

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 100 identical units can be connected in parallel to 1.8MW. 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**
- + <1.5ms for 10 - 90% Load Step**
- + Configurable OCP, OVP and OTP**
- + Adjustable Voltage Ramps**
- + Adjustable Resistance**
- + Active PFC of >0.95**

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LAB-AUTO SELECTION TABLE

STANDARD MODELS

Part Number	Nominal Power ¹	Max. Settable Power ²	Nominal Voltage Range ¹	Settable Voltage Range ²	Nominal Current Range ¹	Settable Current Range ²	Weight	Dimensions [W × H × D]
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5kW MODELS

LAB-AUTO 80-180	5kW	5.1kW	0 - 80V	0 - 84V	0 - 180A	0 - 189A	27.5kg	19" × 3U × 765mm
LAB-AUTO 250-60	5kW	5.1kW	0 - 250V	0 - 262.5V	0 - 60A	0 - 63A	26kg	19" × 3U × 765mm
LAB-AUTO 350-42	5kW	5.1kW	0 - 350V	0 - 367.5V	0 - 42A	0 - 44.1A	26kg	19" × 3U × 765mm
LAB-AUTO 500-30	5kW	5.1kW	0 - 500V	0 - 525V	0 - 30A	0 - 31.5A	26kg	19" × 3U × 765mm
LAB-AUTO 650-23	5kW	5.1kW	0 - 650V	0 - 682.5V	0 - 23A	0 - 24.1A	26kg	19" × 3U × 765mm

6kW MODELS

LAB-AUTO 500-36	6kW	6.12kW	0 - 500V	0 - 525V	0 - 36A	0 - 37.8A	26kg	19" × 3U × 765mm
LAB-AUTO 650-27	6kW	6.12kW	0 - 650V	0 - 682.5V	0 - 27A	0 - 28.35A	26kg	19" × 3U × 765mm

10kW MODELS

LAB-AUTO 80-360	10kW	10.2kW	0 - 80V	0 - 84V	0 - 360A	0 - 378A	36.3kg	19" × 3U × 765mm
LAB-AUTO 160-180	10kW	10.2kW	0 - 160V	0 - 168V	0 - 180A	0 - 189A	36.3kg	19" × 3U × 765mm
LAB-AUTO 250-120	10kW	10.2kW	0 - 250V	0 - 262.5V	0 - 120A	0 - 126A	34.8kg	19" × 3U × 765mm
LAB-AUTO 350-84	10kW	10.2kW	0 - 350V	0 - 367.5V	0 - 84A	0 - 88.2A	34.8kg	19" × 3U × 765mm
LAB-AUTO 500-60	10kW	10.2kW	0 - 500V	0 - 525V	0 - 60A	0 - 63A	34.8kg	19" × 3U × 765mm
LAB-AUTO 650-46	10kW	10.2kW	0 - 650V	0 - 682.5V	0 - 46A	0 - 48.3A	34.8kg	19" × 3U × 765mm
LAB-AUTO 1000-30	10kW	10.2kW	0 - 1000V	0 - 1050V	0 - 30A	0 - 31.5A	34.8kg	19" × 3U × 765mm
LAB-AUTO 1300-23	10kW	10.2kW	0 - 1300V	0 - 1365V	0 - 23A	0 - 24.15A	34.8kg	19" × 3U × 765mm

12kW MODELS

LAB-AUTO 500-72	12kW	12.24kW	0 - 500V	0 - 525V	0 - 72A	0 - 75.6A	34.8kg	19" × 3U × 765mm
LAB-AUTO 650-54	12kW	12.24kW	0 - 650V	0 - 682.5V	0 - 54A	0 - 56.7A	34.8kg	19" × 3U × 765mm
LAB-AUTO 1000-36	12kW	12.24kW	0 - 1000V	0 - 1050V	0 - 36A	0 - 37.8A	34.8kg	19" × 3U × 765mm
LAB-AUTO 1300-27	12kW	12.24kW	0 - 1300V	0 - 1365V	0 - 27A	0 - 28.35A	34.8kg	19" × 3U × 765mm

