

# LAB-SMS

## ULTRA COMPACT DC POWER SUPPLY



POSITIVE PROBLEM SOLVING **+ =**

The LAB-SMS is a series of programmable DC Sources with a variety of interface options. Each unit can be operated in constant voltage and constant current modes.

Adjustable power limit and resistance modes are also provided. Each unit has an RS-232 and isolated analogue interface, which allows the user to select the analogue voltage range to be 0-5Vdc or 0-10Vdc. Additionally, any combination of RS-485, IEEE 488.2 (GPIB), USB and LAN interfaces be optionally specified.

- + Compact Design with up to 10kW in Only 2U
- + 5 Operating Modes: CC, CV, CP, CR, & PVsim
- + Single Phase Input Option up to 5kW
- + SD Card Slot with Datalogging
- + Master / Slave Operation

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## FURTHER DETAILS

While front panel control and display is provided as standard, the LAB-SMS can also be built with a blank panel for applications that require only remote control.

An optional SD card slot provides a very convenient and low cost method of implementing complex DC waveforms. The set up can be done via simple text script or graphically using freely available WAV software. The memory card slot can also be used for data logging of actual output values. The sampling time can be adjusted by the user from 1 second to 71 minutes.

A soft interlock circuit allows users to connect the unit to an external safety device such as an emergency stop. This feature requires a high signal (+10V) to be present between two pins, otherwise the output will be shutdown.

The PV mode allows basic simulation of a solar cell array via adjustable IMPP and VMPP values. The LAB-SMS product family has models providing up to 1200Vdc. High current versions are also available.

An extraordinary power density of up to 10kW is provided in just a 2U high rackmounting case. Each unit is built with a systems interface as standard for master/slave operation. This enables setting values to be equally shared amongst units that are configured in parallel. A choice of voltage inputs ensures the LAB-SMS is suitable for any location.

## HIGHLIGHTED FEATURES

### SD MEMORY CARD

An integrated SD card provides a convenient low cost method of recording and editing complex waveforms, using simple WAV or script files via a PC.

### MODIFICATIONS

Existing platforms can be modified by ETPS's design specialists to meet unusual test needs. Voltage or current outputs can be tailored to suit your requirements.

### MASTER / SLAVE

Operation of several PSUs in series or parallel is possible. This allows users to retrospectively expand systems to meet ever changing power requirements.

### INTERFACES

A variety of analogue and digital interfaces are available providing flexibility for users. Each system can be configured with multiple interfaces.

## SELECTION TABLE

Part Number	Max Power	Output Voltage	Output Current
LAB-SMS 315	3kW	0 - 15V	0 - 200A
LAB-SMS 335	3kW	0 - 35V	0 - 90A
LAB-SMS 345	3kW	0 - 45V	0 - 70A
LAB-SMS 370	3kW	0 - 70V	0 - 45A
LAB-SMS 3100	3kW	0 - 100V	0 - 30A
LAB-SMS 3150	3kW	0 - 150V	0 - 20A
LAB-SMS 3300	3kW	0 - 300V	0 - 10A
LAB-SMS 3600	3kW	0 - 600V	0 - 5A
LAB-SMS 3800	3kW	0 - 800V	0 - 4A
LAB-SMS 31000	3kW	0 - 1000V	0 - 3A
LAB-SMS 31200	3kW	0 - 1200V	0 - 2.6A
LAB-SMS 31500	3kW	0 - 1500V	0 - 2A
LAB-SMS 420	4kW	0 - 20V	0 - 200A
LAB-SMS 435	4kW	0 - 35V	0 - 115A
LAB-SMS 445	4kW	0 - 45V	0 - 90A
LAB-SMS 470	4kW	0 - 70V	0 - 60A
LAB-SMS 4100	4kW	0 - 100V	0 - 40A
LAB-SMS 4150	4kW	0 - 150V	0 - 30A
LAB-SMS 4300	4kW	0 - 300V	0 - 15A
LAB-SMS 4600	4kW	0 - 600V	0 - 7A
LAB-SMS 4800	4kW	0 - 800V	0 - 5A
LAB-SMS 41000	4kW	0 - 1000V	0 - 4A
LAB-SMS 41200	4kW	0 - 1200V	0 - 3.4A
LAB-SMS 41500	4kW	0 - 1500V	0 - 2.7A
LAB-SMS 525	5kW	0 - 25V	0 - 200A
LAB-SMS 535	5kW	0 - 35V	0 - 150A
LAB-SMS 545	5kW	0 - 45V	0 - 120A
LAB-SMS 570	5kW	0 - 70V	0 - 75A
LAB-SMS 5100	5kW	0 - 100V	0 - 50A
LAB-SMS 5150	5kW	0 - 150V	0 - 35A
LAB-SMS 5300	5kW	0 - 300V	0 - 17A
LAB-SMS 5600	5kW	0 - 600V	0 - 8.5A
LAB-SMS 5800	5kW	0 - 800V	0 - 6.25A
LAB-SMS 51000	5kW	0 - 1000V	0 - 5A
LAB-SMS 51200	5kW	0 - 1200V	0 - 4.2A
LAB-SMS 51500	5kW	0 - 1500V	0 - 3.4A

