Applications

Aerospace:
• Combustion/flow simulation

Packaging:
• High-speed, poly-coated paperboard sealing
• High-speed, heat-shrink installations
• Forming
• Curing adhesives
• Sterilizing bottles or cartons

Automotive:
• Hot air bonding of body panels
• Curing adhesives
• Vacuum forming
• Simulation of engine exhaust
• Fuel cell testing

Plastics/Rubber:
• Salt removal from rubber extrusions
• Bending and forming of plastics
• De-flashing of molded parts

Textiles:
• Welding plastic or vinyl fabrics
• Heat-treating specialty fabrics

Semiconductor and Electronics:
• Air knife in wave solder machines
• Soldering/desoldering PC boards, lead frames, capacitors
• Wafer and PC board drying
• Heat-shrinking wire insulation
• Preheating process gases

Sterilization:
• Pharmaceuticals
• Medical/surgical hardware
• Packaging materials

Paper/Printing:
• Speed drying coated paper
• Adhesive activation
• Ink drying

WARNING: OSRAM SYLVANIA Air/Inert Gas Heaters should be used to heat air or an inert gas only. Use with explosive gases or in an explosive ambient can result in an explosive event, possibly leading to a serious accident or injury.
SYLVANIA Air Heaters

With air temperatures controllable to 1652°F (900°C), SYLVANIA Air Heaters are your solution for many critical applications. If our “standard” heaters below do not meet your needs, contact us. Since 1968, SYLVANIA has developed hundreds of unique and custom products for the most demanding applications. Let us know what we can do for you.

<table>
<thead>
<tr>
<th>Product</th>
<th>Series I, II, III</th>
<th>Hot Air Tool</th>
<th>Serpentine II, VI</th>
<th>Threaded Inline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>Basic heater with quartz insulator tube. Ideal for “spot” heating applications.</td>
<td>Compact size. Built-in Type K thermocouple allows for precise ±1 degree control.</td>
<td>Triple-pass exchanger housing improves efficiency and safety.</td>
<td>Serpentine element in high-pressure pipe for critical processes.</td>
</tr>
<tr>
<td><strong>kW</strong></td>
<td>0.6 - 2.4, 1 phase</td>
<td>1.5 - 3.5, 1 phase</td>
<td>2.0 - 8.0, 1 phase</td>
<td>1.6 - 18.0, 1/3 phase</td>
</tr>
<tr>
<td><strong>Max. Air Temperature °F (°C)</strong></td>
<td>1600 (871)</td>
<td>1400 (760)</td>
<td>1500 (815)</td>
<td>1400 (760)</td>
</tr>
<tr>
<td><strong>Max. Air Pressure psi (bar)</strong></td>
<td>7 (0.5)</td>
<td>60 (4)</td>
<td>25 (1.7)</td>
<td>150 (10)</td>
</tr>
<tr>
<td><strong>Use with Blower?</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Page</strong></td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>
SUREHEAT® JET
All-purpose single-phase heater with two built-in Type K thermocouples for precise control and overtemp protection.

SUREHEAT® MAX
All-purpose three-phase heater with two built-in Type K thermocouples for precise control and overtemp protection.

SUREHEAT® MAX HT
High temperature heater to 900ºC with a built-in Type K thermocouple for precise control and overtemp protection.

SKORPION™
The complete heater, blower and control unit that is ready to plug in and use. Includes built-in overtemp protection.

Flanged Inline
ANSI flange-mount heater for extremely high pressure and high flow applications. Significantly smaller, lighter weight and faster response than tubular designs.

<table>
<thead>
<tr>
<th></th>
<th>SUREHEAT® JET</th>
<th>SUREHEAT® MAX</th>
<th>SUREHEAT® MAX HT</th>
<th>SKORPION™</th>
<th>Flanged Inline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 phase</td>
<td>3.0 – 8.0</td>
<td>6.0 – 36.0</td>
<td>30.0 – 36.0</td>
<td>1.5 – 4.5</td>
<td>18.0 – 400.0</td>
</tr>
<tr>
<td>1/3 phase</td>
<td>6.0 – 36.0</td>
<td>6.0 – 36.0</td>
<td>30.0 – 36.0</td>
<td>1.5 – 4.5</td>
<td>18.0 – 400.0</td>
</tr>
<tr>
<td>3 phase</td>
<td>30.0 – 36.0</td>
<td>30.0 – 36.0</td>
<td>30.0 – 36.0</td>
<td>1.5 – 4.5</td>
<td>18.0 – 400.0</td>
</tr>
<tr>
<td>1 phase</td>
<td>1.5 – 4.5</td>
<td>1.5 – 4.5</td>
<td>1.5 – 4.5</td>
<td>1.5 – 4.5</td>
<td>18.0 – 400.0</td>
</tr>
<tr>
<td>3 phase</td>
<td>1.5 – 4.5</td>
<td>1.5 – 4.5</td>
<td>1.5 – 4.5</td>
<td>1.5 – 4.5</td>
<td>18.0 – 400.0</td>
</tr>
<tr>
<td>1400 (760)</td>
<td>1400 (760)</td>
<td>1652 (900)</td>
<td>1400 (760)</td>
<td>1400 (760)</td>
<td>1500 (815)</td>
</tr>
<tr>
<td>150 (4)</td>
<td>60 (4)</td>
<td>60 (4)</td>
<td>60 (4)</td>
<td>1 (0.07)</td>
<td>150 (10)*</td>
</tr>
<tr>
<td>150 (10)*</td>
<td>60 (4)</td>
<td>60 (4)</td>
<td>60 (4)</td>
<td>1 (0.07)</td>
<td>150 (10)*</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>16</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

*higher pressure models available
About Air Heaters

Selecting an Air Heater

The energy (kW) requirement is calculated from the following formula:

\[ kW = \frac{SCFM \times (T_{exit} - T_{inlet})}{2500} \]

- SCFM = Air flow in Standard Cubic Feet per Minute
- Tinlet = Inlet Air Temperature (°F) (typically 70°F)
- Text = Desired Exit Air Temperature (°F)
- 2500 = Unit conversion factor which includes 20% heat losses

Example:

Heating 10 SCFM from ambient temperature (70°F) to 80°F:

\[ kW = \frac{10 \times (80°F - 70°F)}{2500} = 0.4 \text{ kW} \]

Conversion Formulas:

\[
\text{SCFM} = \frac{\text{CFM}}{28.3} = \text{Cubic Feet per Minute} \\
°C = \frac{5}{9} (°F - 32) \\
°F = \frac{9}{5} (°C) + 32
\]

*Please refer below for an explanation of Standard flow rate.

Air Sources

If used properly, heater life of 5000 hours or greater can be expected. To ensure long heater life and safe operation, follow these guidelines. Also read and understand your heater operating manual before use. Failure to follow these guidelines can result in heater damage, failure or personal injury.

Air Sources

In general, compressed air and air from regenerative blowers may be used to supply OSRAM SYLVANIA air heaters. Your air source should be clean and dry. Dirt, grease, oil, or oil vapors, or corrosive or reactive gases will damage an air heater. Also, use air or inert gas only. Do not use with volatile or combustible gases.

Regenerative Blowers

Regenerative blowers are compact and inexpensive clean air sources. They can provide large amounts of low-pressure air for your air heating system. Blower size is based on the maximum amount of airflow (CFM or LPM) it can produce without any inlet or exit restrictions. When a heater or other restriction is attached to a blower, the maximum flow decreases. If the blower is severely restricted, the blower motor can overheat and fail.

When designing your heating system, you should try to minimize air restrictions and select a blower sufficient to overcome the backpressure generated by the heater, flare and associated piping. Because of their small size, the Series, Hot Air Tool, and Serpentine II heaters should not be used with regenerative blowers.

Compressed Air

Compressed air is commonly available in most factories. It is high-pressure regulated air (typically to 100 psi), and often contains oil for lubricating pneumatic valves and equipment. You must filter this oil to prevent fouling and damage to the electric air heater elements.

When measuring compressed air flow rates, be sure you are measuring Standard CFM or Standard LPM units. The “Standard” means that the units are measured at standard temperature and pressure. Many flow meters are labeled SCFM, but this is incorrect at the higher pressures produced by compressed air. For accurate flow measurements, you must consult your flow meter manual for converting CFM to “Standard” CFM. In the diagram below, the flow meter reading (CFM) is converted to SCFM using a Dwyer ball-type flow meter conversion.
Controls

A good control system is critical for long heater life. Before turning your control system on, you must have sufficient airflow through the heater before applying power. (Applies to heaters without SUREHEAT® over-temperature protection.) Only qualified individuals should install OSRAM SYLVANIA heaters and controls. Follow all applicable electrical codes and use proper wiring.

Open-Loop (Manual) Control

This simple method of control uses a manually operated power controller to apply a fixed voltage to the heating element. Using this system, the operator manually adjusts the controller to change heater temperature. Note that if the airflow is suddenly interrupted, the element could fail. The open-loop controller is generally used with heaters from OSRAM SYLVANIA.

Closed-Loop (Feedback) Control

A closed-loop heater control system uses a power controller, temperature controller and thermocouple to provide a constant output temperature, regardless of changes in airflow. The temperature controller also provides a convenient display of your process air temperature.

Power Controller

Phase angle fired SCR (Silicon Controlled Rectifier) power controls will provide the smoothest power regulation for OSRAM SYLVANIA air heaters.

Other power controls may be suitable, such as distributive zero cross SSR (Solid State Relays) or other fast-switching SSR’s, but you should contact OSRAM SYLVANIA for approval before use.

Temperature Controller

Use only digital temperature controls with Type K thermocouple inputs. The temperature control output must match the input of the power control (i.e., 4-20mA or 0-10VDC).

A standard PID-type control with a wide proportional band setting will work best to minimize temperature overshoot. PID parameters may be auto-tuned, but only at temperatures well below the maximum of the heater. If the temperature rises too high during auto-tune, turn power off immediately.

When using a Solid State Relay power control, the temperature controller cycle time should be set for 100ms or less.

Thermocouple

Use only a fine-wire (.030" max. wire diameter), exposed junction, Type K thermocouple placed within 1" of the heater exit for accurate temperature readings. Other thermocouple styles, or varying the distance from the heater exit, will result in temperature measurement errors and/or heater failure.
Series I, II, III Heaters

Specifications

- Air temperature controllable to 1600°F (871°C)
- Quartz outer tube housing
- Nozzled (Style B) or open-ended (Style A) design
- High-temperature silicone rubber rear adapter/terminal assembly
- Maximum air pressure 7 psi (0.5 bar)
- Maximum inlet temperature 120°F (49°C)
- Recommended minimum airflow 1 SCFM (60 SCFH)
- RoHS compliant

Performance
### Installation

![Diagram showing installation of Style A and B tubes.]

### Products

#### Series I

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tube Style</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Tube Length &quot;A&quot;</th>
<th>Tube O.D. &quot;B&quot;</th>
<th>Nozzle I.D. (Style B) &quot;C&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>010226</td>
<td>A</td>
<td>1050W</td>
<td>180</td>
<td>6.88&quot; (175mm)</td>
<td>.41&quot; (10mm)</td>
<td>—</td>
</tr>
<tr>
<td>014372</td>
<td>A</td>
<td>1000W</td>
<td>130</td>
<td>7.75&quot; (197mm)</td>
<td>.41&quot; (10mm)</td>
<td>—</td>
</tr>
<tr>
<td>014682</td>
<td>B</td>
<td>680W</td>
<td>145</td>
<td>7.88&quot; (200mm)</td>
<td>.41&quot; (10mm)</td>
<td>.07&quot; (2mm)</td>
</tr>
<tr>
<td>014683</td>
<td>B</td>
<td>650W</td>
<td>105</td>
<td>8.75&quot; (222mm)</td>
<td>.41&quot; (10mm)</td>
<td>.07&quot; (2mm)</td>
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#### Series II

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tube Style</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Tube Length &quot;A&quot;</th>
<th>Tube O.D. &quot;B&quot;</th>
<th>Nozzle I.D. (Style B) &quot;C&quot;</th>
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<tbody>
<tr>
<td>016501</td>
<td>A</td>
<td>1125W</td>
<td>130</td>
<td>3.88&quot; (98mm)</td>
<td>.41&quot; (10mm)</td>
<td>—</td>
</tr>
<tr>
<td>016503</td>
<td>A</td>
<td>850W</td>
<td>80</td>
<td>3.88&quot; (98mm)</td>
<td>.41&quot; (10mm)</td>
<td>—</td>
</tr>
<tr>
<td>016502</td>
<td>B</td>
<td>600W</td>
<td>95</td>
<td>4.88&quot; (124mm)</td>
<td>.41&quot; (10mm)</td>
<td>.07&quot; (2mm)</td>
</tr>
<tr>
<td>016504</td>
<td>B</td>
<td>650W</td>
<td>70</td>
<td>4.88&quot; (124mm)</td>
<td>.41&quot; (10mm)</td>
<td>.07&quot; (2mm)</td>
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</table>

