

# RVA SERIES

## AGRICULTURAL TUBE HEATER

INSTALLATION, OPERATION,  
MAINTENANCE  
AND PARTS MANUAL



Detroit Radiant Products Company

### FOR YOUR SAFETY!

#### IF YOU SMELL GAS:

1. Open windows.
2. Do not touch electrical switches.
3. Extinguish any open flame.
4. Immediately call your gas supplier.

### CONSIGNES DE SÉCURITÉ

#### Si vous sentez une odeur de gaz:

- Ouvrez les fenêtres.
- Ne touchez pas aux interrupteurs électriques.
- Éteignez toute flamme nue.
- Contactez immédiatement votre compagnie de gaz.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Il est interdit d'utiliser des liquides inflammables ou dégagant des vapeurs inflammables, à proximité de tout appareil fonctionnant au gaz.

## FOREWORD

### **WARNING!**

THIS HEATER **MUST** BE INSTALLED AND SERVICED BY TRAINED GAS INSTALLATION AND SERVICE PERSONNEL ONLY. READ AND UNDERSTAND THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THE DETROIT RADIANT PRODUCTS COMPANY HEATER. FAILURE TO COMPLY WITH THESE WARNINGS AND INSTRUCTIONS, AND THOSE ON THE HEATER COULD RESULT IN PERSONAL INJURY, DEATH, FIRE, ASPHYXIATION, AND/OR PROPERTY DAMAGE. RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

### **Approval Standards and Certifications**

Detroit Radiant Products units comply with or are certified by the following organizations or standards:

- ❖ American National Standards (ANSI Z83.6)
- ❖ Occupational Safety and Health Act (OSHA)
- ❖ American Gas Association (AGA)
- ❖ International Approval Services (IAS)
- ❖ Canadian Gas Association (CGA)
- ❖ National Standards of Canada

**Any** alteration of the system or of the factory-authorized components specified either in this manual or by Detroit Radiant Products Company voids all certification and warranties.

### **Detroit Radiant Products Company**

21400 Hoover Road ♦ Warren MI 48089 ♦ (810) 756-0950 ♦ Fax: (810) 756-2626

<http://www.reverberray.com>

E-mail: DRPSales@AOL.com

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## SAFETY INFORMATION

### WARNING

#### NOT FOR RESIDENTIAL USE!

Do not use in the home, sleeping quarters, attached garages, etc.

### WARNING

This is not an explosion-proof heater. Where there is the possibility of exposure to flammable vapors, consult the local fire marshal, the fire insurance carrier or other authorities for approval of the proposed installation.

- This infrared heater is designed for use in an agricultural application including most confinement applications.
- Detroit Radiant Products Company cannot anticipate every use, which may be made of their heaters. Check with your local fire safety authority if you have questions about local regulations.

### CAUTION!

The following information **must** be reviewed before installing this heater:

- Check the AGA/CGA rating label on the heater to verify the proper gas to be used. Check the other labels on the heater to verify proper mounting and clearance to combustibles.
- Signs should be posted in storage areas to specify maximum stacking height allowed in order to maintain clearance to combustibles. DRP Part # PLQ warning plaques are recommended.
- The installation of this heater must conform with local building codes or, in the absence of local codes, to the latest edition of the National Fuel Gas Code, ANSI Z223.1 (NFPA54). Applications in Canada must conform to CAN/CGA B149.1 and 2 Codes and Canadian Electrical Code C22.1-latest edition.
- The heater, when installed, must be electrically grounded in accordance with the latest edition of the National Electrical Code, ANSI/NFPA70.
- Under no circumstance is either the gas supply line or the electrical supply line to the heater to provide any assistance in the suspension of the heater.
- The weight of the heater must be entirely suspended from a permanent part of the building structure having adequate load characteristics.
- Neither the gas supply line, electrical supply line or sprinkler heads shall be located within the minimum clearance to combustibles as shown in the Clearance to Combustibles Chart on page 3.

**WARNING!**

Failure to comply with the stated clearance to combustibles could result in personal injury, death and/or property damage.

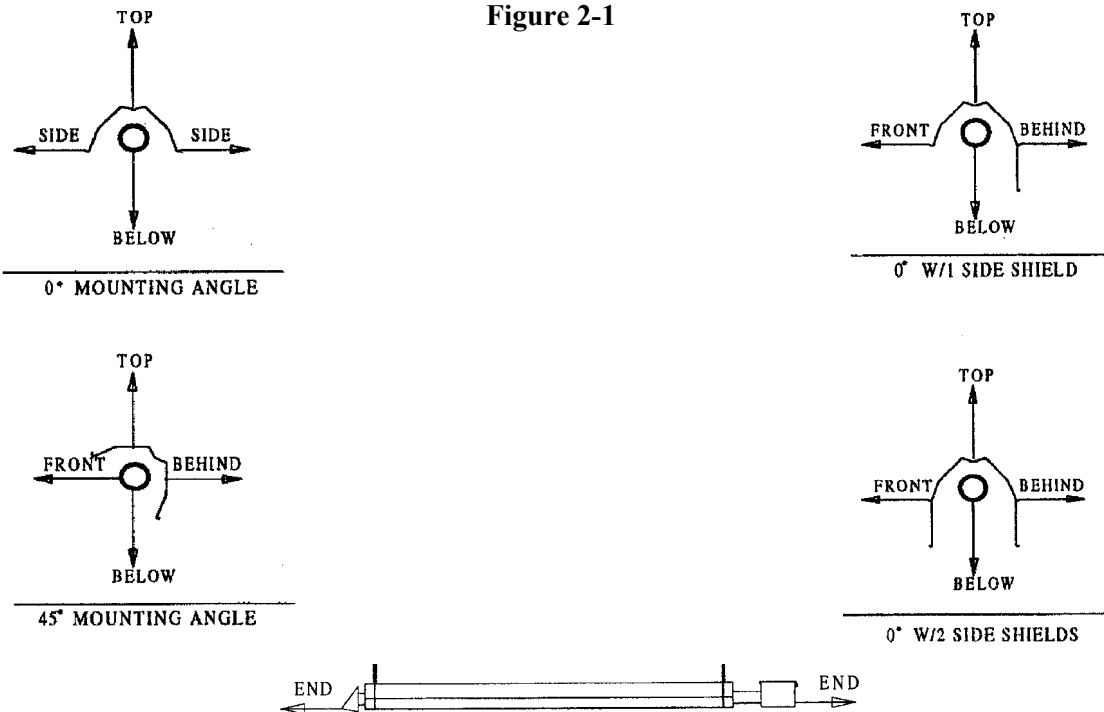
**WARNING!**

This heater should be installed so that the minimum clearances, as marked on the heater, will be maintained. If lifts are present, ensure that these clearances will be maintained from the highest raised object.

For the safe installation of this heater, the following table contains clearances that must be maintained

CLEARANCES TO COMBUSTIBLES (IN.)							TUBE SIZING	
MODEL NO.	GAS	MOUNTING ANGLE	SIDE		TOP	BELOW	4" OD	3"OD
			FRONT	BEHIND				
RVA (20,30) 50/35 MBTU/H DUAL STAGE OPERATION	NAT	0°		9"	4"	47"	ALL 3" TUBING	
	LP	45°	39"	8"	6"	47"	FIRST 30'	FROM 30'-40'
RVA (20,30,40) 75/50 MBTU/H DUAL STAGE OPERATION	NAT	0°		9"	4"	60"	FIRST 30'	FROM 30'-50'
	LP	45°	39"	8"	10"	60"	ALL 4" TUBING	
RVA (30,40,50) 100/65 MBTU/H DUAL STAGE OPERATION	NAT	0°		14"	4"	66"		
	LP	45°	39"	8"	10"	66"		
RVA (40,50) 150/100 MBTU/H DUAL STAGE OPERATION	NAT	0°		24"	6"	81"		
	LP	45°	58"	8"	10"	81"		

Figure 2-1



Note: The minimum end clearance for all models is 12 inches.

## 2 INSTALLATION

### 2.1 Design Criteria

#### System Design

It is strongly recommended to retain the services of a qualified person such as an agricultural engineering ventilation specialist to size equipment and develop an operating protocol for your swine facilities.

Proper equipment sizing, installation and control of the equipment are vital to ensuring a system that provides the optimum environment at the least cost to the producer.

#### Applications - Nursery, Grower and Finisher

- 1) **Nursery, Grower and Finisher:** Nursery barns are well suited to infra-red heating. Younger pigs will congregate close to the heat source and move away as they grow older. The surroundings in the pens will also be heated, reducing radiation heat losses and the need for huddling.
- 2) **Breeding/Gestation** - Generally not recommended unless ceiling height is very high (>10') and heaters can be placed over pen/aisle areas, not gestation stalls. Extreme care in proper design is required.
- 3) **Wean to Finish:** Wean to finish applications are best suited for infra-red use. The ability of the infra-red heaters to warm the cement slats will significantly improve the environment for the animals. Younger pigs will congregate close to the heat source as needed. A “sleeping”, “eating” and “dunging” zone is essentially created with the idea of keeping the pigs away from the cold / curtain wall as much as possible. Optimum design utilizes scissors trusses for higher mounting heights and optimum infra-red coverage.
- 4) **Farrowing:** - Not recommended.

#### APPLICATION GUIDELINES:

- Mount the heaters as high as possible, while observing the clearance to combustible limits.
- Position burner boxes apart from each other, two burner boxes should not be adjacent to each other.
- Position burner boxes (and heaters) toward the outside walls when possible.
- Locate minimum exhaust fans by the terminating end of the heaters.
- Recommended heater length should not exceed 55' in nursery applications, 40' in wean to finish.
- Rooms exceeding 60' in length should use two heaters positioned opposite of each other.

It should be taken into account, when reviewing an application, that a temperature differential will exist from the burner end of the tube to the exhaust end. The burner end will always be hotter than the termination end of the heater. This is how the heater is designed and performs.

## 2.2 Prechecks

When positioning heaters, keep in mind the clearances to combustible materials, lights, sprinkler heads, overhead doors, storage areas with stacked materials, gas and electrical lines and any other possible obstructions or hazards. Refer to the Warnings, Cautions and the Clearance – To - Combustibles Chart in the Safety Information Section and on the heater to verify that a safe installation condition exists.

The following guidelines must also be met to ensure a good installation and proper heater performance:

RVA Series heaters should be mounted as high as possible in confinement applications.

### Model Above Finished Floor

RVA 50 MBTU/H	7-10 ft.
RVA 75 MBTU/H	7-12 ft.
RVA 100 MBTU/H	7-12 ft.
RVA 150 MBTU/H	15'+ ft.

Consult Detroit Radiant Products if you have a special case requiring a lower mounting height.

A maximum of two 90° elbows or one 180° elbow can be installed on RVA model heaters. The gas input of the heaters, as stated on the rating label, will determine the minimum length of radiant pipe from the control box to the first elbow. (See optional 90° and 180° Elbows Section.)

RVA Series heaters are designed to operate as an unvented heater. Install WVE-GALV or WVE-3 flapper caps on the terminating ends of the RVA Series heater. Minimum exhaust ventilation must be met. Consult page 15.

**Outside air for combustion must be ducted to the heater in all agricultural applications. A tight waterproof seal is also required. Intake air is provided from a sidewall (not endwall) with 1/8" x 4" PVC piping. Locate intakes away from any exhaust fans. Consult page 16.**

Consult Combustion Air Requirements section on page 16.

