GORDON-RAY

VENTED INFRARED
RADIANT TUBE GAS HEATER

MODEL

RTH-150A

SPECIFICATIONS
INSTALLATION, OPERATION, SERVICE
& SPARE PARTS

Roberts
Gordon

Appliance Corp.
Subsidiary of A.J. Industries Inc.
Buffalo, New York 14240

Quality Gas Heating Equipment for over 50 Years

Form No. F-1595E (5-85)

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.

GENERAL INFORMATION

It is important that these instructions and all applicable specifications be read in their entirety before proceeding.

This heater is intended for heating non-residential indoor spaces. Installation of this heater must comply with local codes and recommendations of the local gas company, and the National Fuel Gas Code, ANSI Z223.1-1984 (same as Bulletin #54). Units must be electrically grounded in accordance with the National Electrical Code, ANSI/NFPA 70-1984. Installation in (1) aircraft hangars must be in accordance with the standard for Aircraft Hangars, ANSI/NFPA 409-1979 and (2) garages in accordance with the standard for Parking Structures, NFPA 88A-1979 or the standard for Repair Garages NFPA 88B-1979.

For locations where there is the possibility of exposure to combustible airborne materials or vapor, consult the authorities having local jurisdiction to obtain approval for proposed installation. The authorities with local jurisdiction are usually the Fire Marshal and fire insurance carrier.

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. Local authorities such as Building Inspections or Fire Marshals should be consulted for guidance in this matter.

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LIST OF ILLUSTRATIONS

Form No. F-1595E

General Specifications

Model: RTH-150A
Rating: Natural Gas - 150,000 BTU/HR INPUT
L.P. Gas - 145,000 BTU/HR INPUT
Gas Connection Size - ½" N.P.T.

Manifold Pressure

Natural	3.5" w.c.
L.P.	11.0" w.c.

Orifice Pressure (Manifold-Burner)

Natural	2.8" w.c.
L.P.	10.3"

ELECTRICAL RATING - 120V 60Hz 2.6 Amp
FLUE CONNECTION SIZE - 6" O.D.
WEIGHT OF HEATER - 200 LBS.

Gas Inlet Pressure

GAS	MAXIMUM	MINIMUM
Natural	13.0" w.c.	4.5" w.c.
L.P.	13.0" w.c.	11.0" w.c.

Mounting Height typically 13 feet minimum (plus additional height as necessary to maintain listed clearances to combustible material)

Clearances to Combustibles, Stnd.	Above	Below	Side	Opposite Side	
Standard Reflector	12"	72"	36"	36"	
With 1-Side Extension Reflector	12"	76"	36"	12"	*Do not use with
With 2-Side Extension Reflectors	12"	84"	24"	24"	Side Extension
Radiant Shield*	12"	60"	60"	60"	Reflector

In all situations, clearances to combustibles must be maintained.

Warning: Minimum clearances from heater must be maintained from vehicles parked below heater.

Standard Equiment Includes:
Complete heater assembled, consisting of: Cast-iron burner, coated steel combustion chamber and heat exchanger, fully automatic controls, motor with thermal overload switch, balanced air rotor, 5" O.D. radiant tube with stainless steel air pre-heater and baffles; gas shut-off cock; aluminum reflector and built-in drafthood.
OPTIONAL: Thermostats, Reflector Side Extension.

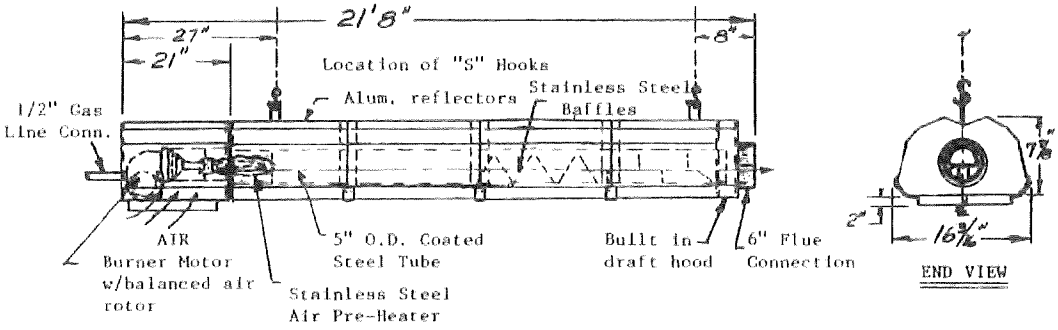


Fig. 1 – Side View Showing Hangar Supports

Installation in Aircraft Hangars
Heaters must be installed in accordance with specification ANSI/NFPA 409-1979 and with special consideration for the following:

1. 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).
2. 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.
3. Heaters installed in aircraft hangars shall be so located 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.

Installation in Public Garages
In accordance with the standard for parking instructions, NFPA 88A-1979, or the standard for repair garages, NFPA 88B-1979.

1. 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.
2. When installed over hoists, clearance to combustibles must be maintained from top of vehicle on hoist or in elevated position.

3. 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 - 1984).

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

Installing the Heater

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, provide for accessibility for service, combustion and ventilating air supply as specified in ANSI Z223.1 National Fuel Gas Code.

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 or supplier of equipment.

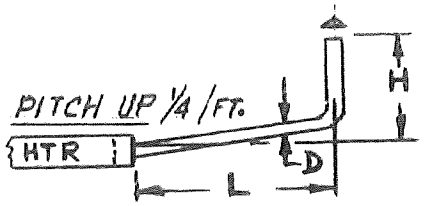
Venting

The venting must be installed in accordance with Specification ANSI Z223.1 (NFPA No. 54) "National Fuel Gas Code." Partial information relating to this Specification is provided in this section with regard to size and configurations for venting arrangements (see following tables and diagrams). However, it is the responsibility of the installer to make the installation in strict accordance with National Fuel Gas Code ANSI Z223.1 to provide assurance of proper and safe operation.

RTH heaters are designed for outdoor venting. For best results RTH heaters should be vented individually or in groups of heaters with a common vent and controlled by a common thermostat. This reduces condensation and provides a stronger natural draft. The use of vent caps and positioning of the top of the vent with respect to roof structure should be in accordance with ANSI Z223.1. For other situations not covered here, the installer must consult ANSI Z223.1 or other sources to obtain the necessary information.

INDIVIDUAL VENTING

LATERAL (L) (Max.)	(H) HEIGHT (Min.)	(D) DIA. (Min.)
0 - 2 ft.	8 ft.	6"
0 - 10 ft.	15 ft.	6"
0 - 5 ft.	6 ft.	7"
0 - 10 ft.	8 ft.	7"
0 - 15 ft.	10 ft.	7"

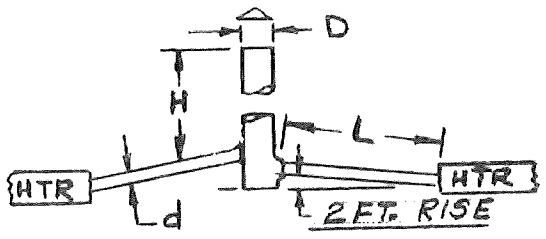


MULTIPLE VENTING

(Vent connectors into a common stack)

CONNECTOR Maximum Length (L)	CONNECTOR Diameter Required (d)
0 - 8 ft.	7" Min.
0 - 9 ft.	7" Min.
0 - 10 ft.	7" Min.

