

# DCB-2 Series



# Regenerative, Bidirectional DC Power Supplies

DC Power



<b>DCB Series DC Source+Sink</b>
<b>2.5kW to 1080kW</b>
<b>Bidirectional + Regenerative</b>
<b>Up to 1500Vdc, 360A dc</b>
<b>7.5kW in 3U</b>
<b>AC Input 208V, 3Phs</b>

## KEY BENEFITS OF DCB TWO QUADRANT POWER SUPPLIES

- Combines a DC power supply with a regenerative DC load
- Output voltage ranges from 60 V up to 1500 V
- Constant Power Auto-ranging Voltage/Current profile
- Current: up to 360 A/unit, parallelable for higher current
- Power levels from 2.5kW to 7.5kW or parallel for higher power
- High overall efficiency saves on energy cost
- Three phase 208Vac input voltage for US Market (Refer to DCB-HP Series for 380Vac~480Vac input)
- Active Power Factor Corrected AC input
- Flexible, precisely regulated output power stages
- Various protection circuits (OVP, OCP, OPP, OTP)
- Intuitive TFT touch panel with display of settings, read-backs, status and notifications
- Remote sensing with automatic open sense detection
- Galvanically isolated analog interface and USB port
- Built-in Battery Charging and Discharging Profiles
- Programmable Resistance Mode
- ModBus RTU or ModBus TCP support

**Look no further** for powerful yet cost effective Battery test solutions than the compact DCB Series regenerative bi-directional DC power supplies/loads from Adaptive Power Systems. Designed using state-of-the-art Digital Signal Processing, these units combine a DC power supply with a regenerative electronic DC load. The DCB units all support an auto-ranging constant power V-I output profile that offers both higher voltage and high current from a single model.

Available at power levels of 2.5kW, 5kW or 7.5kW with voltage ranges to 1500Vdc and max. current of 360A dc per unit.

Master/ Slave mode for series or parallel operation available for higher voltage and or power requirements.



Worldwide Supplier of Power Conversion Equipment

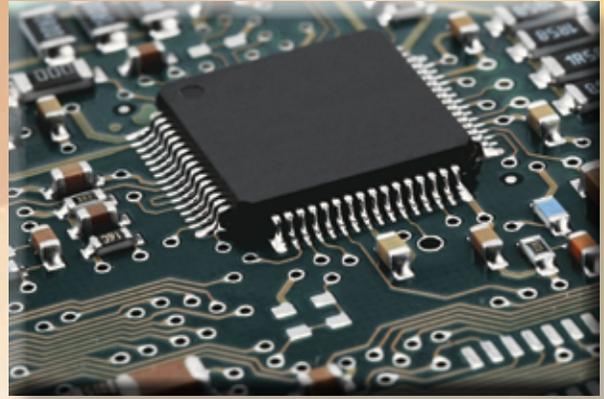
Toll Free 1-888-239-1619 [www.adaptivepower.com](http://www.adaptivepower.com)



## VALUE & PERFORMANCE BY LEVERAGING MODERN TECHNOLOGY

The DCB Series of precision Regenerative Two Quadrant DC power Supplies uses state of the art field programmable logic array (FPGA) technology to implement a digital power conversion topology that combines a DC source with a Regenerative DC load into a single unit. High efficiency energy recycling back to the grid results in significant energy and HVAC cost savings, especially for large EV battery pack applications.

Packaged in a compact, standard 19" rack mount chassis, these powerful functions are easily accessible through an easy to use, color touch screen based user interface from the front panel or by sending commands over one of several available digital control interfaces.



## DESIGNED TO SUPPORT E-MOBILITY APPLICATIONS

The ability of the DCB Series to both source and sink DC power using regenerative technology makes them ideally suitable for a E-Mobility development and test applications. With power levels from 5000W to 7500W per

3U chassis and ability to parallel units for higher power needs, a wide range of present and future power demands can be met. **Put the DCB Series to the test!**



Battery Pack Charging and Discharging

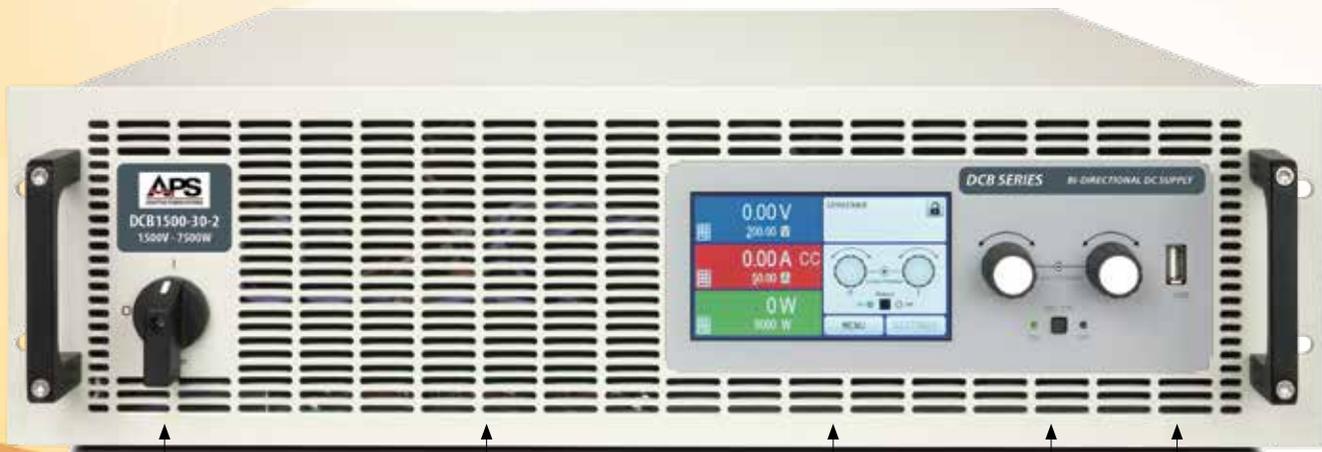


Fuel Cell Testing



EV Drive Train Development

## MODERN COLOR TOUCH USER INTERFACE FOR EASE OF OPERATION



Power On/Off

Air Intake



Color LCD Touch Display

Dual Shuttles Output On/Off

USB Port

All DCB Series models share an intuitive user interface using a combination of a large color LCD touch screen and two rotary shuttle knobs. This results in an easy to use power supply for novice and experienced users alike. The large color LCD allows visualization of output set-

tings and configurations as well as a wide assortment of precision DC measurements.

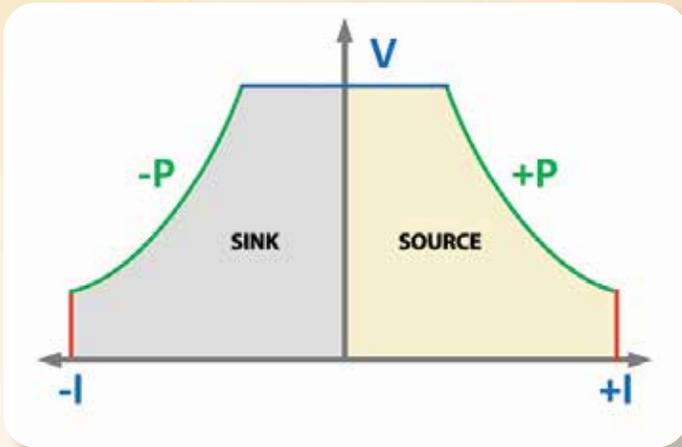
Changing parameters such as voltage or current can be done using the touch screen or the shuttle.

