

# LAB-HP Compact high power DC Source



### **POSITIVE PROBLEM SOLVING**

### ╈═

## The LAB-HP provides up to 21kW of power in just a 3U high case. A 10 turn digitally encoded potentiometer allows for straight forward front panel operation.

The large touchscreen display indicates all relevant output quantities simultaneously. Output values can be preset and read prior to releasing the output. ATE options are offered for system integration. Each unit has an RS-232, LAN and isolated analogue interface with switchable ranging as standard. If computer control is required then any combination of Integrated RS-485, GPIB and USB interfaces can be specified.

- + CV, CC, CP, CR & PVsim Modes
- + Optional Computer Interfaces
- + Simple Front Panel Operation
- + USB Drive Option
- + Worldwide Input Options
- + Datalogging Capability

### CONTENTS

Selection Table	2
Options Table	3
Modularity (Master/Slave)	4
Operating Features, Ranges, Modes	5
Input	6-7
Interface & Control	7-8
Software/Soft Tools	8
Safety/Protection	9
Mechanical, Isolation	10
Form Factors & Enclosures	11-13
General Spec, Rental Systems, Application	ons 14

# **SELECTION TABLE**

	OUTPUT CURRENT							
OUTPUT VOLTAGE	3kW Models	4kW Models	5kW Models	7kW Models	10kW Models	15kW Models		
0 - 15V	0 - 250A	0 - 500A	0 - 500A	0 - 500A	0 - 666A	0 - 1000A		
0 - 20V	0 - 250A	0 - 250A	0 - 250A	0 - 500A	0 - 666A	0 - 750A		
0 - 25V	0 - 240A	0 - 240A	0 - 240A	0 - 480A	0 - 600A	0 - 600A		
0 - 30V	0 - 234A	0 - 234A	0 - 234A	0 - 234A	0 - 333A	0 - 500A		
0 - 35V	0 - 200A	0 - 200A	0 - 200A	0 - 200A	0 - 286A	0 - 430A		
0 - 40V	0 - 175A	0 - 175A	0 - 175A	0 - 175A	0 - 250A	0 - 375A		
0 - 45V	0 - 156A	0 - 156A	0 - 156A	0 - 156A	0 - 222A	0 - 340A		
0 - 50V	0 - 140A	0 - 140A	0 - 140A	0 - 140A	0 - 200A	0 - 300A		
0 - 60V	0 - 117A	0 - 117A	0 - 117A	0 - 117A	0 - 167A	0 - 250A		
0 - 70V	0 - 100A	0 - 100A	0 - 100A	0 - 100A	0 - 143A	0 - 220A		
0 - 80V	0 - 88A	0 - 88A	0 - 88A	0 - 88A	0 - 125A	0 - 190A		
0 - 100V	0 - 70A	0 - 70A	0 - 70A	0 - 70A	0 - 100A	0 - 150A		
0 - 150V	0 - 47A	0 - 47A	0 - 47A	0 - 47A	0 - 67A	0 - 100A		
0 - 300V	0 - 24A	0 - 24A	0 - 24A	0 - 24A	0 - 33A	0 - 50A		
0 - 600V	0 - 12A	0 - 12A	0 - 12A	0 - 12A	0 - 17A	0 - 25A		
0 - 800V	0 - 9A	0 - 9A	0 - 9A	0 - 9A	0 - 13A	0 - 19A		
0 - 1000V	0 - 7A	0 - 7A	0 - 7A	0 - 7A	0 - 10A	0 - 15A		
0 - 1200V	0 - 5.8A	0 - 5.8A	0 - 5.8A	0 - 5.8A	0 - 8A	0 - 13A		
0 - 1500V	0 - 4.7A	0 - 4.7A	0 - 4.7A	0 - 4.7A	0 - 7A	0 - 10A		

				OUTPUT CURRENT			
OUTPUT VOLTAGE	21kW Models	30kW Models	35kW Models	45kW Models	49kW Models	56kW Models	63kW Models
0 - 20V	0 - 1250A	0 - 1500A	0 - 1750A	0 - 2250A	N/A	N/A	N/A
0 - 25V	0 - 1000A	0 - 1250A	0 - 1500A	0 - 1800A	0 - 2000A	0 - 2250A	N/A
0 - 30V	0 - 700A	0 - 1000A	0 - 1200A	0 - 1500A	0 - 1650A	0 - 1900A	0 - 2100A
0 - 35V	0 - 600A	0 - 857A	0 - 1000A	0 - 1285A	0 - 1400A	0 - 1600A	0 - 1800A
0 - 40V	0 - 525A	0 - 750A	0 - 900A	0 - 1125A	0 - 1240A	0 - 1400A	0 - 1575A
0 - 45V	0 - 470A	0 - 666A	0 - 800A	0 - 1000A	0 - 1100A	0 - 1250A	0 - 1400A
0 - 50V	0 - 420A	0 - 600A	0 - 700A	0 - 900A	0 - 1000A	0 - 1150A	0 - 1260A
0-60V	0 - 350A	0 - 500A	0 - 600A	0 - 750A	0 - 840A	0 - 950A	0 - 1050A
0 - 70V	0 - 300A	0 - 425A	0 - 500A	0 - 640A	0 - 700A	0 - 800A	0 - 900A
0 - 80V	0 - 270A	0 - 375A	0 - 450A	0 - 560A	0 - 620A	0 - 700A	0 - 800A
0 - 100V	0 - 210A	0 - 300A	0 - 350A	0 - 450A	0 - 500A	0 - 560A	0 - 640A
0 - 150V	0 - 140A	0 - 200A	0 - 240A	0 - 300A	0 - 330A	0 - 380A	0 - 420A
0 - 300V	0 - 70A	0 - 100A	0 - 120A	0 - 150A	0 - 170A	0 - 190A	0 - 210A
0-600V	0 - 35A	0 - 50A	0 - 60A	0 - 75A	0 - 85A	0 - 95A	0 - 105A
0 - 800V	0 - 27A	0 - 37A	0 - 44A	0 - 56A	0 - 62A	0 - 70A	0 - 80A
0 - 1000V	0 - 21A	0 - 30A	0 - 35A	0 - 45A	0 - 49A	0 - 56A	0 - 63A
0 - 1200V	0 - 18A	0 - 25A	0 - 30A	0 - 37A	0 - 41A	0 - 47A	0 - 53A
0 - 1500V	0 - 14A	0 - 20A	0 - 24A	0 - 30A	0 - 33A	0 - 38A	0 - 42A

