SafeFlame IR3 Flame Detection Installation Manual

February 3, 2025

NOTICE:
Installers of any SafeFlame products or systems must be trained and hold a current and valid training certificate number. Warranty will be void if installed by unauthorized personnel.

WARNING: Unit Must Be Grounded Before Applying Power
See Page 17

FM
APPROVED

Safe Fire Detection – Home Office

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NOTICE:
THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT, OR TO PROVIDE FOR EVERY POSSIBLE CONTIGENCY IN CONNECTION, INSTALLATION, OPERATION OR MAINTENANCE OF SAFEFLAME FLAME DETECTION SYSTEMS.

SHOULD FURTHER INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE, WHICH ARE NOT COVERED SUFFICIENTLY FOR THE PURCHASERS PURPOSE, THE MATTER SHOULD BE REFERRED TO SAFE FIRE DETECTION, INC.

INSTALLATION, COMMISSIONING, SERVICE AND MAINTENANCE SHOULD ONLY BE PERFORMED BY SAFE FIRE DETECTION, INC. OR BY AN AUTHORIZED DISTRIBUTOR / REPRESENTATIVE FAMILIAR WITH ALL RELEVANT PROCEDURES AND HAZARDS. FOR INFORMATION REGARDING TRAINING SCHOOLS OR FACTORY APPROVED CERTIFICATION, PLEASE CONTACT SAFE FIRE DETECTION.

Disclaimer:
Safe Fire Detection, Inc. reserves the right to change any information contained in this manual without notice.

Codes and Standards:
Safe Fire Detection, Inc. strongly recommends that this manual be read in conjunction with the appropriate local codes and standards for fire detection systems and electrical connections.

Warranty Information

Safe Fire Detection's new Flame Detector, SafeFlame is a flame detector, not a complete system, and must interface with an approved fire alarm panel that meets all local and national codes to become a system

All accessories pertaining to the detector for installation and mounting must be purchased from Safe Fire Detection or the warranty may be void. If a system is desired, the fire alarm control/releasing panel can be purchased from Safe Fire Detection to create a system, and if all it's components and accessories are purchased from Safe Fire Detection Inc., SafeFire Detection Inc. will honor it's warranty as stated below. If non-approved mounting hardware is used and/or manufacturer's installation instructions are not complied with fully, the detector warranty may be void.

Seller warrants that detectors and/or systems purchased from Safe Fire Detection will, under normal use and service, be free from defects in material and workmanship for a period of five (5) year from the date of original sale. All parts and repairs under, the same conditions, as the systems above will be warranted for ninety (90) days. Seller agrees, upon written notice from Buyer given no later than thirty (30) days after the defect is discovered, to repair or replace at the Seller's option any part which, after examination by Seller, is disclosed to have been defective provided that such product is returned to Seller transportation prepaid during the warranty period. This warranty does not apply to any damage resulting from accident, improper installation, misuse or abuse. The full extents of Seller's warranty obligations are to repair or replace any defective part. Return Transportation is the responsibility of the buyer.

There are no other warranty obligations of seller, including any warranty of merchantability or fitness for a particular purpose, either expressed or implied.

Seller is not liable for any other costs, delays, labor charges, shipping or handling charges for warranty parts, or claims, nor for any consequential or incidental damages with respect to the product for its use.

Table of Contents

This guide is to be used as a general guideline for installing a SafeFlame flame detection system. Please be sure to check all local and state codes prior to designing and installing a system. It is advisable to contact the local AHJ in the planning stages of a project.

1. Safe Introduction

Safe Fire Detection, Inc. is committed to providing the best customer support in the industry. This provides our clients with the satisfaction of knowing that their valuable assets and business operation are our greatest concerns. This trust has been earned through 40 years of proven product reliability, dedication, and by providing unparalleled detection helping safeguard facilities around the world.

Safe Fire Detection's products have been leading the Early Warning Fire Detection (EWFD) market since 1972, protecting loss from fire, smoke, heat and water. Our new product line, Safeflame , is revolutionizing flame detection by implementing a more versatile flame detector, with greater detection distances combined with the lowest cost in the industry.

We have built our reputation not just on products, but customer focused solutions. We combine extensive industry knowledge with solid technical expertise to help our clients customers safeguard their valuable assets.

This manual will provide information regarding the proper installation of a SafeFlame detection system (see warranty information), as well as a guide in planning for adequate coverage of the protected areas in accordance with accepted fire protection principles. The current NFPA 72 National spacing and location for adequate area protection. It is important to note that codes, standards, and regulatory requirements do change over time and it is highly recommended that prior to planning and installation, the Authority Having Jurisdiction (AHJ) be consulted to ensure compliance.

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2. SafeFlame IR3 Introduction

2.1 Overview

SafeFlame is an advanced IR3 type flame detector that utilizes 3 sensors. One of the sensors monitors the spectral band for CO_2 emissions. The other two sensors monitor adjacent spectral bands to reduce radiation interference and reduce false alarms.

The advanced technology in the SafeFlame IR3 detectors give the detectors an adjustable detection range of a maximum of 200 feet and a viewing angle of 90° horizontal and 90° vertical.

Both the SF200A and the SF200SX come standard with 0-20mA current source, RS-485 communication, and user selectable Warning (Pre-Alarm) and Fault relays. The SafeFlame IR3 detectors are available in Standard (Aluminum) and Explosion Proof (Stainless Steel).

