



PORTABLE HSCB TESTER

CITY ELECTRIC TRANSPORT ■
RAILWAYS ■ METRO

PURPOSE

Portable HSCB Tester is an advanced device for precise, fast and safe testing of high-speed DC circuit breakers applied in traction substations of urban electric transport, metro and railways. It is featured by high reliability of circuit solutions as well as compactness.

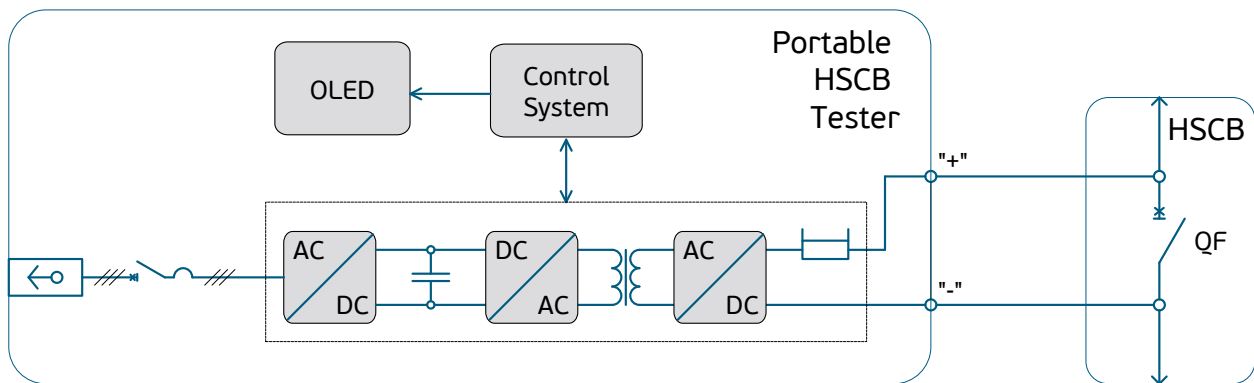
Portable HSCB Tester is designed to convert three-phase AC voltage into low-voltage pulse voltage in order to generate rising unipolar current pulse in the circuit breaker main circuit. Portable HSCB Tester can generate up to 8000 A current and record maximum current value at the moment of circuit breaker tripping.

Special attention was paid to weight and dimensions during the tester designing. It helped to develop an ergonomic and compact design that can be used in limited space.



BENEFITS

- / versatility and possibility to operate with different types of circuit breakers;
- / robust housing that guarantees safety of operating personnel;
- / modern component base;
- / various test modes;
- / easy setup and connection;
- / protection against overheating;
- / lightweight and mobile design for easy use in places that were previously inaccessible for test equipment;
- / due to low weight and dimensions, the tester is easily transported from one substation to another;
- / replaces large and bulky complex of electrical test equipment and has a compact design allowing it to occupy minimal space at the substation;
- / the tester is designed, manufactured and tested in accordance with the requirements of DSTU EN 60146-2:2022, DSTU IEC 60529:2019, DSTU EN 60664-1:2015, DSTU EN 50110-1:2019.



▲ Portable HSCB Tester Structural Diagram

Power Section

The power section is designed as a two-cascade conversion circuit with a DC intermediate stage and high-frequency galvanic isolation. This ensures isolation of the network from measurement circuit connected to power contacts of high-speed circuit breaker.

Control System

The control system forms pulses to generate an output current with a specified rate of rise and automatically fixes tripping current of high-speed circuit breaker.

Measurement results (actual/previous) and operational information are displayed on OLED screen.

