

# Bidirectional DC Sources LAB/HPR

## 5 kW – 210 kW

 19" x 3 U x 620 mm

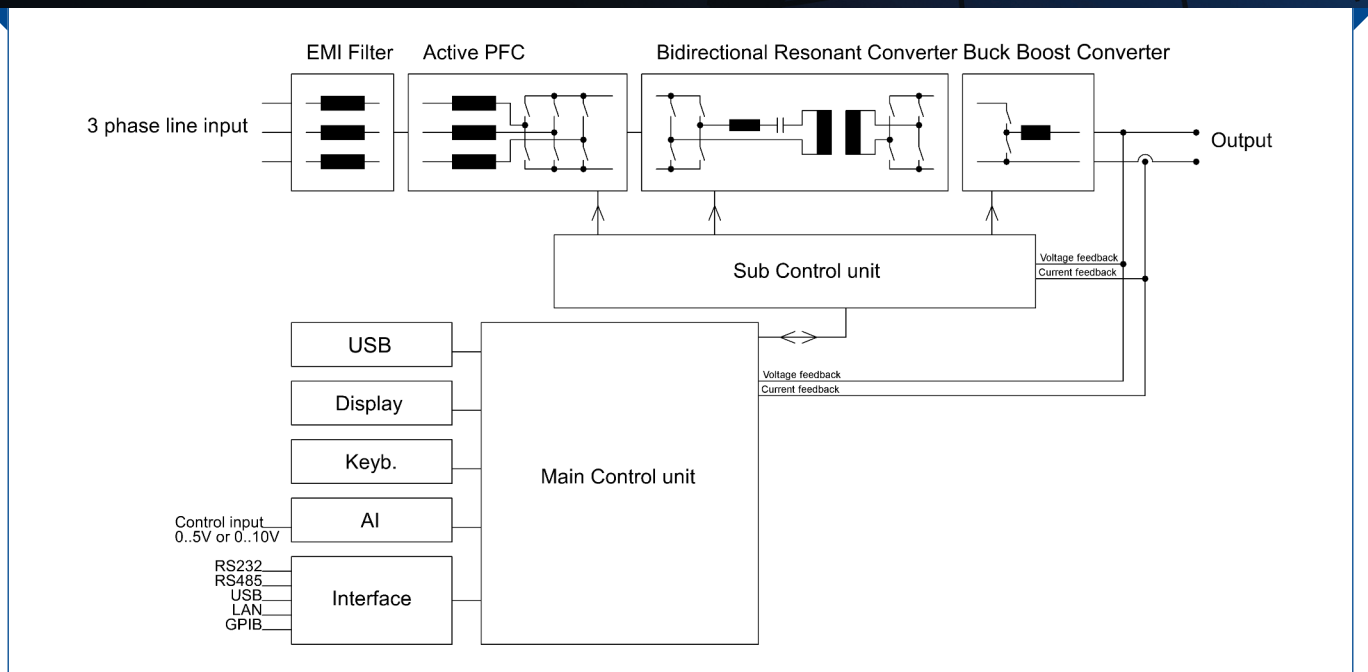
 Bidirectional High-Power DC Supply

**PRELIMINARY DATASHEET**



- 5" colour touch-display
- Operation via touch-display or rotary pulse encoder
- Additionally controllable via WiFi (option)
- Frontside USB flash drive connection (option)
- Full bidirectional operation made possible by grid-tie source sink technology
- Product line with various output voltages: 60, 100, 150, 300, 600, 800, 1.000, 1.200, 1.500 VDC
- Constant voltage (0 to 100 %), constant current (0 to 100 %), constant power operation (5 to 100 %) with automatic and fast crossover as well as mode indication and internal resistance simulation
- Power categories from 5 to 20 kW are available for each nominal output voltage
- Extended product range with various extras and optional accessories
- Software for battery simulation (option)
- DataLog function: current operations values are saved to an USB flash drive at adjustable time intervals (option)
- Autoranging (option)
- Measuring range switchover for current and voltage
- Power increased easily through modular design: Parallel, series, matrix or multiloop master-slave-operation
- Low cost while maintaining high efficiency by applying innovative SiC Mosfet and transformer technology
- Full digital control and regulation
- CE conformity
- Smart functions for monitoring
- Easy to use operating controls
- Lightweight
- Small footprint
- Air-cooling enclosures
- Customized designs
- Made in Germany

