

614-0796 Spectrum Tube Power Supply

Introduction: What are spectrum tubes, and why do we need a separate power supply for them? Spectrum tubes are small glass vessels which are filled with a specific gas, and are then sealed. Electrodes are added to the ends of the tubes. When electricity is passed through the tube, it excites the molecules of the gas, causing them to emit light.

However, all gases are not created equal, and different elements will produce a different light spectrum. Argon, for example, produces a purplish light, while hydrogen is redder. Why is this the case?

The gases most commonly selected for spectrum tubes are used because of their sharp spectral lines. To the naked eye, each tube produces a single color. However, if you look at the light through a spectrometer, it will reveal sharp lines in the spectrum. As noted above, Argon will produce strong spectral lines in the violet portion of the spectrum, but will be weak in the red. Hydrogen produces some violet lines but dominates the redder portions of the spectrum. Sharp lines indicate that the light is *monochromatic*, or made of one color.



Why is this important? By analyzing light, it is possible to use the spectrum to determine which kinds of atoms are producing it. Argon will produce the same spectral lines, regardless if it is argon in your spectrum tube, or argon in a star millions of light years away. Because of this, astronomers can use spectrometers to determine the precise chemical makeup of a star. This is important for classifying stars, determining their age or even if they have planets!

Your Spectrum Tube Power Supply is exactly that: it provides the electricity needed to energize the gas in your spectrum tubes, causing it to glow.

Operation: The spectrum tube power supply is designed to be very easy to use. It can accommodate tubes of varying lengths, which is very helpful if you have a mixed collection. To adjust the length, simply loosen the brass nut on the back of the column, slide the top receiver into the desired position, and tighten the nut. It's that easy.

To put a tube in the power supply, place one end in the lower receiver, and press down the spring there. This should give you enough clearance to slide the top portion of the tube into the upper receiver.

Note: For safety, it is recommended that you slide the upper receiver down an inch or so after placing the tube inside. This will completely cover the electrodes on the tube, minimizing the chance of shock.

To activate the power supply, simply press the red switch. On the left hand side of the unit is an intensity dial. Low settings will prolong the life of the tube; higher settings will make the spectrum more visible.

When you are done with the experiment, slide the upper receiver out of the way and remove the tube. It is best to give the tube a half minute or so to cool before touching it.

To prolong the life of the tube, it is best to activate it for only 30 seconds at a time. For best results, allow the bulb to cool between uses.

Note: the Spectrum Tube Power Supply uses high voltage electricity to energize the tubes. For this reason, it should only be operated by a teacher.

Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

May we suggest:

614-0210 Project Star Spectrometer: Explore flame spectra, streetlights and solar spectra with this dependable device. Since it is labeled in electron volts and nanometers, you can use it in both your physics and chemistry labs. It is plastic and contains a built-in chart of common spectral lines. 31 x 18 cm long. With instructions.

614-0701 Cylindrical Spectroscope: Metal teaching spectroscope. Great colors are produced by superior optics and highly accurate diffraction grating. View the spectral diffractions of various light sources and excited gasses. Includes focusing adjuster. 100mm long by 25mm diameter.