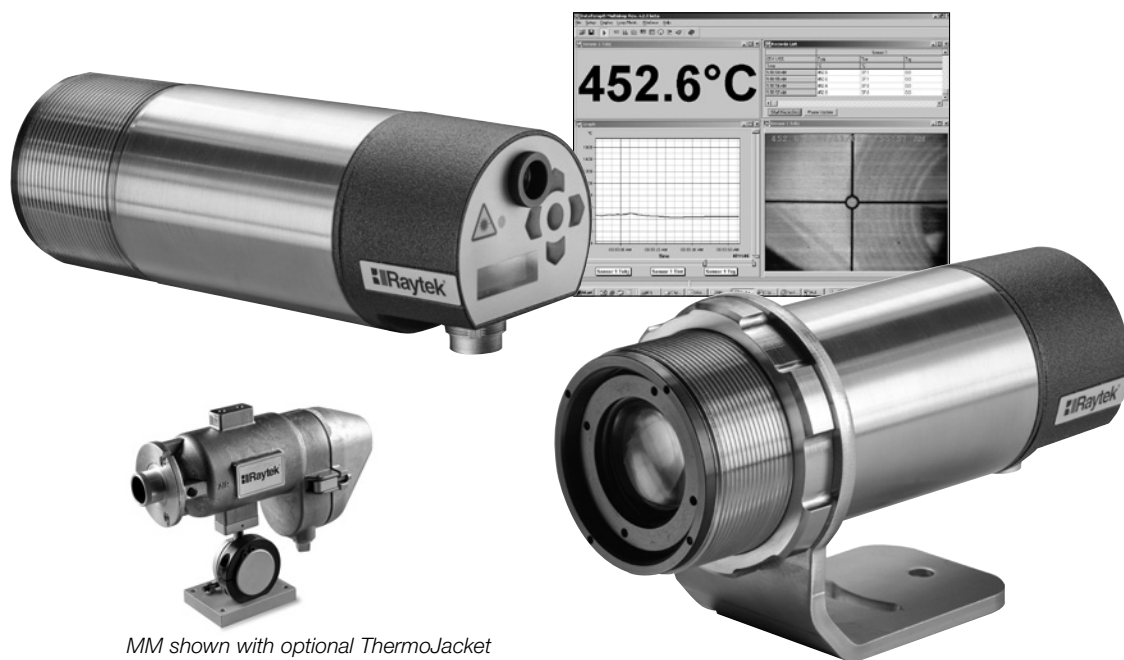


## MM 1M, 2M, 3M



## 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

**M**arathon™ 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 100°C to 3000°C (212°F to 5432°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	Response	Spectral (95% response)	Response Time	Optics <sup>(1)</sup>
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
<b>Accuracy <sup>(2)</sup></b>	1ML ± (0.3% of reading + 1°C) 2ML ± (0.3% of reading + 2°C) 3ML ± (1% of reading + 1°C)				
<b>Repeatability</b>	± (0.1% of reading + 1°C)				
<b>Temperature Resolution</b>	0.1°C on 4 – 20 mA output (up to 0.2°C for 2MH and 1MH)				
<b>Emissivity</b>	0.100 to 1.100, in 0.001 increments				
<b>Signal Processing</b>	Peak hold, valley hold, averaging, ambient background temperature compensation				

(1) Measured @ focal distance

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

3ML ± 5°C @ 100°C-150°C

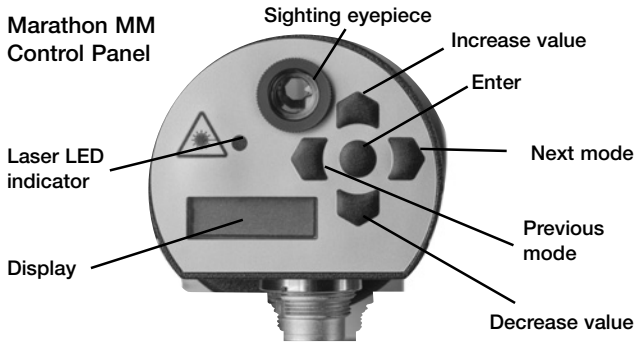
## Electrical Specifications

<b>Power Supply</b>	24 VDC ± 20%, 500 mA
<b>Outputs</b>	
<b>Analog</b>	0 - 20 mA, 4 - 20 mA, 14 bit resolution, max. current loop impedance: 500 ohms.
<b>Digital RS-485</b>	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
<b>Relay</b>	Contacts max. 48 V, 300 mA, response time < 2 ms, (software programmable)
<b>Display</b>	5 digit backlit LCD display
<b>External Input</b>	
<b>Input Voltage</b>	0 to 5 VDC functions: trigger, ambient background temperature compensation, or emissivity setting

## Environmental Specifications

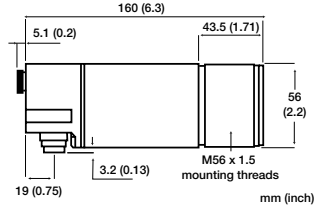
<b>Environmental rating</b>	NEMA-4 (IEC 529, IP 65)
<b>EMI</b>	CE compliant to IEC 61326, performance criteria B
<b>Relative Humidity</b>	10% to 95% non-condensing
<b>Storage Temperature</b>	-20°C to 70°C (-4°F to 158°F)
<b>Ambient Temperature with video option</b>	5°C to 65°C (41°F to 150°F) without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

# Easy to Use Interface

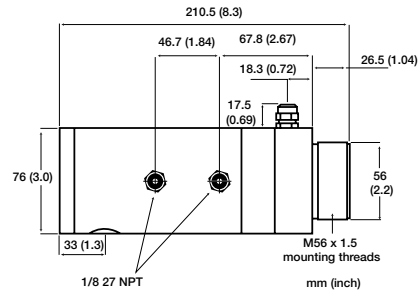


# Physical Dimensions

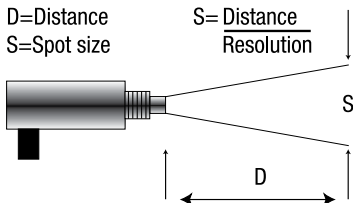
## MM Housing



## MM with Air/Water Cooled Housing



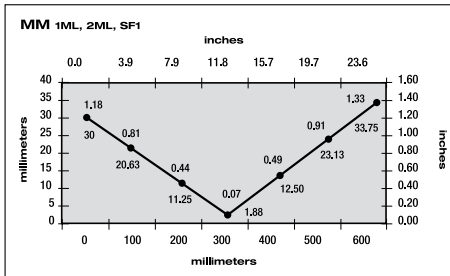
# Focusable Optics



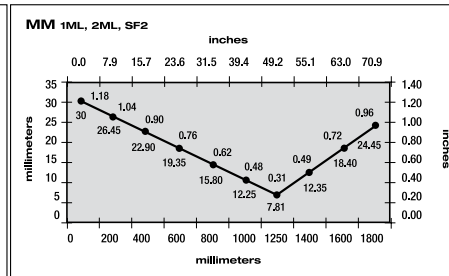
1M, 2M, 3M D=300mm to 2m (11.8 inch to 7.2 feet)

# Nominal Optical Specifications

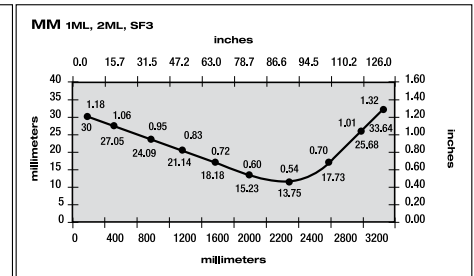
## Standard Focus 1



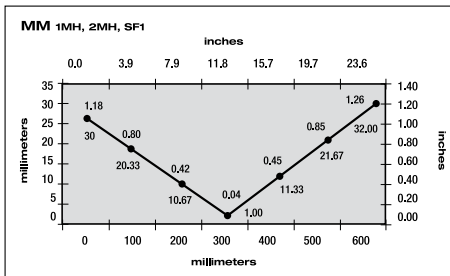
## Standard Focus 2



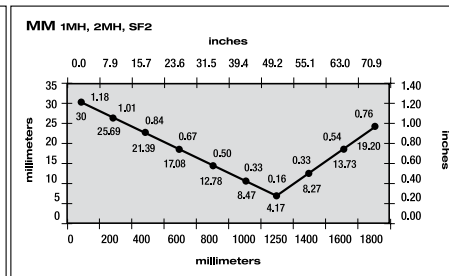
## Standard Focus 3



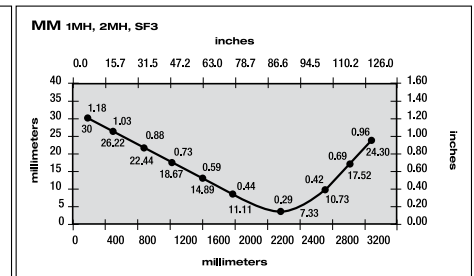
## Standard Focus 1



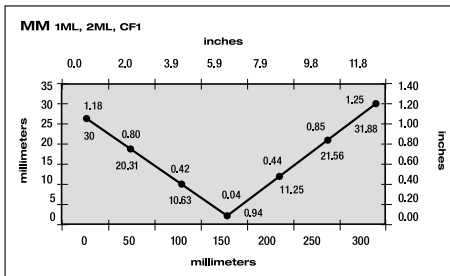
## Standard Focus 2



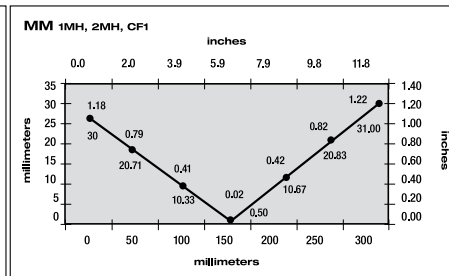
## Standard Focus 3



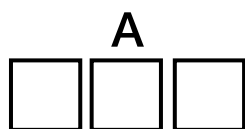
## Close Focus 1



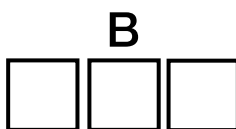
## Close Focus 1



# RAYMM



Temperature and Range Spectral Response



Focus Options



Options

Model	Description
RAYMM	
<b>Code A</b>	<b>Temperature Range</b>
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
<b>Code B</b>	<b>Focus Option</b>
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)
<b>Code C</b>	<b>Options must be specified at the time of order</b>
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
<b>Typical Model Number</b>	<b>RAYMM1MLSF3V</b> 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 (RAYTXJT4T)
- 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

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### Worldwide Service

Fluke Process Instruments offers services, including repair and calibration. For more information, contact your local office.

### 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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