

Installation

- 1. INSPECT SHIPMENT-** Inspect the water heater for possible shipping damage. Check the marking on the rating plate of the water heater to be certain the type of gas being furnished corresponds to that for which the water heater is equipped.
- 2. WATER SUPPLY CONNECTION-** Refer to Fig. 4 for suggested typical installation. The installation of unions or flexible copper connectors is recommended on the HOT and COLD water lines, so that the water heater may be easily disconnected for servicing if necessary. The HOT and COLD water connections are clearly marked. Install a shut-off valve in the cold water supply line near the water heater. Dielectric unions are not required for protection of the water heater. At the installers option, heat traps formed from piping as illustrated in Fig. 4 can be used to reduce heat loss from piping.

THERMAL EXPANSION — Determine if a check valve exists in the inlet water line. It may have been installed in the cold water line as a separate back flow preventer, or it may be part of a pressure reducing valve, water meter or water softener. A check valve located in the cold water inlet line can cause what is referred to as a **"closed water system"**. A cold water inlet line with no check valve or back flow prevention device is referred to as an "open" water system.

As water is heated, it expands in volume and creates an increase in the pressure within the water system. This action is referred to as **"thermal expansion"**. In an "open" water system, expanding water which exceeds the capacity of the water heater flows back into the city main where the pressure is easily dissipated.

A **"closed water system"**, however, prevents the expanding water from flowing back into the main supply line, and the result of **"thermal expansion"** can create a rapid, and dangerous pressure increase in the water heater and system piping. This rapid pressure increase can quickly reach the safety setting of the relief valve, causing it to operate during each heating cycle. Thermal expansion, and the resulting rapid, and repeated expansion and contraction of components in the water heater and piping system can cause premature failure of the relief valve, and possibly the heater itself. Replacing the relief valve **will not** correct the problem!

The suggested method of controlling thermal expansion is to install an expansion tank in the cold water line between the water heater and the check valve. (refer to Figure 4.) The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the over pressure condition and eliminating the repeated operation of the relief valve. Other methods of controlling thermal expansion are also available. Contact your installing contractor, water supplier, or plumbing inspector for additional information regarding this subject.

IMPORTANT: Do not apply heat to the cold water fittings. If sweat connections are used, sweat tubing to adapter before fitting the adapter to the cold water connection on top of heater. Any heat applied to this fitting will permanently damage the plastic dip tube.

- 3. RELIEF VALVE-** A new combination pressure and temperature relief valve, complying with the Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22, must be installed in the opening provided on the water heater, at the time of installation. (Refer to figure 4.) No valve of any type should be installed between the relief valve

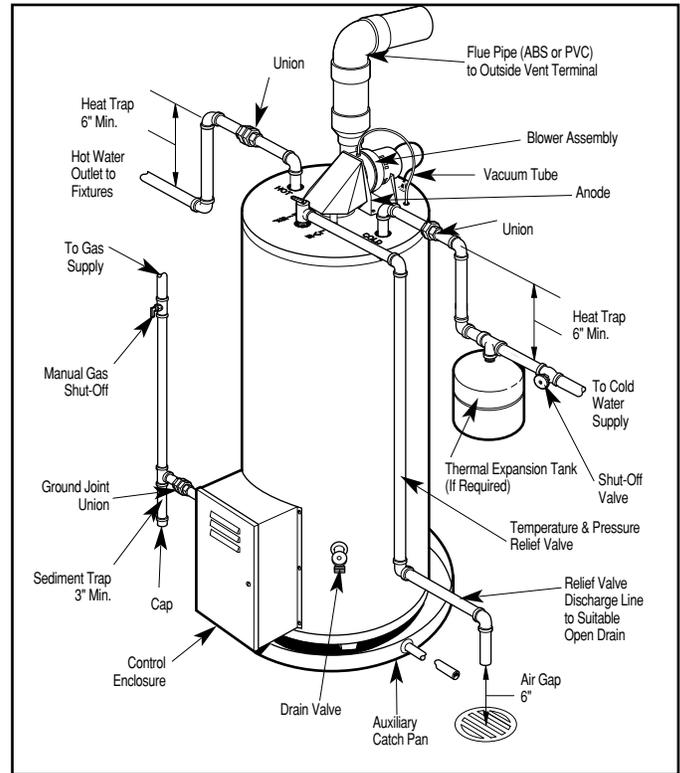


Figure 4 — Typical Installation

and the tank. Local codes shall govern the installation of relief valves.

