CJN 22.09.2025

HERRFORS NÄT- VERKKO OY AB:S

Technical Requirements for Production Plant

Table of Contents

1 Introduction

This document contains Oy Herrfors Nät-Verkko Ab:s (hereafter Herrfors) technical requirements for connection to Herrfors distribution network and regional network (110kV). The technical requirements that are described below concern connection of Power plants. Already in-use production plants need to upgrade their plant according to technical requirements if there is a upgrade on regulator or generator of the production plant.

The connection point of the Power plant needs to be planned so that in normal grid operation the production power can be distributed in the grid. The Feed-in transmission route is planned in co-operation with the connection client.

In un-normal grid situations, TSO or Herrfors Regional network service of fault-situations, Herrfors has the right to limit the Feed-in production to the regional network. Limited production of the power plant or power plant running time in planned un-normal grid situations are done in co-operation with the client.

2 Planning of Electrical Components

Electrical connections to Herrfors regional network through a power line connection the maximum power is limited to 1x25MVA. In a busbar or Power station connection there will be investigated what Power is possible in co-operation with the client. The medium voltage side of the power transformer can never be connected in a ring network

2.1 Chosen voltage-level

The size of a power plant defines which voltage-level the power plant will be connected to. To a low voltage network a size of a few 100kW be connected. If the short-circuit current is high enough. Connection to the distribution network (20kV) every power plant over 300kW shall be investigated separately. Over 2MVA shall be installed in substation or own power plant substation.
Beyond Herrfors technical requirements also Fingrid VJV/SJV requirements shall be fulfilled.

2.2 Increase in voltage and rapid voltage variations

In a stable increase of voltage in the distribution network (20kV) a general increase of voltage of 1,5% is allowed. Every power plant gets a maximum increase of voltage percent investigated for the connection point, depending on the structure of the grid to the connection point.

Larger power plants shall fulfil Herrfors and Fingrid requirements for increase of voltage at the connection point.

3 Planning of Voltage regulation type for Wind power plant

3.1 Connection Point

Connection point is chosen by Fingrid VJV/SJV – requirements. VJV gives the TSO or regional network owner the right to choose the connection point for the power plant.

3.2 Automatic Voltage regulation mode

Automatic voltage regulation, Power plants production or consumption of reactive power. The power plant shall be equipped so it is possible to choose between these voltage regulation modes:

Reference voltage regulation

Herrfors/Fingrid decides the voltage level that the wind power plant shall maintain during production. Voltage regulation is recommended.

Reactive power regulation

Herrfors/Fingrid decides which reactive power level the wind power plant shall maintain during production, consumption or production of reactive power.

Power Factor

Herrfors/Fingrid decides which power factor the wind power plant shall maintain at the reference point, this will be given in cos fi, or PF

3.3 Reactive power compensation

Reactive power compensation is decided separately for the plant at the latest when connection client has delivered the reactive power capacity calculation for the power plant. The preferred solution is in idle mode (no noticeable production) is the power plants don't produce nor consume significant reactive power.

4 Power plant electrical protection

This chapter will go into detail concerning the electrical protection for the wind power plant.

4.1 Electrical protection

All production facilities that fulfil the size according to Fingrid VJV/SJV shall implement a Loss of Mains protection for the power plant. This shall be fulfilled according to Loss of mains requirements which are in force from Fingrid.

Other protection that needs to be according to Finnish grid code/standards are for example Differential protection of transformer, Earth fault protection. Low/High-voltage protection. Short circuit protection. Synchro check.

4.2 General principles of connection

Power plants connected to Herrfors, will have one of these solutions.

Power line connection

Power plant is connected directly to Herrfors Power line

Busbar connection

Power plant is connected to a busbar which is part of Herrfors regional network. Connection is to 110kV disconnectors and breaker.

110kV Power station Bay

This solution is a project specific solution with electrical protection and breaker and disconnector in a Power station bay in Herrfors regional network.

All connected power plants shall fulfil Fingrid requirements of Loss of Mains and Herrfors Electrical protection specifics.

