InstruTech®, Inc.

Series 3000 - The New Generation of B-RAX™ Vacuum Gauge Controllers

- **3 Channel Controller for one ionization and two convection gauges or one ionization, one convection and one alternate capacitance diaphragm gauge**
- **Various pressure measurement ranges from 4 x 10^{-10} to 1,000 Torr**
- **3 analog outputs, 6 setpoint relays, RS232/RS485 serial communications, remote Digital I/O**
- **Compact space saving half rack design, bench top or panel/rack mount instrument**
- **Outstanding product warranty of 5 years**

Description

The B-RAX is a highly versatile vacuum gauge controller capable of operating one ionization gauge (IG) and up to two CVG101 convection vacuum gauge sensors (CG), or one IG, one CG and one alternate gauge such as a capacitance diaphragm gauge (CDG).

The ionization gauge on/off, degas functions and emission current selection can be controlled via front panel soft-keys, remote input signals (Digital I/O), or serial communications. IG sensor can also be automatically turned on/off using the measurements from one of the user selectable convection or alternate gauges. When using hot cathode IGs, the B-RAX can be set to automatically switch (auto-ranging) between various emission currents. This results in optimal and stabile pressure readings over the entire measurement range from low to high vacuum. High efficiency power supply design and effective thermal management techniques are used to enable operation of the *B-RAX* without the need for air movement devices such as troublesome fans.

The state of all setpoint relays, emission current, filament in use and error messages for all fault conditions are displayed on the easy to read OLED set-up screen. Filament operation including filament current, emission current and ion current can be monitored in real time in the research screen mode.

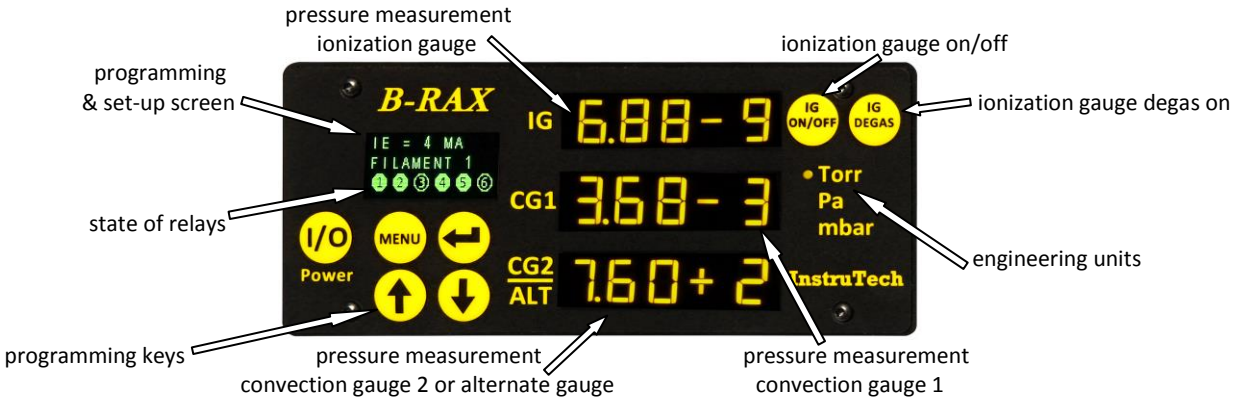
B-RAX Controller	Ionization Gauge Compatibility		Convection Gauge Compatibility
Model **B-RAX <u>3300</u>** 	One BA602 Nude I^2R Hot Cathode (4×10^{-10} to 1×10^{-3} Torr) 	or One BA603 Glass I^2R Hot Cathode (4×10^{-10} to 1×10^{-3} Torr) 	Up to two CVG101 Convection Gauges (1×10^{-4} to 1,000 Torr) 
Model **B-RAX <u>3200</u>** 	One IGM400 Hot Cathode (1×10^{-9} to 5×10^{-2} Torr) 	or One CCM500 Cold Cathode (1×10^{-9} to 1×10^{-2} Torr) 	Up to two CVG101 Convection Gauges (1×10^{-4} to 1,000 Torr) 

Specifications

measurement range:	**B-RAX 3300:** 4 x 10^{-10} to 1,000 Torr when used with the BA602/603 hot cathode IG and CVG101 CG **B-RAX 3200:** 1 x 10^{-9} to 1,000 Torr when used with the IGM400 hot cathode IG and CVG101 CG **B-RAX 3200:** 1 x 10^{-9} to 1,000 Torr when used with the CCM500 cold cathode IG and CVG101 CG
display pressure indication programming & set-up screen	LED - 3 independent pressure display channels - 3 digit plus 2 digit exponent per channel OLED - displays state of all setpoint relays, IG emission current, error messages for fault conditions
units of measure	Torr, mbar, Pa - user selectable
functionality IG	Powers & operates one InstruTech BA602, BA603, IGM400 or CCM500 ionization vacuum gauge **B-RAX 3300** is also capable of operating other equivalent brands of glass or nude I^2R B-A hot cathode IG
CG	powers & operates up to 2 InstruTech CVG101 convection or Granville-Phillips® (GP) Convectron® gauges
alternate gauge	displays pressure from an alternate gauge such as a CDG or other InstruTech modules using the analog input (external power source for these alternate auxiliary devices will be required)
IG sensor control	IG sensor on/off, degas on/off and emission current can all be controlled via front panel soft-keys, remote input signals (digital I/O) or serial communications. IG sensor can also be automatically turned on/off using the measurements from one of the user selectable convection or alternate gauges.
IG remote input signals (digital I/O)	IG sensor on/off, degas on/off and emission current can also be set by applying momentary continuity to ground. Also the 9-pin D-sub remote input DIGITAL I/O connector provides pin-pin compatible signals with the GP 358 controller as well as compatible signals with the GP 307.
setpoint relays	six single-pole , double-throw (SPDT), 1 A at 30 Vdc resistive, or 1 A at 30 Vac non-inductive, user assignable to any of the gauges
analog output	three analog outputs, user assignable to any of the gauges;
IG analog output	log linear 0 to 10 Vdc, 1 V/decade, various scaling selections also provide analog output compatibility with Granville-Phillips® controller models 307, 350 and 358 controllers, or log Linear 1.7 V to 9.3 Vdc (nominal 1.8 to 8.7 Vdc) 0.8 V/decade, or linear 0 to 10 Vdc (useable over 3 decades, also compatible with GP 307 controller)
combination IG + CG analog output	log linear 0.5 to 7 Vdc, 0.5 V/decade
CG analog output	log linear 1 to 8 Vdc, 1 V/decade, or 0 to 7 Vdc, 1 V/decade (also compatible with GP 307, 350, 358), or non-linear analog S-curve 0.375 to 5.659 Vdc, or linear 0 to 10 Vdc (useable over 3 decades)
analog input CDG InstruTech modules	one 0-10 Vdc analog input signal from a CDG when used as an alternate gauge to CG2, or analog input signal from one of the following InstruTech modules: CVM201, CVM211, IGM401,CCM501
serial communications	RS485 / RS232 - ASCII protocol (command protocol compatibility with GP 307 and 358 controller is also provided)
status output	IG sensor on/off status message is displayed on the front panel, by serial communications and by SPDT relay (DIGITAL I/O Connector) rated at 1 A at 30 Vdc resistive, or 1 A at 30 Vac non-inductive. IG degas on/off status or IG error conditions are displayed on the front panel, by serial communications and by an open collector transistor output (ground emitter) rated at 40 V max. VCE, 50 mA IC max.
IG hot cathode filament switching	user selectable between filament 1 or 2 using the front panel soft-keys
IG hot cathode emission current	**B-RAX 3300:** 100 µA, 4 mA, 10 mA or automatic switching (auto ranging) between 100 µA, 4 mA, 10 mA **B-RAX 3200:** 100 µA, 4 mA, or automatic switching (auto ranging) between 100 µA and 4 mA
IG degas	**B-RAX 3300:** 40 W, resistive **B-RAX 3200:** 3 W, electron bombardment
IG overpressure protection	**B-RAX 3300:** turns BA602 or BA603 ion gauge filament off at the following factory default settings; 1 x 10^{-3} Torr at 100 µA emission current, 5 x 10^{-4} Torr at 4 mA emission current, 1 x 10^{-4} Torr at 10 mA emission current **B-RAX 3200**: turns off IGM400 ion gauge filament or CCM500 sensor at the following factory default setting: 5 x 10^{-2} Torr at 100 µA and 1 x 10^{-3} Torr at 4 mA emission current for IGM400 hot cathode 1 x 10^{-2} Torr for CCM500 cold cathode
temperature	operating; 0 to + 40 °C storage; -40 to + 70 °C
humidity	0 to 95% relative humidity, non-condensing
weight	1.7 lb. (0.7 kg)
housing	aluminum extrusion - black powder paint finish

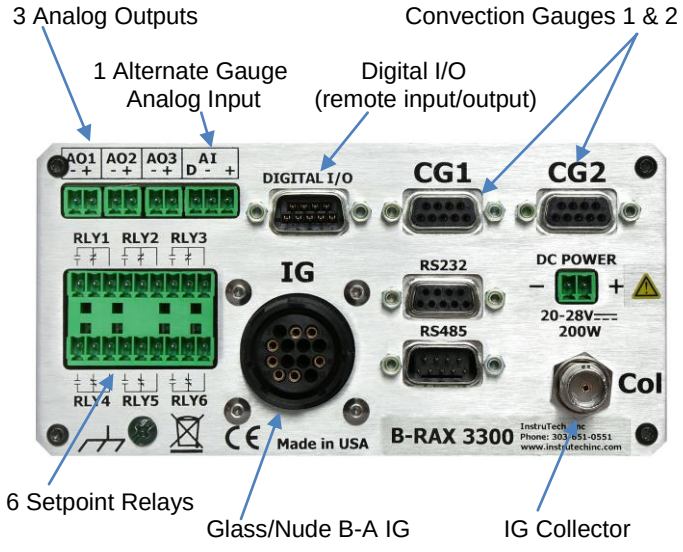
input power		**B-RAX 3300:** 20 - 28 Vdc, 200 W protected against power reversal and transient over-voltages **B-RAX 3200:** 20 - 28 Vdc, 36 W protected against power reversal and transient over-voltages
connectors	IG & CG	gauge cable assemblies provided by InstruTech
	digital I/O	9-pin D-sub male
	serial communications	RS232; 9-pin D-sub female, RS485; 9-pin D-sub male
	analog I/O, setpoint relays, power	pluggable terminal block (mating connectors included)
CE compliance		EMC Directive 2004/108/EC, EN 61326-1, EN 55011 Low Voltage Directive 2006/95/EC, EN 61010-1
environmental		RoHS compliant

Front Panel Operation



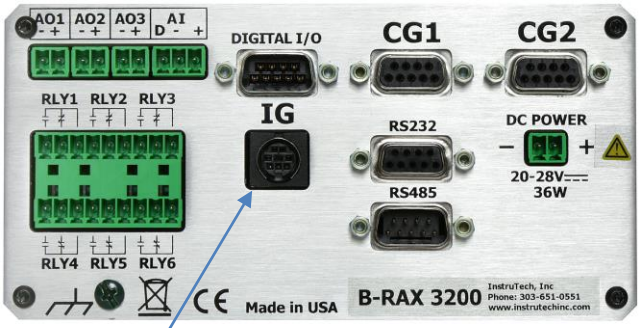
Electrical Connections

B-RAX 3300



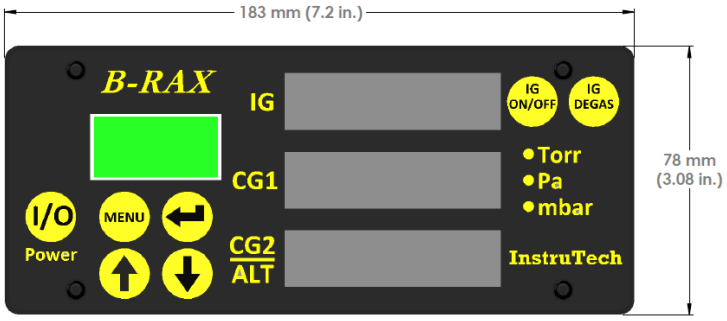
B-RAX 3200

All connections are the same as the B-RAX 3300 except IG (Note IG Collector is removed below)

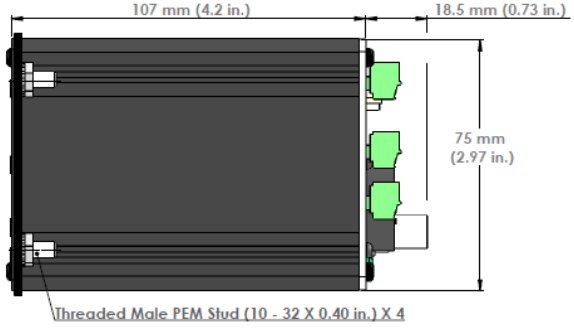


Outline Drawing

Front View



Side View



Ordering Information	***Part Numbers***

B-RAX Vacuum Gauge Controller 3 channel pressure display vacuum gauge controller. Operates one ionization gauge (IG) plus up to two convection gauges (CG), or one IG, one CG and one alternate gauge. Includes 6 setpoint relays, 3 analog outputs, Digital I/O, RS232/RS485 serial communications, one analog input from an alternate gauge. 	
B-RAX 3300; Operates one BA602 nude or BA603 glass hot cathode IG plus up to two CGs B-RAX 3200; Operates one IGM400 hot cathode IG or one CCM500 cold cathode IG plus up to two CGs	B-RAX 3300 B-RAX 3200

Optional 24 Vdc Power Supply for B-RAX Power Input: 100 - 240 Vac, 50-60 Hz Power Output: 24 Vdc @ 9.16 A (220 W); For B-RAX 3300 24 Vdc @ 2.5 A (60 W); For B-RAX 3200 Connector: 2-pin pluggable terminal block to mate with the B-RAX Compliance: CE, RoHS, UL (US/Canada), CCC (China) 	
For B-RAX 3300; Power cord with North American 115 Vac plug included For B-RAX 3300; No power cord included*	PS330-UA PS330-UX
For B-RAX 3200; Power cord with North American 115 Vac plug included For B-RAX 3200; No power cord included*	PS301-UA PS301-UX
* The conventional IEC60320 AC receptacle allows use with any user supplied AC mains power cord set available worldwide.	

Gauge Cable Length	**For BA602 Nude IG to B-RAX 3300 Bakeable Cable 200 °C*** 	**For BA602 Nude IG to B-RAX 3300** 	**For BA603 Glass IG to B-RAX 3300** 	**For IGM400/CCM500 to B-RAX 3200** 	**For CVG101 to B-RAX 3300/3200** 
10 ft. (3 m)	IRNBD441-1-10F	IRN441-1-10F	IRG441-1-10F	BXC400-1-10F	CB421-1-10F
25 ft. (8 m)	IRNBD441-1-25F	IRN441-1-25F	IRG441-1-25F	BXC400-1-25F	CB421-1-25F
50 ft. (15 m)	IRNBD441-1-50F	IRN441-1-50F	IRG441-1-50F	BXC400-1-50F	CB421-1-50F
>50 ft. consult factory	consult factory	consult factory	consult factory	consult factory	consult factory

* The IRNBD441 bakeable Nude IG cable is provided with push-on sockets for connection to the Nude gauge pins (BA602 pins) and is bakeable to 200 °C. All other cables listed above are rated for 50 °C ambient temperature. All IG cables listed above can be used with either single or dual filament ion gauges and filament switching is controlled from the B-RAX controller.

Optional Rack Mount Adapter Aluminum - black powder paint finish Rack Mount adapter panel for installation of one B-RAX as a left-mount or right-mount in a 2U, 19 inch wide rack. 	000849
Rack Mount adapter panel for installation of two B-RAX side-by-side in a 2U, 19 inch wide rack. 	001007

BA602, BA603, IGM400, CCM500 ionization gauges	See BA602, BA603, IGM400 or CCM500 Hornet™ ionization gauge data sheets
CVG101 convection gauge	See CVG101 Worker Bee™ convection gauge data sheets

InstruTech®, Inc.
1475 S. Fordham Street
Longmont, CO 80503
USA

Phone +1-303-651-0551
Fax: +1-303-678-1754
E-mail info@instrutechinc.com
Web www.instrutechinc.com