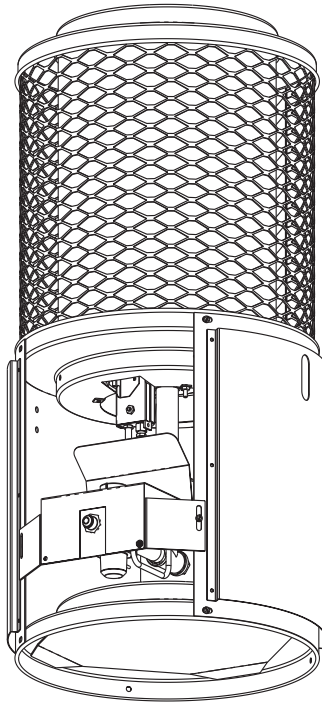




# INSTALLATION AND OPERATION INSTRUCTIONS

## RCH100 CONSTRUCTION HEATER FLOOR MODEL



### WHAT TO DO IF YOU SMELL GAS

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

**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.

SAVE FOR FUTURE REFERENCE



Sunstar Heating Products Inc, P.O. Box 36271, Charlotte, NC 28236 (704) 372-3486

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## SECTION 1: RCH100 GENERAL INFORMATION

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**INSTALLER:** This manual is the property of the owner. Please present this manual to the owner when you leave the job site. This heater is a self-contained infrared floor model heater for use in the temporary heating of buildings under construction, repair or alteration.



### GENERAL HAZARD WARNING:

FAILURE TO COMPLY WITH THE PRECAUTIONS AND INSTRUCTIONS PROVIDED WITH THIS HEATER, CAN RESULT IN DEATH, SERIOUS BODILY INJURY AND PROPERTY LOSS OR DAMAGE FROM THE HAZARDS OF FIRE, EXPLOSION, BURN, ASPHYXIATION, CARBON MONOXIDE POISONING, AND/OR ELECTRICAL SHOCK.

ONLY PERSONS WHO CAN UNDERSTAND AND FOLLOW THE INSTRUCTIONS SHOULD SERVICE THIS HEATER.

IF YOU NEED ASSISTANCE WITH THIS HEATER OR INFORMATION SUCH AS AN INSTRUCTIONS MANUAL, LABEL, ETC. CONTACT THE MANUFACTURER.



**WARNING: FIRE, BURN, INHALATION, AND EXPLOSION HAZARD. KEEP SOLID COMBUSTIBLES, SUCH AS BUILDING MATERIALS, PAPER OR CARDBOARD, A SAFE DISTANCE AWAY FROM THE HEATER AS RECOMMENDED BY THE INSTRUCTIONS. NEVER USE THE HEATER IN SPACES WHICH DO OR MAY CONTAIN VOLATILE OR AIRBORNE COMBUSTIBLES, OR PRODUCTS SUCH AS GASOLINE, SOLVENTS, PAINT THINNER, DUST PARTICLES OR UNKNOWN CHEMICALS.**



**WARNING: NOT FOR HOME OR RECREATIONAL USE.**

## INSTALLATION REQUIREMENTS

The heater is designed and approved for use as a construction heater in accordance with Standard ANSI Z83.7 - CGA 2.14. CHECK WITH YOUR LOCAL FIRE SAFETY AUTHORITY IF YOU HAVE ANY QUESTIONS ABOUT APPLICATIONS. Other standards govern the use of fuel gases and heat producing products in specific applications. Your local authority can advise you about these.

This heater is intended for use in the temporary heating of buildings or structures under construction, alteration or repair.


Installation of this heater must be in accordance with all applicable codes shown in the instructions and/or the local codes and authorities having jurisdiction. Heaters shall be installed by a licensed contractor or licensed installer. Clearances to combustibles as outlined in this manual should always be observed.


Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater. Each installer shall use good installation practices when locating the heater and must give consideration to service accessibility. The heater should be inspected before each use, and at least annually by a qualified service person.

This heater is for **INDOOR INSTALLATION ONLY**. While the products of combustion are expelled into the building, national codes require ventilation in the building to dilute these products of combustion. This ventilation may be provided by gravity or mechanical means. Refer to Section 7 "VENTILATION AND COMBUSTION AIR" on page 6 of this manual for minimum requirements for ventilation and combustion air.

The heater must not be installed where it is directly exposed to water spray, rain and/or dripping water.

Copies of the National Fuel Gas Code (ANSI Z223.1 - latest edition) are available from the American Gas Association Laboratories, 8501 E. Pleasant Valley Road, Cleveland, OH 44131. All NFPA codes are available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.




**WARNING**

**BURN HAZARD**

Hot surfaces! Do NOT move, handle or service heater while operating.

Allow at least 10 minutes before touching any surfaces.

Failure to do so may result in serious injury.




**WARNING**

**FIRE HAZARD**

Heater must be on a stable and level surface.

Failure to do so may result in death, serious injury or property damage.

## SECTION 2: SPECIFICATIONS

Table 1: Model input rating

MODEL NO	GAS TYPE	INPUT BTU/HR	ORIFICE SIZE
RCH100	NATURAL	100,000	#12 (.1890)
RCH100	PROPANE	95,000	7/64 (.1094)

