



UV/IR Detector C7052B

APPLICATION

When used in conjunction with a Det-Tronics R7409 UV/IR Controller, the C7052B Detector provides continuous and automated fire protection in applications where electric arcs, x-rays or gamma rays may be present in the environment.

The C7052B consists of one ultraviolet (UV) and one infrared (IR) sensor, mounted side-by-side on a swivel/bracket assembly. A fire signal is produced in the controller when both sensors, which are sensitive to different portions of the radiation spectrum, detect a fire. This dual criteria for production of an alarm signal ensures rapid fire detection while discriminating against false alarm sources such as arc welding. The C7052B Detector with its ability to discriminate against arc welding provides better protection than either UV or IR detectors alone.

The C7052B is explosion-proof, dust-proof, and water-tight, making it suitable for protection of hazardous areas in a wide variety of applications. The detector is not affected by adverse weather conditions, natural or artificial lighting, electric arcs, steady x-rays or gamma rays. The optical integrity (**oi**) feature continuously monitors the condition of the detector's optical surfaces to assure that the system is ready to respond to a fire at any time.

FEATURES

- Designed for use in hazardous locations.
- Operates under adverse weather conditions such as wind, rain, snow, high humidity, and extremes of temperature and pressure.
- Insensitive to solar radiation.
- Automatic Optical Integrity (**oi**) for both UV and IR sensors.
- Both UV and IR sensors are mounted to withstand shock and vibration—meets MIL SPEC 810C.

* **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.



- Enclosure available in anodized aluminum or 316 stainless steel.
- Designed for FM, CSA, BASEEFA, and CENELEC approval.

DESCRIPTION

The C7052B Detector consists of an ultraviolet and an infrared sensor mounted side-by-side on a swivel/bracket assembly.

The ultraviolet sensor responds to high energy radiation with wavelengths from 185 to 245 nanometers (1850 to 2450 angstroms) from sources such as fire, arc welding, x-rays and gamma rays. However, the UV sensor is not sensitive to radiation from the sun or other blackbody radiation.

The infrared sensor is sensitive to IR radiation over the range of 4,100 to 4,700 nanometers (4.1 to 4.7 microns). It is not sensitive to steady x-rays, gamma rays or radiation generated during arc welding. However, it will respond to a fire, and may respond to flickering sunlight and other blackbody radiation sources.

Two UV/IR sensors with different sensitivities are available. The standard sensitivity sensor will detect a 1 square foot

gasoline fire at 35 feet in less than 5 seconds. This sensor is suitable for most applications.

The high sensitivity sensor will detect a 4 square foot JP-4 fire at a distance of 100 feet in less than 5 seconds and a 100 square foot JP-4 fire at a distance of 150 feet in less than 5 seconds. This sensor is suitable for applications where greater distance must be covered. For example, in large aircraft hangars detectors mounted on the walls must provide protection throughout the hangar because it is not possible to mount detectors within the area to be protected. The high sensitivity sensor enables reliable protection in cases where the distance from the detector to the hazard is great.

The controller produces a fire signal when both the UV and the IR sensor have actuated in response to a fire. By using both a UV and an IR sensor, the UV/IR system is able to discriminate against virtually all false alarm sources and respond only to a true fire.

SPECIFICATIONS

SPECTRAL SENSITIVITY RANGE—

Ultraviolet: Responds to radiation in the range of 185 to 245 nanometers (1850 to 2450) angstroms.

Infrared: Responds to flickering radiation in the range of 4,100 to 4,700 nanometers (4.1 to 4.7 microns).

CONE OF VISION—

The C7052B has a nominal 80 degree cone of vision with the highest sensitivity in a direct line of sight. Sensitivity decreases away from this direct line of sight.

DIMENSIONS—

See Figure 1.

RESPONSE TIME—

Response time is a function of fire composition, size and distance. The C7052B will respond to an intense fire within 1 to 5 seconds.

INPUT VOLTAGE—

The IR sensor is powered by an external +24 vdc supply (range: 18 to 35 vdc, 2.4 watts required). The UV sensor is powered by a +290 vdc supply from the controller.

TEMPERATURE RATING—

Operating: -40°F to +185°F (-40°C to +85°C).
Storage: -67°F to +185°F (-55°C to +85°C).

DETECTOR ENCLOSURE MATERIALS—

Models available in anodized aluminum or 316 stainless steel.

DETECTOR ENCLOSURE RATINGS—

Watertight, dust-tight, designed to meet NEMA standards, Publication ICS6-1983 for Type 4 enclosures. CSA certified Enclosure 4.

Hazardous locations - FM approved for Class I, Groups C and D, Class II, Groups E, F and G. Designed for CSA certification for Class I, Groups C and D; Class II, Groups E, F and G. Designed for BASEEFA certification for Group Ex d 11b T6. Designed for CENELEC certification for EEx d 11B T6.

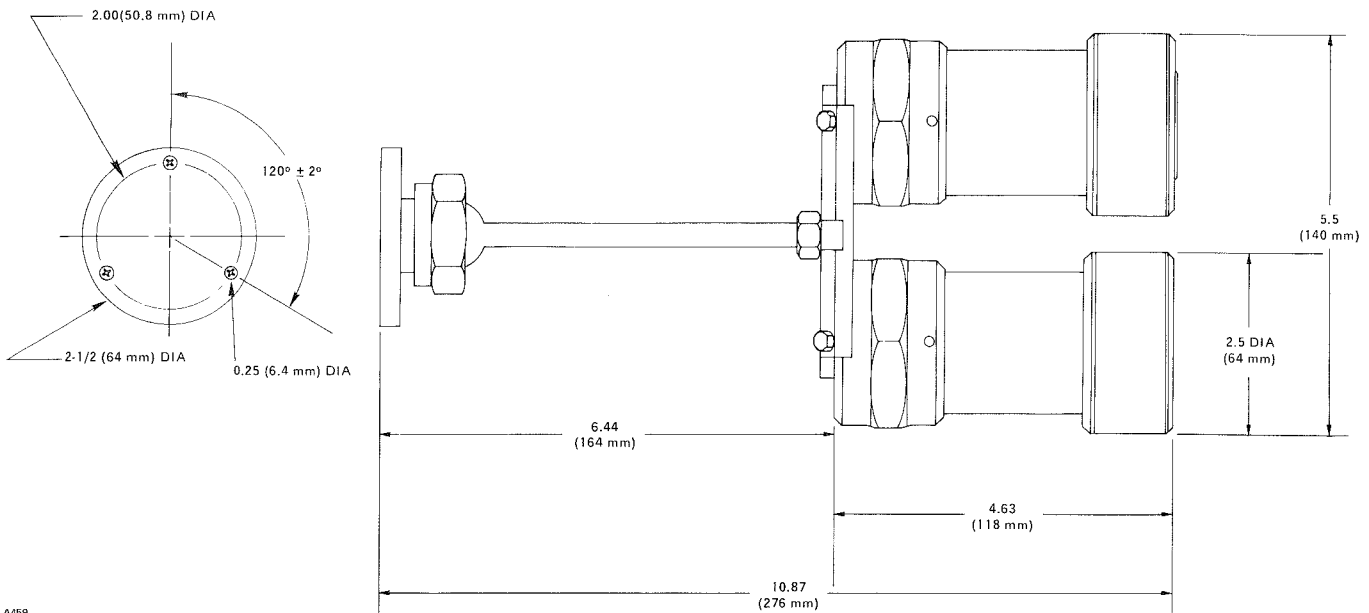


Figure 1—C7052B Dimensions

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SHIPPING WEIGHT (Approximate)—

	Pounds	Kilograms
C7052B Detector (aluminum)	2.8	1.1
(stainless steel)	4.8	2.0

INSTALLATION

DETECTOR POSITIONING AND DENSITY

As previously stated, the Det-Tronics C7052B Detector has a nominal 80 degree cone of vision. What this means in practical terms can be understood by reference to a typical installation. Consider an application such as an aircraft hangar, and assume it is desired to have complete detector coverage out to 100 feet (30 meters) from the detector with the detector mounted on the wall and aimed straight out. Because of its 80 degree cone of vision, the detector would cover a circular area with a diameter of 170 feet (52 meters) at the designated distance. A simple layout of the area to be covered will show the number of detectors required to completely supervise the designated area.

NOTE

Caution must be used when the detector is mounted on a wall, parallel to the ground, since the sun or other high intensity radiation source may reach the detector from a great distance. If there is a possibility of this occurring, the use of overlapping cones of vision and voting is recommended to guard against false actuations. In general, detectors should be placed as close as is practical to the probable hazard.

SWIVEL/BRACKET ASSEMBLY

Refer to Figure 2 for part identification.

1. Unscrew the hexagon swivel nut from the swivel base and set the base flat.
2. Place the ball end of the bracket stem into the up-turned cup of the base. Pass the hexagon swivel nut over the bracket stem and screw it onto the swivel base, trapping the ball between the base and the nut.

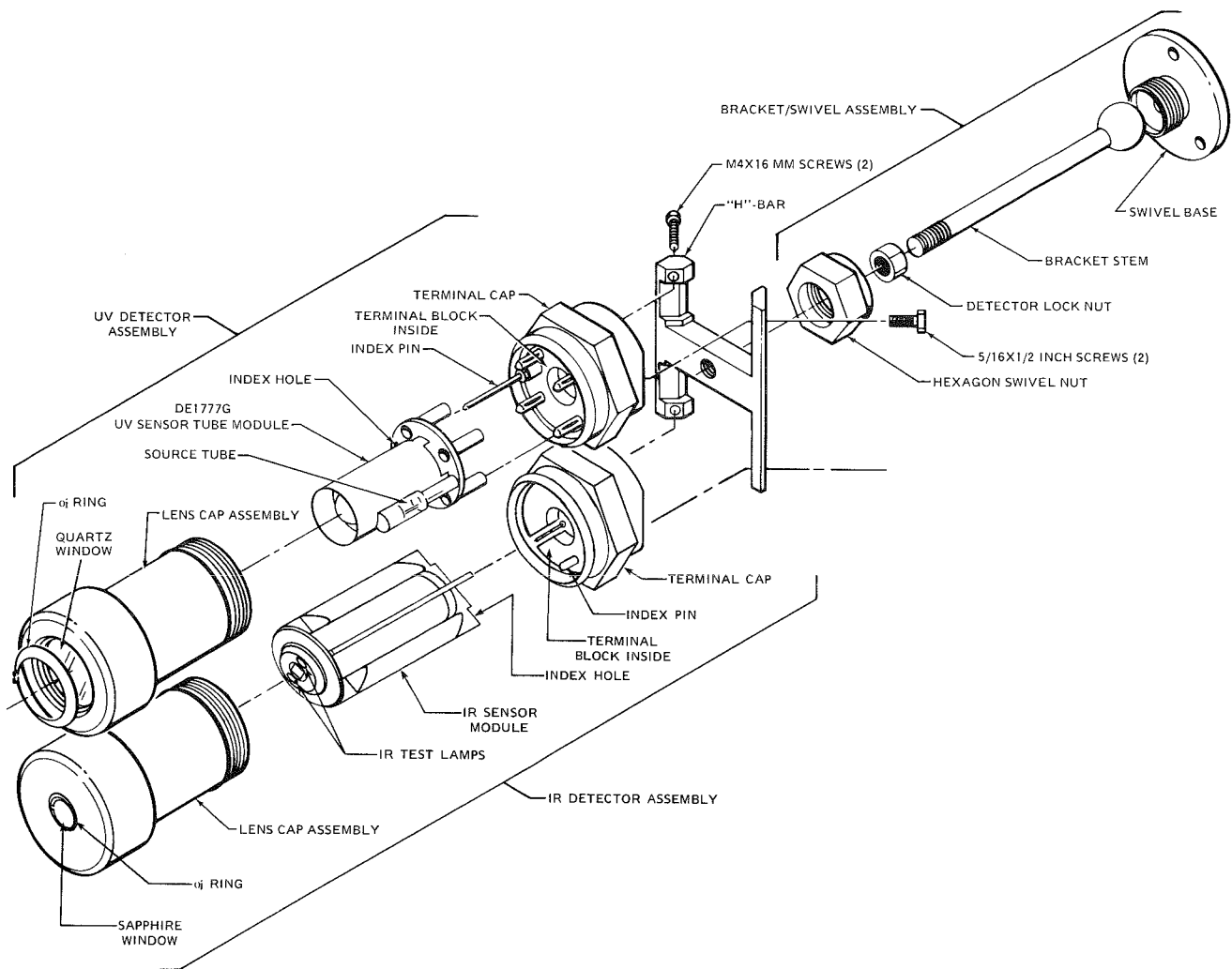


Figure 2—Assembly of C7052B

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3. Screw the detector locknut onto the bracket stem.
4. Screw the H-bar into the end bracket stem.

NOTE

The bracket stem can be screwed into both sides of the H-bar. However, only one side is correct. Refer to Figure 2 for an illustration of the H-bar when properly oriented.

5. Tighten locknut on bracket stem to H-bar box.

DETECTOR ASSEMBLY

1. Disassemble both housings, separating the terminal caps from the lens assemblies.
2. Attach IR sensor terminal cap to H-bar with the screws provided.
3. Attach UV sensor terminal cap to H-bar next to the IR sensor terminal cap with the screws provided.

WIRING REQUIREMENTS

The wiring of each detector must be at least 18 gauge (1.02 mm diameter) with a minimum rating of 600 volts rms. Each detector should be located no more than 2000 feet (0.6 km) from the controller. The B-lead (detector output) must be shielded and the shield grounded only at the controller. A four conductor shielded cable is recommended for each sensor (two per detector) with the shield tied to circuit ground at the controller.

NOTE

Installation requirements may prohibit the connection of a shield to the negative terminal of a power source (terminal 2). If this is the case, the detector shielding should be grounded in the following manner:

1. *Connect the B-lead shields to the chassis (earth) ground connection (terminal 64) of the controller.*
2. *Be certain that the shield is NOT connected to the detector at terminal "C" or any other points.*
3. *Connect the C-leads of the sensors to terminal 2 (power supply negative).*
4. *Connect a nonpolarized 0.47 microfarad 250 vdc capacitor from terminal 64 to terminal 2. This places the chassis and the power supply negative at the same ac potential, minimizing the induction of noise into the system through the detector cable.*

If the B-lead is run in conduit, the conduit must not be

used for wiring from other electrical equipment. An external grounding screw is provided for applications where the local wiring code requires that the detector enclosure be connected to earth ground. See controller manual for more information.

NOTE

Make certain that all wiring complies with applicable electrical wiring regulations that relate to the installation of electrical equipment in a ion resistance should be 100 megohms or more, using a high voltage insulation tester (megohmmeter). If cable resistance drops below 10 megohms, it should be replaced immediately to avoid shorting.

IMPORTANT

Disconnect the detectors and controller before applying a megohmmeter to the cable.

Certain guidelines must be followed when installing the detector to maintain the explosion-proof, dust-proof, and moisture-proof qualities of its enclosure. In applications where rigid metal conduit is used to install the detector in a hazardous location, a conduit seal is required to prevent gases, vapors, flames and moisture from entering the detector housing. These seals must be installed even if they are not required by local wiring codes. A seal must be located as close to the detector as possible. In no case should this seal be located more than 18 inches from the detector housing. Where an explosion-proof installation is required, an additional seal must also be used at any point where the conduit enters a non-hazardous area.

When pouring a seal, the use of a fiberdam is necessary to assure proper formation of the seal. The seals should never be poured in temperatures that are below freezing, since the water in the sealing compound will freeze and proper drying will not be possible. Contamination of the detector will then result when temperatures rise above the freezing point. The shielding of the cable should be stripped back to permit the seal to form around the individual detector leads, rather than around the outside of the shield. This will prevent any siphoning action that might occur through the inside of the shield.

Since moisture can be detrimental to electronic devices, it is essential that the electrical connections of the sensor tube module be kept dry. Moisture in the air can be trapped within sections of conduit and can condense and accumulate at the base of vertical conduit runs. To eliminate this condition, explosion-proof drains and breathers should be installed to automatically bleed off accumulated water.

DETECTOR WIRING

1. Detectors should be installed in a location best suited for covering the area to be protected, following the

detector positioning guidelines. Whenever practical, they should be placed where they will be easily accessible for servicing. Mount the swivel/bracket assembly in the area to be protected. See Figure 1 for mounting dimensions of the swivel base.

2. To wire the terminal block to the controller, pass a 4-wire cable through the hole in the end of the terminal cap. Connect each wire to the corresponding lettered screw of the terminal block (refer to Figure 3 for terminal block illustration). Refer to the UV/IR System instruction manual for further wiring details and cable standards.
3. Remove the UV tube module from its shipping package. Avoid touching the exposed glass envelope of the tube, since oil from fingerprints can absorb UV and reduce the sensitivity of the tube. Insert the tube module into the UV terminal block, using the index pin as a guide. Ensure that the four legs of the tube module are properly aligned over the terminal block plugs and press firmly until the tube module is securely in place.
4. Remove the IR sensor module from its shipping package. Avoid touching the terminal block, using the index pin as a guide. Ensure that the six pin sockets on the sensor module are aligned properly over the terminal block pins and press firmly until the sensor module is securely in place.
5. Screw the lens cap assemblies back into their corresponding terminal caps. Small window is IR, large window is UV.
6. Ensure that the split in the UV reflection ring is located 180 degrees from the **oi** test lamp, opening downward to prevent contaminant buildup. The split in the IR reflection ring should be located between the two test lamps and also opening downward.

MAINTENANCE

The C7052B Detector requires no periodic calibration. However, to maintain maximum sensitivity, the window and **oi** ring of each detector should be thoroughly cleaned on a regular basis. The length of time between periodic cleanings will be determined by the nature and amount of contaminants present in the environment.

NOTE

*Switch the keylock switch on the controller to the **RESET** or **TEST** position while cleaning the optical surfaces.*

On each detector assembly, remove the **oi** ring and clean the window thoroughly. Hold the **oi** ring by its tabs to

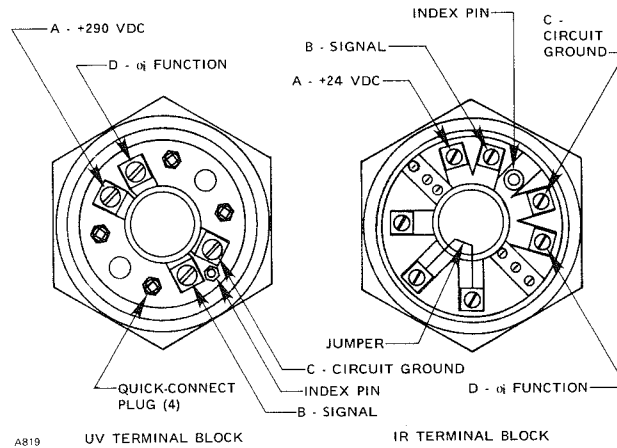


Figure 3—Terminal Block Wiring

avoid leaving fingerprints while cleaning the reflective surface. Re-install the UV reflective ring so that the split is 180 degrees from the **oi** test lamp, opening downward to prevent contaminant buildup. Re-install the IR reflective ring so that the split is between the two test lamps and also opening downward.

NOTE

*Use a clean cloth or tissue to clean the window and **oi** ring. DO NOT use commercial glass cleaning tissues. Many of these contain a silicon substance that remains on the cleaned surface and will reduce sensitivity. Avoid the use of commercial cleaners, since many of them also leave a UV absorbing residue on cleaned surfaces. Det-Tronics window cleaner solution is designed specifically for cleaning the optical surfaces (see the "Options" section of this manual for part number).*

Two rubber O-rings on each of the detector housings are used to ensure the watertight integrity of the detector. The housing should be periodically opened and the O-rings inspected for breaks, cracks, or dryness. To test the O-rings, remove them from the detector housing and stretch them slightly. If cracks are visible, the ring should be replaced. If they feel dry to the touch, a thin coating of lubricant should be applied.

CAUTION

The O-rings should be lubricated with polyalphaolefin grease, such as GRS-450 made by CPI Engineering. Suitability of other lubricants should be evaluated, since some materials can adversely affect the performance of certain detection devices.

When re-installing the rings, be sure that they are properly seated in the groove on the housing. It is imperative that these O-rings be properly installed and in good condition. Failure to properly maintain these rings can

allow water to enter the detector and cause premature failure.

The life expectancy of rubber O-rings can vary considerably, depending on the amount and nature of contaminants that are present in the environment. The person responsible for maintenance of the system must rely on experience and common sense to determine how frequently the rings should be inspected.

A coating of lubricant should be applied to the threads on the detector enclosure before re-assembling the detector. This will both lubricate the threads and help to prevent moisture from entering the detector housing.

ORDERING INFORMATION

When ordering, specify model, options and shipping mode.

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

Detector Electronics Corporation
Field Support Group
6901 West 110th Street
Minneapolis, Minnesota 55438 USA
Telephone (612) 941-5665
Telex 29-0562 DETRONICS BLTN or 6879043 DETEL UW
Cable Detronics

REPLACEMENT PARTS

- Replacement **oi** rings for UV sensor (part number 003088-001)
- Replacement **oi** rings for IR sensor (part number 003525-001)
- Replacement O-rings (2 per sensor) for UV and IR sensors (part number 107427-004)
- Replacement standard sensitivity UV tube module (part number DE1888A or DE1777A)
- Replacement high sensitivity UV tube module (part number DE1888N or DE1777N)
- Replacement standard sensitivity IR electronic package (part number 003207-001).
- Replacement high sensitivity IR electronic package (part number 003207-002).

OPTIONS

UV window cleaning kit (part number 002507-001)

Front Cover Locking Assembly for BASEEFA requirements (part number 002141-001, two required for UV/IR detector).

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