Slant/Fin®

GALAXY™

GAS-FIRED CAST IRON BOILERS FOR NATURAL AND L.P. PROPANE GASES

HOT WATER BOILERS

INSTALLATION AND OPERATING INSTRUCTIONS

Models GG-75H through GG-399H and Models GXH-105 through GXH-190

CONTENTS .....PAGE

IMPORTANT

READ ALL OF THE FOLLOWING WARNINGS AND STATEMENTS BEFORE READING THE INSTALLATION INSTRUCTIONS

WARNING
LIQUEFIED PETROLEUM (L.P.)
PROPANE GAS-FIRED BOILERS

Installation location ONLY as permitted in paragraph entitled "LIQUEFIED PETROLEUM (L.P.) PROPANE GAS-FIRED BOILER LOCATION" on page 3 of this instruction book.
The above warning does not apply to NATURAL gas-fired boilers.

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-latest edition. The installation must also conform to the additional requirements in this Slant/Fin Instruction Book.

In addition, where required by the authority having jurisdiction, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, No. CSD-1.

This manual must be left with owner and should be hung on or adjacent to the boiler for reference.

WARNING
This boiler, gas piping and accessories must be installed, connected, serviced and repaired by a trained, experienced service technician, familiar with all precautions required for gas-fired equipment and licensed or otherwise qualified, in compliance with the authority having jurisdiction.

Heating Contractor _____

Address _____

Phone Number _____

Boiler Model Number _____

Boiler Serial Number _____

Installation Date _____

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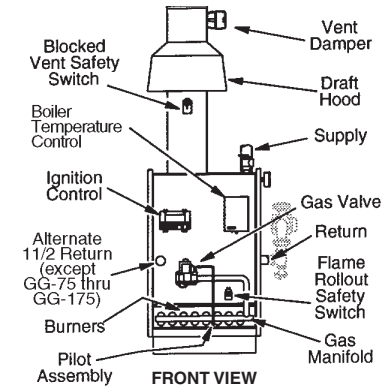
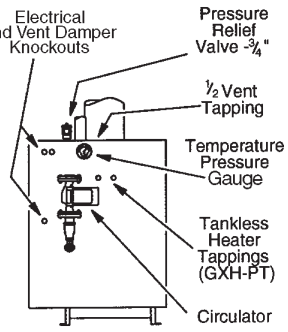
Part No. 41-0879

PUBLICATION GG-41 Rev. A

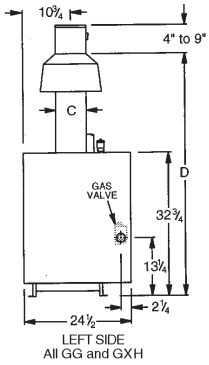
BOILER DIMENSIONS



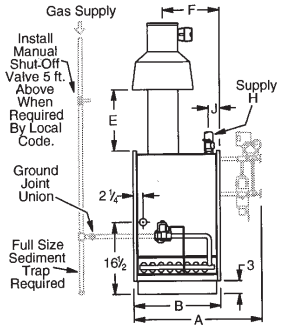
FRONT VIEW
All GG and GXH



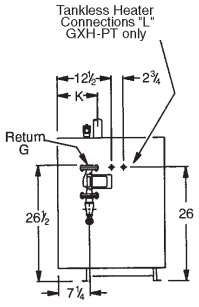
RIGHT SIDE
GG / GXH-PT



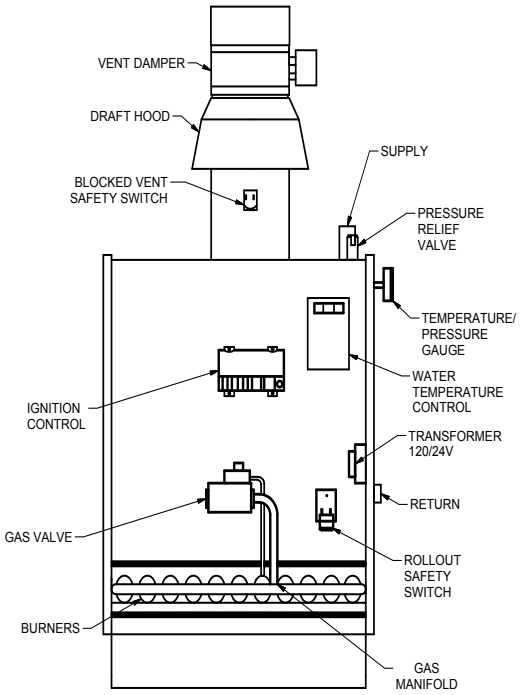
LEFT SIDE
All GG and GXH



FRONT VIEW
All GG and GXH



RIGHT SIDE
GG/GXH -PT



Location and identification of parts

GG SERIES HOT WATER BOILERS - DIMENSIONS IN INCHES

	GG-75H	GG-100H	GG-125H	GG-150H	GG-175H	GG-200H	GG-225H	GG-250H	GG-275H	GG-300	GG-350H	GG-375H	GG-399H
A	19¾	19¾	19¾	23	23	26½	26½	29¾	29¾	33¼	36½	36½	36½
B	13¼	13¼	13¼	16½	16½	20	20	23¼	23¼	26¾	30	30	30
C	5	6	6	6	7	7	7	8	8	8	9	10	10
D	46⅜	53¼	55¼	53¼	53¼	57½	57½	59⅝	59⅝	59⅝	66⅛	59⅝	66⅝
E	6¾	13	15	13	13	16	16	17	17	17	22½	15	22
F	8	8	8	9¾	9¾	11¼	11¼	13	13	14¾	16¼	16¼	16¼
G	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½
H	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
J	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾
K	9¼	9¼	9¼	9¼	9¼	9¼	9¼	9¼	9¼	9¼	9¼	9¼	9¼

GXH HOT WATER BOILERS - DIMENSIONS IN INCHES

	GXH-105	GXH-125	GXH-150	GXH-170	GXH-190
A	23	23	26½	26½	26½
B	16½	16½	20	20	20
C	5	6	7	7	7
D	46⅜	53¼	55½	55½	55½
E	6¾	13	14	14	14
F	9¾	9¾	11¼	11¼	11¼
G	1¼	1¼	1¼	1¼	1½
H	2½	2½	2½	2½	2½
J	3½	3½	3½	3½	3½
K	9¾	9¾	9¾	9¾	9¾

ORIFICE SIZES indicated for Sea Level are factory installed in boiler unless otherwise specified by the local authority.
See VII, page 12 for burner input adjustment.
GAS VALVE CONNECTION Size is 1/2" f.p.t. for all sizes up to and including GG-300. Larger boilers, gas valves is 3/4".
COMBUSTIBLE FLOOR KIT increases all height dimensions by 1".
RAISED SLAB - When mounting boiler on a raised slab, the slab must extend at least 2" beyond the boiler cabinet on all sides.
CHIMNEY HEIGHT: 15 ft. minimum from draft hood skirt to top of chimney. **CHIMNEY INSIDE DIAMETER** must be same as Dimension "C" or larger. Larger diameter and/or height may be required if two or more boilers or a boiler and another appliance are vented to a single chimney.

			ORIFICE SIZES AT HIGH ALTITUDES INCLUDES 4% INPUT REDUCTION FOR EACH 1000 FEET								
			ELEVATION–FEET								
BOILER MODEL	GAS TYPE	Orifice Size for Sea Level	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
GG Except GG-399H	Natural	42	43	43	43	43	44	44	45	46	47
	Propane	54	54	55	55	55	55	55	56	56	56
GG-399H	Natural	40	41	42	42	42	43	43	44	44	45
	Propane	53	54	54	54	54	54	54	55	55	55
GXH-105 through 190	Natural	44	45	45	45	46	47	47	48	48	49
	Propane	54	54	55	55	55	55	55	56	56	56
GG-350H	Natural Gas*	43	44	44	44	45	45	46	47	47	48

*For L.P. Propane gas, consult factory.

