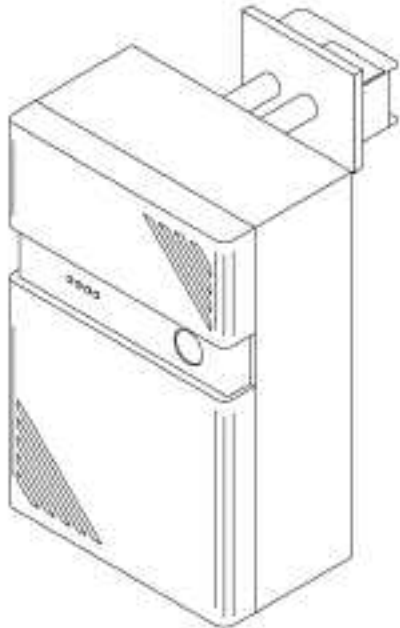


PRODIGY 21®



WALL MOUNT HOT WATER BOILER INSTRUCTION MANUAL

Contents	Page
• Planning Ahead	2
• Installation Procedures	4
• Operation Procedures	12
• Maintenance Procedures	15
• Troubleshooting	16

REFERENCES FOR YOUR USE

Boiler Failure Codes.....	16
Boiler Location Requirements	2
Blower Speed Calibration	13
Components Identification	2
Data (Boiler)	3
Diagnostic Indicator Light	16
Dimensions	3
Freeze Protection.....	15
Gas Valve Calibration.....	13
Indicator Light Panel	12
Input Rate Verification Procedure	13
Jacket Installation	11
Lighting Instructions	20
Measuring Equipment.....	12
Orifice (Gas and Air) Sizes	24
Purge Heating System	9
Replacement Parts	15
Safety Controls.....	14
Sequence of Operation	21
Thermostat Heat Anticipator	11
Venting Location Requirements	2
Water Treatment	15
Wiring Diagram (Boiler)	22

Models KC-45 and KC-90

Boiler Packing List
SEE BACK PAGE OF THIS MANUAL

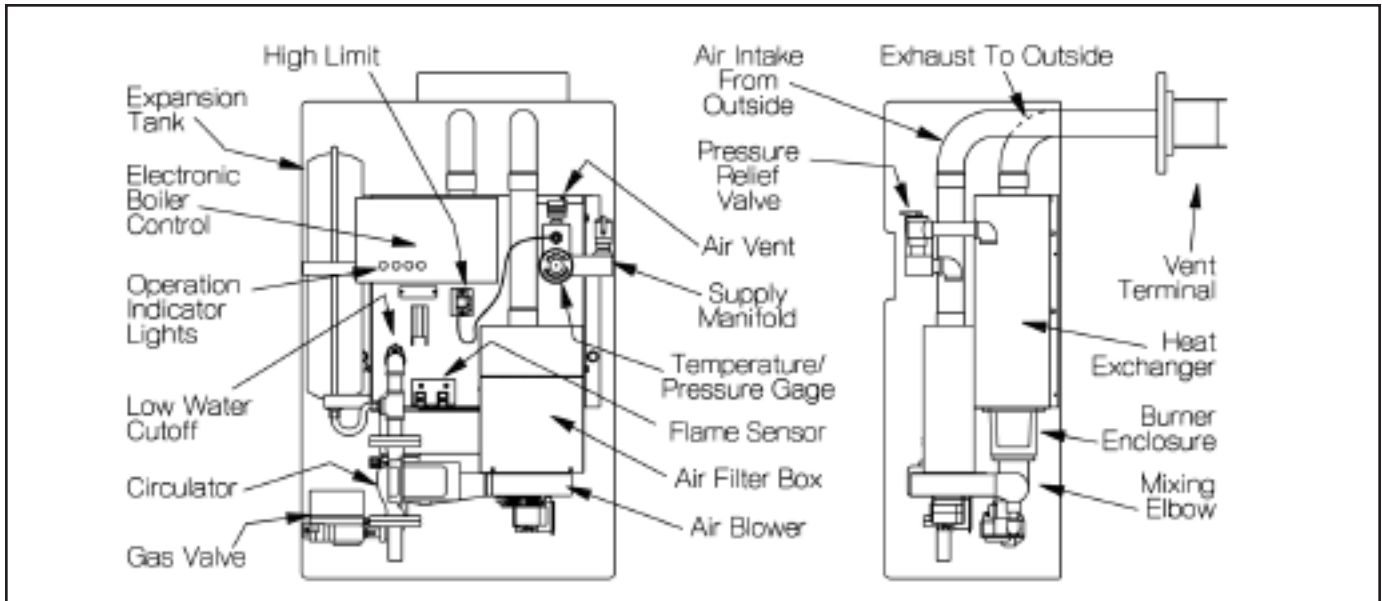
Additional Tools Needed

- Differential pressure gage: 0 - 1.0" w.c. range with .02" increments.
- Plastic gage hookup tubing: 2 lengths of 3/16" I.D. tubing with female service fitting adapters.
- Microampmeter: 0-25 microamp range with 1 microamp increments.



This manual must be left with owner, hung on or adjacent to the boiler. Owner should retain manual for future reference.

PART 1: PLANNING AHEAD



Circulator, ASME #30 pressure relief valve and automatic air vent are factory mounted/wired. Low water cutoff is factory-installed. Low water cutoff will shut off boiler in the event water falls below lowest safe water level.

BOILER LOCATION REQUIREMENTS

Boiler must be wall-mounted and can be installed on a combustible wall. Boiler must be mounted on a wall which provides access to the outside for choice of venting. Boiler must not be installed on or above carpeting.

Wall through which venting will pass must be free and clear for opening (i.e. no hidden conduit, telephone cables or other obstructions). Wall construction must be able to support the weight of boiler, piping and fill water.

For a closet installation, ventilation openings must be provided through a door or wall to prevent excessive heat buildup. Two openings, one near the floor and one near the ceiling, should be sized to assure sufficient air circulation in the closet (minimum 100 sq. inches each).

Boiler must be installed so gas ignition system components are protected from dripping or spraying water or rain during operation and service.

VENTING LOCATION REQUIREMENTS

Vent installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or applicable provisions of local building codes.

The boiler can be vented directly through a rear wall or through any wall within 10 feet of the right side, left side or back of the boiler. Venting is approved for

wall thickness of 4" to 24". The boiler cannot be vented up through a roof.

Maximum vent pipe length for both the exhaust and air intake is 10 feet external to boiler with no additional elbows other than those provided with boiler.

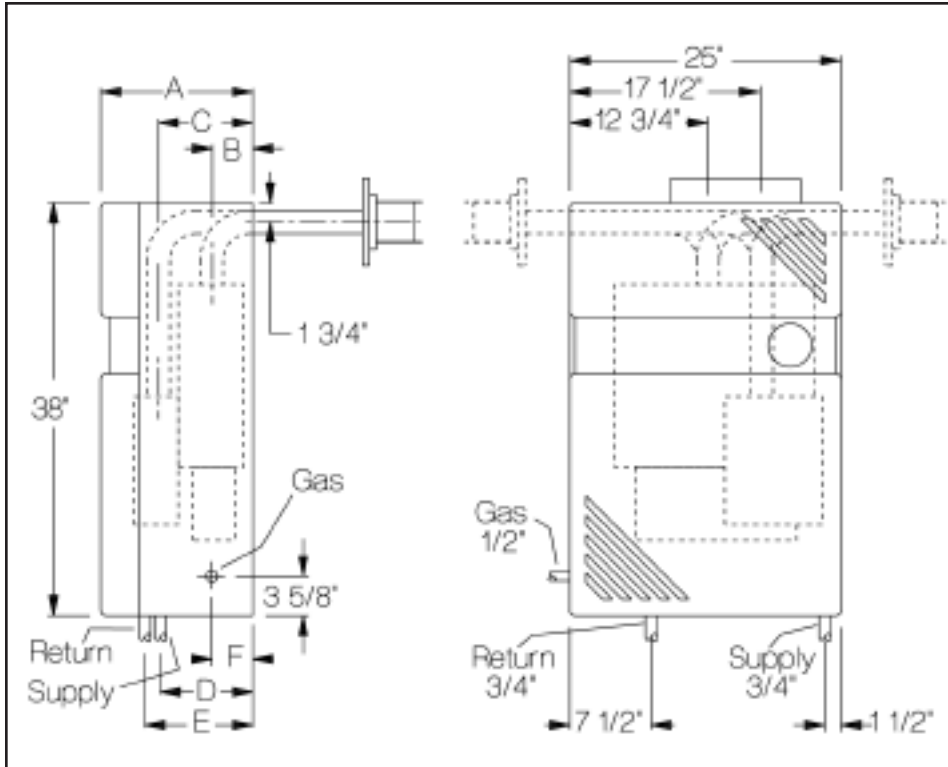
Vent termination must meet the following clearances: Minimum of 12" above grade and normal snow line to vent terminal bottom; minimum of 12" from any building opening; minimum of 3 feet above any forced air intake located within 10 feet; minimum of 4 feet from electric or gas meters, regulators and relief equipment.

Vent termination must not be located over any public walkway, in any confined space (i.e. window wells, alcoves, narrow alleys) or under any overhang or deck. Vent termination should not allow flue-gas discharge towards neighbor's windows or where personal injury or property damage can occur.

Vent terminal is designed to deflect flue gases from outside building wall; properly installed, it will prevent flue-gas degradation of normal building materials.

DO NOT install the venting into a chimney or any common venting system. DO NOT install a vent damper or similar device in vent tubing or on the boiler.

Vent terminal provided by Slant/Fin must be used. This vent terminal must only be mounted to an outside vertical wall.



Minimum Clearances To Combustibles and Recommended Service Clearances

	Minimum	Service
Front	6"	18"
Sides	2"	12"
Top	3"	3"
Bottom	12"	12"
Rear	0"	0"
Flue Conn.* 1-1/2"		3"

* Flue tubing must be insulated with supplied insulation material for wall passage.

Boiler Heat Exchanger Water Content

Model	Water Content
KC-45	1/2 gal.
KC-90	1 gal.

Boiler Model	Gas Input (MBH)		Gas Pressure (In. w.c.)				Dimensions (In.)						Shipping Weight (lbs)
			Natural		Propane		A	B	C	D	E	F	
	High	Low	Max.	Min.	Max.	Min.							
KC-45	45	22.5	9	3.5	14	11	14½	4	8½	4½	9½	3¾	220
KC-90	90	45	9	3.5	14	11	17½	7	11½	7½	12½	6¼	280

NOTICE: INSTALLATION AND SERVICE MUST BE PERFORMED BY A TRAINED AND QUALIFIED TECHNICIAN.

The installation must conform to the requirements of the National Fuel Gas Code ANSI Z223.1 and the requirements of the authority having jurisdiction as well as the requirements in this instruction manual.

In addition, where required by the authority having jurisdiction, installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1. If there is any conflict in the above requirements, then the more stringent requirement will apply.

WARNING
LIQUEFIED PETROLEUM (L.P.) PROPANE GAS-FIRED BOILER LOCATION
 REQUIRES SPECIAL ATTENTION

Liquefied Petroleum (L.P.) propane gas is *heavier than air*. Therefore, propane boilers, piping, valves must 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. Location should be as near the vent terminal as possible so that the flue pipe from boiler to outside 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.

PART 2: INSTALLATION PROCEDURES

STEP 1A: MOUNTING BOILER WITH REAR WALL VENTING

Boiler can be mounted on and vented directly through an outside rear wall or mounted on an interior wall and vented through an outside rear wall that is within 10 feet of the back of the boiler. See Figure on Page 3.

If horizontal passage through wall is above boiler, vent tubing can be extended vertically from boiler to reach horizontal passage; full tubing length must still be within 10 feet external to boiler with no additional elbows.

If wall is frame construction, locate wall studs for mounting. Suggested boiler mounting height is 32" minimum from floor to bottom of boiler enclosure. This allows for ease of service and/or the installation of an indirect-fired water heater under boiler.

