



The project team (from left to right): Thomas Winkler, (TPA/VT), ZDF; Ralph Schuster, Frankfurt Area Sales Manager, Belimo; Ralf Baumann, Technical Planning and Design/Facility Technology, ZDF; Udo Ruf, external project superintendent

**To be continued...**

ZDF plans to replace the single room control in its building installation block at its premises in Mainz as the next phase of the upgrade. Belimo control ball valves will also be used here. Thus continues the success story «Investment in a better climate».



Countless Belimo HVAC valve actuators are already in use throughout the entire ZDF complex, including around 200 smoke protection valve actuators

## Revolutionary though already proven: the control ball valve from Belimo

**More than just an alternative to the conventional globe valve**

The motorized control ball valve from Belimo stands out due to its precise control properties and offers the same percentage valve characteristics for warm and cold water management in air conditioning and heating systems. Although the control ball valve was a revolutionary innovation when Belimo launched it on the market only a short time ago, it has already been tried and tested in countless applications. It is easy to install and extremely economical to operate.

The Belimo product range includes compact LR rotary actuators, which are specially designed for the motorization requirements of ball valves up to DN32, and high-performance NR rotary actuators for reliable motorization of control ball valves and open/close ball valves up to DN50.

The following equipment was selected for the upgrade of the single room control at the ZDF high-rise building: Belimo NRD24-3 rotary actuator for a rated voltage of 24 V AC

**There's nothing like it: the characterizing disk for the precise control of water cycles**

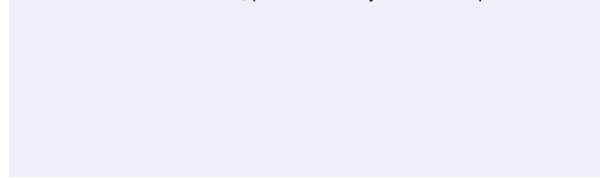
Conventional ball valves exhibit an S-shaped valve characteristic which becomes radically deformed during operation, however, because the flow characteristic of the ball valve is extremely high compared with its nominal width. The Belimo control ball valve combines proven ball valve technology with the innovative new development of the characterizing disk, which features an actuator with the same percentage valve characteristic. The result is a linear heat emission response relative to the degree of opening, and consequently high control stability.

**The Belimo Group**

Belimo is a worldwide leading supplier for innovative electrical drive solutions in the field of heating, ventilation and air conditioning systems. Their headquarters are in Hinwil, Switzerland. The Group achieved a sales turnover of around CHF 240 million in fiscal year 2003 and employs a workforce of about 700. Belimo is represented in 60 countries worldwide. For further information on the company and its products, visit the web site at: [www.belimo.co.uk](http://www.belimo.co.uk)

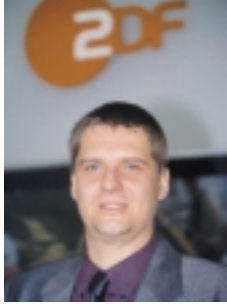


For more detailed information, please contact your Belimo representative:



Retrofit at ZDF using motorized control ball valves from Belimo

## Investment in a better climate



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*Ralf Baumann is responsible for building management systems in the ZDF department Central Technical*

*Systems (TZA), Technical Planning and Design (TPA). His duties include the planning and implementation of the retrofit for the single room control in the ZDF editorial and administrative high-rise building. The replacement of the old pneumatic valves by the new motorized control ball valves from Belimo was initiated, planned and implemented in a team which also included the external project superintendent, Udo Ruf, and the ZDF planning engineer for heating, ventilation and sanitation systems. The conversion was carried out during normal building operation.*

*Ralf Baumann: «The whole project requires a great deal of psychological diplomacy – on two levels: On the one hand, the colleagues' work should not be disturbed by the conversion if at all possible. And on the other hand, they should be convinced that the project is necessary and beneficial, despite the fact that the externally visible changes to the system are minimal. The results are really only tangible after completion of the work: the work environment is simply more comfortable.*

*Immediately after the conversion, very positive feedback came from the employees regarding the comfortable environment in the offices. This is due to the new control, which is more accurate than the old system and which is also more efficient thanks to reduced losses. The Belimo control ball valves are working perfectly. We can therefore say even now, shortly after completion of the entire project, that the overall response has been very positive and highly satisfactory.*