- **Do not** exceed the maximum duct length for fresh air intake (usually 20 feet). Consult Air Intake Duct Chart on page 16.
- **Do not** draw fresh air to the heater from an attic space. There is no guarantee that adequate air will be supplied.
- All unvented heaters **must** use Part No. WVE-GALV or WVE-3 vent with flapper.

Once all of the safety precautions and design criteria are met, the actual installation of the heater may begin.

Exercise caution when applying RVA 150,000 MBTU/H models. Maintain minimum mounting heights and published clearances to combustibles.

## 2.2 Prechecks

1. Verify that all parts have been received by checking them against the packing list. If anything is missing, notify the Re-Verber-Ray representative or Detroit Radiant Products.
2. Check the rating label on the heater to verify the model number, the gas to be used and that the clearances to combustibles will be met.
3. Make sure the finished installation will conform to the design requirements listed in the Clearance to Combustibles Chart and the figure shown on page 3, and Figure 2-1.

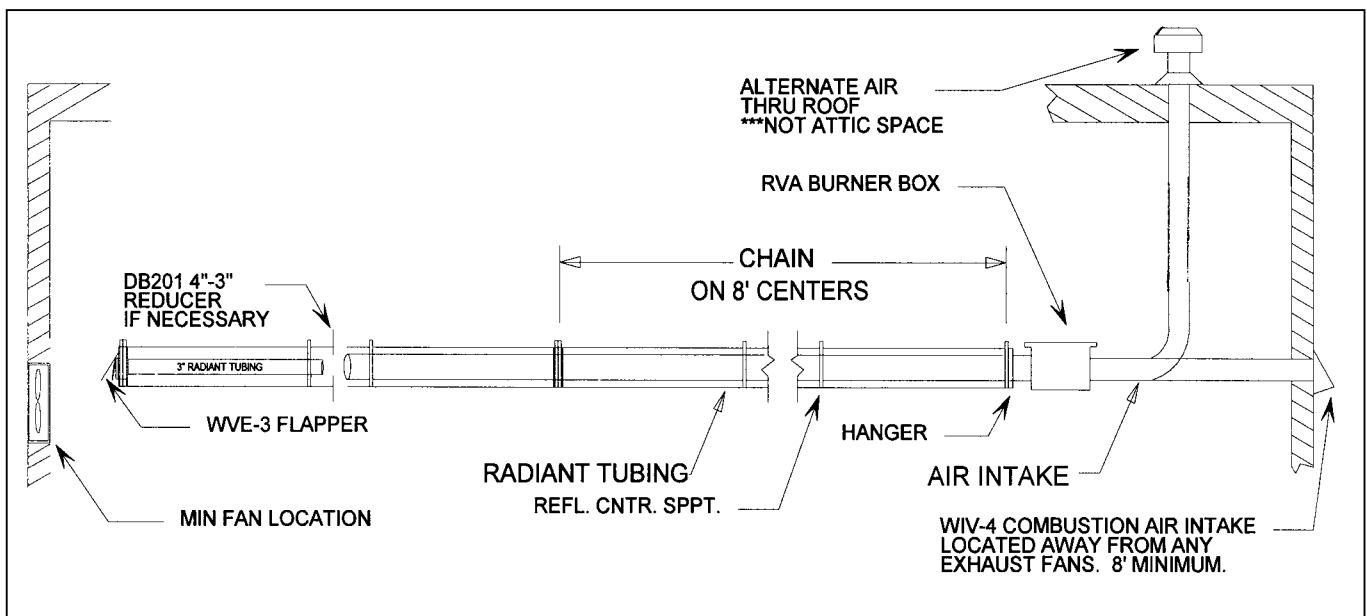
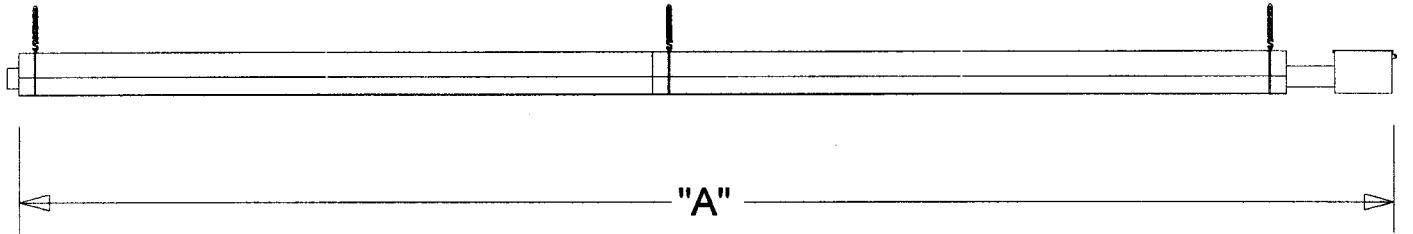


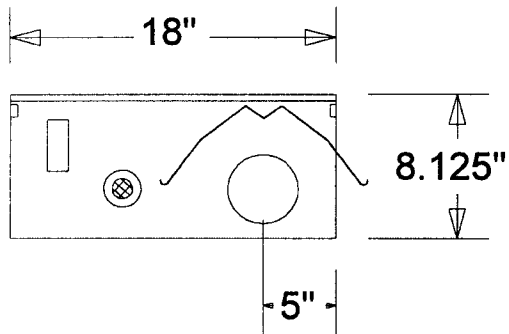
Figure 2-2



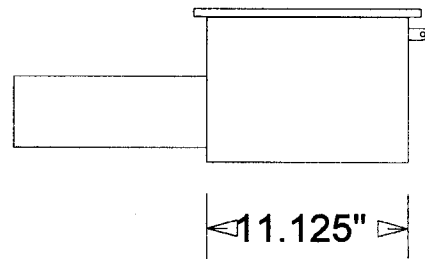
**DIMENSIONS FOR RVA MODELS**



MODEL NO.	DIM. "A"
RVA 20	259"
RVA 30	375"
RVA 40	504"
RVA 50	620"



**END VIEW**



**ENLARGED SIDE VIEW**

**Figure 2-3**

## 2.3 Heater Mounting

1. Each heater comes equipped with the necessary hangers (Figure 2-4) for hanging.

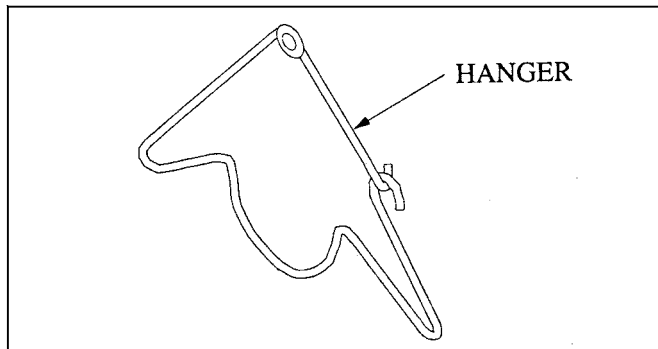


Figure 2-4

2. Use of number 1 double-loop chain is recommended for heater hanging (accessory No. RVA-CS). See Figure 2-5.

**NOTE:** If windy conditions exist in the space around the heater, it may be necessary to rigidly mount the heater to prevent swaying. It is recommended that threaded rod be used for the two hanging points at the burner control box (see Figure 2-6). The remaining hanging points should use chains to allow for heater expansion.

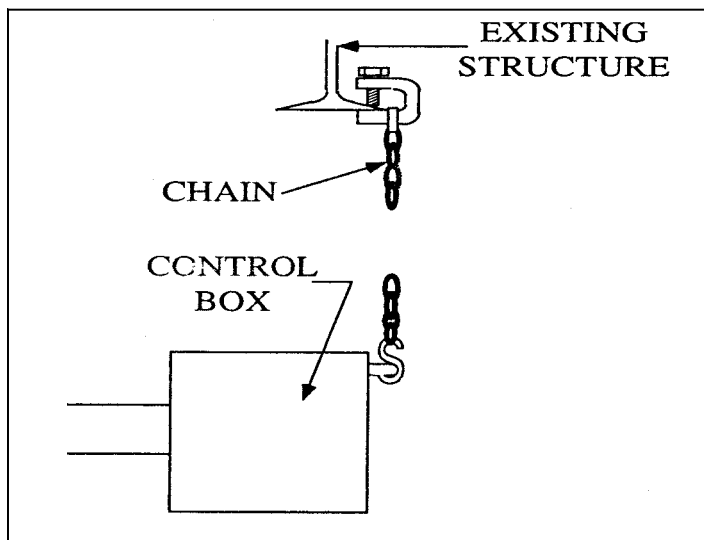


Figure 2-5

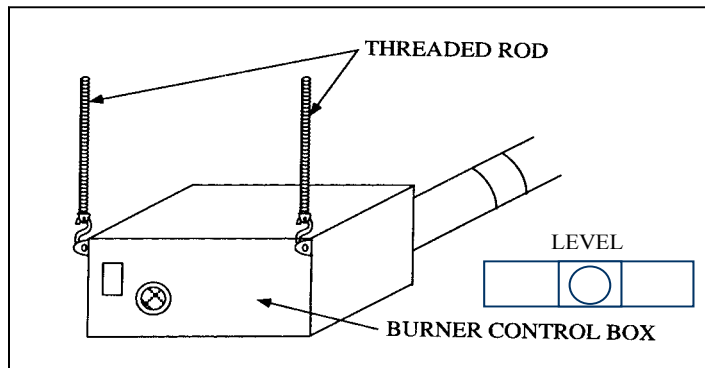


Figure 2-6

3. Mount heaters on approximately 8-ft centers. Slide tubes through hangers with weld seam downward (see Figure 2-7) and fasten with tube clamps (see Figure 2-8). Center clamps on seams.

4. Do not rotate control burner box. Mount level as shown in Figure 2-6.

**NOTE:** The tube clamps provided with the heater are pre-assembled at the factory. If a clamp is dismantled, it is important that upon reassembly the spacer is properly inserted (see Figure 2-8). The spacer's concave surface **must** face the radiant tube. Incorrect spacer placement will result in shearing of the bolt when torqued to the recommended specifications (40 - 60 lb-ft).

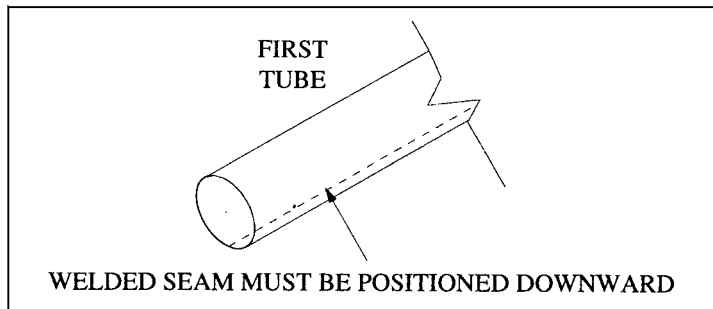


Figure 2-7

**NOTE:** The RVA burner box should be supported from 3 hanging points. Two points are brackets on the burner box, one is the first hanger

**IMPORTANT:** Radiant tubes with baffles must be installed last (farthest from the burner). See Figure 2-9. All baffles must be in the vertical position.

4. Mount heaters in conformance with approval standards referenced in the Foreword.
5. Install chains perpendicular to the heater.

6. Install heater so that it is independently supported and must not rely on the gas or electrical line for any of its support.
7. Mount heater so that burner sight glass is visible from the floor.

