6-way CCV & ePIV

Focusing on the details

Matt Hamilton - Belimo Americas

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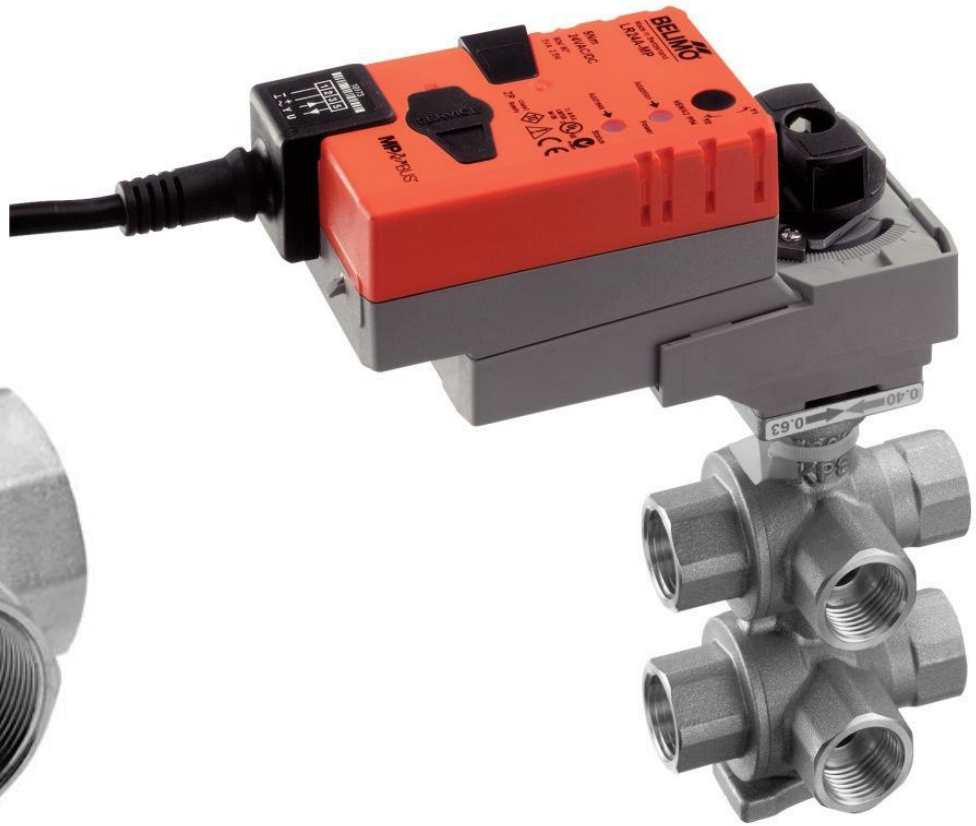
Agenda

- **6-way CCV – Pressure Dependent Valve**
  - Why and how does it work
  - Pressure Relief Technology
  - Selection / Specification
- **6-way ePIV – Pressure Independent Valve**
  - Why and how does it work
  - Selection / Specification
  - Communication
  - Settings
- **Best Practices – CCV and ePIV**
  - Frequent questions
  - Test, check & commissioning
- **Q&A**

6-way CCV

What is a 6-way valve

The 6-way valve is two “3-way valves” that are mechanically linked.

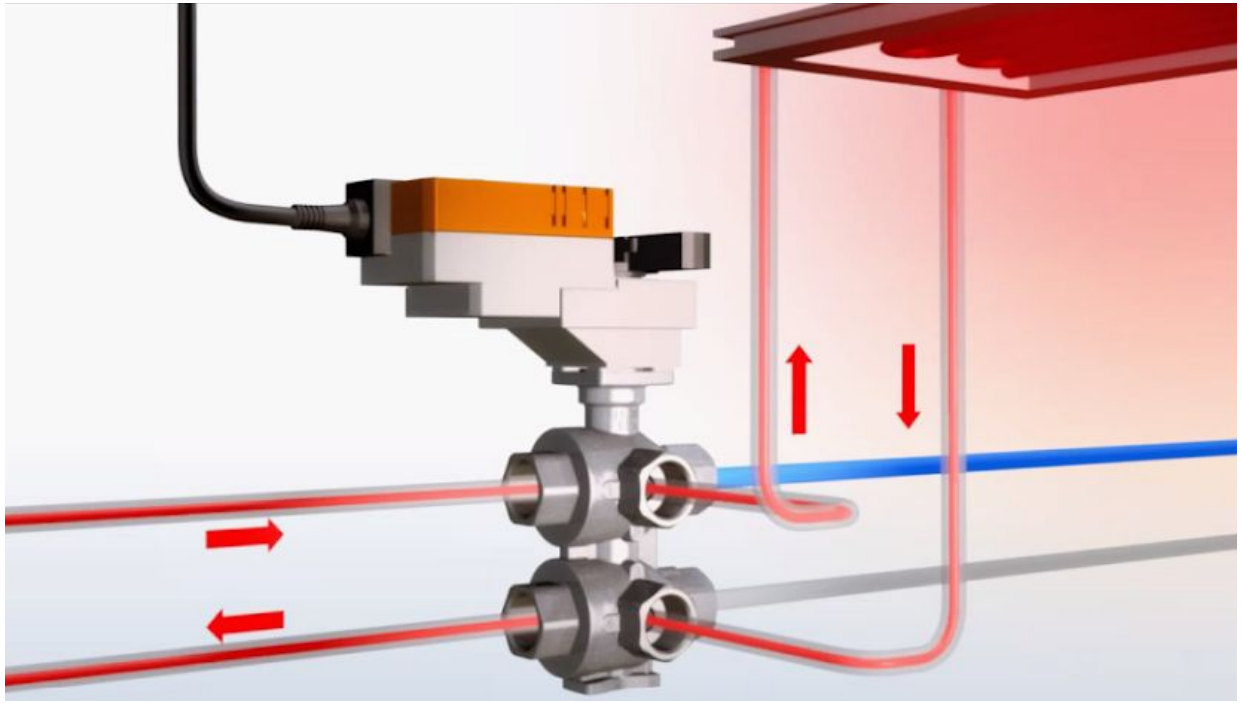


How does it work – Sequence 1

- **Top**
  - Supply water enters the top left port of the valve and flows to the “coil”
- **Bottom**
  - Return water enters the bottom common port and flows to the return line

- **Both upper and lower balls rotate together as flow increase or decrease**

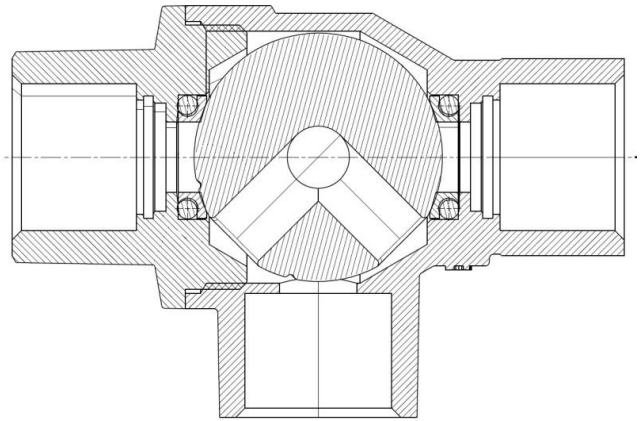
- **Flow moves across the valve not from top to bottom**

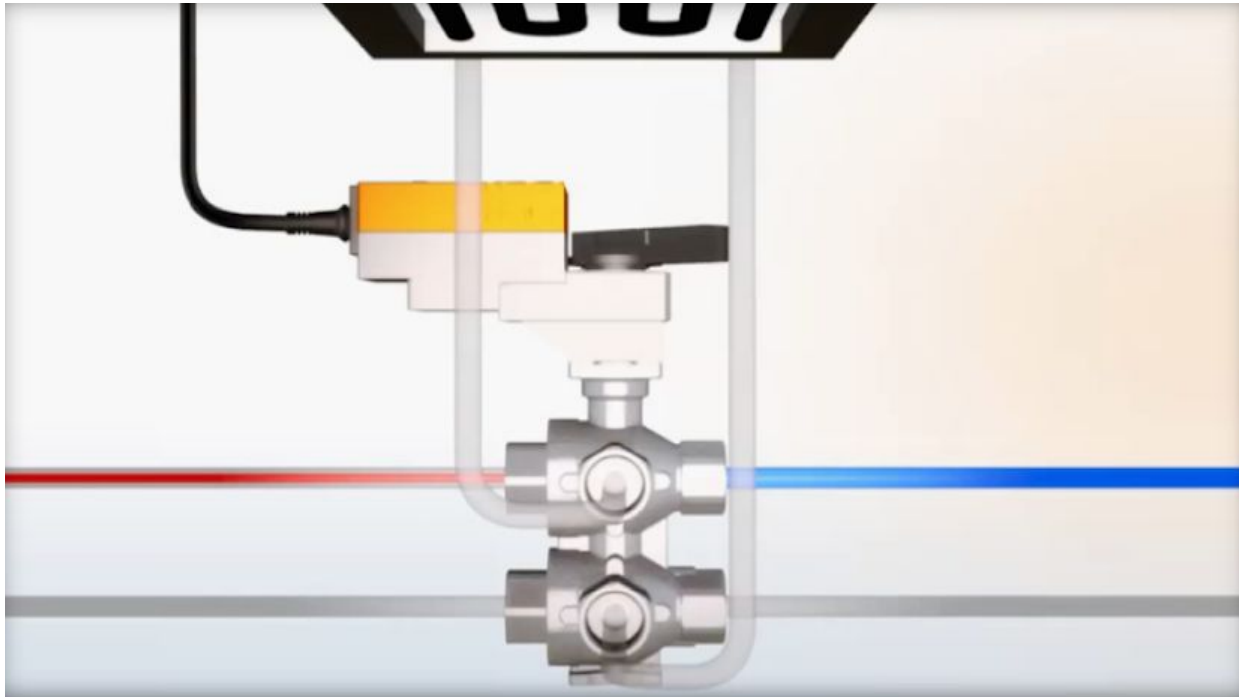


How does it work – Closed position

- **Top**
  - Closed for both sides (heating/cooling), actuator is positioned at 45º
- **Bottom**
  - Closed for both sides (heating/cooling), actuator is positioned at 45º

- **No flow across the valve**



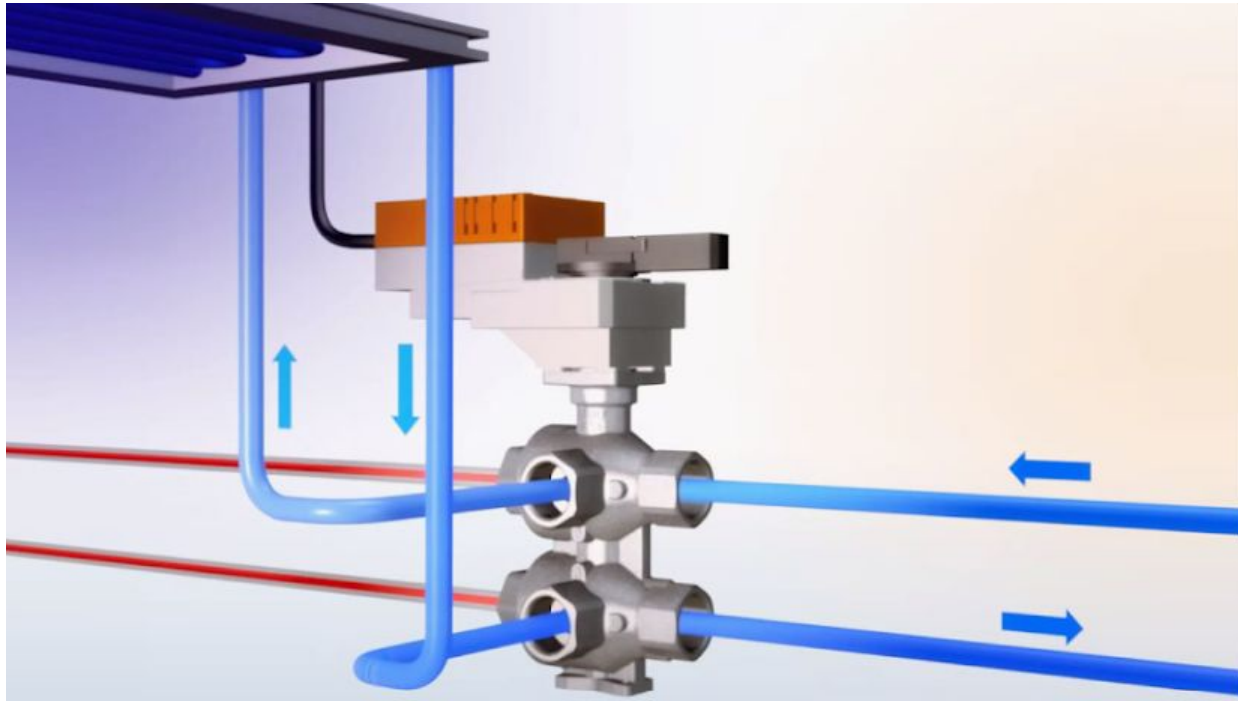


How does it work – Sequence 2

- **Top**
  - Supply moves through the valve similar to a 3-way diverting CCV
- **Bottom**
  - The return flows similarly but in the opposite direction

- **Both upper and lower balls rotate together as flow increase or decrease**

- **Flow moves across the valve not from top to bottom**

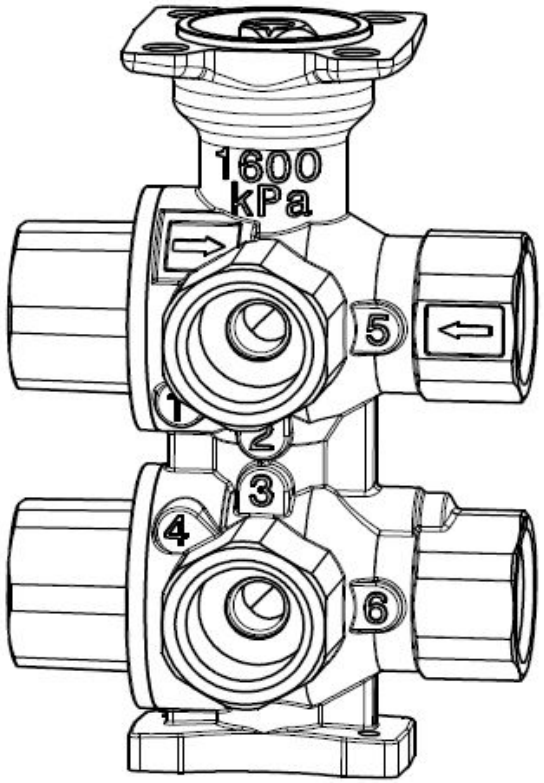


Valve Design – Right Application

Technical Details

6-way Valve Overview

- Typical installations are Chilled Beams, Radiant Ceiling Panels, Four Pipe Fancoils
- 2 Switching valves interconnected by center valve stem replacing two 3Way valves.
  - Only 1 actuator is required.
- 6-way supplies heating or cooling are piped to Ports 1 & 5 and returns are piped to Ports 4 & 6
- 6-way is a single flow direction valve (supply and return ports are not interchangeable) due to noise that is created if the disc is installed in the supply port.
- To be used only for systems which are designed as 4 pipe common load systems.



Four-Pipe Independent Load – System

- Heating and cooling circuits are completely separate closed loops and must not interact.
- Typically each circuit will have a different optimized working pressures to align with required capacities of heating or cooling.
- Each circuit can have different flow medias.
- Each load has separate heating and cooling coil.
- Separate expansion tanks for each closed loop.
- **What should you know?**
  - Why should a 6-way **NOT** be used in this system type?
    - This valve risks the separate systems equalizing in pressure. This can reduce system efficiencies, damage piping components & mixed media.

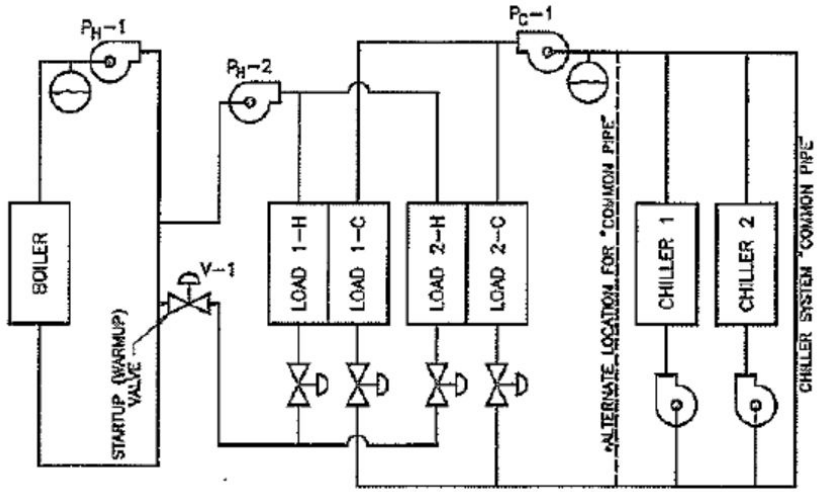


Fig. 26 Four-Pipe Independent Load System

2012 ASHRAE Handbook - Hydronic Heating & Cooling System Design - Section 13.11

Four-Pipe Common Load – System

- Individual loads can be run in either heating or cooling mode.
- Changeover between modes occurs at each load.
- System pressures must be equal on heating and cooling loops.
- Shared or linked expansion tank(s).
- Note: The two, 3Way valves shown in figure, adjacent to each load replaced by one 6-way valve.

