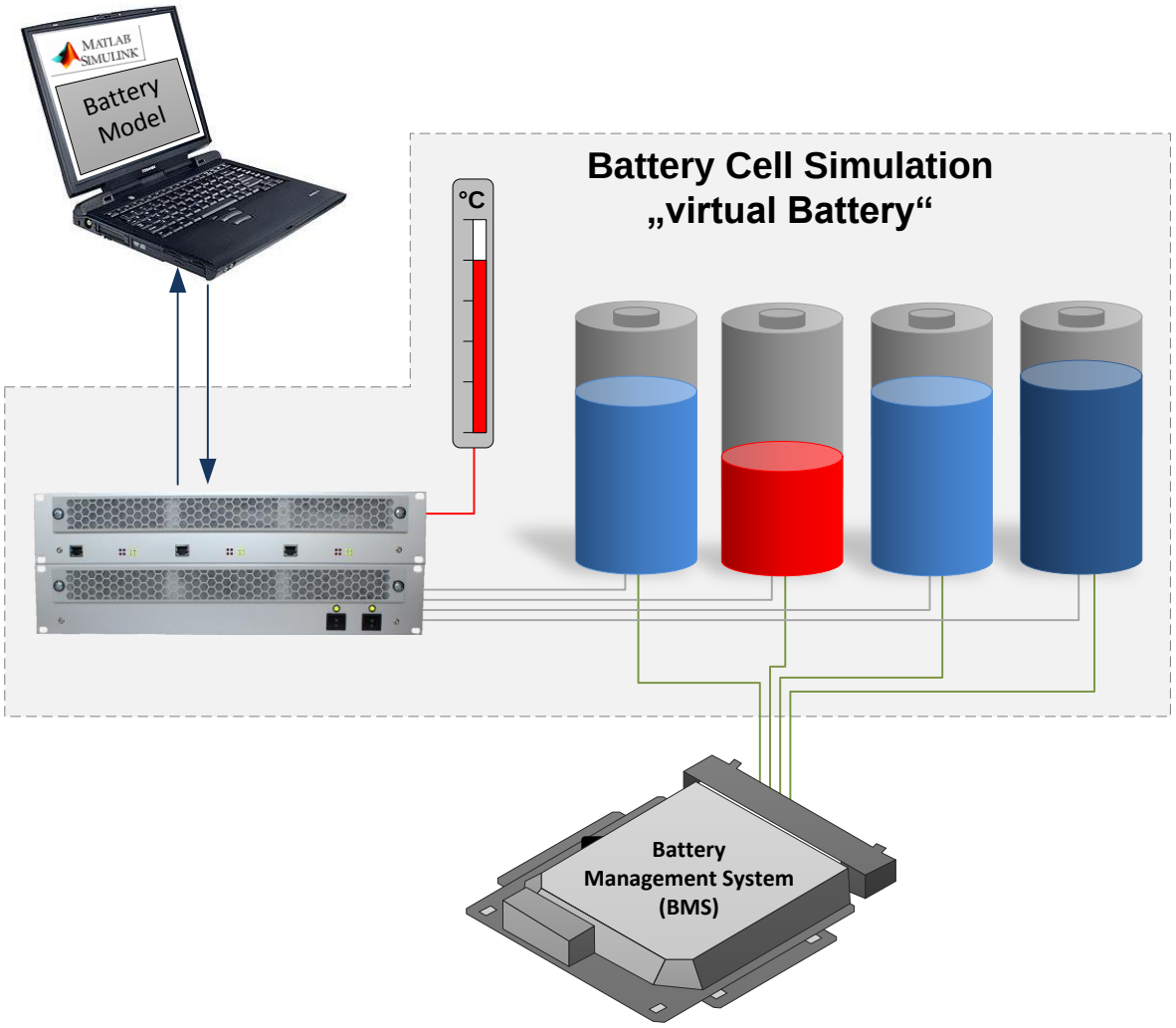
Battery Cell Simulator „Compact“

Based on Gen. 7

NEW!



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your partner for complex embedded solutions

Communication:
CAN or
EtherCAT

Battery Cell Simulator „Compact“

Features

- Cell supply range 0.01 … 8 V up to 5 A
- ▶ Accuracy +/-500 µV
- ▶ Active and passive Balancing
- Current measurement up to +/-4.9 A
- Coulomb Measurement (Charge/Discharge)
- Integrated failure simulation
- Communication CAN or EtherCAT 100 MBit/s
- Up to 144 cells per rack, 200 cells in sum
- Scalable system, different versions available
- High reliability: 3 years warranty

ATION BW
INNOV 2013
Innovation Award Baden-Württemberg
Dr.-Rudolf-Eberle-Preis
Award Winner 2013

The new compact design of the Battery Cell Simulator

The new BCS compact version gives you the possibility to store and simulate 15% more battery cells in the same space.[(1)] To achieve the space saving technically, the module was split into two devices: a battery cell part and the power supply. Each battery cell module is now only 2 HU high (compared to common BCS 3 HU) and still able to simulate up to 12 cells.

