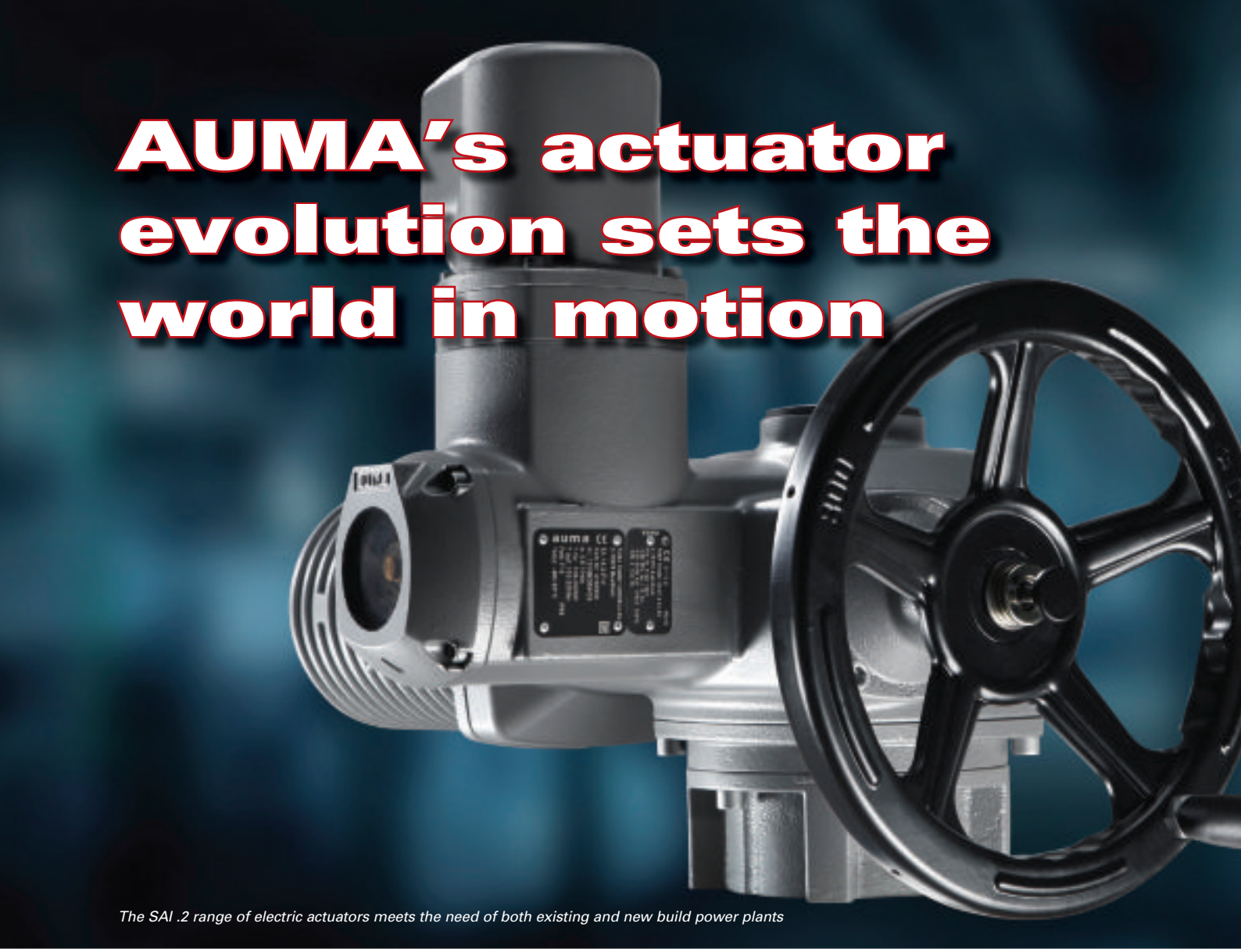
AUMA's actuator evolution sets the world in motion



The SAI .2 range of electric actuators meets the need of both existing and new build power plants

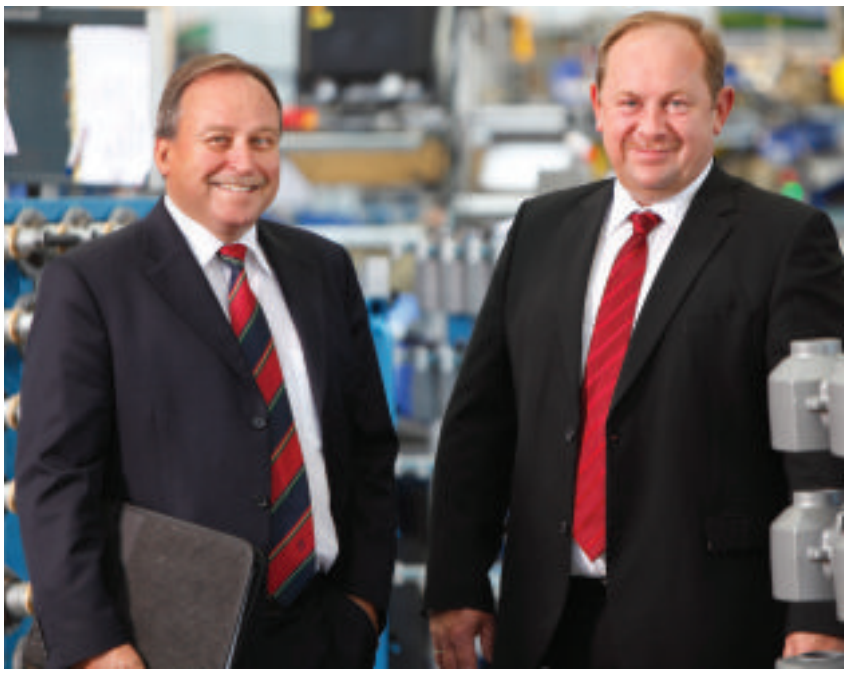
The AUMA brand is synonymous with electric actuators worldwide, and the company enjoys a solid reputation in the nuclear industry dating back over thirty years. Nuclear Exchange travelled to the company's headquarters in Muellheim, Germany, to learn about its next generation SAI .2 range of nuclear qualified actuators which promise to be a major step forward in the evolution of actuator technology. While the company has facilities and staff around the world, it is attention to detail that continues to win AUMA orders – and friends – around the globe.

By Joanne McIntyre

AUMA was founded in 1964 Mr. Werner Riester and Mr. Rudolf Dinse and remains a privately-held company. From the beginning the company's focus has been the design, manufacture and sale of electric actuators. Strong investments in the German water and wastewater industry led to rapid growth and the founding of a good relationship with the valve industry. By 1974 the first AUMA subsidiary was set up in the Netherlands; today there are 20 subsidiary companies around the world. In 1978 AUMA began developing actuators for the international nuclear industry and has since installed products in nuclear plants in twenty countries including Spain, Sweden, Finland, UK, France and Russia.

"AUMA has supplied actuators to the nuclear industry for over 30 years," explains Mr. Matthias Dinse, President and COO. "Early on we recognised that it was an excellent opportunity to enhance quality and procedures within the company due to the stringent requirements of the industry. Once the Iron Curtain fell a lot of refurbishment was carried out in nuclear power plants (NPP) in Eastern Europe and Russia. There followed a lull in the industry which finally ended with the Olkiluoto 3 project in Finland. We're proud that the AUMA group has supplied every electric actuator for inside containment, outside containment and the balance of plant for that project. We see this as recognition from the industry of our current design of nuclear actuators."

The industry decision to define new standards for the next generation of NPPs coincided with AUMAs design of its new



Mr. Henrik Newerla, Technical Managing Director (left) and Mr. Matthias Dinse, Commercial Managing Director.

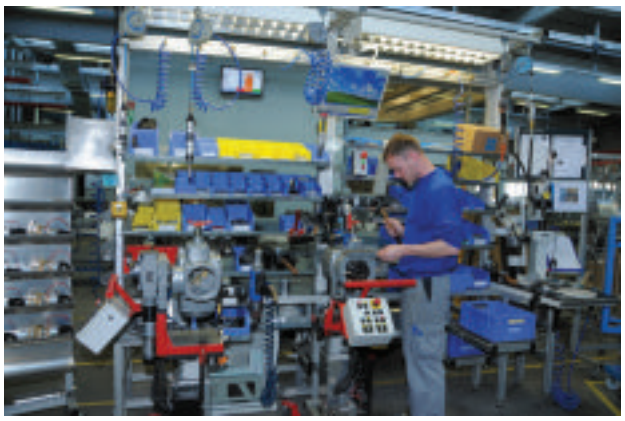
SAI .2 actuator series. "This prompted us to qualify this range for the latest IEEE standards," explains Mr. Dinse. "The nuclear industry is complex with different designs and standards around the world. As a leading actuator manufacturer we pay close attention to all these developments whether they occur in Russia, China, India, the US or Europe. This requires a lot of organizing to ensure we stay close to local developments. It's a challenge because there are constant discussions about new designs, existing designs and plant refurbishments, upgrades or lifetime extensions up to 60 years. It's also important to distinguish between the needs for new plant construction the upgrading and refurbishing of existing plants. Meeting new qualifications is a time-consuming and complicated exercise. With our new evolution SAI .2 actuator we cover all the requirements for the refurbishment of aging installations to serve existing clients, while at the same time focusing on the new designs to cover the new standards, specifications and plant designs. Ongoing product improvements help us to move ahead with new qualifications and new standards," continues Mr. Dinse. To date AUMA has sold around one million electric actuators worldwide.

