Premier VS-VH
Infrared Heating System
Installation, Operation and Maintenance Instructions

FOR YOUR SAFETY

If you smell gas:
1. Open windows
2. Don’t touch electrical switches
3. Extinguish any open flame
4. Immediately call your gas supplier

CONSIGNES DE SEURITE

Si vous sentez une odeur de gaz:
1. Ouvrez les fenêtres
2. Ne touchez pas aux interrupteursélectriques
3. Éteignez touteflamme nue
4. Contactez immédiatement votre fournisseur de gaz

FOR YOUR SAFETY

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

CONSIGNES DE SEURITE

Il est interdit d’utiliser des liquides inflammables ou dégageant des vapeurs inflammables, a proximités de tout appareil fonctionnent au gaz.

AVERTISSEMENT

Une installation, un réglage, une modification, une réparation ou un entretien incorrect peut entraîner des dommages matériels, des blessures ou la mort. Lisez attentivement les instructions d’installation, de fonctionnement et d’entretien avant de procéder à l’installation ou à l’entretien de cet équipement.

Installer
Read and thoroughly understand these instructions & the System Design Layout before attempting any installation.

Owner
Retain this manual for reference.

WARNING
Improper installation, adjustment, alteration, service or maintenance can cause injury, death or property damage. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

Superior Radiant Products
563 Barton Street, Stoney Creek, Ontario L8E 5S1
www.superiorradiant.com
<table>
<thead>
<tr>
<th>CAUTION: FIRE OR EXPLOSION HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain clearance to combustible constructions as further specified in this manual. Failure to do so could result in a serious fire hazard. Heaters should not be located in hazardous atmospheres containing flammable vapors or combustible dusts. Signs should be provided in storage areas specifying maximum safe stacking height and safe parking locations for vehicles of various heights.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION: MECHANICAL HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>This equipment expands and contracts with each operating cycle. The gas connection, suspension hardware and the installation itself must safely allow this movement. Failure to do so could result in serious fire or explosion hazard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION: FIRE OR EXPLOSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>This heater is equipped with an automatic ignition device. Do not attempt to light the burner by hand. Failure to comply could result in a serious fire and personal injury hazard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION: MECHANICAL HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not use high pressure (above ½ psi [3.5 kPa]) to test the gas supply system with the burners connected. Failure to comply could result in damage to the burner and its control components requiring replacement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION: SERVICE LIFE RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not install equipment in atmospheres containing halogenated hydrocarbons or other corrosive chemicals. Failure to comply may lead to premature equipment failure and invalidation of the warranty. Additionally, it is recommended that the equipment be installed with a slope downward and away from the burner of ¼” in 10 ft (7 mm per 3 m) to allow drainage of start-up condensate.</td>
</tr>
</tbody>
</table>
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INTRODUCTION

**Superior Radiant Products** is a company in the infrared heating industry founded on the principles of product quality and consumer commitment.

Quality commitment is evidenced by superior design, a regard for design detail and an upgrade of materials wherever justifiable.

Customer commitment is apparent through our ready responses to market demands and a never ending training and service support program for and through our distributor network.

The Premier VS-VH Vacuum System is the culmination of decades of infrared expertise and commitment to quality products. The VS-VH System is easy to install and maintain, offers flexibility of design which is unmatched in the industry and provides economical and trouble free operation.

---

**Important**

These instructions, the System Design Layout drawing, local codes and ordinances, and applicable standards such as apply to gas piping and electrical wiring comprise the basic information needed to complete the installation, and must be thoroughly understood along with general building codes before proceeding.

Only personnel who have been trained and understand all applicable codes should undertake the installation. SRP Representatives are Factory Certified in the service and application of this equipment and can be called on for helpful suggestions about installation.

---

**Operating Principle**

The PREMIER VS-VH System operates on the following basic principles:

- **ONE** Vacuum Setting is required for all Branches in the System, and is independent of which Burner Model is installed.
- Individual Air Plates have been specially engineered to co-ordinate with the ‘Position’ a Burner is placed in on any Branch of the System.
- Individual Burner Models are specific for a desired BTU/hr heat rating.
- System can be operated in **ONE** of **TWO** modes:
  - **Single Rate**: Entire system operates at ONE fixed Rate using Manual Dampers.
  - **Modulating Rate**: The use of Motorized Dampers allows the System to modulate the overall Heat Output during operation to meet building demand. Burner output Rates may be decreased from ideal designed rate by up to 40%.
Installations must comply with local building codes, or in their absence, the latest edition of the national regulations and procedures listed below:

**General Installation and Gas Codes**

Heaters must be installed only for use with the type of gas appearing on the rating plate, and the installation must conform to the *National Fuel Gas Code*, ANSI Z223.1 (NFPA 54) in the US and the *Natural Gas and Propane Installation Code*, CAN/CGA B149.1 & B149.2 in Canada.

**Aircraft Hangar Installation**

Installation in aircraft hangars must conform to the Standard for *Aircraft Hangars*, ANSI/NFPA 409 in the US and CAN/CGA B149.1 & B149.2 in Canada.

**Public Garage Installation**

Installation in public garages must conform to the Standard for *Parking Structures*, NFPA-88A or *Standard for Repair Garages*, NFPA 88B, in the US and CAN/CGA B149.1 & B149.2 in Canada.

**Parking Structures**

Technical requirements are outlined in the Standard for *Parking Structures*, ANSI/NFPA 88a, in the US and CAN/CGA B149.1 & B149.2 in Canada.

**Gas Supply Lines**

Gas supply pipe sizing must be in accordance with the *National Fuel Gas Code*, ANSI Z223.1 (NFPA 54) in the US and the *Natural Gas and Propane Installation Code*, CAN/CGA B149.1 & B149.2 in Canada.

- A 1/8” NPT plugged tap must be installed in the gas line connection immediately upstream of the burner farthest from the gas supply meter to allow checking of system gas pressure.

**Electrical**

All heaters must be electrically grounded in accordance with the *National Electric Code*, ANSI/NFPA 70 in the US, and the *Canadian Electric Code*, CSA C22.1 in Canada, and must comply with all local requirements.

**Venting**

Refer to the *National Fuel Gas Code*, ANSI Z223.1 (NFPA 54) in the US and the *Natural Gas and Propane Installation Code*, CAN/CGA B149.1 and B149.2 in Canada for proper location, sizing and installation of vents as well as information on termination clearance requirements when penetrating combustible walls for venting purposes.
EQUIPMENT SPECIFICATIONS

System Layout Types

Figure 1: Symmetric System Overview
EQUIPMENT SPECIFICATIONS

Figure 2: Non-Symmetric System Overview

Shown WITHOUT Reflectors for Tube Clarity

Burner Position #1
Combustion Tube
Radiant Line
Radiant Branch "B"
Reflector Hanger

Burner Position #2

Radiant Line
Radiant Branch "A"
Damper Couplings
Flexible Boot
Common Tailpipe
Reducer
Vacuum Switch
Tailpipe
Reducer Boot
Tailpipe
Reduc Couplings
## Major Components

### Figure 3: Common Component Dimensions

<table>
<thead>
<tr>
<th>Component</th>
<th>Diameter (cm)</th>
<th>Length (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Elbow, 4&quot; (10.2cm) Ø</td>
<td></td>
<td>40.6</td>
</tr>
<tr>
<td>Tube Tee, 4&quot; (10.2cm) Ø</td>
<td></td>
<td>30.5</td>
</tr>
<tr>
<td>Combustion Tubes, 4&quot; (10.2cm) Ø</td>
<td></td>
<td>305</td>
</tr>
<tr>
<td>Tubes, 4&quot; (10.2cm) Ø &amp; 5&quot; (12.7cm) Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Boot 4&quot; (10.2cm) Ø or 6&quot; (15.2cm) Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum Switch  Ø 6&quot; (15.2cm) 7.4&quot; (18.8 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reducer w/Vacuum Switch Ø 4&quot; (10.2cm) or 5&quot; (12.7cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube U Bend, 4&quot; (10.2cm) Ø</td>
<td></td>
<td>50.8</td>
</tr>
<tr>
<td>Vacuum Switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reducer w/Vacuum Switch Ø 4&quot; (10.2cm) or 5&quot; (12.7cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Reflector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube Coupling Ø 4&quot; (10.2cm) Ø or 5&quot; (12.7cm) Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damper Coupling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Figure 4: Specialty Components**

- **Side Reflector**
  - 15.5" (39.4 cm)

- **Bottom Shield**
  - 10" (25.4 cm)

- **Double Swept Tee**
  - 28" (71 cm)
  - 16" (40.6 cm)
  - 4" Ø (10.2 cm)
  - 5" Ø (12.7 cm)

- **Single Swept Tee**
  - 24" (61 cm)
  - 16" (40.6 cm)
  - 4" Ø (10.2 cm)
  - 5" Ø (12.7 cm)

- **Tube Elbow, 5" (12.7 cm) Ø**
  - 17" (43 cm)

**Additional Components Available:**

- Stainless Steel (S/S) Components
- Reflector Kit, Mitered 90°
- Fresh Air Inlet Hood

---

**Tubing**

- Coated Tube & Tubing Components
  - 45° Elbow, 4" Ø
  - Cross Fitting, Square, 4" or 5" Ø
  - Cross Fitting, Double Swept, 5" Ø
  - Hanger Strap, 4" or 5" Ø (tailpipe)

---

*A list of parts & part numbers can be found in the PARTS section at the end of this manual.*
**Burners**

<table>
<thead>
<tr>
<th>Burners</th>
<th>General Burner Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas Supply</strong></td>
<td></td>
</tr>
<tr>
<td>Natural Gas:</td>
<td>Minimum</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
</tr>
<tr>
<td><strong>Manifold Pressure</strong>:</td>
<td>0” W.C.</td>
</tr>
<tr>
<td><strong>Inlet Connection</strong>:</td>
<td>½” NPT male</td>
</tr>
</tbody>
</table>

**Electric Supply**

120 VAC, 60 Hz, 0.2 Amp: 36” (0.9 m) cord connector with grounded 3-prong plug.

**Flue and Outside Air Connection**

4” type C duct for flue adaptor and outside air (optional) provided at the heater.

---

**Figure 5: Burner Dimensions**

- Dimensions: Inches (centimeters)
  - Weight: 25 lbs (11.4kg)
  - Air Flow Direction
  - Dimensions: 14.75 (37.5), 7.11 (18.1), 9.48 (24.1), 7.18 (18.2), 17.06 (43.3)
Figure 6: Locations of Burner Labels/Stickers
Details of all Burner Labels / Stickers: Qty (8)

**WIRING DIAGRAM**

**NOTE:** If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a rating of at least 105°C

**VENTING LABEL - VL005**

1. SRP Part # for venting materials
   - wall thimble (4") ............... CS006
   - wall thimble (6") ............... CS033
   - vent terminal (4") .............. CT011
   - vent terminal (6") .............. CT044
   - C vent / aluminized tube (4") .... CT001
   - C vent / galvanized tube (6") ... CT059
   - Vibration Boot Package (4") ...... VS010
   - Vibration Boot Package (6") ...... VS048
2. Vent length from vacuum pump
   - minimum 2 ft.
   - maximum 50 ft.

**WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.

Read the Installation, Operating and Maintenance Instructions thoroughly before installing or servicing this equipment.

**AVERTISSEMENT**

For use with natural gas or propane. A conversion kit as supplied by the manufacturer, shall be used to convert this heater to the alternate fuel. Installation shall be by qualified personnel only.

Pour utilisation avec gaz naturel ou propane. Pour changer d’un combustible à l’autre, vous êtes requis de prendre une trousse fournie par le fabricant. L’installation doit être fait par des personnes qualifiées seulement.
EQUIPMENT SPECIFICATIONS

Gas Connection Label - CL034

WARNING: Connector Must Be Installed As Shown Above.

For US use only 1/2" x 24" or 3/4" x 36" SS for burners over 150 MBTU
For Canada use only 1/2" x 30" rubber; or 3/4" x 30" rubber for burners over 150 MBTU. Gas connector sold separate from heater.

*For more Gas Connection details refer to Part 4- Gas Supply System on Page 52.

VS-VH Burner Rate Chart - VL015

Chart of Burner Rates
Premier VS-VH

Important: This burner is a variable input appliance. See chart below to determine appliance burn rate.

A flow plate appropriate to the position of the burner in the system MUST be installed (see Manufacturer's Instructions).

Positions are identified in ascending order from the start end of the system.

Note: An end vent vacuum intermediate to those shown will result in rates intermediate and proportional to those indicated.

<table>
<thead>
<tr>
<th>End Vent Vacuum (in. wc)</th>
<th>PREMIER VS-VH02</th>
<th>PREMIER VS-VH04</th>
<th>PREMIER VS-VH06</th>
<th>PREMIER VS-VH08</th>
<th>PREMIER VS-VH10</th>
<th>PREMIER VS-VH12</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>120,000</td>
</tr>
<tr>
<td>3.0</td>
<td>20,000</td>
<td>40,000</td>
<td>60,000</td>
<td>80,000</td>
<td>100,000</td>
<td>110,000</td>
</tr>
<tr>
<td>1.7</td>
<td>12,000</td>
<td>24,000</td>
<td>36,000</td>
<td>48,000</td>
<td>60,000</td>
<td>66,000</td>
</tr>
</tbody>
</table>

Gas Orifice size

| Gas Orifice size | #43 | #31 | #27 | #13 | #1 | #K |

Superior Radiant Products Ltd.
Stoney Creek, ON
EQUIPMENT SPECIFICATIONS

Burner Rating Plate - VL007

### INFRARED HEATER / RADIATEUR INFRA-ROUGE

<table>
<thead>
<tr>
<th>SUPERIOR RADIANT PRODUCTS LTD.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STONEY CREEK, ON CANADA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>SERIAL NO.</th>
<th>INPUT BTUH</th>
<th>GAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. modèle</td>
<td>No. de série</td>
<td>Press a l’orifice</td>
<td>Gaz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELECTRICAL RATING</th>
<th>MANIFOLD PRESSURE</th>
<th>MIN. SUPPLY PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>115V 60Hz 1A</td>
<td>Press a l’orifice</td>
<td>Press d’alimentation</td>
</tr>
</tbody>
</table>

**SUITABLE FOR INSTALLATION INDOORS/Intérieur**

- **Suitable for installation in aircraft hangars per ANSI 409 & Public garages per NFPA 88A**
  
  À l’instar de la configuration variable mais en position horizontale seulement

- **Heater may be installed in variable configuration in horizontal position only**
  
  Pour chauffer Non-residentielle et élevage des poules

### LIGHTING INSTRUCTIONS

1. Ensure all main supplies are off.
2. Set thermostat below ambient temperature.
3. Turn main gas valve on.
4. Turn on electrical current.
5. Set thermostat to desired temperature.

### SHUT DOWN INSTRUCTIONS

1. Turn down thermostat.
2. Turn off electric power.
3. Turn off main gas valve.
4. Wait 5 minutes before attempting to re-light.

### CERTIFIED

**CERTIFIED**

CAN1-2.20 M85 (R2006) IAS-U.S. Req. 8-94
ANSI Z83.20-2008 / CSA 2.34-2008
CAN/CSA C22.2 No. 3-M1988 (R2004)
CGA 2.17-M91 (R2009)

### As-Built Burner Position Label

**BURNER No.**

*As-Built* - If burner will not be placed in this position the air plates will need to be changed prior to installation, consult manual for further details.
EQUIPMENT SPECIFICATIONS

VS-VH Clearance to Combustibles Label - VL016

MINIMUM CLEARANCE TO COMBUSTIBLE MATERIALS
for space heating applications (inches)

<table>
<thead>
<tr>
<th>MODEL #</th>
<th>PREMIER VS-VH02</th>
<th>VS-VH04</th>
<th>VS-VH06</th>
<th>VS-VH08</th>
<th>VS-VH10</th>
<th>VS-VH12</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIG. 1</td>
<td>A 2 2 2 2 2 2 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B 15 15 17 23 28 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>C 45 45 50 53 58 60</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>D 15 15 17 23 28 30</td>
<td></td>
<td></td>
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<tr>
<td>FIG. 2</td>
<td>A 4 4 4 4 4 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B 4 4 4 4 4 4</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>C 40 40 48 52 60 66</td>
<td></td>
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<tr>
<td></td>
<td>D 38 38 42 46 50 59</td>
<td></td>
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<tr>
<td>FIG. 3</td>
<td>A 2 2 2 2 2 4</td>
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<tr>
<td></td>
<td>B 4 4 4 4 4 4</td>
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<tr>
<td></td>
<td>C 50 50 56 65 70 73</td>
<td></td>
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<tr>
<td></td>
<td>D 32 32 34 38 43 49</td>
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<tr>
<td>FIG. 4</td>
<td>A 2 2 2 2 2 4</td>
<td></td>
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<tr>
<td></td>
<td>B 9 9 14 16 18 21</td>
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<tr>
<td></td>
<td>C 50 50 56 64 71 74</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>D 9 9 14 16 18 21</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

NOTES:
- Fig. 1 clearances also apply with use of approved Decorative Grill.
- Use of approved Bottom Shield reduces C by up to 25%.
- Downstream 25 ft. from Burner: B, C, D can be reduced by up to 50%.
- See Manual for Complete Details
Vacuum Pump A

Electric Supply: 115/230 VAC, 60Hz, 1 PH, 0.75 HP
Tube Connection: 6” dia. Inlet & 4” dia. Outlet

Figure 7: Vacuum Pump A - Available in RH or LH Style

Dimensions: Inches (centimeters)
Weight: 100 lb (45.5kg)
(Including connecting pieces)
Vacuum Pump B

*Electric Supply:* 208/230/460 VAC, 60Hz, 3 PH, 1.5 HP
*Tube Connection:* 6" dia. Inlet & 6" dia. Outlet

Figure 8: Vacuum Pump B - Available in RH or LH Style

Dimensions: Inches (centimeters)
*Weight:* 115 lbs (52.3kg)
(Including connecting pieces)
CLEARANCE TO COMBUSTIBLES

A general clearance of 18” (0.5 m) in every direction is recommended for servicing only around each Burner, Vacuum Pump, and End Vent Cap air supply (at the far end of each Radiant Branch) also to ensure adequate air flow in and around the Heating System.

In addition to this it is very important to observe the minimum clearance to combustibles at all times to avoid any possibility of property damage or personal injury.

- Clearances as marked on the heater body must be maintained from vehicles parked beneath. Signs should be posted identifying any possible violation of the clearance distances from the heater in all vehicle areas.
- Maximum allowable stacking height in storage areas should be identified with signs or appropriate markings adjacent to the thermostat or in a conspicuous location.

Table A lists the minimum clearance to combustible materials for various installation configurations. Note that standard clearances also apply to installation above T-bar ceilings and above decorative grills. Additional clearance may be required for glass, painted surfaces and other materials which may be damaged by radiant or convective heat.

Combustible materials are considered to be wood, compressed paper, plant fibres, plastics, Plexiglas or other materials capable of being ignited and burned. Such materials shall be considered combustible even though flame-proofed, fire-retardant treated or plastered.

The installer is responsible to ensure that building materials with a low heat tolerance which may degrade at higher temperatures (up to 90°F (32°C) above ambient) are protected to prevent degradation.

Note 1:

Bottom Shields are approved for all burner sizes. The “below” clearance (dimension C in Table A) may be reduced by 25% when an approved Bottom Shield is used.

Note 2:

Reduced clearances downstream from the burner are approved for all configurations. Dimensions “B”, “C”, and “D” in Table A can be reduced for locations 25 ft (7.6 m) or more downstream from a burner, before the next burner, maximum reduction is 50%
**CLEARANCE TO COMBUSTIBLES**

Table A: Required Clearance to Combustibles

* Clearance to combustibles for non-reflectored fittings is 18” (0.5 m).

<table>
<thead>
<tr>
<th>Reflectors Configurations</th>
<th>Dimensions: Inches (cm)</th>
<th>PREMIER VS-VH Burner Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dim A</td>
<td>Dim B</td>
</tr>
<tr>
<td>Horizontal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
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<td></td>
<td></td>
</tr>
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<td></td>
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<td></td>
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<tr>
<td>45° Reflector Tilt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One Side Reflector</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Side Reflectors</td>
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</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INSTALLATION

Preparation

Most vacuum system designs are laid out on a clean blank sheet of paper. Unfortunately, typical construction does not permit this unimpeded access and therefore some planning and preparation early in the project will save much time and effort later on.

Start by reviewing the installation procedure. Examine where the equipment will be installed and how it will be supported. Please pay special attention to any objects that might be in the way or in close proximity to the heating system. Refer to Table A (Clearance to Combustibles) to ensure a safe distance between the heating system and any combustible materials.

Acquaint yourself with the standard components referred to in this manual. Many of these components are shown in detail in Figure 3 & Figure 4. They are also shown in general assembly form in Figure 1 and Figure 2 to illustrate where the components fit in a typical Symmetrical System and a Non-Symmetrical System. (These Figures are found in the ‘Equipment Specifications’ section.)

If possible, lay the entire system out on the floor prior to installation. This will help identify any potential problems with the installation as well as any discrepancy in component quantity. Ensure that all burners are those specified by the System Design Layout in input, gas type and position no..

*DO NOT TRIM / CUT ANY Combustion Tube, adjust the system to fit around the Combustion Tubes.

Layout Limits

Ensure that the System Layout meets the limits required in Table B and Table C.

