

# GORDON-RAY

**MODELS**  
**DS-40 DS-60**  
**DS-80**

## **INSTALLATION, OPERATION AND SERVICE INSTRUCTIONS**



### **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.

**Roberts**  **Gordon**

**A LEADER IN HEATING EQUIPMENT  
FOR OVER 60 YEARS**

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*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.*

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**GORDON-RAY DS SPECIFICATIONS  
INSTALLATION, OPERATING, SERVICE INSTRUCTIONS**

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## INTRODUCTION

### UNPACKING THE HEATER

Remove the heater carefully from the shipping carton so as not to damage any components. The unit is inspected and tested at the factory before shipment and is delivered to the carrier in good condition. Check the heater for possible damage in shipment. In case of damage, the carrier should be contacted immediately.

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

#### IMPORTANT

This heater is designed for heating nonresidential 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.

#### IMPORTANT

**DO NOT USE IN AN ATMOSPHERE CONTAINING HALOGENATED HYDROCARBONS OR OTHER CORROSIVE CHEMICALS.**

Some compounds in the air can be ingested into the equipment and cause an accelerated rate of corrosion of some parts of the heat exchanger. The use of such chemical compounds in or near the enclosure should be avoided where a longer life of the burner, tubing and other parts is desirable.

### 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

GORDON-RAY DS 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.

## GENERAL SPECIFICATIONS

General specifications for Gordon-Ray DS heaters are as follows:

**RATING:**

Model DS-40  
(Natural & LP Gas) - 40,000 BTU/HR. input

Model DS-60  
(Natural & LP Gas) - 60,000 BTU/HR. input

Model DS-80  
(Natural & LP Gas) - 80,000 BTU/HR. input

**GAS INLET PRESSURE:**

Gas	Minimum	Maximum
Natural	4.6" W.C.	14.0" W.C.
LP	11.0" W.C.	14.0" W.C.

**ELECTRICAL RATING:**

Models DS  
120 V - 60 Hz-(2.6 AMP Run) (5.0 AMP Start)

**GAS PRESSURE AT MANIFOLD:**

Natural Gas. . . . . 3.5" W.C.  
LP Gas. . . . . 10.5" W.C.  
Gas connection Size . . . . . 1/2" NPT

**DIMENSIONS:**

Flue Connection Size . . . . . 4" O.D.  
Refer to Figure 1 on page 3 of these instructions for dimensional information

**GORDON-RAY DS STANDARD PARTS LIST**

DESCRIPTION	PART NO.	QUANTITY (MODEL #)		
		(40)	(60)	(80)
Burner and Control Assembly -DS -40 - NATURAL	030108DS	1	--	--
Burner and Control Assembly -DS -40 - LP	030109DS	1	--	--
Burner and Control Assembly -DS -60 - NATURAL	030106DS	--	1	--
Burner and Control Assembly -DS -60 - LP	030107DS	--	1	--
Burner and Control Assembly -DS -80 - NATURAL	030104DS	--	--	1
Burner and Control Assembly -DS -80 - LP	030105DS	--	--	1
Tube Assembly	03051700	--	1	1
Tube Assembly	03051600	1	--	--
Reflector-118 inches	02757600	1	2	2
Hanger 4" (Flue End)	03020700	1	1	1
Hanger 5" (Burner End)	03020701	1	1	1
Reflector Support	03020600	3	6	6
End Cap	02754600	2	2	2
Flexible Gas Connector & Stop Cock Assy.	91412200	1	1	1
Flue Pipe Adapter	90502700	1	1	1
Turbulator Baffle 10 feet	03051500	--	1	1
Turbulator Baffle 7 feet	03051502	1	--	--

For systems components parts lists see Figure 12.

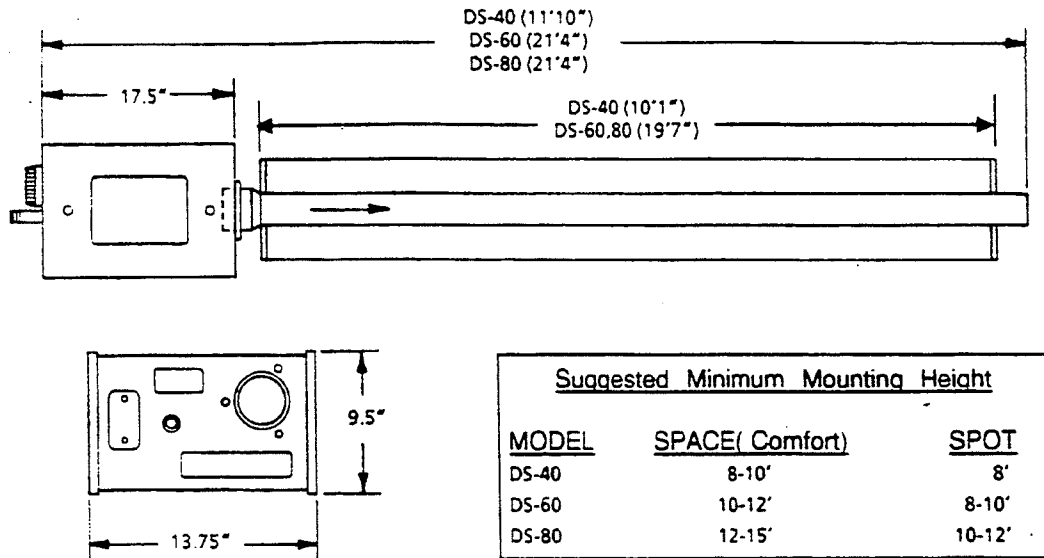


FIGURE 1. GORDON-RAY DS SYSTEM DIMENSIONS & SUGGESTED MINIMUM HEIGHTS

### 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 (see Considerations and Planning Sections Below.).

#### CRITICAL CONSIDERATIONS

The GORDON-RAY DS 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 Figure 2).
- 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 adequate clearance between ends of the heater and building walls. See Figure 2 for dimensions.
- The heater must be suspended pitched down (one-half inch in 20 ft) away from burner.

#### HANGING THE HEATER

Suspension straps and "S" hooks provided with the heater should be used as the only suspension points. Chain should be used to support the unit between the ceiling and suspension straps provided. Chain should have a load rating of at least 400 lbs. at each suspension point. For instructions on mounting height and locations of heaters, refer to installation plans of equipment.

## INSTALLATION

### Don't -

- Pressure test the gas line using high pressure (greater than 1.2 PSIG) without closing the high pressure shut-off cocks. Failure to do so may result in damage to the burners.

### Do -

- Familiarize yourself with local and national codes.
- Develop a planned installation procedure which will conserve material and labor on the job.
- Check to see that all material and equipment is on the job before starting installation.
- Be sure to accommodate thermal expansion of the hot tube.
- **INSTALL THE GAS CONNECTOR ONLY AS SHOWN IN INSTRUCTIONS.**
- Provide end clearance so tubing won't expand and touch a wall or a structural member.
- Provide access to burner for servicing.
- Provide one square inch of free area air opening for each 1,000 BTU/Hr. of heater input (but not less than 100 square inches) in enclosed spaces. One opening should be within 12 inches of the top and one within 12 inches of the bottom of the enclosure.

### **CLEARANCE TO COMBUSTIBLES (From Heater Surfaces)**

Caution must be used when running the system near combustible materials such as wood, paper, rubber, etc. Consideration should be given to partitions, storage racks, hoists, building construction, etc. Figure 2 gives MINIMUM clearances

#### **WARNING**

Minimum clearance from heater must be maintained from vehicles parked below heater.

**NOTE:** In all situations, clearances to combustibles must be maintained. Signs should be posted in storage areas to specify MAXIMUM stacking height to maintain required clearance to combustibles.

### **IN PUBLIC GARAGES**

Additional guidelines are provided for public garages in accordance with the standard for parking structures (NFPA 88A-1985) or the standard for repair garages (NFPA 88B-1985):

- Heaters shall be installed in accordance with their listings and not less than eight feet above the floor. Minimum clearances to combustibles must be maintained from vehicles parked below the heater.
- When installed over hoists, clearance to combustible material must be maintained from uppermost point on hoist.
- Clearance between the heater and its vent and adjacent combustible material (which is part of the building or its contents) shall be maintained to conform with the standard for installation of gas appliances and gas piping (NFPA No. 54 ANSI Z223.1-1988, National Fuel Gas Code).

### **IN AIRCRAFT HANGARS**

Heaters for use in aircraft hangars must be installed in accordance with specification, ANSI/NFPA 409-1985 and with special consideration for the following:

- Heaters in aircraft storage or service areas shall be installed at a height of at least 10 feet above the upper surface of wings or engine enclosures of the highest aircraft which may be housed in the hangar. (This should be measured from the bottom of the heater to the wing or engine enclosure, whichever is highest from the floor.)
- In other sections of aircraft hangars, such as shops or offices communicating with airplane storage or servicing area, heaters shall be installed in accordance with their listings and not less than eight feet above the floor.
- Heaters installed in aircraft hangars shall be located so as not to be subject to damage by aircraft, cranes, movable scaffolding or other objects. Heaters shall be placed so they will be readily accessible for maintenance purposes.

CAUTION: CLEARANCES AS SHOWN ARE NOT FOR USE IN FOUR SIDED ENCLOSURES.

MINIMUM CLEARANCES TO COMBUSTIBLES

MODEL #	FIGURE #1			FIGURE #2			FIGURE #3			FIGURE #4			FIGURE #5			UNVENTED		VENTED		
	A	B	D	A	B	D	A	B	D	A	B	C	D	A	B	C	D	ABOVE	END	
40,000	4	22	50	4	4	50	4	10	50	4	4	45	42	4	22	50	22	12	18	18
60,000	4	30	60	4	4	60	4	18	63	4	4	54	50	4	30	60	30	12	18	18
80,000	4	33	63	4	4	67	4	20	69	4	4	60	56	4	33	63	33	18	24	18

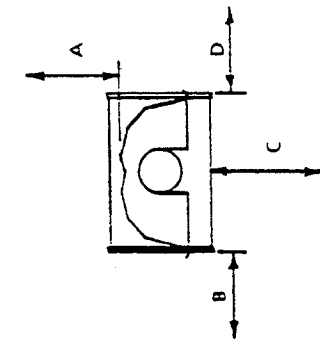


FIG. 1  
STANDARD REFLECTOR

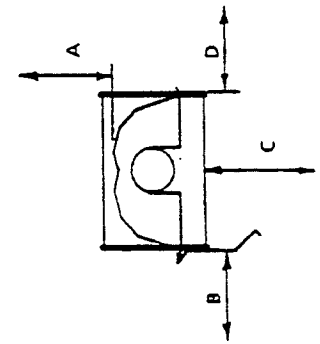


FIG. 2  
ONE SIDE EXTENSION

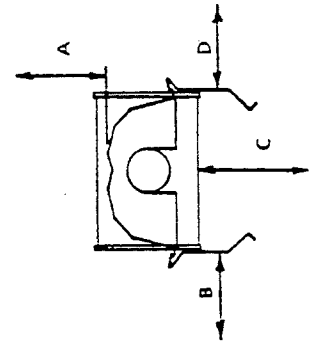


FIG. 3  
TWO SIDE EXTENSIONS

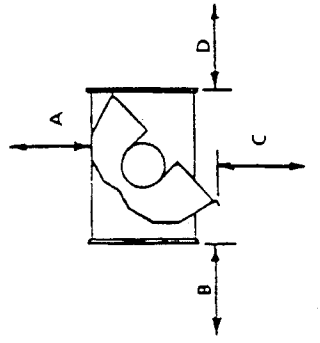


FIG. 4  
45° STANDARD REFLECTOR

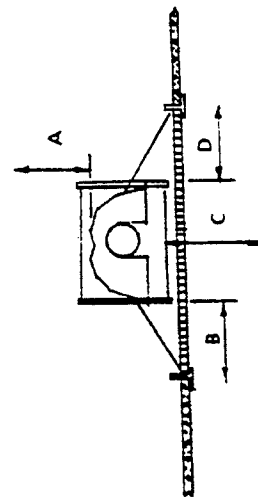


FIG. 5  
2 FT. WIDE W/GRILLE

NOTES: IN ALL SITUATIONS CLEARANCES TO COMBUSTIBLES MUST BE MAINTAINED. MINIMUM CLEARANCES MUST BE MAINTAINED FROM VEHICLES PARKED BELOW HEATER. SIGNS SHOULD BE POSTED IN STORAGE AREAS TO SPECIFY MAXIMUM STACKING HEIGHT TO MAINTAIN REQUIRED CLEARANCE TO COMBUSTIBLES.

FIGURE 2. MINIMUM CLEARANCES TO COMBUSTIBLES

**VENTING****GENERAL REQUIREMENTS**

Heater vent must be installed in accordance with specification ANSI Z223.1-1988 (NFPA No. 54). Partial information relating to this specification is provided in this section with regard to size and configurations for venting arrangements (see Figures 7a, 7b, 7c, 7d and 7e). For complete information consult ANSI Z223.1-1988 and applicable local codes.

**Use the following guidelines to help insure an adequate, safe venting arrangement:**

- Be sure that method selected for venting heater complies with all codes as required for each particular location.
- Exhaust end of heater will accept a four inch flue pipe using the flue pipe adaptor provided.
- Heater may be vented to the outdoors either vertically or horizontally.
- If heater is to be vented horizontally:
  - a.) Vent must exit building not less than seven feet above grade when located adjacent to public walkways.
  - b.) Vent must terminate at least three feet above any forced air inlet located within 10 feet.
  - c.) Vent must terminate at least four feet below, four feet horizontally from or one foot above any door, window or gravity air inlet into any building.
  - d.) Vent terminal shall be located at least 12 inches from any opening through which vent gases could enter a building.
- Vent terminal opening must be beyond any combustible overhang.
- If condensation in the flue is a problem, the flue length should be shortened or insulated.
- For vent specifications:

**All four (4) of the following conditions must be met.**

- a.) Maximum vent length allowed is 45 feet.
- b.) Maximum intake length allowed is 45 feet.
- c.) Maximum total of vent length plus intake length shall not exceed 65 feet.
- d.) Under length conditions a) through c) above, a maximum of 2 elbows are allowed for vent or intake. Subtract 15 feet per elbow from maximum length allowed if more than 2 elbows are used.

**IMPORTANT**

Heaters should be placed so they will be readily accessible for maintenance.



**ALTERNATE ARRANGEMENTS/OPTIONAL EQUIPMENT FOR VENTING**

Alternate venting configurations and optional equipment for venting are shown in Figures 7a through 7e.

**For horizontal venting (see Figure 7a):**

- In combustible or noncombustible walls use Tjernlund VH1-4" (P/N 90502100). Follow vent manufacturer's instructions for proper installation. (Alternate vent Roberts-Gordon P/N 02537800, noncombustible wall only.)
- Four-inch O.D. flue pipe is required, 30 feet in length is recommended. Up to 45 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 or Permatex Form-a-Gasket Red High Temperature Silicone Adhesive Sealant.
- Vent terminal should be installed at a height sufficient to prevent blockage by snow.
- Building materials should be protected from degradation by flue gases.

**For vertical venting (see Figure 7b):**

- A four-inch O.D. flue pipe, maximum 45 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 7c):**

- 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.

