Watlow Capabilities
Extend from the Chamber to the Abatement System

Watlow Capabilities Includes:

- **Adaptive Thermal Systems (ATS)**
  - Reduces wiring
  - Differentiated closed loop control
  - Adapts to changing process conditions
  - Smaller footprint requirements
- **Design**
  - Finite element analysis (FEA) and computational fluid dynamics (CFD)
  - Rapid prototyping
  - Lean product development
- **Manufacturing**
  - Over 12,000 square feet of clean rooms from Class 10k to 100
  - Global manufacturing
  - Statistical process control
- **Verification and Validation**
  - infrared thermography
  - Acoustic microscopy
  - Interferometry
  - Vacuum and plasma test chambers

Watlow provides state-of-the-art thermal solutions to help our customers improve yields, throughput and cost of ownership.

Watlow Capabilities Optimize the Thermal Performance of Your Process Tools

Watlow Products and Technical Support Delivered Worldwide:

<table>
<thead>
<tr>
<th>Region</th>
<th>Technical Support &amp; Sales Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td></td>
</tr>
<tr>
<td>United States &amp; Canada</td>
<td>Phone: 1-800-WATLOW2 (1-800-928-5692)</td>
</tr>
<tr>
<td>Asia</td>
<td>Phone</td>
</tr>
<tr>
<td>Australia</td>
<td>+61 3 9335 6449</td>
</tr>
<tr>
<td>China</td>
<td>+86 21 3532 8532</td>
</tr>
<tr>
<td>India</td>
<td>+91 40 6661 2700</td>
</tr>
<tr>
<td>Japan</td>
<td>+81 3 3518 6630</td>
</tr>
<tr>
<td>Korea</td>
<td>+82 2 2169 2600</td>
</tr>
<tr>
<td>Singapore</td>
<td>+65 6773 9488</td>
</tr>
<tr>
<td>Taiwan</td>
<td>+886 7 288 5168</td>
</tr>
<tr>
<td>Europe</td>
<td>Phone</td>
</tr>
<tr>
<td>Austria</td>
<td>+43 6244 20129 0</td>
</tr>
<tr>
<td>France</td>
<td>+33 1 41 32 79 70</td>
</tr>
<tr>
<td>Germany</td>
<td>+49 7253 9400 0</td>
</tr>
<tr>
<td>Italy</td>
<td>+39 02 4588841</td>
</tr>
<tr>
<td>Spain</td>
<td>+34 91 675 1292</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>+44 115 964 0777</td>
</tr>
<tr>
<td>Latin America</td>
<td>Phone</td>
</tr>
<tr>
<td>Mexico</td>
<td>+52 442 256 2200</td>
</tr>
<tr>
<td>South America</td>
<td>+55 11 3054-0555</td>
</tr>
<tr>
<td>Central America</td>
<td>+506 8320-4712</td>
</tr>
<tr>
<td>Brazil</td>
<td>+55 11 3054-0555</td>
</tr>
<tr>
<td>Argentina</td>
<td>+54 11 5514-3333</td>
</tr>
<tr>
<td>Chile</td>
<td>+56 2 2060-0300</td>
</tr>
<tr>
<td>Colombia</td>
<td>+57 1 306-2277</td>
</tr>
<tr>
<td>Ecuador</td>
<td>+593 2 663-1100</td>
</tr>
<tr>
<td>Peru</td>
<td>+51 1 222-4500</td>
</tr>
<tr>
<td>Uruguay</td>
<td>+598 1 658-9555</td>
</tr>
<tr>
<td>Colombia</td>
<td>+57 1 306-2277</td>
</tr>
<tr>
<td>Ecuador</td>
<td>+593 2 663-1100</td>
</tr>
<tr>
<td>Peru</td>
<td>+51 1 222-4500</td>
</tr>
<tr>
<td>Uruguay</td>
<td>+598 1 658-9555</td>
</tr>
<tr>
<td>Latin America</td>
<td>Phone</td>
</tr>
<tr>
<td>Brazil</td>
<td>+55 11 3054-0555</td>
</tr>
<tr>
<td>Argentina</td>
<td>+54 11 5514-3333</td>
</tr>
<tr>
<td>Chile</td>
<td>+56 2 2060-0300</td>
</tr>
<tr>
<td>Colombia</td>
<td>+57 1 306-2277</td>
</tr>
<tr>
<td>Ecuador</td>
<td>+593 2 663-1100</td>
</tr>
<tr>
<td>Peru</td>
<td>+51 1 222-4500</td>
</tr>
<tr>
<td>Uruguay</td>
<td>+598 1 658-9555</td>
</tr>
<tr>
<td>Global</td>
<td>Phone</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>+61 3 9335 6449</td>
</tr>
<tr>
<td>Americas</td>
<td>+1 636 285 4888</td>
</tr>
<tr>
<td>Europe</td>
<td>+33 1 41 32 79 70</td>
</tr>
<tr>
<td>Latin America</td>
<td>+55 11 3054-0555</td>
</tr>
<tr>
<td>North America</td>
<td>+1 800 WATLOW2 (1-800-928-5692)</td>
</tr>
<tr>
<td>Mideast</td>
<td>+971 4 818 5577</td>
</tr>
<tr>
<td>South Asia</td>
<td>+91 11 4178 4887</td>
</tr>
<tr>
<td>South Africa</td>
<td>+27 11 709 0888</td>
</tr>
<tr>
<td>South Korea</td>
<td>+82 2 2169 2600</td>
</tr>
<tr>
<td>Thailand</td>
<td>+66 2 246 3999</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>+44 115 964 0777</td>
</tr>
</tbody>
</table>

