

Ultraviolet Flame Detection System Detector/Controller U7602

SYSTEM APPLICATION

The U7602 is a completely unitized ultraviolet (UV) flame detection device that incorporates all detection, electronic, and switching components in a single, explosion-proof enclosure. The U7602 Detector/Controller responds to the ultraviolet radiation that is emitted by a flame. It is designed for use in hazardous locations and is particularly suitable for use in outdoor applications because it is not affected by wind or rain, and is insensitive to solar radiation. In addition, the detector does not respond to normal artificial light or flickering hot objects. Typical applications include:

- Hydrogen, ammonia processing and storage areas
- Turbine enclosures
- Solvent Storage areas
- Petrochemical storage areas.

The UV detector module within the U7602 provides a pulse output that is measured in counts per second (cps) and is proportional to the fire intensity. The controller module within the U7602 monitors the cps output and activates an alarm relay when the cps value exceeds the factory set alarm threshold for the field adjusted time delay period. A current output is also provided to indicate the status of the U7602.

The U7602 is equipped with the Automatic Optical Integrity (**oi**) feature, which provides a continuous check of detector optical surfaces and detector/controller circuitry. Failure of the **oi** test results in the normally energized Fault Relay being de-energized.

The **oi** test can also be manually initiated by connecting the **oi** terminal on the U7602 to the negative (–) side of the power supply through a momentary switch (typically located in the fire alarm panel). The Fire relay will activate upon successful completion of the manual **oi** test, therefore, output loads that are connected to the U7602 must be disconnected when performing this test.

***oi** is Detector Electronics' Trademark for its patented Optical Integrity Systems, U.S. Patent 3,952,196, United Kingdom Patent 1,534,969, Canada Patent 1,059,598.



FEATURES

- Fast response. Typical response to an intense ultraviolet source is less than 25 milliseconds. Fire relay output is field adjustable from 0.025 to 30 seconds.
- Operates under adverse weather conditions such as wind, rain, snow, high humidity, and extremes of temperature or pressure.
- Automatic Optical Integrity (**oi**) feature provides automatic self-checking of circuitry and optical surfaces.
- Current output. Standard 0 to 400 microampere output provided. Optional 4 to 20 ma output.
- Fault relay and Fire relay outputs. Standard Form A (N.O.), 0.2 ampere maximum at 50 vdc provided. Optional Form C (N.O./C/N.C.), non-latching, 3 amperes at 30 volts dc or 120 volts ac.

SHIPPING WEIGHT—

Aluminum enclosure: 2.0 kilograms (4-1/2 pounds).
Stainless steel enclosure: 3.15 kilograms (7 pounds).

DIMENSIONS—

Refer to Figure 3.

ENCLOSURE MATERIALS—

Models are available in red anodized copper-free aluminum or 316 stainless steel.

CONDUIT THREAD SIZE—

One or two conduit entries can be provided on each unit for incoming and outgoing field wiring. Entry sizes available are: 1/2 inch NPT, 3/4 inch NPT, 20 mm, 25 mm or Pg16.

HUMIDITY—

0 to 95% relative humidity.

VIBRATION—

Designed to meet MIL SPEC 810C, method 514.2, procedure X, curve AW (5-200 Hz, 1.5 g).

ENCLOSURE RATINGS—

Watertight, dust-tight NEMA 4 enclosure. Explosion-proof enclosure. FM approved for Class I, Groups B, C and D; Class II, Groups E, F and G. CSA certified for Class I, Groups C and D; Class II, Groups E, F and G. BASEEFA/CENELEC certified for Group IIB T6 (T_{amb} -40°C to +75°C) when ordered with a locking cover assembly. Enclosure rated IP66. Listed product of the Australian Scientific Services Laboratory (SSL).

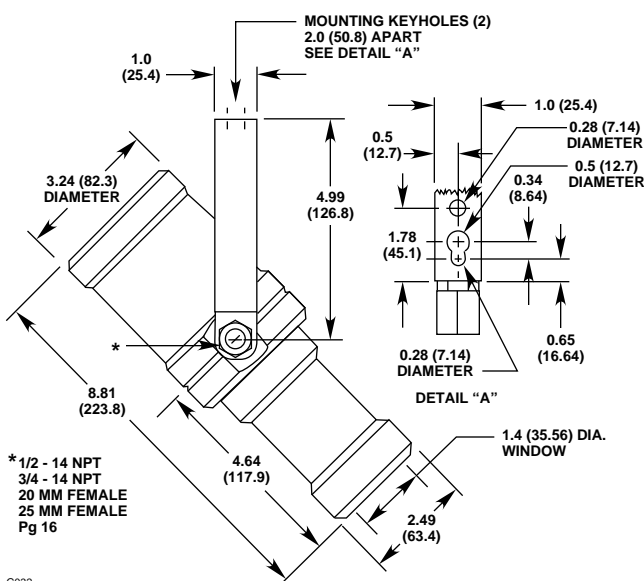


Figure 3—U7602 Dimensions in Inches (Millimeters)

ENGINEERING SPECIFICATIONS

NOTE

Items in bold are options that can be substituted with items appearing in the footnotes below.

