



FLAMEWATCH II

FLAME DETECTOR with VIDEO CAMERA

USER MANUAL



FW2-IR3S-A/AR shown

MODELS: FW2-IR3S-A/AR, FW2-UV/IRS-A/AR & FW2-UVS-A/AR
(Available in Aluminum & Stainless Steel)

IMPORTANT INFORMATION

This manual is for informational purposes only. Although every effort has been made to ensure the correctness of the information, technical inaccuracies may occur and periodic changes may be made without notice. Net Safety Monitoring Inc., assumes no responsibility for any error contained within this manual.

This manual is a guide for using the FlameWatch II (IR3S, UV/IRS & UVS model Flame Detectors with the Surveillance Video Camera) product and the data and procedures contained within this document have been verified and are believed to be adequate for the intended use of the device. If the device or procedures are used for purposes other than as described in the manual without receiving prior confirmation of validity or suitability, Net Safety Monitoring Inc. does not guarantee the results and assumes no obligation or liability.

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WARRANTY

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Contact Net Safety Monitoring Inc. or an authorized representative for details.

We welcome your input at Net Safety Monitoring Inc. If you have any comments please contact us at the telephone number or address below or visit our web-site, www.net-safety.com, and complete our on-line customer survey.

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SECTION 1: INTRODUCTION

1.1 Description

Net Safety's latest upgrade in Flame detection with surveillance monitoring is the FlameWatch II product. It is light in weight, easy to install and allows flame detection coverage and intrusion monitoring over a wide area. The outputs available are analog (4-20 mA) signal and relay, along with video signal transmission via a shielded twisted pair cable. The unit will respond with the appropriate output signal whenever a fire is present, at the same time allow users real time viewing of the coverage area. With real time viewing, users can make on the spot critical decisions based on flame source, size and location. In addition to monitoring and viewing of fires, unauthorized entry into restricted areas may also be properly tracked. Users are provided the option of selecting the model Net Safety Flame Detector supplied with the Video Camera, which determines the model FlameWatch II. The choice in FlameWatch II is dependent on users' preference, environment and application.

1.1.1 Product Components:

FlameWatch II has two component products: A surveillance colour video camera and a Net Safety Flame Detector. The camera is fitted inside an explosion proof enclosure (junction box) and a flame detector is mounted on top of the enclosure by way of a sealed conduit. With this latest design, the video camera is allowed a wide field of view comparable to that of flame detectors. The types of flame detector available are: the Phoenix Triple IR (IR3S), the UV/IRS and the UVS. FlameWatch II is available in Aluminum (AL) and Stainless Steel (SS).

Surveillance Video Camera:

The field of view of the video camera is 100 degrees. This angle is wide enough to account for parallax errors between the flame detector and video camera. The camera employs digital signal processor (DSP) technology and delivers a composite video output for use with most monitoring systems/video monitors. The video formats available are the NTSC (National Television Systems Committee) and PAL (Phase Alternating Line) systems; users are able to choose between the NTSC formatted FlameWatch II product and the PAL formatted FlameWatch II product. Video output signal is delivered by a shielded twisted pair cable which has a male RCA connector attached. See Appendix C for video camera specifications.

Triple IR FlameWatch II (FW2-IR3S-AR):

The FW2-IR3S-AR is the incorporation of the surveillance video camera and the Phoenix Triple IR Flame Detector (IR3S). The IR3S Flame Detector is a triple spectrum IR detector designed to respond to infrared radiation emitted by a wide range of hydrocarbon based fires. Its state of the art design allows it to respond to specific IR frequencies generated by a flame source, while virtually eliminating response to sources of false alarms. The detector has a proven track record when compared to other IR flame detectors. It is not affected by rain in its line of sight or on its lens surface and shows immunity to arc welding, lightning and sparks. Because of these advantages, along with the wide field of view and high resolution of the video camera, the FW2-IR3S-AR can be used in both indoor and outdoor applications.

UV/IRS and UVS FlameWatch II (FW2-UV/IRS-AR and FW2-UVS-AR):

The FW2-UV/IRS-AR is a combination of the surveillance video camera and the UV/IRS Flame Detector. The UV/IRS Flame Detector incorporates UV and IR detection circuitry to detect specific wavelengths in the UV and IR spectrums whenever a fire is present. This flame detector is designed to detect a wide range of hydrocarbon based fires and shows exceptional immunity against arc welding, hot body radiation, lightning and sunlight. With these attributes, along with the wide field of view and high resolution of the video camera, the FW2-UV/IRS-AR is suitable for indoor and outdoor applications.

The FW2-UVS-AR is a combination of the surveillance video camera and the UVS Flame Detector. The UVS Flame Detector is designed to detect a wide range of hydrocarbon, hydrogen and metal based fires. This flame detector continually monitors coverage area for the presence of UV radiation specifically generated by a fire source. It shows great immunity to false alarm sources such as: incandescent or fluorescent sources, lightning, heaters and sunlight. With its immunity to false alarm sources and the attributes of the camera in mind, the FW2-UVS-AR is also well suited for indoor and outdoor applications.

1.1.2 Available models

Aluminum (AL) models:

FW2-UVS-A (FlameWatch II, UV, Analog, NTSC) / FW2-UVS-A-P (FlameWatch II, UV, Analog, PAL)
FW2-UVS-AR (FlameWatch II, UV, Analog/Relay, NTSC) / FW2-UVS-AR-P (FlameWatch II, UV, Analog / Relay, PAL)
FW2-UV/IRS-A (FlameWatch II, UV/IRS, Analog, NTSC) / FW2-UV/IRS-A-P (FlameWatch II, UV/IR, Analog, PAL)
FW2-UV/IRS-AR (FlameWatch II, UV/IRS, Analog/Relay, NTSC) / FW2-UV/IRS-AR-P (FlameWatch II, UV/IR, Analog/Relay, PAL)
FW2-IR3S-A (FlameWatch II, IR3S, Analog, NTSC) / FW2-IR3S-A-P (FlameWatch II, IR3S, Analog, PAL)
FW2-IR3S-AR (FlameWatch II, IR3S, Analog/Relay, NTSC) / FW2-IR3S-AR-P (FlameWatch II, IR3S, Analog/Relay, PAL)

Stainless Steel (SS) models:

FW2-UVS-A-SS (FlameWatch II, UV, Analog, NTSC) / FW2-UVS-A-P-SS (FlameWatch II, UV, Analog, PAL)
FW2-UVS-AR-SS (FlameWatch II, UV, Analog/Relay, NTSC) / FW2-UVS-AR-P-SS (FlameWatch II, UV, Analog / Relay, PAL)
FW2-UV/IRS-A-SS (FlameWatch II, UV/IRS, Analog, NTSC) / FW2-UV/IRS-A-P-SS (FlameWatch II, UV/IR, Analog, PAL)
FW2-UV/IRS-AR-SS (FlameWatch II, UV/IRS, Analog/Relay, NTSC) / FW2-UV/IRS-AR-P-SS (FlameWatch II, UV/IR, Analog/Relay, PAL)
FW2-IR3S-A-SS (FlameWatch II, IR3S, Analog, NTSC) / FW2-IR3S-A-P-SS (FlameWatch II, IR3S, Analog, PAL)
FW2-IR3S-AR-SS (FlameWatch II, IR3S, Analog/Relay, NTSC) / FW2-IR3S-AR-P-SS (FlameWatch II, IR3S, Analog/Relay, PAL)

1.2 Unpack

Remove all packaging components from the box. Carefully remove the FlameWatch II unit by holding the junction box. Check components against the enclosed packing list and inspect all components for obvious damage such as broken or loose parts. Use the Net Safety lens cleaner to clean the flame detector's lens and camera window before installation and operation.

