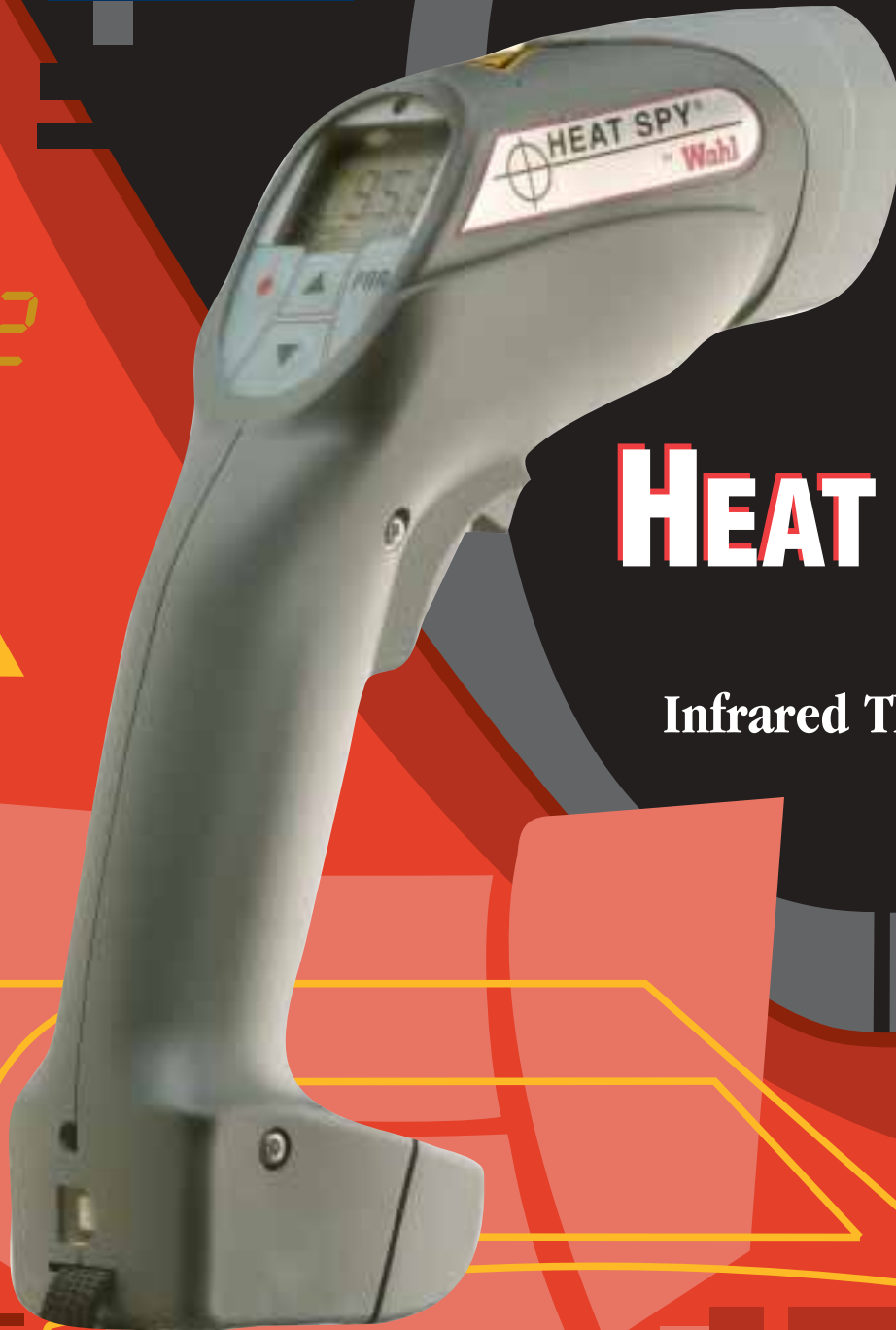


Wahl

INSTRUMENTS, INC.



HEAT SPY®

Non-Contact
Infrared Thermometers

PALMER Wahl

INSTRUMENTATION GROUP



DHS100



DHS250 Series



DHS54



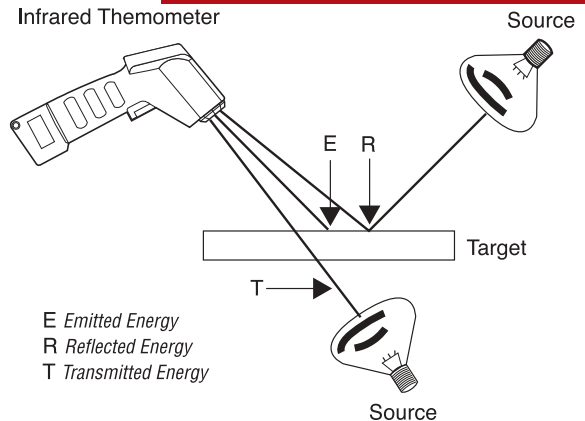
DHS35 XT

GENERAL INFORMATION	3
SIGHTING INFORMATION	4
ACCESSORIES AND APPLICATIONS	5
UTILITY HEAT SPYS	
DHS100 Series	6-7
General Purpose – Economical entry level Heat Spy for general maintenance applications. Model options for advanced menu-driven functions and laser sighting.	
POCKET HEAT SPYS	
DHS110 Series	8-9
POCKET SERIES – General Purpose Compact Heat Spy for general maintenance applications. Laser sighting system. Model options for advanced menu-driven functions.	
HIGH PERFORMANCE HEAT SPYS	
DHS250 Series	10-11
Expanded Capabilities and laser sighting, PLUS the added feature of RS232 interface for computer storage and display of readings. Readings up to 1650°F/900°C. Rugged and ergonomic design, dual displays with secondary display for Max, Min, Avg, etc.	
DHS24, 26, 28, 29 and 35XT	12-15
General Purpose – superior accuracy and stability. Will measure all normal materials, including glass surfaces. High temperature models, DHS29 designed for measuring temperatures through glass ports, DHS35XT designed for measuring temperature in furnaces. Models available with LED or LCD display, telescopic or laser sights, and FM ratings.	
SPECIALTY HEAT SPYS	
DHS34 Series	16
AUTO FOCUS – Low Temperature, high precision, general purpose, thermometers, the world's first autofocus infrared thermometers for easier and more accurate spot temperature measurements (450° to 1300°C).	
DHS54 Series	17
WIDE TEMPERATURE RANGE – Measures high temperature surfaces with small target diameters from 0.8 inches. Adjustable focus, and through-the-lens viewing allow you to sight the target while reading temperatures in the range of 5800°F to 3200°C. Model options for digital data output.	
DHS55 and DHS56	18
NARROW SPECTRAL RANGE of models DHS55 and DHS56 gives accurate temperature measurement within a specific range. Model DHS55 measures Liquid Metals in the range of 1830° to 3270°F (1000° to 1800°C). Model DHS56 measures gas or oil fired Furnaces in the range of 840° to 2370°F (450° to 1300°C).	
HSA201	19
LONG DISTANCE – TELEMATIC SERIES with a Spot Ratio of 300 to 1 for long distance targets. Telematic Heat Spy's are preferred by maintenance engineers for checking distant targets such as transmission lines, transformers, insulators, stacks, kilns, or reactors at a safe distance up to 300 ft. away. Telematics are designed for quick and easy "scan" operation for hot spots and are available with several range and scale options.	