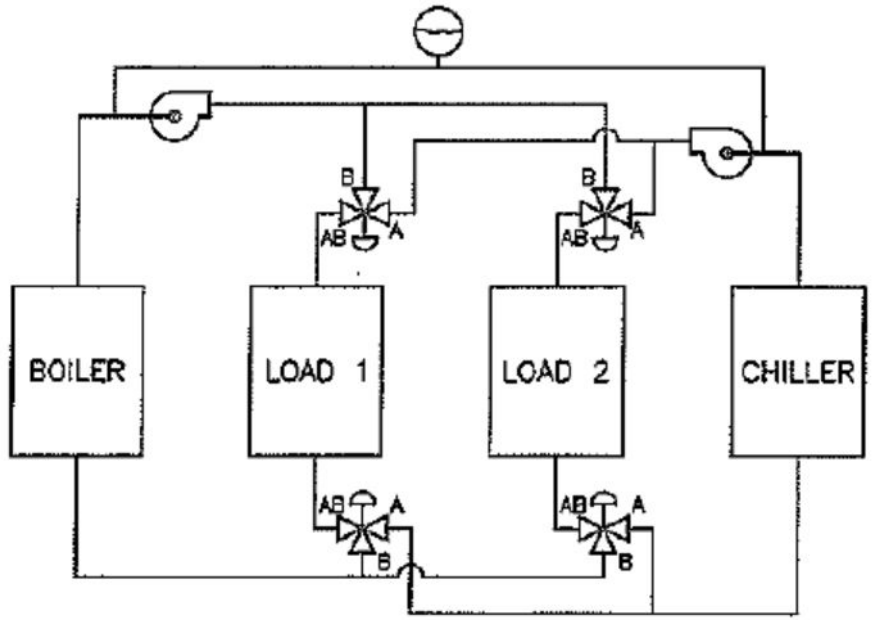


Fig. 25 Four-Pipe Common Load System

2012 ASHRAE Handbook - Hydronic Heating & Cooling System Design - Section 13.11

Four-Pipe Common Load – Expansion Tank

- Only one expansion tank is to be used.
- Systems must be connected at this point.
- Why a common load system should NOT have 2 separate expansion tanks?
- Causes an unbalanced volume in the heating and cooling circuit instead of maintaining a desired equilibrium.
- Unbalanced volume can lead to loss of system pressure on the cooling circuit and overpressure on the heating circuit.
- Loss of system pressure on cooling circuit leads to constant filling of fresh water which leads to corrosion from oxygen and dilution of the glycol mixture
- Water hammer can occur as tanks will fight each other due to unbalanced systems.

Four-Pipe Common Load – Expansion Tank

- **What to do if 2 tanks has been previously installed?**
  - 1. Decommission 1 tank and ensure both sides of the system are connected at the active tank.
- OR
  - 2. Both tanks need to be connected.

- **Can one tank lower the overall system efficiency?**
  - Expansion tanks are at ambient temperature regardless. One tank will not reduce efficiency.
  - Expansion tank has a relatively low volume compared to the overall system.
  - Higher levels of temperature differential occur when the system is switching modes when compared to expansion tank.

- **Danbury Facility had 2 expansion tank issue!**
  - Expansion tanks were connected to prevent further system issues.

Pressure Relief

Technical Details

Why a pressure relief feature is required?

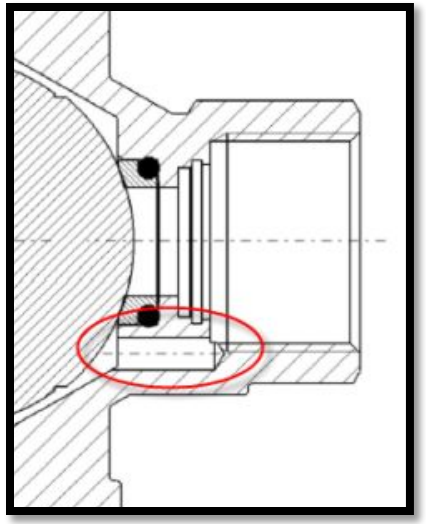
- During cooling operation water is chilled below ambient temperature.
- If a individual load is not required for heating or cooling the valve is closed creating a isolated circuit.
- When chilled water is present in the isolated circuit while the valve is closed it will continue to warm until reaching ambient temperature.
- As water warms its density decreases, creating expansion.
- The isolated circuit has the same volume capacity and yet the water volume is increasing! This in turn increases the pressure of the isolated circuit.
- Density = Mass/Volume
  - Density of water changes with temperature. In a fixed volume and mass, lower density results in increased pressure.
- These pressure increases can exceed the designed maximums of piping components, damaging the system.

History of Pressure Relief

- Original pressure relief design for 6-way valve was a pinhole from Port 6 and into the valve body cavity.
- This pressure relief design had 2 distinct disadvantages.
- Hole could become clogged by debris preventing the pressure relief from functioning properly.
- Hole allowed mixing of water from Sequence 2 side when Sequence 1 was actively open.
- **Why a new design was needed?**
  - Pressure Relief is only activated when the valve is in the closed position, 45°±2°.
  - There are 2 openings created by the circular groove along the sealing seat

(Top and Bottom) to relieve pressure

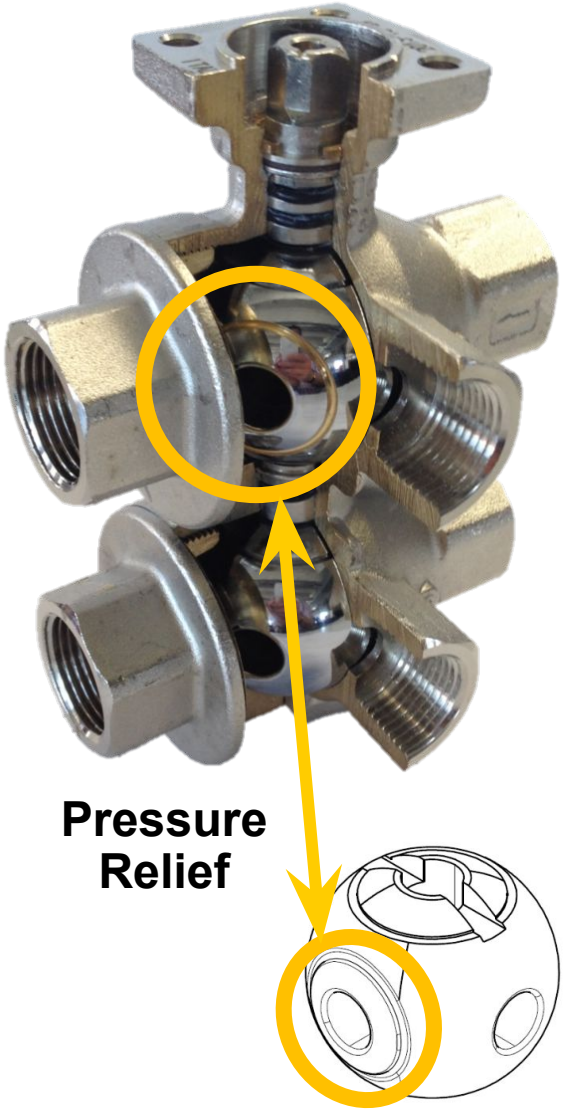
  - If one were to be clogged another path is available.
  - When the ball is turned the groove passes over the seats, which can dislodge attached debris, cleaning the pressure relief.
  - No risk of mixing!



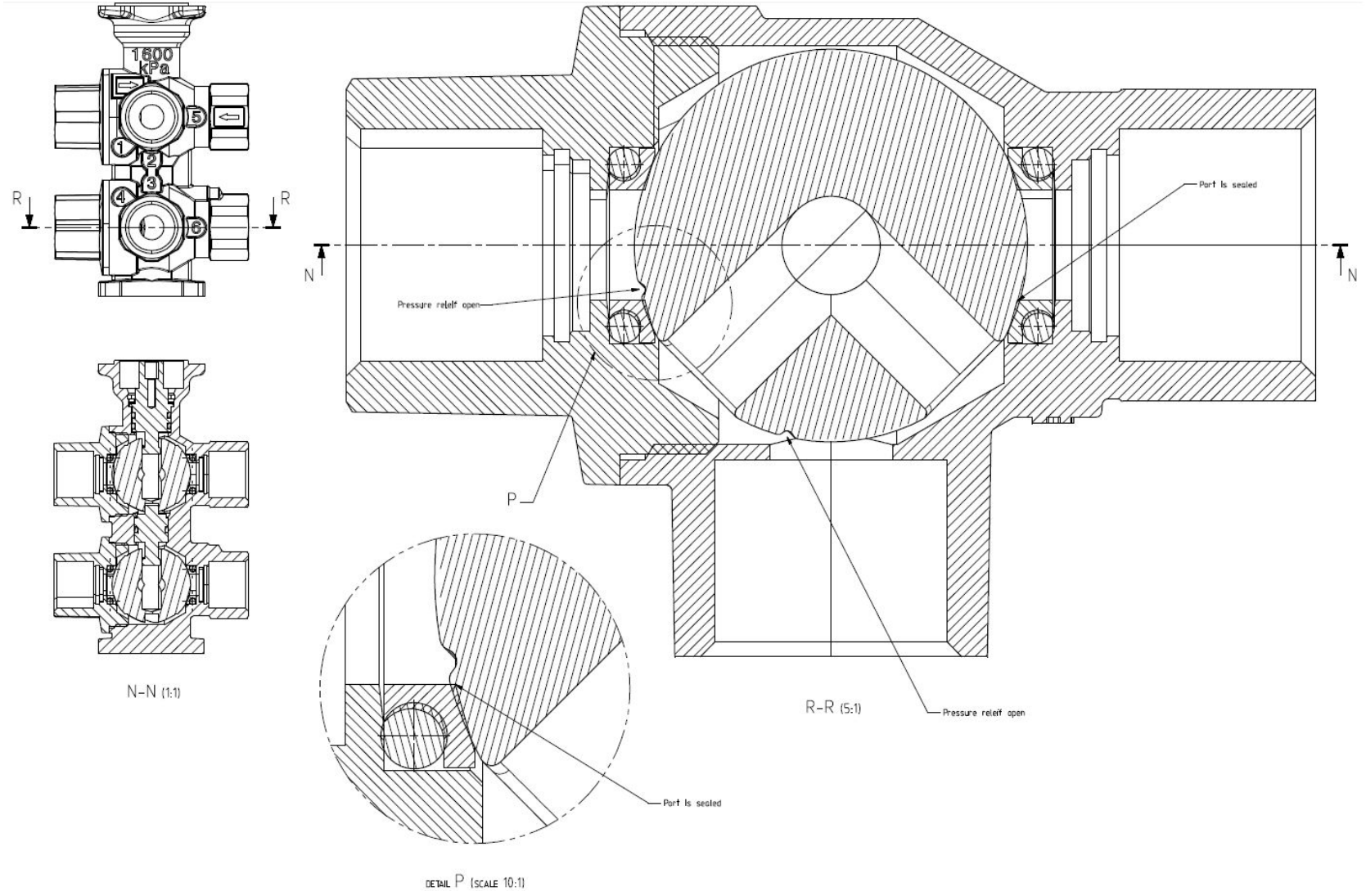
Old Pressure Relief

What is the new design? How does it work?

- Circular groove surrounding top ball flow port.
- The groove is activated when the valve is set to the, closed position.
- Activation allows pressure from the coil/load to be relieved to the Port 1 side of the valve.
- The expansion tank provides system pressure compensation.
- Bottom valve ball has no groove preventing internal leakage through circuit.
- Top valve ball used to improve accuracy of position due to valve backlash and angular error.

