GENERAL MONITORS

Protection for life.

MODEL FL3002

Enhanced Infrared
Flame Detector

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INSTRUCTION MANUAL 12/97

General Monitors reserves the right to change published specifications and designs without prior notice.

Part No. MANFL3002
Revision E/12-97

Warranty

General Monitors warrants the Model FL3002 to be free from defects in workmanship or material under normal use and service within two (2) years from the date of shipment.

General Monitors will repair or replace without charge any such equipment found to be defective during the warranty period. Full determination of the nature of, and responsibility for defective or damaged equipment will be made by General Monitors' personnel.

Defective or damaged equipment must be shipped to the General Monitors plant or representative from which the original shipment was made. In all cases this warranty is limited to the cost of the equipment supplied by General Monitors.

The customer will assume all liability for the misuse of this equipment by its employees or other personnel.

All warranties are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without General Monitors approval or which have been subjected to neglect, accident, improper installation or application, or on which the original identification marks have been removed or altered.

Except for the express warranty stated above, General Monitors disclaims all warranties with regard to the products sold, including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of General Monitors for damages including, but not limited to, consequential damages arising out of/or in connection with the performance of the product.

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Model FL3002

Introduction

1-1 General Description

Fire is a phenomenon of combustion. Combustion is the continuous chemical reaction of a reducing agent (*fuel*) and an oxidizing agent (*oxygen, etc.*) with the evolution of thermal energy (*heat*). Fire is usually manifested in heat (*IR*), smoke, light (*visible*), and flame (*UV*).

Flame is the gaseous region of a fire where vigorous combustion chain reactions take place. These reactions emit radiation covering the Infrared, Ultraviolet and the Visible spectral regions.

The General Monitors Model FL3002 is an Enhanced Infrared (*IR/IR*) Flame Detector (*figure 1-A*) with features such as:

explosion/flame proof

complete unitization

microcomputer based

The Model FL3002 detects the intensity and flicker rate of the Infrared spectral region of flame (*figure 1-B*) to produce a system of flame detection that is highly immune to obstructions like the presence of smoke and airborne debris (*dust, etc.*).

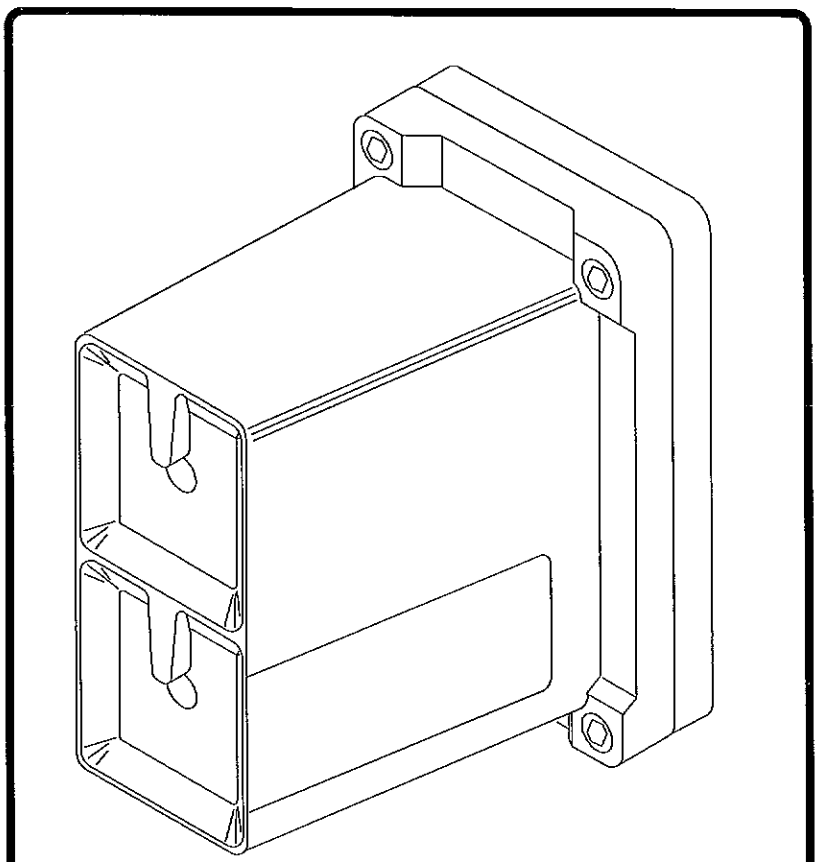

Figure 1-A Model FL3002

GENERAL MONITORS
Model FL3002

Introduction

1-2 Principle of Operation

The Model FL3002 is a discriminating IR/IR Flame Detector which makes use of a thermopile IR detector and a pyroelectric IR detector which are sensitive to infrared radiation. The Model FL3002 processes the signals from these two IR detectors with a microcomputer and produces the following outputs:

4-20 mA analog signal
immediate WARN relay contacts
immediate WARN open collector
time delayed ALARM relay contacts
time delayed ALARM open collector
FAULT relay contacts
FAULT open collector

Infrared radiation from a fire is detected by the temperature-compensated IR detectors which are mounted behind sapphire windows on the front of the enclosure.

The flicker rate and intensity of infrared radiation are the characteristics of a fire that are detected by the General Monitors' Model FL3002.

Pyroelectric IR Detector
The pyroelectric IR detector responds to changes in the intensity of IR radiation. A *flicker discrimination* circuit permits the detector to ignore steady static sources of infrared radiation such as hot objects. The inherent flickering of a flame provides the necessary modulation (*about 10 hertz*) to activate this portion of the IR circuit.

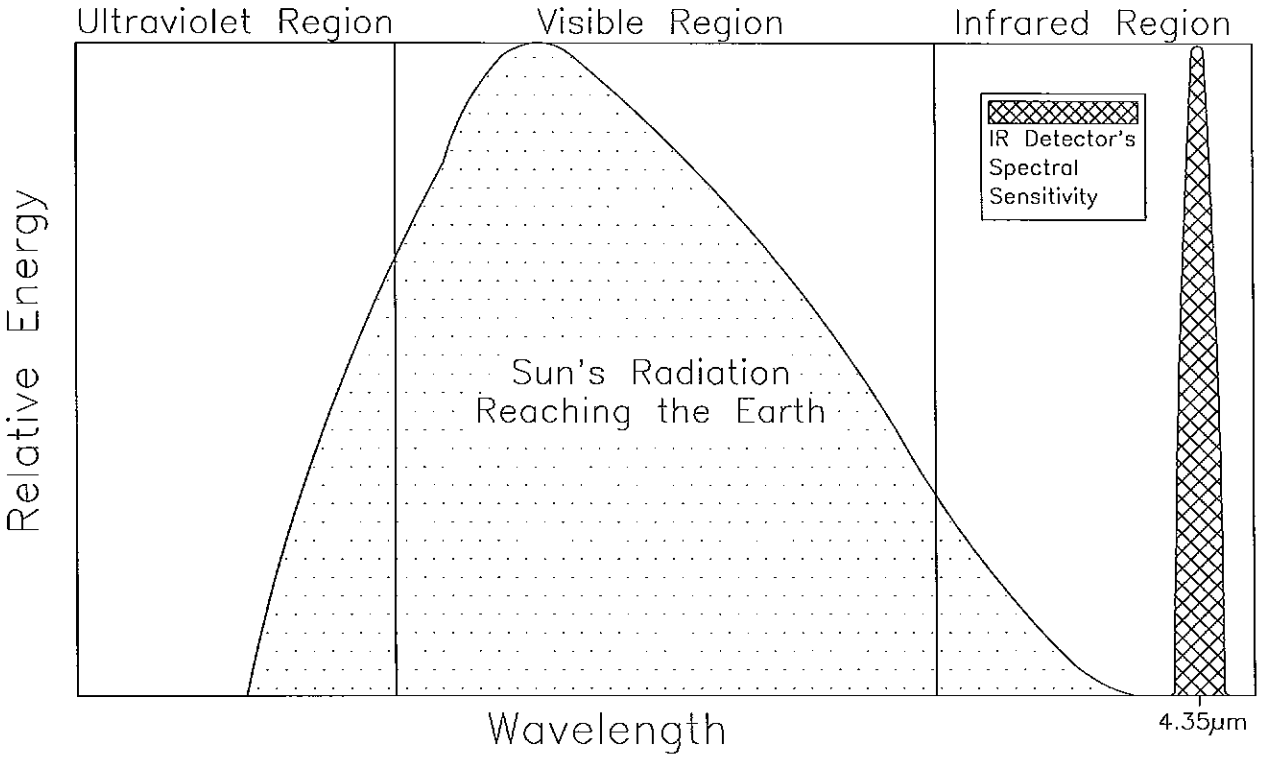

Figure 1-B Spectral Response of IR Detectors

Introduction

Thermopile IR Detector
The thermopile IR detector measures the intensity of infrared radiation occurring on a center wavelength of 4.35 microns. A fire will emit an intensity of IR radiation such that detection can be achieved as far as 50 feet from the detector.

