PROCESS SENSORS CORPORATION

New Dimension in Non-Contact Temperature Measurement Sensing

Metis HS / HI Series - High Speed Pyrometers

50 microsecond speed of response delivers 20,000 measurements per second.

New Infrared Thermometer models: Metis HS09 and HI16 are ultra high speed versions of the reliable and reputable, Metis series. Operating in the short wavelength region of the infrared spectrum, these models are an excellent choice for applications with the need for ultra fast measurement of metals, silicon wafers, ceramics, composites etc., above 250℃.

Chart 1: Temperature Range and Spectral Response

Model	HS09	HI16	HI16*
Spectral Response	0.7…1.1µm	1.45…1.8µm	1.45…1.8µm
Temperature Range	550...1200℃ 600...1400℃ 650...1600℃ 700...1800℃ 750...2000℃	400…1200℃ 500…1600℃ 600…1800℃ 700…2500℃	250…800℃ 300…900℃ 350…1100℃

Non-fiber / fiber optic versions employ **focusable lenses** which provide for the smallest spot size in respect to the sensor's field of view, selected by lens type, at any distance.

The **fiber optic model** is equipped with the standard, rugged stainless steel sheathed mono glass fiber cable, 9.8 ft (2.5 m) long. Depending on zero scale temperature, up to 98 foot (30m) long cable can be selected.

Chart 2: Focusable Lenses of Standard Version

Lens Type	Distance	Spot size diameter Ø	
		HS09 / HI16	HI16*
OM09-A0	130 mm	0.35 mm	0.7 mm
	160 mm	0.50 mm	1.0 mm
	200 mm	0.70 mm	1.4 mm
OM09-B0	190 mm	0.50 mm	1.0 mm
	300 mm	0.80 mm	1.6 mm
	420 mm	1.30 mm	2.6 mm
OM09-C0	340 mm	0.90 mm	1.8 mm
	2000 mm	6.50 mm	13 mm
	4000 mm	15 mm	30 mm

Chart 3: Focusable Lenses for Fiber Optic Version

with 1" (25 mm) O.D. lens assembly

Lens Type	Distance	Spot size diameter Ø	
		HS09 / HI16	HI16*
OL25-G0	75 mm	0.50 mm	0.7 mm
	130 mm	0.65 mm	0.85 mm
	180 mm	0.70 mm	1.0 mm
OL25-H0	170 mm	0.75 mm	1.4 mm
	2000 mm	9 mm	17 mm
	4500 mm	22 mm	40 mm

The detector is sensitive to infrared radiation in an area called **cone of vision.** Refer to **Chart 2 and 3** for determining spot size diameter at the shortest, medium and longest distances, when in focus. For full scale temperatures up to 1400℃, the cone of vision (aperture diameter of Metis Sensor's lens) is approximately 16 mm, and 8 mm for full scale temperatures greater than 1400℃. Aperture diameter for **Chart 3** lenses are approximately 18 mm. The spot size diameter for distances not given in the charts can be calculated by interpolation. The cone of vision area must to be kept free from any intervening

Chart 4: Miniature Focusable Lens for Fiber Optic Version

Lens Type	Distace	Spot size diameter Ø	
		HS09 / HI16	HI16*
OL12-A0	100 mm	1.0 mm	2.0 mm
	350 mm	3.7 mm	7.4 mm
	600 mm	7.0 mm	14 mm

A small 12 mm diameter focusable lens with an aperture (cone of vision) diameter of 7 mm in front of the lens is available for applications where a miniature reimaging lens is necessary. To determine spot size at the focal distance, please refer to Chart 4.

Focusable lenses offer an optimal adaptation of spot size diameter depending on application and sensor type:

Infrared energy emitted by a target is collimated either directly onto the detector (standard version), or onto one end of the fiber optic cable via the focusable lens assembly.

The lens focussing feature offers:

- Temperature measurement of the smallest spot size provided at its focal point
- Measures the average temperature of a bigger spot size when focusable lens is out of focus

Lenses are made of BK7, an optical glass which is highly transparent in the spectral region of *Metis HS and HI series*.
If additional windows are necessary, they must offer similar optical characteristics.

3 different optical alignment solutions are offered for focussing onto a target:

- Laser aiming (and only method of sighting available for fiber optic versions).
- Through the lens sighting with reticule is advantageous for aiming down sight tubes or onto hot incandescent targets. For full scale temperatures above 1800℃, a dimmabl e Through the lens sight attenuation filter is incorporated into the IR sensor to protect the operator's eye from high intensity radiation.
- Built-in b/w video camera for remote monitoring of the heating process in harsh & difficult to reach environments.

