

Duct Smoke Detector



Features

- Damped or un-damped output
- Manual or auto reset
- Analogue output for service diagnostics

Specification

Supply	24Vac 50/60Hz or 24Vdc(-10 +15%)
Power consumption	62mA
Outputs:	
Relay	SPST 1A @ 24Vdc, 120Vac
Analogue	2-10Vdc
Analogue status levels:	
<2Vdc	Sensor fault
3-7Vdc	Normal operation
7-9Vdc	Optics require cleaning
>9.5Vdc	Smoke alarm
Minimum duct size	100 x 320mm
Maximum duct size	450 x 450mm
LED indication	ON in alarm
Reset	Manual or auto reset, selectable
Sensitivity	3 to 25% obscuration, adjustable
Signal damping	On/Off selectable
Housing:	
Dimensions	130 x 68 x 58mm
Material	Glass-filled Polycarbonate to UL94V-0
Probe:	
Dimensions	300 x 25.5mm dia.
Material	ABS plastic
Protection	IP65 (housing only)
Ambient range:	
Temperature	+10 to 40°C
RH	0 to 95% non-condensing
Country of origin	UK

Product Codes

SD-521
Duct smoke detector, 300mm probe

Technical Overview

The SD-521 provides an auto or manual reset relay output on detection of smoke, with a user adjustable threshold. An analogue output can transmit smoke and service alarms to a BEMS system.

Description

The SD-521 duct smoke detector has been developed from a proven design using modern devices to provide effective and reliable detection of smoke in ventilation systems.

Detection of smoke is achieved by monitoring a carefully controlled infra red beam within a perforated tube which is inserted into the ductwork. This method senses smoke directly within the duct eliminating the problems associated with conventional detectors mounted in sampling boxes.

Circuitry incorporated in the design of the detector controls the infra red beam continuously. This ensures that the detectors response will remain constant throughout operation of the system. External influences including background pollution, airborne dust and low level electrical interference frequently found in commercial and industrial applications, a common source of problems with some other types of detector, are selectively filtered by the electronics thereby providing the highest sensitivity to smoke combined with effective rejection of short term disturbances that would otherwise give a false alarm.

The detector features variable sensitivity and an advanced signal damping circuit which can be bypassed for testing purposes. And this signal is available as an analogue output to communicate with a building management system.

Recommendations

The SD-521 has a probe length of 300mm and should NOT be used in ducts with a diameter or square size greater than 450mm, as it will not monitor the whole of the duct and smoke may pass along the duct without being detected.

Units should NOT be mounted where ambient sunlight will fall on the photocell.

Units should never be mounted at or near sharp bends in ductwork, as turbulence and side currents can carry the smoke away from the probe.

The SD-521 is an optical beam detector and therefore, air velocity has little effect on performance. However, careful positioning of the detector is required if optimum detection

Recommendations (continued)

is to be achieved. The detector should always be fitted with the holes in the sensing tube parallel to the airflow.

Units should to be mounted close to supply or extract fans.

With large installations, where several ducts collect into a common duct, consideration must be given to dilution of smoke and rate of airflow. For example, 10 small ducts may feed at different points into one large main extract duct, and if only one smoke detector is fitted in the main extract duct, the position can arise where one duct is feeding smoke and nine are feeding clean air. The amount of smoke is therefore diluted by 90%, and if this is coupled with a high flow rate, the smoke may not be detected for the minimum operating period of 1 second, resulting in no alarm being generated. It may be necessary to mount 10 detectors in each of the small ducts to guarantee correct operation.

Installation Notes

Removable links are provided for signal damping and internal latching of the output relay.

It is recommended that the damping be used (LK1) for normal use as this will give the best false alarm rejection. The link should be removed for testing purposes.

The internal latching circuit is enabled with the link LK2 in place, in this condition any alarm will result in the detector signal remaining on until locally reset. If the latching link is removed and conditions return to normal for this reason the electrical circuit to which the detector is connected should have self latch with reset facilities.

Due to the self calibrating design of the detector as dust builds up on the optics the internal signal is increased to compensate, this results in the detector maintaining sensitivity during operation. Failure to clean the detector will ultimately result in an alarm signal occurring. At the final signal level, either from dust accumulation or dense smoke the detector will remain in alarm state for a minimum of 1 minute, following this final stage the detector will not be able to recalibrate and will no longer function correctly.

As with all detectors it is not recommended to switch fan or damper loads directly as any fire in the vicinity may damage the detector or the wiring resulting in loss of control.

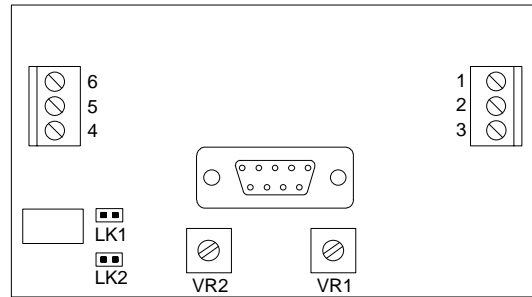
Installation

1. The SD-521 should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)
2. Ensure that all power is disconnected before carrying out any work on the SD-521.
3. Maximum cable is 2.5mm², care must be taken not to over tighten terminals.
4. If the sensor is mounted outside, it is recommended that the unit be mounted with the cable entry at the bottom. If the cable is fed from above then into the cable gland at the bottom, it is recommended that a rain loop be placed in the cable before entry into the sensor.
5. Drill two holes at 142mm centres, and a 26mm dia. probe hole as dimensions on page 3. Fix the IP65 housing to the duct with appropriate screws.
6. Remove the front cover by undoing the two screws on the lid and separating from the main body.
7. Feed the cable through the waterproof gland and terminate the cores at the terminal block. Leaving some slack inside the unit, tighten the cable gland onto the cable to ensure water tightness.
8. Replace the lid after the connections have been made.
9. Ensure the voltage is within the specified tolerances.
10. Allow 3 minutes before checking functionality.
11. Allow 30 minutes before any pre-commissioning checks.

Connections

Links & adjustments:	Terminals:
VR1 Do NOT adjust	1 - 0V
VR2 Sensitivity	2 - 24Vac/dc
LK1:	3 - 2-10Vdc Output
ON = Output damped	4- Relay common
OFF = Output un-damped	5 - Not used
LK2:	6 - Relay N/O
ON = Alarm manual reset	
OFF = Alarm auto reset	

Connections (continued)



Relay Mode

All units are supplied in manual-reset mode. To convert to auto-reset mode, remove the link LK2. To revert back to manual-reset replace the LK2 link.

To reset an alarm, or after power failure, press the RESET button on the sensor lid.

Dimensions