2.1.1 Models and Types

SafeFlame IR3 Aluminum
SF200A

SafeFlame IR3 Stainless Steel Explosion Proof
SF200SX

The SafeFlame IR3 Flame Detector comes in two varieties; standard and explosion proof. The standard SafeFlame detector is made from aluminum and the explosion proof SafeFlame detector is made from stainless steel. Their part numbers are notated below:

SF200A - SafeFlame IR3 Standard

SF200SX - SafeFlame IR3 Explosion Proof

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2.2 Principles of Operation

2.2.1 IR3 Flame Detector

SafeFlame's triple IR (IR3) flame detector compares three specific wavelength bands within the IR spectral range of a fire and their ratio to each other. This offers fast response without the fear of typical false alarms. One sensor monitors the 4.4 micrometer range and the other sensors monitor the bands above and below.

This advanced technology allows the detector to distinguish between non-flame IR sources, and flames that emit hot carbon dioxide in the combustion process (which have a spectral characteristic peak at 4.4 micrometers). As a result, both detection range and immunity to false alarms can be significantly increased. The SafeFlame IR3 detectors can detect a 0.1m² (1ft²) gasoline pan fire at up to 60m (200ft) in less than 5 seconds.

SafeFlame's IR3 detector is designed to ignore constant background IR radiation, which is present in all environments. Instead it measure the modulated part of the radiation of a fire.

2.2.2 RS-485 Modbus

The SF200A/SX is capable of connecting to any RS-485 communication network by connecting to a universal controller. The detector is capable of informing the network of the current product condition (fire, fault, warning) and can be used in synch with interlinking remote control.

2.3 Detector Performance Options

2.3.1 Cone of Vision

The SF200A/SX have a field of view of 90° horizontal, 90° vertical.
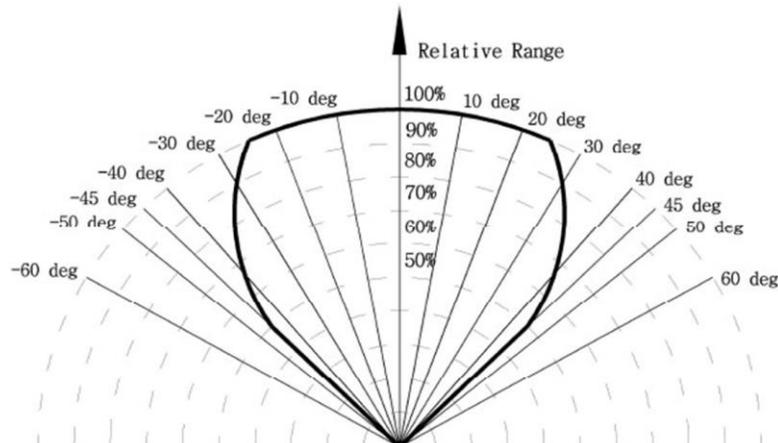
2.3.2 Detector Sensitivity

The detector has two alarm levels: Warning (Pre-Alarm) and Alarm. The detection range for the detector is 200 feet (60 meters) for a standard fire. A standard fire is defined as a 1ft² (0.1m²) n-heptane pan fire.

The Warning level is an alarm verification system. Having this option enabled will delay the alarm signal by approximately 5 seconds.

2.3.3 LED Indicator

Three colored LED indicators are located inside the detector, one LED is adjacent to each of the IR sensors.

Detector Condition	LED Color and Mode
Normal	Green LED on
Warning	Red LED blinking
Alarm	Red LED on
Reset	LEDs blinking repeatedly and sequentially(counter-clockwise)
Power Supply Fault	Orange LED blinking (2Hz)
BIT Fault	Any LEDs simultaneously blinking (1Hz)
Initializing Circuit Fault	Any LEDs simultaneously blinking (2Hz) with 0.5 sec delay

SafeFlame IR3 Aluminum
SF200A

SafeFlame IR3 Stainless Steel Explosion Proof
SF200SX
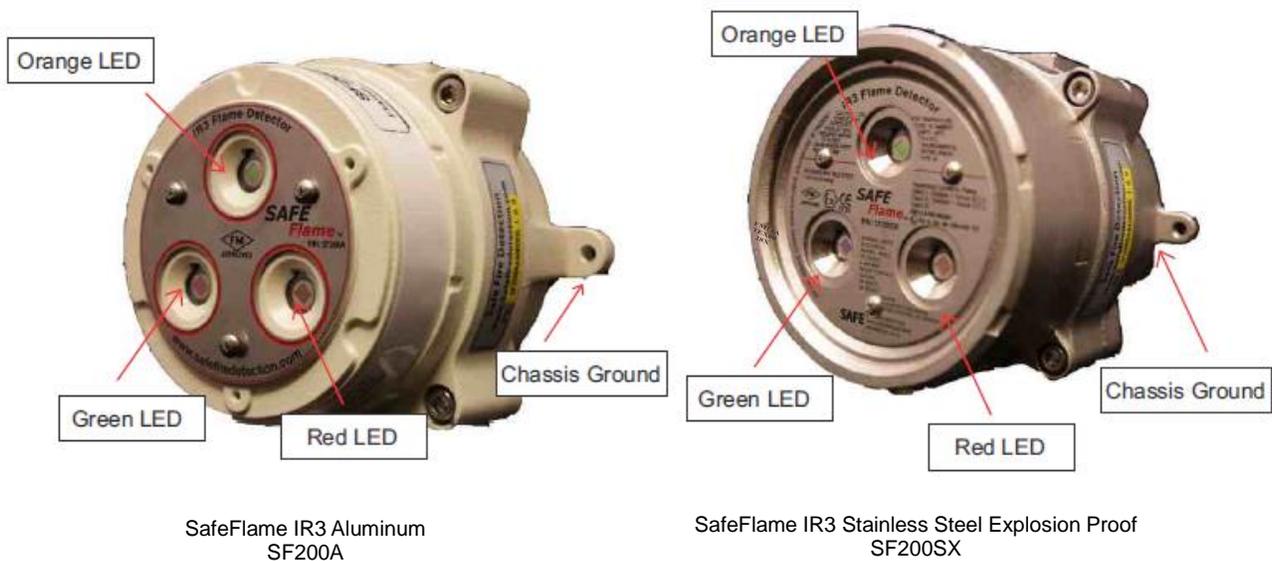
[Figure 1] Product Image LED Position indicator

2.3.4 False Alarm Protection and Immunity

The detector is immune to a variety of potential false alarm sources. Below is a table showing either the immunity to a radiation source or the distance beyond which the detector is immune to the radiation source.