### CUSTOM OUTPUT MODIFICATIONS

You can specify your own nominal output voltage and current ranges outside of the selection table above. So if you needed to power a device which needs exactly 850V at 15kW, we can provide a new unit with exactly those output ranges.

### MODEL PART NUMBERS

To request a specific model is simple. The LAB-HP product family name precedes the requested nominal output power, followed by the nominal voltage. The example below shows how to create the part number for a 30kW/1500V unit.





# **OPTIONS TABLE**

OPTIONS	
CODE	DESCRIPTION
	OPERATING RANGES AND FEATURES
/2000V	Unit built with 2000V output
/HS	High speed model - secondary rise and fall time shortened by a factor of 10
/PR	Reversible output polarity (only in standby mode)
	OPERATING MODES
/HP-E	Essentials model with non-touchscreen front panel display and reduced functionality [CC and CV modes only]
	INPUT
/1P	Input voltage is 230VAC $\pm$ 10% (for models with outputs of 3kW to 5kW only)
/3P200	3 Phase input of 3 × 200VAC (180 - 220VAC), 50/60Hz
/3P208	3 Phase input of 3 × 208VAC (187 - 229VAC), 50/60Hz
/3P440	3 Phase input of 3 × 440VAC (396 - 484VAC), 50/60Hz
/3P480	3 Phase input of 3 × 480VAC (432 - 528VAC), 50/60Hz
/400HZ	400Hz input frequency
/DC	Any nominal in the input range 250 - 750VDC $\pm$ 10% (eg. 500VDC $\pm$ 10% = 450 - 550VDC input)
	INTERFACES AND CONTROL
/ATE	No front panel control or display
/IEEE488	IEEE 488.2 (GPIB) remote control interface on rear panel
/RS485	RS-485 remote control interface on rear panel
/USB	USB remote control interface on rear panel
/USB-PORT	USB port on front panel for uploading scripts and datalogging (only available when option /C is selected)
	SAFETY AND PROTECTION
/DDS	Decoupling diode
/FD	Freewheeling diode
/LOCK-AC	Interlock for mains input
/LOCK-DC	Interlock for DC output
/POP	Passive overvoltage protection
/SC	Metal cover set with cable glands for input and output terminals
	ISOLATION
/IIO	Models up to $300V_{_{NOM}}$ built with increased 2000VDC isolation between DC-output and earth
	MECHANICAL
/CC	Conformal coating of PCBs (only available when option /ATE is selected)
/RUG	Ruggedised modifications to protect the unit against shock and vibration (only available when option /ATE is selected)
	FORM FACTOR AND ENCLOSURES
/LR	Integration into a 19" lab rack
/FC	Integration into a flightcase
	GENERAL SPECIFICATIONS
/3Y	3 year warranty
/5Y	5 year warranty

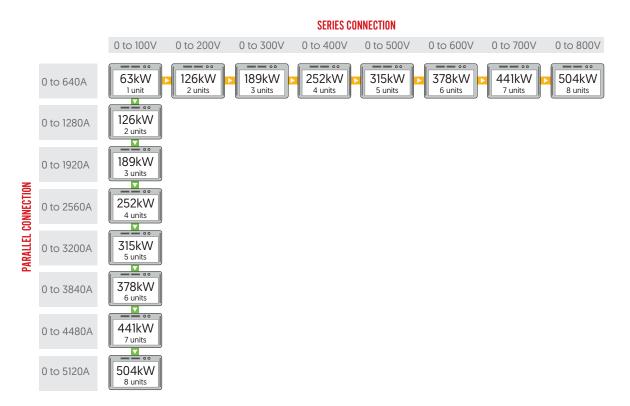
### X CUSTOM OPTIONS

Around a third of our units are custom builds or modified in some way. So if you require a custom modification or option please let us know.