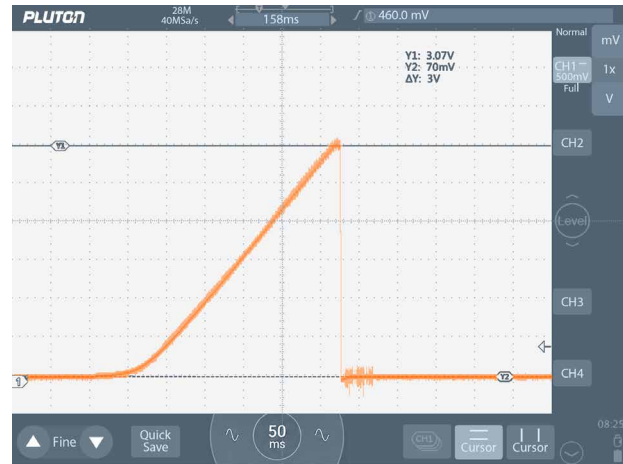


Protection

The Portable HSCB Tester includes the following protections:

- power supply network quality monitoring (availability of phases, U_{max}/U_{min});
- overheating protection (forced cooling is activated first; if the temperature continues rising, output current formation is blocked);
- output current disconnection in case high-speed circuit breaker fails to operate after expiration of testing time or upon exceeding the maximum value (8.3 kA).

Dynamic mode (0.5 s):



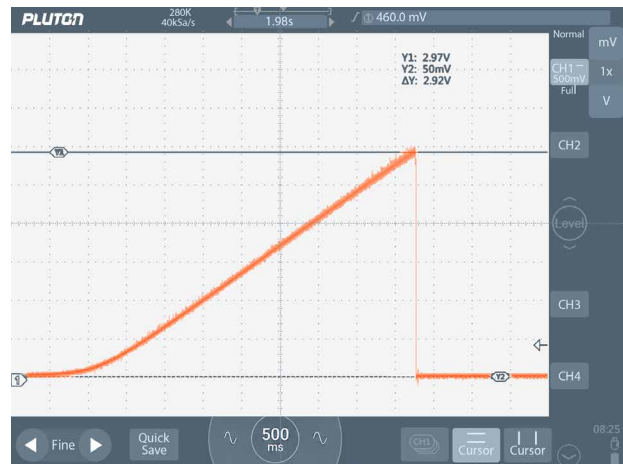
▲ Y-axis scale: 500 mV/div corresponds to 500 A/div.
Circuit breaker tripping: 3.0 kA

Operation Modes

There are two basic output current pulse generation modes provided:

- Dynamic mode (0.5 s):
a mode with high current rate of rise (di/dt) for fast measurement of high-speed circuit breaker tripping threshold.
- Static mode (10 s):
applied to accurately determine high-speed circuit breaker tripping thresholds during smooth current rise.

Static mode (10 s):



▲ Y-axis scale: 500 mV/div corresponds to 500 A/div.
Circuit breaker tripping: 2.92 kA.

Current through the high-speed circuit breaker increases linearly with a constant rate of change (di/dt) on oscillograms, ensuring accurate and repeatable verification of the release mechanism operating threshold.

TECHNICAL SPECIFICATIONS

Rated technical parameters and specifications of Portable HSCB Tester

Parameter name	Unit	Value
Rated AC supply voltage	V	3x230 3x400*
Deviation of AC supply voltage from rated value	-	0.9...1.1
Rated frequency of AC supply voltage	Hz	50
Maximum voltage at output busbars, without cables connected	V	8
Maximum output current (RMS), not less	A	8000
Dependence of current rise on time	-	linear
Duration of output current generation, not less - static mode - dynamic mode	s	10 0.5
Output current ripple, not more	%	4.2
Error of tripping current value fixing in the range (1000...8000) A	%	±2.5
Number of digits for indication of tripping current value	-	3
AC insulation test voltage (50 Hz, 60 s) "power supply network/output busbars" "power supply network/enclosure"	kV	2.5
Protection level according to DSTU IEC 60529:2019	-	IP30
Cooling type	-	air, forced (AF)
Overall dimensions (WxHxD)	mm	420 x 910 x 445
Weight (without cables)	kg	58

* to be specified when ordering

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