Press handling solutions
Customized electronic part transport in the press shop

siemens.com/metalforming

Answers for industry.

Cost-effective workpiece transport is essential for presses. With this in mind, Siemens offers you the optimum solution for every handling or transport application in your press system. This ranges from feeding up to stacking pressed parts, and is applicable for stand-alone presses as well as for large transfer presses and press lines. The SIMOTION motion control system and the SINAMICS drive family equips your press to handle even the toughest of application environments. Our products can be universally used and quickly applied. Further, they use open communication interfaces and are equipped with integrated safety functions. They are complemented by additional components that increase the part yield and availability. Siemens solutions always precisely fit your requirements as a result of their design – cost-effectively and flexibly.

SIMOTICS S-1FK7/1FT7 motors

- Servomotors for dynamic applications
- Sturdy, vibration-isolated encoder mounting
- Safety-relevant encoders and encoder mounting for precise closed-loop speed/position control

Motion control system SIMOTION D

The modular SIMOTION control platform and the SCOUT engineering tool shorten valuable setting up and maintenance times and reduce costs. The systems can be flexibly integrated into plants of any size.

- Motion control system for automation tasks, motion and technology functions
- Automation and motion control functionality in one controller
- Lower engineering and commissioning costs as a result of SIMOTION SCOUT’s modular operating control and programming concept
- Synchronization of multiple SIMOTION controllers for distributed synchronism, e.g., for servo press, electronic transfer and roll feed

SINAMICS S120

- One interface for automation, motion control and safety via PROFINET/PROFISAFE
- Encoder evaluation, also for indirect measuring systems (machine encoder) and in conjunction with a Drive-CLiQ encoder, even without requiring any additional encoder evaluation module
- Energy buffering to ride through power failures by connecting to a common press DC link or by using electrical or kinetic buffer
- Deterministic and high-performance gripper and suction control using the TM15/17 hardware cam output module

Safety

- SINAMICS S120 with Safety Integrated functions for safely setting up the press with the protective doors open
- Safe bus communication between SINAMICS S120 and a fail-safe SIMATIC F-CPU
- SIMATIC HMI Mobile Panel with acknowledgment button and handwheel for teaching in

Configuration example of a press handling system
Feeder – SIMOTION SimoFeed

Feeders in press lines transport parts and facilitate simple loading and unloading operations. SIMOTION SimoFeed sets itself apart as it reduces mechanical stress on parts and components. The flexible programmability decreases production idle times and extends maintenance cycles.

The details

- Motion programing via table or breakpoint table
- Parameters: Position, velocity, acceleration, jerk, dwell time, target address
- Adjustable, password-protected machine data (e.g. maximum velocity values)
- Smoothing window (holding position for advance to the next step)
- Output and acknowledgment of M functions (e.g. controlling the suction equipment)
- Teaching in position data
- Free transformation interface for customer specific kinematics (LK Trans)
- Operating mode manager
- Vibration Extinction (VIBX)

Electronic Transfer – SIMOTION SimoTrans

For an electric transfer system, together with the SIMOTION SimoTrans application, positioning drives running in synchronism with the press instead of mechanical drive elements result in motion control that ensures that machines and workpieces are subject to extremely low stress levels.

The details

- Coupling of the motion system to a higher-level leading value, e.g. a press encoder or a virtual encoder (servo press)
- Traversing based on standard motion laws, therefore achieving favorable jerk and impact relationships
- Support of different press versions using modular program architectures that can be parameterized
- Plausibility check of the entered traversing data
- Calculation of maximum stroke rates with velocity optimization for longer traversing distances
- Visualization of the various motion sequences
- Free transformation interface for customer specific kinematics (LK Trans)
- Operating mode manager
- Press Line Simulation (PLS)
Roll feed – SIMOTION SimoRoll  
– SINAMICS DCC SinaRoll

Using the application flexible roll feed automation can be implemented offering many advantages over the frequently complex mechanical designs. This places extremely low stress levels on the various parts and components as a result of the especially favorable jerk and impact relationships.

