Purex 8000 & 9000 Range
Gas Sensors

Introduction

Fume extractors in the Purex 8000 & 9000 range are each fitted with sensors designed to detect particulate and gaseous/vaporous contaminants which could pass through the unit in the event of the saturation of the chemical filter, or the failure of the HEPA filter or seals.

Each extractor unit is rigorously tested before shipment and the final tests carried out are to verify that each of the sensors installed operates satisfactorily. The sensors are designed for indicative/alarm usage and are not calibrated for quantitative measurements.

Gas Sensor Description

The gas sensors used in the 8000/9000 series machines are designed to detect the presence of a wide range of gaseous and vaporous contaminants.

The basic mode of operation is that a boundary layer of oxygen molecules is created when the surface temperature of a layer of an oxide of tin is raised by a small heating element. The resistance of this sensor surface is converted electronically to a representative voltage. When molecules of contaminant gases arrive on the sensor surface, the resistance varies and hence the output voltage. This is amplified and visually indicated on the control panel. When the output voltage exceeds a preset value a visual warning is displayed and a further increase results in a visual and audible alarm.

Purex gas sensors will detect all but a small number of gases with a high degree of sensitivity and are essential where adsorptive type chemical filters are used to purify airflows which are to be returned to the workplace.

Factory Settings for the Gas Sensor

The sensors used react to the presence of a wide range of gaseous or vaporous contaminants with high but varying degrees of sensitivity i.e. they are sensitive to the presence of some contaminants more than others . Where a number of different contaminants are present in the airstream it is not possible to set the sensors to react to specific concentrations of particular contaminants.

Since the adsorptive and chemisorbent elements used in Purex filters completely remove contaminants from the airstream in a non selective manner before they become spent, the assumption is made that when a significant quantity of any contaminant is detected this will indicate the possible presence of any of the suspected contaminant components.

Before despatch the gas sensor potentiometers are set to zero in the presence of normal shop air. The sensors are then challenged with a standard volatile solvent to ensure reactivity and the warning and alarm voltages adjusted to mid range values. These voltages can be adjusted to increase or decrease the sensitivity of the sensor either to ensure reactivity to actual contaminants present or to avoid spurious alarm conditions.

Purex International Ltd. Purex House, Farfield Park, Manvers, Rotherham, S63 5DB. UK.
T +44 (0)1709 763000 **F** +44 (0)1709 763001 **W** www.purexltd.co.uk **E** purex@purexltd.co.uk

Registered Office. Purex International Ltd. Purex House, Farfield Park, Manvers, Rotherham, S63 5DB. UK.
Registered No.5136616 England. VAT No.GB842 5025 49

Particle Monitor Description

The particle monitors used in the 8000/9000 series machines are designed to detect the presence of any particulate matter which passes through the filtration system due to either a perforated HEPA filter or leakage past the main filter seal. Because Purex HEPA filters are heavily constructed and utilise a high integrity sealing arrangement, passage of particles to the clean air side is rare and therefore the particle monitors are only very infrequently called into use.

The basic mode of operation is that when the detector is powered up, current flows between it's inner and outer chambers. Mounted inside the inner, semi sealed, reference chamber is a low activity radioactive foil which enables the current flow.

As particulates enter the detector, they cause a reduction of current flow in the outer chamber and hence an increase in the voltage, measured at the junction between the two chambers. The voltage increase is monitored by the electronic circuitry which triggers the sensor at a preset threshold, displaying a visual warning, a further increase resulting in a visual and audible alarm.

Factory Settings for the Particle Monitor

The particulate sensors used react to the presence of a wide range of particulate contaminants with high but varying degrees of sensitivity i.e. they are sensitive to the presence of some contaminants more than others. It is therefore not possible to set the sensors to react to specific concentrations of particular contaminants.

Before despatch the sensors are challenged with the smoke from a controlled source to ensure reactivity and the warning and alarm voltages adjusted to mid range values. These voltages can be adjusted on site to increase or decrease the sensitivity of the sensor either to ensure reactivity to actual contaminants present or to avoid spurious alarm conditions.

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