KNOLLREPORT

AT IFM ELECTRONIC IN TETTNANG

User report of
KNOLL Maschinenbau GmbH

High pressure for a reliable process

Compact high-pressure units from KNOLL can be retrofitted easily and in a space-saving manner

The stainless steel sleeves serve as housings for all ifm sensor series from M8 to M30, for capacitive and inductive sensors as well as for fluid sensor products.

For the difficult lathe machining of VA materials, tools with an internal coolant supply and a high-pressure cooling lubricant system have a decisive advantage. For this reason, sensor housing production at ifm in Tettnang has retrofitted its fixed and sliding headstock automatic lathes with high-pressure units from KNOLL. The results: Higher process reliability, less machine downtime, improved chip control, shorter machining times and longer tool service life.

Advances in production are essentially determined by automation and digitalization technology. One of the most important suppliers in this respect is the ifm group of companies - a global leader in the development and manufacture of sensors, controllers and systems. Among others, development and manufacturing are located at the Tettnang site. "These important departments work very closely together, which has a beneficial effect on product improvements, new product launches and economic efficiency," explains ifm technical officer Frank Watzlawik. In particular, production is constantly optimized. This applies to assembly, which is already largely automated, but also to machining - for example, in so-called sleeve production. "Up until 20 years ago, we had the housings for inductive sensors manufactured externally," Matthias Finsterle recalls. "At that time, they were made from solid material. Then those responsible decided to bring this prefabrication work in-house. A new development made it possible to manufacture the housings from calibrated VA tubes. That means that the inner diameter requires no further machining, only threads had to be added on the outside."

Six million sensor housings a year

What started back then with an initial sliding headstock lathe is now an independent part of the central prefabrication department belonging to ifm electronic gmbh. Around 25,000 sensor housings are produced daily on twelve fixed and sliding headstock lathes, all made of 1.4404 stainless steel (colloquially "V4A") in 220 variants. Matthias Finsterle, who has been responsible for this machining from the beginning, explains that ifm uses it for all the sensor series from M8 to M30,

The strengths of the LubiCool®-S high-pressure system

- Compact design – perfect for limited spatial conditions
- Attractive price and short delivery time
- Wear-resistant high-pressure pump for long service life and high process reliability
- Effective filtration thanks to affordable filter element
- SmartConnect control unit for simple, intuitive operation
- Coloured LED status display
- Numerous additional options
- Fast plug-and-play installation and retrofit

Small but powerful: The KNOLL LubiCool®-S high-pressure unit, which fits under standard bar feeders, generates a high pressure of up to 100 bar, causing small chips to form and enabling higher cutting speeds.

i.e., capacitive and inductive sensors, as well as for pressure, flow and heat sensor products. The sleeves are supplied to all ifm production plants worldwide.

In 2021 Matthias Finsterle handed over the group management to his colleague Jakob Sauter, who since then has mainly been responsible for the capacity planning and organization of a total of 15 employees in production and quality inspection. As the person responsible for technology, Finsterle can thus concentrate fully on optimizing the machines in terms of productivity and quality. His first goal is to improve process reliability and to reduce machine downtime.

An end to chip buildup, tool breakage and machine downtime

"Since we only machine long-chipping stainless steel, there was an increasing amount of chip buildup in the past, especially on our MAIER sliding headstock lathes as well as on the Sprint 20 from DMG MORI used as a fixed headstock lathe, and as a result, tool breakage and machine downtime," explains Matthias Finsterle. "This is due to the fact that their linear tool carriers offer only limited space between the tools and the cooling lubricant supply does not remove the chips via standard volume pumps." The solution: Finsterle was certain that the problem should be solved for tools with an internal coolant supply and a corresponding high-pressure pump. After all, experience with high-pressure supplies for other machines was already available. This technical manager therefore started looking for a retrofittable high-pressure system that was suitable for sliding and fixed headstock lathes.

Mobile high-pressure station for uncomplicated retrofitting

Ralf Spöcker, Area Sales Manager at KNOLL Maschinenbau, was able to offer him an interesting solution. He was actually in-house because of a chip conveyor in the toolmaking section. However, since the sleeve production department had been equipping sliding head lathes with coolant pumps and hinged belt conveyors from KNOLL right from the start, a visit to

Matthias Finsterle (left) and Jakob Sauter (centre), the people responsible for ifm's sleeve production, are delighted with their KNOLL LubiCool®-S high-pressure unit. They praise not only the product, but also the competent advice provided by KNOLL Area Sales Manager Ralf Spöcker. Their verdict: "The cooperation with KNOLL has been exemplary for many years."

Matthias Finsterle was a must. When the conversation turned to the required high-pressure supply, Spöcker had a possible solution ready: the mobile KNOLL LubiCool®-M high-pressure station. It is capable of generating a coolant pressure of up to 150 bar and a flow rate of up to 27 l/min. This was exactly what Matthias Finsterle was looking for. Especially since the LubiCool®-M is equipped with the KNOLL compact filter KF with filter fleece, which ensures an automated filtering process with a filter fineness down to 20 µm. "On other machines, we have installed high-pressure units with cartridge filters," Finsterle mentions. "We have to clean these almost daily, which involves enormous effort and corresponding machine downtimes. In addition, their filter fineness is not sufficient for the fine channels of the internally cooled tools."

So the decision was made quickly. KNOLL was able to deliver the LubiCool®-M just as quickly. With its successful use, Matthias Finsterle and the sleeve production team desired to equip other machines with such a high-pressure unit. During his next visit on site, Ralf Spöcker was able to present another, newly developed KNOLL LubiCool®unit, in size S. With a height of only 663 mm, a depth of 635 mm and a length of 985 mm, it is so compact that it fits under standard bar feeders - ideal for sleeve production that has to cope with limited space.

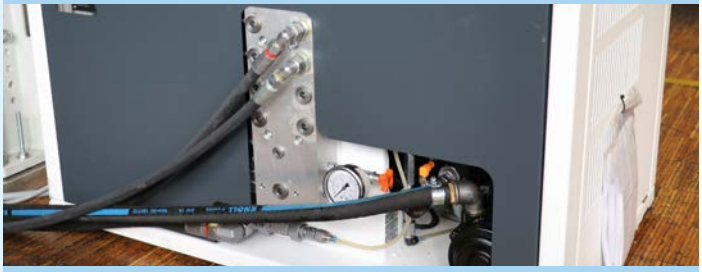
A highlight of the entire LubiCool® range is the incredibly simple and intuitive operation. For this, KNOLL developed the new "SmartConnect" control concept, which includes a small touch display, via which the user can set and adjust the desired pressure level and other parameters.

LubiCool®-S fits under standard bar feeders

In terms of its internal values - high pressure up to 100 bar and a flow rate of up to 23 l/min - the LubiCool®-S is not significantly inferior to its bigger brother, as Matthias Finsterle assures us. He had reservations, however, because it uses a replaceable and cleanable filter element rather than a belt filter. To convince him that the maintenance intervals remain

Up to eight switchable outputs on the KNOLL LubiCool®-S high-pressure unit ensure that the machine tool - in this case, the DMG MORI Sprint 20 - is supplied with cooling lubricant as required.

The Sprint 20 from DMG MORI used as a fixed headstock lathe: With this machine, ifm produces adapter pieces in three-shift operation for fluid sensors.



LubiCool®-S from the back: KNOLL supplies the high-pressure system for plug-and-play - complete with hose package, accessories and machine-specific interface.

This KNOLL LubiCool®-M supplies a sliding headstock automatic lathe with high pressure. It also cleans the coolant coming from the machine tool by means of filter fleece and removes the dirt load directly from the circuit. As a result, the LubiCool®-M extremely effectively prevents the concentration of ultra-fine particles in the entire medium.

With the KNOLL LubiCool®-S, the filter element can be changed very easily and in only five minutes. At ifm in the sleeve production section, this is only necessary every six weeks despite three-shift operation of the fixed headstock automatic lathe.

Sleeves with M18 thread produced on the automatic sliding headstock lathe equipped with the KNOLL LubiCool®-M.

within tolerable limits, KNOLL provided a test unit. It was installed on a fixed headstock lathe, which - like all other machines in sleeve production - runs in three-shift operation. "The performance of the KNOLL LubiCool®-S ensures reliable machining of our stainless steel products. The filter technology also impressed us," reports group leader Jakob Sauter. "We only have to replace the filter element every six weeks, which takes no longer than five minutes when a second one is used. Afterwards, we can clean the dirty filter and prepare it for the next use."

Jakob Sauter and Matthias Finsterle are absolutely delighted with both KNOLL LubiCool®units: "It starts with the competent product advice, which was specifically targeted for our use case and focused on the most economical solution." As additional pluses, they emphasize the quick delivery and the simple installation: "KNOLL actually delivered a plug-and-play solution with all the accessories - such as hose packages and connections - matched to the particular machine. We also received professional instruction during the start-up phase. Then, if a technical problem did arise, the hotline with the specialist department was always able to help us."

Excellent cost-benefit ratio

Most important, however, is the good cost-benefit factor of KNOLL's LubiCool® high-pressure systems, which relates to both acquisition as well as operating costs. "Thanks to the high pressure, we achieve greatly improved chip control, so that machine downtimes have dropped to a minimum," says a pleased Finsterle, who is responsible for technology. "In addition, we have been able to reduce production times per unit. This is because the targeted high-pressure lubricant feed to the tool cutting edge enables higher feed and cutting speeds without sacrificing tool service life."

As an additional positive effect, Group Manager Sauter mentions that the internal coolant channels of the tools eliminate

The adapter pieces produced on the DMG MORI Sprint 20 have a male thread, recesses and a cross bore.

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the need for the time-consuming adjustment or readjustment of the flexible coolant nozzles after tool changes. In addition, he emphasizes the energy efficiency and low noise generation due to frequency-controlled pumps. Both managers come to the same conclusion: "Based on these positive experiences, we will successively equip other lathes with a KNOLL LubiCool®-S or -M high-pressure system, depending on requirements and space availability."

Mutual partnership between ifm and KNOLL Maschinenbau: KNOLL uses fluid sensors from ifm for all LubiCool®units, for example the pressure transmitter shown in the figure ...

... and the digital pressure sensor of the PN series shown here. Both components, which have been on the market for a long time, have proven to be very reliable and robust.

KNOLL Maschinenbau GmbH

KNOLL is the leading provider of conveyor systems, filtration units and pumps for metalworking. These transport and separate chips and cooling lubricants. The comprehensive product range offers systems for decentralised or centralised applications. Its Automation Division deals with solutions for demanding assembly and logistics tasks. These include stationary transport systems with chain and roller conveyors. The integration of handling units (robots, cobots) and transport robots (AGVs) enables flexible systems to be created from a single source.

Leading in automation technology and digitalization

The ifm group of companies employs 8100 people worldwide and generated sales of more than 1.2 billion euros in 2021. The family business, founded in 1969 by Robert Buck and Gerd Marhofer and managed by the second generation since 2001, has its headquarters in Essen to this day. However, it is rooted in the Lake Constance region through the second owner family. More than two thirds of the more than 25 million products are produced there. Additional development and production sites are located in the USA, Singapore, Poland, Romania and India.

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