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Requirements for data exchange related to the electrical installations of clients

Valid from 1 July 2019

Contents

1 Introduction and general part

1.1 This guide establishes the requirements for measurements, status and control signals transmitted by the TSO and the client (hereinafter also referred to as data volume) and the conditions with which the transmitted information must comply. This guide is applied with the connection conditions.

1.2 Measurements, status and control signals shall be exchanged between the client's electrical installation and the TSO's main and back-up control centres (hereinafter the control centres are referred to as *energy system control centres*).

1.3 The data communication connection used by the client and the producer connected to the distribution network (hereinafter together or separately referred to as the client) to the TSO's SCADA shall comply with the standard EVS-EN 60870-5-104. In order to control the client's equipment and transmit data, the client must install a separate remote terminal unit (RTU), the data exchange protocol of which is compatible with the SCADA data exchange protocol of the TSO. Data exchange between the client's RTU and the TSO's RTU is not permitted.

2 Real-time information

2.1 Real-time measurements, power-generating module controls and position signals from the client's electrical installation, power-generating module and/or power-generating module connected to the client's power grid must be transmitted to the energy system control centre according to the information volume table format stipulated in the guide 'Requirements for data exchange related to the electrical installations of clients' (hereinafter referred to as the information volume table). When applying the information volume table to the connected electrical installation, the direction of the electricity transmitted at the connection point, the installed capacity and the type of the power-generating module must be taken into account, among other things.

2.2 During the performance of the connection contract, the TSO has the right to add additional information objects to the information volume table during the approval of the electrical part project only if the addition of information objects is technically justified, does not involve unreasonable costs for the client and is inevitably necessary to ensure the security of supply of the system.

2.3 All position signals must be given directly from the auxiliary contacts of the primary equipment, without the use of auxiliary relays, as so-called double-contact signals.

2.4 The wind velocity transmitted by the wind farm to the energy system control centre may be a single measurement, a set of single measurements or the average of the wind velocity measurements in the wind farm, as agreed, whereas each single measurement must be taken from the height of the wind turbine's nacelle either separately from the meteorological mast or from the electrical wind turbine.

2.5 If a wind farm connected to the electricity network is distributed in groups in several geographical areas, but has a single point of connection to the electricity network, real-time active load and meteorological measurements set out in clause 2.6 for each group of wind turbines must be transmitted. The set of measurements shall include at least the total active power (MW), wind velocity (m/s) and direction (in degrees) of the group for each geographically separated group. In the case of a distributed wind farm, the situation arises where the wind farm consists of groups of wind turbines and the groups are located at such a geographical distance from one another that the wind conditions at the same time are statistically significantly different for each group.

2.6 In addition, the meteorological measurements transmitted by the wind farm to the energy system control centre shall comply with the following requirements regarding the location of the measurement:

2.6.1 the wind velocity and direction must be determined from the height of the wind turbine nacelle;

2.6.2 the external air temperature must be measured at ground level.

2.7 The solar intensity (W/m^2) transmitted by the solar power plant to the electricity system control centre may be a single measurement, a set of single measurements or the average of the solar power plant's solar intensity measurements, as agreed.

2.8 If a solar power plant connected to the transmission network is located in groups in several geographical areas, but has a single connection point to the transmission network, real-time active load and meteorological tele-measurements must be transmitted separately for each group of solar power plants. The set of measurements shall include at least the total active power (MW), solar intensity (W/m2) and air temperature (in degrees °C) of the group for each geographically separated group. In the case of a distributed solar power plant, the situation arises where the solar power plant consists of groups of inverters and the groups are located at such a geographical distance from one another that the conditions of solar intensity at the same time are statistically significantly different for each group.

3 Requirements for communication and rules for establishing communication

3.1 For the purposes of this document, communication is a set of devices and data communication channels that enable the exchange of data between the control systems of the energy system and the client's RTU.

3.2 The client must establish communication using an IPSec-based virtual private network (VPN). The client's equipment is not connected to the TSO's computer networks and the client's communication is not made via the TSO's data communication networks.

3.3 Communication must be set up in such a way that requests to the client's devices are allowed from at least four (4) IP subnetworks of the TSO.

3.4 The RTU setting must allow four (4) simultaneous logical connections (EVS_EN_60870_5_104 p.10 *Redundant connection*. N = 4).

3.5 If the communication is interrupted, the TSO has the right to switch off the power switch(es) at the client's point of consumption if the client's equipment causes disturbances or emergency operation in the electrical system. The requirements for the reliability of the communication are given in clause 3.6.

3.6 The reliability of the client's communication must be at least 0.9836 (144 hours of allowed interruptions per year) and a single communication interruption must not exceed 16 hours.

3.7 The design of the electrical part of the communication must include the basic scheme of the communication of the electrical installation and an explanatory note, which shall contain at least the following information:

3.7.1 The static IP address of the client's VPN hub;

3.7.2 IP addresses provided by the TSO for all equipment requested by the TSO's SCADA (RTU, etc.), which are coordinated by the TSO;

3.7.3 An explanation (with diagrams if necessary) of how the client ensures the availability required in clause 3.6;

3.7.4 The technical parameters of the VPN tunnel required for the establishment of data communication in accordance with the form of the TSO, which is provided in Annex 1 to this guide (technical parameters for establishing AS ELERING VPN data communication (IPSec tunnel)).

4 Procedure for opening communication

4.1 Communication is opened according to the following procedure:

4.1.1 The client shall submit a communication solution project with the data contained in clause 3.7, which shall be approved as part of the electrical part project;

4.1.2 After approval of the project, the client shall submit an application for opening communication to the project manager of the TSO's connections or the e-mail address kliendihaldur@elring.ee for power-generating modules connected to the distribution network at least 7 working days before establishing the desired communication. The application for establishing communication shall include the client's contact person for data communication, the name of the object and the required date for establishing data communication;

4.1.3 The TSO shall forward the keys necessary for creation of the VPN tunnel to the client within 5 working days;

4.1.4 Once the client has set up their communication equipment, the client agrees with the project manager at least 1 working day in advance to test the communication connection, and after a successful test the data communication is considered established.

