

# Air Heaters

Air Heaters	Sheath Materials	Max. Operating Temperatures		Typical Max. Watt Densities		Page
		°F	°C	W/in <sup>2</sup>	W/cm <sup>2</sup>	
<b>Duct Heaters</b>						
<b>LDH SERIES and D SERIES</b>	Alloy 840	1200	650	30	4.7	<b>391</b>
<b>MDH SERIES</b>	Alloy 840	1200	650	26	4.0	<b>405</b>
<b>Finned</b>						
<b>375 Fined Strip</b>	Aluminized steel	1100	595	33	5.1	<b>409</b>
<b>FINBAR™ Single-Ended</b>	304 stainless steel	1200	650	50	7.7	<b>415</b>
<b>FIREROD® Cartridge</b>	Alloy 800	Application Specific		100	15.5	<b>416</b>
<b>Enclosure Heaters</b>						
<b>WATROD™</b>	Alloy 840	390	200	15	2.3	<b>417</b>
<b>Silicone Rubber</b>	Fiberglass reinforced silicone rubber	500	260	5	0.8	<b>419</b>





# Air Heaters

## Duct Heaters

### LDH SERIES and D SERIES

Constructed of sturdy 0.430 in. (11 mm) diameter WATROD™ heating elements mounted to a 1/4 in. (6 mm) thick steel flange, duct heaters are easily adapted to many non-pressurized air-heating systems.

They are easily installed in applications requiring a wide range of temperature versus air flow combinations.

The modular duct heater offers increased reliability. The individual modules are removable through the housing of the assembly, which eliminates the need to pull the complete heater from the duct work. This reduces downtime costs because the heating elements can be replaced individually. Performance improvements include quicker response time and reduced infiltration from the air stream being heated into the electrical enclosure.

Watlow® duct heaters offer advantages over gas or oil fired and open coil electric units with:

- Installation flexibility—no flues or fuel lines
- 100 percent energy efficient—no energy loss up the flue
- Universal availability of electricity
- Resistance coil in sheath is protected from corrosive environments

### Performance Capabilities

- Watt densities up to 40 W/in<sup>2</sup> (6.2 W/cm<sup>2</sup>)
- Recommended process temperatures from -20 to 1200°F (-29 to 650°C)
- Catalog P/N wattages up to 225kW
- Voltages up to 600VAC

### Features and Benefits

#### Long life alloy 840 sheath

- Resists corrosion/oxidation while protecting resistance coils against contamination

#### MgO insulation filled elements compacted to rock hard density

- Maximizes dielectric strength, heat transfer and life

#### Field replaceable heating elements

- Permits easy service and reduces downtime. Element change-out is made simple by a single screw clamp (D SERIES only)

#### 3 1/2 in. (90 mm) thick mineral insulation

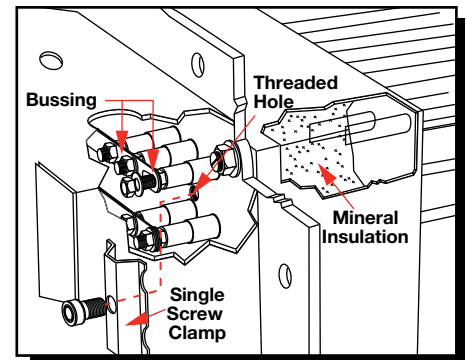
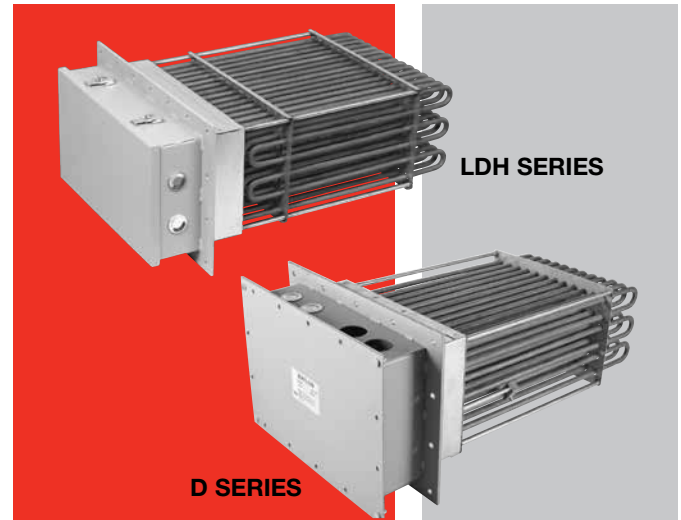
- Keeps wiring cooler and reduces heat loss

#### Silicone resin seals rated to 221°F (105°C)

- Protects elements against moisture and other contaminants

#### General purpose terminal enclosure

- Offers easy access to wiring



#### 1/4 in. (6 mm) inside diameter thermowell

- Accepts an optional Type J or K thermocouple for accurate sheath temperature sensing (D SERIES only)

#### Rigid stainless steel supports

- Prevents element sagging or deformation in various mounting positions

#### 1/4 in. (6 mm) thick steel flange with 3/8 in. (9.5 mm) diameter mounting holes

- Easily bolts to the duct wall

#### WATROD hairpins are repressed (recompacted) after bending to assure MgO density

- Eliminates hot spots and electrical insulation voids

#### Stock heaters feature from 3 to 60 elements

- Meets a wide variety of kilowatt demands

#### One or three phase voltages

- Meets local power supplies

#### Maximum 48 amperes per circuit

- Complies with National Electrical Code (NEC)

Duct heaters with general purpose enclosures meet UL® and CSA component recognition to 480 and 600VAC maximum respectively—UL® and CSA file numbers are E52951 and 31388

# Air Heaters

## Duct Heaters

### LDH SERIES and D SERIES

#### Typical Applications

- Drying ovens
- Autoclaves
- Furnaces
- Load banks
- Heat treating
- Reheating
- HVAC
- Paint drying

#### Choosing a Duct Heater

The English and metric graphs, shown on the following pages will help you to select the correct duct heater. These graphs include: *Watt Density vs. Air Temperature/Velocity*, *Watt Density vs. Sheath Temperature and Pressure Drop vs. Air Velocity*.

These graphs, with the quick formulas on this page, along with information specific to your application, will determine the correct duct heater specifications. However, if engineering assistance is needed, contact your Watlow representative.

#### Required Application Information

- Desired outlet air temperature
- Inlet air temperature
- Delta T—the temperature difference between inlet and desired outlet temperature
- Air volume (CFM/CMM) measured at both inlet temperature and pressure
- Air velocity in feet per minute (FPM); meters per minute (MPM) which equals:

<b>English</b>	
$FPM =$	$\frac{CFM \text{ measured at standard conditions}}{\text{Duct cross section area at heater in ft}^2}$
<b>Metric</b>	
$MPM =$	$\frac{CMM \text{ measured at normal conditions}}{\text{Duct cross section area at heater in m}^2}$

- Minimum duct heater wattage (kW). This can be determined by:

<b>English</b>	
$kW =$	$\frac{CFM \times \Delta T (^{\circ}F) \times 1.1 \text{ (safety factor)}}{3000}$
<b>Metric</b>	
$kW =$	$\frac{CMM \times \Delta T (^{\circ}C) \times 1.1 \text{ (safety factor)}}{48}$

**Note:** The duct heater, or combination of duct heaters, used for the process should be equal to or exceed the minimum wattage calculation.

# Air Heaters

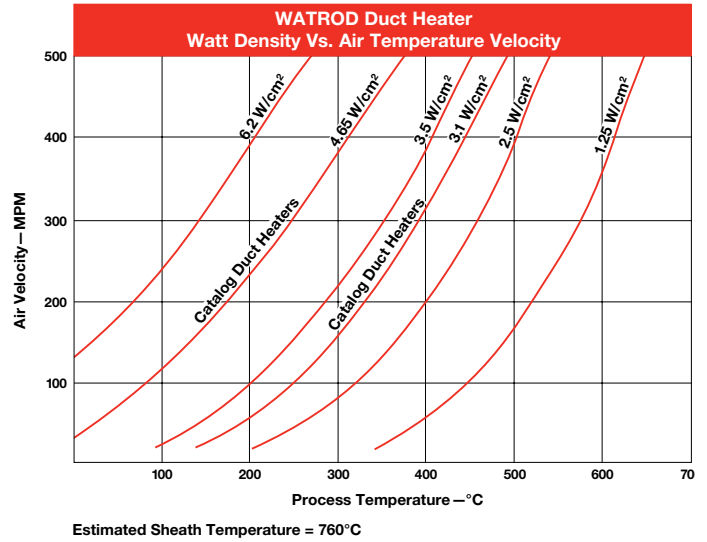
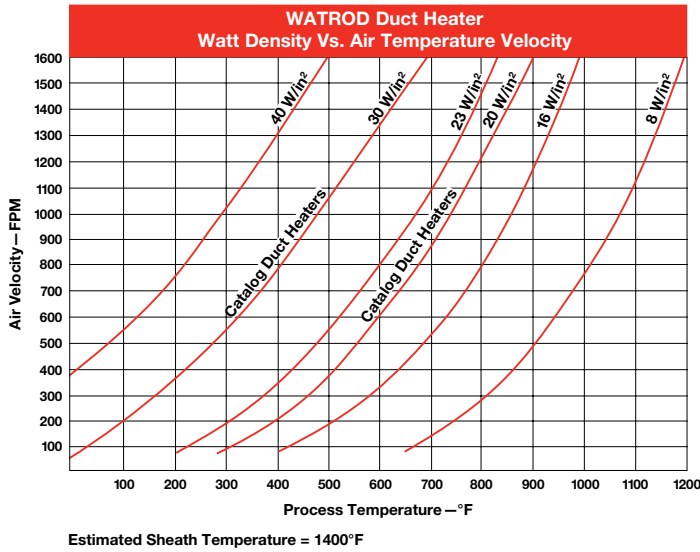
## Duct Heaters

### LDH SERIES and D SERIES

#### Watt Density vs. Air Temperature/Velocity

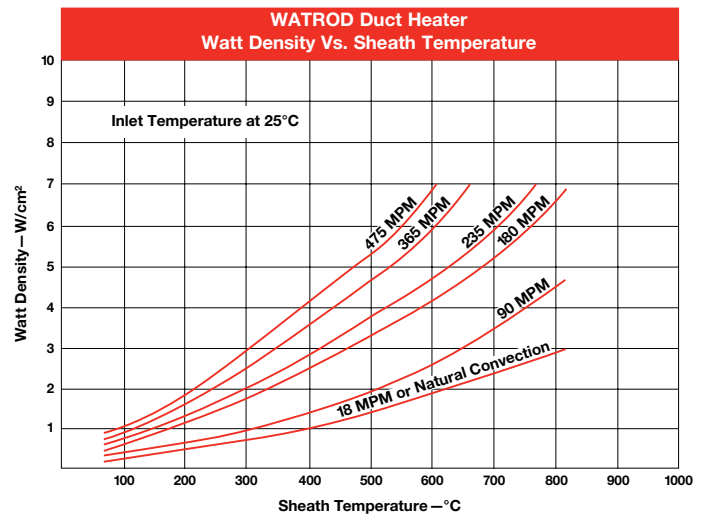
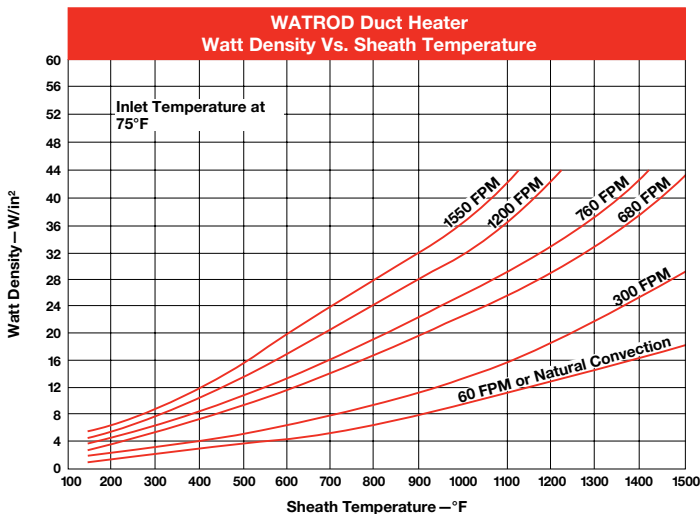
To decide watt density requirements, first determine the desired outlet air temperature and velocity in feet per minute. Then, follow the lines on the graph for velocity and process temperature to the watt density

curve's intersecting point. This shows the recommended watt density based on a maximum sheath temperature of 1400°F (760°C). **For longer heater life, lower watt densities should be chosen.**



#### Watt Density vs. Sheath Temperature

The *Watt Density vs. Sheath Temperature* graph shows the air velocity (FPM or MPM) required to operate a WATROD duct heater at specific watt densities or sheath temperatures. Also depicted is the appropriate watt density vs. sheath temperature at a specified air flow.



# Air Heaters

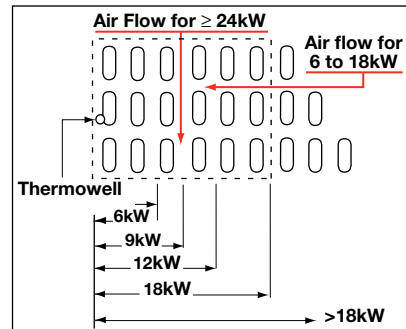
## Duct Heaters

### LDH SERIES and D SERIES

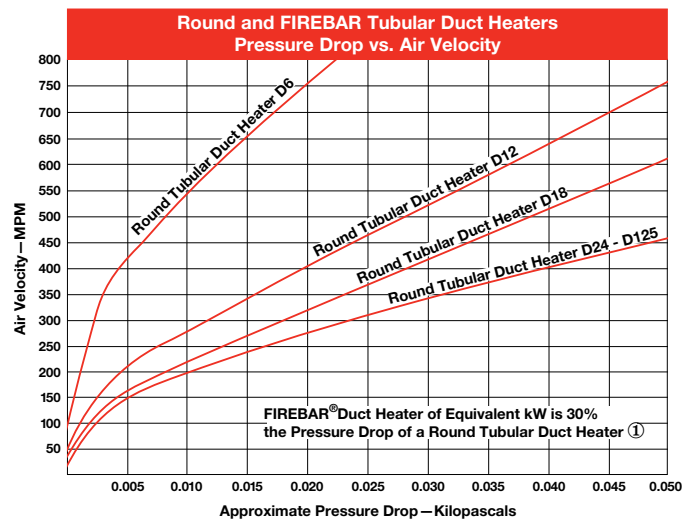
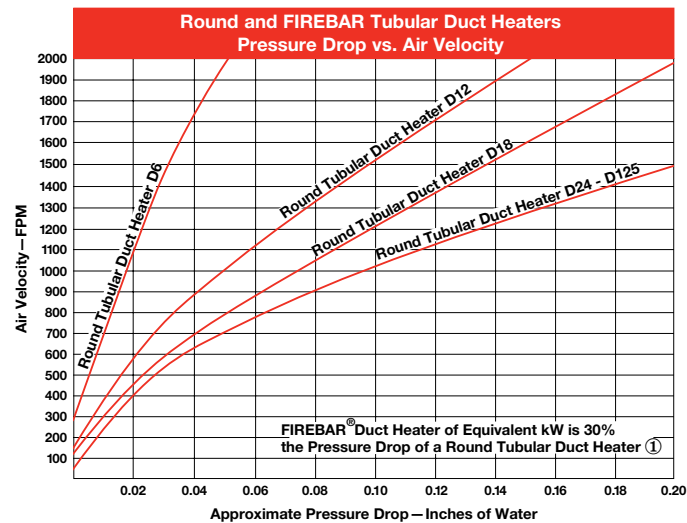
#### Pressure Drop vs. Air Velocity

The rate at which pressure drops through the duct heater is critical for properly sizing blowers and pumps. *The Pressure Drop vs. Air Velocity* graph gives recommended maximum velocities in feet per minute and meters per minute according to the air velocity and duct heater size.

