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**Instrument transformers –
Part 99: Glossary**

**Transformateurs de mesure –
Partie 99: Glossaire**

[IEC 61869-99:2022](#)

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INSTRUMENT TRANSFORMERS –

Part 99: Glossary

FOREWORD

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

Draft	Report on voting
38/709/FDIS	38/711/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.

A list of all parts in the IEC 61869 series, published under the general title *Instrument transformers*, can be found on the IEC website.

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.

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INTRODUCTION

Definitions presented in this document are definitions related to the terminology of the IEC 61869 series and updated in terms of editorial and technical aspects according to the official decisions of TC 38 (38/619/Q and 38/626/RQ).

TC 38 decided to start this project to develop the IEC 61869-99 Glossary as preliminary work for revision of IEC 60050-321. The Glossary IEC 61869-99, when published, will be used as a basis for the update of IEC 60050-321.

Definitions that are listed in this document are valid definitions and should be used for terminology concerning instrument transformers.

The structure of this Glossary does not follow the order of product families but follows a logical order based on the hierarchy of concepts: starting from the most general concepts and continuing with the more specific ones.

For the purpose of better orientation in the arrangement of terminology it is helpful to use the "Supporting document for IEC 61869-99" which is located at the following link:

https://www.iec.ch/dyn/www/f?p=103:227:::::FSP_ORG_ID:1241

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INSTRUMENT TRANSFORMERS –

Part 99: Glossary

1 Scope

This part of the IEC 61869 series contains the glossary of specific terminology and definitions used in the field of instrument transformers within the various parts of the series. Unless it is otherwise specified, in this document all periodic electrical quantities are understood to be RMS values.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

NOTE See Annex A for indexes of terms, abbreviated terms, and symbols.

3.1 Basic terms and definitions

3.1.1

instrument transformer

IT

device providing a secondary signal whose instantaneous value is substantially proportional to the instantaneous value of the primary voltage or current with a defined accuracy and intended to feed protective, metering or control equipment

3.1.2

current sensor

CS

device providing a secondary signal whose instantaneous value is related to but not proportional to the instantaneous value of the primary current with a defined accuracy and intended to feed protective, metering or control equipment

EXAMPLE A Rogowski coil is an example of a current sensor.

3.1.3

primary circuit

external circuit connected to the primary terminals

3.1.4

secondary circuit

external circuit connected to the secondary terminals

3.1.5

earthed neutral system

system in which the neutral point(s) is(are) connected to earth either solidly or through a resistance or reactance of sufficiently low value to reduce transient oscillations and to give a current sufficient for selective earth fault protection

3.1.6

solidly earthed neutral system

system whose neutral point(s) is(are) earthed directly

Note 1 to entry: In low-voltage applications, this corresponds to "TT system" and "TN system" according to IEC 60364-1.

Note 2 to entry: In some countries (e.g., USA) a line conductor may be earthed instead of the neutral (corner grounded systems).

[SOURCE: IEC 60050-601:1985, 601-02-25, modified – Note 1 and Note 2 to entry added.]

3.1.7

impedance earthed neutral system

system whose neutral point(s) is(are) earthed through impedances to limit earth fault currents

Note 1 to entry: In low-voltage applications, this corresponds to "IT system" where the neutral conductor is earthed via an impedance according to IEC 60364-1.

[SOURCE: IEC 60050-601:1985, 601-02-26, modified – Note 1 to entry added.]

3.1.8

resonant earthed neutral system

arc-suppression-coil-earthed neutral system

system in which one or more neutral points are connected to earth through reactances which approximately compensate the capacitive component of a single-phase-to-earth fault current

Note 1 to entry: With resonant earthing of a system, the residual current in the fault is limited to such an extent that an arcing fault in air is self-extinguishing.

[SOURCE: IEC 60050-601:1985, 601-02-27, modified – Note 1 to entry added and "arc-suppression-coil-earthed neutral system" formatted as an admitted term instead of a preferred term.]

3.1.9

isolated neutral system

system where the neutral point is not intentionally connected to earth, except for high impedance connections for protection or measurement purposes

Note 1 to entry: In low-voltage applications, this corresponds to an "IT system" according to IEC 60364-1.

[SOURCE: IEC 60050-601:1985, 601-02-24, modified – Note 1 to entry added.]

3.1.10

port

access to a device or network where electromagnetic energy or signals may be supplied or received or where the device or network variables may be observed or measured

EXAMPLE Auxiliary power supply terminals

[SOURCE: IEC 60050-131:2002, 131-12-60, modified – example added, Note 1 to entry deleted.]

