

# LAB-AUTO

## AUTORANGING DC POWER SUPPLY



POSITIVE PROBLEM SOLVING **+ =**

The LAB-AUTO's autoranging output allows for many more voltage/current combinations than a traditional DC source. Each unit has an extensive feature set as standard.

All units operate from a three phase wide AC input with active PFC. Up to ten identical units can be connected in parallel to 150kW. Constant voltage, current and power modes are provided as standard. Control of the system is provided via a large touch screen with 5 digit V, I and W display, as well as by analogue knobs. A LAN interface allows for remote control, with other interfaces optionally available.

- + Back EMF Protection up to PSU's Nominal Voltage**
- + PV Simulation and Adjustable Resistance**
- + <1.5ms for 10 - 90% Load Step**
- + Configurable OCP, OVP and OTP**
- + Adjustable Voltage Ramps**
- + Active PFC of >0.95**

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# STANDARD MODELS



## SELECTION TABLE

Part Number	Nominal Power <sup>1</sup>	Max. Settable Power <sup>2</sup>	Nominal Voltage Range <sup>1</sup>	Settable Voltage Range <sup>2</sup>	Nominal Current Range <sup>1</sup>	Settable Current Range <sup>2</sup>	Weight
LAB-AUTO 80-180	5kW	5.1kW	0 - 80V	0 - 84V	0 - 180A	0 - 189A	27.5kg
LAB-AUTO 250-60	5kW	5.1kW	0 - 250V	0 - 262.5V	0 - 60A	0 - 63A	26kg
LAB-AUTO 350-42	5kW	5.1kW	0 - 350V	0 - 367.5V	0 - 42A	0 - 44.1A	26kg
LAB-AUTO 500-30	5kW	5.1kW	0 - 500V	0 - 525V	0 - 30A	0 - 31.5A	26kg
LAB-AUTO 650-23	5kW	5.1kW	0 - 650V	0 - 682.5V	0 - 23A	0 - 24.1A	26kg
LAB-AUTO 80-360	10kW	10.2kW	0 - 80V	0 - 84V	0 - 360A	0 - 378A	36.3kg
LAB-AUTO 250-120	10kW	10.2kW	0 - 250V	0 - 262.5V	0 - 120A	0 - 126A	34.8kg
LAB-AUTO 350-84	10kW	10.2kW	0 - 350V	0 - 367.5V	0 - 84A	0 - 88.2A	34.8kg
LAB-AUTO 500-60	10kW	10.2kW	0 - 500V	0 - 525V	0 - 60A	0 - 63A	34.8kg
LAB-AUTO 650-46	10kW	10.2kW	0 - 650V	0 - 682.5V	0 - 46A	0 - 48.3A	34.8kg
LAB-AUTO 1000-30	10kW	10.2kW	0 - 1000V	0 - 1050V	0 - 30A	0 - 31.5A	34.8kg
LAB-AUTO 80-540	15kW	15.3kW	0 - 80V	0 - 84V	0 - 540A	0 - 567A	45.1kg
LAB-AUTO 250-180	15kW	15.3kW	0 - 250V	0 - 262.5V	0 - 180A	0 - 189A	43.6kg
LAB-AUTO 350-126	15kW	15.3kW	0 - 350V	0 - 367.5V	0 - 126A	0 - 132.3A	43.6kg
LAB-AUTO 500-90	15kW	15.3kW	0 - 500V	0 - 525V	0 - 90A	0 - 94.5A	43.6kg
LAB-AUTO 650-69	15kW	15.3kW	0 - 650V	0 - 682.5V	0 - 69A	0 - 72.4A	43.6kg
LAB-AUTO 1050-42	15kW	15.3kW	0 - 1050V	0 - 1102.5V	0 - 42A	0 - 44.1A	43.6kg
LAB-AUTO 1500-30	15kW	15.3kW	0 - 1500V	0 - 1575V	0 - 30A	0 - 31.5A	43.6kg

<sup>1</sup> The technical specifications detailed within this datasheet are characterised within the nominal V, I & P ranges of the LAB-AUTO.

