Honeywell

THE POWER OF **CONNECTED**

Installation Guide and Operating Manual

Flame Detector with Pigtail Cable, Models

FS7-2173-2RP, -2RPC, -2RPT15, -2RPK, -2RPC-K, and 2RPC-KZ

Stand-alone, Leak-proof, Digital, Electro-optical Semiconductor Fabrication Clean Room Specialized Fire Detection Applications Including Wet Benches

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The detector must be installed only by qualified professional personnel in accordance with local codes.

The protection provided by the gas detector may be impaired if it is used in a manner not specified by Honeywell Analytics.

Honeywell Analytics

Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	**ATTENTION:** Identifies information that requires special consideration.
	**TIP:** Identifies advice or hints for the user, often in terms of performing a task.
	**REFERENCE-EXTERNAL:** Identifies an additional source of information outside of this manual.
	**REFERENCE-INTERNAL:** Identifies an additional source of information within this manual.
⚠**CAUTION**	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. **CAUTION:** Symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.

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APPROVALS

This detector has been manufactured in compliance with the requirements of the ISO-9001 standard and has been approved by:

- **California State Fire Marshal (CSFM)**
- **Factory Mutual (FM)**

Restricted Materials Table for China RoHS

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB 板	X	0	0	0	0	0
感光探测器	X	0	0	0	0	0

本表格中未列出的所有部件和配件包含的有害物质都没有超过 GB/T 26572 所要求的限制。

本表格依据 SJ/T 11364 的规定编制

O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26752 规定的限量要求以下。

×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 规定的限量要求。

2004Y2004C_1 A0xxxx Pb PCB Pb Det 27 Apr 16

SECTION 1: INTRODUCTION

1.1 Overview

The leakproof, stand-alone, digital, electro-optical FS7-2173-2RP flame detector, with pigtailed cable, is designed for installation within wet benches and other equipment containing combustible materials in semiconductor manufacturing clean room environment. The alert criteria are programmed for a 3.9 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.

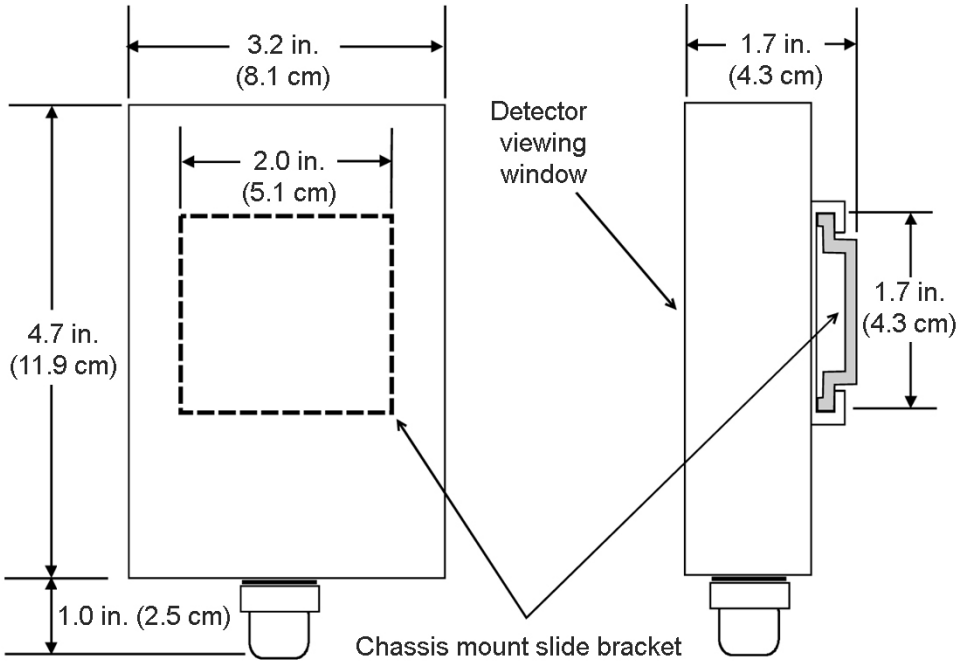

Figure 1: Detector Housing Dimensions

1.1.1 Model Number Descriptions

Model Number		Input Voltage		O-Ring		Sensitivity		Relays			Cable (ft)	Teflon Sleeve (in)
Prefix	Suffix	12 Vdc	24 Vdc	Viton	Kalrez	Standard	Low	Fault	Alert	Alarm		
FS7-2173	-2RP		●	●		●		●	●	●	20	41
	-2RPK		●		●	●		●	●	●	20	41
	-2RPT15		●	●		●		●	●	●	20	180
	-2RPC		●	●			●	●	●	●	20	41
	-2RPC-KZ		●		●		●	●	●	●	20	41

1.2 Electro-Optical Flame 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 3.9 kW and alarm at a 13 kW polypropylene pool fire criteria. The detector has a non-latching relay and automatically resets the fire signal relays after 5 seconds, once the fire self-extinguishes or is discharged.

The detector's printed circuit board is housed in a polypropylene water- and acid-proof (leakproof) heat-sealed (IP67) enclosure.

1.2.1 FirePic™

The FirePic™ feature 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: The detector must be returned to Honeywell Analytics for FirePic data to be downloaded.

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.

NOTE: The detector must be returned to Honeywell Analytics for Event Log data to be downloaded.

SECTION 2: INSTALLATION

2.1 Wiring Requirements

The input electrical power is 24 VDC at 50 mA.

Refer to section 5, table 1 for wiring details.

2.2 Detector Installation

2.2.1 MOUNTING BRACKET LOCATION

a. The detector has a 120-degree conical Field-of-View (viewing angle). It is recommended that 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 the detector 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 enclosure onto the mounting bracket until it locks into place.

2.2.2 DETECTOR WIRING

Connect each "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 detector is ready to detect fires within 15 seconds of applying the 24 VDC Power. The LED will blink once every 10 seconds to indicate that the device is in normal operation mode. In this mode the detector can report faults if 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 ten 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 a Honeywell Analytics remote Handheld Test Lamp.

NOTE: Use Model FT-S7 (short range) or FS-746-B (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 LED blinks 3 times every 10 seconds. Flame detector “Sensor Integrity” test failure. No user serviceable repair. Return to Honeywell Analytics for service.
Leak Detection Fault	The detector LED blinks 4 times every 10 seconds. The fault occurs due to a leak within the detector housing. Return the detector to Honeywell Analytics for service.
High Temperature Fault	The detector LED blinks 5 times every 10 seconds. Return the detector to Honeywell Analytics for service.
Memory Corruption	The detector LED blinks 6 times every 10 seconds. Return the detector to Honeywell Analytics for service.

4.2 Routine Maintenance and Calibration

The detector has no calibration requirements or field calibration options. Test it according to a periodic schedule. 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 Honeywell Analytics test lamp handheld 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.
4. Carefully slide the detector off the mounting bracket.
5. Install another detector in reverse order.

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

A detector should be packaged in static protective material for return. If this material is not available, carefully wrap the detector and harness in aluminum foil. Before returning it to the factory, contact Honeywell Analytics 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 leakproof integrity. If the fitting components become loose for any reason, re-torque according to the parameters shown in Figure 2.

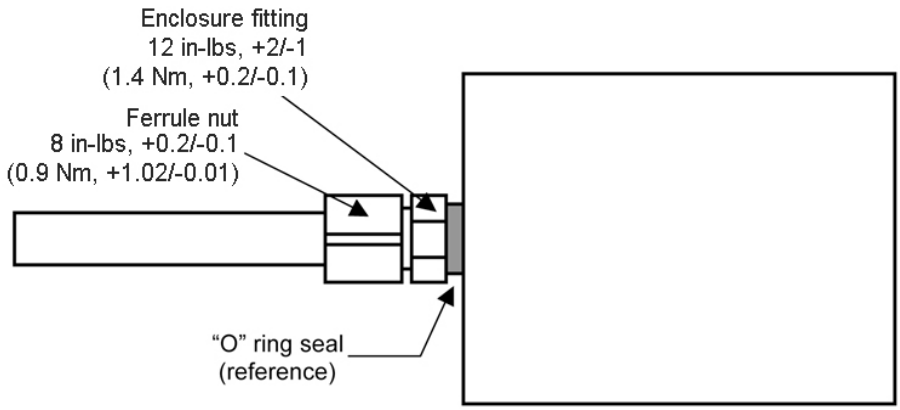

Figure 2

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-insulated 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.

SECTION 6: ORDERING INFORMATION

Part Number	Description
FS7-2173-2RP	**FS7-2173-2RP Flame Detector:** The standalone FS7 electro-optical flame detector for wet benches with Standard Wide Band Infrared Spectral Sensor Array; operating temperature range is 0 to +70°C (+32°F to +158°F). The standard cable length is 20 feet with a 41-inch Teflon sleeve; fault, alert, and alarm relays; and a Viton O-ring.
FS7-2173-2RPT15	**FS7-2173-2RPT15 Flame Detector:** The standalone FS7 electro-optical flame detector for wet benches with Standard Wide Band Infrared Spectral Sensor Array; operating temperature range is 0 to +70°C (+32°F to +158°F). The cable length is 20 feet with a 180-inch (15-foot) Teflon sleeve; fault, alert, and alarm relays; and a Viton O-ring.
FS7-2173-2RPK	**FS7-2173-2RPK Flame Detector:** The standalone FS7 electro-optical flame detector for wet benches with Standard Wide Band Infrared Spectral Sensor Array; operating temperature range is 0 to +70°C (+32°F to +158°F). The standard cable length is 20 feet with a 41-inch Teflon sleeve; fault, alert, and alarm relays; and a Kalrez O-ring.
FS7-2173-2RPC	**FS7-2173-2RPC Flame Detector:** The standalone FS7 electro-optical flame detector for wet benches with a Low Sensitivity Wide Band Infrared Spectral Sensor Array; operating temperature range is 0 to +70°C (+32°F to +158°F). The standard cable length is 20 feet with a 41-inch Teflon sleeve; fault, alert, and alarm relays; and a Viton O-ring.
FS7-2173-2RPC-KZ	**FS7-2173-2RPC-KZ Flame Detector:** The standalone FS7 electro-optical flame detector for wet benches with a Low Sensitivity Wide Band Infrared Spectral Sensor Array; operating temperature range is 0 to +70°C (+32°F to +158°F). The standard cable length is 20 feet with a 41-inch Teflon sleeve; fault, alert, and alarm relays; and a Kalrez O-ring.
FS-746-B	**FS7-2173 Detector Long-Range Test Lamp:** Self-contained, handheld, battery-operated test lamp to verify model FS7-2173-RP detector operation “end-to-end” without test fires. Use to test FS7 detectors at a distance of up to 10 feet.
FT-S7	**FS7-2173 Detector Short Range Test Lamp:** Small, handheld self-contained, battery-operated detector test lamp to verify model FS7-2173-RP 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 a distance of up to 2 feet.

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Honeywell Analytics warrants its Products against defects in material and workmanship under normal use and service for a period of two 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.

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2. Defects or damage from misuse, accident, or neglect.

3. Defects or damage from improper testing, operation, maintenance, installation, alteration, modification or adjustment.

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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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