



## Description

The SL-2000 Series Smoke Duct Detector is the latest innovation for early detection of smoke and products of combustion present in air moving

through HVAC ducts in Commercial, Industrial, and Residential applications. The unit is designed to prevent the recirculation or spread of smoke by air handling systems, fans, and blowers. Complete systems may be shut down in the event of smoke detection. The SD-2000 is designed and built to meet all local code requirements regarding HVAC supply and return duct smoke detectors. Output terminals are provided for a wide range of remote accessories such as horns, strobes, remote status indicators, and test/reset key switches or push buttons.

The SD-2000 includes many features that represent true innovations from current generation duct smoke detectors. Our traditional installer/servicer-friendly approach has been closely followed and expanded throughout the SD-2000. This philosophy provides a new level of efficiency in after-purchase value to both the installer/servicer and end-user. Our attention to detail has yielded a host of "No-Tools Required" features, as well as a multi-application performance level as yet unmatched in the industry. Innovative product combined with unsurpassed customer service equals the right combination for all of your projects. The key features detail many of the customer-driven innovations incorporated in the SD-2000 Series.

## Features

- Both models listed for high-temperature applications
- Operating voltages: 230VAC, 115VAC, 24VAC, 24VDC
- Interconnect up to 30 units for common functions
- Patent pending "No-Tools Required" front or rear loading and removing sampling/exhaust tubes
- Patent pending "Test Port Valve" allows for aerosol smoke testing without cover removal
- Instantaneous cover removal trouble indication
- Staggered terminal blocks for easier wiring
- Flashing LED on detector head indicates normal operation
- Magnet test capability (magnet included)
- More wiring space than competitive models
- Duct wall gaskets on back of enclosure are pre-installed
- Reset switch is also an alarm test switch
- Unit includes green pilot and red alarm visual indicators
- External mounting tabs do not require cover removal to install
- Colored cover gasket indicates proper cover seal
- Compact, lightweight size means easy handling
- Two sets of 10A form "C" alarm contacts
- One set of 2A form "A" alarm contacts
- One set of 10A form "C" trouble contacts
- Large terminal connection screws
- Standard interchangeable photoelectric or ionization heads
- Complete wiring details permanently attached to unit

## Technical Specification

Model Number:	SD-2000-N Ionization SD-2000-P Photoelectric
Sampling Tubes:	STN-1.0 Sampling tube for 12" or less duct STN-2.5 Sampling tube for 6" to 2.5' duct STN-5.0 Sampling tube for 2.5' to 5.0' duct STN-10.0 Sampling tube for 5.0' to 10.0'
Power Requirements:	230VAC Standby 8 mA, Alarm 18mA 115VAC Standby 14 mA, Alarm 32mA 24VAC Standby 55 mA, Alarm 190mA 24VDC Standby 14 mA, Alarm 68mA
Alarm Contacts Rating:	2 sets rated at 10 Amps @ 115VAC 1 set rated at 2 Amps
Trouble Contacts Rating:	1 set rated at 10 Amps @ 115VAC
Air Velocity:	100 to 4,000 ft./min.
Ambient Temperature:	0...60°
Ambient Humidity :	10-85% RH
Wiring:	Solid or stranded: #12 to #22 AWG
Material:	Grey plastic backbox, clear plastic cover (Makrolon 94V-0)
Dimensions:	13 ½" L x 4 ½" W x 2 ¼" H
Weight:	2 ½ lbs.
Hardware:	7" exhaust tube, sampling tube end cap, mounting template, test magnet, and mounting hardware included

## Order Codes

SD-2000-N	Duct smoke detector housing with ionisation sensor
SD-2000-P	Duct smoke detector housing with photoelectric sensor
STN1	Sampling tube 1-2'
STN2.5	Sampling tube 2-4'
STN5	Sampling tube 4-8'
STN10	Sampling tube 8-12'

## Sampling Tubes

The operating principle of a duct detector is based on the Venturi effect. Two tubes extend into the HVAC duct. Air flowing through the duct is forced into the air intake (inlet) tube via the air intake holes, (facing the airflow) and passes over the detector head. The air will be drawn out via the exhaust tube back into the HVAC duct. (A 7" exhaust tube is provided in the installation kit.) When the concentration of smoke particles suspended in the air stream reach the alarm threshold of the detector head, the unit will go into alarm.

The duct smoke detector units are designed to operate in duct widths from 6" to 10' wide with an air velocity between 100 to 4,000 feet per minute. To verify correct installation, the pressure differential between the sampling (high side) and exhaust (low side) tubes should be measured using a Magnehelic pressure gauge or equivalent. An acceptable reading is between 0.01 and 1.2 inches of water. To minimize the impact of air turbulence and stratification on performance, a duct smoke detector should be located as far as possible downstream from any obstruction (i.e. deflector plates, elbows, dampers, etc.). In all situations, confirmation of velocity and pressure differential within specifications is required.

