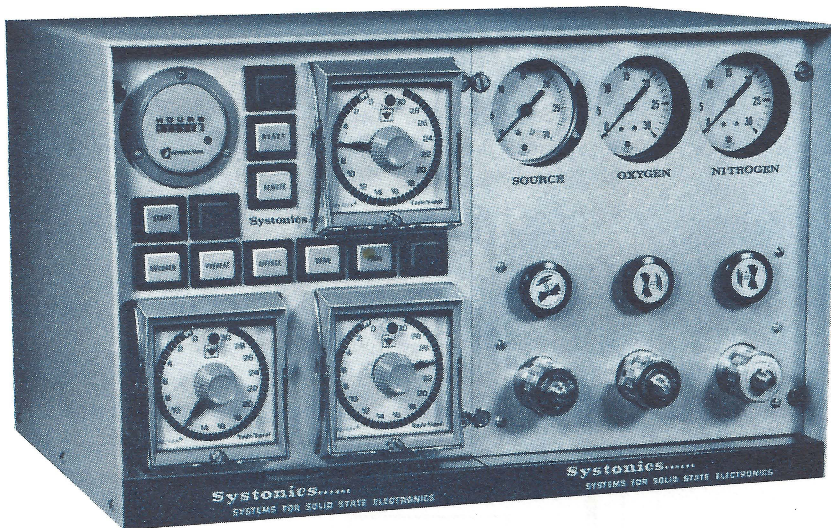
Systonics.....

SYSTEMS FOR SOLID STATE ELECTRONICS



AUTOMATIC DIFFUSION SYSTEM

The Systonics Liquid Source Diffusion Systems have been specifically designed for low concentration and low glass formation depositions with continuous or cycled source management. These demanding diffusion conditions require dopant and reaction gas control in the parts per million range, at surface concentrations very near the minimums needed for reaching electrical solubility limits. The systems are particularly stable sources when used for conventional device ambient conditions. The design, construction, and testing techniques eliminate compensation for the oxygen and water vapor which tends to diffuse through joints in glass and flow meter systems. This results in direct control of the dopant delivered, and longer diffusion zones.

The source container and its associated valving are external to the gas supply chassis to facilitate the use of temperature stabilization baths and direct coupling to the furnace muffle tube. The latter assures rapid and reproducible system response in cycled operation. The source concentration is stabilized by routing flow to a symetrically located vent line. The vent is purged at a flow which is slaved to the main inert carrier gas control and is factory set to the proper ratio.

The Automatic Cycle Controller provides five separately adjustable times and selection of the control location. The times are preheat, diffuse, drive, alert, and recover. The source is injected into the furnace during the diffuse time. Alert is the final portion of the drive time with a visual display to warn of the nearing cycle end. Visual and audible alarms signal cycle end and continue during overtime running. The 'information-only' recover time automatically follows cycle stop and system reset to allow reproducible spacing of successive furnace loadings. Power, and the air supply for operating the souce valves, are interlocked to return the system to a safe standby condition. Manual reset is required.

The modular design of the source, gas supply chassis, and control consoles permit adaptation to any furnace configurations. A wide variety of special gas flows and valving arrangements may be accomodated by the basic system due to the unique gas flow control method which is employed.

PRECISION CONTROL
* Flow stabilized source.
* Leak free construction.
* Longer uniform zones.
* Calibrated capillary gas metering.
* Controlled gas saturation without entrainment.
* Designed for TE source cooling.

SOURCE VERSATILITY
* Continuous or cycled source flow.
* Boron tribromide.
* Phosphorous oxychloride
* Arsenic trichloride

SIMPLE OPERATION
* Pushbutton controls.
* Automatic cycle timing.
* Remote indication and control.
* Cycle end alert and alarm.
* Automatic recovery timing.

PRODUCTION ECONOMY
* Simple quartz muffles.
* In place calibration check.
* Minimum maintenance.

LOW FLOW CAPABILITY
* Minimal glass formation.
* Low concentration diffusion.
* Extended source life.

Systonics gas mixing systems use the pressure dependence of fluid flow through a fixed capillary for flow metering and control. Each gas control channel incorporates a precision gas regulator and one or more custom flow elements. Flow is varied by adjusting gas pressure which is accurately readout on a bourdon tube gauge. The calibrated flow element is analogous to the fixed resistor in the determination of electric current by measurement of the voltage drop across a known impedance. The advantage of this method to precision gas mixing systems is the inherent stability and reproducibility of flow which extends well into the fractions of a cc/min range. At higher flow values the internal gas regulation promotes rapid and accurate reestablishing of preset flows in solenoid valved operation. The stainless steel capillary elements, pressure gauges, and other system components are fully compatible with leak free, noncontaminating construction for sustained quality performance.

