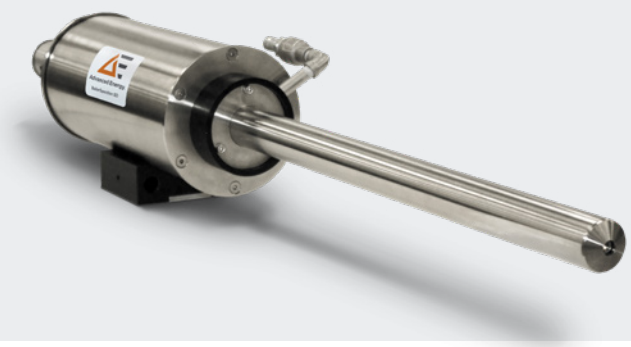
DATASHEETS

BOILERSPECTION SD | BOILERSPECTION MB

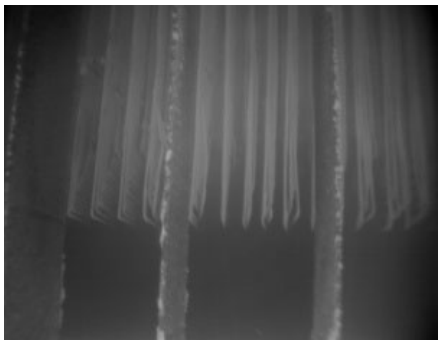
BOILERSPECTION SD

Infrared camera system for continuous temperature measurement and monitoring in boilers and furnaces from 500 to 1600°C (932 to 2912°F).

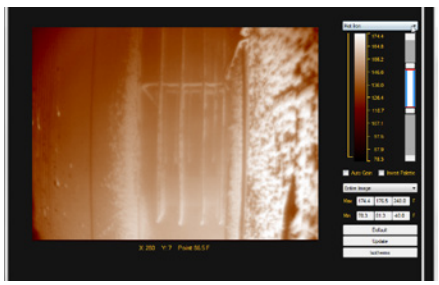


The BoilerSpection™ SD thermal imaging system provides continuous, real-time, through-flame imaging plus is resilient and robust enough to withstand the harshest conditions. Plant operators need a view inside the boiler, furnace or kiln to increase efficiency, improve emissions, and lower operating costs.

BoilerSpection includes state-of-the-art optics, infrared cameras, an auto-retraction device, networking components and software to control the entire system remotely. The LumaSpec RT software is a powerful tool for analysis and historical trending, outputs to automation and DCS, along with a real-time web server to broadcast images over the plant's network.



Infrared image from BoilerSpection SD system in grayscale color palette



Infrared image in LumaSpec RT software

PRODUCT HIGHLIGHTS

- Capture lost boiler capacity by reducing unnecessary cleanings
- Increase efficiency by improving heat transfer with precise knowledge of slag and ash buildup
- Lower maintenance costs by optimizing cleaning and identifying large deposits (clinkers) before they cause damage to boiler tubes
- Optimize fuel-switching by directly and accurately measuring ash rate and uniformity as fuel changes
- Manage combustion by tracking uniformity of ash deposits

TECHNICAL DATA

Infrared Camera Specifications	
Wavelength	Narrowband 3.9 µm
Resolution	320 x 240
Detector Type	Uncooled focal plane array VOx microbolometer
Protective Housing	IP66 with integrated vortex air cooling
Measurement Range	500 to 1600°C (932 to 2912°F)
Ambient Environment	Up to 60°C (140°F)
Camera Weight	13.5 kg (30 lbs)

Lens Specifications	
Construction	Stainless steel with air cooling purge
Field of View (H x V)	50° x 38°
Focus	Manual
Protection	Sapphire window tip with air purge shield
Diameter	42 mm (1.65")

Facility Connection Requirements	
Power	110 to 240 VAC, two 15 amp lines to support six cameras
Electrical Cabinets	All cabinets/panels are NEMA 4 / IP65
Air Supply	20 to 30 scfm @ min 80 psi per camera

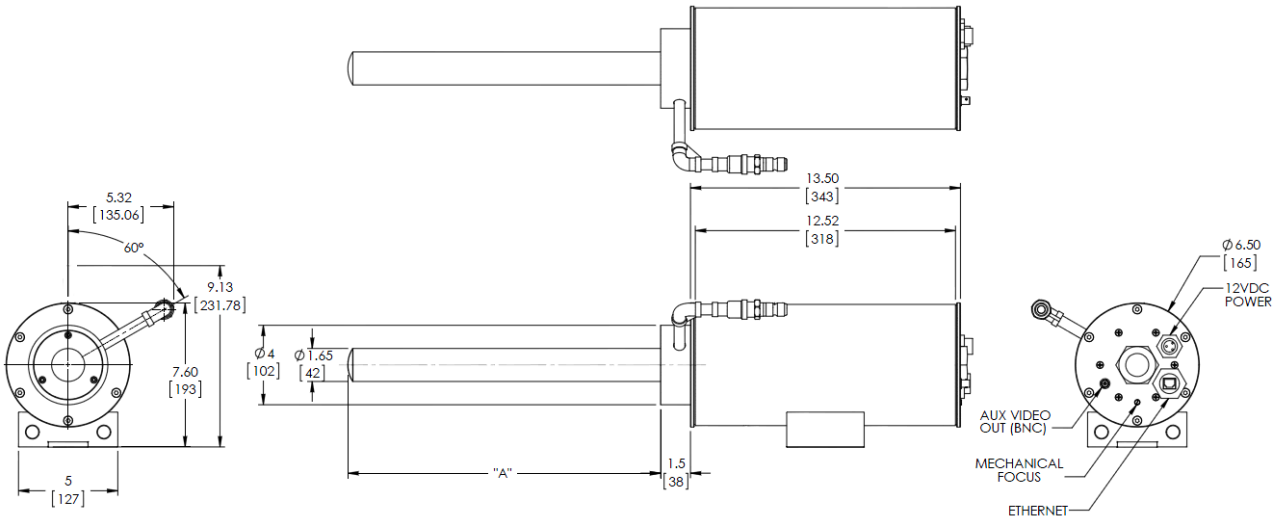
Automatic Retraction Device and Mounting	
Controls	Automated retraction if air or power is disrupted
Air Filters	Two-stage filter system
Air Regulators	Included
Mounting	Weld or bolt on mounting plates
Waterwall Opening	50 mm (2") gap
Weld-On Thru Hole	64 mm (2.5") circle
Furnace Pressure	Negative, balanced, or positive pressure

Networking Specifications	
Number of Cameras	Up to 24 with a single controller
Camera Connection	100 Base T Ethernet
Field Switch Cabinet	NEMA 4 / IP66 enclosure with ethernet switch
Connection to Control Room	Fiber Optic Link, 50/125 µm core/cladding diameter multi-mode fiber, 850/1310 nm wavelength

Available Options

- LumaSpec RT web server functionality for remote broadcasting of data over plant network(s)
- I/O outputs and relay outputs for DCS, PLC, or connection to trigger cleaning equipment
- Interface for 3rd party plant historical archiving programs
- OPC and Modbus Support (Serial and IP)
- RAID memory systems
- Service offerings: installation, maintenance, and training