The UV flame detector shall be a unitized device that contains all sensing, signal processing, and relay outputs **in a red copper-free aluminum enclosure.**¹ The detector shall operate on **24 vdc.**² The signal processing circuitry shall require UV radiation to exceed a field adjustable time delay period and a threshold level of **25 cps before responding at 35 feet to a**³ 1 foot by 1 foot gasoline fire. The detector shall have a uniform 90° cone of vision.

The detector shall have two form **A relays rated at 0.2 ampere maximum at 50 vdc.**⁴ The detector shall have a field adjustable time delay of 0.025 to 30 seconds.

The UV flame detector shall have modular design that allows the UV sensor module and electronics package to be easily field replaced without the use of special tools. All optical surfaces shall be easy to access for cleaning. No metal rods shall be allowed in front of the sensor window.

The optional UV tube module with LED indicators for fire alarm shall be provided.⁵

The UV flame detector shall have automatic optical testing capabilities on the UV sensor. **During the optical test, a beam of UV radiation shall be transmitted out of the detector housing, be reflected off of a reflector ring, back into the detector housing through the sensor's viewing window, and stimulate the UV sensor.**⁶ Films that blind the UV sensor shall cause a failure of the optical test, and cause the Fault relay to de-energize.

The device shall have separate **1/2 inch NPT**⁷ cable entries for incoming and outgoing field wiring. Terminals shall be suitable to accept 16 to 22 AWG wire.

The UV flame detector shall be rated for an operating temperature range of -40°F to +158°F (-40°C to +70°C) and a storage temperature of -67°F to +170°F (-55°C to +77°C). The detector shall operate over a humidity range of 0 to 95% RH and be able to withstand 100% condensing humidity for short periods of time. All printed circuit boards shall be coated to provide protection from environmental conditions. The UV flame detector shall meet MIL-STD 810C for vibration and have a swivel mounting bracket to provide a means to easily mount and aim the detector.

The UV flame detector shall be **explosion-proof for Class I, Division 1, Groups B, C and D; Class II, Division 1, Groups E, F and G. The device shall be rated NEMA 4 (dust-tight, watertight). The detector shall be FM approved.**⁸ The UV flame detector shall be the Det-Tronics model U7602, no equal.

An Intrinsically Safe UV test lamp shall be provided to allow field testing of the UV flame detection system. The test lamp shall be FM approved and CSA certified for use in Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Group G hazardous areas. The test lamp shall be the Det-Tronics model W8066, no equal.

The following options can be substituted for the item in bold:

- 1 or: "in a 316 stainless steel enclosure."
- 2 or: "120 vac." or: "12 vdc." or: "220/240 vac."
- 3 or: "10 cps before responding at 50 feet to a" or: "50 cps before responding at 25 feet to a" or: "100 cps before responding at 15 feet to a"
- 4 or: "C relays rated for 3 amperes at 30 volts dc or 120 volts ac."
- 5 This sentence may be deleted if the option is not desired.
- 6 or: "The optical test method shall operate on the Internal Reflection principle for detecting oil film buildup. The Internal Reflection principle shall require no external reflector or UV source to determine the cleanliness of the sensor's viewing window."
- 7 or: "3/4 inch NPT" or: "20 mm" or: "25 mm" or: "Pg 16"
- 8 or: "flame-proof for EEx d IIB. The device shall be rated IP66 (dust-tight/watertight). The detector shall be BASEEFA/CENELEC certified." or: "explosion-proof for Class I, Division 1, Groups C and D; Class II, Division 1, Groups E, F and G. The device shall be rated NEMA 4 (dust-tight, watertight). The detector shall be CSA certified."

ORDERING INFORMATION

When ordering, specify:

Model	U7602 Detector/Controller
Detector Module	DE1888 (LED optional)
Input voltage	120 vac, 50/60 Hz 220/240 vac, 50/60 Hz 12 vdc 24 vdc
Sensitivity	25 counts per second (cps) 50 counts per second (cps) 75 counts per second (cps) 100 counts per second (cps)
Housing Material	Copper-free red anodized aluminum 316 stainless steel
Conduit entry threads	1/2-inch NPT 3/4-inch NPT 20 mm 25 mm Pg16 Stop plug if required.
Cover locking assembly	Meets BASEEFA requirements.
Approval requirements	FM CSA BASEEFA/CENELEC SSL

For assistance in ordering a system to fit your specific application, contact:

Detector Electronics Corporation
6901 West 110th Street
Minneapolis, Minnesota 55438 USA
Telephone (612) 941-5665 or (800) 765-FIRE
Telex 6879043 DETEL UW
Cable Detronics
Facsimile (612) 829-8750

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