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Edition 1.0 2017-12

INTERNATIONAL STANDARD

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Instrument transformers –
Part 11: Additional requirements for low-power passive voltage transformers

Transformateurs de mesure –
Partie 11: Exigences supplémentaires pour les transformateurs de tension passifs de faible puissance

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 61869-11
Edition 1.0 2017-12

INSTRUMENT TRANSFORMERS –

Part 11: Additional requirements for low-power passive voltage transformers

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 38: Instrument transformers.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
38/663/DISH	38/672/RVDISH

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

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1 Introduction

IEC 61869-11 was published in 12-2017 and since then experience with the application of the document has been gained. During this period, it became visible that the type test "Test for impact of electric field from other phases" as required in 7.2.6.1101 and outlined in Annex 11A creates ambiguities in the execution of the test and the interpretation of its results.

IEC 61869-11:2017-12/ISH1:2021-09(en-fr)

7.2.6.1101 Test for impact of electric field from other phases

The purpose of this test is to verify the influence of the electric fields at rated frequency emitted by other phases.

The test shall be performed in a configuration representing the real installation. The test can be performed in three-phase or single-phase. Test arrangement and procedure are given in Annex 11A.

Annex 11A (normative)
Tests for impact of electric field from other phases

11A.1 General

Adjacent phases in a three-phase power system can influence the accuracy of passive LPVT. To evaluate the impact of electric fields effects at rated frequency generated by adjacent phases in the power system the following test shall be performed.

2 Background

2.1 General

The type test is intended to evaluate the impact of horizontal and vertical stray capacitances that the equipment is exposed to in service, which is typically different to the situation in the laboratory. In order to estimate this impact on the ratio of the LPVT, Annex 11A describes a test layout and procedure where:

Figure 1 (Figure 11A.1 from IEC 61869-11, annotated, with stray capacitances when busbar is grounded) shows the general layout of the test setup in which the influence of stray capacitances is evaluated through a two-step test process. The setup consists of the equipment under test (EUT, coded 1 in Figure 1 and Figure 3 (Figure 11A.1 from IEC 61869-11, annotated, with stray capacitances if busbar is energized), a second LPVT (coded 2 in Figure 1 and Figure 3), a metallic busbar with a length equal to twice the distance between the second LPVT and EUT, a switch to connect the busbar to either ground or high voltage, a grounded metallic wall with 1,5 times the height of the EUT, a reference VT, measuring equipment and an HV generator, see Figure 1 and Figure 3. The distance D between the EUT to the metallic wall as well as between the EUT to the second LPVT is equal to the distance between phases of a power system operating at U_m of the EUT.

The stray capacitances of the setup originate from the horizontal capacitance between the two LPVTs as well as to the metallic wall and the vertical stray capacitances of the LPVTs to ground. The horizontal stray capacitances depend on the height of the LPVT and the distance to parallel objects. The vertical stray capacitances depend on the height of the LPVT over ground potential, i.e., height of a pedestal, specified by the system design supplier. Depending on the dimensions of the test laboratory hall, the distance between the top of the EUT to the laboratory roof may pose restrictions due to necessary insulation clearances and add additional stray capacitances to the grounded roof.

2.2 First step

In the first step of the evaluation the busbar is grounded, and the following stray capacitances are effective:

C_{E1_E}: Stray capacitance between EUT and ground

C_{E1_MW}: Stray capacitance between EUT and grounded metallic wall

$C_{E1\_E'}$: Stray capacitance between EUT and grounded busbar

C_{E1_2}: Stray capacitance between EUT and second LPVT

C_{E2_E}: Stray capacitance between second LPVT and ground (can be disregarded, only shown for completeness)

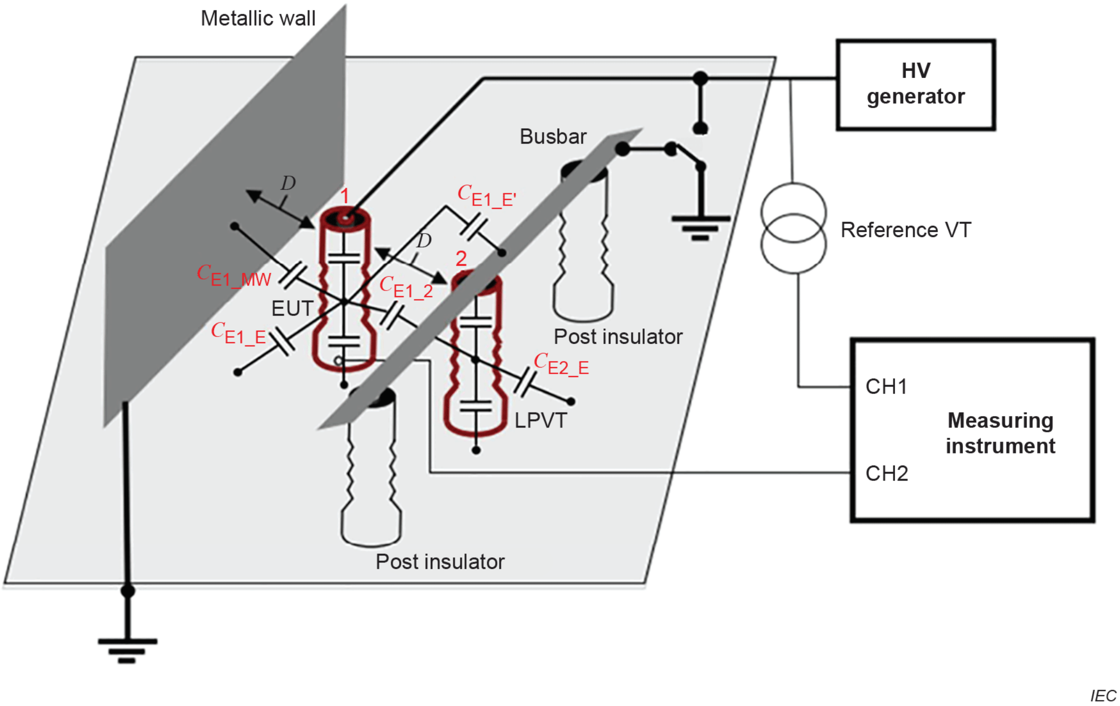

Figure 1 – Test setup with stray capacitances when busbar is grounded (Figure 11A.1, annotated)

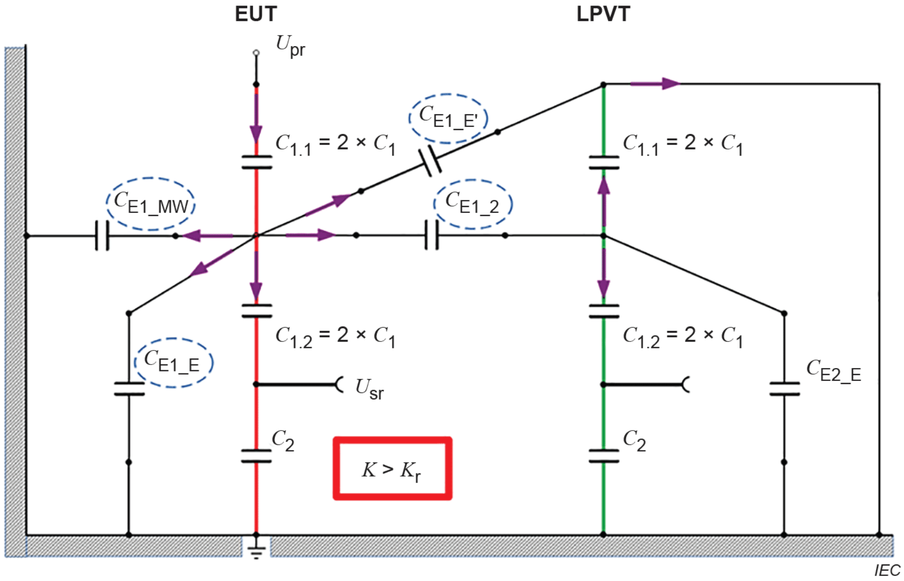

Figure 2 – Equivalent circuit of the test setup in Figure 1 with current flow direction

In this test configuration, the stray capacitances act to decrease the primary capacitance C_1 of the EUT leading to an increase of the transformation ratio, $K > K_r$. The stray capacitances with the largest impact on the ratio are marked with dotted blue circles. The red marked path represents the EUT, the green marked path represents the second LPVT shown in Figure 2.

2.3 Second step

In the second step of the evaluation, the busbar and hence the second LPVT are energized to the same high voltage source as the EUT and the following stray capacitances are effective:

C_{E1_E}: Stray capacitance between EUT and ground;

C_{E1_MW}: Stray capacitance between EUT and grounded metallic wall;

C_{E1_HV}: Stray capacitance between EUT and energized busbar;

C_{E1_2}: Stray capacitance between EUT and second LPVT (0 pF if identical units);

C_{E2_E}: Stray capacitance between second LPVT and ground (can be disregarded, only shown for completeness).

