e·f·m ELECTRIC FURNACE MAN — The Finest in AUTOMATIC HEAT

Installation Instructions Boiler Burner Unit

Model S-PK600 (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
S-PK600	1.25 - 80 S	150000	131000	870	AFG56YB	22	6	8x8x15	575
	1.35 - 80 S	163000	142000	945					

Specifications

These installation instructions provide information for the installation and adjustment for the proper operation of the S-PK600 Oil Fired Boiler unit. 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 in accordance with local ordinances which may differ from these installation instructions.

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 S-PK600 boiler is 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 555 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 turbulators are inserted from the burner end. Turbulator length is 18″. Refer to Figure 2 for details on boiler construction.

Chimney

The chimney should be masonry with tile lining (8″×8″×15′ high) or metal insulated, with a stainless steel internal surface such as the tradename "Metalbestos" (7″ dia. inside × 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
S-PK600	1.25 GPH	.020
	1.35 GPH	.025

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 ½" tappings 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 S-PK600 operates 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 S-PK600 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 by-pass 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 ½ 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 S-PK600 is shipped with a 1.25 GPH 80° solid spray nozzle 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 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% CO_2. The smoke must be between a trace to No. 1 smoke maximum.

The gross stack temperature at the specified firing rates will vary between 335°F. to 380°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. Refer to Figure 2.

Maintenance And Service

Refer to burner manufacturers instructions furnished with this unit.

When cleaning the boiler, both the front and rear cross-over 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.

INSTALLATION DIMENSIONS

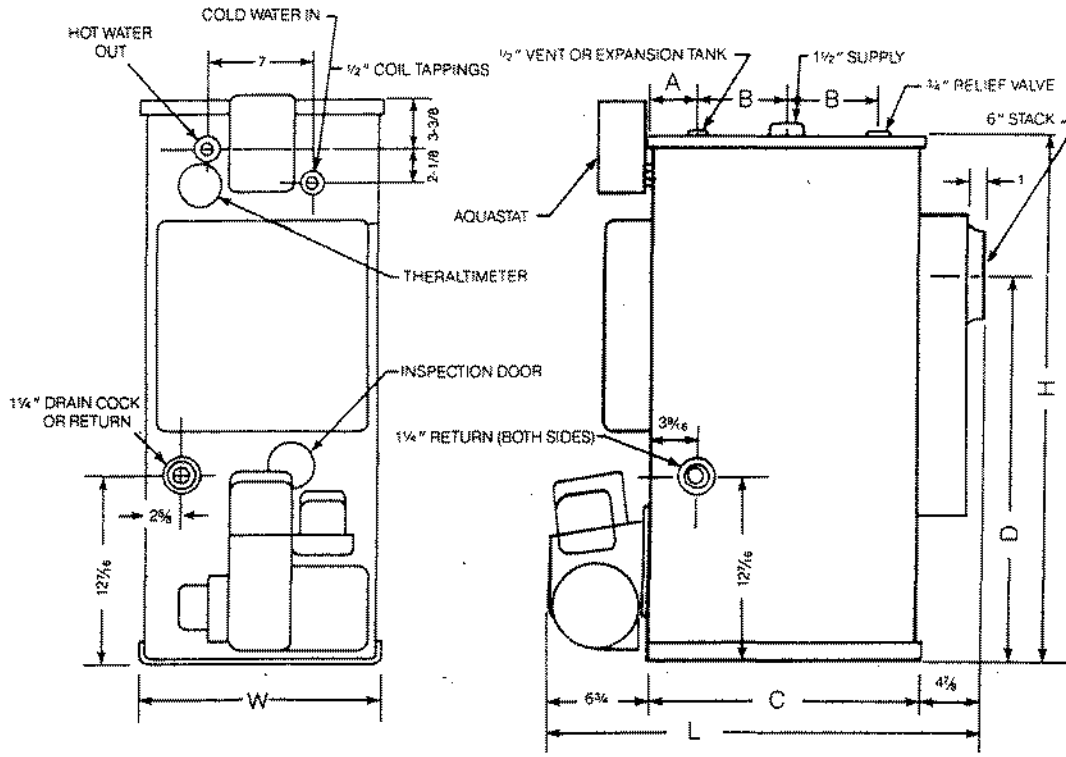
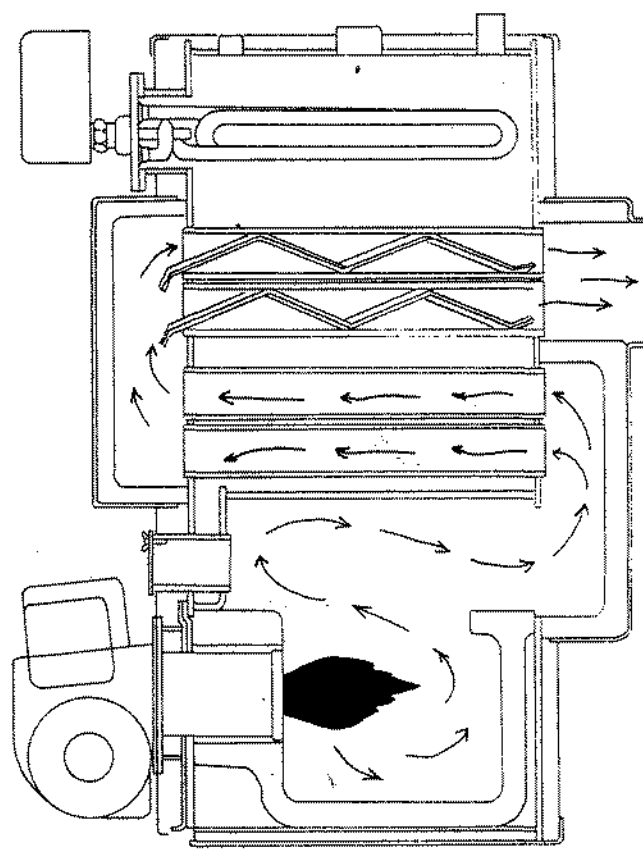


FIG. 1

MODEL	A	B	C	D	H	L	W
S-PK600	3⁹⁄₁₆	7	20⁹⁄₁₆	28¹¹⁄₁₆	40¼	32³⁄₁₆	21⁷⁄₁₆

CROSS SECTION OF UNIT



PIPING DIAGRAM
SINGLE ZONE

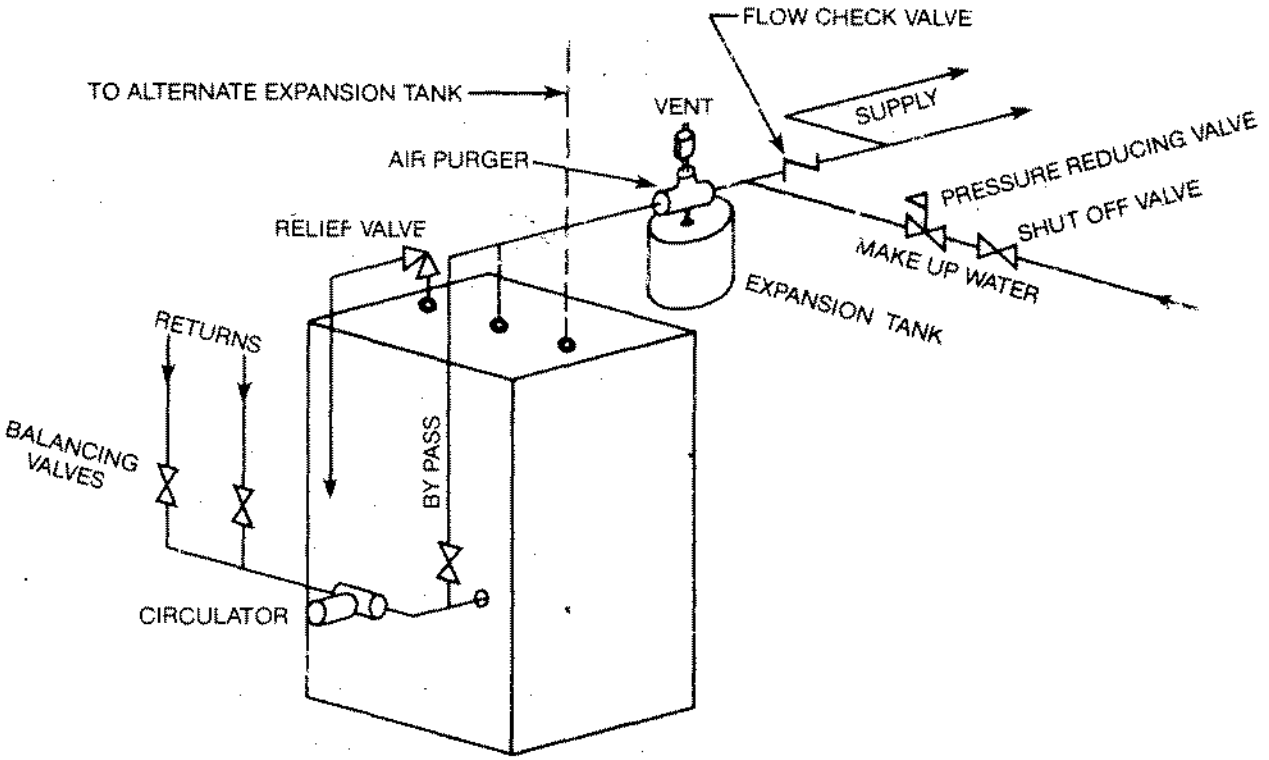
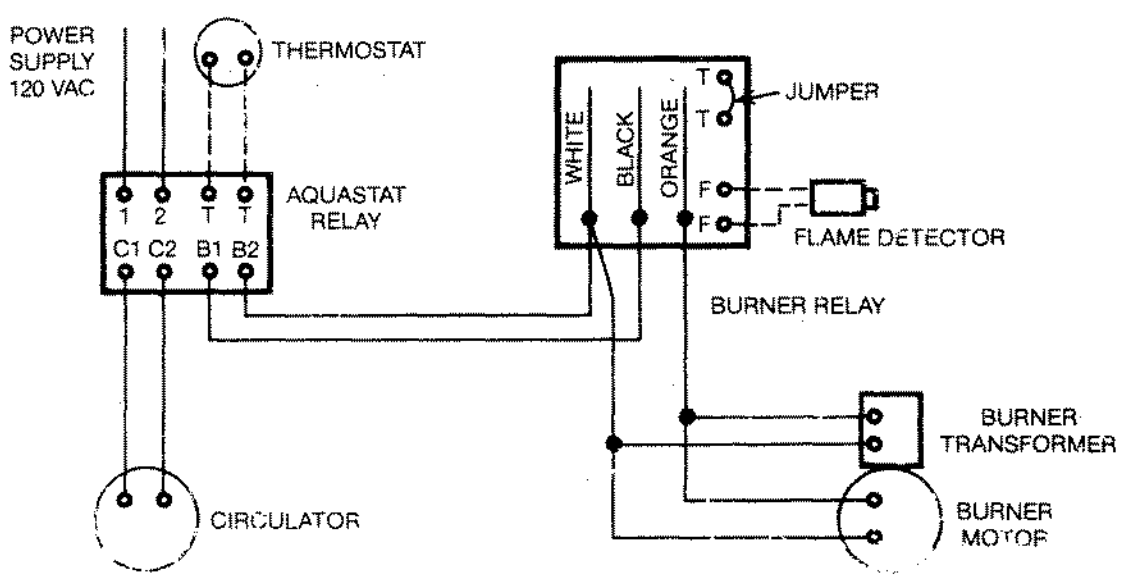