4.2 The client's final data volume table must be approved as part of the electrical project before data volume testing begins.

4.3 The exact start of testing shall be agreed with the IT department of the TSO at least 3 working days before the start of testing.

5 Measuring accuracy

5.1 The calculated total maximum error of the measurements transmitted to the energy system control centre (P, Q, I, U) must be less than 1% and, in order to ensure this, the client must provide measuring transformers that meet the accuracy requirements in their installation.

5.2. The accuracy of the measurements of the control system of the client's production module must be less than 1%. The client must use measurements as close as possible to the connection point (preferably at the same voltage class) to control their power-generating module.

5.3 The measuring ranges of the transmitted measurements for frequency, currents and voltages shall be specified during the coordination of the electrical part project.

5.4 The client's RTU must exchange information volumes with the energy system control centre, the time recording accuracy of which must be equal to or better than ±20 ms (with a resolution of 1 ms).

6 Volume of signals transmitted from power-generating modules to the energy system control centre

6.1 The limit values for the power-generating modules of categories B, C and D are given in Table 1.

Table 1

Limits for power-generating modules of categories B, C and D.

1 Synchronous area	2 Maximum power limit above which the power-generating module is considered to be of type B.	3 Maximum power limit above which the power-generating module is considered to be of type C.	4 Maximum power limit above which the power-generating module is considered to be of type D.
Baltic power system	0.5 MW	5 MW	15 W

6.2 Signal volume of type A power-generating modules

ENERGY PARK MODULE AND SYNCHRONOUS MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
1	M_ME_NC	1001	P wind	MW	Wind	MW
2	M_ME_NC	1002	P sun	MW	Sun	MW
3	M_ME_NC	1003	P biomass	MW	Biomass	MW
4	M_ME_NC	1004	P hydro	MW	Hydro power plants	MW
5	M_ME_NC	1005	P solid fuel	MW	Solid fuel	MW
6	M_ME_NC	1006	P gas	MW	Gas	MW
7	M_ME_NC	1007	P liquid fuel	MW	Liquid fuel	MW

6.3 Signal volume required for type B power-generating modules

ENERGY PARK MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
1	C_DC_NA	1	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR)	10 = On, 01 = Off
2	C_SE_NA	6201	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
3	C_SE_NA	6202	P decrease rate	MW/min	Active power decrease rate (MW/min)	MW/min (step 1 MW/min)
4	C_SE_NA	6203	P raise rate	MW/min	Active power raise rate (MW/min)	MW/min (step 1 MW/min)
5	M_SP_TA (TB)	3001	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
6	M_ME_NA	1001	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
7	M_ME_NA	1002	P decrease rate	MW/min	Active power decrease rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
8	M_ME_NA	1003	P raise rate	MW/min	Active power raise rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
9	M_ME_NA	1004	possible P	MW	Theoretically possible active power setpoint (AGC)	MW
10	M_ME_NA	1005	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
Quick limitation of active power						
11	C_DC_NA	1	P emergency limit 80%	On/Off	Emergency limit 80% of active power	10=On,01=Off

12	C_DC_NA	2	P emergency limit 60%	On/Off	Emergency limit 60% of active power	10=On,01=Off
13	C_DC_NA	3	P emergency limit 40%	On/Off	Emergency limit 40% of active power	10=On,01=Off
14	C_DC_NA	4	P emergency limit 20%	On/Off	Emergency limit 20% of active power	10=On,01=Off
15	M_SP_TA (TB)	3002	P emergency limit 80%	On/Off	Emergency limit 80% of active power (feedback)	On=1,Off=0
16	M_SP_TA (TB)	3003	P emergency limit 60%	On/Off	Emergency limit 60% of active power (feedback)	On=1,Off=0
17	M_SP_TA (TB)	3004	P emergency limit 40%	On/Off	Emergency limit 40% of active power (feedback)	On=1,Off=0
18	M_SP_TA (TB)	3005	P emergency limit 20%	On/Off	Emergency limit 20% of active power (feedback)	On=1,Off=0
MEASUREMENTS, INFORMATION TO OPERATOR						
19	M_ME_NA	1006	Energy park module P	MW	Active power measurement, net	MW
20	M_ME_NA	1007	Energy park module P	MW	Active power measurement, gross	MW
21	M_ME_NA	1008	Out of work P	MW	Nominal active power out of work	MW
INFORMATION FOR THE FORECASTING SYSTEM						
22	M_ME_NA	1010	Wind velocity	m/sec	Wind velocity	m/sec
23	M_ME_NA	1011	Wind direction	deg	Wind direction	deg
24	M_ME_NA	1012	Air temperature	C	Air temperature	C
25	M_ME_NA	1013	Air pressure	mbar (hPa)	NOT OBLIGATORY	mbar (hPa)
26	M_ME_NA	1014	Solar intensity	W/m2	Solar intensity	W/m2

SYNCHRONOUS MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**

CONTROL SIGNALS AND FEEDBACK						
1	C_DC_NA	1	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR)	10 = On, 01 = Off
2	C_SE_NA	6201	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
3	M_SP_TA (TB)	3001	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control according to setpoint (feedback)	On = 1, Off = 0
4	M_ME_NA	1001	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
5	M_ME_NA	1002	possible P	MW	Theoretically possible active power setpoint (AGC)	MW
6	M_ME_NA	1003	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
MEASUREMENTS, INFORMATION TO OPERATOR						
7	M_ME_NA	1004	Synchronous module P	MW	Active power measurement, net	MW
8	M_ME_NA	1005	Synchronous module P	MW	Active power measurement, gross	MW
9	M_ME_NA	1006	Out of work P	MW	Nominal active power out of work	MW

6.4 Signal volume required for type C power-generating modules

ENERGY PARK MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
SIGNALS REQUIRED FOR FREQUENCY STABILITY						
1	C_DC_NA	1	Primary control (FCR)	On/Off	Primary control (FCR) 10%	10 = On, 01 = Off

