

With a system for an economical universal press

ENERGY-EFFICIENT DRIVE TECHNOLOGY

How can a press series in the medium performance class be designed and produced in such a way that impresses in terms of price, technology and energy? The traditional company Dieffenbacher has found an answer using state-of-the-art industrial hydraulics from Bosch Rexroth.

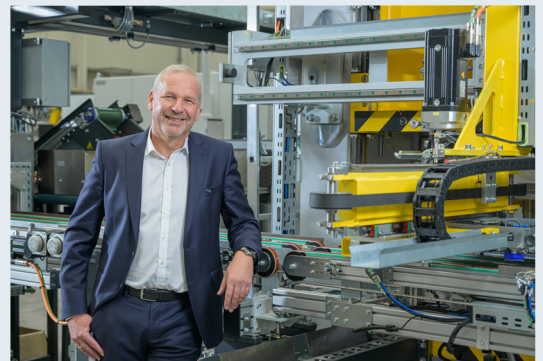
Great performance, great price – with this promise, machine and system manufacturer Dieffenbacher is addressing small businesses such as craft businesses and workshops as well as industrial companies that are looking for an economical solution for forming metal and composite components. But how can a highly versatile press for forces of 1,000 to 10,000 kN be built in such a cost-effective way that it is able to hold its own in international competition?

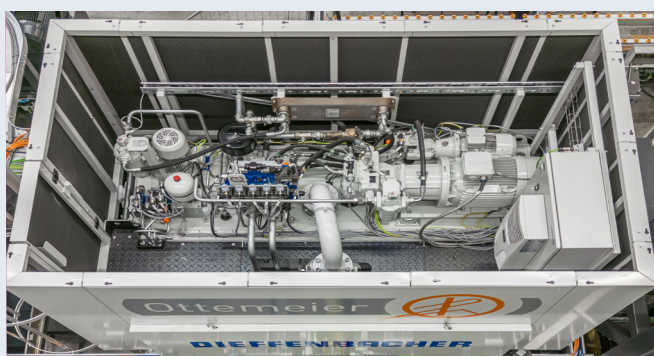
Modular drive for the TailoredPress

“We wanted to build a future-proof press from standard modules that can be customized in terms of force, installation space, table and ram size”, explains Georg Obermaier, Head of Business Unit Forming, the new TailoredPress concept from Dieffenbacher. “At the same time, we placed high demands on energy efficiency. We found both aspects were fulfilled by our system partner Bosch Rexroth, with whom we jointly designed a modular drive concept that they were ultimately able to produce for us.”

“With the new TailoredPress, we want to offer small businesses and industrial companies a cost-efficient and sustainable solution consisting of standard modules that can be customized. To combine flexibility and energy efficiency, we designed a modular drive concept together with Bosch Rexroth, which is produced in the immediate vicinity of our plant in Brno, Czech Republic.”

Georg Obermaier





Initiatives for a more sustainable forming technology

Dieffenbacher is one of the leading manufacturers of pressing systems and complete production systems for the wood-based material, forming and recycling industry. In addition, the family-run company, which is now in its fifth generation and is headquartered in Eppingen, offers a wide range of advanced solutions for sustainable energy generation. As part of its sustainability strategy, Dieffenbacher has committed itself to reducing its own greenhouse gases at its German site in Eppingen by 50 percent by 2030. An important secondary goal in the area of forming technology, the machines built should also be as energy-efficient as possible.

Technology, manufacturing and service speak for Rexroth's favor

In line with the overall concept, the drive module for the TailoredPress should be made up of standard components as much as possible. In addition to the speed-controlled power-on-demand concept, the fact that the long-standing partner Bosch Rexroth won the tender was due to its leading pump technology and well-known expertise in implementation. "Bosch Rexroth has an excellent reputation in the pressing industry around the world. The company plays in the top league in terms of technology and stands for continuity and good advice," says Georg Obermeier.

The shared production site in Brno in the Czech Republic was another point in favor of cooperation. Less than two kilometers from the Rexroth plant, Dieffenbacher is installing the pre-prepared drive modules directly onto the machine.

Modular drive concept

The modular drive concept means that the machine manufacturer can easily offer the TailoredPress in different performance and speed classes. For example, a 500-tonne version can simply be upgraded to a speed version with active high-speed parallel holding for precise component thicknesses and higher component quality by using a different pump size. The entire range of services is covered by the Bosch Rexroth pump program as required, which streamlines the processes over the life cycle from engineering to warehousing and service. Other versions with draw cushions can also be realized quickly if required using the modular system.