Radiation Source			Immunity Distance ft(m)
Indirect or reflected sunlight			10ft (3m)
Incandescent lamp 100W			No False Alarm
Fluorescent light 40W			No False Alarm
Electric Heater 1500W			No False Alarm
Blue, Green dome light XXXW			No False Alarm
Hot plate (200℃)			No False Alarm
Halogen lamp 500W (Glass)			No False Alarm
Halogen lamp 1000W (Quartz lamp)			No False Alarm
Grinding metal			3.3ft (1m)
Arc welding (5mm, 200A)	Detection Range	50ft (15m)	16ft (5m)
		100ft (30m)	23ft (7m)
		150ft (45m)	30ft (9m)
		200ft (60m)	59ft (18m)

2.4 Specifications

2.4.1 Electrical Specifications

| Electrical	
Recommended Voltage:	Continuous 24 VDC
Rating Voltage:	18 VDC to 30 VDC
Max Input Voltage:	30 VDC
Normal Average Current:	100 mA @ 24 VDC
Max Operating Power:	4.8 watt @ 30VDC
Relay Output	
Dry Contact Relays:	Fire, Fault, Warning
Rating:	3A at 30VDC, 3A at 277VAC
RS-485 Communication	
Non-Isolation Output:	2 Wiring
Communication Speed:	4800, 9600, 19200, 38400 bps (dip switch selectable)
0-20mA Current Output	
Non-Isolation Output:	Common GND(-Power)
Max Resistance:	400Ω

2.4.2 Environmental Specifications

| Operating Temperature:	-40°C to +75°C (-40°F to +167°F)
Storage Temperature:	-50°C to +80°C (-58°F to +176°F)
Humidity Range:	0 to 95% relative humidity

2.4.3 Mechanical Specifications

SafeFlame IR3 Standard (SF200A)	
Enclosure (Material):	Aluminum
Weight:	Detector- 1.2kg (2.6lbs.), Detector w/ Bracket- 2.2kg (4.8lbs.)
Dimensions(Detector):	150 x 103 x 125mm (5.9" x 4.1" x 4.9")
Dimensions (with Bracket):	150 x 171 x 347mm (5.9" x 6.7" x 13.7")
Color:	Ivory
Conduit Connection:	2 x 1/2" PF
Wire Gauge:	14 AWG to 24 AWG
Water and Dust Tight:	IP67, NEMA type 4X
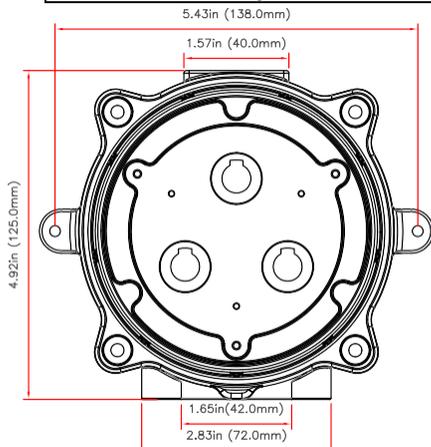
[Figure 2] Front
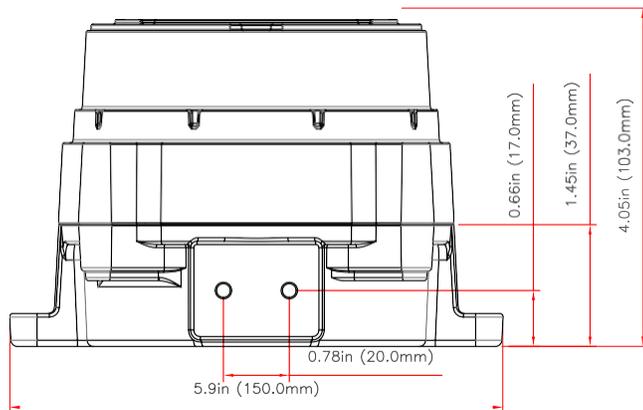
[Figure 3] Side

SafeFlame IR3 Explosion Proof (SF200SX)	
Enclosure (Material):	316 Stainless Steel
Weight:	Detector- 3.5kg (7.7lbs.), Detector w/ Bracket- 4.5kg (9.9lbs.)
Dimensions(Detector):	134 x 117 x 110mm (5.3" x 4.6" x 4.3")
Dimensions (with Bracket):	134 x 163 x 356mm (5.3" x 6.4" x 14.0")
Color:	Metal
Electrical Connection:	½" NPT-14 (standard) or M20 x 1.5 (option)
Wire Gauge (power supply & Signal):	14 AWG to 24 AWG
Hazardous Area Approvals:	Class I Div. 1 Groups B, C, and D Class II Div. 1 Groups E, F, and G Class III ATEX CE 2809 Ex II G, Ex db IIB+H2 T5 (-40℃ ≤ Ta ≤ +75℃)
Water and Dust Tight:	IP66/67 NEMA Type 4X
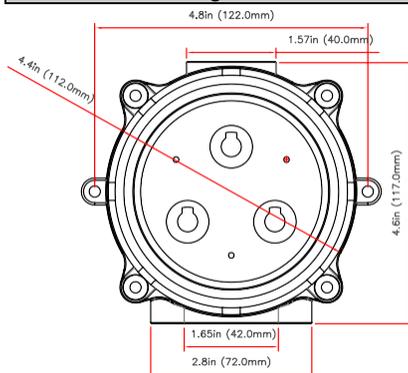
[Figure 4] Front

[Figure 5] Side

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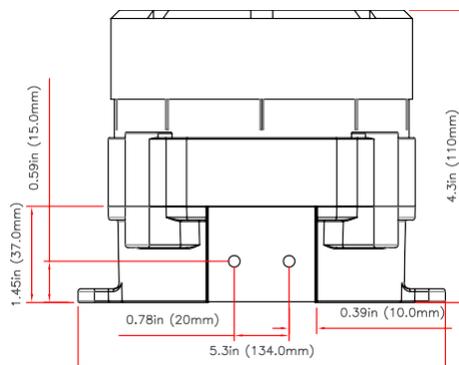
3. Installation

3.1 Guidelines for Installation

For optimal detector performance and protection of the hazard, please consider the guidelines for installation:

Spacing: The number of flame detectors in the protected area is determined by the size of the area, the Cone of Vision, obstructions, and sensitivity.

Aiming: The flame detector should be pointed toward the center of the desired area of protection. Point the detector pointed at a downward angle to prevent dust and dirt build up if possible.

Sensitivity: Determined by the size of the fire at the required distance and the type of flammable materials.

Wiring: Use only 12 to 24 AWG shielded wire for all power and networking cable. NOTE: Wire for continuous 24VDC Power.

Environment: Avoid areas that are outside of the operating range of the detector and areas that would be prone to false alarms.

3.2 Unpacking the Detector and Necessary Tools

Please inspect the external condition of the detector when unpacking the product. If there is any damage on the detector please contact the manufacturer immediately.

Box contents:
- SafeFlame IR3 detector
- Mounting Bracket
- Spare bolts (detailed below)

Spare Part	Size	Q'ty	Description
Hexagon Wrench Bolt	M6x10	2	Connecting bracket to the detector
Hexagon Wrench Bolt	M6x35 (OEM)	4	Holding sensors to backplate
Button Screw (+)	M5x30	4	For mounting the bracket

Necessary Tools for Installation:
- Hexagon Wrench(Metric5M)
- Phillips Screwdriver

3.3 Mounting Bracket

3.3.1 Specifications

Angle Adjustment:	Horizontal 180°, Vertical 180°
Weight:	1kg
Dimensions(Bracket):	276 x 100 x 88mm (10.9" x 3.9" x 3.4")
Color:	Metal
Enclosure Material:	316 Stainless Steel
Wall Mounted Size:	6Φ x 4 (5mm bolt)

3.3.2 Installation

Necessary Tool:	Hexagon Wrench Driver, Screw Driver
Components:	Metric M6-10 x 2pcs, Metric M5-30 x 4pcs

Mount Bracket with M5-30 x 4pcs bolts. Refer to figure 6.

Detector can be installed on the wall or the ceiling with bracket. Refer to figure 6.
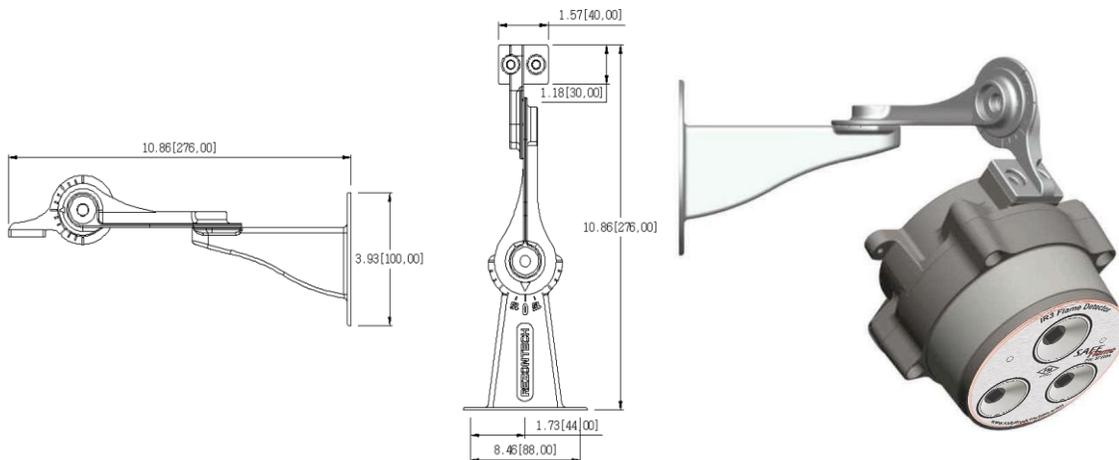
[Figure 6] Bracket and Product

3.4 Wiring and Conduit Connections

3.4.1 Conduit Installation

- Use ½ inch NPT-14 or M20X1.5 conduit connection or suitable explosion proof gland to assemble the cable and conduit to the detector.
- When using conduit connection for Division installation, conduit seals must be installed within 18 inches (450mm) from the enclosure.
- When using conduit connection for ATEX installation, conduit deals must be placed at enclosure.
- Install the conduit including drain holes facing downward to avoid water condensation in the detector.
- Any conduit entry not used during installation shall be plugged with suitable rated and approved conduit/blanking plug.
- Specific Conditions of Safe Use: Consult the manufacturer for dimensional information on the flameproof joint for repair.

Standard for Electrical Wiring
Wire gauge for detectors' power supply wires

AWG NO.	Diameter (mm)	Cross Section (mm)
24, 23, 22	.0.511, 0.573, 0.644	0.205, 0258, 0326
21	0.723	0.410
20	0.812	0.518
19	0.912	0.653
18	1.02	0.823
17	1.15	1.04
16	1.29	1.31
15	1.45	1.65
14	1.63	2.08

Cable Gland Specification

Cable Conduit Standard: ½ inch NPT-14, M20 X 1.5
Water and Dust: IP66/67, NEMA Type 4X

3.4.2 Terminal Connections

The detector has terminal blocks TB1 and TB2 as shown in Figure 12. Each of the terminals has a label which indicates its proper connection.

Terminal Block	Terminal	Connection
TB1	VCC	24VDC +
	GND	24VDC -
	FLT_N.O / N.C.	Fault loop normally closed or normally open (selected by JP1)
	FLT_COM	Fault loop common
	ALM_N.O.	Alarm loop normally open
	ALM_COM	Alarm loop common
	ALM_N.C.	Alarm loop normally closed
TB2	SELF TEST	Self diagnosis (BIT) input
	EXT_RST	External reset input
	WARN_N.O.	Warning loop normally open
	WARN_COM	Warning loop common
	485+	RS-485 communication A
	485-	RS-485 communication B
	0-20mA	Current output line

[Figure 7] TB1 Terminal address at product cover

Alarm Relay Output: Wiring Diagram

	Terminal	Relay Status	
		Normal (De-Energized)	Alarm (Energized)
TB1	ALM_N.C.	Normally Closed (N.C.)	Normally Open (N.O.)
	ALM_N.O.	Normally Open (N.O.)	Normally Closed (N.C.)
	ALM_COM	Common	Common
Rating: 3A@30VDC, 3A@277VAC			
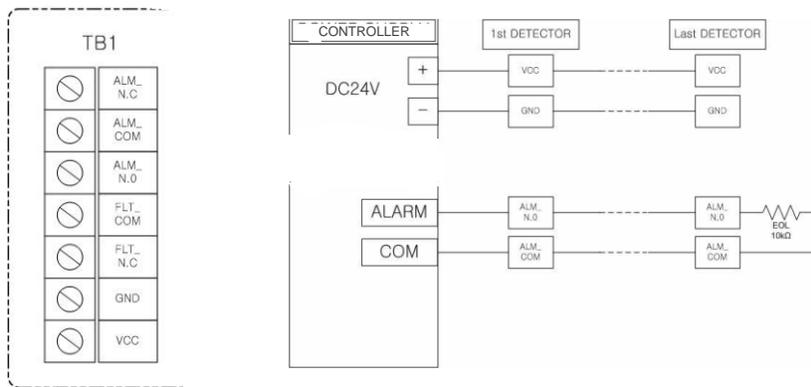
[Figure 8] Terminal wiring diagram at fire alarm relay

Warning Relay Output: Wiring Diagram

	Terminal	Relay Status	
		Normal (De-Energized)	Warning (Energized)
TB2	WARN_N.O.	Normally Open (N.O.)	Normally Closed (N.C.)
	WARN_COM	Common	Common
Rating: 3A@30VDC, 3A@277VAC			
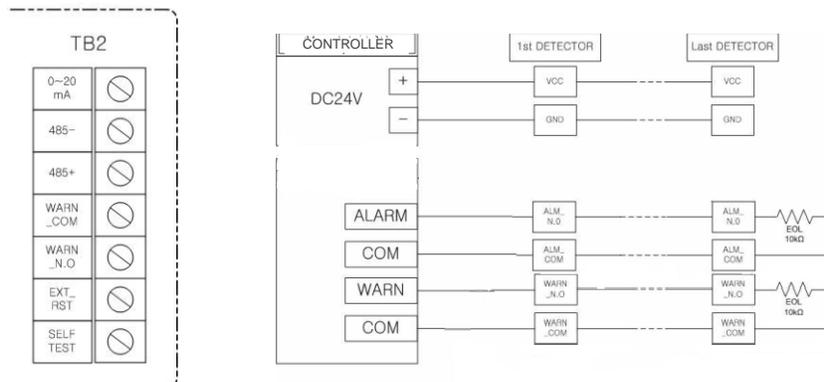
[Figure 9] Terminal wiring diagram at fire and warning relay

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Fault Relay Output: Wiring Diagram

	Terminal	Relay Status	
		Normal (Energized)	**Fault (De-Energized)**
TB1	FLT_N.O/N.C	Normally Closed (N.C.)	Normally Open (N.O.)
	FLT_COM	Common	Common
Rating: 3A@30VDC, 3A@277VAC -FLT_N.O. is default. To disable Fault relay switch SW1-8 to OFF -The default setting for JP1 on the terminal PCB is FLT.N.O. See Figure 7			
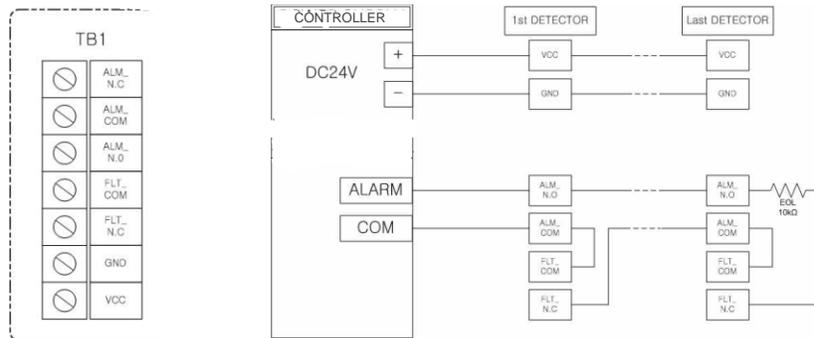
[Figure 10] Terminal wiring diagram at fire and fault relay

0-20mA Current Source: Wiring Diagram

Terminal Block	Terminal	Detector Status	Current Output (mA)
TB2	0-20mA	Connection fault	0
		Self diagnosis fault	2
		Normal	4
		Initializing Circuit fault	8
		Self Diagnosis Test	12
		Warning	16
		Alarm	20
Non-Isolation Output:		Common 24V-_IN(-Power)	
Max Resistance:		400Ω	
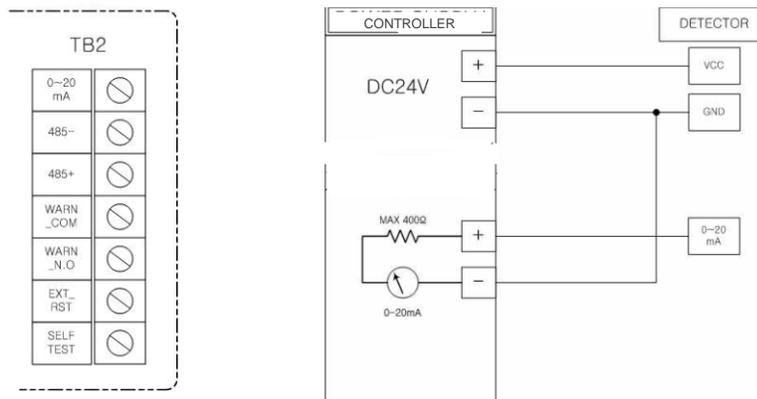
RS-485: Wiring Diagram

RS-485 Terminals and their Connection Description		
	Terminal	**Connection**
TB2	485+	RS-485 A
	485-	RS-485 B

· Communication Specification

Non-Isolation Communication
Full-Duplex, Half-Duplex
4800, 9600, 19200, 38400bps are available (dip-switch selectable)
1:N support (Client)
Support Protocol: Manufacturer
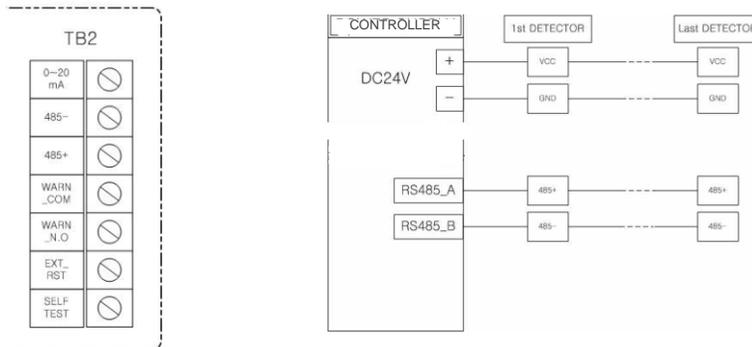
[Figure 11] RS-485 Network wiring diagram

Remote Reset: Wiring Diagram

	Terminal	**Connection**
TB2	EXT_RST	Remote Reset signal line

· Signal Specification

Operating Signal:	Short Circuit (1 sec) to GND and then Open Circuit
Operating Delayed Time:	1 Second
Operating Continuous Time:	After cancelling operating signal + initializing time
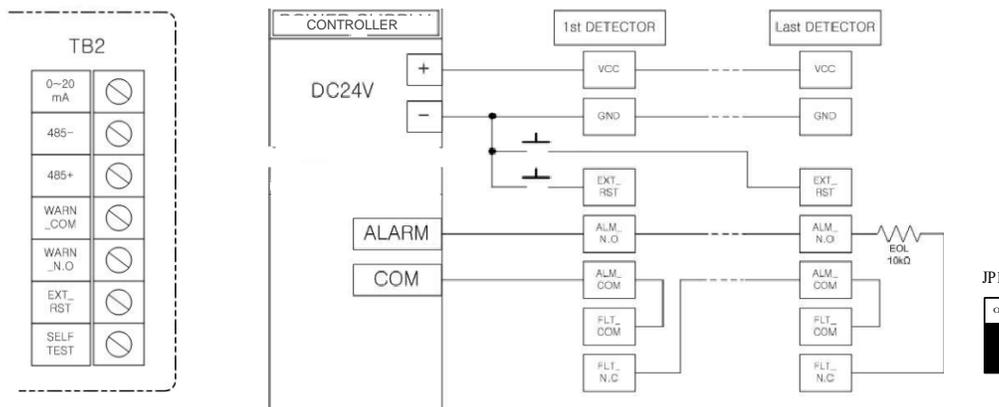
[Figure 12] Remote reset wiring diagram

External Self-Diagnosis Test: Wiring Diagram

External Self-Diagnosis Connection		
	Terminal	**Connection**
TB2	485-	External self diagnosis signal line
Operating Signal:		Same level of Signal with 24V-_IN
Operating Delayed Time:		5 Seconds
Operating Continuous Time:		Operating delayed time + 10 sec.
Result Signal		
Normal		**Fault**
Normal output for all signals		- Fault Relay output (De-Energized) - 2mA (0.5mA): Self-test error signal - Any of LEDs simultaneously blinking (1Hz) at where the channels having detection problem - Response of communication self-test fault signal
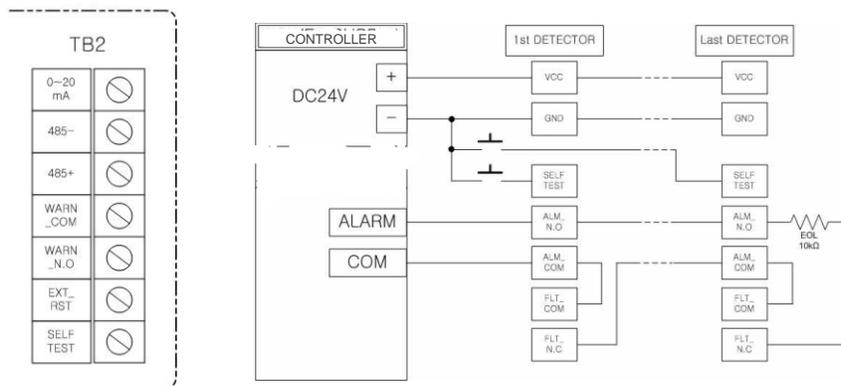
[Figure 13] External self-test wiring diagram

Ground Connection

For proper operation of the detector the SafeFlame must be grounded through a wire to the chassis. Failure to establish a ground connection can lead to greater susceptibility of the detector to power surges, electromagnetic interference, and ultimately damage to the detector.

