SPECTREX INC.

SharpEye™ 20/20SH

Hydrogen Flame Optical Detector

The SharpEye Triple IR (IR3) Hydrogen Flame Optical Detector 20/20SH is a self-contained, triple-spectrum flame detector specifically designed for the detection of hydrogen flames. The optical sensors and filters have been carefully selected to ensure the greatest degree of spectral matching to the radiant energy emitted by the hydrogen fire and the lowest degree of matching to non-fire stimuli.

The well-known Triple Infrared Spectrum design incorporated in the various SharpEye Optical Flame Detectors has been further developed in this detector to include sensors with special filters with spectral bands typical to hydrogen flame emission main combustion product - water vapor (H_2O) in the 1-4 microns band and reference filters to discriminate background radiation.

This highly advanced detector uses programmable algorithms, which check the ratio and correlation of data, received by the three sensors. The microprocessor design allows for unique field programmability, making the 20/20SH highly immune to false alarms.

The detector has applications in a wide range of industrial and commercial facilities that use hydrogen fuel cells, hydrogen gas generators and hydroxy-fuels. As the hydrogen community moves towards commercialization, the new emerging use of hydrogen for automotive transportation requires special safety measures for the unique refilling stations, storage tanks and special hydrogen fuel cells handling facilities.

** Note: The hydrogen flame detector is NOT designed to detect hydrocarbons fires.*

Main Features

- Triple Spectrum Design
- Sensitivity Selection
- User Programmable Configuration
- Highly Immune to False Alarms
- Automatic and Manual Built-In Test (BIT)
- Standard 4-wire Connection
- 4-20mA sink or source (3-4 wires) configuration
- RS-485 Modbus Compatible
- MTBF Minimum 100,000 Hours
- 3-Year Warranty
- FM, ATEX Approved

Applications

- **Hydrogen fuel cells industry** - production, storage and transportation
- **Hydrogen vehicle refueling stations**
- **Battery charging areas**
- **Chemical process industry** - production, storage, transportation
- **Parking** - special enclosed structures for hydrogen fuelled cars
- **Refineries** - hydrogenation processes
- **Space industry** - hydroxy propellant storage, transportation
- **Stationary fuel cell systems** in equipment enclosures

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SharpEye™ 20/20SH

General Specifications

Spectral Response	Three IR Bands
Detection Range (Highest sensitivity setting for a 8" (0.2m) wide, 20" (0.5m) high flame)	Hydrogen 100 ft (30m) Alcohol (Ethanol) 60 ft (18m) Methanol 26 ft (8m) ** Note: Hydrocarbon flames will not be detected at any range.*
Response Time	Typical 5 sec.
Adjustable Time Delay	Up to 30 sec. (up to 20 sec. in compliance with FM requirements)
Sensitivity Range	4 Sensitivity Ranges for a 8" (0.2m) wide, 20" (0.5m) high Hydrogen flame: 25 ft (7.5m), 50 ft (15m), 75 ft (22m) and 100 ft (30m)
Field of View	90° horizontal, 90° vertical
Built-in-Test	Manual and Automatic BIT
Temperature Range	Operating: -40°F (-40°C) to 160°F (70°C) Storage: -65°F (-55°C) to 185°F (85°C)
Humidity	Up to 95%

Electrical Specifications

Power Supply	Operating Voltage: 18-32 VDC
Power Consumption	Max. 100mA in stand-by Max. 150mA in alarm
Electrical Connection	2 x 3/4" - 14NPT conduits or 2 x M25 x 1.5 mm ISO
Electrical Input Protection	According to MIL-STD-1275B
Electromagnetic Compatibility	EMI/RFI protected CE Marked

Outputs

Relays	Alarm - 2A at 30 VDC, 0.5A at 250 VAC Fault and Accessory - 5A at 30 VDC and 250 VAC Fault relay normally closed, others normally open
4-20mA	Sink (source option) configuration Fault: 0 +0.5mA BIT Fault: 2mA ±10% Normal: 5mA ±10% Warning: 10mA ±5% Alarm: 15mA ±5% Resistance Loop: 100-600 Ω
RS-485	The detector is equipped with an RS-485 communication link that can be used in installation with computerized controllers. The RS-485 is Modbus compatible.

Mechanical Specifications

Dimensions	4.7" x 5.2" x 5.2" (120 x 132 x 132 mm)
Weight	Aluminum: 8.1Lb (3.7 Kg) St.St 316L: 14.3Lb (6.5 Kg)
Enclosure	Aluminum, heavy-duty copper free (less than 1%), white epoxy enamel finish. Optional - Stainless Steel 316L with electro polish finish.
Environmental Standards	Meets MIL-STD-810C for Humidity, Salt & Fog, Vibration, Mechanical Shock, High Temp, Low Temp
Water and Dust	IP66 and IP67 per En60529 NEMA 250 6P

Hazardous Area approvals

ATEX	EX II 2G, EExd IIB + H_2 T5 (70°C) ,T4 (85°C) EX II 2G, EExde IIB + H_2 T5 (70°C)
FM	Class I Div. 1, Groups B, C & D Class II Div. 1, Groups E, F & G

Accessories

Fire Simulator	20/20-313
Swivel Mount	20/20-003 (St. St. 316L)
PDA Kit	799820, 799810