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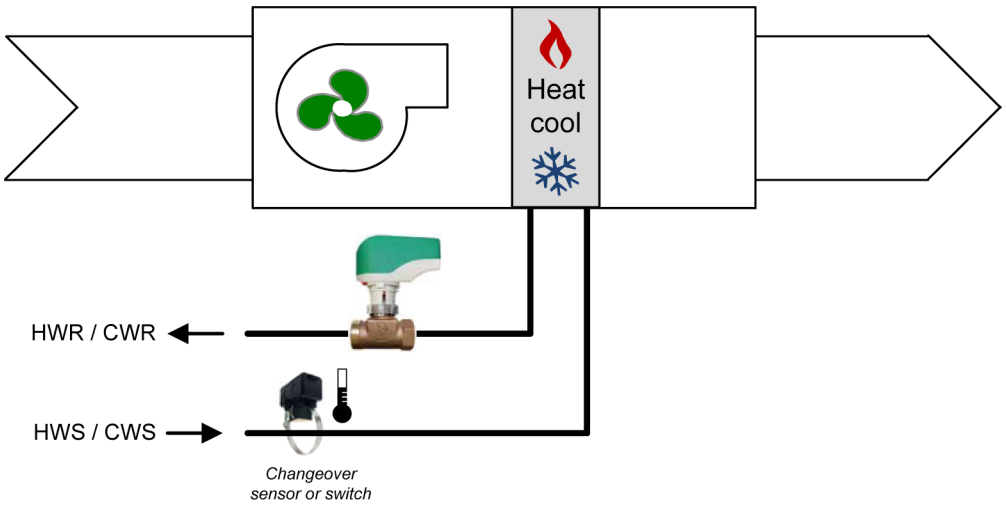
What's the Difference?
2 Pipe vs 4 Pipe Fan Coil

There are many questions that arise when setting up a fan coil controller. Most of these interrogations come when setting up a TFC series controllers. While in the configuration of the TFC, one of the first settings asks if it is a 2 pipe or 4 pipe system.

In order to clarify the differences, we will expose these two concepts.

2 Pipe Fan Coil



The 2 pipe system consists of a single water coil connected to two pipes (supply and return) and one valvle that can serve as either chill water coil or hot water coil depending on the mode of the system. This type of fan coil cannot cool and heat at the same time and is dependent of the actual mode of the building.

The 2 pipe fan coil requires a changeover sensor, usually a strap-on temperature sensor installed on the water supply, to determine the mode of the system.

These units can be equiped with an auxiliary electric heater to compensate the limitations of the system.

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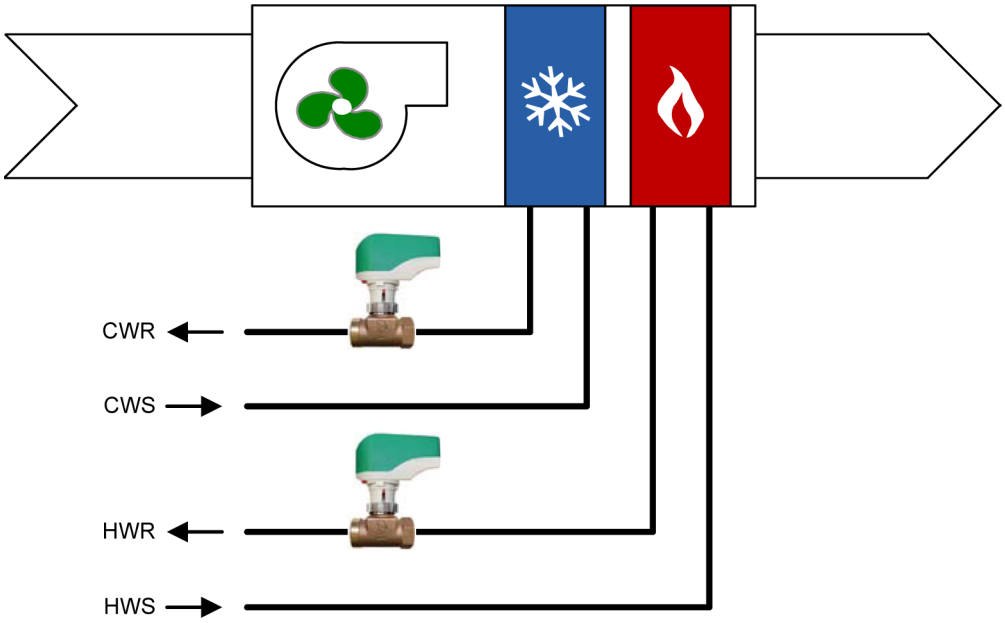
4 Pipe Fan Coil



