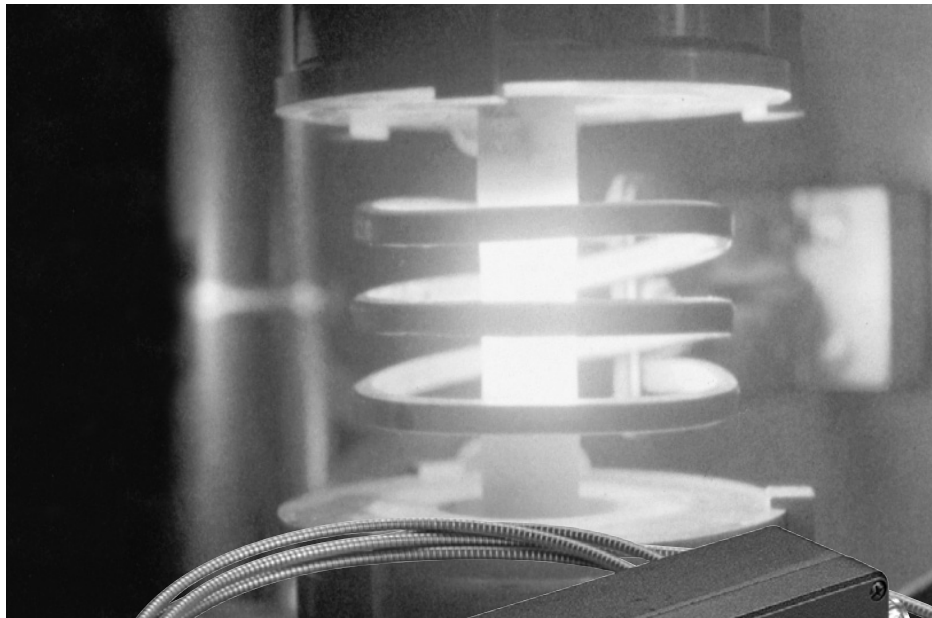


FA1/FA2

Raytek® MARATHON SERIES

Fiber Optic Noncontact Thermometers



FA model shown with optional adjustable mounting bracket

FA1/FA2 Highlights

- Rugged fiber optic measurement systems
- Laser aiming available on selected models
- Fiber cable rated to 315°C (600°F) available on selected models
- Programmable relay output (dual temperature setpoints or “fail-safe”)
- Simultaneous analog and digital outputs
- Bi-directional RS485 communications
- Supports up to 32 Marathon Series sensors on a multipoint network
- Windows® DataTemp® software for data acquisition, display, and analysis (operates under WIN 3.1/95/98/NT4 Windows 2000, XP and WIN 7)
- Field Calibration Software

Marathon fiber optic infrared thermometers (FA1/FA2) consist of a rugged fiber optic cable plus optical head assembly connected to an electronics housing containing the detector, processing electronics, internal user interface/LED display, and termination connections for field wiring. FA1/FA2 thermometers permit measurement of targets in harsh industrial environments that are otherwise inaccessible by non-fiber optic thermometers.

FA1/FA2 thermometers maintain high accuracy over the ambient operating temperature range from 0° to 60°C (32° to 140°F).

The fixed-focus optical head consists of a small stainless steel cylindrical housing and lens assembly. The optical head accommodates an air-purge accessory to prevent lens contamination and the fiber optic cable is protected by metal armor. The assembly accommodates a small bend radius for threading through tight spaces.

The Marathon FA1G sensor, specifically designed for measuring glass temperature from 750° to 1675°C (1382° to 3047°F), permits measurement of melter, refiner, regenerator, and forehearth temperatures.