*Although other HVAC actuators from Belimo have been installed at ZDF by other companies, this first direct cooperation with Belimo proved to be very constructive and pleasant. I would recommend Belimo and their valve actuators for heating, ventilation and air conditioning very highly.»*



**Pneumatic sequence valves were used for the single room control of the 850 rooms in the ZDF high-rise building in Mainz, Germany for 30 years. An increase in the incidence of serious problems with the old valves pointed to only one solution: the valves had to be replaced. Following careful examination and comparison of other valves on the market, ZDF (Second German Television) decided to opt for motorized control ball valves from Belimo. These were seen to be the best technical solution and the most sustainable economic solution.**

When the valves of the single room controls in the induction heating/cooling system need to be replaced in the 16-story ZDF building, exact planning and extremely well-structured procedures are required. Belimo was closely involved in the process, as were planners, a project superintendent and fitters.

### Problems instead of a pleasant climate

The pneumatic sequence valves which were installed when the ZDF editorial and administrative high-rise building was built in 1973 had controlled the heating and cooling capacities of the induction plates in each individual room ever since. Because this control equipment was out-of-date in the meantime and wasted a lot of energy, it created problems instead of a pleasant climate.

The first problem: precision. The old valves regulated very inaccurately. The slightest changes in the settings caused huge changes in temperature and a number of valves were not operating at all any more. A certain amount of heat exchange was also

unavoidable due to the simultaneous flow of cold and warm water through a common valve body. The consequence: high energy losses in each individual induction plate when cold and warm water were flowing through them at the same time. «The negative economic and ecological effects were multiplied by the large temperature differences between the north and south sides of the exposed high-rise building, which meant that heating and cooling had to be in operation almost throughout the year», says Thomas Winkler from Technical Planning and Design in the Facility Technology department at ZDF.

The second and really the main problem: reliability of the pneumatic controllers. Increasing numbers of sequence valves were failing due to ageing. Previous repairs had been costly, as the valves for this technology are no longer available.

Standard valves with linear actuators which were installed on a trial basis in a test room proved not to be sufficiently reliable, as the valve seat jammed after only a short time. Particles deposited by the heating and cooling water were identified as the reason for this failure.

Because the presence of such particles can never be excluded in water systems, the use of standard valves was out of the question.

## Stringent requirements

The ZDF facility technology officers knew they had to find a small valve which could exclude such problems.

Their specifications:

- No more valve jamming
- Insensitivity to dirt
- Robust but compact design
- Separate valves for each medium with appropriate kvs values

Ralf Baumann, the responsible planning engineer at Technical Planning and Design in the Facility Technology department at ZDF, adds: «We knew from the outset that the induction plates could not be replaced, as the amount of work involved and the costs would be prohibitive.» This is understandable considering 850 rooms had to be upgraded. Furthermore, the induction plates which were installed thirty years ago are fully functional and can still be purchased today if necessary. ZDF was on the lookout for a solution which was both economical and sustainable.

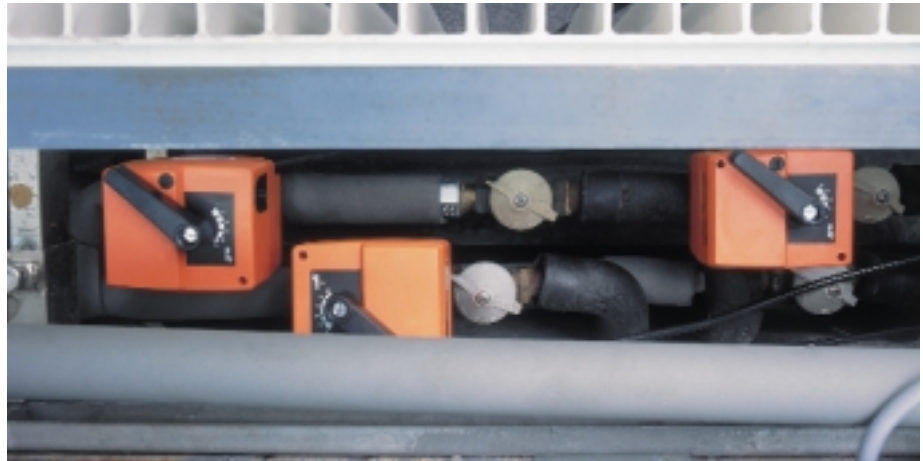


Disturbances for employees are kept to a minimum: The workstations are prepared for the upgrade of the single room control to be carried out within half a day