Gas Pipe connection: 1/2" NPT Female

### MODEL SUFFIXES:

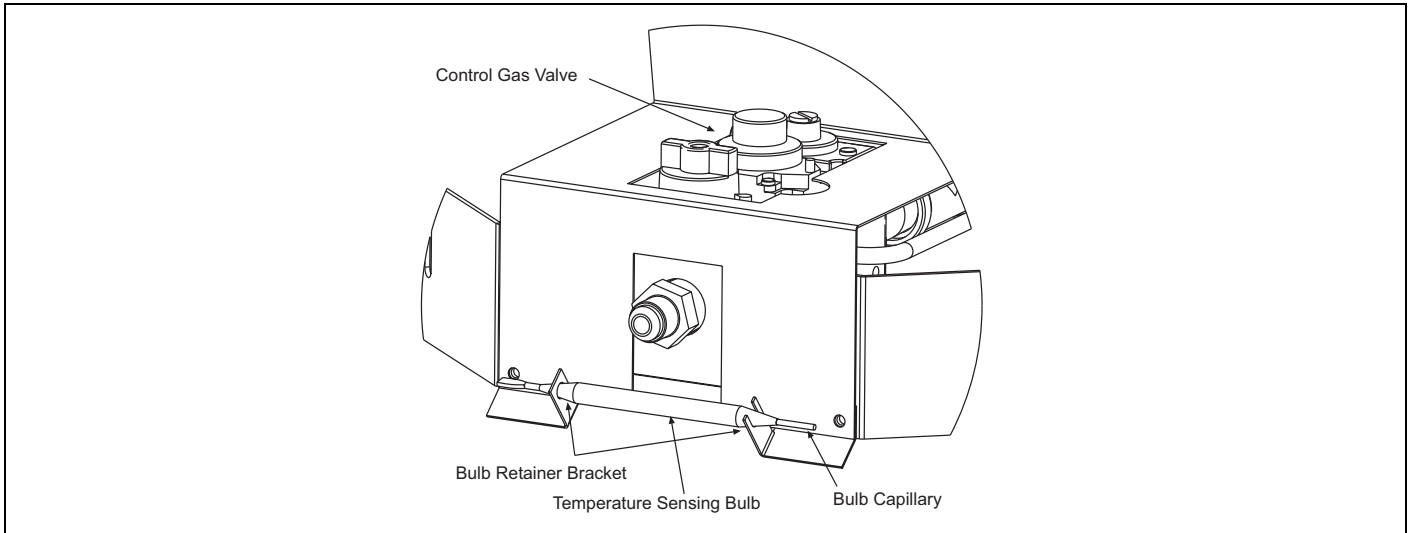
- N Natural Gas
- L Propane Gas
- 6C Standing Pilot Ignition, 100% Safety Shutoff, Manual Valve (White-Rodgers)
- 9A Standing Pilot Ignition, 100% Safety Shutoff, Thermostatic Controlled Valve (Robertshaw)
- 9B Standing Pilot Ignition, 100% Safety Shutoff, Thermostatic Controlled Valve (Robertshaw) with Suspension assembly and Tip-over switch

Table 2: Model Dimensions

DIMENSIONS	RCH100
HEATER	15"Dia. x 32-1/4"
PACKAGED	18-1/2" x 18-1/2" x 34"
SHIPPING WEIGHTS	40 LBS.

## SECTION 3: INSTALLATION OF THE THERMOSTAT BULB (RCH100 9A & 9B models)

The thermostat bulb is not factory installed to avoid shipping damage. To install the thermostat bulb, insert the sensing bulb into the retainer bracket. Secure bulb by gently squeezing the tabs of the bracket, taking care not to crimp the bulb capillary. See Figure 1 "Thermostatic Bulb Retainer detail." on page 3

**Figure 1: Thermostatic Bulb Retainer detail.**

## SECTION 4: MINIMUM CLEARANCES TO COMBUSTIBLES

The heater shall be operated only on a NON-COMBUSTIBLE, level floor. Minimum clearances to combustible walls and ceilings are listed below:

**Table 3: RCH100 Clearances to combustibles**

MODEL RCH100	FRONT	SIDES	REAR	TOP	CLEARANCE FROM PROPANE CYLINDER
WITHOUT REFLECTOR	—	60"	—	54"	10 FEET

## SECTION 5: GAS CONNECTIONS AND REGULATION

- 5.1. The installation must conform with local codes, or in absence of local codes, with the standard for the storage and handling of Liquefied Petroleum Gases, ANSI/NFPA 58 and the Natural Gas and Propane Installation Code, CSA B149.1.
- 5.2. This heater is intended for construction heating and it must never be used for residential/domestic heating.
- 5.3. Connect to the supply tank or manifold in accordance with the latest edition of National Fuel Gas Code (ANSI Z223.1/NFPA 54) and local building codes. Authorities having jurisdiction should be consulted before the installation is made.
- 5.4. Pipe joint compounds must be resistant to the action of liquefied petroleum gases.
- 5.5. Where local codes do not prohibit, a C.S.A or U.L. approved flexible connection is recommended between the rigid piping and the heater. A union and an approved shut-off valve should be installed before the control valve inlet. The shut-off valve should be installed within 6 feet of the union.
- 5.6. This appliance is equipped with a manual gas valve and an appliance regulator. The maximum supply pressure to the appliance is 14" W.C. or 1/2 P.S.I. If the line pressure is more than the maximum supply pressure, then use a line regulator which corresponds to the supply pressure.
- 5.7. After gas connections have been made, make sure the heater and all gas outlets are turned off before the main gas supply is turned on. Turn the gas pressure on and check for leaks. To check for leaks, apply a solution of soap suds to all connections and joints or check by one of the methods listed in Appendix D of ANSI Z223.1/NFPA 54 (latest edition) Natural Fuel Gas Code. DO NOT USE AN OPEN FLAME OF ANY KIND TO TEST FOR LEAKS.

## SECTION 6: INSTRUCTIONS FOR PRESSURE TEST GAUGE CONNECTION

- 6.1. Supply Pressure: Installer to provide a 1/8" N.P.T. plugged tapping, accessible for test gauge connection immediately upstream of the gas supply connection to the heater.
- 6.2. Manifold Pressure: Turn gas valve to "OFF" position. Remove 1/8" plug from manifold downstream from the valve and connect 1/8" nipple to the tapped hole. Connect gauge to nipple. Turn on the gas supply.
- 6.3. With the main burner operating, check burner manifold pressure using a water manometer (see Table 4 on page 4 for correct setting pressures). If adjustment is required, remove cover screw of the appliance regulator. Using a small screwdriver, turn adjustment screw clockwise to increase or counter-clockwise to decrease gas pressure to burner. Replace cover screw.
- 6.4. Gauges which measure in pounds per square inch or ounces per square inch are not accurate enough to measure or set the manifold pressure. Use a water manometer.