To determine the pressure drop through the duct heater, follow the air velocity (FPM or MPM) over to the appropriate curve, which identifies the duct heater size. Then, take the intersecting point down to the approximate pressure drop value.



**Note:** Viewing from the element ends—the recommended air flow direction through element bundle changes at >18kW.



① FIREBAR® flat tubular element duct heaters are available as extended capabilities to enhance your application output or performance. Although duct heaters are not normally constructed with FIREBAR elements, the pressure drop reduction using FIREBAR as a distinct advantage is shown above.

## Options

### Wattages/Voltages

To meet specific application needs, voltage and wattage combinations outside stock product parameters are available.

For more information about this option, contact your Watlow representative.

# Air Heaters

## Duct Heaters

### LDH SERIES and D SERIES

#### Options (Continued)

#### Terminal Enclosures

In addition to the standard, general purpose terminal enclosure, Watlow offers a moisture resistant optional terminal enclosure to meet specific application requirements.

#### Thermocouples

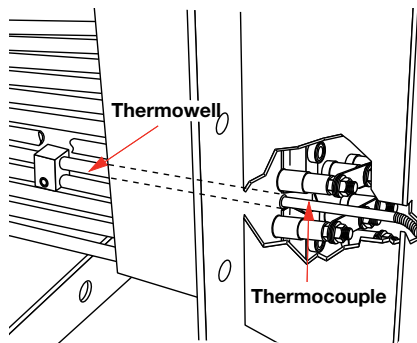
**Type J** or **K** thermocouples, inserted in the thermowell, accurately sense element sheath temperature for over-temperature conditions.

To sense process temperature, the sensing element should be located downstream from the duct heater. This will eliminate incorrect sensing caused by radiant heat.

Thermocouples are supplied with 120 in. (3050 mm) leads, longer lead lengths are available (this applies to “D” SERIES only). Unless otherwise specified, thermocouples are supplied with temperature ranges detailed on the *Thermocouple Types* chart.

Using a thermocouple requires an appropriate temperature and power controller. These must be purchased separately. Watlow offers a wide variety of temperature and power controllers to meet virtually all applications. Temperature controllers can be configured to accept process variable inputs, too. Contact your Watlow representative for details.

To order a thermocouple, add the appropriate suffix letter to the duct heater’s base part number, as indicated on the *Ordering Information* chart on page 404.



Duct heater thermowell holds thermocouple for sensing sheath temperature.

#### Thermocouple Types

ASTM Type	Conductor Characteristics		Recommended <sup>①</sup> Temperature Range	
	Positive	Negative	°F	(°C)
J	Iron (Magnetic)	Constantan (Non-magnetic)	0 to 1000	(-20 to 540)
K	Chromel® (Non-magnetic)	Alumel® (Magnetic)	0 to 2000	(-20 to 1100)

① **Type J** and **Type K** thermocouples are rated 32 to 1382°F and 32 to 2282°F (0-750°C and 0-1250°C), respectively. Watlow does not recommend exceeding temperature ranges shown on this chart for the tubular product line.

#### Application Hints

- Mount duct heaters horizontally to lower enclosure temperatures and promote unit life.
- Orient heating elements as per the air flow illustration on page 394.
- Promote heater life by keeping sheath temperature below the 1400°F (760°C) maximum.
- Measure process temperature in the outlet stream, away from the heater.
- Maintain wiring integrity by keeping enclosure temperature below 400°F (205°C).
- Thermal cycling can cause terminations to loosen. Periodically check and tighten all electrical connections.
- Size power feeder wires in accordance with NEC and other applicable codes.
- Protect employees against electrical shock by properly grounding the unit per NEC specifications.

## Extended Capabilities For Duct Heaters

### *LDH SERIES and D SERIES*

#### Performance Capabilities

- Wattages to 2.2 megawatts

#### Features and Benefits

##### **Ceramic fiber insulation available**

- Keeps wiring cooler and reduces heat loss

##### **Greater than 1/4 in. (6 mm) with 304 or 316 stainless steel flange material**

- Easily bolts to the duct wall

##### **60 plus element designs available**

- Meets a wide variety of kilowatt demands

#### Options

##### **Sheath Material**

Watlow duct heaters can be made with the following sheath materials:

- 304, 316, 321 SS
- Alloy 800, 840
- Laminated alloy 600 (hi-temp)
- Hastelloy C276

Contact your Watlow representative for details and availability.

##### **Terminal Enclosures**

In addition to the standard, general purpose terminal enclosure, Watlow offers the following optional terminal enclosures to meet specific application requirements:

- Explosion resistant (contact your Watlow representative)
- High-temperature stand-off enclosures



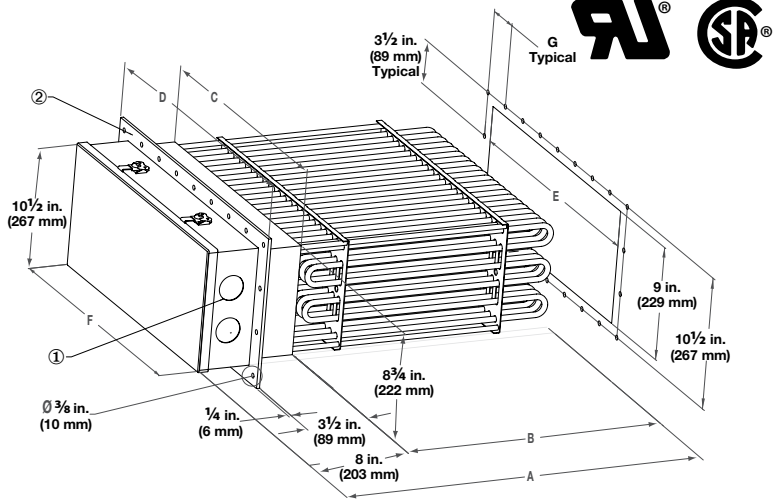
# Air Heaters

## Duct Heaters

### LDH SERIES

**Application: High Temperature Air  
800°F (427°C)**

- Welded alloy 840 WATROD elements
  - Without thermostat
  - General purpose enclosure
  - Steel flange
- ① 3 and 6 element heaters have (1) 1 inch NPT conduit opening; 9, 12 and 15 element heaters have (2) 1 inch NPT conduit openings; 18 element heaters have (2) 1½ inch NPT conduit openings; 21 element (B= 20¼ in.) heaters have (2) 1½ inch NPT conduit openings; remaining 21 and 24 element heaters have (3) 1½ inch NPT conduit openings
- ② All flanges are 12 inches wide



# of Elem	Volts	kW	Ph	# Circ	Part Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	"D" Dim. in. (mm)	"E" Dim. in. (mm)	"F" Dim. in. (mm)	"G" Dim. in. (mm)
<b>20 W/in<sup>2</sup> (3.1 W/cm<sup>2</sup>)</b>														
3	240	9.0	1	1	LDH9S10S	M	55 (25)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	3 <sup>3</sup> / <sub>4</sub> (95)	7 <sup>1</sup> / <sub>2</sub> (191)	4 (102)	4 <sup>5</sup> / <sub>8</sub> (117.5)	3 (76)
3	240	9.0	3	1	LDH9S3S	M	55 (25)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	3 <sup>3</sup> / <sub>4</sub> (95)	7 <sup>1</sup> / <sub>2</sub> (191)	4 (102)	4 <sup>5</sup> / <sub>8</sub> (117.5)	3 (76)
3	480	9.0	1	1	LDH9S11S	M	55 (25)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	3 <sup>3</sup> / <sub>4</sub> (95)	7 <sup>1</sup> / <sub>2</sub> (191)	4 (102)	4 <sup>5</sup> / <sub>8</sub> (117.5)	3 (76)
3	480	9.0	3	1	LDH9S5S	M	55 (25)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	3 <sup>3</sup> / <sub>4</sub> (95)	7 <sup>1</sup> / <sub>2</sub> (191)	4 (102)	4 <sup>5</sup> / <sub>8</sub> (117.5)	3 (76)
6	240	18.0	1	2	LDH18S10S	M	65 (30)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	7 <sup>5</sup> / <sub>8</sub> (193.7)	3 (76)
6	240	18.0	3	1	LDH18S3S	M	65 (30)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	7 <sup>5</sup> / <sub>8</sub> (193.7)	3 (76)
6	480	18.0	1	1	LDH18S11S	M	65 (30)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	7 <sup>5</sup> / <sub>8</sub> (193.7)	3 (76)
6	480	18.0	3	1	LDH18S5S	M	65 (30)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	7 <sup>5</sup> / <sub>8</sub> (193.7)	3 (76)
9	240	27.0	1	3	LDH27S10S	M	120 (55)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	9 <sup>3</sup> / <sub>4</sub> (248)	13 <sup>1</sup> / <sub>2</sub> (343)	10 (254)	10 <sup>5</sup> / <sub>8</sub> (269.9)	3 (76)
9	240	27.0	3	3	LDH27S3S	M	120 (55)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	9 <sup>3</sup> / <sub>4</sub> (248)	13 <sup>1</sup> / <sub>2</sub> (343)	10 (254)	10 <sup>5</sup> / <sub>8</sub> (269.9)	3 (76)
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12	240	36.0	1	4	LDH36S10S	M	135 (62)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	13 <sup>5</sup> / <sub>8</sub> (346.1)	3 (76)
12	240	36.0	3	2	LDH36S3S	M	135 (62)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	13 <sup>5</sup> / <sub>8</sub> (346.1)	3 (76)
12	480	36.0	1	2	LDH36S11S	M	135 (62)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	13 <sup>5</sup> / <sub>8</sub> (346.1)	3 (76)
12	480	36.0	3	1	LDH36S5S	M	135 (62)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	13 <sup>5</sup> / <sub>8</sub> (346.1)	3 (76)
15	240	45.0	3	5	LDH45S3S	M	195 (89)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	15 <sup>3</sup> / <sub>4</sub> (400)	19 <sup>1</sup> / <sub>2</sub> (495)	16 (406)	17 <sup>7</sup> / <sub>8</sub> (454.0)	3 (76)
15	480	45.0	1	3	LDH45S11S	M	195 (89)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	15 <sup>3</sup> / <sub>4</sub> (400)	19 <sup>1</sup> / <sub>2</sub> (495)	16 (406)	17 <sup>7</sup> / <sub>8</sub> (454.0)	3 (76)
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18	240	54.0	3	3	LDH54S3S	M	205 (93)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	20 <sup>7</sup> / <sub>8</sub> (530.2)	3 (76)
18	480	54.0	1	3	LDH54S11S	M	205 (93)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	20 <sup>7</sup> / <sub>8</sub> (530.2)	3 (76)
18	480	54.0	3	2	LDH54S5S	M	205 (93)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	20 <sup>7</sup> / <sub>8</sub> (530.2)	3 (76)
21	240	63.0	3	7	LDH63S3S	M	235 (107)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	480	63.0	1	3	LDH63S11S	M	235 (107)	28 <sup>1</sup> / <sub>4</sub> (718)	20 <sup>1</sup> / <sub>4</sub> (514)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
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21	240	79.0	3	7	LDH79S3S	M	260 (118)	33 (838)	25 (635)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	480	79.0	1	7	LDH79S11S	M	260 (118)	33 (838)	25 (635)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	480	79.0	3	7	LDH79S5S	M	260 (118)	33 (838)	25 (635)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	240	105.0	3	7	LDH105S3S	M	290 (132)	40 <sup>1</sup> / <sub>2</sub> (1029)	32 <sup>1</sup> / <sub>2</sub> (826)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	480	105.0	1	7	LDH105S11S	M	290 (132)	40 <sup>1</sup> / <sub>2</sub> (1029)	32 <sup>1</sup> / <sub>2</sub> (826)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	480	105.0	3	7	LDH105S5S	M	290 (132)	40 <sup>1</sup> / <sub>2</sub> (1029)	32 <sup>1</sup> / <sub>2</sub> (826)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
21	480	131.0	3	7	LDH131S5S	M	310 (141)	49 <sup>1</sup> / <sub>2</sub> (1257)	41 <sup>1</sup> / <sub>2</sub> (1054)	21 <sup>3</sup> / <sub>4</sub> (552)	25 <sup>1</sup> / <sub>2</sub> (848)	22 (559)	23 <sup>7</sup> / <sub>8</sub> (606.4)	3 (76)
24	480	150.0	3	4	LDH150S5S	M	330 (150)	49 <sup>1</sup> / <sub>2</sub> (1257)	41 <sup>1</sup> / <sub>2</sub> (1054)	24 <sup>3</sup> / <sub>4</sub> (629)	28 <sup>1</sup> / <sub>2</sub> (724)	25 (635)	26 <sup>7</sup> / <sub>8</sub> (682.6)	3 (76)

- M - Manufacturing lead times
- Truck Shipment only

**Notes:**

- See Watt Density vs. Air Temperature/Velocity charts on page 393 to confirm suitability in the application.