BOILERSPECTION SD DIMENSIONS



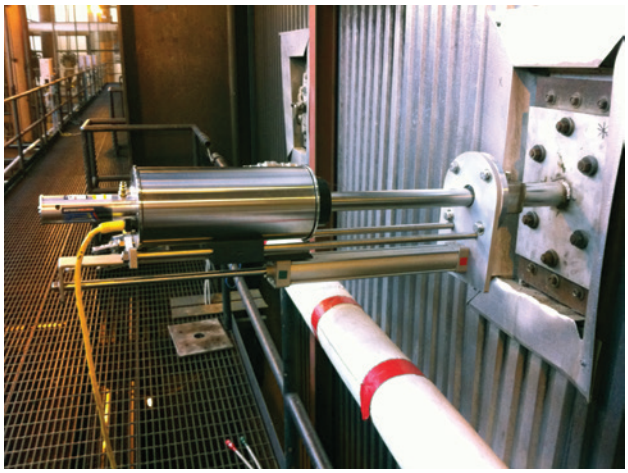
All dimensions in mm

SYSTEM INSTALLATION

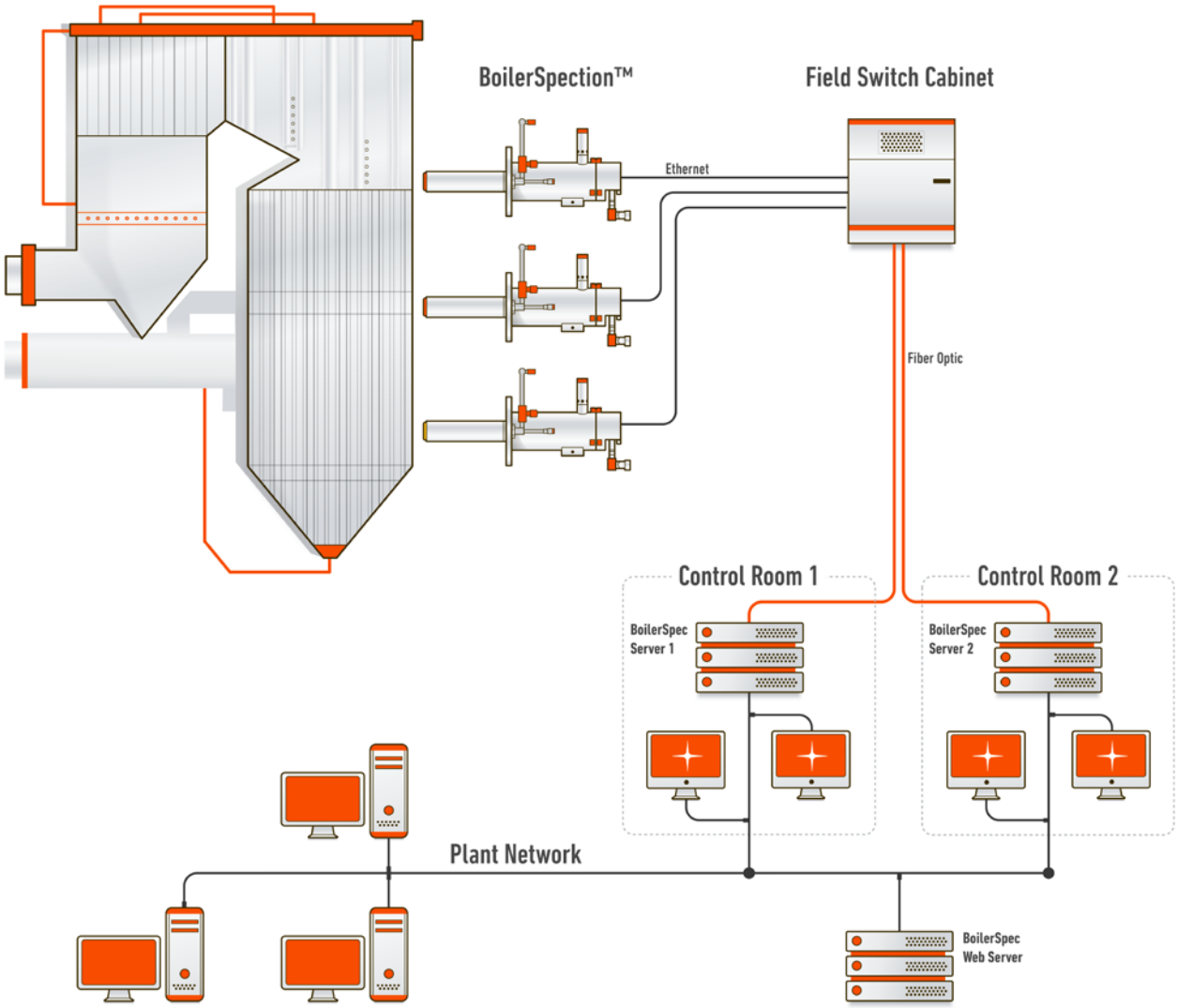
The BoilerSpection system can be installed and commissioned either while the boiler is operating or during an outage. The cameras system mounts to the furnace wall via a mounting plate. Advanced Energy offers a choice of weld-on or bolt-on mounting plates. Exact dimensions can be customized by request.

The standard BoilerSpection system has the following requirements:

- Facility connections
- Ports with a 2" (50 mm) clearance
- Less than 330' (100 m) distance between cameras and the field switch cabinet
- Less than 820' (250 m) distance from field switch cabinet and control room
- Instrument grade air



BOILERSPECTION SYSTEM CONFIGURATION



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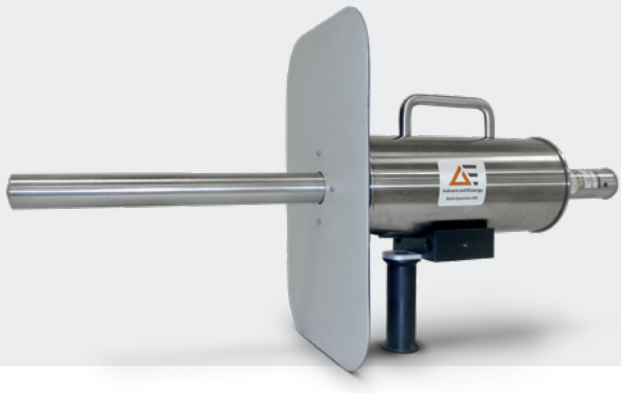
BOILERSPECTION MB

Mobile infrared camera for clear inspection of boiler tubes and furnace walls in temperatures between 500 to 1600°C (932 to 2912°F).



The BoilerSpection™ MB thermal imaging system uses a special mid-wave infrared detector, allowing operators to better see through flames in a boiler, furnace, kiln, or incinerator. This unique feature means BoilerSpection MB provides the clearest and most stable through-flame images.

With a real-time infrared inspection, plant operators can quickly and accurately identify process abnormalities, allowing for more optimal combustion and heat transfer. Operators can then direct cleaning operations, regulate flow of fuel and air, reduce emissions, reduce fuel consumption, speed up boiler start up, and improve safety.

