

Innovative solutions for water applications:

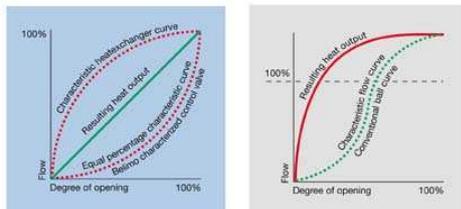
## Belimo adds control to its new ball valves

The inventor of the direct-coupled damper motor and world-leader in air damper actuators has caused yet another stir with its new motorized valves for water control in HVAC systems. Thanks to the development of a special characterizing disk this is the first time that the market has seen a range of ball valves offering full control features.

Unlike the USA, for example, Europe has not previously made much use of the ball valve for control purposes despite the fact that this type of valve has many advantages over the short-lift globe valve that is much more widely used for such applications. The reason, as far as the European situation is concerned, has been the inadequate control stability that could be obtained from conventional ball valves.

### Distorted characteristic curves

In order to achieve a high degree of control stability it is essential for a control device to have an equal-percentage characteristic that will provide a linear relationship between heat output and the amount of opening of the control valve (otherwise known as the system characteristic). Under standard test conditions a conventional ball valve exhibits an S-characteristic. However, once installed in a plant this characteristic becomes severely distorted due to the fact that ball valves have an extremely high flow characteristic ( $k_{vs}$  value) in relation to their nominal diameter.



### Legend:

**Characteristic curve of a Belimo ball valve and of conventional ball valve**

### A characterizing disk is the answer

Belimo has succeeded in solving the problem of the distorted characteristic with its new type of control ball valve incorporating a specially developed, patented characterizing disk which produces an equal-percentage valve characteristic. The flow is regulated very precisely by means of a through-hole in the ball and a V-shaped opening in the characterizing disk. Thus, the  $k_{vs}$  value is reduced and becomes comparable with that of a lift-type globe valve of identical nominal diameter. Especially in the initial range of opening the flow through a Belimo control valve increases very slowly and uniformly indeed. This produces better part-load characteristics, better control stability and optimum energy consumption.



**Legend:**

***The new Belimo control ball valve with equal-percentage characteristic***

**A full-performance control device**

Belimo control ball valves are available in 2-way and 3-way versions in the usual range of nominal pipe diameters from DN 15 to 50 mm. This means that no additional pipe adapters are needed so not only the design is greatly simplified but also the task of installation. For each nominal diameter there are versions available with a variety of different  $k_{vs}$  values.

Belimo control ball valves are able to fulfil all the demands that are normally made on full-performance control devices:

- Suitable for both hot and cold water applications within the normal range of European limits (maximum medium temperatures from +5 °C to +100°C).
- Suitable for all the usual water circuit designs popular in Europe (e.g. throttling and mixing applications).

A maximum permitted pressure of 1600 kPa (16 bar) allows them to be used in both single-storey buildings and high-rise blocks.

- The reduced  $k_{vs}$  value via the bypass of 3-way valves makes the use of a balancing throttle superfluous.
- A constant flow rate of water across the whole load range of a system's pumps in mixing and diverter circuits thanks to the reduced  $k_{vs}$  value via the bypass.
- The high maximum permitted differential pressure of 2 bar allows their use in conjunction with variable-speed pumps in large distribution networks.

Its first-class control characteristics make the Belimo control ball valve a true and, most of all, cost-effective alternative to the lift-type globe valve for use in HVAC water circuits - whether it be for water/air heat exchangers with thermal ratings from 1 to 500 kW, heating systems with several heater batteries, chilled ceilings, manifold systems, etc.

**The right power whatever the application**

The range of motorized actuators offered for use with Belimo ball valves also leaves little to be desired in terms of engineering design and functionality. Depending on the particular application there are two separate families of rotary actuators to choose from: the compact Type LR... rotary actuator developed from the well-proven LM... damper actuator and the powerful Type NR... .



**Legend:**

**The rotary actuators type LR and NR ensure the right power rating whatever the application**

The choice of actuator type depends primarily on what kind of control system and what kind of flow characteristics are needed to produce an efficient overall system. This is why, for both families of types, there are different versions for the modulating control and Open/Close control of conventional ball valves with shut-off or changeover functions. The Type NR... actuator is also available with 3-point control.

**Total solutions**

In order to ensure a properly co-ordinated and functional combination of control ball valve and actuator, the two are always supplied together. The extensive range of different types available means that the best possible combination of valve and actuator can always be selected to suit a particular application. The example below illustrates the most important points to consider when placing an order:

<b>Designation:</b>	<b>Typically: R322/NR24-3</b>
<b>Valve type:</b> <i>version, size, flow characteristic</i>	<i>3-way control ball valve PN16, female screw 1" BSP, DN 25, <math>k_{vs}</math> 6.3</i>
<b>Actuator:</b> <i>power supply, type of control, running time</i>	<i>Rotary actuator, AC 24 V, 3-point, running time 140 s</i>
<b>As supplied:</b>	<i>Valve and actuator supplied separately</i>

Depending on the needs of performance and installation, the choice to be made is between a fully-assembled unit supplied directly from the factory and a ball valve and actuator supplied as separate items. The actuator can be mounted directly on the square neck of the ball valve without the need for any special adapters and there are also 4 alternative mounting positions to choose from depending on the amount of space available and the need for easy operation. The valves have a specially shaped stem to which the actuator can be fixed by means of a central screw to produce a secure form-fit attachment.

**Total actuator solutions for air and water**

Now that Belimo is producing valves too, the company is increasingly becoming a supplier of total solutions in the field of actuator applications for the HVAC industry. This is an ideal development because so many customers these days are looking for "one-stop shopping" as well as seeking to apply a uniform product and application philosophy throughout their plants and systems.

Apart from motorized control ball valves and a supplementary range of conventional Open/Close ball valves, Belimo is now also marketing a carefully co-ordinated range of motorized lift-type globe valves in nominal diameters from DN 15 to 150 mm. Perhaps the outstanding feature of all the company's motorized products is the way in which good existing basic technology has been combined with innovative ideas.

Get more information from:

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