### BLOCK DIAGRAM LAB/HPR (DC SOURCE)



Type	Power W	Voltage V	Current A	Dimensions
LAB/HPR 560	5.000	0 – 60	0 – +/-83,33	19" x 3 U x 620 mm
LAB/HPR 5100	5.000	0 – 100	0 – +/-50	19" x 3 U x 620 mm
LAB/HPR 5150	5.000	0 – 150	0 – +/-33,33	19" x 3 U x 620 mm
LAB/HPR 5300	5.000	0 – 300	0 – +/-16,67	19" x 3 U x 620 mm
LAB/HPR 5600	5.000	0 – 600	0 – +/-8,33	19" x 3 U x 620 mm
LAB/HPR 5800	5.000	0 – 800	0 – +/-6,25	19" x 3 U x 620 mm
LAB/HPR 51000	5.000	0 – 1.000	0 – +/-5,5	19" x 3 U x 620 mm
LAB/HPR 51200	5.000	0 – 1.200	0 – +/-4,17	19" x 3 U x 620 mm
LAB/HPR 51500	5.000	0 – 1.500	0 – +/-3,33	19" x 3 U x 620 mm
LAB/HPR 1060	10.000	0 – 60	0 – +/-166,7	19" x 3 U x 620 mm
LAB/HPR 10100	10.000	0 – 100	0 – +/-100	19" x 3 U x 620 mm
LAB/HPR 10150	10.000	0 – 150	0 – +/-66,67	19" x 3 U x 620 mm
LAB/HPR 10300	10.000	0 – 300	0 – +/-33,33	19" x 3 U x 620 mm
LAB/HPR 10600	10.000	0 – 600	0 – +/-16,7	19" x 3 U x 620 mm
LAB/HPR 10800	10.000	0 – 800	0 – +/-12,5	19" x 3 U x 620 mm
LAB/HPR 101000	10.000	0 – 1.000	0 – +/-10	19" x 3 U x 620 mm
LAB/HPR 101200	10.000	0 – 1.200	0 – +/-8,33	19" x 3 U x 620 mm
LAB/HPR 101500	10.000	0 – 1.500	0 – +/-6,67	19" x 3 U x 620 mm
LAB/HPR 1560	15.000	0 – 60	0 – +/-250	19" x 3 U x 620 mm
LAB/HPR 15100	15.000	0 – 100	0 – +/-150	19" x 3 U x 620 mm
LAB/HPR 15150	15.000	0 – 150	0 – +/-100	19" x 3 U x 620 mm
LAB/HPR 15300	15.000	0 – 300	0 – +/-50	19" x 3 U x 620 mm
LAB/HPR 15600	15.000	0 – 600	0 – +/-25	19" x 3 U x 620 mm
LAB/HPR 15800	15.000	0 – 800	0 – +/-18,75	19" x 3 U x 620 mm
LAB/HPR 151000	15.000	0 – 1.000	0 – +/-15	19" x 3 U x 620 mm
LAB/HPR 151200	15.000	0 – 1.200	0 – +/-12,5	19" x 3 U x 620 mm
LAB/HPR 151500	15.000	0 – 1.500	0 – +/-10	19" x 3 U x 620 mm
LAB/HPR 2060	20.000	0 – 60	0 – +/-333,33	19" x 3 U x 620 mm
LAB/HPR 20100	20.000	0 – 100	0 – +/-200	19" x 3 U x 620 mm
LAB/HPR 20150	20.000	0 – 150	0 – +/-133,33	19" x 3 U x 620 mm
LAB/HPR 20300	20.000	0 – 300	0 – +/-66,67	19" x 3 U x 620 mm
LAB/HPR 20600	20.000	0 – 600	0 – +/-33,33	19" x 3 U x 620 mm
LAB/HPR 20800	20.000	0 – 800	0 – +/-25	19" x 3 U x 620 mm
LAB/HPR 201000	20.000	0 – 1.000	0 – +/-20	19" x 3 U x 620 mm
LAB/HPR 201200	20.000	0 – 1.200	0 – +/-16,67	19" x 3 U x 620 mm
LAB/HPR 201500	20.000	0 – 1.500	0 – +/-13,33	19" x 3 U x 620 mm

