

Endurance®

Datasheet

Highlights

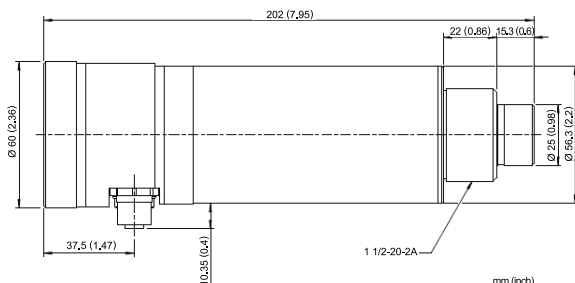
- 4 year warranty
- Wide temperature range:
50 to 3200 °C (122 to 5792 °F)
- Sighting options:
 - Laser through the lens and
Visible through the lens - Manual Variable focus
 - Video Camera through the lens and
Visible through the lens - Manual Variable focus
 - LED through the lens and
Visible through the lens - Manual Variable focus
- Superior optical resolution to 300:1
- LAN/Ethernet interface with PoE for communication
with the sensor (ASCII, Video, and Webserver)
- Profinet and EtherNet/IP interface options
- Programmable relay output
- Fail safe alarm
- Isolated analog input/output
- Ambient temperatures to 315 °C (600 °F)
with ThermoJacket enclosure
- Rugged stainless steel housing, IP65 (NEMA 4) rated
- Unique "dirty window" alarm
- Endurance software for remote configuration,
remote monitoring and field calibration
- Single color and two colors models



Electrical Specifications

Inputs	Contact input (peak/valley reset, Laser, LED), Analog input (emissivity, e-slope, background temperature) 0/4-20 mA
Outputs	Ethernet, Profinet, EtherNet/IP, 0/4-20 mA, max. load: 500 Ω RS485 (2-wire half duplex), networkable Relay, 48 V, 300 mA, response time < 2 m
Power Supply	20 to 48 VDC, 500 mA Power over Ethernet (PoE)

Dimensions



General Specifications

Environmental Rating IP65 (IEC529) / NEMA-4

Ambient Temperature

without cooling	0 to 65 °C (32 to 149 °F)
E2R without cooling	0 to 60 °C (32 to 140 °F)
with air cooling	0 to 120 °C (32 to 250 °F)
with water cooling	0 to 175 °C (32 to 350 °F)
with ThermoJacket	0 to 315 °C (32 to 600 °F)

Storage Temperature -20 to 70 °C (-4 to 158 °F)

Relative Humidity 10 to 95 %, non-condensing

Shock IEC 68-2-27

Vibration IEC 68-2-6

Weight

Optical head 1220 g (2.69 lbs)

With air/water cooled housing 2980 g (6.57 lbs)

