

# LAB-SCUBI

## SINGLE CHANNEL BIDIRECTIONAL PSU



POSITIVE PROBLEM SOLVING **+ =**

**The LAB-SCUBI is a series of high power single channel Bidirectional PSUs. Each system is able to operate as either a DC Source or a DC Electronic Load.**

This integrated approach features high dynamics enabling the user to switch seamlessly between quadrants. When sinking energy from the unit under test the LAB-SCUBI automatically inverts the DC to AC and synchronises this output to the grid. Dedicated application modes are available for battery cycling and emulation, which can be used to implement specific test routines.

- + Dedicated Battery Testing / Emulation Modes**
- + Seamless Transition Between Source / Sink**
- + Nominal Outputs from 40kW to 500kW**
- + Currents up to  $\pm 1000V$  and  $\pm 1000A$**
- + High Efficiencies up to 95%**

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## FURTHER DETAILS

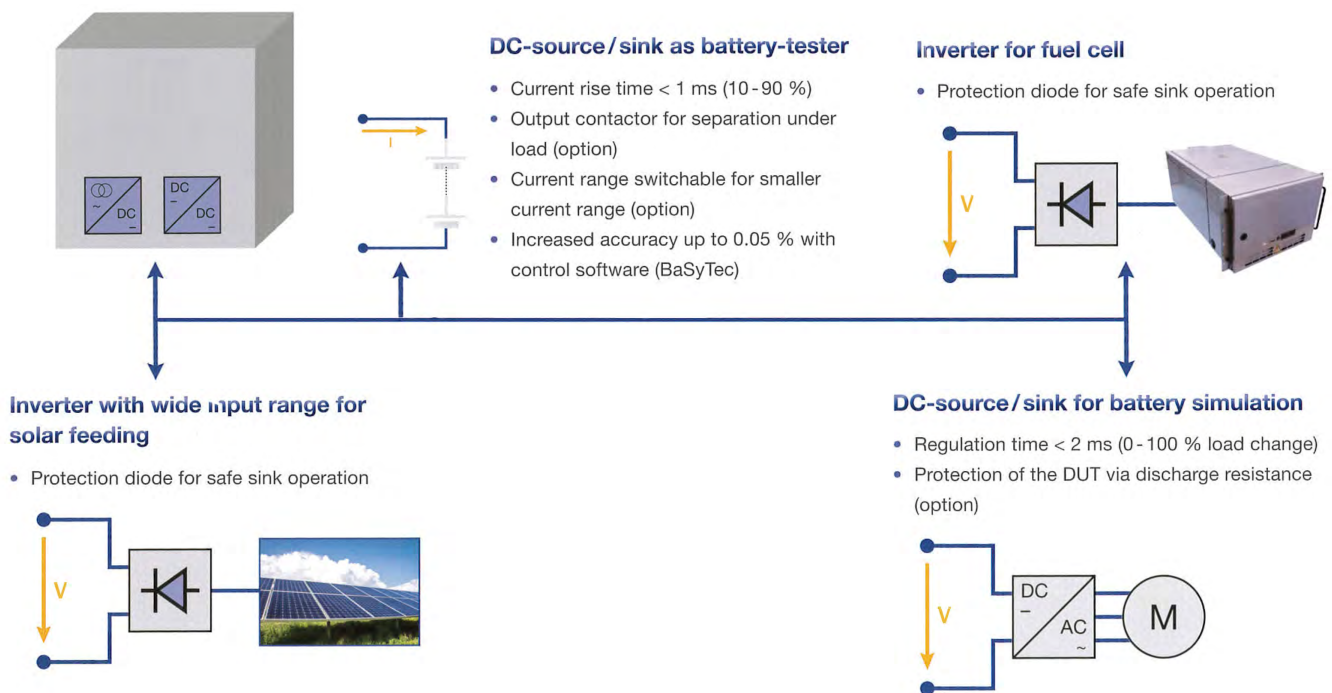
Common applications the LAB-SCUBI is used for include testing electric motors, fuel cells, super capacitors and solar panels.

As standard each system is built with a CAN-Bus interface, which has a maximum sampling frequency of 100Hz. Other interfaces are optionally available.

An extensive feature set includes voltage/current ripple below 0.1%, wide V/I operating ranges, sense terminals for connection and a range of protection features.

Outputs up to 2MW can be achieved when combining multiple systems in parallel. Besides the standard range, special voltage and current levels can be specified on request.

## TYPICAL APPLICATIONS



## TECHNICAL DATA

	40kW	75kW	100kW	160kW	250kW	320kW	400kW	500kW
Rectifier Type	IGBT, PWM, galvanically isolated							
Power Factor	>0.99 [at nominal power]							
AC Input Voltage/Frequency	400V <sup>1</sup> ± 10%, 3-phase, (N), PE, 50 / 60Hz ± 6%							
Maximum Output Voltage	See selection table							
Minimum Output Voltage	5V [typical] to sink full current within the maximum power capability							
Measuring Accuracy and Resolution	Voltage: 0.1% F.S. / 16 bit ADC, current: 0.1% F.S. / 16 bit ADC							
Control Accuracy <sup>2,3</sup>	Voltage: 0.1% F.S., current: 0.1% F.S.							
Voltage Tolerance Dynamic	<3% F.S. [0 - 100% I <sub>NOM</sub> in 5ms]							
Voltage Ripple <sup>4</sup>	≤0.1% rms F.S. [V > 10]							
Current Ripple <sup>5</sup>	≤0.1% rms F.S. [V > 10]							
Current Rise Time <sup>6</sup>	Typically <1.5ms for 10 - 90% load step							
Short Circuit Behaviour	Short circuit proof [I <sub>k</sub> <5kA]							
Interface	CAN-Bus <sup>7</sup>							
Overall Efficiency	94%	94%	94%	95%	95%	95%	95%	95%
Permissible Ambient Temperature	0 - 40°C							
Climate Class	3K3 EN60721 [85% relative humidity non condensing, with cabinet heating up to 95% relative humidity without condensing]							
Cooling	Forced air cooling / air-water heat exchanger							
Cabinet 1 Width	1400mm	1400mm	1400mm	1400mm	1400mm	1400mm	1200mm	1200mm
Cabinet 2 Width	N/A	N/A	N/A	1000mm	1000mm	1000mm	1200mm	1200mm
Cabinet 3 Width	N/A	N/A	N/A	N/A	N/A	N/A	1200mm	1200mm
Cabinet(s) Height	1800mm							
Cabinet(s) Depth	800mm							
Minimum Distance from Wall	200mm [standard]							
Minimum Distance from Ceiling	300mm [standard]							
Installation	Operating area with restricted access							
Protection Class	IP20 [IP53 <sup>12</sup> ] IEC 60529							
Safety Features	Over voltage protection, under voltage protection, over temperature protection, over current protection							
Maximum Altitude	1000m above sea level with nominal load							
Acoustic Level at IP20	71dB [A]	71dB [A]	71dB [A]	73dB [A]	76dB [A]	78dB [A]	78dB [A]	78dB [A]
Safety	EN ISO 13849-1							
Basic Standard	EN 62040							
EMC	EN 61000-2-4 grid disturbances, EN 61000-6-2 interference immunity, EN 61000-6-4 interference emission, EN 61800-3 cat C2 [A1] variable - speed electrical drives							

<sup>1</sup> 380V, 415V, 420V, 440 and 480V inputs are available on request.

<sup>2</sup> Via 16 bit digital controller.

<sup>3</sup> Digital controller [± 600A = 15 bit + sign].

<sup>4</sup> Resistance as load, operation mode simulator [in constant voltage mode].

<sup>5</sup> 48/96V battery [constant voltage mode].

<sup>6</sup> Measured at half nominal voltage with max. 5% overshoot [in constant current mode].

<sup>7</sup> CAN-Bus with maximum sampling frequency of 100Hz.

Every effort is made to ensure that the information provided within this technical summary is accurate. However, ETPS Ltd must reserve the right to make changes to the published specifications without prior notice. Where certain operating parameters are critical for your application we advise that they be confirmed at the time of order. ETPS Ltd specialises in modifying its proven platforms to suit your needs. Please contact our office if your requirement is non-standard. Please note that your actual unit may differ from those shown.

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### OPTIONS

CODE	DESCRIPTION
/SCR	Second current range for improved resolution and accuracy in low current applications
/B-CAP-M-800	Capacitor box metal 800V (13200+280μF)
/B-CAP-P-800	Capacitor box plastic 800V (13200μF)
/O-CAP-800	Switchable output capacitors 800V
/O-CAP-1000	Switchable output capacitors 1000V
/DC-1000A-1000V	2 DC contactors for cut off under load, performance level D
/DCU-1-60	Discharge unit 1Ω 60kW sec
/DCU-1-120	Discharge unit 1Ω 120kW sec
/DCU-2-500	Discharge unit 2Ω 500kW sec
/SIM	Simulator operation
/SIM-TEST	Simulator/tester switchable
/PARALLEL	Parallel connection of systems
/PDSB-1E-2A-600	Power distribution switch box with 1 input and 2 outputs 1000V, 600A
/PDSB-2E-1A-1200	Power distribution switch box with 2 inputs and 1 output 1000V, 1200A
/PDU-TEST-600	Power distribution unit tester 600A
/PDU-TEST-1200	Power distribution unit tester 1200A
/PDU-SIM-600	Power distribution unit simulator 600A
/PDU-SIM-1200	Power distribution unit simulator 1200A
/MODBUS-TCPIP	Modbus interface
/IP21-IP22	Protection class IP21/IP22 per cabinet
/IP23	Protection class IP23 per cabinet
/IP53	Protection class IP53 (air-water cooling system)
/SENSE-M	Sense cable 800 + 1000V per metre, please specify
/CONTROL-M	Control cable 800 + 1000V per metre, please specify
/DIODE-800A	Protection diode for external unit under test
/LABVIEW	Labview drivers (dbc file)
/E-STOP	Emergency stop at door only
/TFT	TFT touchscreen display
/CAB-HALOGEN-FREE	Cabinet fitted with halogen free cables
/CAB-GLAND-PLATES	Cabinet fitted with gland plates
/CAB-LIFTING-LUGS	Cabinet fitted with lifting lugs
/CAB-L-DS-PLUG	Cabinet lamp with door switch and plug
/CAB-HEATING-SEP	Cabinet heating with separate input
/CAB-WHEELS	Cabinet fitted with wheels (only for single cabinets)



## SELECTION TABLE

Part Number	Maximum Power	Voltage Range*	Current Range	Part Number	Maximum Power	Voltage Range*	Current Range
LAB-SCUBI 100-40-800	40kW	0 - 100V	0 ± 800A	LAB-SCUBI 400-250-600	250kW	0 - 400V	0 ± 600A
LAB-SCUBI 100-40-1000	40kW	0 - 100V	0 ± 1000A	LAB-SCUBI 400-250-800	250kW	0 - 400V	0 ± 800A
LAB-SCUBI 200-40-200	40kW	0 - 200V	0 ± 200A	LAB-SCUBI 400-250-1000	250kW	0 - 400V	0 ± 1000A
LAB-SCUBI 200-40-600	40kW	0 - 200V	0 ± 600A	LAB-SCUBI 600-250-600	250kW	0 - 600V	0 ± 600A
LAB-SCUBI 200-75-600	75kW	0 - 200V	0 ± 600A	LAB-SCUBI 600-250-800	250kW	0 - 600V	0 ± 800A
LAB-SCUBI 200-75-800	75kW	0 - 200V	0 ± 800A	LAB-SCUBI 600-250-1000	250kW	0 - 600V	0 ± 1000A
LAB-SCUBI 200-75-1000	75kW	0 - 200V	0 ± 1000A	LAB-SCUBI 800-250-600	250kW	0 - 800V	0 ± 600A
LAB-SCUBI 400-75-600	75kW	0 - 400V	0 ± 600A	LAB-SCUBI 800-250-800	250kW	0 - 800V	0 ± 800A
LAB-SCUBI 400-75-800	75kW	0 - 400V	0 ± 800A	LAB-SCUBI 800-250-1000	250kW	0 - 800V	0 ± 1000A
LAB-SCUBI 400-75-1000	75kW	0 - 400V	0 ± 1000A	LAB-SCUBI 1000-250-600	250kW	0 - 1000V	0 ± 600A
LAB-SCUBI 600-75-600	75kW	0 - 600V	0 ± 600A	LAB-SCUBI 1000-250-800	250kW	0 - 1000V	0 ± 800A
LAB-SCUBI 600-75-800	75kW	0 - 600V	0 ± 800A	LAB-SCUBI 1000-250-1000	250kW	0 - 1000V	0 ± 1000A
LAB-SCUBI 600-75-1000	75kW	0 - 600V	0 ± 1000A	LAB-SCUBI 400-320-800	320kW	0 - 400V	0 ± 800A
LAB-SCUBI 800-75-600	75kW	0 - 800V	0 ± 600A	LAB-SCUBI 400-320-1000	320kW	0 - 400V	0 ± 1000A
LAB-SCUBI 800-75-800	75kW	0 - 800V	0 ± 800A	LAB-SCUBI 600-320-600	320kW	0 - 600V	0 ± 600A
LAB-SCUBI 800-75-1000	75kW	0 - 800V	0 ± 1000A	LAB-SCUBI 600-320-800	320kW	0 - 600V	0 ± 800A
LAB-SCUBI 1000-75-600	75kW	0 - 1000V	0 ± 600A	LAB-SCUBI 600-320-1000	320kW	0 - 600V	0 ± 1000A
LAB-SCUBI 1000-75-800	75kW	0 - 1000V	0 ± 800A	LAB-SCUBI 800-320-600	320kW	0 - 800V	0 ± 600A
LAB-SCUBI 1000-75-1000	75kW	0 - 1000V	0 ± 1000A	LAB-SCUBI 800-320-800	320kW	0 - 800V	0 ± 800A
LAB-SCUBI 200-100-600	100kW	0 - 200V	0 ± 600A	LAB-SCUBI 800-320-1000	320kW	0 - 800V	0 ± 1000A
LAB-SCUBI 200-100-800	100kW	0 - 200V	0 ± 800A	LAB-SCUBI 1000-320-600	320kW	0 - 1000V	0 ± 600A
LAB-SCUBI 200-100-1000	100kW	0 - 200V	0 ± 1000A	LAB-SCUBI 1000-320-800	320kW	0 - 1000V	0 ± 800A
LAB-SCUBI 400-100-600	100kW	0 - 400V	0 ± 600A	LAB-SCUBI 1000-320-1000	320kW	0 - 1000V	0 ± 1000A
LAB-SCUBI 400-100-800	100kW	0 - 400V	0 ± 800A	LAB-SCUBI 600-400-1000	400kW	0 - 600V	0 ± 1000A
LAB-SCUBI 400-100-1000	100kW	0 - 400V	0 ± 1000A	LAB-SCUBI 800-400-800	400kW	0 - 800V	0 ± 800A
LAB-SCUBI 600-100-600	100kW	0 - 600V	0 ± 600A	LAB-SCUBI 800-400-1000	400kW	0 - 800V	0 ± 1000A
LAB-SCUBI 600-100-800	100kW	0 - 600V	0 ± 800A	LAB-SCUBI 1000-400-600	400kW	0 - 1000V	0 ± 600A
LAB-SCUBI 600-100-1000	100kW	0 - 600V	0 ± 1000A	LAB-SCUBI 1000-400-800	400kW	0 - 1000V	0 ± 800A
LAB-SCUBI 800-100-600	100kW	0 - 800V	0 ± 600A	LAB-SCUBI 1000-400-1000	400kW	0 - 1000V	0 ± 1000A
LAB-SCUBI 800-100-800	100kW	0 - 800V	0 ± 800A	LAB-SCUBI 600-500-1000	500kW	0 - 600V	0 ± 1000A
LAB-SCUBI 800-100-1000	100kW	0 - 800V	0 ± 1000A	LAB-SCUBI 800-500-800	500kW	0 - 800V	0 ± 800A
LAB-SCUBI 1000-100-600	100kW	0 - 1000V	0 ± 600A	LAB-SCUBI 800-500-1000	500kW	0 - 800V	0 ± 1000A
LAB-SCUBI 1000-100-800	100kW	0 - 1000V	0 ± 800A	LAB-SCUBI 1000-500-600	500kW	0 - 1000V	0 ± 600A
LAB-SCUBI 1000-100-1000	100kW	0 - 1000V	0 ± 1000A	LAB-SCUBI 1000-500-800	500kW	0 - 1000V	0 ± 800A
LAB-SCUBI 400-160-600	160kW	0 - 400V	0 ± 600A	LAB-SCUBI 1000-500-1000	500kW	0 - 1000V	0 ± 1000A
LAB-SCUBI 400-160-800	160kW	0 - 400V	0 ± 800A				
LAB-SCUBI 400-160-1000	160kW	0 - 400V	0 ± 1000A				
LAB-SCUBI 600-160-600	160kW	0 - 600V	0 ± 600A				
LAB-SCUBI 600-160-800	160kW	0 - 600V	0 ± 800A				
LAB-SCUBI 600-160-1000	160kW	0 - 600V	0 ± 1000A				
LAB-SCUBI 800-160-600	160kW	0 - 800V	0 ± 600A				
LAB-SCUBI 800-160-800	160kW	0 - 800V	0 ± 800A				
LAB-SCUBI 800-160-1000	160kW	0 - 800V	0 ± 1000A				
LAB-SCUBI 1000-160-600	160kW	0 - 1000V	0 ± 600A				
LAB-SCUBI 1000-160-800	160kW	0 - 1000V	0 ± 800A				
LAB-SCUBI 1000-160-1000	160kW	0 - 1000V	0 ± 1000A				

\* The max. current that can be sunk derates as the voltage reduces below 5V. Please contact ETPS for the characterisation values.



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ETPS engineer electronic power supply and testing systems. Our problem solving skills provide the spark of innovation to some of the world's leading technology brands.



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