



**Fan Coil Control w/ Geo Heat Pumps  
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**NOTES**

Fan coil control methods vary and are dependant upon comfort, aggravation, first cost and energy efficiency. Each method has advantages (+) and disadvantages (-) and is as outlined in this bulletin.

Continuous flow from central pump

FAN CYCLE, CONTINUOUS WATER FLOW

- Least Comfort Noisy
- ~15% heating/cooling at all times, temperature over shoot
- Lower energy efficiency
- + Low Cost

Variable flow from central pump w/VFD

2-WAY VALVE w/ VFD PUMP

- Cost of 2-way valve & VFD
- Short pipe runs desired
- + Comfort, slight delay
- + De-stratify Air
- + High Energy efficiency

No Central pump – each FC has own circulator

CIRCULATOR PUMP CYCLE

- Cost of circulator
- Short pipe runs desired
- + Comfort, slight delay
- + De-stratify Air
- + High Energy efficiency

Continuous flow from central pump

3-WAY VALVE CENTRAL CIRCULATION

- Cost of 3-way valve & VFD
- ~15% heating/cooling at all times
- Short pipe runs
- + Highest Comfort, no delay
- + Energy efficient
- + Energy efficient



FAN CYCLE, CONTINUOUS WATER FLOW

A low first cost method. Commonly used in low income or areas where there are few people near the fan coils. The fan cycling being a variable noise make people aware that the fan is “going on and off”, a common complaint. Fan coils with blower motors on Variable Frequency Drives (VFD) can mitigate that comment by having a “soft” start feature. Soft starts run the motor up in a few seconds and the starting awareness noise is reduced/ Fan coils with blowers on VFD controls add cost and offer no advantage over other control methods described. ( VFD fan coil blower controls can be useful in variable air volume designs)

Water flowing through the hydronic coil has a convective component even without the blower motor running. Typical residual heat transfer is about 15% of the capacity of the fan coil by natural convection through the heat exchange surface. Areas can overheat or over cool

Standby loss at full flow from the distribution piping can reduce overall system efficiency and is a function of the insulation methods and material employed

2-WAY VALVE w/ VFD PUMP

A higher first cost method, with the costs of the independent valving and central VFD pump control. Highest comfort can be realized from this design. A zone type valve shutting off the water flow to the fan coil when the fan coil is not being called has the advantage that the blower motor can us used to de-stratify a room with radiant floor, high ceilings and high solar or radiational cooling walls.

As there is no water flowing in the distribution piping, standby losses are minimized. Distribution piping should be short, e.g. centralized fan coils. If the distribution piping is long, the time it takes for the called temperature to reach the fan coil when there is a call can result in cold (or hot in summer) air being blown for a short period – a comfort complaint.

A small by-pass piping at the end of a long distribution run can provide a path for the temperature water to maintain is presence when there is no call. The VFD control can then be employed to pump a small low energy use amount of water.

CIRCULATOR PUMP CYCLE

A higher first cost method, with the cost of the circulator pump required. Controls are simpler than the 2-way valving and central VFD. The method offers the destratification and standby savings advantages.

As there is no water flowing in the distribution piping, standby losses are minimized. Distribution piping should be short, e.g. centralized fan coils. If the distribution piping is long, the time it takes for the called temperature to reach the fan coil when there is a call can result in cold (or hot in summer) air being blown for a short period – a comfort complaint.



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### 3-WAY VALVE CENTRAL CIRCULATION

A modest first cost. The 3-way valve control design is a common fan coil application. Most manufacturers and suppliers offer this option as a standard. The controls are typically line voltage (115vac) or 24 volt; with the line voltage as the lowest first cost. Line voltage packages require running 7 to 80 115 volt wires to the thermostat which also has a three speed blower motor switch. A circulated water temperature sensor normally achieves change over from thermostat control in heating to thermostat control in air conditioning.

This method provides the highest comfort as a call for heating (or cooling) provides immediate water to the air heat exchanger.

Distribution piping standby loss is reduced as by-pass flow around the fan coil piping is minimized by smaller by-pass piping. Standby loss is also a function of the insulation methods and material employed.