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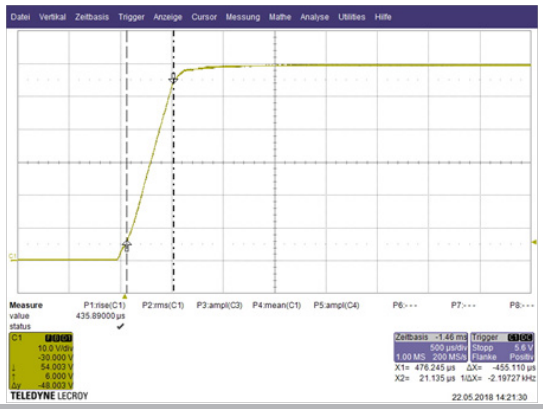
Battery simulator BSR48HP

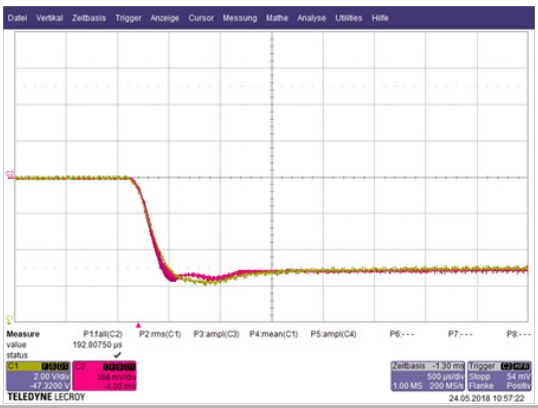
DC voltage source /-sink for 12 VDC up to 48 VDC

The battery simulator is a DC voltage source/sink which simulates the static and dynamic behaviour of battery systems and to replace the original battery on stationary test stands. The specification of defined operation points and parameters allows meaningful and repeatable test of components of a 48 V onboard power system.

- U_{nom}: 48 V
- U_{output}: ... 10 ... 60 V
- $P_{perm.}$: 40 kW (48 V) resp. 50 kW (60 V)
- P_{30s}: 75 kW (60 V)
- $I_{perm.}$: ±833 A
- I_{30s}: ±1250 A



Voltage in case of setpoint 0 V -> 60 V



Ri simulation in case of load jump 0 A -> 800 A; Ri = 6 mΩ

Main features

- Output power: 40 kW at 48 V, 50 kW at 60 V without current derating
- Energy recovery
- Operation modes: voltage/current/power
- Ri simulation
- Sense input
- Potential free DC output
- DC output can be switches off by DC contactor
- Internal water cooling system with heat exchanger water/air or water/water
- Manual operation via touch screen
- Mobile electronic cabinet (800 mm x 800 mm x 1800 mm)

Options:

- Boost module for increased control dynamics
- Crowbar module for limitation of overvoltages
- Insulation monitor for output voltage
- Short circuit protection via safety fuse
- All common field bus interfaces available (EtherCat, Profinet, CAN, ...)
- Connection to MATLAB® Simulink®

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Data sheet for the Battery simulator BSR48HP

Technical data:

Output voltage:	10 ... 60 VDC
Output power:	40 kW (48 V), or 50 kW (60 V)
Overload (30 s):	75 kW (60 V) [1]
Output current:	± 833 A, ± 1250 A (30 s) [1]
Mains connection:	3 PE 400 ... 480 V ± 10%, 50/60Hz
External fuse:	100 A
Static control accuracy voltage:	< 50 mV
Static control accuracy current:	< ± 1 A

Basic device:

Voltage stability in case of load jump 0 ... 100% in 1 ms:	< ± 3,5 V, adjusted in 3 ms [2]
Current dynamics 0 ... 800A (bei U = 40 V):	< 0,8 ms
Voltage dynamics 0 V ... 60 V:	< 0,5 ms
Voltage dynamics 40 V ... 53 V:	< 0,35 ms
Voltage ripple:	< 50 mVeff

With optional boost module:

Voltage stability in case of load jump 0 ... 100% in 1ms:	< 0,4 V, adjusted in 0,3 ms [2]
Voltage stability in case of 0 ... 100% in 0,25ms:	< 1 V, adjusted in 0,5 ms [2]
Current dynamics 0 ... 800 A (at U = 48 V) :	< 0,25 ms
Voltage dynamics 0 V ... 60 V:	< 0,5 ms
Voltage dynamics 40 V ... 53 V:	< 0,16 ms
Voltage ripple:	< 50 mVeff
Current ripple:	< 0,4 Aeff
Dimensions with heat exchanger water/air:	800 x 800 x 1800 mm³ incl. rollers

Integrated battery models:

A fast Ri simulation is integrated. Additional simple integrated moduls on request.

Individual battery models on basis of Matlab/Simulink® [3]:

Requires additional real time capable hardware which is supported by Matlab/Simulink®, e. g. – Raspberry Pi® (Zykluszeit = 10 ms) – speedgoat® (Zykluszeit = 100 µs) – ...

1) Max. effective value of the output current: 833 A. Examples for possible load cycles:
1250 A (30 s) + 0 A (38 s)
1250 A (30 s) + 630 A (90 s)

2) Recovery time to within ± 1% FS of full scale value.

3) Corresponding licenses for Matlab/Simulink® are necessary.