⚠WARNING: This heater must be installed and serviced by trained gas installation and service personnel only! 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. Protect yourself and others by observing all safety information. Retain instructions for future reference.

Detroit Radiant Products Company
- DR Series -

⚠ WARNING!

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

⚠ *WARNING - NOT FOR RESIDENTIAL USE*

This heater is **NOT** approved for use in any residential application. This includes (but is not limited to) attached garages, solariums, living quarters, etc. Consult the local fire marshal and/or insurance provider if unsure of your application.

FOR YOUR SAFETY

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

⚠ WARNING!

In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats in a conspicuous location.

⚠ WARNING!

This heater must be installed and serviced by trained gas installation and service personnel only. Read and understand these instructions thoroughly before attempting to install, operate or service this heater. Failure to comply could result in personal injury, asphyxiation, death, fire, and/or property damage. Retain these instructions for future reference.

⚠ WARNING!

This is **NOT** an explosion proof heater. Where there is the possibility of exposure to flammable vapors, consult the local fire marshal, the fire insurance carrier and other authorities for apporval of the proposed installation.

FOR YOUR SAFETY

What to do if you smell gas:

- *Do not try to light any appliance.*
- *Do not touch any electrical switch or use any phones in your building.*
- *Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.*
- *If you cannot reach your gas supplier, call the fire department.*

Form# LIODR-10M-09/04 (ID)
Replaces Form# LIODR-7.5M-02/04

Printed in U.S.A.

21400 Hoover Rd., Warren, MI 48089
T. (586) 756-0950 F. (586) 756-2626
www.reverberray.com

CAUTION!

The following information should be reviewed before installing this heater:

- Check the AGA rating label on the heater to verify model number. Check and maintain the attached minimum clearance to combustibles label and the proper gas to be used. Check all labels on the heater to verify proper mounting.

- The installation of this heater must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1-1999 (NFPA 54-current edition).

- The installation of this heater in public garages must conform with the Standard for Parking Structures, ANSI / NFPA 88A-current edition: or the Standard for Repair Garages, ANSI / NFPA 88B-current edition, and must be at least 8 ft. above the floor while maintaining all clearances to combustibles.

- The installation of this heater in aircraft hangars must conform to the Standard for Aircraft Hangars, ANSI / NFPA 409-current edition. The heater must be installed at least 10 ft. above the upper wing surfaces and engine enclosures of the highest aircraft which might be stored in the hangar. In areas adjoining the aircraft storage area, the heaters must be installed at least 8 ft. above the floor. The heaters must be located in areas where they will not be subject to contact by aircraft, cranes, moveable scaffolding or other objects.

- If an external electrical source is utilized, the heater must be electrically grounded in accordance with the National Electrical Code, ANSI / NFPA70-current edition.

- Under no circumstance is either the gas supply line or the electrical supply line to the heater to provide any assistance in the suspension of the heater.

- The weight of the heater must be entirely suspended from a permanent part of the building structure having adequate load characteristics.

- Neither the gas supply line, electrical supply line nor sprinkler heads shall be located in or near the path of the flue products from the heater.

- This heater cannot be used in a building with an uninsulated roof or condensation problems could result.

- Where this heater is used, natural or mechanical means shall be provided to supply and exhaust at least 4.0(Nat.) or 4.5(LP) C.F.M. per 1000 BTU/H of the heater's rated input.

- Signs should be posted in storage areas to specify maximum stacking height allowed in order to maintain clearance to combustibles. Clearance safety limit plaques (PLQ), available from Detroit Radiant Products are recommended for this purpose.

DR Series Heaters

WARNING!

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

WARNING!

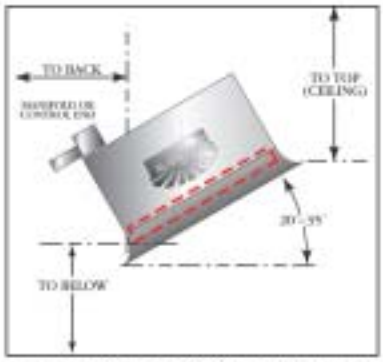
This heater should be installed so that the minimum clearance to combustibles, as marked on the heater, will be maintained. If vehicle lifts are present, ensure that these clearances will be maintained from the highest raised vehicle.

CLEARANCES TO COMBUSTIBLES [IN.]				
Model No.	Sides	Back	Top	Below
DR 30 (S)	30	18	28	72
DR 45	30	18	28	72
DR 50	30	18	34	72
DR 55	32	18	40	72*
DR 60	32	18	40	72*
DR 75	48	30	42	98
DR 80	48	30	42	98
DR 85	48	30	42	98
DR 90	48	30	42	98
DR 95	48	30	52	120
DR 100	48	30	52	120
DR 130	48	30	52	120
DR 160	50	32	60	132

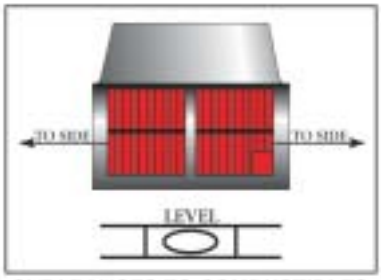
*** This clearance is 80 in. when the heater is fitted with a parabolic reflector.**

Figure 1.1 CLEARANCE-TO-COMBUSTIBLES CHART

NOTE: If the heater is mounted beneath a non-combustible surface a 24 in. minimum top clearance must be maintained from the top of the heater to prevent overheating the controls.