4.3 Connection to Distribution network with consumption clients (0.3-2MVA)

If the power plant is connected to a distribution network where there are consumption clients, disconnecting equipment shall be installed which are operated by Herrfors. If the connection point demands electrical protection these protections are preferred, Zero voltage protection, Directional earth fault, Overvoltage protection, overcurrent protection. The disconnecting device do not attempt Auto-Reclose.

4.4 Size of connection 5-XX MVA

Fingrid requirements for Loss of Mains are specified in VJV/SJV

4.5 Communication and Real-time measurements

Technical requirements concerning Real-time measurements and communication are in force from 0,3 MVA. Demands for real-time measurements and communication are based on Fingrid VJV/SJV and Herrfors technical requirements.

Real-time measurements and communication shall be commissioned in Herrfors Operating Centre when the power plant is connected to the grid

4.5.1 Communication interface

Communication between connection clients and Herrfors in real-time will be executed through IEC 60870-5-104.

Connection client / Power plant communicates in real-time through the communication channels that are decided in co-operation with Herrfors. Real-time measurements come directly from the power plant substation / RTU solution

4.5.2 Communication data that shall be sent to Herrfors in Real-time

- Active power and reactive power in separate measurements (P.Q).
- Connection point Voltage and Current (I.U).
- Breaker position and control ability at connection point
- Disconnectors position up to connection point.
- Earthing knives position up to connection point.
- Tap changer position in Main transformer.
- Trip/Start information of protection up to connection point.

- Information on Loss of mains start/trip condition.
- Information on DC – system (if Herrfors has own equipment installed at site)

4.6 Requirements regarding space in technical facilities

These requirements are in place at the facility if Herrfors has equipment installed at site.

- Cabinet with deep bottom and a turn able 19” rack
- DC feeder to the cabinet 110VDC or 48 VDC
- available space, cable route and mounting point for antenna.

5 Energy Measurement

Herrfors installs and maintains the energy meter for the grid measurement between the grid and connection client, Herrfors shall have free passage to the measuring cabinet

If there are no separate grid measurements before TSO grid, then the TSO is responsible for the measurement and that it fulfils requirements.

5.1 General requirements and standards for Energy Measurement

Measuring circuits shall fulfil these standards:

SFS 2529
SFS 2537
SFS 3381
SFS 3382

For the regional network there is demanded separate already routed conductors from the measurement equipment/devices. Marked and numbered. Consumption metering shall be considered and applied, when necessary, from the client.

All Herrfors energy meters are remote reading, in remote reading GSM - network will be used, and between energy meters serial cables shall be used.

The facility shall have enough broad – range strength (over -85dBm). If that is not possible there shall be an alternative route for an external antenna and cable, so the strength will be sufficient. Bushings for external antenna and installation pipes (JAP or JM) the diameter shall be 20mm.

If the energy meters are placed in different cabinets, there shall be a cable route available for a series cable between energy meters.

6 Connection criteria for Power plant

6.1 Authorizations and access to the production power plants components

Production facility shall be equipped with disconnecting devices that makes it possible to disconnect the production facility from Herrfors grid. These shall be accessible for Herrfors and be lockable, so that grid work can be done safely. Herrfors shall also have access to the disconnecting devices. Operational responsibility for the power plant is the responsibility of the connection client.

At the power plant facility there shall be a lock case where Herrfors delivers the lock-cylinder to. The lock-cylinder shall have the power plant keys to be able to reach and lock the disconnecting devices, also give access to Herrfors to equipment meant for Herrfors.

6.2 Approval and commenting of connection

Plans, drawings and test-report shall be done according to Fingrid in force being VJV. These shall be delivered to Herrfors in enough time for commenting. Herrfors shall also get relevant documents concerning the connection of production power plant.

Herrfors reserves 2 weeks for commenting regarding the connection

Documents and signal list for communication to the power plant shall be delivered 4 weeks before testing of signals. Signal tests during normal business hours.

Comments from Herrfors does not move the responsibility for the safety, functionality and quality requirements at the power plant.

