



Installation – Series and Parallel

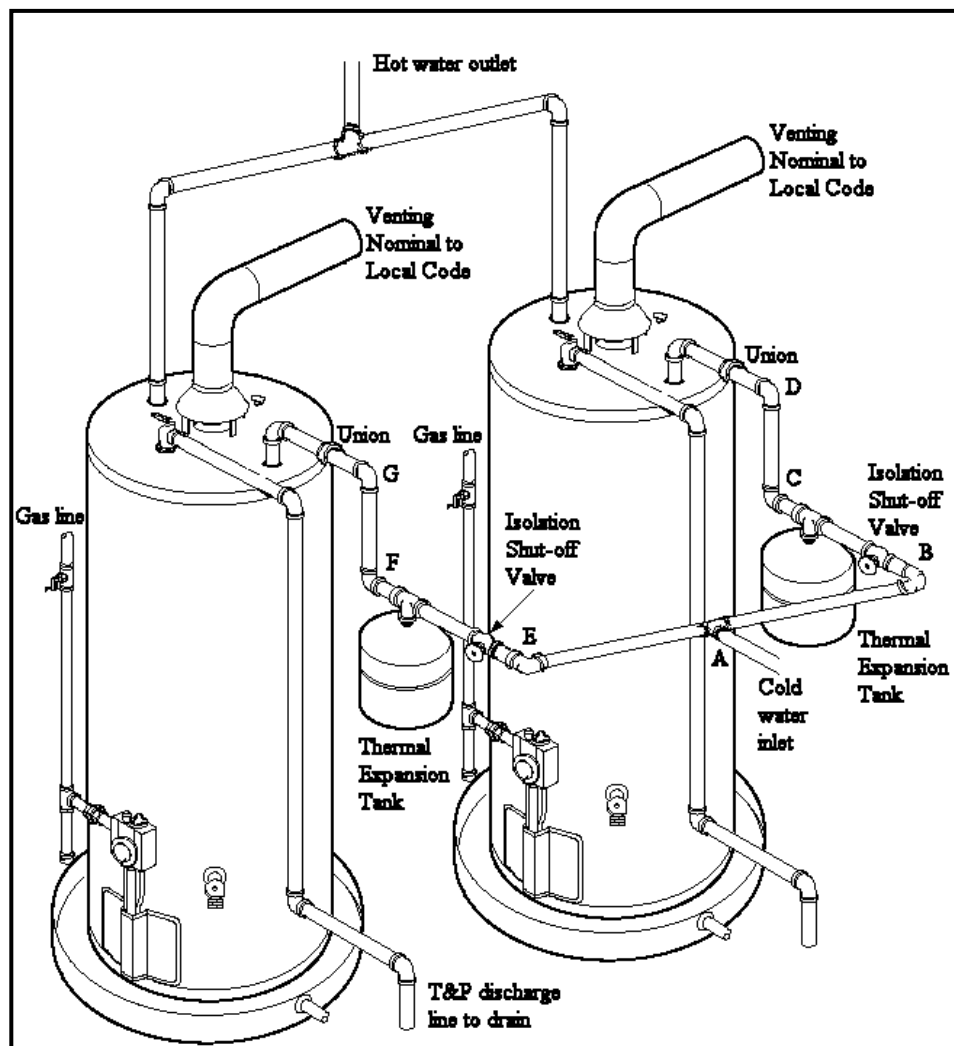
INSTALLATION - SERIES AND PARALLEL

The installation drawings in this bulletin are typical. Check local code requirements for vacuum breaker devices and cold-water inlet check valves. ***If you install a check valve in any of these systems, you must install a thermal expansion tank.*** There are two methods of manifold installation: series and parallel. Manifold means to pipe together with several apertures that make multiple connections. That is what manifolding is all about. Think about the intake and exhaust manifolds on a car. The carburetor sprays gasoline into the intake manifold (think of this as the cold water supply line). After the fuel is ignited by the spark plugs, the hot combustion gases are pushed out of the engine through the exhaust manifold (think of this as the hot water supply line). The intake and exhaust manifold on a car is an example of a parallel design.

Parallel Installation

Parallel installation uses heaters that are identical in both BTU input and storage capacity. Normally, parallel installation is used when there is a demand for large quantities of hot water over a short period of time, such as filling a large garden tub or back to back showers. Equipment being equal, two or more heaters connected in parallel will deliver more hot water than the same heaters connected in series. In a parallel configuration, the hot water demand is taken equally from each unit. For every gallon of hot water drawn from each unit, one gallon of cold

water is introduced into the water heater. Each heater will then perform the same amount of work to heat the cold water. Another important point of parallel installation is the length of the supply piping and delivery piping - they must all be the same length. As shown in the drawing below, section A-E must be the same length as section A-B; C-D must be the same length as F-G; E-F must be the same length as C-B. The same holds true for the hot water outlet side. Because the water pressure is constant along the cold inlet piping and hot water supply piping, the heater with the closest 'run' will do the majority of the work. To prevent this we 'balance' the unit with equal pipe lengths. When installing heaters (and storage tanks) in parallel, it is important to accurately plan and measure the distances





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from the cold water supply pipe to the heaters and from the hot water outlet on the heater to the hot water supply line. This will equalize the work between the two water heaters.

Series Installation

Series installation uses heaters that are not identical in both BTU input and storage capacity. An example might be when an expansion or addition is made in an application that will require additional hot water. For example, you add a new bathroom to your home. The existing system will not handle the demand and a new water heater must be installed. The new heater is not identical to the existing heater. In this example, series installation may be appropriate. When installing water heaters in series, the heater with the largest input (BTU or KW) should be the first heater in the series, at the cold-water inlet side of the system. Series installation draws hot water from one tank at a time. As hot water is drawn, it is taken from the last heater in the series. For every gallon of hot water drawn, preheated water is introduced into the last heater in the series and cold water is introduced into the first heater in the series. In a series configuration, the first heater, piped to the cold-water inlet, will do the majority of the work. The second (or remaining) heater will not work as hard because it receives preheated water, not cold water. The last heater in the series will do very little work. In the example below the installation shows a series system with a gas water heater and an electric water heater. The larger gas heater is supplying the hot water into the cold inlet side of the electric heater. When there is a demand for hot water it is drawn from the hot water side of the electric heater.