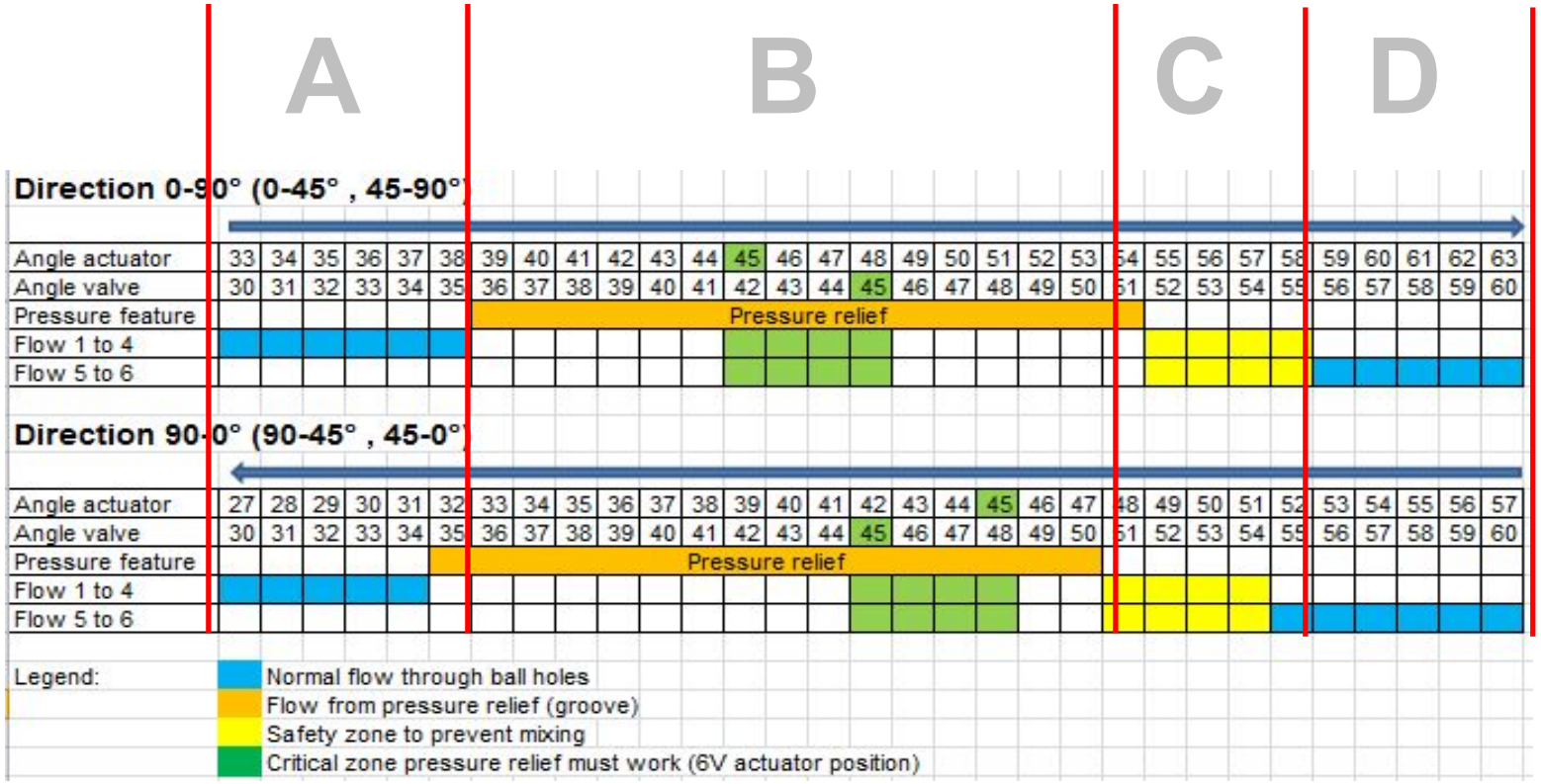


Pressure Relief – Cross Sectional View

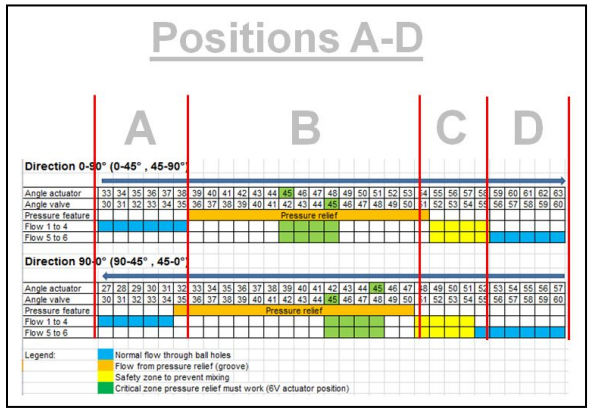


Pressure Relief – Design Considerations

Positions A-D

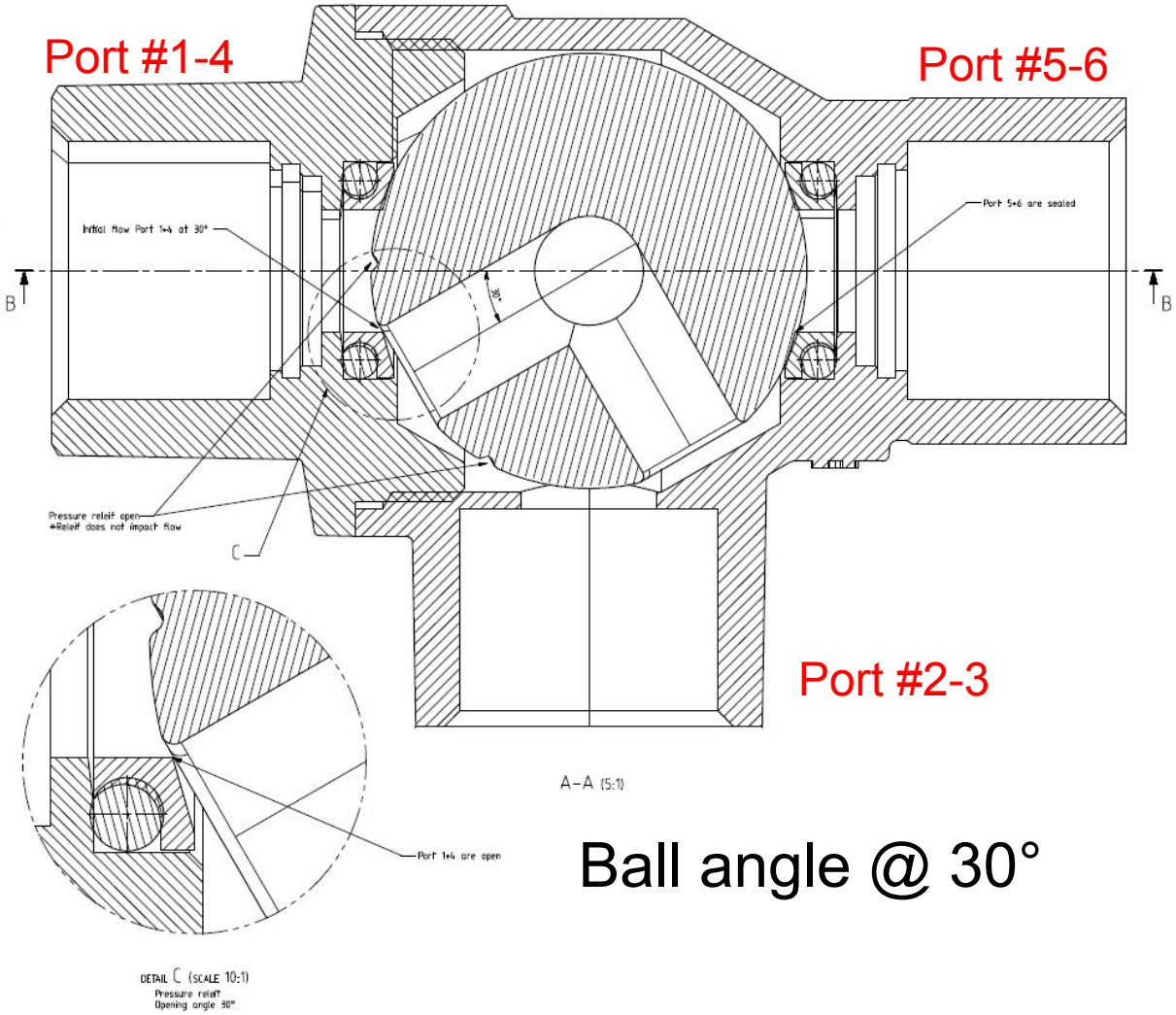


Pressure Relief
Sequence 1 Partially Open – Position A



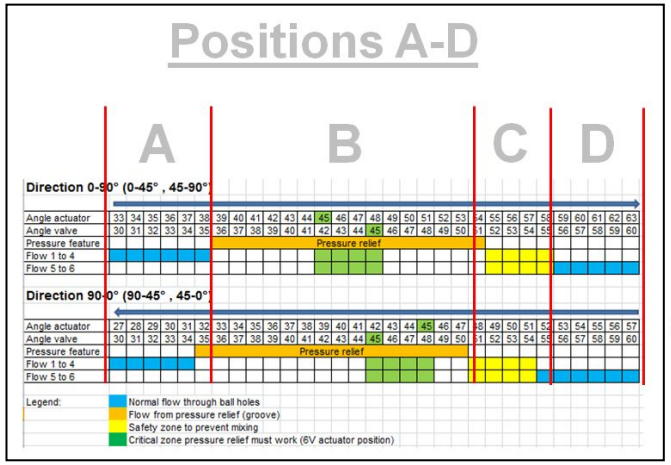
Function:

- Control path (Ports 5-6) is closed!
- Normal flow through control path (Ports 1-4)



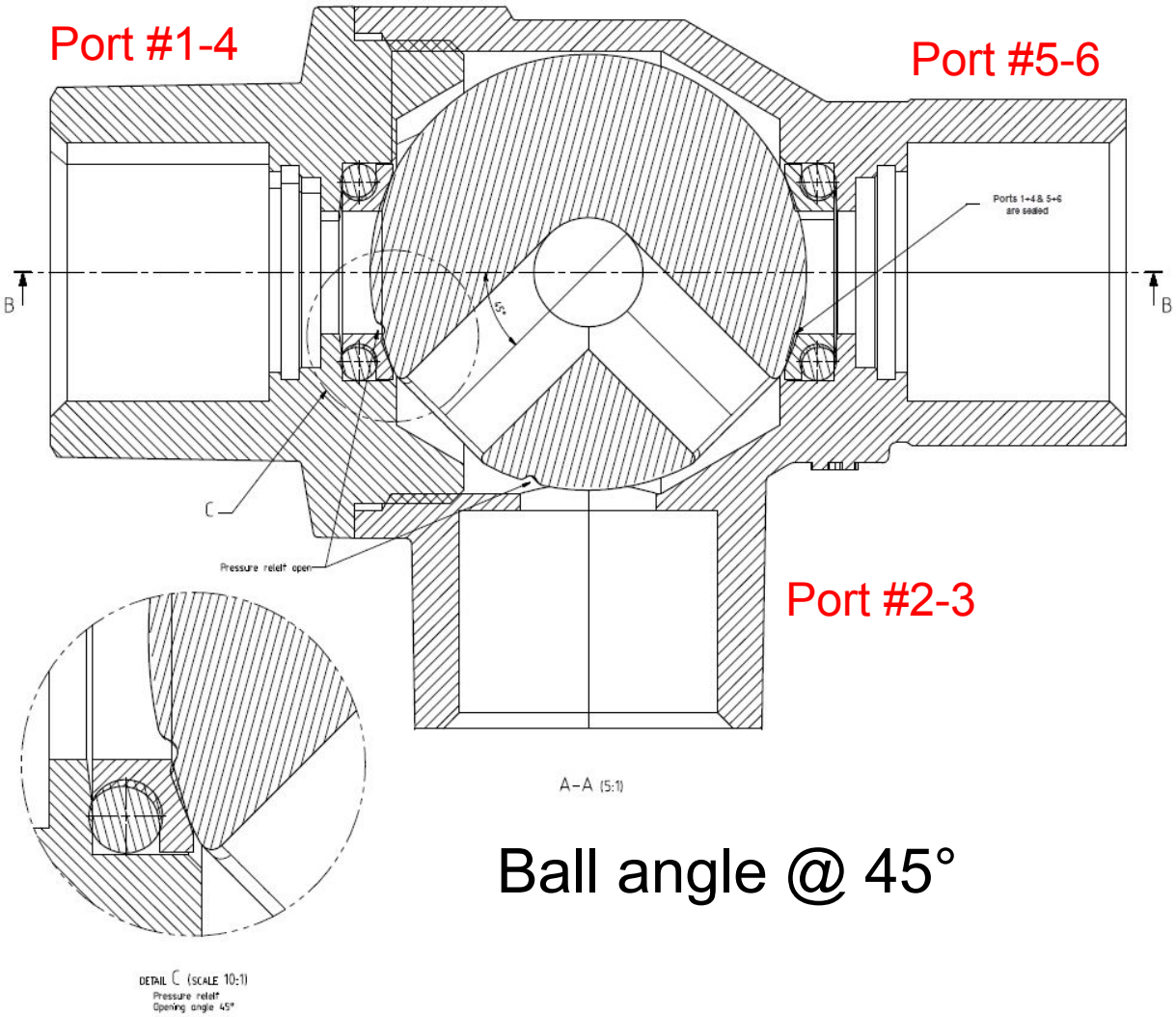
Ball angle @ 30°

Pressure Relief
Fully Closed Position – Position B



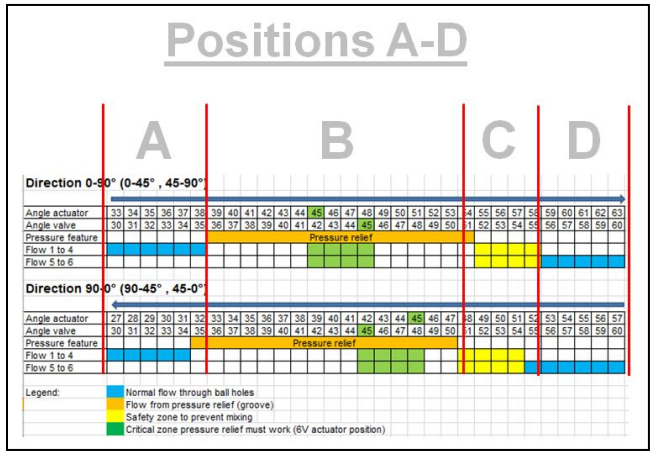
Function:

- Control path (Ports 1-4) is closed!
- Control path (Ports 5-6) is closed!
- Pressure relief is active between ≈36° and ≈50°
- Actuator signal of 6 volts will activate pressure relief. (2-10V Control Signal)



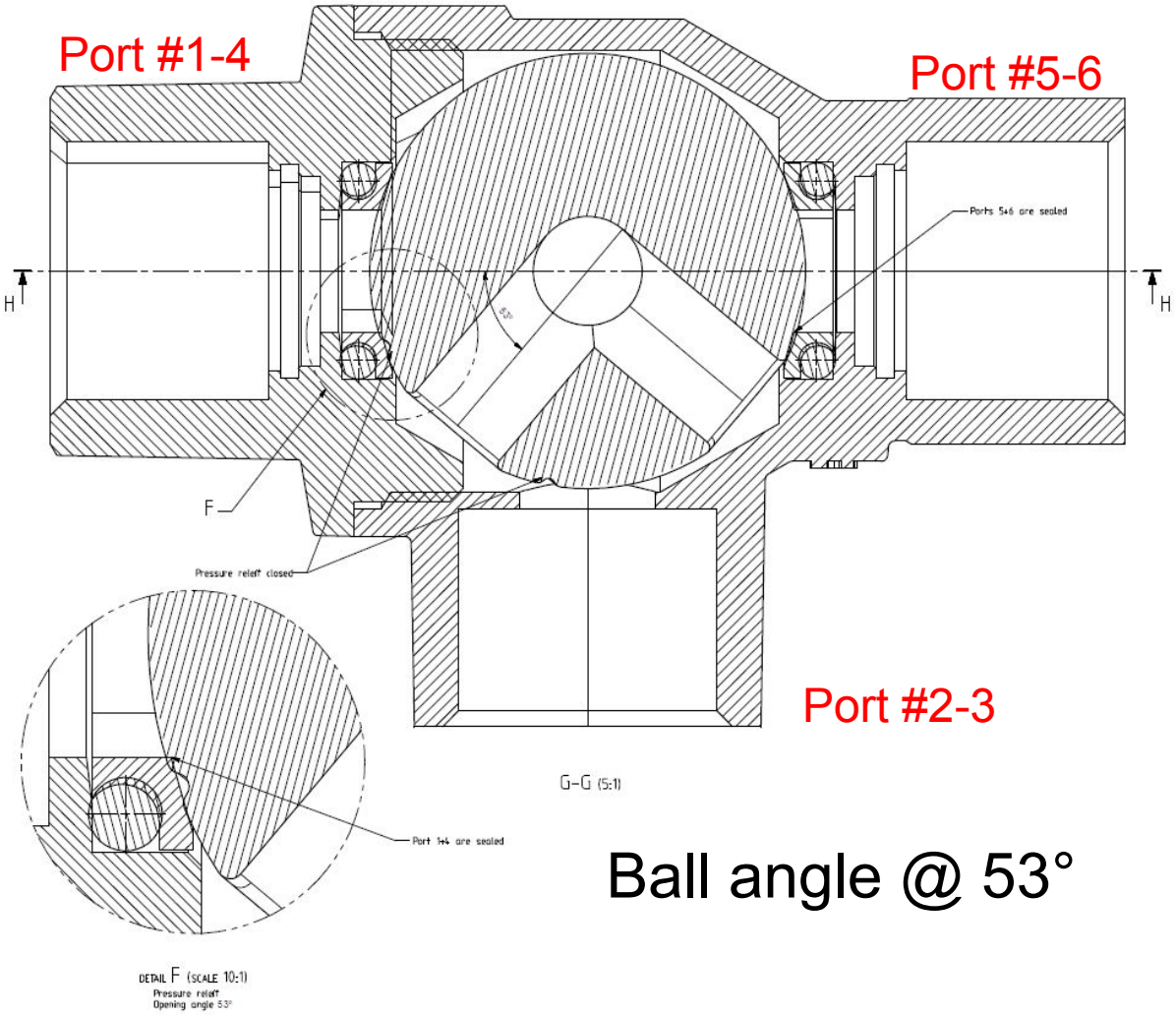
Ball angle @ 45°

Pressure Relief
Safety Zone, Preventing Mixing – Position C



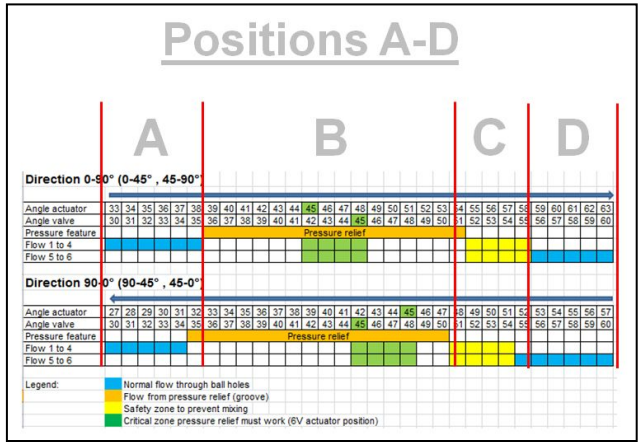
Function:

- Pressure relief is closed!
- Control path (Ports 1-4) is closed!
- Control path (Ports 5-6) is closed!
- No mixing can occur!



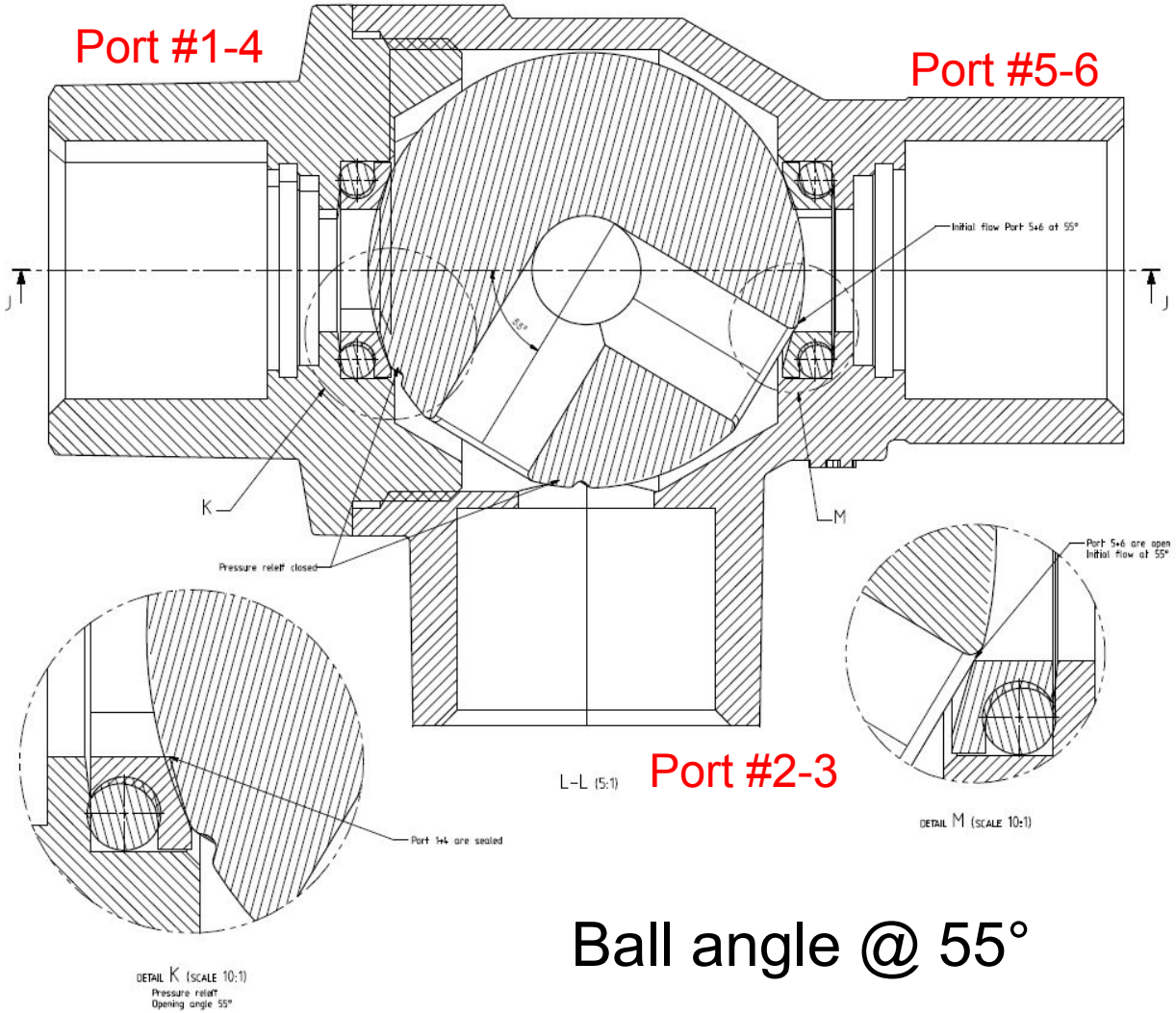
Ball angle @ 53°

Pressure Relief
Sequence 2 Begins Operation – Position D



Function:

- Pressure relief is closed!
- Control path (Ports 1-4) is closed!
- Normal flow through control path (Ports 5-6) starts



Ball angle @ 55°

Valve Design – Considerations

Technical Details

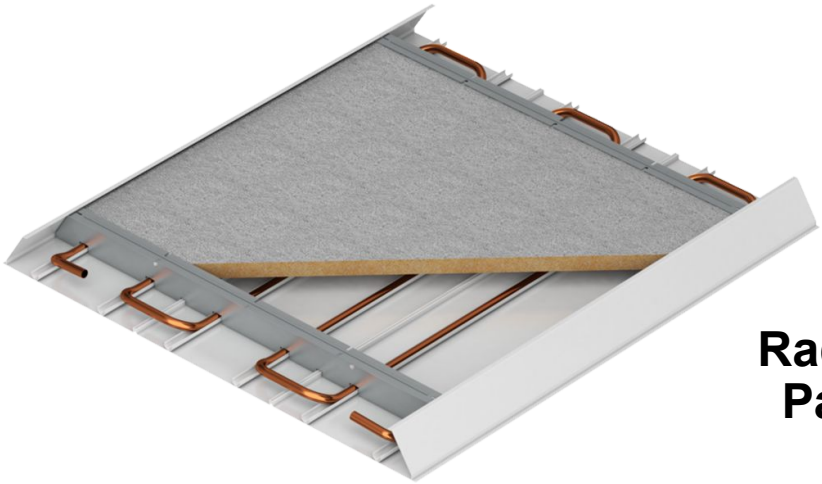
Differential Pressure Capacity

- Currently all 6-way valves are rated to 15 psi differential pressure.
- The current limit is based on the internal leakage requirement over life.
- Torque, Internal Leakage & Differential Pressure are all interconnected characteristics within the valve mechanical system.
  - Its generally a compromise
- Seat design can be improved
  - Current design was considered adequate to lower manufacturing cost
  - Within requirements of most current system pressure requirements.
- IEV has performed some testing concerning this and observed potential at raising the dP with the acceptance of a higher internal leakage.
- General requests to investigate performance increases should prompt a product opening request.