Heat Spy® General Information

How Does The Heat Spy Work?

All solid objects emit infrared energy above absolute zero. The amount of energy emitted is proportional to the body or target temperature. Wahl's Heat Spy directs this energy by means of fixed focus optics into a sensitive detector, which is amplified and processed by the micro processor to temperature readings in °F or °C. It is fast because it collects IR energy at the speed of light, and the detector has a very low mass. The time constant is 0.1 second, about 10 times faster than conventional contact methods. Measurements are displayed in less than one second. Some Heat Spy's offer an analog output option of 1mV/deg for recording, while others feature RS232 computer interface.



What Does The Heat Spy Measure?

Temperature at a Distance

You can stand 1 to 40 feet away and conveniently measure temperature of bearings, kiln and furnace walls, locate hot spots in reactor shells, steam piping, and insulation surfaces. Specialty models can be used up to 300 feet away from your temperature target.

Temperature of Moving Material

Moving materials require two Heat Spy features not available by any other measurement method: non-contact with the process material, and fast measurement of rapidly moving materials. Measure continuously moving solid materials such as plastic film and extrusions, pulp and paper, textiles, rubber, steel sheet, coating, or paint.

Temperature of Small Low Mass Materials

Electronic components or other small or low mass items can be measured with a Heat Spy where a contact thermometer would change the measured condition through heat transfer.

Temperature of Areas Too Hot to Approach Safely

In foundries, forging shops, glass factories, and power plants, Heat Spy's can allow you to stand away from heat or high voltage to measure temperature up to 5800°F (3200°C).

Temperature of Rough Surfaces

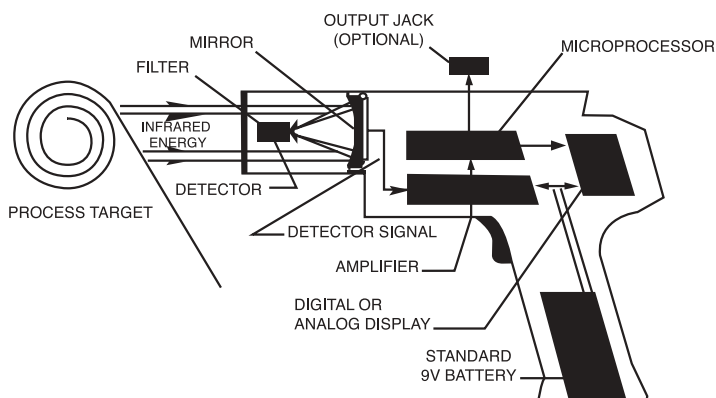
The Heat Spy does not require contact with the target. It measures rough and uneven surfaces and averages temperature readings of the observed target area. It affords users an efficient method of measuring the temperature of granular materials, rough castings, and forgings.

Temperature Requiring Quick Measurement

Opening and closing of injection molding dies requires temperature to be measured in less than 2 seconds. The Heat Spy is ideal for use with rotating machinery - large motor armatures and drive couplings for example.

Heat Spy Emissivity

Emissivity in IR measurement refers to the ability of the measured surface to emit radiation. Surfaces vary in emissivity and this must be taken into account before accurate readings can be obtained. The emissivity ratio represents the amount of radiated energy the measured surface allows to be returned to the instrument. A return of 100% of the energy is measured as 1.0 emissivity. If all the radiated energy is reflected and/or transmitted and none emitted, the emissivity ratio is 0.0. A perfect radiator, such as a black body, has a 1.0 emissivity ratio and a very shiny or highly polished surface has a ratio of 0.2 or lower. Most textured or painted surfaces have an emissivity ratio of around 0.95. Many Heat Spy thermometers feature adjustable emissivity from 0.10 to 1.00. Other Heat Spy's without adjustment are set at 0.95.



Sighting with the Heat Spy®

Understanding the relationship of target size to spot size is critical to obtaining accurate temperature readings with any Infrared thermometer. Target size is the size of the object whose temperature you are measuring. Spot size is an indication of the diameter of the measurement area of the instrument. Picture a flashlight; as you shine it on a wall, the size of the bright spot on the wall gets larger as you move away from the wall. The same is true of the spot size for an infrared thermometer. For accurate temperature measurement, the spot size should always be smaller than the target size, since the instrument will “average” the temperatures of everything inside the spot. The spot size is expressed as a fraction of the distance to the target. For example a 10:1 instrument has a spot size of 1 foot at 10 feet from the target. The distance to spot size ratio is specified for all Heat Spy models.

Heat Spys Incorporate The Following Sighting Methods

Open Sight

Open sighting simplifies Heat Spy operation and keeps cost low. Spot size increases with distance and must always be smaller than the target size to achieve the instrument’s rated accuracy. Distance to spot size ratios are specified on all open sight Heat Spy models.



Open Sight

Enclosed Optical Sight

This sighting system allows more precise target definition with parallax correction at 4 ft. and 20 ft. Distance to spot size ratios apply and are specified for all Heat Spy’s incorporating enclosed optics.



Enclosed Optical Sight

Telescopic Sight

Some Heat Spy models offer telescopic sighting options for long distance (up to 300 ft.) or precise aiming applications such as bolts, wire, tubing, forgings, and castings. Telescopes provide sighting on the centerline of the infrared optics.



Telescopic Sight

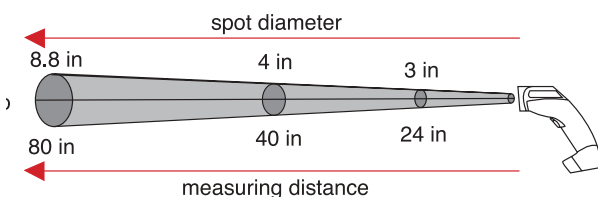
Laser Sight

A high coherence laser aiming beam adds a powerful dimension to precise temperature measurements. The laser places a visible red dot on the center of the target surface. The Heat Spy can be held in any position and at any level. It is especially useful in cramped areas and in awkward conditions such as standing on ladders and platforms. The laser is very effective indoors under all lighting conditions and useful in low light conditions outdoors. Laser energy from low reflective targets such as painted surfaces or oxidized metals is considered safe for viewing. All Wahl laser sighting systems meet Federal Safety Regulations. It is important to note that the laser beam is a sighting device only and that the displayed temperature when using a laser-equipped Heat Spy is not the reading at the laser spot. The area being measured is always dependent upon the distance to spot size ratio of the Heat Spy.



Laser Sight

Distance to Spot size ratio for DHS100 XEL Heat Spy



Accessories

DHS 100 Series	
Part No.	Description
DA-100	Carrying Pouch with "D" ring
DA-100HC	Replacement Attache Case
DA-18078	Wrist Strap

DHS 250 Series	
Part No.	Description
DA250	Carrying Pouch
DA250RS232	RS232 Computer Cable
DA250AC	Analog Output Cable DHS250M & MH Only
DA250WCFS	Wahl Control Software
DA250CL	Close-Up Lens
11441-3	Battery Recharger - 110V

DHS 24, 26, 28, 29, 35 Series	
Part No.	Description
9990	Replacement Attache Case
11441-1	Spare AC Adapter, 110V AC
11441-2	Spare AC Adapter, 220V AC
9852	Spare Trigger Lock

DHS 34, 54, 55, 56 Series	
Part No.	Description
531-1	AC Power Adapter, 110V
531-2	AC Power Adapter, 220V
L-50	Close-Up Lens for DHS54 Spot Size = 0.04" at 10"(1.106mm at 254mm)
DA54RS232	RS232C Cable for DHS54 Specify 25 Pin or 9 Pin Adapter

HSA 201	
Part No.	Description
10120	Replacement Attache Case

Heat Spy Accessories	
Part No.	Description
B-11	Bench Stand with Tripod Thread
TR-19	Heavy Duty, Fully Adjustable Tripod
EP-10	13 oz Can Black Emissivity Testing Paint
MN-1604	Standard 9V Alkaline Battery
NIST- *	NIST Certification (3 Points)

* add part number of specific Heat Spy

Note: Please contact Wahl Customer Service for Calibration and Repair Manuals.

