



# **Reflect-O-Ray<sup>®</sup>**

## **Oil Fired, EDS 3.5**

Products by: Combustion Research Corporation

# **SUBMITTAL DATA**

**PROJECT:**

**Specifications for**  
**Reflect-O-Ray<sup>®</sup> E.D.S. 3.5<sup>®</sup> OIL FIRED SYSTEMS**

**PART 1 - GENERAL**

It is the intent of this specification to identify design requirements and minimum standards for the quality, construction, delivery, installation and operation of the low intensity, vacuum vented, oil fired infrared heating equipment. Minor variations, in accordance with standard practice, shall be indicated on the shop drawings and submitted for approval.

**1.1 - CODES AND STANDARDS**

- 1.1.1 The entire heating system shall be designed to the CSA, B140.4 - (Current Standard) and CAN 2.16- (Current Standard) & UL 731 standards.
- 1.1.2 Installation shall conform to local codes and local gas authorities including the National Electrical Code, National Fuel Gas Code, and applicable ANSI, NFPA & CAN/CGA & CSA codes.

**1.2 - QUALITY ASSURANCE**

- 1.2.1 The material construction and operation of the infrared heating equipment shall conform to the performance specifications contained herein. Approved manufacturer is: Combustion Research Corporation, 2516 Leach Rd., Rochester Hills, MI, 48309; Tel. No. 248.852.3611, Fax. No. 248.852.9165.
- 1.2.2 Manufacturer shall warrant mechanical and electrical components for a period of one year from original invoice date.
- 1.2.3 Manufacturer shall warrant radiant tube for a period of ten (10) years (against internally created corrosion) from the original invoice date provided system is installed and maintained in accordance with the owner's manual - see warranty statement for details.
- 1.2.4 System shall be furnished complete with Burner(s), Vacuum Exhauster(s), Tubular infrared emitters, Fittings, Reflector Shields, Hangers and System Controls.

**1.3 - MANUFACTURER AND INSTALLER QUALIFICATIONS**

- 1.3.1 The low intensity, oil fired infrared heating system shall be a product of a manufacturer who has had at least ten years experience in design, fabrication and service and who is regularly engaged in the manufacture of the type of oil fired low intensity infrared heating equipment specified herein. Only manufactures who can submit evidence of actual installations of comparable designed construction, and that the products have proven practical, durable, and require a minimum of maintenance, will be qualified under this specification.
- 1.3.2 Installation of the oil fired low intensity infrared heating equipment shall be by supervised by an authorized representative of the heater manufacturer and shall be in accordance with approved installation drawings. Mechanics shall be skilled and experienced in the erection of the oil fired low intensity infrared heating equipment of the type specified herein.

**1.4 - DELIVERY AND STORAGE**

- 1.4.1 Materials shall be shipped in the manufacturers standard protective packaging to the designated site.
- 1.4.2 The installing contractor is responsible for receiving, unloading and storage of materials. Storage shall be in dry locations free from dust and water and available for inspection and handling. Handle equipment carefully to prevent damage. Remove damaged items that cannot be restored to like new condition and replace with new items.

**PART 2 - PRODUCT**

**2.1 - BURNERS**

- 2.1.1 Burners shall be capable of firing at 70,000 BTU/hr (20.51 kW), 105,000 BTU/hr (30.76 kW) or 125,000 BTU/hr (36.63 kW) inputs, with #2 fuel oil utilizing a "Riello" burner assembly.

- 2.1.2 Burner power requirements 115 Volt, 60 Hz AC, 1.3 amp - 150 watts.
- 2.1.3 Burner(s) are shipped as, and intended to be installed as a "Two Pipe" system.
- 2.1.4 Burners shall include the following features:
  - a) Fitted with a 4" (101.6 mm) diameter combustion air inlet with a fixed combustion air-metering orifice.
  - b) Burners shall be fitted a differential air pressure switch so as to prove adequate combustion air is present before burner fires.
  - c) Burners shall be fitted with solid state electronic controls with spark ignition & 100% lockout in event of low fire or main flame failure.
  - d) Burner(s) shall have a minimum 15-second pre-purge before ignition.
  - e) Burner(s) shall have a combustion chamber assembly with outer casing to be constructed of 16-gauge (1.587 mm) aluminized steel.
  - f) Industrial grade inspection window for visual inspection of spark and flame.
- 2.1.5 Burner(s) and vacuum exhauster electrically interlocked.

## 2.2 - VACUUM EXHAUSTER

- 2.2.1 Dynamically balanced forward inclined fan wheel constructed of stainless steel with a cast iron hub.
- 2.2.3 Direct Drive.
- 2.2.4 Inlet cone and venturi plate engineered for maximum efficiency.
- 2.2.5 16-gauge (1.587 mm) aluminized steel housing and mounting bracket to be powder coated.
- 2.2.6 Motor to be one quarter (1/4) HP (115V, 3.5 amp - 402.5 watts), one half (1/2) HP dual voltage (115/230V 6.2/3.1 Amps - 713 watts) or one (1) HP dual voltage (115/230 V 12/6 Amps - 1,380 watts) - 3450 RPM, 60 Hz capacitor start internally protected, class B insulation. Sealed ball bearings front and rear.
- 2.2.7 Vibration isolating rubber mounts.
- 2.2.8 Stainless steel bird screen on side wall venting.
- 2.2.9 Three and one half-inch (3.5" / 89 mm) Stainless steel, insulated flexible vibration isolation connector.

## 2.3 - SYSTEM CONTROLS

- 2.3.1 Thermostat provided by equipment manufacturer, 115V, 16 amp rating.
- 2.3.2 Control panel with approximately 30 seconds pre & post purge.

## 2.4 - RADIANT TUBE HEAT EXCHANGING NETWORK

- 2.4.1 Combustion tube shall be 10' long 16 gauge (1.587mm) aluminized steel 3.5" (89 mm) OD swaged one end.
- 2.4.2 Balance of radiant tubing shall be constructed of patented, spiral wound 22 gauge (0.76 mm) aluminized steel, 3.5" (89 mm) OD.
- 2.4.3 Elbows and tube coupler to be made of min. 18 gauge (1.32 mm) aluminized steel, swaged at both ends so as to fit into 3.5" (89 mm) spiral tube.
- 2.4.4 Reflectors to be made of minimum 0.025" (0.635 mm) bright aluminum.
- 2.4.5 Tubing and reflector hangers to be made of 0.25" (6.35 mm) Dia. Zinc plated CRS.
- 2.4.6 All joints to be sealed and mechanically fastened with self drilling and tapping screws.
- 2.4.7 All radiant tubing to be continuously covered by the reflector, i.e. radiant tube elbows, "U" bends and fittings to be covered by reflectors -- NO GAPS BETWEEN REFLECTORS. Reflectors are to be overlapped a minimum of one-inch (1"/25.4 mm) and secured together with sheet metal screws allowing for one unsecured overlap joint for expansion on each straight run exceeding ten feet (10' / 3.048m).
- 2.4.8 Minimum lineal length of radiant tubing per 100,000 Btu/hr (29.3 kW) of input shall be 60 feet (18.29m).

- 2.4.9 The maximum firing rate shall be 2000 Btu/hr (0.586 kW) per square foot (0.0929 square meter) of radiant tubing surface area. The total radiant tubing surface area is the radiant tubing which is covered by reflectors and associated with one vacuum exhauster.

## 2.5 - COMBUSTION AIR

- 2.5.1 Outside combustion air (if used) is to be provided without the use of supplementary supply blowers or fans.
- 2.5.2 Outside combustion air ducting to be minimum of 4" OD (S&D PVC or galvanized stovepipe).

## 2.6 - SYSTEM PERFORMANCE

- 2.6.1 System shall attain a net exhaust temperature of not less than 200°F in a 15-min. run cycle and shall not exceed a maximum net temperature of 325°F.
- 2.6.2 System STEADY STATE EFFICIENCY shall be a minimum of 82%, maximum 87%. The system cyclic efficiency shall be a minimum of 85%, maximum 91% (this is based on a 15 min. run time).
- 2.6.3 System shall be a non-condensing dry tube system. i.e. - After a minimum run time of 8 min. all condensation will cease and moisture will exit the system in a vapor state.

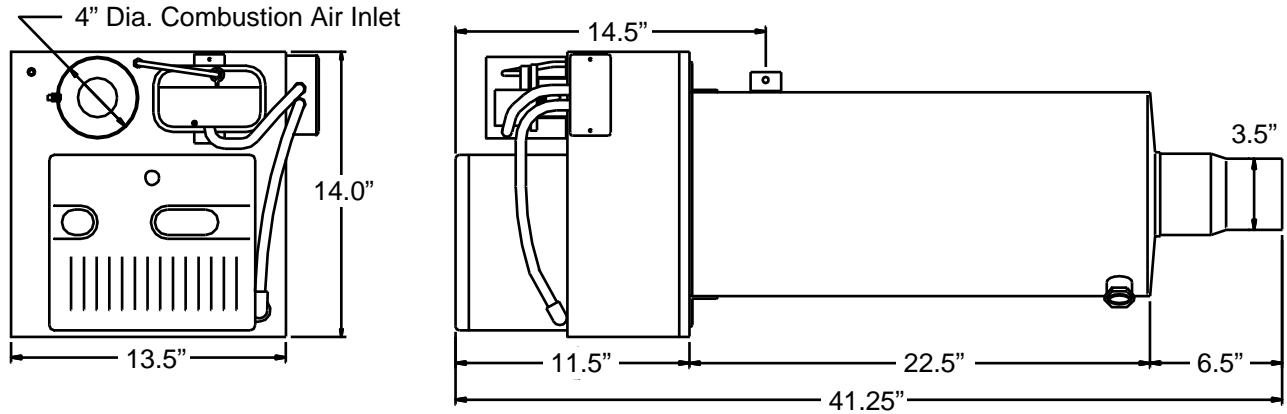
# PART 3 - EXECUTION

## 3.1 - INSTALLATION

- 3.1.1 Power Requirements: It is the installers' responsibility to verify the correct power requirements for the project.
- 3.1.2 Fuel Oil Supply and Distribution:
- a) It is strongly recommended that the burner assemblies be operated as a "two pipe" system.
  - b) Each burner assembly is to be fitted with fusible valves and oil filters.
  - c) Clean, filtered fuel oil is to be used.
  - d) A suitable oil distribution system such as a "Day Tank" system is to be utilized.
- 3.1.3 Assembly: Assemble and install the heating system in accordance with the installation manual and shop drawings.
- 3.1.4 Cleaning: Clean reflectors as may be required and touch up painted surfaces as may be needed.
- 3.1.5 Testing: Upon completion of installation, including work by other trades, adjust and test the heating system in accordance to the manufacturer's owners manual. Adjust and re-test heating system until entire installation is fully operable and acceptable.

## END OF SECTION

## BURNER DIMENSIONS



## BURNER DATA

BURNER PART NO.	BTU/Hr INPUT	MAX. GPH	VACUUM READING HOT*
0500.R	125,000	0.893 GPH	0.4" – 0.5" W.C.
0510.R	105,000	0.75 GPH	0.4" – 0.5" W.C.
0520.R	70,000	0.50 GPH	0.3" – 0.4" W.C.

**\*NOTE** - The system must be operating for a minimum of 15 minutes prior to taking any readings. The vacuum settings are for systems equipped with both inside and outside combustion air supply.

