mirage®

Infrared Thermometers
Noncontact temperature measurement system

A higher standard for performance, reliability, versatility and value

IRCON®
A Fluke Company

For over 40 years, Ircon has been the technological leader in infrared thermometry. We've been the leader because of advanced product features like robust, well-sealed housings; quick response times; unparalleled accuracies and reliabilities; and innovations like our Peak-Picker option, E-slope adjustment and stable InGaAs detectors. We've been the leader because we have an acute understanding of the connections between manufacturing and IR technology. Ircon's Quality System is ISO 9001certified and its products meet CE directives.

For 40 years, IRCON, Inc. has been solving industry's toughest temperature measurement problems. We have successfully installed over 300,000 temperature measurement instruments including infrared thermometers and industrial line scanning systems and accessories – in manufacturing facilities around the world. Designed for reliability and ruggedness, these instruments have proven themselves time and time again in the most hostile environments.

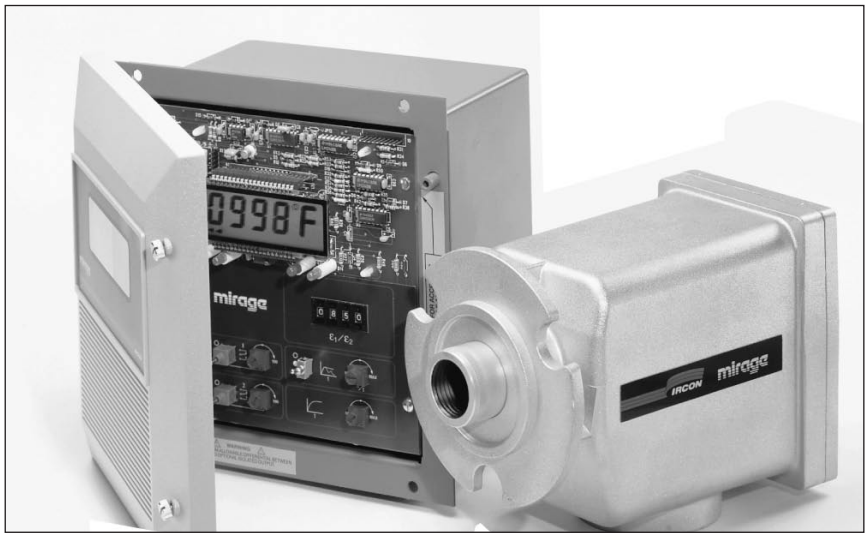
Our wide selection of on-line, noncontact infrared thermometers includes highly reliable two-color thermometers, portable thermometers, line scanners, calibration systems and accessories. The instruments in this catalog are just a sampling of what we have to offer. If a Mirage isn't right for your application, you can be sure we've got the IR thermometer that is.

Each series of Ircon instruments offers a wide range of temperature spans and spectral regions. In addition, our infrared thermometers feature through-the-lens focusable optics or fiber optics that allow for viewing and measuring temperatures of very small or obstructed targets.

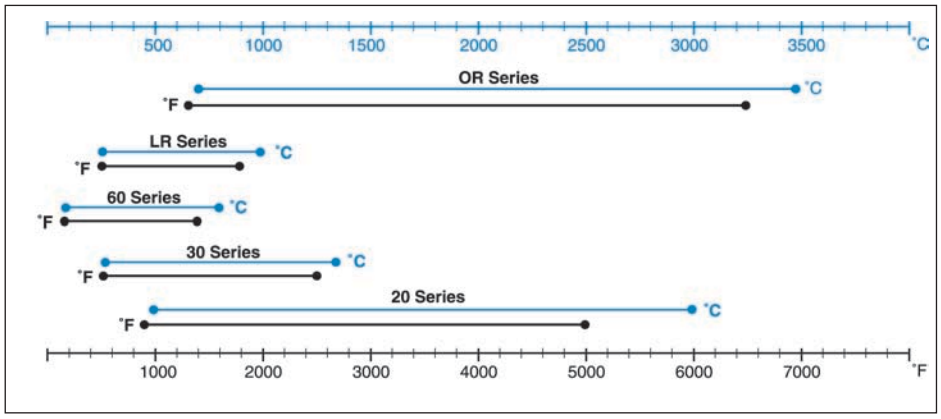
Ircon provides more than a complete line of dependable equipment; we also offer total measurement solutions and a variety of support services. Ircon sales representatives and application engineers have years of experience in solving application problems. They can analyze your product or material in a laboratory environment to assist in selecting the correct instrument, or do an on-site demonstration of Ircon instruments.

Or, for short-term testing, we offer a month-to-month rental plan that lets you try a particular instrument under various process conditions on your own. And, if you decide to buy the instrument, you can apply a portion of the rental fee toward the total purchase price.

The Latest Mirage innovation



The InGaAs Detector - Found on the Mirage 30 Series and LR Series, this innovative detector offers a high degree of stability, drift-free operation and superior temperature meaasurment accuracy.



Mirage Series Temperature Range Overview

In an effort to provide the best possible customer support, Ircon conducts easy-to-understand technical training seminars covering basic infrared theory in practical applications, laboratory and industrial measurement and process control solutions. This is something many other infrared thermometer companies can't offer – we are the IR experts and you'll see why if you attend one of these highly informative seminars.

The Ircon Technical Services Center provides various field services, including preventative maintenance contracts, calibration of instruments and training for plant maintenance personnel.

With three decades of experience and a wide range of temperature measurement instruments, Ircon constantly strives to meet the needs of existing and potential customers. By introducing new Ircon instruments like the ScanIR® II linescanning system, the Maxline® 2 thermal imager and the Modline® 5 micro processor based infrared thermometer, Ircon remains on the cutting edge of temperature measurement.

Mirage Sets a High Standard for Performance - A system overview

What makes Mirage different? The Mirage temperature monitoring and control systems are compact, economical and designed to set a higher standard for performance, reliability, versatility and value. No other infrared thermometer provides as many powerful features as the Mirage does – and at such an affordable price.

The Mirage system consists of a highly reliable signal processing unit with a large and highly visible 4-digit LCD display. Because the Mirage is also a flexible system, you can choose from a broad line of infrared noncontact sensors to find one that not only matches your process needs, but is the most cost-effective means of measuring temperature for your application.

No matter which type of Ircon sensor you choose with your Mirage system – a sensor with sophisticated single lens reflex (SLR) focusing that can view spots as small as 0.012 inches (0.3 mm); or one that incorporates fiber optics – these noncontact infrared thermometers are fast and flexible. They can measure and control temperatures with adjustable response times from as fast as 10 milli-seconds to 30 seconds, and offer temperature ranges from 80 to 3500°C (150 to 6500°F).

The Mirage Sensors– Single and Two-Color IR Thermometry from Ircon

With Ircon, you have five sensor series to choose from. Each Mirage package includes the sensor, indicator/ processor and interconnecting cable. For operation above ambient temperature limits; or to protect the lens from dust, vapors and contaminants, optional accessories are available.

The 20 Series is a single-color IR thermometer that offers you through-the-lens target viewing with focusable optics. You can view a reticle-defined measuring area on the target as small as 0.012 inches (0.3 mm). It operates in a narrow spectral region of 0.70 to 1.08 microns and measures temperatures from 500 to 3000°C (900 to 5000°F).

The Mirage system: procesor, sensor and accessories - the best system at an affordable price

Mirage 20 / 30 / 60 Series

Mirage LR / OR Series

Mirage Fiber Optic Series

The 30 series (single-color) has through-the-lens target viewing with focusable optics as well, but this sensor also features our new, highly stable Indium Gallium Arsenide (InGaAs) detector that operates at 1.5 to 1.6 microns to accurately measure lower temperatures from 250 to 1400°C (500 to 2500°F).

The 60 series (single-color) also features through-the-lens target viewing with focusable optics and the ability to view a reticle defined measuring area. An extremely versatile sensor, the 60 Series can measure temperatures down to 80°C (150°F) with fast response time and high optical resolution. It operates in an absorption-free spectral region between 2.0 and 2.6 microns and a temperature range from 80 to 800°C (150 to 1400°F).

The LR series is a two-color infrared thermometer – that means it measures temperatures from the ratio of radiation signals of two adjacent wavelengths and not from absolute intensity. It will tolerate a more than 95% reduction in radiant intensity with virtually no error. This is beneficial for applications where the target is smaller than the spot size; where there are obstructions such as dust, smoke, dirty windows obscuring the line of sight; or where there are changes in emissivity of the product such as those due to changes in surface condition and sometimes changes in alloy. The LR-Series has the same focusable optics as all Mirage sensors. It operates at 1.55 microns and 1.68 microns, also at 1.12 and 1.68 microns to span temperatures from 250 to 1000°C (500 to 1800°F).

The OR-series also features focusable optics and uses two-color technology to tolerate a more than 95% reduction in radiant intensity with virtually no error. It operates in a spectral region of 0.70 to 1.08 microns and a narrow band centered at 1.08 microns. This allows it to measure temperatures from 700 to 3500°C (1300 to 6500°F).

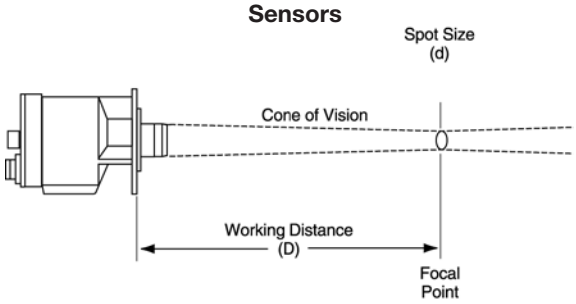
Fiber Optic Series
Our fiber optic sensors are the ultimate in noncontact temperature measurement for difficult-to-reach or obstructed targets. Available in single-color 20 and 60 series models and a two-color OR series model, these sensors can measure temperatures ranging from 180 to 3500°C (350 to 6500°F). A unique focusable reimaging lens* assembly and fiber optic cable allow target sighting even where electromagnetic interference is a problem or where extremely high ambient temperatures are present.

The Mirage Series Optical Characteristics
The sensors used in the Mirage system, like all IR sensors, are sensitive to infrared radiation in an area indicated by the cone of vision (see diagram). They will measure only objects within this cone. The diameter of the cone at any point will determine the area of measurement, or spot size. Infrared energy within the spot size will be focused on the detector element and will, therefore, produce a temperature signal.

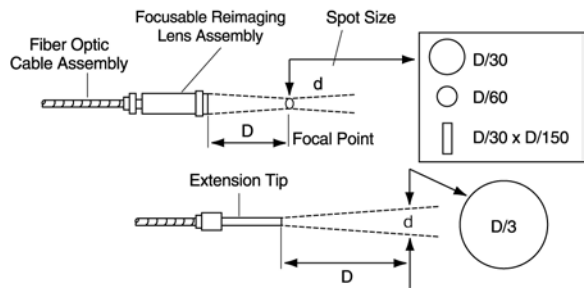
Optical Resolution Formula
The formula below defines the spot size at the focal point. Simply divide the Working Distance (D) by the Resolution Factor (F) of the instrument to determine the spot size (d). The value of (F) depends on sensor series and model. See pages 12 and 13 for Optical Resolution Factor (F).

* U.S. Patent #4919505 and 5011296

Optical Characteristics for Single Lens Reflex (SLR) Sensors



Optical Characteristics for Fiber Optic Sensors



Sensor Cone of Vision

Inside the Mirage Indicator/Processor – Full-featured and DIN panel cutout mountable

The Mirage indicator / processor unit is a compact, self-contained instrument designed for simple installation, operation and service. The enclosure fits a standard 43 700 DIN panel cutout or can be easily mounted on a wall or pipe. All wiring can be done quickly and easily through the front-end of the unit. The Mirage indicator/processor is fully compatible with international standards IEC-348 and NEMA 12K. This product also meets EMC directive 89/336/EEC. The Mirage indicator/ processor offers standard linearized analog temperature outputs of 0 to 10 Vdc and either 4 to 20 mA or 0 to 20 mA. You can choose either a ºF or ºC temperature indication.

A. Two-Point On/Off Control is optional.

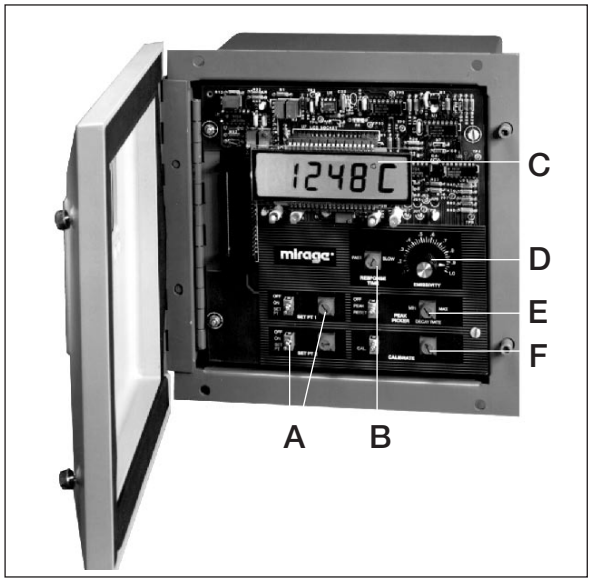
B. Response time is adjustable from 10 milliseconds to 10 seconds (25 miliseconds to 30 seconds for LR-Series).

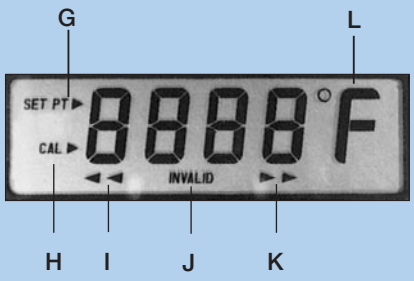
C. 4-digit LCD displays temperature; set point; over/under range; °F or °C; and other conditions depending on the model.

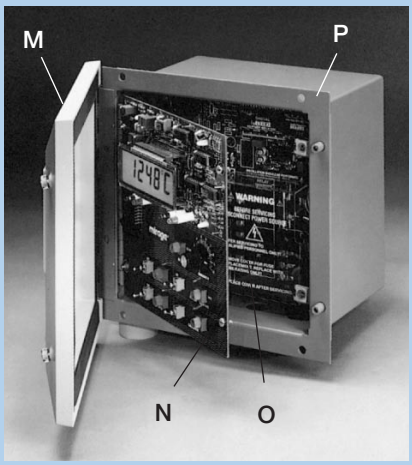
D. Emissivity control can be adjusted from 0.1 to 1.0. (E-slope control adjustment is standard on the OR and LR-Series.)

E. Peak-Picker with adjustable decay rate from 0.01% to 5% of span per second is optional.

F. Adjustable calibration potentiometer is standard on the 60-Series.







G Set point indication for on/off controller

H Calibration indication (60-Series)

I Under range

J Invalid indication (OR- and LR-Series)

K Over range

L ºC or ºF display per model selection

M Swing-out front door provides easy access to control panel

N Hinged swing-out control PCB for fast installation and service

O Terminal connection PCB allows easily accessible front-end wiring hookup

P Enclosure fits standard DIN opening

Mirage Optional Features

Peak-Picker

A Peak Picker option allows stable temperature measurement of moving objects or targets periodically blocked by smoke, steam or dust. The Peak-Picker provides circuitry which responds to the highest instantaneous value of temperature and holds this signal through an adjustable slow decay rate from 0.01% to 5% of span per second. A three-position control switch permits Off, Peaking and Reset functions with remote reset available through user-supplied contact closure.

Two-Point On/Off Control

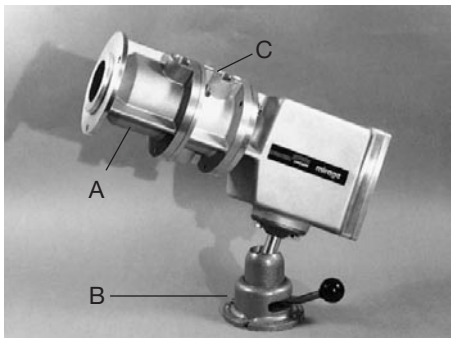
This optional control function provides the most economical and simplest type of control. A relay opens and closes as the process temperature moves through the selected temperature set points turning equipment on or off or providing high and low alarms. Two sets of LED's on the front panel indicate below/above temperature for each set point. A 3-position control switch per point permits control on, off and setting functions.

Isolated Outputs

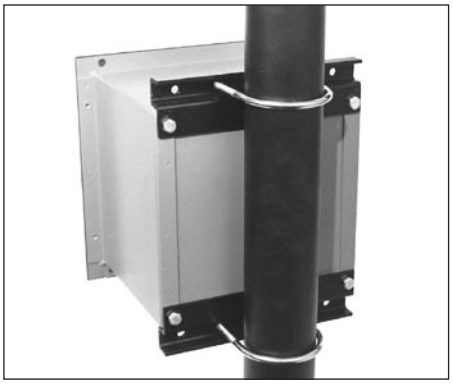
This feature electrically isolates the analog temperature output from other external instruments, eliminating ground loop and electrical noise interference.

Accessories

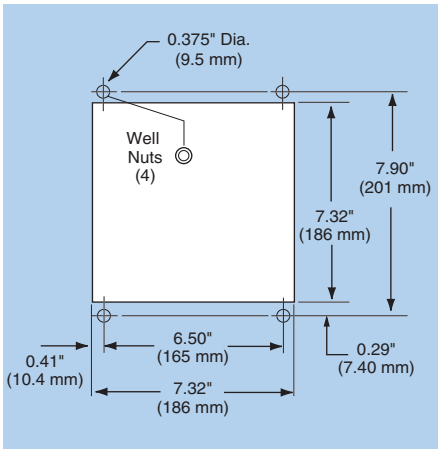
Additionally, Mirage infrared thermometers are available with all standard Ircon accessories such as air purge and water cooling accessories, water cooling jacket, open and closed end sighting tubes and several types of mounting assemblies. These accessories are explained in greater detail at the back of this brochure.



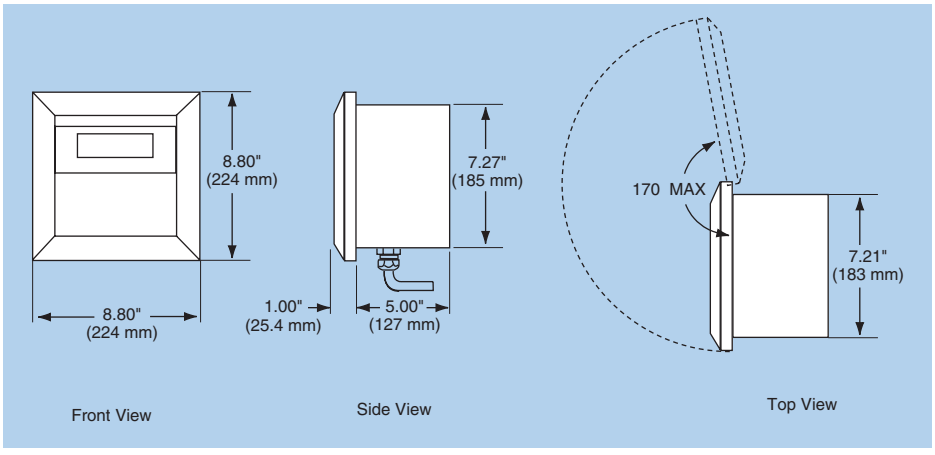
A - AA-3 air purge assembly
B - SB-1 swivel base
C - WA-3 water cooling accessory



The idicator/processor unit may be panel mounted with suppled hardware or can be mounted to a pipe or wall with an optional mounting kit.



DIN panel cutout dimensions



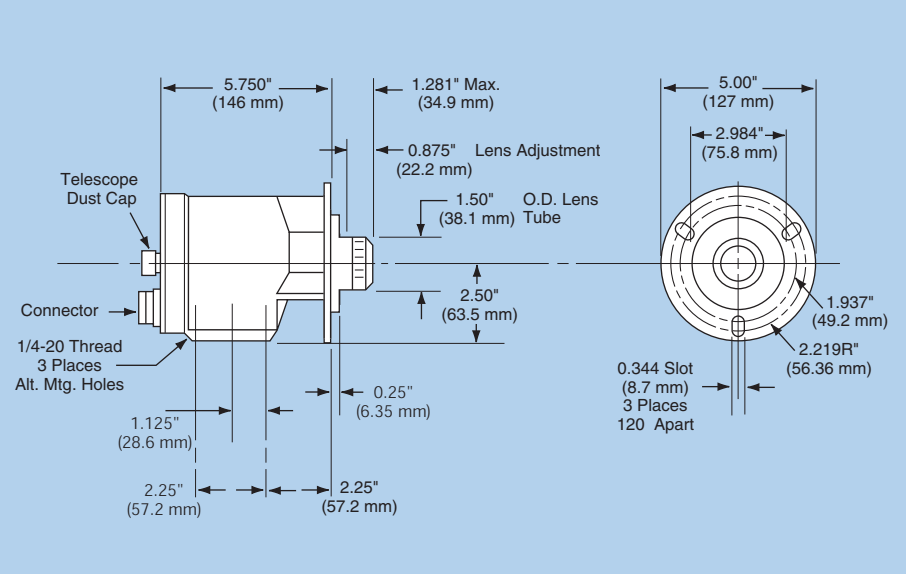
Dimensions of Mirage Iindicator / processor enclosure

MIRAGE Sensors – Optimum Performance with Powerful Features

These sensors are precision electro-optical instruments that can sense infrared radiation and produce a signal proportional to the radiant intensity. They feature through-the-lens sighting by means of a viewing telescope. A circular reticle visible through the eyepiece defines the exact area to be measured. The sensor is sighted and focused as simply as an SLR camera. Its optical component, infrared detector, and electronics are housed in a rugged, die cast, gasketed housing to allow operation in severe industrial environments. For operation above ambient temperature limits; or to protect the lens from dust, vapors and contaminants, optional accessories are available.

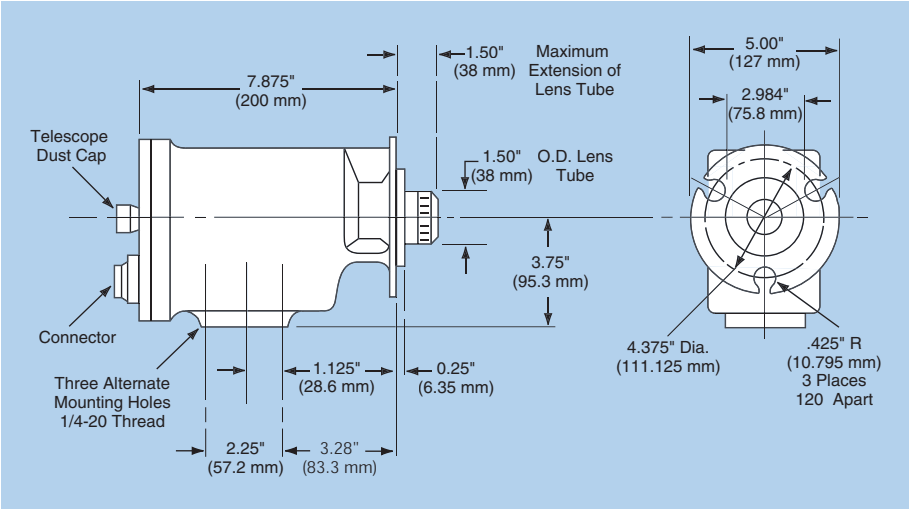
The 20 Series offers many discrete temperature ranges for incandescent applications between 500 to 3000°C (900 and 5000°F). Its stable and rugged silicon detector permits applications to 90°C (200°F) ambient without cooling. This series also includes a fiber optic model described later.

The 30 Series features our innovative Indium Gallium Arsenide (InGaAs) detector which is extremely stable, permitting operation in high ambient temperatures up to 60°C (140°F) without external cooling. It provides accurate and reliable temperature measurements over very wide temperature ranges from 250 to 1400°C (500 to 2500°F).



The 20, 30, and 60 series single color sensors

The 60-Series is an extremely versatile, high optical resolution sensor that can measure temperatures from 80 to 800ºC (150 to 1400ºF). It operates in an absorption-free spectral region between 2.0 and 2.6 microns. This series also includes a fiber optic model.



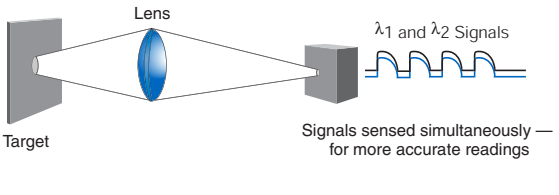
The OR and LR Series two color sensors

LR-Series Two-Color Technique Advantages

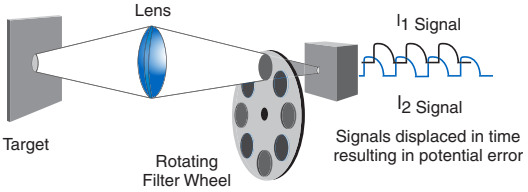
Ircon's dual detector measuring technique (A) overwhelmingly provides faster and more accurate temperature measurement in comparison to instruments that use the filterwheel technique (B). In the IRCON two-color scheme, ratio computation of the two spectral signals takes place simultaneously. In the filter wheel scheme, ratio computation is displaced in time resulting in slower operation and potential error. Ircon's superior temperature measurement under dynamic target conditions (target moving in and out of the field of view or temperature fluctuations) is made possible because both detectors view and measure the same spot on the target at the same instant.

These sensors have dual detectors that sense infrared radiation and pro-duce a signal proportional to the ratio of two adjacent wavelengths. They allow temperature of two adjacent wavelengths. They allow temperature measurement for difficult temperature applications where the target is smaller than the spot size; where there are obstructions such as dust, smoke, steam or dirty windows obscuring the line of sight; or where there are changes in emissivity of the product such as those due to changes in surface condition and in some cases, alloy.

A The two-color technique using two detectors measures simultane-ously, allowing accu-rate readings and fast response time.



B The filter wheel tech-nique using one detector is time-delayed, result-ing in potential error and slow response time.



Reliable temperature readings are possible as long as both operating wavelengths are affected equally – the OR and LR Series will tolerate a more than 95% reduction in radiant intensity with virtually no error.

Choose either the OR series for high temperature applications ranging from 700 to 3500°C (1300 to 6500°F), or the LR series when applications are below 700°C (1300°F).

These two color IR thermometers also feature through-the-lens sighting by means of a viewing telescope. A circular reticle, visible through the eyepiece, defines the exact area to be measured.

The sensor is sighted and focused as simply as an SLR camera. Its optical components, infrared detector and electronics are housed in a rugged, die cast, gasketed housing to allow operation in severe industrial environments.

Features unique to Ircon's two-color thermometer series' indicator/processor are: a four-digit E-Slope potentiometer (for non-greybody applications), an invalid indication and a response-time adjustment that allows values to be set from 0.025 to 30 seconds (LR-series only).

The LR-series features two Indium Gallium Arsenide (InGaAs) detectors which measure the target simultaneously delivering highly stable, highly accurate measurements with response that is 50 times faster than other two-color instruments. The OR series includes a fiber optic model described later.

The Mirage Fiber Optic Sensors– For hostile and severe environments and when there's no clear sight path to the target

The fiber optic Mirage sensor is available in single and two-color IR thermometer versions. Both utilize a unique focusable reimaging lens assembly with a fiber optic cable and sensor which allow temperature measurement even when it is difficult or impossible to get a clear sight path to the target. The slender, focusable reimaging lens allows infrared temperature measurement to be applied to processes that were never before possible.

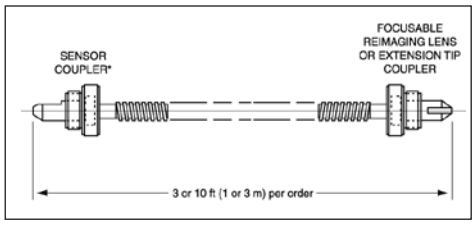
It offers the opportunity to operate in small areas and narrow openings; and it can measure temperature of objects at distances ranging from 10 inches (250 mm) to infinity with a spot size as small as 0.1 inch (2.5 mm). An optional close-focus lens allows focusing from 6 to 10 inches (150 to 250 mm).

A flexible fiber optic cable provides the optical link between sensor and reimaging lens and allows operation through harsh environments that contain smoke, steam or intense electrical fields. These sensors are ideal for applications that involve processes using vacuum furnaces, induction heating, welding or semiconductor manufacturing or where conventional thermometers are impossible to use.

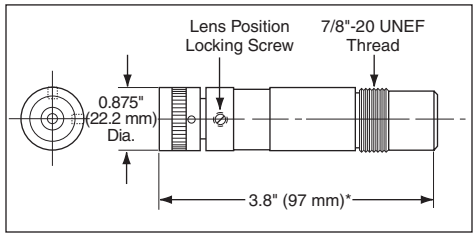
The focusable reimaging lens and fiber optic cable are designed to operate in ambient temperatures up to 200°C (400°F) without auxiliary cooling. An extension tip is available and can be used for ambients up to 300°C (575°F). This extension tip can be inserted between the windings of an induction heating coil without disturbing the field or upsetting the sensor's electronics.

Three Fiber Optic Series for Broad Application Flexibility
Choose from either a 20 or 60 series single-color fiber optic sensor that operates within a temperature range from 900 to 5000°F or 500 to 3000°C for the 20 series; 350 to 1400°F or 180 to 800°C for the 60 series; the OR series two-color fiber optic sensor that measures temperatures from 1300 to 6500°F or 700 to 3500°C *See product bulletin PB-FOMR for details.*

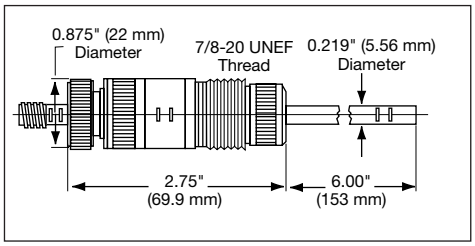
Cable dimensions

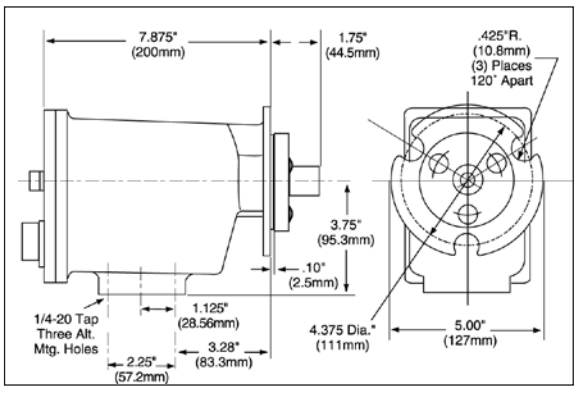


Reimaging lens dimensions

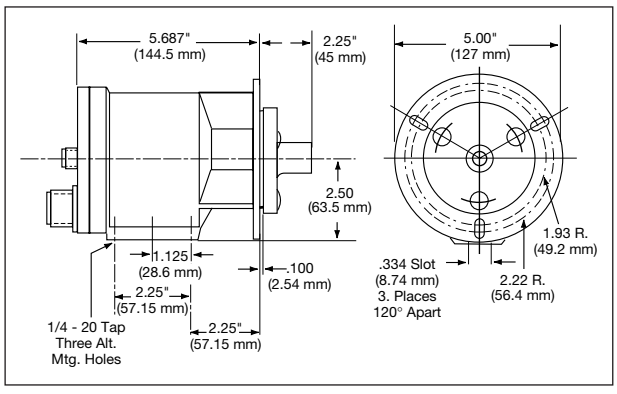


Extension tip dimensions





OR series fiber optic sensor dimensions



20, 60 series fiber optic sensor dimensions

Mirage System Specifications

The MIRAGE system meets CE directives of conformity for EMI/RFI compliance.

EMC Directive 89/336/EE C and Low Voltage Directive 73/23 EEC

Tested to: EN 50081-1:1992 Generic Emissions Standard

EN 50082-1:1992 Generic Immunity Standard
EN 61010-1: Safety Standard

Sensors

Optical Resolution	0.75% of reading or 3°C (5°F)
Temperature Range	*See ordering chart*
Input Power	From indicator / processor
Ambient Temperature Range *(without auxiliary cooling)*	
20 series	-17 to 90°C (0 to 200°F)
30 series	0 to 60°C (32 to 140°F)
60 series	10 to 55°C (50 to 130°F)
OR series	0 to 55°C (32 to 130°F)
LR series	0 to 55°C (32 to 130°F)
Fiber Optic Cable and Reimaging Lens	0 to 200°C (0 to 400°F)
Extension Tip	0 to 300°C (0 to 575°F)
Relative Humidity	10 to 90% non-condensing
Construction	NEMA 4 (IP 66)

Indicator / Processor

Calibration Accuracy	20, 30, 60, OR series	1% of full scale temeprature of 10°F (6°C), whichever is greater
	LR series	0.75% of reading or 5°F (3°C)
Repeatability	20, 30, 60, OR series	0.3% of full scale temperature +/- 1°
	LR series	0.2% of full scale temperature +/- 1° (noise free)
Emissivity Control Ranges		Adjustable from 0.1 to 1.0
E-slope Adjustment	OR, LR series only	0.850 to 1.150
Invalid Relay Contact Rating	OR, LR series only	1 A at 24 Vdc; 0.5 A at 120 Vac - non inductive load
Signal Reduction Range	OR series	Above 1500°F (800°C) will tolerate approximately 95% reduction in radiation intensity.
	LR series	Above 575°F (300°C) will tolerate approximately 95% reduction in radiation intensity.
Display	20, 30, 60 series	4 digit LCD with °F or °C. Out of range arrows, on/off control option with set point, display updates every 0.5 seconds, CAL *(60 series only)*
Response Time	20, 30, 60, OR series	Adjustable from 10 milliseconds to 10 seconds
	LR series	Adjustable from 25 milliseconds to 30 seconds
Analog Outputs		0 to 10 Vdc non-isolated (3 mA max), isolated option available; 4 to 20 mA or 0 to 20 mA non-isolated (500 ohms load max), isolated option available
Power Requirements		100, 115, 200, 230 Vac +/- 10%, 50/60 Hz
Ambient Temperature Range		32 to 125°F (0 to 50°C), 10 to 90% R.H. non-condensing
Construction		Meets NEMA 12K (IP 52) standards
Dimensions		8.80"H x 8.80"W x 5.00" D (224mm x 224 mm x 127 mm)

Options

Peak Picker	Adjustable decay rate 0.01% to 5% of span per second. Three position control switch permits off, peaking or reset functions; reset can be activated from user-supplied contact
Two point On/Off Controller	Two form C relay outputs rated 3A, 250 Vac resistive, 1A, 250 Vac inductive; 30 millisecond response time *(LR series - 5 milliseconds additional);* Hysteresis: 0.3% of span of 1°F (1°C), whichever is greater
Isolated Analog Outputs	50 Vdc ,axo,i, dofferemtoa; between ground and optional isolated outputs.

A Mirage for Every Temperature Range

The Mirage temperature monitoring and control systems are compact and designed to set a new, higher standard for performance, reliability, versatility and value. No other infrared thermometer provides as many powerful features as the Mirage does - and at such an affordable price.

Start with the highly reliable signal processing unit with a large and visible 4-digit LCD display. Choose your sensor from a broad line of infrared noncontact sensors. Whether you decide on a single color, two color, or fiber optic sensor, we're certain you will appreciate the reliability and flexibility of the Mirage IR thermometer system.

Mirage Infrared Temperature System Ordering Chart

Block A Mirage series MR.

Block B First two digits identify sensor series (20, 30, 60, OR, or LR); third and fourth digits describe optical characteristics of sensor.

Block C Upper temperature limit of sensor in hundreds of degrees (ex: 6 = 600, (12 = 1200) and units of measurement (Fahrenheit or Celsius).

Block D Signal conditioning options.

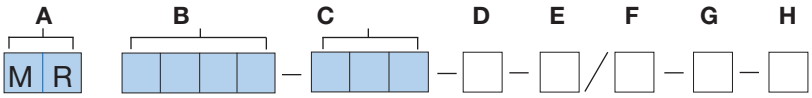
Block E Type of outputs.

Block F Input power.

Block G Control options

Block H Language selection.

Note: For details on blocks D through H, see page 14 of this brochure.



Sensors–Table below shows blocks **A**, **B** and **C** (Sensor Series, Optical Characteristics and Temperature Range in ºF or ºC)

20-Series (0.70 to 1.08 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MR2002-08C*	D/20	500 to 800°C	MR2002-14F*	D/20	900 to 1400°F
MR2002-09C**	D/20	550 to 900°C	MR2002-16F**	D/20	1000 to 1600°F
MR2002-10C	D/20	600 to 1000°C	MR2002-18F	D/20	1100 to 1800°F
MR2005-10C**	D/50	600 to 1000°C	MR2005-18F**	D/50	1100 to 1800°F
MR2005-11C	D/50	700 to 1100°C	MR2005-20F	D/50	1200 to 2000°F
MR2010-11C**	D/100	700 to 1100°C	MR2010-20F**	D/100	1200 to 2000°F
MR2010-13C	D/100	800 to 1300°C	MR2005-22F	D/50	1300 to 2200°F
MR2020-13C**	D/200	800 to 1300°C	MR2010-22F**	D/100	1300 to 2200°F
MR2020-16C	D/200	900 to 1600°C	MR2010-25F	D/100	1500 to 2500°F
MR2030-16C**	D/300	900 to 1600°C	MR2020-25F**	D/200	1500 to 2500°F
MR2030-20C	D/300	1100 to 2000°C	MR2020-32F	D/200	1800 to 3200°F
MR2030-30C	D/300	1500 to 3000°C	MR2030-32F**	D/300	1800 to 3200°F
			MR2030-40F	D/300	2000 to 4000°F
			MR2030-50F	D/300	2500 to 5000°F

30-Series (1.5 to 1.6 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MR3005-10C	D/50	250 to 1000°C	MR3005-18F	D/50	500 to 1800°F
MR3010-11C	D/100	350 to 1100°C	MR3010-20F	D/100	600 to 2000°F
MR3015-14C	D/150	400 to 1400°C	MR3015-25F	D/150	700 to 2500°F

Note: Minimum emissivity setting of 0.3 for first 100ºF (55ºC) of range.

60-Series (2.0 to 2.6 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MR6015-02C	D/150	80 to 200°C	MR6015-04F	D/150	150 to 400°F
MR6015-03C	D/150	120 to 300°C	MR6015-05F	D/150	200 to 500°F
MR6015-04C	D/150	160 to 400°C	MR6015-06F	D/150	250 to 600°F
MR6015-06C	D/150	250 to 600°C	MR6015-08F	D/150	350 to 800°F
MR6015-08C	D/150	350 to 800°C	MR6015-10F	D/150	500 to 1000°F
			MR6015-14F	D/150	600 to 1400°F

OR-Series (0.70 to 1.08 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MROR05-14C	D/50	700 to 1400°C	MROR05-25F	D/50	1300 to 2500°F
MROR05-16C	D/50	900 to 1600°C	MROR05-32F	D/50	1800 to 3200°F
MROR05-24C	D/50	900 to 2400°C	MROR10-40F	D/100	2000 to 4000°F
MROR05-20C	D/100	1100 to 2000°C	MROR15-65F	D/150	2500 to 6500°F
MROR05-35C	D/150	1500 to 3500°C			

LR-Series (1.50 to 1.60 microns and 1.65 to 1.71 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MRLR05-05C	D/50	250 to 550°C	MRLR05-10F	D/50	500 to 1000°F
MRLR10-07C	D/100	400 to 750°C	MRLR10-14F	D/100	700 to 1400°F
MRLR10-10C***	D/100	550 to 1000°C	MRLR10-18F***	D/100	1000 to 1800°F

* *These models are restricted to sensing head ambient of 0 to 130°F (-17 to 65°C) and minimum emissivity setting of 0.4.*

** *These high resolution models restricted to sensing head ambient of 0 to 150°F (-17 to 65°C) and minimum emissivity setting of 0.3.*

*** *Note: 1.00 to 1.20 microns and 1.65 to 1.71 microns.*

Model blocks are the same for fiber optics as well as for non-fiber optic sensors with this exception:

The third and fourth digits of block B identifies fiber optic cable length, focusable spot size and/or extension tip.

F1 = 3 ft. (1 m) cable, D/30 spot size
F2 = 3 ft. (1 m) cable, D/60 spot size
F3 = 3 ft. (1 m) cable, D/30 x D/150 spot size
F4 = 3 ft. (1 m) cable, extension tip
F5 = 10 ft. (3 m) cable, D/30 spot size
F6 = 10 ft. (3 m) cable, D/60 spot size
F7 = 10 ft. (3 m) cable, D/30 x D/150 spot size
F8 = 10 ft. (3 m) cable, extension tip

Fiber Optic Sensors

The tables below show blocks A, B, and C
Sensor series, fiber optic options and temperature ranges in °F or °C.

20-Series (0.70 to 1.08 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MR20F1-11C*	D/30	700 to 1100°C	MR20F1-22F*	D/30	1300 to 2200°F
MR20F4-11C	extension tip	700 to 1100°C	MR20F4-22F	extension tip	1300 to 2200°F
MR20F5-11C	D/30	700 to 1100°C	MR20F5-22F	D/30	1300 to 2200°F
MR20F8-11C	extension tip	700 to 1100°C	MR20F8-22F	extension tip	1300 to 2200°F
MR20F1-13C	D/30	800 to 1300°C	MR20F1-25F	D/30	1500 to 2500°F
MR20F4-13C	extension tip	800 to 1300°C	MR20F4-25F	extension tip	1500 to 2500°F
MR20F5-13C	D/30	800 to 1300°C	MR20F5-25F	D/30	1500 to 2500°F
MR20F8-13C	extension tip	800 to 1300°C	MR20F8-25F	extension tip	1500 to 2500°F
MR20F2-16C	D/60	900 to 1600°C	MR20F2-32F	D/60	1800 to 3200°F
MR20F3-16C	D/30 x D/150	900 to 1600°C	MR20F3-32F	D/30 x D/150	1800 to 3200°F
MR20F6-16C	D/60	900 to 1600°C	MR20F6-32F	D/60	1800 to 3200°F
MR20F7-16C	D/30 x D/150	900 to 1600°C	MR20F7-32F	D/30 x D/150	1800 to 3200°F
MR20F2-20C	D/60	1100 to 2000°C	MR20F2-40F	D/60	2000 to 4000°F
MR20F3-20C	D/30 x D/150	1100 to 2000°C	MR20F3-40F	D/30 x D/150	2000 to 4000°F
MR20F6-20C	D/60	1100 to 2000°C	MR20F6-40F	D/60	2000 to 4000°F
MR20F7-20C	D/30 x D/150	1100 to 2000°C	MR20F7-40F	D/30 x D/150	2000 to 4000°F
			MR20F2-50F	D/60	2500 to 5000°F
			MR20F3-50F	D/30 x D/150	2500 to 5000°F
			MR20F6-50F	D/60	2500 to 5000°F
			MR20F7-50F	D/30 x D/150	2500 to 5000°F

60-Series (2.0 to 2.25 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MR60F2-04C**	D/60	180 to 400°C	MR60F2-07F**	D/60	350 to 700°F
MR60F4-04C	extension tip	180 to 400°C	MR60F4-07F	extension tip	350 to 700°F
MR60F2-06C	D/60	250 to 600°C	MR60F2-09F	D/60	400 to 900°F
MR60F4-06C	extension tip	250 to 600°C	MR60F4-09F	extension tip	400 to 900°F
MR60F2-08C	D/60	350 to 800°C	MR60F2-10F	D/60	500 to 1000°F
MR60F4-08C	extension tip	350 to 800°C	MR60F4-10F	extension tip	500 to 1000°F
			MR60F2-14F	D/60	600 to 1400°F
			MR60F4-14F	extension tip	600 to 1400°F

* *These models are restricted to sensing head ambient of 0 to 150°F (-17 to 65°C) and minimum emissivity setting of 0.3.*

** *These models are restricted to sensing head ambient of 50 to 113°F (10 to 45°C) and minimum emissivity setting of 0.4, and minimum response time of 1.0 second.*

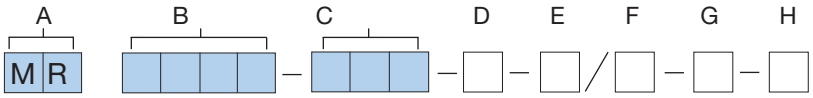
Note: The fiber optic cable and focusable reimaging lens of all 60-series models are restricted to an ambient range of 0 to 300°F(-17 to 150°C).

OR-Series (0.70 to 1.08 microns and 1.08 microns)

Model No.	Optical Resolution	Temperature Range	Model No.	Optical Resolution	Temperature Range
MRORF1-14C	D/30	700 to 1400°C	MRORF1-25F	D/30	1300 to 2500°F
MRORF4-14C	extension tip	700 to 1400°C	MRORF4-25F	extension tip	1300 to 2500°F
MRORF5-14C	D/30	700 to 1400°C	MRORF5-25F	D/30	1300 to 2500°F
MRORF8-14C	extension tip	700 to 1400°C	MRORF8-25F	extension tip	1300 to 2500°F
MRORF1-16C	D/30	900 to 1600°C	MRORF1-32F	D/30	1800 to 3200°F
MRORF4-16C	extension tip	900 to 1600°C	MRORF4-32F	extension tip	1800 to 3200°F
MRORF5-16C	D/30	900 to 1600°C	MRORF5-32F	D/30	1800 to 3200°F
MRORF8-16C	extension tip	900 to 1600°C	MRORF8-32F	extension tip	1800 to 3200°F
MRORF1-20C	D/30	1100 to 2000°C	MRORF1-40F	D/30	2000 to 4000°F
MRORF4-20C	extension tip	1100 to 2000°C	MRORF4-40F	extension tip	2000 to 4000°F
MRORF5-20C	D/30	1100 to 2000°C	MRORF5-40F	D/30	2000 to 4000°F
MRORF8-20C	extension tip	1100 to 2000°C	MRORF8-40F	extension tip	2000 to 4000°F
MRORF2-24C	D/60	900 to 2400°C	MRORF2-65F	D/60	2500 to 6500°F
MRORF3-24C	D/30 x D/150	900 to 2400°C	MRORF3-65F	D/30 x D/150	2500 to 6500°F
MRORF6-24C	D/60	900 to 2400°C	MRORF6-65F	D/60	2500 to 6500°F
MRORF7-24C	D/30 x D/150	900 to 2400°C	MRORF7-65F	D/30 x D/150	2500 to 6500°F
MRORF2-35C	D/60	1500 to 3500°C			
MRORF3-35C	D/30 x D/150	1500 to 3500°C			
MRORF6-35C	D/60	1500 to 3500°C			
MRORF7-35C	D/30 x D/150	1500 to 3500°C			

A Mirage for every application

Once you've decided on a sensor and have filled in model blocks A, B, and C, (see pgs12 and 13), you've have half the model number. To complete your model number, choose an option from blocks D, E, F, G, and H as shown below.



