

DIN EN 61850-7-4:2010-11 (E)

Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes (IEC 61850-7-4:2010); English version EN 61850-7-4:2010

Inhalt

Seite

INTRODUCTION.....	10
1 Scope.....	11
2 Normative references	12
3 Terms and definitions	13
4 Abbreviated terms	13
5 Logical node classes	19
5.1 Logical node groups	19
5.2 Interpretation of logical node tables.....	20
5.3 System logical nodes LN group: L	21
5.3.1 LN relationships	21
5.3.2 LN: Physical device information Name: LPHD.....	22
5.3.3 LN: common logical node Name: Common LN	22
5.3.4 LN: Logical node zero Name: LLN0	24
5.3.5 LN: Physical communication channel supervision Name: LCCH.....	24
5.3.6 LN: GOOSE subscription Name: LGOS	25
5.3.7 LN: Sampled value subscription Name: LSVS.....	25
5.3.8 LN: Time management Name: LTIM.....	26
5.3.9 LN: Time master supervision Name: LTMS	26
5.3.10 LN: Service tracking Name: LTRK	27
5.4 Logical nodes for automatic control LN Group: A.....	27
5.4.1 Modelling remarks	27
5.4.2 LN: Neutral current regulator Name: ANCR	28
5.4.3 LN: Reactive power control Name: ARCO	29
5.4.4 LN: Resistor control Name: ARIS.....	29
5.4.5 LN: Automatic tap changer controller Name: ATCC	30
5.4.6 LN: Voltage control Name: AVCO	32
5.5 Logical nodes for control LN Group: C.....	32
5.5.1 Modelling remarks	32
5.5.2 LN: Alarm handling Name: CALH.....	32
5.5.3 LN: Cooling group control Name: CCGR.....	33
5.5.4 LN: Interlocking Name: CILO	34
5.5.5 LN: Point-on-wave switching Name: CPOW	34
5.5.6 LN: Switch controller Name: CSWI	34
5.5.7 LN: Synchronizer controller Name: CSYN	35
5.6 Logical nodes for functional blocks LN group F	37
5.6.1 Modelling remarks	37
5.6.2 LN: Counter Name: FCNT.....	37
5.6.3 LN: Curve shape description Name: FCSD	37

5.6.4	LN: Generic filter	Name: FFIL	38
5.6.5	LN: Control function output limitation	Name: FLIM	38
5.6.6	LN: PID regulator	Name: FPID	39
5.6.7	LN: Ramp function	Name: FRMP	40
5.6.8	LN: Set-point control function	Name: FSPT	40
5.6.9	LN: Action at over threshold	Name: FXOT	41
5.6.10	LN: Action at under threshold	Name: FXUT	41
5.7	Logical nodes for generic references	LN Group: G	42
5.7.1	Modelling remarks		42
5.7.2	LN: Generic automatic process control	Name: GAPC	42
5.7.3	LN: Generic process I/O	Name: GGIO	43
5.7.4	LN: Generic log	Name: GLOG	43
5.7.5	LN: Generic security application	Name: GSAL	44
5.8	Logical nodes for interfacing and archiving	LN Group: I	44
5.8.1	Modelling remarks		44
5.8.2	LN: Archiving	Name: IARC	44
5.8.3	LN: Human machine interface	Name: IHMI	45
5.8.4	LN: Safety alarm function	Name: ISAF	45
5.8.5	LN: Telecontrol interface	Name: ITCI	46
5.8.6	LN: Telemonitoring interface	Name: ITMI	46
5.8.7	LN: Teleprotection communication interfaces	Name: ITPC	46
5.9	Logical nodes for mechanical and non-electric primary equipment	LN group K	48
5.9.1	Modelling remarks		48
5.9.2	LN: Fan	Name: KFAN	48
5.9.3	LN: Filter	Name: KFIL	48
5.9.4	LN: Pump	Name: KPMP	49
5.9.5	LN: Tank	Name: KTNK	49
5.9.6	LN: Valve control	Name: KVLV	50
5.10	Logical nodes for metering and measurement	LN Group: M	51
5.10.1	Modelling remarks		51
5.10.2	LN: Environmental information	Name: MENV	51
5.10.3	LN: Flicker measurement name	Name: MFLK	52
5.10.4	LN: Harmonics or interharmonics	Name: MHAI	53
5.10.5	LN: Non-phase-related harmonics or interharmonics	Name: MHAN	54
5.10.6	LN: Hydrological information	Name: MHYD	56
5.10.7	LN: DC measurement	Name: MMDC	56
5.10.8	LN: Meteorological information	Name: MMET	56
5.10.9	LN: Metering	Name: MMTN	57
5.10.10	LN: Metering	Name: MMTR	58
5.10.11	LN: Non-phase-related measurement	Name: MMXN	58
5.10.12	LN: Measurement	Name: MMXU	58
5.10.13	LN: Sequence and imbalance	Name: MSQI	60
5.10.14	LN: Metering statistics	Name: MSTA	61
5.11	Logical nodes for protection functions	LN Group: P	61
5.11.1	Modelling remarks		61
5.11.2	LN: Differential	Name: PDIF	62
5.11.3	LN: Direction comparison	Name: PDIR	63
5.11.4	LN: Distance	Name: PDIS	64
5.11.5	LN: Directional overpower	Name: PDOP	64

