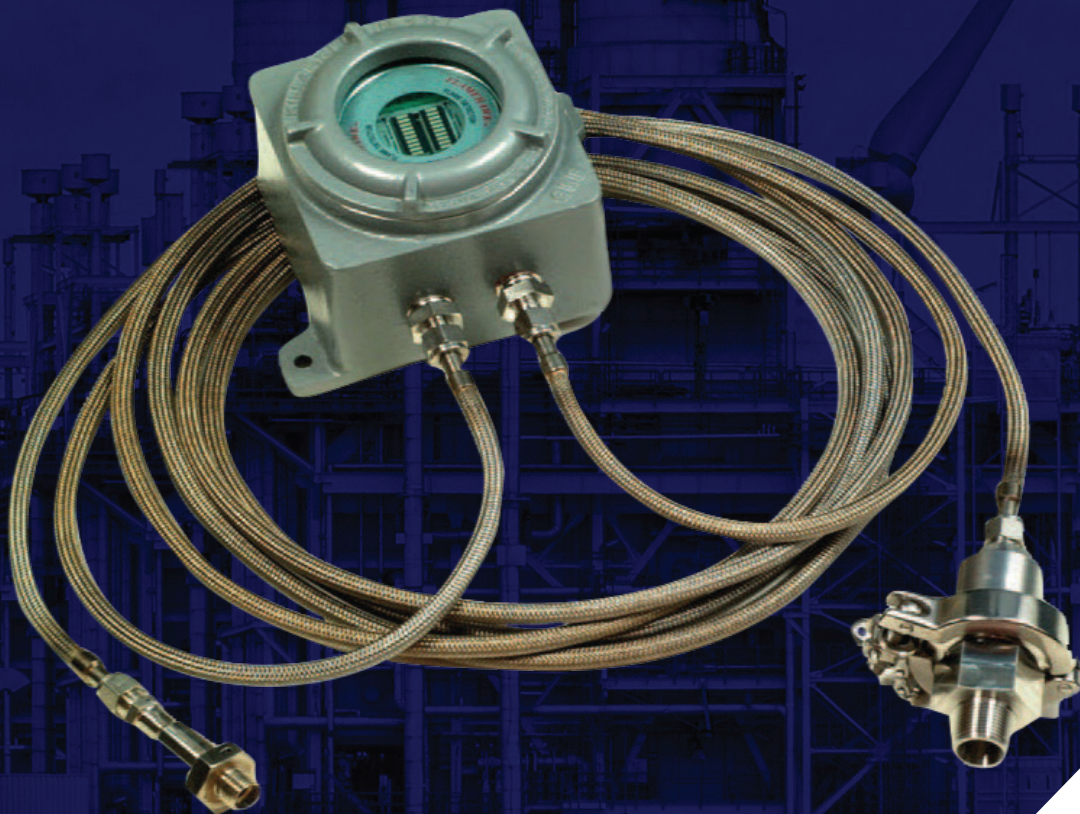




## Flamehawk® Flame Detector

Forney's FlameHawk® fiber optic flame detector is a dual channel solid-state device designed for industrial and marine gas turbines.



# PRODUCT OVERVIEW

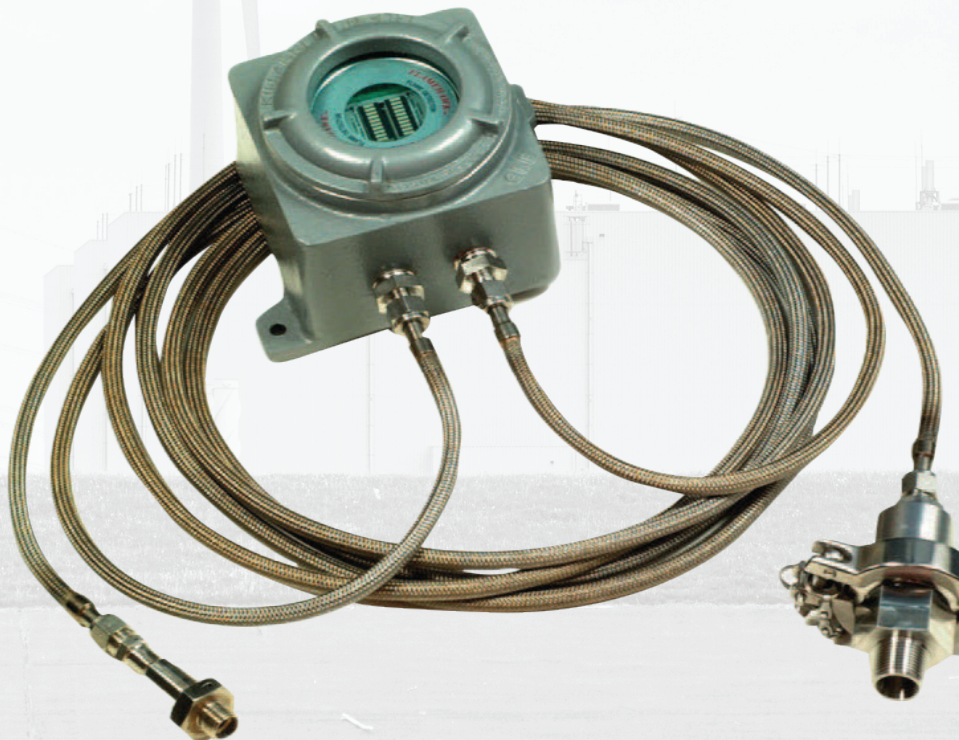
The FlameHawk® fiber optic flame detector is a dual channel solid-state device designed for direct replacement of Geiger-Mueller (GM) tube flame sensors used on industrial and marine gas turbine engines.

The FlameHawk® flame detector improves performance and reduces maintenance costs. It has durable fiber optic cables that transmit the spectral energy from the combustion process to the electronics module. This allows for remote mounting of the electronics outside of the engine enclosure, which eliminates complicated and costly cooling systems common in other flame sensors.

The FlameHawk® flame detector system works in low NOx combustors, multiple fuel applications and with systems incorporating steam injection.

## Operational Principles

The fiber optic cables and optical probes offer easy installation and maintainability. Simple threaded connections are used throughout the system to allow for rapid installation without the need for special tooling. Unique features, such as a quick-release clamp on the frame engine optical probe, have been incorporated to ease cleaning and inspection.



# FEATURES & BENEFITS

- Mechanically and electronically interchangeable with other flame sensors.
- Remote mounting of electronics.
- Optical probe mounts directly to engine.
- No external cooling required.
- Dual channel – easy installation and less wiring.
- Multiple fiber optic cable lengths available.
- Quick disconnect clamp allows for easy cleaning of adapter lens.
- Low voltage operation.
- Multiple field configurable outputs: relay, 4-20 mA, 4-20 mA loop.
- Signal strength meter provides visual indication of system health.
- Reliable operation when using gas or liquid fuel.
- Proven operation in steam injection applications.
- Industrial boiler flame, auto-ignition and flashback detection.


# FlameHawk® Flame Detector

## Model 705 Series

### Products and Accessories:

|                 |  |                 |  |
|-----------------|--|-----------------|--|
| 00705-0225-0007 | Amplifier, with Connector                                      | 00705-0192-0120 | 10' (3.05m) F/O Light Guide Top Assembly |
| 00705-0225-0008 | Amplifier, without Connector                                   | 00705-0192-0180 | 15' (4.57m) F/O Light Guide Top Assembly |
| 00705-0225-0009 | Amplifier, ATEX, IECEx Approved                                | 00705-0192-0300 | 25' (7.62m) F/O Light Guide Top Assembly |
| 00705-0185-0001 | Aeroderivative Sight Tube, Inconel/Sapphire                    | 00705-0192-0480 | 40' (12.2m) F/O Light Guide Top Assembly |
| 00705-0212-0001 | Coupling Mounted Frame Application Sight Tube, 316 SST, Quartz | 00705-0258-0001 | Replacement Quartz Lens Assembly         |
| 00705-0239-0001 | Flange Mounted Frame Application Sight Tube, 316 SST, Quartz   |                 |  |
| 00705-0242-0001 | Interface cable to 00705-0225-0007                             |                 |  |

