

INTERNATIONAL STANDARD

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

get full document from standards.iteh.ai



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2026 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 Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search -

webstore.iec.ch/advsearchform

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 It also gives information on projects, replaced and withdrawn publications.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 once a month by email.

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: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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

CONTENTS

FOREWORD	3
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Classification	9
4.1 Contact elements	9
4.2 Means of actuation	9
4.3 Additional functions	9
4.4 Emergency stop device mounting	9
5 Characteristics	9
5.1 Summary of characteristics	9
5.2 Type of emergency stop device	9
5.3 Rated and limiting values for switching elements	9
5.4 Utilization categories for switching elements	9
6 Product information	10
6.1 Nature of information	10
6.2 Marking	10
6.2.1 General	10
6.2.2 Push-button type emergency stop devices	10
6.2.3 Trip wire switches	10
6.3 Instructions for installation, operation and maintenance, decommissioning and dismantling	11
6.4 Environmental information	11
6.5 Reliability data	11
7 Normal service, mounting and transport conditions	11
8 Constructional and performance requirements	11
8.1 Constructional requirements	11
8.1.1 General	11
8.1.2 Additional requirements for push-button type emergency stop devices	11
8.1.3 Additional requirements for trip wire switches	12
8.2 Performance requirements	12
8.2.1 General	12
8.2.2 Direct opening action	12
8.2.3 Operation	12
8.2.4 Opening and latching	12
8.2.5 Additional requirements for push-button type emergency stop device	13
8.2.6 Additional requirements for trip wire switches	13
8.3 Electromagnetic compatibility (EMC)	13
8.4 Special requirements	13
8.4.1 Requirements for functional safety applications	13
8.4.2 Requirements for emergency stop devices embedding additional functions	13
9 Tests	14
9.1 Kinds of tests	14
9.1.1 General	14
9.1.2 Type tests	14

9.1.3	Routine tests	14
9.1.4	Sampling tests	14
9.1.5	Special tests	14
9.2	Compliance with constructional requirements	15
9.3	Performance	15
9.3.1	General	15
9.3.2	Test sequences	15
9.3.3	General test condition	15
9.3.4	Robustness of a push-button actuator	16
9.3.5	Robustness of a trip wire actuator	16
9.3.6	Mechanical durability test	17
9.3.7	Conditioning procedures	17
9.3.8	Shock test	17
9.3.9	Vibration tests	18
9.3.10	Opening, latching, actuation, resetting and impact tests	18
9.4	Tests for EMC	20
Annex A (normative) Procedure to determine reliability data for electrical emergency stop devices used in functional safety applications		21
A.1	General	21
A.1.1	Object	21
A.1.2	General requirements	21
A.2	Terms, definitions and symbols	21
A.3	Method based on durability test results	21
A.3.1	General method	21
A.3.2	Test requirements	21
A.3.3	Number of samples	22
A.3.4	Characterization of a failure mode	22
A.3.5	Weibull modelling	22
A.3.6	Useful life and upper limit of failure rate	22
A.3.7	Reliability data	22
A.4	Data information	22
A.5	Examples	22
Annex B (normative) Additional requirements for illuminated push-button type emergency stop devices		23
B.1	General	23
B.2	Special requirements for an emergency stop device using illumination function to signal whether the device is active or not	23
Bibliography		24
Figure 1 – Symbol (IEC 60417-5638:2002-10) for emergency stop		10
Figure 2 – Hammer for tests		19
Table 1 – Robustness of a push-button actuator		16
Table 2 – Relationship between the mounting hole and the hammer height		20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60947-5-5 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

This second edition cancels and replaces the first edition published in 1997. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) re-shaping the document with the clause numbers and names to be in line with other documents of the 60947 series;
- b) review of the test method to reasonably determine that the latch mechanism meets the requirements of the document;

- c) new Annex B for special requirements for illuminated push-button type emergency stop devices, including the reference to a function to distinguish between "active and inactive" by changing the colour of the push-button depending on the illumination.

The text of this International Standard is based on the following documents:

Draft	Report on voting
121A/699/FDIS	121A/703/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This International Standard is to be used in conjunction with IEC 60947-1:2020 and with IEC 60947-5-1:2024.

The provisions of the general rules, IEC 60947-1, are applicable to this standard, where specifically called for. General rules clauses and subclauses thus applicable, as well as tables, figures and annexes are identified by a reference to IEC 60947-1, for example 1.2.3 or Annex A of IEC 60947-1:2020.

A list of all parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

This document deals specifically with electrical emergency stop devices with mechanical latching function and gives additional electrical and mechanical requirements to those given in the following International Standards:

- ISO 13850, giving requirements for the emergency stop function of a machine, whatever be the energy used;
- IEC 60204-1, giving additional requirements for an emergency stop function realized by the electrical equipment of a machine;
- IEC 60947-5-1, specifying electrical characteristics of electromechanical control circuit devices.

Sample Document

get full document from standards.iteh.ai