## VALUE PROPOSITION

### Why choose DCB Series?

When it comes to bidirectional DC source and sink power supplies, only the DCB Series offers the range of voltage, current and power levels to support both today's and tomorrow's leading edge electric vehicle battery technologies. Here are some other things that make the DCB Series special:

### Auto-ranging Power Stage



All models are equipped with a flexible auto-ranging output/input stage which supports higher voltage at lower current, or a higher current at lower voltage, only limited by the adjustable power set value or the rated power. Therefore, a wide range of voltage and current combinations can be covered by the use of just one DCB model.

### DC Voltage and Current Ranges

Choice of voltage, current and power. DC voltages between 0~60 V and 0~1500 V, currents between 0~20 A and 0~360 A and several output power ratings of 2.5 kW to 7.5 kW per chassis are available. The DC bus bars are located on the rear panel.

### DC Current Sinking

When discharging batteries, all current sunk by the DCB unit is regenerated back to the grid rather than dissipated as is the case when using conventional resistive or electronic loads. This results in both energy and cooling cost savings that help offset the acquisition cost of the test equipment. Transitions between source and sink modes are smooth and without any interruption or time loss ensure true 2-Quadrant operation.

### Protection Features

For protection of the equipment connected, it is possible to set an over-voltage protection threshold (OVP), as well as an over-current (OCP) and over-power (OPP) limit.

As soon as one of these thresholds is reached for any reason, the DCB unit will be immediately shut off and a status signal will be generated on the display and via the interfaces. There is also an over-temperature protection, which will shut off the unit if the power supply overheats.

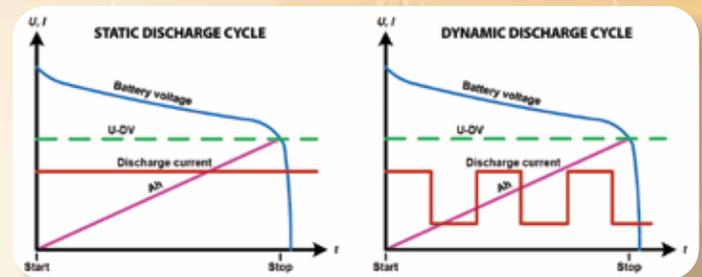
## Remote Voltage Sensing

The voltage sensing input can be connected directly to the load in order to compensate for any voltage drop along the power cables, up to a certain level. If the Vsense input is connected to the load, the power supply will adjust the output voltage automatically to ensure the precise programmed voltage is available at the load.

## Analog Interface

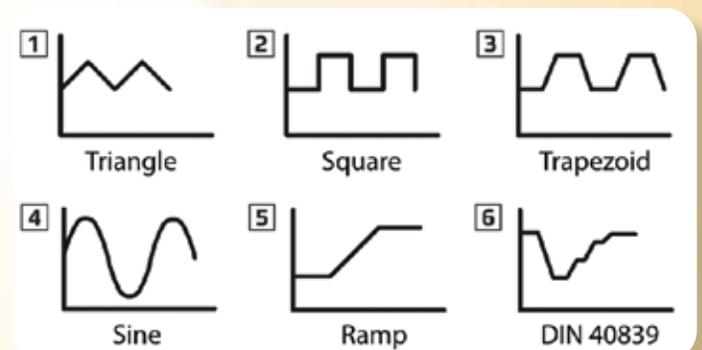
All models feature a galvanically isolated analog interface terminal, located on the rear of the supply. It offers analog inputs to set voltage, current, power and resistance from 0...100% through control voltages of 0~10 V or 0~5 V. To monitor the voltage and current, there are analog outputs with 0~10 V or 0~5 V. Also, several inputs and outputs are available for controlling and monitoring the power supply status.

## Battery Test Modes



Dedicated static and dynamic battery charge and discharge modes are embedded in the DCB controller for battery testing and forming application support.

## Function generator



All DCB models include a function generator which can generate typical functions, as displayed in the figure below. These waveforms can be applied to either the output voltage or the output current. The generator can be completely configured and controlled by using the touch panel on the screen of the power supply or via remote control using one of the digital interfaces.