Number of Heaters	D (Minimum)	H (Minimum)
2	10"	6 ft.
3	10"	15 ft.
4	12"	15 ft.
5	12"	20 ft.



The diagram above shows a common stack serving two or more heaters.
THE STACK HEIGHT (H) MUST BE ⅓ MORE THAN THE LONGEST CONNECTOR LENGTH.

NOTE: For multiple vent connectors with converging flow, the connections must be positioned to avoid direct opposition between the streams of combustion gases.

Power venting

Power venting should be used if conditions cannot be met for size and configuration as described herein, or if the heater is located in an area of negative pressure with respect to the point of discharge of flue products. For best results, all heaters connected to a common powered vent should meet both of the following conditions:

1. Be controlled by a single thermostat.
2. Be wired with an interlock circuit to preclude firing unless the power vent is operating.

See Field Wiring Dia. Fig. 3a and 4a.

A maximum of (2) Model RTH-150A Heaters can be vented per power ventor R.G. Part No. 907-075. This is for a distance up to 100 feet of equivalent length and a minimum duct diameter of 6". The equivalent length is computed as actual length of straight sections plus 10' for 90 degree elbows, 5' for 45 degree elbows and 10' for Briedert cap or equivalent.

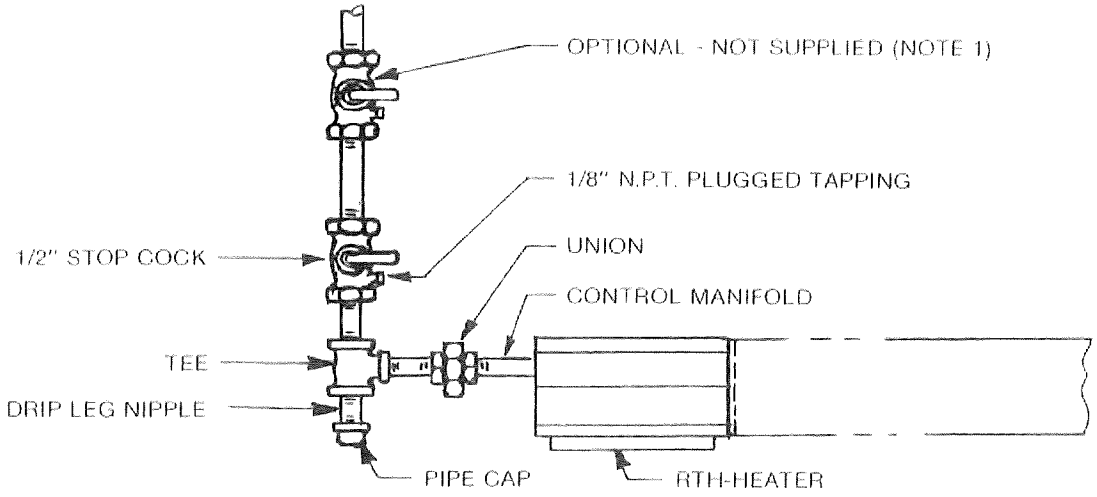
GAS PIPING

1. Check meter to be sure it is large enough to handle all the gas appliances on the line, including this heater. If necessary, request gas company to install a larger meter.
2. 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" W.C. If there is any question, check with the gas company. Use the following capacity table as a guide:

Pipe Capacity Cu. Ft./Hr.-Specific Gravity 0.6 — Pressure Drop-0.5 Inches Water Column

PIPE SIZE	LENGTH OF STRAIGHT PIPE, FEET						
	20	40	60	80	100	150	200
¾"	250	170	138	118	103	84	72
1"	465	320	260	220	195	160	135
1¼"	950	660	530	460	400	325	280

3. All pipe should be properly supported by using suitable pipe hanging materials.
4. Wrought iron or wrought steel pipe and malleable iron fittings are recommended. All pipe fittings should be new and free from defects.
5. For LP Gases, see your LP Dealer for details on pipe or tubing sizes and general information on handling Liquefied Petroleum gases.
6. Ends of pipes and tubing should be carefuly reamed to remove obstructions or burrs.
7. Use a special compound in making all pipe connections. Compound should be of a type that is suitable for LP Gas.
8. Install a drip leg ahead of heater to prevent foreign matter and moisture frome entering the heater controls.
9. Provide a 1/8" N.P.T. plugged tapping immediately upstream of the gas supply connection to the heater, accessible for test gage connection.



NOTE (1) High pressure stop cock as supplied by installer if required.

Fig. 2 – Typical Gas Piping Arrangement

Electrical

1. Heaters are normally controlled by thermostats (See Fig. 3 & 3a). Line voltage thermostats are wired directly; the recommended 24 volt thermostats use a relay per Figure 4 & 4a. Heaters must be grounded in accordance with National Electrical Code ANSI/NFPA 70-1981. Heaters can also be controlled with a manual line voltage switch or times switch in place of the thermostat.
2. For schematic of factory wiring RTH Heater refer to applicable wiring diagram supplied with these instructions.

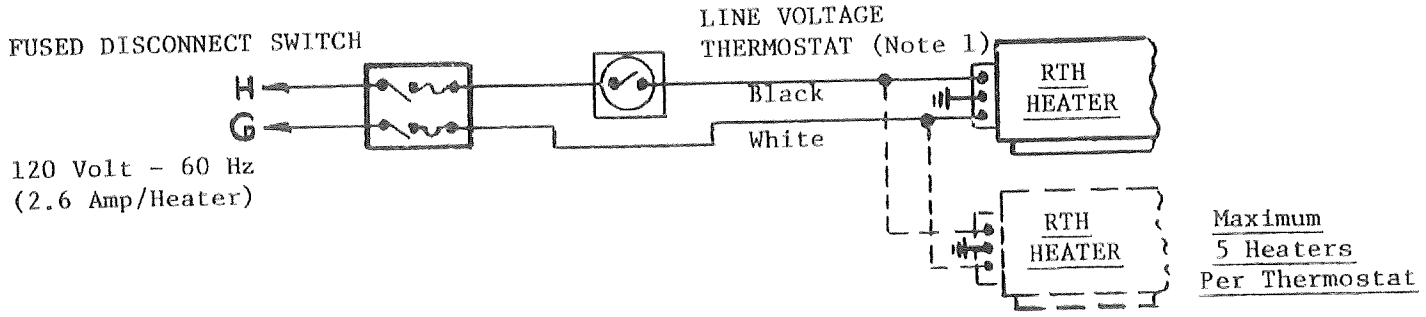


Fig. 3 – "Field" Wiring of Line Voltage Thermostat

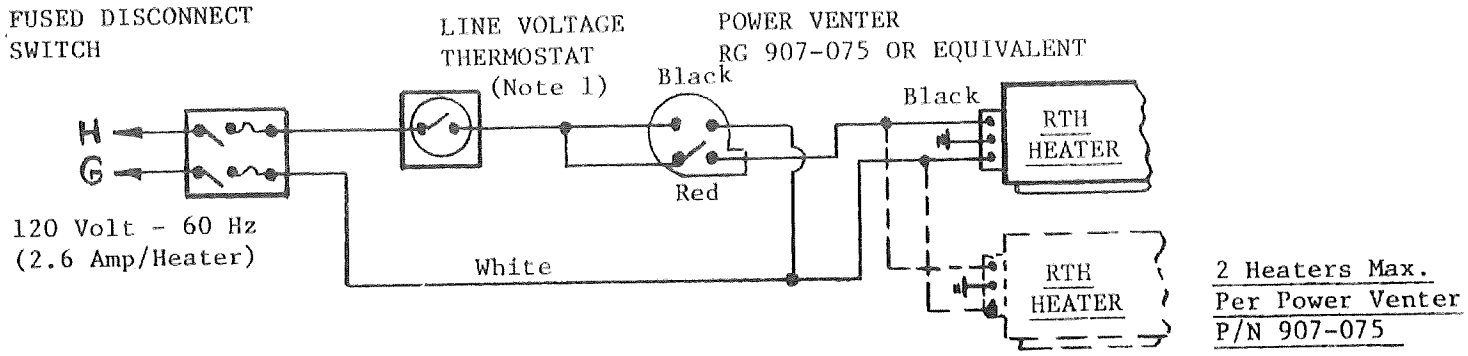


Fig. 3a – "Field" Wiring of Line Voltage Thermostat with Power Venting

Note:
1. For wiring line voltage thermostat White Rodgers P/N 176-12 (RG 904-113) use terminals "B" and "R" and jumper terminal "W" to "R".