CLEARANCES TO COMBUSTIBLES DIAGRAM: SIDE VIEW



CLEARANCES TO COMBUSTIBLES DIAGRAM: FRONT VIEW

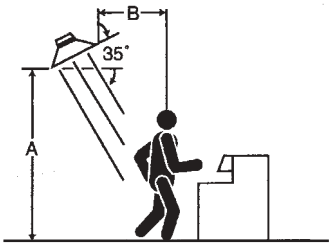
Figure 1.2 CLEARANCE-TO-COMBUSTIBLES DIAGRAM

Detroit Radiant Products Company

1.1 DESIGN

When positioning heater, keep in mind the clearance to combustibles with materials such as, lights, sprinkler heads, overhead doors, storage areas with stacked materials, gas and electrical lines, parked vehicles, cranes, etc. Refer to **Figure 1.1** on page 3 for minimum clearance to verify that a safe installation condition exists.

In locations used for the storage of combustible materials, signs shall be posted to specify the maximum permissible stacking height to maintain required clearances from the heater to the combustibles.



1.2 LAYOUT

Perimeter mounting of these infrared heaters provides for the most efficient installation. In Figure 1.5, the heaters are mounted around the perimeter of the space to be heated. Refer to the Installation Chart for the recommended distances on the models being installed.

Buildings that require the rows of heaters to be farther apart than the recommended distance in the Installation Chart may need additional heaters placed in the center of the space as in Figure 1-5.

Typical exhauster, air intake louver and thermostat location is also shown on the sample buildings in Figure 1.5.

DR SERIES SPOT HEATER LOCATION CHART

MODEL & INPUT	TYPE AREA (SURROUNDINGS)	APPROX. DIMENSIONS OF AREA COVERED	APPROX. SQ. FT. COVERED	RECOMMENDED MOUNTING HEIGHT ("A" DIM.) 10' 12' 14' 16' 18' 20' 22' 24' 26' 28' 30'	"B" DIM. DISTANCE BEHIND MAN OR WORK STATION	APPROX. CENTERS FOR FULL COVERAGE (SPOT & AREA) HTG. ONLY
DR-30	COLD/DRAFTY	10' X 10'	100	9'	4'	10'
30,000	AVERAGE	12' X 12'	144	10' 12'	5'	12'
BTU/H	PROTECTED/INSUL.	14' X 14'	196	12' 14'	6'	14'
DR-45	COLD/DRAFTY	12' X 12'	144	10' 12'	5'	12'
45,000	AVERAGE	14' X 14'	196		6'	14'
BTU/H	PROTECTED/INSUL.	16' X 16'	256		7'	16'
DR-60	COLD/DRAFTY	16' X 16'	256	12 14'	6'	16'
60,000	AVERAGE	18' X 18'	324	14' 16'	7'	18'
BTU/H	PROTECTED/INSUL.	20' X 20'	400	16' 18'	8'	20'
DR-75	COLD/DRAFTY	18' X 18'	324	14' 16'	7'	18'
75,000	AVERAGE	22' X 22'	484	16' 18'	8'	22'
BTU/H	PROTECTED/INSUL.	26' X 26'	676	18' 20'	9'	24'
DR-90	COLD/DRAFTY	20' X 20'	400	16' 18'	9'	20'
90,000	AVERAGE	24' X 24'	576	18' 20'	10'	24'
BTU/H	PROTECTED/INSUL.	28' X 28'	784	20'	11'	26'
DR-100	COLD/DRAFTY	24' X 24'	576	18'	10'	24'
100,000	AVERAGE	28' X 28'	784	18' 20'	11'	26'
BTU/H	PROTECTED/INSUL.	32' X 32'	1024	20'	12'	30'
DR-130	COLD/DRAFTY	26' X 26'	676	18'	11'	26'
130,000	AVERAGE	30' X 30'	900	18' 20'	12'	28'
BTU/H	PROTECTED/INSUL.	35' X 35'	1225	20' 22'	13'	32'
DR-160	COLD/DRAFTY	28' X 28'	784	20' 22'	12'	28'
160,000	AVERAGE	35' X 35'	1225	24' 26'	16'	32'
BTU/H	PROTECTED/INSUL.	40' X 40'	1600	28' 30'	20'	35'

Figure 1.3

DR Series Heaters

HEATER INSTALLATION CHART					
Model No.	Mounting Heights (Dimension A)		Distance Between Heaters (Dimension B) [ft]	Distance Between Heater Rows (Dimension C) [ft]	Distance Between Heater and Wall [ft]
	30° Angle Standard Reflector [ft]	30° Angle Parabolic Reflector [ft]			
DR 30(S)	12-14	12-15	8-30	10-70	6
DR 45	12-14	16-19	14-40	14-80	10
DR 50	12-14	17-20	14-40	14-80	10
DR 55	13-15	18-21	14-43	14-90	10
DR 60	14-16	18-21	15-43	15-90	12
DR 75	15-17	19-22	16-50	20-100	12
DR 80	15-17	19-22	16-50	20-100	12
DR 85	16-18	21-25	16-55	20-110	12
DR 90	16-18	21-25	20-55	20-110	12
DR 100	17-20	23-27	20-60	20-120	12
DR 130	21-24	26-32	22-65	23-140	14
DR 160	24-28	29-35	25-70	25-160	14

Figure 1.4

NOTE: The chart above is provided as a guideline only. Actual conditions may dictate variation from the data shown.

