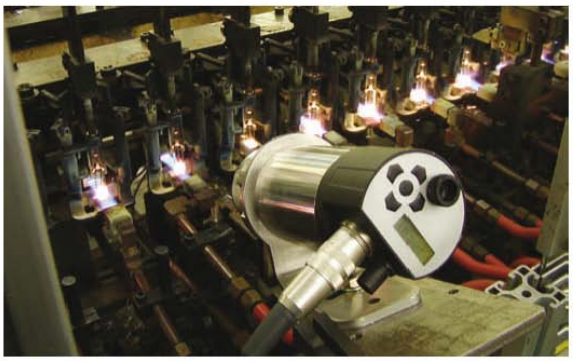
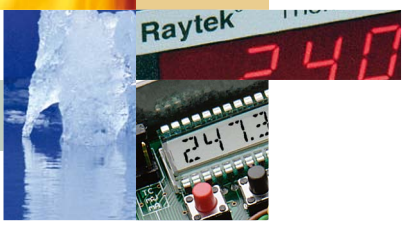
# Marathon

MM, MR, FA, FR

## High-Performance Pyrometers for Industrial Applications






Raytek®
A Fluke Company

# Marathon Series Highlights

- Broad temperature range from -40 to 3000°C (-40 to 5432°F)
- Superior optical resolution to 300:1
- Spot sizes down to 0.6 mm
- Fast response times down to 1 ms
- Easy adjustment with variable focus optics
- Through-the-lens sighting, optional with laser aiming or video function
- Video monitoring and image capture capability
- Compact, rugged housings with IP65 (NEMA-4) rating
- Smart, two-way digital communications (RS232/485)
- Programmable relay output
- Simultaneous analogue and digital outputs
- Dirty lens alarm


*Marathon MM Series with video function, variable focus feature, temperature measurement range of -40 to 3000 °C (-40 to 5432 °F), stainless steel housing, and high-resolution optics.*

## Marathon Series Infrared Pyrometers for Demanding Applications

High-performance Marathon Series pyrometers provide a complete solution for non-contact, real-time temperature monitoring within a temperature range of -40 to 3000°C (-40 to 5432°F). These include:

- One-Colour Pyrometers
- Ratio Pyrometers (Two-Colour Pyrometers)
- Fibre-Optic Pyrometers
- ThermoJacket and Accessories
- System Software for Configuration and Monitoring
- Field Calibration and Utilities Software

Marathon MM sensors provide integrated through-the-lens sighting, plus either laser or video-sighting for correct aiming and target location. The MM series is also available with simultaneous real-time video monitoring, with automated image recording and precision focusable optics.

MR/FR Marathon Ratio Pyrometers provide fast, real-time monitoring for medium- and high-temperature applications. Ratio Pyrometers are used where the target is small, moving, or obstructed due to dust, smoke, and other particulates in the atmosphere.

FA/FR Marathon Fibre-Optic Pyrometers allow measurement of targets that would be otherwise inaccessible because of space constraints or harsh environments. Separated by a flexible fibre-optic cable, the optical head may be positioned near the target with the rugged electronics housing installed remotely in a convenient location.


*Marathon MR Ratio Pyrometers*

| Type | Temperature Range* | Spectral Response | Optical Resolution | Sighting | Model |
|---|---|---|---|---|---|
| One-Colour Pyrometer | -40 to 800°C (-40 to 1472°F) | 8-14 µm | 70:1 | Trough-the-lens, Laser or Video | MMLT |
| One-Colour Pyrometer | 300 to 900°C (572 to 1652°F) | 7.9 µm | 100:1 | Trough-the-lens, Laser or Video | MMG7 |
| One-Colour Pyrometer | 250 to 2250°C (482 to 4082°F) | 5 µm | 70:1 | Trough-the-lens, Laser or Video | MMG5 |
| One-Colour Pyrometer | 250 to 1100°C (482 to 2012°F) | 3.9 µm | 70:1 | Trough-the-lens, Laser or Video | MMMT |
| One-Colour Pyrometer | 100 to 600°C (212 to 1112°F) | 2.3 µm | 70:1 | Trough-the-lens, Laser or Video | MM3M |
| One-Colour Pyrometer | 300 to 2250°C (572 to 4082°F) | 1.6 µm | 300:1 | Trough-the-lens, Laser or Video | MM2M |
| One-Colour Pyrometer | 400 to 3000°C (842 to 5432°F) | 1 µm | 300:1 | Trough-the-lens, Laser or Video | MM1M |
| Ratio Pyrometer | 600 to 3000°C (1112 to 5432°F) | 1 µm | 130:1 | Trough-the-lens | MR1 |
| Fibre-Optic Pyrometer | 475 to 3000°C (887 to 5432°F) | 1 µm | 100:1 | Laser** | FA1 |
| Fibre-Optic Pyrometer | 250 to 1700°C (482 to 3092°F) | 1.6 µm | 100:1 | Laser** | FA2 |
| Fibre-Optic Pyrometer | 750 to 1675°C (1382 to 3042°F) | 1 µm | 100:1 | Laser** | FA1G |
| Fibre-Optic Ratio Pyrometer | 500 to 2500°C (932 to 4532°F) | 1 µm | 60:1 | Laser** | FR1 |

**Either one or up to three models cover the indicated temperature range  **Option*

## Variable Focus

The Marathon MM sensor is available with remotely adjustable precision focus optics. All motorised focussing components are contained within the sensor housing. Users can easily adjust the focus of measurement targets, either by push-button on the rear of the instrument, or from a PC where adjustments can be seen real-time on video. The variable focus feature provides the flexibility of needing only one sensor type for multiple sensor applications. This reduces the requirement for replacement sensors stock.

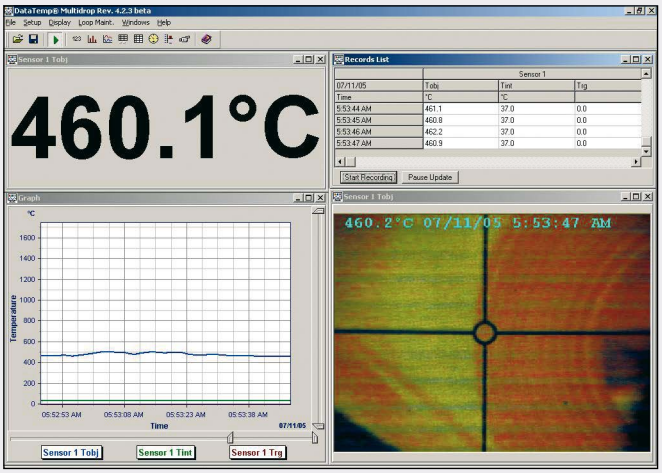
## Video Function

For greatly improved remote monitoring, the Marathon MM sensor series provides an optional built-in video camera. The video signal can be sent to a surveillance monitor or imported directly into DataTemp Multidrop Software on a PC. The software's video function includes automatic image capture, which visually documents exactly when temperatures fall outside of specified limits, and which products were affected.

## Easy Setup and Installation

Installation of Marathon Series pyrometers is easy with the built-in user interface that displays the target temperature and allows adjustment of sensor parameters. Through-the-lens sighting, video or laser aiming help pinpoint the measurement target, and variable-focus optics provide versatility for initial setup and continued operation. And Marathon DataTemp Multidrop Software makes it easy to configure or fine-tune your sensor or a network of sensors remotely.


### DataTemp® Multidrop—Windows® Software for Remote Sensor Configuration and Process Monitoring




Plot the temperature values of an MM sensor with a video image. High and low alarms are shown, making it easy to identify out-of-range conditions. DataTemp Multidrop software makes it easy to remotely configure smart MM sensors from the safety of the control room.

## ThermoJacket and Accessories


*The ThermoJacket protective enclosure enables use in ambient temperatures up to 315°C (599°F).*

Marathon sensors are supported by rugged accessories, like the ThermoJacket enclosure that provides environmental protection with integral water cooling and air purging. Marathon integrated sensors can be installed or removed while the ThermoJacket is in its mounted position. Additional accessories are available for customised installations.

Optional furnace wall mounting systems allow fast, production-specified installation of the sensor heads. These accessories protect the mechanical components of the sensor and provide air purge to keep the optics free of moisture and dust.

*Marathon FR and FA1G models are fibre-optic sensors, whose measurement heads withstand ambient temperatures up to 315°C (599°F) without cooling. Easy monitoring with the built-in display. Designed for networked installations (RS485).*

## Marathon Series Applications

The advanced electro-optical design of Marathon pyrometers ensures high accuracy in difficult applications. Proprietary electronics enable user-selectable response times down to 1 ms. This high speed is coupled with superior optical resolution for small or distant targets. Finally, the entire electro-optical system has been optimised to yield excellent performance over a wide measurement and ambient temperature range.

Applications:

- **Metals processing**
- **Molten metal/forging**
- **Hot rolling mills**
- **Rod/wire mills**
- **Heat treating & annealing**
- **Induction heating**
- **Laser welding**
- **Lightbulb & halogen lamp production**
- **Paper production**
- **Thermoforming**
- **Glass melting**
- **Semiconductor furnaces**
- **Food industry**
- **Cement & lime kilns**
- **Refuse burning**

*From the molten state through to the cooling process, continuous temperature monitoring ensures that glass retains its properties as it travels through the manufacturing process.*

*Monitoring temperature of molten metal prior to and during pouring ensures correct metallurgical properties.*

*Monitoring edge temperature and drying uniformity results in higher yields and reduced downtime during paper production.*

*Accurately measuring temperature of slabs, billets, or blooms on a hot rolling mill ensures consistent product quality.*

## Raytek Service Ensures Long Use

A leading worldwide provider of infrared temperature measurement solutions, Raytek has over fifty years of experience and know-how. The company develops, manufactures, sells, and services a wide range of noncontact infrared thermometers for industrial process monitoring and control. In addtion to our worlwide headquarters in Santa Cruz, California (USA), the European headquarters in Berlin (Germany) and our Chinese headquarters, Raytek has regional offices around the globe and is represented by a worldwide network of authorised distributors.

Our application engineers are located around the world to help answer your technical questions. Raytek offers maintenance, training, calibration, and other customised services to ensure that you receive the maximum benefits from your Marathon Series Pyrometer. For more information about our infrared temperature measurement solutions, contact your local Raytek application engineer today.

**The Worldwide Leader in Noncontact Temperature Measurement**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