

# INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS ALLIANCE™ SERIES INDIRECT-FIRED WATER HEATERS MODELS AL-26A, 40A, 53A, 79A and 119A

for SINGLE WATER  
HEATER  
INSTALLATIONS



For service or repairs to the water heater, call your heating contractor. When seeking information on water heater, provide Model Number and Serial Number as shown on Rating Label.

|                            |                            |                   |
|----------------------------|----------------------------|-------------------|
| Model Number<br>_ AL _____ | Serial Number<br>_ _ _ _ _ | Installation Date |
| Heating Contractor         |                            | Phone Number      |
| Address                    |                            |                   |



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## IMPORTANT INFORMATION - READ CAREFULLY

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NOTE: The equipment shall be installed in accordance with those installation regulations required in the area where the installation is to be made. These regulations shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made.

All wiring on water heaters installed in the USA shall be in accordance with the National Electrical Code and/or local regulations.

All wiring on water heaters installed in Canada shall be in accordance with the Canadian Electrical Code and/or local regulations.

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning the life of the water heater.

### DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

### CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury or property damage.

### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death, serious injury or substantial property damage.

### NOTICE

Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.

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### DANGER

**DO NOT** store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.

If you smell gas vapors, **DO NOT** try to operate any appliance - **DO NOT** touch any electrical switch or use any phone in the building. Immediately, call the gas supplier from a remotely located phone. Follow the gas supplier's instructions or if the supplier is unavailable, contact the fire department.

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## I. General Information

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### WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Read and understand the entire manual before attempting installation, start-up operation, or service. Installation and service must be performed only by an experienced, skilled installer or service agency.

Installation is not complete unless a pressure and temperature relief valve is installed into the side of the water heater. See Piping Section of this manual for details.

This water heater contains very hot water under high pressure. Do not unscrew any pipe fittings nor attempt to disconnect any components of this water heater without positively assuring the water is cool and has no pressure. Always wear protective clothing and equipment when installing, starting up or servicing this water heater to prevent scald injuries. Do not rely on the pressure and temperature gauges to determine the temperature and pressure of the water heater. This water heater contains components which become very hot when the boiler is operating. Do not touch any components unless they are cool.

Water heater materials of construction contain urethane, heavy metals and/or other toxic or harmful substances which can cause death or serious injury and which are known to the state of California to cause cancer, birth defects and other reproductive harm. Always use proper safety clothing, respirators and equipment when servicing or working nearby this water heater.

Failure to follow all instructions in the proper order can cause personal injury or death. Read all instructions, including all those contained in component manufacturers' manuals which are provided with the water heater before installing, starting up, operating, maintaining or servicing.

### NOTICE

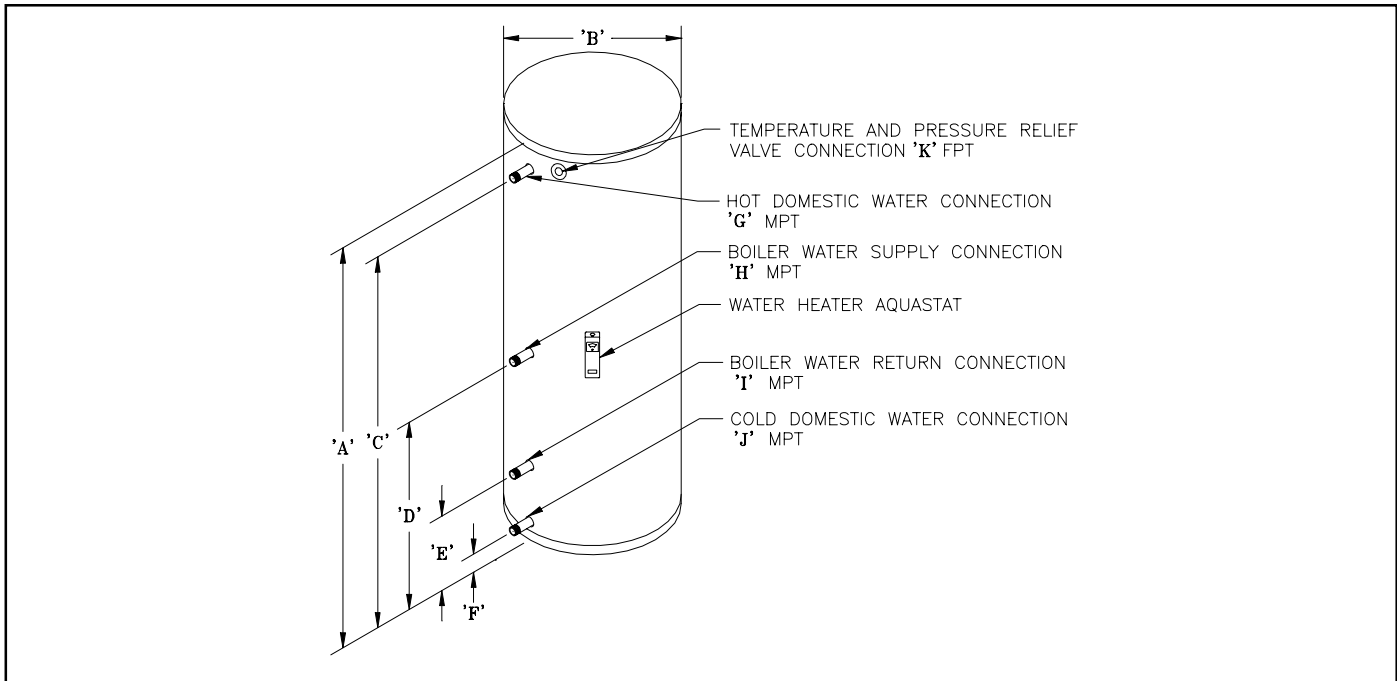
The Alliance water heater must be installed with a pressure and temperature relief valve. The valve is not supplied with the water heater and must be provided by the installer.

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**Table 1: Alliance Water Heater Dimension (Inches)**

| ALLIANCE MODEL | A      | B      | C      | D      | E      | F     | G     | H     | I     | J     | K   |
|----------------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-----|
| AL26A          | 40     | 20-1/4 | 31-1/2 | 22-1/2 | 9-3/4  | 2     | 3/4   | 3/4   | 3/4   | 3/4   | 3/4 |
| AL40A          | 55     | 20-1/4 | 46-1/2 | 25-3/4 | 9-3/4  | 2     | 3/4   | 3/4   | 3/4   | 3/4   | 3/4 |
| AL53A          | 70-5/8 | 20-1/4 | 62-1/8 | 28-3/4 | 9-3/4  | 2     | 3/4   | 3/4   | 3/4   | 3/4   | 3/4 |
| AL79A          | 69-3/8 | 23-3/4 | 60-7/8 | 29-1/4 | 10-1/4 | 1-5/8 | 1     | 3/4   | 3/4   | 1     | 1   |
| AL119A         | 66     | 29-1/2 | 52-3/4 | 39-1/4 | 12-3/4 | 2-1/2 | 1-1/4 | 1-1/4 | 1-1/4 | 1-1/4 | 1   |

**Table 2: Alliance Water Heater Capacities**

| ALLIANCE MODEL | TANK VOLUME (GAL) | COIL VOLUME (GAL) | DRY WEIGHT (LBS) | WET WEIGHT (LBS) | COIL HEAT TRANSFER AREA (SQ. FT.) | MAXIMUM ALLOWABLE WORKING PRESSURE (PSI) | HYDROSTATIC DESIGN PRESSURE (PSI) |
|----------------|-------------------|-------------------|------------------|------------------|-----------------------------------|--|-----------------------------------|
| AL26A          | 26.4              | 1.0               | 49               | 269              | 6.5                               | 150                                      | 300                               |
| AL40A          | 39.6              | 1.2               | 66               | 396              | 8.6                               | 150                                      | 300                               |
| AL53A          | 52.8              | 1.4               | 82               | 522              | 9.7                               | 150                                      | 300                               |
| AL79A          | 79.3              | 2.2               | 170              | 831              | 15.1                              | 150                                      | 300                               |
| AL119A         | 119.4             | 2.9               | 183              | 1178             | 24.3                              | 150                                      | 300                               |

**Table 3: Alliance Water Heater Performance**

| MODEL  | MAXIMUM FIRST HOUR RATING GAL/HR @ |      | CONTINUOUS RATING GAL/MIN @ |      | BOILER DOE HEATING CAPACITY NEEDED FOR RATINGS (BTU/HR) | MINIMUM BOILER WATER FLOW THROUGH HEATER COIL (GAL/MIN) | PRESSURE DROP THROUGH COIL AT MIN. FLOW (FT. W.C.) | MINUTES OF 140F WATER AVAILABLE AT 5 GPM DRAW |
|--------|------------------------------------|------|-----------------------------|------|---|---|--|---|
|        | 140F                               | 115F | 140F                        | 115F |   |   |  |   |
| AL26A  | 142                                | 197  | 1.93                        | 2.84 | 110,000   | 8.0   | 2.5  | 2.4   |
| AL40A  | 175                                | 242  | 2.26                        | 3.38 | 133,000   | 11.4  | 6.1  | 7.2   |
| AL53A  | 224                                | 310  | 2.85                        | 4.29 | 164,000   | 10.9  | 6.5  | 9.0   |
| AL79A  | 253                                | 350  | 2.90                        | 4.51 | 190,000   | 10.6  | 8.4  | 9.1   |
| AL119A | 350                                | 409  | 3.84                        | 4.83 | 386,000   | 15.4  | 11.6   | 16.4  |

**NOTES:** All ratings based on 200F boiler water temperature, 50F domestic water inlet temperature, and a fully recovered tank (when applicable).

