

IEC TC38 - Instrument Transformers

ITs and PQ measurements: view and needs from standardization

February 2021
IT4PQ Stakeholder
Workshop

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TC 38 chair

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TC 38 Officers and Working Bodies

Secretary: Filippo Frugoni (IT)

Chair: Volker Leitloff (FR)

IEC Officer: Miroslav Siket

Members: 46 Members (26 P + 20 O) [Feb 21]

[Jan 20 Status change from NO O -> P

Jan 21 Status change from AU O -> P]

Active WG/MT/PT [Feb 21]

- CAG
- 1 MT, 9 WG (including 3 JWG)
 - with 4 PT (WG37)

Liaison: 15 IEC, 3 Type A [CIGRE] 3 Type C [WG level]

Participation in ACTAD



TC 38 – Technical Meetings

Nov 2009	Madrid	(ES)
Dec 2011	Prague	(CZ)
April 2013	Houston	(US)
Nov 2014	Tokyo	(JP)
Nov 2016	Milano	(IT)
Nov 2018	Frankfurt	(DE)
Sept 2020	Bucharest (RO)	— cancelled due to COVID-19 Crisis
Sept 21	web or f2f – to be confirmed	

[W38 Sept 20-24, 2021]

<http://www.iec.ch/>

<http://collaborate.iec.ch>

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TC 38 - Scope

Standardisation in the field of AC and/or DC current and/or voltage instrument transformers, including their subparts like (but not limited to) sensing devices, signal treatment, data conversion and analog or digital interfacing.

Motivation for TC38 scope update in 2009:

- cover all the emerging technologies
- new scenarios for equipment with integrated functions
- tighter coordination with TC13, TC57, TC85 and TC95

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Overview of TC 38 Standards

IEC 61869

- Parts 1-99: General parts and parts related to HV applications
- Parts 100-199: Technical Reports
- Parts 200-299: LV Instrument Transformers
[<1kV ac and <1,5kV dc]

IEC 62689

- Fault Passage Indicators (FPI)

IEC 63253

- Station Service Voltage Transformers (SSVT)

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TC 38 - Overview of Standards

IEC 61869 Parts 1-5 “Conventional” IT

Reference	Title	Comment
61869-1	General Requirements	IS: 2007 MT48 Ed2 including merge with part -6 CD4 11/20
61869-2	Additional Requirements for CT	IS: 2012
61869-3	Additional Requirements for Inductive VT	IS: 2011
61869-4	Additional Requirements for Combined IT	IS: 2013
61869-5	Additional Requirements for Capacitive VT	IS: 2011
61869-99	Glossary	WG 39 NP 11/2020

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TC 38 - Overview of Standards

IEC 61869 Parts 6-13 Low Power IT

Reference	Title	Out	Comment
61869-6	Additional General Requirements for LPIT		IS: 2016 Ed2: merge -1
61869-7	Additional Requirements for Electronic VT	A/D	WG37 PT7/8 NP feb 20
61869-8	Additional Requirements for Electronic CT	A/D	
61869-9	Digital Interface for IT	D	IS: 2016
61869-10	Additional Requirements for LP Passive CT	A	IS: 2018
61869-11	Additional Requirements for LP Passive VT	A	IS: 2018
61869-12	Add. Req. for Combined Electronic IT / LPIT	A	after 7, -8
61869-13	SAMU (Stand Alone Merging Unit)	D	IS: 2021

NEW

Notes: Parts -1, -and 16 also apply to LPIT
Part -9: update required for consistency with IEC 61850 ed 2.1



TC 38 - Overview of Standards

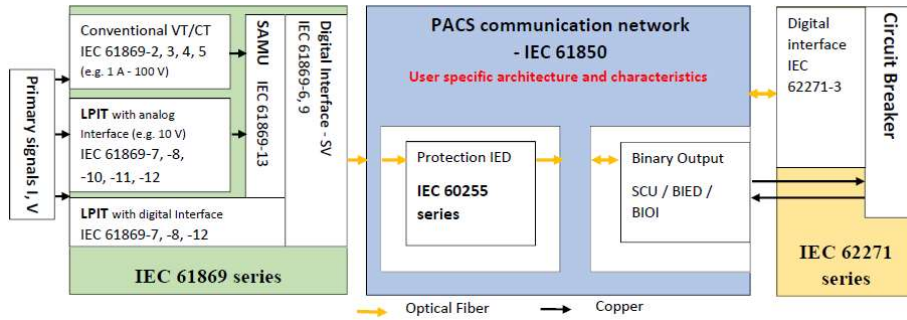
IEC 61869 Parts 14 /15 DC

Reference	Title	Comment
61869-14	Add. Req. for CT for DC Applications	IS: 2018
61869-15	Add. Req. for VT for DC Applications	IS: 2018

IEC 61869 IT Companion Standards

Reference	Title	Comment
61869-16	TEDS (Transducer Electronic Data Sheet) for IT	WG 37 PT16
61869-20	Product Safety Req. for IT above 1kV	WG Disbanded in TC38 meeting 2018
61869-?	IT integrated with other functions	WG 54

