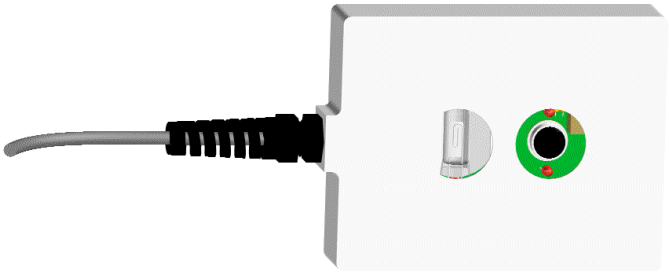
DCR1-A

UV/IR Acid/Solvent Resistant Flame Detector

SIERRA SAFETY TECHNOLOGY, INC.



FM Approved

Features

- Meets or exceeds FM Specification Class Number 3260 (2002)
- Compatible with standard 4-wire interface
- No moving parts or field modification required
- Smooth, non-shedding, scuff-resistant surfaces designed for easy wipe-down
- Chemical-resistant surfaces tested against the acids, solvents, and cleaning agents common to semiconductor and wet processing environments, including hydrofluoric, sulfuric, phosphoric, nitric, and hydrochloric acids; de-ionized water; ammonium hydroxide; isopropyl alcohol; chromium phosphate; n-methyl-pyrrolidone; organic solvent-based photoresist strippers; ozone; and similar compounds

Description

The DCR1 is built for indoor environments where chemicals used in normal operations pose a risk to standard detection equipment, primarily with semiconductor manufacturing tools and wet processing equipment. The ultrasonically welded polypropylene housing carries an IEC 529 IP67 rating and has been tested against the acids, solvents, and cleaning agents common to these facilities. The detector withstands periodic submersion without damage.

Detection relies on a combination of UV and IR sensing. UV responds to the radiation produced by open-flame combustion. IR captures both the thermal emissions shared by all fires and the chemistry-specific spectral signatures produced by different fuel types. Using both bands together allows the DCR1 to identify fire at its earliest stages while screening out the background radiation sources, such as fluorescent lighting, incandescent lights, or infrared heaters, common to the environments it operates in.

The DCR1's -40° to 85°C operating range covers facilities where drying or heating equipment runs alongside detection systems. All models use industry-standard relay contacts and are compatible with most control panels and fire protection systems.

Specifications

Sensitivity
4-inch diameter isopropyl alcohol pan fire (on-axis) at 10 feet within 3 seconds

Field of View
120° conical (NFPA)

False Alarm Immunity
Does not alarm to sunlight, fluorescent lights, incandescent lights, flashlights, or infrared heaters

Housing
Ultrasonically welded FR-rated polypropylene enclosure rated to IEC 529 IP67, with a 6-foot pigtail (8 wires standard). Meets UL 94 flammability rating V0.

Input Voltage Range
12 to 32 VDC @ 28 mA

Operating Temperature
-40° to 85° C

Operating Humidity
10% to 90%

Footprint
3.4" wide by 4.2" long by 1" thick

Tested Fuels
Gasoline (Heptane), Polypropylene, Isopropyl Alcohol, MEK, Hydrogen, Silane

LEDs
Two red LEDs indicate Normal, Trouble, or Alarm status

Alarm Relay
1.0 Amp at 30 VDC resistive

Trouble Relay
1.0 Amp at 30 VDC resistive

Spectral Sensitivity
Solar-blind UV sensor responding to radiant energy in the 185 to 260 nm band, and a solid-state IR sensor responding to energy in the 0.715 to 3.5 µm band

Self-Test Models
Include an internal self-test circuit that continuously verifies UV sensor integrity, reducing the need for manual testing intervals

Enhanced Models
Add an RS485 computer interface to the self-test circuit, enabling real-time spectral data and pre-fire spectral data to be downloaded and reviewed externally

Sensor Coverage

ULTRAVIOLET (UV)

A UV detector tube monitors the UV energy produced by open-flame combustion. Solar UV in this wavelength range is absorbed by the upper atmosphere before reaching ground level. The DCR1 is not triggered by sunlight.

VISIBLE LIGHT

INFRARED (IR)

The near-IR sensor covers 0.715 to 3.5 microns, capturing both the thermal emissions common to all fires and the chemistry-specific spectral signatures produced by different fuel types. This gives the detector sensitivity across a broad range of fire scenarios.

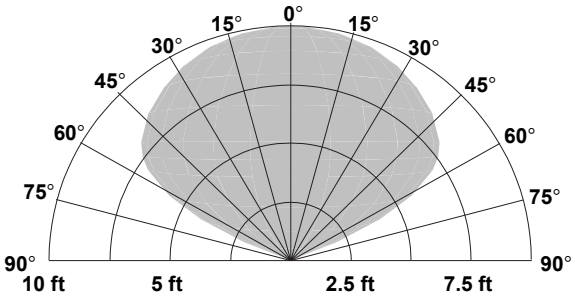
False Alarm and Fire Response

The following table shows the detector's ability to reject both modulated and unmodulated false alarm stimuli while simultaneously detecting a fire in the presence of the same source. All fire tests used a 1.75-inch diameter alcohol pan fire at 6 feet.

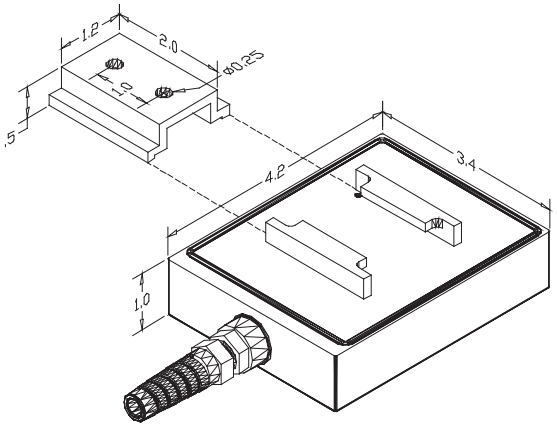
False Alarm Source	Distance to Source	Modulated/ Unmodulated	Response Time To Fire
Resistive Electric Heater (1320 watt)	6 feet	No response	<3 seconds
Fluorescent Light (two 40 Watt Bulbs)	6 feet	No response	<3 seconds
Halogen Light (500 Watt Bulb)	10 feet	No response	<3 seconds
Incandescent Light (100 Watt Bulb)	6 feet	No response	<3 seconds

Detector Response to Various Fuels

Fuel	Distance	Fire Size	Response Time
Polypropylene	8 feet	4" diameter	<3 seconds
Isopropyl Alcohol	10 feet	4" diameter	<3 seconds
Heptane	40 feet	1ft²	<3 seconds
MEK	15 feet	4" diameter	<3 seconds
Silane	30 feet	18" jet	<3 seconds
Hydrogen	15 feet	18" jet	<3 seconds



FIELD OF VIEW



DIMENSIONS
(In inches)

Ordering Information

Model #	Configuration	Housing	Fault Relay
DCR1-AS1	Standard	FRPP	N.C.
DCR1-AS3	Standard	FRPP	N.O.
DCR1-AT1	Self-Test	FRPP	N.C.
DCR1-AT3	Self-Test	FRPP	N.O.
DCR1-AE1	Enhanced	FRPP	N.C.
DCR1-AE3	Enhanced	FRPP	N.O.
DCR1-AM	Special Cable	PVDF	N.C.

Notes: N.C. stands for normally closed and N.O. for normally open trouble relay operation.

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