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IEC/TR 61850-90-7

Edition 1.0 2013-02

# TECHNICAL REPORT



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**Communication networks and systems for power utility automation –  
Part 90-7: Object models for power converters in distributed energy resources  
(DER) systems**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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ICS 33.200

ISBN 978-2-83220-647-8

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## CONTENTS

FOREWORD.....	7
1 Scope.....	9
2 Normative references .....	9
3 Terms, definitions and acronyms .....	10
3.1 Terms and definitions .....	10
3.2 Acronyms .....	13
4 Abbreviated terms .....	14
5 Overview of power converter-based DER functions .....	15
5.1 General.....	15
5.2 Power converter configurations and interactions.....	16
5.3 Power converter methods.....	18
5.4 Power converter functions .....	19
5.5 Differing DER architectures .....	20
5.5.1 Conceptual architecture: electrical coupling point (ECP).....	20
5.5.2 Conceptual architecture: point of common coupling (PCC).....	20
5.5.3 Utility interactions directly with power converters or indirectly via a customer EMS .....	21
5.5.4 Communication profiles .....	21
5.6 General Sequence of information exchange interactions .....	22
6 Concepts and constructs for managing power converter functions .....	23
6.1 Basic settings of power converters .....	23
6.1.1 Nameplate values versus basic settings .....	23
6.1.2 Power factor and power converter quadrants .....	23
6.1.3 Maximum watts, vars, and volt-amp settings .....	25
6.1.4 Active power ramp rate settings.....	27
6.1.5 Voltage phase and correction settings .....	27
6.1.6 Charging settings .....	28
6.1.7 Example of basic settings .....	28
6.1.8 Basic setting process.....	29
6.2 Modes for managing autonomous behaviour.....	29
6.2.1 Benefits of modes to manage DER at ECPs.....	29
6.2.2 Modes using curves to describe behaviour .....	30
6.2.3 Paired arrays to describe mode curves .....	31
6.2.4 Percentages as size-neutral parameters: voltage and var calculations.....	32
6.2.5 Hysteresis as values cycle within mode curves .....	32
6.2.6 Low pass exponential time rate.....	33
6.2.7 Ramp rates.....	34
6.2.8 Randomized response times.....	34
6.2.9 Timeout period .....	35
6.2.10 Multiple curves for a mode.....	35
6.2.11 Multiple modes .....	35
6.2.12 Use of modes for loosely coupled, autonomous actions .....	35
6.3 Schedules for establishing time-based behaviour .....	35
6.3.1 Purpose of schedules .....	35
6.3.2 Schedule components .....	36
7 DER management functions for power converters.....	37

7.1	Immediate control functions for power converters .....	37
7.1.1	General .....	37
7.1.2	Function INV1: connect / disconnect from grid .....	38
7.1.3	Function INV2: adjust maximum generation level up/down.....	38
7.1.4	Function INV3: adjust power factor .....	39
7.1.5	Function INV4: request active power (charge or discharge storage).....	39
7.1.6	Function INV5: pricing signal for charge/discharge action .....	40
7.2	Modes for volt-var management .....	41
7.2.1	VAr management modes using volt-var arrays .....	41
7.2.2	Example setting volt-var mode VV11: available var support mode with no impact on watts .....	42
7.2.3	Example setting volt-var mode VV12: maximum var support mode based on <i>WMax</i> .....	44
7.2.4	Example setting volt-var mode VV13: static power converter mode based on settings .....	45
7.2.5	Example setting volt-var mode VV14: passive mode with no var support .....	46
7.3	Modes for frequency-related behaviours .....	47
7.3.1	Frequency management modes .....	47
7.3.2	Frequency-watt mode FW21: high frequency reduces active power .....	48
7.3.3	Frequency-watt mode FW22: constraining generating/charging by frequency .....	50
7.4	Dynamic reactive current support during abnormally high or low voltage levels .....	53
7.4.1	Purpose of dynamic reactive current support .....	53
7.4.2	Dynamic reactive current support mode TV31: support during abnormally high or low voltage levels .....	54
7.5	Low/high voltage ride-through curves for “must disconnect” and “must remain connected” zones .....	57
7.5.1	Purpose of L/HVRT.....	57
7.5.2	“Must disconnect” (MD) and “must remain connected” (MRC) curves .....	57
7.6	Modes for watt-triggered behaviours.....	59
7.6.1	Watt-power factor mode WP41: feed-in power controls power factor.....	59
7.6.2	Alternative watt-power factor mode WP42: feed-in power controls power factor .....	59
7.7	Modes for voltage-watt management .....	60
7.7.1	Voltage-watt mode VW51: voltage-watt management: generating by voltage .....	60
7.7.2	Voltage-watt mode VW52: voltage-watt management: charging by voltage .....	60
7.8	Modes for behaviours triggered by non-power parameters.....	61
7.8.1	Temperature mode TMP .....	61
7.8.2	Pricing signal mode PS.....	61
7.9	Setting and reporting functions .....	62
7.9.1	Purpose of setting and reporting functions .....	62
7.9.2	Establishing settings DS91: modify power converter-based DER settings .....	62
7.9.3	Event logging DS92: log alarms and events, retrieve logs.....	62
7.9.4	Reporting status DS93: selecting status points, establishing reporting mechanisms .....	66
7.9.5	Time synchronization DS94: time synchronization requirements .....	68
8	IEC 61850 information models for power converter-based functions .....	68