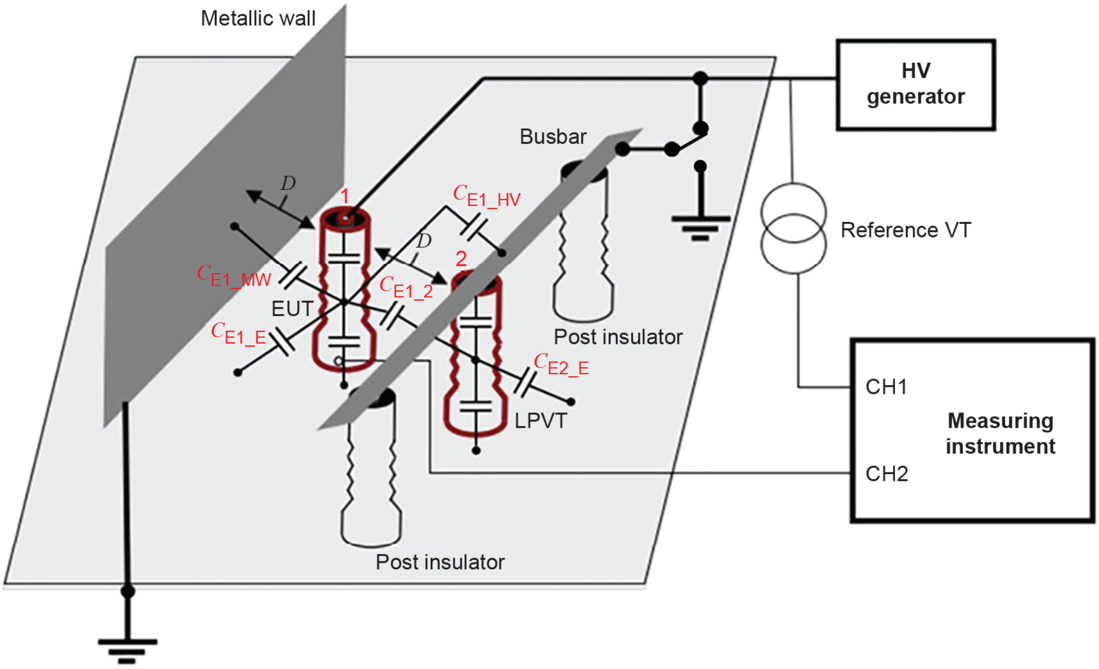

Figure 3 – Test setup with stray capacitances when busbar and second LPVT are energized (Figure 11A.1, annotated)

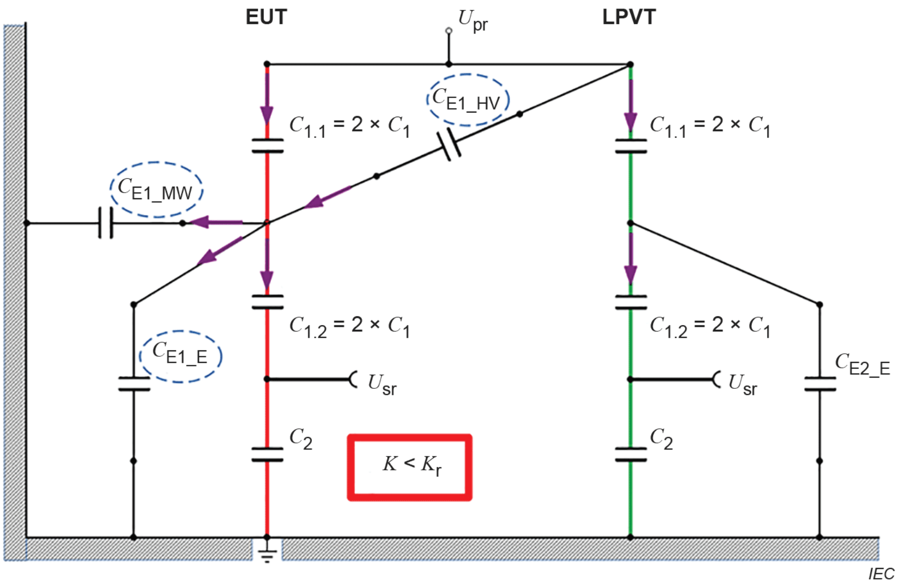

Figure 4 – Equivalent circuit of the test setup in Figure 2 with current flow direction

In this test configuration, the stray capacitances act to increase the primary capacitance of the EUT leading to a decrease of the transformation ratio, $K < K_r$. The colour coding is the same as described for Figure 2.

2.4 Result of the two steps

IEC 61869-11, Annex 11A requires the following limits:

The transformation ratios as well as the phase displacements evaluated in step 1 and in step 2 are then compared. The difference between the actual transformation ratios, evaluated in step 1 and step 2 divided by the actual transformation ratio evaluated in step 1, shall be lower than or equal to 1/5 of the ratio error associated with the specified accuracy class. The difference between the phase displacements shall be below 1/3 of the phase displacement associated with the specified accuracy class.

2.5 Open topics – Analysis of the test

This two-step test procedure suffers from the following issues:

a) The first step in the process is not representative of service conditions since it measures the impact of stray capacitances to a grounded parallel busbar. In three-phase system all 3 busbars are either grounded or energized.

b) The test layout needs a lot of space especially for HV and UHV LPVTs and available test laboratories are of limited size with varying dimensions. This leads to different spacing to other grounded objects and walls in different laboratories. These spacing differences and the influence of the additional stray capacitances may lead to different test results from one laboratory to another making the comparison of results and their reproducibility difficult.

c) HV and UHV LPVTs are typically installed in a substation on a pedestal. This elevation has an influence on the stray capacitance to ground which can vary by more than 10 % depending on voltage class. No pedestal is foreseen in the test setup. However, if included, the overall geometric structure would then exacerbate the spacing situation and in some cases test may not be possible.

d) The test evaluates in-phase contributions to the ratio accuracy whereas in typical three-phase applications the influence of the other two phases is 120° out of phase.