Part Number	Max Power	Output Voltage	Output Current
LAB-SMS 615	6kW	0 - 15V	0 - 400A
LAB-SMS 620	6kW	0 - 20V	0 - 300A
LAB-SMS 635	6kW	0 - 35V	0 - 175A
LAB-SMS 645	6kW	0 - 45V	0 - 140A
LAB-SMS 670	6kW	0 - 70V	0 - 90A
LAB-SMS 6100	6kW	0 - 100V	0 - 60A
LAB-SMS 6150	6kW	0 - 150V	0 - 40A
LAB-SMS 6300	6kW	0 - 300V	0 - 20A
LAB-SMS 6600	6kW	0 - 600V	0 - 10A
LAB-SMS 6800	6kW	0 - 800V	0 - 7.5A
LAB-SMS 61000	6kW	0 - 1000V	0 - 6A
LAB-SMS 61200	6kW	0 - 1200V	0 - 5A
LAB-SMS 61500	6kW	0 - 1500V	0 - 4A
LAB-SMS 820	8kW	0 - 20V	0 - 440A
LAB-SMS 825	8kW	0 - 25V	0 - 320A
LAB-SMS 835	8kW	0 - 35V	0 - 230A
LAB-SMS 845	8kW	0 - 45V	0 - 180A
LAB-SMS 870	8kW	0 - 70V	0 - 115A
LAB-SMS 8100	8kW	0 - 100V	0 - 80A
LAB-SMS 8150	8kW	0 - 150V	0 - 55A
LAB-SMS 8300	8kW	0 - 300V	0 - 30A
LAB-SMS 8600	8kW	0 - 600V	0 - 15A
LAB-SMS 8800	8kW	0 - 800V	0 - 10A
LAB-SMS 81000	8kW	0 - 1000V	0 - 8A
LAB-SMS 81200	8kW	0 - 1200V	0 - 6.7A
LAB-SMS 81500	8kW	0 - 1500V	0 - 5.4A
LAB-SMS 1020	10kW	0 - 20V	0 - 500A
LAB-SMS 1035	10kW	0 - 35V	0 - 350A
LAB-SMS 1045	10kW	0 - 45V	0 - 250A
LAB-SMS 1070	10kW	0 - 70V	0 - 175A
LAB-SMS 10100	10kW	0 - 100V	0 - 100A
LAB-SMS 10150	10kW	0 - 150V	0 - 75A
LAB-SMS 10300	10kW	0 - 300V	0 - 40A
LAB-SMS 10600	10kW	0 - 600V	0 - 17A
LAB-SMS 10800	10kW	0 - 800V	0 - 13A
LAB-SMS 101000	10kW	0 - 1000V	0 - 10A
LAB-SMS 101200	10kW	0 - 1200V	0 - 8.4A
LAB-SMS 101500	10kW	0 - 1500V	0 - 7A



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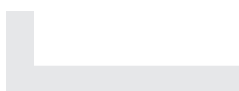
### TECHNICAL DATA

