

# Rosemount™ 975UF Ultra Fast Ultraviolet Infrared Flame Detector



The Rosemount 975UF Ultra Fast Ultraviolet Infrared Flame Detector can detect hydrocarbon-based fuel and gas fires, hydroxyl and hydrogen fires, as well as metal and inorganic fires. This UV/IR flame detector senses radiant energy in the short wave section of both the ultraviolet and infrared portions of the electromagnetic spectrum. The signals from both sensors are analyzed for frequency, intensity and duration. Simultaneous detection of radiant energy in both the UV and IR sensors triggers an alarm signal. The UV sensor incorporates a special logic circuit that helps prevent false alarms caused by solar radiation.

## Features and benefits

- UV/IR Dual-Sensor
- High speed response under 20 msec (Exp./1 sec)
- Solar blind
- Automatic and manual non-radioactive UV built-in test (BIT) to assure continued reliable operation
- Heated window for operation in harsh weather conditions (snow, ice, condensation)
- Relays (3) for Alarm, Fault, and Auxiliary
- Analog output for fast detection
- 0–20 mA (stepped)
- HART® Protocol for maintenance and asset management
- High reliability - MTBF - minimum 150,000 hours
- Designed to meet Safety Integrity Level SIL3 (TÜV)
- Five year warranty
- User programmable via HART 7 or RS-485 Modbus®

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## Applications examples

- Oil and gas: offshore and onshore process facilities and pipelines
- Chemical plants
- Petrochemical plants
- Power generation facilities
- Pharmaceutical industry
- Refinery hydrogenation
- Automotive industry
- Explosives and ammunition manufacturing
- Waste disposal facilities
- Aerospace industry
- Hydrogen fuel cell industry
- Battery charging areas
- Space industry hydroxyl propellant
- Static fuel cell systems

## Ordering information

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



- Longest distance detection
- Ultra fast response to fire
- Widest operation temperature range
- Highest immunity to false alarms

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### Model

| Code | Description                  |
|------|------------------------------|
| 975  | Rosemount 975 Flame Detector |

### Measurement type

| Code | Description                     |
|------|---------------------------------|
| UF   | Ultra Fast Ultraviolet Infrared |

### Output

| Code | Description      |
|------|------------------|
| 4U   | Universal wiring |

### Housing style

| Code | Description                                   |
|------|---|
| 6A   | Aluminum - 3/4-in. NPT conduit entries        |
| 8A   | Aluminum - M25 conduit entries                |
| 6S   | Stainless steel - 3/4-in. NPT conduit entries |
| 8S   | Stainless steel - M25 conduit entries         |

## Temperature rating

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

## Product certifications

| Code | Description   |
|------|---|
| A1   | ATEX/IECEx flameproof   |
| A2   | FM and CSA flameproof   |
| E2   | INMETRO flameproof  |
| EM   | Technical Regulations Customs Union (EAC) flameproof            |
| KZ   | Technical Regulations Customs Union (EAC) Kazakhstan flameproof |

## Tilt mount

| Code | Description   |
|------|---------------|
| Y    | Tilt mount    |
| N    | No tilt mount |

## Rain cover

| Code | Description        |
|------|--------------------|
| 0    | No rain cover      |
| 7    | Plastic rain cover |
| 8    | SST rain cover     |

## Specifications

**Table 1: General Specifications**

|  |  |
|--|--|
| Spectral response  | UV: 0.185–0.260 $\mu\text{m}$ ; IR: 2.5–3.0 $\mu\text{m}$                            |
| Detection ranges (at highest sensitivity setting for 1 ft <sup>2</sup> [0.1 m <sup>2</sup> ] pan fire) | See <a href="#">Table 3</a> .  |
| Sensitivity ranges   | 3 sensitivity ranges for 1 ft <sup>2</sup> (0.1 m <sup>2</sup> ) n-Heptane pan fire  |
| Field of view  | Horizontal: 100°, vertical: 95°  |
| Temperature range  | Operating: -76 to +185 °F (-60 to +85 °C)<br>Storage: -76 to +185 °F (-60 to +85 °C) |
| Humidity   | Up to 95% non-condensing (withstands up to 100% relative humidity for short periods) |

**Table 2: Detection Response Time**

|                                      |   |
|--------------------------------------|---|
| Standard response time               | Typically 5 sec. at 93 ft. (28 m)   |
| Ultra fast response time             | 20 msec for flash fire pan fire from 9.84 ft. (3 m) distance via analog voltage output                            |
| High speed response time (explosion) | 50 msec for 1 ft. (0.30 m) diameter sphere LPG-air mixture explosion at 32.8 ft. (10 m) via analog voltage output |