FIG. 3

WIRING DIAGRAM
SINGLE ZONE



PIPING DIAGRAM
MULTI-ZONE WITH CIRCULATORS

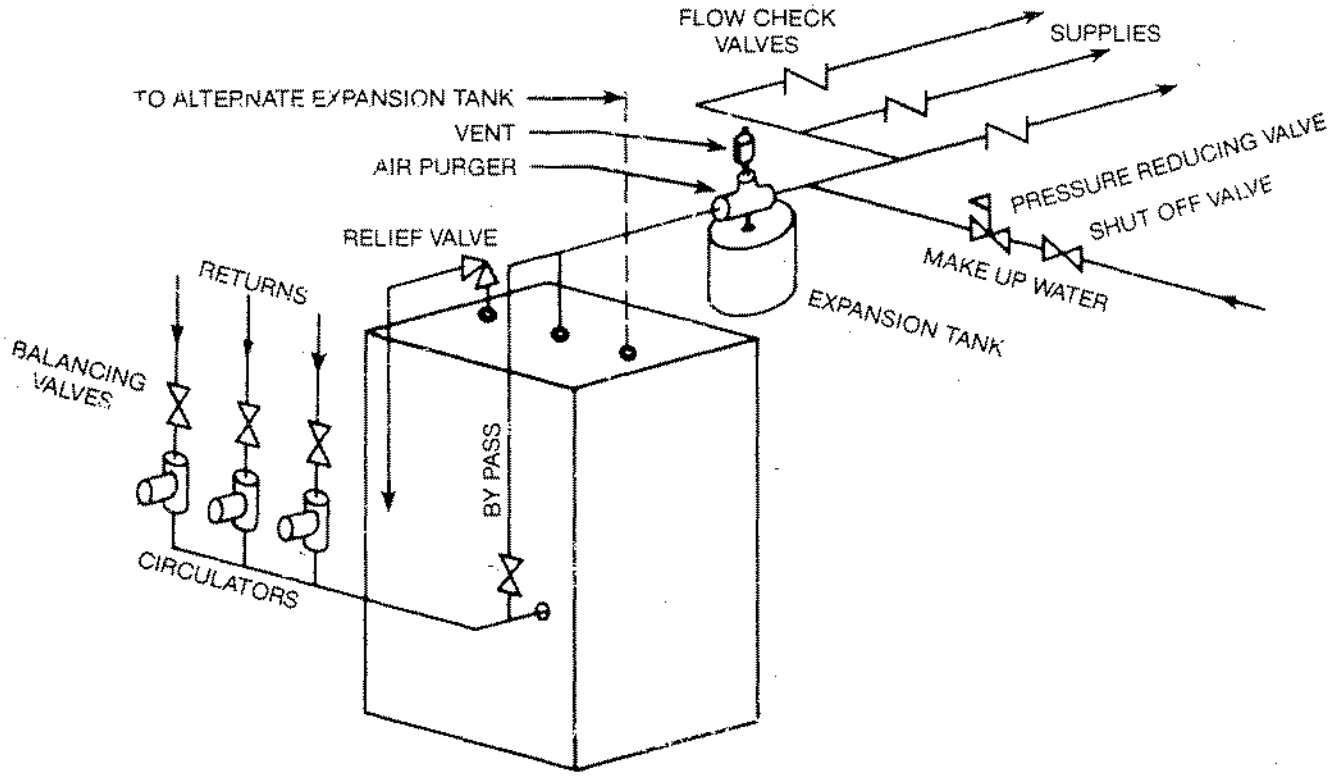
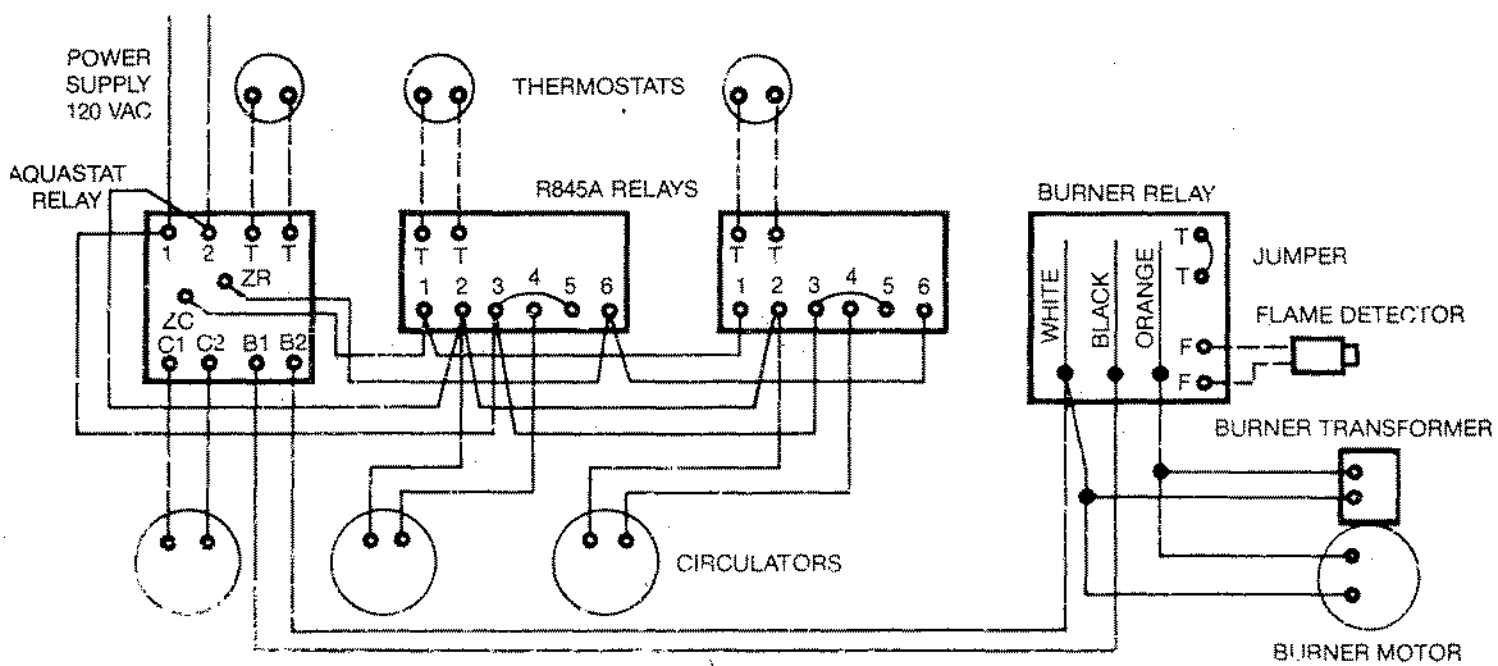


