BS ISO 21815-1:2022

BSI Standards Publication

Earth-moving machinery - Collision warning and avoidance

Part 1 - General requirements

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National foreword

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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Full document details: BS ISO 21815-1:2022

Contents

Page

Foreword ... **v**
Introduction ... **vi**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **2**
4 Performance requirements ... **4**
4.1 General requirements ... 4
4.1.1 General ... 4
4.1.2 Electro-magnetic compatibility (EMC) ... 4
4.1.3 Environmental condition requirements ... 4
4.1.4 Functional safety ... 4
4.1.5 Risk assessment ... 4
4.1.6 Analysis on machine modification ... 5
4.2 Requirements on CxS ... 5
4.2.1 General ... 5
4.2.2 Detection of intended objects ... 5
4.2.3 Collision risk levels and CxS actions ... 5
4.2.4 System limitations ... 5
4.3 Outline of process flow for CxS ... 6
4.4 False CxS actions ... 6
4.5 Operating state transition of CxS ... 6
4.5.1 General ... 6
4.5.2 Switching between normal mode and stand-by mode ... 6
4.5.3 Switching between normal mode to override mode ... 7
4.5.4 Status information ... 7
4.6 Self-checking, status indication and failure warning ... 7
4.7 Protection against unauthorized modification of system functions ... 8
5 System classification ... **8**
5.1 General ... 8
5.2 System capability types ... 8
5.2.1 Take-off inhibition CxS (TIC) ... 8
5.2.2 Swing inhibition CxS (SIC) ... 8
5.2.3 Manoeuvring speed CxS (MSC) ... 8
5.2.4 Travel speed CxS (TSC) ... 8
5.3 System types ... 9
5.4 Types of detection ... 9
5.5 Description of systems ... 9
6 Test procedures ... **9**
6.1 General ... 9
6.2 Test condition ... 9
6.2.1 Test environment condition ... 9
6.2.2 Test surface conditions ... 9
6.3 Subject machine conditions ... 10
6.4 Specification of test objects ... 10
6.5 Performance test ... 10
6.5.1 General ... 10
6.5.2 Test object installation ... 10
6.5.3 Subject machine ... 10
6.5.4 Test result judgement criteria ... 10
6.6 False positive CxS action test ... 10
7 CxS information for use ... **11**
7.1 Information for the operator ... 11

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Document Sharing Hub
Full document details: BS ISO 21815-1:2022

7.2 Information about residual risks 11
Annex A (informative) **Machine interaction scenario common examples** **12**
Annex B (informative) **Comparison of system functions** **14**
Annex C (informative) **Example of operator's manual** **15**
Bibliography **17**

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Document Sharing Hub
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements,* in collaboration with Technical Committee ISO/TC 82, *Mining*, ISO/TC 82, *Mining*, Subcommittee SC 8, *Advanced automated mining systems*, ISO/TC 195, *Building construction machinery and equipment* and ISO/TC 195 *Building construction machinery and equipment* , Subcommittee SC 3 *Drilling and foundation machinery and equipment*.

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Introduction

This document is a type-C standard as stated in ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organisations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

In addition, this document is intended for standardization bodies elaborating type-C standards.

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.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Increasing use of detection systems and avoidance technology in the area of earth-moving machinery has been supporting operators to safely operate machines in the field of mining and construction. At the same time, there are demands to set standards for machines and systems detecting, alerting and intervening to mitigate collision risk.

There are currently two existing standards in the field: ISO 16001 and ISO 17757. These standards provide guidance for visibility aids and object detection systems and for autonomous and semi-autonomous machines, however, there is currently no standard that describes collision risk awareness, warning signals and collision avoidance actions of the machinery operated by humans when there is a risk of collision.

Collision warning and avoidance systems are developing technologies and algorithms are not yet mature and well understood. This document is intended to foster innovation and accelerate the pace of improvements in new collision warning and avoidance technologies. The performance requirements of this document are technology-neutral and do not specify technologies to make the requirements.

The systems described in this document are intended to assist the operator of the machine. As current technologies are unable to achieve full collision warning/avoidance in every situation, the responsibility for safe operation of the machine remains with the operator of the machine.

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This document is a part of the ISO 21815 series relating to: communication interfaces, collision risk areas and collision risk levels, specific requirements for collision warning and collision avoidance systems, and specific use case requirements.

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