## General Specifications

| Electronics Module Performance                     |  |  |
|--|--|--|
| Sensitivity:                                       | Calibrated with 1 $\mu$ W radiance (@ 370 nm) Correlates to Relay Switch Point or 7.0 mA                         |  |
| Response Time (On / Off)                           | Less than 50 milliseconds  |  |
| Electrical   |  |  |
| 4-20 mA and Relay Using Signal Strength Meter      | 18 to 32 VDC @ > 50 mA, 4-20 mA and relay. May be operated simultaneously  |  |
| 4-20 mA Max. Load                                  | <650 ohms at 18 VDC to 1350 ohms at 32 VDC (linear)  |  |
| 4-20 mA Loop Powered                               | 18 to 32 VDC with 4 mA headroom  |  |
| Relay Rating                                       | Resistive: 1A @ 30 VDC<br>Load: 0.5A @ 125 VDC   |  |
| Mechanical   |  |  |
| Enclosure Material                                 | Aluminum   |  |
| Optical Interface                                  | Female 3/8" compression-style fitting  |  |
| Electrical Interface                               | Standard versions - 3/4" NPT conduit hole.<br>ATEX/IECEX version - MS38999/20WD97PN conduit hole for ATEX gland. |  |
| Enclosure Mounting                                 | 11 mm (0.437 inch) diameter holes (2x)   |  |
| Weight   | 6.8 lbs (3.1 kg)   |  |
| Enclosure Certifications                           | Class I, Div. 1 & 2, Groups B, C & D<br>NEMA 3, 4, 4X, 7 (B, C, D), 9 (E, F, G)<br>CENELEC – EEx d IIC, T6 or T5 |  |
| ATEX/ IECEX certification #:                       | FM16ATEX0035X/ IECEX FMG 16.0025X  |  |
| Environmental                                      |  |  |
| Operating Temperature                              | -22°F to 158°F<br>(-30°C to 70°C)  |  |
| Vibration  | 8g over a range of 5 to 1200Hz   |  |
| Humidity   | 0 to 100% relative humidity  |  |
| Agency Approvals                                   |  |  |
| <b>ATEX/IECEX version</b><br>Part #00705-0225-0009 |  II 3 G                       | Ex db ec IIB + H2 T6 Gc -30°C < T <sub>AMB</sub> < +70°C |

## Fiber Optic Cables

| Mechanical               |                                  |
|--------------------------|----------------------------------|
| External Sheath Material | 316 Stainless steel (dual layer) |
| Fiber Material           | Fused silica – UV enhanced       |
| Optical Interface Probe  | 3/8" compression-style fitting   |
| Bend Radius              | 4" (101.6 mm) minimum            |
| Environmental            |                                  |
| Temperature Range        | -40°F to 662°F (-40°C to 350°C)  |

## Optical Probe - Aeroderivative

| Mechanical            |                                  |
|-----------------------|----------------------------------|
| Material              | Inconel 625                      |
| Engine Interface      | 5/8-18 UNF external thread       |
| Fiber Optic Interface | 3/8" compression-style fitting   |
| Window Material       | Sapphire                         |
| Environmental         |                                  |
| Temperature Range     | -40°F to 1095°F (-40°C to 590°C) |
| Maximum Pressure      | 6895 kPa (1000 psi)              |

## Optical Probe - Frame

| Mechanical            |  |
|-----------------------|--|
| Material              | 316 stainless steel                      |
| Engine Interface      | 3/4" NPT external thread or flange mount |
| Fiber Optic Interface | 3/8" compression-style fitting           |
| Window Material       | Quartz                                   |
| Purge Port            | 1/8" NPT (if needed)                     |
| Environmental         |  |
| Temperature Range     | -40°F to 572°F (-40°C to 300°C)          |
| Maximum Pressure      | 4137 kPa (600 psi)                       |