2	C_SE_NA	6201	droop	%	Droop setpoint	2-12%, with step 1%
3	C_SE_NA	6202	frequency controller dead band	mHz	Frequency controller dead band setpoint	0-500 mHz, with step 10 mHz
4	M_DP_TA (TB)	3001	Primary control (FCR)	On/Off	Primary control (FCR) 10% (feedback)	On = 1, Off = 0
5	M_ME_NA	1001	droop	%	Droop setpoint (feedback)	2-12%, with step 1%
6	M_ME_NA	1002	frequency controller dead band	mHz	Frequency controller dead band setpoint (feedback)	0-500 mHz, with step 10 mHz
SIGNALS REQUIRED TO ENSURE FREQUENCY STABILITY OR REGIONAL STABILITY						
ACTIVE POWER CONTROL BY SETTING WITH RAISE AND DECREASE RATE						
7	C_DC_NA	2	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR)	10 = On, 01 = Off
8	C_SE_NA	6203	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
9	C_SE_NA	6204	P decrease rate	MW/min	Active power decrease rate (MW/min)	MW/min (step 1 MW/min)
10	C_SE_NA	6205	P raise rate	MW/min	Active power raise rate (MW/min)	MW/min (step 1 MW/min)
11	M_DP_TA (TB)	3002	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
12	M_ME_NA	1003	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
13	M_ME_NA	1004	P decrease rate	MW/min	Active power decrease rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
14	M_ME_NA	1005	P raise rate	MW/min	Active power raise rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
15	M_ME_NA	1006	possible P	MW	Theoretically possible active power setpoint (AGC)	MW

16	M_ME_NA	1007	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
QUICK LIMITATION OF ACTIVE POWER						
17	C_DC_NA	3	P emergency limit 80%	On/Off	Emergency limit 80% of active power	10=On,01=Off
18	C_DC_NA	4	P emergency limit 60%	On/Off	Emergency limit 60% of active power	10=On,01=Off
19	C_DC_NA	5	P emergency limit 40%	On/Off	Emergency limit 40% of active power	10=On,01=Off
20	C_DC_NA	6	P emergency limit 20%	On/Off	Emergency limit 20% of active power	10=On,01=Off
21	M_SP_TA (TB)	3003	P emergency limit 80%	On/Off	Emergency limit 80% of active power (feedback)	On=1,Off=0
22	M_SP_TA (TB)	3004	P emergency limit 60%	On/Off	Emergency limit 60% of active power (feedback)	On=1,Off=0
23	M_SP_TA (TB)	3005	P emergency limit 40%	On/Off	Emergency limit 40% of active power (feedback)	On=1,Off=0
24	M_SP_TA (TB)	3006	P emergency limit 20%	On/Off	Emergency limit 20% of active power (feedback)	On=1,Off=0
MEASUREMENTS, INFORMATION TO OPERATOR						
25	M_ME_NA	1008	Energy park module P	MW	Active power measurement, net	MW
26	M_ME_NA	1009	Energy park module P	MW	Active power measurement, gross	MW
27	M_ME_NA	1010	Out of work P	MW	Nominal active power out of work	MW
ALARMS, INFORMATION TO OPERATOR						
29	M_SP_TA (TB)	3007	Limited frequency sensitive mode in the case of overfrequency	Operated/Dead	Limited frequency sensitive mode in the case of overfrequency (LFSM-O) in operation	On=1,Off=0
30	M_SP_TA (TB)	3008	Limited frequency sensitive mode in the	Operated/Dead	Limited frequency sensitive mode in the case of underfrequency (LFSM-U) in operation	On=1,Off=0

			case of underfrequency			
INFORMATION FOR THE FORECASTING SYSTEM						
31	M_ME_NA	1012	Wind velocity	m/sec	Wind velocity	m/sec
32	M_ME_NA	1013	Wind direction	deg	Wind direction	deg
33	M_ME_NA	1014	Air temperature	C	Air temperature	C
34	M_ME_NA	1015	Air pressure	mbar (hPa)	NOT OBLIGATORY	mbar (hPa)
35	M_ME_NA	1016	Solar intensity	W/m2	Solar intensity	W/m2

SYNCHRONOUS MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
SIGNALS REQUIRED FOR FREQUENCY STABILITY						
1	C_DC_NA	1	Primary control (FCR)	On/Off	Primary control (FCR) 10%	10 = On, 01 = Off
2	C_SE_NA	6201	droop	%	Droop setpoint	2-12%, with step 1%
3	C_SE_NA	6202	frequency controller dead band	mHz	Frequency controller dead band setpoint	0-500 mHz, with step 10 mHz
4	M_DP_TA (TB)	3001	Primary control (FCR)	On/Off	Primary control (FCR) 10% (feedback)	On = 1, Off = 0
5	M_ME_NA	1001	droop	%	Droop setpoint (feedback)	2-12%, with step 1%

6	M_ME_NA	1002	frequency controller dead band	mHz	Frequency controller dead band setpoint (feedback)	0-500 mHz, with step 10 mHz

SIGNALS REQUIRED TO ENSURE FREQUENCY STABILITY OR REGIONAL STABILITY

ACTIVE POWER CONTROL BY SETTING WITH RAISE AND DECREASE RATE						
7	C_DC_NA	2	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (must also function as a limiter)	10 = On, 01 = Off
8	C_SE_NA	6203	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
9	C_SE_NA	6204	P decrease rate	MW/min	Active power ramp rate, decrease (MW/min) (IF IT IS TECHNICALLY POSSIBLE TO MODIFY)	MW/min (step 1 MW/min)
10	C_SE_NA	6205	P raise rate	MW/min	Active power ramp rate, raising (MW/min) (IF IT IS TECHNICALLY POSSIBLE TO MODIFY)	MW/min (step 1 MW/min)
11	M_DP_TA (TB)	3002	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
12	M_ME_NA	1003	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
13	M_ME_NA	1004	P decrease rate	MW/min	Active power ramp rate, decrease (1MW/min) (IF IT IS TECHNICALLY POSSIBLE TO MODIFY) (feedback)	MW/min (step 1 MW/min)
14	M_ME_NA	1005	P raise rate	MW/min	Active power ramp rate, raising (1MW/min) (feedback) (IF IT IS TECHNICALLY POSSIBLE TO MODIFY)	MW/min (step 1 MW/min)
15	M_ME_NA	1006	possible P	MW	Theoretically possible active power setpoint (AGC)	MW