Specifications

Measurement

Models	Temperature Range
FA1A	475° to 900°C (887° to 1652°F)
FA1B	800° to 1900°C (1472° to 3452°F)
FA1C	1200° to 3000°C (2192° to 5432°F)
FA1G	750° to 1675°C (1384° to 3047°F)
FA2A	250° to 800°C (482° to 1472°F)
FA2B	400° to 1700°C (752° to 3092°F)
Spectral Response/Detector	
FA1	1.0 μm (Si detector)
FA2	1.6 μm (InGaAs detector)
Fiber Cable Lengths	
	1m (3'), 3m (10'), 6m (19'), and 10m (32')
Accuracy	
FA1/FA2	±(0.3%T _{meas} + 2°C); T _{meas} in °C
FA1G	±3°C (±5.4°F)
Repeatability	±1°C
Temperature Resolution	±0.05°C (±0.1°F)
Response Time	10 mSec; averaging selectable to 10 sec
Emissivity	0.1 to 1.0 in 0.01 increments
Signal Processing	Peak Hold, Valley Hold, Averaging

Optical

Models	Focus Distance			
	D:S*	CF1	CF2	SF0
**FA1A 20	4mm@102mm (0.17"@4")	15mm@305mm (0.60"@12")	76mm@1524mm (3"@60")	
FA1B 100	1mm@102mm (0.04"@4")	2.08mm@305mm (0.11"@12")	160mm@1524mm (0.62"@60")	
FA1C 100	1mm@102mm (0.04"@4")	2.08mm@305mm (0.11"@12")	160mm@1524mm (0.62"@60")	
FA1G 100	NA	NA	∞	
**FA2A 20	4mm@102mm (0.17"@4")	15mm@305mm (0.60"@12")	76mm@1524mm (3"@60")	
FA2B 40	2.5mm@102mm (0.1"@4")	7mm@305mm (0.26"@12")	38mm@1524mm (1.5"@60")	

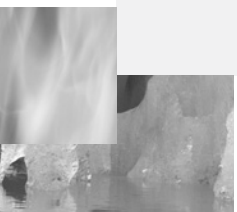
*At 95% energy Recommend: Target diameter Spot size diameter ≥1.4 **Available with laser aiming

Electrical

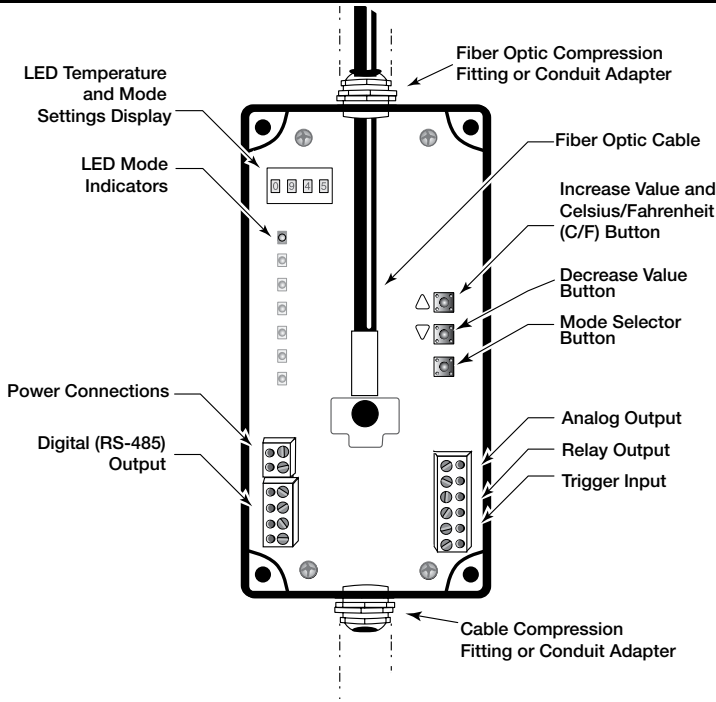
Outputs	0/4–20 mA; RS-485, 2-wire/4-wire, networkable to 32 sensors; Relay (SPST 48V, 300 mA, response time < 2 mSec)
Power Requirements	24 VDC, 250 mA, ±20%
Compliance	CE low voltage directive; EN 61326

General

Environmental Rating	NEMA-4 (IEC 529, IP 65)
Ambient Temperature	
Electronics housing	0° to 50°C (32° to 122°F)
With water cooling option	0° to 150°C (32° to 300°F); 2 l (0.5 gal) per minute 16°C (62°F)
Fiber cable/Optical head	0° to 200°C (32° to 392°F); standard temperature rating 0° to 315°C (32° to 600°F); high-temperature option
Air purge	0.5 to 1.5 l/sec (1-3 CFM)
Storage Temperature	
Electronics housing	-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	
Electronics Housing	0.71 kg (25 oz)
Optical Head	0.10 kg (3 oz)
Cable protection	Rated to 200°C; stainless steel armor; Viton coating, rubber “boot”, and NEMA-4 (not available on high temperature cable); provision for conduit to protect fiber cable



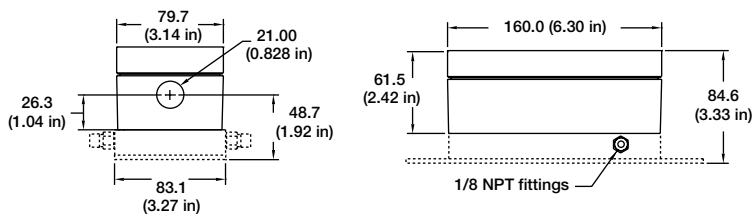
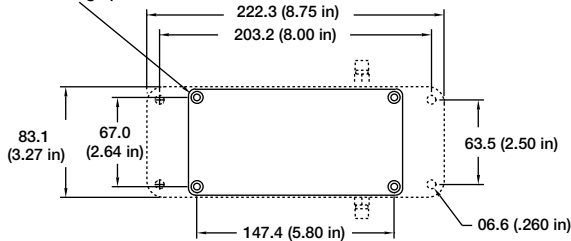
User Interface



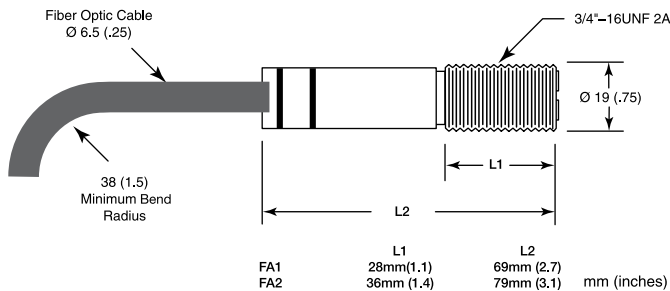
Physical Dimensions

Electronics Housing (Cooling Platform option "W" shown as a dotted line)

Mounting hole diameter 5mm (0.188 in)
Fastener head diameter 8mm (0.31 in) MAX
for units without cooling option



Optical Head



Accessories

Adjustable Mounting Bracket (XXXFOMB)

Adjustable mounting bracket for FA/FR optical head.

Quick-Release/Air Purging Accessory

Rugged fiber optic stainless steel air purge collar with quick release fitting protective sapphire window: (XXXFORFQP).

Air Purge Collar

Air purge collar and stainless steel sighting-tube, 150mm (6 in) long, 25mm (1 in) diameter: (XXXFOHAPA).

Right Angle Mirror (XXXCIACRA)

Connects to Optical Head

NIST Calibration (2132558)

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)

SMART RS485/RS232 CONVERTERS

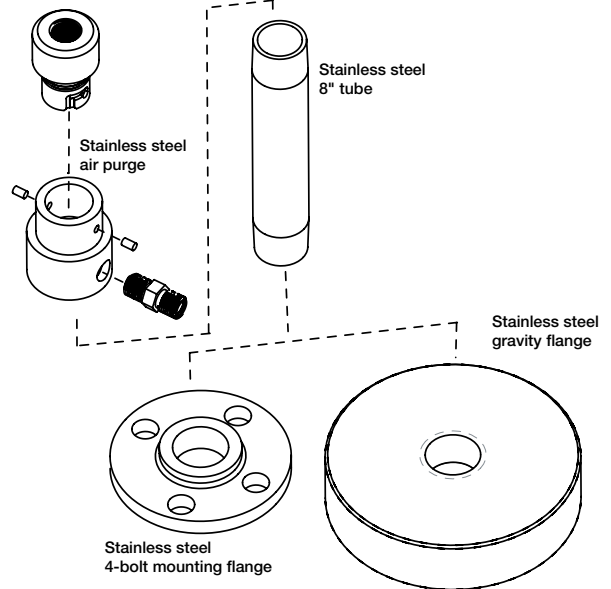
DB25 to Terminal Strip Interface Converter, recommended for direct wiring between a serial interface and the Marathon terminal block (XXX485CVT)

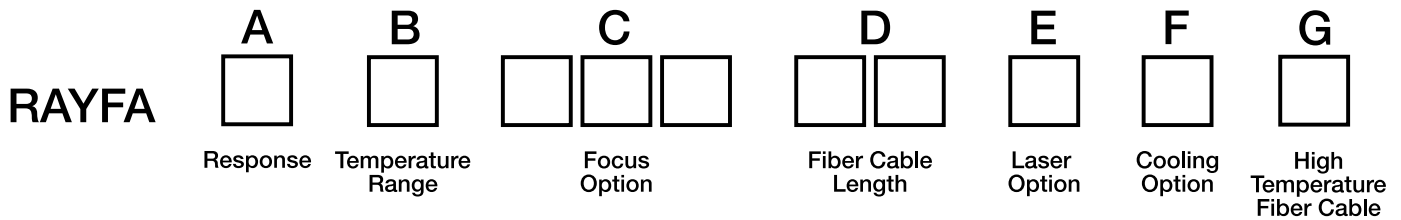
Rooftop Mounting/Purging

Available with flange (XXXFORFMF) or gravity-held base (XXXFORFMC) with quick-release fitting for Optical Head, sapphire window, stainless steel pipe-cap or flanged mounting base.

USB / RS485 Converter (XXXUSB485)

Stainless steel quick disconnect and sapphire protective window





Model	Description	
RAYFA	Raytek Fiber Optic Thermometer	
Code A	Response	
1	1 micron spectral response	
2	1.6 micron spectral response	
Code B	Temperature Range (FA1)	Code B Temperature Range (FA2)
A	475° to 900°C (752° to 1652°F) 20:1 D:S	A 250° to 800°C (482° to 1472°F)
B	800° to 1900°C (1472° to 3092°F) 100:1 D:S	B 400° to 1700°C (752° to 3092°F)
C	1200° to 3000°C (2192° to 5432°F) 100:1 D:S	
G	750° to 1675°C (1382° to 3047°F) 100:1* D:S	
Code C	Focus Option	
SF0	Standard Focus Optical Head Focused at "infinity" *	
CF1	Close Focus Optical Head Focused distance at 100mm (4 inch)	
CF2	Close Focus Optical Head Focused distance at 300mm (12 inch)	
Code D	Fiber Cable Length	
01	1m (≈ 3') length fiber optic cable with connector	
03	3m (≈10') length fiber optic cable with connector	
06	6m (≈19.7') length fiber optic cable with connector	
10	10m (≈ 32.8') length fiber optic cable with connector	
Code E	Laser Aiming Option **	
L	Laser aiming available on FA1A and FA2A models	
Code F	Cooling Platform Option	
W	Water cooled mounting platform for FA housing	
Code G	High Temperature Fiber Cable	
H	Rated to 315°C (600°F) (Not available on FA2); option excludes Teflon Sheath and NEMA-4 rating	
Typical Model Number	FA1ACF103LW	

* The FA1G is available only with SF0 optics ** Contact factory for availability of special FA1B or FA1C laser models

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