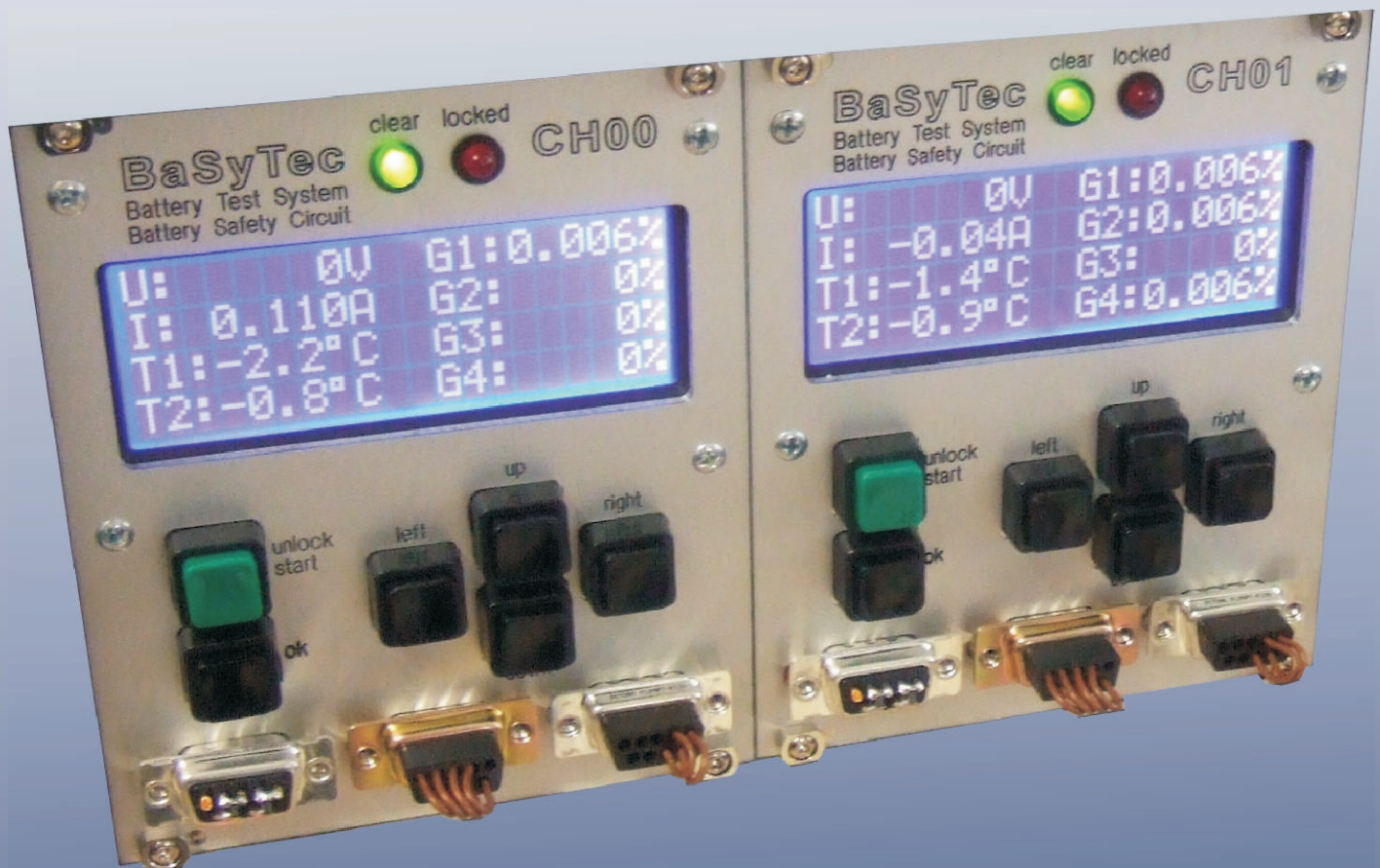# BaSyTec
Battery Test Systems

BSD
Battery Safety Device

Avoid battery accidents

Research
Development
Production
Quality control

Make battery testing safer

BaSyTec is one of the leading manufacturers of battery test systems. Several hundred systems are operated today all over the world. Customers are battery manufacturers, universities, test laboratories, car makers, power tool manufacturers and producers of electronic equipment. The ongoing development is strongly related to our customer needs. BaSyTec offers today the most powerful battery test software and a wide product range. The Battery Safety Device (BSD) is an add-on for the test systems. It operates independently and monitors all relevant battery parameters.
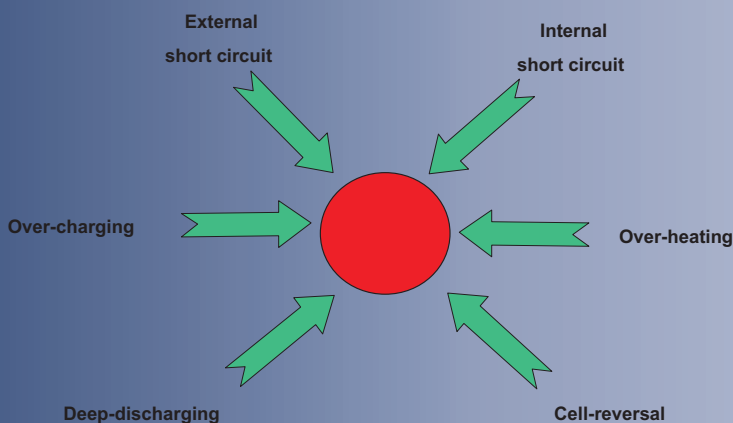
Battery Safety

