FA1G

Noncontact Temperature Measurement for Industrial Applications

Raytek®

A Fluke Company

LED Temperature & Mode Settings Display
LED Mode Indicators
Fiber Optic Cable

0 9 4 5

C
F
€
PKH
AVG
VAL

C/F △
▽
MODE

Increase Value and Celsius/Fahrenheit (C/F) Button
Decrease Value Button
Mode Selector Button
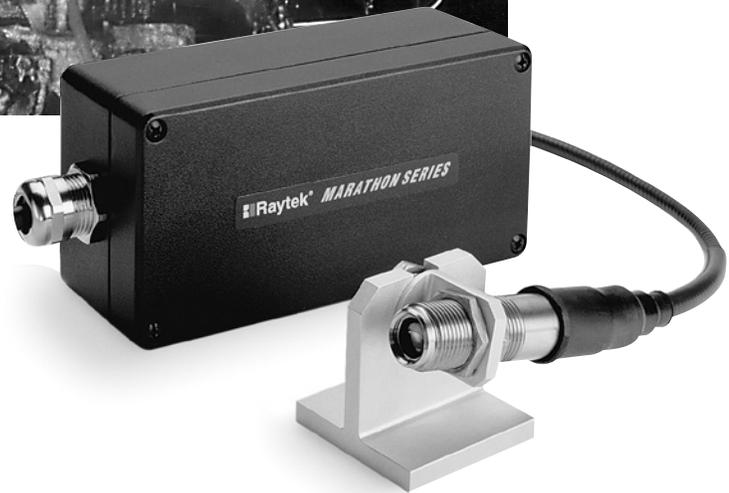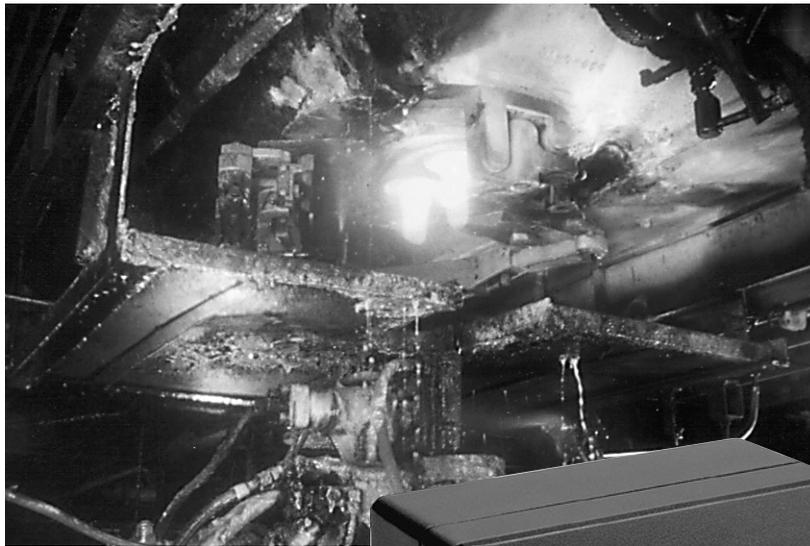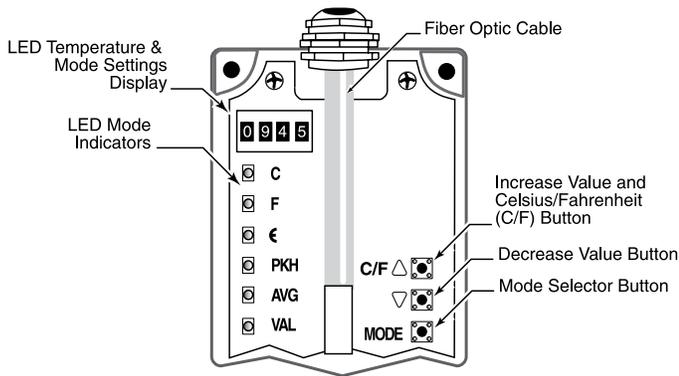
FA1G User Interface

T he Marathon FA1G is a Fiber Optic infrared thermometer specifically designed for measuring glass temperature from 750 to 1675°C (1382 to 3047°F). With applications ranging from measuring the molten glass in the forehearth to measuring the packing material temperature for optimum regenerator airflow control, the Marathon FA1G is designed to meet the needs of the Glass Industry. The FA1G thermometer permits measurement of the melter, refiner, regenerator, and forehearth temperatures otherwise inaccessible with non-fiber optic thermometers.

The FA1G is rated IP 65 (NEMA 4) and consists of a rugged fiber optic cable, plus optical head assembly connected to a sturdy electronics housing. Within this housing are detector, processing electronics, internal user-interface/LED display, and termination connections for field-wiring. The electronics maintain high accuracy in ambient operating temperatures up to 60°C (140°F), or 150°C (300°F) with optional cooling.