SPECIFICATIONS

General

- Nitrogen pressure — 30 psi min.
- Oxygen pressure — 30 psi min.
- Dry air or N_2 — 60-100 psi.
- Preheat, Diffuse, and Drive times — 0-30 min std.
- Final Alert time — 0-60 sec.
- Recovery time — 0-15 min.
- Source capacity — 300 cc. std.
- Flow variability — Nominal ± 50% calibration curves supplied.

Installation

- Gas and Air inputs — ¼″ OD tube connectors, flareless.
- Muffle termination — 12mm OD x 8mm ID quartz tube.
- Weight, Gas Chassis — 19kg (40lb)
- Weight, Timer — 14kg (31lb)

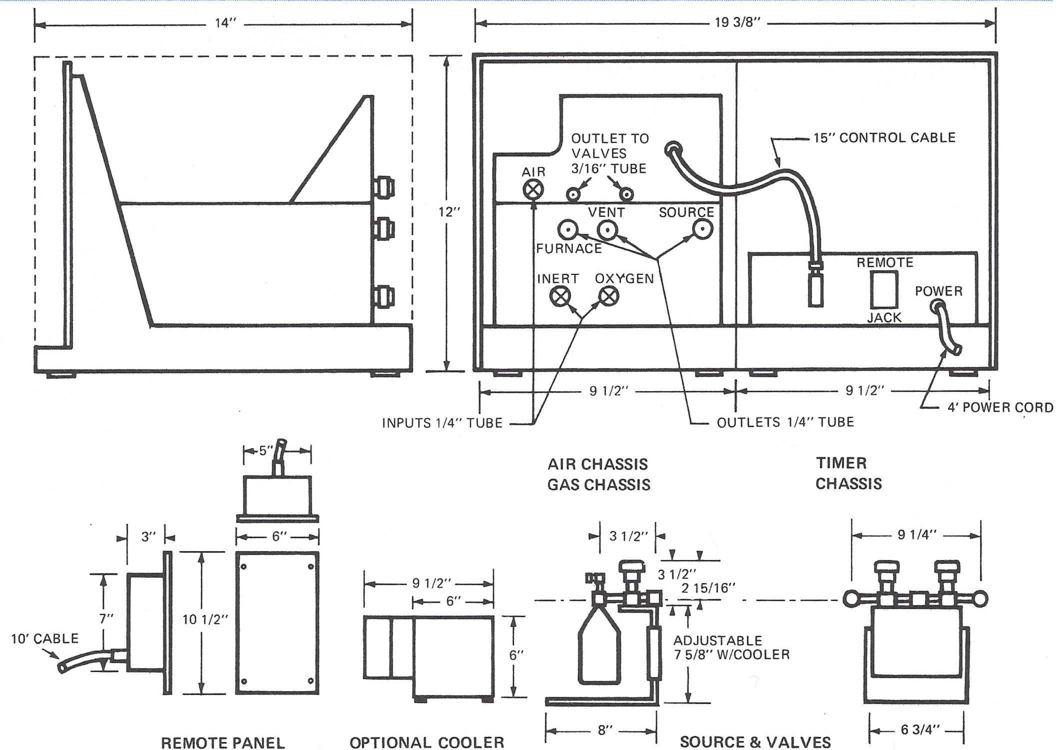
Options

- Stainless steel inputs.
- 220 VAC; 50 hz.
- Process gas interlocks.
- LED readout, solid state timers.
- Custom flows and gasses.
- Lower input pressures.
- Alternate process times.
- Remote timer location.
- Manual switching.
- Air cooled TE source bath and power supply.

Electrical

- Power — 115VAC, 60 hz, 3A
- All illuminated switches and indicators — neon 115 VAC

DIMENSIONS:



PRICE and DELIVERY

* Available on request from factory or your nearest representative.

Systonics engineering experience has been continuous since 1955 in the development of semiconductor devices, processes and equipment. As part of our full service to the solid state electronic industry we offer process consulting, with specialties in yield improvement and process organization. Please contact us for more information.

WARRANTY

All Systonics systems are warranted against defects in material and workmanship for a period of 120 days following delivery.

YOUR NEAREST REPRESENTATIVE: