

Option: fixed output voltage  
n x 800 Watt

**Battery charger** isolated  
DC high voltage and 3Ph AC



- 3Ph-AC and DC input
- Regulated power cascading power safety redundancy
- Charging end voltage = f(TBat)
- Over load / short circuit proof
- System capability with internal LMB (BLG)
- Increased isolation PD2 / OV2
- Shock/vibration EN 61373 (any mounting position)
- Functional monitoring with controller

for  
• Railway  
• Vehicles  
• High voltage batteries



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## Series HVC.U

### Battery charger from DC high voltage or 3ph grid

#### Main Points:

##### Output:

- Temperature regulated charging end voltage
- Parallel operation network-battery
- Regulated parallel connection up to 3 units
- Accuracy absolute  $\pm 1\%$
- Ripple  $< 100 \text{ mV}_{pp}$  (over  $T_a$ )
- Spikes  $< 200 \text{ mV}_{pp}$  (T 1:1/50MHz)
- Regulation offset  $\Delta I = 40 \dots 90\% < 500 \text{ mV}$
- Response time 3 ms
- constant short circuit  $< 1,2 I_{o-max}$  (Hick-up-Mode)
- Output spike filter (C - L<sup>2</sup> - C)
- no-load, over load, short circuit proof
- Optional U<sub>o</sub>-adjustment (isolated)
- Current consumption with Inhibit approx. 1mA (24V)
- Connection PT1000
- CAN interface [RS232-interface = Option]
- connector: Phoenix SPT 5/3-H

##### Input:

- 3ph input or DC input with reverse voltage protection
- converter starts from input source
- Inhibit function, floating, any polarity  
OFF:  $> 10 \text{ V} \dots 52 \text{ V max.} / 2 \text{ mA}$   
ON: open or  $< 2 \text{ V}$
- Current consumption with inhibit approx 1mA
- Input filter acc. EN 50121-3-2
- Disturbances EN 61000-4-4 level 3 Burst  
EN 61000-4-5 level 3 Surge  
2kV an 42Ω / 50μs
- Input fuse (emergency protection) 10x38mm (please inquire spare parts at SYKO)
- Run up with internal setpoint ramp
- Over and under voltage turn-off with Hysteresis and re-start delay
- Connector: Phoenix SPT 5/3-H

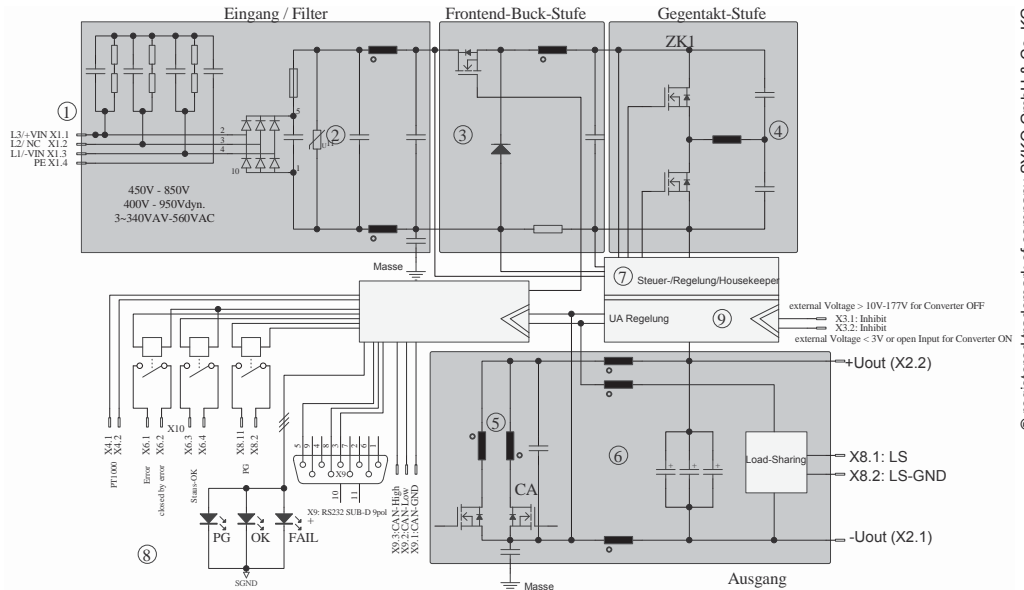
##### General:

- Efficiency typ.  $> 94\%$  (full load)
- Clock frequency 80Hz
- Isolation test voltage 2,8kV AC / 10s
- Air and creepage distances:  
Input - output: 12mm  
Input-Ground: 6 mm  
Output-Ground: 6 mm
- Pollution degree PD2
- Over voltage category OV2
- Ambient temperature:  $-25^\circ\text{C}/+70^\circ\text{C}$   
Option:  $-40 \dots +85^\circ\text{C}$ , derating  $1\%/^\circ\text{C} > 60^\circ\text{C}$
- Over temperature turn off
- MTBF on request
- Shock/vibration acc. EN61373 kat. 1, cl. B
- Weight: approx. 4kg
- Dimension approx: 236 x 203 x 79 mm<sup>3</sup>
- CE-conformity on request
- Monitoring: U<sub>o</sub>, I<sub>o</sub>, relay contacts for power good and failure / three optical display LEDs
- Connector interface:  
Phoenix MC1.5/x-GF-3.81
- Option: Software for configuration  
Battery management

<u>U<sub>in</sub></u>	<u>P<sub>max</sub></u>	<u>U<sub>out</sub></u>	<u>I<sub>out</sub></u>	Model number 1)
V	W	V	A	
<b>450 - 850 DC</b>		12	50	HVC.U600.12.50 BLG
950V / 10ms		24	33	HVC.U600.24.33 BLG
and		36	22	HVC.U600.36.22 BLG
<b>340 - 560V 3AC</b>		72	11	HVC.U600.72.11 BLG
50/60 Hz		110	7,3	HVC.U600.10.07 BLG
<b>320 - 580 DC</b>		12	50	HVC.U450.12.50 BLG
850V / 10ms		24	33	HVC.U450.24.33 BLG
950V / 2ms		36	22	HVC.U450.36.22 BLG
450V battery		72	11	HVC.U450.72.11 BLG
		110	7,3	HVC.U450.10.07 BLG
<b>160 - 330 DC</b>		12	50	HVC.U220.12.50 BLG
450V / 10ms		24	33	HVC.U220.24.33 BLG
550V / 1ms		36	22	HVC.U220.36.22 BLG
220V battery		72	11	HVC.U220.72.11 BLG
		110	7,3	HVC.U220.10.07 BLG
<b>Version H</b>	$-40^\circ\text{C} \dots 85^\circ\text{C}$			add. charge
Projecting costs:				on request
Modification costs for possible changes above values:				on request
1) additional indication <i>BLG</i> stands for: Implementation as battery charger with charging management. Output is fixed level when no additional indication <i>BLG</i> is assigned.				

