



CESIM

提供最合适的压力无关电动阀，
让水系统从设计，施工到运行
变得更简单。

June 14, 2018

BELIMO®

舒适源自设计的初衷

保证空调舒适性与设计匹配

永远配置最完美的阀件

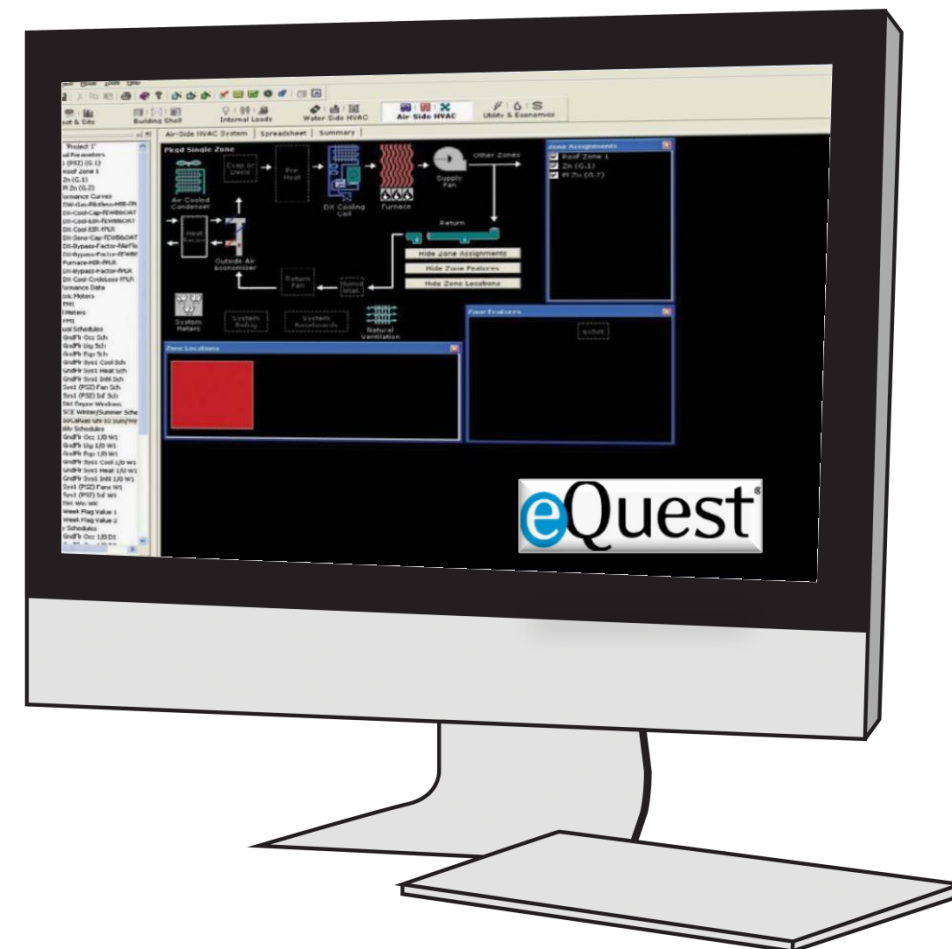
构建模型

设计/模型的设想

1. 合适地阀门尺寸
2. 合理地系统压损
3. 完美的阀权度

所以.....

只有压力无关型电动阀才能满足设计的参数



水力阀门的尺寸选择

压力相关型电动阀

二通压力相关型电动阀

尺寸 (DN)	Kv
65	63
80	100
100	145
125	220

Formula k_{vs}

$$k_v = \frac{\dot{V}_{100}}{\sqrt{\frac{\Delta p_{v100}}{100}}}$$

单位:

k_v [m³/h]

\dot{V}_{100} [m³/h]

Δp_{v100} [kPa]

水力阀门的尺寸选择

压力无关型电动阀

二通压力无关型阀门

型号 #	Cv	尺寸 [mm]
65	8	480
80	11	660
100	20	1200
125	31	1860

举例: 流量换算 100 m³/h = 27 l/s

Formula $k_v = \frac{\dot{V}_{100}}{\sqrt{\Delta p_{v100}}}$

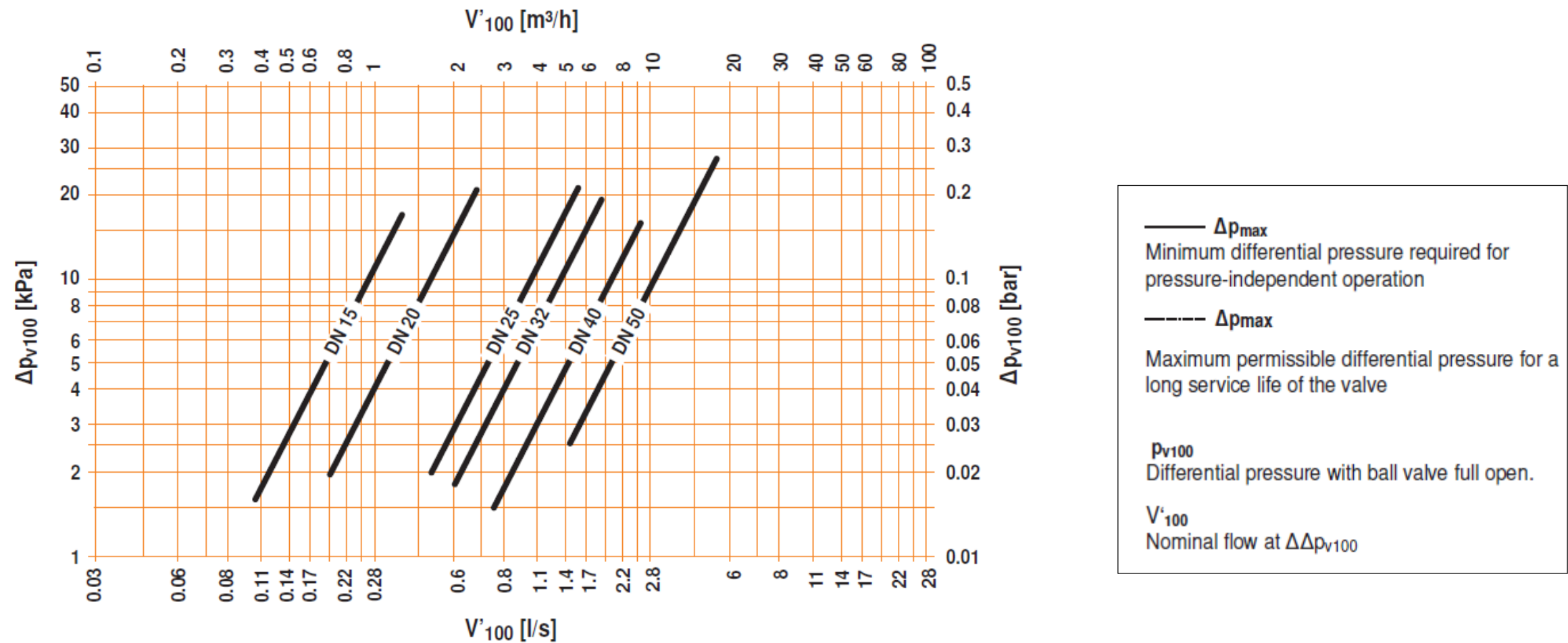
单位:

k_v [m³/h]

\dot{V}_{100} [m³/h] = 1 m³/h = 0.27 l/s

Δp_{v100} [kPa]

可调整压降的调节器—机械一体阀



可设定流量的调节器



File Project Channel Tools Help

MP1 MP2

Type **EP025R+MP** SN 01346-40305-157-136
Designation Address PP
Position

Service Configuration Simulation

Designation
Position

Valve Size V'nom V'max
0.35...1.15
l/s U5 Flow Range:

Control mode

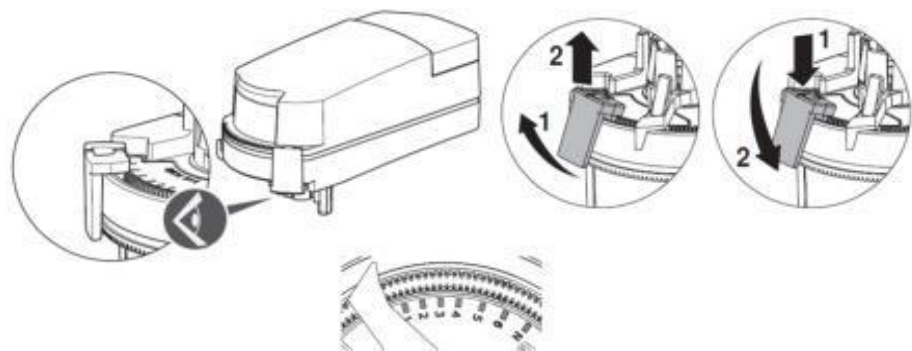
Control signal Y
☐ invert 10 V = Vmax

Feedback U5

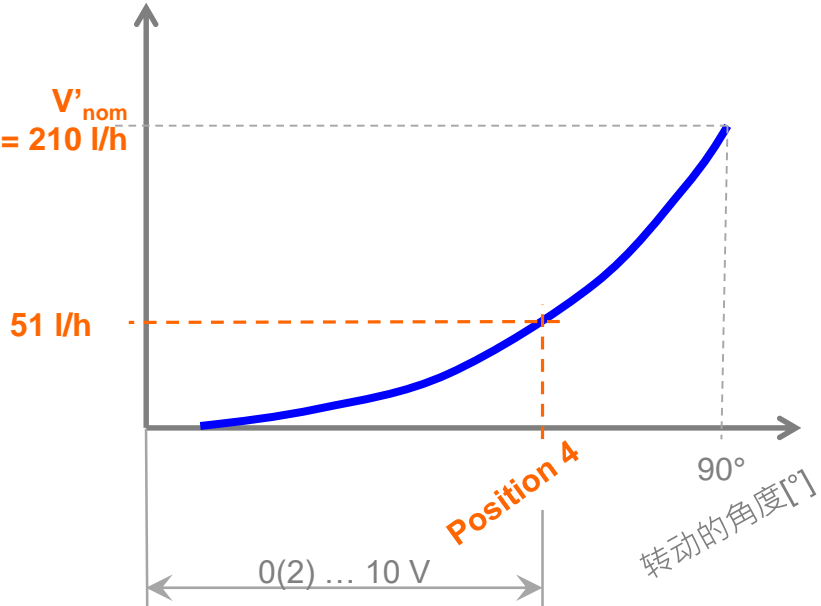
Y-Characteristics on [equal percentage] ☒

U5 Characteristics off [linear] ☐

可调型流量计



	Pos	1	2	3	4-	4	4+	5-	6+	N-	N	
C215QP(T)-B	\dot{V}_{max} (l/h)	20	25	35	45	50	60	70	140	160	170	210
	\dot{V}_{max} (l/s)	0.005	0.007	0.009	0.012	0.014	0.017	0.020	0.039	0.044	0.048	0.058
C215QP(T)-D	\dot{V}_{max} (l/h)	45	60	80	100	115	130	150	260	290	310	420
	\dot{V}_{max} (l/s)	0.012	0.016	0.022	0.028	0.032	0.037	0.042	0.073	0.080	0.086	0.120
C220QP(T)-F	\dot{V}_{max} (l/h)	115	145	180	250	280	310	360	680	740	800	910
	\dot{V}_{max} (l/s)	0.032	0.040	0.050	0.069	0.077	0.085	0.10	0.19	0.20	0.22	0.25



舒适源自合理的成本

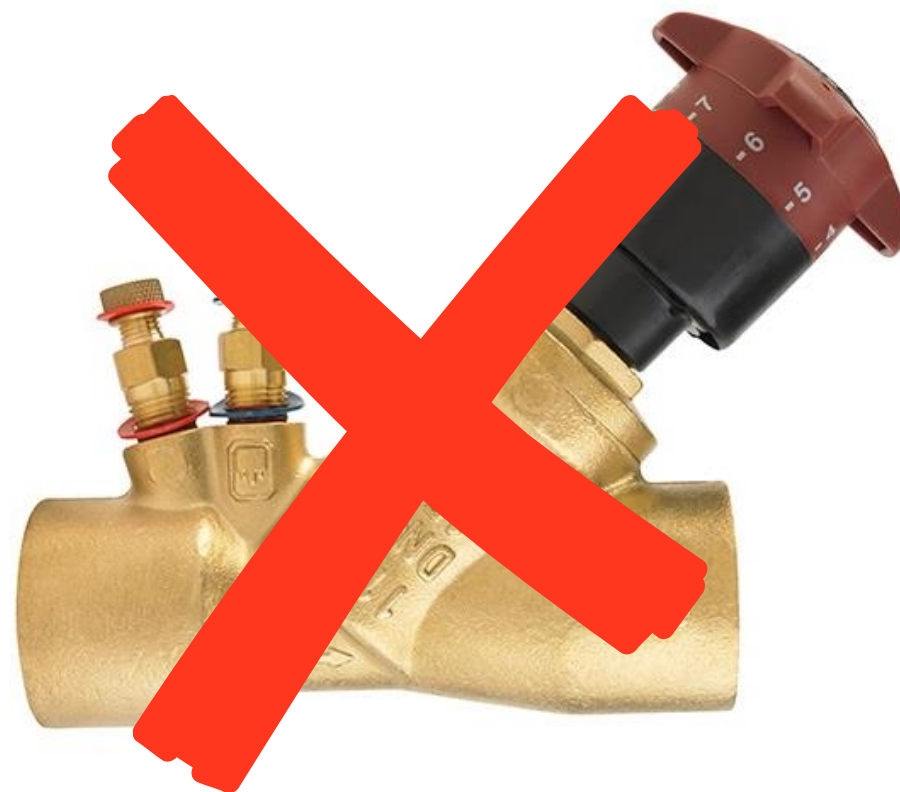
精简安装工序，更快更简单的完成调试，降低人工成本

精简材料&人工成本

压力无关型电动阀并不是简单意义上的平衡装置

有些平衡阀不是我们想要的:

1. 阀门的选择，订购及替换；
2. 安装平衡阀；
3. 水力平衡调试；
4. 存在被人擅动阀门的风险。



调试、试运行及流量确认



Procedures without Flow Orifice Device

Procedure #1 (System Verification) – Total System Flow Method

Verification for PIQCV Cooling/Heating

1. Verify that the system is in proper working order. Depending on the valves used, check the items listed for PIQCV Pre-Flow Verification Checklists.
2. If diversity factor = 100%, command open all PIQCV's via the BMS system. Systems with less than 100% diversity need to have a number of valves closed to match design diversity.
3. Ensure that pumps are either manually commanded to sufficient speed to provide proper differential pressure across all valves OR if pumps are under DDC pressure control ensure ΔP setpoint is sufficient to provide the above conditions.
- Verify total system flow in main return line is at system design flow rate using one of the following methods: Orifice, Venturi, Electronic flow meter, System-level Flow Device
1. Decrease the pump speed (or decrease ΔP setpoint if under

Verification for PIQCV Cooling/Heating

1. Verify that the system is in proper working order. Depending on the valves used, check the items listed for PIQCV Pre-Flow Verification Checklists. Ensure that water is at design temperature.
2. Ensure that terminal airflow is at design flow rate (cfm) or water coil airflow is unencumbered.
3. Command open the PIQCV via analog or BMS control signal to maximum design flow position. (Do not manually open the PIQCV beyond the actuator travel limit clip position.)
4. Reference approved engineering document containing design water temperature drop/rise for design conditions.
5. Measure water temperature differential of coil by using P/T ports A and B (or A and P1) as referenced in Fig. A.
6. Measured temperature differential should be equal to designed water temperature differential (EWT, LWT) as shown on the contract documents.

舒适来自于用户的满意

系统在动态平衡调节下可以使建筑能耗管理变得更加简易，并使客户获得更佳的舒适度。

静态水力平衡



静态水力平衡

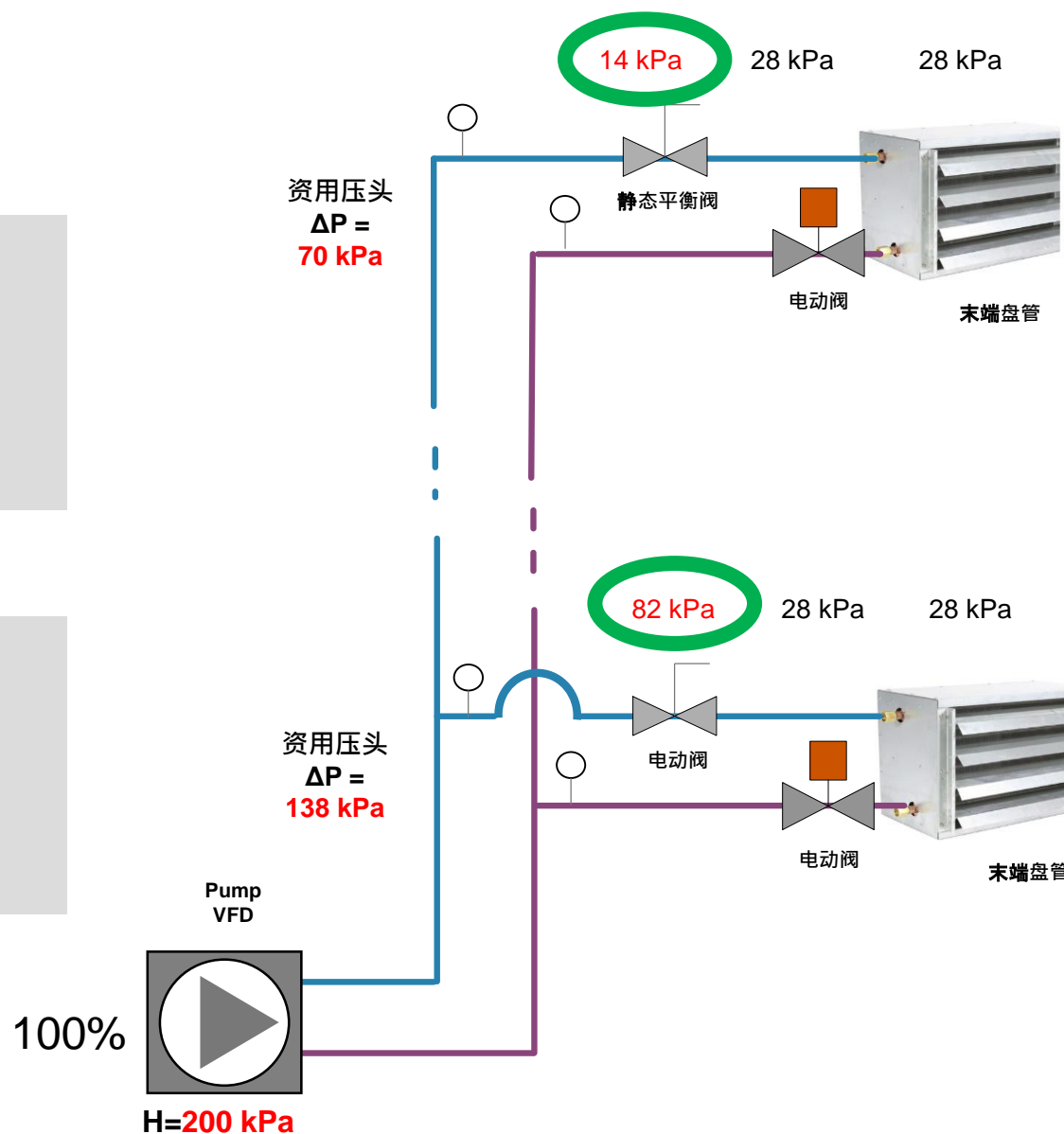
设计工况 (满负荷)

距离水泵较远处 (不利点) :

- 资用压头小，容易出现欠流
- 平衡阀抵消的压降比较小

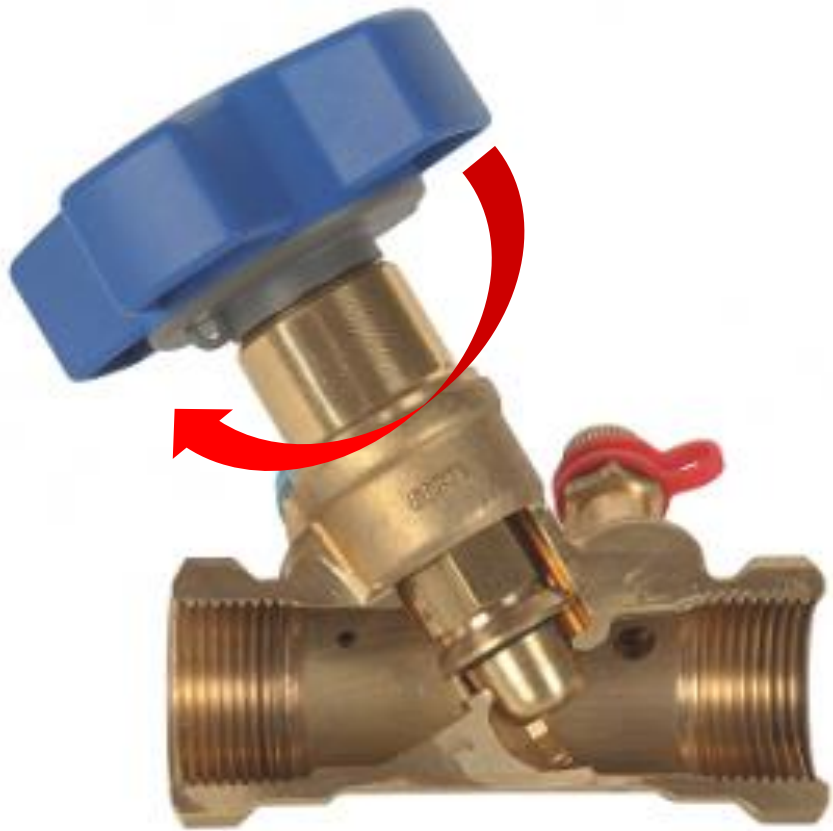
靠近水泵处 (有利点) :

- 资用压头大，容易出现过流
- 平衡阀抵消较大的压降



静态水力平衡 手动平衡阀

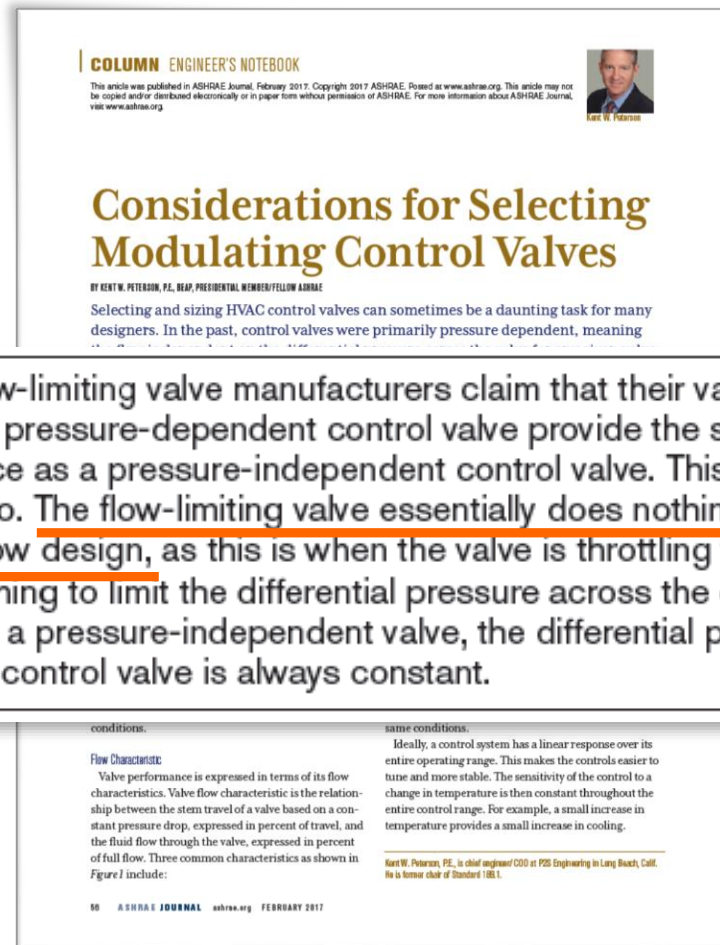
100% 流量
82 kPa 压降



静态水力平衡 自动流量平衡阀



- 限制最大盘管流量...
- 低于最大流量时，会如何？



* Some flow-limiting valve manufacturers claim that their valve plus a standard pressure-dependent control valve provide the same performance as a pressure-independent control valve. This is definitely not so. The flow-limiting valve essentially does nothing when flow is below design, as this is when the valve is throttling flow. So it does nothing to limit the differential pressure across the control valve. With a pressure-independent valve, the differential pressure across the control valve is always constant.