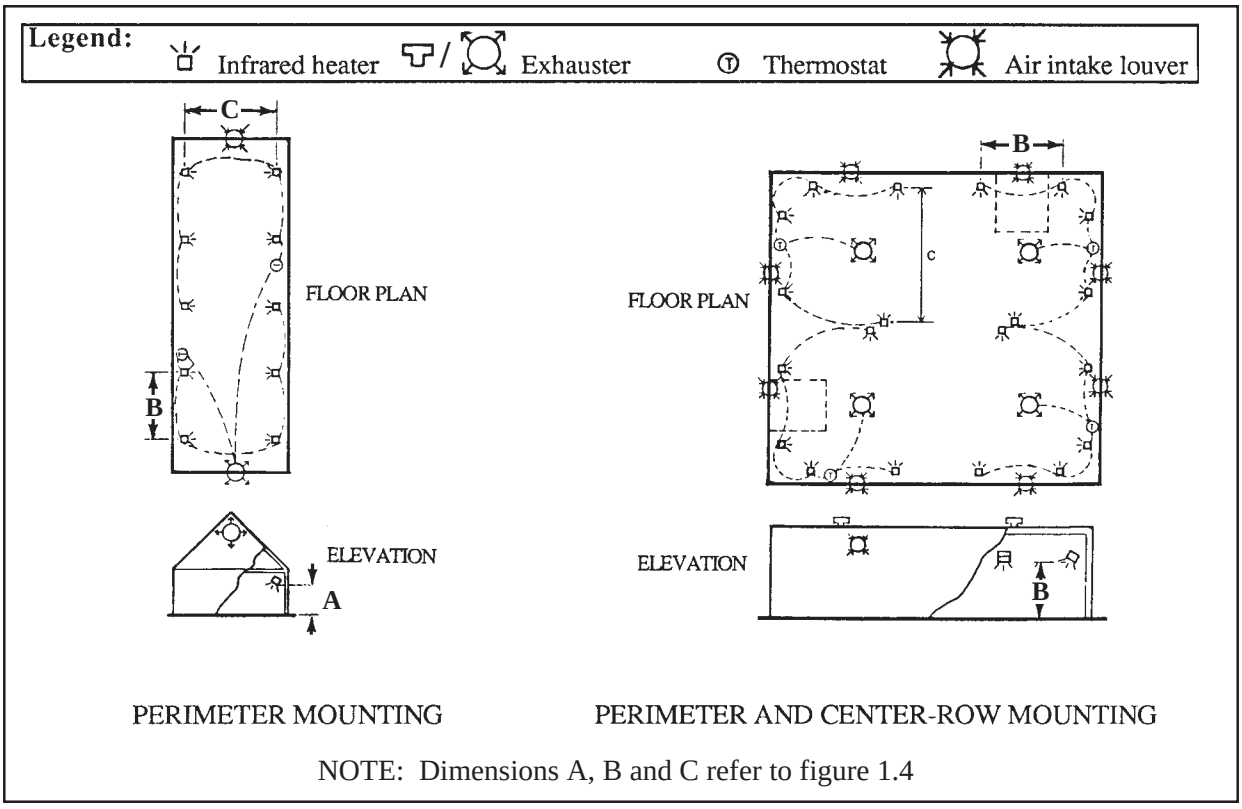


Figure 1.5

2.1 HEATER MOUNTING

- Figure 2.1 illustrates the more common method for heater mounting. Some local codes or application conditions, such as drafts or other variables that could cause the units to move, stipulate that if flexible gas connectors are used then the heater must be rigidly mounted (see Figure 2.2). Consult local codes for further details.

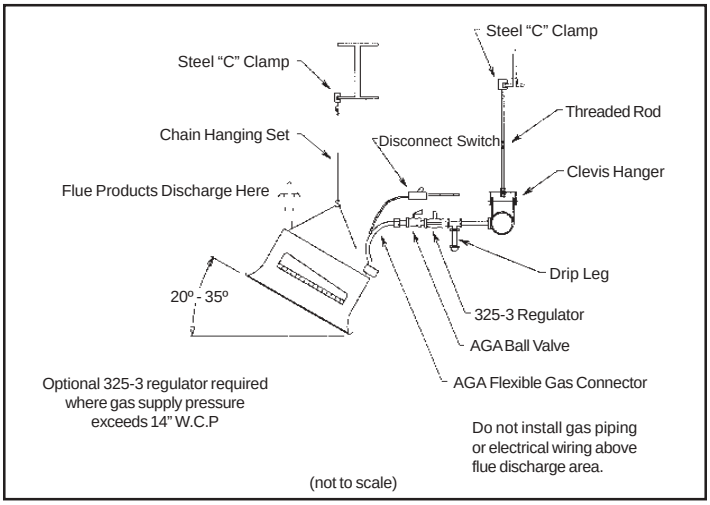


Figure 2.1 TYPICAL HEATER MOUNTING

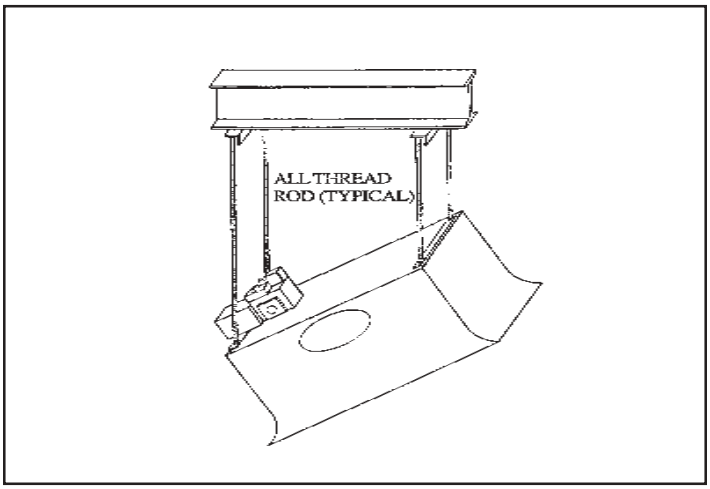


Figure 2.2 RIGID HEATER MOUNTING

- Heater must be level from side to side (see Figure 1.2 on pg. 3). The **units must be mounted at a 20° to 35° angle from horizontal**, so the controls (or manifold end) are located at the lower end (Figure 2.3-2.5). Gas and electrical lines must not be located above the path of exhaust. See figure 6-1 on page 11 for path of exhaust.

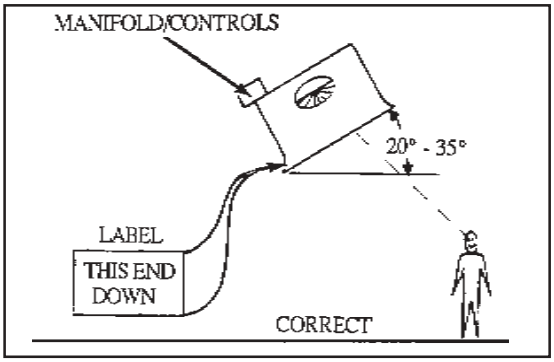


Figure 2.3 BURNER ASSEMBLY RELATION TO GROUND LEVEL

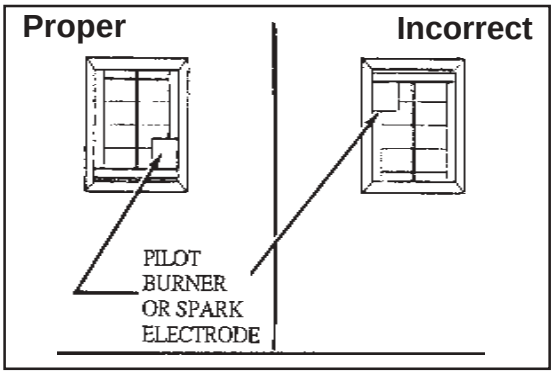


Figure 2.4 BURNER ASSEMBLY RELATION TO GROUND LEVEL

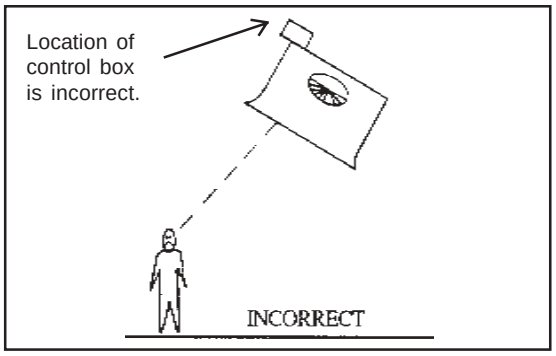


Figure 2.5 BURNER ASSEMBLY RELATION TO GROUND LEVEL

3.1 GAS SUPPLY

CAUTION!

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

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

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

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

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

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

A sediment trap in the gas line will decrease the possibility of any loose scale or dirt in the supply line entering the heater's control system and causing a malfunction. Provide a 1/8 in. (3.2mm) NPT, plugged tapping accessible for test gauge connection immediately up stream of gas connection to heater. Consult gas company for the proper pipe sizing. The gas supply line must be of sufficient size to provide the required capacity and inlet pressure to the heater (see figure 3.1).

NOTE: Manifold pressure should be checked at the tap on the gas valve. Readings will be above atmospheric pressure (during operation).

MANIFOLD PRESSURE CHART			
	Required Manifold Pressure (WCP)	Minimum Inlet Pressure (WCP)	Maximum Inlet Pressure (WCP)
Natural Gas	6.0 in.	7.0 in.	14.0 in.
Liquified Petroleum Gas	10.0 in.	11.0 in.	14.0 in.

Figure 3.1

Use only a pipe joint compound that is resistant to liquified petroleum gases.

The following guidelines **must** be observed to ensure proper system performance and safety:

Gas Line Connection

- The use of a stainless steel, flexible gas connector is recommended. If, however, local codes require rigid piping to the heater, a swing joint can be used.
- The gas outlet shall be in the same room as the appliance and the connector must not be concealed within or run through any wall, floor or partition.
- The connector shall be of adequate length.
- The final assembly shall be tested for leaks. **CAUTION:** Matches, candles, open flame or other sources of ignition shall not be used for this purpose. Leak test solutions may cause corrosion-water rinse after test.
- Contact with foreign objects or substances should be avoided.
- The connector should not be kinked, twisted or torqued.
- Connectors are for use only on piping systems having fuel gas pressures not in excess of ½ pound per square inch or 14.0 in. W.C.P.
- Neither the gas pipe nor flexible gas connector shall be placed in the 'flue discharge area'. See Fig. 2.1.
- Bending, flexing and vibration to the gas connections must be avoided to prevent failure.

CAUTION!

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

4.1 ELECTRICAL

WARNING!
The unit, when installed, must be electrically grounded in accordance with the most current national electrical code, ANSI/NFPA-70, when an external source is utilized.

Control systems are energized by either 120 VAC, 24 VAC or millivolt energy. The 120 VAC systems can be used directly from a 120 VAC line. On 24 VAC systems, transformers must be used to supply power of sufficient VA rating for single or multiple connected installations.

Millivolt systems require NO external power, as energy needed to operate the valve is developed by the power-pile generator. Do not use multiple connections, as one thermostat may only control one heater.

Important: Proper grounding and polarity are essential for heaters with spark ignition controls. If the system is not properly grounded, it cannot determine the presence of a flame and will lockout and shut off.

For wiring of controls on the unit see the wiring diagram included on the provided insert.

