BELIMO ACTUATORS AND VALVES

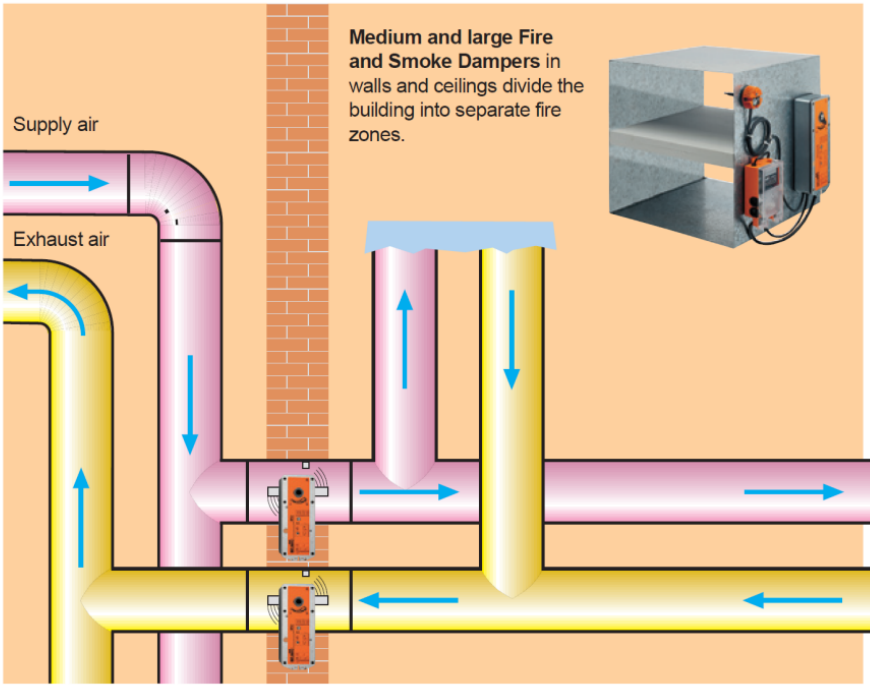
**Cost-effective, environment conservation,
system optimisation, universal and simple adaptation**

www.belimo.com

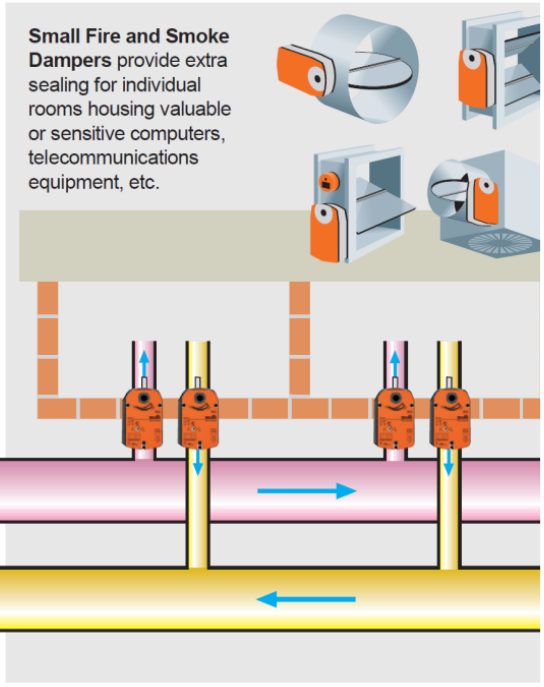
BELIMO®

FIRE AND SMOKE DAMPER ACTUATORS

Main distribution



Terminal control in individual rooms



Fire and smoke spring return damper actuator (UL555S Certification)

Product range	Types / performace classes	Specification	Applications
	• FSLF.. US (3.5 Nm) • FSNF.. US (7.9 Nm) • FSAF.. US (15 Nm)	• 24 V and 230 V Nominal Voltage • Automatic closing function in <20s in the event of electricity interruption • Manual override • UL5555S Certification	Motorisation of small and large smoke control dampers in mechanical smoke control systems

Fire and smoke spring return damper actuator (CE Certification)

Product range	Types / performace classes	Specification	Applications
	• BLF (4 Nm) • BFG (8.5 Nm) • BLF (12 Nm)	• 24 V and 230 V Nominal Voltage • Automatic closing function in <20s in the event of electricity interruption • Manual override • CE Certification	Motorisation of small and large smoke control dampers in mechanical smoke control systems

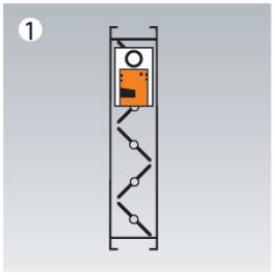
Fire and smoke non spring return damper actuator (CE Certification)

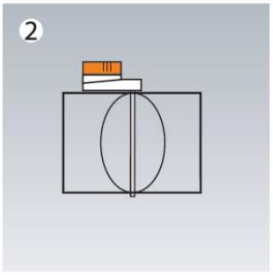
Product range	Types / performace classes	Specification	Applications
	• BLE (4 Nm) • BE (15 Nm) • BR24-48-F-ST (15 Nm)*	• 24 V and 230 V Nominal Voltage • Manual override • *AC 24..48 V control unit for pulse triggering BSIA24-48 (R) • CE Certification	Motorisation of small and large smoke control dampers in mechanical smoke control systems

