

# Boiler Electronics Products and Services

Improving Safety, Reliability  
and Availability



*With Alstom behind me...  
I'm in control*

POWER

**ALSTOM**

# Boiler Electronics

WITH ALSTOM...I'M IN CONTROL

Alstom is a leader in the design, manufacturing and servicing of utility and industrial power generation systems. While our heritage dates to the late 1800s, our capabilities continue to expand and point us to the future.

**SAFETY** | We believe that safety is a key indicator of operational excellence for both Alstom and its customers. Our commitment to safety hinges on strong leadership, timely communication and the involvement of all employees. Our target is zero safety incidents.

**Target Zero** 

**EXPERIENCE** | With an installed base of over 400 GW of power generation capacity and a track record spanning over 100 years, we believe you cannot find a partner whose experience in the power industry matches ours. We are dedicated to meeting your needs and exceeding your expectations. Our track record proves it.

**INNOVATION** | Each and every day, Alstom applies leading edge technology to develop new products and services to meet your maintenance and operational challenges regardless of your boiler type or fuel. Your performance is our measure of our success.

**LOGISTICS** | The right products and services when and where you need them. That is our commitment. With a wide range of capabilities and options for replacement parts supply, technical services, and construction services, Alstom is your complete boiler services solution. We offer the industry's most comprehensive and innovative replacement parts and service programs.

**CUSTOMER SERVICE** | Alstom's field service engineers, customer service representatives and construction managers have one goal – exceeding your service expectations. Our strategically located service and distribution centers enable us to provide fast response and reliable solutions to meet your needs.

At Alstom, we combine our capabilities and experience to enhance the productivity and performance of your boilers, pulverizers, feeders, air pollution control systems, ash handling systems and auxiliary equipment. Our focus is customer service and we understand the

challenges faced by plant owners, operators, maintenance personnel and management. Whether it is a replacement or upgraded part, a rebuilt assembly, a custom fabrication or inventory management program, Alstom provides exceptional value and service to our customers.

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# Introduction to Boiler Electronics Products and Systems

## IMPROVING SAFETY, RELIABILITY AND AVAILABILITY

### THE ALSTOM IGNITOR PORTFOLIO CONSISTS OF THE FOLLOWING HIGH PERFORMANCE PRODUCTS:

- 6" Oil side ignitor
- 6" Gas side ignitor
- 3" Oil pipe ignitor
- 3" Gas pipe ignitor
- High Energy Ignitor (light or heavy oil)
- Diagnostic flame indicator (Model 100 or 110)
- Ignitor control cabinet (standard or SMART)
- Valve train assembly (oil and gas)
- Oil flow controller
- HEI spark upgrade
- Oil atomizer upgrade



ALSTOM OFFERS A FULL COMPLEMENT OF NFPA COMPLIANT CLASS 1, 2 AND 3; AND 3 SPECIAL IGNITORS FOR ALL TYPES OF UTILITY AND INDUSTRIAL BOILERS. | The Alstom ignitor system portfolio will support complete systems and typically require auxiliary equipment such as an ignitor assembly, a control cabinet, and a valve train. Alstom can provide these and other equipment to meet customer requirements. In addition, Alstom can incorporate firing system upgrades with ignitors and burners when upgrading their unit for improved efficiency, emissions and/or controls updates.

# LIMELIGHT™ Ignitors

## LIMELIGHT Oil Eddy Plate Side Ignitor

**THE LIMELIGHT OIL EDDY PLATE SIDE IGNITOR HAS BEEN SPECIFICALLY DESIGNED** | to integrate the latest in combustion technology, flexibility and overall reliability. It is intended to provide customers with state-of-the-art technology, enabling increased availability for tangentially fired boilers.

Alstom's unique design allows for either a complete upgrade reusing the existing ignitor windbox or an upgrade to selected components as needed. Individual components feature "plug and play" capabilities requiring minimal installation time.

The following LIMELIGHT Oil Eddy Plate Side Ignitor subassemblies can be purchased separately:

- Upgraded "Solid Rod" technology flame rod
- HEI solid state ignition system
- LIMELIGHT Diagnostic Flame Indicator (DFI) flame detection system
- Low emissions oil atomizers:
- Digital test equipment
- Replacement ignitor face plate with optional view port

**THE LIMELIGHT OIL EDDY PLATE SIDE IGNITOR AND ASSOCIATED FLAME PROVING DEVICE** | have been designed to meet all code requirements, including the latest releases of the National Fire Protection Association (NFPA).

### FEATURES:

- Capacity options: 0.5- 6.0 MMBTU/hr
- Dual atomizer design for higher capacities: 6.0 - 14.0 MMBTU/hr
- Easy retrofit with existing side ignitors, resulting in minimal conversion costs for upgrade
- Easy removal of the ignitor internals from the faceplate assembly
- Minimum opacity during cold startups
- System offered as individual subassembly upgrades
- ΔP airflow proving for coal units
- Available with line of sight scanner

### BENEFITS:

- Highly reliable start-ups and operation
- Easy removal for maintenance
- Reliable flame detection utilizing the DFI technology along with Alstom's solid flame rod
- Reliable ignition spark during trial time periods

**IMPROVED ATOMIZER  
INCREASED RELIABILITY**



## LIMELIGHT Oil Bluff Body Pipe Ignitor

### FEATURES:

- Heat input/capacity 0.5 – 4.0 MMBtu/hr
- Stainless steel construction
- Offers clean and reliable operation with minimal opacity during start ups
- Flow enhanced bluff body design replaces eddy plate design
- High Energy Ignitor
- Includes solid spark and flame rod
- Uses internal mix tip that minimizes carbon build-up potential
- Utilizes Alstom's micro-processor based DFI flame proving technology
- Easy retrofit with existing ignitor system hardware
- Available with ionic flame rod or optical flame scanner

THIS LIMELIGHT OIL BLUFF BODY PIPE IGNITOR HAS BEEN SPECIFICALLY DESIGNED TO INTEGRATE THE LATEST IN COMBUSTION TECHNOLOGY, FLEXIBILITY AND OVERALL RELIABILITY. | It is intended to provide customers with state-of-the-art technology, enabling increased flame stability and availability. It has been designed to meet all code requirements including the latest releases of the National Fire Protection Association (NFPA).



**RELIABLE IGNITION**

### BENEFITS:

- Consistently demonstrates over 95% reliability
- Improved combustion airflow
- Lower pressure drop
- Easy installation and maintenance

### APPLICATIONS:

- Utility, industrial, pulp and paper boilers
- All OEMs
- Tilting tangential or fixed burner environment

## LIMELIGHT Gas Eddy Plate Side Ignitor

THE LIMELIGHT HIGH PERFORMANCE GAS EDDY PLATE SIDE IGNITOR HAS BEEN SPECIFICALLY DESIGNED | to integrate the latest in combustion technology, flexibility and overall reliability. It is intended to provide customers with state-of-the-art technology, enabling increased availability for tangentially fired boilers.

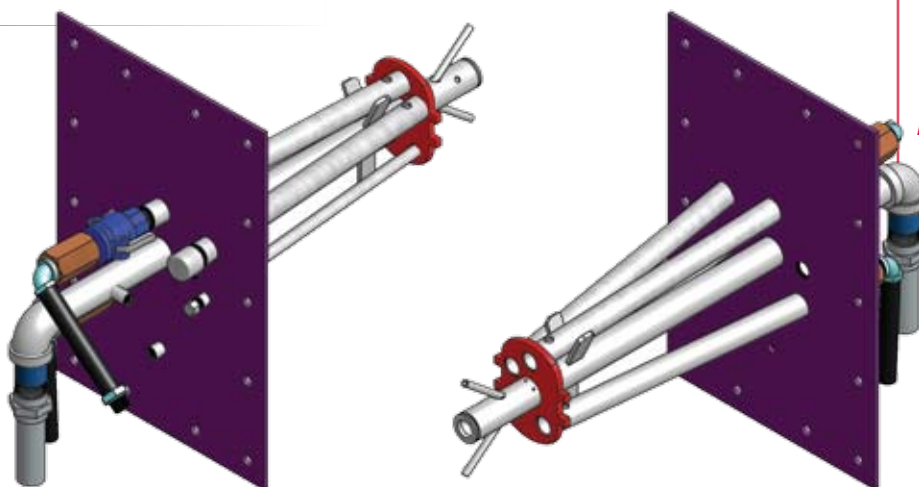
Alstom's unique design allows for either a complete upgrade reusing the existing ignitor windbox or an upgrade to selected components as needed. Individual components feature "plug and play" capabilities requiring minimal installation time.