Application

Common Application

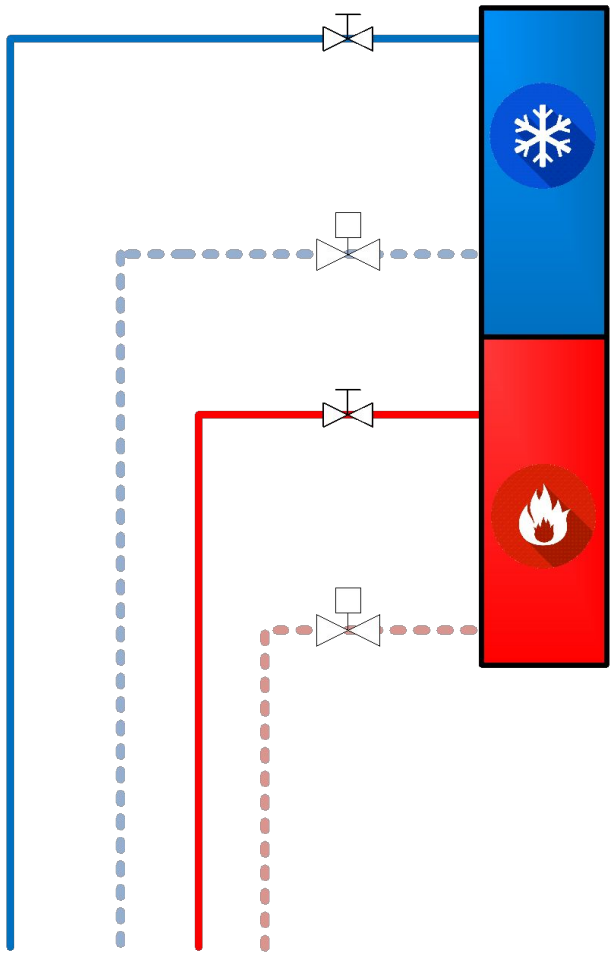
Chilled Beam



Radiant Panel

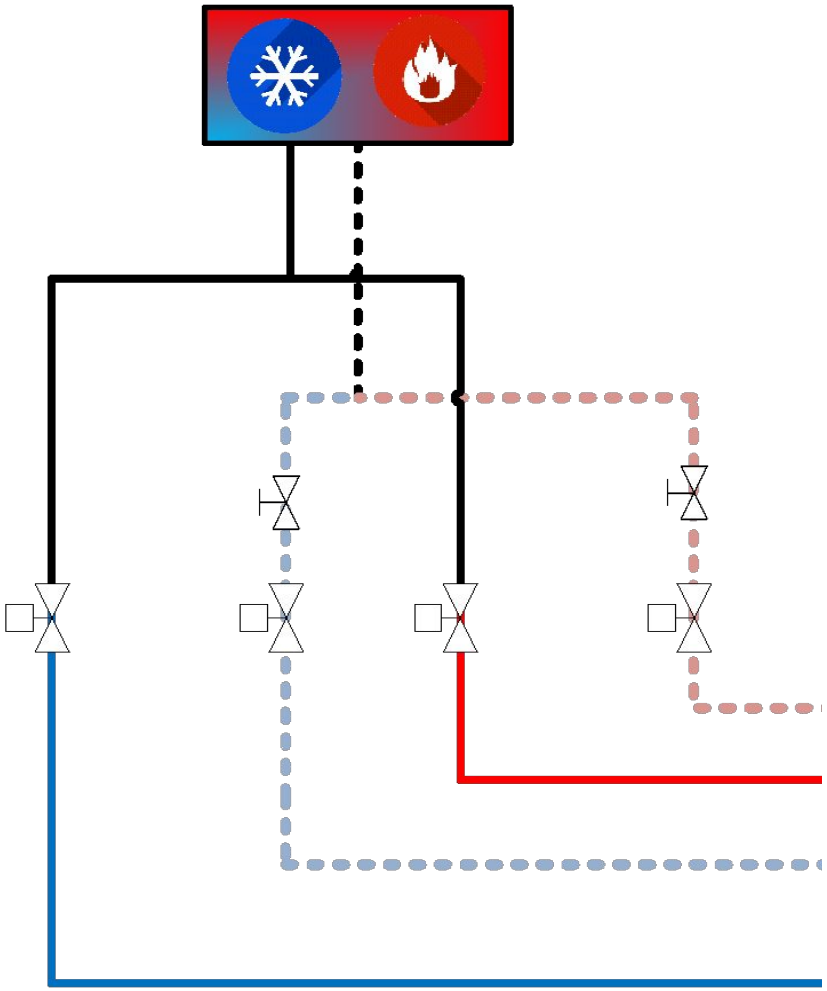
Fan Coil Units

Common Solution



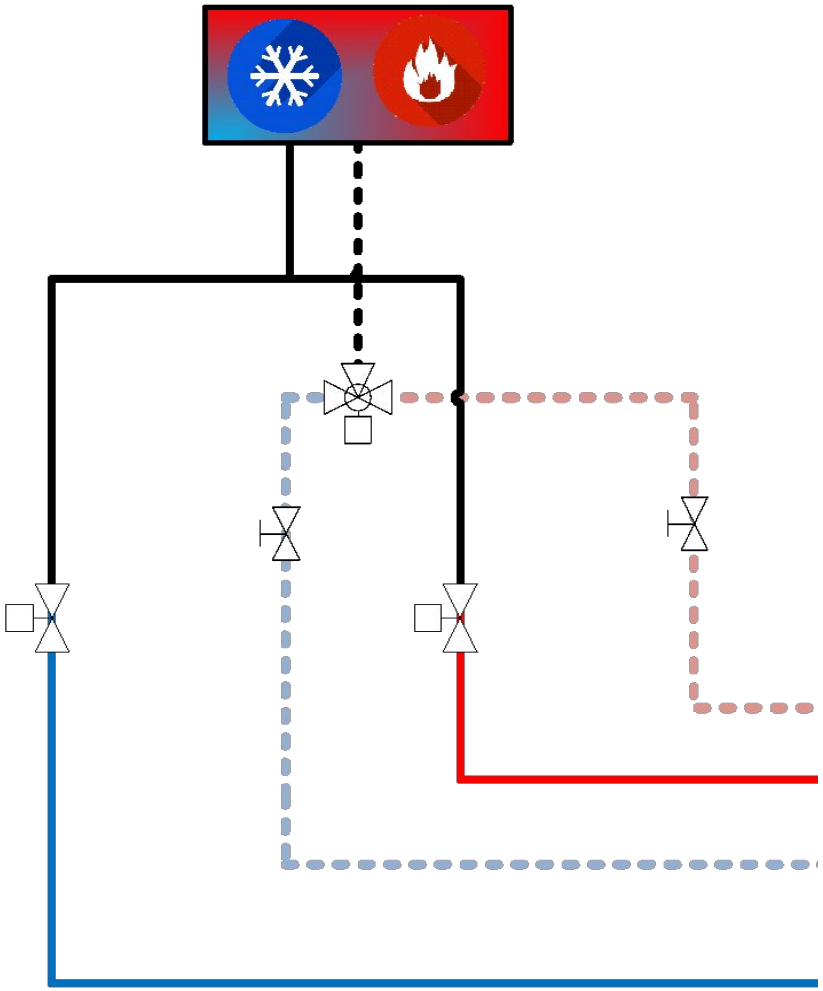
- **Terminal Unit**
  - 4-pipe system
  - Two Coils
    - One for heating
    - One for cooling
- **Pros**
  - Dedicated coils for each application
- **Cons**
  - 2 control valves
  - 2 manual balancing valves
  - 2 control sequences and 2 actuators (points of control)
  - More cost on labor / commissioning / balancing

Common Solution



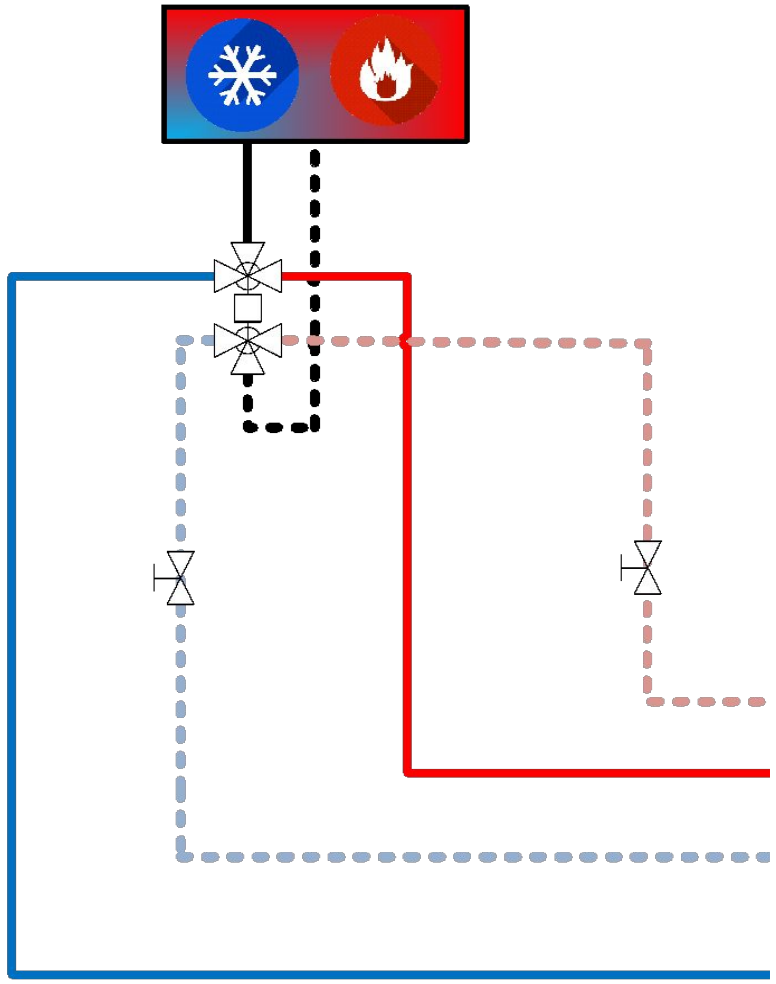
- **Terminal Unit**
  - 4-pipe system
  - One Coil for both heating and cooling
- **Pros**
  - Optimize exchanger (heating/cooling)
- **Cons**
  - 4 control valves
  - 2 manual balancing valves
  - 4 control sequences and 4 actuators (points of control)
  - Much more cost on labor / commissioning / balancing

Common Solution



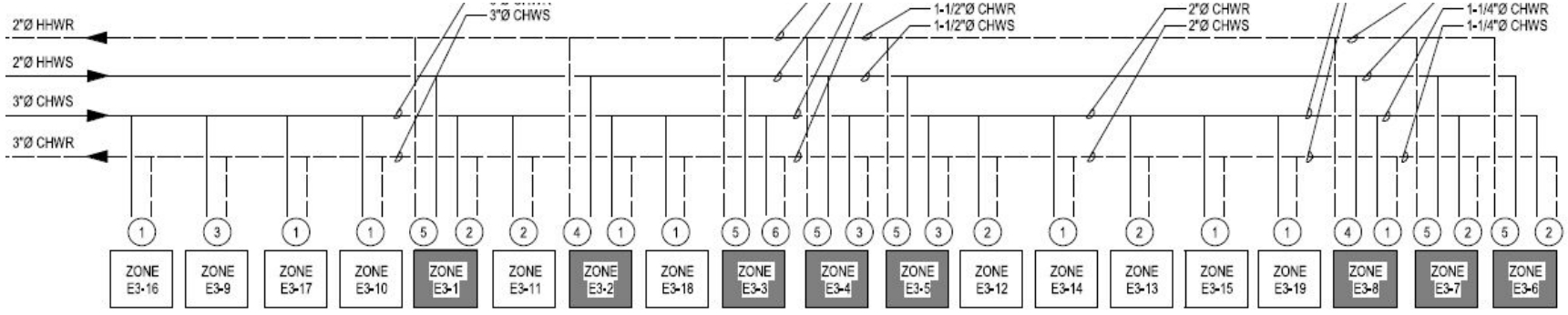
- **Terminal Unit**
  - 4-pipe system
  - One Coil for both heating and cooling
- **Pros**
  - Optimize exchanger (heating/cooling)
- **Cons**
  - 3 control valves (2x 2-way / 1x 3-way)
  - 2 manual balancing valves
  - 3 control sequences and 3 actuators (points of control)
  - More cost on labor / commissioning / balancing

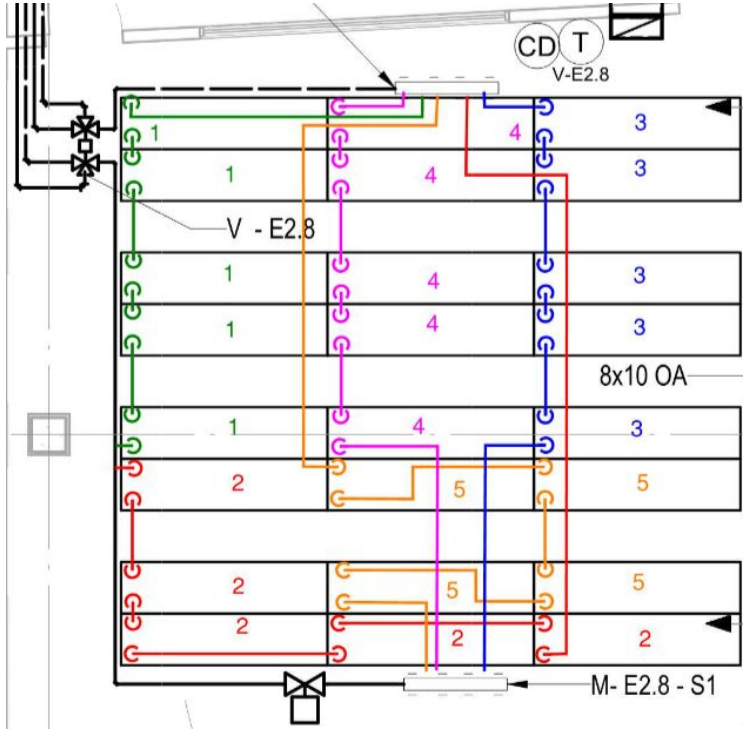
6-way CCV solution



- **Terminal Unit**
  - 4-pipe system
  - One Coil for both heating and cooling
- **Pros**
  - Optimize exchanger (heating/cooling)
  - 1 control valve
  - Two control sequences in one actuator
  - Less labor / commissioning
- **Cons**
  - 2 manual balancing valves
  - Cost on balancing

