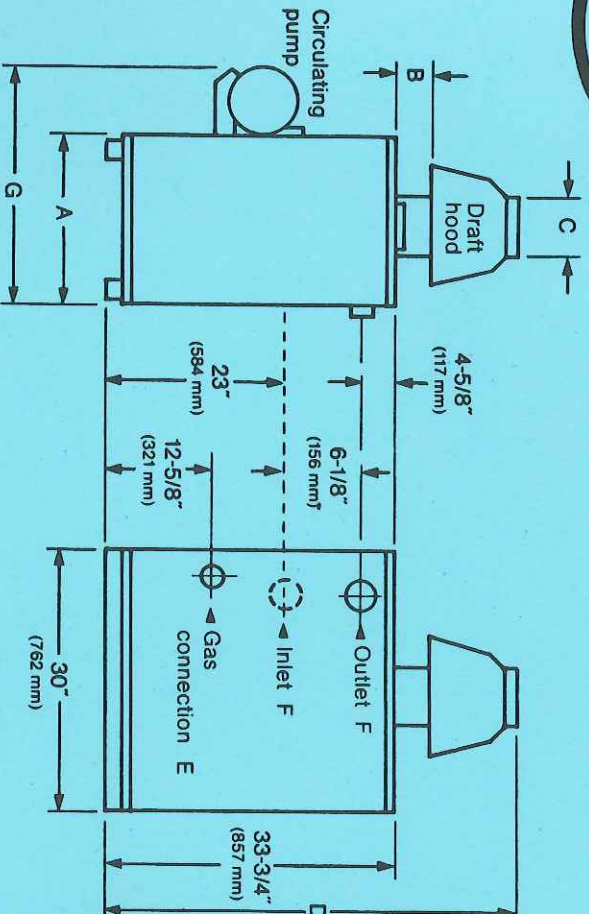




INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS

GSE SERIES BOILERS

DIMENSIONS AND SPECIFICATIONS



Standard Models include:

Gas Valve
Operating Aquastat/Hi Limit
Relief Valve
Tridicator
Transformer
Draft Hood
Drain Valve

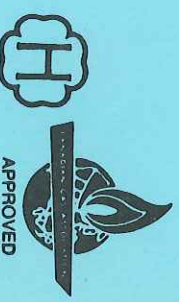
"PS" Packaged Models include:

Standard model
parts plus
Circulating Pump
Expansion Tank
Airout
Combination Fill/Shut Off Valve
Automatic Air Vent

MODEL NO.	NATURAL OR PROPANE		METRIC CONVERSION		DIMENSIONS				GAS CONN. E	INLET & OUTLET F	PS PACK G	WT. LBS
	BTU INPUT	BTU ** OUTPUT	K/WATTS INPUT	K/WATTS OUTPUT	A INS MM	B INS MM	C INS MM	D INS MM				
GSE90	90,000	72,000	26	21	13 330	5.25 133	5 127	47 1194	1/2"	2"	21	170
GSE135	135,000	108,000	39	32	16 410	4.5 114	6 152	46 1168	1/2"	2"	24	202
GSE180	180,000	144,000	53	42	19 480	5.3 135	7 178	47 1194	3/4"	2"	27	235
GSE225	225,000	180,000	66	53	22 560	6.7 170	8 203	49 1245	3/4"	2"	30	268
GSE270	270,000	216,000	79	63	25 640	6.7 170	8 203	51 1295	3/4"	2"	33	300
GSE315*	315,000	252,000	92	74	28 710	7.3 185	9 229	54 1372	3/4"	2"	-	332
GSE360*	360,000	288,000	106	84	31 790	8.7 221	10 254	55 1397	1"	2"	-	364
GSE400*	400,000	320,000	117	94	34 860	8.7 221	10 254	56 1422	1"	2"	-	380
GSE450*	450,000	360,000	131	106	37 940	23 584	10 254	70 1778	1"	2"	-	419
GSE495*	495,000	396,000	145	116	40 1020	23 584	12 305	75 1905	1"	2"	-	458

* These models are not manufactured with doors nor available in "PS" package
 ** Outputs for Model GSE 450 and GSE 495 are not part of CGA Certification
 Model No. GSE 450 and GSE 495 available with hi-low firing (add suffix M)
 All models except those for propane gas available with electronic pilot
 ignition (add suffix E)
 Add 65# to weights for "PS" packaged models

Manufactured by
Allied Engineering Company
 Division of E-Z-Reel Metal Products Ltd.
 Manufacturers of Gas Fired Boilers, Tankless Coils, Electric Boosters
 94 Riverside Drive, North Vancouver, B.C. V7H 2M6 • Telephone (604) 929-1214 • Telex 04-352714
 Branches: Calgary • Edmonton • Toronto • Montreal



Installation

INSPECT SHIPMENT - for possible damage. All goods are carefully manufactured, inspected, checked and packed by experienced workmen. The manufacturer's responsibility ceases upon delivery of goods to the carrier in good condition. Any claims for damage, shortage in shipment or non-delivery must be filed immediately against carrier by consignee.

I. INSTALLATION CODES AND REGULATIONS

In Canada the installation must conform with CGA Codes CAN1-B149-1 or CAN1-B149-2 for gas burning appliances and equipment and/or local codes. All electrical connections are to be made in accordance with Standard C.S.A. C22.1 Canadian Electrical Code, Part 1 and/or Local Codes.

In the United States of America the installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1-1980. All electrical wiring is to be done accordance with the National Electrical Code ANSI C1-1978 and all electrical codes. The unit must be electrically grounded if an external power source is used.

The above codes must be followed. They expand on and take precedence over any recommendations in this booklet.

Boiler performance data, abbreviations, and metric conversions are given on an appended sheet.