The following LIMELIGHT Gas Eddy Plate Side Ignitor subassemblies can be purchased separately:

- Upgraded "Solid Rod" technology spark rod
- LIMELIGHT Diagnostic Flame Indicator (DFI) flame detection system
- Low emissions oil atomizers
- Digital test equipment
- Replacement ignitor face plate with optional view port

THE LIMELIGHT GAS EDDY PLATE SIDE IGNITOR AND ASSOCIATED FLAME PROVING DEVICE | have been designed to meet all code requirements, including the latest releases of the National Fire Protection Association (NFPA).

**DURABLE DESIGN**  
**RELIABLE IGNITION**



### FEATURES:

- Capacity options: 2-10 MMBTU/hr
- Easy retrofit with existing oil side ignitors, resulting in minimal gas conversion costs
- Easy removal of the ignitor internals from the faceplate assembly
- System offered as individual subassembly upgrades
- Available with line of sight scanner

### BENEFITS:

- Highly reliable start ups and operation
- Easy removal for maintenance
- Reliable flame detection utilizing the DFI technology along with Alstom's solid flame rod
- Reliable ignition spark during trial time periods for reduced spark plug maintenance

### APPLICATIONS:

- Tangential-fired boilers

# LIMELIGHT™ Ignitors

## LIMELIGHT Gas Bluff Body Side Ignitor

**THE BEST PERFORMING SIDE PILOT IGNITOR AVAILABLE.** | Bluff body design reduces airflow, pressure drop and improves ignition and flame stability. All electrical connections made at the rear of the ignitor.



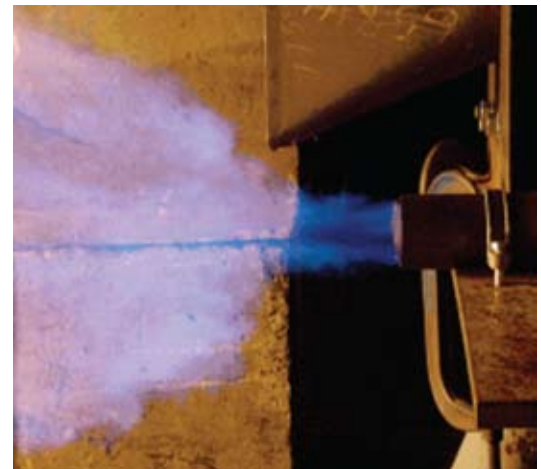
**RELIABLE IGNITION**  
**STABLE FLAME**

### FEATURES:

- Heat/input capacity 0.5 – 6.0 MMBtu/hr
- Clean and reliable operation
- Stainless steel construction
- New bluff body provides improved flame-stability
- Includes solid rod design flame and spark rod technology
- Utilizes Alstom's micro-processor based DFI flame proving technology
- Available with ionic flame rod or optical flame scanner

### BENEFITS:

- Lower pressure drop
- Greater turndown capability
- Reduced combustion airflow requirements



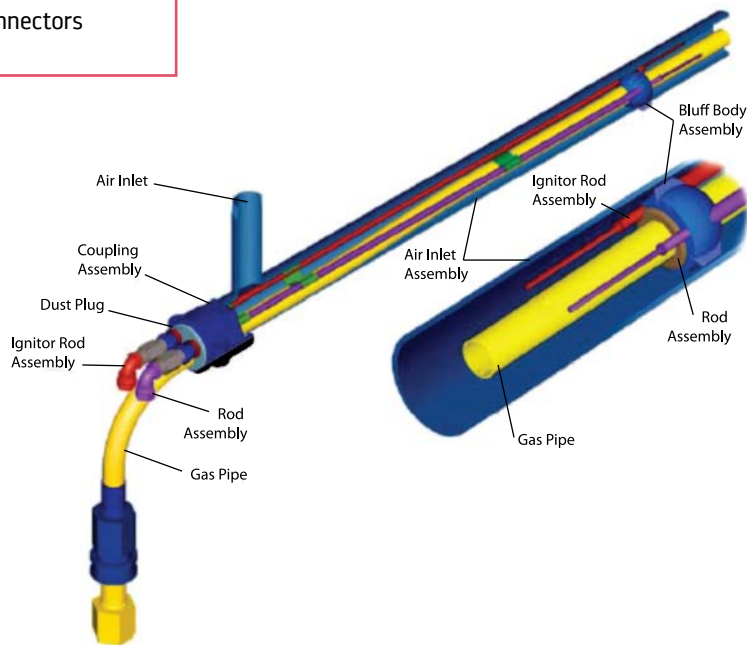


## LIMELIGHT Gas Bluff Body Pipe Ignitor

### FEATURES:

- Capacity from 0.5 – 20.0 MMBtu/hr
- Stainless steel construction
- Includes solid rod design flame and spark rod technology
- Variable heat input
- New bluff body design provides improved flame stability
- Utilizes Alstom's micro-processor based DFI flame proving technology
- Available with ionic flame rod or optical flame scanner
- Easy retrofit with existing 3" pipe ignitors
- High quality pin and socket electrical connectors

THE LIMELIGHT GAS BLUFF BODY PIPE IGNITOR IS AN UPGRADE | to conventional 3" eddy plate gas pipe ignitors and provides increased availability. This high heat output ignitor is useful in a wide range of applications. It offers a clean and efficient method for boiler warm-up and flame stabilization periods.



**STABLE FLAME  
WIDE RANGE**

### BENEFITS:

- Highly reliable start-ups and operation
- Reduced support fuel costs
- Integrates with the LIMELIGHT ignitor control cabinet
- Improved airflow and minimum pressure drop
- Minimum upgrade conversion costs

### APPLICATIONS:

- Wall-fired boilers
- Tangential-fired boilers

## HEI Solid Spark Upgrade

### FEATURES:

- Increase in ignition energy
- Double layer ceramic insulation
- Interchangeable with most 6-inch eddy plate side-fire ignitor rod assemblies
- Self-grounded from the spark point to the ignitor cabinet
- Solid conductor rod – eliminates plastic insulation in the high temperature zone
- Sturdy, positive plug-in connection to the electrode
- Stainless steel construction
- Solid semi-conductor spark tip for extended life

### BENEFITS:

- Improved safety
- Improved reliability
- Better ignition
- Larger diameter electrode increases service life
- Long-lasting components rated for service up to 2800°F
- Reduced maintenance and installation time
- Reduced failure due to heat
- Reduced electrical failures

### ALSTOM'S IGNITOR ROD FOR 6-INCH EDDY PLATE SIDE-FIRE IGNITORS AND PIPE IGNITORS PROVIDES FOR BETTER IGNITION AND HAS A HIGHER TEMPERATURE RATING FOR LONGER SERVICE LIFE. |

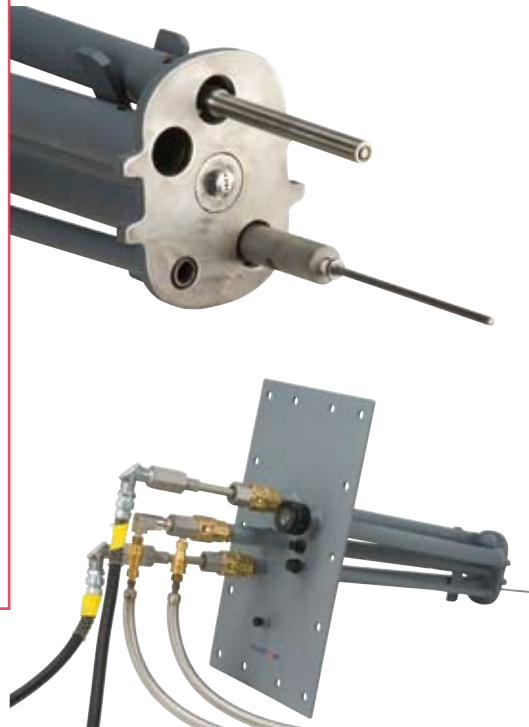
The SOLID SPARK™ Ignitor Rod provides a stronger, more robust spark and withstands higher temperatures than conventional designs.

The SOLID SPARK Ignitor Rod employs all stainless steel construction and a solid conductor rod that eliminates the use of low temperature wire and insulation in the high temperature zone. The result – a service rating of 2800°F, far above the previous temperature limit.

Maintenance time is reduced because the SOLID SPARK Ignitor Rod can be bench tested as received and placed into service in the boiler with little or no further assembly.

And because maintenance is accomplished at the burner face; removal of the entire ignitor assembly is no longer necessary. Its one-piece, field-replaceable electrode eliminates handling individual parts.

The SOLID SPARK Ignitor Rod brings together the benefits of quick installation, improved ignition, longer service life and easier maintenance – vast improvements to previous designs.



**QUICK INSTALLATION  
IMPROVED IGNITION  
LONGER LIFE  
EASY MAINTENANCE**

# Ignitor Systems and Auxiliary Equipment

## The LIMELIGHT Ignitor Control Cabinet

**THE LIMELIGHT IGNITOR CONTROL CABINET IS AN IGNITION SUPERVISION AND SAFETY SYSTEM** | designed for reliable and consistent operation. It can be used for oil, gas and dual fuel ignitors in utility, pulp and paper and industrial environments.