Also a possibility – Multiple beams per zone





6-way CCV – Selection & Specification

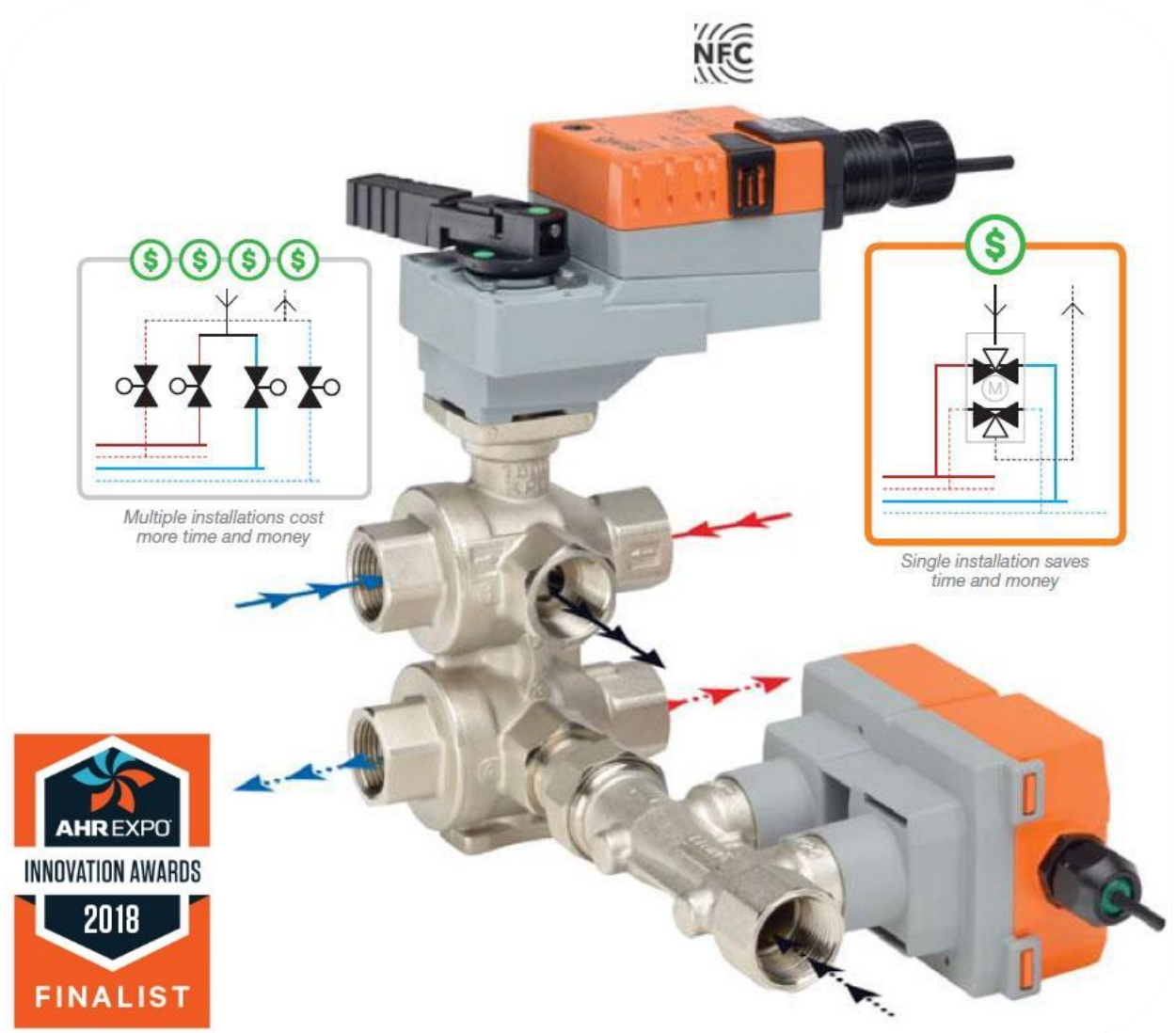
- **Valve Specification**
  - **Media:** Chilled or Hot Water, 60% glycol max.
  - **Sizes:** ½” ¾” and 1”
  - **Cv** .29 – 7.4
  - **End Fitting:** NPT
  - **Media Temperature Range:**
  - 43ºF to 180ºF [6ºC to 82ºC]
  - **Body Pressure Rate:** 232 psi
  - **Close-off Pressure:** 50 psi
  - **Maximum Differential Pressure:**
  - 15 psi
  - **Leakage:** 0%

Sequence 1 C_v	Sequence 2 C_v	Valve Nominal Size		Type	Suitable Actuators	
		Inches	DN [mm]	6-way NPT	Non Fail-Safe	
0.73	0.73	¾	20	B320-073-073	LR924-SR	LRX24-MFT
0.73	1.16	¾	20	B320-073-116		
0.73	1.86	¾	20	B320-073-186		
0.73	2.9	¾	20	B320-073-290		
1.16	0.73	¾	20	B320-116-073		
1.16	1.16	¾	20	B320-116-116		
1.16	1.86	¾	20	B320-116-186		
1.16	2.9	¾	20	B320-116-290		
1.86	0.73	¾	20	B320-186-073		
1.86	1.16	¾	20	B320-186-116		
1.86	1.86	¾	20	B320-186-186		
1.86	2.9	¾	20	B320-186-290		
2.9	0.73	¾	20	B320-290-073		
2.9	1.16	¾	20	B320-290-116		
2.9	1.86	¾	20	B320-290-186		
2.9	2.9	¾	20	B320-290-290		
2.9	4.0	¾	20	B320-290-400		
2.9	4.7	¾	20	B320-290-470		
4.0	2.9	¾	20	B320-400-290		
4.0	4.0	¾	20	B320-400-400		
4.0	4.7	¾	20	B320-400-470		
4.9	2.9	¾	20	B320-490-290		
4.9	4.0	¾	20	B320-490-400		
4.9	4.7	¾	20	B320-490-470		
7.4	7	1	25	B325-740-700	NRB24-SR	NRX24-MFT

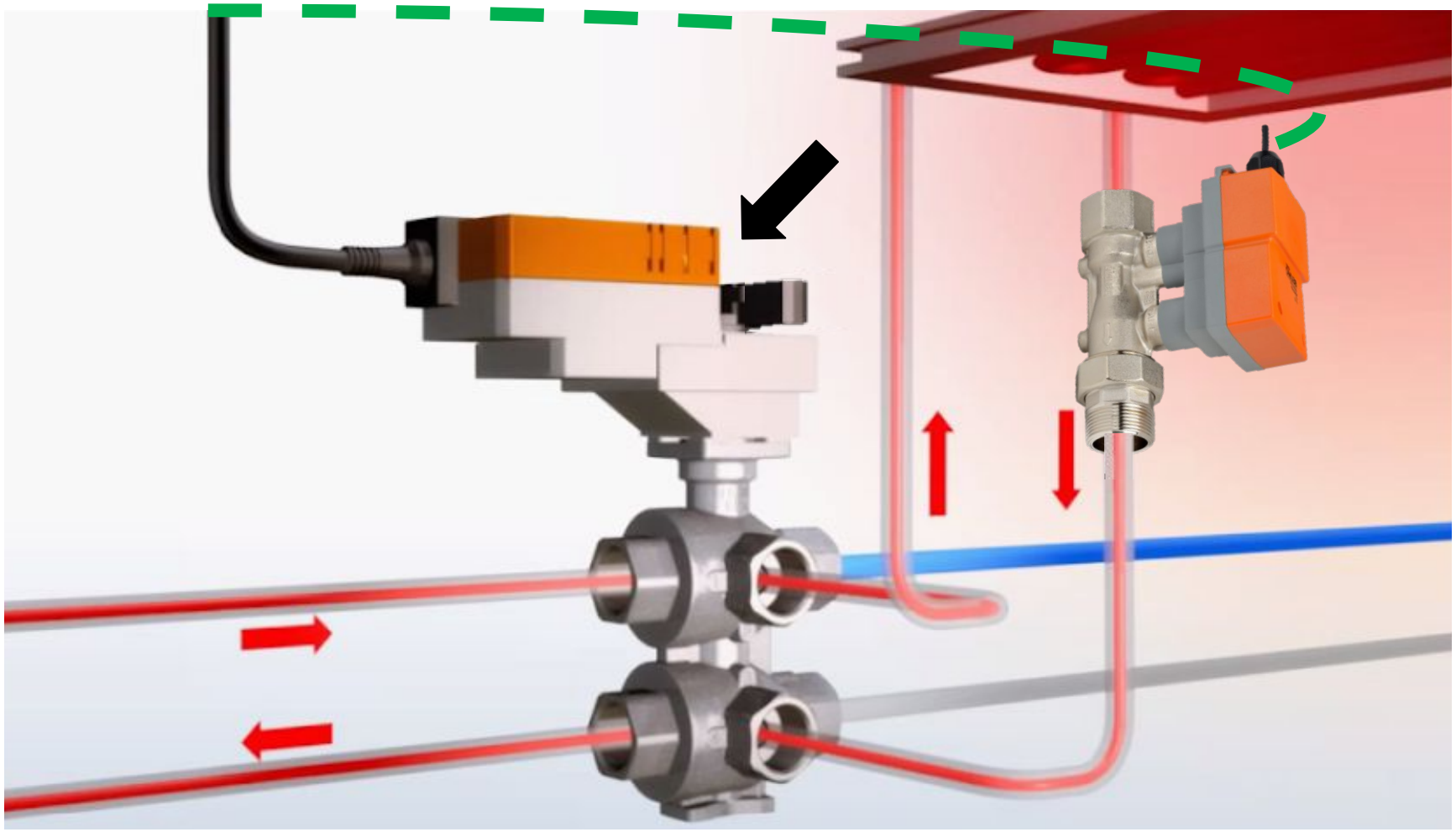
Sequence 1 C_v	Sequence 2 C_v	Valve Nominal Size		Type	Suitable Actuators	
		Inches	DN [mm]	6-way NPT	Non Fail-Safe	
0.29	0.29	½	15	B315-029-029	LR924-SR	LRX24-MFT
0.29	0.46	½	15	B315-029-046		
0.29	0.73	½	15	B315-029-073		
0.29	1.16	½	15	B315-029-116		
0.29	1.50	½	15	B315-029-150		
0.46	0.29	½	15	B315-046-029		
0.46	0.46	½	15	B315-046-046		
0.46	0.73	½	15	B315-046-073		
0.46	1.16	½	15	B315-046-116		
0.46	1.50	½	15	B315-046-150		
0.73	0.29	½	15	B315-073-029		
0.73	0.46	½	15	B315-073-046		
0.73	0.73	½	15	B315-073-073		
0.73	1.16	½	15	B315-073-116		
0.73	1.50	½	15	B315-073-150		
1.16	0.29	½	15	B315-116-029		
1.16	0.46	½	15	B315-116-046		
1.16	0.73	½	15	B315-116-073		
1.16	1.16	½	15	B315-116-116		
1.16	1.50	½	15	B315-116-150		
1.50	0.29	½	15	B315-150-029		
1.50	0.46	½	15	B315-150-046		
1.50	0.73	½	15	B315-150-073		
1.50	1.16	½	15	B315-150-116		
1.50	1.50	½	15	B315-150-150		
1.75	2.0	½	15	B315-175-200		
2.0	1.75	½	15	B315-200-175		
2.0	2.0	½	15	B315-200-200		

6-way ePIV

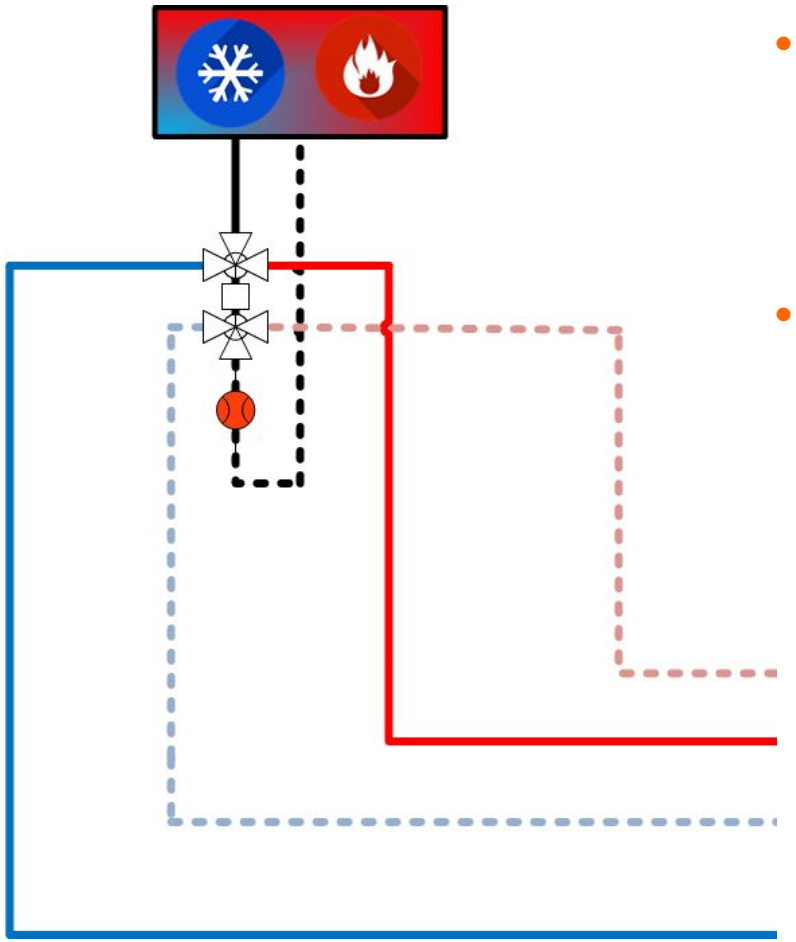
6-way ePIV


NFC
Multiple installations cost more time and money
Single installation saves time and money
AHR EXPO
INNOVATION AWARDS
2018
FINALIST

How does it work

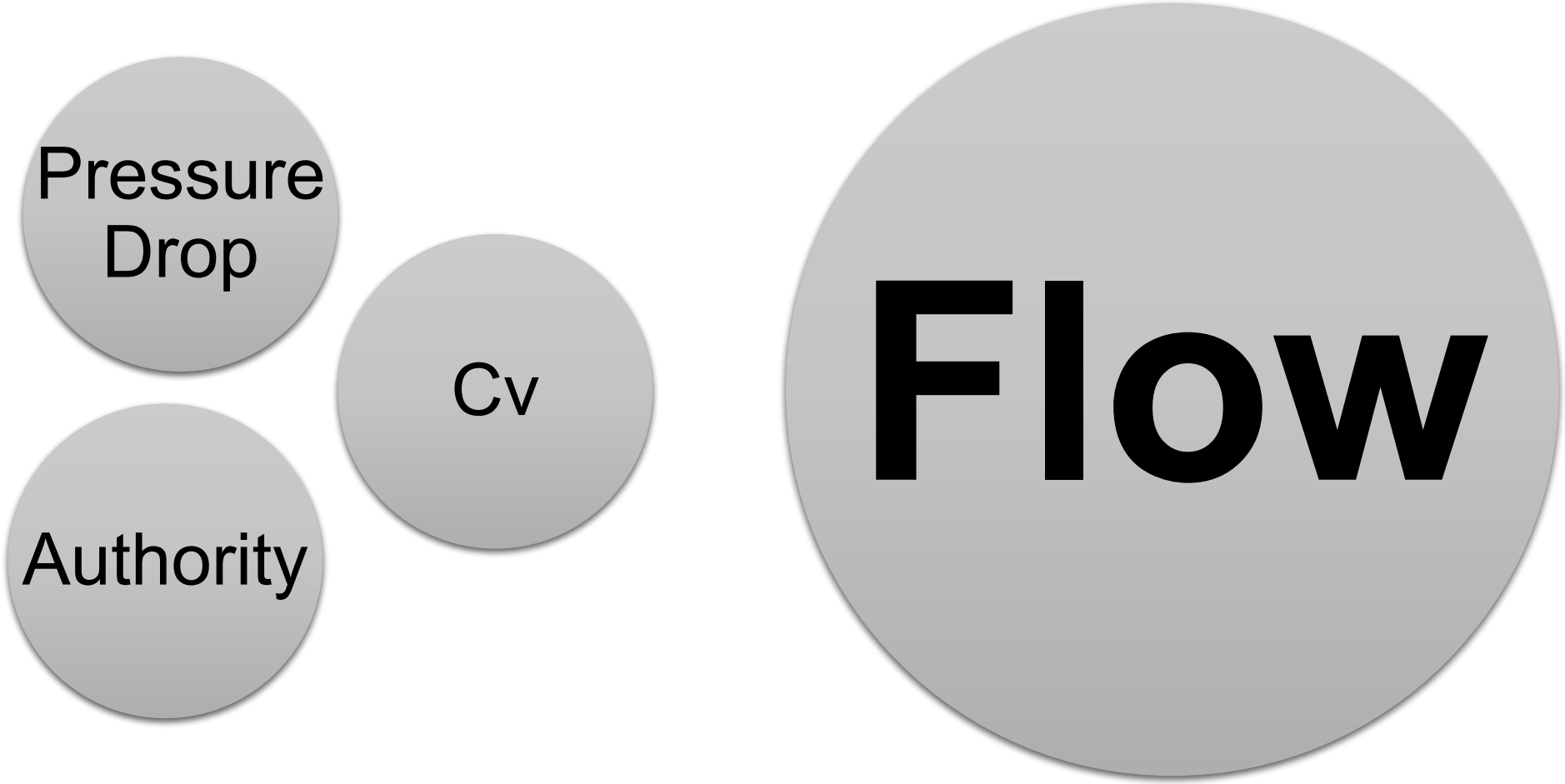


6-way ePIV solution



- **Terminal Unit**
  - 4-pipe system
  - One Coil for both heating and cooling
- **Pros**
  - Optimize exchanger (heating/cooling)
  - 1 control valve
  - Two control sequences in one actuator
  - Less labor / commissioning
  - No manual balancing valves needed
  - Automatically balancing system regardless pressure changes
  - True Flow measurement
  - Easy flow settings for heating/cooling

6-way ePIV – Selection



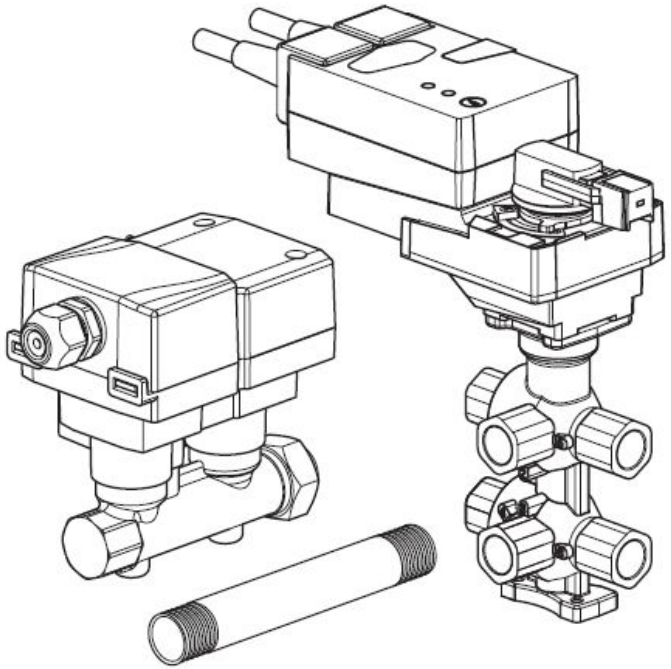
6-way ePIV – Selection & Specification

- **Valve Specification**
  - **Media:** Chilled or Hot Water, 60% glycol max.
  - **Sizes:** ½” and ¾”
  - **End Fitting:** NPT
  - **Media Temperature Range:** 43ºF to 180ºF [6ºC to 82ºC]
  - **Body Pressure Rate:** 232 psi
  - **Close-off Pressure:** 50 psi
  - **Maximum Differential Pressure:** 15 psi
  - **Leakage:** 0%
  - **Rangeability:** 100:1
  - **Tolerances:**
    - ***Measurement:*** *+/- 2%*
    - ***Control:*** *+/- 6%*
    - ***Repeatability:*** *+/- 0.5%*

Flow	Valve Nominal Size		6-way NPT Valve	Suitable Actuators
V'nom/GPM	Inches	DN [mm]	Valve Model	Non-Spring Return
5.5	½	15	P3050B6-K	LRX24-LP-EP6
10.3	¾	20	P3075B6-J	

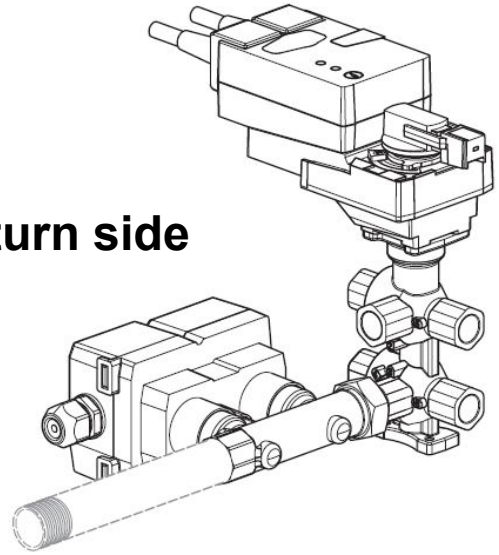
6-way ePIV – Installation

Inlet Length On Sensor
5xDN



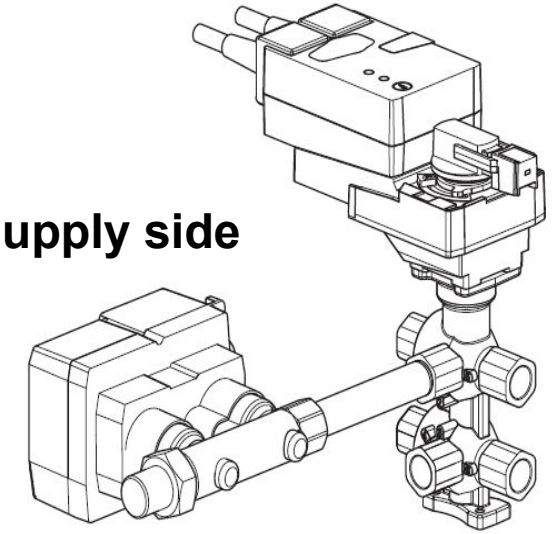
Standard Shipping

Return side



Future:
P3050B6-K
P3075B6-J

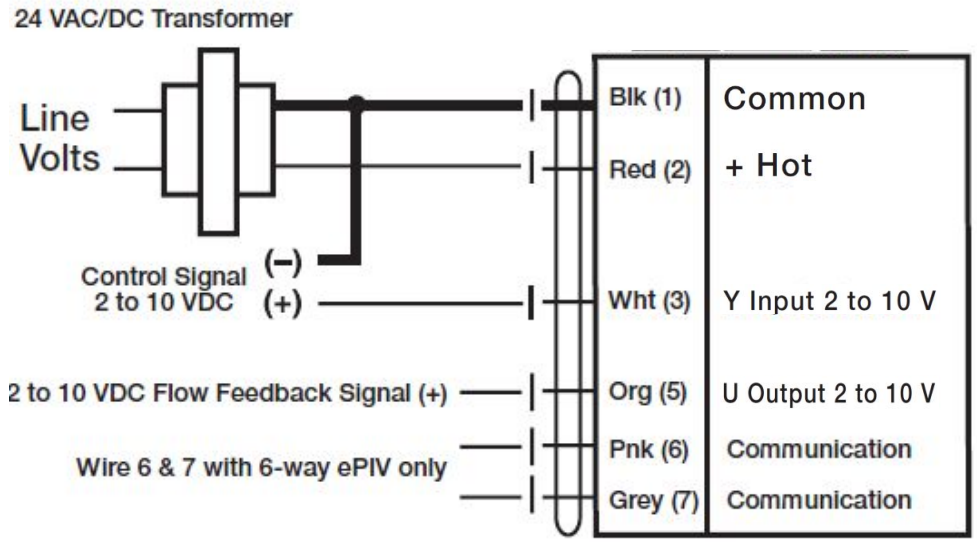
Supply side



Future:
P3050B6-KS
P3075B6-JS

6-way ePIV – Communication

Analog



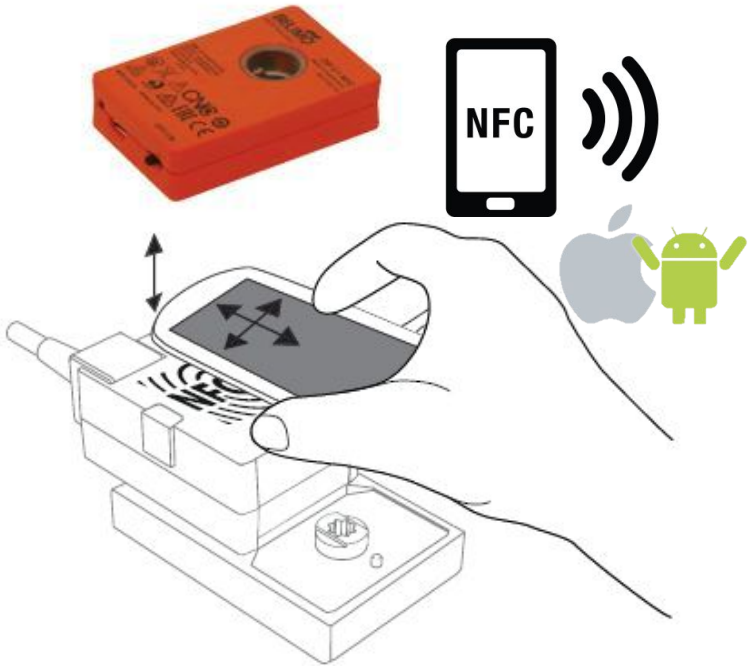
Modbus

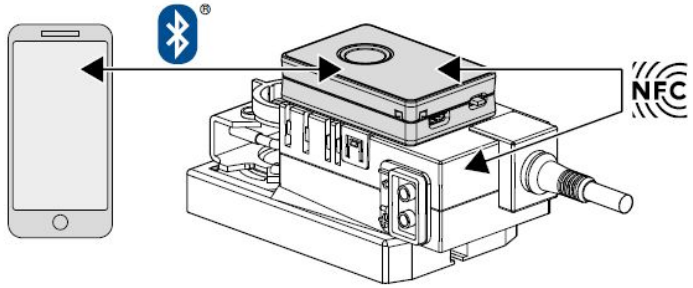
ASHRAE BACnet™

6-way ePIV – Settings

Modbus

ASHRAE BACnet™

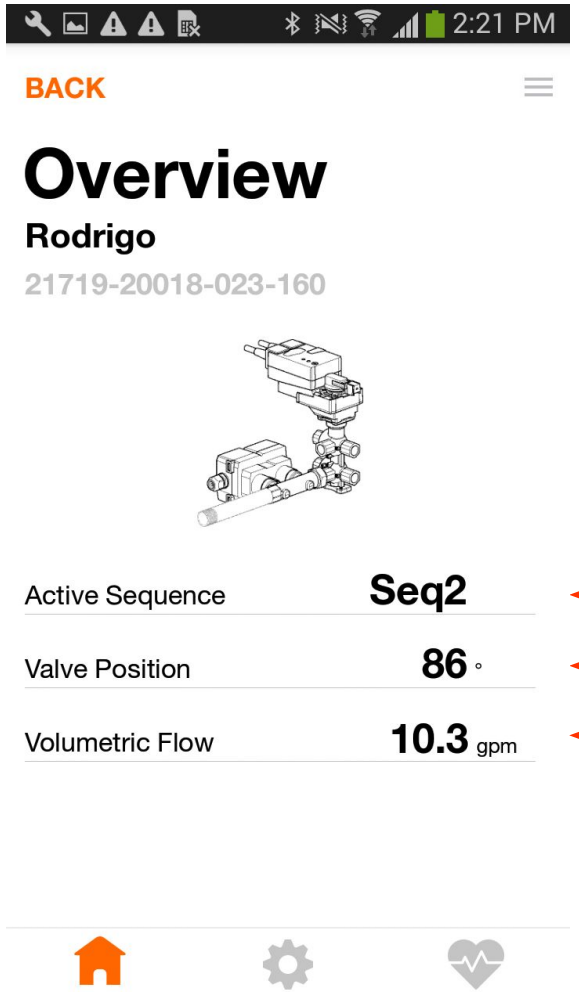




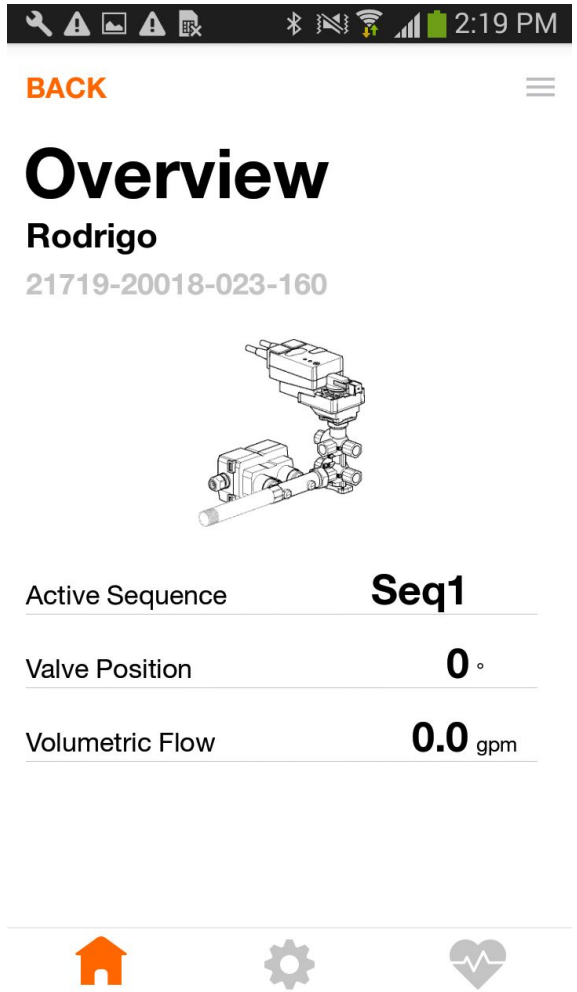
6-way ePIV – ZTH Settings

Data, Settings	Possible settings with ▼▲ in editing mode:
SpRel 0%	Setpoint Position- / Flowcontrol
RelPos 0%	
RelFlow 0%	Actual flow in % to V'Max
AbsFlow 0.000 l/s	
AbsFlow 0.000 l/h	
AbsFlow 0.000 GPM	
ActSequence Sequence 1	Sequence 1, Sequence 2
Override None	None, Seq2 Vmax, Seq1 Vmax, Close Seq2 Open, Seq1 Open
Mode Sp/Fb 0.5-10V	0.5-10V , 2-10V
Mode Y Inv not inverted	not inverted, inverted
Vmax1 100%	5...100 % von V'Nom *1)
Vmax2 100 %	5...100 % von V'Nom *1)
SensorStatus Not Ok	ok, airbubbles, Not Ok *2)
ControlMode FlowCtrl	PosCtrl, FlowCtrl