## CAUTION

The heat transfer medium must be water or other non-toxic fluid having a toxicity rating or class of 1, as listed in clinical Toxicology of Commercial Products, 5th edition.

The pressure of the heat transfer medium must be limited to a maximum of 30 psig by an approved safety or relief valve.

## NOTICE

This water heater has a limited warranty, a copy of which is printed on the back of this manual. It is the responsibility of the installing contractor to see that all controls are correctly installed and are operating properly when the installation is complete.

## II. Pre-Installation

Inspect shipment carefully for any sign of damage. All equipment is carefully manufactured, inspected and packed. Burnham Corporation's responsibility ceases upon delivery of water heater to the carrier in good condition. Any claim for damage or shortage in shipment must be filed immediately against the carrier by the consignee. No claims for variances or shortages will be allowed by Manufacturer, unless presented within sixty (60) days after receipt of equipment.

Installation must conform to the requirements of the authority having jurisdiction. In the absence of such requirements, installation must conform to National Plumbing Code and National Electrical Code, ANSI/NFPA No. 70, current edition.

### IMPORTANT DECISIONS REQUIRED BEFORE INSTALLATION:

#### A. Sizing

1. **Alliance™ Model** - Choose the Alliance™ model based on the expected water usage of the building. The average residence with one shower or more will require a model AL40A or larger. The AL26A should only be considered for residences with minimal water demand or for commercial application where showers are not present.

Factors which dramatically increase water demand include high flow shower heads, whirlpool tubs, and the use of multiple showers at the same time. Upsize the tank size if any of these factors are

present.

Consult Burnham for size recommendations for installation with unusual water demand.

Refer to Table 3 for water heater performance specifications.

2. **Boiler DOE Heating Capacity** The Alliance™ water heater will provide the rated performance only if used in conjunction with a boiler with a DOE heating capacity at least as much as the minimum noted in Table 3. If the boiler has less capacity, the output of the tank will be reduced. To determine the approximate reduction in output from the tank use the following formula:

For example, what would the first hour rating be if a model AL53A were installed with a boiler having a DOE heating capacity of 120,000 BTU/h?

Increasing the boiler DOE heating capacity above the values listed in Table 3 will not increase the rating of the water heater.

3. **Circulator Sizing** - Refer to Table 3 for the minimum flow rate through the water heater coil and the corresponding pressure drop through the coil. Calculate the pressure drop of all straight pipe and fittings on the supply and return of the water heater at the minimum flow rate. Add the piping/fitting pressure drop to the pressure drop through the water heater coil.

Select a circulator which will provide at least the minimum flow rate at combined pressure drop.

**B. System Zone Control** The Alliance™ water heater must be installed as a zone separate from the space heating system. The domestic hot water zone's piping and circulator must be sized for a minimum flow rate with all zones in use and a maximum flow rate with only the water heater in use. For this reason, the preferred method of zone control is with circulators.

1. **Circulators** - With space heating zones using circulators, the Alliance™ should be added as an additional zone with a circulator.
2. **Zone Valves** - Select a valve with low pressure drop to assure adequate flow through the water heater.
3. **Hybrid** - The space heating zone can be zoned using zone valves and Alliance™ zoned with a circulator. Refer to Figures 3 and 5.

**C. Domestic Hot Water Priority** Two options are available, Priority and Non-Priority.

1. **Priority** Demand for space heating is interrupted or postponed until the domestic hot water demand is satisfied. This option provides maximum delivery of domestic hot water. Priority is recommended when:
  - a. Boiler net output is 100,000 Btu per hour or less, or
  - b. When boiler output required to satisfy domestic hot water demand is at least 50% of the boiler output required to satisfy space heating demand, or
  - c. When an interruption in space heating can be tolerated during a long domestic hot water draw.

The delay in space heating may not be noticed due to the fast recovery time of the Alliance™ water heater. Certain water heater system malfunctions (such as domestic hot water zone circulator failure) could delay space heating indefinitely.

When zoning with zone valves, priority can be provided with a three-way valve. Carefully size the valve for proper flow to all zones.

2. **Non-Priority** Boiler output is divided between space heating and domestic hot water heating. Delivery of domestic hot water can be reduced

during simultaneous space and domestic hot water heating operations, depending on such factors as boiler output, boiler over sizing, number of space heating zones calling for heat and ratio of domestic hot water load to space heating load.

## D. Component Location

### 1. Alliance™ Location

When such a location cannot be avoided, a suitable drain pan must be installed under the water heater. The drain pan must be connected to a drain. Adequate clearance from combustible materials and for service must be provided.

The Alliance™ is design certified for installation on combustible flooring.

The Alliance™ may be installed in a closet or alcove.

2. **Boiler Location** - Locate the boiler as close to the Alliance™ as practical.
3. **Fixture Locations** - For fastest delivery of hot water, place Alliance™ close to points of use.

## E. Additional Recommended Components

1. **Shut-off Valves** - Allows isolation of water heater from domestic water system and/or boiler system during service.
2. **Unions** - Allows water heater movement during service if adequate clearance cannot be provided.
3. **Vacuum Breaker** - Protects water heater's tank from possible collapse if a hot tank is allowed to

cool to room temperature, or if tank is drained without opening a hot water faucet. A Watts® Model No. N36 is an appropriate vacuum relief valve.

4. **Thermal Expansion Tank** If water heater is installed in a closed water supply system, such as one having a back-flow preventer in the cold water line, provide thermal expansion control. Contact the water supplier or local plumbing inspector for additional information. An Amtrol Model ST-12 is an appropriate diaphragm style thermal expansion tank for most installations.

## **F. Removal of Existing Domestic Water Heating System**

1. **External Tankless Heater** - Disconnect from boiler piping and domestic water system.
2. **Tankless and Storage Heaters** - Disconnect from domestic water system. Heater does not need to be removed from boiler. If left in place, do not plug

inlet and outlet tappings.

- G. Water Quality** Improper water quality will reduce the expected life of the Alliance™ water heater. Hard water, sediment, high or low water Ph, and high levels of chlorides in the domestic water should be avoided. Sediment and hard water will coat the water heater coil surfaces and reduce the rating of the water heater and may, eventually, cause a failure. High or low Ph and/or high chloride concentrations will cause the stainless steel water heater components to corrode and eventually fail. A filter is strongly recommended where sediment is present in the water. A water softening system is recommended for areas with hard water. In areas where water quality is unknown, a water quality test should be performed.

## **WARNING**

**Do not operate ALLIANCE™ water heater in areas where water Ph is above 8.0 or below 6.0, and/or with chloride concentrations greater than 80 parts per million (ppm). Burnham's Standard Warranty does not cover problems caused by improper water Ph or excessive levels of chlorides.**

### III. Piping

#### A. Drain domestic water system.

1. Shut off cold water supply at main shut-off valve.
2. Open one or more system faucets to relieve pressure. Open system drain valve, leaving faucets open to relieve vacuum.
3. Disconnect existing domestic water heating system (if applicable).

#### B. Position Alliance™ in final location.

#### C. Connect domestic hot water piping (see Figure 1).

1. Install piping and union out of indicated supply connection.
2. Install Temperature-Pressure Relief Valve (installer supplied) in the indicated location. Do not place shut-off valve between the tank and relief valve.

#### 3. Pipe relief valve discharge to floor.

4. Connect from supply union to hot water supply system using vacuum breaker, shut-off valve, and heat trap (to prevent thermal siphoning during non-draw periods).

#### D. Connect cold water supply piping (see Figure 2).

1. Install piping into connection on bottom of tank as indicated.
2. Connect to cold water supply system using union, shut-off valves, expansion tank (where required), back flow preventer (where required), and filter (recommended to prevent sediment buildup in tank).

#### E. Fill Alliance™ tank.

1. Open all faucets to allow air to purge from tank and piping. Remove screens on faucet.
2. Open domestic hot water shut-off valve.
3. Open cold water inlet shut-off valve.