High energy density and high specific power are two of the key targets in battery research and development. However, both parameters result in fast energy release in case of internal or external battery failures. Additionally the thermal energy content of lithium based batteries is a multiple of the stored electrical energy. Exothermal reactions in case of overcharging or in case of short circuits can result in explosion and fire and can destroy a battery test laboratory. The risk increases with larger batteries and should not be underestimated.

BaSyTec test procedures allow to supervise a test by all monitored signals, as current, temperatures and voltages. However this method does not protect from careless mistakes and it is not independent from the control system.

The BaSyTec Battery Safety Device (BSD) is an optional extension of the BaSyTec Battery Test Systems. It will independently monitor all critical parameters of the battery and it's ambient and will switch off the battery current by locking the main output relay if any parameter exceeds it's safe range.

Fire caused by an overcharged battery

Typical Applications

The BSD is mechanically included into the BaSyTec Battery Test system but operates completely independently, so offering a second backup safety circuit to the main control system of the BaSyTec Battery Test System.
It is recommended for:

- All NiMH batteries with an energy content of more than 500 Wh.

- All Lithium batteries with an energy content of more than 100 Wh.

- All batteries and cells where safety risks are expected, i.e. Prototypes.

External short circuit

Internal short circuit

Over-charging

Over-heating

Deep-discharging

Cell-reversal

Most Critical operation conditions, resulting in battery degradation or fire.

Technical Specification

User Interface	Green light	Everything ok
	Red light	Emergency switch off
	LCD Display	Showing actual values, also used for configuration and to show critical parameters which lock the system 20*4 characters, 85*30.5mm, backlight
	6 Buttons	RESET ➜ leave locked state. This button and disconnecting from mains supply are the only possibilities to unlock the BSD ENTER, left, right, up, down ➜ switch between screens and configure the device
Temperature inputs	Count	2 per unit
	Connector	D-SUB 9-pin female
	Mode	4-wire connection
	Sensors	Pt100
	Resolution	0.05°C
	Precision	2°C
	Sample rate	5Hz
	Lock delay	400ms to 10s (default 2s)
Analog inputs (Used for gas sensors like H, CO or any other sensor outputs)	Count	4 per unit
	Connector	D-SUB 9-pin male
	Range	0-10V (0-20mA), differential
	Resolution	16 bit
	Precision	1% FS
	Sample rate	5Hz
	Lock delay	400ms to 10s (default 2s)
Main voltage	Count	1 per unit
	Connector	Internally wired to the sense input of the battery test system
	Range	Same as test system voltage range
	Resolution	16 bit
	Precision	1% FS
	Sample rate	5Hz
	Lock delay	400ms to 10s (default 2s)
Main current	Count	1 per unit
	Connector	Internally wired to the main shunt of the battery test system
	Range	Equal to the current range of the test system
	Resolution	16 bit
	Precision	2% FS

Technical Specification

Single cell / module voltages (SC and HV variant)	Count	11 per unit
	Connector	D-SUB 25-pin male (SC)
		Phönix DFK-PC4/12-GF-7,62 (HV)
	Range	0-5V, differential, common mode voltage up to 100V(SC)
		0-100V,differential, common mode voltage up to 1000V(HV)
	Resolution	16 Bit
	Precision	1% FS
	Sample rate	5 Hz
	Lock delay	400ms to 10s (default 2s)

External clearance	Count	2 per unit (1 for HV variant)
	Connector	D-SUB 9-pin female
	Type	TTL-like input with internal 2k2 pullup
		Must be connected to potential free relais or optocoupler output
	Range	cleared if potential < 0.5V
		locked if potential > 2.5V
		0.5V to 2.5V is not allowed
	Lock delay	400ms to 10s (default 2s)

External signal out	Count	2 per unit
	Connector	D-SUB 9-pin female (same one as before)
	Type	Relais output with changeover contacts
		max. 24V/1A each
	Output will be closed if the BSD is enabled	

Calibration	The units will reach the specified precision without calibration.

Parameter readout (optional)	All measured parameters can be read out and used by the BaSyTec Battery Test System. For reasons of safety it is not possible to set any parameter this way.

Global enable	There is a global enable signal connecting all BSD´s in a system. So, if one BSD goes into locked state all others can also lock their outputs.
	So global parameters (gas sensors, emergency shutdown) need to be wired only to one BSD
	It can be configured for each input whether a failure will lock all or only one test channels
	Default is that cell voltage, temprature and current inputs do only lock the affected channel
	Default is that external clearance and analogue inputs (for gas sensors) will lock all channels