CBS

Circuit Breaker Simulator

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CIRCUIT BREAKER SIMULATOR

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Introducing CBS

CBS is a circuit breaker simulator that allows for a replacement of the field circuit breaker during the Testing of Interoperability with the protection circuit, as well as the testing of 765kV recloser.

- Circuit breaker simulator that can execute transmission line reclosing system without a direct motion of the actual circuit breaker
- A simulator that makes possible the performance of an automatic test analysis at the same time as the test by interoperability an analysis system that confirms the analysis and results of the motion before and after the Testing of Interoperability

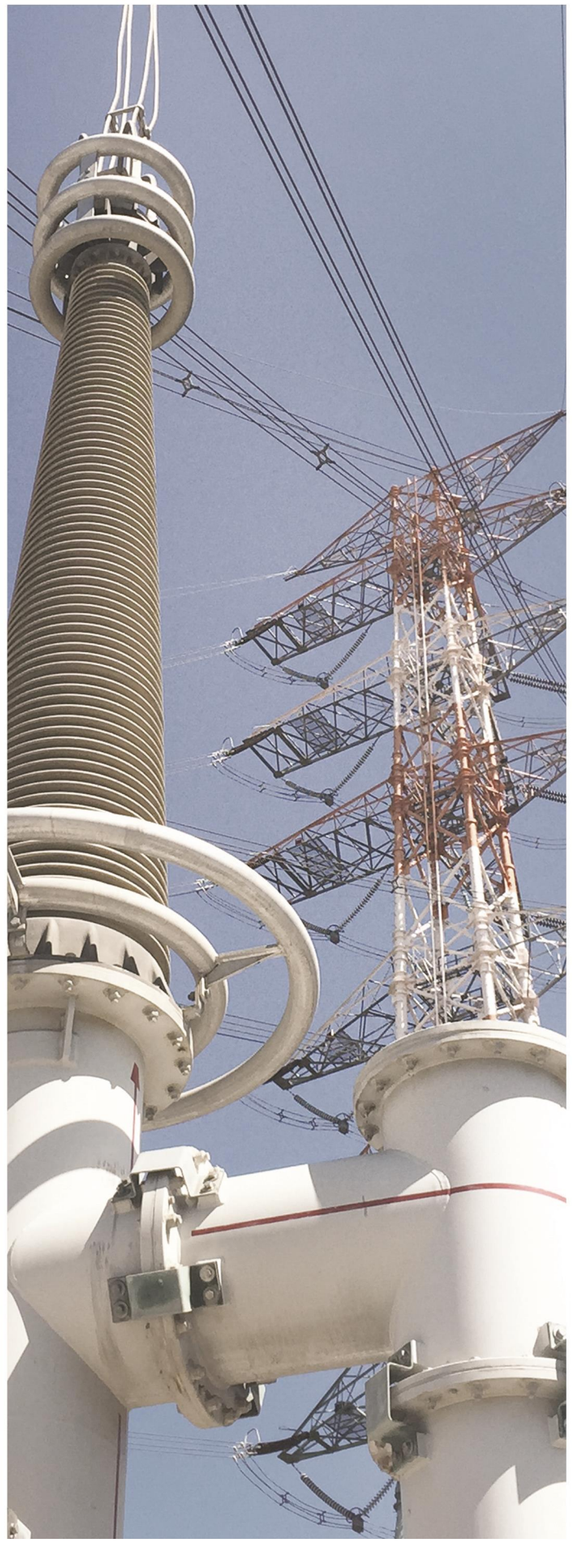
Technology application transferred from KEPCO (Korea Electric Power Corporation) Diagnosis Center (Skills transfer performance) / Completion of site field test KEPCO Equipment Diagnosis Center / Completion of verification of KEPCO Research Institute Protected Relay Demonstration Center

Power Plant & Substation Field Situations

- Direct operation of the real circuit breaker during the Testing of Interoperability for tran smission line reclosing system
- Direct operation of the actual circuit bre aker during the Testing of Interoperability of the other protection systems

Problems

- Because the circuit breaker is repeatedly being operated in order to verify the recl osing system and protective relaying Tes ting of Interoperability, not a circuit brea ker self-test, unnecessary motion operat ions are brought about in view of the circ uit breaker
- Because the circuit breaker is over-operated during the test, it may exert influence on the maintenance and life cycle of the circuit b reaker, thereby leaving the possibility of a breakdown
- There is a necessity for verification of relia bility by arbitrarily altering the Trip and Clo se times of the circuit breaker; however, the actual circuit breaker is controlled, so an effective verification is impossible