It is recommended that the thermostat be installed on the hot side of a fused supply line and have a sufficient ampere capacity rating for the heater(s) it will control.

The ventilation system may be controlled separately from the heating system (consult local codes) by use of a humidistat that closes on a rise in humidity. The humidistat control should be installed at roof level. For summer ventilation, a simple on/off switch can be installed at the occupant level.

OPERATION

Upon satisfactory completion of the electrical supply and the purging of the gas supply line to the heater(s), follow the "Lighting Instructions" on the heater's rating label to put heater into operation.

Note: Do **not** attempt to ignite a direct spark ignition heater by hand.

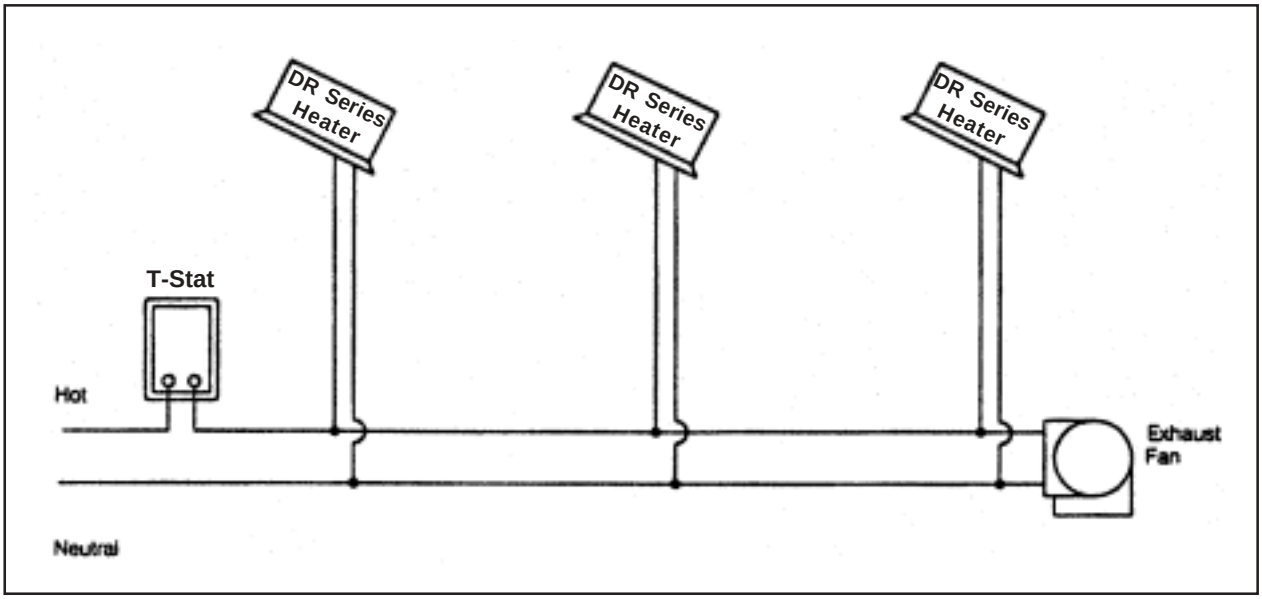


Figure 4.1 TYPICAL FIELD WIRING

DR Series Heaters

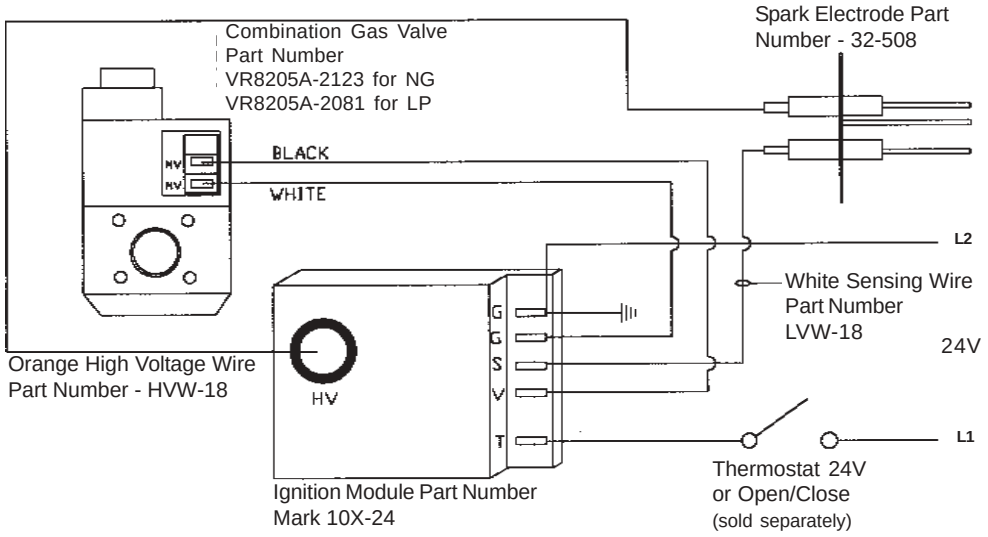
NFS-2/PFS-2 (24V)

24 V SCHEMATIC
Direct Spark Ignition

VA Draw : 12
Amps : .48

(Regular Circuit Board)

