



cicsa
COMBUSTIÓN INDUSTRIAL Y CONTROL S.A. DE C.V.

Industrial Flame Monitoring

Fuel Fired Process Safety Monitoring

LAR TRAINING

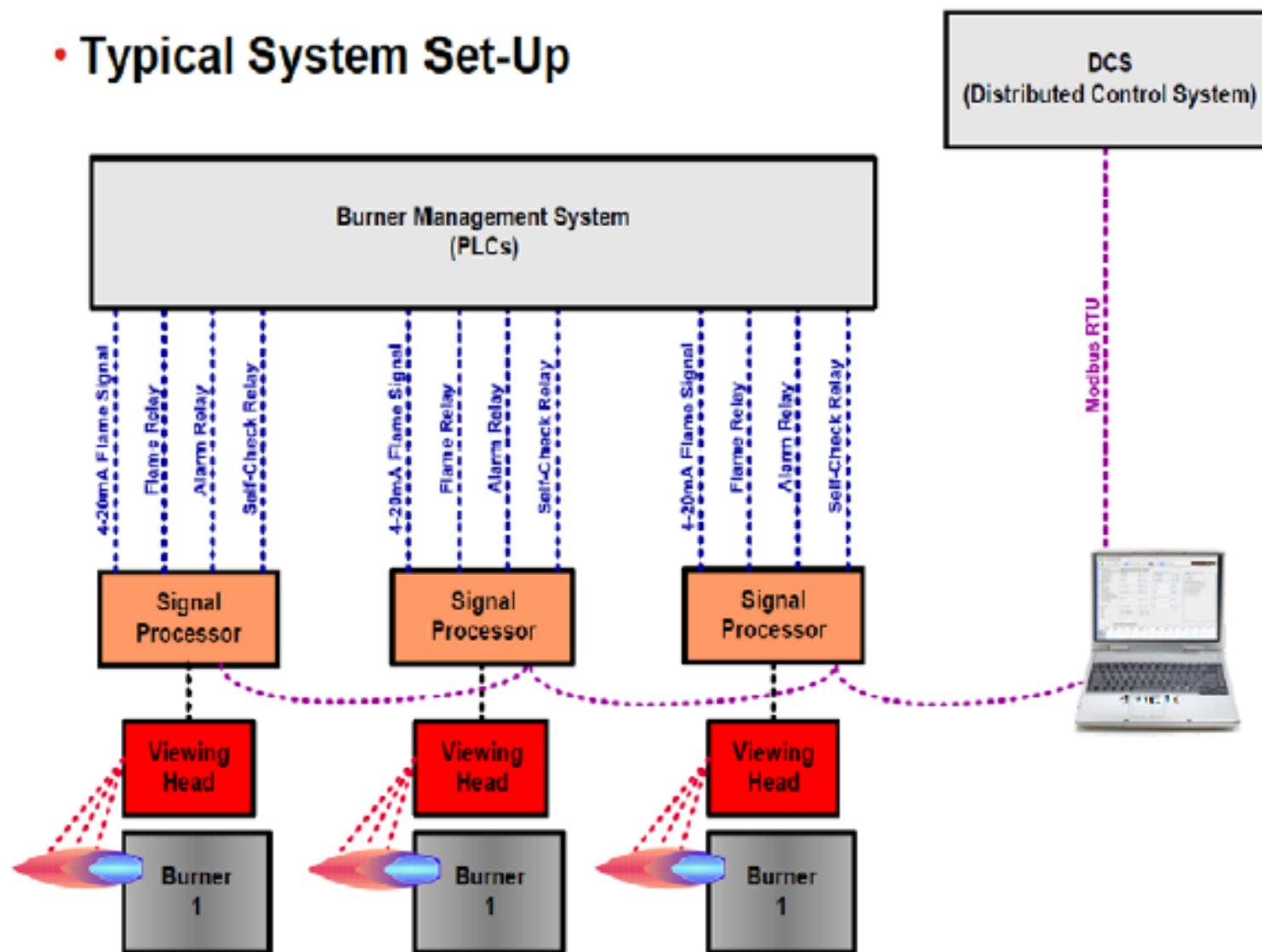
MAY 2015

Honeywell



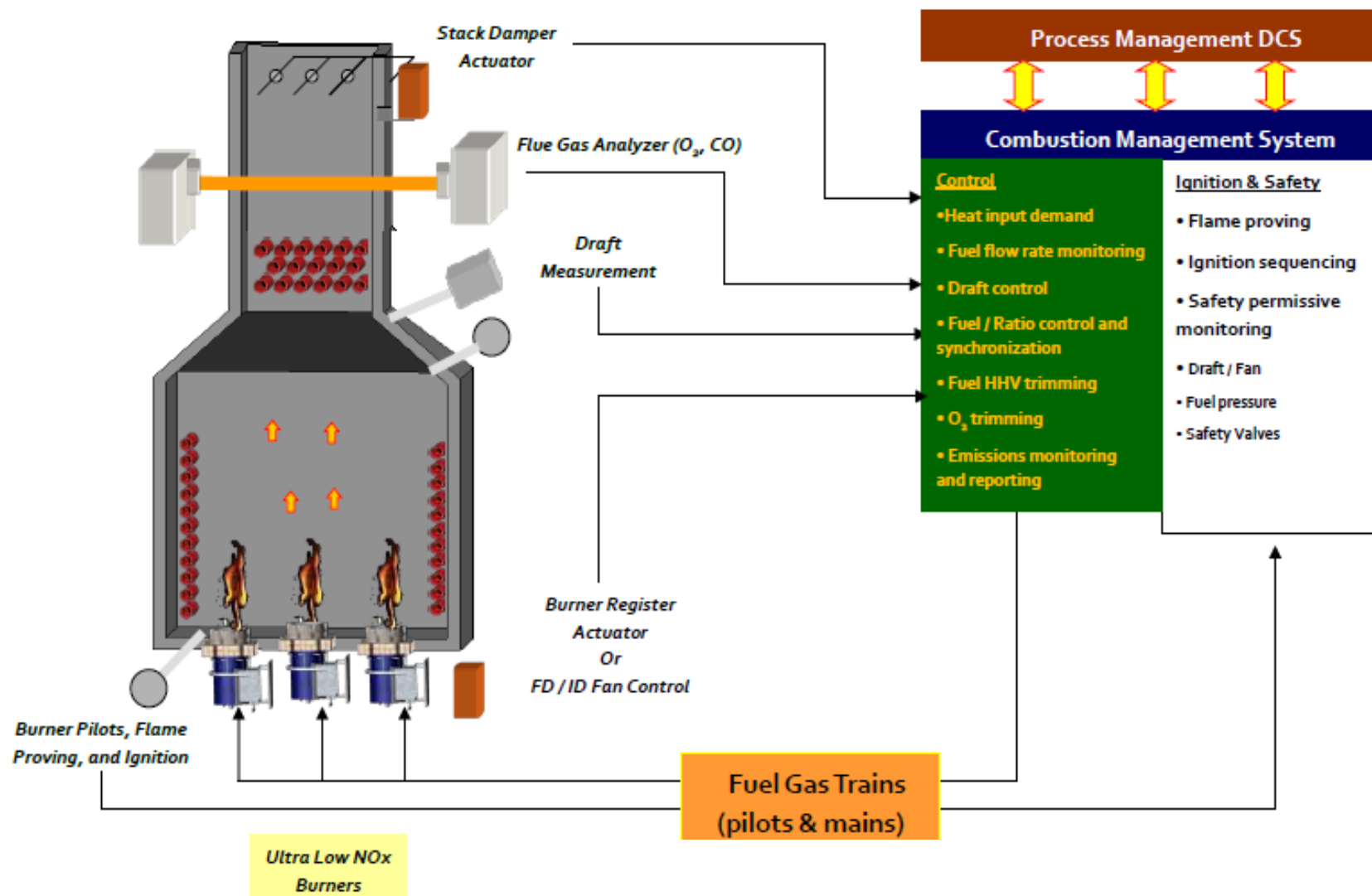
How is IFM Used (Not Just as a Flame Switch!)

