

FORMING THE FUTURE



SYSTEM SOLUTIONS FOR COLD FORGING

FORGING FROM SCHULER. BROAD RANGE OF COMPONENTS WITH HIGH OUTPUT.

Schuler forging. System solutions from Schuler offer customers worldwide a decisive advantage when it comes to quality, in all temperature ranges:

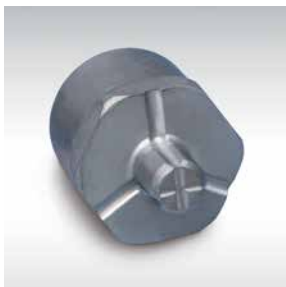
- Systems for hot forging
- Systems for warm forging
- Systems for cold forging

Cold forging enables the manufacture of components with extremely high geometrical and dimensional accuracy at high output rates. The process does not cause any scale or shrinkage and tool wear is very limited. The material is not heated prior to forming in this procedure. The work hardening that occurs during forming allows increased component strengths while using low-cost raw stock.

Cold forging systems are suitable for a wide range of components. These include motor, gear and chassis/suspension components as well as long shaft components such as drive shafts, axle or gear shafts and axles. On ironing presses, customers worldwide produce components such as CNG cylinders, CO₂ cartridges, shock absorbers and hollow shafts.

Ensuring maximum productivity: As a pioneer in cold forging, we have accrued decades of experience and specialist expertise in process development.

COLD-FORGED COMPONENTS



FORGING FROM SCHULER. TURN-KEY SYSTEMS.



Knuckle joint press with automatic feed, NC transfer system and finished part output.

PERFECT HARMONY.

In addition to presses, as a turn-key partner in cold forging, Schuler supplies complete systems tailored precisely to customer requirements. Depending on these requirements and the degree of automation, the systems consist of a billot feed, automation and component discharge system. Innovative die change and clamping concepts minimize non-productive times. Safe and easy operation of the systems is facilitated by modern operating and safety concepts. Solution-based concepts taking into account optimum material flow and local conditions are developed together with the customer.



Multi-station hydraulic cold-extrusion press with 25,000 kN press force.

Advantages:

- System solution from a single source for maximum possible benefit for the customer
- Outstanding performance due to precise coordination of all components
- Standardized operating concept
- 3D layout planning right from the outset to increase planning certainty
- Minimal project planning work even for complex lines

Schuler is always focused on achieving full customer satisfaction.

SYSTEMS FOR COLD FORGING. HYDRAULIC PRESSES.

INNOVATIVE SOLUTIONS FOR INDIVIDUAL REQUIREMENTS.

As a world market leader in hydraulic cold forging, Schuler boasts many years of experience. Innovative solutions coupled with carefully selected, reliable components ensure maximum possible output with maximum availability. The intelligent press control system made by Schuler plays its part here, providing easy operation. To constantly improve the efficiency of its systems, Schuler is continually working on new solutions. One example of this is the patented Schuler ring valve and the energy-saving EHF (Efficient Hydraulic Forming).

The advantages:

- Maximum possible output even in the case of complex components
- High availability thanks to tried-and-tested technology
- Low maintenance costs thanks to modular design and high-quality components
- User-friendly and easy operation
- Efficient energy management with state-of-the-art technology
- Transparent recording and evaluation of product data

EFFICIENT HYDRAULIC FORMING (EHF)

Efficient Hydraulic Forming is used by Schuler to considerably reduce the energy required by hydraulic presses. In particular, it comes into play for processes with long non-productive times. And this also means: automatically, without the intervention of the operator, for all processes, in every operating mode – and in all performance classes!