Flexible by design, the LIMELIGHT Ignitor Control Cabinet can be custom built or supplied in a standard configuration.

Alstom offers its control cabinet as a stand-alone product or packaged with an upgraded Alstom valve train. A control cabinet is available for virtually all valve trains, including:

- Tandem oil/air valve isolation for oil ignitors
- Double block vent and safety shut-off valve arrangement for gas ignitors
- Dual fuel — oil and gas

The LIMELIGHT Ignitor Control Cabinet is designed to provide self-diagnostics and troubleshooting capabilities. The design is suitable for interface with existing plant control systems.

The LIMELIGHT Ignitor Control Cabinet incorporates Alstom's proven and reliable Diagnostic Flame Indicator (DFI) technology along with reliable ignition systems. It meets utility, pulp and paper and industrial boiler requirements.

A window kit allows the alpha-numeric and light displays of the LIMELIGHT Diagnostic Flame Indicator (DFI) to be visible at a glance.

### **BENEFITS:**

- Reliable, consistent operations
- Reduces start-up periods
- Easy to troubleshoot
- Plug and play with host BMS

**Control cabinets are available as a self contained local control station or remote control from Burner Management System (BMS).**

### **FEATURES:**

- Standard design or SMART self contained local control station
- Standard NEMA 4 or 4X enclosure
- Simple connection to new or existing burner management system
- Window kit allows operator to see displays
- Additional operator controls (lights and push buttons) available
- Functionality can be hardwired relays or remote control from BMS
- Safely and reliably controls ignitor operation
- Meets NFPA and CSA codes
- Self diagnostics and troubleshooting
- Suitable for interface with existing burner management systems
- Incorporates latest design LIMELIGHT Diagnostic Flame Indicator

### **APPLICATIONS:**

- Oil ignitors
- Gas ignitors
- Dual fuel ignitors



# Ignitor Systems and Auxiliary Equipment

## LIMELIGHT Diagnostic Flame Indicator (DFI)

### FEATURES:

- 40 volts DC operating voltage
- State-of-the-art technology incorporating a simple and reliable flame proving design
- Upgraded replacement for IFM flame proving devices
- DSP chip retains history allowing diagnostics to be performed
- Designed for immunity to noise and grounding problems
- 16 character alpha-numeric backlit display for quick operational review
- Communications port for both PC and control systems
- Built-in diagnostics enable efficient economical equipment evaluation and maintenance of ignitor system

THE LIMELIGHT DIAGNOSTIC FLAME INDICATOR (DFI) IS A STATE-OF-THE-ART DIAGNOSTIC FLAME- PROVING DEVICE DESIGNED FOR RELIABLE AND CONSISTENT OPERATION.

### Technical Highlights

The LIMELIGHT DFI uses advanced digital signal processor (DSP) technology. The DSP chip offers industry-leading performance of 40 million instructions per second (MIPS).

The DFI100 communicates to your host computer or plant control systems through industry standard interfaces. Communication among LIMELIGHT DFI modules is accomplished using CANbus technology.

The LIMELIGHT DFI is delivered preprogrammed, ready for a simple installation. On-site tuning will allow you to customize the DFI for optimum performance. The DFI is designed for industrial service with a temperature rating of 70°C / 158°F and front-end electronics intended to provide greater immunity to noise and grounding problems.



DFI 100



DFI 110

### BENEFITS:

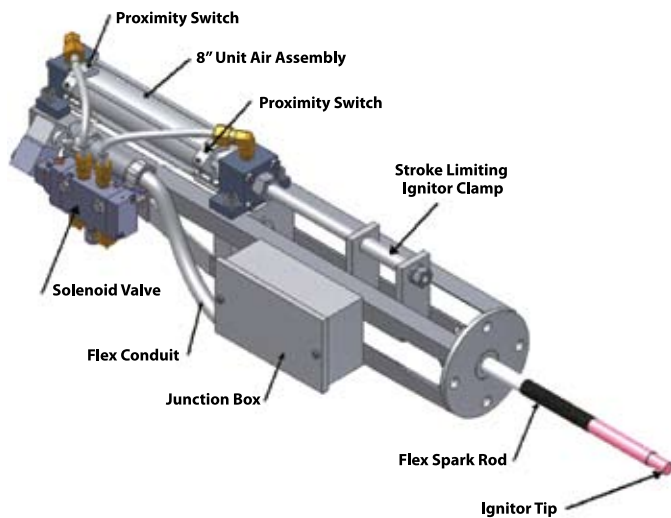
- Improved safety
- DFI 110 installation as easy as “remove the old card and plug in the new card”
- Easy installation
- Records ignitor operational history for efficient equipment evaluation and trouble shooting

**LOW VOLTAGE  
IMPROVES SAFETY**

# Ignitor Systems and Auxiliary Equipment

## LIMELIGHT Tilting High Energy Ignitor with Flexible Spark Rod

**FLEXIBLE DESIGN TO EXTEND THE SPARK ROD TIP TO THE PROPER IGNITION LOCATION FOR TILTING BURNER DESIGNS. AVAILABLE FOR NEW INSTALLATIONS OR AS A PERFORMANCE UPGRADE KIT FOR EXISTING INSTALLATIONS** | A stainless steel sheath surrounds a nickel braided flexible portion of the assembly. This braided section is engineered to match the flexible guide pipe arrangement in length to provide proper bucket tilt both upward and in the downward operation. The spark rod guide pipe is also provided with cooling and/or cleaning air holes.



*Illustration of the HEIR Mechanism and Flexible Spark Assembly*

### **BENEFITS:**

- More powerful spark improves light-off reliability
- Maintains performance over time
- Worldwide installation flexibility
- Minimal startup or set up time required for installation
- Solid semi-conductor construction extends tip life
- Easily replaced components
- Reduced maintenance/ increased availability

### **FEATURES:**

- 100% solid-state electronics eliminate spark gap fouling
- 12 Joules at 4 or 20 sparks per second for a powerful spark discharge for either light or heavy fuel oil
- Self-cleaning tip resists fouling from unburned fuel and combustion products
- Increased spark size and intensity for better ignition
- Output spark increases intensity as the ignitor tip wears
- An 85-265 VRMS input power range at 50-60 Hz
- Minimal startup or set up time required for installation

### **APPLICATIONS:**

- Tilting burner designs
- Direct ignition oil guns
- Oil ignitors



*High Energy Ignition*

## LIMELIGHT High Energy Ignitor with Retract (HEIR) for Recovery Boiler Applications

### FEATURES:

- 85-265 VRMS input power range at 50-60 Hz
- 100% solid-state electronics eliminate the spark gap used in the firing circuitry of other designs
- 12 Joules at 4 or 20 sparks per second for a powerful spark discharge for either light or heavy fuel oil
- Self-cleaning tip resists fouling from unburned fuel and combustion products
- Increased spark size and intensity for better ignition

HIGH ENERGY ARC TECHNOLOGY HAS PROVEN TO PROVIDE ONE OF THE MOST RELIABLE METHODS OF IGNITING FUEL OIL. THIS LIMELIGHT IGNITOR WITH ITS RETRACT DESIGN OFFERS STATE-OF-THE-ART PERFORMANCE. | The LIMELIGHT High Energy Ignitor with Retract (HEIR) is designed for reliable direct ignition of either light or heavy oil guns. It is a direct replacement for existing hardware and provides new technology for state-of-the-art performance.

The LIMELIGHT High Energy Ignitor with Retract consists of:

- Ignitor rod using SOLID SPARK Technology
- High energy power pack
- Wire harness assembly
- Retract cylinder assembly with insert/retract limit switches, solenoid valve for insertion of the HEIR

### Safety Features:

- RB retract mechanism has protective shroud over moving parts for environmental protection and personnel safety
- Hinged trap door to protect spark tip when not in service

### BENEFITS:

- More powerful spark improves light-off reliability
- Maintains performance over time
- Worldwide installation flexibility
- Minimal startup or set up time required for installation
- Ceramic insulators extend spark rod life
- Easily replaced components
- Reduced maintenance/increased availability

### APPLICATIONS:

- Utility boilers
- Recovery boilers
- Light or heavy oil guns
- Oil ignitors

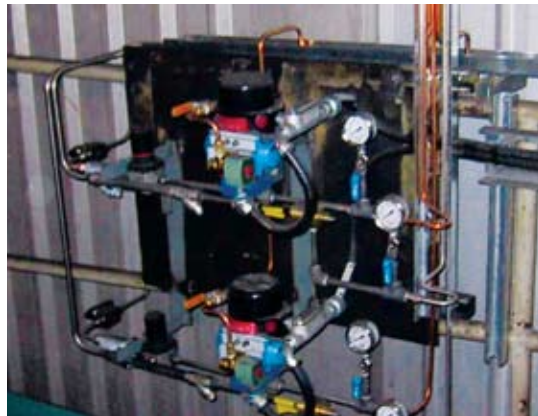
# Ignitor Systems and Auxiliary Equipment

## LIMELIGHT Ignitor Valve Train Assemblies

SAFETY SHUTOFF VALVES, USED IN BOTH OIL AND GAS IGNITOR VALVE TRAINS, ARE PROVIDED IN CONVENIENT PRE-ASSEMBLED PACKAGES AND ARE IDEAL FOR HANDLING OIL AND GAS FIRING EQUIPMENT. | Alstom provides fail-safe valves as they close with loss of electrical power (deenergize-to-trip) or instrument air. Energize-to-trip valves can be provided if preferred.