All features of the normal Battery Cell Simulator

Flexible voltage source and current load adjustment:

High-precision function tests of the BMS are possible with the comemso BCS. Each cell has an electronic load, which can be used for active and passive balancing. This constant current sink can generate currents up to 4.5A (depending on selected features). The comemso BCS comes with all accuracies directly at the BMS test object, even in case of 3m cable length.

Fault simulation and current measurement:

Each cell provides a **fault simulation** for generating short circuits, cable breakage and change in polarity (reverse polarity). Each cell output additionally includes a **high-precision current measurement system**. This market innovation enables the BCS to detect balancing currents as well as leakage currents per cell, e.g. at a turned off BMS. This way, deep discharges of whole battery modules can be analyzed quickly. With the integrated **Coulomb measurement** per cell balancing procedures are verified. The comemso BCS combines a high-precision emulation of battery cells with a high-resolution measurement technology and extended validation possibilities. The comemso BCS combines battery cell emulation with measurement techniques. Communication takes place via CAN or via EtherCAT, for high-performance measurements and highly dynamic control even at > 120 cells.

[(1)] When using more than 60 battery cells.

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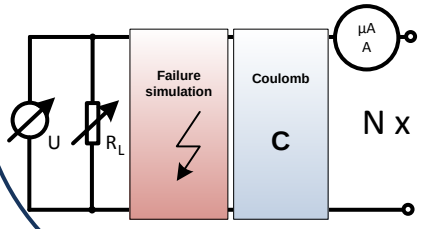
Overview / Technical data

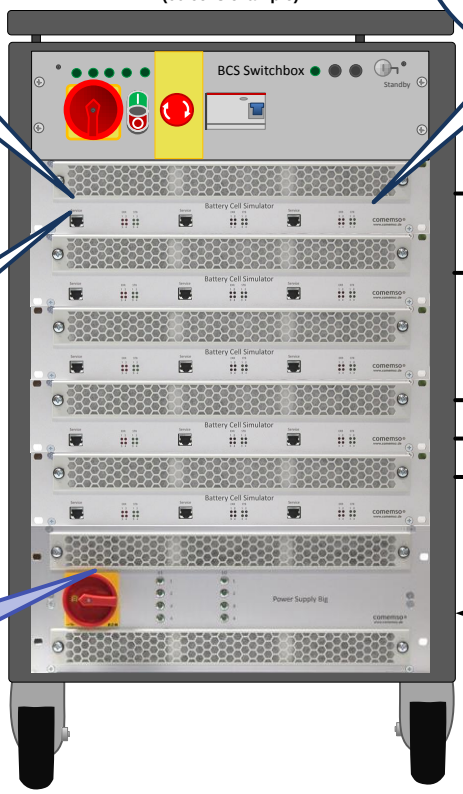
„Virtual Battery Cell“ with integrated failure simulation incl. Coulomb and leakage current measurement

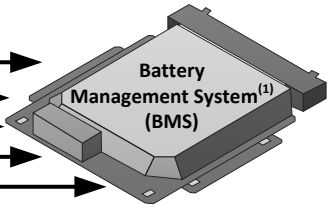


N = 1...200

Scalable variants

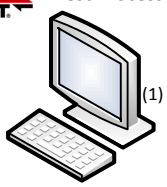
- Basic (incl. mA current measurement)
- Basic + F (Fault simulation)
- Basic + F + µA (current measurement)
- Basic + F + HiLoad (>4 A sink/source)
- Full (all features)





BCS Compact Slide-in module:
- 2 HU
- Can store up to 3 BCS Cards
- Simulation of max. 12 cells per module

CAN + EtherCAT



Compact Power Supply

Large version:
- 4 HU
- at max. 5 A source up to 12 BCS modules

Small version:
- 2 HU
- at max. 3 A source up to 5 BCS modules

(1) Not included in BCS products.