**Table 3: Detection Range**

| Fuel   | ft/m  |
|--|-------|
| Gasoline (Petrol) <sup>(1)</sup>                               | 93/28 |
| N-Heptane <sup>(1)</sup>                                       | 93/28 |
| Diesel fuel <sup>(1)</sup>                                     | 49/15 |
| Methane  | 26/8  |
| Liquefied petroleum gas (LPG)                                  | 43/13 |
| Kerosene <sup>(1)</sup>  | 70/21 |
| Jet fuel JP5 <sup>(1)</sup>                                    | 70/21 |
| Jet fuel A1 <sup>(1)</sup>                                     | 70/21 |
| Ethanol 95% <sup>(1)</sup>                                     | 57/17 |
| Isopropyl alcohol (IPA) <sup>(1)</sup>                         | 70/21 |
| Methanol <sup>(1)</sup>  | 57/17 |
| Ethylene glycol <sup>(1)</sup>                                 | 23/7  |
| Solvents <sup>(1)</sup>  | 70/21 |
| Flammable adhesive (flash point 140 °F < 60 °C) <sup>(1)</sup> | 70/21 |
| Butyl acrylate <sup>(1)</sup>                                  | 70/21 |
| Vinyl acetate <sup>(1)</sup>                                   | 70/21 |
| Oil paint <sup>(1)</sup>                                       | 70/21 |

**Table 3: Detection Range (continued)**

|                                      |       |
|--------------------------------------|-------|
| Gun powder <sup>(2)</sup>            | 66/20 |
| Fireworks <sup>(3)</sup>             | 10/33 |
| Magnesium alloy <sup>(4)</sup>       | 33/10 |
| Polypropylene pellets <sup>(1)</sup> | 43/13 |
| Office paper <sup>(1)</sup>          | 33/10 |
| Wood <sup>(1)</sup>                  | 33/10 |
| Mineral oil (20w50) <sup>(1)</sup>   | 70/21 |
| Cooking oil <sup>(1)</sup>           | 70/21 |
| Lithium ion battery <sup>(5)</sup>   | 75/23 |

(1) 1 ft x 1 ft (0.3 m x 0.3 m) pan

(2) 1.5-in. sq.

(3) 10 pcs per test

(4) Only for UV detector

(5) One cell of battery per test

**Table 4: Electrical Specifications**

|                               |  |
|-------------------------------|--|
| Operating voltage             | 24 Vdc nominal (18-32 Vdc)   |
| Power consumption             | Standby: Max. 3 W (8 W with heated window)<br>Alarm: Max. 4.2 W (9.6 W with heated window) |
| Cable entries                 | 2 x ¾-in.-14 NPT conduits or 2 x M25 x 1.5 mm ISO  |
| Electrical input protection   | According to EN50130   |
| Electromagnetic compatibility | EMI/RFI protected to EN61000-6-3 and EN50130   |
| Electrical interface          | The detector includes 17 terminals with one wiring option                                  |

**Table 5: Outputs**

|                       |  |
|-----------------------|--|
| Relays                | Alarm, fault, and auxiliary<br>SPST volt-free contacts rated 2 A at 30 Vdc   |
| Analog voltage output | Analog port malfunction: 0 V (< 0.5 V)<br>Nomal: 2 V ± 0.3 V<br>Alarm/Explosion: 5 V ± 0.3 V   |
| 0-20 mA (stepped)     | Sink (source option) configuration:<br>Fault: 0 ± 1 mA<br>BIT fault: 2 mA ± 10 %<br>Normal: 4 mA ± 10 %<br>Warning: 16 mA ± 5 %<br>Alarm: 20 mA ± 5 %<br>Resistance loop: 100 to 600 Ω |
| HART® protocol        | HART communications on the 0-20 mA analog current (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   |

**Table 6: Mechanical Specifications**

|                         |  |
|-------------------------|--|
| Enclosure options       | Stainless steel 316 with electro polish finish<br>Heavy duty copper free aluminum (less than 1%), polyurethane paint |
| Mounting                | Tilt mount material-stainless steel 316 with electro polish finish   |
| 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)<br>Detector aluminum: 2.8 lb. (1.3 kg)<br>Tilt mount: 2.5 lb. (1.1 kg)    |
| Environmental standards | DNV 2-4  |
| Water and dust          | IP66 and IP68 per EN60529, NEMA 250 6P   |

**Table 7: Approvals**

|                |                            |  |
|----------------|----------------------------|--|
| Hazardous area | ATEX and IECEx             | Ex II 2 G D<br>Ex db eb IIC T4 Gb<br>Ex tb IIIC T110 °C Db<br>(-50 °C ≤ T <sub>a</sub> ≤ +85 °C)   |
|                | FM/FMC/CSA                 | Class I Division 1, Groups B, C, and D, T4<br>Class II/III Division 1, Groups E, F, and G, T4<br>Class I Division 2, Groups B, C, and D, T4<br>T <sub>a</sub> = -50 °C to +85 °C |
|                | TR CU (EAC)                | Ex db eb IIC T4 Gb X<br>Ex tb IIIC T110 °C Db X<br>(-55 °C ≤ T <sub>a</sub> ≤ +85 °C)  |
| Marine         | MED "Wheelmark" (DNV)      |  |
| Performance    | EN54-10 (VdS)   FM3260     |  |
| Reliability    | IEC61508 - SIL3 compatible |  |

