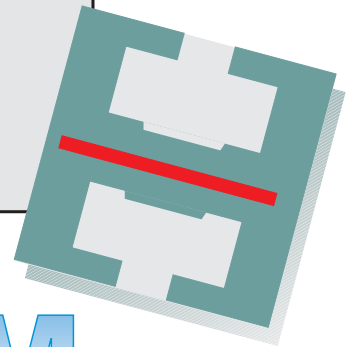


## ELT 2000 Transfer Controller

Product Brief

November 2000



Multi stage presses and large transfer presses have integrated transfer systems which ensure the transport of the parts from stage to stage.

The workpieces are transported by means of a gripper rail system with two or three directions of motion:

- Longitudinal motion for transport
- Stroke motion for lifting and lowering the workpiece
- Transverse motion for closing and opening the gripper system

The gripper rails are equipped with "shovels" or pneumatically operated tongs or grippers to suit the workpiece.

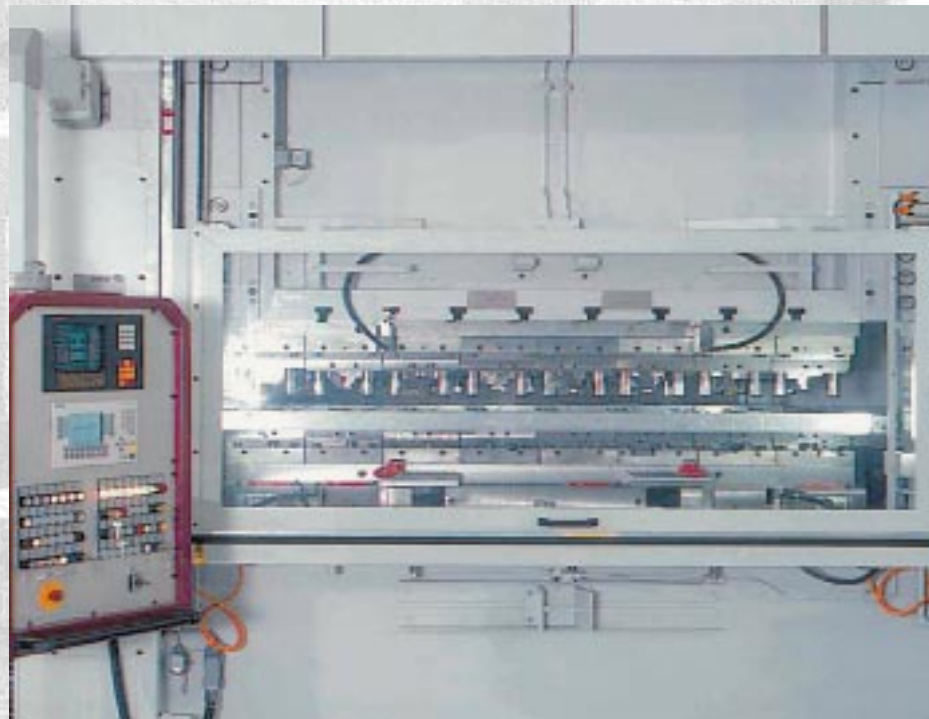
### Electronic transfer

In modern electronic transfer systems, costly mechanical drives are replaced by electrical positioning drives that operate in synchronism with the main press motion.

This is an extremely demanding solution that, however, provides a number of benefits for the press OEM and the operating company:

- Reduction of mechanical design costs
- Improved accessibility of the press during tool changes
- Increased rigidity through direct coupling of ram position with transfer system. No mechanical linkages
- Flexible parameterization of the movement sequence by the press OEM

# SYSTEM SOLUTIONS



The main quantifiable advantage of electrically driven transfer over mechanical transfer lies in its flexibility. Distance, speed and acceleration values can be programmed by the user to optimize transfer for different tool sets.

Tool-specific axis data, lifting distances, transfer distances and clamping distances can be stored electronically and called up when necessary.

