



SLOVENSKI STANDARD
oSIST prEN ISO 14118:2016
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Varnost strojev - Preprečevanje nepričakovanega zagona

Safety of machinery - Prevention of unexpected start-up

Sicherheit von Maschinen - Vermeidung von unerwartetem Anlauf

Sécurité des machines - Prévention de la mise en marche intempestive

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Safety of machinery — Prevention of unexpected start-up

Sécurité des machines — Prévention de la mise en marche intempestive

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.



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ISO/DIS 14118:2016(E)**Foreword**

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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 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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The committee responsible for this document is ISO/TC 199, Safety of machinery.

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Introduction

Keeping a machine in a stopped condition while persons are present in danger zones is one of the most important conditions of the safe use of machinery and hence one of the major aims of the machine designer and machine user.

In the past, the concepts of “operating machine” and “stopped machine” were generally unambiguous; a machine was:

- operating when its movable elements, or some of them, were moving;
- stopped when its movable elements were at rest.

Machine automation has made the relationship between “operating” and “moving” on the one hand and “stopped” and “at rest” on the other hand, more difficult to define. Automation has also increased the potential for unexpected start-up, and a significant number of hazardous events have occurred where machines, stopped for diagnostic work or corrective actions, started up unexpectedly.

Hazards other than mechanical hazards generated by movable elements (e.g. from a laser beam) also need to be taken into account.

The risk assessment relating to the presence of persons in a danger zone of a stopped machine needs to take into account the probability of an unexpected start-up of the hazard-generating elements.

This International Standard provides machine designers and machinery safety standard technical committees with samples of built-in measures which can be used to prevent unexpected start-up.

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Safety of machinery — Prevention of unexpected start-up

1 Scope

This International Standard specifies designed-in means aimed at preventing unexpected machine start-up (see 3.2) to allow safe human interventions in danger zones (see annex A).

This International Standard applies to unexpected start-up from all types of energy source, i.e.:

- power supply, e.g. electrical, hydraulic, pneumatic;
- stored energy due to, e.g., gravity, compressed springs;
- external influences, e.g. from wind.

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 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 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

start-up

machine start-up

change from rest to motion of a machine or of one of its parts

Note 1 to entry: The definition includes functions other than motion, e.g. switch-on of a laser beam.

3.2

unexpected start-up

unintended start-up

any start-up which, because of its unexpected nature, generates a risk to persons

Note 1 to entry: This can be caused by, for example:

- a start command which is the result of a failure in, or an external influence on, the control system;
- a start command generated by inopportune action on a start control or other parts of the machine such as a sensor or a power control element;

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- restoration of the power supply after an interruption;
- external/internal influences (gravity, wind, self-ignition in internal combustion engines, etc.) on parts of the machine.

Note 2 to entry: Machine start-up during normal sequence of an automatic cycle is not unintended, but can be considered as being unexpected from the point of view of the operator. Prevention of hazardous events in this case involves the use of safeguarding measures (see [6.3](#)).

[SOURCE: ISO 12100:2010, 3.31]

3.3

isolation and energy dissipation

procedure which consists of all of the four following actions:

- a) isolating (disconnecting, separating) the machine (or defined parts of the machine) from all power supplies;
- b) locking (or otherwise securing), if necessary (for instance in large machines or in installations), all the isolating units in the “isolated” position;
- c) dissipating or restraining [containing] any stored energy which may give rise to a hazard.

Note 1 to entry: Energy considered in c) above may be stored in e.g.:

- mechanical parts continuing to move through inertia;
- mechanical parts liable to move by gravity;
- capacitors, accumulators;
- pressurized fluids;
- springs.

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- d) verifying by using a safe working procedure that the actions taken according to a), b) and c) above have produced the desired effect.

4 General measures to prevent unexpected start-up

4.1 General

Measures to prevent unexpected start-up shall be provided based on a documented risk assessment.

4.2 Manual isolation and energy dissipation

Machines shall be provided with manual operated devices intended for isolation and energy dissipation (see [clause 5](#)), especially with a major view to maintenance, work on power circuits and decommissioning.

4.3 Other means to prevent unexpected [unintended] start-up

If the use of manual isolation and energy dissipation is not appropriate for frequent short interventions, the designer shall provide, according to the risk assessment in accordance with ISO 12100:2010, additional automatic controlled functions (see [clause 6](#)) to prevent unexpected start-up.

NOTE 1 Examples of tasks which can require the presence of persons in danger zones are given in [annex A](#).