The details
• Relative positioning (incremental dimension) for material feed with an accuracy of one cycle
• Program blocks for the feed motion (traversing profile modulation)
• Special algorithms to avoid slip – with optimized positioning and measurement of the utilization level
• Roll release, automatic strip threading function and banding monitoring
• Roll diameter correction
• Input of a maximum velocity and velocity override
• Leading axis coupling for motion control via cam
• Coupling of the motion system to a higher-level leading value, e.g. a press encoder or a virtual encoder (servo press)

Blanking system – SIMOTION SimoBlank

A compact design increases the throughput of your blanking line – the SIMOTION SimoBlank technological application supports you with the new automation structure that is required. Efficient and fast, cut for cut, from the coiler up to the cutting press.

The details
• Core functions: Unwinder, leveller, loop storage pit and roll feed
• Calculation of the maximum stroke rate as a function of the feed length
• Favorable jerk and impact relationships using traversing profiles based on higher order polynomials
• Relative positioning (incremental dimension) for material feed with an accuracy of one cycle
• Roll diameter correction
• Input of a maximum velocity and velocity override
• Various closed-loop control techniques for material withdrawal from the coiler
Expanded functions for higher performance

Vibration Extinction (VIBX)
By changing the command variable of an axis, the OA technology package OAVIBX reduces the natural frequency oscillations of the moving mechanical system. Positioning without any oscillation is achieved and the stress on the mechanical system is reduced. This increases the availability as well as the part yield and overall productivity. Effects of the setpoint filter (VIBX) can be simulated via PLS.

Active actual value filter and deadtime compensation
Axes coupled to leading values, for example in the electric transfer system or roll feed, are always subject to oscillations, coupled in through external encoders. SIMOTION uses the special “external encoder” Technology Object. This filters out oscillations, and by entering an extrapolation time, compensates dead times caused by the different signal propagation times of the various components, therefore preventing collisions. This means that the handling equipment operates with low disturbances and oscillation levels, therefore increasing the overall availability of the plant.

Free transformation interface (LK Trans)
Almost all kinematics can be seamlessly integrated into SimoFeed and SimoTrans applications.

Setpoint and actual value filters minimize path motion oscillation – special filters for precise, harmonious path motion.

An extensive range of simulation routines allows potential collisions and workpiece damage/destuction to be identified early on, therefore increasing the availability of your press line.

SIMUMOTION Kinematic Transformation is a universal module that is available for integrating individual kinematics, thus ensuring full system flexibility at all times.

Press Line Simulation (PLS) – simulation and kinematic tool for inter-press handling
The PLS subpackage provides extensive simulation routines – for example to synchronize the press ram with the transfer system to avoid collisions, and also optimization of the travel cams and workpiece ejection mechanism to increase the stroke rate. The use of simulation software is indispensable when it comes to complex kinematics, which require coordinate transformation. PLS also monitors the acceleration of the parts to be transported, in order to prevent possible loss when using suction equipment. A standard communication interface between SIMOTION and PLS facilitates the transfer of the knowledge gained from the simulation to the machines, quickly and at a favorable cost – and more specifically, without interrupting production or causing machine downtimes.

• Programming of the motion profiles for electronic transfer systems identical to SIMOTION SimoTrans
• Customer specific motion profiles can be included
• Generation of motion profiles for servo presses integrated (OACAMGEN)
• Effects of the setpoint filter (VIBX) can be simulated

Expanded functions for higher performance
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<th>The applications that you can address</th>
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<td>• Blanking line</td>
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<td>• Roll feed</td>
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<td>• Electronic transfer</td>
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<td>• Feeder system</td>
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<td>• Front of line</td>
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<td>• Press Line Simulation</td>
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<th>Overview of the advantages</th>
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<tr>
<td>• Highest degree of flexibility as a result of scalable products, systems and solutions</td>
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<td>• Free parameterization of the motion control for time-optimized, low-vibration motion</td>
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<td>• Open application solutions that can be individually adapted by the OEM</td>
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<td>• Complete package of hardware and software solutions with integrated safety from a single source</td>
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The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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