Certification Services Available

Applications

Heat Spy's perform in a wide variety of routine maintenance and inspection applications including:

- Steam Traps
- Electrical Busses
- Motor Bearings
- Paper
- Plastic
- Rubber
- Glass
- Painted Surfaces
- Ceramic
- Chips
- Asphalt
- Wood
- Stacks
- Circuit Boards
- Shells
- Dies
- Heat Treating
- Chemical Processes
- Furnaces
- Wave Soldering
- Wheel Bearings
- Welding
- Moving Machinery
- High Voltage Targets
- Transportation
- Rotating Machinery
- Food Processing
- Storage
- HVAC System Testing
- Exhausts
- Process Assembly Lines
- Closed Robotic Assembly Areas
- Vents
- Tires
- Fire Safety
- Grain Curing
- Pipes
- Insulation

DHS100XE DHS100XL • DHS100XEL

The DHS100 Series are low-cost, value packed instruments that offer rugged and accurate service for general maintenance applications.

Features for All Models

- Rugged, Light-Weight Construction allowing Quick Pointing and Easy Carrying
- Temperature Measurement Range of 0° to 850°F (-18° to 450°C)
- Accuracy @ 23°C / ± 5°C, greater of ± 2% of reading or ± 3°F (± 2°C)
- Large, Easy-To-Read LCD Digits with Switch-On Back Light for Low Light Conditions
- Low-Drain Battery Operation with Low Battery Indicator
- Display Hold of Last Reading for 6 Seconds
- °F or °C Range Selectable
- Two Year Warranty
- CE Compliance

DHS100 XE and DHS100 XEL Model Features

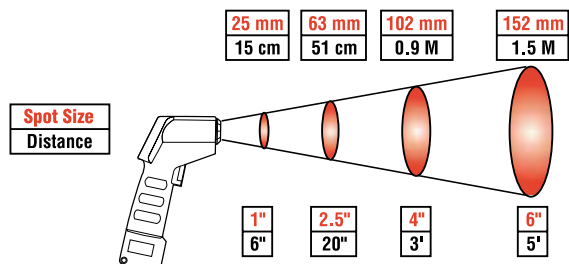
Advanced Menu-Driven Models

- Menu Selection of Maximum, Minimum, Average Temperatures, and Maximum Differential
- Adjustable Emissivity of 0.10 to 1.00
- °F or °C Menu Selectable
- Audible and Visual Alarm at HI/LO Setpoint
- Menu Selectable Battery Voltage and % of Battery Life Displays
- Memory Recalls All Previous Temperature Selections until Next Reading is Taken

DHS100 XL and DHS100 XEL Model Features

Laser Sighting Models

- Bright Laser Aiming Beam for Precision Targeting
- Safe Class 2, 1mW Laser Beam Sights at 0.5" above Target Center



DHS100XE Heat Spy Series
Distance to Spot Size Ratio 10:1



DHS100 XE Display

DHS100 XE



DHS100 XL



DHS100 XEL



DHS100 XEL Display

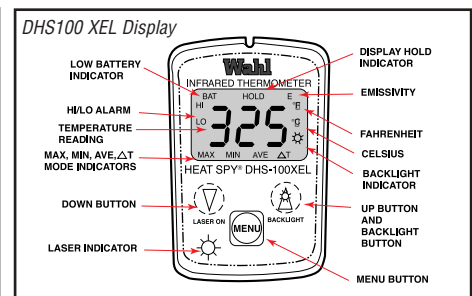
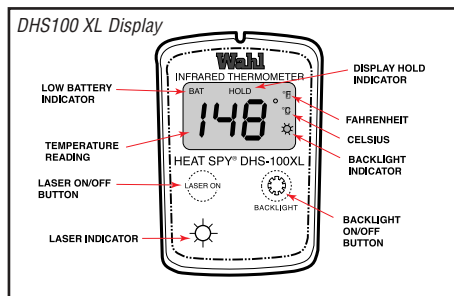
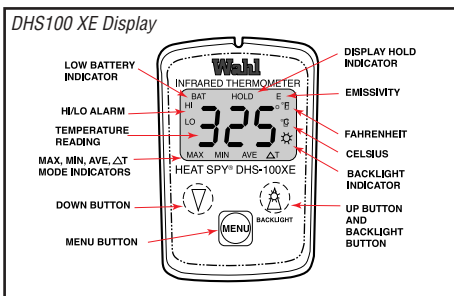
2 year
limited
WARRANTY

For Heat Spy Accessories see page 5

DHS100XE DHS100XL • DHS100XEL

Specifications			
	DHS100XE	DHS100XL	DHS100XEL
Temperature Range	0° to 850°F (-18° to 450°C) Displays HI when target temp > 851°F (455°C) Displays LO when target temp < -20°F (-28°C) nominal		
Sighting	Open	Bright laser sight Class 2 (1mW), 0.5" above target center	
Accuracy at 23°C ± 5° C, e = 0.95	Greater of ± 2% of reading or ± 3°F (± 2°C)		
Repeatability at 23°C ± 5° C, e = 0.95	Greater of ± 1% of reading or ± 2°F (± 1°C)		
Response Time	500msec		
Spectral Range	7-18 microns nominal, thermopile detector		
Display Hold	Last reading and operating mode displayed for 6 seconds nominal upon trigger release		
LCD Backlight	User selectable		
Emissivity	0.10 to 1.0, user selectable. Automatically switches to AVG mode for emissivity < 0.3	Pre-set 0.95	0.10 to 1.0, user selectable. Automatically switches to AVG mode for emissivity < 0.3
Calculating Mode	MAX, MIN, AVG, MAX ΔT	No	MAX, MIN, AVG, MAX ΔT
Recall Last Reading	Yes	No	Yes
High or Low Audible/Visual Alarm	Yes	No	Yes
Temperature Display	°F or °C (menu-selectable), 3 digit LCD	°F or °C (switchable), 3 digit LCD	°F or °C (menu-selectable), 3 digit LCD
Display Resolution	1° F or C in all modes		
Ambient Operating Conditions	32° to 120°F (0 to 50°C); 10% to 90% relative humidity noncondensing		
Storage Temperature	-13° to 158°F (-25° to 70°C) without battery		
Power Supply	9V Alkaline (included) or NiCad battery		
Battery Life (with alkaline)	150 hours, with backlight off. Laser and backlight operation will reduce battery life		
Battery Life Indicator	Display icon flashes when low, menu recalls % life remaining and actual voltage	Display icon flashes when low	Display icon flashes when low, menu recalls % life remaining and actual voltage
Temperature Update Rate	5 readings per second		
CE Compliant	Yes		
Dimensions	5.5 x 2.0 x 8.5 inches (140 x 51 x 216 mm)		
Weight	11.2 oz. (318 gm)		
Included Accessories	Zip-up soft carrying pouch, with "D" ring, Wrist strap		
Options	NIST Certification		

Specifications are subject to change without notice.



