WBQ series

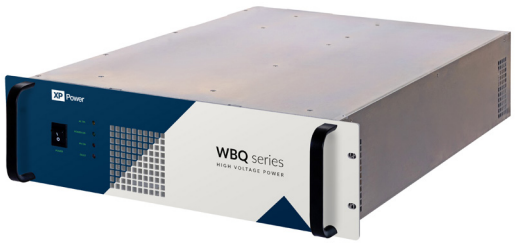
XP Power

10kW

AC-HVDC power supplies

The WBQ series of digital high voltage AC-DC power supplies offer a wide range of output voltages from 15kV to 100kV at 10kW in a compact, industry-leading 3U rack-mount format. The WBQ features adjustable outputs, analog and digital interfaces, and control and monitoring options which provide the ultimate flexibility for high voltage design engineers.

WBQ's fully digital control loop and user-friendly UI enable precise management and customization. Its programmable arc control features enhance safety, datalogging and real-time diagnostics support predictive maintenance, and Black Box reporting simplifies troubleshooting. The WBQ allows easy integration into a wide range of semiconductor manufacturing and industrial technology applications including ion implantation, E-beam welding, additive manufacturing, cyclotrons and research.



Features

- Output voltages up to 100kV
- 10kW output power, parallelable up to 100kW+
- 0 to 100% programmable voltage and current
- Analog and digital control via CAN; EtherCAT optional
- Compact 3U 19" rack-mount
- 3 phase AC input 208VAC, 400VAC optional
- Output voltage and current regulated
- Voltage and current monitoring and diagnostics
- Graphical user interface (GUI)
- Positive or negative polarity
- Efficiency >90%
- Low ripple
- Short circuit, arc quench, arc count, overload and thermal protection
- UKCA and CE compliant for EMC, low voltage (LVD) and RoHS directives

Applications

Ion implant

High power E-beam

Industrial technology

Research

Dimensions

132.1 x 431.8 x 609.6 mm (5.2" x 17.0" x 24.0")
3U 19" rack mount

Documentation

For further information click the link or scan the code

→ xppower.com

Models & ratings

Model number	Polarity	Output voltage	Output current	Max stored energy
WBQ015P670	Positive	0 to +15kV	0 - 670mA	3.4J
WBQ015N670	Negative	0 to -15kV		
WBQ020P500	Positive	0 to +20kV	0 - 500mA	5.0J
WBQ020N500	Negative	0 to -20kV		
WBQ025P400	Positive	0 to +25kV	0 - 400mA	5.2J
WBQ025N400	Negative	0 to -25kV		
WBQ030P335	Positive	0 to +30kV	0 - 335mA	7.5J
WBQ030N335	Negative	0 to -30kV		
WBQ040P250	Positive	0 to +40kV	0 - 250mA	6.4J
WBQ040N250	Negative	0 to -40kV		
WBQ050P200	Positive	0 to +50kV	0 - 200mA	8J
WBQ050N200	Negative	0 to -50kV		
WBQ060P170	Positive	0 to +60kV	0 - 170mA	9.6J
WBQ060N170	Negative	0 to -60kV		
WBQ070P145	Positive	0 to +70kV	0 - 145mA	11.2J
WBQ070N145	Negative	0 to -70kV		
WBQ080P125	Positive	0 to +80kV	0 - 125mA	12.8J
WBQ080N125	Negative	0 to -80kV		
WBQ090P112	Positive	0 to +90kV	0 - 112mA	14.4J
WBQ090N112	Negative	0 to -90kV		
WBQ100P100	Positive	0 to +100kV	0 - 100mA	16J
WBQ100N100	Negative	0 to -100kV		

Notes:

