

A **STEVO** Electric product

# DC CURRENT GENERATOR

## BALTO 4.000A - 40.000A

40.000 A  
**BALTO**



**STEVO** Electric bvba

Internationally patented

EN



## Challenge

The problems arising during testing of High-speed DC Circuit-breakers frequently worry the service and maintenance personnel of railway organizations, especially when it comes down to checking and adjusting the threshold Ids

STEVO Electric brings the solution to this problem. After having acquired experience with its BALTO System 6.000A - available on the worldwide market since 2003, STEVO Electric developed an innovative mobile BALTO System useable up to 30.000A.

Starting from 2016 BALTO systems of 4.000A up to 40.000A are available

## General information



The BALTO System was developed to generate very high and precise DC test currents in order to carry out functional tests on High-speed DC Circuitbreakers.

These very high currents are injected in the main circuit of Highspeed DC Circuit-breakers. Moreover, the whole circuit can be controlled, namely the current converters, the elements of measurement and the DC protection relays.

## Innovations

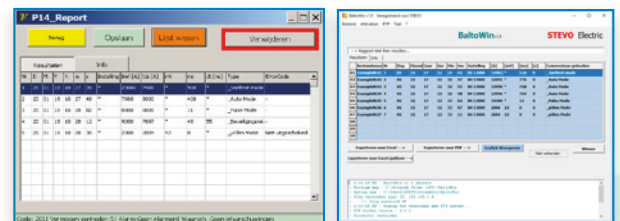
- Ergonomic design
- Energy sources: batteries and ultra-caps
- Power units: DC/DC current converters - Internationally patented
- Current rising slope according to IEC norms
- Current rate of rise can be adjusted

## Communications

- Interface USB
- Interface Ethernet RJ45

## Options

- BALTO Win: Software package for off-line processing of test results and Remote control



Easy exportation of data into Excel and Pdf files

- Calibration tool: for self-calibration of the BALTO System
- Various handle appliances
- Various busbar systems for all possible types of High-Speed DC Circuit Breakers - withdrawable or not - in DC switchgears

## Construction

To meet the requirements encountered in the market, the innovative BALTO system was subject to the specifications worked out on the basis of requests from High-Speed DC Circuit Breakers' manufacturers and various Railways/Train Operators and Public Transport Company's.

The modular BALTO system consists of:

- Control Unit with user friendly Operator Terminal
- Power Unit(s): 4.000A each
- Cart supporting batteries, ultra-caps and battery charger(s).
- Connection with the High-Speed DC Circuit Breaker by specific high current flex-cables or suitable busbar systems

### Control unit: extended with Submodule ADP for DC protection testing capabilities

The control unit can be extended for testing DC protections of the DC switchgear in the DC substations. In this way, the BALTO System can perform primary as well as secondary injection tests. Secondary injection capabilities are optionally available. The system is modular and extensible. A single support carriage can hold 5 Power units and hence generate currents of up to 20.000A. In a Master/Slave configuration 40.000A can be reached. All the modules are portable. The energy source, i.e. chargers, batteries and ultra-caps are fastened on the carriage support. Assembly of the BALTO system is easy and only takes 5 minutes. The user-friendly, touch screen interface is self-explanatory. For testing high speed DC circuit-breakers on rolling stock with more convenience, a downsized version was developed:

**BALTO COMPACT** → This version has the same functionality but is limited to 3.000A or 4.000A

## Remarks

- For a BALTO System equipped with 8.000A/12.000A no further extensions required, a storage drawer is available as an option.
- Specific designs upon request.



## Security

During the development of the BALTO system, special care was taken to the aspects of safety, health and the environment. Automated monitoring of the system, including the temperature, is standard available.

