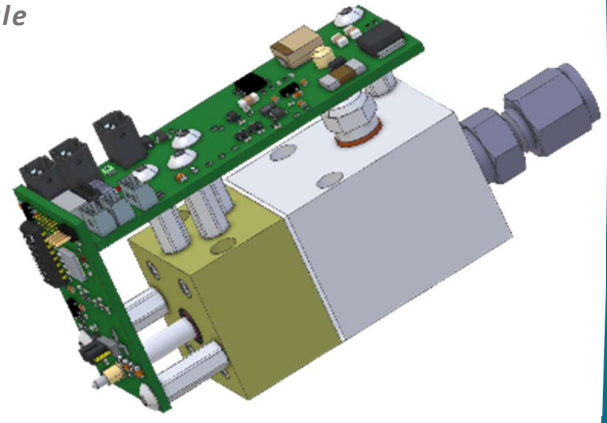
APPLICATIONS UNIQUES TAIWAN

Fireworks II

Product Description / Data Sheet

Fireworks™ II - Smart Sensor

Cyclone™ OC Sensor Based FID Smart Module



Fireworks™ is an FID analytical module designed to be incorporated into sophisticated instrumentation, such as hydrocarbon analysers and GCs, as a dedicated component.

Fireworks™ can be configured as either a Digital Sensor (DS) or a Smart Sensor (SS).

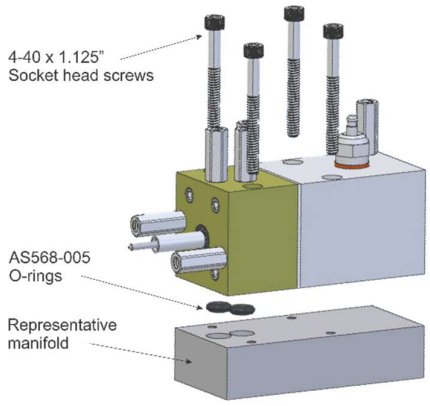
The Digital Sensor converts signal to 24-bit digital values and sends data up to 10 times per second.

The Smart Sensor version provides all functionality of the Digital sensor version and additionally supports calibration of the signal. It can send calibrated concentration readings accordingly.

Fireworks™ can also be configured to operate in a free running, more independent fashion in which it continuously monitors flame status, reads and digitizes the sensor signal value and streams data to external systems. This functionality allows Fireworks™ to act as a very low cost, high performance, self-contained total hydrocarbon analyser.

High Performance

- Extremely large dynamic range (up to 10^9)
- Linear range over 7+ orders of magnitude
- Operates at high temps (up to 200 °C)
- Sensitivity to ~ 1 pg C/s (design dependent)
- Very low background signal
- Very low temperature drift



Typical Manifold Mounting

Applications

- Total Hydrocarbon Analyzer
- Gas Chromatography Detector
- Hybrid Analytical Instrument
- Stand Alone Smart Sensor (SASS) w/external control of fuel, air and sample flows

Features

- Rich command set
- Allows operation in either polling mode or streaming mode
- Communications/Control via I2C & UART
- Range adjust via flow & electronic settings
- Automatic ignition and flame monitoring
- On-board calibration with simple calibration routine
- Sensitivity to ~ 3 ppb THC as C_3 (by Vol)
- Manifold mounted compact design

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Operating Parameters:

The following information is representative of a typical Fireworks™ Smart Sensor. It is provided here as a point of reference. Actual results may vary due to manufacturing tolerance and test conditions.

Cyclone OC Sensor – FID Organic Compound Sensor

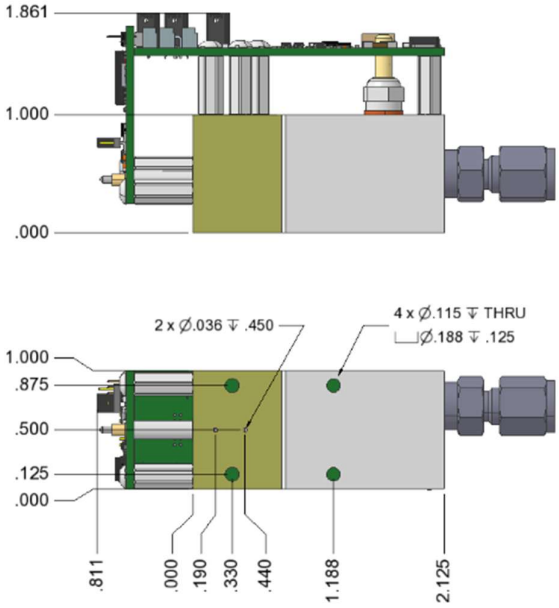
Fuel Flow (100% H2)	25 to 50 SCCM (40 SCCM typical)
Combustion Air Flow	110 to 220 SCCM (175 typical)
Sample Flow	5 to 45 SCCM (range dependent)
Operating Temperature	<= 200 °C (operation below 100 °C must consider condensation)
Background Current	1 pA to 4 pA (@ 120 °C, 40 SCCM H_2 & 175 SCCM Zero Air))
Sensitivity*	10 to 30 pA/ppm CH_4 in Air @ 35 to 50 SCCM sample flow (40 SCCM H_2 & 174 SCCM Air)

*Polarizing voltage @ -15V

Fireworks™ Module

A/D Resolution	24 Bit (2^{24} = 16,777,216 Counts)
Electrometer Gain	Low/Medium/High (jumper Selectable fixed gain)
Polarizing Voltage	0 to -150V (programmable)
Zero Offset	Fixed @ 3% FS = approx. 515K A/D Counts (Gain Med, 40 H_2, 175 Air, 0 Sample, V_{pol} -15V)
Fuel Control Valve	12V DC ground closure to operate normally closed solenoid H_2 shutoff valve
Signal Conditioning	Block or rolling average (0 to 999 readings, programmable)
Communications	UART (115,200 baud), I²C (one of 16 unique addresses)

Physical Dimensions & Considerations:



All Dimensions in Inches

The Fireworks™ Sensor is designed to be mounted on a heated manifold. Two gas inlets (0.91 mm diameter) are located on the side of the sensor opposite to the longer printed circuit board. One inlet is for combustion air. The other inlet is for fuel and sample (premixed).

The sensor should be sealed to the manifold by way of face seals using O-rings or by incorporation of a suitable gasket material. As the Sensor is at ambient pressure, the seal integrity will not need to withstand a significant pressure differential. Viton and PTFE are generally good materials to use to effect the seal.

There is a ½" gap between the FID body and the electronic circuit boards. This space allows for thermal insulation to be employed in designs where he detector will operate at elevated temperatures.

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