16	M_ME_NA	1007	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
MEASUREMENTS, INFORMATION TO OPERATOR						
17	M_ME_NA	1008	Synchronous module P	MW	Active power measurement, net	MW
18	M_ME_NA	1009	Synchronous module P	MW	Active power measurement, gross	MW
19	M_ME_NA	1010	Out of work P	MW	Nominal active power out of work	MW
ALARMS, INFORMATION TO OPERATOR						
21	M_SP_TA (TB)	3003	Limited frequency sensitive mode in the case of overfrequency	Operated/Dead	Limited frequency sensitive mode in the case of overfrequency (LFSM-O) in operation	On=1,Off=0
22	M_SP_TA (TB)	3004	Limited frequency sensitive mode in the case of underfrequency	Operated/Dead	Limited frequency sensitive mode in the case of underfrequency (LFSM-U) in operation	On=1,Off=0

6.5 Signal volume required for type D power-generating modules

6.5.1 Type D power-generating modules connected to the distribution network:

ENERGY PARK MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
SIGNALS REQUIRED FOR FREQUENCY STABILITY						
1	C_DC_NA	1	Primary control (FCR)	On/Off	Primary control (FCR) 10%	10 = On, 01 = Off
2	C_SE_NA	6201	droop	%	Droop setpoint	2-12%, with step 1%
3	C_SE_NA	6202	frequency controller dead band	mHz	Frequency controller dead band setpoint	0-500 mHz, with step 10 mHz
4	M_DP_TA (TB)	3001	Primary control (FCR)	On/Off	Primary control (FCR) 10% (feedback)	On = 1, Off = 0
5	M_ME_NA	1001	droop	%	Droop setpoint (feedback)	2-12%, with step 1%
6	M_ME_NA	1002	frequency controller dead band	mHz	Frequency controller dead band setpoint (feedback)	0-500 mHz, with step 10 mHz
SIGNALS REQUIRED TO ENSURE FREQUENCY STABILITY OR REGIONAL STABILITY						
ACTIVE POWER CONTROL BY SETTING WITH RAISE AND DECREASE RATE						
7	C_DC_NA	2	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR)	10 = On, 01 = Off
8	C_SE_NA	6203	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
9	C_SE_NA	6204	P decrease rate	MW/min	Active power decrease rate (MW/min)	MW/min (step 1 MW/min)
10	C_SE_NA	6205	P raise rate	MW/min	Active power raise rate (MW/min)	MW/min (step 1 MW/min)

11	M_DP_TA (TB)	3002	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
12	M_ME_NA	1003	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
13	M_ME_NA	1004	P decrease rate	MW/min	Active power decrease rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
14	M_ME_NA	1005	P raise rate	MW/min	Active power raise rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
15	M_ME_NA	1006	possible P	MW	Theoretically possible active power setpoint (AGC)	MW
16	M_ME_NA	1007	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
QUICK LIMITATION OF ACTIVE POWER						
17	C_DC_NA	3	P emergency limit 80%	On/Off	Emergency limit 80% of active power	10=On,01=Off
18	C_DC_NA	4	P emergency limit 60%	On/Off	Emergency limit 60% of active power	10=On,01=Off
19	C_DC_NA	5	P emergency limit 40%	On/Off	Emergency limit 40% of active power	10=On,01=Off
20	C_DC_NA	6	P emergency limit 20%	On/Off	Emergency limit 20% of active power	10=On,01=Off
21	M_SP_TA (TB)	3003	P emergency limit 80%	On/Off	Emergency limit 80% of active power (feedback)	On=1,Off=0
22	M_SP_TA (TB)	3004	P emergency limit 60%	On/Off	Emergency limit 60% of active power (feedback)	On=1,Off=0
23	M_SP_TA (TB)	3005	P emergency limit 40%	On/Off	Emergency limit 40% of active power (feedback)	On=1,Off=0
24	M_SP_TA (TB)	3006	P emergency limit 20%	On/Off	Emergency limit 20% of active power (feedback)	On=1,Off=0
MEASUREMENTS, INFORMATION TO OPERATOR						

23	M_ME_NA	1008	possible P	MW	Theoretically possible active power setpoint	MW
24	M_ME_NA	1009	Out of work P	MW	Rated active power out of service or under maintenance	MW
25	M_ME_NA	1010	Not usable from over-wind P	MW	Active power not usable from over-wind	MW
26	M_ME_NA	1011	Not usable from under-wind P	MW	Active power not usable from under-wind	MW
27	M_ME_NA	1012	Energy park module P	MW	Active power measurement, net	MW
28	M_ME_NA	1013	Energy park module P	MW	Active power measurement, gross	MW
29	M_ME_NA	1014	Power system stabiliser (PSS)	On/Off	Power system stabiliser (PSS) position	On=1,Off=0
ALARMS, INFORMATION TO OPERATOR						
30	M_SP_TA (TB)	3007	Limited frequency sensitive mode in the case of overfrequency	Operated/Dead	Limited frequency sensitive mode in the case of overfrequency (LFSM-O) in operation	On=1,Off=0
31	M_SP_TA (TB)	3008	Limited frequency sensitive mode in the case of underfrequency	Operated/Dead	Limited frequency sensitive mode in the case of underfrequency (LFSM-U) in operation	On=1,Off=0
INFORMATION FOR THE FORECASTING SYSTEM						
32	M_ME_NA	1015	Wind velocity	m/sec	Wind velocity	m/sec
33	M_ME_NA	1016	Wind direction	deg	Wind direction	deg
34	M_ME_NA	1017	Air temperature	C	Air temperature	C

35	M_ME_NA	1018	Air pressure	mbar (hPa)	NOT OBLIGATORY	mbar (hPa)
36	M_ME_NA	1019	Solar intensity	W/m2	Solar intensity	W/m2

