

Ziegler relies on direct-driven, energy-efficient screw compressors from ALMiG for the manufacture of high-precision components. Savings all down the line



Ziegler GmbH manufactures high-precision components for the aircraft and automotive industries. Compressed air is used in all machines. As their number increased over the years, the previous four screw compressors reached their limits. ALMiG replaced them with three direct-driven screw compressors from the V-Drive and Variable XP series. With their energy-saving speed control, they adapt to permanent load changes and avoid cost-intensive idling times. Ziegler can save up to 40,000 kilowatt hours per year - and received federal subsidies due to its high energy efficiency.

„For us, the highest precision is essential,” says Klaus Welte, pointing to a container containing sparkling clean and complexly shaped components. He is team leader for precision deburring and part finishing at Ziegler GmbH in Bermatingen on Lake Constance in Baden-Württemberg. „With about 160 employees, we manufacture components in small quantities here,” he describes. The average quantities are between 50 and 70 parts. These can be just a few millimeters thin or several kilograms heavy, for example chassis components. They are used in the automotive and aircraft industries - in sectors where passenger transportation is involved, and so they can also perform safety-relevant functions. Among the main customers of the family-owned company are in particular suppliers to the major manufacturers. The Ziegler Group has a second location in Markdorf, just under four kilometers away, which manufactures spare parts and accessories for lathes, among other things.



Ziegler GmbH manufactures high-precision components for the automotive and aircraft industry. In production, the manufacturer relies on screw compressors from ALMiG.

„Certainly we are feeling the effects of the Corona pandemic,” says Welte and points into the hall: The machinery is only partly in operation. „Even though we cannot yet foresee the end of the crisis, I am not worried. We’re in a good position, and in the past we have only invested when we could afford to.

Nothing works without compressed air
These investments also include three new air

compressors from ALMiG. „In the past ten to 15 years we have almost doubled our staff. The machine park has also grown continuously,” explains the team leader. Naturally, this has also increased the need for compressed air, because without this expensive medium, no plant can run - whether tools need to be changed automatically or cylinders moved. Until then, four aging screw compressors were in use. All the systems were supplied by ALMiG. „Over the years, we have been able to gain very good experience with these machines, particularly in terms of availability,” reports Welte. Slowly but surely, however, they reached their performance limits.



Compressed air is used almost everywhere in production.

„Compressed air is a very valuable commodity for us, but also an enormous cost factor,” says team leader Welte. „We wanted to be able to cover the increasing demand for compressed air as well as permanently reduce our energy costs. There was no question that those responsible would continue to rely on compressors from Köngen in Swabia. The team leader greatly appreciates the advice of ALMiG area sales manager Volker Gräschke, who has been supporting the company on Lake Constance for years.

„To find the right solution, we carried out a compressed air analysis,” reports Gräschke. „On this basis, we supplied direct-driven, speed-controlled screw compressors - two of the V-Drive 75 series and a smaller Variable XP 22”. Because these systems work particularly well in terms of energy, Ziegler was able to apply for subsidies from the Federal Office of Economics and Export Control (BAFA) with the support of the ALMiG expert. Another good reason for the manufacturers from Lake Constance to invest in the new plants. „In order to receive these subsidies, our compressors meet all the necessary requirements”, describes Gräschke.

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The demand for compressed air in Bermatingen is very different. „We generally work here five

days a week in two shifts,” Welte describes. „Before the pandemic, the daily requirement was around nine cubic meters per minute. A V-Drive system currently only runs at around 50 to 60 percent. The compressed air station is currently set at 7.8 bar and will be reduced in 0.1 bar steps until we reach the optimum. One bar accounts for around seven percent of energy costs,” says Gräschke. To keep leakages to a minimum, compressed air losses in the distribution network and in the machines are constantly monitored and eliminated. To further improve the control behavior of the compressors, ALMiG has installed a compressed air tank with a volume of 3,000 liters. Previously, only 1,750 liters were available.



With the new compressed air tank, a volume of 3,000 liters is now available.