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Overall Configuration of CBS

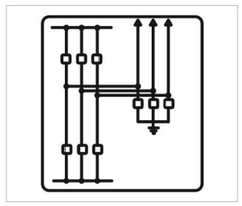
Not only the functions, but the overall design is also simple and easy to identify. Users can distinguish the circuit breaker with its color that is easily seen at a glance. The color of the case is yellow, which is the symbol for safety, has been utilized for those who work at the site

- Unconstrained setting function of Trip Time, Close Time
- Interoperability function between test sets that can simultaneously test the upper part and socket of the circuit breaker
- Provision of simultaneous operation of test equipment and analysis system, and independent operation of test equipment
- Circuit breaker simulator that operates the function of a circuit breaker that supports 154kV, 345kV, 765kV, including Digital Input and Digital Output
- Simultaneous test analysis performance with the implementation of analysis system, that allows for analysis and results of signal function before and after the circuit breaker simulator

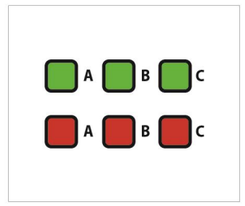
CBS created with a concrete design

It has been designed overall with the color blue. With crisp colors on the front part and side parts, the sockets and buttons can be found at a glance. It is a circuit breaker simulator of which can easily and simply perform a reclosing system of 765kV.

Front View

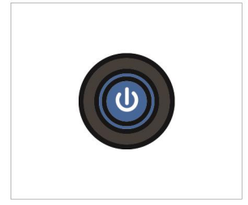


Single wireline supporting
All White Line 765kV



Circuit breaker status
display (Green/Red Color)

Trip/Close
Buttons

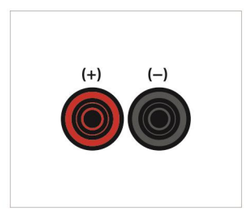


ON/OFF
Power Button

Side View

INPUT Signal (Left)

OUTPUT Signal (Right)



Power supply

Built-in Bluetooth

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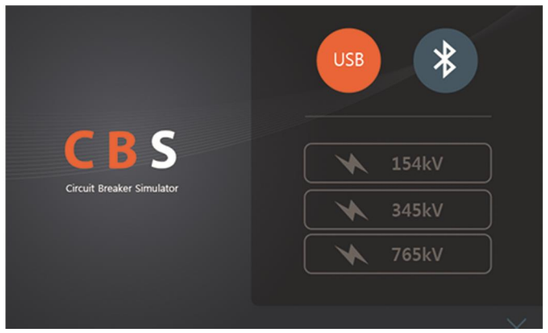
Software Functions

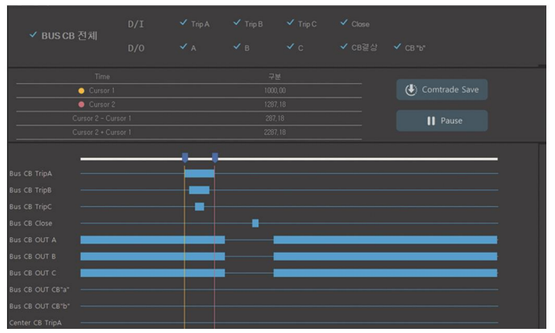
It is a software that is configured to check the analysis and reception of signals. Software functions can easily be used by linking with USB or Bluetooth.

- Recording of operation results with a Comtrade format
- Delay setting and instrument indication concerning the Trip and Close of circuit breaker
- Reception and analysis of Binary Input signal and Binary Output signal
- Signal movement analysis and analysis result confirmation before and after the circuit breaker simulation test provided through I/O module

Analytic Package Interlock

Automatic test analysis operation simultaneously with the test through analysis system interlock, that allows for checking the before and after the Testing of Interoperability





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CBS Device Functions

Functions such as 765kV HSGS accepta nce, circuit breaker logistics processing, signal output, single line diagram displ ay, Trip/Close, and circuit breaker time setting can be employed.

Device Function Introduction

765kV HSGS Capacity
Reclosing test of 1.5 cut-off method of a line

Logic Processing
Logic processing according to openi ng and closing of the circuit breaker

Signal Output
Signal output concerning the circuit breaker simulation results

Single Line Diagram Display
Single line diagram display according to circuit breaker status

Trip / Close
3-phase Trip/Close signal button for each circuit breaker

Operation Time Setting
Easy means of changing from Trip Time to Close Time for each phase

Expected Effects

CBS was produced based on current problems. CBS can be expected to have great effects on prevention of circuit breaker breakdowns and life shortening preventions.