15kW MODELS

LAB-AUTO 80-540	15kW	15.3kW	0 - 80V	0 - 84V	0 - 540A	0 - 567A	45.1kg	19" × 3U × 765mm
LAB-AUTO 250-180	15kW	15.3kW	0 - 250V	0 - 262.5V	0 - 180A	0 - 189A	43.6kg	19" × 3U × 765mm
LAB-AUTO 350-126	15kW	15.3kW	0 - 350V	0 - 367.5V	0 - 126A	0 - 132.3A	43.6kg	19" × 3U × 765mm
LAB-AUTO 500-90	15kW	15.3kW	0 - 500V	0 - 525V	0 - 90A	0 - 94.5A	43.6kg	19" × 3U × 765mm
LAB-AUTO 650-69	15kW	15.3kW	0 - 650V	0 - 682.5V	0 - 69A	0 - 72.4A	43.6kg	19" × 3U × 765mm
LAB-AUTO 750-60	15kW	15.3kW	0 - 750V	0 - 787.5V	0 - 60A	0 - 63A	43.6kg	19" × 3U × 765mm
LAB-AUTO 1050-42	15kW	15.3kW	0 - 1050V	0 - 1102.5V	0 - 42A	0 - 44.1A	43.6kg	19" × 3U × 765mm
LAB-AUTO 1500-30	15kW	15.3kW	0 - 1500V	0 - 1575V	0 - 30A	0 - 31.5A	43.6kg	19" × 3U × 765mm
LAB-AUTO 1950-23	15kW	15.3kW	0 - 1950V	0 - 2047.5V	0 - 23A	0 - 24.15A	43.6kg	19" × 3U × 765mm

18kW MODELS

LAB-AUTO 500-108	18kW	18.36kW	0 - 500V	0 - 525V	0 - 108A	0 - 113.4A	43.6kg	19" × 3U × 765mm
LAB-AUTO 650-81	18kW	18.36kW	0 - 650V	0 - 682.5V	0 - 81A	0 - 85.05A	43.6kg	19" × 3U × 765mm
LAB-AUTO 1500-36	18kW	18.36kW	0 - 1500V	0 - 1575V	0 - 36A	0 - 37.8A	43.6kg	19" × 3U × 765mm
LAB-AUTO 1950-27	18kW	18.36kW	0 - 1950V	0 - 2047.5V	0 - 27A	0 - 28.35A	43.6kg	19" × 3U × 765mm

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

² 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.

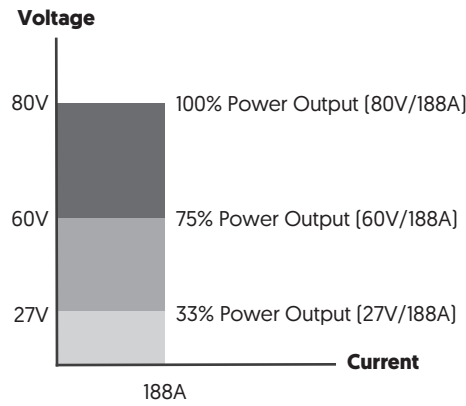
OPTIONAL MODELS

CODE	DESCRIPTION
/E	Essentials model with reduced features, operates in constant voltage and constant current modes only
/PV	Solar array simulation mode (only available for models ≥10kW/≥1000V)