The pressure rating of the relief valve must not exceed 150 psi, the maximum working pressure of the water heater as marked on its rating plate.

The Btu/h rating of the relief valve must equal or exceed the Btu/h input of the water heater as marked on its rating plate.

Connect the outlet of the relief valve to a suitable open drain. Piping used should be of a type approved for hot water distribution. The discharge line must be no smaller than the outlet of the valve and must pitch downward from the valve to allow complete draining (by gravity) of the relief valve and discharge line. The end of the discharge line should not be threaded or concealed and should be protected from freezing. **No valve of any type, restriction or reducer coupling should be installed in the discharge line.**

- 4. TO FILL WATER HEATER-** Make certain drain valve is closed. Open shut-off valve in cold water supply line. Open a nearby hot water faucet(s) slowly to allow air to vent from the water heater and piping. A steady flow of water from the faucet(s) indicates a full water heater.
- 5. GAS SUPPLY—**The branch gas supply line to the water heater should be clean 1/2" black steel pipe or other approved gas piping material. A ground joint union or ANSI design certified semi-rigid or flexible gas appliance connector should be installed in gas line close to the water heater, and a manual gas shut-off valve should be installed in the gas line prior to the union. The manual gas shut-off valve should be at least 5 feet above the floor and readily accessible for turning on or off. A sediment trap should be installed at the bottom of the gas line. (Refer to Fig. 4)

Compound used on threaded joints of the gas piping must be of the

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type resistant to the action of liquefied petroleum gas. Use compound sparingly on male threads only. Do not use excessive force (over 31.5 Ft. Lbs.) in tightening the pipe joint at the gas valve inlet, particularly if teflon pipe compound is used, as the valve body may be damaged.

The inlet gas pressure to the water heater must not exceed 14" w.c. for Natural or L.P. gas. For purposes of input adjustment, the minimum inlet gas pressure (with main burner on) is shown on the water heater rating plate. If high or low gas pressures are present, contact your gas supplier for correction.

CAUTION

Do not attempt to convert this water heater for use with a different type of gas other than the type shown on the rating plate. Such conversion could result in hazardous operating conditions.

6. LEAK TESTING- The water heater and its gas connections **must** be leak tested at normal operating pressure before it is placed in operation. Turn **on** the manual gas shut-off valve near the water heater (refer to Figure 4). Use a soapy water solution to test for leaks at all connections and fittings. Bubbles indicate a gas leak that must be corrected. The factory connections to the gas valve and fittings should also be leak tested after the water heater is placed in operation.

WARNING

NEVER use open flame to test for gas leaks, as bodily injury, property damage or death could result.

PRESSURE TESTING THE GAS SUPPLY SYSTEM- The water heater and its manual gas shut-off valve **must** be disconnected from the gas supply piping system during any high pressure testing of that system at pressures in excess of ½ psig (14" w.c.). The manual gas shut-off valve need only be closed during testing at pressures equal to or less than ½ psig (14" w.c.).

7. VENTING - The water heater must be vented to the outdoors as described in these instructions. **DO NOT** connect this water heater to an existing Vent or Chimney - it must be vented separately from all other appliances.

Use only 3 inch diameter Schedule 40 PVC (Polyvinylchloride) or ABS (Acrylonitrile Butadiene Styrene) pipe and fittings that conform to ANSI/ ASTM or CSA standards, using the appropriate solvent and adhesive. (The Vent Connector fitting supplied with the Blower Assembly included with the water heater is made of ABS plastic.)