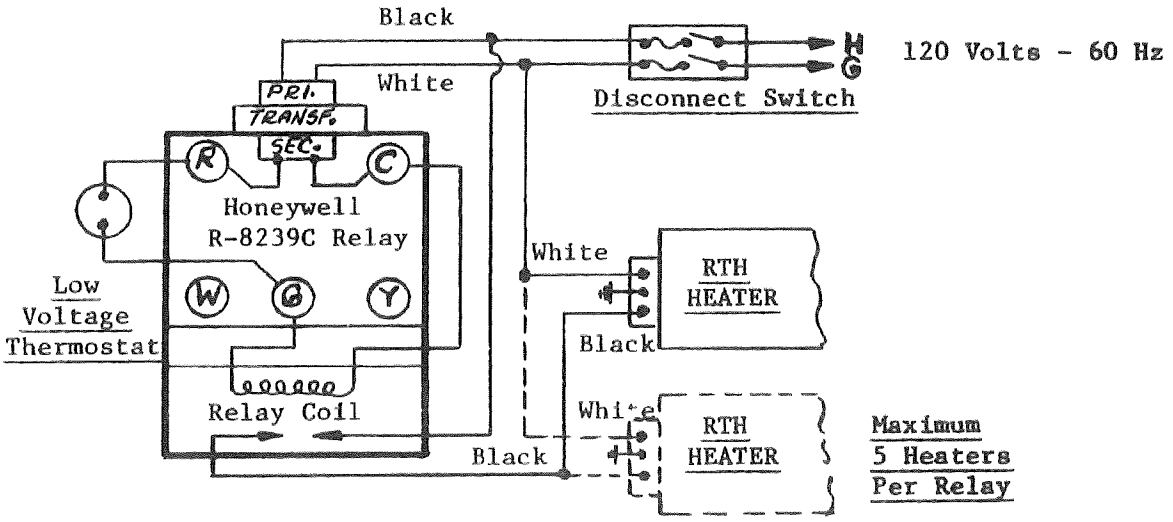


Fig. 4 — "Field" Wiring of Low Voltage Thermostat and Relay

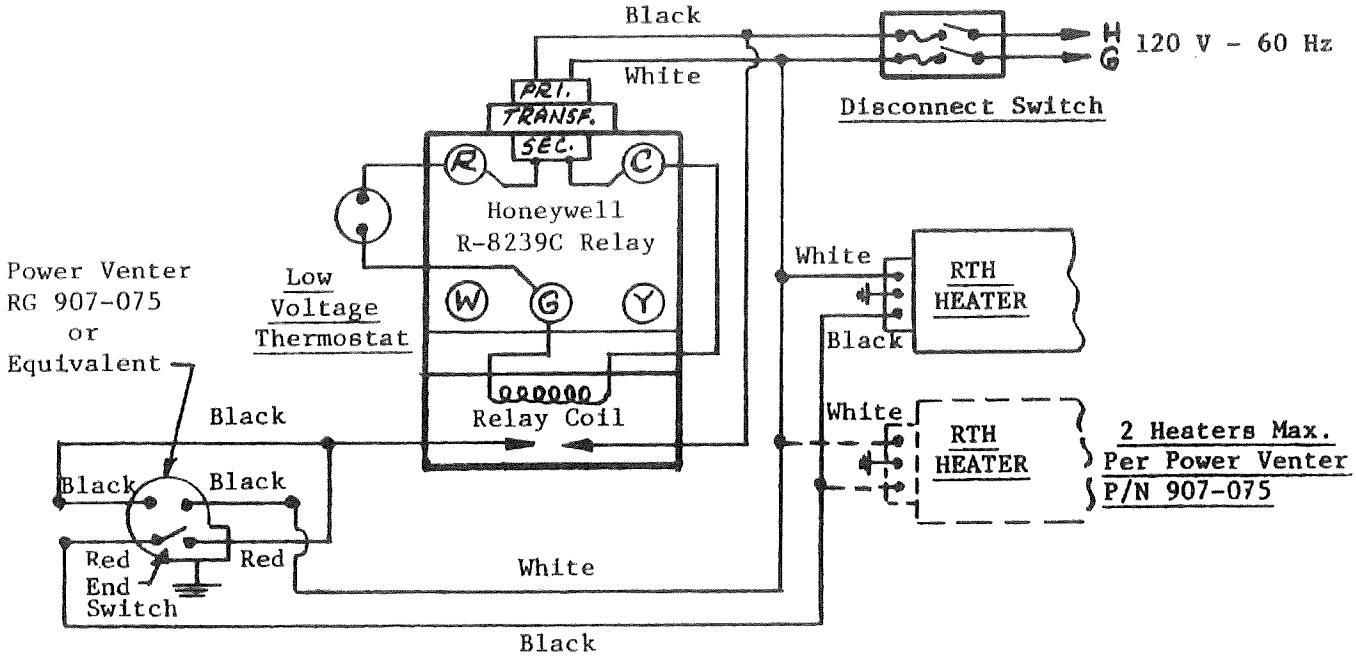


Fig. 4a — "Field" Wiring of Low Voltage Thermostat and Relay and Power Venting

SEQUENCE OF OPERATION

MODEL RTH-150A D.S.I. CONTROL

The RTH Gordon-Ray Heater is equipped with a gas direct spark ignition system. This is how it works:

1. Thermostat on a call for heat energizes the blower motor and motor end switch.
2. When motor approaches nominal running R.P.M., the centrifugal end switch closes, energizing the control board which energizes the spark ignitor and opens the redundant gas valve.
3. With normal operation as the flame is established, the spark ceases.
4. If the flame is not established during the flame establishing period, the system closes the gas valve and locks out.
5. If flame is extinguished during the duty cycle, the ignitor will provide one immediate retry for ignition before going into lockout.
6. After lockout, control must be reset by turning down thermostat for five seconds and then raising it again to desired temperature.
7. When thermostat is satisfied all power to the unit is deenergized.

SERVICE INSTRUCTIONS

MODEL RTH-150A

D.S.I. CONTROL

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 ground 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 ground 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.

No Spark

1. With gas to heater turned **off** set thermostat above room temperature. When blower motor attains running speed the blower motor end switch energizes the spark module. The spark electrode may be observed by looking thru the observation window of the burner control housing. Spark should appear as a bright blue arc across the electrodes. Spark duration is only a few seconds since main flame is not established, so recycling of thermostat may be necesary for observation purposes, if no spark appears.

Service Instructions cont.

a. **Check** for loose or broken leads from motor end switch.
b. **Check** for carbon bridge or broken porcelain insulator on spark electrode.
c. **Check** spark electrode gap should be .125 inches.
d. **Check** leads from electrode for loose connections or frayed insulation.
e. **Replace D.S.I. module if defective, module is not field repairable.**

No Gas Present

Set thermostat above room temperature. When blower attains running speed blower motor end switch energizes main gas valve if no gas flow or flame are established:

a. **Check** to see that manual gas supply valve to heater is on.
b. **Check** to see that dial knob on redundant valve in control housing is turned to on.
c. **Check** for gas pressure at 1/8" N.P.T. Gauge tapping upstream of burner control.
d. **Check** for loose or broken leads from motor end switch.
e. **Check** for loose or broken wire leads from gas valve to circuit board.
f. Replace defective gas valve.
g. Replace circuit board. Board is not field repairable.

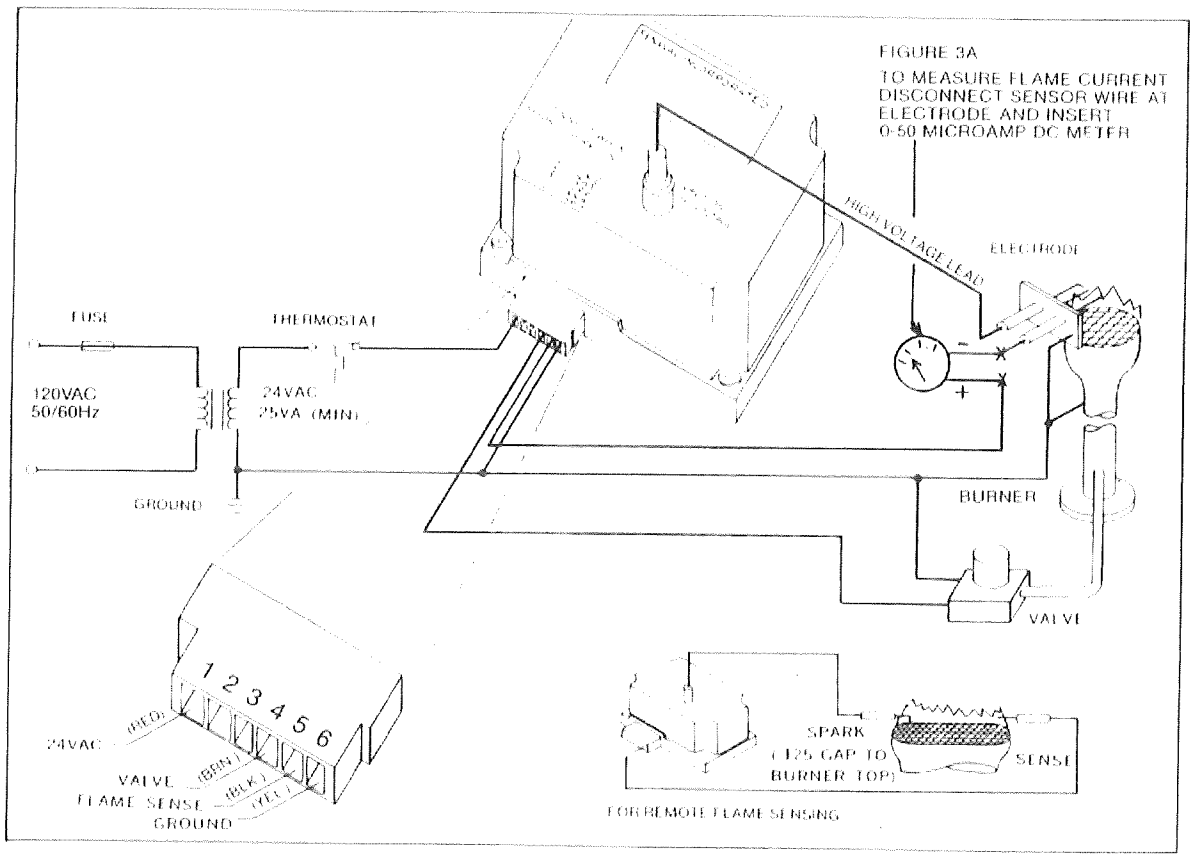
WITH FENWAL CONTROL

Flame current is the current which passes through the flame from the sensor to ground to complete the primary safety circuit. The minimum flame current necessary to keep the ignitor from lockout is five microamps. To measure flame current, DISCONNECT INPUT VOLTAGE then remove low voltage sensing lead wire from electrode terminal and insert a 0-50 DC microamp meter in a series with the sensor probe and sensor wire (see Diagram 10, page 10). Meter reading should be 5 microamps or higher.

If meter reads below "0" on scale, the leads are reversed. Disconnect power and reconnect leads for proper polarity.

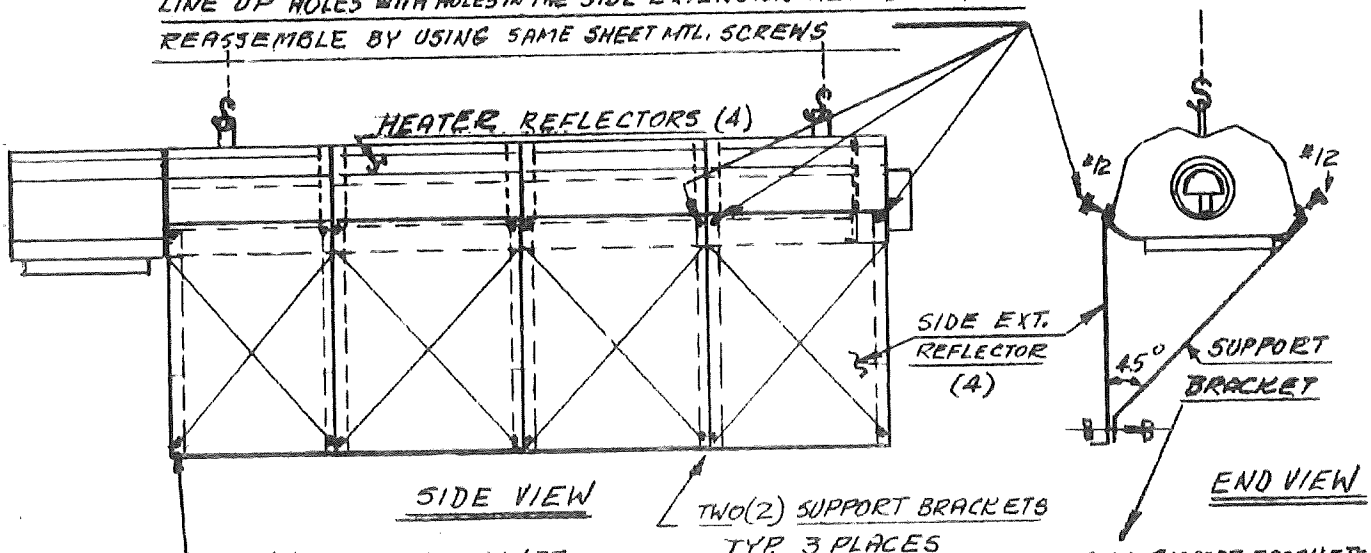
If the flame current reading is less than 5 microamps, reposition the electrode in the flame to get a higher reading.