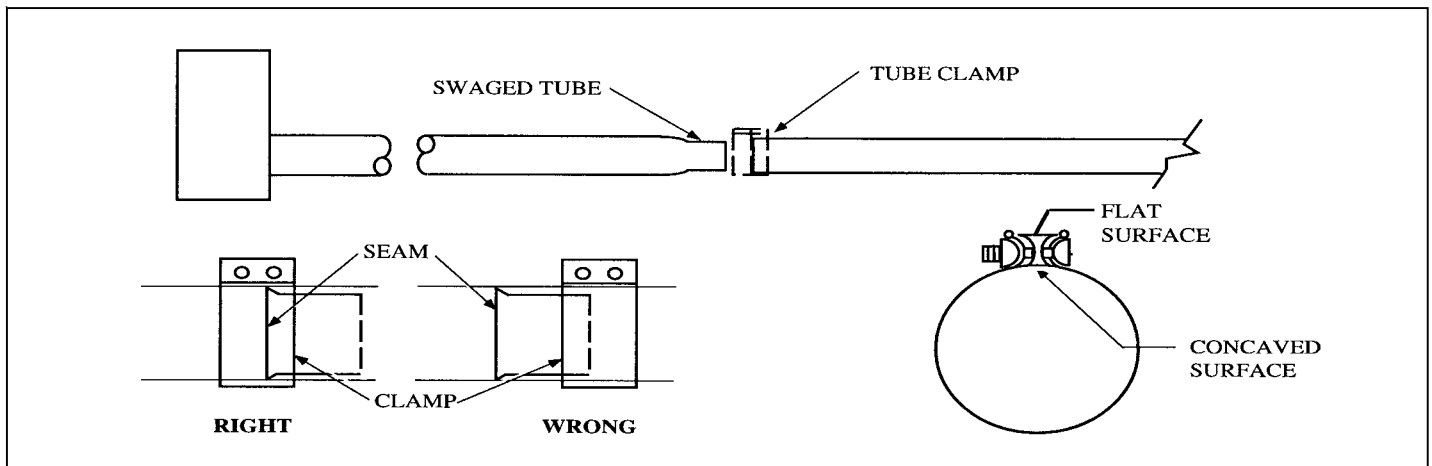


Figure 2-8

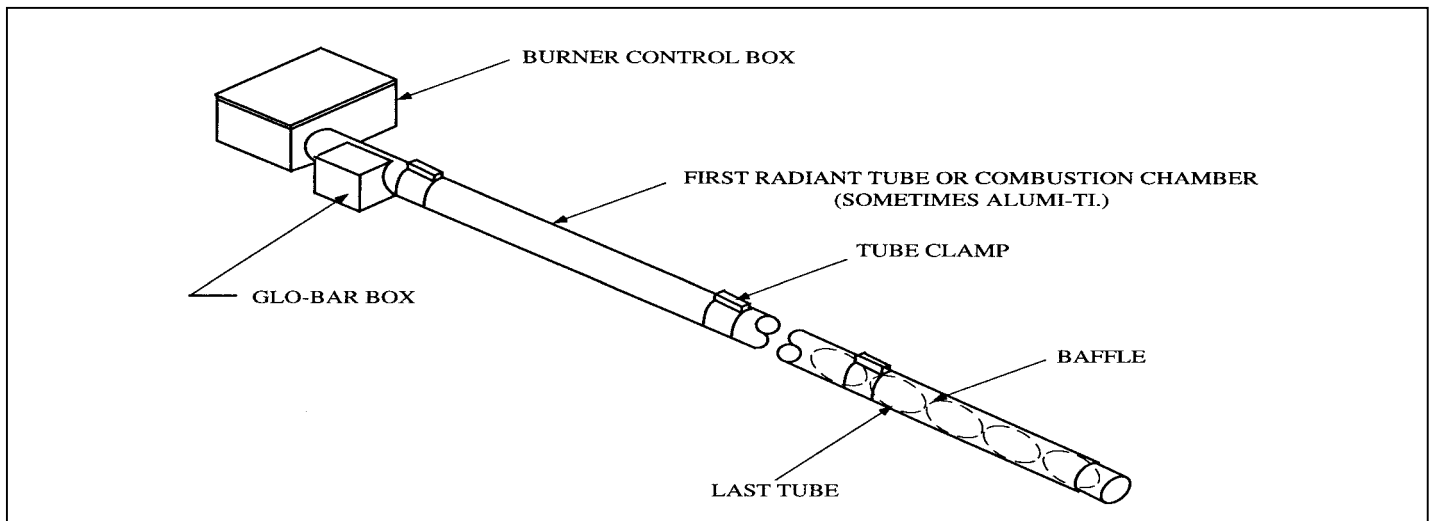


Figure 2-9

### 2.31 Tube Sizing and Reducer Placement

RVA Series heaters utilize 16 gauge aluminized coated steel as the heat exchangers. The diameter of the tubing will either be all 4", all 3" or a combination of 3" and 4" as shown in Figure 2-9 below.

1. Models RVA 20-50/35 and RVA 30-50/35 operate as dual stage units with only 3" radiant tubing.

- Models RVA 20-75/50, RVA 30-75/50 and RVA 30-100/65, RVA 40-150/100, RVA 50-150/100 operate as dual stage units with only 4" radiant tubing.
- Models RVA 40-75/50, RVA 40-100/65, RVA 50-75/50 and RVA 50-100/65 operate as dual stage units with 4" radiant tubing transitioning to 3".

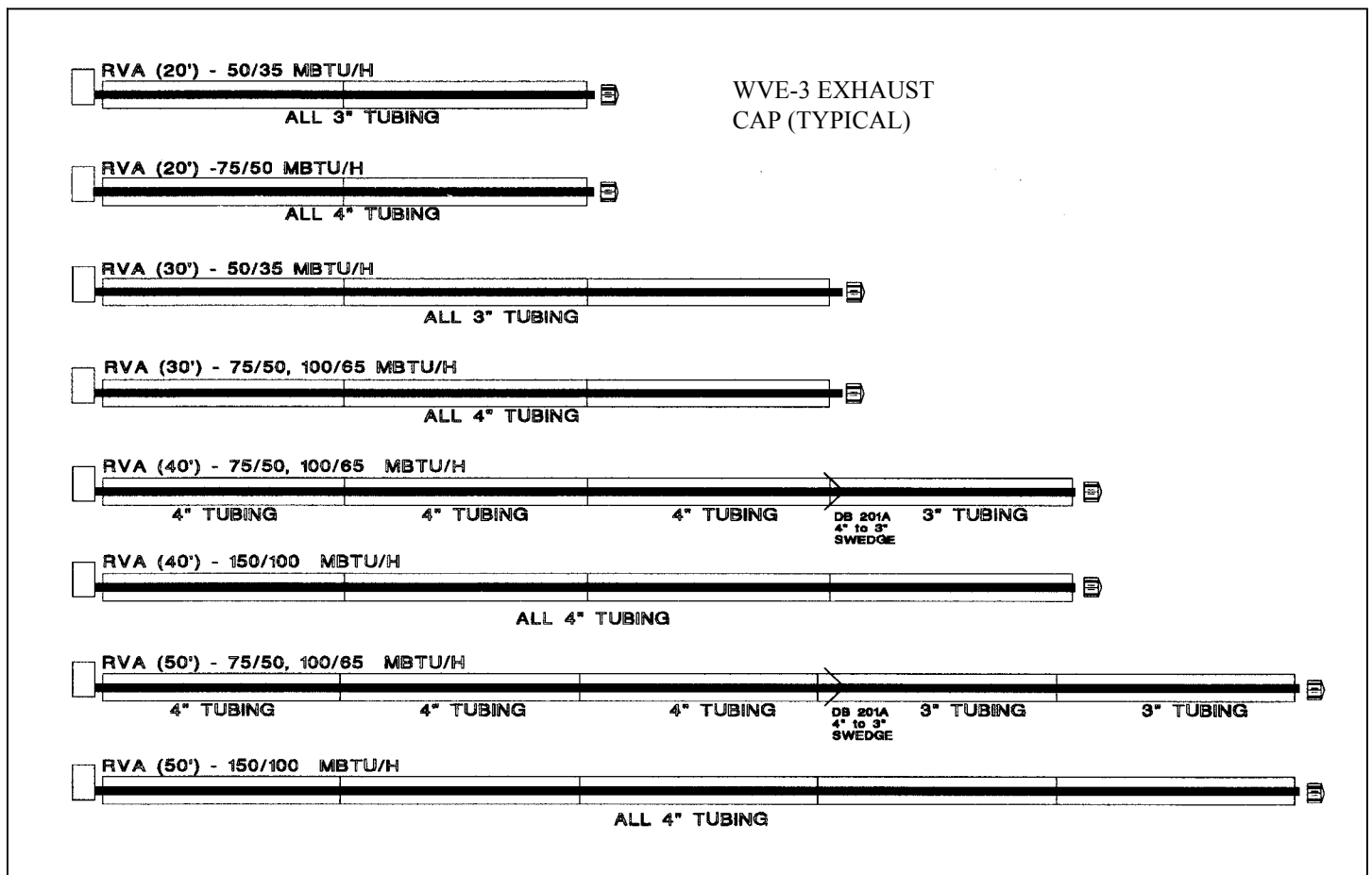


Figure 2-9

## 2.32 RVA Series Hanging Points

1. The RVA Series heaters are designed to be hung on 8' centers as shown in Figure 2-10.
2. Each burner box shall utilize 3 hanging points, and tubes shall be mounted with chains at 8' increments.
3. Each heater utilizes reflector center supports between each mounting point.
4. In most applications, mount the heater as close to ceiling as possible. Always maintain the specified clearance to combustibles.