#### Series III

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tube Style</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Tube Length &quot;A&quot;</th>
<th>Tube O.D. &quot;B&quot;</th>
<th>Nozzle I.D. (Style B) &quot;C&quot;</th>
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<tbody>
<tr>
<td>017558</td>
<td>A</td>
<td>2050W</td>
<td>160</td>
<td>6.88&quot; (175mm)</td>
<td>.59&quot; (15mm)</td>
<td>—</td>
</tr>
<tr>
<td>017575</td>
<td>B</td>
<td>1450W</td>
<td>135</td>
<td>7.88&quot; (200mm)</td>
<td>.59&quot; (15mm)</td>
<td>12&quot; (3mm)</td>
</tr>
</tbody>
</table>

### Accessories

#### Part Number | Description |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>057081</td>
<td>Open-loop (manual) power control 120-277V 25A</td>
</tr>
</tbody>
</table>

#### Stainless Steel Outer Shields - Open Ended

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>015509</td>
<td>For Series I heater</td>
<td>014372</td>
</tr>
<tr>
<td>057083</td>
<td>For Series I heater</td>
<td>010226</td>
</tr>
<tr>
<td>017853</td>
<td>For Series II heater</td>
<td>016501, 016503</td>
</tr>
</tbody>
</table>
Hot Air Tools

Specifications

- Air temperature controllable to 1400°F (760°C)
- Built-in Type K thermocouple
- 1/4" hose barb air connection
- Maximum inlet temperature 120°F (49°C)
- Maximum air pressure 60 psi (4 bar)
- Slotted exit for flare attachment
- 304 stainless steel body
- 3' (914mm) power and thermocouple leads
- RoHS compliant

Performance

![Hot Air Tools](image)

![Graph: Hot Air Tools Temperature vs Air Flow](image)

www.sylvaniaheaters.com
Installation

- .81" (20.6mm) Dia.
- 8.88" (225.6mm) Hose Barb
- .74" (18.8mm) ID
- .62" (15.8mm)
- .88" (22.4mm) Dia.
- Electrical & TC Leads

Products

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Max. Amps</th>
<th>Min. Flow SCFH (SLPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>068462</td>
<td>1500W</td>
<td>120</td>
<td>13</td>
<td>30 (14)</td>
</tr>
<tr>
<td>068463</td>
<td>2000W</td>
<td>240</td>
<td>9</td>
<td>70 (33)</td>
</tr>
<tr>
<td>068464</td>
<td>3500W</td>
<td>240</td>
<td>15</td>
<td>90 (43)</td>
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</table>

Accessories

<table>
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<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>068472</td>
<td>Flare (includes clamp) .06&quot; x 2.5&quot; (1.52mm x 63.5mm) opening</td>
</tr>
<tr>
<td>057081</td>
<td>Open-loop (manual) power control 120-277V 25A</td>
</tr>
<tr>
<td>066823</td>
<td>Closed-loop power control, 30A, 240V, 4-20mA (used with 070429)</td>
</tr>
<tr>
<td>070429</td>
<td>Digital temperature control, 1/16 DIN (used with 066823), 4-20mA</td>
</tr>
</tbody>
</table>

- .06 x 2.5 Opening (1.52mm x 63.5mm) FLARE
Serpentine II, VI
Triple Pass Heaters

Performance

Specifications

- Air temperature controllable to 1500°F (815°C)
- Serpentine II to 3.6kW
- Serpentine VI to 8.0kW
- Triple Pass Heat Exchanger uses incoming air to cool outer shell
- Maximum air pressure 25 psi (1.7 bar)
- Replaceable element assemblies
- Recommended minimum airflow 60 SCFH
- RoHS compliant
### Elements

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Max. Amps</th>
<th>Overall Length “A”</th>
<th>Tube O.D. “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serpentine II Elements</strong> used with housing 029763</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>029765</td>
<td>2.0kW</td>
<td>240</td>
<td>8</td>
<td>8.20” (208mm)</td>
<td>0.63” (16mm)</td>
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<tr>
<td>029766</td>
<td>2.8kW</td>
<td>240</td>
<td>12</td>
<td>8.20” (208mm)</td>
<td>0.63” (16mm)</td>
</tr>
<tr>
<td>029767</td>
<td>3.6kW</td>
<td>240</td>
<td>15</td>
<td>8.20” (208mm)</td>
<td>0.63” (16mm)</td>
</tr>
<tr>
<td>060418</td>
<td>3.6kW (Two-stage)</td>
<td>240</td>
<td>15</td>
<td>8.63” (219mm)</td>
<td>0.63” (16mm)</td>
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<tr>
<td><strong>Serpentine VI Elements</strong> used with housing 057088</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>040291</td>
<td>5.0kW</td>
<td>240</td>
<td>21</td>
<td>10.88” (276mm)</td>
<td>1.25” (32mm)</td>
</tr>
<tr>
<td>040292</td>
<td>6.0kW</td>
<td>240</td>
<td>25</td>
<td>10.88” (276mm)</td>
<td>1.25” (32mm)</td>
</tr>
<tr>
<td>061429</td>
<td>6.0kW (Two-stage)</td>
<td>240</td>
<td>25</td>
<td>10.88” (276mm)</td>
<td>1.25” (32mm)</td>
</tr>
<tr>
<td>056548</td>
<td>8.0kW</td>
<td>240</td>
<td>33</td>
<td>10.88” (276mm)</td>
<td>1.25” (32mm)</td>
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</table>

