

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Live working – Voltage detectors –
Part 3: Two-pole low-voltage type**

**Travaux sous tension – Détecteurs de tension –
Partie 3: Type bipolaire basse tension**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2009 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: 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.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Live working – Voltage detectors –
Part 3: Two-pole low-voltage type**

**Travaux sous tension – Détecteurs de tension –
Partie 3: Type bipolaire basse tension**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XB**
CODE PRIX

ICS 13.260; 29.240.20; 29.260.99

ISBN 978-2-88910-452-9

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions.....	10
4 Requirements.....	13
4.1 General requirements.....	13
4.1.1 Safety.....	13
4.1.2 Indication.....	13
4.1.3 Electromagnetic compatibility (EMC).....	14
4.2 Functional requirements.....	14
4.2.1 Clear indication.....	14
4.2.2 Clear perceptibility.....	15
4.2.3 Temperature and humidity dependence of the indication.....	15
4.2.4 Frequency dependency for a.c. voltage detector.....	16
4.2.5 Ripple dependency for d.c. voltage detector.....	16
4.2.6 Response time.....	16
4.2.7 Power source dependability.....	16
4.2.8 Testing element.....	16
4.2.9 Time rating.....	16
4.3 Electrical requirements.....	17
4.3.1 Insulating material.....	17
4.3.2 Protection against electric shocks.....	17
4.3.3 Current limiting elements.....	17
4.3.4 Minimum clearance and creepage distances.....	17
4.3.5 Protection against electrical stresses.....	20
4.3.6 Lead(s).....	20
4.3.7 Probes.....	20
4.3.8 Connector(s) (if any).....	20
4.3.9 Accessible switches in the detecting circuit for temporary loading (if any).....	20
4.4 Mechanical requirements.....	20
4.4.1 Design.....	20
4.4.2 Dimensions, construction.....	22
4.4.3 Degree of protection provided by enclosures.....	22
4.4.4 Resistance to vibration.....	22
4.4.5 Drop resistance.....	22
4.4.6 Shock resistance.....	22
4.4.7 Possible disassembling.....	22
4.4.8 Surface temperature.....	23
4.4.9 Resistance to heat.....	23
4.4.10 Probes.....	23
4.4.11 Lead(s).....	23
4.5 Marking.....	23
4.5.1 General.....	23
4.5.2 Marking on the indicator.....	23

4.5.3	Marking on the probe and/or the lead	24
4.6	Instructions for use.....	24
4.7	Requirements in case of reasonably foreseeable misuse during live working.....	24
4.7.1	AC/DC voltage misuse.....	24
4.7.2	Maximum current to earth in case of misuse.....	25
4.7.3	Misuse in case of mistaking of the voltage of the low voltage network	26
5	Tests.....	26
5.1	General.....	26
5.2	Tests for general requirements.....	27
5.2.1	Indication.....	27
5.2.2	Electromagnetic compatibility (EMC)	27
5.3	Tests for functional requirements	28
5.3.1	Clear indication	28
5.3.2	Clear perceptibility of visual indication.....	30
5.3.3	Clear perceptibility of audible indication (when available).....	32
5.3.4	Temperature and humidity dependence of the indication	34
5.3.5	Frequency dependency for a.c. voltage detector.....	35
5.3.6	Ripple dependency for d.c. voltage detector	36
5.3.7	Response time	36
5.3.8	Power source dependability.....	37
5.3.9	Testing element.....	37
5.3.10	Time rating	37
5.4	Tests for electrical requirements.....	38
5.4.1	Tests on the insulation	38
5.4.2	Protection against electric shocks.....	39
5.4.3	Current limiting elements.....	40
5.4.4	Minimum clearance and creepage distances.....	40
5.4.5	Protection against electrical stresses.....	40
5.4.6	Lead(s).....	41
5.4.7	Probe(s)	41
5.4.8	Connector(s)	41
5.4.9	Switches for temporary loading (if any).....	41
5.5	Tests for mechanical requirements.....	42
5.5.1	Design.....	42
5.5.2	Dimensions, construction.....	42
5.5.3	Degree of protection provided by enclosures	42
5.5.4	Vibration resistance.....	42
5.5.5	Drop resistance	43
5.5.6	Shock resistance	44
5.5.7	Possible disassembling	44
5.5.8	Surface temperature.....	44
5.5.9	Heat resistance	45
5.5.10	Probes.....	45
5.5.11	Lead(s).....	47
5.6	Marking.....	48
5.6.1	Visual inspection and measurement	48
5.6.2	Durability of marking.....	48
5.7	Instructions for use.....	48
5.7.1	Type test.....	48