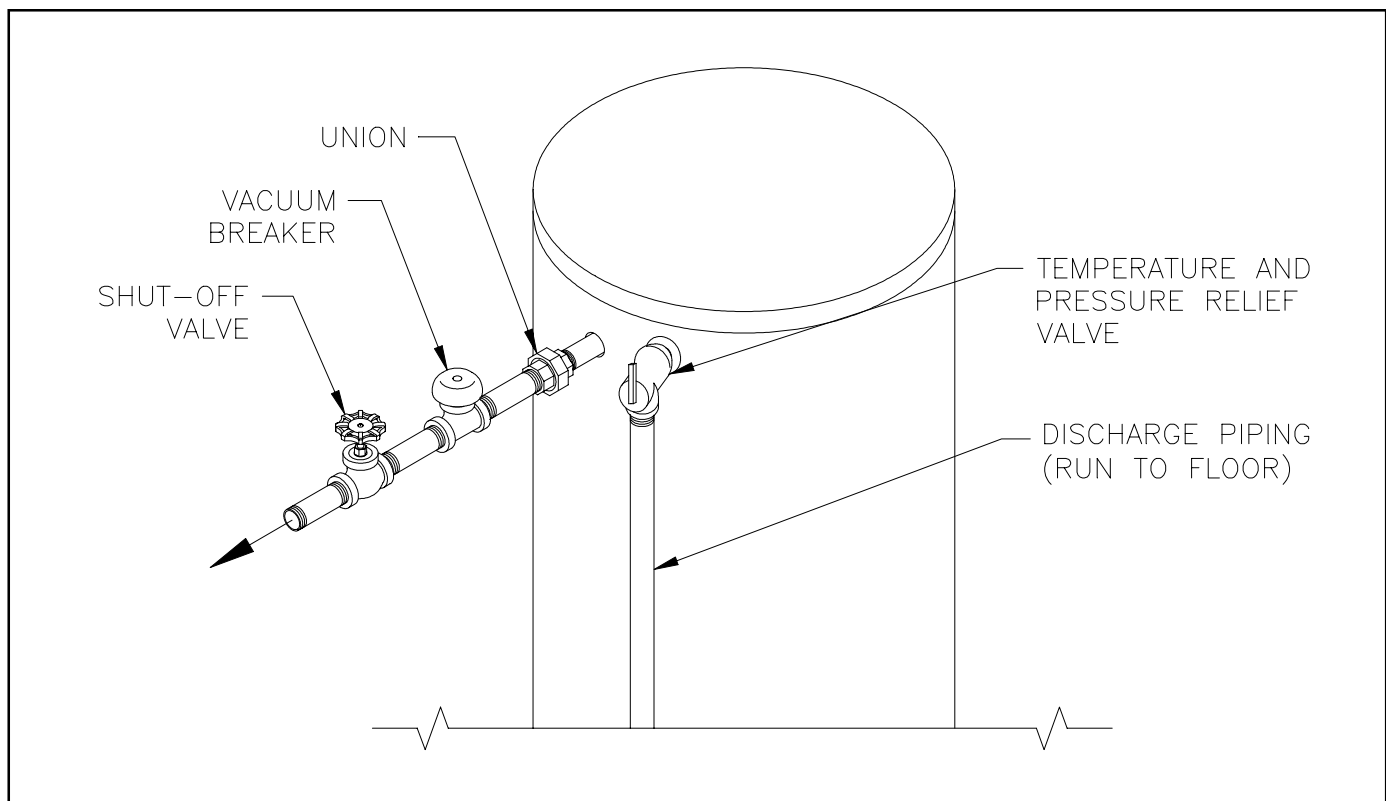


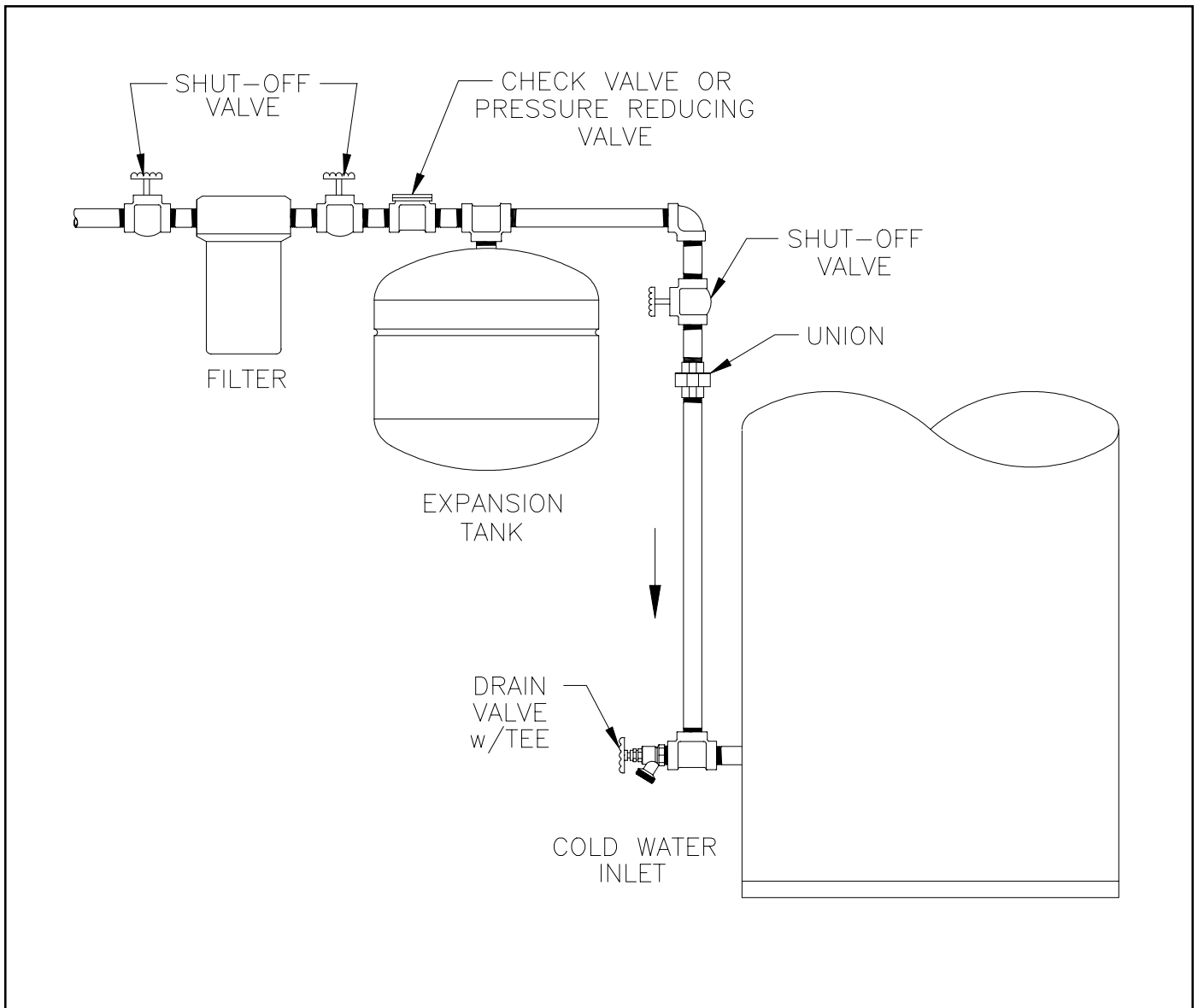
Figure 1: Hot Water and Relief Valve Piping

4. Purge air from domestic water system. Allow water to run so the tank is thoroughly purged of any debris. Run water long enough so that a minimum of five (5) volume changes of the tank are accomplished. Close faucets. Reinstall screens.
5. Check system for leaks. Repair as necessary.

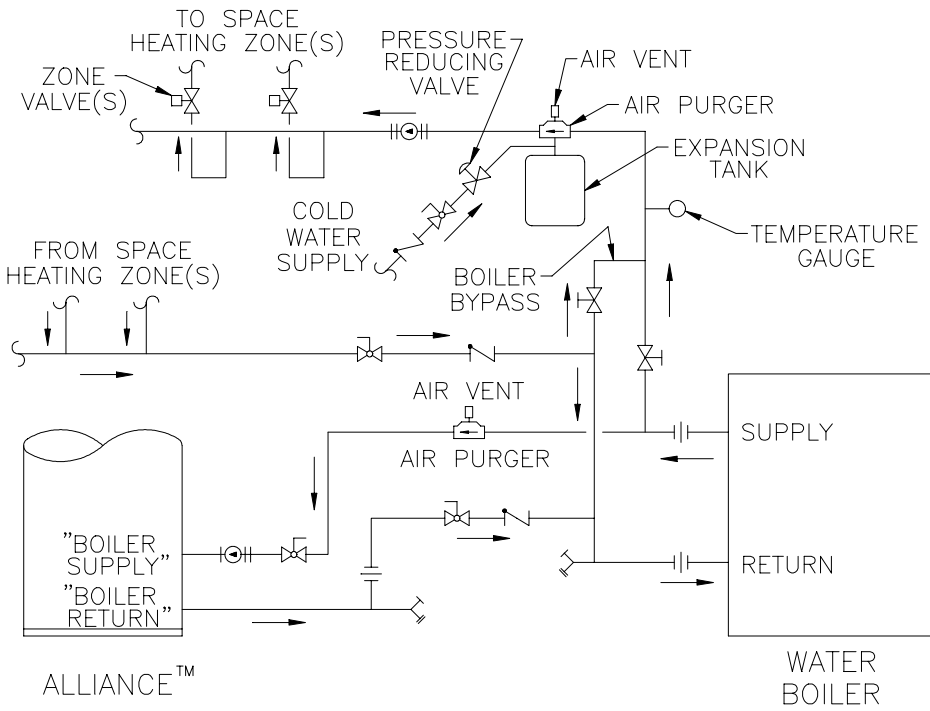
**F.** Connect water boiler return piping (See Figures 3 thru 6).