Fig. 5



INSTALLATION OF SIDE EXTENSION REFLECTORS

REMOVE #12 SHEET METAL SCREWS (ONE SECTION AT A TIME), THEN LINE UP HOLES WITH HOLES IN THE SIDE EXTENSION REFLECTOR AND REASSEMBLE BY USING SAME SHEET MTL. SCREWS

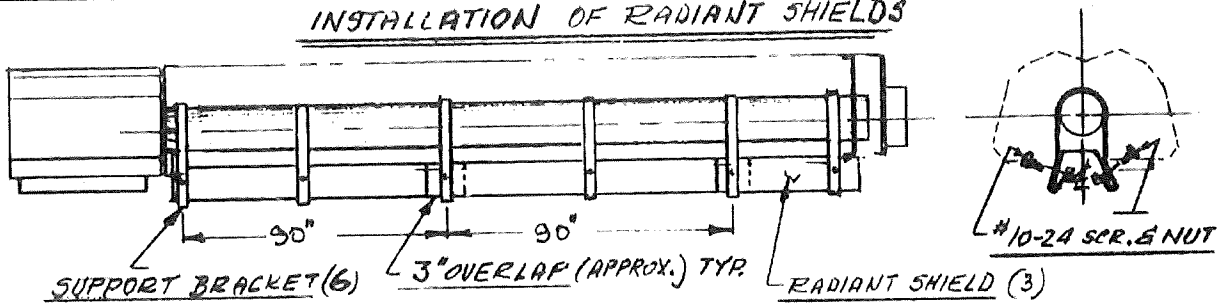


TO INSTALL SUPPORT BRACKETS:

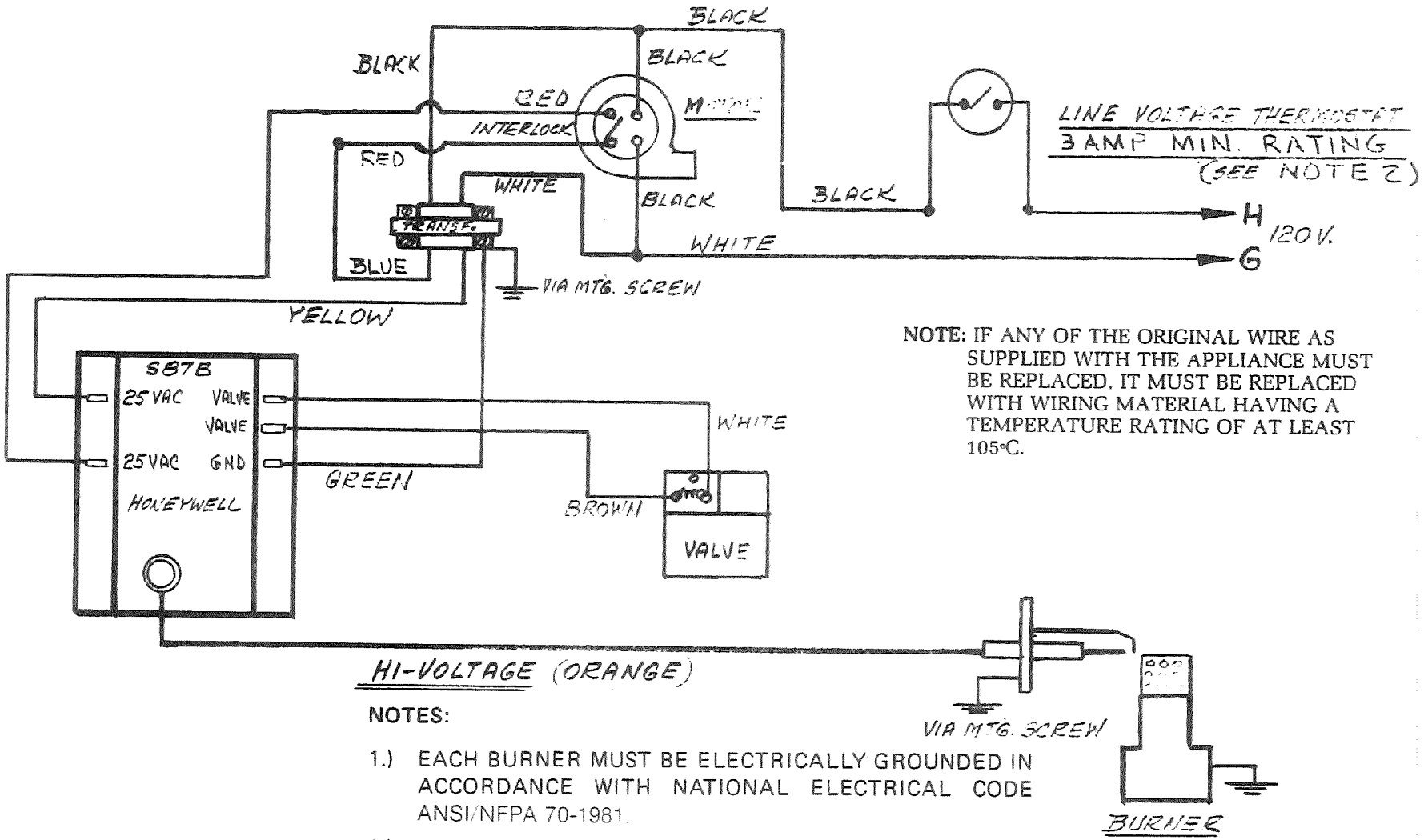
a) REMOVE #12 SHEET METAL SCREWS, ATTACH SUPPORT BRACKETS TO THE HEATER REFLECTORS BY USING SAME #12 SCREWS (AS ILLUSTRATED).

b) ATTACH LOWER FLANGE (45°) OF THE EACH SUPPORT BRACKET TO THE SIDE EXT. REFL. BY DRILLING 7/32 DIA. HOLE TO LINE UP WITH THE HOLE IN SUPPORT BRACKET. ASSEMBLE BY USING #10-24 SCREWS AND NUTS PROVIDED.

INSTALLATION OF RADIANT SHIELDS



SLIDE SUPPORTS BRACKETS OVER THE 5" O.D. TUBE, SPACE THEM APPROX. AS SHOWN. INSTALL RADIANT SHIELDS (2 PC's EACH 96" LG. 3rd PC. 48" LONG). DRILL 7/32 DIA. HOLES THROUGH RAD. SHIELDS TO LINE UP WITH EXISTING HOLES IN THE SUPPORT BRACKETS. ASSEMBLE BY USING #10-24 SCREWS AND NUTS, PROVIDED. (SEE ILLUSTRATION)



NOTE: 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.

