BELIMO

Characterized Control Valve

By: Sebastian Goh

Day-to-Day Problems

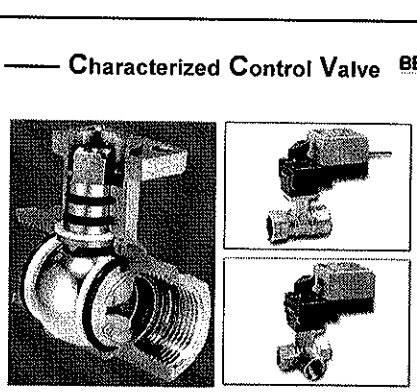
BELIMO

Currently, what are the problems that we faced with the existing control valves?

- Shut-off / Close-off problem
- Leakage when valve is fully closed
- Big actuator leading to insufficient head room space
- Difficulty in mounting the actuator onto valve
- Requires more than 2 hands to complete the job
- Short life span of actuator

CCV —— Characterized Control Valve

BELIMO



Why - Characterized Control Valve

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The idea originated from ball valve

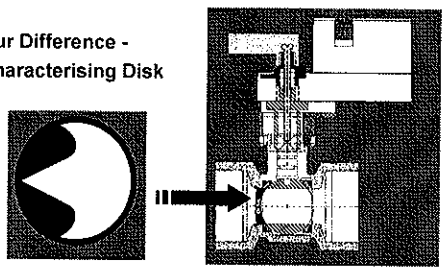
Ball Valve is commonly known as "shut-off" valve
Shut-off = no leakage

Ball Valve requires very little torque to overcome high pressure

Why - Characterized Control Valve

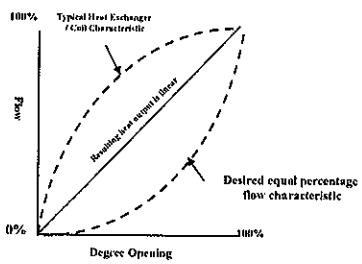
BELIMO

Our Difference -
Characterising Disk



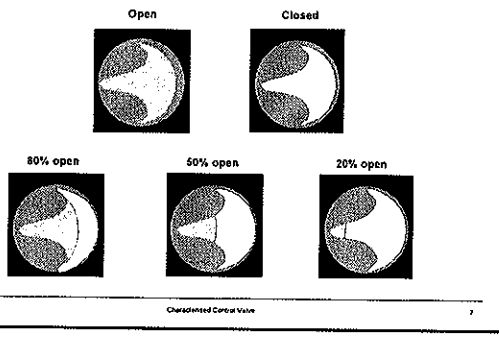
Why - Characterized Control Valve

BELIMO

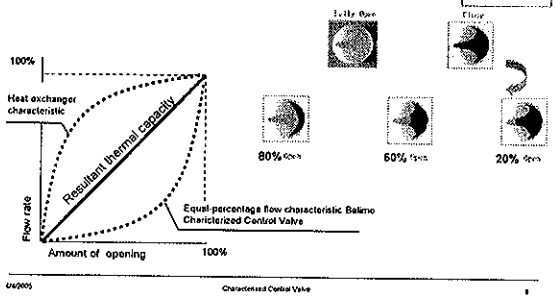


Why - Characterized Control Valve

BELIMO



We added "control" to the ball valve —— with a Characterizing disk



Why - Characterized Control Valve

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Model	Size		Kvs Rating
R209	1/2"	15mm	0.63
R210	1/2"	15mm	1
R211	1/2"	15mm	1.6
R212	1/2"	15mm	2.5
R213	1/2"	15mm	4
R214	1/2"	15mm	6.3
R217	3/4"	20mm	4
R218	3/4"	20mm	6.3
R219	3/4"	20mm	8.6
R222	1"	25mm	6.3
R223	1"	25mm	10
R224	1"	25mm	16

Model	Size		Kvs Rating
R229	1-1/4"	32mm	10
R231	1-1/4"	32mm	16
R236	1-1/2"	40mm	16
R239	1-1/2"	40mm	25
R248	2"	50mm	25
R249	2"	50mm	40

= Full Port Model valve without characterising disc

Test Results

BELIMO

Of the 16 valves tested. No leakage was observed on any valve before 300,000 cycles, which is approximately a 30-year life.

After 300,000 cycles three of the valves showed some leakage at the stem and were removed from the test. The other 13 valves were further tested to determine their close-off pressure capability.

Of the 13 valves tested, 11 closed off at 100% of the rated close-off pressure of 14bar (200 psi). The other two valves were able to close off against more than 7bar (110 psi).

4/4/2005 Characterised Control Valve 10

Other Benefits

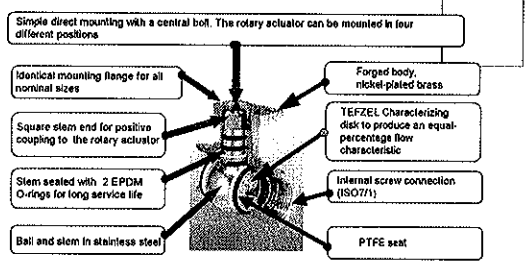
BELIMO

- Excellent control stability assured with the characterising disc
- Kv values are equal of globe valves of the same size
- Need for pipe reducers virtually eliminated
- Better control prevents "hunting" of the control loop, increasing life span of actuators, fans, pumps, chillers etc etc etc
- Very high rangeability
- Reduced Cost

4/4/2005 Characterised Control Valve 11

Parts and properties of the CCV

BELIMO

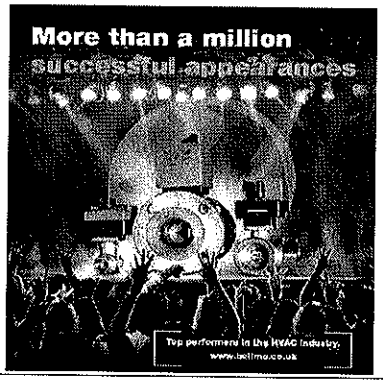


4/4/2005 Characterised Control Valve 12

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[redacted]

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Thank you for your time



BELIMO

The best way to control flow

BELIMO

PICCV

By: Sebastian Goh

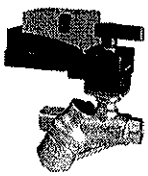
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BELIMO

The best way to control flow

PICCV ——

The Hydraulic & Control Revolution!

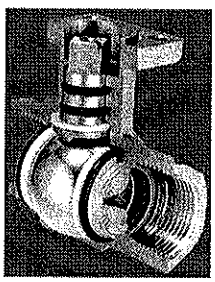


PICCV 2

CCV —— Characterized Control Valve

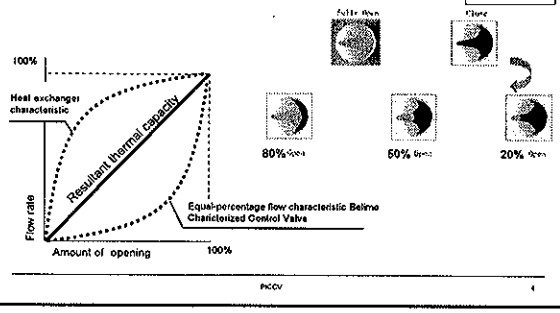
BELIMO

The best way to control flow



PICCV 3

We added "control" to the ball valve —— with a Characterizing disk



PICCV 4

Advantage of BELIMO Characterizing disk

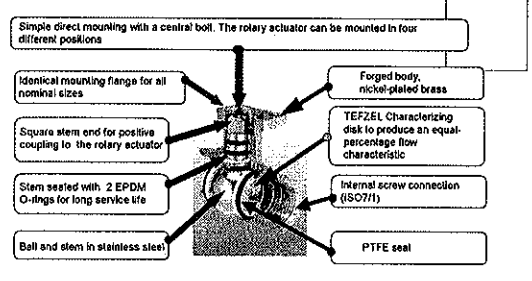
BELIMO

- Provide the ball valve equal-percentage flow characteristic
- With different disc shape， the same nominal size of the valves have different k_{VS} values which comparable with those of globe valves
- Ensures excellent stability of control especially at low load
- The better controllability eliminates control loop hunting and increases service life expectancy