(For connection to a steam boiler skip ahead to **H** on page 12).

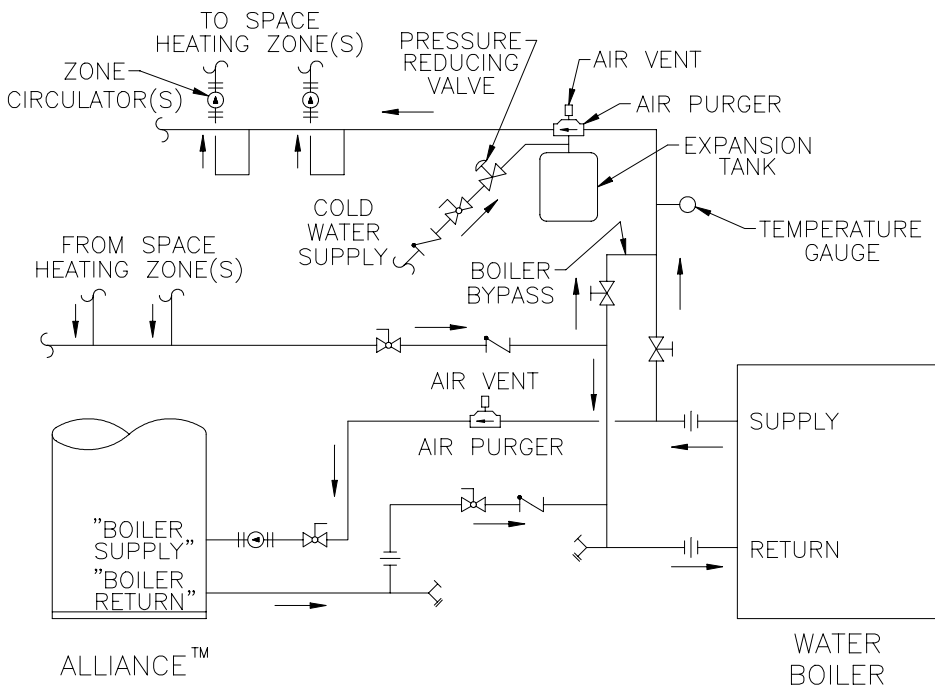
1. Determine where in the boiler and space heating piping system the Alliance™ connections should be made by identifying the type of system from Figures 3 thru 6.
2. In all cases, the Alliance™ connection labeled "BOILER RETURN" should be piped to the boiler return piping as close to the boiler as possible and especially after any flow control or check valves in the space heating return piping. The use of a union and a shut-off valve is recommended. The use of a flow control or check valve is required to prevent back flow through the water heater during operation of the space heating system.



**Figure 2: Cold Water Supply Piping**



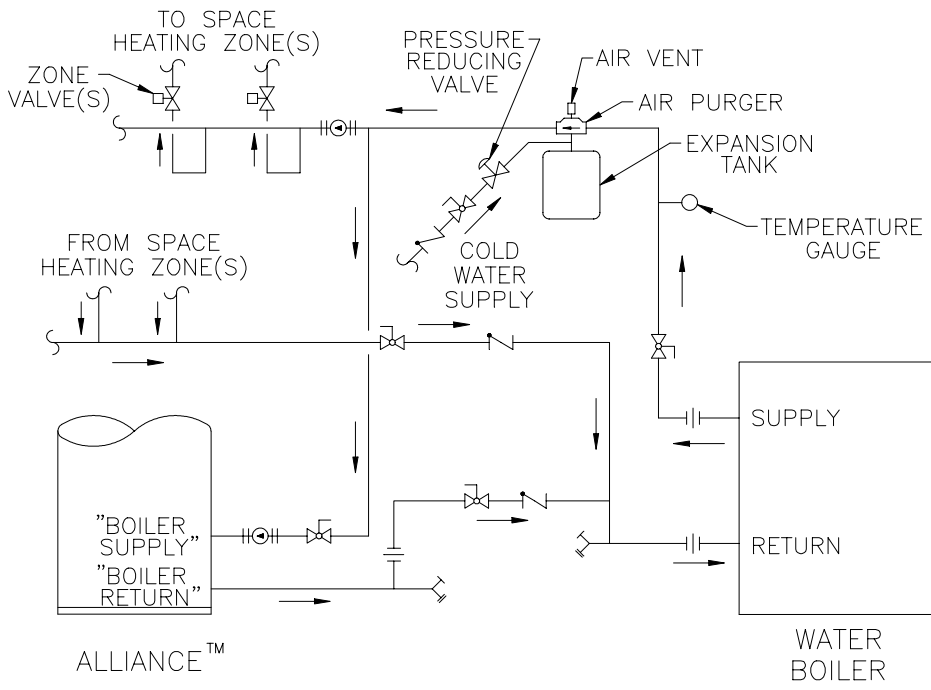
**Figure 3: Water Boiler Piping with Zone Valves and a Boiler Bypass**



**Figure 4: Water Boiler Piping with Zone Circulators and a Boiler Bypass**

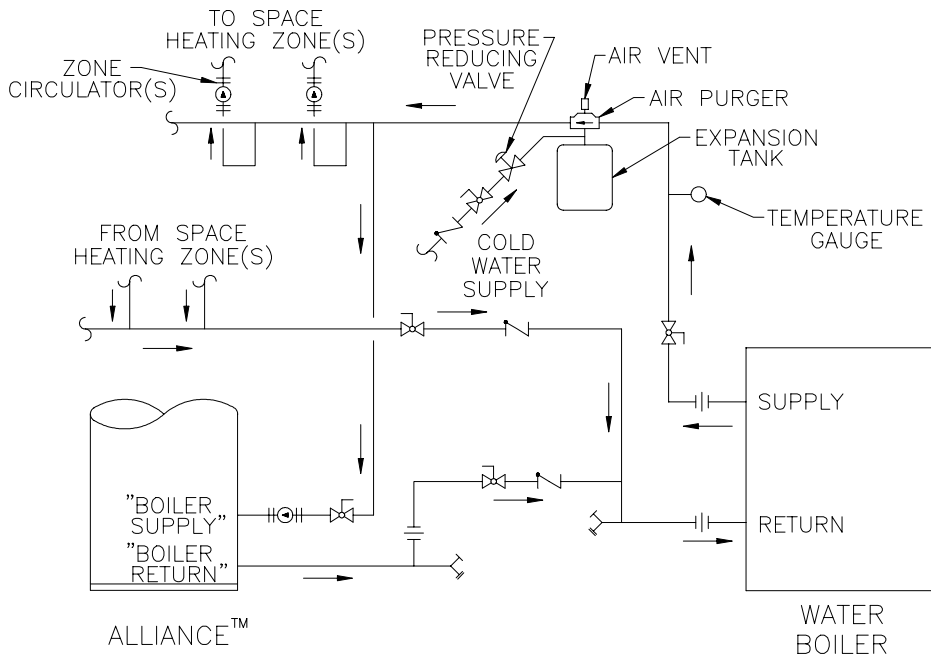
**G. Connect water boiler supply piping (See Figures 3 thru 6).**

1. For a space heating system that utilizes ZONE VALVES AND A BOILER BYPASS, refer to Figure 3. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to the boiler supply piping as close to the boiler as possible and especially before the bypass piping. Mount the circulator as close as possible to the water heater making sure the flow arrow points toward the water heater. The use of a shut-off valve is recommended for future service convenience. The use of an air purger and vent is recommended to eliminate air in the system during warmer periods when the space heating system is not operating. Otherwise, if air noises occur during summer months the space heating system would have to be operated to purge air at the main purger.
2. For a space heating system that utilizes ZONE CIRCULATORS AND A BOILER BYPASS, refer to Figure 4. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to the boiler supply piping as close to the boiler as possible and especially before the bypass piping. Mount the circulator as close as possible to the water heater making sure the flow arrow points toward the water heater. The use of a shut-off valve is recommended for future service convenience. The use of an air purger and vent is recommended to eliminate air in the system during warmer periods when the space heating system is not operating. Otherwise, if air noises occur during summer months the space heating system would have to be operated to purge air at the main purger.



- For a space heating system that utilizes ZONE VALVES WITHOUT A BOILER BYPASS, refer to Figure 5. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to the boiler supply piping after the air purger and before the space heating circulator. Mount the water heater circulator as close as possible to the water heater making sure the flow arrow points toward the water heater. The use of a shut-off valve is recommended for future service convenience.

**Figure 5: Water Boiler Piping with Zone Valves and without a Boiler Bypass**



- For a space heating system that utilizes ZONE CIRCULATORS WITHOUT A BOILER BYPASS, refer to Figure 6. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to the boiler supply piping after the air purger and before the space heating takeoffs. Mount the water heater circulator as close as possible to the water heater making sure the flow arrow points toward the water heater. The use of a shut-off valve is recommended for future service convenience.