The unit may be vented horizontally through a wall or vertically through the roof. Pipe runs must be adequately supported along both vertical and horizontal runs. Maximum unsupported span is recommended to be no more than 6 feet. It is imperative that the first hanger be located on the horizontal run immediately adjacent to the first 90 degree elbow from the vertical rise or at the blower outlet in the case of a horizontal blower position. Support method used should isolate the vent pipe from floor joists or other structural members to help prevent the transmission of noise and vibration. Do not support, pin or otherwise secure the venting system in a way that restricts the normal thermal expansion and contraction of the chosen venting material.

If the water heater is being installed as a replacement for an existing power vented water heater, a thorough inspection of the existing venting system must be performed prior to any installation work. Verify that the correct materials, as detailed above have been used, and that the minimum or maximum vent length and terminal locations as detailed in this manual have been met. Carefully inspect the entire venting system for any signs of cracks or fractures, particularly at the joints between elbows or other fittings and the straight

runs of vent pipe. Check the system for signs of sagging or other stresses in the joints as a result of mis-alignment of any components in the system. If any of these conditions are found, they must be corrected in accordance with the venting instructions in this manual before completing the installation and putting the water heater into service.

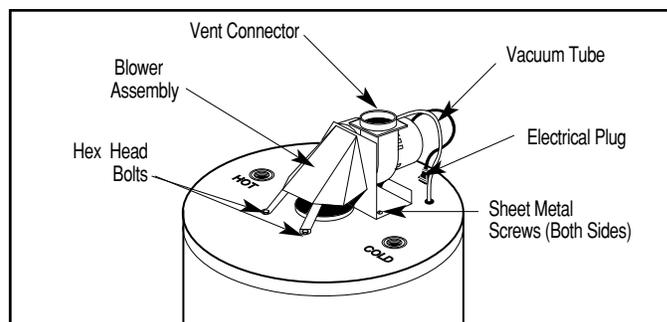


Figure 5. — Blower Assembly Installation

WARNING

Failure to properly vent the water heater to the outdoors as outlined above and in the following section can result in unsafe operation of the water heater causing bodily injury, explosion, fire, or death. To avoid the risk of fire, explosion, or asphyxiation from carbon monoxide, NEVER operate this water heater unless it is properly vented and has an adequate air supply for proper operation.

BLOWER ASSEMBLY INSTALLATION - Attach Blower Assembly to top pan using the four screws and two hex head bolts provided. (See Fig. 5) Slip flexible vacuum tubing onto aluminum tube stub protruding from top pan. Connect blower electrical plug to receptacle on top pan.

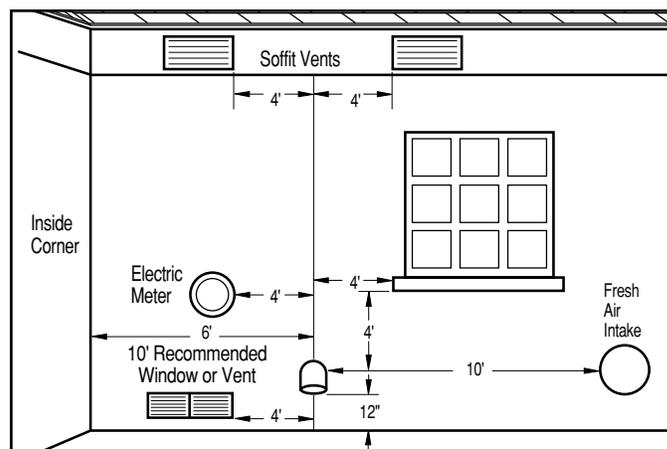


Figure 6. — Minimum Clearances

MAXIMUM VENT LENGTH. - The system will not operate if there is excessive restriction (pressure drop) in the venting system. A maximum of 45 feet of vent pipe may be used provided there is only one 90° elbow in the system. If additional elbows are required, two elbows can be used with 40 feet, and three elbows can be used with 35 feet of vent pipe. All elbows must be long radius type to minimize vent restrictions.