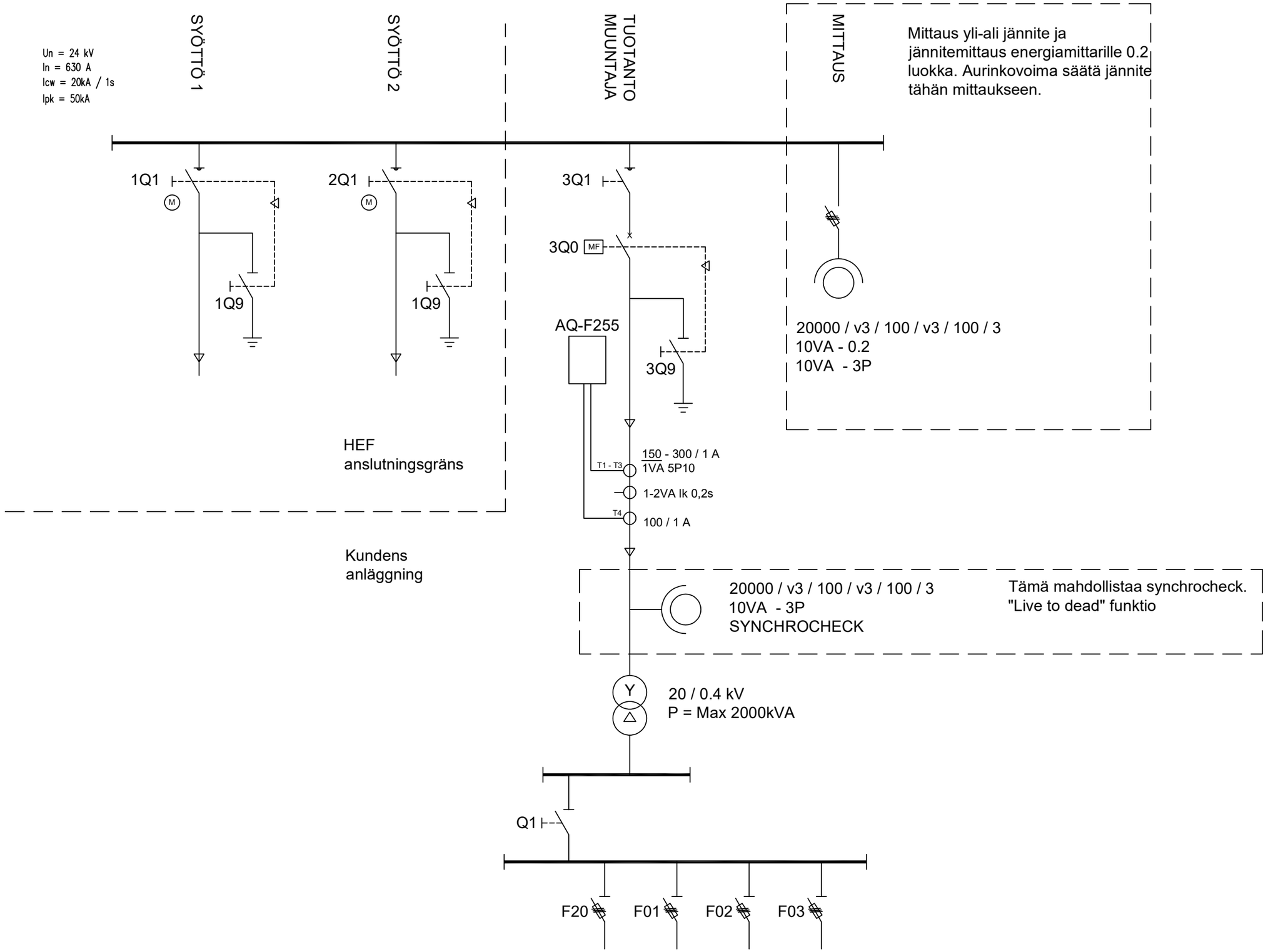
6.3 Commissioning and approval of connection

Connection to the grid is organized with Herrfors and Herrfors Operating Centre 28 days until commissioning. Connection at 20kv grid the requirement is 5 days until commissioning. Before commissioning and energization of the facility, the production power plant shall deliver commissioning protocols, relay protection protocols and other relevant document to Herrfors electronically.

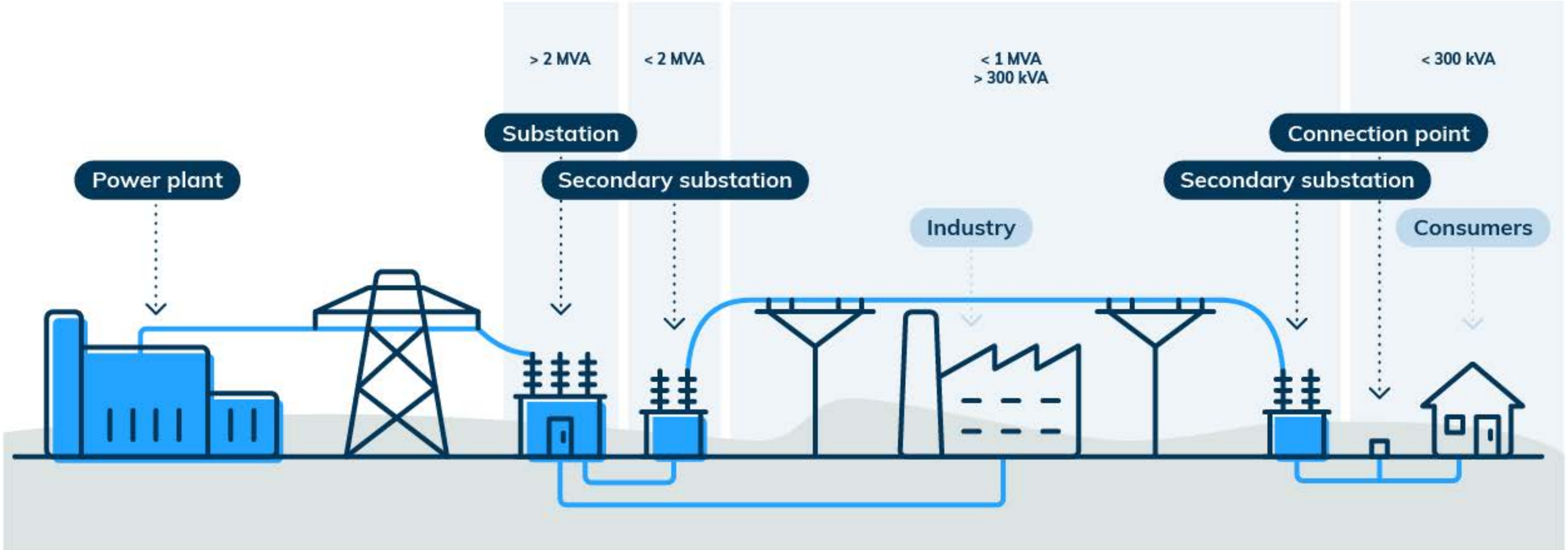
Power plant commissioning tests shall be executed in co-operation with Herrfors and Herrfors Operating centre.
Connection approval will take place when commissioning tests are finalized with accepted results and all reports and final documentations are delivered

6.4 Operation and monitoring of the power plant

The operations of the power plant will be handled in Finnish or Swedish.
Before commissioning of the plant, the client will deliver contact lists of people of operation and the Operations manager which is reported to the authorities.
Communication to people of operation shall be operated through the facilities operating centre, that shall be available 24/7.



MADE BY	APPROVED BY			DATE	PAGE / OF PAGES	OBJECT NAME
Carl-Johan Nylund	Carl-Johan Nylund	-	KATTERNÖ GROUP HERRFORS NÄT - VERKKO			Example
CHECKED BY	-	-		-	MADE FOR	DRAWING NR
Carl-Johan Nylund						


> 2 MVA
< 2 MVA
< 1 MVA
> 300 kVA
< 300 kVA
Power plant
Substation
Secondary substation
Industry
Connection point
Secondary substation
Consumers
110 kV Grid
1-20 kV Medium voltage grid
0,4 kV Low voltage grid