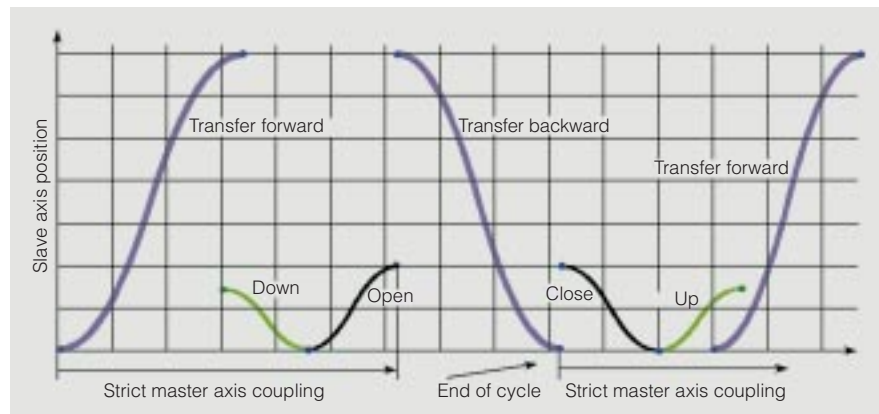
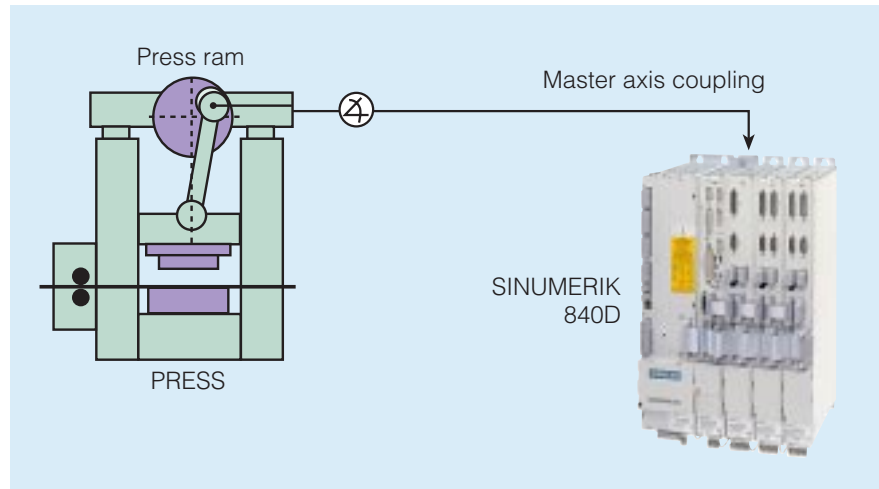
Electronic transfer supports the production of small batches, just-in-time in the same manner as large quantities.

**Mechanical transfer**

In mechanical transfer, the axis movements are created via individually machined cams and sliding gears and distributed throughout the working area. The axis movements of the system are directly mechanically derived from the motion of the ram.

Flexible implementation of the machine and rapid adaptation to changed operating conditions is only possible to a limited extent.

Due to the growing demand for increased automation density in industrial production engineering, more and more machine manufacturers replace conventional, mechanically coupled transfer systems with freely programmable electronic transfer controls, using electric positioning drives.



Motion sequence for transfer

**Requirements**

Flexible production processes and constantly increasing output rates require highly dynamic motion control during handling tasks. This can only be achieved using state of the art drive technology and high-quality controls.

Gentle material handling must be ensured, and safety aspects must be considered.

Tool changing times must be as short as possible, requiring the use of an operating system with parts-respective tool data management. As well as tool data management, comfortable input facilities for motion and positioning data ensure user-friendly operation of the control system.

The increased use of automation components in field technology means that a fieldbus connection is essential for transfer controls.

## System solution

The electrical equipment system solution in the shape of the ELT 2000 electronic transfer control is based on the SINUMERIK 840D universal motion controller and the SIMODRIVE 611 digital modular drive system and offers highly dynamic motion control and PLC functionality in a single system.

SINUMERIK Safety Integrated offers integrated, prototype-tested safety functions that can be used to implement highly effective personnel protection.