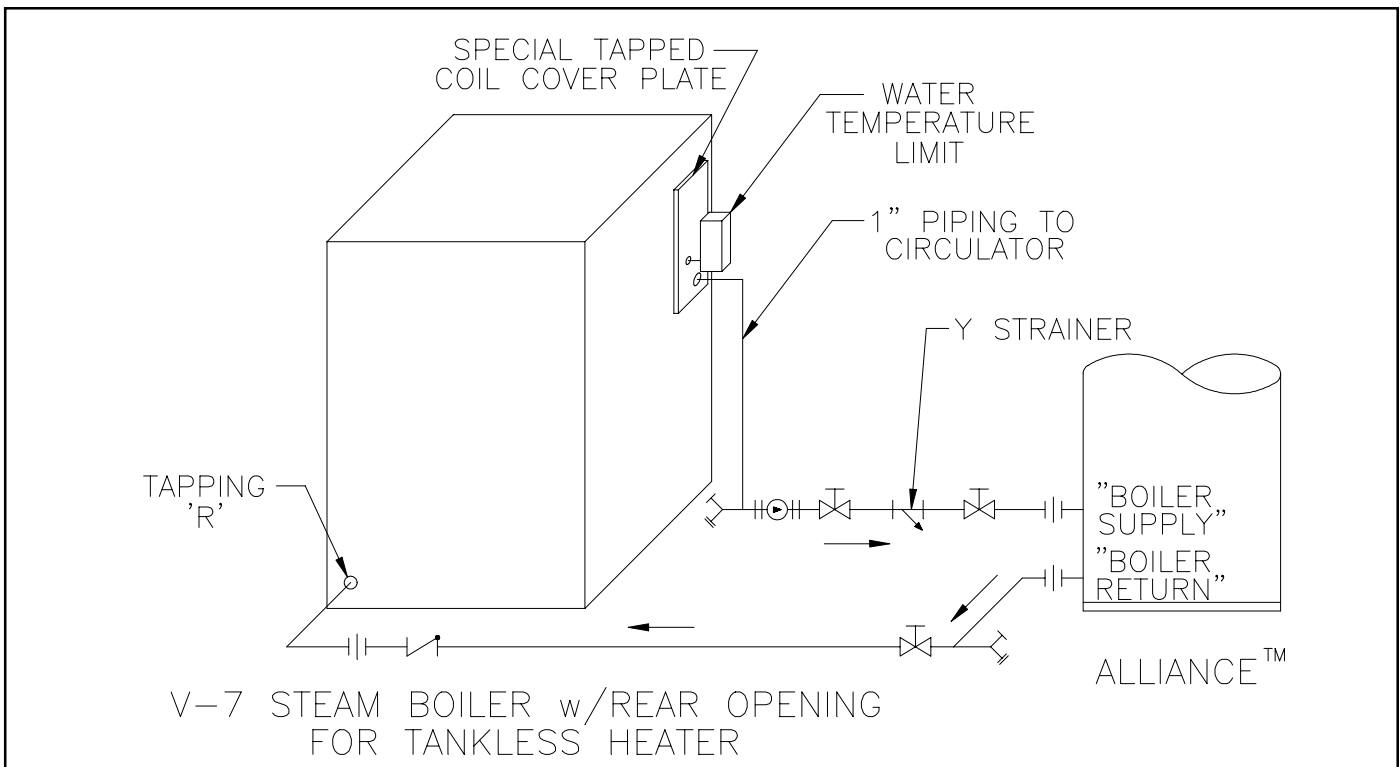
**Figure 6: Water Boiler Piping with Zone Circulators and without a Boiler Bypass**

**H. Connect steam boiler piping (See Figures 7 thru 10).**

1. Burnham V-7 Series steam boiler (Refer to Figure 7).
  - a. For satisfactory supply of hot water, the V-7 steam boiler must be equipped with a special tapped rear heater coil cover plate contained in both of the following kits:  
Part No.  
6032702 Includes tapped cover plate, mounting hardware, water temperature limit with well, and installations instructions.  
6032703 As above, except less limit and well.
  - b. The Alliance™ connection labeled "BOILER RETURN" should be piped to tapping "R" (lower left hand ¾" tapping in front of boiler). The use of unions, a shut-off valve, and a drain

valve is recommended for future service convenience. The use of a flow control or check valve is required to prevent back flow through the water heater during operation of the space heating system.

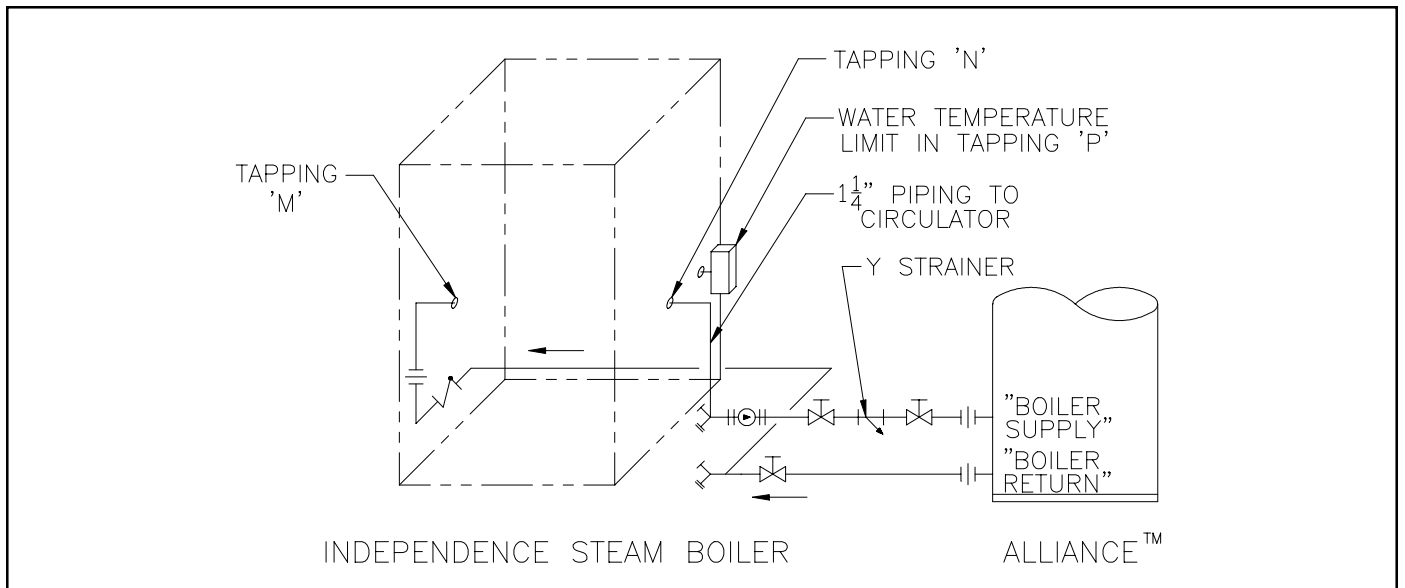
- c. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to the 1" NPT tapping in the boiler's aforementioned tapped cover plate. The circulator should be floor mounted with full size 1" piping from the boiler and no flow restrictions in this piping. Be sure the flow arrow on the circulator points toward the water heater. The use of a union, shut-off valves, and a drain valve is recommended for future service convenience. The use of an in-line "Y" style strainer is required to prevent accumulation of sludge in the water heater's coil.



**Figure 7**

2. Burnham Independence® Series steam boiler (Refer to Figure 8).
  - a. The Alliance™ connection labeled "BOILER RETURN" should be piped to tapping "M" on the left side of the Independence boiler. The use of unions, a shut-off valve, and a drain valve is recommended for future service convenience. The use of a flow control or check valve is required to prevent back flow through the water heater during operation of the space heating system.

- b. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to tapping "N" on the right side of the Independence boiler. The water heater circulator should be floor mounted with full size 1¼" piping from the boiler and no flow restrictions in this piping. Be sure the flow arrow on the circulator points toward the water heater. The use of a union, shut-off valves, and a drain valve is recommended for future service convenience. The use of an in-line "Y" style strainer is required to prevent accumulation of sludge in the water heater's coil.

