

# FlameHawk<sup>®</sup> Flame Detector

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

## Product Overview

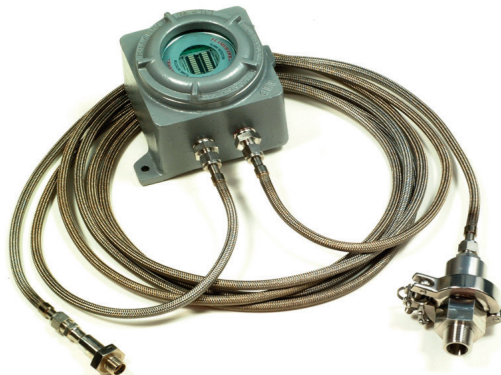
The FlameHawk<sup>®</sup> fiber optic flame detector is a dual channel solid-state device designed for direct replacement of Geiger-Mueller (GM) tube flame sensors used on industrial and marine gas turbine engines.

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

Pub # 404005-31  
Rev 06/2016

## Model 705 Series

### Products and Accessories:

00705-0225-0003	Amplifier, with Cable Connector	00705-0192-0120	10' (3.05m) F/O Light Guide Top Assembly
00705-0225-0004	Amplifier, without Cable Connector	00705-0192-0180	15' (4.57m) F/O Light Guide Top Assembly
00705-0225-0005	Amplifier, with Connector, Unfiltered	00705-0192-0300	25' (7.62m) F/O Light Guide Top Assembly
00705-0225-0006	Amplifier, without Connector, Unfiltered	00705-0192-0480	40' (12.2m) F/O Light Guide Top Assembly
00705-0225-0009	Amplifier, ATEX, IECEx Approved	00705-0258-0001	Replacement Quartz Lens Assembly
00705-0242-0001	Cable, Interface		
00705-0185-0001	Aeroderivative Sight Tube, Inconel/Sapphire		
00705-0212-0001	Coupling Mounted Frame Application Sight Tube, 316 SST, Quartz		
00705-0213-0001	Coupling Mounted Frame Application Sight Tube, 316 SST, Quartz, with Offset		
00705-0239-0001	Flange Mounted Frame Application Sight Tube, 316 SST, Quartz		

## 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  
Load: 0.5A @ 125 VDC

### Mechanical

Enclosure Material Aluminum, epoxy painted

Optical Interface Female 3/8" compression-style fitting

Electrical Interface MS38999 / 20WD97PN or 3/4" NPT conduit hole  
**ATEX/IECEX version** - 3/4" NPT conduit hole only for ATEX gland

Enclosure Mounting 5/16" (7.9mm) diameter holes (2x)

Enclosure Certifications Class I, Div. 1 & 2, Groups B, C & D  
NEMA 3, 4, 4X, 7 (B, C, D), 9 (E, F, G)  
CENELEC — EEx d IIC, T6 or T5

### Environmental

Operating Temperature -22°F to 158°F  
(-30°C to 70°C)

Vibration 8g over a range of 5 to 1200Hz

Humidity 0 to 100% relative humidity

### Agency Approvals

**ATEX/IECEX version**  
Part #00705-0225-0009



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)

**Forney Corporation**

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