MOTORIZED DAMPER

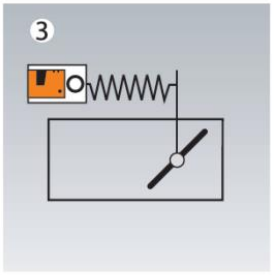
BELIMO

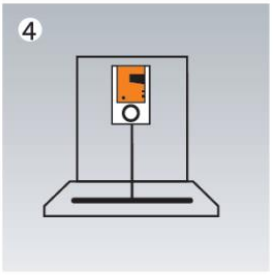
Air duct system

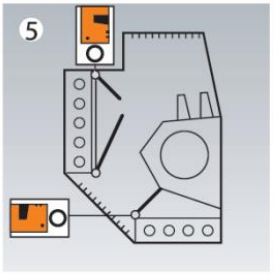




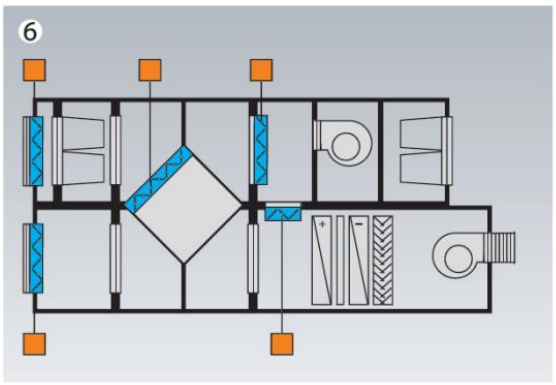
Terminal control

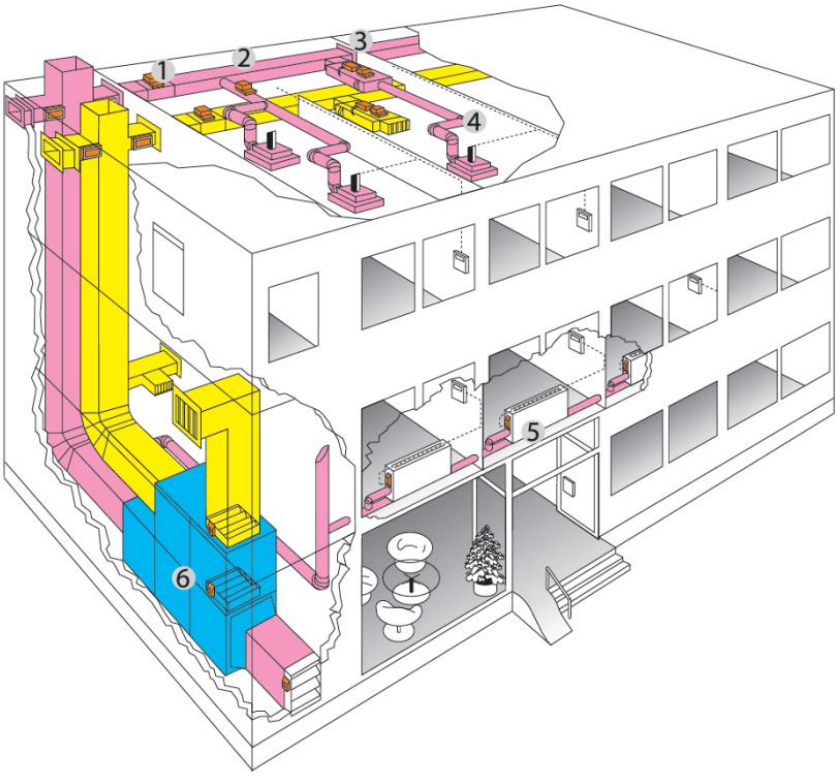






Central air-conditioning unit





Rotary actuators without emergency control function

Product range	Types / performace classes	Specification	Applications
	Standard actuators : • LMU (5 Nm) • NMU (10 Nm) • SMU (20 Nm) • GMU (40 Nm) Compact actuators : • CMU (2 Nm)	• 24 V and 230 V Nominal Voltage • With integrated auxiliary switch or potentiometer • Identical accessories for all types • Cable (IP54) or terminal connection (IP20 or IP 54)	Motorisation of air dampers without emergency control function up to 8 m^2

Rotary actuators with emergency control function

Product range	Types / performace classes	Specification	Applications
	Mechanical : • TF (2 Nm) • LF (4 Nm) • NF (10 Nm) • SF (20 Nm) • EF (30 Nm) Electrical : • NKQ (6 Nm, running time 4s) • GK (40 Nm, running time 150s)	• 24 V and 230 V Nominal Voltage • Automatic closing function in < 20s in the event of electricity interruption • Manual override • Actuator moves into predefined emergency setting position in < 35 s in the event of electricity interruption	Motorisation of air dampers without emergency control function up to 8 m^2

