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Robotar och robotutrustning – Säkerhetskrav för industrirobotar –
Del 2: Robotsystem och integration (ISO 10218-2:2011)

Robots and robotic devices – Safety requirements for industrial robots –
Part 2: Robot systems and integration (ISO 10218-2:2011)

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Europastandarden EN ISO 10218-2:2011 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 10218-2:2011.

The European Standard EN ISO 10218-2:2011 has the status of a Swedish Standard. This document contains the official version of EN ISO 10218-2:2011.

Förhållandet till övriga delar under samma huvudtitel - Utdrag ur Förord i ISO 10218-2:2011 / Relations to other parts under the same general title - Extract from the Foreword of ISO 10218-2:2011

ISO 10218 consists of the following parts, under the general title *Robots and robotic devices – Safety requirements for industrial robots:*

- Part 1: Robots
- Part 2: Robot systems and integration

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Robotar och robotutrustning, SIS/TK 278.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 10218-2

July 2011

ICS 25.040.30

English Version

Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration (ISO 10218-2:2011)

Robots et dispositifs robotiques - Exigences de sécurité pour les robots industriels - Partie 2: Systèmes robots et intégration (ISO 10218-2:2011)

Roboter und Robotikgeräte - Sicherheitsanforderungen - Teil 2: Industrierobotersystem und Integration (ISO 10218-2:2011)

This European Standard was approved by CEN on 21 April 2011.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN ISO 10218-2:2011) has been prepared by Technical Committee ISO/TC 184 "Automation systems and integration" in collaboration with Technical Committee CEN/TC 310 “Advanced automation technologies and their applications” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2012, and conflicting national standards shall be withdrawn at the latest by January 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 10218-2:2011 has been approved by CEN as a EN ISO 10218-2:2011 without any modification.

Introduction

This part of ISO 10218 has been created in recognition of the particular hazards that are presented by industrial robot systems when integrated and installed in industrial robot cells and lines.

Hazards are frequently unique to a particular robot system. The number and types of hazards are directly related to the nature of the automation process and the complexity of the installation.

The risks associated with these hazards vary with the type of robot used and its purpose and the way in which it is installed, programmed, operated, and maintained.

For the purpose of understanding requirements in this part of ISO 10218, a word syntax is used to distinguish absolute requirements from recommended practices or suggested actions. The word “shall” is used to identify requirements necessary for compliance with this part of ISO 10218. Such requirements have to be accomplished unless an alternative instruction is provided or a suitable alternative is determined by a risk assessment. The word “should” is used to identify suggestions, recommended actions or possible solutions for requirements, but alternatives are possible and the suggested actions are not absolute.

In recognition of the variable nature of hazards with the application of industrial robots, this part of ISO 10218 provides guidance for the assurance of safety in the integration and installation of robots. Since safety in the use of industrial robots is influenced by the design of the particular robot system, a supplementary, though equally important, purpose is to provide guidelines for the design, construction and information for use of robot systems and cells. Requirements for the robot portion of the system can be found in ISO 10218-1.

Providing for a safe robot system or cell depends on the cooperation of a variety of “stakeholders” – those entities that share in a responsibility for the ultimate purpose of providing a safe working environment. Stakeholders may be identified as manufacturers, suppliers, integrators and users (the entity responsible for using robots), but all share the common goal of a safe (robot) machine. The requirements in this part of ISO 10218 may be assigned to one of the stakeholders, but overlapping responsibilities can involve multiple stakeholders in the same requirements. While using this part of ISO 10218, the reader is cautioned that all of the requirements identified may apply to them, even if not specifically addressed by “assigned” stakeholder tasks.

This part of ISO 10218 is complementary and in addition to ISO 10218-1, which covers the robot only. This part of ISO 10218 adds additional information in line with ISO 12100 and ISO 11161, International Standards for requirements to identify and respond in a type-C standard to unique hazards presented by the integration, installation and requirements for use of industrial robots. New technical requirements include, but are not limited to, instructions for applying the new requirements in ISO 10218-1 for safety-related control system performance, robot stopping function, enabling device, programme verification, cableless pendant criteria, collaborating robot criteria and updated design for safety.