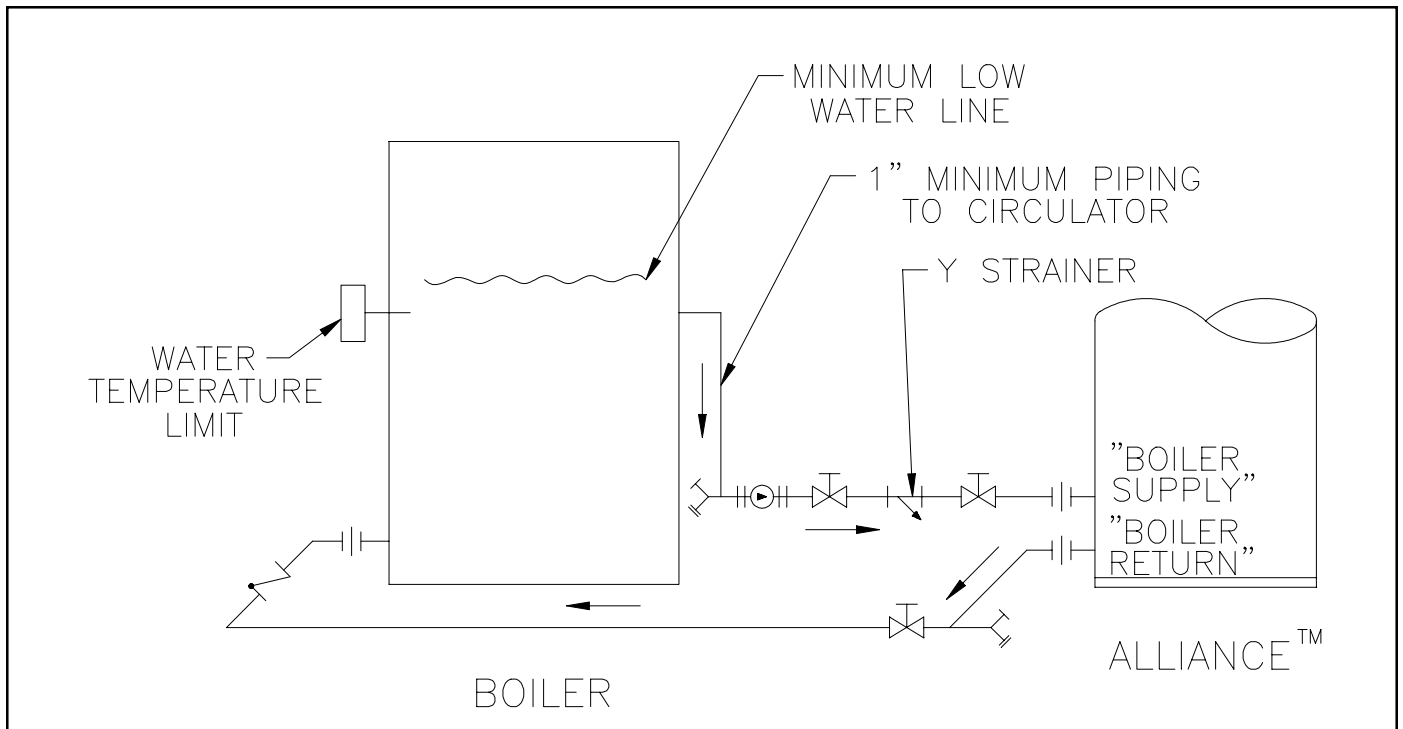


**Figure 8**

3. Typical steam boiler with connections available below the water line (Refer to Figure 9).

- a. The Alliance™ connection labeled "BOILER RETURN" should be piped to a tapping in the boiler that is below the lowest permissible water level. The use of unions, a shut-off valve, and a drain valve is recommended for future service convenience. The use of a flow control or check valve is required to prevent back flow through the water heater during operation of the space heating system.
- b. The Alliance™ connection labeled "BOILER SUPPLY" should be piped to a tapping in the

boiler section furthest away from the return tapping to prevent short circuiting in the boiler. This tapping should be high enough to provide hot water but must be below the lowest permissible water level. The water heater circulator should be floor mounted with full size (1" minimum) piping from the boiler and no flow restrictions in this piping. Be sure the flow arrow on the circulator points toward the water heater. The use of a union, shut-off valves, and a drain valve is recommended for future service convenience. The use of an in-line "Y" style strainer is required to prevent accumulation of sludge in the water heater's coil.



Typical Steam Boiler w/Connections Available Below Water Line

**Figure 9**

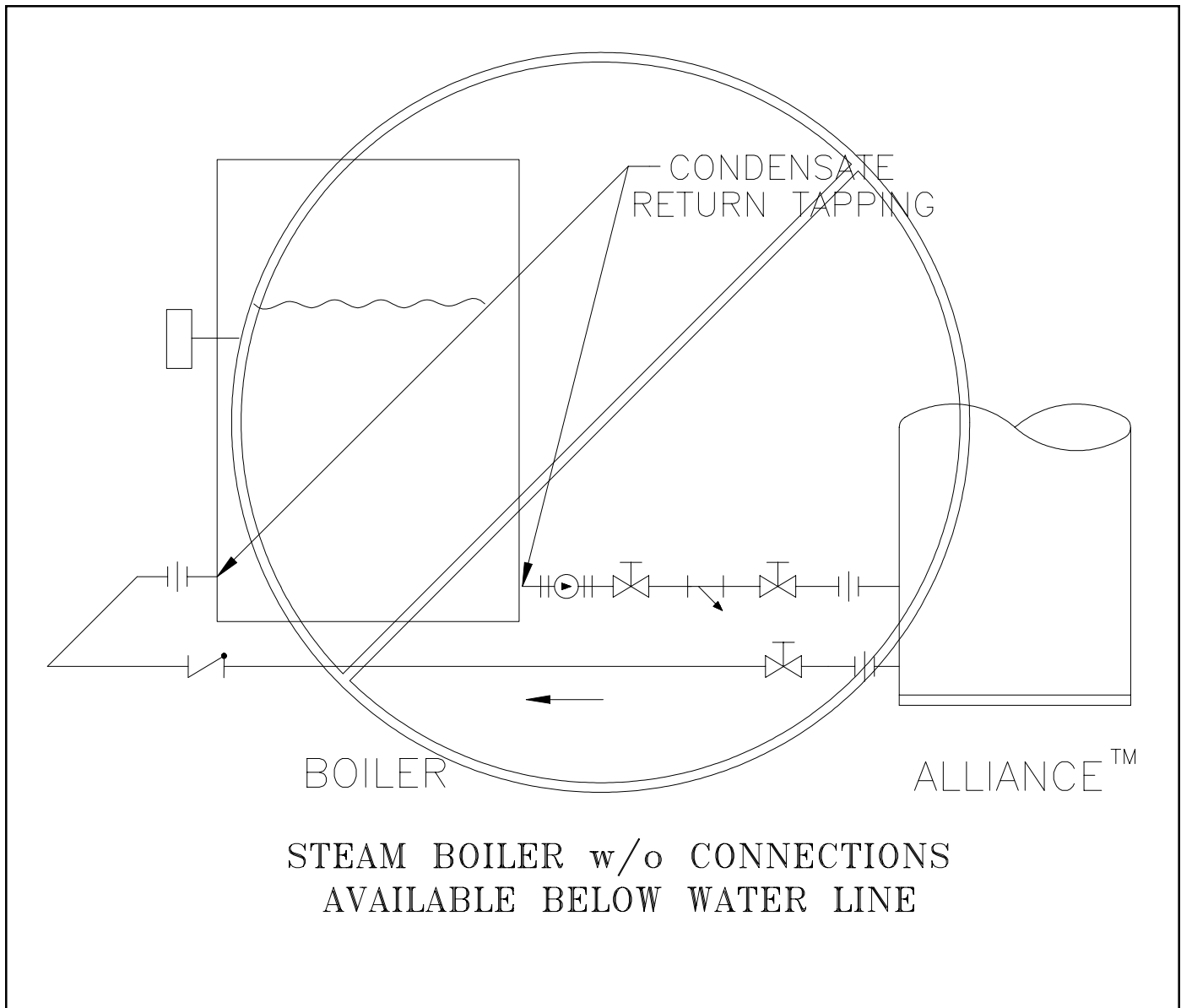


Figure 10

4. Steam boiler without hot water connections available below the water line (Refer to Figure 10).

- a. Supplying the Alliance™ from the bottom tappings in a steam boiler is not recommended due to insufficient water temperature, especially during warmer months when the space heating system is not operational. Boiler water temperature at the bottom of a steam boiler can be 50°F lower than the boiler's water temperature limit setting during such periods.

