



SLOVENSKI STANDARD
SIST EN 61850-7-410:2013/A1:2016
01-april-2016

Komunikacijska omrežja in sistemi za avtomatizacijo uporabe električne energije - 7-410. del: Hidroelektrarne - Komunikacije za nadzorovanje in krmiljenje - Dopolnilo A1

Communication networks and systems for power utility automation - Part 7-410: Basic communication structure - Hydroelectric power plants - Communication for monitoring and control

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ICS:

| | | |
|-----------|---|--|
| 27.140 | Vodna energija | Hydraulic energy engineering |
| 29.240.30 | Krmilna oprema za elektroenergetske sisteme | Control equipment for electric power systems |
| 33.200 | Daljinsko krmiljenje, daljinske meritve (telemetrija) | Telecontrol. Telemetry |

SIST EN 61850-7-410:2013/A1:2016 **en**

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EUROPEAN STANDARD

EN 61850-7-410:2013/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2016

ICS 33.200

English Version

Communication networks and systems for power utility
automation - Part 7-410: Basic communication structure -
Hydroelectric power plants - Communication for monitoring
and control
(IEC 61850-7-410:2012/A1:2015)

Réseaux et systèmes de communication pour
l'automatisation des systèmes électriques -
Partie 7-410: Structure de communication de base -
Centrales hydroélectriques - Communication pour le
contrôle-commande
(IEC 61850-7-410:2012/A1:2015)

Kommunikationsnetze und -systeme für die
Automatisierung in der elektrischen Energieversorgung -
Teil 7-410: Grundlegende Kommunikationsstruktur -
Wasserkraftwerke - Kommunikation für Überwachung,
Regelung und Steuerung
(IEC 61850-7-410:2012/A1:2015)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 61850-7-410:2013/A1:2016**European foreword**

The text of document 57/1607/FDIS, future IEC 61850-7-410:2012/A1, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61850-7-410:2013/A1:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-09-17
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-12-17

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The text of the International Standard IEC 61850-7-410:2012/A1:2015 was approved by CENELEC as a European Standard without any modification.



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INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

**Communication networks and systems for power utility automation –
Part 7-410: Basic communication structure – Hydroelectric power plants –
Communication for monitoring and control**

**Réseaux et systèmes de communication pour l'automatisation des systèmes
électriques –
Partie 7-410: Structure de communication de base – Centrales
hydroélectriques – Communication pour le contrôle-commande**

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FOREWORD

This amendment has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this amendment is based on the following documents:

| FDIS | Report on voting |
|--------------|------------------|
| 57/1607/FDIS | 57/1633/RVD |

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website 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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Generic change: the abbreviation "Trb" for Turbine is changed to "Tur", for consistency with other documents in the IEC 61850 series, where it appears in the following cases:

Table 1, Subclause 5.6.26, Table 14.

4 Abbreviated terms

Add the following terms to Table 1.

| Term | Description | Term | Description |
|--------|-----------------------------|--------|----------------|
| Boil | Boiler | Jnt | Joint |
| Cmpr | Compressor | LoPres | Low pressure |
| Cndct | Electrical conductivity [S] | Mft | Main fuel trip |
| Ctl | Control | Msk | Mask |
| Gdv | Guide vanes | Mtx | Matrix |
| HiPres | High pressure | Rh | Re-heat |
| Icp | Intercept | Rlf | Relief |
| Ign | Ignition | Src | Source |
| Iner | Inertia | Stm | Steam |
| Inlet | Inlet (to turbine) | Va | Variable |
| Ip | Intermediate pressure | | |

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5.3 Summary of logical nodes to be used in hydropower plants

Replace the existing title of 5.3 with the following new title:

5.3 Summary of logical node groups to be used in power plants

Table 4 – Logical nodes for automatic functions

Add the following class at the end of Table 4:

| LN Class | Description |
|----------|----------------------------------|
| ASEQ | Generic control action sequencer |

Add, at the end of Subclause 5.3.2, the following new Subclause 5.3.11:

5.3.11 Group E – Thermal power plant specific logical nodes (“Enthalpy”)**Table 16 – Logical nodes representing thermal power**

| LN Class | Description |
|----------|--|
| EBCF | Block control function. This LN will represent one physical device that coordinates the control of the thermal pressure of the steam generator and the electrical power regulation of turbine / generator system. |
| EFCV | Fuel control valve. This LN will represent the physical device of fuel control valve related to the gas turbine in a thermal power plant. |
| EGTU | Gas turbine production unit. This LN represents the physical device of the GT and the generator combination in a thermal power plant. It is intended as an extended rating plate that allows settings of data. It also acts as a placeholder for the current operating conditions of the unit. |
| ESCV | Steam control valve. This LN will represent the physical device of inlet control valve of the steam turbine in a thermal power plant. |
| ESPD | Speed monitoring. This LN is derived from HSPD. |
| ESTU | Steam turbine production unit. This LN represents the physical device of the ST and the generator combination in a thermal power plant. It is intended as an extended rating plate that allows settings of data. It also acts as a placeholder for the current operating conditions of the unit. |
| EUNT | Thermal unit operating mode. The present status of the production unit. |