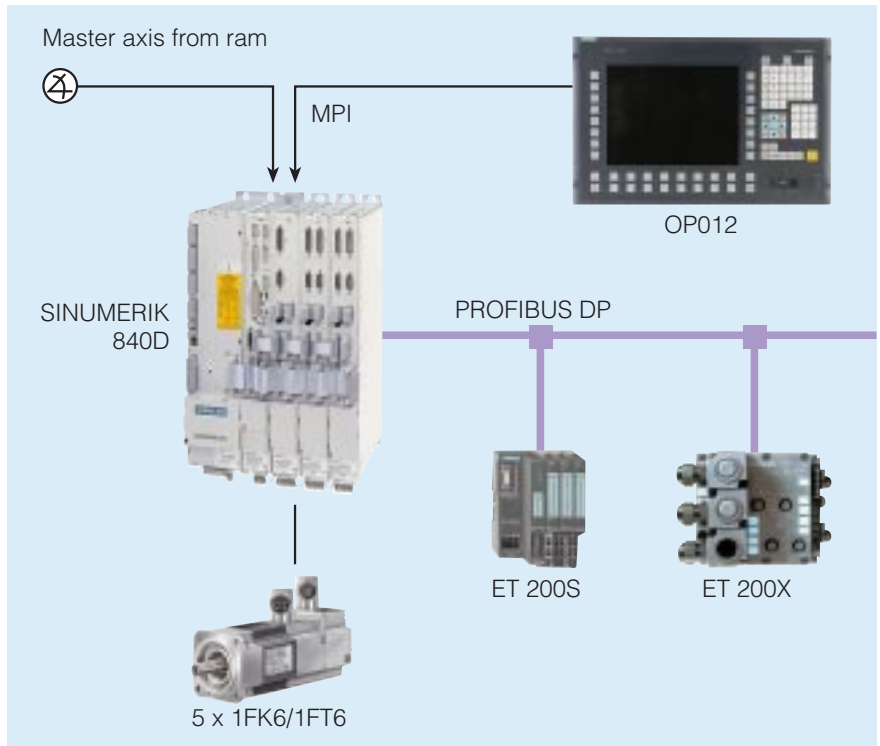
The transfer user-interface integrated into ELT 2000 can be individually adapted using ProTool/Pro and the SINUMERIK option. Both the machine and SINUMERIK are operated in this case using a common operator panel, the OP012.

With the SINUMERIK electronic transfer option (MLFB 6FC5250-0AD05-0AA0), the SINUMERIK 840D becomes the core component of the highly dynamic ELT 2000 transfer controller. Rounded off with an industry-specific technology software, the system offers a user interface, transfer modes and the required parts data handling.

In order to individual adaptation and expansion, a documentation is provided which describes all operating modes, functions and significant interfaces of the technology software.

This is supported through the use of new, innovative control and drive components which offer significant advantages:

- Compact controller design
- Digital drive technology
- Distributed I/O
- Implementation of operating components according to requirements
- Configuration using SIMATIC S7, SINUMERIK and SIMODRIVE standard components
- Optional use of safety functions (Safety Integrated)



Depending on the size of the transfer device, several drives can be involved in a motion axis. A typical configuration of a transfer press, would comprise five drives, e.g. x axis: 1 drive; y axis: 2 drives; z axis: 2 drives.

For large transfer presses, a much higher number of drives can be realized, depending on machine configuration. Because they are all coupled to the master-axis setpoint from the ram, all drives relating to a motion axis will, of course, operate according to the same standardized motion principles (VDI 2143).

Via PROFIBUS, the ELT 2000 transfer control concept can be fully integrated into higher-level total automation concepts.

## Functions

The functionality of the mechanical transfer is replaced by an electrical solution. The three motion axes are driven via electric actuators, which can be optimally mounted at the points of action to suit the design of the tool mounting space. The mechanical cam disk is replaced by an electronic cam disk.

In this context, the ELT 2000 electronic transfer system offers a broad range of powerful functions, such as:

- Coupling of the complete motion system to a higher-level master axis.
- Motion control according to standardized motion principles (VDI 2143).
- Optional use of an external or virtual master axis; on-the-fly changeover.
- Infinite number of cam disks via high-precision polynomials.
- Freely designable EMERGENCY and STOP strategies.
- Up to 30 axes can be operated in a single system.
- Calculation of maximum number of strokes based on performance data of the used drives
- 3 set-up modes and 3 automatic modes of operation.



Start menu of the ELT 2000 transfer controller

Furthermore, the SINUMERIK 840D motion control contains the following useful functions:

- Electronic gear box.
- Electronic cam controller with 2 cam paths per axis.
- Drive optimization through automatic control loop measurements.
- "Safety Integrated".



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