Table 4: Gas supply pressures

GAS TYPE	MANIFOLD PRESSURE	MINIMUM*	MAXIMUM
Natural	3.5" W.C.	5" W.C.	14" W.C.
Propane	10" W.C.	11" W.C.	14" W.C.

\*Minimum permissible gas supply pressure for purpose of input adjustment.

## SECTION 7: INFORMATION FOR LP GAS FLOOR MODEL HEATERS ONLY

Heaters used with LP gas must be installed in accordance with the latest edition of the National Fuel Gas Code -NFPA54, Standard for the Storage and Handling of LP Gas - NFPA 58, all state and local codes or the authority having jurisdiction. See Section 7.1 "LP models only - Regulator and hose assembly instructions" on page 5 for specific LP connection information.

The heater must be connected to the tank or cylinder by a UL Listed hose assembly or hard piping. A 10 foot assembly of UL Listed hose is available from Sunstar under Part No. 3052200. A single stage LP gas regulator (operation range: 10-150 PSIG inlet and 11.0" W.C. outlet) having a POL fitting with an excess flow valve is included with each hose assembly Part No. 3052400.

The hose assembly must be visually inspected prior to each use of the heater. If it is evident there is excessive abrasion or wear, or the hose is cut, it must be replaced prior to the heater being put into operation. The replacement hose must be a UL Listed hose assembly.

The volume of a given quantity of liquid LP gas in a container is directly related to its temperature. As a result, the vaporization rate of a tank or cylinder will decrease as the temperature drops and as the percentage of liquid in the container becomes smaller. Table 5 on page 4 shows the approximate vaporization rate of a 100 lb. cylinder.

Table 5: Maximum Continuous Flow in BTU/Hr. At Various Temperatures (Degrees F)

Lbs. of Propane in Cylinder	20°F	40°F	60°F	70°F
100	167,000	214,000	277,000	300,000
80	137,000	180,000	214,000	236,000
60	109,000	140,000	176,000	197,000
40	**	105,000	131,000	141,000
30	**	**	107,000	118,000

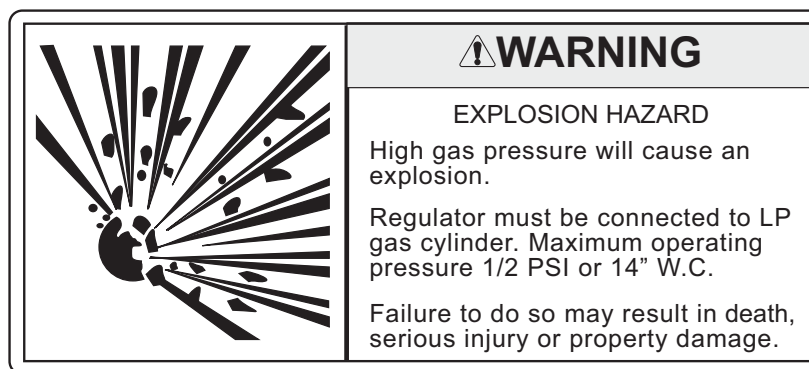
\*\* Rate of vaporization drops below the heater input rate.

**WARNING:** Due to the continuous length of time the heater might be in operation, a 100 lb. LP gas cylinder may not be sufficient in size. Manifolding several cylinders together is a practical way of increasing the time of operation of these heaters. Operation of the heater with insufficient sized cylinders or when the liquid level becomes too low will result in poor heater performance and can cause sooting. Consult your LP gas dealer for proper sizing of container.

Always turn the gas off at the tank or cylinder when the heater is not in use. When in operation, keep the heater a safe distance from the LP gas container and combustible materials as indicated on the heater and in the instructions. Fasten LP cylinders securely so they cannot be knocked over.

When the heater is to be stored indoors, the connection between the propane supply cylinder(s) and the heater must be disconnected and the cylinder(s) removed from the heater and stored in accordance with the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58 and CSA B149.1, Natural Gas and Propane Installation Code.

#### 7.1. LP models only - Regulator and hose assembly instructions



- 7.1.1. Attach the POL fitting on the regulator to the LP gas tank / cylinder as shown in Figure 2 "Regulator and hose assembly" on page 6. Use a wrench to tighten the connection.

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*Note:* This fitting has left hand threads (like a gas barbecue and tank). Screw the POL fitting counter-clockwise.

