

<i>Nova Research and Engineering, Inc.</i> 11930 A 44th Street North Clearwater FL 33762	Specification Number: N15X00	Rev: G Date: 9/1/2006
Data Sheet and Selection Chart		Department: ENG Originator: JFK

Electrostatic Chuck Power Supply Data Sheet

This is the premier electrostatic chuck power supply and control. This control is suitable for operation of coulombic or Johnson-Rahbeck chucks of up to 300mm size for the newest processes. The features of this control are:

- High voltage power supplies for bipolar operation
 - Floating output from 50V to 5000V, programmable and tracking
 - 1mA and 3.5mA capacity units available
 - Selectable and programmable polarity
 - High voltage monitor available as both analog and communications feedback
 - Center tapped unit available
 - Programmable overcurrent alarm
 - Programmable voltage compliance
- Programmable clamping and declamping features
- Dual low pass filters built in
- Analog interface for setpoints, feedback, and control.
- Serial RS232 interface for programming, setpoints, feedback, and control.
- 10base-T Ethernet interface for setpoints, feedback, and control available.
- Available with sourcing or sinking interface for signals: SIG1 (clamp is up), SIG2 (clamp is down), ALARM, CLAMP command.
- Power is 24VDC, 3A maximum, local ON/OFF switch.
- Interlock available in HV cable for maximum protection. Interlock enable is designed for external dry contact closure.
- Remote status, configuration, and power supply unit available.
- 2U high, ½ 19” rack mount chassis with display and user interface (13300 Series).
- 8” wide by 2.5” high by 9.5” long embedded series available (15X00 Series).

Nova Research and Engineering, Inc. 11930 A 44 th Street North Clearwater FL 33762	Specification Number: N15X00	Rev: G Date: 9/1/2006
	Data Sheet and Selection Chart	
		Department: ENG Originator: JFK

Electrostatic Chuck Power Supply Selection Chart

The part number for the power supply is composed of a root number with a qualification suffix determined by the required control and output characteristics.

13300 Series (Rack Mount)

Series Root	Output Voltage	Communication Interface
13300	1kV, 3.5mA	Serial RS232
13303	1kV, 3.5mA	Serial RS232, 10base-T
13310	2.5kV, 3.5mA	Serial RS232
13313	2.5kV, 3.5mA	Serial RS232, 10base-T

15X00 Series (Embedded)

Series Root	Output Voltage	Communication Interface
15300	1kV, 3.5mA	Serial RS232
15303	1kV, 3.5mA	Serial RS232(Config), 10base-T
15310	2.5kV, 3.5mA	Serial RS232
15313	2.5kV, 3.5mA	Serial RS232(Config), 10base-T
15510	5kV, 1mA	Serial RS232
15513	5kV, 1mA	Serial RS232(Config), 10base-T
15520	5kV, 3.5mA	Serial RS232
15523	5kV, 3.5mA	Serial RS232(Config), 10base-T

Each power supply may also be ordered with either sourcing or sinking feedback, center tapped or non center tapped outputs, and HV cable only, or HV cable and IO connector interlocks. To formulate a final product number, first select the series root number from the tables above, then add the qualification codes from the list below.

Sourcing Feedback	R
Sinking Feedback	N
Standard Output	S
Center Tapped Output	C
Cable Interlock Only	H
Cable and I/O Connector Interlock	O
No Interlock	-
Remote Operation	R (post)

<i>Nova Research and Engineering, Inc.</i> 11930 A 44th Street North Clearwater FL 33762	Specification Number: N15X00	Rev: G Date: 9/1/2006
Data Sheet and Selection Chart		Department: ENG Originator: JFK

Examples

A 2.5kV rack mounted power supply with sinking feedback, standard outputs, and serial only communications would be part number 13310NS.

A 2.5kV, embedded power supply with sourcing feedback, center tapped output, serial and ethernet communications, and interlocked cable would be 15313RCH.

A 2.5kV, embedded power supply with sourcing feedback, hardware control, and interlocked cable and IO connector would be 15311RO.

A 2.5kV, embedded power supply with sourcing feedback, standard outputs, serial and ethernet communications, remote capable operation, and interlocked cable would be 15313SHR.

A 5kV, 1mA embedded power supply with sourcing feedback, center tapped output, serial and ethernet communications, remote capable operation, and interlocked cable would be 15513RCHR.

A 5kV, 3.5mA embedded power supply with sourcing feedback, center tapped output, serial and ethernet communications, remote capable operation, and interlocked cable would be 15523RCHR.

