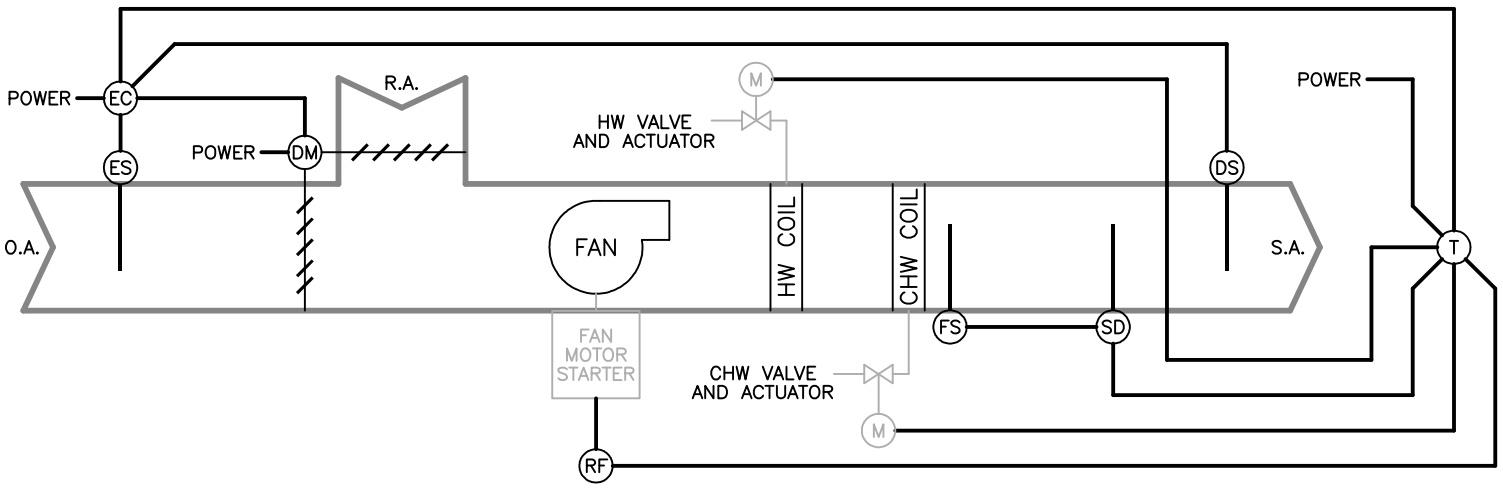
CONTROLS
ESTIMATING
AND
DESIGN
GUIDELINE

APPLICATION EXAMPLE #3

Fan Coil Unit

- **Fractional horsepower single phase fan (600 CFM)**
- **Hot and chilled water coils (2.6 GPM chilled water)**
- **Hot and chilled water line sizes = ¾”**
- **Outside air / return air mixing box**

FAN COIL UNIT – TWO–POSITION CHW COOLING & HW HEATING



DESCRIPTION

Built up fan coil unit serving a single zone with a thermostat in the zone. The unit is equipped with two position chilled water cooling and two position hot water heating. The unit is also equipped with economizer controls. Refer to valve sheets for chilled and hot water valves and actuators. Refer to starter sheet for starter descriptions, selections, and pricing.

COMPONENTS

		NOTES	LABOR (hours)	MATERIAL (cost)
(T)	THERMOSTAT, PROGRAMMABLE (or)	[1] [2]	4.0	200.00
~~(T)~~	~~THERMOSTAT, NON–PROGRAMMABLE~~	~~[2]~~	~~4.0~~	~~90.00~~
~~(SD)~~	~~DUCT MOUNTED SMOKE DETECTOR~~	~~[3] [4]~~	~~4.0~~	~~150.00~~
(FS)	FREEZESTAT	[5]	2.0	120.00
(RF)	FAN RELAY		2.0	17.00
(DM)	DAMPER MOTOR	[6] [7]	4.0	200.00
(EC)	ECONOMIZER CONTROL	[7]	2.0	40.00
(ES)	ENTHALPY SENSOR	[7]	4.0	70.00
(DS)	DISCHARGE AIR SENSOR	[7]	2.0	12.00
	STARTUP AND COMMISSIONING: 8 hours	TOTALS:	20.0	$659.00
	ENGINEERING TIME: 16 hours			

NOTES

[1] Most programmable thermostats have remote sensing capabilities. Two conductor from the thermostat to the remote sensor. Add cost of sensor ($50.00) and labor required to mount and wire sensor (2 hours).

[2] Thermostat labor includes mounting and power, and wiring to the valves. All other wiring associated with the thermostat is included in the labor factors of the devices wired back to the thermostat.

[3] No smoke detector required if the fan coil unit CFM is less than 2000.

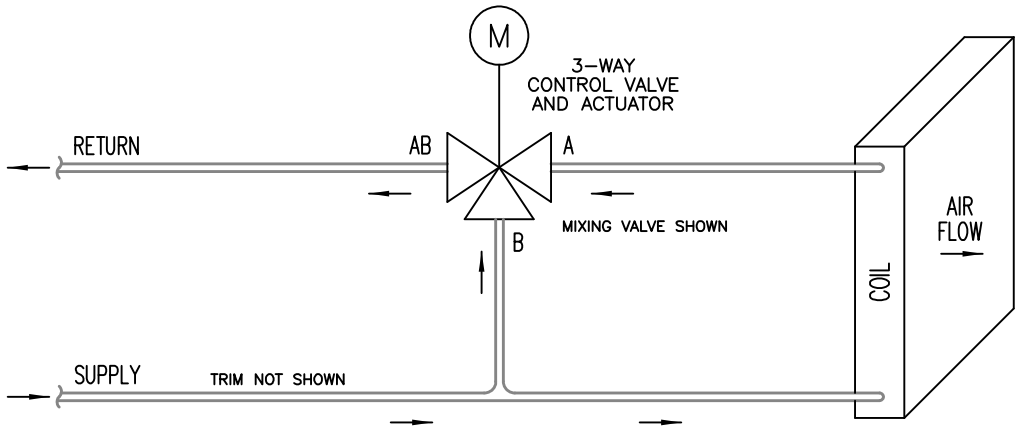
[4] Labor includes power wiring to the detector and interlocking the detector to the fan coil unit. Labor does not include interlock to any fire alarm system.

