



IG2

Quick Start Guide

Step 1: Unpacking the IG2

1. Inspect the boxes for any visible damage. If there is any damage, please report it to the shipping company immediately.
2. Remove all components and inspect them for damage. If there is any damage, please report it to the shipping company immediately.
3. Verify that you have the following items. If any are missing, please contact RBD Instruments at 541-330-0723 or e-mail us at tech@rbdinstruments.com.
 - 04-165 Ion source
 - 32-165 Control
 - IG2-CA1 Cable
 - AC Power Cord
 - Digital Volt Meter
 - Red Banana Plug Cable
 - Black Banana Plug Cable
 - IG2 CD (includes IG2 Manual)

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Step 2: Setting up the IG2

1. Install the 04-165 Ion Source in the vacuum system.
2. Bake the system at 150° C to 200° C for 4 to 8 hours. You may use heat tape to bake only the 04-165.
3. Install the 32-165 Control in a 19" electronics rack.
4. Verify that the 32-165 Control front panel power switch is in the OFF position.
5. Connect the 04-165 Ion Source to the 32-165 Control using the IG2-CA1 cable.
6. Connect the AC power cord to the 32-165 and then plug the AC power cord into the power outlet. DO NOT TURN ON THE POWER to the 32-165 at this time.
7. Set the following switches and controls on the 32-165 Control front panel:
 - a. Set the Beam Control switch to Timer.
 - b. Set the Timer dial to 0.
 - c. Set the Timer switch to Seconds.
 - d. Set the Beam Voltage Select dial to 500, which is its lowest setting.
 - e. Turn the Focus Adjust dial fully counter-clockwise (set to 0).
 - f. Turn the Filament Adjust dial fully counter-clockwise (set to 0).
8. On the 32-165 Control back panel, set the Filament Select Switch (labeled F1 and F2) to the F1 position.
9. Follow the instructions for operating the 32-165, which appear on the next page.

The IG2 is ready for use.

Step 3: Operating the 32-165

This procedure requires the following items:

- The digital volt meter (DVM) and the double-banana connectors that are included with the 32-165.
- A test sample loaded in your system. A sample mount or other conductive sample will work well.

In addition, confirm that the 04-165 is under vacuum (better than 5×10^{-5} Torr).

1. Turn on the 32-165. The green light to the right of the ON/OFF switch is illuminated. The amber-colored On light for the Beam Control lights for a moment then goes off again. If the light does not go off immediately, the Timer switch is set to Minutes. Change the Timer switch setting to Seconds.
2. Set the Focus Adjust dial to 4 (80%) as a nominal setting. Once you have the optimal value for this defined as it applies to your system, it can be locked in place because you won't need to change it again. (How to determine the optimal value for your system is covered in the Principles of Operation section of the IG2 Operation Manual.)
3. Monitor the voltage output on the Filament Adjust dial by connecting the DVM to the +/- Filament Adjust connectors on the front panel, using the included double-banana connectors and DVM.
4. Slowly increase the Filament Adjust voltage by turning the dial clockwise until the DVM shows 2 volts. This corresponds to 2 amps of filament current. To get this reading, you'll be at approximately 4 on the Filament Adjust dial. This is a good starting point for defining your standard operating settings for your 32-165. The filament in the 04-165 should be glowing white.
5. Backfill your vacuum system to 5×10^{-5} with argon.

Turn the Beam Voltage Select dial to 500 V. Connect the DVM to the +/- Beam Voltage Select connectors on the front panel.

- .5 V on the 32-165 when measured with the DVM corresponds to 500 V of beam voltage being applied to the ion source
- 1 V on the 32-165 when measured with the DVM corresponds to 1000 V of beam voltage being applied to the ion source
- 1.5 V on the 32-165 when measured with the DVM corresponds to 1500 V of beam voltage being applied to the ion source
- 2 V on the 32-165 when measured with the DVM corresponds to 2000 V of beam voltage being applied to the ion source.

For any Beam Voltage Select setting, you can optimize the Focus Adjust setting by maximizing the target current. The ratio of the Focus Adjust voltage will change automatically as you reduce or increase beam voltage.

6. Move the DVM to monitor the Anode Monitor test points, which are located under the timer meter.

The reading shown on the DVM for the Anode Monitor corresponds to the beam current that is leaving the ion source (0 to 10 mV corresponds to 0 to 10 μ A). This is useful when the target current cannot be measured.

7. Fine-tune the filament:

- a. Increase the Beam Voltage Select to 2000 V.
- b. Increase the filament current using the Filament Adjust dial slightly until you monitor 10 millivolts on the Anode Monitor, which corresponds to 10 μA of anode current (ions being generated by the source and accelerated to target).

Tip: Operating the filament current higher than required to get 10 μA of target current will shorten the filament lifetime. The nominal filament current range is 2.1 to 2.3 amps. Filament current is internally limited to 2.5 amps. You can run it higher than 2.3 amps (for short periods of time), but doing so will shorten the lifetime of filament.

Notes:

1. The meter on the front panel of the 32-165 allows you to monitor the run-time of the ion source. This helps you determine the life of your filament, and is useful for maintenance planning purposes.
2. Even though the beam is off, the filament stays on to stabilize the gun. This affects the filament life. To prolong the filament life when the 32-165 is not in use:
 1. Turn the Filament Adjust dial fully counter-clockwise.
 2. Turn the power switch to OFF.