OPERATOR MANUAL

OM-AH

Model :AH/1,AH/1E
Steam Jacketed Kettles

Self-contained
Stainless steel
Gas heated
Floor mounted
Stationary

THIS MANUAL MUST BE RETAINED FOR FUTURE REFERENCE. READ, UNDERSTAND AND FOLLOW THE INSTRUCTIONS AND WARNINGS CONTAINED IN THIS MANUAL.

FOR YOUR SAFETY

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS.OR ANY OTHER APPLIANCE

POST IN A PROMINENT LOCATION INSTRUCTIONS TO BE FOLLOWED IN THE EVENT USER SMELLS GAS. THIS INFORMATION SHALL BE OBTAINED BY CONSULTING YOUR LOCAL GAS SUPPLIER. AS A MINIMUM, TURN OFF THE GAS AND CALL YOUR GAS COMPANY AND YOUR AUTHORIZED SERVICE AGENT. EVACUATE ALL PERSONNEL FROM THE AREA.

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.

GROEN

MADE IN USA

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IMPORTANT--READ FIRST-- IMPORTANT

WARNING: **INSTALLATION OF THE UNIT MUST BE DONE BY PERSONNEL QUALIFIED TO WORK WITH ELECTRICITY AND PLUMBING. IMPROPER INSTALLATION CAN CAUSE INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT. UNIT MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES.**

CAUTION: **TO AVOID DAMAGING PARTS OF THE BURNER SYSTEM UNDERNEATH THE KETTLE, LIFT THE UNIT ONLY BY THE RING BENEATH THE OUTER PORTION OF THE BODY.**

WARNING: **DO NOT ATTACH THE UNIT TO A TYPE "B" VENT. FAILURE COULD RESULT IN FIRE OR PROPERTY DAMAGE.**

WARNING: **DO NOT CONNECT ANY PIPING TO THE POP SAFETY VALVE. THE VALVE MUST BE FREE TO VENT STEAM AS NEEDED. ELBOW, ATTACHED TO THE SAFETY VALVE, SHOULD POINT DOWN TOWARD THE FLOOR. IMPROPER INSTALLATION WILL VOID THE WARRANTY!**

DANGER: **ELECTRICALLY GROUND THE UNIT AT THE TERMINAL PROVIDED. FAILURE TO GROUND THE UNIT COULD RESULT IN ELECTROCUTION AND DEATH.**

CAUTION: **BE SURE ALL OPERATORS READ, UNDERSTAND AND FOLLOW THE OPERATING INSTRUCTIONS, CAUTIONS AND SAFETY INSTRUCTIONS CONTAINED IN THIS MANUAL.**

CAUTION: **DO NOT OVERFILL THE KETTLE WHEN COOKING, HOLDING OR CLEANING. KEEP LIQUIDS A MINIMUM OF 2-3" (5-8 CM) BELOW THE KETTLE BODY RIM TO ALLOW CLEARANCE FOR STIRRING, BOILING PRODUCT AND SAFE TRANSFER.**

CAUTION: **KEEP FLOORS IN FRONT OF KETTLE WORK AREA CLEAN AND DRY. IF SPILLS OCCUR, CLEAN IMMEDIATELY TO AVOID DANGER OF SLIPS OR FALLS.**

WARNING: **KEEP WATER AND SOLUTIONS OUT OF CONTROLS AND BURNERS. NEVER SPRAY OR HOSE CONTROL CONSOLE, ELECTRICAL CONNECTIONS, ETC.**

CAUTION: **MOST CLEANERS ARE HARMFUL TO THE SKIN, EYES, MUCOUS MEMBRANES AND CLOTHING. PRECAUTIONS SHOULD BE TAKEN TO WEAR RUBBER GLOVES, GOGGLES OR FACE SHIELD AND PROTECTIVE CLOTHING. CAREFULLY READ THE WARNINGS AND FOLLOW THE DIRECTIONS ON THE LABEL OF THE CLEANER TO BE USED.**

IMPORTANT: **Do not mix the parts of different tangent draw-off valve assemblies during washing. The parts are not interchangeable.**

NOTICE: **NEVER leave a sanitizer in contact with stainless steel surfaces LONGER THAN 10 minutes. Longer contact can cause corrosion.**

WARNING: **FAILURE TO PERIODICALLY CHECK SAFETY VALVE OPERATION COULD RESULT IN PERSONAL INJURY AND/OR DAMAGE TO EQUIPMENT.**

WARNING: **WHEN TESTING, AVOID ANY EXPOSURE TO THE STEAM BLOWING OUT OF THE SAFETY VALVE. DIRECT CONTACT COULD RESULT IN SEVERE BURNS.**

WARNING: **TO AVOID INJURY, READ AND FOLLOW ALL PRECAUTIONS STATED ON THE LABEL OF THE WATER TREATMENT COMPOUND.**

WARNING: **BEFORE REPLACING ANY PARTS, DISCONNECT THE UNIT FROM THE ELECTRIC POWER SUPPLY AND CLOSE THE MAIN GAS COCK. ALLOW FIVE MINUTES FOR UNBURNED GAS TO VENT.**

CAUTION: **USE OF ANY REPLACEMENT PARTS OTHER THAN THOSE SUPPLIED BY GROEN OR THEIR AUTHORIZED DISTRIBUTOR CAN CAUSE INJURY TO THE OPERATOR AND DAMAGE TO THE EQUIPMENT AND WILL VOID ALL WARRANTIES.**

IMPORTANT: **Service performed by other than factory authorized personnel will void all warranties.**

WARNING: **KEEP AREA AROUND KETTLE FREE AND CLEAR OF ALL COMBUSTIBLE MATERIALS, FAILURE TO DO SO, COULD RESULT IN FIRE OR PROPERTY DAMAGE.**

Equipment Description

Groen Models AH/1 and AH/1E steam kettles are stainless steel, floor mounted kettles with a self-contained steam source heated by gas. A closed steam jacket covers the lower 2/3 of the kettle. Heat from gas flames boils water in the jacket to produce steam under pressure. To ignite the flames, Model AH/1 has a continuously burning pilot flame, called the standing pilot, and Model AH/1E has electronic spark ignition.

The kettles are of the stationary (nontilting) type. Liquids can be removed from the kettle through the tangent draw-off valve.

All exposed surfaces are stainless steel. An insulated canopy protects the kettle body, and a housing encloses all the controls.

Three tubular legs support the unit. Bullet feet on the legs can be adjusted to level the kettle.

A one piece dome cover is hinged to the kettle. Covers for 60, 80, and 100 gallon kettles are supplied with counterbalancing actuators to hold the covers in the fully open or closed position.

Controls used by the operator include the ON/OFF switch, to control electric power for the unit, and the thermostat, to set the cooking temperature.

The automatic controls and a brief description are listed below.

Gas pressure regulator:	Protects the unit from high pressure in the gas supply line
Automatic gas valves:	Let gas into the burners at the proper time
Pressure limit switch:	Closes the main automatic gas valve when steam pressure in the jacket reaches 27 PSI and opens the valve when the pressure drops to 22 PSI
Safety valve:	Lets steam out of the jacket if the steam pressure gets too high
Low-water cutoff:	Turns off the burner if the water level in the jacket gets too low for safe operation

Instruments also are provided to show the operator what is happening inside the unit. These instruments are:

Water gauge glass:	Indicates whether there is enough water in the steam jacket
Pressure/vacuum gauge:	Shows the steam pressure and whether too much air has got into the jacket
Heating indicator light:	Indicates that the kettle is being heated

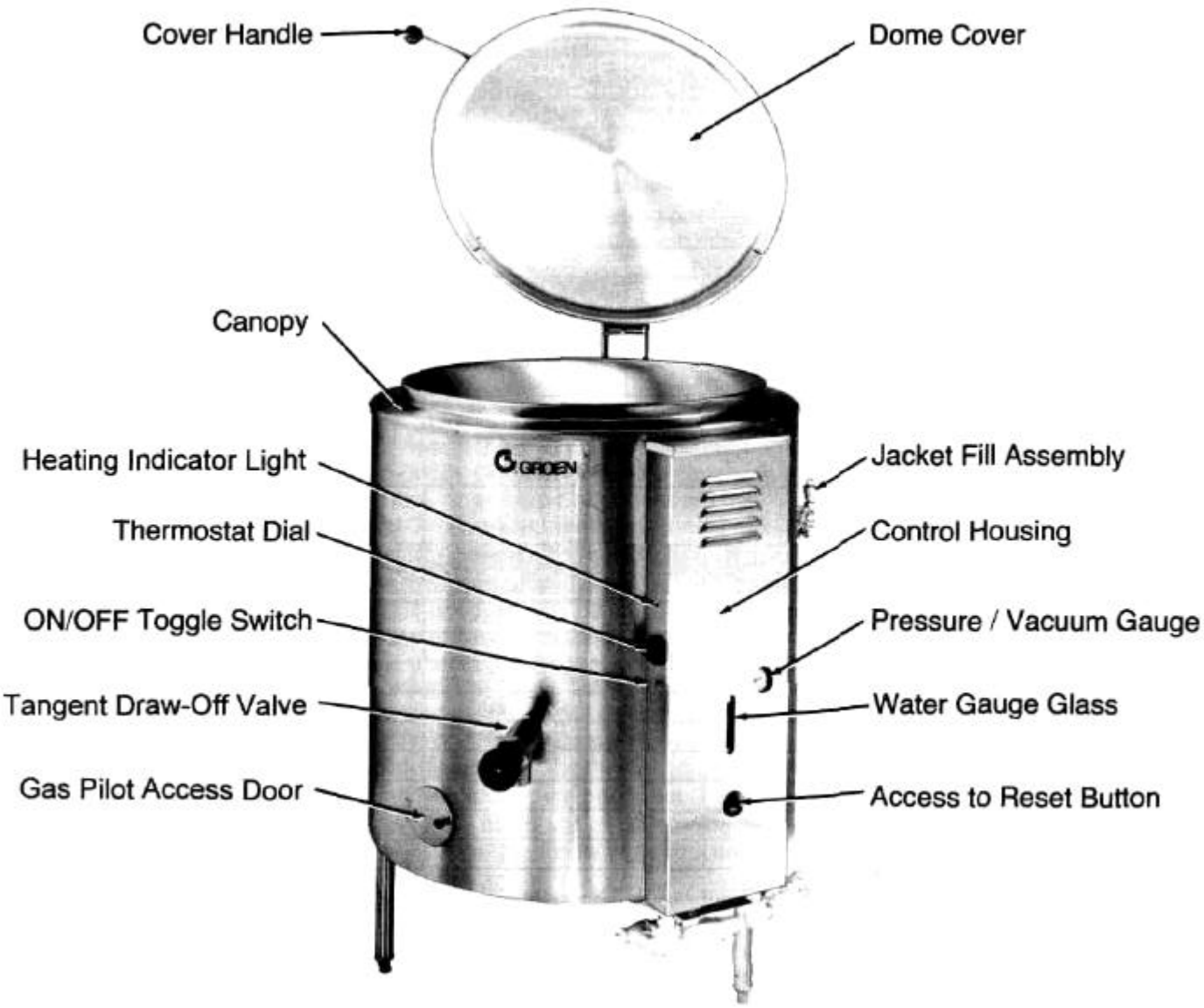
The kettle body is welded into one piece and furnished with a rim reinforced by a rectangular bar. The interior of the kettle is polished to a 180 emery grit finish, while the exterior is given a bright semi-deluxe finish. The unit is ASME shop inspected and registered with the National Board for working pressures up to 30 PSI.

The standard 2 inch tangent draw-off is a 316 stainless steel, compression disc valve. A removable strainer with 1/4 inch holes keeps pieces of product that are too large from going down into the drawoff.

The jacket is filled at the factory with water containing rust inhibitors. The kettle can operate at steam pressures up to 30 PSI, which provide kettle temperatures of 150 to 270°F. This temperature range allows the operator to use the kettle for warming, simmering, boiling, or braising.

For AH kettles, options include:

1. Larger (3 inch) draw-offs
2. Plug-type draw-off valves (not NSF approved)
3. Solid disc strainer or strainer with 1/8 inch perforations
4. Electronic spark ignition
5. Fill faucet
6. Automatic, metered water filler (Gallon Master)
7. TRI-BC basket inserts
8. Kettle brush kit
9. Etch marks
10. Flanged feet


Cover Handle
Dome Cover
Canopy
Heating Indicator Light
Thermostat Dial
ON/OFF Toggle Switch
Tangent Draw-Off Valve
Gas Pilot Access Door
Jacket Fill Assembly
Control Housing
Pressure / Vacuum Gauge
Water Gauge Glass
Access to Reset Button
GRIDEN

Model AH/1

Equipment Description (cont'd)

KETTLE CHARACTERISTICS

		Firing rate, BTU/hour	
Model	**Ignition**	**Natural gas**	**Propane gas**
AH/1-20	Pilot	85,000	85,000
AH/1-40	Pilot	100,000	85,000
AH/1-60	Pilot	145,000	145,000
AH/1-80	Pilot	145,000	145,000
AH/1-100	Pilot .	145,000	145,000
AH/1E-20	Spark	85,000	85,000
AH/1E-40	Spark	100,000	85,000
AH/1E-60	Spark	145,000	145,000
AH/1E-80	Spark	145,000	145,000
AH/1E-100	Spark	145,000	145,000

Dimensions

Model	Kettle capacity, gallons	Jacket capacity, gallons	Kettle diameter, inches	Kettle depth, inches	Overall width, inches	Overall front-to-back, inches	Rim height, nches
AH/1-20	20	4-1/2	20	18	36-3/4	39	40
AH/1-40	40	7	26	22	38-1/4	45	42
AH/1-60	60	9-1/2	30	25	41	49	49
AH/1-80	80	11-1/2	32	29	42-1/2	51	55-1/2
AH/1-100	100	11-1/2	32	35	42-1/2	51	61-1/2
AH/1E-20	20	4-1/2	20	18	36-3/4	39	40
AH/1E-40	40	7	26	22	38-1/4	45	42
AH/1E-60	60	9-1/2	30	25	41	49	49
AH/1E-80	80	11-1/2	32	29	42-1/2	51	55-1/2
AH/1E-100	100	11-1/2	32	35	42-1/2	51	61-1/2

Inspection & Unpacking

The unit will arrive completely assembled, wrapped in protective plastic on a heavy skid. Immediately upon receipt, remove all protective plastic wrap form the unit, and inspect the unit for damage. Report any shipping damage or an incorrect shipment to the delivery agent.

