

# SILVER SERIES

Low Cost, Single-Wavelength (1 $\lambda$ ) Industrial Infrared Thermometers

SSDS2013

## Reliable compact industrial infrared thermometers for

- *Temperatures below 3632°F/2000 °C*
- *Non-reflective target materials*
- *Moving targets*



The C9 Class offers current, voltage or thermocouple outputs with a fixed emissivity setting of 0.95.

The C9A Class has a 4-20mA output plus a 4-20mA input for remote emissivity adjustment. The emissivity input can be supplied by a PLC or adjusted manually with the optional Emissivity Adjuster (EA) Module.

The C9B features digital communications via a built-in RS485 Modbus RTU interface which allows users to adjust the emissivity setting; compensate for reflected energy; apply filtering; select max, min, average or instantaneous readings; and peak or valley hold.

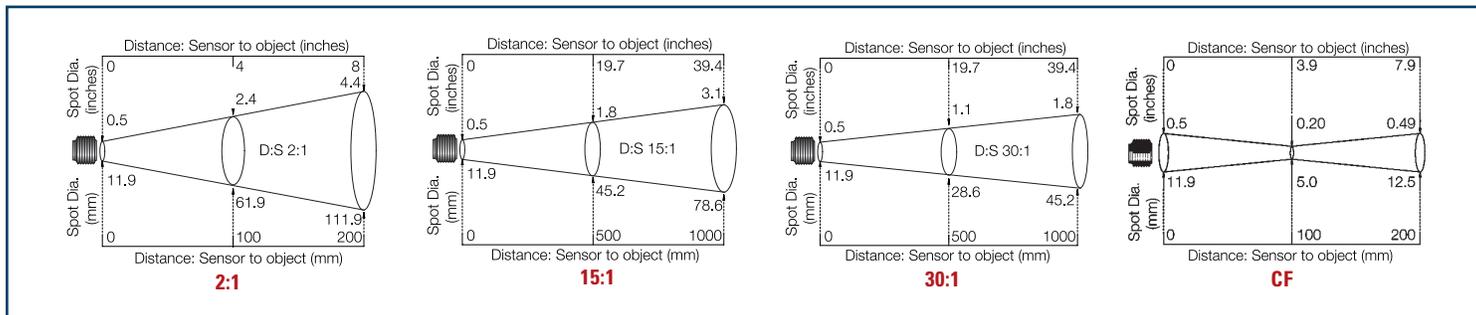
**Features**

- Temperature range: -20°C to 500°C
- Emissivity Setting: 0.95— Optional manual emissivity adjuster (C9A via 4-20mA Input, C9B via Modbus)
- Two-wire 4-20 mA output proportional to target temperature
- Field of view: 2:1, 15:1, 30:1 or close focus
- Fast response with high stability
- Stainless steel enclosure with NEMA4X (IP65) Rating
- Quick and easy installation
- Optional air/water cooled housing, air purge collar, laser sighting tool and mounting brackets
- Optional SilverBus Touch-Screen Terminal for configuring and displaying data from up to eight pyrometers (C9B only)



Sensor Specifications	
<b>Accuracy</b>	±1% of Reading or ±1°C whichever is greater
<b>Repeatability</b>	±0.5% of Reading or ±0.5°C whichever is greater
<b>Response Time</b>	240 ms (90% of Response)
<b>Input Power</b>	6 to 28Vdc (20mA)
<b>Loop Impedance</b>	900 ohms maximum
<b>Sensor Ambient Temperature Limits</b>	32-158°F / 0-70°C with water cooling the limit is 482°F/250°C
<b>Enclosure Rating</b>	Stainless Steel Enclosures with NEMA 4X (IP65) Rating
<b>Relative Humidity</b>	95% max non condensing
<b>Mounting Thread (Nut Included)</b>	M16 x 1.0mm pitch
<b>Weight with Cable</b>	0.2 lbs / 95 g
<b>Sensor Dimensions</b>	0.7in/18mm Diameter x 4in/103mm Long
<b>Optional Emissivity Adjuster (EA)</b>	<ul style="list-style-type: none"> <li>• Polycarbonate enclosure with NEMA 4 (IP65) Rating</li> <li>• 2.6in/65mm tall x 2in/50mm wide x 1.4in/35mm deep</li> <li>• 24Vdc (13V to 28Vdc) Input power</li> <li>• 4-20mA output for emissivity 0.2-1.0</li> <li>• 3.5 digit LCD Display with push buttons</li> </ul>
<b>CE Certification</b>	EN61326-1: 2006 for EMC
<b>Warranty</b>	2 year

Part Code A - Sensor Model (see page 6 for options and accessories)			
Model Number	Spectral Response	Temperature Range	
		Fahrenheit	Celsius
<b>C9-1</b>	8 to 14um	-4 - 212 °F	-20 - 100 °C
<b>C9-2</b>	8 to 14um	32 - 482 °F	0 - 250 °C
<b>C9-3</b>	8 to 14um	32 - 932 °F	0 - 500 °C
<b>C9A-1</b>	8 to 14um	-4 - 212 °F	-20 - 100 °C
<b>C9A-2</b>	8 to 14um	32 - 482 °F	0 - 250 °C
<b>C9A-3</b>	8 to 14um	32 - 932 °F	0 - 500 °C
<b>C9B-1</b>	8 to 14um	-4 - 932 °F	-20 - 500 °C



# SILVER M CLASS PYROMETERS

The MD9 Class features a two piece design and miniature sensing head with up to D/30 optical resolution. There is a choice of 4-20mA with an adjustable emissivity setting or RS485 Modbus interface. The MD9HT has a high ambient sensing head that can withstand temperatures to 350°F.

## Features

- Miniature sensing head and configurable electronics module
- Touch screen (optional) for temperature indication and configuration.
- Adjustable emissivity setting - suitable for a wide range of target materials such as paper, plastics, food, painted surfaces, and many more
- Data logging to MicroSD Card on touch screen models (optional)
- Resistant to interference from movement of sensing head cable - ideal for mounting on robot arms
- 4 to 20 mA or RS485 Modbus outputs
- Alarm relay outputs rated 24 V DC (optional)
- Temperature ranges from -4 to 1832°F (-20 to 1000°C)
- Maximum, minimum, average and instantaneous readings, peak or valley hold, reflected energy compensation
- Optional mounting brackets, air purge collar, laser sighting tool and protective window



MD9 Sensor shown with optional Touch Screen

## Optional Touch Screen with Data Logging

**Touch screen:** The optional backlit touch screen interface provides a large, bright display of the measured temperature, as well as controls to configure the sensor. The graph view shows the history of the measured temperature.

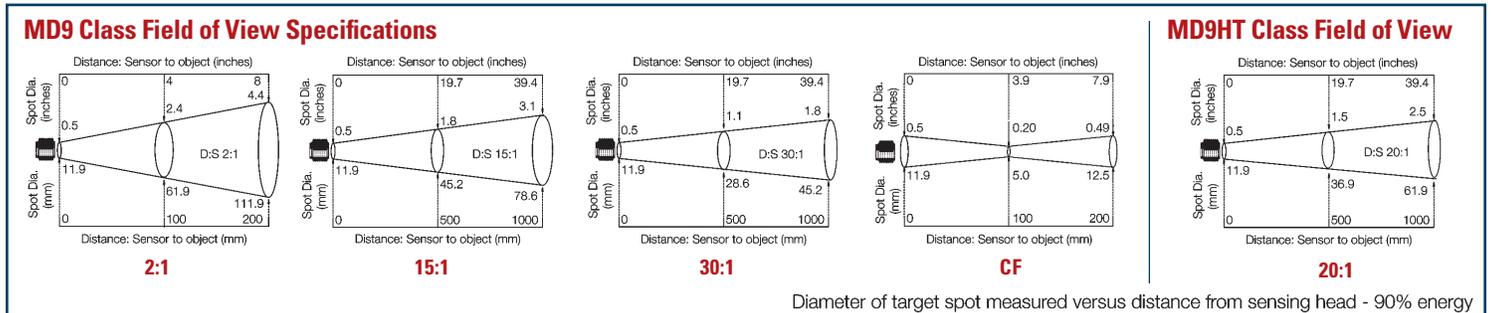
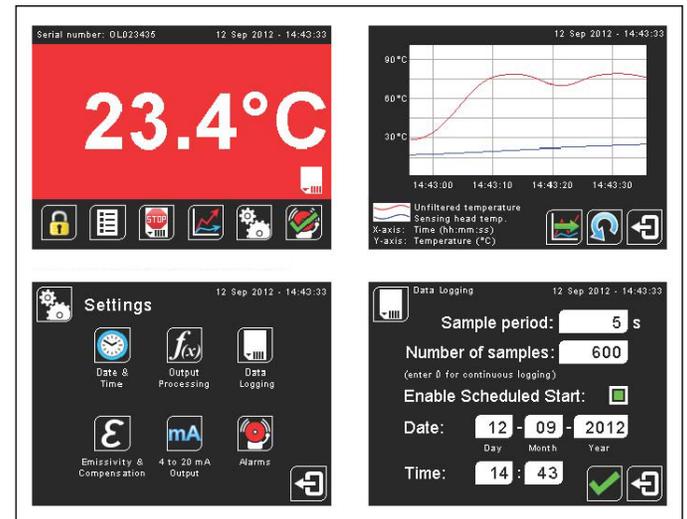
In alarm conditions, the display changes color to provide an immediate alarm indication.

**Data logging:** The MD9 Sensors (with Touch Screen) include a MicroSD card slot for data logging, which can be configured via the touch screen interface. The user can select the sample rate and the number of samples to be taken and schedule the data logging to start at a certain time.

Data is stored on the MicroSD card in .CSV format and can be viewed and edited easily using spreadsheet software. Alarm events can also be logged to the MicroSD card.

Sensor Specifications	
Accuracy	±1% of Reading or ±1°C whichever is greater
Repeatability	±0.5% of Reading or ±0.5°C whichever is greater
Response Time	240 ms (90% of Response)
Input Power	6 to 28Vdc (20mA)
Loop Impedance	900 ohms maximum
Sensing Head Ambient Temperature Limits	MD9: 32-140°F / 0-60°C MD9HT: 32-350°F / 0-177°C
Electronics Module Ambient Temp. Limits	32-140°F / 0-60°C
Enclosure Rating	Sensor: Stainless Steel Enclosures with NEMA 4X (IP65) Rating Electronics module: die cast aluminum with NEMA 4 (IP65) Rating
Relative Humidity	95% max non condensing
Mounting Thread (Nut Included)	M16 x 1.0mm pitch
Weight with Cable	0.6 lbs / 295 g
Sensor Dimensions	0.73in/18mm Diameter x 1.8in/45mm Long
CE Certification	EN61326-1: 2006 for EMC
Warranty	2 year

Part Code A - Sensor Model (see page 6 for options and accessories)				
Model Number	Spectral Response	Temperature Range		Sensing Head Ambient Temperature Limits
		Fahrenheit	Celsius	
MD9-1	8 to 14um	-4 - 1832°F	-20 - 1000°C	32-140°F / 0-60°C
MD9HT-1	8 to 14um	-4 - 1832°F	-20 - 1000°C	32-350°F / 0-177°C



The U Class features a 4-20mA output and an innovative design with adjustable settings using a USB port, cable, and SilverView PC software which are all included with each sensor. The user friendly SilverView software can be used with the sensor to: set the temperature range and emissivity; compensate for reflected energy; apply filtering, peak or valley hold processing; select max, min, average or instantaneous readings; setup OPC server capabilities and log and display sensor data

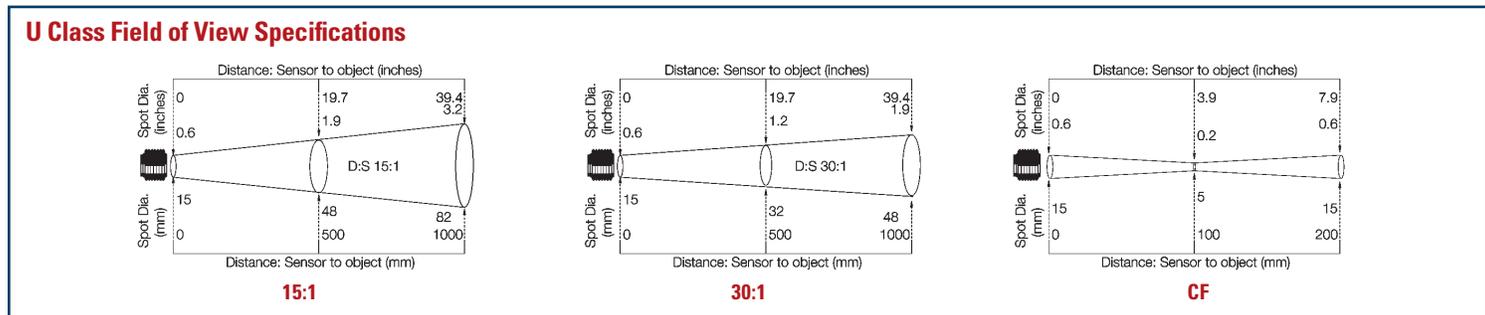
**Features**

- Short-wavelength measurement is available for low emissivity targets such as steel rollers and other metal surfaces, even at low temperatures
- Features max, min, average and instantaneous readings; peak or valley hold; reflected energy compensation
- OPC Server capabilities
- Temperature ranges from 45°C to 2000°C
- Adjustable emissivity setting - suitable for a wide range of target materials such as paper, plastics, food, painted surfaces, and many more
- Stainless steel housing, sealed to IP65
- Multiple Fields of View available, see part number selection guide on page 5
- Selectable 0 to 20 mA or 4 to 20 mA output
- Optional air/water cooled housing, air purge collar, laser sighting tool, mounting brackets and protective window