The 4 pipe system consists of two separate cooling and heating water coils. Each coil has its own dedicated set of pipes (supply and return) and valve. This type of fan coil can cool and heat at the same time and is not dependant of the actual mode of the building.

Contrarely to the 2 pipe system, the 4 pipe fan coil does not require a changeover sensor since both hot and chill water is available.

These units can be equiped with an auxiliary electric heater to boost the heating capacity (if required).

The 4 pipe fan coil can also use a chill water coil and an electric or gas heater. As long as the cooling and heating are independent of each other, the system will be a 4 pipe configuration.

Not all fan coils are equipped in this manner but the concept remains. The important thing to remember is that for a two pipe fan coil, a changeover sensor is required to determine the system mode (cooling or heating). In other words, the fan coil is dependent of the system mode. If cooling is available and no electric reheat coil is present, then the fan coil can only cool. If heating is available, no cooling is possible.

If no changeover sensor is required, this means that system falls automatically on the 4 pipe system. The 4 pipe system has two available sources (heating and cooling) which makes the fan coil independent of the system mode. Unlike to the 2 pipe system, it can cool and heat at the same time allowing for dehumidification to occur.

This is the configuration required when setting up an analog valve in a 2 pipe fan coil.

- AO1: Modulating valve- AI2: Changeover sensor or switch- TO1 & TO2 are not used- AO2 is not used

This is the configuration required when setting up an On/Off valve in a 2 pipe fan coil.

- TO1: On/Off valve
- AI2: Changeover sensor or switch
- TO2 is not used
- AO1 & AO2 are not used

This is the configuration required when setting up an Floating valve in a 2 pipe fan coil.

- TO1 & TO2: Floating valve
- AI2: Changeover sensor or switch
- AO1 & AO2 are not used

2 Pipe				**Analog**				**On/Off**				**Floating**			
Terminals		**Fan option**		**analog**	**1 spd**	**2spd**	**3spd**	**analog**	**1 spd**	**2spd**	**3spd**	**analog**	**1 spd**	**2spd**	**3spd**
TB1	**1**	Common		Common				Common				Common			
	2	24 VAC		24 Vac				24 Vac				24 Vac			
	3	Common Triac		Common Triac				Common Triac				Common Triac			
	4	Triac output 1 (TO1)	Floating output 1	-				2 Pipe on/off				2 Pipe floating (close)			
	5	Triac output 2 (TO2)		-				-				2 Pipe floating (open)			
	6	Triac output 3 (TO3) Reheat		Local reheat (optional) (on/off or pulse)				Local reheat (optional) (on/off or pulse)				Local reheat (optional) (on/off or pulse)			
	7	Common Relay		-	Common Relay			-	Common Relay			-	Common Relay		
	8	Digital output 1 (DO1)		-	-	-	High	-	-	-	High	-	-	-	High
	9	Digital output 2 (DO2)		-	-	High	Med	-	-	High	Med	-	-	High	Med
	10	Digital output 3 (DO3) / Analog Fan Speed (AO4)		Fan analog	1 spd	Low	Low	Fan analog	1 spd	Low	Low	Fan analog	1 spd	Low	Low
	11	Occupancy Sensor (DI1)		Occupancy Sensor (optional)				Occupancy Sensor (optional)				Occupancy Sensor (optional)			
	12	External Temp. Sensor (AI1)		External Temp. Sensor (optional)				External Temp. Sensor (optional)				External Temp. Sensor (optional)			
	13	External Changeover (AI2)		External Changeover				External Changeover				External Changeover			
	14	Analog output 1 (AO1)		2 Pipe analog				-				-			
	15	Analog output 2 (AO2)		-				-				-			
	16	Analog output 3 (AO3) Reheat		Local reheat analog (optional)				Local reheat analog (optional)				Local reheat analog (optional)			

