

## S4-5

### Development of STATCOM Technology & Example Projects

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#### Abstract

STATCOM(Static Synchronous Compensator) is one of the 3rd generation FACTS(Flexible AC Transmission System) controllers and real-time reactive power compensator which are used to control power system voltages. Unlike other conventional electric power apparatuses, it utilizes the voltage source converter technology which is composed of power electronic devices. Therefore, the response time is very fast, maintenance and repair are simple, and it shows excellent compensation performance under low voltage conditions. Because of its many advantages, the demand for this type of equipment is increasing all over the world.

In 2009, Hyosung Corporation succeeded in developing and setting up a 100MVA STATCOM at Migeum 345kV substation in collaboration with KEPCO Research Institute. It is the 1st FACTS device made in Korea and the 1st STATCOM installed in KEPCO system. With the reference, Hyosung won a bid for Jeju STATCOM project in 2010. According to the contract, Hyosung supplied 2 50MVA STATCOMs to KEPCO and installed them at Sinjeju and Halla 154kV substations in Jeju Island. Currently, they have operated very well and contributed to power system voltage stability since July 2011. This paper describes the introduction of STATCOMs which have been developed by Hyosung and KEPCO Research Institute.

In the 1st part, we introduce the structures and operational theories of the STATCOMs developed by Hyosung and KEPCO Research Institute. The developed STATCOM has 2 3-phase VSCs(voltage source converters) which are composed of IGCTs(Integrated Gate Commutated Thyristors). Their 2 AC voltages are compounded by a Y-delta connected auxiliary transformer and the resulting output is supplied to the external AC power system through a main transformer. When it used as a general STATCOM, the 2 VSCs can generate 12-pulse multi-level AC voltages and the resulting output becomes 24-pulse multi-level AC voltages.

In the 2nd part, we introduce the reference projects, which are Migeum and Sinjeju & Halla STATCOMs. The 100MVA STATCOM in Migeum substation is installed for the voltage stability enhancement of Seoul metropolitan power system. And, the 50MVA STATCOMs in Sinjeju & Halla substations are not only concerned with the voltage stability of Jeju power system but also cooperate with the 2<sup>nd</sup> Jeju LCC HVDC interconnections. We will show the introductions and some major operation results of the projects.