

**FLUKE®**

**Process  
Instruments**

# **Endurance® Series**

**Innovative High Performance Infrared Pyrometers**



**Flexible**

**Durable**

**Visual**

A close-up photograph of a digital pressure gauge. The gauge has a circular stainless steel body. The digital display shows the number '98.85' in green. To the left of the display are two arrow buttons (up and down) and a central yellow button. To the right is a 'UNIT' button. Below the display is a green label with text that is partially obscured but appears to say 'PRESSURE' and 'PSI'.

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.

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.

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.

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.

## 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, no laser

**EF1R**
**EF1RL**

500 to 1100 °C  
(932 to 2012 °F)  
20:1

**EF1RM**

700 to 1500 °C  
(1292 to 2732 °F)  
40:1

**EF1RH**

1000 to 3200 °C  
(1832 to 5792 °F)  
65:1

1.0 µm nominal  
one/two color


**EF2R**
**EF2RL**

275 to 1000 °C  
(527 to 1832 °F)  
20:1

**EF2RH**

350 to 1300 °C  
(662 to 2372 °F)  
40:1

1.6 µm nominal  
one/two color


**EF1M**
**EF1ML**

475 to 900 °C  
(887 to 1652 °F)  
20:1

**EF1MM**

800 to 1900 °C  
(1472 to 3452 °F)  
100:1

**EF1MH**

1200 to 3000 °C  
(2192 to 5432 °F)  
100:1

1.0 µm nominal  
single color


**EF2M**
**EF2ML**

250 to 800 °C  
(482 to 1472 °F)  
20:1

**EF2MH**

400 to 1700 °C  
(752 to 3092 °F)  
40:1

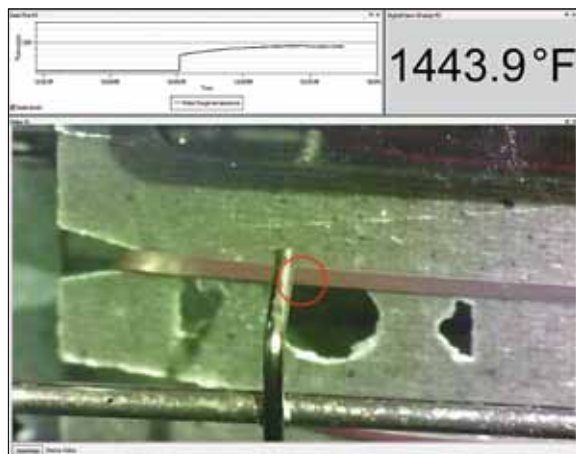
1.6 µm nominal  
single color


**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

## 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 inaccessible targets with rugged non-contact fiber-optic single and two color pyrometer measurement systems.



Fluke Process Instruments



Fluke Process Instruments



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 you can rely on time after time.

## Fluke Process Instruments

### Americas

Everett, WA USA

Tel: +1 800 227 8074 (USA and Canada, only)

+1 425 446 6300

[solutions@flukeprocessinstruments.com](mailto:solutions@flukeprocessinstruments.com)

### EMEA

Berlin, Germany

Tel: +49 30 4 78 00 80

[info@flukeprocessinstruments.de](mailto:info@flukeprocessinstruments.de)

### China

Beijing, China

Tel: +8610 6438 4691

[info@flukeprocessinstruments.cn](mailto:info@flukeprocessinstruments.cn)

### Japan

Tokyo, Japan

Tel: +81 03 6714 3114

[info@flukeprocessinstruments.jp](mailto:info@flukeprocessinstruments.jp)

### Asia East and South

India Tel: +91 22 62495028

Singapore Tel: +65 6799 5578

[sales.asia@flukeprocessinstruments.com](mailto:sales.asia@flukeprocessinstruments.com)

### Worldwide Service

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

**[www.flukeprocessinstruments.com](http://www.flukeprocessinstruments.com)**

© 2019 Fluke Process Instruments

Specifications subject to change without notice.

2/2019 6006198E