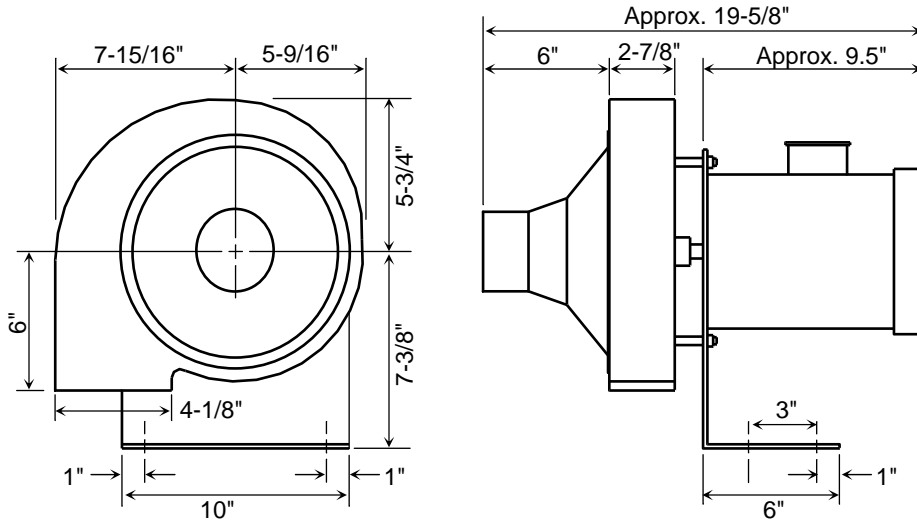
BURNER PART NO.	BTU/Hr INPUT	ELECTRICAL RATING	NOZZLE SIZE FOR 40 F3 HEAD	OIL PRESSURE FOR 40 F3 HEAD
0500.R	125,000	120V, 1.6 Amp, (4.0 FLA)	0.70-60° HOLLOW	150 PSI
0510.R	105,000	120V, 1.6 Amp, (4.0 FLA)	0.65-60° HOLLOW	145 PSI
0520.R	70,000	120V, 1.6 Amp, (4.0 FLA)	0.50-60° HOLLOW	125 PSI

BURNER PART NO.	COMBUSTION AIR ORIFICE SIZE	AIR SHUTTER SETTING	TURBULATOR SETTING	ALTITUDE
0500.R	2.0"	4	3	0 – 4500Ft. (0 - 1370 M)
0510.R	1.75"	3.6	2	0 – 4500Ft. (0 - 1370 M)
0520.R	1.5"	2.6	0	0 – 4500Ft. (0 - 1370 M)

## 0401.WO & 0402.WO - VACUUM EXHAUSTERS

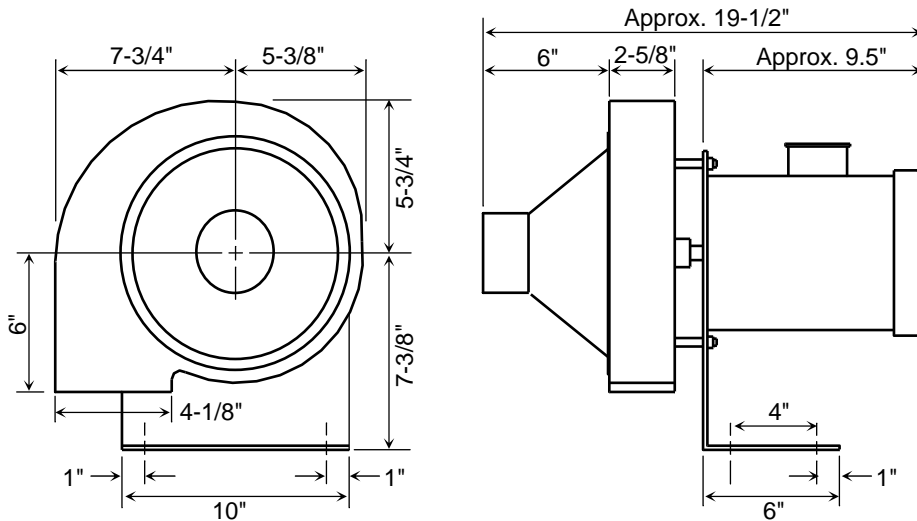
**0401.WO** - 115 / 208-230V, 6.2 / 3.1-3.0 FLA, 60 Hz, 1 Ph., 3450 RPM, totally enclosed motor (TENV or TEFC), thermally protected.

**0402.WO** - 115 / 208-230V, 12.4 / 3.0-2.7 FLA, 60 Hz, 1 Ph., 3450 RPM, totally enclosed motor (TENV or TEFC), thermally protected.



## 0201.WO - VACUUM EXHAUSTERS

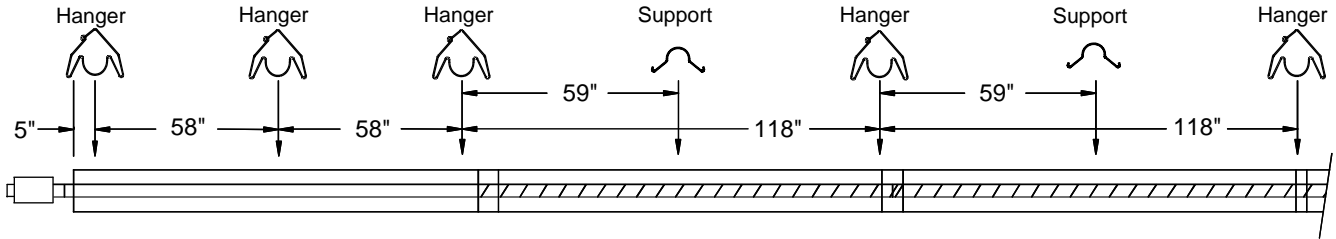
**0201.WO** – ¼ HP / 115 / 208-230V, 3.6 / 3.0-3.0 FLA, 60 Hz, 1 Ph., 3450 RPM, totally enclosed motor (TENV or TEFC), thermally protected. NOTE – 1/3 HP motor may be substituted.



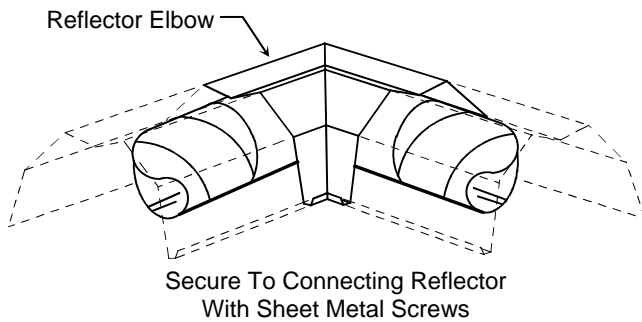
**NOTE** - Motor substitutions can occur, always refer to the motor manufacturer nameplate for electrical information and wiring instructions.

**Note:** One 40 VA, 24-volt transformer is shipped with each burner assembly.

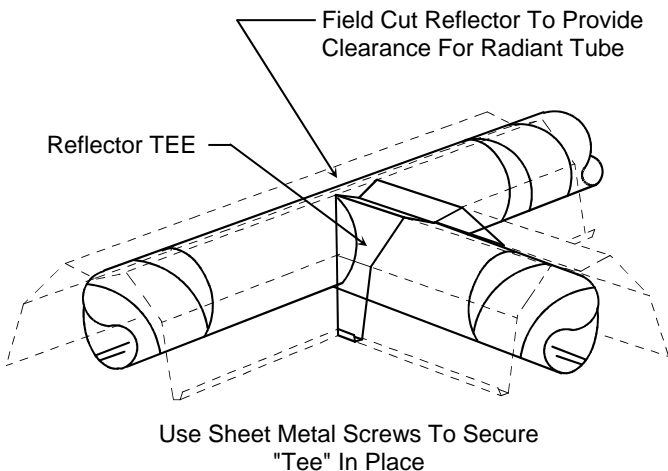
## HANGER & SUPPORT LOCATIONS - STANDARD INSTALLATION



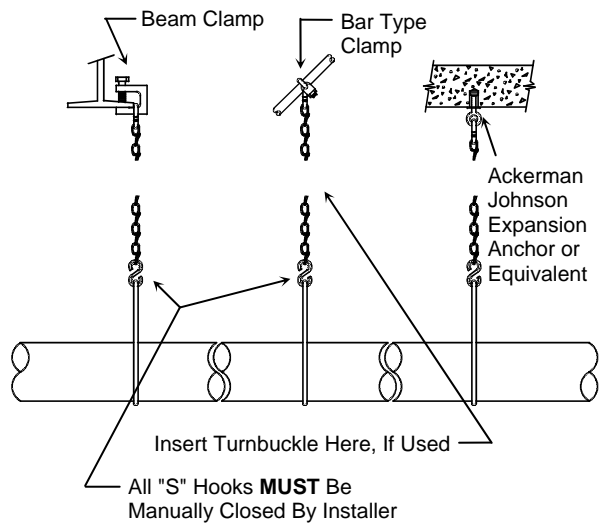
## REFLECTOR ELBOW CONNECTION



## REFLECTOR TEE CONNECTION



## SUSPENSION METHODS



System shall be suspended by chain (trade size #3 or larger), wire rope, etc., minimum workload of 90 Lbs. All suspension hardware must be corrosion resistant. For fine adjustment turnbuckles may be used.

### NOTES:

- DO NOT HANG VACUUM EXHAUSTER WITH CHAIN.
- SECURE TURNBUCKLES SO THAT THEY WILL NOT UNWIND OR UN-SCREW.
- CRIMP "S" HOOKS CLOSED BEFORE LEAVING JOB.
- LISTED MATERIALS ARE MINIMUM REQUIRED, USE EQUIVALENT OR BETTER MATERIALS



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### **ALUMINIZED STEEL RADIANT TUBE**

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- ◆ Aluminized Steel Construction
- ◆ Used With Reflect-O-Ray® EDS3.5 Radiant Tube System
- ◆ Corrosion Resistant

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### **SPECIFICATIONS**

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**CRC Part No.:**

0304.AS.16 - 4.0" diameter radiant tube  
Wt. – 23.50 lbs. (10.66 kg)

**Dimensions:**

Minimum 16 Ga. aluminized steel, 3.5" Tubing

**Temperature Rating:**

1050°F (565°C)

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### **INSTALLATION & CHECKOUT**

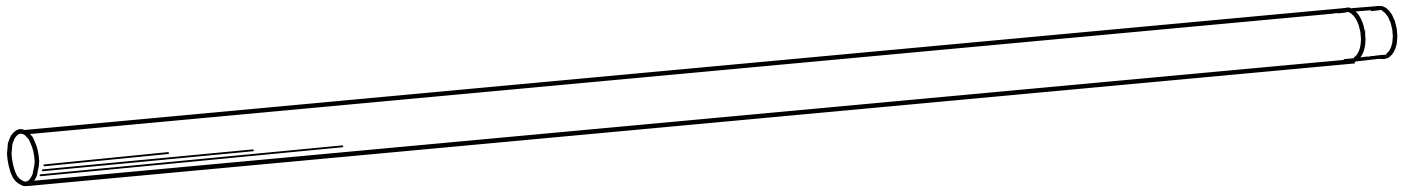
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**Installation**

Install 16 Ga. burner combustion tube immediately down stream of burner. Note one end is swaged to fit inside the next radiant tube. Position weld seam so that it is on the bottom. Secure burner to this radiant tube with P/N 0507.00 drawband coupler. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that the weld seam is positioned on the bottom of the tube. Inspect to make sure that all radiant tubes are connected square and straight.







### **ALUMINIZED STEEL RADIANT TUBE**

- ◆ Aluminized Steel Spiral Construction
- ◆ 9'-9" Long Sections
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Patented, Strong, Low Mass Tube (Min. 22 Ga.)
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0304.AS – 3.5" diameter radiant tube  
Wt. – 13.00 lbs. (5.89 kg)

**Dimensions:**

3.5" Diameter – 9'-9" maximum length Minimum  
22 Ga. aluminized steel

**Temperature Rating:**

1050°F (565°C)

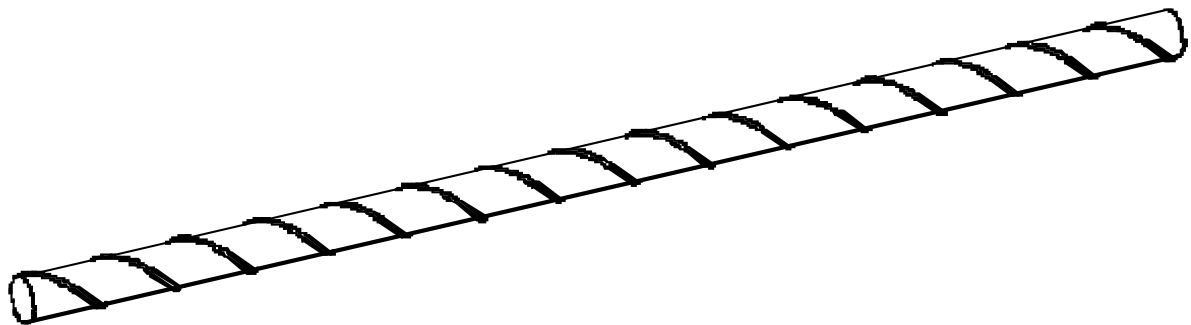
### **INSTALLATION & CHECKOUT**

#### **Installation**

Install radiant tube as shown on shop drawing. Note, radiant tubes are connected by swaged couplers (P/N 0311.AS) designed to fit inside the spiral radiant tube. Refer to the owner's manual for installation guidance.

#### **Checkout**

Make sure that radiant tubes are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are connected square and straight.