Power on Demand: needs-based volume flows

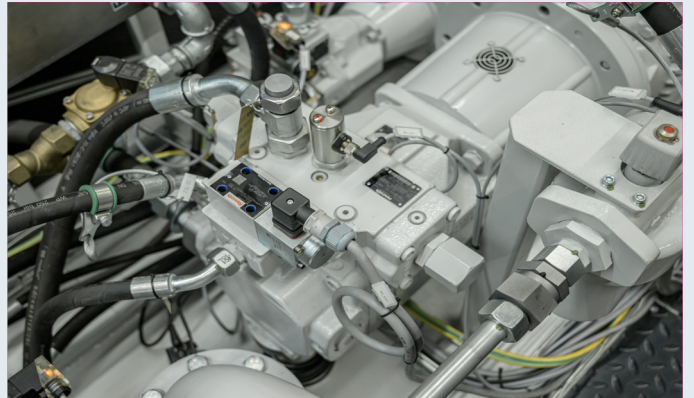
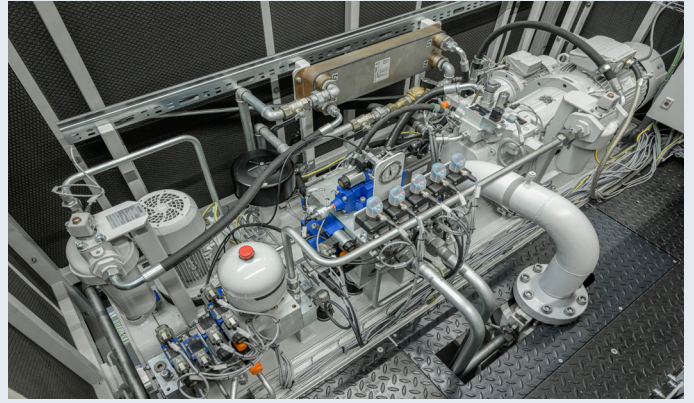
For the main drive, the modular drive concept uses a type-A4VSO axial piston variable pump in various sizes with a digital HS5 control unit, as well as the IH04 press module with standardized security concept and EG type examination certificate for performance level e category 4 in line with the requirements of DIN EN ISO 16092-3 and DIN EN 289.

A functionally equipped multistation manifold and a motor-pump unit with the A10VSO axial piston variable pump are used for the control and cooling filter circuit with water cooling. The complete package from Bosch Rexroth also includes the speed-controlled hydraulic power unit suitable for the respective press design.

The electro-hydraulic drive concept generates volume flows in line with demand - on the one hand via the swivel angle and on the other via the motor speed, allowing the pump to operate at 1.5 times the power if required. The digital control adjusts the volume flow precisely to the individual process points. If no performance is required, the pumps are switched off so that the TailoredPress consumes almost no energy when at a standstill.

Energy savings of up to 70 percent

Compared to the conventional drive with a constant speed, the optimally controlled electrohydraulics save around 50 percent of the energy previously required. Together with the adaptive battery control, the potential increases to 70 percent. The directly driven TailoredPress automatically adjusts the charging pressure of the hydraulic accumulator to the upcoming forming process. From the perspective of the operating personnel, however, nothing changes. Forces, travel and ram parameters are set as usual, the respective speeds are calculated in the background.



End-to-end digitalization for service

The new drive concept also brings advantages in terms of digitalization. Thanks to the integrated interfaces, Dieffenbacher can also deliver machines in the lower price segment economically with its EVORIS digitalization platform. In this way, the company can also offer its customers pioneering online services for the TailoredPress, such as remote maintenance, condition monitoring or data-based analyses for process improvements or predictive maintenance, and standardize and accelerate service worldwide.

Quiet operation

From Georg Obermaier's perspective, the partnership with Bosch Rexroth represents an important step towards standardization, flexibility and cost-effectiveness. "In addition to energy efficiency and digitalization, the drive technology is also impressive in terms of its compact design and noise emissions. The actual 70 dbA is much lower than our specification of a maximum sound pressure of 80 dbA." The exceptionally quiet operation has also been well received by customers, for example a control cabinet manufacturer that uses the TailoredPress in a manufacturing line for forming doors.

Economical drive technology also for retrofits

In view of these various improvements, Dieffenbacher also uses the Bosch Rexroth drive concept for retrofits. Corresponding comparative measurements have shown that the variable-speed drive achieves energy savings of between 30 and 50 percent, depending on the cycle. "Standby mode for downtimes alone usually saves 20 percent in electricity costs and indirect CO2 emissions," explains Georg Obermaier.

„We have integrated the Tailored Press into an automated line and tested it extensively. The digitally controlled electrohydraulics work very quietly and generate the right power for the exact process. As a result, our end customer saves 50 percent energy and CO2 compared to conventional drives“

Ulrich Dresselhaus from Ottemeier



From his point of view, the latest Rexroth project is also a complete success. "Thanks to the new drive concept, we can offer a future-proof press concept with attractive value for money and a fast return on investment," Georg Obermaier sums up. "The collaboration was committed and solution-oriented, from engineering and commissioning to production, support and spare parts supply. All required performance data were fulfilled as well as possible."

