

March 2015 Glitch and Fix

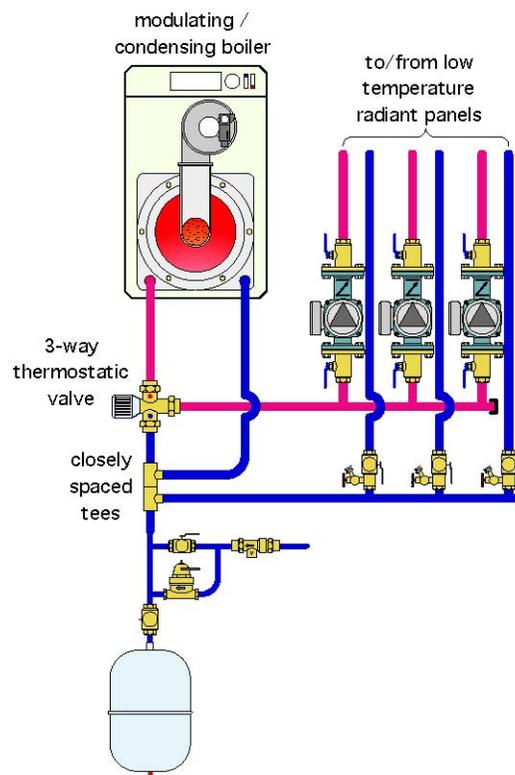
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First attempt

The Glitch

A heating contractor who's trying out his first wall-mounted mod/con boiler installs it as shown below. All flow into the distribution system supplying three radiant panel manifold stations passes through the three-way thermostatic mixing valve. When buying the boiler, the contractor was told to use a pair of closely spaced tees to separate the boiler and distribution system, so he installed some closely spaced tees as shown.

Can you spot at least five things that should be changed in this layout?



The Fix

Although those are closely spaced tees under the boiler, they don't serve to hydraulically separate the boiler from the distribution system.

Another poor choice is to install a three-way thermostatic mixing valve (or any mixing assembly for that matter) between a mod/con boiler and the distribution system. It makes no sense to operate the boiler at a temperature higher than needed by the distribution system and then mix down the water temperature. This reduces the ability of the mod/con boiler to operate with flue gas condensation and thus reduces efficiency.

Furthermore, if that three-way thermostatic valve has a low C_v — which is typical of valves of 1-in. pipe size or less — it's going to act as a significant flow restrictor to the distribution system. Low flow leads to wide ΔT on the radiant panel circuits and very likely to insufficient heat delivery.

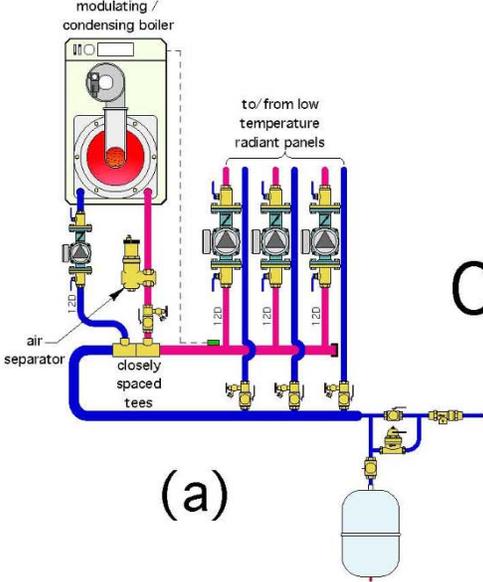
It's also likely that very low flow rates through the mod/con boiler will lead to operating problems, especially in boilers with low-mass heat exchangers.

A good microbubble air separator needs to be added to the system. For the best performance, install it where the fluid is hottest, near the boiler outlet. This is done using a vertically mounted separator in the (a) Fix drawing or using a hydraulic separator in the (b) Fix drawing (both on next page). The latter also provides dirt separation.

There should be a minimum of 12 pipe diameters (12D) of straight tubing upstream of any circulator. This is not the case in the Glitch drawing but has been corrected, and noted, in the Fix drawings.

Finally, take a look at how the circuit purging valves are installed on the zone returns in the Glitch drawing. In this orientation, the only thing they will be purging is the return manifold.

Two possible piping configurations that address these issues are shown below.



OR

