

Rosemount™ 975 Flame Detector



The Rosemount 975 flame detector utilizes proven technologies, including QuadSense™ triple infrared (IR3) and ultraviolet infrared (UV/IR), to provide the fastest response to fire, the longest distance detection, superior immunity to false alarms, and unparalleled reliability and durability even in harsh conditions.

Detection performance can be easily adapted to all environments, applications, and requirements, by changing the detector's configuration parameters. Adjusting these parameters, as well as performing other maintenance and monitoring tasks, is possible by means of RS-485-based Modbus® communication or HART® communication.

Introduction

Rosemount 975 with QuadSense™ triple infrared (IR3) technology

The Rosemount 975 with QuadSense technology provides superior detection range and reliability and is the best choice for detecting hydrocarbon and Hydrogen⁽¹⁾ based fires in most industrial and commercial applications.

Rosemount 975 ultraviolet infrared (UV/IR) technology

The Rosemount 975 Ultra-Fast UV/IR Flame Detector can detect fire in under 20 milliseconds and features a unique dual sensor with selectable UV and IR channels that can be used separately or combined. The detector is designed to detect a range of fires, such as hydrocarbon-based fuel and gas, hydroxyl, hydrogen, metal, and inorganic.

Features and benefits

- Superior detection range of hydrocarbon-based fuel and gas fires at up to 300 ft. (90 m)
- Extended detection range more than doubles detection coverage
- Ultra-fast detection, high-speed response under 50 ms
- Proven false alarm immunity
- Unparalleled reliability—150,000 hours Mean Time Between Failures (MTBF)
- Best in class temperature range: -76 to +185 °F (-60 to +85 °C)
- Enhanced durability backed up by a five-year warranty
- Smart field of view integrity test, allowing flawless operation
- Innovative infrared built-in test—continuously validating the optical integrity and the electronic circuitry
- Multiple output options for maximum compatibility with standard infrastructures
- Plug and play – factory calibrated for immediate use in any fire detection system
- Universal wiring option for a fast-ordering process
- Two-mode heated optics for impeccable performance in challenging environmental conditions
- Worldwide and regionally certified for hazardous areas
- Performance and reliability approved by recognizable certification bodies
- SIL3 compatible
- Internal log event recorder to analyze past events

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(1) Hydrogen fire detection is only on 975HR (QuadSense) or 975UF (UV/IR) options.

Applications

- Oil and gas onshore and offshore installations and pipelines
- Chemical and petrochemical plants
- Storage tank farms
- Fuel and gas processing and storage facilities
- Power generation facilities
- Explosives and munitions
- Fertilizer plants
- Automotive industry
- Vehicle battery charging stations
- Hydroxyl production and storage
- Aerospace industry
- Waste management facilities
- Pharmaceutical industry
- Printing
- Warehouses
- Hazardous materials storage areas
- Food processing
- Hydrogenation (petroleum refining, food processing, and chemical)
- Hydrogen fuel cell industry
- Mining

Ordering information

You can order the Rosemount 975 as separate parts: detector (PN 975XXXXXXXXX) and accessories.

Model

Code	Description
975	Rosemount 975 Flame Detector

Measurement type

Code	Description
MR	QuadSense™ triple infrared (IR3)
HR	QuadSense triple infrared (IR3) with Hydrogen fire detection
UF	Ultraviolet infrared (UV/IR) with Hydrogen fire detection

Code	Description
UR	Ultraviolet infrared (UV/IR)

Output

Code	Description
4U	Universal wiring

Housing style

Code	Description
6A	Aluminum: ¾-in. NPT conduit entries
8A	Aluminum: M25 conduit entries
6S	Stainless steel: ¾-in. NPT conduit entries
8S	Stainless steel: M25 conduit entries

Temperature rating

Code	Description
3	-76 to +185 °F (-60 to +85 °C)

Product certifications

Code	Description
A1	ATEX/IECEX/UKCA Flameproof
A2	USA and Canada Explosion-Proof ⁽¹⁾
E2	INMETRO Flameproof
E3	China Flameproof and CCCF
EM	Technical Regulations Customs Union (EAC) Flameproof

(1) Aluminum enclosure: FM, FMC; Stainless steel enclosure: FM, FMC, CSA US/C

Tilt mount

Code	Description
Y	Tilt mount
N	No tilt mount

Protective cover

Code	Description
7	ABS plastic
8	Stainless steel 316

Special option (optional)

Code	Description
H	Enhanced hot CO ₂ discrimination

Note

Available for Rosemount 975MR only.

Accessories

Part Number	Description
FS-IR-975	Flame simulator (ex-proof) compatible with 975MR models
FS-UVIR-975	Flame simulator (ex-proof) compatible with 975UF and 975UR models
FS-HR-975	Flame simulator (ex-proof) compatible with 975HR models
877090	Tilt mount
877670	Flame detector duct mount assembly
789260-2	Flame detector pole mount assembly, 2 in.
789260-1	Flame detector pole mount assembly, 3 in.
789260-3	Flame detector pole mount assembly, 4 in.
794079	USB RS-485 harness kit
877650	Flame detector air shield assembly
877263	Protective cover (Plastic)
877163	Protective cover (Stainless steel)
877563	Field of view limiter

Specifications

Table 1: Detection Ranges

At the highest sensitivity setting for 1 ft.² (0.1 m²) pan fire.

Fuel	975MR	975HR	975UF	975UR
Gasoline	300 ft. (90 m)		93 ft. (28 m)	
N-Heptane	300 ft. (90 m)		93 ft. (28 m)	
Diesel fuel	207 ft. (63 m)		70 ft. (21 m)	
Kerosene	207 ft. (63 m)		70 ft. (21 m)	

Table 1: Detection Ranges (continued)

Fuel	975MR	975HR	975UF	975UR
Alcohol 95%	185 ft. (55 m)		57 ft. (17 m)	
Isopropyl alcohol (IPA)	185 ft. (55 m)		70 ft. (21 m)	
Methanol	185 ft. (55 m)		57 ft. (17 m)	
Methane	207 ft. (63 m)		60 ft. (18 m)	
Liquefied petroleum gas (LPG)	207 ft. (63 m)		60 ft. (18 m)	
Polypropylene	160 ft. (49 m)		60 ft. (18 m)	
Paper	112 ft. (34 m)		33 ft. (10 m)	
Hydrogen ⁽¹⁾	N/A	164 ft. (50 m)	70 ft. (21 m)	N/A
Magnesium alloy ⁽²⁾	N/A		33 ft. (10 m)	
Gunpowder ⁽³⁾	197 ft. (60 m)		66 ft. (20 m)	93 ft. (28 m)
Fireworks	33 ft. (10 m)		10 ft. (3 m)	
Cooking oil	207 ft. (63 m)		70 ft. (21 m)	
Mineral oil: 20W-50	207 ft. (63 m)		70 ft. (21 m)	
Wood	112 ft. (34 m)		33 ft. (10 m)	
Ethylene glycol	164 ft. (50 m)		23 ft. (7 m)	
Butyl acrylate	246 ft. (75 m)		70 ft. (21 m)	
Vinyl acetate	246 ft. (75 m)		70 ft. (21 m)	
Flammable adhesive	207 ft. (63 m)		70 ft. (21 m)	
Solvents	246 ft. (75 m)		70 ft. (21 m)	
Oil paint	207 ft. (63 m)		70 ft. (21 m)	
Jet fuel JP5	207 ft. (63 m)		70 ft. (21 m)	
Jet fuel A1	207 ft. (63 m)		70 ft. (21 m)	
Battery ⁽⁴⁾	279 ft. (85 m)		75 ft. (23 m)	
Acetylene	203 ft. (61 m)		60 ft. (18 m)	
Ammonia fire ⁽⁵⁾	N/A	117 ft. (35 m)	30 ft. (9 m)	17.5 ft. (5 m)
Silane fire ⁽⁶⁾	N/A	N/A	67 ft. (20 m)	N/A

(1) 30 in. (0.75 m) high, 10 in. (0.25 m) wide plume fire.

(2) Contact Emerson representative for guidance on detecting magnesium alloy.

(3) 1.5 in. x 1.5 in. (3.8 cm x 3.8 cm) wide, 4 in. (10 cm) tall.

(4) One Lithium-ion battery cell. Height: 2.6 in. (65 mm). Diameter: 0.72 in. (18.4 mm).

(5) Available for Rosemount 975HR, 975UF and 975UR only.

(6) Available for Rosemount 975UF only.

Table 2: General Specifications

	975MR	975HR	975UF	975UR
Spectral response	Four infrared (IR) bands between 4 μm and 5 μm	Four infrared (IR) bands between 2 μm and 5 μm	Ultraviolet: 0.185 to 0.260 μm Infrared: 2.5 to 3.0 μm	Ultraviolet: 0.185 to 0.260 μm Infrared: 4.3 to 4.8 μm

Table 2: General Specifications (continued)

	975MR	975HR	975UF	975UR
Detection response time	- Standard response: Typically < 2 s at 131 ft. (40 m) and 10 s at 300 ft. (90 m) - Ultra-fast response: Typically < 1 s at 100 ft. (30 m) - High-speed response (explosion): 50 ms for 1 ft. (0.3 m) diameter sphere liquefied petroleum gas (LPG)/air mixture explosion at 66 ft. (20 m) via analog voltage output		- Standard response: Typically 5 s at 93 ft. (28 m) - Ultra-fast response: 20 ms for flash fire pan fire from 10 ft. (3 m) distance via analog voltage output - High-speed response (explosion): 50 ms for 1 ft. (0.3 m) diameter sphere liquefied petroleum gas (LPG)-air mixture explosion at 32.8 ft. (10 m) distance via analog voltage output	
Sensitivity ranges	Six sensitivity ranges		Three sensitivity ranges	
Field of view	- Horizontal: 100° - Vertical: 95°	Hydrogen: - Horizontal: 90° - Vertical: 90° For other fuels: - Horizontal: 80° - Vertical: 80°	- Horizontal: 100° - Vertical: 95°	
Coverage area (m ³)	15,762,949 ft. (446,357 m) ⁽¹⁾	11,365,390 ft. (321,832 m) ⁽¹⁾	471,663 ft. (13,356 m) ⁽¹⁾	
Coverage area (m ²)	68,200 ft. (6,336 m) ⁽¹⁾	58,405 ft. (5,426 m) ⁽¹⁾	6,900 ft. (641 m) ⁽¹⁾	
Temperature range	Operating: -76 to +185 °F (-60 to +85 °C) Storage: -76 to +185 °F (-60 to +85 °C)			
Humidity	Non-condensing relative humidity up to 100%			

(1) Gasoline and N-Heptane fuels.

Table 3: Electrical Specifications

Operating voltage	24 Vdc nominal (18 to 32 Vdc)
Cable entries	2 x ¾-in.-14 NPT conduits or 2 x M25 x 1.5 mm ISO
Electrical input protection	According to EN 50130
Electromagnetic compatibility	EMI/RFI protected to EN61000-6-3 and EN 50130 Approved to MIL-STD-461, CS114 conducted susceptibility, 10 kHz – 200 MHz
Electrical interface	The detector includes 17 terminals and one wiring option

Table 4: Typical Power Consumption (24 Vdc)

Mode	975MR, 975HR	975UF, 975UR
Normal power consumption without a heater	60 mA, 1.4 W	100 mA, 2.2 W
Normal power consumption without a heater, with an alarm	100 mA, 2.2 W	120 mA, 2.9 W
Low power mode heater with alarm	140 mA, 3.4 W	180 mA, 4.3 W
Standard power mode heater with alarm	280 mA, 7.6 W	320 mA, 7.7 W

Table 5: Outputs

Relays	Alarm, fault, and auxiliary SPDT volt-free contacts rated 2 A at 30 Vdc
Analog output default ⁽¹⁾	Analog port malfunction: 0 V (< 0.5 V) Normal: 2 V ± 0.3 V Alarm/explosion: 5 V ± 0.3 V
0–20 mA (stepped) default ⁽¹⁾	Fault: 0 ± 1 mA Built-in test (BIT) fault: 2 mA ± 0.3 mA Normal: 4 mA ± 0.3 mA Warning: 16 mA ± 0.3 mA Alarm: 20 mA ± 0.3 mA
HART® protocol	HART communication on the 0–20 analog current (Frequency-Shift Keying [FSK]) used for maintenance, configuration changes, and asset management, available in mA source output wiring options
RS-485	RS-485 Modbus®-compatible communication link that can be used in computer-controlled installations

(1) This output is configurable.

Table 6: Mechanical Specifications

Enclosure options	Electropolished stainless steel 316 Heavy-duty copper-free aluminum (less than 1%), polyurethane painted
Mounting	Electropolished stainless steel 316
Dimensions	Detector: 4 x 4.6 x 6.18 in. (100.6 x 117 x 155 mm)
Weight	Detector stainless steel: 6.3 lb. (2.9 kg) Detector aluminum: 2.8 lb. (1.3 kg) Tilt mount: 2.5 lb. (1.1 kg)
Environmental standards	DNV 2-4
Water and dust	IP66 and IP68 per EN60529 NEMA® 250 6P

Approvals

For approvals information, see [Rosemount 975 Series Certification Information](#).

For more information: [Emerson.com/global](https://emerson.com/global)

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