

Australian Standard™

Safety of machinery

**Part 1603: Design of controls,
interlocks and guards—Prevention of
unexpected start-up**



This Australian Standard was prepared by Committee SF-041, General Principles for the Guarding of Machinery. It was approved on behalf of the Council of Standards Australia on 18 April 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 Standards may also be withdrawn.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 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, or write to the Chief Executive, Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard™

Safety of machinery

Part 1603: Design of controls, interlocks and guards—Prevention of unexpected start-up

Originated as part of AS 4024.1(Int)—1992.
Previous edition part of AS 4024.1—1996.
Revised in part and redesignated as AS 4024.1603—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 7428 8

PREFACE

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

During its work, the Committee considered a number of Standards originating within the European Community in the field of safety of machinery. Many of these European Standards are 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. This action will maintain consistency with previous editions of AS 4024.1 and other machine-specific Australian Standards.

This edition has been published as a series of Parts rather than the single Standard previously published as AS 4024.1. In doing this, the Committee has cleared the way for simple revisions in the future. When a new edition of a relevant Standard becomes available at the international level, it will 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>
FOREWORD.....	4
1 SCOPE	5
2 OBJECTIVE.....	5
3 REFERENCED DOCUMENTS	5
4 DEFINITIONS	6
5 GENERAL REQUIREMENTS	7
6 MEANS FOR ISOLATION AND ENERGY DISSIPATION.....	7
7 MEASURES, OTHER THAN ISOLATION AND ENERGY DISSIPATION, TO PREVENT UNEXPECTED START-UP	9
APPENDICES	
A EXAMPLES OF TASKS WHICH CAN REQUIRE THE PRESENCE OF PERSONS IN DANGER ZONES.....	14
B SIGNALLING AND WARNING	15

FOREWORD

Keeping a machine stopped 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—

- (a) operating when its movable elements, or some of them, were moving; or
- (b) 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 accidents 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 Standard provides machine designers with a selection of built-in measures which can be used to prevent unexpected start-up.

STANDARDS AUSTRALIA

Australian Standard Safety of machinery

Part 1603: Design of controls, interlocks and guards—Prevention of unexpected start-up

1 SCOPE

This Standard specifies designed-in means aimed at preventing unexpected machine start-up (see Clause 4.2) to allow safe human interventions in danger zones.

NOTE: Examples of tasks which can require the presence of persons in danger zones are listed in Appendix A.

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

- (a) power supply, e.g. electrical, hydraulic, pneumatic;
- (b) stored energy due to, for example, gravity, compressed springs; and
- (c) external influences, for example, from wind.

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 by providing technical means of preventing unexpected start-up.

3 REFERENCED DOCUMENTS

The following documents are referenced in this Standard.

AS

- 4024 Safety of machinery
- 4024.1101 Part 1101: Terminology—Terminology
- 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 for design
- 4024.1602 Part 1602: Design of controls, interlocks and guarding—Interlocking devices associated with guards—Principles for design and selection
- 4024.1904 Part 1904: Displays, controls, actuators and signals—Indication, marking and actuation—Requirements for visual auditory and tactile signals
- 4024.1905 Part 1905: Displays, controls, actuators and signals—Requirements for marking
- 60204 Safety of machinery—Electrical equipment of machines
- 60204.1 Part 1: General requirements (IEC 60204-1, Ed. 5 (FDIS), MOD)

IEC

- 61496 Safety of machinery—Electro-sensitive protective equipment
- 61496-1 Part 1: General requirements and tests
- 61496-2 Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)



SAI GLOBAL

This is a free 7 page sample. Access the full version online.

The remainder of this document
is available for purchase online at

www.saiglobal.com/shop

SAI Global also carries a wide range of publications from a wide variety of Standards Publishers:



Click on the logos to search the database online.