SYNCHRONOUS MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
SIGNALS REQUIRED FOR FREQUENCY STABILITY						
1	C_DC_NA	1	Primary control (FCR)	On/Off	Primary control (FCR) 10%	10 = On, 01 = Off
2	C_SE_NA	6201	droop	%	Droop setpoint	2-12%, with step 1%
3	C_SE_NA	6202	frequency controller dead band	mHz	Frequency controller dead band setpoint	0-500 mHz, with step 10 mHz
4	M_DP_TA (TB)	3001	Primary control (FCR)	On/Off	Primary control (FCR) 10% (feedback)	On = 1, Off = 0
5	M_ME_NA	1001	droop	%	Droop setpoint (feedback)	2-12%, with step 1%
6	M_ME_NA	1002	frequency controller dead band	mHz	Frequency controller dead band setpoint (feedback)	0-500 mHz, with step 10 mHz
SIGNALS REQUIRED TO ENSURE FREQUENCY STABILITY OR REGIONAL STABILITY						
ACTIVE POWER CONTROL BY SETTING WITH RAISE AND DECREASE RATE						
7	C_DC_NA	2	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR)	10 = On, 01 = Off

8	C_SE_NA	6203	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
9	C_SE_NA	6204	P decrease rate	MW/min	Active power decrease rate (MW/min)	MW/min (step 1 MW/min)
10	C_SE_NA	6205	P raise rate	MW/min	Active power raise rate (MW/min)	MW/min (step 1 MW/min)
11	M_DP_TA (TB)	3002	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
12	M_ME_NA	1003	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
13	M_ME_NA	1004	P decrease rate	MW/min	Active power decrease rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
14	M_ME_NA	1005	P raise rate	MW/min	Active power raise rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
15	M_ME_NA	1006	possible P	MW	Theoretically possible active power setpoint (AGC)	MW
16	M_ME_NA	1007	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
MEASUREMENTS, INFORMATION TO OPERATOR						
17	M_ME_NA	1008	Synchronous module P	MW	Active power measurement, net	MW
18	M_ME_NA	1009	Synchronous module P	MW	Active power measurement, gross	MW
19	M_ME_NA	1010	Out of work P	MW	Nominal active power out of work	MW
20	M_ME_NA	1011	Power system stabiliser (PSS)	On/Off	Power system stabiliser (PSS) position	On=1,Off=0
ALARMS, INFORMATION TO OPERATOR						
21	M_SP_TA (TB)	3003	Limited frequency sensitive mode in	Operated/Dead	Limited frequency sensitive mode in the case of overfrequency (LFSM-O) in operation	On=1,Off=0

			the case of overfrequency			
22	M_SP_TA (TB)	3004	Limited frequency sensitive mode in the case of underfrequency	Operated/Dead	Limited frequency sensitive mode in the case of underfrequency (LFSM-U) in operation	On=1,Off=0

6.5.2 Type D power-generating modules connected to the TSO's network:

ENERGY PARK MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
SIGNALS REQUIRED FOR FREQUENCY STABILITY						
1	C_DC_NA	1	Primary control (FCR)	On/Off	Primary control (FCR) 10%	10 = On, 01 = Off
2	C_SE_NA	6201	droop	%	Droop setpoint	2-12%, with step 1%
3	C_SE_NA	6202	frequency controller dead band	mHz	Frequency controller dead band setpoint	0-500 mHz, with step 10 mHz
4	M_DP_TA (TB)	3001	Primary control (FCR)	On/Off	Primary control (FCR) 10% (feedback)	On = 1, Off = 0
5	M_ME_NA	1001	droop	%	Droop setpoint (feedback)	2-12%, with step 1%
6	M_ME_NA	1002	frequency controller dead band	mHz	Frequency controller dead band setpoint (feedback)	0-500 mHz, with step 10 mHz
SIGNALS REQUIRED TO ENSURE FREQUENCY STABILITY OR REGIONAL STABILITY						
ACTIVE POWER CONTROL BY SETTING WITH RAISE AND DECREASE RATE						
7	C_DC_NA	2	Active power control (AGC, aFRR, mFRR)	On/Off	In addition to active power control, must act as a capacity limiter	10 = On, 01 = Off

8	C_SE_NA	6203	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
9	C_SE_NA	6204	P decrease rate	MW/min	Active power decrease rate (MW/min)	MW/min (step 1 MW/min)
10	C_SE_NA	6205	P raise rate	MW/min	Active power raise rate (MW/min)	MW/min (step 1 MW/min)
11	M_DP_TA (TB)	3002	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
12	M_ME_NA	1003	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
13	M_ME_NA	1004	P decrease rate	MW/min	Active power decrease rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
14	M_ME_NA	1005	P raise rate	MW/min	Active power raise rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
15	M_ME_NA	1006	possible P	MW	Theoretically possible active power setpoint (AGC)	MW
16	M_ME_NA	1007	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
QUICK LIMITATION OF ACTIVE POWER						
17	C_DC_NA	3	P emergency limit 80%	On/Off	Emergency limit 80% of active power	10=On,01=Off
18	C_DC_NA	4	P emergency limit 60%	On/Off	Emergency limit 60% of active power	10=On,01=Off
19	C_DC_NA	5	P emergency limit 40%	On/Off	Emergency limit 40% of active power	10=On,01=Off
20	C_DC_NA	6	P emergency limit 20%	On/Off	Emergency limit 20% of active power	10=On,01=Off
21	M_SP_TA (TB)	3003	P emergency limit 80%	On/Off	Emergency limit 80% of active power (feedback)	On=1,Off=0
22	M_SP_TA (TB)	3004	P emergency limit 60%	On/Off	Emergency limit 60% of active power (feedback)	On=1,Off=0
23	M_SP_TA (TB)	3005	P emergency limit 40%	On/Off	Emergency limit 40% of active power (feedback)	On=1,Off=0
24	M_SP_TA (TB)	3006	P emergency limit 20%	On/Off	Emergency limit 20% of active power (feedback)	On=1,Off=0

