Honeywell

Installation Guide and Operating Manual

FSX™ Fire and Flame Detectors

Model FS17X™

FS17X WideBand IR™

Multi-Spectral Infrared Electro-Optical Digital WideBand IR Sensor

Radiant Energy Fire and Flame Detector

Read and understand this manual before installing or operating equipment.

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SECTION 1: INTRODUCTION

1.1 Product Overview

The Model FS17X™ Electro-Optical Multi-Spectral Detector senses the WideBand Infrared™ (IR) radiant energy of blackbody particulate and molecular emissions generated by both hydrocarbon and non-hydrocarbon flames and fires. Additionally, the Detector's sensor array senses Visible Band (VIS) and NearBand IR to further discriminate against false fire sources. The FS17X WideBand Multi-Spectral sensor array spans 0.4 to 3.0 microns and features a wide 120° field of view.

The Model FS17X Multi-Spectral Fire and Flame Detector is Factory Mutual approved for use in Class I, Division 2 (Zone 2) Hazardous Locations (*see Figure 1-1)*.

The FS17X Detector available in a polypropylene housing, is rated IP67, dust tight, leak-proof and water tight to 1 meter.

Figure 1-1
FS17X Detector

FS17X Connections

The Model FS17X uses an eight (8) conductor Standard Cable or an optional eight (8) conductor Cable with a Phoenix Connector for inputs and outputs. Every **FS17X** has the following six (6) connections:

1. +24 Vdc & DC Return
2. Fault **N**.**C**. (**N**ormally **C**losed) & **COM** (**COM**mon)
3. ALARM **N**.**O**. (**N**ormally **O**pen)[1] & **COM** (**COM**mon)

There are 2 options for the **FS17X-S** Detector:

S1. Quick Response - Fireball **N**.**O**. (**N**ormally **O**pen)[1] & **COM** (**COM**mon) or
S2. RS-485 Data A & Data B

There are 4 options for the **FS17X-G** Detector:

G1. RS-485 Data A & Data B **or**
G2. Quick Response - Fireball **N**.**O**. (**N**ormally **O**pen)[1] & **COM** (**COM**mon) **or**
G3. Fire Verification **N**.**O**. (**N**ormally **O**pen)[1] & **COM** (**COM**mon) **or**
G2. Current sinking 4-20mA (+) & (-)

[1] Optional N.C. (Normally Closed) Relay Contacts are available.

FS17X Configurations

The Model FSX has several factory configurations to choose from:

- **Auxiliary:** Alert (-R) **or** Fireball Quick Response (-S or -G) **or** Fire Verification (-G)
- **Fire Verification Time**: 5 **or** 10 second
- **Relay Outputs**: Latching **or** Non-latching
- **Detection Sensitivity**: High **or** Low
- **Digital Communication Address**: 0 to 32

1.2 Detector Technical Specifications

1.2.1 Mechanical Specifications

Housing Material:	Polypropylene
Physical Dimensions:	4.7 in. Height 3.2 in. Width 1.7 in. Depth
Weight:	1 lbs. 4oz. With standard 20 ft cable (0.57 kg)
Enclosure Rating:	IP66 / IP67

1.2.2 Electrical Specifications

Input Voltage Range:	18 Vdc to 32 Vdc
Normal Operation Current:	47 mA (nominal)
Max Fire ALARM Current:	88 mA (maximum)
Relay Contact Rating:	1 Amp @ 24 Vdc resistive
Analog Current Output:	400 Ohms Max Load (loop resistance)
	0.0 to 20.0 mA (Non-Isolated, Current Sinking)
	0.0 mA (<0.6 mA) = Detector Fault
	2.0 mA (±0.6 mA) = Dirty Detector Window Lens
	4.0 mA (±0.6 mA) = Normal, Safe (no Fault, no Fire)
	20.0 mA (±0.6 mA) = Fireball or Fire ALARM
	20.0 mA (±0.6 mA) = Fire ALARM or Verified Fire ALARM
Cable:	Eight (8) Conductor 24 AWG or fourteen (14) Conductor 24 AWG Maximum Cable Length = 1,400 feet

1.2.3 Environmental Specifications

Operating Temperature:	+32° F to +158° F (0° C to +70° C)
Operating Humidity Range:	0 to 95% RH, 100% RH condensing for short periods of time
Storage Temperature:	-13° F to +170° F (-25° C to 77° C)

1.2.4 Performance Specifications

Field of View:	120° Horizontal and Vertical (conical)
Detector Sensitivity:	
High	One (1) sq. ft. heptane fire at 30 feet (± 60° from axis)
Low	One (1) sq. ft. heptane fire at 15 feet (± 60° from axis)
Speed of Response:	Less than 5 seconds (typical)
Quick Response:	Less than 0.5 seconds to “fireball” type fires
Spectral Sensitivity:	
VIS	0.4 to 0.7 micron wavelengths
NearBand IR	0.7 to 1.1 micron wavelengths
WideBand IR	1.1 to 3.0 micron wavelengths

1.2.5 Area Classifications

Class I, Division 2 Class I, Zone 2

1.3 Features and Benefits

- FSC Patented WideBand IR Detection Technology for detecting **BOTH** hydrocarbon and non-hydrocarbon fires in industrial environmental conditions.
- Uses the proven Quantum WideBand IR sensors as the highly successful FSC Models FS7 Detectors, which have over 25,000 successful installations in Semiconductor Cleanroom applications worldwide since 1996.
- False Alarm Immunity due to the patented software signal processing algorithms and due to full WideBand Spectrum sensor array with WideBand IR sensor wth twin Visible sensors, and twin NearBand IR sensors.
- Twin highly integrated Microprocessors reduce the number of discrete components, provides larger software algorithm programming and memory capacity, and provides redundant processor self-checking.
- Lower price Detector replacement for Model FS7 applications.
- Low power consumption, 24Vdc, 47mA nominal (1.13 W), 88mA max ALARM current (2.11 W).
- Multiple Detector output options for a variety of industrial applications.
- Up to 32 unique digital communication addresses when RS-485 communication is used.
- Optional RS-485 output available (FireBus II protocol) for use with the FS2100X System CPX Din Rail Panels and the FS7-130-SX Controller.
- Digitally stepped 4-20mA (current sinking) output (optional).
- Latching or non-latching mechanical (dry contacts) relay outputs (same reliable relays as used in the Model FS7-2173-2RP Detectors).
- Class I, Zone 2 Honeywell Analytics (FSC) polypropylene housing (sames as proven Model FS7 housing) for Clean Room, Semiconductor Wet Bench and Wet Chemical applications.
- Three Separate Bright LEDs (Red, Yellow, Green) for quick, easy identification of ALARM, Fault and Normal status for semiconductor clean room environments.
- FSC Windows® based PC Software for remote FSX diagnostics and data retrieval.
- Designed, Manufactured, Tested, and Patented by Honeywell Analytics (30 years of proven fire / flame detection product excellence worldwide).

1.4 Applications

The applications for the FS17X Fire and Flame Detectors include:

Clean Rooms Gas Cabinets Hydrogen Gas Cabinets

Hydrogen Plants	Hydrogen Storage	Semiconductor Wet Benches
Semiconductor Wet Chemicals	Silane Gas Cabinets	Silane Gas Manufacturing

SECTION 2: INSTALLATION

2.1 Mounting Instructions

Consider the following guidelines when selecting Detector location:

1. As with all flame and fire Detectors, avoid areas that contain radiant energy sources (such as radiant heaters, high intensity lamps, flare-stacks, etc.) in close proximity to the Detector's field of view.
2. Detectors should **NOT** be mounted so that they look up or face the horizon (especially outdoors). Use a minimum twenty degrees (20°) downward angle with the recommended swivel mount.
3. Make sure the Detector has a clear, unobstructed view of the fire threat area. Physical obstructions between a fire and the Detector may cause the fire to be undetected.
4. The rugged, stable, and calibrated Polypropylene Swivel Mount (SM17) is designed by FSC specifically for the FS17X Detector housings. The mounting clip attaches to the back of the FS17X Detector. The mounting plate, with the four (4) screw holes, is used for mounting to a solid surface. Each adjustment increment along an axis is calibrated to 10°. For single axis adjustments, the center section does not need to be installed.
5. Avoid mounting the Detectors in areas where temperatures exceeds the specified operating temperature range *(see Section 1.2.3).*

Figure 2-1
Model **SM17** Swivel Mount

There are no serviceable parts inside the Model FS17X Detector housing. If the Detector housing is opened up or tampered with, all warranties are voided

Note: Do not attempt to modify the Model FS17X Detector as this voids all warranties.

2.2 Detector Connections

The The FS17X-S and -G Detectors have eight (8) connections available with the Standard Cable. These connections are subject to the Output Configuration of the Detector at the time the order is placed. These Output Configurations are:

#1 RS-485 FireBusII (FS17X-S & FS17X-G**)**

#2 Quick Response Fireball Relay (FS17X-S & FS17X-G**)**

#3 Fire Verification Relay (FS17X-S & FS17X-G**)**

#4 Current sinking 4-20mA (FS17X-S & FS17X-G**)**

Color Code for Standard Cable	Output Configuration #1	Output Configuration #2	Output Configuration #3	Output Configuration #4
Red	+24 Vdc	+24 Vdc	+24 Vdc	+24 Vdc
Black	DC Return	DC Return	DC Return	DC Return
Green	FireBusII Data A RS-485	Quick Response Fireball Relay **N**.**O**. (**N**ormally **O**pen)	Fire Verification Relay **N**.**O**. (**N**ormally **O**pen)	Current Sinking 4-20mA (+)
White	FireBusII Data B RS-485	Quick Response Fireball Relay **COM** (**COM**mon)	Fire Verification Relay **COM** (**COM**mon)	Current Sinking 4-20mA (-)
Orange	Fire ALARM Relay **N**.**O**. (**N**ormally **O**pen)	Fire ALARM Relay **N**.**O**. (**N**ormally **O**pen)	Fire ALARM Relay **N**.**O**. (**N**ormally **O**pen)	Fire ALARM Relay **N**.**O**. (**N**ormally **O**pen)
Blue	Fire ALARM Relay **COM** (**COM**mon)	Fire ALARM Relay **COM** (**COM**mon)	Fire ALARM Relay **COM** (**COM**mon)	Fire ALARM Relay **COM** (**COM**mon)
Yellow	Fault Relay **N**.**C**. (**N**ormally **Closed**)	Fault Relay **N**.**C**. (**N**ormally **Closed**)	Fault Relay **N**.**C**. (**N**ormally **Closed**)	Fault Relay **N**.**C**. (**N**ormally **Closed**)
Brown	Fault Relay **COM** (**COM**mon)	Fault Relay **COM** (**COM**mon)	Fault Relay **COM** (**COM**mon)	Fault Relay **COM** (**COM**mon)

The following Relays have a Normally Closed (N.C.) option: Fire ALARM, Quick Response Fireball, and Fire Verification.

1. Make sure that the external 24 Vdc electrical power is turned **OFF** before connecting the Detector.
2. Avoid wire splices. However, if wire splices are required, all splices should be soldered and properly insulated. The use of good wiring practices will simplify installation, improve reliability and facilitate maintenance.

CAUTION: Follow static protection procedures while handling the connectors and the wiring of the FS17X Detector. Use a wrist strap connected to earth ground.

Detector Connections (*continued*)

The The FS17X-S and -G Detectors have eight (8) connections available with the Phoenix Connector. These connections are subject to the Output Configuration of the Detector at the time the order is placed. These Output Configurations are:

#1 RS-485 FireBusII (FS17X-S & FS17X-G**)**

#2 Quick Response Fireball Relay (FS17X-S & FS17X-G**)**

#3 Fire Verification Relay (FS17X-S & FS17X-G**)**

#4 Current sinking 4-20mA (FS17X-S & FS17X-G**)**

Color Code for Cable with Phoenix Connector	Output Configuration #1	Output Configuration #2	Output Configuration #3	Output Configuration #4
Brown	+24 Vdc	+24 Vdc	+24 Vdc	+24 Vdc
Blue	DC Return	DC Return	DC Return	DC Return
Gray	FireBusII Data A RS-485	Quick Response Fireball Relay **N.O.** (**N**ormally **O**pen)	Fire Verification Relay **N.O.** (**N**ormally **O**pen)	Current Sinking 4-20mA (+)
Violet	FireBusII Data B RS-485	Quick Response Fireball Relay **COM** (**COM**mon)	Fire Verification Relay **COM** (**COM**mon)	Current Sinking 4-20mA (-)
Red	Fire ALARM Relay **N.O.** (**N**ormally **O**pen)	Fire ALARM Relay **N.O.** (**N**ormally **O**pen)	Fire ALARM Relay **N.O.** (**N**ormally **O**pen)	Fire ALARM Relay **N.O.** (**N**ormally **O**pen)
Yellow	Fire ALARM Relay **COM** (**COM**mon)	Fire ALARM Relay **COM** (**COM**mon)	Fire ALARM Relay **COM** (**COM**mon)	Fire ALARM Relay **COM** (**COM**mon)
Green	Fault Relay **N.C.** (**N**ormally **Closed**)	Fault Relay **N.C.** (**N**ormally **Closed**)	Fault Relay **N.C.** (**N**ormally **Closed**)	Fault Relay **N.C.** (**N**ormally **Closed**)
White	Fault Relay **COM** (**COM**mon)	Fault Relay **COM** (**COM**mon)	Fault Relay **COM** (**COM**mon)	Fault Relay **COM** (**COM**mon)

The following Relays have a Normally Closed (N.C.) option: Fire ALARM, Quick Response Fireball, and Fire Verification.

1. Make sure that the external 24 Vdc electrical power is turned **OFF** before connecting the Detector.
2. Avoid wire splices. However, if wire splices are required, all splices should be soldered and properly insulated. The use of good wiring practices will simplify installation, improve reliability and facilitate maintenance.

CAUTION: Follow static protection procedures while handling the connectors and the wiring of the FS17X Detector. Use a wrist strap connected to earth ground.

Detector Connections *(continued)*

The The FS17X-R Detector has fourteen (14) connections available. These connections are:

Color Code	Description
Red	24 VDC (+) Supply
Black	24 VDC (-) Return
Green	FireBusII RS-485 Digital Data A Signal
White	FireBusII RS-485 Digital Data B Signal
Gray	Fault Relay Terminal A, Contact to B during Normal Operation
Purple	Fault Relay Terminal B, Contact to A during Normal Operation
Brown	Fire ALARM Relay Terminal A
Blue	Fire ALARM Relay Terminal B
Brown / White	Fire ALARM Relay Terminal A loop-through
Blue / White	Fire ALARM Relay Terminal B loop-through
Yellow	Fire ALERT Relay Terminal A
Orange	Fire ALERT Relay Terminal B
Yellow / Black	Fire ALERT Relay Terminal A loop-through
Orange / Black	Fire ALERT Relay Terminal B loop-through

1. Make sure that the external 24 Vdc electrical power is turned **OFF** before connecting the Detector.
2. Avoid wire splices. However, if wire splices are required, all splices should be soldered and properly insulated. The use of good wiring practices will simplify installation, improve reliability and facilitate maintenance.

CAUTION: **Follow static protection procedures while handling the connectors and the wiring of the FS17X Detector. Use a wrist strap connected to earth ground.**

2.3 Installation Practices

For installations in a Hazardous Classified Area, consult the National Electric Code Handbook, Articles 500 through 517 for the proper installation practices. For locations outside of the United States, observe local and/or regional regulations.

Before applying 24 Vdc Electrical power to the Detector, make sure:

1. Wire connections are correct (Section 2.2). Each wire must be stripped properly to the correct length, loose wire strands must be removed and each wire must be securely and firmly screwed clockwise in the connector.
2. If using the Teflon Sleeve, ensure a proper sleeve seal at the bulkhead, (appropriate for the area classification), has been installed and ***all measures to prevent moisture from entering the Detector housing have been taken.***
3. The FS17X Detector is securely mounted and has an unobstructed view of the area of coverage (Section 2.1).
4. The FS17X Detector window is unobstructed and clean.

The FS17X Detector is now ready for Power-Up. ***On Power-Up, the Fault Relay will change state and the three front red, green, and yellow LED's will flash in a clockwise circular motion signifying the microprocessors are successfully checking out the sensors and electronics in the Detector Module.***

2.4 Start-Up and Commissioning

ATTENTION: **FSX Power-Up** – After the application of 24 Vdc electrical power or after resetting the FS17X Detector, a Power-On Self-Test (POST) will be performed automatically. During this time (approximately 10 seconds) the detector will sequence in a clockwise circular motion through the its LED's several times. Wait a mimimum of thirty (30) seconds after the POST is completed to allow the Detector's sensors to normalize to the spectral background conditions. Count four (4) Green LED flashes to be sure the minmum amount of time has passed before testing the Detector's response with a test lamp (TL-2055X or TL-1055X) or a test fire.

FSX Detector Testing - As with any intelligent flame and fire Detector, please wait a minimum of thirty (30) seconds between tests (i.e., FSX test lamp, butane lighter, or test fires) to allow the Detector's sensors to normalize to the spectral background conditions.

During Start-Up and Commissioning, **DISABLE** all outputs from the Detector to any control panels or control devices. After the Detector(s) is powered, as with all flame and fire Detectors, conduct an external Detector test "end to end". Using an external FSC FSX hand-held test lamp ensures that the FS17X Detector has a clear unobstructed view of the threat area and the Detector is aimed properly at the fire threat area.

Start-Up and Commissioning *(continued)*

Note: As with ALL optical fire and flame Detectors, perform a fully functional "end to end" test of the Detector since the optical path to the fire threat may be obstructed or the detector's mount may be damaged (see Section 3.6).

Note: In order to test the full functionality and operational readiness of any fire or flame Detector "end to end", without starting a real fire (which is not permitted in hazardous areas), it is necessary to test fire and flame detector(s) with an external test lamp.

Using a test lamp is the only non-hazardous and safe method to test any flame or fire Detector's sensors, internal electronics and its alarm activation software, viewing window lens cleanliness, terminal wiring integrity, actual relay activation, and the proper functionality of any other outputs that are used. Also, since most Detectors are installed in a fire protection system, this is the only method to test the complete fire protection system, ensuring all the system wiring and cabling and system control panel(s) are properly installed.
Additionally, using an external test lamp eliminates the following Detector conditions:

1. **The fire or flame Detector(s)' viewing lens being covered up (such as paint, paint overspray, paint masking material, plastic coverings left by cleaning persons, hanging garments, etc.),**

2. **Improperly positioned and orientated Detector (or defective or loose mount) for coverage of the threat area,**

3. **Partial or full blockage of the Detector's line of sight by one or more objects (i.e., recently installed air ducts or pipes, storage boxes, vehicles, etc.) such that the fire threat area is not fully protected. Since all optical fire and flame Detectors are line-of-sight devices, they must be properly positioned and oriented with an unobstructed view of the fire threat area so that they can detect fires.**

To test the full functionality of a FSX Detector, use either the Model TL1055X or TL2055X Test Lamp in the manner prescribed in this Instruction Manual.

The TL-1055X and the TL-2055X are the ONLY Test Lamps that will activate the FSX Detectors. Additionally, do not use these Test Lamps to activate other Honeywell Analytics Detectors such as the Models SS2 or SS4 (nor any other conventional fire and flame detectors). Do not use other Honeywell Analytics Test Lamps to test the FSX Detectors.

Start-Up and Commissioning (*continued*)

Figure 2-8
TL-1055X Hand Held Test Lamp (NEMA 1)

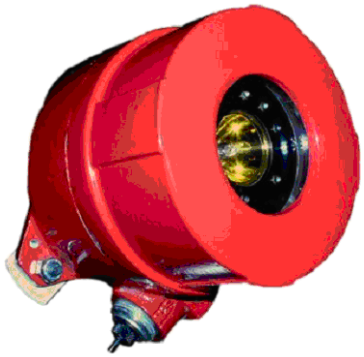

Figure 2-9
TL-2055X Hand Held Test Lamp for Hazardous Areas FM, cFM, FM-ATEX Approved

Remember to disable the Detector outputs, as a full functional test includes activating the alarm outputs. A FSX Honeywell Analytics Test Lamp must be used for this test (Section 4.3). Point the Test Lamp directly at the front of the Detector (on axis as much as possible, within a distance of 1 to 25 feet). Activate the Test Lamp by pressing and holding its pushbutton. While watching the red ALARM LED on the face of the Detector, slowly move the Test Lamp's boresight to ensure the Detector receives its full intensity. **(NOTE: Practicing this technique may help to optimize testing of the FSX Detectors).** (Sections 3.6 and 4.3). The Detector's ALARM LED will illuminate, usually within three (3) to ten (10) seconds. Also, the ALARM Relay outputs will activate and the 4-20 mA analog output will increase to 20 mA (±0.6 mA).

If the Detector does not respond within ten (10) seconds, do the following:

1. Wait thirty (30) seconds before performing another test.
2. **Check the Distance**: verify that the testing distance is between one (1) and fifteen (15) feet from the FSX Detector(s).
3. **Check Aiming Accuracy**: verify that the proper testing technique (as described above) is followed.
4. Make sure the Test Lamp is either a FSC Model TL-2055X or TL1055X Test Lamp.

SECTION 3: OPERATION

3.1 Principle of Operation

Honeywell Analytics line of Multi-Spectral and MultiBand™ Infrared Fire and Flame Detectors are sophisticated, state of the art, electro-optical digital radiant energy Detectors that sense the wideband radiant energy emitted by fire's combustion processes that include flames' molecular emissions and hot particulate blackbody emissions. Radiant Energy Fire Detectors respond much faster to flames and fires at a longer distance than other types of conventional photoelectric and ionization smoke and heat detectors because a fire's emitted radiant energy travels at the speed of light. Fast response is critical for detecting flaming fires in time to successfully activate suppression or activate other fire responses such as closing fire doors. Seconds can make the difference between suppressing a small fire with little or no damage or having a disastrous fire that overwhelms a suppression system.

Infrared (IR) consists of spectral wavelengths longer than the color Red. For the FS17X Detector, the IR spectral range for fire detection, which a large portion of the spectrum is invisible to the human eye, is from approximately 400 to 3000 nanometers (0.4 to 3.0 microns). FSC's Detectors sense and measure the radiant energy generated by a fire at the speed of light using high speed infrared quantum sensors for its IR detectors.

FSC's patented FSX Fire Detectors also use two additional spectral regions, the Visible Band, that spans from about 400 to 700 nanometers (0.4 to 0.7 microns) and the NearBand IR that span from about 0.7 to 1.1 microns. The Visible Band and NearBand IR are used primarily to further discriminate against non-fire false alarm sources.

As with all FSC Detectors, the Model FS17X Detector senses radiant energy generated by both hydrocarbon and non-hydrocarbon fires. Built-in microprocessors use sophisticated Digital Signal Processing (DSP) to accurately distinguish radiant energy from a real fire and a false alarm source(s). FSC has developed and refined these complex proprietary and patented WideBand IR algorithms since 1981. These patented algorithms perform real-time DSP, and precisely analyze the signals in high-resolution frequency and time domains. This decision making process involves thousands of real-time calculations every second. FSC's FSX Detectors use solid-state high speed quantum sensors (not heat sensors such as pyroelectric or thermopile) that all respond to the fire's radiant energy emissions. The quantum sensors convert the rate of photonic energy directly into analog electrical signals. These analog signals are converted to high resolution digital values for real-time microprocessor analysis.

The Detector microprocessors incorporate random access memory (RAM), read-only memory (ROM), and non-volatile flash memory. When the microprocessors determine that a real fire has been detected, the pre-alarm digital sensor data (FirePic™) and the event information are recorded in flash memory. Depending on the configuration, other actions may include activating one or more status LEDs, relays, a current loop and sending digital data via the RS-485 FireBus II™. If the microprocessors determine, based on internal testing and "through-the-lens" testing, that the Detector is not operating correctly, it records the Fault data in flash memory and activates the Fault outputs and the yellow status LED. The digital data in the Detector can be accessed with a PC for later analysis and record keeping using Honeywell Analytics' Windows® based PC software and the FSIM USB Interface Unit.

3.2 LED Status Indicators

As with all FSX Detectors, the Model FS17X Detector uses three (3) separate, bright LED's (rather than one tri-colored LED that can be difficult to recognize the different colors outdoors or in a brightly lit area) to indicate the Detector's status.

- The **Green** LED blinks (flashes) once every ten (10) seconds to indicate a Normal, safe operational condition (i.e. no Faults and no Alarms). The Green LED is OFF when no external 24 Vdc input power is applied to the Detector.
- The **Red** LED turns ON when the FS17X goes into ALARM. The Red LED flashes when the FS17X-R version goes into ALERT.
- The **Yellow** LED blinks (flashes) when the window lens is dirty. For all other Fault conditions, the Yellow LED will turn ON solidly (see Section 3.5).

3.3 Normal Operation

In **Normal Operation**, the bright **Green LED** blinks (flashes) every 10 seconds. See Figure 3-1 for the location of the **Green LED**. Normal Operation is defined as the Detector with 24 Vdc applied and no **ALARM** or Fault conditions are present.

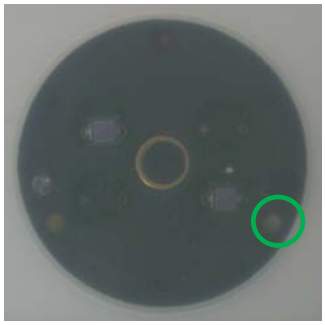

Figure 3-1
Green LED Location

Flashes	LED	Status
1	Green	Normal Operation (No Faults and No Alarms)
2	Green	Normal Operation and Communication*

*The Green LED will be OFF when there is a Detector Fault

The number of Green LED flashes immediately following the power-up sequence identifies the type of FS17X:

Two (2) Flashes for the **FS17X-S** (Semiconductor Detector)

Four (4) Flashes for the **FS17X-G** (General Purpose Detector)

Six (6) Flashes for the **FS17X-R** (Radiant Energy Detector)

3.4 ALARM

When an **ALARM** occurs, the **Red LED** will turn **ON**, (factory setting with the **Auxiliary** relay set to "0" seconds). See Figure 3-2 for the location of the **Red LED**.

Figure 3-2
Red LED Location

The Detector has the following **ALERT**, **ALARM** or **Fire Verification** outputs:

- ALERT Relay activation
- ALARM Relay activation
- Fire Verification Relay activation[1]
- 4-20 mA[1] (sink 20 mA) ALARM Output
- 4-20 mA[1] (sink 20 mA) Fire Verifification Output[1]
- RS-485 FireBus II ALERT Notification[1]
- RS-485 FireBus II ALARM Notification[1]

1 Only one active output from this group

3.5 Fault

When a Fault (Trouble) occurs, the **Yellow LED** will illuminate. See Figure 3-3 for the location of the **Yellow LED**.

Figure 3-3
Yellow LED Location

The Detector has the following Fault outputs:

- Fault Relay activation
- 4-20 mA (sink) Output[2]
  - 2 mA (Self-Test/Lens Obscuration Fault)
  - 0 mA (All Other Faults)
- RS-485 FireBusII Fault Notification[2]

2 Only one active **Fault** output from this group

The FS17X has the following Fault (Trouble) outputs:

Flashes	LED	Fault	Cause	Remedy
3	Yellow	Self Test Fault	Sensor response is out of range.	Contact Honeywell Analytics to speak with a Technical Representative.
4	Yellow	Relay Coil Fault **or** Leak Detection Fault	One or more Relay Coils has an open or a short; **OR** Moisture is inside of the Detector Housing.	Contact Honeywell Analytics to speak with a Technical Representative.
5	Yellow	High or Low Temperature Fault	Less than -40°C or Greater than +60°C (Zone 2) or Greater than +85°C (Zone 1)	Contact Honeywell Analytics to speak with a Technical Representative.
6	Yellow	High or Low Input Voltage Fault	Less than +18 Vdc or Greater than +32 Vdc	Verify the DC Voltage at the FS17X Detector is between 18 Vdc and 32 Vdc. DC voltage, not AC.
Solid ON	Yellow	Major Internal Fault	Microprocessor Fault Communication Fault Internal Electronic Self-Test Fault	Contact Honeywell Analytics to speak with a Technical Representative.

The Green LED will be OFF during Detector Faults.

In addition to the Remedies listed above, cycle (re-apply) primary input power to the Detector. If any of the Faults listed above continues after taking the appropriate remedy, contact a Technical Representative at Honeywell Analytics. It may be necessary to obtain a Return Merchandise Authorization Number (RMA #) and return the Detector to the Factory.

3.6 Maintenance

After the FS17X Detector is installed and commissioned, virtually no maintenance required in a clean room environment. However, a complete “end-to-end” test of the entire fire detection system should be performed monthly or more frequently, depending on the application. Additionally, semi-annual or quarterly testing should be performed, using the correct Honeywell Analytics Test Lamp, to ensure the integrity of the entire fire protection system. (see Note in Section 2.4 and Section 4.3)

Clean the FS17X Detector window:

- Each time the Detector is taken out of or put back into to service.
- Detector window is dirty or contaminated.
- Detector does not respond to an end-to-end test with the FSC hand-held portable Test Lamp (TL-1055X or TL-2055X).
- Each time the Detector has been disassembled for wiring or replacement.

Use a blast of clean air or an oil-free cloth to clean the Detector window. Occassionally, the use of a solvent, such as alcohol is acceptable. No disassembly of the Detector is required.

SECTION 4: APPENDIX

4.1 Warranty Information

Honeywell Analytics warrants its Products against defects in material and workmanship under normal use and service for a period of two (2) years from the date of shipment as described herein. Honeywell Analytics, at its option, will repair or replace, at no charge, such products found to be defective during the warranty period provided that they are returned in accordance with the terms of this warranty. Replaced parts or boards are warranted for the balance of the original applicable warranty period. All Replaced parts of Products shall become the property of Honeywell Analytics. This express limited warranty is extended by Honeywell Analytics to the original purchaser only and is not assignable or transferable to any other party. This is the complete warranty for the Products manufactured by Honeywell Analytics. Honeywell Analytics assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of Honeywell Analytics. Honeywell Analytics does not warrant the installation, maintenance or service of its Products. Honeywell Analytics is not responsible in any way for ancillary equipment not furnished by Honeywell Analytics, which is attached to or used in connection with its Product(s), or for operation of the Product(s) with ancillary equipment and all such equipment if expressly excluded from this warranty. This warranty sets forth the full extent of Honeywell Analytics' responsibility regarding the Products' repair or replacement at Honeywell Analytics' options, is the exclusive remedy.

This Warranty is given in lieu of all other Express Warranties, Implied Warranties, including without limitation, Implied Warranties of Merchantability and fitness for a particular purpose, are limited to the duration of this Limited Warranty. In no other event shall Honeywell Analytics be liable for damages in excess of the purchased price of the product(s), for any loss of use, loss of time, inconvenience, commercial loss, lost profits or savings or other incidental, special or consequential damages arising out of or in connection with the use or inability to use such product, to the full extent such may be disclaimed by law.

THIS WARRANTY DOES NOT COVER:

1. Defects or damage resulting from use of the Product(s) in other than its normal and customary manner.
2. Defects or damage from misuse, accident, or neglect.
3. Defects or damage from improper testing, operation, maintenance, installation, alteration, modification or adjustment.
4. Product(s) subject to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the audition of the product of non-Honeywell Analytics supplied equipment) which adversely affect performance of the Product(s) to interfere with Honeywell Analytics' normal warranty inspection and testing of the Product(s) to verify any warranty claim.
5. Product(s) that have had the serial number removed or made illegible.
6. Freight cost to the repair facility.
7. A Product which due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with Honeywell Analytics' specifications.
8. Scratches or other cosmetic damage to Product surfaces that do not affect the operation of the Product.
9. Normal and customary wear and tear.

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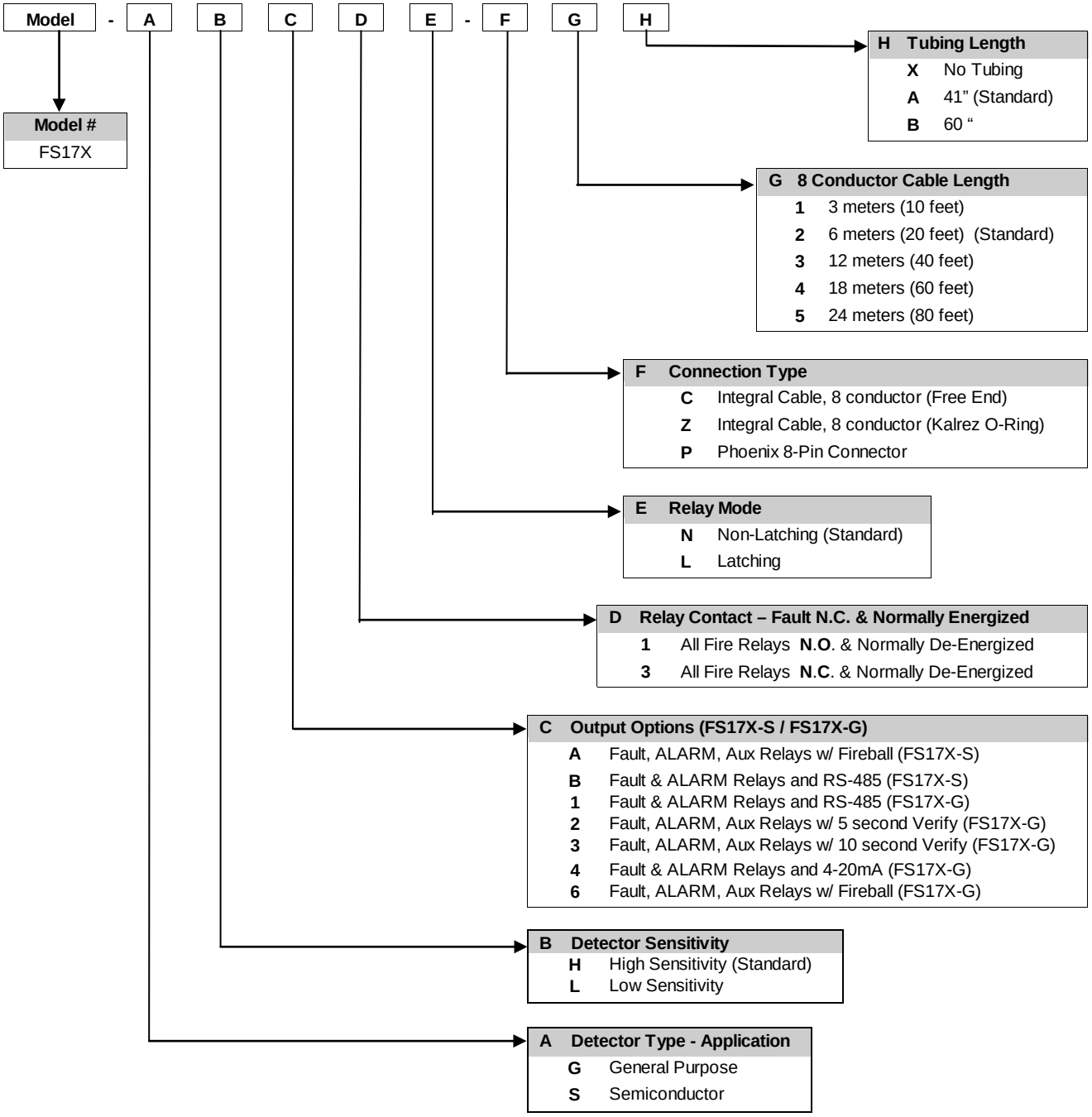
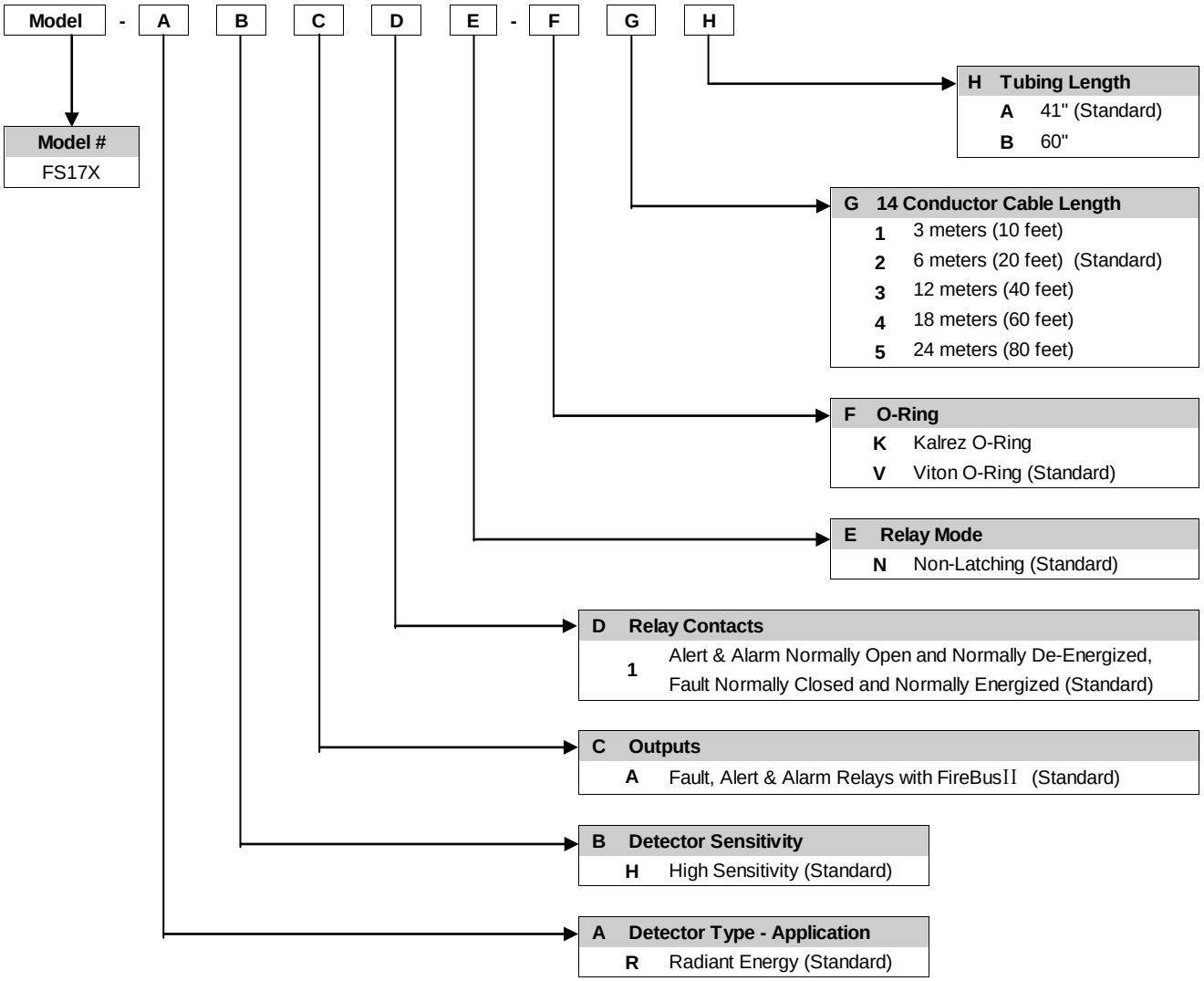
4.2 Product Variations

All options for the FS17X must be specified on the customer's purchase order. Here is a list of current ordering options for the Model FS17X™:



Product Variations *(continued)*



4.3 Test Lamps

Some flame detector manufacturers claim that their Detectors do not need remote testing with an external Test Lamp because their Detectors test themselves. Even though Honeywell Analytics Detectors also test themselves, FSC, in compliance with NFPA 72 codes, has developed portable test lamps for periodical "end-to-end" testing of their Detectors remotely. Some of the most important functions of the remote test lamp are to ensure:

- The Detector's optical path is not blocked.
- The Detector is aimed properly at the fire threat area (that the Detector mounting bracket didn't move or was accidentally bumped by someone).
- The Detectors alarming circuitry and outputs (i.e. relays, 4-to-20 mA, etc.) function properly.

Internal Detector testing and window lens cleanliness testing cannot insure the Detector is aimed properly, that its view of the fire scene has not been blocked by something such as a newly installed pipe or duct, storage box, parked vehicle, etc., and its ALARM outputs are functioning properly. *(see Note in Section 2.4)*

For calibrated testing, in compliance with NFPA 72 Codes for flame detectors, as manufacturers of the FSX product line, our calibrated testing using our TL-2055X Test Lamp is as follows. If the FS17X set at Highest Sensitivity ALARMS to a fully charged TL-2055X Test Lamp at a distance between 1 and 25 feet, then the FS17X is in normal operating condition.

TL-1055X is a general purpose NEMA 1 light weight hand-held portable rechargeable Test Lamp designed for testing the FSX™ Detectors externally. The hand held Test Lamp (*see Figure 4-1*) comes with a Universal Charger (110 VAC and 220 VAC).

Figure 4-1
TL-1055X Hand Held Test Lamp (NEMA 1)

TL-2055X is a Class I, Div. 1 approved Explosion-Proof light weight hand-held portable rechargeable Test Lamp designed for testing the FSX™ Detectors externally, in a hazardous location. The hand held Test Lamp (*see Figure 4-2*) comes with a Universal Charger (110 VAC and 220 VAC).

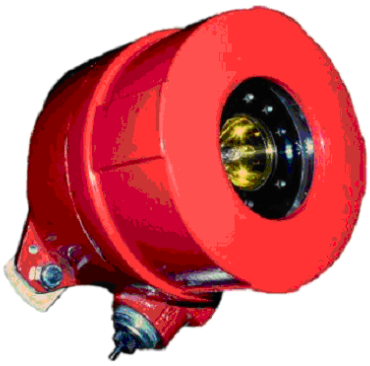


Figure 4-2
TL-2055X Hand Held Test Lamp (Class I, Division 1)

4.4 Drawings

4.4.1 Outline and Dimensions

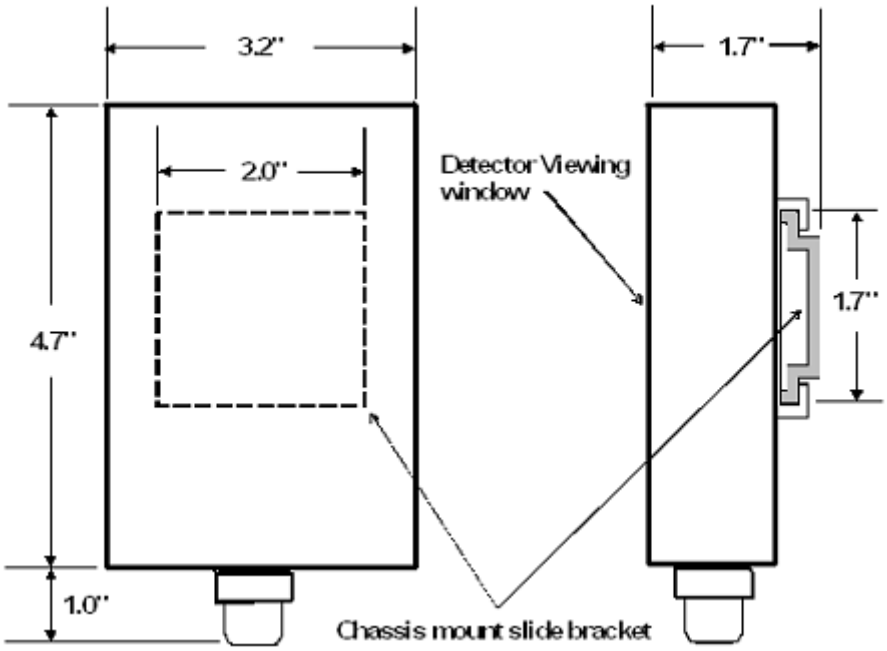


Figure 4-3
Outline & Dimesional Drawing for Model **FS17X**

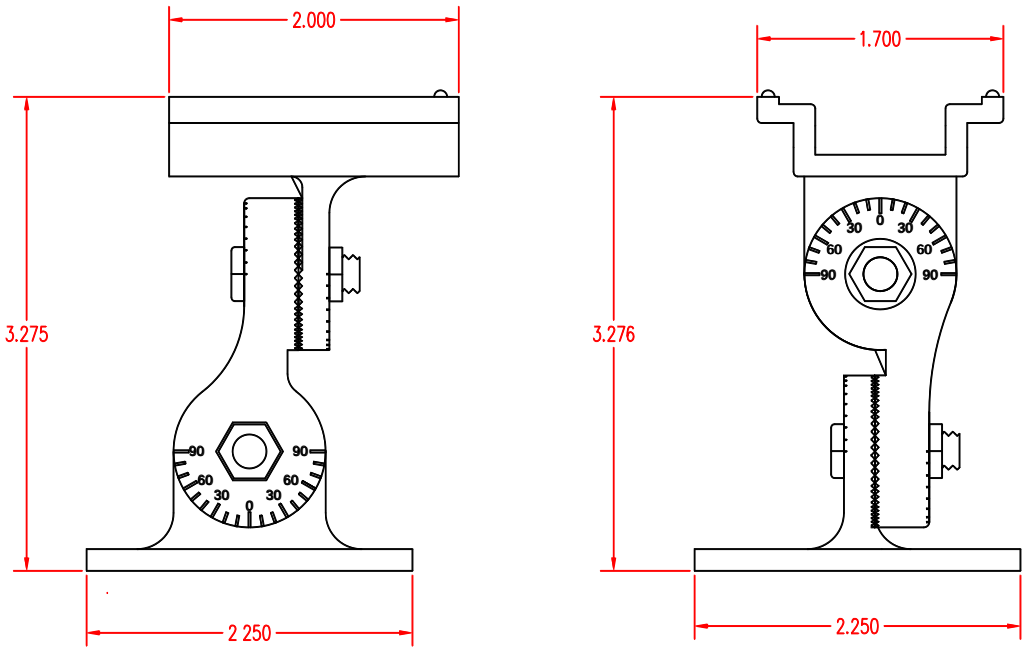


Figure 4-4
Outline & Dimesional Drawing for **SM17** Swivel Mount

Drawings *(continued)*

4.4.2 Wiring and Terminal Connections

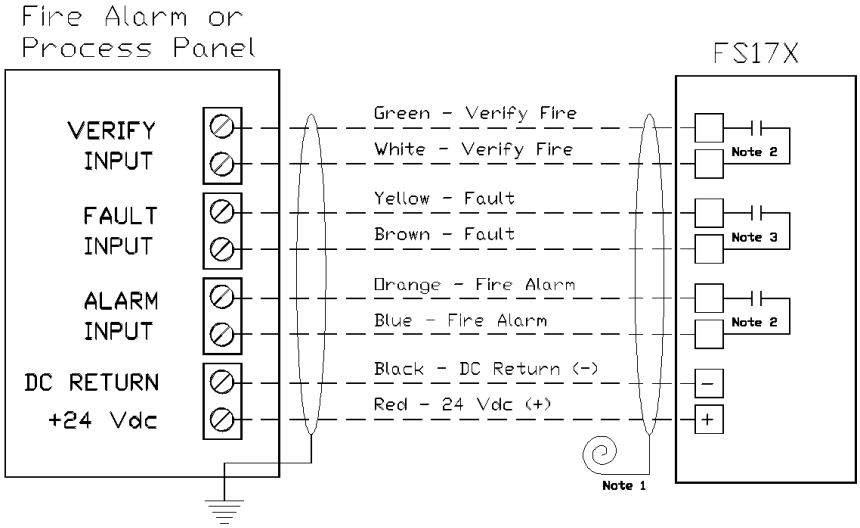


Figure 4-5 Typical Wiring for Fault / ALARM / Fire Verify Relays
(FS17X-G□2□□-C□□, FS17X-G□2□□-Z□□, FS17X-G□3□□-C□□, **or** FS17X-G□3□□-Z□□)

NOTES:

1. Cable shield must be grounded at one end only, at the Control Panel. Coil and tape cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the N.O. (Normally Open) contacts will close.

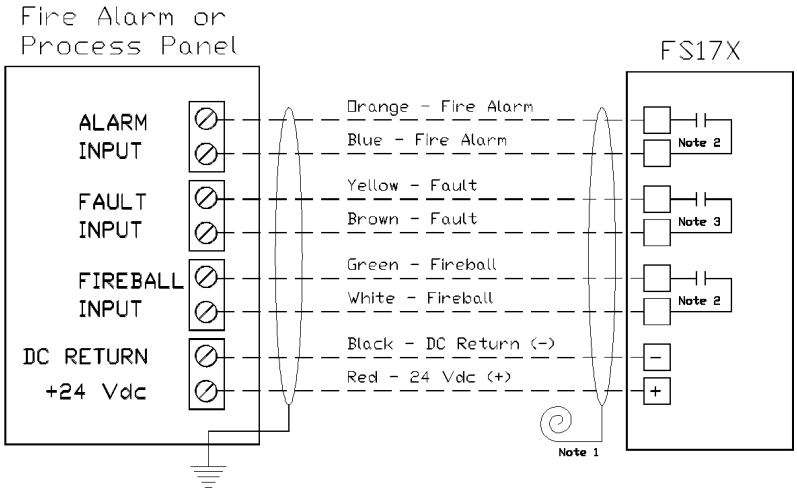


Figure 4-6 Typical Wiring for Fault / Fireball / ALARM Relays
(FS17X-G□6□□-C□□, FS17X-G□6□□-Z□□, FS17X-S□A□□-C□□, **or** FS17X-S□A□□-Z□□)

NOTES:

1. Cable shield must be grounded at one end only, at the Control Panel. Coil and tape cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.

Drawings *(continued)*

Wiring and Terminal Connections (*continued*)

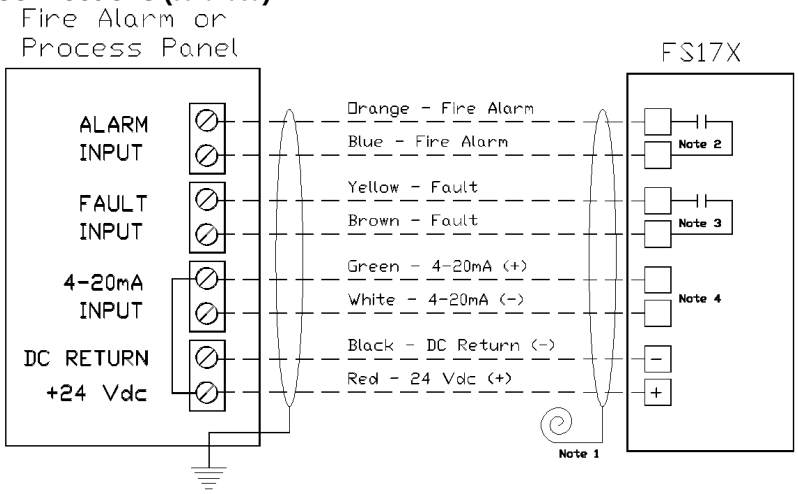


Figure 4-7 Typical Wiring for 4-20mA (current sinking) Analog Output and Fault / ALARM Relays
(FS17X-G□4□□-C□□ **or** FS17X-G□4□□-Z□□)

NOTES:

1. Cable shield must be grounded at one end only, at the Control Panel. Coil and tape cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.
4. At the Fire Alarm or Process Panel connect a jumper between +24 Vdc Supply and 4-20mA (+).

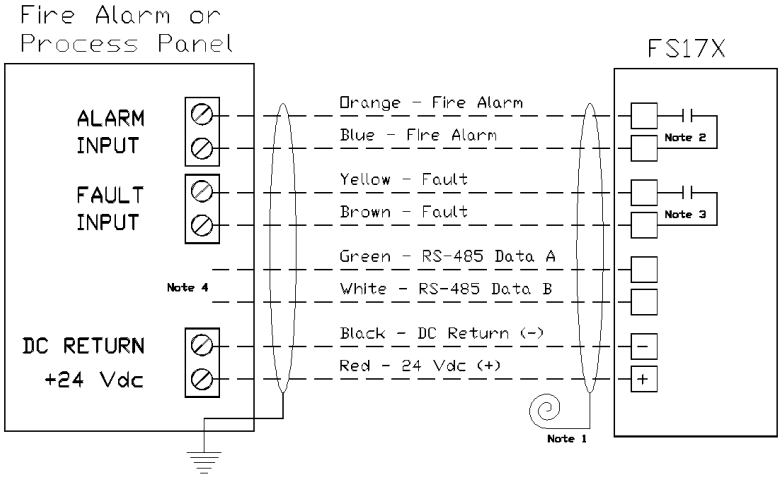


Figure 4-8 Typical Relay Output Wiring for Monitoring RS-485, ALARM and Fault Contacts
(FS17X-G□1□□-C□□, FS17X-G□1□□-Z□□, FS17X-S□B□□-C□□, **or** FS17X-S□B□□-Z□□)

NOTES:

1. Cable shield must be grounded to "Earth Ground" at the Control Panel end only. Coil and tape the cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.
4. **EOL** (**E**nd-**O**f-**L**ine) device shall be installed as required and supplied by the Fire Alarm Panel.

Drawings *(continued)*

Wiring and Terminal Connections (*continued*)

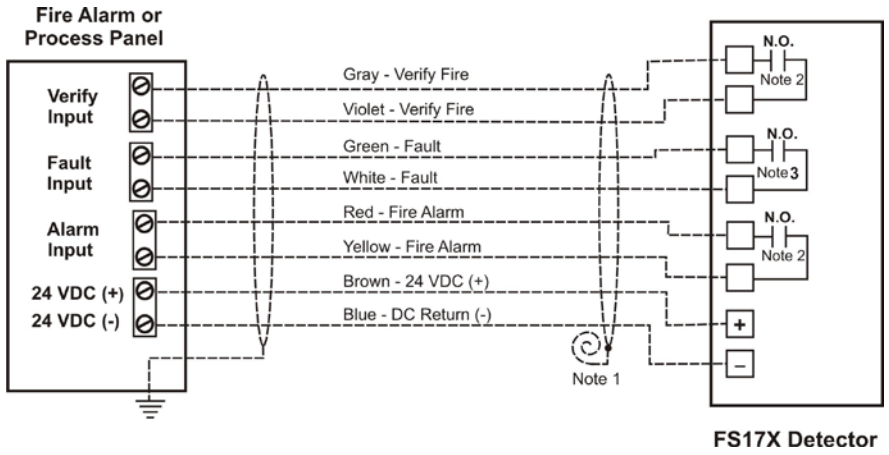


Figure 4-9 Typical Wiring for Fault / ALARM / Fire Verify Relays
(FS17X-G□2□□-P□□ **or** FS17X-G□3□□-P□□)

NOTES:

1. Cable shield must be grounded at one end only, at the Control Panel. Coil and tape cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.

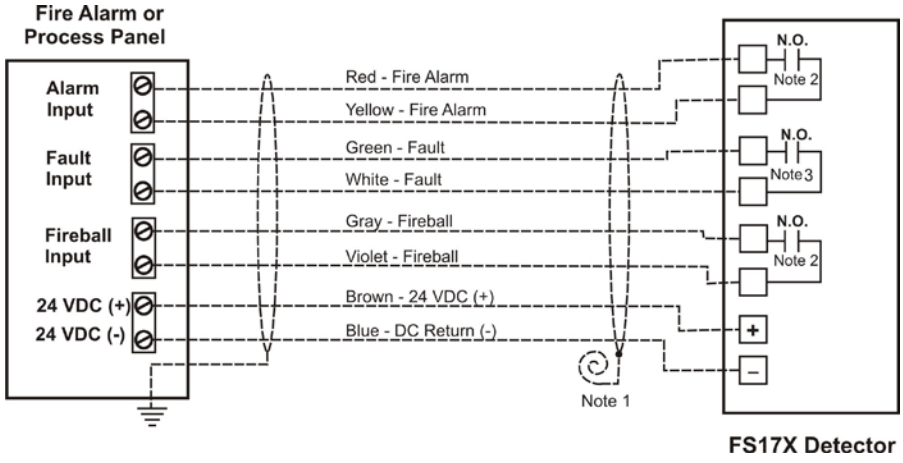


Figure 4-10 Typical Wiring for Fault / Fireball / ALARM Relays
(FS17X-G□6□□-P□□ **or** FS17X-S□A□□-P□□)

NOTES:

1. Cable shield must be grounded at one end only, at the Control Panel. Coil and tape cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.

Drawings *(continued)*

Wiring and Terminal Connections (*continued*)

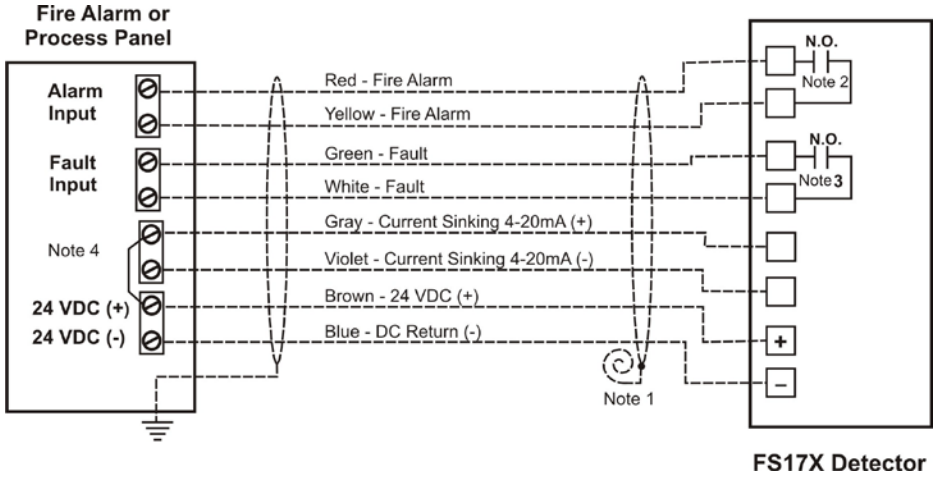


Figure 4-11 Typical Wiring for 4-20mA (current sinking) Analog Output and Fault / ALARM Relays (FS17X-G□4□□-P□□)

NOTES:

1. Cable shield must be grounded at one end only, at the Control Panel. Coil and tape cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.
4. At the Fire Alarm or Process Panel connect a jumper between +24 Vdc Supply and 4-20mA (+).

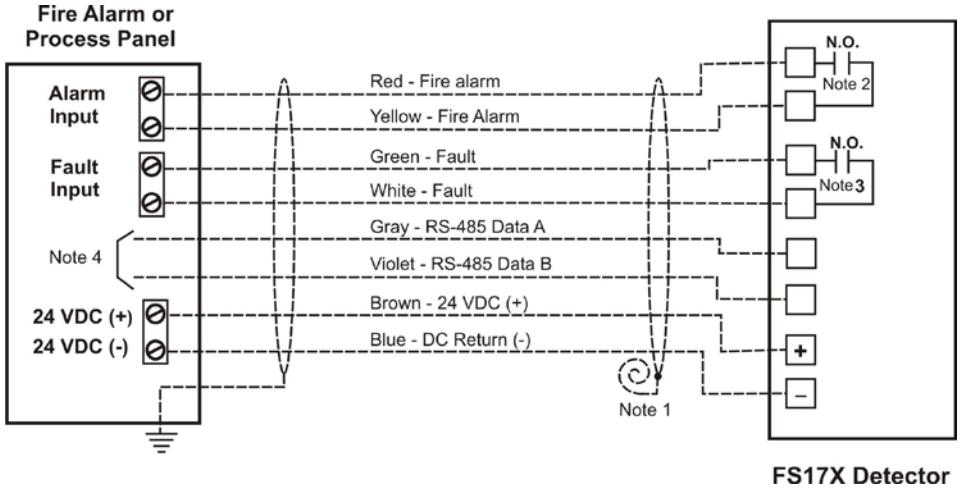


Figure 4-12 Typical Relay Output Wiring for Monitoring RS-485, ALARM and Fault Contacts (FS17X-G□1□□-P□□ **or** FS17X-S□B□□-P□□)

NOTES:

1. Cable shield must be grounded to "Earth Ground" at the Control Panel end only. Coil and tape the cable shield at the Detector end.
2. ALARM relay contacts shown with no power applied. ALARM relay is normally De-Energized during normal operation and with no ALARM. This relay will Energize during ALARM conditions.
3. Fault relay contacts shown with no electrical power applied. During normal operation and with no Fault, this relay will De-Energize and the **N**.**O**. (**N**ormally **O**pen) contacts will close.
4. **EOL** (**E**nd-**O**f-**L**ine) device shall be installed as required and supplied by the Fire Alarm Panel.

5. Drawings *(continued)*

Wiring and Terminal Connections *(continued)*

14 Conductor Color Code	Connection Description
Black	24 V Return (-) Supply
Red	+24 VDC Supply
Green	FireBusII / RS-485 Digital Data A Signal
White	FireBusII / RS-485 Digital Data B Signal
Gray	Fault Relay Terminal A contact to B during Normal Operation
Purple	Fault Relay Terminal B contact to A during Normal Operation
Brown	Fire Alarm Relay Terminal A
Blue	Fire Alarm Relay Terminal B
Brown with White Stripe	Fire Alarm Relay Terminal A Loop-Through
Blue with White Stripe	Fire Alarm Relay Terminal B Loop-Through
Yellow	Fire Alert Relay Terminal A
Orange	Fire Alert Relay Terminal B
Yellow with Black Stripe	Fire Alert Relay Terminal A Loop-Through
Orange with Black Stripe	Fire Alert Relay Terminal B Loop-Through

Figure 4-13
FS17X-RHA1N-□□□

4.4.3 Detector Label Drawings

Figure 4-14
Model FS17X Detector Label

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These Honeywell websites may be of interest to Industry Solution customers.

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Honeywell Analytics	www.honeywellanalytics.com

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Contact us by telephone at these numbers.

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