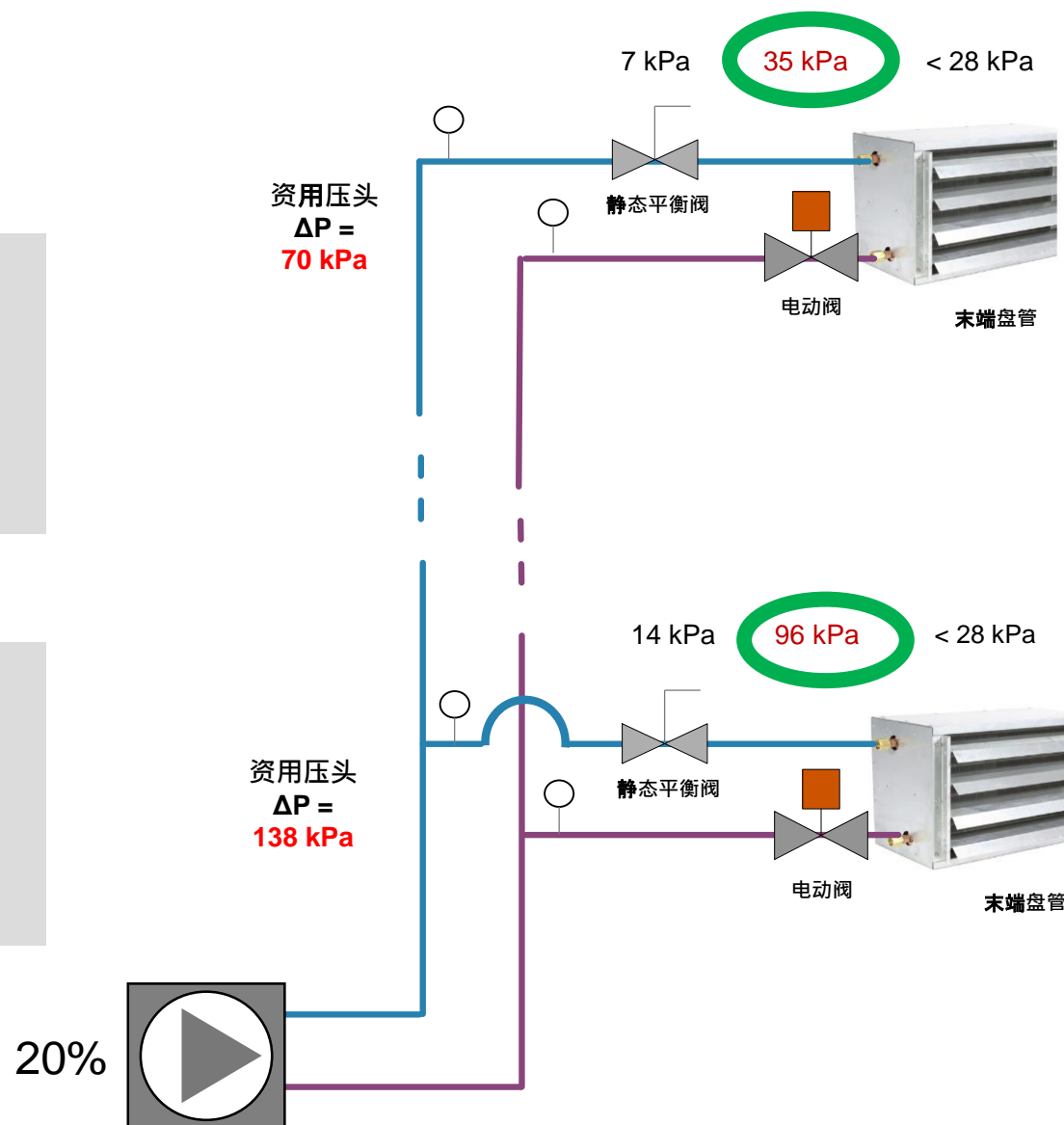
静态水力平衡 部分负荷时

距离水泵较远侧:

- 小程度的过流

靠近水泵侧:

- 严重过流



动态水力平衡



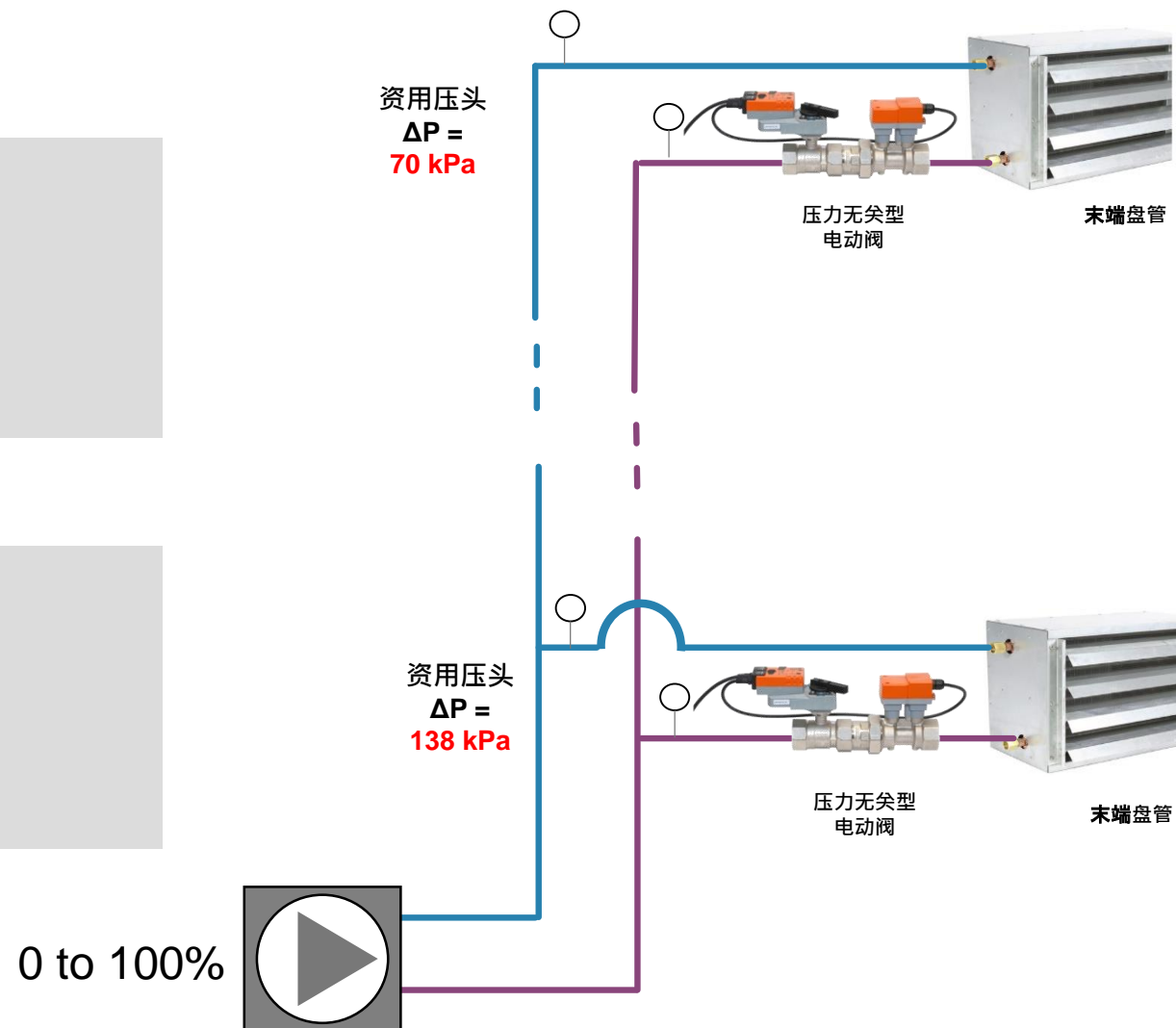
动态水力平衡 包含全流量范围

距离水泵较远侧:

- 保持精准流量

靠近水泵侧:

