IEC 61243-1

Edition 2.1 2009-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Live working – Voltage detectors – Part 1: Capacitive type to be used for voltages exceeding 1 kV a.c.

Travaux sous tension – Détecteurs de tension – Partie 1: Type capacitif pour usage sur des tensions alternatives de plus de 1 kV

IEC 61243-1:2003+A1:2009

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE CODE PRIX CL

ICS 29.240.99

ISBN 2-8318-1043-8

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIVE WORKING – VOLTAGE DETECTORS –

Part 1: Capacitive type to be used for voltages exceeding 1 kV a.c.

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.
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International Standard IEC 61243-1 has been prepared by IEC technical committee 78: Live working.

This edition includes the following major technical changes from the previous edition:

a) the Scope has been extended to cover the use on electrical systems for voltages up to 765 kV a.c.;
b) the notion of family of voltage detectors which are identical in terms of design and dimensions and only differ by their nominal voltages (or nominal voltage ranges) has been included;
c) the classification in terms of the setting of the threshold voltage to give a clear indication has been eliminated;
d) a new test set-up with bars has been introduced. Depending on the nominal voltage of the voltage detector, it is required or becomes an alternative test set-up for checking the influence of interference fields, the influence of interference voltages, the protection against bridging and the spark resistance;

e) the revision of specific dielectric tests has been included;

f) some test procedures (clear perceptibility of audible indication, drop resistance, climatic dependence) have been improved and completed.

This consolidated version of IEC 61243-1 consists of the second edition (2003) [documents 78/527/FDIS and 78/537/RVD], its amendment 1 (2009) [documents 78/751/CDV and 78/794/RVC] and its corrigendum of October 2005.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 2.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

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

IEC 61243 consists of the following parts, under the general title *Live working – Voltage detectors:*

Part 1: Capacitive type to be used for voltages exceeding 1 kV a.c.

Part 2: Resistive type to be used for voltages of 1 kV to 36 kV a.c.

Part 3: Two-pole low-voltage type

Part 5: Voltage detecting systems (VDS)

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

INTRODUCTION

This International Standard has been prepared according to the requirements of IEC 61477, where applicable.

LIVE WORKING – VOLTAGE DETECTORS –

Part 1: Capacitive type to be used for voltages exceeding 1 kV a.c.

1 Scope

This part of IEC 61243 is applicable to portable voltage detectors, with or without built-in power sources, to be used on electrical systems for voltages of 1 kV to 765 kV a.c., and frequencies of 50 Hz and/or 60 Hz.

This part applies only to voltage detectors of capacitive type used in contact with the part to be tested, as a complete device including its insulating element or as a separate device, adaptable to an insulating stick which, as a separate tool, is not covered by this standard (see 4.4.1 for general design).

Other types of voltage detectors are not covered by this part of the standard.

Some restrictions on their use are applicable in the case of factory-assembled switchgear and on overhead systems of electrified railways (see Annex B, instructions for use).

NOTE Except where otherwise specified, all the voltages defined in this standard refer to values of phase-to-phase voltages of three-phase systems. In other systems, the applicable phase-to-phase or phase-to-earth (ground) voltages should be used to determine the operating voltage.

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.

IEC 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-1, *Environmental testing -Part 1: General and guidance*

IEC 60068-2-6:1995, *Environmental testing – Tests – Test Fc and guidance: Vibration (sinusoidal)*

IEC 60068-2-14:1984, *Environmental testing – Tests – Test N: Change of temperature*
Amendment 1 (1986)

IEC 60068-2-32:1975, *Environmental testing – Tests – Test Ed: Free fall*
Amendment 2 (1990)

IEC 60071-1:2006, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60417-DB:2002[1], *Graphical symbols for use on equipment*

IEC 60942, *Electroacoustics – Sound calibrators*

IEC 61260:1995, *Electroacoustics – Octave-band and fractional-octave-band filters*

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[1] "DB" refers to the IEC on-line database.

IEC 61318:2007, *Live working – Conformity assessment applicable to tools, devices and equipment*

IEC 61477:2001, *Live working – Minimum requirements for the utilization of tools, devices and equipment*
Amendment 1 (2002)[2]

IEC 61672-1:2002, *Electroacoustics – Sound level meters – Part 1: Specifications*

ISO 286-1:1988*, ISO system of limits and fits – Part 1: Bases of tolerances, deviations and fits*

ISO 286-2:1988*, ISO system of limits and fits – Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

ISO 3744:1994, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane*

CIE (International Commission on Illumination) 15.2:1986*, Colorimetry*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61318:2007 and the following apply.

3.1
voltage detector
device used to provide clear evidence of the presence or the absence of the operating voltage

NOTE For example, voltage detectors can be described as capacitive type or resistive type.

[Definition 11.2.5 of IEC 60743, modified, and IEV 651-10-04, modified]

3.2
voltage detector of capacitive type
device whose operation is based on the current passing through the stray capacitance to earth (ground)

NOTE The term voltage detector is used in this document for voltage detector of capacitive type.

3.3
designs of voltage detectors
different constructions of voltage detectors, either as a complete device with or without contact electrode extension, or as a separate device intended to be equipped with an insulating stick, with or without contact electrode extension

NOTE Some parts such as the contact electrode, the contact electrode extension (if existing), or the insulating element of a voltage detector as a complete device may be dismantled.

3.4
family of voltage detectors
for testing purposes, a group of voltage detectors, delimited by a minimum and a maximum rated voltage, that are identical in design (including dimensions) and only differ by their nominal voltages or nominal voltage ranges

[2] There exists a consolidated edition 1.1 (2002) that includes edition 1 and its amendment.

3.5
contact electrode
bare conductive part of the conductive element which establishes the electric connection to the component to be tested

[IEV 651-10-09]

3.6
contact electrode extension
externally insulated conductive element between the indicator and the contact electrode, intended to achieve the correct position of the indicator relative to the installation being tested

3.7
indicator
part of the voltage detector which indicates the presence or absence of the operating voltage at the contact electrode

[IEV 651-10-08, modified]

3.8
adaptor
part of a voltage detector as a separate device which permits attachment of an insulating stick

3.9
insulating element
part of a voltage detector as a complete device that provides adequate safety distance and insulation to the user

3.10
insulating stick
insulating tool essentially made of an insulating tube and/or rod with end fittings

[Definition 2.5.1 of IEC 60743 and IEV 651-02-01]

NOTE For voltage detection, an insulating stick is intended to be attached to a voltage detector as a separate device in order to provide the length to reach the installation to be tested and adequate safety distance and insulation to the user.

3.11
limit mark
distinctive location or mark to indicate to the user the physical limit to which the voltage detector may be inserted between live parts or may touch them

3.12
hand guard
distinctive physical guard separating the handle from the insulating element

NOTE Its purpose is to prevent the hands from slipping and passing into contact with the insulating element.

3.13
testing element
built-in or external device, by means of which the functioning of the voltage detector can be checked by the user

[IEV 651-10-11, modified]

3.14
accessories
items used to lengthen the handle or the contact electrode, to improve the efficiency of the contact electrode or to enable the contact electrode to reach the part to be tested