VOLTAGE CONTROL SIGNALS						
25	C_SC_NA	7	Control U = const	On	Reactive power control according to voltage U = const**	On=1,Off=0
26	C_SC_NA	8	Control Q = const	On	Reactive power control according to Q, Q = const**	On=1,Off=0
27	C_SC_NA	9	To the connection point Q = 0***	On/Off	To the connection point Q is set to 0	10=On,01=Off
28	C_SE_NA	6206	XXX kV Uab settings	kV	Voltage setting for U = const of the function	110...123 kV, step 1 kV
29	C_SE_NA	6207	XXX kV Q settings	Mvar	Q setting for Q = const of the function	Qmin…0…Qmax , step 1 Mvar
30	M_ME_NA	1008	XXX kV Uab settings	kV	Voltage setting for U = const of the function (feedback)	110...123 kV, step 1 kV
31	M_ME_NA	1009	XXX kV Q settings	Mvar	Q setting for Q = const of the function (feedback)	Qmin…0…Qmax , step 1 Mvar
32	M_SP_TA (TB)	3007	control U = const	On/Off	Reactive power control according to voltage U = const**	On=1,Off=0
33	M_SP_TA (TB)	3008	control Q = const	On/Off	Reactive power control according to Q, Q = const**	On=1,Off=0
34	M_SP_TA	3009	To the connection point Q = 0***	On/Off	Connection point Q is set to 0 (feedback)	10=On,01=Off
POSITION INDICATORS OF SWITCHES						
36	M_DP_TA (TB)	2001	CXT ML xNx	On/Off	Neutral earthing switch of power transformers connected to the connection point, each earthing switch separately	10=On,01=Off
37	M_DP_TA (TB)	2002	CXT VL xxx kV	On/Off	Power switches of power transformers connected to the connection point (all transformer shoulders)	10=On,01=Off
38	M_DP_TA (TB)	2003	CXT LL xxx kV	On/Off	Disconnectors of power transformers connected to the connection point (all transformer shoulders)	10=On,01=Off

39	M_DP_TA (TB)	2004	CXT ML xxx kV	On/Off	Earthing switches of power transformers connected to the connection point (all transformer shoulders)	10=On,01=Off
MEASUREMENTS, INFORMATION TO OPERATOR						
40	M_ME_NA	1010	possible Q+	MVar	Theoretically possible maximum reactive power in relation to the connection point	MVar
41	M_ME_NA	1011	possible Q-	MVar	Theoretically possible minimum reactive power in relation to the connection point	MVar
42	M_ME_NA	1012	Out of work P	MW	Rated active power out of service or under maintenance	MW
43	M_ME_NA	1013	Not usable from over-wind P	MW	Active power not usable from over-wind	MW
44	M_ME_NA	1014	Not usable from under-wind P	MW	Active power not usable from under-wind	MW
45	M_ME_NA	1015	CXT XXX kV Uab	kV	Voltage measurements of power transformers connected to the connection point (all transformer shoulders)	kV
46	M_ME_NA	1016	CXT XXX kV P	MW	Voltage measurements of power transformers connected to the connection point, (all transformer shoulders)	MW
47	M_ME_NA	1017	CXT XXX kV Q	Mvar	Voltage measurements of power transformers connected to the connection point (all transformer shoulders)	MVar
48	M_ME_NA	1018	CXT XXX kV Ia	A	Voltage measurements XXX kV of power transformers connected to the connection point, separately for each transformer (all transformer shoulders)	A
49	M_ME_NA	1019	Energy park module P	MW	Active power measurement, net	MW
50	M_ME_NA	1020	Energy park module P	MW	Active power measurement, gross	MW
51	M_ME_NA	1021	Direct line P***	MW	Direct line P***	MW
52	M_ME_NA	1022	Direct line Q***	Mvar	Direct line Q***	Mvar

53	M_ME_NA	1023	Power system stabiliser (PSS)	On/Off	Power system stabiliser (PSS) position	On=1,Off=0
ALARMS, INFORMATION TO OPERATOR						
54	M_SP_TA (TB)	3010	Limited frequency sensitive mode in the case of overfrequency	Operated/Dead	Limited frequency sensitive mode in the case of overfrequency (LFSM-O) in operation	
55	M_SP_TA (TB)	3011	Limited frequency sensitive mode in the case of underfrequency	Operated/Dead	Limited frequency sensitive mode in the case of underfrequency (LFSM-U) in operation	
56	M_SP_TA (TB)	3012	CXT(LYYY) protection	On/Off	Client's protection relays which have an effect on the system operator's switch	On=1,Off=0
INFORMATION FOR THE FORECASTING SYSTEM						
57	M_ME_NA	1024	Wind velocity	m/sec	Wind velocity	m/sec
58	M_ME_NA	1025	Wind direction	deg	Wind direction	deg
59	M_ME_NA	1026	Air temperature	C	Air temperature	C
60	M_ME_NA	1027	Air pressure	mbar (hPa)	NOT OBLIGATORY	mbar (hPa)
61	M_ME_NA	1028	Solar intensity	W/m2	Solar intensity	W/m2
	XX kV, XXX kV voltage class, (for example 10 kV or 110 kV)					
	LYYY line marking					
	CXT power transformer marking, X number of the power transformer					
	GX generator marking; X number of the generator					
	* - only in the case of CHP plants					
	** - if Q = const is activated, U = const is automatically inactivated; if Q = const is inactivated, then U = const is automatically activated					

	*** - only in the case of a mixed installation					
SYNCHRONOUS MODULE						
Position	**Data type**	**IEC address**	**Name**	**Status**	**Description**	**Value**
CONTROL SIGNALS AND FEEDBACK						
SIGNALS REQUIRED FOR FREQUENCY STABILITY						
1	C_DC_NA	1	Primary control (FCR)	On/Off	Primary control (FCR) 10%	10 = On, 01 = Off
2	C_SE_NA	6201	droop	%	Droop setpoint	2-12%, with step 1%
3	C_SE_NA	6202	frequency controller dead band	mHz	Frequency controller dead band setpoint	0-500 mHz, with step 10 mHz
4	M_DP_TA (TB)	3001	Primary control (FCR)	On/Off	Primary control (FCR) 10% (feedback)	On = 1, Off = 0
5	M_ME_NA	1001	droop	%	Droop setpoint (feedback)	2-12%, with step 1%
6	M_ME_NA	1002	frequency controller dead band	mHz	Frequency controller dead band setpoint (feedback)	0-500 mHz, with step 10 mHz
SIGNALS REQUIRED TO ENSURE FREQUENCY STABILITY OR REGIONAL STABILITY						
ACTIVE POWER CONTROL BY SETTING WITH RAISE AND DECREASE RATE						
7	C_DC_NA	2	Active power control (AGC, aFRR, mFRR)	On/Off	In addition to active power control, must act as a capacity limiter	10 = On, 01 = Off
8	C_SE_NA	6203	P setting	MW	Active power setpoint	P_{min} - P_{max}, with step x
9	C_SE_NA	6204	P decrease rate	MW/min	Active power decrease rate (MW/min)	MW/min (step 1 MW/min)
10	C_SE_NA	6205	P raise rate	MW/min	Active power raise rate (MW/min)	MW/min (step 1 MW/min)