8.1	Overall structure of IEC 61850 .....	68
8.2	IEC 61850 system logical nodes .....	69
8.3	Key components of IEC 61850 information modelling of power converter-based functions .....	71
8.3.1	Subsets of 61850 models for power converter-based DER functions .....	71
8.3.2	Types of interactions for settings, functions, and modes .....	72
8.3.3	Key common data classes (CDCs) .....	73
8.3.4	Messaging services .....	77
8.3.5	Message errors .....	78
8.4	Basic settings in IEC 61850 .....	78
8.4.1	Logical nodes for basic settings .....	78
8.4.2	IEC 61850 models for basic settings .....	79
8.5	Mode settings in IEC 61850 .....	80
8.5.1	Logical nodes for establishing and managing modes .....	80
8.5.2	IEC 61850 models for modes .....	81
8.6	Schedules in IEC 61850 .....	83
8.6.1	Scheduling structures .....	83
8.6.2	IEC 61850 models for schedules .....	84
8.7	Immediate control functions in IEC 61850 .....	84
8.7.1	IEC 61850 models for INV1: connect/disconnect .....	84
8.7.2	IEC 61850 models for INV2: adjust maximum generation level up/down .....	85
8.7.3	IEC 61850 models for INV3: adjust power factor .....	86
8.7.4	IEC 61850 models for INV4: charge/discharge storage .....	86
8.7.5	IEC 61850 models for INV5: pricing signal for charge/discharge of storage .....	87
8.8	Volt-var management modes in IEC 61850 .....	88
8.8.1	IEC 61850 models for VV11 – VV12: volt-var curve settings .....	88
8.8.2	IEC 61850 models for VV13 – VV14: volt-var parameter settings .....	88
8.9	Frequency-related modes in IEC 61850 .....	89
8.9.1	IEC 61850 for FW21: frequency-driven active power modification .....	89
8.9.2	IEC 61850 for FW22: Frequency-watt mode FW22: generating/charging by frequency .....	90
8.10	Voltage management modes in IEC 61850 .....	91
8.10.1	IEC 61850 for TV31: dynamic reactive current support .....	91
8.10.2	IEC 61850 for “must disconnect” .....	92
8.10.3	IEC 61850 for “must remain connected” .....	92
8.11	Watt-triggered behaviour modes in IEC 61850 .....	93
8.11.1	IEC 61850 for WP41 and WP42: feed-in watts control of power factor .....	93
8.12	Voltage-watt management modes in IEC 61850 .....	94
8.12.1	IEC 61850 for VW51: voltage-watt management in generation and charging .....	94
8.13	Non-power mode behaviours in IEC 61850 .....	95
8.13.1	IEC 61850 models for temperature mode TMP .....	95
8.13.2	IEC 61850 models for pricing signal mode PS .....	95
8.14	IEC 61850 reporting commands .....	96
8.14.1	IEC 61850 models for DS91: modify DER settings .....	96
8.14.2	IEC 61850 models for DS92: event/history logging .....	96
8.14.3	IEC 61850 models for DS93: status reporting .....	97
	Bibliography .....	102

Figure 1 – DER management hierarchical interactions: autonomous, loosely-coupled, broadcast/multicast.....	18
Figure 2 – Electrical Connection Points (ECP) and Point of Common Coupling (PCC) .....	21
Figure 3 – Producer and Consumer Reference Frame conventions .....	24
Figure 4 – EEI Power Factor sign convention.....	25
Figure 5 – Working areas for different modes.....	26
Figure 6 – Example of voltage offsets ( $V_{RefOfs}$ ) with respect to the reference voltage ( $V_{Ref}$ ).....	28
Figure 7 – Example of modes associated with different ECPs .....	30
Figure 8 – Example of a volt-var mode curve .....	31
Figure 9 – Example of hysteresis in volt-var curves.....	33
Figure 10 – Example of deadband in volt-var curves .....	33
Figure 11 – Local function block diagram .....	34
Figure 12 – Time domain response of first order low pass filter.....	34
Figure 13 – Interrelationships of schedule controllers, schedules, and schedule references .....	37
Figure 14 – Volt-var mode VV11 – available vars mode .....	43
Figure 15 – Power converter mode VV12 – Maximum var support mode based on $W_{Max}$ .....	44
Figure 16 – Power converter mode VV13 – Example: static var support mode based on $V_{ArMax}$ .....	46
Figure 17 – Frequency-watt mode curves.....	48
Figure 18 – Frequency-based active power reduction .....	49
Figure 19 – Frequency-based active power modification with the use of an array.....	50
Figure 20 – Example of a basic frequency-watt mode configuration .....	51
Figure 21 – Example array settings with hysteresis.....	52
Figure 22 – Example of an asymmetrical hysteresis configuration.....	52
Figure 23 – Example array configuration for absorbed watts vs. frequency .....	53
Figure 24 – Basic concepts of the dynamic reactive current support function .....	54
Figure 25 – Calculation of delta voltage over the filter time window.....	55
Figure 26 – Activation zones for dynamic reactive current support.....	55
Figure 27 – Alternative gradient behaviour, selected by ArGraMod .....	56
Figure 28 – Settings to define a blocking zone.....	57
Figure 29 – Must disconnect and must remain connected zones .....	58
Figure 30 – Examples of “must remain connected” requirements for different regions .....	58
Figure 31 – Power factor controlled by feed-in power.....	59
Figure 32 – Example configuration curve for maximum watts vs. voltage .....	60
Figure 33 – Example configuration curve for maximum watts absorbed vs. voltage .....	61
Figure 34 – Structure of the IEC 61850 Parts.....	69
Figure 35 – Interrelationships of schedule controllers, schedules, and schedule references .....	84
Table 1 – Producer Reference Frame (PRF) conventions.....	24
Table 2 – Example basic settings for a storage DER unit .....	28

Table 3 – Events.....	64
Table 4 – Examples of status points.....	66
Table 5 – Interpretation of logical node tables.....	70
Table 6 – LPHD class .....	70
Table 7 – Common LN class .....	71
Table 8 – LLN0 class .....	71
Table 9 – CDC SPS .....	73
Table 10 – CDC SPC .....	73
Table 11 – CDC DPC.....	74
Table 12 – CDC INC .....	74
Table 13 – CDC ING .....	75
Table 14 – CDC ASG.....	75
Table 15 – CDC ORG .....	76
Table 16 – CDC CSG.....	76
Table 17 – Schedule (SCR) common data class specification .....	77
Table 18 – Service error type definitions .....	78
Table 19 – LN DRCT – DER controller characteristics.....	79
Table 20 – LN FMAR – set mode array .....	81
Table 21 – LN DGSM – issue mode command .....	83
Table 22 – LN DOPM – operations.....	85
Table 23 – INV1 – LN CSWI – issue and respond to control.....	85
Table 24 – LN FWHZ – set power levels by frequency for FW21 .....	90
Table 25 – LN RDGS – dynamic reactive current support for TV31 .....	92
Table 26 – LN PPFW – set power factor by feed-in power for WP41 .....	94
Table 27 – DS92 – IEC 61850 log structure .....	97
Table 28 – LN DRCS – DER state for DS93.....	99
Table 29 – DS93 – Status, settings, and measurement points.....	99

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

#### Part 90-7: Object models for power converters in distributed energy resources (DER) systems

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IEC 61850-90-7, which is a technical report, has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

Enquiry draft	Report on voting
57/1239/DTR	57/1281/RVC

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 publication 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.

Only the new data objects and CDCs which are represented in ***bold-italic*** will be tagged with the namespace name of this document. The others should still refer to the namespace where they are primarily defined.

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

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

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## COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

### Part 90-7: Object models for power converters in distributed energy resources (DER) systems

#### 1 Scope

This part of IEC 61850 describes the functions for power converter-based distributed energy resources (DER) systems, focused on DC-to-AC and AC-to-AC conversions and including photovoltaic systems (PV), battery storage systems, electric vehicle (EV) charging systems, and any other DER systems with a controllable power converter. It defines the IEC 61850 information models to be used in the exchange of information between these power converter-based DER systems and the utilities, energy service providers (ESPs), or other entities which are tasked with managing the volt, var, and watt capabilities of these power converter-based systems.

These power converter-based DER systems can range from very small grid-connected systems at residential customer sites, to medium-sized systems configured as microgrids on campuses or communities, to very large systems in utility-operated power plants, and to many other configurations and ownership models. They may or may not combine different types of DER systems behind the power converter, such as an power converter-based DER system and a battery that are connected at the DC level.

The namespace of this document is:

“(Tr) IEC 61850-90-7:2012”

The namespace "IEC 61850-90-7" is considered as "transitional" since the models are expected to be included in IEC 61850-7-420. Potential extensions/modifications may happen if/when the models are moved to International Standard status.

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NOTE The term power converter is being used in place of “inverter” since it covers more types of conversion from input to output power:

- AC to DC (rectifier)
- DC to AC (inverter)
- DC to DC (DC-to-DC converter)
- AC to AC (AC-to-AC converter)

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 61850-7-3, *Communication networks and systems for power utility automation – Part 7-3: Basic communication structure – Common data classes*

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 61850-7-410, *Communication networks and systems for power utility automation – Part 7-410: Hydroelectric power plants – Communication for monitoring and control*

IEC 61850-7-420, *Communication networks and systems for power utility automation – Part 7-420: Basic communication structure – Distributed energy resources logical nodes*

IEC 61850-8-1, *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*

ISO 4217, *Codes for the representation of currencies and funds*

*EI Handbook for Electricity Metering*, 10<sup>th</sup> Edition (2002), Edison Electric Institute, Washington, D.C.