Up to the complete process: IEF-Werner develops fully automatic handling and testing system for disc springs

Press contact

IEF-Werner GmbH
Stefanie Günter
Wendelhofstr. 6
78120 Furtwangen
Tel. +49 7723/925-218
stefanie.guenter@ief-werner.de
www.ief.de

Agency

a1kommunikation Schweizer GmbH
Dr. Matthias Schweizer
Tel. +49 711/9454161-0
info@a1kommunikation.de
www.a1kommunikation.de

Publication free of charge – file copy requested.

IEF-Werner develops fully automatic handling and testing systems for disc springs:

Up to the complete process

A spring manufacturer commissioned IEF-Werner GmbH to develop a complete solution for the fully automatic testing of disc springs after punching for their exact characteristics, separating good parts from reject parts and feeding them into further production. The result is a system that consists almost entirely of IEF's own components and runs reliably at high cycle rates around the clock. The automation specialist took care of everything from the initial inquiry to commissioning - and beyond.

Furtwangen, 29.05.2020 –- Every machine and every device is born from an idea. In the construction process, this idea takes shape and finally becomes reality. The engineers at IEF-Werner GmbH in Furtwangen in the Black Forest design this path of development according to the wishes of their customers - even if the tasks that the later machines are to fulfil are still very complex. "In many projects we are on board from the initial contact to commissioning," Frank Neugart, product manager for servo presses at IEF-Werner, reports. At least - because often the automation specialists also take care of the smooth operation in everyday production.

As an example, Frank Neugart reports on a successfully completed project. The customer requested at IEF Werner a complete solution for the testing of disc springs. He was looking for a system that would pick up the components with different thicknesses as bulk material from a punching machine at high cycle rates, test them for their characteristic values, separate the good parts from the bad parts and feed them at high speed to further processing. "We have developed a fully automated solution that is based entirely on our know-how - and almost exclusively consists of our own components," says Neugart. The customer received everything from the Black Forest from a single source.

Gentle and precise handling

"We set up the test system in our technical center and implemented it together with the customer," reports Neugart. He points to a few disc springs that differ extremely in their characteristic values, such as strength. In the customer's production line, the components are punched from sheet metal at high cycle rates and fed into the IEF-Werner system according to type. There they are transported via a conveyor system to a spiral bowl conveyor which separates them. "For the pick & place we have installed a vacuum gripper which picks up the spring from the separation. The vacuum solution handles the spring gently without having any additional influence on the part," the product manager explains.

Local court: Freiburg | General Manager: Stefan Deck, Manfred Meyer | Trade register: HRB 611072

The gripper places the spring on the continuing conveyor system. For this purpose, IEF-Werner installs a linear unit of the euroLINE 120 series with four independent carriages. It acts as a transport axis for the disc springs to the next stations. "Our direct drives are ideally suited for such dynamic and precise handling and assembly work," Neugart explains. "The units are compact, fast and accurate in positioning and repetition." A linear motor, a displacement encoder and a guide are integrated in the series. The special feature: On the euroLINE 120, several slides can be moved independently of each other. This means that several springs can be fed and discharged simultaneously in the subsequent stations.

Reliable measurement with the press

To move the components gently on the transport axis, the four carriages push them to the respective station. "The springs are often deformed after punching," Neugart explains. Before they can be tested, they must therefore first be placed in front of the machine. This means that a slide pushes and positions the component under the first servo press of the aiPRESS series. This loads the spring with a force required to bring it into a defined shape.

After positioning, the second slide pushes two components in a double cycle to two further servo presses of the same series. "These test presses conduct a defined measuring load between 16 and 32 Newton and then measure the height," Neugart explains. In the next step, the systems release the spring. In the force measuring unit, the parameters are switched over to measure the test force (200 to 7,000 Newton) depending on the height previously measured. "Our servo presses are ideally suited for this application," Neugart says. This is because the drive train consists of a servo spindle with a matching servo drive. This is integrated in a solid and torsion-resistant steel C-frame. A precision guide, which can completely absorb the lateral forces, keeps the drive train precisely on track over the entire working path. The system is rounded off with a direct measuring optical path measuring system on the press ram to avoid positioning errors. A configuration system ensures that the drive train can be adapted exactly to the required force range.

In order to monitor the process and display the progress graphically, IEF-Werner has equipped the servo press series with the intelligent force-path monitor aiQ-CONTROL. This includes various functions such as envelopes and force-path barriers. This allows measured variables to be monitored precisely. The intelligent process room lighting aiLIGHT is also integrated in the press. The energy-efficient four-colour LED technology clearly signals the status of the system and components to the plant operator.

An industrial PC from Beckhoff serves as the control system for the plant. This communicates with the higher-level controller via the OPC-UA interface. "Warning and fault messages with message number or time stamp are stored," Neugart describes. In addition, the system transmits the measured values to a QS system via a so-called Q-DAS interface. The system checks all parts one hundred percent. The results are stored in random samples. The user interface clearly displays all values to the operator. "We have expanded our standard interface according to customer requirements," Neugart says.

Local court: Freiburg | General Manager: Stefan Deck, Manfred Meyer | Trade register: HRB 611072

In the case of bad parts, the machine distinguishes between rejects or springs that can be reworked. Depending on the result, the disc springs are placed in different closed containers. If the measured values are correct, they are transported by the MINITRANS flat belt for further processing.

Everything from one source

IEF-Werner took care of the design, the production of the components, the switch cabinet construction, the commissioning and the acceptance. "With a few exceptions, all of the components come from our company - even all motor and encoder cables," Neugart reports. This allows the specialist to respond flexibly and individually to the requirements. "The customer not only gets a servo press from us, but much more. In fact, the complete process," the product manager describes. "We relieve him of his responsibility." IEF-Werner has also trained the responsible customer personnel and, according to the maintenance contract, comes twice a year to clean and check the system and, if necessary, to calibrate it. Today, the machine runs in three shifts, seven days a week.

Meta-Title: IEF-Werner develops fully automatic handling and testing system

Meta-Description: Automation specialist IEF-Werner supplies a fully automatic testing system for springs. The heart of the system are the servo presses of the aiPRESS series.

Keywords: IEF-Werner; springs; aiPRESS; complete solution; linear axes; linear units euroLINE, servo press

7.127 Characters inkl. blanks

Local court: Freiburg | General Manager: Stefan Deck, Manfred Meyer | Trade register: HRB 611072

Captions:

Picture 1: In the first step, a slide pushes and positions the spring under the first servo press of the series aiPRESS. This loads the spring with a force required to bring it into a defined shape.

Picture 2: After presetting, the second slide pushes two springs in a double cycle to two further servo presses of the same series.

Picture 3: On the euroLINE 120, several carriages can be moved independently of each other. Thus, several springs can be fed and discharged simultaneously in the following stations.

Images: IEF-Werner GmbH

Local court: Freiburg | General Manager: Stefan Deck, Manfred Meyer | Trade register: HRB 611072