For more information, contact Watlow at:

Phone: 1-800-WATLOW2 (1-800-928-5692)
Email: inquiry@watlow.com
Website: www.watlow.com
Leading Semiconductor Industry Innovators
Utilize Watlow’s Thermal Solutions to Enable Next Generation Technologies

Watlow’s Thermal System Solutions
Provide Equipment Manufacturers a Competitive Advantage

We Offer:
- Adaptive Thermal Systems (ATS)
- Engineering collaboration at your pace
- Deep domain knowledge
- High performance solutions
- Global support

Applications Supported Include:
- Deposition
- Etch
- Lithography
- Wet clean
- Metrology
Watlow’s Thermal System Solutions
Provide Equipment Manufacturers a Competitive Advantage

Extend from the Chamber to the Abatement System

Watlow Capabilities

Watlow Products and Technical Support Delivered Worldwide

North American Technical Support & Sales Offices
United States & Canada
1-800-WATLOW2 (1-800-928-5692)
E-mail: inquiry@watlow.com
Website: www.watlow.com

European Technical Support & Sales Offices

Find out more about Watlow and how we can provide thermal solutions for your company!
Phone: 1-800-WATLOW2 (1-800-928-5692)
E-mail: inquiry@watlow.com
Website: www.watlow.com

Extend from the Chamber to the Abatement System

Watlow Capabilities

For Wafer Processing

SEMICONDUCTOR
Watlow Capabilities
Extend from the Chamber to the Abatement System

Watlow provides state-of-the-art thermal solutions to help our customers improve yields, throughput and cost of ownership.

Watlow Capabilities Include:

Adaptive Thermal Systems (ATS)
• Reduces wiring
• Differentiated closed loop control
• Adapts to changing process conditions
• Smaller footprint requirements

Manufacturing
• Over 12,000 square feet of clean rooms from Class 10K to 100
• Global manufacturing
• Statistical process control

Design
• Finite element analysis (FEA) and computational fluid dynamics (CFD)
• Rapid prototyping
• Lean product development

Verifications and validation
• Infrared thermography
• Acoustic microscopy
• Interferometry
• Vacuum and plasma test chambers

Adaptive Thermal Systems (ATS)

Watlow Capabilities Optimize the Thermal Performance of Your Process Tools

Watlow Capabilities Optimize the Thermal Performance of Your Process Tools

Adaptive Thermal Systems (ATS)

Watlow Capabilities Include:

Adaptive Thermal Systems (ATS)
• Reduces wiring
• Differentiated closed loop control
• Adapts to changing process conditions
• Smaller footprint requirements

Manufacturing
• Over 12,000 square feet of clean rooms from Class 10K to 100
• Global manufacturing
• Statistical process control

Design
• Finite element analysis (FEA) and computational fluid dynamics (CFD)
• Rapid prototyping
• Lean product development

Verifications and validation
• Infrared thermography
• Acoustic microscopy
• Interferometry
• Vacuum and plasma test chambers

Adaptive Thermal Systems (ATS)
Watlow provides state-of-the-art thermal solutions to help our customers improve yields, throughput and cost of ownership.