DHS110XL • DHS110XEL Pocket Series

Compact and economical Pocket Heat Spy for quick, handy general purpose maintenance use. Laser sighting on all models.

DHS110 XL and DHS100 XEL Features

- Rugged, Light-Weight Construction allowing Quick Use and Easy Carrying
- Temperature Measurement Range of 0° to 850°F (-18 to 450°C)
- Accuracy @ 23°C / ± 5°C, greater of ± 2% of reading or ± 3°F (± 2°C)
- Large, Easy-To-Read LCD Digits with Switch on Back Light for Low Light Conditions
- Low-Drain Battery Operation with Low Battery Indicator
- Display Hold of Last Reading for 6 Seconds
- Bright Laser Aiming Beam for Precision Targeting
- Safe Class 2, 1mW Laser Beam Sights at 0.875" to Left of Target Center
- Two Year Warranty

DHS110 XEL Advanced Features

- Menu Selection of Maximum, Minimum, Average Temperatures, and Maximum Differential
- Adjustable Emissivity of 0.10 to 1.00
- °F or °C Menu Selectable
- Audible and Visual Alarm at HI/LO Setpoint
- Menu Selectable Display of Battery Voltage or % of Battery Life
- Memory Storage of Last Temperature Measured



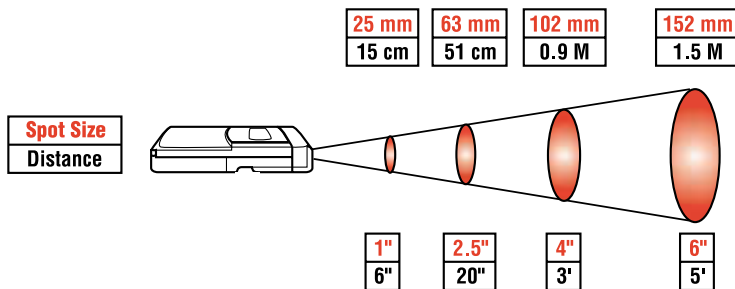
DHS110 XL

Applications

DHS110 Heat Spys perform in a wide variety of routine maintenance and inspection applications including:

- Steam Traps
- Electrical Busses
- Motor Bearings
- Paper
- Plastic
- Rubber
- Glass
- Painted Surfaces
- Ceramic
- Chips
- Asphalt
- Wood
- Stacks
- Circuit Boards
- Shells
- Dies
- Heat Treating
- Chemical Processes
- Furnaces
- Wave Soldering
- Wheel Bearings
- Welding
- Moving Machinery
- High Voltage Targets
- Transportation
- Rotating Machinery
- Food Processing
- Storage
- HVAC System Testing
- Process Assembly Lines
- Closed Robotic Assembly Areas

**2 year
limited
WARRANTY**



DHS110 Heat Spy Series
Distance to Spot Size Ratio 10:1

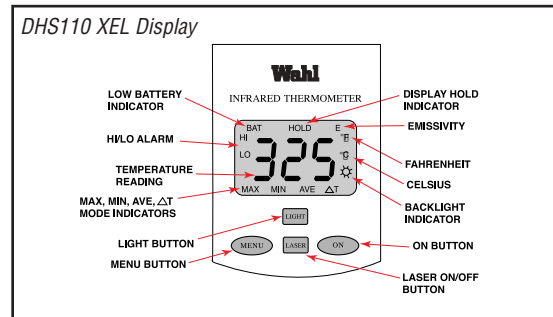
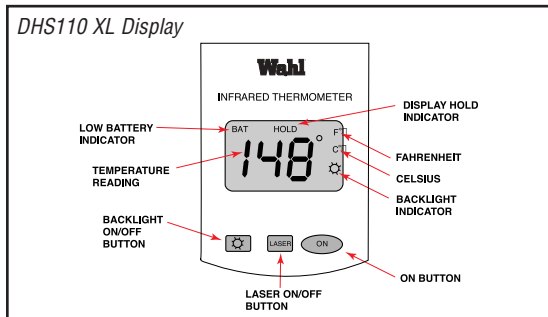
For Heat Spy Accessories see page 5

DHS110XL • DHS110XEL Pocket Series

**Pocket
Heat Spys**

Specifications		
	DHS110XL	DHS110XEL
Temperature Range	0° to 850°F (-18° to 450°C) Displays HI when target temp > 851°F (455°C) nominal Displays LO when target temp < -20°F (-28°C) nominal	
Laser Sighting	Bright laser sight Class 2 (1mW), 0.5" left of target center	
Accuracy at 23°C ± 5° C, e = 0.95	Greater of ± 2% of reading or ± 3°F (± 2°C)	
Repeatability at 23°C ± 5°C, e = 0.95	Greater of ± 1% of reading or ± 2°F (± 1°C)	
Response Time	500msec	
Spectral Range	7-18 microns nominal, thermopile detector	
Display Hold	Last reading and operating mode displayed for 6 seconds nominal upon ON button release	
LCD Backlight	User selectable	
Emissivity	Pre-set 0.95	0.10 to 1.00, user selectable. Automatically switches to AVERAGE mode for emissivity < 0.3
Calculating Mode	No	MAX, MIN, AVG, MAX ΔT
Recall Last Reading	No	Yes
High or Low Audible/Visual Alarm	No	Yes
Temperature Display	°F or °C (switchable), 3 digit LCD	°F or °C (menu selectable), 3 digit LCD
Display Resolution	1°F or C in all modes	
Ambient Operating Conditions	32° to 120°F (0° to 50°C) at relative humidity of 10% to 90%, noncondensing	
Storage Temperature	-13 to 158°F (-25 to 70°C) without battery	
Power Supply	9V Alkaline (included) or NiCad battery	
Battery Life (with alkaline)	150 hours with backlight off, Laser and backlight operation will reduce battery life	
Battery Life indicator	Display icon flashes when low	Display icon flashes when low, menu recalls % life remaining and actual voltage
Temperature Update Rate	5 readings per second	
Dimensions	6 x 2 x 1 inches (152 x 51 x 25 mm)	
Weight	7 oz (198 gm)	
Included Accessories	one 9V Alkaline battery, carrying/storage case, and wrist strap	
Options	NIST Certification	

Specifications are subject to change without notice.