OPTIONS

Appendix	Description
../3P208	3 x 208 / 187 – 229 VAC Input
../3P400	3 x 400 / 360 – 440 VAC Input
../3P440	3 x 400 / 360 – 440 VAC Input
../Autorange	Spread voltage and current range
../LT IEEE488	IEEE488 interface
../RS485	RS485 interface
../LAN	LAN interface
../USB	USB interface
../OPT	Predefined output characteristic
../Slot USB	Connection USB flash drive
../WiFi	WiFi interface
../battery simulation	Software for battery simulation

Input	Device Power	5 kW	10 kW	15 kW	20 kW						
	Connection	4 wire (3L+PE)									
	Input 3P/400	3 x 400 Vac (360 – 440 Vac 47 – 63 Hz)									
	Input Current 3P/400 model	10 Aeff	18 Aeff	26 Aeff	32 Aeff						
	Inrush Transient Current	TDB									
	Norminal Current Internal Fuse 3P/400 model	16 A	20 A	32 A	35 A						
	Recommended Supply Breaker 3P/400 model (value and curve)	32 A Type D/K									
	Leakage Current	< 35 mA									
	cos phi / PF	≈ 0.99									
	Efficiency Type	95 %									
Output	<b>Standard-Version</b>										
	Output Voltage / [V]	60	100	150	300	600	800	1000	1200	1500	
	Output Current for 5 kW Unit/ [A]	83,33	50,00	33,33	16,67	8,33	6,25	5,00	4,17	3,33	
	Output Current for 10 kW Unit/ [A]	166,67	100,00	66,67	33,33	16,67	12,50	10,00	8,33	6,67	
	Output Current for 15 kW Unit/ [A]	250,00	150,00	100,00	50,00	25,00	18,75	15,00	12,50	10,00	
	Output Current for 20 kW Unit/ [A]	333,33	200,00	133,33	66,67	33,33	25,00	20,00	16,67	13,33	
	<b>Autorange-Version-Option</b>										
	Output Voltage / [V]	60	100	150	300	600	800	1000	1200	1500	
	Output Current for 5 kW Unit/ [A]	333,33	200,00	133,33	66,67	33,33	25,00	20,00	16,67	13,33	
	Output Current for 10 kW Unit/ [A]	333,33	200,00	133,33	66,67	33,33	25,00	20,00	16,67	13,33	
	Output Current for 15 kW Unit/ [A]	666,67	400,00	266,67	133,33	66,67	50,00	40,00	33,33	26,67	
	Output Current for 20 kW Unit/ [A]	666,67	400,00	266,67	133,33	66,67	50,00	40,00	33,33	26,67	
	Static Regulation ± 0.01 % of F.S.										
	Line Regulation	Voltage	±0.01 % F.S. ± 10 mV								
		Current	±0.01 % F.S. ± 100 mA								
	Load Regulation	Voltage	±0.01 % F.S. ± 10 mV								
		Current	±0.01 % F.S. ± 100 mA								
	Dynamic Responce Time @ Load Step 10 % – 90 % < 2ms										
	Rippel and Noise	Voltage Ripple (p-p)	TBD								
		Voltage Ripple (rms)	TBD								
		Current Ripple (p-p)	TBD								
		Current Ripple (rms)	TBD								
	Isolation	Primary / Secondary	3000 Vac								
		DC-Output / Earth	2000 VDC								
		Primary / Earth	2150 VDC								
	Programming Response Time < 1 ms										
	Rise Time, Full load	TBD									
	Rise Time, No load	TBD									
	Fall Time, Full Load	TBD									
	Fall Time, No Load	TBD									
5 s to get below 50 V											
Relative Accuracy / [%]											
Voltage / [V]	0,1	0,060	0,100	0,150	0,300	0,600	0,800	1,000	1,200	1,500	
Current / [A]	0,1	0,250	0,400	0,267	0,133	0,067	0,050	0,040	0,033	0,027	
Relative Accuracy for Sens Operation (worst case) / [%]											
Voltage / [V]	0,5	0,300	0,500	0,750	1,500	3,000	4,000	5,000	6,000	7,500	
Maximum Sens Voltage over nominal Voltage 1 % of F.S.											
Resolution Voltage Display / Voltage Setting Resolution											
		10 V – 60 V	70 V – 90 V	100 V – 900 V				1000 V – 1500 V			
		00.00	00.00	000.0				0000			
Resolution Current Display / Current Setting Resolution											
		2 A – 60 A	70 A – 100 A	100 A – 900 A				1000 A – 2000 A			
		00.00	00.00	000.0				0000			
Device Function	OVP	Over Voltage Protection: is adjustable between 0 % and 120 % of Voltage full range									
	OCF	Over Current Protection: is realised by the current setpoint, the output current can not go over the set output current									
	OTP	Over Temperature Protection: if the internal heat sink tempearture is go above 90 °C the device will automatical shut down									
	UVLO	Under Voltage Lock out: if set limit reach device shut down									
	CC/CV-MODE	Voltage and Current Operation Mode: Voltage and current are setable									
	CP-MODE	Power Limit Mode: A Powerlimit is setable									
	CR-MODE	Output Resistor Mode: A Output resistor is setable between [Rmax=Vout_max/out_max] and [Rmin=Rmax X 0.1]									
	PV-SIM-MODE	Photovoltaic Simulation Mode: Simulation of a PV-Cell is possible									
	SLOPE-FUNCTION	Adjustable Slope for current and Voltage: Range-Minimum 1 A/s resp. 1 V/s   Range-Maximum is 30 ms to Vmax resp. lmax									
	AI-FILTER	Adjustable filter function for Analoginterface Setvalues.									
t-ENABLE	Adjustable on time for the device after press the start button (standby). Time is adjustable between 1 s and 65000 s										