NOTES:

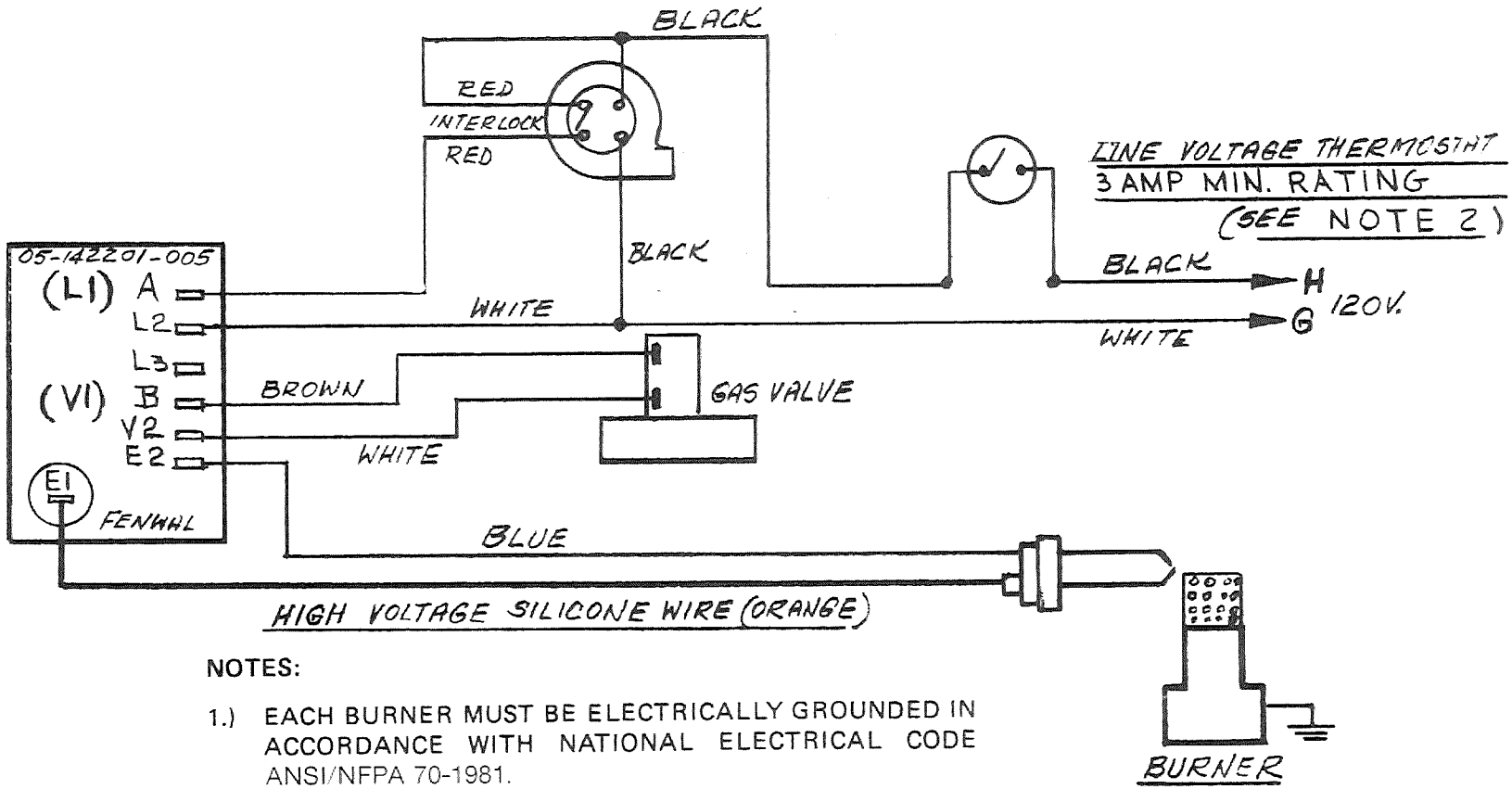
1.) EACH BURNER MUST BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70-1981.

2.) FOR LOW VOLTAGE THERMOSTAT AND/OR PARALLEL BURNER OPERATION. SEE "FIELD" WIRING - FIG. 3, 3a ON PAGE 5.

WIRING DIAGRAM - HONEYWELL
D.S.I. 24 VOLT, RTH-150A HEATER

Fig. 6

NOTE: 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.



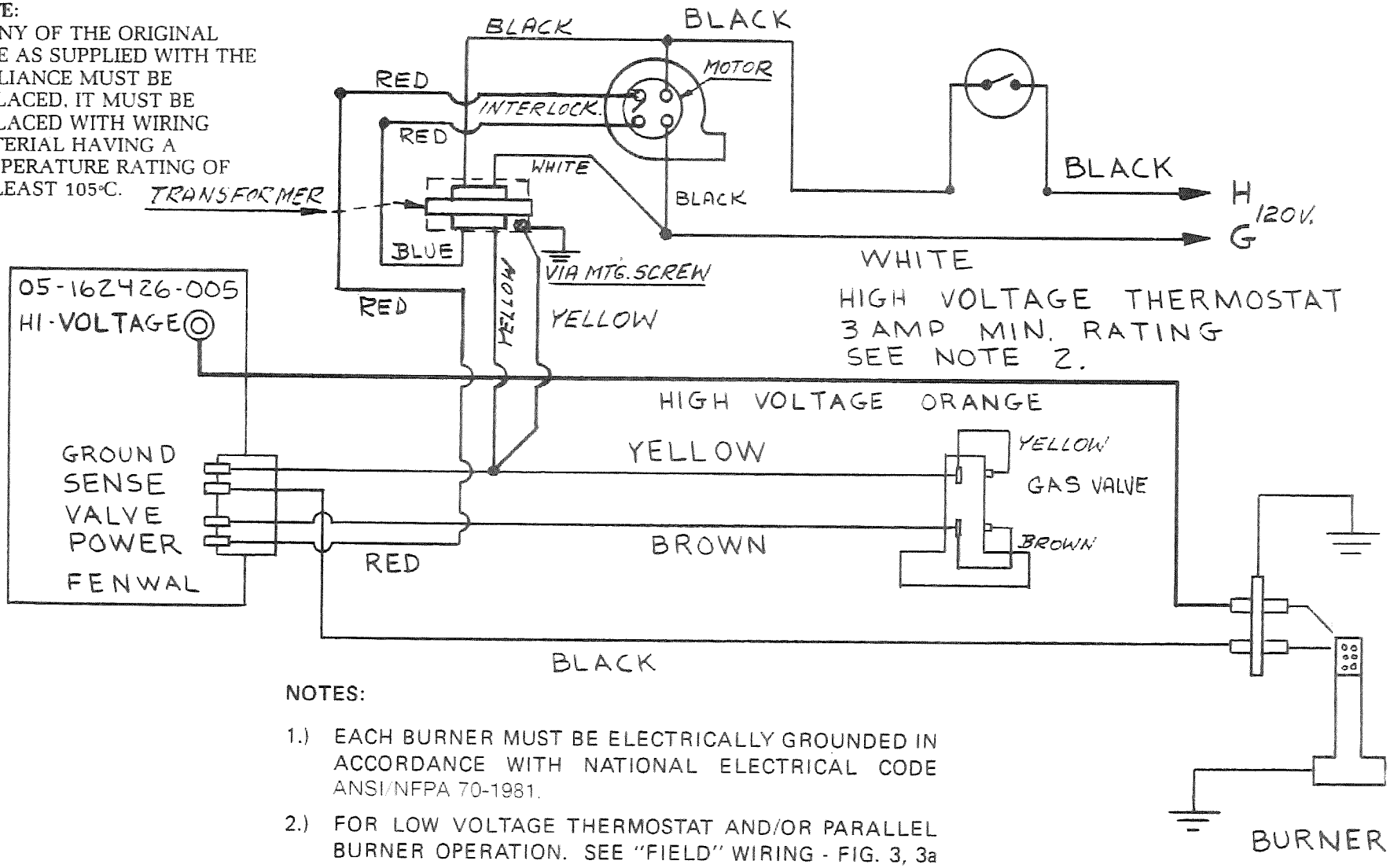
NOTES:

1.) EACH BURNER MUST BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70-1981.

2.) FOR LOW VOLTAGE THERMOSTAT AND/OR PARALLEL BURNER OPERATION. SEE "FIELD" WIRING - FIG. 3, 3a ON PAGE 5.