Figure 4.2



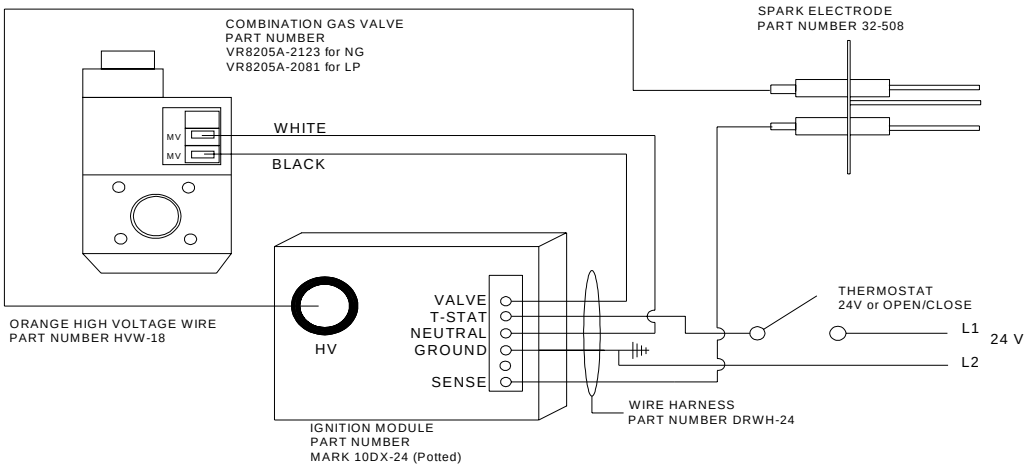
NFS-2/PFS-2 (24V)

24 V SCHEMATIC
Direct Spark Ignition

VA Draw : 12
Amps : .48

(Potted Circuit Board)

Figure 4.3



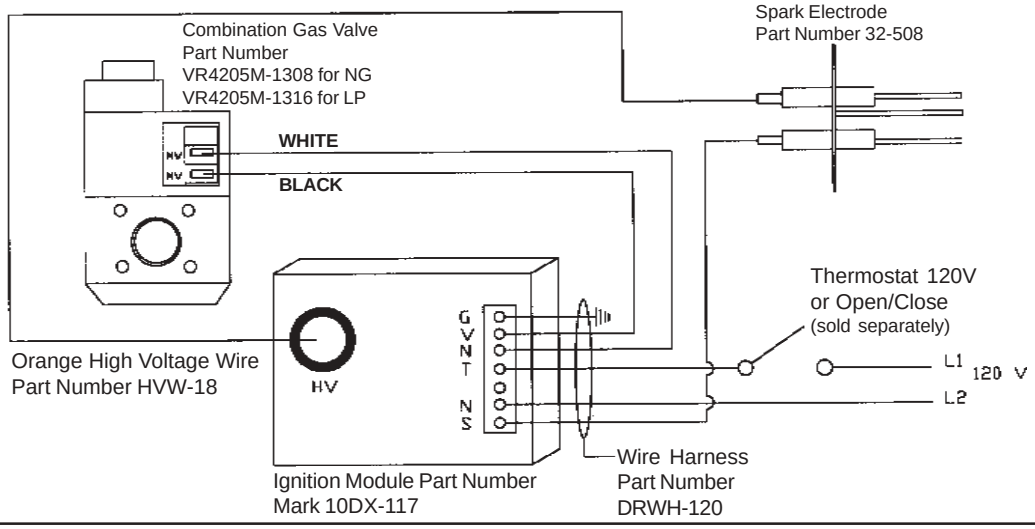
NFS-2/PFS-2 (120V)

120 V SCHEMATIC
Direct Spark Ignition

VA Draw : 12
Amps : .10

(Potted Circuit Board)

Figure 4.4



NMV-2/PMV-2

750 MV SCHEMATIC

(millivolt control)

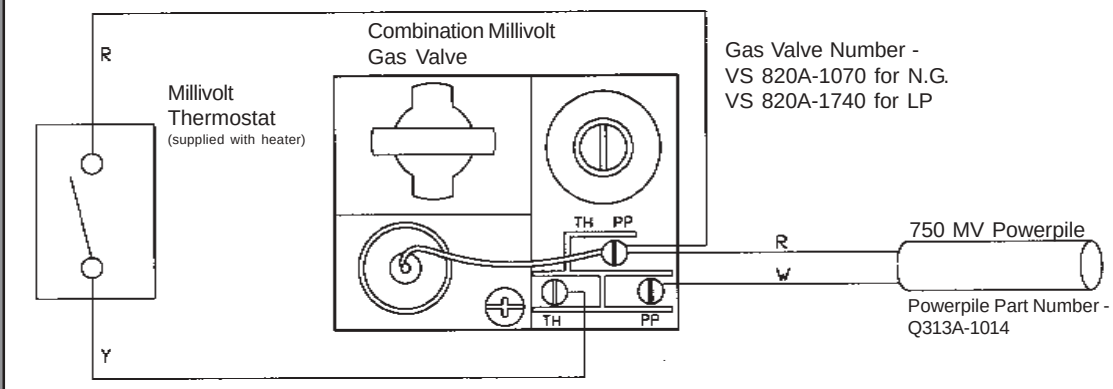


Figure 4.5

5.1 Ventilation

It is required that the upper levels of the space to be heated are properly ventilated to supply combustion air to the heaters and to sufficiently dilute the products of combustion. This also prevents excessive humidity buildup. With heaters mounted overhead and a properly designed ventilation system, products of combustion and excessive drafts will never be present at occupancy levels.

For proper ventilation, **a positive air displacement of 4.0 CFM per 1000 BTU/H** of natural gas consumed must be provided. If propane is used, **a positive air displacement of 4.5 CFM per 1000 BTU/H** of propane gas consumed must be provided. Many large industrial buildings have sufficient air movement to satisfy these dilution requirements. However, in tightly constructed buildings where insufficient air movement exists, induced air displacement is required. This air displacement may be accomplished by either gravity or mechanical means. Provisions must be made to provide sufficient fresh air intake area and exhaust air outlet area. This is essential to provide a balanced system to avoid negative building pressure which cause excessive infiltration and unfavorable drafts thereby affecting efficient combustion of infrared heaters.