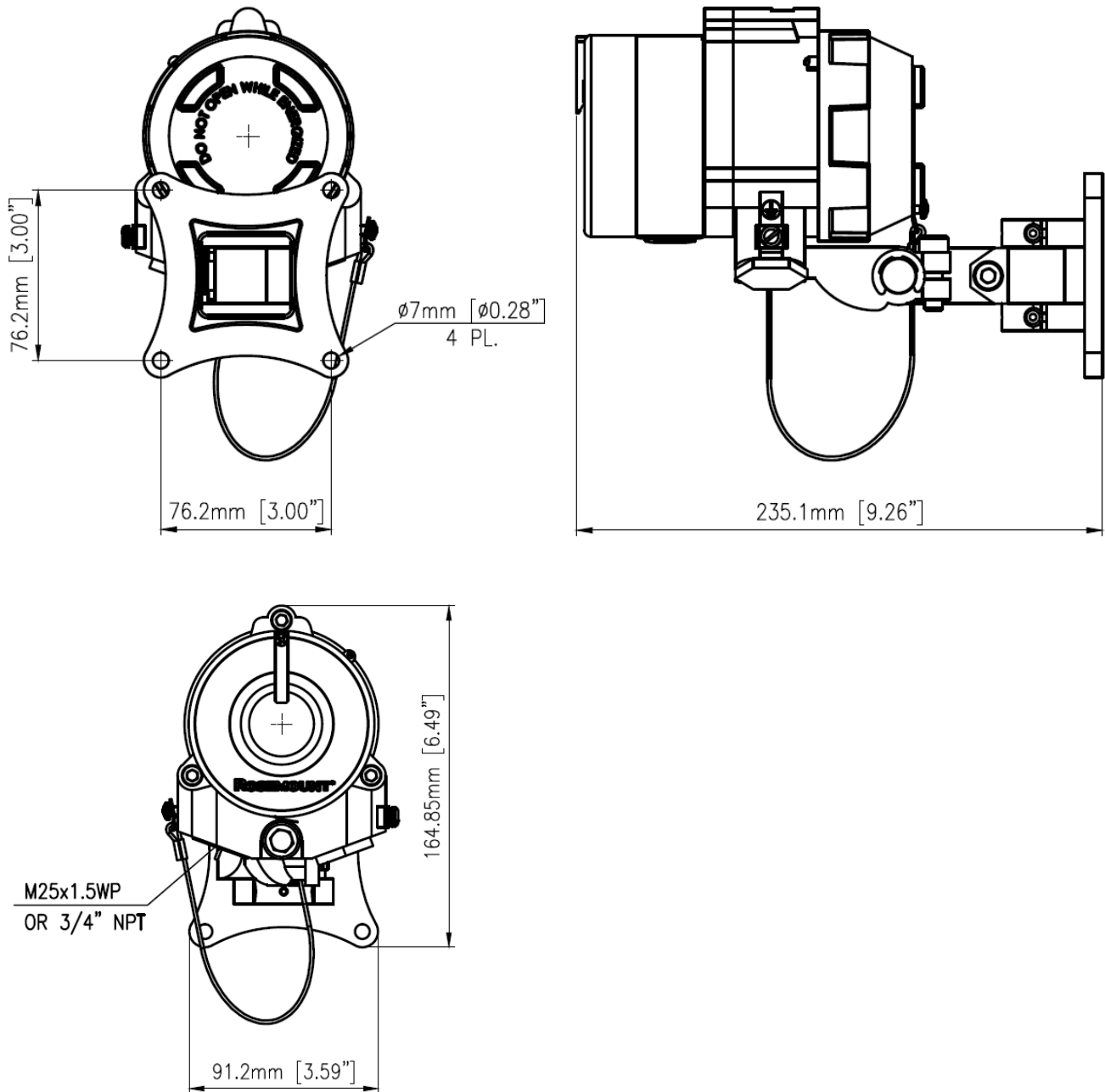
**Table 8: Accessories**

| Accessory                  | Part number                            |
|----------------------------|--|
| Flame simulator (Ex proof) | FS-UVIR-975                            |
| Tilt mount                 | 00975-9000-0022                        |
| Duct mount (Ex proof)      | 00975-9000-0018                        |
| U-bolt/pole mount          | 00975-9000-0007 (2-in. [50.8 mm] pole) |
|                            | 00975-9000-0008 (3-in. [76.2 mm] pole) |
| USB RS-485 harness kit     | 00975-9000-0011                        |
| Air shield                 | 00975-9000-0019                        |
| Protective cover           | ABS plastic: 00975-9000-0020           |
|                            | Stainless steel: 00975-9000-0021       |



# Dimensional drawings

Figure 1: IR3 Flame Detector + Tilt







For more information: [www.emerson.com](http://www.emerson.com)

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