BoilerSpection MB is a completely digital and IP addressable camera system that utilizes standard connections for viewing and recording real-time images. It also includes a standard video (BNC) output for use with legacy video equipment.

Superheat pendants in 700MW power boiler burning PRB coal

Opposing wall burner and slag on water wall

PRODUCT BENEFITS

- Mobile or semi-permanent through-flame imaging inside power boilers, furnaces and incinerators
- Pinpoint problems before they cause outages
- Inspect buildup of ash/slag on boiler tubes
- Diagnose burner flame conditions
- Measure temperature across entire image
- Record and analyze data to optimize combustion processes
- Compatible with BoilerSpection SD continuous monitoring solution

TECHNICAL DATA

Infrared Camera Specifications	
Spectral Wavelength	~3.9 µm narrowband pass filter
Resolution	320 x 240
Detector Type	Uncooled focal plane array VOx microbolometer
Speed	30 Hz / 9 Hz
Protective Housing	Stainless steel enclosure with vortex air cooling (air is only required for longterm monitoring)
Measurement Range	500 to 1600°C (932 to 2912°F)
Video Out	NTSC / PAL
Power Supply	Included, input is universal AC
Camera Weight	< 13.5 kg (30 lb)

Lens Specifications	
Lens Shroud Outer Diameter	42 mm (1.65")
Lens Length	18" ("A" Dimension 15.75" [400 mm])
	24" ("A" Dimension 22.50" [572 mm])
	36" ("A" Dimension 34.10" [866 mm])
Field of View (H x V)	50° x 38°
Construction	Stainless Steel Borescope Optics with ZnS optical elements (can be operated without air for brief inspections)
Protection	Sapphire window tip with air purge shield

Recording and Analysis Software	
Key Features	Image recording, region of interest analysis, export data to Excel, save recordings as JPGs and AVI movies

Base Camera System Components

- BoilerSpection MB Camera with 18”, 24”, or 36” lens
- Removable radiation shield
- Power and Ethernet connection cables
- Software for image recording and analysis
- Camera storage and travel case
- User manual

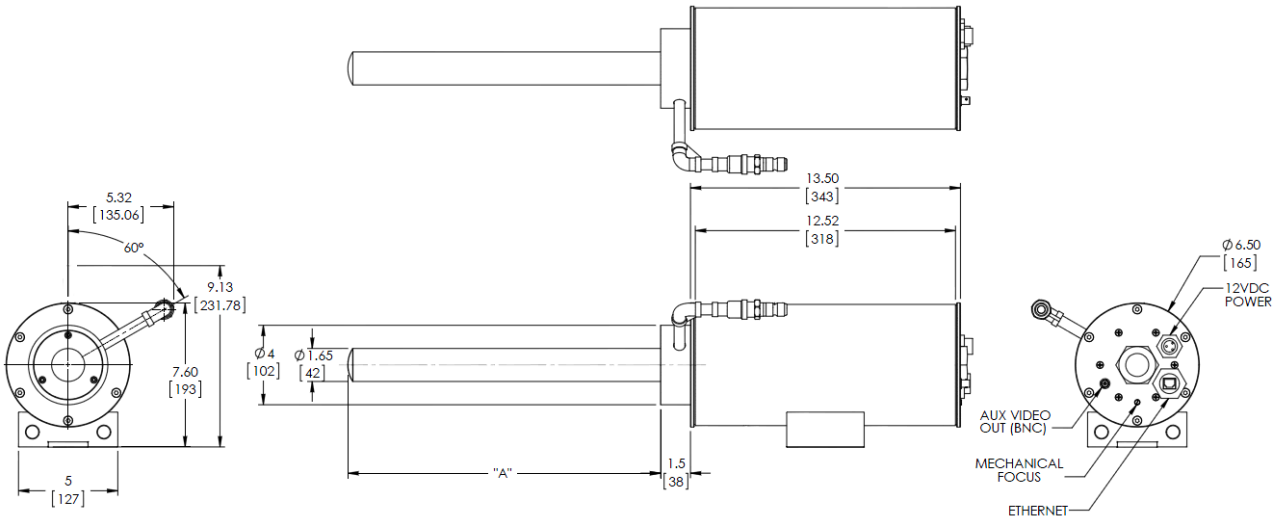
Available Options

- Battery pack
- Automatic retraction system for continuous monitoring installation

Accessory Kit Components

- 4.5 m (15') flexible stainless braided air lines with fittings
- Dual stage air filters with regulators
- Industrial grade laptop computer with software pre-installed
- LumaSpec Offline Analyzer
- Accessory kit storage and travel case
- Bottom mounted handle (see below)

DIMENSIONS



All dimensions in mm

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

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