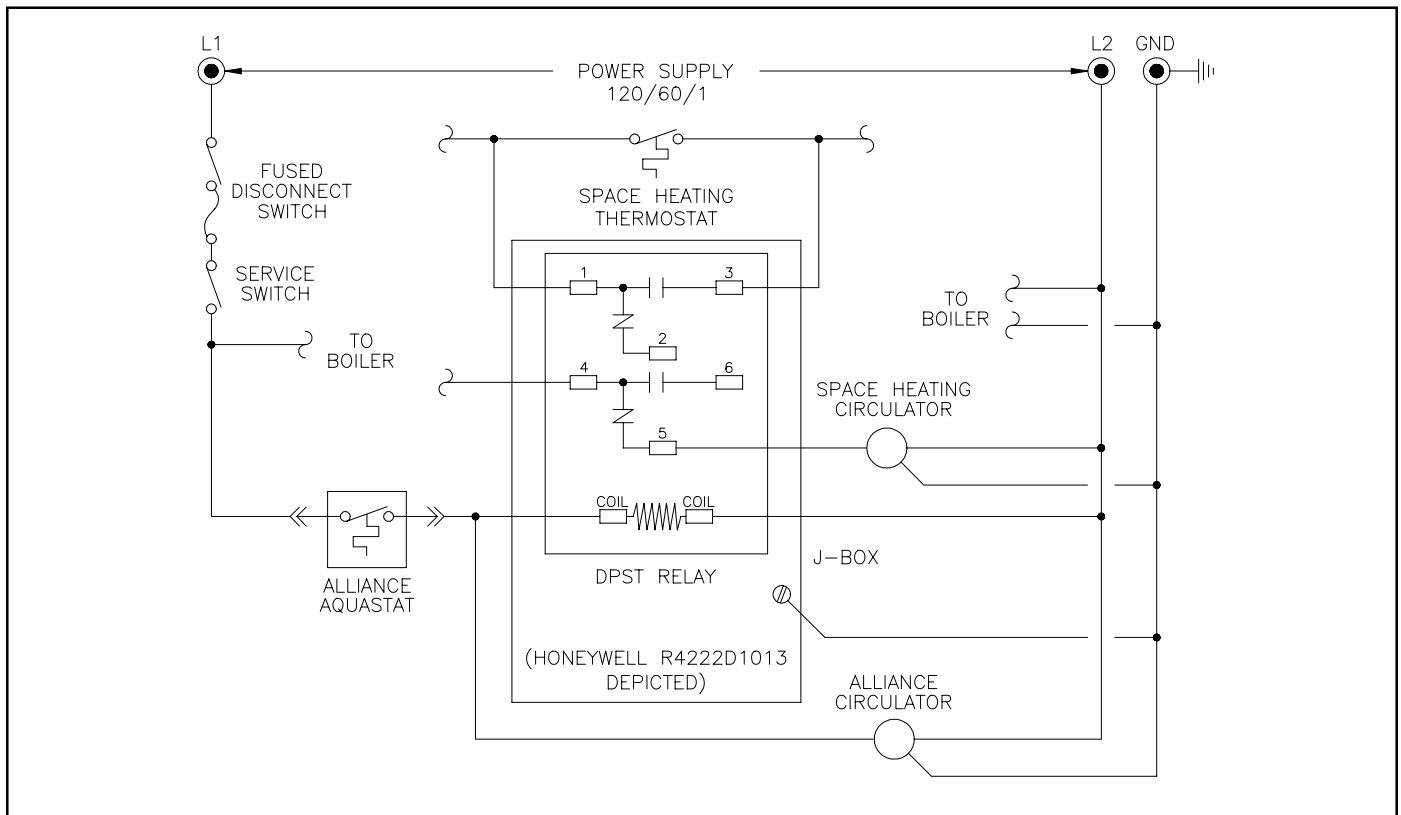
**I.** Fill boiler system.

1. On new boiler installations, do not purge the boiler or space heating system through the water heater. During any boiler or space heating system flushing, cleaning, or purging, the water heater should be isolated to avoid possible attack on the copper coil by chemical additives.
2. Purge air from boiler/water heater piping.
3. Check system for leaks. Repair as necessary.

## IV. Electrical

1. Install electric wiring in accordance with National Electrical Code or the Canadian Electrical Code and local regulations. See Figure 11 for the wiring diagram and the boiler's Installation manual.

2. The Alliance™ models contain an aquastat assembly and will require an installer supplied double pole, single throw (DPST) relay with a normally open (NO) contact, a normally closed (NC) contact, and a 120 volt coil for priority domestic water. A Honeywell R4222D1013 is an appropriate relay. Refer to Figure 11. For non-priority, a SPST relay with one NO contact is sufficient. For non-priority and space heating with zone circulators, treat the water heater as an additional zone.



**Figure 11: Priority Wiring Diagram - Multizone Space Heating with Zone Valves or Single Zone Space Heating**

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## V. Operation

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### A. System Start-Up

1. Follow boiler installation instructions to place boiler in operation.
2. Turn aquastat dial clockwise to desired setting.
  - a. An initial setting of 120°F is recommended.
  - b. Turning the knob clockwise from "100" position will cause an audible click indicating the desired temperature is higher than the current tank water temperature.
2. For the most energy efficient operation, adjust aquastat for the minimum water temperature necessary to meet domestic hot water needs.

### B. Sequence of Operation

1. Aquastat senses stored water temperature drops below desired setting.
  - a. Aquastat contacts close to start domestic hot water circulator and energize relay.
  - b. Normally open contacts close to initiate boiler ignition sequence.
  - c. Domestic hot water priority only: normally closed contacts open to interrupt space heating.
2. Aquastat satisfied
  - a. Aquastat contacts open, turning off domestic hot water circulator and de-energizing relay.
  - b. Normally open contacts open, stopping boiler operation.
  - c. Domestic hot water priority only: normally closed contacts close, returning boiler control to space heating.
3. After the water heater completes a heat-up cycle, check the water temperature at a faucet. Adjust water heater's temperature setting as necessary.
  - a. Adjusting to a lower temperature setting will not immediately affect water temperature. Draw sufficient water or allow the water heater to sit until a heat-up cycle is initiated. Repeat step 3.
  - b. Adjusting to a higher temperature may not immediately affect water temperature. If a heat-up cycle begins, go to step 3. If a heat-up cycle does not begin, draw sufficient water or allow the water heater to sit until a heat-up cycle is initiated. Repeat step 3.

### C. Water Temperature Adjustment

1. The aquastat controls the maximum water temperature in the tank. It's differential is fixed at 5°F. It's maximum setting is 160°F.

### D. To Shut-off Water Heater

1. Turn power off to the Alliance.
2. Follow boiler operating instructions to turn off boiler.

## WARNING

**Never operate water heater with temperatures in excess of 200°F. Severely reduced water heater life will result.**

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## VI. Service Instructions

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- A.** The Alliance™ is intended to provide a service life of many years. Components that require service, however, may be subject to failure. Failure to use the correct procedures or parts in these circumstances may make the water heater unsafe.

The owner should arrange to have the following inspections and simple maintenance procedures performed by qualified service personnel at the frequencies suggested.

1. Boiler and Domestic Water Piping (Annual)  
Check all piping for signs of leakage at joints, unions, and shut-off valves. Repair as needed.
2. Temperature-Pressure Relief Valve (Annual)  
Follow instructions packed with valve.
3. Sediment (Annual, but harsh water quality may dictate more frequent service)  
Depending on water conditions, a varying amount of sediment may collect in the tank. Levels requiring service are indicated by a small temperature difference in the supply and return lines. (See also "Scale" below.) Repeated flushing usually clears such material. As a preventive measure, water should be drawn from the tank at the drain valve until it runs clear.
4. Scale (Annual)  
Hard water may cause scale to build-up on the outside of the heat exchanger coil. A water softener will prevent this problem. (See also "Sediment" above.) Symptoms would be reduced recovery capacity or reduced temperature differential between boiler supply and return lines. Repeated flushing should resolve the problem. If not, proceed to **B**.

**B.** Chemical cleaning of heat exchanger coil

1. To avoid water damage to nearby areas in subsequent steps, shut off the cold water supply to the water heater.
2. Make a note of the temperature control setting on the water heater, then turn the unit off.
3. Relieve the water pressure in the tank by opening a hot water faucet. This will reduce the risk of scald injury.
4. Remove the relief valve from the water heater taking care to avoid contact with the hot water

which may drain out of the lines leading to the domestic uses.

5. Drain the water heater until the water within the tank is even with the top of the heat exchanger coil. The water heater cover plate should be removed from the tank to view the inside of the tank and assure the coil is just covered with water.
6. Using a funnel, pour one gallon of commercial ice maker cleaning solution into the tank through the cover plate opening. Follow solution manufacturer's instructions, cautions and warnings.
7. Set the water heater's temperature control to its highest setting and operate the system until the control is satisfied. Boiler may cycle on its high limit several times during this period. If the tank temperature setting has not been satisfied after 45 minutes of boiler operation, turn aquastat to the lowest setting to stop boiler operation.
8. Allow heated solution to set in tank for 30 minutes.
9. Drain tank completely using fittings and hose, as required, to reach a floor drain.
10. Fill the water heater's tank with fresh, cold, conditioned water and drain completely at least two (2) times to flush all cleaning solution from the tank.
11. Reinstall the relief valve, cover plate, and piping.
12. Open the cold water supply and fill the tank with water. Then purge air from lines and tank by operating hot and cold water faucets in the house.
13. Return the temperature control to the setting noted in Step 2.