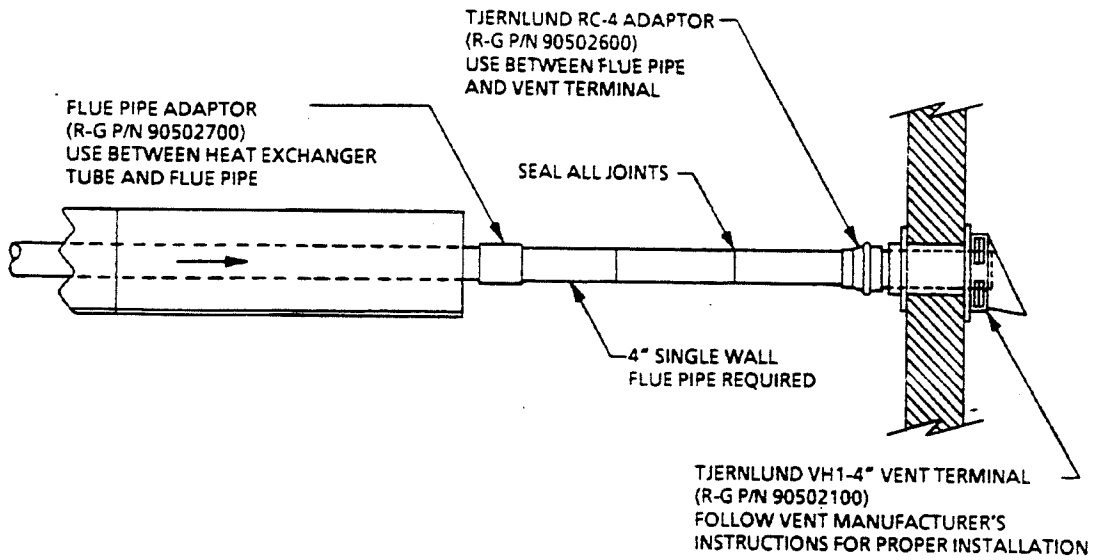
**For common venting (see Figure 7d):**

- 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 must be controlled by the same thermostat.
- All joints must be sealed using suitable products (see recommendation for horizontal venting).

**For unvented operation (see Figure 7e):**

- 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.

VENTING



RECOMMENDED FLUE PIPE LENGTH 30 FEET (MINIMUM TWO FEET).  
UP TO 45 FEET MAXIMUM MAY BE USED IF INSULATED IN ORDER  
TO PREVENT EXCESSIVE CONDENSATION.

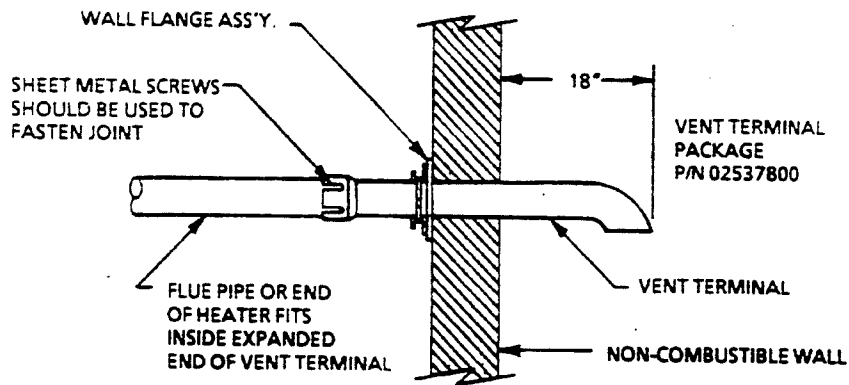


FIGURE 3A. HORIZONTAL VENTING

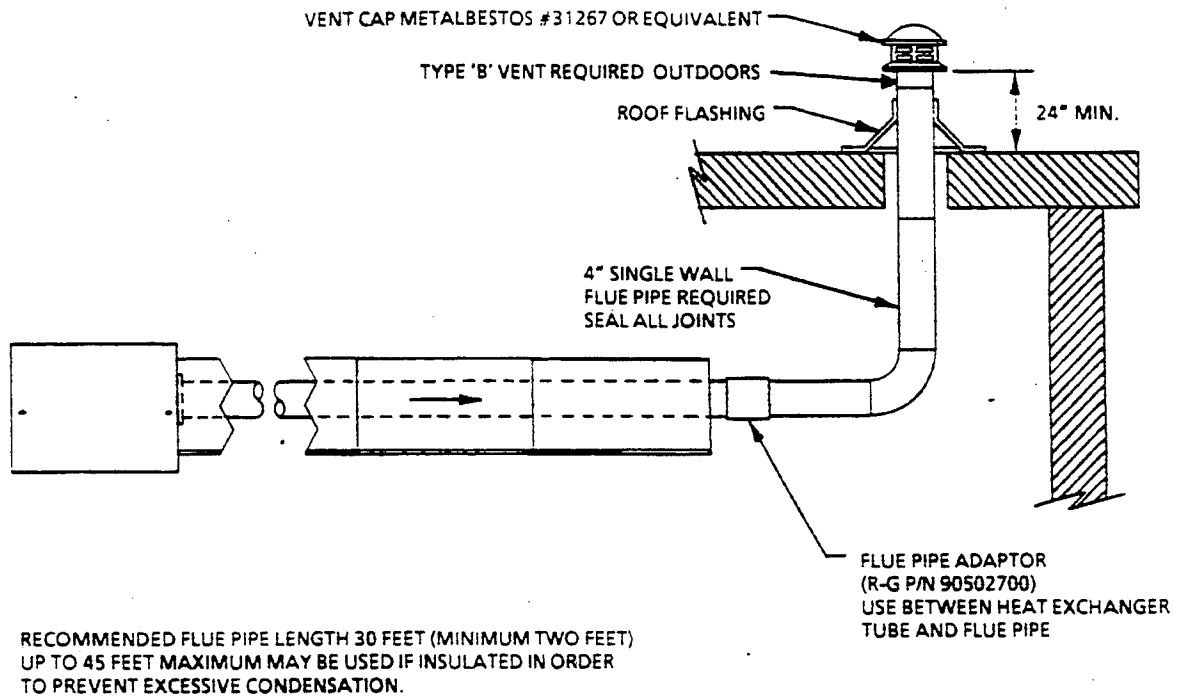


Figure 3b. VERTICAL VENTING

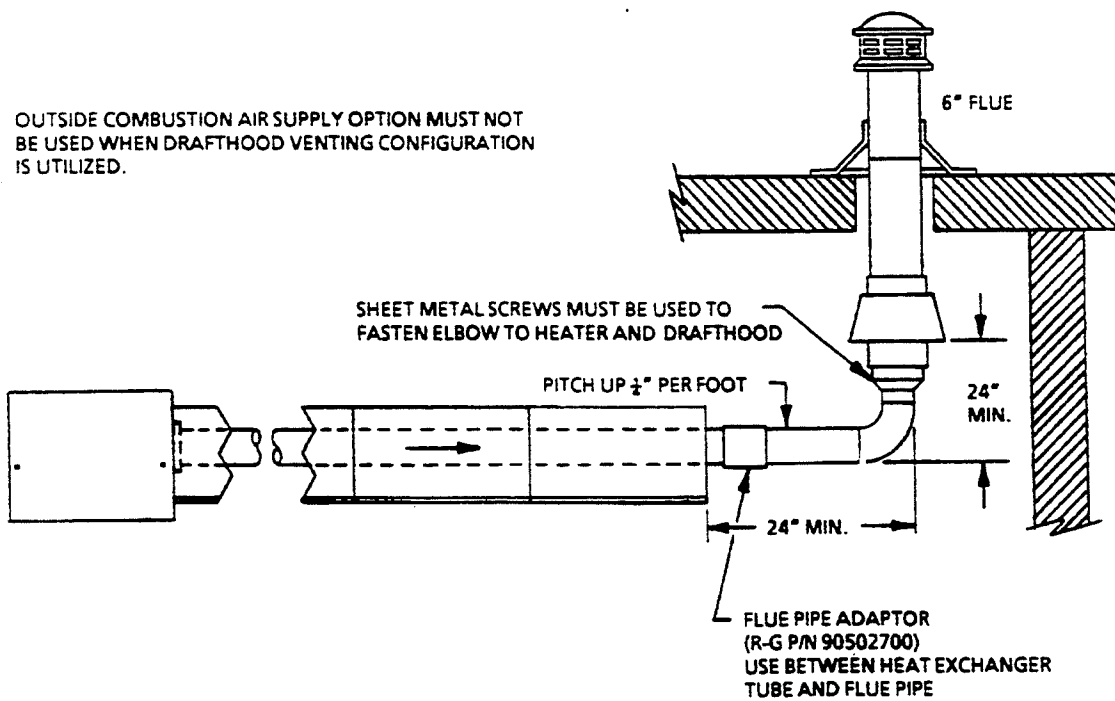


Figure 3c. VERTICAL VENTING WITH DRAFTHOOD

**CAUTION**

For high pressure testing on gas piping, THE HIGH PRESSURE SHUT-OFF COCKS MUST BE CLOSED. Failure to follow this procedure will exceed pressure rating of burner gas controls and this will require complete replacement of these parts.

The following is provided as a guide to ensure 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:

TABLE 1. PIPE CAPACITY CU. FT./HR.