Block D – Signal Conditioner
0 None
1 Peak Picker with adjustable decay rate; internal and external reset

Block E – Analog Output
0 4 to 20 mAdc and 0 to 10 Vdc, Non-isolated
1 4 to 20 mAdc and 0 to 10 Vdc, Isolated
2 0 to 20 mAdc and 0 to 10 Vdc, Non-isolated
3 0 to 20 mAdc and 0 to 10 Vdc, Isolated

Block F – Input Power
0 115 Vac ± 10%
1 230 Vac ± 10%
2 100 Vac ± 10%
3 200 Vac ± 10%

Block G – Control
0 No control
1 Two-point on/off control

Block H – Language
0 English
1 French
2 German

MIRAGE Accessories

Air Purge
The AA-3 Air Purge accessory attaches to the front-end of the sensor housing and provides a positive air pressure in front of the lens, thus preventing dust, smoke, moisture and other particulate contamination from forming on the lens. Generally, six cubic feet of air per minute (0.17 cubic meters per minute) is suitable for most applications. For the fiber optic version, the AA-5 accessory screws directly to the front end of the reimaging lens. The threaded portion of the air purge can be used for easy mounting to a mounting bracket or into a threaded bulkhead. Air flow of 1 cubic foot per minute (0.02 cubic meter) is required. The AAQ-1 Quick Release/Air Purge Assembly with Reimaging Lens Adapter provides the same function and allows for quick, easy servicing of the Reimaging Lens.

Angle Mounting Bracket
The MB-5 Angle Mounting Bracket is a stainless steel angle bracket that serves as an inexpensive mounting base for the reimaging lens assembly or the extension tip for the Mirage fiber optic series. The bracket base plate is designed for bolting the bracket to almost any fixed mounting surface. The hole in the bracket face will accept the threaded end of the reimaging lens assembly or extension tip. Two mounting nuts are supplied with either assembly and are used to secure these devices to the bracket.
The MB-2 Angle Mounting Bracket is a heavy-duty bracket designed to hold large loads and multiple accessories. The MB-3 Adjustable Angle Mounting Bracket provides an adjustable mounting base for fiber optic version.

Swivel Mounting Base
The SB-1 or SB-5 Swivel Mounting Base provides an adjustable mounting base for the MIRAGE sensor or reimaging lens assembly for the fiber optic version. This mounting facilitates orienting the lens assembly for correct optical alignment. A locking feature firmly locks the lens in position when optical alignment is completed or permits realignment, when necessary. When used with a fiber optic version, the model MC-5 Mounting Clamp accessory (described below) is an integral part of the swivel mounting base.

Mounting Clamp
The MC-5 Mounting Clamp is a rugged, stainless steel mounting support which can either be used to mount a fiber optic MIRAGE reimaging lens assembly or extension tip to a support structure. It can also be screwed into the mounting base of the model TM-6 Tripod for general laboratory or engineering use.

Illuminator
Designed for use with fiber optic MIRAGE sensors, the model IL-5 Illuminator is a portable precision device that transmits bright light through the fiber optic cable and focusable lens assembly to aid in aligning and focusing the lens on a target object. The light indicated on the target accurately defines the spot size to be measured. This compact, hand-held illuminator utilizes a rechargeable, battery-powered, quartz halogen lamp with variable intensity control and a precision adapter that easily connects to the fiber optic cable. A battery recharger is supplied with the illuminator.

Water Cooling Accessory
This accessory, WA-3, permits the use of sensors in ambient temperatures 35ºF (19ºC) above the maximum rating. To cool effectively, a nominal 10-20 gal./hr. (40 to 75 liter/hr.) flow of water below 90ºF (32ºC) is suitable for most applications. Water pressure should be less than 100 PSI (6.8 bar).

Water Cooling Jacket
This feature, WJ-5, protects the sensor in ambient temperatures up to 400ºF (200ºC). Water flow rate of 20 gal./hr. (75 liter/hr.) at a temperature of 90ºF (32ºC) or less is adequate for rated cooling. Water pressure should be less than 100 PSI (6.8 bar). Two 1/2" NPT threaded holes in the top of the enclosure accept water inlet and outlet pipes or tubing. Four 1/4-20 tapped holes are provided in the base for mounting. An air purge accessory is included with this model.

Sight and Target Tubes
Sight tubes provide a protected optical path for incoming infrared radiation when sighting through furnace walls or particle- or vapor-filled atmospheres. Closed-end target tubes heat up to the temperature of their surroundings; the sensor measures the temperature of the tip. Target tubes are useful for measuring furnace atmosphere, immersion baths and other media that do not present a solid target. Sight and target tubes are available in a variety of materials, lengths and diameters.
Inconel and stainless steel sight tubes for fiber optic version are also available.

Tripod

Our tripod, TM-6, is a portable, adjustable-height platform with a tilting and panning head. It has twist-to-lock control handles for ease in making panning and tilt adjustments; friction-grip adjustable length legs; and a geared elevation crank which allows height adjustment from 2-1/2 to over 6 feet (.76 m to 1.8 m). All adjustments can be locked securely once optical alignment of the sensor is completed. An NC-threaded thumb screw in the tilt head mates with the 1/4-20 tapped hole in the base of the sensor.

In addition, a special ruggedized fiber optic cable is available for high temperature and severe environments.

Accessory Availability

Accessories	20-Series	30-Series	60-Series	OR-Series	LR-Series
Air Purge, AA-3	X	X	X	X	X
Swivel Mounting Base					
SB-1				X	X
Water Cooling Accessory, WA-3	X	X	X	X	X
Water Cooling Jacket, WJ-5	X	X	X	X	X
Tripod, TM-6	X	X	X	X	X
Close Focus Lens	X	X	X	X	X
Sight and Target Tubes	X	X	X	X	X

Fiber Optic Accessory Availability

Accessories	20-Series	30-Series	60-Series	OR-Series	LR-Series
Air Purge, AA-5	X		X	X	
Angle Mounting Brackets					
MB-2	X		X	X	
MB-5	X		X	X	
Swivel Mounting Base, SB-5	X		X	X	
Mounting Clamp, MC-5	X		X	X	
Illuminator, IL-5	X		X	X	
Sight Tubes					
SI-12	X		X	X	
SI-24	X		X	X	
SS-14	X		X	X	
Close Focus Lens	X		X	X	
Fiber Optic Cable	X		X	X	
Extension Tip	X		X	X	
Adjustable Angle Bracket, MB-3	X		X		

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