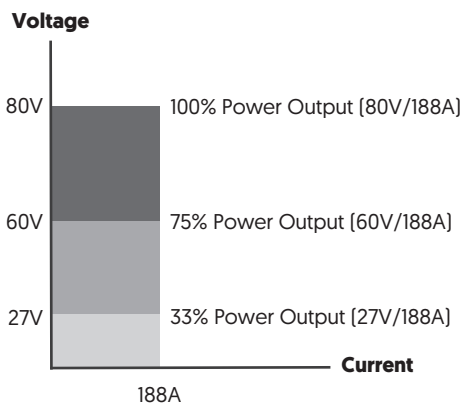
<sup>2</sup> The settable V, I & P ranges of the LAB-AUTO is the maximum values that the unit is capable of. When operating between the maximum nominal values and the maximum settable values, the technical specifications may differ from those specified in this datasheet.

# AUTORANGING POWER SUPPLIES

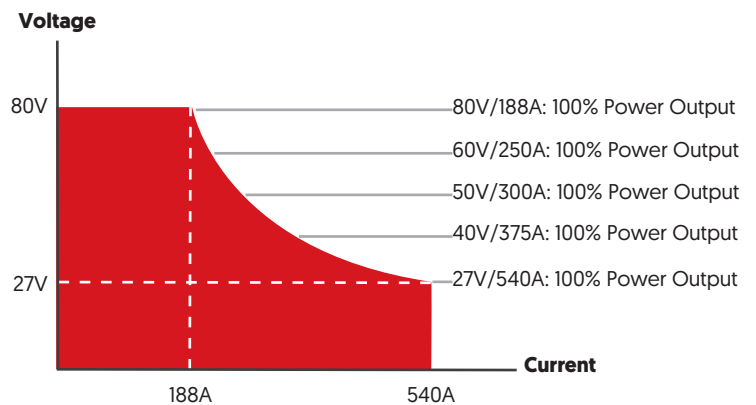
Every LAB-AUTO features an autoranging output. This allows many more voltage/current combinations at nominal power than a traditional DC source. An example of the difference is shown below using a LAB-AUTO 80-540.

Using one autoranging PSU instead of several traditional DC sources saves both cost and bench space. Despite the units offering such a large output range, they are still incredibly power dense. 15kW of output power is provided from 3U of rackmounting height.

## TRADITIONAL 15kW/80V DC SOURCE



## LAB-AUTO 15kW/80V DC SOURCE

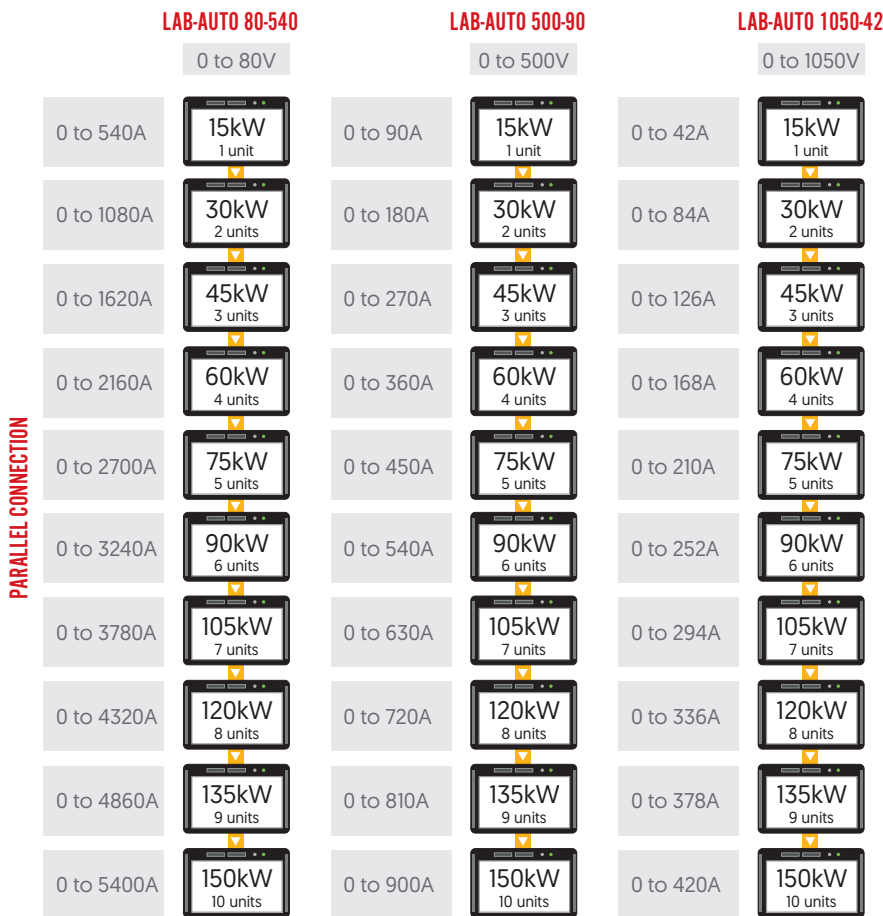


# MASTER-SLAVE CAPABILITY

Up to 10 LAB-AUTO systems can be arranged in parallel. 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.

