FLUKE®

Process Instruments

Endurance® Series

Innovative High Performance Infrared Pyrometers

Flexible

Durable

Visual

E1R	E2R	E1M	E2M	E3M
E1RL 600 to 1800 °C (1112 to 3272 °F) (2 color mode) 550 to 1800 °C (1022 to 3272 °F) (single color mode) 100 : 1 **E1RH** 1000 to 3200 °C (1832 to 5792 °F) 150 : 1 **1.0 µm nominal one/two color**	**E2RL** 250 to 1200 °C (482 to 2192 °F) 75 : 1 **1.6 µm nominal one/two color**	**E1ML** 400 to 1740 °C (752 to 3164 °F) 160 :1 **E1MH** 540 to 3000 °C (1004 to 5432 °F) 300 : 1 **1.0 µm nominal single color**	**E2ML** 250 to 1100 °C (482 to 2012 °F) 160 :1 **E2MM** 250 to 1400 °C (482 to 2552 °F) 160 :1 **E2MH** 450 to 2250 °C (842 to 4082 °F) 300 : 1 **1.6 µm nominal single color**	**E3ML** 50 to 1000 °C (122 to 1832 °F) 100 :1 **E3MH** 150 to 1800 °C (302 to 3272 °F) 300 : 1 **2.4 µm nominal single color**





The flexible, durable, visual solution... saving you time and money

Flexible

Designed to handle wider temperature ranges with superior optical resolution. Profinet, Ethernet, EtherNet/IP, RS-485 and analog output is available to meet your process requirements. Endurance® series sensors are rugged, small and easy to install.

Durable

Built to withstand the harshest environments, the sensor is housed in a stainless steel IP65 (NEMA-4) housing. Accessories such as high temperature enclosures, cables, and totally sealed connectors, along with best in class 4 year warranty, Endurance series sensors are a snap to install.

Visual

The video camera option provides remote verification of sighting as well as continuous monitoring of your process. The LED sighting option can be used in applications where it is important to "see" the actual spot size projected on the target. The laser sighting option for integrated and fiber optic heads is useful for local verification of sighting accuracy. By using the Endurance software or the built in web server, you can archive, monitor and troubleshoot with a total view to your process.

Rugged sensors for harsh installations

Endurance sensors have a rugged stainless steel housing designed to meet IP65 (NEMA 4) environmental requirements in high ambients up to 65 °C (149 °F) for integrated sensors and 315 °C (599 °F) for fiber-optic sensors without cooling.

Isolated analog outputs and sensor protection circuitry prevent sensor damage from mis-wiring at installation or unstable power supply line voltages.

See more of your process

Using the onboard Ethernet option, you have access to a web server, Power over Ethernet, ASCII over Ethernet and video if the camera option is selected for the sighting method. The camera option can be used to stream a view of your process (while showing exactly where the pyrometer is aimed) right into a control room to see what is happening at the exact instant a temperature event occurs.

Note: Sighting options Integrated head sensors – video, laser, LED. Fiber-optic sensors – laser (option), no laser (standard)

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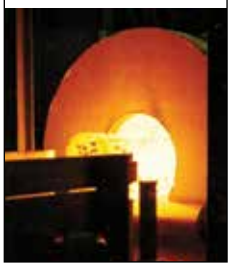
EF1R	EF2R	EF1M	EF2M
EF1RL 500 to 1100 °C (932 to 2012 °F) 20:1	**EF2RL** 275 to 1000 °C (527 to 1832 °F) 20:1	**EF1ML** 475 to 900 °C (887 to 1652 °F) 20:1	**EF2ML** 250 to 800 °C (482 to 1472 °F) 20:1
EF1RM 700 to 1500 °C (1292 to 2732 °F) 40:1		**EF1MM** 800 to 1900 °C (1472 to 3452 °F) 100:1	
EF1RH 1000 to 3200 °C (1832 to 5792 °F) 65:1	**EF2RH** 350 to 1300 °C (662 to 2372 °F) 40:1	**EF1MH** 1200 to 3000 °C (2192 to 5432 °F) 100:1	**EF2MH** 400 to 1700 °C (752 to 3092 °F) 40:1
1.0 µm nominal one/two color	**1.6 µm nominal one/two color**	**1.0 µm nominal single color**	**1.6 µm nominal single color**