The predefined functions offer all necessary parameters to the user, such as Y offset, time / frequency or amplitude, for full configuration ability.

## Master-slave

All DCB Series models feature a digital master-slave bus. This bus can be used to connect up to 36 identical models in parallel operation support higher power requirements.

## TECHNICAL SPECIFICATIONS 2500W Models -3U

MODEL	DCB60-120-2	DCB80-120-2	DCB200-70-2	DCB360-40-2	DCB500-30-2	DCB750-20-2
Voltage Range	0~60 V	0~80 V	0~200 V	0~360 V	0~500 V	0~750 V
Current Range	0...120 A	0...120 A	0...70 A	0...40 A	0...30 A	0...20 A
CP V-I Range	20.8V@120A ~ 60V@41.7A	20.8V@120A ~ 80V@31.25A	35.7V@70A ~ 200V@12.5A	62.5V@40A ~ 360V@6.9A	83.3V@30A ~ 500V@5A	125V@20A ~ 750V@3.3A
Voltage Ripple <sup>1</sup> (source)	<200 mVpp <16 mVrms	<200 mVpp <16 mVrms	<300 mVpp <40 mVrms	<320mVpp <55mVrms	<350mVpp <70mVrms	<800mVpp <200mVrms
Insulation -DC to PE	±400 Vdc	±400 Vdc	±725 Vdc	±725 Vdc	±1500 Vdc	±1500 Vdc
Insulation +DC to PE	+400 Vdc	+400 Vdc	+1000 Vdc	+1000 Vdc	+1800 Vdc	+1800 Vdc
Power Range	0~2500 W	0~2500 W	0~2500 W	0~2500 W	0~2500 W	0~2500 W
Efficiency	95%	95%	95%	95%	95%	95%
Weight <sup>2</sup>	18kg/39.7lbs	18kg/39.7lbs	18kg/39.7lbs	18kg/39.7lbs	18kg/39.7lbs	18kg/39.7lbs

## TECHNICAL SPECIFICATIONS 5000W Models -3U

MODEL	DCB60-240-2	DCB80-240-2	DCB200-140-2	DCB360-80-2	DCB500-60-2	DCB750-40-2
Voltage Range	0~60 V	0~80 V	0~200 V	0~360 V	0~500 V	0~750 V
Current Range	0...240 A	0...240 A	0...140 A	0~80 A	0~60 A	0~40 A
CP V-I Range	41.7V@240A ~ 60V@83.3A	20.8V@240A ~ 80V@62.5A	35.7V@140A ~ 200V@25A	62.5V@80A ~ 360V@13.9A	83.3V@60A ~ 500V@10A	125V@40A ~ 750V@6.7A
Voltage Ripple <sup>1</sup> (source)	<320mVpp <25mVrms	<320mVpp <25mVrms	<300mVpp <40mVrms	<320mVpp <55mVrms	<350mVpp <70mVrms	<800mVpp <200mVrms
Insulation -DC to PE	±400 Vdc	±400 Vdc	±725 Vdc	±725 V DC	±1500 V DC	±1500 V DC
Insulation +DC to PE	+400 Vdc	+400 Vdc	+1000 Vdc	+1000 V DC	+1800 V DC	+1800 V DC
Power Range	0~5000 W	0~5000 W	0~5000 W	0~5000 W	0~5000 W	0~5000 W
Efficiency	95%	95%	95%	95%	95%	95%
Weight <sup>2</sup>	25kg/55.1lbs	25kg/55.1lbs	25kg/55.1lbs	25kg/55.1lbs	25kg/55.1lbs	25kg/55.1lbs

