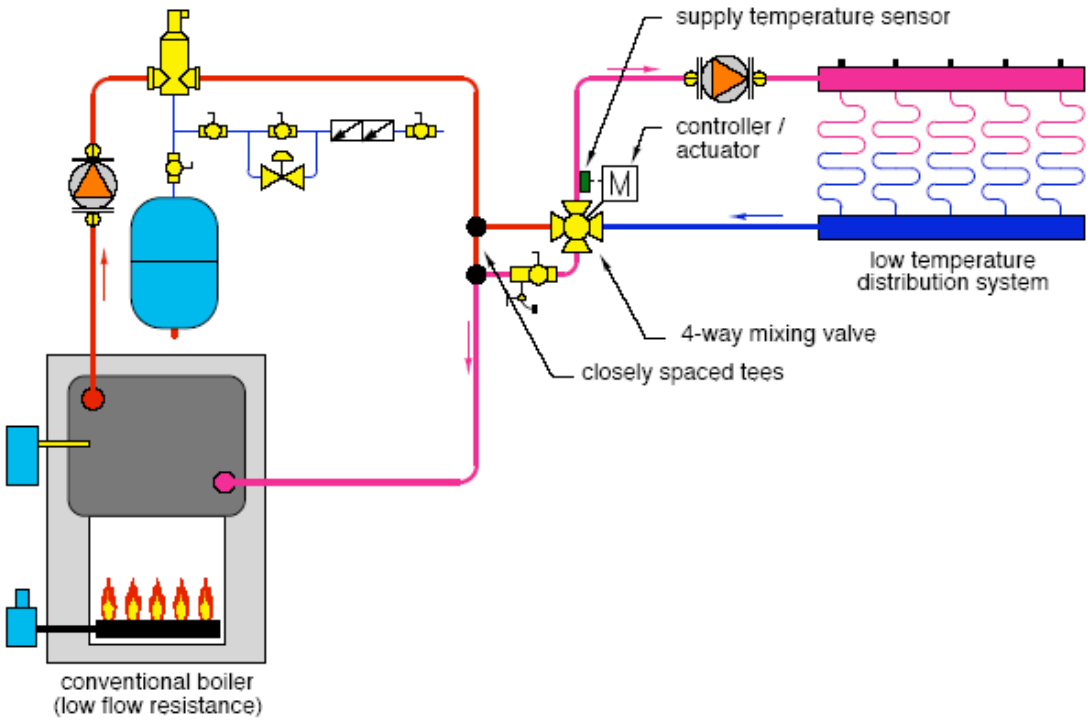
The Glitch & The Fix — October 2008

Mastering The Mixing Valve

The Glitch

Overview: An installer has decided to use a 4-way motorized mixing valve to interface between a conventional gas-fired cast-iron boiler and a low temperature radiant panel system. The system is installed as shown. The mixing valve is located close to the boiler.

Exercise: Can you spot at least 4 details that are either incorrect or unnecessary for this type of system?



The Fix

A 4-way motorized mixing valve is specifically design to create two mixing points within itself: One to regulate system supply temperature, and the other to boost boiler inlet

temperature high enough to prevent sustained flue gas condensation. To accomplish the latter the controller operating the valve's motor must sense and react to boiler inlet temperature. Thus a boiler inlet temperature sensor is required.

It's also unnecessary to use a separate boiler loop and its associated circulator when the boiler has low flow resistance and the mixing valve is located close to the boiler. With generously sized piping between the boiler and 4-way valve, sufficient flow is created from the combined effects of buoyancy and momentum exchange in the mixing valve. Elimination of the boiler circulator reduces both installation and operating cost.

Note that the supply temperature sensor is located immediately downstream of the 4-way mixing valve. Although mixing may have begun by the time flow passes this sensor location, it may not be complete, and thus the sensor may not be sensing the final blended temperature sensor to the radiant panel circuits. It’s always good practice to install the supply temperature sensor downstream of the distribution circulator to ensure complete mixing has occurred prior to flow past the sensor.

The purging valve adjacent to the mixing valve is installed backwards.

Finally, the boiler loop circulator is pumping toward the location of the expansion tank. It should be pumping away from this location.