### Housing Assemblies

<table>
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<tr>
<th>Part Number</th>
<th>Serpentine Type</th>
<th>“A”</th>
<th>“B”</th>
<th>“C”</th>
<th>“D”</th>
<th>“E”</th>
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</thead>
<tbody>
<tr>
<td>029763</td>
<td>II</td>
<td>1.6” (40mm)</td>
<td>9.0” (229mm)</td>
<td>10.0” (254mm)</td>
<td>0.7” (18mm)</td>
<td>3/8” NPT</td>
</tr>
<tr>
<td>057088</td>
<td>VI</td>
<td>2.1” (54mm)</td>
<td>11.9” (302mm)</td>
<td>12.9” (327mm)</td>
<td>1.4” (35mm)</td>
<td>3/4” NPT</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>039739</td>
<td>Serpentine II base adaptor assembly</td>
</tr>
<tr>
<td>042339</td>
<td>Serpentine VI base adaptor assembly</td>
</tr>
<tr>
<td>029485</td>
<td>Serpentine II TC holder (includes TC)</td>
</tr>
<tr>
<td>040299</td>
<td>Serpentine VI TC holder (includes TC)</td>
</tr>
<tr>
<td>039272</td>
<td>Type K thermocouple probe, 3/16” (4.8mm) O.D.</td>
</tr>
<tr>
<td>066823</td>
<td>Closed-loop power control, 240V, 30A, 4–20mA</td>
</tr>
<tr>
<td>057081</td>
<td>Open-loop (manual) power control 120-277V 25A</td>
</tr>
<tr>
<td>070429</td>
<td>Digital temperature controller, 1/16 DIN, 4–20mA</td>
</tr>
</tbody>
</table>
Threaded Inline Heaters

Specifications

- Air temperature controllable to 1400°F (760°C)
- For applications requiring high pressure air
- Both ends threaded 3/8", 1/2", 1-1/4", and 2-1/2" NPT
- 304 stainless steel housing
- Recommended minimum air flow 60 SCFH

Style A

- Should be used whenever an absolute leak-proof system up to 150 psi (10 bar) is required
- Two high-temperature power feedthroughs
- Maximum inlet temperature 900°F (482°C)

Style B

- Maximum air pressure 150 psi (10 bar), but will have slight air leakage through power wire strands
- 12" (305mm) flexible power wires
- Maximum inlet temperature 200°F (93°C)
- RoHS compliant
### Products

<table>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>1.6kW</td>
<td>170</td>
<td>9.4</td>
<td>038821</td>
<td>038822</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>4.0kW</td>
<td>220</td>
<td>18.2</td>
<td>038823</td>
<td>038824</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>6.0kW</td>
<td>220</td>
<td>27.3</td>
<td>038825</td>
<td>038826</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>18.0kW</td>
<td>240</td>
<td>75.0 (1φ)/44.0 (3φ)</td>
<td>N/A</td>
<td>063007</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>24.0kW</td>
<td>240</td>
<td>100 (1φ)/57.8 (3φ)</td>
<td>N/A</td>
<td>074439</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>057081</td>
<td>Open-loop (manual) power control 120-277V 25A</td>
</tr>
<tr>
<td>066823</td>
<td>Closed-loop power control, 240V, 30A</td>
</tr>
<tr>
<td>070429</td>
<td>Temperature controller — 1/16 DIN, 4-20mA</td>
</tr>
<tr>
<td>039272</td>
<td>Type K thermocouple probe, 3/16&quot; (4.8mm) O.D.</td>
</tr>
</tbody>
</table>
SUREHEAT® J ET Air Heater

Specifications

- Air temperature controllable to 1400°F (760°C)
- Power ratings 3.0kW - 8.0kW 240V - 1φ
- Two internal Type K thermocouple sensors for control and safety:
  - S1 measures inlet temperature
  - S2 measures exit temperature
- Rapid heat-up and cool-down
- Maximum air pressure 60 psi (4 bar)
- Maximum inlet temperature 200°F (93°C)
- Use SUREHEAT J ET Control (purchased separately) for easy installation
- Recommended minimum airflow 2 SCFM (57 SLPM)
- RoHS compliant

Performance

SUREHEAT JET Maximum Performance

* Temperature as measured by internal Type K thermocouple.
Installation

Wiring Notes:
- S1 and S2 sensors are Type K thermocouple.
- S1 measures inlet air temperature.
- S2 measures exit air temperature.
- See operating manual for control settings.

Products

<table>
<thead>
<tr>
<th>Heater Size (NPT)</th>
<th>Description</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Max. Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>074718</td>
<td>SUREHEAT® J ET 3.0kW heater</td>
<td>3.0kW</td>
<td>240</td>
<td>12.5</td>
</tr>
<tr>
<td>074719</td>
<td>SUREHEAT® J ET 8.0kW heater</td>
<td>8.0kW</td>
<td>240</td>
<td>33.3</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>074722</td>
<td>SUREHEAT® J ET control cabinet 8.0kW/240V/35A/1φ</td>
</tr>
<tr>
<td>075526</td>
<td>SUREHEAT® J ET control cabinet 8.0kW/240V/35A/1φ w/RS-232 comm.</td>
</tr>
<tr>
<td>074829</td>
<td>1/16 DIN digital temperature control (for S2 KTC)</td>
</tr>
<tr>
<td>074835</td>
<td>Inlet temperature limit circuit (for S1 KTC)</td>
</tr>
</tbody>
</table>

Power Wire Port: 3/4” NPT
Sensor Wire Port: 3/8” NPT
Air Inlet Port: 3/4” NPT
Air Exit Port: 1-1/2” NPT
Flow

Power Wire Port
Sensor Wire Port
Air Inlet Port
Air Exit Port

1/4–20 MTG HOLES

1.50 [38.1]
3.63 [92.2]
4.50 [114.3]
1/4–20 MTG HOLES

1.83 [46.5]
3.50 [88.8]
1.75 [44.4]

14.92 [378.9]
11.42 [290.1]
11.17 [283.7]
.69 [17.5]
SUREHEAT® MAX Air Heater

Specifications

- Air temperature controllable to 1400°F (760°C)
- Power ratings 6.0kW - 36.0kW
  240/380/480V - 1φ /3φ
- Two internal Type K thermocouple sensors for control and safety:
  - S1 measures inlet temperature
  - S2 measures exit temperature
- Rapid heat-up and cool-down
- Maximum air pressure 60 psi (4 bar)
- Maximum inlet temperature 200°F (93°C)
- Recommended minimum airflow 12 SCFM
- Use SUREHEAT MAX Control (purchased separately) for easy installation
- RoHS compliant

Performance

SUREHEAT MAX Maximum Performance

* Temperature as measured by internal Type K thermocouple.
### Installation

**Wiring Notes:**
- S1 and S2 sensors are Type K thermocouple.
- S1 measures inlet air temperature.
- S2 measures exit air temperature.
- See operating manual for control settings.

**Installation Notes:**
- 18kW, 36kW heater is 16" (406.4mm) long.
- 6kW, 10kW heater is 12" (304.8mm) long.
- Difference is 4" (101.6mm) shorter nozzle tube.