5.11.6	LN: Directional underpower	Name: PDUP	65
5.11.7	LN: Rate of change of frequency	Name: PFRC	65
5.11.8	LN: Harmonic restraint	Name: PHAR	66
5.11.9	LN: Ground detector	Name: PHIZ	66
5.11.10	LN: Instantaneous overcurrent	Name: PIOC	67
5.11.11	LN: Motor restart inhibition	Name: PMRI	67
5.11.12	LN: Motor starting time supervision	Name: PMSS	68
5.11.13	LN: Over power factor	Name: POPF	68
5.11.14	LN: Phase angle measuring	Name: PPAM	68
5.11.15	LN: Rotor protection	Name: PRTR	69
5.11.16	LN: Protection scheme	Name: PSCH	69
5.11.17	LN: Sensitive directional earthfault	Name: PSDE	70
5.11.18	LN: Transient earth fault	Name: PTEF	71
5.11.19	LN: Thyristor protection	Name: PTHF	71
5.11.20	LN: Time overcurrent	Name: PTOC	71
5.11.21	LN: Overfrequency	Name: PTOF	72
5.11.22	LN: Overvoltage	Name: PTOV	73
5.11.23	LN: Protection trip conditioning	Name: PTRC	73
5.11.24	LN: Thermal overload	Name: PTTR	74
5.11.25	LN: Undercurrent	Name: PTUC	74
5.11.26	LN: Underfrequency	Name: PTUF	75
5.11.27	LN: Undervoltage	Name: PTUV	75
5.11.28	LN: Underpower factor	Name: PUPF	76
5.11.29	LN: Voltage controlled time overcurrent	Name: PVOC	76
5.11.30	LN: Volts per Hz	Name: PVPH	77
5.11.31	LN: Zero speed or underspeed	Name: PZSU	78
5.12	Logical nodes for power quality events	LN Group: Q	78
5.12.1	Modelling remarks		78
5.12.2	LN: Frequency variation	Name: QFVR	78
5.12.3	LN: Current transient	Name: QITR	79
5.12.4	LN: Current unbalance variation	Name: QIUB	79
5.12.5	LN: Voltage transient	Name: QVTR	80
5.12.6	LN: Voltage unbalance variation	Name: QVUB	80
5.12.7	LN: Voltage variation	Name: QVVR	81
5.13	Logical nodes for protection related functions	LN Group: R	81
5.13.1	Modelling remarks		81
5.13.2	LN: Disturbance recorder channel analogue	Name: RADR	82
5.13.3	LN: Disturbance recorder channel binary	Name: RBDR	82
5.13.4	LN: Breaker failure	Name: RBRF	83
5.13.5	LN: Directional element	Name: RDIR	83
5.13.6	LN: Disturbance recorder function	Name: RDRE	84
5.13.7	LN: Disturbance record handling	Name: RDRS	85
5.13.8	LN: Fault locator	Name: RFLO	85
5.13.9	LN: Differential measurements	Name: RMXU	86
5.13.10	LN: Power swing detection/blocking	Name: RPSB	86
5.13.11	LN: Autoreclosing	Name: RREC	87
5.13.12	LN: Synchronism-check	Name: RSYN	87
5.14	Logical nodes for supervision and monitoring	LN Group: S	88
5.14.1	Modelling remarks		88

5.14.2	LN: Monitoring and diagnostics for arcs	Name: SARC	89
5.14.3	LN: Circuit breaker supervision	Name: SCBR	89
5.14.4	LN: Insulation medium supervision (gas)	Name: SIMG	90
5.14.5	LN: Insulation medium supervision (liquid)	Name: SIML	91
5.14.6	LN: Tap changer supervision	Name: SLTC	92
5.14.7	LN: Supervision of operating mechanism	Name: SOPM	92
5.14.8	LN: Monitoring and diagnostics for partial discharges	Name: SPDC	93
5.14.9	LN: Power transformer supervision	Name: SPTR	94
5.14.10	LN: Circuit switch supervision	Name: SSWI	94
5.14.11	LN: Temperature supervision	Name: STMP	95
5.14.12	LN: Vibration supervision	Name: SVBR	96
5.15	Logical nodes for instrument transformers and sensors	LN Group: T	97
5.15.1	Modelling remarks		97
5.15.2	LN: Angle	Name: TANG	97
5.15.3	LN: Axial displacement	Name: TAXD	97
5.15.4	LN: Current transformer	Name: TCTR	98
5.15.5	LN: Distance	Name: TDST	98
5.15.6	LN: Liquid flow	Name: TFLW	99
5.15.7	LN: Frequency	Name: TFRQ	99
5.15.8	LN: Generic sensor	Name: TGSN	100
5.15.9	LN: Humidity	Name: THUM	100
5.15.10	LN: Media level	Name: TLVL	101
5.15.11	LN: Magnetic field	Name: TMGF	101
5.15.12	LN: Movement sensor	Name: TMVM	101
5.15.13	LN: Position indicator	Name: TPOS	102
5.15.14	LN: Pressure sensor	Name: TPRS	102
5.15.15	LN: Rotation transmitter	Name: TRTN	103
5.15.16	LN: Sound pressure sensor	Name: TSND	103
5.15.17	LN: Temperature sensor	Name: TTMP	104
5.15.18	LN: Mechanical tension / stress	Name: TTNS	104
5.15.19	LN: Vibration sensor	Name: TVBR	105
5.15.20	LN: Voltage transformer	Name: TVTR	105
5.15.21	LN: Water acidity	Name: TWPH	106
5.16	Logical nodes for switchgear	LN Group: X	106
5.16.1	Modelling remarks		106
5.16.2	LN: Circuit breaker	Name: XCBR	106
5.16.3	LN: Circuit switch	Name: XSWI	107
5.17	Logical nodes for power transformers	LN Group: Y	108
5.17.1	Modelling remarks		108
5.17.2	LN: Earth fault neutralizer (Petersen coil)	Name: YEFN	108
5.17.3	LN: Tap changer	Name: YLTC	109
5.17.4	LN: Power shunt	Name: YPSH	109
5.17.5	LN: Power transformer	Name: YPTR	109
5.18	Logical nodes for further power system equipment	LN Group: Z	110
5.18.1	Modelling remarks		110
5.18.2	LN: Auxilliary network	Name: ZAXN	110
5.18.3	LN: Battery	Name: ZBAT	111
5.18.4	LN: Bushing	Name: ZBSH	111
5.18.5	LN: Power cable	Name: ZCAB	111

5.18.6	LN: Capacitor bank Name: ZCAP	112
5.18.7	LN: Converter Name: ZCON	112
5.18.8	LN: Generator Name: ZGEN.....	112
5.18.9	LN: Gas insulated line Name: ZGIL	113
5.18.10	LN: Power overhead line Name: ZLIN.....	113
5.18.11	LN: Motor Name: ZMOT	114
5.18.12	LN: Reactor Name: ZREA.....	114
5.18.13	LN: Resistor Name: ZRES	115
5.18.14	LN: Rotating reactive component Name: ZRRC	115
5.18.15	LN: Surge arrester Name: ZSAR	116
5.18.16	LN: Semi-conductor controlled rectifier Name: ZSCR	116
5.18.17	LN: Synchronous machine Name: ZSMC	116
5.18.18	LN: Thyristor controlled frequency converter Name: ZTCF	118
5.18.19	LN: Thyristor controlled reactive component Name: ZTCR.....	118
6	Data object name semantics.....	118
Annex A	(normative) Interpretation of mode and behaviour.....	157
Annex B	(normative) Local / Remote concept.....	159
Annex C	(informative) Deprecated logical node classes	161
Annex D	(informative) Relationship between this standard and IEC 61850-5.....	162
Annex E	(informative) Algorithms used in logical nodes for automatic control	163
Annex F	(normative) Statistical calculation.....	168
Annex G	(normative) Functional relationship of data objects of autorecloser RREC	173
Annex H	(normative) SCL enumerations	174
Bibliography	180
Figure 1	– Overview of this standard.....	12
Figure 2	– LOGICAL NODE relationships.....	21
Figure E.1	– Example of curve based on an indexed gate position providing water flow	163
Figure E.2	– Example of curve based on an indexed guide vane position (x axis) vs. net head (y axis) giving an interpolated runner blade position (Z axis)	164
Figure E.3	– Example of a proportional-integral-derivate controller	165
Figure E.4	– Example of a power stabilisation system.....	166
Figure E.5	– Example of a ramp generator.....	166
Figure E.6	– Example of an interface with a set-point algorithm	167
Figure F.1	– Statistical calculation of a vector.....	169
Figure F.2	– Examples of statistical calculations	171
Figure G.1	– Diagram of autorecloser function	173
Table 1	– List of logical node groups.....	19
Table 2	– Interpretation of logical node tables	20
Table 3	– Relation between IEC 61850-5 and IEC 61850-7-4 for automatic control LNs	28
Table 4	– Relation between IEC 61850-5 and IEC 61850-7-4 for control LNs	32
Table 5	– Conditional attributes in FPID	40

Table 6 – Relation between IEC 61850-5 and IEC 61850-7-4 for metering and measurement LNs	51
Table 7 – Relation between IEC 61850-5 and IEC 61850-7-4 (this standard) for protection LNs	61
Table 8 – Relation between IEC 61850-5 and IEC 61850-7-4 for protection related LN	82
Table 9 – Relation between IEC 61850-5 and IEC 61850-7-4 for supervision and monitoring LNs	88
Table 10 – Description of data objects	118
Table A.1 – Values of mode and behaviour	157
Table A.2 – Definition of mode and behaviour	158
Table B.1 – Relationship between Loc/Rem data objects and control authority	160
Table D.1 – Relationship between IEC 61850-5 and this standard for some miscellaneous LNs	162