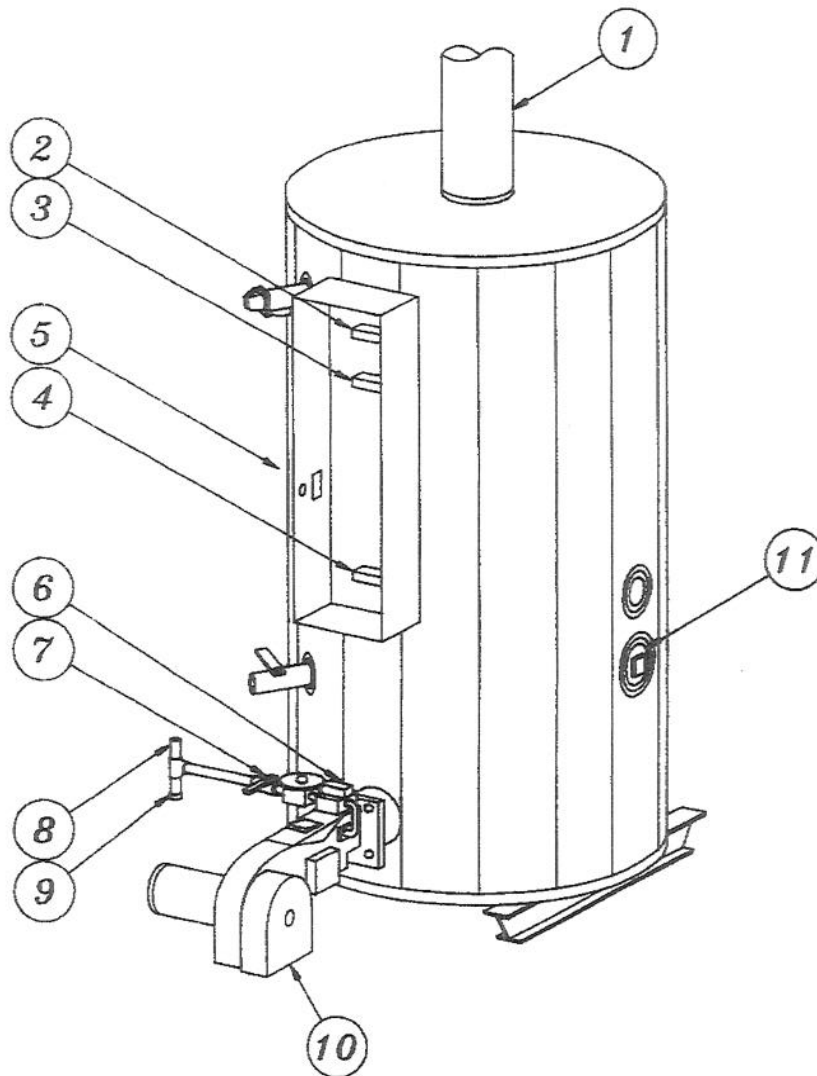


# PVI POWER GAS, OIL AND COMBINATION GAS/OIL WATER HEATERS TYPICAL CONSTRUCTION



**FIGURE 3-1**

- 1. FLUE STACK\*
- 2. TEMPERATURE LIMITING DEVICE  
(set at 200°F)
- 3. UPPER OPERATING THERMOSTAT  
(set at 130°F)
- 4. OPERATING THERMOSTAT  
(set at 120°F)
- 5. CONTROL SWITCH(es) AND FUSE(s)

- 6. GAS VALVE
- 7. GAS INLET
- 8. GAS LINE\*
- 9. DRIP LEG\*
- 10. BURNER
- 11. HANDHOLE CLEANOUT (not supplied on all models)

(\* NOT FURNISHED BY PVI)

For connection points on oil pumps, see section 10 or specific burner manufacturer's installation and maintenance instructions.

**CAUTION:** Temperatures higher than 130°F increase the risk of scald injury!

**IMPORTANT!** Clearances to unprotected combustible material and for servicing and maintenance must be 16" minimum at top, sides and rear and 24" minimum in front.

## ELECTRICAL

1 Wiring to the unit should conform to the National Electrical Code or the code legally authorized in your locality. A fused disconnect switch should be used for water heater control. 120V, 1 phase, 60 Hz service wiring connections are located in the enclosure on the water heater. Some models may additionally have high voltage connections located on the burner.

2. Be certain that high and low voltages are connected to the correct points; also, check rotation of motors on three phase models. The burners are shipped separately from the heaters and are provided with connecting wires in conduit to be connected after burner is in place in combustion chamber. Wires and terminal block connections are marked for simplified hookup. See figure 3-2.

NOTE: Use only copper wire of proper sizing for incoming service. Damage resulting from use of aluminum wiring will be excluded from coverage under the warranty of this unit.

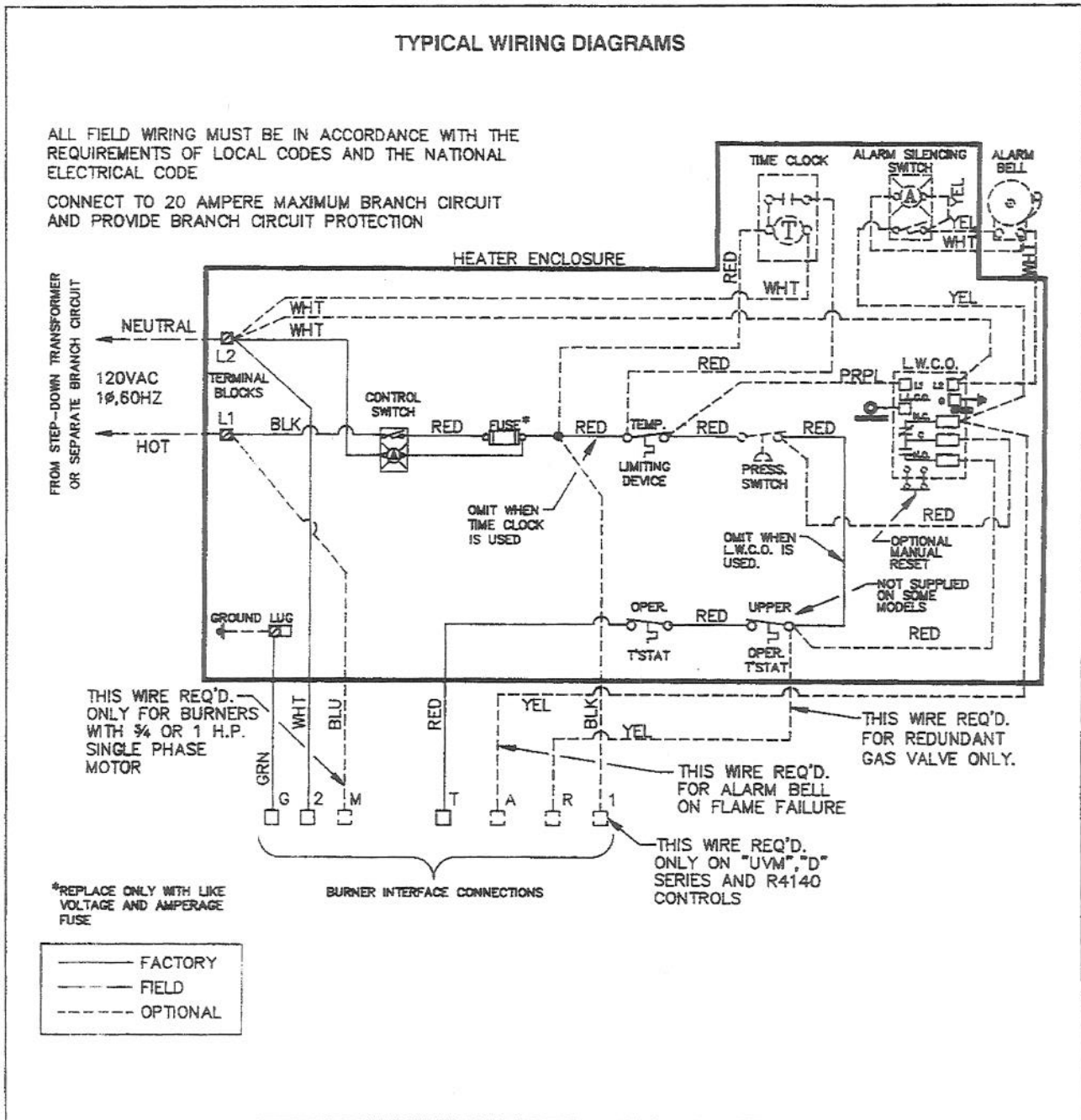


FIGURE 3-2

## START-UP PROCEDURES AND OPERATION

**CAUTION:** Do not relight pilot or start burner with combustion chamber full of gas or oil vapor, or with very hot combustion chamber.

1. The burner manufacturer's installation and service manual start-up procedures for the individual burner on your water heater may be part of this manual or will be shipped with the burner. Study the information carefully and follow the burner manufacturer's recommendations.
2. Because of the many different burners and control systems, the instructions in this section are general information and refer to the water heater with either power gas, oil or combination gas/oil burner installed.

3. Fill the water heater tank with water. Open the relief valve or a nearby hot water faucet to allow air in the tank to escape. Be sure all connections into the tank are tight as leaks at tank fittings will damage the insulation.

4. The top thermostat is a temperature limiting safety device set at 200°F. The thermostats are set at the factory at 130°F on the upper operating thermostat and 120°F on the lower operating thermostat. Adjustment may be made by turning the thermostat dial to the desired temperature.

**CAUTION:** Temperatures higher than 130°F increase the risk of scald injury.

## INITIAL FIRING AND ADJUSTING OF BURNER

1. The following procedure is the quickest and best means of starting and adjusting the burner for efficient operation.
2. The following test equipment is required:
  - A. Stack temperature gauge.
  - B. Manometer for checking gas pressure.
  - C. Draft gauge for determining draft in stack.
  - D. CO tester (gas only).
  - E. CO<sub>2</sub> tester.
  - F. AC/DC multimeter with a 20,000 ohm/volt DC rating.
  - G. Ammeter.
  - H. Oil pressure gauge (100-350 psi) (oil only).
  - I. Vacuum gauge (0-30" Hg.) (oil only).
  - J. Smoke spot tester (oil only).

**NOTE:** Emergency shutoff can be made by turning off the fuel inlet shutoff valve.

3. Drill 1/4" test hole in stack approximately 3" above heater vent connection (before the draft regulator).
4. Refer to start-up instructions for the burner supplied with your appliance. They may be included as part of this manual or may be shipped with the burner.

## MAINTENANCE

1. A preventive maintenance program should be established to assure a long, trouble-free life of the water heater.
2. The tank should be flushed at two- or three-month intervals depending on water conditions in your location. To flush, turn off electrical disconnect switch to prevent the burner from operating. Open the drain valve and allow water to flow through the tank until it runs clear. Close the drain valve and turn the electrical switch back on. Draining two or three gallons from the bottom of the tank on a weekly basis will also help prevent any accumulation of sediment. Water impurities consist of fine particles of soil or sand which will settle out and form a layer

of sediment on the bottom of the tank.

3. A scale of lime will normally form in the tank during operation and will accumulate on the bottom of the tank. The lime is formed from the natural chemicals in the water which precipitate out during the heating cycles. Some water supplies contain more of these chemicals than others, and the scale buildup will occur more rapidly. Other factors affecting the scale buildup are the amount of hot water used and the temperature of the water. The more hot water used, the more fresh water containing the scale-forming chemicals is brought into the tank. As the temperature of the water increases, the rate of scale deposited will be increased.

## MAINTENANCE (Cont'd)

Sediment and scale accumulations in the tank will greatly reduce the water heating ability of the heater by reducing the effectiveness of the heat transfer surfaces. When the heating energy from the burner cannot be effectively transferred to the water in the tank, the metal will overheat. Overheating will cause the metal to lose its structural strength and create excessive expansion that will break water seals and cause the tank to leak.

**SINCE PVI CANNOT CONTROL THE USE OF THE WATER HEATER, WATER CONDITIONS OR MAINTENANCE, THE WARRANTY ON THE WATER HEATER DOES NOT COVER POOR PERFORMANCE, STRUCTURAL FAILURE OR LEAKING DUE TO AN EXCESSIVE ACCUMULATION OF SCALE.**

- 4 Should a firetube leak for any reason, consult the factory for instructions. Inspect the bottom tubesheet on a regular basis. If the water heater was built with insulation on the bottom tubesheet, inspect insulation for holes or areas that may have pulled away from tubesheet. Repair or replace as required.

NOTE: Condensate coming from the tubes on a cold start is normal and does not indicate a leaking tube.

- 5 The tank may have a handhole for inspection and cleaning. (See figure 3-1) The handhole cover should be removed and the tank inspected for scale buildup. If scale is present, it can be loosened with a high pressure stream of water. The smaller pieces can be flushed through the drain and the larger pieces removed by hand through the handhole. The frequency of inspections will be determined by the rate of scale buildup. We recommend 30-60 day intervals.
- 6 Periodic inspection and check-out of the burner ignition system, control system, and fuel valve operation (for tight close-off) should be made. Refer to the burner installation instructions for recommendations.

When oil burners are used, the flue tubes and flue baffles should be inspected periodically and cleaned if necessary. A maladjusted oil burner producing excessive smoke will result in soot collecting in the flue tubes. Once sooting starts, it accelerates rapidly and will eventually block air movement through the flue tubes.

7. Examine the venting system at least once each year for proper connections and alignment. Oil the blower motor and wipe oil and dust from the burner at regular intervals. The blower inlet will collect dust from the air during operation. Clean the blower wheel when necessary. The burner should be cleaned each year according to burner manufacturer's recommended procedures. Inspect all parts and make replacements when necessary. Check wiring for loose connections and burned wires.
8. The temperature and pressure relief valve should be checked at regular intervals by removing it from the tank, to determine its condition for safe operation. The openings inside the valve may become restricted by a buildup of scale and become inoperative. If the valve does not open and close properly when tested, it must be replaced. Replace relief valve with a like kind or one meeting the requirements stated on the rating decal located adjacent to the relief valve.

CAUTION: The relief valve is a primary safety device.

9. Extended shutdown of the appliance and restarting are as follows:
  - A. Turn off all power and fuel supplies.
  - B. Drain and flush tank as previously discussed.
  - C. Tag power switch(es) that fuel is off and tank is empty.
  - D. Refill tank with water and turn fuel and power switch(es) on to restart. Reset all controls and conduct start-up of the appliance as discussed in preceding pages.