## Conventional valves or control ball valves?

The retrofit of the single room control in the ZDF high-rise building still entailed a huge investment. Needless to say, the prescribed planning procedures had to be followed before the project was approved and could be initiated. Many different concepts were tested in the planning and evaluation phase and various suppliers were involved. However, tests quickly showed – after only a few weeks in some cases – that many were not immune to failures caused by valve jamming and could not therefore ensure the required level of reliability.

The motorized control ball valves from the Swiss supplier Belimo - an innovation first presented to the specialist public at the ISH in 1999 - were also included in the trials. Ralf Baumann, project officer at ZDF, soon came to this conclusion: «I could see that the control ball valve technology presented a real alternative to conventional globe valves. At first glance, they had only one drawback: the innovative Belimo control ball valves are slightly



Compact, robust and reliable: the new motorized control ball valves from Belimo replace conventional pneumatic globe valves

more expensive than conventional globe valves.» However, the calculations connected with their advantages, e.g. insensitivity to dirt, control accuracy and reliability, quickly outweighed this drawback. Baumann continues: «The decision-making phase involved weighing the pros and cons of conventional globe valve technology and the new control ball valve technology, of a lower cost of purchase versus a more sustainable economic solution. With around 10,000 valves to be installed, we had to be sure that they would perform their job reliably.»

## Decision in favor of Belimo control ball valves

Soon after their introduction, specialists were already ascribing the highest levels of operational safety and economy to the new control ball valves from Belimo. The same actuators had already been used at the college of music in Wiesbaden, for example. However, Ralf Baumann was not taking any chances: «We fitted a test room with Belimo products and monitored their performance for a period of six months. The test conditions were especially demanding: a corner room facing south with lots of windows, PCs and other equipment with high heat build-up levels.» The results were convincing: the motorized control ball valves from Belimo which had been installed on a trial basis were satisfactory in every respect. We therefore decided to opt for the control ball valve technology from Belimo.

## The psychology of the retrofit

Work started on the upgrade of the single room control in the middle of 2002. Office by office, floor by floor. The specification and aim of the conversion project was to cause as little disturbance as possible to the employees during work time. The amount of time during which they were disturbed had to be kept as short as possible, i.e. a maximum of four to six hours per room! The project superintendent, Udo Ruf, emphasizes: «Resolute yet sympathetic action was required, as the personal environment of each individual employee was affected.» Office furniture, equipment, documents and utensils had to be cleared away from the window areas. The project was implemented in two phases:

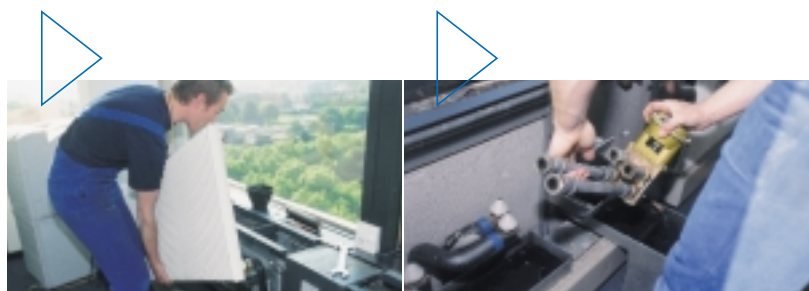
Preparation:

- General information to all employees in advance
- Continued information and motivation (leaflet for each employee)
- Personal talks with supervisors and employees conducted by project officers
- Advance, to-schedule room reservation
- Cable laying over the weekends

Upgrade procedure for each room:

- Dismantling, cleaning and flushing of the induction plates
- Removal of the old valve units
- Installation of new preassembled control ball valves
- Cabling of components
- Replacement of induction plates
- Testing and startup