1. Hold mounting panel on wall (with the boiler mounting studs facing out) in the location where boiler will be positioned and level wall panel.
2. Mark the mounting bolt holes for wall panel on wall. Use the cutout in the top of the mounting panel to mark 9"x5" rectangular vent cutout on wall.
3. Drill mounting bolt holes for wall panel. Cut the 9"x5" opening through rear wall and do all finishing work.
4. Secure the mounting panel (see Figure 1) to wall using appropriate hardware: 5/16" lag bolts (provided) for frame construction wall studs; 5/16" wall

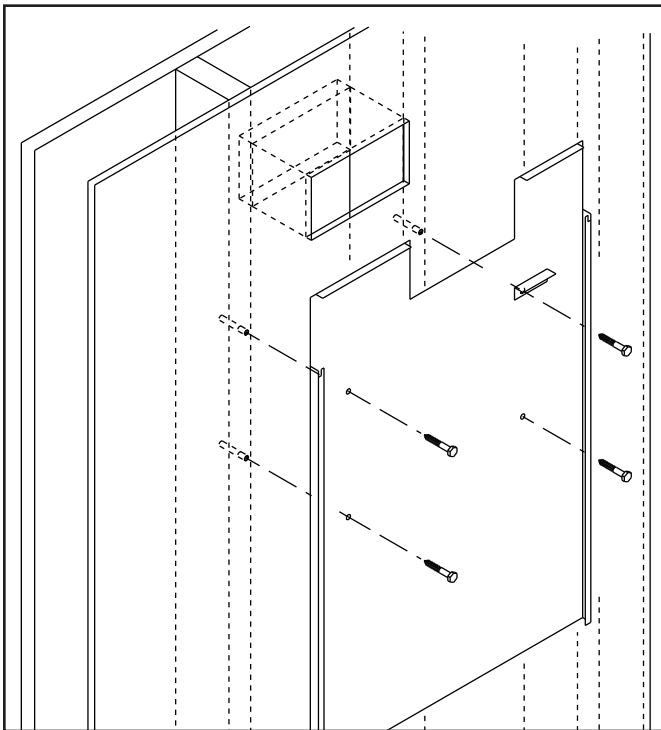


Figure 1: Secure Mounting Panel

How To Locate Outside Wall Opening For Extended Rear-Wall Venting

Remember, the maximum vent length is 10 feet external to boiler with no additional elbows.

Measure the distance from floor or ceiling (whichever is most level to the outside rear wall) to the center of the vent opening.

Measure the same distance on outside rear wall through which venting will pass. From this point, drop the center mark 1/4" for every 1-foot of tubing run from boiler. (Prevents condensate from flowing back to boiler.)

Mark and cut 9"x5" opening through outside rear wall around new center mark and do all finishing work.

anchors or expansion plugs if construction is other type.

5. For extended rear-wall venting only, follow the boxed instructions above.
6. Place hex nuts (provided) loosely on the ends of boiler mounting studs on mounting panel. (See Figure 2.) Two keyhole-shaped slots are provided on each side of the boiler rear which allow hex nuts (on studs) to pass through slots. Lift the boiler and seat it on the mounting studs. Tighten hex nuts securely.

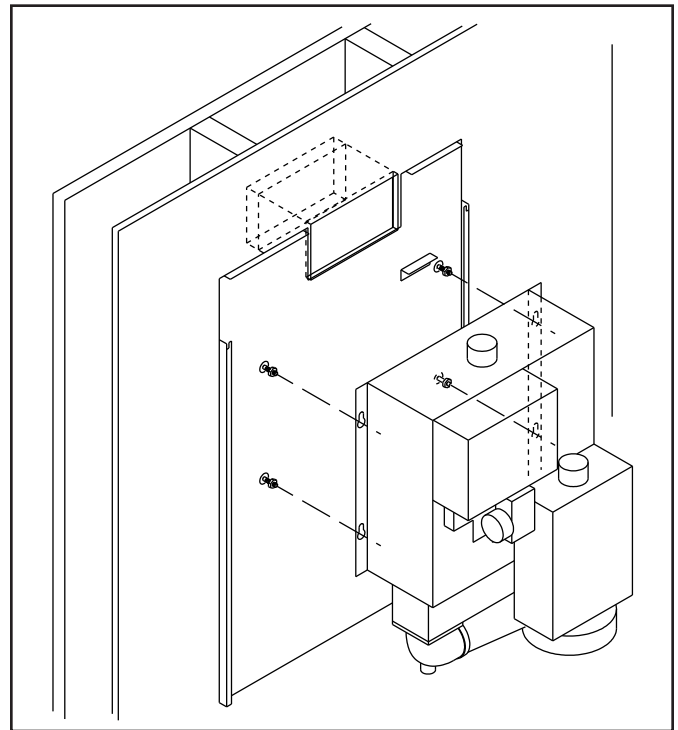


Figure 2: Position and Secure Boiler

EXHAUST/AIR INTAKE TUBING

Vent installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or applicable provisions of local building codes.

Only 2" stainless steel tubing provided by Slant/Fin Corp. can be used for exhaust venting. 2" copper DWV tubing for air intake can be provided from Slant/Fin or local supplier. See Figure 3.

7. For exhaust, install the stainless steel elbowed tubing length (provided) on the boiler exhaust outlet, pointing toward the outside wall opening.
8. For air intake, assemble copper tubing parts (see Figure 4) provided with boiler and install assembly on boiler air intake inlet, pointing toward outside wall opening.
9. For extended rear-wall venting only, complete both of the tubing runs through outside rear wall opening. Avoid routing tubing internal to walls or ceiling;

always allow sufficient access to tubing for annual inspection.

10. Both tubing runs must terminate exactly 1-3/4" beyond outside wall surface for proper insertion into vent terminal. If necessary, cut tubing to proper length and remove all burrs.
11. Seal all tubing run joints and boiler connections with high-temperature RTV sealant (provided). **APPLY SEALANT TO OUTSIDE OF MALE TUBE ENDS ONLY**, 1/4 inch from the tube end, not inside of tubes or fittings.
12. If vent length exceeds 5 feet, install one vibration isolating-type hanger on each tubing run (to prevent sagging).
13. Install the insulation (provided) around stainless steel vent pipe and secure. Insulation must cover the vent pipe passing through the wall and terminate at outside wall surface.
14. Proceed to Step 2 on Page 8.

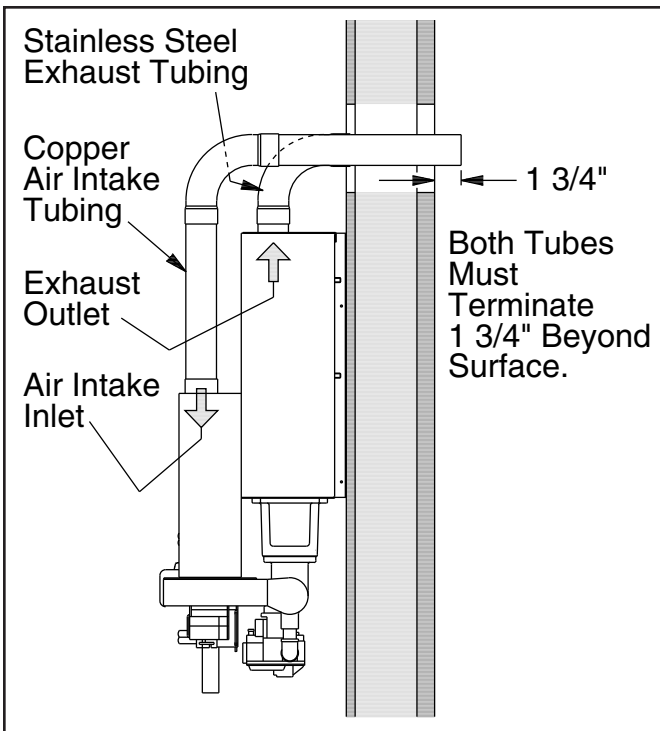


Figure 3: Rear Wall Vent Tubing Installation

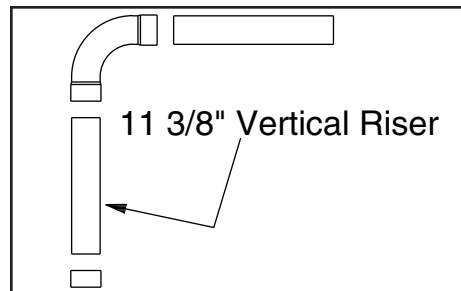


Figure 4: Copper Parts Assembly

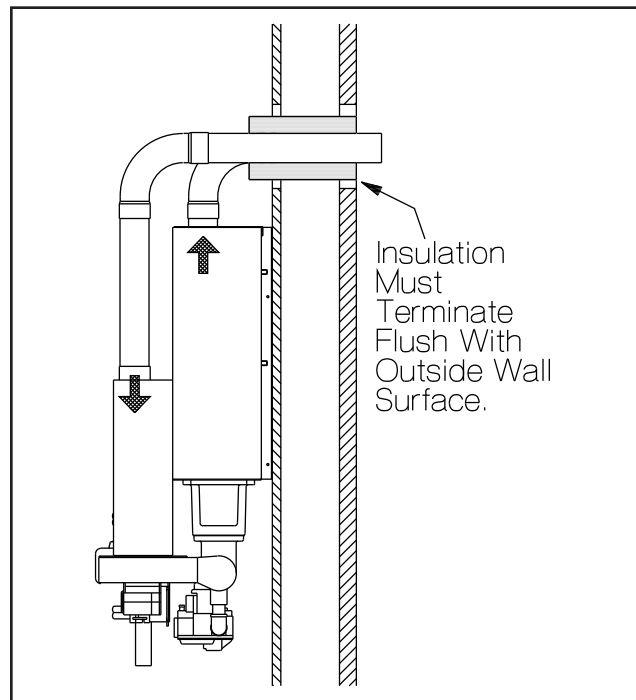


Figure 5: Insulation Installation

STEP 1B: MOUNTING BOILER WITH SIDE WALL VENTING

Boiler can be vented through an outside wall that is within 10 feet right or left of the boiler with no additional elbows.

If horizontal passage through wall is above boiler, vent tubing can be extended vertically from boiler to reach horizontal passage; full tubing length must still be within 10 feet external to boiler with no additional elbows.

If wall is frame construction, locate wall studs for mounting. Suggested boiler mounting height is 32" minimum from floor to bottom of boiler enclosure. This allows for ease of service and/or the installation of an indirect-fired water heater under boiler.

1. Hold mounting panel on wall (with the boiler mounting studs facing out) in the location where boiler will be positioned and level wall panel.
2. Mark mounting bolt holes for wall panel on wall and then drill mounting bolt holes for wall panel.
3. Secure the mounting panel (see Figure 6) to wall using appropriate hardware: 5/16" lag bolts (provided) for frame construction wall studs; 5/16" wall anchors or expansion plugs if construction is other type.
4. Measure the distance from floor or ceiling (whichever is most level to the outside side wall) to center of 9"x5" vent cutout on the wall panel.
5. Measure the same distance on the outside side wall

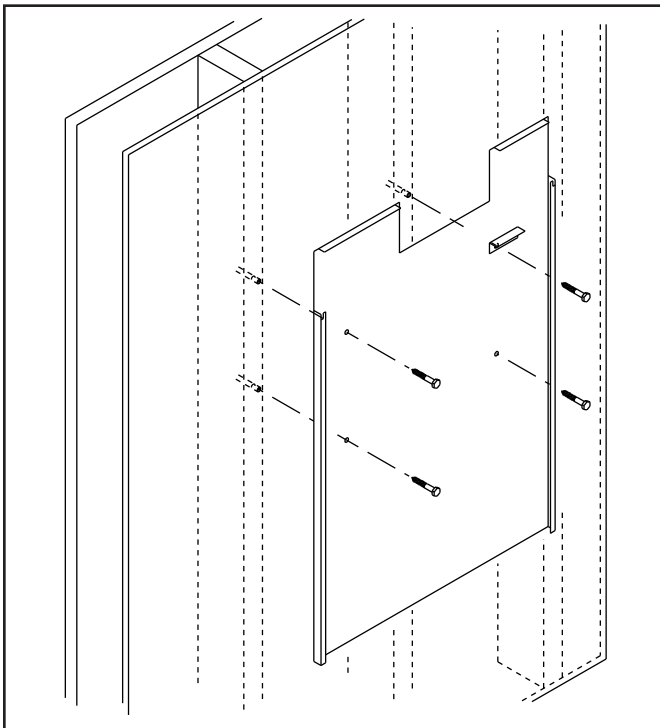


Figure 6: Secure Mounting Panel

through which the venting will pass. *This mark must be 5-1/2" from corner where the two walls adjoin.*

6. From this point, drop the center mark 1/4" for every 1-foot of tubing run from boiler. (Prevents any condensate from flowing back to boiler.)
7. Mark and cut 9"x5" opening through the outside side wall around new center mark and do all finishing work.
8. Place hex nuts (provided) loosely on the ends of boiler mounting studs on mounting panel. (See Figure 7.) Two keyhole-shaped slots are provided on each side of the boiler rear which allow hex nuts (on studs) to pass through slots. Lift the boiler and seat it on the mounting studs. Tighten hex nuts securely.