### ALUMINIZED STEEL RADIANT TUBE

- ◆ Aluminized Steel Spiral Construction
- ◆ 19'-6" Long Sections
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Patented, Strong, Low Mass Tube (Min. 22 Ga.)
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**

0304.AS.20 – 3.5" diameter radiant tube  
Wt. – 26.00 lbs. (11.79 kg)

**Dimensions:**

3.5" Diameter – 19'-6" maximum length  
Minimum 22 Ga. aluminized steel

**Temperature Rating:**

1050°F (565°C)

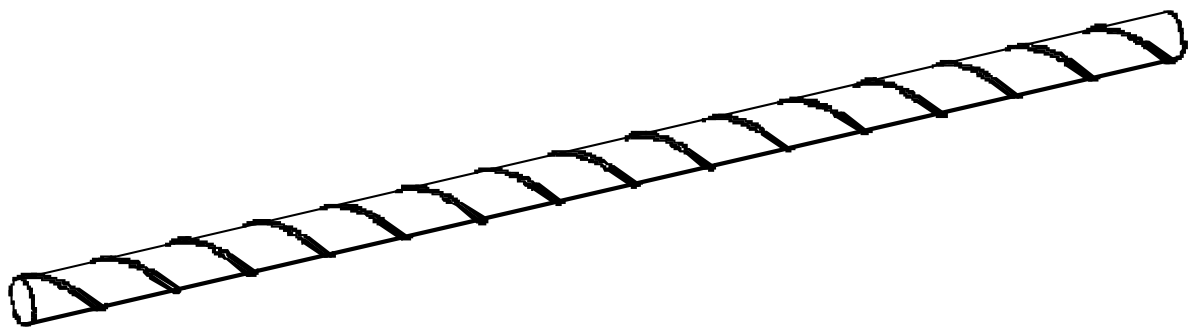
### INSTALLATION & CHECKOUT

**Installation**

Install radiant tube as shown on shop drawing. Note, radiant tubes are connected by swaged couplers (P/N 0311.AS) designed to fit inside the spiral radiant tube. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that radiant tubes are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are connected square and straight.





### **ALUMINIZED STEEL RADIANT TUBE**

- ◆ Heat treated aluminized Steel Spiral Construction
- ◆ 9'-9" Long Sections
- ◆ Used With Reflect-O-Ray® EDS4 Radiant Tube System
- ◆ Patented, Strong, Low Mass Tube (Min. 22 Ga.)
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0304.AS – 3.5" diameter radiant tube  
Wt. – 13.00 lbs. (5.89 kg)

**Dimensions:**

3.5" Diameter – 9'-9" maximum length Minimum  
22 Ga. heat treated aluminized steel

**Temperature Rating:**

1050°F (565°C)

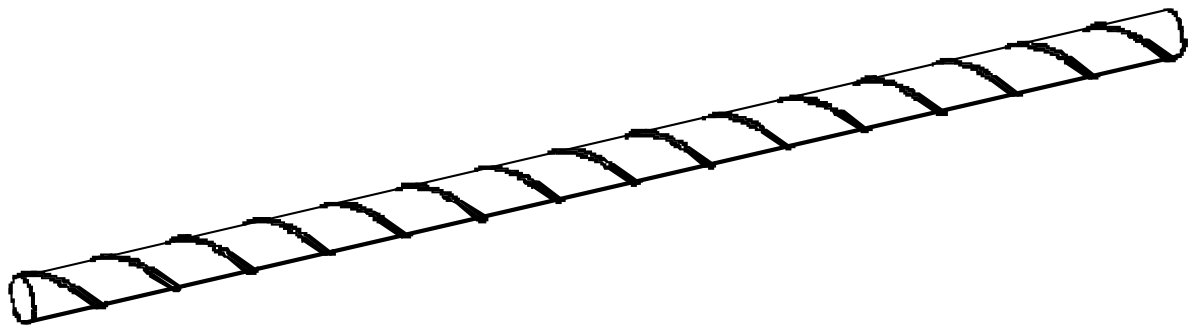
### **INSTALLATION & CHECKOUT**

**Installation**

Install radiant tube as shown on shop drawing. Note, radiant tubes are connected by swaged couplers (P/N 0311.AS) designed to fit inside the spiral radiant tube. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that radiant tubes are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are connected square and straight.





## **ALUMINUM REFLECTOR**

- ◆ Bright Finish Aluminum Reflector
- ◆ High Reflectivity
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Corrosion Resistant

## **SPECIFICATIONS**

### **CRC Part No.:**

0360.00 – 10'-0" Long

### **Dimensions:**

Minimum 0.025" Thick Bright Aluminum,  
10'-0" Long.

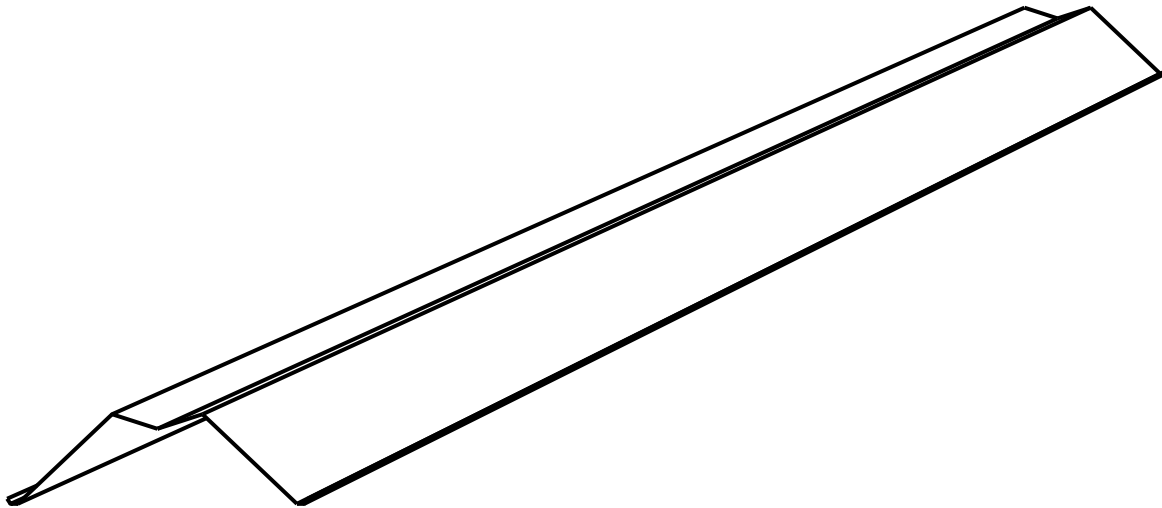
## **INSTALLATION & CHECKOUT**

### **Installation**

Install reflectors over radiant tubes as shown on shop drawing. Note, secure reflectors together at each straight run allowing for one unsecured joint for expansion - Refer to the owner's manual for installation guidance.

### **Checkout**

Make sure that the radiant tubes and reflectors are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are connected square and straight. Make sure that one expansion joint for each straight run is installed





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### **ALUMINUM REFLECTOR END CAP**

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- ◆ Bright Finish Aluminum Reflector End Cap
- ◆ High Reflectivity
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

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**CRC Part No.:**  
0360.WH – End Cap

**Dimensions:**  
Minimum 0.025" Thick Bright Aluminum,

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### **INSTALLATION & CHECKOUT**

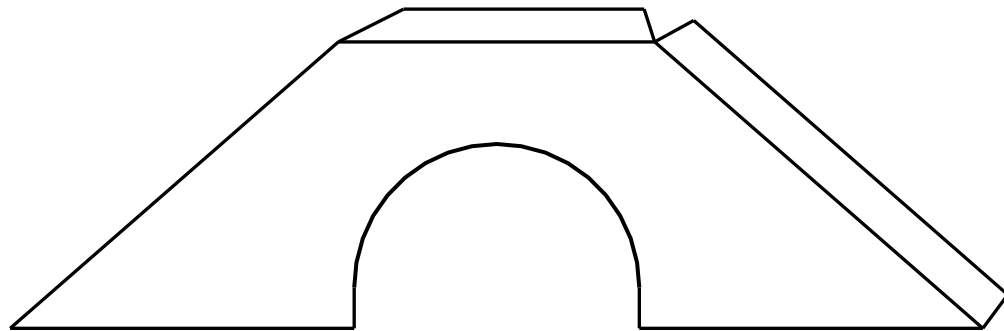
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#### **Installation**

Attach reflector end cap to reflector at the burner end and at the vacuum exhaustor end. Refer to the owner's manual for installation guidance.

#### **Checkout**

Make sure that the radiant tubes and reflectors are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are connected square and straight. Make sure that one expansion joint for each straight run is installed





### ALUMINUM REFLECTOR ELBOW

- ◆ 0.025" Minimum, Aluminum – Bright one side, minimum 97% reflectivity.
- ◆ 90° Horizontal Reflector Elbow
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube Systems.
- ◆ Bright Finish - Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0360.EB

**Dimensions:**  
Minimum 0.025" Thick Bright Aluminum

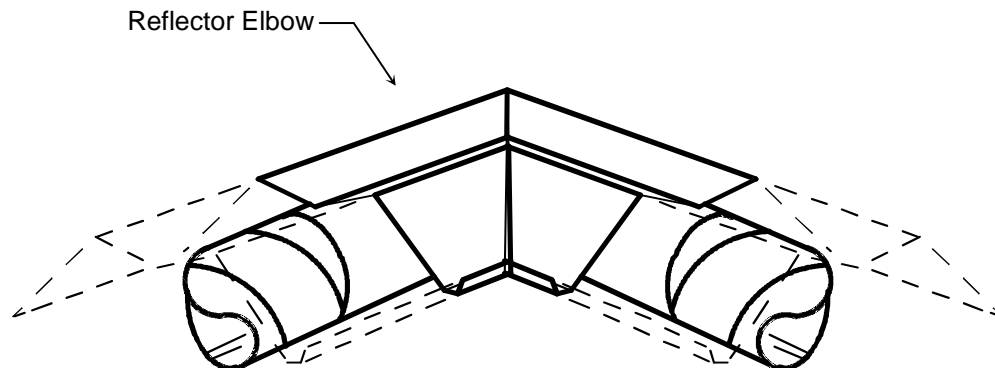
### INSTALLATION & CHECKOUT

#### INSTALLATION

Install reflector elbow as outlined on the shop drawings. Secure reflector elbow to reflectors with pop rivets or screws. Refer to the owner's manual for installation guidance.

#### CHECKOUT

Make sure that reflectors and reflector elbows are straight and true with a expansion joint in each straight run of reflector. In high wind conditions install a "tether wire" to secure reflectors from swaying. Refer to drawing "360-seismic" for details.



Secure To Connecting Reflector With Sheet Metal  
Screws



### ALUMINUM REFLECTOR ELBOW

- ◆ 0.025" Minimum, Aluminum – Bright one side, minimum 97% reflectivity.
- ◆ Horizontal Reflector Tee
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube Systems.
- ◆ Bright Finish - Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0360.TB

**Dimensions:**  
Minimum 0.025" Thick Bright Aluminum

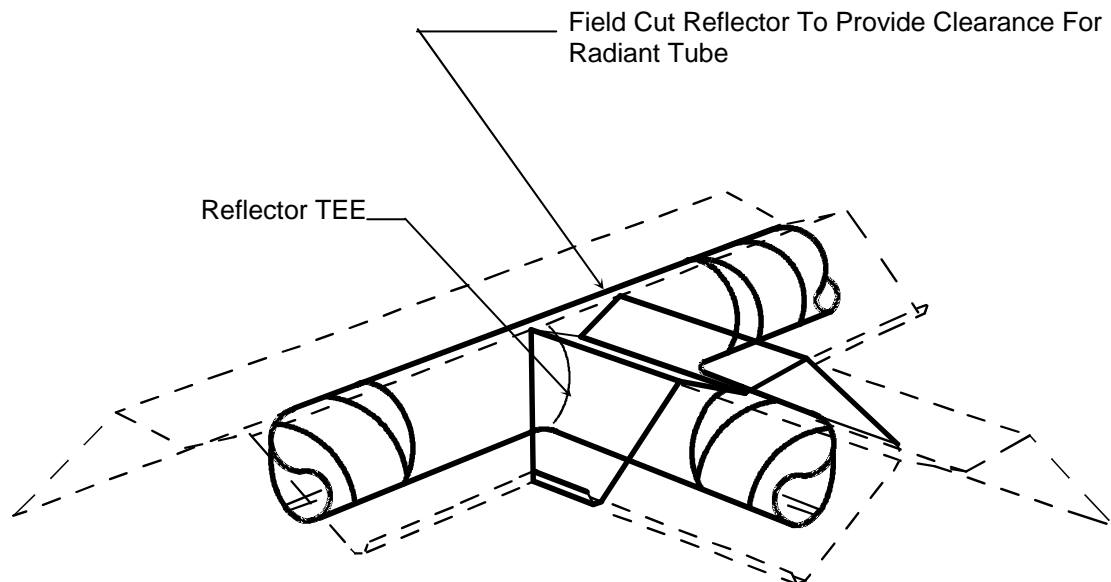
### INSTALLATION & CHECKOUT

#### INSTALLATION

Install reflector Tee as outlined on the shop drawings. Secure reflector elbow to reflectors with pop rivets or screws. Refer to the owner's manual for installation guidance.

#### CHECKOUT

Make sure that reflectors and reflector Tee is straight and true with a expansion joint in each straight run of reflector. Secure adjoining reflectors with sheet metal screws or pop rivets.





### **ALUMINUM SIDE SHIELD**

- ◆ Bright Finish Aluminum Side Shield
- ◆ High Reflectivity
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**  
0367.00 – 10'-0" Long

**Dimensions:**  
Minimum 0.025" Thick Bright Aluminum,  
10'-0" Long.  
6.0 lbs. (2.72 Kg)

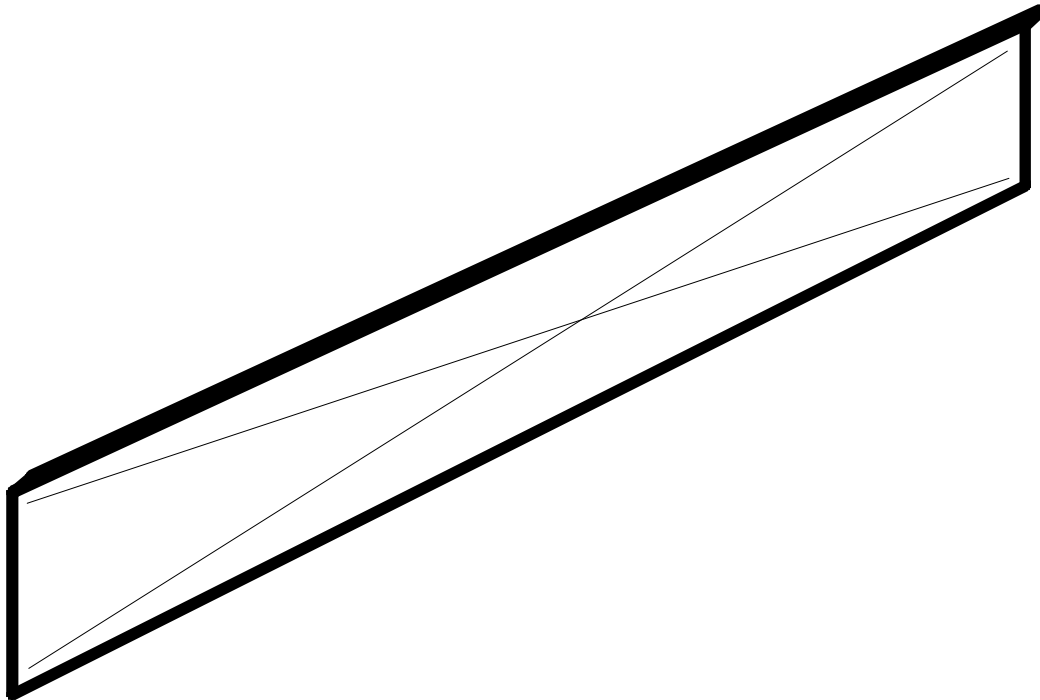
### **INSTALLATION & CHECKOUT**

#### **INSTALLATION**

Install side shield as outlined on the shop drawings. Secure to reflectors with sheet metal screws or pop rivets. Expansion joint shall match the reflector expansion joint. Attach side shield supports (P/N 0363.0050) - Refer to the owner's manual for installation guidance.

#### **CHECKOUT**

Make sure that reflectors and side shields are straight and true with a expansion joint in each straight run of reflector.







### **SIDE SHIELD SUPPORT**

- ◆ 16 Ga. Aluminized steel.
- ◆ Used With P/N 0360.00 Reflectors
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0368.00

**Dimensions:**

1" Wide x 5-1/2" (Approx.) Long

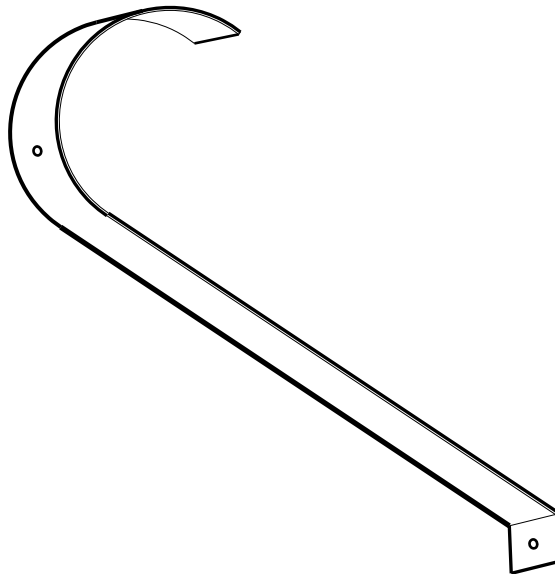
### **INSTALLATION & CHECKOUT**

#### **INSTALLATION**

Install side shield as outlined on the shop drawings. Side shield supports are to be installed approximately every five feet (5'). Secure side shield support to radiant tube and side shield with self drilling and tapping screws. Secure side shields to reflector with pop rivets or screws allowing for at least one unsecured expansion joint for each straight run – these should coincide with the expansion joints of the reflector. Refer to the owner's manual for installation guidance.

#### **CHECKOUT**

Make sure that reflectors are straight and true with a expansion joint in each straight run.





### **SIDE SHIELD SUPPORT**

- ◆ 16 Ga. Aluminized steel.
- ◆ Used With P/N 0812.00 Reflectors
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0368.0010

**Dimensions:**

1" Wide x 4" (Approx.) Long

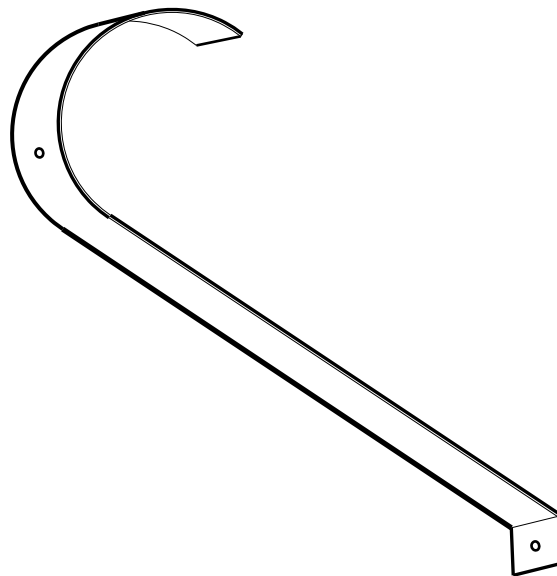
### **INSTALLATION & CHECKOUT**

#### **INSTALLATION**

Install side shield as outlined on the shop drawings. Side shield supports are to be installed approximately every five feet (5'). Secure side shield support to radiant tube and side shield with self drilling and tapping screws. Secure side shields to reflector with pop rivets or screws allowing for at least one unsecured expansion joint for each straight run – these should coincide with the expansion joints of the reflector. Refer to the owner's manual for installation guidance.

#### **CHECKOUT**

Make sure that reflectors are straight and true with a expansion joint in each straight run.





## **PROTECTIVE SCREEN**

- ◆ Minimum 14 Ga. Galvanized wire construction.
- ◆ 2" x 4" openings.
- ◆ Used With 0360.00 Reflectors.
- ◆ Corrosion Resistant

## **SPECIFICATIONS**

### **CRC Part No.:**

0360.PS

### **Dimensions:**

5' Long Protective Screen

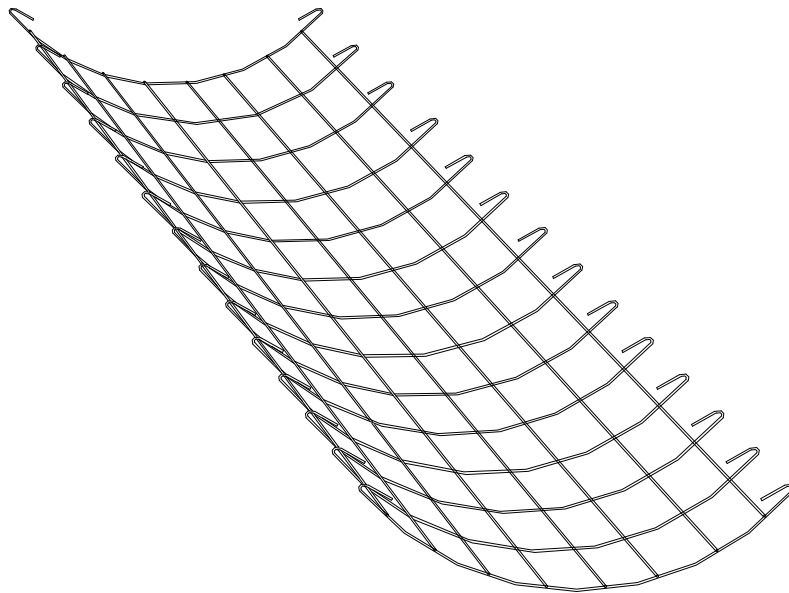
## **INSTALLATION & CHECKOUT**

### **INSTALLATION**

Install Protective Screen as outlined on the shop drawings. Secure Protective Screens to reflector as outlined in the installation instruction.

### **CHECKOUT**

Make sure that reflectors are straight and true with a expansion joint in each straight run. Make sure Protective Screen is secured to the radiant tube and reflector hangers as outlined in the installation instructions. In high wind conditions install a "tether wire" to insure reflectors and protective screens will not sway. Refer to drawing "360-seismic" for details.





### ALUMINIZED STEEL TUBE COUPLER

- ◆ Aluminized Steel Construction
- ◆ Swaged For Internal Connection to 0304.AS Radiant tubes.
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Aluminized Steel, Min. 18 Ga.
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0311.AS

**Dimensions:**  
Minimum 18 Ga. aluminized steel, 3.5" Tubing  
Swaged on Both Ends

**Temperature Rating:**  
1050°F (565°C)

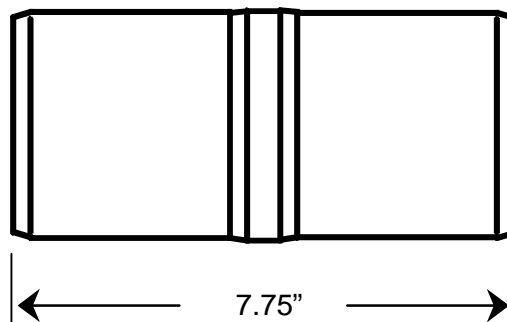
### INSTALLATION & CHECKOUT

#### Installation

Install coupler as shown on shop drawing. Note couplers are designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance.

#### Checkout

Make sure that the radiant tubes and couplers are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### ALUMINIZED STEEL TUBE ELBOW

- ◆ Aluminized Steel Construction
- ◆ Swaged Ends For Internal Connection To 0304.AS Radiant tubes.
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Aluminized Steel, Min. 18 Ga.
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0306.AS

**Dimensions:**  
Minimum 18 Ga. Aluminized Steel, 3.5" - 90°  
Elbow, Swaged on Both Ends

**Temperature Rating:**  
1050°F (565°C)

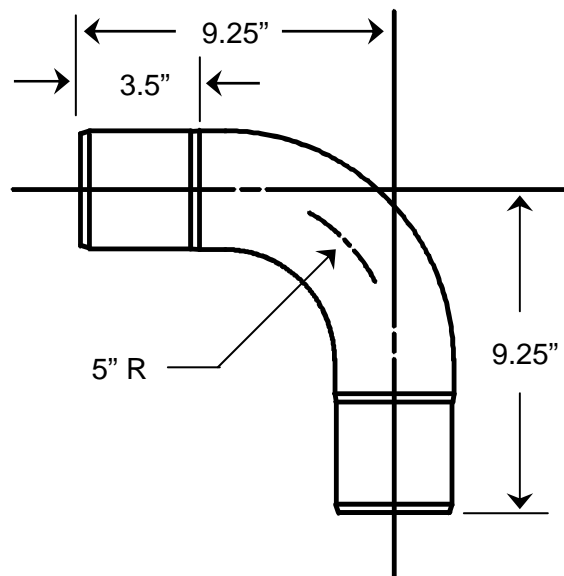
### INSTALLATION & CHECKOUT

#### Installation

Install elbow as shown on shop drawing. Note elbows are designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance.

