

10kW

AC-HVDC POWER SUPPLIES

The BQ series of high voltage AC-DC power supplies offer a wide range of standard outputs up to 100kV at 10kW with various output control options, input voltages, and low output discharge currents that facilitate extremely simple integration into new systems.

Featuring low ripple and noise, air insulation and worldwide safety approvals, the BQ series is specifically designed to address high voltage integration challenges in a wide range of semiconductor manufacturing and industrial technology applications including ion implantation, E-beam welding, E-beam additive manufacturing, and research applications.

Multiple units can be used in parallel via the current share facility, providing higher power solutions. Designed to ensure maximum flexibility, the BQ series can be easily adapted to customer specific requirements at this voltage and power level.



Features

- Output voltages up to 100kV
- 10kW output power, parallelable up to 50kW
- 0 to 100% programmable voltage and current
- Local, analog and RS232/USB digital control, Ethernet optional
- 3 phase AC input 208VAC, 380VAC, 415VAC and 480VAC options available
- Output voltage and current regulated
- Voltage and current monitor outputs
- Operating temperature: -20°C to +40°C, no derating
- Short circuit, arc, overload, and thermal protection
- Efficiency >80%
- Low ripple
- CE marked for EMC, low voltage (LVD) and RoHS directives
- 3-year warranty

Benefits

- Custom capability and monitoring allow maximum flexibility and control
- Air insulation makes the BQ series lightweight and easy to maintain
- Arc sensing ensures safe operation providing maximum protection to the PSU, the load and the user
- High efficiency drives towards carbon neutral goals
- Low cost of ownership

Applications



Ion Implant



High Power
E-beam



Industrial
Technology



Research

Dimensions

12.25" x 19.0" x 24.0" (311.2 x 482.6 x 609.6 mm)

Models & Ratings

Model Number	Polarity	Output Voltage	Output Current	Max Stored Energy	Output Cable
BQ15P670	Positive	0 to +15kV	0 - 670mA	13J	DS2124
BQ15N670	Negative	0 to -15kV			DS2124
BQ15R670	Reversible	0 to 15kV			DS2124
BQ20P500	Positive	0 to +20kV	0 - 500mA	19J	DS2124
BQ20N500	Negative	0 to -20kV			DS2124
BQ20R500	Reversible	0 to 20kV			DS2124
BQ25P400	Positive	0 to +25kV	0 - 400mA	20J	DS2124
BQ25N400	Negative	0 to -25kV			DS2124
BQ25R400	Reversible	0 to 25kV			DS2124
BQ30P340	Positive	0 to +30kV	0 - 340mA	24J	DS2124
BQ30N340	Negative	0 to 30kV			DS2124
BQ30R340	Reversible	0 to -30kV			DS2124
BQ40P250	Positive	0 to +40kV	0 - 250mA	21J	DS2124
BQ40N250	Negative	0 to -40kV			DS2124
BQ40R250	Reversible	0 to 40kV			DS2124
BQ50P200	Positive	0 to +50kV	0 - 200mA	27J	DS2124
BQ50N200	Negative	0 to -50kV			DS2124
BQ50R200	Reversible	0 to 50kV			DS2124
BQ60P170	Positive	0 to +60kV	0 - 170mA	32J	DS2124
BQ60N170	Negative	0 to -860kV			DS2124
BQ60R170	Reversible	0 to 60kV			DS2124
BQ70P145	Positive	0 to +70kV	0 - 145mA	38J	DS2124
BQ70N145	Negative	0 to -70kV			DS2124
BQ70R145	Reversible	0 to 70kV			DS2124
BQ80P125	Positive	0 to +80kV	0 - 125mA	43J	DS2124
BQ80N125	Negative	0 to -80kV			DS2124
BQ80R125	Reversible	0 to 80kV			DS2124
BQ100P100	Positive	0 to +100kV	0 - 100mA	60J	DS2124
BQ100N100	Negative	0 to -100kV			DS2124
BQ100R100	Reversible	0 to 100kV			DS2124

Options

Symbol	Description
200	180 to 220 VRMS, 3-phase input, 48-63 Hz, derate output current by 10%
380	342 to 440 VRMS, 3-phase input, 48-63 Hz
415-50	370 to 460 VRMS, 3-phase input, 48-52 Hz
480-60	430 to 530 VRMS, 3-phase input, 57-63 Hz
NC	Blank front panel, AC power breaker/switch and indicator only
SS	Slow start ramp. Specify standard times of 5, 10, 15, 20, or 30 seconds ±20%
ZR	Zero start interlock. Voltage control, local or remote, must be at zero before HV will enable.
K02	RS-232/USB/Ethernet control and monitor

Please consult factory for special requirements.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	187	208	228	VAC	48-63Hz; 380VAC, 415VAC & 480VAC inputs optional
Inrush Current			150	A	
Input Connector	IEC60320 C20 receptacle. AC power cord not included				

Notes:

Mains service must be protected with fuses or circuit breakers with a maximum rating of 125A for 208VAC models and 100A for 380 through 480VAC models.

