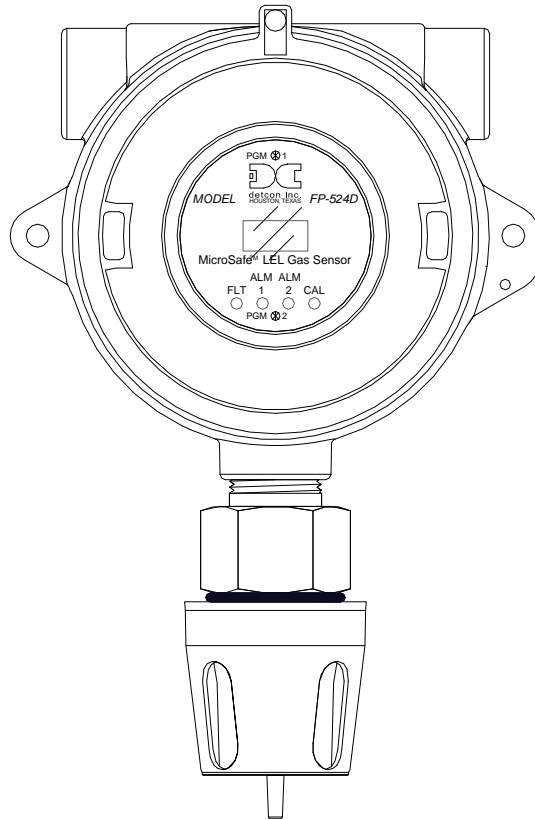


INSTRUCTION MANUAL

Detcon Model FP-524D



FP-524D Combustible Gas Sensor (0 – 100% LEL)



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1. Introduction

1.1 Description

Detcon Model FP-524D LEL Combustible sensors are non-intrusive “Smart” sensors designed to detect and monitor combustible gases in air. Range of detection is 0-100% LEL (Lower Explosive Limit). The sensor features an LED display of current reading, fault, and calibration status. The Sensor is equipped with a standard analog 4-20mA output. A primary feature of the sensor is its method of automatic calibration, which guides the user through each step via fully scripted instructions displayed on the LED display.

The microprocessor-supervised electronics are packaged as a plug-in replaceable Transmitter Module that is housed in an explosion proof junction box. The Transmitter Module includes a four character alpha/numeric LED used to display sensor readings, and the sensor’s menu driven features when the hand-held programming magnet is used.

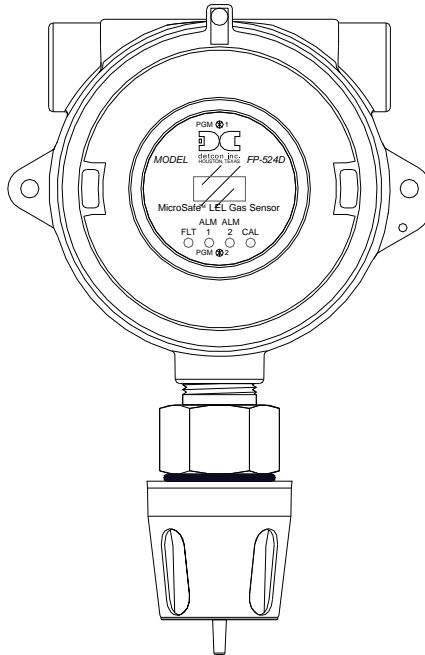


Figure 1 Sensor Assembly Front View

Catalytic Bead (Pellistor) Sensor Technology

The sensor technology is a poison-resistant catalytic bead type. Catalytic bead sensors show a strong response to a long list of combustible gases. The sensor is supplied as a matched-pair of detector elements mounted in a plug-in replaceable module. One bead is a catalytically active detector and the other is a non-active reference detector. Each detector consists of a fine platinum wire coil embedded in aluminum oxide. A catalytic mixture is applied to the active detector while the reference detector is treated so that oxidation of the gas does not occur. This technique is referred to as non-selective and may be used to monitor most any combustible gas. Detcon catalytic bead sensors are specifically designed to be resistant to poisons such as sulfides, chlorides, and silicones. The sensors are characteristically stable and capable of providing reliable performance for periods exceeding 5 years in most industrial environments.

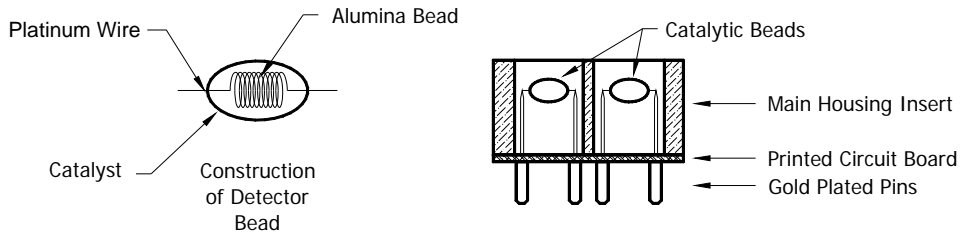


Figure 2 Sensor Cell Construction

Principle of Operation

Method of detection is by diffusion/adsorption. Air and combustible gases pass through a sintered stainless steel filter and contact the heated surface of both the active and reference detectors. The surface of the active detector promotes oxidation of the combustible gas molecules while the reference detector has been treated not to support this oxidation. The reference detector serves as a means to maintain zero stability over a wide range of temperature and humidity.

When combustible gas molecules oxidize on the surface of the active detector, heat is generated, and the resistance of the detector changes. Electronically, the detectors form part of a balanced bridge circuit. As the active detector changes in resistance, the bridge circuit unbalances. This change in output is conditioned by the amplifier circuitry, which is an integral part of the sensor design. The response and clearing characteristics of the sensor are rapid and provide for the continuous and accurate monitoring of ambient air conditions.

