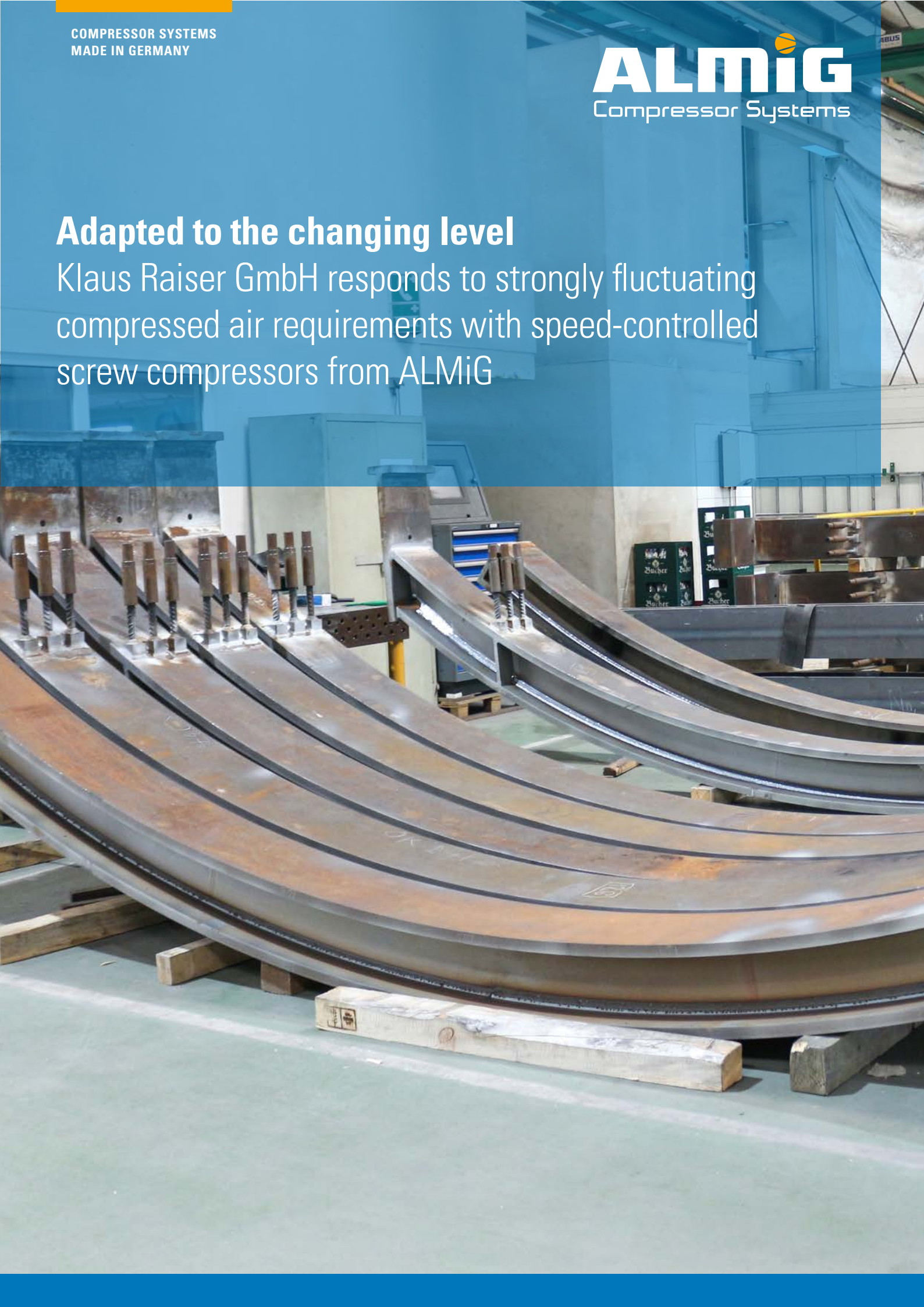
COMPRESSOR SYSTEMS
MADE IN GERMANY

ALMiG
Compressor Systems

Adapted to the changing level

Klaus Raiser GmbH responds to strongly fluctuating compressed air requirements with speed-controlled screw compressors from ALMiG



Klaus Raiser GmbH is a supplier of sophisticated mechanical engineering components and a contract manufacturer for friction welding. Compressed air is omnipresent in operations. If the components are cleaned of scale after welding with sandblasting, the demand for this expensive form of energy increases extremely. To ensure high availability of this medium, the paver therefore relies on four direct-drive screw compressors from ALMiG's V-Drive series. With their energy-saving speed control, they adapt to permanent load changes and Raiser avoids cost-intensive idle times.

„We are currently welding steel girders for the Engelberg Tunnel," says Dr Elmar Raiser, pointing to an employee in production who is using a crane to hoist one of these curved components weighing several tonnes into a robot welding machine. The renovation of the structure on the A81 near Leonberg, close to Stuttgart, was delayed in the summer of 2020 because the steel girders manufactured abroad did not meet the quality requirements. „Now they are with us so that we can rework them," says Raiser.

To clean the components after annealing, the company uses sandblasting.

Klaus Raiser GmbH is a supplier of sophisticated mechanical engineering components and a contract manufacturer for friction welding.

He is the managing director of Klaus Raiser GmbH & Co. KG in the Swabian town of Eberdingen (Hochdorf). His father founded the company in 1969 as a supplier of welded constructions. Today, the company employs about 60 people and produces a wide variety of parts for the mechanical engineering industry. What distinguishes the company? „We are well networked with our customers and can thus realise relatively short delivery times," promises Raiser.

Klaus Raiser GmbH is also one of Germany's largest contract manufacturers for friction welding. This process is very efficient for mass production, explains the managing director: „Materials can be welded together quickly and easily that are difficult or impossible to join otherwise, such as steel with aluminium or metal with ceramics. Managing director Raiser goes to an employee who is in the process of welding steel components in this way. „The principle is simple," he explains. „The two workpieces to be joined are moved towards each other. In the process, one joining part rotates extremely quickly around its own axis while the other remains stationary. When the two workpieces meet, the friction generates enormous heat and chemical bridges form on the contact surfaces. When their highest possible density is reached, the movement stops and at the same time the pressing pressure is significantly increased. The parts are welded together."

Nothing works without compressed air

Compressed air plays a major role throughout the entire process chain in the company. It starts with the cutting of the workpieces and goes through the entire locksmith's shop with its turning and milling centres to the welding systems. In addition, there is a paint shop to coat the workpieces after machining. Compressed air is used to control valves and cylinders, blow away chips or apply paint to the workpieces. „However, we need most of the compressed air for sandblasting," says Raiser. This is because after welding, the components are first annealed to relieve internal stresses. This is important, he says, so that they can later be machined with mechanical precision on the milling centres, for example. „When they come out of the furnace, they are heavily scaled," Raiser describes. „With sandblasting, we can free the components from this." The company works from Monday to Friday from 6 am to 11 pm. There are days when the sandblasting plant runs non-stop for 16 hours. „If the compressed air fails during this, the operation comes to a standstill," says Raiser. „For a long time we only had one compressor with a capacity of 75 kilowatts. It was already a few years old. To ensure high availability, we knew we had to replace it." Those responsible held talks with various suppliers. Through an employee in the company, they finally came into contact with ALMiG Kompressoren GmbH from Köngen in Swabia. The concept and advice of the compressed air experts were convincing. Since May 2019, Klaus Raiser GmbH has been using four V-Drive 37 series screw compressors.

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Compressors of the latest generation

It is pleasantly warm in the new compressor room. Michael Ziegler is ALMiG's area sales manager and looks after the Swabian

In order to be able to react to the changing compressed air demand, speed-controlled screw compressors from ALMiG are used.

manufacturing company. „Our powerful V-Drive 37 screw compressors belong to the latest generation," he reports. „What makes them special is their optimised energy-saving speed control. This is because it enables the compressors to achieve excellent efficiency over the entire speed range." Compressed air generation can be precisely adapted to the actual demand. By avoiding idle times, the permanent load changes and the associated higher compression, the company can save a considerable amount of electricity. With several thousand load changes per year, the energy expenditure adds up considerably. Compared to compressors that are controlled during load idling, the ALMiG units save around 30 per cent energy for this reason alone.

The V-Drive 37 can be regulated between 1.77 and 7.57 cubic metres per minute. The operating pressure is continuously adjustable from five to 13 bar. „The units are switched on and off in a narrow pressure band according to the compressed air requirement via our higher-level ALMiG Air Control HE control system. This means they always run at their optimum," says Ziegler. The operating hours are distributed evenly among all four units. „Actually, three compressors would have been enough," says Elmar Raiser. „The fourth machine serves as a backup for us in case a compressor needs maintenance or repair." Because that was precisely a problem with the old system: maintenance had to be scheduled for the weekend. There was usually only a small window of time available for repairs. If the work took longer, the company had a problem.

Safely controlled

The ALMiG control system regulates the compressors that are currently in use in a network depending on consumption. This allows the operator to take full advantage of the energy benefits of speed control, because the units only generate as much compressed air as they actually consume. The pressure remains constant. „If consumption rises towards the maximum delivery rate of a system, the second compressor switches on. A speed reserve is maintained so that no pressure fluctuations occur due to the compressors switching on and off and the station runs in the economic range," explains ALMiG expert Ziegler.

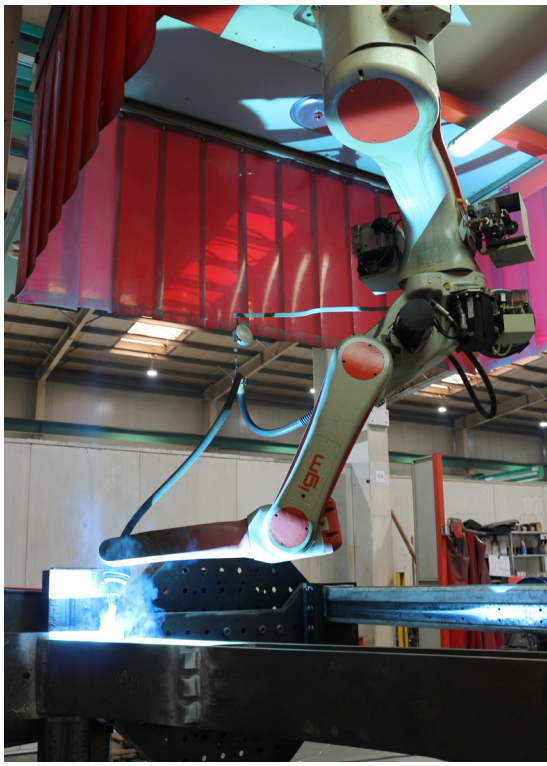
In the main load phase, i.e. during the peak production period, three units run synchronously at the same speed. In the off-load phase, when less is produced, only one compressor runs. This automatically adapts to the consumption profile. Since the machines are in the medium speed range, both the energy demand and the noise emission are lower. In addition, the machine components are subjected to less stress, which has a positive effect on the service life of the compressors. „By default, our premium controls are equipped with a balance monitoring system. This station also contains a web server," explains Ziegler. This makes it possible to read out all relevant data conveniently on the computer or via smartphone. Service technicians can read the running behaviour of the past operating days or weeks and conclude how heavily the compressor is utilised, when maintenance is due and whether there are still reserves. „If we notice that the operating behaviour has changed significantly, the responsible employees can react immediately," says Ziegler.

Since the ALMiG systems perform particularly well in terms of energy, the managing director was able to apply for subsidies from the Federal Office of Economics and Export Control (BAFA).

Energy-efficient all along the line

„We have set up our company in a very energy-efficient way," reports Raiser. For example, there are large photovoltaic systems on the roofs, a combined heat and power plant provides heat and electricity, and the hall is equipped with LED lighting. „So the new compressors are a perfect fit for us," says Raiser. Because the ALMiG systems work particularly well in terms of energy, the managing director was able to apply for subsidies from the Federal Office of Economics and Export Control (BAFA).

Because compressed air not only controls valves but can also come into contact with the product - as in the painting of components - it is treated with a cyclone, pre-filter, refrigeration dryer and ultra-fine filter. The characteristic values of the refrigeration dryers are precisely adapted to the respective plant. „One advantage is



For this purpose, the contract manufacturer relies on robot welding.

Because the compressed air must be free of oil and moisture, it is treated with filters, among other things. The resulting water is so pure that it can be discharged into the sewage system.

that the two external refrigeration dryers are thermally separated from the hot zone of the compressor," says Ziegler. „This means that there is no so-called refrigerator in the oven." The compressed air is then processed further and fed to the consumers via a collector pipe with a large cross-section.

Because of the block heating plant and the annealing furnace, heat recovery from the compressors does not play a major role in the company. Only in the winter months, when it gets cool in the warehouse, does the company use the heat generated by the machines.

Avoiding leaks

In the compressor room there are two compressed air tanks with volumes of 2,000 and 3,000 litres. Attached to these are three ring lines that supply the different production areas. „We installed an electrovalve directly after the boilers for each ring line," explains Raiser. „This allows us to shut off the compressed air overnight and at weekends to avoid leaks that can occur in the lines." If an employee switches on the ring lines, the systems are up and running within a few minutes.

Elmar Raiser is very satisfied with his new compressed air system. „The system is modularly expandable. We can also connect a fifth machine if demand increases," he says. How high his cost savings will be is difficult to estimate at the moment in the difficult times caused by Corona. But energy efficiency is a big issue, especially with rising energy prices. „Not only is the company colour green, we have also internalised green awareness in our corporate goals," says the managing director.

Autor: Ralph Jeschabek, Head of Marketing bei ALMiG

ALMiG Kompressoren GmbH
Adolf-Ehmann-Str. 2
73257 Köngen
info@almig.de
www.almig.de

Elmar Raiser (left), Ralf Entenmann, the person responsible for compressed air (centre), and ALMiG area sales manager Michael Ziegler in the new compressor room.