CAUTION: Super-Hot GSE Series boilers are designed for use in closed hot water systems and are not recommended in systems where water is constantly replenished, such as direct fired volume water heating. These systems require a separate heat exchanger details of which are available from the Manufacturer. Boiler return water temperatures which cool heat exchange surfaces exposed to flue gases to, or less than, the dew point temperature of the flue gas will result in condensation of flue gas moisture. This natural phenomenon is independent of boiler design. As a guide to avoiding such condensation and resulting corrosion of the heat exchanger, it is recommended that the return water temperature be not less than 133°F (56°C).

SERIES GSE BOILERS ARE NOT TO BE USED WITHOUT FORCED SYSTEM CIRCULATION.

2. LOCATION

Locate the boiler so that the connecting flue pipe between the draft diverter and chimney is as short as possible. Observe the following minimum clearances from the boiler to combustible materials.

Sides-6" (150 mm), Rear-6" (150 mm), Front-18" (450 mm) (for servicing). Top-6" (150 mm). From draft diverter and flue pipe in any direction: 6" (150 mm).

This boiler may be installed on a combustible floor.

3. AIR SUPPLY FOR COMBUSTION AND VENTILATION

When infiltration does not meet the air supply requirements an outside air supply must be provided.

a. Boilers of 400,000 Btuh (120 kW) or Less Input Rating Installed in a Single Enclosure

(1) Boilers in Unconfined Space

Where air infiltration is insufficient, air supply must be by means of an opening to the outdoors having a total free area of not less than 1 inch² per 5000 Btuh (450 mm² per kW).

(2) Boilers in Confined Spaces

(a) Air Supply From Inside of Building Having Adequate Infiltration

Air supply must be by means of two openings to interior areas having adequate infiltration. Lower opening must have a free area of not less than 1 inch² per 1,000 Btuh (2225 mm² per kW) and located not more than 18 inches (450 mm) nor less than 6 inches (150 mm) above floor level. Upper opening located near the ceiling must have a total area of not less than the total area of all vents. For closet type installations this area must be not less than that of the lower opening.

(b) Air Supply From Outdoors

Air supply must be by means of two openings that communicate directly to the outdoors by means of openings or ducts. The lower opening must be located as in (a) above and have a free area of not less than 1 inch² per 1000 Btuh (1100 mm² per kW) when communication to outdoors is by means of a horizontal duct or of 1 inch² per 4000 Btuh (500 mm² per kW) when communication to outdoors is by an opening or by means of a vertical duct. The upper opening in each case must be as for (a) above.

Further information may be found in applicable codes referred to in Section 1.

b. Boilers of More than 400,000 Btuh (120 kW) Input Rating Installed in a Single Enclosure

When air supply to a single enclosure is provided by natural air flow from outdoors there must be a permanent air supply opening having a cross-sectional area of not less than 100 inch² (65,000 mm²) plus 1 square inch for each 14,000 Btuh (160 mm² per kW) in excess of 400,000 Btuh (120 kW). This opening or openings must be located at or ducted to a point no more than 18 inches (450mm) nor less than 6 inches (150 mm) above floor level.

In addition to the above, ventilation air supply must be provided by an opening or openings at the highest practical point communicating with outdoors of a total cross-sectional area of at least 10 percent of that of the above combustion air supply opening or openings but in no case less than 10 inch² (6,500 mm²).

Further information may be found in applicable codes referred to in Section 1.

4. CORROSIVE ATMOSPHERES

If a heater is to be installed near a corrosive or potentially corrosive air supply, the heater should be isolated from it and outside air should be supplied as recommended in Section 3.

Examples where potentially corrosive atmospheres could be found are beauty shops and dry cleaning establishments. The air may be safe to breathe but when passed through a gas flame corrosive substances are liberated which will shorten the life of any gas burning appliance. Freon from common aerosol dispensers or leaking refrigeration equipment is highly corrosive after passing through a flame. The warranty is void when failure is due to corrosion from a corrosive atmosphere.

5. ELECTRICAL WIRING

Run a separate circuit from the meter switch or fuse box through a fused disconnect switch to the junction box on the boiler. Make connections as shown in wiring diagrams attached to boiler. Applicable electrical wiring codes are given in Section 1.

For details of electrical wiring for different pilots and controls see Figures 2 to 7.

6. GAS SERVICE PIPING

The controls furnished are for a maximum operating inlet gas pressure of 1/2 psi (1/4 inches water column). If higher pressures are present, consult the gas company for correction.

The gas line should be of adequate size to prevent undue pressure drop and never smaller than the size of the connection on the heater. Sizing based upon Table I is recommended.

A ground joint union and manual shutoff valve should be installed in the gas line near the heater so that the control assembly may be easily removed. The valve should be readily accessible for turning on and off.

A drip leg or trap should be installed in the gas supply line as close to the heater as possible. The pipe compound used should be resistant to the action of liquified petroleum gases. To check for gas leaks in piping use a soap and water solution. DO NOT USE AN OPEN FLAME.

TABLE I

Maximum capacity of Pipe in Cubic Feet of Gas per Hour for gas pressures of 0.5 Psig or less and a pressure drop of 0.3 inch Water Column.