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage Range	0		100	kV	See Models and Ratings
Output Current Range	100		670	mA	See Models and Ratings
Polarity	Available with either positive, negative or reversible polarity				
Output Control	0 to rated voltage or current via rotary dials, analog or optional RS232, USB or ethernet				
Line Regulation	±0.005			%	For ±10% input line variation
Load Regulation			±0.01 ±0.02	%	<70kV: of rated output for a no load to full load change >70kV: of rated output for a no load to full load change
Dynamic Voltage Regulation	For load transients from 10% to 99% and 99% to 10%, typical deviation is less than 2% of rated output voltage with recovery to within 1% in 500µs and recovery to within 0.1% in 1ms.				
Stability		0.01 0.05		%/hr	After 30 min. warm up Per 8 hours under constant conditions after 30 min. warm up
Temperature Coefficient		0.01		%/°C	
Voltage Rise/Decay Time Constant		200		ms	HV enable or remote programming control with a 6% minimum load
Voltage Ripple			0.05	%	+0.5V RMS at full load
Arc Quench	An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20ms after each arc				
Arc Count	Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off for approximately five seconds to allow clearance of the fault. After this period, the supply will return automatically to the programmed output voltage value with the voltage rise time constant indicated. If the load fault still exists, the above cycle will be repeated				
HV Output Connection	Mating HV connector and 8ft (2.4m) shielded coaxial cable supplied. 25 pin D-306 miniature connector for computer interface supplied				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	80			%	At full load
HV Insulating Medium	Air insulated				
External Interlock	Open = off, closed = on. Normally latching except for blank front panel version where it is non-latching. Interlock LED is 'ON' when interlock is open				
Remote HV Enable/Disable	0-1.5V = Off, 2.5-15V = On				
Local HV Enable/Disable	HV output is permanently enabled				
Voltage Accuracy	0.5% of setting + 0.2% of rated				
Voltage Monitor	0 to +10V equivalent to 0 to rated voltage. Accuracy: 0.5% of reading +0.2% of rated. Impedance is 10KΩ				
Current Monitor	0 to +10V equivalent to 0 to rated current. Accuracy: 1% of reading + 0.1% of rated. Impedance is 10KΩ				
RS232/USB/Ethernet Programming (Optional)	Resolution	0.025% of full scale for both the voltage and the current programs 0.1% of full scale for both the voltage and the current monitors			
	Remote setting accuracy	Voltage setting accuracy is better than 0.5% of setting +0.2% rated			
	Remote reading accuracy	Voltage reading accuracy is 0.5% of reading + 0.2% of rated Current reading accuracy is 1% of reading + 0.1% of rated			

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Ambient Temperature	-20		+40	°C	Operating
	-40		+85	°C	Storage
Cooling	Forced air cooling				
Protection	Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches and rpm sensing fans protect against thermal overload. Circuit breaker, fuses, surge limiting resistors, and low energy components provide ultimate protection.				
RoHS	Restriction of the use of Hazardous Substances				

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted Emissions	EN61000-6-4	Class A	CISPER 11
Radiated Emissions	EN61000-6-4	Class A	CISPER 11
Line Harmonics	EN61000-3-2	Class A	

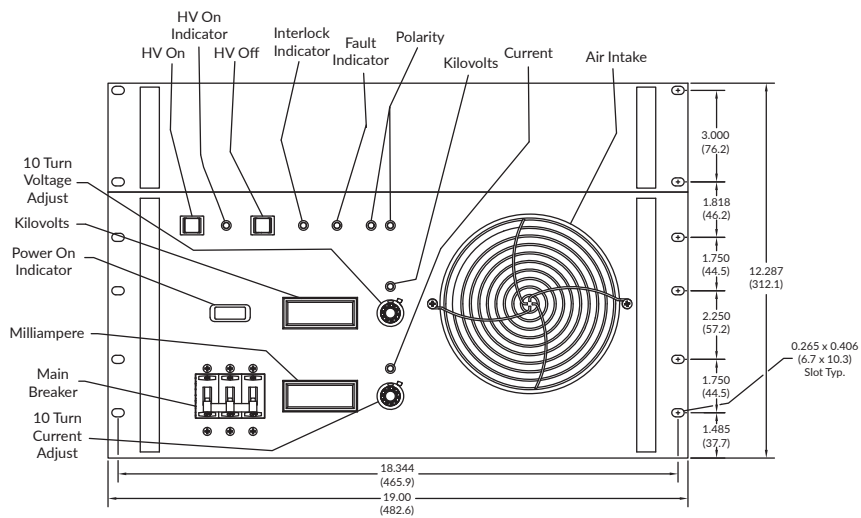
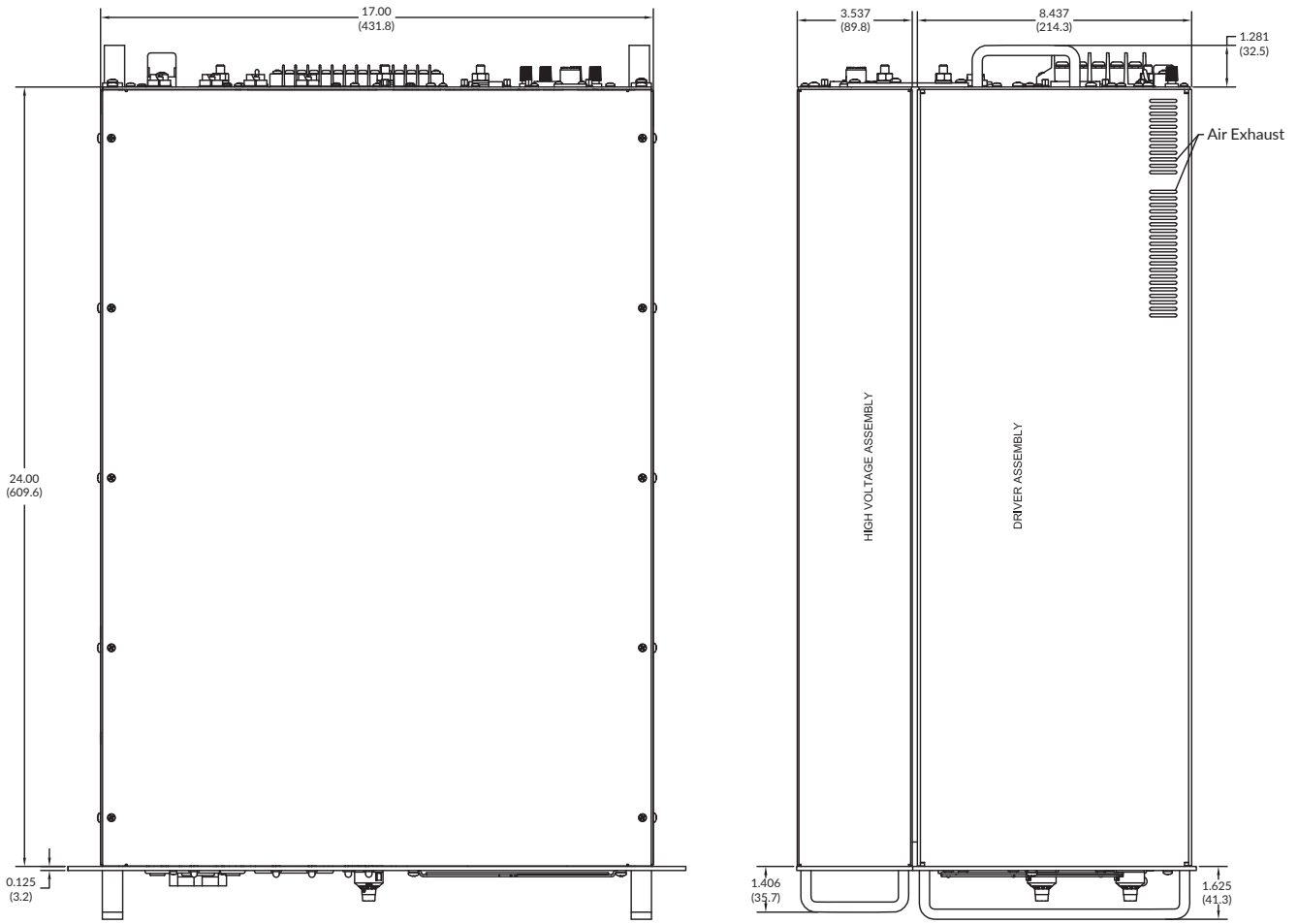
EMC: Immunity

Phenomenon	Standard	Performance Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	B	
Radiated Immunity	EN61000-4-3	A	
EFT/Burst	EN61000-4-4	B	
Surge	EN61000-4-5	B	
Conducted	EN61000-4-6	A	
Voltage Dips & Interruptions	EN61000-4-11	B & C	

Safety Approvals

Safety Agency	Standard	Test Level	Notes & Conditions
EN	EN61010/IEC61010	-	Safety
CE	Meets all applicable directives		
UKCA	Meets all applicable legislation		