11	M_DP_TA (TB)	3002	Active power control (AGC, aFRR, mFRR)	On/Off	Active power control (AGC, aFRR, mFRR) according to setpoint (feedback)	On = 1, Off = 0
12	M_ME_NA	1003	P setting	MW	Active power setpoint (feedback)	P_{min} - P_{max}, with step x
13	M_ME_NA	1004	P decrease rate	MW/min	Active power decrease rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
14	M_ME_NA	1005	P raise rate	MW/min	Active power raise rate (MW/min) (1 MW/min), (feedback)	MW/min (step 1 MW/min)
15	M_ME_NA	1006	possible P	MW	Theoretically possible active power setpoint (AGC)	MW
16	M_ME_NA	1007	Minimum P	MW	Theoretically possible minimum active power setpoint (AGC)	MW
VOLTAGE CONTROL SIGNALS						
15	C_SC_NA	3	Control U = const	On	Reactive power control according to voltage U = const**	On=1,Off=0
16	C_SC_NA	4	Control Q = const	On	Reactive power control according to Q, Q = const**	On=1,Off=0
17	C_SC_NA	5	To the connection point Q = 0***	On/Off	To the connection point Q is set to 0	10=On,01=Off
18	M_ME_NA	1008	XXX kV Uab settings	kV	Voltage setting for U = const of the function (feedback)	110...123 kV, step 1 kV
19	M_ME_NA	1009	XXX kV Q settings	Mvar	Q setting for Q = const of the function (feedback)	Qmin…0…Qmax, step 1 Mvar
20	M_SP_TA (TB)	3003	Control U = const	On/Off	Reactive power control according to voltage U = const**	On=1,Off=0
21	M_SP_TA (TB)	3004	Control Q = const	On/Off	Reactive power control according to Q, Q = const**	On=1,Off=0

22	M_SP_TA	3005	To the connection point Q = 0***	On/Off	Connection point Q is set to 0 (feedback)	10=On,01=Off
23	C_SE_NA	6206	XXX kV Q settings	Mvar	Voltage setting for U = const of the function	Qmin…0…Qmax, step 1 Mvar
24	C_SE_NA	6207	XXX kV Uab settings	kV	Q setting for Q = const of the function	110...123 kV, step 1 kV
POSITION INDICATORS OF SWITCHES						
25	M_DP_TA (TB)	2001	CXT ML xNx	On/Off	Neutral earthing switch of power transformers connected to the connection point, each earthing switch separately	10=On,01=Off
26	M_DP_TA (TB)	2002	CXT VL xxx kV	On/Off	Power switches of power transformers connected to the connection point (all transformer shoulders)	10=On,01=Off
27	M_DP_TA (TB)	2003	CXT LL xxx kV	On/Off	Disconnectors of power transformers connected to the connection point (all transformer shoulders)	10=On,01=Off
28	M_DP_TA (TB)	2004	CXT ML xxx kV	On/Off	Earthing switches of power transformers connected to the connection point (all transformer shoulders)	10=On,01=Off
29	M_DP_TA (TB)	2005	GX XX kV VL xxx	On/Off	Indicates whether the generator is operating parallel to the system. Each generator separately	10=On,01=Off
MEASUREMENTS, INFORMATION TO OPERATOR						
30	M_ME_NA	1010	CXT XXX kV Uab	kV	Voltage measurements of power transformers connected to the connection point (all transformer shoulders)	kV
31	M_ME_NA	1011	CXT XXX kV P	MW	Active power measurements of power transformers connected to the	MW

					connection point (all transformer shoulders)	
32	M_ME_NA	1012	CXT XXX kV Q	Mvar	Reactive power measurements of power transformers connected to the connection point (all transformer shoulders)	Mvar
33	M_ME_NA	1013	CXT XXX kV Ia	A	Current measurements of power transformers connected to the connection point (all transformer shoulders)	A
34	M_ME_NA	1014	GX XX kV P	MW	Active power output of the generator, at the generator	MW
35	M_ME_NA	1015	GX XX kV Q	Mvar	Reactive power output of the generator, at the generator	Mvar
36	M_ME_NA	1016	Pth	MW	Heat load*	MW
37	M_ME_NA	1017	110/xx transformer diverter switch step	No.	Transformer diverter switch position	
38	M_ME_NA	1018	GX XXX kV F	Hz	Generator frequency (measured from the terminals of the generators)	
39	M_ME_NA	1019	GX XXX kV Uab	kV	Generator terminal voltage	
40	M_ME_NA	1020	Out of work P	MW	Nominal active power out of work	MW
41	M_ME_NA	1021	Direct line P***	MW	Direct line P	MW
42	M_ME_NA	1022	Direct line Q***	Mvar	Direct line Q	Mvar
43	M_ME_NA	1023	XXX kV P maximum	MW	Maximum net capacity in relation to the connection point	MW
44	M_ME_NA	1024	XXX kV P minimum	MW	Minimum net capacity in relation to the connection point (XXXkV)	MW
45	M_ME_NA	1025	Power system stabiliser (PSS)	On/Off	Power system stabiliser (PSS) position	On=1,Off=0
ALARMS, INFORMATION TO OPERATOR						