Write down the model number, serial number, and installation date of your unit, and file this information for future reference. Space for these entries is provided at the top of the Service Log in this manual.

CAUTION: SHIPPING STRAPS ARE UNDER TENSION AND CAN SNAP BACK WHEN CUT.

CAUTION: UNIT WEIGHS 440 TO 1100 LB. (200 TO 500 KG). FOR SAFE HANDLING, INSTALLER SHOULD OBTAIN HELP AS NEEDED, OR EMPLOY APPROPRIATE MATERIALS HANDLING EQUIPMENT (SUCH AS A FORKLIFT, DOLLY, OR PALLET JACK) TO REMOVE THE UNIT FROM THE SKID ANDMOVEIT TO THE PLACE OF INSTALLATION.

When installation is to begin, cut the straps holding the unit on the skid, and lift the unit straight up off the skid.

Installation & Start-Up

A. Installation

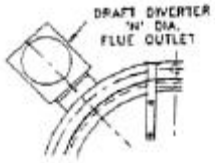
The unit should be installed in a ventilated room for efficient performance. All items which may obstruct or restrict the flow of air for combustion and ventilation must be removed. The area directly around the appliance must be cleared of all combustible materials.

WARNING: INSTALLATION OF THE UNIT MUST BE DONE BY PERSONNEL QUALIFIED TO WORK WITH ELECTRICITY AND PLUMBING. IMPROPER INSTALLATION CAN CAUSE INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT. UNIT MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES.

1. Installation requires connection with gas and electrical services. See items 8 to 14 for details.
2. To protect the unit from damage, leave it on the shipping pallet until the time of installation. When installation is to begin, cut the straps holding the kettle, and hoist the kettle straight up off the skid.

NOTICE: To avoid damaging parts of the burner system underneath the kettle, LIFT THE UNIT ONLY BY THE RING beneath the outer portion of the body.

3. Install the unit with a minimum clearance to combustible and non-combustible construction of six (6) inches at the sides and six (6) inches between the draft diverter and the wall. Also leave enough room for cleaning, maintenance, and service.
4. The draft diverter shipped with the kettle is the correct height and shape to give maximum performance. Install the draft diverter as shown on the specification sheet (drawing D-6038). Do **not** change the diverter in any way. **Any mechanical, electrical, or gas type change must be approved by the Groen Food Service Engineering Department.**



WARNING: DO NOT ATTACH THE UNIT TO A TYPE "B" VENT. FAILURE COULD RESULT IN FIRE OR PROPERTY DAMAGE.

Install the unit under a ventilation hood, or vent the flue directly to a masonry chimney. Put a hood at least several inches above the upper end of the draft diverter. Do **not** rest hood supports on the diverter. If the kettle is installed under a ventilating hood, installation of the ventilating hood should comply with local codes and/or ANSI/NFPA-96 Latest Edition. Also, local codes may require that the kettle be electrically interlocked to shut off the gas supply and prevent the operation of the unit if the exhaust fan is not operating or if the fire suppression system is activated. Failure to follow these instructions can cause bodily injury and/or property damage.

5. To level the unit, adjust leg length by turning the bullet feet.
6. Make sure the water level is correct in the jacket, by confirming that the level is between the marks on the gauge glass. If the water level is low, follow the instructions under "Jacket Filling" in the "Maintenance" Section of this manual.

CAUTION: DO NOT CONNECT ANY PIPING TO THIS POP SAFETY VALVE. IT MUST BE FREE TO VENT STEAM AS NEEDED. ELBOW SHOULD POINT DOWN TOWARD FLOOR. IMPROPER INSTALLATION WILL VOID WARRANTY!

7. To protect personnel from steam coming out of the safety valve, the open end of the elbow at the outlet must be directed down. If it is not, turn the elbow to the correct position

DANGER: ELECTRICALLY GROUND THE UNIT AT THE TERMINAL PROVIDED. FAILURE TO GROUND UNIT COULD RESULT IN ELECTROCUTION AND DEATH.

Safety valve with elbow in correct position

8. Provide 115 VAC, 60 HZ, 1 PH, 15 AMP electrical service. Use 1/2 inch waterproof conduit and waterproof connections. Observe local codes and/or The National Electrical Code in accordance with ANSI/NFPA 70 - latest edition. **AN ELECTRICAL GROUND IS REQUIRED.** The electrical schematic is located on the inside of the service panel.

In Canada, provide electrical service in accordance with the Canadian Electrical Code, CSA C22.1 Part 1 and/or local codes.

9. The internal gas lines of the unit were cleaned and closed off with a gas cock, before the unit was shipped from the factory. Free all external gas lines of lint, dirt, metal chips, sealant, grease, oil, and other contaminants, before you connect the lines to the kettle.
10. Connect the gas cock of the kettle to the gas service main with 3/4 inch IPS line or approved equivalent.
11. Installation must conform with local codes, or in the absence of local codes, with the National Fuel Gas Code, ANSI Z 223.1-1988 (or latest edition). The unit should be installed in an adequately ventilated room with a provision for adequate air supply. The best ventilation will utilize a vent hood and exhaust fan with no direct connection between the vent duct and the flue. Do NOT obstruct the flue or vent duct after installation.
    In Canada, the installation must conform to the CAN/CGA B149 Installation Codes for Gas Burning Appliances and Equipment and/or local codes.
12. Adequate space for proper service and operation is required. Do NOT block any air intake spacings to the combustion chamber or obstruct the air flow by piling or stacking anything near the kettle.
13. After the kettle has been connected to the gas supply, all gas line joints must be checked for leaks. DO NOT USE A FLAME TO CHECK FOR LEAKS. A thick soap solution or other suitable leak detector should be employed.
14 For a unit on casters, complete connection to the gas supply with connectors that comply with the standard for connectors for moveable gas appliances, ANSI Z21.69 — latest edition. Restrain movement of the unit by attaching a cable or chain to the eyelet (provided at the back of the frame) and anchoring the cable or chain to the wall or floor. Make the length and location of the cable such that the unit cannot pull on the gas connection while the cable is connected.
15. The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 PSIG (3.48 kPa). The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 PSIG (3.48 kPa).
16. Check the following points to confirm that your AH kettle has been installed properly.
    a. Enough room between the kettle and nearby objects for cleaning and service.
    b. Minimum clearance of 6 inches from sides and 6 inches from draft diverter.
    c. Unit vented to a hood or chimney.
    d. Kettle level.
    e. Correct amount of water in the jacket.
    f. Safety valve outlet pointed down.
    g. Connected with a waterproof, 115 volt, 15 amp supply of electric power in accordance with electrical codes.
    h. Gas lines cleaned before connection.
    i. Gas connected with 3/4 inch pipe or equivalent.
    j. Gas line joints checked for leaks.
    k. No obstruction to air supply or venting.

B. Initial Start-Up

After the kettle has been installed, the installer should test to ensure that the unit is operating correctly.

1. Remove all literature and packing materials from the inside and outside of the unit. Clean out any material that might clog or damage the tangent draw-off valve (TDO).
2. Close the TDO, then put water into the kettle until the water is about 6 inches deep. Test operation of the TDO by opening it all the way, then closing it before all the water runs out.
3. Make sure the supplies of gas and electric power are on.
4. Following "To Start Kettle" instructions in the "Operation" section of this manual, begin heating the water at the highest thermostat setting. The heating indicator light should come on as soon as you turn up the thermostat dial, and heating should continue until the water boils.
5. To turn off the unit, follow "To Turn Off Kettle" instructions in the "Operation" section.

If the kettle functions as described above, it is ready for use. If it does not, contact your area Groen representative.

Operation

CAUTION: BE SURE ALL OPERATORS READ, UNDERSTAND AND FOLLOW THE OPERATING INSTRUCTIONS, CAUTIONS AND SAFETY INSTRUCTIONS CONTAINED IN THIS MANUAL.

A. Controls

The operator controls for the kettle are:

1. Main gas cock, which controls the supply of gas from the main to the unit.
2. ON/OFF (toggle) switch. This switch controls the supply of electrical power to the control circuits.
3. Thermostat dial, which turns the thermostat on or off and sets the operating temperature of the kettle.
4. Reset button, used in lighting the pilot burner (on standing pilot model only).

Refer to the photograph in the "Equipment Description" section of this manual for the location of controls and other features.

B. Operating Procedure

WARNING: KEEP AREA AROUND KETTLE FREE AND CLEAR OF ALL COMBUSTIBLE MATERIALS.

1. To Start Kettle

a. CHECK THE WATER LEVEL IN THE JACKET EVERY DAY. The level must be between the lines on the gauge glass. If the level is low, see "Jacket Filling" in the "Preventive Maintenance" section of this manual.

b. While the kettle is cold, check the pressure gauge. If the gauge does not show 20 or more inches of vacuum (that is, a reading of 20 to 30 below 0), see "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.

c. Make sure the strainer is covering the outlet to the draw-off at the bottom of the kettle.

d. Set both the toggle (ON/OFF) switch and the thermostat dial to "OFF".

e. If the unit has just been turned off, allow 5 minutes for unburned gas to clear out, before you turn the kettle on again.

f. Turn the gas cock ON (handle lined up with the gas pipe), if it is not already on.

g. If you are using Model AH/1 E with electronic spark ignition, or if you are using a Model AH/1 unit with the pilot burner already lit, all you must do to start heating the kettle is:

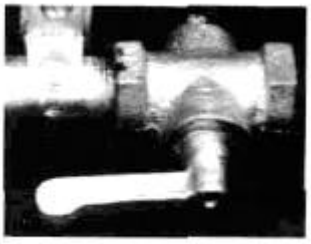
(1) Press the ON/OFF switch to "ON".

(2) Turn the thermostat dial to the desired setting.

h. If you must light the pilot burner in a Model AH/1, look through the access hole in the cover of the control housing to see which kind of pilot system is in your unit. If there is a red reset button on top of the gas control, you have a Basotrol pilot system. If you see an "ON/PILOT/OFF" knob, you have a Honeywell pilot system.

Correct water level

Correct vacuum reading for cold kettle



Gas cock turned on

Operation (cont'd)

i. Light the pilot burner by the procedure that applies to your unit.
   (1) With Basotrol standing pilot ignition system:
      (a) Locate the red reset button on the automatic gas valve inside the control housing. You can reach the button through the hole below the pressure gauge.
      (b) Hold a flame to the pilot burner and press down the reset button to start the flow of gas. Continue to hold the reset button down for 60 seconds after the pilot burner is lit.
      (c) Release the button. The pilot burner should stay lit.
   (2) With Honeywell pilot ignition system:
      (a) To reach the "ON/PILOT/OFF" knob, remove the cover of the control housing.
      (b) Set the knob to "PI LOT".
      (c) Hold a flame to the pilot burner and press down the knob to start the flow of gas. Continue to hold the knob down for 60 seconds after the pilot burner is lit.
      (d) Release the knob. The pilot should stay lit.
      (e) Set the knob to "ON". Then replace the cover of the control housing.
   (3) For all units, if pilot requires relighting:
      (a) Set both the ON/OFF switch and the thermostat dial to their "OFF" positions.
      (b) Wait 5 minutes.
      (c) Light the pilot by the appropriate procedure above.

j. To light the main burner and start heating the kettle, after the pilot burner is lit:
   (1) Press the ON/OFF switch to "ON".
   (2) Turn the thermostat dial to the desired setting.

CAUTION: DO NOT OVER FILL THE KETTLE WHEN COOKING, HOLDING OR CLEANING. KEEP LIQUIDS A MINIMUM OF 2-3" (5-8 CM) BELOW THE KETTLE BODY RIM TO ALLOW CLEARANCE FOR STIRRING, BOILING PRODUCT AND SAFE TRANSFER.

CAUTION: KEEP FLOORS IN FRONT OF KETTLE WORK AREA CLEAN AND DRY. IF SPILLS OCCUR, CLEAN IMMEDIATELY TO AVOID THE DANGER OF SLIPS OR FALLS.

2. To Turn Off Kettle.

a. Turn the thermostat dial to "OFF".

b. Press the ON/OFF switch to "OFF".

c. Before the unit is serviced, or if it will be off for a week or more:

   (1) Set the thermostat and ON/OFF switch at "OFF".

   (2) Turn the main gas cock OFF (handle at right angles to the gas pipe).

   (3) Cut off electric power for the unit at the circuit breaker or fuse box.

3. If Electric Power Fails

a. Do not attempt to operate the unit. The main burner cannot be lit until the power comes back on.

b. When power is restored, follow the instructions under "To Start Kettle" above.

4. To Relight Kettle

Close the main supply gas cock, then follow the instructions under "To Start Kettle" above.

Cleaning

1. Suggested Tools

a. Detergent and sanitizer, or a combination cleaning-sanitizing agent like Micro-Quat from ECOLAB.

b. Kettle brushes.

c. Bottle brush for cleaning the draw-off (product faucet).

2. Precautions

Before any cleaning operation:

a. Turn off the main burner by turning the thermostat dial to "OFF".

b. Cut off electric power to the unit at the circuit breaker or fuse box.

WARNING: KEEP WATER AND SOLUTIONS OUT OF CONTROLS AND BURNERS. NEVER SPRAY OR HOSE THE CONTROL CONSOLE, ELECTRICAL CONNECTIONS, ETC.

3. Procedure

a. Clean all food contact surfaces as soon as possible after use, preferably while the kettle is still warm. If the unit is in continuous use, thoroughly clean and sanitize both inside and outside at least once every 12 hours.

b. Scrape and flush out large amounts of food residues. Be careful not to scratch the kettle with metal implements. After flushing the kettle, close the draw-off valve.

CAUTION: MOST CLEANERS ARE HARMFUL TO THE SKIN, EYES, MUCOUS MEMBRANES AND CLOTHING. PRECAUTIONS SHOULD BE TAKEN TO WEAR RUBBER GLOVES. GOGGLES OR FACE SHIELD AND PROTECTIVE CLOTHING. CAREFULLY READ THE WARNINGS AND FOLLOW THE DIRECTIONS ON THE LABEL OF THE CLEANER.

c. Prepare a solution of the detergent/cleaning compound as instructed by the supplier. Clean the unit thoroughly. A cloth moistened with cleaning solution can be used to clean controls, control housing, electrical conduit, etc.

d. Drain the kettle, then take apart the tangent draw-off valve. Clean the draw-off port and each valve part with a brush.