External Grounding- Connect ground wire to right side of enclosure.

3.5 Setting up the Detector

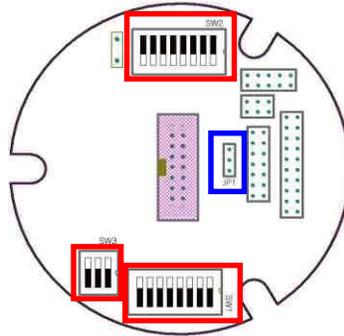The detector has 3 programmable dip-switches (SW1, SW2, and SW3) which can set and change various detector functions.

Dip-Switch	Description
SW1	Controls and sets Sensitivity, Alarm Delay, and Output Relays
SW2	Sets detector address, and Baud rate
SW3	Controls other output functions
JP1	Connect remote reset signal

3.5.1 Sensitivity

Sensitivity setting can be adjusted by the user according to adhere to local codes, environments, or the desires of the client. Please make sure all laws, codes, and regulations are met when installing the SafeFlame detector

Note: The detector must be powered off to adjust the sensitivity level and comes at the preset detection range of 200ft (60m)

SW1			
Switch Setting		Sensitivity	Detection Range
SW1-1	SW1-2		
Off	Off	High*	200ft (60m)
ON	Off	Medium	150ft (45m)
Off	ON	Low	100ft (30m)
ON	ON	Very low	50ft (15m)
-Reference source of detection range is 1' x 1' fire of n-heptane -" * " designates the only sensitivity approved by FM Approval.			

3.5.2 Signal Latching

The detector can latch the alarm signals in the case of a fire event. With this setting activated the alarm signal can only be reset two ways: one is by powering off and reapplying power manually and the other is using EXT_RST terminal short to GND.

SW1	
Switch Setting	Function
SW1-5	
Off	Automatic Recovery
ON	Alarm Latch

3.5.3 Alarm Delay

The SafeFlame is equipped with an Alarm delay option, which provides programmable time delays by changing settings. The alarm signal will be activated if the fire still exists after the programmed delay time. But if the fire disappears within the programmed delay time, the detector will return to its standby state.

The alarm delay option affects the output relays and the 0-20mA. The LEDs and the outputs indicate warning levels during the delay time only if the fire condition exists.

SW1		
Switch Setting		**Delay Time (sec)**
SW1-3	SW1-4	
Off	Off	3
ON	Off	6
Off	ON	9
ON	ON	12

Note: When setting the delay time to 5, the average response time is about 12 seconds for a 1' x 1' n-Heptane pan flame at 197ft(60m)

3.5.4 Built-in-Test (BIT)

The detector has the self diagnosis function to check whether sensors are detectable (detection of internal circuitry or sensor itself) for radiant. If there are some fault on the internal circuit or sensors, the detector will output the self-diagnosis fault signal.

SW1	
Switch Setting	**Function**
SW1-6	
Off	Self-diagnosis function "OFF"
ON	Self-diagnosis function "ON"
- The detector will self test every 1 hours	

3.5.5 Relay Output

Warning Relay Output

The detector can indicate a warning state with a warning relay output. In the warning relay enabling setting, if the detector is in the warning state, the warning relay contacts are used. This setting can be disabled to save power

SW1	
Switch Setting	**Function**
SW1-7	
Off	Warning relay Disabled (default)
ON	Warning relay Enabled

Fault Relay Output

This is a feature to enable the fault relay and energize (N.C.) the relay in the standby state. The setting can be disabled to save power.

SW1	
Switch Setting	**Function**
SW1-8	
Off	Fault relay Enable (default)
ON	Fault relay Disabled

0-20mA Current Relay Output

This is a feature to enable the 0-20mA current output signal. This can be disabled to save power.

SW1	
Switch Setting	**Function**
SW3-1	
Off	Current output Disabled (default)
ON	Current output enabled

3.5.6 RS-485

This is a feature to enable the RS-485 communication between Master(server) and Slave(detector) with manufacturer protocol. This feature can be disabled to save power.

SW1	
Switch Setting	**Function**
SW3-2	
Off	RS-485 Communication Disabled (default)
ON	RS-485 Communication Enabled

Setting Detector Address

This is a feature to set the address of detectors to identify each other when the user utilizes the RS-485 communication. Available range of addresses are from 1 to 63. If communication enabling switch (SW3-2) is OFF, address setting is not applicable.

SW2						
Address	**Switch Setting (SW2-1 ~ SW2-6)**					
	SW2-1	SW2-2	SW2-3	SW2-4	SW2-5	SW2-6
1	ON	Off	Off	Off	Off	Off
2	Off	ON	Off	Off	Off	Off
.	.	.	.	.	.	.
.	.	.	.	.	.	.
62	Off	ON	ON	ON	ON	ON
63	ON	ON	ON	ON	ON	ON

Setting Communication Baud Rate

The detector can change the RS-485 communication baud rate. If communication is not available (SW3-2 is OFF), the baud rate setting is not applicable. After changing the baud rate, the detector must be reset before using the communication.

SW2		
Switch Setting		**Function**
SW2-7	SW2-8	
Off	Off	9600 bps (default)
ON	Off	4800 bps
Off	ON	19200 bps
ON	ON	38400 bps

4. Operating and Testing the Detector

4.1 Initial Power-Up

Before powering-up a SafeFlame detector inspect all aspects of the installed equipment. This initial inspection can help to prevent future down time and improve the longevity and performance of the detectors.

Initial Operation		
		Operational or Output Status
Before Connecting Power		-Fault Relay signal Open (N.O.: De-Energized) - All LEDs off
After Connecting Power	Common	- Fault Relay signal Open (N.O.: De-Energized) - After LED blinking sequentially 3 second (Orange → Red → Green, clockwise), 10 seconds of self diagnosis test
	Normal	- Fault Relay signal Closed (N.C.: Energized) -All output, "Normal" signal (N.O.: De-Energized) - Green LED ON
	Fault	- Fault Relay signal Open (N.O.: De-Energized) - LED "Fault" signal output - 0-20mA "Fault" signal - RS-485 communication "Fault" signal

4.2 Safety Handling

Below are a few safety considerations to take into account when the SafeFlame has power connected.

- Please refer to the diagrams and specifications in the user manual
- Do not open the SafeFlame while the power is connected
- Disassembly and assembly of the internal electrical parts is not allowed by anyone except the manufacturer. Unauthorized action will void the warranty
- Before working on any equipment be sure that the detector is disconnected from any suppression or extinguishing systems.

4.3 Testing

4.3.1 Built-in-Test

The detector will automatically perform a self-diagnostic test every 1 hours.

4.3.2 Test Lamp

The SF4306 generates specific IR3 radiation which can be detected by the SafeFlame detector series as a fire. It has an individual built-in internal power supply, making it portable with up to 80 minute.

[Figure 14] SF4306 Test Lamp

- Testing Procedures with the SF4306
  1. Please wait for 10 seconds after power is connected. Check if Green LED is turn on.
  2. Turn on the SF4306 and point it at the front of the SafeFlame. The recommended distance between the test lamp and the detector is within 16ft(5m)
  3. If the Red LED is on, the fire is detected
  4. If the product is set to reset manually, cycle power to the detector
  5. If the Red LED does not turn on, please adjust the testing distance and try again. If that same problem persists, check the test lamp for functionality. If working properly, contact the manufacturer.

Note: If bulb No. 1 is blinking and the radiation intensity is weak, or if the No. 2 bulb is not functioning, please re-charge the test lamp. If neither the No. 1 or No. 2 bulbs turn on, it means the test lamp is defective and require repair.

Detector Status During Testing		
Status		Operational or Output Status
Before Connecting Power		-Fault Relay signal Open (N.O.: De-Energized) - All LEDs off
After Connecting Power	Common	- Fault Relay signal Open (N.O.: De-Energized) - After LED blinking sequentially 3 second (Orange → Red → Green, clockwise), 10 seconds of self diagnosis test
	Normal	- Fault Relay signal Closed (N.C.: Energized) -All output, "Normal" signal (N.O.: De-Energized) - Green LED ON
	Fire	- All output "Fire" signal

5. Maintenance and Troubleshooting

This section deals with preventive maintenance, describes possible faults, and indicates corrective measures. Ignoring these instructions may cause problems with the detector and may invalidate the warranty. Whenever a unit requires service, please contact Safe Fire Detection or its authorized distributor for assistance.

Please record the maintenance process for the detector in the maintenance book. Device name, date of installation, name or supplier, and other necessary information must be recorded accordingly. If there is any service needed, the maintenance record should be sent with the detector for reference.

5.1 Maintenance

The detector must be kept as clean as possible. Clean the viewing window and the reflector of the SafeFlame periodically. The frequency of cleaning depends on the local environmental conditions and specific applications. Cleaning and operation testing must be completed at least every 6 months.

Steps for cleaning the detector:
1. Disconnect power to the detector before proceeding with any maintenance including window/lens cleaning
2. Use cleaning liquid for view window on detector. Do not forget to rinse when finished.
3. Where dust, dirt, or moisture accumulate on the window, first clean it with a soft brush, and use the cleaning liquid with a soft cloth. Finally rinse it clean with water

5.2 Troubleshooting

No LED response after power applied	1. Check that the detector is connected properly 2. Check that the detector is connected with the appropriate power supply polarity 3. Check the voltage supplied to the detector 4. Check to see if there has been an internal short due to a foreign substance
Orange LED blinking (2Hz)	1. Check the input voltage of the product 2. Check all wiring and search for signs of for signs of foreign substances 3. If input voltage is correct, please contact the manufacturer
Output signals not received	1. Check that the detector is connected properly 2. Check that the wiring connections are correct according to the user manual 3. Fire signals can be measure after detection. Check if there is a signal after performing a fire test 4. Check the jumper setting for 0-20mA current output is correctly set
Any LEDs blinking repeatedly (1Hz/2Hz) with 0.5 second delay	1. Contact the manufacturer

6. Certification & Approvals

- FM Approved for USA
- FM 3260
- FM 3615
- Class I Division 1, Groups B, C, D, T5 (Ta = -40°C to +75°C)
- Class II, Class III, Division 1, Groups E, F, G, T5 (Ta = -40°C to +75°C)
- ATEX CE 2809 Ex II G, Ex db IIB + H2 T5 (-40°C $\leq$ Ta $\leq$ +75°C)

Revision History

REVISION	DATE OF REVISION	CONTENT	REMARKS
1	2014 April	Registration of Document	
2	2019 March	Modification of EU NB number for FM Approval to 2809 and Incorrect notation	
3	2025 February	Change terminal board	

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