INPUT						
	3kW	4kW	5kW	6kW	8kW	10kW
Connection	3 wire [1P+N+E]		5 wire [3P+N+E]			
Maximum Allowed Non-Symmetry [3P-Systems]	<3%					
Standard Input Voltage	230VAC ± 10%		3 × 400 VAC ± 10%			
Standard Input Frequency	47 - 63Hz					
Standard Input Current <sup>1,2</sup>	22A <sub>eff</sub>	10A <sub>eff</sub>	11.5A <sub>eff</sub>	15A <sub>eff</sub>	20A <sub>eff</sub>	22.9A <sub>eff</sub>
Standard Nominal Current Internal Fuse	30A	15A	15A	30A	30A	30A
Rec. Supply Breaker Value and Curve [Op. /3P400]	16A type D/K	16A type D/K	16A type D/K	32A type D/K	32A type D/K	32A type D/K
Input Voltage [Option /1P]	230VAC ± 10%			N/A		
Input Current [Option /1P] <sup>1,2</sup>	22A <sub>eff</sub>	28A <sub>eff</sub>	33A <sub>eff</sub>	N/A		
Input Voltage [Option /3P208]	3 × 208 VAC ± 10%					
Input Current [Option /3P208] <sup>1,2</sup>	14A <sub>eff</sub>	19A <sub>eff</sub>	23A <sub>eff</sub>	28A <sub>eff</sub>	37A <sub>eff</sub>	46A <sub>eff</sub>
Input Voltage [Option /3P400]	3 × 400 VAC ± 10%					
Input Current [Option /3P400] <sup>1,2</sup>	7.5A <sub>eff</sub>	10A <sub>eff</sub>	11.5A <sub>eff</sub>	15A <sub>eff</sub>	20A <sub>eff</sub>	22.9A <sub>eff</sub>
Input Voltage [Option /3P440]	3 × 440 VAC ± 10%					
Input Current [Option /3P440] <sup>1,2</sup>	7A <sub>eff</sub>	9A <sub>eff</sub>	11A <sub>eff</sub>	14A <sub>eff</sub>	18A <sub>eff</sub>	21A <sub>eff</sub>
Input Voltage [Option /3P480]	3 × 480 VAC ± 10%					
Input Current [Option /3P480] <sup>1,2</sup>	6.5A <sub>eff</sub>	8A <sub>eff</sub>	10A <sub>eff</sub>	12.5A <sub>eff</sub>	16.5A <sub>eff</sub>	19.5A <sub>eff</sub>
Inrush Transient Current <sup>2</sup>	<25A	<25A	<25A	<51A	<51A	<51A
Leakage Current	<35mA					
Cos Phi	>0.7					
Harmonic Content <sup>3</sup>	50Hz = 72 %   100Hz = 2 %   150Hz = 0.9 %   200Hz = 0.1 %   250Hz = 11 %   350Hz = 0.6 %					
Efficiency	Up to 94%					
DISPLAY						
Resolution Voltage Display	10V – 69.99V		70V – 99.9V		100V – 999V	
Voltage Setting Resolution	00.00		00.0		000	
Resolution Current Display	2A – 69.99A		70A – 99.9A		100A – 999A	
Current Setting Resolution	00,00		00,0		000	
EMC AND SAFETY STANDARDS						
Safety	EN60950					
Emissions	EN61000-6-4:2007					
Immunity	EN61000-6-2:2005					
Measurement, Control and Laboratory Equipment	EN61000-1:2010					
AMBIENT CONDITIONS						
Cooling	Forced air, front to back					
Operating Temperature	0 to 50°C					
Storage Temperature	-20°C to 70°C					
Humidity	<80%					
Operating Altitude	<2000m					
Weight	18kg [3kW / 4kW / 5kW], 25kg [6kW / 8kW / 10kW]					
Dimensions	19" × 2U × 440mm [3kW / 4kW / 5kW], 19" × 2U × 600mm [6kW / 8kW / 10kW]					
Fan Noise	42 – 43 dB					

<sup>1</sup> For nominal current and nominal voltage

<sup>2</sup> For nominal input voltage

<sup>3</sup> Total harmonic distortion input current [(%)/lin]