1. For other voltage models, please contact sales.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage	187	208	228	VAC	Mains service must be protected with fuses or circuit breakers with a maximum rating of 125A for 208VAC models and 100A for 400VAC models. No Neutral is needed.
	360	400	440	VAC	
Input current			46	A	Input current per phase at low line (187VAC)
Input connector	5 Position terminal block. AC power cord not included				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage range	0		100	kV	See models and ratings table
Output current range	100		670	mA	See models and ratings table
Polarity	Available with either positive or negative polarity				
Output control	0 to rated voltage or current via analog, RS232, USB or Ethernet.				
Line regulation	±0.05			%	For ±10% input line variation
Load regulation			±0.05	%	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		%/hr	After 30 min. warm up
		0.05			Per 8 hours under constant conditions after 30 min. warm up
Temperature coefficient		100		ppm/°C	
Rise time		50		ms	0 - 100%
Decay time constant		25		ms	
	3.2			s	No load
Voltage ripple			0.03	%	Of rated voltage +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 desired time 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 10ft (2.4m) shielded coaxial cable supplied.				

Notes:

1. Specifications apply from 5% to 100% rated voltage. Operation is guaranteed down to 0 voltage with a slight degradation in perfomance.

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Conversion efficiency	90			%	At full load
HV insulating medium	Air insulated				
External interlock	Open = off, closed = on.				
Remote HV enable/disable	0-1.5V = OFF, 2.5-15V = ON				
Voltage accuracy	0.5% of setting + 0.2% of rated				
Voltage monitor	0 to +10V equivilant to 0 to rated voltage. Accuracy: 0.5% of reading + 0.2% of rated. Output impedance is 10kΩ				
Current monitor	0 to +10V equivilant to 0 to rated current. Accuracy: 1% of reading + 0.1% of rated. Output impedance is 10kΩ				
CAN/USB/EtherCAT[1]	Resolution		0.05% 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% of 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		

Notes:

1. USB/EtherCAT optional.
2. Specifications apply from 5% to 100% rated voltage. Operation is guaranteed down to 0 voltage with a slight degradation in perfomance.

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Ambient temperature	-20		+50	°C	Operating
	-40		+85	°C	Storage
Cooling	Forced air cooling				
Protection	Overload, arc and short circuit 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	EN61000-3-12	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. Designed to meet.
CE	Meets all applicable directives		
UKCA	Meets all applicable legislation		

Signals

Analog interface - J3			
Pin	Function	Pin	Function
1	GROUND	14	ISHARE
2	SUM FAULT	15	+10V
3	ARC STATUS	16	COMMON
4	MODE STATUS	17	IMON
5	FAULT STATUS	18	VMON
6	HV STATUS	19	COMMON
7	HV ENABLE	20	IPROG
8	+5V	21	VPROG
9	COMMON	22	DC PROG
10	CL/CT	23	INTERLOCK RTN
11	RESET	24	INTERLOCK
12	M CAN COMMON	25	M CAN-L
13	M CAN-H		