EXHAUST/AIR INTAKE TUBING

Vent installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or applicable provisions of local building codes.

Only 2" stainless steel tubing provided by Slant/Fin Corp. can be used for exhaust venting. 2" copper DWV tubing for air intake can be provided from Slant/Fin or local supplier.

9. For exhaust, install the stainless steel elbowed tubing length (provided) on the boiler exhaust outlet, pointing toward outside wall opening.

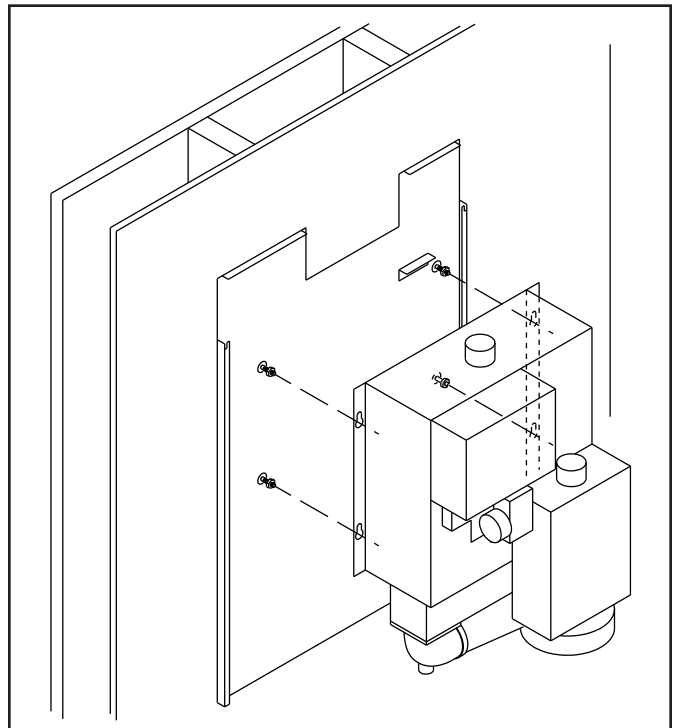


Figure 7: Position and Secure Boiler

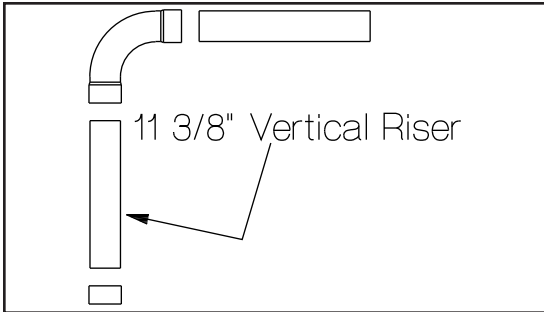


Figure 9: Copper Parts Assembly

10. For air intake, assemble copper tubing parts (see Figure 9) provided with boiler and install the assembly on boiler air intake inlet, pointing toward outside wall opening.
11. Complete both tubing runs through outside side wall opening. Avoid routing tubing internal to walls or ceilings; always allow sufficient access to tubing for annual inspection.
12. Both tubing runs must terminate exactly 1-3/4" beyond the surface of the outside wall for proper insertion into vent terminal. If necessary, cut the tubing to proper length and remove all burrs.
13. Seal all tubing run joints and boiler connections with a high-temperature RTV sealant (provided). **APPLY SEALANT TO OUTSIDE OF MALE TUBE ENDS ONLY, 1/4 inch from the tube end, not inside of the tubes or fittings.**
14. If vent length exceeds 5 feet, install one vibration isolating-type hanger on each tubing run (to prevent sagging).
15. Install the insulation (provided) around stainless steel vent pipe and secure. Insulation must cover the vent pipe passing through the wall and terminate at outside wall surface.

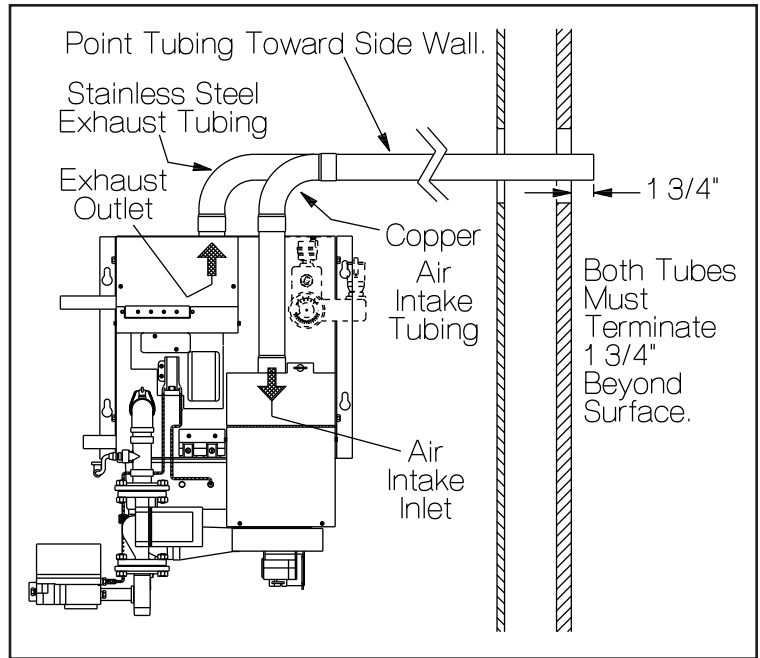


Figure 8: Side Wall Vent Tubing Installation

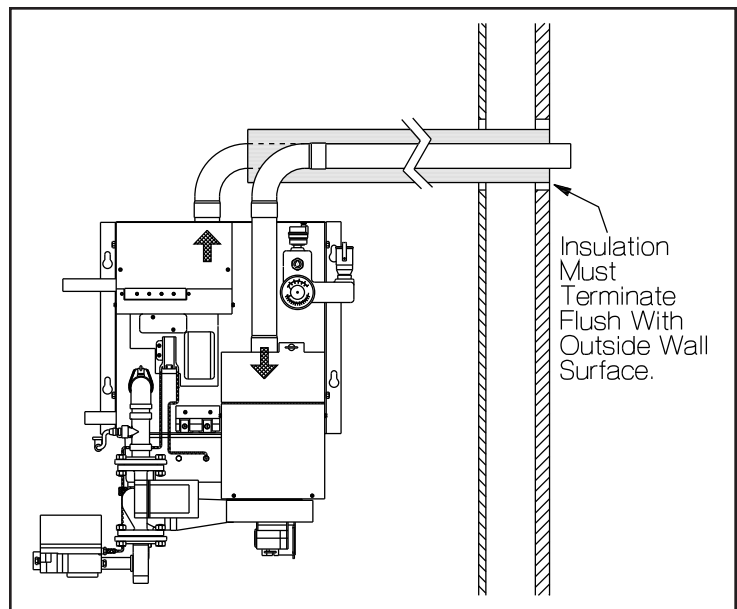


Figure 10: Insulation Installation

STEP 2: INSTALL OUTSIDE VENT TERMINAL

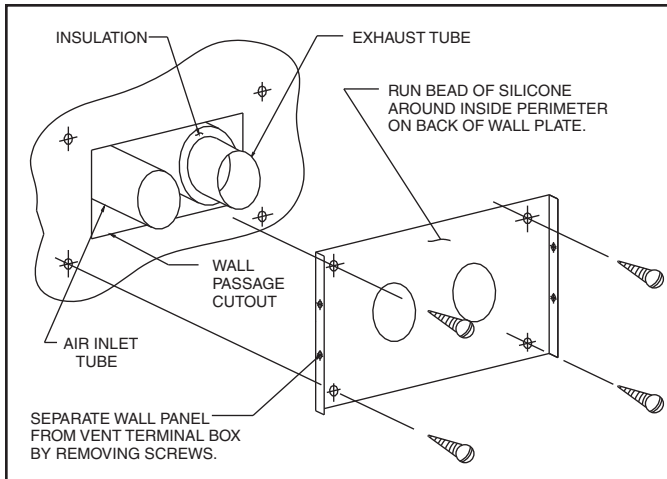


Figure 11: Wall Plate Installation

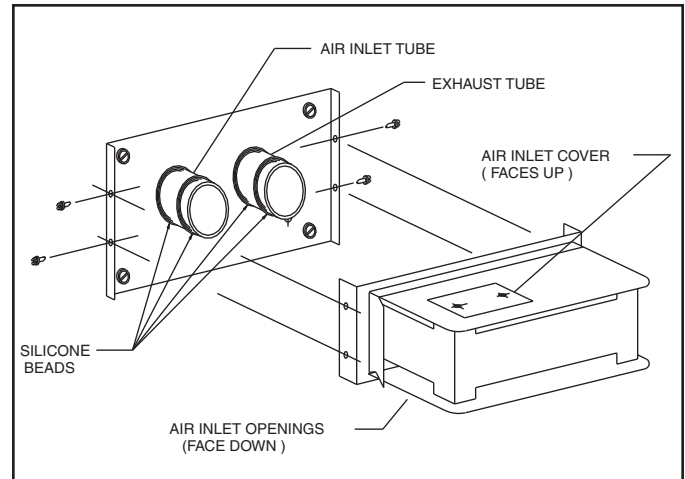


Figure 12: Vent Terminal Box Installation

VENT TERMINAL INSTALLATION

Warning: The vent terminal provided must be used. DO NOT alter this part in any manner other than as shown in these instructions. This vent terminal can only be mounted on a vertical surface.

1. Checking tubing installation
 - a) Both exhaust and air intake tubes should extend 1-3/4" beyond outside wall surface.
 - b) Insulation on exhaust tube should be flush with outside wall surface.
2. Check tubing orientation
 - a) Air inlet tubing may be located to the left or to the right of the exhaust tube, depending on which direction the tubes were run from the boiler.
 - b) If the air inlet tubing is to the left of the exhaust (viewed from outside of building), then the vent terminal may be installed as supplied without alteration.
 - c) If the air inlet tubing is to the right of the exhaust (viewed from outside of building), then the air inlet cover must be removed and reinstalled over the slots on the opposite side of the vent terminal. This alteration will ensure that the air inlet openings will face down when the vent terminal is installed.
3. Prepare outside wall
 - a) Position vent terminal up to wall cutout so that both exhaust and air intake tubes are inserted into the terminal's back openings.
 - b) Check that the wall mounting plate overlaps the wall passage cutout on both sides for proper sealing to wall.
4. Install wall mounting plate
 - a) Separate wall mounting plate from vent terminal box by unscrewing the two screws on both sides of the terminal.
 - b) Run a bead of silicone around the inside perimeter of the back of the wall plate.
 - c) Slide the wall plate over the tubes and screw it securely to the outside wall. Check that the plate is flush and sealed to the wall around its perimeter.
 - d) Run a bead of RTV high-temperature sealant around the tubes, both where they pass through the wall plate and also about 1/4" from the end of each tube for sealing the vent terminal box in the next step.
5. Install vent terminal box
 - a) Place the vent terminal box over the tubes and reattach to the wall mounting plate with the screws removed in step 4.
 - b) Make sure the terminal is orientated so that the air intake tube inserts into the side of the terminal with the air intake openings, and that these openings face downward and the air intake cover is facing upward.
 - c) Make sure that both the air intake and exhaust tubes insert into the vent terminal box and are sealed properly.

- c) Check that the terminal itself is level and that its position ensures a 1/4" per foot downward pitch of the tubing from the boiler.
- d) Mark and drill out the location of the four screw holes in the wall for mounting the vent terminal.

STEP 3: INSTALL EXPANSION TANK AND WATER PIPING

Always follow good piping practices. Observe minimum 1" clearance to combustibles around all uninsulated hot water pipes or when openings around pipes are not protected by non-combustible materials.

Boiler must not be connected to a chiller. If the boiler supplies hot water to heating coils in air handling units, flow control valves or other devices must be installed to prevent gravity circulation of boiler water in the coils during the cooling cycle.

NOTICE: USE PIPE DOPE SPARINGLY AND SPREAD AROUND MALE PIPE THREADS ONLY.

Expansion Tank: (Provided) To install, see Figure 14. Piping systems with unusually large water volume may require the connection of a larger capacity expansion tank outside of the boiler's enclosure.

Relief Valve Discharge Piping: Install behind supply

water pipe. Use same size or larger piping (iron or copper) than valve outlet. Must terminate 6" from floor (or local codes) with a plain (no threads) end. DO NOT hard-pipe to drain piping. Make sure discharge is always visible.