# MODULARITY (MASTER/SLAVE)

Up to 8 standard LAB-HP systems can be arranged in parallel or series configurations. Each PSU is able to operate independently, so that systems can be reconfigured, expanded or broken up as needs dictate. The modular approach is useful for test houses and research labs who regularly test different sized power devices. Individual units can be used for the day to day testing of multiple small devices, then grouped together for larger projects.

The diagram shows all the possible configurations with eight 100V/63kW systems.



### **STANDARD FEATURES**

	TECHNICAL DATA
Number of Devices Connectable in Master/Slave	Up to 8
Maximum Voltage in Series	1000V
Maximum Power Using Standard Devices	504kW
Maximum Power Using Modified LAB HP Devices	1.4MW
Voltage Accuracy	$\pm 0.1\%$ of V <sub>NOM</sub> × number of devices connected in master/slave
Current Accuracy	$\pm 0.2\%$ of I <sub>NOM</sub> × number of devices connected in master/slave

## **HIGHLIGHTED FEATURES**

### REDUNDANCY

To ensure minimal disruption, redundancy is provided when operating multiple LAB-HP units in master/slave. Values set on the master unit are multiplied by number of units in series or parallel (e.g. if you have three units in parallel and set 10A on the master unit, each unit will provide 10A for a combined 30A total). If a unit device fails, the remaining units continue to provide their pre-assigned output (e.g. in the example above each unit will would provide 10A for a combined 20A total should one unit fail).







# **OPERATING RANGES AND FEATURES**

#### **STANDARD FEATURES**

TECHNICAL DATA										
	0 - 15V	16 - 35V	36 - 70V	71 - 120V	121 - 350V	351 - 700V	701 - 900V	901 - 1150V	1151 - 1400V	1401 - 1500V
Static Regulation	±0.1 % of	F.S.								
Line Regulation Voltage	±0.02 % F	S.								
Line Regulation Current	±0.02 % F	<del>.</del> .S.								
Load Regulation	±0.05 % F	.S. ±20mV								
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	140mV	140mV	900mV	350mV	350mV	400mV	850mV	900mV
Typical Voltage Ripple (p-p) 300kHz	15mV	35mV	60mV	60mV	400mV	250mV	250mV	300mV	500mV	550mV
Typical Voltage Ripple (rms) 20MHz	15mV	35mV	60mV	60mV	400mV	150mV	150mV	150mV	150mV	200mV
Typical Voltage Ripple (rms) 300kHz	10mV	25mV	40mV	40mV	300mV	100mV	100mV	100mV	100mV	150mV
Current Ripple (p-p)	<0.5 % of	F.S. of I <sub>MAX</sub>								
Current Ripple (rms)	600mA	380mA	260mA	220mA	60mA	30mA	25mA	15mA	12mA	12mA
Rise Time (Full Load)	6ms	6ms	12ms	20ms	20ms	20ms	40ms	40ms	40ms	6ms
Rise Time (No Load)	5ms	5ms	10ms	10ms	10ms	10ms	10ms	20ms	20ms	5ms
Fall Time (Full Load)	15ms	15ms	20ms	20ms	40ms	50ms	60ms	80ms	100ms	25ms
Fall Time (No Load)	tf <5s at \	/a <60V			10s				15s	1s
Voltage Set-Value Accuracy	$\pm$ 0.1% V $_{_{\rm N}}$	IAX								
Current Set-Value Accuracy	±0.2% I <sub>MA</sub>	x								
Relative Voltage Sense Accuracy	$\pm 0.5\%$ V <sub>N</sub>	IAX (relative a	accuracy for	worst case	e sense ope	eration)				

### **OPTIONS**

CODE	DESCRIPTION
/2000V	Unit built with 2000V output
/HS	High speed model - secondary rise and fall time shortened by a factor of 10
/PR	Reversible output polarity (only in standby mode)

## **OPERATING MODES**

### **STANDARD FEATURES**

	TECHNICAL DATA
VI Mode	Voltage and current operation mode: voltage and current limit are programmable
VIP Mode	Power limit mode: a power limit is programmable
VIR Mode	$Output \ resistor \ mode: an \ output \ resistor \ is \ programmable \ between \ [R_{_{MAX}} = V_{_{OUTMAX}} / I_{_{OUTMAX}}] \ and \ [R_{_{MAX}} = R_{_{MAX}} \times 0.1]$
PVSim Mode	Photovoltaic Simulation Mode: simulates a PV generator's MPP tracking in both voltage and current modes
Slope Function	Adjustable slope for current and voltage: Range-Minimum 1 A/s resp. 1 V/s   Range-Maximum is 30ms to V_{_{\rm MAX}} resp. I $_{_{\rm MAX}}$
Al 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
ODTIONS	

CODE	DESCRIPTION
/HP-E	Essentials model with non-touchscreen front panel display and reduced functionality (CC and CV modes only)