5.7.2	Alternative test in case of voltage detectors having completed the production phase	49
5.8	Tests for reasonably foreseeable misuse during live working	49
5.8.1	AC/DC voltage misuse	49
5.8.2	Maximum current to earth in case of misuse	49
5.8.3	Misuse in case of mistaking of the voltage of the low voltage network	50
6	Conformity assessment	50
7	Modifications	50
Annex A (informative)	Differences with IEC 61010 series	51
Annex B (normative)	Supplementary functions Phase indication – Rotating field indication – Continuity check	56
Annex C (normative)	Instructions for use	62
Annex D (normative)	General type test procedure	63
Annex E (normative)	Classification of defects and associated requirements and tests	65
Annex F (informative)	In-service care and use	67
	Bibliography	69
	Figure 1a – Illustration of the electrical insulation of an indicator casing	18
	Figure 1b – Illustration of the electrical insulation of a probe with a detachable lead	18
	Figure 1 – Illustration of the electrical insulation features applicable to components of a voltage detector	18
	Figure 2a – Example of a voltage detector with the indicator integrated in a probe	21
	Figure 2b – Example of a voltage detector with the indicator not integrated in a probe	21
	Figure 2 – Voltage detector	21
	Figure 3 – Maximum rms a.c. current to earth in case of misuse	25
	Figure 4 – Maximum d.c. current to earth in case of misuse	25
	Figure 5 – Test set-up for the influence of interference voltage	29
	Figure 6 – Test set-up for measurement of clear perceptibility of visual indication	31
	Figure 7a – Positioning of the voltage detector in the test set-up	33
	Figure 7b – Key measurement points on the hemisphere	33
	Figure 7 – Test set-up for measurement of clear perceptibility of audible indication	33
	Figure 8 – Test set-up for close adhesion of insulation of the insulated part of the contact electrode	46
	Table 1 – Climatic categories of voltage detectors	16
	Table 2 – Minimum clearance distances for basic insulation and for supplementary insulation	19
	Table 3 – Minimum clearance distances for reinforced insulation	19
	Table 4 – Parameters to be observed to check the climatic dependence	34
	Table 5 – AC voltage values for test on the complete equipment	39
	Table 6 – Maximum permissible surface temperatures	45
	Table B.1 – Classification of defects and associated requirements and tests	61
	Table D.1 – Sequential order for performing type tests	63
	Table D.2 – Type tests out of sequence	64
	Table E.1 – Classification of defects and associated requirements and tests	65
	Table F.1 – Periodic testing	68

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LIVE WORKING –
VOLTAGE DETECTORS –****Part 3: Two-pole low-voltage type**

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.

International Standard IEC 61243-3 has been prepared by IEC technical committee 78: Live working.

This second edition cancels and replaces the first edition published in 1998. It is a technical revision.

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

- no more switches are allowed for scale change;
- all the voltage detectors are now for use indoor and outdoor excluding the use under rain conditions;
- no contact electrode which has the construction of a hook is allowed;
- no more voltage classes (A and B) are considered;
- the concept of double or reinforced insulation design (or constructional arrangements providing an equivalent protection) is added;