46	M_SP_TA (TB)	3006	Limited frequency sensitive mode in the case of overfrequency	Operated/Dead	Limited frequency sensitive mode in the case of overfrequency (LFSM-O) in operation	On=1,Off=0
47	M_SP_TA (TB)	3007	Limited frequency sensitive mode in the case of underfrequency	Operated/Dead	Limited frequency sensitive mode in the case of underfrequency (LFSM-U) in operation	On=1,Off=0
48	M_SP_TA (TB)	3008	CXT(LYYY) protection	On/Off	Client's protection relays which have an effect on the system operator's switch	On=1,Off=0

XX kV, XXX kV voltage class, (for example 10 kV or 110 kV)

LYYY line marking

CXT power transformer marking, X number of the power transformer
GX generator marking; X number of the generator

* - only in the case of CHP plants
** - if Q = const is activated, U = const is automatically inactivated; if Q = const is inactivated, then U = const is automatically activated
*** - only in the case of a mixed installation

7 Volume of signals required for demand-oriented connection

SIGNALS TO THE ENERGY SYSTEM CONTROL CENTRE									
Connection point 330kV, 110 kV or at the medium voltage side				**Extension in Estonian**					
Location	**Object**	**Signal/ indication/ measuring**	**Signal name in Estonian**	**Command1**	**Command2**	**Data to Elering RCC**	**Signal type**	**Remarks**	**Scope**
Client power transformer	Earthing switch	Earthing switch open / close	CXT neutral ML xxxx	Off	On		DP_TB		1
Client power transformer		Control (local/remote) mode of feeder terminal	CXT control ELV	Remote	Local		SP_TB		1
		ARS on /off	C1T-C2T RLA	Off	On		SP_TB		1
		ARS operated	C1T-C2T RLA on	Dead	Operated		SP_TB		1
XX kV power transformer bay	Circuitbreaker	Circuit breaker open / closed	CXT XX kV VL CXTx	Off	On		DP_TB		1
	Truck	Truck open / close	CXT XX kV VA CXTx truck	Off	On		DP_TB		1
	Disconnector	Disconnector open / closed	CXT XX kV LL CXTx	Off	On		DP_TB		1
	Earthing switch	Earthing switch open / closed	CXT XX kV ML CXTx	Off	On		DP_TB		1
XX kV bus coupler bay	Circuitbreaker	Circuit breaker open / closed	XX kV SVL xxxx	Off	On		DP_TB		1
	Truck	Truck open / close	XX kV SVL VA xxxx truck	Off	On		DP_TB		1

	Disconnector	Disconnector open / closed	XX kV SVLL xxxx	Off	On		DP_TB		1
XX kV busbar voltage	Busbar voltage transformer	Voltage Uab	XX kV Xs. busbar voltage Uab				ME_NC		1
400 V AC auxiliary power switchboard	AC	Load break switch closed / opened	Client's 0.4 kV OT input KL	Off	On		DP_TB	Necessary only in the case client's OT reserves ER OT	1
Group signals	GA1	Client protection tripped	Client's CXT protection	Dead	Operated		SP_TB	According to the example of group signals below	1
	GA2	Failure of Client AC distribution centre	Client's AC fault	Dead	Operated		SP_TB	According to the example of group signals below Necessary only in the case client's OT reserves ER OT	1

Group signals – there shall be signals in the group signals operating on the TSO's switches

The volume of signals shall be agreed according to the nature of the demand installation

Group signals could include the following

TX gas relay tripped	CXT gas relay	Dead	Operated	
TX general trip of differential protection relay	CXT diff. protection relay	Dead	Operated	
TX over-pressure valve tripped	CXT over-pressure valve	Dead	Operated	
TX over-pressure valve of tap-changer diverter switch tripped	CXT over-pressure valve of diverter switch	Dead	Operated	
TX flow relay of tap-changer diverter switch tripped	CXT flow relay	Dead	Operated	
TX oil temperature tripped	CXT oil temperature relay	Dead	Operated	
TX temperature of windings tripped	CXT winding over-temperature relay	Dead	Operated	
TX general trip of 110 kV protection	CXT 110 current protection	Dead	Operated	
ARC tripped	CXT XX kV flash barrier	Dead	Operated	
BFP tripped	CXT XX kV VLTK	Dead	Operated	GA1

CB tripped	Client's 0.4 kV circuit breaker protection	Dead	Operated	
Under- or overvoltage	Client's 0.4 kV OT1 under or overvoltage	Dead	Operated	
Feeder dead	Client's 0.4 kV feeder failure	Dead	Operated	
Failure of terminal	Client's 0.4 kV OT terminal failure	Dead	Operated	
ARS operated	Client's 0.4 kV OT RLA operated	Dead	Operated	GA2

ANNEX 1

Technical parameters for establishing AS ELERING VPN data communication (IPSec tunnel):

1. Tunnel end points
1.1. Transmission system operator ID: _____

1.2. Client's IP: _____

2. Tunnel mode: Routed
2.1. Policy-based
2.1.1. proxy-id local: _____(Elering's side, default 0.0.0.0/0)
2.1.2. proxy-id remote: _____ (Client's side, default 0.0.0.0/0)
2.2. Nat Traversal : Yes
2.3. Dead Peer Detection: Yes
2.4. Keep Alive : 30 seconds

3. IKE Phase1
3.1. Authentication method: *pre-shared key* (given by Elering upon submission of the application for establishment of data communication)
3.2. encryption algorithm: _____ (default AES256)
3.3. integrity algorithm: _____ (default sha1)
3.4. key change: _____ (default DH Group 2)
3.5. IKE SA life time: _____ seconds (default 28,800 seconds)

4. IPSec Phase2
4.1. encryption algorithm: _____ (default AES256)
4.2. integrity algorithm: _____ (default sha1)
4.3. key change: _____ (default DH Group 2)
4.4. IPSec SA life time: _____ seconds (default 3600 seconds)
4.5. protocol: **ESP**
4.6. autokey Keep Alive : **Yes**
4.7. auto-negotiate : **Yes**
4.8. PFS : **Yes**
Contact person of the client
Name: _____
E-mail: _____
Telephone: _____