---

### Products

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Max. Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>074723</td>
<td>SUREHEAT® MAX 6.0kW heater</td>
<td>6.0kW</td>
<td>240 - 1φ</td>
<td>25.0</td>
</tr>
<tr>
<td>074724</td>
<td>SUREHEAT MAX 6.0kW heater</td>
<td>6.0kW</td>
<td>240 - 3φ</td>
<td>14.5</td>
</tr>
<tr>
<td>074725</td>
<td>SUREHEAT MAX 6.0kW heater</td>
<td>6.0kW</td>
<td>380 - 3φ</td>
<td>9.1</td>
</tr>
<tr>
<td>074726</td>
<td>SUREHEAT MAX 6.0kW heater</td>
<td>6.0kW</td>
<td>480 - 3φ</td>
<td>7.2</td>
</tr>
<tr>
<td>074727</td>
<td>SUREHEAT MAX 10.0kW heater</td>
<td>10.0kW</td>
<td>240 - 1φ</td>
<td>41.7</td>
</tr>
<tr>
<td>074728</td>
<td>SUREHEAT MAX 10.0kW heater</td>
<td>10.0kW</td>
<td>240 - 3φ</td>
<td>24.1</td>
</tr>
<tr>
<td>074729</td>
<td>SUREHEAT MAX 10.0kW heater</td>
<td>10.0kW</td>
<td>380 - 3φ</td>
<td>15.2</td>
</tr>
<tr>
<td>074731</td>
<td>SUREHEAT MAX 10.0kW heater</td>
<td>10.0kW</td>
<td>480 - 3φ</td>
<td>12.0</td>
</tr>
<tr>
<td>074732</td>
<td>SUREHEAT MAX 18.0kW heater</td>
<td>18.0kW</td>
<td>240 - 3φ</td>
<td>43.4</td>
</tr>
<tr>
<td>074733</td>
<td>SUREHEAT MAX 18.0kW heater</td>
<td>18.0kW</td>
<td>380 - 3φ</td>
<td>27.4</td>
</tr>
<tr>
<td>074734</td>
<td>SUREHEAT MAX 18.0kW heater</td>
<td>18.0kW</td>
<td>480 - 3φ</td>
<td>21.7</td>
</tr>
<tr>
<td>074735</td>
<td>SUREHEAT MAX 30.0kW heater</td>
<td>30.0kW</td>
<td>380 - 3φ</td>
<td>45.6</td>
</tr>
<tr>
<td>074736</td>
<td>SUREHEAT MAX 36.0kW heater</td>
<td>36.0kW</td>
<td>480 - 3φ</td>
<td>43.4</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>075725</td>
<td>SUREHEAT MAX control cabinet 18.0kW/480V/25A/3φ</td>
</tr>
<tr>
<td>074829</td>
<td>1/16 DIN digital temperature control (for S2 KTC)</td>
</tr>
<tr>
<td>074835</td>
<td>Inlet temperature limit circuit (for S1 KTC)</td>
</tr>
</tbody>
</table>
SUREHEAT® MAX HT Air Heater

Specifications

- Specially constructed SUREHEAT MAX air heater for heating air and inert gases to 900°C (1652°F)
- For applications demanding extremely high temperature including automotive sensors, diesel filter regeneration, thermal stress conditioning, general R&D, etc.
- Two (2) current models available:
  - 30kW  380V - 3φ 45.6A  (P/N F076189)
  - 36kW  480V - 3φ 43.4A  (P/N F076197)
- Custom sizes available upon request
- One (1) dual exposed junction, Type K thermocouple probe included for precision control and over-temperature protection
- Recommended minimum airflow 12 SCFM (340 SLPM)
- RoHS compliant

* Temperature as measured by internal Type K thermocouple.
SKORPION™ Air Heater

Performance

Specifications

- Air temperature controllable to 1400°F (760°C)
- Power ratings 1.5kW – 4.5kW 120/230 - 1φ
- Complete heater including blower and control unit that is ready to plug in and use
- Convenient digital display shows current operating temperature
- Built in over-temperature protection and a two-year limited warranty
- Models also available without blower for use with customer supplied air source
  - Maximum inlet temperature 200°F (93°C)
  - Recommended minimum airflow 2 SCFM
- RoHS compliant

* Air Temperature as measured by internal Type K thermocouple.
## Installation

![Diagram of SKORPION air heater](image)

## Products

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Max. Watts</th>
<th>Max. Volts</th>
<th>Max. Amps</th>
<th>Height “A”</th>
<th>Height “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>075615</td>
<td>SKORPION™ air heater</td>
<td>1.5kW</td>
<td>120 - 1φ</td>
<td>12.5A</td>
<td>9.18&quot;</td>
<td>13.58&quot;</td>
</tr>
<tr>
<td>075616</td>
<td>SKORPION air heater</td>
<td>3.0kW</td>
<td>230 - 1φ</td>
<td>12.5A</td>
<td>9.18&quot;</td>
<td>13.58&quot;</td>
</tr>
<tr>
<td>076008</td>
<td>SKORPION air heater</td>
<td>4.5kW</td>
<td>230 - 1φ</td>
<td>20.0A</td>
<td>10.84&quot;</td>
<td>14.44&quot;</td>
</tr>
<tr>
<td>075869</td>
<td>SKORPION air heater without blower</td>
<td>1.5kW</td>
<td>120 - 1φ</td>
<td>12.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>075835</td>
<td>SKORPION air heater without blower</td>
<td>3.0kW</td>
<td>230 - 1φ</td>
<td>12.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>076029</td>
<td>SKORPION air heater without blower</td>
<td>4.5kW</td>
<td>230 - 1φ</td>
<td>20.0A</td>
<td></td>
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</table>

## Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>075744</td>
<td>High flow nozzle 21mm (1&quot;) diameter opening – slip-on mount with set screw</td>
<td>F075744</td>
</tr>
<tr>
<td>075745</td>
<td>Standard flare 150mm x 12mm (6&quot; x 0.5&quot;) opening – slip-on mount with set screw</td>
<td>F075745</td>
</tr>
<tr>
<td>075746</td>
<td>Wide flare 300mm x 4mm (12&quot; x 0.16&quot;) opening – slip-on mount with set screw</td>
<td>F075746</td>
</tr>
</tbody>
</table>
Specifications

- Electric process inline air heater with ANSI standard pipe and flanges for heating high-pressure air or inert gases to 1400°F (760°C) and higher
- With the SYLVANIA patented Serpentine elements, you can reach set point temperature within just a few seconds or minutes, versus the much slower response of tubular element designs
- Standard heater models range from 2.5" pipe size (18kW) to 10" pipe size (400kW). (400kW model shown in photo.) Custom heater models are available upon request
- Maximum static pressures to 150 psi (10 bar)
- Maximum inlet temperature 900°F (482°C)
- Type K thermocouple probes included for accurate control and safety
- Each 6" diameter and larger heater model is supplied with four (4) internal Type K thermocouples attached to heater element for additional protection
- Elements are easily replaceable as a complete cartridge assembly
- Ultra High Pressure (UHP) models (>150 psi) are available with ASME Section VIII Div. 1 code stamp. Models up to 800 psi (54 bar) have been supplied
- Custom SCR power and temperature control cabinets are available on request
- On-site start-up assistance can also be provided
- RoHS compliant
Reference Data

A. Air Heater Energy Requirement

\[
\text{kW} = \frac{\text{SCFM} \times (T_{exit} - T_{inlet})}{2500}
\]

B. Temperature Conversions

\[
\begin{align*}
\text{°F} & = \frac{9}{5} (\text{°C}) + 32 \\
\text{°C} & = \frac{5}{9} (\text{°F} - 32)
\end{align*}
\]

C. Air Flow Conversions

\[
\begin{align*}
\text{SCFM} & = \frac{\text{SCFH}}{60} = \frac{\text{SLPM}}{28.3} \\
\text{SLPM} & = \frac{\text{SCFH}}{2.12} \\
\text{SCMH} & = \frac{\text{SCFH}}{35.3} \\
\text{SCFM} & = (\text{Pounds of Air Per Minute}) / (0.076 \text{ lbs/ft}^3) \\
\text{SCFM} & = \text{grams/sec.} \times 1.74 \\
\text{SCFM} & = \text{kg/min.} \times 28.9 \\
\text{SCFM} & = \text{Standard Cubic Feet per Minute} \\
\text{SCFH} & = \text{Standard Cubic Feet per Hour} \\
\text{SLPM} & = \text{Standard Liters per Minute} \\
\text{SCMH} & = \text{Standard Cubic Meters per Hour}
\end{align*}
\]

D. Single Phase Wiring

\[
\begin{align*}
V & = I \times R \quad (\text{Volts} = \text{Amps} \times \text{Ohms}) \\
I & = \frac{W}{V} \quad (\text{Amps} = \text{Watts} / \text{Volts}) \\
W & = \frac{V^2}{R} \quad (\text{Watts} = (\text{Volts} \times \text{Volts}) / \text{Ohms})
\end{align*}
\]

E. Three Phase Wiring

\[
\begin{align*}
\text{Delta Configuration} \\
R & = R_1 = R_2 = R_3 \\
W_{\text{delta}} & = 3(V_L^2)/R \\
I_P & = I_L / 1.73 \\
V_P & = V_L
\end{align*}
\]

\[
\begin{align*}
\text{Wye Configuration} \\
R & = R_1 = R_2 = R_3 \\
W_{\text{wye}} & = (V_L^2)/R = 3(V_P^2)/R \\
I_P & = I_L \\
V_P & = V_L / 1.73
\end{align*}
\]

F. Thermocouple Configuration (Type K)

\[
\begin{align*}
(+) & = \text{Yellow} = \text{Alumel (non-magnetic)} \\
(-) & = \text{Red} = \text{Chromel (magnetic)}
\end{align*}
\]
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