
BENRICH SERVICE COMPANY TRAINING PROGRAM©

Combination Hot Water and Heating System

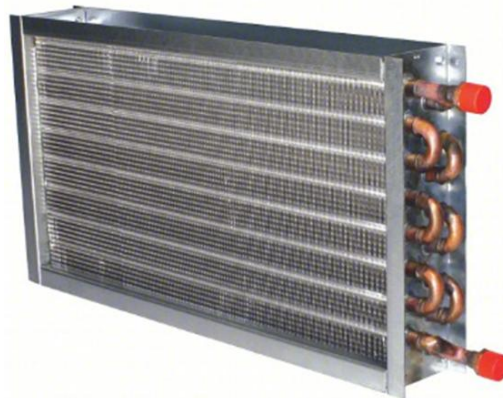
A Combination Hot Water and Heating System uses hot water to heat the space within a home or building. The system's hot water is sourced by an exterior hot water boiler on the property. A combo system uses the same heat source for domestic hot water service and space heating for the building.

The Combination Hot Water and Heating System, found in the ceiling vault, circulates heated water through two (2) or three (3) row coils. Once the hot water is in the coils, a fan then blows the now heated air around the coils into the air ducting to disperse the heated air into the rooms of the unit or building.

Benrich's standard/expectation is that a system blows at minimum temperature of 88 degrees or higher to be considered a properly working system.

Components

- 1) Thermostat – Wall thermostat controls the room temperature and on/off switch.
- 2) Transformer – Converts 120 volts to 24 volts
- 3) Two (2) Row or Three (3) Row Coil (The amount of rows will depend on the space area needing to be heated)



- 4) 3 speed (high/med/low) Fan Motor
- 5) Motor Housing - Housing of fan motor and blades
- 6) Zone Valve (3-Way Valve) – The operation of the zone valve is to by-pass the coil when the heater is not in use.

- a. Electronically it acts as a relay for the thermostat and fan motor sending 120 volts to the fan and 24 volts to the thermostat.
- 7) Hose Bib – If the unit has a hose bib, it is used to bleed air out or drain the system
 - a. If the hose bib is not to be used for bleeding air or draining the system, it should be capped
- 8) Relay – Component that can be used in place of a Zone Valve if the customer has a manual bypass
- 9) Vault – Sheet metal box found usually in the ceiling or cabinets, which contains the coil and all the other components listed (other than the wall thermostat). The vault is connected to the duct work throughout the unit.
- 10) Isolation Valves – ½” ball valves (feed and return line) are used to isolate for repairs or bleed the system

Troubleshooting

- 1) No hot water running through the coils
 - a. Check to verify the hot water at the storage tank is at least 140 degrees and the return pump is operational. Check that all return valves are open and operational.
 - b. Check that the Zone Valve (3-way valve) is working; opening, and closing properly
 - i. Use the manual lever on the side of the valve to test if the valve opens and activates the fan.
 - ii. If the Zone Valve does not activate the fan it needs to be replaced.
 - c. Bleed coil
 - i. Bleed coil to eliminate any air locks.
 - ii. Bleed the feed line to the coil and the return line of the coil individually to relieve the air pockets.
- 2) Coils are hot, but system won't turn on
 - a. Test to verify the thermostat is working
 - i. Remove thermostat cover and test resistance with your Ohm Meter. If there is no resistance, then the thermostat needs to be replaced.
 - ii. Another way of testing the thermostat, touch the red and white wires if the fan turns on that means your thermostat is bad and needs to be replaced.
 - b. Test transformer by using the voltmeter to verify it is working properly.
 - i. To know if the transformer is working properly, you will need the incoming as 120 volts into the transformer and the outlet needs to be 24 volts.
 - c. Check the fan
 - i. Visually verify the fan is not stuck

- ii. Use the voltmeter to verify that the fan is getting 124 volts of power
 - d. Check for loose wiring. If necessary, replace wiring; always turn off power at the breaker first before beginning the repair
- 3) Air flow issues causing the coils to cool
- a. Verify the cover to the vault is on properly and there are not any air leaks
 - b. Verify the filter is cleaned and placed correctly
 - c. Set the fan to medium speed