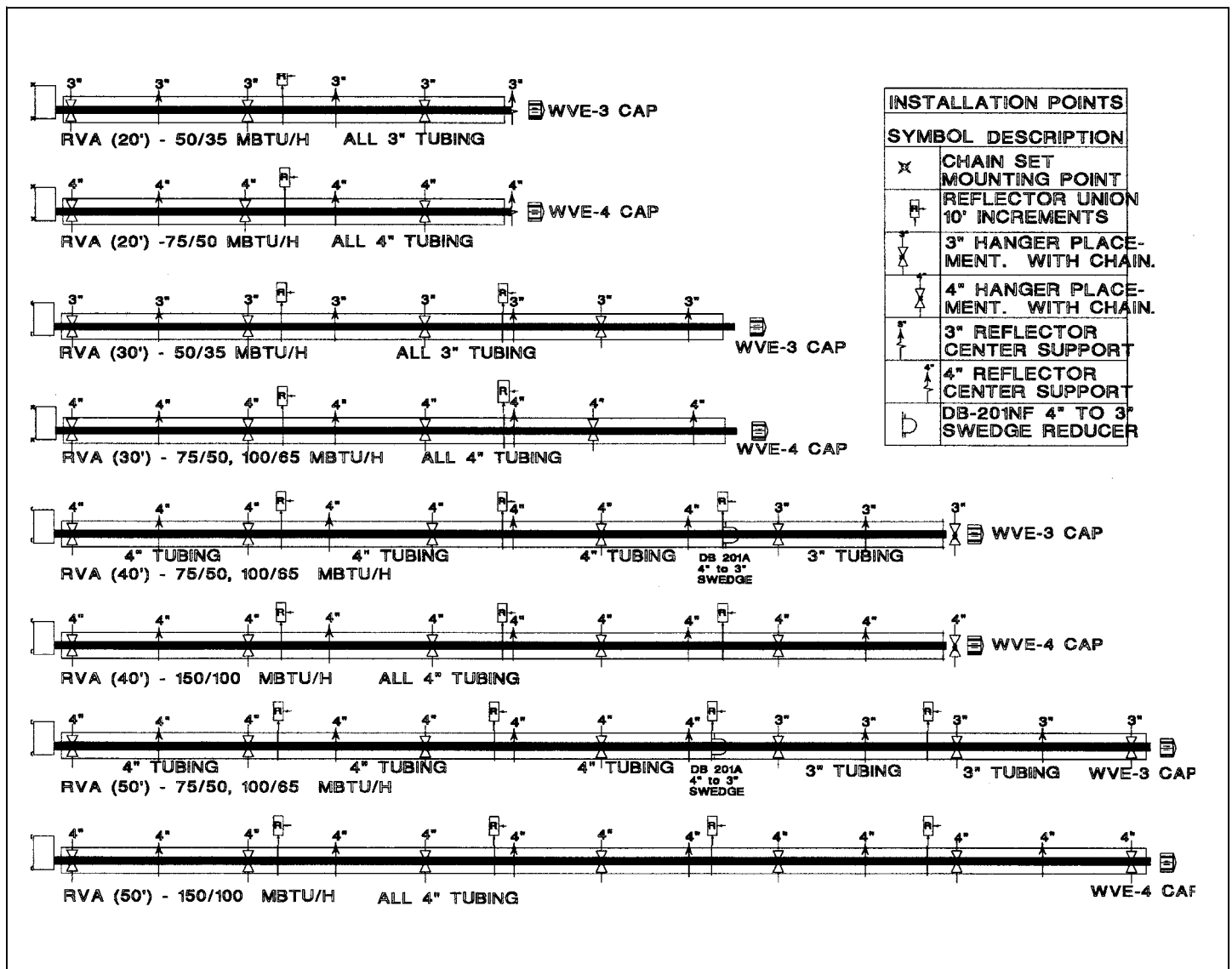


Figure 2-10

## 2.4 Reflector Assembly

1. Install reflector center supports (RCS) as shown in Figure 2-11.
2. Slide reflector through wire hangers and adjust the reflector positioning spring in the V-groove on top of the reflector as shown in Figure 2-12. Overlap reflectors 4 in. for support (see Figure 2-11).
3. Secure reflectors together with sheet metal screws (not supplied) at points indicated by arrows (see Figure 2-13). Make sure to leave an expansion joint.

**NOTE:** Assemble the reflector last, after every 10-ft. section of emitter pipe is installed.

**NOTE:** The clips prevent the reflectors from shifting position due to heater operation.

4. Install reflector end caps at exposed ends of the reflector runs with clips (Figure 2-12).

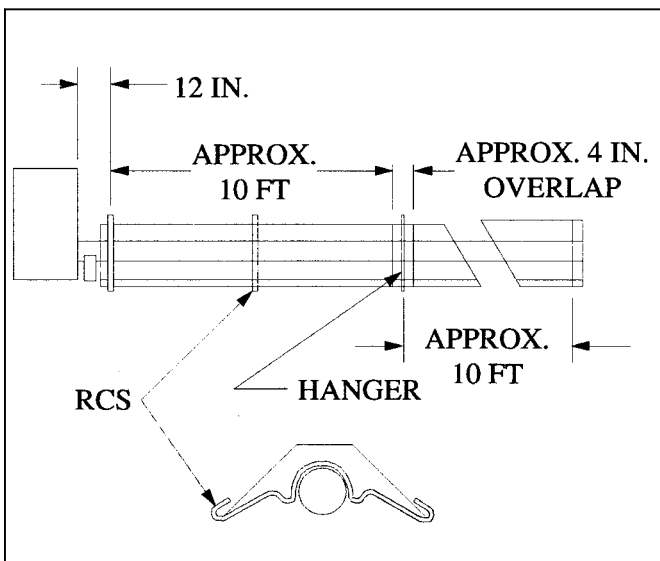


Figure 2-11

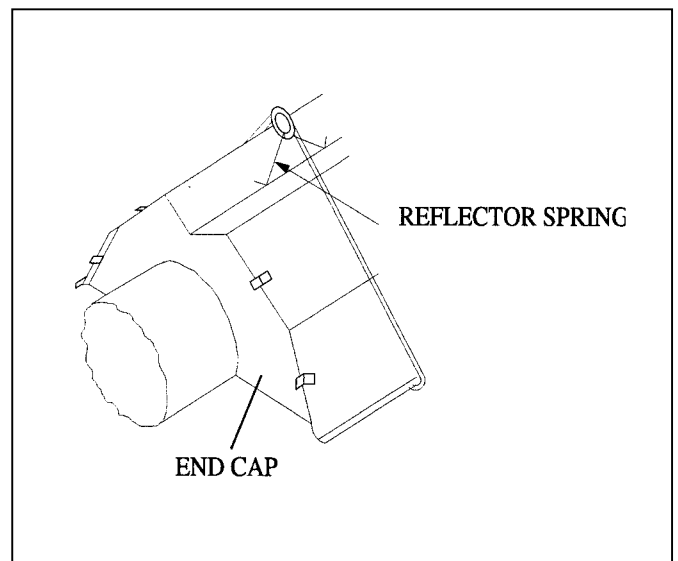


Figure 2-12

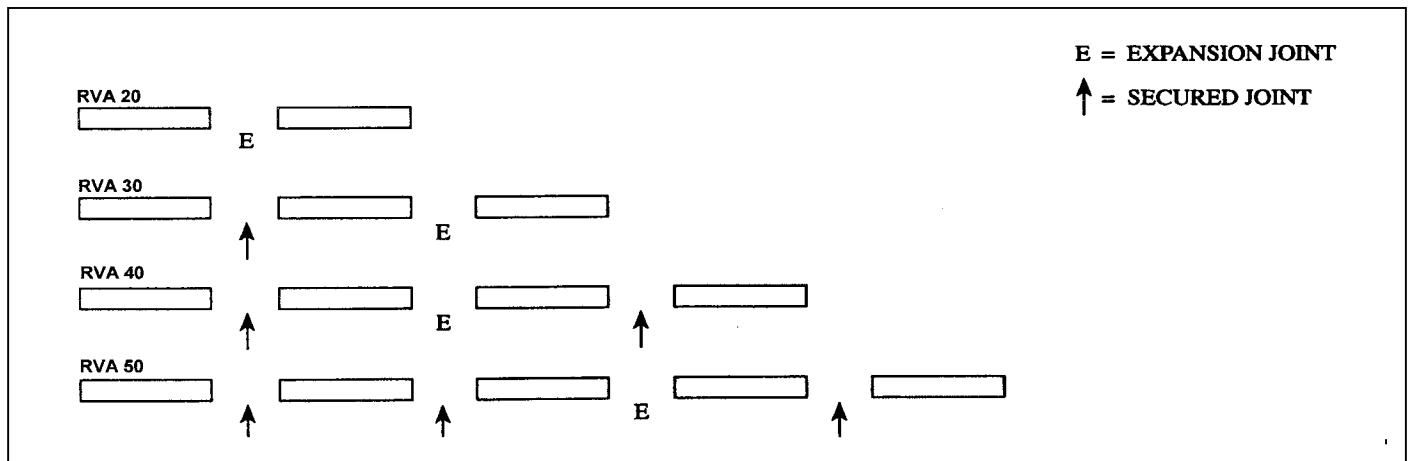


Figure 2-13

## Optional Side Shield Installation

1. Install an additional 2 reflector center supports (RCS) 4 ft on each side of the standard RCS.
2. Install the side shield by hooking the edge holes onto the RCSs (Figure 2-14).

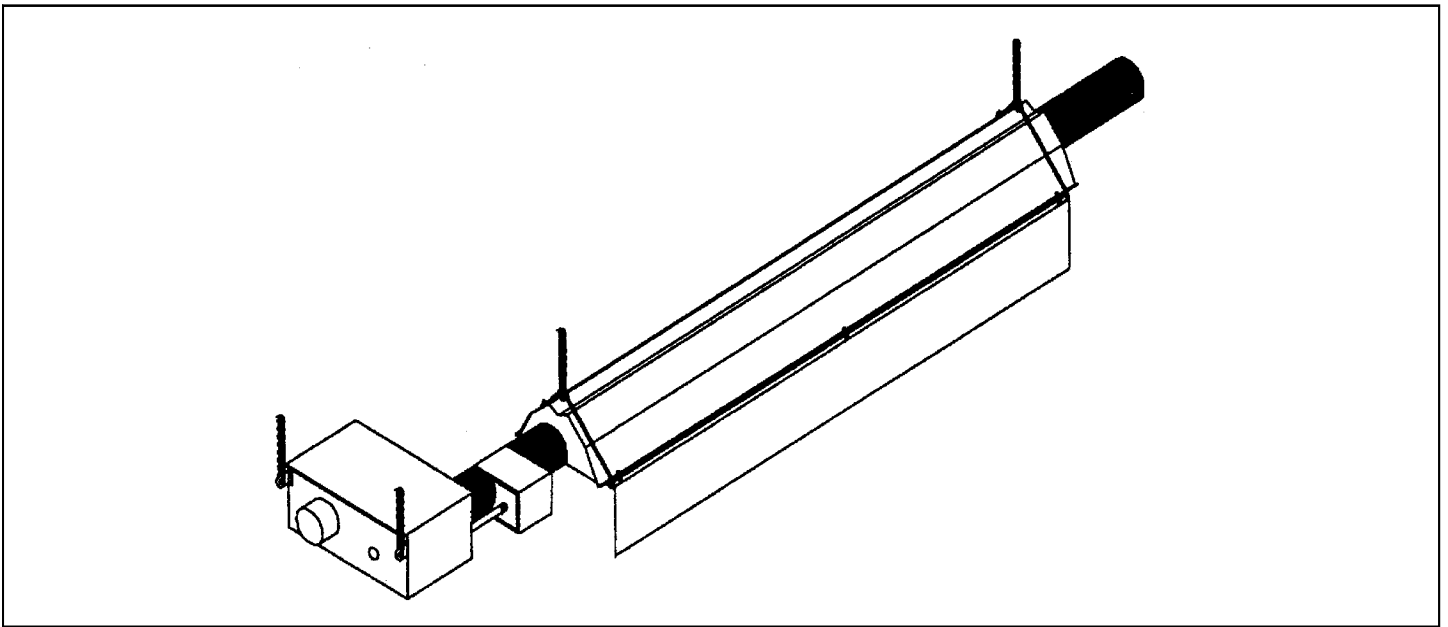


Figure 2-14

## Optional Food Line Shield Installation

1. Install optional FLS where needed to protect feeder lines that are within the clearance to combustible zone.
2. It may be necessary to directly shield plastic tubing if that is located within the specified clearance to combustibles zone.