Nova Research and Engineering, Inc. 11930 A 44 th Street North Clearwater FL 33762	Specification Number: N15X00	Rev: G Date: 9/1/2006
Data Sheet and Selection Chart		Department: ENG Originator: JFK

Electrostatic Chuck Power Supply Specifications

Input Power: the unit is powered by 24 VDC ($\pm 10\%$), with a current load of 3A (Max).

Output Voltage: output voltages from 50VDC to 5000VDC, model dependant.

Output Current: output current from zero to 3.5mA, model dependant.

Digital Inputs: each digital input is referenced to a common digital GND. The input current with 24 VDC applied is 20 mA.

Digital Outputs: each digital output can drive 25mA to over 18VDC when configured as a sourcing device with 24VDC drive voltage, or can sink 25mA to less than 2.5VDC.

Analog Outputs: 0 to 10VDC or 0 to 5VDC configured outputs, 1mA maximum load.

Interlock: if the hardware interlock option is chosen, the HV output is enabled when pin 3 is shorted to pin 4 at the output connector and/or pin 11 is shorted to pin 12 on the I/O connector, using a dry contact relay, wire, or switch. When these pins are open, the output turns off and the residual voltage drains to < 50V within 30 seconds.

Frame Ground: a #6-32 threaded stud is supplied to attach the frame ground to the control. The frame ground is not attached to any part of the high voltage output.

Input Connector: the unit power is supplied via a 9-pin Amp CPC connector (mating connector is an AMP/Tyco Part No. 206485-1. Use AMP/Tyco cable clamp Part No. 206062). The pin assignments are:

Pin Number	Signal Name	Description
1	+24VDC	Unit Power, +24VDC ($\pm 10\%$), 3A peak
2	Fail	Unit Fault output
3	HV is ON	Unit status output, HV is ON
4	Init	Unit status output, Initialized
5	+5VDC	+5VDC, 50mA output
6	TXD	RS232 Tx Output
7	RXD	RS232 Rx Input
8	PCommon	24VDC Power Common
9	Common	RS232 Common

Nova Research and Engineering, Inc. 11930 A 44 th Street North Clearwater FL 33762	Specification Number: N15X00	Rev: G Date: 9/1/2006
Data Sheet and Selection Chart		Department: ENG Originator: JFK

Output connector: the high voltage output and interlock input connections are contained in a 6-pin connector, AMP/Tyco Part No. 867535-1 (or equivalent). The pin assignments are:

Pin Number	Signal Name	Description
1	Pos Output	HV Output
2	Output CT	High Voltage Output Center Tap
3	Neg Output	HV Output
4	GND	Frame Ground
5	Interlock Source	+24VDC Current Limited Drive for Interlock Source
6	Interlock Return	Internal Interlock Drive

This connector is medical grade, uses recessed pins for safe connection, and has a rated dielectric breakdown of 5000VDC. The required mating connector is an AMP/Tyco Part No. 867534-1. Use AMP/Tyco cable clamp Part No. 206062.

Serial Port: a 9-pin female D-sub connector is provided for serial communication to the unit. The pin assignments are:

Pin	Function
1	-
2	Transmit Data (Output)
3	Receive Data (Input)
4	-
5	GND
6	-
7	-
8	-
9	-

Nova Research and Engineering, Inc. 11930 A 44 th Street North Clearwater FL 33762	Specification Number: N15X00	Rev: G Date: 9/1/2006
	Data Sheet and Selection Chart	
		Department: ENG Originator: JFK

I/O Connector: the interface signals are connected through a 15-pin female Dsub connector. The pin assignments are:

Pin Number	Signal	Description
1	HVEN RETN	Low side of HV Enable
2	Analog Setpoint	Remote Analog Setpoint Input
3	HVEN	HV Enable Signal, ON = +12 to 24VDC ref pin 1
4	+12VDC	+12VDC Source for I/O, 100mA
5	Analog Setpoint GND	Analog Common for Setpoint and Feedback
6	VFDBCK	Voltage Feedback, (Sum of Both Legs if CT)
7	SIG2	Output Signal (Clamp is DOWN)
8	SIG1	Output Signal (Clamp is UP)
9	Alarm	Alarm Output Bit
10	Digital GND	Remote Digital Common
11	INTLK1	External Interlock Source (+24VDC, 100mA)
12	INTLK2	External Interlock Return
13	RES	Reserved
14	IFDBCK	Current Feedback, (Sum of Both Legs if CT)
15	RES	Reserved

Environmental:

Operating Temperature: 0 to +70C

Storage Temperature: -30 to +85C

Humidity: 0 to 100%, non-condensing

ESD Sensitivity: All inputs and outputs safe to 15kV human body model

Power Dissipation: 60W maximum