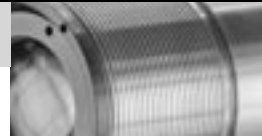
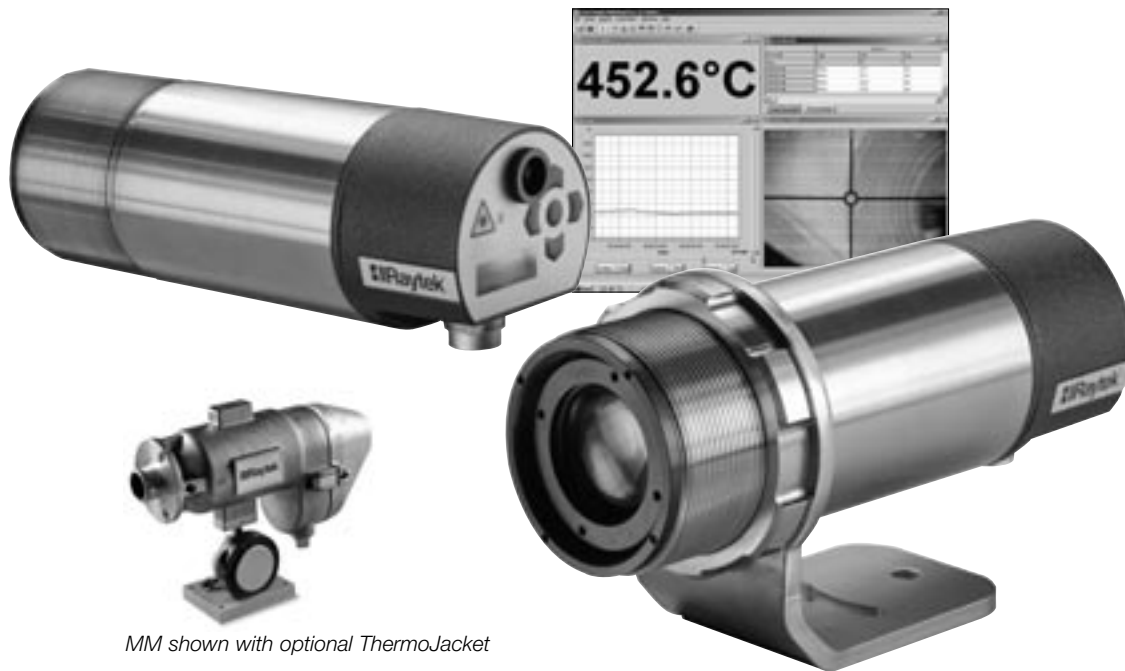


MM 1M, 2M

Datasheet



Noncontact Temperature Measurement for Industrial Applications



MM shown with optional ThermoJacket

The Marathon™ Series MM

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

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:

- High resolution optics
- Rugged stainless steel housing
- Real time ambient background temperature compensation
- 2 different spectral responses to meet every demanding application
- Laser sighting in addition to through the lens optical sighting
- Optional color video sighting
- Measures from 300°C to 3000°C (572°F to 4532°F) 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	Spectral Response	Response Time (95% response)
2ML	300°C to 1100°C (572°F to 2012°F)	1.6 µm	2 ms
2MH	300°C to 2250°C (572°F to 4082°F)	1.6 µm	2 ms
1ML	450°C to 1740°C (842°F to 2732°F)	1 µm	2 ms
1MH	650°C to 3000°C (1202°F to 5432°F)	1 µm	2 ms
Accuracy ⁽¹⁾	± (0.3% of reading + 1°C)		
Repeatability	± (0.1% of reading + 1°C)		
Optics ⁽²⁾	160:1, 300:1		
Temperature Resolution	0.1° K on 4 – 20 mA output (up to 0.2° K for 2MH and 1MH)		
Emissivity	0.100 to 1.150, in 0.001 increments		
Signal Processing	Peak hold, valley hold, averaging, ambient background temperature compensation		

(1) Accuracy @ Ambient 23°C ± 5°C (73°F ± 9°F)