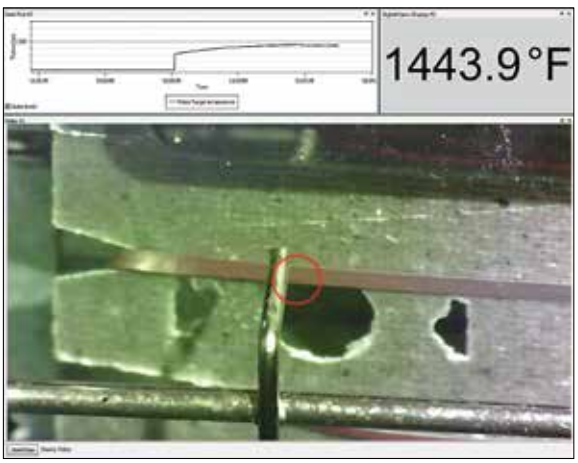




Interface Options

Full access to all sensor settings is achievable from the backlit rear panel. This panel displays the indicated temperature, system alarm status, as well as all sensor parameters.

Software

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



Fiber-Optic

Endurance fiber-optic pyrometers allow measurement of targets that would otherwise be inaccessible because of space constraints or harsh environments. Separated by a flexible fiber-optic cable, the optical head may be positioned near the target with the rugged electronics housing installed remotely in a convenient location.

Fiber-optic sensors are completely non-conductive and offers improved immunity to RFI and EMI interference.

Applications

- **Metals processing**
- **Molten metal/forging**
- **Hot rolling mills**
- **Rod/wire mills**
- **Heat treating & annealing**
- **Induction heating**
- **Lightbulb and halogen lamp production**
- **Glass melting**
- **Semiconductor furnaces**
- **Cement & lime kilns**
- **Refuse burning**
- **Carbon graphite production**
- **Foundry & welding**
- **Rubber & thick plastic**

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Key Features

- Broad temperature range from 50 °C to 3200 °C (122 °F to 5792 °F)
- Superior optical resolution to 300:1
- Spot sizes down to 0.6mm (0.02 inch)
- Fast response times down to 2 ms
- Easy adjustment with manual variable focus integrated head optics
- Through-the-lens sighting, with optional laser, LED or video aiming function
- Compact, rugged housings with IP65 (NEMA-4) rating
- Ethernet, Profinet and EtherNet/IP options
- Programmable relay output for control
- Simultaneous analog and digital outputs

Highlights

- Innovative optional camera feature allows you to continuously monitor your process visually
- LED sighting option allows you to see the spot size on the target and make sure you have a clean line of sight to the target.
- Match function takes the guess work out of setting the emissivity
- Endurance companion software allows you to archive your process temperatures for data analysis and sensor setup.
- Easy to upgrade from your existing Ircon Modline® 5, Modline 6, Modline 7 or Marathon MR, Marathon MM, Marathon FA/FR series installations. Adapter accessories and patch cables allow you to use existing accessories.
- Temperature measurement of inaccessable targets with rugged non-contact fiber-optic single and two color pyrometer measurement systems.

Raytek® Fluke Process Instruments | IRCON® Fluke Process Instruments | DATAPAQ® Fluke Process Instruments

In the heat of the moment, what is the temperature? Not knowing can mean the investment and labor of everyone and every material involved in the manufacturing process, from the raw to the finished product, is at risk. We take the heat and tell you its temperature. Precisely, accurately, and with the greatest of detail, all to ensure our customers' promise of quality is delivered.

We are Raytek, Ircon, and Datapaq. Combined, we have over 150 years of experience in temperature measurement. Individually, we have earned the respect of manufacturing's most valued names.

Together, we are Fluke® Process Instruments – a triad of the top performing, innovative, most rugged and dependable noncontact temperature measurement and profiling equipment made – a complete line of infrared sensors, line scanners, thermal imagers and profiling systems for use in today's most demanding environments.

Raytek, Ircon, and Datapaq. The first names in temperature control have become the last word in manufacturing with confidence:

Fluke Process Instruments

The Fluke Process Instruments Guarantee

The Endurance Series is supported by a 4 year warranty. With a network of trained representatives and agents in over one hundred countries and offices located in the U.S., Germany and China, we provide local service and support.

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Worldwide Service
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