



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  $4 \times 10^{-10}$  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 stable 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.

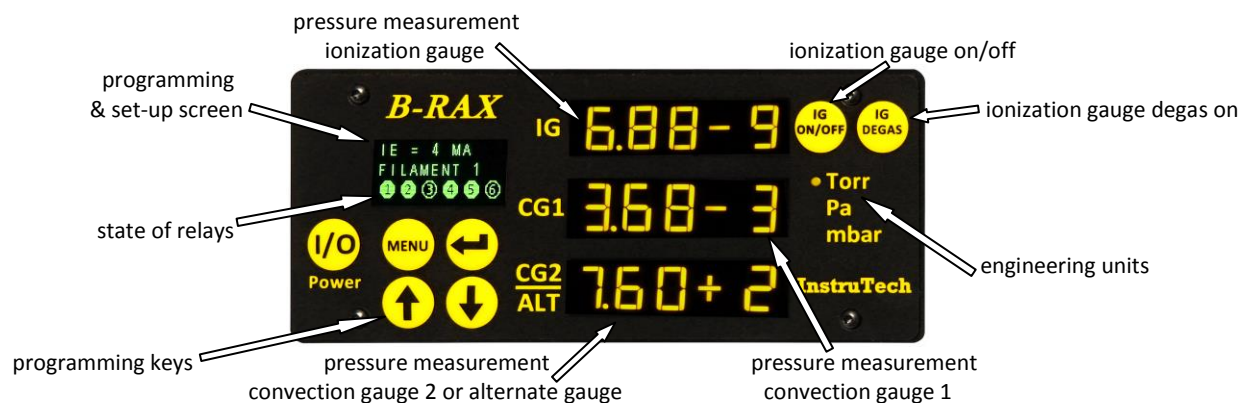
B-RAX Controller	Ionization Gauge Compatibility		Convection Gauge Compatibility
Model B-RAX <u>3300</u> 	One BA602 Nude I <sup>2</sup> R Hot Cathode ( $4 \times 10^{-10}$ to $1 \times 10^{-3}$ Torr)	or           One BA603 Glass I <sup>2</sup> R Hot Cathode ( $4 \times 10^{-10}$ to $1 \times 10^{-3}$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

## Specifications

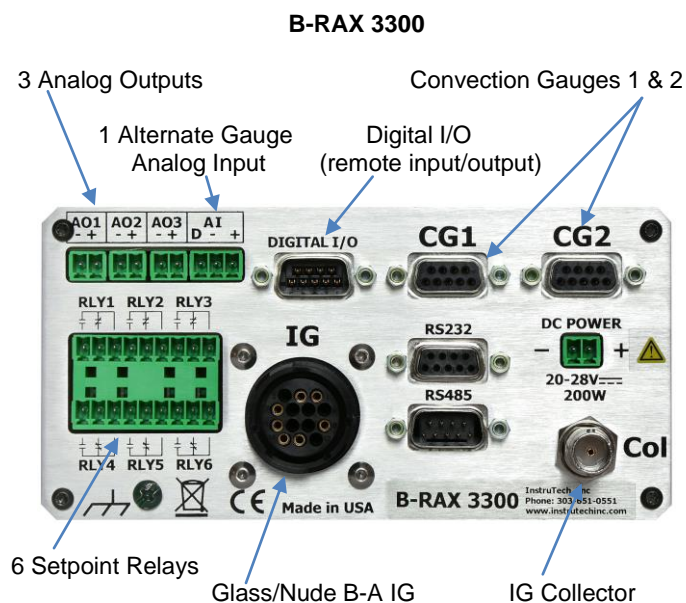
measurement range:		B-RAX 3300; $4 \times 10^{-10}$ to 1,000 Torr when used with the BA602/603 hot cathode IG and CVG101 CG  B-RAX 3200: $1 \times 10^{-9}$ to 1,000 Torr when used with the IGM400 hot cathode IG and CVG101 CG B-RAX 3200: $1 \times 10^{-9}$ to 1,000 Torr when used with the CCM500 cold cathode IG and CVG101 CG
display	pressure indication	LED - 3 independent pressure display channels - 3 digit plus 2 digit exponent per channel
	programming & set-up screen	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 <sup>2</sup> R 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; $1 \times 10^{-3}$ Torr at 100 µA emission current, $5 \times 10^{-4}$ Torr at 4 mA emission current, $1 \times 10^{-4}$ Torr at 10 mA emission current  B-RAX 3200: turns off IGM400 ion gauge filament or CCM500 sensor at the following factory default setting : $5 \times 10^{-2}$ Torr at 100 µA and $1 \times 10^{-3}$ Torr at 4 mA emission current for IGM400 hot cathode $1 \times 10^{-2}$ 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-RAX3200; 20 - 28 Vdc, 36 W protected against power reversal and transient over-voltages
connectors	IG & CG gauge cable assemblies provided by InstruTech 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

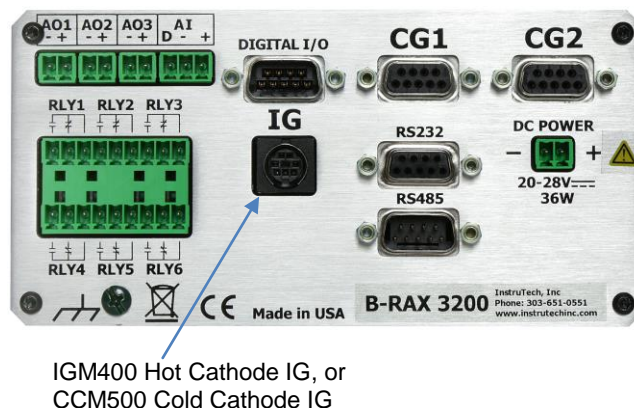


## Electrical Connections

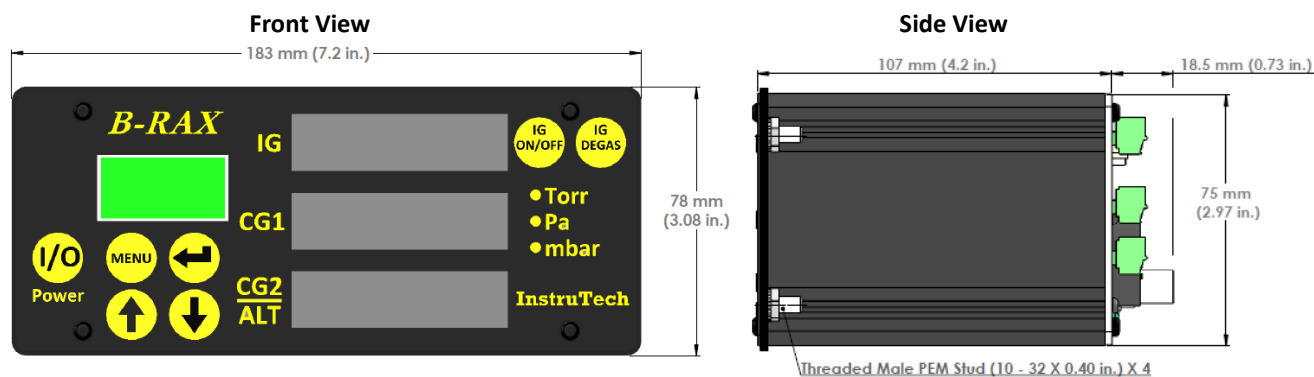


**B-RAX 3200**

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



## Outline Drawing



## 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.

### 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  
CVG101 convection gauge

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

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