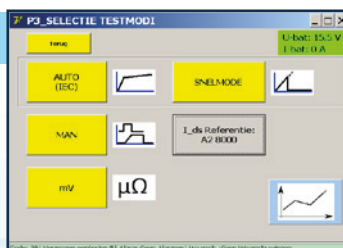
## BALTO System features

- Automatic recognition of the Power units
- Auto diagnostic – Control and calibration of current measurement per Power unit
- Current increase supervision
- Check the settings and performance of the High Speed DC Circuit Breaker
- Check functionality of the DC protection relay, e.g Delta I, di/dt, I<sub>max</sub> etc.
- All test results are stored in memory for easy retrieval

## Test modes

- Automatic mode with quick test
- Manual mode
- Voltage drop measure

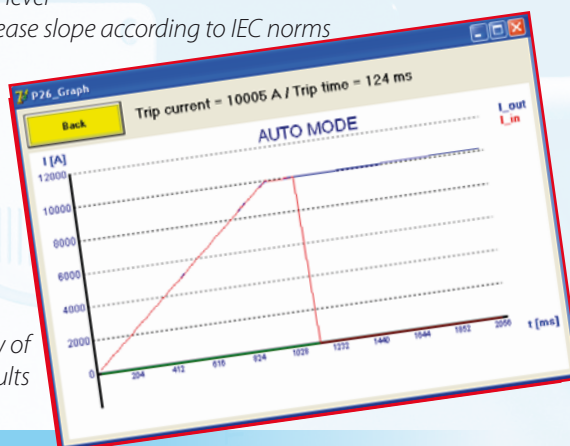
Selection test modes



## Quick test /automatic mode

- Quick test to determinate the I<sub>ds</sub> level
- Automatic test with current increase slope according to IEC norms

Graphical display of measurements results



## Manuel mode

- Measure of the mechanical reaction time by tripping of the DC high speed circuit-breaker
  - Primary testing of the DC protection relays
  - Calibration of measuring circuits
- Measuring of reaction time: Manuel opening and Manuel closing in conjunction with BCD (Breaker Control Drive) for secondary injection.

## Voltage drop measure

- Voltage drop measurement in accordance with the procedure prescribed by the manufacturers of High-speed DC Circuit-breakers

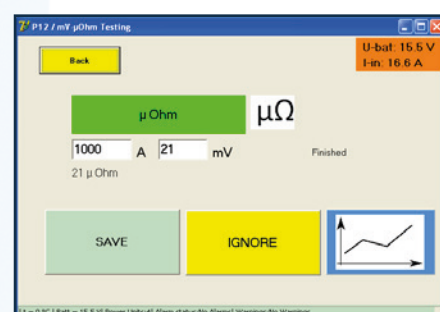
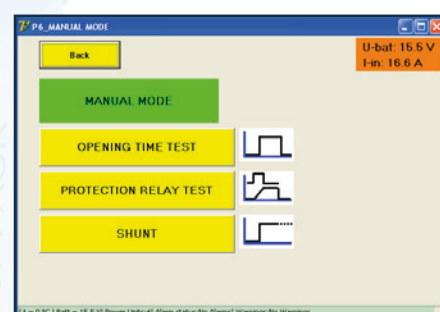
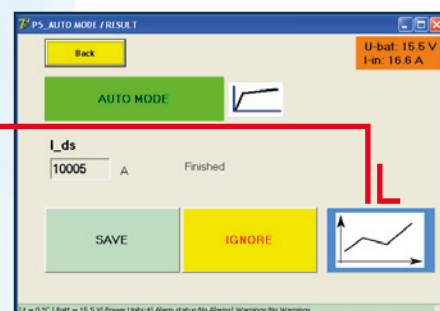
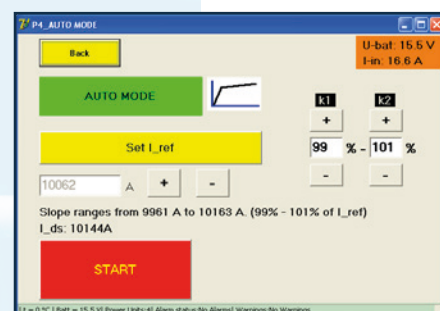
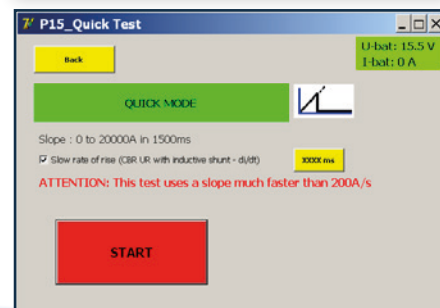
## Applications