Simply translated the thermopile sees intensity of IR, while the pyroelectric sees the flicker rate of IR. These two infrared devices combine to produce an Enhanced IR detector optimized for detection of fires under dirty/smoky conditions.

COPM Circuitry
A self-testing feature called Continuous Optical Path Monitoring (*COPM*) checks the optical path, the detectors, and the related electronic circuitry once every minute. If enough foreign material impairs the optical path of either IR detector for two consecutive checks, the unit will indicate FAULT. The FAULT outputs are a 0mA signal, de-energizing of the FAULT relay, and de-activating the FAULT open collector output (*see Section 3-4 Terminal Connections*). After a COPM FAULT, a COPM check is made once every eight seconds until the obstruction is removed. Then the COPM check will resume a once per minute check.

Note: *Since the optical path is checked once per minute and it requires two check failures to produce a FAULT, it may take up to two minutes for the unit to detect an obstruction.*

Alarm Test
The Model FL3002 Flame Detector has a built-in Alarm Test feature. By connecting one contact of a SPST momentary switch to TB1 position 14 and the other contact to DC COM (*see Section 3-4 Terminal Connections*), the user can test the Flame Detector by activating this switch for three seconds. The COPM sources (*the two IR source tubes*) turn on and simulate a fire condition. If the Flame Detector detects these sources, it will go into WARN and then the time delayed ALARM. After eight seconds the Flame Detector will reset the non-latching WARN and/or ALARM. A latching WARN and/or ALARM will remain latched until manually RESET. If the Flame Detector does not respond to the sources, it will output a FAULT condition and will retest every eight seconds, as in the COPM FAULT case. Thus, the Alarm Test feature tests the total integrity of the unit.

Introduction

1-3 System Components

ITEM	PART #
FL3002 IR/IR Flame Detector (Standard)	FL3002-321-100-120
Mounting Bracket Assembly	70580-1
Swivel Elbow - 3/4 NPT	961-003
TL103 UV/IR Test Lamp (Standard)	TL103-000-000-130
Window cleaning solution	10272-1
Instruction Manual	MANFL3002

Optional Display Modules

TA402A	TA402A-321-100-063 (Standard) Single Channel **02A Series** Trip Amplifier Control Module for Flame Detection
FL802	FL802-311-800-120 (Standard) Multi-Channel Readout/Relay Display Module for Flame Detection

Specifications

2-1 System Specifications

Application:
FL3002 Enhanced IR Flame Detector

Detector Location:
Class I, Division 1, Groups B, C & D;
Class II, Groups E, F & G; Class III

IR Detector Center Wavelength (*figure 1-B*):
4.35 um

Typical Response Time*:

30 to 50 feet	3 to 5 seconds
20 to 30 feet	2 to 3 seconds
< 20 feet	≤ 2 seconds

Field of View*:(*figure 3-A*)
100° maximum (*±50° from center*)

***NOTE:**
Response Times and Field of View data have been derived by testing the Model FL3002 Flame Detector with a 1 square foot gasoline fire. One cup of unleaded gasoline on top of a one inch layer of water was ignited for each test. These are typical values and different results may occur depending on the variation of each fire.

Sensitivity:
50 feet (*15.2m*) - Maximum distance for a 1 square foot (*.092m²*) gasoline fire to be reliably detected. (*For settings see Section 3-5 Switch Selectable Options*)

Maximum Cable Parameters:
Output signal - 9000 feet (*2750 m*), maximum 50 Ohms loop, with maximum 250 Ohms input impedance of readout unit. Remote power supply - 4500 feet (*1370 m*), maximum 20 Ohms loop and 24 VDC minimum. (*See Section 3-4 Terminal Connections*)

Certification:
CSA certified
FM, UL & CENELEC approved

2-2 Mechanical Specifications

Enclosure Material:
Aluminum

Material:	Housing, A-356 Base, 6061-T6
Finish:	Chemical Film per MIL-C-5541, Epoxy Powder Coated

Physical Dimensions:

Height	6.850 in	(*17.4 cm*)
Width	4.100 in	(*10.4 cm*)
Depth	6.325 in	(*16.1 cm*)
Weight	7.25 lbs	(*3.3 kg*)

Specifications

2-3 Electrical Specifications

Nominal supply voltage	24 VDC
Supply voltage range	20 to 35 VDC
Nominal supply current	200 mA
Maximum supply current	250 mA
Maximum output signal load	300 Ohms
Output signal	0 to 20 mA
FAULT signal	0 to 0.5 mA
Ready signal	4.0 ±0.5 mA
WARN signal	16.0 ±0.5 mA
ALARM signal	20.0 ±0.5 mA
Relay Contact	4A 250 VAC, 3A 30 VDC Resistive MAX
Open Collector	50mA 30 VDC MAX.

(*See Terminal Connections 3-4 for relay contact and open collector connections*)

2-4 Environmental Specifications

Operating temperature range:

-40°F to 158°F -40°C to 70°C

Storage temperature range:

-40°F to 140°F -40°C to 60°C

Humidity range:

5% to 100% R.H. non-condensing

Installation

3-1 On Receipt of Your Equipment

All equipment shipped by General Monitors is packed in shock-absorbing containers which affords a considerable degree of protection against physical damage. The contents should be carefully removed and checked against the enclosed packing slip.

All subsequent correspondence with General Monitors must specify the equipment part number and serial number.

3-2 Choosing Detector Locations

Several variables are involved in selecting the locations to install detectors to ensure proper flame detection. There are no hard and fast rules defining the optimum location. However, the following general suggestions should be considered in regard to particular conditions at the site where the unit is being installed.

Detector Field of View

Each FL3002 Flame Detector has a maximum of 100° **Cone of Vision**. (*Figures 3-A & 3-B*)

Optical Sensitivity Range

The distance at which the FL3002 Flame Detector will respond to a flame is a function of the intensity of that flame. The maximum distance is 50 feet (*15.2m*) for a gasoline fire with a surface area of 1 square foot (*.092m*^{2}).

Environmental Factors

1. Avoid installing the FL3002 Flame Detector where it will be unnecessarily exposed to shock or vibration.

2. Although the FL3002 is not extremely affected by oil, grease, or other contaminants on the optical windows, detectors mounted in dirty atmospheric conditions will require more frequent inspection, cleaning, and/or sensitivity checking. Mount the detector in a slightly downward plane to minimize the effect of dust or moisture build up on the detector's optical IR windows.

3. Observe the ambient temperature range for the specific model (see Environmental Specifications, Section 2-4). For outdoor installations, in areas exposed to intense direct solar radiation, the detector may reach temperatures well above specification. For this condition, a cover for shade may be required to bring the temperature within specification. As with any cover or object near by, ensure that the field-of-view of the detector is not obstructed.