The SD-2000 Series duct smoke detectors employ a specially notched sampling tube, which may be ordered separately in one of four standard lengths.

STN-1 for duct widths of 6" TO 1.0'

STN-2.5 for duct widths of 1.0' TO 3.0'

STN-5 for duct widths of 3.0' TO 5.0'

STN-10 for duct widths of 5.0' TO 10.0'

Standard sampling tubes are steel tubes with air intake holes drilled the entire length of the tube. These tubes can be cut to length and must span at least 80% the width of the duct. Sampling tubes over 3.0' must be supported on the opposite side of the duct. To ensure the correct operation of the sensing tube, the red end cap (red stopper in installation kit) must be inserted in the end of the air intake sampling tube. For custom duct widths, always use the next longest standard size and cut down to the exact requirement.

## Installation

To determine the correct installation position for an SD-2000 Series duct smoke detector, the following factors must be considered.

1. A uniform non-turbulent (laminar) airflow between 100 ft/min to 4,000 ft/min. must be present in the HVAC duct. To determine duct velocities, examine the engineering specifications that define the expected velocities or use a velocity meter.
2. Identify a code compliant location (supply or return side, or both) for the installation of the duct unit that will permit easy access for viewing and serviceability.
3. When installing on the return side, install duct units prior to the air being exhausted from the building or diluted with outside "fresh" air.
4. When installing duct smoke units downstream of filters, fires occurring in the filters will be detected, but if the filters become blocked, insufficient air flow through the duct unit will prevent the correct operation of the duct detector. Duct units installed in the supply air side may monitor upstream equipment and/or filters.
5. Where possible, install duct detectors upstream of air humidifiers and downstream of dehumidifiers.
6. To prevent false alarms, the duct detector should not be mounted in areas of extreme high or low temperatures, in areas where high humidity exists, or in areas where the duct may contain gases or excessive dust.

## Duct preparation

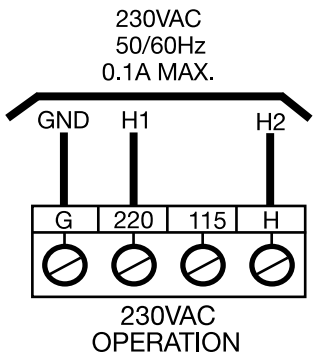
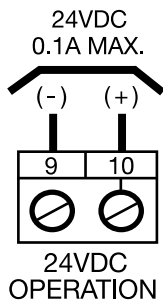
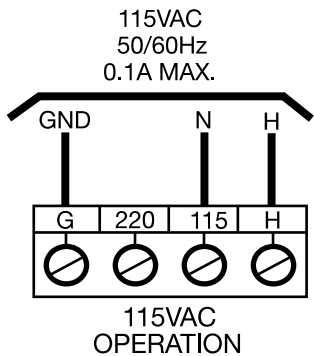
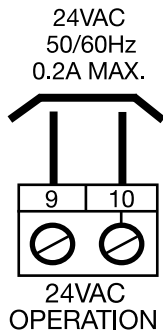
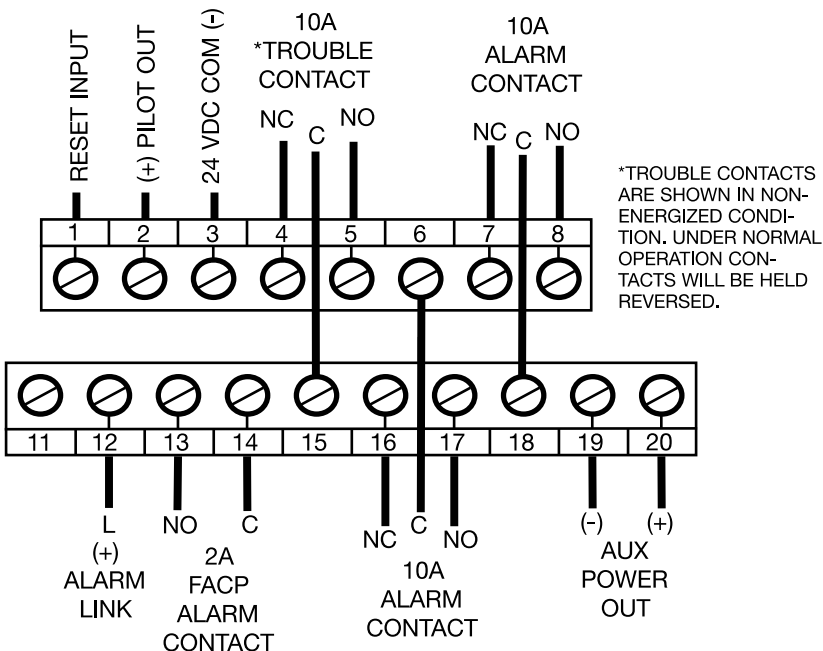
Remove mounting template from the installation kit. Remove paper backing from the mounting template and affix it to the duct at the desired location. Using the template as a guide, drill (2) mounting holes, 3/32" (2.5mm) for the #12 X 1/2" sheet metal screws packaged in the installation kit. Drill or punch (2) 1 1/4" (32mm) holes for inlet sampling and exhaust tubes, using the template as a guide. Clean all holes.