CAUTION: DO NOT MIX THE PARTS of different draw-off assemblies during washing. The parts are NOT INTERCHANGEABLE.

e. Rinse the kettle and draw-off valve parts thoroughly with hot water, then drain completely.

f. When you put the draw-off valve back together, tighten the wing nut by hand only, without using a tool.

g. Put the strainer back over the draw-off outlet in the bottom of the kettle.

h. As part of the daily cleaning program, clean all inside and outside surfaces that may have been soiled. Remember to check such parts as the underside of the cover, control housing, etc.

i. To remove materials stuck to the equipment, use a brush, sponge, cloth, plastic or rubber scraper, or plastic wool along with the detergent solution. To make washing easier, let the detergent solution sit in the kettle and soak into the residue, or warm the detergent solution briefly.
Do not use any metal material (like metal sponges) or metal implement (like a spoon, scraper, or wire brush) that might scratch the surface. Scratches make the surface hard to clean and provide places for bacteria to grow. Do not use steel wool, which may leave particles imbedded in the surface and cause eventual corrosion and pitting.

j. The outside of the unit may be polished with a recognized stainless steel cleaner like "Zepper" from Zep Manufacturing Company.

k. When the equipment needs to be sanitized, use a sanitizing solution equivalent to one that supplies 200 parts per million available chlorine. Obtain advice on the best sanitizing agent from your supplier of sanitizing products. Following the supplier's instructions, apply the sanitizing agent after the unit has been cleaned and drained. Rinse off the sanitizer thoroughly.

CAUTION: NEVER leave a sanitizer in contact with stainless steel surfaces LONGER THAN 30 minutes. Longer contact can cause corrosion.

l. It is recommended that the unit be sanitized just before use.

m. If there is difficulty removing mineral deposits or a film left by hard water or food residues, clean the kettle thoroughly. Then use a deliming agent, like Lime-Away from ECOLAB, in accordance with the manufacturer's directions. Rinse and drain the unit before further use.

n. If especially difficult cleaning problems persist, contact your cleaning product supplier for assistance. The supplier has a trained technical staff with laboratory facilities to serve you.

Preventive Maintenance

This section describes actions the operator must take to keep warranty coverage of the unit and to keep the unit working safely and efficiently.

1. Jacket Vacuum

Every day, while the kettle is cold, read the pressure/vacuum gauge. A positive pressure reading or a vacuum reading between zero and 20 on the pressure/vacuum gauge indicates an excess of air in the jacket. Air in the jacket slows the heating of the kettle and sometimes keeps the kettle from reaching the desired operating temperature. To remove air:

a. Start the kettle. (See the "Operation" section of this manual).
b. Make sure the elbow on the outlet of the safety valve is turned so it will direct escaping steam down toward the floor.
c. When the pressure/vacuum gauge reaches a positive pressure reading of 5 PSI, release entrapped air and steam by lifting the lever on the safety valve for about 1 second. Repeat this step, then let the valve lever snap back into the closed position, so the valve will seat properly and not leak.

Safety valve with elbow in correct position

WARNING: AVOID ANY EXPOSURE TO THE STEAM BLOWING OUT OF THE SAFETY VALVE. A SEVERE BURN CAN RESULT ON EXPOSED SKIN.

2. Safety Valve

WARNING: FAILURE TO PERIODICALLY CHECK SAFETY VALVE OPERATION COULD RESULT IN PERSONAL INJURY AND/OR DAMAGE TO EQUIPMENT.

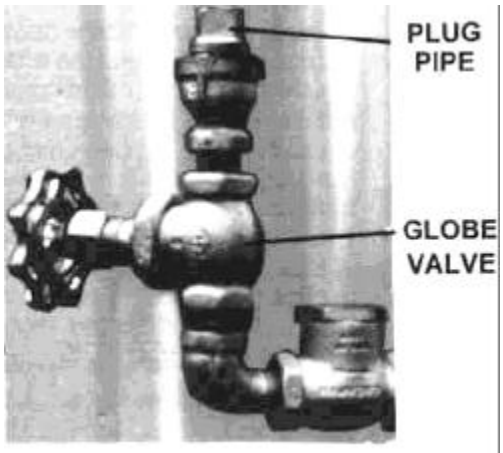
WARNING: WHEN TESTING, AVOID ANY EXPOSURE TO THE STEAM BLOWING OUT OF THE SAFETY VALVE. DIRECT CONTACT COULD RESULT IN SEVERE BURNS.

At least twice a month, the safety valve should be tested. Test the valve with the kettle operating at 15 psi (105 kPa), by holding the test lever for at least 5 seconds. Then release the lever and permit the valve to snap shut. If the lever does not activate, or there is no evidence of discharge, or the valve leaks, immediately discontinue use of the kettle and contact a qualified service representative.

3. Jacket Filling

Every day, **before you turn on the unit,** make sure the water level is between the marks on the water gauge glass. The jacket was filled at the factory with the proper amount of treated water. From time to time, you may need to restore the water to its proper level, either because water was lost as steam during venting or because treated water was lost by draining. The procedure for adding water follows.

a. If you are replacing water lost as steam, use distilled water. Do **not** use tap water. If you are replacing treated water that was drained from the jacket, prepare more treated water as directed below.



Jacket fill assembly

b. Allow the kettle to cool **completely**. Remove the pipe plug from the jacket fill assembly, then open the globe valve and pour in the distilled or treated water. Hold the safety valve open while you pour, to let air escape from the jacket. Continue adding water until the water level rises to a point between the marks on the gauge glass.

c. Close the globe valve.

d. Air that gets into the jacket during the filling operation must be removed, because it will make heating less efficient. See "Jacket Vacuum" above.

4. Water Treatment

Color-blind persons mixing the treated water solution must use an electroanalytical instrument to measure the pH level or have a person that is not color blind read the test strip color level.

WARNING: TO AVOID INJURY, READ AND FOLLOW ALL PRECAUTIONS STATED ON THE LABEL OF THE WATER TREATMENT COMPOUND.

a. Fill a mixing container with the approximate amount of water required (distilled water preferred). See the Table 1.

b. Hang a strip of pH test paper on the rim of the container, with about 1 inch into the water.

c. Stir the water continuously, while slowly adding boiler treatment compound until a color between 10.5 and 11.5 is reached as shown on the pH test kit chart.

d. Use a measuring cup to add compound. Record the exact amount of compound used for preparing additional treated water.

TABLE 1

Kettle capacity	Jacket capacity
20 gallons	4-1/2 gallons (17 liters)
30 gallons	6 gallons (23 liters)
40 gallons	7 gallons (26 liters)
60 gallons	9-1/2 gallons (36 liters)
80 gallons	11-1/2 gallons (44 liters)
100 gallons	11-1/2 gallons (44 liters)

5. Venting System

Periodically check the draft diverter and flue or hood to make sure that nothing will block or hinder the free flow of exhaust gases.

Troubleshooting List for the Operator

The Groen kettle is designed to operate smoothly and efficiently if properly maintained. However, the following is a list of checks to make in the event of a problem. If the actions suggested in this list do not solve the problem, call your Groen Certified Service Agency. To get the phone number of the nearest agency, call the your Area Groen representative or the Groen Parts and Service Department.

A. All Models

SYMPTOM	WHAT TO CHECK
Pilot burner and/or burner will not light or goes out after working for a while.	a. That the main gas cock is completely open (handle is in line with the gas pipe). b. That the toggle switch is ON. c. That the thermostat dial is at the correct setting. d. Lighting procedure. See the "Operation" Section of this manual. e. Jacket water level. If it is low, see "Jacket Filling" in the "Preventive Maintenance" section of this manual. f. That electric power is turned on at the circuit breaker or fuse box, and that power is being supplied to your building. g. Gas supply to your building.
Kettle continues heating after it reaches the desired temperature.	a. That the thermostat dial is at the correct setting.
Kettle stops heating before it reaches the desired temperature.	a. That the thermostat dial is at the correct setting. b. That the ON/OFF switch is ON. c. Reading of the pressure/vacuum gauge. If it is not 20 to 30 below zero when the kettle is cold, see "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.
Kettle heats slowly.	a. Reading of the pressure/vacuum gauge. If it is not 20 to 30 below zero when the kettle is cold, see "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.
Safety valve pops.	a. Reading of the pressure/vacuum gauge. If it is not 20 to 30 below zero when the kettle is cold, see "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.

B. Models with Standing Pilot Ignition

SYMPTOM	WHAT TO CHECK
Pilot burner will not light.	a. Lighting procedure. See the "Operation" section of this manual.
Pilot flame goes out when reset button is released.	a. Lighting procedure. See the "Operation" section of this manual.

Sequence of Operation

The following "action-reaction" outline is provided to help service personnel understand the functioning of the unit.

A. Model AH/1 with Standing Pilot Ignition

When the operator presses down the reset button, the button overrides the automatic control and opens the pilot burner valve, admitting gas from the supply line to the pilot. Lighting and maintaining the pilot flame for 60 seconds heats the thermocouple to operating temperature, so the thermocouple begins to supply electric current at 20 to 25 mV. Current from the thermocouple powers a coil that holds the pilot burner valve open. If the pilot flame goes out and allows the thermocouple to cool, the valve closes and prevents any flow of gas into the unit.

Once the pilot burner valve is open, gas is available at the main burner valve, which is normally closed. Pushing the toggle switch to "ON" provides 120 V electric power to the thermostat. When the operator turns the thermostat dial to an operating setting, the thermostat switch closes and allows the 120 V power to energize the heating indicator light and a coil at the main burner valve. The coil opens the main burner valve. Gas flows to the main burner and is ignited by the pilot flame.

B. Model AH/1 E with Electronic Spark Ignition

When the operator presses the toggle switch to "ON", electric power at 120V is supplied to the thermostat. Turning the thermostat dial to an operating setting closes the thermostat switch, which allows the automatic gas control to be energized. Simultaneously, an electric arc is established at the spark gap, and the automatic valve for the pilot burner is opened. When the electric spark ignites gas flowing from the pilot burner, a pilot flame probe detects the flame. The probe sends a control signal that causes the spark to shut off and a circuit to close for 24V power. The 24V provides power for the heating indicator light and the main automatic valve. Gas flowing from the main burner is ignited by the pilot flame. If a pilot flame is not sensed within 30 seconds after the spark begins, a timer shuts down the whole operation.

C. All Units

As heat from the main burner brings the temperature of steam in the jacket up to the thermostat setting, the thermostat switch opens. With electric power cut off, the main burner valve closes and turns off the burner. When the jacket steam cools below the thermostat set point, the thermostat switch closes and begins another heating cycle. On-off cycling continues and maintains the kettle at the desired temperature.

The thermostat controls heating by alternately calling for flames at the full capacity of the main burner and then signaling the control to shut the burner off completely. Because the control works in this "all or nothing" way, the kettle will heat as fast as it can until it reaches the set temperature, no matter what that temperature is. Turning the thermostat dial to a higher setting will cause heating to continue longer, until the kettle reaches the higher temperature, but it cannot make the unit heat any faster.

Safety features of these units operate as explained below:

1. Pressure limit switch. If the pressure of steam in the jacket exceeds 27 PSI, the switch opens and breaks the electrical circuit to the solenoid coil at the main gas valve. The valve closes and remains closed until jacket pressure decreases to 22 PSI. The pressure limit switch then closes, energizes the gas valve coil, and permits operation to resume.
2. Low-water cutoff. As long as water in the steam jacket touches the cutoff electrode, operation of the kettle can continue. If the water level falls below the end of the electrode, an electrical control circuit is broken, and the main gas valve closes. Jacket water must be restored to a safe operating level, before the kettle can be heated again.
3. Safety valve. If steam pressure in the jacket reaches 30 PSI, the valve will open and relieve the excess pressure.

Service Troubleshooting

The Groen kettle is designed to operate smoothly and efficiently if properly maintained. However, the following is a list of checks to make in the event of a problem. Wiring diagrams are furnished inside the service panel. If an item on the list is followed by an asterisk (*), the work should be done by a factory authorized service representative.

WARNING: BEFORE REPLACING ANY PARTS, DISCONNECT THE UNIT FROM THE ELECTRIC POWER SUPPLY AND CLOSE THE MAIN GAS COCK. ALLOW FIVE MINUTES FOR UNBURNED GAS TO VENT.

CAUTION: USE OF ANY REPLACEMENT PARTS OTHER THAN THOSE SUPPLIED BY GROEN OR THEIR AUTHORIZED DISTRIBUTOR CAN CAUSE INJURY TO THE OPERATOR AND DAMAGE TO THE EQUIPMENT AND WILL VOID ALL WARRANTIES.

IMPORTANT: Service performed by other than factory authorized personnel will void all warranties.

A. All Models

SYMPTOM	WHAT TO CHECK	
Pilot burner and/or burner will not light or goes out after working for a while.	a.	That the main gas cock is completely open (handle is in line with the gas pipe).
	b.	Thermostat dial and toggle switch settings.
	c.	Lighting procedure. See the "Operation" section of this manual.
	d.	Jacket water level. If it is low, see "Jacket Filling" in the "Preventive Maintenance" section of this manual.
	e.	Gas supply to the unit.
	f.	Electric power supply to the unit.
	g.	Thermostat operation.
	h.	Gas pressure at the automatic valve.*
Kettle continues heating after it reaches the desired temperature.	a.	Thermostat dial setting.
	b.	Thermostat calibration
	c.	Thermostat operation.
	d.	Seat of the main automatic gas valve for dirt.*
	e.	Solenoid plunger of the automatic valve for sticking.*
Kettle stops heating before it reaches the desired temperature.	a.	Thermostat dial and toggle switch settings.
	b.	For excess air in the jacket. See "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.
	c.	Thermostat calibration.*
	d.	Thermostat operation.*
	e.	Pressure limit switch for malfunction at low pressures.*
Kettle heats slowly.	a.	For excess air in the jacket. See "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.
	b.	Gas pressure at the automatic gas valve*
Safety valve pops.	a.	For excess air in the jacket. See "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.
	b.	Safety valve. If the valve pops at pressures below 29 PSI, replace it*
	c.	If high limit switch is set too high.*
	d.	Thermostat operation.*

B. Models with Standing Pilot Ignition
(Refer to the electrical schematic)

SYMPTOM	WHAT TO CHECK	
Pilot burner will not light.	a.	Lighting procedure. See the "Operation" section of this manual.
	b.	Pilot tubing and orifice for clogging.*
	c.	That the pilot gas supply line is purged of air.*
	d.	Gas pressure at the automatic valve.*
Pilot flame goes out when reset button is released.	a.	Lighting procedure. See the "Operation" section of this manual.
	b.	That electrical connections in the controls, including ground connections, are clean and secure.*
Main burner will not light, and previously lighted pilot burner is out.	a.	Pilot tubing and orifice for clogging.*
	b.	That electrical connections, including ground connections, are clean and secure.*
	c.	Gas pressure at the automatic valve.*
Main burner will not light, but pilot burner is lit.	a.	That electrical connections, including ground connections, are clean and secure.*
	b.	That the pressure limit switch is closed.*
	c.	Low-water cutoff for continuity, and the cutoff transformer for proper input and output voltages.*
	d.	That the low-water cutoff electrode is clean.*
	e,	That the pilot flame surrounds approximately 1/2 inch of the tip of the thermocouple.* If not, check for: (1) Clogging of the pilot burner.* (2) Air currents deflecting the pilot flame.* (3) Low gas pressure at the automatic valve.*
	f.	That the thermocouple generates at least 17 mV at the Basotrol valve terminal.*
	g.	For a defective automatic gas valve.*

Service Troubleshooting (cont'd)

The Groen kettle is designed to operate smoothly and efficiently if properly maintained. However, the following is a list of checks to make in the event of a problem. Wiring diagrams are furnished inside the service panel. If an item on the list is followed by an asterisk (*), the work should be done by a factory authorized service representative.

WARNING: BEFORE REPLACING ANY PARTS, DISCONNECT THE UNIT FROM THE ELECTRIC POWER SUPPLY AND CLOSE THE MAIN GAS COCK. ALLOW FIVE MINUTES FOR UNBURNED GAS TO VENT.

CAUTION: USE OF ANY REPLACEMENT PARTS OTHER THAN THOSE SUPPLIED BY GROEN OR THEIR AUTHORIZED DISTRIBUTOR CAN CAUSE INJURY TO THE OPERATOR AND DAMAGE TO THE EQUIPMENT AND WILL VOID ALL WARRANTIES.

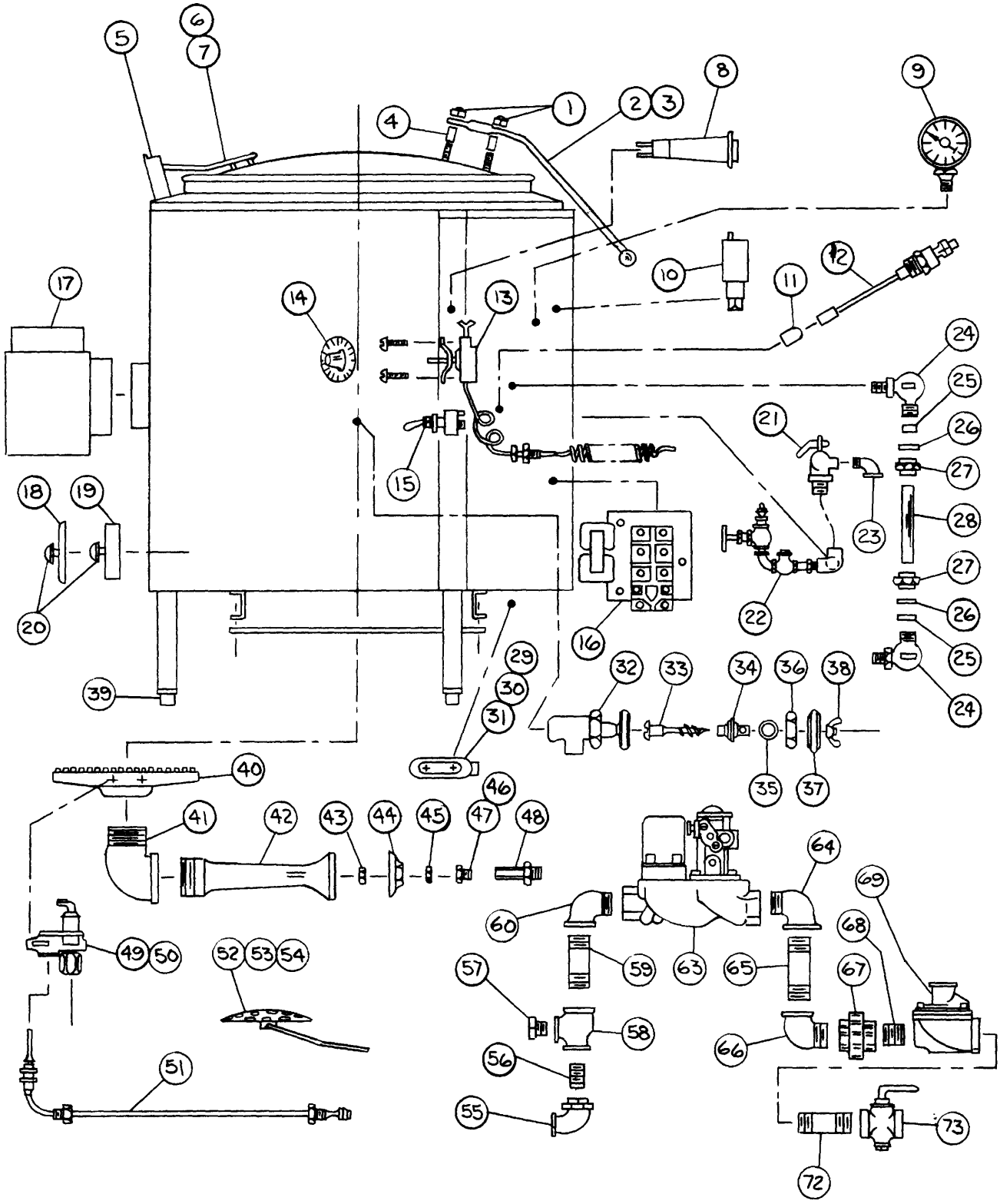
IMPORTANT: Service performed by other than factory authorized personnel will void all warranties.

C. Models with Electronic Spark Ignition System

(Refer to the electrical schematic)

SYMPTOM	WHAT TO CHECK
System does not produce a spark.	a. Thermostat, and close the contacts, if they are open.* b. AC voltage between terminals "2" and "GR". If it is not 24V: (1) Check high limit switch, which should be closed.* (2) Replace the transformer.* c. Pilot spark gap. Regap, it is not 7/64 inch.* d, Pilot electrode ceramic for crack or break.* e. That the high tension cable is firmly attached and in good condition. If it is cracked or brittle, replace the pilot.* f. Replace the electronic portion of the G60 system.*
Spark is present, but the pilot will not light.	a. That the pilot valve is securely connected to terminals "1" and "GR". Some models have the pilot valve grounded internally.* b. That gas pressure meets the control manufacturer's specifications.* c. For gas at the pilot. If it is not flowing: (1) Check the pilot gas line for kinks and obstructions.* (2) Replace the pilot valve.* d. That the pilot spark gap is 7/64 inch and located in the pilot gas stream. If not, adjust or replace the pilot* e. Pilot orifice, and clean, if necessary.* f. For drafts. Shield the pilot burner, if necessary.*

SYMPTOM	WHAT TO CHECK
Pilot lights, but main burner will not come on, and the spark stays on.	a. Sensor cable, to make sure of secure attachments to the sensor and to terminal "4" on the G60* b. That the cable is not grounded out. If it is, correct the ground.* c. Cable for continuity and condition of insulation.* d. Sensor ceramic for cracks.* e. That sensor probe current is less than 0.7 microamp, by disconnecting the sensor cable from terminal "4" and connecting a DC microammeter between the sensor cable terminal and terminal "4". If the current is equal to or greater than 0.7 microamp, replace the G60 electronics.* If the current is less than 0.7 microamp: (1) Check the gas pressure.* (2) Clean the pilot assembly.* (3) Tighten mechanical and electrical connections.* f. Pilot application, and correct to increase sensor probe current, by: (1) Increasing or decreasing pilot orifice size.* (2) Shielding the pilot from drafts.*
Pilot lights, but main burner will not come on, and spark does not stay on.	a. For 24V between terminals "3" and "GR". If voltage is not correct, replace the G60 electronics.* b. That the gas pressure meets the control manufacturer's specifications. * c. Electrical connections to the main valve to terminals "3" and "GR", to assure that they are securely attached. If they are, replace the main valve.*



C-7288-2

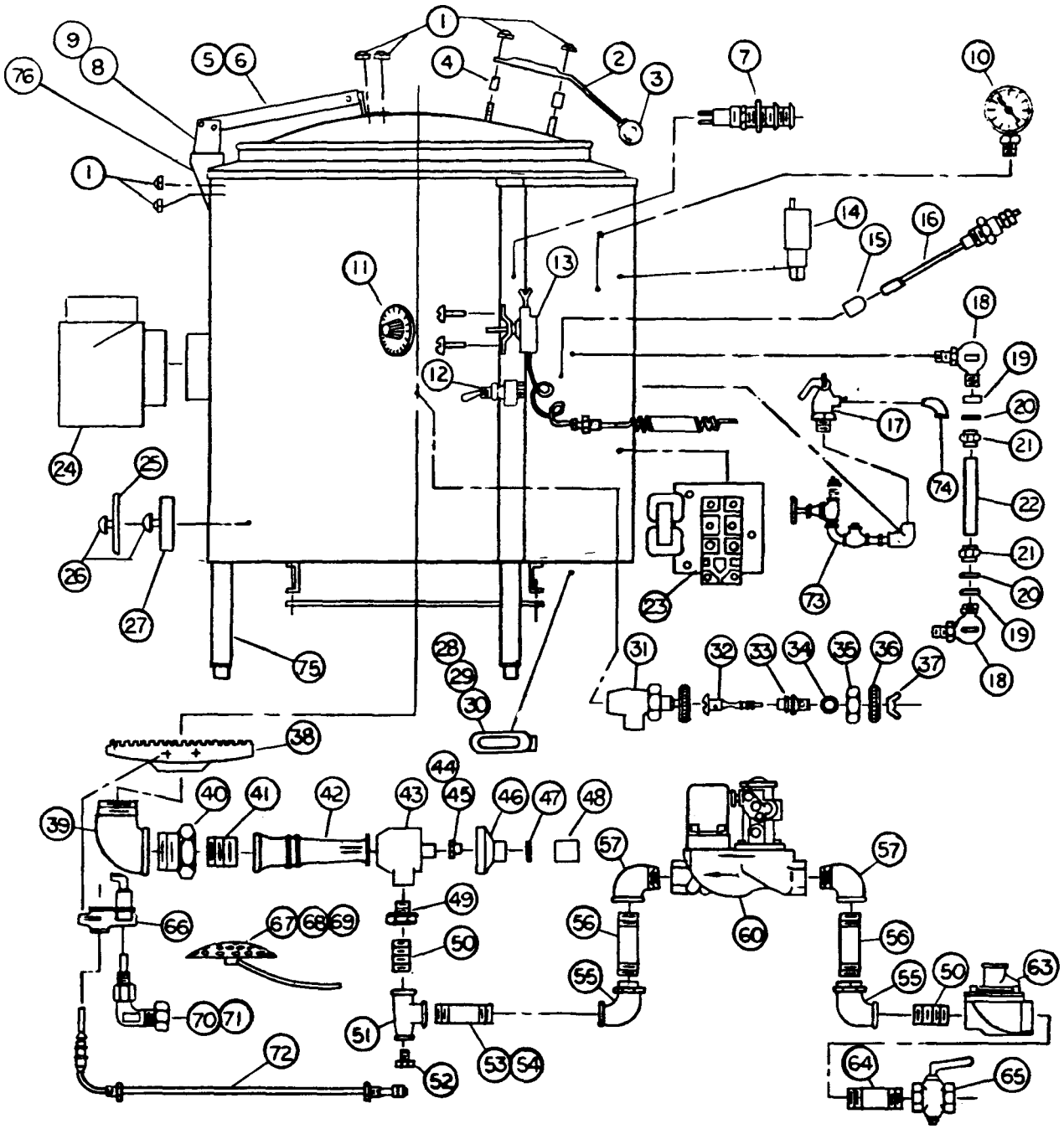
AH/I — 20, 30, & 40 Gallon Models

Parts Lists

To order parts, contact your Groen Certified Service Agency. Supply the model designation, part description, part number, quantity, and, where applicable, voltage and phase or type of gas.

A. AH/1 -20, 30, and 40 Gallon Models

ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
1	5471	1/4--20 CAP NUT	36	8911	SANITARY HEX NUT (FOR 1-1/2" VALVE)
2	47552	HANDLE		9354	SANITARY HEX NUT (FOR 2" VALVE)
3	12691	KNOB		3927	SANITARY HEX NUT (FOR 3" VALVE)
4	12733	SPACER	37	9029	VALVE HANDLE (FOR 1-1/2" VALVE)
5	61012	HINGE BAR		9029	VALVE HANDLE (FOR 2" VALVE)
6	13485	HINGE COVER		12209	VALVE HANDLE (FOR 3" VALVE)
7	2378	SPACER VENT COVER	38	9028	WING NUT (FOR 1-1/2" VALVE)
8	2986	PILOT LIGHT ASSEMBLY (115V)		9028	WING NUT (FOR 2" VALVE)
9	99156	PRESSURE GAUGE		W/1908	WING NUT (FOR 3" VALVE)
10	8453	PRESSURE LIMIT CONTROL	39	2479	BULLET FOOT (STANDARD)
11	10390	RUBBER BOOT	40	286	BURNER HEAD (PROPANE & NAT. GAS)
12	74665	WARRICK ELECTRODE	41	289	2-1/2" IPS STREET ELBOW
13	12313	THERMOSTAT	42	287	VENTURITUBE
14	12314	THERMOSTAT KNOB	43	294	3/8" IPS HEX LOCKNUT
15	6904	TOGGLE SWITCH	44	288	AIR SHUTTER
16	10412	WARRICK RELAY (115V)	45	294	3/8" IPS HEX LOCKNUT
17	576	DRAFT DIVERTER	46	280	ORIFICE (NAT GAS)
18	4035	COMBUSTION DOOR	47	281	ORIFICE (PROPANE GAS)
	4002	HINGE	48	279	ORIFICE SPUD
	4000	PIN	49	283	PILOT BRACKET & ORIFICE (NAT. GAS)
	4001	SPRING	50	284	PILOT BRACKET & ORIFICE (PROPANE)
19	8201	INSULATION DOOR	51	63048	THERMOCOUPLE LEAD
20	4112	KNOB	52	9007	REMOVABLE STRAINER, 9" DIA, 1/4" HOLES
21	4010	SAFETY VALVE (units built before 8/1/92)	53	9040	REMOVABLE STRAINER, 9" DIA, 1/8" HOLES
	97009	SAFETY VALVE (units built after 8/1/92)	54	9057	REMOVABLE STRAINER, 9" DIA, NO HOLES
22	13541	WATER FILL ASSY. (units built before 8/1/92)	55	8059	3/8" IPS X 90" UNION ELBOW
	96007	1/2" NPT WATER FILL ASSY. (units built after 8/1/92)	56	7439	3/8" IPS CLOSE NIPPLE
23	10668	3/4" IPS X 90° STREET ELBOW (units built before 8/1/92	57	8504	3/8" IPS PIPE PLUG
	96905	1/2" NPT STREET ELBOW (units built after 8/1/92	58	338	3/4 X3/8 X 3/8" REDUCING TEE
24	4071	1/2" GAUGE GLASS CONNECTOR ASSEMBLY	59	8239	3/4" IPS X 3" NIPPLE
25	8917	RUBBER GAUGE GLASS GASKET	60	8124	3/4" IPS X 90° ELBOW
26		WASHER (WITH ASSEMBLY #4071)	61	—	(NOT USED)
27		HEX NUT (WITH ASSEMBLY #4071)	62	—	(NOT USED)
28	8742	WATER GAUGE GLASS	63	97610	3/4" BASOTROL GAS VALVE (COMPLETE)
29	13421	1/2" CONDUIT FITTING	64	8347	3/4" IPS X 90° STREET ELBOW
30	8902	COVER FOR ITEM 29	65	8229	3/4" IPS X 4" LG NIPPLE
31	8904	GASKET FOR ITEM 29	66	8347	3/4" IPS X 90° STREET ELBOW
32	9000	1-1/2" DRAW-OFF VALVE (COMPLETE)	67	5516	3/4" IPS FEMALE UNION
	9046	2" DRAW-OFF VALVE (COMPLETE)	68	5561	3/4" IPS X 7" NIPPLE
	12262	3" DRAW-OFF VALVE (COMPLETE)	69	345	GAS PRESSURE REGULATOR (NAT. GAS)
33	9027	VALVE STEM (FOR 1-1/2" VALVE)		3548	GAS PRESSURE REGULATOR (PROPANE)
	9048	VALVE STEM (FOR 2" VALVE)	70	—	(NOT USED)
	1908	3" VALVE STEM (FOR 3" VALVE)	71	—	(NOT USED)
34	9024	VALVE BONNET (FOR 1-1/2" VALVE)	72	8239	NIPPLE 3/4" IPS X 3" LG
	9047	VALVE BONNET (FOR 2" VALVE)	73	8172	3/4" IPS GAS COCK
	3925	VALVE BONNET (FOR 3" VALVE)			
35	9034	RUBBER "O" RING (FOR 1-1/2" VALVE)			
	9034	RUBBER "O' RING (FOR 2" VALVE)			
	W/1908	RUBBER "O" RING (FOR 3" VALVE)			



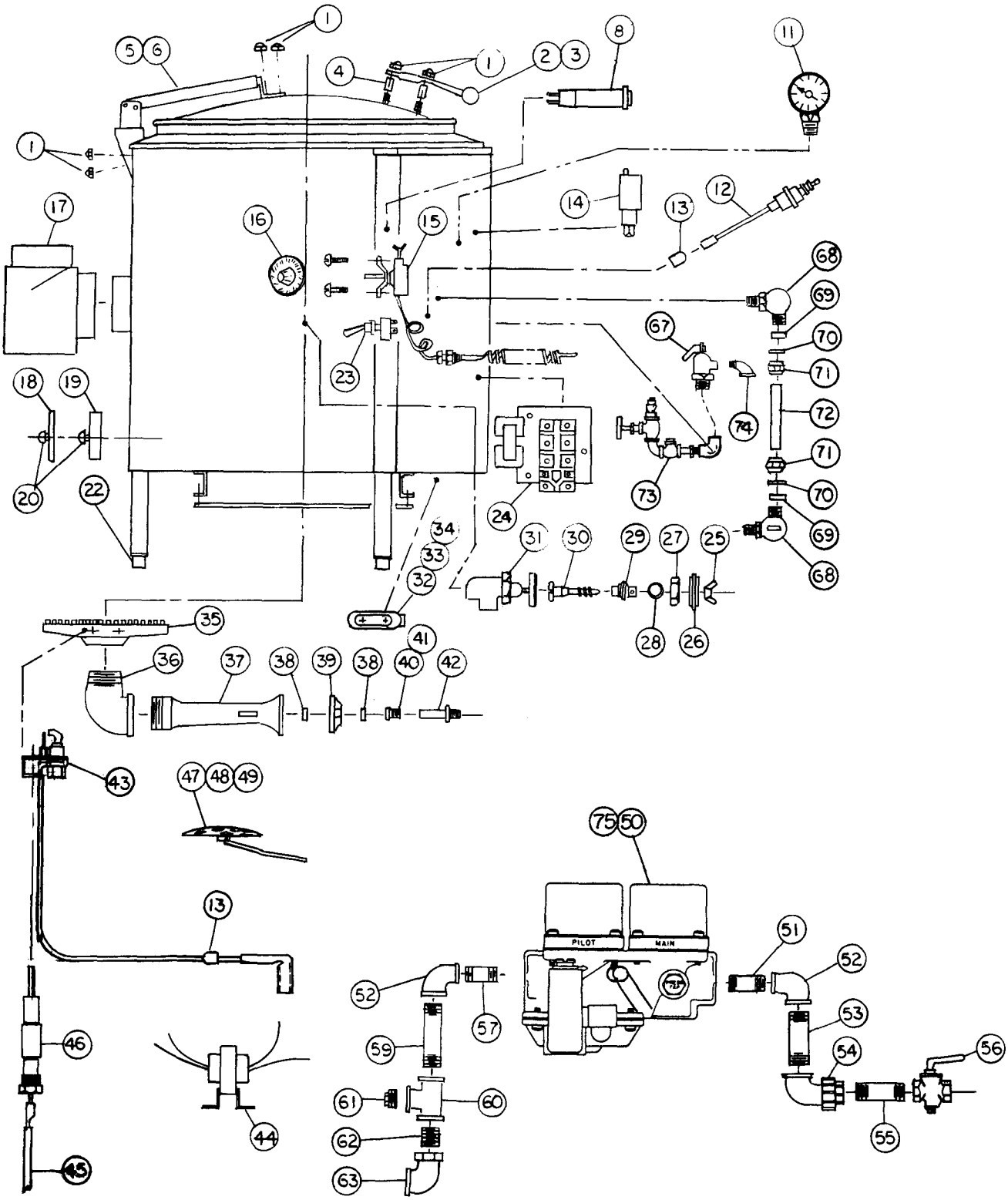
AH/I —60,80, & 100 Gallon Models

Parts Lists (cont'd)

To order parts, contact your Groen Certified Service Agency. Supply the model designation, part description, part number, quantity and, where applicable, voltage and phase or type of gas.

B. AH/1-60, 80, and 100 Gallon Models

ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
1	5471	CAP NUT1/4--20 NC	36	9029	VALVE HANDLE (FOR 1-1/2" VALVE)
2	47552	HANDLE		9029	VALVE HANDLE (FOR 2" VALVE)
3	12691	KNOB		12209	VALVE HANDLE (FOR 3" VALVE)
4	12733	SPACER	37	9028	WING NUT (FOR 1-1/2" VALVE)
5	12520	COVER ACTUATOR (60 GAL.)		9028	WING NUT (FOR 2" VALVE)
6	12521	COVER ACTUATOR (80 & 100 GAL.)		W/1908	WING NUT (FOR 3" VALVE)
7	2986	PILOT LAMP(115V)	38	8246	BURNER HEAD (PROPANE & NATURAL GAS)
8	12406	BRACKET (60 GAL)	39	289	STREET ELBOW 2-1/2" IPS
9	12813	BRACKET (80 & 100 GAL.)	40	8774	REDUCER FACE BUSHING 2-1/2" TO 2"
10	99156	PRESSURE GAUGE	41	8731	CLOSE NIPPLE 2" IPS
11	12314	THERMOSTAT KNOB	42	10542	VENTURI ASSY
12	6904	TOGGLE SWITCH	43	—	(NOT USED)
13	12313	EA-3 THERMOSTAT	44	399	NATURAL GAS ORIFICE
14	8453	PRESSURE LIMIT CONTROL	45	403	PROPANE GAS ORIFICE
15	10390	RUBBER BOOT FOR ITEM 16	46	396	AIR SHUTTER
16	74665	WARRICK ELECTRODE	47	397	LOCKNUT
17	4010	SAFETY VALVE (units built before 8/1/92)	48	398	END CAP
	97009	SAFETY VALVE (units built after 8/1/92)	49	8043	REDUCER FACE BUSHING 1" TO 3/4"
18	4071	1/2" GAUGE GLASS CONNECTOR ASSY. (COM.)	50	8238	CLOSE NIPPLE 3/4" IPS
19	8917	RUBBER GAUGE GLASS GASKET	51	575	REDUCING TEE
20		WASHER (WITH ASSY. #4071)	52	8504	PIPE PLUG 3/8" IPS
21		HEX NUT (WITH ASSY. #4071)	53	5559	NIPPLE 3/4" IPS X 2-1/2" LG. (60 GAL)
22	8742	WATER GAUGE GLASS	54	8239	NIPPLE 3/4" IPS X 3" LG. (80 GAL)
23	10412	WARRICK RELAY 115V	55	5493	UNION ELBOW 3/4" IPS X 90 DEGREES
24	576	DRAFT DIVERTER	56	8229	NIPPLE 3/4" IPS X 4" LG.
25	4035	COMBUSTION DOOR (COMPLETE)	57	8347	STREET ELBOW 3/4" IPS X 90 DEGREES
	4002	HINGE	58	—	(NOT USED)
	4000	PIN	59	—	(NOT USED)
	4001	SPRING	60	97610	3/4" BASOTROL GAS VALVE (COMPLETE)
26	4112	KNOB (BLACK PLASTIC)	61	—	(NOT USED)
27	8201	INSULATION DOOR (COMPLETE)	62	—	(NOT USED)
28	13421	1/2" CONDUIT FITTING	63	345	GAS PRESSURE REGULATOR (NAT. GAS)
29	8902	COVER FOR ITEM #28		3548	GAS PRESSURE REGULATOR (PROPANE)
30	8904	GASKET FOR ITEM 28	64	8239	NIPPLE 3/4" IPS X 3" LG.
31	9000	1-1/2" DRAW-OFF VALVE (COMPLETE)	65	8172	3/4" IPS GAS COCK
	9046	2" DRAW-OFF VALVE (COMPLETE)	66	283	PILOT BRACKET & ORIFICE (NAT. GAS)
	12262	3" DRAW-OFF VALVE (COMPLETE)	67	9007	REMOVABLE STRAINER 9" DIA. 1/4" HOLES
32	9027	VALVE STEM (FOR 1-1/2" VALVE)	68	9040	REMOVABLE STRAINER 9" DIA. 1/8" HOLES
	9048	VALVE STEM (FOR 2" VALVE)	69	9057	REMOVABLE STRAINER 9" DIA. NO HOLES
	1908	3" VALVE STEM (FOR 3" VALVE)	70	69886	PILOT LIGHT SPUD (NATURAL GAS)
33	9024	VALVE BONNET (FOR 1-1/2" VALVE)	71	284	PILOT LIGHT SPUD (PROPANE GAS)
	9047	VALVE BONNET (FOR 2" VALVE)	72	63048	THERMOCOUPLE & LEAD
	3925	VALVE BONNET (FOR 3" VALVE)	73	13541	WATER FILL ASSY.(units built before 8/1/92)
34	9034	RUBBER "O" RING (FOR 1-1/2" VALVE)		96007	1/2" NPT WATER FILL ASSY. (units built after 8/1/92)
	9034	RUBBER "O' RING (FOR 2" VALVE)	74	10668	3/4" IPS X 90 DEGREE STREET ELBOW (units built before 8/1/92
	W/1908	RUBBER "O" RING (FOR 3" VALVE)		96905	1/2" NPT STREET ELBOW (units built after 8/1/92)
35	8911	SANITARY HEX NUT (FOR 1-1/2" VALVE)	75	2479	BULLET FOOT 1-1/2" TUBE (60 GAL.)
	9354	SANITARY HEX NUT (FOR 2" VALVE)		13275	BULLET FOOT 2" TUBE (80 & 100 GAL.)
	3927	SANITARY HEX NUT (FOR 3" VALVE)	76	12599	POWER AIDE BRACKET



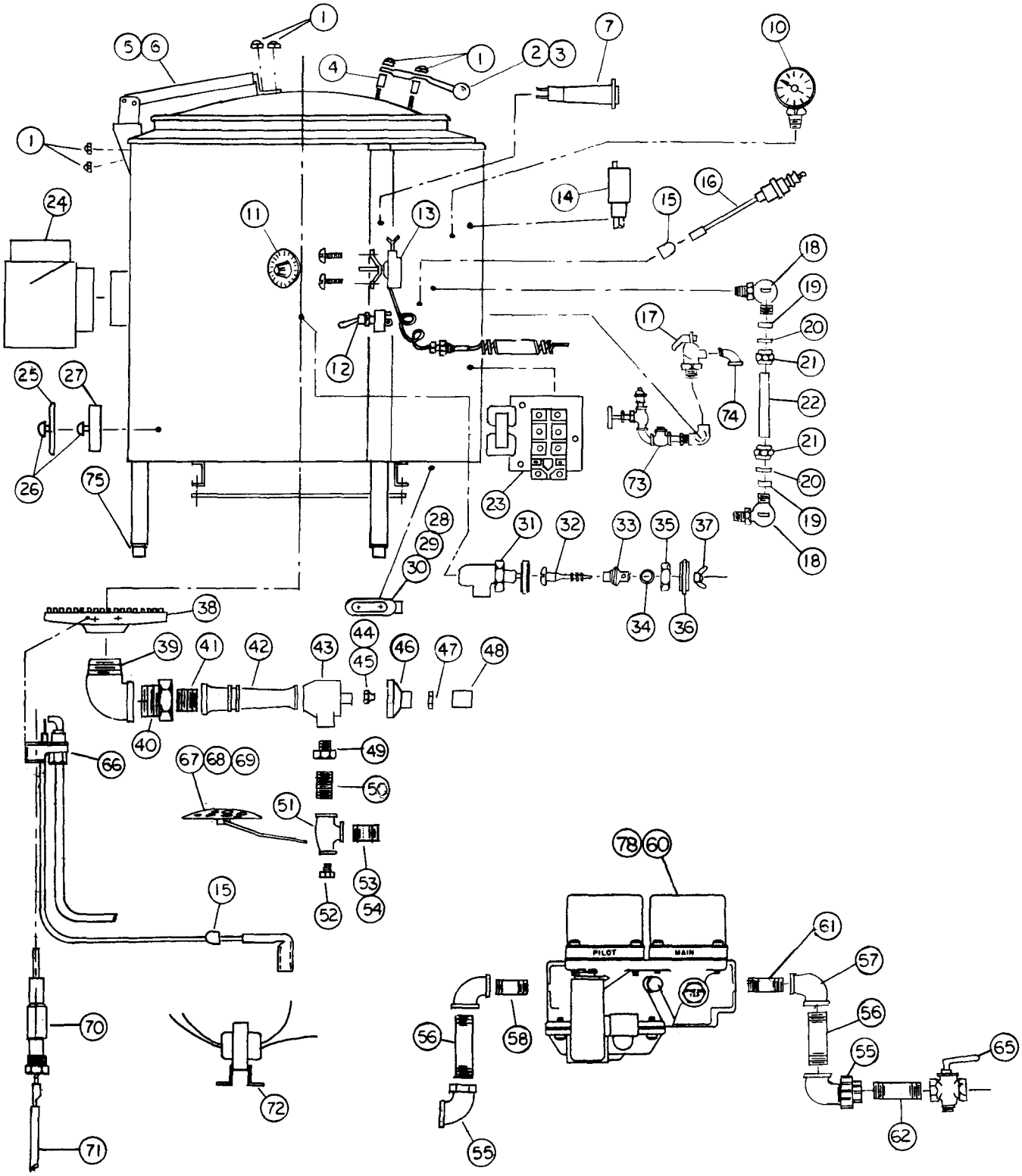
AH/IE — 20, 30. & 40 Gallon Models

Parts Lists (cont'd)

To order parts, contact your Groen Certified Service Agency. Supply the model designation, part description, part number, quantity, and, where applicable, voltage and phase or type of gas.

