Model F120 Triple-Mode UV/IR Flame Detector & Controller

Shown with optional swivel mount conduit

- ***Flame Sensor and Control Electronics self-contained in explosion proof enclosure***
- ***Automatic and Manual Optical Path Checking***
- ***Automatic Self Test Diagnostics for electronics and sensor elements***
- ***Analog and Discrete Outputs***
- ***Discriminates against Arc Welding Radioactive sources (x-ray), sunlight, lightning, or black body radiation***
- ***High current relays for control or shutdown of external equipment.***
- ***Explosion proof enclosure suitable for Class I Division 1 Groups B,C,D and EEx dIIB T6 + Hydrogen locations***
- ***NEMA4X weatherproof and corrosion resistant***
- ***24 volt DC nominal operating voltage***

Class I Groups B,C,D
Class II Groups E,F,G

Class I Groups B,C,D
Class II Groups E,F,G

EEx dIIB T6
IP66

THE DETECTOR

The protection of onshore and offshore hydrocarbon process and handling facilities against any loss from fires requires positive and fast–responding optical flame detectors, with no tolerance for false or nuisance alarms caused by either EMI, lightning, x-rays, gamma radiation, arc welding, reflected sunlight, or any light source such as mercury or quartz iodine flood lights. Traditional UV and UV/IR detectors can be blinded by precombustion smoke, thus rendering the detector useless under these conditions. Also, oil mist or oil deposits on the quartz lens of a UV detector or combination UV/IR detector will seriously diminish the response to a fire. Therefore, we do not recommend using these types of detectors in a hydrocarbon environment.

The SST Model F120 Triple Mode UV/IR optical flame detector uses the latest state of the art processor and circuitry, eliminating the shortcomings of currently available UV/IR detectors which are subject to the aforementioned interferences. Outputs are either voted automatically, or can be manually selected by the customer. Selected outputs can either be for UV only, IR only, Temperature, or any two out of three combination. This “voting” capability is what sets this detector apart from any other UV/IR detector. This detector will see a fire, while other manufacturer’s detectors may not. To insure reliable operation, the detector is equipped with an automatic Optical Self-Checking feature which continuously checks the optical viewing window for cleanliness and confirms operation of the detection circuits.

PHYSICAL DESCRIPTION

The Model F120 is self-contained in a two-piece explosion proof copper-free aluminum housing finished in a deep red color for rapid identification as a flame detector. A protective coating permits use in harsh environments, such as offshore platforms, without degradation. (An optional stainless steel housing is also available.) The detector is suitable for use in “classified” areas where ignitable concentrations of flammable gas normally exist. A sapphire window in the front of the housing permits both ultraviolet and infrared radiation to strike the sensing elements inside. Electrical connections are made through a ¾ inch threaded outlet on the rear of the detector, suitable for connection to electrical conduit or a cable gland.

OPERATIONAL DESCRIPTION

Contained within the Model F120 Detector Housing are the UV, IR and heat sensing elements and associated electronics, three (3) relays, and screw terminal blocks for wiring. The detector may be installed for completely self-contained operation, utilizing the relays to control local equipment directly. Additionally, the alarm and status conditions may be transmitted by the detector to a central control room. The relay contacts, if not being used for local control, may be hard-wired to the control room to transmit these conditions. Or all conditions may be transmitted over a single wire by using the available 0-20 mA signal.

When the detector is installed and operating normally, the green “Ready” light will be visible through the detector window. This provides a rapid visual check of detector operation. The Model F120 Detector responds to a flame with a variety of criteria and time delay settings. An internal switch sets the detector to the most appropriate mode for the exact conditions at your particular installation.

When flame radiation is initially detected, the Alarm Outputs, both relay contact and current loop, are instantly activated. A red Alarm light behind the viewing window in the detector is also activated. Should this flame persist for a user selectable period of time, the Delayed Alarm outputs (relay and current loop) will be activated.

Periodically, the Model F120 Detector runs the Automatic Self-Test program. A source of radiation is transmitted to the outside surface of the viewing window, and then passes through the window onto the sensor element. Should the transmission of the window be degraded, or other circuit malfunctions detected, the yellow Malfunction LED in the detector will turn on, the malfunction relay contacts will transfer, and the 0-20 mA output will transmit a malfunction signal. This malfunction indicates a need for maintenance before the performance has been degraded enough to prevent response to flame.

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

Flame detection capability shall be provided by a triple mode UV/IR flame detector. The detector shall provide a minimum 70 foot on-axis sensitivity to a standard 1 square foot 87 octane unleaded gasoline fire. The detector shall not be susceptible to common false alarm sources such as lightning and arc welding, nor blinded by dense smoke or oil film on the viewing window. The sensor sensitivity response time shall be user selectable.

A comprehensive through the lens self check shall be performed periodically utilizing an integrated test source to verify that the viewing window does not need cleaning. The detector shall provide relay outputs for Alarm, Delayed Alarm, and Malfunction in addition to a 0 to 20 mA current loop capable of reporting the same conditions over a single wire.

All electronics shall be contained in a single user replaceable module which does not require field wiring or unwiring for replacement.

The detector housing shall be waterproof, explosion proof and corrosion resistant. The detector shall be classified as to explosion and fire hazard by Underwriter's Laboratories, and certified for use in potentially explosive atmospheres per CENELEC requirements. Safety Systems Technology Model F120 Triple-Mode UV/IR Flame Detector & Controller, or approved equivalent, shall be supplied.

TECHNICAL SPECIFICATIONS

Flame Sensitivity:	Reliably detects a 1 square foot gasoline fire at a distance of 70 feet in less than 3.0 seconds. Response to radiation detected is less than 0.5 seconds
Cone of Vision:	90 degrees
Spectral Sensitivity:	UV: 1850 to 2450 Angstrom (0.185 to 0.245 microns) IR: 4.3 Microns (Hydrocarbon CO_2 spike)
Detection Modes:	UV only, IR flicker only, IR flicker and Temperature, UV/IR (voted any two out of three detectors), Alarm (instantaneous, non-latching), Delayed Alarm (latching or non-latching, 3 or 6 seconds, selectable by internal switch)
Detector Self-Test:	Automatically performed every 10 seconds
Relay Outputs:	Alarm, Delayed Alarm, Malfunction
Relay Contact Ratings:	6 amps @ 28 VDC or 300 VAC resistive, 1/8 HP @ 120/240 VAC
Analog Output:	**S**tandard 0 to 20 mA, self-powered 0 or 2 mA = Malfunction 4 mA = Ready 12 mA = Alarm (radiation detected) 20 mA = Delayed Alarm
Alarm Reset:	Latched alarms are reset by either activating the Test/Reset Input or interrupting power to the unit.
Visual Indicators:	Detector Ready (Green) Malfunction (Yellow) Alarm/Delayed Alarm (Red)
Enclosure Ratings:	Explosion proof; Nema 4X, Class I, Division 1, Groups B, C or D areas or Class II Groups E,F,G EEx dIIB T6 per EN50018 for Groups I, IIB+H_2 and EN50014, IP66
Operating Temperature:	-40 to +85°C, -40 to +185°F
Power Requirements:	20 to 35 Volts DC 125 mA standby, 230 mA alarm at 24 VDC
Agency Approvals:	UL File E126501(N), C-UL File E126501(N)

ORDERING INFORMATION

PART NO.	DESCRIPTION
120-01	Model F120 UV/IR Flame Detector/Controller with 0-20 mA and Relay Outputs, red aluminum housing
120-01-SS	Model F120 UV/IR Flame Detector/Controller with 0-20 mA and Relay Outputs, stainless steel housing
190-01	Swivel Mount Assembly for use with 3/4 inch conduit
191-01	Swivel Bracket Assembly for non-conduit installations
194-1	Portable UV/IR Flame Detector Test Lamp

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