CHARACTERIZED CONTROL VALVE

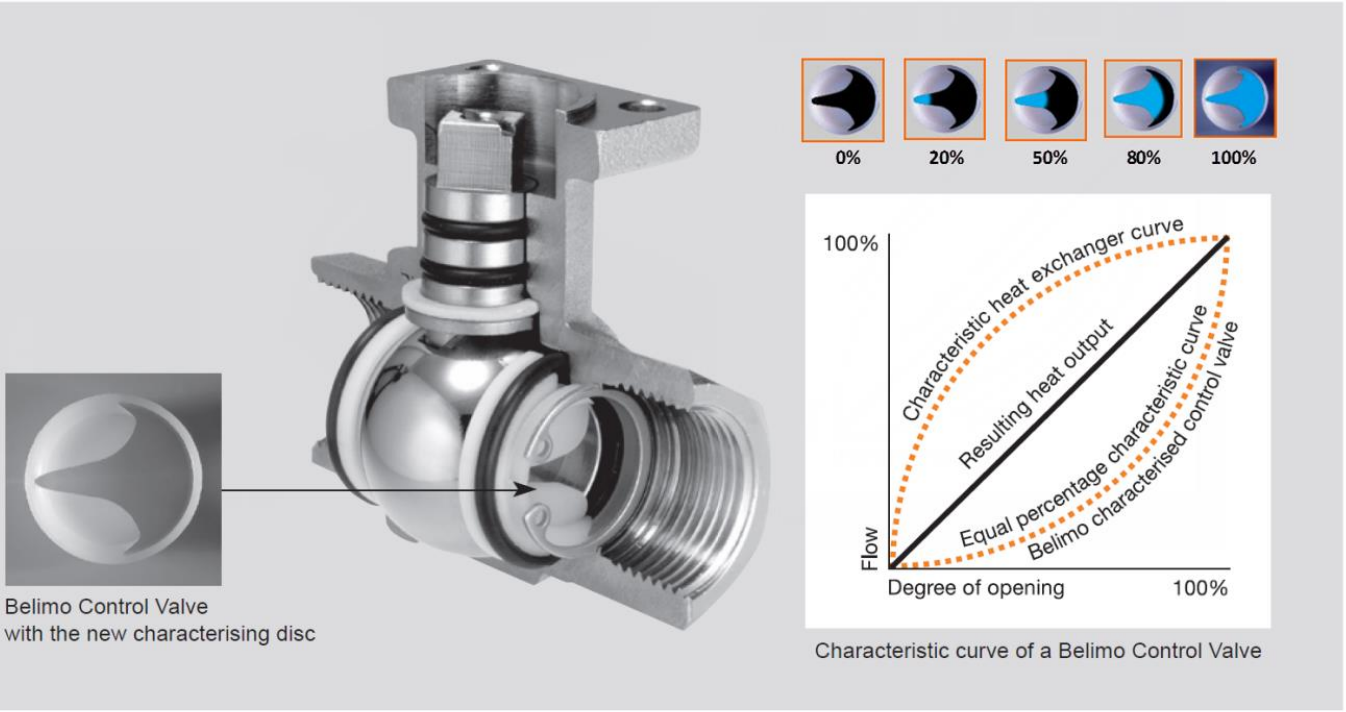
Belimo Characterised Control Valves:
Equal-percentage valve characteristic thanks to the new characterising disc

In order to ensure good stability of control, the final controlling element must have an equal-percentage valve characteristic. This will give a linear relationship between the thermal output and the amount of valve opening.

In the past, this has only been possible by using lift-type Globe Valves: under normal circumstances Ball Valves have an S-shaped characteristic which, however, is considerably deformed in actual use because of the extremely high flow characteristic (Kvs) compared with the nominal size.

By developing a special characterising disc, Belimo has succeeded in solving this problem.

The side of the characterising disc that faces the ball is concave and rests on the surface of the ball. The flow is regulated as it passes through the hole in the ball and a V-shaped slot in the characterising disc. This reduces the Kvs value to value comparable with that of a lift-type Globe Valve of the same nominal size. It guarantees an equal-percentage valve characteristic.



Belimo Control Valve
with the new characterising disc

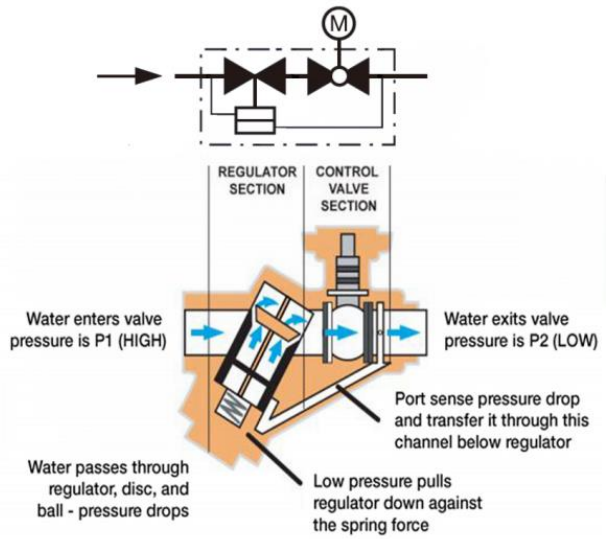
Characteristic curve of a Belimo Control Valve

