



Resonator Gas System

CONCOA laser gas controls are designed to meet the unique requirements of carbon dioxide lasers that use a gas mixture of helium, nitrogen, and CO₂. The lasing principles are similar for all CO₂ lasers. Different designs employ various methods of exciting and cooling the gas mixture in the resonator cavity. Other gases such as carbon monoxide and hydrogen may be added to supplement the basic three-gas mixture.

The performance and integrity of the gas delivery system will affect the productivity and profitability of the laser. CONCOA zero permeation gas systems prevent atmospheric contamination during a cylinder exchange by incorporating check valves in the CGA glands and optional purge valves. The 620 and 621 Series Automatic Switchovers provide a continuous supply of gas that maintains the productivity gains of an automated material handling system.

CONCOA 601 Series Regulators, 620 and 621 Switchovers are manufactured using computer-controlled, watchmaking machinery that maintains tight tolerances, which is key to avoiding moisture diffusion and hydrocarbon out-gassing into the lasing cavity (i.e. resonator). Excessive optic thermal absorption caused by deposited contaminants reduces power output and distorts beam quality. Out-gassing is the process in which the material (such as a neoprene regulator diaphragm) releases contaminants such as plasticizers into the gas stream. For this reason, CONCOA laser-grade equipment is made from barstock bodies with stainless steel diaphragms and have a design leak rate of 1×10^{-8} scc/sec. CONCOA also offers moisture traps and 2-micron filters to meet the most demanding laser manufacture requirements. The following illustrates the basic components of a zero permeation resonator gas supply system.