MINIMUM VENT LENGTH. - The venting may be as short as necessary, provided the vent termination is outdoors.

HORIZONTAL VENT TERMINAL LOCATION - The location of the vent terminal depends on the following minimum clearances and considerations (See Figure 6)

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1. Twelve (12) inches above grade level and above normal snow levels.
2. Four (4) feet below, or four (4) feet horizontally from any door, window, or gravity air inlet to the building or other appliances, or from gas or electric meters. Do not locate vent above walkways, doors, windows, air inlets, gas or electrical meters.
3. Ten (10) feet from any forced air inlet to the building. Any fresh or make-up air inlet such as for a dryer or furnace area is considered to be a forced air inlet.

spaces etc.) to help prevent moisture from accumulating in vent pipe.

⚠ WARNING

Moisture in the flue gas will condense as it leaves the vent terminal. In cold weather this condensate can freeze on the exterior wall, under the eaves, and on surrounding objects. Some discoloration to the exterior of the building is to be expected. However, improper location or installation can result in severe damage to the structure or exterior finish of the building.

VERTICAL VENT TERMINAL LOCATION - The location of vertical vent terminal depends on the following considerations (See Fig. 8):

1. Minimum twelve (12) inches above roof.
2. Minimum twelve (12) inches above anticipated snow level.
3. Maximum twenty-four (24) inches above roof level without additional support for vent pipe.

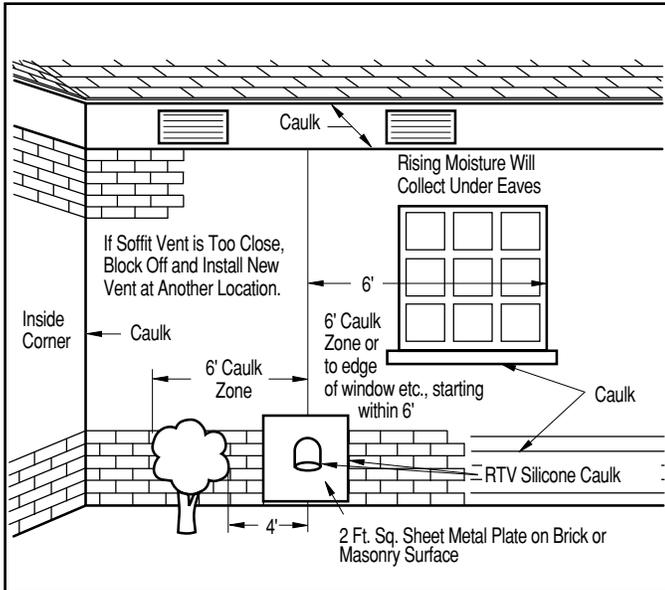


Figure 7. — Additional Considerations for Vent Terminal Location

4. Six (6) feet from an inside corner formed by two exterior walls.
5. Four (4) feet horizontally from any soffit or under-eave vent

Additional Considerations (See Fig. 7)

1. Do Not install vent terminal under any patio or deck.
2. To help prevent moisture from freezing on walls and under eaves do not locate vent terminal on the side of a building with prevailing winter winds.
3. Do Not terminate vent pipe directly on brick or masonry surfaces. Use a rust resistant sheet metal backing plate (2 x 2 ft.) behind vent. (See Fig. 7).
4. Do Not locate vent terminal too close to shrubbery, as flue gasses may damage them.
5. Caulk all cracks, seams, and joints within 6 feet of vent terminal.
6. All painted surfaces should be primed to lessen the chance of physical damage. Painted surfaces will require maintenance.
7. Insulate vent pipe exposed to cold conditions (attics, crawl

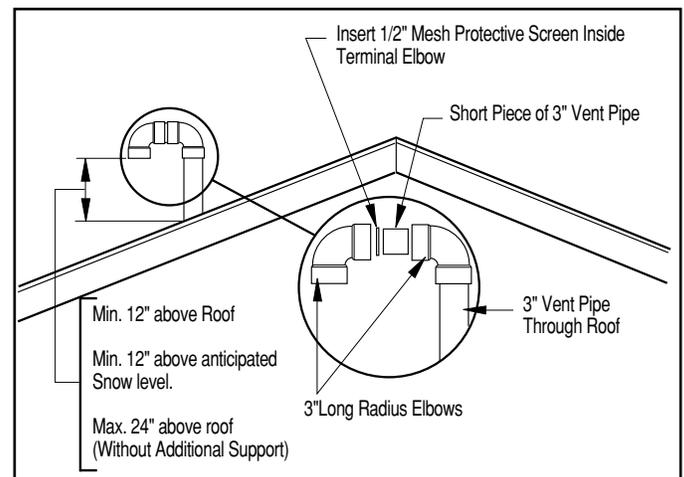


Figure 8. — Vertical Vent Terminal Location

4. Four (4) feet from any gable, dormer, or other roof structure with building interior access (i.e.; vent, window, etc.).
5. Ten (10) feet from any forced air inlet to the building. Any fresh or make-up air inlet such as a dryer or furnace area is considered to be a forced air inlet.

VENT INSTALLATION - Before proceeding, make certain you understand the procedure and cautions covered in the section "Joining Pipes and Fittings" on Page 9.

HORIZONTAL VENT INSTALLATION - Once the vent terminal location has been determined, make a hole through the exterior wall to accommodate the 3" vent pipe. Vent pipe must exit exterior wall horizontally only. (See Fig. 9)

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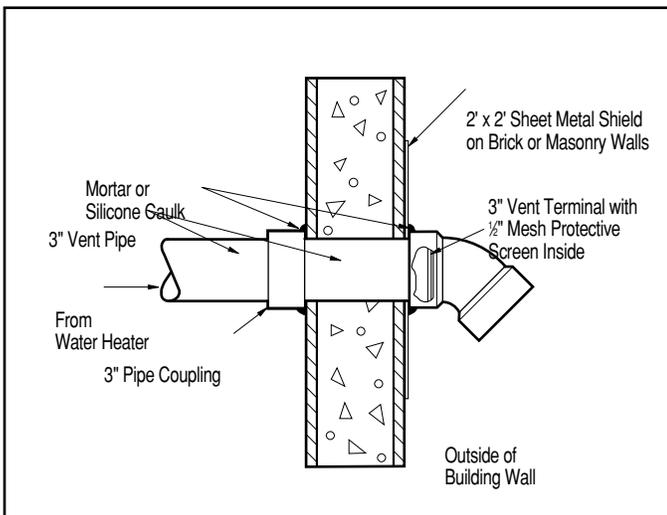


Figure 9. — Typical Horizontal Vent Installation

Insert a small length of 3" vent pipe through the wall and connect the coupling as shown in Fig. 9. Place the ½" mesh metal screen inside the terminal fitting and connect it as shown to the vent pipe on the exterior of the building. Seal any opening around the vent pipe or fittings with mortar or silicone caulk as shown in Fig. 9.

Complete the rest of the vent pipe installation to the water heater's vent connector fitting on the blower outlet. If necessary support horizontal run as previously mentioned. Use silicone sealant at the point the vent connector joins the blower assembly.

VERTICAL VENT INSTALLATION - Once the vent terminal location has been determined, make a hole through the roof and interior ceiling to accommodate the 3" vent pipe. Complete the vent pipe installation to the water heater's vent connector fitting on the blower outlet. Support vertical or horizontal runs as previously mentioned. Use silicone sealant at the point the vent connector joins the blower assembly.

Install adequate flashing where the vent pipe passes through the roof. Determine the vent terminal height and cut vent pipe accordingly. Refer to Fig. 8 for proper vent terminal height. Connect 3" vent elbow onto vertical pipe through roof. Connect short piece of vent pipe (approx. 3" long) to elbow, then insert ½" mesh metal screen into terminal elbow and join it to the short piece of vent pipe.

JOINING PIPES AND FITTINGS - All pipe, fittings, solvent cement, primers and procedures must conform to American National Standard Institute and American Society for Testing and Materials (ANSI/ASTM) standards.

CEMENTING JOINTS - Please note that the vent connector provided with the blower is made of ABS (Acrylonitrile Butadiene Styrene) plastic. When cementing the exhaust adaptor to the 3" vent connector, ensure that the cement used is designed for joining ABS and the specific vent connector material (ABS, PVC) being used in your installation. All joints in the vent must be properly sealed using the following material and procedure:

Cleaner-Primer and Medium Body Solvent Cement.

1. Cut pipe end square, remove jagged edges and burrs. Chamfer end of pipe, then clean fitting socket and pipe joint area of all dirt, grease or moisture.
2. After checking pipe and socket for proper fit, wipe socket and pipe with cleaner-primer. Apply a liberal coat of primer to inside surface of socket and outside of pipe. Do not allow primer to dry before applying cement.

3. Apply a thin coat of cement evenly in the socket. Quickly apply a heavy coat of cement to the pipe end and insert pipe into fitting with a slight twisting motion until it bottoms out.

NOTE: Cement must be fluid; if not, recoat.

4. Hold the pipe fitting for 30 seconds to prevent the tapered socket from pushing the pipe out of the fitting.
5. Wipe all excess cement from the joint with a rag. Allow 15 minutes before handling. Cure time will vary according to fit, temperature and humidity.

NOTE: Stir the solvent cement frequently while using. Use a natural bristle brush or the dauber supplied with the can. The proper brush size is one inch.

CAUTION

FOR PROPER INSTALLATION:

- **DO NOT** use solvent cement that has become curdled, lumpy or thickened.
- **DO NOT** thin solvent cement. Observe shelf precautions printed on the containers.
- For applications below 32° F use only low temperature type solvent cement.
- Appropriate solvent and cleaner must be used for the type of vent pipe used (PVC, ABS).

WARNING

DANGER OF FIRE OR BODILY INJURY - Solvent cements and primers are highly flammable. Provide adequate ventilation and do not assemble near heat source or open flame. Do not smoke. Avoid skin or eye contact. Observe all cautions and warnings on material containers.

8. **WIRING** - If local codes permit, the water heater may be connected to electric service with the eleven (11) foot power cord provided (DO NOT use an extension cord). A grounding receptacle is required. If local codes do not permit the use of cord connections, a 120 V, 50/60 Hz power supply, with suitable disconnecting means, must be connected to the black and white leads in the heater control enclosure. The hole where the supply cord enters the control enclosure is sized to permit use of conduit or metal clad cable con-