<table>
<thead>
<tr>
<th>Burner Model No.</th>
<th>Avg. Burner Rating [BTU/hr]</th>
<th>Radiant Tube Lengths (Distance between Burners) [ft (m)]</th>
<th>Minimum Distance to Elbow [ft (m)]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Minimum</td>
<td>Recommended</td>
</tr>
<tr>
<td>PREMIER VS-VH02</td>
<td>20 000</td>
<td>10 (3.1)</td>
<td>15 (4.6)</td>
</tr>
<tr>
<td>PREMIER VS-VH04</td>
<td>40 000</td>
<td>15 (4.6)</td>
<td>20 (6.1)</td>
</tr>
<tr>
<td>PREMIER VS-VH06</td>
<td>60 000</td>
<td>20 (6.1)</td>
<td>25 (7.7)</td>
</tr>
<tr>
<td>PREMIER VS-VH08</td>
<td>80 000</td>
<td>20 (6.1)</td>
<td>30 (9.2)</td>
</tr>
<tr>
<td>PREMIER VS-VH10</td>
<td>100 000</td>
<td>30 (9.2)</td>
<td>40 (12.2)</td>
</tr>
<tr>
<td>PREMIER VS-VH12</td>
<td>110 000 &amp; 120 000</td>
<td>40 (12.2)</td>
<td>50 (15.3)</td>
</tr>
</tbody>
</table>

*When minimum Radiant Tube lengths are used, minimum tailpipe length must be increased by 50%
## INSTALLATION

### Table C: Tailpipe Lengths Required for Various Branch Layouts

<table>
<thead>
<tr>
<th>Burner Model No.</th>
<th>Total # Burners in Branch</th>
<th>Total Output for Branch [MBTU/hr]</th>
<th>Minimum Tailpipe for Branch [ft (m)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREMIER VS-VH02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>10 (3.0)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>10 (3.0)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td>20 (6.1)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>80</td>
<td>20 (6.1)</td>
<td></td>
</tr>
<tr>
<td>PREMIER VS-VH04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>20 (6.1)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>80</td>
<td>20 (6.1)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>120</td>
<td>30 (9.1)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>160</td>
<td>30 (9.1)</td>
<td></td>
</tr>
<tr>
<td>PREMIER VS-VH06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>60</td>
<td>30 (9.1)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>120</td>
<td>30 (9.1)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>180</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>240</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>PREMIER VS-VH08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>160</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>240</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>320</td>
<td>60 (18.3)</td>
<td></td>
</tr>
<tr>
<td>PREMIER VS-VH10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td>50 (15.2)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>300</td>
<td>60 (18.3)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>400</td>
<td>60 (18.3)</td>
<td></td>
</tr>
<tr>
<td>PREMIER VS-VH12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>110 / 120</td>
<td>40 (12.2)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>220 / 240</td>
<td>50 (15.2)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>330 / 360</td>
<td>60 (18.3)</td>
<td></td>
</tr>
</tbody>
</table>

**Exceptions:**

1) When minimum Radiant Tube lengths are used, minimum tailpipe length must be increased by 50%

2) If using Common Tailpipe refer to the following to determine the Minimum Common Tailpipe length required:
   1 - Add up usual recommended lengths of Tailpipe (from data in this Table)
   2 - Subtract the length of any Tailpipe which will NOT be common
   3 - If result is > 40' remaining, multiply by 0.6 for Minimum common Tailpipe Length
      OR 3 - If result is ≤ 40' remaining, multiply by 0.75 for Minimum common Tailpipe Length

3) When using 5" Ø Tailpipe, the required Tailpipe lengths may be reduced by 25%.
Assembly Overview Notes

Generally there is no unique sequence for installation of the Premier VS-VH system. A review of the job site will often indicate a logical installation order. However, it is typical to start at the end of the branch with the furthest burner location and continue that branch downstream towards the Vacuum Pump, then begin again with the next branch. Generally, 10ft (3 m) increments of Tube and Reflector can be used until one reaches the Common Tailpipe areas or Vacuum Pump connections. The general order of material in this manual is recommended for low-hassle installation purposes.

The installation of the entire system potentially consists of five individual parts, one part for each major component / system;

1- Radiant Line System, (Heat Exchangers)
2- Vacuum Pumps & Ventilation Systems,
3- Optional Combustion Air Supply System,
4- Gas Supply System, and
5- Electrical System(s)

Directions for the installation of each component / system are therefore found in the respective sections along with general information and additional safety notes as required.
INSTALLATION – PART 1

Part 1 - Radiant Line System

For the purpose of this section the term “Radiant Line System” will refer only to the main heat exchanging components: Tubes, Burners, Reflectors, Tailpipes and attached Optional pieces. These must be hung from ceiling supports and form the main Radiant Lines & Branches of the Heat Exchanger System.

Installation of the Radiant Line System has been divided into 6 main parts as follows:

Radiant Line Tubes
Tailpipe Tubes
Burners
Reflectors
Optional Shield Equipment
Deco-Grille Option

The order they are listed in is recommended for ease of installation and allows for adjustments to be made easily if required. Other orders of installation are possible; please note that there are certain components which, once installed, will make it more difficult to install others. Thoroughly read through the following installation directions for details on individual components.

Figure 9 illustrates the relationship of many of the various components of the Radiant Line System and will be a useful reference at many times during the installation.

NOTE: Close all open ended “S” hooks and turnbuckles to avoid unhooking chain with inadvertent contact.

NOTE: The Premier VS-VH System does not typically require the use of Baffles, if Baffles are desired please consult with the Manufacturer (SRP) prior to installation.

All Combustion Tubes are heat-treated aluminized steel tubes.
The remaining Radiant Tube length can be either hot rolled or heat-treated aluminized depending on the system design.

A - Radiant Line Tubes

1. Locate hanging chain at predetermined points in the structure using methods as shown in Figure 11. The first 2 hanging points are approximately 7.5 ft (2.3 m) apart to fully support each end of the first tube. Thereafter spacing of 10 ft (3 m) is acceptable, i.e. one hanging point per tube. Ensure that Reflector Hangers located on a Combustion Tube will be within 8” (20 cm) of the Burner. Ensure that the mounting height allows a downward slope of ¼” per 10 ft (7 mm per 3 m) towards the Vacuum Pump location.

2. Welded link chain with a working load limit of at least 500 lbs. (230 kg) is recommended. The suspension mechanism must allow for lateral expansion of the tubing. A minimum length of 12” (30 cm) of hanging chain is recommended. Using turnbuckles between the chain and the Reflector Hanger allows for easy height adjustment later.
INSTALLATION – PART 1

Figure 9: Radiant Line System – Component Relationships

- Fasten end caps with screws
- Secure every second reflector overlap with #8-32 x 1-1/4" screws
- Install the J-bolts in the hangers immediately following a burner only
- Install the J-bolts in the hangers immediately following a burner only
- Reflectors (overlap approx 4")
- Air Flow Direction
- Tight Screws
- Loose Screws
- End Vent Cap
- Burner Position #1
- Burner Position #2
- Reflector Hanger
- Radiant Tube
- Combustion Tube
- Turnbuckles

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3. Install an End Vent Cap at the beginning of each Branch (open end of the first Combustion Tube) and fasten it with a #8 x 3/8” screw as shown in Figure 10 below.

Figure 10: End Vent Cap Orientation

Figure 11: Ceiling Mounting / Hanging Options
4. Fasten the Reflector Hanger to the end of the hanging chain and place the tube in the hanger. Ensure that Combustion Tubes have the burner mounting hole positioned at 12 o’clock and facing downstream. (Refer to Figure 12)

**Figure 12: Tube & Reflector Hanger Detail**

5. Join consecutive pieces of tube using Couplings. Insert one end of both tubes fully into the Coupling. (Refer to Figure 13). These should be tightened as the tubing is put in place, as it is more difficult to do so once the Reflector is installed. Tighten band clamps alternately to prevent buckling of the sleeve, set to Torque shown. Ensure that the weld seams on ALL Tubes are facing down.

**Figure 13: Tube Coupling Installation**

<table>
<thead>
<tr>
<th>Recommended Static Torque* for Couplings:</th>
<th>S/S</th>
<th>Aluminized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nm</td>
<td>55 ± 8</td>
<td>70 ± 10</td>
</tr>
<tr>
<td>lb ft</td>
<td>40.6 ± 6</td>
<td>51.6 ± 7</td>
</tr>
</tbody>
</table>

* Static (Audit) Torque is defined as the amount of torque required to rotate the nut approximately 1/8th turn in the tightening direction immediately after rundown.
Figure 14: View of System after Installation of Radiant Line Tubes

System is now ready for Burner installation(s).
B - Tailpipe Tubes

1. Continue to install Hangers*, Tubes and Couplings as per Installation Part 1-A: Steps 1 to 4. Ensure that the mounting height allows a downward slope of ¼” per 10 ft (7 mm per 3 m) towards the Vacuum Pump location.

*On Tubes which will NOT have Reflectors, i.e. Tailpipe, the use of Hanger Straps instead of Reflector Hangers is approved.

2. BEFORE installing the Tee Section between the Branch Tailpipes and the Common Tailpipe determine where the Damper Couplings need to be installed.

3. Check which type of System is being installed, Symmetric (S) or Non-Symmetric (N) as per Figure 1 and Figure 2. Dampers are positioned to allow the Vacuum Setting at the Branch End Vent to be adjusted individually for each branch. Symmetric / identical branches require the same vacuum setting so one damper coupling is located before the tailpipe splits into separate branches. Non-symmetric branches require a separate Damper Coupling for each Branch. For Modulating Rate Systems ensure that Motorized Damper Couplings are used.

Damper Couplings are ONLY installed in the locations on the System where the respective letter reference “S”, OR “N” is located in Figure 15. On all other connections use normal Couplings. Dampers and Couplings are installed using the same method. (See previous section.)

4. Continue to install the Common Tailpipe in the same manner as all other Tubing. Ensure that the mounting height allows a downward slope of ¼” per 10 ft (7 mm per 3 m) towards the Vacuum Pump location.

System is now ready for Vacuum Pump and Ventilation connection(s).
C - **Burners**

1. Use the J-bolt (included with the burner packaging) to clamp the tube snugly at the first Reflector Hanger after a burner mountinghole location. This prevents the tube from twisting / rotating once the burner is installed. (Refer to Figure 9 and Figure 16)

2. J-bolts must be installed **before** the Reflectors are inserted.

**Figure 16: J-Bolt Installation Detail**

Each Burner in a Premier VS-VH Branch must be placed in its appropriate position, and have the appropriate Air Plate installed. Burner Position No.1 is at the furthest end of the branch from the Vacuum Pump and the Burner number increases as the branch runs towards the Vacuum Pump. *(As shown in Figure 17 & referred to in your System Design Layout)*

Each Burner is shipped with a Burner Rating Plate & As-Built Burner Position Label affixed, with the corresponding Air Plate installed. If the System Design Layout changes and the Burner must be placed in a position other than the As-Built Burner Position then the Air Plate will need to be replaced with the appropriate one for the required new Position. *(See following page for details.)*
3. Confirm Burner Positions & change-out Air Plate(s) as necessary.

Each burner position in series along a branch requires the burner in that location to have a specific Air Plate installed. Burners will come with the Air Plate for a specific Position installed. The Position will be identified by the As-Built Burner Position Label (Burner No. #). If, due to changes in the System Design Layout, any Burner is NOT going to be placed in the labeled As-Built Position, prior to installation the Air Plate will need to be removed and replaced, as shown in Figure 18, with the corresponding Air Plate as given in Table D for the Burner Model and the Position that it will be placed in. Contact the Supplier to obtain the correct Air Plates.

**Figure 17: Burner Position Reference Diagram**

**Table D: Burner Set-up – Install the Required Air Plate in the Correct Burner**

<table>
<thead>
<tr>
<th>Burner Model No.</th>
<th>Branch Set-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Burner Air Plate [Part No.] required for each Position</td>
</tr>
<tr>
<td></td>
<td>Position 1</td>
</tr>
<tr>
<td>PREMIER VS-VH02</td>
<td>VS084</td>
</tr>
<tr>
<td>PREMIER VS-VH04</td>
<td>VS088</td>
</tr>
<tr>
<td>PREMIER VS-VH06</td>
<td>VS092</td>
</tr>
<tr>
<td>PREMIER VS-VH08</td>
<td>VS096</td>
</tr>
<tr>
<td>PREMIER VS-VH10</td>
<td>VS100</td>
</tr>
<tr>
<td>PREMIER VS-VH12</td>
<td>VS104</td>
</tr>
</tbody>
</table>
Figure 18: Air Plate Change-Out Procedure

1. Remove Two Screws from Door Panel of Burner
2. Open Door Panel of Burner
3. Remove Filter from Burner
4. Locate Air Plate
5. Remove Two Screws and Change-Out Air Plate
6. Reassemble all other Burner Parts in reverse order (Air Plate Screws (2), Filter, Door & Door Screws (2))
4. Install each Burner. Ensure the gasket is properly in place, a small amount of contact cement will hold the gasket. **Position the Burner completely to the back of the installation slot** as shown in Figure 19. Ensure that little or no Tube is in view thru the Viewing Glass/Window.

5. Fasten the U-bolts but do **NOT** over tighten as it will damage the Combustion Tube.

**Figure 19: Burner Installation**

Burners are now ready for Optional Combustion Air Supply connection(s) as necessary.

Burners are now ready for Electrical System connection(s).

Burners are now ready for Gas Supply System connection(s).
INSTALLATION – PART 1

Secure Burner With U-bolts

Burner Position #1

Burner Position #2

Secure Burner With U-bolts

J-bolt

Air Flow Direction

To Tailpipe

Install J-bolts only in the Hanger immediately following a Burner from the Front of each Burner. Ensure there is a Hanger a Max. of 8” (20.3cm) from the Front of each Burner.

Figure 20: View of System after Installation of Burners
D - Reflectors

1. Install Reflectors after any Tube Couplings and J-bolts they cover have been installed. (For ease of installation it is suggested to install Burners before the Reflectors; however it is possible to do the reverse.)

*If the System Plan includes Bottom Shields these MUST be put on before the Reflectors as there will be limited access afterwards. For details see Section E- Optional Shield Equipment.

2. Begin the first Reflector after a Burner with an End Cap about 3” (7.6 cm) downstream of the Burner as shown in Figure 21 & Figure 22. Install the End Cap using #8 x 3/8” screws. Leaving space in the Reflector run allows unimpeded installation and servicing of the Burner.

3. Install Reflector Brackets. Place one at each Reflector overlap position and one in the middle of each 10 ft (3 m) Reflector length. Secure the Brackets loosely with #8-32 x 1-1/4” screws. Tighten only the screws for Brackets in the centre of alternating Reflectors & at every second overlap location. The remaining Reflector Bracket screws are left loose to accommodate system movement / expansion. Refer to Figure 21 below and to Figure 9 for a visual of which screws to tighten and which to leave loose.

Figure 21: Reflector End Cap & Bracket Detail
INSTALLATION – PART 1

Figure 22: View of System after Installation of first Reflector
4. Continue to slide the Reflectors into place within the Tube/Reflector Hanger up to the next Burner position. Overlap the Reflectors as shown in Figure 9 and Figure 24.

**DO NOT** install Reflectors like roofing shingles, by overlapping the same end of the reflector every time. This will cause damage once the system heats up and components start to expand.

5. When approaching successive Burner locations, ensure the Reflector is as far under the Burner (close to the Burner mounting hole) as possible, as shown in Figure 23. *Install an End Cap using #8 x 3/8” screws on the open end of the Reflector which will be under the Burner at the end of the Reflector run.*

*Burner Reflectors* are for use instead of End Caps. If Burner Reflectors, for Continuous Reflector runs, are required by the System Plan please refer to Section E- Optional Shield Equipment for alternate Reflector installation details.

**Figure 23: Standard Reflector & Burner Relative Positioning**

Place Reflectors as far under Burner housing as possible.

6. Stop the Reflector run as per plan or when reaching an Elbow or Tee and install an End Cap at the end of the Reflector run using #8 x 3/8” screws.

*When using the optional Corner / Mitered Reflectors refer to Figure 27 in Section E- Optional Shield Equipment, for details on how to assemble Reflectors sections instead of installing End Caps.*
Figure 24: View of System after Installation all Reflectors

- Tighten Reflector Bracket screws (#8 x 32" x 1-1/4") on every second Reflector & overlap ONLY.
- Fasten End Caps with screws.
- Tighten Screws
- Loose Screws
- Air Flow Direction
- CR024 Reflector Brackets
- CR001 Reflectors (overlap approx. 4"

Overlap Reflectors as shown

OVER
UNDER
OVER

Air Flow Direction
E - Optional Shield Equipment

Bottom Shields

Bottom Shields do not need to overlap. Each 5 ft (1.5 m) section is held with two Support Brackets. Secure each of the Support Brackets around the Tube and attach to bottom shields with two #8 x 3/8” screws. Refer to Figure 25 below for reference.

Figure 25: Bottom Shield Installation Detail

Burner Reflectors

Burner reflectors are used to maintain a continuous reflector surface along the length of the heat exchanger instead of ending & restarting reflector runs with End Caps at each burner location.

Burner reflectors are installed after Burner installation, and before / during assembly of the main Reflector run. All pieces are connected using #8 x 3/8” Screws. The Sidepieces and End Sections are installed first to create a base to secure the Burner Reflector sections to. Overlap the Burner Reflectors with Standard Reflectors; secure the Reflectors together with Support Brackets. Refer to the sequence of images in Figure 26 for more detail.
Figure 26: Burner Reflector Installation Sequence Details

1. Install screws through one Side Segment into one End Cap

2. Position under Burner

3. Attach second End Cap to first Side Segment

4. Attach second Side Segment to both End Caps

5. Secure one Burner Reflector Section on top of the Base

6. Base of Burner Reflector is now assembled

7. Finished

Secure the second Burner Reflector Section on top of the Base

Overlap with main Reflectors and secure each in-place with one Bracket and 2 Screws
**Corner / Mitered Reflector**

Corner / Mitered Reflector Kits are used above elbow locations instead of stopping and restarting a reflector run to accommodate the elbow. Secure the Mitered Reflectors together using the Two (2) Corner Brackets as shown in Figure 27. Also insert #8 x 3/8” screws at each ‘tab’ location along the top of the Reflectors.

![Figure 27: Optional - Corner (Mitered) Reflectors](image)

**Side Reflectors**

Side Reflectors are 124” (3.15 m) long. Fasten one Side Reflector per main Reflector tightly with #8 x 3/8” screws spaced about 18” (0.5 m) apart. Install three (3) **Side Reflector Brackets** per Side Reflector, spaced about 48” (1.2 m) apart, using #8 x 3/8” screws. DO NOT tighten screws where Reflectors overlap. Refer to Figure 28 on the following page for details.
Install **Side Reflector Retainer Clips** when connecting / overlapping Side Reflectors. Side Reflectors should be independent of each other. They should overlap approximately 2-4” (5-10 cm) but with no physical connection between them. This will allow for movement with thermal expansion of the Tube & main Reflector.

**Figure 28: Side Reflector Installation Detail**

![Side Reflector Installation Diagram](image)

- Notch the Side Reflector for Reflector Brackets and Hangers
- Use the hole as a guide to position Side Reflector. The Side Reflector edge must be visible through the hole at room temperature.
- Screws to be installed from inside of Side Reflector. Install screws on one end of the Retainer Clip to allow movement.
F - Deco-Grille Option

VS System heaters are approved for the addition of a Decorative Grille [Deco-Grille] either directly to the Reflector or as part of a T-bar installation where the Heater System is above the ceiling structure. Refer to Figure 29 and Figure 30 below for their respective details.

Figure 29: Deco-Grille – Mounted Directly To Heater
Figure 30: Deco-Grille – Mounted With T-Bar

- T-bar
- Reflector Hanger
- Deco-Grille Panel
- CR026
- CR027
- CR059
- Notch Side Shield as required for Reflector Brackets and Hangers
- (Cut to fit Deco-Grille)
- CR059 Side Shield
- T-bar Suspended Ceiling
INSTALLATION – PART 2

Part 2 - Vacuum Pump & Venting

Vacuum Pump

General Requirements

The Vacuum Pump (with permanently mounted motor affixed) is generally located at the height of the system, bolted to a platform or support structure that is either suspended from the ceiling members or is bolted to a column or building sidewall. The Vacuum Pump scroll is orientated for the preferred horizontal discharge, but can be rotated 90 degrees in the field for vertical discharge.

(Refer to Figure 31, Figure 32 and Figure 33 for visuals of Vacuum Pump mounting options.)

*If a lengthy heater run has a 90 degree elbow with a short run to the Vacuum Pump, consider placing the Pump somewhat off (past) the centerline of the connecting Tailpipe so that as the system grows the Flexible Boot Connection in fact improves performance.

Safety Warnings

Confirm that the Vacuum Pump’s impeller rotates in the same direction indicated by the arrow on the pump scroll. To reverse rotation, see instructions on the motor.

**WARNING** - DO NOT OPERATE THE VACUUM PUMP WHEN NOT INSTALLED
- Unguarded openings can entangle clothing and severe injury can result
- Unrestricted air flow into Vacuum Pump can cause the motor to overload

To ensure maximum safety, a vacuum proving switch is mounted near the inlet of the vacuum pump and electrically interlocked to the burner power circuit. No fuel gas can flow or ignition begin before the vacuum proving switch has established the presence of a blower induced vacuum.

See the “Electrical Connections” section for details on wiring the switch.
A - **Vacuum Pump Mounting**

1. Install Vacuum Pump as per designed system mounting location and position.

2. Ensure that mounting supports are sufficient to withstand the weight and vibration of the Vacuum Pump and Ventilation System. Welded link chain with a working load limit of at least 200 lbs. (91 kg) is recommended for mounting vacuum pumps only.

3. Install using the Vacuum Pump Mounting Kit if purchased. (Chain & threaded rods for ceiling mounting are NOT included in package.)

4. Ensure elevation of Inlet will allow for the alignment of the Tubing with a downward slope of ¼” per 10 ft (7 mm per 3 m) towards the Vacuum Pump.

5. Ensure that the isolators are placed between the Pump housing and the mounting supports to reduce vibration transfer to the structure.

See Figure 31, Figure 32 or Figure 33 respectively for mounting type details.

**Figure 31: Column Mounting – Recommended Pump Suspension**

![Diagram of column mounting with pump suspension](image)
Figure 32: Side Wall Mounting - Recommended Pump Suspension

Figure 33: Ceiling Mount - Recommended Pump Suspension
**Venting**

The Premier VS-VH System is approved for both Sidewall (Horizontal) and Roof (Vertical) Venting.  
(Refer to Figure 34 and Figure 35)

**General Requirements**

Venting must comply with the *National Fuel Gas Code*, ANSI Z223.1/ NFPA-54 in the USA and  
CAN/CGA B149.1/B149.2 Installation Code in Canada.

**Note**: ANSI Z223.1 specifies a minimum 4 ft (1.22 m) horizontal vent terminal clearance from gas  
and electric meters, regulators and relief equipment (see clause 1/31/3-m4).

**Items Common to both Codes:**
(Always check for changes to Code – list is for example only)

- Horizontal discharge must be not less than a specified distance above grade
- Vent must not terminate within a specified distance below, horizontally from, or above any  
  window, door or gravity opening to a building.
- Discharge must be at least a specified distance from any opening through which vent gases can  
  enter a building.
- Venting must terminate beyond any combustible overhead and at a height sufficient to prevent  
  blockage by snow.
- Venting through a combustible wall requires an approved thimble.
- Vent should extend beyond wall surfaces to avoid splash-back condensation.
- Corrosion resistant materials should be employed for venting.

**General Installation Notes**

- Never connect venting to a chimney flue serving a separate solid-fuel burning appliance.
- Rigid, spiral wrap, corrosion resistant ducting is recommended to facilitate leak-proofing the  
  system. Venting runs over 25 ft (7.6 m) in length may need to be insulated.
- Always install venting with a down-slope of at least ¼” per 10 ft (7 mm per 3 m) towards the  
  Vacuum Pump location.
- Ensure that ducting is well suspended to avoid low spots where condensate can gather.
- Seal ALL joints using higher temperature Silicone Sealant. (RTV Silicone)
System Requirements

**Horizontal Venting:**

*Material:* Minimum 24 gauge, GALV, single wall Pipe

*Size:* 4" or 6" dia. as per Vacuum Pump Outlet

*Sealant:* RTV Silicone

*Fasteners:* Minimum of Two (2) sheet metal screws #8 x 3/4" per joint.

**Table E: Size Conditions for Horizontal Exhaust Venting**

For specific part numbers of wall vent connection pieces see Figure 34 OR the listing in the PARTS section of this manual.

**Vertical Venting:**

- For Vertical Venting refer to ANSI Z223.1 and CAN/CGA B149.1 for Fan Assisted Appliances.
B - Venting Connections

1. Install Ventilation system pipes, etc. as per design / conformance with required Codes and connect with Vacuum Pump Outlet. Ensure that there is a minimum of 2” (5 cm) between the Vacuum Pump outlet and the first rigid section of the Ventilation piping to avoid mechanical contact between the two. Use the Silicone Connector Boot to connect the Vent Pipe to the Vacuum Pump Outlet. (Refer to Figure 34 or Figure 35 respectively for mounting type details.)

Figure 34: Side Wall Mounting- Recommended Venting (Horizontal)

![Figure 34: Side Wall Mounting- Recommended Venting (Horizontal)](image)

Figure 35: Ceiling Mounting - Recommended Venting (Vertical)

![Figure 35: Ceiling Mounting - Recommended Venting (Vertical)](image)
C - Additional Pump Connections & Equipment

1. Connect the Reducer to the end of the Common Tailpipe using a 4” Butt Joint Clamp. Ensure a minimum of 2” (5 cm) clearance between the Reducer and the Pump Inlet.

2. Install the Flexible Boot Connector between the Reducer and Pump Inlet, to reduce vibration and noise transmission, using a gear clamp at either end, as shown in Figure 36.

3. Seal all joints and seams using high temperature Silicone Sealant (RTV Silicone).

4. Where Condensing System designs are specified, a Condensate Drain may be installed as shown in Figure 37. Ensure the connection to the Drain Pipe is flexible to allow for system movement / expansion during operation, and that an appropriate Neutralization Device is installed as required.

Figure 36: Tailpipe to Vacuum Pump Connections

Figure 37: Condensate Drain Detail - Optional
Part 3 - Optional Combustion Air Supply

An air supply at atmospheric pressure of 40 CFM per 100,000 BTU/hr to each Burner and the end of each Radiant Branch (at the End Vent Cap) is usually sufficient.

Under certain circumstances of very dirty or wet environments, or extremely negative building pressure, a Combustion Air Supply System that is connected to the fresh air outside the building may be recommended. The Combustion Air Supply System must be designed with accepted HVAC design methods to ensure adequate supply of air to each Burner and Radiant Branch. This Combustion Air can be supplied using a Blower. Supply at the Burner must be at atmospheric pressure therefore it may be necessary for the Installer to insert Damper Couplings to allow adjustment of pressure just before the connection to each Burner and at the end of each Branch. The Blower must be electrically interlocked with the Vacuum Pump, details can be found in “Electrical Connections”.

A - Combustion Air Supply Duct Connections

1. Install Blower if required.

2. Install Combustion Air Supply ductwork and Damper Couplings as required.

3. Each Burner can be fitted with a 4” dia. fitting to accept 4” dia. Type C-Duct or 4” PVC pipe. Provision for thermal expansion of the System must be made when considering Combustion Air Supply Ducting. Ensure that the System movement / expansion does not restrict the supply of fresh air to the Burners or the Radiant Branches. (Refer to Figure 38 for clearance requirements)

As required, connect the Supply Ductwork in the same manner as for the Burner. (Refer to Figure 38 for details), **DO NOT** remove the End Vent Cap from the Radiant Branch to make this connection.

**Figure 38: Outside Combustion Air Detail**

* Dampers are to be provided by Installer, as necessary, to obtain atmospheric pressure at the Burner(s)
Part 4 - Gas Supply System

General Requirements

Supply Lines
The Gas Supply Meter and the Supply Service must be sufficiently large to supply gas to the total building gas load including the heating equipment. Additionally, the gas distribution piping must be designed according to local and national ordinances. Generally, systems designed with a maximum ½” W.C. total pressure drop (low pressure) meet this requirement.

Gas supply pipe sizing must be in accordance with the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the US and CAN/CGA B149.1 and B149.2 Installation Codes in Canada.

A 1/8” NPT plugged tap must be installed in the Gas Line connection immediately upstream of the Burner farthest from the Gas Supply Meter to allow checking of system gas pressure.

A Gas Shut-off Valve must be installed parallel to EACH Burner’s Gas Inlet connection.

Before connecting Burners to the Gas Supply System, verify that high pressure testing of the Gas System has been completed. Burners must be isolated from any pressure testing in excess of ½ psi (3.5 kPa). Failure to comply may expose the Burner components to damaging high pressure, requiring replacement of key components.

Flexible Gas Connector Lines

In Canada: Only use Type I Hose Connector that is (a) certified as being in compliance with the Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1; and (b) of a length of 36”± 6” (90 ± 15 cm).

In the United States: The Flexible Metallic Connector Hose must be certified for use on a Radiant Tube type Infrared Heater per the Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10.

Failure to install the Gas Connection in the approved manner will result in a hazardous and potentially deadly situation due to the movement of the Heat Exchanger System and the Burners in the normal course of operation.

- Gas Flex Line Connector must be ½” dia. x 36” (90 cm) long

Installation or repair of this heater should only be done by personnel qualified for the installation of powered gas appliances.

(Certified by the local or national regulating body)
A - **Flexible Gas Connector Line**

A Flexible Gas Connector of approved type & size must be installed as shown in Figure 40 and Figure 39, in one plane, and without sharp bends, kinks or twists. A smooth loop of approximately 12” (30 cm) in diameter is best. Refer to Figure 40 for examples of correct and incorrect positioning.

---

**Figure 40: Installation Position Instructions**

**CORRECT POSITIONS**

- 3” (7.62 cm) Max. Displacement
- 12” (30 cm) Vertical (As Shown Below)
- Alternate Positions Okay

**INCORRECT POSITIONS**

- Wrong
- Wrong
- Wrong

---

**Figure 39: Connector Installation Details**

**WARNING:** CONNECTOR MUST BE INSTALLED IN "[ ]" CONFIGURATION. USE ONLY THE 36” (90 cm) LONG CONNECTION OF ½” OR ¾” (12.7 OR 19 mm) NOMINAL ID THAT WAS FURNISHED WITH THIS HEATER.
Part 5 - Electrical Connections

General Requirements
If electronic components are to be installed in an area that is subject to water (drips, spray, rain etc.) then sufficient means shall be provided by the Installer to protect the components from water ingress.

Ensure that all Electricity to the Supply locations involved has been ‘disconnected’ and ‘locked out’ as per local and national safety requirements before proceeding with any part of the Electrical installation.

General Wiring
All field wiring and connections must be in accordance with the National Electric Code, ANSI/NFPA 70 in the US, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

All heaters must be connected and electrically grounded in accordance with the National Electric Code, ANSI/NFPA 70 in the US, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

Thermostats
Preference is to have each Branch as a separate Heating Zone with a separate Thermostat for better control of heat levels and fuel usage.

Thermostats must be located/ mounted within the operating heat envelope of the Radiant Line Branch being controlled. Thermostats must be protected / shielded from direct ‘line of sight’ with the Radiant Tubing & Reflectors.

Control Methods & Devices*

1. Single Thermostat: Entire system operates as one Heating Zone, ON or OFF using one Relay to control the Vacuum Pump, Vacuum Switch and Burner Power.

2. Multiple Thermostats: System Branches operate as multiple individual Heating Zones which can be separately controlled ON or OFF. Burners are controlled ON / OFF by the Thermostat they are wired / connected to using one of the following control devices:
   a. Relays (Two)- 2 Thermostats - Hardwired control of Vacuum Pump & Burner Power depending on individual Thermostat status change.
   b. Premier Control Panel- up to 6 Thermostats - Local Panel control of Burner Power & Vacuum Pump with options for response to Thermostat status change.
   c. SRP Accu-Rate™ (Modulating Control System)- 2 Systems & up to 4 Thermostats per System - Remote / Local control of Burner Power & Vacuum Pump (and optional Modulating Dampers) with options for various Thermostat status change response types.

*Refer to their respective OEM Manual when electrically wiring ALL Control Devices
General Requirements

A - Burners

Maximum current draw is 0.2 A per Burner. Burners operate on 120 VAC, 60 Hz. Internal Burner wiring between the transformer, gas valve, etc. has been completed by the manufacturer as shown in Figure 41 and in the Wiring Diagram located on the inside of the panel door on the Burner Cover. Burners are connected via a standard three-prong plug (grounded) which has a Power Cord length of 3 ft (90 cm) and extends from the back of the Burner.