## Mounting

After securing the sampling and exhaust tubes to the duct smoke unit, (or initially placing the tubes through the 1 1/4" holes drilled or punched in the HVAC duct to accept the inlet sampling and exhaust tubes and then attaching them to the duct unit), hold the duct unit assembly in position and use (2) # 12 X 1/2" sheet metal screws (packaged in the installation kit) to secure the duct smoke detector to the HVAC duct sheet metal.

# Duct Smoke Detector SD-2000

## Wiring



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## Testing & Maintenance Procedures

To determine the correct operation of the SD-2000 Series duct smoke detector, ensure input power is connected and the green pilot LED is illuminated. The LED on the detector head of both the ionization and photoelectric models will flash while the unit is in standby mode. The LED on the smoke detector head will be permanently illuminated when smoke is detected and the head is in alarm.

With the air handling unit shut down (not connected), and the clear cover removed, press and hold the test/reset button and the cover removal switch on the SL-2000. The red alarm LED on the circuit board will be illuminated and the alarm relay outputs will change state. Using a multimeter set to OHMS (or continuity buzzer function on the meter) place the meter probes on the following terminals, and ensure the contacts are closed (continuity) (8-18) and (6-17). When releasing the test/reset button these contacts will open. The trouble contacts (4,15,5) on the SL-2000 detector will not change state in the event of a fire alarm, operational, or functional testing. The trouble contacts can be tested by either releasing the cover removal switch, or depressing the cover removal switch after rotating the smoke detector head counter-clockwise and removing the detector head. This action will extinguish the green pilot LED and cause the trouble contacts to change state, (4-15) will be closed (continuity) and (5-15) will be open circuit. Replacing the detector head and rotating it clockwise until it locks, will cause the green pilot LED to be illuminated and the unit will be operational, terminals (4-15) will be an open circuit and (5-15) will be closed (continuity).

### Functional testing

Once operational testing is concluded the unit requires functional testing to determine the correct operation of the detector head.

### Magnet testing

Place the magnet provided with the installation kit on top of the housing between the raised sections above the detector head (as indicated on the unit cover. Allow at least five seconds for alarm initiation. Remove magnet and reset detector.

### Smoke testing

Using smoke test canister with testing nozzle insert the test gas nozzle into the test port on the unit cover. Press can against cover to release gas into the chamber.

Caution: do not spray gas for more than ½ second. Overuse of test gas facility may result in Detector contamination.

After 15 to 20 seconds the detector head will go into alarm, illuminating the detector head LED and causing the duct unit functions to operate, alarm relays will change state, and the alarm related remote accessories, if attached, will function.

If no test gas is available to conduct functional testing, remove cover and, while holding down the cover removal switch, blow smoke from a cotton wick or punk directly at the head to cause an alarm. The alarm indicator should illuminate within one minute. Should additional testing also be required for simulated fire conditions, smoke bombs placed in the duct may not be suited for the particular detector head (photoelectric or ionization) selected and installed. Consult the smoke bomb data for proper use and compatibility with detector type.

The S65A ionization detector head (55000-225APO) utilizes a radioactive source as its means of detection and will detect smoke particles of between .1 and 1 micron in size.

The S65A photoelectric detector head (55000-328APO) operates on the principle of light scatter and will detect smoke particles of between 1 and 10 microns in size.

When purchasing smoke bombs for additional required functional testing, ensure smoke particle sizes comply with the criteria as described above.

Note: In situations that require a duct smoke detector to be held in an alarm condition for an extended period of time, the magnet test or smoke test methods should be used to ensure the detector is locked into alarm.

### Maintenance

Each installation location must be assessed on its own merits. If the protected area is of a very dirty nature then the SL-2000 Duct unit(s) will have to be checked and cleaned on a quarterly basis or when cleaning is required. As a guideline the smoke detector head should be cleaned every six months or as required. The best methods of cleaning are to vacuum the detector head thoroughly or to blow the detector head out using clean, dry compressed air. Do not use chemicals or non-conforming air to clean the detector head housing as this could contaminate the detector head and damage the casing.

Sensing tubes must be inspected and cleaned in accordance with the schedule as determined above, to allow the free flow of air through both inlet and exhaust tubes. Consult your local code and AHJ requirements for required maintenance schedules.