

VANTAGE

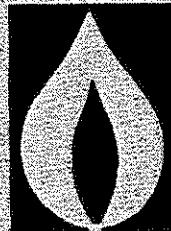
MODEL CTH-125

MODEL CTH-100

MODEL CTH-80

**INSTALLATION, OPERATION
AND SERVICE INSTRUCTIONS**

Roberts



Gordon

**A LEADER IN HEATING EQUIPMENT
FOR OVER 50 YEARS**

INSTALLER — Please take time to read and understand these instructions prior to any installation.

OWNER — Keep this manual in a safe place to provide your serviceman with helpful information if the need arises.

VANTAGE™ SPECIFICATIONS INSTALLATION, OPERATING, SERVICE INSTRUCTIONS

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INTRODUCTION

UNPACKING THE HEATER

As material is being delivered, check shipment against Bill of Lading for shortages. Also check for external damage to cartons. Shortages and/or external damage to cartons (see Standard Parts List, page 2) must be noted on the Bill of Lading in the presence of delivery trucker. The delivery trucker should acknowledge any shortages or damages by initialling this "noted" Bill of Lading.

Claims for damaged material, or shortages that were not evident upon receipt of shipment must be reported to carrier and Roberts-Gordon Sales Representative as soon as they become known.

NOTE: Packing inside burner housing must be removed before installing heater.

IMPORTANT: This heater is designed for heating non-residential indoor spaces. These instructions, the layout drawing, local codes and ordinances, and applicable standards such as apply to gas piping, electrical wiring, venting, etc., must be thoroughly understood before proceeding with the installation.

NATIONAL STANDARDS AND APPLICABLE CODES

Installation must comply with local codes and recommendations of the local gas company, and the National Fuel Gas Code, ANSI Z223.1-1988 (same as Bulletin 54).

Installation in (1) aircraft hangars must be in accordance with the Standard for Aircraft Hangars, ANSI/NFPA 409-1985 and (2) garages in accordance with the Standard for Parking Structures, NFPA 88A-1985 or the Standard for Repair Garages, NFPA 88B-1985.

ELECTRICAL GROUNDING

Burner units must be electrically grounded in accordance with the National Electrical Code, ANSI/NFPA 70-1987.

HAZARDOUS LOCATIONS

Where there is the possibility of exposure to combustible airborne materials or vapor, consult the local Fire Marshal, the fire insurance carrier or other authorities for approval of the proposed installation.

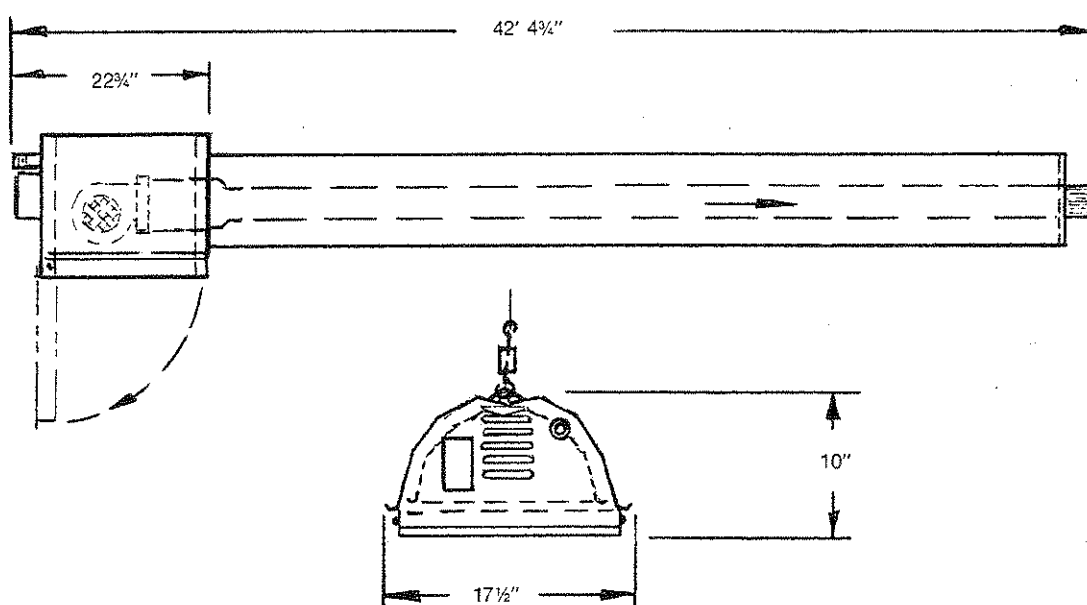
INSTALLER QUALIFICATIONS

All heaters and associated gas piping should be installed in accordance with applicable specifications and this installation made only by firms (or individuals) well qualified in this type of work. Consult local building inspectors, Fire Marshals or the local Roberts-Gordon Representative for guidance.

INSTALLER RESPONSIBILITY

VANTAGE™ heaters are installed on the basis of information given in a layout drawing, which together with these instructions and the cited codes and regulations, comprise the basic information needed to complete the installation. The installer must furnish all needed material that is not furnished as standard equipment, and it is his responsibility to see that such materials, as well as the installation methods he uses result in a job that is workmanlike and in compliance with all applicable codes.

Roberts-Gordon Factory Representatives have had training and experience in the application of this equipment and can be called on for suggestions about installation which can save material and labor.



VANTAGE™ SYSTEM DIMENSIONS
Figure 1

INSTALLATION

IMPORTANT: The type of gas appearing on the heater nameplate must be the type of gas used. Read all accompanying literature carefully before proceeding with installation. Allow for adequate clearances around air openings in heater, clearances to combustible materials, accessibility for service, combustion and ventilating air supply as specified in ANSI Z223.1-1988, National Fuel Gas Code.

CRITICAL CONSIDERATIONS

The Vantage™ is a suspended heater which requires that consideration be given to the factors that determine its stability, flexibility, safety, and satisfactory operation. Before starting installation, be sure the following requirements can be met:

- Maintain specified clearances to combustibles, and to heat-sensitive material, equipment and work stations (see Figures 2a and 2b).
- Provide approved heat-radiation shielding or barriers where needed. Refer to the National Fuel Gas Code for guidance.
- Be sure suspension system is sufficiently flexible to accommodate thermal expansion which occurs as the system heats up.
- Provide for a minimum of 24 inches of clearance between ends of the heater and building walls.
- System must be suspended pitched down (one-half inch in 20 ft.)

