



Installation and Maintenance

ARMSTRONG NO. 21AR AND NO. 21-312AR AIR VENTS

This bulletin should be used by experienced personnel as a guide to the installation of Armstrong No. 21-AR and No. 21-312AR air vents and their repair parts. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

The maximum operating pressures for No. 21AR and No. 21-312 AR are listed in Table 1. DO NOT EXCEED THE MAXIMUM OPERATING PRESSURE.

The vessel design limitations of the No. 21-AR are 250 psig @ 450°F.

Vessel design limitations for the No. 21-312AR are 750 psig @ 100°F. and 500 psig @ 750°F.

Table 1

Model Number	Orifice Size, Inches	Specific Gravity Range, 1.00 to .50
No. 21 AR	7/32	15 psi
Cast	3/16	20 psi
Iron	5/32	30 psi
With Standard	9/64	35 psi
2 1/4 oz. Float	1/8	45 psi
	3/32	80 psi
	5/64	125 psi
	1/16	175 psi
No. 21 AR With 4 1/8 oz. Float	1/16	250 psi (Sp. Gr. 1.00 to .85)

Model Number	Orifice Size, Inches	Specific Gravity, Range, 1.00 to .85
No. 21-312 AR, Forged Steel	7/32	25 psi
With Std. 5 oz. Float	3/16 5/32 9/64	35 psi 55 psi 65 psi
No. 21-312V AR, Forged Steel	1/8	165 psi
With Std. 5 oz. Float and High Leverage Mechanism	3/32 5/64 1/16	300 psi 430 psi 680 psi

INSTALLATION

FOR TYPICAL INSTALLATIONS, SEE FIG. 1-7.

- The inlet and the outlet piping should be the same size as the air vent connections. Do not reduce the size of the inlet on light loads; however, smaller pipe or tubing may be used on the outlet. Keep the piping as short as possible, with a minimum of fittings and valves. DO NOT USE ELBOWS IN THE INLET LINE, FROM THE EQUIPMENT TO THE VENT.
- Install gate valves so the air vent can be isolated from the system to permit cleaning and repair. DO NOT USE GLOBE VALVES.



3. Before installing the vent, flush out the line to remove loose dirt. Use pipe dope or teflon sparingly and on male threads only. Leave the end thread exposed to avoid introducing sealant into the system.
4. DO NOT use a pipe strainer in the line leading to the vent.
5. For occasional venting, a single pipe 3/4" or larger is a suitable connection. Once the system is filled with water, only small additional amounts of air need to be vented, so there is no difficulty in getting air to enter the vent countercurrent to the water displaced.
6. For continuous operation, an equalizing line is usually necessary. Where gas enters the system continuously or when very fast venting is required, an equalizing line should be provided, as shown in Fig. 3.
7. Be certain the vent is installed properly, with the CAP AT THE TOP for air and gas relief service.
8. Install the air vent at the high points of the system. See the accompanying diagrams for typical installations.
9. Air vents should be installed so that they can be checked periodically. A drain line should be piped to a floor drain, slop sink, or other visible location where maintenance personnel can regularly check for leakage.
10. The pipe plug in the cap of the air vent can be replaced with a test cock or test valve for vent testing or even manual venting. A test cock makes it possible to check that the vent is not air bound due to the orifice being clogged. In addition, the manual test cock will enable the operator to vent the unit manually should the automatic vent fail.
11. If the vent is installed in an inaccessible location, a 1/4" copper tube drain line to a slop sink, floor drain, or other visible location makes periodic inspection practicable.

MAINTENANCE

1. No discharge from the vent is normal on hydronic systems, but is not proof that the vent functions properly. To check the air vent, crack the test cock. If the vent is working correctly, a little air should escape, followed by water.
2. Vent Does Not Open.
If a lot of air escapes out of the test cock before water begins to discharge, it is a sign that the vent body was full of air and that the float did not sink to open the valve, or that the valve was plugged. Isolate the vent by closing the gate valve before opening for inspection.
 - a. Remove the vent cover and inspect the mechanism. If the mechanism cannot be made to operate freely after cleaning and inspection, order a new assembly.
 - b. Check the orifice for dirt. Clean the orifice. If the orifice cannot be cleared, order a new mechanism.
 - c. On new installations, an air vent may fail to open if the orifice is too large for the operating pressure. Replace the mechanism with one sized for your operating pressure.