1.3 Mounting

FlameWatch II Junction Box has three ¾ inch NPT conduit entries. The flame detector is connected to one of these entries via a sealed conduit. Connection of conduit and cable glands to remaining conduit entries should be done so by use of appropriate tools. A 6mm Hex Key is required for installing or removing conduit entry plugs. The junction box has mounting holes for installing directly on a wall or to a pole as desired.

1.4 Field Installation

WARNING:  Wiring codes and regulations may vary. Compliance with regulations is the responsibility of the installer. Wiring must comply with applicable regulations relating to the installation of electrical equipment in a hazardous area. If in doubt, consult a qualified official before wiring the system.

1.4.1 Installation Considerations

- Point the FlameWatch II unit toward where the flame is expected, ensuring an unobstructed view of the area to be monitored.
- If required employ sufficient units to ensure the hazard is fully covered.
- Mount the unit a few feet (about 1 metre) below the ceiling so the flame detector can respond before being blocked by smoke accumulation at the ceiling.
- If dense smoke is likely to accumulate prior to flame (as in an electrical fire), supplement FlameWatch II with other protection such as Net Safety Monitoring Airborne Particle Monitor.
- FlameWatch II should be accessible for cleaning of the windows and reflector surfaces.
- Tilt the unit downward a minimum of 10 to 20° to reduce dirt and dust accumulation.
- Securely mount the unit so as to reduce vibration as much as possible.
- When located outside, the flame detector's sensitivity can be reduced by heavy fog, rain and/or ice.
- Consider shortening the time delay settings when smoke is expected to accumulate before or during a fire. See relevant flame detector manual.
- Reduce sensitivity setting if false alarms, related to surrounding activities, occur.
- When installed near or on water (such as an off shore platform), be sure to take into account the low horizon level when tilting detector downward.

1.5 Wiring

Warning  Wiring must comply with all applicable regulations relating to the installation of electrical equipment in a hazardous area and is the responsibility of the installer. Proper shielding and grounding procedures, for the specific area must be followed. Consult local electrical codes and /or qualified personnel before wiring.

Warning  Do not open the Junction box or flame detector enclosure in a classified area (Do not open when an explosive atmosphere may be present). The area should be de-classified prior to opening.

1.6 Seal

Warning  To fully avoid any environmental exposure (water ingress), the use of seals is recommended, especially for installations that use high-pressure or steam cleaning devices in proximity to FlameWatch II.

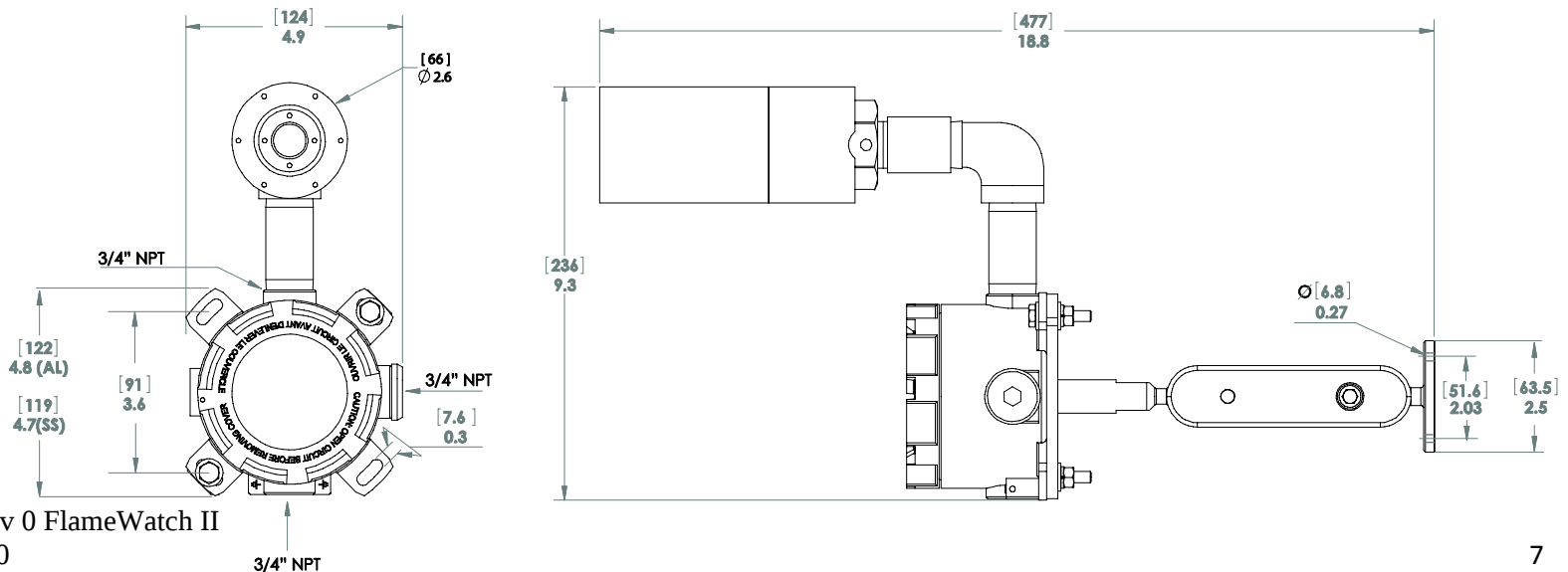
It is recommended that explosion-proof drains and conduit breathers be used. Changes in temperature and barometric pressure can cause 'breathing' which allows moist air to enter conduit. Joints are seldom enough to prevent 'breathing'. Consult qualified personnel on sealing requirements relating to equipment, application and local regulations.

1.7 FlameWatch II General Application

FlameWatch II can be used in almost all applications requiring monitoring and surveillance. Real time video feed is provided along a shielded 22 gauge (AWG) twisted pair cable with a male RCA connector. Consult qualified personnel when mixing different types of cables and for video transmission over extended distances.

1.8 FlameWatch II Dimensional Drawing

Figure 1: Dimensional Drawing (Measurements are in Millimeters and Inches)

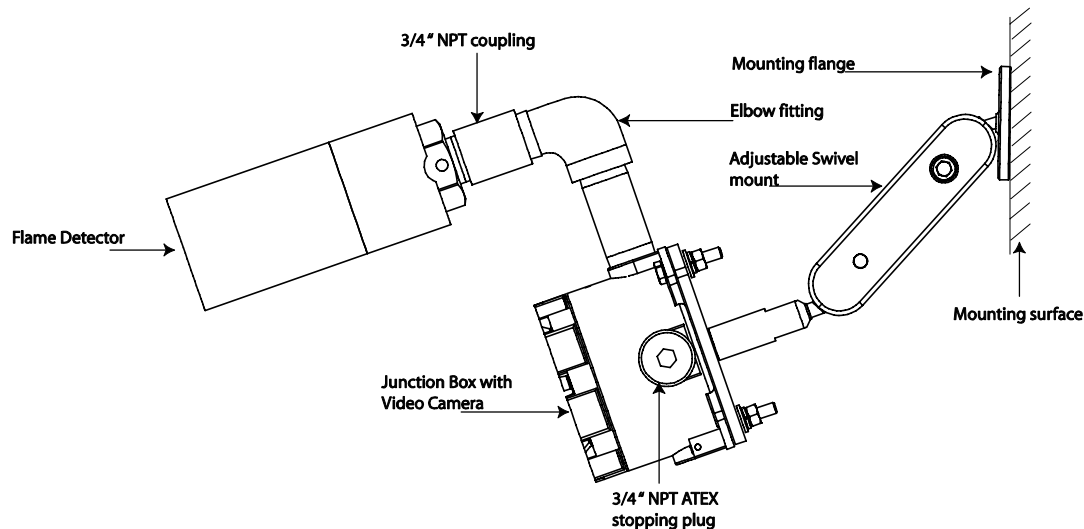


1.9 Mounting and Positioning FlameWatch II

Since the surveillance video camera installed in the junction box, mounting and positioning is made much simpler, as there is no concern for complex positioning of enclosures. Adjustments to the unit's position can be made by way of the adjustable swivel mount connected at rear of the junction box. Always mount the unit with the flame detector in the top position as seen in Figure 2 below. Prior to mounting and installing FlameWatch II, a plan must be made on where the unit is to be located. It should be located in an area where it is easily accessible for maintenance and cleaning. It is recommended that the unit be mounted to a surface with limited or minimum vibration.

After mounting, use the Net Safety lens cleaner to clean the flame detector's lens and the junction box window (video camera viewing window). Make adjustments to the swivel mount to properly position FlameWatch II as needed. It is recommended that the unit be angled downward to prevent dust accumulation on the lens/window. After installation and power up, check to be certain that the immediate area is free from any obstruction and that the coverage area is within the unit's line of sight. Perform a walk through across the coverage area to confirm the camera's viewing angle. Simulate a fire test using the appropriate Net Safety Test Lamp to ensure desired operation of the flame detector.

Figure 2: Mounting and Installation.



Note: It is recommended that a sunshade kit be fitted on the video camera enclosure (junction box) if FlameWatch II is going to be continually exposed to direct sunlight, which may result in temperatures beyond 75°C. Contact your local representative for more details.

SECTION 2: Operation

2.1 FlameWatch II Junction Box Terminal Board

The type flame detector and hence model FlameWatch II chosen will depend on the particular application, environment and response needed. The surveillance video camera and one end of the shielded twisted pair video cable is factory fitted to the terminal board. The free end of the video cable (male RCA) should be connected to the video monitor cabling system by the user. The flame detector wires are connected to Terminal J1. User interface is made to Terminal blocks J2 (power connections and signal output) and J3 (Relay outputs). The Analog model terminal board is similar to the Analog – Relay model terminal board, except that J3 terminals are not included on Analog models. Refer to Figure 3 along with Tables 1, 2, and 4 for terminal designations. See Table 3 for relay configurations.

Figure 3: FlameWatch II Analog- Relay Terminal Board

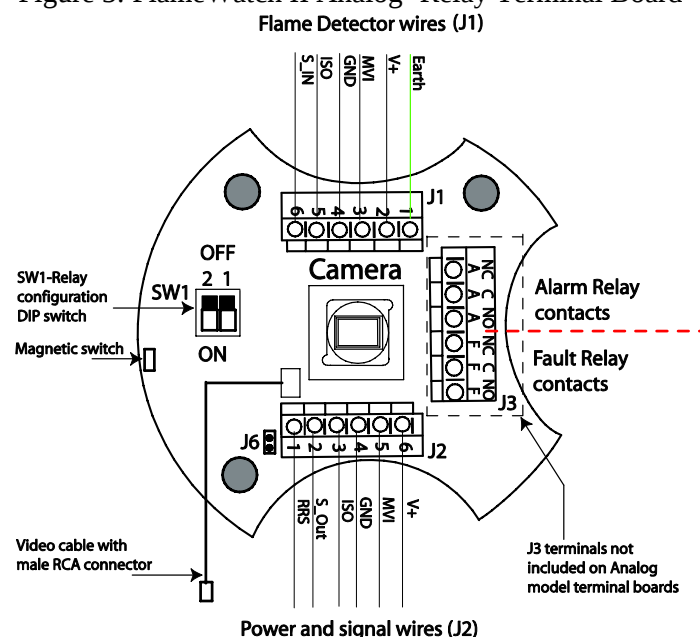


Table 1: Junction Box Terminals

Flame Detector Terminal (J1)wiring	
Terminal J1	Designation/Function
1	Earth / Earth Ground
2	V+ / Power (+)
3	MVI / MVI Test
4	GND / Power (-)
5	ISO / Isolated V+
6	S_IN / 4-20mA signal

Table 2: Junction Box Terminals

Power Terminal (J2) wiring	
Terminal J2	Designation/Function
1	RRS / Alarm Reset
2	S_OUT / 4-20mA out
3	ISO / Isolated V+
4	GND / Power (-)
5	MVI / MVI Test
6	V+ / Power (+)

Note 1: For **Analog model** terminal boards, the **J6 jumper should remain over one pin** (default position). For **Analog-Relay** model terminal boards, the **jumper should be connected across the two pins**; it should remain in the default position. See Figure 3 for the location of J6.

Note 2: Resetting of latched alarms can be done by connecting the RRS terminal to power supply ground/ (power -), or activating the magnetic switch using the magnet attached to the junction box enclosure.

2.2 Relay configurations

DIP Switch (SW1) Positions

FlameWatch II Terminal Board has a two position DIP Switch to define the Coil and Latch Status for the Fire Relay. Refer to Figure 3 and Table 3 for locating the DIP Switch (SW1) and for configuring relays. The default setting for the Fire Relay is normally De-energized/Non-latching. The Fault Relay is factory set to Normally Energized/Non-latching and cannot be modified.