WIRING DIAGRAM - FENWAL
D.S.I. 120 VOLT, RTH-150A HEATER

NOTE:
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.



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2.) FOR LOW VOLTAGE THERMOSTAT AND/OR PARALLEL BURNER OPERATION. SEE "FIELD" WIRING - FIG. 3, 3a ON PAGE 5.

WIRING DIAGRAM - FENWAL
D.S.I. 24 VOLT, RTH-150A HEATER

Fig. 8

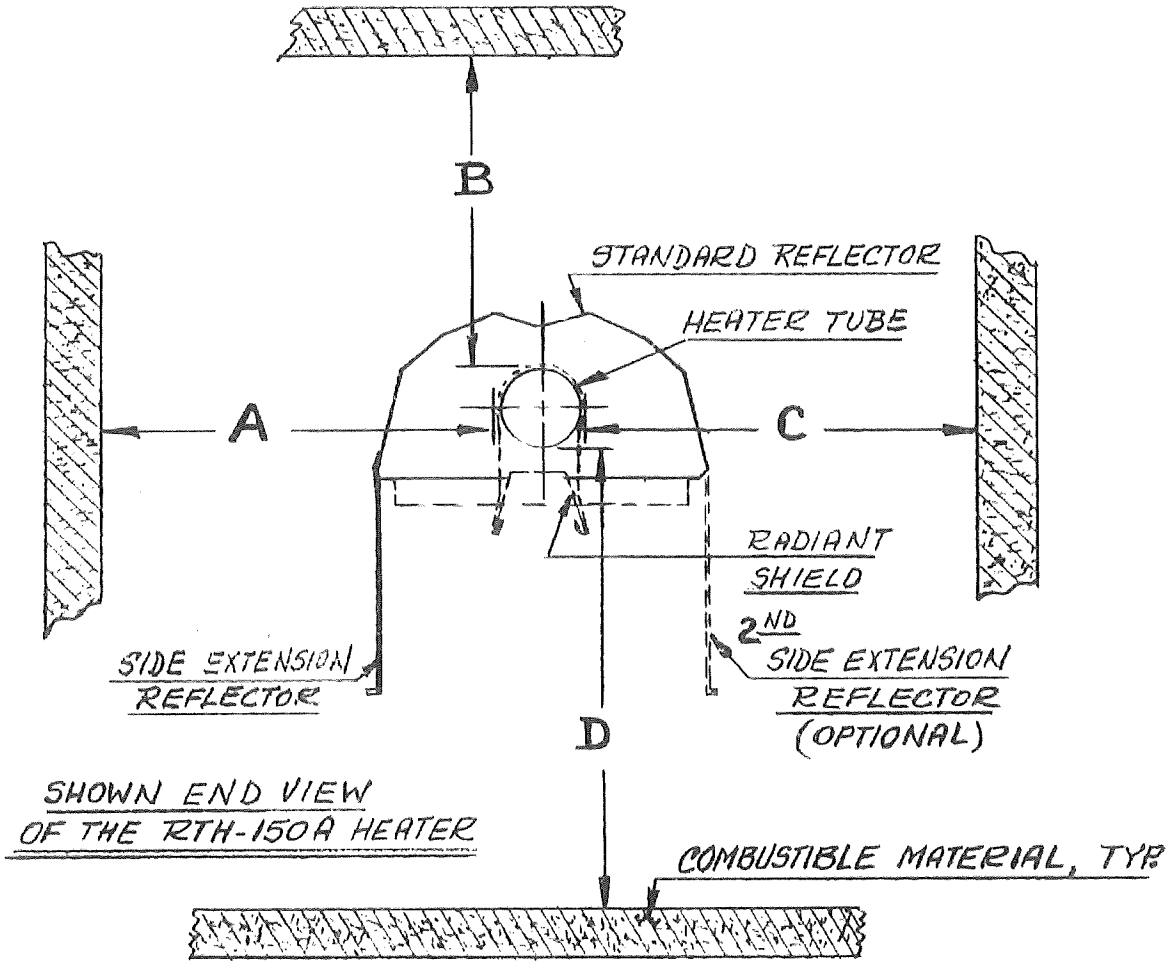


TABLE OF CLEARANCES TO COMBUSTIBLES:

	RTH-150A HEATER	A	B	C	D
	STANDARD REFLECTOR.	36	12	36	72
*	STD. REFL. WITH RADIANT SHIELD.	60	12	60	60
	STD. REFL. WITH ONE SIDE EXTENSION REFL.	12	12	36	76
	STD. REFL. WITH TWO SIDE EXTENSION REFLS.	24	12	24	84
		INCHES:			

* DO NOT USE WITH SIDE EXTENSION REFLECTOR.

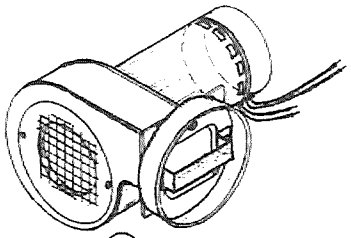
NOTE: IN ALL SITUATIONS CLEARANCES TO COMBUSTIBLES MUST BE MAINTAINED.

WARNING: MINIMUM CLEARANCES FROM HEATER MUST BE MAINTAINED FROM VEHICLES PARKED BELOW HEATER.

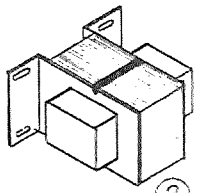
Fig. 9

REPLACEMENT PARTS FOR RTH-150A

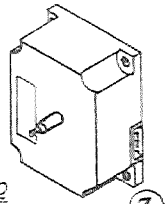
ITEM	DESCRIPTION	PART NO.
1	Blower and Motor Assembly	02516100
2	AT-40C Transformer	90424200
3	Fenwal D.S.I. Control Module 24 Volt	90427302
4	Honeywell D.S.I. Control Module 24 Volt	90427900
5	Fenwal Electrode Assembly	90427400
6	Honeywell Electrode Assembly	90428000
7	Honeywell Electrode Mounting Bracket	02516300
8	Fenwal Electrode Mounting Bracket	02516200
9	Fenwal Ignition Cable Assembly	90427700
10	Fenwal Low Voltage Connector Assembly	02514700
11	Honeywell Ignition Cable Assembly	90428100
12	Mixer Assembly with Adaptor and Orifice – Nat. Gas	02516400
12a	Mixer Assembly with Adaptor and Orifice – L.P. Gas	02516500
13	Burner Tube and Back Plate Assembly	02516600
14	Bottom Cover Assembly (Control Housing)	02525100
15	Fuel Conversion Kit L.P. to Nat. (Robert-Shaw Valve)	02514900
16	Fuel Conversion Kit Nat. to L.P. (Robert-Shaw Valve)	02515000
17	Fuel Conversion Kit Nat. to L.P. (Honeywell Valve)	02516700
18	Fuel Conversion Kit L.P. to Nat. (Honeywell Valve)	02516800
19	Robert-Shaw Gas Valve - Nat. Gas	90031200
20	Robert-Shaw Gas Valve - L.P. Gas	90031100
21	Honeywell Gas Valve - Nat. Gas	90031300
22	Honeywell Gas Valve - L.P. Gas	90031700
23	Orifice Adaptor	02591800
24	Orifice "B" Drill - Nat. Gas	91910498
25	Orifice #29 Drill - L.P. Gas	91910429



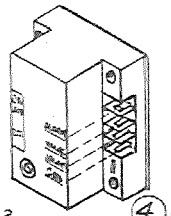
(1) P/N 02516100
BLOWER AND MOTOR ASS'Y. WITH FLANGE, BAFFLE AND AIR INLET PLATE ASS'Y, ASSEMBLED



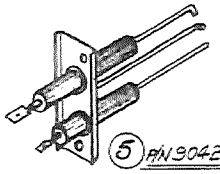
(2) P/N 30424200
AT-40B TRANSFORMER



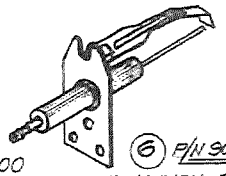
(3) P/N 30427302
FENWAL D.S.I. CONTROL MODULE
(24 V.)



(4) P/N 30427900
HONEYWELL D.S.I. CONTROL MODULE
(24 V.)



(5) P/N 30427400
FENWAL ELECTRODE ASS'Y.



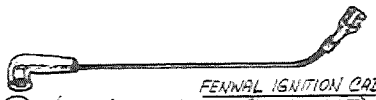
(6) P/N 30428000
HONEYWELL ELECTRODE ASS'Y.

(15) P/N 02514900
FUEL CONVERSION KIT L.P. TO NAT. (ROBERT-SHAW VALVE)

(16) P/N 02515000
FUEL CONVERSION KIT NAT. TO L.P.
(ROBERT-SHAW VALVE)

(17) P/N 02516700
FUEL CONVERSION KIT NAT. TO L.P. (HONEYWELL VALVE)

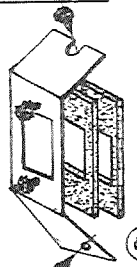
(18) P/N 02516800
FUEL CONVERSION KIT L.P. TO NAT. (HONEYWELL VALVE)



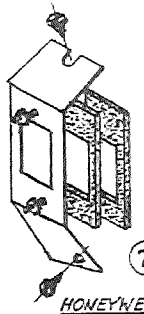
(9) P/N 30427700
FENWAL IGNITION CABLE ASS'Y.
(HI-VOLTAGE)

(10) P/N 02514700 FENWAL LOW VOLTAGE CONNECTOR ASS'Y.

(11) P/N 30428100 HONEYWELL IGNITION CABLE ASS'Y.
(HI-VOLTAGE)



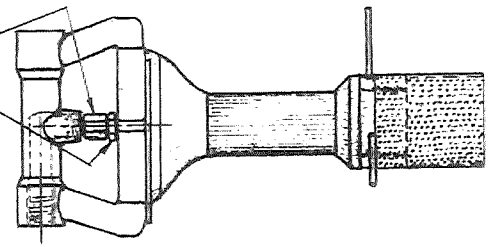
(8) P/N 02516200
PACKAGE:
FENWAL ELECTRODE MTG. BRACKET WITH 2 GASKETS AND MOUNTING HARDWARE



(7) P/N 02516300
PACKAGE:
HONEYWELL ELECTRODE MTG. BRACKET WITH 2 GASKETS AND MOUNTING HARDWARE

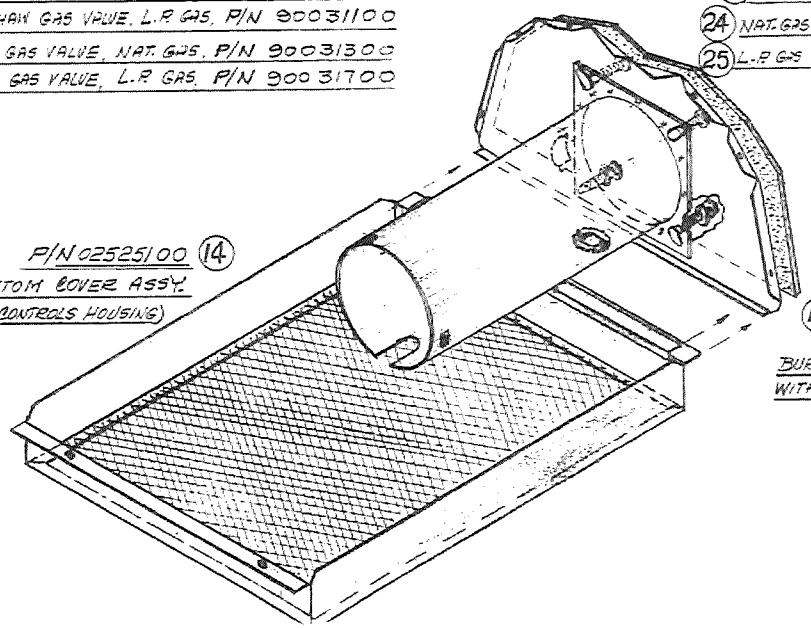
(19) ROBERT-SHAW GAS VALVE, NAT. GAS. P/N 90031200
(20) ROBERT-SHAW GAS VALVE, L.P. GAS. P/N 90031100
(21) HONEYWELL GAS VALVE, NAT. GAS. P/N 90031300
(22) HONEYWELL GAS VALVE, L.P. GAS. P/N 90031700

(23) ORIFICE ADAPTER ONLY. P/N: 02591800
(24) NAT. GAS ORIFICE ONLY, "B" DRILL, AN 9110438
(25) L.P. GAS ORIFICE ONLY, #29 DRILL, P/N 9110429



(12) P/N 02516400 MIXER ASS'Y. WITH ADAPTER AND ORIFICE FOR NAT. GAS

(12a) P/N 02516500 MIXER ASS'Y. WITH ADAPTER AND ORIFICE FOR L.P. GAS



P/N 02525100 (14)
BOTTOM COVER ASS'Y.
(CONTROLS HOUSING)

(13) P/N 02516600
PACKAGE:
BURNER TUBE AND BACK PLATE ASS'Y. WITH END GASKET AND MTG. HARDWARE

WARRANTY

WARRANTY: ROBERTS-GORDON APPLIANCE CORPORATION ("Seller") manufactures heating components 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 the enclosure, or upon any of the contents of the enclosure, including, without limitation, all plant or animal life, kept or processed in the enclosure. Seller does warrant that heating components manufactured by it, or bearing its nameplate, shall be free from defects in workmanship and material.

WARNING: Seller's warranty shall not apply: (a) to damage to the product 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 parts of the heating components. 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 any heaters or heating components which have been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which have been used contrary to seller's written instructions.

LIMITATION OF WARRANTY: THIS IS SELLER'S ONLY WARRANTY. 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, WHETHER BASED ON CONTRACT, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE, IS LIMITED TO THE OBLIGATION OF SELLER TO REPAIR OR REPLACE PARTS, AT ITS FACTORY, OF ANY HEATING COMPONENT OWNED BY ORIGINAL BUYER AND RETURNED TO SELLER'S FACTORY WITHIN ONE (1) YEAR AFTER DELIVERY, 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 OF SELLER'S HEATING COMPONENTS.

BUYER RESPONSIBLE FOR DATA: Seller and its representatives may furnish Buyer, upon Buyer's request, data relating to the function and use of Seller's heating components. 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 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.

QUALIFIED ACCEPTANCE OF BUYER'S ORDER: Acceptance of Buyer's form of order is expressly conditioned upon Buyer's assent to these provisions of sale. Any terms and conditions of Buyer's order inconsistent with these provisions shall not be binding on Seller and shall not be considered applicable to the sale or shipment of Seller's heating components. Acceptance of shipment by Buyer shall be conclusively deemed acceptance of these provisions.