## TECHNICAL SPECIFICATIONS 7500W Models -3U

MODEL	DCB80-360-2 <sup>3</sup>	DCB200-210-2	DCB360-120-2	DCB500-90-2	DCB750-60-2	DCB1000-40-2	DCB1500-30-2
Voltage Range	0~60V or 80 V	0~200 V	0~360 V	0~500 V	0~750 V	0~1000 V	0~1500 V
Current Range	0...360 A	0...210 A	0~120 A	0~90 A	0~60 A	0~40 A	0~30 A
CP V-I Range	20.8V@360A ~80V@93.75A	35.7V@210A~ 200V@37.5A	62.5V@210A~ 360V@20.8A	83.3V@90A~ 500V@15A	125V@60A ~750V@10A	187.5V@40A~ 1000V@7.5A	250V@30A~ 1500V@5A
Voltage Ripple <sup>1</sup> (source)	<320mVpp <25mVrms	<300mVpp <40mVrms	<320mVpp <55mVrms	<350mVpp <70mVrms	<800mVpp <200mVrms	<1.6pp <300mVrms	<2.4Vpp <400mVrms
Insulation -DC to PE	±400 Vdc	±725 Vdc	±725 V DC	±1500 V DC	±1500 V DC	±1500 Vdc	±1500 Vdc
Insulation +DC to PE	+400 Vdc	+1000 Vdc	+1000 V DC	+1800 V DC	+1800 V DC	+1800 Vdc	+1800 Vdc
Power Range	0~7500 W	0~7500 W	0~7500 W	0~7500 W	0~7500 W	0~7500 W	0~7500 W
Efficiency	95%	95%	95%	95%	95%	95%	95%
Weight <sup>2</sup>	32kg/70.5lbs	32kg/70.5lbs	32kg/70.5lbs	32kg/70.5lbs	32kg/70.5lbs	32kg/70.5lbs	32kg/70.5lbs

**Note 1:** Ripple RMS value is measured at LF with BWL 300 kHz, Ripple PP value is measured at HF with BWL 20MHz

**Note 2:** Weight of the base version, models with option(s) may vary

**Note 3:** A 60V model DCB60-320-2 is available as well with same max current of 360A. All other specs same as DCB80-360-2