3.1.11**channel**

digital channel

digital representation describing a single measurement quantity

EXAMPLE Phase current, phase voltage.

Note 1 to entry: Channels are individually rated and may contain a mathematical combination of multiple inputs (e.g., calculated neutral current).

Note 2 to entry: Multiple channels can be grouped into a single stream and presented at the device digital output.

3.1.12**stream**

digital stream

group of channels brought together into a single digital message

Note 1 to entry: All channels in the stream share a common time stamp and a common sample rate in accordance with IEC 61869-9.

3.1.13**channel group**

set of channels with a common specification

Note 1 to entry: For example, set of three phase voltages or currents. All channels in the group share the same set of rating plate specifications. If the neutral channel shares the same specification as the individual phases, then it is included in the same group.

3.1.14**electromagnetic compatibility****EMC**

ability of equipment or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

<https://standards.iteh.ai/catalog/standards/sist/f65593e-45b8-48b0-bb07-550fc7d26758/iec-60050-161-2018>, 161-01-07] [SOURCE: IEC 60050-161:2018, 161-01-07]

3.1.15**steady state**

state of a physical system in which the relevant characteristics remain constant with time

Note 1 to entry: A state under periodic conditions is often considered as a steady state.

[SOURCE: IEC 60050-103:2009, 103-05-01]

3.1.16**transient, adj**

pertaining to a phenomenon or quantity which passes from one steady state to another consecutive steady state

Note 1 to entry: The term "transient" is also used as a noun to mean a transient phenomenon or quantity.

[SOURCE: IEC 60050-103:2009, 103-05-02]

3.1.17**normal environmental conditions**

basic set of environmental conditions under which a device is intended to operate as specified

3.1.18**special environmental conditions**

set of environmental conditions different from normal environmental conditions

3.1.19**temperature category**

range of temperatures of the ambient air or of the cooling medium for which the instrument transformer has been designed

3.1.20**rated value**

value of a quantity used for specification purposes, established for a specified set of operating conditions of a component, device, equipment, or system

[SOURCE: IEC 60050-151:2001, 151-16-08]

3.2 Instrument transformer types, parts and details**3.2.1****instrument transformer for DC application**

instrument transformer designed for

- measuring DC currents and/or DC voltages
- with or without AC components

3.2.2**measuring instrument transformer**

instrument transformer intended for measurement applications

3.2.3**protective instrument transformer**

instrument transformer intended for protection applications

3.2.4**multipurpose instrument transformer**

instrument transformer intended for both measurement and protection applications

3.2.5**current transformer****CT**

instrument transformer for current measurement

3.2.6**bushing type current transformer**

current transformer without primary conductor and primary insulation of its own which can be fitted directly over an insulated bushing or conductor

Note 1 to entry: This definition for "bushing type current transformer" is a generic definition that includes the cable type current transformer as defined in IEC 321-02-04.

[SOURCE: IEC 60050-321:1986, 321-02-02, modified – Note 1 to entry added.]

3.2.7**low-leakage reactance current transformer**

current transformer for which measurements made at the secondary terminals (while primary terminals are open-circuited) are sufficient for an assessment of its protection performance up to the rated accuracy limit primary current

3.2.8**high-leakage reactance current transformer**

current transformer which does not correspond to the definition of low-leakage reactance current transformer, and for which an additional allowance is made by the manufacturer to take account of influencing effects which result in additional leakage flux

**3.2.9
voltage transformer
VT**

DEPRECATED: PT
instrument transformer for voltage measurement

**3.2.10
capacitor voltage transformer
CVT**

voltage transformer comprising a capacitor voltage divider and an electromagnetic unit so designed and interconnected that the secondary voltage of the electromagnetic unit is substantially proportional to the primary voltage, and differs in phase from it by an angle which is approximately zero for an appropriate direction of the connections

[SOURCE: IEC 60050-321:1986, 321-03-14, modified – Abbreviated term added as a synonym and "capacitor divider unit" replaced with "capacitor voltage divider" in the definition.]