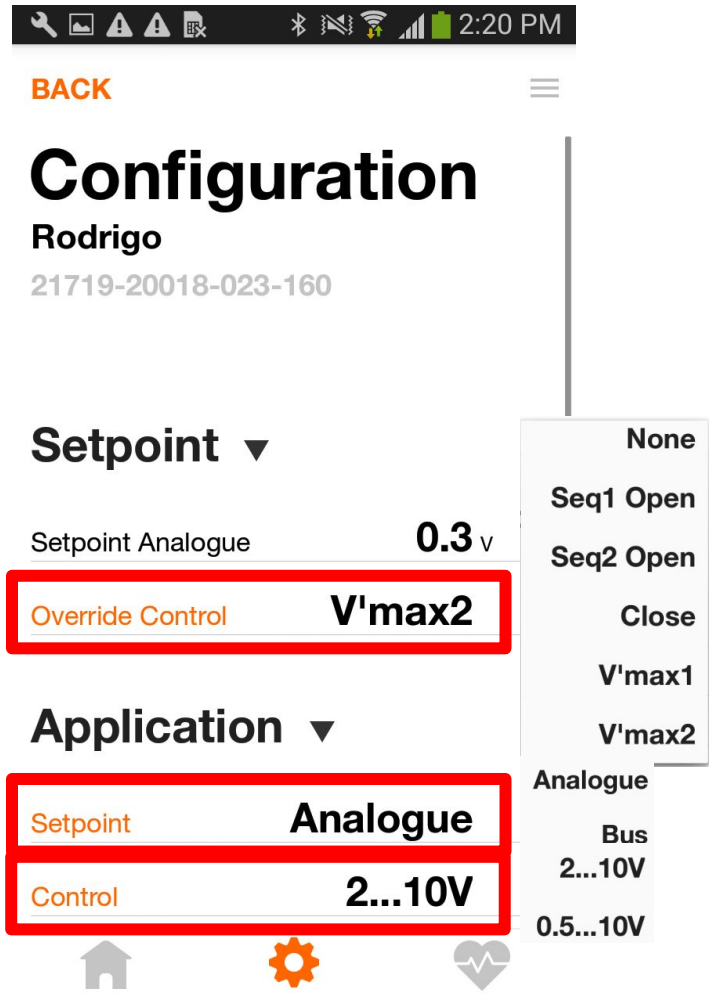
6-way ePIV – NFC Settings



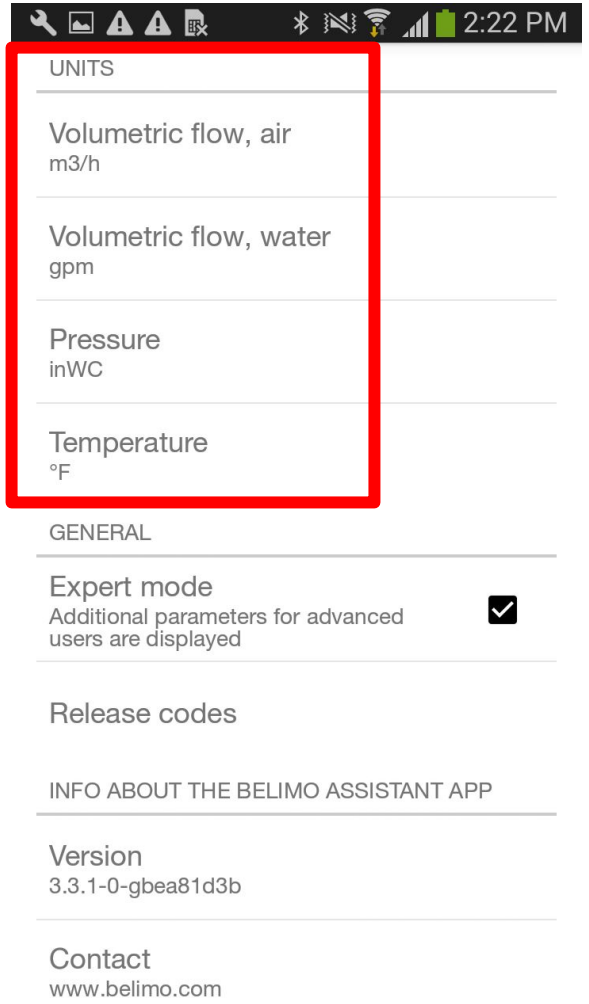
Heating or Cooling
0º to 90º
Flow



6-way ePIV – NFC Settings



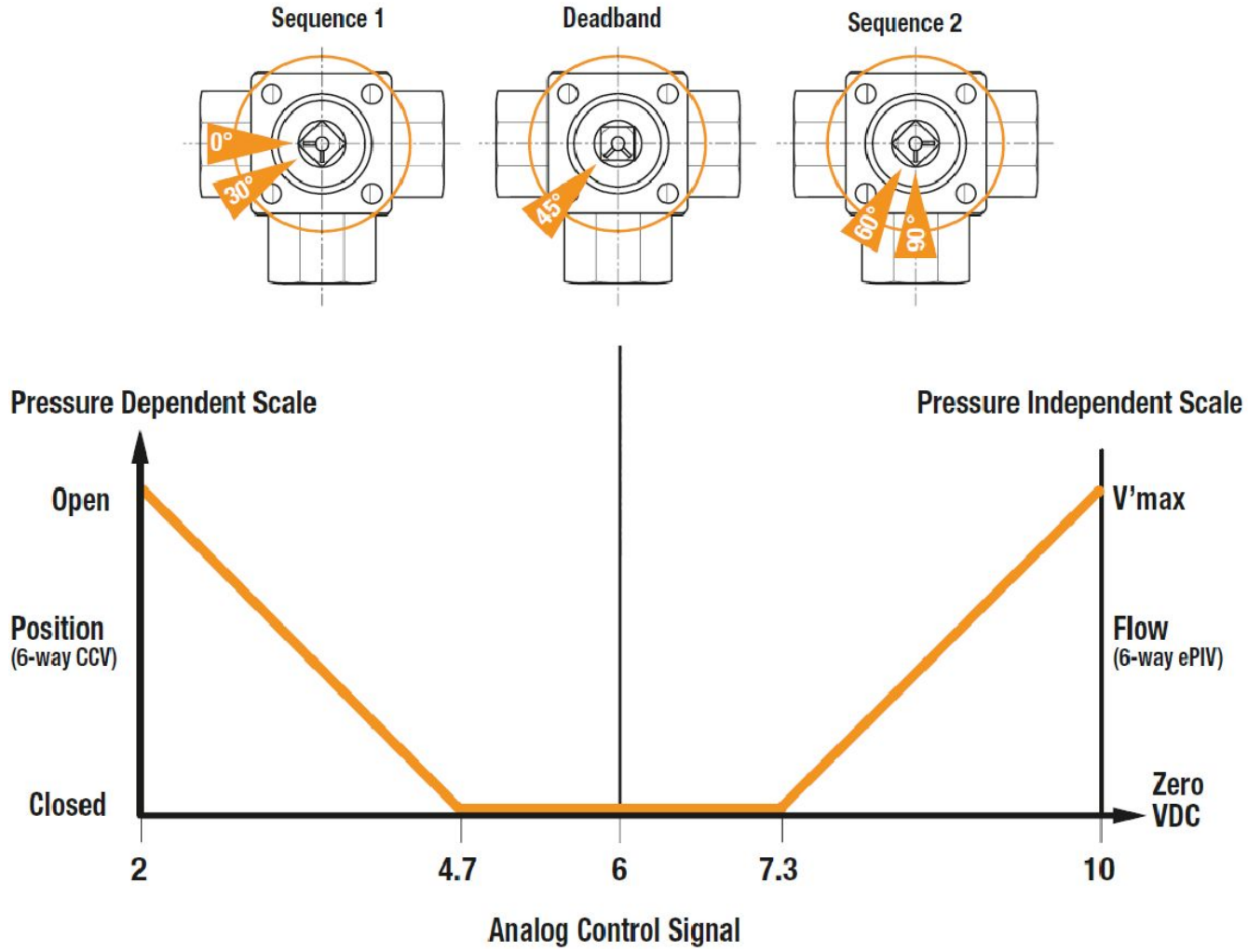
6-way ePIV – NFC Settings



Practices & Frequent Questions

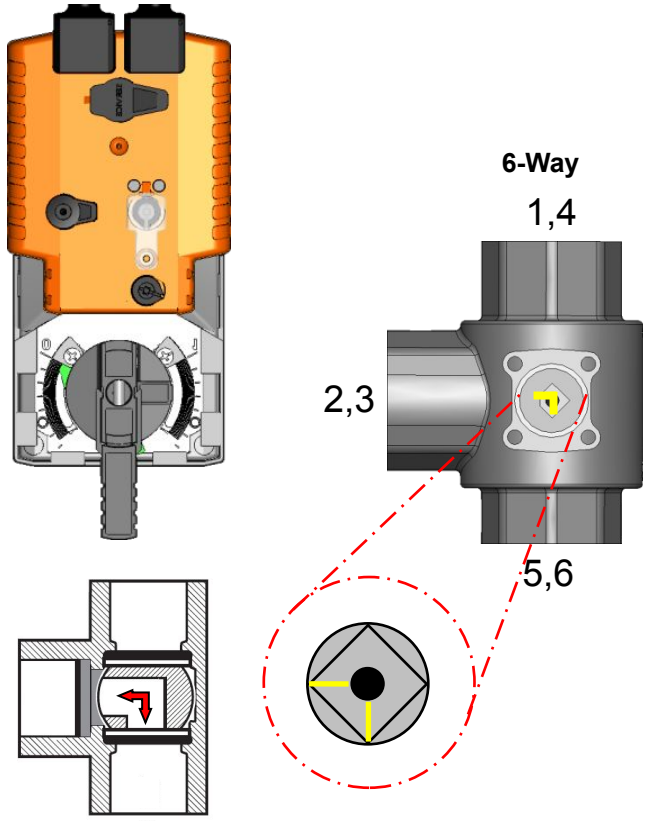
Frequent questions

- Pressure Dependent
  - Cv vs Control Signal
- Pressure Independent
  - V’max vs Control Signal

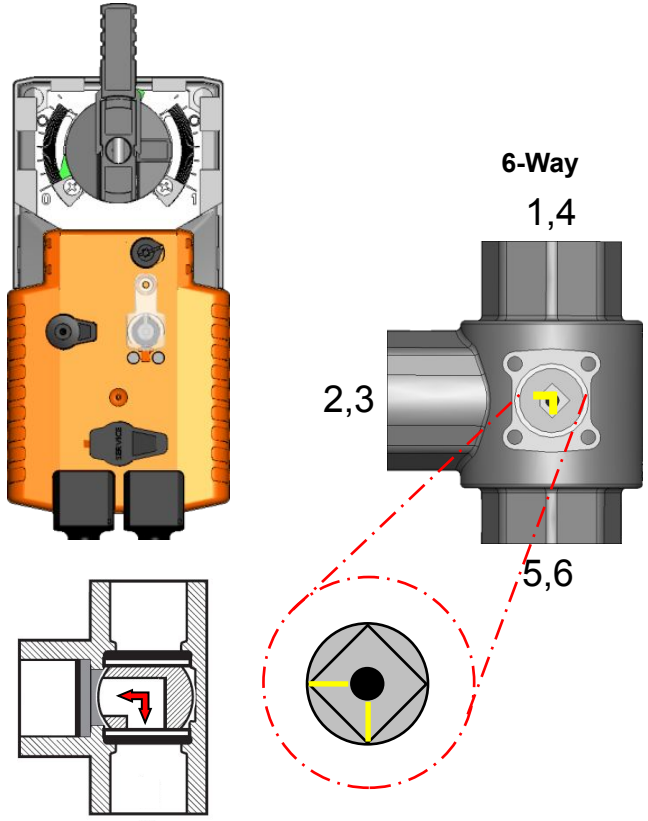


Frequent questions

- **Wrong** Orientation, **before** Sep. 2019 (ePIV)



- **Right** Orientation, **after** Sep. 2019 (ePIV)



Frequent questions

- Flow Reduction Chart (ePIV)

MAXIMUM FLOW BASED ON MINIMUM DIFFERENTIAL PRESSURE FOR 6-WAY EPIV

Size		13.5 psid	12.5 psid	10 psid	8 psid	5 psid	3 psid	1 psid
Inches	DN [mm]							
½	15	5.5 GPM	5.3 GPM	4.7 GPM	4.2 GPM	3.4 GPM	2.6 GPM	1.5 GPM
¾	20	10.3 GPM	10.3 GPM	9.2 GPM	8.2 GPM	6.5 GPM	5 GPM	2.9 GPM

The differential pressure accross the valve is:

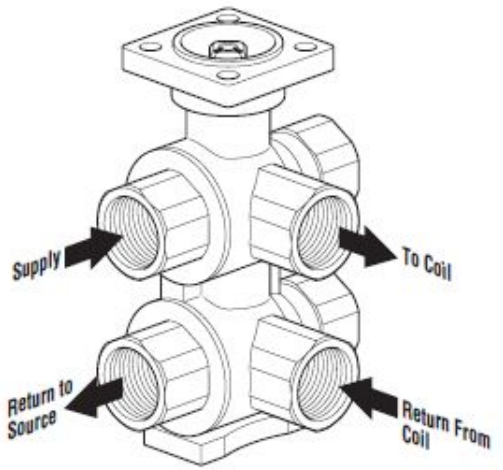
$Dp_{valve} = Dp_{source} - Dp_{coil}$

Where:

Dp_{valve} = differential pressure accross the valve

Dp_{source} = differential pressure between supply and return of the source

Dp_{coil} = differential pressure between supply and return of the coil



Setting the Flow

Ordering Example

1. Choose the valve actuator combination.
   P3050B6-K+LRX24-LP-EP6

2. Specify maximum flow (Vmax)

   Requested Flow S1
   Vmax = 10…100% Vnom (nominal flow)

   Requested Flow S2
   Vmax = 10…100% Vnom (nominal flow)

   S1 = Sequence 1
   S2 = Sequence 2

3. Specify preference or configuration.

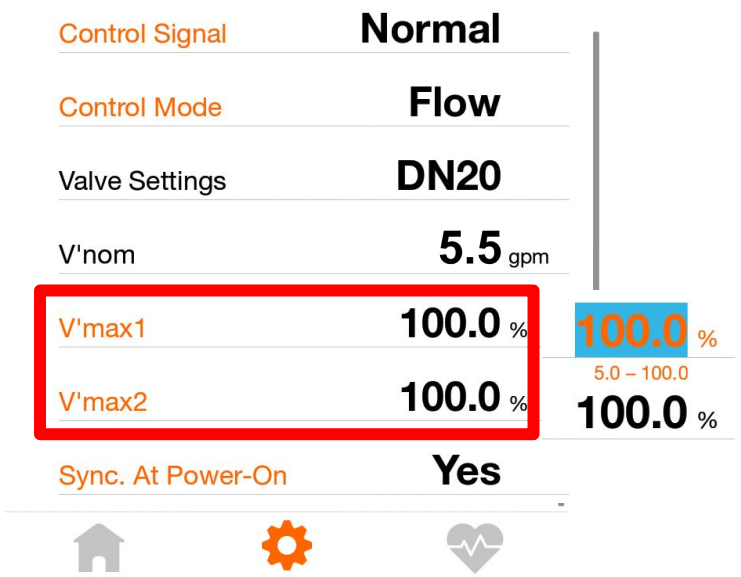
   Set-Up
   Non Fail-Safe Models
   NO = Normally Open - Sequence 1
   OR
   NC = Normally Closed - Sequence 1

4. Does order require tagging?

   Tagging:
   Valves may be tagged per customer specification. ($12.00 charge per tag)
   Example:
   Chilled/Heating Beam Room #1
   Part number for tagging: 99981-00101

5. Complete Ordering Example: P3050B6-K+LRX24-LP-EP6
   Requested Flow: S1: 4.0 GPM
   S2: 1.0 GPM
   Setup: NC
   Tag: CB-01

NOTE: All models should be entered with the GPM designed - in case GPM is not provided this will come with V'nom set up.



V'nom GPM → 100%
V'max GPM → V'max%

$$V'max\% = \frac{V'max}{V'nom} \times 100$$

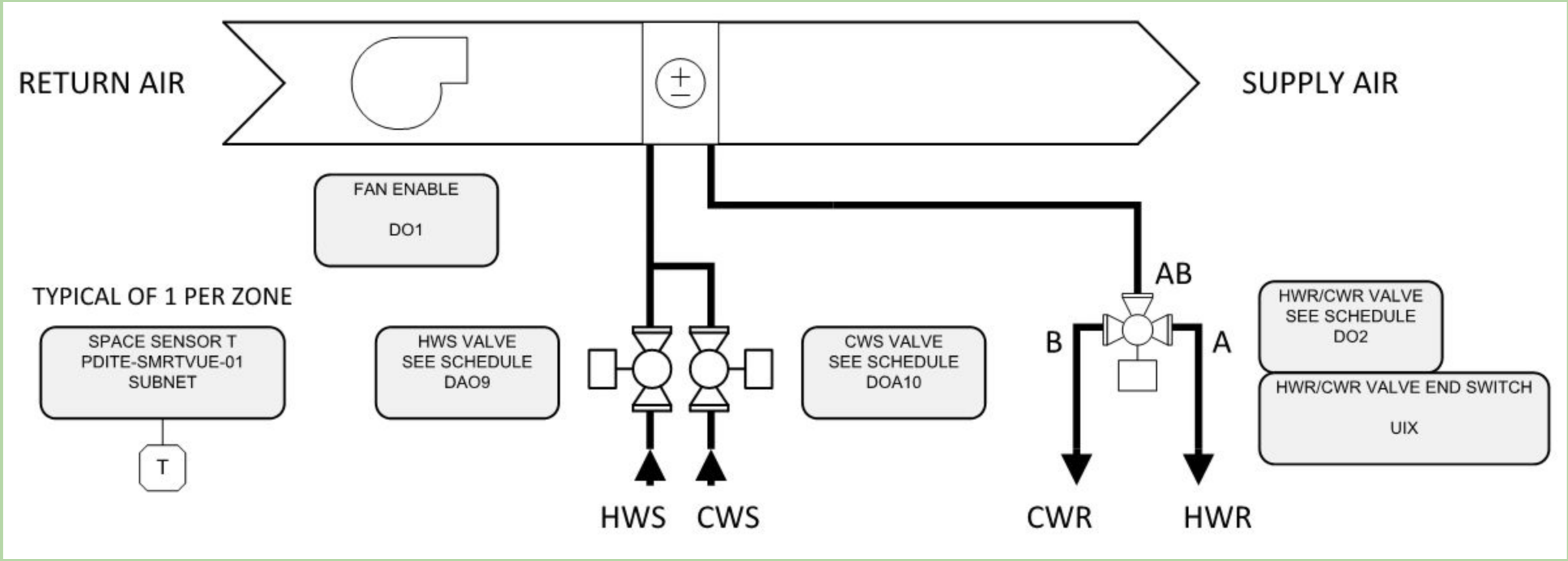
$$V'max\% = \frac{4}{5.5} \times 100$$

$$V'max\% = 72.3\%$$

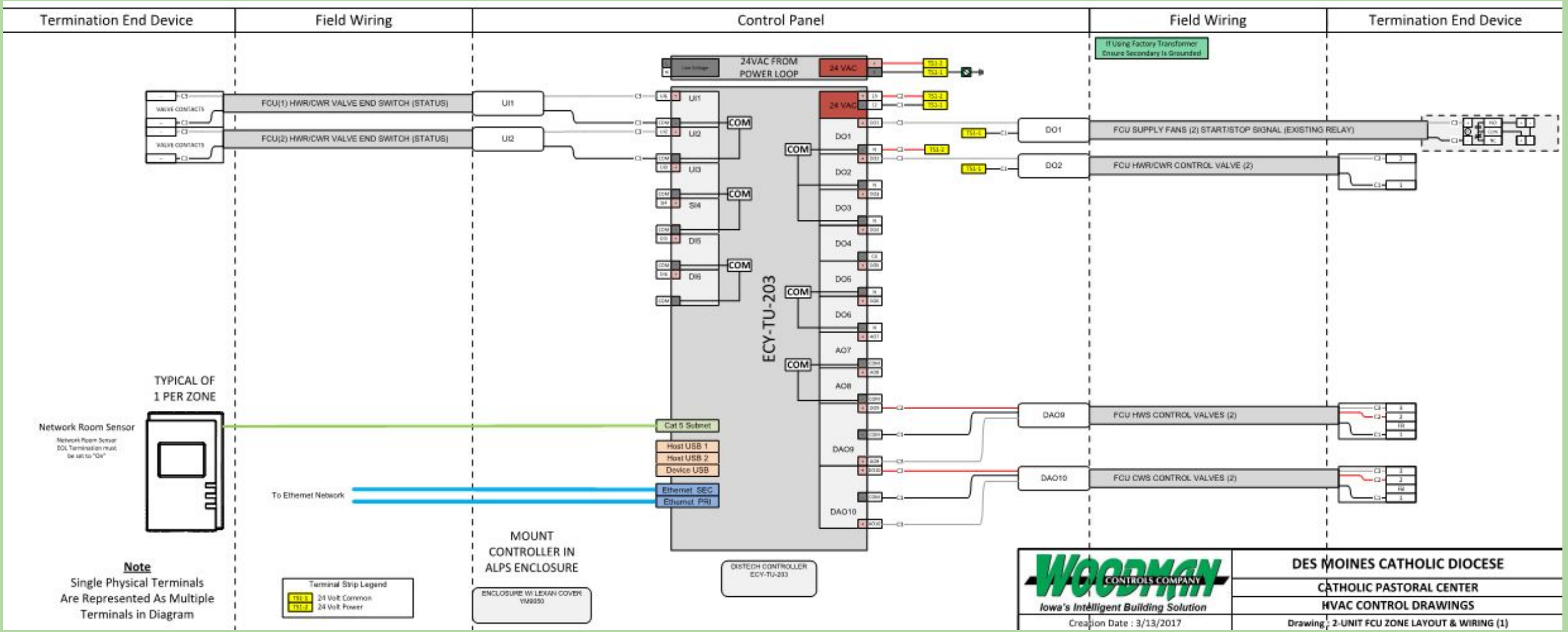
Test, check & commissioning

- Steps:
  - Water running in the system
  - Enough differential pressure through the valve
  - Check air in the system
  - Piped correctly – return and supply and 5x DN inlet length (flow meter)
  - Actuator is mounted correctly
  - Control signal is ok (0.5…10V or 2…10V)
  - V’max1 and V’max2 is set correctly
  - Communication is set up
  - Manual Override for troubleshooting – Sequence 1 Open, Sequence 2 Open, Close, V’max1 or V’max2
  - For troubleshooting, always change to Position Control to make sure the control signal is working
  - If 0 GPM, and sensor OK, then check all the above points
  - If the sensor is not ok, check cable connections to the actuator – It could be a sensor failure – RMA
  - If nothing worked, call your “Field Support Specialist”