#### Checkout

Make sure that the radiant tubes and couplers are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### **ALUMINIZED STEEL TUBE ELBOW**

- ◆ Aluminized Steel Construction
- ◆ Swaged Ends For Internal Connection To 0304.AS Radiant tubes.
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Aluminized Steel, Min. 18 Ga.
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**  
0336.AS

**Dimensions:**  
Minimum 18 Ga. Aluminized Steel, 3.50" - 45°  
Elbow, Swaged on Both Ends

**Temperature Rating:**  
1050°F (565°C)

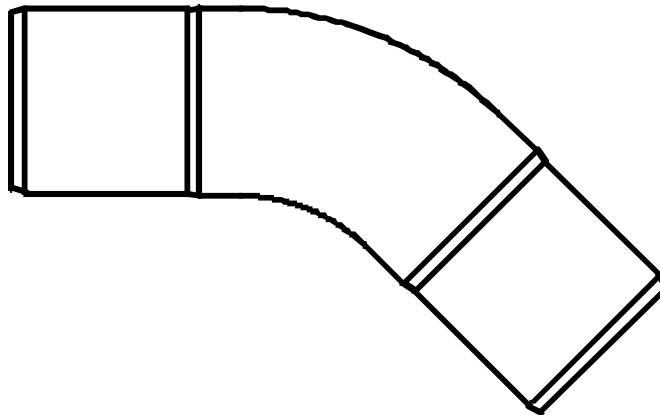
### **INSTALLATION & CHECKOUT**

#### **Installation**

Install elbow as shown on shop drawing. Note elbows are designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance.

#### **Checkout**

Make sure that the radiant tubes and couplers are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### ALUMINIZED STEEL TEE

- ◆ Aluminized Steel Construction
- ◆ Swaged Ends For Internal Connection To 0304.AS Radiant tubes.
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Aluminized Steel, Min. 18 Ga.
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0307.AS

**Dimensions:**  
Minimum 18 Ga. Aluminized Steel, 3.5" x 3.5" x 3.5" Tee, Swaged Ends

**Temperature Rating:**  
1050°F (565°C)

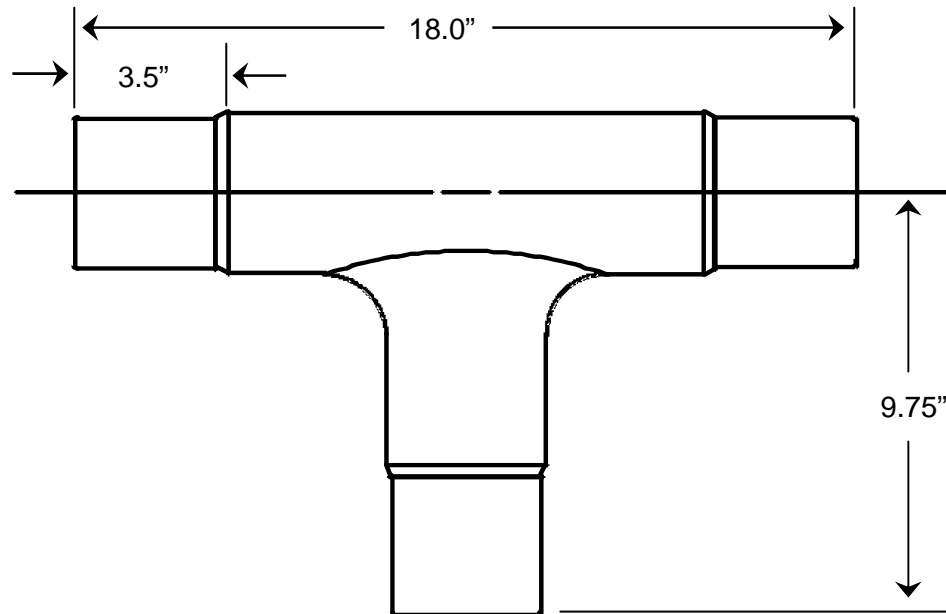
### INSTALLATION & CHECKOUT

#### Installation

Install tee as shown on shop drawing. Note tee is designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance.

#### Checkout

Make sure that the radiant tubes and tee's are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### ALUMINIZED STEEL TEE WITH DAMPERS INLINE

- ◆ Aluminized Steel Construction
- ◆ Swaged Ends For Internal Connection To 0304.AS Radiant tubes.
- ◆ Dampers Installed Inline
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Aluminized Steel, Min. 18 Ga.
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0407.AS.B

**Dimensions:**  
Minimum 18 Ga. Aluminized Steel, 3.5" x 3.5" x 3.5" Tee With Dampers, Swaged Ends

**Temperature Rating:**  
850°F (454°C)

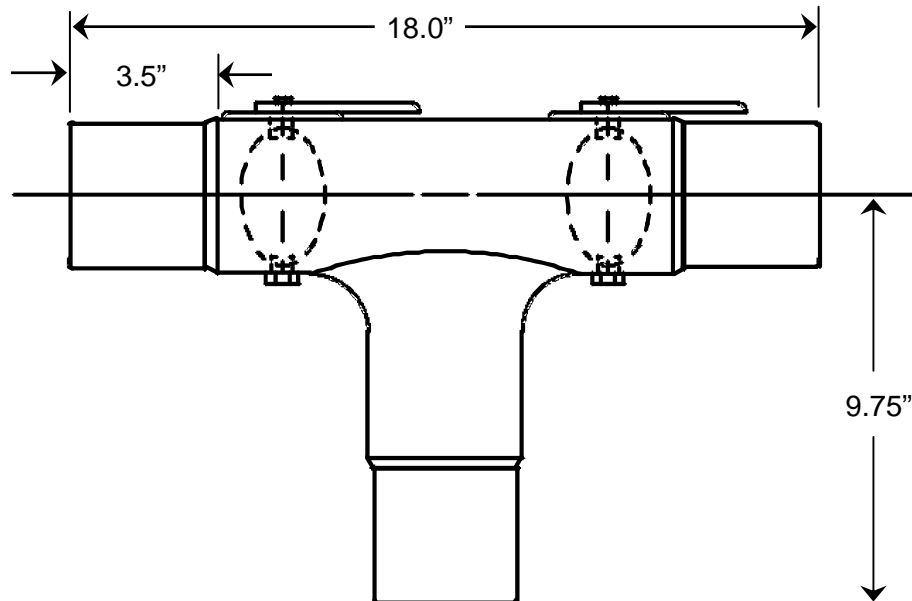
### INSTALLATION & CHECKOUT

#### Installation

Install damper tee as shown on shop drawing. Note tee is designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance and method for setting the system vacuum.

#### Checkout

Make sure that the radiant tubes and tee's are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.







### ALUMINIZED STEEL TEE WITH DAMPERS AT 90°

- ◆ Aluminized Steel Construction
- ◆ Swaged Ends For Internal Connection To 0304.AS Radiant tubes.
- ◆ Dampers Installed Inline
- ◆ Used With Reflect-O-Ray® EDS 3.5 Radiant Tube System
- ◆ Aluminized Steel, Min. 18 Ga.
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**  
0407.AS.C

**Dimensions:**  
Minimum 18 Ga. Aluminized Steel, 3.5" x 3.5" x 3.5" Tee With Dampers, Swaged Ends

**Temperature Rating:**  
850°F (454°C)

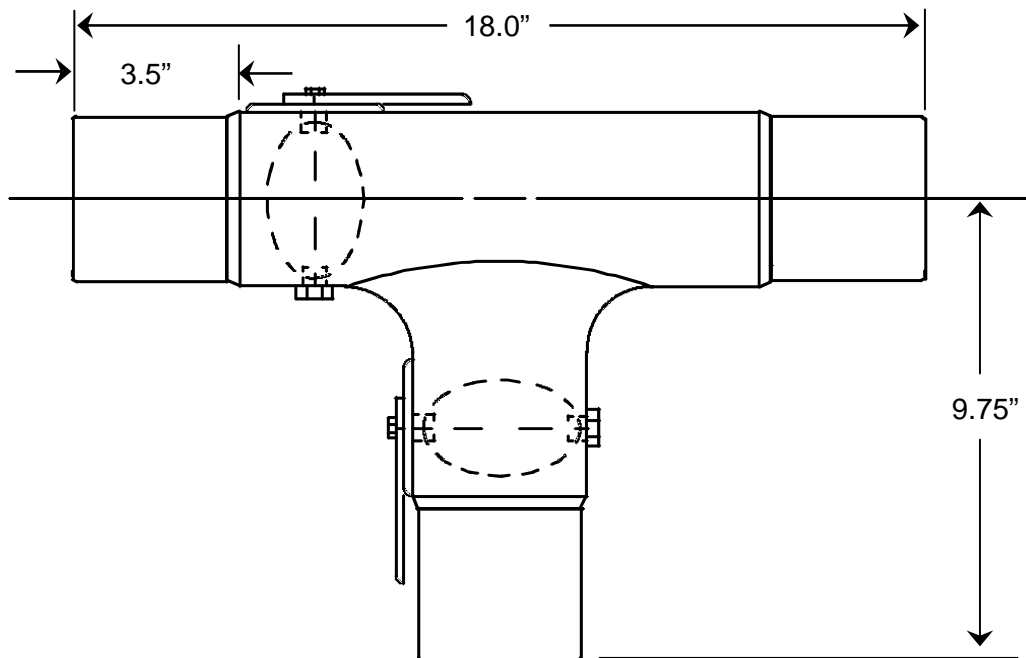
### INSTALLATION & CHECKOUT

#### Installation

Install damper tee as shown on shop drawing. Note tee is designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance and method for setting the system vacuum.

#### Checkout

Make sure that the radiant tubes and tee's are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### **ALUMINIZED STEEL DAMPER**

- ◆ Aluminized Steel Construction
- ◆ Swaged End For Internal Connection To 0304.AS Radiant tubes.
- ◆ Single Flow Damper Application
- ◆ Used With Reflect-O-Ray® EDS3.5 Radiant Tube System.
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0341.00 - Damper

**Dimensions:**

8" section of 3.5" spiral tube with damper in the center. A 0311.AS coupler inserted in one end.

**Temperature Rating:**

850°F (454°C)

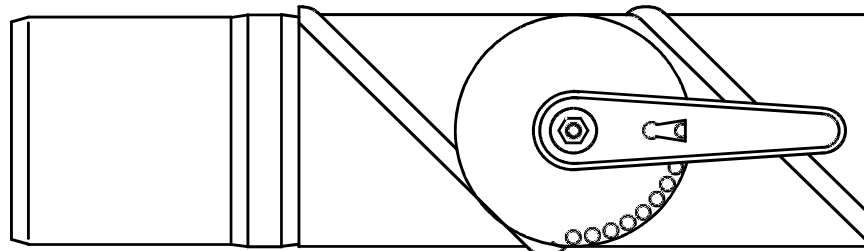
### **INSTALLATION & CHECKOUT**

**Installation**

Install the damper as shown on shop drawing. Note coupler in damper assembly is designed to fit inside the spiral radiant tube. Apply sealer to internal surface of radiant tube before inserting coupler. Secure with three self drilling and taping screws on each swaged end. Refer to the owner's manual for installation guidance and method for setting the system vacuum.

**Checkout**

Make sure that the radiant tubes and couplers and fittings are installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### STAINLESS STEEL EXHAUST FLEX

- ◆ Stainless steel inner liner with black fiberglass outer liner.
- ◆ 3.5" (90 mm) ID, 30" (762 mm) Long
- ◆ High temperature rating
- ◆ Two stainless steel hose clamps included
- ◆ Corrosion Resistant

### SPECIFICATIONS

**CRC Part No.:**

0334.SS – Stainless Steel Exhaust Flex & Clamps

**Dimensions:**

3.56" (90mm) ID, 30" (762mm) Long

**Temperature Rating:**

Max. 850°F (454°C)

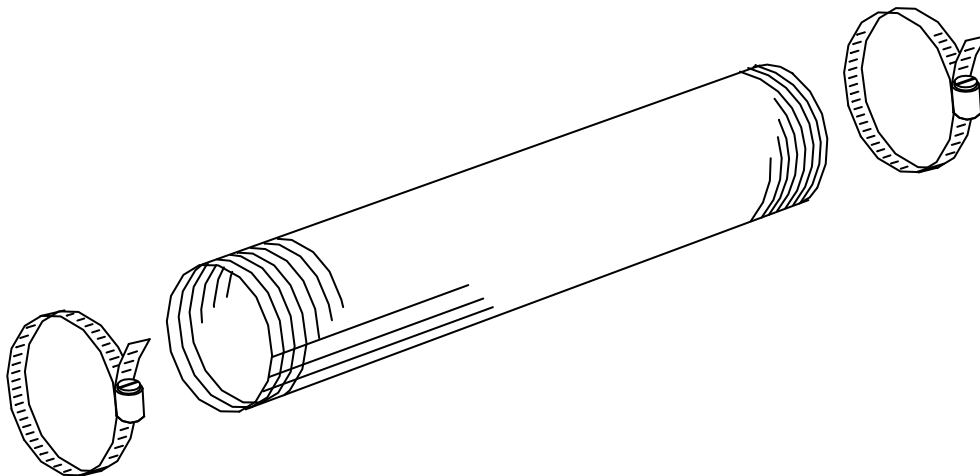
### INSTALLATION & CHECKOUT

**Installation**

Install the flex assembly as shown on shop drawing. Refer to the owner's manual for installation guidance and method for setting the system vacuum.

