



VSD 301

## Features

- Early warning of smoke and fire
- Sensing smoke directly in the ventilation duct without help of built-in fan in the detector -  
No use of sampling tubes -  
A true duct smoke detector
- IR-detection (obscuration)
- Outputs
 

Relay	SPDT 1A@24Vdc, 120 Vac
Analogue	2-10 Vdc
- Analogue output status levels
 

< 2 Vdc	Sensor fault
< 3-7 Vdc	Normal operation
< 7-9 Vdc	Optics require cleaning
> 9,5 Vdc	Smoke alarm
- The analogue output signal 2-10 Vdc can transmit smoke or service alarm (dirt level) to BEMS system
- Relay output for closing fan/damper motor
- Damped or undamped output (jumper selection)
- Manual or auto reset (jumper selection)
- Reset button in front of enclosure
- Power supply 24 Vac/dc
- Probe lengths 300 mm and 600 mm
- LED bargraph display for indication of dirt level and service level (only VSD 302 and VSD 602)

## Technical data

<b>Sensitivity</b>	Adjustable from: 3% to 25% obscuration ( 0.1 to 0.9 db/m )
<b>Power supply</b>	24 Vac at 50-60Hz, 24 Vdc, (-10..+15%)
<b>Consumption</b>	62 mA
<b>Relay output</b>	Volt free normally open contact
<b>Contact rating</b>	1A at 120 Vac, 24 V dc.
<b>Analogue output</b>	2-10 Vdc (3V = normal)
<b>Operation</b>	+10 to +40°C 0 to 95% r.H. non condensing
<b>Storage</b>	-10 to +50°C 0 to 95% r.H. non condensing
<b>Protection</b>	IP65 Head only with suitable cable gland
<b>Weight</b>	<300 g

## Ordering codes

Type no.	Description
VSD 301	Duct smoke detector, 300 mm probe length
VSD 601	Duct smoke detector, 600 mm probe length
VSD 302	Duct smoke detector, 300 mm probe length, with LED bargraph display
VSD 602	Duct smoke detector, 600 mm probe length, with LED bargraph display

VSD 301 is standard type at no minimum quantities.

VSD 601, VSD 302 and VSD 602 are supplied on request at minimum 10 pcs.

Sensing smoke directly in the duct without help of built-in fan in the detector – no use of sampling tubes.



IR-  
receiver

Sensing smoke with infrared light (IR-light) between IR-sender and IR-receiver on the sensing probe.

IR-  
sender

Perforated probe for the detection of smoke via IR-light on sensing probe.

Sensing probe connector to PCB inside the housing.



Reset  
button

## Description

The true duct smoke detector VSD-series 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 duct smoke detector mounted in sampling boxes.

Circuitry incorporated in the design of the true duct smoke 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 duct smoke 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 true duct smoke detector features variable sensitivity and an advanced signal damping circuit which can be bypassed for testing purposes.

An LED bargraph visually indicates the smoke density and service state of the optical devices (VSD 302 and 602 only) and this signal is available as an analogue output to communicate with a building automation system.

The true duct smoke detector VSD-series has an alarm relay with potential free normally open contacts which will make contact when smoke is detected.

## Application

The true duct smoke detector VSD-series should be installed in ventilation or airconditioning systems to prevent the smoke generated by a fire circulating within the building and spreading through areas which are not immediately affected.

In particular these detectors should be fitted wherever the ventilation ductwork passes through fire barriers and where smoke control dampers are fitted.

This allows the dampers to be closed immediately, thereby limiting the spread of smoke which would otherwise occur if heat activated systems alone were used.

These detectors should also be fitted in the return air ducts of single zone or package air handling units in order that the supply fans may be automatically shut down thus limiting the provision of oxygen to the fire.

## cont. Application

The exhaust fans and air control dampers, where fitted, may also be moved to the full exhaust condition to expel any smoke during evacuation of the building.

The number and correct positioning of the detectors will of course depend on the design of the building and the ventilation system serving it.

These detectors are primarily designed for building return air monitoring and suitability for other applications should be confirmed prior to purchase.

For further information please contact our technical department.

## Location

The true duct smoke detector VSD-series is an optical beam detector and therefore, air velocity has little effect on performance, however, careful positioning of the duct smoke detector is required if optimum detection is to be achieved.

The true duct smoke detector should always be fitted with the holes in the sensing tube parallel to the airflow.

Where air changes direction its density will vary, therefore, bends and changes in section should be avoided wherever possible when positioning the true duct smoke detector.

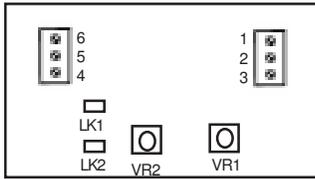
The chosen location should also allow access for routine cleaning, however, where site conditions restrict the choice consideration should be given to the air flow pattern to ensure that the true duct smoke detector is in the main airstream.

In order to provide the earliest possible detection of smoke the chosen location should limit the number of grilles or branch ducts entering the system prior to the true duct smoke detector position to the minimum possible.

This will reduce the possibility of small quantities of smoke in the duct from the early stages of a fire being diluted by air from unaffected areas prior to passing over the duct smoke detector.

For this reason each room should, ideally, be protected individually and large open plan areas should be zoned. The true duct smoke detector should always be fitted

Electrical connections



Terminals

0 Volt supply ----- 1  
 24 Volt supply ----- 2  
 2-10 V analogue output ---- 3

6 ----- Relay NO  
 5 ----- Fault (only VSD 302 and VSD 602)  
 4 ----- Relay common

Link positions

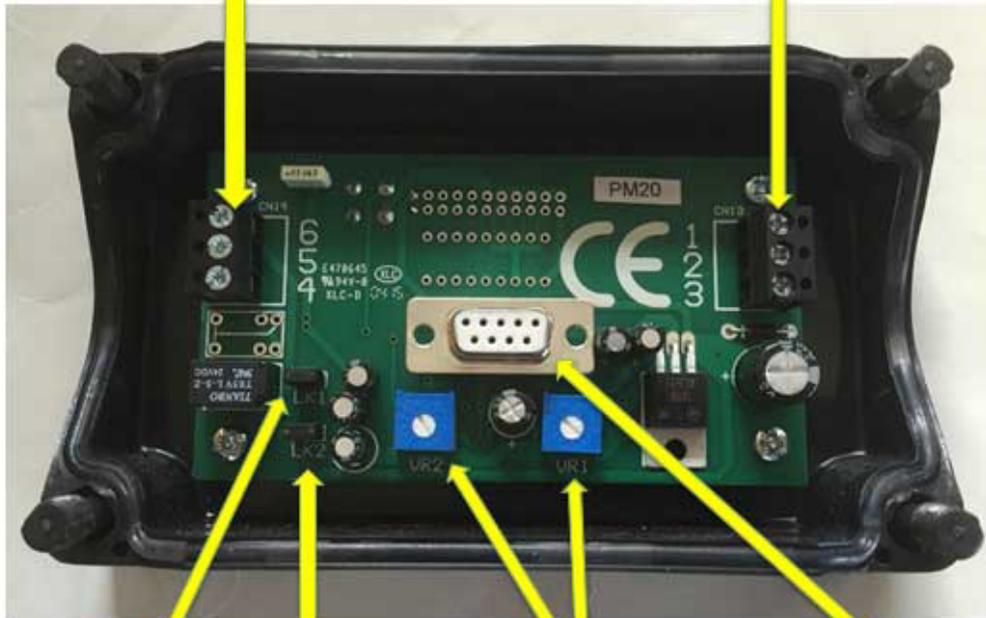
LK1 ON = Damped output  
 LK1 OFF = Undamped output  
 LK2 ON = Alarm manual reset  
 LK2 OFF = Alarm auto reset

Adjustment

VR1 = Do not adjust  
 VR2 = Sensitivity

Terminal 6: Relay NO  
 Terminal 5: Fault  
 (only VSD 302 & 602)  
 Terminal 4: Relay common

Terminal 1: 0 V  
 Terminal 2: 24 Vac/dc supply  
 Terminal 3: 2-10 Vdc output



LK1 ON: Damped output  
 LK1 OFF: Undamped output  
 LK2 ON: Alarm manual reset  
 LK2 OFF: Alarm auto reset

VR2: Sensitivity  
 VR1: Do not adjust

Sensing probe connector

## 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 (link in place) 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 duct smoke detector signal remaining on until locally reset.

Power failure will also result in an alarm output on restoration of power and the true duct smoke detector will need to be reset locally.

If the latching link is removed the true duct smoke detector will auto reset after the obscuration is removed and conditions return to normal for this reason the electrical circuit to which the true duct smoke detector is connected should self latch with reset facilities.

Due to the self recalibrating design of the true duct smoke detector as dust builds up on the optics the internal signal is increased to compensate, this results in the detector maintaining sensitivity during operation.

For this reason routine cleaning should take place either when the internal service relay operates (VSD 302 and VSD 602 only) or on a planned basis.

Failure to clean the true duct smoke detector will ultimately result in an alarm signal occurring before the detector attempts to reset.

Following this alarm the true duct smoke detector

## Dimensions (mm)