- d. An unusual increase in system pressure may cause the air vent to lock shut. Either eliminate the cause of the increased pressure or replace the mechanism with one that can handle the peak pressures.
3. Vent Fails to Close Tightly (Leaks Water).
 - a. Dirt may be lodged in the orifice. Clean the orifice, the mechanism, the body, and the cap.
 - b. The valve and seat may be worn. Replace the whole mechanism.
 - c. There may be a leak in the float. Disconnect the float and shake it close to your ear. If liquid has leaked inside you will be able to hear it sloshing. Replace the float.
 - d. An unlikely possibility is that the float has collapsed. Replace the float.

For help with unusual installations or service problems, contact your Armstrong Representative or the Armstrong Machine Works Applications Engineering Department.

REPLACEMENT OF LEVERAGE SYSTEM FOR NO. 21-AR.NO. 21-312AR

1. Make sure the parts you have received are for the correct orifice size for your operating pressure. The orifice size ($7/32"$, for example) is stamped on the valve seat.
2. Remove the air vent cap and place it in a vise with the mechanism up.
3. Disassemble the float and lever mechanism by removing the valve lever pin and the valve seat.
4. Clean all dirt, pipe scale, and foreign materials from the cap, especially from the threaded holes.
5. Place the valve seat through the hole in the valve lever clip and tighten both parts into the air vent cap. When the valve seat is tightened, the lever clip should be symmetrical with respect to the gasket surfaces to the left and right of it and with respect to the centerline of the cap. The ears for the valve lever pin should be on the side of the valve seat closest to the gasket surface (away from the center of the cap).

DO NOT use pipe dope or lubricant on the valve seat threads. The seal is made, not by the threads, but by metal to metal contact at the ground end of the valve seat. Make sure the seating area in the cap is clean before screwing the valve seat into position.

6. Use the valve lever pin to assemble the valve lever to the valve lever clip. The ears of the valve lever fit in between the ears of the valve lever clip.



7. Check the sideways motion of the valve lever in the lever clip. Total motion should be about 1/32" (1/64" to the left and to the right of center). Adjustments can be made by tapping the ears of the valve lever clip VERY LIGHTLY left or right with a SMALL HAMMER (4 oz.).
8. Check the seating of the valve. The point of the cone valve should easily drop into the orifice with no hang-up on the edges of the orifice. When the valve is shut, the valve lever should be visually parallel to the valve lever clip. (See Figure 8) Adjustments maybe made to the front or back of the lever pin ears by tapping VERY LIGHTLY with a SMALL HAMMER.
9. Use the float screw to assemble the float to the valve lever.
10. Remove the cap from the vise, invert it, and assemble it to the air vent body.
11. Remove the plug in the cap of the air vent.
12. Turn the air vent over so that the cap is at the bottom.
13. Insert a pencil or rod into the plug hole to lift the float. The float should readily move upward and strike the body wall. All motion must be free and easy. Lowering the float should result in the valve seating in the orifice and no contact between the float and the body of the air vent. When moving the float, the pencil or rod should travel 1/4" up and down.
14. When the valve is in position to function properly, disassemble the cap from the body. Remove the float. Tap the valve VERY **LIGHTLY** with a SMALL HAMMER (4 oz.) to produce a seating ring.
15. Replace the float.
16. Put the body gasket in place.
17. Assemble the cap to the body.
18. Check the float motion as in step 13 above. If the valve seats properly, replace the plug.

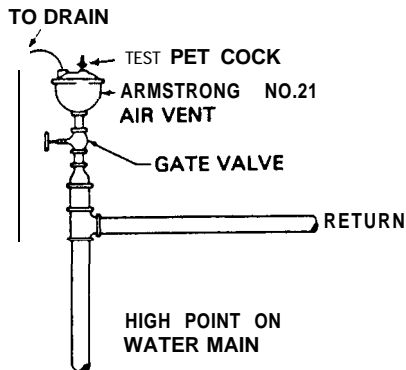


Fig. 1. Air vent on high point of main of hydronic heating system. Test pet cock is optional. Gate valve for isolating vent to permit cleaning and repair if necessary.