Technical Data

Communication:	CAN bus / EtherCAT	Isolation cell/communication:	2kV
Temperature range:	Lab conditions	Isolation cell/cell:	60V
Connector:	115V/230V or CEE 3x16A	Amount of cells:	12 to 200
Integrated emergency shutdown management		Simulation of up to 144 cells per rack	

comemso_Batteriezellen-Simulator_Flyer_eng_20161010

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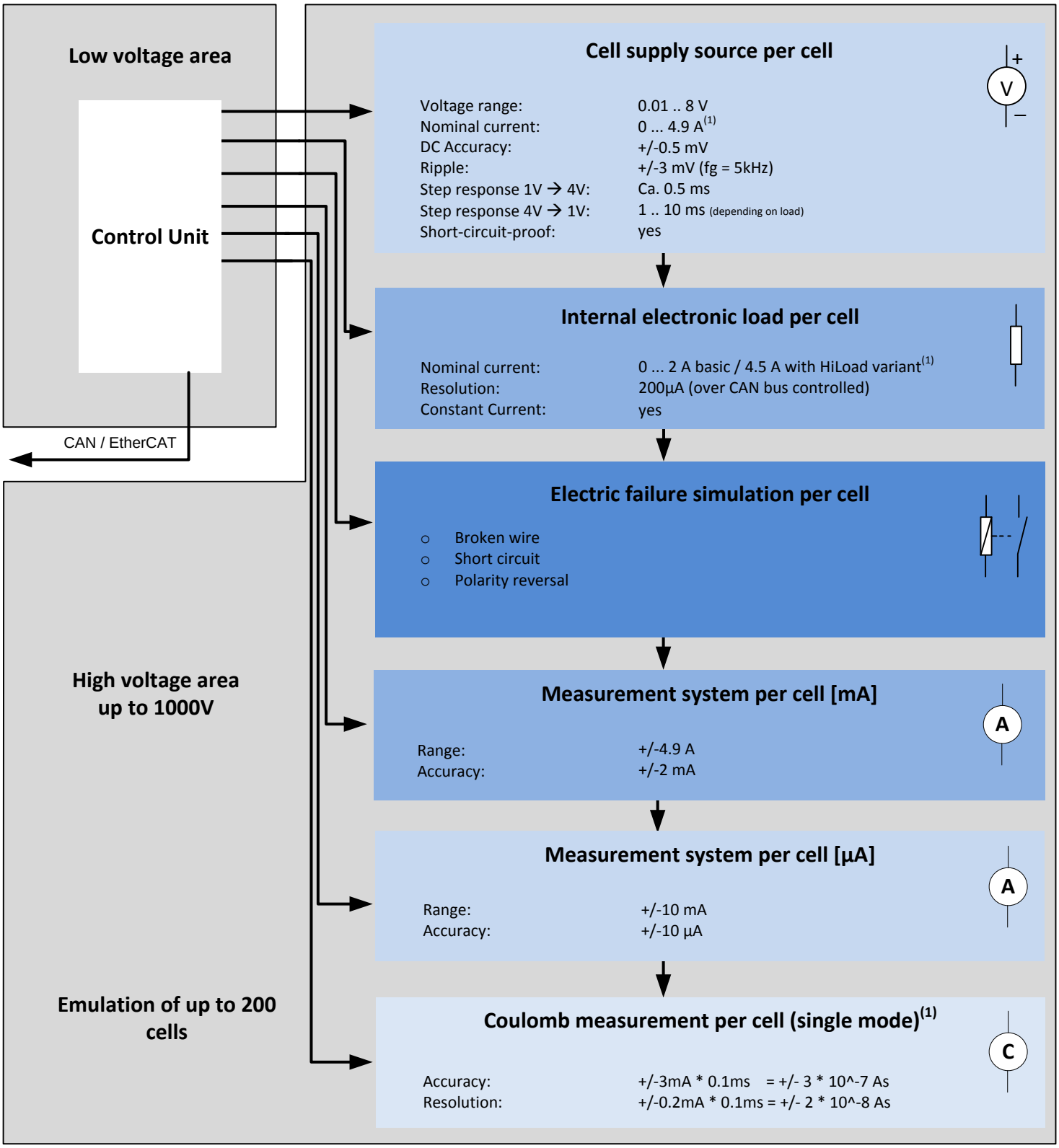
Technical Data Overview



(1) At 5 V cell voltage.

