

Renewal of the High Power Short-Circuit Testing Facility

Purpose:

The high power short-circuit testing facility has the ability to supply current accompanying ground faults and short-circuit faults in power transmission and distribution systems using a short-circuit generator and short-circuit transformers. This facility has been used in order to clarify fault current phenomena and study ways of tackling these phenomena in the power transmission and distribution system, and verify the fault current performance of power equipment and materials. This time, “Short-circuit generator frequency conversion system” and “Automatic monitoring and control system for short-circuit testing” in order for setting up and operating of various equipment and conditions at short-circuit testing have been newly established, and “Backup circuit-breaker system” for breaking the short-circuit testing current has been renewed. By doing so a study on the short-circuit test with both 50Hz and 60Hz with the relevant short-circuit testing facility is now possible, while with the conventional test facility a test was possible with only 50Hz.

Full-scale operation of this short-circuit testing facility started in October 2005. It has been used for various short-circuit studies, and its performance substantially verified.

Specifications:

1. Short-circuit generator frequency conversion system (inverter system; induction motor power supply for short-circuit generator drive)
 - Inverter: three-phase 6.6kV, 50/60Hz, IGBT module 6 stages in series connection, sine wave PWM control
 - Transformers for inverter: 6.6kV/660V x 3, 2500kVA, 50Hz 2 units
2. Automatic monitoring and control system for short-circuit testing
 - System console: 4 units
 - Control function: short-circuit generator operation control, automatic configuration of testing circuit, testing control, various monitoring and recording, etc.
 - Sequence controllers: number of control elements is 50, 2 units
3. Backup circuit-breaker system
 - Vacuum circuit-breakers: 2 units in serial/per 1 winding of short-circuit generator, 4 units in total (number of short-circuit generator windings: 2)
 - Rating: 15kV, 3000A, 100kA (per unit)

Location and Date of Installation:

Yokosuka Campus, September 2005



Short-circuit generator frequency conversion system (inverter system)



Automatic monitoring and control system for short-circuit testing



Backup circuit-breaker system