**Checkout**

Make sure that the exhaust flex is installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure that all radiant tubes are securely connected, and are square and straight.





### **FRESH AIR INLET ASSEMBLY**

- ◆ PVC and Aluminum Construction
- ◆ Weather Proof
- ◆ Inlet Flex & Clamps Included
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0314.00 – Fresh Air Inlet, Flex & Clamps

**Dimensions:**

4.0" (101.9mm) OD on Inlet Hood  
24" (609.6mm) Long PVC Coated Aluminum Flex & Clamps

**Temperature Rating:**

Min. -40°F (-40°C)  
Max. 200°F (93°C)

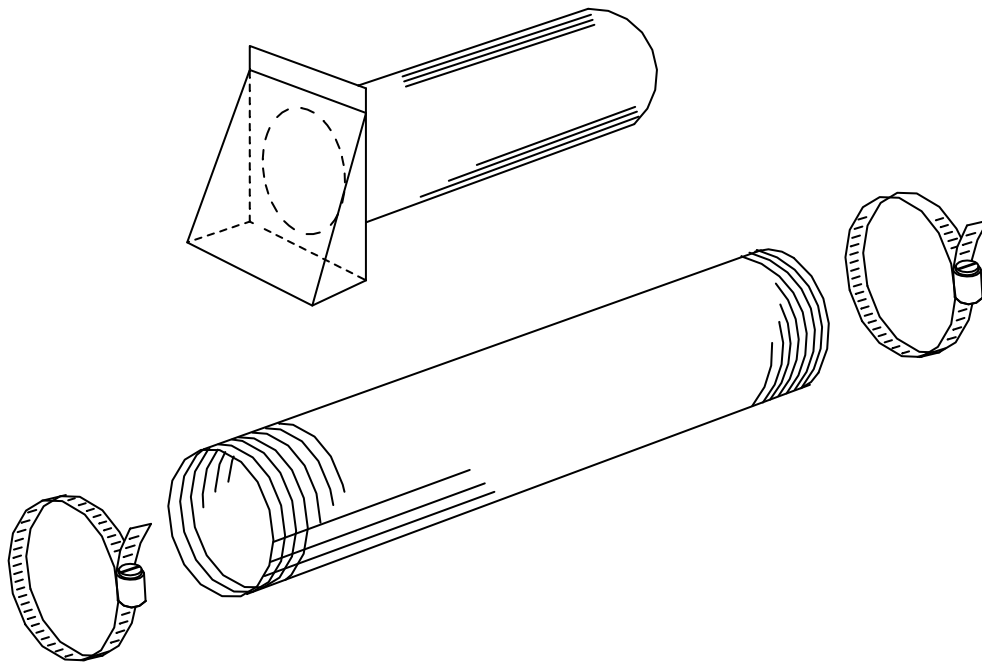
### **INSTALLATION & CHECKOUT**

**Installation**

Install the fresh air assembly as shown on shop drawing. Apply silicone sealer to external surface that mounts against wall. Secure to wall with three screws. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that the fresh air assembly and flex is installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure flex is securely fastened with clamps provided.





### **FRESH AIR FLEX & CLAMPS**

- ◆ PVC and Aluminum Construction
- ◆ Weather Proof
- ◆ Clamps Included
- ◆ Corrosion Resistant

### **SPECIFICATIONS**

**CRC Part No.:**

0314.AC – Fresh Air Inlet Flex & Clamps

**Dimensions:**

4.0" (101.9mm) ID, 24" (609.6mm) Long PVC Coated  
Aluminum Flex & Clamps

**Temperature Rating:**

Min. -40°F (-40°C)  
Max. 200°F (93°C)

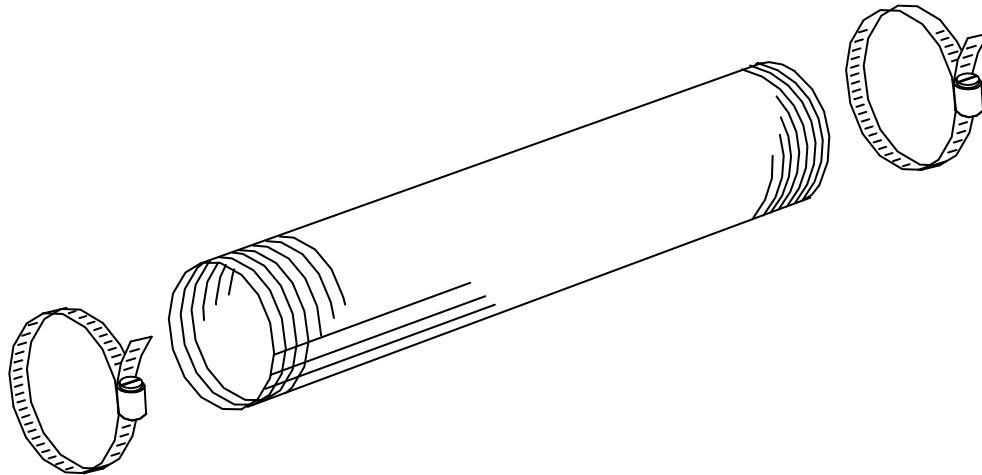
### **INSTALLATION & CHECKOUT**

**Installation**

Install the fresh air assembly as shown on shop drawing. Apply silicone sealer to external surface that mounts against wall. Secure to wall with three screws. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that the fresh air assembly and flex is installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure flex is securely fastened with clamps provided.





### THERMOSTAT FEATURES

- N.E.M./A. 4X enclosure complies with N.E.C Article 547 when used with appropriate watertight connections
- Rugged weather resistant enclosure made of corrosion resistant materials.
- Low Mass, high surface area of stainless steel coiled sensor provides rapid response to temperature change.
- Underwriters Laboratories (UL) listed and CSA Certified
- Multi-positional mounting meets new or existing wiring.
- Insulated enclosure
- Easily removable knockouts in sides, ends and back of enclosure
- Large wiring compartment with water tight cover separated from thermostat compartment.
- Large dial with temperature in Fahrenheit (40° F to 110° F) & Celsius (5° C to 113° C)

### SPECIFICATIONS

**CRC Part No.:**  
5487.00 - Heating only.

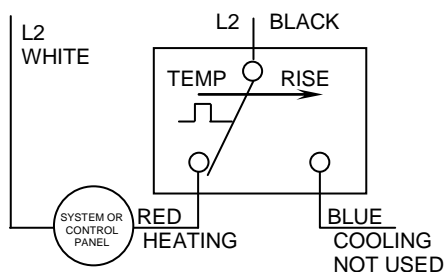
**Control Range:**  
40°F (5°C) to 110°F (113°C)

#### Electrical Ratings:

50-60Hz	120 V	240 V	277 V	480V
Full Load Amp	16	12	10	--
LRA	80	60	50	--
Resistive Amp	25	25	22	5
Pilot Duty	125 VA	125 VA	125 VA	125 VA

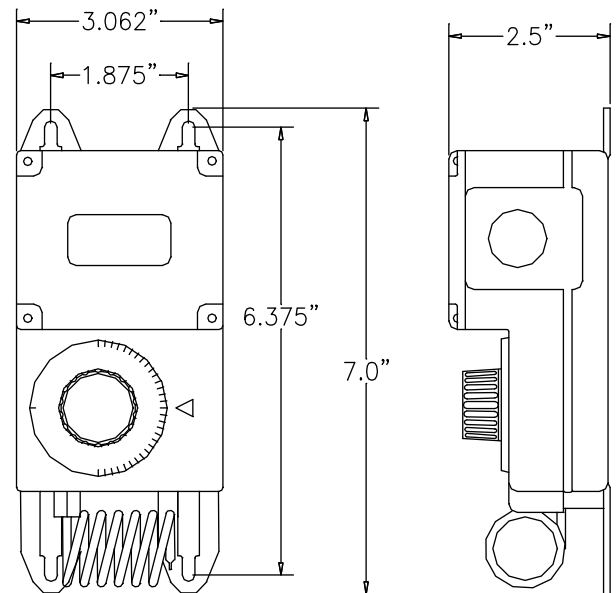
**NOTE: This thermostat is suitable for 24 V operation**

#### Wiring:



(Figure 1)

### Dimensions:



### INSTALLATION & CHECKOUT

#### MOUNTING:

Position thermostat on inside wall about 5' (1.5m) above floor, mount on wall with 4 screws (not provided) through 4 slotted feet on thermostat. Remove the desired knockout and install electrical conduit. In wet applications use of appropriate watertight conduit (4X Listed) is required. Install conduit with a drip loop so that water or other liquids cannot enter the thermostat.

**CAUTION:** Failure to use suitable watertight connections and suitable drip loop could result in water or other liquids entering the enclosure which can cause control failure, personal injury and/or property damage.

Do not mount thermostat where it can be affected by drafts, direct radiant heat from the heater as well as the sun or other sources of heating or cooling. Do not bend, crimp or damage the sensor - the calibration and operation may be affected.

Wire as shown in figure 1.

#### SETTING AND CHECKOUT:

Turn on power. Raise the temperature setting to energize the heating load. The heater will turn on. The heater will turn off when the temperature rises to the set point.

Lower the temperature setting to lowest setting to de-energize the heating load. The heater will turn off.



## LOCKING THERMOSTAT GUARD FEATURES

- ◆ Metal construction with beige coating.
- ◆ Keyed lock
- ◆ Ring Base: 6.625" L x 4.5"
- ◆ Vertical or horizontal mounting

## SPECIFICATIONS

### CRC Part No.:

5485.LC – Locking Thermostat Guard

### Dimensions:

6.625" L (168 mm) x 4.5" H (114mm) x 3.375" D (86mm)

## INSTALLATION & CHECKOUT

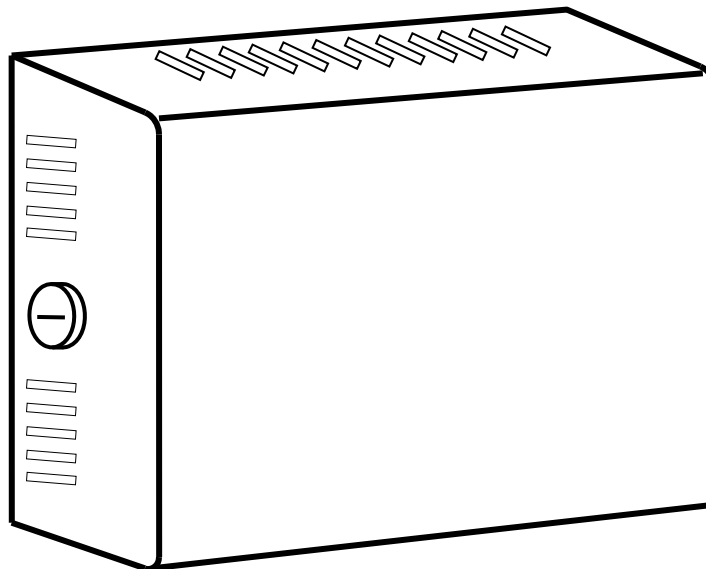
### MOUNTING

Position thermostat and guard on inside wall about 5' (1.5m) above floor, mounted on 2" x 4" vertical electrical outlet box. Do not mount thermostat where it can be affected by drafts, direct radiant heat from the heater as well as the sun or other sources of heating or cooling.

Remove cover by pulling out at the bottom. Install thermostat by screwing base to electrical box. **DO NOT** press on the bimetal sensor or set point knob to seat the thermostat to the electrical box - thermostat will be damaged.

### CHECKOUT

Make sure that the thermostat guard locks and un-locks properly. Leave keys with building owner



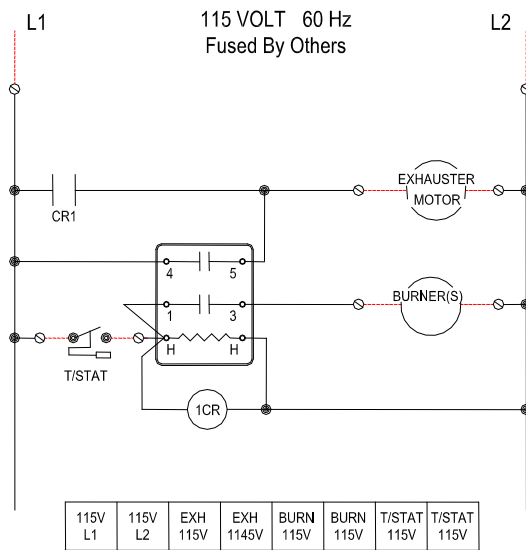


**CONTROL PANEL**

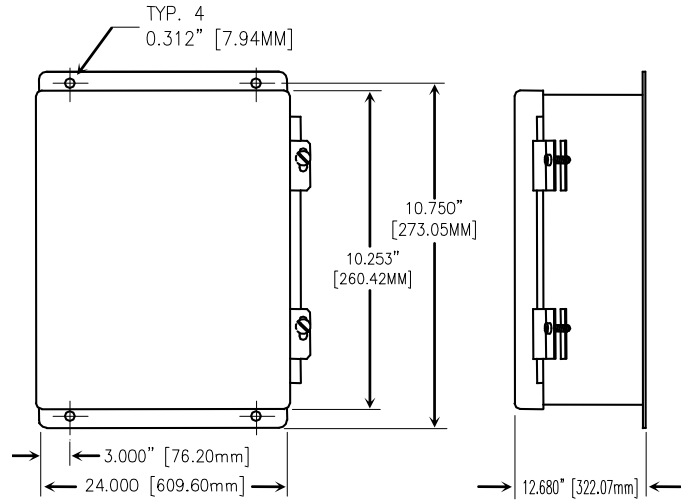
- ◆ JIC Enclosure
- ◆ Corrosion Resistant
- ◆ Approximately 60 seconds pre purge
- ◆ Approximately 80 seconds post purge

**SPECIFICATIONS**

**CRC Part No.:**  
5500.00 – Control Panel, Pre & Post Purge



**Dimensions:**



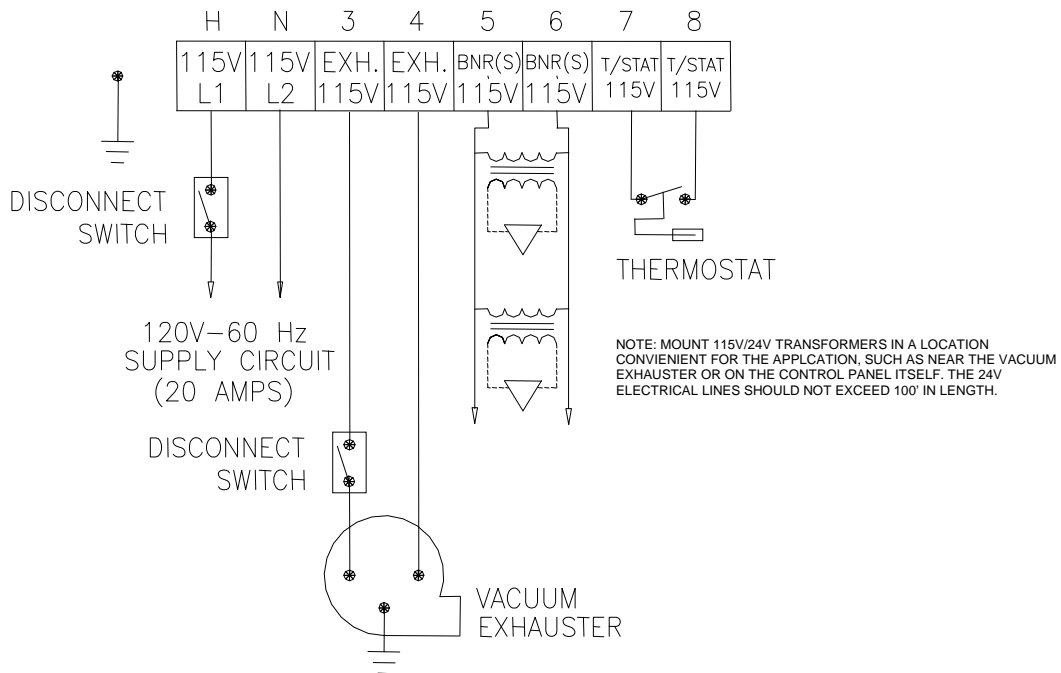
**INSTALLATION & CHECKOUT**

**Installation**

Install the fresh air assembly as shown on shop drawing. Apply silicone sealer to external surface that mounts against wall. Secure to wall with three screws. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that the fresh air assembly and flex is installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure flex is securely fastened with clamps provided.





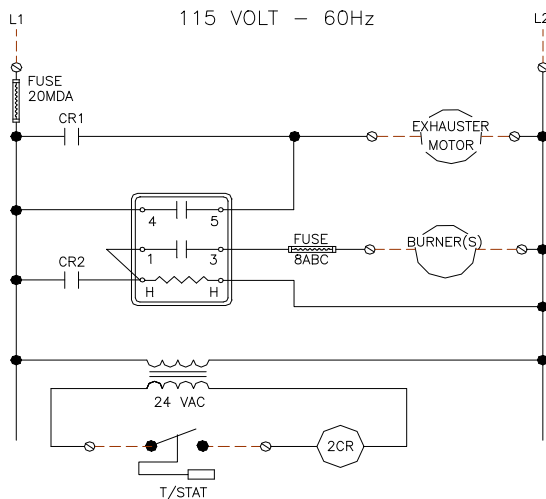


**CONTROL PANEL**

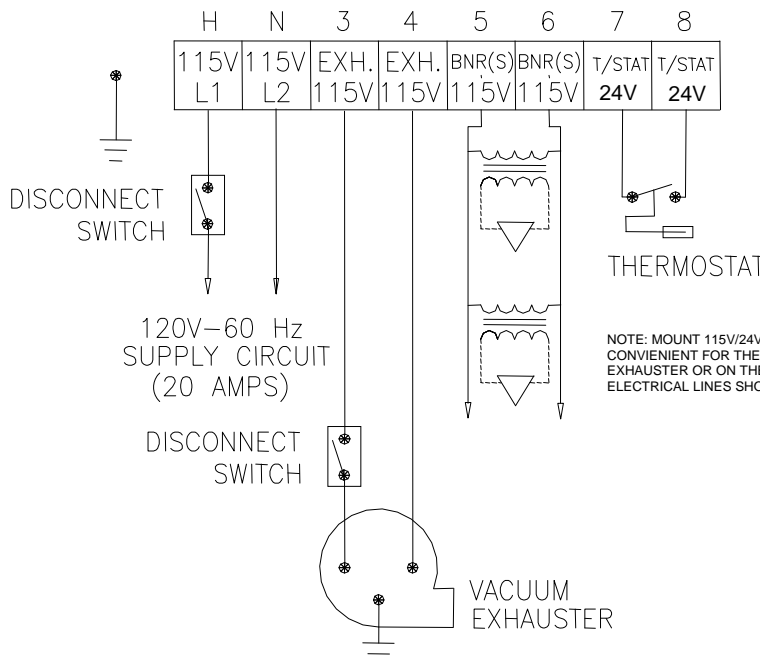
- ◆ JIC Enclosure
- ◆ Corrosion Resistant
- ◆ Approximately 60 seconds pre purge
- ◆ Approximately 80 seconds post purge

**SPECIFICATIONS**

**CRC Part No.:**  
5500.04 – Control Panel, Pre & Post Purge With  
24 Volt Thermostat Control

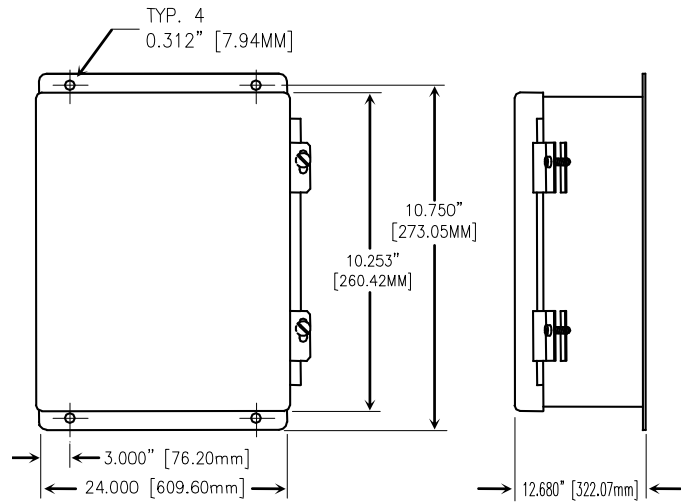


115V L1	115V L2	EXH. 115V	EXH. 115V	BURN 115V	BURN 115V	T/STAT 24V	T/STAT 24V
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NOTE: MOUNT 115V/24V TRANSFORMERS IN A LOCATION CONVENIENT FOR THE APPLICATION, SUCH AS NEAR THE VACUUM EXHAUSTER OR ON THE CONTROL PANEL ITSELF. THE 24V ELECTRICAL LINES SHOULD NOT EXCEED 100' IN LENGTH.

**Dimensions:**



**INSTALLATION & CHECKOUT**

**Installation**

Install the fresh air assembly as shown on shop drawing. Apply silicone sealer to external surface that mounts against wall. Secure to wall with three screws. Refer to the owner's manual for installation guidance.

**Checkout**

Make sure that the fresh air assembly and flex is installed in accordance with the owner's manual as well as the shop drawing. Inspect to make sure flex is securely fastened with clamps provided.



## **SIDE WALL VENT TERMINAL**

- ◆ Powder Coated Aluminized Steel Construction
- ◆ Stainless Steel Bird Screen
- ◆ Powder Coated
- ◆ Corrosion Resistant

## **SPECIFICATIONS**

### **CRC Part No.:**

0419.00 – Used with 0401 & 0402 series  
Vacuum Exhausters

### **Dimensions:**

0419.00 – 2.5" (63.5mm) x 5.312" (134.9mm)  
(ID Dimensions), 24" (609.6mm) Long

### **Temperature Rating:**

450°F (232°C)

## **INSTALLATION & CHECKOUT**

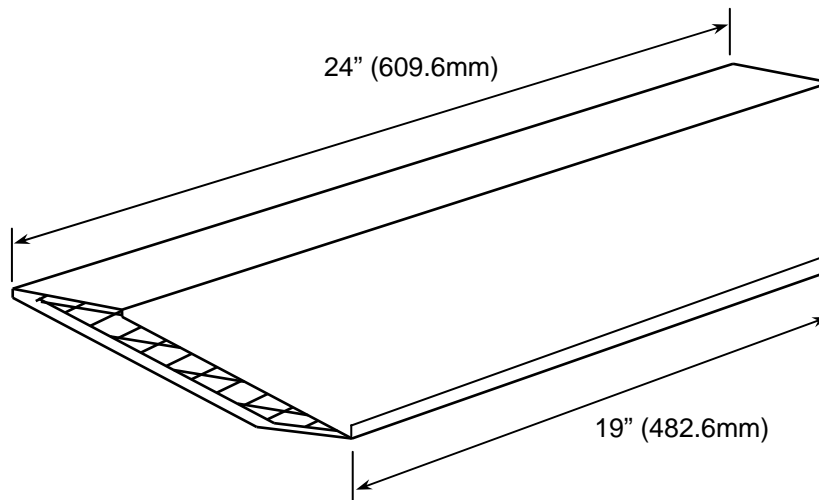
### **MOUNTING**

Position thermostat and guard on inside wall about 5' (1.5m) above floor, mounted on 2" x 4" vertical electrical outlet box. Do not mount thermostat where it can be affected by drafts, direct radiant heat from the heater as well as the sun or other sources of heating or cooling.

Remove cover by pulling out at the bottom. Install thermostat by screwing base to electrical box. **DO NOT** press on the bimetal sensor or set point knob to seat the thermostat to the electrical box - thermostat will be damaged.

### **CHECKOUT**

Make sure that the thermostat guard locks and un-locks properly. Leave keys with building owner





## **SIDE WALL VENT TERMINAL**

- ◆ Powder Coated Aluminized Steel Construction
- ◆ Stainless Steel Bird Screen
- ◆ Powder Coated
- ◆ Corrosion Resistant

## **SPECIFICATIONS**

### **CRC Part No.:**

0219.00 – Used with 0201 series Vacuum  
Exhausters

### **Dimensions:**

0219.00 – 2.5" (63.5mm) x 5.312" (134.9mm)  
(ID Dimensions), 24" (609.6mm) Long

### **Temperature Rating:**

450°F (232°C)

## **INSTALLATION & CHECKOUT**

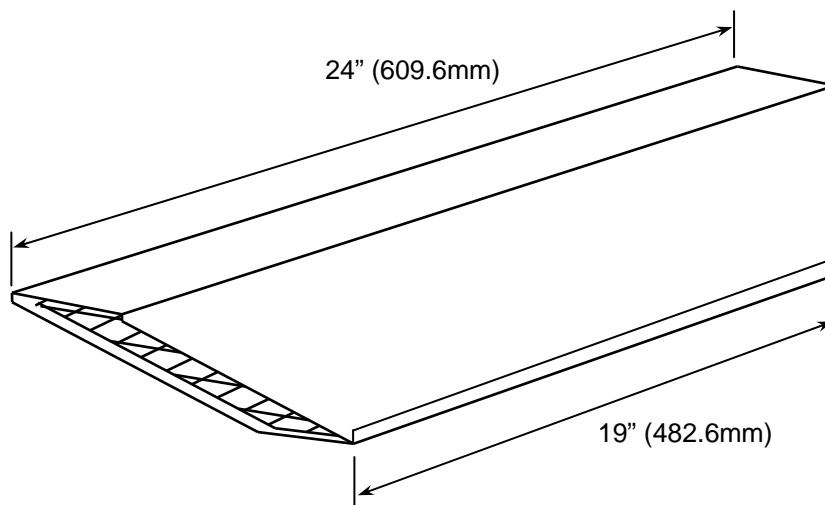
### **MOUNTING**

Position thermostat and guard on inside wall about 5' (1.5m) above floor, mounted on 2" x 4" vertical electrical outlet box. Do not mount thermostat where it can be affected by drafts, direct radiant heat from the heater as well as the sun or other sources of heating or cooling.

Remove cover by pulling out at the bottom. Install thermostat by screwing base to electrical box. **DO NOT** press on the bimetal sensor or set point knob to seat the thermostat to the electrical box - thermostat will be damaged.

### **CHECKOUT**

Make sure that the thermostat guard locks and un-locks properly. Leave keys with building owner





## **SIDE WALL VENT TERMINAL**

- ◆ Powder Coated Aluminized Steel Construction
- ◆ Stainless Steel Bird Screen
- ◆ Powder Coated
- ◆ Corrosion Resistant

## **SPECIFICATIONS**

### **CRC Part No.:**

0119.00 – Used with 0101 series Vacuum  
Exhausters

### **Dimensions:**

0119.00 – 2.28 (57.9mm) x 5.218" (132.5mm)  
(ID Dimensions), 24" (609.6mm) Long

### **Temperature Rating:**

450°F (232°C)

## **INSTALLATION & CHECKOUT**

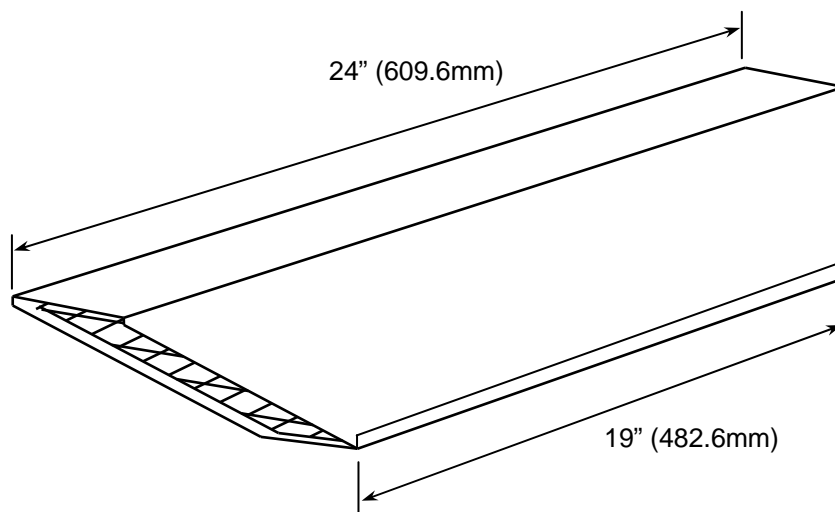
### **MOUNTING**

Position thermostat and guard on inside wall about 5' (1.5m) above floor, mounted on 2" x 4" vertical electrical outlet box. Do not mount thermostat where it can be affected by drafts, direct radiant heat from the heater as well as the sun or other sources of heating or cooling.

Remove cover by pulling out at the bottom. Install thermostat by screwing base to electrical box. **DO NOT** press on the bimetal sensor or set point knob to seat the thermostat to the electrical box - thermostat will be damaged.

### **CHECKOUT**

Make sure that the thermostat guard locks and un-locks properly. Leave keys with building owner





### **SIDE WALL & ROOF VENT TERMINAL**

- ◆ High Wind Vent Cap
- ◆ 4" Diameter Inlet
- ◆ Aluminum Construction
- ◆ Corrosion resistant

### **SPECIFICATIONS**

**CRC Part No.:**

1811.VT.400

**Dimensions:**

4" , "B" Vent Connection

**Maximum Temperature:**

Maximum 600°F (315°C)

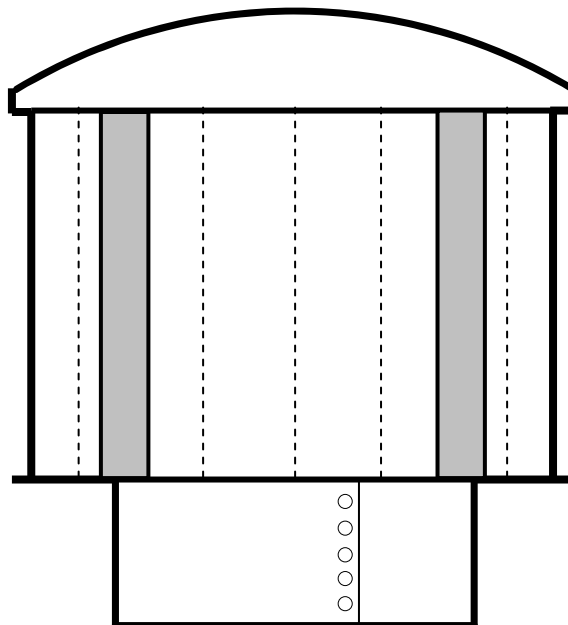
### **INSTALLATION & CHECKOUT**

**INSTALLATION**

Install the vent cap as shown in the Owners' Manual and shop drawings. Observe any clearance to combustibles and applicable installation codes.

**CHECKOUT**

Make sure that vent terminal is securely fastened to venting pipe (supplied by installer). Install as outlined in the Owners' Manual and in accordance with applicable codes.





### **SIDE WALL & ROOF VENT TERMINAL**

- ◆ High Wind Vent Cap
- ◆ 6" Diameter Inlet
- ◆ Aluminum Construction
- ◆ Corrosion resistant

### **SPECIFICATIONS**

**CRC Part No.:**

1811.VT.600

**Dimensions:**

6" , "B" Vent Connection

**Maximum Temperature:**

Maximum 600°F (315°C)

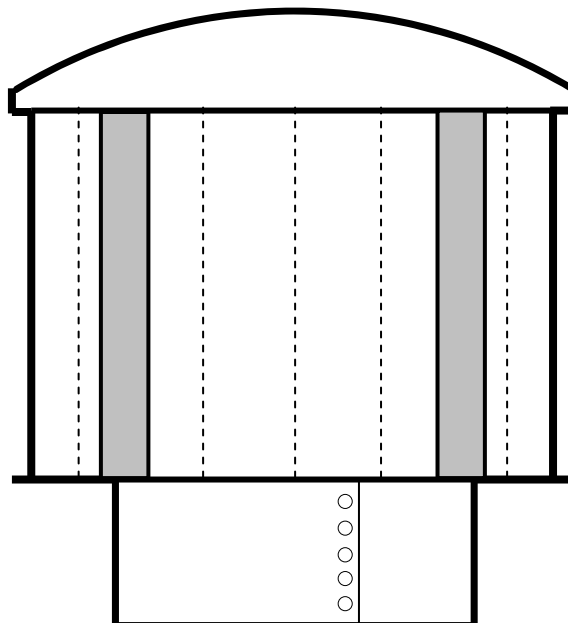
### **INSTALLATION & CHECKOUT**

**INSTALLATION**

Install the vent cap as shown in the Owners' Manual and shop drawings. Observe any clearance to combustibles and applicable installation codes.

**CHECKOUT**

Make sure that vent terminal is securely fastened to venting pipe (supplied by installer). Install as outlined in the Owners' Manual and in accordance with applicable codes.





## **HANGING CHAIN**

- ◆ Double Loop Hanging Chain – 100' Long
- ◆ Zinc plated or galvanized steel construction

## **SPECIFICATIONS**

### **CRC Part No.:**

1800.CH.000

### **Dimensions:**

100' (30,481mm) Hanging Chain – Workload rating of 90 pounds – Zinc plated or galvanized steel construction.

### **Maximum Temperature:**

Maximum 600°F (315°C)

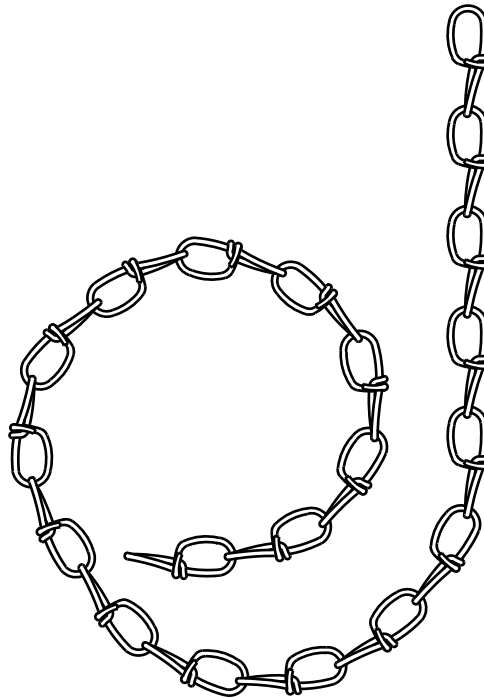
## **INSTALLATION & CHECKOUT**

### **INSTALLATION**

Install chain and “S” hooks as shown in the Owners' Manual and shop drawings.

### **CHECKOUT**

Make sure that all “S” are crimped closed Install as outlined in the Owners' Manual and in accordance with applicable codes.





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## **"S" HOOK**

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- ◆ Zinc plated or galvanized steel construction

## **SPECIFICATIONS**

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### **CRC Part No.:**

1800.SH.000

### **Dimensions:**

50 Pieces of "S" Hook – Workload rating of 90 pounds – Zinc plated or galvanized steel construction.

### **Maximum Temperature:**

Maximum 600°F (315°C)

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## **INSTALLATION & CHECKOUT**

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### **INSTALLATION**

Install chain and "S" hooks as shown in the Owners' Manual and shop drawings.

### **CHECKOUT**

Make sure that all "S" are crimped closed Install as outlined in the Owners' Manual and in accordance with applicable codes.

**S**





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## **TURNBUCKLE**

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- ◆ Zinc plated or galvanized steel construction

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## **SPECIFICATIONS**

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**CRC Part No.:**

1800.TB.000

**Dimensions:**

Turnbuckle – Minimum workload rating of 90 pounds – Zinc plated or galvanized steel construction.

**Maximum Temperature:**

Maximum 600°F (315°C)

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## **INSTALLATION & CHECKOUT**

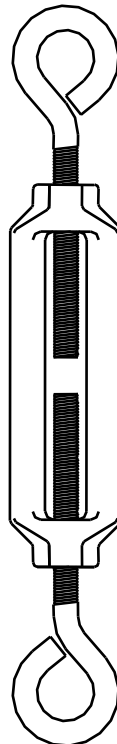
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**INSTALLATION**

Install turnbuckle as shown in the Owners' Manual and shop drawings.

**CHECKOUT**

Make sure that all turnbuckles are wired closed – see Owners' Manual for details.





## **SCREW & SEALER**

- ◆ #10 TEC Self drilling and taping metal screws.
- ◆ High temperature sealer

## **SPECIFICATIONS**

### **CRC Part No.:**

0315.AS

### **Dimensions:**

Screws – ½" long #10 TEC screw  
Sealer – 5 oz. Tube.

### **Maximum Temperature:**

Screws & Sealer - Maximum 1030°F (555°C)

## **INSTALLATION & CHECKOUT**

### **INSTALLATION**

Apply sealer and install screws as shown in the Owners' Manual and shop drawings.

### **CHECKOUT**

Make sure that all excess sealer is wiped away before sealer dries – see Owners' Manual for details.