The BALTO System was developed for specific applications in the railway environment, including:

- High-speed DC Circuit-breakers for DC substations and their protection relays
- High-speed DC Circuit-breakers used on the rolling stock: Locomotives, train sets, subways, undergrounds and tramways.
- Electromagnetic contactors (control and main) in tramways and trolleybuses
- Electromagnetic contactors (control and main) with over current protection
- DC protections used in the DC switchgear or supplies of overhead lines, third rail, trolleys or others

Moreover the BALTO System can be used for other applications where very high currents are required.

**Hint: Supposition of equivalent testing of High-speed DC Circuit-breakers in application submarines and ships.**





## DC CURRENT GENERATOR BALTO 4.000A up to 40.000A

### TECHNICAL DATA

<b>Power supply BALTO</b>	Auxiliary supply - mains 220VAC - 240VAC/50Hz and 110VAC -120VAC/60Hz
<b>Tension level power units</b>	Batteries and Ultra-caps 12VDC – 15,7VDC
<b>Available ranges</b>	System 4.000A - 20.000A per 4.000A unit System master/slave 24.000A - 40.000A per 4.000A unit
<b>Control unit</b>	Offers the following features: <ul style="list-style-type: none"> <li>☛ Operator terminal – Operation, Control, Supervision and DC protection</li> <li>☛ Communication interfaces</li> <li>☛ Auxiliary supplies</li> </ul> Weight: 16,4Kg Dimensions: 500x480x230
<b>Power unit</b>	Current converters DC/DC 4.000A Weight per power unit: 24,5Kg Dimensions: 700x430x160
<b>Carriage of support</b>	Per system up to 20.000A Carriage support for: <ul style="list-style-type: none"> <li>☛ Control unit</li> <li>☛ Power units 4.000A – 20.000A</li> <li>☛ Batteries &amp; chargers – Disposition according the power range (fixed)</li> <li>☛ Ultra-caps – Disposition according the power range (fixed)</li> </ul> Weight: 55Kg – 110Kg – Depending on the disposition of the power range Dimensions: 1100x700x750
<b>Output characteristics</b>	Output voltage: 3,6VDC - 4,71VDC Output current: 100A - 4.000A up to 20.000A Master/Slave: Up to 40.000A
<b>Measures</b>	Measure of the effective trip current level $I_{ds}$ Measure of the mechanical reaction time by tripping Measure of the voltage drop
<b>Environment</b>	Application area : This test equipment is destined for applications in substations, electrical areas and industrial environments. Security norms : <ul style="list-style-type: none"> <li>☛ According harmonized document EC directive 2006/42/EEC</li> <li>☛ LVD : 2006/95/EC (LVD EN61010-1:2001)</li> <li>☛ EMC: 2004/108/EEC (EC EN61326-1:2006)</li> </ul>
<b>Connections</b>	Power supply cable: standard.  Output connections : High current flex cables, section 240mm <sup>2</sup> – 2m à 3m (standard 2m) per power unit - two cables. From 16.000A up to 40.000A - Option: with a busbar system or with cable set. Remark: special fixture upon request as option. Earth cable: 16 mm <sup>2</sup>
<b>Application area</b>	DC substations, Maintenance workshops for locomotives, train sets, subways, undergrounds, tramways and trolleybus Submarines and navigation: all kinds of high speed DC circuit breakers
<b>Service temperature</b>	0C° ... +55C° / 32F° ... +131F°
<b>Stock temperature</b>	-20C° ... +35C° / -13F° ... +149F°
<b>Humidity</b>	95% RH none condensing
<b>Protection</b>	IP22