PLANNING

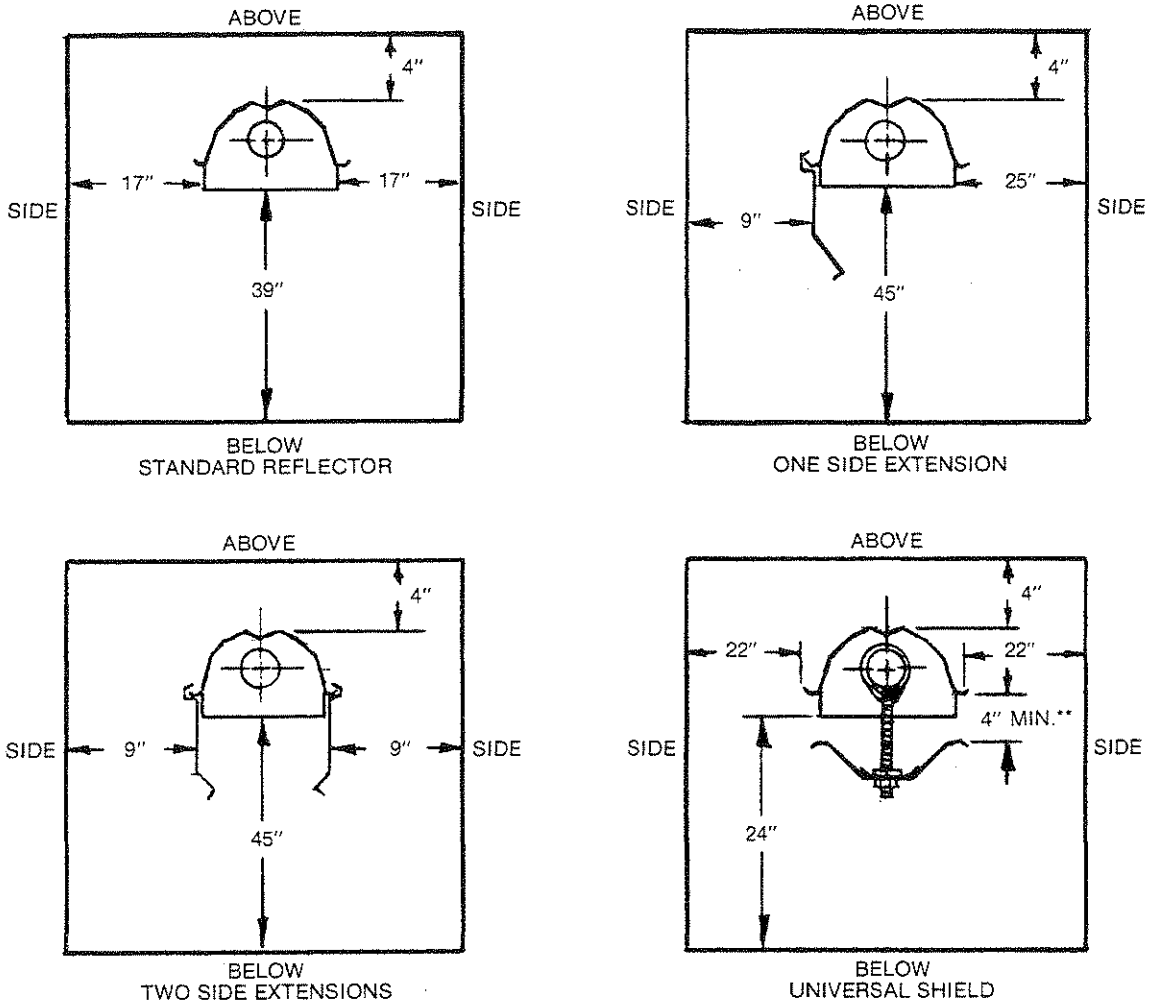
Take maximum advantage of the building upper structure, beams, joists, purlins, etc., from which to suspend the system.

There is no one correct sequence for installation of the tubing. Onsite observation will usually reveal a logical sequence.

Begin the installation at the most critical dimension. This could save time. Watch for swinging doors, overhead cranes, car lifts, etc.

Reflectors and tube could be installed as you move along. Carefully adjust system pitch at each position to level the heater (pitch down one-half inch in 20 ft. away from burner).

****WARNING:** Excessive tube temperature will result if less than four inches is used.



**MODEL CTH-80
CLEARANCE TO COMBUSTIBLES WITH
STANDARD REFLECTOR AND OPTIONAL EQUIPMENT
Figure 2b**

FIELD ASSEMBLY

Assemble the heater components as shown in Figure 3.

Install appropriate suspension hardware (see Figure 4), beam clamps, chain (rod or perforated strap) and a turnbuckle at predetermined locations. Adjustment of chain length and turnbuckle will provide uniform pitch. Weight to be supported may be figured as follows:

