TOX PRESSOTECHNIK delivers precise press drives for automotive production line

Without delay

The new EU emission standard for trucks presents great challenges for the automotive industry and its suppliers – this also applies to Pierburg GmbH, who was asked to take on swift production of exhaust gas recirculation valves and check valves for a well-known manufacturer. The company based in Berlin relies on a state-of-the-art and flexible production line for this, with pneumohydraulic and electrical drives from TOX PRESSOTECHNIK. Together with the Dutch automation specialist Manders, the mechanical engineering company based in Baden-Württemberg ensured that the production was ready to use after just six months.

Much stricter emission regulations for trucks were recently introduced with the Euro-VI standard. The aim is to lower emissions of freight traffic on European roads and make it more environmentally compliant. As a result, truck manufacturers must adapt their engines respectively in order to reduce exhaust emissions. An important factor here is the exhaust gas recirculation (EGR): In this process, a part of the exhaust emissions is added again to the intake air. This lowers the oxygen content in the air-fuel mixture as well as the combustion temperature in the cylinders. This results in less nitrogen oxide (NO_x) emissions in the exhaust gas.

A central component of the exhaust gas recirculation is the so-called EGR valve. It is integrated into a bypass housing, in which a driven flap guides the gas back to the combustion chamber. A separate check valve prevents air from flowing back from the engine to the bypass through the EGR valve. Berlin-based Pierburg GmbH, a subsidiary of the automotive supplier Rheinmetall Automotive AG, produces these two valve types for a well known truck manufacturer on a combined production line. Short changeover times play an important role here, enabling the specialist to respond flexibly to the respective need. A flowing, semi-automated re-tooling process ensures that this procedure does not take longer than nine minutes.

Accuracy was the biggest challenge

The Dutch family business Manders Automation was responsible for the development of the production line. The EGR and check valves are produced from pre-manufactured subassemblies. The short re-tooling times were not the only challenge here, Rudy Ehren, Technical Project Manager at Manders, remembers: "In order to achieve these, we equipped the line with firmly assigned machining stations and robots with automated gripper changing systems." What proved to be much

more complicated was compliance with the requested accuracy, amongst others with which the bearing bushes had to be pressed into the valve housing. "The machines not only had to operate with utmost precision and record and store all process data, but deformations of the valve housings and the press frame had to be ruled out from the start." Therefore, Manders Automation sought out TOX PRESSOTECHNIK for support: The equally family business based in Weingarten in Baden-Württemberg specializes in sturdy and high-quality press drives for various industrial applications.

Pneumohydraulic and electrical drives in one production line

The new production line at Pierburg uses both the TOX-ElectricDrive as well as the TOX-Powerpackage: A total of three electrical servo drives and one pneumohydraulic drive are integrated into the system. The bearing bushes of the EGR valves must be pressed into their end position with a maximum tolerance of 0.05 millimeters. However, this was not straightforward: "The valve body and the press frame deform minimally due to the press-in forces. This had to be prevented", says Rudy Ehren. A mandrel was not suitable as solution, as it would have to be removed without damaging the bearing bushes. "This was impossible in this case, as we press with a force of ten kilonewton", says the project manager. A divided mold would have been an option in order to pull out the mandrel without force, but would be very difficult to implement. "Instead, we have attached an external measuring instrument between the two connectors, which records their position during pressing. This way, we can precisely measure each deformation, and countersteer accordingly by using the software."

With the external measurement it is possible to rule out any deformation of the valve body or the frame and to precisely position the components. In order to calculate the extent of pressure to be applied by the press, the measuring instrument sends its data to the TOX-Control System. As the material of the valve bodies also deforms during the pressing process, this system is particularly important. "We must monitor the speed and force precisely", says Mr. Ehren. "We fully rely here on the control from TOX PRESSOTECHNIK." The high precision with which the servo-electrical TOX drives can be driven and controlled was a crucial factor for Manders to opt for the supplier from South Germany. Adding to this was that all relevant data of the pressing process are recorded automatically – ideal for a traceable production at high quality.

Technology that impresses – just as much as the service

When producing the EGR valves, a special bearing bush is heated inductively. A TOX-Press then moves a valve shaft to the required position at a precisely controllable speed. This is then pressed

again, whereby the position of the shaft as well as the press force are measured. At the end of the line is a control station, checking each valve for its tightness and attaching a label, with which every single component can be traced. "The servo drives from TOX PRESSOTECHNIK are a real plug-and-play solution, which enabled us to start immediately", states Mr. Ehren enthusiastically. "The components also impressed us all round with regard to safety." Another bonus for Manders Automation was the close and straightforward cooperation of colleagues in The Netherlands and South Germany. "At TOX PRESSOTECHNIK, great importance is attached to service. We always received quick answers to our questions even during holidays." For the automation specialist, this flexibility is a crucial criterion – especially when complete production lines must be realized under great time pressure. "Speed pays off in the automotive industry in particular", Mr. Ehren says. "Therefore, I am certain that this has not been our last joint project with TOX PRESSOTECHNIK."

6,869 characters incl. spaces

Meta title: TOX: Precise press drives for production line at Pierburg

Meta description: Automotive supplier relies on the reliable and precise solutions from TOX PRESSOTECHNIK with regard to the flexible production of EGR valves.

Keywords: TOX PRESSOTECHNIK; Pierburg; automotive; supplier; press; EGR; valves; production line; manufacturing line; TOX-Powerpackage; TOX-ElectricDrive; control system; Manders; automation

Images:

Image 1:

Pierburg GmbH based in Berlin relies on a state-of-the-art and flexible production line for the production of exhaust gas recirculation valves and check valves for the automotive industry.

Image 2:

The new production line at Pierburg uses both the TOX-Powerpackage as well as the electro-mechanical drive TOX-ElectricDrive.

Image 3:

When producing the EGR valves, a special bearing bush is heated inductively. A TOX-Press then moves a valve shaft to the required position at a precisely controllable speed.

Image 4:

Short changeover times play an important role, enabling Pierburg to respond flexibly to the respective need. A flowing, semi-automated re-tooling process ensures that this procedure does not take longer than nine minutes.

Image 5:

The bearing bushes of the EGR valves must be pressed into their end position with a maximum tolerance of 0.05 millimeters. With an external measurement it is possible to rule out any deformation of the valve body or the frame and to precisely position the components.

Images: TOX PRESSOTECHNIK GmbH & Co. KG

The high-resolution images can be downloaded here.