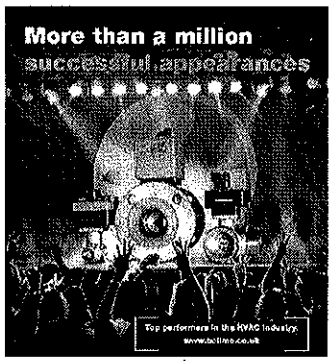
PICCV 5

Parts and properties of the CCV

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PICCV 6



BELIMO
The best way to control flow

PICCV 7

What is the PICCV?

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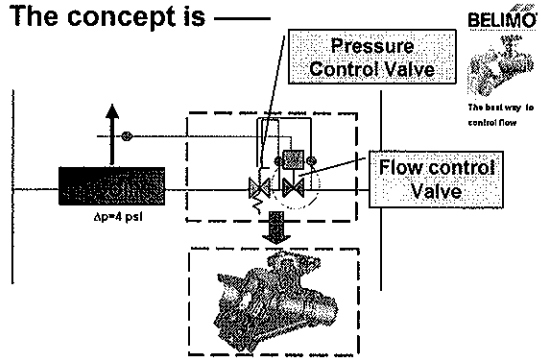
PICCV is ....

a valve that takes the place of a conventional control valve and dynamic balancing valve in an HVAC system.

PICCV 8

The concept is ——

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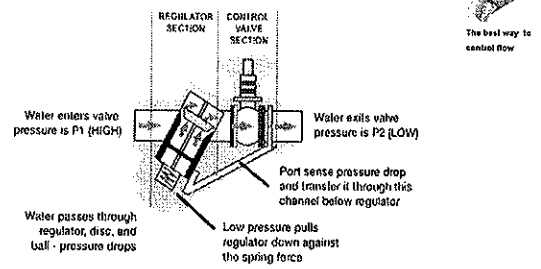


PICCV 9

PICCV Consists of a Differential Pressure Regulator in Series with a Control Valve

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The best way to control flow

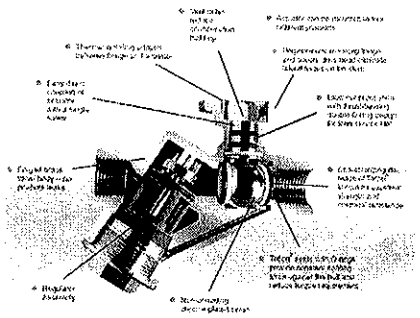


PICCV 10

PICCV Construction

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The best way to control flow



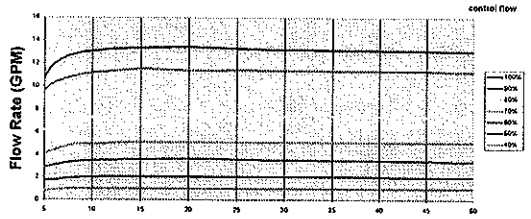
PICCV 11

Maintain Design Flow Independent of Pressure

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The best way to control flow

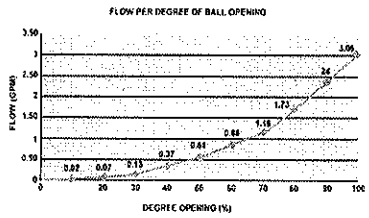
3/4" PICCV Performance



PICCV 12

Flow Characteristic of PICCV

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PICCV 13

Specification of PICCV

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The best way to control flow