[5] If the unit does not have an economizer, and there is no outside air, then delete this item.

[6] Mixing box with mechanically linked outside and return air dampers illustrated here. If outside and return air dampers are separate, double the labor and material factors.

[7] If economizer operation is not required, then delete these items. If outside air damper is required, then use damper motor labor and material factors.

CONTROL VALVES – THREE–WAY BODIES, TWO–POSITION CONTROL HOT OR CHILLED WATER



DESCRIPTION

Three–way control valve with electric valve actuator suitable for two–position control of hot and chilled water. Typical applications include on/off control of water flow through the primary hot or chilled water coil of a fan coil unit, or on/off control of the morning warm–up coil of a built up air handling unit.

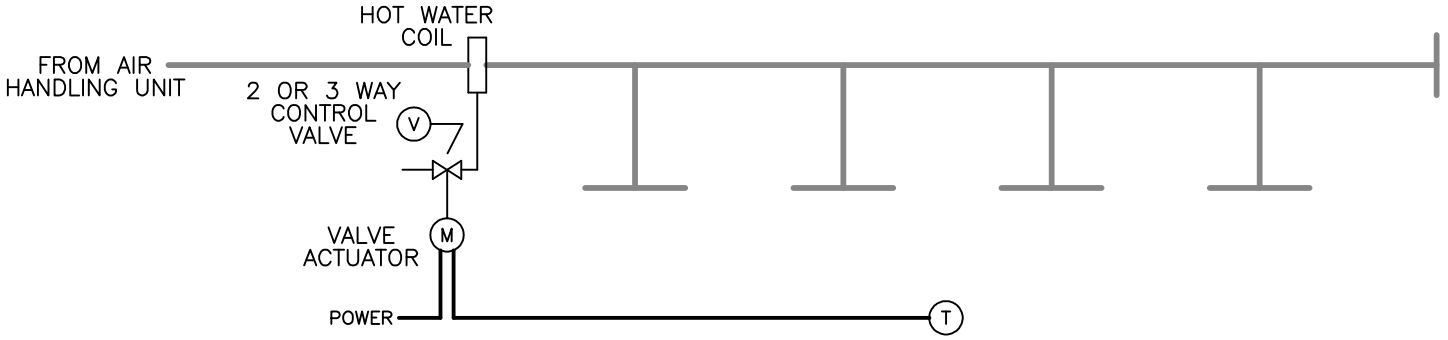
VALVE PRICING TABLE

	GLOBE VALVES		BALL VALVES	
SIZE	SPRING RETURN	NON–SPRING RETURN	SPRING RETURN	NON–SPRING RETURN
1/2"	385.00	295.00	235.00	145.00
3/4"	410.00	320.00	270.00	180.00
1"	415.00	330.00	285.00	195.00
1–1/4"	440.00	350.00	295.00	200.00
1–1/2"	605.00	400.00	570.00	400.00
2"	655.00	430.00	610.00	435.00
2–1/2"	895.00	725.00	-----	-----
3"	945.00	770.00	-----	-----
4"	1080.00	905.00	-----	-----

NOTES

1. Valve pricing based on Delta valves with Belimo 24 volt actuators.
2. Globe valves selected here have standard trim. Ball valves selected here have stainless steel ball and stems.
3. For two–position control, size the valve according to line size (example: 3/4" pipe gets 3/4" valve).
4. Three–way globe valves selected here are mixing valves. Three–way ball valves selected here are diverting valves (ball valves are diverting by design).
5. The valves selected here are "middle of the road". There are cheaper and more expensive alternatives.
6. For valve sizes up to 1", a "zone valve" is a much cheaper alternative. Refer to the HOT WATER REHEAT COIL – TWO–POSITION CONTROL guideline for zone valve pricing.

HOT WATER REHEAT COIL – TWO–POSITION CONTROL



DESCRIPTION

Hot water coil served by an upstream air handling unit. The coil serves a single zone with a thermostat in the the zone.

COMPONENTS

	NOTES	LABOR (hours)	MATERIAL (cost)
~~(T) THERMOSTAT~~		~~2.0~~	~~40.00~~
(M) VALVE ACTUATOR	[1] [5]	~~2.0~~	-----
~~(V) 1/2" VALVE BODY (or)~~		-----	~~70.00~~
(V) 3/4" VALVE BODY (or)	[2] [3] [4] [5]	-----	75.00
~~(V) 1" VALVE BODY~~		-----	~~85.00~~
STARTUP AND COMMISSIONING: 1 hour	TOTALS:	-----	$75.00
ENGINEERING TIME: 4 hours (per air handling unit)			

NOTES

[1] For small two–position zone valves, the valve body and valve actuator are normally purchased as an assembly. Therefore, the cost of the actuator is included in the valve body cost.

[2] For two position control, size the valve body according to line size (example: 3/4" pipe gets 3/4" valve).

[3] Material costs shown for the valve bodies are for 3–way valves. Two–way valves are slightly less expensive.

[4] There is no electrical labor associated with the valve body.

[5] The actuator/valve body assemblies that these prices are based on are SPRING RETURN.