

Australian Standard™

**Safety of machinery**

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



This Australian Standard was prepared by Committee SF-041, General Principles for Guarding of Machinery. It was approved on behalf of the Council of Standards Australia on 1 May 2006.  
This Standard was published on 29 June 2006.

---

The following are represented on Committee SF-041:

Australian Chamber of Commerce and Industry  
Australian Electrical and Electronic Manufacturers Association  
Department for Administration and Information Services, SA  
Department of Consumer and Employment Protection, WorkSafe Division, WA  
Department of Primary Industries, Mine Safety, NSW  
Engineers Australia  
Federal Chamber of Automotive Industries  
Human Factors and Ergonomics Society of Australia  
Institution of Instrumentation, Control and Automation Australia  
National Electrical and Communications Association  
National Safety Council of Australia  
Office of the Australian Safety and Compensation Council  
Safety Institute of Australia  
The University of Melbourne  
Tractor and Machinery Association of Australia  
Victorian WorkCover Authority

---

### **Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Web Shop at [www.standards.com.au](http://www.standards.com.au) and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Global Standard*, has a full listing of revisions and amendments published each month.

Australian Standards™ and other products and services developed by Standards Australia are published and distributed under contract by SAI Global, which operates the Standards Web Shop.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at [mail@standards.org.au](mailto:mail@standards.org.au), or write to the Chief Executive, Standards Australia, GPO Box 476, Sydney, NSW 2001.

---

Australian Standard™

## **Safety of machinery**

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

Originated as part of AS 4024.1(Int)—1992.  
Previous edition part of AS 4024.1—1996.  
Revised in part and redesignated as AS 4024.1602—2006.

### **COPYRIGHT**

© Standards Australia

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 7468 7

## PREFACE

This Standard was prepared by the Standards Australia Committee SF-041, General Principles for the Guarding of Machinery as a revision, in part, of AS 4024.1—1996 *Safeguarding of machinery, Part 1: General principles*.

This Standard was prepared to give guidance to machinery designers and writers of product safety standards on how to design or to select interlocking devices associated with guards. It may also be used as guidance in controlling the risk where there is no product safety standard for a particular machine.

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

The Appendices contain examples complying with the principles set out in this Standard, and where their use has been validated by experience. Other solutions may be adopted, provided that they comply with the same principles.

During its work, the Committee considered a number of standards dealing with the safety of machinery originating within the European Community. Many of these European Standards are now being adopted virtually unchanged as International Standards by the International Organization for Standardization (ISO), and the Committee has agreed to continue to use material emanating from both CEN and ISO in this new edition, to maintain consistency with previous editions of AS 4024, and other, machine-specific Australian Standards currently under development.

This edition has been published as a series of small parts rather than the single part of AS 4024.1 previously available. In doing this, the Committee has cleared the way for simple revisions in the future. When a new edition of a relevant EN or ISO Standard becomes available, it can be adopted and published within the framework of AS 4024 with a minimum delay, so ensuring continued international alignment.

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

## CONTENTS

	<i>Page</i>
1 SCOPE .....	4
2 OBJECTIVE.....	4
3 REFERENCED DOCUMENTS .....	4
4 DEFINITIONS .....	5
5 OPERATING PRINCIPLES AND TYPICAL FORMS OF INTERLOCKING DEVICES ASSOCIATED WITH GUARDS .....	6
6 PROVISIONS FOR THE DESIGN OF INTERLOCKING DEVICES (INDEPENDENT OF THE NATURE OF THE ENERGY SOURCE) .....	11
7 ADDITIONAL TECHNOLOGICAL REQUIREMENTS FOR ELECTRICAL INTERLOCKING DEVICES .....	16
8 SELECTION OF AN INTERLOCKING DEVICE.....	17
 APPENDICES	
A GUARD-OPERATED INTERLOCKING DEVICE WITH ONE CAM-OPERATED POSITION DETECTOR.....	20
B GUARD-OPERATED INTERLOCKING DEVICE WITH TONGUE-OPERATED SWITCH.....	22
C PLUG AND SOCKET INTERLOCKING DEVICE (PLUG/SOCKET COMBINATION).....	24
D GUARD-OPERATED INTERLOCKING DEVICE INCORPORATING TWO CAM-OPERATED POSITION DETECTORS .....	26
E ELECTRICAL INTERLOCKING DEVICE INCORPORATING MAGNETICALLY ACTUATED (MAGNETIC) SWITCHES .....	28
F ELECTRICAL INTERLOCKING DEVICE INCORPORATING TWO PROXIMITY DETECTORS.....	29
G PNEUMATIC/HYDRAULIC INTERLOCKING DEVICES.....	31
H INTERLOCKING DEVICE WITH GUARD LOCKING, WITH MANUALLY OPERATED DELAY DEVICE .....	33
I DIRECT (MECHANICAL) INTERLOCKING BETWEEN GUARD AND START/STOP MANUAL CONTROL .....	34
J CAPTIVE-KEY INTERLOCKING DEVICE.....	36
K TRAPPED-KEY INTERLOCKING DEVICE .....	38
L MECHANICAL INTERLOCKING BETWEEN A GUARD AND A MOVABLE ELEMENT .....	40
M INTERLOCKING DEVICE WITH SPRING-APPLIED/POWER-RELEASED GUARD LOCKING DEVICE .....	41

## STANDARDS AUSTRALIA

---

**Australian Standard**  
**Safety of machinery**


---



---

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


---

**1 SCOPE**

This Standard specifies principles for the design and selection, independent of the nature of the energy source, of interlocking devices associated with guards (as defined in AS 4024.1201).

It also provides requirements specifically intended for electrical interlocking devices (see Clause 7).

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

NOTE: Requirements for guards are given in AS 4024.1601. The processing of the signal from the interlocking device to stop and immobilize the machine is dealt with in AS 4024.1501.

**2 OBJECTIVE**

The objective of this Standard is to enable designers, manufacturers, suppliers, employers and users of machinery to minimize risks to the health and safety of employees working with or otherwise near machinery by providing technical means for designing interlocks.

**3 REFERENCED DOCUMENTS**

The following documents are referred to in this Standard.

## AS

- |           |  |
|-----------|--|
| 4024      | Safety of machinery  |
| 4024.1201 | Part 1201: General principles—Basic terminology and methodology  |
| 4024.1202 | Part 1202: General principles—Technical principles   |
| 4024.1301 | Part 1301: Risk assessment—Principles for risk assessment  |
| 4024.1501 | Part 1501: Design of safety related parts of control systems—General principles of design  |
| 4024.1601 | Part 1601: Design of controls, interlocks and guarding—Guards—General requirements for the design and construction of fixed and movable guards |
| 4024.1801 | Part 1801: Safety distances and safety gaps—Safety distances to prevent danger zones being reached by the upper limbs                          |
| 60204     | Safety of machinery—Electrical equipment of machines   |
| 60204.1   | Part 1: General requirements (IEC 60204-1, Ed.5 (FDIS) MOD)  |
| 60947     | Low-voltage switchgear and controlgear   |
| 60947.5.1 | Part 5.1: Control circuits devices and switching elements—Electromechanical control circuit devices  |

## ISO

- |       |   |
|-------|---|
| 13855 | Safety of machinery—Positioning of protective equipment with respect to the approach speeds of parts of the human body. |
|-------|---|