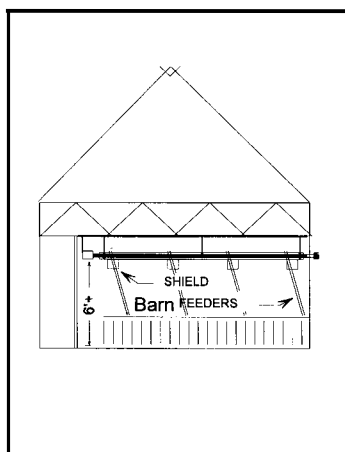


Figure 2-15

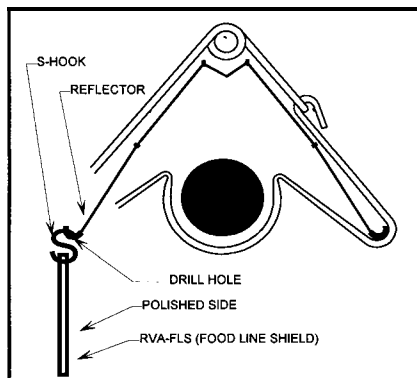


Figure 2-16

## 2.5 Optional “L” or “U” Configuration

A 90° elbow (DRP Accessory No. E6) or an 180° “U” (DRP Accessory No. TF1B) may be installed in the exchanger to make an “L” or “U” configuration. See the chart and figures below for dimensions and distance requirements from the burner control box to an elbow or “U”.

**NOTE:** Only (2) E6 or (1) TF1B may be used on an RVA heater.

MINIMUM DISTANCE FROM THE BURNER TO AN ELBOW OR “U” FITTING	
MODEL NO.	FT.
RVA (20, 30)-50	10'
RVA (20, 30, 40, 50)-75	20'
RVA (30, 40, 50)-100	15'
RVA (40,50)-150	20'

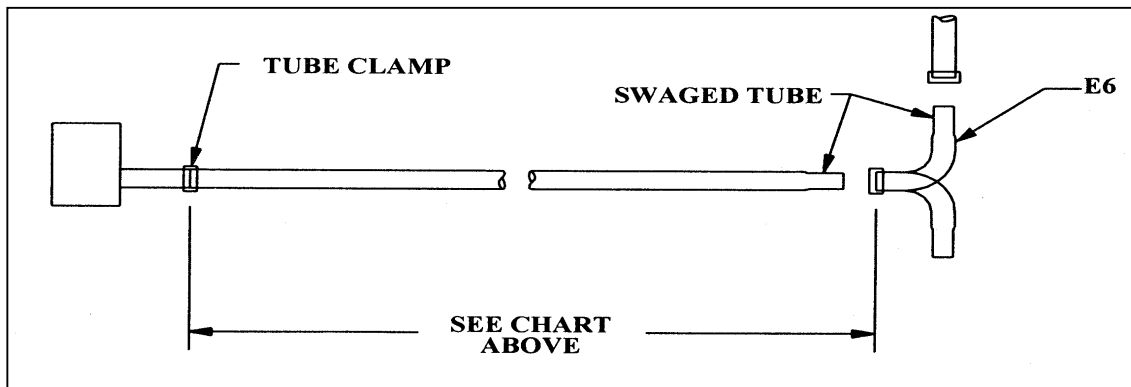


Figure 2-17

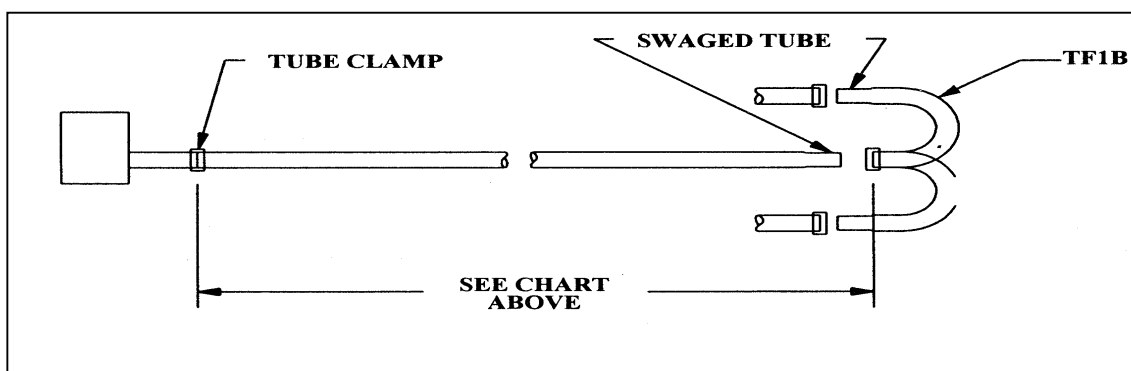


Figure 2-18



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## 2.7 Installation for Unvented Operation

RVA Heaters are required to operate as an unvented unit.

The model RVA units are approved for unvented operation when equipped with an end cap/diffuser, Part No. WVE-GALV (4") or WVE-3 (3") (see Figure 2-19). This allows the products of combustion to be discharged from the units into the space being heated.

Ventilation of the space is required to dilute those products of combustion sufficiently. For proper ventilation, it is recommended that a positive air displacement of at least 3.8-cfm per 1000 BTU/H of natural gas input be provided.

If propane is used, a positive air displacement of at least 4.5-cfm per 1000 BTU/H of gas input is recommended. Either gravity or mechanical means may accomplish this air displacement. Provisions must be made for a sufficiently large fresh-air intake area and exhaust-air outlet area, to accomplish the displacement. Local codes may require that the mechanical exhaust system be interlocked with the electrical supply line to the heaters, enabling both to function simultaneously.

If your application calls for the RVA Series heater to be vented, consult the factory.

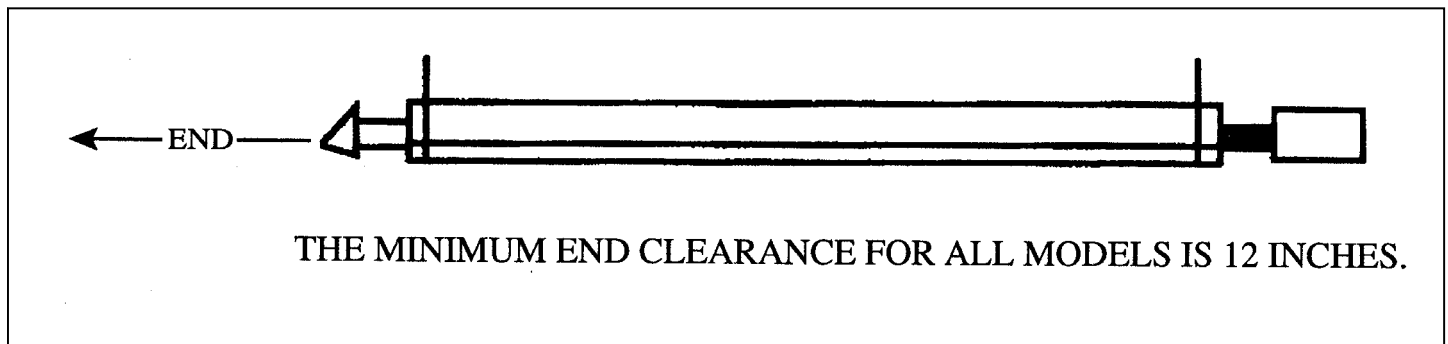


Figure 2-19

## 2.8 Combustion Air Requirements

Combustion air intake has a factory-preset air orifice. Non-contaminated air for combustion must be ducted to the heater in all agricultural applications to avoid contaminants present in the area where the heater is installed, or if the building has a negative pressure.

Outside combustion air may be provided by an accessory 4-in. air duct, directly attached over the air orifice (see Figure 2-20). A WIV-4 wall inlet vent must be used with horizontal outside air intake ducts. The preferred method of providing combustion air is through a sidewall, not an endwall. Use 1/8" PVC pipe, to supply combustion air, run inside of the building to temper incoming air. **Combustion air from an attic is not approved.**

**IMPORTANT:** If WIV-4 is located above a curtain, the use of an intake shield is recommended. Steam exiting curtain must not frost air intake. A 10" diameter PVC pipe (12" long) may be mounted around WIV-4 intake. See Figure 2-20.

The maximum number of 90° elbows allowed is two. The air intake terminal must be installed to prevent blockage by snow, dirt or any contaminants.

**NOTE: Keep intake opening at least 8 ft., laterally, from any exhaust vent openings or outlet fans.** Steam, dust, dirt, etc. must not be exhausted or located close to heater intakes. For limitations of length and size, see the Air Intake Duct Chart.

DRP# AIB (Air Inlet Boot) will provide a tight seal to the burner box and allow access to the heater if service is necessary. **A watertight seal to the burner box is critical** (silicone is recommended)

AIR INTAKE DUCT CHART		
MODEL	AIR INTAKE DUCT SIZE [in.]	MAXIMUM INTAKE LENGTH [ft]
ALL MODELS	4	20
	5	30

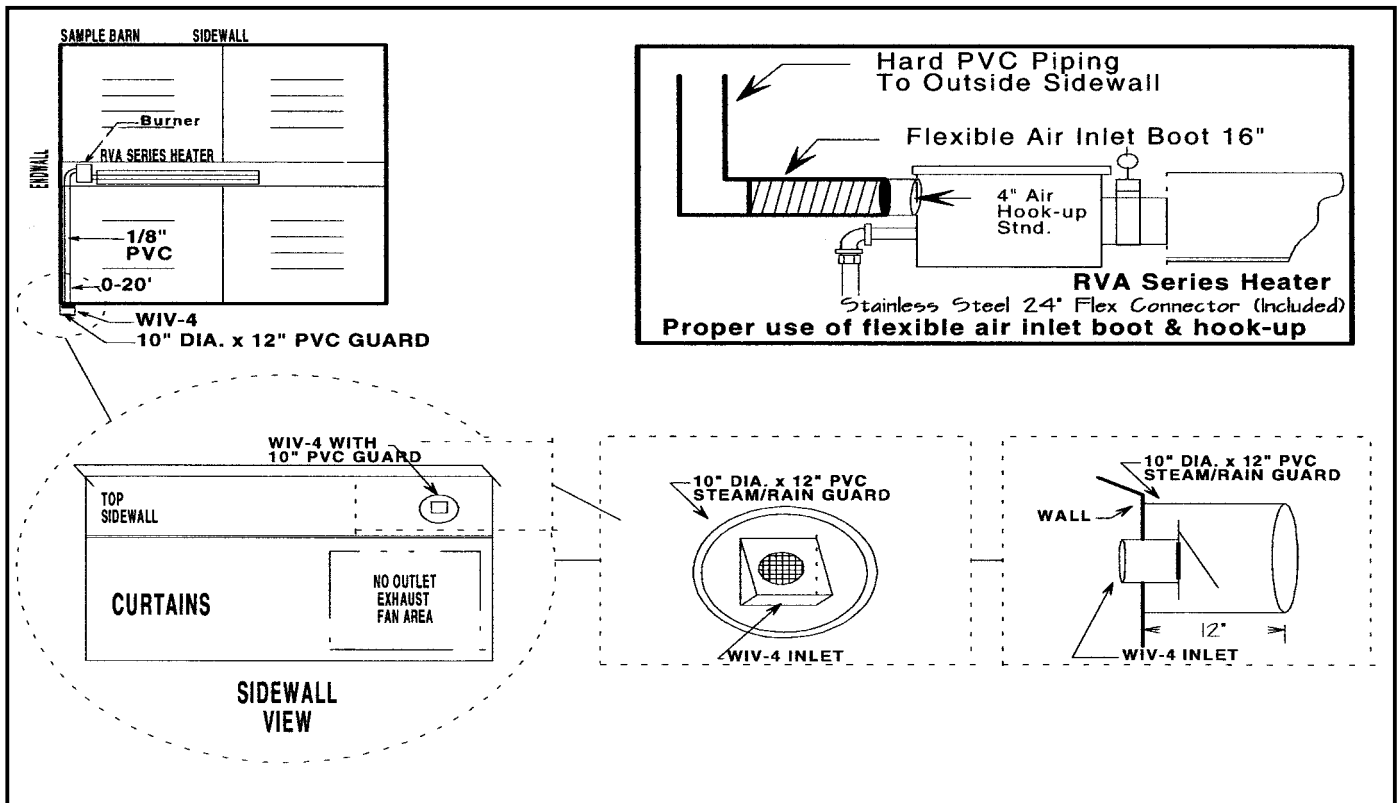


Figure 2-20

## 2.9 Gas Supply

### CAUTION

CORRECT INLET PRESSURES ARE VITAL FOR EFFICIENT OPERATION OF HEATERS. REFER TO AGA/CGA RATING PLATE AND, IF NECESSARY, CONSULT GAS COMPANY.