## TECHNICAL DATA

OUTPUT																	
	15V	20V	25V	35V	40V	45V	70V	80V	100V	150V	300V	600V	800V	1000V	1200V	1500V	
Static Regulation	± 0.1 % of F.S.																
Line Regulation Voltage	± 0.02 % F.S.																
Line Regulation Current	± 0.02 % F.S.																
Load Regulation	± 0.05 % F.S. ± 2mV																
Load Regulation Current	± 0.05 % F.S. ± 20mA																
Dynamic Response (10%-90%)	Typically <3ms assuming an ohmic load																
Typical Voltage Ripple (p-p) 20MHz	40mV	80mV	80mV	80mV	140mV	140mV	140mV	140mV	140mV	900mV	900mV	900mV	1000mV	1200mV	2500mV	2500mV	
Typical Voltage Ripple (p-p) 300kHz	15mV	35mV	35mV	35mV	60mV	60mV	60mV	60mV	60mV	400mV	400mV	400mV	700mV	800mV	1500mV	1500mV	
Typical Voltage Ripple (rms) 20MHz	15mV	35mV	35mV	35mV	60mV	60mV	60mV	60mV	60mV	400mV	400mV	400mV	400mV	400mV	400mV	500mV	
Typical Voltage Ripple (rms) 300kHz	25mV	25mV	25mV	25mV	40mV	40mV	40mV	40mV	40mV	300mV	300mV	300mV	300mV	300mV	300mV	400mV	
Current Ripple (p-p)	<0.5 % of F.S.																
Current Ripple (rms)	<0.4 % of F.S.																
Isolation	3000VAC (Between Primary and Secondary)																
Isolation	500VDC (Between DC-Output and Earth)										2000VDC (Between DC-Output and Earth)						
Isolation	2150VDC (Between Primary and Earth)																
Rise Time (Full Load)	6ms	6ms	6ms	6ms	12ms	12ms	12ms	20ms	20ms	20ms	20ms	20ms	20ms	40ms	40ms	40ms	6ms
Rise Time (No Load)	5ms	5ms	5ms	5ms	10ms	10ms	10ms	10ms	10ms	10ms	10ms	10ms	10ms	10ms	20ms	20ms	5ms
Fall Time (Full Load)	15ms	15ms	15ms	15ms	20ms	20ms	20ms	20ms	20ms	40ms	40ms	50ms	60ms	80ms	100ms	25ms	
Fall Time (No Load)	5s ≤50V																
Relative Voltage Accuracy	± 0.25% V <sub>MAX</sub>																
Relative Current Accuracy	± 0.4% I <sub>MAX</sub>																
Maximum Sense Voltage	5% of F.S. [0 to V <sub>MAX</sub> ]											No sense function provided					
Maximum Sense Voltage	± 1% of F.S. [Operating Over V <sub>MAX</sub> ]											No sense function provided					
Relative Voltage Sense Accuracy	± 0.5% V <sub>MAX</sub> (relative accuracy for worst case sense operation)																
Over Voltage Protection	Adjustable between 0 % and 120 % of full voltage range																
Over Current Protection	Limited by the current setpoint																
Over Temperature Protection	If the internal heat sink temperature rises above 90°C the device will automatically shut down																
Under Voltage Lock Out	If the set limit is reached then the device will automatically shut down																
Slope Function	Adjustable slope for current and voltage: Range-Minimum 1 A/s resp. 1 V/s   Range-Maximum is 30ms to V <sub>MAX</sub> resp. I <sub>MAX</sub>																
AI Filter	Adjustable filter function for analogue interface set values. Average time is adjustable between 0s to 80s. 0=0s; 2=15ms; 3=30ms; 4=60ms; 5=125ms; 6=250ms; 7=500ms; 8=1s; 9=2s; 10=3s; 11=5s; 12=10s; 13=20s; 14=40s; 15=80s																
t-Enable	Adjustable on time for the device after press the start button (standby). Time is adjustable between 1s and 65000s																

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### OUTPUT OPERATING MODES

GENERAL	
VI Mode	Voltage and current operation mode: voltage and current limit are programmable
VIP Mode	Power limit mode: a powerlimit is programmable
VIR Mode	Output resistor mode: an output resistor is programmable between $[R_{MAX} = V_{OUTMAX} / I_{OUTMAX}]$ and $[R_{MIN} = R_{MAX} \times 0.1]$
PVSim Mode	Photovoltaic Simulation Mode: simulates a PV generator's MPP tracking in both voltage and current modes