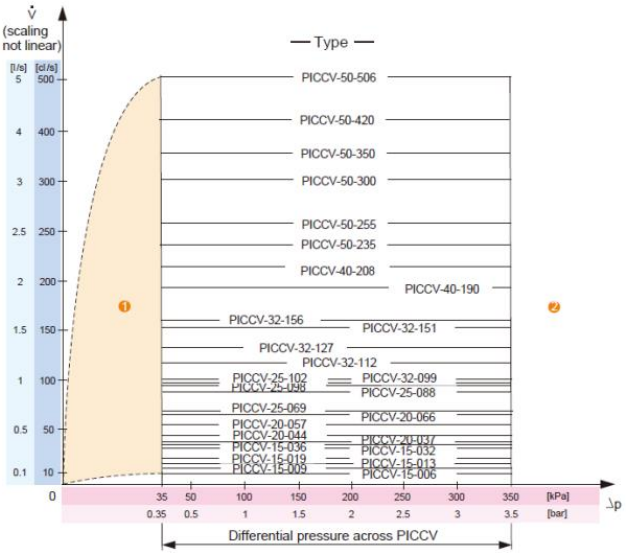
Characterised control valves

Product range	Valves	Actuators	Applications
	Internal thread Stainless Steel 316: • R2..AH (2-way) Nickel Plated Brass: • R2..AC (2-way) • R3..AC (3-way)	• 24 V or 230 V Nominal Voltage • On/Off, 3-point, Modulating control DN15..50 • Rotary actuators: TR, LR, NR, SR series • With emergency control function: TRF, LRF, NRF, SRF series	2-way Valve Cold and hot water : • Nominal diamters DN15..50 • Allowed pressure [kPa]: 2500 3-way Valve Cold and hot water : • Nominal diamters DN15..25 • Allowed pressure [kPa]: 4100 • Nominal diamters DN32..50 • Allowed pressure [kPa]: 2700
	Flange GG25 Polyester coated : • R6..AO(2-way)	DN65..150 • Rotary actuators: SR-5, GR-5 series • With emergency control function: SRF-5, GRK-5 series	Cold and hot water : • Nominal diamters DN65..150 • Allowed pressure [kPa]: 1600

PRESSURE INDEPENDENT CHARACTERISED CONTROL VALVE (PICCV)

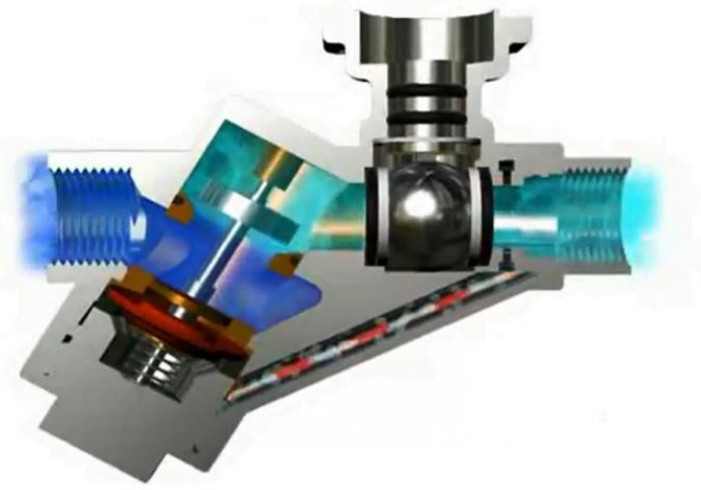
The Pressure Independent Characterized Control Valve (PICCV) combines a differential pressure regulator with a 2-way control valve to supply a specific flow for each degree of ball opening - regardless of system pressure fluctuations. The valve performs the fucntion of a balancing valve and control valve in one unit. Therefore, the flow characteistic and operation of the valve is not distorted in the system.

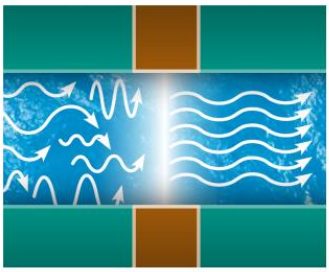




How It Works

As flow passes the vavle, a uniquely designed pressure regulator moves according to the change in pressure above and below it. The regulator assembly adjusts to the diffrential pressure increasing and decreasing the orifice so the diffrential pressure across the ball stays constat. The valve maintains a constant exiting flow despite any and all changes in system activity, including changes in demand, system redesign, and virtually any occurance that results in pressure variation.