(2) Measured @ focal distance

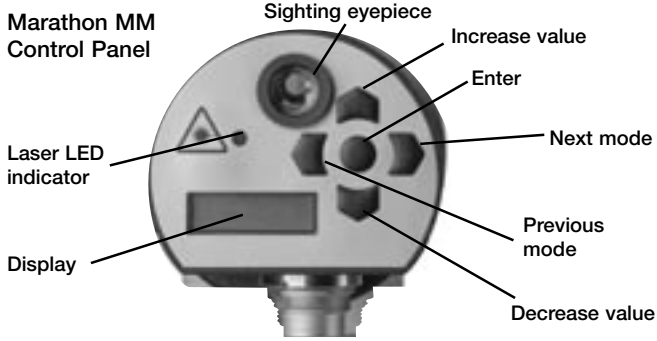
Electrical Specifications

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

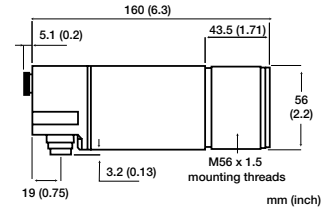
Environmental rating	NEMA-4 (IEC 529, IP 65)
EMI	CE compliant to IEC 61326, performance criteria B
Relative Humidity	10% to 95% non-condensing
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Ambient Temperature	0°C to 65°C without cooling, includes video option (32°F to 150°F)
with air cooling	10°C to 120°C (50°F to 250°F)
with water cooling	10°C to 175°C (50°F to 350°F)
with Thermo jacket	water cooled 10°C to 315°C (50°F to 600°F)
Vibration	MIL-STD-810D (IEC 68-2-6) 3G's, 11 - 200 Hz, any axis
Mechanical Shock	MIL-STD-810D (IEC 68-2-27) 50G's, 11 ms duration, any axis
Weight	0.7 kg (8.7 oz)

Easy to Use Interface

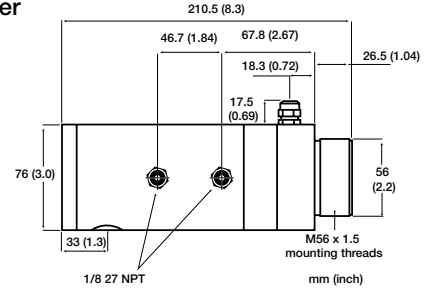


Physical Dimensions

MM Housing

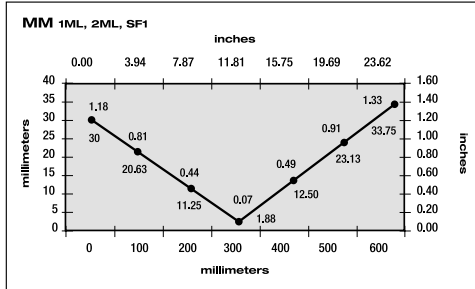


MM with Air/Water Cooled Housing

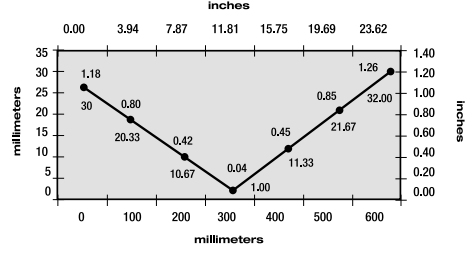


Nominal Optical Specifications

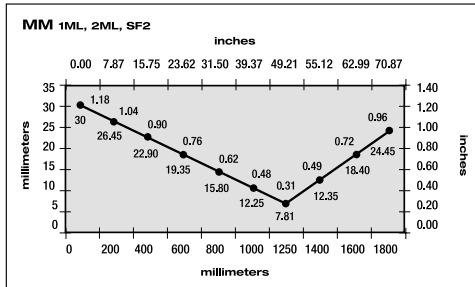
Standard Focus 1



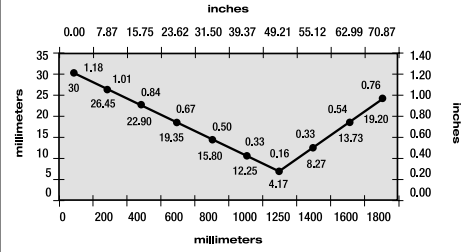
Standard Focus 1



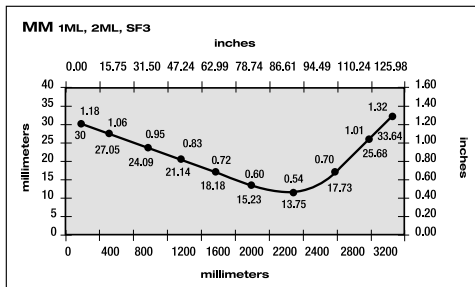
Standard Focus 2



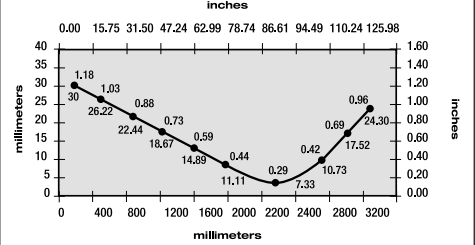
Standard Focus 2



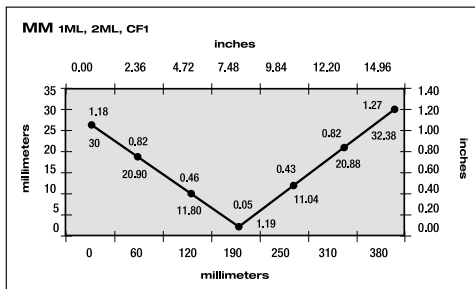
Standard Focus 3



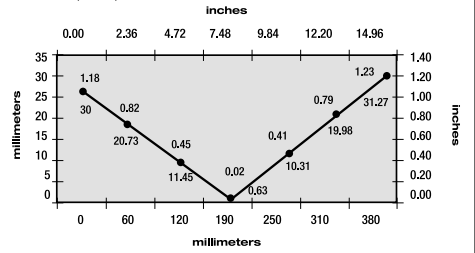
Standard Focus 3



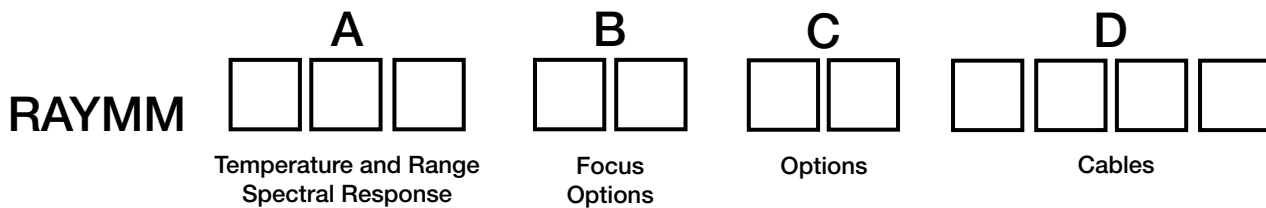
Close Focus 1



Close Focus 1



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



Model	Description
RAYMM	
Code A	Temperature Range
1ML	Low Range: 450°C to 1740°C (698°F to 3164°F) / 1 micron
1MH	High Range: 650°C to 3000°C (1004°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 (662°F to 4082°F) / 1.6 micron
Code B	Focus Option
SF1	Standard Focus 1
SF2	Standard Focus 2
SF3	Standard Focus 3
CF1	Close Focus
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 (XXXTXACSB) *
- Adjustable bracket (XXXMMACAB)
- Right angle mirror (XXXMMACRA)
- Pipe adapter (Compatible with Sighting Tubes) (XXXMMACPA) *
- Adjustable Pipe Adapter Assembly (Compatible with Sighting Tubes) (XXXTXAPAA) *

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

- ### Flow Regulators
- Water flow regulator (water cooling) (XXXTXWR)
 - Air purging flow/regulator assembly with air filter (XXXTXAR)
 - Cooling air flow regulator (high capacity) (XXXTXCAFR)
- ### ThermoJacket Housing
- Rated to 315 °C (600 °F)
- ThermoJacket housing; for Marathon MM (RAYTXJT)
 - Mounting Flange for ThermoJacket (XXXTXMF)**
 - Adjustable mounting base (XXXTXMB)**
 - Adjustable Pipe Adapter assembly (XXXTXAPA) **

- Mounting flange for use with sighting tubes (XXXTXMST)**
*** 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)

Raytek Automation Products: Noncontact Temperature Measurement for Industrial ApplicationsSM

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