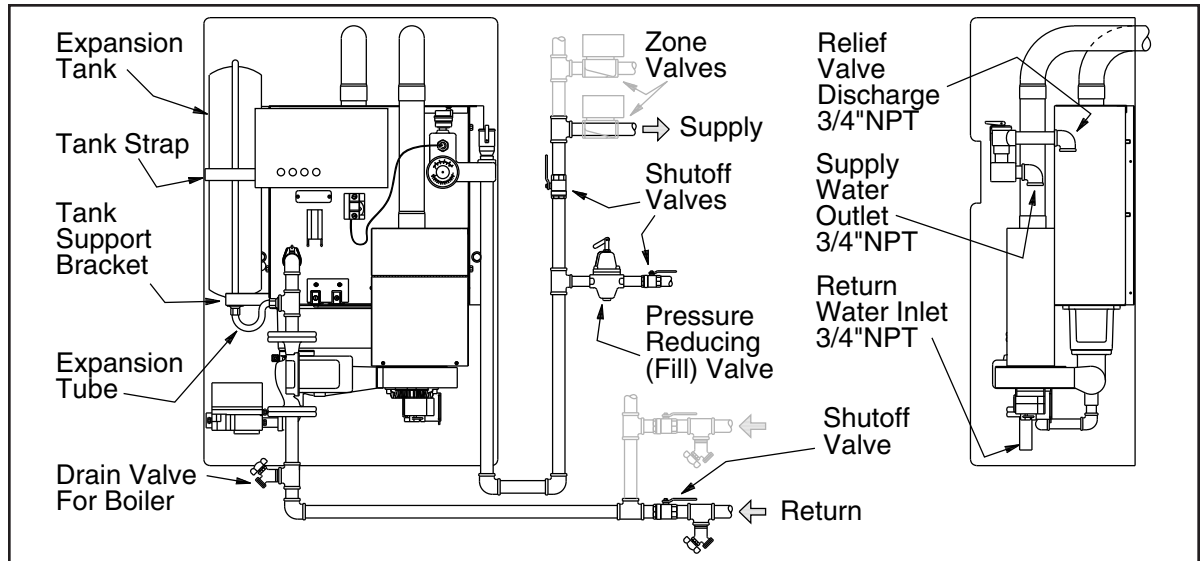
Cold Water Fill: Pressure reducing (fill) valve and shutoff valve should be installed.

Supply and Return: For tapping sizes, see dimensions on Page 3. Recommend shutoff valve in supply (and shutoff and drain valves in return on non-zoned system).

Radiant Floor and Standing Iron Radiant Systems: A boiler by-pass loop (or equivalent) will be required to avoid flue gas condensation on cast iron sections for low temperature application. (i.e. radiant floor systems.)

Zone Piping: See Page 20 for zoning with zone valves and domestic hot water installation.

Figure 14:
Expansion Tank and Piping Connections



Note: Factory-installed low water cutoff will shut off boiler in the event water falls below the lowest safe water level.

STEP 4: FILL AND PURGE HEATING SYSTEM

- Make sure flow direction arrows on components are facing in direction of flow.
- Place bucket under pressure relief valve discharge.

BASEBOARD AND RADIANT FLOOR SYSTEMS

- Close all shutoff valves, drain valves and air vents.
- Open supply shutoff valve and return drain valve on first zone (or return drain valve on non-zoned system). If zoned with zone valves, manually open zone valve.
- Attach a hose from return drain valve to a drain. Open fill line shutoff valve. Manually operate fill valve regulator. When water runs out of hose in a steady stream (with no air bubbles), close return drain valve.
- Repeat procedure for additional zones (one at a time).
- On completion, open all return shutoff valves.

STANDING IRON RADIATION AND SYSTEMS WITH MANUAL VENTS AT HIGH POINTS

- Close all shutoff valves, drain valves and air vents.

- Open supply and return shutoff valves. If zoned with zone valves, manually open all zone valves.
- Open fill line shutoff valve. Manually operate fill valve regulator. Open pressure relief valve manual operator to fill boiler. When water runs out of discharge pipe in steady stream (with no air bubbles), close operator.
- Starting with nearest manual air vent, open vent until water flows out; close vent. Repeat procedure, working your way toward farthest air vent.

WHEN FINISHED

- Place fill valve regulator and all zone valve operators in automatic position.
- Check that temperature/pressure gage reads minimum of 12 psi (fill pressure); exact pressure will vary with altitude. If piping system rises more than 16 feet vertically above boiler, higher fill pressures are required.
- Check for and repair any water leaks.

STEP 5: SELECT GAS PIPE SIZE

- Measure length of piping from gas meter to farthest appliance on gas line. MEASURE BOTH VERTICAL AND HORIZONTAL RUNS. This is the only measurement required regardless of which portion of the gas piping is being sized. No allowance required for fittings.
- Using sizing table below, enter table at top with number of running feet.

- Read down and match boiler's input to capacity (cu.ft./hr). If the input falls between two numbers, always use higher capacity.
- Read across to left side of table for correct pipe size.

Example: Prodigy Model KC-90, with 90,000 input, will be installed. Measured length of piping is 30 feet. From chart, a "matched" capacity would be 152; so, pipe size would be 3/4".

Schedule 40 Pipe Size	Maximum Capacity of Pipe (cu.ft./hr.) for Gas Pressures of 0.5 psig or Less and Pressure Drop of 0.3" W.C. (Based on 0.60 Specific Gravity Gas)													
	10	20	30	40	50	60	70	80	90	100	125	150	175	200
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"	1050	730	590	500	440	400	370	350	320	305	275	250	225	210
1 1/2"	1600	1100	890	760	670	610	560	530	490	460	410	380	350	320
2"	3050	2100	1650	1450	1270	1150	1050	990	930	870	780	710	650	610

STEP 6: INSTALL AND TEST GAS PIPING SYSTEM

Where it's applicable, local codes supercede these instructions. Always follow good piping practices. Inspect piping thoroughly for cleanliness before make-up. Pipe dope must be compatible with gas (NG or LP). NEVER use teflon tape or hard-setting compounds.

NOTICE: USE PIPE DOPE SPARINGLY AND SPREAD AROUND MALE PIPE THREADS ONLY.

Gas Piping Components: Install piping from gas meter to boiler with a manual main shutoff valve (recommend a full port, ball-type valve approved for use with gas), a ground joint union and full size sediment trap.

Piping Supports: Horizontal piping must be supported by hangers, not by the boiler or accessories. Space hangers 8 feet apart (or local codes).

GAS SUPPLY PRESSURE

Minimum and maximum gas supply pressure to the gas valve is provided on the boiler rating plate. Check local utility for pressure being supplied. If pressure is below minimum, contact the gas utility. If pressure is above maximum, install a 100% lock-up gas pressure regulator in gas supply line and adjust to maximum boiler gas pressure.

LEAK TEST GAS PIPING

For test pressures of 13" w.c. or less, isolate the boiler from gas piping by closing the manual main shutoff val-

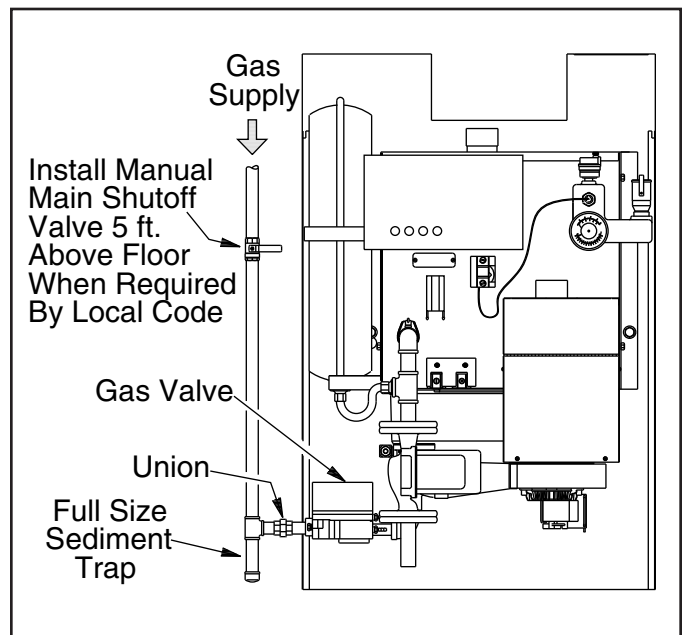


Figure 15: Gas Piping Component Locations

ve. For test pressures greater than 13" w.c., disconnect boiler gas valve from the gas piping. Pressurize the gas piping and bubble test all piping and boiler connections for leaks using soap solution.

DANGER: DO NOT USE FLAME TO CHECK FOR GAS LEAKS. FIRE OR EXPLOSION CAN RESULT.

STEP 7: INSTALL POWER AND THERMOSTAT WIRING

DANGER: BEFORE WIRING, ALWAYS TURN OFF ELECTRIC POWER SUPPLY. OTHERWISE, SHOCK OR DEATH CAN RESULT.

WARNING: DO NOT USE BOILER TRANSFORMER TO POWER EXTERNAL ACCESSORIES (i.e. ZONE VALVES, RELAYS). OVERLOADED/BURNED-OUT TRANSFORMER CAN RESULT.

WARNING: DO NOT CONNECT WIRES CARRYING POWER FROM AN EXTERNAL SOURCE TO THERMOSTAT OR AQUASTAT TERMINALS. SEVERE DAMAGE TO THE CONTROL BOARD CAN OCCUR.

Boiler must be electrically grounded in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the National Electrical Code, ANSI/NFPA 70.

Power Supply: A separately fused circuit is recommended. Use a standard 15-amp fuse or breaker and 14-gauge conductors in BX cable or conduit.

Thermostat Connections: The boiler will run at high or low fire, depending on space heating needs, when the T1 and T2 terminals are closed. Connect low voltage wiring from space heating zones to T1 and T2 terminals on control board. Wire connections to T1 and T2 terminal block must be from an isolated circuit. **DO NOT BRING VOLTAGE FROM AN EXTERNAL SOURCE HERE.** Wires should be only run from thermostats, zone valve end switches, or circulator end switches. 3 wire zone valves which do not have isolated end switches cannot be used unless a relay is added with the dry contacts wired to T1 and T2.

Thermostat Heat Anticipator: For zoned system, set to match amp draw of zone valve or circulator relay. For a non-zoned system, set to .3 amps.

Circulator Relay on Board: DO NOT exceed 5 amp/120V max. rating.

Wiring Diagrams: See index on Page 20 for zoning with zone valves, indirect-fired water heater and reference boiler diagram.

OPTIONS AVAILABLE

Domestic Hot Water Installation: The boiler will run at

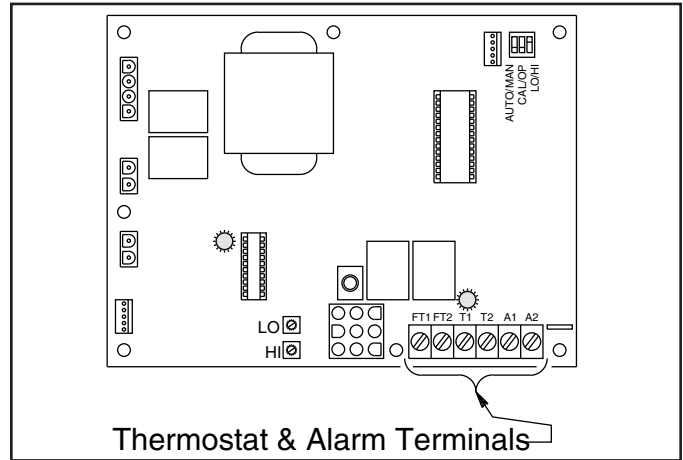


Figure 16: Electronic Boiler Control Board

Power Connections

- Remove electrical junction box cover.
- HOT CONNECTION LEAD IS BLACK.
- NEUTRAL CONNECTION LEAD IS WHITE.
- Connect ground inside box.

DO NOT REVERSE POWER CONNECTIONS; if reversed, ignition control will not detect a flame and will go into safety shutdown.

high fire mode for maximum recovery of the Storage Tank when the A1 and A2 terminals are closed. Connect zone valve end switch to A1 and A2 terminals on electronic boiler control board. Water heater thermostat operates zone valve. **DO NOT** bring power from an external source to these terminals. Note: 3 wire zone valves which do not have isolated end switches cannot be used unless a relay is added with the dry contacts wired to T1 and T2.

Alarm System: A remote-type alarm device may be connected to the boiler that will be activated if the boiler shuts down due to a malfunction. FT1 and FT2 terminals on electronic boiler control board are a dry contact (5 amp 120 V max) that makes on a system fault or power outage.

STEP 8: INSTALL JACKET ENCLOSURE

The jacket can also be installed after start-up procedures. Jacket components include boiler enclosure and front cover.