INSTALLATION REQUIREMENTS

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-latest edition.

This installation must also conform to the additional requirements in this Slant/Fin instruction book. Installation and service to be performed by a qualified installer, service agency or the gas supplier.

NATURAL GAS-FIRED BOILER LOCATION—

Provide a level, solid foundation for the boiler. Location should be as near the chimney as possible so that the flue pipe from boiler to chimney is short and direct.

Automatic gas ignition system components shall be installed so these components will not be subjected to dripping water during installation or service.

WARNING

LIQUEFIED PETROLEUM (L.P.) PROPANE GAS-FIRED BOILER LOCATION

REQUIRES SPECIAL ATTENTION

Liquefied Petroleum (LP) propane gas is *heavier than air.* Therefore, propane boilers, piping, valves should NOT be installed in locations where propane leaking from defective equipment and piping will "pool" in a basement or other space below the leak.

A spark or flame from the boiler or other source may ignite the accumulated propane gas causing an explosion or fire. Provide a level, solid foundation for the boiler. Location should be as near the chimney as possible so that the flue pipe from boiler to chimney is short and direct.

THE UNIFORM MECHANICAL CODE may be in effect in your geographic area.

The following precautions are cited by the 1994 UNIFORM MECHANICAL CODE, section 304.6:

"**LPG Appliances.** Liquefied petroleum gas-burning appliances shall not be installed in a pit, basement or similar location where heavier-than-air gas might collect. Appliances so fueled shall not be installed in an above-grade under-floor space or basement unless such location is provided with an approved means for removal of unburned gas."

Consult Chapter 5 of the 1994 UNIFORM MECHANICAL CODE for design criteria of the "approved" means for removal of unburned gas.

BOILER FOUNDATION

A. Provide a solid, level foundation, capable of supporting the weight of the boiler filled with water, and extending at least 2" past the jacket on all sides. See dimensions of boilers, page 2.

B. For installation on non-combustible floors only.*

C. If boiler is to be located over buried conduit containing electric wires or telephone cables, consult local codes or the National Board of Fire Underwriters for specific requirements.

* The Combustible Floor Kit part number printed on the boiler rating plate is the only one to be used when installing on combustible floors. The boiler must NOT be installed on carpeting. DO NOT place boilers above floor area containing radiant tubing.

CHIMNEY REQUIREMENTS—

A. Galaxy boilers may be vented into a masonry vitreous tile-lined chimney or UL LISTED Type “B” Venting system NOT EXPOSED to the OUTDOORS below the roof line.
Venting and sizing of venting system must be in accordance with National Fuel Gas Code ANSI Z223.1, NFPA 54, -latest edition which will be referred to as the National Fuel Gas Code. Local codes apply.
If a masonry chimney is exposed to the outdoors on one or more sides below the roof line (exterior chimney), ONE of the following options apply:
   1. Chimney must be re-lined with a UL LISTED metallic liner. When this is done, the chimney will be considered NOT exposed to the outdoors and the requirements of the National Fuel Gas Code for NON-exposed chimneys and/or local codes will apply.
   2. If an exposed tile-lined chimney is to be used WITHOUT a UL LISTED metallic liner, the boiler must first meet the requirements of the National Fuel Gas Code:

B. If an existing boiler is removed from a common venting system, the common venting system may be too large for proper venting of the remaining appliances connected to the common vent. Follow the test procedure shown in Appendix "A" on page 19 of this manual to insure proper operation of venting system and appliances.

C. Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.

D. Chimney or vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney.

MINIMUM CLEARANCES FROM COMBUSTIBLE CONSTRUCTION —

A. Minimum boiler clearances shall be as follows:

GALAXY GG SERIES

MODELS GG-75H THROUGH GG-225H. MINIMUM CLEARANCE FOR COMBUSTIBLE CONSTRUCTION. MINIMUM CLOSET CLEARANCE.	
Front	6"
Rear	6"
Left Side	6"
Right Side	6"
Top	36"
Flue Connector	6"
Type 'B' Vent	1"

MODELS GG-250 THROUGH GG-399H. MINIMUM CLEARANCE FOR COMBUSTIBLE CONSTRUCTION. MINIMUM ALCOVE CLEARANCE.	
Front	Alcove
Rear	6"
Left Side	6"
Right Side	6"
Top	36"
Flue Connector	6"
Type 'B' Vent	1"

GXH SERIES	
MODELS GXH-105 THROUGH GXH-190 MINIMUM CLEARANCE FOR COMBUSTIBLE CONSTRUCTION. MINIMUM CLOSET CLEARANCE.	
Front	6"
Rear	6"
Left Side	6"
Right Side	18"
Top	36"
Flue Connector	6"
Type 'B' Vent	1"

B. Provide accessibility clearance of 24" on sides requiring servicing and 18" on sides used for passage.
C. All minimum clearances shown above must be met. This may result in increased values of some minimum clearances in order to maintain the minimum clearances of others.
D. Clearance from steam and hot water pipes shall be 1". **

** At points where hot water or steam pipes emerge from a floor, wall or ceiling, the clearance at the opening through the finished floor boards or wall or ceiling boards may be not less than 1/2". Each such opening shall be covered with a plate of noncombustible material.

SAFETY—

KEEP THE BOILER AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS.

VENT PIPING—

A. Vent piping installation must be in accordance with ANSI Z223.1-latest edition, National Fuel Gas Code, Part 7, Venting of Equipment. Other local codes may also apply and must be followed.
B. Boiler vent pipe must be the full diameter of the boiler draft hood outlet. See dimensions, page 2. If a vent damper is added, its diameter must be equal to the hood outlet and must be located past the hood outlet. See installation instructions furnished with vent damper and in the section "Vent Damper Installation" of this instruction book.
C. If more than one appliance vents into a common breeching, the area of the breeching must be equal to the area of the largest vent plus 50% of the area of the additional vent areas. Vent connectors serving appliances vented by natural draft shall not be connected into any portion of mechanical draft systems operating under positive pressure. Horizontal breeching or vent pipe should be as high as possible, consistent with codes, so that vertical vents from appliances will have a high rise above draft diverter openings. All horizontal runs must slope upwards not less than 1/4 inch per foot of run. Horizontal portions of the venting system must be supported to prevent sagging by securing each joint with metal screws and by providing hangers spaced no greater than 5 feet apart.
D. Vent or breeching into chimney should not be inserted past the inside wall of the chimney liner.
E. All venting means should be inspected frequently. See Care and Maintenance and separate User's Information Manual.

GAS PIPING—

A. Local installation codes apply. The pipe joint compound used on threads must be resistant to the action of liquefied petroleum gases.
B. The gas supply line to the boiler should be run directly from the meter for natural gas or from the fuel tank for L.P. propane gas. See page 2 for location of union and manual main shut-off valve that may be specified locally.
Selecting pipe size for natural gas:
1. Measure or estimate the length of piping from the meter to the installation site.
2. Consult gas supplier for heating value of gas (BTU/cu. ft.).
3. Divide boiler rated input by heating value to find gas flow in piping (cu. ft. per hour).
4. Use table below to select proper pipe size.