## INPUT

### **STANDARD FEATURES**

		TECHNICA	L DATA						
	3kW	4kW	5kW		7kW		10kW		15kW
Connection	3 wire (P+N+PE)	5 wire (3P+	N+PE)						
Maximum Allowed Non-Symmetry	<3%								
Standard Input Voltage	230VAC ±10%	3 × 400VAC	C ±10%						
Standard Input Frequency	47 - 63Hz								
Standard Input Current <sup>1</sup>	22A <sub>eff</sub>	9.3A <sub>eff</sub>	11.6A <sub>eff</sub>		16.6A <sub>eff</sub>		23.2A <sub>eff</sub>		34.7A <sub>eff</sub>
Recommended Supply Breaker Value and Curve (3 × 400VAC Input)	16A type D/K [Op. /3P400]	16A type D/K 16A type D/K 32A ty		32A typ	be D/K	32A type D,	′K	63A type D/	
Input Voltage (Option /IP)	Standard	230VAC ±10	230VAC ±10% 230VAC ±10% N/A						
Input Current (Option /1P) <sup>1</sup>	Standard	28A <sub>eff</sub> 33A <sub>eff</sub> N/A							
Input Voltage (Option /3P200)	3 × 200VAC ±10%	6							
Input Current (Option /3P200) <sup>1</sup>	13.9A <sub>eff</sub>	18.5A <sub>eff</sub>	23.2A <sub>eff</sub>		32.5A <sub>eff</sub>		46.3A <sub>eff</sub>		69.4A <sub>eff</sub>
Input Voltage (Option /3P208)	3 × 208VAC ±10%	6							
Input Current (Option /3P208) <sup>1</sup>	13.4A <sub>eff</sub>	17.8A <sub>eff</sub>	22.3A <sub>eff</sub>		31.2A <sub>eff</sub>		44.5A <sub>eff</sub>		66.7A <sub>eff</sub>
Input Voltage (Option /3P400)	3 × 400VAC ±10%	Standard	en		an				
Input Current (Option /3P400) <sup>1</sup>	7A <sub>eff</sub>								
Input Voltage (Option /3P440)	3 × 440VAC ±109	6							
Input Current (Option /3P440) <sup>1</sup>	6.4A <sub>off</sub>	8.5A <sub>eff</sub> 10.6A <sub>eff</sub> 14.8A <sub>eff</sub> 21.1A <sub>eff</sub>				21.1A_"		31.6A <sub>eff</sub>	
Input Voltage (Option /3P480)	3 × 480VAC ±10%						en		
Input Current (Option /3P480) <sup>1</sup>	5.8A <sub>eff</sub>							28.9A <sub>eff</sub>	
Inrush Transient Current <sup>2</sup>	<25A	<25A	<25A		<25A		<51A		<51A
Leakage Current	<35mA								
Cos Phi	>0.7								
Harmonic Content <sup>2</sup>	50Hz = 72 %   100	)Hz = 2 %   150	Hz = 0.9 %   200	)Hz = 0.1 %	250Hz =	= 11 %   350	Hz = 0.6 %		
Efficiency	Up to 94%				1				
					_		_		_
	21kW	30kW	35kW	45kW		49kW	56kW	1	63kW
Connection	5 wire (3P+N+PE)								
Maximum Allowed Non-Symmetry	<3%								
Standard Input Voltage	3 × 400VAC ±10%	6							
Standard Input Current <sup>1</sup>	48.6A <sub>eff</sub>	69.4A <sub>eff</sub>	80.9A <sub>eff</sub>	104A <sub>ef</sub>	f	113.3A <sub>eff</sub>	129.5A	eff	145.6A <sub>eff</sub>
Recommended Supply Breaker Value and Curve		80A type D/K	120A type D/K	120A t D/K	ype	150A type D/K	e 150A t D/K	уре	180A typ D/K
Input Voltage (Option /3P200)	3 × 200VAC ±10%	6							
	97.1A	138.7A <sub>eff</sub>	161.8A <sub>eff</sub>	208A	ff	226.5A	258.9/	A	291.2A <sub>eff</sub>
Input Current (Option /3P208) <sup>1</sup>			Gii	0		cii		- Cil	Cir
Input Current (Option /3P208) <sup>1</sup> Input Voltage (Option /3P208)	3 × 208VAC ±10%	6							2004
	3 × 208VAC ±10%		155.6A <sub>off</sub>	200A	ff	217.8A <sub>off</sub>	248.9/	A <sub>off</sub>	ZOUA
Input Voltage [Option /3P208] Input Current [Option /3P208] <sup>1</sup>	3 × 208VAC ±10%	133.4A <sub>eff</sub>	155.6A <sub>eff</sub>	200A <sub>e</sub>	ff	217.8A <sub>eff</sub>	248.9/	A <sub>eff</sub>	$280A_{eff}$
Input Voltage (Option /3P208) Input Current (Option /3P208) <sup>1</sup> Input Voltage (Option /3P440)	3 × 208VAC ±109 93.4A <sub>eff</sub> 3 × 440VAC ±109	133.4A <sub>eff</sub>	155.6A <sub>eff</sub> 73.6A <sub>eff</sub>	200A <sub>e</sub> 94.6A		217.8A <sub>eff</sub>	248.9/ 117.7A,	-	
Input Voltage (Option /3P208) Input Current (Option /3P208) <sup>1</sup> Input Voltage (Option /3P440) Input Current (Option /3P440) <sup>1</sup>	3 × 208VAC ±109 93.4A <sub>eff</sub> 3 × 440VAC ±109	133.4A <sub>eff</sub> 63.1A <sub>eff</sub>				c		-	132.4A <sub>eff</sub>
Input Voltage (Option /3P208)	3 × 208VAC ±109 93.4A <sub>eff</sub> 3 × 440VAC ±109 44.2A <sub>eff</sub> 3 × 480VAC ±109	133.4A <sub>eff</sub> 6 63.1A <sub>eff</sub> 6	73.6A <sub>eff</sub>	94.6A	eff	103A <sub>eff</sub>	117.7A	eff	132.4A <sub>eff</sub>
Input Voltage [Option /3P208] Input Current [Option /3P208] <sup>1</sup> Input Voltage [Option /3P440] Input Current [Option /3P440] <sup>1</sup> Input Voltage [Option /3P480]	3 × 208VAC ±109 93.4A <sub>eff</sub> 3 × 440VAC ±109 44.2A <sub>eff</sub> 3 × 480VAC ±109	133.4A <sub>eff</sub> 63.1A <sub>eff</sub>			≥ff	c		eff	
Input Voltage [Option /3P208] Input Current [Option /3P208] <sup>1</sup> Input Voltage [Option /3P440] Input Current [Option /3P440] <sup>1</sup> Input Voltage [Option /3P480] Input Current [Option /3P480] <sup>1</sup> Inrush Transient Current <sup>2</sup>	3 × 208VAC ±109     93.4A <sub>eff</sub> 3 × 440VAC ±109     44.2A <sub>eff</sub> 3 × 480VAC ±109     40.5A <sub>eff</sub>	133.4A <sub>eff</sub> 6 63.1A <sub>eff</sub> 6 57.8A <sub>eff</sub>	73.6A <sub>eff</sub> 67.4A <sub>eff</sub>	94.6A 86.7A	≥ff	103A <sub>eff</sub> 94.4A <sub>eff</sub>	117.7A 107.9A	eff	132.4A <sub>eff</sub> 121.4A <sub>eff</sub>
Input Voltage (Option /3P208) Input Current (Option /3P208) <sup>1</sup> Input Voltage (Option /3P440) Input Current (Option /3P440) <sup>1</sup> Input Voltage (Option /3P480) Input Current (Option /3P480) <sup>1</sup> Inrush Transient Current <sup>2</sup> Leakage Current	3 × 208VAC ±109     93.4A <sub>eff</sub> 3 × 440VAC ±109     44.2A <sub>eff</sub> 3 × 480VAC ±109     40.5A <sub>eff</sub> 40.5A <sub>eff</sub>	133.4A <sub>eff</sub> 6 63.1A <sub>eff</sub> 6 57.8A <sub>eff</sub>	73.6A <sub>eff</sub> 67.4A <sub>eff</sub>	94.6A 86.7A	≥ff	103A <sub>eff</sub> 94.4A <sub>eff</sub>	117.7A 107.9A	eff	132.4A <sub>eff</sub> 121.4A <sub>eff</sub>
Input Voltage (Option /3P208) Input Current (Option /3P208) <sup>1</sup> Input Voltage (Option /3P440) Input Current (Option /3P440) <sup>1</sup> Input Voltage (Option /3P480) Input Current (Option /3P480) <sup>1</sup> Inrush Transient Current <sup>2</sup>	3 × 208VAC ±109   93.4A <sub>eff</sub> 3 × 440VAC ±109   44.2A <sub>eff</sub> 3 × 480VAC ±109   40.5A <sub>eff</sub> <76A	133.4A <sub>eff</sub> 6 63.1A <sub>eff</sub> 6 57.8A <sub>eff</sub> <102A	73.6A <sub>eff</sub> 67.4A <sub>eff</sub> <127A	94.6A 86.7A <153A	aff	103A <sub>eff</sub> 94.4A <sub>eff</sub> <178A	117.7A, 107.9A <203A	eff	132.4A <sub>eff</sub> 121.4A <sub>eff</sub>