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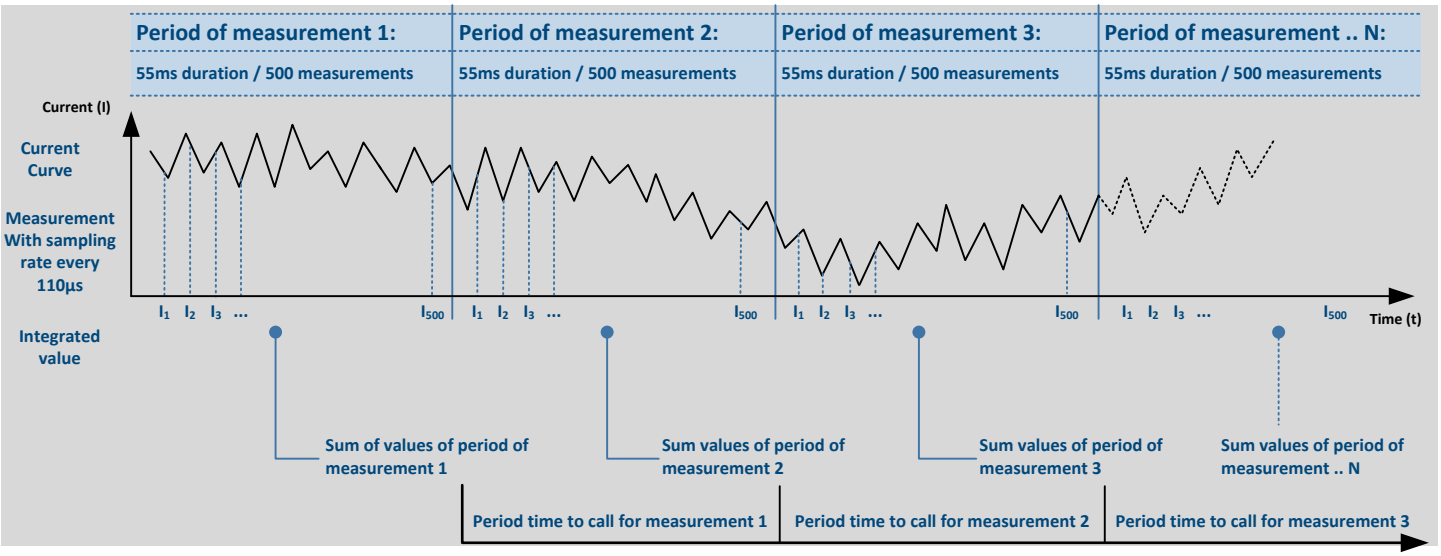
Details of the Coulomb Current Measurement

Description the Coulomb Current measurement principle (Charging/Discharging measurement):

When you have a current measurement with a high frequency, but you have a lower sampling rate by your host PC to call for those measurements, you will lose important information e.g. for verifying your balancing algorithm. To decrease this, the „Extended“ version of the BCS cards have an internal integration of current values, which are measured every 110µs. 500 measurement values are added in sum (=55ms). This sum is converted into the physical value using calibration data and can then be read-out via CAN bus (the Flag „Coulomb Measurement (NewValue)“ in the CAN message is set to TRUE and back to FALSE after CAN transmission).



Technical data of the Coulomb Current Measurement (Firmware 07.00.19)

Sampling time:	110µs	Averaging:	No averaging (integration is sufficient)
CAN resolution:	1/10000 mC	Hardware filter:	(Baseboard Rev. 7.2.6): 100R, 47nF = 29µs
Measurement range:	+/-3A		

