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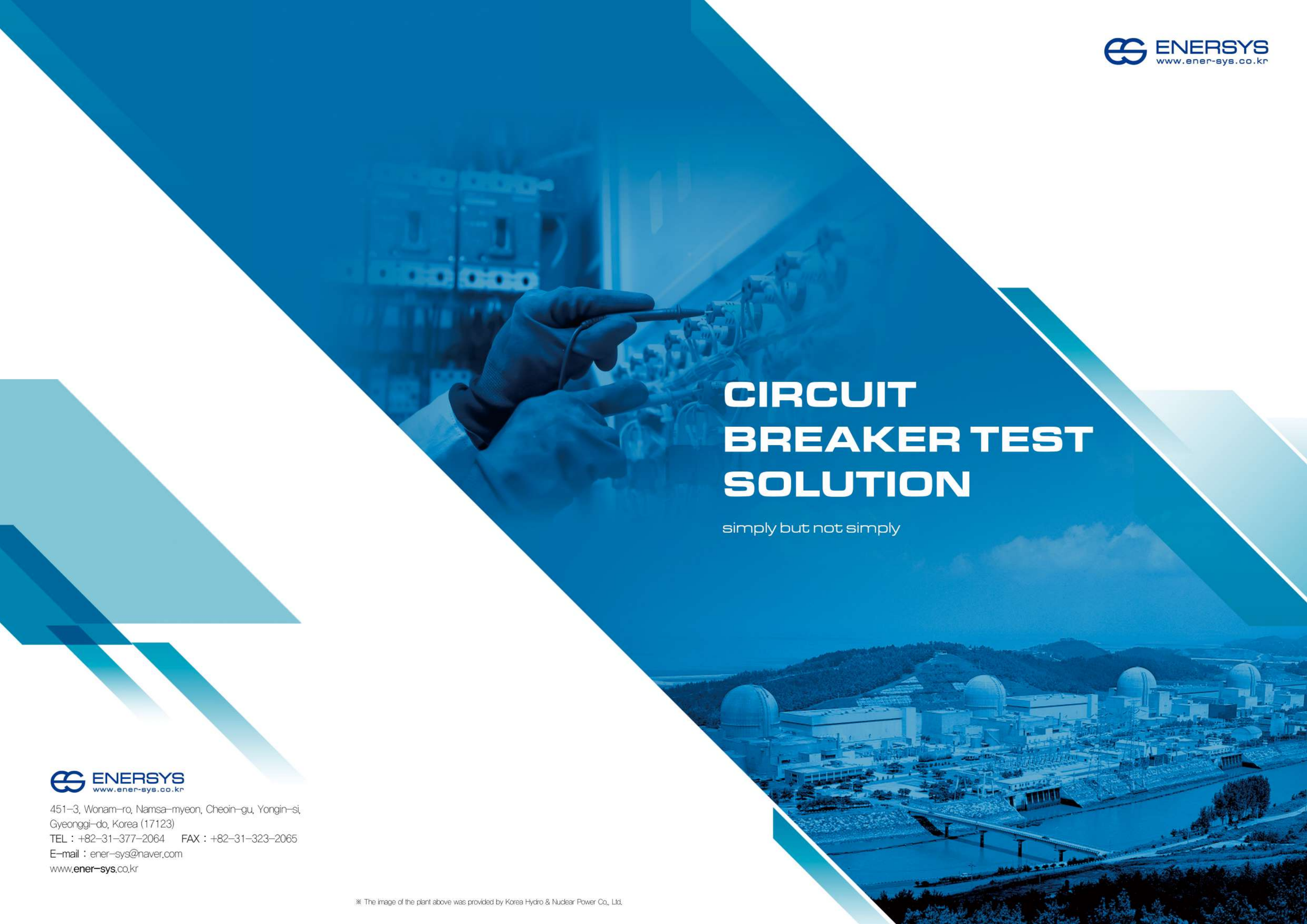

CIRCUIT BREAKER TEST SOLUTION

simply but not simply

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※ The image of the plant above was provided by Korea Hydro & Nuclear Power Co., Ltd.

Business partner that continuously grows

The circuit breaker test equipment of Enersys started with this one question, "How can we safely and easily conduct tests on the circuit breaker, which are usually complicated and dangerous?"

To find an answer, Enersys listened to the opinions of operators and workers in the industry who work on site and came up with the idea of the cradle type of integrated test equipment used by mounting the circuit breaker in. Through this successful invention, Enersys has been leading the innovation of safe and prompt maintenance of the plant by immediately checking the results, when conducting the test with easy and safe set up of test circuit.

The current method of using multiple equipments for measurement is vulnerable to error and high possibly leads to accidents. There are also many difficulties for maintenance due to the multiple numbers of equipment.

However, Enersys successfully developed the I.M.E (Integrated Measurement Equipment) for circuit breaker which integrates the power source required for the test, a control circuit for properly connecting the power source to the measurement target, and high-performance data collecting equipment to measure the values precisely.

To utilize the fast measuring abilities of developed I.M.E at the site, it provides the integrated program of the circuit breaker test equipment with user-friendly UI.

Developed integrated program by Enersys conducts test easily with just a few touches and print out the report after saving the result automatically.

The history of the power circuit breaker can be managed by registering the information on the circuit breaker in the integrated program.

Company History

2017

02. Established Enersys Inc.
05. Registered Osan factory of Enersys Inc.
Registered Affiliated Corporate Research Institute
06. ISO 9001: certified in 2008
08. Registered patent for automatic dual-type testing device for air circuit breakers
Registered patent for automatic testing equipment for switchgear circuit breakers
12. Selected as a certified venture company by the Korea Technology Finance Corporation

2018

04. Asia Economy TV close-up on company site (Company info and interview with the CEO)
08. Participated in Korea Nuclear Industry Exhibition 2018
Won commendation from Minster of Trade and Industry

2019

01. Relocated company building to Dongtan, Hwaseong-si, Gyeonggi-do
03. Registered software business
Registered 2 cases of direct production on Public e-Procurement Information
Registered Enersys Inc. in defense electronic procurement system
08. Participated in Korea Nuclear Industry Exhibition 2019
10. Selected as new military service institution
11. Certified as company with excellent technological capabilities
12. Established company building in Yongin-si, Gyeonggi-do

2020

06. ISO 9001: certified in 2015
ISO 14001: certified in 2015
ISO 45001: certified in 2018
08. Participated in Purchase Consultation Fair of Korea Hydro & Nuclear Power Co. Ltd.

Certificates and Recognition

Certificate of the company with excellent technological capabilities

Recognition letter of Affiliated Corporate Research Institute

Confirmation letter for venture companies

Verification of direct manufacture (software)

Verification of direct manufacture (system management)

ISO 9001 : 2015
Certificate of product quality management system

ISO 14001 : 2015
Certificate of the environmental management system

ISO 45001 : 2018
Certificate of safety and hygiene management system

Patent Certificates

#10-1773433
(Automatic dual-type testing device for air circuit breakers)

#10-1697178
(Automatic testing equipment for switchgear circuit breakers)

#10-1673903
(Customized clip-type plug for testing equipment for circuit breaker's contacting plates)

#10-1673902
(Customized clip-type plug for testing equipment for circuit breaker's contacting plates)

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Portable Testing Equipment – CBS 100

Equipment Overview

We, ENERSYS, developed portable testing equipment that is free from cradle which is installed in fixed testing equipment.
Achieved CE Certificate, to step forward for overseas markets.
Minimized volume and weight compared to current testing equipment to improve mobility.
Improved program to change the test procedure according to the using circuit breaker.

Technical specifications

Mechanical data

Dimensions	405(H) × 530(W) × 270(D)mm
Weight	40 kg

Control Specification

TYPE	12 " Touch Screen
CPU	Intel Quad-core 1.8 Ghz
RAM	4 GB
Storage	64 GB
Display	12 " LED Display 1024 × 768 resolution
Communication	1 RS-232 & 2 USB

DC Power Output – Electric motor control and UVTA (2-channel use)

Power	Voltage	Current	Accuracy
0 W ~ 3000 W (basic specifications)	DC 0 V ~ 150 V	0 A ~ 20 A	0.5 %FS
0 W ~ 3000 W (basic specifications)	DC 0 V ~ 300 V	0 A ~ 10 A	

Charging Motor Current Measurements

Source	Range	Accuracy
DC	0 A ~ 10 A	1 %FS

Resistance Measurements

Range	Voltage	Current	Accuracy
1 μΩ ~ 2 mΩ	DC 0 V ~ 5 V	100 A	1 %FS
1 Ω ~ 200 kΩ	DC 0 V ~ 12 V	0.2 A ~ 3 A	
1 MΩ ~ 4000 MΩ	DC 0 V ~ 1000 V	–	

Timing Test

Phase	Sampling rate	Time	Accuracy
Phase A	100 kHz	20 μs ~ 500 ms	0.1 %FS
Phase B			
Phase C			

Check OCR Operation – Additional options

Power	Voltage	Current	Accuracy
0 W ~ 100 W	AC 0 V ~ 1 V	0 A ~ 100 A	0.5 %FS

Environmental conditions

Temperature	–15 ℃ ~ 55 ℃ / 5 ℉ ~ 131 ℉
Humidity	30 % ~ 70 %

Calibration

Basic	1 set of calibration cables for I.M.E Guide book for calibration is provided (Contact us for assistant service of calibration)
Warranty	2 years (contact us for extension)

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Features of Testing Equipment

MINIMUM PICK-UP TEST

Test equipment developed by Enersys conducts the test by the procedural guidelines on "operational test on minimum control voltage" recommended by the KHNP Central Research Institute. Also the range of applied voltage can be limited or changed by this test equipment.
It is possible to measure the electric current required for charging the spring.
The measurement is displayed in a graph of the electric current's intensity over time.
Workers or operators can check the abnormalities through the warning pop-up.

- Test Voltage: DC 60V when close, DC 50V when open(Individually settable)
- Rising Voltage: DC 5V
- Reference Voltage: DC 90V when close, DC 70V when open(Individually settable)
- Electric Current Measurement: 0 A-10 A

RESISTANCE MEASUREMENT

This test equipment can measure the general resistance, as well as the resistance of the motor coil, reclosing prevention relay, closing coil, tripping coil, and low voltage tripping device. The contact resistance of the main circuit and insulation resistance of the main and control circuit can also be measured.

- General Resistance: 1Ω-200kΩ
- Contact Resistance: 1μΩ-2mΩ (uses DC 100A)
- Insulation Resistance: 1MΩ-4000MΩ (uses DC 500V, 1000V)

TIMING TEST

I.M.E can measure the opening and closing time of the main circuit of the circuit breaker without any additional device or equipment.
It is possible to measure both operations of closing and opening in the circuit breaker. It displays the total opening and closing time, initiated and period of chattering time, and the analyzed number of chattering through the graph of measurement results.

OVERCURRENT RELAY TEST - ADDITIONAL OPTIONS

It is possible to test the overcurrent relay if the overcurrent relay is installed in the circuit breaker.
It checks the integrity of the overcurrent relay by measuring the pick-up current and long, short, and instantaneous time limits.
This test is an additional option, and a customized AC Power Source is supplied.

UNDERVOLTAGE TRIP TEST

It can test the under-voltage trip attachment device installed in the circuit breaker. The coil state of the under-voltage trip attachment device is checked through a resistance measurement circuit and it can check the integrity under the emergency of under-voltage by measuring the operating voltage and time to see if the tripping operation proceeds normally in a situation of actual under voltage.

CIRCUIT BREAKER STATUS MONITORING

It displays the contact point to check both incoming status and opening/closing status of the power circuit breaker while conducting the test, in order to check the integrity of the control signal and prevent any accidents that may occur during the test.

SELF-INSPECTION OF TEST EQUIPMENT

Before conducting the test, this circuit breaker test equipment secures the integrity by itself and prevent the possibility of errors or misjudgment with self-inspection functions for reliable testing equipment.

TEST HISTORY MANAGEMENT

All test results are automatically saved so that users can freely check it at any time. It is possible to check the details of what is changed in the circuit breaker, which is tracked through changes in the graph according to the result of the general report as well as the test description of the selected circuit breaker and tested date.

PRINT TEST REPORT

Auto-saved test results can be checked in a test report programmed in the power circuit breaker test equipment.
All results measured using the test equipment can be checked in a report and can be printed out after connecting the printer you have to portable testing equipment.

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