Watlow Capabilities Include:

Adaptive Thermal Systems (ATS)
- Reduces wiring
- Differentiates closed loop control
- Adapts to changing process conditions
- Smaller footprint requirements

Design
- Finite element analysis (FEA) and computational fluid dynamics (CFD)
- Rapid prototyping
- Lean product development

Verification and validation
- Infrared thermography
- Acoustic microscopy
- Interferometry
- Vacuum and plasma test chambers

Manufacturing
- Over 12,000 square feet of clean rooms from Class 10k to 100
- Global manufacturing
- Statistical process control

Watlow Capabilities Optimize the Thermal Performance of Your Process Tools

Adaptive Thermal Systems (ATS)
- Reduces wiring
- Differentiates closed loop control
- Adapts to changing process conditions
- Smaller footprint requirements

Design
- Finite element analysis (FEA) and computational fluid dynamics (CFD)
- Rapid prototyping
- Lean product development

Verification and validation
- Infrared thermography
- Acoustic microscopy
- Interferometry
- Vacuum and plasma test chambers

Manufacturing
- Over 12,000 square feet of clean rooms from Class 10k to 100
- Global manufacturing
- Statistical process control

Find out more about Watlow and how we can provide thermal solutions for your company:
Phone: 1-800-WATLOW2 (1-800-928-5692)
Email: inquiry@watlow.com
Website: www.watlow.com
Watlow Provides Precise and Flexible Solutions for Wafer Processing Tools

Watlow’s layered heaters provide the precision and flexibility needed to ensure the highest level of thermal performance in wafer processing applications. These planar heating circuits can be manufactured using various technologies including thermal spray, thick film and thin film deposition, wet etching and laser ablation. They are designed with distributed power circuitry and can accommodate multiple zones and multiple layers. Watlow has a wide range of integration capabilities that are compatible with various metal and ceramic substrates depending on the application needs.

Watlow provides precision elastomeric bonding and assembly integration capabilities for critical components in wafer processing tools. Specialized tooling and innovative bond methods enable superior control over dimensional characteristics and material properties. Watlow also applies elastomeric material expertise to custom molding solutions, both for assembly integration and as stand-alone coatings, seals and gaskets.

Layered heaters:
> Accommodate multiple zones and multiple layers
> Enable customized resistance patterns designed with FEA/CFD
> Provide high power densities (typ. 50 – 150 W/in²)
> Offer low profile (microns to 0.5 mm)

Precision bonded assemblies:
> Ensure flexibility with multiple substrate materials
> Enable elastomer temperatures to 250°C
> Provide custom thermal and mechanical properties (thermal conductivity 0.1 to 3.0 W/m-K)

<table>
<thead>
<tr>
<th>Substrate Material</th>
<th>Maximum Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austenitic stainless steel</td>
<td>250°C</td>
</tr>
<tr>
<td>Ferritic stainless steel</td>
<td>450°C</td>
</tr>
<tr>
<td>Titanium / molybdenum</td>
<td>500°C</td>
</tr>
<tr>
<td>Aluminum</td>
<td>250°C</td>
</tr>
<tr>
<td>Aluminum oxide</td>
<td>500°C</td>
</tr>
<tr>
<td>Aluminum nitride</td>
<td>600°C</td>
</tr>
<tr>
<td>Quartz / sapphire</td>
<td>350°C</td>
</tr>
</tbody>
</table>

Powered by Possibility

Find the thermal solution for your application, contact Watlow today.

Contact us at www.watlow.com
Watlow’s EZ-ZONE® RM Fiber Optic Temperature Measurement System

A Complete Temperature Measurement and Control System for Plasma Chambers

Temperature sensors that transmit electrical signals (such as thermocouples and RTDs) are often compromised when exposed to the electromagnetic environments found in plasma chambers where the RF noise couples onto the sensor and distorts the signal.

How Fluorescent Temperature Sensing Works

Fluorescence is the slow release of energy, in the form of light, by a material following its exposure to shorter, higher energy wavelengths. Fluorescent temperature sensing is based on the principle that the rate of energy released is dependent on the temperature of the fluorescing material. This time-dependent behavior, when properly measured, calibrated and controlled, can be used to accurately and repeatably measure temperature.