- Prevention of malfunctioning and shortening of service life due to the extremely reduced number of operations of the actual circuit breaker
- Reduction of adverse effects and cost reductions of circuit breaker maintenance
- Possibility of verification through minimization of opening and closing of the actual field circuit breaker during the conclusive test of reclosing transmission line protection
- Real-time test results are available, which shortens the period of analysis of failure causes of Testing of Interoperability, through which it enables accurate verification of protection system
- Shortening of unnecessary waiting time due to the decrease of hydraulic pressure or air pressure of the circuit breaker during test
- Possibility of self-verifying the reclosing system without operating the circuit breaker, which reduces the time required for testing by 1/10 or more

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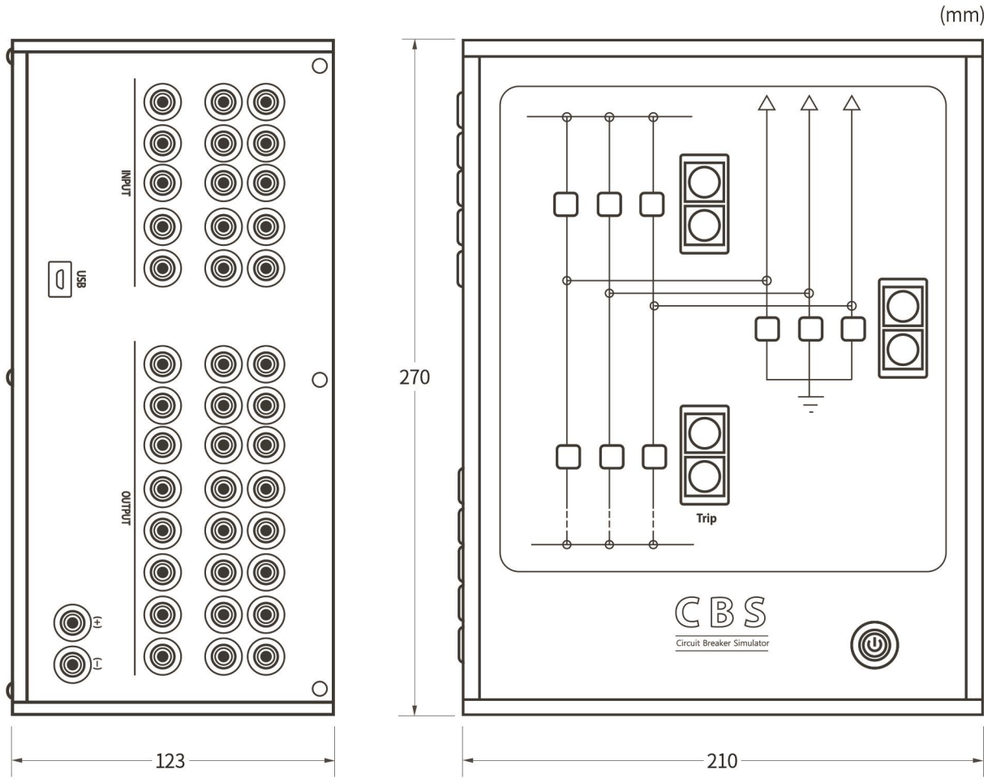
CBS Product Specifications

You may find out about the CBS product specifications such as size and weight, as well as software specifications.



CBS

Power	DC 110 ~ 150V
Serial Port	MicroUSB and Bluetooth support
Binary Input	12 Channel
Binary Output	15 Channel
Status LED	9EA (3-phase information display for each circuit breaker)
Trip · Close Button	6EA (2EA for each circuit breaker)
Size	270 X 210 x 123 (mm)

CBS CASE

Dimensions	411 X 321 X 165(mm)
Inner Dimensions	372 X 257 X 153 (Lid28+Body125)
Weight	2.34kg
Waterproof	Waterproof for 5m-deep water level, moisture block off
Operating Temperature	-40°C ~ 80°C
Material	Hyper-intensive special fiber plastic for the purpose of all-weather equipment protection
Color	Yellow

Software

OS	Windows 7 or later
SDK	.NET Framework 3.5 / 4.0
Resolution	1920 X 1080
Bluetooth	Bluetooth 2.0