Evolution of the electric actuator

The company's new range of SAI .2 electric actuators are direct successors of the proven type range SAI 6 – SAI 100, and employ the same popular modular design. The actuators are small and light weight in design, powerful and precise for positioning the valve, as well as maintenance friendly; ideal for fulfilling the demands of nuclear power plants. The range is already in production and will have completed nuclear accreditation by the end of the year 2012.

"The nuclear industry prefers to use proven designs, so the SAI .2 range is an evolution of the successful existing design, not a revolution," explains Mr. Wolfgang Ranft, Nuclear Power Applications AUMA. "The gearing and motor principles are the same, while safety features such as travel limit and torque switches, electrical connections, sealing, lubrication and magnesium free motor components are key features which have to be selected to suit the

Service life tests in the AUMA in-house R & D area.



Actuator assembly in the Muellheim plant.

special environmental conditions in NPPs. Details are important in electric actuators and we pay close attention to these."
Two key strengths of AUMA's actuators have always been their compact design and low-weight. "Compared to other brands our actuators are smaller, more compact and lighter. This offers significant advantages in terms of the seismic considerations for safety-related applications. Furthermore it's easier to replace a heavy actuator with a lighter one which is an important consideration for the existing fleet of NPPs."
What makes this new generation actuator stand out is the well-known AUMA modular design. The SAI .2 actuator meets all nuclear requirements with regards to radiation, high temperature, pressure, vibrations etc. The modular concept allows customers to benefit from the plug and socket arrangement. The customer needs to wire up only once to screw-type or crimp connectors on the plug cover, which themselves will be fitted to the actuator body. The wiring remains undisturbed but the actuator can be disconnected easily."This is a significant benefit in terms of replacing or repairing these items," explains Mr. Ranft.
"Most NPPs carry out their own maintenance and are able to very quickly repair these actuators themselves, an important consideration when time can be very critical. Alternatively our qualified service engineers will visit customers to support them during planned outages. Because the new range is an evolution of our current products, existing actuators can be rapidly and easily replaced with the new range without requiring a lot of new paperwork and approvals."
In addition to the SAI multi-turn actuators, the gearbox type range GSTI and GSI are qualified for use in safety relevant areas of nuclear plants and can be combined with the SAI multi-turn actuators to extend the application range. Consequently, AUMA is in a position to offer automation solutions for virtually all valves in the nuclear field.

Global growth, local expertise

The company has experienced a period of strong growth over the last 10 years and the renewed interest in the global nuclear industry will maintain this. "Our design, testing facilities and knowledge base is in Germany but we see strong demand coming from Russia, India, China and other areas of the world," explains Mr. Michael Herbstritt, Technical Editor.
"We work closely with clients in those areas and expect more growth there than in Europe. In Russia alone we employ more than 80 people; in China over 130 and in India we have 270 employees. Local assembly and manufacturing capabilities have been established in these countries and this is the key to our success in these areas. Our principle is "Always think global and act local," because you need local people speaking the language to succeed in those countries. In addition, different countries may require special product features and requirements which may not be applicable elsewhere. To meet these requirements it makes sense to make have local assembly facilities and manufacturing capacities to produce a local product to serve that market. Of course service is similarly unique and we gain local approvals to comply with local standards. For example in Russia we employ local specialists who are both familiar with the nuclear application and with the Russian standards. Not only does this make it easier to review documentation, they also understand the mentality and culture which makes it easier for us to meet the local requirements, standards specifications and everything involved in the local qualification of our products for the Russian industry. This philosophy is in place throughout the command chain; the Managing Director in Russia is a Russian atomic physicist."
"Interesting projects we were involved with was the refurbishment of Russian NPPs and again the key to securing that order was that we gained a local qualification. The projects were EC-supported and funded. We brought in our nuclear engineers from AUMA Russia to address the specifications, standards, and environmental features point of view; they also carried out the qualification testing. Again it came down to good relations because people will always look at MOVs as a complete unit and our good relationship with the valve industry throughout the world speaks for AUMA."
Quality service and support is essential to plant operators and AUMA has established a network of experts around the globe to meet these needs. "In addition to our centres in other countries,

High precision dimension check of actuator housing.