Table 3: SW1 DIP Switch Positions

Coil and Latch Status		
Fire Relay	Position 1	Position 2
De-Energized/Non-latching	ON	ON
Energized/Non-latching	ON	OFF
De-Energized/ Latching	OFF	ON
Energized/ Latching	OFF	OFF

Table 4: SW1 DIP Switch Positions

Relay Terminal (J3)					
Alarm Relay	Alarm Relay Contacts		Fault Relay	Fault Relay Contacts	
A	NC	Normally Closed	F	NC	Normally Closed
A	C	Common	F	C	Common
A	NO	Normally Open	F	NO	Normally Open

Note: Relays are Form C SPDT rated 5 Amperes at 30VDC/250AC. Relays are dry contacts.

2.3 Current Loop power configurations

The two current loop power configurations available for the FW2-IR3S-AR are the Non –Isolated power configuration and the Isolated power configuration. When using the **Non-Isolated power configuration (Non-Isolated current loop)**, the current output jumper located on the IR3S Flame Detector electronics should remain in its default (INT) position for source. Also, ‘ISO’ on the power terminal side of the FlameWatch II terminal board is not used in this configuration. See Figure 4 and Figure 5.

For the **Isolated power configuration (Isolated current loop)**, the current output jumper on the IR3S Flame Detector electronics should be placed in the ‘EXT’ position. See the IR3S Flame Detector manual for locating the jumper. For this configuration a separate power supply should be used to supply +24VDC to ‘ISO’ on the power terminal side of the FlameWatch II terminal board. See Figure 4 and Figure 6.

Note: The FW2-UV/IRS-AR and FW2-UVS-AR only allow Non-Isolated power configuration. Refer to Figure 7.

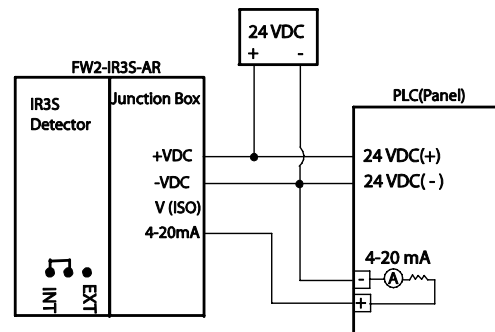
SECTION 3: Wiring diagrams

3.1 FW2-IR3S-AR Current Loop power block diagrams

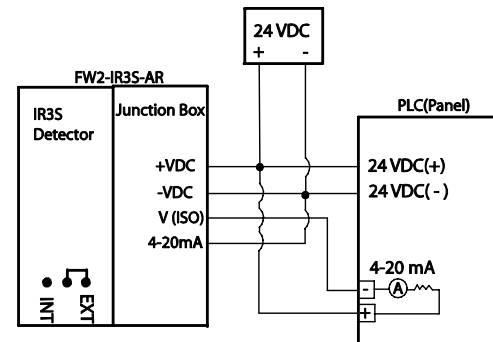
Warning ⚠ The current output jumper on the IR3S Flame Detector electronics should **remain** in the 'INT' position for **Non-Isolated configuration (source)**. For the remaining configurations, the jumper should be placed in the 'EXT' position. See IR3S manual for jumper location.

Figure 4: FW2-IR3S-AR current sink and source wiring.

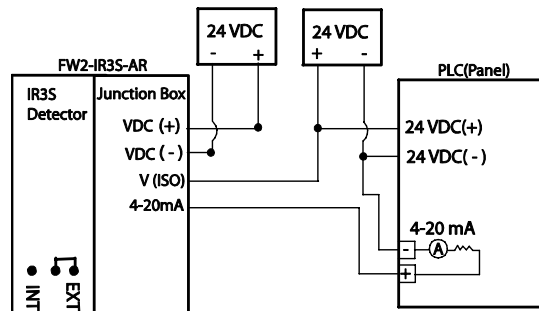
FW2-IR3S-AR Non-Isolated configuration(Source)



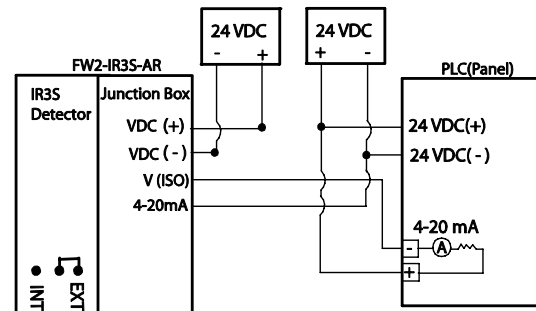
FW2-IR3S-AR Non-Isolated configuration(Sink)



FW2-IR3S-AR Isolated configuration(Source)



FW2-IR3S-AR Isolated configuration(Sink)



3.2 Typical wiring diagrams

The following drawings are typical ways in wiring the system using general wiring requirements. Consult qualified personnel on specific wiring requirements. Note that alarms are wired in parallel in the examples shown.

Figure 5: FW2-IR3S-AR Non-Isolated current output wiring diagram.

Note: The **current output jumper** located on IR3S Flame Detector electronics should remain in the 'INT' position for this configuration.