<b>Interface</b>	Analog Interface	Digital outputs (CV, Standby, Error)	Output type: Open collector with pull-up resistor 10 k after +5V Isinkmax: 50 mA
		Digital inputs (Ext. Control, standby)	Input resistance: 47 kΩ Maximum input voltage: 50 V High level: Uin > 2 V Low Level: Uin < 0.8 V
		Analog outputs (Xmon)	Output resistance : 100 Ω Minimum permissible load resistance : 2 kΩ Minimum load resistance for 0.1 % accuracy: 100 kΩ
		Analog inputs (Xset)	Input resistance: 1 MΩ Maximum permissible input voltage: 25 V
		Reference voltage	Reference voltage Uref: 10 V ± 10 mV Output resistance: < 10 Ω
		5 V - supply voltage	Maximum output current: 10mA (not short-circuit-proof) Output voltage: 5 V ± 300 mV Maximum output current: 50 mA (not short-circuit-proof)
	RS 232	Signal inputs (Rx,D,CTS)	Maximum input voltage: ± 25 V Input resistance: 5 kΩ (Type) Switching thresholds: UH < -3 V , UL > +3 V
		Signal outputs (Tx,D,RTS)	Output voltage (at RL > 3 kΩ): min ± 5 V, Type ± 9 V, max ± 10 V Output resistance: < 300 Ω Short circuit current: Type ± 10 mA
	RS 485	Maximum input voltage	± 5 V
		Input resistance	> 12 kΩ
		Output current	± 60 mA Max
		High level	Ud > 0,2 V
	Master-Slave	Low Level	Ud < -0,2 V
		Number of devices	TDB (more then 8)
		Maximum Voltage serial	TBD (more then 1000 V)
		Maximum Power Standard Device	TDB
	Maximum Power LAB/HP modified Device	TDB	
<b>EMC and Safety Standards</b>	Safety standard	EN 60950	
	Emission	EN 61000-6-4:2007	
	Immunity	EN 61000-6-2:2005	
	Measurement, control- and laboratory equipment	EN 61010-1:2006	
<b>Ambient Conditions</b>	Cooling	Fans	
	Operating temperature	0 – 50 °C	
	Storage temperature	-20 °C – 70 °C	
	Humidity	< 90 % without condensation	
	Operating height	< 2000 m	
	Vibration	10 – 55 Hz / 1 min / 2G XYZ	
	Shock	< 20 G	
	Weight-LAB/HPR	TBD	