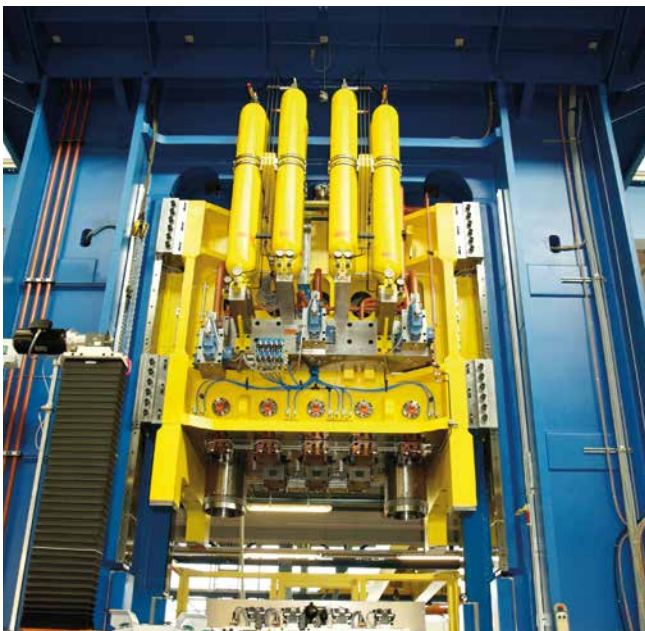


Multi-level hydraulic cold-extrusion press with 16,000 kN press force.



SYSTEMS FOR COLD FORGING.

HYDRAULIC COLD-EXTRUSION PRESSES.



Multi-level hydraulic cold-extrusion press with 16,000 kN press force.

MAXIMUM EFFICIENCY THANKS TO FLEXIBLE PRESS TECHNOLOGY.

The high level of flexibility of hydraulic systems thanks to the freely programmable strokes, forces and speeds allows for a broad range of applications in cold forging. Hydraulic single- and multi-stage presses stand out particularly here for their unlimited working capacity, which offers crucial advantages for long shaftshaped components in particular. The characteristics of hydraulic presses are also ideal for calibrating components. In addition to the vertical forming systems, Schuler also offers horizontal solutions.



Horizontal hydraulic cold-extrusion press.

Advantages:

- Flexibly adjustable force/displacement profile to optimize processes
- Unlimited working capacity
- Individually controlled ejectors to reduce set-up times
- Rigid press frame for minimal tilting values and maximum precision
- Adjustable stroke limitation for precise configuration of BDC

SYSTEMS FOR COLD FORGING. MECHANICAL KNUCKLE JOINT PRESSES.



Knuckle joint press with 6,300 kN press force.



Knuckle joint press with ServoDirect Technology.

A STEP-BY-STEP APPROACH TO COST-EFFECTIVENESS.

Owing to their large stroke range, knuckle joint presses are suitable both for mass production of small components as well as for production of shafts in large quantities. State-of-the-art control systems allow for easy integration of the presses into fully automated manufacturing systems.

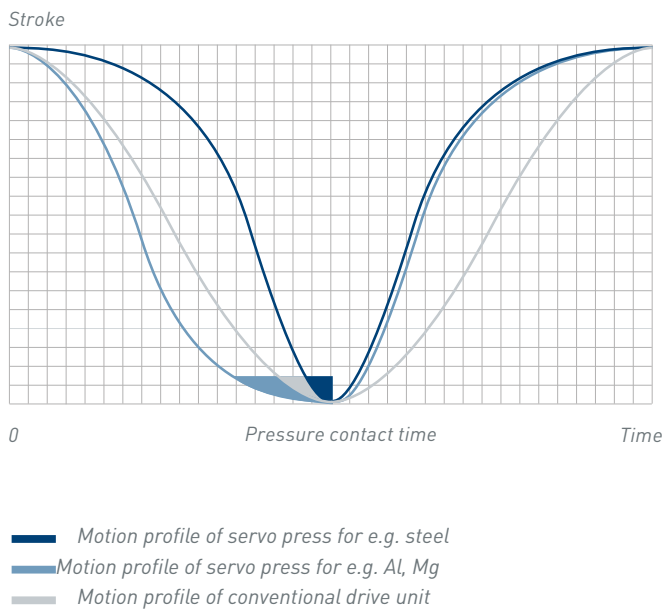
The large number of features and additional functions of bed and slide ejectors, feed, transfer and die change allow optimization of the systems specifically for certain applications, or flexibly for a wide range of applications.

The advantages:

- High output rate
- Reduced forming speed
- Longer die life spans
- Wide range of applications

Due to the different kinematics that can be chosen, these presses can also be configured for warm forging.

SYSTEMS FOR COLD FORGING. MECHANICAL ECCENTRIC PRESSES.



ServoDirect Technology enables the slide movement to be individually programmed.

BROAD RANGE OF COMPONENTS AND HIGH PRODUCTION STROKE RATES.

The eccentric presses from Schuler require considerably less space than conventional drive units with several eccentric gears. This allows a more compact press construction with increased rigidity. Combination with a servo drive extends the advantages of this drive concept to include free programmability of the slide curve and therefore the speed and acceleration profile. The result is an extremely flexible manufacturing system for a broad range of applications.



Eccentric press with ServoDirect Technology.

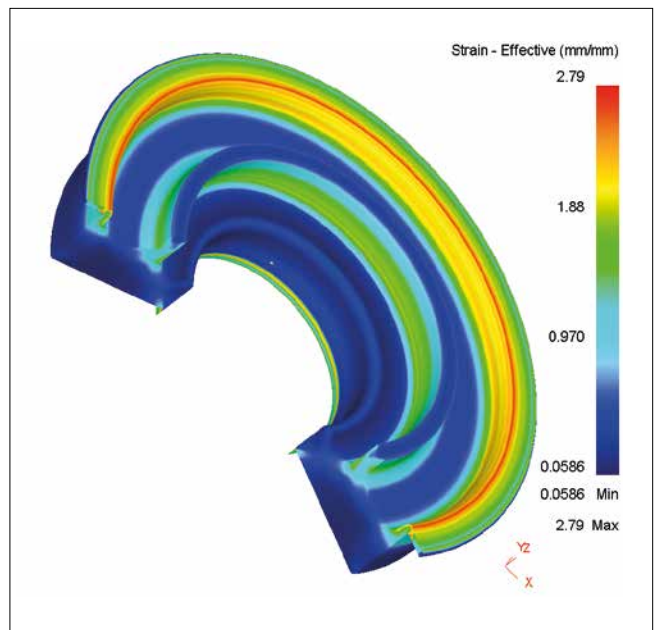
The advantages:

- Increase in output rate
- Slide speeds and motion sequences can be programmed individually
- Optimum adaptation to the forming process
- High component quality and long die service lives
- Adaptation of slide motion to the transport process
- Sensitive tryout operation possible
- Optimized energy consumption

DEVELOPMENT OF PROCESSES AND PROCEDURES.



Forming stages of a shaft.



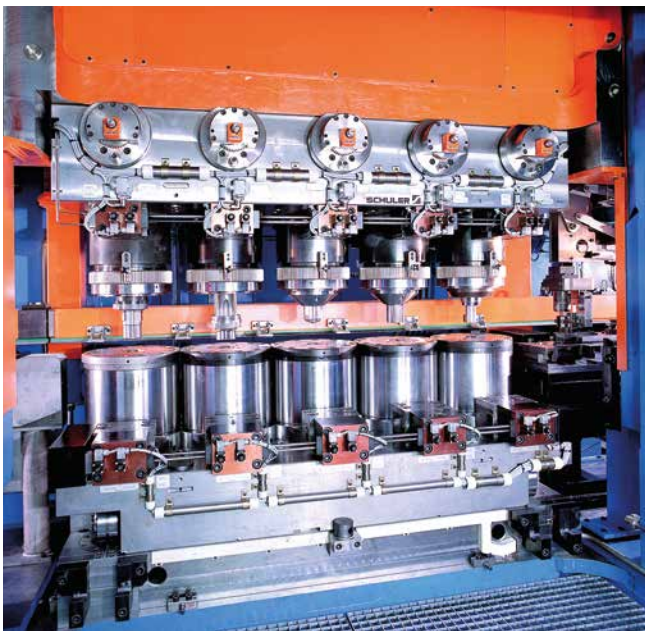
FEM simulation.