Stand: 07/15

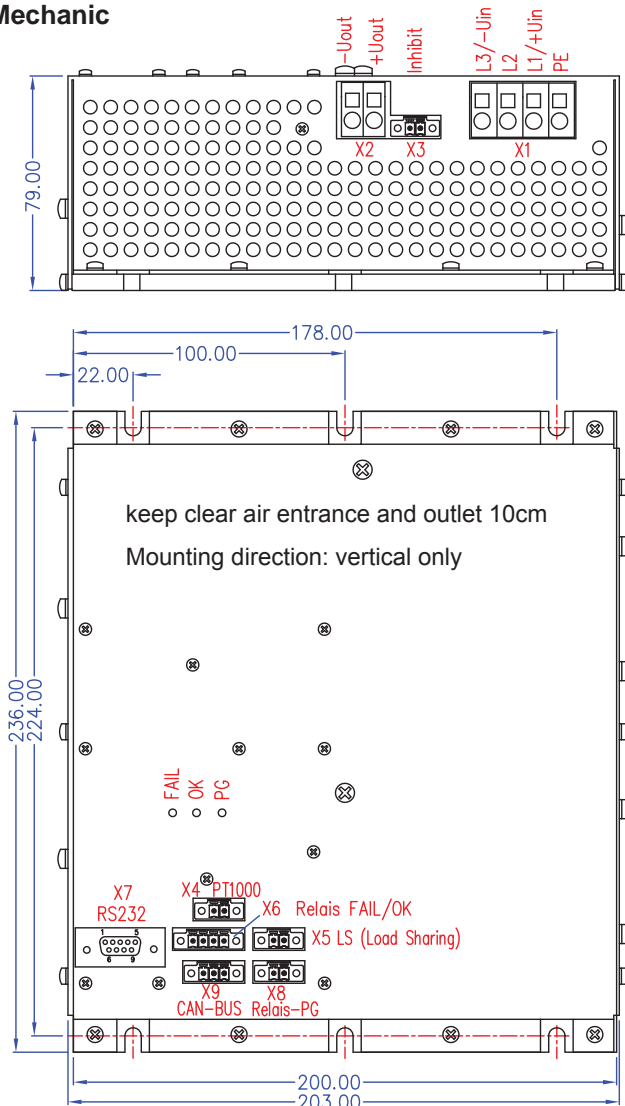
The **HVC** series is designed as battery charger for mobile applications (railway, ship and vehicle) for Hybrid-DC-Grids with very wide input voltage range of 1:5 (Speed reduction when the vehicle is stationary) The chosen switching concept results very high and constant efficiencies over the whole input voltage range. Inrush currents are limited by pre-charging, differential  $U_i/dt$ -currents are limited by an optional pre-connected choke with snubber and run-up currents are prevented by integral power activating. This secures an undisturbed operation on the intermediate voltage level with low system perturbation. The stable mechanical build-up and the direct thermal connection to the chassis guarantees the use in mobile applications with high shock/vibration and temperature requirements.



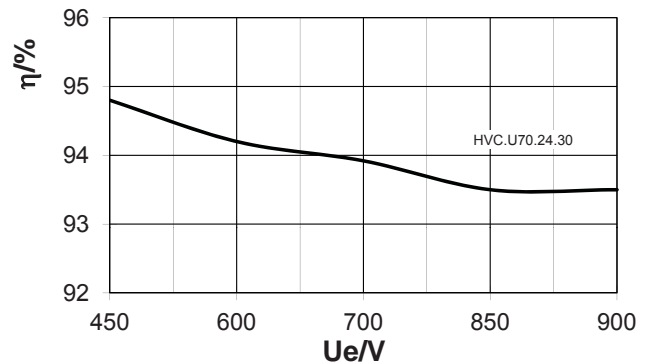
The input circuit is protected against long term transients (in closed energy systems) without current refecton, radio interference suppressed and can deal with chattering over plugging and short-term power failures (auto re-start). The start-up operation is handled down to <33% of a deep discharged battery or the battery voltage must reach 33% of the nominal value within 50ms. The switching topology, the choice of components, the auto run-up with the input voltage and the interface characteristic result high system reliability up to limit values for the customer application. The integrated no-load capability prevents pumping (voltage ripple) when the choke is operating in discontinuing mode.

An internal „Charging management board“ **LMB** covers the intelligence of temperature regulated charging, current splitting, and current sharing and communication at parallel operation. With this solution up to three units can work safety redundant with a sum output power of >3kW. The battery management characteristic can be modified on customer demand.

**Mechanic**



**Efficiency curve (DC/full load):**



**Charging curve:**