**Gas Valve Train**



**Oil Valve Train**

### FEATURES:

- Oil train includes air pressure regulator, oil flow controller and single actuator automatic trip valve for both oil and atomizing air
- Safety shutoff valve with "energize to trip" or "de-energize to trip" design
- Compatible with new or existing BMS equipment
- Valve, actuator, and limit switch enclosure designed as a unit
- Gas train includes double block and vent valve arrangement and globe valve for gas flow regulation
- Easy to service inline "Y" strainer for oil and gas
- Oil filters available as an alternate to "Y" strainer
- Mist separator available for wet air applications
- Designed for a wide range of heat input capacities
- Compatible with our LIMELIGHT ignitor control cabinet

### BENEFITS:

- In-kind replacement for old or obsolete equipment
- Easy maintenance
- Easy installation
- Code compliance

## LIMELIGHT Oil Flow Controllers

### FEATURES:

- Replaces INVALCO® flow controller
- Available as either an adjustable set point or fixed flow controller as required by the application
- Supports oil ignitors for either single or dual atomizer designs
- Larger flow path
- Fixed flow

### BENEFITS:

- Simple and reliable design
- Low cost solution
- Lower pressure drop
- Allows operation at low header pressure

ALSTOM'S IGNITOR OIL FLOW CONTROLLER IS DESIGNED TO ENSURE A CONSTANT FLOW RATE REGARDLESS OF VARIATIONS IN SUPPLY OR DISCHARGE PRESSURE TO MAINTAIN THE IGNITORS' RATED CAPACITY AND PERFORMANCE |

The unit ensures a constant flow rate regardless of variations in either the supply or discharge pressure by keeping a constant pressure drop across the metering device.

The LIMELIGHT Ignitor Oil Flow Controller has a low pressure drop of 10 psig as compared to 150-200 psig for similar controllers. This allows the ignitor oil system to operate at a lower header pressure.

*Adjustable Oil Ignitor Flow Controller*



*Non-adjustable Oil Ignitor Flow Controller*



**PRESSURE DROP  
OF ONLY 10 PSIG**



# Oil Ignition and Warm Up Guns

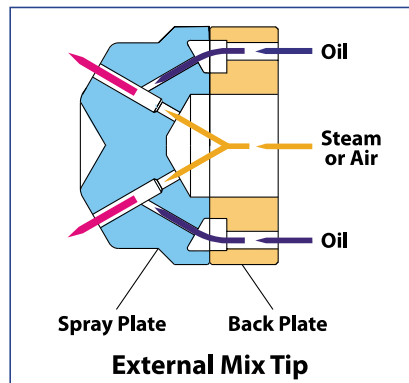
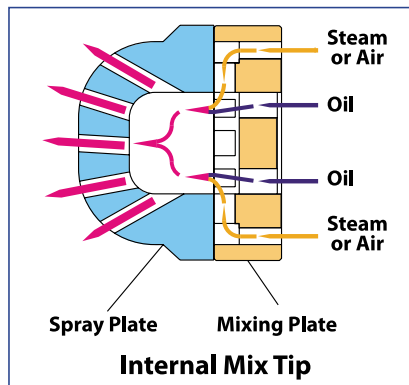
## EVER-KOOL Oil Gun and Spray Tips

**ALSTOM'S NON-RETRACTING EVER-KOOL OIL GUNS ELIMINATE RETRACT MECHANISMS AND THEIR ASSOCIATED HARDWARE AND MAINTENANCE** | The EVER-KOOL air-cooled design allows the oil guns to remain inserted in the firing position when not in use, without damage to any components. This high performance oil gun meets all current safety and code requirements and is an attractive alternative to traditional retractable systems.



**EVER-KOOL Oil Gun Flame**  
- 30 MMBtu/hr

**NO MOVING PARTS**  
**REDUCED MAINTENANCE**



### FEATURES:

- Incorporates Alstom's standard and proven parallel-pipe oil gun design
- Oil guns remain in firing position at all times

### BENEFITS:

- Ready for immediate service
- No moving parts – retract mechanism not required
- Reduced coking of any remaining oil after purging
- Reduced maintenance
- Improved light-off reliability
- Safer
- Reduced opacity

### Internal Mix Tip Benefit:

- High turndown

### External Mix Tip Benefit:

- Constant pressure atomization simplifies controls

### APPLICATIONS:

- Utility, industrial, pulp and paper boilers



# Flame Scanners

## LIMELIGHT Flame Scanner Products - Introduction

**FLAME SCANNERS CONFIRM THAT FUEL ENTERING THE FURNACE IS IGNITING AND FORMING THE BOILER FLAME ENVELOPE** | Unignited fuel entering the furnace could cause an explosion. As essential elements of a boiler's safety system, flame scanners must be both rugged and reliable, while providing consistent and accurate flame safety information.

**The LIMELIGHT Flame Spectrometer is an advanced flame detector with enhanced diagnostic capability.**

- Direct Mount Flame Scanner Assembly with adjustable sighting.
- Tilting Tangential Flame Scanner Assembly with fiber optic cable.

Alstom has provided reliable flame detection technology for decades. Our new LIMELIGHT Flame Spectrometer incorporates the speed and precision of digital signal processing as well as full detection of infrared, visible and UV light in seven bands, making it the most flexible flame scanner available. Simplicity of system design reduces capital, installation and maintenance costs.



**THE EXACTA FLAME SCANNER OFFERS A LOWER COST APPROACH** | and provides a convenient upgrade of older generation SafeFlame™ scanner equipment.



**INCREASED SAFETY**  
**REDUCED COST**

## LIMELIGHT Flame Spectrometer

### FEATURES:

- Available with or without fiber optic extension for T-fired or wall-fired applications
- Incorporates “next generation” flame scanner technology using the latest design for flame signature analysis
- Detects flame patterns across a wide range of the light wavelength spectrum (from infrared to visible to ultraviolet)
- Suitable for coal, oil or gas
- Flame spectrometer software is 100% programmable and password protected

### BENEFITS:

- Simple, efficient design provides superior flame detection, reduces nuisance trips, and enhances low load performance
- Easy and straight forward connection to the burner management system minimizes field wiring and installation costs
- Advanced flame diagnostics for flame discrimination and burner tuning
- Military style electric quick disconnects allow for quick and easy maintenance

### Design

**THE LIMELIGHT FLAME SPECTROMETER INCORPORATES ALL SIGNAL PROCESSING ELECTRONICS IN A COMPACT HOUSING.** | It contains the sensors that

convert light from the flame into electrical signals.

An integrated analog to digital converter coupled with a 40MIP Digital Signal Processor (DSP) converts the analog signals into digital signals. The DSP examines the intensity and frequency content of the flame in seven light bands to determine whether flame is present.

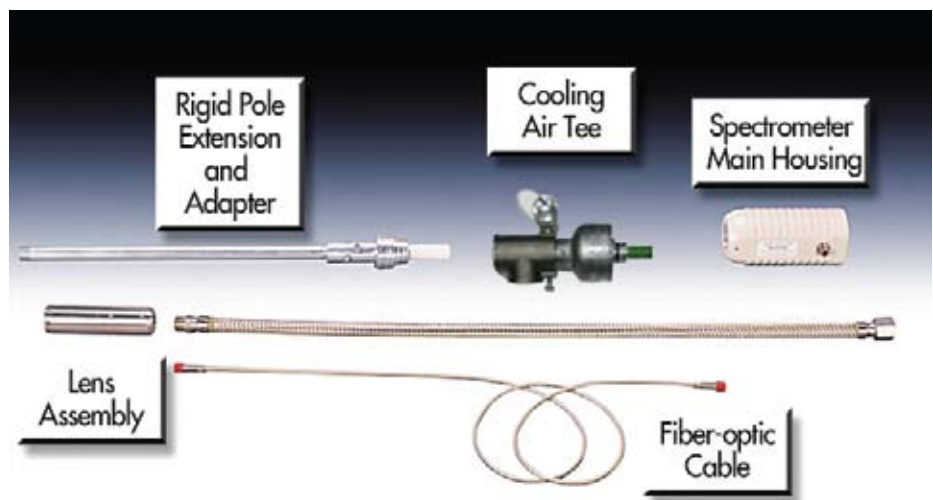
Flame scanners operate in extremely challenging environments. Alstom’s Flame Spectrometer Signal Processor is rated to operate at 165°F (75°C) with minimal cooling air requirements. A NEMA 4X enclosure provides a secure dust and water seal.

**INTERFACE TO THE BURNER MANAGEMENT SYSTEM (BMS) IS EXTREMELY**

**FLEXIBLE.** | Each LIMELIGHT Flame Spectrometer has two programmable function relay contacts that can be directly wired to the BMS. Alternatively, a remote interface module (IM) connected to the digital network can be located near the BMS input terminals. This eliminates long wire runs from each flame spectrometer.

Each flame spectrometer network can also be linked to the plant’s control system or PC for remote viewing of real time flame conditions, setpoint changes (password protected) and maintenance diagnostics.

All LIMELIGHT Flame Spectrometers provide 4-20 ma output, RS-232 and CANbus signals that can be used to monitor flame conditions.



# LIMELIGHT™ Flame Scanner Products

## Network Interface Module (IM100)

THE NETWORK INTERFACE MODULE IS DESIGNED TO FACILITATE THE INTERCONNECTION | between the flame spectrometer system and the customer's plant control system. Because the IM100 can be located anywhere in the plant, within 800 meters from the farthest flame spectrometer, field wiring, using the CANbus network can be minimized.

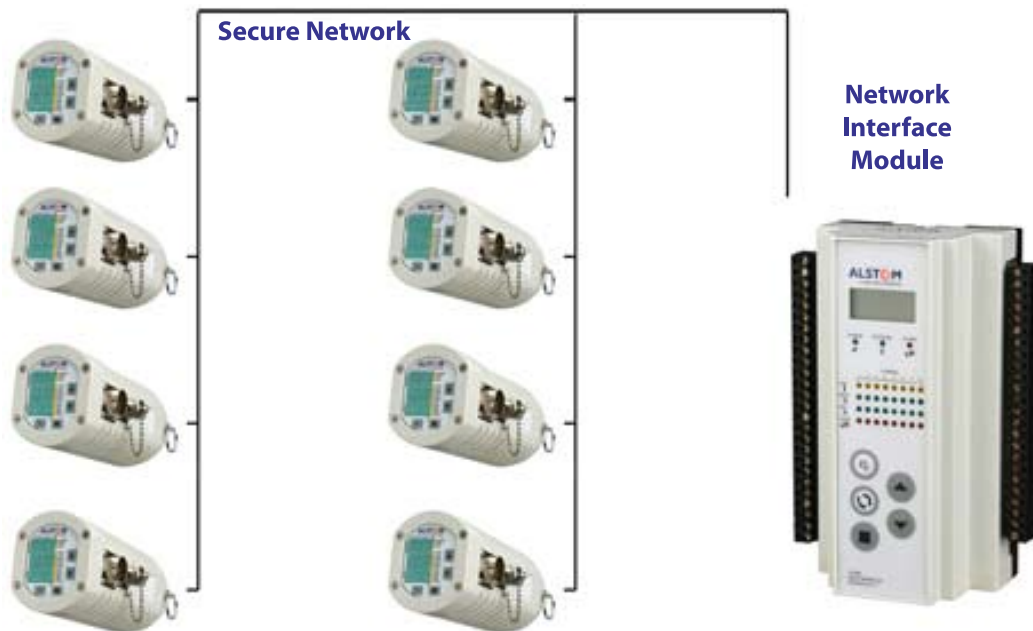
The CANbus network is a high-speed industrial network used to exchange information between the spectrometer heads and the IM100. Each IM can interface with 1 to 8 flame spectrometers. The IM provides a simple RS485 Modbus® protocol that can be used to remotely monitor flame spectrometer data from up to 32 IM100. The IM100 has 12 form-C relays, 4 form-C contacts for primary fuel flame, 4 form-C contacts for auxiliary fuel flame, and 4 programmable for either primary or auxiliary fuel flame. In addition to providing relay contacts, the IM100 offers several high-speed serial communication options for control system interface and operator displays.

### FEATURES:

- 85-230 VAC power
- 60° C Rating
- 2 CANbus Ports
- 2 RS485 Ports
- DIN rail mount
- Removable terminal blocks

### BENEFITS:

- Each IM communicates with up to 8 scanner heads
- Remote PC interface software allows users to access scanners with remote PC



# LIMELIGHT™ Flame Scanner Products

## PC Interface Software

### FEATURES:

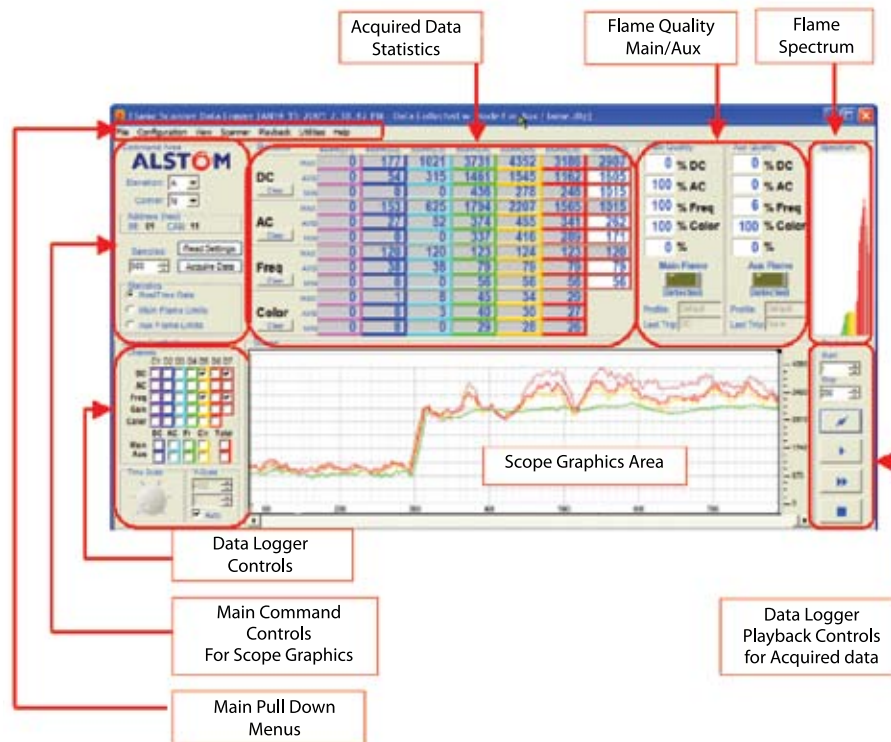
- Software installs automatically
- Compatible with Windows 2000 and XP operating systems
- Easy to configure
- Can be customized for each application

### BENEFITS:

- High resolution graphic displays
- Easy to use

ALSTOM PC INTERFACE SOFTWARE PROVIDES | intensity (DC), frequency (Freq) and color discrimination information for each detector. In addition to this, main flame quality, auxiliary flame quality, and overall flame spectrum information is displayed.

For ease of troubleshooting, all detector data can be selected for trending on the chart. With the addition of the Network Interface Module (IM100) each scanner can be connected to the IM100 and all data is available from one remote PC. That data can also be sent to the customer's DCS via Ethernet or Modbus® protocols. The data can also be saved on the PC, allowing other remote users to play back the trends and verify set point adjustments if required.



**PRECISE FLAME DATA  
USER SELECTS DISPLAY FORMAT**

# LIMELIGHT™ Flame Scanner Products

## LIMELIGHT Exacta Flame Scanner

**THE LIMELIGHT EXACTA FLAME SCANNER IS AN UPGRADED DESIGN FOR SEVERAL GENERATIONS OF OLDER SCANNERS.** | It can be provided as an in-kind component upgrade for SAFE SCAN™ and SAFE FLAME™ Scanners or as a new complete flame scanning system.

The primary purpose of a flame scanner is to confirm that fuel entering the furnace is still igniting and forming the burner flame envelope. If fuel enters the furnace without ignition, a most dangerous condition will occur that could cause a furnace explosion. Flame scanners must be both reliable and rugged while providing consistent, accurate information to help ensure safe operation.