A matter of three to four hours for each office: dismantling of the induction plates and the old valves, cleaning, installation of the control ball valves, replacement of the induction plates, installation of the control, function test



## 40 years of ZDF

**ZDF celebrated its 40th anniversary on 1st April 2003. The television broadcasting station on the Lerchenberg in Mainz has become synonymous with European quality television. With around a 15% share in the total market, ZDF belongs to the «big three» in Germany.**

The station was originally housed in a barracks in Eschborn near Frankfurt and moved to Mainz-Lerchenberg in 1974. Other buildings containing conference and training facilities, the editorial building, the workshop building and the two-story building installation block are located on the same premises next to the dominant high-rise building of the ZDF broadcasting center. Current affairs programs are produced live in three large and two small television studios in the broadcasting building. The headquarters of the ZDF administration for European satellite stations is located in broadcasting center 2, with stations such as 3sat, ARTE, ZDF Theaterkanal and ZDFvision.

ZDF can boast major achievements in these 40 years: Who in the German-speaking world is not familiar with programs such as «heute» (news program), the «ZDF-Sportstudio», the crime watch program «AktENZEICHEN XY ... ungelöst», the police drama «Derrick», the game show «Wetten, dass..?» or, indeed, the most famous stars of the ZDF, the six «Mainzel-



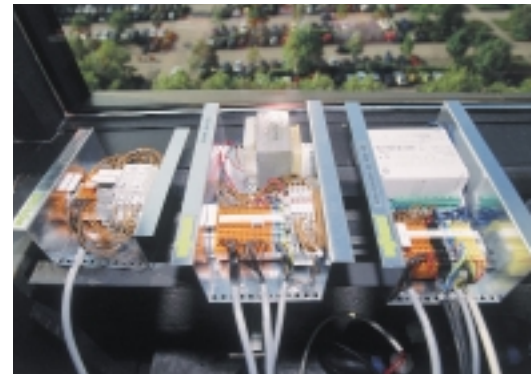
männchen» and their adventures during the commercials. In the field of technology, ZDF has also promoted innovations from the start: it launched the first German color television in 1967, for example.

ZDF is one of the largest enterprises in the Rhine-Main region with around 3600 permanent employees. In addition to this broadcasting center, ZDF runs 18 regional studios within Germany as well as several studios abroad. To find out more about ZDF, visit their web site at: [www.zdf.de](http://www.zdf.de)

### 16 floors, 850 rooms, 10,000 control ball valves

The ZDF broadcasting center on the Lerchenberg in Mainz can be seen from quite a distance: the 16-story editorial and administrative building is 70 meters high, 125 meters long and 19 meters wide. The single room control for the air conditioning systems is currently being upgraded in this building, which went into operation in 1974: the old pneumatic control valves are being replaced by around 10,000 motorized control ball valves from Belimo. This project is both complex and demanding, as the day-to-day operations must not be disturbed if at all possible.

Perfectly coordinated teamwork on the part of internal and external specialists in the fields of building construction, electrical engineering, installation and cleaning was absolutely indispensable. Not to mention the psychological approach: «Most employees were extremely understanding and only very few queries had to be answered. Not only was our reputation within the company important, we also had to proceed efficiently and according to plan», says Ralf Baumann when describing his approach. The extensive information and preparation procedures proved to be worthwhile. Thomas Winkler informs us that the motorized control ball valves from Belimo have been operating perfectly and accurately since their installation. The complete retrofit in the ZDF high-rise building was completed in the autumn of 2003 as planned.



ZDF in-house development: easy-to-position control modules for one room, individual controls for each induction plate

### To sum up: A complete success

The upgrade of 850 rooms with around 10,000 motorized control ball valves without any notable problems and, more importantly, with positive feedback, can be seen as a complete success. The employees are obviously very happy with the new controls in their offices.

A second, decisive advantage of the entire retrofit procedure is energy optimization. Although no energy balance calculation has been possible as yet, Thomas Winkler from ZDF can already say without a doubt that: «Energy consumption and costs have decreased significantly, the room temperatures can be controlled much more accurately and the offices are noticeably more comfortable. This has a positive effect on the working climate and on employee performance.»



The ZDF editorial and administrative high-rise building: 850 offices are being fitted with control ball valves from Belimo