C. AH/1 E--20, 30, and 40 Gallon Models

ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
1	5471	1/4"-20 CAP NUT	33	8902	COVER FOR ITEM 32
2	47552	HANDLE	34	8904	GASKET FOR ITEM 32
3	12691	KNOB	35	286	BURNER HEAD (PROPANE & NAT. GAS
4	12733	SPACER	36	289	2-1/2" IPS STREET ELBOW
5	61012	HINGE BAR	37	287	VENTURITUBE
6	13485	HINGE COVER	38	294	3/8" IPS HEX LOCKNUT
7	2378	SPACER VENT COVER	39	288	AIR SHUTTER
8	3332	PILOT LIGHT ASSEMBLY (28V)	40	280	ORIFICE (NAT GAS)
9	—	NOT USED	41	281	ORIFICE (PROPANE GAS)
10	—	NOT USED	42	279	ORIFICE SPUD
11	99156	PRESSURE GAUGE	43	3750	BURNER & ELECTRODE with ORIFICE FOR NATURAL GAS
12	74665	WARRICK ELECTRODE		3751	BURNER & ELECTRODE with ORIFICE (PROPANE)
13	10390	RUBBER BOOT	44	74839	TRANSFORMER (115V/24V)
14	8453	PRESSURE LIMIT CONTROL	45	3329	SENSING PROBE LEAD
15	12313	THERMOSTAT	46	3328	SENSING PROBE WITH KANTHOL
16	12314	THERMOSTAT KNOB	47	9007	REMOVABLE STRAINER, 9" DIA, 1/4" HOLES
17	576	DRAFT DIVERTER	48	9040	REMOVABLE STRAINER, 9" DIA, 1/8" HOLES
18	4035	COMBUSTION DOOR	49	9057	REMOVABLE STRAINER, 9" DIA, NO HOLES
	4002	HINGE	50	79801	GAS CONTROL VALVE NAT. GAS
	4000	PIN	51	5553	1/2" IPS X 3" NIPPLE
	4001	SPRING	52	8751	1/2" IPS X 3/4" IPS 90 DEGREE REDUCING ELBOW
19	8201	INSULATION DOOR	53	8229	3/4" IPS X 4" NIPPLE
20	4112	KNOB	54	5493	3/4" IPS X 90 DEGREE REDUCING ELBOW
21	—	NOT USED	55	5523	3/4" IPS X 6" NIPPLE
22	2479	BULLET FOOT	56	8172	3/4" IPS GAS COCK
23	6904	TOGGLE SWITCH	57	8877	1/2" IPS CLOSE NIPPLE
24	10412	WARRICK RELAY 115V	58		(NOT USED)
25	9000	1-1/2" DRAW-OFF VALVE (COMPLETE)	59	8239	3/4" IPS X 3" NIPPLE
	9046	2" DRAW-OFF VALVE (COMPLETE)	60	338	3/4 X 3/8 X 3/8" REDUCING TEE
	12262	3" DRAW-OFF VALVE (COMPLETE)	59	8239	3/4" IPS X 3" NIPPLE
26	9027	VALVE STEM (FOR 1-1/2" VALVE)	60	338	3/4" X 3/8" X 3/8" REDUCING TEE
	9048	VALVE STEM (FOR 2" VALVE)	61	8504	3/8" IPS PIPE PLUG
	1908	3" VALVE STEM (FOR 3" VALVE)	62	7439	3/8" IPS CLOSE NIPPLE
27	9024	VALVE BONNET (FOR 1-1/2" VALVE)	63	8059	3/8" IPS X 90 DEGREE UNION ELBOW
	9047	VALVE BONNET (FOR 2" VALVE)	64	—	(NOT USED)
	3925	VALVE BONNET (FOR 3" VALVE)	65	—	(NOT USED)
28	9034	RUBBER "0" RING (FOR 1-1/2" VALVE)	66	—	(NOT USED)
	9034	RUBBER "0' RING (FOR 2" VALVE)	67	4010	SAFETY VALVE (units built before 8/1/92)
	W/1908	RUBBER "0" RING (FOR 3" VALVE)		97009	SAFETY VALVE (units built after 8/1/92)
29	8911	SANITARY HEX NUT (FOR 1-1/2" VALVE)	68	4071	1/2" GAUGE GLASS CONNECTOR ASSEMBLY
	9354	SANITARY HEX NUT (FOR 2" VALVE)	69	8917	RUBBER GAUGE GLASS GASKET
	3927	SANITARY HEX NUT (FOR 3" VALVE)	70	—	WASHER (WITH ASSEMBLY #4071)
30	9029	VALVE HANDLE (FOR 1-1/2' VALVE)	71	—	HEX. NUT (WITH ASSEMBLY #4071)
	9029	VALVE HANDLE (FOR 2" VALVE)	72	8742	WATER GAUGE GLASS
	12209	VALVE HANDLE (FOR 3- VALVE)	73	13541	WATER FILL ASSY. (units built before 8/1/92)
31	9028	WING NUT (FOR 1-1/2" VALVE)		96007	1/2" NPT WATER FILL ASSY. (units built after 8/1/92)
	9028	WING NUT (FOR 2" VALVE)	74	10668	3/4" IPS X 90° STREET ELBOW (units built before 8/1/92)
	W/1908	WING NUT (FOR 3" VALVE)		96905	1/2" NPT STREET ELBOW (units built after 8/1/92)
32	13421	1/2" CONDUIT FITTING	75	79803	GAS CONTROL VALVE PROPANE



AH/1E —60, 80, & 100 Gallon Models

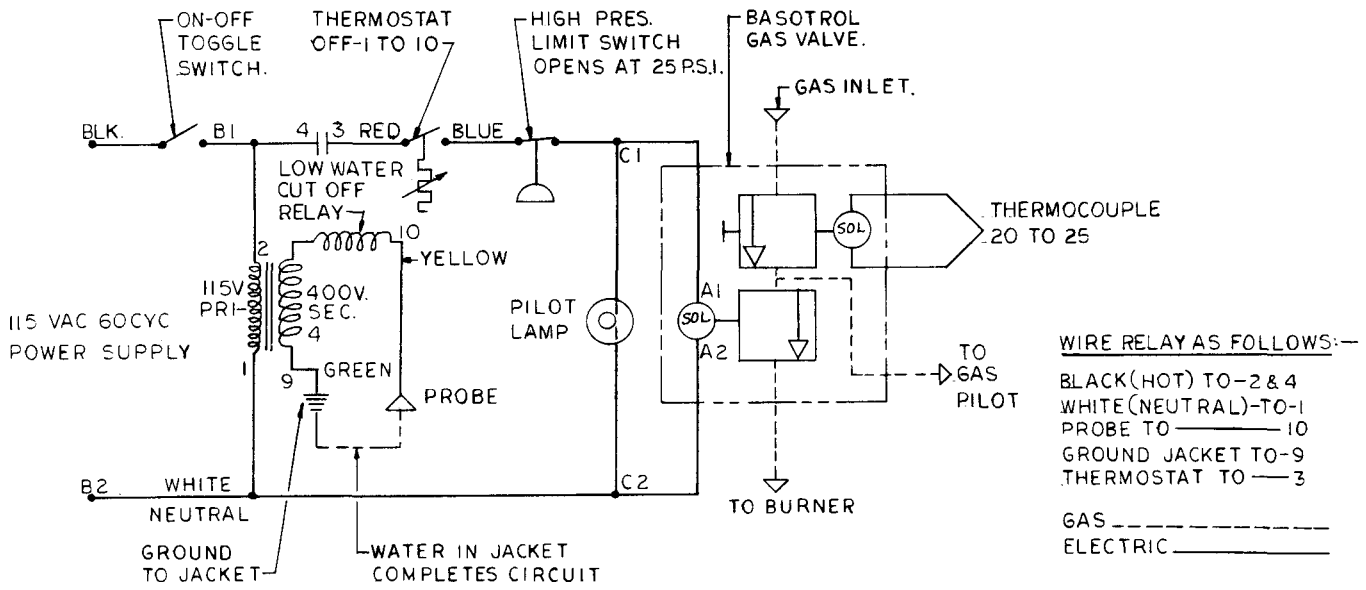
Parts List

To order parts, contact your Groen Certified Service Agency. Supply the model designation, part description, part number, quantity, and, where applicable, voltage and phase or type of gas.

