



# SENTRY™ 9000

## Automated Exhaust Flow Controller

Hardware

### Complete Process Control

The SENTRY™9000 is designed to automatically control the exhaust for track equipment or other process systems. By providing complete control over the exhaust at the process tool, the SENTRY™9000 allows full process characterization and optimization.

### Based on Proven Technology

The SENTRY™9000 consist of a mass flow controller and a TIM interface. A pressure transducer and a Venturi are added to measure differential pressure, which can then be converted, through a basic algorithm, to flow. The SENTRY™9000 controls flows between 4 and 35 CFM. A stepper motor is used to open and close the throttle to meet the desired flow rate. The TIM provides the electronic user interface.

### Patented Mechanical Control

The SENTRY™9000 is based on the “floating piston” concept, with one moving part reacting within 50 milliseconds to changes in exhaust pressure. All dynamic control is accomplished through the piston.

### Powered By Gravity and Exhaust Flow

The piston is held aloft by the pressure differential between the clean room and the exhaust stream. Once this differential overcomes the weight of the piston itself, the piston begins to float. When the exhaust flow fluctuates, the piston inside the SENTRY™ responds immediately (within 50 milliseconds) to the change, preventing the fluctuation from affecting the process.

### Mass Flow Control

The SENTRY™9000 is set up to control the exhaust flow from a process tool. For coating system, for example, the SENTRY™9000 allows the process controller to switch between optimized set points for low flow during the coating period and high flow during the spin off, edge bead removal and backside rinse operations. These set points (up to four) can be programmed into the TIM and can be changed to match the process.

### Complete Set Point Control

While dynamic control is accomplished by the piston, static control over the set point is controlled by the TIM. The TIM provides the SENTRY™9000 with a flow rate to be maintained. Through a PID algorithm, the stepper motor opens or closes the throttle until the

### Features

- Mass flow control of process exhaust
- Fast response
- Automatic set point control
- Analog or digital communications

### Benefits

- Process optimization
- Process repeatability
- Particle reduction
- Reduced “splash back”
- Reliable
- Fail-safe

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flow rate is obtained. The throttle is then fixed to allow the piston to react to changes in house exhaust.

#### Easy-to-Use Operator Interface

A trend chart and menu-driven programming create a helpful interface between SENTRY™9000 and user. The TIM provide the user a substantial window into the process:

- Real time trend chart of actual flow data
- Real time numeric read-out of set point, process flow and stepper motor position
- 4-key menu driven programming of set points, timing or remote control modes

#### Host Control Over the TIM

In addition to stand alone, closed-loop control the TIM can also work with an upstream controller. The TIM has a 0-5V analog interface for remote set point control from the process tool. An RS422/485 serial communications port is available for use by the process tool or the facility integrated control system.

#### Materials Compatibility

The SENTRY™9000 is constructed of stainless steel, Teflon, aluminum and epoxy: materials ideally suited for use with solvents.

#### Local Exhaust Flow

The SENTRY™9000 is available with a booster fan. The vacuum generated by the booster fan creates a localized pressure zone to power the SENTRY™. By providing an independent power source, the booster fan ensures proper functionality of the unit, protecting the process without challenging the exhaust system.

#### SENTRY 9000 Specifications

<b>Flow Rate Range:</b>	4-35 CFM (113 – 991 LPM)		
<b>Input O.D.:</b>	3" (76 mm)		
<b>Output O.D.:</b>	4" (102 mm)		
	3" (76 mm) (with booster fan)		
<b>Exhaust required: (without booster fan)</b>	Minimum 2.5" of water column for maximum flow rate (622 Pa)		
<b>Accuracy to set point:</b>	± 5%		
<b>Response time to fluctuation:</b>	50 milliseconds to fluctuations of 100%		
<b>Response to instantaneous spike:</b>	> 92% attenuation		
<b>Materials:</b>	Teflon, Stainless Steel, Aluminum, Polyethylene, Epoxy		

Dimensions	Controller	Controller with Booster Fan	TIM
<b>Length</b>	11.33" (288 mm)	19.00" (483 mm)	8.32" (211 mm)
<b>Width</b>	8.00" (203 mm)	13.25" (337 mm)	5.41" (137 mm)
<b>Height</b>	11.84" (301 mm)	11.84" (301 mm)	2.33" (59 mm)
<b>Weight</b>	22 lbs. (10.0 kg)	36 lbs. (16.3 kg)	2 lbs. (.9 kg)

**Power Options:** DC Supply: +15 to +24 VDC, 650 mA and -15 to -24 VDC, 50 mA  
90-260 VAC, 47-63 Hz

**Control Types:** 0-5 Volt analog  
RS422/RS485 at 9600 baud  
Stand Alone Operator Keypad



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