

# Spectrex™ 40/40C Flame Detector



The Spectrex 40/40C 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

**Spectrex 40/40C with QuadSense™ triple infrared (IR3) technology**

The Spectrex 40/40C with QuadSense technology provides superior detection range and reliability and is the best choice for detecting hydrocarbon and Hydrogen<sup>(1)</sup> based fires in most industrial and commercial applications.

**Spectrex 40/40C ultraviolet infrared (UV/IR) technology**

The Spectrex 40/40C Ultra-Fast UV/IR Flame Detector 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

- Advanced long-distance detection of hydrocarbon-based fuel and gas fires at up to 215 ft. (65 m)
- Extended detection range more than doubles detection coverage
- Proven false alarm immunity
- Unparalleled reliability—150,000 hours Mean Time Between Failures (MTBF)
- Wide temperature range: -40 to +167 °F (-40 to +75 °C)
- Enhanced durability backed up by a three-year warranty
- Innovative infrared built-in test (BIT)—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
- 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 40/40C-M (QuadSense) or 40/40C-LB (UV/IR) options.

## Applications

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

## Ordering information

You can order the Spectrex 40/40C as separate parts and accessories.

Spectrex 40/40C detector (PN 40/40C-X-64XXXX).

## Model

| Code | Description                                                  |
|------|--------------------------------------------------------------|
| -I   | QuadSense™ triple infrared (IR3)                             |
| -M   | QuadSense triple infrared (IR3) with Hydrogen fire detection |
| -LB  | Ultraviolet/infrared (UV/IR) with Hydrogen fire detection    |
| -L4B | Ultraviolet/infrared (UV/IR)                                 |

## Wiring

| Code | Description |
|------|-------------|
| -6   | Universal   |

## Operating temperature range

| Code | Description                    |
|------|--------------------------------|
| 4    | -40 to +167 °F (-40 to +75 °C) |

## Electrical cable entries

| Code | Description |
|------|-------------|
| 1    | M25         |
| 2    | ¾-in. NPT   |

## Enclosure

| Code | Description                   |
|------|-------------------------------|
| A    | Aluminum polyurethane painted |

## Hazardous area approvals

| Code | Description                                   |
|------|-----------------------------------------------|
| B    | INMETRO                                       |
| F    | USA and Canada Explosion-Proof <sup>(1)</sup> |
| C    | ATEX/IECEX/UKCA                               |
| R    | EAC CU TR                                     |
| P    | Korea Flameproof                              |

(1) Aluminum enclosure: FM, FMC

## Tilt mount

| Code | Description                              |
|------|------------------------------------------|
| Y    | Including tilt mount stainless steel 316 |
| N    | Without tilt mount                       |

## Protective cover

| Code | Description         |
|------|---------------------|
| 7    | ABS plastic         |
| 8    | Stainless steel 316 |

## Accessories

| Part Number | Description                                                                |
|-------------|----------------------------------------------------------------------------|
| FS-1100     | Flame simulator (ex-proof) compatible with 40/40C-I model                  |
| FS-1200     | Flame simulator (ex-proof) compatible with 40/40C-LB and 40/40C-L4B models |
| FS-1400     | Flame simulator (ex-proof) compatible with 40/40C-M model                  |
| 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.<sup>2</sup> (0.1 m<sup>2</sup>) pan fire.

| Fuel                          | 40/40C-I       | 40/40C-M       | 40/40C-LB      | 40/40C-L4B    |
|-------------------------------|----------------|----------------|----------------|---------------|
| Gasoline                      | 215 ft. (65 m) |                | 50 ft. (15 m)  | 93 ft. (28 m) |
| N-Heptane                     | 215 ft. (65 m) |                | 50 ft. (15 m)  | 93 ft. (28 m) |
| Diesel fuel                   | 150 ft. (45 m) |                | 37 ft. (11 m)  | 70 ft. (21 m) |
| Kerosene                      | 150 ft. (45 m) |                | 37 ft. (11 m)  | 70 ft. (21 m) |
| Alcohol 95%                   | 135 ft. (40 m) |                | 30 ft. (9 m)   | 57 ft. (17 m) |
| Isopropyl alcohol (IPA)       | 135 ft. (40 m) |                | 37 ft. (11 m)  | 70 ft. (21 m) |
| Methanol                      | 135 ft. (40 m) |                | 30 ft. (9 m)   | 57 ft. (17 m) |
| Methane                       | 150 ft. (45 m) |                | 33 ft. (10 m)  | 60 ft. (18 m) |
| Liquefied petroleum gas (LPG) | 150 ft. (45 m) |                | 33 ft. (10 m)  | 60 ft. (18 m) |
| Polypropylene                 | 115 ft. (35 m) |                | 33 ft. (10 m)  | 60 ft. (18 m) |
| Paper                         | 82 ft. (25 m)  |                | 16.4 ft. (5 m) | 33 ft. (10 m) |
| Hydrogen <sup>(1)</sup>       | N/A            | 118 ft. (36 m) | 37 ft. (11 m)  | N/A           |