Based on a 0.60 Specific Gravity Natural Gas; if 2.0 Specific Gravity L.P. Gas is used multiply capacity by 0.55

Nominal Iron Pipe Size, Inches	Length of Pipe, Feet															
	10	20	30	40	50	60	70	80	90	100	125	150	175	200		
1/4	32	22	18	15	14	12	11	11	10	9	8	8	7	6		
3/8	72	49	40	34	30	27	25	23	22	21	18	17	15	14		
1/2	132	92	73	63	56	50	46	43	40	38	34	31	28	26		
3/4	278	190	152	130	115	105	96	90	84	79	72	64	59	55		
1	520	350	285	245	215	195	180	170	160	150	130	120	110	100		
1-1/4	1,050	730	590	500	440	400	370	350	320	305	275	250	225	210		
1-1/2	1,600	1,100	890	760	670	610	560	530	490	460	410	380	350	320		
2	3,050	2,100	1,650	1,450	1,270	1,150	1,050	990	930	870	780	710	650	610		
2-1/2	4,800	3,300	2,700	2,300	2,000	1,850	1,700	1,600	1,500	1,400	1,250	1,130	1,050	980		
3	8,500	5,900	4,700	4,100	3,600	3,250	3,000	2,800	2,600	2,500	2,200	2,000	1,850	1,700		
4	17,500	12,000	9,700	8,300	7,400	6,800	6,200	5,800	5,400	5,100	4,500	4,100	3,800	3,500		

7. VENTING

The responsibility of providing a vent of adequate draft capacity and in good usable condition is that of the owner.

This unit must be installed with the factory supplied draft diverter in place. The draft diverter is a safety device designed to control chimney drafts that might affect combustion or blow out the pilot.

A vent or chimney must be designed and constructed so as to develop a positive flow adequate to remove all flue gases to the outdoors.

Vent connectors must be attached to the draft diverter outlet to connect the appliance with the gas vent (or chimney).

Any horizontal run of vent connectors would have an upward slope of at least 1/4 inch per foot.

Where two or more appliances connect to a common vent or chimney, the area of the common passageway should be at least equal to the area of the largest connector plus 50% of the areas of additional connectors. However, there is a definite BTUH capacity for any given vent style and height which should not be exceeded. Complete venting tables are printed in applicable codes referred to in Section 1.

8. RELIEF VALVE

A relief valve is supplied as standard equipment. The relief valve is extra protection against damage that could be caused by malfunctioning controls or excessive water pressure. If a relief valve is not used, the warranty will be void.

Connect the outlet of the relief valve to a suitable drain. The drain pipe must pitch down from the valve and should be no smaller than the outlet of the valve. The end of the drain line should not be concealed or threaded and should be protected from freezing. No valve of any type should be installed between the relief valve and unit or in the drain line. Extensive runs, traps or bends could reduce capacity of valve. The relief valve is to be installed in vertical position.

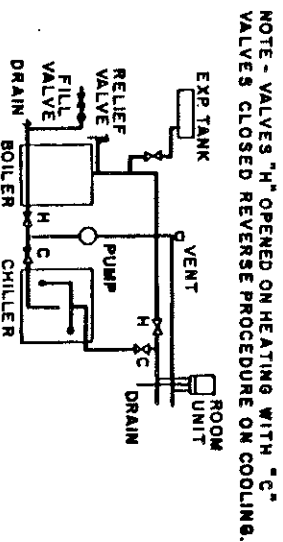
9. WATER CONNECTIONS

This boiler may be connected individually or in multiples. A typical piping connection for a single boiler is shown in Figure 1. Typical piping details for various types of installations are available from your distributor or Allied Engineering Company.

Maintain 1" clearance between hot water piping and combustible material.

For further information on methods of connecting supply and return water piping to boilers consult I=B=R Installation and Piping Guides.

If the boiler is used in connection with refrigeration systems, the boiler must be installed so that the chilled medium is piped in parallel with the heating boiler using appropriate valves to prevent the chilled medium from entering the boiler as shown below.



Operation

1. CAUTION

Before lighting, vent air and fill system with water. Check burners to see that they are not dislodged.

2. STARTUP

- a. Fill entire heating system with water and vent or purge air from system. Vent air and add water as needed at boiler operating pressure.
- b. Check for and repair any leaks in water piping.
- c. Check for proper installation of relief valve, vent, and electrical wiring.
- d. Using soap solution, check for and repair any leaks in gas piping from meter to boiler pilot and manifold.
- e. Carry out pre-ignition check as described in Section 7, adjust control as described in Section 4, and light pilot.
- f. Check and adjust gas input rate as described in Section 5 and Section 6. Set thermostat high enough so that boiler will remain on while checking input rate.
- g. Operate system and vent all radiation units and high points in system piping. Check controls as described in Section 8.
- h. Place system into operation by setting thermostat.

- b. Check for and repair any leaks in water piping.

- c. Check for proper installation of relief valve, vent, and electrical wiring.

- d. Using soap solution, check for and repair any leaks in gas piping from meter to boiler pilot and manifold.

- e. Carry out pre-ignition check as described in Section 7, adjust control as described in Section 4, and light pilot.

- f. Check and adjust gas input rate as described in Section 5 and Section 6. Set thermostat high enough so that boiler will remain on while checking input rate.

- g. Operate system and vent all radiation units and high points in system piping. Check controls as described in Section 8.

- #### h. Place system into operation by setting thermostat.

2. LIGHTING INSTRUCTIONS

Lighting Instructions are printed on rating plate attached to front of boiler.

3. PILOT FLAME ADJUSTMENT

Remove cap screw cover, then adjust gas flow to the point where the thermocouple tip is completely enveloped by the flame, but not necessarily glowing red. Replace and tighten cap.

4. CONTROL ADJUSTMENT

The factory mounted high limit aquastat senses outlet water temperature. To set the temperature of this control, rotate the dial until indicator points to the temperature at which it is desired that the gas valve shall close. This is to protect the heat exchanger from damage due to the excessive temperature. (It is not an operating control.) The operating aquastat temperature control setting should be 209°F (11°C) below the high limit temperature control setting.

5. GAS MANIFOLD PRESSURE

The designated manifold pressures for all models are 3-1/2 inch water column for natural gas and 11 inch water column for propane gas. A 1/8 NPT tapping is provided on the manifold or gas valve for connecting a gauge to check this pressure. Natural gas models are furnished with a preset gas pressure regulator - propane models use the service regulator on the tank. If necessary, adjust pressure to the proper value by turning adjusting screw clockwise to increase pressure or vice versa.

6. CHECK INPUT

The input shown in rating plate must not be exceeded. Consult gas company to determine the heating value of the gas supplied. Check input by clocking gas meter with all other gas appliances turned off. Use the following formula:

$$\text{INPUT (BTUH)} = \frac{(3,600) \times (\text{Heating Value}) \times (\text{Number of Cubic Feet Timed})}{\text{Seconds Clocked}}$$

To insure accuracy for rating, clock enough cubic feet of gas so that the clocked time is at least 60 seconds. Small adjustments in input can be made by varying the manifold pressure from the designated settings mentioned above. Any large change required should be made by changing the burner orifice size.

High Altitude: Ratings of gas appliances are based on sea level operation and need not be changed for installation at elevations up to 2,000 feet. For elevations above 2,000 feet, units with a rating of 90% of sea level altitude rating are available.

7. PRE-IGNITION CHECK

a. Standing pilot

- (1) Make sure gas valve and controls are "off".
- (2) Supply gas as far as the pilot only, ignite as per lighting instructions, and adjust the pilot as described in Section 3.
- (3) Install a pressure gauge at top on downstream side of automatic main gas valve.
- (4) Turn main gas valve to "on" and set the thermostat above room temperature to turn on main burner.
- (5) Check burner input and pressure reading on the pressure gauge and make necessary adjustments to obtain the required input. Manifold pressure should be 3.5" W.C. for natural gas.

- (6) Check the operation of the limit control rotating the dial to lower settings and back to the desired operating temperature.
- (7) Check the operation of the thermostat and other system controls.
- (8) Turn the gas valve to "off" and listen to the audible click which signifies that the automatic safety valve has closed. This should occur within ninety seconds.
- (9) Before relighting, wait 5 minutes with the gas cock knob to "off" to allow all unburned gas to vent. Remember that L.P. gas does not vent upward naturally.

b. Intermittent pilot

N.B. In the event of power failure of any component, either the system will not operate or will go into safety lockout.

- (1) Make sure the gas valve and controls are "off".
- (2) Install a pressure gauge at tap on downstream section of automatic main gas valve.
- (3) Check the ignition control module.
 - a) Set thermostat above room temperature to call for heat.
 - b) Watch for spark at pilot burner.
 - c) For lockout models, duration of spark operation must be within lockout period (Honeywell valve).
 - d) Turn thermostat down to cancel demand for heat and wait 60 seconds.
- (4) Turn gas valve to "on and set the thermostat above room temperature; normal operation should occur as follow:
 - a) Spark will turn on and pilot gas valve will open at once. Pilot burner should ignite after gas reaches pilot burner.
 - b) sparks ignition should cut off when pilot flame is established.
 - c) Main gas valve should open and main burners will ignite after gas reaches burner parts.
- (5) Check and adjust pilot.
- (6) Make the operations described in item 5, 6, and 7 in preceding paragraph a.
- (7) Check the safety lockout (on propane gas models only). With thermostat set well below room temperature, turn gas cock to "on" position. No gas should flow to main burner. System will remain in safety lockout until system is reset.
- (8) To reset lockout system (on propane gas models only). Adjust thermostat below room temperature. Wait at least 5 minutes, then raise thermostat setting above room temperature. Normal ignition should occur.
- (9) Return thermostat and controls to normal operating.

8. CHECK OF CONTROLS

After the unit has been operated for a while, rotate the limit control setting below and back to the original setting. Repeat this type of check on aquastat, thermostat and other system controls to make sure all work satisfactorily. In case any of the safety or operating controls do not function, necessary corrections should be made immediately.

9. EMERGENCY INSTRUCTIONS

Any audible sounds in the equipment, like the pinging of an automobile or hissing of a steam kettle, are indications of scaling or lack of sufficient water flow and the heat exchanger should be checked without delay. Scaling is due to improper operation and maintenance. It is not the fault of the equipment. Scale damage is not covered by warranty or guarantee.

Should your equipment be subjected to fire, flood or some other unusual condition, turn off all gas and electrical supply (see Section 10 below). If you are unable to turn off the gas, call your gas company or gas supplier at once. Do not put the unit in operation again until it has been ascertained by a qualified agency that the controls are functioning correctly. The installer should always clearly identify the emergency shut-off devices.

10. EMERGENCY SHUT DOWN

- a. Close main manual valve located outside jacket.
- b. Turn main power switch off.
- c. Contact local utility and/or authorities having jurisdiction.

11. ADDITIONAL CONTROLS

Due to the small water content of the boiler it is not necessary to maintain a definite boiler water temperature during off periods since the boilers heat up quickly. This results in considerable fuel savings through reduction of stand-by losses. In large volume cast iron radiation type systems a reverse acting aquastat must be used which delays circulator starting until 160°F (71°C) boiler temperature is reached in order to avoid condensation.

Maintenance

I. SERVICE HINTS

- I. This boiler has been designed to provide years of trouble free performance in normal installations. Examination by the home owner at the beginning of each heating season and in mid heating season should assure continued good performance. In addition, the boiler should be examined by a qualified service professional or gas suppliers service person at least once every year.

2. Do not store anything against the boiler or allow dirt or debris to accumulate in the area immediately surrounding the boiler. Keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

3. Before each heating season, the draft hood should be removed from the boiler and the flueways inspected for the presence of soot or rust scale. Inspect the draft hood and smoke pipe connecting the draft hood to the flue for rust or corrosion before replacing the draft hood. The presence of soot, rust scale or corrosion indicates misadjustment and your service agency should be called should such accumulation be observed. The pilot burner and main burner must be checked for continued safe operation. All burner ports should be ignited and burn with a steady blue flame. A yellow flame caused by improper adjustment is always accompanied by formation of carbon which, if allowed to continue, will partially restrict free passage of products of combustion to flue.

Cleaning. To clean finned tube sections proceed as follows.

- a. Shut down boiler in accordance with shut down procedure. Be sure gas is turned off at main supply.
- b. When unit has cooled remove draft hood, top of jacket, and flue collector.
- c. Remove rear section seal.
- d. Remove burners and burner drawer from combustion chamber.
- e. Remove upper and lower rows of baffles.
- f. Brush soot and scale into combustion chamber and vacuum.
- g. Re-install parts as they were removed; pay special attention to areas where flue gases may leak and make sure that they are sealed.
- h. Check input and adjust pressure regulator to give proper input if necessary.
- i. Periodic washing of the outer casing and removal of dust and lint from airways is recommended.

CAUTION: Black carbon soot on a dirty heat exchanger can sometimes be ignited by a spark or open flame. As a precaution, dampen the soot deposits with a wet brush or fine water spray before cleaning the heat exchanger.

4. Circulators used with hot water heating systems should be inspected for water leaks at the pump seal periodically, and the unit lubricated following lube instructions found on the unit.

2. EXPLANATION OF TROUBLE SYMPTOMS

BOILER GOES ON & OFF AT FREQUENT INTERVALS

1. Wrong type of thermostat.
2. Improperly wired.
3. Break in control wiring.
4. No circulation, caused by air pocket or faulty circulator.
5. Heat anticipator in room thermostat set too low.
6. Aquastat high limit switch set too low.

THERMOSTAT CALLS FOR HEAT, BOILER DOES NOT GO ON

1. Boiler is overheated.
2. Gas valve not in "on" position.

3. Failure of gas valve to operate due to faulty wiring, burned out coil, burned out transformer or sticking of valve stem.
4. Faulty thermostat.

THERMOSTAT IS SATISFIED, BOILER FIRES CONTINUOUSLY

1. Faulty thermostat.
2. Short in wiring leading to thermostat.
3. Faulty gas valve.

RUMBLING SOUND IN BOILER

1. Boiler is overheated and high limit fails to cut out.
2. Improper wiring.
3. Foreign material in heat exchanger.
4. Poor water circulation.

POPPING SOUND WHEN BOILER GOES OFF

1. Air mixture too lean.

GAS ODOR

1. Faulty draft.
2. Leak in piping
3. Insufficient fresh air to boiler causing incomplete combustion.

BOILER CARBONIZES QUICKLY

1. Wrong orifice.
2. Faulty draft.
3. Too high gas/air ratio resulting in incomplete combustion.
4. Dirty environment.

PILOT SAFETY SWITCH RELEASES

1. Improper pilot flame.
2. End of thermocouple lead dirty.
3. Thermocouple lead to gas valve loose.

BOILER OVERHEATS & SYSTEM REMAINS COLD

1. Insufficient circulation due to obstruction in pipes or faulty circulation.
2. Air trapped in piping preventing proper circulation.
3. Improper wiring.

BOILER AND HEATING SYSTEM OVERHEAT

1. Not sufficient radiation.
2. Faulty thermostat.
3. Faulty high limit aquastat.

3. CAUTION

Avoid extensive replenishment of system water as an excessive amount of minerals may be deposited in the heat exchanger. (See also Section 9 under OPERATION). Do not draw water from the heating system for cleaning, flushing, etc.

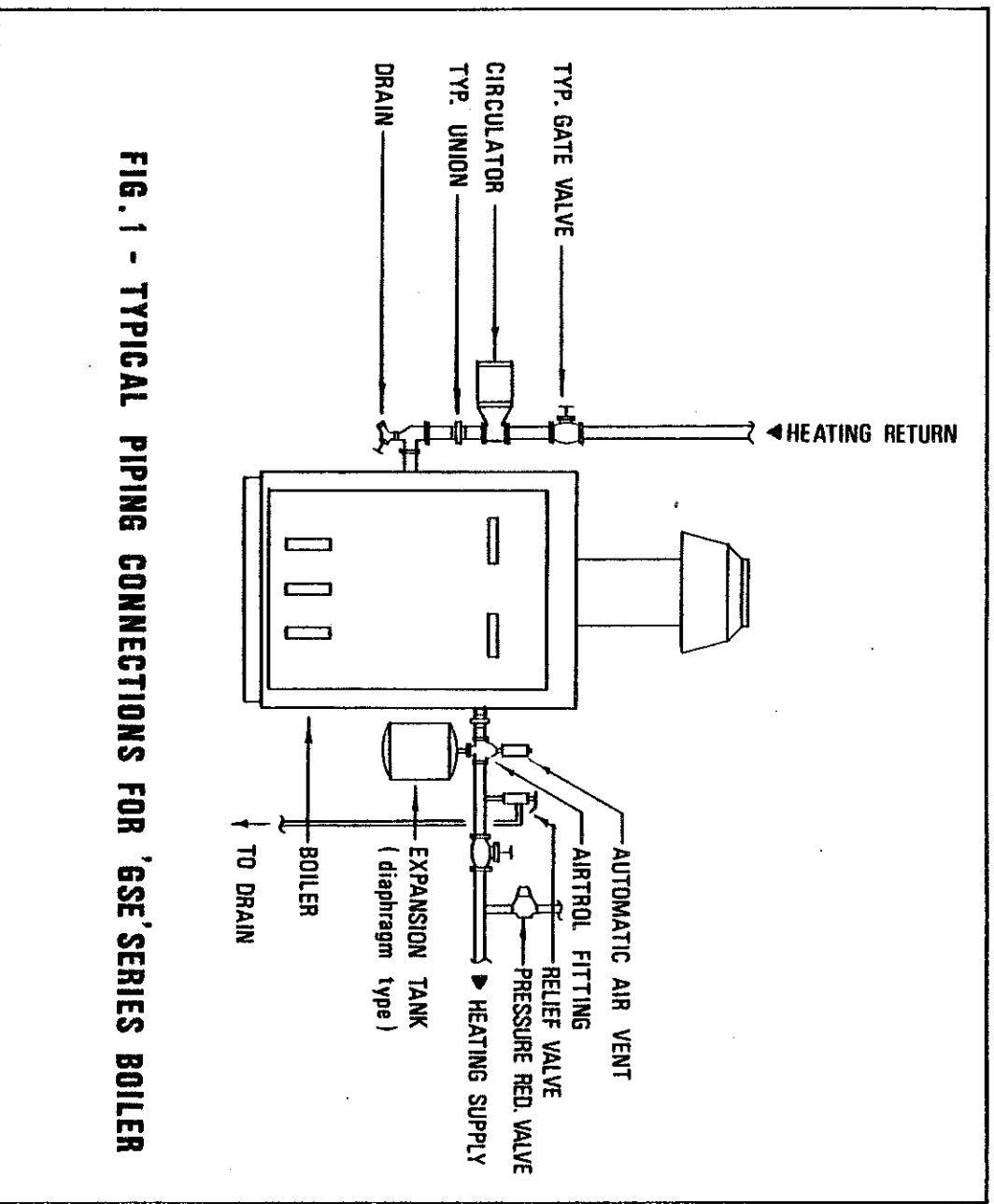


FIG. 1 - TYPICAL PIPING CONNECTIONS FOR 'GSE' SERIES BOILER

BOILER DATA

Model Number	Input BTU	KW	Gross Output BTU	KW	New Output* MBH	KW	Flow versus P.D.			
							@ 200°F T.D.	@ 300°F T.D.	U.S. GPM	P.D., FT.
GSE90	90,000	26	72,000	21	62.6	18.3	7	1.1	5	1.0
GSE135	135,000	39	108,000	32	93.9	27.5	10	2.2	7	1.0
GSE180	180,000	53	144,000	42	125.2	36.7	13	2.2	9	1.0
GSE225	225,000	66	180,000	53	156.2	45.9	17	2.2	11	1.0
GSE270	270,000	79	216,000	63	187.8	55.0	20	2.2	13	1.0
GSE315	315,000	92	252,000	74	219.1	64.2	23	2.3	16	1.0
GSE360	360,000	106	288,000	84	250.4	73.4	27	2.4	18	1.1
GSE400	400,000	117	320,000	94	278.3	81.5	30	2.6	20	1.2
GSE450	450,000	131	360,000	106	313.0	91.7	34	3.0	22	1.3
GSE495	495,000	145	396,000	116	344.3	100.9	37	3.2	25	1.5

* Net ratings for baseboard radiation are based on a piping and pick-up allowance of 1.15.

METRIC CONVERSIONS

To Convert	Multiply By	To Obtain
of T.D.	.555	oC T.D.
LBS	.4536	Kg
INCHES	2.540	CM
MBH	.2931	KW
USG	3.785	LITRES
P.S.I.	6.894	KPA
FT. HD	2.99	KPA
FT3	28,320	CM3
of	(of - 32) 5/9	oC
oC	(oC) 9/5 + 32	of
FT3	.02837	1 M3

ABBREVIATIONS

BTUH (or btuh)	-	British thermal units per hour
MBH	-	Thousand British thermal units per hour
KW	-	Kilowatts
P.D.	-	Pressure drop
T.D.	-	Temperature drop in heating circuit
U.S. GPM	-	United States Standard gallons per minute

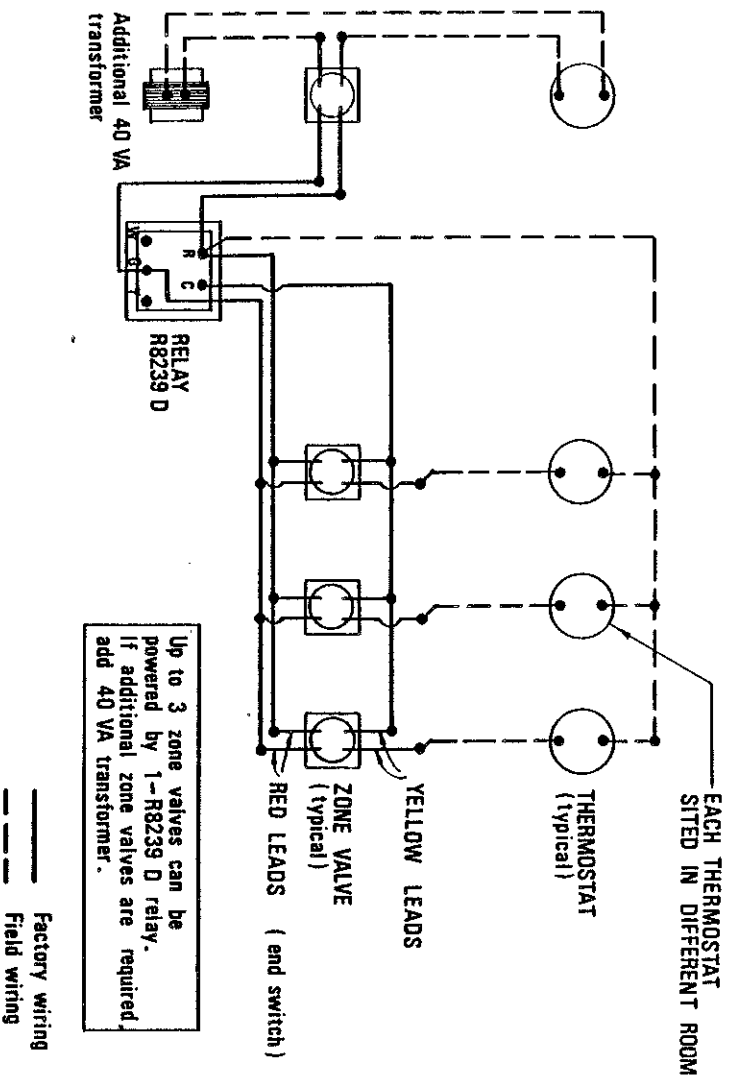


FIG. 4 - WIRING FOR MULTIPLE HEATING ZONES
 MODELS GSE90PS to GSE270PS

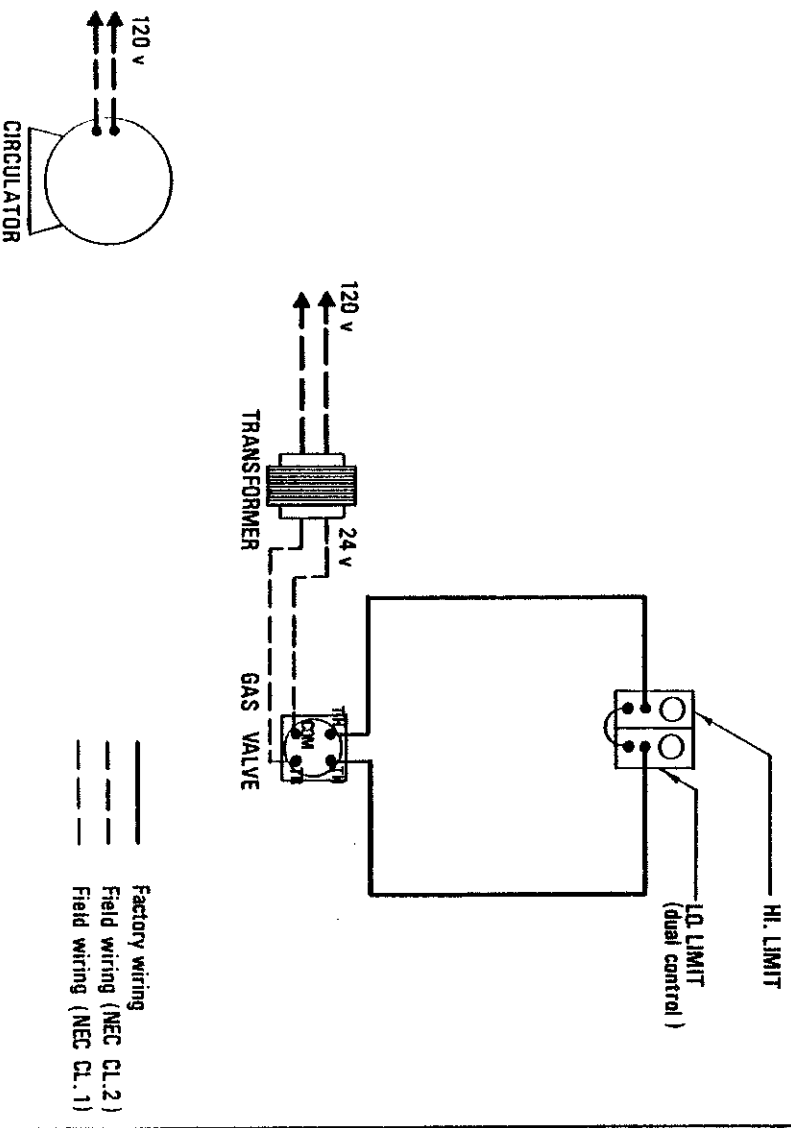


FIG. 5 - WIRING FOR CONTINUOUS OPERATING CIRCULATOR
 MODELS GSE 315 to GSE 495

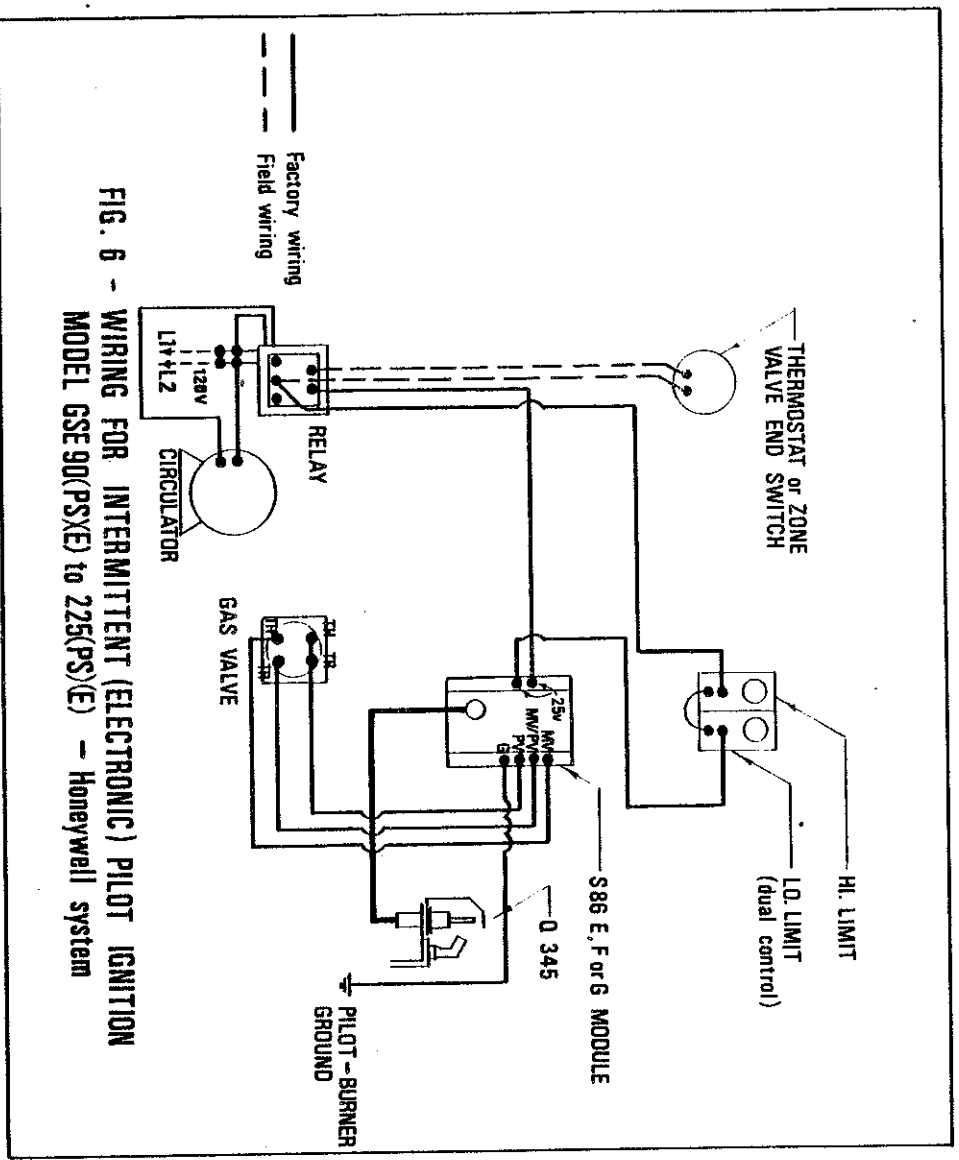


FIG. 6 - WIRING FOR INTERMITTENT (ELECTRONIC) PILOT IGNITION
MODEL GSE 90(PS)(E) to 225(PS)(E) - Honeywell system

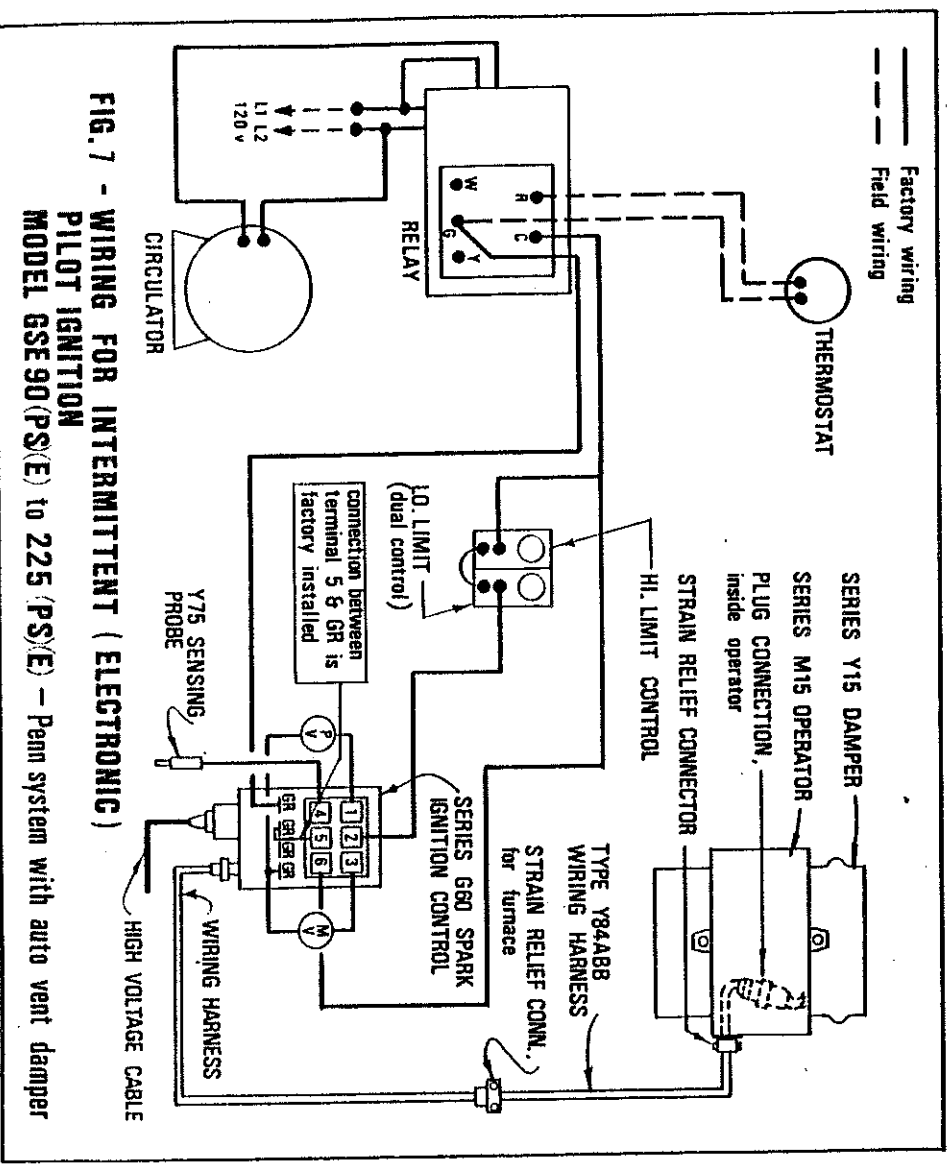


FIG. 7 - WIRING FOR INTERMITTENT (ELECTRONIC)
PILOT IGNITION
MODEL GSE 90(PS)(E) to 225(PS)(E) - Penn system with auto vent damper