Fiber optic temperature sensing, using the principles of fluorescence, enables operation in plasma environments providing stability, repeatability and cost effectiveness.

The Watlow® system surpasses conventional offerings by integrating fluorescent fiber optic sensing with Watlow’s proven EZ-ZONE® temperature control product family, thereby providing tighter temperature control and faster response times in RF environments.

Ideal applications include:

- Chamber lids
- Chamber baffles
- Electrostatic chucks
- Edge rings
- Showerheads
The Fluorescent Temperature System

By combining advances in fluorescent sensing with the power of proven EZ-ZONE multi-loop controllers, the Watlow system is unsurpassed in offering temperature measurement and control in a flexible configuration ideal for integration into the latest semiconductor processing tools. Two versions make the system adaptable to all system requirements.

The EZ-ZONE RMZ is specifically targeted at the most advanced implementations of measurement and control by integrating fiber optics, PID temperature control and EtherCAT® communications in a single package. It features multi-channel control, hosting up to four channels of fiber optic inputs as well as supporting up to 44 additional control loops from other EZ-ZONE RM modules. These modules support a wide array of capabilities including I/O, logic, current measurement, power switching and more.

The EZ-ZONE RMF module is a dedicated fiber optic input module integrating the advanced control technology of the EZ-ZONE system with one to eight channels of fiber optic temperature sensing.

The EZ-ZONE RMF can also serve as additional inputs to the EZ-ZONE RMZ enabling extensive expansion opportunities for future system needs. All EZ-ZONE RM modules are self-identifying making expansion and integration easy. The EZ-ZONE RMF is ideal either as an expansion module or configured with built-in temperature control loops. The EZ-ZONE RMF can be used independently when only sensing is required.

Benefits of Watlow’s high performance fluorescence based temperature measurement system include:

- Compact integrated fiber optic sensing with temperature control
- Easily expands to increase number of zones as your system needs increase
- Integrates seamlessly with the temperature control system avoiding additional analog signal processing
- Faster temperature sampling rates with high resolution
- Minimizes installed footprint due to the small form factor and DIN-rail mounting
- Highly accurate fluorescent signal processing electronics
- Offers highly reliable LED light source, designed to run at low currents for maximum life
- Up to 48 loops of input and control with all EZ-ZONE RM temperature control features
  a. Temperature/limit loops
  b. Power switching
  c. Current measurement
  d. Logic

Probes

Integration of the probe (sensing head) is a critical element of the total sensing system and must be designed to ensure consistent contact of the fluorescent material with the target surface throughout the temperature range. Probes are typically custom configured with the construction determined by many factors including application environment, temperature regime, size constraints and material compatibilities.

Specifications

<table>
<thead>
<tr>
<th></th>
<th>EZ-ZONE RMZ</th>
<th>EZ-ZONE RMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Inputs</td>
<td>1 to 4</td>
<td>1 to 8</td>
</tr>
<tr>
<td>Communication</td>
<td>EtherCAT®, Standard Bus, EtherNet/IP™, DeviceNet™, PROFIBUS DP, Modbus® TCP, Modbus® RTU</td>
<td></td>
</tr>
<tr>
<td>Short Term Stability</td>
<td>3σ ±0.03°C</td>
<td></td>
</tr>
<tr>
<td>Operating Ambient Temperature</td>
<td>-18°C to 65°C</td>
<td></td>
</tr>
<tr>
<td>Unit to Unit Accuracy (electronics)</td>
<td>±0.05°C</td>
<td></td>
</tr>
<tr>
<td>Module Dimensions (mm)</td>
<td>51.6 (H) x 44.5 (W) x 148 (D)</td>
<td></td>
</tr>
<tr>
<td>Measurement Ranges**</td>
<td>-70°C to 300°C</td>
<td></td>
</tr>
<tr>
<td>Probe Materials (typical)</td>
<td>Polyimide/PEEK/Polyamide-imide</td>
<td></td>
</tr>
<tr>
<td>System Accuracy (calibrated)</td>
<td>±0.05°C</td>
<td></td>
</tr>
<tr>
<td>System Accuracy (uncalibrated)</td>
<td>±0.5°C</td>
<td></td>
</tr>
<tr>
<td>Maximum Drift</td>
<td>0.5°C/yr</td>
<td></td>
</tr>
<tr>
<td>Analog Output*</td>
<td>0-10V, 0-20mA</td>
<td></td>
</tr>
</tbody>
</table>