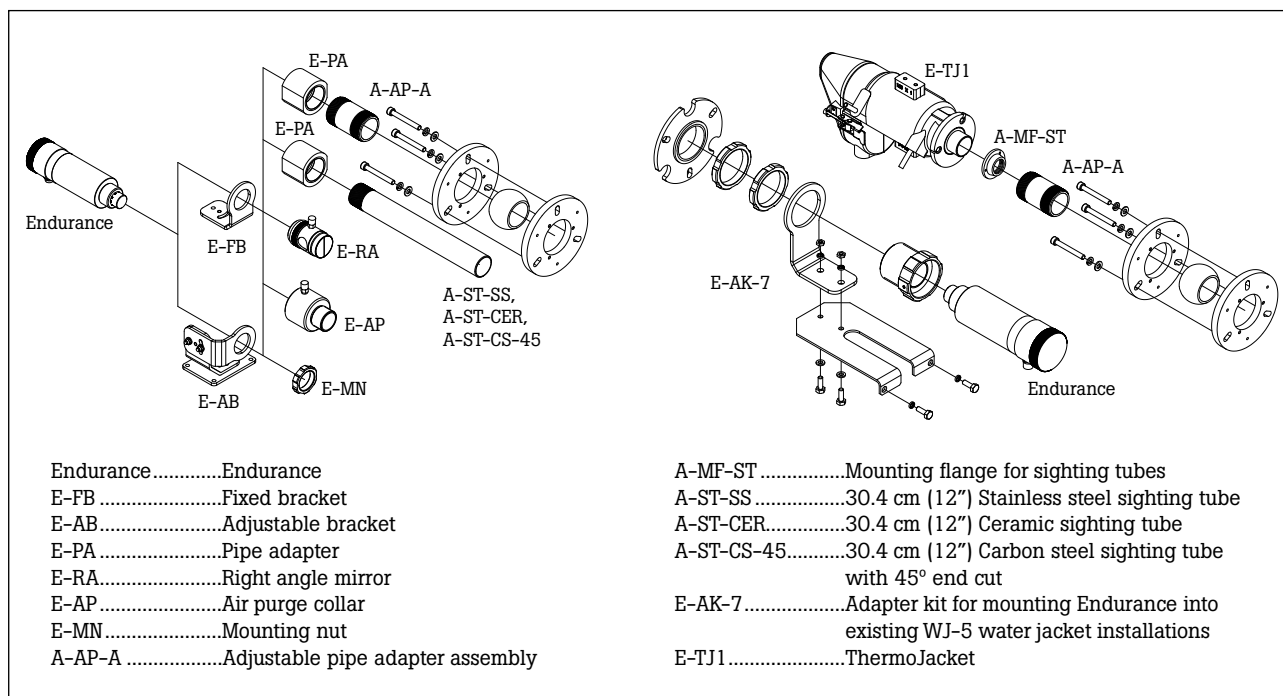
User Interface



Measurement Specifications

	E1R	E2R	E1M	E2M	E3M
Temperature Range and Optical Resolution (90 % energy)	E1RL 600 to 1800 °C (1112 to 3272 °F) (2 color mode)	E2RL 250 to 1200 °C (482 to 2192 °F) 75 : 1	E1ML 400 to 1740 °C (752 to 3164 °F) 160 : 1	E2ML 250 to 1100 °C (482 to 2012 °F) 160 : 1	E3ML 50 to 1000 °C (122 to 1832 °F) 100 : 1
	550 to 1800 °C (1022 to 3272 °F) (single color mode) 100 : 1 (95 % energy)			E2MM 250 to 1400 °C (482 to 2552 °F) 160 : 1	
	E1RH 1000 to 3200 °C (1832 to 5792 °F) 150 : 1 (95 % energy)		E1MH 540 to 3000 °C (1004 to 5432 °F) 300 : 1	E2MH 450 to 2250 °C (842 to 4082 °F) 300 : 1	E3MH 150 to 1800 °C (302 to 3272 °F) 300 : 1
Spectral Response	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	2.4 μm nominal single color
Lens Options	600 mm – ∞ (24" – ∞) (F2), 300 – 600 mm (12 – 24") (F1), 190-300 mm (7.5 – 12") (F0)				
Sighting	Visual/Laser, Visual/Camera, Visual/LED				
Accuracy*	E1RL ±(0.5 % + 2 °C) no attenuation	E2RL ±(0.5 % + 2 °C) for T _{meas} ≥ 270°C (518°F) no attenuation	E1ML ±(0.3 % + 1 °C) for T _{meas} ≥ 450°C (842°F) ±(2 % + 2 °C) for T _{meas} < 450°C (842°F)	E2ML ±(0.3 % + 2 °C)	E3ML ±(0.3 % + 1 °C) for T _{meas} ≥ 100°C
	E1RH ±(0.5 % + 2 °C) for T _{meas} < 3000°C (5432°F) no attenuation Temperature indication only for T _{meas} ≥ 3000°C (5432 °F)	T _{meas} in °C	E1MH ±(0.3 % + 1 °C) for T _{meas} ≥ 650°C (1202°F) ±(2 % + 2 °C) for T _{meas} < 650°C (1202°F)	E2MM ±(0.3 % + 2 °C) for T _{meas} ≥ 350°C (662°F) ±(1 % + 2 °C) for T _{meas} < 350°C (662°F)	±(1 % + 2 °C) for T _{meas} < 100°C
Repeatability*	±(0.3 % + 1 °C) no attenuation T _{meas} in °C	±(0.3 % + 1 °C) for T _{meas} ≥ 270°C (518°F) no attenuation T _{meas} in °C	E1ML ±(0.1 % + 1 °C) for T _{meas} ≥ 450°C (842°F) ±(1 % + 1 °C) for T _{meas} < 450°C (842°F)	E2ML ±(0.1 % + 1 °C)	±(0.1 % + 1 °C) for T _{meas} ≥ 100°C (212°F)
			E1MH ±(0.1 % + 1 °C) for T _{meas} ≥ 650°C (1202°F) ±(1 % + 1 °C) for T _{meas} < 650°C (1202°F)	E2MM ±(0.1 % + 1 °C) for T _{meas} ≥ 350°C (662°F) ±(1 % + 1 °C) for T _{meas} < 350°C (662°F)	±(1 % + 1 °C) for T _{meas} < 100°C (212°F)
			E2MH ±(0.1 % + 1 °C)	E3MH ±(0.3 % + 1 °C)	±(0.1 % + 1 °C)
Temperature Resolution	Digital Output 0.1 °C, Current Output <0.03 °C / 16 bit				
Response Time	10 ms (95 %)	20 ms (95 %)	2 ms (95 %)	2 ms (95 %)	20 ms (95 %)
Emissivity	0.100 to 1.100				
E-Slope	0.850 to 1.150		N/A		
Signal Processing	Peak Hold, Valley Hold, Averaging, Ambient background temperature compensation				

* at ambient temperature 23 °C ± 5 °C (73 °F ± 9 °F), emissivity = 1.0 and calibration geometry, T_{meas} in °C



Options

Options must be specified at time of order.

- Water-cooled housing, including air purge collar
- Profinet, EtherNet/IP communications

Accessories

The model includes a mounting nut, fixed bracket, end cap for display, operator's manual and Endurance software. Additional accessories are available (refer to the Endurance Accessory datasheet).

- Adjustable bracket (**E-AB**)
- Air purge collar (**E-AP**)
- SpotScan™ Accessory (**SSA or SSB**) to allow Endurance sensors to scan over a line
- ThermoJacket enclosure for ambient temperatures to 315 °C (600 °F) (**E-TJ1**) – see *ThermoJacket* documentation.
- Polarizing filter end cap (**E-PFEC**)
- Terminal block (**E-TB**)
- Switching power supply 24 VDC 1.3 A industrial power supply, DIN rail mount (**E-SYSPS**)
- Switching power supply in NEMA 4 (IP65) enclosure 100/240 VAC to 24 VDC, 1.1 A (**E-PS**)
- Power over Ethernet (**PoE**) Injector provides power and also acts as a single Ethernet hub (100/240 VAC input) (**E-PoE**)
- USB/RS485 Converter (**E-USB485**)
- Protective front window including O-ring (**E-PW**)

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.

Fluke Process Instruments



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