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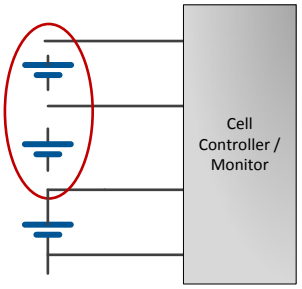
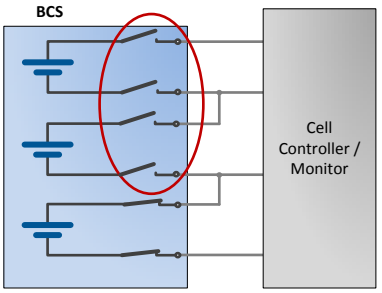
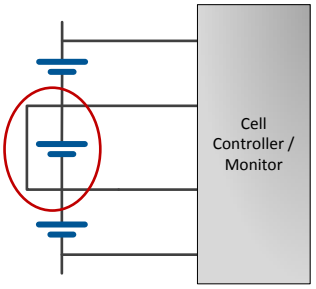
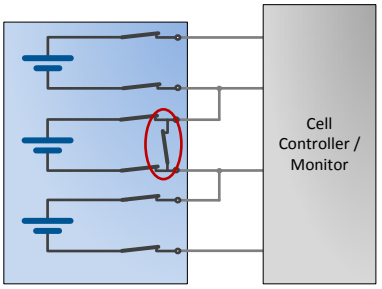
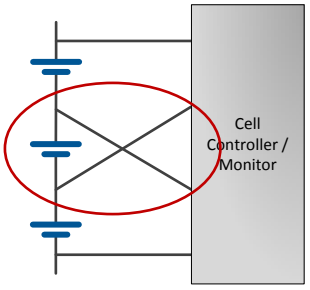
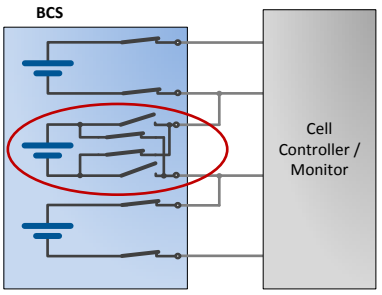
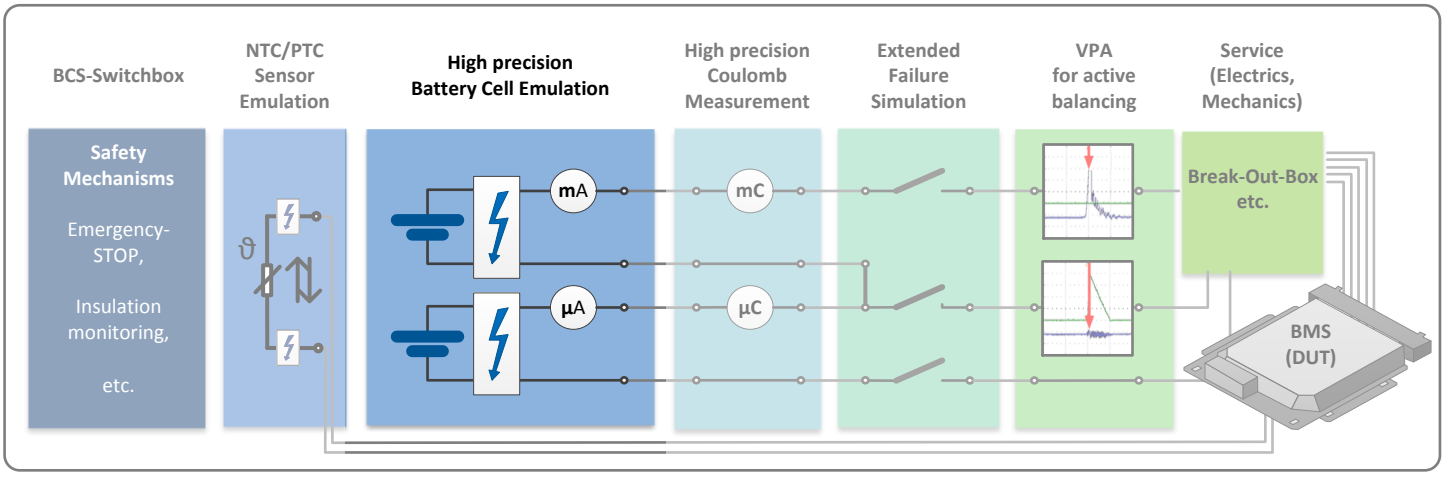
Integrated Failure Simulation for each Cell

No.	Test case failure simulation	Sketch	Realization
1	Connecting of different cells to the BMS **Cause:** e.g. a sequenced connecting of the cells to the BMS by the ECU connector		
2	Shortcut of one cell **Cause:** Defect of cell or failure on cell controller ...		
3	Polarity change of a cell **Cause:** Mistake in cabling ...		

BMS Test Bench extendable by further failure insulation, measurements and emulation.



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Overview product variants

Battery Cell Simulator Compact						
Product Variant	**Light**	**Basic**	**Basic + F**	**Basic + F + µA**	**Basic + F + HiLoad**	**Full**
Height	2 HU	2 HU	2 HU	2 HU	2 HU	2 HU
Cells per module	12	12	12	12	12	12
Max. amount of cells	200	200	200	200	200	200
Source *	**1.0 A**	**4.9 A**	**4.9 A**	**4.9 A**	**4.9 A**	**4.9 A**
Sink *	**1.0 A**	**2.0 A**	**2.0 A**	**2.0 A**	**4.5 A**	**4.5 A**
Fault Simulation			●	●	●	●
Current Measurement µA				●		●
Current Measurement +/- 5 A	●	●	●	●	●	●
Fast Current Measurement (Coulomb)		●	●	●	●	●
CAN-Baudrate 500kBd	●	●	●	●	●	●
CAN-Baudrate 1MBd	●	●	●	●	●	●

* Sink and Source: values can be reached separately - not in combination. Example: If sink has 2.0 A setting, then the source is only max. 2.9A (4.9A - 2.0A)

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