IEC 62745

Edition 1.0 2017-03

INTERNATIONAL STANDARD

colour inside

Safety of machinery – Requirements for cableless control systems of machinery

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

IEC 62745:2017-03(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2017 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

IEC 62745

Edition 1.0 2017-03

INTERNATIONAL STANDARD

colour inside

Safety of machinery – Requirements for cableless control systems of machinery

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 13.110; 29.020; 35.100.01

ISBN 978-2-8322-4013-7

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

SAFETY OF MACHINERY – REQUIREMENTS FOR CABLELESS CONTROL SYSTEMS OF MACHINERY

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

iTeh Standards (https://standards.iteh.ai) Document Preview IEC 62745:2017 https://standards.iteh.ai/catalog/standards/iec/62745-2017

International Standard IEC 62745 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects.

The text of this standard is based on the following documents:

FDIS	Report on voting
44/783/FDIS	44/785/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

INTRODUCTION

Cableless control systems (CCS) are increasingly being used to provide an operator interface on a wide range of machinery. The functionality of a CCS and the way in which it interfaces with the overall machine control system can therefore affect the safety of the machinery.

IEC 62745 specifies requirements for the functionality of a CCS that is interfaced with or is part of a machine control system for use as an operator control station on a machine.

The extent to which the functionality of a CCS is relied upon to minimise risk on a machine is a key selection criterion. It is therefore important to select a CCS that provides suitable control functions with an appropriate safety integrity in accordance with the risk assessment at the machine.

In some particular applications, the requirements for a CCS can exceed those specified in this document.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

SAFETY OF MACHINERY – REQUIREMENTS FOR CABLELESS CONTROL SYSTEMS OF MACHINERY

1 Scope

This standard specifies requirements for the functionality and interfacing of cableless (for example, radio, infra-red) control systems that provide communication between operator control station(s) and the control system of a machine. Specific requirements are included for such operator control stations that are portable by the operator.

NOTE The part of the cableless control system that is used as an operator control station is sometimes referred to as the 'transmitter' and the part that interfaces with the machine control system is sometimes referred to as the 'receiver'. However, to take account of the possibility of bi-directional communication, this standard refers to these individual parts as the 'remote station' and the 'base station' respectively.

This document does not deal with cableless communication between parts of a machine(s) that are not operator control stations.

This document is not intended to specify all of the requirements that are necessary for the design and construction of a cableless control system. For example, it does not specify communication protocols, frequency or bandwidth aspects, nor the full range of constructional requirements such as impact resistance, ingress protection, electromagnetic compatibility, etc.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

The provisions of this document are intended to be applied in addition to the requirements for electrical equipment in the IEC 60204-1.

This document is a type-B2 standard as stated in ISO 12100.

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60068-2-31:2008, *Environmental testing – Part 2-31: Tests – Test Ec – Rough handling shocks, primarily for equipment-type specimens*

IEC 60204-1:2005, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60947-5-5, *Low-voltage switchgear and controlgear – Part 5-5: Control circuit devices and switching elements – Electrical emergency stop device with mechanical latching function*

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

ISO 13849-1, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

ISO 13849-2, *Safety of machinery – Safety-related parts of control systems – Part 2: Validation*

ISO 13850, *Safety of machinery – Emergency stop function– Principles for design*

3 Terms, definitions and abbreviations

For the purposes of this document, the following terms and definitions apply.

For an alphabetical list of definitions, see Table 1.

For list of abbreviations see Table 2.

Table 1 – Alphabetical list of definitions

Term	Definition number
active stop	3.17
address code	3.7
automatic stop (ATS)	3.19
base station	3.13
cableless control	3.1
cableless control system (CCS)	3.2
disabling of a remote station	3.22
error detection code	3.9
frame	3.6
Hamming distance	3.11
manual stop	3.20
neutral frame	3.10
OFF-state	3.15
operating command signal	3.8
operator control station	3.5
passive stop	3.18
receiver	3.3
remote station	3.12
safety-related stop function	3.16
stop output	3.14
transmitter	3.4
valid signal	3.21

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e7...-9865-2c7c2a440e02/iec-62745-2017

Table 2 – Abbreviations

Term	Abbreviation
automatic stop (4.7.3.5)	ATS
cableless control system (3.2)	CCS
emergency stop (4.7.3.4)	EMS
general safe stop (4.7.3.3)	GSS

3.1
cableless control
transmission of the machine operator's commands without any wired connection

3.2
cableless control system
CCS
system consisting of at least one remote station and one base station, which uses cableless control to transmit commands between them

3.3
receiver
part of a cableless control system which receives frames from a transmitter

3.4
transmitter
part of a cableless control system which sends frames to a receiver

3.5
operator control station
assembly of one or more control actuators (part of a device to which an external manual action is to be applied) fixed on the same panel or located in the same enclosure

Note 1 to entry: An operator control station can also contain related equipment, for example, potentiometers, signal lamps, instruments, display devices, etc.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

3.6
frame
“package” of information exchanged between a remote station and a base station, and consisting of, for example:

a) address code;
b) operating commands;
c) error detection code;
d) other commands, signals or information

IEC 62745:2017
https://standards.iteh.ai/catalog/standards/iec/722e75ea-6163-457b-9865-2c7c2a440e02/iec-62745-2017

Note 1 to entry: A “frame” is sometimes referred to as a “telegram” or “message”.

3.7
address code
part of a frame that enables a base station or a remote station to recognise frames that are intended to convey commands to it

Note 1 to entry: The base station or remote station respond to commands that are recognised as having the relevant address code.

3.8
operating command signal
control signal that is intended to initiate, modify or maintain a machine function

3.9
error detection code
additional information added to each frame to enable the detection of transmission errors

3.10
neutral frame
frame in which all operating command signals are in a state such that when it is received at the base station it does not activate any outputs intended for control of hazardous operations of the machine