<sup>1</sup> At nominal input voltage. <sup>2</sup> At nominal input voltage, the inrush current only occurs at switch-on.



### **OPTIONS**

#### LAB-HP DATASHEET - PAGE 7 OF 15

CODE	DESCRIPTION
/1P	Input voltage is 230VAC $\pm$ 10% (for models with outputs of 3kW to 5kW only)
/3P200	3 Phase input of 3 × 200VAC (180 - 220VAC), 50/60Hz
/3P208	3 Phase Input of 3 × 208VAC (187 - 229VAC), 50/60Hz
/3P440	3 Phase Input of 3 × 440VAC (396 - 484VAC), 50/60Hz
/3P480	3 Phase Input of 3 × 480VAC [432 - 528VAC], 50/60Hz
/400HZ	400Hz input frequency
/DC	Any nominal in the input range 250 - 750VDC $\pm$ 10% (eg. 500VDC $\pm$ 10% = 450 - 550VDC input)

## **INTERFACES AND CONTROL**

### **TECHNICAL INFORMATION**

	ANALOGUE INT	ERFACE (STANDARD)					
Digital Outputs (CV, Standby, Error)	Output type: Open colle I <sub>SINKMAX</sub> : 50 mA	Output type: Open collector with pull-up resistor 10k $\Omega$ after +5 V $I_{\text{SINKMAX}}$ : 50 mA					
Digital Inputs (Ext. Control, Standby)	Input resistance: $47k\Omega$ Maximum input voltage: High level: $V_{\rm IN} > 2V$ Low level: $V_{\rm IN} < 0.8V$	Maximum input voltage: 50V High level: V <sub>IN</sub> >2V					
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 in	put voltage: 25V					
Reference Voltage	Output resistance: <10 $\Omega$	Reference voltage V <sub>REF</sub> : 10V ±10 mV Output resistance: <10 $\Omega$ Maximum output current: 10 mA (not short-circuit-proof)					
5 V – Supply Voltage	Output voltage: $5V \pm 300 \text{mV}$ Maximum output current: 50 mA (not short-circuit-proof)						
Set Value Accuracy (V/A) When Using Internal Ref.	±0.5%						
Programming Response Time	<10ms						
	RS-232 INTER	FACE (STANDARD)					
Signal Inputs (RxD, CTS)	Maximum input voltage: ±25V Input resistance: 5 kΩ (Type) Switching thresholds: VH < -3V, VL > +3V						
Signal outputs (TxD, RTS)		$(\Omega)$ : min ± 5V, Type ± 9V, m 2; Short circuit current: Type					
	RS-485 INTER	FACE (OPTIONAL)					
Maximum Input Voltage	± 5V						
Input Resistance	>12kΩ						
Output Current	±60mA Max						
High Level	Vd >0.2V						
Low Level	Vd <-0.2V						
	STANDARD FRO	ONT PANEL DISPLAY					
Resolution Voltage Display	20V – 99.99V		100.0V - 999.9V	1000V – 1500V			
Voltage Setting Resolution Single & MS Series Mode	00.00		000.0	0000			
	N × 00.01 N × 000.1 N × 0001						
Voltage Setting Resolution MS Parallel Mode	N × 00.01		N × 000.1	N × 0001			
Voltage Setting Resolution MS Parallel Mode Resolution Current Display	N × 00.01 0.000A – 9.999A	10.00A – 99.99A	N × 000.1 100.0A – 999.9A	N × 0001 1000A – 99999A			
		10.00A - 99.99A 00.00					

### **INTERFACE AND CONTROL OPTIONS**

CODE	DESCRIPTION
/ATE	No front panel control or display
/IEEE488	IEEE 488.2 (GPIB) remote control interface on rear panel
/RS485	RS-485 remote control interface on rear panel
/USB	USB remote control interface on rear panel
/USB-PORT	USB port on front panel for datalogging and uploading scripts to the power supply

### **HIGHLIGHTED OPTION**

### •⇐ USB PORT (USB-PORT)

A front panel USB port can be specified on order with the LAB-HP. This is a useful feature to enable the power system to follow predetermined voltage and current curves. Data is programmed on a PC using text or .WAV formats. It can then be simply transferred to a USB drive and recalled from the front panel of the LAB-HP.

The USB drive can also be used for data logging. Output values can be recorded at intervals of 1 sec to 71 mins. The front panel display indicates when the unit is logging data and will alert the user when the USB drive is becomes full.

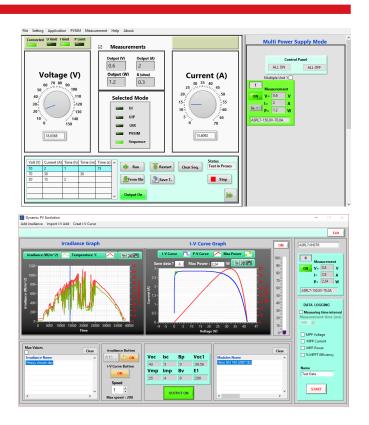
## **SOFTWARE/SOFT TOOLS**

#### **STANDARD SOFTWARE**

All new LAB-HP units are provided with free operating software. Live values of the power systems can be viewed remotely in a simple and intuitive way. This is particularly useful when operating the power supply in a location that is remote to the DUT.

Voltage, current, power and resistance values can all be controlled through the GUI. A test sequence function allows for more complex DC waveforms to be implemented directly through the software.

A specialised PV simulation feature is also provided as part of the software. This allows the power system to simulate a generator's MPP tracking in both current and voltage modes. The software contains many pre-loaded solar panels from different manufacturers.





# **SAFETY AND PROTECTION**

### **STANDARD FEATURES**

TECHNICAL DATA	
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
OPTIONS	
CODE	DESCRIPTION
/DDS	Decoupling diode
/FD	Freewheeling diode
/LOCK-AC	Interlock for mains input
/LOCK-DC	Interlock for DC output
/POP	Passive overvoltage protection

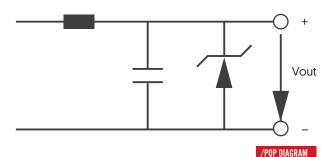
Metal cover set with cable glands for input and output terminals

/SC

## HIGHLIGHTED OPTIONS

### VMAX [///// PASSIVE OVERVOLTAGE PROTECTION (/POP)

Transient suppression diodes are fitted within the unit across the output stage. This is used to detect and clamp transient voltage spikes.



