Installation Guide and Operating Manual

Honeywell

Fire Sentry FS7-2173-2RP Fire Detector

**Stand-Alone, Leak-Proof, Digital, Electro-Optical
With 20-foot Pigtail Cable**

TABLE OF CONTENTS

APPROVALS

FS System 7 has been manufactured in compliance with the requirements of the ISO-9001 standard and has been approved by:

- Factory Mutual (FM)
- CE Compliant

SECTION 1: INTRODUCTION

1.1 FS7-2173-2RP Overview

The Leak-Proof, Stand-alone, Digital, Electro-Optical FS7-2173-2RP Fire Detector, with Pigtailed Cable, is specifically designed for use for installation within wet benches and other equipment containing combustible materials in semiconductor manufacturing clean room environment. The Alert criteria are programmed for a 3 kW and Alarm criteria are programmed for 13 kW polypropylene pool fire. The Detector Housing is rated IP67, dust tight, and watertight to 1 meter.

1.2 Electro-Optical Fire Detector

The FS7-2173-2RP Detector contains a multi-spectral sensor array consisting of Wide Band IR™, Near Band IR™, and Visible Band™ sensors. The Detector is designed to see all types of hydrocarbon and non-hydrocarbon fires, including polypropylene and IPA fires. The Detector is able to see a one square foot heptane fire at half the stated sensitivity when the fire is 60 degrees off-axis. The Detector's microcomputer, with digital signal processing algorithms, continuously monitors its circuitry and verifies proper operation. When a fire is detected, the ALERT relay is activated at 3 kW and Alarm at a 13 kW polypropylene pool fire criteria. The Detector has a non-latching relay and <u>automatically</u> resets the Fire Signal Relays after 5 seconds, once the fire self-extinguishes or is discharged.

The Detector electronic printed circuit board is housed in a polypropylene water- and acid- leak-proof heat-sealed enclosure.

1.2.1 FirePic™

FirePic™ provides digital spectral data information facilitating analysis of the probable fire cause. This Feature may be used to prevent a subsequent, potentially damaging fires from occurring. FirePic will store 6 fire events in the non-volatile digital memory, 8 seconds of pre-fire, actual Detector sensor spectral data, and the time and date for each event. The stored data includes a graphical display of the relative spectral intensities versus time preceding and during the fire event.

Note: Use the optional FS7-Interface Unit and appropriate PC software to obtain all FirePic's.

1.2.2 Event Log

The FS-2173-2RP Detector maintains an internal history Log (Event Log) of up to 200 events (Fires, Faults, Resets, etc.). The Event Log can be accessed using an FS7-Interface Unit with a minimum 486 type PC and appropriate PC Software.

Figure 1: Detector Housing Dimensions

3.2"

1.7"

2.0"

Detector Viewing window

4.7"

1.7"

1.0"

Chassis mount slide bracket
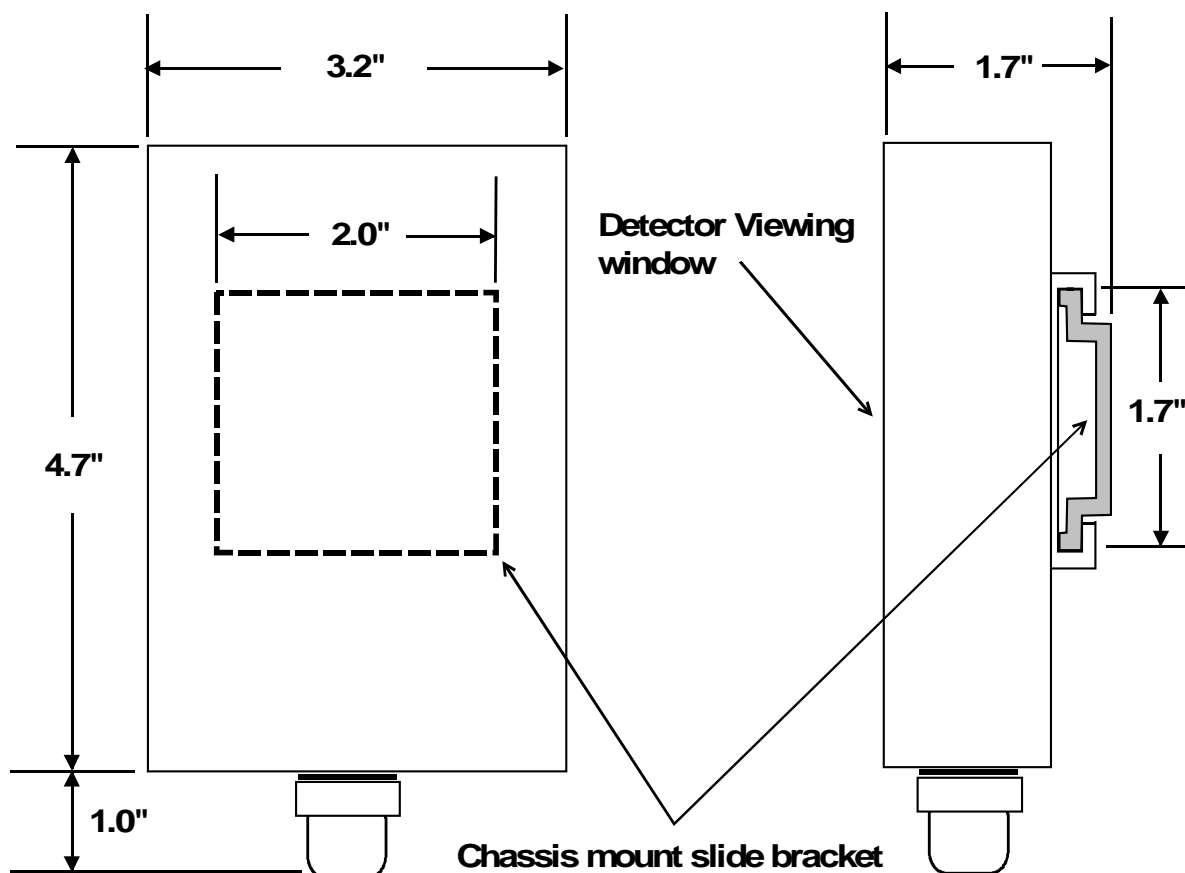
SECTION 2: INSTALLATION

2.1 Wiring Requirements

Input Electrical Power is 24 VDC at 50 mA.

Refer to Section 5, Table 1, for wiring details.

Warning:
to Power Detector, apply <u>24 Volt DC +/- 20%</u> ONLY

2.2 Detector Installation

2.2.1 MOUNTING BRACKET LOCATION

a. The Fire Detector has a 120-degree conical Field-of-View (viewing angle). It is recommended the Detector be positioned with the primary fire threat location along in the axis of the Detector's Field-of-View. Since the Detector must "see" the fire in order to detect it, it should be installed in locations, such as corners and ceilings, to avoid line-of-sight blockage.

b. Choose a fastening method which will secure it solidly to the type of material at the enclosure location. For example, custom holes may be drilled in the mounting bracket and attached with screws, rivets, etc. If the mounting surface is polypropylene, heat welding may be used to secure the bracket.

c. Slide the Detector enclosure onto the mounting bracket until it locks into place.

2.2.2 DETECTOR WIRING

Connect each Detector "pigtail" wire lead to the appropriate connection of external equipment. Refer to Section 6, Table 1, for wiring details.

> **CAUTION: Follow static protection procedures while handling the pigtail wiring of the Detector. The proper use of a wrist strap connected to earth ground will help prevent product damage.**

SECTION 3: DETECTOR OPERATION

3.1 Detector Operation

3.1.1 Normal Operation mode

The FS7-2173-2RP Fire Detector is ready to detect fires within 10-15 seconds of applying the 24 VDC Power. The internal LED will blink ON once every 10 seconds to indicate the device is in the Normal Operation mode. In this mode the Detector can report Faults, should any occur. (See Section 4.2 for Fault codes).

Note: The LED will double blink when communicating with a PC or Control Panel.

3.1.2 Fault Condition

During a Fault condition, the Detector will:

- Blink its LED every 10 seconds with a Fault code. Refer to Section 4.1.
- Record the Fault in the Event History file.
- De-energize its Fault relay (opening the relay contacts). Where possible, this condition is self-resetting; i.e. if the action causing the Fault is remedied, then the Detector will stop reporting a Fault and return to Normal Operation.

3.1.3 Detector Self-Test

The Detector automatically performs an internal Self-Test every 10 minutes to check the integrity of operation. The Detector is still fully functional and able to Alert/Alarm to a fire or Fault while Self-tests are occurring.

3.1.4 Manual Detector Test

> **WARNING**: **DISABLE RESPONSES TO DETECTOR OUTPUTS TO AVOID ACTIVATING EXTERNAL ALARMS AND / OR SUPPRESSION SYSTEMS DURING MANUAL TESTING.**

The Detector may be tested "end-to-end" using an FSC remote Handheld Test Lamp.

Note: Use Model FT-S7 (short range) or FS-746 (long range) Test Lamp for Detector Fire Simulation. Refer to Section 6 for Ordering Information.

SECTION 4: MAINTENANCE AND REPLACEMENT

4.1 Detector Faults

Fault CONDITION	ACTION
Power Fault	LED is OFF. No power is available at the Detector. Check wiring for broken or crimped cables or loose terminations.
Self-Test Fault	The Detector LED blinks 3 times each 10 seconds. Flame Detector "Sensor Integrity" test failure. No user serviceable repair. Return to Fire Sentry for service.
Leak Detection Fault	The Detector LED blinks 4 times each 10 seconds. The fault occurs due to a leak within the detector housing. Return the Detector to Fire Sentry for service.
High Temperature Fault	The Detector LED blinks 5 times each 10 seconds. Return the Detector to Fire Sentry for service.
Memory Corruption	The Detector LED blinks 6 times each 10 seconds. Return the Detector to Fire Sentry for service.

4.2 Routine Maintenance and Calibration

The Detector has no calibration requirements or field calibration options. It is recommended to test the Detector according to a periodic scheduled. When operated in a clean room environment, the window viewing area is expected to remain clean. This would be verified as part of a routine test with a Fire Sentry Test Lamp hand-held tester. If cleaning is required, the Detector's viewing area may be cleaned with Isopropyl alcohol.

4.3 Detector Replacement

1. Disable 24 VDC power to the Detector.
2. Disconnect the Detector's pigtailed wires.
3. Make sure there is enough cable slack for removing the Detector.
3. Carefully slide the Detector off the mounting bracket.
4. Install another Detector in reverse order.

THERE ARE <u>NO</u> USER SERVICEABLE PARTS. EVIDENCE OF TAMPERING OF <u>ANY</u> <u>KIND</u> BY NON-FACTORY PERSONNEL SUCH AS, PRYING OPEN THE DETECTOR HOUSING, OR ATTEMPTED REPAIRS WILL VOID ALL WARRANTIES.

A Detector *must* be packaged in static protective material for return. If this material is not available, carefully wrap the Detector and harness within aluminum foil. Before shipping the Detector back to the factory, contact FSC Customer Service for a *required* Return Material Authorization (RMA).

4.4 Enclosure Fitting Torque

The proper torque of the housing Teflon tube fitting maintains the enclosure Leak-proof integrity. If the fitting components become loose for any reason, re-torque according to the parameters shown in Figure 2.

Figure 2

Enclosure fitting
12 in lb +2 / -1

Ferrule nut
8 in lb +2 / -1

"O" ring seal
(reference)
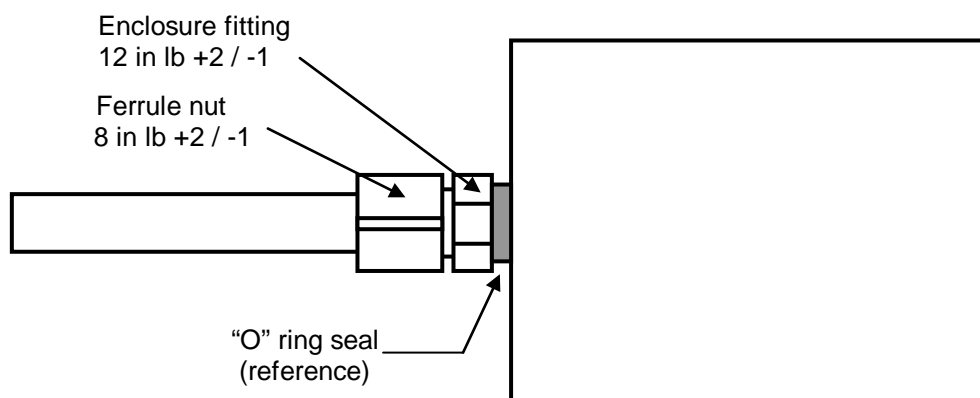
SECTION 5: DETECTOR CABLE WIRING

Table 1: Pigtail Wiring Data

Wire Number	Wire Color	Description
1	BLACK	24 V Return (-) Supply
4	RED	+ 24 VDC Supply
2	GREEN	FireBus RS-485 Digital Data A Signal
3	WHITE	FireBus RS-485 Digital Data B Signal
5	GRAY	Fault Relay Terminal A, Contact to B during Normal Operation
6	PURPLE	Fault Relay Terminal B, Contact to A during Normal Operation
7	BROWN	Fire ALARM Relay Terminal A
9	BLUE	Fire ALARM Relay Terminal B
8	BROWN / WHITE	Fire ALARM Relay Terminal A loop-through
10	BLUE / WHITE	Fire ALARM Relay Terminal B loop-through
11	YELLOW	Fire ALERT Relay Terminal A
13	ORANGE	Fire ALERT Relay Terminal B
12	YELLOW / BLACK	Fire ALERT Relay Terminal A loop-through
14	ORANGE / BLACK	Fire ALERT Relay Terminal B loop-through
None	Non-isulated Wire	Cable shield – To be terminated at the Fire Alarm Panel Chassis Ground.

Note: The Fire ALERT and ALARM relay loop-through contacts may be used for End-of-Line

(EOL) resistors for supervision of contact wiring.

Warrantee

The Control Panel is warranted for two years against defects in materials and Workmanship.

SECTION 6: ORDERING INFORMATION

DESCRIPTION	PART NUMBER
FS7-2173-2RP Fire Detector: The Stand-alone FS7 Electro-Optical Fire Detector for wet benches with Wide Band Infrared Spectral Sensor Array; operating temperature range is 0 to +70 ºC (+ 32ºF to +158ºF) The standard cable length is ten (10) feet. Cable lengths up to 100 foot maximum can be ordered in 5-foot increments at additional cost.	**FS7-2173-2RP**
FS7-2173 Detector Long-Range Test Lamp: Self-contained, handheld, battery operated Test Lamp to verify the FS7-2173-2RP Detector operation "end-to-end" without test fires. Use to test FS7 Detectors at up to a distance of 10 feet.	**FS-746**
FS7-2173 Detector Short Range Test Lamp: Small, handheld self-contained, battery operated Detector Test Lamp to verify the FS7-2173-2RP Detector operation "end-to-end" without test fires. An AC/DC wall transformer is included for recharging the battery. Use to test FS7 Detectors at up to a distance of 2 feet.	**FT-S7**
FS7-2173-2RP Interface Kit: Complete with RS 485/RS-232 Interface Box, cable, PC software and charger. Used for accessing Firepic and Event Log	**FS7-Interface**

INDEX

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13115