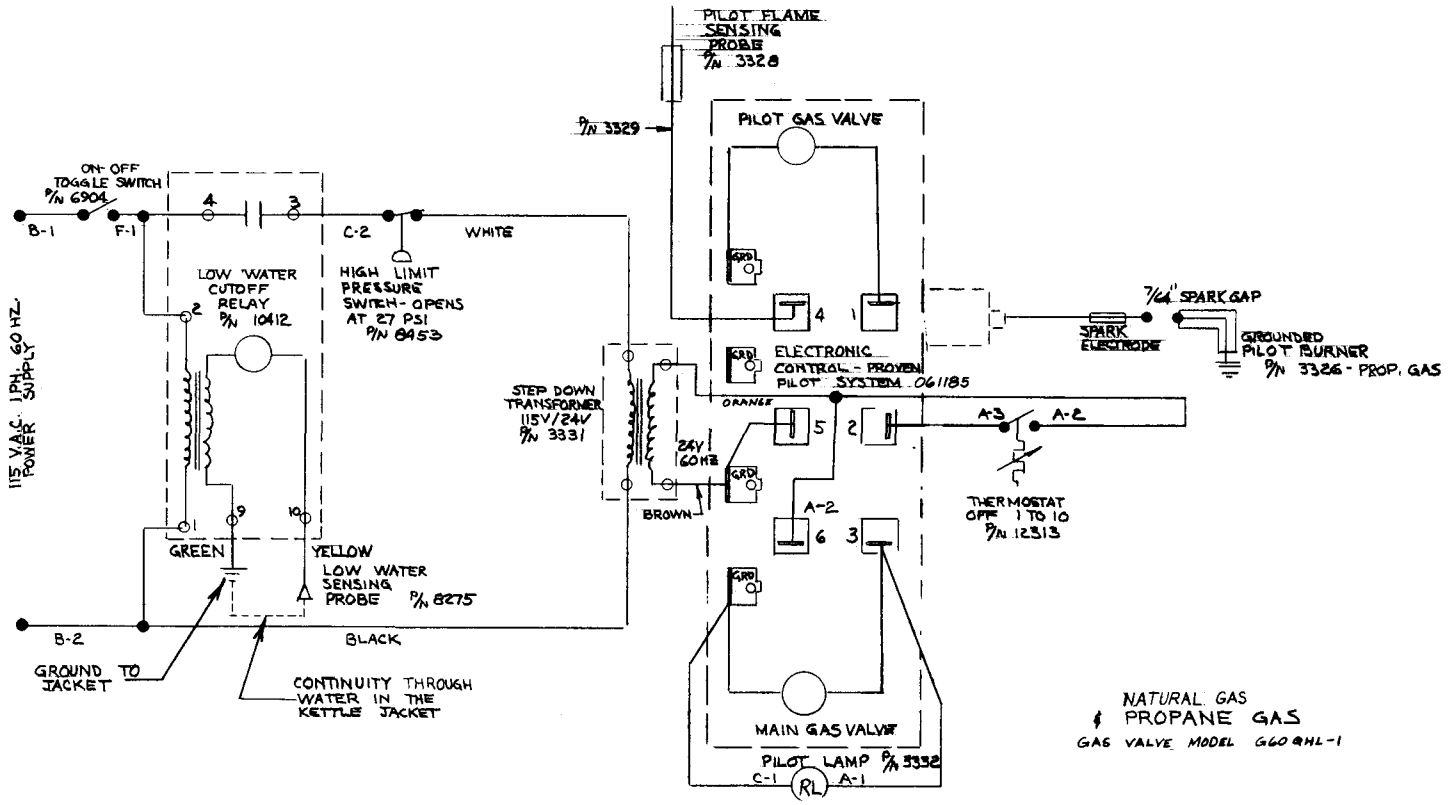
D. AH/1 E-60, 80, and 100 Gallon Models

ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
1	5471	CAP NUT1/4"-20 NC	37	9028	WING NUT (FOR 1-1/2" VALVE)
2	47552	HANDLE		9028	WING NUT (FOR 2" VALVE)
3	12691	KNOB		W/1908	WING NUT (FOR 3" VALVE)
4	12733	SPACER	38	8246	BURNER HEAD (PROPANE & NATURAL GAS)
5	12520	COVER ACTUATOR (60 GAL.)	39	289	STREET ELBOW 2-1/2" IPS
6	12521	COVER ACTUATOR (80 & 100 GAL.)	40	8774	REDUCER FACE BUSHING 2-1/2" TO 2"
7	3332	PILOT LIGHT ASSEMBLY (28V)	41	8731	CLOSE NIPPLE 2" IPS
8	12599	BRACKET POWER AIDE	42	10542	VENTURIASSY
9	47552	HANDLE (80 & 100 GAL.)	43	395	MIXER TUBE
10	99156	PRESSURE GAUGE	44	399	NATURAL GAS ORIFICE
11	12314	THERMOSTAT KNOB	45	403	PROPANE GAS ORIFICE
12	6904	TOGGLE SWITCH	46	396	AIR SHUTTER
13	12313	THERMOSTAT	47	397	LOCKNUT
14	8345	PRESSURE LIMIT CONTROL	48	398	END CAP
15	10390	RUBBER BOOT	49	8043	REDUCER FACE BUSHING 1" TO 3/4"
16	74665	WARRICK ELECTRODE	50	—	(NOT USED)
17	4010	SAFETY VALVE (units built before 8/1/92)	51	575	REDUCING TEE
	97009	SAFETY VALVE (units built after 8/1/92)	52	8504	PIPE PLUG 3/8" IPS
18	4071	1/2- GAUGE GLASS CONNECTOR ASSY.	53	5559	NIPPLE 3/4" IPS X 2-1/2" LG. (60 GAL)
19	8917	RUBBER GAUGE GLASS GASKET	54	8239	NIPPLE 3/4" IPS X 3" LG. (80 GAL)
20		WASHER (WITH ASSY. #4071)	55	5493	UNION ELBOW 3/4" IPS X 90 DEGREE
21		HEX NUT (WITH ASSY. #4071)	56	8229	NIPPLE 3/4" IPS X 4" LG.
22	8742	WATER GAUGE GLASS	57	8751	REDUCING ELBOW 3/4" X 1/2" X 90 DEGREE
23	10412	WARRICK RELAY 115V	58	8877	CLOSE NIPPLE 1/2" IPS
24	576	DRAFT DIVERTER	59	79802	SPRING KIT, PROPANE GAS
25	4035	COMBUSTION DOOR	60	79801	CONTROL VALVE (NAT. GAS)
	4002	HINGE	61	5553	NIPPLE 1/2" IPS X 3" LG.
	4000	PIN	62	8286	NIPPLE 3/4" IPS X 8" LG.
	4001	SPRING	63	—	(NOT USED)
26	4112	KNOB	64	—	(NOT USED)
27	8201	INSULATION DOOR	65	8172	3/4" IPS GAS COCK
28	13421	1/2" CONDUIT FITTING	66	3750	BURNER & ELECTRODE WITH ORIFICE (NAT.GAS)
29	8902	COVER FOR ITEM #28		3751	BURNER & ELECTRODE WITH ORIFICE (PROPANE)
30	8904	COVER FOR ITEM #28	67	9007	REMOVABLE STRAINER 9" DIA. 1/4" HOLES
31	9000	1-1/2" DRAW-OFF VALVE (COMPLETE)	68	9040	REMOVABLE STRAINER 9" DIA 1/8" HOLES
	9046	2" DRAW-OFF VALVE (COMPLETE)	69	9057	REMOVABLE STRAINER 9" DIA NO HOLES
	12262	3" DRAW-OFF VALVE (COMPLETE)	70	3328	SENSING PROBE WITH KANTHOL
32	9027	VALVE STEM (FOR 1-1/2" VALVE)	71	3329	SENSING PROBE LEAD
	9048	VALVE STEM (FOR 2" VALVE)	72	74839	TRANSFORMER (115V/24V)
	1908	VALVE STEM (FOR 3" VALVE)	73	13541	WATER FILL ASSEMBLY (units built before 8/1/92)
33	9024	VALVE BONNET (FOR 1-1/2" VALVE)		96007	1/2" NPT WATER FILL ASSY. (units built after 8/1/92)
	9047	VALVE BONNET (FOR 2" VALVE)	74	10668	3/4" IPS X 90 DEGREE STREET ELBOW (units built before 8/1/92
	3925	VALVE BONNET (FOR 3" VALVE)		96905	1/2" NPT STREET ELBOW (units built after 8/1/92)
34	9034	RUBBER "O" RING (FOR 1-1/2" VALVE)	75	2479	BULLET FOOT 1-1/2" TUBE (60 GAL.)
	9034	RUBBER "O' RING (FOR 2" VALVE)		13275	BULLET FOOT 2" TUBE (80 & 100 GAL.)
	W/1908	RUBBER "O" RING (FOR 3" VALVE)	76	12406	BRACKET HINGE ASSY (60 GAL.)
35	8911	SANITARY HEX NUT (FOR 1-1/2" VALVE)	77	12813	BRACKET HINGE ASSY (80 & 100 GAL.)
	9354	SANITARY HEX NUT (FOR 2" VALVE)	78	79803	GAS CONTROL VALVE PROPANE
	3927	SANITARY HEX NUT (FOR 3" VALVE)			
36	9029	VALVE HANDLE (FOR 1-1/2" VALVE)			
	9029	VALVE HANDLE (FOR 2" VALVE)			
	12209	VALVE HANDLE (FOR 3' VALVE)			

Wiring Diagrams

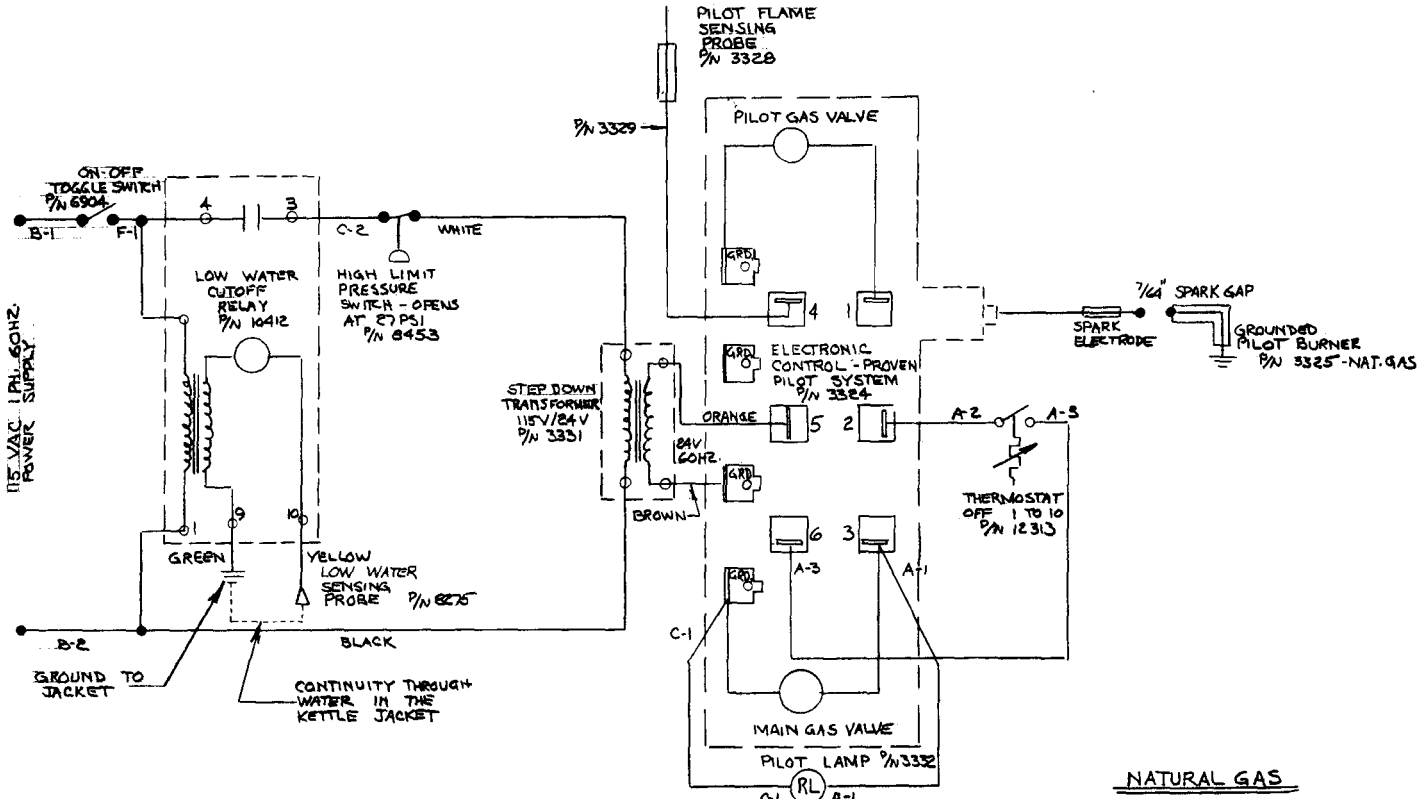


AH/1 Standing Pilot Ignition



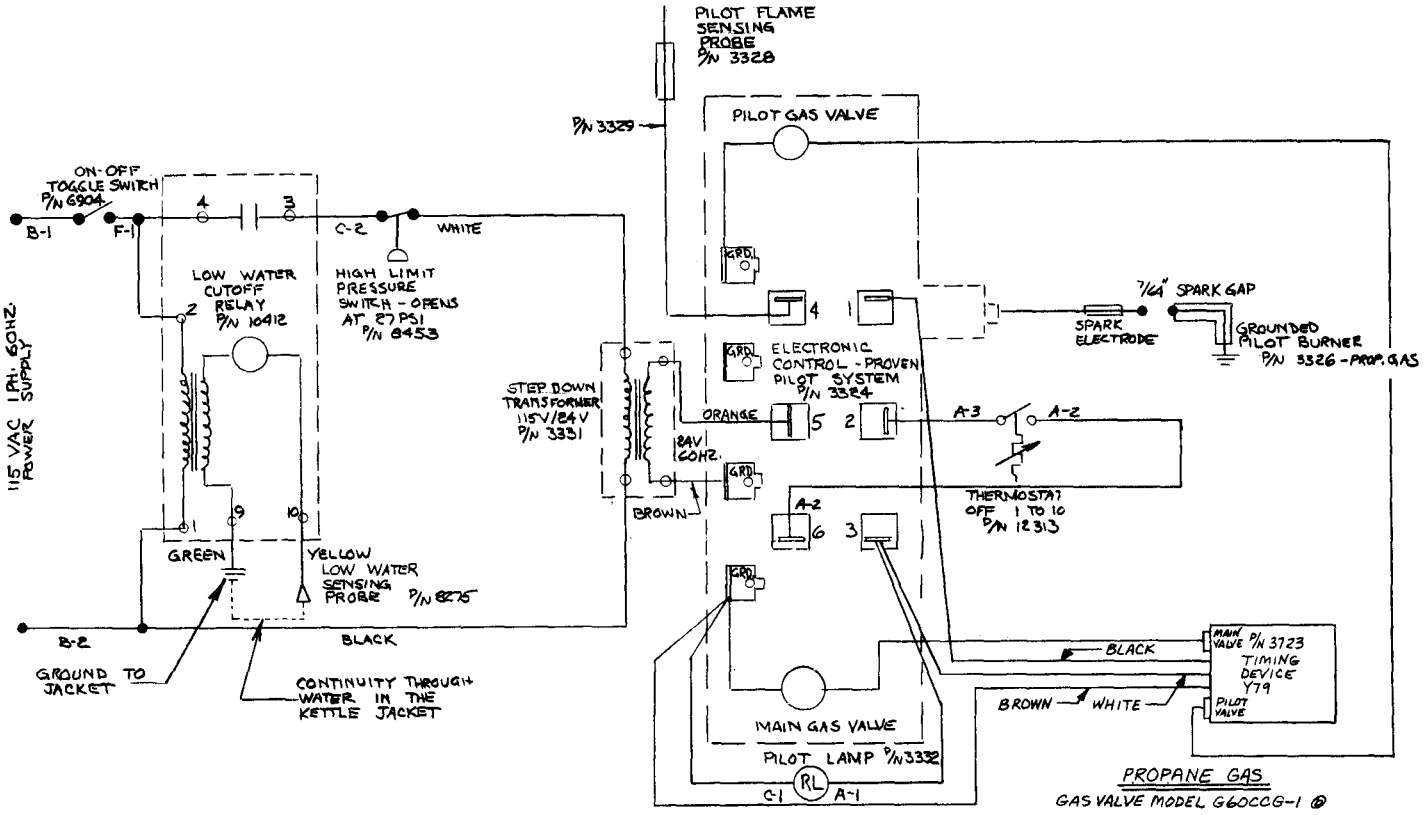
AH/1E Electrical Spark Ignition G60QHL-1

For units built before March, 1984



AH/1 E Electrical Spark Ignition — Natural Gas

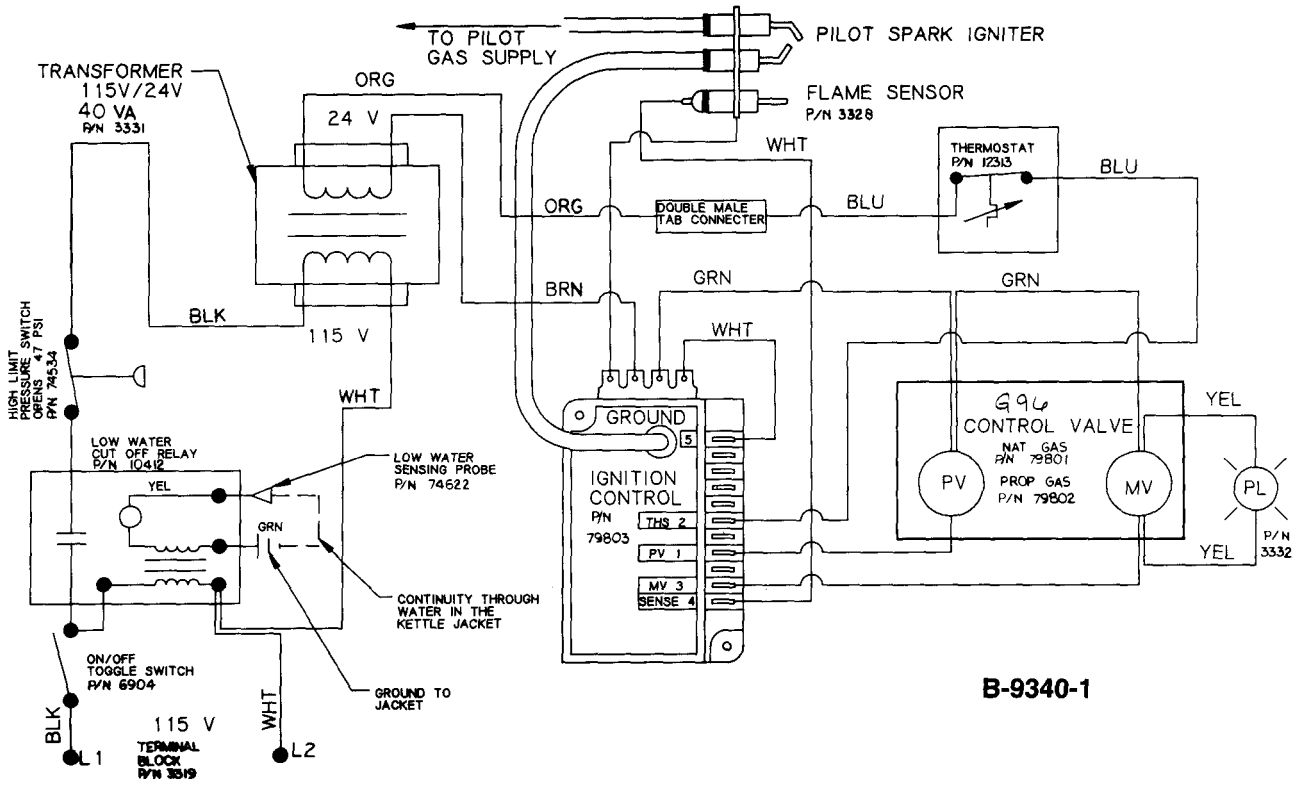
For units built between March, 1984 and June, 1989



