PRECISE FLAME MONITORING FOR MULTI-BURNER ENVIRONMENTS.

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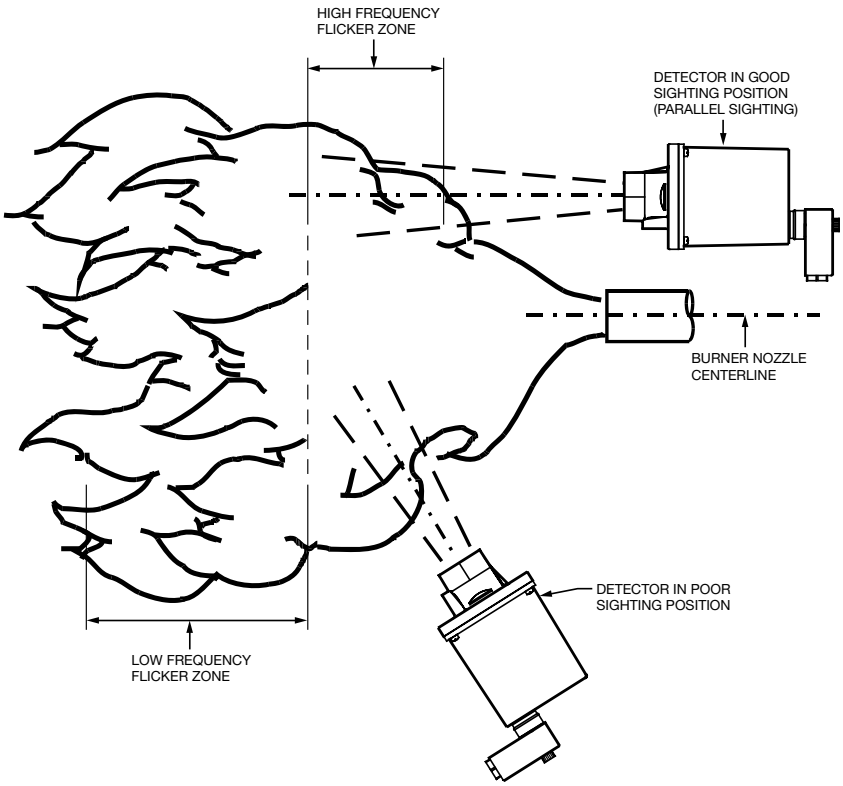
For industries and applications that depend upon continuous, controlled combustion, effective monitoring of burners is a must. This type of detection is effectively provided by scanners that monitor the condition of a flame and provide alerts when a flame has been extinguished.

Yet establishing a clear view of each flame becomes complex when working with large industrial furnaces that operate multiple burners in the same space. In such environments, setting up flame scanners requires careful planning and positioning. Each scanner must have a clear view of its burner to monitor flames for failure, and the scanner must also be able to distinguish or reject refractory glow and background radiation from other burners.

This type of monitoring and analysis is known as "flame discrimination." Honeywell Industrial Flame Monitoring products are designed to provide precise, reliable flame discrimination, even in complex and challenging environments.



Example of sighting for Ultraviolet flame radiation (UV), or Infrared radiation (IR).

The Basics of Flame Monitoring

To refine flame discrimination, it's helpful to first review the essentials of how a scanner monitors a flame. Basic monitoring is typically accomplished by programming a relay to ensure that the flame maintains a setpoint, or operates within a targeted level of performance. If the flame signal or "flamecount" falls below a minimum threshold, then the relay initiates a response.

In the case of Honeywell flame-monitoring products – such as the S70x, S50x, P52x, and P53x product families – when the flamecount falls below the threshold, also known as "flame off", then the relay opens, signaling to the burner control system that the flame has been lost.

With these standard elements in mind, flame discrimination is refined by calibrating three key settings to ensure precise detection of flame loss. These three settings are proper sighting, gain adjustment, and filtering adjustment.

Sighting the Scanner

When sighting a flame scanner, the goal is to place the sensors where the target flame's radiation will register with high magnitude and frequency, while background radiation will only register with low magnitude and frequency. Thus the scanner's position should enable it to view the high-energy,

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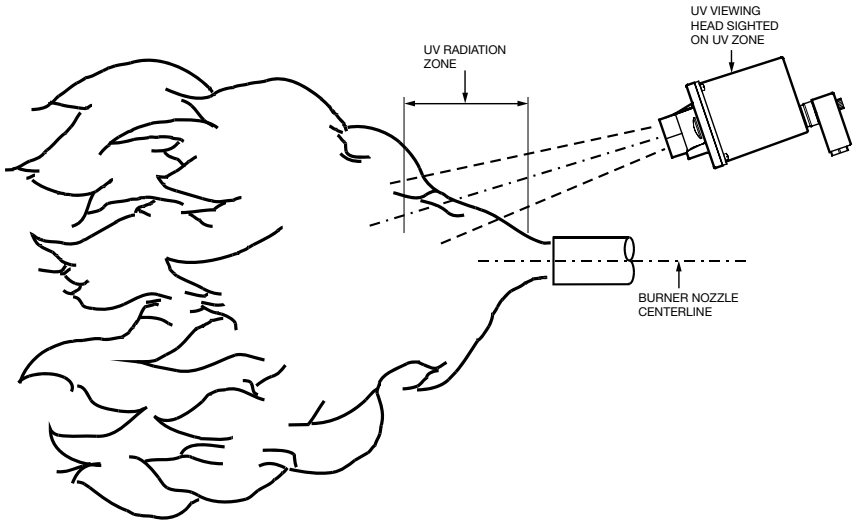
high-frequency portion of the target flame and only the low-energy, low-frequency portion of background flames.

The optimal position for this sort of detection may vary based on the type of sensor being used as well as the type of burner and the specific combustion application. Nonetheless, in many case the optimal position is viewing from the root of the target flame with the scanner positioned nearly parallel to it.

Once positioned properly, the sensor's gain and filter settings can be calibrated to further refine the flamecount detected by the flame scanner. The objective in this case is to calibrate the settings so that during normal firing and load conditions, the scanner registers radiation from the target flame at a value in the middle of its detection range.

During this calibration, filter and gain settings may be adjusted at the same time or one before the other, but it will likely require several adjustments and refinements to each to achieve an optimum detection value.



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Gain Adjustment

Gain adjustment increases or decreases the intensity of sensor amplification within the flame scanner. This causes the scanner to register a higher or lower flamecount for a fixed quantity of radiation. The gain should be adjusted to a value that will produce midrange flamecount values at normal firing conditions. (See manuals for your specific device to determine your standard operating ranges.)

Filter Adjustment

Filter adjustment increases or decreases the flame-flicker frequencies to be rejected by the scanner. As this setting is increased, the scanner omits lower flame-flicker frequencies from the flamecount, thus reducing the overall flamecount.

Thus for example, sighting a scanner for the high-frequency portion of the target flame and the low-frequency portion of the background radiation allows for a portion of background radiation to be omitted by increasing the filter setting.

Testing the Calibrations

Finally, it is important to emphasize that proper calibrations for sighting, gain, and filtering must be tested after implementation, and further adjustments should be made as necessary to ensure that the flame scanner operates effectively. Optimal operation is achieved when the flame scanner accurately detects the flame during all firing rates and load conditions and immediately alerts the control system when the target flame is extinguished, even amidst the presence of background radiation.

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