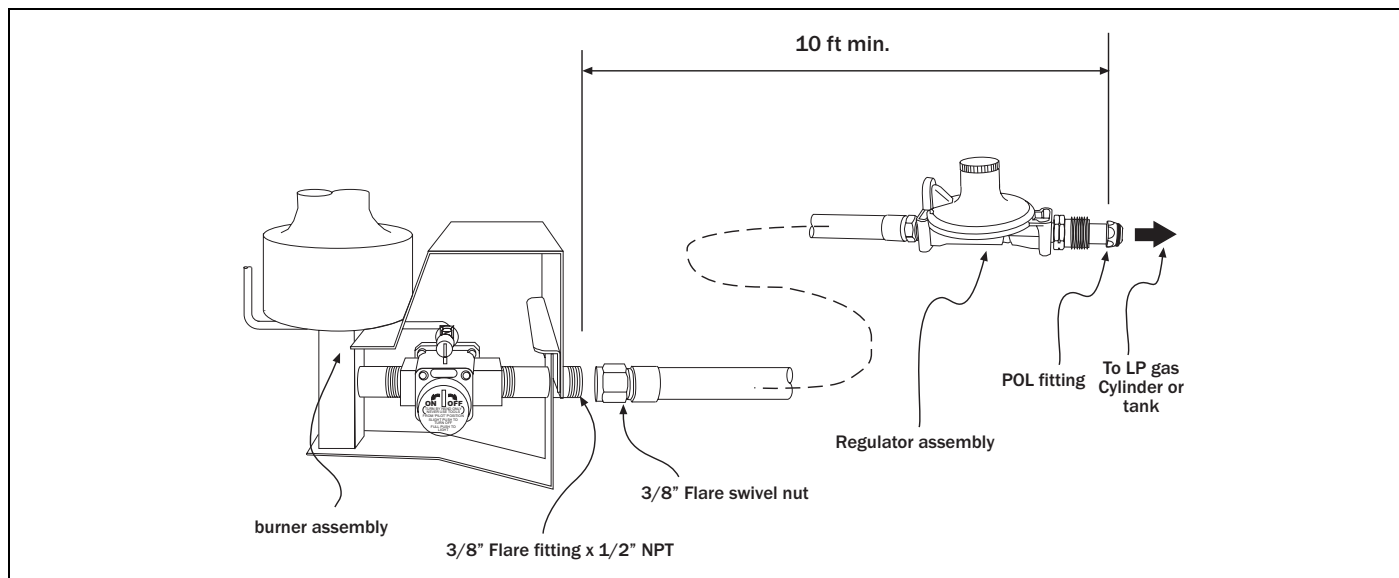
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**CAUTION:** DO NOT try to overtighten this connection. Overtightening may damage the "Excess flow control safety device" in the POL fitting regulator.

- 7.1.2. Remove the plastic cap from the end of the 3/8" flare fitting. Connect the 3/8" flare swivel nut on the end of the regulator/hose assembly to the 3/8" flare tube fitting on the burner assembly, as shown in Figure 2 "Regulator and hose assembly" on page 6. Use two wrenches to tighten this connection, screwing the swivel nut clockwise onto the supported 3/8" flare fitting.
- 7.1.3. After all the connections are made, they must be checked for leaks prior to operation. The following instructions describe the leak checking procedure.
- Make sure the control knob on the heater is turned to "OFF" prior to opening the valve on the LP tank/cylinder.
  - Open the tank/cylinder valve fully (turn tank knob counterclockwise). Apply a rich soap and water solution to the POL fitting into the tank/cylinder as well as the 3/8" flare swivel fitting at the heater. Bubbles indicate leaks which must be fixed before the heater is operated.
  - Tighten the joints to stop any leaks. Repeat steps i. and ii. after any tightening. If you are unable to stop the leaks, DO NOT operate the heater. Contact your local LP dealer.




Figure 2: Regulator and hose assembly



	<b>⚠ WARNING</b>
	<b>FIRE HAZARD</b> Never use an open flame to check for gas leaks.
	<b>DO NOT</b> operate a heater that has a leak
	Any leaks must be repaired before use. Failure to do so may result in death, serious injury or property damage.

## SECTION 8: VENTILATION AND COMBUSTION AIR

	<b>⚠ WARNING</b>
	<b>POISON HAZARD</b> Do not restrict air. Poisonous Carbon monoxide will be produced.
	Minimum ventilation 418 cfm. must be provided.
	Failure to do so may result in death or serious injury.

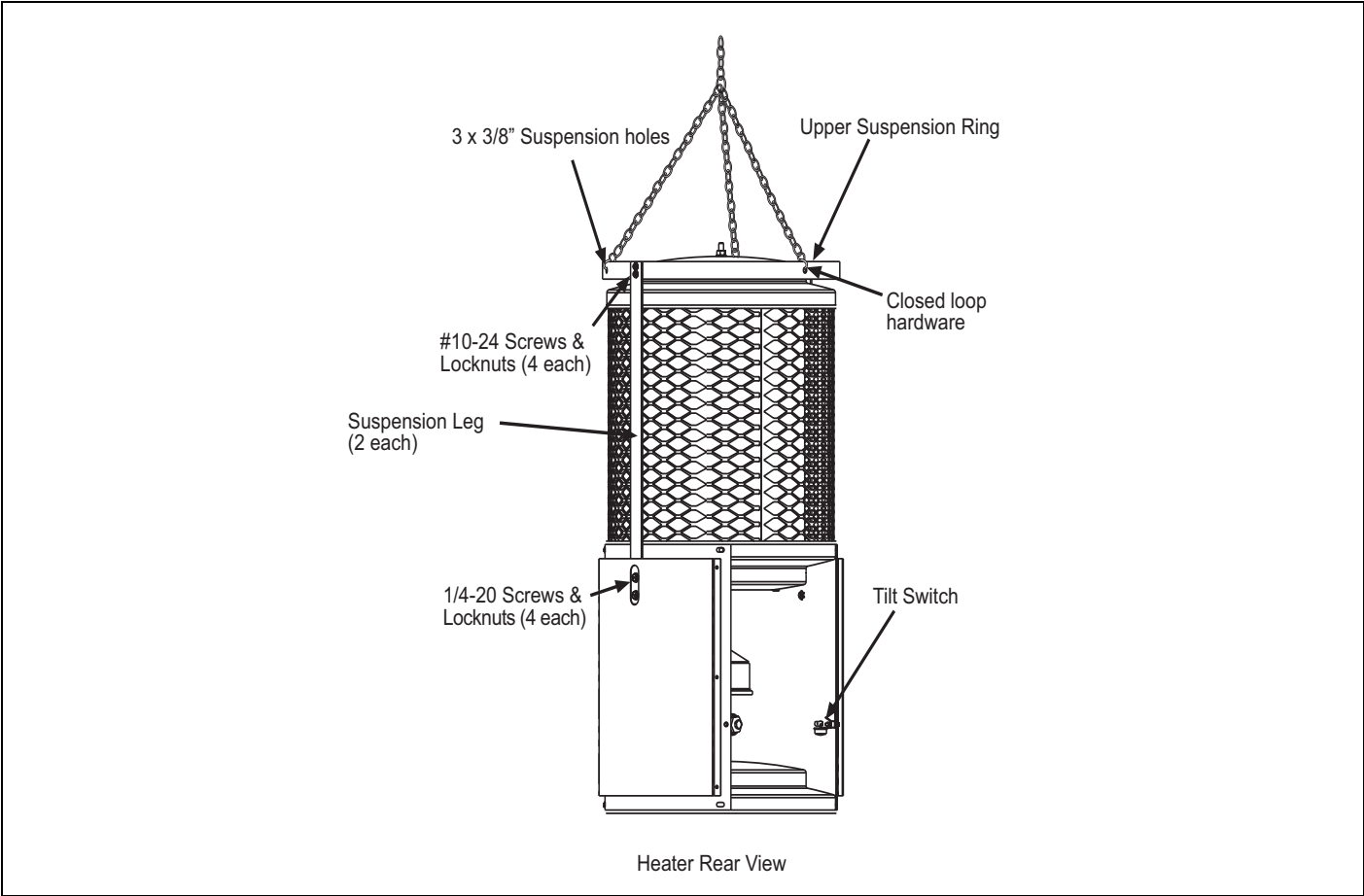
This heater requires ventilation in the building to dilute the products of combustion and provide fresh air for combustion. The minimum recommended vent flow required is 418 cfm.

The combustion air enters through the heater base and must not be restricted. DO NOT block or enclose any part of the heater base. All ventilation in the building must be at a level above the height of the heater.

**SECTION 9: HANGING INSTRUCTIONS FOR RCH100-9B**

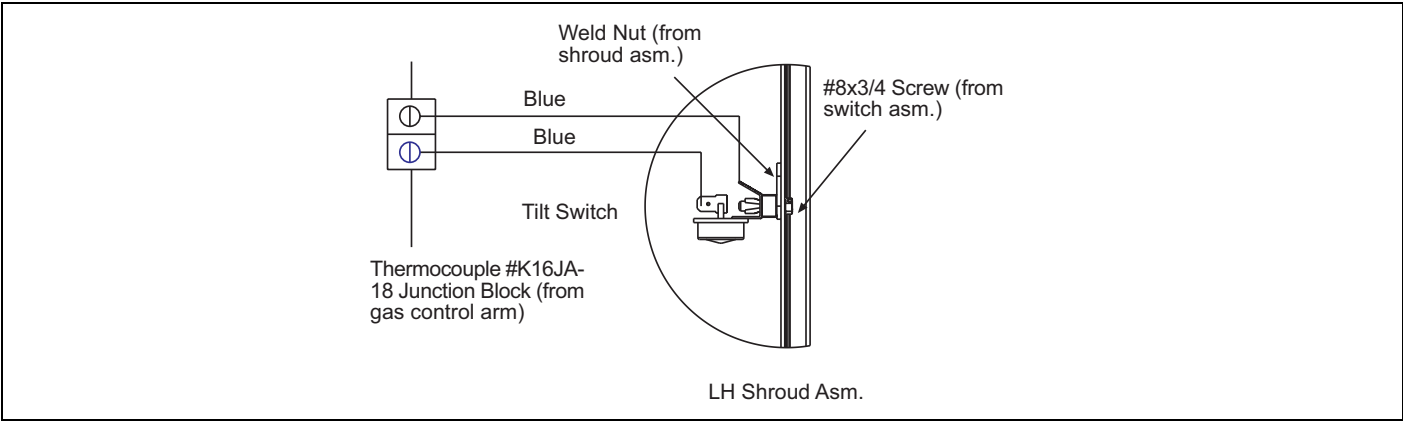
The RCH100-9B model is supplied with a suspension ring accessory and tip-over switch. Please see Figure 3 "RCH100-9B Suspension Assembly" on page 7 for the approved method for suspending the RCH100-9B. The suspended weight of the heater is 40lb.

**Figure 3: RCH100-9B Suspension Assembly**



The RCH100-9B heater is equipped with a tip-over switch as standard, the tip-over switch is connected to the thermocouple and will safely turn off the heater if it is tipped between 25 and 40 degrees from the vertical in any direction. To reset the tip-over switch the heater must be returned to its vertical upright position. See Figure 4 "Tip-over Switch Details" on page 7 for details of the tip-over switch connection.

**Figure 4: Tip-over Switch Details**



## SECTION 10: LIGHTING AND SHUTDOWN INSTRUCTIONS

### 10.1. MODELS WITH IGNITION SUFFIX "-6C"

- 10.1.1. Turn gas control knob to "OFF" position. Allow 5 minutes for any gas to escape before lighting.
- 10.1.2. Turn gas control knob to "PILOT" position. Push down on gas control knob and light the pilot with a match. (See Figure 5 "Pilot lighting hole location" on page 8). Hold this knob down for approximately 60 seconds after lighting the pilot.
- 10.1.3. When the gas control knob is released, the pilot should continue to burn. If the pilot goes out, repeat Steps 1 and 2 again. Close the pilot hole swivel door after the pilot is lit.
- 10.1.4. Push the knob down slightly and rotate the gas control knob from "PILOT" to "ON". The main burner will ignite.
- 10.1.5. If the main or pilot burners extinguish, depress and turn the gas control knob to the "OFF" position, wait 5 minutes and repeat the above lighting procedure.

**CAUTION: DO NOT OPERATE MAIN BURNER AT ANY SETTING LESS THAN FULL "ON" POSITION. SOOTING WILL OCCUR!**

### 10.2. MODELS WITH IGNITION SUFFIX "-9A" and "-9B"

- 10.2.1. Turn gas control knob to "OFF" position. Allow 5 minutes for any gas to escape before lighting.
- 10.2.2. Turn gas control knob to "PILOT" position. Push down on gas control knob and light the pilot with a match. (See Figure 5 "Pilot lighting hole location" on page 8.) Hold this knob down for approximately 60 seconds after lighting the pilot.
- 10.2.3. When the gas control knob is released, the pilot should continue to burn. If the pilot goes out, repeat Steps 1 and 2 again. Close the pilot hole swivel door after the pilot is lit.
- 10.2.4. Rotate the gas control knob from "PILOT" to "ON". The main burner will ignite.
- 10.2.5. If the main or pilot burners extinguish, depress and turn the gas control knob to the "OFF" position, wait 5 minutes and repeat the above lighting procedure.
- 10.2.6. Turn the temperature control knob to the desired setting.

**CAUTION: DO NOT OPERATE MAIN BURNER AT ANY SETTING LESS THAN FULL "ON" POSITION. SOOTING WILL OCCUR!**

Figure 5: Gas control knob setting position

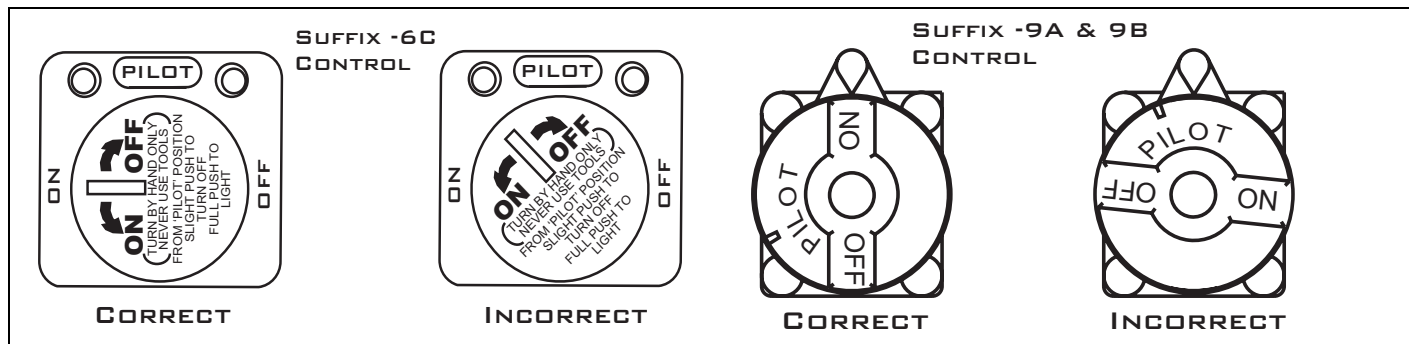
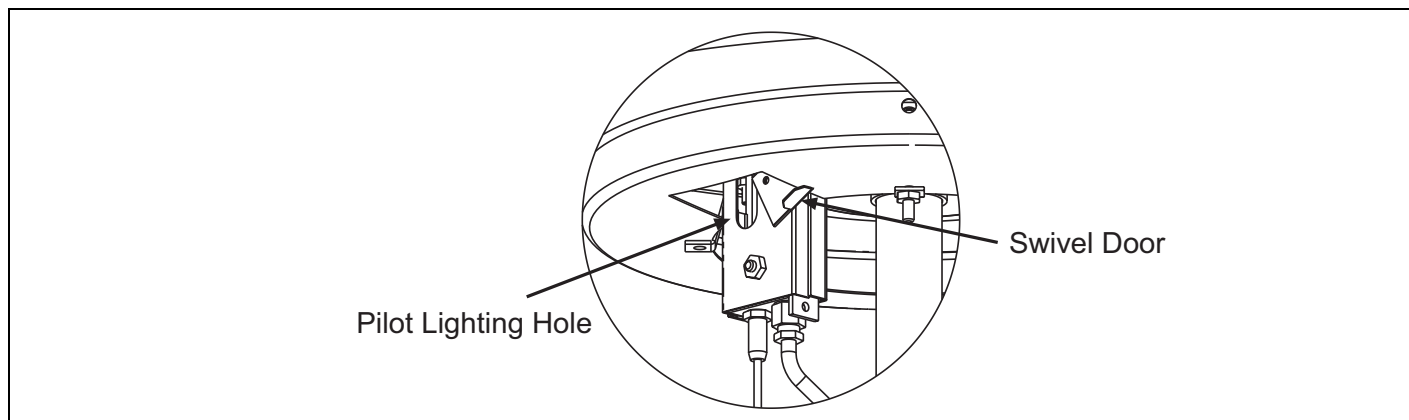


Figure 6: Pilot lighting hole location



## SECTION 11: CLEANING AND ANNUAL MAINTENANCE

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This heater must be cleaned and serviced at least once before the start of each heating season or at any time the infrared emitter show signs of collecting any foreign material on its surface. Maximum heating efficiency and clean combustion will be maintained by keeping the emitter and burner clean. To clean the heater follow these instructions:

11.1. Turn off the gas supply to the heater.

11.2. Remove and clean the burner.

11.2.1. Remove the front cross brace and radiation shield from heater.

11.2.2. Disconnect the pilot burner and pilot shield from burner assembly. Rotate the swivel clamp (at the bottom of the burner) away from the brass orifice holder.