These issues, combined, lead to an overestimation of the influence of the stray capacitances.

Besides the ambiguities in the execution of the test, the interpretation of the results gives rise to difficulties as to how these are to be implemented in the overall ratio accuracy. LPVTs, contrary to conventional instrument transformers, can be adjusted to accommodate influencing factors in order to achieve a ratio as close as possible to nominal. This fact is reflected in the introduction of a ratio correction factor (3.4.1101) and a corrected transformation ratio (3.4.1102, Annex 11B).

The specified limit of the effect from other phases of 1/5 of the specified accuracy class as defined in Annex 11A is interpreted as a fixed value in case a ratio correction is not applied because the impact of electric field from other phases is considered negligible. An LPVT of class 0.2 with a ratio error of 0,19 % can have a ratio error of 0,23 % with the influence of the external field included.

3 Interpretation

3.1 Description of the test circuit

The following description is related to a single-phase LPVT for air-insulated applications. Figure 5 shows the test setup and illustrates how the surrounded components shall be arranged. For both LPVT, all the original external grading electrodes or additional components (e.g., gas density monitor) shall be attached.

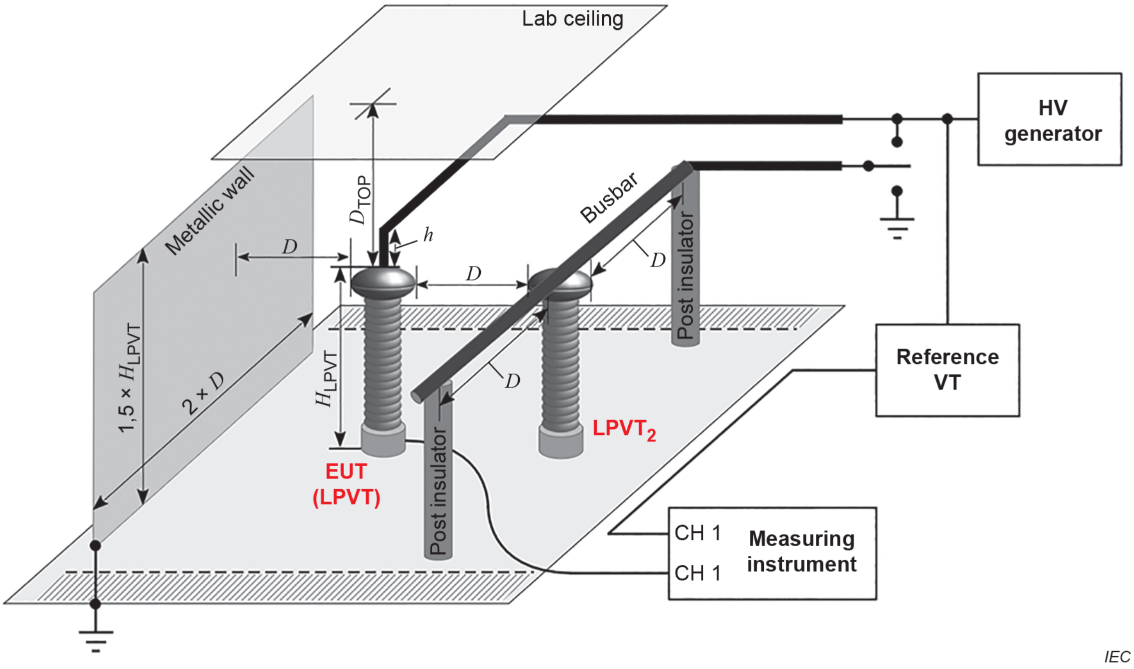

Figure 5 – Test setup for LPVT used in air-insulated substations (Figure 11A.1, improved)

The EUT shall be placed in the test field with a distance D equal to the clearance (according to IEC 61936-1:2021, 3.5 "Definitions concerning clearances") between phases to all other equipment, based on the highest voltage for equipment U_m. If not otherwise defined, the distance D is based on IEC 61936-1:2021, Table 2 or Table 3, depending on U_m. The grounded metallic wall shall have the length of 2 × D and the height of the metallic wall shall be at least 1,5 times the total height H_{LPVT} of the EUT. The EUT shall be placed directly at the ground level since this is the worst case with the largest influence of the ground plane. The distance D_{TOP} between the top of the EUT and the lab ceiling, if present, shall be at least 0,75 × D since the ceiling can have an influence for LPVTs 72,5 kV and above.

