



## Servo presses in forging applications



# ServoDirect technology – for the requirements of today and tomorrow

## **PRACTICALLY ORIENTED CONSULTING**

From component development to process and procedure development – we work out the most efficient solution with you.

## **HIGH EFFICIENCY**

High availability with optimum output levels, significantly longer die lives as well as shortest pressure contact times for lower service and maintenance costs when using our servo presses – giving you even more efficiency.

## **BEST COMPONENT QUALITY**

Consistent quality of components is guaranteed, even when complex parts are involved. With servo presses, it is possible to achieve a significant productivity boost compared to conventional mechanical presses.

## **GREAT FLEXIBILITY**

The slide movement can be adapted to various process requirements. Not only stroke heights but also forging speeds can be programmed individually. This means even materials which are challenging in terms of forging can be manufactured in an optimized process.

## **MAXIMUM PROCESS RELIABILITY**

Adapted forging speeds guarantee a stable production process as well as the best forging results. Reduced heat absorption means that better die service lives are achieved, with consistent product quality.

## **BEST ENERGY EFFICIENCY**

Compared to conventional presses, presses with ServoDirect technology generally consume less energy per part produced. This is because there are no heat losses in the connected clutch/brake units.

## **RELIABLE SERVICE**

Extensive service provision for all aspects of press and automation technology ensures smooth operation of the machine. Whether technical service, measures to increase performance or individual training – the Schuler service team is available anywhere in the world.



PUT IT INTO MOTION. FORGING WITH SCHULER.

## Forging presses with ServoDirect technology

Automated forging presses have been used since the 1960s, operating either in switched mode or continuous running mode. The production output rates depend on the pressure contact times and the corresponding heat load to the dies. Servo drive systems have been used successfully in sheet metal forming for years. Now its advantages are also introduced in the forging environment.

### Increased productivity with optimized pressure contact time

At Schuler, new machine concepts have specifically been developed for forging applications based on servo drive technology. Production output rates of 40 parts per minute can be achieved. Up to forming forces of 25,000 kN servo driven presses are designed without a conventional flywheel drive. Only for forging presses with 25,000 kN or higher the corresponding high forging energies are additionally taken from a mechanical flywheel which is added to the servo drive.

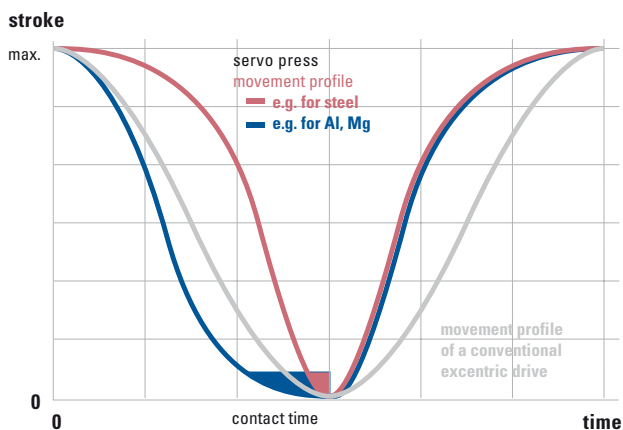
### ADVANTAGES

- shortest pressure contact times
- smooth handling sequences in automatic mode
- longer spraying times
- productivity boost
- wide product range
- adaptation of slide kinematics for materials with critical forging properties
- further reduction in cycle times when operating in shuttle mode

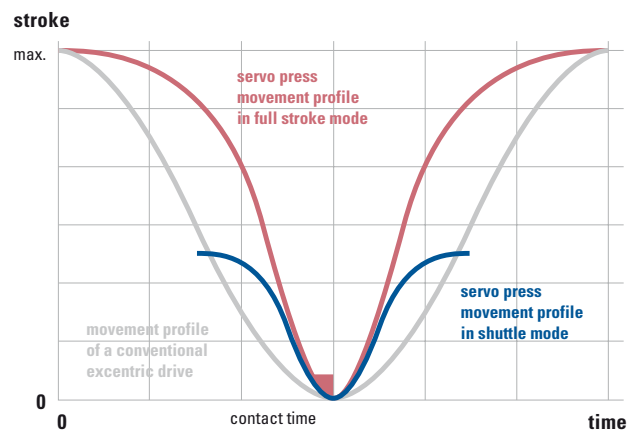
### Performance without restrictions: Schuler servo presses compared to conventional technology for hot forging

		Pressure contact time [ms]	Production output [parts/min]	Thermal capacity at 1250 °C [kW]	Restrictions
Press 1	Horizontal, continuous, every station occupied	160	60	75	Press force, symmetrical parts
Press 2	Continuous run, every 2nd station loaded	150	30	35	
Press 3	Switched mode, every station loaded	120	25	25	
Servo press	Continuous run, every station loaded	110	40	35	

Example for typical hot forging process e.g. wheel hub with 20.000 kN forming force



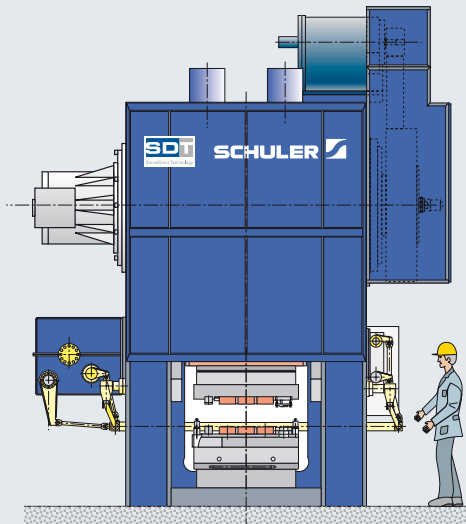
ServoDirect technology allows the slide motion to be programmed individually



Operating in shuttle mode can reduce the cycle time even further

## SERVODIRECT TECHNOLOGY FOR FORGING

### AUTOMATED FORGING PRESS FROM 25.000 KN FOR HOT FORGING



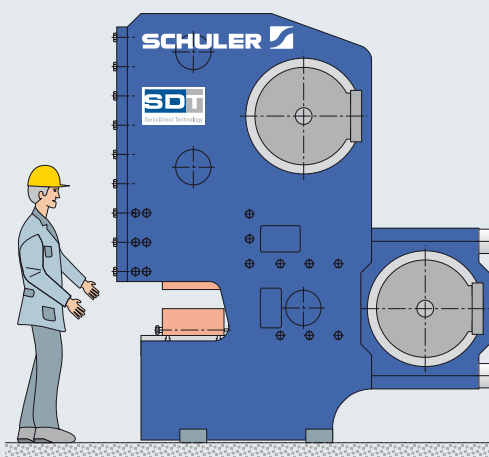
### DOUBLE IS BETTER

Compared to the sinusoidal ram kinematics of conventional press designs, the innovative servo drive with added flywheel energy in switched mode offers a decisive step forward. This design is especially suitable for heavy duty forging operations with 25,000 kN and more. BDC is passed with shortest pressure contact times. On the other hand, the slide moves through TDC more slowly. This ensures extended spraying and handling times. Production output rates of up to 40 parts per minute can be achieved. There are no restrictions on the range of parts and the forging forces.

#### Advantages:

- rigid design with triple bearing of the crankshaft and an extremely wide bed
- dual drive with conventional flywheel and servomotor
- link-up between the drives
- extremely short pressure contact times and correspondingly reduced thermal load to the dies

### BIDIRECTIONAL FORGING PRESS



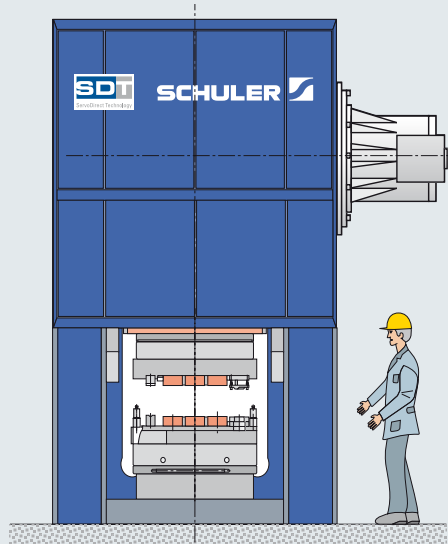
### FORGING IN TWO DIRECTIONS

Conventional horizontal forging machines are mechanically linked in their clamping and upsetting slide movements. It is only possible to adapt the movement kinematics to the forging process within certain limits. The new design of the bidirectional forging press with two independent servo motors achieves highest production output rates and improves the adaptation of the forming process to characteristic material behaviour. Furthermore, shortest pressure contact times can be achieved in the clamping and upsetting work sequence.

#### Advantages:

- robust structure
- independent movements of the clamping slide and the upsetting slide due to two servo drives
- high output
- double overload protection with force and torque limitation
- energy efficiency due to current consumption at different times

**FORGING PRESS UP TO 25.000 KN  
FOR HOT FORGING**



**SIMPLE STRUCTURE**

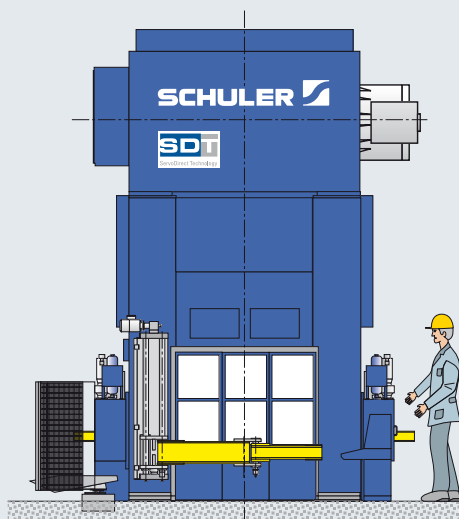
Forging presses up to 25,000 kN are designed without a separate flywheel drive. They draw their energy from the motion of the rotating masses and the torque from servo motors.

One or more torque motors operate directly or via a step-down gear unit on the main drive shaft. These types of presses are suitable for single-stroke operation as well as fully automated forging.

**Advantages:**

- rigid design with triple bearing of the crankshaft
- simple structure without flywheel
- no clutch/brake
- one or more maintenance-free servo drives
- programmable slide kinematics
- shortest die contact times/reduced thermal load to the dies
- wear free operation in single stroke mode possible

**FORGING PRESS UP TO 25.000 KN  
FOR COLD AND WARM FORGING**



**FROM LONG TO COLD**

The combination of the eccentric drive or a mechanical link drive with the ServoDirect motor advantageously lead to highly flexible production systems with increased efficiency. This press type is especially suitable for long-shaft parts with high energy consumption over an increased forming path.

**Advantages:**

- long stroke
- programmable slide kinematics
- no clutch/brake
- no mechanical flywheel
- link drive or eccentric drive with one or more servo motors



## More. Service from Schuler.

### Technical service

- Maintenance and servicing
- Machine inspection
- Safety inspection
- Preventive maintenance
- Energy checks
- Teleservice
- Overhaul
- Machine relocation
- Machine installations

### Performance enhancement

- Optimization
- Modernization
- Die and process technology

### Training

- Schuler Academy
- Production start-up support

### Used equipment



### Service worldwide:

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