This part of ISO 10218 and ISO 10218-1 form part of a series of standards dealing with robots and robotic devices. Other standards cover such topics as integrated robotic systems, coordinate systems and axis motions, general characteristics, performance criteria and related testing methods, terminology, and mechanical interfaces. It is noted that these standards are interrelated and also related to other International Standards.

For ease of reading this part of ISO 10218, the words “robot” and “robot system” refer to “industrial robot” and “industrial robot system” as defined in ISO 10218-1.

Figure 1 describes the relationship of the scope of machinery standards used in a robot system. The robot alone is covered by ISO 10218-1, the system and cell is covered by this part of ISO 10218. A robot cell may include other machines subject to their own C level standards, and the robot system can be part of an integrated manufacturing system covered by ISO 11161 which in turn can also make reference to other relevant B and C level standards.

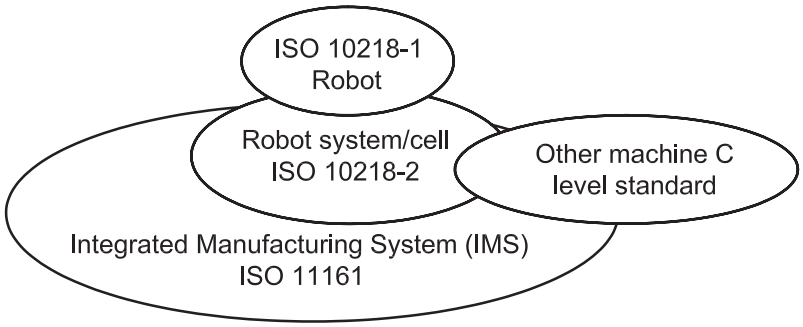

Figure 1 — Graphical view of relationships between standards relating to robot system/cell

Robots and robotic devices — Safety requirements for industrial robots —

Part 2:
Robot systems and integration

1 Scope

This part of ISO 10218 specifies safety requirements for the integration of industrial robots and industrial robot systems as defined in ISO 10218-1, and industrial robot cell(s). The integration includes the following:

a) the design, manufacturing, installation, operation, maintenance and decommissioning of the industrial robot system or cell;

b) necessary information for the design, manufacturing, installation, operation, maintenance and decommissioning of the industrial robot system or cell;

c) component devices of the industrial robot system or cell.

This part of ISO 10218 describes the basic hazards and hazardous situations identified with these systems, and provides requirements to eliminate or adequately reduce the risks associated with these hazards. Although noise has been identified to be a significant hazard with industrial robot systems, it is not considered in this part of ISO 10218. This part of ISO 10218 also specifies requirements for the industrial robot system as part of an integrated manufacturing system. This part of ISO 10218 does not deal specifically with hazards associated with processes (e.g. laser radiation, ejected chips, welding smoke). Other standards can be applicable to these process hazards.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 8995-1, *Lighting of work places — Part 1: Indoor*

ISO 9946, *Manipulating industrial robots — Presentation of characteristics*

ISO 10218-1, *Robots and robotic devices — Safety requirements for industrial robots — Part 1: Industrial robots*

ISO 11161, *Safety of machinery — Integrated manufacturing systems — Basic requirements*

ISO 12100, *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 13850, *Safety of machinery — Emergency stop — Principles for design*

ISO 13854, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

ISO 13855, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13856 (all parts), *Safety of machinery — Pressure-sensitive protective devices*

ISO 13857, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14118, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14122 (all parts), *Safety of machinery — Permanent means of access to machinery*

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

IEC 61496-1, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests*

IEC 61800-5-2, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional*

IEC/TS 62046, *Safety of machinery — Application of protective equipment to detect the presence of persons*

IEC 62061:2005, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*