The fixed-focus optical head consists of a small stainless steel cylindrical housing and lens assembly capable of withstanding ambient temperatures up to 200°C (392°F). The fiber optic cable is protected by metal armor and sealed with a Viton® jacket to prevent wicking of water or oils. The whole assembly has a small bend radius for threading through tight spaces.

Included with the sensor is the Marathon Support Software, a suite of Windows® programs that allow remote parameter setting, data acquisition, graphic display of data, and RS-485 multidrop network configuration.

Measurement Specifications

| Temperature Range	750 to 1675°C (1382 to 3047°F)
Nominal Spectral Response	0.7–1.2 µm
Accuracy	±3°C (±5.4°F)
Repeatability	±1°C
Temperature Resolution	±0.05°C (±0.1°F)
Response Time	10 mSec; selectable to 10 sec
Emissivity	0.1 to 1.0 in 0.01 increments
Signal Processing	Peak Hold, Valley Hold, Averaging

Optical Specifications

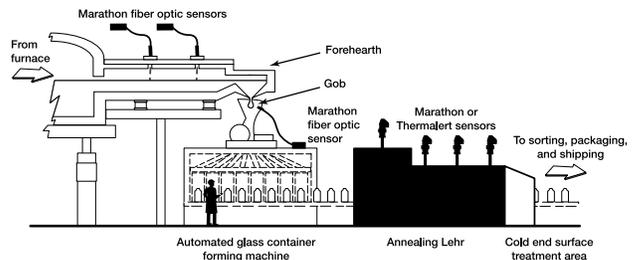| Models SF	D:S (Min)*	Focus Distance
FA1G	100:1	∞

*At 95% energy

Optimized for the melt furnace and forehearth
From the furnace to the forehearth, through the tin bath or the molds, and on toward the annealing lehr or the curing oven, Raytek covers the full line of glass temperature measuring requirements.

Crown
Feed hopper
Regenerator (cross-fired)
Canal
To manufacturing
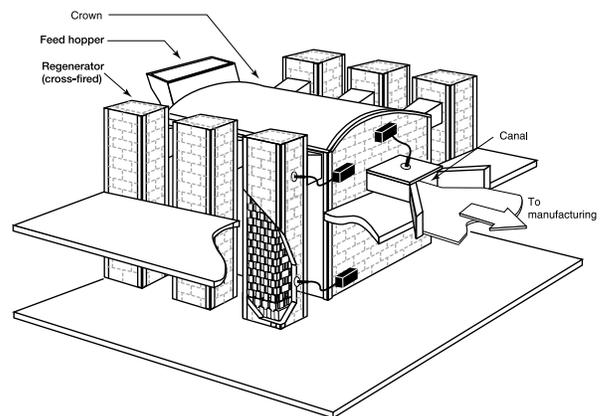
The FA1G is particularly suited to measurements on the melt furnace and the forehearth. Available with rugged accessories and able to withstand temperatures up to 200ºC, the multidrop-capable digital electronics of the FA1G provide the most flexibility for temperature measurement and control.

Marathon fiber optic sensors
From furnace
Forehearth
Gob
Marathon fiber optic sensor
Marathon or Thermalert sensors
To sorting, packaging, and shipping
Automated glass container forming machine
Annealing Lehr
Cold end surface treatment area

In glass molding, maintaining the proper temperature in the forehearth is critical so the molten glass is in the proper homogenous condition when it reaches the exit.

Electrical Specifications

Outputs	0/4-20 mA; RS-485, 2-wire/4-wire, network able to 32 sensors Relay (48V, 300 mA, response time < 2 mSec)
Power Supply	24 VDC, 500 mA, ±20%
Cable	Supplied by customer Supplied by Raytek as option

Sensor Specifications

Environmental Rating	NEMA-4 (IEC 529, IP 65)
Ambient Operating	
Temperature Range	
Fiber cable/optical head	0 to 200°C (32 to 392°F)
Electronics housing	0 to 50°C (32 to 122°F); with cooling platform 0 to 150ºC (32 to 300ºF)
Storage Temperature Range 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)
Fiber Cable Protection	Rated to 200°C; stainless steel armor; Viton coated; NEMA-4; provision for conduit to protect fiber cable

Sensor Dimensions

Optical Head

| L1 | 25mm (.98) |
| L2 | 62mm (2.4) |

mm (inches)

Electronics Housing

mm (inches)
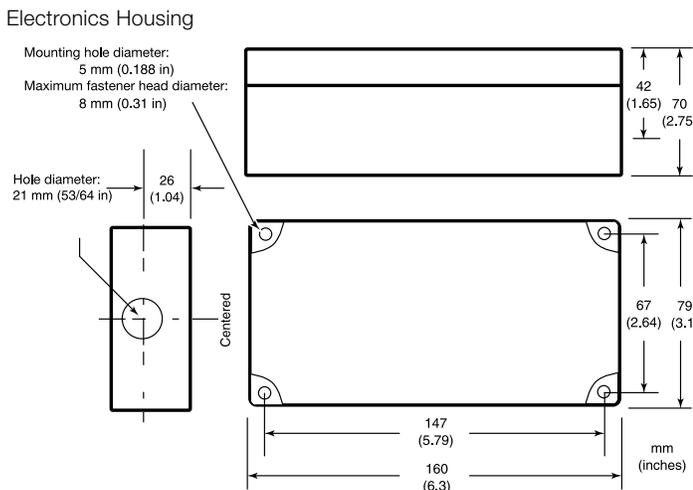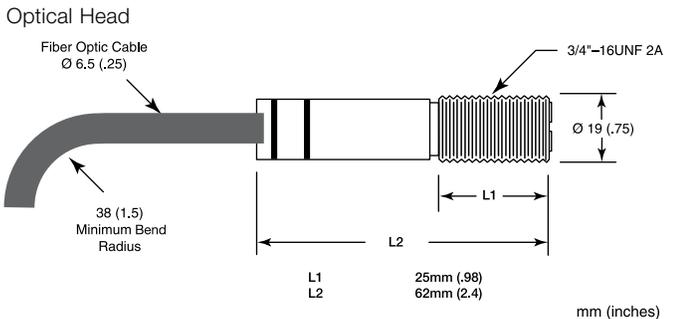
FA1G Highlights

- Wide temperature measurement range: 750 to 1675°C (1382 to 3047°F)

- High accuracy ±3°C (±5.4°F) absolute

- High optical resolution to 100:1

- Rugged fiber optic assembly withstands 200°C (392°F); NEMA-4 IP 65 rated

- Adjustable response time

- 0/4-20 mA analog output

- RS-485 serial output; network able to any combination of 32 Marathon sensors

- Advanced signal processing: Peak Hold, Valley Hold, Average

- Background radiation compensation

- Internal LED display and Marathon user interface

- Programmable relay output: dual temperature set points and fail-safe alarm

- Windows Marathon Support Software (operates under WIN 3.1/95/98/NT)

Accessories / Options

All systems are shipped with a mounting bracket for the optical head, an operator's manual, and all applicable software packages.

- **Furnace rooftop mounting/purging system** available with either flange (XXXFORFMF) or gravity-held base (XXXFORFMC)

- **Stainless steel air-purge collar** for optical head with integrated stainless steel sighting tube, 150mm (6 inch) long, 25mm (1 inch) diameter (XXXFOHAPA)

- **24VDC 1.1A power supply** with universal 110/220VAC input (XXX2CDCPSS)

- **Smart RS-485 to RS-232 interface converters** with built-in smart switching allowing for use in either 2-wire or 4-wire mode, in either multi-drop or stand-alone mode

- *Optional fiber optic cable lengths: 1, 3, 6, or 10m (3.2,10, 19.2, or 32 ft)

- *Optional NIST traceable certificate of calibration

- *Optional water-cooled platform for electronics housing to enable operation in environments up to 150°C (300°F)

- USB / RS485 Convertor (XXXUSB485)

*Options must be specified at time of order

Rugged Accessories for Harsh Environments

The roof of a glass furnace or forehearth is not the place to spend a great deal of time cleaning a dirty lens or exchanging a sensing head for calibration. The newest mounting accessory for the FA1G ensures maintenance requirements are kept to a minimum and available for the fastest servicing.

The rooftop mounting accessory includes a choice of two flanges, one with 4 mounting holes to attach directly to the roof or wall of a furnace or forehearth. The second is a heavy stainless steel "pipecap" specifically designed for gravity-held rooftop mounting.

The sensor is held in place by a quick-disconnect, bayonet-style adapter, with an integrated air-purged sapphire window. The large surface area of the window provides for simple cleaning, while at the same time preventing scratching or contamination of the calibrated sensor optics.

In addition to the rooftop mounting, other options and accessories for the FA1G include a cooling plate for the sensor electronics, air-purged pipe fittings, adjustable brackets, and many others.

Rooftop mounting accessory with FA1G sensor installed

The Worldwide Leader in Noncontact Temperature Measurement

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CE   ISO 9001   CAUTION   nqa. ISO 9001 Registered   ANAB ACCREDITED

Raytek is an ISO 9001 certified company