



# Installation Instructions Boiler Burner Unit

## Models PK440T

### (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
PK440	.85-70S	102000	8900	592	AFG56XN	12.5	6	8x8x15	435
	1.00-70S	120000	105000	697					
	1.10-70S	132000	115000	763					

## Specifications

These installation instructions provide information for the installation and adjustment for the proper operation of the PK440 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 PK440 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 415 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

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
PK440	.85 GPH	.010
	1.00 GPH	.015
	1.10 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. Refer to Figure 9 for piping diagram with domestic hot water tank.

When filling boiler with water, loosen the aquastat well and PT gage to bleed off trapped air. Retighten and wipe up any water spilled.



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 PK440 operates on 120 vac 60 HZ with a power draw of 5 amps. or less with one circulator.

## ***Oil Line Installation***

The burner on the PK440 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 in the flue pipe to reduce fluctuating draft conditions

## ***Starting And Adjustment Procedure***

Refer to burner manufacturers instructions furnished with this unit.

The PK440 burner is shipped with a 1.00 GPH 70° 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 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% CO<sub>2</sub> The smoke must be between a trace to No. 1 smoke maximum

The gross stack temperature at the specified firing rates will vary between 315° F. to 375° F.

With these low stack temperatures, steady state output efficiencies in excess of 87% 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.

## ***Maintenance And Service***

Refer to burner manufacturers instructions furnished with this unit.

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 crossover 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

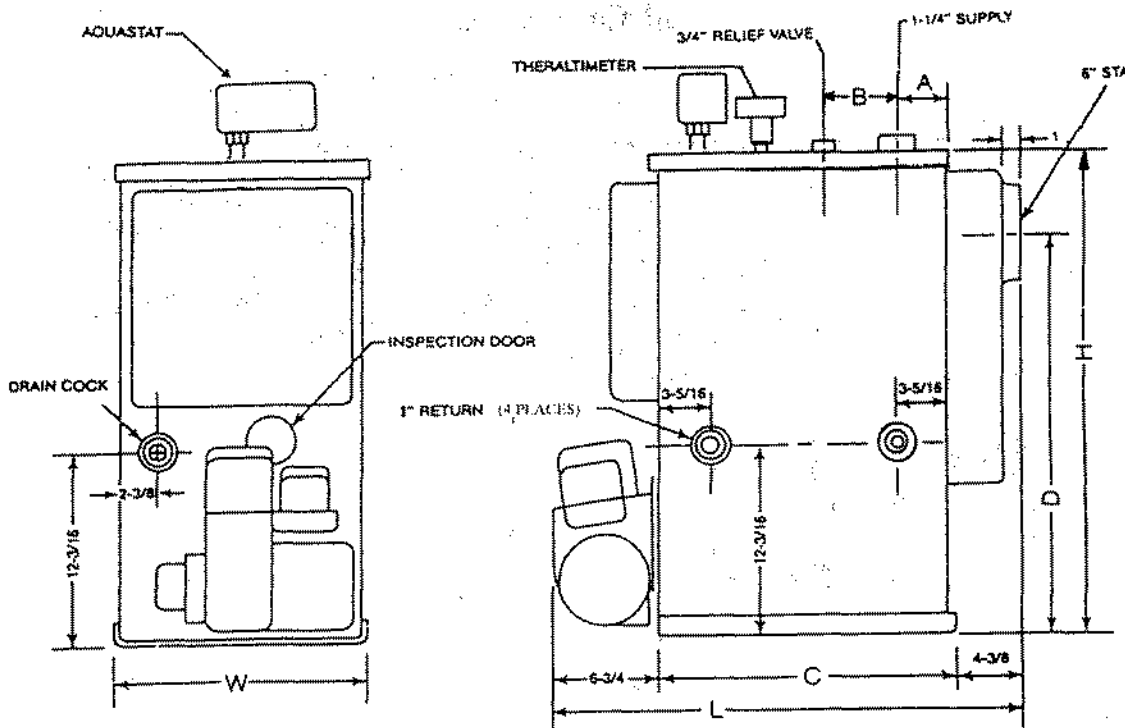
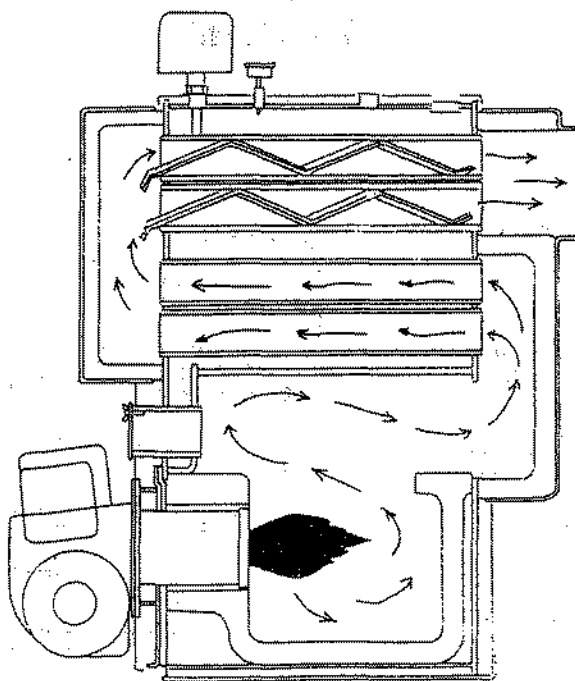