TO INSTALL BOILER ENCLOSURE

- For side wall venting ONLY, remove appropriate vent side panel from enclosure (located at top of sides).
- Place enclosure top over top flange of wall panel.
- Slide down until slots (on the insides of enclosure) are seated in support brackets on mounting panel.

- Attach sheet metal enclosure to wall panel on both sides with screws.

TO INSTALL FRONT COVER

- Insert the slots in cover bottom over support clips on sheet metal enclosure bottom.
- Line up temperature/pressure indicator and push cover in until support clip (at enclosure top) snaps into slot on cover top.
- Install the 4 LED window plugs into the front cover holes (if not factory installed).

PART 3: OPERATION PROCEDURES

INDICATOR LIGHT PANEL

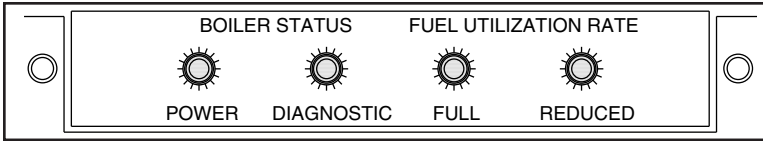


Figure 17: Indicator Lights Identification

LED indicator lights provide important information about boiler operation at a glance. When the CAL/OP selector switch (see Step 1 below) is UP in the OP position, the lights indicate as follows:

Power Indicator (RED): Steady ON means there is electrical power to the boiler. Light will come on when power is provided to boiler.

Diagnostic Indicator (RED): Steady ON or intermittent flashing indicates a system operation problem.

Full Rate Indicator (AMBER): Steady ON means boiler

is running in high-fire mode. Light will come on when the boiler starts up; will go off when boiler switches to low-fire mode or shuts off.

Reduced Rate Indicator (GREEN): Steady ON means the boiler is running in low-fire mode. Light will come on when boiler automatically switches to low-fire mode; will go off when boiler returns to high-fire mode or shuts off.

Note: When the CAL/OP selector switch is DOWN in the CAL position, the amber and green lights indicate pressure switch closure at high and low blower speeds.

STEP 1: SET UP MEASURING EQUIPMENT

A differential pressure gage is necessary to calibrate the blower speed and the gas valve to assure the proper air-gas ratio when the boiler is operating.

CALIBRATION EQUIPMENT:

Pressure measurement fittings: There are 3 service fittings with caps provided on this boiler for convenient calibration of the air/gas ratio and input in the field. See Figure 18 for the location of each.

Pressure measurement gage: Magnehelic or Incline differential pressure gage with 0 - 1.0" w.c. range and 0.02" increments recommended.

Available from Slant/Fin is a calibration gage kit (part number 665185) that has a gage mounted on a stand with a "togging" feature which allows the user to switch between the blower and gas valve calibration without moving the tubing connections.

Tubing and connectors for gage: Need 2 lengths of

3/16" I.D. plastic tubing with female adapters which mate to the service fittings.

- Mount gage securely, within reach of all tubing. Make sure it's level so the meter indicates "zero" or can be adjusted to do so. HI/LO sides marked on the gage.
- Calibration also requires using boiler Operation Selector Switches and Blower Speed Adjustment Pots, located on the Electronic Boiler Control Board (see Figure 19).

Operation Selector Switches

Switch #	Position	Operation	Description
1	Down	AUTO	Automatic Boiler Operation
1	Up	MAN	Manual Boiler Operation
2	Down	CAL	Calibration Procedures - Blower Runs Gas Valve WILL NOT OPEN
2	UP	OP	Normal Boiler Operation
3	Down	LO	Low Fire Operation
3	Up	HI	High Fire Operation

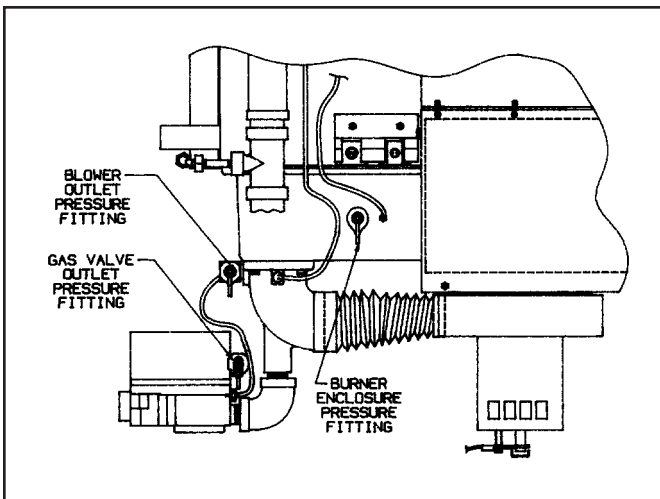


Figure 18: Locations of Pressure Measurement Fittings

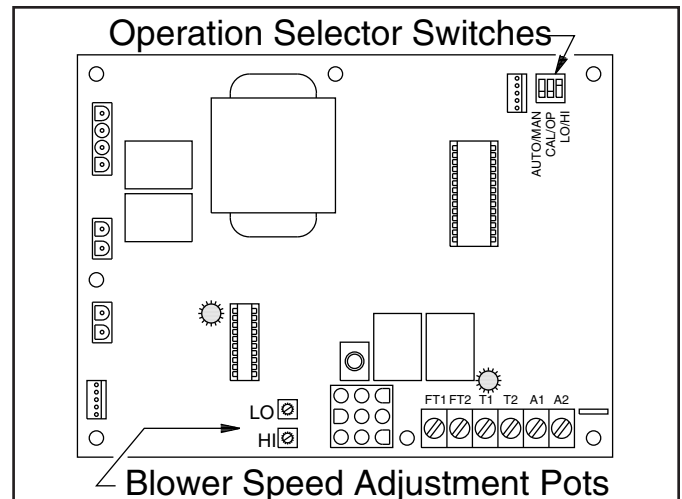


Figure 19: Electronic Boiler Control Board

STEP 2: CALIBRATE BLOWER SPEED

- Connect tubing to differential pressure gage as follows:
 1. From Blower Outlet Pressure Fitting on MIXING ELBOW to GAGE HI side.
 2. From BURNER ENCLOSURE Pressure Fitting to GAGE LO side.

FOR HIGH FIRE OPERATION:

- Set the Operation Selector Switches as follows:

Switch 1 (left)	UP	MAN
Switch 2 (center)	DOWN	CAL
Switch 3 (right)	UP	HI
- Turn power ON. (Red power light and amber full rate light will come on. Blower will start.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Reading should be 1.00" w.c.**

- Adjust as necessary. Using HI Blower Speed Adjustment Pot, turn in small increments (clockwise to increase reading or counterclockwise to decrease the reading). Allow to stabilize between adjustments.

FOR LOW FIRE OPERATION:

- Set the Operation Selector Switch 3 to DOWN, LO position. (Amber light goes off, green reduced rate light comes on.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Pressure reading should be 0.25" w.c..**
- Adjust as necessary. Using LO Blower Speed Adjustment Pot, turn in small increments (clockwise to increase reading or counterclockwise to decrease the reading). Allow to stabilize between adjustments.

STEP 3: CALIBRATE GAS VALVE (First Light-Off)

PURPOSE OF GAS VALVE CALIBRATION IS TO ADJUST AIR-GAS RATIO ONLY - NOT INPUT.

- Connect tubing to differential pressure gage as follows:
 1. From Blower Outlet Pressure Fitting on MIXING ELBOW to GAGE HI side.
 2. From GAS VALVE OUTLET Pressure Fitting to GAGE LO side.
- Disconnect any wires from T1, T2 and A1-A2 terminals and set up a jumper wire across T1-T2 terminals to control operation at boiler. Open zone valves.

FOR LOW FIRE OPERATION:

- Set the Operation Selector Switches as follows:

Switch 1 (left)	UP	MAN
Switch 2 (center)	UP	OP
Switch 3 (right)	DOWN	LO
- Open manual main gas shutoff valve and turn boiler gas valve ON.
- Place the jumper across the T1 and T2 terminals.
- After about 20 seconds, boiler will start. (Green reduced rate light on.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Reading should be 0" w.c. ±0.01".**
- Adjust as necessary. Remove round screw cap covering gas valve adjustment. Position screwdriver into adjustment screw slot carefully. Observe gage while

adjusting and turn screw slowly. Turn adjustment screw clockwise to decrease reading if over 0 set-point. Turn adjustment screw counterclockwise to increase reading if under 0 setpoint.

Note: Remember that the gas pressure is on the low side of the gage. Consequently, decreasing the differential reading actually is INCREASING the gas pressure reading, since the blower outlet pressure is on the high side of the gage and not changing.

FOR HIGH FIRE OPERATION:

- Set Operation Selector Switch 3 (right) to the UP, HI position. (Green light goes off. Amber full rate light comes on.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Pressure reading should be about 0" w.c. ±0.05".** If reading slightly off "zero", DO NOT re-adjust gas valve. This would alter the more critical low setting. This step is done only to check boiler rate switching ability.
- REPLACE SCREW COVER ON GAS VALVE ADJUSTMENT. Double check gage reading with cover on.
- Disconnect gage adapters and replace service fitting caps hand tight.
- If gas meter available, proceed to Step 4.

STEP 4: CHECK BOILER INPUT RATE

NOTICE: DO NOT USE GAS VALVE TO ADJUST INPUT RATE. FOLLOW DIRECTIONS BELOW.

- Consult gas supplier for heating value of gas (usually 1000 Btu/cu.ft. for NG; 2500 Btu/cu.ft. for LP).
- Place the jumper across the T1-T2 terminals and allow the boiler to operate 10 minutes.
- Shut off all other appliances served by gas meter during timing of input rate.

FOR HIGH FIRE OPERATION: Set the Operation Selector Switches to MAN, OP and HI.

- At meter, observe number of cubic feet of gas the boiler uses in 3 minutes.
- Verify input using following formula:

Cu.Ft. in 3 mins. x Heating Value x 20 = Btu/hr Input
Example: 4.5 cu.ft. x 1000 x 20 = 90,000 Input

FOR LOW FIRE OPERATION: Set Operation Selector Switch 3 to LO position.

- Allow operation to stabilize.
- At meter, observe number of cubic feet of gas boiler uses in 3 minutes. Verify input using same formula.

Example: 2.25 cu.ft. x 1000 x 20 = 45,000 Input

IF ADJUSTMENTS NECESSARY: Turn Blower Speed Adjustment Pot (HI for high-fire or LO for low-fire) in small increments, clockwise to increase input or counterclockwise to decrease input. Allow for stabilization of operation between adjustments.

STEP 5: SETUP SYSTEM FOR AUTOMATIC OPERATION

FOR INITIAL START-UP ONLY

- Remove jumper from across T1-T2 terminals and reconnect wires to control board T1-T2 and A1-A2 terminals properly.
- Restore zone valves to automatic operation.
- Set thermostat(s) to call for heat.
- Set selector switches to AUTO, OP and HI.

FOR NORMAL SYSTEM START-UP

- Set selector switches to AUTO, OP and HI.

- Follow lighting instructions attached to boiler. See index on Page 20 for reference lighting instructions and sequence of operation.

Safe lighting and other performance criteria were met with the gas manifold and control assembly provided on the boiler when the boiler underwent tests specified in ANSI Z21.13.

STEP 6: CHECK SYSTEM OPERATION

Purge Air One Final Time

- Let system water reach 160°. Temperature/pressure gage should be between 12 and 25 psi.
- Bleed all air vents until water squirts out; start on lowest floor with first air vent in the line of flow.

Check Exhaust and Air Intake Venting

- Check for and reseal any vent tubing leaks.
- Check for and remove any vent terminal obstructions.

Check Gas Valve Operation (With Burner Firing)

USE CAUTION - LINE VOLTAGE PRESENT.

- Disconnect flame sensor wire lead from flame sensor tab. Gas valve should close.

- It is normal for boiler to re-try for ignition (3 times) with wire removed from flame sensor, but gas valve should only open for a few seconds during each re-try and be closed between trials.
- Replace flame sensor wire lead on flame sensor tab.

Check High Limit Operation

HIGH LIMIT CANNOT BE SET BELOW 180°. HIGHEST MAXIMUM ALLOWABLE SETTING IS 220°.

- Set thermostat high enough for the water temperature to reach limit switch setting of 180°.
- When reached, limit switch should open and gas valve should close.

STEP 7: TEST COMMON VENTING SYSTEM (IF REQUIRED)

If existing boiler was removed from a common venting system, common venting system may be too large for proper venting of appliances remaining connected to it.

At the time of removal of existing boiler, the following steps shall be followed with each appliance remaining connected to common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

1. Seal any unused openings in common venting system.
2. Visually inspect venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of building. Turn on clothes dryer and any appliance not connected to common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed.

DO NOT operate a summer exhaust fan. Close fire-place dampers.

4. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from cigarette, cigar or pipe.
6. After it has been determined that each appliance remaining connected to common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliances to their previous condition of use.
7. Any improper operation of common venting system should be corrected so installation conforms with National Fuel Gas Code ANSI Z223.1. When resizing any portion of the common venting system, common venting system should be resized to approach minimum size as determined using appropriate tables in Part II in National Fuel Gas Code ANSI Z223.1.

PART 4: MAINTENANCE PROCEDURES

This section must be brought to the owner's attention, so the owner can make necessary arrangements with a trained and qualified service technician for periodic maintenance of this boiler. Installer must also inform owner that the lack of proper care and maintenance of this boiler may result in a hazardous condition. Installer should discuss contents of the User's Information Manual with the owner.

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

BEFORE EACH HEATING SEASON

A trained and qualified service technician should perform the inspections listed in these instructions at least once a year.

Vent Terminal: Check for and remove obstructions.

Closet Installations: Check for and remove ventilation air opening obstructions.

Vent Tubing: Check for and repair leaks or sagging.

Exhaust Tubing (Externally): Check for corrosion. To inspect, remove insulation. If corrosion is present, replace and reseal exhaust tubing assembly and insulation.

Exhaust and Air Intake Tubing (Internally): Check for and remove obstructions. To inspect, remove tubing from boiler. When finished, reseal all removed tubing parts with high-temperature RTV sealant and replace insulation.

Heat Exchanger: In the unlikely event of boiler flue passage blockage, service to remedy situation must be performed only by an authorized Slant/Fin representative.

Burner: In the unlikely event of burner sooting or blockages, service to remedy situation must be performed only by an authorized Slant/Fin representative.

System Water: Check that the system is full of water and properly pressurized. Check for and correct radiation system air "noise".

Water Piping: Check for and repair any leaks.

Gas Piping: Check for and repair any leaks.

Safety Shutdown Controls: Check operation as detailed on Page 14 in this manual.

Air Filter: Replace (recommended) or clean annually (more often if conditions dictate). Slant/Fin replacement air filter, part number 65-0524 must be used. Can be cleaned with soap and water; after drying, spray with an adhesive-type air filter spray which will attract/hold airborne dust particles.

Blower and Circulator: These are sealed components and do not require lubrication.

WATER TREATMENT

A good water treatment program will extend the useful life of the boiler and is especially recommended in areas where water quality is a problem. A reputable water treatment company should be consulted for determining the best overall treatment program for this equipment.

FREEZE PROTECTION

If anti-freeze must be used, INHIBITED PROPYLENE GLYCOL is recommended as it is practically non-toxic. For useful information on the characteristics and mixing proportions of anti-freeze in heating systems, obtain a copy of Technical Topics No. 2A from Hydronics Institute, 34 Russo Place, Berkeley Heights, NJ 07922.

WARNING: DO NOT USE ETHYLENE GLYCOL, AN AUTOMOTIVE-TYPE OR UNDILUTED ANTI-FREEZE. SEVERE BOILER DAMAGE CAN RESULT.

REPLACEMENT PARTS

When parts are needed, refer to Slant/Fin's Prodigy Replacement Parts List furnished with the boiler. If not available, contact local Slant/Fin wholesaler or Slant/Fin Corporation, Greenvale, NY.

Control identification and replacement should not be attempted by unskilled personnel. Only the simple, easily-identified controls and parts can be obtained locally. All other controls and parts may have to be ordered from Slant/Fin. Pressure relief valve must be ASME rated for the pressure and gross output of the boiler.

This boiler is equipped with an unconventional gas control. If this control is replaced, it must be replaced with an identical gas control and calibrated as specified in the Operation Procedures.

Replacement parts are available from:
Slant/Fin Corp.
100 Forest Drive
Greenvale, NY 11548

PART 5: TROUBLESHOOTING

DIAGNOSTIC INDICATOR LIGHT (RED)

Carefully note red diagnostic indicator light. When a system failure occurs, indicator light will show a series of quick flashes with a short interval between the series when indicator stops flashing. Count the number of flashes that occur after the short no-flashing interval. Correct failure code for each number of flashes is shown in box.

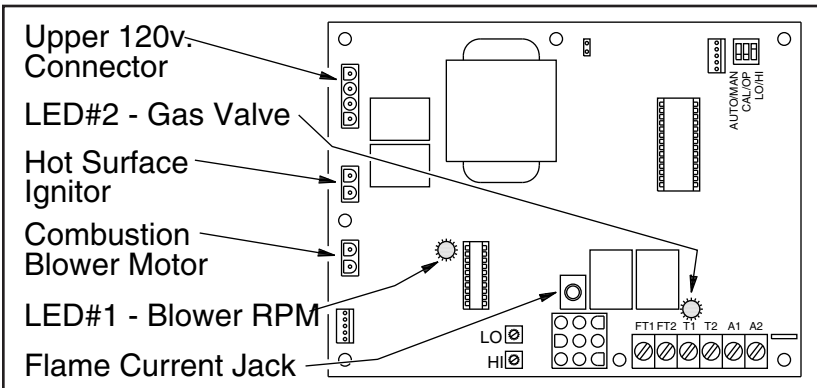
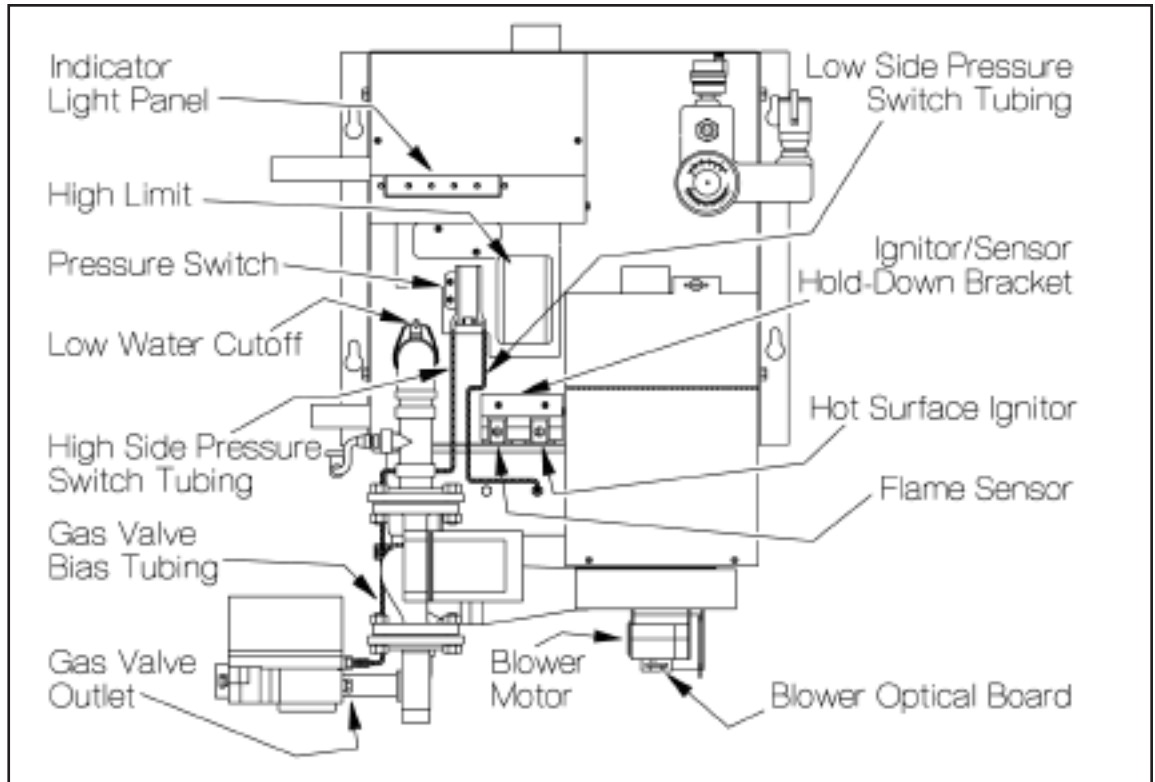
If the diagnostic light is off when service technician arrives, set thermostat to call for heat. Boiler will attempt restart. (Boiler also attempts restart each hour during failure mode and after a power interruption.) If the boiler restarts, the diagnostic light will stay off. If the boiler

Boiler Failure Codes Page

Continuous Flashing	-----Electronic Control Failure	17
1 Flash	-----High Limit Open 1 Hour	17
2 Flashes	-----No Ignition	17
3 Flashes	-----Pressure Switch Problem	17
4 Flashes	-----Hot Surface Ignitor Failure	18
5 Flashes	-----Blower RPM Too Low	18
6 Flashes	-----Low Water Cutoff Open	18
7 Flashes	-----Improper Flame Signal	18
Steady ON	-----Loss Of Flame Signal	18

does not restart, the diagnostic light will return to either Steady On or the series of flashes.

Figure 20:
Boiler
Components for
Troubleshooting



NOTICE: ANY WIRES CUT WHILE SERVICING MUST BE ROUTED TO AND SPLICED INSIDE THE BOILER JUNCTION BOX OR SEPARATE JUNCTION BOX.

Figure 21: Electronic Control Board Components For Troubleshooting

DIAGNOSTIC “Continuous Flashing” - ELECTRONIC CONTROL FAILURE

Electronic Control Is Defective. Control board cannot be serviced. Replacement must be same manufacturer and model. After replacement, calibrate blower speed as shown in Part 3 in manual.

DIAGNOSTIC “1 FLASH” - HIGH LIMIT OPEN 1 HOUR

CAUSE	TEST	SOLUTION
High Limit Is Defective?	Set high limit above boiler water temperature (raise limit setting substantially as water temperature may be higher than gage reading when there is no water flow through boiler). Check for continuity across high limit contacts.	If contacts remain open, replace high limit. <i>Replacement must be same manufacturer and model.</i> DO NOT set above 220°.
Circulator Not Running?	With thermostat calling for heat, check for power to circulator. If no power, check wiring connections to circulator.	If power OK, but circulator not running, replace circulator.
Zone Valves Not Opening?	With thermostat calling for heat, check for power to each valve. If no power, check wiring connections to valve.	If power OK, but valve not opening, replace valve.

DIAGNOSTIC “2 FLASHES” - NO IGNITION (No Flame Signal After Trial For Ignition)

No Gas Supply To Gas Valve?	Check that manual gas shutoff is open. Check for gas supply pressure to valve.	If no pressure, check for gas shutoff by utility.
No Gas Supply To Burner?	Check gas valve knob in ON position. Check wiring and tubing connections to valve. Check for power to gas valve. Note gas valve LED on control board (see Figure 21). Check valve outlet pressure to determine if valve is opening (see “How To Do It” on Page 19).	If valve not opening, replace valve. <i>Replacement must be same manufacturer and model.</i> Calibrate new valve as shown in Part 3 in manual.
Air-Gas Ratio Is Not Proper?	Check gas valve calibration as shown in Part 3 in manual.	If pressure reading is incorrect, adjust gas valve as shown in Part 3 in manual.
Orifice Sizing Is Not Correct?	Check gas and air orifice size (see “How To Do It” on Page 19).	If size not correct, contact Slant/Fin Technical Services Department.
Electrical Connections Are Loose or Reversed?	Check power wiring to electronic board, (hot wire to L1; neutral to L2) ground wire in junction box and to electronic board.	Correct all wiring connections.
Flame Sensor Current Is Weak?	Check flame sensor current with microammeter (see “How To Do It” on Page 19).	If reading is below 1 microamp, continue with “No Ignition” troubleshooting.
Flame Sensor Is Defective?	Remove flame sensor from boiler (see “How To Do It” on Page 19). Check for cracked, wet ceramic insulator or bent, burned, coated kanthal rod.	If defective, replace flame sensor. <i>Replacement must be same manufacturer, model and length.</i>

DIAGNOSTIC “3 FLASHES” - PRESSURE SWITCH PROBLEM

Electrical Wiring?	Check wiring connections to pressure switch. Wires go to Normally Open (N.O.) and Common (C) Connections on switch.	Correct all wiring connections.
No Pressure Signal To Pressure Switch?	Check for loose, blocked tubing connections to pressure switch; loose blower hose connection; loose blower wheel. Check for blocked air filter, vent terminal or vent tubing.	Secure all loose connections. Tighten blower wheel set screw. Remove obstructions. Replace or clean filter.
Blower Speed Not Correct?	Check blower calibration as shown in Part 3 in manual.	If pressure readings are incorrect, adjust blower speed as shown in Part 3 in manual.
Pressure Switch Is Defective?	Check pressure switch calibration (see “How To Do It” on Page 19). Check that pressure switch contacts are open (between N.O. and C) when blower is OFF.	If switch is defective, replace switch with same manufacturer, model and calibration.

DIAGNOSTIC “4 FLASHES” - HOT SURFACE IGNITOR FAILURE

CAUSE	TEST	SOLUTION
Electrical Wiring?	Check wire connections from ignitor.	Tighten all wiring connections.
Hot Surface Ignitor Tip or Ceramic Insulator Is Broken?	Turn power OFF. Carefully remove ignitor from boiler (see “How To Do It” on Page 19). Check for cracks, breakage.	If defective, replace ignitor. <i>Replacement must be same manufacturer, model and length.</i>
Hot Surface Ignitor Is Defective?	Energize ignitor while outside of boiler. BE CAREFUL OF HOT TIP. DO NOT allow hot tip to come in contact with your hand or any other objects. Turn off gas valve to prevent gas from exiting ignitor opening and igniting outside of boiler. Observe glow on ignitor tip.	If tip does not glow quickly and strongly, replace ignitor. <i>Replacement must be same manufacturer, model and length.</i>

DIAGNOSTIC “5 FLASHES” - BLOWER RPM TOO LOW

Electrical Wiring?	Check wiring connections to motor, particularly cable to RPM control on motor shaft.	Tighten all wiring connections.
Blower Wheel Restricted?	Check that wheel turns freely in housing (Remove filter from filter box; reach down through box to blower wheel). Check for foreign material or misalignment.	If wheel not free or misaligned, replace blower/motor assembly. <i>Replacement must be same manufacturer and model.</i>
Blower Motor Not Running?	Set boiler operation selector switch to CAL. Motor should run.	If motor does not run, replace blower/motor assembly. <i>Replacement must be same manufacturer and model.</i>
Blower Optical Board Is Defective?	Disconnect Blower Motor connector from control board. Spin the blower wheel by hand while observing Blower RPM Indicator LED on electronic board (see Figure 21). Indicator should blink on and off with each wheel revolution.	If indicator does not blink, replace board. <i>Replacement must be same manufacturer and model.</i>

DIAGNOSTIC “6 FLASHES” - LOW WATER CUTOFF OPEN

High Limit Is Defective?	Set high limit to lowest setting (180°); run boiler to get water temperature above 180°. Check for continuity across high limit contacts.	If contacts remain closed when temperature exceeds 180°, replace high limit. <i>Replacement must be same manufacturer and model. DO NOT set above 220°.</i>
Boiler Water Level Too Low?	Check temperature/pressure gage pressure reading. Carefully snap open relief valve handle to determine if boiler is full of water. If not full of water, check for system leaks and check water pressure regulator operation.	Repair any system leaks. Adjust or replace water pressure regulator.
Circulator Not Running?	With thermostat calling for heat, check for power to circulator. If no power, check wiring connections to circulator.	If power OK, but circulator not running, replace circulator.
Zone Valves Not Opening?	With thermostat calling for heat, check for power to each valve. If no power, check wiring connections to valve.	If power OK, but valve not opening, replace valve.

**DIAGNOSTIC “7 FLASHES” - IMPROPER FLAME SIGNAL
(Flame Signal Detected When Gas Valve Should Be Closed)**

Gas Valve Is Defective?	Turn gas valve knob to OFF and check that valve shuts off gas flow.	If gas flow continues, replace valve. <i>Replacement must be same manufacturer and model. Calibrate new valve as shown in Part 3 in manual.</i>
Flame Detector Shorted?	Remove flame detector from boiler. Check for coating on rod or material contacting rod inside ceramic or combustion area.	Clean or clear any foreign matter. Replace flame detector, if necessary, with same manufacturer, model and length.

**DIAGNOSTIC “Steady ON” - LOSS OF FLAME SIGNAL
(Flame Signal Lost After Proper Flame Signal Has Been Established)
Boiler continues to run normally but ONLY at high-fire.**

Improper Air-Gas Ratio?	Check gas valve calibration at low-fire.	Adjust gas valve at low-fire. Calibrate as shown in Part 3 of manual.
Low Blower Speed?	Check blower calibration at low-fire as shown in Part 3 of manual.	Adjust blower speed as shown in Part 3 of manual.
Bad Flame Sensor?	Check flame current at low-fire.	See “No Ignition” procedure regarding possible flame sensing problems.

“HOW TO DO IT” PROCEDURES FOR TROUBLESHOOTING

Flame Sensor Current

For microammeter with cable connector, insert cable connector into flame current jack on electronic board (see Fig. 21). Turn power ON. Once the gas valve opens, and ignition occurs at the burner, the microammeter must read at least 1 microamp to keep the gas valve open. Typically, the reading is between 5 and 10 microamps. (If no reading, polarity may be wrong - reverse leads.)

For microammeter without cable connector:

- Turn power OFF and remove lead from flame sensor.
- Connect one microammeter lead to the flame sensor wire lead; connect other microammeter lead to the flame sensor.
- Turn power ON. Once the gas valve opens, and ignition occurs at the burner, the microammeter must read at least 1 microamp to keep the gas valve open. Typically, the reading is between 5 and 10 microamps. (If no reading, polarity may be wrong - reverse leads.)

Flame Sensor Removal

- Turn power OFF and remove lead from flame sensor.
- Remove ignitor/sensor hold-down bracket.
- Carefully pull out flame sensor.

Hot Surface Ignitor Removal

- Turn power OFF and remove ignitor/sensor hold-down bracket.
- Carefully pull out ignitor (Handle With Care-Fragile). DO NOT CUT WIRES TO REMOVE IGNITOR.

Orifice (Gas and Air) Removal (See Figure 22)

- Turn power OFF and close gas manual shutoff valve.
- Disconnect gas valve bias tubing from gas valve.
- Disconnect wire harness from gas valve.
- Disconnect gas valve from boiler.
- Disconnect blower hose from mixing elbow.
- Remove screws securing mixing elbow to burner enclosure and remove mixing elbow.
- For gas orifice, unscrew (counterclockwise) gas orifice tube from mixing elbow. Note identifying stamp on tube for size.
- For air orifice, remove orifice plate from between the two gaskets. Note identifying notches on edge of plate for size.
- See Page 24 for correct orifice sizes and notch designations.
- Reassemble all parts removed. (Be sure the air orifice plate and gaskets remain square on top of mixing elbow, so screws pass smoothly through gasket holes.)
- Make sure all tubing and wiring connections are tight.

Pressure Switch Calibration

Procedure requires a Magnehelic gage to be connected to pressure service fittings as done in Operation Procedures, Step 2, for Calibrating Blower Speed. Refer to page 13.

- Turn power OFF.
- Set the boiler Operation Selector Switches to MAN, CAL and LO.
- Turn power ON. Blower should start.
- When pressure reaches .22" w.c. approximately, the pressure switch should close and green reduced rate light comes on.
- Using Blower LO-Speed Adjustment Pot, decrease the pressure slowly until green light goes off, indicating the pressure switch has opened. This reading should be .12" w.c.
- If reading is not .12" w.c. or if switch does not open or close during this procedure, replace switch.
- Replacement must be same manufacturer and model with .12" w.c. cutout setting.
- Recalibrate the blower as shown in Part 3 in manual. Then return selector switches to normal.

Inlet Gas Pressure

- Measure i.g.p. at inlet pressure tap on gas valve (see Fig. 22).

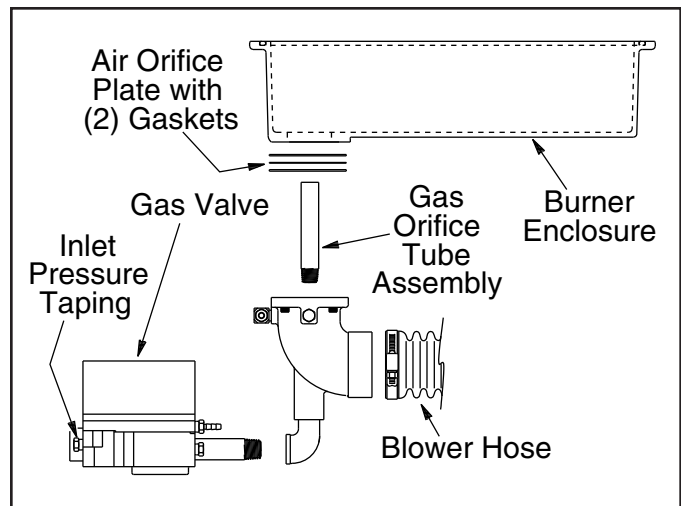


Figure 22: For Access To Gas and Air Orifices

INDEX TO REFERENCES

Lighting Instructions (Part No. 65-0640)	23
Lighting Instructions (Part No. 65-0645)	23
Orifice (Gas and Air) Sizes	24
Sequence Of Operation	21
Wiring Diagram (Part No. 65-0641)	22
Zoning With Zone Valves (DHW Included)	20

For Lighting Instructions

Locate lighting instructions label attached to your boiler. A Slant/Fin part number is printed in the lower right corner of the label. Use this part number to find the appropriate lighting instruction reference in this manual.

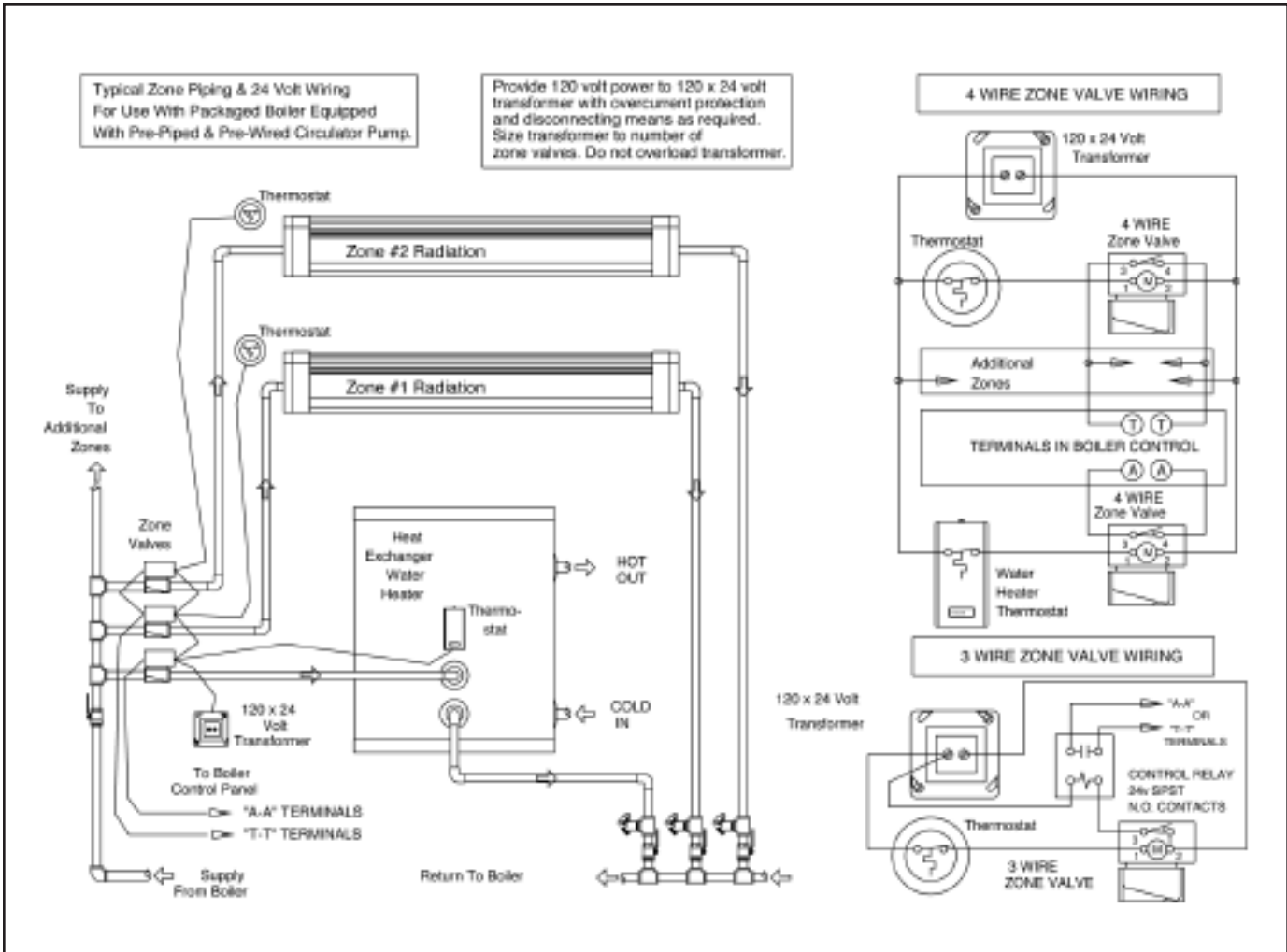
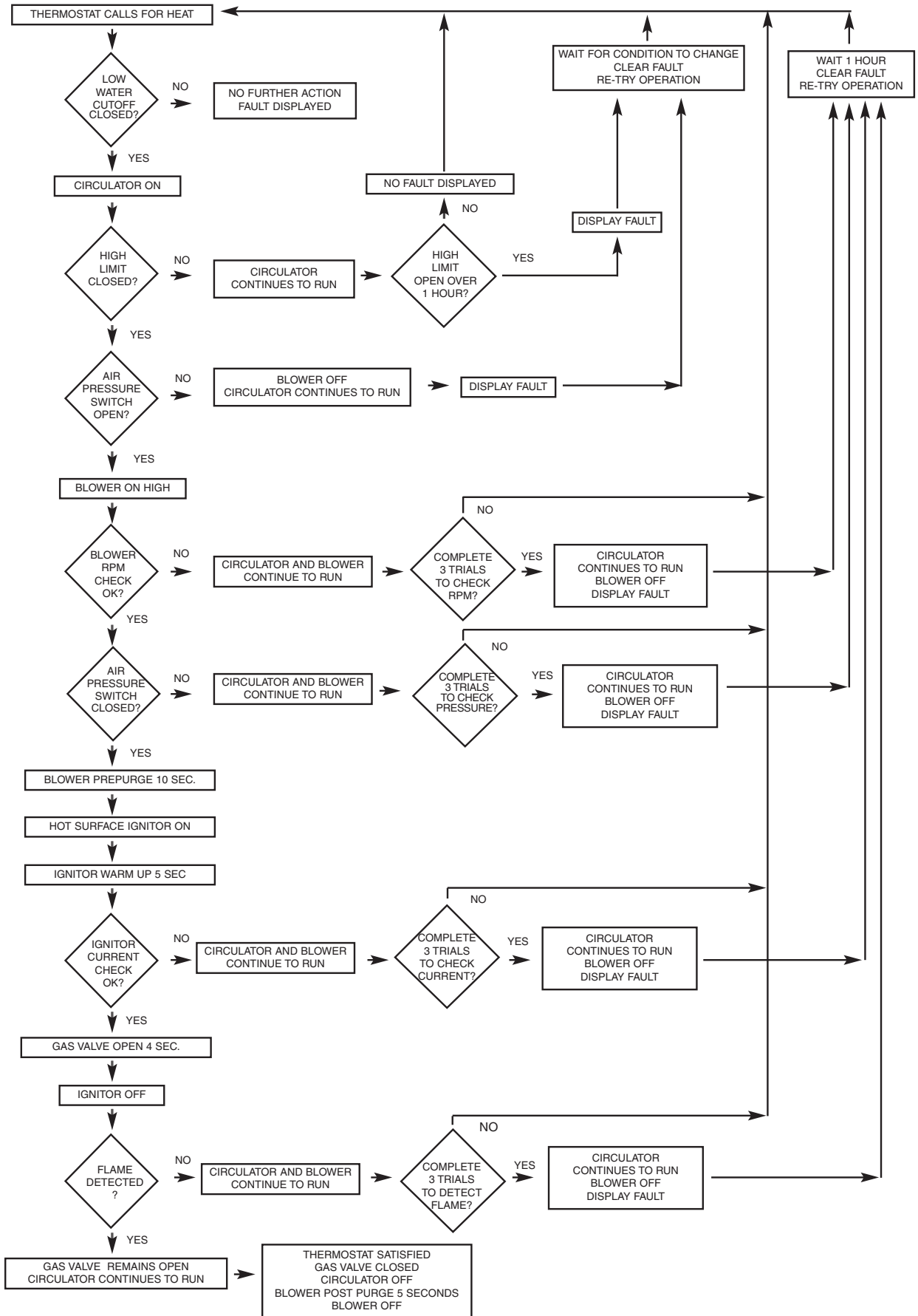
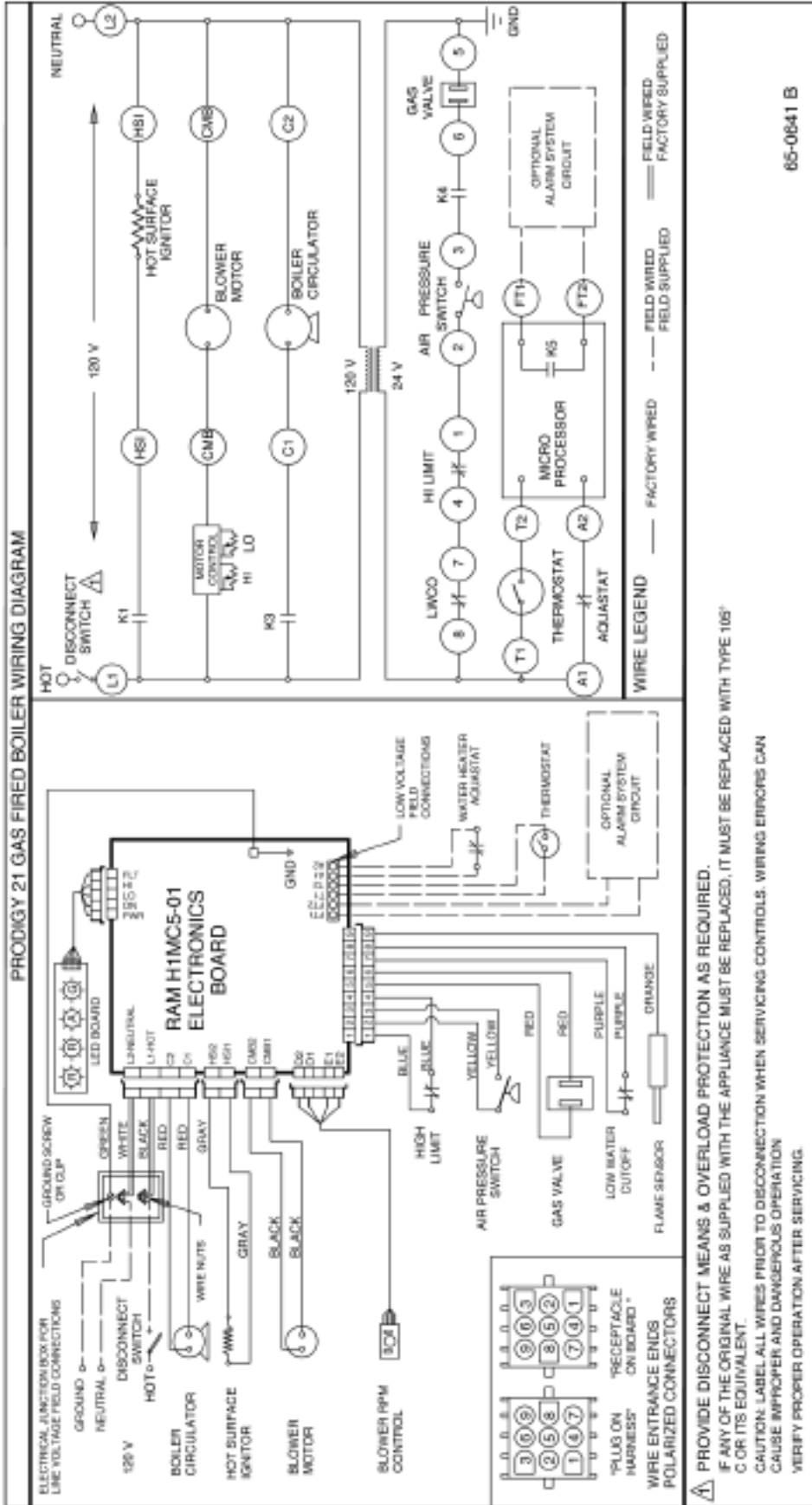


Figure 24: Zone Valves (with indirect-fired water heater) Piping and Wiring

PRODIGY 21 SEQUENCE OF OPERATION



PRODIGY 21 GAS FIRED BOILER WIRING DIAGRAM



LIGHTING INSTRUCTIONS (Reference For Labels 65-0640 and 65-0645)

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 does not have a pilot. It is equipped with an ignition device that automatically lights the burner. DO NOT try to light the burner 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 turn the gas control knob or depress and move the gas control selector arm. NEVER use tools. If the knob will not turn or selector arm will not depress or move by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

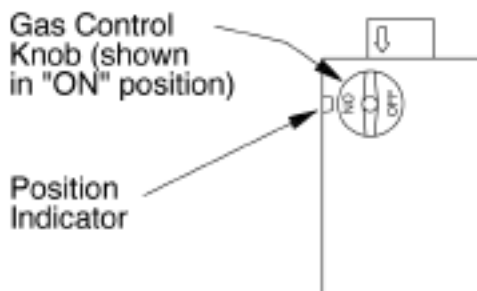
D. DO NOT use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

OPERATING INSTRUCTIONS (Label 65-0640)

- **STOP!** Read the safety information above on this label.
- Set the thermostat to lowest setting.
- Turn off all electric power to the appliance.
- This appliance is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
- Remove control access panel.
- Turn gas control knob clockwise  to "OFF" position.
- Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
- Turn gas control knob counterclockwise  to "ON" position.
- Replace control access panel.
- Turn on all electric power to the appliance.
- Set thermostat to desired setting.
- 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

- Set thermostat to lowest setting.
- Turn off all electric power to the appliance if service is to be performed.
- Remove control access panel.
- Turn gas control knob clockwise  to "OFF" position.
- Replace control access panel.




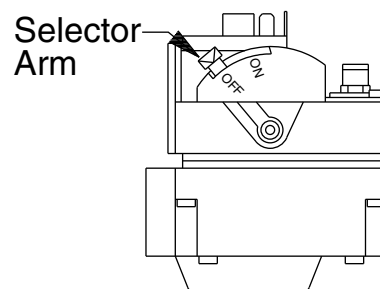
Gas Valve 36E65-202

OPERATING INSTRUCTIONS (Label 65-0645)

- **STOP!** Read the safety information above on this label.
- Set the thermostat to lowest setting.
- Turn off all electric power to the appliance.
- This appliance is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
- Remove control access panel.
- Depress and move gas control selector arm left  to "OFF" position. Note: Arm cannot be turned to "OFF" unless arm is pushed in slightly. DO NOT force.
- Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
- Depress and move gas control selector arm right  to "ON" position.
- Replace control access panel.
- Turn on all electric power to the appliance.
- Set thermostat to desired setting.
- 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

- Set thermostat to lowest setting.
- Turn off all electric power to the appliance if service is to be performed.
- Remove control access panel.
- Depress and move gas control selector arm left  to "OFF" position.
- Replace control access panel.



Gas Valve 7200 DERN



PRODIGY 21 Hot Water Boiler Instruction Manual

Gas Orifices

Boiler Model	Gas Type	Gas Orifice Size	Input - BTU/HR	
			Full Rate	Reduced Rate
KC-45N	Natural	0.169"	45,000	22,500
KC-45P	Propane	0.138"	45,000	22,500
KC-90N	Natural	0.228"	90,000	45,000
KC-90P	Propane	0.183"	90,000	45,000

Air Orifices

Boiler Model	Air Orifice Size	Identifying Plate Notches
KC-45N KC-45P	1.075"	1 notch
KC-90N KC-90P	1.320"	2 notches

BOILER PACKING LIST

- Boiler Instruction Manual
- Replacement Parts List
- User's Information Manual
- Lifetime Limited Warranty
- Wall Mounting Panel
- 5/16" Lag Bolts (4)
- 5/16-18 Hex Nuts (4)
- 2" Stainless Steel Elbowed Length
- 2" Copper Elbow

- 2" Copper Coupling
- 2" Copper Lengths (2)
- Flue Insulation, 18" Length
- Tube of High-Temperature RTV Sealant Dow#732 or equal
- Vent Terminal
- Expansion Tank
- Jacket Enclosure
- Front Jacket Cover
- Service Fitting Adapters (2)

OPTIONAL VENT KIT

Slant/Fin Part Number 65-0617

- 2" Stainless Steel 36" Length
- 2" Copper 36" Length
- 2" Copper Coupling
- Flue Insulation 36" Length

Refer to Prodigy Replacement Parts List for materials needed to cover other venting options.

