AS/NZS 4024.1602:2014
ISO 14119:2013

AS/NZS 4024.1602:2014

Australian/New Zealand Standard™

Safety of machinery

Part 1602: Interlocking devices associated with guards—Principles for design and selection

STANDARDS Australia

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This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-041, General Principles for the Guarding of Machinery. It was approved on behalf of the Council of Standards Australia on 5 July 2014 and on behalf of the Council of Standards New Zealand on 24 April 2014.
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The following are represented on Committee SF-041:

Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Manufacturing Workers Union
Department of Mines and Petroleum, WA
Department of the Premier and Cabinet, SA
Engineers Australia
Federal Chamber of Automotive Industries
Human Factors and Ergonomics Society of Australia
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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 4024.1602.

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Part 1602: Interlocking devices associated with guards—Principles for design and selection

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-041, General Principles for the Guarding of Machinery, to supersede AS 4024.1602—2006.

It is emphasized that this Standard is part of the AS(/NZS) 4024.1 series and it is imperative that it is used in conjunction with other applicable parts of the series. A complete listing of all current parts of the AS(/NZS) 4024.1 series can be found at the Standards Australia website <www.standards.org.au> and in AS/NZS 4024.1100, *Safety of machinery*, Part 1100: *Application Guide*.

The objective of this Standard is to specify the principles for the design and selection, independent of the energy source, of interlocking devices associated with guards. It provides measures to minimize defeat of interlocking devices in a reasonably foreseeable manner and it covers the parts of guards which actuate interlocking devices. It does not necessarily provide all the specific requirements for trapped key systems.

This Standard is identical with, and has been reproduced from ISO 14119:2013, *Safety of machinery—Interlocking devices associated with guards—Principles for design and selection*.

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

(b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
ISO		AS/NZS	
		4024	Safety of machinery
12100	Safety of machinery—General principles for design—Risk assessment and risk reduction	4024.1201	Part 1201: General principles for design—Risk assessment and risk reduction
13849	Safety of machinery—Safety-related parts of control systems		
13849-1	Part 1: General principles for design	4024.1503	Part 1503: Safety-related parts of control system—General principles for design
		AS	
13849-2	Part 2: Validation	4024.1502	Part 1502: Design of safety related parts of control systems—Validation
IEC			
60204	Safety of machinery—Electrical equipment of machines	60204	Safety of machinery—Electrical equipment machines
60204-1	Part 1: General requirements	60204.1	Part 1: General requirements (IEC 60204-1, Ed. 5 (FDIS) MOD)
62061	Safety of machinery—Functional safety of safety-related electrical, electronic and programmable electronic control systems	62061	Safety of machinery—Functional safety of safety-related electrical, electronic and programmable electronic control systems

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

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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 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.

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 International Standard 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 International Standard, 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.

The informative Annexes A to F describe the technology and the typical characteristics of the defined 4 types of interlocking devices. Other solutions may be adopted, provided that they comply with the principles of this standard. The informative Annexes G to I give information on particular aspects like interlocking devices used within safety functions, risk assessment considering the motivation to defeat and static action forces. ISO/TR 24119 is under preparation and will give information on the masking of faults in series connection of interlocking devices.

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Safety of machinery

Part 1602:
Interlocking devices associated with guards—Principles for design and selection

1 Scope

This International Standard specifies principles for the design and selection — independent of the nature of the energy source — of interlocking devices associated with guards.

This International Standard covers the parts of guards which actuate interlocking devices.

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 and immobilize the machine is dealt with in ISO 13849-1 or IEC 62061.

This International Standard does not necessarily provide all the specific requirements for trapped key systems.

This International Standard provides measures to minimize defeat of interlocking devices in a reasonably foreseeable manner.

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 13849-1:2006, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

IEC 60204-1:2009, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

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 (PDF)*

IEC 62061:2015, *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, ISO 13849-1 and the following apply.

3.1
interlocking device
interlock
mechanical, electrical or other type of device, the purpose of which is to prevent the operation of hazardous machine functions under specified conditions (generally as long as a guard is not closed)

Note 1 to entry: See Figure 1 and Table 1.

[SOURCE: ISO 12100:2010, 3.28.1.]