A second LPVT ($LPVT_2$) of the same type or a similar one, with a tolerance of ±10 % of the total height H_{LPVT} of the EUT, shall be placed with the distance D to the test object. The position is opposite to the grounded metallic wall and with the EUT in between. The base frame shall be placed at the same level as the EUT. A metallic busbar with a length twice the distance D is mounted on top of the $LPVT_2$. The outer diameter of the busbar should be designed to be corona free; a circular cross section is recommended.

The electrical connection on the high voltage terminal of the EUT should start with h = 0,15 × H_{LPVT} in the vertical direction and then in the horizontal direction to the HV generator.

For the electric field impact test, the original transmission cable and the rated burden shall be used as it is in the accuracy test. The ground terminal of each device should be connected to a ground star point to prevent any loops. The type of the ground connection shall be a flat copper band as it is used in impulse voltage tests.

All other equipment within the test lab shall be grounded and placed outside the area of the test arrangement, see dotted line in Figure 5.

3.2 Test and assessment criteria

Considering these arguments there would be three possible ways to include, and respectively exclude, the impact of the electric field from other phases in the overall ratio accuracy of an LPVT. These are:

1) As defined in Annex 11A.3 Test procedure:

   The transformation ratios as well as the phase displacements evaluated in step 1 and step 2 are compared. The difference between the actual transformation ratios, evaluated in step 1 and step 2 divided by the actual transformation ratio evaluated in step 1, shall be lower than or equal to 1/5 of the ratio error associated with the specified accuracy class. The difference between the phase displacements shall be below 1/3 of the phase displacement associated with the specified accuracy class.

   Using this approach, the results are treated as an uncertainty contribution to the overall ratio error which can be neglected due to their very small effect on the overall uncertainty of the LPVT ratio error evaluation.

2) Similar to that which is defined in 7.3.5 Test for accuracy:

   Owing to the opposite effects of the two steps defined in Annex 11A on the ratio, step 1 leads to a negative shift of the ratio, whereas step 2 shifts the ratio in a positive direction closer to the initial ratio from the test for accuracy; the test for the impact of the electric field is divided into two tests representing the two influencing components combined in the test of Annex 11A. These are proximity effects originating from grounded walls, reflected in step 1 of the test defined in Annex 11A, and from energized parallel busbars, reflected in step 2 of the test defined in Annex 11A.

   – In the first step the LPVT transformation ratio is measured with a grounded wall at a distance D as shown in Figure 5 without the grounded busbar arrangement as defined in Annex 11A.

   The accuracy shall be within the limits of the associated accuracy class.

   – In the second step the LPVT transformation ratio is measured with a parallel energized busbar according to Figure 5.

   The accuracy shall be within the limits of the associated accuracy class.

   The test for influence of external electrical field is considered passed when the ratio and phase errors in both tests stay within the associated accuracy class limits.

3) On-site calibration

   This method would be the most service site compliant method; the drawbacks of limited voltage capabilities of available test sources and the higher uncertainty of the measured ratio due to limitations of on-site calibration equipment, would most probably be combined with provision of a ratio correction factor.

3.3 Extension of validity of tests

Because of the variety of types of low-power voltage transformers, ratings and possible combinations of components, it is not practical to perform this test with all the possible characteristics of the low-power voltage transformer. Therefore, the performance may be evaluated by reference to test reports of other low-power voltage transformers of the same product range.

It is requested that the manufacturer provides relevant information on design parameters of the tested object as listed in the Table 1 below to be included in any type test report. Most often single value design parameters are not sufficient to perform the evaluation. In this case, relevant drawings of both objects, the already tested LPVT and the to be evaluated LPVT, are necessary.

Documents providing traceability of the analysis performed should be established. Such documents should be part of the report for extending the validity of performed type tests to the whole family or part of the family of low-power voltage transformer.

The criteria listed in Table 1 should be taken into consideration for the design parameters of the low-power voltage transformer and compared to a reference test object. The evaluation is applicable to the extension of validity of the test for impact of electric field from other phases from one divider to another belonging to the same product range of low-power instrument transformer.

Table 1 – Extension criteria for the influence of electric field from other phases

Item	Design parameter	Acceptance criterion	Condition
1	Height of the divider	≤	
2	Diameter of the divider	±10 %	
3	Primary capacitance and resistance	≥	The primary resistance has negligible influence on the stray field impact
4	Distance to other phases	≥	
5	Distance to other grounded structure	≥	Earthed wall in Figure 11A.1
6	Grading electrode design and arrangement (HV and ground side)		No modification of external electrical field distribution of the divider within the arcing distance

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INSTRUMENT TRANSFORMERS –

Part 11: Additional requirements for low-power passive voltage transformers

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 61869-11 has been prepared by IEC technical committee 38: Instrument transformers.

This first edition of IEC 61869-11, together with IEC 61869-1 and IEC 61869-6, cancels and replaces the relevant clauses or subclauses of the first edition of IEC 60044-7, published in 1999 and the first edition of IEC 60044-8, published in 2002[1]. This edition constitutes a technical revision.