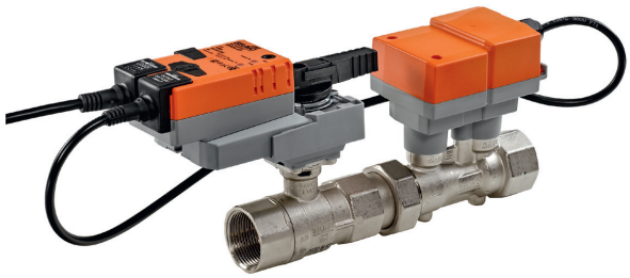


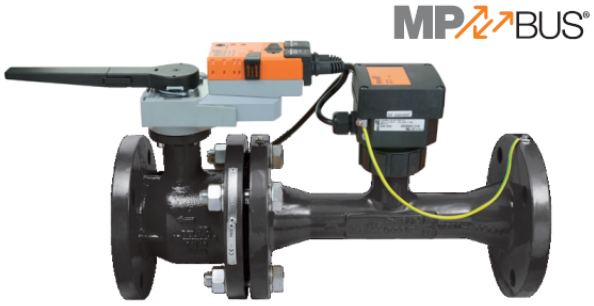
Pressure independent characterised control valve (PICCV)

Product range	Valves	Actuators	Applications
	Internal thread: • PICCV.. (2-way)	• Rotary actuators: TR,LR,NR,SR series • With emergency control function: TRF, LRF, NRF(D), SRF series • 24 V or 230 V Nominal Voltage • On/Off, 3-point, Modulating control	Balancing, controlling, and shutting with one valve: • Flow Vmax [ls]: 0.04 .. 5.5 • Nominal diameters DN15..50 • Allowed pressure [kPa]: 1600

ELECTRONIC PRESSURE INDEPENDENT VALVE

Belimo pressure independent control valve is the kind of valve that will supply a specific flow according to the control signal from actuators regardless of pressure variations in a system. It can balance the dynamic system automatically and achive a constant flow volume. Pressure changes of water system is an adverse external disturbance to the temperature adjustment of overload area. Belimo pressure indepent control valve absorbs all pressure changes and improve the control accuracy of flow and temperature in HVAC system.





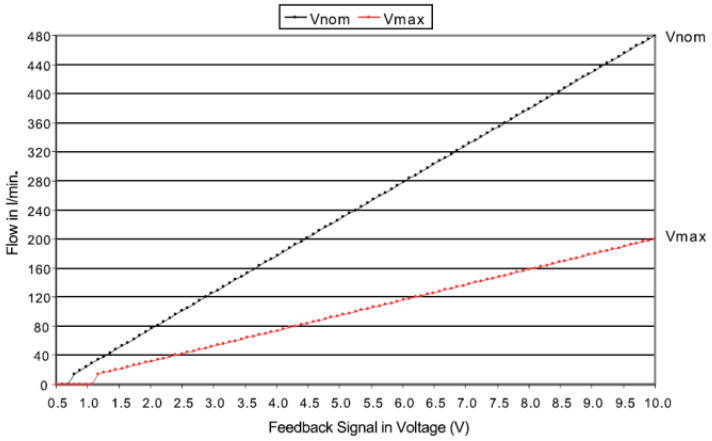
Technical Data

Mode of operation

The Electronic Pressure Independent Valve, EPIV, consists of an Electromagnetic flow sensing element, a Characterised Control Ball Valve, and a modulating type Rotary Actuator with MP Bus technology. The Control Valve is motorised by the actuator according to the input signal, while fine tuning is based on the comparison between the actual and the requested flow by the flow-sensing electronic. As a result, constant flow is achieved independent of system pressure changes or other tolerances.

Flow Reading by Feedback (U5)

The actual flow can be read out froom feedback signal pin 5 (U5)



Product Features

Equal-percentage characteristic

Equal-percentage characteristic of the flow ensured by the integrated characterising disk, and algorithm inside actuator.

Constant flow volume V

Constant flow volume V with various differential pressure up to 340kPa, thanks to the electronic flow sensor. A valve authority of is attained, regardless of differential pressure variations across the valve. Even in the part-load range, the flow rate remains constant, and the valve compensates the extra differential pressure.

Manual operation by lever

Manual operation by lever after disengaging the gearing latch on the SRU.. Rotary Actuator

Electronic Pressure Independent Valves

Product range	Valves	Actuators	Applications
	Internal thread: • EP..R+MP (2-way)	Integrated actuator	Balancing, measuring, controlling and shutting with one valve. • Flow Vmax [l/s]: 0.11...4.8 • Nominal diamters DN 15..50 • Allowed pressure [kPa]: 1600
	Flange: • P6..W..E-MP (2-way)	Integrated actuator	Balancing, measuring, controlling and shutting with one valve. • Flow Vmax [l/s]: 3.6...45 • Nominal diamters DN 65..150 • Allowed pressure [kPa]: 1600

BELIMO ENERGY VALVE

The Energy Valve combines ALL of the following components:

- Belimo CCV (Characterised Control Valve) and actuator.
- Electromagnetic flow sensor.
- Advanced control options including Belimo Delta T Manager.• Supply and return water temperature sensors, for energy management.
- BACnet MS/TP or BACnet IP network communication.

