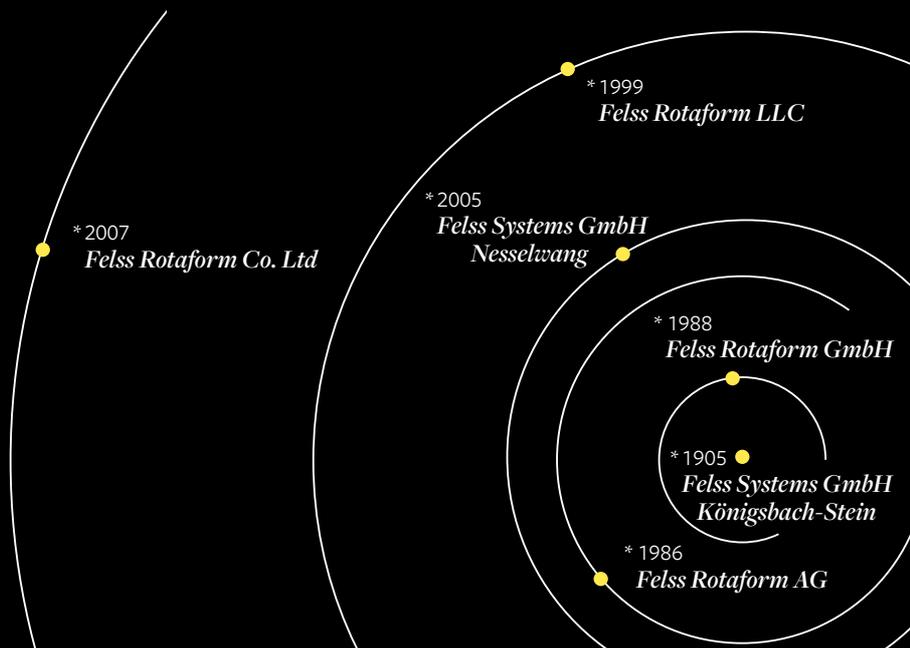


ABOUT THE FELSS GROUP

The Felss Group manufactures, under the brand name Felss Shortcut Technologies, metal processing machines and components for diverse sectors such as the automotive industry. The cold forming processes rotary swaging, axial forming, bending and tube end forming are central to the technology.

The Felss Group is a globally active group with headquarters in Königsbach-Stein. In addition to the other two German sites in Bretten-Gölshausen and Nesselwang, the company also has sites in Wujiang (China), New Berlin (USA) and Triengen (Switzerland). In 2012, the turnover was more than 100 million Euros. Felss employs more than 500 employees worldwide, of which 290 are based in Germany.

For more information please visit www.felss.com.



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JUST LIKE A CLOCKWORK

The basic principle of rotary swaging can be easily explained: Several die segments impact on the workpiece again and again in quick succession. The material starts to flow and is formed in quick succession with high precision.

PRECISION

This is why the swaging mechanism achieves the accuracy of a clock mechanism. The die segments hit the component at a rate of more than 1000 strokes per minute. The designed forming takes place through an incremental, step by step process. The actual stroke is only 0.25 to 1.5 millimeters per base jaw. A critical mechanism that is determined by the swaging mechanism of the system. In the swaging mechanism, a shaft drives several base jaws with dies. If the base jaws are positioned between two pressure rollers, the dies are in an open position; if the pressure base jaws are under a roller, the dies are closed – and impact on the component. The outer roller cage has a continuous movement resulting from the rotation of the swaging shaft and the specific curve shape of the base jaws. Compensating spacing plates or shims are fitted between the die segments and the base jaws. The outer ring, which is made up of a holding ring and a shrunk-in wear ring, is designed to take the radial forces and is responsible for the rigidity of the machine system. There are two types of rotary swaging machines: Machines with inner rotor and machines with outer rotor. The outer ring is either stationary or, in order to increase the swaging frequency, it is rotated in the opposite direction to that of the swaging shaft.

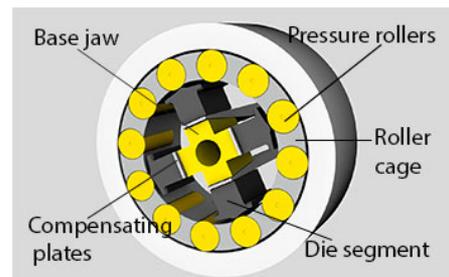


Felss Central shaft

OPTIMIZED PRESSURE BASE JAWS

Key to having perfect sequences within the rotary swaging system is also the curve profile of the base jaws. The optimized design ensures that the base jaws remain in permanent contact with the rollers. The deceleration and acceleration curve in a radial direction is therefore extremely stable – bringing with it wide-ranging advantages: Even, steady movement: There are no acceleration peaks, the blow frequency is absolutely constant and the wear on the dies is low. Long opening and short closing periods: The machine is optimally aligned. Kinematic and machine dynamics benefit from this. Continuously active drive: Roller and roller cage are driven without the need for additional machine components.

Regardless of the desired form of the workpiece, various forming procedures are used for rotary swaging: Infeed swaging, recess swaging or combined processes with or without an internal mandrel.



Structure of a Felss rotary swaging machine

MAKE and BUY

MAKE

Felss Systems:

Developing machines, manufacturing equipment and the optimal process chains

Even while developing the component, Felss cooperates closely with the customer to ensure optimal design of the transfer systems and integration into the existing production process. Sole responsibility for value creation and for the control and optimization of processes then lies with the customer. But customers can count on the support of the Felss Service team at all times: They not only undertake maintenance and training, but also provide new tools and can further develop and expand the capabilities of the system on request.

BUY

Felss Rotaform:

Component manufacturing from a specialist – also in large-batch production

The special strength of the Felss Group lies in the fact that they not only have expertise in machine engineering & construction, but also in component manufacture. Felss Rotaform is backed by the entire know-how of the group and manufactures your components on systems specifically designed for the task. The company has long moved away from focusing solely on its core technologies, undertaking non-core work such as turning, grinding, polishing, and assembly on request. For customers, the 'Buy' option means that their capital is not tied up in production facilities, giving them greater liquidity. And as additional benefits, particularly in overseas markets: No systems have to be installed and no operators trained to run them.

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