

Controlled Switching System To Solve Transients Problem in the Field

Author: Haruhiko Kohyama*

1. Controlled Switching System

The controlled switching system of gas circuit breakers (GCB) is an economical and effective solution to eliminate harmful transients in networks and to reduce the cost of maintaining equipment.

Table 1 summarizes the advantages of the controlled switching system for each type of switching purpose.

Table 1 Advantages of controlled switching system

Load type	Transients	Merit
Transformer energization	Inrush current	<ul style="list-style-type: none"> • Elimination of closing resistor • Improvement of power quality • Prevention of mal-operation of secondary system
Shunt reactor energization		
Capacitor bank energization	Inrush current	<ul style="list-style-type: none"> • Reduction of GCB contact wearing • Reduction of insulation level
	Over-voltage	
Line energization	Over-voltage	<ul style="list-style-type: none"> • Elimination of closing resistor • Reduction of insulation level
Shunt reactor de-energization	Over-voltage	<ul style="list-style-type: none"> • Reduction of insulation level • Reduction of GCB contact wearing
Line/capacitor bank de-energization	Over-voltage	<ul style="list-style-type: none"> • Improvement of re-ignition free reliability

2. Mitsubishi's Controlled Switching System

The controlled switching system using Mitsubishi's synchronous switching controller (SSC) has high accuracy and reliability backed by a solid track record in the field around the world. The main ratings of the SSC are summarized in Table 2.

Table 2 Main ratings of Mitsubishi SSC

Item	Rating
Control voltage	DC 100/125 V
Frequency	50/60 Hz
Consumption	35 W or less
Control output	3 close and 3 open signals
Reference voltage	57/100/110 V
Reference current	1/5 A
Ambient temperature	-30 to +60°C (<95% RH)
Dimensions	W: 220 × H: 260 × D: 260 (mm)

(1) Compensation of GCB operation

The operating time variation of GCB can be compensated to maintain accurate control according to operating conditions, past operation results, idle time, ambient temperature, control

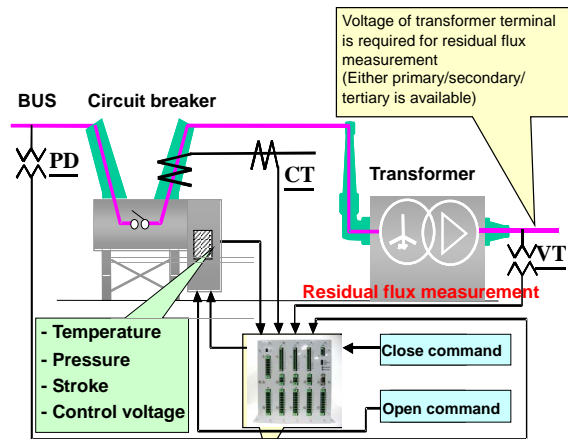
time, ambient temperature, control voltage and operating pressure.

(2) Measurement and recording of GCB operation

The SSC can store the operation times and conditions of the past 200 operations, thus allowing GCB conditions to be monitored.

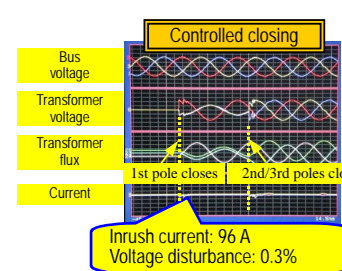
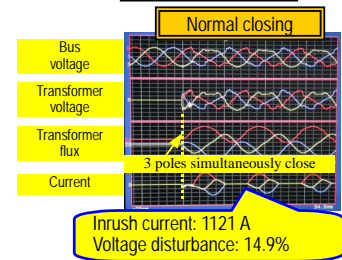
(3) High reliability

The SSC is designed using advanced technology supported by experience in relay and monitoring systems, and has excellent reliability and robustness.



Synchronous switching controller (Installed in local control cabinet)

Sample of transformer energization in field



*Transmission & Distribution System Center