More transparency in consumption

Valuable insights with sensors from IPF

Multifunctional: Parameterizable flow sensors from IPF are versatile and can not only measure the consumption of air, for example, but also of technical gases. A decisive reason why Kettenwulf invested in several of these extremely easy-to-use devices, and not just for machine monitoring.

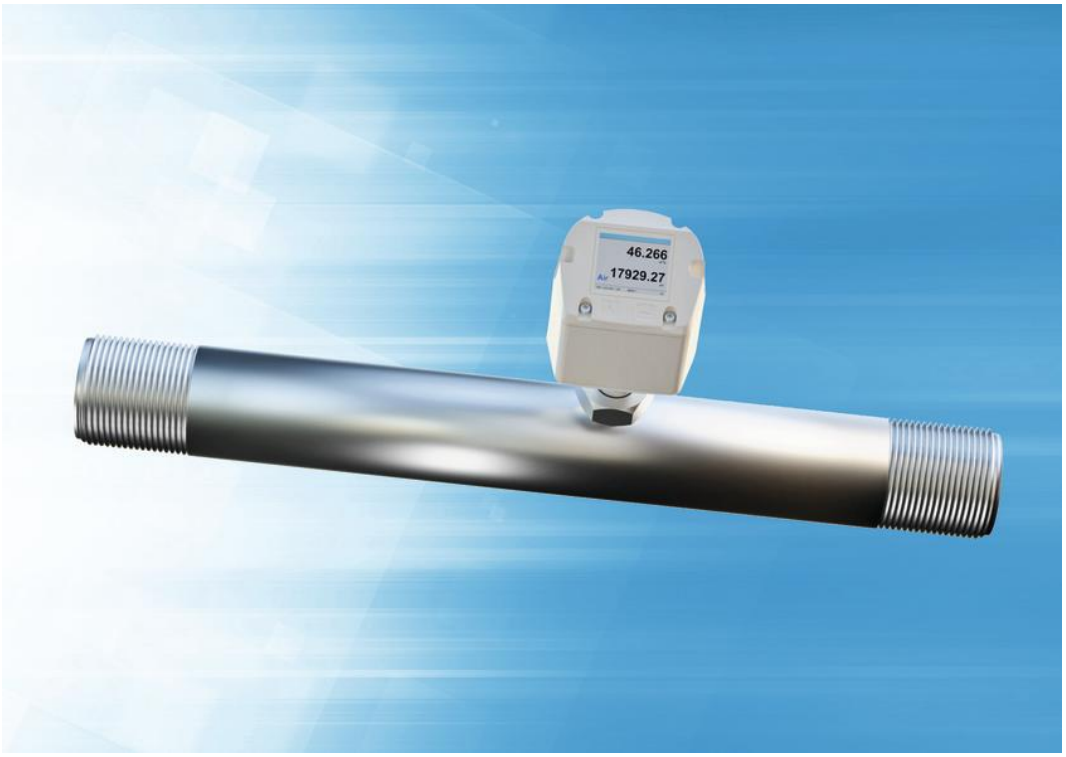
Proven technology at every turn: anyone using an escalator in the London Underground, for example, may have a Kettenwulf solution under their feet. Kettenwulf Betriebs GmbH from Eslohe manufactures conveyor chains, drive chains, special chains and chain conveyors for the global market on a production area of around 25,000 square meters with around 1000 employees. "With the exception of the motors, we also supply the entire drive units," says Lucas Schönfelder, Head of Energy Management at Kettenwulf. The family-owned company with around 1,400 employees worldwide and production and sales locations in Europe, America and Asia manufactures industry solutions for the bulk materials industry, mechanical engineering/plant construction, the wood, steel, automotive and food industries and the escalator industry, among others.

Straight recording of all measurement results

Kettenwulf took its first steps in the area of energy controlling back in 2017. In addition to DIN EN ISO 9001 (quality management), the company has long been certified for sustainable environmental management (DIN EN ISO 140001). "In October 2024, we also received certification in accordance with EN 50001 for sustainable energy management. Among other things, we have around 90 electricity meters distributed throughout the company. There are also a number of measuring instruments for technical gases, oxygen and air and, most recently, heat meters for cooling water consumption. It is estimated that more than 150 counters from the entire plant are connected to our straight recording system. One of my straightforward tasks is to monitor consumption and find optimization potential whenever possible," explains Lucas Schönfelder.

Comparison of machine consumption

Kettenwulf relies on state-of-the-art, high-precision laser technology for the production of link plates. The lasers in the systems cut with nitrogen, although oxygen is also required to produce the cutting gas. The systems also have a compressed air connection, e.g. for moving the machine axes. As the consumption of nitrogen is not only particularly high for the laser cutting systems, Kettenwulf produces most of the gas itself, around 70 to 80 percent of the total requirement. "In connection with the new investment in 2020 in a 10 kW laser cutting system from Trumpf, we wanted to determine the exact nitrogen, oxygen and compressed air consumption of the machine along with the electricity consumption and compare the data with an older existing laser machine, a$CO2_{laser}$. For this reason, we needed the appropriate measuring instruments, and twice as many of them. As we already had contact with IPF, we decided to use the company's flow sensors. The devices, which were preset for a specific reference medium, were calibrated by IPF, if necessary, according to our specifications for the respective application," says Lucas Schönfelder.



Parameterizable flow sensors from IPF for the measurement of flow, consumption, temperature and velocity of air and technical gases work according to the calorimetric principle, which delivers highly precise measurement results. (all images: ipf electronic gmbh)

Plenty of choice for flexible use

Parameterizable flow sensors from IPF are used for the measurement of flow, consumption, temperature and velocity of air and technical gases. They work according to the calorimetric principle and therefore provide highly precise measurement results. The very broad portfolio ranges from insertion sensors for installation under pressure via a ball valve, to sensors with an integrated measuring section, all with freely scalable analog outputs, through to compact inline devices with a common funnel for optimum flow to the sensor elements. For the consumption measurements on the two laser cutting machines, Kettenwulf opted for the **SY92E296** (reference medium nitrogen), the **SY92E297** for the measurement of oxygen and the **SL910020** for compressed air.
All devices with integrated measuring section and stainless steel transducer have a switching output as well as an analog output (4...20mA) and can be easily parameterized via two diffuse reflection sensors on the front LED display. The **SY92E296** is pressure-proof up to 40bar, the **SY92E297** and **SL910020** can withstand pressure peaks of up to 16 bar.

Simple and precise: With the flow sensors from IPF, the minimum and maximum values of the analog output, e.g. for compressed air, are already specified in cubic meters and can be adjusted.

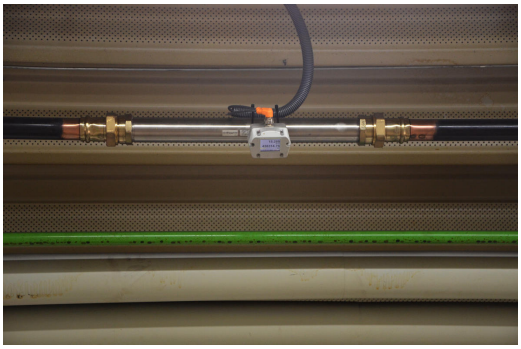
Different areas of application, different pipe cross-sections but a uniform design and operating concept: the **SY92E296** and **SY94E304** for nitrogen (left from top), the **SY92E297** for oxygen (center, bottom) and the **SL910020** and **SL950020** (right, from top) for measurement of compressed air consumption.

Consumption measurements on a laser cutting system at Kettenwulf: the **SY92E297** (above) for the measurement of oxygen, the **SY92E296** (center) (reference medium nitrogen) and the **SL910020** (bottom) for compressed air.

Fewer differences than expected

According to Lucas Schönfelder, the measurements on both machines brought some surprises: "We wanted to know whether the consumption of the two machines actually differed greatly from each other, but ultimately discovered via the recording and analysis of the data on technical gases and compressed air, among other things, that the differences between the two systems are not that great." For example, the new investment is more economical in terms of current consumption, but consumes more nitrogen for the faster laser cutting than the existing machine, which in turn requires additional nitrogen to clean the laser nozzles. "Taken together, these were some very important findings for us. We therefore decided shortly afterwards to install another flow sensor of the type **SY94E304** flow sensor from IPF to measure the nitrogen requirements of our in-house hardening shop. This was followed by a sensor **SL950020** which we use to determine our total compressed air consumption here at the site."

Department with high nitrogen requirements: Kettenwulf's in-house hardening shop.

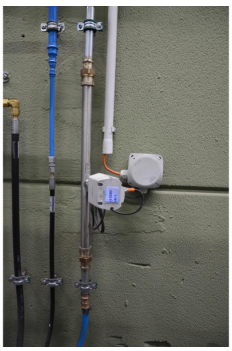


With a flow sensor of the type **SY94E304** is used to measure the nitrogen requirement in the hardening shop.

Compressed air requirements of particular interest

When Kettenwulf was due to purchase a new generation of laser cutting systems from Trumpf in 2022, the consumption of this machine was also to be scrutinized, but this time only with an **SL950020** from IPF. The Head of Energy Management explains: "We already had experience with the consumption of technical gases in particular from the two machines described above. That's why we concentrated on the measurement of compressed air consumption for this system, especially as this laser machine also cuts with compressed air and the data on this is of particular interest to us."

In the course of investing in new laser cutting systems, e.g. a TruLaser 5030 fiber from Trumpf, Kettenwulf is taking a closer look at their consumption.



The third laser cutting machine had to be equipped with an **SL950020** only the compressed air consumption had to be determined, as empirical values were already available from two other systems, particularly with regard to the technical gases.

Precise calculation through granular data

A total of nine flow sensors for measuring the consumption of compressed air, oxygen and nitrogen are now in use at Kettenwulf in Eslohe. With the exception of the process connections and the preset reference medium, the sensors do not differ in terms of their design, general functionality or simple menu-guided parameterization, so they were easy to put into operation for the respective measuring tasks. Lucas Schönfeld draws a consistently positive conclusion: "In recent years, we have increasingly adopted the strategy of determining the actual consumption per system, among other things, in order to obtain more precise data. In the beginning, the focus was purely on electricity consumption, but we gradually added further consumption data in order to calculate the machine hourly rates on the basis of the overall data. As a result, we are now able to calculate each order very accurately, including with regard to the required production resources."