The Energy Valve is a pressure independent valve that optimises, documents and proves water coil performance. The Energy Valve is a two way pressure independent valve using the Electronic Pressure Independent Valve (EPIV) platform that measures the coil energy using an embedded electromagnetic flow sensor, water supply and return temperature sensors.
The Energy Valve uses the Belimo Delta T ManagerTM algorithm that monitors the coil performance and optimises the available energy of the coil. The Energy Valve has standard analog signal and feedback wiring and communicates data to the DDC system via BACnet Protocol. The actuator stores all the coil performance data such as Delta T and energy usage. All the coil performance data, stored trends

One solution, so many benefits!

- **Energy Monitoring.** New Energy Valve can provide Delta T, Flow and Energy information with no difficulties. All data can be sent to BMS through BACnet IP or MS/TP, making energy monitoring an easy job from now on.
- **Combat Low Delta T.** The risk of Low Delta T (the most common culprit of major system inefficiencies) is dramatically reduced or eliminated.
- **Enhanced Energy Optimisation.** Owners capitalise on optimisation strategies such as variable flow pumping without risking occupant comfort.
- **Improved Commissioning.** Start-up commissioning as well as re-commissioning is greatly simplified.
- **Better System Maintenance.** Operators are much more informed about coil performance and thus better able to schedule preventive maintenance.
- **More Effective Control.** Engineers are able to implement more advanced control strategies by taking advantage of the data logging provided at individual coils.
- **Smaller Equipment.** Buildings are able to meet comfort demand with smaller, less expensive piping and equipment.

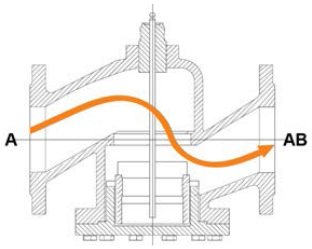
Product range	Valves	Actuators	Applications
	Internal thread: (Belimo Energy Valve) • EP..R+BAC (2-way)	• Actuator with monitoring and recording function integrated • Delta-T Manager • Power control • Power limitation *Available from the 2nd quarter of 2014*	Balancing, measuring, controlling and shutting with one valve. • Flow Vmax [l/s]: 0.11...4.8 • Nominal diamters DN 15..50 • Allowed pressure [kPa]: 1600
	Flange: (Belimo Energy Valve) • P6..W..E-MP (2-way)	• Actuator with monitoring and recording function integrated • Delta-T Manager • Power control • Power limitation	Balancing, measuring, controlling and shutting with one valve. • Flow Vmax [l/s]: 3.6...45 • Nominal diamters DN 65..150 • Allowed pressure [kPa]: 1600

GLOBE VALVE & STEAM VALVE

The New Globe Valve Actuators

Based on the technology that has already proven itself in rotary actuators a million times over, Belimo is now bringing a new generation of globe valve actuators to the market to complete the comprehensive standarised actuator concept. To further enhance the field of application, the entire product range has been expanded to a power spectrum of 1000 to 4500N naturally to the usual Belimo quality standards. The compact design permits installation in stationary heating, ventilation and air conditioning systems where space is restricted. The new range is characterised by simple and intuitive handling, from mechanical connection to adjusting parameters.

Balancing Core Structure



When valve is fully closed, differential pressure increases gradually. A small amount of water will sneak into the seat through a tiny hole. This allows pressure within the seat to assimilate with the inlet pressure. Pressure load on seat will be minimised. Therefore, high close-off pressure can be achieved.
Inlet pressure = A, outlet pressure = AB

Globe valves

Product range	Valves	Actuators	Applications
	Internal thread: • H2..X-S (2-way) • H3..X-S (3-way)	• Globe valve actuators without emergency control function: NV (1000 N, 20 mm) SV (1500 N, 20 mm) EV (2500 N, 40 mm) RV (4500 N, 40 mm) • Globe valve actuators with emergency control function: NVK (1000 N, 20 mm) AVK (2000 N, 32 mm)	Cold and hot water: • Nominal diameters DN 15..50 • Allowed pressure [kPa]: 2500
	Flange: • H6..W-SP (2-way) • H7..W-SP (3-way) • H7..W-D (3-way)* *Diverting only application		Cold and hot water: • Nominal diameters DN 65..2500 • Allowed pressure [kPa]: 1600

Universal retrofit globe valves actuators

Product range	Valves	Actuators	Applications
	For globe valves from various manufacturers: • Johnson Controls • Honeywell • TAC • Siemens • Invensys • Danfoss • etc	Universal globe valve actuators without emergency control function: • NV..A..-RE (1000 N, 20mm) • SV..A..-RE (1500 N, 20mm) Universal globe valve actuators with emergency control function: • NVK..A..-RE (1000 N, 20mm)	Motorisation of globe valves with nomonal diamters DN15..150

Steam valves

Product range	Valves	Actuators	Applications
	Flange: • R6..AS (2-way)	Rotary actuators with emergency control function: • LFH (DN 15 .. 25) • SRFU (DN 40..80)	Steam: • Nominal diamters DN 15..80 • Allowed pressure [kPa]: 1600

MOTORIZED BUTTERFLY VALVE

Applications

Belimo has developed a wide range of Butterfly Valves and Actuators meeting all specific and stringent demands of HVAC applications requiring positive shut off and control for all kinds of flow media, with enormous efforts and continual innovation. Typical applications include chiller isolations, cooling tower isolations, large air handling units, boilers, change-over systems, water and ice storage systems and bypass control applications

