At all production machines, particularly metalforming presses, ensuring a high level of safety is of fundamental importance in order to avoid hazardous situations during the manufacturing process. This can be done by equipping the machines with safety-guaranteed components. However, the operator has to intervene more frequently during the production processes under normal operating conditions, the machine-specific control systems must be able to prevent a hazardous movement of the machine due to failures of the control system.

The SIMOTION Safety Unit TM 121 has been developed to meet such requirements. Furthermore, personnel in order to avoid hazardous situations during production, arrangements have to be made for the protection of the operating personnel. This can be done by equipping the machines with safety gates or light curtains.

Function blocks

The safety-related function blocks are stored in the Safety Unit. These function blocks are already completely programmed in the parameterization software and stored in the Safety Unit. These function blocks are inserted repeatedly within a parameter set.

Example: Function-blocks for mechanical presses

- Two-hand operation
- Safe rotation monitoring
- Safe evaluation of cam signals
- Safe mode selector switch
- Control and monitoring of safety valves
- Safe rotation monitoring
- Foot operation
- Emergency stop link
- Safety gate and guard monitoring

Further information can be found at: www.siemens.com/metalforming

Sample screen of parameterization software
At all production facilities, particularly presses, arrangements have to be made in order to avoid hazardous situations during the manufacturing process. This can be done by equipping the machines with safety devices that can be set to different sensitivity levels in order to avoid hazardous situations during the manufacturing process. The safety relay or control system is able to make errors and can be set to different sensitivity levels in order to avoid the cutting mechanism to continue operation under certain conditions. The machine manufacturer must be informed in this case. This ensures the safe operation of the machine and prevents the occurrence of hazardous situations under the machine due to failure of the HMI-GUI and mechanical system.

The SIMOTION Safety Unit (SMU) has been developed to meet such requirements. It is designed to meet the following safety requirements:

- EN 61496-1 safety-related control parts of machines category A
- IEC 61508 Functional safety of electrical/electronic/pneumatic safety-related systems, complete with A1.2
- EN 61496 safety of control systems, process safety and personnel safety. Examples were considered at higher degrees of severity, e.g., full motor control systems or BMS

Thus these requirements for implementing safety functions at machines including manually operated presses (the flatbed) throughout Europe and for ANS, DoM and SAE safety.

Example:
Function blocks for mechanical press
- Two-hand operation
- Safe part input (acceleration, deceleration, transfer)
- Operation mode selection
- EMERGENCY STOP (power disconnect), engagement lockout
- Clutch/brake combination control (with monitoring)
- Safety gates / guard / light curtain motion sensor control (through frequency input)

These functions can be adapted using the parameterization tool.

Further information can be found at www.siemens.com/safetyforming

SIMOTION Safety Unit

Stand-alone solution

Safety Unit

Safety function

DI / DO / AO / AO-DRS

Photo-interferometer (plug-and-play)

SIMOTION Safety Unit - topology - packaged

Redundant (two-channel) electronic processor system with
- 32 safety-related inputs, 24 V
- 8 safety-related outputs, 24 V, 2 A
- standard outputs, 24 V, 0,5 A
- 2 safe frequency inputs, 24 V, 50 mA
- 4 safe analog inputs
- 2 safe analog outputs: single- or double-channel (PIN) switching
- Power supply: 24 V DC

Mech. strengths:
- Limits the degree of severity in the case of mechanical stress according to EN 61496

Facts
- SIMOTION Safety Unit
- SIMOTION Safety Ultramax

Safety functions:
- Two-hand operation
- Foot operation
- Emergency stop
- Safety gate and guard monitoring
- Safe mode selector switch
- Control and monitoring of safety values
- Safe elimination of safety signals
- Safe rotation monitoring

Sample screen of parameterization software

SIEMENS AG

Automation and Drive
Motion Control Systems

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Subject to change without prior notice
solutions for metalforming

SIMOTION Safety Unit

At all production machines, particularly in metalforming, it is essential to the safety of personnel in order to avoid hazardous situations during the manufacturing process. This can be done by equipping the machines with safety-guaranteed components. If, however, the operator has to intervene more frequently during the production process under normal operating conditions, the machine reactions must be controlled, e.g. by speed monitoring, to prevent a hazardous movement of the machine due to failures of the control system.

The SIMOTION Safety Unit™ 121 has been developed to meet such requirements. It is designed to meet the following safety requirements:
- EN 61496 safety of machines
- IEC 61508 Functional Safety of electrical/electronic/programmable safety-related systems
- EN 954-1 safety-related controller parts
- IEC 61511 Safety of machinery

It fulfills a higher degree of severity in the case of mechanical stress according to EN 61496.

Further information can be found at www.siemens.com/metalforming

SIMOTION Safety Unit-technical data

Mech. strength:
- 24 V DC

Power supply:
- 24 V DC

Inputs:
- 2 safe frequency inputs, 24 V, 500 Hz
- 8 standard inputs, 24 V, 0.5 A
- 32 safety-related inputs, 24 V

Outputs:
- 8 standard outputs, 24 V, 0.5 A
- 8 safety-related outputs, 24 V, 2 A

Function blocks:
- Function blocks for mechanical presses
- Function blocks for punch presses (e.g. C7, S7-300)
- Example:
  - Function block for mechanical presses
  - Two-hand operation
  - Safe rotation monitoring

Further information can be found at www.siemens.com/metalforming

The information provided is subject to change without notice, the user is responsible for ensuring that the equipment is suitable for the intended applications. The user is responsible for ensuring that the equipment is used accordingly.

Sample screen of parameterization software

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Further information can be found at www.siemens.com/metalforming

SIMOTION Safety Unit

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