### (本) FREEWHEELING DIODE (/FD)

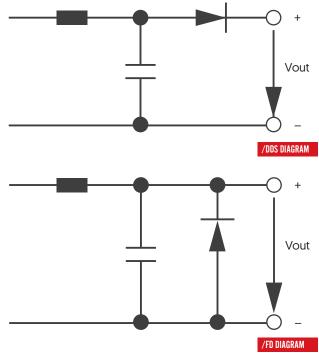
Built-in diode arrangement across the output. This can permanently cycle the maximum current through the output stage. The main applications area is when the LAB-HP is used for testing electric drives and inductive loads. The worst case fault condition of the DUT should be considered. If the DUT actively generates back towards the power supply and there is nothing else in circuit to sink the current then there's the potential for voltage to rise above the nominal value and the rating of the DC filter which would cause damage.

### 🕀 INTERLOCK AC OR DC (/LOCK-AC OR LOCK-DC)

This is an external option and provides a physical disconnection at either the AC input or DC output. The higher power systems may require additional rack space compared to standard units for either of these options. There is a choice of operating the hardware interlock via closing the contacts or applying an external voltage.

### E × ← DECOUPLING DIODE (/DDS)

Built-in diodes in the positive lines to guard against the DUT's voltage being fed back to the PSU. Rated at 150% of the nominal output of the model. The decoupling diode is commonly used when the LAB-HP is used to charge battery packs.



### **↓** SAFETY COVER SET (/SC)

Metal covers for the input and output terminals with cable glands. Screws are M4  $\times$  8mm.



## **ISOLATION**

### **STANDARD FEATURES**

TECHNICAL DATA	
Isolation (Between Primary and Secondary)	3000VAC
Isolation (Between DC-Output and Earth)	500VDC (0-300V models)   2000VDC (301-1500V models)
Isolation (Between Primary and Earth)	2150VDC

#### OPTIONS

CODE	DESCRIPTION
/IIO	Models up to $300V_{NOM}$ built with increased 2000VDC isolation between DC-output and earth

## **MECHANICAL**

### STANDARD FEATURES

AMBIENT CONDITIONS	
Weight	3kW-7kW models: 14kg   10kW-15kW models: 26kg   21kW models: 37kg   30kW models: 52kg 35kW models: 59kg   45kW models: 73kg   49kW models: 85kg   56kW models: 92kg   63kW models: 99kg
Cooling	Forced air, front to back
Operating Temperature	0 to 50°C
Storage Temperature	-20°C to 70°C
Humidity	<80%
Operating Altitude	<2000m
Fan Noise	42 – 43 dB

#### **OPTIONS**

CODE	DESCRIPTION
/CC	Conformal coating of PCBs (only available when option /ATE is selected)
/RUG	Ruggedised modifications to protect the unit against shock and vibration (only available when option /ATE is selected)

### HIGHLIGHTED OPTIONS RUGGEDISED MODIFCATIONS (/RUG)

Modifications can be made to the LAB-HP to ensure suitability in harsh conditions by providing protection against shock and vibration. This is often ideal for companies who regularly need to move equipment to different sites, to mitigate the risk of any potential transit damage.

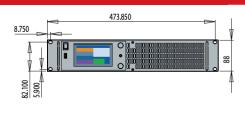
### - CONFORMAL COATING OF PCBs (/CC)

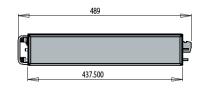
The PCBs of the units are coated with a solution to protect against environmental conditions such as condensing humidity, as well as providing resistance against salt moisture. This option can also be combined with /RUG.

LAB-HP DATASHEET - PAGE 11 OF 15

# FORM FACTOR AND ENCLOSURES

#### 3kW-7kW MODELS<sup>1</sup>

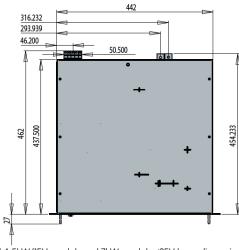


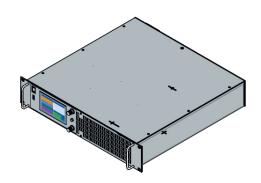


667.500

605.500

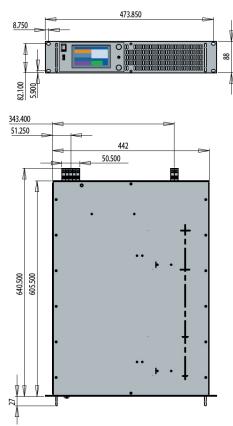
0





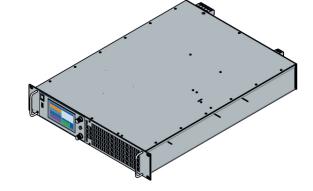
 $^{1}$  4-5kW/15V models and 7kW models  $\leq$ 25V have dimensions of 19"  $\times$  2U  $\times$  600mm.

### **10kW MODELS<sup>2</sup>**

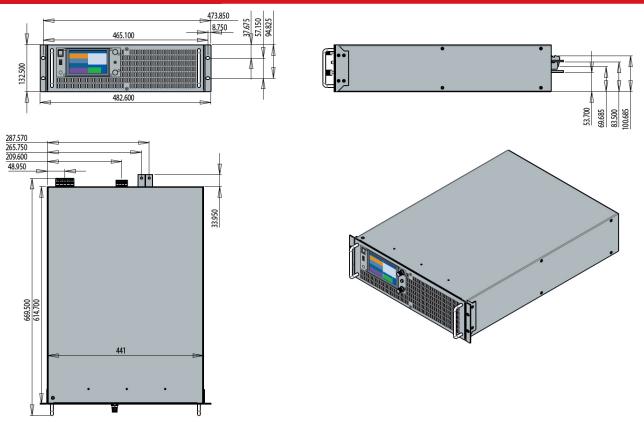


 $^2$  Models  ${\leq}50V$  have dimensions of 19"  ${\times}$  3U  ${\times}$  620mm.

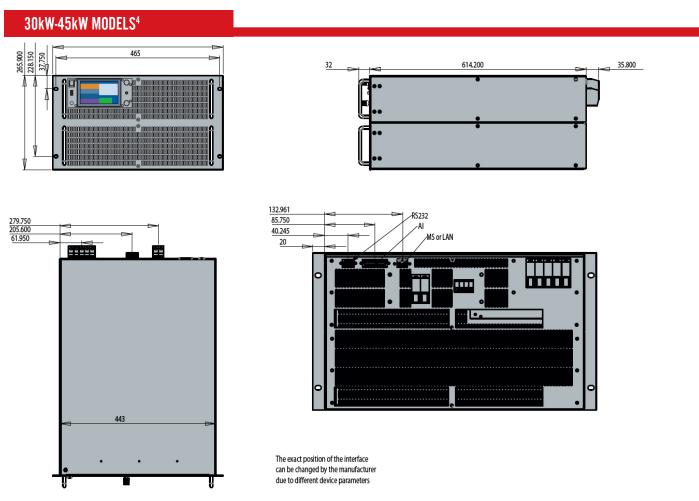




### 15kW-21kW MODELS<sup>3</sup>

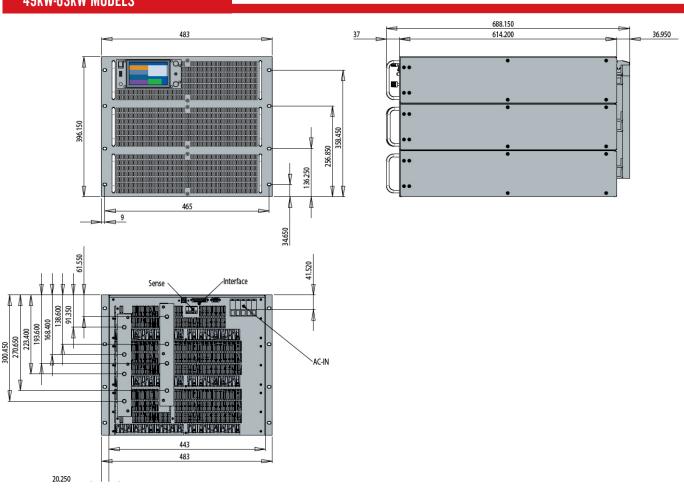


<sup>3</sup> 15kW/15V models and 21kW models ≤25V have dimensions of 19" × 6U × 620mm.



 $^4$  35kW/20V models and 45kW models  ${\leq}35V$  have dimensions of 19"  ${\times}$  9U  ${\times}$  620mm.

### 49kW-63kW MODELS



#### **DESKTOP UNITS**

On request, your choice of LAB-HP can be built without rackmounting flanges for no extra cost. This allows the unit to be used on a desktop or bench.

#### **OPTIONAL ENCLOSURES**

Units can be treated to a laboratory rack or flight case integration. Having a programmable power system mounted into a flight case on castors is often advantageous, especially when several departments or test cells share the same equipment.

Multiple power systems can be fitted into the same flight case. Door hangers are fitted for convenience. Existing ETPS systems can also be retrospectively integrated into new flight cases where requested.

CODE	DESCRIPTION
/LR	Integration into a 19" lab rack
/FC	Integration into a flightcase



# **GENERAL SPECIFICATIONS**

#### **STANDARD FEATURES**

EMC AND SAFETY STANDARDS		
Safety	EN 61010-1:2010+A1;2019	
EMC	EN 61326-1:2013	
RoHS	EN IEC 63000:2018	
Standard Warranty	1 year	
OPTIONS		
CODE	DESCRIPTION	
/3Y	3 year warranty	
/5Y	5 year warranty	

## **RENTAL SYSTEMS**

If your test requirement is short term, we have multiple LAB-HP units in our rental DC source range. These include 60V, 120V and 150V systems up to 30kW.



# **COMMON LAB-HP APPLICATIONS**

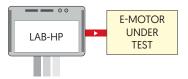
### **ICANKING CURVE TESTING**

Electrical components within a vehicle's subsystem must be able to withstand a wide range of input voltage surges and drops during a start-up. The LAB-HP can accurately recreate these conditions. This increases reproducibility and accuracy of results when compared to using real batteries. Hard to replicate conditions such as voltage cranking during a cold start can be achieved. The SD card and USB options provide a convenient method of implementing and editing cranking waveforms using simple script files.



### **₩**IF BATTERY EMULATION

Using real batteries to test battery powered equipment can be unreliable and time consuming. To compare experiments like for like, control variables such as state of charge and temperature need to be conditioned and accurately measured before testing. The LAB-HP's constant power mode can replicate the standard discharge curve of a battery pack. An adjustable resistance mode is also provided to help simulate an aging pack.



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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