Features & Benefits

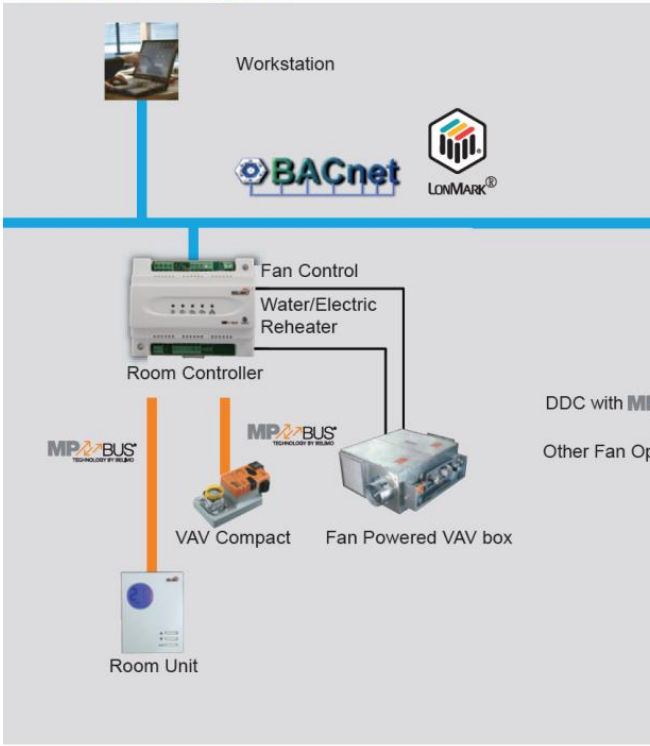
- Double-D fit of stem connecting with the disc, gives a stronger and more compact structure. It can produce self-adjusting centring due to rotary movement, thanks to a unique design. It can also optimise and minimise interference-fit, resulting in low operation torque.
- Innovative double supports of trench seat without back can ensure positive assembly among valve body, valve seat disc and can keep rotation of disc consistently running smoothly, minimising compressional deformation and seat brushing off.
- Advanced ball profile of disc with narrow sealing belt can provide complete isolation of HVAC flow media from valve body by double-prevention and can eliminate internal leakage and reduce seat tearing or fatiguing due to bunching. The primary seal is achieved by an interference-fit of the molded seat flat with the disc hub. The secondary seal is created when the stem diameteris greater than the internal stem hole.
- The nylon coated disc features excellent anti-corrosion and low friction coefficient with exact casting, precision machining and advanced coated process which give a smooth rotation and close disc-to-seat relationship. The stainless steel disc is rust proofdue to the hand polishing process which can decrease operation torque for the actuator and withstand higher HVAC flow mediatemperature.
- Three anti-corrosion RPTFE bushings (made of Reinforced PolyTetraFluoroEthylene), EPDM O ring (made of Ethylene Propylene Diene Monomer) and stainless steel stem circlip completely isolate flow media from top flange, synchronise rotation between stem and disc, decrease operation torque and ensure extreme long life cycle.
- Meet stringent and extensive HVAC flow media variations with wide and circular arc flange sealing surface. This can be suitable for all flange connection standards as ISO, JIS, AS without additional gasket in Asia Pacific.

Motorized Butterfly Valve

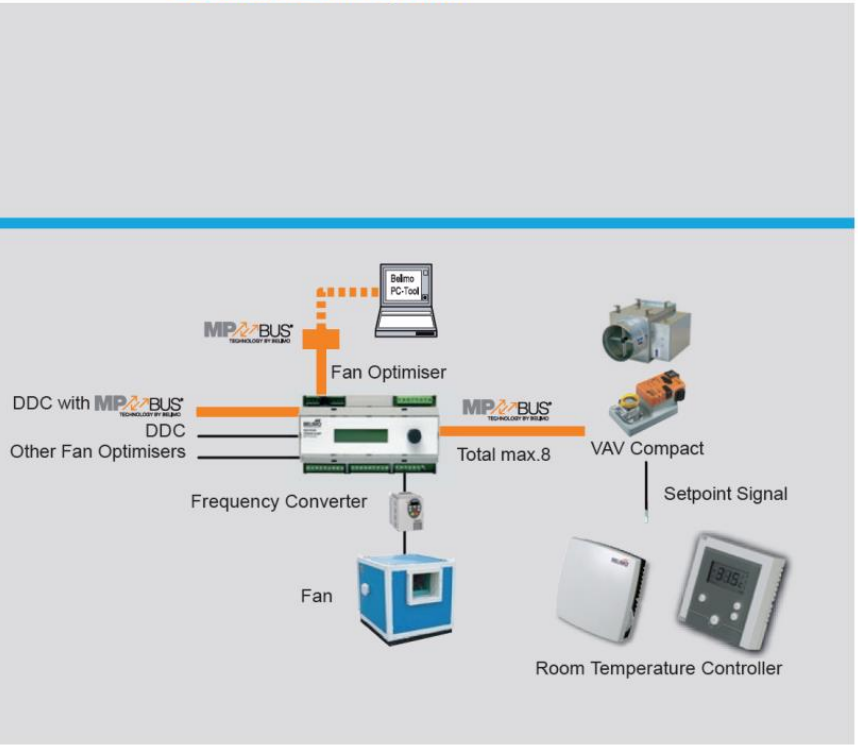
Product range	Valves	Actuators	Applications
	General water application: • BU6.. (S) Wafer type • BU6.. L (S) Lug Type	• 24 V or 230 V Nominal Voltage • On/Off, 3-point, Modulating control • Rotary actuators: SR-5, GR-5, GR-7, DGR-7, DR..G-7, SY series • With emergency control function: SRF-5, GRK-5 series • Manual Operator: ZD6 series	Cold and hot water • Nominal diameters DN 25..500 • Nominal pressure [kPa] : 1600
	Sea water application • D6.. AB (S)		Sea water • Nominal diameters DN 50..800 • Nominal pressure [kPa] : 1600
	Large size pipe application • D6.. D (S) Lug Type		Large pipe size • Nominal diameters DN 60..1200 • Nominal pressure [kPa] : 1600
	High close-off pressuree application • D6.. H Lug Type		High close-off pressure • Nominal diameters DN 50..500 • Nominal pressure [kPa] : 2500