FIG. 5

WIRING DIAGRAM
MULTI-ZONE WITH CIRCULATORS



PIPING DIAGRAM
MULTI-ZONE WITH ZONE VALVES

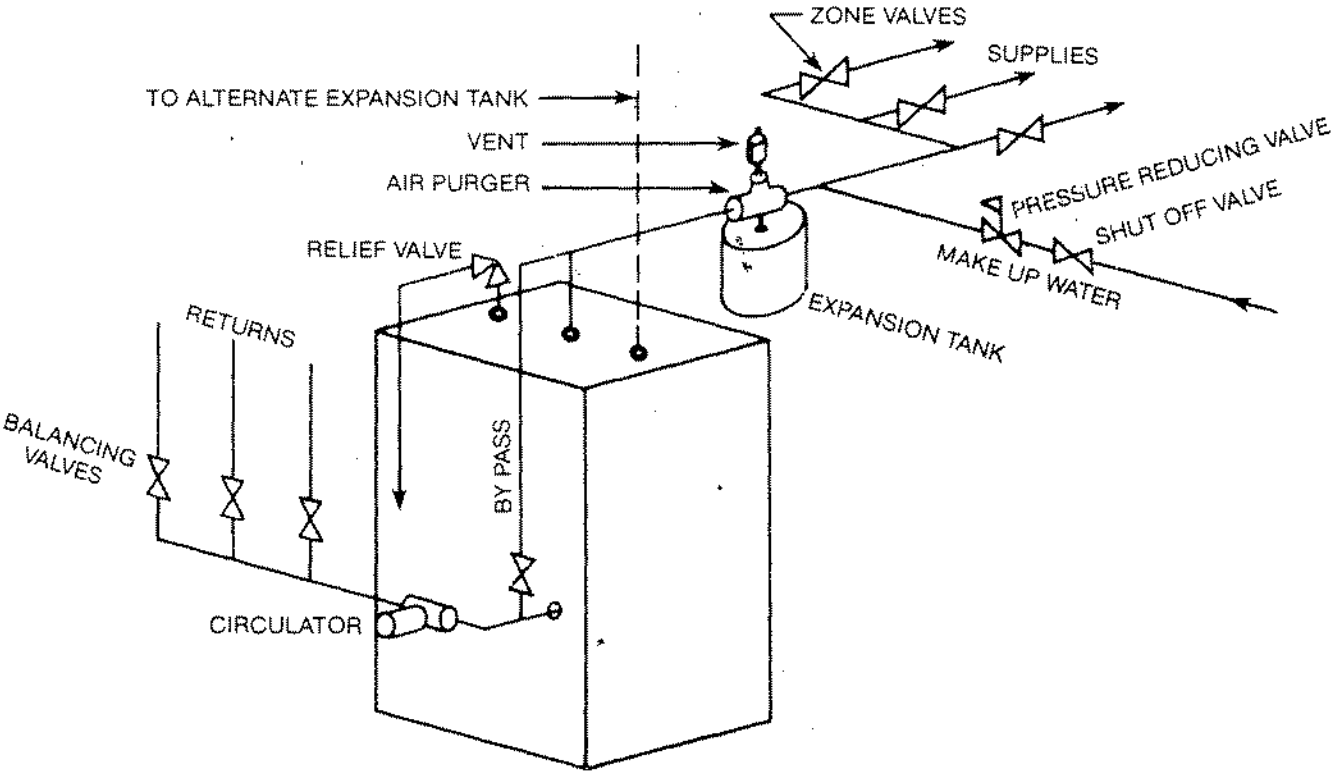
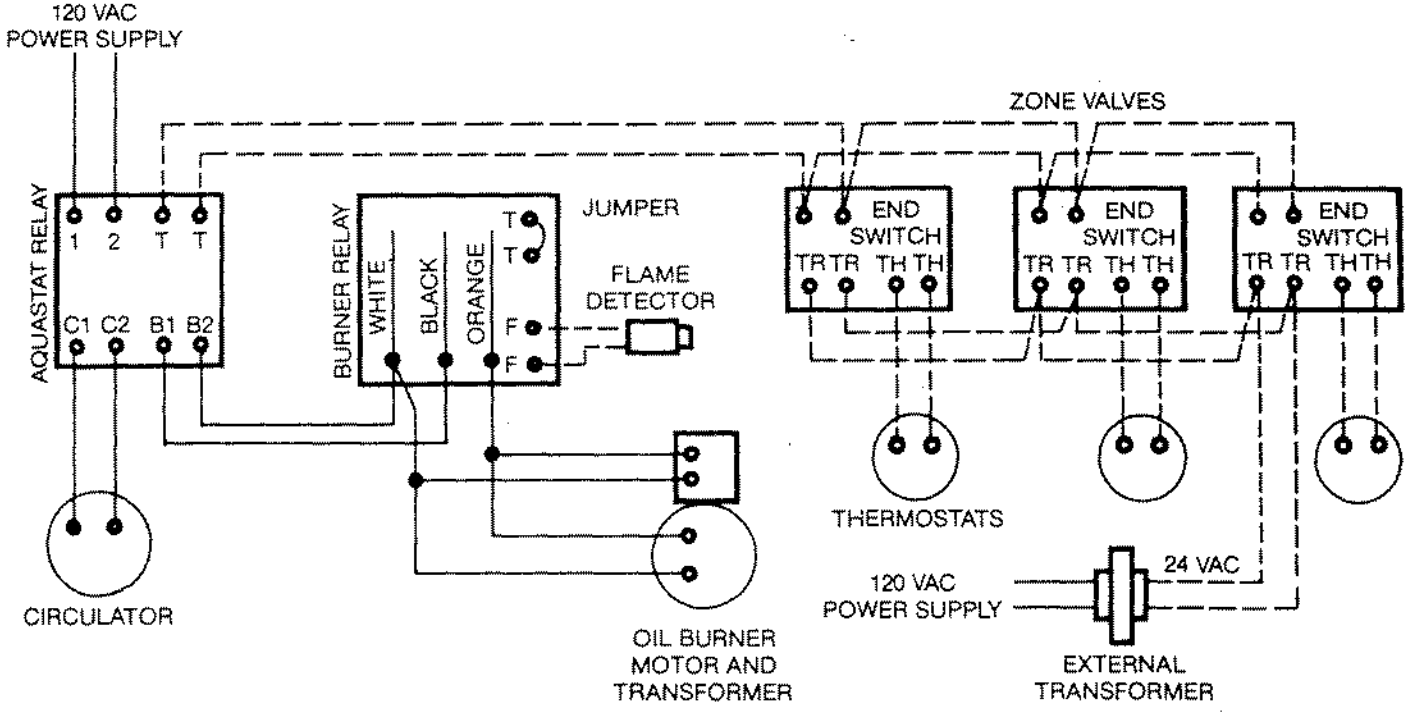


FIG. 7

WIRING DIAGRAM
MULTI-ZONE WITH ZONE VALVES



PIPING DIAGRAM
DOMESTIC HOT WATER

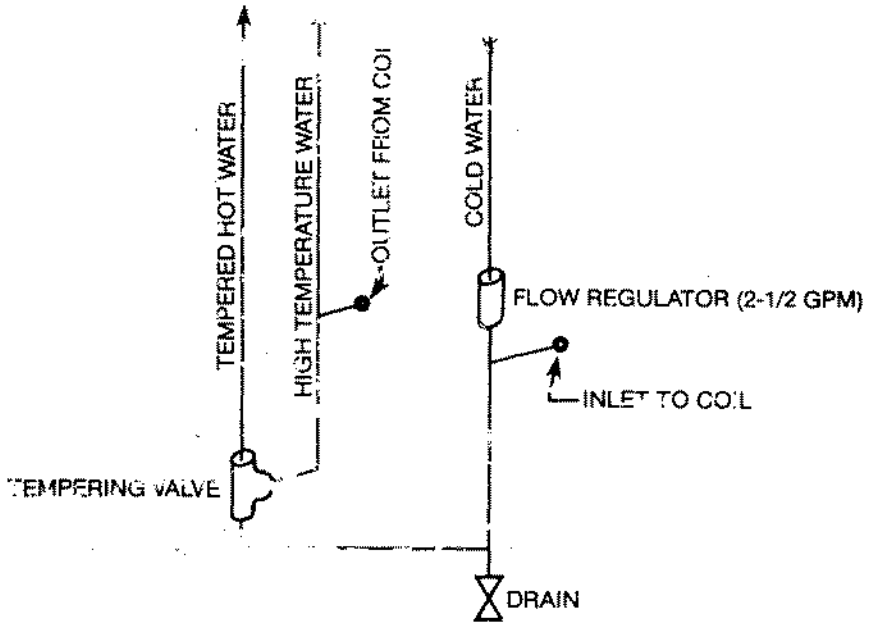
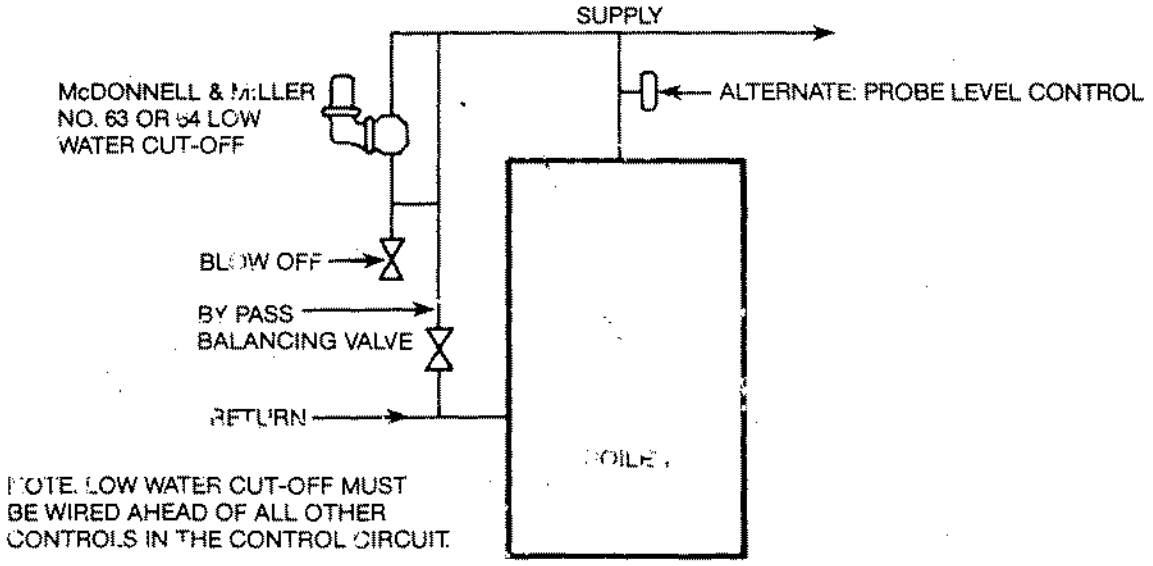


FIG. 9

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

ENERGYGUIDE

ELECTRIC FURNACE MAN DIV. **GENERAL MACHINE CORP.**

WATER BOILER
MODEL: S-PK600 WITH 1.25GPH NOZZLE
CAPACITY: 150000 BTU/HR

EFFICIENCY RATING

LEAST THIS MODEL MOST

62% 83.1% 84.4%

Only models with 145,000 to 161,000 BTU/HR capacities are used in the scale.

COMPARATIVE NATIONAL AVERAGE YEARLY COST ($)						
Cost per gallon of oil (cents)	BTU/HR HEAT LOSS OF HOME (1,000's)					
	80	90	100	110	120	
76	870	979	1087	1196	1305	
79	903	1016	1129	1242	1355	
82	937	1054	1171	1288	1405	
85	970	1091	1213	1334	1455	
88	1004	1129	1255	1380	1506	
91	1037	1167	1296	1426	1556	
94	1071	1204	1338	1472	1606	
97	1104	1242	1380	1518	1656	
100	1138	1280	1422	1564	1706	

WATER BOILER
MODEL: S-PK600 WITH 1.35GPH NOZZLE
CAPACITY: 163000 BTU/HR

EFFICIENCY RATING

LEAST THIS MODEL MOST

73.4% 83.1% 83.3%

Only models with 162,000 to 178,000 BTU/HR capacities are used in the scale.

COMPARATIVE NATIONAL AVERAGE YEARLY COST ($)						
Cost per gallon of oil (cents)	BTU/HR HEAT LOSS OF HOME (1,000's)					
	80	90	100	110	120	
76	870	979	1087	1196	1305	
79	903	1016	1129	1242	1355	
82	937	1054	1171	1288	1405	
85	970	1091	1213	1334	1455	
88	1004	1129	1255	1380	1506	
91	1037	1167	1296	1426	1556	
94	1071	1204	1338	1472	1606	
97	1104	1242	1380	1518	1656	
100	1138	1280	1422	1564	1706	

ENERGY COSTS AND ENERGY EFFICIENCY RATINGS ARE BASED ON U.S GOVERNMENT STANDARD TESTS

Efficiency rating shown is "Annual Fuel Utilization Efficiency" and should not be confused with "Steady State Efficiency" which is a higher value.

Energy Costs are average for the nation. Your cost may vary due to location, climate or living habits.

ELECTRIC FURNACE-MAN, EMMAUS PA.

DIVISION OF GENERAL MACHINE CORPORATION