**3.2.11
earthed voltage transformer**

single-phase voltage transformer which is intended to have one of its primary terminals directly earthed or a three-phase voltage transformer which is intended to have the star-point primary terminal directly earthed

**3.2.12
unearthed voltage transformer**

voltage transformer which has all primary terminals insulated from earth to a level corresponding to its rated insulation level

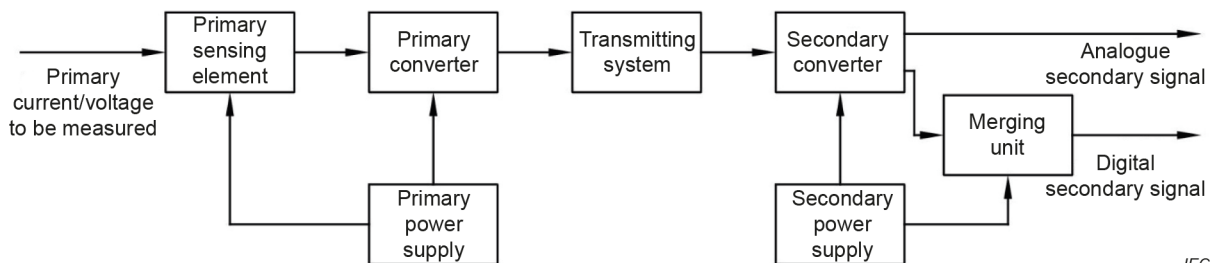
**3.2.13
combined transformer**

combined instrument transformer
instrument transformer consisting of current transformer and voltage transformer in the same enclosure

**3.2.14
low-power instrument transformer
LPIT**

instrument transformer with no rating assigned to the output power as it is irrelevant

Note 1 to entry: A general block diagram of an LPIT is given in the following image.



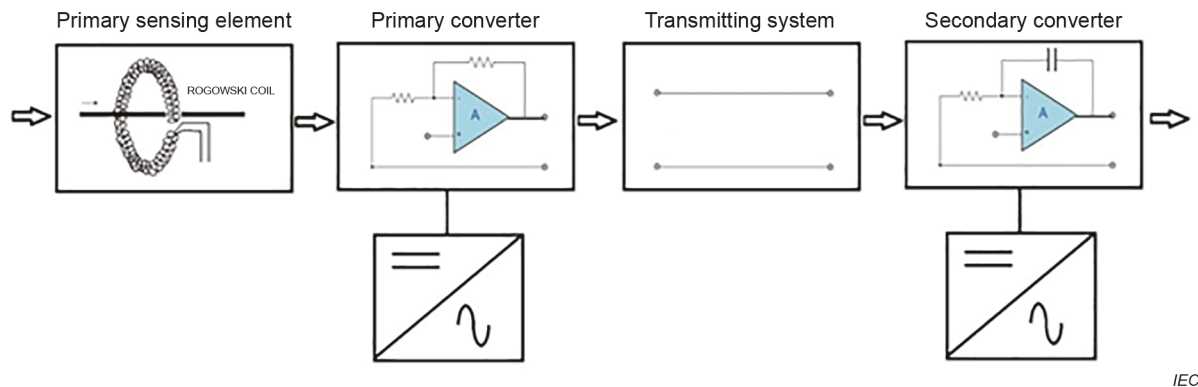
IEC

In practice some blocks may be omitted or combined, according to the specific technology of the LPIT under consideration.

**3.2.15
low-power current transformer
LPCT**

low-power instrument transformer for current measurement

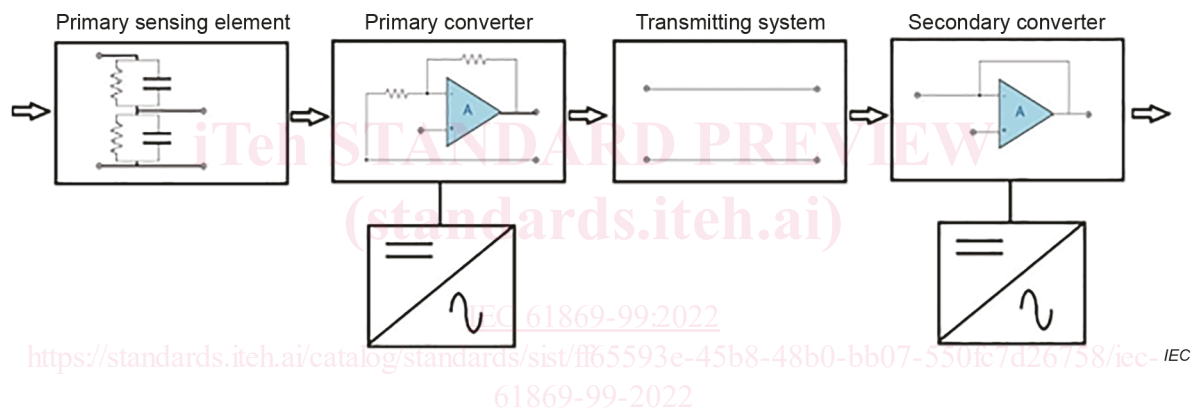
Note 1 to entry: An example block diagram of an LPCT is given in the following image.



3.2.16 low-power voltage transformer LPVT

low-power instrument transformer for voltage measurement

Note 1 to entry: An example block diagram of an LPVT is given in the following image.



3.2.17 electronic IT EIT

LPIT in which signal processing is performed by active electronic components

3.2.18 electronic current transformer ECT

EIT for current measurement

3.2.19 electronic voltage transformer EVT

EIT for voltage measurement

3.2.20 voltage divider

device comprising resistors, inductors, capacitors or a combination of these components such that, between two points of the device, a desired fraction of the voltage applied to the device as a whole can be obtained

[SOURCE: IEC 60050-312:2001, 312-02-32, modified – The word "transformer" deleted from the definition.]

3.2.21**capacitor voltage divider**

capacitor stack forming an alternating voltage divider

[SOURCE: IEC 60050-436:1990, 436-02-10]

3.2.22**section**

electrically conductive part of an instrument transformer insulated from other similar parts and equipped with terminals

EXAMPLE Primary or secondary reconnectable windings, shieldings to be externally grounded, temperature sensors.

3.2.23**high-voltage terminal**

terminal intended to be connected to the power line

[SOURCE: IEC 60050-321:1986, 321-03-16]

3.2.24**primary terminal**

terminal to which the voltage or current to be measured is applied

3.2.25**secondary terminal**

terminal which transmits the secondary signal to measuring instruments, meters and protective or control devices or similar apparatus

3.2.26**primary winding**

winding to which the current or voltage to be transformed is applied

3.2.27**secondary winding**

winding intended to be connected with devices for measuring, metering, control and/or protection applications

3.2.28**selectable-ratio instrument transformer**

instrument transformer on which several transformation ratios are obtained by reconnecting the primary winding sections and/or by means of taps on the secondary winding

Note 1 to entry: Taps are only relevant for windings of inductive current transformers, voltage transformers and capacitor voltage transformers.

3.2.29**residual voltage winding**

winding of a single-phase voltage transformer intended, in a set of three single-phase transformers, to be used in open-delta connection for the purpose of:

- a) producing a residual voltage under earth-fault conditions;
- b) damping of relaxation oscillations (ferro-resonances)

3.2.30**enclosure**

housing affording the type and degree of protection suitable for the intended application

[SOURCE: IEC 60050-151:2001, 151-13-08]

3.2.31**low-voltage component**

electrical component of an LPIT separated from the primary circuit at the full rated withstand voltage level

EXAMPLE Examples of low-voltage components are the secondary converter, the merging unit, and the primary converter if placed at ground level of the high-voltage instrument transformer.

3.2.32**connecting point**

individual point of connection between the different low-voltage components

3.2.33**transmitting system**

short-distance or long-distance coupling arrangement between primary and secondary parts of an LPIT intended to transmit the signal

Note 1 to entry: Depending on the LPIT technology used, the transmitting system can also be used for power transmission.

3.2.34**primary sensing element**

electrical, optical or other device belonging to an LPIT transducing the primary signal into a more suitable signal to be treated by the other components of the LPIT

EXAMPLE Faraday effect electro-optical devices, Hall effect elements, and Pockels effect elements are examples of primary sensing elements.

3.2.35**primary converter**

part of an LPIT that converts the signal coming from one or more primary sensing elements into a signal suitable for the transmitting system

3.2.36**secondary converter**

part of an LPIT that converts the signal transmitted through the transmitting system into a signal proportional to the primary signal to be used by measuring instruments, meters and protective or control devices

Note 1 to entry: For an analogue signal, the secondary converter directly supplies measuring instruments, meters, and protective or control devices. For a digital signal the secondary converter is connected to a merging unit before supplying the secondary equipment.

3.2.37**auxiliary power supply**

external power supply, either AC or DC that powers the equipment through dedicated terminals separated from the measurement terminals

Note 1 to entry: Auxiliary power supply is intended to feed the primary and/or the secondary power supply.

3.2.38**secondary power supply**

power supply circuit that feeds the secondary converter of an LPIT

Note 1 to entry: Secondary power supply can be combined with primary power supply or a power supply of other instrument transformers and can supply a merging unit if any.

3.2.39**primary power supply**

power supply circuit of the primary converter and/or primary sensing element of an LPIT

Note 1 to entry: Primary power supply can be combined with secondary power supply.