Sensor Specifications	
<b>Accuracy</b>	±1% of Reading or ±1°C whichever is greater
<b>Repeatability</b>	±0.5% of Reading or ±0.5°C whichever is greater
<b>Response Time</b>	240 ms (90% of Response)
<b>Input Power</b>	6 to 28Vdc (20mA)
<b>Loop Impedance</b>	900 ohms maximum
<b>Sensor Ambient Temperature Limits</b>	32-158°F / 0-70°C with water cooling the limit is 482°F/250°C
<b>Enclosure Rating</b>	Sensors: Stainless Steel Enclosures with NEMA 4X (IP65) Rating
<b>Relative Humidity</b>	95% max non condensing
<b>Mounting Thread (Nut Included)</b>	M20 x 1.0mm pitch
<b>Weight with Cable</b>	0.4 lbs / 175 g
<b>Sensor Dimensions</b>	0.98in/25mm Diameter x 4.2in/106.5mm Long
<b>CE Certification</b>	EN61326-1: 2006 for EMC
<b>Warranty</b>	2 year

Part Code A - Sensor Model (see page 6 for options and accessories)			
Model Number	Spectral Response	Temperature Range	
		Fahrenheit	Celsius
<b>U9-4</b>	8 to 14um	-40 - 1832°F	-40 - 1000°C
<b>U9-4</b>	8 to 14um	0-500°F	-17 - 260°C
<b>U2-1</b>	2 to 2.4um	113 - 572°F	45 - 300°C
<b>U2-2</b>	2 to 2.4um	212 - 752°F	100 - 400°C
<b>U2-3</b>	2 to 2.4um	482 - 1832°F	250 - 1000°C
<b>U2-4</b>	2 to 2.4um	842 - 3632°F	450 - 2000°C



Select the part numbers from the table to configure a sensor for your application. See Sample below. Contact Williamson for custom options. \*FOV CodeB: 2=2:1, 15=15:1, 30=30:1

A - Sensor Model	B - Field of View*	C - Sensor Output	D - Cable	D - Options and Accessories
Silver C9-2	15	0	3C	AP2 - FB1

Part Code A - Sensor Model				Part Code B - FOV			
Model Number	Spectral Response	Temperature Range		Field of View (select one FOV)			
		Fahrenheit	Celsius				
C9-1	8-14µm	-4-212°F	-20-100°C	2:1	15:1	30:1	CF
C9-2	8-14µm	32-482°F	0-250°C	2:1	15:1	30:1	CF
C9-3	8-14µm	32-932°F	0-500°C	n/a	15:1	30:1	CF
C9A-1	8-14µm	-4-212°F	-20-100°C	2:1	15:1	30:1	CF
C9A-2	8-14µm	32-482°F	0-250°C	2:1	15:1	30:1	CF
C9A-3	8-14µm	32-932°F	0-500°C	n/a	15:1	30:1	CF
C9B-1	8-14µm	-4 - 932°F	-20 - 500°C	2:1	15:1	30:1	CF
MD9-1	8-14µm	-4-1832°F	-20-1000°C	2:1	15:1	30:1	CF
MD9HT-1	8-14µm	-4-1832°F	-20-1000°C	n/a	n/a	20:1	n/a
U9-4	8-14µm	-40-1832°F	-40-1000°C	15:1	30:1	CF	n/a
U9-5	8-14µm	0-500°F	-17-260°C	15:1	30:1	CF	n/a
U2-1	2-2.4µm	113-572°F	45-300°C	15:1	n/a	n/a	n/a
U2-2	2-2.4µm	212-752°F	100-400°C	15:1	n/a	n/a	n/a
U2-3	2-2.4µm	482-1832°F	250-1000°C	25:1	75:1	CF	n/a
U2-4	2-2.4µm	842-3632°F	450-2000°C	25:1	75:1	CF	n/a

C - Sensor Output	
Part No.	Description
<b>C9 Class</b>	
0	2-wire, 4-20mA
1	4-wire, 0-50mV
2	4-wire, T Thermocouple
3	4-wire, J Thermocouple
4	4-wire, K Thermocouple
<b>C9A Class</b>	
0	4-wire, 4-20mA output and a 4-20mA input for emissivity
<b>C9B Class</b>	
0	4-wire, RS485 Modus
<b>MD9 Class</b>	
0	4-wire, 4-20mA
1	4-wire, RS485 Modbus
<b>U9 Class</b>	
0	2-wire, 4-20mA output and a USB 2.0 connection