4. Avoid conditions where the detector is pointed directly at the sun. While the detector will not respond to solar radiation under "normal" conditions, intense solar radiation with an induced chopping effect (flicker) for a specific duration of time can result in an incorrect alarm output.

5. Avoid conditions of extreme ice build up on the optical IR detector windows. Complete icing over of the IR detector window can result in fault conditions.

3-3 Detector Installation

The FL3002 Flame Detector is an explosion-proof assembly rated for use in Class I, Division 1, Group B, C, & D, Class II, Groups E, F & G and Class III locations.

The detector should be mounted in locations which will inhibit people or objects from obscuring the detectors' **Cone of Vision**. Mounting should be convenient for visual inspection and cleaning.

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Model FL3002

Installation

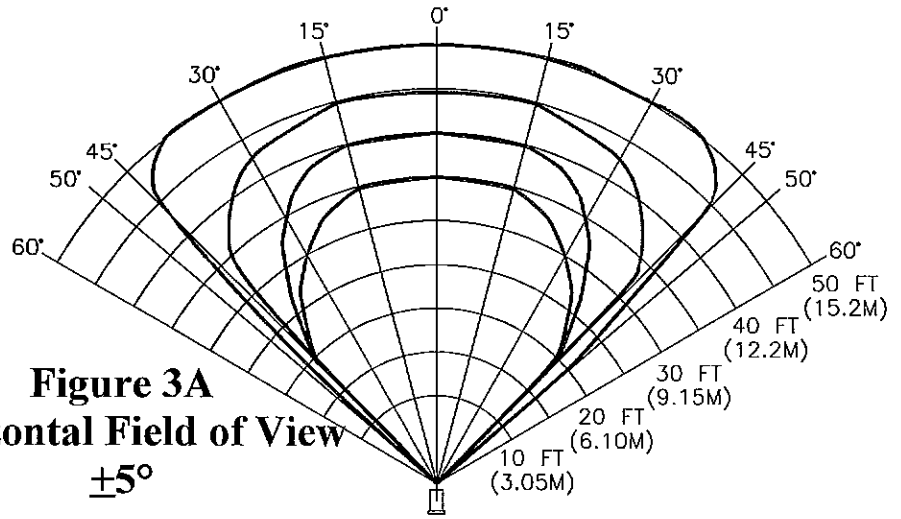

Figure 3A
Horizontal Field of View
±5°

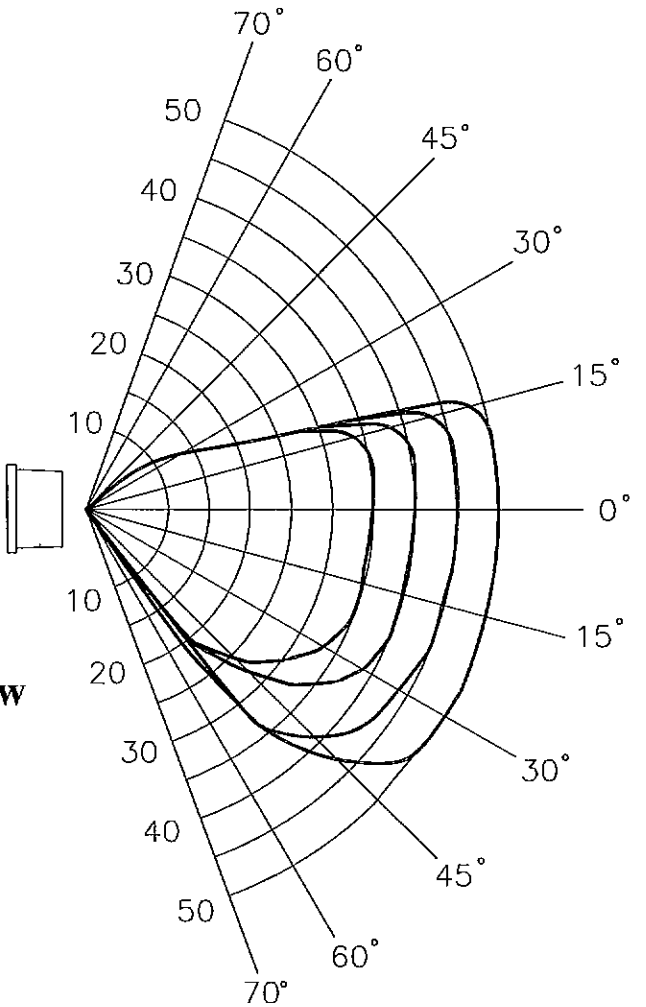

Figure 3B
Vertical Field of View
±5°

Installation

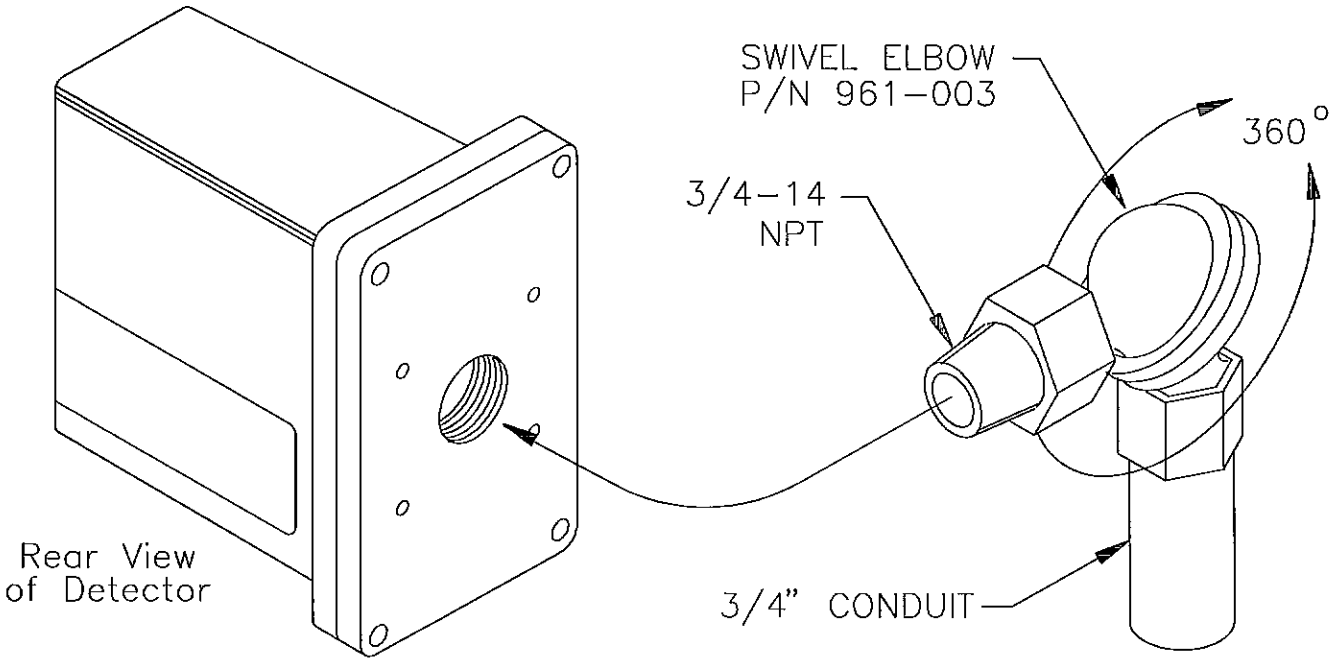

Figure 3-C Mounting Hardware - EP Swivel Elbow

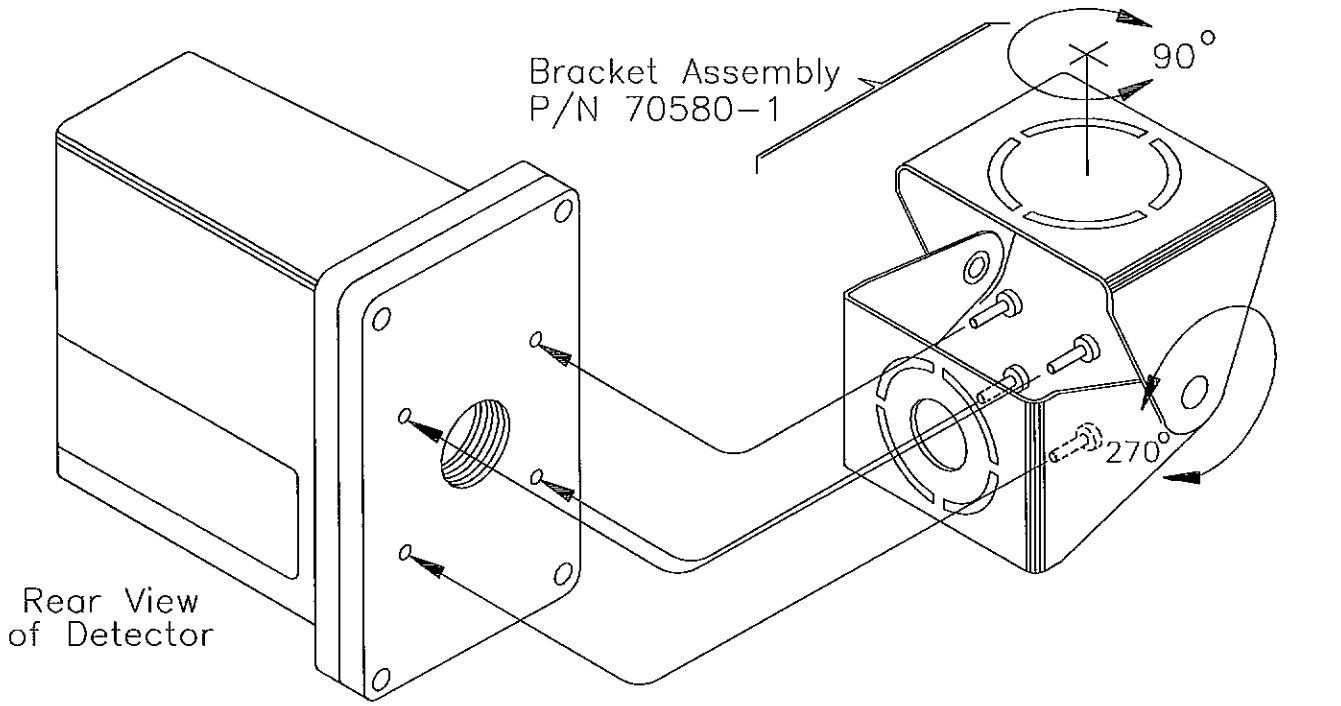

Figure 3-D Mounting Hardware - Bracket Assembly

GENERAL MONITORS
Model FL3002