Any repair / replacement of the manufacturer’s wiring must have a minimum temperature rating of at least 105°C and supply circuit wiring shall have a minimum size of 18 AWG.

Figure 41: Burner Wiring Diagram
B - **Fresh Air Blower Interlock**

If a Blower is installed to achieve the 40 CPM per 100,000 BTU/hr of Fresh (Combustion) Air Supply requirement then an ‘interlock’ connection must be made between the Blower and Vacuum Switch (and therefore the Vacuum Pump).

1. Mount the Vacuum Switch and make the connections to the Blower as required. (See Figure 42 below for details)

   *Ensure that field wiring maintains the required clearances when being routed near equipment.*

*Figure 42: Fresh Air Blower Connection Diagram*
C - **System Wiring Connections**

1. Ensure that field wiring maintains the required clearances when being routed near equipment.

2. Mount ALL Electrical components as required by Code(s) and system layout / plan.  

   **Reminder:** Ensure that all Electricity to the supply locations involved has been ‘disconnected’ and ‘locked out’ as per local and national safety requirements before proceeding with any part of the electrical installation.

3. Mount the Thermostat(s) as per plan & as described on Page 54. Wire the Thermostats into the system Relay(s) / Control Panel as shown in Figure 43, Figure 44 or 45, 46 respectively and according to the device OEM Manual.

4. Mount the Electrical Power Outlets (120 VAC, 60 Hz, 0.2 A) for each Burner. Outlets are required to be within reach of the Burner Power Cord while maintaining the minimum clearances around the equipment.

5. Wire the Electrical Power Outlets to the Relay(s) / Control Panel according to the device OEM Manual: as required for the Heating Zone system Plan/Layout.

6. Mount / position the Vacuum Switch onto the Radiant System as shown in Figure 36. Connect the Vacuum Switch to the Vacuum Pump and the Relay(s) / Control Panel as shown in Figure 43, Figure 45, 46 and according to the device OEM Manual.

7. Depending on System layout, wire the Modulating Damper controls to respective panel(s) as per the device OEM Manual(s) as required.

8. Connect the Electrical Power Supply to the Relay(s) / Control Panel and all other equipment as shown in Figure 43, Figure 44, 45 or, 46 and according to the device OEM Manual.

9. Test all connections / wires as necessary.  

   **DO NOT** energize Relay(s) / Control Panel with Electrical Power until it is time to complete the COMMISSIONING of the System.

10. Confirm that the Vacuum Pump’s impeller rotates in the same direction indicated by the arrow on the pump scroll. To reverse rotation, see instructions on the motor.

---

**WARNING - DO NOT OPERATE THE VACUUM PUMP WHEN NOT INSTALLED**

- Unguarded openings can entangle clothing and severe injury can result
- Unrestricted air flow into Vacuum Pump can cause the motor to overload
Figure 43: Single Zone with One Thermostat Wiring Diagram

CAUTION:
POWER ON = LIVE VOLTAGE TO:
BROWN (2) WIRE
- USE WIRE NUT TO AVOID GROUNDING & EXPOSURE OF LIVE WIRE
Figure 44: Single Zones with one 24V Burner Relay - Wiring Diagram
Figure 45: Two Zones with Two Thermostats and 24 V Burner Relay- Wiring Diagram
INSTALLATION - PART 5
Figure 47: Control Panel Wiring Diagram (4 Zones)

* This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your SRP Representative for more details.
Figure 48: SRP Control Panel Wiring Diagram with VFD (Optional One Stage, 3 Zones)

* This is ONE possible set-up for the SRP Control Panel with a Variable Frequency Drive (VFD), other set-ups are available, see OEM Instructions and / or your SRP Representative for more details.

**NOTE: VFD is used for a single speed motor control only**
* This is ONE possible set-up for the SRP Control Panel with a Variable Frequency Drive (VFD), other set-ups are available, see OEM Instructions and / or your SRP Representative for more details.
COMMISSIONING

Part 1 - Installation Checklist

Before proceeding with the start-up of the system, review the list of items below to ensure proper operation.

- Close all open ended “S” hooks and turnbuckles to avoid unlocking chain with inadvertent contact

- Verify that the Burners are correct for the fuel being burned. The rating plate listing this information is located on the Burner housing, check this against your site plans.

- Burner Air Plates are position dependent. The Burner ‘as shipped’ may be located at the furthest point of each Radiant Branch, Position #1. For proper operation, ensure that the Air Plate has been changed out on any Burner which will not be in Position #1. Make sure to reference the Burner Position with the Air Plate Part Numbers in Table D.

- Burners should be mounted with the Burner casting as far back in the Tube opening as possible. Ensure that little or no Tube is in view thru the viewing window.

- Ensure that the End Vent Cap is oriented with the ¼” test hole at the 12 o’clock position and that it has been secured to the end of each Branch with a #8 x 3/8” screw.

- If you have both hot rolled Tube (black & shiny) and heat-treated aluminized steel Tube (matte gray), ensure that the heat-treated aluminized Tube is used in the Tailpipe section of the system.

- Ensure that Tubes are fully inserted in the Couplings and tightened with band clamp hardware at the 10 or 2 o’clock position. Tighten band clamps alternately to prevent buckling of the Coupling sleeve.

- Ensure that each Branch has a Damper Coupling at the end of the Radiant length, as well as one at the Vacuum Pump. If the system is symmetrical, one Damper along the Common Tailpipe may be used. (See the System Plan for intended Damper locations.) Single Rate Systems will use standard Manual Dampers while Modulating Rate Systems will use Motorized Dampers.

- Ensure that Reflectors are properly overlapped and that every second overlap joint is screwed together, as shown in Figure 9. The remaining joints are left loose. This will allow the Reflectors to ‘telescope’ with the thermal expansion of the System.

- Visually confirm that the Vacuum Pump’s impeller rotates in the same direction indicated by the arrow on the pump scroll. To reverse the rotation, see instructions on the motor.

- Ensure that EACH Flexible Gas Connector is the correct size (½” Ø x 36”) and is installed in a smooth arc with no kinks as shown in Figure 40 and Figure 39.

- Purge Gas Lines of all air.

- Verify the Wiring & that the Electrical Power Supply is connected but remains turned OFF.
**COMMISSIONING**

**Part 2 - Initial System Power Test**

*With the individual gas valves to each burner ‘Shut off’ perform the following:*

1. Ensure Gas Supply is turned OFF. (Open main gas valve and ensure that no gas is flowing through the gas meter [dial test].)

2. Verify that lock-up gas pressure is not above 14 in. W.C.

3. Set all thermostats below room temperature and turn ON main power – no part of the System should be energized.

4. Check each Radiant Branch in each Zone in sequence by turning up the appropriate Thermostat. In each case the Vacuum Pump should turn on and after the pre-purge time, the Burners in that Zone should attempt to light.

5. Troubleshoot as necessary to get the System operational. (See the Trouble-Shooting section of this manual for more detailed information & helpful notes.)
Part 3 -Balancing the System Vacuum

NOTE: The Premier VS-VH burner is a variable rate appliance. Vacuum Pump setting must be accurately adjusted to ensure Burners are operating at the specified design input.

1. Turn ON the Electrical Supply but NOT the Gas Supply (remains turned OFF).

2. Allow the system to run without Burners operating.

3. With a manometer check the vacuum at the End Vent Cap of the longest Branch. (Refer to Figure for manometer positioning details.)

4. Adjust the Damper that is installed in the Tailpipe of the same Branch to obtain the Vacuum readings according to Table F below. (In Systems that are “Symmetrical” there will be only one Damper along the Common Tailpipe.) The setting maybe within $+0.75$ to $+0.50$ in. W.C. at this time. Mark the Damper positions for future reference.

5. Proceed similarly until each individual branch in the system is balanced / adjusted.


7. Turn ON the Gas Supply.

8. Turn up the Thermostat(s) to start the System and let it run (with Burners operating) for at least 30 minutes.

9. With a manometer check the Vacuum at the End Vent Cap of the longest Branch. (Refer to Figure 50 for manometer positioning details.)

10. Adjust the Dampers again (Caution: dampers are now hot adjust with caution) as required to obtain the vacuum readings within $+0.1$ to $-0.5$ in. W.C. of the settings in Table F. The Burners in this Branch should now be firing at the appropriate rate.

11. Proceed similarly until each individual Branch in the System is balanced / re-adjusted.

12. Mark the Damper position and lock in place when the System has been balanced. (Lock in place by putting a screw through the handle to hold it against the Sleeve / Tube.)

13. Turn the Thermostat(s) down again to shut off the System.

Note: Vacuum Settings apply regardless of the number of Burners being used in the System Branch.

Your System is now ready for use.
COMMISSIONING

Figure 50: Manometer Placement Diagram

Table F: Vacuum System Settings for Relative Burner Rates

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Insert manometer 12" from the end of the End Vent Cap in order to establish recommended end vent vacuum settings H = Inches W.C. (see Table B)
**Operation**

**Manual Set-Up**

1. Set the ambient temperature to be maintained at / by each Thermostat.

2. Ensure Electrical Power and Gas Supply are turned “ON”

**Automatic Operating Sequence**

**Start-up**

1. Thermostat calls for heat and energizes the transformer relay.

2. Transformer relay contacts close and the Vacuum Pump motor is energized.

3. If the Vacuum Switch finds no fault, power is supplied to all the Burners in the Zone(s) in which the Thermostat(s) are calling for heat.

4. At the Burner, the control module waits for the pre-purge period and then opens the fuel valve and the spark igniter is energized. Time delay in the control module causes the Burners to light sequentially.

5. When the flame is established, the flame sensor signal returns to the control module and the ignition spark ceases.

6. If the flame is not established, the control module will re-try the ignition cycle again in 30 seconds.

7. Should ignition continue to fail, the control module will make 3 ignition attempts every hour.

8. If it does not, or if it continues to “not establish a flame”, Trouble-Shoot to find the cause.

9. System operates until Thermostat(s) temperature setting is reached.

**Shut-down**

1. When the Thermostat has been supplied sufficient heat, its contacts open and de-energize the transformer relay.

2. The contacts of the transformer relay open and Electrical Power to the Burners and Vacuum Pump is disconnected.

3. A post purge cycle can be provided when a Control Panel is supplied.

4. System remains ‘OFF’ until ambient temperature falls below the Thermostat(s) setting.

5. System cycles through Steps 1 to 10 on a continuous basis until Power is turned OFF.
MAINTENANCE & TROUBLE-SHOOTING

General Safety Reminders

- Ensure Gas Supply and Electrical Power are shut OFF before commencing maintenance work. *Exception: Checking ignitor flames will require the system to be operational.*

- Keep area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

- **Caution:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

- **Verify proper operation and set-up (as listed in the Commissioning section) after servicing.**

Annual Maintenance Recommendations

Annual maintenance, **prior to** the heating season (Fall / Winter) is recommended.

*Part 1: Each Burner*

1. Remove Burner and inspect burner face for soot or cracks.

2. Visually inspect electrode. Replace if there is excessive oxidation, erosion or cracks in the ceramic insulators. Set spark gap at 0.125” (3.175 mm) and clean the electrodes.

3. Verify that flame observation glass is clean, free of cracks and airtight.

4. Inspect air filter. Change as necessary.

5. Observe each flame through the flame sight glass.

6. Flame may flutter once or twice at ignition but should settle promptly.

7. Flame should extend straight out from Ignitor

8. Sense rod (and ignitor) will glow bright red-orange on all Burners.

**Note:** Dirty air filters will restrict combustion air flow into the burner housing, creating a slight negative pressure environment for the zero governor (and other controls). Consequently, while flame characteristics and balance will not change appreciably, overall burner rate will decline. Very dirty filters will cause the flame to become more rich (yellow and soft). Filters can be cleaned once with reverse air pressure, but it is generally more cost effective to merely replace them.

For VS Air Filter includes frame (Bulk Qty. 20) use part No. VH001B
For VS Filter Media Kits (Bulk Qty 24) use part No. VH053B

*(Overall System maintenance requirements are found on the next page.)*
Part 2: The Vacuum Settings

1. If the Vacuum is too low, inspect the Flexible Boot Connectors on the Inlet and Outlet of the Vacuum Pump for tight connections, leaks, damage, kinks, etc.

Part 3: The System

1. Inspect the Common Tailpipe and VentPipe for soot or dirt, clean as required to avoid obstructions.
2. Check that Flexible Boot Connectors are without cracks, kinks or leaking connections.
3. Ensure that the Vacuum Pump and motor mounting bolts are tight.
4. Make a visual inspection (without dismounting) of the Vacuum Pump impeller.
5. Clean the Condensate Trap and ensure that all piping to / from the Condensate Trap allows free flow of fluid.
6. There should be no sound of leaking air around any of the various gaskets or connections.
7. Make spot checks of the interior of the Radiant Line Tubes for soot or obstructions, clean as required.
MAINTENANCE & TROUBLE-SHOOTING

Trouble-Shooting

Vacuum Pump

Vacuum Pump Fails To Run
1. Check that a Thermostat is calling for heat.
2. Check the main Electrical Power Supply, fuses or breakers.
3. Check for power to the Control Panel or Relay.

Vacuum Pump Runs, But Little to No Vacuum
1. Check the direction of the impeller rotation.
2. Are the End Vent Caps installed in all of the Branches?

Vacuum Pump Runs, But No Power to Burners
1. Check the Vacuum Switch.
2. Check voltage to Burner terminals.
3. Check Relay.
4. Check individual Burner control.

Burners

No Power to Burner
1. Check if correct Thermostat is calling for heat.
2. Check for 120VAC supply at Burner.

No Gas Supply
1. Ensure manual supply valve to the System is turned ON.
2. Ensure gas valve knob on Burner gas control is ON.
3. Check for 24V across valve terminals during ignition trial time.

Burner Does Not Light
1. Ensure spark is present during ignition trial.
   (If no, check control module & check for cracked ignitor insulation.)
2. Ensure there is gas flow during ignition trial.
3. Purge gas lines.
4. Ensure Filter is not obstructed.

Burner Does Not Stay Lit
1. Check sensor wire for continuity.
2. Measure flame signal current, it should be above 5 μA - DC.
3. Regulator adjustment may be necessary.
4. Ensure Filter is not obstructed.
### Table G: Burner Parts List

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VG010</td>
<td>ZERO GOVERNOR, MAXITROL R-500Z</td>
</tr>
<tr>
<td>2</td>
<td>VG009</td>
<td>GAS VALVE, HONEYWELL 8205M</td>
</tr>
<tr>
<td>3</td>
<td>VH002</td>
<td>VALVE GASKET</td>
</tr>
<tr>
<td>4</td>
<td>(See Table D)</td>
<td>AIR PLATE</td>
</tr>
<tr>
<td>5</td>
<td>VS022</td>
<td>COMBUSTION AIR ADAPTOR AND GASKET (AIR)</td>
</tr>
<tr>
<td>6</td>
<td>VH001</td>
<td>COMBUSTION AIR FILTER</td>
</tr>
<tr>
<td>7</td>
<td>VG001</td>
<td>MIXING CHAMBER</td>
</tr>
<tr>
<td>8</td>
<td>CH007</td>
<td>VALVE TRAIN GASKET/BURNER MOUNT</td>
</tr>
<tr>
<td>9</td>
<td>CE008</td>
<td>TRANSFORMER</td>
</tr>
<tr>
<td>10</td>
<td>CE056</td>
<td>CONTROL MODULE</td>
</tr>
<tr>
<td>11</td>
<td>CE010</td>
<td>POWER CORD</td>
</tr>
<tr>
<td>12</td>
<td>CE057</td>
<td>OPERATOR INDICATOR LIGHT (ROUND)</td>
</tr>
<tr>
<td>13</td>
<td>VH003</td>
<td>BURNER MOUNTING GASKET</td>
</tr>
<tr>
<td>14</td>
<td>VH004</td>
<td>MOUNTING U-BOLTS</td>
</tr>
<tr>
<td>15</td>
<td>CE036</td>
<td>SENSE WIRE</td>
</tr>
<tr>
<td>16</td>
<td>CE006</td>
<td>IGNITION WIRE (13 INCH)</td>
</tr>
<tr>
<td>17</td>
<td>VE002</td>
<td>ELECTRODE ASSEMBLY</td>
</tr>
<tr>
<td>18</td>
<td>VH005</td>
<td>ELECTRODE ASSEMBLY GASKET</td>
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<tr>
<td>19</td>
<td>CH011</td>
<td>FLAME SIGHT WINDOW</td>
</tr>
<tr>
<td>20</td>
<td>VG025</td>
<td>BURNER HEAD ASSEMBLY (ELECTRODE &amp; GASKETS INCLUDED)</td>
</tr>
</tbody>
</table>
### Table J: Vacuum Pumps - Main Part Numbers

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VH010</td>
<td>PUMP MOUNTING PKG.</td>
</tr>
<tr>
<td>VS010</td>
<td>VIBRATION BOOT PKG - 4&quot; for vacuum pump</td>
</tr>
<tr>
<td>VS048</td>
<td>VIBRATION BOOT PKG - 6&quot; for vacuum pump</td>
</tr>
<tr>
<td>VE020</td>
<td>VACUUM PUMP A w/ below:</td>
</tr>
<tr>
<td></td>
<td>VE032  MOTOR - 0.75 HP, 110/220 V, 1 PH</td>
</tr>
<tr>
<td>VE024</td>
<td>VACUUM PUMP A w/ below:</td>
</tr>
<tr>
<td></td>
<td>VE039  MOTOR - 0.75 HP, 208/230/460 V, 3 PH</td>
</tr>
<tr>
<td>VE021</td>
<td>VACUUM PUMP B w/ below:</td>
</tr>
<tr>
<td></td>
<td>VE030  MOTOR - 1.50 HP, 208/230/460 V, 3 PH</td>
</tr>
<tr>
<td>VE023</td>
<td>VACUUM PUMP B w/ below:</td>
</tr>
<tr>
<td></td>
<td>VE031  MOTOR - 1.50 HP, 575 V, 3 PH</td>
</tr>
<tr>
<td>VE025</td>
<td>VACUUM PUMP B w/ below:</td>
</tr>
<tr>
<td></td>
<td>VE049  MOTOR - 1.50 HP, 115/203 V, 1 PH</td>
</tr>
</tbody>
</table>

### Table I: Gas Connection Replacement Part Numbers

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG022</td>
<td>GAS FLEX CONNECTOR - 36&quot; x 1/2&quot; dia. (USA)</td>
</tr>
<tr>
<td>CG024</td>
<td>GAS FLEX CONNECTOR - 36&quot; x 3/4&quot; dia. (USA)</td>
</tr>
<tr>
<td>CG011</td>
<td>SHUT OFF VALVE - for gas flex (1/2&quot;)</td>
</tr>
<tr>
<td>CG028</td>
<td>SHUT OFF VALVE - for gas flex (3/4&quot;)</td>
</tr>
<tr>
<td>CG052</td>
<td>GAS CONNECTOR RUBBER 1/2&quot; x 1/2&quot; x 30&quot;</td>
</tr>
<tr>
<td>CG053</td>
<td>GAS CONNECTOR RUBBER 3/4&quot; x 1/2&quot; x 30&quot;</td>
</tr>
</tbody>
</table>

### Table H: Optional Wall Vent Terminal Part Numbers

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT011</td>
<td>VENT TERMINAL 4&quot; - Exterior Wall Flue (Pump A)</td>
</tr>
<tr>
<td>CT044</td>
<td>VENT TERMINAL 6&quot; - Exterior Wall Flue (Pump B)</td>
</tr>
<tr>
<td>CS006</td>
<td>WALL THIMBLE 4&quot; (Pump A)</td>
</tr>
<tr>
<td>CS033</td>
<td>WALL THIMBLE 6&quot; (Pump B)</td>
</tr>
</tbody>
</table>
## Table K: Burner Part Numbers

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VH02N-1</td>
<td>PREMIER VS-VH BURNER 20,000 BTU NAT</td>
</tr>
<tr>
<td>VH02N-2</td>
<td>PREMIER VS-VH BURNER 20,000 BTU NAT</td>
</tr>
<tr>
<td>VH02N-3</td>
<td>PREMIER VS-VH BURNER 20,000 BTU NAT</td>
</tr>
<tr>
<td>VH02N-4</td>
<td>PREMIER VS-VH BURNER 20,000 BTU NAT</td>
</tr>
<tr>
<td>VH04N-1</td>
<td>PREMIER VS-VH BURNER 40,000 BTU NAT</td>
</tr>
<tr>
<td>VH04N-2</td>
<td>PREMIER VS-VH BURNER 40,000 BTU NAT</td>
</tr>
<tr>
<td>VH04N-3</td>
<td>PREMIER VS-VH BURNER 40,000 BTU NAT</td>
</tr>
<tr>
<td>VH04N-4</td>
<td>PREMIER VS-VH BURNER 40,000 BTU NAT</td>
</tr>
<tr>
<td>VH06N-1</td>
<td>PREMIER VS-VH BURNER 60,000 BTU NAT</td>
</tr>
<tr>
<td>VH06N-2</td>
<td>PREMIER VS-VH BURNER 60,000 BTU NAT</td>
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<tr>
<td>VH06N-3</td>
<td>PREMIER VS-VH BURNER 60,000 BTU NAT</td>
</tr>
<tr>
<td>VH06N-4</td>
<td>PREMIER VS-VH BURNER 60,000 BTU NAT</td>
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<tr>
<td>VH08N-1</td>
<td>PREMIER VS-VH BURNER 80,000 BTU NAT</td>
</tr>
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<td>VH08N-2</td>
<td>PREMIER VS-VH BURNER 80,000 BTU NAT</td>
</tr>
<tr>
<td>VH08N-3</td>
<td>PREMIER VS-VH BURNER 80,000 BTU NAT</td>
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<td>VH08N-4</td>
<td>PREMIER VS-VH BURNER 80,000 BTU NAT</td>
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<tr>
<td>VH10N-1</td>
<td>PREMIER VS-VH BURNER 100,000 BTU NAT</td>
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<tr>
<td>VH10N-2</td>
<td>PREMIER VS-VH BURNER 100,000 BTU NAT</td>
</tr>
<tr>
<td>VH10N-3</td>
<td>PREMIER VS-VH BURNER 100,000 BTU NAT</td>
</tr>
<tr>
<td>VH10N-4</td>
<td>PREMIER VS-VH BURNER 100,000 BTU NAT</td>
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<tr>
<td>VH12N-1</td>
<td>PREMIER VS-VH BURNER 110,000 BTU NAT</td>
</tr>
<tr>
<td>VH12N-2</td>
<td>PREMIER VS-VH BURNER 110,000 BTU NAT</td>
</tr>
<tr>
<td>VH12N-3</td>
<td>PREMIER VS-VH BURNER 110,000 BTU NAT</td>
</tr>
</tbody>
</table>
### Table L: Main System Component Parts List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMMON COMPONENTS</strong></td>
<td><strong>SPECIALTY TUBING COMPONENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VT001</td>
<td>VS COMBUSTION TUBE, 4&quot; OD</td>
<td>CT002</td>
<td>TUBE, 4&quot; OD HR</td>
</tr>
<tr>
<td>CT001</td>
<td>TUBE, 4&quot; OD, HEAT TREATED ALUM.</td>
<td>CT012</td>
<td>TUBE, 4&quot; OD ALUMINIZED NHT</td>
</tr>
<tr>
<td>CT010</td>
<td>ELBOW, 90 DEG, 4&quot; OD</td>
<td>CT055</td>
<td>ELBOW, 4&quot; OD x 45 DEGREES</td>
</tr>
<tr>
<td>CT020</td>
<td>U-TUBE, 4&quot;OD on 10&quot; RADIUS (ROUND)</td>
<td>CT050</td>
<td>TEE, 4&quot; DOUBLE SWEP</td>
</tr>
<tr>
<td>CT021</td>
<td>TEE FITTING, 4&quot;OD SQUARE</td>
<td>CT051</td>
<td>TEE, 4&quot; SINGLE SWEP</td>
</tr>
<tr>
<td>CT022</td>
<td>CROSS, 4&quot; O.D. ALUMINIZED</td>
<td>VT0015</td>
<td>SHORT COMBUSTION TUBE VS</td>
</tr>
<tr>
<td>CR010</td>
<td>COUPLING ASS’Y 4” ALUMINIZED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VS107</td>
<td>END VENT CAP - VH</td>
<td>CT038</td>
<td>TUBE, 5&quot;OD</td>
</tr>
<tr>
<td>CH010</td>
<td>TURNBUCkLE</td>
<td>CT040</td>
<td>ELBOW, 90 DEG, 5&quot;OD</td>
</tr>
<tr>
<td>CR003</td>
<td>HANGER, TUBE &amp; REFLECTOR</td>
<td>CT052</td>
<td>TEE, 5&quot;, SINGLE SWEP</td>
</tr>
<tr>
<td>CR024</td>
<td>REF. BRACKET &amp; CLIP SET</td>
<td>CT039</td>
<td>TEE FITTING, 5&quot;, DOUBLE SWEP</td>
</tr>
<tr>
<td>CR001</td>
<td>REFLECTOR 124&quot;</td>
<td>CT056</td>
<td>CROSS, 5&quot;OD, SQUARE</td>
</tr>
<tr>
<td>CR002</td>
<td>END CAP</td>
<td>CT078</td>
<td>CROSS, 5&quot; OD, DOUBLE SWEP</td>
</tr>
<tr>
<td>CS005</td>
<td>4&quot; AIR INLET HOOD</td>
<td>CT041</td>
<td>REDUCER 6&quot;-5&quot; w/PS NIPPLE</td>
</tr>
<tr>
<td>CR015</td>
<td>DAMPER COUPLING. 4&quot; - MANUAL</td>
<td>CT042</td>
<td>REDUCER, 5&quot;-4&quot; ALUMINIZED</td>
</tr>
<tr>
<td>CR025</td>
<td>HANGER STRAP, 4&quot; OD TAILPIPE</td>
<td>CR068</td>
<td>COUPLING 5&quot; DIA</td>
</tr>
<tr>
<td>VH044</td>
<td>CONDENSATE TRAP ASSEMBLY</td>
<td>CR070</td>
<td>DAMPER COUPLING, 5&quot; - MANUAL</td>
</tr>
<tr>
<td></td>
<td><strong>OPTIONAL SHEILD EQUIPMENT</strong></td>
<td>CR029</td>
<td>HANGER STRAP - 5&quot; TAILPIPE</td>
</tr>
<tr>
<td>CR039</td>
<td>REFLECTOR KIT - MITERED 90 DEGREE</td>
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<td></td>
</tr>
<tr>
<td>VR003</td>
<td>BURNER REFLECTOR KIT</td>
<td>VT003</td>
<td>S/S COMBUSTION TUBE VS</td>
</tr>
<tr>
<td>CR018</td>
<td>SIDE REFLECTOR</td>
<td>CT030</td>
<td>S/S RADIANT TUBE</td>
</tr>
<tr>
<td>CR019</td>
<td>SIDE REFLECTOR</td>
<td>CR005</td>
<td>S/S COUPLING ASS’Y, 4&quot;</td>
</tr>
<tr>
<td>CR016</td>
<td>BRACKET ASS’Y (for SIDE SHIELD)</td>
<td>CR027</td>
<td>S/S COUPLING LINER</td>
</tr>
<tr>
<td>CR035</td>
<td>RETAINER CLIP-SIDE SHIELD</td>
<td>CR047</td>
<td>S/S DAMPER COUPLING - MANUAL</td>
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<tr>
<td></td>
<td><strong>Bottom Shield Components</strong></td>
<td>CR032</td>
<td>S/S REFLECTOR</td>
</tr>
<tr>
<td>CR017</td>
<td>SUPPORT ASS’Y (for BOTTOM SHIELD)</td>
<td>CR033</td>
<td>S/S SIDE REFLECTOR</td>
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<tr>
<td></td>
<td><strong>DECO-GRILLE Components (Suspended from Heater)</strong></td>
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<td></td>
</tr>
<tr>
<td>CR051</td>
<td>DECORATIVE GRILLE 15&quot; x 60&quot; x .5&quot;</td>
<td>CT032</td>
<td>TUBE, COATED INSIDE ONLY</td>
</tr>
<tr>
<td>CR052</td>
<td>DECO GRILLE SUPPORT 60&quot;</td>
<td>CT033</td>
<td>TUBE, COATED INSIDE &amp; OUT</td>
</tr>
<tr>
<td>CR053</td>
<td>DECO GRILLE CROSS STRAP 15&quot;</td>
<td>VT004</td>
<td>COMBUSTION TUBE VS COATED INSIDE</td>
</tr>
<tr>
<td>CR054</td>
<td>DECO GRILLE END ANGLE 15&quot;</td>
<td>VT005</td>
<td>COMBUSTION TUBE VS COATED IN &amp; OUT</td>
</tr>
<tr>
<td></td>
<td><strong>DECO-GRILLE Components (Suspended Ceiling)</strong></td>
<td>CT034</td>
<td>ELBOW 90 DEGREE, COATED INSIDE</td>
</tr>
<tr>
<td>CR026</td>
<td>DECO GRILLE PANEL 24&quot; x 48&quot;</td>
<td>CT035</td>
<td>ELBOW 90 DEGREE,COATED INSIDE &amp; OUT</td>
</tr>
<tr>
<td>CS059</td>
<td>DECO GRILLE SIDE SHIELD</td>
<td>CT036</td>
<td>TEE, 4&quot; SQUARE COATED INSIDE</td>
</tr>
<tr>
<td>CS027</td>
<td>T-BAR SHIELD</td>
<td>CT037</td>
<td>TEE, 4&quot; SQUARE COATED INSIDE &amp; OUT</td>
</tr>
<tr>
<td></td>
<td><strong>MODULATING SYSTEM COMPONENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VT013</td>
<td>MOTORIZED DAMPER 4&quot; Dia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VT014</td>
<td>MOTORIZED DAMPER 5&quot; Dia.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Stainless Steel (S/S)**
- Side Reflecter Components
- Bottom Shield Components
- DECO-GRILLE Components (Suspended from Heater)
- DECO-GRILLE Components (Suspended Ceiling)

**Coated Tubes & Fittings**
- Side Reflecter
- DECO-GRILLE Components (Suspended from Heater)
- DECO-GRILLE Components (Suspended Ceiling)

**Specialty Tubing Components**
- COMMON COMPONENTS
- SPECIALTY TUBING COMPONENTS

**Optional Shield Equipment**
- COMMON COMPONENTS
- SPECIALTY TUBING COMPONENTS

**Common Components**
- COMMON COMPONENTS
- SPECIALTY TUBING COMPONENTS
The Manufacturer warrants to the original owner that the product will be free of defects in material and workmanship as described below.

<table>
<thead>
<tr>
<th>VS-VH Vacuum System Components</th>
<th>Warranty Period (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Panel</td>
<td></td>
</tr>
<tr>
<td>Vacuum Pump</td>
<td></td>
</tr>
<tr>
<td>Burner Electrical Components</td>
<td></td>
</tr>
<tr>
<td>Cast Iron Burner Head</td>
<td></td>
</tr>
<tr>
<td>Hot Rolled Heat Exchanger</td>
<td></td>
</tr>
<tr>
<td>Aluminized Heat Exchanger</td>
<td></td>
</tr>
<tr>
<td>Hot Rolled Heat Exchanger with Control Panel</td>
<td></td>
</tr>
<tr>
<td>Aluminized Heat Exchanger with Control Panel</td>
<td></td>
</tr>
<tr>
<td>Tailpipe – Aluminized / Coated (per minimum design length)</td>
<td></td>
</tr>
</tbody>
</table>

The Manufacturer’s obligation under this warranty is limited to repair or replacement, F.O.B. its facility, of the defective part. In the case of replacement parts, the warranty period shall be the longer of the original warranty or a period of 12 months from date of purchase. In no event shall the manufacturer be liable for incidental expense or consequential damages of any kind.

This warranty does not cover any shipping, installation or other labour costs incurred in the repair or replacement of the product. No materials will be accepted for return without authorization.

This warranty will not apply, if in the judgment of the Manufacturer, the equipment has been improperly installed, unreasonably used, damaged, or modified.

This warranty will not apply to damage to the product when used in corrosive atmospheres and in particular atmospheres containing halogenated hydrocarbons. No person is authorized to assume for the Manufacturer any other warranty, obligation or liability.

THE REMEDIES PROVIDED FOR IN THE ABOVE EXPRESS WARRANTIES ARE THE SOLE AND EXCLUSIVE REMEDIES. NO OTHER EXPRESS OR IMPLIED WARRANTIES ARE MADE INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE.