



Installation Instructions Boiler Burner Unit

Models PK400T PK450T (For Hot Water Heating Systems)

MODEL	NOZZLE SIZE GPH + TYPE	HEATING CAPACITY BTUH	NET OUTPUT BTUH	NET OUTPUT SQ. FT.	BECKETT BURNER	WATER CAPACITY GAL.	SMOKE OUTLET SIZE	CHIMNEY SIZE	SHIPPING WEIGHT POUNDS
PK400	.50-80S	61000	53000	350	AFG56XN	13	6	8x8x15	395
	.65-70S	79000	69000	460					
	.75-70S	91000	79000	525					
PK450	.85-70S	104000	90000	600	AFG56XN	20	6	8x8x15	475
	1.00-70S	122000	106000	707					
	1.10-70S	134000	117000	780					

Specifications

These installation instructions provide information for the installation and adjustment for the proper operation of the PK400 and PK450 Oil Fired Boiler units. Be sure to follow these instructions carefully when making the installation. Before proceeding with the installation, be sure to check local ordinance requirements. Installation must be made by a qualified installer in accordance with regulations of the National Fire Protection Standard for Oil Burning equipment, NFPA NO. 31, and in complete accordance with all local codes and authorities having jurisdiction.

A qualified installer is an individual or agency who is engaged in, responsible for, or thoroughly familiar with the installation and operation of oil-fired appliances, who is experienced in such work, who is familiar with the precautions required, and who will comply with all the requirements of the authority having jurisdiction for the installation.

The unit is subject to shipping damage during transit or can be shipped with missing parts. Upon receipt, examine carton and boiler unit for possible missing parts or damage. If unit is damaged, notify carrier immediately. If parts are missing, notify factory as soon as possible.

The boiler is shipped completely assembled except for the circulator and drain cock which are furnished but shipped loose.

The PK400 and PK450 boilers are designed for use with a circulating hot water heating system (30 PSI Max).

Do not use or store flammable liquids, especially gasoline in the vicinity of the boiler.

Setting Boiler

Make sure that foundation for boiler is level and adequate to support unit weight (approximately 375 and 455 pounds).

Locate boiler close to chimney with adequate clearance around unit for service. See Figure 1 for installation dimensions. Keep in mind that the tube turbulators must be removed for proper cleaning of the tubes. There is a double set of tubes in the boiler. The top turbulators are inserted from the burner end. Turbulator length is 18". Refer to Figure 2 for details on boiler construction.

Chimney

A properly designed chimney of adequate size and height and adequate combustion air supply are essentials for the

best operation of any heating plant. The chimney should be masonry with tile lining (8" x 8" x 15' high) or metal insulated, with a stainless steel internal surface such as the tradename "Metalbestos" (7" dia. inside x 15' high).

The chimney should provide a minimum of .03 draft at the boiler flue outlet, although it is preferable to have .05 draft. The draft loss through the boiler is as follows:

MODEL	FIRING RATE	DRAFT LOSS
PK400	.50 GPH	.01
	.65 GPH	.02
	.75 GPH	.03
PK450	.85 GPH	.02
	1.00 GPH	.025
	1.10 GPH	.03

After the installation of a new oil-fired appliance or upgrade, if no chimney modifications were required at the time of the installation, the condition of the chimney should be rechecked after three months and after six months of normal heating appliance operation to verify that the chimney is still in good condition and suitable for continued use. If any doubts exists regarding the condition of the chimney, examination by an experienced professional is again highly recommended, and any problems must be corrected.

For those installations not requiring a chimney, such as "through the wall" venting units, refer to the manufacturer's recommendations.

Air For Combustion And Ventilation

Be certain adequate facilities are available to provide air for satisfactory combustion and ventilation.

Open basements without storm windows or tight fitting doors will generally permit adequate air infiltration. If the boiler is located in a separate room with a tight door, ventilation must be provided to an open area within the building or to the outside. If the building is of tight construction or with exhaust fans, an outside air supply that is ducted into the Boiler Room may be required.

For installation in confined areas provide two openings, one near the floor and one near the ceiling. Each opening to

interior space must have a minimum free area of 150 square inches per gallon firing rate.

Each opening to outdoors must have a minimum free area of 50 square inches per gallon firing rate.

Piping Boiler To System

Refer to Figure 1 for location of piping connections on boiler. Refer to Figure 3 for piping diagram for single zone, Figure 5 for multi-zone with circulators and Figure 7 for multi-zone with zone valves.

Pipe boiler to heating system in accordance with recommended practices in order to assure satisfactory heating performance. Connect domestic hot water lines to 1/2" tapings on top front of boiler. Refer to Figure 9 for piping diagram.

If local ordinances require a low water cut-off, use an external mounted cut-off. Refer to Figure 10.

Electrical Installation

All wiring must be in accordance with local codes or in the absence of a local code must comply with the National Electric Code.

Refer to the appropriate wiring diagram. Figure 4 for a single zone, Figure 6 for a multi-zone with circulators and Figure 8 for a multi-zone with zone valves.

Provide a separate branch circuit with a fused disconnect switch to the boiler. The PK400 and PK450 operate on 120 vac 60 HZ with a power draw of 5 amps. or less with one circulator.

The unit, as shipped, is furnished with the wiring between the aquastat and the oil burner installed. Balance of wiring must be furnished by the installer.

Oil Line Installation

The burner on the PK400 and PK450 is furnished with a Sundstrand Model A, single stage, 3450 RPM pump as standard equipment.

One pipe installations must be absolutely air tight or loss of prime may result. Maximum lift on a one-pipe installation is 8 feet.

On a two pipe installation, the bypass plug (furnished with pump-in plastic bag) must be inserted in the bottom return port. The lift on a 2 pipe installation depends on size and length of the tubing. With 52 feet of 1/2 inch tubing, the lift is 10 feet.

Install a shutoff valve and oil filter in the oil supply line. Locate shutoff valve close to tank with oil filter between valve and burner.

Vent Connection

The flue pipe must be 6" nominal dia. galvanized steel. The flue pipe should be short as possible (while maintaining service clearance behind unit), with a minimum of elbows and must pitch upward to the chimney connection. Maintain 18 inches clearance (minimum) between stack and combustible material. Secure each flue pipe joint and boiler flue outlet connection with sheet metal screws. Seal opening at chimney connection.

Install barometric draft control (furnished with unit) in the flue pipe to reduce fluctuating draft conditions.

Starting And Adjustment Procedure

Refer to burner manufacturers instructions furnished with this unit.

The PK400 burner is shipped with a .75 GPH 70° solid spray nozzle and the PK450 with a 1.00 GPH 70° as standard equipment. Check burner to be sure proper nozzle is installed. Change nozzle size if desired. See specifications on Page 1. Do not fire units under or above ratings shown.

These units should be set up with an .01 WC. over fire draft. Refer to section under "chimney" for draft loss through boiler at various firing rates. Adjust barometric draft control accordingly.

The combustion air should be adjusted to secure a 12 to 13% CO₂ The smoke must be between a trace to No. 1 smoke maximum

The gross stack temperature at the specified firing rates will vary between 280° F. to 320° F.

With these low stack temperatures, steady state output efficiencies in excess of 88% can be achieved. However, in some instances it is possible to encounter chimney condensation. If condensation develops, it may be necessary to remove flue tube turbulators to elevate the stack temperature until the condition is corrected. Always remove a like number of turbulators from both flue passes. Refer to Figure 2.

Maintenance And Service

Refer to burner manufacturers instructions furnished with this unit.

It is recommended that the unit be checked, cleaned and serviced at least once a year by a qualified individual or agency.

When cleaning the boiler, both the front and rear crossover boxes must be removed from the boiler in order to remove the flue tube turbulators. Both boxes can be removed without removing any cabinet panels. Refer to section under "Setting Boiler" for proper turbulator insertion direction. Refer to Figure 2.

The cross-over boxes are insulated with a molded high temperature ceramic fiber liner. This material is the same as used in the combustion chamber. The operating temperature rating is 2300° F. The condition of these liners must be checked during the annual cleaning and service check. Replace if they do not provide a proper gas seal or show some deterioration. Be particularly careful in checking the rear box liner (stack end), that the gas pass dividing wall on this liner is sound and provides a good gas seal. If the gases get around this divider, the first gas pass through the lower bank of flue tubes will exit directly out the stack.

Instructing The Homeowner

The operation and care of the heating system should be explained to the homeowner, including the simple checks to make before calling for service if the burner fails to operate automatically.

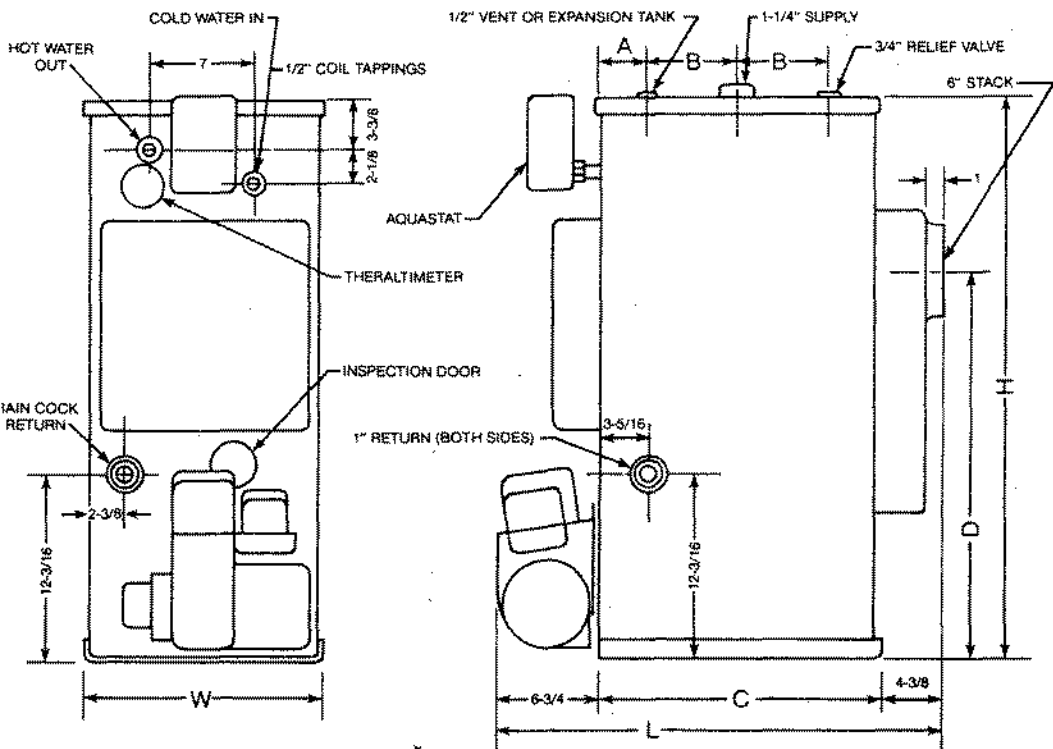
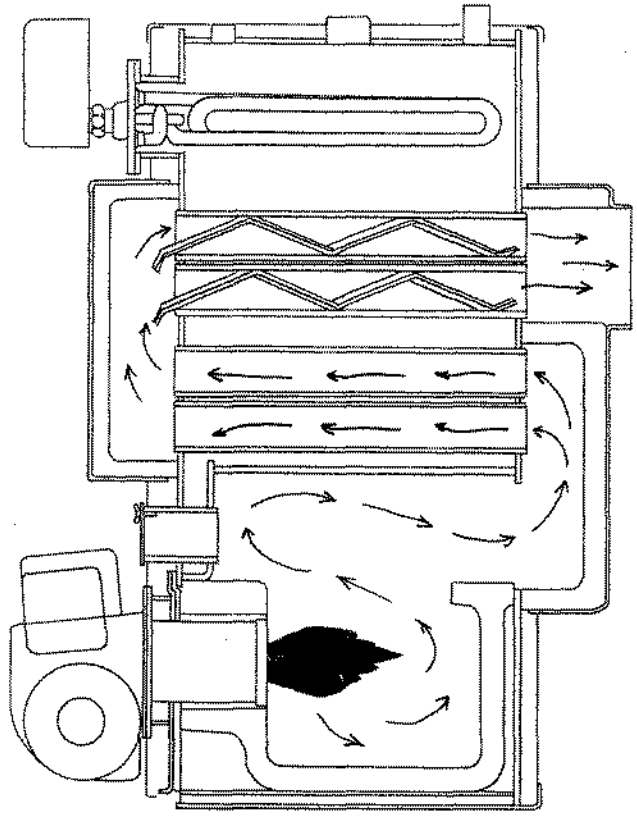


FIG. 1

MODEL	A	B	C	.D	H	L	W
PK400	2-7/8	6	18-5/16	25-1/2	37	29-7/16	15-7/16
PK450	3-9/16	7	20-9/16	27-3/16	38-3/4	31-11/16	18-7/16

CROSS SECTION OF UNIT



PIPING DIAGRAM SINGLE ZONE

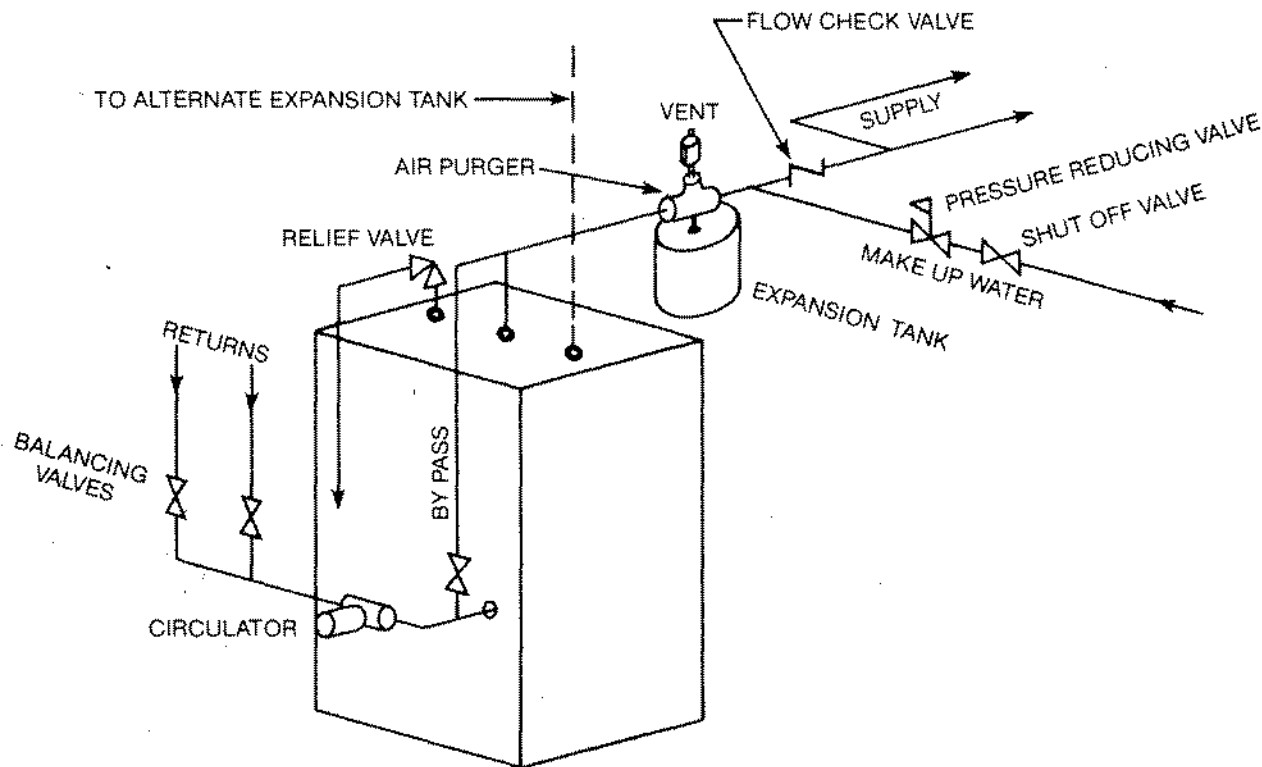
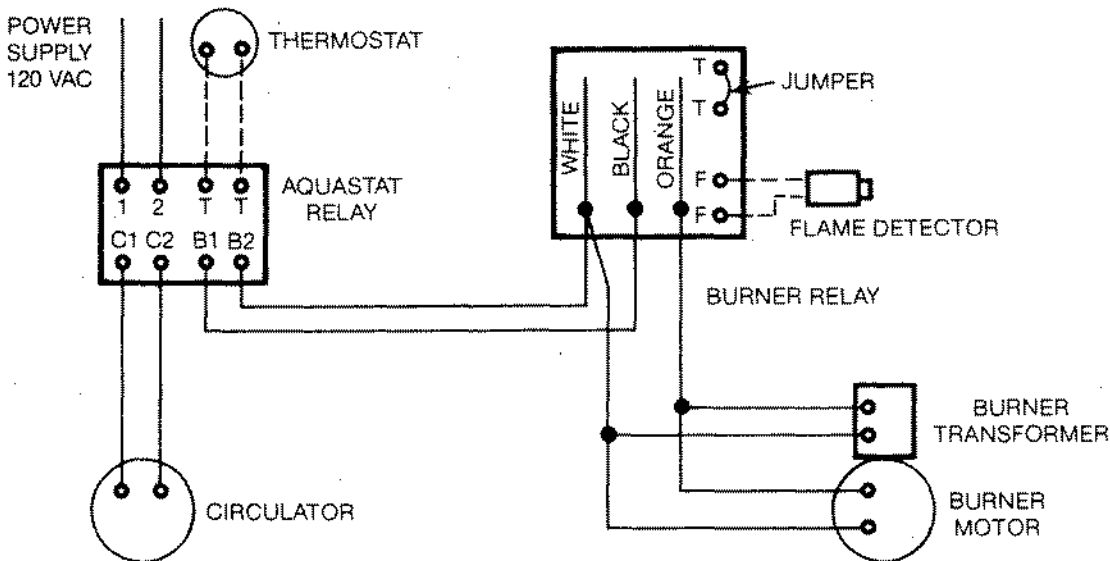


FIG. 3

WIRING DIAGRAM SINGLE ZONE



PIPING DIAGRAM MULTI-ZONE WITH CIRCULATORS

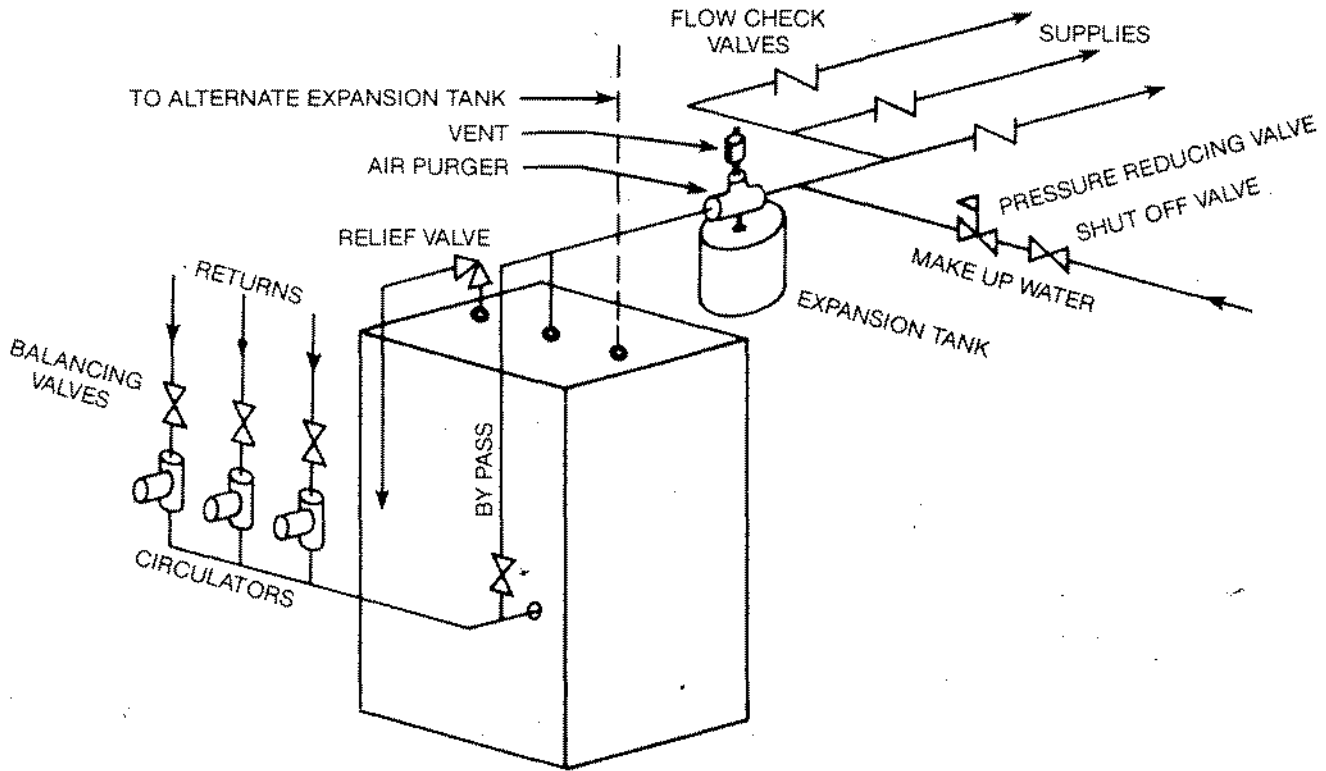
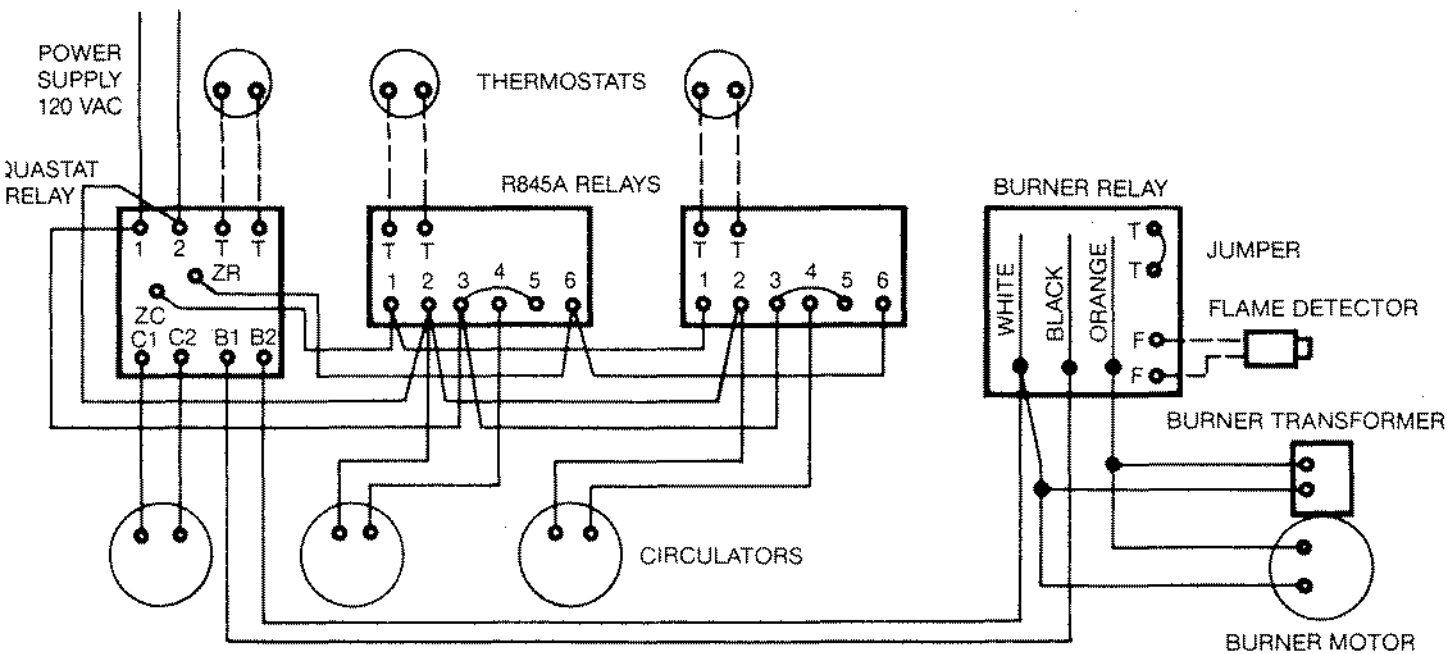


FIG. 5

WIRING DIAGRAM MULTI-ZONE WITH CIRCULATORS



PIPING DIAGRAM MULTI-ZONE WITH ZONE VALVES

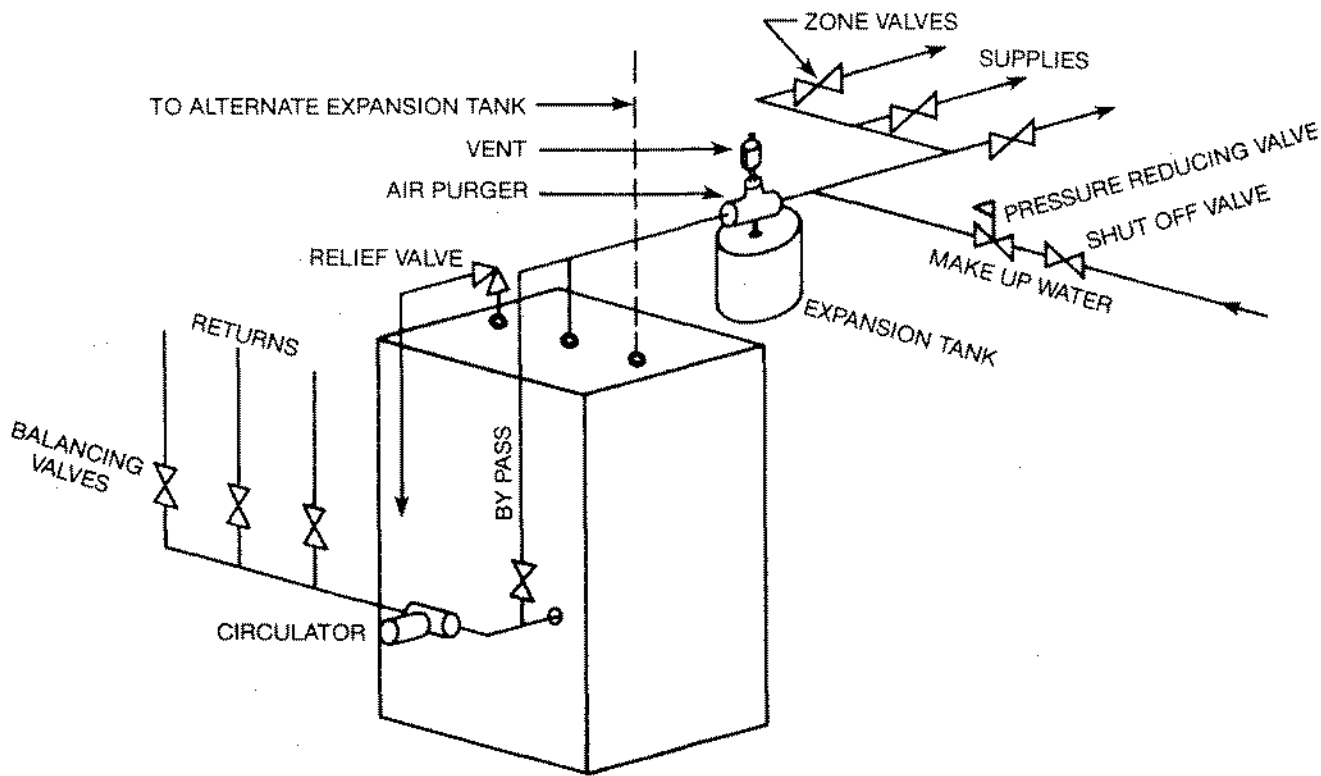


FIG. 7

WIRING DIAGRAM MULTI-ZONE WITH ZONE VALVES

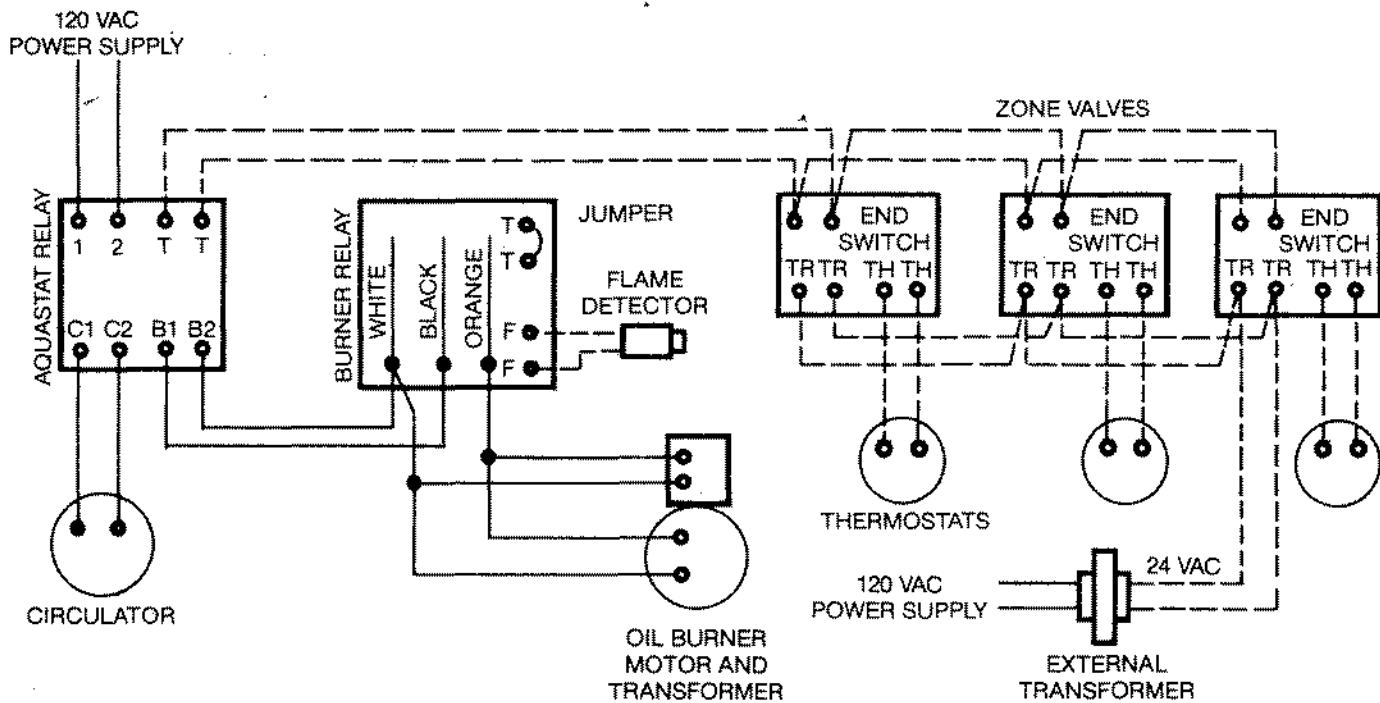


FIG. 8

PIPING DIAGRAM DOMESTIC HOT WATER

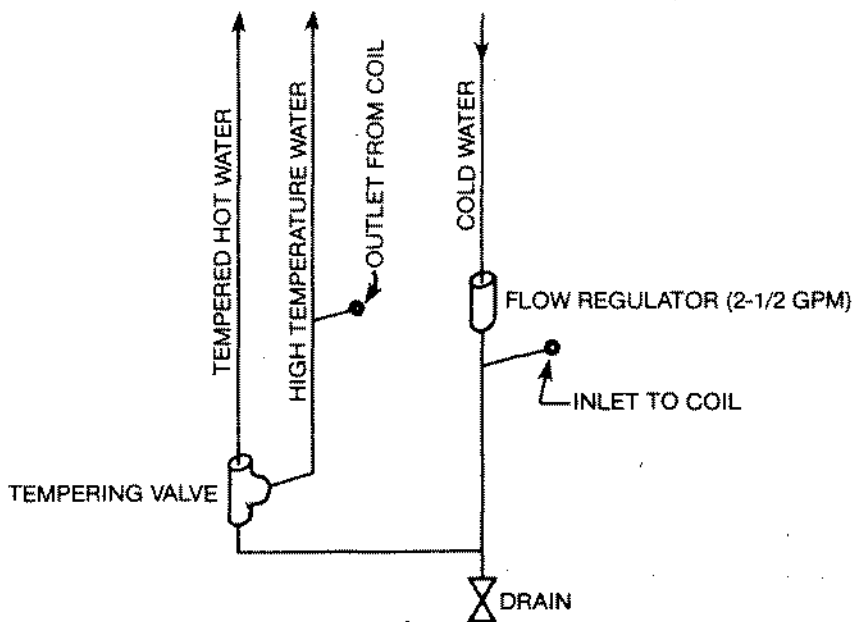
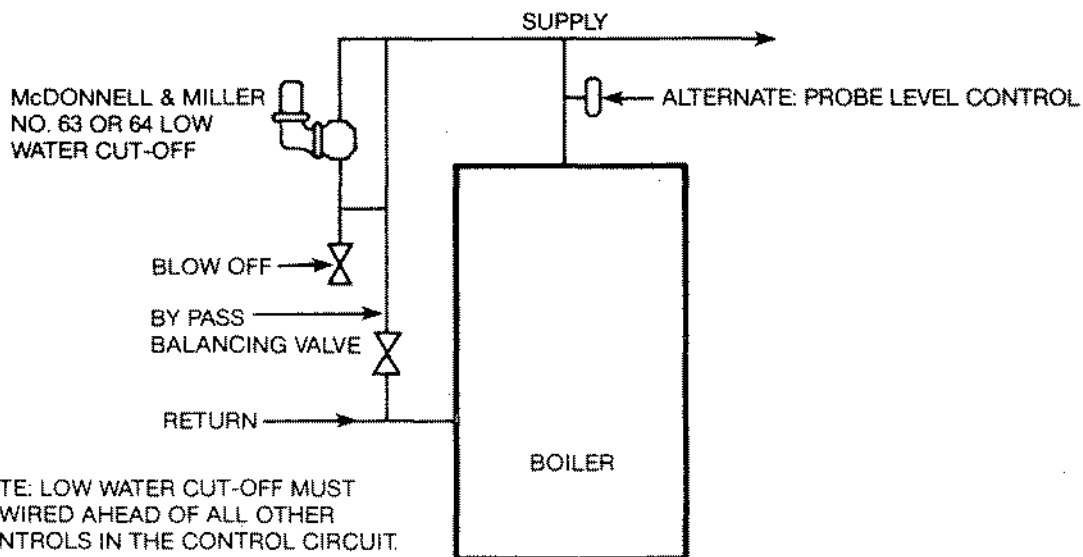


FIG. 9

PIPING DIAGRAM LOW WATER CUT-OFF



NOTE: LOW WATER CUT-OFF MUST BE WIRED AHEAD OF ALL OTHER CONTROLS IN THE CONTROL CIRCUIT.

BALANCING VALVE MUST BE PARTIALLY OPEN