Installation

Mounting hardware should be used as shown in figures 3-C and 3-D. Overall dimensions of the detector and mounting hardware are shown in figure 3-E.

WARNING: General Monitors requires that the conduit entry be sealed per the Canadian Electrical Code Handbook (Part 1, Section 18-154). Conduit seals prevent water from entering the units' housing through the conduit entry. Water entering the housing through the conduit entry will damage the electronics and nullify the warranty.

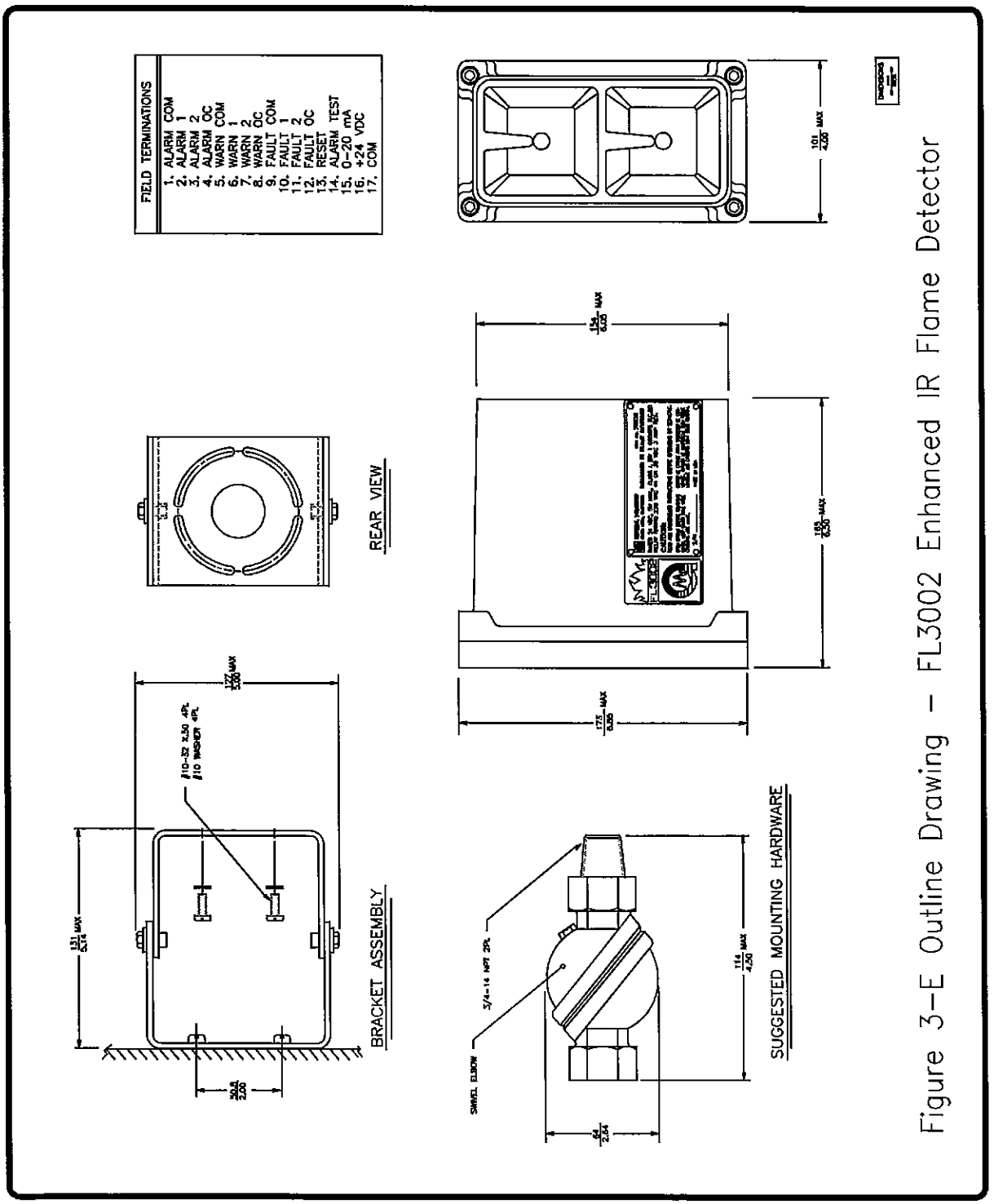

Figure 3-E Outline Drawing - FL3002 Enhanced IR Flame Detector

Installation

3-4 Terminal Connections

All wire connections are made through the 3/4 NPT opening in the base assembly to the terminal block (*See Figure 3-G*). The Terminal Block located on the Base Assembly (*See Figure 3-I*) accepts 16 AWG to 22 AWG stranded or solid core wire. (*14 AWG wire can be used but extreme care must be taken, in that the connection space will be very tight for that gauge of wire*). Each wire should be stripped as shown in Figure 3-F.

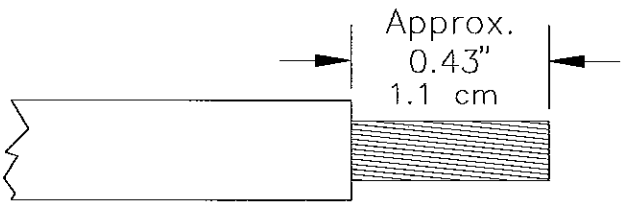

Figure 3–F Strip Length

To connect wiring to the Terminal Block, press the orange opening lever with a flat head screwdriver and insert the conductor into the connection space as shown in Figure 3-H.