- 保持精准流量

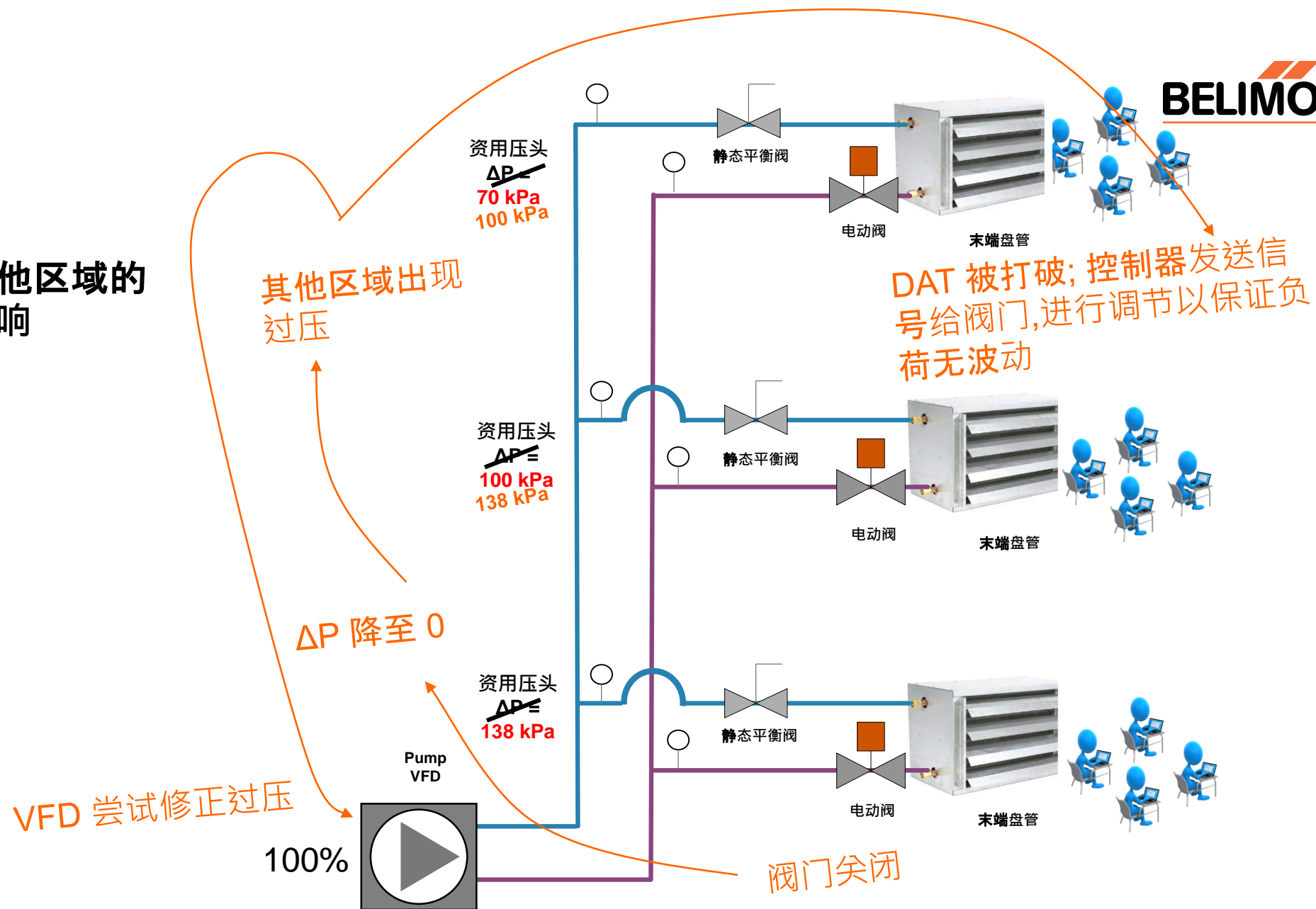


独立热循环



独立热循环

每个区域都会因其他区域的负荷变化而受到影响



独立热循环

独立热循环仅受负荷变化的影响。

其他区段过压

ΔP 降至 0

100%

变频水泵

资用压头
 $\Delta P =$
~~100 kPa~~
138 kPa

资用压头
 $\Delta P =$
~~100 kPa~~
138 kPa

资用压头
 $\Delta P =$
~~78 kPa~~
100 kPa

压力无关电动阀

末端盘管

压力无关型阀门不受影响
；区域保持稳定

压力无关电动阀

末端盘管

压力无关电动阀

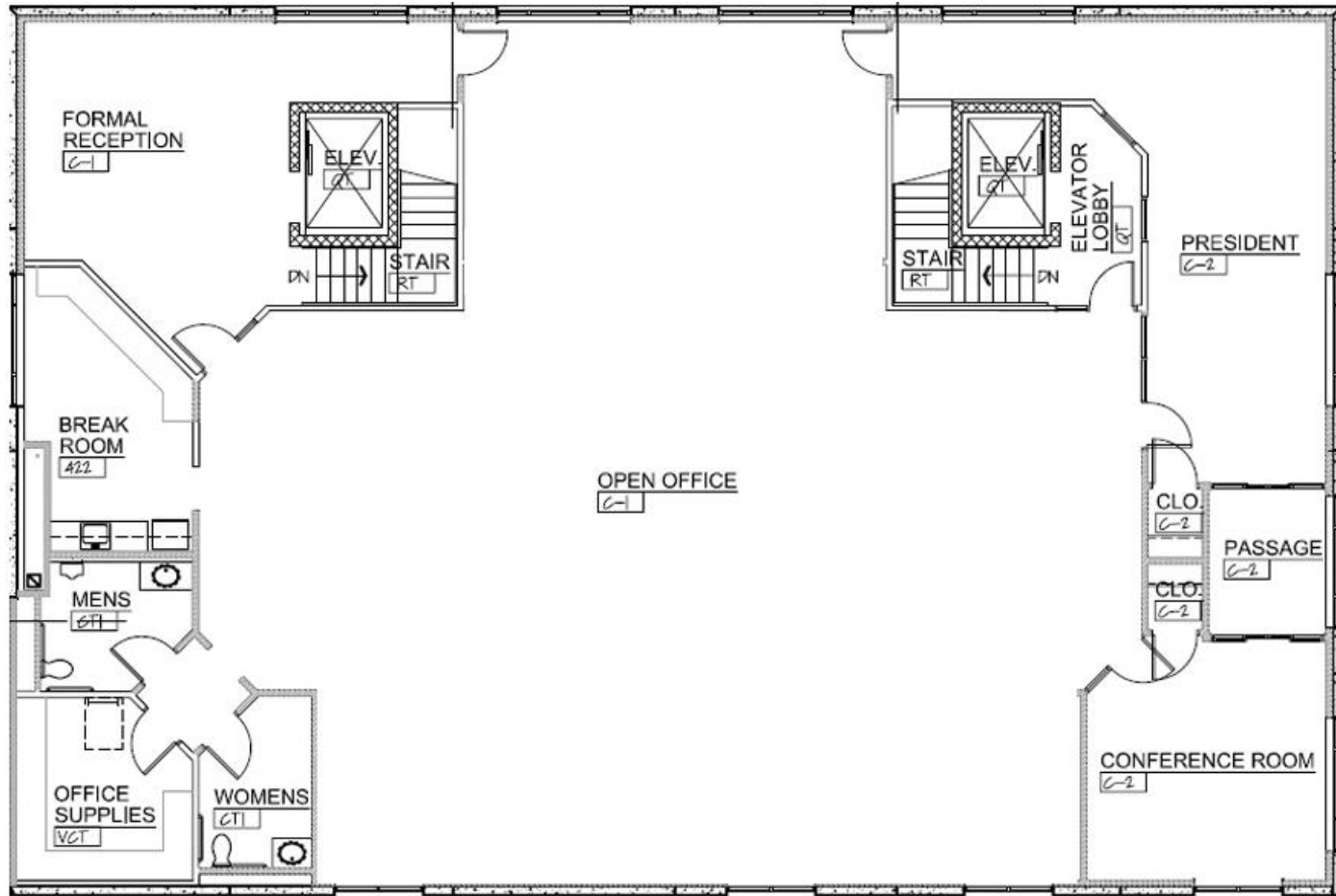
末端盘管

阀门关闭

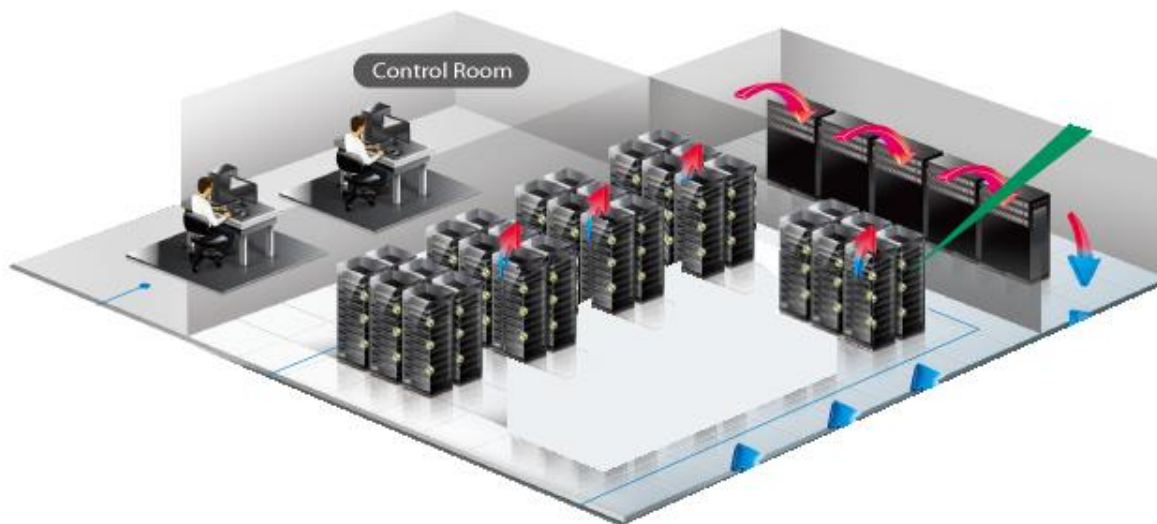
BELIMO®

完成了全部的安
装工程后，再来
做一次水力平衡？

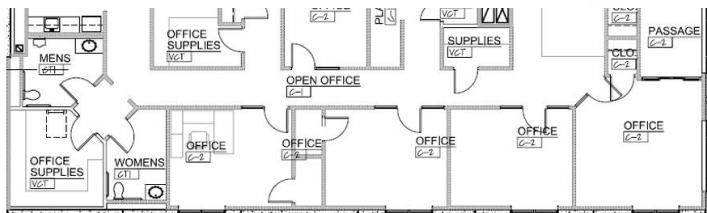




动态平衡对翻新扩建及改造项目的益处



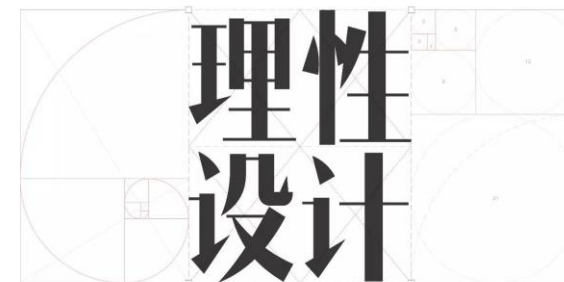
- 使用了PI阀的水力平衡区域无需反复做水力平衡。
- 计划性扩建等也可以按需调试应用
- 即使租户有特别应用要求也可轻松应对



BELIMO 水力失调与平衡情景模拟



BELIMO 压力无关型技术

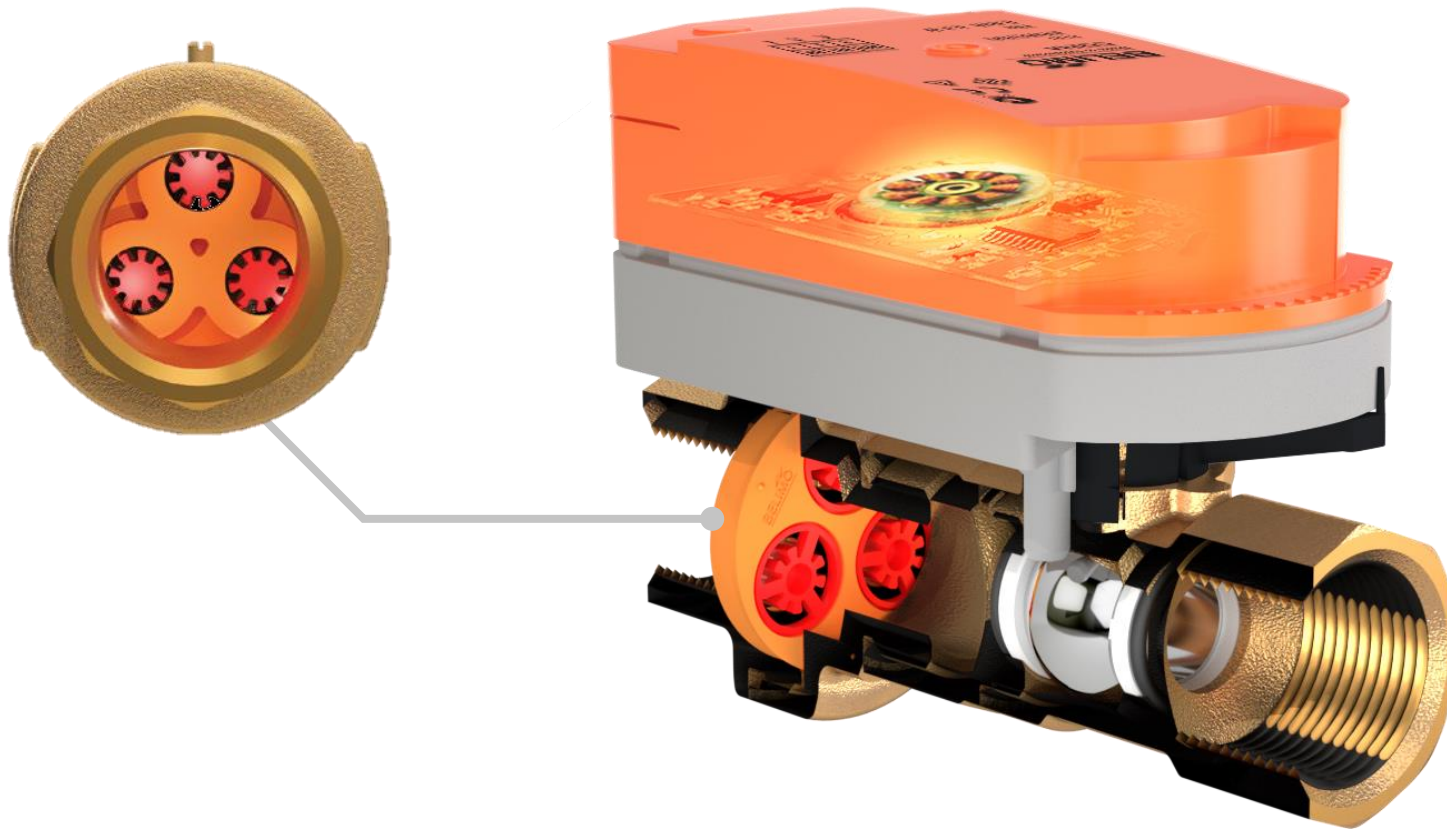


PRESSURE INDEPENDENT FLOW LIMITER VALVE, PIFLV™

Designed for on/off cooling
zone applications.