* Outputs via EZ-ZONE RME module
** Consult engineering center for measurement ranges outside of these values

Contact us at www.watlow.com
Achieve Maximum Performance with Intelligently Designed Thermal Systems

Features and Benefits

> Moisture and chemical-resistant materials
  - Provides longer heater life
  - Ensures clean room compatibility

> Flexible heater designs
  - Allows thermal profile to be customized to meet specific needs
  - Reduces system costs

> Maximize thermal coverage
  - Eliminates cold spots
  - Provides uniform heating

> Integrated control systems
  - Provides multiple zones of control
  - Eliminates the need for over-temperature protection

> Agency approvals: UL®, SEMI-S2 and CE
  - Meets necessary safety and industry regulations

Watlow’s Thermal Solutions Provide Reliability and Temperature Uniformity in Complex Applications

UL® is a registered trademark of Underwriter's Laboratories.
Watlow’s Gas Delivery/Exhaust Heating Solutions

The solution to achieving the optimum performance on the lines in semiconductor processing equipment is through an intelligently designed heating system.

Watlow® has the knowledge, experience and expertise to partner with you during the design phase of the process tool. Working in parallel, Watlow can customize the right solution for the lines during the tool design phase by recommending the correct heaters, sensors and control system to achieve optimal performance.

Watlow’s vast product offering ensures the right product for your process.

Process Gas and Exhaust Line Heating

Molded Foam
- Exact part fit
- Easy to install
- Refined appearance

Silicone Rubber
- Designed to specific part geometry
- Rugged, yet thin, lightweight and flexible
- Uniform heating

ASSURANT® Series TA
- Cost-effective, silicone-coated fiberglass construction
- Energy efficient design

ASSURANT Series TC
- PTFE coated fiberglass
- Cost effective solution for higher operating temperatures

ASSURANT Series TF
- PTFE cloth
- Improved temperature uniformity for higher operating temperatures

FLUENT® In-Line Heater
- Small, lightweight yet robust
- High watt density, ultra-fast response

Foam-In-Place Heaters
Pump Line and Gas Line Heaters
ASSURANT TA
ASSURANT TC
ASSURANT TF Gas Line Heaters
FLUENT® In-Line Heater
Powerful Gas Line Controller Features
Built-In Diagnostics and Multiple Input and Output Capabilities for Maximum Flexibility and Control

The EZ-ZONE® RMG is Watlow’s new controller for gas delivery applications. The rail-mounted controller is versatile in regards to mounting within the gas chamber and provides distributed control up 12 amps from four outputs (up to three amps per output).

The new EZ-ZONE RMG features Watlow’s Adaptive Thermal System (ATS) technology, which provides detection of mis-wired heaters by offering a “ping” feature test system allowing users to obtain immediate feedback from soft power prior to turning on the main power. A small amount of power is applied and the system is tested against the input data from the free software tool. If any data does not match, including ground fault detection, a fault condition occurs signaling the built in global relay to shut down the system. This feedback prevents catastrophic conditions associated with overheated or cold spots within the gas line system.

The EZ-ZONE RMG also offers a combination of thermocouple inputs (up to 18 per printed circuit board assembly) and field effect transistor outputs (four three-amp outputs). The module can be ordered in multiple arrangements; with inputs and outputs, inputs only or outputs only. This ability to mix and match inputs and outputs allows for maximum system flexibility.

Multiple EZ-ZONE RMG modules can be used together to make up multiple loops of control. Alternating switching technology is built in to provide for maximum ambient conditions whereby all four outputs are not full-on at the same time. The EZ-ZONE RMG can also be used in conjunction with any other EZ-ZONE RM series controller. For example, additional thermocouple inputs from the gas line module can be mapped to outputs within the EZ-ZONE RME module.

Features include

- Adaptive Thermal System (ATS) capabilities
- Built-in diagnostics
- Multiple inputs and outputs
- Free software
- Plug and play; adapts directly with EZ-ZONE RMZ EtherCAT® module

Find the thermal solution for your application, contact Watlow today.