Table 5 – Logical nodes representing functional blocks

Add the following new logical node classes to Table 5:

| LN Class | Description |
|----------|--|
| FDBF | Dead-band filter. This LN represents a settable filter for dead-band. |
| FMTX | Trip matrix. This LN represents a matrix for linking various trip functions to equipment that shall be tripped or controlled during a fault. |

Add, after Subclause 5.3.3, the following new Subclause 5.3.12:

5.3.12 Group G – Logical nodes for general purposes**Table 17 – Logical nodes representing generic functions references**

| LN Class | Description |
|----------|--|
| GUNT | Production unit operating mode. The present status of the production unit. |

Table 6 – Hydropower specific logical nodes

Replace LN Class "HUNT" with LN Class "GUNT".

Replace LN Class "HSEQ" with LN Class "ASEQ".

Table 9 – Logical nodes for protections

Add the following class at the end of Table 9:

| LN Class | Description |
|----------|---|
| PTUR | Used for detection of under resistance, e.g. due to stator or rotor earth-faults. |

Table 11 – Logical nodes for supervision and monitoring

Add the following class at the beginning of Table 11:

| LN Class | Description |
|----------|--|
| SECW | Supervision of electrical conductivity in water. This logical node represents a system for monitoring of electrical conductivity in water. |

Add, after Subclause 5.3.9, the following new Subclause 5.3.13:

5.3.13 Group T – Transducers and instrument transformers

Table 18 – Logical nodes for transducers

| LN Class | Description |
|----------|---|
| TECW | Measurement of electrical conductivity in water. This logical node represents a generic device for measuring the conductivity in water. |

Add, after Subclause 5.4, the following new Subclause 5.13:

5.13 Logical nodes for thermal power

LN group E

5.13.1 LN: Block coordination function

Name: EBCF

Logical node EBCF shall be used to coordinate the control of the thermal pressure of the steam generator and the electrical power regulation of turbine / generator system.

| EBCF class | | | | | | | | | | | | | | | | |
|---------------------------|-------------------|---|-----------------------|--------|-----------|---|-------------|---|---------------|---|--------------|---|------------|---|--|---|
| Data Object Name | Common Data Class | Explanation | T | M/O/C | | | | | | | | | | | | |
| LNName | | The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2:2010, Clause 22 | | | | | | | | | | | | | | |
| Data Objects | | | | | | | | | | | | | | | | |
| Status information | | | | | | | | | | | | | | | | |
| GasTurUnt | SPS | Gas turbine generation unit {inst} contributing [True = contributing] | | Omulti | | | | | | | | | | | | |
| StmTurUnt | SPS | Steam turbine generation unit {inst} contributing [True = contributing] | | Omulti | | | | | | | | | | | | |
| BoilUnt | SPS | Boiler unit {inst} contributing [True = contributing] | | Omulti | | | | | | | | | | | | |
| BkOpSt | ENS | Status of the block. <table border="1" data-bbox="582 1534 1268 1765"> <thead> <tr> <th>Operational condition</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Undefined</td> <td>0</td> </tr> <tr> <td>Coordinated</td> <td>1</td> </tr> <tr> <td>Boiler Follow</td> <td>2</td> </tr> <tr> <td>Steam Follow</td> <td>3</td> </tr> <tr> <td>Gas Follow</td> <td>4</td> </tr> </tbody> </table> | Operational condition | Value | Undefined | 0 | Coordinated | 1 | Boiler Follow | 2 | Steam Follow | 3 | Gas Follow | 4 | | M |
| Operational condition | Value | | | | | | | | | | | | | | | |
| Undefined | 0 | | | | | | | | | | | | | | | |
| Coordinated | 1 | | | | | | | | | | | | | | | |
| Boiler Follow | 2 | | | | | | | | | | | | | | | |
| Steam Follow | 3 | | | | | | | | | | | | | | | |
| Gas Follow | 4 | | | | | | | | | | | | | | | |
| GasTurErr | MV | Gas turbine generation unit {inst} error. | | Omulti | | | | | | | | | | | | |
| StmTurErr | MV | Steam turbine generation unit {inst} error. | | Omulti | | | | | | | | | | | | |
| BoilErr | MV | Boiler unit {inst} error. | | Omulti | | | | | | | | | | | | |
| JntCtlTag | TAG | Joint control maintenance tag affixed to the equipment | | O | | | | | | | | | | | | |
| UntTag | TAG | Maintenance tag affixed to the unit {inst} | | Omulti | | | | | | | | | | | | |
| CmdBk | SPC | Block operation | | O | | | | | | | | | | | | |

| | | | | |
|-----------|-----|---|---|--------|
| GasTurMft | ACT | Gas turbine generation unit {inst} main fuel trip | T | Omulti |
| BoilMft | ACT | Boiler unit {inst} main fuel trip | T | Omulti |