### MASTER SLAVE INFORMATION

GENERAL	
Number of Devices Connectable in Master Slave	Up to 8
Maximum Voltage in Series	600V
Maximum Power Using Standard Devices	80kW
Set-Value Accuracy (V/A) Using Internal Reference	± 0.5 %
Absolute Voltage Accuracy in Parallel	± 0.25% of $V_{NOM}$
Absolute Current Accuracy in Parallel	± 0.4% of $I_{NOM}$ × number of devices connected in parallel
Absolute Voltage Accuracy in Series	± 0.25% of $V_{NOM}$ × number of devices connected in series
Absolute Current Accuracy in Series	± 0.4% of $I_{NOM}$



## INTERFACE INFORMATION

### ANALOGUE INTERFACE (STANDARD)

Digital Outputs (CV, Standby, Error)	Output type: Open collector with pull-up resistor 10k $\Omega$ after +5 V $I_{SINKMAX}$ : 50 mA
Digital Inputs (Ext. Control, Standby)	Input resistance: 47k $\Omega$ Maximum input voltage: 50V High level: $V_{IN} > 2V$ Low level: $V_{IN} < 0.8V$
Analog Outputs (Xmon)	Output resistance: 100 $\Omega$ Minimum permissible load resistance: 2k $\Omega$ Minimum load resistance for 0.1 % accuracy: 100k $\Omega$
Analog Inputs (Xset)	Input resistance: 1M $\Omega$ Maximum permissible input voltage: 25V
Reference Voltage	Reference voltage $V_{REF}$ : 10V $\pm$ 10 mV Output resistance: <10 $\Omega$ Maximum output current: 10 mA (not short-circuit-proof)
5 V – Supply Voltage	Output voltage: 5V $\pm$ 300mV Maximum output current: 50 mA (not short-circuit-proof)
Programming Response Time	<10ms

### RS-232 INTERFACE (STANDARD)

Signal Inputs (RxD, CTS)	Maximum input voltage: $\pm$ 25V Input resistance: 5 k $\Omega$ [Type] Switching thresholds: $V_H < -3V$ , $V_L > +3V$
Signal outputs (TxD, RTS)	Output voltage (at $R_L > 3k\Omega$ ): min $\pm$ 5V, Type $\pm$ 9V, max $\pm$ 10V Output resistance: <300 $\Omega$ ; Short circuit current: Type $\pm$ 10mA

### RS-485 INTERFACE (OPTIONAL)

Maximum Input Voltage	$\pm$ 5V
Input Resistance	>12k $\Omega$
Output Current	$\pm$ 60mA Max
High Level	$V_d > 0.2V$
Low Level	$V_d < -0.2V$

## OPTIONS

CODE	DESCRIPTION
/3P208	3 Phase Input of 3 $\times$ 208 (187 - 229Vac), 50/60Hz
/3P440	3 Phase Input of 3 $\times$ 440 (396 - 484Vac), 50/60Hz
/3P480	3 Phase Input of 3 $\times$ 480 (432 - 528Vac), 50/60Hz
/400HZ	400Hz input frequency
/1P	Input voltage is 230VAC $\pm$ 10% (for models with outputs of 4kW or 5kW only)
/DC	Any nominal in the input range 250 - 750VDC $\pm$ 10% (eg. 500VDC $\pm$ 10% = 450 - 550VDC input)
/ATE	No front panel control or display, analogue interface provided as standard
/USB	USB interface
/LT	IEEE 488.2 (GPIB) interface
/LTRS485	RS-485 interface
/LAN	Ethernet interface
/KFZ12	Output follows a 12Vdc automotive cranking curve
/KFZ24	Output follows a 24Vdc automotive cranking curve
/KFZXX	Output follows a user specific curve
/SD	Integrated memory card slot on the front panel
/SCS	Metal cover set with cable glands for input and output terminals

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**WE ARE  
POSITIVE  
PEOPLE**  
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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.



Tel: +44 (0) 1246 452909  
Sales: 0800 612 95 75  
sales@etps.co.uk  
www.etps.co.uk

ETPS Ltd  
Unit 14, The Bridge  
Beresford Way, Chesterfield  
S41 9FG



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