11.2.3. Lower and remove the complete gas control arm from the heater.

11.2.4. Remove the four (4) nuts from each burner alignment bracket.

11.2.5. Lower the burner and remove from the heater.

11.2.6. Remove four (4) pan head screws holding burner cap in place.

11.2.7. Burner ports are formed by grooves on underside of burner cap; burner ports may be cleaned with a wire brush.

11.2.8. Removal of burner cap also makes mixing tube of burner accessible for cleaning with a round wire brush.

11.2.9. After cleaning, re-assemble burner cap on burner base with the four (4) pan head screws.

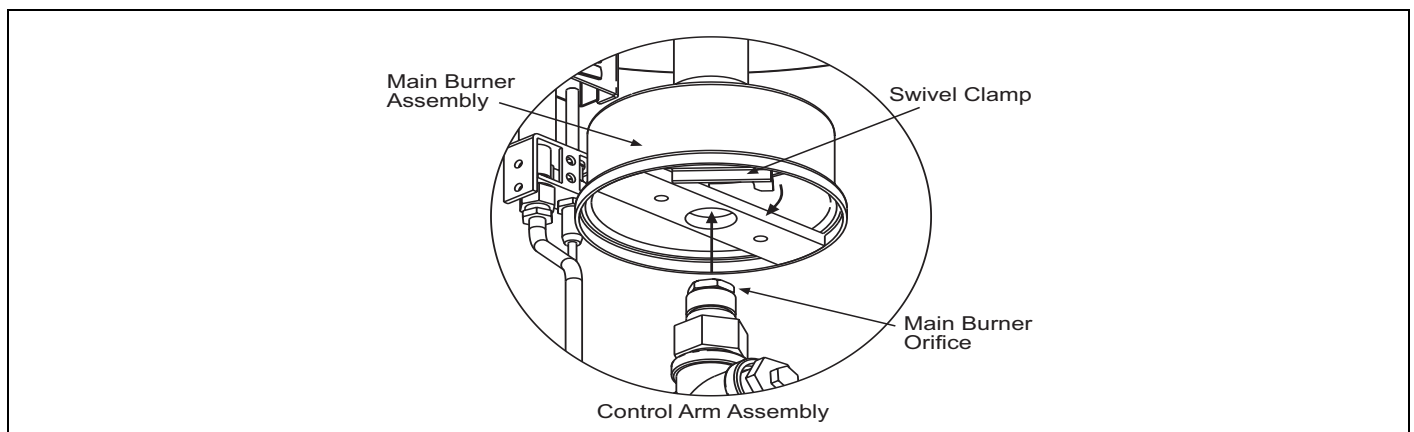
11.2.10. Re-install the Burner control arm and remaining components in reverse order.

11.3. If the emitter shows any accumulation of material in the ports, remove the heater top and the expanded metal guard to expose the emitter and use a high pressure air hose to blow the ports clean. If this does not clean the holes, remove the four (4) screws holding the emitter to its mounting ring and remove the emitter so that it can be cleaned both inside and out with a wire brush and then blown out with a high pressure air hose.

11.4. Inspect the pilot burner and remove any foreign material with a brush or an air hose.

11.5. Reassemble the heater, test all connections for leaks and test the heater to be sure it is now operating properly.

Figure 7: Burner swivel retainer detail



## SECTION 12: REPLACING PARTS

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At all times when parts are being replaced, ensure that both gas and electrical supplies are disconnected. Various parts are available from the factory for replacement by a licensed service person. Refer to exploded parts guide in Section 12 for all replacement parts.

Date of Installation \_\_\_\_\_

Heater Model Number RCH100 \_\_\_\_\_ - \_\_\_\_\_ N = Natural Gas, L = Propane Gas

Heater Serial Number \_\_\_\_\_

**SECTION 13: REPLACEMENT PARTS LIST - RCH100****Table 6: Replacement parts**

<b>ITEM No.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QUANTITY</b>
2	03333080	Nipple 1/2 x 2 - 1/2"	1
3	02127110	Nut, Hex 5/16-18	1
4	02167040	Locknut, #8-32 KEPS	4
5	02166060	PHMS, #8-32 x 3/4"	4
6	02167020	Locknut, #10-24 KEPS	5
7	02155060	HWHMS, #10-24 x 1/2"	12
8	02192010	HWHSMS, #10 x 1/2"	4
9	02152010	HHTCS, #10-24" x 3/8"	2
10	04362050	Heat Exchanger Assembly	1
11	04593050	Guard, Expanded Metal	1
12	43901000	Head, 15" dia (top of heater)	1
13	43901980	Head 15" dia. (upper base)	1
14	43901990	Head 15" dia (lower base)	1
15	43902050	Base Shroud Assembly - LH	2
16	43904000	Brace, Cross	1
17	43905000	Shield, Radiation	1
18	41357030	Instruction Manual (Not Shown)	1
19	43633060	Burner Assembly (complete w/cap)	1
20	43633005	Burner Sub-Assembly	1
21	41859000	Burner Cap	1
22	43903000	Burner Bracket	4
23	43637050	Pilot Shield Assembly (outer)	1
24	43900010	Control Arm Complete-LP Gas (Suffix L6C)	1
25	43900020	Control Arm Complete-NG Gas (Suffix N6C)	1
26	03258910	Main Burner Orifice-LP Gas (7/64")	1
27	03258120	Main Burner Orifice-NG Gas (#12)	1
28	03399030	Pilot Burner Assembly - LP Gas (#J129DDA4212)	1
29	03399020	Pilot Burner Assembly - Nat Gas (#J129DDA3223)	1
30	03345020	Pilot Orifice ftg - LP Gas (#Y90AA4212)	1
31	03345010	Pilot Orifice ftg - Nat Gas (#Y90AA3223)	1
32	03437000	Pilot Burner Less fittings (#J129DDA-ID)	1
33	03401030	Thermocouple (#K16BA18)	1
33a	03401070	Thermocouple with tip-over switch junction block (#K16JA-24)	1
34	30091010	Gas Valve (White Rodgers #764-2)	1
35	30241010	Male Fitting 3/8 Flared Tube x 1/2 MPT-LP Gas	1
36	41799010	Pilot Tubing	1
37	42889010	Orifice Fitting 9/16-18 UNF x 1/2NPT	1
38	03307100	Regulator, 1/2 x 1/2 NPT (#RV48)-Nat Gas	1
39	03333140	Nipple, 1/2 x 4	1