Safely controlled

The ALMiG Air Control HE (high-end) system regulates the compressors in a consumption-dependent network - the higher-level control system is also supported by the BAFA. With this control system, Ziegler can make full use of the energy advantages of speed control because the station only produces as much compressed air as is actually consumed and automatically selects the best combination of available compressors. The pressure remains constant. „If consumption rises towards the maximum delivery rate of the variable XP 22, a V-Drive 75 switches on and the small station switches off after an adjustable waiting period. A speed reserve is maintained during this process. This prevents pressure fluctuations caused by switching the compressors on and off, and the station runs within the economic range,” explains Gräschke. In the main load phase, i.e. during the main production time, one V-Drive 75 is running, the second V-Drive 75 is in standby mode. In order to ensure an even load, this is done in the base load change. In the low load phase, when production is less, only the variable XP 22 runs. ▶

„Our HE controls are equipped with a balance monitoring system and have a web server as standard“.

The station automatically adapts to the consumption profile. Since the machines are always in the optimum speed range, both energy consumption and noise emissions are lower. In addition, the machine components are less stressed, which has a positive effect on the service life of the compressors.

Another positive side effect is that the control system allows all machines to run at around 4,000 bph per year. This corresponds to the service interval. This means that all compressors can be serviced on a single date, which further reduces running costs.

„Our HE controls are equipped with a balance monitoring system and have a web server as standard“, explains Gräschke. This makes it possible to read out all relevant data online. The running behaviour of the past operating days or weeks can be read off and the data can be used to determine how busy the compressor is and when maintenance is due. In addition, the amount of air consumed and energy consumption are recorded. „If we notice that the operating behavior has changed significantly, we can react immediately,“ says Welte.

In addition to the permanent availability of compressed air, Ziegler is particularly concerned about the purity of the medium - and that no condensate can form. ALMiG's existing compressed air treatment system consisting of pre-filter, refrigerant dryer and ultra-fine filter was taken over, as it was already sufficiently dimensioned and redundantly designed. After treatment, the compressed air is fed to the consumers via a collecting pipe with a large cross-section via the compressed air receiver.



The external, refrigerant dryer: Its characteristics are precisely adapted to the respective system.

No heat accumulation with controlled supply and exhaust air

Ziegler previously had the problem that the old compressors were partly housed in a small prefabricated garage. This led to thermal problems at high outside temperatures. This was to change.



The new hall also houses the new compressed air station.

The prefabricated garage no longer exists today - if only for reasons of space. Instead, there is a modern hall with controlled supply and exhaust air in which the new machines are housed.

„The conversion was a challenge for everyone involved, because operations had to continue without interruption,“ recalls Gräschke.

Precise planning and a lot of improvisation were necessary. Most of the work took place on Saturdays. First, one of the two V-Drive systems and the Variable XP were installed outside of the construction work; these kept operations running. Piece by piece the old compressors and the prefabricated garage were removed and the new hall was built. „We installed the second V-Drive in it, then we moved with the Variable XP and installed the compressed air treatment with the new tank.



The Variable XP is used in low load phases - for example at night or on weekends.

Once these were up and running, the other V-Drive also moved,“ Welte describes. „Within half a year, we managed the complete conversion without any loss of production.

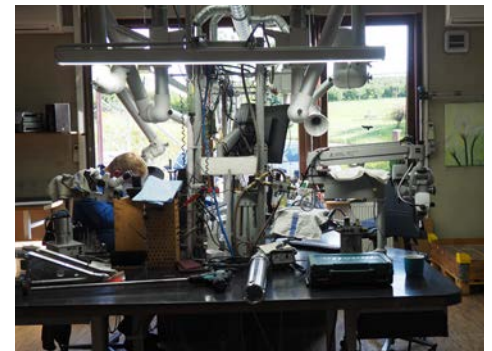
„We avoid cost-intensive idle times and can save quite a few kilowatt hours per year“.

High availability ensured

The compressors have now been in operation since May 2020. „We avoid cost-intensive idling times and can save many kilowatt hours per year,“ says a satisfied Klaus Welte. „Above all, we benefit from a high availability of com-

pressed air. The screw compressors are also easy to maintain and only require servicing every 4,000 hours of operation: all components are easily accessible and the sound-insulating doors can be easily removed. This significantly reduces maintenance and downtimes. This also keeps service costs manageable.

„Now all that is needed is a full economic recovery. We are ready to start,“ says team leader Klaus Welte. He points to an employee who is currently working under the microscope with a hand grinder on a complexly shaped component. „Automated, that would either be impossible or very uneconomical given the small quantities we have,“ he says. „The resulting fine chips are blown off with a compressed air gun. This is also a typical application for us“.



A quite classical application; at the manual workplaces chips have to be blown off with compressed air.

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