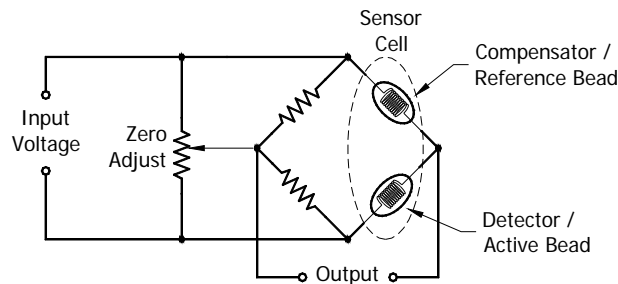


Figure 3 Wheatstone Bridge

Performance Characteristics

The detector elements maintain good sensitivity to combustible gas concentrations in the Lower Explosive Limit (LEL) range, as shown in the response curves in Figure 4. However, for gas concentrations significantly above the LEL range (100% LEL = 5% by volume Methane), the bridge output begins to decrease. Ambiguous readings above the LEL range dictate that alarm control logic be of the latching type, wherein alarms are held in the “ON” position until reset by operations personnel.

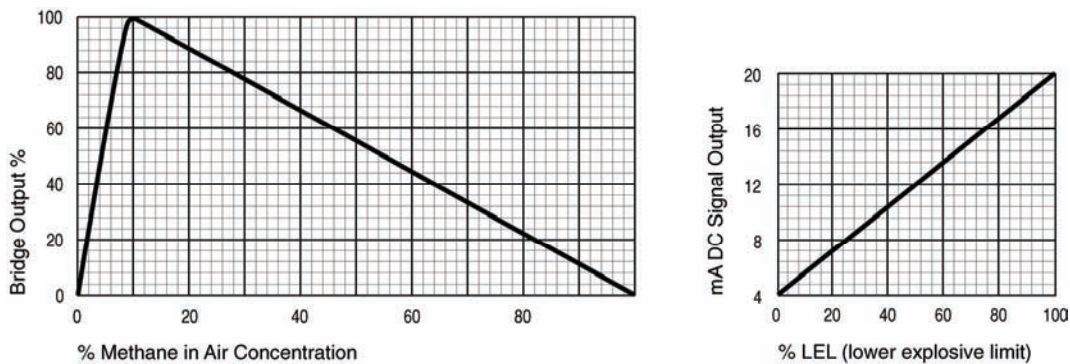


Figure 4 Response Curves

1.2 Modular Mechanical Design

The Model FP-524D Sensor Assembly is completely modular and is made up of four parts:

- 1) FP-524D Plug-in Transmitter
- 2) Field Replaceable Combustible Gas Sensor
- 3) Connector PCB
- 4) Splash Guard.

FP-524D Plug-in Transmitter

The Plug-in Transmitter Module is a microprocessor-based package that plugs into the connector board located in the explosion proof junction box. Circuit functions include extensive I/O circuit protection, sensor pre-amplifier, sensor temperature control, on-board power supplies, microprocessor, LED display, magnetic programming switches, and a linear 4-20mA DC output. Magnetic program switches located on either side of the LED Display are activated via a hand-held magnetic programming tool, thus allowing non-intrusive operator interface with the Transmitter Module. Calibration can be accomplished without declassifying the area. Electrical classifications are Class I, Division 1, Groups B C D.

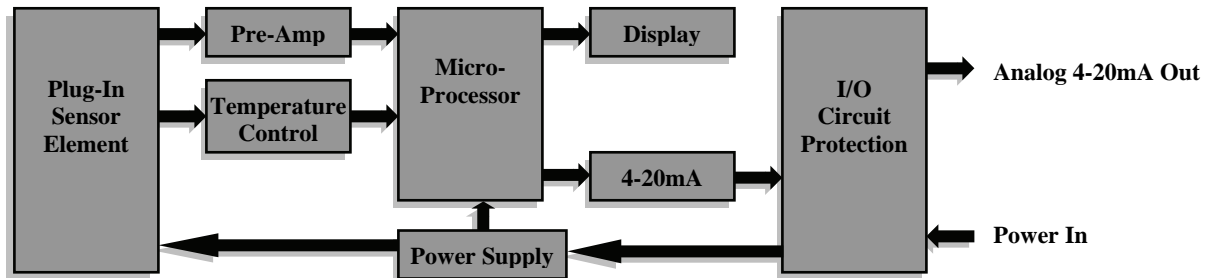


Figure 5 Circuit Functional Block Diagram

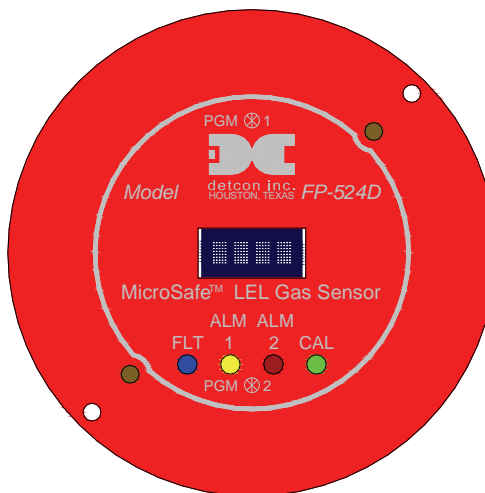


Figure 6 FP-524D Transmitter Module

Field Replaceable Sensor

The Detcon combustible gas sensor is a field proven, replaceable type sensor. It can be accessed and replaced in the field by unthreading the lower half of the sensor housing. The cell can then be unplugged and replaced. The Detcon combustible gas sensor has an infinite shelf life and is supported by a 2 year warranty.