- **Typical System Set-Up**





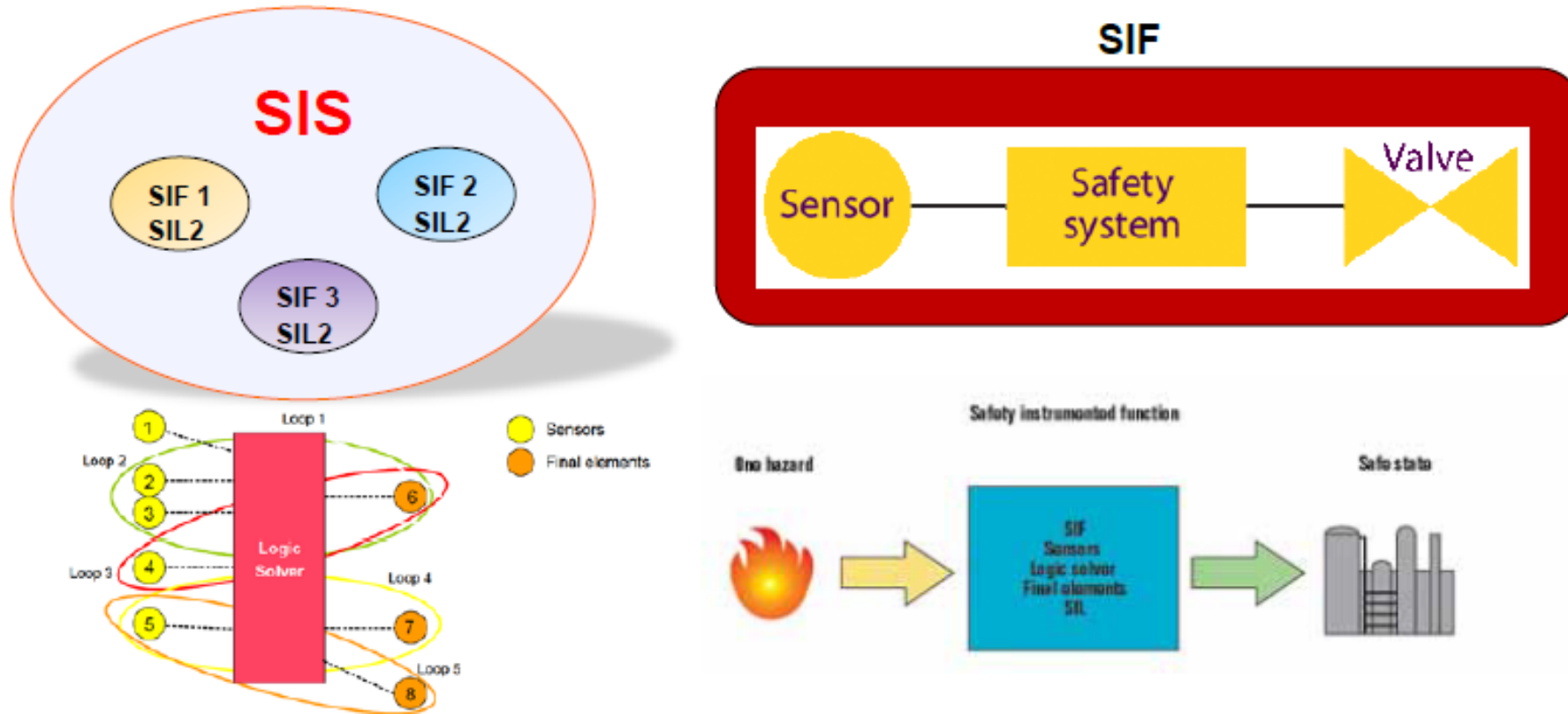
Typical Process Application for IFM





Functional Safety Application

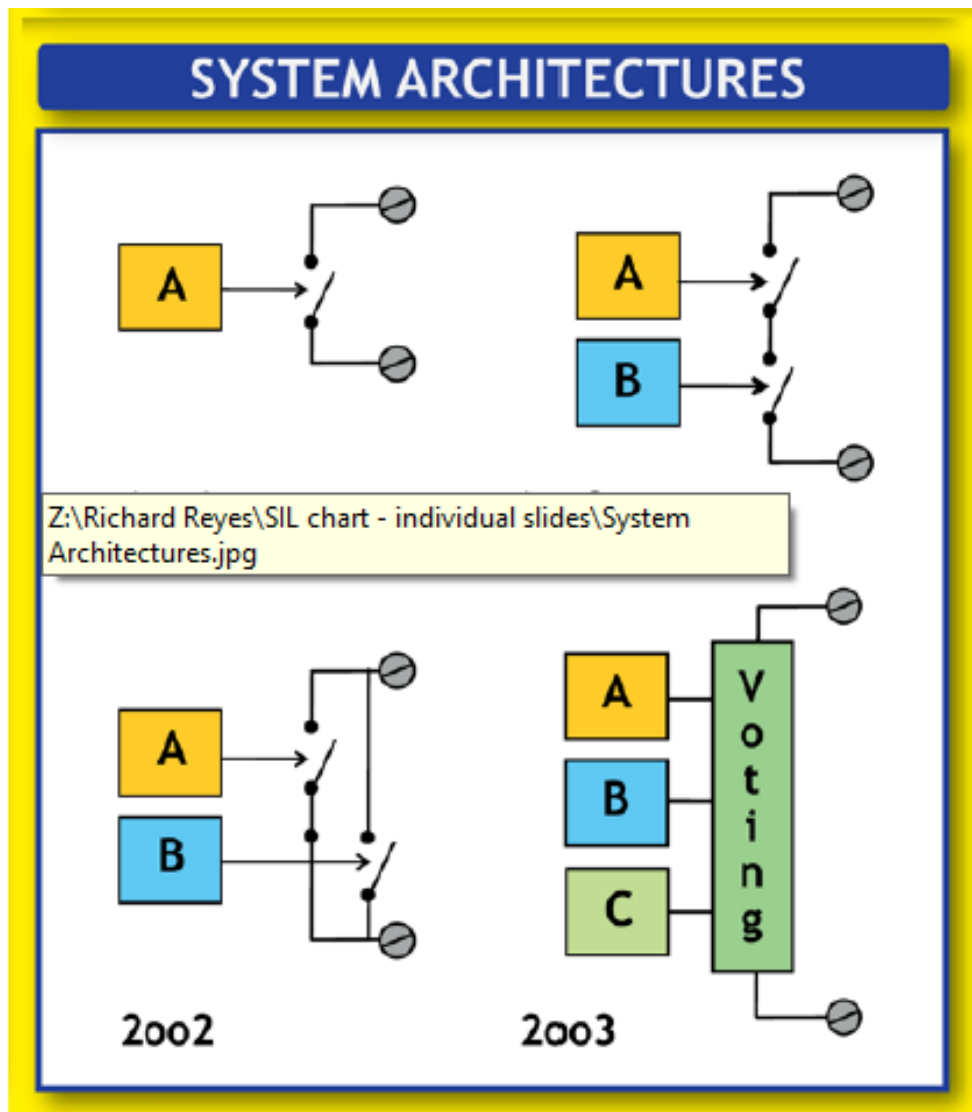
Relation Between SIS, SIF, SIL



SIF: A Safety Instrumented Function (SIF) is a safety function with a specified Safety Integrity Level (SIL) which is implemented by a SIS in order to achieve or maintain a safe state.

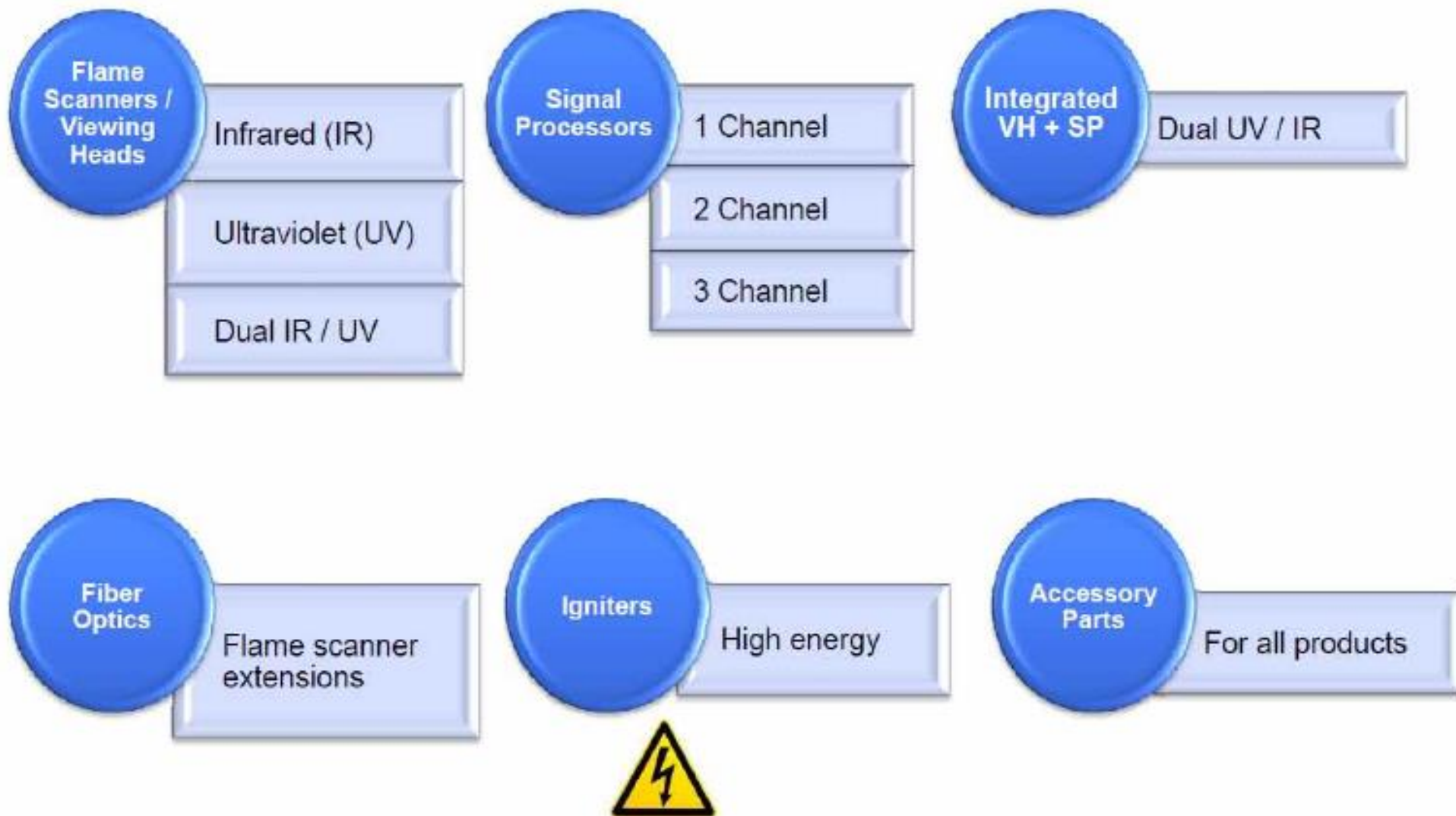


Used in Voting Architecture Applications





IFM Portfolio





Where Used?

- Industries:

Pretroleum/Refineries



Petrochemical



Pulp and paper



Metals Processing





Process Applications

- Typical applications:

Industrials
process boilers

Black liquor
recovery

Co-generation
boilers

Grate fired
boilers

Cement or lime
kilns

Claus reactors
(sulfur recovery)

Thermal oxidizers

Gas turbines



























Flare stacks





Viewing Head and Signal Processor Combinations

Viewing Head and Signal Processor Combinations

									Server Type			Application
	•	•			•	•	•	•	IR			Suitable for oil
	•	•			•	•	•	•	IR			Suitable for oil
	•	•			•	•	•	•	UVTron			Suitable for clean gaseous fuel
	•	•			•	•	•	•	UVTron			Suitable for clean gaseous fuel
	•	•			•	•	•	•	IR			Suitable for oil fuel - stainless steel
	•	•			•	•	•	•	UVTron			Suitable for clean gaseous fuel
			•	•	•	•	•	•	IR			Suitable for oil and coal
			•	•	•	•	•	•	IR			Suitable for oil and coal
			•	•	•	•	•	•	UVTron			Suitable for clean gaseous fuel
			•	•	•	•	•	•	UVTron			Suitable for clean gaseous fuel
			•	•	•	•	•	•	IR+UV			For all fuels: GRI, KLN, etc.
			•	•	•	•	•	•	IR+UV			For all fuels: GRI, KLN, etc.
										•		For Flame Guard monitoring systems
	Flame rod system for use with ignition transformer or ignition coil. For additional information refer to manual 66-237E.											
	Custom Glass and Quartz fiber optic System											
	Cooling jackets with Modbus module for S706 and S630SE											

1. For all AC models, voltage range is 85-250V, 50/60 Hz plus backup 24VDC input permitted.
2. For all DC models, input voltage 24VDC plus backup 24VDC input permitted.
3. For custom approvals and additional models please contact your sales representative.
4. All models listed above except W08 and 600 U are suitable for use in OIL & GAS applications.

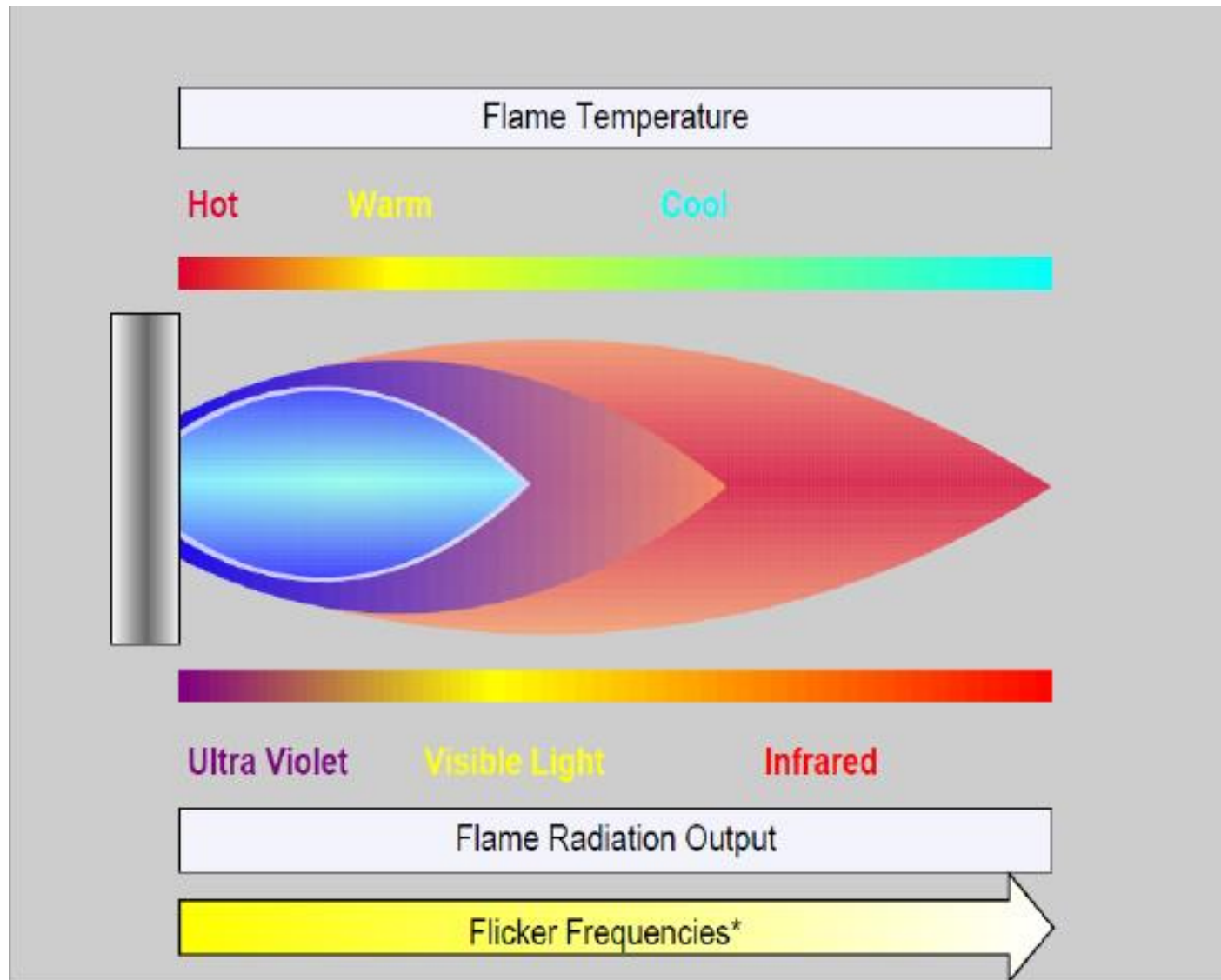
Integrated IR / UV Viewing Head & Signal Processor



The U2 has a unique touchscreen interface
- for easier "push-to-test" "touch-to-view" screen structure
(similar to the iPad®)

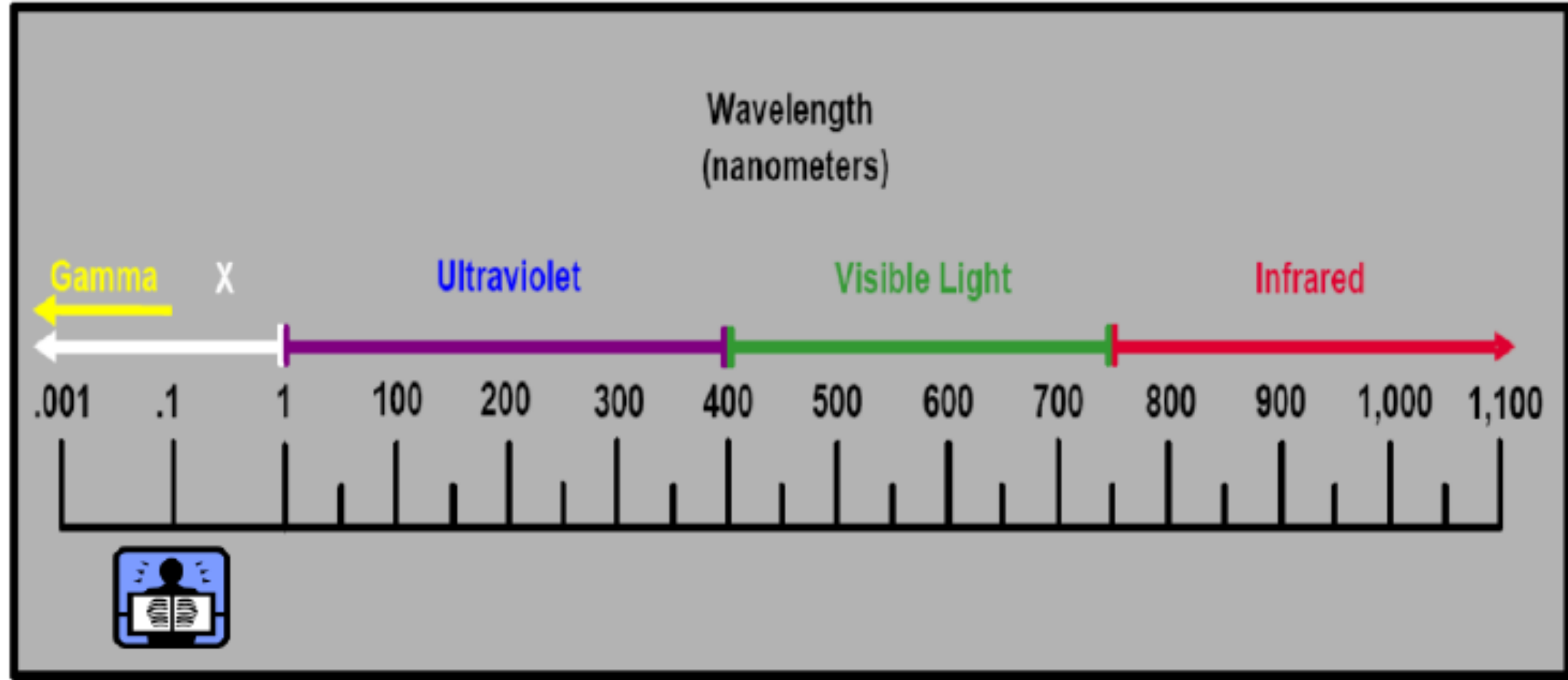


Typical Flame Envelope





Light Spectrum (What is Visible?)





Viewing Head Sensors

- Infrared (IR) - Solid state sensor
- Ultraviolet (UV) – UVTron tube
- Flare Stack model (UV) – UVTron tube
- Dual IR/UV – Solid state + UVTron tube
- Integrated IR/UV VH/SP – 2 Solid state + UVTron tube





Sensors (Continued)

- Viewing Head Sensors

- Infrared (IR) - Solid state sensor

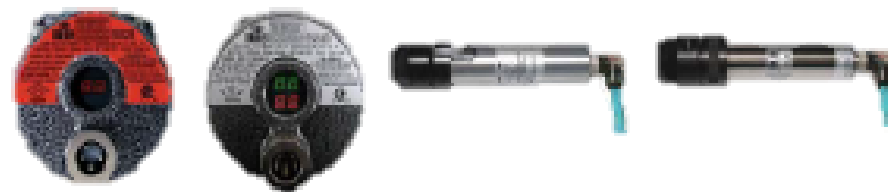
- Peak response at 1,400nm in the light spectrum

- Responds to IR radiation/flicker in the flame above (selectable):

- 9Hz (U2)
 - 16Hz (S55XB, S55XBE)
 - 33Hz/155Hz (S70X/S80X)

- Outout = Pulse stream of randomly spaced pulses whose average rate is proporcional to the IR radiation/flicker frequency present in the flame

- Think of: AC Voltage with a DC component





- Viewing Head Sensors

- Ultraviolet (UV) – UVTron tuve
 - Peak response at 210nm in the light spectrum
- Outout = Pulse stream of randomly spaced pulses whose average rate is proporcional to the UV radiation present in the flame
- Think of: DC Voltage _____



Sensors (Continued)

- Infrared (IR) - Solid state sensor

- IR Solid state sensor

- Longer wavelength discrimination

- Measure flame strength flicker

- Amplitude + modulations of the flame in the target zone
 - High IR levels that are not characteristic of the flame are ignored
 - 33Hz/155Hz (S70X/S80X)

- Programmed + monitored via signal processor

- ◆ FLAME ON

- ◆ FLAME OFF

- ◆ IR GAIN

- ◆ IR FILTER

- ◆ FFRT (1,2,3)

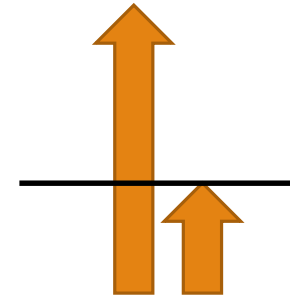
- ◆ Flame ON Delay (only S552)

- ◆ Alarm (flame threshold)

- ◆ Analog Output

- ◆ Analog Gain

- ◆ Modbus communication





Sensors (Continued)

- Ultraviolet (UV) – UVTron tuve

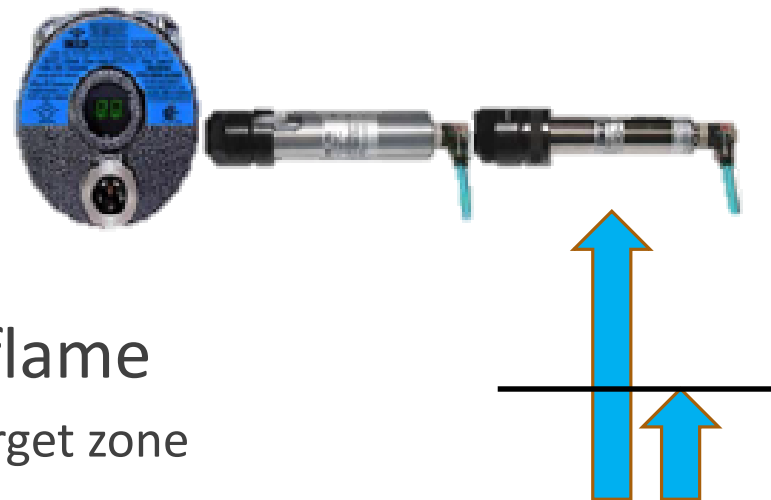
- UV Tube sensor

- Very short wavelength discrimination

- Measure UV portion generated by the flame

- Amplitude + random UV Tube pulses/firings in the target zone

- Programmed + monitored via signal processor



- ◆ FLAME ON

- ◆ FLAME OFF

- ◆ UV GAIN

- ◆ FFRT (1,2,3)

- ◆ Flame ON Delay (only S556)

- ◆ Alarm (flame threshold)

- ◆ Analog Output

- ◆ Analog Gain

- ◆ Modbus communication



Sensors (Continued)

- Dual IR/UV Viewing Heads
 - Independent configuration for each sensor
 - Programmed + monitored via signal processor





Sensors (Continued)

- Integrated IR and/or UV Viewing & Signal Processor

- Features

- 24 Vdc input
 - Touchscreen interface with scrolling menú structure
 - 100% programable through interface
 - 8 Files/flame profiles
 - Hazardous location approvals





Sensors (Continued)

- Integrated IR/UV Viewing Head & Signal Processor



- The U2 has a unique touchscreen interface
 - Circular scroll finger “touch Wheel” menú structure (similar to the iPod)



Sensors (Continued)

WATCHDOG III FLARE STACK MONITOR

IRIS MODELS P222 and S256B UV





Select Signal Processors



P522



P531



P532



700ACSP/DCSP



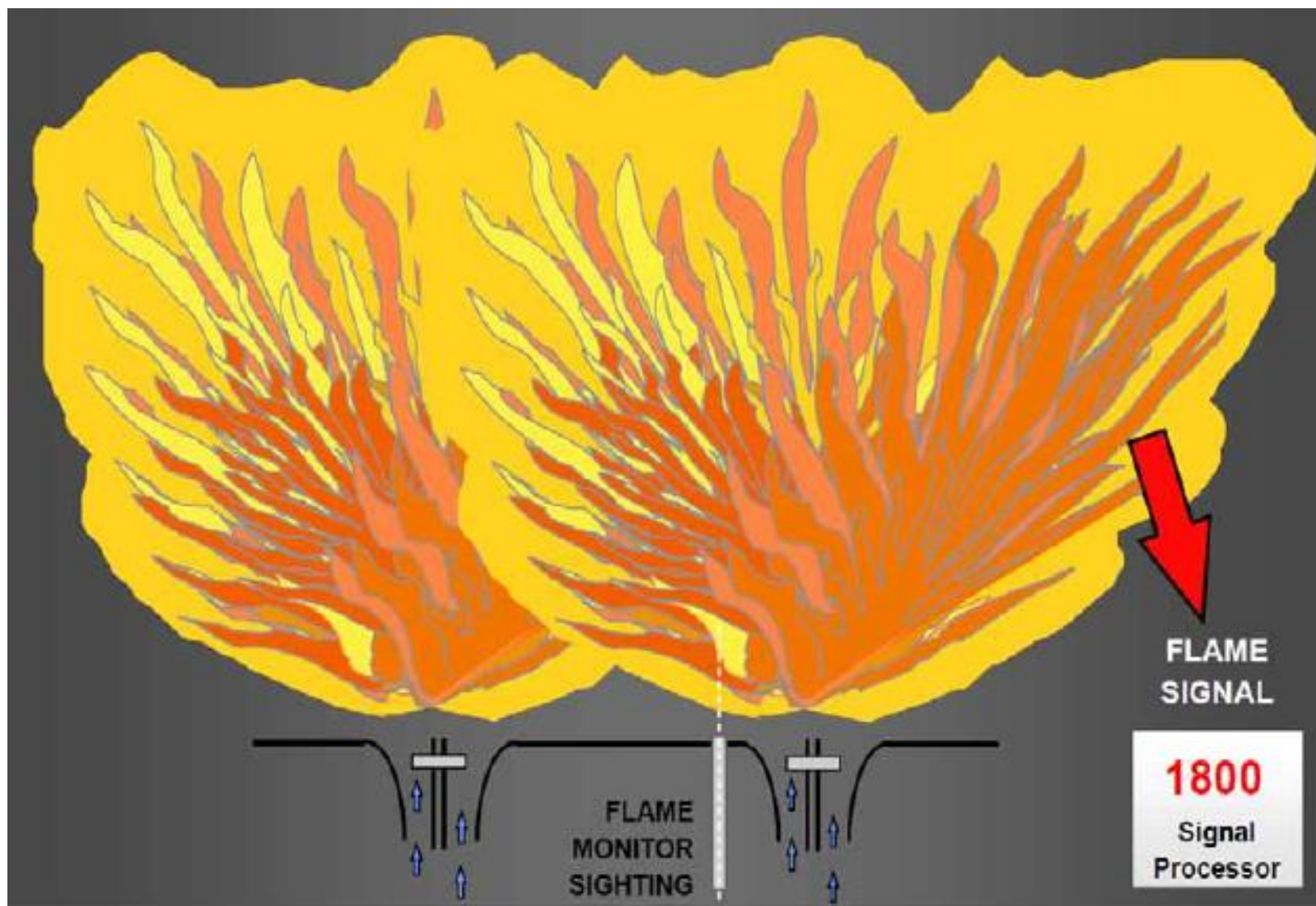
Flame Discrimination Adjustments

- Viewing Head Highlights
 - Adjustable FLAME ON and FLAME OFF settings
 - The “pull-in” and “drop-out” thresholds of the flame relay.
 - Adjustable UV and IR GAIN settings
 - Increase/decrease flame signal for flame discrimination + recognition
 - Multiple SOLID STATE high pass flicker frequency settings
 - Adjust filter based on the flicker frequency on the flame
 - Provides good discrimination *between* flames and background
 - Ignore everything below
 - UV flare stack application specif model
 - Integrated IR/UV scanner and processor model



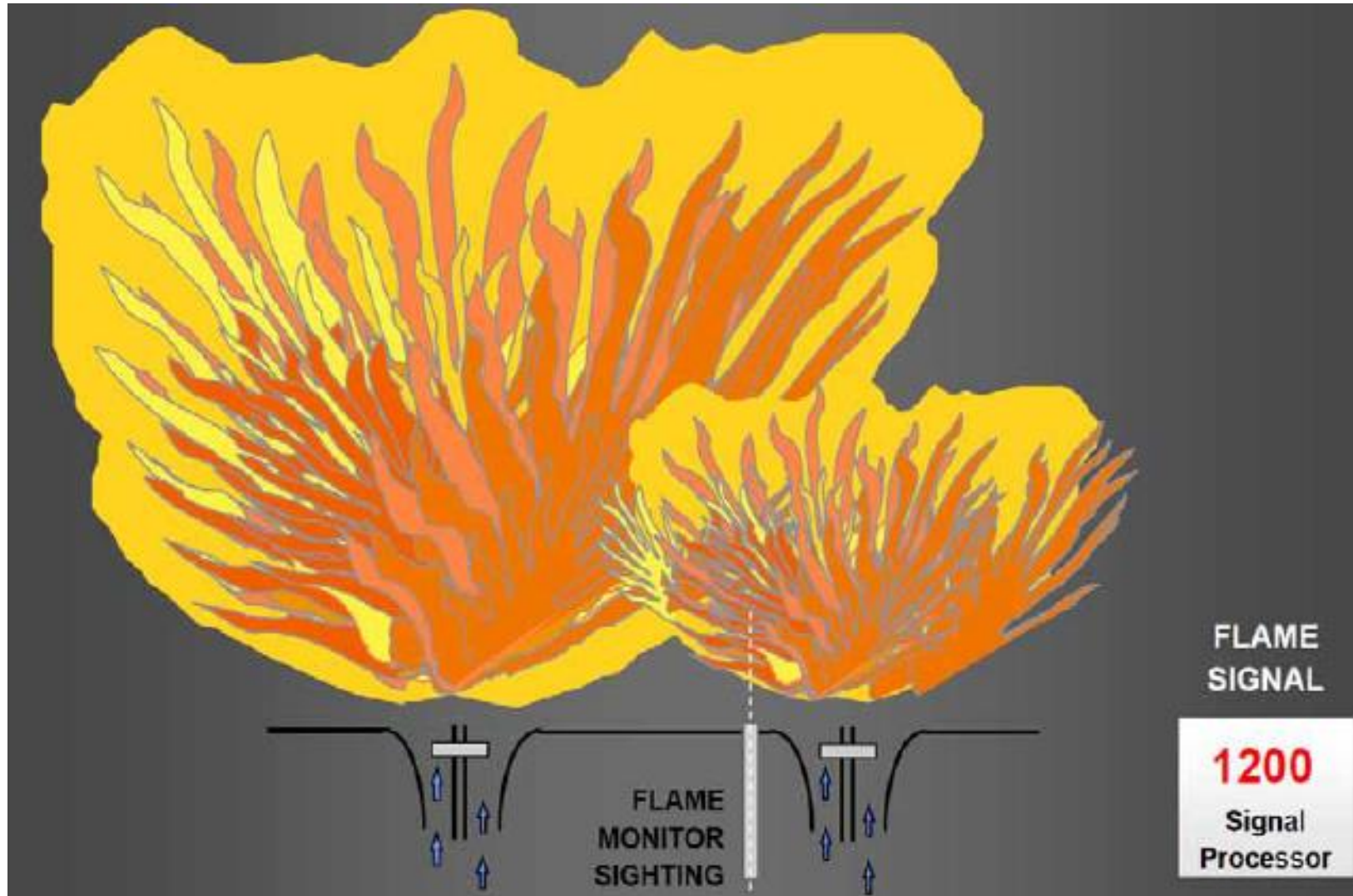


Example Processor Set-up Considerations



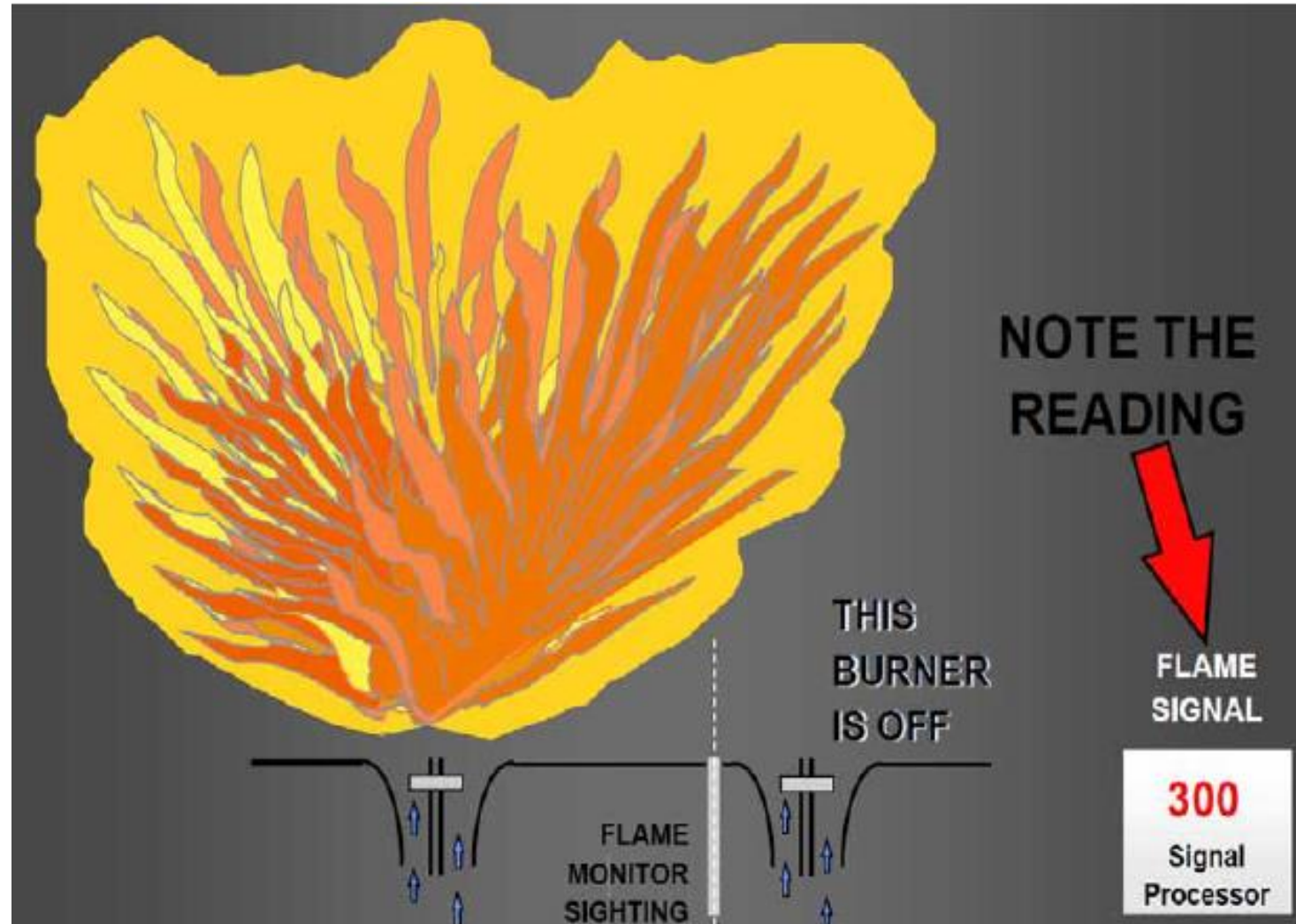


Example Processor Set-up Considerations





Example Processor Set-up Considerations



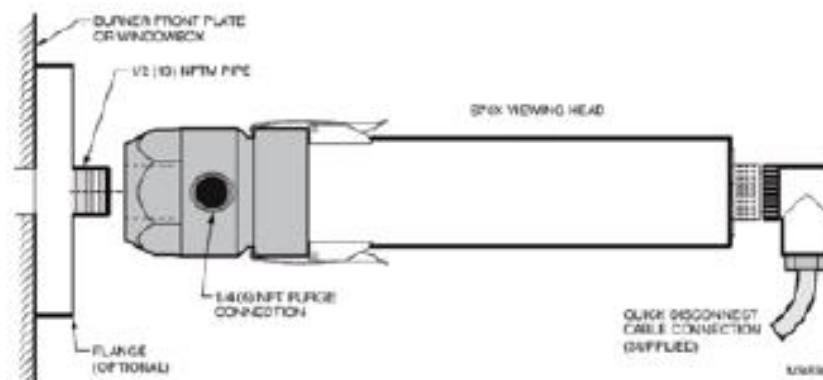
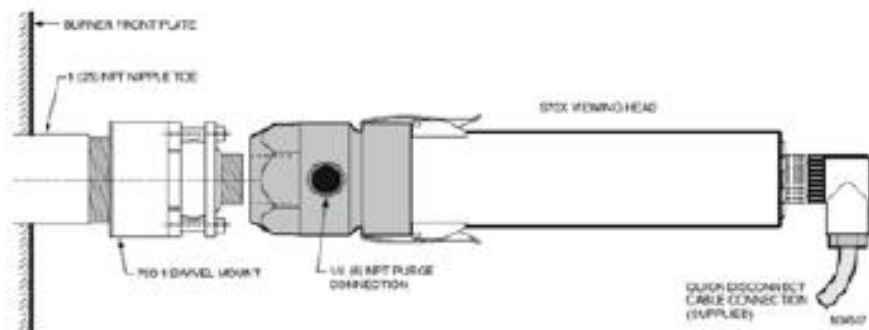
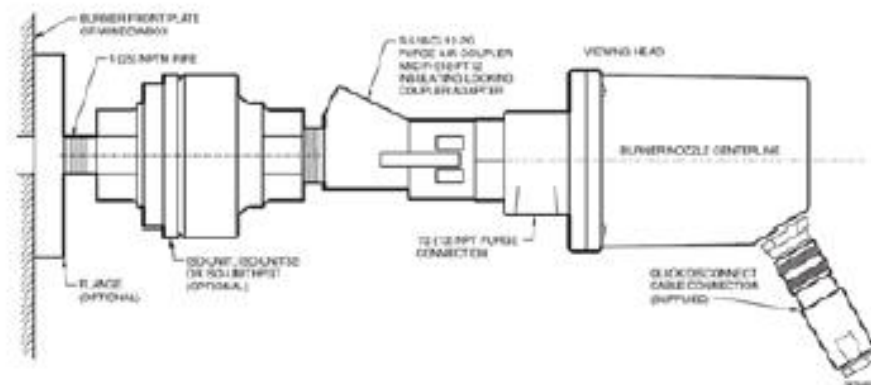
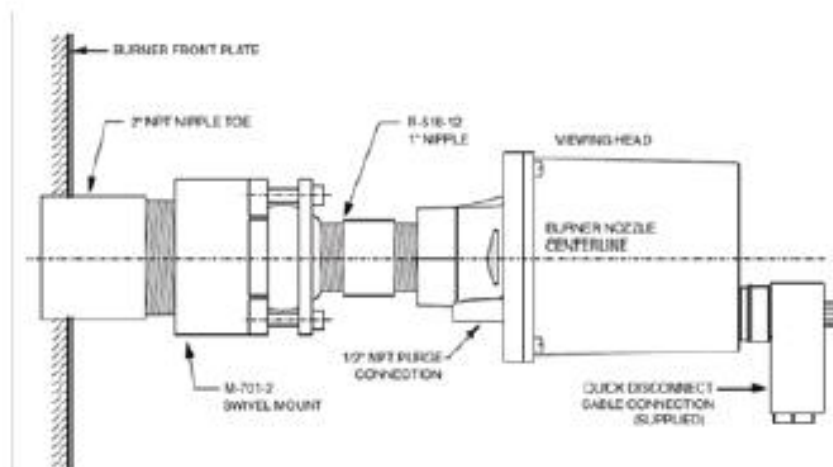


Scenerios that can be monitored





Viewing head mounting examples



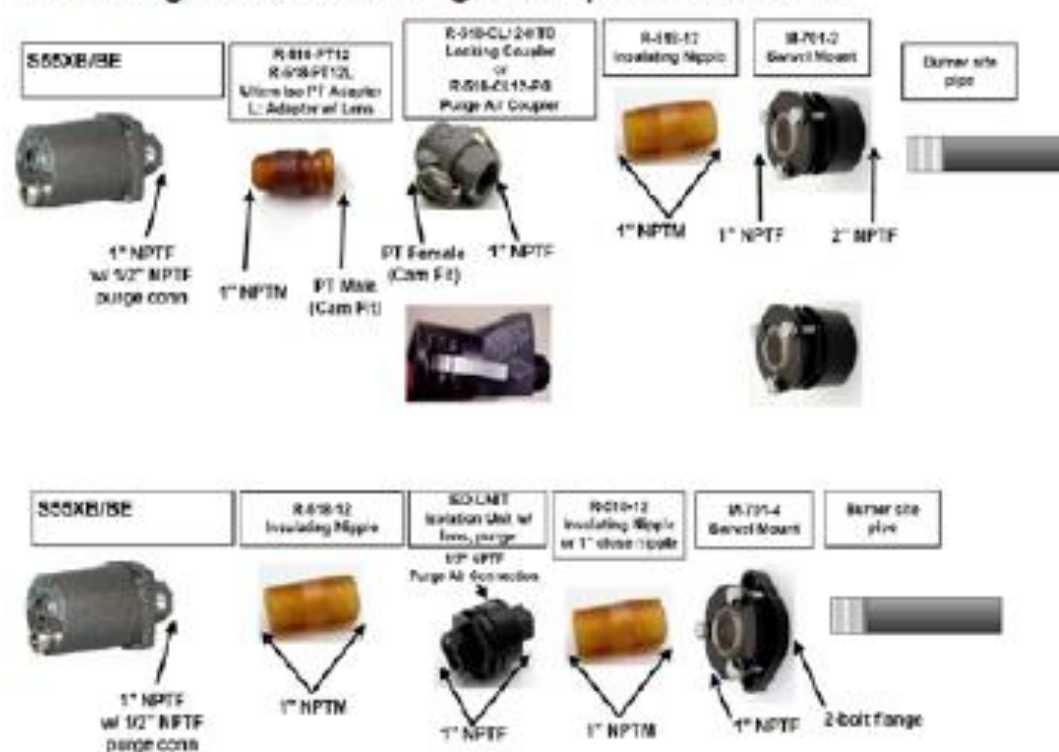


Accessories

• Viewing Head Mounting Examples: S70X/S80X



• Viewing Head Mounting Examples: S55XBE





Get a Better View with Fiber Optics

FIBER OPTIC VIEWING HEAD EXTENSIONS



FEATURES

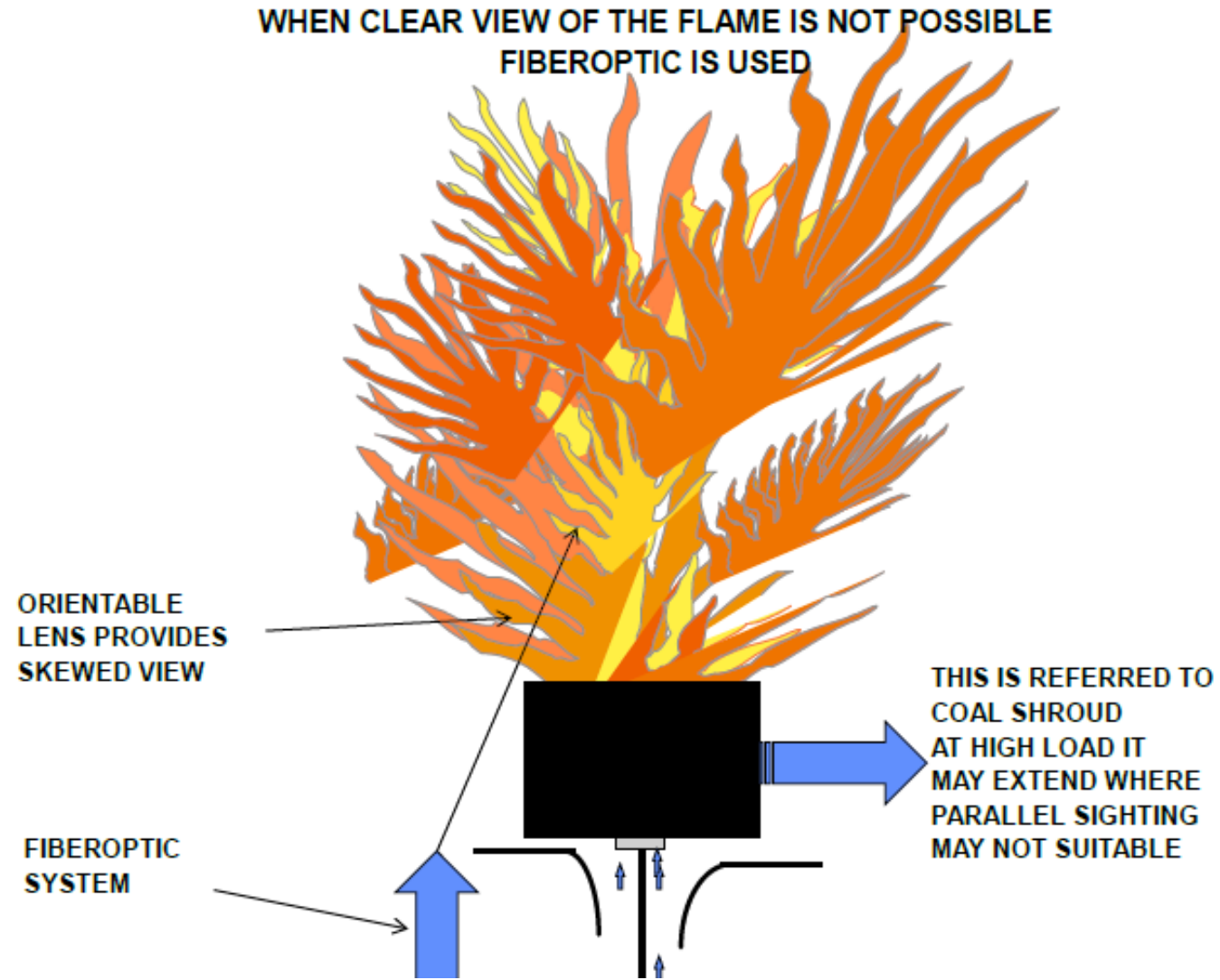
- Transmission up to 25 feet
- Withstands high temperatures
- Withstands high vibrations (application dependent)
- Corrosion protected stainless steel construction
- Different lens assemblies available for changing the angle of view or for specific applications

