

TECHNICAL REPORT



Communication networks and systems for power utility automation –
Part 90-17: Using IEC 61850 to transmit power quality data

ITIH STANDARD PREVIEW
(standards.iteh.ai)

IEC TR 61850-90-17:2017
<https://standards.iteh.ai/catalog/standards/sist/062cecaa-6d56-4b85-9eb5-fc6e2c51cf5c/iec-tr-61850-90-17-2017>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2017 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.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
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 corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

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 It also gives information on projects, replaced and withdrawn publications.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 also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

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: csc@iec.ch.

IEC STANDARD PREVIEW
(standards.iteh.ai)

IEC TR 61850-10:2017
<https://standards.iteh.ai/catalog/standards/iec/61850-10-1-2017>

TECHNICAL REPORT



**Communication networks and systems for power utility automation –
Part 90-17: Using IEC 61850 to transmit power quality data**

<https://standards.iteh.ai/catalog/standards/sist/062cecaa-6d56-4b85-9eb5-fc6e2c51cf5c/iec-tr-61850-90-17-2017>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.200

ISBN 978-2-8322-4291-9

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	11
3 Terms and definitions	12
4 Abbreviated terms	13
5 Uses cases and requirements: Application of power quality data	14
5.1 General.....	14
5.2 Constraints / assumptions / design considerations	14
5.3 Actors	15
5.4 Use case diagram	15
5.5 Use cases description.....	16
5.6 Sequence diagram	16
5.6.1 Request for power quality measurements	16
5.6.2 Sending of power quality events/limit violations	17
5.6.3 Retrieve power quality records	18
5.7 Classification and concepts for power quality measurements	18
5.7.1 General.....	18
5.8 PQ devices classification	21
5.9 PQ records	22
5.9.1 General	22
5.9.2 Evaluation of PQ records	24
5.9.3 Power frequency	24
5.9.4 Magnitude of power supply voltage	25
5.9.5 Supply voltage unbalance	27
5.9.6 Voltage Harmonics	28
5.9.7 Interharmonics.....	31
5.9.8 Mains signalling voltages.....	32
5.9.9 Flicker	33
5.9.10 Conducted emission in the 2 kHz to 9 kHz range	34
5.9.11 Conducted emissions in the 9 kHz to 150 kHz range.....	36
5.9.12 Magnitude of current.....	36
5.9.13 Current unbalance	37
5.9.14 Current harmonics	37
5.9.15 Current interharmonics	37
5.9.16 Current recording	37
5.10 PQ events.....	38
5.10.1 General	38
5.10.2 Supply voltage dips and interruptions	38
5.10.3 Evaluation of voltage events: Magnitude-duration table(s)	39
5.10.4 Flagging	41
5.10.5 Rapid voltage changes (RVC).....	42
6 IEC 61850 information models for power quality profiles.....	42
6.1 Power quality modelling name conventions	42
6.2 Modelling of a Class A power quality instrument	43
6.2.1 Use case 1: Request for power quality measurements	43

6.2.2	Use case 2: Sending of power quality events/limit violations	44
6.2.3	Use case 3: Retrieve power quality records	45
6.3	IEC 61850 PQ mapping	45
6.4	PQ monitoring.....	46
6.4.1	General	46
6.4.2	Use of LN MMXU/MMXN.....	46
6.4.3	Use of LN MHAI/MHAN.....	47
6.4.4	Use of LN MHFE – new LN	49
6.4.5	Use of LN MFLK	49
6.4.6	Use of LN MSQI	50
6.5	PQ event monitoring and PQ evaluation.....	50
6.5.1	General	50
6.5.2	Use of LN QVVR voltage variations	50
6.5.3	Use of LN QSVV Supply Voltage Variations – new LN	54
6.5.4	Use of LN QRVC rapid voltage changes – new LN.....	54
6.5.5	Use of LN QFVR frequency variations.....	55
6.5.6	Use of LN QVUB voltage unbalance	55
6.5.7	Use of LN QIUB current unbalance	55
6.5.8	Use of LN QFLK flicker limit violation.....	55
6.5.9	Use of LN QVHA harmonics/interharmonics limit violation – new LN -.....	56
6.5.10	Use of LN QMSV mains signalling voltage limit violation – new LN -	56
6.5.11	Use of LN QCPR continuous power quality recorder – new LN -	56
6.5.12	Use of LN QVTR voltage transients	57
6.5.13	Use of LN QITR current transients.....	57
7	Data model of namespace IEC 61850-90-17 for power quality.....	57
7.1	Namespace name and version.....	57
7.2	Abbreviated terms.....	57
7.3	Logical node classes.....	58
7.3.1	General	58
7.3.2	Package LNGroupM.....	58
7.3.3	Package LNGroupQ.....	61
7.4	Data semantics	80
7.5	Enumerated data attribute types	83
7.5.1	General	83
7.5.2	AffectedPhases90-17Kind enumeration	84
7.5.3	CalcMethod90-17Kind enumeration	85
7.5.4	FlickerCalcMethodKind enumeration.....	86
7.5.5	FreqRangeGroupKind enumeration.....	86
7.5.6	NumHarmonicPcbKind enumeration.....	87
7.5.7	VoltInterruptDetection90-17Kind enumeration.....	87
8	Communication services for data transfer	87
Annex A (normative)	SCL enumerations (IEC TR 61850-90-17)	89
A.1	SCL enumerations (from DOEnums_90_17).....	89
Figure 1	– Use cases related to Power Quality monitoring application.....	16
Figure 2	– Use case "Request for power quality measurements"	17
Figure 3	– Use case "Sending of power quality event/limit violation"	17
Figure 4	– Use case "Retrieve power quality records"	18

Figure 5 – File transfer of PQ records from IED to user.....	23
Figure 6 – File transfer of PQ reports from IED to user	23
Figure 7 – Voltage record example (6 h): 10 min r.m.s values of magnitude of supply voltage and additional record containing voltage variations (1/2 cycle r.m.s. values) in a single phase LV system (U _{din} = 230 V).....	24
Figure 8 – One-month power frequency record (10 s) and limits of frequency deviation 50 Hz ± 1 % according to EN 50160.....	24
Figure 9 – Example of a one day 10 min voltage r.m.s record in a single phase LV system (U _{din} = 230 V) with dip (90 %) and swell (110 %) limits	26
Figure 10 – Harmonic subgroup calculation method according to IEC 61000-4-7/IEC 61000-4-30	28
Figure 11 – Example of 10 min 3 rd harmonic record (single phase, LV 230 V), 5 weeks	29
Figure 12 – Interharmonic centred subgroup calculation method according to IEC 61000-4-7 and IEC 61000-4-30	32
Figure 13 – Voltage levels of signal frequencies in percent of nominal voltage U _n used in public LV and MV networks from EN 50160 standard	33
Figure 14 – Example of a one month long term Flicker record (single phase, 230 V).....	34
Figure 15 – Grouping of 5 Hz frequencies to 200 Hz frequency bands Y	35
Figure 16 – Voltage events with hysteresis explanation	38
Figure 17 – Example of a voltage event: voltage dip with limits (dip, swell, interruption), hysteresis = 2 % of U _{din} and additional record of voltage variations (1/2 cycle r.m.s. values).....	40
Figure 18 – Voltage dip event with additional fault record	40
Figure 19 – Flagged data: supply voltage magnitude is flagged if a voltage dip occurred in aggregation interval.....	41
Figure 20 – RVC characterization.....	42
Figure 21 – State of the art data modeling for use case “Request for power quality measurements” (new in IEC 61000-4-30:2015)	44
Figure 22 – State of the art data modeling for use case "Sending of power quality events/limit violations" (new in IEC 61000-4-30:2015).....	45
Figure 23 – State of the art data modelling for use case “Retrieve power quality records” (new in IEC 61000-4-30:2015)	45
Figure 24 – Modelling of magnitude-duration table for voltage events with histogram HST ...	53
Figure 25 – Visualization of example event in Figure 17/Figure 18/Figure 24 in ITI curve	53
Figure 26 – Class diagram LogicalNodes_90_17::LogicalNodes_90_17	58
Figure 27 – Class diagram LNGroupM::LNGroupM.....	59
Figure 28 – Class diagram LNGroupQ::LNGroupQ1	62
Figure 29 – Class diagram LNGroupQ::LNGroupQ2	63
Figure 30 – Voltage events with hysteresis explanation	78
Figure 31 – Enumerated data attribute types.....	84
Table 1 – Actors and roles	15
Table 2 – Use cases and applications	16
Table 3 – Use case "Request for power quality measurements"	16
Table 4 – Use case "Sending of power quality events/limits violations"	17
Table 5 – Use case "Retrieve power quality records"	18

Table 6 – Mapping between PQ measurement methods, evaluation/reporting requirements and IEC 61850 modelling.....	19
Table 7 – Relation between LN and PQ use cases.....	21
Table 8 – PQ records for Class A and Class S devices.....	22
Table 9 – Transfer of PQ records vs. transfer of PQ reports.....	23
Table 10 – Evaluation of power frequency data according to EN 50160.....	25
Table 11 – Evaluation of a voltage magnitude record (single phase, LV: 230 V).....	27
Table 12 – Limits for harmonics in LV/MV networks.....	29
Table 13 – Limits for harmonics in HV networks.....	30
Table 14 – LV/MV network limits for harmonics/interharmonics according to IEC TS 62749.....	30
Table 15 – HV network limits for harmonics/interharmonics according to IEC TS 62749.....	31
Table 16 – Flicker severity Plt recommended values.....	34
Table 17 – Evaluation of a Flicker record (single phase, nominal voltage 230 V).....	34
Table 18 – Requirements from IEC 61000-4-7:2009.....	35
Table 19 – Requirements from IEC 61000-4-30:2015.....	36
Table 20 – PQ event overview.....	38
Table 21 – Voltage dip/interruption and swell classification according to EN 50160.....	39
Table 22 – Voltage event classification according to IEC TS 62749.....	39
Table 23 – Example of single event assessment according to IEC TS 62749.....	40
Table 24 – Flagging requirements vs. use cases according to Figure 1.....	41
Table 25 – Calculation methods for power quality values according to IEC 61000-4-30.....	43
Table 26 – Calculation methods for modified power quality values.....	43
Table 27 – PQ mapping.....	46
Table 28 – Relation between nominal frequency, number of cycles and harmonics/interharmonics grouping for PQ application.....	48
Table 29 – Order of DC, harmonics and interharmonics in MHA1 for PQ application.....	49
Table 30 – hstVal indices (e.g. according to IEC TS 62749).....	51
Table 31 – Array arrangement for voltage events.....	52
Table 32 – Normative abbreviations for data object names.....	58
Table 33 – Data objects of MHFE.....	60
Table 34 – Data objects of QCPR.....	64
Table 35 – Data objects of QFLK.....	65
Table 36 – Data objects of QFVRExt.....	67
Table 37 – Data objects of QITRExt.....	68
Table 38 – Data objects of QIUBExt.....	70
Table 39 – Data objects of QMSV.....	71
Table 40 – Data objects of QRVC.....	72
Table 41 – Data objects of QSVV.....	74
Table 42 – Data objects of QVHA.....	75
Table 43 – Data objects of QVTRExt.....	76
Table 44 – Data objects of QVUBExt.....	77
Table 45 – Data objects of QVVRExt.....	79
Table 46 – Attributes defined on classes of LogicalNodes_90_17 package.....	81
Table 47 – Literals of AffectedPhases90-17Kind.....	85

Table 48 – Literals of CalcMethod90-17Kind	86
Table 49 – Literals of FlickerCalcMethodKind	86
Table 50 – Literals of FreqRangeGroupKind	87
Table 51 – Literals of NumHarmonicPcbKind	87
Table 52 – Literals of VoltInterruptDetection90-17Kind	87

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC TR 61850-90-17:2017](https://standards.iteh.ai/catalog/standards/sist/062cecaa-6d56-4b85-9eb5-fc6e2c51cf5c/iec-tr-61850-90-17-2017)

<https://standards.iteh.ai/catalog/standards/sist/062cecaa-6d56-4b85-9eb5-fc6e2c51cf5c/iec-tr-61850-90-17-2017>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 90-17: Using IEC 61850 to transmit power quality data

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.
- 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.
<https://standards.iteh.ai/catalog/standards/sist/062cecaa-6d56-4b85-9eb5->
- 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.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 61850-90-17, which is a technical report, has been prepared by IEC technical committee 57: Power systems management and associated information exchange, in cooperation with IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
57/1676/DTR	57/1836/RVDTR

Full information on the voting for the approval of this technical report 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.

A list of all parts of the IEC 61850 series, under the general title *Communication networks and systems for power utility automation*, 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 "<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.

A bilingual version of this publication may be issued at a later date.

ITEH STANDARD PREVIEW
(standards.iteh.ai)

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Power quality (PQ) measurement methods are defined in IEC 61000-4-30.

Power quality measurement instruments are used to evaluate the quality of electricity (voltage characteristics) supplied by distribution and transmission systems and to evaluate the performance (emission) of equipment.

These instruments provide different types of data for different applications of PQ data:

- Power quality monitoring:
 - Continuity of supply monitoring,
 - Monitoring of different voltage characteristics: Voltage quality (VQ) covers a wide range of voltage disturbances and deviations in voltage magnitude or waveform from the optimum values.
- Power quality compliance reporting:
 - Continuous monitoring and compliance reporting of different voltage characteristics at point of connection.
 - Additional data are helpful for:
 - a) Detailed problem analysis (e.g. waveform or transient records),
 - b) Flexible data evaluation (e.g. grid codes for data post processing).

NOTE See also "Document on Guidelines of Good Practice on the Implementation and Use of Voltage Quality Monitoring Systems for Regulatory Purposes, which has been jointly developed by CEER and the ECRB" (C12-EQS-51-03) and CIGRÉ/CIREN Joint Working Group (JWG) C4.112: "Guidelines for Power quality monitoring – measurement locations, processing and presentation of data".

IEC 61850 provides the services and data modeling for transmission of PQ related data from instruments to substation/SCADA systems.

There is a desire to have a communication mechanism that is compliant to the concept of IEC 61850. This document lays out how this shall be done.

File based transmission of PQ data is based on the following standards:

- IEC 60255-24/IEEE Std. C37.111, *Measuring relays and protection equipment – Part 24: Common format for transient data exchange (COMTRADE) for power systems for fault records*,
- IEEE Std. 1159.3, PQDIF for PQ records (events, measurements, records).

During modelling of PQ applications IEC 61850-7-4 and IEC 61850-7-3 will be reviewed.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 90-17: Using IEC 61850 to transmit power quality data

1 Scope

This part of IEC 61850, which is a technical report, provides a way of exchanging power quality data between instruments whose functions include measuring, recording and possibly monitoring power quality phenomena in power supply systems, and clients using them in a way that is compliant to the concepts of IEC 61850.

The main goal is the interoperability of power quality instruments.

NOTE 1 The measurement of PQ phenomena maybe provided by communication e.g. IEC 61850-9-2 or instrument transformers. Their application is outside of the scope of this document.

NOTE 2 This document does not set any limits for power quality values, but only repeats limits from other sources (e.g. EN 50160, IEC TS 62749) as suitable examples.

NOTE 3 This document provides recommendations for naming conventions for PQ measurements provided by power quality instruments to manifest the usage of Power quality measurement methods and to ensure interoperability.

This document provides

- Guidelines for using of IEC 61850 for power quality domain,
- Name space extensions based on power quality function assessment,
- Profile for using IEC 61850 in the specific context of IEC 61000-4-30.

Specific power quality requirements that cannot be wholly covered with existing Logical Nodes (LN) or Common Data Classes (CDC) (e.g. LN for continuous power quality recorders, LN for RVC, etc.) will be addressed and added in the next editions of IEC 61850-7-3 and IEC 61850-7-4.

NOTE 4 This document references to/is compliance with the future 61850 amendment 2.1, and also bring the needed elements which are mandatory to understand the document; at least the new presence conditions rules, as well as the enumeration models.

The namespace introduced by this document in Clause 7 has the following properties:

- Namespace Version: 2016
- Namespace Revision:
- UML model file which reflects this namespace edition: wg10uml02v20draftPQ00-wg18uml02v11b-wg17uml02v17c-jwg25uml02v04c-tc17umlv0-tc38umlv0.eap, UML model version WG10UML02v20DraftUpdate
- Namespace release date: 2017-01-17
- Namespace name: "(Tr)IEC61850-90-17:2016"

This name space is considered as "transitional" since the models are expected to be included in future editions of IEC 61850-7-4xx. Potential extensions/modifications may happen if/when the models are moved to International Standard status. Only the new data objects and CDCs which are represented in bold-italic will be tagged with this namespace name. The others still refer to the namespace where they are primarily defined.

The Profile (set of additional rules) for using IEC 61850 in the specific context of IEC 61000-4-30, introduced in this document in Clause 6 is named “Profile_61000-4-30_(Tr)IEC61850-90-17:2016”.