# Air Heaters

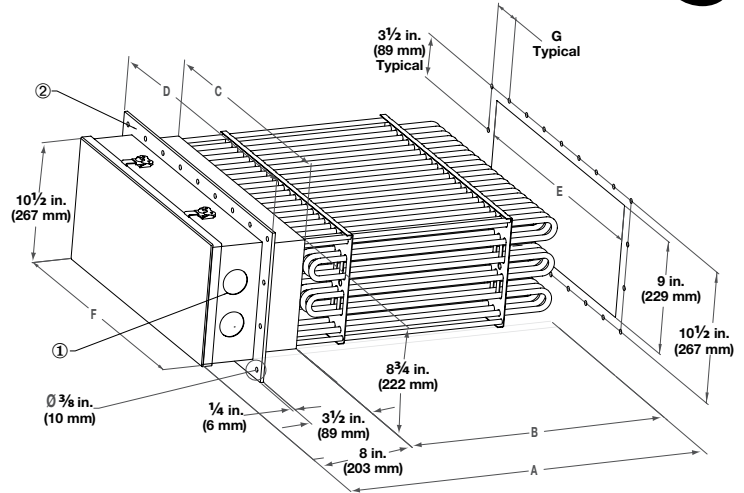
## Duct Heaters

### LDH SERIES



### Application: Medium Temperature Air 750°F (399°C)

- Welded alloy 840 WATROD elements
  - Without thermostat
  - General purpose enclosure
  - Steel flange
- ① 3 and 6 element heaters have (1) 1 inch NPT conduit opening; 9, 12 and 15 element heaters have (2) 1 inch NPT conduit openings; 18 element heaters have (2) 1 1/2 inch NPT conduit openings; 21 element (B= 20 1/4 in.) heaters have (2) 1 1/2 inch NPT conduit openings; remaining 21 and 24 element heaters have (3) 1 1/2 inch NPT conduit openings
- ② All flanges are 12 inches wide



# of Elem	Volts	kW	Ph	# Circ	Part Number	Del.	Ship Wt. lbs. (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	"D" Dim. in. (mm)	"E" Dim. in. (mm)	"F" Dim. in. (mm)	"G" Dim. in. (mm)
<b>30 W/in<sup>2</sup> (4.7 W/cm<sup>2</sup>)</b>														
3	240	14.0	1	3	LDH14SX10S	M	55 (25)	28 1/4 (718)	20 1/4 (514)	3 3/4 (95)	7 1/2 (191)	4 (102)	4 5/8 (117.5)	3 (76)
3	240	14.0	3	1	LDH14SX3S	M	55 (25)	28 1/4 (718)	20 1/4 (514)	3 3/4 (95)	7 1/2 (191)	4 (102)	4 5/8 (117.5)	3 (76)
3	480	14.0	1	1	LDH14SX11S	M	55 (25)	28 1/4 (718)	20 1/4 (514)	3 3/4 (95)	7 1/2 (191)	4 (102)	4 5/8 (117.5)	3 (76)
3	480	14.0	3	1	LDH14SX5S	M	55 (25)	28 1/4 (718)	20 1/4 (514)	3 3/4 (95)	7 1/2 (191)	4 (102)	4 5/8 (117.5)	3 (76)
6	240	27.0	1	3	LDH27SX10S	M	65 (30)	28 1/4 (718)	20 1/4 (514)	6 3/4 (171)	10 1/2 (267)	7 (178)	7 5/8 (193.7)	3 (76)
6	240	27.0	3	2	LDH27SX3X	M	65 (30)	28 1/4 (718)	20 1/4 (514)	6 3/4 (171)	10 1/2 (267)	7 (178)	7 5/8 (193.7)	3 (76)
6	480	27.0	1	2	LDH27SX11S	M	65 (30)	28 1/4 (718)	20 1/4 (514)	6 3/4 (171)	10 1/2 (267)	7 (178)	7 5/8 (193.7)	3 (76)
6	480	27.0	3	1	LDH27SX5S	M	65 (30)	28 1/4 (718)	20 1/4 (514)	6 3/4 (171)	10 1/2 (267)	7 (178)	7 5/8 (193.7)	3 (76)
9	240	41.0	3	3	LDH41SX3S	M	120 (55)	28 1/4 (718)	20 1/4 (514)	9 3/4 (248)	13 1/2 (343)	10 (254)	10 5/8 (269.9)	3 (76)
9	480	41.0	1	3	LDH41SX11S	M	120 (55)	28 1/4 (718)	20 1/4 (514)	9 3/4 (248)	13 1/2 (343)	10 (254)	10 5/8 (269.9)	3 (76)
9	480	41.0	3	3	LDH41SX5S	M	120 (55)	28 1/4 (718)	20 1/4 (514)	9 3/4 (248)	13 1/2 (343)	10 (254)	10 5/8 (269.9)	3 (76)
12	240	54.0	3	4	LDH54SX3S	M	135 (62)	28 1/4 (718)	20 1/4 (514)	12 3/4 (324)	16 1/2 (419)	13 (330)	13 5/8 (346.1)	3 (76)
12	480	54.0	1	3	LDH54SX11S	M	135 (62)	28 1/4 (718)	20 1/4 (514)	12 3/4 (324)	16 1/2 (419)	13 (330)	13 5/8 (346.1)	3 (76)
12	480	54.0	3	2	LDH54SX5S	M	135 (62)	28 1/4 (718)	20 1/4 (514)	12 3/4 (324)	16 1/2 (419)	13 (330)	13 5/8 (346.1)	3 (76)
15	240	68.0	3	5	LDH68SX3S	M	195 (89)	28 1/4 (718)	20 1/4 (514)	15 3/4 (400)	19 1/2 (495)	16 (406)	17 7/8 (454.0)	3 (76)
15	480	68.0	1	3	LDH68SX11S	M	195 (89)	28 1/4 (718)	20 1/4 (514)	15 3/4 (400)	19 1/2 (495)	16 (406)	17 7/8 (454.0)	3 (76)
15	480	68.0	3	5	LDH68SX5S	M	195 (89)	28 1/4 (718)	20 1/4 (514)	15 3/4 (400)	19 1/2 (495)	16 (406)	17 7/8 (454.0)	3 (76)
18	240	80.0	3	6	LDH80SX3S	M	205 (93)	28 1/4 (718)	20 1/4 (514)	18 3/4 (476)	22 1/2 (572)	19 (483)	20 7/8 (530.2)	3 (76)
18	480	80.0	1	6	LDH80SX11S	M	205 (93)	28 1/4 (718)	20 1/4 (514)	18 3/4 (476)	22 1/2 (572)	19 (483)	20 7/8 (530.2)	3 (76)
18	480	80.0	3	3	LDH80SX5S	M	205 (93)	28 1/4 (718)	20 1/4 (514)	18 3/4 (476)	22 1/2 (572)	19 (483)	20 7/8 (530.2)	3 (76)
21	240	95.0	3	7	LDH95SX3S	M	235 (107)	28 1/4 (718)	20 1/4 (514)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	480	95.0	1	7	LDH95SX11S	M	235 (107)	28 1/4 (718)	20 1/4 (514)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	480	95.0	3	7	LDH95SX5S	M	235 (107)	28 1/4 (718)	20 1/4 (514)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	240	120.0	3	7	LDH120SX3S	M	260 (118)	33 (838)	25 (635)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	480	120.0	1	7	LDH120SX11S	M	260 (118)	33 (838)	25 (635)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	480	120.0	3	7	LDH120SX5S	M	260 (118)	33 (838)	25 (635)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	480	160.0	3	7	LDH160SX5S	M	290 (132)	40 1/2 (1029)	32 1/2 (826)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
21	480	200.0	3	7	LDH200SX5S	M	310 (141)	49 1/2 (1257)	41 1/2 (1054)	21 3/4 (552)	25 1/2 (648)	22 (559)	23 7/8 (606.4)	3 (76)
24	480	225.0	3	8	LDH225SX5S	M	330 (150)	49 1/2 (1257)	41 1/2 (1054)	24 3/4 (629)	28 1/2 (724)	25 (635)	26 7/8 (682.6)	3 (76)

- M - Manufacturing lead times
- Truck Shipment only

#### Notes:

- See Watt Density vs. Air Temperature/Velocity charts on page 393 to confirm suitability in the application.

# Air Heaters

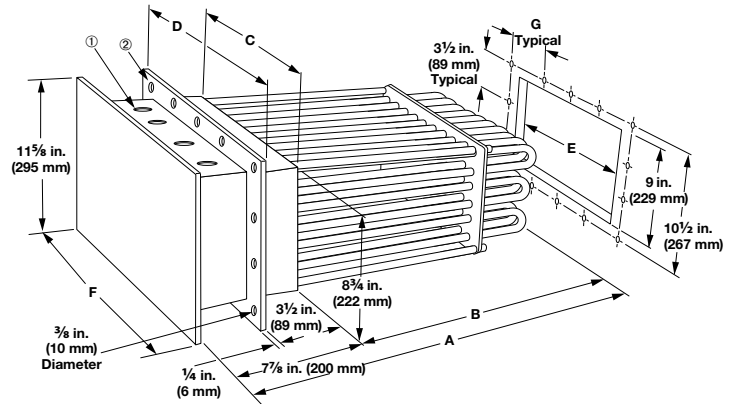
## Duct Heaters

### D SERIES



### Application: High Temperature Air 800°F (427°C)

- Removable alloy 840 WATROD elements
  - Without thermostat
  - General purpose enclosure
  - Steel flange
- ① 6 and 12 element heaters have (1) 1 inch NPT conduit opening; 18, 24, 30 and 42 element heaters have (2) 1 inch NPT conduit openings; 36, 48, 54 and 60 element heaters have (2) 1 inch NPT and (2) 1 1/4 inch conduit openings
- ② All flanges are 12 inches wide



# of Elem.	Volts	kW	Ph	# Circ	Part Number	Del.	Ship Wt. lbs. (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	"D" Dim. in. (mm)	"E" Dim. in. (mm)	"F" Dim. in. (mm)	"G" Dim. in. (mm)
<b>20 W/in<sup>2</sup> (3.1 W/cm<sup>2</sup>)</b>														
6	240	6.0	1	1	D6S10S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
6	240	6.0	3	1	D6S3S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
6	480	6.0	1	1	D6S11S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
6	480	6.0	3	1	D6S5S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
12	240	12.0	1	1	D12S10S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
12	240	12.0	3	1	D12S3S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
12	480	12.0	1	1	D12S11S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
12	480	12.0	3	1	D12S5S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
18	240	18.0	1	2	D18S10S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
18	240	18.0	3	1	D18S3S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
18	480	18.0	1	1	D18S11S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
18	480	18.0	3	1	D18S5S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
24	240	24.0	1	2	D24S10S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
24	240	24.0	3	2	D24S3S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
24	480	24.0	1	1	D24S11S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
24	480	24.0	3	1	D24S5S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
30	240	30.0	3	2	D30S3S	M	120 (55)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	10 <sup>3</sup> / <sub>4</sub> (273)	14 <sup>1</sup> / <sub>2</sub> (368)	11 (279)	13 <sup>3</sup> / <sub>4</sub> (349)	3 <sup>1</sup> / <sub>4</sub> (83)
30	480	30.0	1	2	D30S11S	M	120 (55)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	10 <sup>3</sup> / <sub>4</sub> (273)	14 <sup>1</sup> / <sub>2</sub> (368)	11 (279)	13 <sup>3</sup> / <sub>4</sub> (349)	3 <sup>1</sup> / <sub>4</sub> (83)
30	480	30.0	3	1	D30S5S	M	120 (55)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	10 <sup>3</sup> / <sub>4</sub> (273)	14 <sup>1</sup> / <sub>2</sub> (368)	11 (279)	13 <sup>3</sup> / <sub>4</sub> (349)	3 <sup>1</sup> / <sub>4</sub> (83)

CONTINUED

- M - Manufacturing lead times
- Truck Shipment only

#### Notes:

- See *Watt Density vs. Air Temperature/Velocity* charts on page 393 to confirm suitability in the application.

# Air Heaters

## Duct Heaters

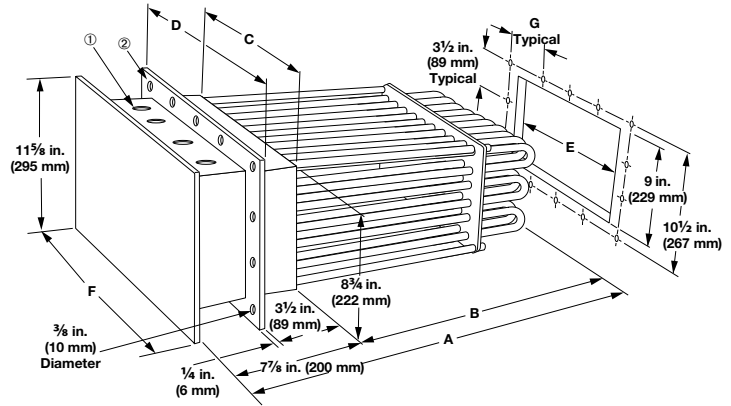
### D SERIES



### Application: High Temperature Air 800°F (427°C)

- Removable alloy 840 WATROD elements
- Without thermostat
- General purpose enclosure
- Steel flange

- ① 6 and 12 element heaters have (1) 1 inch NPT conduit opening; 18, 24, 30 and 42 element heaters have (2) 1 inch NPT conduit openings; 36, 48, 54, and 60 element heaters have (2) 1 inch NPT and (2) 1 1/4 inch conduit openings
- ② All flanges are 12 inches wide



# of Elem.	Volts	kW	Ph	# Circ	Part Number	Del.	Ship Wt. lbs. (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	"D" Dim. in. (mm)	"E" Dim. in. (mm)	"F" Dim. in. (mm)	"G" Dim. in. (mm)
<b>20 W/in<sup>2</sup> (3.1 W/cm<sup>2</sup>)</b>														
36	240	36.0	3	2	<b>D36S3S</b>	M	135 (62)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	15 <sup>3</sup> / <sub>4</sub> (400)	3 <sup>3</sup> / <sub>4</sub> (95)
36	480	36.0	1	2	<b>D36S11S</b>	M	135 (62)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	15 <sup>3</sup> / <sub>4</sub> (400)	3 <sup>3</sup> / <sub>4</sub> (95)
36	480	36.0	3	1	<b>D36S5S</b>	M	135 (62)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	15 <sup>3</sup> / <sub>4</sub> (400)	3 <sup>3</sup> / <sub>4</sub> (95)
42	240	42.0	3	2	<b>D42S3S</b>	M	155 (71)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	14 <sup>3</sup> / <sub>4</sub> (375)	18 <sup>1</sup> / <sub>2</sub> (470)	15 (381)	17 <sup>3</sup> / <sub>4</sub> (451)	4 <sup>1</sup> / <sub>4</sub> (108)
42	480	42.0	1	2	<b>D42S11S</b>	M	155 (71)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	14 <sup>3</sup> / <sub>4</sub> (375)	18 <sup>1</sup> / <sub>2</sub> (470)	15 (381)	17 <sup>3</sup> / <sub>4</sub> (451)	4 <sup>1</sup> / <sub>4</sub> (108)
42	480	42.0	3	2	<b>D42S5S</b>	M	155 (71)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	14 <sup>3</sup> / <sub>4</sub> (375)	18 <sup>1</sup> / <sub>2</sub> (470)	15 (381)	17 <sup>3</sup> / <sub>4</sub> (451)	4 <sup>1</sup> / <sub>4</sub> (108)
48	240	48.0	3	4	<b>D48S3S</b>	M	195 (89)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	16 <sup>3</sup> / <sub>4</sub> (425)	20 <sup>1</sup> / <sub>2</sub> (521)	17 (432)	19 <sup>3</sup> / <sub>4</sub> (502)	4 <sup>3</sup> / <sub>4</sub> (121)
48	480	48.0	1	2	<b>D48S11S</b>	M	195 (89)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	16 <sup>3</sup> / <sub>4</sub> (425)	20 <sup>1</sup> / <sub>2</sub> (521)	17 (432)	19 <sup>3</sup> / <sub>4</sub> (502)	4 <sup>3</sup> / <sub>4</sub> (121)
48	480	48.0	3	2	<b>D48S5S</b>	M	195 (89)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	16 <sup>3</sup> / <sub>4</sub> (425)	20 <sup>1</sup> / <sub>2</sub> (521)	17 (432)	19 <sup>3</sup> / <sub>4</sub> (502)	4 <sup>3</sup> / <sub>4</sub> (121)
54	240	54.0	3	3	<b>D54S3S</b>	M	205 (93)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	21 <sup>3</sup> / <sub>4</sub> (552)	5 <sup>1</sup> / <sub>4</sub> (133)
54	480	54.0	1	3	<b>D54S11S</b>	M	205 (93)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	21 <sup>3</sup> / <sub>4</sub> (552)	5 <sup>1</sup> / <sub>4</sub> (133)
54	480	54.0	3	2	<b>D54S5S</b>	M	205 (93)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	21 <sup>3</sup> / <sub>4</sub> (552)	5 <sup>1</sup> / <sub>4</sub> (133)
60	240	60.0	3	4	<b>D60S3S</b>	M	235 (107)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	60.0	1	4	<b>D60S11S</b>	M	235 (107)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	60.0	3	2	<b>D60S5S</b>	M	235 (107)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	240	75.0	3	4	<b>D75S3S</b>	M	260 (118)	32 <sup>7</sup> / <sub>8</sub> (835.0)	25 (635)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	75.0	1	4	<b>D75S11S</b>	M	260 (118)	32 <sup>7</sup> / <sub>8</sub> (835.0)	25 (635)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	75.0	3	2	<b>D75S5S</b>	M	260 (118)	32 <sup>7</sup> / <sub>8</sub> (835.0)	25 (635)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	100.0	3	4	<b>D100S5S</b>	M	290 (132)	40 <sup>3</sup> / <sub>8</sub> (1025.5)	32 <sup>1</sup> / <sub>2</sub> (826)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	125.0	3	4	<b>D125S5S</b>	M	310 (141)	49 <sup>3</sup> / <sub>8</sub> (1254.1)	41 <sup>1</sup> / <sub>2</sub> (1054)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)

- **M** - Manufacturing lead times
- Truck Shipment only

#### Notes:

- See *Watt Density vs. Air Temperature/Velocity* charts on page 393 to confirm suitability in the application.

# Air Heaters

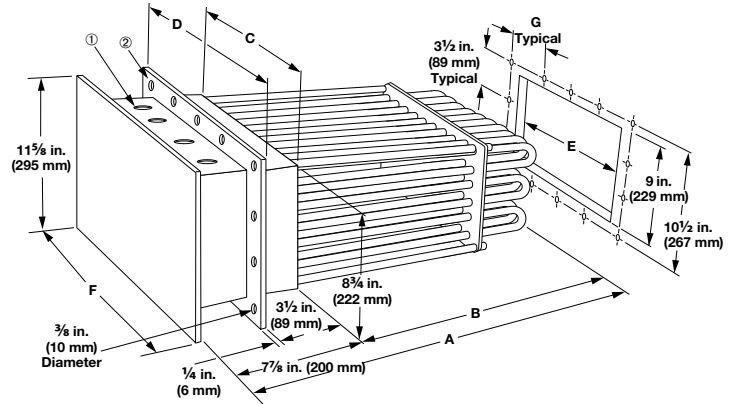
## Duct Heaters

### D SERIES



### Application: Medium Temperature Air 750°F (399°C)

- Removable alloy 840 WATROD elements
  - Without thermostat
  - General purpose enclosure
  - Steel flange
- ① 6 and 12 element heaters have (1) 1 inch NPT conduit opening; 18, 24, 30 and 42 element heaters have (2) 1 inch NPT conduit openings; 36, 48, 54, and 60 element heaters have (2) 1 inch NPT and (2) 1 1/4 inch conduit openings
- ② All flanges are 12 inches wide



# of Elem.	Volts	kW	Ph	# Circ	Part Number	Del.	Ship Wt. lbs. (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	"D" Dim. in. (mm)	"E" Dim. in. (mm)	"F" Dim. in. (mm)	"G" Dim. in. (mm)
<b>30 W/in<sup>2</sup> (4.7 W/cm<sup>2</sup>)</b>														
6	240	9.0	1	1	D6SX10S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
6	240	9.0	3	1	D6SX3S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
6	480	9.0	1	1	D6SX11S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
6	480	9.0	3	1	D6SX5S	M	50 (23)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	2 <sup>3</sup> / <sub>4</sub> (70)	6 <sup>1</sup> / <sub>2</sub> (165)	3 (76)	5 <sup>3</sup> / <sub>4</sub> (146)	2 <sup>1</sup> / <sub>2</sub> (64)
12	240	18.0	1	2	D12SX10S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
12	240	18.0	3	1	D12SX3S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
12	480	18.0	1	1	D12SX11S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
12	480	18.0	3	1	D12SX5S	M	55 (25)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	4 <sup>3</sup> / <sub>4</sub> (121)	8 <sup>1</sup> / <sub>2</sub> (215)	5 (127)	7 <sup>3</sup> / <sub>4</sub> (197)	3 <sup>1</sup> / <sub>2</sub> (89)
18	240	27.0	1	3	D18SX10S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
18	240	27.0	3	2	D18SX3S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
18	480	27.0	1	2	D18SX11S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
18	480	27.0	3	1	D18SX5S	M	65 (30)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	6 <sup>3</sup> / <sub>4</sub> (171)	10 <sup>1</sup> / <sub>2</sub> (267)	7 (178)	9 <sup>3</sup> / <sub>4</sub> (248)	3 (76)
24	240	36.0	1	4	D24SX10S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
24	240	36.0	3	2	D24SX3S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
24	480	36.0	1	2	D24SX11S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
24	480	36.0	3	1	D24SX5S	M	95 (43)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	8 <sup>3</sup> / <sub>4</sub> (222)	12 <sup>1</sup> / <sub>2</sub> (318)	9 (229)	11 <sup>3</sup> / <sub>4</sub> (298)	2 <sup>3</sup> / <sub>4</sub> (70)
30	240	45.0	3	5	D30SX3S	M	120 (55)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	10 <sup>3</sup> / <sub>4</sub> (273)	14 <sup>1</sup> / <sub>2</sub> (368)	11 (279)	13 <sup>3</sup> / <sub>4</sub> (349)	3 <sup>1</sup> / <sub>4</sub> (83)
30	480	45.0	1	2	D30SX11S	M	120 (55)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	10 <sup>3</sup> / <sub>4</sub> (273)	14 <sup>1</sup> / <sub>2</sub> (368)	11 (279)	13 <sup>3</sup> / <sub>4</sub> (349)	3 <sup>1</sup> / <sub>4</sub> (83)
30	480	45.0	3	2	D30SX5S	M	120 (55)	27 <sup>7</sup> / <sub>8</sub> (708)	20 (508)	10 <sup>3</sup> / <sub>4</sub> (273)	14 <sup>1</sup> / <sub>2</sub> (368)	11 (279)	13 <sup>3</sup> / <sub>4</sub> (349)	3 <sup>1</sup> / <sub>4</sub> (83)

CONTINUED

- M - Manufacturing lead times
- Truck Shipment only

**Notes:**

- See Watt Density vs. Air Temperature/Velocity charts on page 393 to confirm suitability in the application.

# Air Heaters

## Duct Heaters

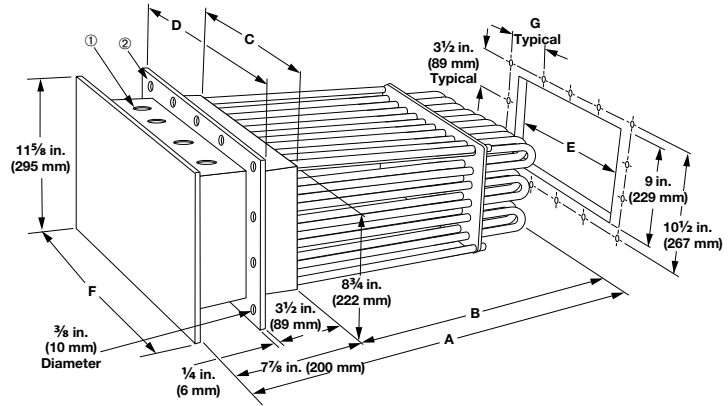
### D SERIES



### Application: Medium Temperature Air 750°F (399°C)

- Removable alloy 840 WATROD elements
- Without thermostat
- General purpose enclosure
- Steel flange

- ① 6 and 12 element heaters have (1) 1 inch NPT conduit opening; 18, 24, 30 and 42 element heaters have (2) 1 inch NPT conduit openings; 36, 48, 54, and 60 element heaters have (2) 1 inch NPT and (2) 1 1/4 inch conduit openings
- ② All flanges are 12 inches. wide



# of Elem.	Volts	kW	Ph	# Circ	Part Number	Del.	Ship Wt. lbs. (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	"D" Dim. in. (mm)	"E" Dim. in. (mm)	"F" Dim. in. (mm)	"G" Dim. in. (mm)
<b>30 W/in<sup>2</sup> (4.7 W/cm<sup>2</sup>)</b>														
36	240	54.0	3	3	D36SX3S	M	135 (62)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	15 <sup>3</sup> / <sub>4</sub> (400)	3 <sup>3</sup> / <sub>4</sub> (95)
36	480	54.0	1	3	D36SX11S	M	135 (62)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	15 <sup>3</sup> / <sub>4</sub> (400)	3 <sup>3</sup> / <sub>4</sub> (95)
36	480	54.0	3	2	D36SX5S	M	135 (62)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	12 <sup>3</sup> / <sub>4</sub> (324)	16 <sup>1</sup> / <sub>2</sub> (419)	13 (330)	15 <sup>3</sup> / <sub>4</sub> (400)	3 <sup>3</sup> / <sub>4</sub> (95)
42	240	63.0	3	7	D42SX3S	M	155 (71)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	14 <sup>3</sup> / <sub>4</sub> (375)	18 <sup>1</sup> / <sub>2</sub> (470)	15 (381)	17 <sup>3</sup> / <sub>4</sub> (451)	4 <sup>1</sup> / <sub>4</sub> (108)
42	480	63.0	1	3	D42SX11S	M	155 (71)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	14 <sup>3</sup> / <sub>4</sub> (375)	18 <sup>1</sup> / <sub>2</sub> (470)	15 (381)	17 <sup>3</sup> / <sub>4</sub> (451)	4 <sup>1</sup> / <sub>4</sub> (108)
42	480	63.0	3	2	D42SX5S	M	155 (71)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	14 <sup>3</sup> / <sub>4</sub> (375)	18 <sup>1</sup> / <sub>2</sub> (470)	15 (381)	17 <sup>3</sup> / <sub>4</sub> (451)	4 <sup>1</sup> / <sub>4</sub> (108)
48	240	72.0	3	4	D48SX3S	M	195 (89)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	16 <sup>3</sup> / <sub>4</sub> (425)	20 <sup>1</sup> / <sub>2</sub> (521)	17 (432)	19 <sup>3</sup> / <sub>4</sub> (502)	4 <sup>3</sup> / <sub>4</sub> (121)
48	480	72.0	1	4	D48SX11S	M	195 (89)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	16 <sup>3</sup> / <sub>4</sub> (425)	20 <sup>1</sup> / <sub>2</sub> (521)	17 (432)	19 <sup>3</sup> / <sub>4</sub> (502)	4 <sup>3</sup> / <sub>4</sub> (121)
48	480	72.0	3	2	D48SX5S	M	195 (89)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	16 <sup>3</sup> / <sub>4</sub> (425)	20 <sup>1</sup> / <sub>2</sub> (521)	17 (432)	19 <sup>3</sup> / <sub>4</sub> (502)	4 <sup>3</sup> / <sub>4</sub> (121)
54	240	81.0	3	6	D54SX3S	M	205 (93)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	21 <sup>3</sup> / <sub>4</sub> (552)	5 <sup>1</sup> / <sub>4</sub> (133)
54	480	81.0	1	6	D54SX11S	M	205 (93)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	21 <sup>3</sup> / <sub>4</sub> (552)	5 <sup>1</sup> / <sub>4</sub> (133)
54	480	81.0	3	3	D54SX5S	M	205 (93)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	18 <sup>3</sup> / <sub>4</sub> (476)	22 <sup>1</sup> / <sub>2</sub> (572)	19 (483)	21 <sup>3</sup> / <sub>4</sub> (552)	5 <sup>1</sup> / <sub>4</sub> (133)
60	240	90.0	3	5	D60SX3S	M	235 (107)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	90.0	1	4	D60SX11S	M	235 (107)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	90.0	3	4	D60SX5S	M	235 (107)	27 <sup>7</sup> / <sub>8</sub> (708.0)	20 (508)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	240	115.0	3	10	D75SX3S	M	260 (118)	32 <sup>7</sup> / <sub>8</sub> (835.0)	25 (635)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	115.0	1	5	D75SX11S	M	260 (118)	32 <sup>7</sup> / <sub>8</sub> (835.0)	25 (635)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	115.0	3	4	D75SX5S	M	260 (118)	32 <sup>7</sup> / <sub>8</sub> (835.0)	25 (635)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	150.0	3	4	D100SX5S	M	290 (132)	40 <sup>3</sup> / <sub>8</sub> (1025.5)	32 <sup>1</sup> / <sub>2</sub> (826)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)
60	480	190.0	3	5	D125SX5S	M	310 (141)	49 <sup>3</sup> / <sub>8</sub> (1254.1)	41 <sup>1</sup> / <sub>2</sub> (1054)	20 <sup>3</sup> / <sub>4</sub> (527)	24 <sup>1</sup> / <sub>2</sub> (622)	21 (533)	23 <sup>3</sup> / <sub>4</sub> (603)	5 <sup>3</sup> / <sub>4</sub> (146)

- M - Manufacturing lead times
- Truck Shipment only

#### Notes:

- See Watt Density vs. Air Temperature/Velocity charts on page 393 to confirm suitability in the application.

# Air Heaters

## Duct Heaters

### LDH SERIES and D SERIES

#### Replacement Elements

Replaceable heating elements provide easy field service and reduce downtime. Element change-out is made simple by a single screw clamp.

To order replacement elements, specify the **replacement element part number** (from the table) that corresponds to the original Watlow duct heater part number. Then, specify **quantity**.

#### Replacement Elements

Original Duct Heater Part Numbers	Replacement Element		A Dimension		Replacement Element Part Number	Delivery	Est. Net Wt.	
	Volts	Watts	in.	(mm)			lbs	(kg)
<b>20 W/in<sup>2</sup> (3.1 W/cm<sup>2</sup>)</b>								
<b>D6S3 to D60S3</b>	240	1000	27 <sup>7</sup> / <sub>8</sub>	(708.0)	<b>D6240</b>	M	1.0	(0.5)
<b>D6S5 to D60S5</b>	480	1000	27 <sup>7</sup> / <sub>8</sub>	(708.0)	<b>D6480</b>	M	1.0	(0.5)
<b>D75S3</b>	240	1250	32 <sup>7</sup> / <sub>8</sub>	(835.0)	<b>D75240</b>	M	1.0	(0.5)
<b>D75S5</b>	480	1250	32 <sup>7</sup> / <sub>8</sub>	(835.0)	<b>D75480</b>	M	1.0	(0.5)
<b>D100S5</b>	480	1667	40 <sup>3</sup> / <sub>8</sub>	(1025.5)	<b>D100480</b>	M	1.4	(0.7)
<b>D125S5</b>	480	2083	49 <sup>3</sup> / <sub>8</sub>	(1254.1)	<b>D125480</b>	M	1.7	(0.8)
<b>30 W/in<sup>2</sup> (4.7 W/cm<sup>2</sup>)</b>								
<b>D6SX3 to D60SX3</b>	240	1500	27 <sup>7</sup> / <sub>8</sub>	(708.0)	<b>D6X240</b>	M	1.0	(0.5)
<b>D6SX5 to D60SX5</b>	480	1500	27 <sup>7</sup> / <sub>8</sub>	(708.0)	<b>D6X480</b>	M	1.0	(0.5)
<b>D75SX3</b>	240	1917	32 <sup>7</sup> / <sub>8</sub>	(835.0)	<b>D75X240</b>	M	1.0	(0.5)
<b>D75SX5</b>	480	1917	32 <sup>7</sup> / <sub>8</sub>	(835.0)	<b>D75X480</b>	M	1.0	(0.5)
<b>D100SX5</b>	480	2500	40 <sup>3</sup> / <sub>8</sub>	(1025.5)	<b>D100X480</b>	M	1.4	(0.7)
<b>D125SX5</b>	480	3167	49 <sup>3</sup> / <sub>8</sub>	(1254.1)	<b>D125X480</b>	M	1.7	(0.8)

• **M** - Manufacturing lead times

# Air Heaters

## Duct Heaters

### LDH SERIES and D SERIES

#### Part Number

Stock Duct Part Number	Optional Terminal Enclosures	Optional Process Sensors	Sheath Limit Sensors

#### Stock Duct Part Number

**Note:** Catalog part numbers include optional enclosures. To order optional enclosures or sensors, substitute the appropriate suffix.

#### Optional Terminal Enclosures

S = General purpose enclosure

W = Moisture resistant enclosure

**Note:** Catalog listing is a general purpose enclosure. Substitute enclosure options are noted.

#### Optional Process Sensors

PJ = Type J process thermocouple in thermowell

PK = Type K process thermocouple in thermowell

#### Sheath Limit Sensors

HJ = Type J high-limit thermocouple

HK = Type K high-limit thermocouple

**Example Part Number:** D6SX10 S J HJ



# Air Heaters

## Duct Heaters

### MDH SERIES

Watlow has developed a line of process air heaters offering improved performance and increased versatility in medium to low temperature applications.

The duct heaters are modular and consist of two parts. The first is a 6 kilowatt heater available in either 240 or 480 volts, single- or three-phase.

The second part of the heater consists of the electrical housing protecting each module's termination area and a main flange that bolts into the user's ductwork. The heater modules are installed in the housing and main flange via rectangular slots in the main flange. The range of modules that can be accommodated in various duct heater assemblies, range from 1-10 modules. A range of 6 to 60 kilowatts, in 6 kilowatt increments is achieved.

The new design of the modular duct heater offers increased reliability. The individual modules are removable through the housing of the assembly, which eliminates the need to pull the complete heater from the ductwork. This reduces downtime and costs because the heating elements can be replaced individually.

Performance improvements include quicker response time and reduced infiltration from the air stream being heated into the electrical enclosure.

### Features and Benefits

#### Individual modules removable through housing

- Reduces downtime for replacement of module

#### Smaller diameter elements (0.315 inch)

- Results in a 25 percent lower energy usage on initial heat-up

#### 27 percent reduction in heat-up time as compared to traditional 0.430 inch diameter duct heater elements

- Results in faster response time

#### 31 percent lighter weight than traditional tubular duct heaters

- Reduces shipping costs and increases worker safety

#### Greater free cross sectional area

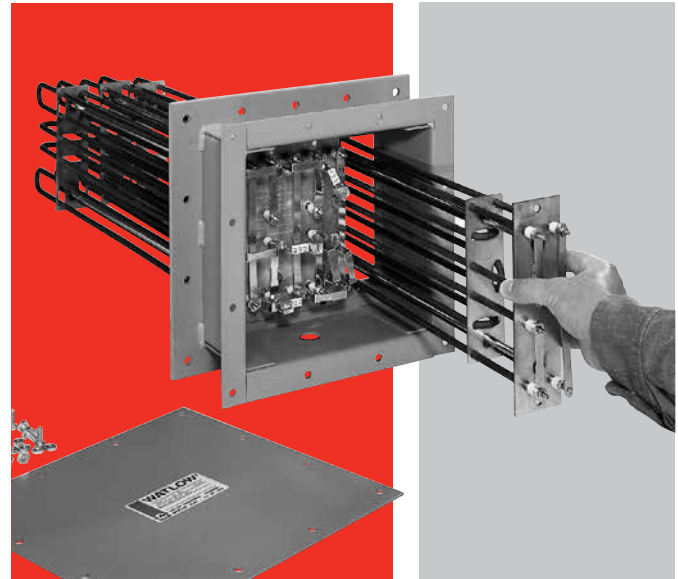
- Results in lower pressure drop

#### Improved seal between element and electrical housing

- Results in lower electrical housing temperature

#### Flexible module wiring

- Allows user to sequentially stage modules



### Typical Applications

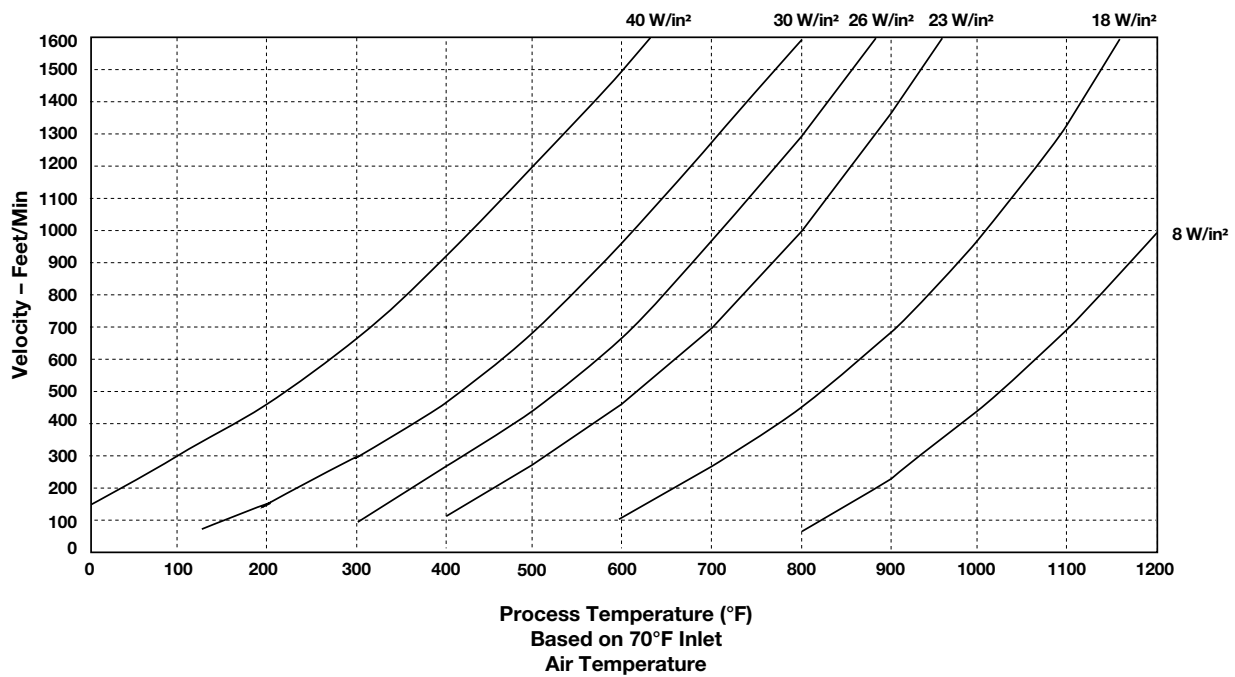
- Low temperature ovens
- Parts drying
- Semiconductor clean room environmental heating
- Plastic curing
- Load banks
- Heated air knives
- Food dehydration
- Heat shrink tunnels

# Air Heaters

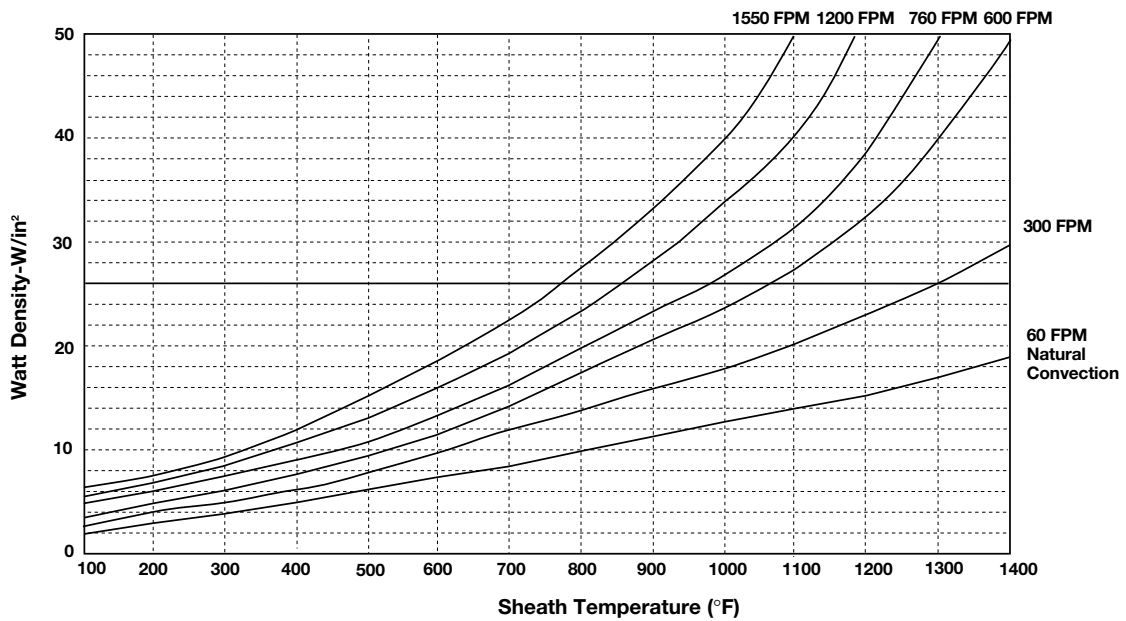
## Duct Heaters

### MDH SERIES

#### Velocity vs. Process Temperature



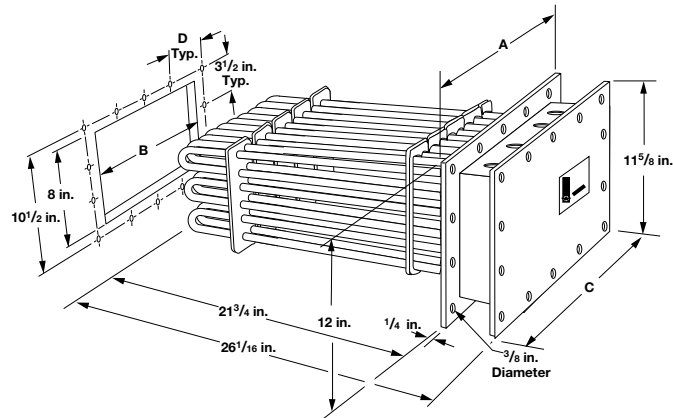
#### Watt Density vs. Sheath Temperature



# Air Heaters

## Duct Heaters

### MDH SERIES



Application: Air Heating – Maximum outlet temperature – 750°F (399°C)

Watt Density W/in <sup>2</sup>	kW	Volts	Phase	No. of Circuits	No. of Modules	Est. Shipping Wt. lbs	Del.	Part Number	Dimensions in.			
									A	B	C	D
26	6	240	1	1	1	35	M	MDH6S10	6.50	2.50	5.75	2.50
26	6	240	3	1	1	35	M	MDH6S3	6.50	2.50	5.75	2.50
26	6	480	1	1	1	35	M	MDH6S11	6.50	2.50	5.75	2.50
26	6	480	3	1	1	35	M	MDH6S5	6.50	2.50	5.75	2.50
26	12	240	1	2	2	39	M	MDH12S10	8.50	4.75	7.75	3.50
26	12	240	3	1	2	39	M	MDH12S3	8.50	4.75	7.75	3.50
26	12	480	1	1	2	39	M	MDH12S11	8.50	4.75	7.75	3.50
26	12	480	3	1	2	39	M	MDH12S5	8.50	4.75	7.75	3.50
26	18	240	1	3	3	46	M	MDH18S10	10.50	7.00	9.75	3.00
26	18	240	3	1	3	46	M	MDH18S3	10.50	7.00	9.75	3.00
26	18	480	1	1	3	46	M	MDH18S11	10.50	7.00	9.75	3.00
26	18	480	3	1	3	46	M	MDH18S5	10.50	7.00	9.75	3.00
26	24	240	1	4	4	67	M	MDH24S10	12.50	9.25	11.75	2.75
26	24	240	3	2	4	67	M	MDH24S3	12.50	9.25	11.75	2.75
26	24	480	1	2	4	67	M	MDH24S11	12.50	9.25	11.75	2.75
26	24	480	3	1	4	67	M	MDH24S5	12.50	9.25	11.75	2.75
26	30	240	3	2	5	84	M	MDH30S3	15.75	11.50	15.00	3.56
26	30	480	1	2	5	84	M	MDH30S11	15.75	11.50	15.00	3.56
26	30	480	3	1	5	84	M	MDH30S5	15.75	11.50	15.00	3.56
26	36	240	3	2	6	95	M	MDH36S3	18.00	13.75	17.25	4.13
26	36	480	1	2	6	95	M	MDH36S11	18.00	13.75	17.25	4.13
26	36	480	3	1	6	95	M	MDH36S5	18.00	13.75	17.25	4.13
26	42	240	3	3	7	109	M	MDH42S3	20.25	16.00	19.50	4.69
26	42	480	1	3	7	109	M	MDH42S11	20.25	16.00	19.50	4.69
26	42	480	3	2	7	109	M	MDH42S5	20.25	16.00	19.50	4.69
26	48	240	3	4	8	137	M	MDH48S3	22.50	18.25	21.75	5.25
26	48	480	1	3	8	137	M	MDH48S11	22.50	18.25	21.75	5.25
26	48	480	3	2	8	137	M	MDH48S5	22.50	18.25	21.75	5.25
26	54	240	3	3	9	144	M	MDH54S3	24.75	20.50	24.00	5.81
26	54	480	1	3	9	144	M	MDH54S11	24.75	20.50	24.00	5.81
26	54	480	3	2	9	144	M	MDH54S5	24.75	20.50	24.00	5.81
26	60	240	3	4	10	165	M	MDH60S3	27.00	22.75	26.25	6.38
26	60	480	1	4	10	165	M	MDH60S11	27.00	22.75	26.25	6.38
26	60	480	3	2	10	165	M	MDH60S5	27.00	22.75	26.25	6.38

• M - Manufacturing lead times

■ Truck Shipment only

Options include individual modules with optional general purpose housing, high-temperature thermocouple kit and blank flange modules.

Modular duct heaters with **1** and **2** modules have conduit openings for **one**, 1 inch NPT fitting.

Modular duct heaters with **3, 4, 5,** and **7** modules have conduit openings for **two**, 1 inch NPT fittings.

Modular duct heaters with **6, 8, 9,** and **10** modules have conduit openings for **two**, 1 1/4 inch NPT and **two**, 1 inch NPT fittings.

# Air Heaters

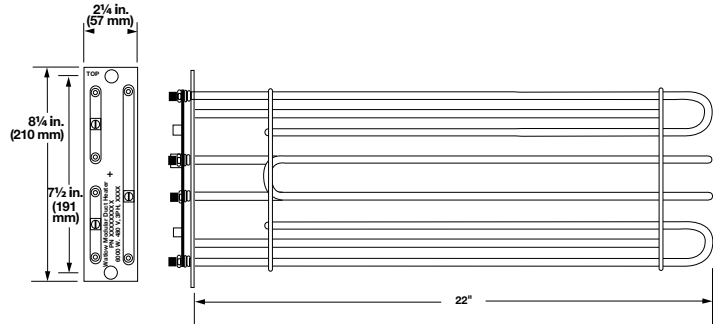
## Duct Heaters

### MDH SERIES

#### Individual Module Dimensions

##### Specifications

- Module rating - 240 or 480VAC, 6kW, three-phase or one-phase
- Watt density - 26 W/in<sup>2</sup>
- Elements - 0.315 inch dia. alloy 840 elements
- High-limit thermocouple installed by drilling premarked hole in flange
- 6-60kW range when mounted in duct heater assembly



##### Application Information

- Maximum sheath temperature = 1200°F (649°C)
- Maximum outlet temperature = 750°F (399°C)

## Options

### Terminal Enclosures

Terminal enclosures are available in general purpose and moisture resistant configurations.

### High-Limit Thermocouples

High-limit thermocouples can be supplied on specified modules or shipped as a kit. Available thermocouples are Types J and K.

### Blank Module Covers

Module covers are available for covering blank slots on the main flange. This allows for adding heater module at a later time to allow higher wattage outputs.

Watlow Part Number	Description
<b>Replacement Modules</b>	
<b>M63</b>	6kW, 240V, 3 phase
<b>M610</b>	6kW, 240V, 1 phase
<b>M65</b>	6kW, 480V, 3 phase
<b>M611</b>	6kW, 480V, 1 phase
<b>High Limit Thermocouple Kits</b>	
<b>MTCJ</b>	Type J (0-1000°F)
<b>MTCK</b>	Type K (0-2000°F)
<b>Blank Module Covers</b>	
<b>MBLK</b>	Cover slots in main flange

# Air Heaters

## Finned Heaters

### 375 Finned Strip Heaters

Watlow's 375 finned strip heater is constructed of highly-compacted magnesium oxide (MgO) based insulation, which conducts heat efficiently from the nickel chromium element wire to the sheath. Two-inch wide (51 mm) nickel plated fins are attached to maximize surface contact allowing heat to transfer into the air faster. Lower sheath temperature and element life are maximized by this finned construction.

### Performance Capabilities

- Aluminized steel sheath temperatures up to 1100°F (595°C)
- Watt density up to 33 W/in<sup>2</sup> (5.1 W/cm<sup>2</sup>)
- UL® approved up to 240VAC (File No. E52951)
- CSA approved up to 600VAC (File No. LR7392)

### Features and Benefits

#### Nickel chromium element wire is centered in the heater

- Uniformly heats the strip

#### Aluminized steel sheath

- Operates at higher temperatures
- Resists corrosion more effectively than iron-sheathed heaters

#### Optional 430 stainless steel sheath

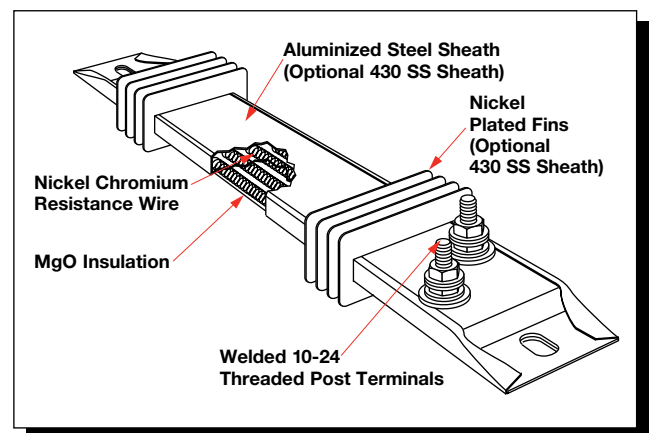
- Provides a durable solution for highly corrosive environments

#### Welded post terminals

- Produces strong, trouble-free connections

#### Available lengths from 5<sup>1</sup>/<sub>2</sub> to 48 in. (140 to 1220 mm)

- Fits a variety of application needs



### Typical Applications

- Enclosure heating
- Load bank resistors
- Shrink tunnels
- Duct heaters
- Space heaters
- Drying ovens
- Incubators
- Air heating
- Heat curing
- Ink drying
- Food warmers
- Moisture protection
- Dehumidifiers
- Stress relieving ovens

# Air Heaters

## Finned Heaters

### 375 Finned Strip Heaters

#### Applications and Technical Data

#### Calculating Watt Density

Use the graph and formulas to ensure that the maximum allowable watt density for the heater is not exceeded in the application.

Open air watt density is calculated for the total heated surface area.

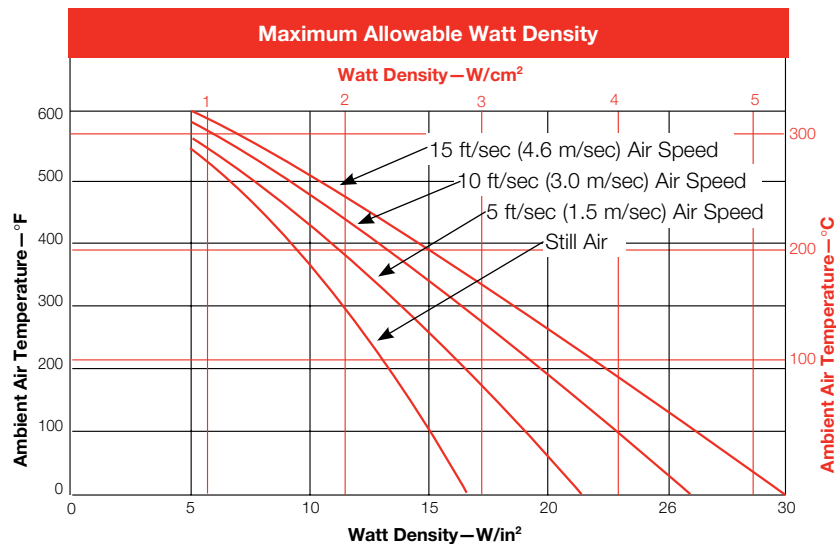
#### Formulas

$$\text{Watt Density} = \frac{\text{Wattage}}{\text{Heated Area}}$$

$$\begin{aligned} \text{Heated Area} \\ (\text{Offset Terminals}) &= [\text{Overall Length (A)} - 4 \text{ in.}] \\ &\quad \times 3.75 \text{ in.} \\ &= [\text{Overall Length (A)} - 102 \text{ mm}] \\ &\quad \times 95.3 \text{ mm} \end{aligned}$$

$$\begin{aligned} \text{Heated Area} \\ (\text{Parallel Terminals}) &= [\text{Overall Length (A)} - 3.12 \text{ in.}] \\ &\quad \times 3.75 \text{ in.} \\ &= [\text{Overall Length (A)} - 79.3 \text{ mm}] \\ &\quad \times 95.3 \text{ mm} \end{aligned}$$

$$\begin{aligned} \text{Heated Area} \\ (\text{One-on-One Terminals}) &= [\text{Overall Length (A)} - 4.25 \text{ in.}] \\ &\quad \times 3.75 \text{ in.} \\ &= [\text{Overall Length (A)} - 108 \text{ mm}] \\ &\quad \times 95.3 \text{ mm} \end{aligned}$$



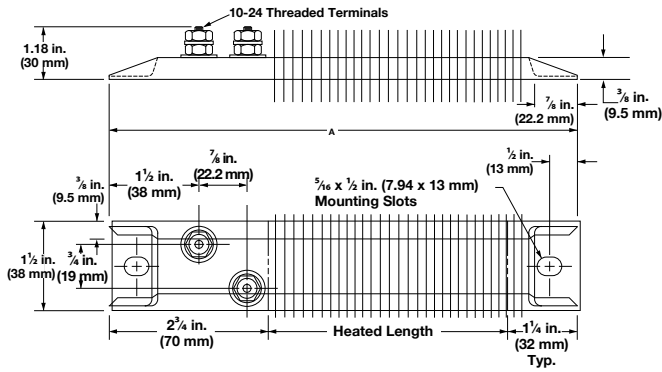
# Air Heaters

## Finned Heaters

### 375 Finned Strip Heaters

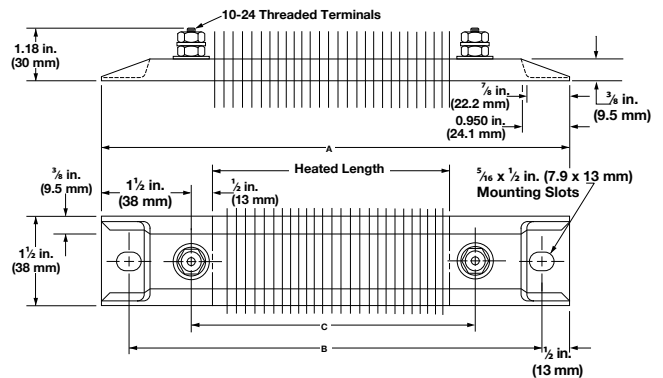
#### Termination Options

##### Offset Terminals



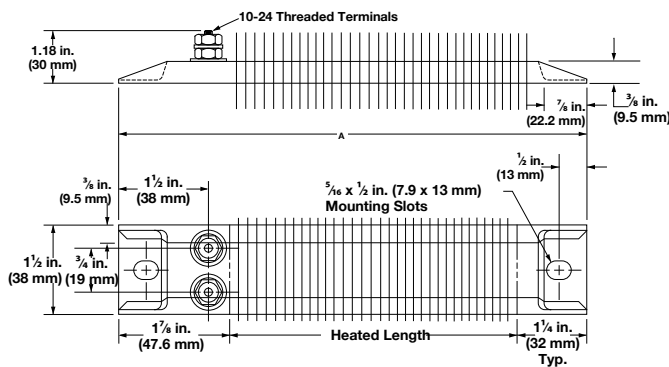
Two 10-24 threaded post terminals are offset from each other on the same end.

##### One-on-One Terminals



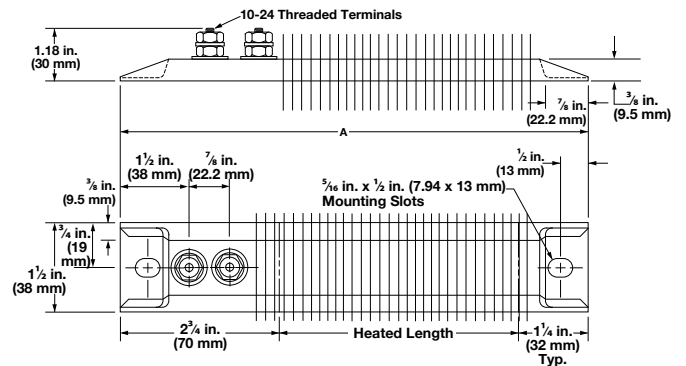
Two 10-24 threaded post terminals are placed one on each end.

##### Parallel Terminals



Two 10-24 threaded post terminals are used; both terminals on one end.

##### In-Line Terminals



Two 10-24 threaded post terminals are in-line with each other on the same end.

# Air Heaters

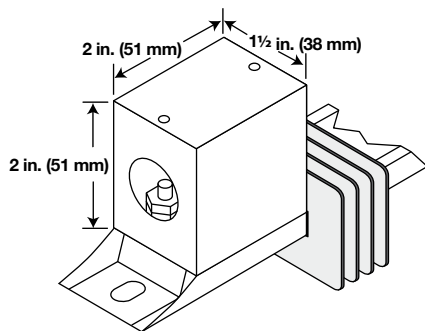
## Finned Heaters

### 375 Finned Strip Heaters

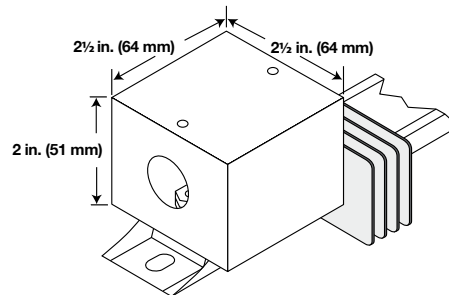
#### Termination Options (Continued)

#### Metallic Terminal Boxes - Variations

Metallic terminal boxes are available from stock on offset terminals. Terminal boxes act as a safety feature by covering the terminals. A conduit may be attached to the box through  $\frac{7}{8}$  in. (22.2 mm) diameter holes in the ends of the box. To order, specify **terminal box**.



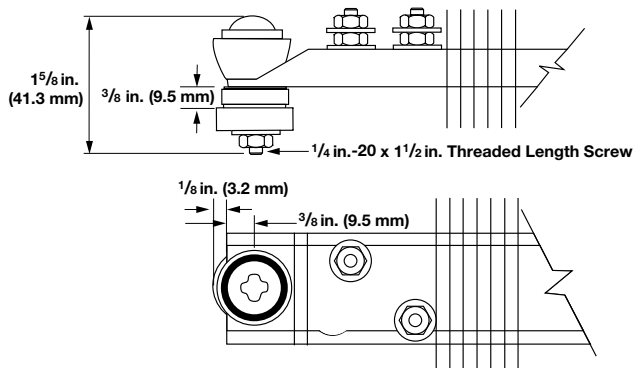
Available on in-line terminals only.



Available on offset terminals from stock and manufactured.

## Accessories

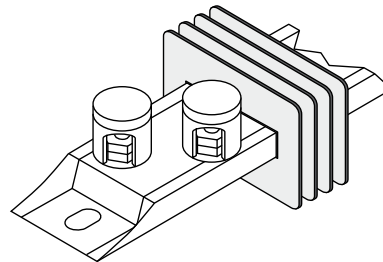
### Secondary Insulation Bushings



Insulators are suitable when air heating and/or voltage to ground is a concern. A secondary insulation bushing kit, part number **Z-5230**, contains one set of bushings for one heater. To accommodate bushings,  $\frac{17}{32} \times \frac{11}{16}$  inch diameter mounting holes **must** be specified when ordering.

**Note:** Number of fins are dependent on length of heater.

### Ceramic Terminal Covers



Ceramic terminal covers offer a convenient and economical method to insulate post terminals. A 10-24 screw thread is sized for standard length posts and is supplied as an accessory item and shipped separately. Specify **Z-4918** and quantity.



# Air Heaters

## Finned Heaters

### 375 Finned Strip Heaters

#### Heater Part Numbers

Width in. (mm)	Termination	Length in. (mm)	Volts	Power (Watts)	W/in <sup>2</sup> (W/cm <sup>2</sup> )	Approx. Net Wt. lbs (kg)	Delivery	Part Number
1 1/2 (38)	Parallel	5 1/2 (140)	120	125	14 (2.1)	0.5 (0.23)	RS	<b>SGA1J5JY2</b>
	Parallel	5 1/2 (140)	120	250	28 (4.3)	0.5 (0.23)	RS	<b>SGA1J5JY3</b>
	Parallel	6 (152)	120	150	14 (2.1)	0.5 (0.23)	RS	<b>SGA1J6AY1</b>
	Parallel	6 (152)	240	150	14 (2.1)	0.5 (0.23)	RS	<b>SGA1J6AY2</b>
	Parallel	6 (152)	120	300	28 (4.3)	0.5 (0.23)	RS	<b>SGA1J6AY3</b>
	Parallel	6 (152)	240	300	28 (4.3)	0.5 (0.23)	RS	<b>SGA1J6AY4</b>
	Offset	7 1/2 (191)	120	150	12 (1.8)	0.7 (0.32)	M	<b>SGA1J7JW1</b>
	Offset	7 1/2 (191)	240	150	12 (1.8)	0.7 (0.32)	M	<b>SGA1J7JW2</b>
	Offset	7 1/2 (191)	240	200	15 (2.3)	0.7 (0.32)	M	<b>SGA1J7JW3</b>
	Offset	8 (203)	120	150	10 (1.5)	0.7 (0.32)	RS	<b>SGA1J8AW2</b>
	Offset	8 (203)	240	150	10 (1.5)	0.7 (0.32)	RS	<b>SGA1J8AW3</b>
	Offset	8 (203)	120	175	12 (1.8)	0.7 (0.32)	RS	<b>SGA1J8AW4</b>
	Offset	8 (203)	240	175	12 (1.8)	0.7 (0.32)	M	<b>SGA1J8AW5</b>
	Offset	8 (203)	120	250	17 (2.6)	0.7 (0.32)	RS	<b>SGA1J8AW6</b>
	Offset	8 (203)	240	250	17 (2.6)	0.7 (0.32)	RS	<b>SGA1J8AW7</b>
	Offset	8 (203)	120	400	27 (4.2)	0.7 (0.32)	M	<b>SGA1J8AW8</b>
	Offset	8 (203)	240	400	27 (4.2)	0.7 (0.32)	M	<b>SGA1J8AW9</b>
	Offset	8 (203)	120	500	33 (5.1)	0.7 (0.32)	RS	<b>SGA1J8AW10</b>
	Offset	8 (203)	240	500	33 (5.1)	0.7 (0.32)	RS	<b>SGA1J8AW11</b>
	Offset	10 1/2 (267)	120	250	10 (1.5)	0.9 (0.40)	M	<b>SGA1J10JW1</b>
	Offset	10 1/2 (267)	240	250	10 (1.5)	0.9 (0.40)	M	<b>SGA1J10JW2</b>
	Offset	10 1/2 (267)	120	350	14 (2.1)	0.9 (0.40)	RS	<b>SGA1J10JW3</b>
	Offset	10 1/2 (267)	240	350	14 (2.1)	0.9 (0.40)	M	<b>SGA1J10JW4</b>
	Offset	10 1/2 (267)	120	400	16 (2.5)	0.9 (0.40)	RS	<b>SGA1J10JW5</b>
	Offset	10 1/2 (267)	240	400	16 (2.5)	0.9 (0.40)	RS	<b>SGA1J10JW6</b>
	Offset	12 (305)	120	250	8 (1.2)	1.0 (0.45)	RS	<b>SGA1J12AW1</b>
	Offset	12 (305)	240	250	8 (1.2)	1.0 (0.45)	RS	<b>SGA1J12AW2</b>
	Offset	12 (305)	120	350	12 (1.8)	1.0 (0.45)	RS	<b>SGA1J12AW3</b>
	Offset	12 (305)	240	350	12 (1.8)	1.0 (0.45)	M	<b>SGA1J12AW4</b>
	Offset	12 (305)	120	500	17 (2.6)	1.0 (0.45)	RS	<b>SGA1J12AW5</b>
	Offset	12 (305)	240	500	17 (2.6)	1.0 (0.45)	RS	<b>SGA1J12AW6</b>
	Offset	14 (356)	120	300	8 (1.2)	1.2 (0.54)	M	<b>SGA1J14AW1</b>
Offset	14 (356)	240	300	8 (1.2)	1.2 (0.54)	M	<b>SGA1J14AW2</b>	
Offset	14 (356)	120	500	13 (2.0)	1.2 (0.54)	M	<b>SGA1J14AW3</b>	
Offset	14 (356)	240	500	13 (2.0)	1.2 (0.54)	M	<b>SGA1J14AW4</b>	
Offset	15 1/4 (387)	120	325	8 (1.2)	1.4 (0.64)	M	<b>SGA1J15EW1</b>	
Offset	15 1/4 (387)	240	325	8 (1.2)	1.4 (0.64)	M	<b>SGA1J15EW2</b>	
Offset	15 1/4 (387)	240	500	12 (1.8)	1.4 (0.64)	RS	<b>SGA1J15EW3</b>	

**CONTINUED**

**Note:** 375 finned strip heaters with one-on-one terminations are available as a manufactured item only. Please contact your Watlow representative for additional information.

**Note:** 5/16 x 1/2 in. (7.9 x 13 mm) mounting slots are supplied on all 375 finned strip heaters.

### **RAPID SHIP**

- **RS** - Next day shipment up to 10 pieces
- **M** - Manufacturing lead times

# Air Heaters

## Finned Heaters

### 375 Finned Strip Heaters

#### Heater Part Numbers (Continued)

Width in. (mm)	Termination	Length in. (mm)	Volts	Power (Watts)	W/in <sup>2</sup> (W/cm <sup>2</sup> )	Approx. Net Wt. lbs (kg)	Delivery	Part Number
1 1/2 (38)	Offset	17 7/8 (454)	120	350	8 (1.2)	1.6 (0.73)	M	SGA1J17RW1
	Offset	17 7/8 (454)	240	350	8 (1.2)	1.6 (0.73)	M	SGA1J17RW2
	Offset	17 7/8 (454)	120	375	9 (1.4)	1.6 (0.73)	M	SGA1J17RW3
	Offset	17 7/8 (454)	240	375	9 (1.4)	1.6 (0.73)	M	SGA1J17RW4
	Offset	17 7/8 (454)	120	500	12 (1.8)	1.6 (0.73)	M	SGA1J17RW5
	Offset	17 7/8 (454)	240	500	12 (1.8)	1.6 (0.73)	RS	SGA1J17RW6
	Offset	17 7/8 (454)	120	750	18 (2.8)	1.6 (0.73)	RS	SGA1J17RW7
	Offset	17 7/8 (454)	240	750	18 (2.8)	1.6 (0.73)	RS	SGA1J17RW8
	Offset	17 7/8 (454)	120	1000	24 (3.7)	1.6 (0.73)	M	SGA1J17RW9
	Offset	17 7/8 (454)	240	1000	24 (3.7)	1.6 (0.73)	RS	SGA1J17RW10
	Offset	19 1/2 (495)	240	350	6 (.9)	1.7 (0.77)	M	SGA1J19JW2
	Offset	19 1/2 (495)	120	500	9 (1.4)	1.7 (0.77)	M	SGA1J19JW3
	Offset	19 1/2 (495)	240	500	9 (1.4)	1.7 (0.77)	M	SGA1J19JW4
	Offset	19 1/2 (495)	240	750	13 (2.0)	1.7 (0.77)	RS	SGA1J19JW5
	Offset	19 1/2 (495)	240	1000	17 (2.6)	1.7 (0.77)	RS	SGA1J19JW6
	Offset	21 (533)	120	500	8 (1.2)	1.9 (0.86)	M	SGA1J21AW3
	Offset	21 (533)	240	500	8 (1.2)	1.9 (0.86)	M	SGA1J21AW4
	Offset	21 (533)	120	750	12 (1.8)	1.9 (0.86)	M	SGA1J21AW5
	Offset	21 (533)	240	750	12 (1.8)	1.9 (0.86)	RS	SGA1J21AW6
	Offset	23 3/4 (603)	240	500	7 (1.0)	2.1 (0.95)	M	SGA1J23NW3
	Offset	23 3/4 (603)	240	750	10 (1.5)	2.1 (0.95)	M	SGA1J23NW5
	Offset	23 3/4 (603)	120	1000	14 (2.1)	2.1 (0.95)	M	SGA1J23NW6
	Offset	23 3/4 (603)	240	1000	14 (2.1)	2.1 (0.95)	M	SGA1J23NW7
	Offset	23 3/4 (603)	240	1500	20 (3.1)	2.1 (0.95)	RS	SGA1J23NW8
	Offset	25 1/2 (648)	120	500	6 (0.9)	2.3 (1.00)	M	SGA1J25JW2
	Offset	25 1/2 (648)	240	500	6 (0.9)	2.3 (1.00)	M	SGA1J25JW3
	Offset	25 1/2 (648)	120	750	9 (1.4)	2.3 (1.00)	M	SGA1J25JW4
	Offset	25 1/2 (648)	240	750	9 (1.4)	2.3 (1.00)	RS	SGA1J25JW5
	Offset	25 1/2 (648)	240	1000	12 (1.8)	2.3 (1.00)	RS	SGA1J25JW6
	Offset	26 3/4 (680)	240	700	8 (1.2)	2.4 (1.10)	M	SGA1J26NW2
	Offset	26 3/4 (680)	240	1000	12 (1.8)	2.4 (1.10)	RS	SGA1J26NW3
	Offset	30 1/2 (775)	120	750	8 (1.2)	2.7 (1.20)	M	SGA1J30JW1
	Offset	30 1/2 (775)	240	750	8 (1.2)	2.7 (1.20)	M	SGA1J30JW2
	Offset	33 1/2 (851)	240	750	7 (1.0)	3.0 (1.40)	M	SGA1J33JW1
	Offset	35 7/8 (911)	120	1000	8 (1.2)	3.2 (1.50)	M	SGA1J35RW1
	Offset	35 7/8 (911)	240	1000	8 (1.2)	3.2 (1.50)	M	SGA1J35RW2
	Offset	35 7/8 (911)	240	1500	13 (2.0)	3.2 (1.50)	M	SGA1J35RW3
	Offset	38 1/2 (978)	120	1000	8 (1.2)	3.4 (1.50)	M	SGA1J38JW2
	Offset	38 1/2 (978)	240	1500	11 (1.7)	3.4 (1.50)	M	SGA1J38JW3
	Offset	42 1/2 (1080)	240	1500	10 (1.5)	3.8 (1.70)	RS	SGA1J42JW1
Offset	47 7/8 (1216)	240	2250	16 (2.4)	4.3 (2.00)	RS	SGA1J47RW2	

**Note:** 375 finned strip heaters with one-on-one terminations are available as a manufactured item only. Please contact your Watlow representative for additional information.

**Note:** 5/16 x 1/2 in. (7.9 x 13 mm) mounting slots are supplied on all 375 finned strip heaters.



- **RS** - Next day shipment up to 10 pieces
- **M** - Manufacturing lead times

# Air Heaters

## Finned Heaters

### FINBAR™ Single-Ended Heaters

Composed of aluminized steel fins press fitted to a one-inch single-ended FIREBAR element. The FINBAR™ is designed to improve heat transfer to the air and permits putting more power in tighter spaces—like forced air ducts, dryers, ovens and load bank resistors.

Heat transfer, lower sheath temperature and element life are all maximized by its finned construction. Installation is simplified by terminations exiting at one end and mounting accommodations on both ends.

### Performance Capabilities

- Watt densities up to 50 W/in<sup>2</sup> (7.7 W/cm<sup>2</sup>)
- 304 stainless steel sheath temperatures up to 1200°F (650°C)
- Voltages up to 480VAC
- Amperages up to 48 amperes per heater or 16 amperes per coil

### Features and Benefits

#### Rugged aluminized steel fins

- Provides an increase in surface area to approximately 16 square inches for every linear inch of element length. Fins press fitted to the heating element improve heat transfer to the air

#### Single-ended termination

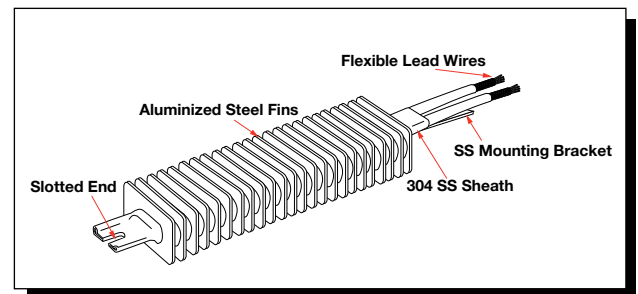
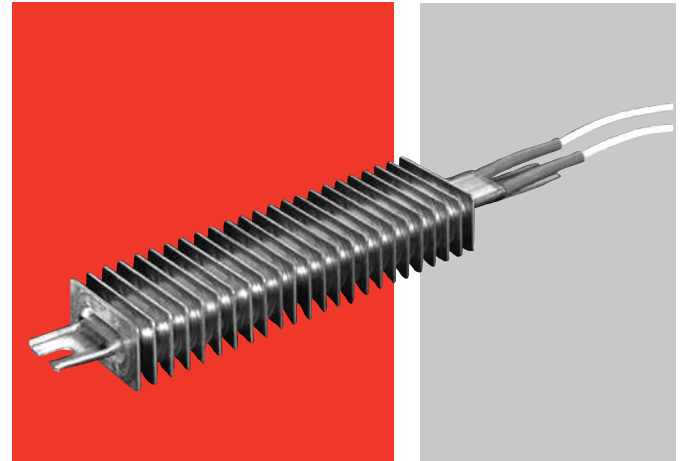
- Simplifies wiring and installation

#### Stainless steel mounting bracket, welded to the terminal end, supplied with a slotted end

- Allows ease of installation

#### Lavacone seals

- Provides protection against humid storage conditions, moisture retardant to 221°F (105°C)



### Typical Applications

- Forced air heating for dryers, ovens, ducts
- Still air heating for ovens, comfort heating
- Incubators
- Ink drying
- Load bank resistors

**For detailed product and technical data,  
see the full FINBAR product  
section located on pages 112 through 114.**

# Air Heaters

## FIREROD® Cartridge Heaters

The Watlow® FIREROD® cartridge heater incorporates engineering excellence and is supported by almost 60 years of solid industry performance across a broad range of simple and complex applications. As the premier choice in swaged cartridge heating, thousands of industrial manufacturers continue to choose Watlow as their trusted thermal partner and certified cartridge heater supplier.

Built using premium materials and tight manufacturing controls, the FIREROD heater provides superior heat transfer, uniform temperatures, resistance to oxidation and corrosion and a long life even at high temperatures. Every system component that leaves our manufacturing facilities meets our strict quality assurance specifications, in addition to those set forth by leading standards and regulating industries.

FIREROD offers many delivery programs to meet your needs.

### Performance Capabilities

- Part temperatures up to 1400°F (760°C) on alloy 800 sheath
- Watt densities up to 400 W/in<sup>2</sup> (62 W/cm<sup>2</sup>)
- Maximum voltage up to 480V

### Features and Benefits

#### Nickel-chromium resistance wire

- Ensures even and efficient distribution of heat to the sheath

#### Conductor pins

- Provide a metallurgical bond to the resistance wire
- Ensure a trouble-free electrical connection

#### Magnesium oxide insulation of specific grain and purity

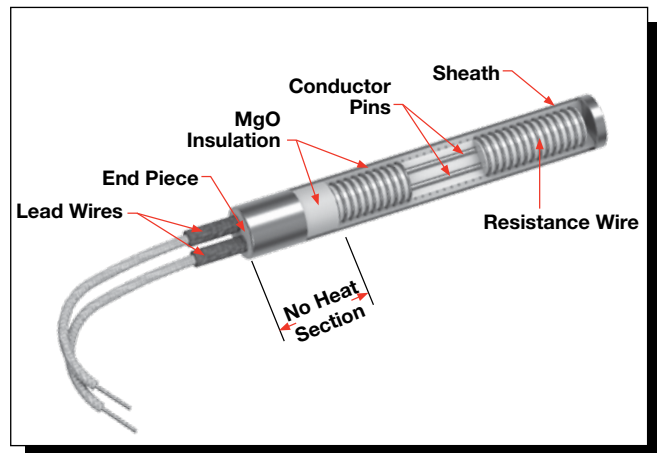
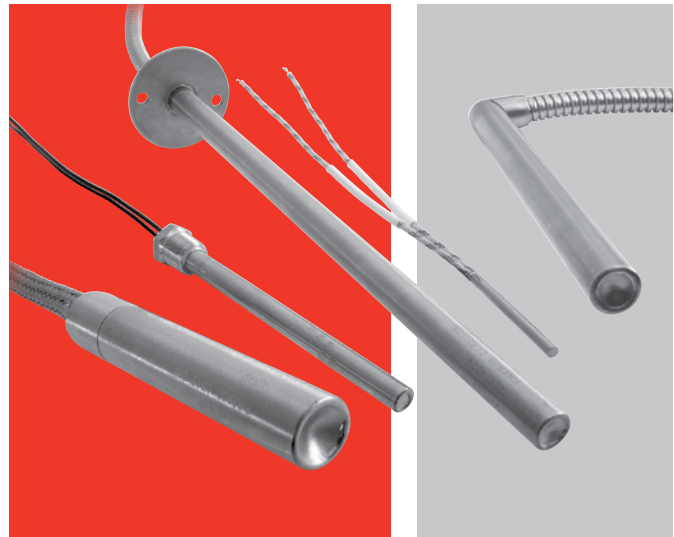
- Results in high dielectric strength and contributes to faster heat-up

#### Alloy 800 sheath

- Resists oxidation and corrosion from heat, many chemicals and atmospheres

#### Minimal spacing between the element wire and sheath

- Results in lower internal temperature
- Accommodates a design with fewer or smaller heaters operating at higher watt densities



#### International Organization for Standardization (ISO) 9001 certified

- Provides confidence that quality and reliability expectations are met

#### UL® and CSA approved flexible stranded wires

- Lead insulation rated to temperatures up to 480°F (250°C)

#### Patented lead adapter (LA) method

- Allows same day shipment on more than 150,000 configurations of stock FIREROD heaters and lead combinations

**For detailed product and technical data,  
see the full FIREROD product  
section located on pages 11 through 47.**

# Air Heaters

## Enclosure Heaters

### WATROD Heaters

Designed to prevent freezing and condensation in electrical and mechanical housings, the WATROD element is enclosed in a perforated, aluminized-steel bracket.

### Performance Capabilities

- Watt densities up to 15 W/in<sup>2</sup> (2.3 W/cm<sup>2</sup>)
- Wattages up to 1000 watts
- UL® and CSA component recognition up to 250VAC

### Features and Benefits

#### Stainless steel sheath wall

- Resists corrosion and protects the heating coil from exposure

#### Silicone resin seal

- Provides protection against humid storage conditions and is effective to 390°F (200°C)

#### Perforated aluminized-steel mounting bracket

- Eases installation and helps prevent direct contact with the heating element

#### Stock straight projection Type B #10-32 screw lug terminals

- Provides easy electrical connection

#### Made-to-order threaded stud

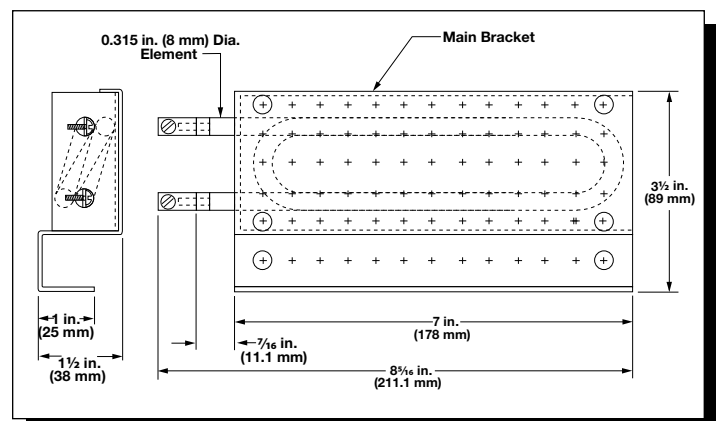
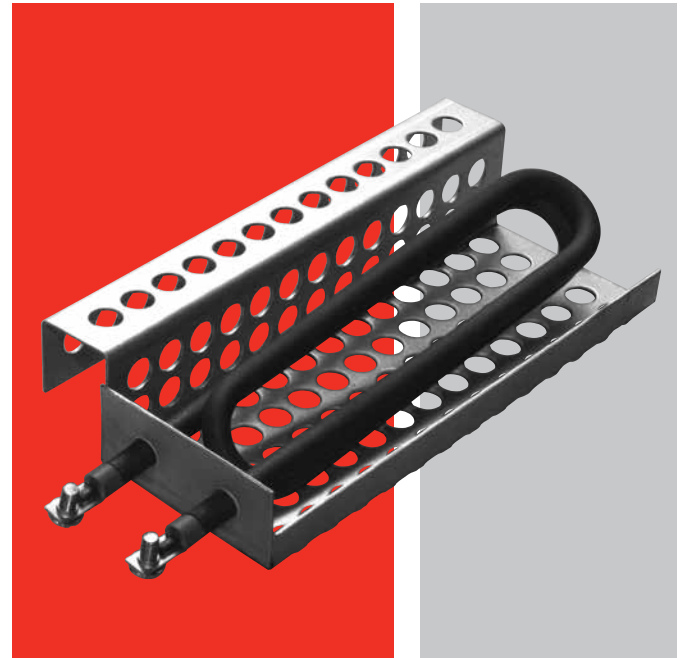
- Provides quick connect and flexible lead wire termination options.

### Typical Applications

- Control panels
- Traffic signal boxes
- Automated teller machines
- Switch gear
- Electronic equipment

### Application Hints

- Locate heater(s) in the lowest portion of the enclosure to maximize convection heating
- Place thermostat(s) in the upper half of the enclosure, away from the heater(s)



# Air Heaters

## Enclosure Heaters

### WATROD Heaters

#### Technical Information

Watts	Watt Density		Part Number		Delivery	Est. Net Wt.	
	W/in <sup>2</sup>	(W/cm <sup>2</sup> )	125VAC	250VAC		lbs	(kg)
95	4	(0.6)	<b>EN951</b>		RS	1.5	(0.7)
100	4	(0.6)		<b>EN10010</b>	RS	1.5	(0.7)
250	10	(1.6)	<b>EN2501</b>	<b>EN25010</b>	RS	1.5	(0.7)
375	15	(2.3)	<b>EN3751</b>	<b>EN37510</b>	RS	1.5	(0.7)

**RAPID SHIP**

- **RS** - Next day shipment up to 5 pieces

# Air Heaters

## Enclosure Heaters

### Silicone Rubber Heaters

Designed for freeze and condensation protection, Watlow's enclosure heaters are rugged, reliable and safe to operate. These rectangular-shaped, wire-wound silicone rubber heaters can be ordered individually with adhesive or vulcanized to an aluminum mounting plate. A thermostat can be attached to the heater or mounted separately as shown.

### Performance Capabilities

- Watt density rating of 5 W/in<sup>2</sup> (0.8 W/cm<sup>2</sup>)
- Temperature up to 150°F (66°C)

### Features and Benefits

#### Pressure-sensitive adhesive mounting to an aluminum plate or customer cementing

- Reduces installation time
- Creates easy installation

#### Several standard thermostat set points

- Ensures protection against freezing with minimal energy consumption

#### Variety of installation options

- Provide the option to utilize cement installation to ensure permanent heater attachment
- The pressure sensitive adhesive installation option saves assembly time
- Facilitate assembly and disassembly with factory installed aluminum plate mount

#### Remote thermostat option

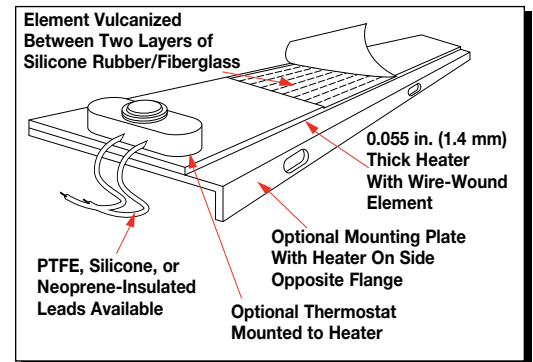
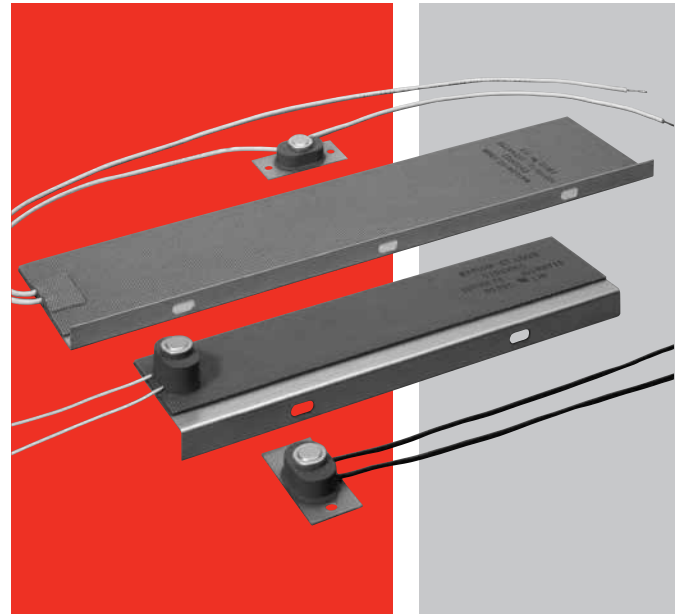
- Provides optimal choice of heater location versus temperature control location

#### Lead options

- Allows for a variety of applications
- Allows different lead lengths for a variety of wiring requirements

#### Factory pre-wired heater and thermostat

- Ensures safety and reliability as there are no exposed electrical connections



### Typical Applications

Freeze or condensation prevention in housings containing electronic equipment including:

- Traffic signal boxes
- Automated teller machines
- Temperature control panels
- Gas or liquid control valve housings





# Air Heaters

## Enclosure Heaters

### Silicone Rubber Heaters

#### Technical Data

#### Determining Minimum Wattage Requirements For Enclosures

This chart is an excellent guide for determining total wattage requirements for both insulated and uninsulated enclosures, assuming the box is relatively airtight.

For windy conditions, add an additional 50 percent to the wattage requirement listed.

		Total Enclosure Surface Area — Square Feet (Square Meters)													
		2 (0.2)	3 (0.3)	4 (0.4)	5 (0.5)	6 (0.6)	7.5 (0.7)	9 (0.8)	10 (0.9)	15 (1.4)	20 (1.9)	25 (2.3)	30 (2.8)	40 (3.7)	50 (4.7)
Temperature Rise from Ambient °F (°C)	20 (11)	30	40	55	70	80	100	120	135	205	270	335	405	540	670
		10	10	15	20	20	25	30	35	50	65	80	100	130	160
	40 (22)	55	80	110	135	160	200	245	270	405	540	670	805	1075	1340
		15	20	30	35	40	50	60	65	100	130	160	195	260	320
	60 (33)	90	120	160	205	245	300	365	405	605	805	1005	1210	1610	2010
		20	30	55	50	60	75	90	100	145	195	240	290	385	480
	80 (44)	110	160	215	270	325	400	485	540	805	1075	1340	1610	2145	2680
		30	40	55	65	80	100	115	130	195	260	320	385	515	640
	100 (56)	135	200	270	335	405	500	605	670	1005	1340	1675	2010	2680	3350
		35	50	65	80	100	125	145	160	240	320	400	480	640	800
	120 (67)	165	240	320	405	485	600	725	805	1210	1610	2010	2415	3220	4020
		40	60	80	100	115	150	175	195	290	385	480	580	770	960
	140 (78)	190	280	375	470	565	700	845	940	1410	1880	2345	2815	3755	4690
		45	70	90	115	135	175	205	225	340	450	560	675	900	1120

□ Uninsulated boxes    □ Insulated boxes

### Silicone Rubber Enclosure Heaters Offering

For a complete list of silicone rubber product offerings available for use as an enclosure heater with a thermostat, please refer to the RAPID SHIP offering on page 125.

