



## **SharpEye™ 20/20I** **IR<sup>3</sup> Flame Detector**



### **3-Year Warranty**

The Spectrex SharpEye 20/20I is a self-contained, triple-spectrum flame detector. The sensor band pass has been carefully selected to ensure the greatest degree of spectral matching to the radiant energy emissions of fire, and the lowest degree of matching to non-fire stimuli.

The microprocessor design allows for unique field programmability not found in similar detectors. The 20/20I incorporates both Automatic and Manual BIT (Built-In-Test).

The patented Triple IR (IR<sup>3</sup>) circuit design scans for oscillating IR radiation (1 to 10 Hz) in the spectral bands ranging from 4.0 to 5.0 microns. This highly advanced detector uses programmed algorithms which check the ratio and correlation of data received by the three sensors. Only detection of radiation emissions matching the spectral fingerprint of fire will produce an alarm, making the 20/20I highly immune to false alarms.

Triple-Spectrum Design

Sensitivity Selection

User-Programmable Configuration

Highly Immune to False Alarms

Automatic and Manual Built-In-Test

Explosion-Proof

Standard 4-Wire Connection

MTBF Minimum 100,000 Hours

FM, CSA, Cenelec and ATEX Approved

The SharpEye 20/20I is extremely sensitive. It can detect a 1x1 sq. ft. gasoline pan fire at 200 ft. in less than 10 seconds. The sensitivity is user-programmable, offering 4 ranges of detection.

The outputs 4-20 mA and RS-485 interface, as well as the standard alarm, accessory and fault relays, make the 20/20I the most diverse detector available.

The 20/20I utilizes Mil-spec. electronic components and materials. The MTBF (Mean Time Between Failures) is calculated to be 100,000 hours (11+ years). This outstanding performance permits a 3-year warranty on the entire detector, not just the sensors.

**The patented triple IR design offers two to three times the detection distance of any conventional IR or UV/IR detector.**

# SharpEye™ 20/20I IR<sup>3</sup> Flame Detector

## Applications:

The 20/20I IR<sup>3</sup> Flame Detector has been designed as a general-purpose flame detector with special emphasis on immunity to false alarms. It has applications in a wide range of industrial and commercial facilities, where the threat of accidental fire involves hydrocarbon fuels such as gasoline, kerosene, diesel fuel, aviation jet fuels like JP-4, JP-5, JP-8, hydraulic fluids, paints and solvents, monomers and polymers like ethylene and polyethylene, natural gas (LNG), town gas and liquefied petroleum gas (LPG), hydrocarbon gases like methane, ethane, propane, butane, acetylene, propylene, etc.

## Field Applications Include:

- **Automotive** – manufacturing, paint spray booths, wet bench manufacturing
- **Aircraft** – hangars, commercial, military, including landing gear pits, under-wing and over-wing protection
- **Chemical Industry** – production, storage, and transportation
- **Explosives and Munitions** – handling and storage
- **Oil and Gas** – exploration, production, storage, and offloading
- **Offshore** – platforms (fixed rigs and floating vessels FPSO)
- **Onshore** – refineries, loading terminals, pipelines
- **Petrochemicals** – production, storage, and shipping facilities
- **Power Generation Facilities** – pump areas, generator rooms, and unmanned stations, gas-fired and coal-fired reactors
- **Pharmaceutical Industry**
- **Printing Industry** – solvent handling, presses, drying processes
- **Tank Farms** – floating-roof and fixed-roof tank areas
- **Warehouses** – storage facilities for flammable materials
- **Waste Disposal Facilities** – incineration, processing and storage of flammable waste materials (solids, liquids, gases)

## General Specifications:

### Spectral Response:

Three IR band channels.

### Detection Range:

- 1 sq. ft. gasoline fire at 200 ft. (60m)\*
- 1 sq. ft. n-heptane fire at 200 ft. (60m)\*
- 1 sq. ft. diesel oil fire at 100 ft. (30m)\*
- 1 sq. ft. 95% alcohol fire at 150 ft. (45m)\*
- 4 sq. ft. JP4 fire at 150 ft. (45m)\*

\*Highest sensitivity setting

**Response Time:** Typical 5 seconds. Adjustable time delay up to 30 secs.

**Sensitivity Range:** Four sensitivity ranges set by dip-switch for gasoline pan fire 1x1 sq. ft. (30x30cm).

| Sensitivity Range | Detection Range |
|-------------------|-----------------|
| 1                 | 50 ft (15m)     |
| 2                 | 100 ft (30m)    |
| 3                 | 150 ft (45m)    |
| 4                 | 200 ft (60m)    |

### 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)

#### Operating Option:

-40°F (-40°C) to 185°F (85°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. 150 mA in standby  
Max. 200 mA in alarm

### Electrical Connection:

Standard two ¾" 14 NPT cable entries.  
Optional two M25 x 1.5 cable entries.

**Electrical 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 Contacts 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 ± 0.5 mA

Normal: 5 ± 0.5 mA

Warning: 10 ± 1 mA

Alarm: 15 ± 1 mA

Resistance Loop: 100-600 Ω

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

## Explosion-Proof Enclosure:

\* **FM approved** – For use in hazardous (classified) locations

Class I Div. 1 Groups B, C & D

Class II Div. 1 Groups E, F & G

\* **Cenelec approved**

EExd IIB + H<sub>2</sub> T5 (70°) T4 (85°)

Per En 50014 & 50018

EExde IIB + H<sub>2</sub> T5 (70°)

Per 50014, 50018, & 50019

\* **ATEX approved**

ATEX 1163 & 1164

Per CE 0518 Ex II 2G

## Environmental Standards:

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 Tight:**

IP66 and 67 per En60529

NEMA 250 6P

# SharpEye™ 20/20I IR<sup>3</sup> Flame Detector

## False Alarm:

The detector will not provide an alarm or a warning signal as a reaction to the radiation source specified below.

### Immunity to False Alarm Sources

| Radiation Source  | Immunity Distance<br>ft (m) |
|---|-----------------------------|
| Sunlight  | IAD                         |
| Indirect or reflected sunlight  | IAD                         |
| Incandescent frosted glass light, 100 W   | IAD                         |
| Incandescent clear glass light, rough service, 100 W  | IAD                         |
| Fluorescent light with white enamel reflector, standard office or shop, 40 W (or two 20 W)      | IAD                         |
| Electric arc [12mm (15/32 in) gap at 4000 V alternating current, 60 Hz]                         | IAD                         |
| Arc welding [4 mm (5/32 in) rod; 240 A]   | See table below             |
| Ambient light extremes (darkness to bright light with snow, water, rain, desert glare, and fog) | IAD                         |
| Bright colored clothing, including red and safety orange  | IAD                         |
| Electronic flash (180 watt-second minimum output)   | IAD                         |
| Movie light, 625 W quartz DWY lamp (Sylvania S.G.-55 or equivalent)                             | 6.5 ft (2m)                 |
| Flashlight (MX 991/U)   | IAD                         |
| Radiation heater, 1500 W  | IAD                         |
| Radiation heater, 1000 W with fan   | IAD                         |
| Quartz lamp (1000 W)  | 10 ft (3m)                  |
| Mercury vapor lamp  | IAD                         |
| Lit cigar   | 1 ft (0.3m)                 |
| Lit cigarette   | 1 ft (0.3m)                 |
| Match, wood, stick including flare up   | 10 ft (3m)                  |

**Notes:** IAD = Immune at Any Distance  
All sources are chopped from 0 to 20 Hz.

The detector immunity to welding distance specified below:

| SW Setting | Detection Range | Immunity Distance |
|------------|-----------------|-------------------|
| 1          | 50 ft (15 m)    | > 13 ft ( 4 m)    |
| 2          | 100 ft (30 m)   | > 20 ft ( 6 m)    |
| 3          | 150 ft (45 m)   | > 30 ft ( 9 m)    |
| 4          | 200 ft (60 m)   | > 40 ft (12 m)    |



## Physical Specifications:

### Dimensions:

4.7" x 5.2" x 5.2"  
(120mm x 132mm x 132mm)

### Weight:

|                    |                  |
|--------------------|------------------|
| Aluminum           | 8.1 lb (3.7 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 white 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.