PRESS PART DRAWING AND TOOL SEQUENCE LAYOUT.

As a full-service provider, Schuler not only manufactures presses, but also in particular delivers – in addition to other system parts – the holistic development of processes and procedures from a single source. In the project planning stage, the press part drawing and tool sequence layout form the basis for the efficiency assessment. Development is based primarily on experience, and Schuler can draw on decades of practical experience here. Development is also supported by tools such as the forming simulation or design programs. Some of these have been developed by Schuler itself.

When preparing the press part drawing, there are various boundary conditions to be considered. For example, where low quantities are required, a process with few forming stages is to be sought and more extensive machining rework must be expected. Furthermore, in the tool sequence layout we specify the forming unit required, the die system and the transfer system. To achieve the optimum result, these parameters must also be considered at the same time.

DIE SYSTEMS AND DIE CHANGE.



DIE DEVELOPMENT.

In addition to specifying the die change concept, the primary focus when developing dies is on the design of the punches and dies. Modern solid dies usually have a multiple-stage design. This allows additional forming, calibration, perforation and cutting processes within the same work process. Special dies such as closing dies can also be used. This reduces the die and manufacturing costs considerably.

In the transfer study, the profile of all moving axles (slide, ejector and transfer axles) are tailored to each other. The data obtained from this study, such as the travel and the starting and end point of the movement, can then be transferred directly to the machine control.

AUTOMATION FROM SCHULER. TRANSFER SYSTEM SOLUTIONS.



The robust and highly dynamic Compact Mono Beam is perfectly suited to all requirements.

FLEXIBLE TRANSFER SYSTEM SOLUTIONS WITH POSITIONING ACCURACY.

The Schuler tri-axial servo transfer is the reliable solution when maximum positioning accuracy is called for. Electrically-driven and servo motor-driven gripper rail systems form the basis for this concept. They not only enable the motion sequence to be freely programmed and therefore optimally adjusted to the forming process.

If the tri-axial servo transfer is also combined with a servo press drive, an optimized forming and motion process is also achieved for optimum results. All grippers are equipped with quick disconnect coupling systems that



Alternatively, the Double Beam can be used.

enable fast replacement without any long production downtimes.

The advantages:

- Tri-axial servo transfer for maximum positioning accuracy
- Extremely economical, due to fast parts transport
- Servo drive allows freely programmable motion sequences
- Available with active or passive grippers, depending on the requirements of the parts geometry
- Quick disconnect coupling system for fast gripper replacement

SCHULER SERVICE.

STATE-OF-THE-ART SERVICE FOR MORE PERFORMANCE.

Schuler Service offers a tailored portfolio of services covering the entire life cycle of your equipment.

Over 900 service employees worldwide provide expert support 24/7 in close cooperation with you – our partners. Our main priority is always to ensure the maximum productivity and safety of your production equipment in order to secure your company's continued success.

With over 175 years of experience and expertise, we can guarantee the best possible support for the operation of your machines – and not only those supplied by Schuler, but by all other manufacturers. Whatever the situation, Schuler Service has the right solution for your specific needs.



[www.schulergroup.com/
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ABOUT THE SCHULER GROUP – WWW.SCHULERGROUP.COM

Schuler is the world market leader in metal forming technology. The company supplies presses, automation solutions, dies, process know-how, and services for the entire metalworking industry and lightweight automotive design. Customers include automobile manufacturers and suppliers as well as companies from the forging, household appliances, packaging, energy, and electronics industries. Schuler is the leading supplier of minting presses and supplies system solutions for aerospace, rail transport, and large pipe manufacturing. Following the acquisition of toolmaker AWEBA and a majority stake in Chinese press manufacturing company Yadon, Schuler employs around 6,600 members of staff in 40 countries. The Austrian ANDRITZ Group holds a majority share in Schuler.

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