Mechanical exhausters are preferred and typically mounted at high points of the building on areas of the roof where stagnant air can accumulate under the deck. For a flat roof, considerations of prevailing winds, high and low pressure areas, and distribution of air movement must be taken into consideration when locating exhausters.

Best air distribution is accomplished by using a number of small exhausters versus one large exhauster. Provide a minimum of **one square inch of net free inlet area per 1000 BTU/H** for combustion air supply. Inlet opening in the building should be well distributed high in the sidewalls and should direct incoming air upward to dilute products of combustion while preventing drafts at lower levels. Inlets are typically 1 to 3 sq. ft.

Local codes may require that mechanical exhaust systems be interlocked with heaters to enable both to function simultaneously (Figure 4.1 on pg.8). Other codes may allow control of exhausters with a ceiling mounted humidistat. Exhausters then operate when relative humidity rises above humidistat setting. Since the products of combustion increase the relative humidity level of the space, this is a feasible method of controlling exhausters. Selection of a humidistat setting will vary with different conditions and areas of the country.

DR Series Heaters

6.1 MAINTENANCE

WARNING!
Disconnect all power sources related to the installation before servicing any component.

WARNING!
Use protective glasses when cleaning the heater. If the control assembly is not completely disconnected from the manifold, the high air pressure will cause the controls to become defective.

It is recommended that the following become a standard yearly procedure to obtain maximum operating efficiency and trouble free operation.

During long periods of non-usage, remove or cover heater with a polyethylene bag and shut off gas supply. If further service to the heater is desired, contact your representative or the factory.

Main Burner

1. Use an air hose to blow any accumulated dust and/or dirt off the heater. **Air hose pressure should not exceed 30 psig.**
2. Pass the air hose over the entire exposed area of the ceramic. **A distance of 2' to 4'** from the unit is recommended.
3. Place the air hose outlet into each venturi tube and allow the air to flow for approximately one minute.
4. See troubleshooting chart (pg. 12) if there are any signs of burner malfunction. Replace if necessary.

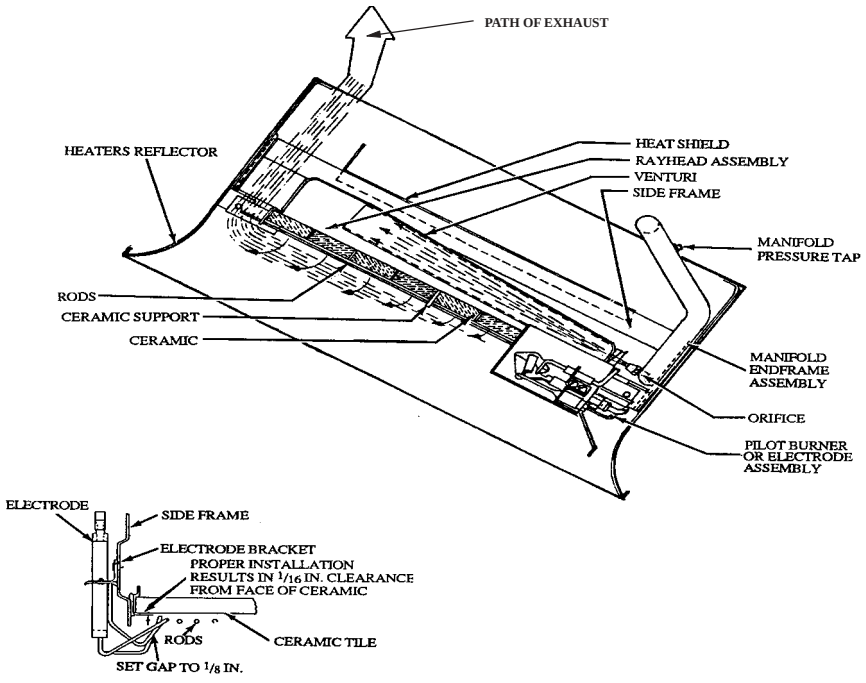
Pilot Burner

1. Remove pilot access door.
2. Use an air hose and blow the pilot burner free of dust.

Gas Supply

1. Periodically inspect the gas supply for signs of corrosion or failure. Replace if necessary.

6.2 HEATER ASSEMBLY COMPONENTS



DR SERIES UNVENTED GAS-FIRED INFRA-RED HEATER ASSEMBLY

Figure 6-1

For complete information on DR Series replacement parts, consult the DR Series Parts Price List. This list includes information on valves, igniters, circuit boards, etc. for most recent models. For other models, consult factory.

Note: Replacement burners are called "rayheads" with rod inserts (Part # DR-RH and DR-ROD). Note: Ceramic grids are not sold separately, order DR-RH. For additional parts information visit www.reverberray.com/parts.

