

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**High-voltage switchgear and controlgear –
Part 213: Voltage detecting and indicating system**

**Appareillage à haute tension –
Partie 213: Système détecteur et indicateur de tension**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2021 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
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 It also gives information on projects, replaced and withdrawn publications.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 online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. 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 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) 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 IEC

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

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC online collection - oc.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**High-voltage switchgear and controlgear –
Part 213: Voltage detecting and indicating system**

**Appareillage à haute tension –
Partie 213: Système détecteur et indicateur de tension**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 13.260; 29.130.10; 29.240.20

ISBN 978-2-8322-9890-9

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Normal and special service conditions	13
4.1 General.....	13
4.2 Normal service conditions	13
4.3 Special service conditions.....	13
5 Ratings.....	13
6 Design and construction	14
6.1 General.....	14
6.2 Parts of <i>voltage detecting and indicating system</i>	14
6.3 <i>VDIS</i> description.....	14
6.4 <i>Coupling system</i>	16
6.5 <i>Voltage limiting element</i>	17
6.6 <i>Connecting leads</i>	17
6.7 <i>Testing points</i>	18
6.8 <i>Connecting points</i>	22
6.9 <i>Indicator</i>	23
6.10 Degree of protection (IP code).....	24
6.11 Climatic requirements	25
6.12 Mechanical requirements	25
6.13 Electromagnetic compatibility.....	26
6.14 Dielectric strength.....	26
6.15 <i>VDIS</i> with built-in power source.....	27
6.16 Marking.....	28
7 Type tests	29
7.1 General.....	29
7.2 Inspection	32
7.3 Dielectric tests	32
7.4 Maximum current of <i>coupling element</i>	33
7.5 Conditions on <i>testing points</i>	33
7.6 <i>Voltage limiting element</i>	34
7.7 Indication of <i>VDIS</i>	34
7.8 Clear perceptibility of visual indication	36
7.9 Phase shift.....	37
7.10 Response time	38
7.11 Non response to DC voltage	39
7.12 <i>Connecting leads</i>	39
7.13 Temperature dependence of indication	39
7.14 Degree of protection (IP code).....	40
7.15 Damp heat	40
7.16 Composite temperature/humidity cyclic test	40
7.17 Vibration	40
7.18 Mechanical impact (IK code).....	40

7.19	Fall	40
7.20	Electrostatic discharge	41
7.21	Radiated electromagnetic fields	41
7.22	<i>VDIS</i> with built-in power source	41
8	<i>Routine tests</i>	42
9	Guide to the selection of <i>VDIS</i> (informative)	42
10	Information to be given with enquiries, tenders and orders	43
10.1	General.....	43
10.2	Information with enquiries and orders	43
10.3	Information with tenders.....	43
11	Transport, storage, installation, operation, maintenance and instructions for use.....	44
11.1	General.....	44
11.2	Installation	44
11.3	Operating instructions.....	44
11.4	Maintenance	44
11.5	Instructions for use	46
12	Safety.....	47
13	Influence of <i>VDIS</i> on the environment.....	47
Annex A	(informative) Derivations and formulas.....	48
A.1	<i>Threshold voltages</i> for indication of <i>VDIS</i>	48
A.2	Maximum <i>measuring voltage</i> of <i>VDIS</i>	48
A.3	Impedances of connected devices to the <i>testing points</i> of <i>VDIS</i>	49
A.4	Current levels of the <i>testing points</i> of <i>VDIS</i>	50
Annex B	(informative) List of notes concerning certain countries.....	51
Bibliography	52
Figure 1	– Example of the typical structure of an integrated <i>VDIS</i>	15
Figure 2	– Example of the typical structure of a separable <i>VDIS</i>	16
Figure 3	– <i>Plug</i> and socket size and design without insulation shield.....	20
Figure 4	– <i>Plug</i> and socket size and design with insulation shield.....	21
Figure 5	– Maximum footprint dimensions of separable <i>VDIS</i> and example of arrangement.....	22
Figure 6	– Examples of <i>socket-outlet</i> arrangement for integrated <i>VDIS</i>	22
Figure 7	– Connection of the voltage source	35
Figure 8	– Test set-up for perceptibility of visual indication	37
Figure 9	– Examples of measure of the response time	38
Table 1	– Impedances of connected devices	18
Table 2	– Current levels (RMS values).....	19
Table 3	– Thresholds for voltage indication.....	24
Table 4	– Sequence of type tests.....	30
Table 5	– List of type tests without sequence.....	31
Table 6	– List of routine tests without sequence.....	42

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 213: Voltage detecting and indicating system

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 Publications”). 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 62271-213 has been prepared by subcommittee 17C:Assemblies, of IEC technical committee 17: High-voltage switchgear and controlgear.

This first edition cancels and replaces the first edition of IEC 61243-5 published in 1997 and the first edition of IEC 62271-206 published in 2011. This edition constitutes a merging of the content of IEC 61243-5 and IEC 62271-206.

This edition includes the following significant technical changes with respect to the previous editions of IEC 61243-5 and IEC 62271-206:

- a) an optional output signal is defined to be used for multipurpose use cases;
- b) only one *interface* is defined for *voltage detecting and indicating system (VDIS)*;
- c) the measurement of the current carrying capacity of the *voltage limiting element* is considered as inaccurate and is not considered in this document. Experience shows that the probability of failure of the *coupling element* is negligible.

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

FDIS	Report on voting
17C/787/FDIS	17C/794/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/standardsdev/publications.

In this document, the following print types are used:

- Terms defined in Clause 3: *in italic type*.

The reader's attention is drawn to the fact that Annex B lists all of the "in some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

A list of all parts in the IEC 62271 series, published under the general title *High-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

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

INTRODUCTION

This part of IEC 62271 has been prepared in accordance with the requirements of IEC 62271-1.

The products designed and manufactured in accordance with this document contribute to the safety of the users, provided they are used by skilled or instructed persons, in accordance with safe methods of work and the instructions for use.

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

IEC 62271-213 does not cover the phase comparison function of IEC 61243-5 which is covered by the new IEC 62271-215. Unless IEC 62271-215 is not published, the relevant subclauses in IEC 61243-5 related to UPCs are applicable.

Currently in preview, click buy full version.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 213: Voltage detecting and indicating system

1 Scope

This part of IEC 62271 is applicable to the *voltage detecting and indicating system (VDIS)* to be installed on indoor and outdoor high-voltage *equipment*.

The *VDIS* as defined by this document includes a *coupling system* per phase (capacitive, resistive coupling or other technology) to connect to live parts (*main circuit*).

The *VDIS* is applicable on systems with *nominal voltages* above 1 kV and service frequencies from 16,7 Hz up to and including 60 Hz. The *VDIS* is used to detect and indicate the presence or absence of *operating voltage*. It is not intended to distinguish between voltage not present (i.e. $U < 10\%$ of *nominal voltage*) and dead circuit state (i.e. $U = 0$ V).

NOTE 1 The use of a specific means of connection to earth of the *main circuit* (e.g. main earthing switch) provides the "dead circuit" ($U = 0$ V) state.

NOTE 2 The *VDIS* has the same threshold values as the voltage presence indicating system (VPIS) (IEC 62271-206) and the voltage detecting system (VDS) (IEC 61243-5) for not indicating presence of voltage and for detecting an absence of *operating voltage*, respectively.

The *VDIS* is fixed on *equipment* such as switchgear and controlgear according to the IEC 62271 series or transformers according to their own standard.

The products designed and manufactured in accordance with this document contribute to the safety of the users, provided they are used by skilled or instructed persons in accordance with safe methods of work and the instructions for use.

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

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

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

IEC 60068-2-11, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

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

IEC 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/humidity cyclic test*