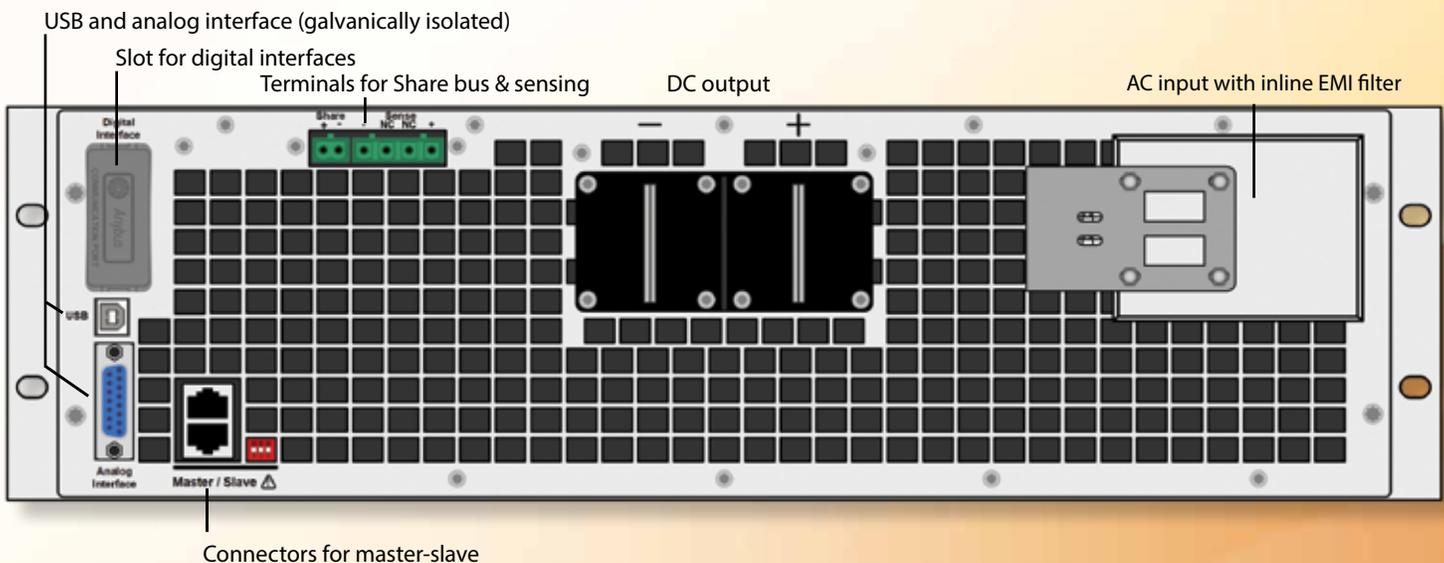
## TECHNICAL SPECIFICATIONS

MODEL	All Models
<b>AC Input</b>	
<b>Input Voltages</b>	
-2 Models	208V models: 188V <sub>LL</sub> ~ 229V <sub>LL</sub> 3ph
Frequency	45~66 Hz
Power Factor	> 0.99
<b>DC Output - Voltage</b>	
Accuracy	< 0.1% of F.S.
Load regulation 0-100%	< 0.05% of F.S.
Line regulation $\pm 10\%$ $\Delta$ Vac	< 0.02% of F.S.
Response Time 10-100% load	< 2 msec
Slew rate 10-90% (Source)	< 30 msec
Over-voltage protection	Adjustable, 0~110% Vnom
Remote Sense Compensation (Source)	Max. 5% of Voltage Range
No load discharge time on DC off	100% V to < 60 V, less than 10 sec
<b>DC Current</b>	
Accuracy	< 0.2% of F.S.
Load regulation 0-100% $\Delta$ Vdc	< 0.15% of F.S.
Slew rate (Sink) 10-90%	< 1 msec
<b>DC Power</b>	
Accuracy	< 1.0% of F.S.
<b>DC Resistance</b>	
Accuracy	< (1.0% of Max R + 0.3% Rated Current)
<b>Protections and Isolation</b>	
<b>Over-voltage category</b>	2
<b>Protection</b>	OT, OVP, OCP, OPP, PF
<b>Insulation</b>	
AC input to enclosure	2500 Vdc
AC input to DC output	2500 Vdc
DC output to enclosure (PE)	Model specific. See model tables
<b>Parallel Operation</b>	Master-slave, up to 16 units
<b>Regulatory Standards</b>	EN 61010, EN 61000-6-2:2016-05 and IEC 61000-6-3:2011-09 Class B

MODEL	All Models
<b>Environmental</b>	
Pollution Degree	2
Protection Class	1
Cooling	
7.5kW and Lower Models:	Forced air, temperature controlled fans
Temperature	Operating: 0~50 °C / 32~122 °F Storage: -20~70 °C / -4~158 °F
Relative humidity	< 80%, non-condensing
Altitude	Operating: < 2000 m (1.242 mi)
<b>Front Panel</b>	
Display	Color Touch Screen Graphics LCD
Controls	Dual Rotary Digital Encoders
Output on/off	Push Button
<b>Digital Interfaces</b>	
Internal	1x USB type B for communication, 1x GPIB option (on 3U models only)
Interface Slot	1x for retrofittable plug-in modules
<b>Analog Interfaces</b>	
Internal	Built-in, 15 pole D-Sub (female), galvanically isolated
Signal range	0~5 V or 0~10 V (selectable)
Inputs	V, I, P, R, remote control on-off, DC output on-off, resistance mode on-off
Outputs	V, I, alarms, reference voltage, status
Accuracy V / I / P / R	0~10 V: < 0.2%    0~5 V: < 0.4%
<b>Dimensions (W x H x D)</b>	
3U Chassis Height Models	19" x 5.25" x 26.4" 483 x 133 x 670 mm

## REAR PANEL CONNECTIONS

All power input and output connectors as well as interfaces are located on the rear panel of the power supply. This supports rack mounting of the power supplies in ATE systems as all internal cabinet wiring routes to the back of the unit and leaves the front panel display and controls accessible from the front. The illustration below shows the various connector locations on the rear panel.



## ORDERING INFORMATION - 208V AC INPUT

2500W MODELS	DESCRIPTION	7500W MODELS	DESCRIPTION
DCB60-120-2	DC Power Supply, 2500W, 0-60V, 0-120A	DCB60-360-2	DC Power Supply, 7500W, 0-60V, 0-360A
DCB80-120-2	DC Power Supply, 2500W, 0-80V, 0-120A	DCB80-360-2	DC Power Supply, 7500W, 0-80V, 0-360A
DCB200-70-2	DC Power Supply, 2500W, 0-200V, 0-70A	DCB200-210-2	DC Power Supply, 7500W, 0-200V, 0-210A
DCB360-40-2	DC Power Supply, 2500W, 0-360V, 0-40A	DCB360-120-2	DC Power Supply, 7500W, 0-360V, 0-120A
DCB500-30-2	DC Power Supply, 2500W, 0-500V, 0-30A	DCB500-90-2	DC Power Supply, 7500W, 0-500V, 0-90A
DCB750-20-2	DC Power Supply, 2500W, 0-750V, 0-20A	DCB750-60-2	DC Power Supply, 7500W, 0-750V, 0-60A
5000W MODELS	DESCRIPTION	DCB1000-40-2	DC Power Supply, 7500W, 0-750V, 0-40A
DCB60-240-2	DC Power Supply, 5000W, 0-60V, 0-240A	DCB1500-30-2	DC Power Supply, 7500W, 0-1500V, 0-30A
DCB80-240-2	DC Power Supply, 5000W, 0-80V, 0-240A		
DCB200-140-2	DC Power Supply, 5000W, 0-200V, 0-140A		
DCB360-80-2	DC Power Supply, 5000W, 0-360V, 0-80A		
DCB500-60-2	DC Power Supply, 5000W W, 0-500V, 0-60A		
DCB750-40-2	DC Power Supply, 5000WW, 0-750V, 0-40A		

## OPTIONS

OPTIONS	DESCRIPTION	OPTIONS	DESCRIPTION
OPT-232	RS232 Serial Interface	OPT-ETH2P	Ethernet/IP 2 Port Interface
OPT-PBUS	Profibus DPV1- Interface	OPT-PNET1P	Profinet-IO 1 Port Interface
OPT-CANO	CANopen Interface	OPT-PNET2P	Profinet-IO 2 Port Interface
OPT-DNET	DeviceNet Interface	OPT-CAN	CAN Interface
OPT-MBUS1P	Modbus-TCP 1 Port Interface	OPT-ECT	EtherCAT Interface
OPT-MBUS2P	Modbus-TCP 2 Port Interface	OPT-3IF	3 Way Interface Analog/USB/GPIB (3U models only)
OPT-ETH1P	Ethernet/IP 1 Port Interface	Opt-RCT	Redundant Contactors

## Service and Support

Adaptive Power Systems' customer support is second to none. Our Customer Support Program provides the training, repair, calibration, and technical support services that our customers value. So, in addition to receiving the right test equipment, our customers can also count on excellent support before, during and after the sale. With company owned support and service centers around the world, support is never far away.

**New Product Warranty:** Two (2) years.

Complete calibration and repair services are offered at our US, European and Chinese manufacturing facilities (see contact info below). Calibrations are to original factory specifications and are traceable to NIST (National Institute of Standards and Technology).



2500W & 5000 Watt Models 750V Max.



5000W & 10000 Watt Models 750V Max.



7500W & 15000 Watt Models 1500V Max.



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