Nominal sizes	DN15...50
Application	cold and hot water (-5°C to 100°C)
Flow characteristic	**equal-percentage**
Rated pressure	**4140KPa**
Close-off pressure	**1400KPa**
Differential pressure	**30...350kPa**
Flow accuracy	**+/- 5%**
Rangeability	**Sv>50** (DN15..20), **Sv >100**(DN32..50)
Connections	internal screw to ISO7/1
Flow range	0.06 ~ 2.55 l/s (5.05 l/s soon)

PICCV 14

The Part number definition

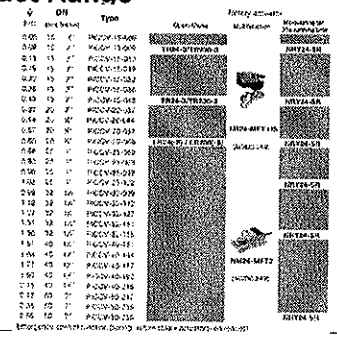
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The best way to control flow

PICCV-15-036

- Flow rate in l /s
- DN in mm
- Pressure-independent Characteristic Control Valve

PICCV 15

Product Range



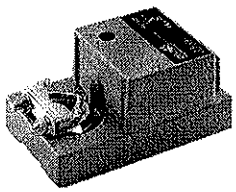
BELIMO

The best way to control flow

PICCV

PICCV with MFT-Technology®

Multi-Function-Technology



1 Actuator - 4 Functions

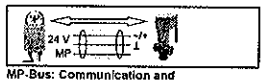
BELIMO

The best way to control flow

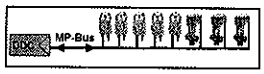
PICCV

1. Simple bus integration

MP- Bus = Master/Slave bus



MP-Bus: Communication and power supply on the same cable



Connection to a digital controller by MP interface

BELIMO

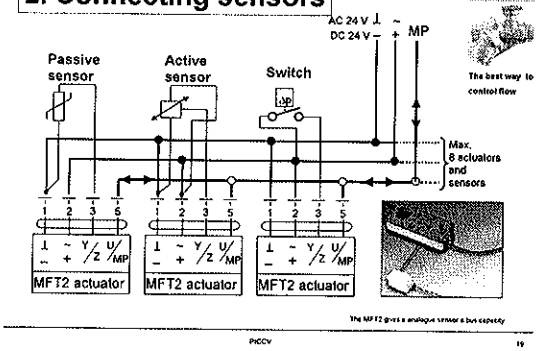
The best way to control flow

PICCV

2. Connecting sensors

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The best way to control flow



The MFT2 gives a analogue sensor bus capacity

PICCV 19

3. Parameter assignment

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The best way to control flow

Be adapted at any time to suit the needs of specific applications.

Supplied already set



Setting during manufacturing

Setting by OEMs and controls companies



Setting by PC-Tool or manual device

Setting on-site



Setting by PC-Tool or manual device

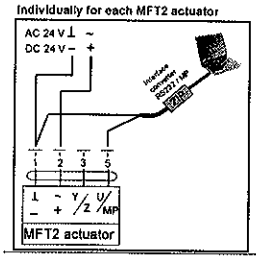
PICCV 20

Parameter assignment by PC-Tool or MFT-H tool

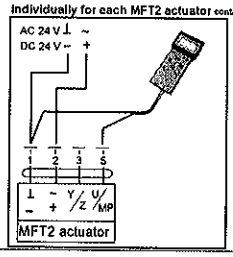
BELIMO

The best way to control flow

Individually for each MFT2 actuator



Individually for each MFT2 actuator



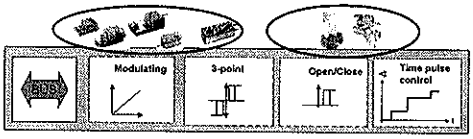
PICCV 21

4. Variable operating modes

BELIMO

The best way to control flow

- suitable for all popular open-loop and closed-loop control systems
- controlled via bus systems
- Controlled via conventional signals
  - modulating, 3-point and Open/Close..
- Excellent flexibility for both new and existing installations.



