Siemens Servo Press Energy Management

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Metal Forming

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So .. You Want a Servo Press
How Much Energy will it use?
Servo Press Power Requirements
2000t - 550kJ – 30spm

Elec Service Req’d 2400amps
3x2000 awg THHN/Phase
Transformer $$/Main Disc $$
Buss Connection $$
Servo Press System Calculations

![Diagram of Press System Calculations]

- **WP Force:** 2000 N
- **Stroke:** 4.9 mm
- **Angle:** 170°

**Theoretical WCap:** 330.0 kJ
**Real WCap:** 324.6 kJ

- **Motor:**
  - **Type:** 1PH8358.7
  - **Infeed (kW):** 290.0

- **Profile:**
  - **Crank Angle (°):** 60, 120, 180, 240, 300, 360
  - **Speed:** 28.3 str/min

- **Torque:** 1000 Nm, average: 495 Nm

Industry Sector

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Optimized Energy Efficiency for Servo Presses for Manageable Energy Supply

Kinetic energy storage

Electric energy storage

SINAMICS S120
ALM=Active Line Module
MM= Motor Module
Integrated Servo Press Automation with Energy Management Systems

► Maximum flexibility: thanks to scalable products, systems and solutions.
► Designed with standard components.
► Pre-engineered function blocks for faster time-to-market
► Reduced energy consumption compared to a conventional press.
► The power demand from the mains supply can be engineered.

Automation example for servo presses

- SIMOTION D4x5 Press controller
- SINAMICS S120 ALM + AIM Motor Module
- Energy storage DC-bus capacitors Kinetic storage
- 1FW3/4 torque motor Press main drive
Automotive reference
25,000 kN (2,750 US tons) servo press at German prime car manufacturer

Press specification @ full force:
- Parts per minute: 30 spm
- Forming speed: max. 17 spm
- Working capacity: 1,000 kJ
Energy management systems at a glance
Example: 2,750 US tons at 30spm with 1,000kJ load at 6"

Without energy management
Nominal grid input power: 2.100 kW
Performance parameters:
- Average power: 698 kW
- Max. input power: 3,855 kW
- Feedback power: -2,486 kW
- Power fluctuation: ∆6,341 kW

Semi sized energy management
Nominal grid input power: 1.800 kW
Performance parameters:
- Average power: 716 kW
- Max. input power: 2,751 kW
- Feedback power: -1,755 kW
- Power fluctuation: ∆4,506 kW

Full sized energy management
Nominal grid input power: 900 kW
Performance parameters:
- Average power: 754 kW
- Max. input power: 877 kW
- Min. input power: 558 kW
- Power fluctuation: ∆319 kW

+ Simple to engineer
+ Reduced investment costs

- Very high oscillating load
- Oversized transformer
- Higher investment for infrastructure
- High line peaks and feedback to line
- Increased energy costs
Energy management systems at a glance
Example: 2,750 US tons at 30spm

+3.7 MW total motor power
~ 250kW line power
-4 MW total flywheel power
2 sec.
How energy is transformed from cost factor to success factor
Example: 2,750 US tons at 30spm with 1,000kJ load at 6”

Total Cost of Ownership

- Increasing energy efficiency quickly results in companies being able to slash their energy costs by 15 percent and more – with payback times that are often less than two years.
Thank you for your attention!

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