

Track 1 - Generic signal list for demand facilities connected in the transmission grid - requirements for real-time information
Revision: 1.5 **Date 3.12.2018**

Definition of demand facility - DCC art. 2(1):
'demand facility' means a facility which consumes electrical energy and is connected at one or more connection points to the transmission or distribution system. Distribution systems and/or auxiliary supplies of power generation facilities do not constitute demand facilities.

Note! Some of the following signals are subject to specific ownership structures, which must be taken into account in any specific grid connection permit.

Please note that if you want to provide ancillary services from a facility, this may require more signals than those listed below, and there may be further/other requirements from balance responsible parties, etc. You should therefore look into the rules and requirements, as appropriate.

Please note that this is a translation of the original Danish text. In case of inconsistencies, the Danish version shall apply.

| Facility category | Generic signal description | Description | Purpose | Basis for requirement |
|-------------------|--|---|--|--|
| X | Grid connection switch / switch gear status in the facility's point of connection | Indicates if there is an electric connection to the public electricity supply grid. The value must reflect the actual status, not only the required setting. | Used to assess the state of the electricity system (primary side of transformer) | TSO: Signal is required in order to perform a correct state assessment of the electricity system, including calculating the facilities' contributions to short-circuit power in the system. |
| X | Grid connection disconnecter / disconnecter (lines or busbar) (primary side of transformer) | Indicates if there is an electric connection from the public electricity supply grid. The value must reflect the actual status, not only the required setting. | Used to assess the state of the electricity system (primary side of transformer) | TSO: Signal is required in order to perform a correct state assessment of the electricity system, including calculating the facilities' contributions to short-circuit power in the system. |
| X | Earthing switch (primary side of transformer) | Indicates if the facility is earthed. | Used to assess the state of the electricity system (primary side of transformer) | |
| X | Facility switch / switch gear status in facility's connection point (secondary side of transformer) | Indicates if there is an electric connection from the individual facility to the public electricity supply grid. The value must reflect the actual status, not only the required setting. | Used to assess the state of the electricity system (secondary side of transformer) | TSO: Signal is required in order to perform a correct state assessment of the electricity system, including calculating the facilities' contributions to short-circuit power in the system. |
| X | Facility disconnecter / Disconnecter (secondary side of transformer) | Indicates if there is an electric connection from the individual facility to the public electricity supply grid. The value must reflect the actual status, not only the required setting. | Used to assess the state of the electricity system (secondary side of transformer) | TSO: Signal is required in order to perform a correct state assessment of the electricity system, including calculating the facilities' contributions to short-circuit power in the system. |
| X | Earthing switch (secondary side of transformer) | Indicates if the facility is earthed. | Used to assess the state of the electricity system | |
| X | Automatic tap changer control | Indicates the transformer tap changer position > 100kV: < 100kV (step number) (This signal is not applicable if there is no active tap changer). | Used to model transformer status | |
| X | Switch gear status of facility (secondary side of transformer) (signal required if parallel switching is possible) | Indicates connections between possible parallel-connected transformers connected in the same substation > 100kV. | Used to assess the state of the electricity system (secondary side of transformer) | TSO: Signal is required in order to perform a correct state assessment of the electricity system, including calculating the facilities' contributions to short-circuit power in the system. |
| X | Voltage measured in the point of connection (U) (primary side of transformer) | Measurement of RMS voltage | State assessment of the electricity system | TSO: Signal is required in order to measure whether the dynamic stability thresholds of the electricity system are complied with in all operating situations, including normal operation, alert state and emergency state as well as system restoration. |
| X | Current measured in the point of connection (I) (primary side of transformer) | Measurement of RMS power | State assessment of the electricity system | TSO: Signal is required in order to operate the electricity system in a way that ensures that the dynamic stability thresholds of the electricity system are complied with in all operating situations, including normal operation, alert state and emergency state as well as system restoration. |
| X | Active power measured in the point of connection (P) (primary side of transformer) | Measurement of active power | State assessment of the electricity system | TSO: Signal is required in order to measure whether the dynamic stability thresholds of the electricity system are complied with in all operating situations, including normal operation, alert state and emergency state as well as system restoration. |
| X | Reactive power measured in the point of connection (Q) (primary side of transformer) | Measurement of reactive power | State assessment of the electricity system | TSO: Signal is required in order to measure whether the dynamic stability thresholds of the electricity system are complied with in all operating situations, including normal operation, alert state and emergency state as well as system restoration. |
| X | Power factor - cos (phi) measured or calculated in the point of connection (primary side of transformer) | Deviations between the set point and measurements may occur temporarily when the set point is changed. | Compare set point to actual operation in connection with voltage control and reactive power control. | TSO: Signal is required in order to operate the electricity system in a way that ensures that the dynamic stability thresholds of the electricity system are complied with in all operating situations, including normal operation, alert state and emergency state as well as system restoration. |

Generic signal list for transmission-connected distribution systems - requirements for real-time information from 30-60 kV grid

Revision: 1.5

Date Dec. 2018

Definition - DCC art. 2, 7):

'transmission-connected distribution system' means a distribution system connected to a transmission system, including transmission-connected distribution facilities

Please note that this is a translation of the original Danish text. In case of inconsistencies, the Danish version shall apply.

| Facility components | Facility component | Operational data measurements |
|--|-------------------------|--|
| Lines (only relevant if there is parallel switching within an area of observation) - separate accuracy of measurements? | Circuit breakers | Indication Out/In |
| | Busbar disconnecter | Indication Out/In |
| | Line bay | MW measurement MVar measurement kV measurement |
| Transformers (secondary voltage 30-60 kV) | Circuit breakers | Indication Out/In |
| | Busbar disconnecter | Indication Out/In |
| | Transformer bay | MW measurement MVar measurement |
| Reactive facility components installed in 132/xx or 150/xx substations - Switchable shunt reactors - Switchable shunt capacitors | Circuit breakers | Indication Out/In |
| | Busbar disconnecter | Indication Out/In |
| | Reactors and capacitors | MVar |
| | Status | Available/unavailable |
| Auxiliary and coupler bays in substations. | Circuit breakers | Indication Out/In |
| | Busbar disconnecter | Indication Out/In |

17-07437-66 DCC - Appendix 1.B - Generic signal list