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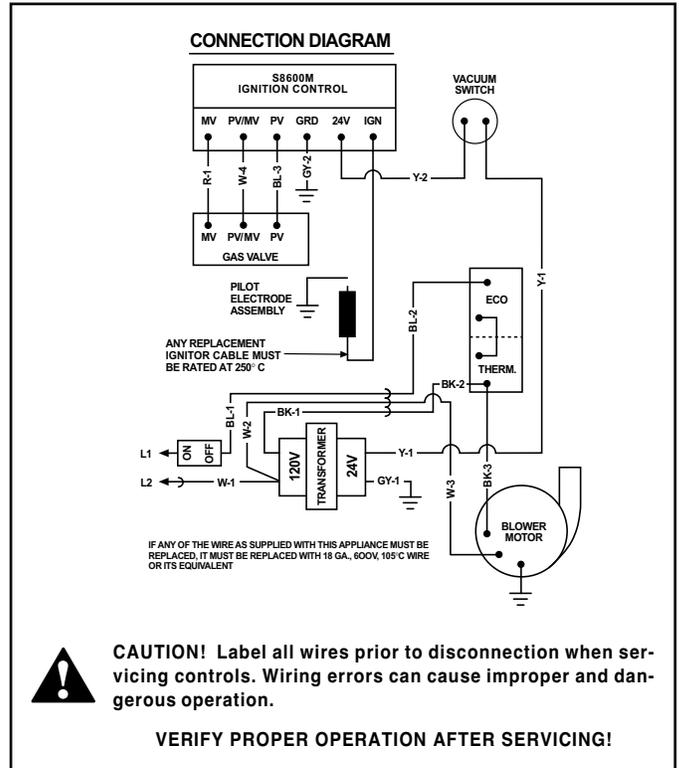
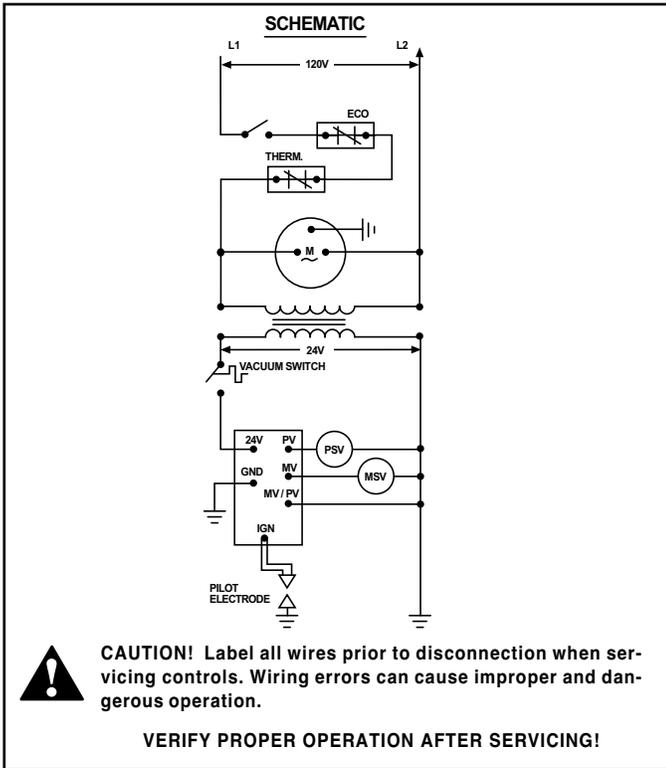


Figure 10. — Schematic Diagram

Figure 11. — Connection Diagram

nectors after the supply cord and bushing are removed. The maximum current draw is approximately 5.0 amps. The water heater must be electrically grounded in accordance with local codes, or, in the absence of local codes, in accordance with the National Elec-

tric Code ANSI/NFPA No. 70-1990. Refer to Figure 11 for water heater internal wiring.

If any of the wire as supplied with the appliance must be replaced, use only 18 gauge 600V., 105° C. wire or its equivalent.

Installation Check List

A. Water Heater Location:

- Indoors and protected from freezing temperatures.
- Proper clearance from combustible surfaces observed and water heater not installed on carpeted floor.
- Sufficient fresh air supply for proper operation of water heater.
- Air supply free of corrosive elements and flammable vapors.
- Provisions made to protect area from water damage.
- Sufficient room to service heater.

B. Water Supply:

- Water heater completely filled with water.
- Water heater and piping purged of air.
- Water connections tight and free of leaks.

C. Relief Valve:

- Temperature and Pressure Relief Valve properly installed and discharge line run to open drain.
- Discharge line protected from freezing.

D. Gas Supply:

- Gas line equipped with shut-off valve, union and drip leg.
- Approved pipe joint compound used.
- Soap and water solution used to check all connections and fittings for possible gas leak.

- Gas Company inspected installation (if required).

E. Venting:

- Heater vented separately from all other appliances.
- Proper materials and techniques used in vent assembly.
- Vent pipe properly secured to blower housing.
- Vent pipe supported at required intervals.
- Appropriate minimum clearances observed.
- Precautions taken to prevent moisture damage around vent termination.

F. Wiring:

- Correct power supply (120 V).
- Electrical connections tight.
- Heater properly grounded and proper polarity observed.

WARNING

The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving device or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.