There are seventeen possible terminal connections. The following is a description and specification for each:

Terminal 1 = ALARM COM
Terminal 2 = ALARM 1
Terminal 3 = ALARM 2
Description: These connections are for the SPDT ALARM relay. The ALARM output is time delayed for 1, 2, 4, or 8 seconds and can be determined by the user. The ALARM output can be normally energized or normally de-energized. It can also be latching or non-latching.

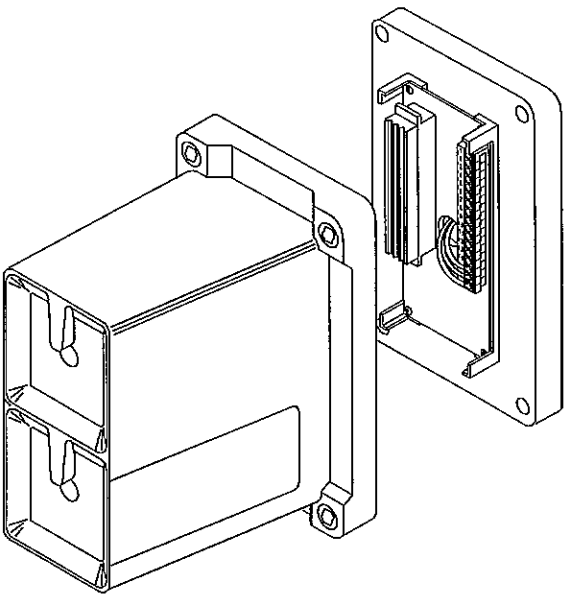

Figure 3–G
Detector Head and Base

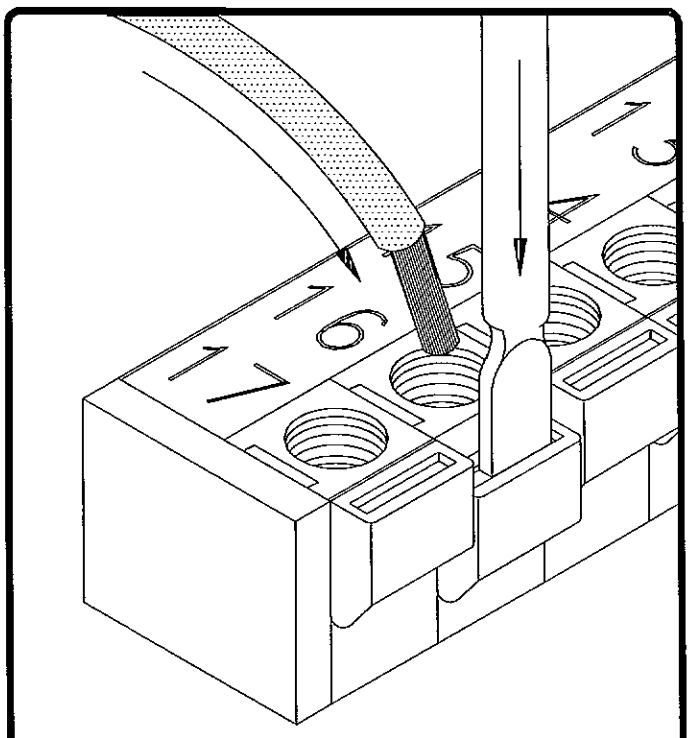

Figure 3–H
Terminal Block Operation

GENERAL MONITORS
Model FL3002

Installation

The time delay and the relay options (*energized/de-energized, latching/non-latching*) are all DIP switch selectable and can be set by the user (*See Section 3-5 for Switch Selectable Options*).

Contact:
Normally De-Energized
Terminal 2, ALARM 1 = Normally Open
Terminal 3, ALARM 2 = Normally Closed
Normally Energized
Terminal 2, ALARM 1 = Normally Closed
Terminal 3, ALARM 2 = Normally Open

ALARM relay contact rating:
4A @ 250VAC, 3A @ 30VDC RES MAX.

Caution: *For all relay connections see Figure 3-J.*

Terminal 4 = ALARM OC
This connection is the ALARM open collector output. This output follows the same logic as the ALARM relay. That is, it can be time delayed for 1, 2, 4 or 8 seconds, normally energized (*sinking current*), or normally de-energized (*not sinking current*), and it can also be latching or non-latching. These settings are DIP switch selectable options (*See Section 3-5 for Switch Selectable Options*). For making connections to Open Collector Outputs see Figure 3-K.

Open Collector Ratings:
With Relays - 50mA @ 30VDC MAX.
Without Relays - 100mA @ 30VDC MAX.
The max. output leakage current is 50uA.

Terminal 5 = WARN COM
Terminal 6 = WARN 1
Terminal 7 = WARN 2

Description: These connections are for the SPDT WARN relay. The WARN output can be normally energized or normally de-energized. It can also be latching or non-latching. The relay options (*energized/de-energized, latching/non-latching*) are DIP switch selectable and can be set by the user (*See Section 3-5 for Switch Selectable Options*).

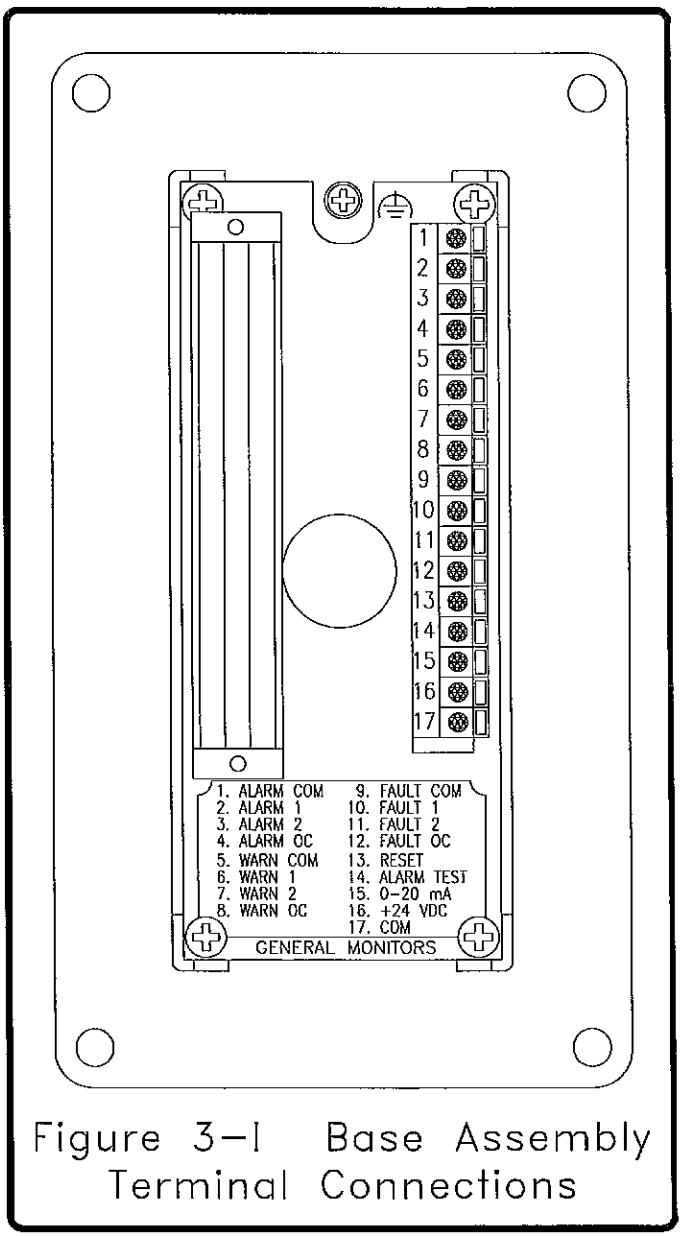

Figure 3-I Base Assembly Terminal Connections

Installation

Contact:
Normally De-Energized
Terminal 6, WARN 1 = Normally Open
Terminal 7, WARN 2 = Normally Closed
Normally Energized
Terminal 6, WARN 1 = Normally Closed
Terminal 7, WARN 2 = Normally Open

WARN relay contact rating:
4A @ 250VAC, 3A @ 30VDC RES MAX.

