

Quality testing

Draw-wire system for position feedback

- Easily retrofittable complete system
- High accuracy
- Rugged housing
- Measuring range up to 6,250 mm





Draw-wire system for position feedback with hydraulic presses

Demand for greater accuracy and rugged design

The Robert Koch Werkzeugbau GmbH & Co. KG of Wuppertal, Germany, is a medium-sized company with a long tradition of manufacturing machine tools as well as top-quality complex stampings.

Small plastic mouldings that have to withstand high stress loads, place high performance demands not only on materials scientists but also on those companies which manufacture the tools for their production. Modern moulds for plastic injection machines are ever more delicate and intricate in their design and production tolerances have long been measured in hundreds of a millimetre.

Difficult quality control

Every tool that comes off Koch's production line is subjected to precise testing to ensure that only the highest quality leaves the company's factory. This task is assigned to a rather elderly, but still fully-functional test press, made by Hessmert, that stands in the corner of the production hall. When this machine was called upon to test the latest tools with their amazingly tight tolerances, it was clear that modifications would be required.

There was the danger that small irregularities during the movement of the press could twist accurately manufactured tools so that these would then no longer close properly.

For one thing, this would prevent reliable testing of the finished tool, since who could say that a tool would fit, if this were not based on 100% parallel movement of the press. Furthermore, with each testing there would always be the risk that delicate tools could be damaged.

Updating the test press

It was soon clear what the solution needed to be: the old test press needed to be fitted with a parallel feed system, so as to guarantee 100% parallel movement of the tool carrier. This system would have to measure the absolute movement of the press and then control the two hydraulic cylinders responsible for the left- and right-hand-side downward movement of the tool carrier.

Here there was a problem, because the Hessmert company had gone into insolvency a number of years previously, which meant that there would be no help forthcoming from the manufacturer in the modifications to the press. Since then the maintenance of Hessmert machines in the region had been carried out by the company HSI, Hydraulik Service Imminger of Bochum, who was now the first port of call for Koch.

New challenge for the maintenance provider

This type of modification posed a new challenge to HSI, as no company had come to them previously with this type of requirement. During the design of the parallel-feed system, the programming of the evaluation and control software proved to be very difficult. This problem was made worse because of the inaccuracy of the first measuring systems that had been used. These were based on proximity sensors that travelled along measuring strips and used magnetic fields to supply the absolute position of the press to the control software. This measuring procedure was not accurate enough to satisfy Koch's control requirements. Even the best control software could not compensate for the skewing problems.

Installation of highly-accurate draw-wire systems

After a few months HSI tried a different approach: the proximity switches disappeared from the machine to be replaced by draw-wire systems from the Wachendorff company of Geisenheim. These systems are equipped with an incremental encoder, which provides information on the amount of cable paid out. Only when these position feedback systems were being used, was the accuracy sufficiently high for HSI's control software to be then able to regulate the hydraulic cylinders on the Hessmert press to the appropriate degree.

Wachendorff's SZG 81 draw-wire system was designed for use in harsh industrial environments and so works very reliably in this application. Here Wachendorff's WDG58A encoder is used, as this provides a perfect match to the mechanics of the draw-wire system. The protection rating of the already-installed WDG58A meets IP65 requirements in line with the EN 60529 standard. Depending on the number of pulses per revolution of the encoder, up to 125 pulses are transmitted for each millimetre of cable that is paid out. The highest accuracy encoders transmit 25,000 pulses per revolution, and this accuracy can be further increased by measuring all four pulse edges.

Flexible system

The measuring range goes up to 6,250 mm. Longer draw-wire systems with cables up to 42 metres can be delivered on request. Its compact dimensions mean that the SZG 81 can be installed even where space is tight. The various installation options offer high flexibility, allowing for quick on-site mounting of the hard anodic-coated aluminium housing. The measuring cable can exit the housing either upwards or downwards and from the front or rear, as desired.

Long service-life expectancy

The intelligent spring suspension and the nylon-coated stainless-steel wire cable guarantee a long service-life even under the harshest operating conditions. The life expectancy of the complete system is at least one million cycles. The maximum cable speed can be up to 7.5 m/sec and a draw force of 2.0 kg is quite adequate.

With the help of two draw-wire systems, one attached to the left side of the hydraulic press and the other to the right, the press can now always be positioned accurately. The control software can thus specifically influence the two hydraulic cylinders and ensure the press travels in a parallel line. This avoids twisting or skewing the tool or otherwise damaging it.



Image 1
The updated tryout press that is used to test the tools



Image 2
A draw-wire system with an encoder on each hydraulic ram allows for precise determination of the position



Image 3
The encoder outputs provide signals corresponding to the length of wire paid out, enabling the control software to govern the position of the presses more precisely



Image 5
Elderly hydraulic press with the latest control technology



Image 4
The SZG81 mounted sideways on the press

Any Questions? Just call Dieter Schömel +49 (0) 67 22/9965-10, send him an E-Mail at sco@wachendorff.de or call your local distributor.

Please contact your local distributor: