

HSD: Hot Slug Detector

Hot Slug Detection

Hot slugs form in the fiber batting process when molten glass falls from the spinner and into the product during the manufacture of fiberglass batting. Surrounded by insulating material, these hot slugs remain hot, and days later can cause the paper backing and organic binder material to ignite, creating a fire in a warehouse, on a train or in a truck. The Williamson HSD hot slug detector identifies the presence of small slugs below the surface of the fiberglass batting during the manufacturing process.

The Williamson model HSD combines three innovative Williamson technologies to produce the only viable and reliable hot slug detector.

Short-Wavelength Technology

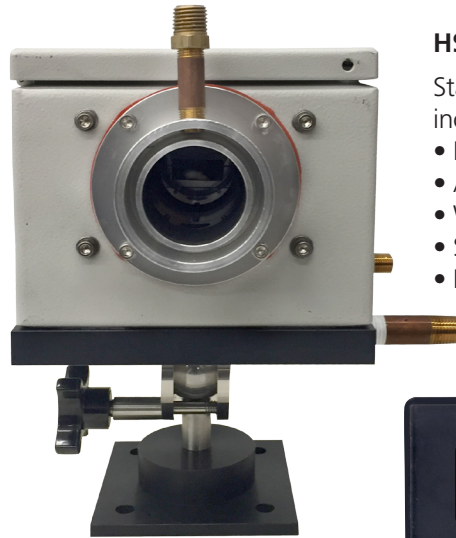
- Short Wavelengths view deep into the batting to sense even the smallest hot slug.
- Model HSD-00 views as deep as 16 inches into the batting and is compatible with conventional lighting.
- Model HSD-01 views as deep as 30 inches into the batting and is compatible with LED lighting, fluorescent lighting, or an area in a shadow. This model is more than 3 times more sensitive to hot slugs near the bottom of the batting compared to the model HSD-00.

Large Viewing Area

- Configuration mounted at a 8 feet / 2.4 meters distance, the HSD views a 37 inches / 923 millimeters wide area.

Unique Hot Spot Detection System

- The Rate of Change (ROC) alarm system senses the small but instantaneous change in temperature reading associated with the introduction of the hot slug into the field-of-view.
- The ROC compares the current reading with the reading taken a fraction of a second earlier. Any rise in temperature is amplified and the result is used as the hot slug alarm parameter.



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Standard Configuration includes

- Laser Aiming (LA)
- Air Purge (AP)
- Water Cooling (WC)
- Swivel Bracket (SB)
- Interface Module (IM)



Interface Module (IM)

HSD Specifications

HSD Specifications	
Part Number	HSD-00-IM-CF040 (Traditional Area Lighting) HSD-01-IM-CF040 (LED / Fluorescent Area Lighting)
Temperature Limits	750 to 250°F / 25 to 120°C
Spectral Response	Traditional Area Lighting / LED or Fluorescent Lighting
Field of View	37 in x 37 in / 923 mm x 923 mm @ 8 ft / 2.4 m
Accuracy	0.25% of reading or 2°C whichever is greater
Repeatability	Better than 1°C
Emissivity	0.010 to 1.500
Response and Update Time	100ms Initial Response Time with 50ms Update Time
Analog Output	0/4-20mA output (max impedance 1000 ohms)
Alarm	Two Form-C, One TTL Alarm
Analog Input	0/4-20mA
Digital Interface	Bi-Directional RS485 and RS232 Multidrop communications available
Measured Parameters	Filtered and Unfiltered Temperature, Ambient Temperature, Rate of Change and Cell Strength
Input Power	24Vdc (300mA)
Ambient Temperature Limits	0 to 150°F / -17 to 65°C with Water Cooling Plate: 350°F / 175°C (varies with water rate & temp)
Enclosure Rating	Corrosion resistant enclosure w/ NEMA4X (IP65) rating.
Weight	12lbs (5.44kg)
Dimensions	9.13 in x 5.91 in x 4.72 in / 233mm x 150mm x 120mm
Certification	Calibration certificate is standard with each unit CE: EMI / RFI for heavy industry; LVD (Low Voltage Directive)
Warranty	2 years

Hot Slug Detector

Configuration:

The hot slug detector is available in two configurations. Both include the interface module (IM) to provide the hot spot detection technology and alarm.

Theory of Operation

The HSD senses the small but rapid change in measured temperature as the hot slug enters the field of view. This small change in measured temperature is amplified by the ROC Multiplier setting (0 to 100). For example, with an ROC Multiplier setting of 100, a 7-degree rise in sensed temperature becomes amplified to produce an ROC output value of 700. This alarm technique allows the bulk temperature of the batting to gradually rise and fall with changes in ambient temperature and operating practices while still allowing the system to alarm on relatively small instantaneous measures of temperature change.

Mounting Location

For best results, the HSD pyrometer should be mounted after the fluffing blower and before the curing oven.

Alarm Action

The Williamson HSD system measures the average bulk temperature of the batting and also the ROC alarm parameter. Both of these signals are available using a 4-20 mA analog output signal and a form-C contact alarm. The typical customer ties the ROC alarm signal to a marking system which identifies the location of the hot slug along the length of the batting so that the identified area may be cut from the product before it leaves the production line. Williamson does not supply the marking system.



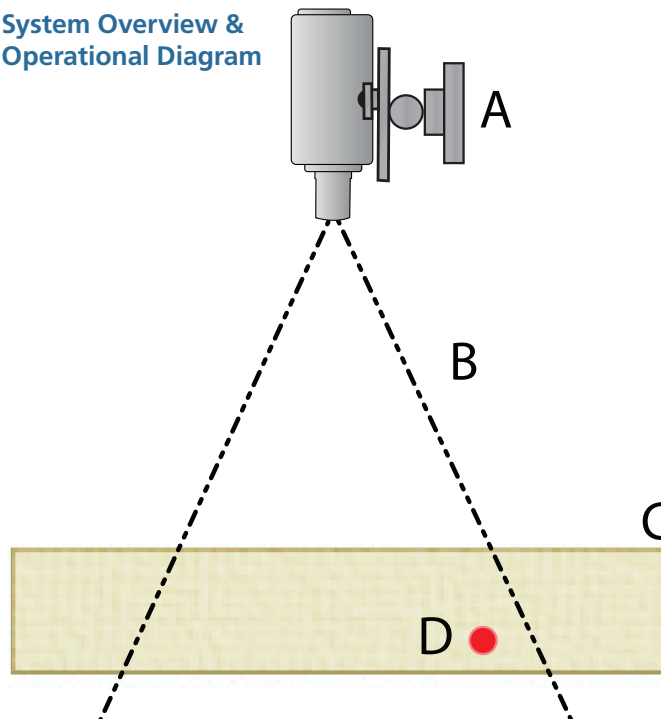
HSD-00-IM-CF040

- Original wavelength set
- Senses a ¼-inch (6 mm) slug as deep as 16 inches below the surface of the batting material.
- Optimized for depth of penetration while also limiting the sensitivity to hot-light reflections.

HSD-01-IM-CF040

- Optimized wavelength Set
- Senses a ¼-inch (6 mm) slug as deep as 20 inches and a ½-inch slug as deep as 30 inches below the surface of the batting material.
- Optimized for depth of penetration and requires the area lighting to be LED or fluorescent or for the area of measurement to be shielded from traditional hot-lighting.

System Overview & Operational Diagram



A) Model HSD

Hot Slug Detector
-00 = traditional lighting
-01 = LED or fluorescent

B) D/2.6 Optical Resolution

27 in x 27 in @ 6 ft / 692 mm x 692 mm @ 1.8 m
37 in x 37 in @ 8 ft / 923 mm x 923 mm @ 2.4 m
Install multiple units across the width of the batting

C) Fiberglass Batting

Typical Thickness:
10 in to 30 in /
250 to 770 mm

D) Subsurface Hot Slug

Warehouse Fire Hazard

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Where Wavelength Matters