1 IEC 60044-7 and IEC 60044-8 will eventually be replaced by the IEC 61869 series, but until all the relevant parts of the IEC 61869 series will be published, these two standards are still in force.

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

FDIS	Report on voting
38/549/FDIS	38/552/RVD

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

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

This standard is Part 11 of IEC 61869, published under the general title *Instrument transformers.*

This Part 11 is to be read in conjunction with, and is based on, IEC 61869-1:2007, *General requirements* and IEC 61869-6:2016, *Additional general requirements for low-power instrument transformers* – however, the reader is encouraged to use the most recent edition of these documents.

This Part 11 follows the structure of IEC 61869-1:2007 and IEC 61869-6:2016 and supplements or modifies the corresponding clauses.

When a particular subclause of Part 1 or Part 6 is not mentioned in this part Part 11, that subclause applies. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 or Part 6 is to be adapted accordingly.

For additional clauses, subclauses, figures, tables, annexes or notes, the following numbering system is used:

– clauses, subclauses, tables, figures and notes that are numbered starting from 1101 are additional to those in Part 1 and Part 6;
– additional annexes are lettered 11A, 11B, etc.

An overview of the planned set of standards at the date of publication of this document is given below. The updated list of standards issued by IEC TC 38 is available at the website: www.iec.ch.

PRODUCT FAMILY STANDARDS		PRODUCT STANDARD	PRODUCTS	OLD STANDARD
IEC 61869-1 GENERAL REQUIREMENTS		IEC 61869-2	ADDITIONAL REQUIREMENTS FOR CURRENT TRANSFORMERS	IEC 60044-1 IEC 60044-6
		IEC 61869-3	ADDITIONAL REQUIREMENTS FOR INDUCTIVE VOLTAGE TRANSFORMERS	IEC 60044-2
		IEC 61869-4	ADDITIONAL REQUIREMENTS FOR COMBINED TRANSFORMERS	IEC 60044-3
		IEC 61869-5	ADDITIONAL REQUIREMENTS FOR CAPACITIVE VOLTAGE TRANSFORMERS	IEC 60044-5
	IEC 61869-6 ADDITIONAL GENERAL REQUIREMENTS FOR LOW-POWER INSTRUMENT TRANSFORMERS	IEC 61869-7	ADDITIONAL REQUIREMENTS FOR ELECTRONIC VOLTAGE TRANSFORMERS	IEC 60044-7
		IEC 61869-8	SPECIFIC REQUIREMENTS FOR ELECTRONIC CURRENT TRANSFORMERS	IEC 60044-8
		IEC 61869-9	DIGITAL INTERFACE FOR INSTRUMENT TRANSFORMERS	
		IEC 61869-10	ADDITIONAL REQUIREMENTS FOR LOW-POWER PASSIVE CURRENT TRANSFORMERS	
		IEC 61869-11	ADDITIONAL REQUIREMENTS FOR LOW-POWER PASSIVE VOLTAGE TRANSFORMERS	IEC 60044-7
		IEC 61869-12	ADDITIONAL REQUIREMENTS FOR COMBINED ELECTRONIC INSTRUMENT TRANSFORMER OR COMBINED LOW-POWER PASSIVE INSTRUMENT TRANSFORMERS	
		IEC 61869-13	STAND-ALONE MERGING UNIT	
		IEC 61869-14	ADDITIONAL REQUIREMENTS FOR CURRENT TRANSFORMERS FOR DC APPLICATIONS	
		IEC 61869-15	ADDITIONAL REQUIREMENTS FOR VOLTAGE TRANSFORMERS FOR DC APPLICATIONS	

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

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

The contents of the Interpretation Sheet 1 of September 2021 have been included in this copy.

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INTRODUCTION

Low-power passive voltage transformers are based on the voltage divider principle. They can be built for example as resistive dividers, capacitive dividers or resistive-capacitive dividers. Annex 11C shows the schematic diagram of the different dividers.

According to a general block diagram given in Figure 601 of IEC 61869-6:2016, the low-power passive voltage transformers do not use an active primary converter (i.e. without any active electronic component); therefore, there is no need for primary power supply. Additionally, neither the secondary converter nor the secondary power supply is used.

The general block diagram of a low-power passive voltage transformer is given in Figure 1101.

The applied technology decides which part is necessary for the realization of a low-power passive voltage transformer, i.e. it is not necessary that the transmitting cable or primary converter described in Figure 1101 be included in the low-power passive voltage transformer.

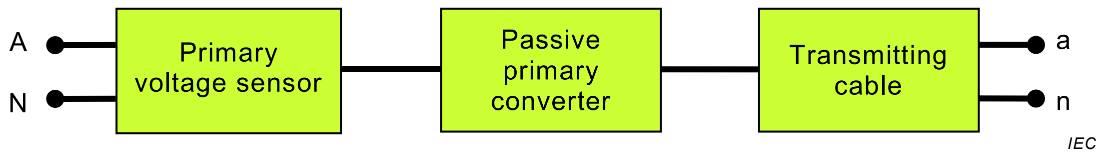

Figure 1101 – General block diagram of a single-phase low-power passive voltage transformer

INSTRUMENT TRANSFORMERS –

Part 11: Additional requirements for low-power passive voltage transformers

1 Scope

This part of IEC 61869 is a product standard and covers only additional requirements for low-power passive voltage transformers (passive LPVT). The product standard for low-power passive voltage transformers is composed of IEC 61869-1, along with IEC 61869-6 and this document with specific requirements.

This document is applicable to newly manufactured low-power passive voltage transformers with analogue output having rated frequencies from 15 Hz to 100 Hz for use with electrical measuring instruments or electrical protective devices.

This document covers low-power passive voltage transformers used for measurement or protection and low-power passive voltage transformers used for both measurement and protection.

Low-power passive voltage transformers have analogue output only (for digital output or for technology using any kind of active electronic components refer to future IEC 61869-7[2]). Such low-power passive voltage transformers can include the secondary signal cable (transmitting cable). The secondary voltage of the low-power passive voltage transformer is proportional to the primary voltage. Derivative output signals are not within the scope of this document.

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.

Clause 2 of IEC 61869-6:2016 is applicable with the following additions:

IEC 61869-6:2016, *Instrument transformers – Part 6: Additional general requirements for low-power instrument transformers*

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2 Under preparation.

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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TRANSFORMATEURS DE MESURE –

Partie 11: Exigences supplémentaires pour les transformateurs de tension passifs de faible puissance

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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La Norme internationale IEC 61869-11 a été établie par le comité d'études 38 de l'IEC: Transformateurs de mesure.

Cette première édition de l'IEC 61869-11, avec l'IEC 61869-1 et l'IEC 61869-6, annule et remplace les articles et paragraphes correspondants de la première édition de l'IEC 60044-7 publiée en 1999 et de la première édition de l'IEC 60044-8 publiée en 2002[1]. Cette édition constitue une révision technique.

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1 L'IEC 60044-7 et l'IEC 60044-8 seront à terme remplacées par la série IEC 61869, mais tant que toutes les parties correspondantes de la série IEC 61869 ne seront pas publiées, ces deux normes restent en vigueur.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
38/549/FDIS	38/552/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

La présente norme constitue la Partie 11 de l'IEC 61869, publiée sous le titre général *Transformateurs de mesure*.

La présente Partie 11 doit être lue conjointement avec l'IEC 61869-1:2007, *Exigences générales* et l'IEC 61869-6:2016, *Exigences générales supplémentaires concernant les transformateurs de mesure de faible puissance*, sur lesquelles elle est basée. Le lecteur est toutefois encouragé à utiliser l'édition la plus récente de ces documents.

La présente Partie 11 reprend la structure de l'IEC 61869-1:2007 et de l'IEC 61869-6:2016, et complète ou modifie les articles concernés.

Lorsqu'un paragraphe particulier de la Partie 1 ou de la Partie 6 n'est pas mentionné dans la présente Partie 11, ce paragraphe s'applique. Lorsque la présente norme spécifie "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 ou de la Partie 6 doit être adapté en conséquence.

Pour les articles, paragraphes, figures, tableaux, annexes ou notes supplémentaires, le système de numérotation suivant est utilisé:

– les articles, paragraphes, tableaux, figures et notes numérotés à partir de 1101 s'ajoutent à ceux de la Partie 1 et de la Partie 6;
– les annexes supplémentaires sont désignées 11A, 11B, etc.

Un aperçu de l'ensemble planifié de normes à la date de publication du présent document est indiqué ci-dessous. La liste à jour des normes publiées par le CE 38 de l'IEC est disponible sur le site web: www.iec.ch.

NORMES DE FAMILLES DE PRODUITS		NORMES DE PRODUITS	PRODUITS	ANCIENNE NORME
IEC 61869-1 EXIGENCES GÉNÉRALES		IEC 61869-2	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS DE COURANT	IEC 60044-1 IEC 60044-6
		IEC 61869-3	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS INDUCTIFS DE TENSION	IEC 60044-2
		IEC 61869-4	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS COMBINÉS	IEC 60044-3
		IEC 61869-5	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS CONDENSATEURS DE TENSION	IEC 60044-5
	IEC 61869-6 EXIGENCES GÉNÉRALES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS DE MESURE DE FAIBLE PUISSANCE	IEC 61869-7	ADDITIONAL REQUIREMENTS FOR ELECTRONIC VOLTAGE TRANSFORMERS (disponible en anglais seulement)	IEC 60044-7
		IEC 61869-8	SPECIFIC REQUIREMENTS FOR ELECTRONIC CURRENT TRANSFORMERS (disponible en anglais seulement)	IEC 60044-8
		IEC 61869-9	INTERFACE NUMÉRIQUE DES TRANSFORMATEURS DE MESURE	
		IEC 61869-10	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS DE COURANT PASSIFS DE FAIBLE PUISSANCE	
		IEC 61869-11	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS DE TENSION PASSIFS DE FAIBLE PUISSANCE	IEC 60044-7
		IEC 61869-12	ADDITIONAL REQUIREMENTS FOR COMBINED ELECTRONIC INSTRUMENT TRANSFORMER OR COMBINED LOW-POWER PASSIVE INSTRUMENT TRANSFORMERS (disponible en anglais seulement)	
		IEC 61869-13	STAND-ALONE MERGING UNIT (disponible en anglais seulement)	
		IEC 61869-14	ADDITIONAL REQUIREMENTS FOR CURRENT TRANSFORMERS FOR DC APPLICATIONS (disponible en anglais seulement)	
		IEC 61869-15	EXIGENCES SUPPLÉMENTAIRES CONCERNANT LES TRANSFORMATEURS DE TENSION POUR APPLICATION EN COURANT CONTINU	

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

Le contenu de la feuille d'interprétation 1 de septembre 2021 a été pris en considération dans cet exemplaire.

IMPORTANT – Le logo *"colour inside"* qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

INTRODUCTION

Les transformateurs de tension passifs de faible puissance sont basés sur le principe du diviseur de tension. Ils peuvent être conçus par exemple sur la base de diviseurs résistifs, diviseurs capacitifs ou diviseurs résistifs capacitifs. L'Annexe 11C donne la représentation schématique des différents diviseurs.

Selon un diagramme général représenté à la Figure 601 de l'IEC 61869-6:2016, les transformateurs de tension passifs de faible puissance n'utilisent pas de convertisseur primaire actif (c'est-à-dire sans aucun composant électronique actif). Une alimentation électrique primaire n'est donc pas nécessaire. De plus, le convertisseur secondaire et l'alimentation électrique secondaire ne sont pas utilisés.

Le diagramme général d'un transformateur de tension passif de faible puissance est représenté à la Figure 1101.

La technique appliquée détermine quelle partie est nécessaire à la construction d'un transformateur de tension passif de faible puissance, c'est-à-dire qu'il n'est pas nécessaire que le transformateur comporte le câble de transmission ou le convertisseur primaire décrit à la Figure 1101.

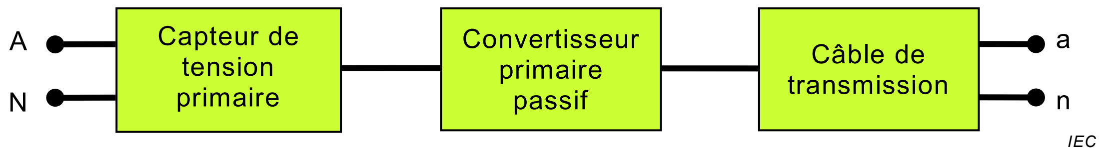

Figure 1101 – Diagramme général d'un transformateur de tension passif monophasé de faible puissance

TRANSFORMATEURS DE MESURE –

Partie 11: Exigences supplémentaires pour les transformateurs de tension passifs de faible puissance

1 Domaine d'application

La présente partie de l'IEC 61869 est une norme de produit qui traite uniquement des exigences supplémentaires concernant les transformateurs de tension passifs de faible puissance (LPVT passif). La norme de produit relative aux transformateurs de tension passifs de faible puissance comprend l'IEC 61869-1, ainsi que l'IEC 61869-6 et le présent document portant sur les exigences spécifiques.

Le présent document s'applique aux transformateurs de tension passifs de faible puissance à sortie analogique et destinés à être utilisés avec des appareils de mesure électriques ou des dispositifs électriques de protection présentant une fréquence assignée comprise entre 15 Hz et 100 Hz.

Le présent document traite des transformateurs de tension passifs de faible puissance utilisés pour la mesure ou la protection, ainsi que des transformateurs de tension passifs de faible puissance utilisés à la fois pour la mesure et la protection.

Les transformateurs de tension passifs de faible puissance ont une sortie exclusivement analogique (se reporter à la future IEC 61869-7[2] pour une sortie numérique ou pour une technologie basée sur des composants électroniques actifs). Ces transformateurs de tension passifs de faible puissance peuvent comporter le câble de transmission du signal secondaire. La tension secondaire du transformateur de tension passif de faible puissance est proportionnelle à la tension primaire. Les signaux de sortie dérivés n'entrent pas dans le domaine d'application de la présente partie de l'IEC 61869.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

L'Article 2 de l'IEC 61869-6:2016 s'applique, avec l'ajout suivant:

IEC 61869-6:2016, *Transformateurs de mesure – Partie 6: Exigences générales supplémentaires concernant les transformateurs de mesure de faible puissance*

2 En préparation.