- tubing — 3.5 lbs. per foot
- Burner — 40 lbs. per unit

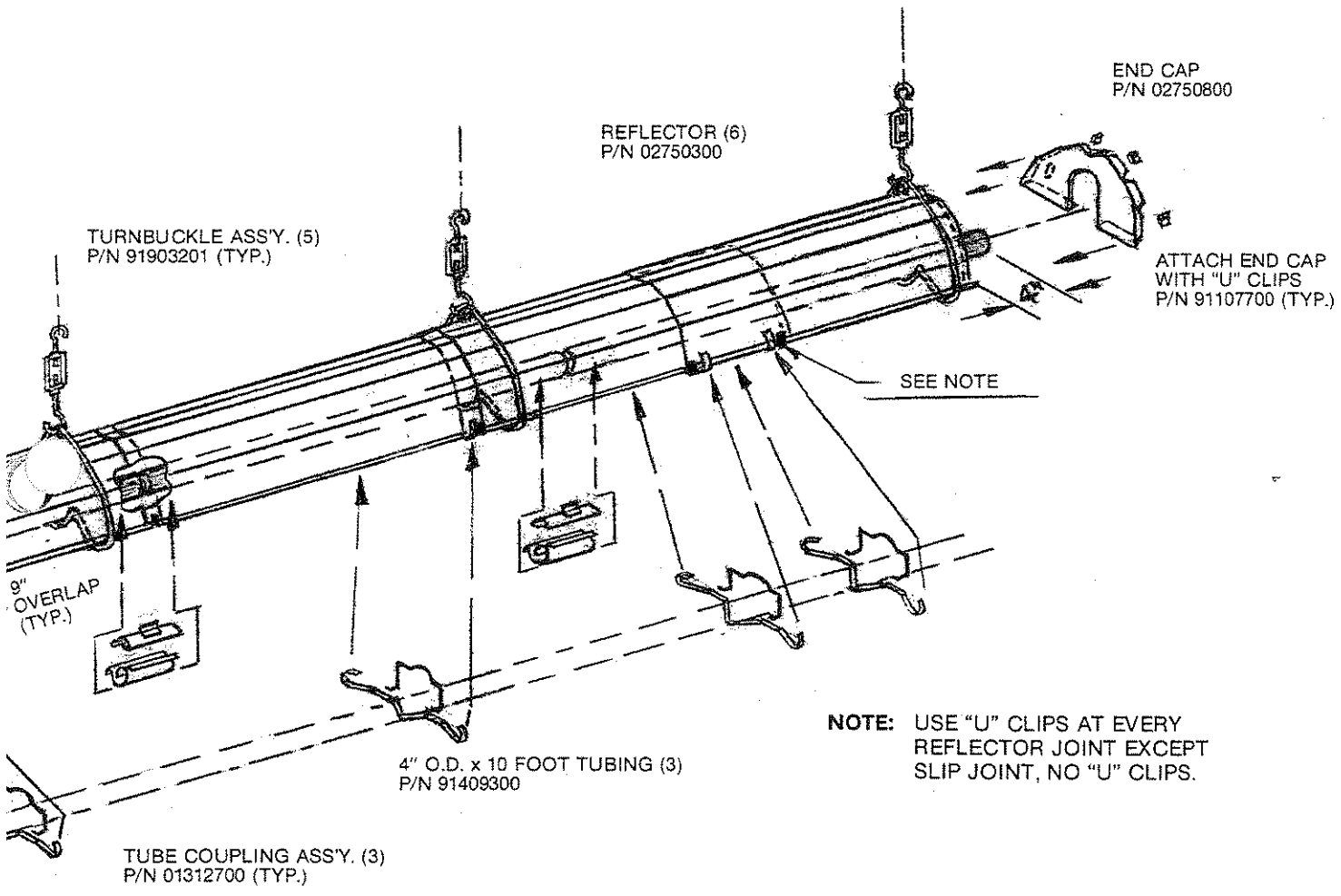
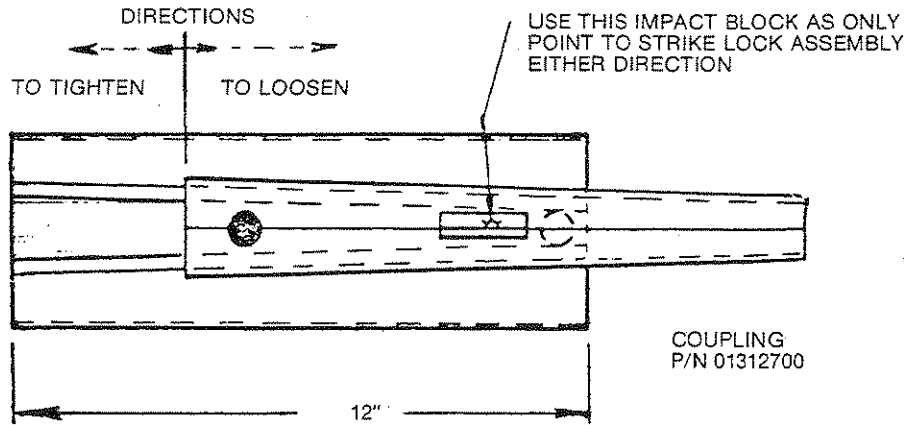


Figure 3



COUPLING DETAILS
Figure 5

IMPORTANT: This is the part of the system that is most apparent and where a neat job marks the installer as a craftsman.

To insure a workmanlike installation:

- Locate the slip joint only as shown. Reflectors at all other joints are locked with "U" clips.
- Reflector supports should be used as shown.
- Reflectors not supported by a hanger or reflector support should rest on a reflector that is supported. Provide at least a nine-inch overlap to provide for thermal expansion.
- Reflectors should be level side to side.
- Reflector end cap must be used at the flue end of the reflectors.
- Reflectors must be carefully handled to avoid finger marks and dents.
- Finger marks are best removed with window spray cleaner.

ALTERNATE ARRANGEMENTS/OPTIONAL EQUIPMENT FOR VENTING

Alternate venting configurations and optional equipment for venting are shown in Figure 6.

For horizontal venting (see Figure 6a):

- In combustible or non-combustible walls use Tjernlund VH1-4" (P/N 90502100). Follow vent manufacturer's instructions for proper installation. (Alternate vent Robert-Gordon P/N 02537800, non-combustible wall only.)
- A four-inch O.D. flue pipe, 30 feet in length is recommended. Up to 50 feet maximum may be used if insulated to prevent excess condensation.
- All flue joints should be sealed using suitable product such as General Electric RTV106 Red High Temperature Silicone Adhesive Sealant.

For vertical venting (see Figure 6b):

- A four-inch O.D. flue pipe, maximum 50 feet in length may be used as shown with an approved vent cap.
- An insulating thimble may be required to pass through combustible walls (check local codes).
- All flue joints should be sealed using suitable products (see recommendation for horizontal venting).

For vertical venting using a draft hood (see Figure 6c):

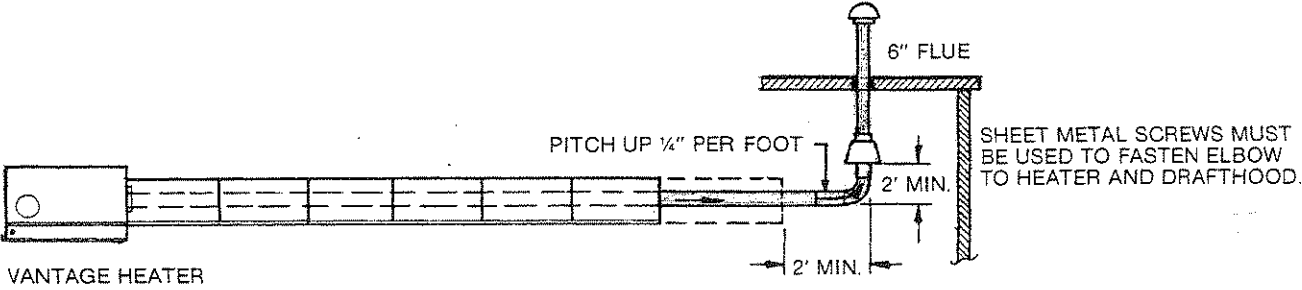
- Refer to ANSI Z223.1-1988 (NFPA No. 54) for heights and vent sizes recommended for proper venting. (Check local codes for additional information.)
- Minimum six-inch O.D. vent is recommended.

