Spectrum VIR VI Flame Scanner

The Fossil Power Systems (FPS) Spectrum VIR VI Flame Scanner adopts a fresh new look at the problems involved in flame scanning. It pairs better visible, infrared and ultraviolet detectors with powerful microprocessor technology to yield an enhanced scanner design.

It utilizes a modular set of detector head electronics (Scanner Heads) to condition the incoming signals for various flame types and conditions. A central processing facility, (Scanner Module) then uses pattern recognition algorithms and user defined rules to detect and correctly signal the flame condition. Superior results are obtained by concentrating on factors other than flame flicker. In particular, the scanner analyzes the frequency spectral characteristics of light emitted in different wavebands, and compares these with pre-stored spectral profiles representative of flame.

Traditional flame scanners measure the peak of the AC time varying signal. This method limits the acceptable flame to a narrow set of characteristics. Each flame, however, emits a flame spectrum or envelope of light transmissions of differing frequencies and amplitudes. This spectrum alters in response to differing conditions caused by changes in load, air supply and background light emissions.

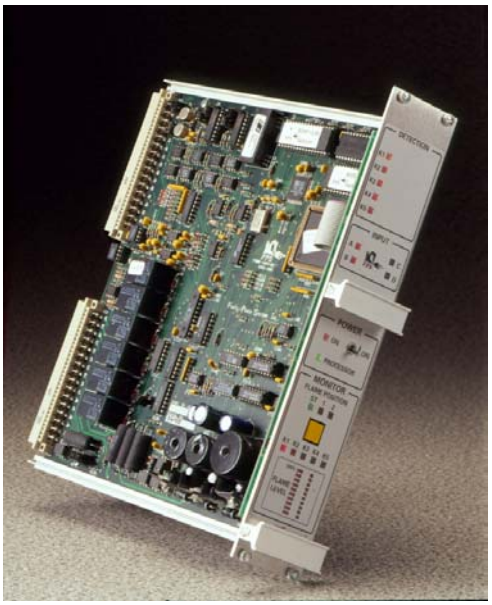
The Spectrum VIR VI Flame Scanner is capable of analyzing the characteristics of the flame spectrum, thereby offering the user much greater flexibility in defining the properties of an acceptable flame.

The Scanner Modules reside in a rack assembly, which also provides networking capability via a proprietary RS-485 protocol to a Windows compatible computer. Up to 16 of these assemblies can be daisy chained together, allowing for 128 Scanners on a single network. Cabling from Scanner Heads is wired into terminal blocks on the rack motherboard. A fully wired chassis can have up to 8 Modules and 16 Heads, since each Module can accommodate up to two Heads.

A Scanner Head contains one or more single or dual color photocells and/or an ultraviolet tube.

A fiber optic assembly may be used to focus the visible and infrared emissions from the flame onto the photocells.

Photocell outputs are low-level voltages, with time varying characteristics that reflect the changing nature of the flame emissions. Signals are characterized as a DC component, corresponding to the general strength (or brightness) of the flame emissions, and an AC time varying component (or flicker) reflecting the time dependent characteristic of the combustion process. The AC characteristic of the cell output is filtered to remove frequency components below 10 Hz and above 500 Hz.



Spectrum VIR VI Flame Scanner Module

Key Features

Visual Indication

- Front panel shows current flame confidence level, relay contact and digital input status

Host Processor

- Host processor manages DSP scans, front panel I/O, tuning software communications and hardware self testing

DSP Coprocessor

- High speed dedicated DSP coprocessor performs signal acquisition and real-time spectral analysis

Two Analog Outputs

- Isolated 4-20mA analog signals for remote indication of flame confidence levels. Configurable to most standard current or voltage ranges

Five Relay Outputs

- Flame status relay output contacts. Form A.

Single or Dual Color Scanner Head

Tri-Color Scanner Head

There are several Scanner Head Types that can be utilized in conjunction with the VIR VI Scanner System.

Scanner Head Types

Direct Sighted Head Assembly

- **Single Color (oil/coal)**
  - Opposed Fired
  - Front Fired
  - Visible spectrum
- **Dual Color (oil/coal)**
  - Opposed Fired
  - Front Fired
  - Visible and Infrared spectrum
- **Tri-Color (oil/coal/gas)**
  - Opposed Fired
  - Front Fired
  - Visible, Infrared and Ultraviolet spectrum

Fiber Optic Sighted Flexible or Rigid Head Assembly

- **Single Color (oil/coal)**
  - Front Fired
  - Tilting Burner (flexible)
  - Visible spectrum
- **Dual Color (oil/coal)**
  - Opposed Fired
  - Tilting Burner (flexible)
  - Visible and Infrared spectrum
- **Tri Color (oil/coal/gas)**
  - Opposed Fired
  - Unstable Burner
  - Visible, Infrared and Ultraviolet spectrum

Guide Tube Assembly

A guide tube assembly of appropriate length is provided with all of the above fiber optic scanner head assemblies.

- **Flexible for flex heads**
- **Rigid for non-flex heads**

Mounting Hardware

- A mounting assembly is provided for direct-sighted heads c/w quick disconnect for easy removal from the boiler. These assemblies can be provided in custom configurations to adapt to existing burner hardware

Specifications

Scanner Modules

- **Relay Contacts**
  10 AMPS @ 120 VAC (General Use)
  8 AMPS @ 30 VDC (resistive)
  1/2 AMP @ 125 VDC (resistive)
  Five outputs provided
- **Alarm Contacts**
  10 AMPS @ 120 VAC (General Use)
  8 AMPS @ 30 VDC (resistive)
  1/2 AMP @ 125 VDC (resistive)
- **Digital Inputs**
  24 VDC @ 2.4mA **or**
  120 VAC/120 VDC @ 12mA
  Four inputs provided
- **Analog Outputs (2) (Isolated Supply)**
  Specified at time of order
  4-20mA
  0-20mA
  0-5 VDC
  1-5 VDC
  0-10 VDC
  2-10 VDC

Scanner Rack

- **Configuration Layout**
  2 Slot, 4 Slot or 8 Slot
- **Supply**
  24 VDC @ 4 AMPS
- **Environment**
  0°C to 60°C
  <95% Relative Humidity
- **Certification**
  FM, CSA

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