5.13.2 LN: Fuel Control Valve

Name: EFCV

Logical Node EFCV shall be used to represent the physical device of fuel control valve related to the gas turbine in a thermal power plant. In case of individually controlled control valves, it is possible to instantiate the logical node for each control valve.

| EFCV class | | | | |
|---------------------------|-------------------|---|---|-------|
| Data Object Name | Common Data Class | Explanation | T | M/O/C |
| LNName | | The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2:2010, Clause 22 | | |
| Data Objects | | | | |
| Status information | | | | |
| PosCls | SPS | Control valve closed | | M |
| PosOpn | SPS | Control valve fully open | | M |
| Controls | | | | |
| OpCntRs | INC | Resettable operation counter | | O |
| PosSpt | APC | Position set-point | | O |
| DithAct | SPC | Activate dither | | O |
| Measured values | | | | |
| PosPct | MV | High pressure control valve position as percent of full opening [%] | | C |
| PosDegt | MV | High pressure control valve position in degrees [°] | | C |

Condition: either PosPct or PosDeg shall be used but not both.

5.13.3 LN Gas turbine unit

Name: EGTU

Logical node EGTU shall be used to represent the physical device of a gas turbine in a thermal power plant. The logical node serves as an extended rating plate only, for any operational status and runtime information, the logical node EUNT shall be used. In case of more than one turbine is used to form a single engine, the logical node shall be instantiated for each.

| EGTU class | | | | |
|---------------------------|-------------------|---|---|-------|
| Data Object Name | Common Data Class | Explanation | T | M/O/C |
| LNName | | The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2:2010, Clause 22 | | |
| Data Objects | | | | |
| Status information | | | | |
| OpTmh | INS | Operation time [h] | | O |
| RotDir | ENS | Rotational direction (Clockwise Counter-clockwise Unknown) | | O |
| Settings | | | | |
| TurTyp | ENG | Turbine type | | M |
| SpdRtg | ASG | Turbine rated speed [s^{-1}] | | M |
| TurInert | ASG | Turbine moment of inertia J [kgm^2] | | O |
| TurTrsSpd | ASG | Maximum transient overspeed [s^{-1}] | | O |
| TurRwySpd | ASG | Runaway speed [s^{-1}] | | O |
| PwrRtgTur | ASG | Rated power in turbine mode [MW] | | O |
| FlwRtgTur | ASG | Rated flow in turbine mode [kg/s] | | O |
| MaxPres | ASG | Maximum pressure [Pa] | | O |
| RtgMaxTmp | ASG | Rated maximum temperature [K] | | O |
| VlvClsTmms | ING | Control valve rated closing time [ms] | | O |

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5.13.4 LN: Steam Control Valve**Name: ESCV**

Logical Node ESCV shall be used to represent the physical device of inlet control valve related to the steam turbine in a thermal power plant. In case of individually controlled control valves, it is possible to instantiate the data objects for each control valve.

| ESCV class | | | | |
|---------------------------|-------------------|---|---|--------|
| Data Object Name | Common Data Class | Explanation | T | M/O/C |
| LNName | | The name shall be composed of the class name, the LN-Prefix and LN-Instance-ID according to IEC 61850-7-2:2010, Clause 22 | | |
| Data Objects | | | | |
| Status information | | | | |
| PosCls | SPS | Control valve closed | | M |
| PosOpn | SPS | Control valve fully open | | O |
| SMLkdCls | SPS | Servomotor {inst} locked closed in position | | Omulti |
| SMLkdMnt | SPS | Servomotor {inst} locked in maintenance position | | Omulti |
| TripVlvOpn | SPS | Trip valve open | | O |
| TripVlvCls | SPS | Trip valve closed | | O |
| Controls | | | | |
| OpCntRs | INC | Resetable operation counter | | O |
| PosSpt | APC | Position set-point | | O |
| DithAct | SPC | Activate dither | | O |
| Measured values | | | | |
| PosPct | MV | High pressure control valve position as percent of full opening [%] | | C |
| PosDeg | MV | High pressure control valve position in degrees [°] | | C |