VAV & FCU CONTROL

Network VAV system



Standalone VAV system



Variable Air Volume system

Product range	Types / performance classes	Specifications	Applications
	Rotary actuators: • LMV-D3 (5 Nm) • NMV-D3 (10 Nm) Room Control Module • T24-V02 Room Unit • T24-MP Room Temperature Sensor • TG-R10000 Room Temperature Controller • T24-DM1 (Digital) • C24 (Analog)	• Compact unit with sensor, controller and actuator • On-site operation with ZTH • Commisioning by means of PC-Tool • Integration in MP-Bus with Modbus, or LonWorks • Integration in MP-Bus with BACNet, or LonWorks with Room Control Module	Control of VAV and CAV units in building

Fan Coil Unit system

Product range	Types / performance classes	Specifications	Applications
	Fan Coil Valve • FRU + RB (Non spring) • Z..S (Spring Return) Room Thermostat • CFU-D221 (Digital) • CFU-M211 (Analog)	• DN15/20/25 • 2-way, and 3-way • 24 V or 230 V Nominal Voltage • 3 Fan Speed Control • Internal temperature sensor	Control of Fan Coil Unit in building

PERIPHERALS

Energy Meter

Product range	Type / performace classes	Pipe specifications	Sensor specifications
	Thermal Energy Meter Package • Superstatic 440 Flow Sensor + Supecal 531 Integrator + Temperature Sensor	Superstatic 440 Flow Sensor Brass Pipe • Internal threaded DN20..50 • Flange connection DN40 Stainless Steel Pipe • Flange connection DN50..250 Coated Steel Steel Pipe • Flange connection DN350..500	• Nominal pressure PN16 • 24 V Nominal Voltage • Built in M-bus module • Pt500 sensor • EN 1434 Class 2
	Compact Thermal Energy Meter • Supercal 449 • Supercal 539	Internal Threaded • Brass pipe DN 20..25	• Nominal pressure PN16 • 24 V Nominal Voltage • Built in M-bus module Supercal 449 • Pt500 sensor • EN 1434 Class 2 Supercal 539 • Pt10K sensor • EN 1434 Class 3

Sensor Products

Leakage Sensor
LS02

Outdoor Humidity Sensor
LC-F(T)A54

Room Air Quality Sensor
LW04

Ceiling Motion Sensor
RDI

Duct Air Quality Sensor
LK

Duct Humidity Sensor
LCN-FTK

Room Light Sensor
Li04

Air Velocity Transmitter
AVT

Room Temperature Sensor with LCD
WRF04LCD

Outdoor Temperature Sensor
AGS54

Pressure Transmitter
DLM

Diffrential Pressure Transmitter
DPT-R8

Diffrential Pressure Transmitter
DPL

Screw-in Temperature Sensor
SFK02

Room Humidity Sensor
FTW04

Cable Temperature Sensor
TF25

Diffrential Pressure Transmitter
DPT-R8

Condensation Detector
WK01

Electronic Diffrential Switch
DPI

Duct CO2 Sensor
LK CO2

Diffrential Pressure Switch
PS

Screw-in Temperature Sensor
SFK01

Room CO2 Sensor
WRF04 CO2

Thermowell

Room Operating Panel
WRF04

Ceiling Multi Sensor
MDS

Surface Motion Sensor
WRF04I

Frost Protection Thermostat
TFR

FIRE &
SMOKE

DAMPER

PICCV
EPIV
EV

CCV

BUTTERFLY
VALVE

Innovation, Quality and Consultancy:

A partnership for motorising HVAC actuators

- 5 year warranty
- On site around the globe
- A complete range of products from one source
- Tested quality
- Short delivery times
- Comprehensive support

Our Local Partner

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