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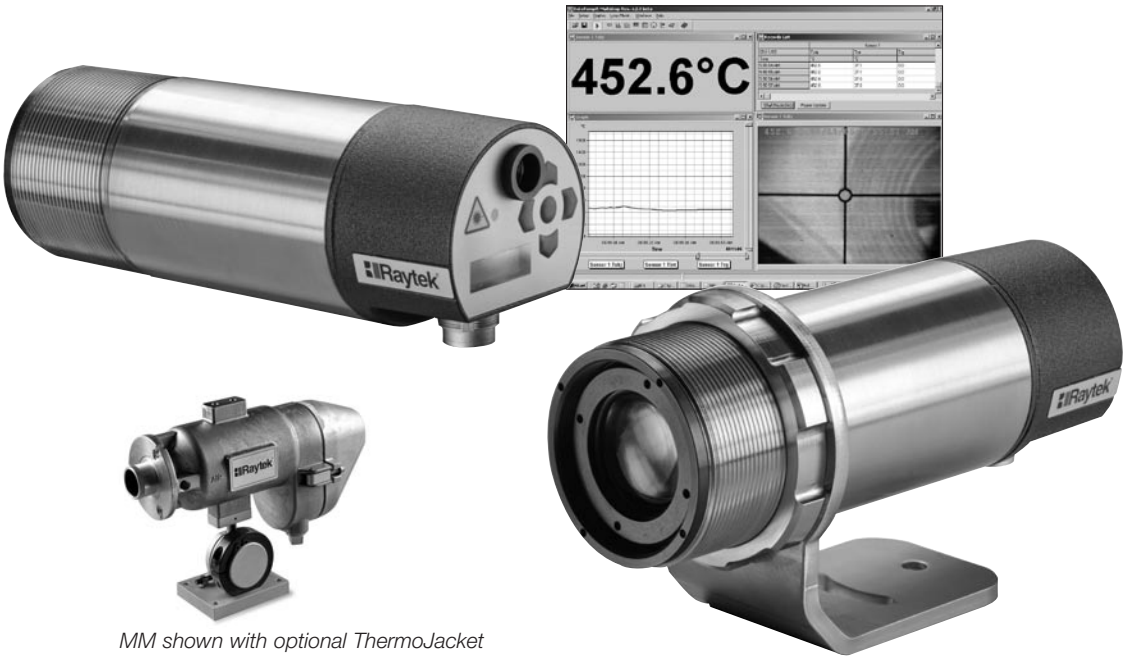
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MM 1M, 2M, 3M

Noncontact Temperature Measurement for Industrial Applications



MM shown with optional ThermoJacket

The Marathon Series MM

- High resolution, optics up to 300:1
- Precision focusable optics
- Optical and laser or sighting standard
- Available color video sighting
- Real time ambient background temperature compensation
- Easy to use operator interface
- Rugged stainless steel housing
- Simultaneous analog and digital outputs
- Field Calibration Software
- Windows® DataTemp® Multidrop software for data acquisition, display and analysis

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Marathon™ MM infrared thermometers provide superior accuracy in demanding industrial process applications. The MM features an advanced electro-optical design, digital electronics and an intuitive easy to use push button interface—all combined in a rugged, compact stainless steel housing. The sensor can be easily set up for stand alone operation or configured for a multi sensor network. All Marathon MM Series sensors feature both through-the-lens optical sighting and laser sighting for optimum sensor alignment and set-up. The MM is also available with optional video sighting.

All Marathon Series thermometers include bi-directional, 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.

Highlights:

- **Optional color video sighting**
- High resolution optics
- Precision focusable optics
- Rugged stainless steel housing
- Real time ambient background temperature compensation
- 3 different spectral responses to meet every demanding application
- Laser sighting in addition to through the lens optical sighting
- Measures from 100ºC to 3000ºC (212ºF to 5432ºF) depending on model
- Capture transient events as fast as 900µs
- Simultaneous analog and digital outputs
- Programmable relay output (dual-temperature setpoints or “fail-safe”)
- Bi-directional RS485 communications
- Supports up to 32 Marathon Series sensors on a multipoint network
- Windows DataTemp Multidrop Software (NT4, Windows 2000, XP compatible)
- Field Calibration Software

Specifications

Model	Temperature Ranges Response	Spectral (95% response)	Response Time	Optics (1)
3ML	100°C to 600°C (212°F to 1112°F)	2.3 µm	20 ms	70:1
2ML	300°C to 1100°C (572°F to 2012°F)	1.6 µm	2 ms	160:1
2MH	450°C to 2250°C (842°F to 4082°F)	1.6 µm	2 ms	300:1
1ML	450°C to 1740°C (842°F to 3164°F)	1 µm	2 ms	160:1
1MH	650°C to 3000°C (1202°F to 5432°F)	1 µm	2 ms	300:1
Accuracy (2)	1ML ± (0.3% of reading + 1°C) 2ML ± (0.3% of reading + 2°C) 3ML ± (1% of reading + 1°C)			
Repeatability	± (0.1% of reading + 1°C)			
Temperature Resolution	0.1ºC on 4 – 20 mA output (up to 0.2ºC for 2MH and 1MH)			
Emissivity	0.100 to 1.100, in 0.001 increments			
Signal Processing	Peak hold, valley hold, averaging, ambient background temperature compensation			

(1) Measured @ focal distance
(2) Accuracy @ Ambient 23ºC ± 5ºC (73ºF ± 9ºF)
3ML ± 5ºC @ 100ºC-150ºC

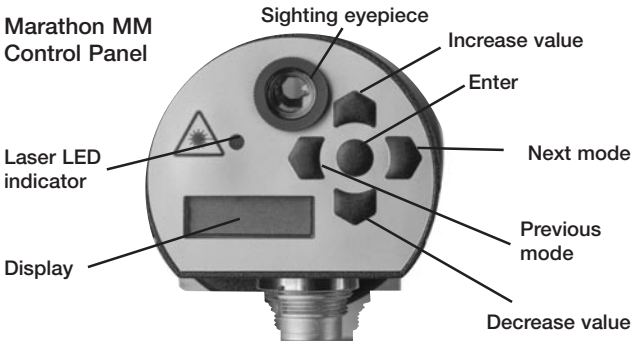
Electrical Specifications

Power Supply	24 VDC ± 20%, 500 mA
Outputs Analog	0 - 20 mA, 4 - 20 mA, 14 bit resolution, max. current loop impedance: 500 ohms.
Digital RS-485	Networkable to 32 sensors, Baud rate: 300, 1200, 2400, 9600, 19200, 38400, 57600 (default), 115200. Data format: 8 bit, no parity, 1 stop bit, 4-wire mode (full-duplex) or 2-wire mode (half duplex), selectable via control panel or software, 2-wire: max. 57600 Baud
Relay	Contacts max. 48 V, 300 mA, response time < 2 ms, (software programmable)
Display	5 digit backlit LCD display
External Input Input Voltage	0 to 5 VDC functions: trigger, ambient background temperature compensation, or emissivity setting

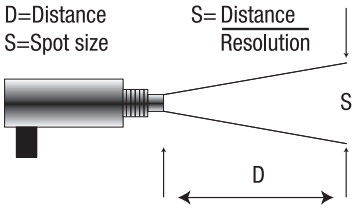
Environmental Specifications

Environmental rating	NEMA-4 (IEC 529, IP 65)
EMI	CE compliant to IEC 61326, performance criteria B
Relative Humidity	10% to 95% non-condensing
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Ambient Temperature with video option with air cooling with water cooling with Thermojacket	5°C to 65°C (41°F to 150°F) without cooling 5°C to 55°C (41°F to 131°F) 10ºC to 120ºC (50ºF to 250ºF) 10ºC to 175ºC (50ºF to 350ºF) water cooled 10ºC to 315ºC (50ºF to 600ºF)
Vibration	MIL-STD-810D (IEC 68-2-6) 2G’s, 10 - 150 Hz, 3 axis
Mechanical Shock	MIL-STD-810D (IEC 68-2-27) 5G’s, 11 ms duration, 3 axis
Weight	0.7 kg (24.7 oz)

Easy to Use Interface



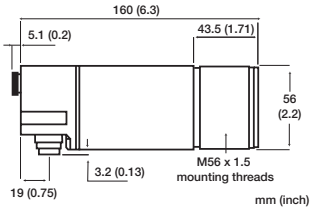
Focusable Optics



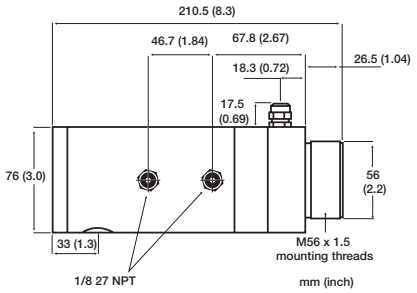
1M, 2M, 3M D=300mm to 2 2m (11.8 inch to 7.2 feet)

Physical Dimensions

MM Housing

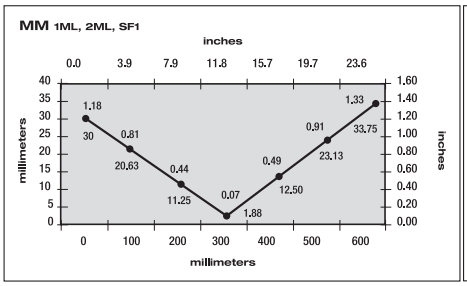


MM with Air/Water Cooled Housing

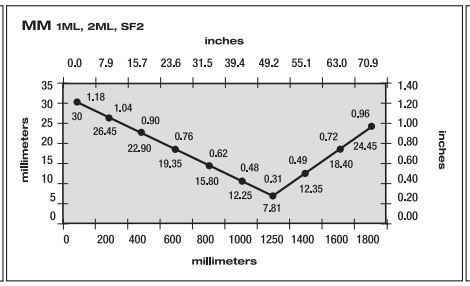


Nominal Optical Specifications

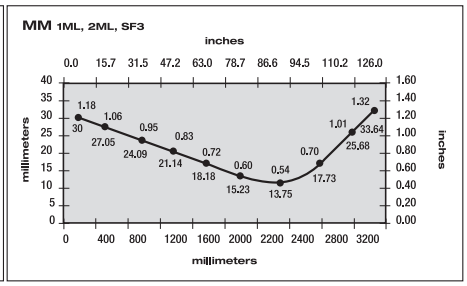
Standard Focus 1



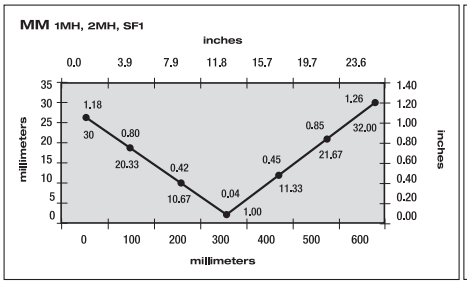
Standard Focus 2



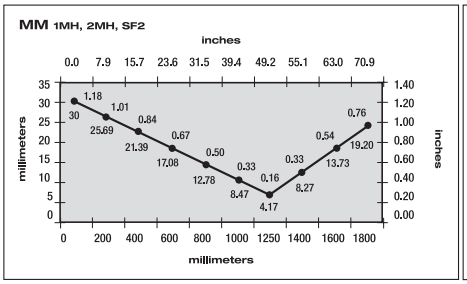
Standard Focus 3



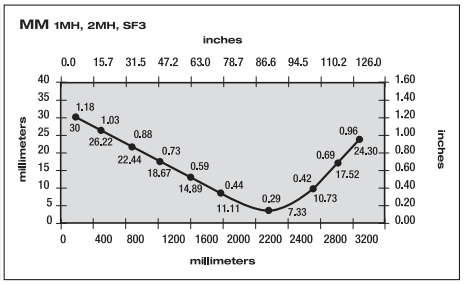
Standard Focus 1



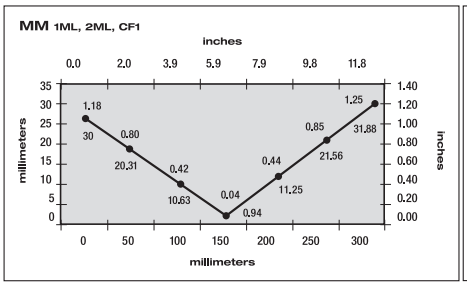
Standard Focus 2



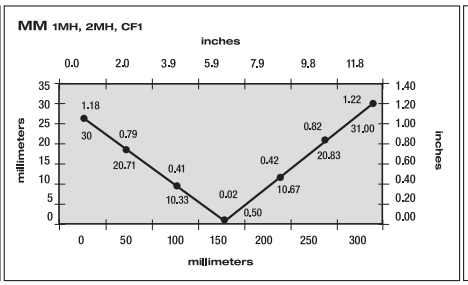
Standard Focus 3



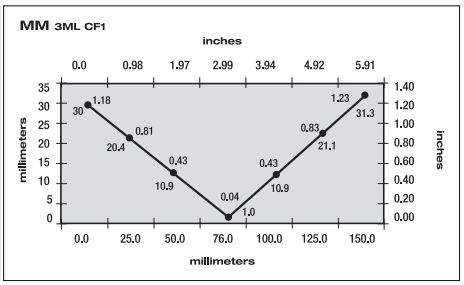
Close Focus 1



Close Focus 1



Close Focus 1



1M, 2M and 3M D:S ratio measured at 90% energy. Other focus options available.

RAYMM

A	B	C
Temperature and Range Spectral Response	Focus Options	Options

Model	Description
RAYMM	
Code A	**Temperature Range**
1ML	Low Range: 450°C to 1740°C (842°F to 3164°F) / 1 micron
1MH	High Range: 650°C to 3000°C (1202°F to 5432°F) / 1 micron
2ML	Low: 300°C to 1100°C (572°F to 2012°F) / 1.6 micron
2MH	High: 450°C to 2250°C (842°F to 4082°F) / 1.6 micron
3ML	Low: 100°C to 600°C (212°F to 1112°F) / 2.4 micron
Code B	**Focus Option**
SF1	Standard Focus 1 – focused @ 300mm (11.8 inch)
SF2	Standard Focus 2 – focused @ 1.25m (4.1 feet)
SF3	Standard Focus 3 – focused @ 2.2m (7.2 feet)
CF1	Close Focus – focused @ 190mm (7.5 inch)
VF1	Variable Focus Range – 300mm to 2.2m (11.8 inch to 7.2 feet)
Code C	**Options must be specified at the time of order**
L	Laser Sighting – Standard Model
V	Video sighting option (in addition to optical sighting) Note: Video sighting replaces the laser sighting feature
W	Coolable Housing, includes Lens Air Purge Collar Note: For ambient temperatures exceeding 175°C (350°F), See Thermojacket
Typical Model Number	**RAYMM1MLSF3V** Specifies a 1ML model with standard focus 3 optics, video sighting option.

Accessories

Air purge collar (XXXMMACAP) *
Swivel bracket (XXXTXXACSB) *
Adjustable bracket (XXXMMACAB)
Right angle mirror (XXXMMACRA)
Pipe adapter (Compatible with Sighting Tubes) **(XXXMMACPA) ***
Adjustable pipe adapter assembly (Compatible with Sighting Tubes) **(XXXTXXAPA) ***
**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 MM **(RAYTXXTJ4T)**
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 (12 in.) SIGHTING TUBE, ceramic (up to 1500°C) **(XXXTSTC12)**
300mm (12 in.) SIGHTING TUBE stainless steel (up to 800°C) **(XXXTST12)**
300mm (12 in.) SIGHTING TUBE, carbon steel; 45 degree end-cut with slotted weep hole at base. **(BEESIGHTT)**
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 connector to Terminal Strip Interface Converter, for direct wiring between a serial interface and the Marathon terminal block **(XXX485CVT)**

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