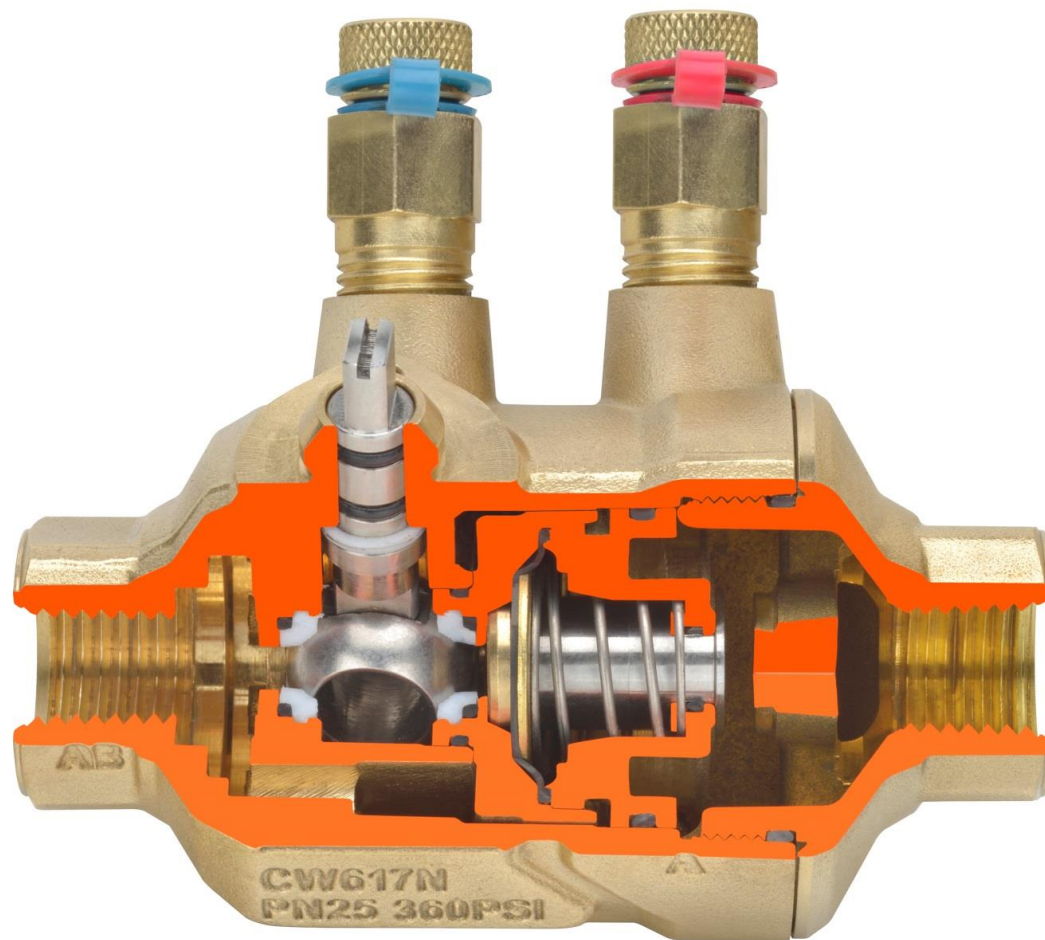
PIFLV 电动限流二通阀运行



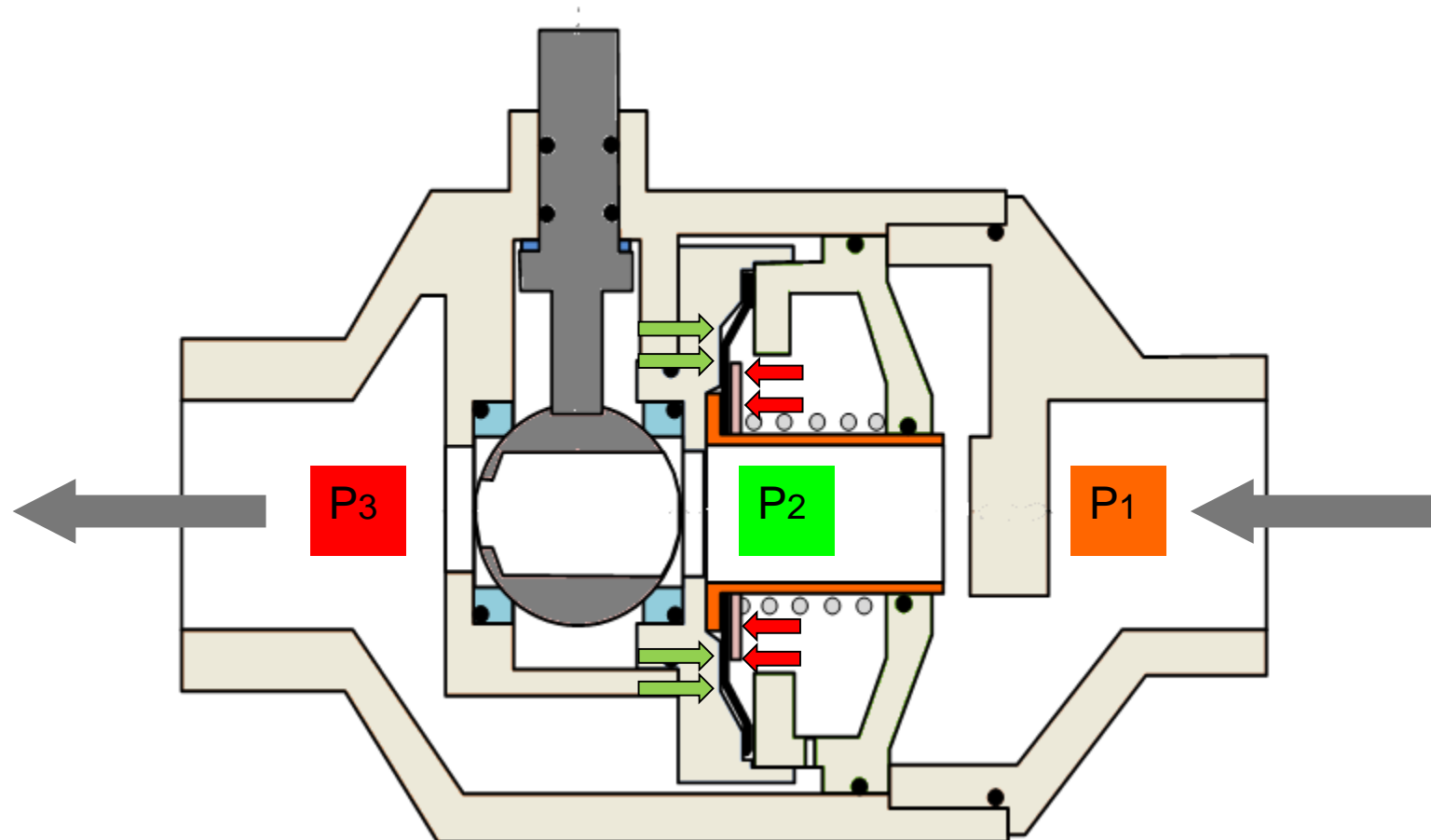
Belimo ZoneTight™



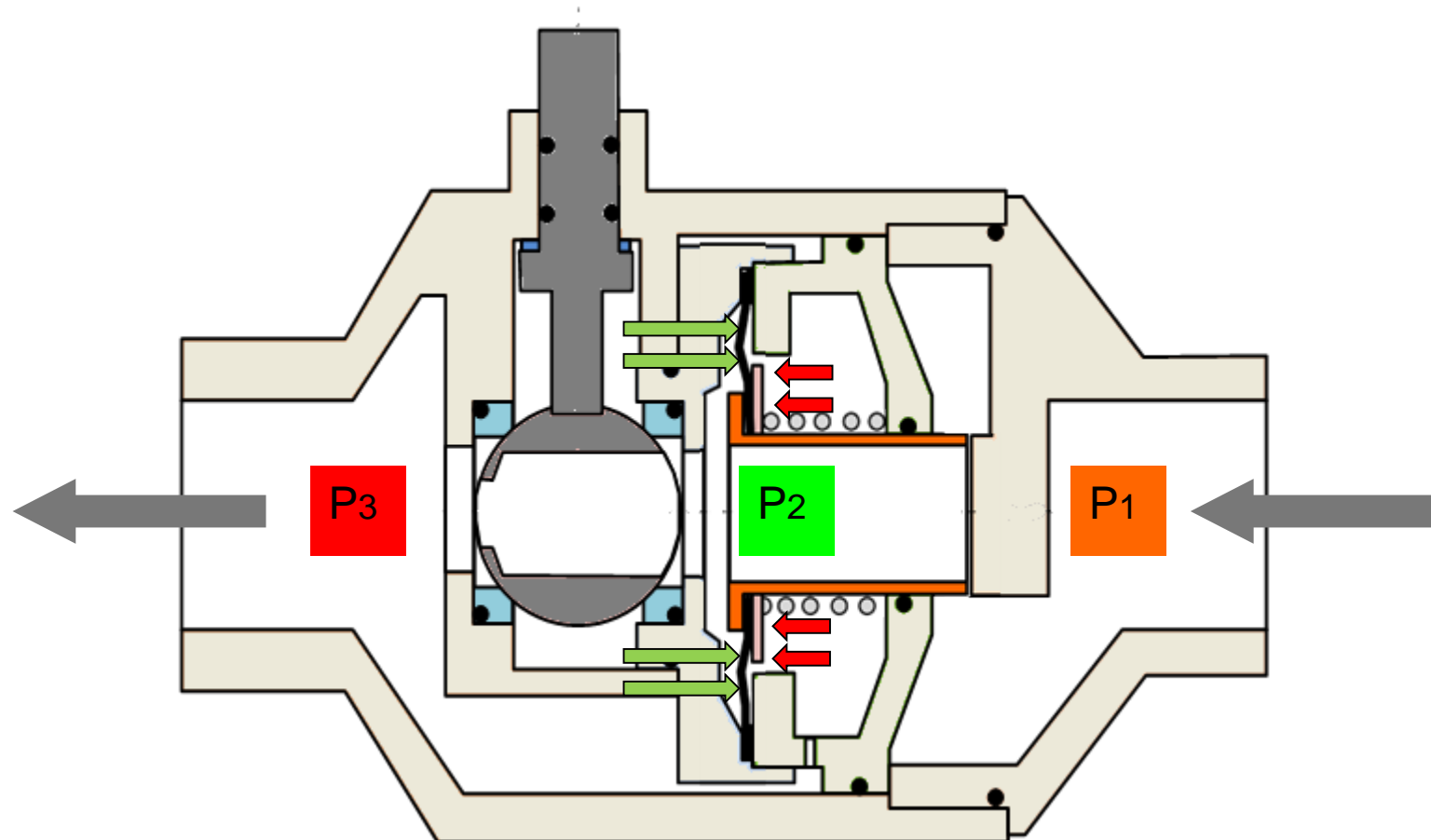
PIQCV – Pressure Independent Quick Compact Valve



Zone Tight: PIQCV



Zone Tight: PIQCV



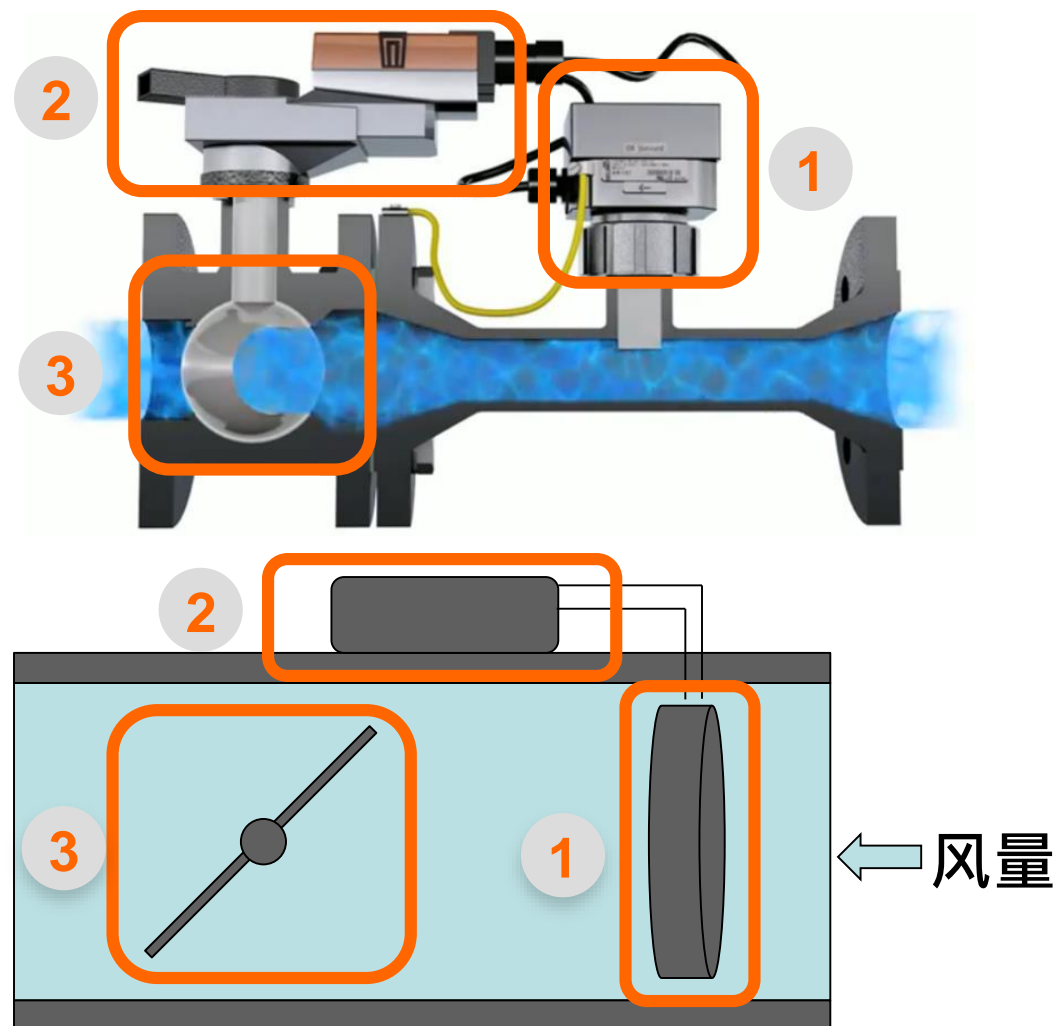
Electronic Pressure Independent Valve (ePIV)



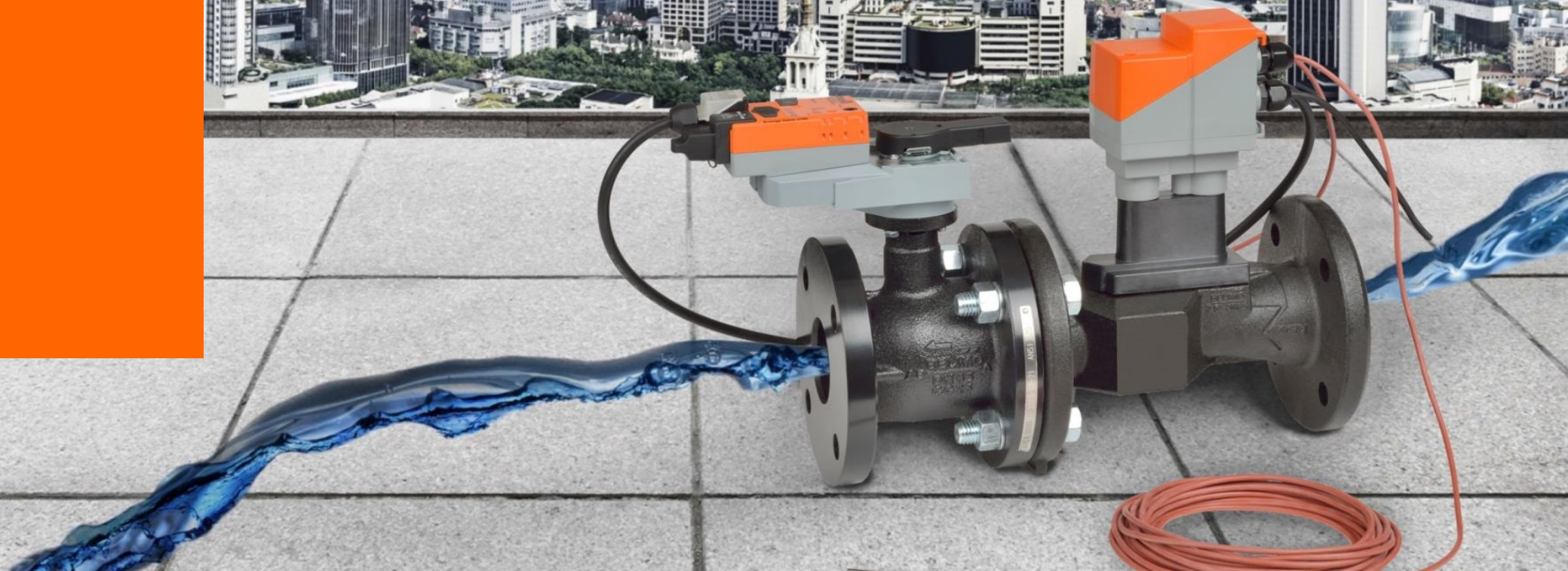
电子式压力无关型阀

使用与VAV同样的控制逻辑

- 1. 流量监测装置
- 2. 控制器
- 3. 流量调节装置

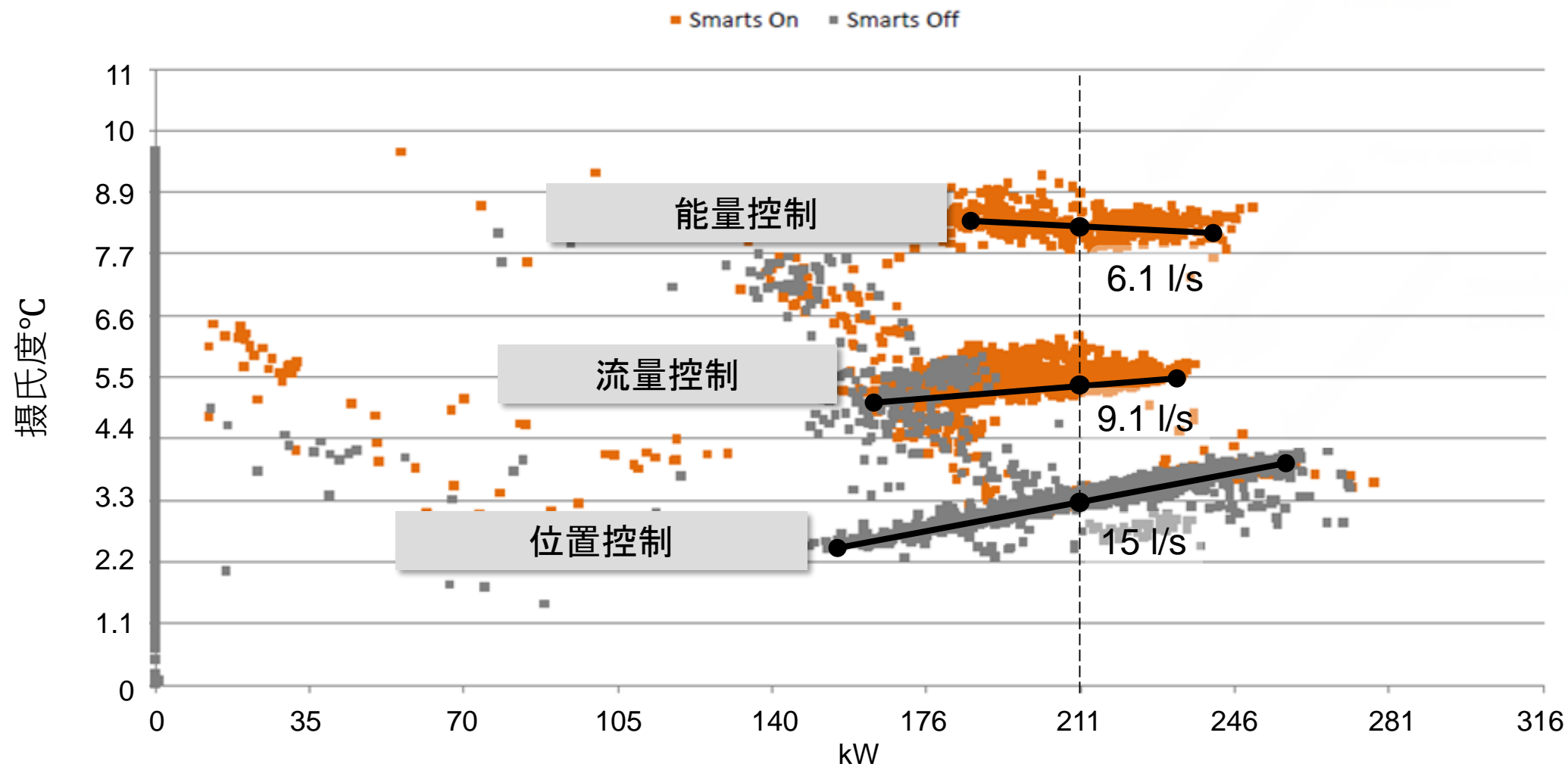


能量阀 3.0
物联网平衡
解决小温差



温差控制 VS 流量控制

Delta T vs. Tons - B500 AHU3



The logo graphic consists of two parallel orange diagonal bars slanted upwards from left to right, positioned above the 'IMO' portion of the brand name.

BELIMO[®]