Since the cooling and heating are independent from each other, the 4 pipe fan coil allow the signals to be different as well. While in the configuration process, you are required to identify what signal is used for cooling and heating (Analog, On/Off or Pulse).

4 Pipe				Cool & Heat Analog				Cool & Heat On/Off				Cool Analog-Heat On/Off or pulse				Cool On/Off - Heat Analog			
Terminals		**Fan option**		**analog**	**1 spd**	**2 spd**	**3 spd**	**analog**	**1 spd**	**2 spd**	**3 spd**	**analog**	**1 spd**	**2 spd**	**3 spd**	**analog**	**1 spd**	**2 spd**	**3 spd**
TB1	1	Common		Common				Common				Common				Common			
	2	24 Vac		24 Vac				24 Vac				24 Vac				24 Vac			
	3	Common Triac		Common Triac				Common Triac				Common Triac				Common Triac			
	4	Triac output 1 (TO1)	Floating output 1	-				4 Pipe on/off cool				-				4 Pipe on/off cool			
	5	Triac output 2 (TO2)		-				4 Pipe (on/off or pulse) heat				4 Pipe (on/off or pulse) heat				-			
	6	Triac output 3 (TO3) Reheat		Local reheat (optional) (on/off or pulse)				Local reheat (optional) (on/off or pulse)				Local reheat (optional) (on/off or pulse)				Local reheat (optional) (on/off or pulse)			
	7	Common Relay		-	Common Relay			-	Common Relay			-	Common Relay			-	Common Relay		
	8	Digital output 1 (DO1)		-	-	-	High	-	-	-	High	-	-	-	High	-	-	-	High
	9	Digital output 2 (DO2)		-	-	High	Med	-	-	High	Med	-	-	High	Med	-	-	High	Med
	10	Digital output 3 (DO3) / Analog Fan Speed (AO4)		Fan analog	1 spd	Low	Low	Fan analog	1 spd	Low	Low	Fan analog	1 spd	Low	Low	Fan analog	1 spd	Low	Low
	11	Occupancy Sensor (DI1)		Occupancy Sensor (optional)				Occupancy Sensor (optional)				Occupancy Sensor (optional)				Occupancy Sensor (optional)			
	12	Ext. Temp Sensor (AI1)		External Temp. Sensor (optional)				External Temp. Sensor (optional)				External Temp. Sensor (optional)				External Temp. Sensor (optional)			
	13	External Changeover (AI2)		-				-				-				-			
	14	Analog output 1 (AO1)		4 Pipe analog cool				-				4 Pipe analog cool				-			
	15	Analog output 2 (AO2)		4 Pipe analog heat				-				-				4 Pipe analog heat			
	16	Analog output 3 (AO3) Reheat		Local reheat analog (optional)				Local reheat analog (optional)				Local reheat analog (optional)				Local reheat analog (optional)			

You can look at the original instruction document here:
http://neptronic.com/Controls/PDF/TFC24F3XYZ1-121112.pdf

The EFC series controllers do not have this type of settings. To setup a 2 pipe fan coil, the Changeover Ramp (COR) must be used and a changeover sensor or switch must be installed and configured.

In conclusion;
2 pipe fan coil uses 1 water coil to heat or cool and is dependent of the system mode. It requires a changeover sensor or switch.

4 pipe fan coil have two distinct cooling and heating coils. It does not require a changeover sensor or switch. It is also independent from the system mode.