DR 16-30	(1) DR-RH
DR 45-60	(2) DR-RH
DR 75-100	(3) DR-RH
DR 130	(4) DR-RH
DR 160	(5) DR-RH

SYMPTOM	CODE	POSSIBLE CAUSE	CORRECTIVE ACTION
Burning of gas-air mixture inside plenum (flashback).	A, B, C	1. Heater mounted at incorrect angle.	1. Mounting angle 20º-35º from horizontal.
	A, B, C	2. Excessive drafts.	2. Relocate or shield from draft.
	A, B, C	3. Gas leaking at orifice, spud, pilot tube.	3. Check with leak detector solution.
	A, B, C	4. Separation of ceramic grids.	4. Replace rayhead.
	A, B, C	5. Ceramic grids cracked.	5. Replace rayhead.
Delayed ignition.	A, B	1. Electrode out of specification.	1. See Ignition System insert.
	A, B, C	2. Low gas pressure.	2. See Section 1.1, Gas Supply.
	A, B, C	3. Partially blocked orifice.	3. Clean or replace.
	A, B, C	4. Improper orifice size.	4. Consult dealer.
	A, B, C	5. Incorrect gas.	5. See unit nameplate.
Low ceramic surface temperature, excessive rollout or soot on rods.	A, B, C	1. Dirty or plugged rayhead ceramics.	1. See perodic maintenance instructions.
	A, B, C	2. Partially blocked orifice.	2. Remove and clean.
	A, B, C	3. Low inlet gas pressure.	3. See Section 1.1, Gas Supply.
	A, B, C	4. Low manifold gas pressure.	4. Adjust main valve regulator for 6" W. C.P. natural gas, 10" W. C.P. propane.
	A, B, C	5. High manifold pressure.	5. Adjust main valve regulator for 6" W. C.P. natural gas, 10" W. C.P. propane.
	A, B, C	6. Foreign matter in venturi tube.	6. See periodic maintenance instructions.
	A, B, C	7. Misaligned manifold from excessive torque applied on pipe during installation.	7. Replace manifold.
	A, B, C	8. Excessive dark spots on rayhead.	8. See periodic maintenance instructions.
	A, B, C	9. Gas supply piping too small.	9. Increase inlet pressure or replace undersize piping.
	A, B, C	10. Incorrect gas.	10. See unit nameplate.
Control system overheating.	A, B, C	1. Heater not mounted correctly.	1. Mounting angle 20º-35º from horizontal.
	A, B, C	2. Heater mounted too close to ceiling.	2. Observe clearance to combustibles safety chart located on heater reflector.
Gas odor.	A, B, C	1. Loose pipe connection.	1. Check all connections with leak-detector solution, tighten as necessary.
	B, C	2. Pilot not lit.	2. Cycle thermostat or manually light.
Heater cycles repeatedly.	A, B, C	1. Heater located in drafty area.	1. Relocate or shield from draft.
	A, B	2. Low gas pressure.	2. See Section 1.1, Gas Supply for propane.
	A, B, C	3. Thermostat located in drafty area.	3. Relocate thermostat.
	B, C	4. Weak pilot flame.	4. Clean or adjust pilot.
	B, C	5. Defective flame detector.	5. Replace.
Pilot light goes out when hold down button released.	C	1. Defective thermocouple.	1. Replace.
	C	2. Defective pilot generator.	2. Replace.
	C	3. Pilot not properly heating flame detector.	3. Check pilot orifice and alignment of flame to sensor.
	C	4. Incorrect wiring.	4. See wiring diagram on unit reflector.
Pilot on, no gas to main burner.	B, C	1. Weak pilot flame.	1. Clean or adjust pilot.
		2. No electrical power to unit.	2. Check thermostat, manual switch or circuit breaker.
		3. Pilot sensor element not located in pilot flame.	3. Locate upper 3/4 of element in pilot flame.
		4. Defective mercury sensor.	4. With element hot, isolate control continunity between 2 & 4, replace if 0.
		5. Defective main valve solenoid.	5. Isolate. Ohm for resistance, replace if 0.
		6. Defective pilot generator or thermocouple.	6. Replace.
		7. Excessive thermostat wire length with millivolt system.	7. Wire not to exceed length provided by factory.
		8. Manual valve off.	8. Turn to "ON" position.
No spark; no ignition.	A, B	1. Lack of 120V or 24V incoming voltage.	1. Clean or adjust pilot.
	A, B	2. Open high voltage wire.	2. Isolate and ohm for resistance, replace if 0.
	A, B	3. Improper electrode gap.	3. See Ignition System insert.
	A, B	4. Loose or open wire connection.	4. Check all wires, tighten or replace.
	A, B	5. Poor or no equipment ground.	5. Trace ground wire for complete circuit back to equipment ground from control.
	A	6. Unit in "safety lockout" mode.	6. Interrupt power source, repeat trial for ignition.
	A	7. Defective "Gaslighter" control.	7. Replace.
	B	8. Defective mercury sensor.	8. With element cold, isolate control. Ohm for resistance between 3 & 4. replace if 0.
No spark; no ignition.	B	9. Defective pilot ignition transformer.	9. Replace.
Heater lights, and "locks out" after approximately 10 seconds.	A.	1. Poor or no equipment ground.	1. Check all connections, provide positive earth ground.
	A	2. Polarity is reversed.	2. 120V to black, neutral to white.
	A	3. Low gas pressure.	3. See Section 1.1, Gas Supply.
	A	4. Electrode not sensing.	4. Relocate or replace if defective.
	A	5. Heater mounted at incorrect angle.	5. Mounting angle 20º-35º from horizontal.
Spark is present. No main gas operation. Unit "locks out".	A	1. Gas valve in "OFF" position.	1. Turn to "ON" position.
	A	2. Defective main valve solenoid.	2. Isolate and check for resistance. replace if 0.
	A	3. Defective "Gaslighter" control.	3. Replace.
Heater will not shut off.	A, B, C	1. Defective thermostat or wiring.	1. Replace or repair.
	A, B, C	2. Gas valve stuck open.	2. Replace.
	A, B, C	3. High gas pressure.	3. See Section 1.1, Gas Supply.

CODES: **A – Direct Spark Ignition B – Spark Pilot Ignition C – Standing Pilot**