If all or a portion of the gas supply line consists of used pipe, it must be cleaned and then inspected to determine its equivalency to new pipe. Test all main supply lines according to local codes. **(Isolate heater gas valve and supplied gas cock during test.)**

Excessive torque on manifold may misalign orifice. Always use two wrenches when tightening mating pipe connections.

### **! WARNING !**

Never use a match or any other flame to test for gas leaks. Use soap-and-water solution to check for leaks.

If any portion of the gas supply line is located in an area that could cause an abnormal amount of condensate to occur in the pipe, a sediment trap should be installed (see Figure 2-21).

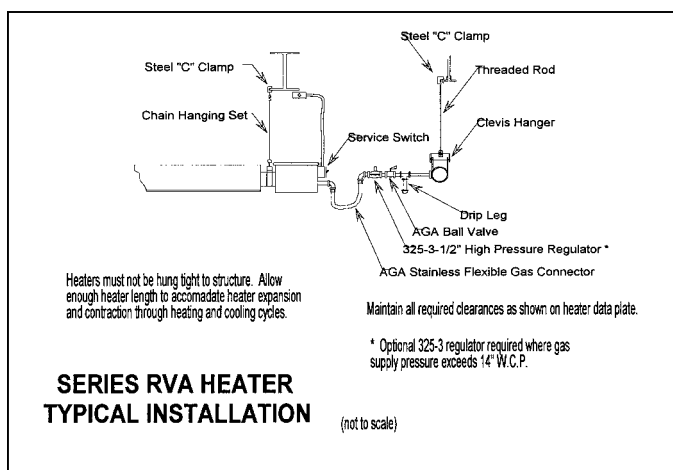


Figure 2-21

**NOTE:** For high-pressure gas above 14 in. W.C.P. (Water Column), a high-pressure regulator and gas cock must be used. If compressed air is used to detect leaks in the gas supply line, disconnect and cap at shutoff cock to avoid damage to regulator and gas valve.

A typical gas supply line connection is illustrated in Figure 2-21. The method shown will decrease the possibility of any loose scale or dirt in the supply line entering the heater's control system and causing a malfunction. Provide a 1/8 in. (3.2 mm) NPT, plugged tapping accessible for test gauge connection immediately upstream of gas connection to heater. The gas supply line must be of sufficient size to provide the required capacity and inlet pressure to the heater (consult gas company) as follows:

**NOTE:** Manifold pressure should be checked at the tap on the gas valve. Readings will be above atmospheric pressure.

- Natural Gas

To obtain the required manifold pressure of 3.5 in. W.C.P., a minimum inlet pressure of 5.0 in. W.C.P. is necessary for purposes of input adjustment. A maximum inlet pressure of 14.0 in. W.C.P. is allowed for all units.

- Liquefied Petroleum Gas

To obtain the required manifold pressure of 10.0 in. W.C.P., a minimum of 11.0 in. W.C.P. for purposes of input adjustment to a maximum of 14.0 in. W.C.P. must be provided ahead of the control system on each heater. Do not exceed a manifold operating pressure of 10.0 in. W.C.P.

Use only a pipejoint compound that is resistant to liquefied petroleum gases.

- Pressure Equivalents

1 in. W.C.P. equals 0.58 oz/sq. in.

- Allowance for Expansion

Allowances must be made for the system to expand. The supplied stainless-steel, flexible gas connector is recommended. If, however, local codes require rigid piping to the heater, a swing joint can be used.

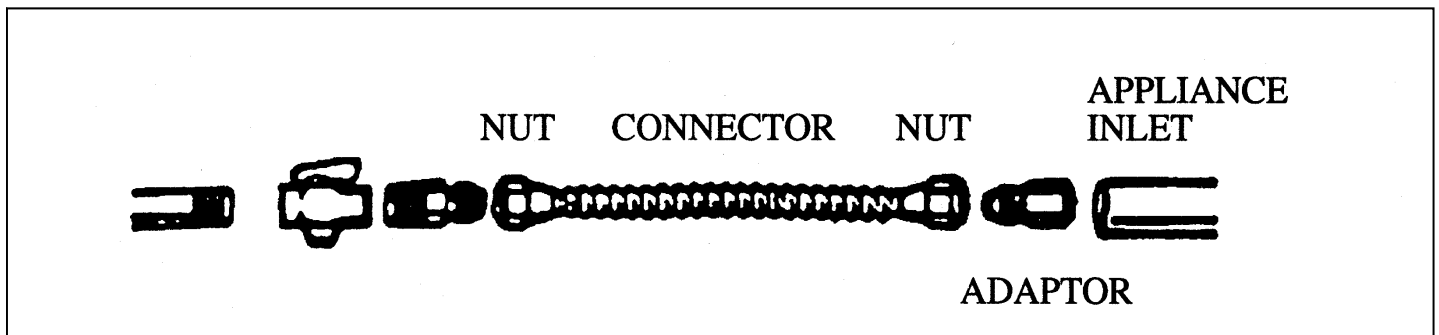
- Gas Line Connection

- The gas outlet shall be in the same room as the appliance and the connector must not be concealed within or run through any wall, floor or partition.
- The connector shall be of adequate length.
- The final assembly shall be tested for leaks. CAUTION: Matches, candles, open flame or other sources of ignition shall not be used for this purpose. Leak test solutions may cause corrosion - water rinse after test.
- Contact with foreign objects or substances should be avoided.

- The connector must not be kinked, twisted or torqued.
- Connectors are not designed for movement after installation. Bending, flexing or vibration must be avoided.
- Connectors are for use only on piping systems having fuel gas pressures not in excess of 1/2 pound per square inch.

**! CAUTION !**

CONNECTOR NUTS MUST NOT BE CONNECTED DIRECTLY TO PIPE THREADS. THIS CONNECTOR MUST BE INSTALLED WITH ADAPTERS PROVIDED. DO NOT REUSE.



**Figure 2-22**

## 2.10 Electrical Requirements

1. Heaters operate on 120 Volts, 60 Hz, single phase. The maximum amperage requirement (starting current) is 4.8 amps per heater. The running current is 1.1 amps.
2. Heater must be grounded in accordance with the National Electrical Code ANSI/NFPA 70 (latest edition).
3. Applications in Canada must be grounded in accordance with the Canadian Electrical Code C22.1-latest edition when any external power source is utilized.
4. Observe proper electrical polarity.
5. It is recommended that the thermostat be installed on the hot side of a fused supply line and have a sufficient ampere rating for the heater(s) that it controls.
6. Clearance to combustibles must be maintained between electrical apparatus and wiring. See page 3.
7. Wiring must not be run above or below the heater, nor exposed to the radiant output.

RVA model heaters require a 24-volt two-stage thermostat / controller to operate.

The RVA Series heater is supplied with a protective yellow control wire with three 18 gauge individual wires. The wires are colored: green (ground), white (low fire) and black (high fire). Provide 24V only to these wires.

NOTE: If two or more RVA models are to be controlled by a single thermostat, then they must utilize the HLRB relay board (as shipped from the factory) in the circuit. A 24V supply (from a field supplied 40VA transformer) is necessary.

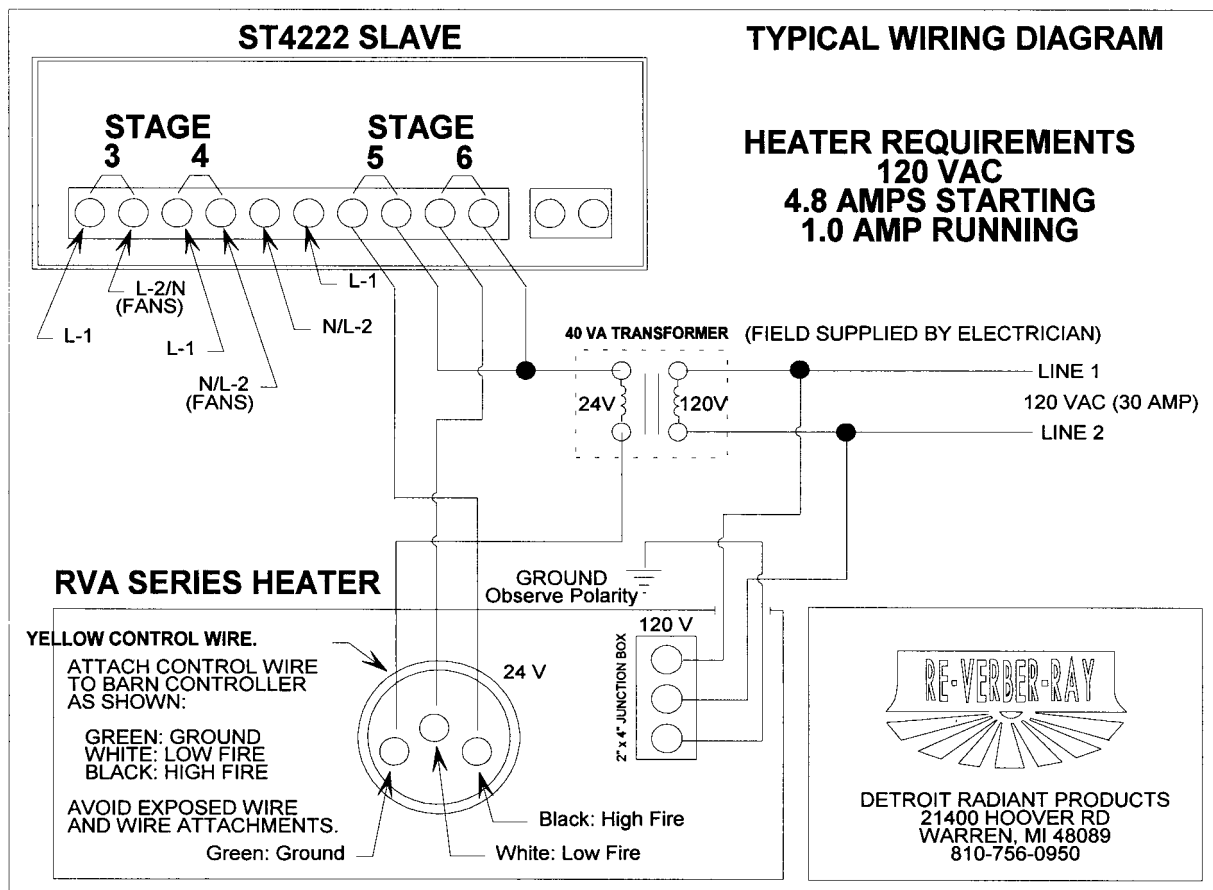
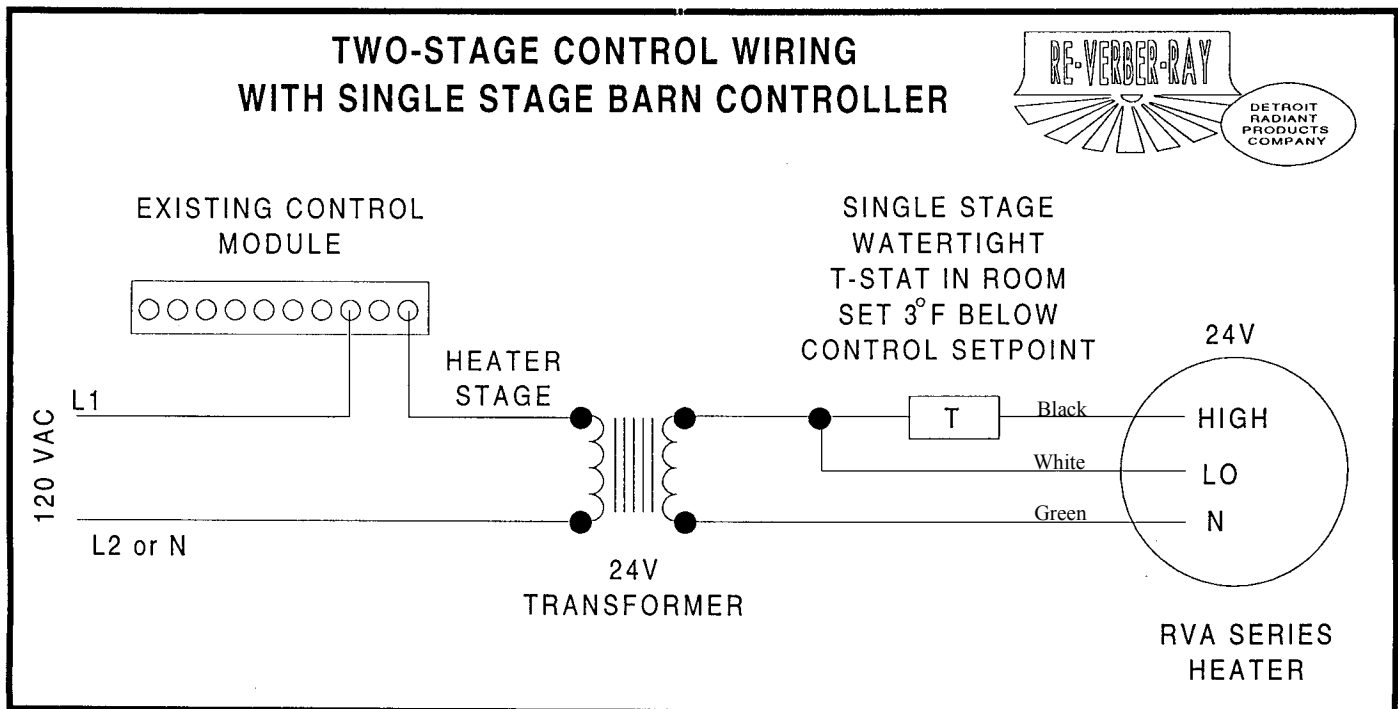


Figure 2-23

## Single Stage Controller.

If the controller slated to operate the RVA Series two stage unit only has one heating stage, the following wiring diagram should be followed. A single stage, water-tight thermostat (DRP# TF-115) must also be purchased.



\*\*\*THIS WIRING DIAGRAM MAY BE USED IF A TWO-STAGE BARN CONTROLLER IS NOT AVAILABLE. TWO-STAGE BARN CONTROLLERS ARE ALWAYS PREFERRED.

Electrician: Confirm proper two stage electrical wiring by cycling heaters between stages. Proper operation of high fire, low fire and off should be confirmed on all two stage RVA Heaters.

### 3 THEORY OF OPERATION

#### LOW FIRE

- **Starting Circuit (Figures 3-1 and 3-2)**

When the first stage of a two-stage thermostat calls for heat, the fan relay in the circuit control starts the fan. When the fan creates a sufficient positive pressure in the burner control box, the normally open pressure switch closes, initiating the ignitors sequence. The glo-bar is powered and after 45 seconds the main valve opens. Power to the glo-bar is shut off during the last three seconds of the ignition trial.

#### **Running Circuit**

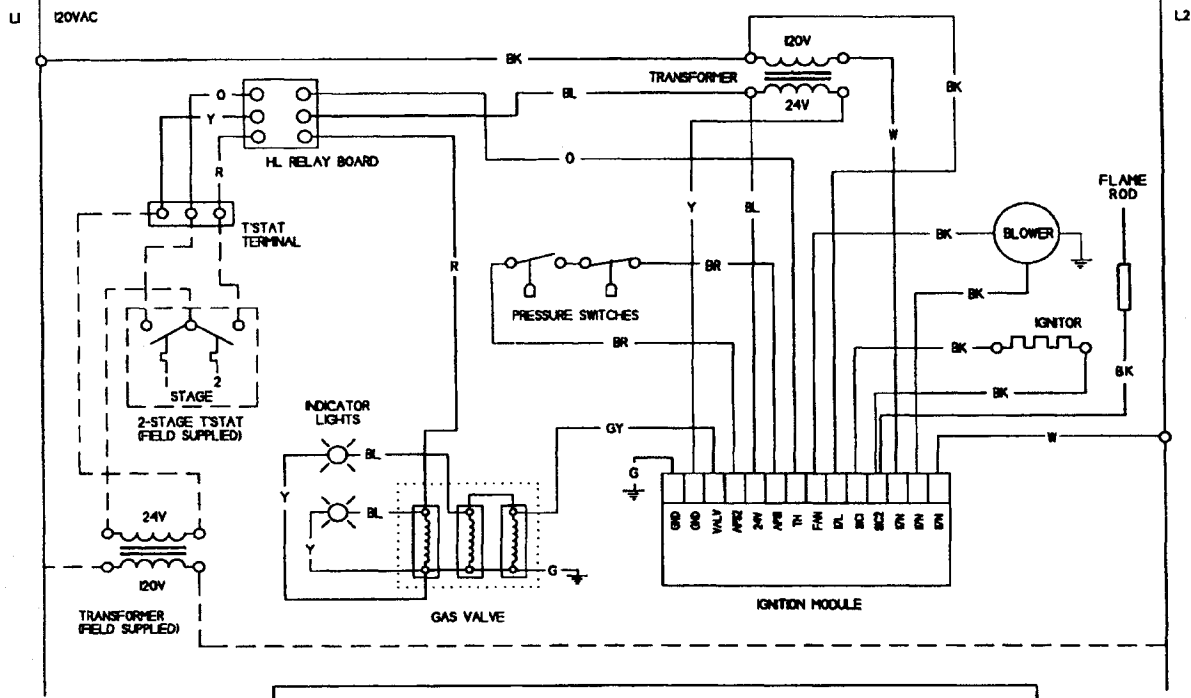
After ignition, the flame rod monitors the flame. As long as a flame is present, the valve is held open. If the flame is lost, the control acts to close the valve within one second, and a new trial sequence identical to that at start-up is initiated. If proof of flame is not established within 8.5 seconds, the unit will lock out. If lockout occurs, the control can be reset by briefly interrupting the power source.

#### HI FIRE

The second stage can be energized at any time during the operation causing the heater to operate in the HI fire mode. This is accomplished by a solenoid, which pushes down on the regulator increasing the manifold pressure and therefore the BTU/H input of the heater.



### RVA LADDER DIAGRAM



IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105 C.

Figure 3-1

### RVA BLOCK DIAGRAM

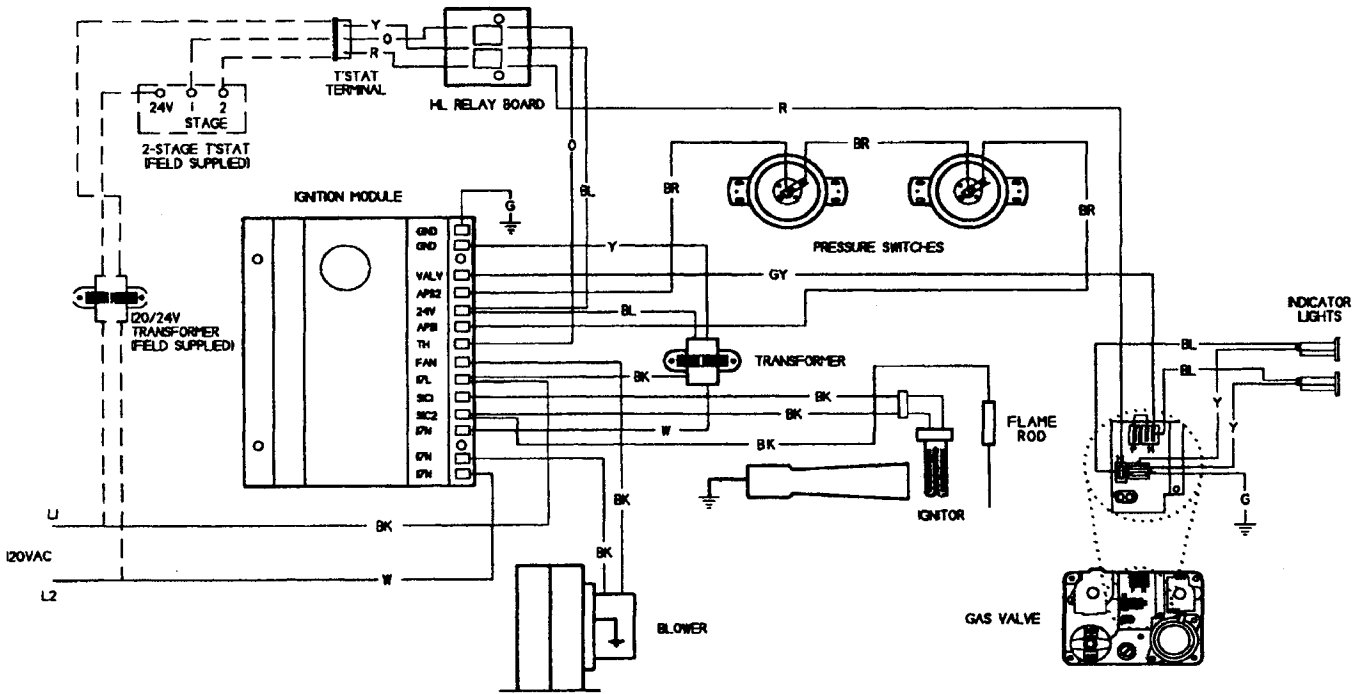


Figure 3-2

### **3.1 Lighting Instructions**

1. Purge main gas supply line at start-up.
2. Rotate heater's manual gas valve knob to the "ON" position.
3. Close electrical circuit.
4. If heater fails to light, turn off gas and wait five minutes before repeating the above procedure.

#### **INSTRUCTIONS POUR L'ALLUMAGE**

PURGER LA CONDUITE D'ALIMENTATION EN GAZ PRINCIPALE.

TOURNER LE BOUTON DU ROBINET DE GAZ A COMMANDE MANUELLE JUSQU' A CE QU'IL SE TROUVE EN POSITION DE MARCHE ("ON").

FERMER LE CIRCUIT ELECTRIQUE.

SI L'APPAREIL DE CHAUFFAGE NE S'ALLUME PAS, ATTENDRE 5 MINUTE AVANT DE SUIVRE DE NOUVEAU LES INSTRUCTIONS CI-DESSUS

### **3.2 Shutdown Instructions**

1. Open electrical circuit.
2. Rotate heater's manual gas valve knob to the "OFF" position.

#### **POUR ETEINDRE L'APPAREIL**

1. OUVRIR LE CIRCUIT ELECTRIQUE.
2. TOURNER LE BOUTON DU ROBINET DE GAZ A COMMANDE MANUELLE DE L'APPAREIL DE CHAUFFAGE JUSQU' A CE QU'IL SE TROUVE EN POSITION D'ARRET ("OFF").

## 4 MAINTENANCE

Model RVA gas-fired, infrared heaters require a minimum of routine maintenance to keep them operating at peak performance.

**! WARNING !**

Use protective glasses when cleaning the heater.

4. Ensure that the squirrel cage in the blower is kept clean. If dirt becomes a problem, installation of outside air intake ducts for combustion is recommended. Oiling the blower motor will extend bearing life beyond the 30,000-hour minimum.
5. Keep the aluminum reflectors clean.

### 4.1 Washdown

1. Caution should be used to avoid high-pressure water being directed towards the heater, particularly the burner box.
2. Apply a light to moderate misting over the entire heater during spray down. Ensure that the top of the heater (reflectors, tube and burner box) is thoroughly cleaned.
3. Fire heaters after washdown for 1 hour, or until they are completely dry.

## 4.1 Troubleshooting Chart

<b>RVA SERIES GENERAL TROUBLESHOOTING CHART</b>		
SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Thermostat closed but nothing happens.	<ol style="list-style-type: none"> <li>1. Blown fuse.</li> <li>2. Defective thermostat.</li> <li>3. Loose or disconnected wire.</li> <li>4. Defective fan.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace.</li> <li>2. Replace.</li> <li>3. Repair as required.</li> <li>4. Lubricate, repair or replace.</li> </ol>
Thermostat closed. Fan operates. No glo-bar energization.	<ol style="list-style-type: none"> <li>1. Loose or disconnected wire.</li> <li>2. Plugged or restricted exhaust vent.</li> <li>3. Plugged pressure switch lines.</li> <li>4. Defective pressure switches.</li> <li>5. Defective glo-bar.</li> <li>6. Defective circuit control.</li> <li>7. Box lid or gasket not in place.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair as required.</li> <li>2. Remove foreign matter.</li> <li>3. Clean as necessary.</li> <li>4. Replace only. Do not adjust.</li> <li>5. Replace.</li> <li>6. Replace circuit control.</li> <li>7. Put in place.</li> </ol>
Thermostat closed. Fan and glo-bar operate. After 45 seconds glo-bar shuts off. No reignition.	<ol style="list-style-type: none"> <li>1. Closed gas supply.</li> <li>2. Dirty or restricted orifice.</li> <li>3. Defective valve. Disconnected valve wire.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open all gas connections.</li> <li>2. Remove and clean with a soft object.</li> <li>3. Replace or repair.</li> </ol>
Loss of heater efficiency.	<ol style="list-style-type: none"> <li>1. Low gas pressure.</li> <li>2. Dirty or restricted orifice.</li> <li>3. Foreign matter inside burner assembly.</li> <li>4. Unit cycles on and off.</li> <li>5. Reflector is sooted and has lost its reflective ability.</li> <li>6. Reflector not in place.</li> <li>7. Clogged fan blower.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide required gas pressure.</li> <li>2. Remove and clean with a soft object.</li> <li>3. Clean as necessary.</li> <li>4. Check previous symptom.</li> <li>5. Clean with aluminum cleaner and soft wiping cloth.</li> <li>6. Put in place.</li> <li>7. Clean.</li> </ol>
Radiant tube leaking burnt gases.	<ol style="list-style-type: none"> <li>1. Loose tube connections.</li> <li>2. Holes or cracks in radiant tube.</li> </ol>	<ol style="list-style-type: none"> <li>1. Assure that tube is fully inserted into flared end and properly clamped.</li> <li>2. Replace.</li> </ol>
Condensation.	<ol style="list-style-type: none"> <li>1. Stack length too long.</li> <li>2. Light gauge flue stack used.</li> <li>3. Low gas pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Shorten stack.</li> <li>2. Minimum of 26 gauge vent pipe is required.</li> <li>3. Set proper gas pressure.</li> </ol>
Tube bowing.	<ol style="list-style-type: none"> <li>1. Insufficient combustion air.</li> <li>2. Overfired.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide 2 sq. in. of free air per 5000 BTU/H of input.</li> <li>2. Check gas pressure and orifice size.</li> </ol>
Tube corroding.	<ol style="list-style-type: none"> <li>1. Contaminated combustion air.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide fresh air inlet duct.</li> </ol>
Visual inspection of burner operation not possible.	<ol style="list-style-type: none"> <li>1. Dirty or sooted sight glass.</li> <li>2. Unit mounted upside down.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove, clean or replace.</li> <li>2. Mount correctly.</li> </ol>
Stack sooting.	<ol style="list-style-type: none"> <li>1. Insufficient combustion air.</li> <li>2. Overfired.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide 1 sq. in. of free air for every 5000 BTU/H of input.</li> <li>2. Check gas pressure and orifice size.</li> </ol>
Thermostat closed. Fan and glo-bar operate. Ignition occurs. Burner cycles off and will not recycle.	<ol style="list-style-type: none"> <li>1. No electrical ground.</li> <li>2. Defective circuit control.</li> <li>3. Low gas pressure.</li> <li>4. Circuit control connection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Connect electrical ground to junction box.</li> <li>2. Replace.</li> <li>3. Provide required gas pressure.</li> <li>4. Repair or replace.</li> </ol>
Thermostat closed. Fan and glo-bar operate. Ignition occurs. Burner cycles off. Burner cycles on.	<ol style="list-style-type: none"> <li>1. Low gas pressure.</li> <li>2. Baffle improperly positioned.</li> <li>3. Defective exhaust pressure switch.</li> <li>4. Restricted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide required gas pressure.</li> <li>2. Reposition baffle (see page 9).</li> <li>3. Replace.</li> <li>4. Remove foreign matter.</li> </ol>



# 5 PARTS LIST

## 5.1 Parts List

KEY	TP#	ITEM	KEY	TP#	ITEM
	TP-1A	STAINLESS STEEL CONTROL BOX COVER		TP-106	REFLECTOR CLIP
	TP-4C	STAINLESS CONTROL BOX		TP-108	5' AL-TI TUBE, PAINTED W/ ONE CLAMP
	TP-5	FLANGE GASKET		TP-111	5' ALUM. TUBE, PAINTED W/1 CLAMP
	TP-9	CONDUIT COUPLING		TP-112	5' REFLECTOR
	TP-10	CONDUIT 4" X 1/2"		TP-122	GASKET FOR AIR ORIFICE & AIR COLLAR
	TP-11	GLO-BAR IGNITOR BOX		TP-200	SS BURNER (50 MBTU/H TO 100 MBTU/H)
	TP-12	GLO-BAR IGNITOR BOX COVER		TP-200A	SS BURNER (50 TO 100 MBTU/H LP GAS)
	TP-14	SIGHT GLASS GASKET		TP-201	SS BURNER (150,000 BTU N or LP GAS)
	TP-15	SIGHT GLASS		TP-202A	16" STAINLESS STEEL 4" BURNER TUBE
	TP-16	SIGHT GLASS WASHER		TP-203A	6' 120V BLACK ELECTRICAL CORD - 3 PRONG
	TP-19B	4" TUBE & REFLECTOR HANGER		TP-203B	6' 24Vx3 YELLOW INSULATED CONTROL WIRE
	TP-20C	120" REFLECTOR		TP-204	GAS ORIFICE - CONSULT FACTORY
	TP-21B	4" TUBE CLAMP		TP-205	GLO-BAR HOLDER
	TP-26A	10 FT. RADIANT TUBE STRAIGHT		TP-206A	RVA END PANEL - LEFT - STAINLESS
	TP-26B	10 FT. RADIANT TUBE STRAIGHT (AL-TI)		TP-207A	RVA END PANEL - RIGHT - STAINLESS
	TP-31B	CONTROL BOX BRACKET		TP-208	"Z" MOUNTING BRACKET
	TP-33B	1/2" GAS COCK		TP-210	36E96-224 TWO STAGE GAS VALVE-NAT ASSY
	TP-44	AIR ORIFICE W/SCREEN (CONSULT FACTORY)		TP-210P	36E96-226 TWO STAGE GAS VALVE-LP ASSY
	TP-50	GLO-BAR IGNITOR		TP-211A	MARK 17U-24 CIRCUIT BOARD (REMOTE SENSE)
	TP-54	BURNER BOX DIVIDER		TP-212	1/2" X 3" PIPE NIPPLE
	TP-55A	FAN BLOWER		TP-214	GLO-BAR WIRING HARNESS
	TP-55B	SMALL STLYE RVA FAN BLOWER (40/28 BTU/H)		TP-216	INDICATOR LIGHT
	TP-56C	1/4" ATMOSPHERIC TUBE (VINYL)		TP-217	PRESSURE BARB FITTING
	TP-57A	1/4" PRESSURE TUBE		TP-218	EXHAUST PRESSURE TUBE (VINYL)
	TP-60G	EXHT PRESSURE SWITCH - 50 TO 150 MBTU/H		TP-219	40VA TRANSFORMER
	TP-61B	BURNER PRESSURE SWITCH - 50 - 100 MBTU/H		TP-221	GLO-BAR HOLDER GASKET
	TP-61D	BURNER PRESSURE SWITCH - 150 MBTU/H		TP-222	FLAME ROD
	TP-65A	66" 4" HEAT DIFFUSER (BAFFLE)		TP-222A	FLAME ROD WIRE
	TP-65B	99" 4" HEAT DIFFUSER (BAFFLE)		TP-223	GAS MANIFOLD
	TP-65C	132" 4" HEAT DIFFUSER (BAFFLE)		TP-225	REPLACEMENT RELAY BOARD (HLRB)
	TP-65D	166" 4" HEAT DIFFUSER (BAFFLE)			3" RVA COMPONENTS
	TP-65I	36" INTERLOCKING BAFFLE			
	TP-66	2" X 4" OUTLET BOX			
	TP-67	2" X 4" OUTLET BOX COVER		DB-82A	3" REFLECTOR CENTER SUPPORT
	TP-68A	STRAIN RELIEF BUSHING		DB-201	4" TO 3" REDUCER FITTING WITH FLANGE
	TP-68B	LARGE STRAIN RELIEF BUSHING (FOR CORDS)		DB-201NF	4" TO 3" REDUCER FITTING NO FLANGE
	TP-70	CONTROL BOX COVER GASKET (PER FOOT**)		DB-204	3" WIRE HANGER
	TP-76	RUBBER GROMMET		DB-205	3" TUBE CLAMP
	TP-82	4" REFLECTOR CENTER SUPPORT		DB-206	99" STAINLESS STEEL BAFFLE
	TP-83A	PVC COATED STAINLESS FLEX CONNECTOR		DB-206A	66" 3" HEAT DIFFUSER (BAFFLE)
	TP-105	REFLECTOR END CAP		DB-207	10' ALUMINIZED, PAINTED 3" RADIANT TUBE

\*\* 6" NEEDED TO COVER EDGES OF BURNER BOX.

# HEATER BREAKDOWN