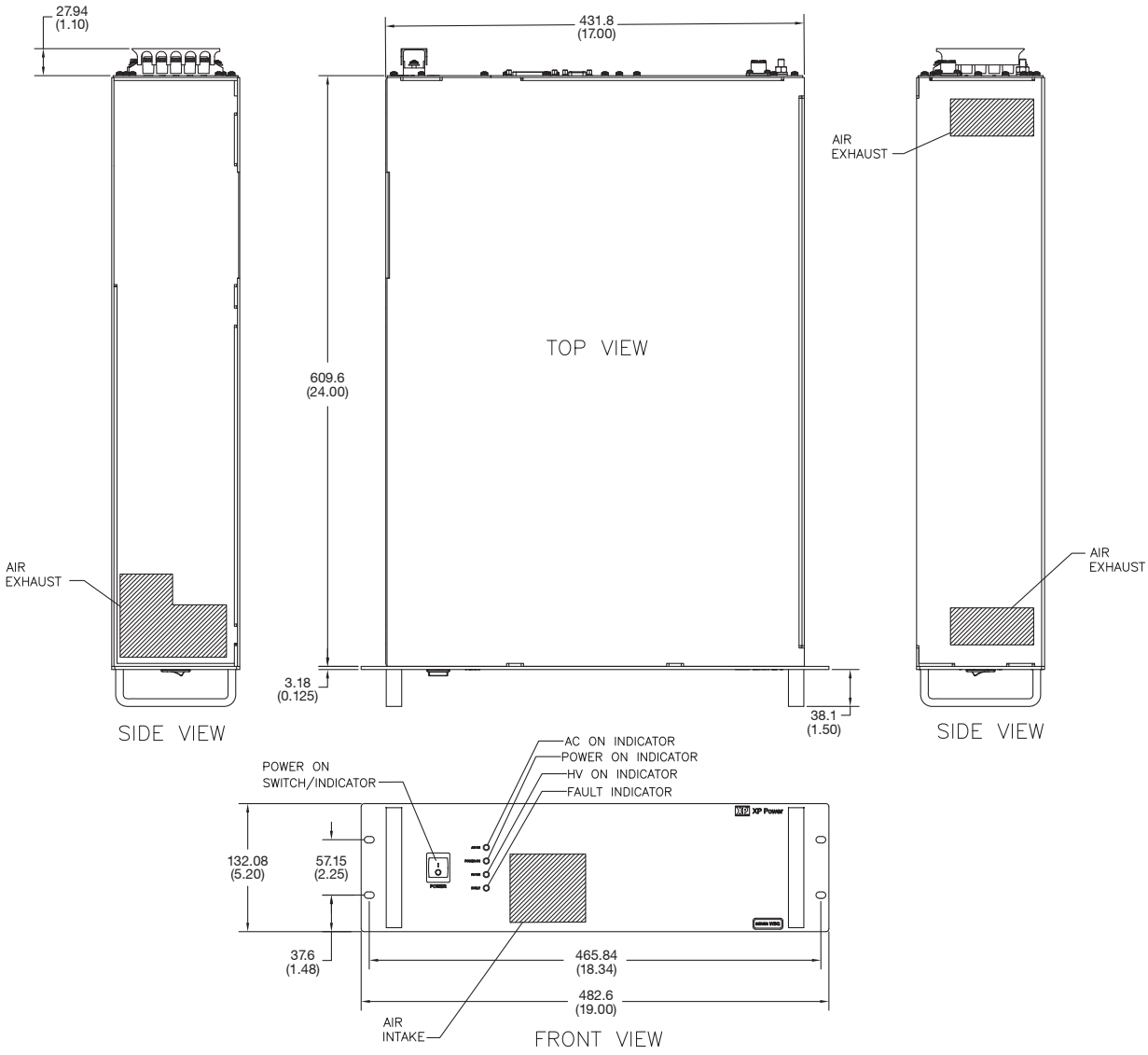
Analog interface - J2			
Pin	Function	Pin	Function
1	RESERVED	9	ISHARE
2	SUM FAULT	10	COMMON
3	HV ENABLE	11	I PROGRAM
4	COMMON	12	V PROGRAM
5	CL/CT	13	INTERLOCK RTN
6	RESET	14	INTERLOCK
7	M CAN COMMON	15	M CAN-L
8	M CAN-H		

CANBUS interface - J1	
Pin	Function
1	N/C
2	CAN-L
3	CAN COMMON
4	N/C
5	N/C
6	N/C
7	CAN-H
8	N/C
9	N/C

HV output
JHV1-AMPHENOL 83-1R-RFX OR EQUIVALENT

TB1 legend	
1	Line
2	Line
3	Line
4	Neutral
5	Ground

Mechanical details



Notes:

1. Dimensions are in mm (inches)
2. Weight: approx. 22.7kg (50lbs)
3. For proper installation, it is recommended to mount equipment in a rack cabinet or bench top enclosure.
4. Connectors not shown on diagram.