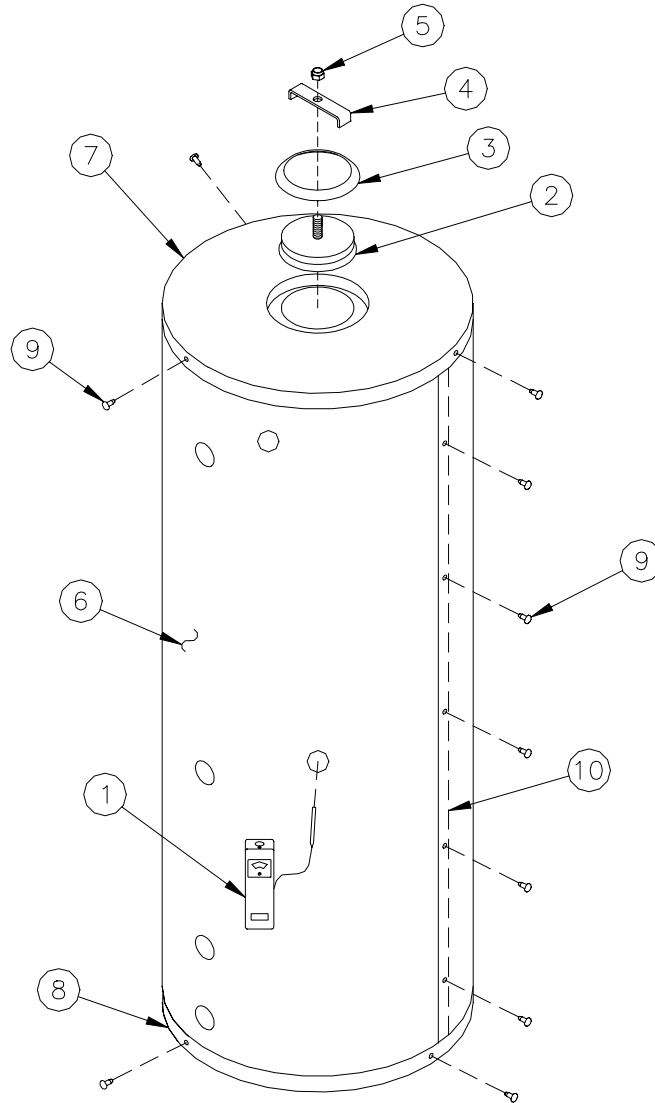
**C.** Alternate heat exchanger coil cleaning methods

The chemical cleaning process is most effective if done properly. Other methods may also give satisfactory results including, high velocity water wash using a wand through the cover plate.

## VII. Trouble Shooting

| PROBLEM   | CAUSE  | SOLUTION   |
|---|--|--|
| No hot water at faucet  | Boiler does not operate  | Refer to boiler installation instructions  |
|   |  | Check main service switch  |
|   |  | Check fused disconnect   |
|   | Circulator does not operate  | Check power supply   |
|   |  | Check shaft coupling   |
|   | Improper aquastat setting or calibration   | Turn tank aquastat to higher setting   |
|   | Zone valve does not open (if used)   | Check power supply   |
|   | Electrical problem (relay, wiring, fuse, etc.)   | Check fuse and replace   |
|   |  | Check circuit breaker and reset (if applicable)  |
|   |  | Check power supply   |
| Scale build-up  | If boiler, circulator and tank are operating satisfactorily, coil may have scale coating. See Section VI: Service Instructions |  |
| Clogged cold water filter or boiler supply strainer (if used) | Clean or replace filter or strainer  |  |
| Insufficient hot water  | Aquastat setting too low   | Adjust aquastat to higher setting  |
|   | Undersized boiler with no priority to domestic hot water   | Rewire for priority  |
|   | Peak use of hot water is greater than tank storage capacity  | Determine peak usage and compare to tank volume  |
|   | Scale build-up   | If boiler, circulator and tank are operating satisfactorily, coil may have scale coating. See Section VI: Service Instructions |
|   | Faulty tank aquastat   | Replace aquastat   |
| Water at faucet too hot                                       | Aquastat set too high  | Lower aquastat setting   |
|   | Improper system plumbing   | Compare plumbing to Section III: Piping  |
|   | Improper system wiring   | Compare wiring to Section IV: Electrical   |
| Boiler cycles more than 5 times per day in summer             | Excessive demand   | Reduce demand or consider larger tank  |
|   | Faulty aquastat  | Replace aquastat   |
|   | Boiler high limit set too low  | Increase boiler high limit setting   |
|   | Scale Build-up   | If boiler, circulator and tank are operating satisfactorily, coil may have scale coating. See Section VI: Service Instructions |

## VIII. Repair Parts



|   |                                 |                |
|---|---------------------------------|----------------|
| 1 | Aquastat (Honeywell L4006A2114) | 8010812        |
| 2 | Handhole Cover                  | 8050802        |
| 3 | Handhole Cover Gasket           | 8200804        |
| 4 | Handhole Cover Bracket          | 8050803        |
| 5 | Handhole Cover Nut              | 8080804        |
| 6 | Jacket                          | AL26A 8040803  |
|   |                                 | AL40A 8040804  |
|   |                                 | AL53A 8040805  |
|   |                                 | AL79A 8040806  |
|   |                                 | AL119A 8040807 |

|    |                     |         |         |
|----|---------------------|---------|---------|
| 7  | Top Cover           | AL26A   | 8040808 |
|    |                     | AL40A   |         |
|    |                     | AL53A   |         |
|    |                     | AL79A   | 8040809 |
|    |                     | AL119A  | 8040810 |
| 8  | Bottom Cover *      | AL26A   | 8040811 |
|    |                     | AL40A   |         |
|    |                     | AL53A   |         |
|    |                     | AL79A   |         |
| 9  | Plastic Rivet *     | 8040813 |         |
| 10 | Double Sided Tape * | 8040814 |         |

\* Not applicable to AL119A

All Alliance™ Series repair parts may be obtained through your local Burnham Wholesale Distributor. Should you require assistance in locating a Burnham Distributor in your area, or have questions regarding the availability of Burnham products or repair parts, please contact your Burnham Regional Sales Office as listed below.

### Burnham Corporation Regional Offices

|  |  |
|--|--|
| <b>A. Burnham Corporation - Central &amp; Western Regions</b><br>P.O. Box 3079<br>Lancaster, PA 17604-3079<br>Phone: (717) 481-8400<br>FAX: (717) 481-8408 | <b>C. Burnham Corporation - Metropolitan Region</b><br>P.O. Box 3079<br>Lancaster, PA 17604-3079<br>Phone: (717) 481-8400<br>FAX: (717) 481-8409 |
| <b>B. Burnham Sales Corporation - Northeast Region</b><br>19-27 Mystic Avenue<br>Somerville, MA 02145<br>Phone: (617) 625-9735<br>FAX: (617) 625-9736      | <b>D. Burnham Corporation - Mid-Atlantic Region</b><br>P.O. Box 3079<br>Lancaster, PA 17604-3079<br>Phone: (717) 481-8400<br>FAX: (717) 481-8409 |

Contact Regional Office Indicated for your State

|               |   |                                      |   |                                      |   |
|---------------|---|--------------------------------------|---|--------------------------------------|---|
| Alabama       | A | Nebraska                             | A | Oregon                               | A |
| Alaska        | A | Nevada                               | A | Pennsylvania                         | D |
| Arizona       | A | New Hampshire                        | B | Rhode Island                         | B |
| Arkansas      | A | New Jersey                           | D | South Carolina                       | A |
| California    | A | <i>Atlantic, Burlington, Camden,</i> |   | South Dakota                         | A |
| Colorado      | A | <i>Cape May, Cumberland,</i>         |   | Tennessee                            | A |
| Connecticut   | B | <i>Gloucester, Mercer,</i>           |   | Texas                                | A |
| Delaware      | D | <i>Monmouth, Ocean, Salem</i>        |   | Utah                                 | A |
| Florida       | A | <i>Counties</i>                      |   | Vermont                              | B |
| Georgia       | A | <i>All other Counties</i>            | C | Virginia                             | D |
| Hawaii        | A | New Mexico                           | A | <i>Arlington, Accomack, Clarke,</i>  |   |
| Idaho         | A | New York                             | B | <i>Fairfax, Frederick, Fauquier,</i> |   |
| Illinois      | A | <i>Albany, Fulton, Montgomery,</i>   |   | <i>Loudoun, Northampton and</i>      |   |
| Indiana       | A | <i>Rensselaer, Saratoga,</i>         |   | <i>Prince William Counties</i>       |   |
| Iowa          | A | <i>Schenectady, Schoharie,</i>       | A | <i>All other Counties</i>            | A |
| Kansas        | A | <i>Warren, Washington Counties</i>   | C | Washington                           | A |
| Kentucky      | A | <i>All Other Counties</i>            | C | Washington, D.C.                     | D |
| Louisiana     | A | North Carolina                       | A | West Virginia                        | D |
| Maine         | B | North Dakota                         | A | Wisconsin                            | A |
| Maryland      | D | Ohio                                 | D | Wyoming                              | A |
| Massachusetts | B | <i>Athens, Belmont, Gallia,</i>      |   |                                      |   |
| Michigan      | A | <i>Jefferson, Lawrence, Meigs,</i>   |   |                                      |   |
| Minnesota     | A | <i>Monroe, and Washington</i>        |   |                                      |   |
| Mississippi   | A | <i>Counties</i>                      |   |                                      |   |
| Missouri      | A | <i>All other Counties</i>            |   |                                      | A |
| Montana       | A | Oklahoma                             | A | Canada                               | A |

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**Inspection / Service Schedule**

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DATE

INSPECTION AND/OR SERVICE PERFORMED