Table 1: Detection Ranges (*continued*)

| Fuel                           | 40/40C-I       | 40/40C-M | 40/40C-LB        | 40/40C-L4B      |
|--------------------------------|----------------|----------|------------------|-----------------|
| Magnesium alloy <sup>(2)</sup> | N/A            |          | 16.4 ft. (5 m)   | 33 ft. (10 m)   |
| Gunpowder <sup>(3)</sup>       | 141 ft. (43 m) |          | 32.8 ft. (10 m)  | 91.9 ft. (28 m) |
| Fireworks                      | 23 ft. (7 m)   |          | 5.25 ft. (1.6 m) | 9.8 ft. (3 m)   |
| Cooking oil                    | 150 ft. (45 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Mineral oil: 20W-50            | 150 ft. (45 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Wood                           | 82 ft. (25 m)  |          | 16 ft. (5 m)     | 33 ft. (10 m)   |
| Ethylene glycol                | 118 ft. (36 m) |          | 12 ft. (3.7 m)   | 23 ft. (7 m)    |
| Butyl acrylate                 | 175 ft. (54 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Vinyl acetate                  | 175 ft. (54 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Flammable adhesive             | 150 ft. (45 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Solvents                       | 175 ft. (54 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Oil paint                      | 150 ft. (45 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Jet fuel JP5                   | 150 ft. (45 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Jet fuel A1                    | 150 ft. (45 m) |          | 37 ft. (11 m)    | 70 ft. (21 m)   |
| Battery <sup>(4)</sup>         | 200 ft. (61 m) |          | 39 ft. (12 m)    | 75 ft. (23 m)   |

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

(2) Contact Spectrex 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).

Table 2: General Specifications

|                                 | 40/40C-I                                                                                  | 40/40C-M                                                                                                                                                                                                     | 40/40C-LB                                                                                 | 40/40C-L4B                                                          |
|---------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Spectral response               | Four infrared (IR) bands between 4 $\mu$ m and 5 $\mu$ m                                  | Four infrared (IR) bands between 2 $\mu$ m and 5 $\mu$ m                                                                                                                                                     | Ultraviolet: 0.185 to 0.260 $\mu$ m<br>Infrared: 2.5 to 3.0 $\mu$ m                       | Ultraviolet: 0.185 to 0.260 $\mu$ m<br>Infrared: 4.3 to 4.8 $\mu$ m |
| Field of view                   | <ul style="list-style-type: none"> <li>Horizontal: 100°</li> <li>Vertical: 95°</li> </ul> | Hydrogen: <ul style="list-style-type: none"> <li>Horizontal: 90°</li> <li>Vertical: 90°</li> </ul> For other fuels: <ul style="list-style-type: none"> <li>Horizontal: 80°</li> <li>Vertical: 80°</li> </ul> | <ul style="list-style-type: none"> <li>Horizontal: 100°</li> <li>Vertical: 95°</li> </ul> |                                                                     |
| Coverage area (m <sup>3</sup> ) | 1,709,660 ft. (48,412 m) <sup>(1)</sup>                                                   | 4,281,515 ft. (121,239 m) <sup>(1)</sup>                                                                                                                                                                     | 73,000 ft. (2,067 m) <sup>(1)</sup>                                                       | 474,912 ft. (13,448 m) <sup>(1)</sup>                               |
| Coverage area (m <sup>2</sup> ) | 15,058 ft. (1,399 m) <sup>(1)</sup>                                                       | 30,462 ft. (2,830 m) <sup>(1)</sup>                                                                                                                                                                          | 1,895 ft. (176 m) <sup>(1)</sup>                                                          | 6,598 ft. (613 m) <sup>(1)</sup>                                    |
| Sensitivity ranges              | Five sensitivity ranges                                                                   |                                                                                                                                                                                                              | Two sensitivity ranges                                                                    | Three sensitivity ranges                                            |
| Detection response time         | Standard response: Typically < 5 seconds                                                  |                                                                                                                                                                                                              |                                                                                           |                                                                     |
| Temperature range               | Operating: -40 to +167 °F (-40 to +75 °C)<br>Storage: -40 to +167 °F (-40 to +75 °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            |
| Electrical interface          | The detector includes 17 terminals and one wiring option |

**Table 4: Typical Power Consumption (24 Vdc)**

| Mode                                                     | 40/40C-I, 40/40C-M | 40/40C-LB, 40/40C-L4B |
|----------------------------------------------------------|--------------------|-----------------------|
| Normal power consumption without a heater                | 60 mA, 1.4 W       | 90 mA, 2.2 W          |
| Normal power consumption without a heater, with an alarm | 90 mA, 2.2 W       | 120 mA, 2.9 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<br>SPDT volt-free contacts rated 2 A at 30 Vdc                                                                                                                   |
| Analog output default <sup>(1)</sup>     | <b>Analog port malfunction:</b> 0 V (< 0.5 V)<br><b>Normal:</b> 2 V ± 0.3 V<br><b>Alarm/explosion:</b> 5 V ± 0.3 V                                                                           |
| 0–20 mA (stepped) default <sup>(1)</sup> | <b>Fault:</b> 0 ± 1 mA<br><b>Built-in test (BIT) fault:</b> 2 mA ± 0.3 mA<br><b>Normal:</b> 4 mA ± 0.3 mA<br><b>Warning:</b> 16 mA ± 0.3 mA<br><b>Alarm:</b> 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 | 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 aluminum: 2.8 lb. (1.3 kg)<br>Tilt mount: 2.5 lb. (1.1 kg)  |
| Water and dust    | IP66 and IP68 per EN60529<br>NEMA® 250 6P                            |

## Approvals

For approvals information, see [Spectrex 40/40 Series Certification Information](#).

For more information: [Spectrex.net](https://spectrex.net)

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