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 TR 61000-3-6, *Electromagnetic compatibility (EMC) – Part 3-6: Limits – Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems*

IEC TR 61000-3-7, *Electromagnetic compatibility (EMC) – Part 3-7: Limits – Assessment of emission limits for the connection of fluctuating installations to MV, HV and EHV power systems*

IEC TR 61000-3-13, *Electromagnetic compatibility (EMC) – Part 3-13: Limits – Assessment of emission limits for the connection of unbalanced installations to MV, HV and EHV power systems*

IEC TR 61000-3-14, *Electromagnetic compatibility (EMC) – Part 3-14: Assessment of emission limits for harmonics, interharmonics, voltage fluctuations and unbalance for the connection of disturbing installations to LV power systems*

IEC 61000-4-7:2009, *Electromagnetic compatibility (EMC) – Part 4-7: Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

IEC 61000-4-15:2010, *Electromagnetic compatibility (EMC) – Part 4-15: Testing and measurement techniques – Flickermeter – Functional and design specifications*

IEC 61000-4-30:2015, *Electromagnetic compatibility (EMC) – Part 4-30: Testing and measurement techniques – Power quality measurement methods*

IEC TS 61850-2, *Communication networks and systems in substations – Part 2: Glossary*

IEC 61850-7-1:2011, *Communication networks and systems for power utility automation – Part 7-1: Basic communication structure – Principles and models*

IEC 61850-7-2:2010, *Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)*

IEC 61850-7-4, *Communication networks and systems for power utility automation – Part 7-4: Basic communication structure – Compatible logical node classes and data object classes*

IEC 61850-8-1:2011, *Communication networks and systems for power utility automation – Part 8-1: Specific communication service mapping (SCSM) – Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3*

IEC TR 61850-90-2, *Communication networks and systems for power utility automation – Part 90-2: Using IEC 61850 for the communication between substations and control centres*

IEC 62586-1:2013, *Power quality measurement in power supply systems – Part 1: Power quality instruments (PQI)*

IEC TS 62749:2015, *Assessment of power quality – Characteristics of electricity supplied by public networks*

IEEE Std. 1159.3:2003, *Power Quality Data Interchange Format (PQDIF)*

EN 51060, *Voltage characteristics in public distribution systems*

3 Terms and definitions

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

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

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

3.1

power quality instrument

PQI

instrument according to IEC 62586-1 whose main function is to measure, record and possibly monitor power quality parameters in power supply systems, and whose measuring methods (class A or class S) are defined in IEC 61000-4-30

3.2

power quality instrument class A

PQI-A

PQI according to IEC 62586-1 whose measuring methods comply with class A of IEC 61000-4-30

3.3

channel

individual measurement path through an instrument

Note 1 to entry: "Channel" and "phase" are not the same. A voltage channel is by definition the difference in potential between 2 conductors. Phase refers to a single conductor. On polyphase systems, a channel may be between 2 phases, or between a phase and neutral, or between a phase and earth, or between neutral and earth.

3.4

power quality instrument class S

PQI-S

PQI according to IEC 62586-1 whose measuring methods comply with class S of IEC 61000-4-30

3.5

declared input voltage

U_{di}

value obtained from the declared supply voltage by a transducer ratio

3.6

declared supply voltage

U_c

nominal voltage U_n of the system

Note 1 to entry: If by agreement between the supplier and the customer a voltage different from the nominal voltage is applied to the terminals, then this voltage is the declared supply voltage U_c .

3.7

flicker

impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time

[SOURCE: IEC 60050-161:1990, 161-08-13]

3.8

power quality

characteristics of the electricity at a given point on an electrical system, evaluated against a set of reference technical parameters

Note 1 to entry: These parameters might, in some cases, relate to the compatibility between electricity supplied on a network and the loads connected to that network.

3.9

r.m.s. (root-mean-square) value

square root of the arithmetic mean of the squares of the instantaneous values of a quantity taken over a specified time interval and a specified bandwidth

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in IEC TS 61850-2 and IEC 61850-7-2 and the following apply.

ACSI	Abstract communication service interface
CDC	Common Data Class
COMFEDE	Common format for event data exchange
COMTRADE	Common format for transient data exchange
Ds	derived statistics
DB	Database
DMS	Distribution Management System
DO	Data Object
EHV	Extra high voltage
EMS	Energy management system
EMC	Electromagnetic Compatibility
F	Element is forbidden
GMS	Generation Management System
HV	High voltage (> 35 kV)
IED	Intelligent Electronic Device
IP	Internet Protocol
LAN	Local Area Network
LD	Logical Device
LN	Logical Node
LV	Low voltage (< 1 kV)
M	Element is mandatory
MMS	Manufacturing Messaging Specification. See IEC 61850-8-1
M-O-C	mandatory – optional – conditional
MS	Management System
MSV	Mains signalling voltage (ripple control)
MV	Medium voltage (1 kV to 35 kV)
n/a	Not applicable