Table 6: Replacement parts

ITEM No.	PART NO.	DESCRIPTION	QUANTITY
39a	03333080	Nipple 1/2 x 2-1/2 - Nat Gas	1
40	03336080	Tee 1/2	1
41	03338130	Bushing 1/2 x 1/8	1
42	03339020	Pipe Plug 1/8 (pressure tap)	1
43	30522000	Hose & Regulator Assembly - LP Gas (Not Shown)	1
44	30523000	Hose Assembly 3/8" x 120" - LP Gas (Not Shown)	1
45	30524000	Regulator, POL x 3/8 - LP Gas (Not Shown)	1
46	43900030	Control Arm Complete - LP Gas (Suffix L9A)	1
47	43900040	Control Arm Complete - Nat Gas (Suffix N9A)	1
48	30528030	Adapter, Extension 1/2FPT x 1/2MPT - Nat Gas	1
49	30640000	Gas Valve (Robertshaw) LP Gas @ 10" WC	1
50	30640010	Gas Valve (Robertshaw) Nat Gas @ 3.5" WC	1
51	41870050	Bulb Retainer	1
52	43137020	Pilot Tubing (Robertshaw)	1
53	03841020	Tip-Over Switch (RCH100-9B only)	1

**MODEL NUMBER SUFFIXES**

N - Natural Gas

L - LP Gas

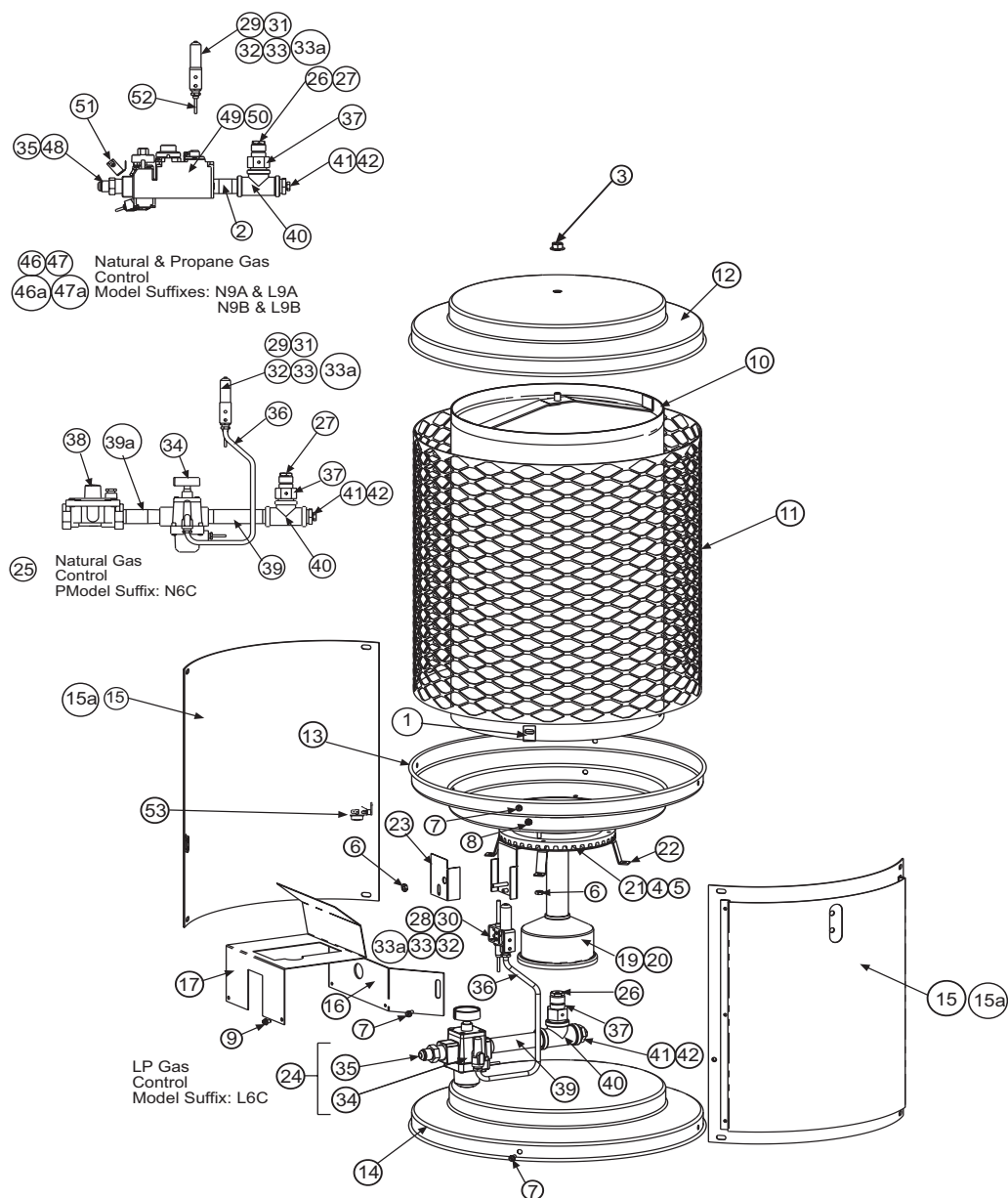
6 - 100% Gas Shutoff Control - Manually Operated (Baso valve)

6C - 100% Gas Shutoff Control - Manually Operated (White-Rodgers valve)

9A - 100% Gas Shutoff Control - Thermostatically Operated (Robertshaw Valve)

9B - 100% Gas Shutoff Control - Thermostatically Operated (Robertshaw Valve)

**Figure 8: Replacement parts**



**IMPORTANT**

PLEASE ORDER BY PART NUMBER - NOT BY ITEM NUMBER. ALSO REFER TO COMPLETE MODEL NUMBER WHEN ORDERING. ALL REPLACEMENT PART PRICES AVAILABLE WHEN ORDERING.