AH/1 E Electrical Spark Ignition — Propane Gas

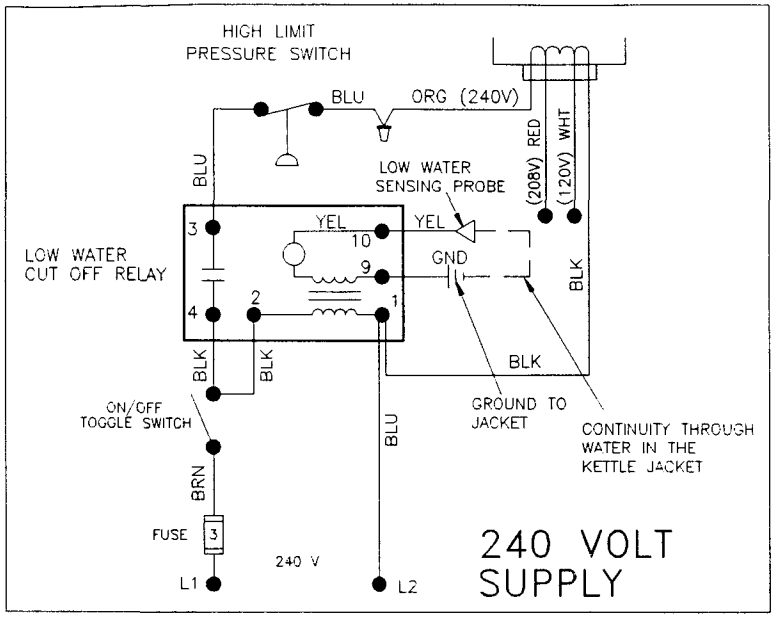
For units built between March, 1984 and June, 1989

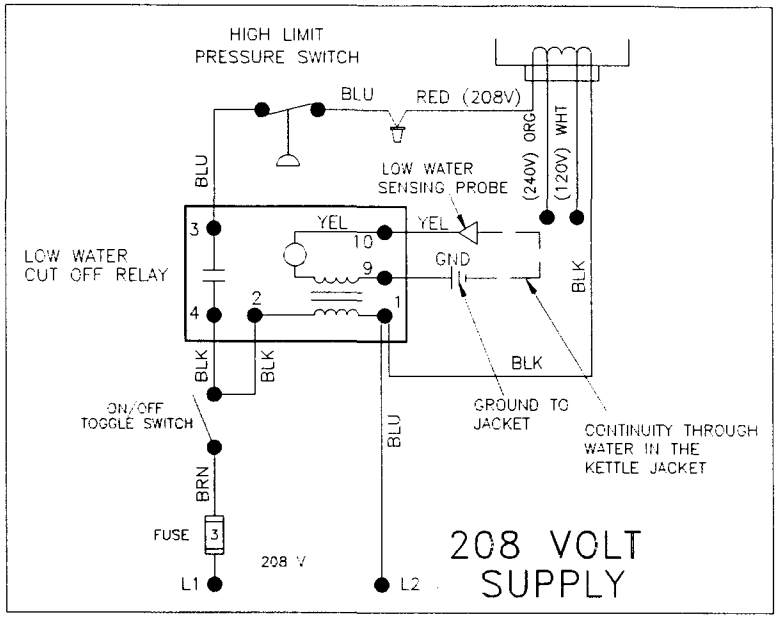
Wiring Diagrams (cont'd)



AH/IE Electrical Spark Ignition

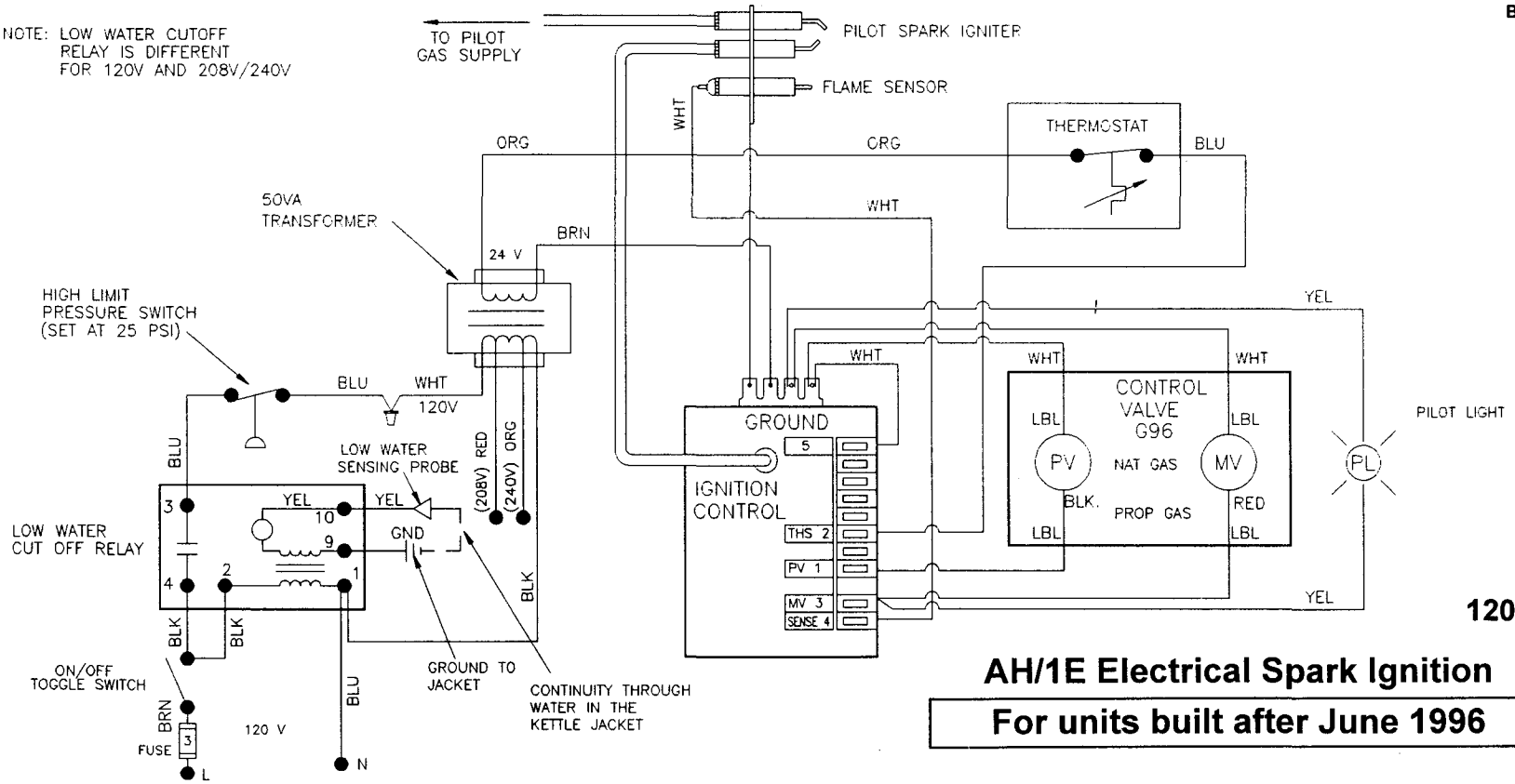
For units built between June, 1989 and June 1996





B-9340-1 REV E

NOTE: LOW WATER CUTOFF RELAY IS DIFFERENT FOR 120V AND 208V/240V



120 Volt Supply

AH/1E Electrical Spark Ignition

For units built after June 1996

References

AMERICAN GAS ASSOCIATION LABORATORIES
8501 East Pleasant Valley Rd.
Cleveland, Ohio 44131

AMERICAN NATIONAL STANDARDS
INSTITUTE, INC.
1430 Broadway
New York, New York 10018

Z223.1 -1984 National Fuel Gas Code

CANADIAN GAS ASSOCIATION
55 Scarsdale Rd.
Don Mills, Ontario
Canada, M3B 2R3

CAN 1-B149 Installation Codes for Gas Burning Appliances & Equipment

KLENZADE SALES CENTER
ECOLAB, Inc.
370 Wabasha
St. Paul, Minnesota 55102
800/352-5326 or 612/293-2233

NATIONAL FIRE PROTECTION ASSOCIATION
60 Battery March Park
Quincy, Massachusetts 02269

NFPA/54 Installation Gas Appliances & Gas Piping
NFPA/70 The National Electrical Code

NATIONAL SANITATION FOUNDATION
3475 Plymouth Rd.
Ann Arbor, Michigan 48106

UNDERWRITERS LABORATORIES, INC.
333 Pfingsten Rd.
Northbrook, Illinois 60062

ZEP MANUFACTURING CO.
1310-T Seaboard Industrial Blvd.
Atlanta, Georgia 30318

Service

A Service Log is provided with the warranty information. Each time service is performed on this Groen equipment, enter the date on which the work was done, what was done, and who did it. The owner should file the log with the warranty.

CAUTION: **USE OF ANY REPLACEMENT PARTS OTHER THAN THOSE SUPPLIED BY GROEN OR THEIR AUTHORIZED DISTRIBUTOR CAN CAUSE INJURY TO THE OPERATOR AND DAMAGE TO THE EQUIPMENT AND WILL VOID ALL WARRANTIES.**

IMPORTANT: **Service performed by other than factory authorized personnel will void all warranties.**

1. Periodic Service

Periodic inspection can minimize equipment down time and increase the efficiency of operation. The following points should be checked at least once a year or more often as indicated.

a. Every day, when the kettle is cold, the pressure/vacuum gauge should show a vacuum of 20 to 30 inches. If it does not, see "Jacket Vacuum" in the "Preventive Maintenance" section of this manual.

b. Every day, the jacket water level must be between the marks on the gauge glass. If it is not, see "Jacket Filling" in the "Preventive Maintenance" section.

c. Keep the primary air shutter of the burner gas jets free of dust and lint.

d. The pilot flame should be blue and should envelop about 1/2 inch of the flame sensor tip.

e. Keep electrical wiring and connections in good condition.

f. Keep the inside of the control console clean and dry.

g. Keep the burner ports clean.

h. Keep the burner shield and adjacent parts clean.

WARNING: FAILURE TO PERIODICALLY CHECK SAFETY VALVE OPERATION COULD RESULT IN PERSONAL INJURY AND/OR DAMAGE TO EQUIPMENT.

WARNING: WHEN TESTING, AVOID ANY EXPOSURE TO THE STEAM BLOWING OUT OF THE SAFETY VALVE. DIRECT CONTACT COULD RESULT IN SEVERE BURNS.

i. Twice a month, check the safety valve to make sure that it works freely. When gauge pressure is about 5 PSI, lift the valve lever enough to vent steam, then quickly let it snap back into place.

2. Component Replacement

WARNING: BEFORE REPLACING ANY PARTS, TURN OFF THE ELECTRIC POWER SUPPLY TO THE UNIT AND CLOSE THE MAIN GAS COCK. ALLOW FIVE MINUTES FOR UNBURNED GAS TO VENT.

When replacement involves breaking a gas pipe connection, check the new connection with soap solution or other appropriate leak detector. **DO NOT USE A FLAME TO TEST FOR LEAKS.**
All internal wiring is marked as shown on the circuit schematic drawings. Be sure that new components are wired in the same manner as the old components.

Limited Warranty To Commercial Purchasers *

(Domestic U.S., Hawaii & Canadian Sales Only)

Groen Foodservice Equipment ("Groen Equipment") has been skillfully manufactured, carefully inspected and packaged to meet rigid standards of excellence. Groen warrants its Equipment to be free from defects in material and workmanship for (12) twelve months with the following conditions and subject to the following limitations.

I. This parts and labor warranty is limited to Groen Equipment sold to the original commercial purchaser/users (but not original equipment manufacturers), at its original place of installation in the continental United States, Hawaii and Canada.

II. Damage during shipment is to be reported to the carrier, is not covered under this warranty, and is the sole responsibility of purchaser/user.

III. Groen, or an authorized service representative, will repair or replace, at Groen's sole election, any Groen Equipment, including but not limited to, draw off valves, safety valves, gas and electric components, found to be defective during the warranty period. As to warranty service in the territory described above, Groen will absorb labor and portal to portal transportation costs (time & mileage) for the first twelve (12) months from date of installation or fifteen (15) months from date of shipment from Groen.

IV. This warranty does not cover boiler maintenance, calibration, periodic adjustments as specified in operating instructions or manuals, and consumable parts such as scraper blades, gaskets, packing, etc., or labor costs incurred for removal of adjacent equipment or objects to gain access to Groen Equipment. This warranty does not cover defects caused by improper installation, abuse, careless operation, or improper maintenance of equipment. This warranty does not cover damage caused by poor water quality or improper boiler maintenance.

V. THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EACH OF WHICH IS HEREBY EXPRESSLY DISCLAIMED. THE REMEDIES DESCRIBED ABOVE ARE EXCLUSIVE AND IN NO EVENT SHALL GROEN BE LIABLE FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR THE BREACH OR DELAY IN PERFORMANCE OF THIS WARRANTY.

VI. Groen Equipment is for commercial use only. If sold as a component of another (O.E.M.) manufacturer's equipment, or if used as a consumer product, such Equipment is sold AS IS and without any warranty.

*** (Covers All Foodservice Equipment Ordered After October 1,1995)**