Mechanical Details

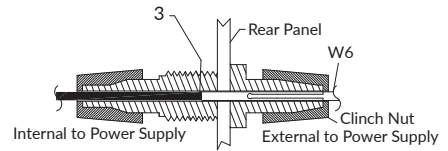
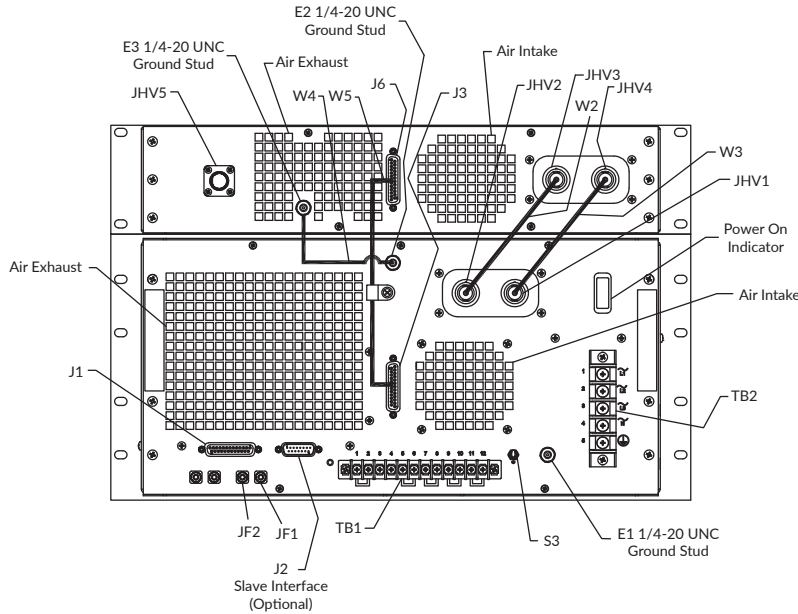


Notes:

- 1. Dimensions are in inches (mm).
- 2. Weight: 88lbs (approx. 40kg)

- 3. For proper installation, it is recommended to mount equipment in a rack cabinet or bench top enclosure.

Mechanical Details



JF1 to JF4 detail
(for fiber optic cable installation)

Analog Interface - J1					
Pin	Function	Pin	Function	Pin	Function

1	V Program	8	Common	15	Fault Common
2	I Program	9	Common	16	I Mode
3	Signal Common	10	HV Status NO	17	V Mode
4	V Monitor	11	HV Status NC	18	Mode Common
5	I Monitor	12	HV Status Common	25	Ground
6	HV Enable	13	Fault NO		
7	+10V Reference	14	Fault NC		

J3/J6					
Pin	Function	Pin	Function	Pin	Function

1	Fan +	8	Interlock	15	Thru 20 Reserved
2	Fan -	9	Arc	21	HV Return
3	Reserved	10	V Feedback -	22	HV Return
4	Reserved	11	V Feedback +	23	Common
5	Reserved	12	I Feedback +	24	Common
6	Polarity	13	I Feedback -	25	Ground
7	Interlock	14	Fan Sense		

TB1					
Pin	Function	Pin	Function	Pin	Function

1	Interlock	5	Remote HV Off	9	I Local
2	Interlock Return	6	Remote HV Off	10	I Local
3	Remote HV On	7	HV Enable Local	11	V Local
4	Remote HV On	8	HV Enable Local	12	V Local

Master			
Pin	Function	Pin	Function

E1	Earth Ground	J2	Slave Interface Output
E2	Ground	J3/J6	Feedback Interface
E3	Load Return Ground	TB1	Signal Interface
E4	Ground	TB2	AC Input
JHV1-JHV4	High Voltage AC	JF1	TX-A Output
JHV5	High Voltage Output	JF2	TX-B Output

Slave(s) Typ.			
Pin	Function	Pin	Function

E1	Earth Ground	J3/J6	Feedback Interface
E2	Ground	TB2	AC Input
E3	Ground	JF1	TX-A Output
JHV1-JHV4	High Voltage AC	JF2	TX-B Output
JHV5	High Voltage Output	JF3	RX-A Input
J1	Signal Interface Input	JF4	RX-B Input
J2*	Slave Interface Output		

AC Input - TB2 (208/380/415/480VAC)			
Pin	Function	Pin	Function

1	Line	4	Neutral (NC)
2	Line	5	Ground
3	Line		

J2 - Slave interface output JHV1 thru JHV4 - Alden/Amphonor 108870 (shown)
 JF1 - TX-A slave output JHV5 - Amphenol 83-1R-RFX or equivalent
 JF2 - TX-B slave output

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