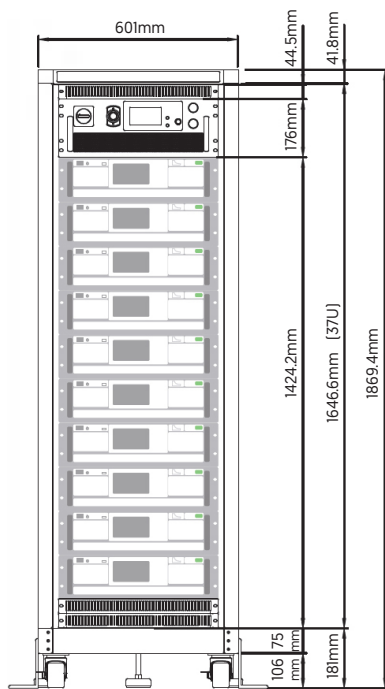
The diagram shows all the possible parallel configurations with 80V, 500V and 1050V 15kW systems.



# CABINET OPTIONS

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.



# INPUT



## STANDARD FEATURES

TECHNICAL DATA	
Nominal Input Voltage	3 × 208VAC ±10% / 3 × 380VAC ±10% / 3 × 400VAC ±10% / 3 × 415VAC ±10% / 3 × 440VAC ±10%
Input Voltage Range	3 × 180 - 460VAC
Line Frequency	47 - 63Hz
Maximum Input Current (5kW models)	20A per phase (Input 3-phase 180V)
Inrush Current (5kW models)	33A per phase (Input 3-phase 460V)
Maximum Input Power (5kW models)	6kVA
Maximum Input Current (10kW models)	40A per phase (Input 3-phase 180V)
Inrush Current (10kW models)	66A per phase (Input 3-phase 460V)
Maximum Input Power (10kW models)	12kVA
Maximum Input Current (15kW models)	60A per phase (Input 3-phase 180V)
Inrush Current (15kW models)	99A per phase (Input 3-phase 460V)
Maximum Input Power (15kW models)	18kVA
Efficiency <sup>3</sup>	86-95% (varies by unit, for model specific values please contact ETPS Ltd.)
Leakage Current	<3.5mA
Power Factor	Typically 0.95
Temperature Coefficient for Set Values	100ppm/°C of rated output voltage, after a 30 minutes warm-up

<sup>3</sup> Specifications warranted at 0°C - 50°C of ambient temperature and warmed up more than 30 min. Humidity: Under 80% RH, with 2%-100% of rated voltage, 1%-100% of rated current, measured at the output terminals with local sensing.

## HIGHLIGHTED FEATURE



### ACTIVE POWER FACTOR CORRECTION

LAB-AUTO power supplies have an active Power Factor Correction (PFC) circuit integrated into the input stage as standard. This enhances the overall efficiency of the modules across the output power range when compared to a unit that does not have PFC. In practice, this means a significant lower peak current value, a decrease of RMS value of the phase current and less perturbations of other equipment running on the same grid.

The inbuilt active PFC is also ideal for operating the power supply from a generator. Generators tend to be sensitive against high current peaks, and their voltage controllers may have some stability problems with non-sinusoidal load currents. The PFC feature forms a lowpass filter and therefore, both the repetitive current peaks and also the harmonic content is enhanced. This will help the generator system maintain a stable and reliable output voltage during load step changes.

## MEMORY & SEQUENCE

### STANDARD FEATURES

TECHNICAL DATA	
Number of Memory Sets	3 sets (operated from front panel)
Maximum Step Number	500 steps per each Sequence
Maximum Sequence Number	16
Step Time Settable Range	0.001 sec - 999999.999 sec

Creation and editing of sequences can be achieved through the LAB-AUTO's operating software, a CSV file, text script or via SCPI commands. A maximum of 16 sequences are permitted. Each Sequence may content up to 500 STEPs, 8000 STEPs in total. A USB port is provided to upload sequences to the LAB-AUTO to execute. The USB port cannot be used to provide remote control and monitoring of the power supply.

