Product Data Sheet
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Spectrex™ 40/40D Flame Detector



The Spectrex 40/40D 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 40/40D with QuadSense™ triple infrared (IR3) technology

The Spectrex 40/40D 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.

Spectrex 40/40D ultraviolet infrared (UV/IR) technology

The Spectrex 40/40D 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 40/40D-M (QuadSense) or 40/40D-LB (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 Spectrex 40/40D as separate parts and accessories.

Spectrex 40/40D detector (PN 40/40D-X-63XXXXX).

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
3	–76 to +185 °F (–60 to +85 °C)

Electrical cable entries

Code	Description
1	M25
2	¾–in. NPT

Enclosure

Code	Description
S	Stainless steel 316
A	Aluminum polyurethane painted

Hazardous area approvals

Code	Description
B	INMETRO
F	USA and Canada Explosion-Proof(1)
C	ATEX/IECEx/UKCA
R	EAC CU TR

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

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

Special option (optional)

Code	Description
H	Enhanced hot CO_2 discrimination

Note
Available for Spectrex 40/40D-I only.

Accessories

Part Number	Description
FS-1100	Flame simulator (ex-proof) compatible with 40/40D-I model
FS-1200	Flame simulator (ex-proof) compatible with 40/40D-LB and 40/40D-L4B models
FS-1400	Flame simulator (ex-proof) compatible with 40/40D-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 $ft.^2$ (0.1 m^2) pan fire.

Fuel	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
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	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
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 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).*
(5) *Available for Spectrex 40/40D-M, 40/40D-LB, and 40/40D-L4B only.*
(6) *Available for Spectrex40/40D-LB only.*

Table 2: General Specifications

	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
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)*

	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
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) with 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 LPG with 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
Electrical interface	The detector includes 17 terminals and one wiring option

Table 4: Typical Power Consumption (24 Vdc)

Mode	40/40D-I, 40/40D-M	40/40D-LB, 40/40D-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
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

Table 5: Outputs *(continued)*

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 Spectrex 40/40 Series Certification Information.

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For more information: **Spectrex.net**

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