

# FlameSpec IR3-H2-HD

Triple IR Flame Detector for Energy Transition



FlameSpec IR3-H2-HD offers the fastest detection of flames and explosions, providing extra time that can be used to reduce damage to plant & property and evacuation of people.

## Introduction

The FlameSpec-IR3-H2-HD flame detector provides unrivaled response, high performance and reliable detection for a number of fires found in Energy Transition applications. The detector addresses slow growing fires as well as fast eruptions of fire using improved IR3 technology. The detector operates in all weathers and light conditions.

The detector provides high-definition (HD) video output of the monitored area with near IR filtered imaging of fire events and personnel at distances up to 100 ft. (30m). This allows the rescue team to be aware of the exact situation before entering the hazardous area.

Video and data of events are stored saved quickly to non-volatile memory for post incident investigation. The recordings start one minute before detection and continue for up to four minutes.

## Key Benefits

- High immunity to false alarm, including arc welding.
- Detects, hydrogen, ammonia, methane & syngas flames using three infrared wavelengths, with clear separation.
- Each sensor has the same field of view to further improve false alarm immunity.
- HD, or composite, video output with automatic HD video recording of events.
- Ultra-fast detection mode detection within 40 milliseconds for fireballs or explosions.
- High speed (< 0.5 s) model [X5] available for the detection of fires in enclosed spaces.
- 5 selectable sensitivity levels.
- Data/Event logger – alarms, faults & videos as well as other relevant events are logged to non-volatile memory.
- Built-in-Test (BIT) – Automatic and manual self-test of window cleanliness and overall detector operation.
- Universal outputs, 3 and 4 wire, 4-20 mA sink / source, Fire, Auxiliary and Fault Relays. RS485 port using Modbus RTU.
- HART® 7 for configuration & maintenance - option available.
- Heated window to avoid condensation and icing.
- Stainless steel tilt mount with horizontal and vertical adjustment.
- Marine approval - DNV type approval.
- Functional safety - SIL 2 capable - option available.

# FlameSpec-IR3-H2-HD

Model: FLS-IR3-H2-HD

Triple IR Flame Detector for Energy Transition

## Response Characteristics (Standard model X0, X1 & X2)

| Fuel                                            | Size        | Sensitivity | Distance ft. (m) | Avrg Resp.Time (s) |
|-------------------------------------------------|-------------|-------------|------------------|--------------------|
| Hydrogen                                        | 32-in Plume | Extreme     | 98 (30)          | 1.5                |
| Hydrogen                                        | 32-in Plume | Medium      | 66 (20)          | 1.5                |
| Hydrogen                                        | 32-in Plume | Low         | 33 (10)          | 1.4                |
| Hydrogen                                        | 32-in Plume | Very Low    | 16 (5)           | 1.5                |
| Methanol                                        | 1 x 1 ft.   | Extreme     | 59 (18)          | 4.2                |
| Methanol                                        | 1 x 1 ft.   | Medium      | 30 (9)           | 2.9                |
| Methanol                                        | 1 x 1 ft.   | Very Low    | 10 (3)           | 4.9                |
| Methane                                         | 32-in Plume | Extreme     | 66 (20)          | 1.7                |
| Methane                                         | 32-in Plume | Medium      | 52 (16)          | 1.2                |
| Methane                                         | 32-in Plume | Low         | 26 (8)           | 1.4                |
| Methane                                         | 32-in Plume | Very Low    | 13 (4)           | 0.9                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Extreme     | 82 (25)          | 3.0                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Medium      | 55 (17)          | 3.0                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Low         | 26 (8)           | 0.8                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Very Low    | 13 (4)           | 2.1                |

## Response Characteristics (Fast model, X5)

| Fuel                                            | Size        | Sensitivity | Distance ft. (m) | Avrg Resp.Time (s) |
|-------------------------------------------------|-------------|-------------|------------------|--------------------|
| Hydrogen                                        | 32-in Plume | Medium      | 59 (18)          | 0.1                |
| Hydrogen                                        | 32-in Plume | Low         | 30 (9)           | 0.1                |
| Hydrogen                                        | 32-in Plume | Very Low    | 16 (5)           | 0.2                |
| Methanol                                        | 1 x 1 ft.   | Medium      | 26 (8)           | 0.3                |
| Methanol                                        | 1 x 1 ft.   | Low         | 16 (5)           | 0.4                |
| Methanol                                        | 1 x 1 ft.   | Very Low    | 8 (2.5)          | 0.3                |
| Methane                                         | 32-in Plume | Medium      | 53 (16)          | 0.1                |
| Methane                                         | 32-in Plume | Low         | 26 (8)           | 0.2                |
| Methane                                         | 32-in Plume | Very Low    | 13 (4)           | 0.2                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Medium      | 50 (15)          | 0.4                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Low         | 23 (7)           | 0.2                |
| Syngas (30%CH <sub>4</sub> :70%H <sub>2</sub> ) | 32-in Plume | Very Low    | 13 (4)           | 0.1                |

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### Immunity to False Alarm

| False Alarm Source                                             | Modulated        |          | Unmodulated      |          |
|----------------------------------------------------------------|------------------|----------|------------------|----------|
|                                                                | Distance ft. (m) | Response | Distance ft. (m) | Response |
| Sunlight, (direct or reflected)                                | No response      |          | No response      |          |
| Sunlight, (direct or reflected) with water droplets on sensors | No response      |          | No response      |          |
| Incandescent frosted glass light, 300W                         | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Fluorescent, 70W (3x23.3W)                                     | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Electric arc                                                   | 3.0 (1.0)        | No Alarm | 3.0 (1.0)        | No Alarm |
| Arc welding                                                    | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Radiation heater, 1850W                                        | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Radiation heater, 1850W with water droplets on the sensors     | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Quartz lamp (1000W) shielded                                   | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Quartz lamp (500W) non-shielded                                | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Mercury vapor lamp 160Wx3                                      | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Car exhausts                                                   | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Projector led                                                  | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Solenoid bell                                                  | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Soldering iron                                                 | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |
| Electric drill                                                 | 2.0 (0.5)        | No Alarm | 2.0 (0.5)        | No Alarm |