For common venting (see Figure 6d):

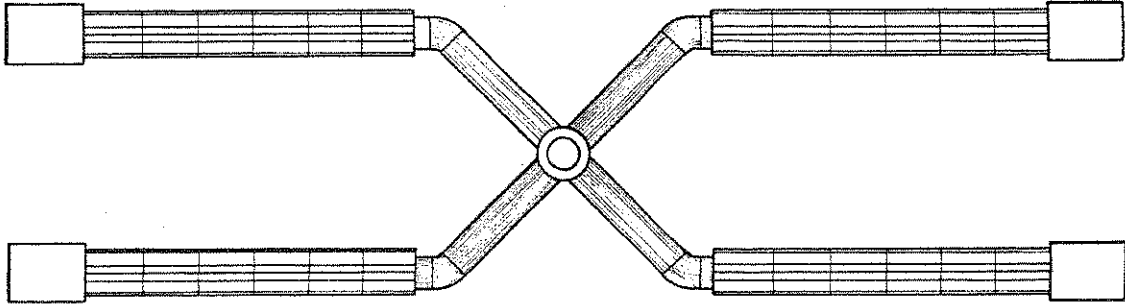
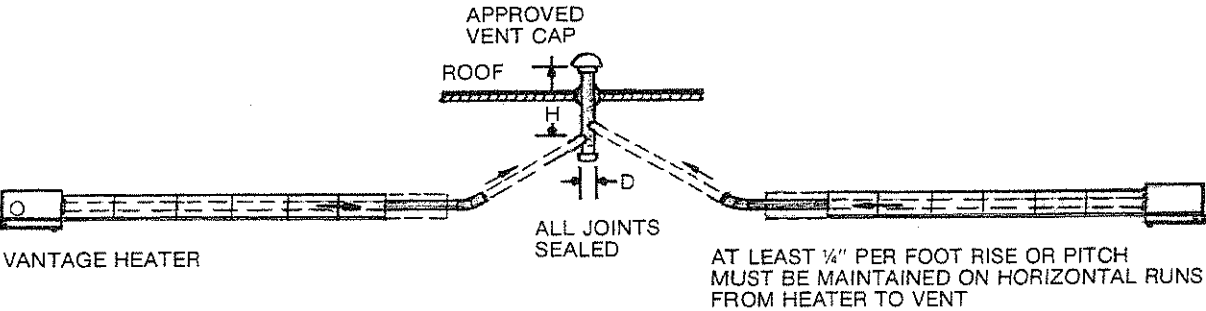
- Horizontal run to vent must never exceed 75% of the vertical height of the vent. (Refer to ANSI Z223.1-1988, NFPA No. 54 for proper vent sizes and installation.)
- Open area of common vent must equal the sum of the open area of individual flue vents connected to it (see chart on diagram).
- Use double wall vent as required (check codes).
- Heaters sharing a common vent should be controlled by the same thermostat.
- All joints must be sealed using suitable products (see recommendation for horizontal venting).

For unvented operation (see Figure 6e):

- Sufficient ventilation must be provided in the amount of 4 cfm per 1000 BTU/HR firing rate.
- Refer to ANSI Z223.1-1988 (NFPA No. 54) and local codes for additional information.
- Use of optional outside combustion air is not recommended with unvented heaters.



VERTICAL VENTING WITH DRAFTHOOD
Figure 6c



PLAN VIEW

No. of HEATERS	STACK HEIGHT H (minimum)	VENT DIAMETER D (minimum)
2	6 feet	10 inches
	8 feet	8 inches
	15 feet	7 inches
4	6 feet	12 inches
	15 feet	10 inches

- NOTES:**
1. HORIZONTAL RUN TO VENT MUST NEVER EXCEED 75% OF THE VERTICAL HEIGHT OF THE VENT. REFER TO ANSI Z223.1a-1987 NFPA No. 54 FOR PROPER VENT SIZES AND INSTALLATION (SEE TABLE).
 2. HEATERS SHARING A COMMON STACK SHOULD BE CONTROLLED BY THE SAME THERMOSTAT.
 3. CONNECTIONS TO COMMON STACK MUST BE POSITIONED TO AVOID DIRECT OPPOSITION BETWEEN STREAMS OF COMBUSTION GASES.

COMMON VENTING
Figure 6d

Meter and service must be large enough to handle all the burners being installed plus any other connected load. When gas piping is not included in the layout drawing, the local gas supplier will usually help in planning the gas piping. A one-half inch tapping at each burner location must be located and oriented as shown on Figure 7. To check system pressure, a plugged one-eighth inch pipe tapping should be incorporated in the gas line at the connection to the burner most remote from the meter or supply. Joint compound resistant to the action of L.P. gas should be used on all pipe threads.

CAUTION: For high pressure testing on gas piping, COMPLETELY DISCONNECT ALL BURNER UNITS AND THE SHUT-OFF COCKS SUPPLIED WITH SAME; then install pipe cap on system and conduct test. Failure to follow this procedure will exceed pressure rating of both burner gas controls and the stop cock, and this will require complete replacement of these parts.

The following is provided as a guide to insure a workmanlike, gas supply system installation:

- All pipe should be properly supported by using suitable pipe hanging materials.
- Wrought iron or wrought steel pipe and malleable iron fittings are recommended. All pipe and fittings should be new and free from defects.
- Ends of pipes and tubing should be carefully reamed to remove obstructions or burrs.
- All gas piping is to be in accordance with the National Fuel Gas Code Z223.1-1988, local codes and local gas company regulations.
- All gas piping should be checked for leaks before placing heating equipment into service. In checking for gas leaks use a soap and water solution; NEVER use an open flame.

GAS PIPING SIZING

The gas line which feeds the heater(s) must be large enough to supply the required gas with a maximum pressure drop of 0.5 inches water column. If there is any question, check with the gas company. Use the following capacity table as a guide:

Pipe (Inches)	Pressure Drop — 0.5 Inches Water Column						
	Length of Straight Pipe (Feet)						
	20	40	60	80	100	150	200
1/2	120	82	66	57	50	40	35
3/4	250	170	138	118	103	84	72
1	465	320	260	220	195	160	135

PIPE CAPACITY CU. FT. HR.
Table 1

GAS CONNECTIONS

The purpose of the gas connector from the heater to the gas piping is twofold as follows:

- To facilitate installation and replacement of the burner.
- To accommodate any movement between the heater and the gas piping. See warning below.

The flexible metallic connector assembly, as supplied, must be installed as shown in Figure 7.

Before connecting heaters to the supply system, verify that all high pressure testing of the gas piping has been completed.

WARNING: There is expansion of the radiant pipe with each firing cycle, and this will cause the burner to move with respect to the gas line. This can cause an unsafe condition if the gas connection is not made strictly in accordance with Figure 7.

OPTIONAL EQUIPMENT

OUTSIDE COMBUSTION AIR SUPPLY

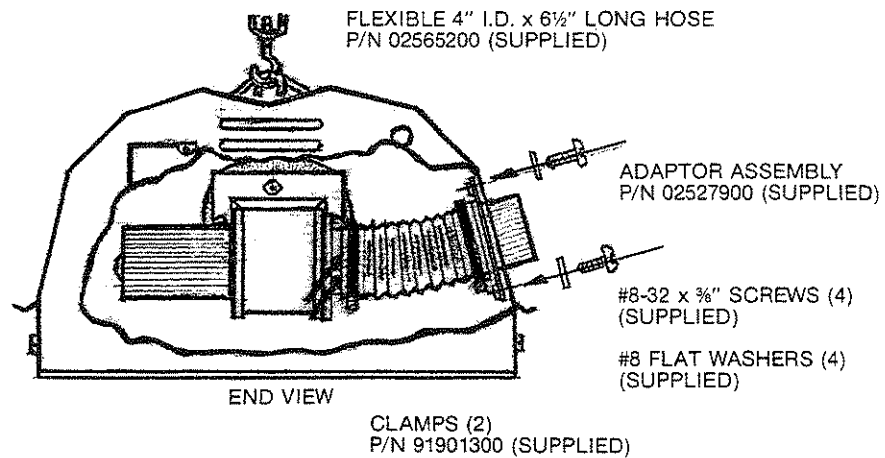
The VANTAGE heater is approved for installation with an outside air supply system.

If the building has a slight negative pressure or contaminants in the air are present, then outside combustion air may be supplied to the heaters using the optional outside air adaptor kit. Install the adaptor as shown in Figure 10 using hardware supplied. (This requires removal of the four-inch diameter "knockout" in the burner housing reflector.)

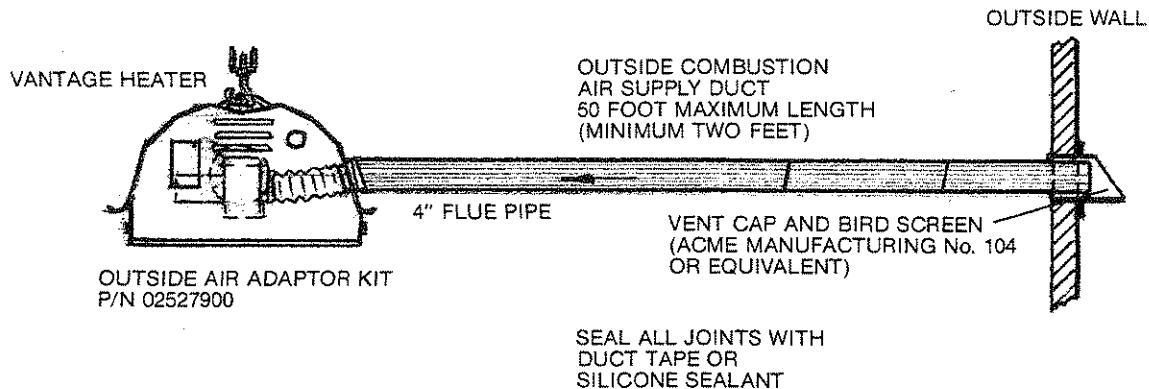
A duct of four inches O.D. single wall pipe may be attached to the heater outside air adaptor. The duct may be up to 50 feet in length maximum with no more than two 90° elbows in its total length (see Figure 11). A minimum length of two feet is recommended.

The air supply duct may have to be insulated to prevent condensation on outer surface.

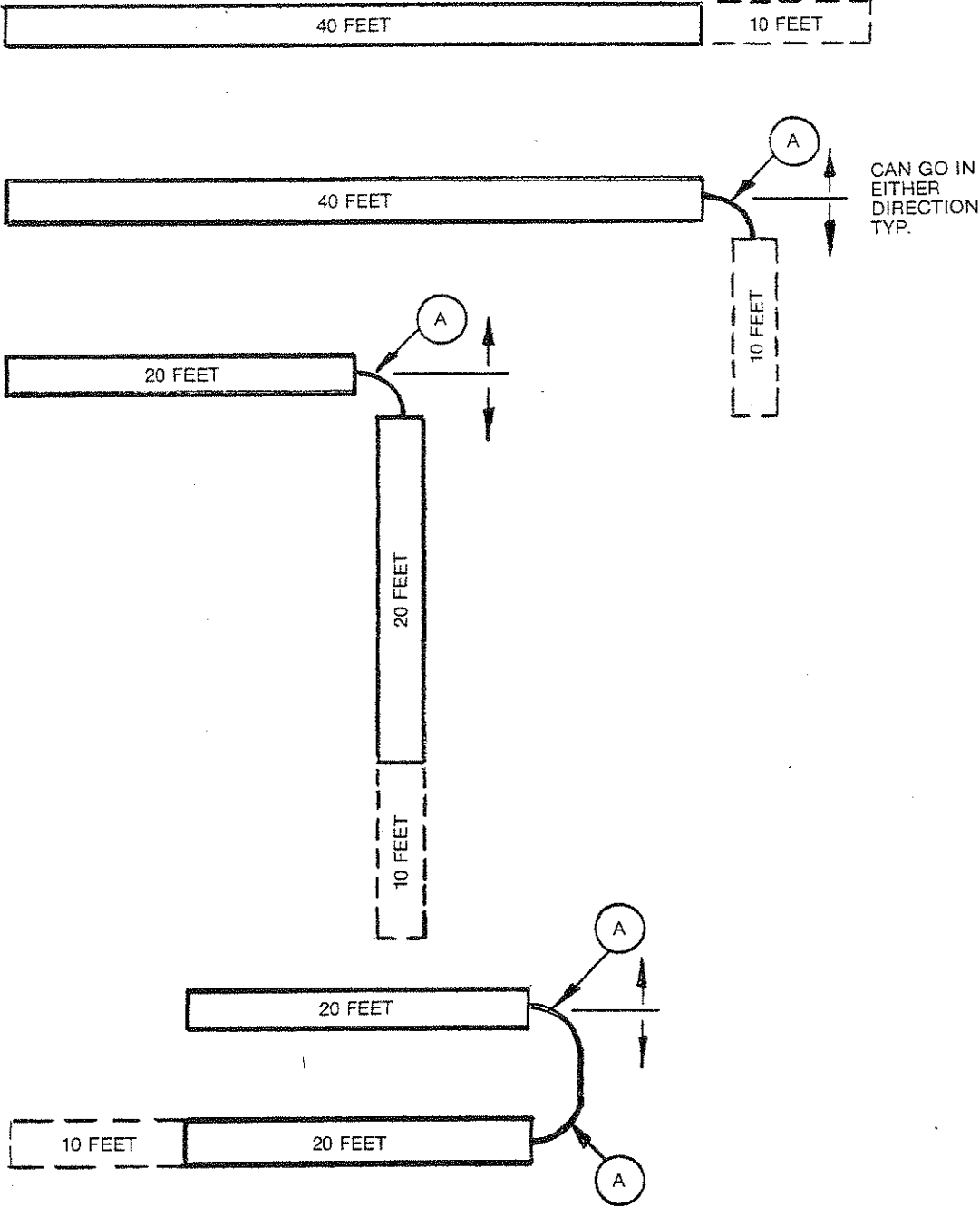
The air inlet vent cap should be securely fastened to outside wall by drilling four 1/4"-diameter holes in outside flange; wood screws or bolts and expansion sleeves may be used as a fastening means.



OUTSIDE AIR SUPPLY ADAPTOR PACKAGE
P/N 02527901
Figure 10



OUTSIDE COMBUSTION AIR INSTALLATION
Figure 11



LEGEND:



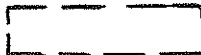

-  40 FOOT LENGTH OF TUBING
 -  20 FOOT LENGTH OF TUBING
 -  10 FOOT TUBING LENGTH EXTENSION (OPTIONAL)
 -  OPTIONAL ELBOW PACKAGE
- STANDARD, HEATER TUBING LENGTH

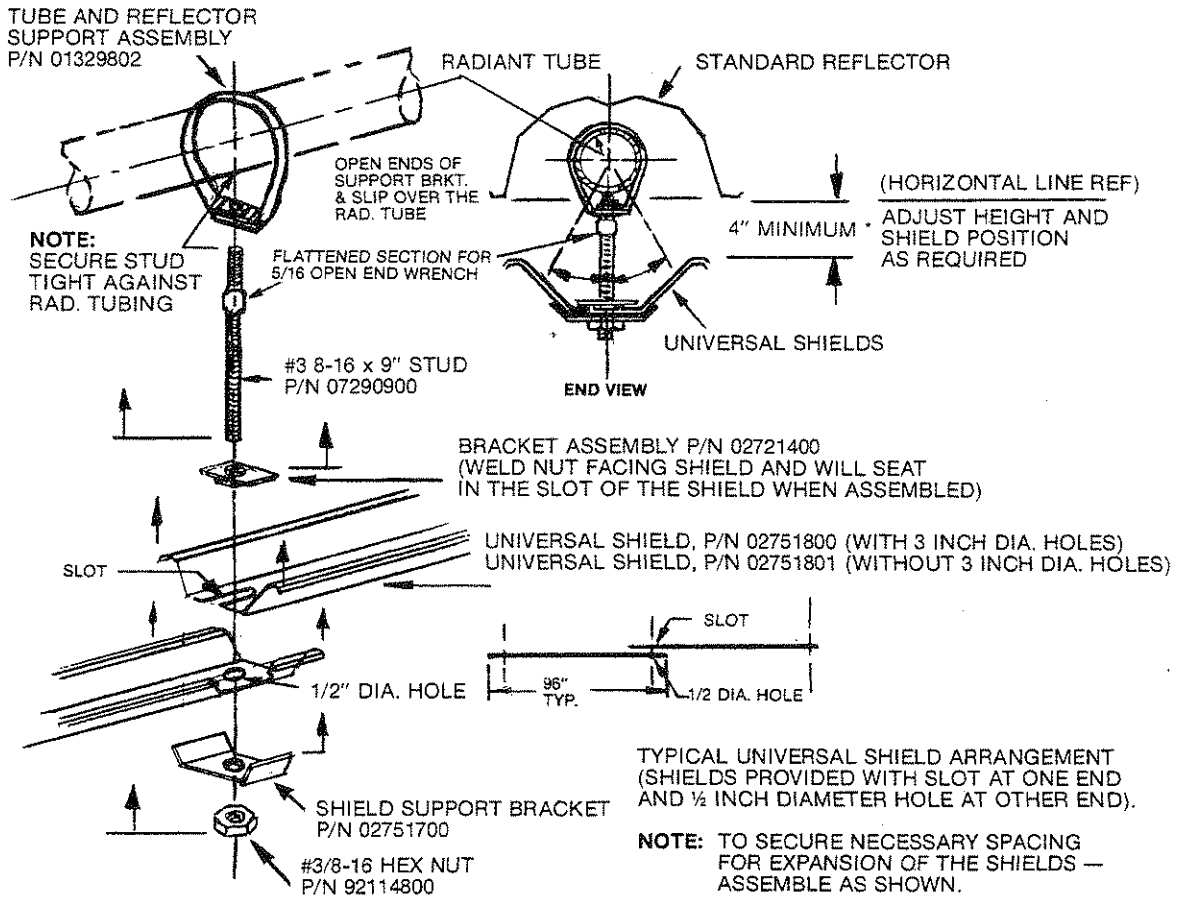
Figure 13

UNIVERSAL SHIELD P/N 02751800

This is an adjustable shield which can be installed horizontally as shown in Figure 15. It is required that the slot in the end of the reflector (P/N 02751800) straddles the weld nut on bracket (P/N 02721400) to allow for expansion.

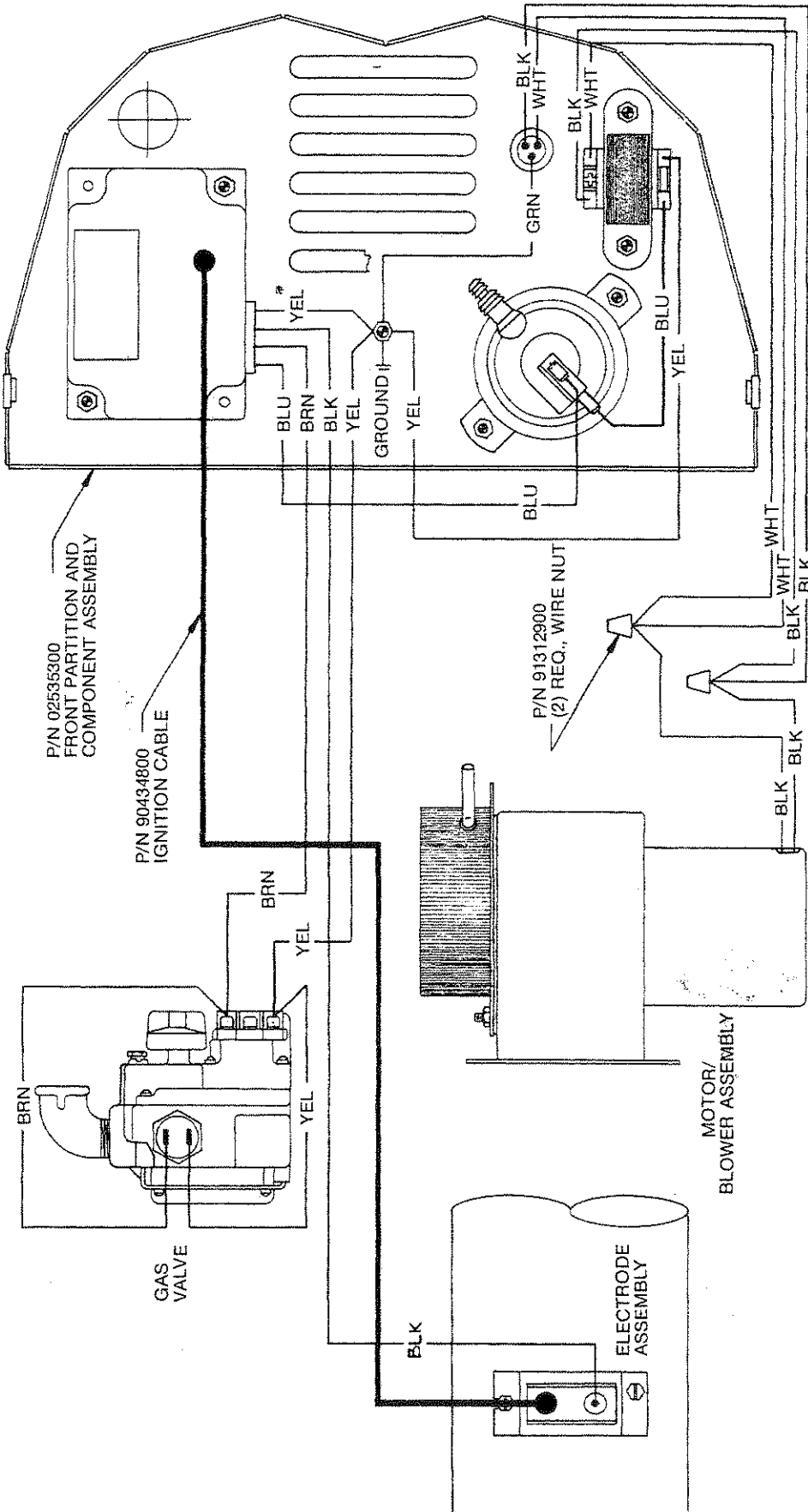
NOTE: When installing the Universal Shield options, two P/N 02721400 brackets are required for single shield installations and one bracket for each adjoining shield.

IMPORTANT: Prior to installation of universal shields see A.G.A. certified table of minimum clearances to combustible materials (Figure 2a or Figure 2b).



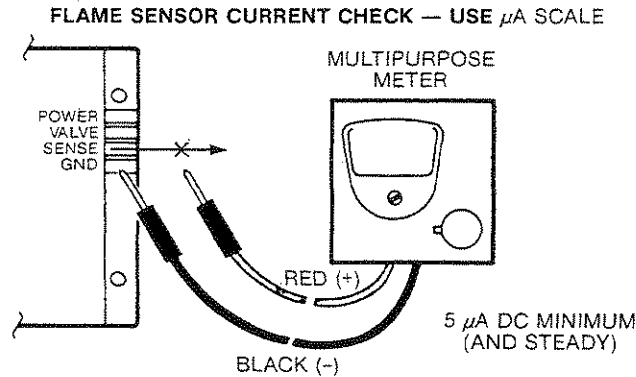
***WARNING:** Excessive tube temperature will result if less than 4" is used.

UNIVERSAL SHIELD INSTALLATION WITH VANTAGE
Figure 15



- NOTES:**
1. 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.
 2. Each burner must be electrically grounded in accordance with National Electrical Code ANSI 70-1987.
 3. For low voltage thermostat and/or parallel burner operation see Wiring Diagram, Figures 9 or 10, Pages 17 and 18.

INTERNAL WIRING DIAGRAM
Figure 16



FLAME CURRENT MEASUREMENT
Figure 18

MAINTENANCE

For best performance, maintenance procedures should be performed before each heating season.

- Be sure gas and electric supply to heater are turned OFF before performing any service or maintenance on heater.
- Open control housing cover.
- Check condition of blower scroll and motor. Dirt and dust may be blown out with compressed air or a vacuum cleaner may be used.
- Remove burner and check its condition (see below). Clean or replace as necessary.
- Make visual check of electrode. Replace if there is excessive carbon residue, erosion of electrodes, or other defects. Gap should be .125 inches.
- Check to see that burner observation window is clean and free of cracks or holes. Clean or replace as necessary.
- Check inside of firing tube with flashlight. If carbon or scale are present, scrape out deposits with wire brush on rod or metal plate attached to wooden pole.
- Check firing tube inside and out for holes or cracks. Replace firing tube if any cracks are found.
- Check flue pipe for soot or dirt or any obstruction to the outdoors. After cleaning as necessary, reattach flue pipe.
- Outside surfaces of heater may be cleaned with damp cloth.
- Check for leaks with soap solution on any pipe joints that were disconnected during maintenance procedure before putting heater back in service.
- Check performance of heater and visually observe flame for proper flame characteristics.
- A qualified service agency should be contacted for service other than routine maintenance.

PROCEDURE TO REMOVE BURNER (see Figures 19 and 20)

- Remove gas connector from heater.
- Open housing cover.
- Disconnect wires between blower, valve, igniter/sensor and rear bulkhead.
- Remove (6) screws holding burner housing shroud to burner tube partition (Figure 20, Item *A).
- Remove bulkhead with control components and housing from burner; this exposes the blower and burner.
- Remove blower from burner tube.
- Remove burner.
- To reassemble, reverse above steps.

VANTAGE REPLACEMENT PARTS (REFER TO FIGURES 19 and 20)

ITEM	DESCRIPTION	PART No.
1	Motor/Blower Assembly	02517400
2	Transformer	02535700
3	Fenwal DSI Control Module	90427302
4	Fenwal Electrode	90427400
5	Electrode Mounting Package (Includes bracket, gaskets and hardware.)	02516200
6	Ignition Cable Assembly	90434800
7	Mica Window Package (Includes ring, window, gasket and hardware.)	02519600
8	Gas Valve (LP Gas)	90031100
9	Gas Valve (Natural Gas)	90031200
10	Air Sensing Switch (normally open)	90434900
11	Wire Harness	02535600
12	Burner Casting Assembly	02525200
13	Orifice Adaptor	02591800
14	Orifice #3 Natural 125,000	91910403
	Orifice #30 LP 125,000	91910430
	Orifice #12 Natural 100,000	91910412
	Orifice #33 LP 100,000	91910433
	Orifice #18 Natural 80,000	91910418
	Orifice #37 LP 80,000	91910437
15	Control Housing Cover	02567401

VANTAGE OPTIONS

DESCRIPTION	PART No.	DESCRIPTION	PART No.
Side Reflector Support	01329910	Six-Inch Draft Hood	90502400
10 Foot Extension Package	02519200	Four to Six Inch Adaptor (Use with Draft Hood)	90502500
90° Elbow Package	02718700	Conversion Kit LP to Natural (125,000)	02519700
Outside Air Adapter Package	02527901	Conversion Kit Natural to LP (125,000)	02519800
Radiant Shield Support	02712100	Conversion Kit LP to Natural (100,000)	02519902
8 Foot Side Reflector	02712700	Conversion Kit Natural to LP (100,000)	02519903
8 Foot Radiant Shield	02751801	Conversion Kit LP to Natural (80,000)	02518302
Line Voltage Thermostat	90411300	Conversion Kit Natural to LP (80,000)	02519901
Relay (for 90425100)	90417600		
Low Voltage Thermostat (use 90417600)	90425100		
Vent Terminal — Tjernlund	90502100		
Vent Terminal Package (non-combustibles wall)	02537800		
Outside Air Vent Cap	90502300		

WARRANTY CARD

Vantage Installation Information

Name _____

Address Where Installed _____

Phone No. _____ Person To Contact _____

Installation Date _____ Installer _____

Purchased From _____

DID THESE UNITS REPLACE AN EXISTING HEATING SYSTEM? YES NO

Type _____ BTU's Replaced _____

Vantage Units No. _____ Type _____

Serial No's. _____

Type of Application — Please Indicate

- | | | |
|--|---|---|
| <input type="checkbox"/> AIRPORT FACILITY | <input type="checkbox"/> FARM IMPLEMENT DEALER | <input type="checkbox"/> SCHOOL |
| <input type="checkbox"/> Hangar <input type="checkbox"/> Warehouse | <input type="checkbox"/> FIRE STATION | TYPE _____ |
| <input type="checkbox"/> Other _____ | <input type="checkbox"/> GARAGE | <input type="checkbox"/> STORE |
| <input type="checkbox"/> AUTO BODY SHOP | TYPE _____ | TYPE _____ |
| <input type="checkbox"/> AUTO DEALER | <input type="checkbox"/> GREENHOUSE | <input type="checkbox"/> SWIMMING POOL |
| <input type="checkbox"/> AUTO SERVICE SHOP | <input type="checkbox"/> HOCKEY RINKS | <input type="checkbox"/> TENNIS COURT |
| <input type="checkbox"/> ASSEMBLY PLANT | <input type="checkbox"/> HIGHWAY DEPT. BUILDING | <input type="checkbox"/> TRUCKING COMPANY |
| <input type="checkbox"/> BOTTLING PLANT OR | TYPE _____ | <input type="checkbox"/> UTILITY COMPANY BUILDING |
| WAREHOUSE | <input type="checkbox"/> LUMBER COMPANY | TYPE _____ |
| <input type="checkbox"/> CAR WASH | <input type="checkbox"/> MANUFACTURING PLANT | UTILITY _____ |
| <input type="checkbox"/> CONSTRUCTION EQUIP. DEALER | TYPE _____ | <input type="checkbox"/> WAREHOUSE |
| <input type="checkbox"/> FABRICATION PLANT | <input type="checkbox"/> MACHINE SHOP | <input type="checkbox"/> WELD SHOP |
| TYPE _____ | <input type="checkbox"/> PUBLIC BUILDING | TYPE _____ |
| <input type="checkbox"/> FARM <input type="checkbox"/> Cattle <input type="checkbox"/> Dairy | TYPE _____ | <input type="checkbox"/> ZOO |
| <input type="checkbox"/> Horse <input type="checkbox"/> Pig <input type="checkbox"/> Poultry | <input type="checkbox"/> POST OFFICE | <input type="checkbox"/> OTHER _____ |
| <input type="checkbox"/> FARM BUILDING | <input type="checkbox"/> RESTAURANT | _____ |
| TYPE _____ | TYPE _____ | _____ |