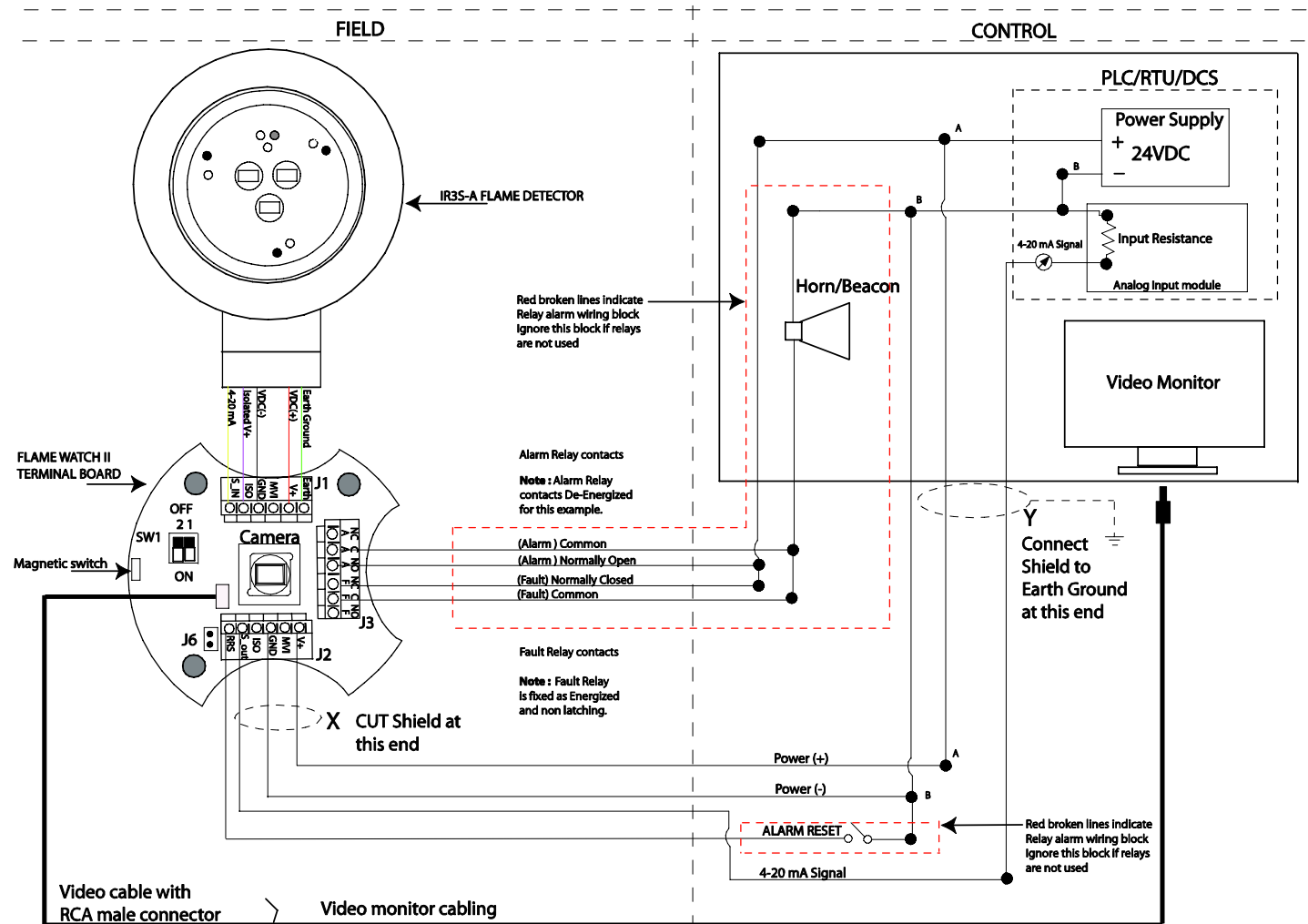


Figure 6: FW2-IR3S-AR Isolated current output wiring diagram.

Note: Place **current output jumper** located on IR3S Flame Detector electronics in the 'EXT' position for this configuration. Refer to IR3S-A Flame Detector manual for correct placement of current output jumper.

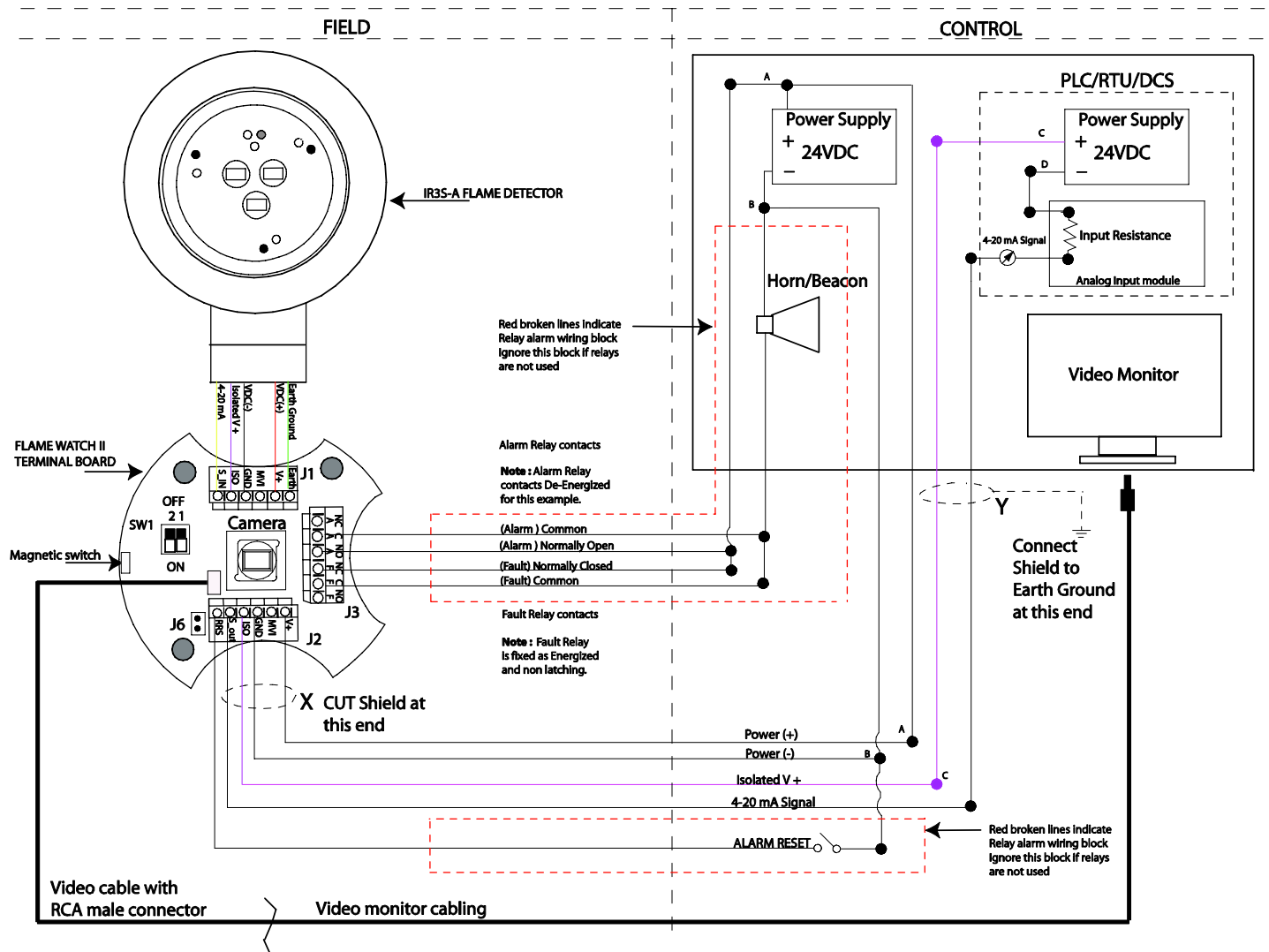
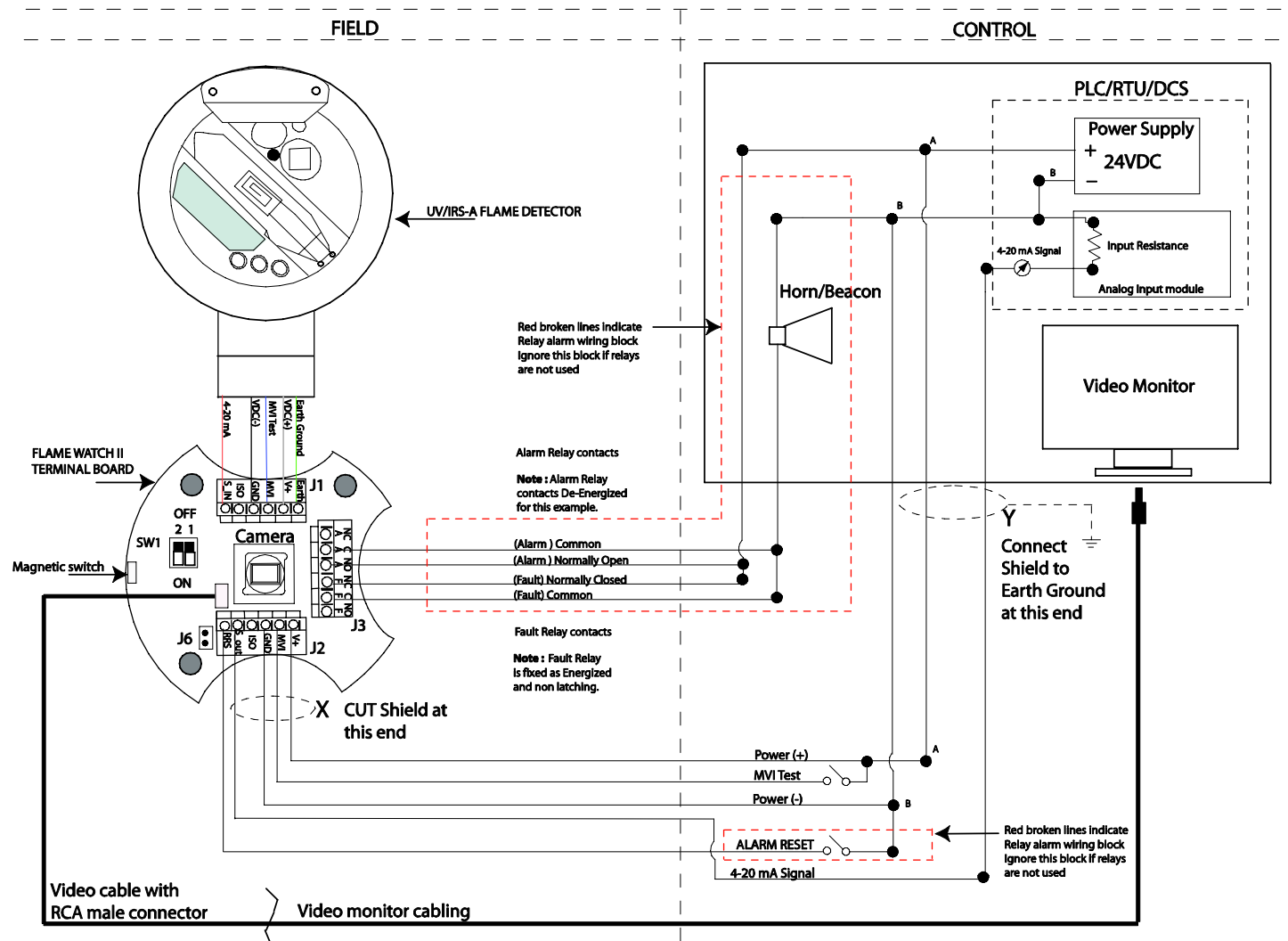


Figure 7: FW2-UV/IRS-AR & FW2-UVS-AR Non- Isolated current output wiring diagram.



SECTION 4: Maintenance

Each type of flame detector performs an automatic visual integrity test on the optics to ensure there is no obstruction on or near the detectors lens. Though this test is done, it is important to perform routine maintenance checks and cleaning of the detector lens and the junction box window. It is recommended that cleaning be done with Net Safety cleaning products. In addition to established maintenance routines, perform response tests on the detector by using the appropriate Net Safety Test Lamp to simulate fire conditions. Refer to specific flame detector and test lamp manuals when performing the above checks. Also do routine checks on the video camera to ensure area is not obstructed.

4.1 Troubleshoot

If a problem should develop, carefully check for correct wiring and refer to individual product manuals. If it is determined that the problem is caused by an electronic defect, the device should be returned to the factory for repair. If returning equipment, see 'How to Return Equipment'. Repairs to Net Safety products should not be performed in the field. Repairs to faulty or damaged equipment should only be performed at the factory; otherwise warranty on the product will be voided.

4.1.1 Spare Parts / Accessories

Table 5: Available Spare Parts

Description	Net Safety Part Number
Analog model IR3S Electronics	IR3S-EMOD-A
Analog model UV./IRS Electronics	UV/IRS-EMOD-A
Analog model UVS Electronics	UVS-EMOD-A
Junction Box Electronics(Analog-relay) w/t camera (PAL)	EMOD-0021
Junction Box Electronics(Analog-relay) w/t camera (NTSC)	EMOD-0022
Junction Box Electronics(Analog) w/t camera (PAL)	EMOD-0023
Junction Box Electronics(Analog) w/t camera (NTSC)	EMOD-0024

HOW TO RETURN EQUIPMENT

A Material Return Authorization number is required in order to return equipment. Please contact Net Safety Monitoring at **(403) 219-0688** before returning equipment or consult our Service Department to possibly avoid returning equipment.

If you are required to return equipment, include the following information:

1. A Material Return Authorization number provided over the phone to you by Net Safety.
2. A detailed description of the problem. The more specific you are regarding the problem, the quicker our Service department can determine and resolve the problem.
3. A company name, contact name and telephone number.
4. A Purchase Order, from your company, authorizing repairs or request for quote.
5. Ship all equipment, prepaid to: **Net Safety Monitoring Inc**
2721 Hopewell Place NE
Calgary, Alberta, Canada
T1Y 7J7

6. Mark all packages: **RETURN for REPAIR**

Waybills, for shipments from outside Canada, must state:

Equipment being returned for repair

All charges to be billed to the sender

Also, please ensure a duplicate copy of the packing slip is enclosed inside the box indicating item 1-4 along with the courier and account number for returning the goods.

All Equipment must be Shipped prepaid. Collect shipments will not be accepted.

Pack items to protect them from damage and use anti-static bags or Aluminum- backed cardboard as protection from electrostatic discharge.

Appendix A: ELECTROSTATIC SENSITIVE DEVICE (ESD)

Electrostatic discharge (ESD) is the transfer, between bodies, of an electrostatic charge caused by direct contact or induced by an electrostatic field. The most common cause of ESD is physical contact. Touching an object can cause a discharge of electrostatic energy—ESD! If the charge is sufficient and occurs near electronic components, it can damage or destroy those components. In some cases, damage is instantaneous and an immediate malfunction occurs. However, symptoms are not always immediate —performance may be marginal or seemingly normal for an indefinite period of time, followed by a sudden failure.

To eliminate potential ESD damage, review the following guidelines:

- Handle boards by metal shields—taking care not to touch electronic components.
 - Wear grounded wrist or foot straps, or ESD shoes or heel grounders to dissipate unwanted static energy.
 - Prior to handling boards, dispel any charge in your body or equipment.
 - Ensure components are transported and stored in static safe packaging.
 - When returning boards, carefully package in the original carton and static protective wrapping.
 - Ensure ALL personnel are educated and trained in ESD Control Procedures.
- In general, exercise accepted and proven precautions normally observed when handling electrostatic sensitive devices.

A warning label is placed on the packaging, identifying product using electrostatic sensitive semiconductor devices.



Appendix B: RESISTANCE (OHMS)

Distance (Feet)	AWG #20	AWG #18	AWG #16	AWG #14	AWG #12	AWG #10	AWG #8
100	1.02	0.64	0.40	0.25	0.16	0.10	0.06
200	2.03	1.28	0.80	0.51	0.32	0.20	0.13
300	3.05	1.92	1.20	0.76	0.48	0.30	0.19
400	4.06	2.55	1.61	1.01	0.64	0.40	0.25
500	5.08	3.20	2.01	1.26	0.79	0.50	0.31
600	6.09	3.83	2.41	1.52	0.95	0.60	0.38
700	7.11	4.47	2.81	1.77	1.11	0.70	0.44
800	8.12	5.11	3.21	2.02	1.27	0.80	0.50
900	9.14	5.75	3.61	2.27	1.43	0.90	0.57
1000	10.20	6.39	4.02	2.53	1.59	1.09	0.63
1250	12.70	7.99	5.03	3.16	1.99	1.25	0.79
1500	15.20	9.58	6.02	3.79	2.38	1.50	0.94
1750	17.80	11.20	7.03	4.42	2.78	1.75	1.10
2000	20.30	12.80	8.03	5.05	3.18	2.00	1.26
2250	22.80	14.40	9.03	5.68	3.57	2.25	1.41
2500	25.40	16.00	10.00	6.31	3.97	2.50	1.57
3000	30.50	19.20	12.00	7.58	4.76	3.00	1.88
3500	35.50	22.40	14.10	8.84	5.56	3.50	2.21
4000	40.60	25.50	16.10	10.00	6.35	4.00	2.51
4500	45.70	28.70	18.10	11.40	7.15	4.50	2.82
5000	50.10	32.00	20.10	12.60	7.94	5.00	3.14

Appendix B: Resistance Table (cont'd)

Distance (Feet)	AWG #20	AWG #18	AWG #16	AWG #14	AWG #12	AWG #10	AWG #8
5500	55.80	35.10	22.10	13.91	8.73	5.50	3.46
6000	61.00	38.30	24.10	15.20	9.53	6.00	3.77
6500	66.00	41.50	26.10	16.40	10.30	6.50	4.08
7000	71.10	44.70	28.10	17.70	11.10	7.00	4.40
7500	76.10	47.90	30.10	19.00	12.00	7.49	4.71
8000	81.20	51.10	23.10	20.20	12.70	7.99	5.03
9000	91.40	57.50	36.10	22.70	14.30	8.99	5.65
10000	102.00	63.90	40.20	25.30	15.90	9.99	6.28

Note: Resistance is one way. This figure should be doubled when determining closed loop.

Appendix C: Technical Specifications of Video Camera

Specification	Video Camera
Image Pick-up Device	1/3" Super HAD II CCD High Resolution
Pixel number	NTSC=270K / PAL=320K(normal resolution), NTSC = 380K / PAL= 440K(High resolution)
Effective Picture Elements	NTSC:768*494, PAL: 752*582(H*V)
Horizontal Resolution	540 TV lines
Minimum Illumination	0.1ux@F1.2
S/N Ratio	More than 48 dB
Auto Electronic shutter	NTSC:1/60s ~ 1/100,000s, PAL:1/50s ~ 1/110,000s
Gamma Characteristic	0.45
Gain control	Automatically
White Balance	Automatically(2500K ~ 9500K)
Synchronous System	Negative sync. Internal
Video Output	1Vp-p composite video
Operating temperature	-20°C to +70°C
Field of View	100 degrees
Specification	Junction Box Electronics
Electrical rating	Operating Voltage: 12 to 32 VDC
Power consumption	At 24VDC: Nominal 135mA/3.24W Max 170mA/4.08W
Relay rating	5A@30VDC/250AC, Form C SPDT dry contacts
Specification	Junction Box
Metallurgy	Aluminum (AL) or 316 SS
Weight	Aluminum: 0.8 Kg / 2.0 lbs (316 SS 1.6 Kg / 3.5lbs)
NEMA/IP	IP67
Approvals	Factory Mutual (FM) Approvals:  US (Certificate 3035217): XP/I/1/BCD/-55°C ≤ +85°C; Type 4X, IP67 I/1/ AEx d IIB+H₂ -55°C ≤ Ta ≤ +85°C ; Type 4X, IP67 Can: (Certificate 3035217C): XP/I/1/BCD/ -55°C ≤ +85°C; Type 4X, IP67 I/1/ Ex d IIB+H₂ -55°C ≤ Ta ≤ +85°C ; Type 4X, IP67 ATEX (Certificate FM09ATEX0027U)  II 2 G Ex d IIB+H₂ -55°C ≤ Ta ≤ +85°C ; IP67

Appendix D: IR3S Flame Detector Technical Specifications

Models	IR3S-A (Analog)	I3RS-R (Relay)	IR3S-AD (Analog/Digital)
Operating Voltage	10 to 32 VDC measured at the detector		
Power Consumption (@ 24Vdc)	Nominal 30mA/ 0.72W Maximum 64mA/ 1.44W	De-Energized: Nominal 39mA/0.96W. Maximum 73mA/ 1.68W Energized: Nominal- 51mA, =1.20w). Maximum- 86mA, 2.16W	Nominal 30mA/ 0.72W Maximum 64mA/ 1.44W
Power Consumption (@ 12Vdc)	Nominal 45mA/ 0.60W Maximum 113mA/ 1.32W	De-Energized: Nominal- 66mA/0.84W. Maximum- 138mA/ 1.68W Energized: Nominal- 93mA, =1.08w) Maximum- 165mA, 2.04W	Nominal 45mA/ 0.60W Maximum 113mA/ 1.32W
In Rush Current (at 24Vdc)	Up to 2.6 A for 2.ms (varies with power supply)		
Output	0 to 20 mA – Into a max loop impedance of 800Ohms @ 32Vdc or 150Ohms @ 11.0Vdc. Non-Isolated loop supply	Normally open/Normally closed contacts rated for 5A @ 30Vdc/125Vac. Selectable energized/ de-energized Fire relay. Fault relay fixed as energized and both Fire & Fault relays fixed as non-latching	0 to 20 mA – Into a max loop impedance of 800Ohms @ 32Vdc or 150Ohms @ 11.0Vdc. Non-Isolated loop supply. RS-485 RTU Modbus protocol.
Field of View	FM Performance tested: 100° horizontal / 100° vertical @ 50% of the on-axis detection distance for N-Heptane. See Table 2, MAN-0044 for more information. 70° horizontal / 70° vertical at a distance of 200ft(Not FM Performance tested) See Table 3, MAN-0044		
Spectral Range	The IR3S fire detector measures at three distinct Infrared Wavelengths		
Time Delay	DIP switch selectable 0, 3, 5, 10 seconds,		
Sensitivity Settings	Two (2) adjustable setting via DIP switch (High/Low)		
Temperature/ RH	FM Certified (-40°C to +75°C / -40°F to 167°F). Operational (-50°C to +75°C / -58°F to 167°F). 0 – 95% RH non condensing		
Metallurgy & IP/Nema Ratings	Aluminum or SS316 (factory sealed housing). IP66 and NEMA 4X		
Weight (with swivel)	2.1Kg /4.5lbs (SS316 Option @ 3.4Kg/ 7.5lbs)		
Approvals	Performance certified to: Class3260, ANSI/NEMA 250, and IEC60529.   US Class I, Div 1, Grps BCD, T5. Ex d IIB+H2 T5. Class I, Zone 1, Grps IIB+H2, T5; Nema 4X, IP66. For CANADA ONLY , Class I, Div 1, Grps A (Canada ONLY – with special cementing), BCD, T5. Ex d IIB+H2 T5.		