APPLICATIONS

- Tilting burners firing pulverized coal, oil or gas
- Applications where normal sighting is impossible
- Hostile environments, such as:
 - Lime Kilns
 - Black Liquor Recovery Boilers
 - Thermal Oxidizers
 - Incinerators - Biomass and other waste fuel streams
 - Gas and Oil Fired turbine generator sets



Fiber Optic Considerations





Fiber Optic Assembly

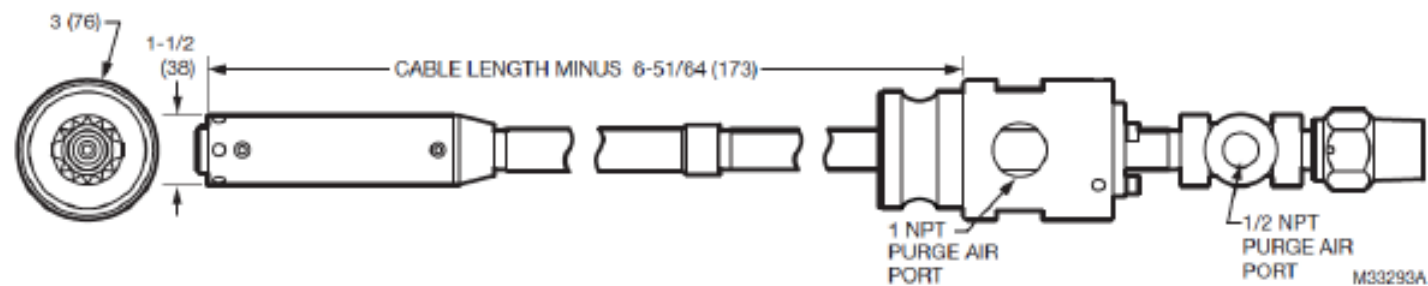


Fig. 1. Inner carrier assembly example (dimensions in in. [mm]).

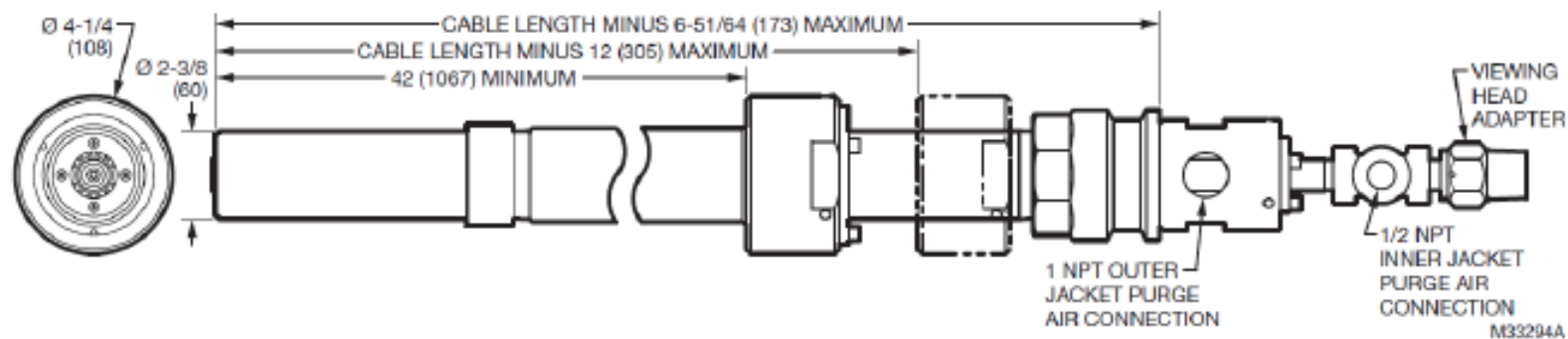


Fig. 2. Outer carrier assembly example (dimensions in in. [mm]).

NOTE: Actual assembly dimensions depend on total fiber optic cable length ordered.



GHE Series Ignitors





GHE Series Ignitors

- Specifications:

- 1-7/8 (4.763) diameter/1-3 MMBTU/hr (~1-3 GJ/hr)
- 2-7/8 (7.303) diameter/2-10 MMBTU/hr (~2-10 GJ/hr)

- Components

- Burner mounting tube with flange, gas insert & gas/air flex hoses
- Inner probe assembly with probe, igniter tip & junction box
- Power pack (2,000Vdc, 12Joules)
- Cable with canon plug





GHE General Dimensions

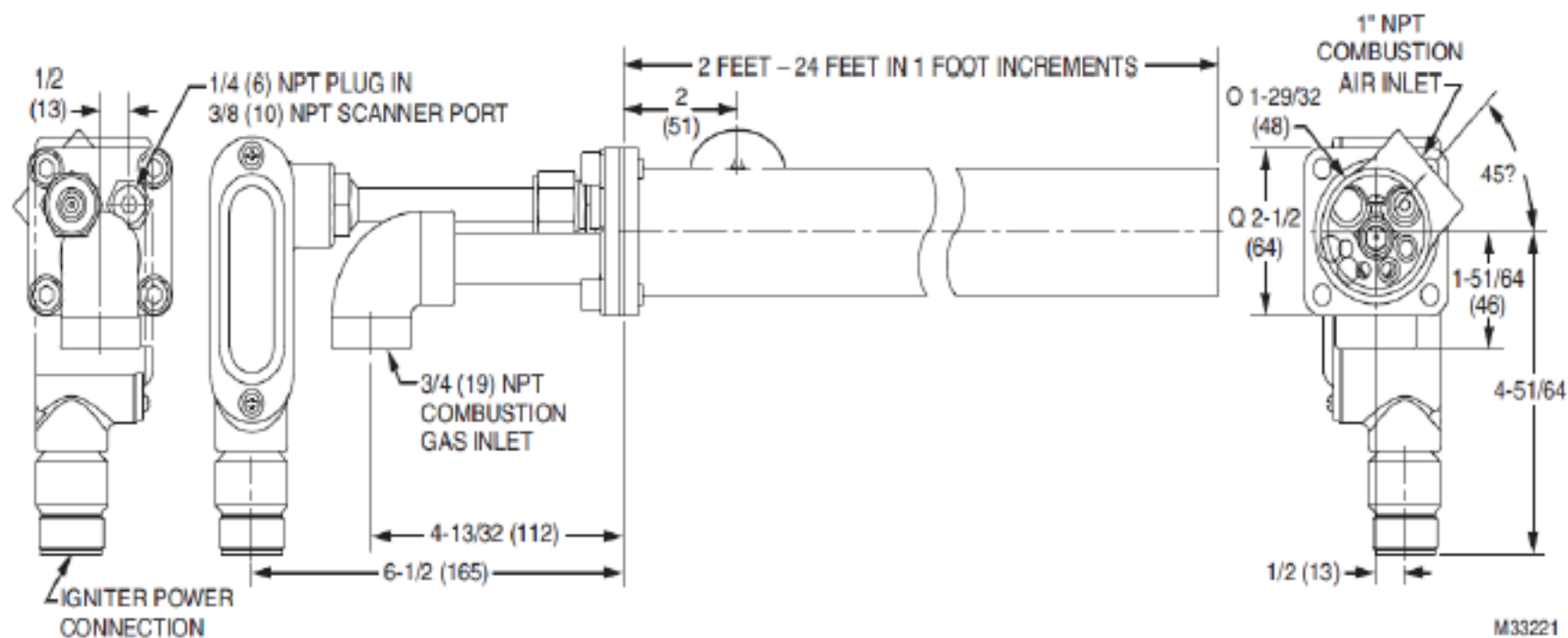


Fig. 2. Igniter example.