

FACTS

The Isovaara 400 kV Series Capacitor: an efficient means for increased power transmission between countries

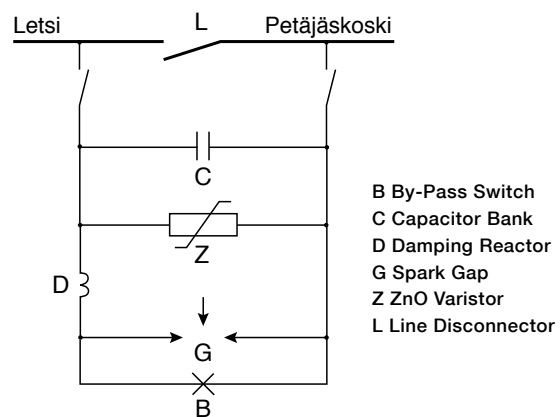


A series capacitor rated at 515 Mvar has been supplied and installed by ABB in the 400 kV grid of the Swedish National Grid at Isovaara in the north of the country. The installation, undertaken on a turnkey base, has the purpose of increasing the power transmission capacity of an existing power corridor between Sweden and Finland by means of increased voltage stability at steady state as well as transient grid conditions.

By these means, extended use of existing facilities is enabled, rendering unnecessary the building of additional lines. The series capacitor is incorporated in the Letsi – Petäjäsoski section of a double circuit 400 kV transborder interconnection Letsi – Petäjäsoski and Svartbyn – Keminmaa north of the Botnian Gulf.

System studies performed prior to the installation showed that with series compensation, it is possible to operate the existing power corridor closer to its thermal limit without jeopardizing its power transmission stability in conjunction with possible system faults.

Single-line diagram



The series capacitor is equipped with ABB's micro-processor based control and protection system type VarMACH. Main circuit protection is achieved with ZnO varistors, permitting instantaneous re-insertion of the series capacitor after fault clearing. In case of faults occurring in the line section containing the series capacitor itself (so-called internal faults), the series capacitor is temporarily by-passed by means of a spark gap and a by-pass switch.

The conditions on platform are monitored and controlled from the ground at all times by means of optical current transformers (OCT), sending all necessary information between platform and ground through optical fibre communication, not requiring any auxiliary power on platform.

Since the Isovaara series capacitor is located out on the line and normally unmanned, it is essential that the proper function of the series capacitor can be supervised as well as influenced if necessary from a distance. This is performed by means of a System Control and Monitoring (SCM) system, allowing remote control and supervision of the series capacitor over the public telephone network. With this, the nearest network control centre communicates with the series capacitor by means of a Gate-way Station and a File Transfer Protocol. It is thus possible to retrieve event data files as well as transient fault recorder files for supervision and analysis at the control centre, and if needed, also to return subsequent corrective commands.

Technical data	
Rated voltage	400 kV
Rated current	1800 A
Rated power	515 Mvar
Degree of compensation	70%
ZnO varistor rating	104 MJ
Protective level	2,3 p.u.

For more information please contact:

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Station Control and Monitoring System (SCM)