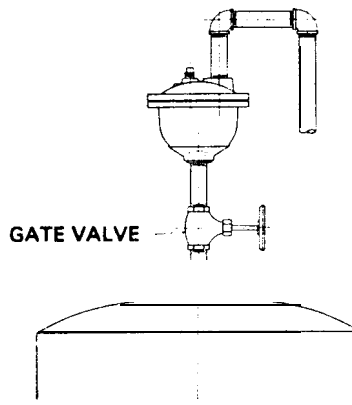


Fig. 2. Vent to remove air when filling tank with liquid. If moderate amounts of air must be vented after tank is filled use 3/4" pipe and a 3/4" gate valve (if trap is to be isolated for cleaning and/or repair).

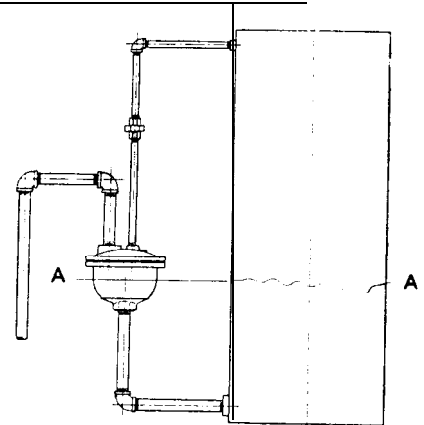


Fig. 3 Hook up for No. 21AR to vent surplus air from a water storage tank. If vent is to be isolated use gate valves. Pipe size can be 1/2". Line A-A shows water level - position vent to secure level desired.

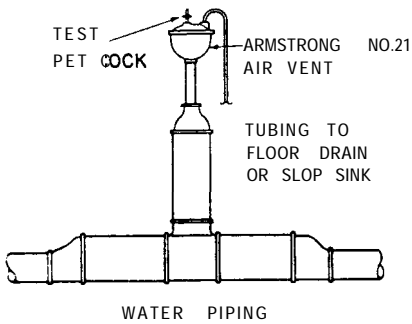


Fig. 4 - Installation of automatic air vent on water piping.

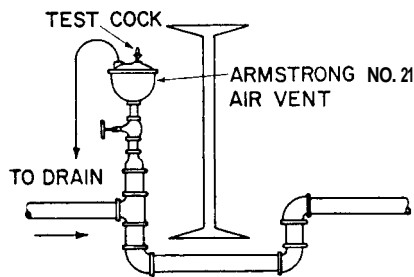


Fig. 5 - Installation of automatic air vent on loop in piping.

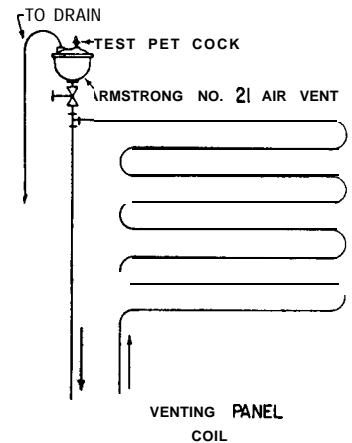


Fig. 6 - Installation of automatic air vent on panel coil.

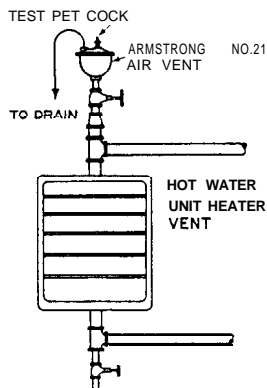


Fig. 7 - Installation of automatic air vent on hot water unit heater.

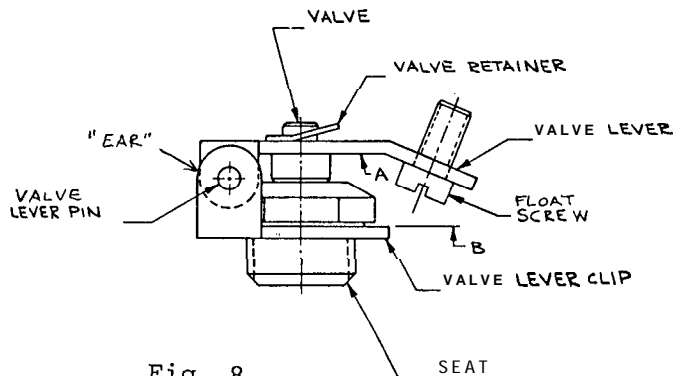


Fig. 8.