SPECTREX INC.

SharpEye™ 20/20R

Single IR Flame Detector

- Automatic and Manual Built-In Test
- Enlarged field of view 90° H. / 90° V.
- Immune to false alarms
- MTBF minimum 100,000 hours
- 4-20 mA and RS-485 interface
- Stainless steel option available

The 20/20R SharpEye Single-IR Optical Flame Detector incorporates the advanced flame analysis algorithms employed in the SharpEye line of UV/IR and IR^3 optical flame detectors, combined with a cost-effective electro-mechanical design to produce a low-cost flame detector.

The 20/20R Flame Detector was designed to provide early warning of flaming fires involving organic (hydrocarbon fuels and vapors) materials. These fires emit strong IR radiation in the 4.4 micron spectral band where the CO_2 (main combustion product of any organic substance) has a unique spectral peak.

The detector contains an infrared sensor and optical filter that provides maximum sensitivity to the CO_2 emission spectral band at 4.4 microns and improved immunity to false alarms caused by environmental IR emitting sources, including sunlight and IR projectors.

The detector was designed to withstand "harsh" environmental conditions, including extreme temperatures, high humidity, vibrations, etc.

A cost-effective, explosion-proof, single IR detector that works in the 4.4 micron range!!

Applications:

Most single band IR detectors are based on pyro-electric sensors with a 4.4 micron optical filter, and a low frequency (1-10 Hz) electronic band pass filter (characteristic of a flickering flame). This type of detector identifies a fire when the IR radiation emitted from a 1 sq. ft. gasoline pan fire at 4.4 microns from a distance of 50 ft. (15m) is above a predetermined value. The single frequency IR detectors respond only to a certain flicker and radiation intensity of 4.4 microns.

The single IR detectors are used mostly for indoors applications; however, for short distances (up to 65 ft./ 20m) in areas where false alarm stimuli are not expected, they are used also outside. In order to improve their reliability, a Built-in-Test (BIT) feature has been incorporated in the detector.

Field Applications:

- **Automotive** – manufacturing, paint spray booths, test cell, wet-benching
- **Paint** – manufacturing facilities
- **Petrochemical and Chemical** – storage facilities, commercial and industrial
- **Polymers and Glue** – manufacturing and curing
- **Power Generation** – generators, boilers, pump houses
- **Printing** – presses and facilities
- **Warehousing** – flammable liquids

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General Specifications

Spectral Response:
Single IR Band
IR: 2.5–3 microns

Detection Range:
1 sq.ft. gasoline fire at 50 ft (15m)*
1 sq.ft. diesel oil fire at 25 ft (7.5m)*
1 sq.ft. n-heptane fire at 50 ft (15m)*
1 sq.ft. 95% alcohol fire at 33 ft (10m)*
1 sq.ft. JP4 fire at 33 ft (10m)*
* *Highest sensitivity setting.*

Response Time: Maximum 10 sec.
Adjustable time delay up to 30 seconds.

Sensitivity Range:
Two sensitivity ranges:
1 – 15 ft (5 m)
2 – 50 ft (15 m)

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:
Relative humidity of up to 95% for the operational temperature.

Electrical Specifications:

Power Supply:
Operating Voltage: 18-32 VDC

Power consumption:
Max. 150mA in Stand-by
Max. 200mA in Alarm

Electrical Connection: Two standard ¾-inch 14 NPT cable entries.
Option two M25 x 1.5 cable entries.

Electric Input Protection: Complete electrical interface protection against reversed polarity voltage, surges, and spikes according to MIL-STD-1275.

Electromagnetic Compatibility: The detector is designed and approved according to the following EMC requirements:

Electrostatic Discharge (ESD):	IEC801-2: 1984
Conducted Emission:	EN55022 Class A
Radiated Emission:	EN55022 Class A
Radiated Immunity:	IEC801-3: 1984
EFT/B:	IEC801-4: 1988

Outputs:

Dry Contact Relays:

Alarm	2 Amps at 30 VDC 0.5 Amps at 250 VAC
Accessory	5 Amps at 30 VDC & 250 VAC
Fault	5 Amps at 30 VDC & 250 VAC

4-20 mA Current Output:
The 4-20mA is sink and can be supplied as source.

Fault:	0 ± 0.5mA
Normal:	5 ± 0.5mA
Warning:	10 ± 1mA
Alarm:	15 ± 1mA
Resistance Loop:	100 - 600 Ohms

RS-485 Communication:
The detector is equipped with an RS-485 communication link that can be used in installations with computerized controllers.

False Alarms:

The detector does not provide an alarm or a warning signal as a reaction to the radiation sources specified in the table below.

Radiation Source	Immunity Distance
Incandescent clear glass light, rough service, 100W	1.7 ft (0.5m)
Fluorescent light with white enamel reflector, standard office or shop, 40W (or two 20W)	IAD
Arc welding [4mm (5/32in) rod; 240A]	11.5 ft (3.5m)
Halogen light 750W	16.5 ft (5.5m)
Grinding metal	3.3 ft (1m)
Lit cigar or cigarette	3.3 ft (1m)
Match, wood, stick, including flare-up	1.7 ft (0.5m)

Notes:
IAD = Immune at any distance.
All sources are chopped from 0 to 20 Hz.

Explosion Proof Enclosure:

Designed to Meet FM:
For use in hazardous (classified) locations.
Class I Div. 1 Groups C & D
Class II Div. 1 Groups E, F, & G

Cenelec Approved:
EExd IIB + H2 T5 (70°)
Per En 50014 & En 50018
EExde IIB + H2 T5 (70°)
Per En 50014, 50018, & 50019

ATEX Approved:
ATEX 1163 and 1164
Per CE 0518 Ex II 2G

Physical Specifications:

Dimensions: 4.7” x 5.2” x 5.2”
(220 x 132 x 132 mm)

Weight:

Aluminum	8.1 lb (3.5 Kg)
St.St. 316	14.3 lb (6.5 Kg)
Base: (St.St. only)	3.7 lb (1.7 Kg)

Mechanical Design:
The standard detector housing is heavy-duty, copper-free (less than 1%) aluminum. The housing is finished in a red epoxy enamel and is also available in 316 Stainless Steel** upon request. The viewing window and back cover are each sealed with special "O" rings to prevent intrusion of dust, salt spray, foam, water, and other fire fighting agents. The circuit boards are conformably coated and shock mounted to minimize damage from mechanical vibration and impact.
** *Carries an additional charge.*

Environmental Tests:

Designed to MIL-STD-810C

High Temp	Method 501.1 proc. II
Low Temp	Method 502.1 proc. I
Humidity	Method 507.1 proc. IV
Vibration	Method 514.2 proc. VIII
Dust	Method 510.1 proc. I
Salt Fog	Method 509.1 proc. I
Mechanical Shock	Method 516.1 proc. I
Water and Dust	IP66 and 67 per En60529 NEMA 250 6P

SI ISO 9002