Functional AC Protection Chain based on IEC 61869 Series for fully Digital PACS



IEC 61869 Parts 2xx LV applications

Reference	Title	Comment
61869-201	General Req. for IT used in LV Applications	WG 49 CD1 11/2020
61869-202	Add. Req. for CT for LV Applications - Conductive	WG 49 CD1 11/2020
61869-210	Add. Req. for CT for LV Applications - Conductive	Split of LV CT standards proposed in 2020 WG 49 CD1 11/2020
61869-204	Add. Req. for VT for LV Applications - Electronic	After part 202
61869-220	Product Safety Requirements for IT used in LV Applications	JWG 52 CD1 CD1 02/2019



TC 38 - Overview of Standards

IEC 61869 Parts 100-199 Technical Reports

Reference	Title	Comment
61869-100	Guidance for application of CT in power system protection	TR:2017
61869-101	Standard Mathematical Models for Instrument Transformers	WG45
61869-102	Ferroresonance oscillations in substations with inductive VT	TR:2014
61869-103	Use of IT for power quality measurement	TR:2012
61869-104	Evolution of Instrument Transformers <i>ratings</i> for the modern market	WG47
61869-105	Uncertainty evaluation in the calibration of Instrument Transformers	WG55 CD1 06/2019 Double Logo

Part 103 directly related to IT4PQ project

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TC 38 - Overview of Standards

IEC 62689 Fault Passage Indicators

Reference	Title	Comment
62689-1	Current and voltage sensors or detectors for FPI- Part 1: General principles and requirements	IS:2016
62689-2	Current and voltage sensors or detectors for FPI- Part 2: System aspects	IS:2016
62689-3	Communication	WG Disbanded (TC38 mtg 18)
62689-4	Conformance Testing	

IEC 63253 SSVT

Reference	Title	Comment
63253	Station Service Voltage Transformers (SSVT)	JWG 56 CD2 10/2020 Double Logo

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TC 38 – Power Quality related issues

Actual state as seen from TC38

- **TR 61869-103** “Instrument transformers – The use of instrument transformers for power quality measurement” [2012]
 - Analyses of impact of IT on PQ measurement chain
- Measurement procedures and uncertainty assessment covered by standardization for the LV measuring instruments
- No standard on the HV characterization and test of PQ phenomena available
- Subject allocated to WG47 (Market needs - convenor Paolo Mazza, Experts from AHG41 - TR 61869-103)
- List of unaddressed standardization needs for IT in the field of PQ transmitted by TC38 to STAIR EMPIR secretariat [2018]
- Support of EMPIR project proposal “Measurement methods and test procedure for assessing accuracy of Instrument Transformers for Power Quality measurements” [sept 2019]
- Coordination with CENELEC TC38, also supporting the activity



TC 38 – Standardisation needs

Results expected by TC38 from IT4PQ – Standard Requirements

- new parameters and indices for evaluating the accuracy of IT for
 - harmonics,
 - interharmonics
 - other PQ disturbances;
- synthetic performance indexes of ITs for PQ measurements;
- requirements and architecture proposals for the reference setups to calibrate ITs for PQ measurements, from National Metrological Institutes to Manufacturers’ labs;
- performance accounting for the simultaneous presence of more than one influence factor such as
 1. Temperature,
 2. Different temperatures in different parts of the same device,
 3. Adjacent phases,
 4. Proximity effect,
 5. Vibrations,
 6. Electro Magnetic Interferences (EMI),
 7. Industrial Frequency electromagnetic fields.



TC 38 – Standardisation needs

Results expected by TC38 from IT4PQ – Related to tests

- test methods to evaluate the performance of LV and HV ITs used for Power Quality (PQ) measurements according to the limits reported in the main International Standards;
[EN 50160, IEC 61000-4-30, IEC 61000-4-7]
- evaluation methods for the uncertainty contribution of ITs to PQ indices;
- testing procedures and uncertainty evaluation in calibration of ITs for PQ;



TC 38 – Power Quality related issues

Use of results of IT4PQ project by TC38

- Subject allocated to WG47 (Market needs - convenor Paolo Mazza)
- Results
 - basis for the development of a future Standard focused on Instrument Transformers for Power Quality measurements [WG47].
 - identification and quantification of influence factors, as well as instrument transformer characterization data [JWG 55 (Uncertainty)]

Interaction between IT4PQ and TC38

- Some Actors contribute to both TC38 WGs and IT4PQ work packages
- Presentations of IT4PQ work
 - on selected subjects TC38 Workshop organized before Plenary Meeting [workshop]
 - Formal progress presentation during TC38 Plenary Meeting
 - Presentation in TC38 WG (47, 55...) and/or CAG (to be coordinated with convenors) [Presentation in TC38 CAG sept 20 by Gabriella Crotti]
 - Documents and reports can be made available to TC38 experts