Appendix E: UV/IRS Flame Detector Technical Specifications

Models	UV/IRS-A (Analog)	UV/IRS-AR (Analog/Relay)
Operating Voltage	10 to 32 VDC	
Power Consumption	At 10Vdc: Nominal 95mA/ 0.95W. Maximum 225mA/ 2.25W *With Heater: Nominal 200mA/ 2.0W. Maximum 345mA/ 3.45W At 24Vdc: Nominal 45mA/ 1.1W. Maximum 115mA/ 2.76W *With Heater: Nominal 90mA/ 2.16W. Maximum 165mA/ 3.96W At 32Vdc: Nominal 35mA/ 1.12W. Maximum 105mA/ 3.36W *With Heater: Nominal 70mA/ 2.24W. Maximum 145mA/ 4.64W	At 10Vdc: Nominal 95mA/ 0.95W. Maximum 225mA/ 2.25W *With Heater: Nominal 200mA/ 2.0W. Maximum 335mA/ 3.35W At 24Vdc: Nominal 45mA/ 1.1W. Maximum 115mA/ 2.76W *With Heater: Nominal 90mA/ 2.16W. Maximum 165mA/ 3.96W At 32Vdc: Nominal 35mA/ 1.12W. Maximum 105mA/ 3.36W *With Heater: Nominal 70mA/ 2.24W. Maximum 145mA/ 4.64W
In Rush Current	1.5A for 22ms	
Current Output	0 to 20 mA – Into a max loop impedance of 800Ohms @ 32Vdc or 150Ohms @ 11.0Vdc. Non-Isolated loop supply	
Relay Output	Form C contacts rated 1A @ 30Vdc, 0.5A @125Vac. Selectable energized/ de-energized, latching/ non-latching Fire relay. Fault relay fixed as energized/ non-latching	
Field of View	120° Horizontal, 95° Vertical @ 50% of maximum on axis distance.	
Spectral Range	UV radiation over the range of 185 to 260 nanometres (1850 to 2600 angstroms); IR radiation in the 4.4micron range	
Time Delay	DIP switch selectable 0, 3, 5, 7 seconds,	
Sensitivity Settings	DIP switch selectable 8, 16, 24 or 32 counts per seconds	
Temperature & RH	FM Certified (-40°C to +75°C / -40°F to 167°F). Operational (-50°C to +75°C / -58°F to 167°F). 0 – 95% RH non condensing	
Metallurgy & IP/NEMA	Aluminum or SS316 (factory sealed housing). IP66 and NEMA 4X	
Weight (with swivel)	2.1Kg /4.5lbs (SS316 Option @ 3.4Kg/ 7.5lbs)	
Approvals	FM Performance certified to: Class3260, ANSI/NEMA 250, and IEC60529.  Class I, Div 1, Grps B,C,D, T5. Ex d IIB+H2 T5. Class I, Zone 1, Grps IIB+H2 T5; Nema 4X, IP66. 	

Appendix F: UVS Flame Detector Technical Specifications

Models	UVS-A (Analog)	UVS-AR (Analog/Relay)
Operating Voltage	10 to 32 VDC	
Power Consumption	At 10Vdc: Nominal 95mA/ 0.95W. Max 225mA/ 2.25W *With Heater: Nominal 200mA/ 2.0W. Maximum 335mA/ 3.35W At 24Vdc: Nominal 45mA/ 1.1W. Max 115mA/ 2.76W *With Heater: Nominal 90mA/ 2.16W. Maximum 165mA/ 3.96W At 32Vdc: Nominal 35mA / 1.12W. Max 105mA/ 3.36W *With Heater: Nominal 70mA/ 2.24W. Maximum 140mA/ 4.48W	At 10Vdc: Nominal 95mA/ 0.95W. Max 225mA/ 2.25W *With Heater: Nominal 200mA/ 2.0W. Maximum 335mA/ 3.35W At 24Vdc: Nominal 45mA/ 1.1W. Max 95mA/ 2.28W *With Heater: Nominal 90mA/ 2.16W. Maximum 145mA/ 3.48W At 32Vdc: Nominal 35mA/ 1.12W. Max 80mA/ 2.56W *With Heater: Nominal 70mA/ 2.24W. Maximum 115mA/ 3.68W
In Rush Current	1.5A for 22ms	
Current Output	0 to 20 mA – Into a max loop impedance of 800Ohms @ 32Vdc or 150Ohms @ 11.0Vdc. Non-Isolated loop supply	
Relay Output	N/A	Form C contacts rated 1A @ 30Vdc, 0.5A @125Vac. Selectable energized/ de-energized, latching/ non-latching Fire relay. Fault relay fixed as energized/ non-latching
Field of View	120° Horizontal, 95° Vertical @ 50% of maximum on axis distance.	
Spectral Range	UV radiation over the range of 185 to 260 nanometres (1850 to 2600 angstroms)	
Time Delay	DIP switches selectable 0, 3, 5, 7 seconds.	
Sensitivity Settings	DIP switch selectable 8, 16, 24 or 32 counts per seconds	
Temperature & RH	FM Certified (-40°C to +75°C / -40°F to 167°F). Operational (-50°C to +75°C / -58°F to 167°F). 0 – 95% RH non condensing	
Metallurgy & IP/NEMA	Aluminum or SS316 (factory sealed housing). IP66 and NEMA 4X	
Weight (with swivel)	2.1Kg /4.5lbs (SS316 Option @ 3.4Kg/ 7.5lbs)	
Approvals	FM Performance certified to: Class3260, ANSI/NEMA 250, IEC60529.   Class I, Div 1, Grps B,C,D, T5. Ex d IIB+H2 T5. Class I, Zone 1, Grps IIB+H2 T5; Nema 4X, IP66.	

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