Example: Boiler model GG-300 is to be installed. Distance from gas meter to the boiler is 50 ft. Heating value of natural gas is 1020 BTU/cu. ft. Select proper pipe size.

$$\text{Gas flow} = \frac{300{,}000 \text{ BTU/hour}}{1020 \text{ BTU/cu. ft.}} = 294 \text{ cu. ft. per hour}$$

At 50 ft. length of pipe, match required capacity from table below (choose higher capacity, in this case is 440 cu. ft. per hour). Required pipe size is 1-1/4". Improper gas pipe sizing will result in pilot flame outages, insufficient heat and other installation difficulties. For more information and also if other appliances are to be attached to the piping system, see Appendix C of National Fuel Gas Code ANSI Z223.1-latest edition.

C. The boiler and its gas connection must be leak tested before placing the boiler in operation. Use liquid soap solution for all gas leak testing. DO NOT use open flame.
This boiler and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 PSIG.
This boiler must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 PSIG.
D. All gas piping used should be inspected thoroughly for cleanliness before makeup. A sediment trap must be provided, as illustrated on page 2.
E. The minimum and maximum gas supply pressure (at the inlet of gas valve) are shown on the boiler rating plate for the type of gas used. Gas supply pressure should never be less than minimum or more than maximum pressure when the boiler or any other appliance is turned on or off.

Length of Pipe in Feet	Gas Flow In Piping — cu. ft. per hr.				
	Iron Pipe Size (IPS) — inches				
	1/2	3/4	1	1-1/4	1-1/2
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	890
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

BOILER ROOM AIR SUPPLY AND VENTILATION

An ample supply of air is required to obtain combustion and ventilation. Room temperature over 100°F may cause nuisance tripping of the Blocked Vent Safety Switch.

ALL AIR MUST COME FROM OUTSIDE, directly through wall openings to the boiler or through unsealed openings around windows, doors, etc. in the whole building. When buildings are insulated, caulked and weather-stripped, now or later on, direct opening to outside may be required and should be provided. If the boiler is not on an outside wall, air may be ducted to it from outside wall openings.

The National Fuel Gas Code, ANSI Z223.1-latest edition specifies openings for air under various conditions. Local codes may specify minimum opening sizes and locations. The following recommendation applies to buildings of energy-saving construction, fully caulked and weather-stripped:

Provide one GRILLED opening near the floor and one near the ceiling on an outside wall near the boiler (or duct from such openings to the boiler), EACH opening to be a minimum of one square inch per 2000 Btuh input to ALL APPLIANCES in the area. For a total appliance input of 200,000 Btuh, each opening will be 100 square inches. A grilled opening 10" x 10" has 100 square inches of area. If fly screen must be used over openings, double the area and inspect and clean the screen frequently.

Openings must NEVER be reduced or closed. If doors or windows are used for air supply, they must be locked open. Protect against closure of openings by snow and debris. Inspect frequently.

NO MECHANICAL DRAFT EXHAUST OR SUPPLY FANS ARE TO BE USED IN OR NEAR THE BOILER AREA.

The flow of combustion and ventilating air to the boiler must NOT be obstructed.

DRAFT HOOD—

The draft hood supplied is part of the listed boiler assembly. DO NOT alter the hood. See dimensions, page 2.

Attach the hood to the boiler flue outlet. Connect flue pipe full size of hood outlet. If a vent damper is added, it must be installed on the outlet side of the hood. See Vent Piping,

VENT DAMPER INSTALLATION
The vent damper referred to in the following instructions is the Slant/Fin Corporation vent damper.

This device is design certified by A.G.A. for use ONLY on specific Slant/Fin Corp. gas boiler models. These boilers must also be equipped with a label which states that the boiler must be used with a Slant/Fin Corp. automatic vent damper device and indicates the proper vent damper model number.

A. INSTALLATION INSTRUCTIONS BEFORE YOU START TO INSTALL
   1. Read this installation manual, the "DANGER" label attached to the top of the boiler, the "WARNING" on the wiring diagrams, vent damper carton and operator cover.
   2. Perform pre-installation inspection as required by ANSI specification Z21.66. (See Vent Damper Instructions.)
   3. Select a proper, convenient location for vent damper. Vent damper may be installed vertical or horizontal on all models (see figures 1 and 2).
   4. Carefully unpack the unit. DO NOT FORCE IT OPEN OR CLOSED! Forcing the damper may damage the gear train and void the warranty.

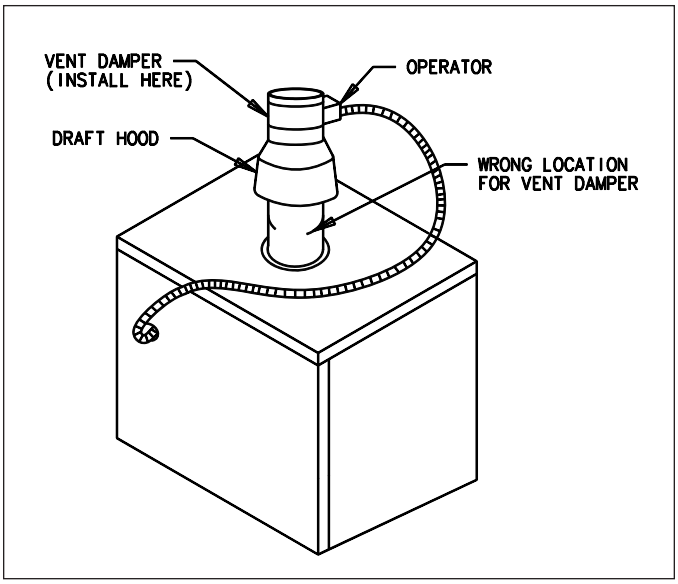
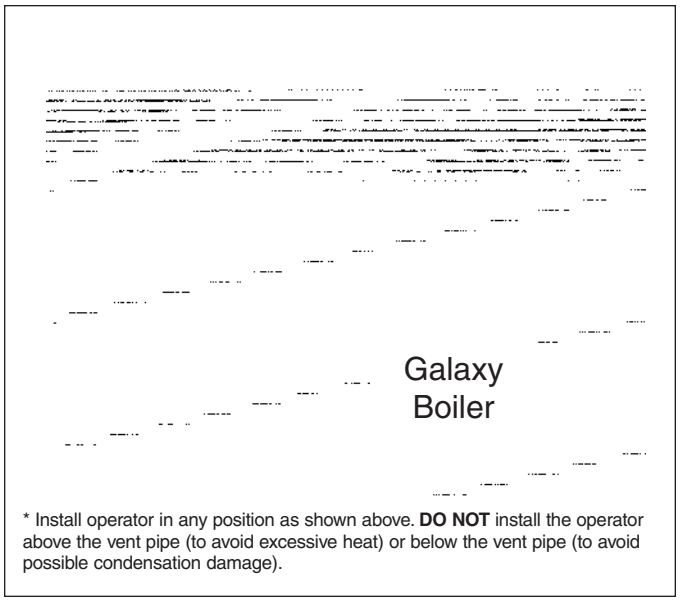


Figure 1. Vertical installation of vent damper on Galaxy Boilers



* Install operator in any position as shown above. **DO NOT** install the operator above the vent pipe (to avoid excessive heat) or below the vent pipe (to avoid possible condensation damage).

Figure 2. Horizontal or sloping installation of vent damper

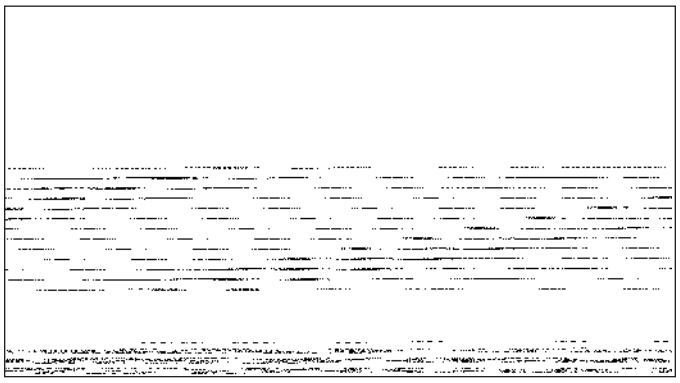


Figure 3.

WARNING—DANGER

Once you have begun vent damper installation procedure, DO NOT restore electric power and gas supply until installation and inspection have been completed (in order to prevent the main burners from operating). DO NOT operate the boiler until the vent damper harness is plugged into vent damper operator. Failure to observe this warning may create a hazardous condition that could cause an explosion or carbon monoxide poisoning.

B. 1. This device must be installed after the boiler draft hood (between the draft hood outlet and the connector to the outdoor chimney or vent) as close to the draft hood as practicable, and without modification of the draft hood or the vent damper. (See figure 1 and 2.)
   2. The inlet size of the vent damper must be the same nominal trade size as the outlet of the draft hood.
   3. This device must be located in a venting system or section of a venting system so that it serves only the single appliance for which it is installed. (See figure 3.)
   4. Clearances of not less than 6 inches (152MM) must be maintained from combustible materials, with provisions for service access.

C. AFTER INSTALLATION:
   1. Operate system through two complete cycles to check for opening and closing in proper sequence, and proper burner operation. DAMPER MUST BE IN OPEN POSITION WHEN BOILER MAIN BURNERS ARE OPERATING.
   2. Perform installation checks as required by ANSI specification Z21.66. (See Vent Damper Instructions.)
   3. Check the troubleshooting section if problems arise with the installation.

ELECTRICAL WIRING

DANGER: Before wiring, always turn off electric power supply, otherwise shock or death can result.

1. **Power Supply**
   A separately fused circuit is recommended. Use a standard 15 Amp. fuse or breaker and 14 gauge conductors in BX cable or circuit.
   Provide disconnect means and overload protection as required. See boiler wiring diagram (Figure 4).
   Boiler must be electrically grounded in accordance with requirements of the authority having jurisdiction, or, in the absence of such requirements, with the National Electrical Code, ANSI/NFPA 70-latest edition.

2. **Power Connection**
   Connect hot and neutral to black and white wires inside junction box at the boiler (See figure 4).
   Connect ground wire to ground screw inside junction box.

3. **Thermostat Connections**
   Thermostat connections must be to T and TV screw terminals of boiler temperature control (See Figure 4).

   Thermostat Heat Anticipator Adjustments
   If the 24v room thermostat that controls this boiler has an adjustable heat anticipator, connect entire system to thermostat and run the system while measuring the current drawn through the thermostat wires. Set the heat anticipator at the value measured. The set current should match power requirements by zone valves and relays. Add an additional 0.1 Amp to the measured currrent for vent damper. Refer to the manufacturer's instruction of zone valve, vent damper and relays. Also, see instructions with the thermostat.

4. **Multi Zoning**
   For pump zoning system, see Figures 5 and 6, for zone valve system, see Figure 7. DO NOT use control transformer to power external accessories like zone valve and relays, overload and/or burned-out transformer and boiler malfunction can result.

5. **Indirect External Water Heater**
   If system includes indirect water heater, the indirect signal must be separated from heating zones(s) system. See figure 6 and follow steps below:
   a. Connect end switch of the indirect water heater relay to I1 and !2 of the boiler temperature control.
   b. Connect end switch of the heating zones(s) relays to T and TV of the boiler temperature control.
   c. Power DHW and heating zone(s) circulators through end switch relays as sgown on figure 6. Do not connect heating zone(s) circulators to C1 and C2 of the control.

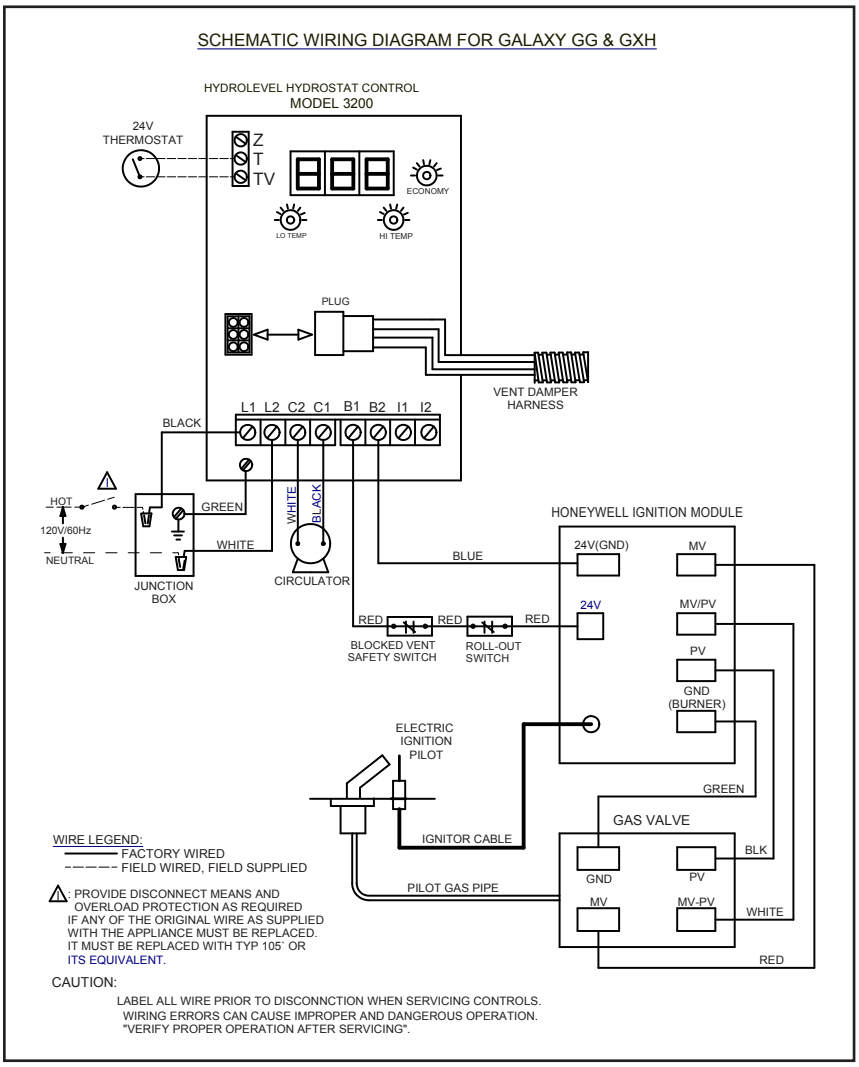


Figure 4

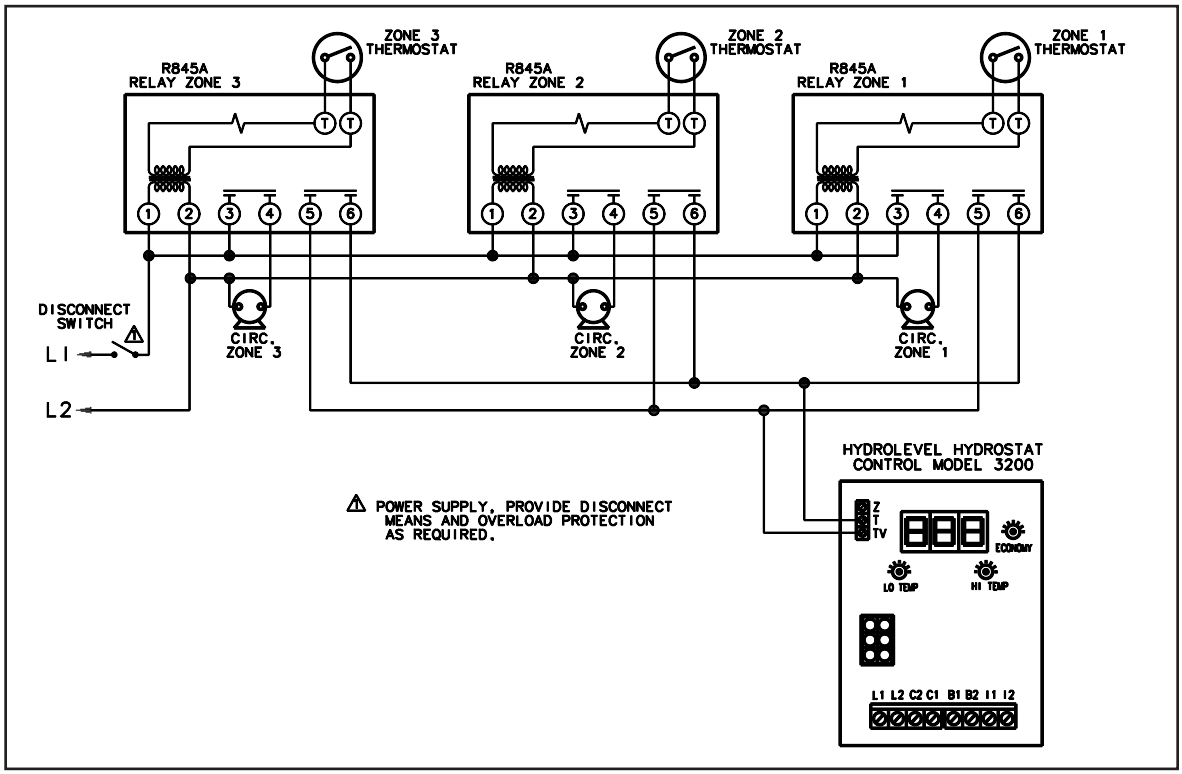


Figure 5. Multizoning of Galaxy boilers pump zoning system using R845A relay.

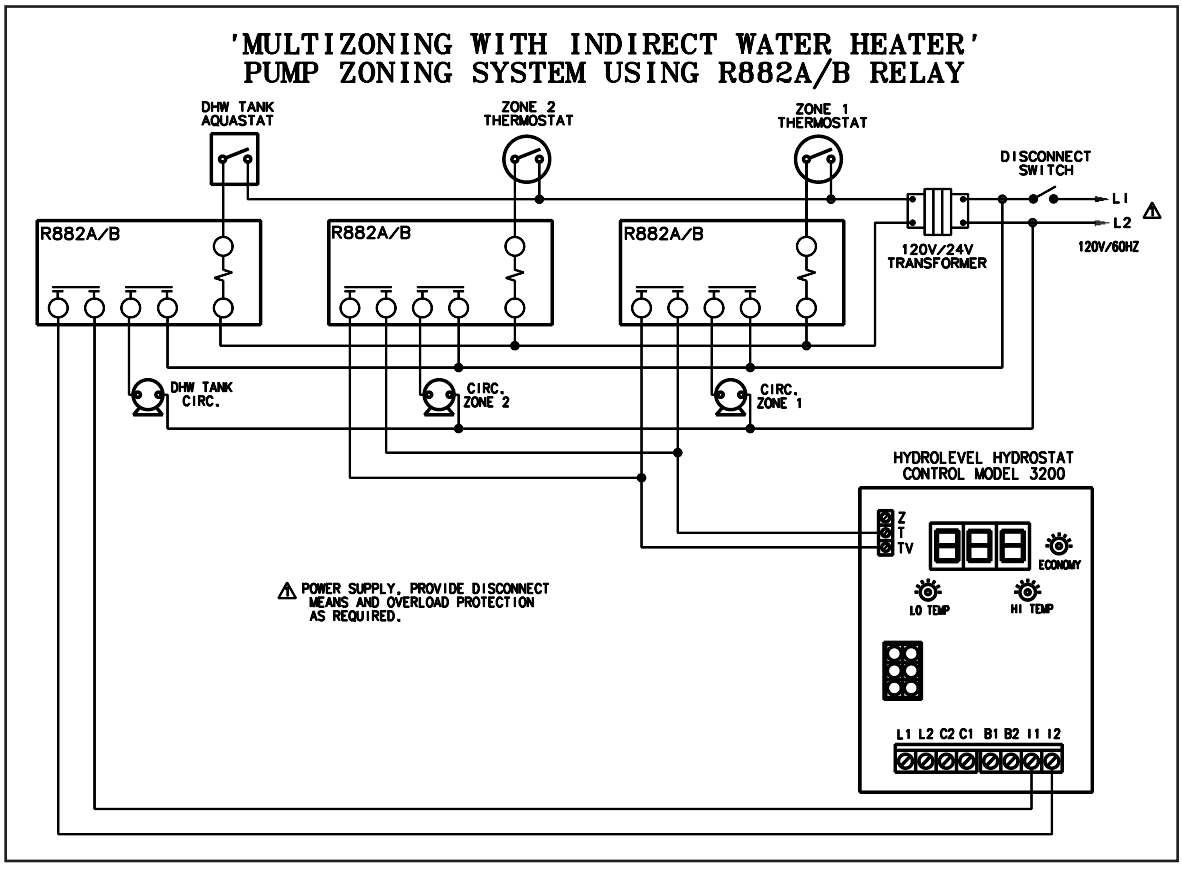


Figure 6. Multizoning of Galaxy boiler-2 zone system pump zoning system using R882A/B relays.

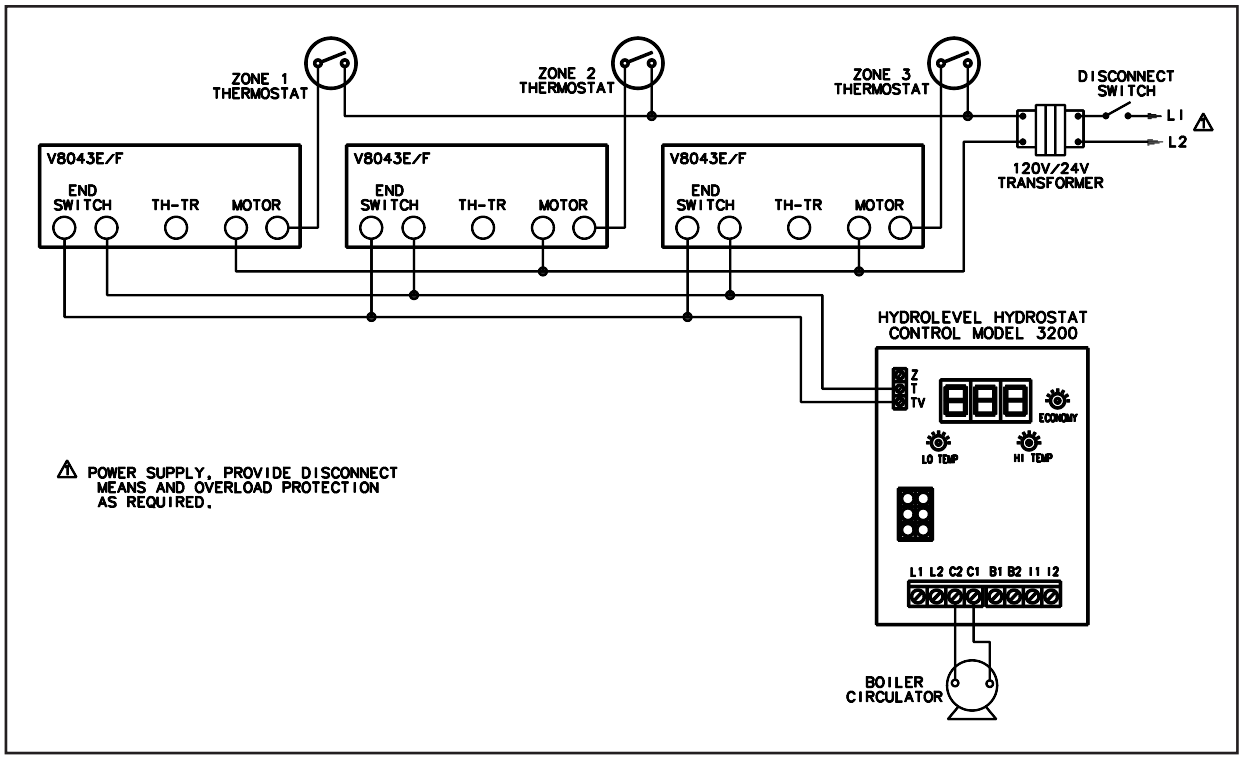


Figure 7. Multizoning of Galaxy boilers zone valve system using V8043E/F zone valves.

BOILERS EQUIPPED WITH HYDROSTAT CONTROL

SETTING THE CONTROL

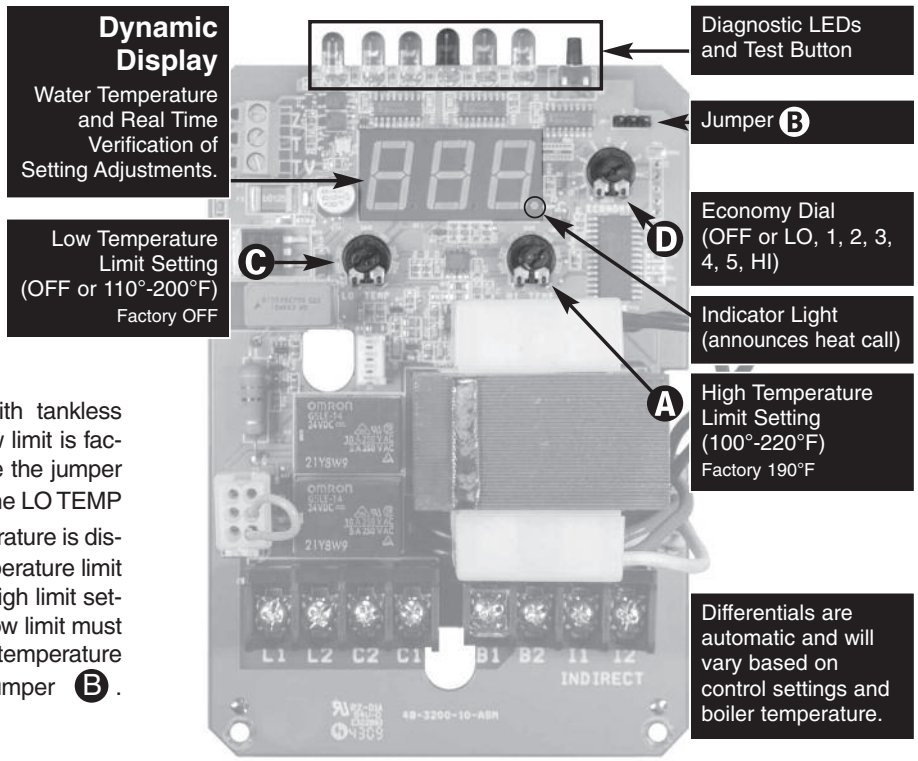
NOTE: Settings can be checked using the TEST/SETTINGS Button.

SETTING THE HIGH LIMIT

The high limit is factory set at 190°F. To adjust, turn the HI TEMP Dial (A) until the desired setting is displayed. (Setting range: 100°-220°F)

SETTING THE LOW LIMIT

The low limit is designed to maintain temperature in boilers equipped with tankless coils used for domestic hot water. The low limit is factory set to OFF. Prior to adjusting, remove the jumper (not equipped on all units) (B). Then turn the LO TEMP Dial (C) clockwise until the desired temperature is displayed. For proper operation, the low temperature limit setting should be at least 10° below the high limit setting. NOTE: For cold start operation, the low limit must be turned OFF. IMPORTANT: If low limit temperature cannot be set above 140°F, remove jumper (B). (Setting range: OFF or 110°-200°F).



SETTING THE ECONOMY FEATURE

The Economy Feature is factory set for a 1 zone heating system. To adjust, turn the ECONOMY Dial (D) until the number displayed equals the number of heating zones. Do not include indirect water heaters in the number of heating zones. The Economy Feature conserves fuel by reducing boiler temperature (see "How Thermal Targeting Works" below). If the heating system is unable to supply needed heat to the house, the ECONOMY Dial should be turned to a lower setting (example: In a three zone house, turn the dial to 2 or 1). Conversely, if the boiler provides adequate heat, added fuel savings can be achieved by selecting a higher setting (example: 4 or 5). If the heating and indirect water heater signals were not separated when wiring the control, the Economy Feature should be turned OFF to insure the boiler supplies adequate temperature to heat the indirect tank.

IMPORTANT NOTICE

This boiler is equipped with a feature that saves energy by reducing the boiler water temperature as the heating load decreases. This feature is equipped with an override which is provided primarily to permit the use of an external energy management system that serves the same function. THIS OVERRIDE MUST NOT BE USED UNLESS AT LEAST ONE OF THE FOLLOWING CONDITIONS IS TRUE:

- An external energy management system is installed that reduces the boiler water temperature as the heating load decreases.
- This boiler is not used for any space heating.
- This boiler has an input of 300,000 BTU/hr or greater
- This boiler is part of a modular or multiple boiler system having a total input of 300,000 BTU/hr or greater.
- This boiler is equipped with a tankless coil.

ACTIVATING THERMAL PRE-PURGE (OPTIONAL)

NOTE: Activation of this feature is not recommended for boilers with tankless coils.

Fuel Smart HydroStat has a Thermal Pre-Purge feature to maximize efficiency. When activated, the control will purge higher boiler temperatures down to 135° at the start of any thermostat call and supply the latent energy in the boiler to the heating zone that is calling. During the purge cycle, the display will indicate Pur. If the heat is not sufficient to satisfy the thermostat, the control will energize the burner. This feature works with single- and multi-zone heating systems utilizing circulators or zone valves. No change in wiring is needed.

To Activate Thermal Pre-Purge

Push and hold the TEST/SETTINGS button for 20 seconds. The display will read Pur On. To deactivate the feature, push and hold the button a second time for 20 seconds. The display will read Pur OFF.

SETTING	
OFF	Disables economy function. Will allow boiler to fire until hi limit temp is reached and re-fire with a 10° subtractive differential.
LO	Provides lowest level of fuel savings. Use this setting only if the house does not stay warm at higher settings.
1	Recommended setting for single zone systems
2	Recommended setting for Two zone systems
3	Recommended setting for Three zone systems
4	Recommended setting for Four zone systems
5	Recommended setting for Five zone systems
HI	Provides highest level of fuel savings

SYSTEM START-UP

At initial start up, with the Economy Feature active, the control establishes a 145°F target temperature. To test the high limit shut-off function, the Economy Dial must be turned to OFF. Once tested, restore the Economy setting. If the heating demand is high, the target will increase over time to satisfy the heat load. NOTE: To reduce the potential for condensing, the control will allow the boiler to heat to 120°F prior to energizing the circulator.

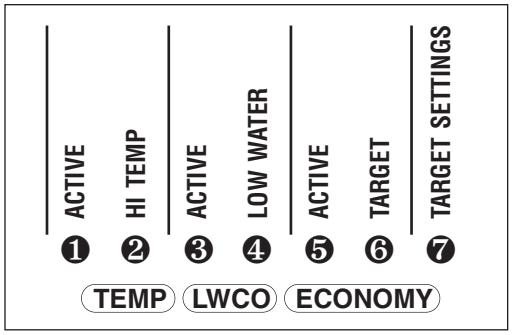
HOW THERMAL TARGETING WORKS

Thermal Targeting technology analyzes thermostat activity and continually evaluate how much heat the house requires. When it is very cold outside, the heat demand is high and the Fuel Smart HydroStat will raise the boiler s Target temperature to provide needed heat to the home. When the outside temperature is milder, the heat demand is lower. During these periods, the Fuel Smart HydroStat will lower the boiler s Target temperature – saving fuel – while continuing to provide comfort to the house.

LED LEGEND and TEST/SETTINGS BUTTON

❶ (TEMP) **ACTIVE** Indicates that the Fuel Smart HydroStat control is powered and that the temperature function is active.

❷ (TEMP) **HIGH TEMP** Illuminates when the boiler water temperature reaches the high limit setting. It will remain lit until the water temperature falls 10° (see High Limit Differential on page 4). The Fuel Smart HydroStat prevents burner operation while this LED is on.



❸ (LWCO) **ACTIVE** Indicates that the low water cut-off (LWCO) function of the Fuel Smart HydroStat is active. When the control is installed with a Hydrolevel Electro-Well, this LED will be on at all times when the control is powered.
IMPORTANT: If the control is installed with a well other than the Electro-Well, this LED will not illuminate indicating that the control is not providing low water cut-off functionality.

❹ (LWCO) **LOW WATER** Illuminates if the boiler is in a low water condition. The Fuel Smart HydroStat will prevent burner operation during this condition. **IMPORTANT:** The system must be checked by a qualified heating professional prior to resuming operation.
WARNING: DO NOT ADD WATER UNTIL THE BOILER HAS FULLY COOLED.

❺ (ECONOMY) **ACTIVE** Indicates that the Thermal Targeting function is active and the Fuel Smart HydroStat will reduce boiler temperature to conserve fuel. The Economy feature is activated using the ECONOMY dial. (See "How Thermal Targeting Works" on page 4 for more information).

❻ (ECONOMY) **TARGET** When the Economy feature is active, the Fuel Smart HydroStat continually sets target temperatures below the high limit setting to maximize fuel efficiency. When the boiler water reaches the target temperature, the LED illuminates and the burner will shut down. The boiler water will continue to circulate and heat the house as long as the thermostat call continues. The LED will stay lit until the boiler temperature drops to the differential set point (see Target Temp Differential on page 4) at which point the boiler will be allowed to fire again. NOTE: This LED illuminates regularly during normal boiler operation.

❼ **TEST/SETTINGS** Button

To Test Low Water Cut-Off: Press and hold the Test/Settings button for 5 seconds. The display will read LCO.

LWCO TEST LCO

The red Low Water light should illuminate and the burner circuit (B1 and B2) should de-energize. NOTE: The control must be installed with a Hydrolevel Electro-Well for low water cut-off functionality (see page 2 for more details).

To View Current Settings: Press and release the Test/Settings Button in short intervals to sequentially display the following settings:

HIGH LIMIT SETTING HL
▼
LOW LIMIT SETTING LL
▼
ECONOMY SETTING ECO
▼
CURRENT TARGET TEMPERATURE ---
▼
PRE-PURGE SETTING PUR

The display will return to boiler temperature (default) if Test/Settings Button in not pressed for 5 seconds.

WATER PIPING

I. CIRCULATING SYSTEMS

A. Packaged water boilers are equipped with a water circulating pump, mounted to return the water into the boiler. For some installations, the pump should be on the supply main. See figure 8.

II. AIR CONTROL SYSTEM

A. DIAPHRAGM-TYPE COMPRESSION TANKS are used to control system pressure in an AIR ELIMINATING SYSTEM: an automatic air vent is used to REMOVE air from the system water. See figure 8. If system pressure needs further control, add an additional tank or install a larger capacity tank. Locate the tank near the boiler, as illustrated.An automatic air vent should be installed in the top of the boiler or air purger. See figure 8.

B. PUMP LOCATION — Locating low-head pump(s) on return to boiler is acceptable for smaller boiler sizes in residences of one or two stories. The alternate pump location shown in illustration is required in large, multi-story building installations, especially when high-head pumps are used. The compression tank must be at the boiler or between boiler and supply main pump(s). IMPORTANT: Hot water heating systems containing high water volume, such as would occur with cast-iron radiation, require special care with air elimination. The circulator pump should be located on the boiler supply pipe and the expansion tank and air scoop should be located near the pump suction.

OPERATING INSTRUCTIONS

FILLING AND VENTING WATER SYSTEMS

A. Fill the system with water. Vent or purge off air.

B. Fire the boiler as soon as possible (see following warning and instructions) and bring water temperature to at least 180 degrees, while circulating water in the system.

C. Vent air and add water as needed to achieve operating pressure on boiler gauge. Pressure must be between approximately 12 psi (cold water) and 25 psi (at water temperature setting of high limit control), for boilers equipped with 30 psi relief valves. Boilers rated for a higher pressure and equipped with a matching relief valve may operate at a higher pressure, but no higher than 5 psi below the relief valve opening pressure.

D. Check for and repair any leaks before placing system in service.

Before firing boiler, make these checks:

1. System is full of water. Air is vented or purged.
2. Relief valve is installed in accordance with the ASME Boiler Pressure Vessel Code, Section IV. Valve opening is not closed or reduced in size.
3. Venting is installed according to instructions under “VENT PIPING”.
4. All wiring is completed, following applicable wiring diagrams.
5. Using soap solution, check for gas leaks in all gas piping from meter to boiler pilot and manifold. DO NOT use open flame.

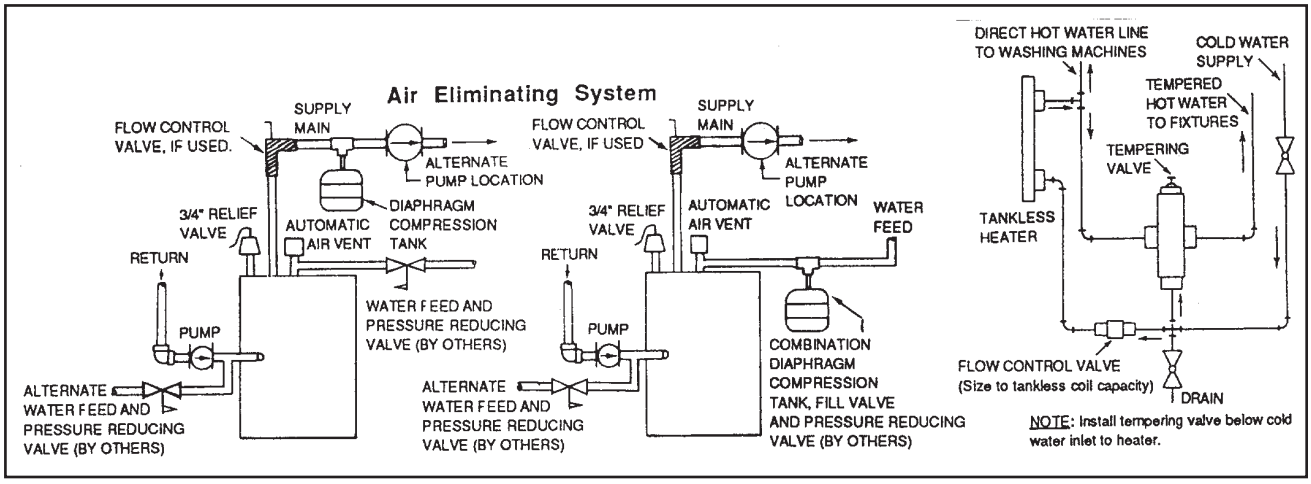
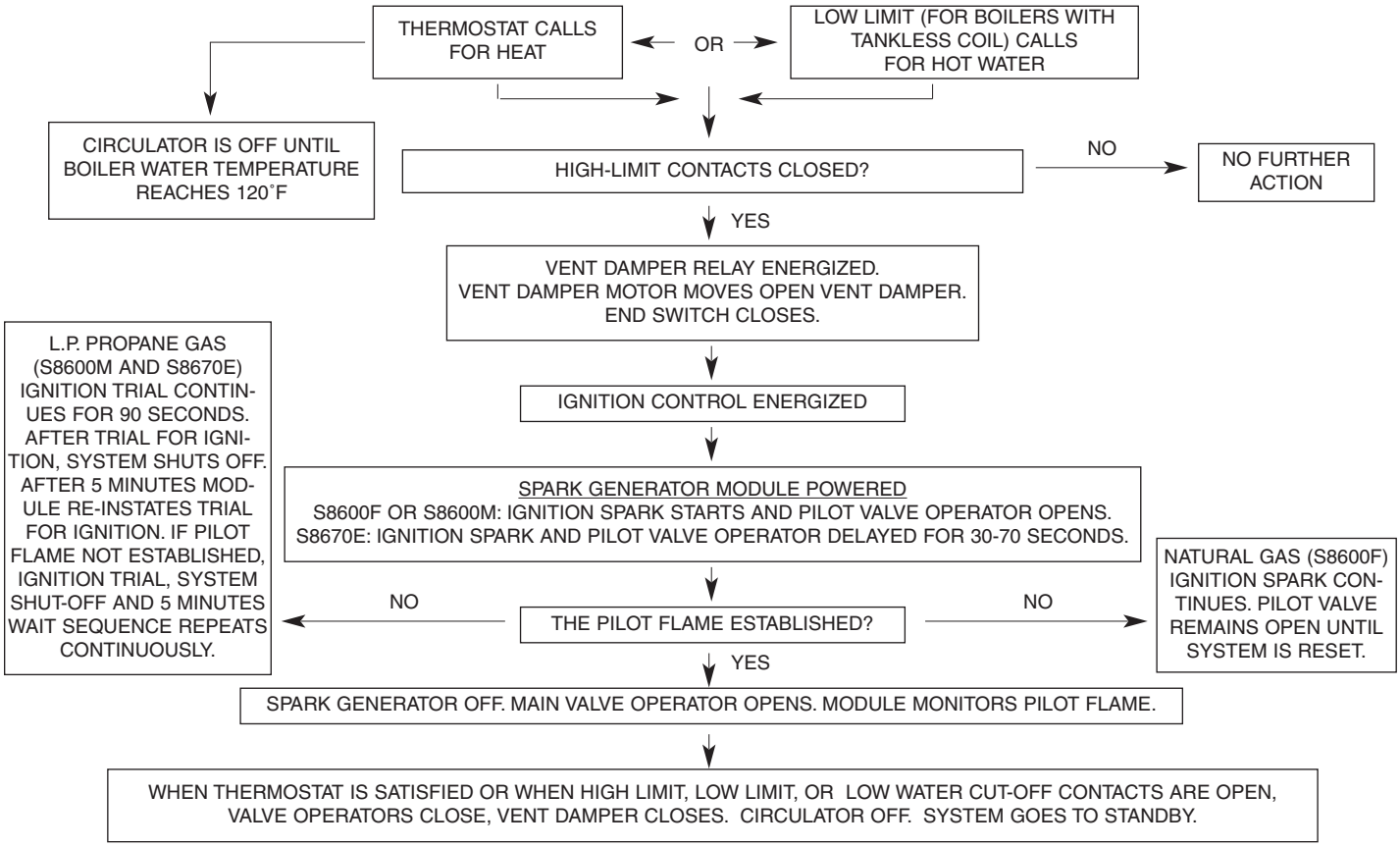


Figure 8. Piping arrangement

SEQUENCE OF OPERATION FOR GALAXY BOILERS



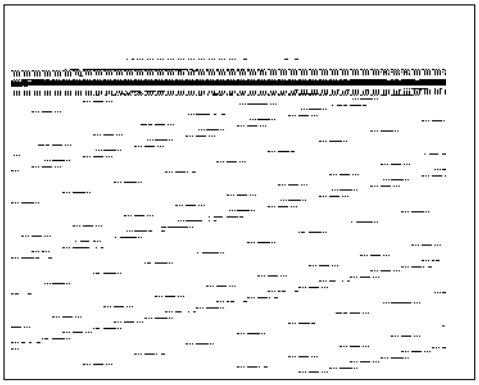
SAFETY INFORMATION
FOR YOUR SAFETY READ BEFORE OPERATING

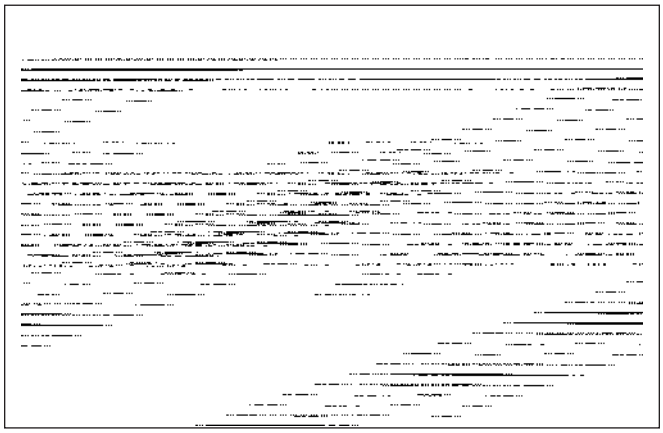
WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance is equipped with an ignition device which automatically lights the pilot. DO NOT try to light the pilot by hand.
B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
   WHAT TO DO IF YOU SMELL GAS
   - DO NOT try to light any appliance.
   - DO NOT touch any electric switch; DO NOT use any phone in your building.
   - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
   - If you cannot reach your gas supplier, call the fire department.
C. Use only your hand to push in or turn the gas control knob. NEVER use tools. If the knob will not push in or turn by hand, DON'T try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
D. DO NOT use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

Operating Instructions

1. STOP! Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. DO NOT try to light the pilot by hand.
5. Remove control access panel.
6. Turn gas control knob clockwise ↷ till knob stops then continue to "OFF". DO NOT force.
7. Wait five (5) minutes (longer for propane) to clear out any gas, then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this page. If you don't smell gas, go to next step.
8. Turn gas control knob counterclockwise ↶ to "ON".
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier





To Turn Off Gas To Appliance

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Turn gas control knob clockwise ↷ till knob stops, then continue to "OFF". DO NOT force.
5. Replace control access panel.

BURNER ADJUSTMENT

A. Adjust gas input rate:
   1. Consult gas supplier for higher* heating value of gas (Btu/cu.ft.)
   2. Set thermostat high enough so that boiler will remain on while checking rate.
   3. Measure manifold pressure at 1/8" tapping. Correct manifold pressure for gas used is printed on boiler rating plate. NOTE: Gas pressure may be adjusted by turning pressure regulator screw on combination gas valve (turn clockwise to increase pressure, counterclockwise to decrease pressure).
      a. Input for PROPANE is approximately at rating shown on rating plate when manifold pressure is 9-1/2" water column.