Specific Gravity 0.6  Pipe (Inches)	Pressure Drop - 0.5 Inches Water Column						
	Length of Straight Pipe (Feet)						
	20	40	60	80	100	150	200
3/8	65	45	36	--	--	--	--
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

**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 4.

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 4.

### FIELD WIRING

Heaters are normally controlled by thermostats (see Figure 5). Line voltage thermostats are wired directly; the recommended 24 volt thermostats use a relay per Figure 6. Heaters must be grounded in accordance with National Electrical Code ANSI/NFPA 70-1987.

Heaters can also be controlled with a manual line voltage switch or timer switch in place of the thermostat.

- 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. For wiring line voltage thermostat (R-G 90411300) use terminals "B" and "R" and jumper terminal "W" to "R".

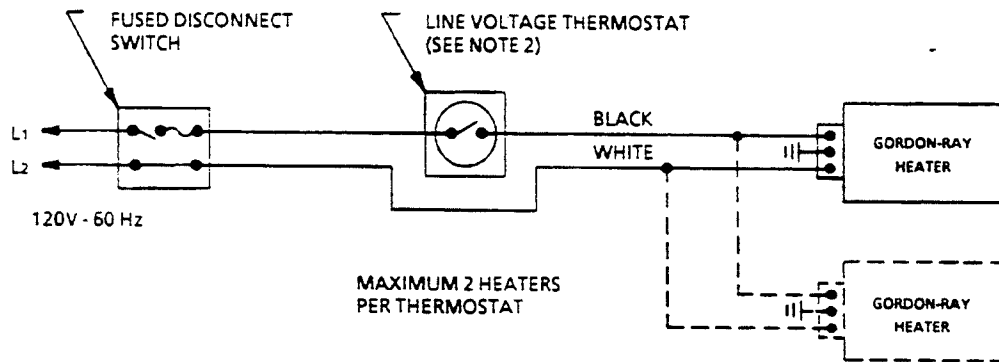


FIGURE 5. WIRING OF LINE VOLTAGE THERMOSTAT

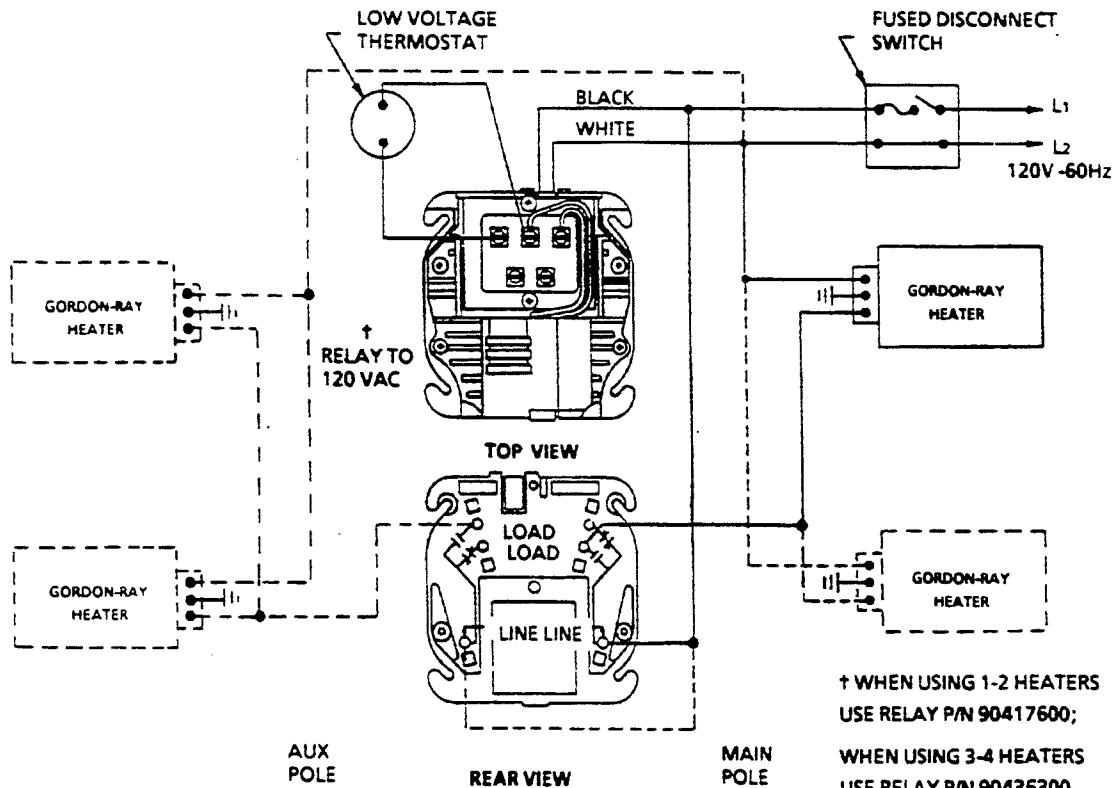
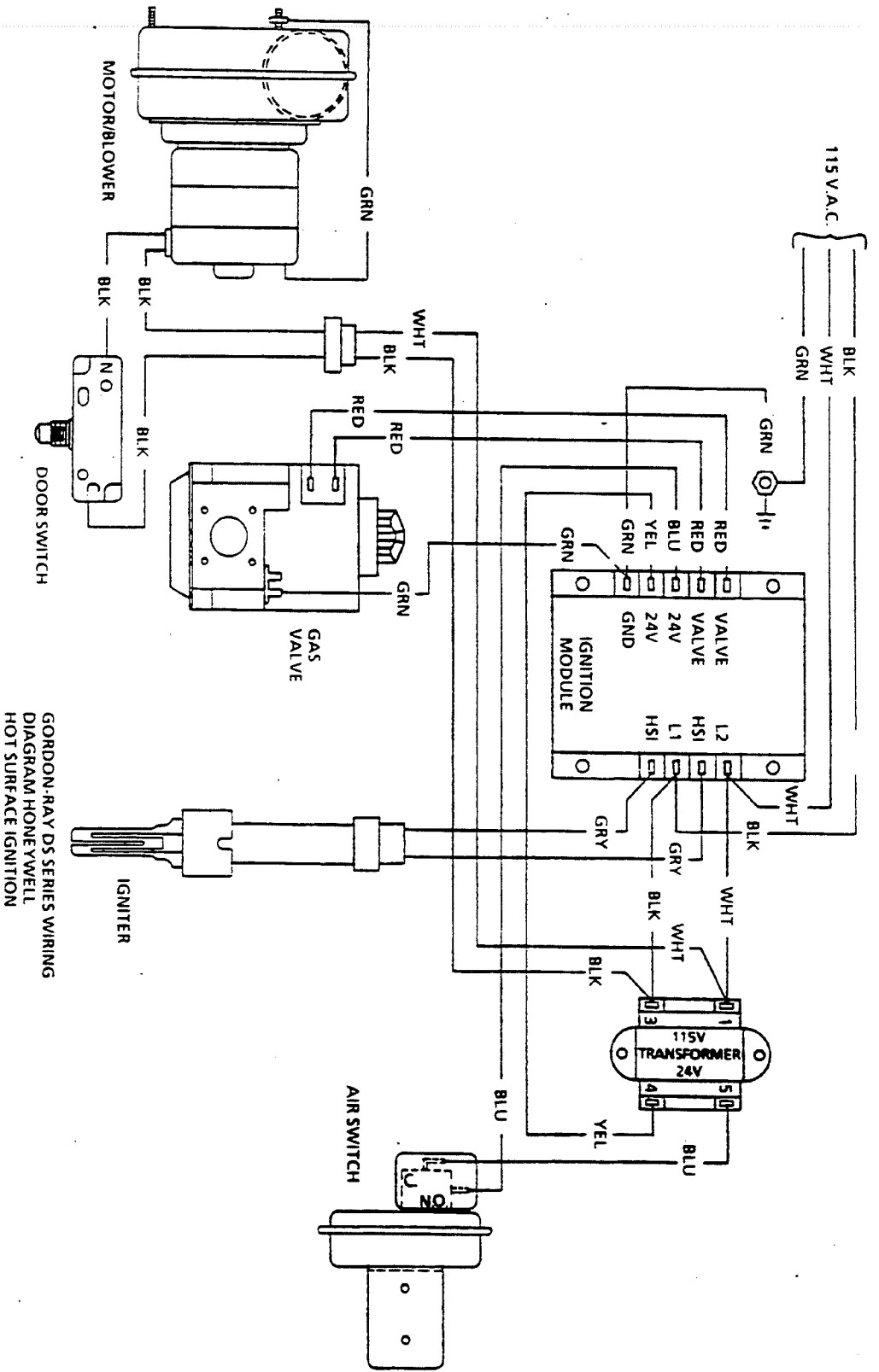


FIGURE 6. WIRING OF LOW VOLTAGE THERMOSTAT AND RELAY



- 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 70-1984.
  3. FOR LOW VOLTAGE THERMOSTAT AND/OR PARALLEL BURNER OPERATION SEE WIRING DIAGRAM, FIGURES 5 OR 6.

FIGURE 7. INTERNAL WIRING DIAGRAM

GORDON-RAY DS SERIES WIRING  
DIAGRAM HONEYWELL  
HOT SURFACE IGNITION

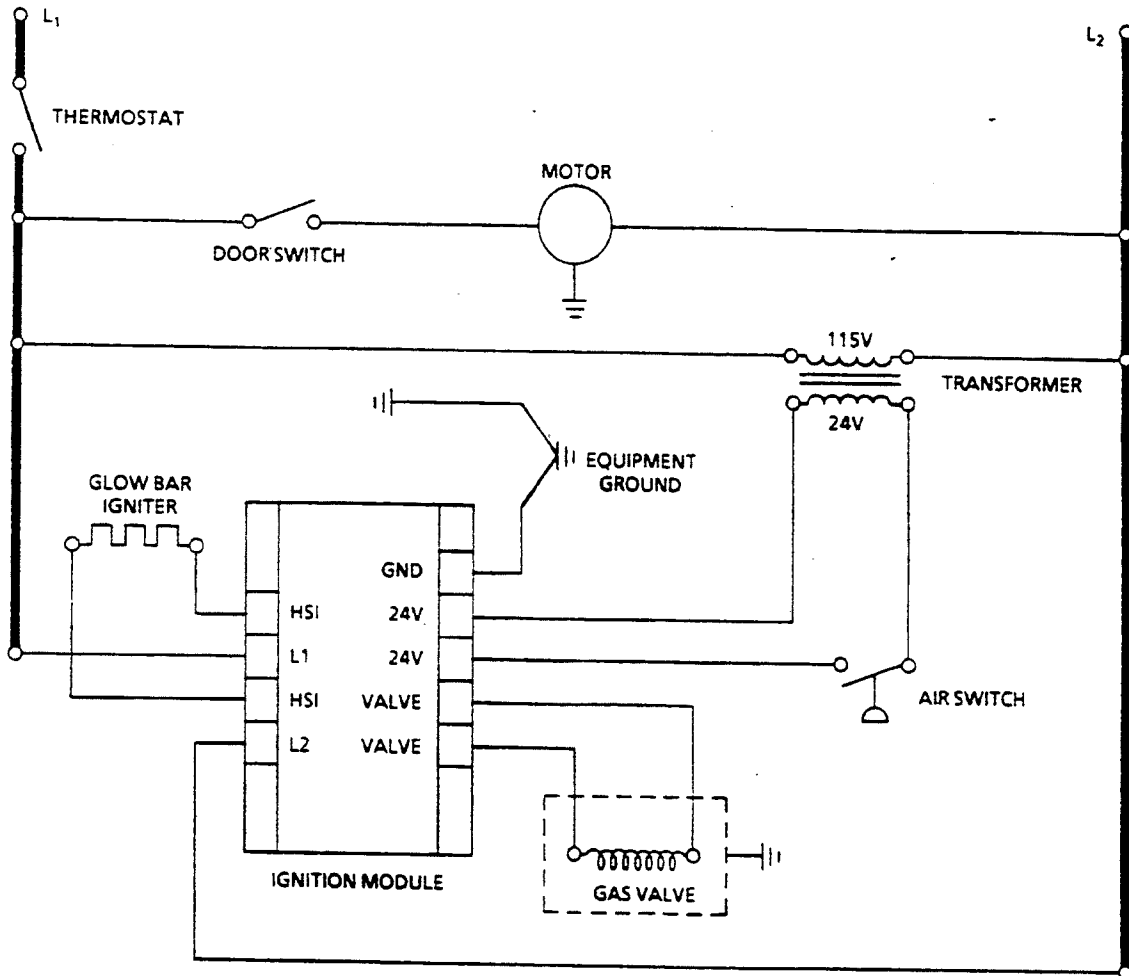


FIGURE 8. HONEYWELL HOT SURFACE IGNITION SYSTEM LADDER DIAGRAM

## OPTIONAL EQUIPMENT

### OUTSIDE COMBUSTION AIR SUPPLY

The Gordon-Ray DS heater is approved for installation with an outside air supply system.

Some compounds such as halogenated hydrocarbons or other corrosive chemicals in the air can be ingested into the equipment and cause an accelerated rate of corrosion of some of the heater components. The use of such chemical compounds near the enclosure should be avoided.

#### IMPORTANT

If the building has a slight negative pressure or contaminants are present in the air, an outside combustion air supply to the heaters is strongly recommended.

A duct of four-inches O.D. single wall pipe may be attached to the heater. The duct may be up to 45 feet in length maximum with no more than two 90° elbows in its total length (see Figure 9). 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 the outside wall by drilling four 1/4-inch diameter holes in outside flange; wood screws or bolts and expansion sleeves may be used as a fastening means.

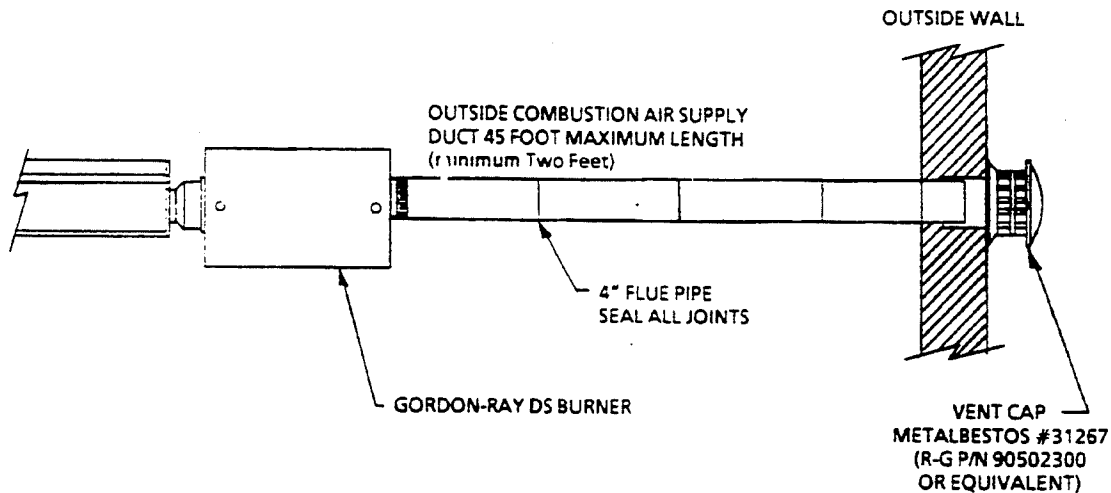


FIGURE 9. OUTSIDE COMBUSTION AIR INSTALLATION



### SIDE EXTENSION REFLECTORS

Optional side extension reflectors may be installed on either side of the unit as follows (see Figure 10):

- Attach a reflector side extension support bracket (P/N 01329910) to tube as needed. These brackets should be located adjacent to the overlapped joints of the reflector side extension.
- Insert lower edge of reflector side extension in extension support bracket.
- Cut suitable relief notch for each reflector support bracket (P/N 03050000 and/or tube and reflector hanger P/N 03090100).
- Hook top edge of side extension reflector (P/N 01368000) over edge of reflector (P/N 02750303) (see Detail "A").
- A slip joint must be provided in the perimeter side extension, at the location of each slip joint in the reflector. The overlap should be the same as the reflector.
- Where severe air movement may be encountered, as at large door, one (1) or two (2) sheet metal screws in each reflector should be used, except where slip joint is required.
- Install at least two brackets (P/N 02751200) for each side extension.

NOTE:  
 TO INSTALL P/N 02751200 BRACKETS:  
 LAY BRACKET OVER THE SIDE EX-  
 TENSION REFLECTOR AND STANDARD  
 REFLECTOR AT SELECTED LOCATION. BY  
 USING HOLE IN THE BRACKET AS THE  
 TEMPLATE, DRILL OR PUNCH  
 APPROXIMATELY 3/32" DIAMETER PILOT  
 HOLE IN THE STANDARD REFLECTOR.  
 INSTALL #8 x 3/8 SHEET METAL SCREWS  
 AS SHOWN (DETAIL "A").

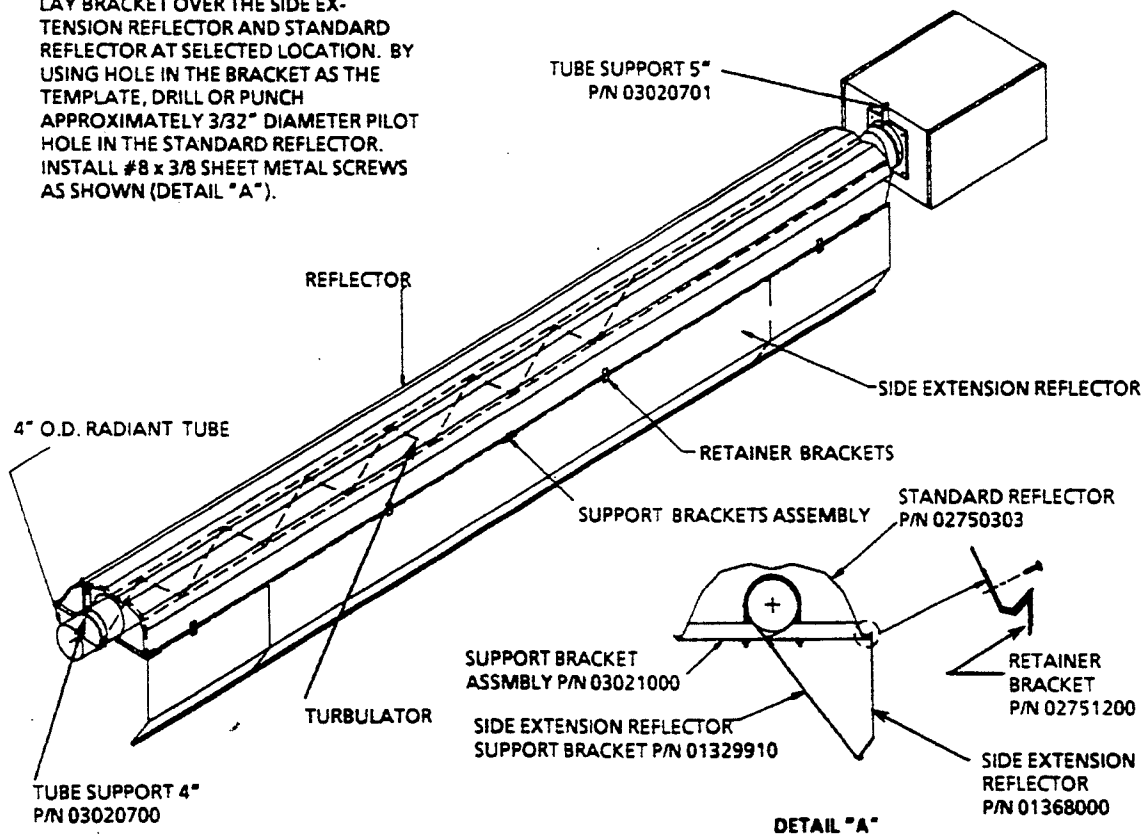
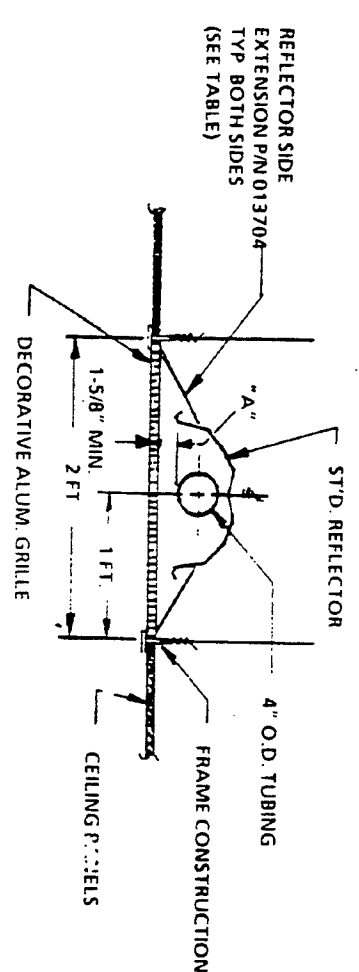
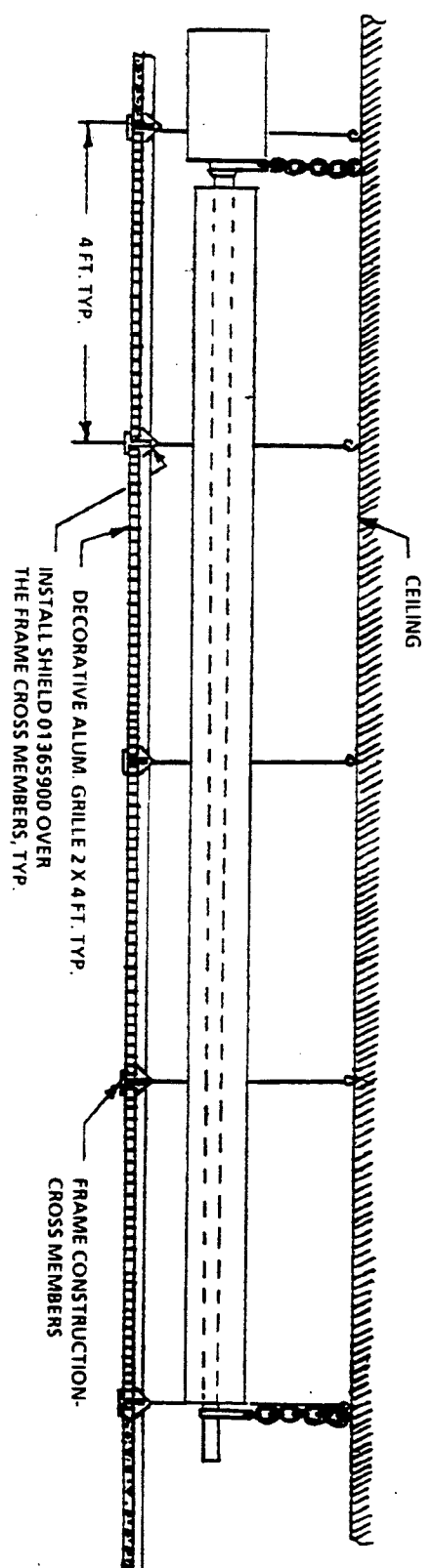


FIGURE 10.



PART NO.	WIDTH	"A"	
		MIN.	MAX.
01370408	8"	1.625	5.00
01370412	12"	5.000	9.75
01370416	16"	9.750	14.24

INSTALLATION OF GORDON-RAY DS HEATER WITH 2 FT. WIDE DECORATIVE GRILLE (OPTIONAL)  
FIGURE 11

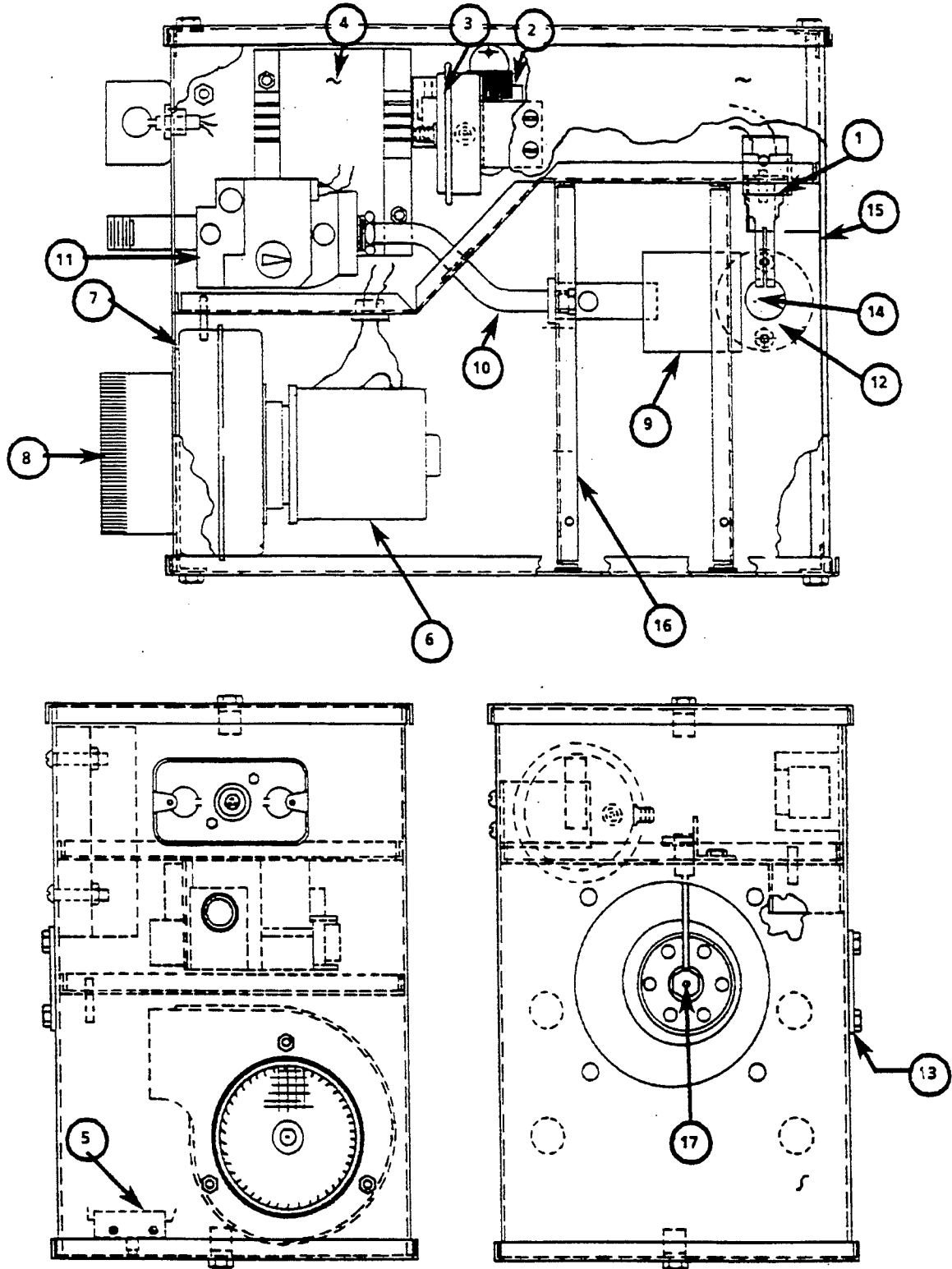


FIGURE 12. GORDON-RAY DS BURNER AND CONTROL HOUSING

### GORDON-RAY DS REPLACEMENT PARTS (REFER TO FIGURE 12)

ITEM	DESCRIPTION	PART No.
1	IGNITER	90436600
2	TRANSFORMER	90436900
3	AIR SENSING SWITCH	
	-DS-40	90436702
	-DS-60 & DS-80	90436700
4	IGNITION MODULE	90436500
5	SWITCH	90436800
6	MOTOR/BLOWER ASS'Y.	90708600
7	BLOWER INLET GASKET	03050900
8	FLUE COLLAR	91911700
9	BURNER CUP ASSEMBLY	03020100
10	MANIFOLD	03090000
11	GAS VALVE	
	-NATURAL GAS	90032500
	-L.P. GAS	90032501
12	VIEWER RING	01390202
13	VIEWER GASKET (2 REQ'D)	01351200
14	MICA WINDOW	02553200
15	TUBE GASKET	02568200
16	AIR ORIFICE PLATE	
	-DS-40	03050504
	-DS-60	03050505
	-DS-80	03050502
17	ORIFICE	
	-DS-40 NATURAL GAS	91910432
	-DS-40 L.P. GAS	91910450
	-DS-60 NATURAL GAS	91910426
	-DS-60 L.P. GAS	91910444
	-DS-80 NATURAL GAS	91910418
	-DS-80 L.P. GAS	91910437

### GORDON-RAY DS OPTIONS

DESCRIPTION	PART No.
Aluminum Grille 2 ft. x 4 ft.	91407000
8 Foot Side Extension Reflector	02712700
Side Extension Reflector Support	01329910
Outside Air Vent Cap	90502300
Vent Terminal - Tjernlund	90502100
Vent Terminal Adapter (use with Tjernlund Vent Terminal)	90502600
Vent Terminal Package (non-combustibles wall)	02537800
Draft Hood, Six Inch	90502400
Four to Six Inch Adapter (use with Draft Hood)	90502500
Line Voltage Thermostat	90411300
Low Voltage Thermostat (use with relay )*	90425100
Chronotherm Thermostat (use with relay )*	90437000
Moisture Resistant Thermostat (Line Voltage)	90437200
Relay (for use with Low Voltage Thermostat)*	90417600
Relay (for use with Low Voltage Thermostat)*	90436300

\* See Figure 6 To Determine Applicable Relay

## SERVICE INSTRUCTIONS

### SEQUENCE OF OPERATION (HOT SURFACE IGNITION)

The Gordon-Ray DS Heater is equipped with a Hot Surface ignition system. Operation sequence is as follows:

- Thermostat on a call for heat energizes the blower motor.
- When motor approaches nominal running RPM, the air proving switch closes, energizing the control module which acts to power the hot surface igniter for a timed warm up period
- After this warm up period, the gas valve is energized for a timed trial for ignition period.
- During the last part of the trial for ignition period the igniter is de-energized and is converted to a flame rod for a flame sense period.
- If a flame is detected, the gas valve remains open. When the call for heat is satisfied, the gas valves are turned off.
- If no flame is detected on a single-try module, the gas valve is closed, and the module will lockout until it is reset. Reset is accomplished by removing power from the module for 5 seconds.
- If no flame is detected on a three-trial module, the gas valve is closed, and a purge period begins. After the purge, the module acts to power the igniter for a second warm up period, and a second trial for ignition period. If flame is still not established, a third and final, purge, warm up, trial cycle begins, after three trials, three-trial modules will lockout until reset. Reset is accomplished by removing power from the module for 5 seconds.
- If flame is established and lost on a single trial module, the gas valve is closed and a purge, warm up, trial for ignition period will occur. On a three-trial module if flame is established, and lost on the first or second trial, the gas valve is turned off, a purge, warm up, trial for ignition will occur (on a three-trial module only three trials for ignition are allowed per thermostat cycle).

## TROUBLESHOOTING

### CAUTION

Before removing control housing cover for any type of service to heater, be sure that gas and electric supply to heater are turned OFF.

#### NO POWER TO HEATER:

1. Check to see that thermostat is calling for heat.
2. Check for blown fuse in electrical supply to heater.
3. Check for power on hot and neutral leads entering heater junction box.
4. Check for loose or broken wire at heater junction box.

#### BLOWER MOTOR FAILS TO RUN:

1. Check for loose or broken wires from motor to hot and neutral leads entering heater junction box.
2. Check to see if blower impeller turns freely; it may be hitting blower housing or motor shaft may be seized. Adjust to free impeller or repair or replace blower motor.
3. Check for loose or broken wires on door interlock switch.

#### NO POWER AT CONTROL MODULE:

1. Check line voltage power to transformer.
2. Check low voltage from transformer.
3. Check air proving switch.
4. Check thermostat.
5. Replace hot surface module

#### NO POWER TO HOT SURFACE IGNITER:

With gas to heater turned off, set thermostat above room temperature. When blower motor attains running speed the air proving pressure switch energizes the control module energizing the hot surface igniter. The hot surface igniter may be observed looking through the observation window of the burner housing.

Igniter should appear a bright orange glow.

Igniter glow duration is approximately 20 seconds, recycling of the thermostat may be necessary for observation purposes if no igniter glow appears.

1. Check for 120V to hot surface igniter.
2. Replace control module
3. Replace broken or shorted hot surface igniter.

Note: If control module goes into lockout, reset system.

#### MAIN BURNER DOES NOT LIGHT:

1. Check for 24 volts across valve and valve terminals on control module during lockout time, if no voltage, replace module.
2. Check igniter position.
3. Check electrical connections between control module and gas control, if okay replace gas control.

Note: If control module goes into lockout, reset system.

**MAIN BURNER DOES NOT STAY LIT:**

1. Check continuity of ground wire.
2. Make sure L1 and L2 are not reversed. This would prevent flame detection.

**NO GAS PRESENT**

Set thermostat above room temperature. When blower attains running speed, air proving pressure switch energizes main gas valve. If no gas flow or flame is established:

1. Check to see that manual gas supply valve to heater is ON.
2. Check to see that dial knob on redundant valve in control housing is turned to ON.
3. Check for gas pressure at 1/8" NPT Gauge tapping upstream of burner control.
4. Check for loose or broken wire leads from air proving pressure switch.
5. Check for loose or broken wire leads from gas valve to circuit board.
6. Replace defective gas valve.
7. Replace hot surface ignition module. Module is not field repairable.

**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.
- 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 hot surface igniter. Replace if there is excessive carbon residue, erosion, breakage or other defects.
- 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 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 CUP**

- Remove housing doors.
- Remove (2) screws holding hot surface igniter in place and remove igniter.
- Remove burner cup from housing by unscrewing counter clockwise from manifold threads.
- To reassemble, reverse above steps.





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 \_\_\_\_\_ BTUs Replaced \_\_\_\_\_

Vantage Units No. \_\_\_\_\_ Type \_\_\_\_\_

Serial Nos. \_\_\_\_\_

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 WAREHOUSE   | TYPE _____                                      | <input type="checkbox"/> UTILITY COMPANY BUILDING |
| <input type="checkbox"/> CAR WASH  | <input type="checkbox"/> LUMBER COMPANY         | TYPE _____  |
| <input type="checkbox"/> CONSTRUCTION EQUIP. DEALER  | <input type="checkbox"/> MANUFACTURING PLANT    | UTILITY _____                                     |
| <input type="checkbox"/> FABRICATION PLANT   | TYPE _____                                      | <input type="checkbox"/> WAREHOUSE                |
| TYPE _____   | <input type="checkbox"/> MACHINE SHOP           | <input type="checkbox"/> WELD SHOP                |
| <input type="checkbox"/> FARM <input type="checkbox"/> Cattle <input type="checkbox"/> Dairy | <input type="checkbox"/> PUBLIC BUILDING        | TYPE _____  |
| <input type="checkbox"/> Horse <input type="checkbox"/> Pig <input type="checkbox"/> Poultry | TYPE _____                                      | <input type="checkbox"/> ZOO                      |
| <input type="checkbox"/> FARM BUILDING   | <input type="checkbox"/> POST OFFICE            | <input type="checkbox"/> OTHER _____              |
| TYPE _____   | <input type="checkbox"/> RESTAURANT             |   |
|  | TYPE _____                                      |   |



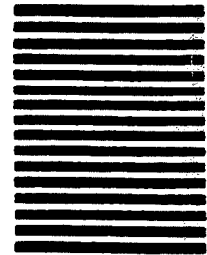
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UNITED STATES

**BUSINESS REPLY MAIL**  
FIRST CLASS PERMIT NO. 7406 BUFFALO, NY



**Roberts-Gordon, Inc.**  
Subsidiary of A.J. Industries  
P.O. Box 44  
Buffalo, NY 14240-0044

1ST FOLD

**ROBERTS-GORDON, INC.  
LIMITED WARRANTY**

**WARRANTY COVERAGE:** ROBERTS-GORDON, INC. ("Seller") warrants that entire heating systems sold by it (individually a "System") and any replacement parts which it sells relating to any System ("Parts") shall be free from defects in workmanship and material for the time periods described as follows. With respect to a System this Warranty shall apply for a period of three years from delivery to the original purchaser ("Buyer"). With respect to Parts, this warranty shall apply for the longer of the original System warranty period or for a period of one year. ("Systems" and "Parts" are hereinafter collectively referred to as "Products".) This warranty extends only to the original purchaser of Products.

Seller manufactures products which are designed only to provide predetermined ranges of heat rises in various enclosures when properly used in systems designed by purchaser or others and installed by others. Seller makes no representation or warranty with respect to the effect upon enclosure, or upon any of the contents of the enclosure, including, without limitation, all plant or animal life, kept or processed in the enclosure subject to the limitations outlined below.

**WARNING:** THIS WARRANTY IS VOID IF THE PRODUCTS HAVE BEEN DAMAGED DUE TO ACCIDENT, ABUSE, MISHANDLING OR ANY OTHER CAUSE WHATSOEVER OTHER THAN DEFECTS IN MATERIAL OR WORKMANSHIP. Specifically, Seller's warranty shall not apply: (a) to damage to Products when used in an atmosphere containing halogenated hydrocarbons or other corrosive chemicals. Some compounds in the air can be ingested into the equipment and can cause an accelerated rate of corrosion of some of the Products. The use of such chemical compounds in or near the enclosure should be avoided where a longer life of the burner, tubing and other parts is desirable; (b) to Products which have been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which have been installed and used contrary to Seller's written instructions or manuals; or (c) to any damage resulting from improper service or a lack of proper maintenance.

**LIMITATIONS OF WARRANTY:** OTHER THAN AS STATED HEREIN OR IN ANY OTHER WRITTEN WARRANTY OF SELLER, THERE ARE NO OTHER WARRANTIES OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, AND ALL OTHER EXPRESS AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR ANY PARTICULAR PURPOSE ARE HEREBY SPECIFICALLY DISCLAIMED.

**EXCLUSIVE REMEDY:** THE SOLE AND EXCLUSIVE REMEDY FOR ANY LOSS, DAMAGE OR LIABILITY, OR OTHERWISE, IS LIMITED TO THE OBLIGATION OF SELLER TO REPAIR OR REPLACE PARTS, AT ITS FACTORY, OF ANY PRODUCT OWNED BY ORIGINAL BUYER AND RETURNED TO SELLER'S FACTORY WITHIN THREE (3) YEARS AFTER SHIPMENT TO JOB SITE IN THE CASE OF SYSTEMS AND WITHIN ONE (1) YEAR AFTER SHIPMENT TO JOB SITE IN THE CASE OF PARTS, TRANSPORTATION CHARGES PREPAID, WHICH EXAMINATION REVEALS TO HAVE BEEN DEFECTIVE. UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR ANY LOSS, DAMAGE, COSTS, EXPENSES, OR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, IN CONNECTION WITH THE SALE, INSTALLATION, USE, MAINTENANCE, OR REPAIR, OF ANY PRODUCT.

**BUYER RESPONSIBLE FOR DATA:** Seller and its representative may furnish Buyer, upon Buyer's request, data relating to the function and use of Products. Seller shall not be liable for loss, damage, cost, expenses or incidental or consequential damages of any kind, sustained directly or indirectly, by any person, or to any property, if Buyer adopts and uses such data in whole or in part.

**LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:** No representative of Seller, other than an Executive Officer, has authority to change or extend these provisions. Changes or extensions shall be binding only if confirmed in writing by Seller's duly authorized Executive Officers.

Direct any questions or warranty claims to the original installer:

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Or to: Warranty Claims, ROBERTS-GORDON, INC., 1250 William Street, Buffalo, New York 14206.



*This Roberts-Gordon Gas-Fired  
Infrared Heater was manufactured  
in the United States by union labor  
dedicated to producing quality products.*



### **What you should know about Roberts-Gordon, Inc.**

- Pioneer developer and manufacturer of low-intensity gas-fired infrared heaters and heating systems.
- More than 60 years experience in the heating equipment industry.
- We cherish and work hard to protect our reputation for quality products.



**Roberts Gordon, Inc.**

*Subsidiary of A.J. Industries Inc.*  
P.O. Box 44, Buffalo, NY 14240