Caution: *For all relay connections see Figure 3-J.*

Terminal 8 = WARN OC
This connection is the WARN open collector output. This output follows the same logic as the WARN relay. That is, it can be normally energized (*sinking current*), or normally de-energized (*not sinking current*), and it can also be latching or non-latching. These settings are DIP switch selectable options (*See Section 3-5 for Switch Selectable Options*). For making connections to Open Collector Outputs see Figure 3-K.

Open Collector Ratings:
With Relays - 50mA @ 30VDC MAX.
Without Relays - 100mA @ 30VDC MAX.
The max. output leakage current is 50uA.

Terminal 9 = FAULT COM
Terminal 10 = FAULT 1
Terminal 11 = FAULT 2
Description: These connections are to the SPDT FAULT relay. The FAULT output configuration is normally energized (*with power on*) and non-latching. This output will change to the de-energized state during loss of power, time-out function, a COPM FAULT, or a low voltage FAULT.

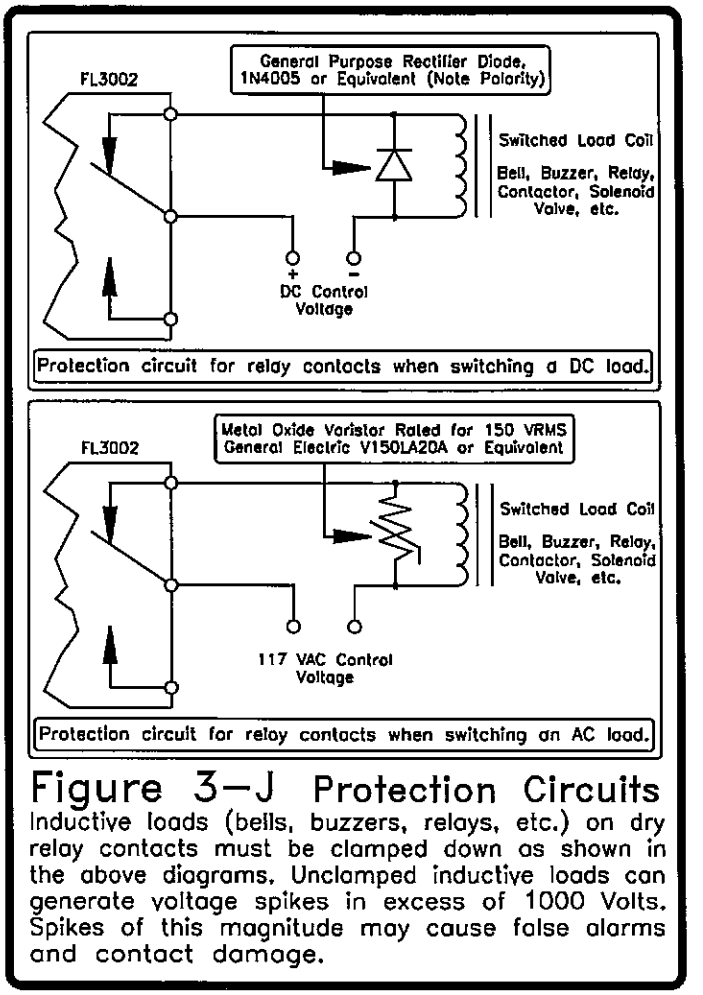

Figure 3−J Protection Circuits
Inductive loads (bells, buzzers, relays, etc.) on dry relay contacts must be clamped down as shown in the above diagrams. Unclamped inductive loads can generate voltage spikes in excess of 1000 Volts. Spikes of this magnitude may cause false alarms and contact damage.

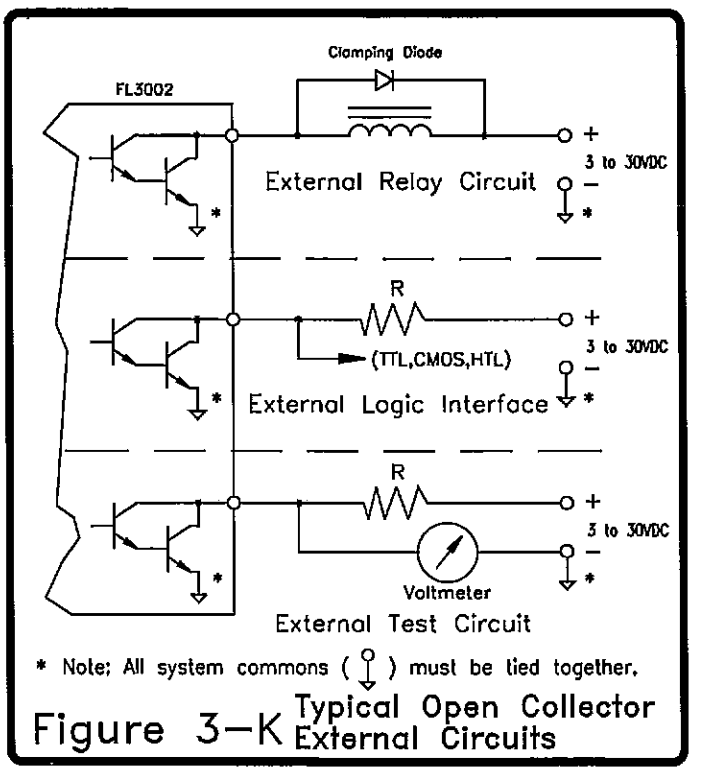

Figure 3−K Typical Open Collector External Circuits

GENERAL MONITORS
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Installation

Contact:
Normally energized
Terminal 10, FAULT 1 = Normally Closed
Terminal 11, FAULT 2 = Normally Open

FAULT Relay Contact Rating:
4A @ 250VAC, 3A @ 30VDC RES MAX.
Caution: *For all relay connections see Figure 3-J.*

Terminal 12 = FAULT OC
This connection is the FAULT open collector output. This output follows the same logic as the FAULT relay. It is normally energized (*sinking current*), and latching. These settings are not DIP switch selectable options. For making connections to Open Collector Outputs see Figure 3-K.

Open Collector Ratings:
With Relays - 50mA @ 30VDC MAX.
Without Relays - 100mA @ 30VDC MAX.
The max. output leakage current is 50uA.

Terminal 13 = RESET
The RESET, when activated, returns a latched ALARM and/or WARN output, which are no longer present, to their original state(s). For this RESET function, place one contact of a SPST normally open momentary switch to TB1, Terminal 13 and the other contact to DC COM (*the detector's common*).

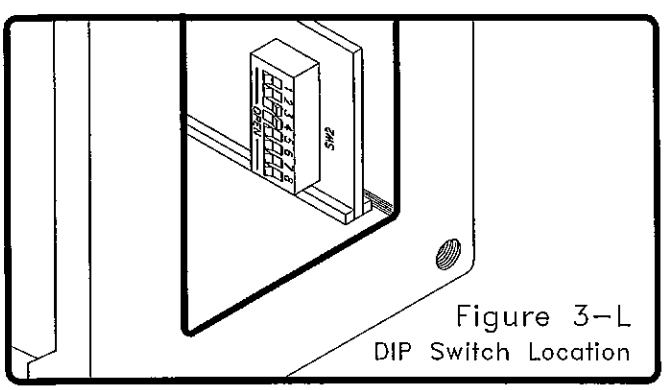


Figure 3–L
DIP Switch Location

Terminal 14 = ALARM TEST
By connecting one contact of a SPST normally open momentary switch to TB1, Terminal 14 and the other contact to DC COM (*the detector's common*) the user can test the Flame Detector by activating this switch for three seconds. The COPM sources (*the two IR source tubes*) turn on and simulate a fire condition. If the Flame Detector detects these sources, the unit will output a WARN condition and then the time delayed ALARM condition.

After eight seconds the Flame Detector will reset the non-latching WARN and/or ALARM outputs, while a latching WARN and/or ALARM output(s) will remain latched until manually RESET. If the Flame Detector does not respond to the sources, it will output a FAULT condition and will retest every eight seconds as in the COPM FAULT case.

Option	Open	Closed
1. 100% Sensitivity – 1 sq ft fire at 50 feet.		1 & 2
2. 80% Sensitivity – 1 sq ft fire at 45 feet.	1	2
3. 65% Sensitivity – 1 sq ft fire at 40 feet.	2	1
4. 50% Sensitivity – 1 sq ft fire at 35 feet.	1 & 2	
5. 1 second ALARM time delay		3 & 4
6. 2 second ALARM time delay	3	4
7. 4 second ALARM time delay	4	3
8. 8 second ALARM time delay	3 & 4	
9. ALARM nonlatching		5
10. ALARM latching	5	
11. WARN nonlatching		6
12. WARN latching	6	
13. ALARM normally energized		7
14. ALARM normally de-energized	7	
15. WARN normally energized		8
16. WARN normally de-energized	8	

Figure 3–M FL3002 Switch Options

Installation

Terminal 15 =0 to 20 mA (*Analog Output*)
The 0 to 20 mA output is a current signal. The output corresponds as follows:

FAULT signal = 0 to 0.5 mA
Ready signal = 4.0 ±0.5 mA
WARN signal = 16.0 ±0.5 mA
ALARM signal = 20.0 ±0.5 mA
Maximum Analog Output Signal Load is 300 Ohms.

Cable Requirements:
For interfacing with 250 Ohm input impedance devices, the following maximum cable lengths apply for the Analog Output Signal (*maximum 50 Ohm loop*):

14 AWG - 9000 feet (*2740 meters*)
16 AWG - 5800 feet (*1760 meters*)
18 AWG - 3800 feet (*1150 meters*)
20 AWG - 2400 feet (*730 meters*)
22 AWG - 1700 feet (*510 meters*)

Terminal 16 = +24VDC
Terminal 17 = COM
The supply voltage range for the FL3002 is 20 to 35 VDC at the detector (*low voltage is detected at 18 VDC*). The following maximum cable lengths apply for a +24VDC power supply (*maximum 20 Ohm loop*):

14 AWG - 4500 feet (*1370 meters*)
16 AWG - 2340 feet (*710 meters*)
18 AWG - 1540 feet (*470 meters*)
20 AWG - 970 feet (*295 meters*)
22 AWG - 670 feet (*200 meters*)

The following maximum cable lengths apply for a power supply that yields +28VDC (*maximum 20 Ohm loop*):

14 AWG - 6650 feet (*2000 meters*)
16 AWG - 4200 feet (*1280 meters*)
18 AWG - 2770 feet (*840 meters*)
20 AWG - 1740 feet (*530 meters*)
22 AWG - 1220 feet (*370 meters*)

In general, all cable lengths specified are maximum values. Good design practices dictate cable lengths conservatively shorter than the given maximum values.

3-5 Switch Selectable Options

All settings for the Model FL3002 are done via a DIP switch on the Control Board. To set these options, remove the detector head from the base assembly and locate the DIP switch (*see Figure 3-L*). On the DIP switch, **OPEN** means the switch is pushed in on the side labeled **OPEN**. **CLOSED** means the switch is pushed in on the other side with the number corresponding to the switch position. Refer to the table in Figure 3-M for the proper switch assignments.

NOTE: *When any Open Collector is connected to a device which is not powered by the same supply that is supplying the detector (FL3002), clip (remove) jumper W3. The W3 jumper location is shown on the drawing illustrated in Figure 5-E, Sheet 1.*

Maintenance

4-1 General Maintenance

Once correctly installed, the Model FL3002 requires very little maintenance other than regular sensitivity checks and cleaning of the lenses. General Monitors recommends that a schedule be established and adhered to.

NOTE: *The removal of particulate matter and any film build-up on the lenses is necessary to ensure proper sensitivity of the system. It is recommended that the window be cleaned at least every thirty days or more often if the detector is located in a particularly dirty environment.*

4-2 Cleaning the lenses

A clean, soft, lint-free cotton swab should be used to apply the cleaning solution to the lenses.

Wet the lens with the cleaning solution using a cotton swab.

Rub dry with a dry cotton swab until the window is clean.

Completely dry the lens.

Repeat the above procedure for the COPM fiber optic light rods. (*See Figure 4-A*)

NOTE: *It is important that a wetting solution be used for cleaning the lenses as wiping with a dry swab may cause a build-up of static charges which may in turn cause false alarms.*

<u>DO NOT</u> USE A COMMERCIAL GLASS CLEANER OTHER THAN "INDUSTRIAL STRENGTH WINDEX® with Ammonia D": The lenses are not made of glass, they are made of sapphire. The cleaning solution should be General Monitors' P/N 10272-1 (Industrial Strength Windex® with Ammonia D).

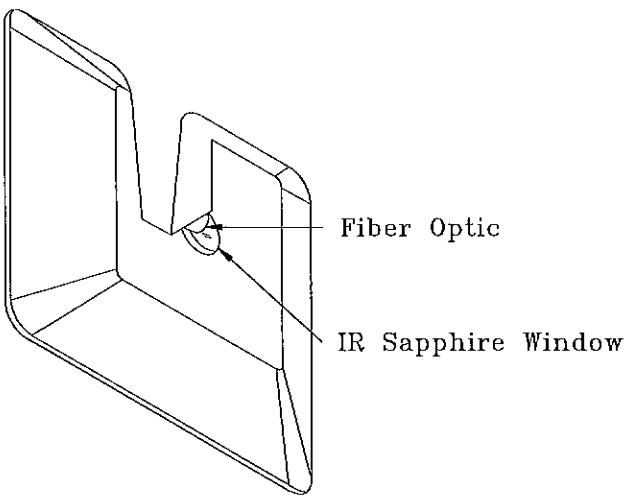


Figure 4-A

Maintenance

4-3 Sensitivity Check

To verify that the detectors are functioning properly, a General Monitors Test Lamp and/or the ALARM TEST function should be used. For the ALARM TEST function, see section 1-2 Principle of Operation, for use and an explanation. For the General Monitors' Test Lamp, see section 6-2 TL103 UV/IR Test Lamp.

4-4 Storage

The Model FL3002 Flame Detector should be stored in a clean dry area within the temperature range quoted in section 2-4 Environmental Specifications.

Trouble Shooting

5-1 Troubleshooting Chart

Problem	Possible Cause	Corrective Action
1. No output signal.	1a. Unit has not timed-in.	1a. Wait 45 seconds for time-in sequence.
	1b. No DC power to the unit.	1b. Be sure that the +24VDC is applied with the correct polarity.
	1c. Low voltage FAULT (voltage at unit is less than +18VDC).	1c. Be sure that the unit is powered with at least +20VDC under load.
	1d. COPM FAULT, dirty or obscured optical path (IR windows).	1d. Clean the IR windows and associated source light rods.
2. Constant 16mA or 20mA signal (WARN or ALARM) with no known radiation to the detector.	2. Unit is in latched WARN (16mA) or ALARM (20mA).	2. Reset unit or change DIP switch settings for desired non-latching option (See Section 3-5).

INTRODUCTION: This section is intended to be a guide in correcting problems which may arise in the field. This section is not all-inclusive, and General Monitors should be contacted for assistance if the corrective actions listed do not eliminate the problem. If equipment or qualified personnel required for various tests are not available it is recommended that the defective unit be returned to General Monitors for repair. A complete written description of the problem should be included.

Be sure to inhibit or disconnect external alarm wiring before making any check which might send the unit into alarm, if an alarm condition will create problems.

NOTE: If the equipment is under warranty, any repairs performed by persons other than General Monitors' authorized personnel may void the warranty. Please read the warranty statement carefully.

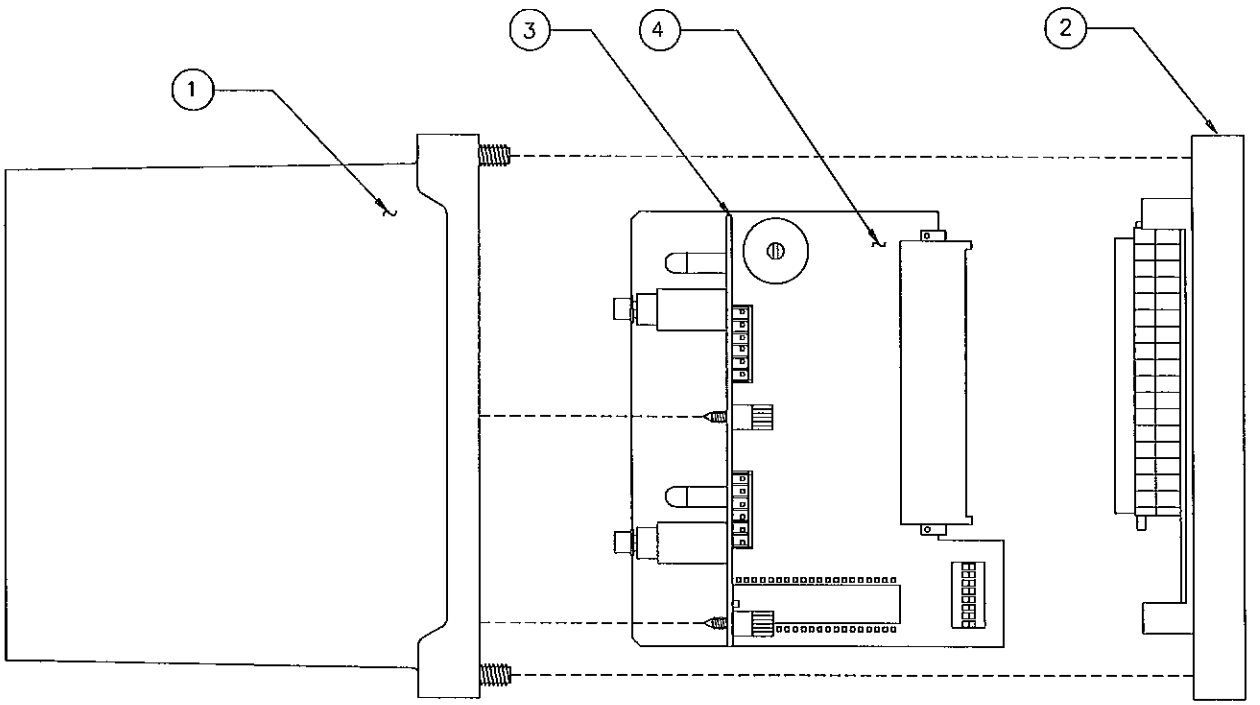
Figure 5-A Troubleshooting Chart - FL3002

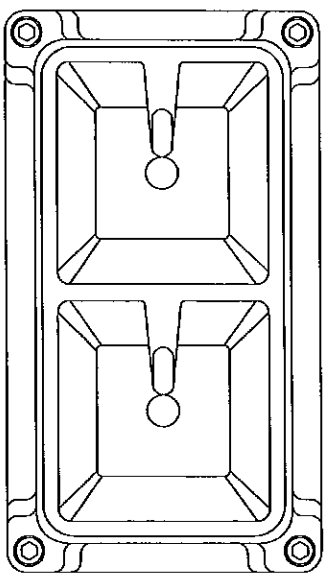
GENERAL MONITORS
Model FL3002

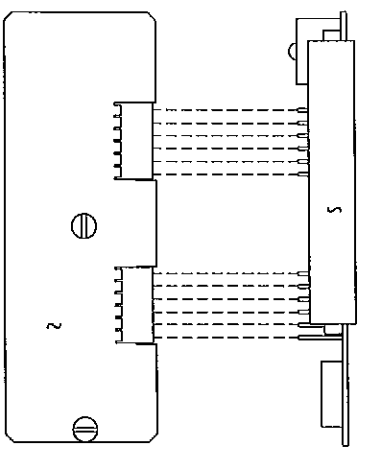
Trouble Shooting

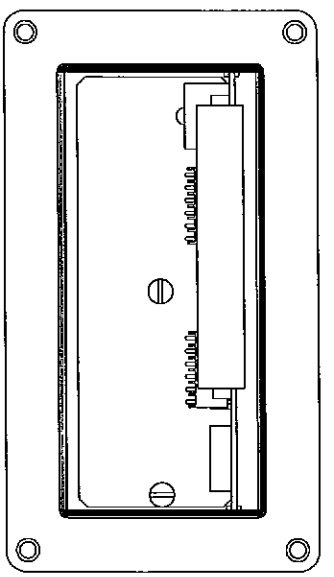
5-2 Final Assembly

Figure 5-B, Final Assembly Drawing - FL3002









Spares & Accessories

6-1 Spare Parts

When ordering Spare Parts and/or Accessories please contact your nearest General Monitors Representative or General Monitors directly and give the part number, description, and the quantity of the item being ordered. The following is a list of recommended spare parts:

DESCRIPTION	PART NUMBER
Lamp, IR Source (*14VDC*)	70596-1
IR Detector, Pyroelectric	70552-1
IR Detector, Thermopile	70523-1
Cleaning Solution	10272-1
Swivel Elbow - 3/4 NPT	961-003
Bracket Assembly	70580-1

6-2 TL103 UV/IR Test Lamp

The General Monitors Model TL103 is a battery operated rechargeable Test Lamp specifically designed to test General Monitors UV, UV/IR, and Enhanced IR flame detection systems. It consists of a high-energy broad band radiation source which emits sufficient energy in both the ultraviolet and infrared spectra to activate UV and IR detectors. To simulate the flickering of a fire, the Test Lamp automatically flashes at one of three DIP switch selectable rates. The Model TL103 is designed for use in Class I, Division 1, Group C, and D areas. The Test Lamp functions on internal lead-acid batteries which, when fully charged, will allow continuous operation for up to 30 minutes. An internal circuit will prevent operation when the battery is low.

Operating Instructions: It is always important to begin a series of flame detector checks with a fully charged Test Lamp. Stand 15 feet from the FL3002 to be tested and aim the TL103 directly into the detector windows. Press the ON button and be sure the high intensity pulsing beam strikes the detector face squarely. If the system being tested is operating normally the detector will go into the WARN condition after a few flashes of the Test Lamp. If the lamp remains on for the period set by the Time Delay Adjustment, the detector will go into the ALARM condition. To conserve charge, do not operate the Test Lamp longer than is necessary to test each unit. When the energy of the battery drops below the level sufficient to maintain the proper intensity, an internal low voltage circuit will shut the TL103 off, until the battery has been recharged. **Recharging Instructions:** Charging and recharging the TL103 must be carried out in a non-hazardous area. The charging receptacle is located inside the housing adjacent to the ON button. To gain access, it is necessary to unscrew the knurled plug from the body of the Test Lamp. The plug is secured to the ON button by a safety strap to prevent its loss. Insert the charging plug into the receptacle. Complete charging takes 14 hours minimum. IMPORTANT - Replace the knurled plug after charging is complete. It is recommended that the TL103 be kept on charge when not in use to prevent excessive battery discharge. The batteries may be charged an average of 500 times and the battery pack is replaceable.