Mr. Wolfgang Ranft and Michael Herbstritt, Technical Editor.

AUMA manufactures the parts subject to mechanical load themselves. The machining hall is equipped with state of the art equipment.

our three service centres in Germany all provide additional qualified experts for support," explains Mr. Dinse, "with one of these service centres being specialized solely on supporting the needs of nuclear power stations and able to send technicians to the customers' site at a moments notice. A strong service team of over 80 people are on hand to provide support for our nuclear clients. This is an area where the relationships we have built with our clients over the years are so important; during planned outages our customers prefer to have the same support staff every time. They like to see familiar faces and to deal with people they know. Our relationships with our customers and the fact that most of our staff have been with us for many years is greatly appreciated. We have always stayed close to the nuclear industry and this was intensified with the purchase in recent years of GFC and Sipos Aktorik. These companies have supplied the nuclear industry with actuators for decades and together we bring a huge pool of experience and knowledge to the industry."

Working closely with valve producers

Over the decades AUMA has built up relationships with valve manufacturers around the globe, working closely with them. "Our designers and engineers talk to their counterparts in the valve companies to ensure that specifications correctly interpreted to offer the best solution to the customer," continues Mr. Dinse. "There are always many decisions to be made and it's much better to decide this together with a valve maker than independently. This is especially true in the nuclear industry where we work very closely with well-reputed valve companies who have gained very deep product knowledge of our actuators. We have worked in this way for many years in the nuclear industry and it's highly appreciated by our clients.

"During the qualification procedure for the SAI .2 actuator we have cooperated very closely with the contractors who are working on new projects for Generation 3+ reactors. We've had to learn their safety philosophy, the new requirements and which product features we need to provide to be able to supply for upcoming projects. There are certain safety standards such as aircraft crashes or certain seismic conditions in different areas of the world which must be decided between the contractor and the supplier of equipment. The new plant designs call for the IEEE Issue 2006 standard and while this is not significantly different to the old version the accident conditions are not clearly stated; we must obtain these from the plant designers such as AREVA, Westinghouse, GE Hitachi, Toshiba, etc. It's more complicated and again relationships are the key; if you know people well they will tell you, "Look, we think along these lines." For example we are currently in the midst of extensive discussions with plant designers regarding the possibilities for motor-temperature monitoring inside containment duty actuators. This design require temperature monitoring even in emergency accident conditions, whereas other designs do not. Together we are working to find a solution."

Future predictions

Looking to the future Mr. Dinse predicts consistent demand for electric actuators. "We still believe that other types of actuators such as pneumatic-hydraulic will be replaced with electric actuators because the energy efficiency and other features which we've developed are superior. The demand for automation and modernisation will continue in all the industries we serve. We anticipate a natural growth in the industry and will continue to develop the company in this direction. We really believe that SAI .2 range actuator is one of the best actuators for the nuclear service that's ever existed," he concludes.

Testing facilities

AUMA has invested heavily in extensive machining and testing facilities for all of its products, including equipment specifically for nuclear qualified actuators. "As a technical company we are engineering driven," explains Mr. Ranft. "All design is carried out in-house and we have the manufacturing capabilities to do all machining of the actuator housing components, gear parts etc. We have extensive in-house testing facilities with a department focused solely on type testing, as well as equipment used exclusively for testing nuclear service actuators. At the moment we are commissioning a shake table to carry out vibration testing for seismic requirements in-house, which will save considerable time.

Our in-house testing facility carries out life-cycle testing of the actuator, the gearbox and further components. We also have a climatic chamber to test actuator performance in high-temperature and low-temperature environments."

The head AUMA's testing department Mr. Manfred Drumm is also in charge of the nuclear qualification. As the key person when it comes to the qualification of new product ranges or product features, he carries out the final review of the documents, drawings, etc. As required he coordinates with external nuclear authorities before finally giving the approval that "Yes, this is permitted for use in nuclear service."

Facts & Figures

Name:	AUMA
Headquarters:	Muellheim, Germany
Employees:	2,000 worldwide
Turnover:	EUR 360 million
Products:	Electric actuators, gearboxes, test equipment
Key markets:	Power generation, waste water & water handling, oil & gas, industrial