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|                              |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FIRE DETECTION               | Detection time and distance                   | 40ms for fast fire burst or explosion<br>1.5s for 32" (0.8m) hydrogen fire at 0–66 ft. (0–20m)<br>4s for 32" (0.8m) hydrogen fire at 66–100 ft. (20–30m)                                                                                                                                                                                                                                                                                                       |
|                              | Sensitivity range                             | 5 sensitivity ranges: Extreme, High, Medium, Low, Very Low                                                                                                                                                                                                                                                                                                                                                                                                     |
|                              | Field of view (IR detection)                  | 90° Horizontal, 80° Vertical                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                              | Time Delay                                    | 0–30 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                              | Built in Test                                 | Automatic and Manual                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VIDEO FUNCTIONALITY          | HD Video                                      | Near IR filtered HD, as standard. Color HD option (X2 available on request)                                                                                                                                                                                                                                                                                                                                                                                    |
|                              | Video recording of alarm events               | 1 minute pre-event and up to 3 minutes post-event                                                                                                                                                                                                                                                                                                                                                                                                              |
|                              | System integration protocol                   | ONVIF (Open Network Video Interface Forum) Profile S                                                                                                                                                                                                                                                                                                                                                                                                           |
| ELECTRICAL SPECIFICATIONS    | Operating Voltage                             | 24 VDC nominal (18–32 VDC)                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                              | Current Consumption                           | Standby: 180mA<br>Maximum: 300mA (including window heater)                                                                                                                                                                                                                                                                                                                                                                                                     |
|                              | Electrical Entries                            | 2x cable and conduit entries 3/4" NPT(F) or M25x1.5                                                                                                                                                                                                                                                                                                                                                                                                            |
|                              | Wiring                                        | 14–17 AWG (2.5–1.0 mm <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                           |
| OUTPUTS                      | Relays                                        | SPST volt-free contacts rated 2A at 30 VDC<br>3 relays: Alarm & Auxiliary – normally open; Fault – normally closed                                                                                                                                                                                                                                                                                                                                             |
|                              | 0–20mA (stepped) current output               | 3 wire and 4 wire configurations (sink and source)<br>HART® rev 7.0 (option available)                                                                                                                                                                                                                                                                                                                                                                         |
|                              | Indication                                    | Tri-color LED (Green, Yellow, Red)                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                              | Modbus                                        | RTU compatible on RS-485                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                              | Digital (for video)                           | IP network IEEE 802.3 100Base-T                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                              | Composite video                               | NTSC or PAL                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                              |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MECHANICAL SPECIFICATIONS    | Size                                          | 7.87 x 5.12 x 5.12" (200x130x130mm)                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                              | Weight                                        | Detector (Stainless Steel 316): 9.8 lbs. (4.4 kg)<br>Tilt mount (Stainless Steel 316): 5.4 lbs. (2.4 kg)                                                                                                                                                                                                                                                                                                                                                       |
| ENVIRONMENTAL SPECIFICATIONS | Temperature Range                             | Operating: -67°F to +185°F (-55°C to +85°C)<br>Storage: -67°F to +185°F (-55°C to +85°C)                                                                                                                                                                                                                                                                                                                                                                       |
|                              | Humidity                                      | Up to 99% (RH), non-condensing                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                              | Ingress Protection                            | IP66 & 68; NEMA 4X & 6P                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| APPROVALS                    | ATEX                                          | ATEX: II 2 G D<br>Ex db IIC T5 Gb or Ex db eb IIC T5 Gb and Ex tb IIIC T95°C Db -55°C<Ta<75°C<br>Ex db IIC T4 Gb or Ex db eb IIC T4 Gb and Ex tb IIIC T105°C Db -55°C<Ta<85°C                                                                                                                                                                                                                                                                                  |
|                              | IECEx, INMETRO & PESO                         | Ex db IIC T5 Gb or Ex db eb IIC T5 Gb and Ex tb IIIC T95°C Db -50°C<Ta<75°C<br>Ex db IIC T4 Gb or Ex db eb IIC T4 Gb and Ex tb IIIC T105°C Db -50°C<Ta<85°C                                                                                                                                                                                                                                                                                                    |
|                              | FMus & FMc                                    | Class I, Div. 1, Groups B, C & D; T4 -50°C≤Ta≤85°C or T5 -50°C≤Ta≤75°C<br>Class II/III, Div. 1, Groups E, F, G; T4 -50°C≤Ta≤85°C or T5 -50°C≤Ta≤75°C<br>Class I, Zone 1, AEx/Ex db IIC T4 Gb or Class I, Zone 1, AEx/Ex db eb IIC T4 Gb -50°C≤Ta≤85°C<br>Class I, Zone 1, AEx/Ex db IIC T5 Gb or Class I, Zone 1, AEx/Ex db eb IIC T5 Gb -50°C≤Ta≤75°C<br>Zone 21, AEx/Ex tb IIIC T95°C Db -50°C≤Ta≤75°C or<br>Zone 21, AEx/Ex tb IIIC T105°C Db -50°C≤Ta≤85°C |
|                              | EAC CU TR                                     | 1Ex d IIC T5 Gb or 1Ex de IIC T5 Gb and Ex tb IIIC T95°C Db -55°C≤Ta≤75°C<br>1Ex d IIC T4 Gb or 1Ex de IIC T4 Gb and Ex tb IIIC T105°C Db -55°C≤Ta≤85°C                                                                                                                                                                                                                                                                                                        |
|                              | Performance                                   | ANSI FM 3260                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                              | Functional safety                             | Certified SIL2 capable, per IEC 61508:2010 High & Low demand (option available)                                                                                                                                                                                                                                                                                                                                                                                |
|                              | Marine                                        | DNV Type Approval                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                              |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                              |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                              |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ACCESSORIES                  | Tilt mount, model FLS-TMO-S02                 | Paint shield / cover                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                              | Weather cover, model FLS-WCO-S02              | Flame simulator, model FLS-FSIM-IR3-H2-KIT                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                              | 2" & 3" pole mount adapter, model FLS-PMA-S23 | Airshield, model FLS-ASD-S02                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                              | Duct mount with window, model FLS-DMW-S02     | Duct mount for airshield, model FLS-DMX-S02                                                                                                                                                                                                                                                                                                                                                                                                                    |
| WARRANTY                     | 5 years                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |