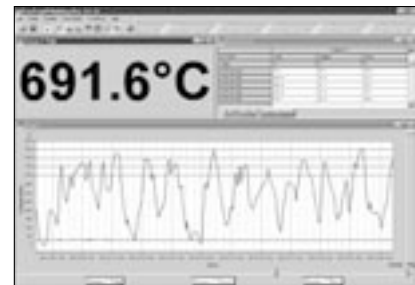


MR1S

Datasheet



High Performance Infrared Ratio Thermometers



MR1S model shown with optional ThermoJacket

MR1S Highlights

- Provides accurate measurement of targets that are: partially occluded, obstructed by smoke, steam, or particulates, moving, smaller than the instrument field of view.
- Measures from 600° to 3000°C (932° to 4532°F) with three models
- Fast response time down to 10 mSec
- One-color or two-color operation
- Simultaneous analog and digital outputs
- Programmable relay output (dual-temperature setpoints or “fail-safe”)
- Unique “dirty window” alarm (attenuation measurement US Patent No. 5,815,410)
- Bi-directional RS485 communications
- Supports up to 32 Marathon Series sensors on a multipoint network
- Windows® DataTemp Multidrop Software (operates under WIN 3.1/95/98/NT4 Windows 2000, XP)
- Field Calibration Software

Marathon Ratio Thermometers (MR1S) use two-color measurement to provide superior accuracy in demanding applications. The MR1S thermometers features an advanced electro-optical design, digital electronics and built-in user interface—all combined in a rugged, compact housing. MR1S thermometers are ideal in situations where the target may be obstructed due to atmospheric smoke or other particulates, where the target is moving, or where the target is smaller than the field-of-view.

MR1S thermometers allow users to switch between one-color and two-color operation, which simplifies setup and provides continued measurement flexibility.

All Marathon Series thermometers include bidirectional, RS-485 serial communications between the sensor (or a local area network of sensors) on the factory floor and a personal computer in the control room. This enables remote setup, monitoring, calibration, and maintenance, especially valuable for installation in hard-to-reach locations.

Specifications

Temperature Ranges:	
MR1SA	600°C to 1400°C (1112°F to 2552°F)
MR1SB	700°C to 1800°C (1292°F to 3632°F)
MR1SC	1000°C to 3000°C (1832°F to 5432°F)
Detector	Si/Si layered detector, nominal 1µm
Accuracy	±(0.5% T _{meas} +2° C); T _{meas} in °C*
Repeatability	±0.3% full scale
Temperature Resolution	1°C or °F
Response Time	10 mSec
Emissivity one-color	0.10 to 1.0 in 0.01 increments
Slope two-color	0.85 to 1.150 in 0.001 increments
Signal Processing	Peak Hold and Averaging

* No attenuation

Optical

Typical Spot Size at Minimum Focus Distance

Models	D:S*	Minimum Spot Size Diameter*
MR1SASF	44:1	14 mm (0.55 inch) @ 600mm (24 inch)
MR1SBSF	82:1	7.3 mm (0.29 inch) @ 600mm (24 inch)
MR1SCSF	130:1	4.6 mm (0.19 inch) @ 600mm (24 inch)
MR1SACF	44:1	7.0 mm (0.28 inch) @ 300mm (12 inch)
MR1SBCF	82:1	3.7 mm (0.15 inch) @ 300mm (12 inch)
MR1SCSF	130:1	2.3 mm (0.09 inch) @ 300mm (12 inch)

*Typical spot size diameter=Minimum Focus Distance / Typical D:S

100% Best performance realized when % signal reduction <95% Consult MR1S Operator's Manual for further information.

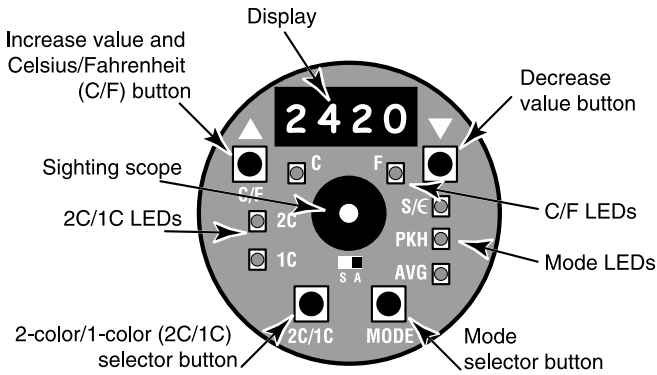
Electrical

Outputs	0/4–20 mA; RS-485, 2-wire/4-wire, networkable to 32 sensors; Relay (SPST 48V, 300 mA, response time < 2 mSec)
Power Requirements	24 VDC, 500 mA, ±20%
Compliance	CE low voltage directive; EN 61326

General

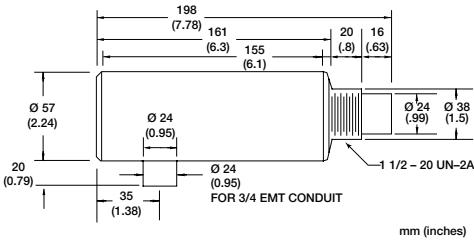
Environmental Rating	NEMA-4 (IEC 529, IP 65)
Ambient Temperature	
Without cooling option	10° to 65°C (50° to 150°F)
With air cooling	10° to 120°C (50° to 250°F)
With water cooling	10° to 175°C (50° to 350°F)
With ThermoJacket (water cooled)	10° to 315°C (50° to 600°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Relative Humidity	10% to 95% non-condensing
Shock (Electronics Housing)	MIL-STD-810D (IEC 68-2-27)
Vibration (Electronics Housing)	MIL-STD-810D (IEC 68-2-6)
Weight	
Sensing Head	0.48kg (17oz)
With air/water cooled housing	0.8kg (28oz)

User Interface

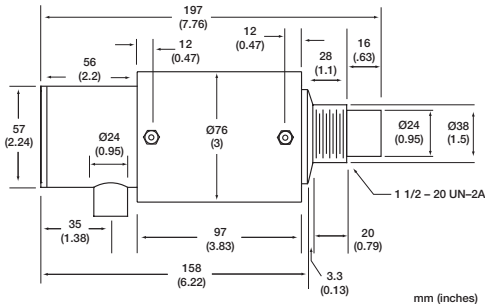


Physical Dimensions

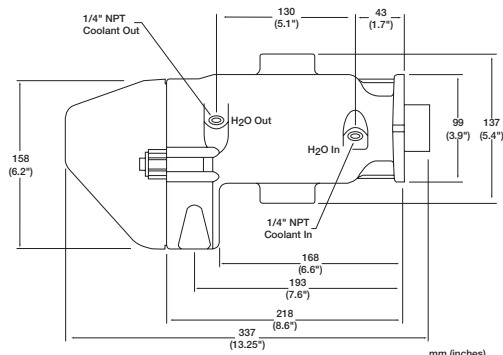
MR1S Housing



MR1S Housing with Air and Water Cooling ("W" option)



ThermoJacket Housing



Accessories

Polarizing filter end cap reduces visual light intensity in high temperature applications (**XXXTPFEC**)

Air purge collar (**XXXTXXACAP**) *

Swivel bracket (**XXXTXXACSB**) *

Right angle sighting accessory (MA1S, MA2S, MR1S) (**XXXTXXACRS**) *

Pipe adapter (Compatible with Sighting Tubes) (**XXXTXXACPA**) *

Adjustable Pipe Adapter Assembly (Compatible with Sighting Tubes) (**A9WTXXAPA**) *

*Compatible with standard unit and "W" option (not ThermoJacket)

Flow Regulators

Water flow regulator (water cooling) (**XXXTXXWR**)

Air purging flow/regulator assembly with air filter (**XXXTXXAR**)

Cooling air flow regulator (high capacity) (**XXXTXXCAFR**)

ThermoJacket Housing Rated to 315 °C (600 °F)

ThermoJacket housing; for Marathon MA/MR (**RAYTXXTJ1**)

Mounting Flange for ThermoJacket (**XXXTXXMF**)**

Adjustable mounting base (**XXXTXXMB**)**

Adjustable Pipe Adapter assembly (**XXXTXXAPA**) **

Mounting flange for use with sighting tubes (**XXXTXXMST**)**

** For use with ThermoJacket only

Sighting Tubes

300mm (12in.) SIGHTING TUBE, ceramic (up to 1500°C) (**XXXTSTC12**)

300mm (12in.) SIGHTING TUBE stainless steel (up to 800°C) (**XXXTST12**)

300mm (12in.) SIGHTING TUBE, carbon steel; 45 degree end-cut with slotted weep hole at base. (**BEESIGHTT**)

NIST Calibration Certification XXXMACERT

Power Supply (24VDC, 110/220VAC input) and **Marathon Terminal Block** mounted in a NEMA 4 (IP65) enclosure (**RAYMAPB**)

Power Supply 24VDC 1.1A Switching power supply with universal input (110/220V) (**XXX2CDCPSS**)

Spare Marathon Terminal Block Accessory (**XXXMATB**)

Spare Marathon Terminal Block in a NEMA-4 enclosure (**XXXMATBN4**)

RS485/RS232 CONVERTER

DB25 to Terminal Strip Interface Converter, for direct wiring between a serial interface and the Marathon terminal block (**XXX485CVT**)

TEFLON 12-CONDUCTOR CABLE (XXXHTCB □□)

High temperature (200°C rated), 12-conductor Teflon jacketed cable suitable for providing connections.

□□ Cable length (in meters) = 1,3,5,10,15,20,...,60

PVC 4-CONDUCTOR CABLE (XXXLTBC □□)

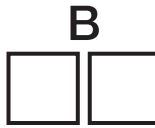
For installations requiring only 24VDC and 0/4-20mA output, 4-conductor PVC wiring cables (2 twisted pairs; each pair shielded) provides connection to 24VDC power, ground, and the +mA and -mA output. Temperature rating is -20°C to 60°C.

□□ Cable length (in meters) = 1,3,5,10,15,20,...,60

RAYMR1S



A
Temperature Range



B
Focus Options



C
Cooling Options

Model	Description
RAYMR1S	Raytek Infrared Ratio Thermometer
Code A	Temperature Range
A	600°C to 1400°C (1112°F to 2552°F) 44:1 D:S
B	700°C to 1800°C (1292°F to 3272°F) 82:1 D:S
C	1000°C to 3000°C (1832°F to 5432°F) 130:1 D:S
Code B	Focus Option
SF	Standard focus variable optics 600mm (24") to ∞
CF	Close focus variable optics 300mm (12") to 600mm (24")
Code C	Cooling Option
W	Coolable Housing for cooling in ambient temperatures up to 175°C (350°F), includes Lens Air Purge Collar; NOTE: For cooling in ambient temperatures in excess of 175°C (350°F), see ThermoJacket
XXXMRCERT	NIST Calibration Certification (must be ordered with MR1S as a separate line item)
Typical Model Number	MR1SBCF



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