AS 4024.1501—2006
(Incorporating Amendment No. 1)

AS 4024.1501—2006

Safety of machinery

Part 1501: Design of safety related parts of control systems—General principles for design

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- 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

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PREFACE

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

This Standard incorporates Amendment No. 1 (November 2015). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

A1 This Standard is technically equivalent to ISO 13849-1:1999, *Safety of machinery—Safety-related parts of control systems*—Part 1: *General principles for design*. This will maintain consistency with 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.

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FOREWORD

Certain parts of machinery control systems are frequently assigned safety functions; these are called the safety related parts. These parts can consist of both hardware and software, and they are intended to provide the safety functions of control systems. They can be separate or integrated parts of the control system.

The performance of a safety-related part of a control system with respect to the occurrence of faults is classified in this Standard into five categories (B, 1, 2, 3 and 4) which should be used as reference points. These categories (see Clause 7.2) are not intended to be used in any given order or in any given hierarchy in respect of safety requirements.

The categories can be applied to—

(a) control systems for all kinds of machinery, from simple, e.g. small kitchen appliances, to complex manufacturing installations, e.g. packaging machinery, printing machines, presses; and

(b) control systems for protective equipment, e.g. two-hand control devices, interlocking devices, electro-sensitive protective devices (e.g. photoelectric barriers) and pressure sensitive mats.

The category selected will depend upon the machine and the extent to which control means are used for the protective measures.

When selecting a category and designing a safety-related part of a control system, the designer should provide at least the following information about the safety-related part:

(i) The category(ies) selected.

(ii) The functional characteristics.

(iii) The precise role the safety related part plays in the machinery protective measure(s).

(iv) The exact limits of the part under consideration (see Clause 4.8).

(v) All safety-relevant faults considered.

(vi) Those safety-relevant faults not considered, by fault exclusion, and the measures employed to allow their exclusion.

(vii) The parameters relevant to the reliability of the part, such as environmental conditions.

(viii) The technology(ies) used.

The use of categories as reference points and a declaration of the rationale followed during the design process is intended to allow this Standard to be used flexibly. It is intended to provide a clear basis upon which the design and performance of any application of the safety-related part of a control system (and the machine) can be assessed, e.g. by a third party, in-house means or an independent test house.

STANDARDS AUSTRALIA

Australian Standard

Safety of machinery

Part 1501: Design of safety related parts of control systems—General principles for design

1 SCOPE

This Standard provides safety requirements and guidance on the principles for the design of safety-related parts of control systems. For these parts, it specifies categories and describes the characteristics of their safety functions, including programmable systems for all machinery and for related protective devices.

This Standard applies to all safety-related parts of control systems, regardless of the type of energy used, e.g. electrical, hydraulic, pneumatic, mechanical. It does not specify which safety functions and which categories are to be used in a particular case.

This Standard applies to all machinery applications for both professional and non-professional use. Where appropriate, it can also be applied to the safety-related parts of control systems used in other technical applications.

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 and others working with or otherwise near machinery by providing technical principles for the design of safety related parts of control systems.

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
4024.1401	Part 1401:	Ergonomic principles—Design principles—Terminology and general principles
4024.1502	Part 1502:	Design of safety related parts of control systems—Validation
4024.1901	Part 1901:	Displays, controls, actuators and signals—Ergonomic requirements for the design of displays and control actuators—General principles for human interactions with displays and control actuators
4024.1902	Part 1902:	Displays, controls, actuators and signals—Ergonomic requirements for the design of displays and control actuators—Displays
4024.1903	Part 1903:	Displays, controls, actuators and signals—Ergonomic requirements for the design of displays and control actuators—Control actuators
60068	Environmental testing—General and guidance	
60068.1	Part 1:	General and guidance