Contact us at www.watlow.com
Watlow’s ATS™ Technology Optimizes Thermal System Performance to Meet Your Precise Application Needs

Watlow’s Adaptive Thermal Systems (ATS™) are a suite of technologies that combine sensing, heating and controlling in innovative ways to improve the thermal performance of a customer’s application. ATS technology integrates foundational technology platforms including power conversion, multi-loop control and sensing, integrated TCH junction temperature control and high TCR materials based temperature control to optimize performance that is specific to the problem being solved.

Historically, engineers have compensated for system variation with inadequate information. With ATS technology users now have the ability to listen and respond to the materials to enhance and simplify performance. ATS enables engineers to close the open loop and see what is going on in the system in real time. For example, locations where temperature sensing was previously impractical can now be measured utilizing heater circuits as additional sensors. Also, increasingly complex wire routings are simplified by using innovative multiplexing methods to integrate additional zones of control. Furthermore, heaters that have been design constrained due to geometry or electrical resistance can now be driven with an appropriately scaled down voltage level.

Watlow’s ATS technology is being integrated into all the thermal systems on the tool including chucks, pedestals, gas lines and chamber components.
ATS Technology Platforms

Watlow’s ATS technology platforms deliver breakthrough performance in wafer processing applications by equipping systems to:

- Protect ceramics from breakage
- Lower sensor and integration costs
- Provide real-time feedback
- Enable closed loop control for better performance
- Reduce complexity with fewer wires
- Ensure immunity to power quality issues

Power Conversion

Regulate power up and down rather than on and off

Integrated TCH Junction

Temperature Control

Converts heater power leads into a thermocouple junction

High TCR Materials

Based Temperature Control

Measure change in resistance to convert every heater into a sensor

Multi-Loop Control and Sensing

Increase heater zones while reducing wires

Chromel® is a registered trademark of Hoskins Manufacturing Company

Find the thermal solution for your application, contact Watlow today.

Contact us at www.watlow.com
Watlow’s Adaptive Thermal Systems (ATS™) are a suite of cutting-edge technologies for semiconductor heating applications. ATS technology is unparalleled in the industry, providing performance that is more efficient and precise for our customers.

The ATS enabled line heating system is Watlow’s latest innovation for semiconductor gas delivery and exhaust applications. While current competing systems require complicated assemblies and struggle to provide thermal uniformity, ATS technology simplifies the entire process and responds to process conditions, enabling it to deliver better temperature control and thermal uniformity.

Watlow’s new ATS enabled line heating system intelligently combines heaters and electronics to simplify design and installation while enhancing tool performance.

**Without ATS Technology**
- Extensive and confusing wiring system
- Large zones of control with one sensing point
- Difficult troubleshooting with generic alarms

**With ATS Technology**
- Fewer wires / less complexity
- Better uniformity with closed loop control on every heater
- Advanced fault detection for over temp, low temp, and mis-wiring on every heater
Watlow’s New EZ-ZONE® RMT Controller Offers Closed Loop Control for Each Heater Preventing System Issues

A critical part of Watlow’s new line heating control system with ATS technology is the new EZ-ZONE® RMT controller. While other line heating systems require a maze of wires and controllers, the ATS enabled line heating system streamlines the solution by offering closed loop control for each heater, managed entirely by one RMT controller. The efficiency helps prevent system issues our customers would otherwise experience. The need to integrate fewer controls makes installation quicker and easier by cutting the required heater connections in half. It also reduces costs and provides a more spatially efficient system.

Features and Benefits:

• Removes complications and nuisance components by migrating functions from the heater to the controller
  - Creates a clean, aesthetic loop with just two wires

• Incorporates an improved fault detection system
  - Provides connectivity to all zones to locate and fix system issues as quickly as possible

• Intelligent design
  - Allows for better diagnostics, reliability and product life expectancy
  - Lowers total cost of ownership

• Reduces the number of design iterations needed
  - Provides a complete thermal system with significantly reduced lead times

ATS Power Conversion:

• Gain total control of power quality
• Lower voltage drives low impedance heaters
• Power is always on rather than duty cycling on and off
• Line cycle synchronization

ATS Integrated TCH Junction Temperature Control:

• Measure temperature without a separate sensor
• Thermocouple integrated into heater