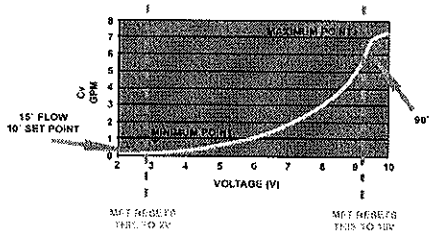
→ only need a few basic types to cover all applications

PICCV 22

Control optimized with MFT actuator

BELIMO

The best way to control flow

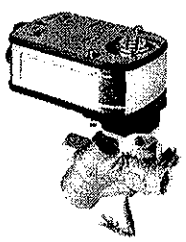


PICCV 23

Features of Belimo PICCV

BELIMO

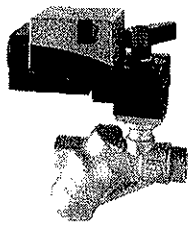
The best way to control flow



- Real Equal-percentage flow characteristic
- Automatic dynamic system balancing
- User friendliness —— flow rate, control signal etc adjustable by MFT actuator
- Wide differential pressure operating range

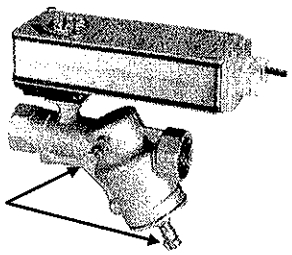
PICCV 24

Features of Belimo PICCV



- Flow / Temp. measurable
- Elimination of branch balancing valve
- High close-off pressure
- Valve authority close to 1
- 5 year warranty
- Price competitive against conventional system using balancing valve and control valve

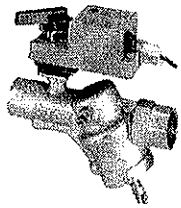
Flow Verification



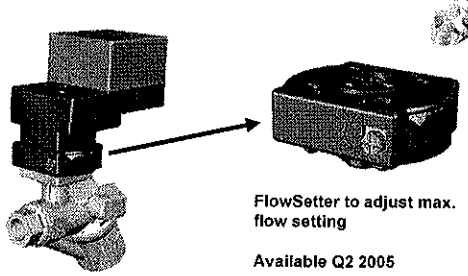
P/T ports to verify flow
DN32-DN50

Options

- Belimo PC-Tool or MFT-H tool for commissioning
- Weather shields
- Auxiliary switches
- LON actuators
- 5.05l/s DN50 coming soon Q4 2005



New: FlowSetter

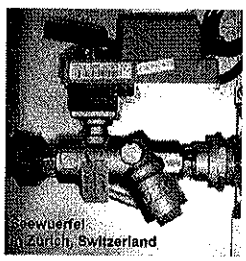


FlowSetter to adjust max. flow setting

Available Q2 2005

PICCV 28

Advantages

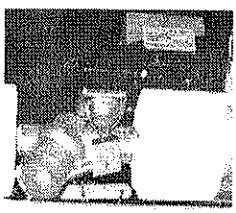


Schwuerfel in Zurich, Switzerland

- Easy valve sizing, no Kvs calculation required
- Hydraulic balancing is simplified, as the circuits are not interactive
- Flexible commissioning
- One piece installation saves at least 40% of labor costs, installation space, and investment for balancing valve

PICCV 29

Advantages



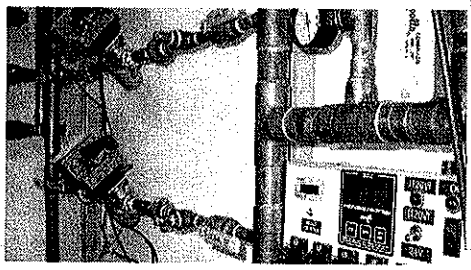
Cytec in Stamford, CT

- Reduces pumping costs
- Temp. is controlled exactly, especially at light loads
- Maintains Δt for higher efficiency of chillers and condensing boilers
- Visualizes flow in a BMS system
- Prevents overflow or underflow for fast start-up
- Actuator life is increased

PICCV 30

Test Stand Belimo Plant (93 °C Lifetime)

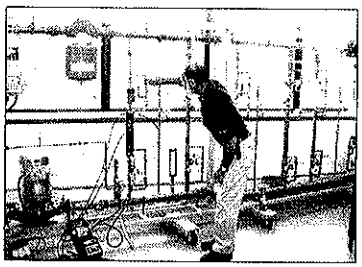
BELIMO
The best way to control flow



PICCV 31

Other Tests

BELIMO
The best way to control flow

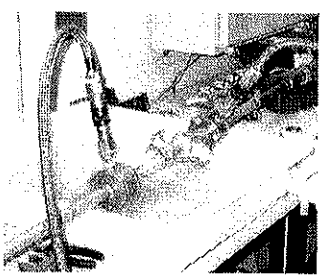


Long Test Stand (Flow, Noise, Training)

PICCV 32

Other Tests

BELIMO
The best way to control flow



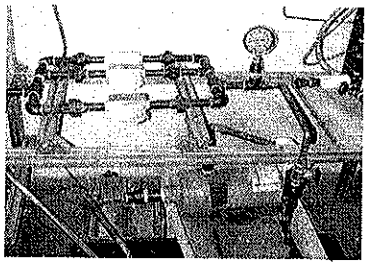
Open Loop Test Stand (Flow)

PICCV 33

Other Tests

BELIMO

The best way to control flow



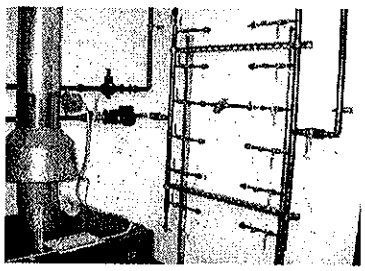
Dirt Test Stand (Lifetime)

PICCV 34

Other Tests

BELIMO

The best way to control flow



Test Stand Belimo Boiler Room (Lifetime)

PICCV 35

Testimonials

BELIMO

The best way to control flow

- Washington DC (900pcs)
- Cytec, Stamford, CT (181 pcs.)
- Union Church, IL (44 pcs.)
- Oswego High School, IL (36 pcs.)
- East Lansing High School, MI (188 pcs.)
- Shell Point, FL (186 pcs.)
- Seewuerfel, Zurich (78 pcs.)
- Wesley Church, Tyrone (21 pcs.)
- Shanghai (74 pcs)
- Pacific (236 pcs)

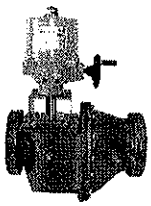
PICCV 36

DeltaPValve™ —— Larger size solution

BELIMO

The best way to control flow

- 7.3 - 240 l/s (DN80 to DN350)
- Industrial type valve
- Pressure Ranges 30 - 350 kPa or 69 - 6210 kPa
- P/T ports as a standard
- ANSI flange pipe connection
- With Belimo actuator

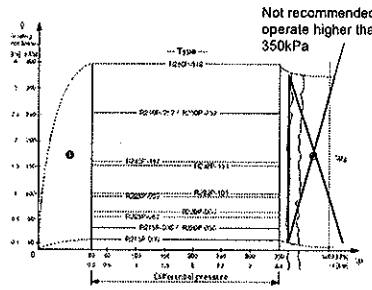


PICCV 32

Not Recommended

BELIMO

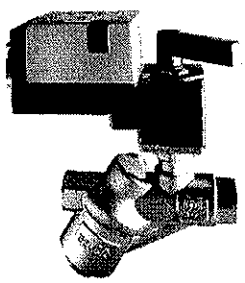
The best way to control flow



PICCV 33

Summary

BELIMO



The PICCV is a 2-way valve that supplys a specific constant flow for each degree of valve opening – regardless of pressure variations in the system.

—— The best way to control flow!

PICCV 35

BELIMO

Thank you for your time



PICCV 40