## CONSTANT VOLTAGE FEATURES

TECHNICAL DATA	
Overvoltage Protection	0-110% of $V_{NOM}$
Programming Resolution	5 digits
Programming Accuracy <sup>4</sup>	±0.1% of rated voltage
Meter Resolution	5 digits
Meter Accuracy <sup>4</sup>	±0.1% of rated voltage
Line Regulation <sup>5</sup>	±0.02% of rated voltage
Load Regulation <sup>5</sup>	±0.05% of rated voltage
Full Load Up	<30ms
Full Load Down	<80ms
No Load Down	<30ms (80V models); <10ms (models >80V)
Transient Response <sup>7</sup>	<1.5ms
Remote Compensation	5V

## CONSTANT CURRENT FEATURES

TECHNICAL DATA	
Overcurrent Protection	0-110% of $I_{NOM}$
Programming Resolution	5 digits
Programming Accuracy <sup>4</sup>	±0.2% of rated current
Meter Resolution	5 digits
Meter Accuracy <sup>4</sup>	±0.2% of rated current
Line Regulation <sup>5</sup>	±0.05% of full scale value
Load Regulation <sup>5</sup>	±0.15% of full scale value

## CONSTANT POWER FEATURES

TECHNICAL DATA	
Overpower Protection	0-110% of $P_{NOM}$
Programming Resolution	5 digits
Programming Accuracy	<1% of rated power
Meter Resolution	5 digits
Meter Accuracy <sup>4</sup>	±0.5% of rated power
Line Regulation <sup>5</sup>	<0.05% of rated power
Load Regulation <sup>5</sup>	<0.75% of rated power

<sup>4</sup> Accuracy specifications warranted at 23°C ±5°C

<sup>6</sup> CV : Constant Input (Full input range), current changes 10% -90%

<sup>8</sup> CC : Constant Input (Full input range), voltage changes 10%-100%

<sup>5</sup> Constant load (0-100%), Input changes between 180-264VAC or 342-460VAC

<sup>7</sup> Time for output voltage recover within +/-1% of rated value when load changes from 10%-90%

<sup>9</sup> CP : Constant Input (Full input range), voltage \* current 10%-90%

Users can nominate an operating mode to take priority over others when testing specific types of load. For example, using the Constant Current priority output mode eliminates overshooting when testing a capacitive load or diode.



# RESISTANCE, RIPPLE & NOISE

## SELECTION TABLE

Part Number	Internal Resistance			Ripple and Noise <sup>11</sup>		
	Range	Resolution	Accuracy <sup>10</sup>	CV [Vpp]	CV [Vrms]	CC [Arms]
LAB-AUTO 80-180	0 - 0.444Ω	0.0001Ω	≤2.3% of max. resistance	<180mV	<15mV	72mA
LAB-AUTO 250-60	0 - 4.170Ω	0.0001Ω	≤2.3% of max. resistance	<270mV	<36mV	20mA
LAB-AUTO 350-42	0 - 8.330Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<50mV	16mA
LAB-AUTO 500-30	0 - 16.70Ω	0.001Ω	≤2.3% of max. resistance	<315mV	<63mV	15mA
LAB-AUTO 650-23	0 - 28.30Ω	0.001Ω	≤2.3% of max. resistance	<720mV	<180mV	15mA
LAB-AUTO 80-360	0 - 0.222Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<23mV	144mA
LAB-AUTO 250-120	0 - 2.080Ω	0.0001Ω	≤2.3% of max. resistance	<270mV	<36mV	40mA
LAB-AUTO 350-84	0 - 4.170Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<50mV	32mA
LAB-AUTO 500-60	0 - 8.330Ω	0.0001Ω	≤2.3% of max. resistance	<315mV	<63mV	29mA
LAB-AUTO 650-46	0 - 14.10Ω	0.001Ω	≤2.3% of max. resistance	<720mV	<180mV	29mA
LAB-AUTO 1000-30	0 - 33.30Ω	0.001Ω	≤2.3% of max. resistance	<1440mV	<315mV	20mA
LAB-AUTO 80-540	0 - 0.148Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<23mV	216mA
LAB-AUTO 250-180	0 - 1.390Ω	0.0001Ω	≤2.3% of max. resistance	<270mV	<45mV	60mA
LAB-AUTO 350-126	0 - 2.780Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<50mV	45mA
LAB-AUTO 500-90	0 - 5.560Ω	0.0001Ω	≤2.3% of max. resistance	<315mV	<63mV	44mA
LAB-AUTO 650-69	0 - 9.420Ω	0.0001Ω	≤2.3% of max. resistance	<720mV	<170mV	44mA
LAB-AUTO 1050-42	0 - 25.00Ω	0.001Ω	≤2.3% of max. resistance	<1440mV	<315mV	32mA
LAB-AUTO 1500-30	0 - 50.00Ω	0.001Ω	≤2.3% of max. resistance	<2160mV	<360mV	24mA

<sup>10</sup> Accuracy specifications warranted at 23°C ±5°C.

<sup>11</sup> Ripple and noise (rms value) measurement bandwidth up to 300 kHz, ripple and noise (peak value) measurement bandwidth up to 20 MHz.

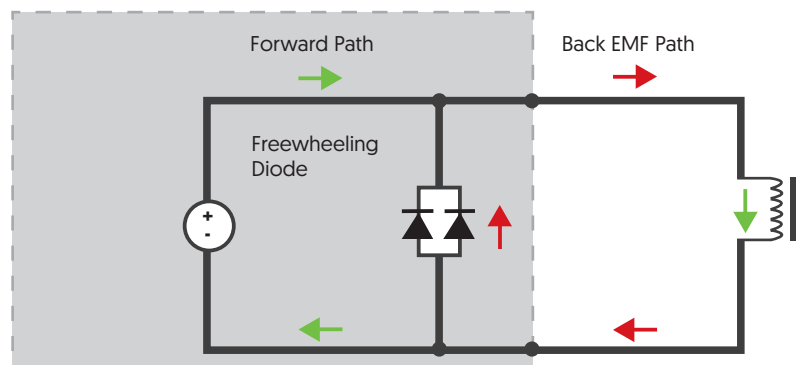
# SAFETY & PROTECTION

## STANDARD FEATURES

### TECHNICAL DATA

Isolation: Primary/Case	2500Vdc
Isolation: Primary/Secondary	2500Vdc
Isolation: Secondary/Case [Models ≤350V]	750Vdc
Isolation: Secondary/Case [500V Models]	1000Vdc
Isolation: Secondary/Case [Models ≥650V]	1500Vdc

When the LAB-AUTO is powering an inductive load such as a DC motor, a back EMF may be unintentionally generated when the output voltage is switched off. An inbuilt freewheeling diode protects the power supply against damage by a back EMF.



# INTERFACES

## STANDARD INTERFACE

TECHNICAL DATA	
LAN Interfaces	1 x LXI 1.4 for communication
J1 [Auxiliary Control]	Function : Interlock, External output ON/OFF, Shut OFF, Alarm signal output, Output voltage downward signal

## OPTIONAL ANALOGUE INTERFACE

TECHNICAL DATA	
Status Indication	CV State, CC State, CP State, CR State, ON/OFF State
Voltage Control	0%-100% of rated output voltage in the range of 0V-5V or 0V-10V
Voltage Control Accuracy <sup>12</sup>	±0.2%
Current Control	0%-100% of rated output current in the range of 0V-5V or 0V-10V
Current Control Accuracy <sup>12</sup>	±0.2%
Power Control	0%-100% of rated output current in the range of 0V-5V or 0V-10V
Power Control Accuracy <sup>12</sup>	±0.2%
Monitoring Output	0-5V or 0-10V output for monitoring V/A/W
Monitoring Accuracy <sup>12</sup>	±2%
Reference Output	0-5Vdc or 0-10Vdc (max=5mA), selectable in MENU

<sup>12</sup> Accuracy specifications warranted at 23°C ±5°C

## OPTIONAL RS-485 INTERFACE

TECHNICAL DATA	
Baud Rate	4800/9600/19200/38400/57600/115200
Line Ending Character	Cr, Lf, Cr+Lf selectable

## OPTIONAL GPIB INTERFACE

TECHNICAL DATA	
IEEE Standard	488.2.1992

## OPTIONAL INTERFACES

CODE	DESCRIPTION
/ATI	Isolated analogue interface in addition to standard LAN interface
/ATE	No front panel control or display, unit controlled via the interface
/GPIB	Integrated GPIB interface in addition to standard LAN interface
/USB-422	Combined RS-422, RS-485 and USB interface

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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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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