FIG. 1

MODEL	A	B	C	D	H	L	W
PK440	3-7/17	4-1/2	20-9/16	27-3/16	33-1/4	31-11/16	18-7/16

## CROSS SECTION OF UNIT



## PIPING DIAGRAM SINGLE ZONE

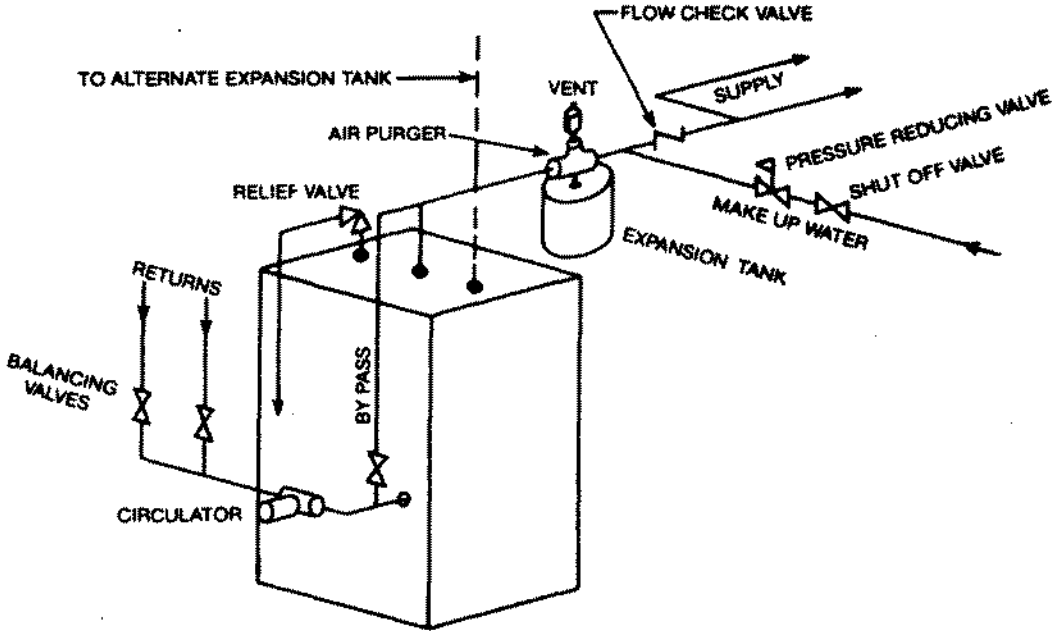
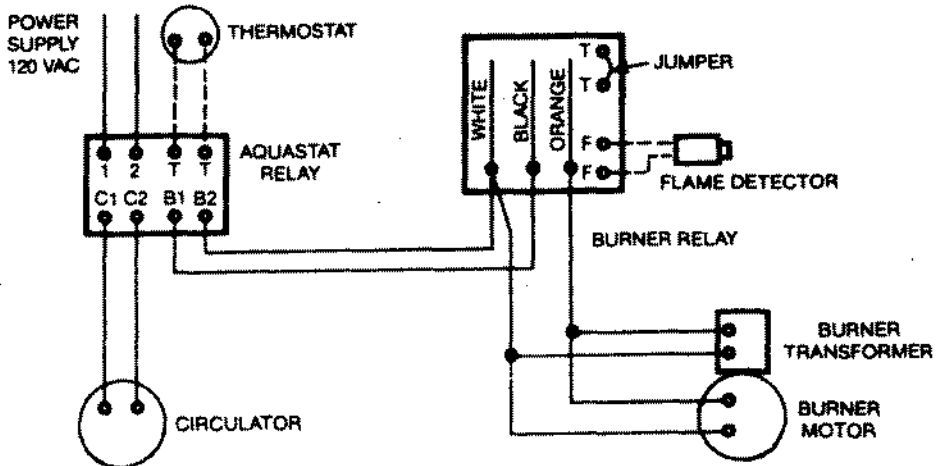


FIG 3.

## WIRING DIAGRAM SINGLE ZONE



# PIPING DIAGRAM MULTI-ZONE WITH CIRCULATORS

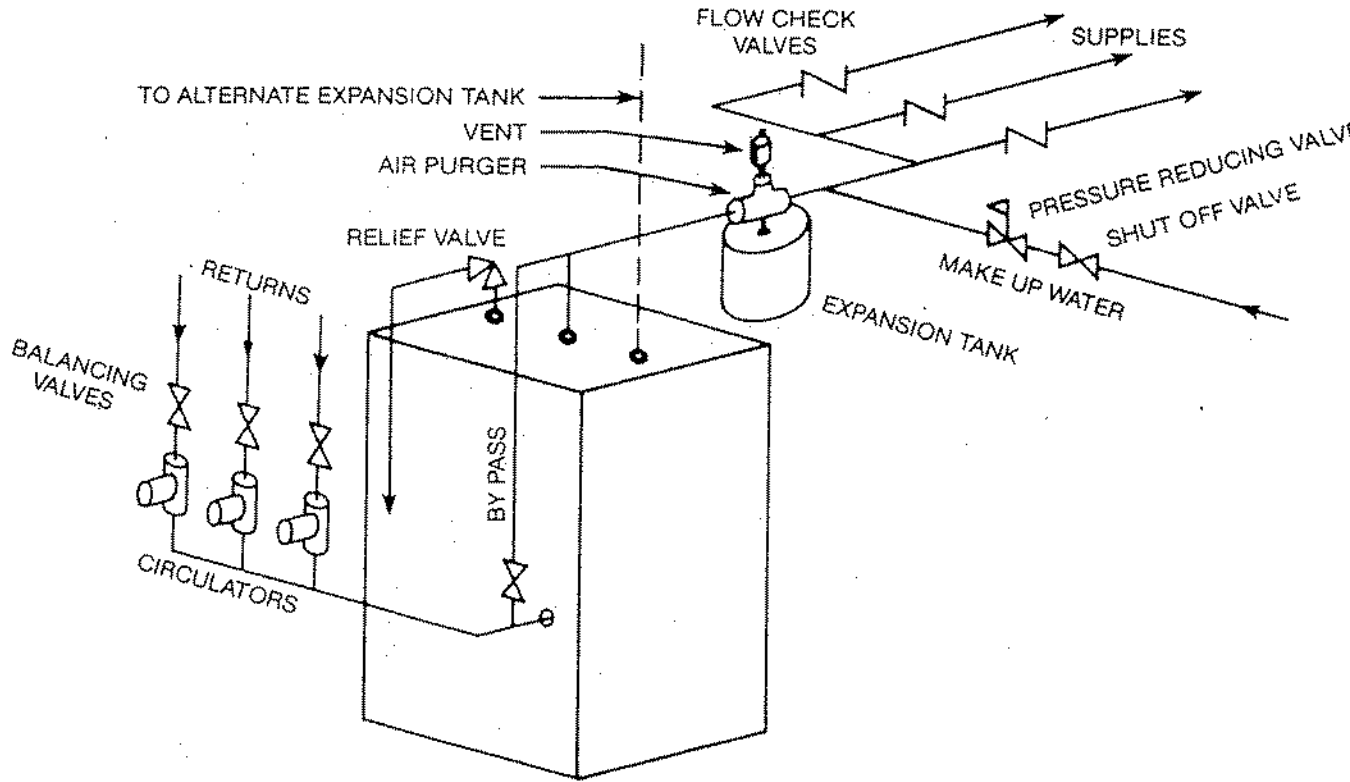
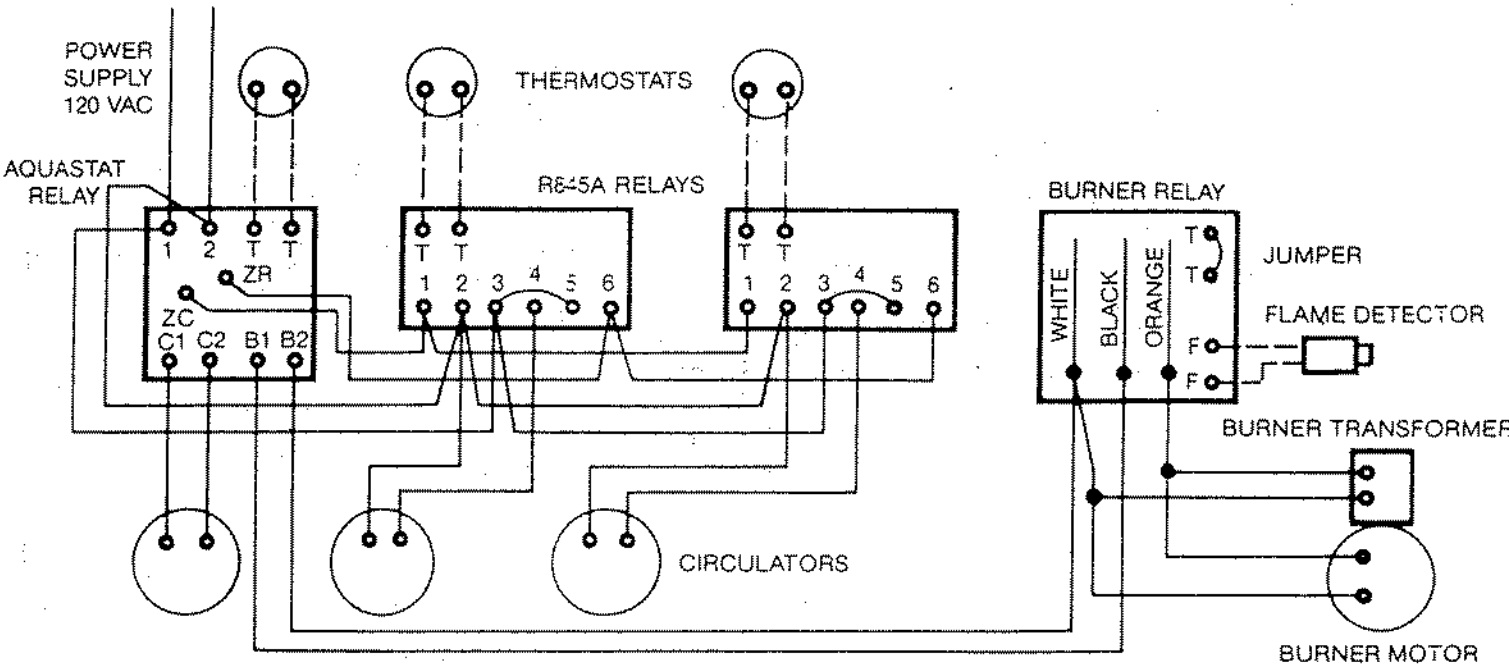


FIG. 5

# WIRING DIAGRAM MULTI-ZONE WITH CIRCULATORS



## PIPING DIAGRAM MULTI-ZONE WITH ZONE VALVES

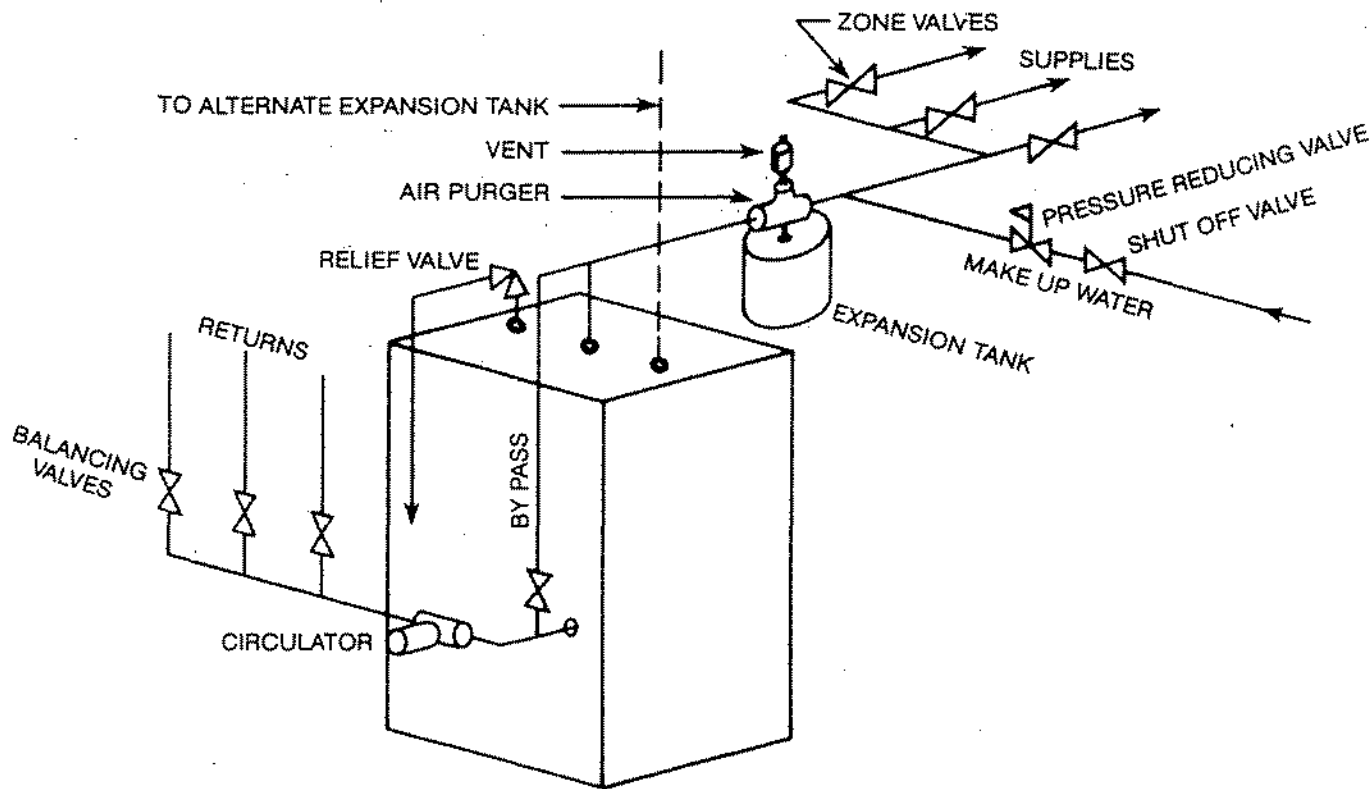


FIG. 7

## WIRING DIAGRAM MULTI-ZONE WITH ZONE VALVES

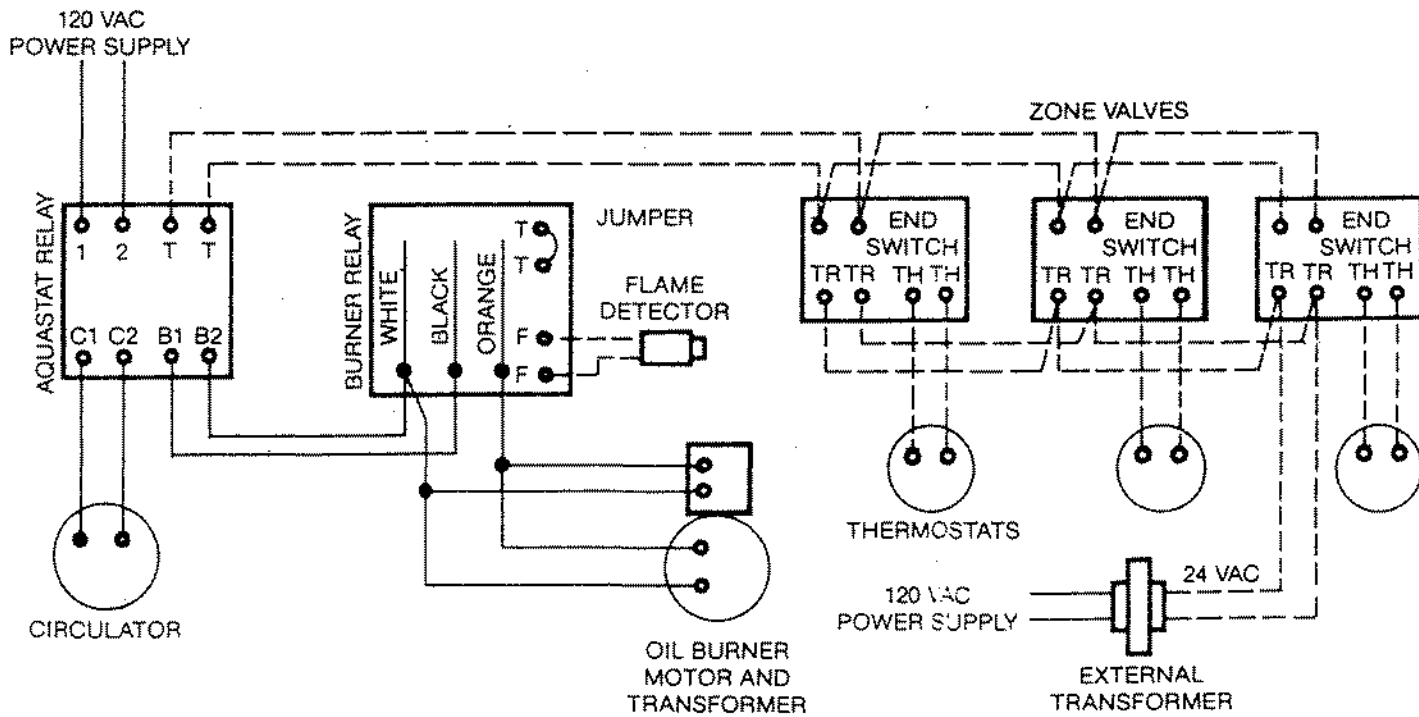


FIG. 8

# PIPING DIAGRAM WITH DOMESTIC HOT WATER TANK

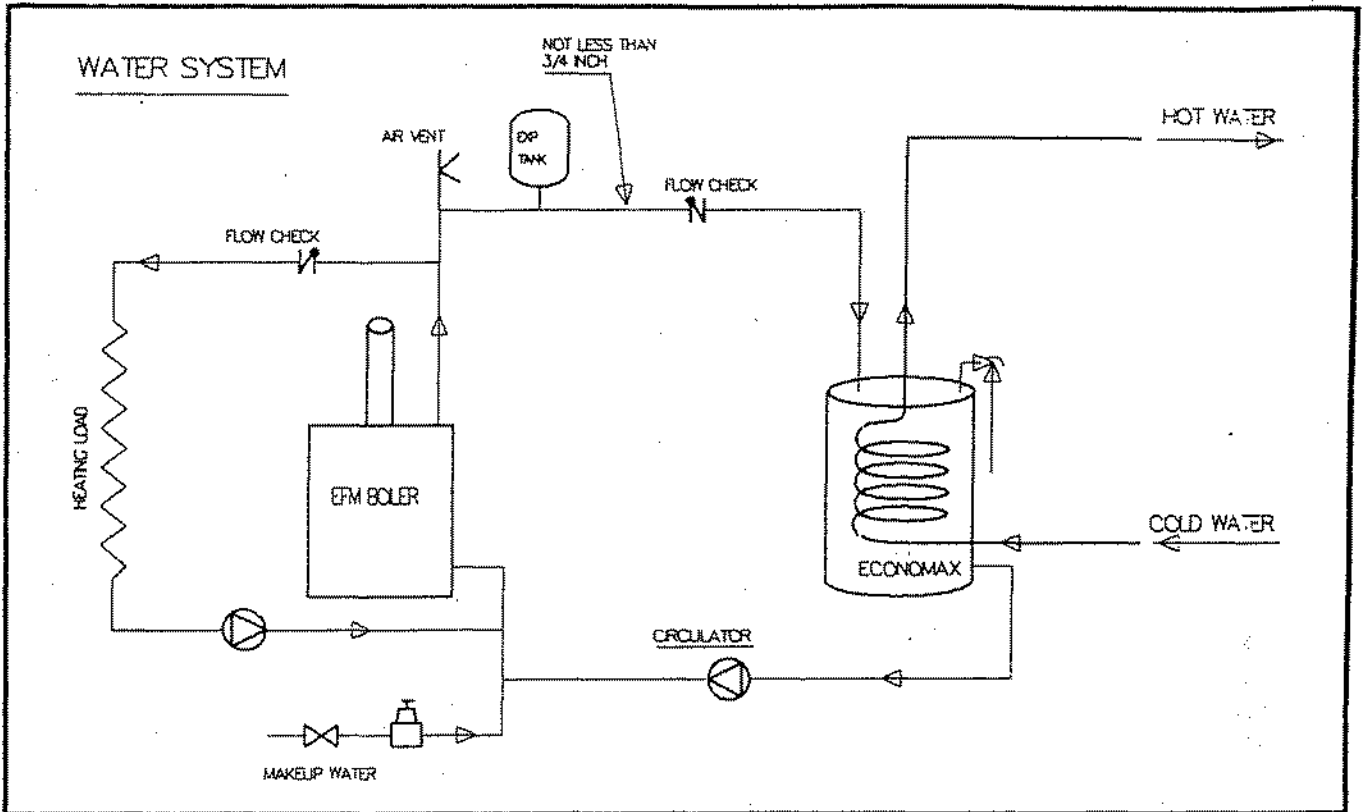
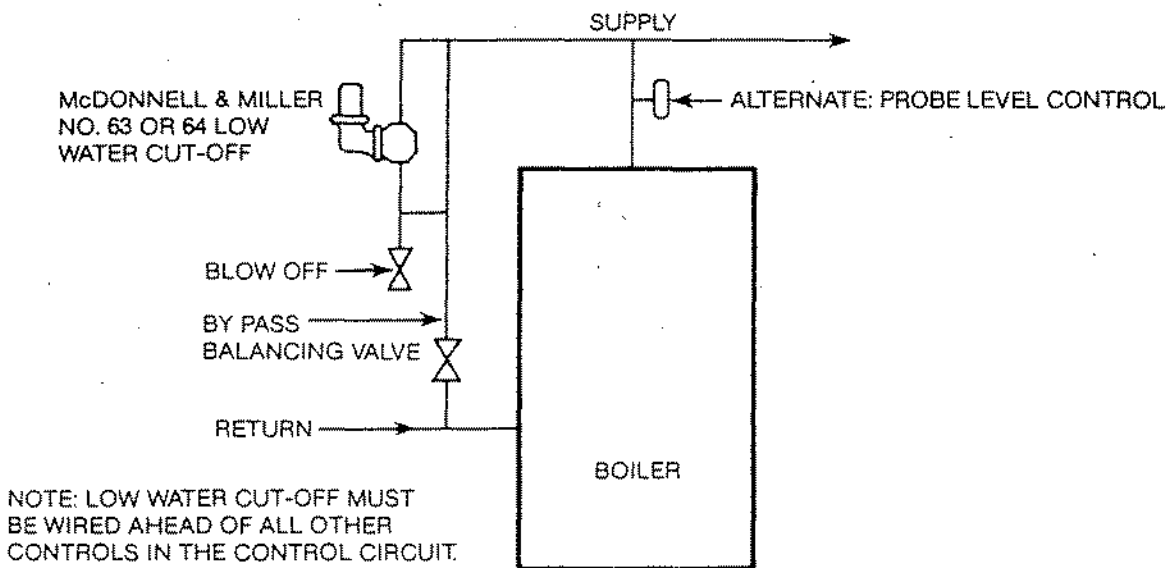


FIG. 9

# 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: PK440 @ 0.85 GPH  
CAPACITY: 102,000 BTUH

EFFICIENCY RATING  
LEAST            THIS MODEL        MOST  
78.1                84.33                88.7



Only models with 94,000 to 110,000 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)				
	60	70	80	90	
76	650	758	867	975	
79	674	787	899	1011	
82	698	815	931	1048	
85	723	843	964	1084	
88	747	871	996	1120	
91	771	900	1028	1157	
94	795	928	1060	1193	
97	819	956	1093	1229	
100	844	984	1125	1265	

WATER BOILER  
MODEL: PK440 @ 1.00 GPH  
CAPACITY: 120,000 BTUH

EFFICIENCY RATING  
LEAST            THIS MODEL        MOST  
75.4                84.38                87.5



Only models with 111,000 to 127,000 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)				
	60	70	80	90	
76	650	758	867	975	
79	674	787	899	1011	
82	698	815	931	1048	
85	723	843	964	1084	
88	747	871	996	1120	
91	771	900	1028	1157	
94	795	928	1060	1193	
97	819	956	1093	1229	
100	844	984	1125	1265	

WATER BOILER  
MODEL: PK440 @ 1.10 GPH  
CAPACITY: 132,000 BTUH

EFFICIENCY RATING  
LEAST            THIS MODEL        MOST  
74.9                83.76                87.6



Only models with 128,000 to 144,000 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)				
	70	80	90	100	
76	767	870	979	1097	
79	796	900	1016	1129	
82	825	937	1054	1171	
85	854	970	1091	1213	
88	883	1004	1129	1255	
91	913	1037	1167	1296	
94	942	1071	1204	1308	
97	971	1104	1242	1380	
100	1000	1138	1280	1422	

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.