Analog and digital temperature output signals for indication, recording, archiving and controlling:

- Isolated analog output signals, switchable from 0 to 20ma to 4 to 20 mA.
- Zero- and full-scale temperatures are adjustable (sub range) to cover any portion of the IR sensor's temperature span
- Ultra fast RS485 digital com. interface max. 921 kBd, min. measurement interval of 60µs via ***PSCWin*** Software.

Signal Filtering:

For measuring and holding of the highest instantaneous temperature value, a **peak picker** (maximum value storage) is installed to compensate interruptions or attenuations in radiation caused by bursts of steam, smoke or dust blocking the Ir sensor's cone of vision.. It can be either reset automatically or manually by an external contact closure or periodically by user preset clear time. In the latter case, the highest temperature will be held in a dual storage and will be reset in only one of the two storages after preset clear time. This advanced circuitry enables it to avoid a decrease of temperature output, should a short "cold period" duration occur at the exact moment of reset, of the clear time.
The **response time** is the length of time it takes for the output signal to reach 90% of a step change in measured temperature. It can be used to filter out rapid variations in temperature and achieve a "more stable" signal for control or display purposes.

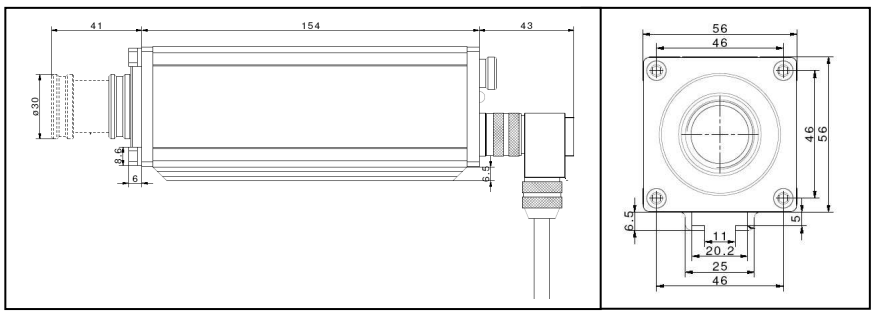
Software:

The ***PSCWin*** **Software** is available for automatic or manual set up of the pyrometer, for recording and saving of graphical, text or table files. These files can be extremely important for quality assurance purposes and for analyzing historical data. In addition, recording can be triggered externally.
Minimum computer requirements are: 1GHz clock frequency and current Windows operating systems.

Sensor Specifications:

Measurement Uncertainty:	Full scale temperatures < 1500℃: 0.5% of measured value in ℃ + 1 K Full scale temperatures < 1800℃: 0.7% of measured value in ℃ + 1 K Full scale temperatures < 2500℃: 1% of measured va lue in ℃ (ε = 1, t_{90} = 1s, T_A = 23℃)
Repeatability:	0.2% of measured value in ℃ + 1 K (ε = 1, t_{90} = 1s, T_A = 23℃)
Response Time t_{90}:	< 50 µs, adjustable up to 10 s
Emissivity adjustment range:	0.10 to 1.20
Temperature resolution:	analog < 0.1% of adjusted temperature range, digital 0.1℃
Peak picker reset rate:	In 0.1 ms steps up to 25 s adjustable via software
Analog Output Signal:	0 to 20ma or 4 to 20 mA (selectable), 500 Ω max. load
Digital Interface:	RS 485, 921 kBd max.
Ambient Temperature Range:	**Pyrometer**: operation 0 – 65℃, storage -20 – 65℃, **Fiber Optic Version: Cable and Lens**: 0-250℃
Power Supply:	24 V DC (15 – 30 V DC), 8 VA
Isolation:	power supply - analog and digital output are galvanically isolated from each other
Housing and Rating:	extruded aluminium profile, IP 65 per DIN 40 050 with cable connector installed
Weight:	1.1 lb (500 g)
CE Label:	according to EU directives for electromagnetic immunity
Laser Pointer:	optional: 650 nm, < 1 mW, class II per IEC 60825-1-3-4

Dimensions: *Metis HS* and *HI* (Standard through lens sighting model illustrated below).



Process Sensors Corporation
113 Cedar St.
Milford MA, 01757
Tel.: 508-473-9901
N.J. Office: 201-485-8773
Fax: 508-473-0715
IRtemp@processensors.com
www.processsensorsIR.com