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Live working - Phase comparators - Part 1: Capacitive type to be used for voltages exceeding 1 kv a.c.

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17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

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EUROPEAN STANDARD

EN 61481-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2014

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Supersedes EN 61481:2001 (partially)

English Version

Live working - Phase comparators -
Part 1: Capacitive type to be used for voltages
exceeding 1 kV a.c.
(IEC 61481-1:2014)

Travaux sous tension - Comparateurs de phase -
Partie 1: Type capacitif pour usage sur des tensions
alternatives de plus de 1 kV
(CEI 61481-1:2014)

Arbeiten unter Spannung - Phasenvergleichler -
Teil 1: Kapazitive Ausführung für Wechselspannungen
über 1 kV
(IEC 61481-1:2014)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 78/1051/FDIS, future edition 1 of IEC 61481-1, prepared by IEC/TC 78 "Live working" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61481-1:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-08-28
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-11-28

This document supersedes EN 61481:2001 (partially).

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Endorsement notice

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60071-1:2006	NOTE	Harmonized as EN 60071-1:2006 (not modified).
IEC 60743:2013	NOTE	Harmonized as EN 60743:2013 (not modified).
IEC 61235:1993	NOTE	Harmonized as EN 61235:1995 (modified).
IEC 61936-1:2010	NOTE	Harmonized as EN 61936-1:2010 (modified).
ISO/IEC 17025	NOTE	Harmonized as EN ISO/IEC 17025 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 11	-	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	-
IEC 60060-1	2010	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	2010
IEC 60068-1	-	Environmental testing - Part 1: General and guidance	EN 60068-1	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-31	-	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-
IEC 60304	-	Standard colours for insulation for low-frequency cables and wires	HD 402 S2	-
IEC 60417-DB	-	Graphical symbols for use on equipment	-	-
IEC 60942	-	Electroacoustics - Sound calibrators	EN 60942	-
IEC 61000-4-2	-	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	-
IEC 61000-4-3	-	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	-
IEC 61260	-	Electroacoustics - Octave-band and fractional-octave-band filters	EN 61260	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61318	-	Live working - Conformity assessment applicable to tools, devices and equipment	EN 61318	-
IEC 61326-1	-	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements	EN 61326-1	-
IEC 61477	-	Live working - Minimum requirements for the utilization of tools, devices and equipment	EN 61477	-
IEC 61672-1	-	Electroacoustics - Sound level meters - Part 1: Specifications	EN 61672-1	-
ISO 354	-	Acoustics - Measurement of sound absorption in a reverberation room	EN ISO 354	-
ISO 3744	2010	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane	EN ISO 3744	2010
ISO 3745	-	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and hemi-anechoic rooms	EN ISO 3745	-
CIE 15	-	Colorimetry	-	-

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Edition 1.0 2014-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

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

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	10
3 Terms and definitions	11
4 Requirements	15
4.1 Indication	15
4.2 Functional requirements.....	16
4.2.1 Clear indication	16
4.2.2 Distance range	17
4.2.3 Clear perceptibility.....	17
4.2.4 Temperature and humidity dependence of the indication.....	17
4.2.5 Frequency dependence	18
4.2.6 Response time.....	18
4.2.7 Power source dependability.....	18
4.2.8 Testing element.....	18
4.2.9 Time rating	19
4.3 Electrical requirements.....	19
4.3.1 Insulating material.....	19
4.3.2 Protection against bridging	19
4.3.3 Resistance against sparking.....	19
4.3.4 Insulating element of phase comparator as a complete device.....	19
4.3.5 Indicator casing	19
4.4 Mechanical requirements	20
4.4.1 General	20
4.4.2 Design.....	20
4.4.3 Dimensions, construction.....	22
4.4.4 Grip force and deflection	23
4.4.5 Vibration resistance	23
4.4.6 Drop resistance	23
4.4.7 Shock resistance	23
4.5 Marking.....	23
4.6 Instructions for use	24
4.7 Requirements in the case of reasonably foreseeable misuse during live working.....	24
4.7.1 Voltage selection	24
4.7.2 Frequency selection	24
4.7.3 Channel selection for wireless connection	24
5 Tests	24
5.1 General.....	24
5.1.1 Testing provisions	24
5.1.2 Atmospheric conditions.....	25
5.1.3 Tests under wet conditions	25
5.1.4 Type test	25
5.1.5 Test methods.....	26
5.2 Function tests	26

5.2.1	Description of the test set-up and general pass criteria.....	26
5.2.2	Clear indication	32
5.2.3	Distance range for two-pole phase comparators with wireless connection	34
5.2.4	Electromagnetic compatibility (EMC)	34
5.2.5	Influence of electric interference fields.....	35
5.2.6	Clear perceptibility.....	37
5.2.7	Frequency dependence	45
5.2.8	Response time.....	46
5.2.9	Power source dependability	47
5.2.10	Check of testing element	47
5.2.11	Time rating of single-pole phase comparator	47
5.2.12	Time rating of two-pole wireless phase comparators.....	48
5.3	Dielectric tests	48
5.3.1	Insulating material for tubes and rods	48
5.3.2	Protection against bridging for indoor/outdoor type phase comparators	49
5.3.3	Protection against bridging for outdoor type phase comparator	52
5.3.4	Spark resistance.....	54
5.3.5	Leakage current for phase comparator as a complete device.....	56
5.4	Mechanical tests	58
5.4.1	Visual and dimensional inspection	58
5.4.2	Grip force and deflection for phase comparator as a complete device	59
5.4.3	Vibration resistance.....	59
5.4.4	Drop resistance	60
5.4.5	Shock resistance	61
5.4.6	Climatic resistance	61
5.4.7	Durability of markings	63
5.5	Test for reasonably foreseeable misuse during live working.....	63
5.5.1	Voltage selection (where relevant).....	63
5.5.2	Frequency selection (where relevant)	63
5.5.3	Channel selection for wireless connection (where relevant)	63
6	Conformity assessment of phase comparators having completed the production phase	64
7	Modifications	64
Annex A (normative)	Instructions for use	65
Annex B (normative)	Suitable for live working; double triangle (IEC 60417-5216 (2002-10)).....	67
Annex C (normative)	Chronology of type tests	68
Annex D (normative)	Classification of defects and tests to be allocated	70
Annex E (informative)	Information and guidelines on the use of the limit mark and of a contact electrode extension	72
E.1	General.....	72
E.2	Situation when using a phase comparator as a complete device	72
E.3	Situation when using a phase comparator as a separate device.....	76
Annex F (informative)	Rationale for the classification of defects.....	78
Annex G (informative)	In-service care	80
Bibliography	81

Figure 1 – Illustration of different elements and different principles of functioning of phase comparators	21
Figure 2 – Location of allowed conductive parts within the minimum length of the insulating element of a pole of a phase comparator as a complete device.....	22
Figure 3 – Test set-up for clear indication with the ball electrode in front of its ring electrode	28
Figure 4 – Test set-up for clear indication with the ball electrode behind its ring electrode	29
Figure 5 – Positioning of a pole of the phase comparator in relation to a ball and ring test arrangement.....	31
Figure 6 – Examples of suitable means for ensuring appropriate contact between a contact electrode and the ball electrode.....	31
Figure 7 – Test set-up for clear perceptibility of visual indication	38
Figure 8 – Test set-up for measurement of clear perceptibility of visual indication in the case of an indicator unit.....	40
Figure 9 – Test set-up for clear perceptibility of audible indication	42
Figure 10 – Test set-up for measurement of clear perceptibility of audible indication in the case of indicator units	44
Figure 11 – Test arrangements and dimensions of the bars for protection against bridging	49
Figure 12 – Electrical connection of the bars	51
Figure 13 – Surface stress test	51
Figure 14 – Radial and surface stress test	52
Figure 15 – Test arrangement for testing bridging protection of outdoor type phase comparator	54
Figure 16 – Arrangement for leakage current test under dry conditions for phase comparator as a complete device.....	57
Figure 17 – Arrangement for leakage current tests under wet conditions for phase comparator as a complete device.....	58
Figure 18 – Test for grip force.....	59
Figure 19 – Drop resistance test – Diagonal position	61
Figure 20 – Curve of test cycle for climatic resistance.....	62
Figure E.1 – Insulating element of a pole of a phase comparator as a complete device	72
Figure E.2 – Example of positioning of a pole of a phase comparator in contact with a live part without obstacles from other live parts.....	73
Figure E.3 – Example of incorrect positioning of a pole of a phase comparator with the limit mark between two live parts	74
Figure E.4 – Usual ways of managing the design or the use of the phase comparator for maintaining the insulation distance between the limit mark and the hand guard	75
Figure E.5 – Usual ways of managing the use of the phase comparator as a separate device for assuring the appropriate insulation for the worker.....	77
Table 1 – Climatic condition ranges	18
Table 2 – Minimum length of the insulating element (L_i) of a phase comparator as a complete device.....	22
Table 3 – Dimensioning of the ball and ring test set-up.....	30
Table 4 – Test series and conditions for clear indication	33
Table 5 – Test series and conditions for influence of electric interference fields.....	36

Table 6 – Type of test	49
Table 7 – Distance d_1 for the bridging test set-up	50
Table 8 – Dimensions for the concentric rings and band electrodes	52
Table C.1 – Sequential order for performing type tests ^a	68
Table C.2 – Type tests out of sequence	69
Table D.1 – Classification of defects and associated requirements and tests	70
Table E.1 – Recommended minimum lengths from the limit mark to the contact electrode (A_i)	75
Table F.1 – Rationale for the classification of defects	78
Table G.1 – In-service testing	80

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LIVE WORKING –
PHASE COMPARATORS –****Part 1: Capacitive type to be used for voltages exceeding 1 kV a.c.**

FOREWORD

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International Standard IEC 61481-1 has been prepared by IEC technical committee 78: Live working.

This first edition, together with the first edition of IEC 61481-2, cancels and replaces the first edition of IEC 61481 published in 2001, Amendment 1:2002 and Amendment 2:2004. This edition constitutes a technical revision.

The major changes are:

- split of the standard in two parts;
- extension of the scope to include two-pole phase comparators operating with a wireless connection up to 245 kV a.c.;
- review of the requirements for indication;
- introduction of a requirement for a new marking “LU” for limited use;
- addition of requirements and tests for two-pole phase comparators operating with a wireless connection;
- clarification of the test procedures in case of additional contact electrodes, accessories and combination of accessories, as well as in case of family of phase comparators;
- addition of requirements and tests for electromagnetic compatibility (EMC);
- clarification of the test provisions for the function tests;
- clarification of the test procedure for clear perceptibility of audible indication;
- preparation of the elements of evaluation of defects, and general application of IEC 61318:2007;
- revision of existing annexes;
- change of existing normative Annex C in two new Annexes D and F giving the classification of defects (normative) and the rationale for the classification of defects (informative);
- deletion of existing Annex D, no longer needed following the specification of IEC 60068-2-75;
- deletion of existing Annex F, not applicable according to IEC 61318:2007;
- addition of a new informative Annex E giving additional information on the use of the limit mark and of a contact electrode extension.

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

FDIS	Report on voting
78/1051/FDIS	78/1087/RVD

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

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

In this standard terms defined in Clause 3 appear in *italics*.

A list of all parts of the IEC 61481 series, published under the general title *Live working – Phase comparators*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

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INTRODUCTION

This International Standard has been prepared in accordance with the requirements of IEC 61477.

Taking into consideration the two different functioning principles of portable *phase comparators* of capacitive type available on the market, the maximum a.c. *nominal voltage* to be associated with each of them has been considered for delimiting the scope of this standard.

The following table presents the rationale for the resulting maximum *nominal voltage* to be associated with each functioning principle of *phase comparator of capacitive type*.

Functioning principle	Maximum nominal voltage kV rms	Rationale
Single-pole <i>phase comparators</i> operating with a memory system	36	<ul style="list-style-type: none"> – With this principle of functioning, the <i>clear indication</i> of the <i>phase comparator</i> is limited by the <i>memory holding time</i>. With higher <i>nominal voltages</i>, the distance between phases of the installation increases and the time necessary to move the pole of the <i>phase comparator</i> between the two parts to be compared becomes the limitation.
Two-pole <i>phase comparators</i> operating with a wireless connection	245	<ul style="list-style-type: none"> – With this principle of functioning, there is no theoretical limit for the maximum <i>nominal voltage</i>. – The definition of 245 kV corresponds to the present limit of validation of the electric test set-up.

The product covered by this standard may have an impact on the environment during some or all stages of its life cycle. These impacts can range from slight to significant, be short-term or long-term, and occur at the global, regional or local level.

In terms of environmental improvement, this standard includes neither requirements nor test provisions for the manufacturers of the product nor recommendations to the users of the product. However, all parties intervening in its design, manufacture, packaging, distribution, use, maintenance, repair, reuse, recovery and disposal are invited to take account of environmental considerations.