AUTORANGING POWER SUPPLIES

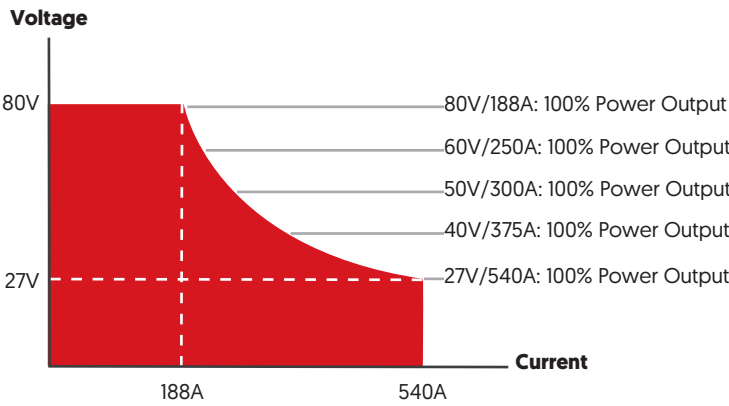
Every LAB-AUTO features an autoranging output. This allows many more voltage/current combinations at nominal power than a traditional DC source. An example of the difference is shown below using a LAB-AUTO 80-540.

TRADITIONAL 15kW/80V DC SOURCE



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. 18kW of output power is provided from 3U of rackmounting height.

LAB-AUTO 15kW/80V DC SOURCE



MASTER/SLAVE

Up to 100 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 ten 80V, 500V and 1050V 15kW systems.

	LAB-AUTO 80-540	LAB-AUTO 500-90	LAB-AUTO 1050-42
	0 to 80V	0 to 500V	0 to 1050V
PARALLEL CONNECTION	0 to 540A	0 to 90A	0 to 42A
	15kW 1 unit	15kW 1 unit	15kW 1 unit
	0 to 1080A	0 to 180A	0 to 84A
	30kW 2 units	30kW 2 units	30kW 2 units
	0 to 1620A	0 to 270A	0 to 126A
	45kW 3 units	45kW 3 units	45kW 3 units
	0 to 2160A	0 to 360A	0 to 168A
	60kW 4 units	60kW 4 units	60kW 4 units
	0 to 2700A	0 to 450A	0 to 210A
	75kW 5 units	75kW 5 units	75kW 5 units
	0 to 3240A	0 to 540A	0 to 252A
	90kW 6 units	90kW 6 units	90kW 6 units
	0 to 3780A	0 to 630A	0 to 294A
	105kW 7 units	105kW 7 units	105kW 7 units
	0 to 4320A	0 to 720A	0 to 336A
	120kW 8 units	120kW 8 units	120kW 8 units
	0 to 4860A	0 to 810A	0 to 378A
	135kW 9 units	135kW 9 units	135kW 9 units
	0 to 5400A	0 to 900A	0 to 420A
	150kW 10 units	150kW 10 units	150kW 10 units

MASTER/SLAVE OPTIONS	
CODE	DESCRIPTION
/PBB	Pair of copper parallel bus bars for connecting 2× LAB-AUTO in master/slave (80V models only)

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.



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

INPUT

STANDARD FEATURES

TECHNICAL DATA	
Nominal Input Voltage [5kW, 10kW & 15kW Models]	3 × 208VAC ±10% / 3 × 380VAC ±10% / 3 × 400VAC ±10% / 3 × 415VAC ±10% / 3 × 440VAC ±10%
Input Voltage Range [5kW, 10kW & 15kW Models]	3 × 180 - 460VAC
Nominal Input Voltage [6kW, 12kW & 18kW Models]	3 × 380VAC ±10% / 3 × 400VAC ±10% / 3 × 415VAC ±10%
Input Voltage Range [6kW, 12kW & 18kW Models]	3 × 340 - 460VAC
Line Frequency	47 - 63Hz
Maximum Input Current	5kW models: 20A per phase (Input 3-phase 180V) 6kW models: 13A per phase (Input 3-phase 340V) 10kW models: 40A per phase (Input 3-phase 180V) 12kW models: 26A per phase (Input 3-phase 340V) 15kW models: 60A per phase (Input 3-phase 180V) 18kW models: 40A per Phase (Input 3-phase 340V)
Inrush Current	5kW models: 33A per phase (Input 3-phase 460V) 6kW models: 33A per phase (Input 3-phase 460V) 10kW models: 66A per phase (Input 3-phase 460V) 12kW models: 66A per phase (Input 3-phase 460V) 15kW models: 99A per phase (Input 3-phase 460V) 18kW models: 99A per phase (Input 3-phase 460V)
Maximum Input Power [5kW models]	5kW models: 6kVA 6kW models: 7.2kVA 10kW models: 12kVA 12kW models: 14.4kVA 15kW models: 18kVA 18kW models: 21.6kVA
Efficiency ³	86-95% [varies by unit, for model specific values please contact ETPS Ltd.]
Leakage Current	<3.5mA
Power Factor	Typically 0.95

³ 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.