Alstom has provided reliable flame detection technology for decades. The LIMELIGHT Exacta Flame Scanner continues that legacy while incorporating the latest in digital signal processing and communication capability. Depending on the fuel being fired, it can be provided with flame detection technology that employs any one of the following:

- UV – Ultraviolet
- VL – Visible Light
- BR – Broad Range, Infra Red and Visible Light

### **BENEFITS:**

#### **(Apply to all Exacta Flame Scanners)**

- Available as individual components for partial upgrade or as a complete new flame scanning system
- Superior flame detection, reduced nuisance trips and increased sensitivity for low load operation
- Reduced cost of installation - compatible with previously installed flame scanners, cable and guidepipes
- Rugged design for long service life and reliability

The LIMELIGHT Exacta Flame Scanner consists of a Flame Sensor Head (FSH) and Flame Signal Analyzer (FSA) and is available for both tangential-fired and wall-fired burner applications



### **FEATURES:**

#### **(Apply to all Exacta Flame Scanners)**

- Suitable for coal, oil, and gas firing
- Designed for use on tilting or fixed burners
- Can discriminate between different fuels in certain applications
- FSA display is user friendly and programmable with or without PC interface
- Two flame/no flame set points per channel for multi-fuel analysis from a single scanner
- Temperature rating is 85° C
- Four contact outputs and two analog outputs per channel
- Three serial outputs per module for remote use of scanner information
- Head and fiber optic cable quick disconnect allows easy inspection of the cable and reduces removal clearance in tight areas
- Retrofit kit available to replace existing scanner chassis

# LIMELIGHT™ Flame Scanner Products

## Flame Sensor Head (FSH)

THE INTERNALS OF THE FSH ARE DESIGNED TO BE COMPATIBLE WITH RECENT GENERATIONS OF INSTALLED FLAME SCANNERS AND USE THE SAME POWER AND SIGNAL INTERFACE. | This results in an easier, lower cost installation.

The scanner can be located in an area of high heat exposure because it is rated at 85° C ambient temperature. The sensor head is a NEMA 4X rated enclosure that is small enough to fit on most burners.

Each LIMELIGHT Exacta Flame Scanner Sensor Head has an indicating light on the rear panel to display flame signal strength that flashes more rapidly as the flame intensifies. This unique feature is very beneficial during the initial installation sighting alignment in wall-fired applications.

A fiber optic cable and cable spooling housing provide flexibility for a variety of configurations. The fiber optic design allows for tilting of the burners in tangential-fired applications and for sightings through a deep windbox in wall-fired applications. Mechanical adjustment of the fiber optic cable insertion depth is now available to assure proper lens positioning to allow for minor variations in length of an existing guide pipe assembly.



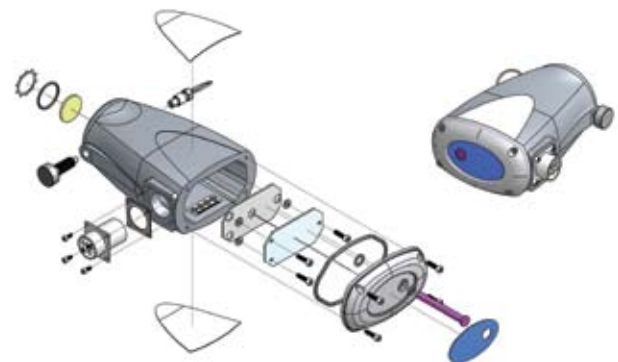
The FSH can be detached easily from the fiber optic cable for trouble shooting at the burner front. This feature also reduces the clearance required for removal in congested burner areas.

### FEATURES:

- Compatible with existing flame scanners
- Fiber optic design
- High temperature design
- Ribbed cast housing
- Detachable for easier troubleshooting



**EXACTA SHAFT & COVER ASSEMBLY**



**EXACTA SCANNER HOUSING ASSEMBLY**

**EASIER AND LOWER  
COST OF INSTALLATION**



# LIMELIGHT™ Flame Scanner Products

## Flame Signal Analyzer (FSA)

**THE SIGNAL FROM THE FSH IS PROCESSED BY THE FLAME SIGNAL ANALYZER** | The FSA is contained in a compact, din-rail mounted module that can be located near the burner or remotely near the Burner Management System (BMS). A convenient rack mount panel is available as an in-place upgrade for an existing 19" rack mount chassis.

This flexible arrangement allows for:

1. Re-use of existing field wiring when upgrading systems or
2. Optimizing electrical enclosures to minimize installation cost and provide easy accessibility for maintenance.

**THE FSA CONSISTS OF A MICROPROCESSOR, SIGNAL CONDITIONERS, AND MULTIPLE RELAY OUTPUTS** | to provide the flame analysis and flame safety contacts for the BMS. Digital and analog signal outputs, as well as serial communication and user interface, are included in this powerful module. Each FSA module monitors the flame signals from two flame scanners for frequency amplitude, frequency flicker, and DC intensity. The two-channel approach simplifies wiring and maintenance by reducing the total number of electronics locations.

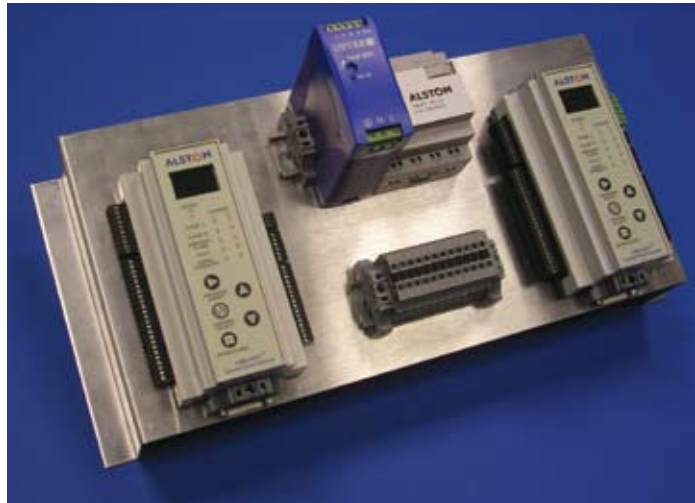
The two channels in a single FSA module can be used to:

- Monitor flames from multiple burners
- Monitor burner/ignitor flames independently
- Provide redundant flame signals

Individual set points are tuned specifically for each scanner location and stored for easy recall. Multiple set points can be programmed for each channel for various operating conditions.



*LIMELIGHT™ Exacta Flame Signal Analyzer*



*LIMELIGHT™ Exacta Rack Mount Kit Upgrade for Existing Scanner Chassis*

**MULTIPLE FLAME SETPOINTS  
RELAY CONTACTS AND  
SERIAL COMMUNICATION**

# LIMELIGHT™ Flame Scanner Products

## Oil or Gas Ignitor Flame Scanner

### FEATURES:

- Suitable for oil and gas firing
- Scanner mounts on existing guidepipe
- The FSA display is user friendly
- Local indicator for easy sighting
- Digital and analog output signals
- Three (3) serial outputs per module for remote use of scanner information
- Redundant power supplies available to increase reliability

THE LIMELIGHT EXACTA IGNITOR SCANNER IS AN OPTICAL FLAME-SENSING INSTRUMENT | that is an alternative design to ionic flame monitor (IFM) rod sensing devices. It can be provided as a replacement for the flame rod and IFM card or as part of a larger ignition system upgrade.

The primary purpose of the LIMELIGHT Exacta Ignitor Flame Scanner is to confirm that the ignition fuel is ignited. A flame safety signal is generated for use by the ignitor control system.

The LIMELIGHT Exacta Ignitor Scanner improves safety and reliability while incorporating the latest in digital signal processing and communication capability.

Depending on the ignition fuel being fired, different detector heads can be provided with either a UV (Ultraviolet) or VL (Visible Light) flame scanner.

The LIMELIGHT Exacta Ignitor Flame Scanner consists of a Flame Sensor Head (FSH) with mounting adapter and Flame Signal Analyzer (FSA). The FSA is mounted in the existing ignitor control cabinet when space is available or in an adjacent cabinet if necessary.

**COMMON SPARE PARTS  
INCREASE RELIABILITY**



*Ignitor Control Cabinet shown with Flame Signal Analyzer installed*

# LIMELIGHT™ Flame Scanner Products

## Visible Light and UV Flame Signals

### Flame Sensor Head (FSH)

RATED AT 185° F (85° C) AMBIENT TEMPERATURE THE SCANNER CAN BE LOCATED IN AN AREA OF HIGH HEAT EXPOSURE. | It is built on a solid design with the flexibility needed to satisfy the various conditions existing at plant sites.

The electric signal from the Flame Sensor Head is processed by the Flame Signal Analyzer. The FSA is a compact, DIN-rail mounted module that can be mounted either local to the ignitor or in a remote location.

### Flame Signal Analyzer (FSA)

THE FSA CONSISTS OF A MICROPROCESSOR, SIGNAL CONDITIONERS, AND MULTIPLE RELAY OUTPUTS | to provide the flame analysis and flame safety contacts for the ignitor control system. Digital and analog signal outputs, as well as serial communication and user interface, are included in this powerful module.

Each FSA module monitors the flame signals from up to two scanner heads for:

- flame frequency amplitude
- frequency flicker
- flame intensity

#### BENEFITS:

- ROHS (Reduction of Hazardous Substances) compliant
- Provides for a replacement of only those parts that are obsolete
- Monitors remotely through Modbus or Ethernet network
- Low installation cost
- Common spare parts for main flame and ignitor flame monitors

**HIGH TEMPERATURE DESIGN**  
**FLEXIBLE PROGRAMMING**



*Flame Sensor Head of the LIMELIGHT Exacta Ignitor Scanner shown with oil side ignition system*



# Pulverizer Instrumentation

## LIMELIGHT Pulverizer Airflow Measurement System

ALSTOM OFFERS A PROVEN SYSTEM THAT ALLOWS OPERATORS TO REDUCE AIRFLOW AS THE BOILER LOAD IS REDUCED. | It is built on a solid design with the flexibility needed to satisfy the various conditions existing at plant sites. Measuring and controlling the primary airflow from pressurized and suction pulverizers to the boiler is a proven way to reduce NOx emissions and improve unit efficiency.

- Improved boiler operation through better air/fuel control
- Improved NOx control by reducing primary airflow at less than maximum loads.
- Improved flame stability and coal fineness control

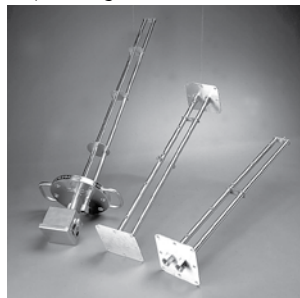
Conventional primary airflow monitoring solutions that utilize venturis, pressure drop across the pulverizer, fuel piping, and burners, or airflow that follows the exhaust fan curves do not meet today's control requirements.

Alstom offers a proven pulverizer airflow measurement system that allows plant operators to better match inlet airflows to the pulverizer load. Instead of operating with unthrottled air at low loads, the system allows operators to accurately reduce airflow as the boiler load is reduced.

The system provides accurate data without being compromised by adverse external factors.

While actual equipment varies by site, the system is based on the use of airflow monitoring probes (or stations) and transmitters. Damper operators (if required), delta-p transmitters and a thermocouple array and purge system for the hot airflow monitoring station are also included. A cold air duct extension, with integral bell-mouth inlet (if required) is added to the airflow monitoring station and louver control dampers.

The flow monitoring probes and transmitters feed airflow signals to either a controller (if required) or, to the plant's distributed control system (DCS). The accuracy of Alstom's pulverizer airflow measurement system allows the DCS to optimize performance.



**Pulverizer AF1**



**Pulverizer AF2**

### FEATURES:

- Grid of self-averaging, self-calibrating Pitot sensors for an instantaneous profile
- Transmitters that can discern variances as small as 0.0025 in. w.g.
- Multiple flow samples are averaged and read by the transmitters to eliminate noise
- Standard pneumatic purge system prevents pluggage

### BENEFITS:

- Improved boiler operation through better air/fuel control
- Improved NOx control by reducing primary airflow at less than maximum loads
- Improved flame stability and coal fineness control
- Reduced coal spillage and coal pipe pluggage
- Extended life of wear parts and burner tip

## LIMELIGHT Coal Flow Monitor

**Application:** Used to monitor flow exiting the feeder

THE LIMELIGHT COAL FLOW MONITOR IS A HIGH QUALITY, INDUSTRIAL GRADE INSTRUMENT | capable of providing a signal indicating flow/no-flow conditions of coal in gravity chutes and feeders downstream of the feeder. It is a direct replacement for Combustion Engineering and ABB coal flow detection devices found on Combustion Engineering and STOCK coal feeders.

The Alstom instrument is a non-contact detector. It has no moving parts or probes that can degrade or break-off in the coal flow.

The LIMELIGHT Coal Flow Monitor utilizes a low power microwave beam to sense motion within the chute or channel. The microwave technology is unaffected by heat, humidity, ambient noise or light, pressure, vacuum, high or low temperatures, or dust; thus providing maximum reliability.

### ADVANTAGES:

- Improves sensitivity and more reliable coal detection
- Senses small and large particles of varying densities
- Eliminates the sound rod
- Self-calibration eliminates tuning
- Mounting arrangement is identical to original Combustion Engineering and ABB coal flow monitor

### BENEFITS:

- Improves reliability
- Reduces maintenance costs
- Quicker start-ups
- Reduces installation time by 50%



**LIMELIGHT™ Coal Flow Monitor Sensor Head and electronics enclosure**

**RELIABLE SOLUTION TO COAL FLOW MONITORING FOR FEEDER OUTLET**

# The Alstom Advantage

## Service Capabilities

**100 YEARS OF EXPERIENCE + SOLUTION-BASED PRODUCTS & SERVICES + COMMITMENT TO CUSTOMER SERVICE = THE ALSTOM ADVANTAGE** | Alstom provides reliable delivery of products and services to meet the demands of the power industry. We are a dedicated customer service organization that delivers the responsiveness our customers require.

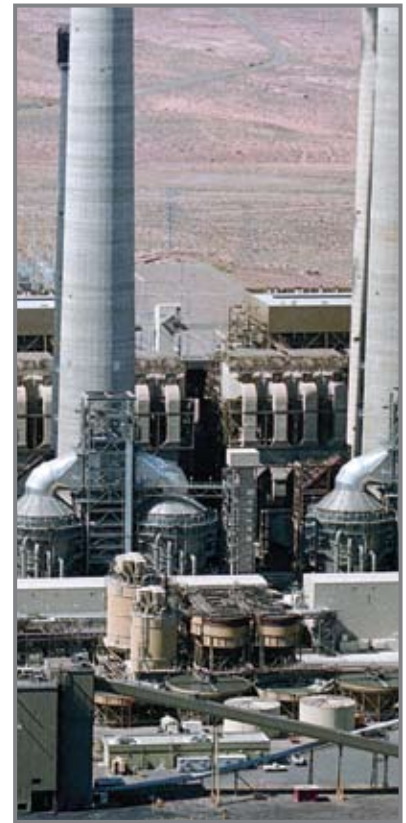
Alstom provides the quality and resources of an OEM while backing our products with comprehensive support. Our products are designed to help our customers meet the **performance, availability** and **reliability** requirements for their power plant equipment.

### MARKETS SERVED

Our experience and customer base include:

- Utility companies
- Regional electric cooperatives
- Federal, municipal power producers
- Independent power producers
- Pulp and paper companies
- Industrials such as chemical plants, steel mills and refineries

In other words, if you generate steam to produce power or to support your manufacturing processes, Alstom is ready to provide the products and services you need.



### EQUIPMENT SUPPORTED

In addition to servicing Alstom equipment, we also provide after market service for the following brands:

**COAL FEEDERS** | ABB, Combustion Engineering, Stock Equipment, Merrick Industries

**COAL PULVERIZERS** | ABB, Combustion Engineering, Babcock & Wilcox, Riley Atrita®, Foster Wheeler

**STEAM GENERATORS** | ABB, Combustion Engineering, Babcock & Wilcox, Riley, and Foster Wheeler

**STOKERS** | ABB, Combustion Engineering, Detroit Stoker, Riley, Westinghouse, Hoffman, Taylor

**FIRING SYSTEMS** | ABB, ICL, NEI, Clark Chapman, CSL, RV Industries, Foster Wheeler

**ASH HANDLING SYSTEMS** | ABB, Combustion Engineering, Allen-Sherman-Hoff, United Conveyor, Fläkt

**AIR POLLUTION CONTROL** | ABB, Combustion Engineering, Fläkt, Walther, Carborundum, Hamon-Research Cottrell, Wheelabrator, Peabody, Rockwell

# Technical Services

## Alstom's Technical Services capabilities cover major plant equipment and systems and include:

- Outage planning
- Inspection services
- Condition assessments
- Maintenance support
- Performance testing
- Training programs
- Dedicated engineers

## Alstom Technical Service includes:

- A team of over 100 field-based service engineers, NDE specialists, performance test engineers and technicians
- Problem solvers
- Equipment inspectors, testers, and evaluators
- Performance specialists



**WE ARE A GLOBAL PROVIDER OF PRODUCTS AND SERVICES TO THE POWER INDUSTRY.** | We maintain a local presence to help ensure that our customers' equipment and systems run reliably and efficiently with the availability they demand.

**FIELD TECHNICAL SERVICE ENGINEERS** | Alstom has extensive capabilities in the form of Field Technical Service Engineers to assist with your outage inspection and operation and maintenance needs.

Our field service engineers are located near our customers to provide the response they need. This full time force of professionally trained engineers and technicians receive constant training to help ensure they are knowledgeable in the latest trends and available technology.

**OUTAGE PLANNING** | Effective outages require effective planning, a continuous process that begins well in advance of the scheduled event. Alstom stands ready to participate in this process to help ensure timely decisions, problem avoidance, and achieved goals.

### The services Alstom provides include:

- Setting overall outage objectives
- Work scope determination
- Prioritization of outage tasks
- Identification of material and parts needs
- Expediting delivery of required material and parts

**INSPECTION SERVICE** | To help ensure an effective outage, we offer our inspection service that includes:

- Pre-outage logistics and work scope definition
- Pre-outage unit walk-downs
- Detailed inspections during the outage
- Daily punch lists and definition of items requiring immediate attention
- Coordination with repair labor personnel
- Initial report with critical findings and recommendations
- Final detailed inspection report complete with photos, recommendations and findings
- On-line retrieval (via our website) of our final report for convenient viewing and downloading



# Technical Services

**CONDITION ASSESSMENT** | Alstom delivers the technology to manage risks through the integration of Advanced NDE and inspection technology, including:

- Ultrasonic examination
- Linear phased array
- Dye penetrant testing
- Magnetic particle testing
- Remote field Eddy current
- Wet fluorescent particle testing
- Boroscope with internal video
- Remote field eddy current
- Visual examinations

as well as service capabilities through:

- Power Plant Laboratory facilities,
- Material Technology Center,
- Field service engineers

## **PERFORMANCE TESTING AND EVALUATIONS** |

The performance evaluation and testing team supports data gathering and analysis to help optimize plant performance. Offerings include:

- Specialized testing of thermal, fluid, and chemical processes (emissions and circulation)
- Boiler and power plant performance evaluation
- Water chemistry consultation for boilers
- Instrumentation supply and rentals of most commonly used boiler and emissions test equipment

**FLEXIBLE TRAINING FORMATS  
DESIGNED FOR YOU AND  
YOUR BUDGET**

**DEDICATED ENGINEER PROGRAM** | We provide an experienced Alstom Technical Services Engineer for exclusive use for a specific time period.

The Dedicated Engineer becomes an on-site member of the plant team spearheading the Alstom support. The result is responsive service in determining root causes to problems and timely development and implementation of solutions to help reach and exceed station goals.

**MAINTENANCE SUPPORT SERVICE** | To help ensure your equipment performs to your expectations, we offer our Maintenance Support Service whereby we:

- Determine equipment condition and need for repairs
- Compare components to original specifications and help make adjustments
- Participate in developing work scope and associated tasks
- Direct maintenance personnel in proper disassembly and assembly procedures
- Coordinate execution of the work scope
- Develop a daily punch list prioritizing work tasks
- Provide a final report documenting work performed and recommendations



**TRAINING PROGRAMS** | Alstom's training programs provide power plant professionals with the knowledge and skills they need to operate and maintain the equipment and systems. Alstom's portfolio includes:

- Standard and customized training
- HOT TOPIC training programs
- Computer-based QUICKSTUDY™ Learning System
- Regional training seminars



**WITH ALSTOM...  
YOU'RE IN CONTROL**

# Alstom Service and Distribution Centers

## ADVANTAGES:

- After hours response team
- Guaranteed parts availability
- Eliminates exposure to obsolete inventory
- Applicable to most plant equipment
- Programs can be expanded to include other plants within the customer's system
- One week standard shipment after receipt of order
- Minimizes exposure to raw materials price fluctuations

## BENEFITS:

- Reduces carrying costs
- Defers cash outlay
- Increases cash flow by delivering products when needed
- Simplifies purchasing

## INVENTORY MANAGEMENT PROGRAMS

With our proven inventory management expertise, purchasing strength and strategically located regional service centers, participation in an Alstom Inventory Management Program can offer customers significant benefits – from guaranteed shipments to improved cash flow.

## IMPROVES CASH FLOW AND GUARANTEES PARTS AVAILABILITY

ALSTOM'S SERVICE CENTER NETWORK, STRATEGICALLY LOCATED ACROSS THE COUNTRY, | provides emergency component repairs, parts, complete component overhauls, custom fabrications, and cost saving inventory management programs to meet our customers' needs.



ROCKY MOUNTAIN SERVICE CENTER – DENVER, COLORADO



MIDWEST SERVICE CENTER – ERLANGER, KENTUCKY

STRATEGICALLY LOCATED TO SERVE OUR CUSTOMERS



# Rebuild and Repair Services

**REBUILD/REPAIR SERVICES** | As a leading supplier of quality power plant equipment and replacement parts, Alstom offers one of the industry's most complete and cost-effective rebuild and repair services.

Alstom's rebuild/repair services include component inspections and maintenance, replacement of worn parts and design upgrades. These offerings, which include extended warranties, can reduce inventory costs by 25-35% and result in longer lasting products that save power producers money.

## R3 COMPONENT ROTATION PROGRAMS

Alstom offers customers a systematic method for rebuilding boiler related equipment and returning this equipment to service. Alstom's Regional Service Centers are the focus of this program combining our extensive experience, inventory, rebuild portfolio and proven processes to provide a unique service.

The R3 program is based on **R**ebuilding, **R**estocking and **R**eplacing components.

### **Rebuild**

Complete disassembly and inspection of a component. Worn out parts are replaced and components repaired. The components are rebuilt to strict procedures and tolerances. Upgrades to components can be included.

### **Restock**

Once a rebuild is completed, the component is placed in the customer's exclusive stock inventory at the Regional Service Center nearest the plant.

### **Replace**

Rebuilt components are returned to a customer when needed to replace a similar component requiring service. The replaced component is sent back to the Service Center

**R3 = REBUILD + RESTOCK + REPLACE**

**IMPROVING AVAILABILITY WHILE REDUCING COST**

### **ADVANTAGES:**

- All work is done in a controlled environment using the latest technology
- All work is done to engineering specifications
- R3 Component Rotation Programs are available to fit your outage schedule
- Extensive parts inventory to support rebuilds/repairs
- OEM inspection and assembly procedures are used
- Component upgrades available

### **BENEFITS:**

- Reduce Inventory costs 25-30%
- Shorter lead times
- All work backed by Alstom's engineering experience, quality and reliability

**SAVE  
50%**

**STRETCH**

**Your Maintenance Budget**

# Outage Kit Services

## ADVANTAGES:

- Custom or standard kits
- Reduces maintenance costs
- Convenient and organized
- Simplifies purchasing

## BENEFITS:

- Right parts available when you need them
- Only pay for the parts that are used
- Instant part availability
- Save time and money

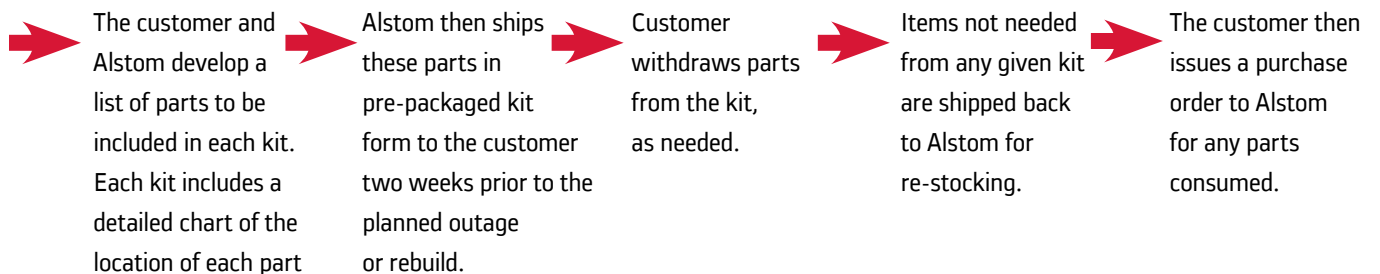
**OUTAGE KITS** | are pre-packaged supplies of equipment-specific replacement parts that support planned or unexpected unit outages and rebuilds. Emergencies cost money! Outage Kits can help minimize costly delays in making repairs.

Outage Kits are the perfect solution when emergencies strike, or to have available as part of a planned preventative maintenance cycle or Inventory Management Program.



**A COST-EFFECTIVE WAY TO MANAGE PLANNED AND UNPLANNED UNIT OUTAGE REPAIRS**

## HOW ALSTOM'S OUTAGE KIT PROGRAM WORKS:












# Your 1-Stop Choice for Boiler Services and Parts

**Call us Toll free: 1.866.257.8664**

**or**

**Direct: 1.860.285.2100**

## **Press:**

-  If you know your party's 4 digit extension
-  For Shipping and Delivery information
-  To speak with a Customer Service Representative
-  If you would like the company directory
-  If you would like this menu repeated

All other calls stay on the line

**E-mail:** [windsorparts@power.alstom.com](mailto:windsorparts@power.alstom.com)

**Fax:** 1.860.285.3101

*We provide 24 hour, 7 days a week emergency service.  
Our normal office hours are 8:00 am to 4:30 pm EST/EDT.*

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**ALSTOM**