DHS250 • DHS250M • DHS250MS DHS250H • DHS250HM • DHS250HMS

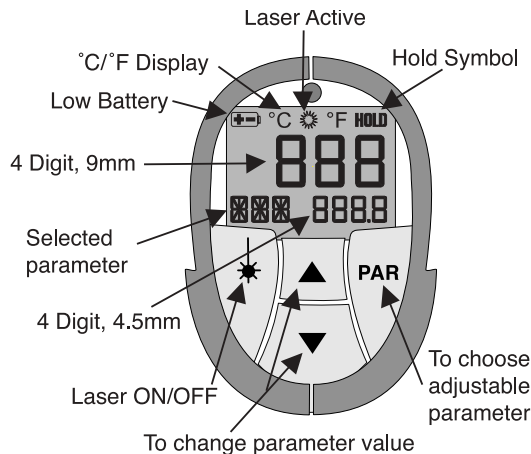
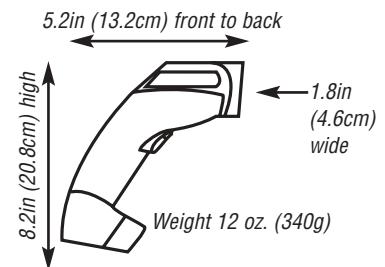


DHS250 M

Expanded Capabilities

- New DHS250 Series Models: DHS250H, DHS250HM AND DHS250HMS for Ferrous and Non-Ferrous Liquid Metal, Glass, and Ceramic
- Laser Sighting System
- 50:1 Distance to Spot Size Ratio (nominal)
- Available RS232 interface and Windows® compatible software for online data acquisition
- Option for 1mV/°C Analog Data Output
- Battery powered (one 9V) for portability, rechargeable option
- Dual display with auto back light
- Adjustable Emissivity, .20 to 1.0
- Fahrenheit or Celsius scale selection
- Readings for Maximum, Minimum, Average, or Differential Value
- Audible and Visual Alarm at HI/LO Setpoint
- Sleek, ergonomic design, with rubber “bumper” to protect the lens
- Built in tripod mount and locking trigger mechanism
- Stores up to 250 temperature readings (DHS250M, MS, and MH)
- 1 Year Warranty

The DHS250 High Performance Series Heat Spys have the added capability of RS232 interface for computer storage and display of readings. Plus Wahl introduces two new additions to the DHS250 Series Heat Spy, the DHS250H and DHS250MH with readings up to 3272°F/1800°C.

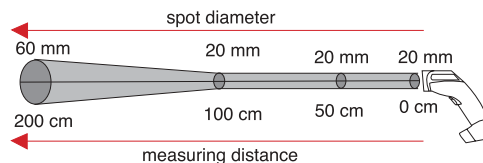


DHS250 with RS232 interface for online data acquisition
Shown with optional TR19 tripod

High Performance Heat Spys

DHS250 • DHS250M • DHS250MS DHS250H • DHS250HM • DHS250HMS

Specifications						
	DHS250	DHS250M	DHS250MS	DHS250H	DHS250HM	DHS250HMS
	High Performance Heat Spy	High Performance Heat Spy with Internal Memory	High Performance Heat Spy with Internal Memory, Windows Compatible Software	High Temperature, High Performance Heat Spy	High Temperature, High Performance Heat Spy with Internal Memory	High Temperature, High Performance Heat Spy with Internal Memory, Windows Compatible Software
Temperature Range	-25 to 1652°F -32 to 900°C			302 to 3272°F 150 to 1800°C		
Measurement Scale	User switchable °F to °C					
Emissivity	0.20 to 1.0 adjustable					
Accuracy	1% of reading or 2°F / 1°C whichever is greater, at an ambient temperature of 73°F / 23°C and emissivity of 1.0					
Repeatability	0.5% of reading					
Temperature Coefficient	0.03°C at 23°C					
Response Time	0.15 seconds					
Spectral Range	8 to 14µm			5.14µm		
IR Detector	Thermopile					
Distance to Spot	50:1 nominal					
Lens Aperture	20mm					
Display Illumination	Automatic in low light					
Main Display	°F and °C switchable with a 4 digit, 9mm LCD display • Resolution: 0.1° to 999.9°F / 900°C					
Secondary Display	°F and °C switchable with 4 digit, 4.5mm LCD display • Resolution: 0.1° from 14 to 392°F (-10°C to 200°C) in average mode, 1° in all others					
Ambient Operating Range	32 to 131°F (0 to 55°C) (Laser operating range 32 to 122°F)					
Storage Temperature	-4 to 158°F (-20°C to 70°C)					
Power Supply / Life	One 9V battery • 50 hours without laser (Laser and backlight operation will reduce battery life)					
Laser	Laser class 2; IEC825/91, output < 1mW					
Housing	High impact ABS, UL class VO					
Tripod Thread	UNC 1/4inch					
Enclosure Class	IP20					
Dimensions • Weight	see fig 1 • 1 lb (340g)					
Calculating Mode	MAX, MIN, AVERAGE, MAX ΔT, and HOLD					
Digital Interface	RS232, 9600 Baud					
Audible Alarm	HI	HI, LOW	HI, LOW	HI	HI	HI
Internal Clock	No	Yes	Yes	No	Yes	Yes
Analog Output	No	1 mV/°C	1 mV/°C	No	1 mV/°C	1 mV/°C
Analog Cable	No	Optional	Optional	No	Optional	Optional
Data Storage	No	250 Values	250 Values	No	250 Values	250 Values
Adjustable Memory	No	Yes	Yes	No	Yes	Yes
Software/RS232	Optional	Optional	Included	Optional	Optional	Included



Specifications are subject to change without notice.

**1 year
limited
WARRANTY**



All DHS250 Series Instruments are supplied with a foam-lined molded carrying/storage case, wrist strap, and one 9V battery.

For Heat Spy Accessories see page 5



High Performance Heat Spys

DHS24 • DHS26 • DHS28

Digital Infrared Thermometers with NIST traceable accuracy are the most advanced, easy to use and durable I.R. Thermometers in the world. Their precision ground mirrors are protected by rare-earth germanium filters and tightly focus I.R. energy on the patented detector for accuracy as good as $\pm 0.3\%$ full scale with $1^\circ\text{F} / ^\circ\text{C}$ resolution. Temperature readings are updated 3 times per second on a unique red liquid crystal display - more readable than a black display.

The entire body is made of cast and extruded aluminum, which provides shielding against stray EMF from machinery and engines. Factory Mutual Approved models for potentially explosive environments are also available. (see page 15).



Telescopic Sight

For long distances (20 to 100ft.) or precise aiming on small objects such as bolts, thick cable, tubing, forgings, and castings. The Heat Spy "T" version telescopic sight provides sighting on the centerline of the infrared optics.



Switchable Laser Aiming Sight

Highly visible narrow red light beam pinpoints objects up to 100 feet away. Good choice for locating hot spots and for centering on targets.



Enclosed Optical Sight

For most applications, the standard enclosed optical sight provides target definition at 4ft. and 20ft. with parallax correction.

Features for All Models

Use Heat Spy with confidence. Thousands have been in trouble-free service for 10 years or longer. We stand behind them with a three year warranty, factory recalibration and service.

- Adjustable Emissivity
- Maxitemp® Peak Temperature Hold
- Self Test
- Auto Calibration
- Output to Recorder
- AC Adapter
- Input Jack for Battery Pack
- $^\circ\text{F}/^\circ\text{C}$ Switchable
- NIST Traceable Accuracy
- Aluminum Housing
- Sighting and Display Options
- Three Year Warranty

Display Options & Modes

Display options for LCD and LED. LCD is best for most uses. Select LED for low light conditions.



Measured temperature is updated 3 times per second on large LCD.



PEAK holds highest measured temperature, and is especially useful in high temperature scans.



TEST mode flashes room temperature to show Heat Spy is working properly.



BATT displays low battery. HLP flashes when instrument is out of specification.



---- means measurement is over or under the range of the instrument.

DHS24 • DHS26 • DHS28

DHS24 Series Features

- Superior accuracy and sensitivity between 0° to 1000°F (-20 to 550°C)
- Accuracy of $\pm 0.3\%$ of full scale
- Repeatability of $\pm 1^\circ\text{F}$
- Anti-reflective filter for accurate use in strong sunlight or other light sources
- Applications include all normal materials, including glass surfaces
- Not affected by IR heaters, carbon dioxide or water vapor, will not measure through glass
- Sighting options and FM approved models available
- 3 Year Warranty

Please see page 15 for a complete listing of DHS24 specifications



DHS24 L

DHS26 Series Features

- Features listed above, *Plus:*
- Wider temperature range: 0° to 2000°F (-20 to 1000°C)
- Accuracy of $\pm 0.3\%$ of full scale
- Application for all normal material, including glass surfaces
- Sighting, display, and FM options available
- 3 Year Warranty

Please see page 15 for a complete listing of DHS26 specifications



DHS26 XT

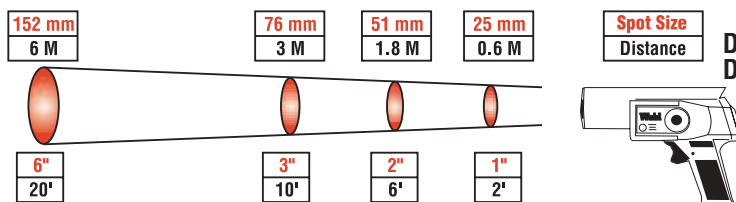
DHS28 Series Features

- Features listed above, *Plus:*
- Ultra High range: 32° to 2500°F (0° to 1380°C)
- Specialized tool for measurement of glass gobs, heat treating, annealing, welding, and metal ingot operations, does not measure through glass ports.
- Accuracy of $\pm 0.3\%$ of full scale
- Repeatability is 3°F
- 3 Year Warranty
- Telescopic sight option recommended

Please see page 15 for a complete listing of DHS28 specifications



DHS28 XT



DHS24, 26, and 28 Heat Spy Series
Distance to Spot Size Ratio: 20:1

For Heat Spy Accessories see page 5

Designed for extreme applications in Ferrous and Non Ferrous Metal, the DHS29 and 35XT Heat Spy models are built from the bottom up for precise, accurate measurement of high temperatures under the toughest factory conditions.

DHS29 Series Features

- Measures through glass ports, flames, and products of combustion
- High temperature Range: 900° to 3200°F (482° to 1760°C)
- Narrow spectral range for general purpose, high temperature measurement through glass
- Small target resolution and long telescopic range
- Aim through ports in furnace walls at refractories, glass gobs, furnace tubes, ceramics, billets, slag, and annealing materials
- Sapphire window protects the silicon optics from heat and contamination
- 3 Year Warranty

Please see page 15 for a complete listing of DHS29 specifications.

DHS35 XT Features

- Measures furnace tube temperatures through open ports
- High temperature Range: 800° to 3200°F (426° to 1760°C)
- Narrow spectral range of 3.5 - 4.1 microns
- Specialized Reflex Sighting to enable readings from very small target areas
- Minimizes errors caused by the reflectance from walls and flames
- Does not measure through glass ports
- Best choice for high temperature general purpose operations
- Offered with telescopic sighting system only
- 3 Year Warranty

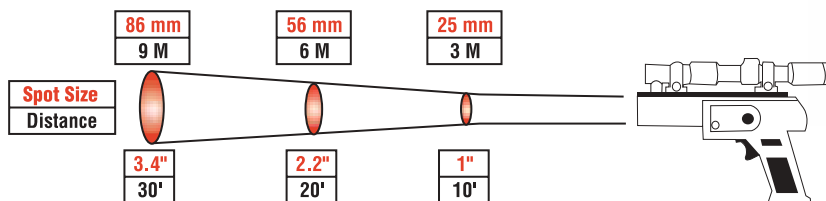
Please see page 15 for a complete listing of DHS35XT specifications.



DHS29 X



DHS35 XT



**DHS29, and 35XT Heat Spy Series
Distance to Spot Size Ratio 100:1**

For Heat Spy Accessories see page 5

DHS24 • DHS26 • DHS28 DHS29 • DHS35XT

DHS24, 26, 28, 29 & 35 Specifications					
	DHS24 (LED) DHS24X (LCD)	DHS26 (LED) DHS26X (LCD)	DHS28 (LED) DHS28X (LCD)	DHS29X (LCD) DHS29XT (LCD)	DHS35XT (LCD)
Temperature Range	0° to 1000°F -20° to 550°C	0° to 2000°F -20° to 1000°C	32° to 2500°F 0° to 1380°C	900° to 3200°F 482° to 1760°C	800° to 3200°F 426° to 1760°C
Spectral Range	8 - 14microns			2.1 - 2.5 microns	3.5 - 4.1 microns
Accuracy at 77°F ± 5°	± 0.3% FS				± 0.5% FS
Repeatability	± 1°F	± 2°F	± 3°F		
Resolution	1°F / °C				
Ambient Operating Temperature	25° to 125°F / -4° to 52°C				
Temperature Coefficient	± 0.1 deg/deg				
Response Time to 95% of Reading	1 second				
Spot Size at Focal Point	1 in. diameter at 2 ft.			1 in. diameter at 10 ft.	
Distance to Spot Size	20:1			100:1	
Practical Working Distance	0 to 40 ft.	0 to 40 ft. (T) 150 ft.		0 to 150 ft.	
Sighting System	Enclosed, Laser, or Telescope			Enclosed or Telescope	Telescope Only
Adjustable Emissivity Range	0.2 - 1.0				
Output to Recorder	1mV/deg.				
Power Supply	LCD 1 - 9V Alkaline Battery, LED 2 - 6V Batteries				
Battery Life	40 hours Laser and Backlight Operation Will Reduce Battery Life			40 hours Laser and Backlight Operation Will Reduce Battery Life	
Weight (Lbs.)	2.2	2.2, (T) 2.8		2.5, (T) 3.0	3.0
Included Accessories	Carrying Case, Spare Battery, Owner's Manual, Trigger Lock, AC Adapter (Specify 110V or 220V AC)				

Specifications are subject to change without notice.

Model No. Suffix Codes and Availability								
Suffix	No Suffix	X	L1	L5	XL1	XL5	T	XT
Heat Spy Series	F&C, LED enclosed opt. sight	F&C, LCD enclosed opt. sight	F&C, LED laser sight 1mW	F&C, LED laser sight 5mW	F&C, LCD laser sight 1mW	F&C, LCD laser sight 5mW	F&C, LED telescopic sight	F&C, LCD telescopic sight
DHS24	Yes FM	Yes FM	Yes	Yes	Yes	Yes	Yes FM	Yes FM
DHS26	Yes FM	Yes FM	Yes	Yes	Yes	Yes	Yes FM	Yes FM
DHS28	No FM	Yes FM	No	No	Yes	Yes	No FM	Yes FM
DHS29	No	Yes	No	No	No	No	No	Yes
DHS35	No	No	No	No	No	No	No	Yes

FM - Factory Mutual approved model is available where noted above.

To specify FM model, modify the model number or suffix by adding "F" for Fahrenheit or "C" for Celsius scale, then add "-FM" to the model number. *EXAMPLE: DHS24XC-FM or DHS26XTF-FM*

Factory Mutual approved for use in Class I and II Groups C, D, E, F, and G hazardous locations.

Factory Mutual (FM) approved models do not include the following Heat Spy features or options:

F/C switch (order dedicated Fahrenheit or Celsius model); 1mV/degree output; AC Adapter; laser sighting.

**3 year
limited
WARRANTY**

DHS34A • DHS34S Auto Focus



DHS34

The DHS34A and the DHS34S Heat Spy's feature the world's first AUTO FOCUS Infrared Thermometer for easier and more accurate spot temperature measurements. High precision, general purpose, thermometers, the DHS34A offers a RETICLE field of view, and the DHS34S has a RECTANGULAR field-of-view.

Applications

DHS34A

- Electrical inspection
- Mechanical inspection
 - Insulation checks
- Steam trap inspection
- Routine maintenance

DHS34S

- Cable splices
- Insulators and switch points
 - Electrical inspection
 - Routine maintenance
 - Power and utilities

**1 year
limited
WARRANTY**

For Heat Spy Accessories see page 5

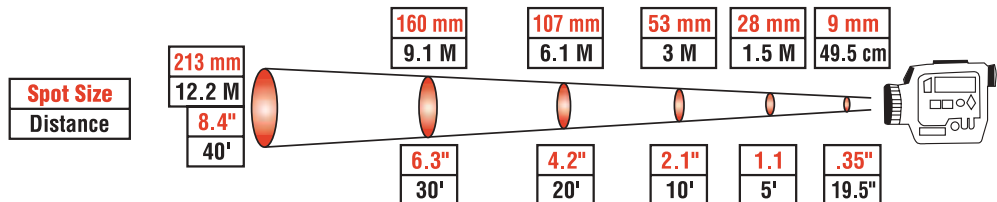
Features

- AUTOFOCUS for comfortable, one-hand operation
- DHS34A - RETICLE RING defines target area
- DHS34S - RECTANGULAR BOX defines target area
- Low Temperature Range -50° to 1800°F / -50° to 1000°C
- Small targets from 0.35" @ 20"
- Large, external LCD display
- Memory recalls Maximum, Minimum, and Mean
- Measures normal, peak, valley, average values
- Adjustable emissivity: 0.10 to 1.00
- Analog and RS232 output

Specifications

	DHS34A	DHS34S
Temperature, Low Range	-50° to 1800°F -50° to 1000°C	-50° to 1800°F -50° to 1000°C
Distance to Target Ratio	60:1	60 x 120:1
Temperature Scale	°F or °C switchable	°F or °C switchable
Output Signal	°1mV/degree & RS232C	°1mV/degree & RS232C
Accuracy at 23°C / ± 5°C	± 2°C / 4°F (0 to 200°C)	± 2°C / 4°F (0 to 200°C)
All Values ± 1-digit	± 3°C / 6°F (below 0°C) ± 1% of reading (above 200°C)	± 3°C / 6°F (below 0°C) ± 1% of reading (above 200°C)
Spectral Range	8 to 13 microns	8 to 13 microns
Emissivity	0.10 to 1.0 adjustable at 0.01 increments	0.10 to 1.0 adjustable at 0.01 increments
Operating Temperature	32° to 122°F 0° to 50°C	32° to 122°F 0° to 50°C
Spot Size	9mm diameter at 500mm 0.35" diameter at 1.6'	9 x 3mm at 500mm 0.35 x 0.12" at 1.6'
Power Supply / Battery Life	4xAA alkaline batteries 40/hrs	4xAA alkaline batteries 40/hrs
Included Accessories	Soft Carrying Case	

Specifications are subject to change without notice.



***DHS34A Heat Spy Series
Distance to Spot Size Ratio: 60:1**

DHS54 • DHS54A Wide Temperature Range



DHS54 Heat Spy

Use the DHS54 Series Heat Spy in tough, hostile industrial environments. This rugged, dustproof thermometer measures high temperature surfaces with small target diameters from 0.8 inches. Adjustable focus, and through-the-lens viewing allow you to sight the target while reading temperatures. The DHS54 has RS232C digital output, the DHS54A has an RS232C and an analog output of 1mV/°. A background reflection compensation function is provided for accurate measurement of targets in hotter surroundings.

Spot Size	
Distance: ft (m)	Spot Size: in (mm)
328 (100)	22.6 (576)
164 (50)	11.2 (287)
65.6 (20)	4.48 (114)
32.8 (10)	2.24 (57)
22.9 (7)	1.53 (39)
16.4 (5)	1.10 (28)
6.5 (2)	0.43 (11)
3.2 (1)	0.18 (4.8)

**1 year
limited
WARRANTY**

For Heat Spy Accessories see page 5

- Reflective Error Compensation
- Measures through glass ports
- Measures high temperature surfaces with small target diameters from 0.8 inches
- Optional close up lens allows measurement as small as 0.016inch / 0.4mm diameter
- Built-in eye protection filter for high temperatures
- °F or °C switchable / Internal display shows temperature
- External display shows temperature, emissivity, out of range, battery status
- Variable focusing from 39 inches / 1 meter to infinity
- Narrow spectral range reduces errors due to emissivity and atmospheric absorption
- Handle detaches for mounting in continuous monitor mode
- RS232C digital output (DHS54) or analog output (DHS54A)
- 1 Year Warranty

Specifications	
DHS54 • DHS54A	
Temperature Range	930° to 5800°F (500° to 3200°C)
Indication	4-digit LCD in viewfinder, 1° increments; over and under range warnings. External display 4-digit LCD of temperature, emissivity, mode, battery level, over and under range warnings
Measuring Mode	CONT, PEAK, VALLEY
Calculating Mode	MAX, MEAN, MIN
Optical System	8° field of view with 1/3° measurement area. Eyepiece adjustable -3.75 to 2.5 diopters
Distance to Spot	180:1
Spot Size	0.18" (4.8mm) at 39.3" (1m)
Spectral Range	0.8 to 1.1µm
Emissivity Range	0.10 to 1.30 in 0.01 graduations
Response Time	0.45 seconds (98% response)
Accuracy	±0.5% of reading ±1 digit in ambient temperature 64° to 82°F (18° to 28°C) e = 1.00
Repeatability	±0.15% of reading in ambient temperature 64° to 82°F (18° to 28°C) e = 1.00
Operating Temp. Range	32° to 122°F (0° to 50°C)
Storage Temp. Range	-4° to 131°F (-20° to 55°C)
Power Supply / Life	Six AA batteries or optional AC adapter / approx. 95 hours
Power Consumption	20mA (DHS54) approximate 25mA (DHS54A) approximate
Dimensions / Weight	8.75 x 3.06 x 6.75in (223.3 x 78 x 170mm) / 2.2 lb (1kg)
Included Accessories	Wrist Strap, locking Hard Carrying Case with strap

Specifications are subject to change without notice.

DHS55 • DHS56 Narrow Spectral Range

DHS55 – FOR LIQUID METALS - is designed for accurate temperature measurement of liquid metals in iron and steel foundries. The thermometer automatically compensates for ambient temperature changes and provides a fast response time (0.8 seconds) and reliable reading in the extended range of 1830° to 3270°F (1000° to 1800°C). Short wavelength operation (0.55µm) minimizes errors due to emissivity/atmospheric absorption.



DHS56 Heat Spy

DHS56 – FOR FURNACES - is designed for accurate temperature measurement in gas or oil fired furnaces in the range of 840° to 2370°F (450° to 1300°C). Narrow spectral response centered at 3.9 µm eliminates errors caused by absorption/emission bands present in combustion gases. Narrow angle field of view (1/3°) and reflex sighting allows measurement of small target areas at long distances.

**1 year
limited
WARRANTY**

Spot Size			
DHS55		DHS56	
Distance: ft (m)	Spot Size: in (mm)	Distance: ft (m)	Spot Size: in (mm)
23 (7)	2.4 (60)	328 (100)	19.4 (492)
19.7 (6)	2.0 (50)	164 (50)	9.68 (246)
16.4 (5)	1.1 (29)	32.8 (10)	1.92 (49)
13.1 (4)	1.2 (30)	22.9 (7)	1.33 (34)
9.8 (3)	1.2 (30)	16.4 (5)	0.94 (24)
NA	NA	6.5 (2)	0.37 (9.4)
NA	NA	3.2 (1)	0.17 (4.4)
NA	NA	2.4 (0.75)	0.13 (3.2)

Specifications		
	DHS55	DHS56
Temperature Range	1830° to 3270°F (1000° to 1800°C)	840° to 2370°F (450° to 1300°C)
Indication	4-digit LCD in viewfinder, 1° increments; display held for 30 seconds after switch-off; blinking display warns that temperature is out of measurable range	4-digit LCD in viewfinder, 1° increments
Measuring Mode	CONT, PEAK, AVERAGE	CONT, PEAK, VALLEY
Calculating Mode	MAX, MEAN, MIN	MAX, MEAN, MIN
Optical System	9° field of view with 1/3° measurement area. Single-lens-reflex system	8° field of view with 1/3° measurement area. Eyepiece adjustable -3.75 to 2.5 diopters
Focusing Range	fixed at 16.4ft (5m)	29.5" (750mm) to infinity
Spot Size	1.1" (29mm) at 16.4ft (5m) Fixed Focus	Distance to Spot Ratio: 180:1
Spectral Range	0.55µm	3.9 µm
Emissivity Range	0.10 to 1.00 in 0.01 graduations	0.10 to 1.00 in 0.01 graduations
Response Time	0.8 seconds (approximate)	3.1 seconds (98% response)
Accuracy	±1% of reading ±1 digit in ambient temperature 64° to 82°F (18° to 28°C) e = 1.00	±1% of reading ±1 digit in ambient temperature 64° to 82°F (18° to 28°C) e = 1.00
Repeatability	±0.3% of reading ±1 digit in ambient temperature 64° to 82°F (18° to 28°C) e=1.00	±1% of reading in ambient temperature 64° to 82°F (18° to 28°C) e = 1.00
Operating Range	32° to 122°F (0° to 50°C)	32° to 122°F (0° to 50°C)
Storage Range	-4° to 131°F (-20° to 55°C)	-4° to 131°F (-20° to 55°C)
Power Supply	One 9V battery	One 9V battery or DC power supply
Power Consumption	20mA with display on (approximate) 5mA with display off (approximate)	30mA (approximate)
Dimensions / Weight	8.2 x 2.75 x 6.1in (208 x 70 x 154mm) / 1.76 lb (0.8kg)	8.37 x 2.75 x 5.80in (208 x 70 x 147.5mm) / 1.76 lb (0.8kg)

Specifications are subject to change without notice.

For Heat Spy Accessories see page 5

HSA201 Telematic Heat Spy for Long Distance Targets

Preferred by maintenance engineers for checking distant targets such as transmission lines, transformers and insulators. Special shielding from EMI interference. Ideal for preventive maintenance in refinery, steel and chemical processing. Searches out hot spots on stacks, kilns, and reactors at a safe convenient distance.



HSA201 shown with B-11 Bench Stand

Features

- Easy to use
- Easy Scanning for Hot Spots
- Maxi-temp Switch Holds Needle for Precise Readings
- 300 to 1 - Distance to Spot Size Ratio
- Measures from 300 feet away
- High Precision Crosshair Telescopic Sight
- Gun Stock Mounted and Balanced for Comfort
- Tripod Fitting Included
- Emissivity control, Maxi-Temp™ Peak Hold, Millivolt Output to Recorder and Rugged Carrying Case are Standard
- 100 hours continuous operation on two 9 volt batteries
- 1 Year Warranty



Needle swing shows differential temperatures instantly.

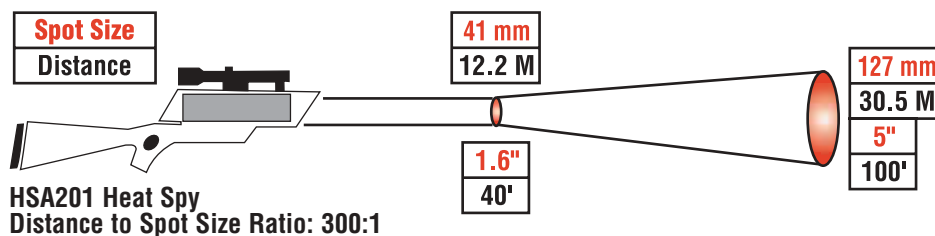
Specifications

Temperature, Low Range	-10 to 100°C, -18 to 180°F
High Range	-20 to 200°C, -36 to 360°F
Dual Range, °C	-10 to 100°C, -20 to 200°C
Dual Range, °F	-18 to 180°F, -36 to 360°F
Sensitivity	0.5°C (1°F)
Meter Accuracy	± 1%FS
Resolution	1°C (2.5°F) low range, 2.5°C (5°F) high range
Spectral Range	8 to 14 microns
Zero Calibration	Automatic self-calibration
Ambient Temperature	0 to 50°C (32 to 120°F)
Power Supply / Life	2 - 9V Batteries / 100 hours
Included Accessories	Carrying Case, Batteries and Manual

Specifications are subject to change without notice.

Ordering Information

Part No.	Description
HSA-201	-10 to 100°C, -18 to 180°F
HSA-201-2	-20 to 200°C, -36 to 360°F
HSA-201-3	-10 to 100°C, -20 to 200°C
HSA-201-4	-18 to 180°F, -36 to 360°F
TR-19	Heavy Duty Tripod, adjustable tilt
MN-1604	9V Alkaline Battery, 2 required
B-11	Bench Stand



**1 year
limited
WARRANTY**

For Heat Spy Accessories see page 5



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- Process Thermometers
- Sanitary Thermometers and Gauges
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- Temp-Plate® Irreversible and Reversible Temperature Labels
- Heat Spy Monitor® Fixed Infrared Sensors
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- Thermistor Probes and Connection Systems
- Specialty Probes for OEM applications
- Probe Extension Cables and Connectors



- Portable Electronic Temperature and Process Calibrators
- Bench Top Electronic Temperature and Process Calibrators
- Bench Top Precision Thermometers



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- Hand-Held RTD, Dual Thermocouple, and Combination Thermocouple and RTD Meters
- Hand-Held Pressure and Differential Pressure Meters, Temperature, Humidity, and Dew Point Meters
- Electronic Weather Stations

Instrumentation Group Warranty

Manufacturer warrants all products listed in this catalog to be free from defects in material or workmanship under normal use and service. The Manufacturer agrees to repair or replace any product which upon examination is revealed to have been defective due to faulty workmanship or material if returned to our factory, transportation charges prepaid, within the product specific warranty period stated in the catalog by the manufacturer. This warranty is in lieu of all other warranties, expressed or implied and of all obligations or liabilities on its part for damages including but not limited to consequential damages, following the use or misuse of instruments sold by the Manufacturer. No agent is authorized to assume for Manufacturer any liability except as set forth above.

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