What we did in the past



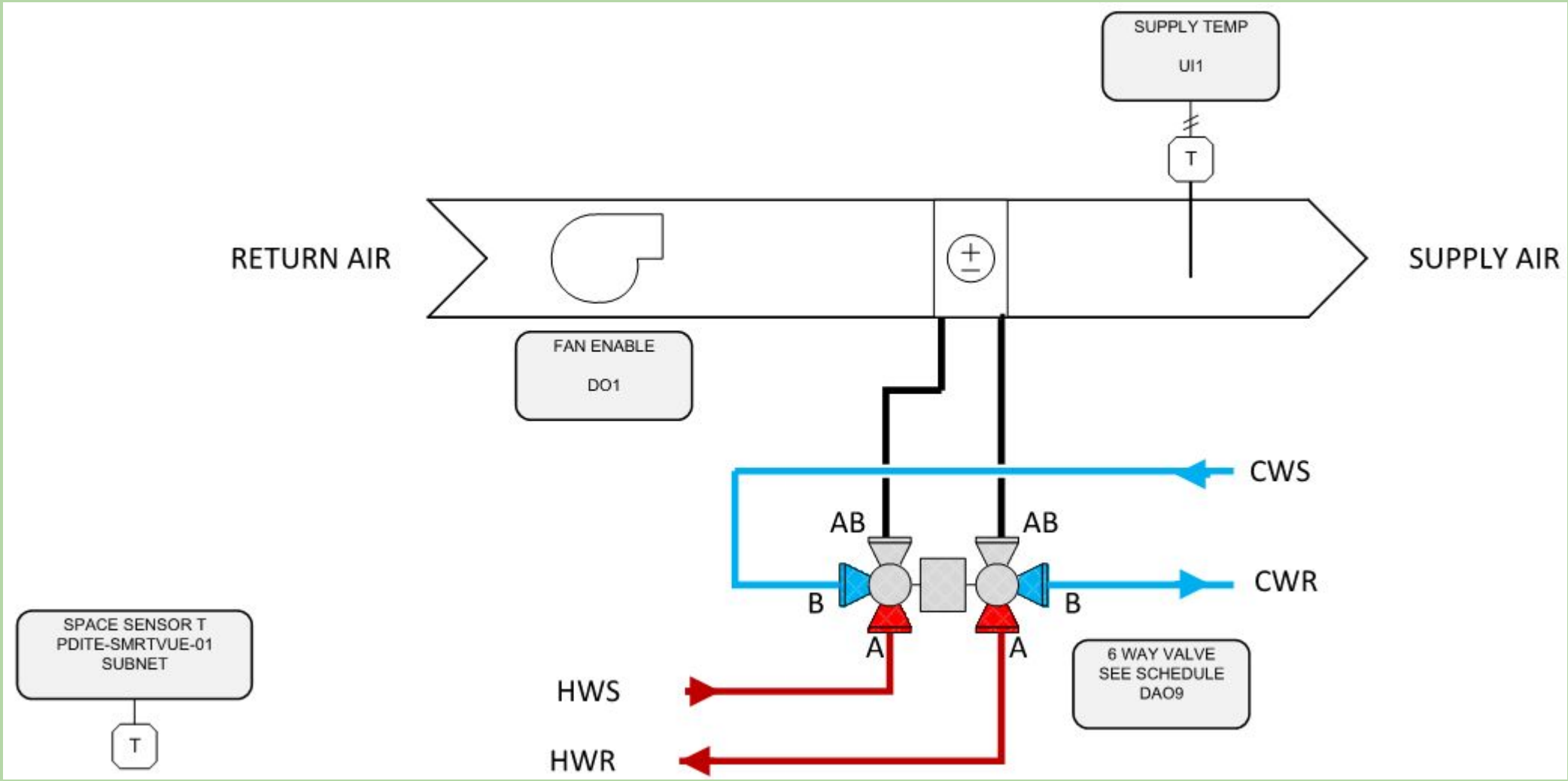
What we did in the past



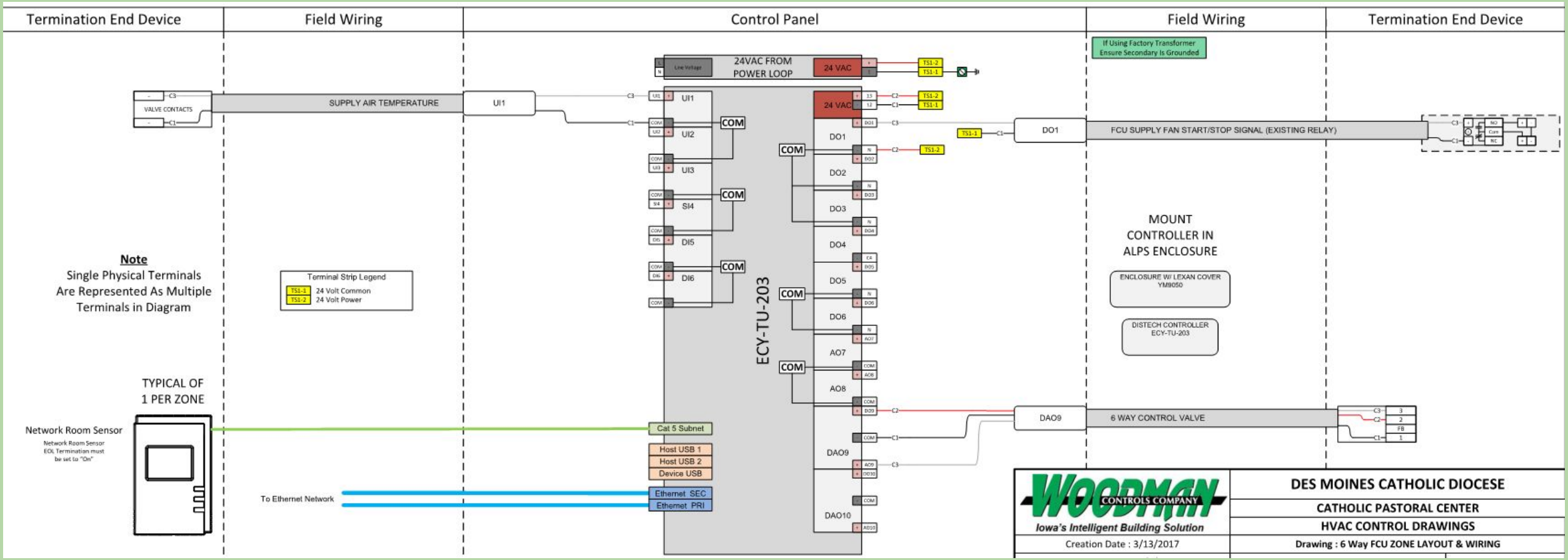
What we've done in the past

e. Change-Over Valves:
   i. A controller will measure the zone temperature and control the two position change-over valves to maintain the zone setpoint.
   ii. Cooling Mode:
      1. Valves will remain in cooling mode when the outdoor air temperature is above 80°F (adj.).
      2. Cooling mode is enabled whenever:
         a. The zone temperature is above the cooling setpoint.
         b. AND chilled water temperature is less than 55°F(adj.).
         c. AND the chilled water pump is on.
   iii. Heating Mode:
      1. Valves will remain in heating mode when the outdoor air temperature is below 40°F (adj.).
      2. Heating mode is enabled whenever:
         a. The zone temperature is below the heating setpoint.
         b. AND heating water temperature is greater than 90°F(adj.)
         c. AND the heating water pump is on.
   iv. Cooling/Heating 3-way return water control valve.
      1. 3-way valve movement will only take place when both 2-way supply valves are fully closed to prevent hydronic systems from mixing.
      2. During cooling mode, the 3-way valve will divert chilled water from the coil to the chilled water return.
      3. During heating mode, the 3-way valve will divert hot water from the coil to the hot water return.

What we can do now



What we can do now



What we can do now - via control signal(s)

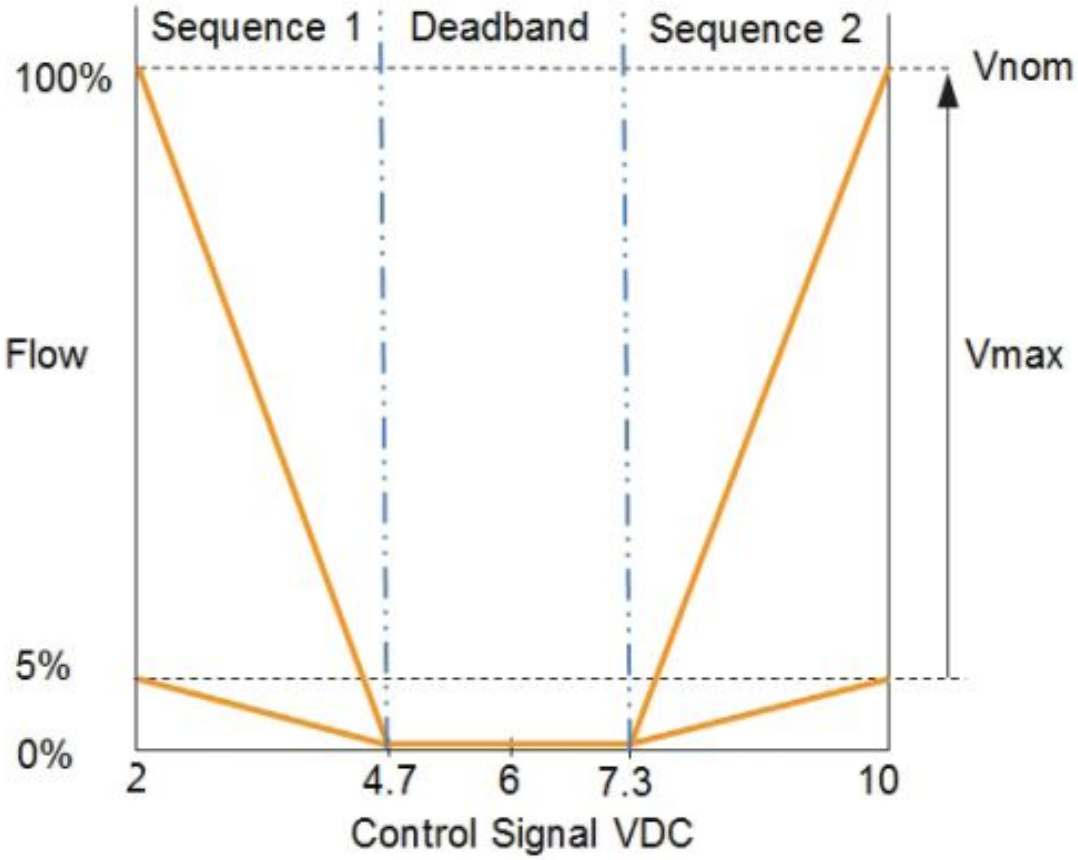
Control Mode Sequence

Flow Control
The device works as an ePIV (Electronic Pressure Independent Valve). The valve reacts to any change in pressure, the actuator logic with True Flow feedback modulates the valve to maintain the heating and cooling flow setpoint. Flow setpoint is with BACnet or Modbus communication or with a single 2-10 VDC or 0.5-10 VDC analog control signal. V'max (design flow setting) is adjustable from 5% to 100% of V'nom (maximum flow capacity of each sequence. V'max1 is the maximum design flow setting for sequence 1, and V'max2 is the maximum design flow setting for sequence 2.

Position Control
The device works as a pressure dependent 6-way CCV with True Flow status feedback. The control signal modulates the valve position.

Opening and Closing Logic for Flow Control
The valve remains closed until the control signal (flow setpoint) is greater than or equal to 1% of V'nom, then it will open and modulate to maintain the flow setpoint within the control tolerance.

An open valve will modulate within the control tolerance to maintain the control signal (flow setpoint) when it is greater than or equal to 1% of V'nom. The flow rate is maintained at 1% of V'nom when the flow setpoint is between 0.5% to 1% of V'nom. The valve will close when the flow setpoint is below 0.5% of V'nom.



ePIV Sequence Response vs. Control Signal Input

What we do now - via BACnet

Object Name	Object Type / Instance	Description *Comment*	Values	Default	Access
Device Name	Device[x]				
SpRel	AO [1]	Setpoint Relative in %[1)] *The set point is related either to the position or the flow (of Vmax)*	0 … 100	50	C
Override	MO [1]	Override Control	None Seq1 Open Seq2 Open Close Seq1 Vmax Seq2 Vmax	None	C
RelPos	AI [1]	Relative Position in %	0 … 100	-	R
AbsPos	AI [2]	Absolute Position in °	0 … 90	-	R
SpAnalog_V	AI [5]	Setpoint Analog in V	0 … 10	-	R
RelFlow	AI [10]	Relative Flow in % *Related to Vmax*	0 … 100	-	R
AbsFlow_lh	AI [15]	Absolute Flow in l/h	0 … Vnom	-	R
AbsFlow_gpm	AI [18]	Absolute Flow in gpm	0 … Vnom	-	R
AbsFlow_UnitSel	AI [19]	Absolute Flow in selected unit *→ MV [121]*	0 … Vnom	-	R
SpAbsFlow_UnitSel	AI [109]	Setpoint Absolute Flow in selected unit *→ MV [121]*	0 … Vnom	-	R
ActSequence	MI [1]	Active Sequence	Sequence 1 Sequence 2 Dead Band	-	R
SummaryStatus	BI [101]	Summary Status *Summarizes all status from MI 103 - 106*	OK not OK	-	R
StatusSens	MI [103]	Status Sensor *Indicates informations within the flow sensor*	OK Flow sensor not OK	-	R
StatusFlow	MI [104]	Status Flow *Setpoint cannot be reached within 3min during flow control* *Flow is measured but position of valve is closed (Dead band)*	OK Flow not reached Flow in closed position	-	R
StatusMedia	MI [105]	Status Media *Airbubbles in the hydronic system*	OK Airbubbles	-	R
StatusAct	MI [106]	Status Actuator *Mechanical overload e.g. blocked valve* *Gear disengaged button is pressed*	OK Actuator cannot move Gear disengaged	-	R

Setpoint Relative in %:

Position Control	Setpoint 0…100% refers to relative position 0…100%	
Flow Control	Setpoint 0…33% refers to range Vmax1…0 i.e. Setpoint 0% = Vmax1 / Setpoint 33% = 0	Setpoint 67…100% refers to 0…Vmax2 i.e. Setpoint 67% = 0 / Setpoint 100% = Vmax2

Object Name	Object Type / Instance	Description	Values	Default	Access
Vmax1	AV [99]	Maximum Flow Limit of Seq1 in % *Related to Vnom*	0 … 100	100	W
Vmax2	AV [100]	Maximum Flow Limit of Seq2 in % *Related to Vnom*	0 … 100	100	W
Vnom_gpm	AV [102]	Nominal Volume Flow in gpm	Depending on DN size	-	R
Vnom_lh	AV [115]	Nominal Volume Flow in l/h	Depending on DN size	-	R
Vnom_UnitSel	AV [119]	Nominal Volume Flow in selected unit *→ MV [121]*	Depending on DN size	-	R
ControlMode	MV [100]	Control Mode *The value defines the interpretation of the setpoint.*	PosCtrl FlowCtrl	FlowCtrl	W
UnitSelFlow	MV [121]	Unit Selection Flow *Defines the unit of the following objects* *AI [19]* *AI [109]* *AI [119]*	m^3/s m^3/h l/s l/min l/h gpm cfm	l/h	W
SpSource	MV [122]	Setpoint Source *The actuator has the possibility to be controlled from an analog input even though integrated on BACnet. Depending on this setting the setpoint by bus or analog input will be followed.* *Analog: Setpoint from analog signal 0…10V on wire 3* *Bus: Setpoint from BACnet → AO [1]*	Analog Bus	Analog	W

BACnet available for larger controller.
Modbus available for smaller controller.

Use if you want ALL the data.


BELIMO®