D - Sensor Cable (2)	
Part No.	Description
<b>C / U Class</b>	
3C	3ft/1m Cable (not for WC option)
3CHT	3ft/1m Cable w/ Water Cooling
10C	10ft/3m Cable(not for WC option)
10CHT	10ft/3m Cable w/ Water Cooling
<b>MD9 Class Sensing Head Cable</b>	
3E	3ft/1m Cable for MD9
3EHT	3ft/1m Cable for MD9HT
10EHT	10ft/3m Cable for MD9HT

E - Options and Accessories	
Part No.	Description
<b>Silver C and MD9 Series</b>	
AP1	Air Purge for 2:1 Optics (887-8010-001)
AP2	Air Purge for 15:1, 30:1 Optics, 20:1, CF (887-8010-002)
PW1	Protective Plastic Window
WCAP1	C9 Water Cooling Air Purge (956-8010-001)
WC1	C9 Water Cooling Option Only (956-8010-002)
AB1	Adjustable Bracket (887-8021-001)
FB1	Fixed Bracket (887-8021-002)
EA	C9A: Remote Emissivity Adjuster (887-8100-001)
<b>Silver C9B Series</b>	
SilverBus	Touchscreen Terminal for up to eight C9B pyrometers
<b>Silver M Series (all options from C series apply except water cooling options)</b>	
TS	Touchscreen, includes two RAO rated 24VDC, 1A (If this option is not selected, you will have to specify a temperature range at time of purchase, please contact Williamson).
<b>Silver U Series</b>	
AP3	Air Purge (887-8310-001)
PW3	Protective Plastic Window
WCAP3	Water Cooling Air Purge (956-8310-001)
WC3	Water Cooling Option Only (956-8310-002)
AB3	Adjustable Bracket (887-8321-001)
FB3	Fixed Bracket (887-8321-002)
<b>All Silver Series Sensors</b>	
LST	Laser Sighting Tool (887-8920-001)
APT	Heavy-Duty Air Purge (887-8970-000)
PSD	Power Supply DIN Rail 24Vdc 600mA output, 85-264Vac input, -10 to 70C ambient (887-1100-001)
PD603	Panel Meter, 1/8DIN, Power to Sensor, Input Power (85-265VAC) (887-1000-003)
PD765	Panel Meter, 1/8DIN, Relay Alarms, Power to Sensor, Input Power (85-265VAC) (887-1000-004)
FMxx	Flange Mounts (consult with Williamson)
CLA	Calibration Certificate (887-8931-001)
CLB	Re-Calibration and Certificate (887-8931-002)

Wire cable lengths up to 100ft./30m are available with longer delivery times



### Fixed Mounting Bracket

The L-shaped fixed mounting bracket offers a rigid support for the sensor and allows fine adjustment in a single plane.



### Adjustable Mounting Bracket

The adjustable mounting bracket consists of a fixed mounting bracket plus another L-shaped bracket. When assembled as shown the adjustable mounting bracket offers a rigid support for the sensor and allows fine adjustment in two planes.



### Air Purge

The air purge is used to keep dust, fumes, moisture and other contaminants away from the lens. Air flows into the fitting on the side and out of the aperture at the front. The Silver C, M, and U Class each include an optional air purge accessory.



### Water Cooling Air Purge

The water cooling air purge allows the sensor to withstand ambient temperatures which exceed the normal 158°F/70°C limit. Air or water flows into one of the fittings on the side and out of the other. To prevent condensation from forming on the lens, the air/water cooled housing includes an air purge. Must be ordered with the sensor.



### Protective Plastic Window

Protect Silver Series precision Germanium Lenses from dust, dirt and scratches with these screw-on protective windows. Must be ordered with the sensor.



### Laser Sighting Tool

The Laser Sighting Tool screws onto the front of the sensor during installation and indicates precisely where the sensor is aiming. Once the sensor has been aimed at the center of the target and locked in position the Laser Sighting Tool can be removed.



### Emissivity Adjuster (C9A)

The optional Emissivity Adjuster Module (EA) allows users to adjust the sensors emissivity setting from 0.2 to 1.0 to cope with different target materials.



### Touch Screen with Data Logging (M Series)

A backlit touch screen interface provides an easy to read temperature display as well as sensor controls. A MicroSD card slot can be used for data logging.



### SilverBus (C9B)

The optional SilverBus Touch Screen Terminal provides two-way digital communications via an RS485 Modbus RTU interface.