CONSTANT VOLTAGE FEATURES

TECHNICAL DATA	
Overvoltage Protection	0-110% of V_{NOM}
Programming Resolution	5 digits
Programming Accuracy ⁴	±0.1% of rated voltage
Meter Resolution	5 digits
Meter Accuracy ⁴	±0.1% of rated voltage
Line Regulation ⁵	±0.02% of rated voltage
Load Regulation ⁶	±0.05% of rated voltage
Full Load Up	<30ms
Full Load Down	<80ms
No Load Down	<5-10ms (varies by unit, for model specific values please contact ETPS Ltd.)
Transient Response ⁷	<1.5ms
Remote Compensation	5V

CONSTANT CURRENT FEATURES

TECHNICAL DATA	
Overcurrent Protection	0-110% of I_{NOM}
Programming Resolution	5 digits
Programming Accuracy ⁴	±0.2% of rated current
Meter Resolution	5 digits
Meter Accuracy ⁴	±0.2% of rated current
Line Regulation ⁵	±0.05% of full scale value
Load Regulation ⁶	±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 ⁴	±0.5% of rated power
Line Regulation ⁵	<0.05% of rated power
Load Regulation ⁸	<0.75% of rated power

⁴ Accuracy specifications warranted at 23°C ±5°C

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

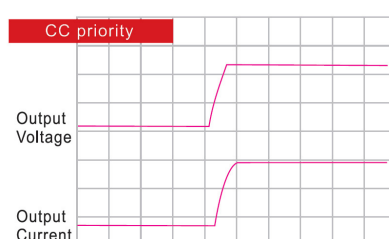
⁸ CC : Constant Input (Full input range), voltage changes 10%-100%

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

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

⁹ 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 ¹¹	
	Range	Resolution	Accuracy ¹⁰	CV [Vpp]	CV [Vrms]
LAB-AUTO 80-180	0 - 0.444Ω	0.0001Ω	≤2.3% of max. resistance	<180mV	<15mV
LAB-AUTO 250-60	0 - 4.170Ω	0.0001Ω	≤2.3% of max. resistance	<270mV	<36mV
LAB-AUTO 350-42	0 - 8.330Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<50mV
LAB-AUTO 500-30	0 - 16.70Ω	0.001Ω	≤2.3% of max. resistance	<315mV	<63mV
LAB-AUTO 650-23	0 - 28.30Ω	0.001Ω	≤2.3% of max. resistance	<720mV	<180mV
LAB-AUTO 500-36	0 - 13.888Ω	0.001Ω	≤2.3% of max. resistance	<375 xmV	<75mV
LAB-AUTO 650-27	0 - 24.074Ω	0.001Ω	≤2.3% of max. resistance	<864mV	<216mV
LAB-AUTO 80-360	0 - 0.222Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<23mV
LAB-AUTO 160-180	0 - 0.8888Ω	0.0001Ω	≤2.3% of max. resistance	<432mV	<35mV
LAB-AUTO 250-120	0 - 2.080Ω	0.0001Ω	≤2.3% of max. resistance	<270mV	<36mV
LAB-AUTO 350-84	0 - 4.170Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<50mV
LAB-AUTO 500-60	0 - 8.330Ω	0.0001Ω	≤2.3% of max. resistance	<315mV	<63mV
LAB-AUTO 650-46	0 - 14.10Ω	0.001Ω	≤2.3% of max. resistance	<720mV	<180mV
LAB-AUTO 1000-30	0 - 33.30Ω	0.001Ω	≤2.3% of max. resistance	<1440mV	<315mV
LAB-AUTO 1300-23	0 - 56.521Ω	0.001Ω	≤2.3% of max. resistance	<2240mV	<490mV
LAB-AUTO 500-72	0 - 6.9444Ω	0.0001Ω	≤2.3% of max. resistance	375mV	<75mV
LAB-AUTO 650-54	0 - 12.03Ω	0.001Ω	≤2.3% of max. resistance	<864mV	<216mV
LAB-AUTO 1000-36	0 - 27.777 Ω	0.001Ω	≤2.3% of max. resistance	<1725mV	<376mV
LAB-AUTO 1300-27	0 - 48.148 Ω	0.001Ω	≤2.3% of max. resistance	<2240mV	<490mV
LAB-AUTO 80-540	0 - 0.148Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<23mV
LAB-AUTO 250-180	0 - 1.390Ω	0.0001Ω	≤2.3% of max. resistance	<270mV	<45mV
LAB-AUTO 350-126	0 - 2.780Ω	0.0001Ω	≤2.3% of max. resistance	<288mV	<50mV
LAB-AUTO 500-90	0 - 5.560Ω	0.0001Ω	≤2.3% of max. resistance	<315mV	<63mV
LAB-AUTO 650-69	0 - 9.420Ω	0.0001Ω	≤2.3% of max. resistance	<720mV	<170mV
LAB-AUTO 750-60	0 - 12.500Ω	0.001Ω	≤2.3% of max. resistance	<830mV	<196mV
LAB-AUTO 1050-42	0 - 25.00Ω	0.001Ω	≤2.3% of max. resistance	<1440mV	<315mV
LAB-AUTO 1500-30	0 - 50.00Ω	0.001Ω	≤2.3% of max. resistance	<2160mV	<360mV
LAB-AUTO 1950-23	0 - 84.782Ω	0.001Ω	≤2.3% of max. resistance	<2800mV	<540mV
LAB-AUTO 500-108	0 - 4.6296Ω	0.0001Ω	≤2.3% of max. resistance	<375mV	<75mV
LAB-AUTO 650-81	0 - 8.0246Ω	0.0001Ω	≤2.3% of max. resistance	<864mV	<216mV
LAB-AUTO 1500-36	0 - 41.666Ω	0.001Ω	≤2.3% of max. resistance	<2590mV	<430mV
LAB-AUTO 1950-27	0 - 72.222Ω	0.001Ω	≤2.3% of max. resistance	<3360mV	<645mV

¹⁰ Accuracy specifications warranted at 23°C ±5°C.

¹¹ Ripple and noise [rms value] measurement bandwidth up to 300 kHz, ripple and noise [peak value] measurement bandwidth up to 20 MHz.

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 ¹²	±0.2%
Current Control	0%-100% of rated output current in the range of 0V-5V or 0V-10V
Current Control Accuracy ¹²	±0.2%
Power Control	0%-100% of rated output current in the range of 0V-5V or 0V-10V
Power Control Accuracy ¹²	±0.2%
Monitoring Output	0-5V or 0-10V output for monitoring V/A/W
Monitoring Accuracy ¹²	±2%
Reference Output	0-5Vdc or 0-10Vdc (max=5mA), selectable in MENU

¹² 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

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.

SOFTWARE/SOFT TOOLS

Operating software can be provided to set and monitor live values. A sequencing function is provided so that the LAB-AUTO can follow pre-determined voltage and current curves. Data can be recorded and recalled via a USB stick. A specialised PV simulation software package is also available when option /PV is selected.



SAFETY & PROTECTION

STANDARD FEATURES

TECHNICAL DATA	
Isolation: Primary/Case	2500Vdc
Isolation: Primary/Secondary	2500Vdc
Isolation: Secondary/Case	750Vdc [models ≤350V] 1000Vdc [500V models] 1500Vdc [650V-1050V models, excluding 650V/18kW model] 2000Vdc [1300-1500V models and 650V/18kW model] 3000Vdc [1950V models]

SAFETY OPTIONS

CODE	DESCRIPTION
/SC	Protective cover for DC output terminals

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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POSITIVE PROBLEM SOLVING