



## TOX®-ElectricDrive

- Electrical drive technology  
with press forces from 2 – 1000 kN



# TOX<sup>®</sup>-ElectricDrive

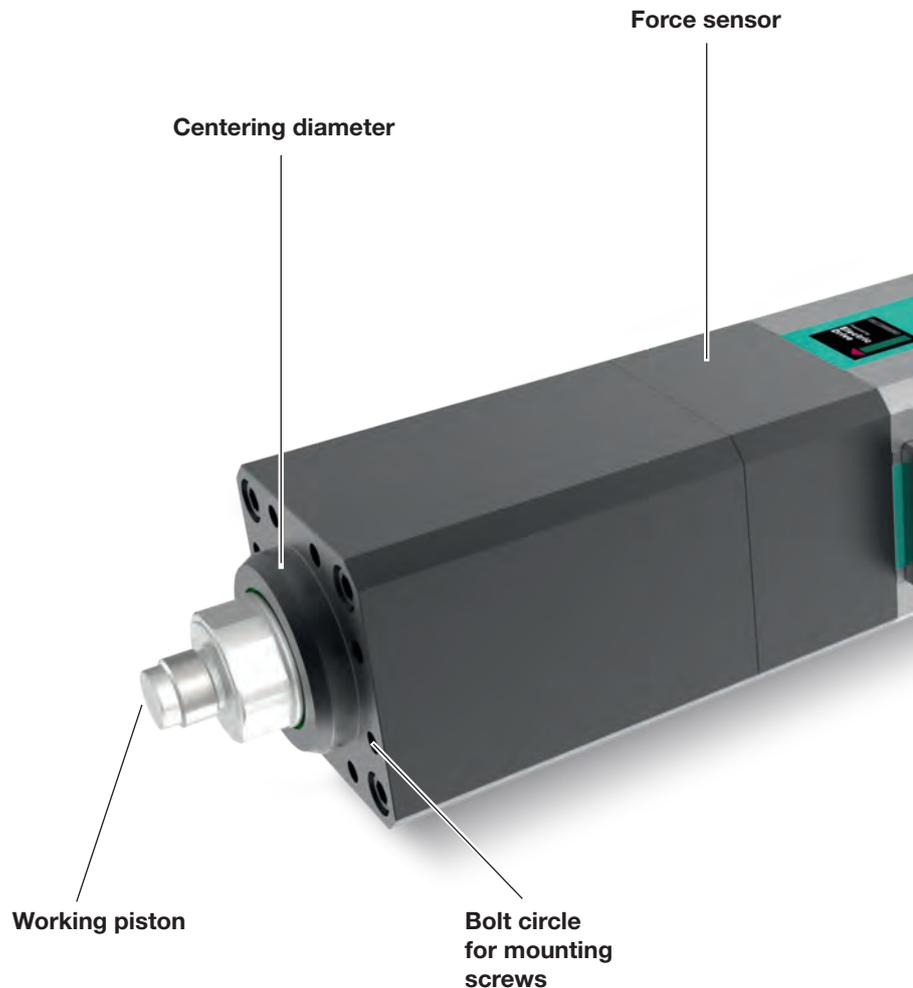
## The electromechanical servo drive

**When working processes require flexibility and precision, electro-mechanical servo drives are the right choice.**

The range of drives named TOX<sup>®</sup>-ElectricDrive provides the right drive solution for every application with an effectively usable press force range of 20N – 1000kN. The drives can be used for a wide range of applications by using ball screws or planetary threaded spindles.

### Advantages in detail:

- + High robustness and durability
- + Highest energy efficiency and low operating costs
- + High mechanical precision
- + Individual special versions possible
- + Simple and comprehensive parameterisation, control, operation, monitoring and documentation
- + Highly dynamic performance through force and stroke control
- + The system is preconfigured, calibrated and ready for use (→ Plug & Work)
- + Stand-alone operation possible without PC/PLC
- + Highest safety possible up to performance level e in compliance with DIN EN ISO 13849-1 and SIL3 in compliance with EN/IEC 62061



## The special TOX<sup>®</sup> benefits

### Low maintenance costs:

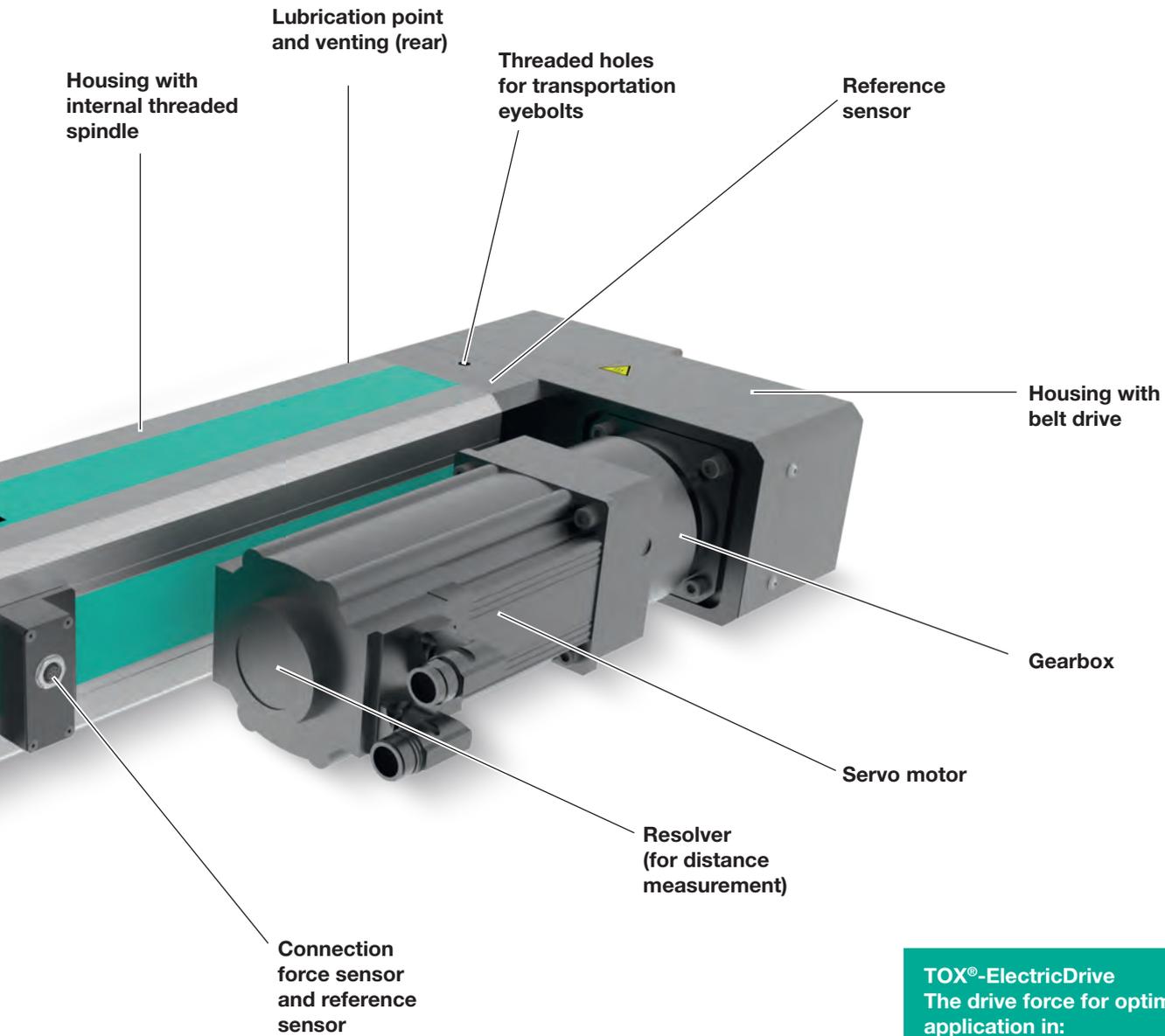
The electromechanical servo drives TOX<sup>®</sup>-ElectricDrive are constructed in such a way that any maintenance work is kept to a minimum.

- Maintenance-free servo motors
- Maintenance-free belt drive for EPMK, EPMP, EQ-K and EX-K
- Long lubrication intervals of the drives (automatic lubrication systems partly possible)

### Reliable service worldwide:

- Comprehensive experience with different applications in different industries (automotive and supply industry, white goods industry, medical technology and many more)
- TOX<sup>®</sup> PRESSOTECHNIK is your active partner during the entire project period – from planning to operation of the system

- Support for commissioning and process optimisation
- Training on the customer's premises or at TOX<sup>®</sup> PRESSOTECHNIK
- Remote service possible
- Calibration and repair service



**TOX®-ElectricDrive**  
 The drive force for optimum application in:

- Joining machines
- Assembly machines
- Special machines
- Presses
- Tongs

**The TOX®-ElectricDrive drive systems:**  
 Ideal for powerful use in various technical applications

	Clinching, joining TOX®-Metal Joining System		Installing, pressing in		Stamping in, pressing in (of functional elements)		Riveting, caulking, beading over
	Punching compressing		Moulding, marking		Tightening, clamping, caulking		Pressing, straightening

# TOX<sup>®</sup>-ElectricDrive servo motors

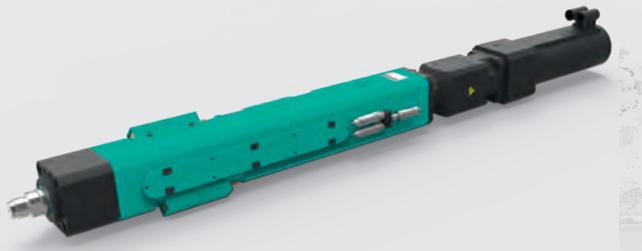
## The complete electromechanical drive family

### The proven

with large range in reliable application

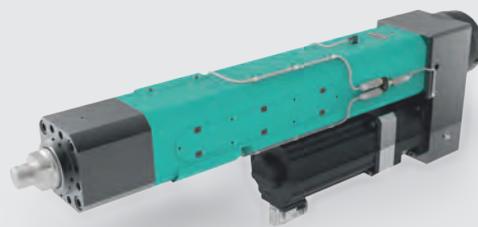
#### The slim standard drive TOX<sup>®</sup>-Electric Power Module EPMS

- Beltless direct drive
- Press force 5 – 200 kN
- Total stroke 200 – 300 mm



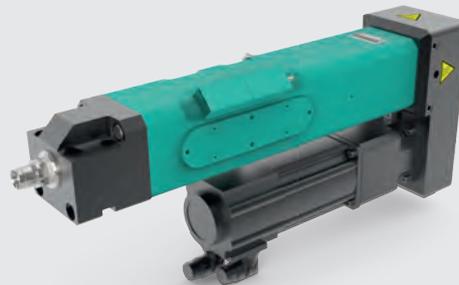
#### The compact drive TOX<sup>®</sup>-Electric Power Module EPMK

- Compact design
- Press force 5 – 1000 kN
- Total stroke 200 – 300 mm



#### The robot tongs drive TOX<sup>®</sup>-Electric Power Module EPMR

- With special flange mounting for TOX<sup>®</sup>-Robot Tongs
- Press force 55 – 100 kN
- Total stroke 100 – 200 mm



## Scope of delivery

The TOX<sup>®</sup>-ElectricDrive servo motors are always complemented by the following components:



Servo controller



Load resistor



- Cable set**  
 drag-chain compatible  
 1x motor cable  
 1x resolver cable  
 1x force sensor cable 5 m  
 (up to 25 m possible)  
 1x reference initiator cable.

Robot-compatible cables available on request.

Reliable  
and  
energy efficient!

### The new

perfectly adapted to the TOX®-Modular System

#### TOX®-ElectricDrive EQ-K and EX-K

- Press force **EQ**: 2 – 100 kN
- Press force **EX**: 10 – 200 kN
- Total stroke 150 – 450 mm

- Compact integrated design
- Reduced weight
- Energy efficient and low maintenance
- Integrated force measuring



#### The robot tongs drive TOX®-Electric Power Module EPMR version 500 and 700

- With special flange mounting for TOX®-Robot Tongs
- Press force 55 – 80 kN
- Total stroke up to 300 mm
- **EPMR version 500:**  
particularly for clinching applications
- **EPMR version 700:**  
particularly for riveting applications



#### TOX®\_softWare

- License-free
- Touchscreen operation
- Operating system-independent

#### Human Machine Interface (HMI)

The user-friendly configuration, operation and visualisation of the system can be done via the optional touch-screen.



# TOX<sup>®</sup>-Servo Controller

**The central intelligence: The freely parameterisable servo controller is a single-axis servo controller with integrated logic.**

**It controls and regulates the TOX<sup>®</sup>-ElectricDrive system with all required functions. Benefits are the immediate processing of process data and a direct response to their deviations. The process data can be viewed during and after production for a complete quality certificate, and documented accordingly.**

## Configuration and parameterisation with TOX<sup>®</sup>softWare

All configurations and parameterisations required in the servo controller are performed with the Worx software contained in the TOX<sup>®</sup>softWare package.

## Properties:

- The servo controller and load resistor can be installed in any standard control cabinet
- Protective function for motor and servo technology
- Galvanic separation between logic and power part
- 3-cable connection technology
- Protection class IP20
- Compact design with direct AC mains connection and integrated resolver and motor connection
- Maintenance-free
- Inputs/outputs extendable
- Integration of external force sensors
- Highest safety category possible
- Fast commissioning with Plug & Work

## Interfaces:

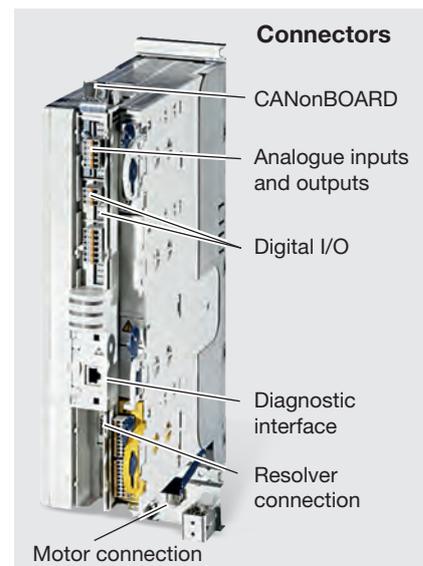
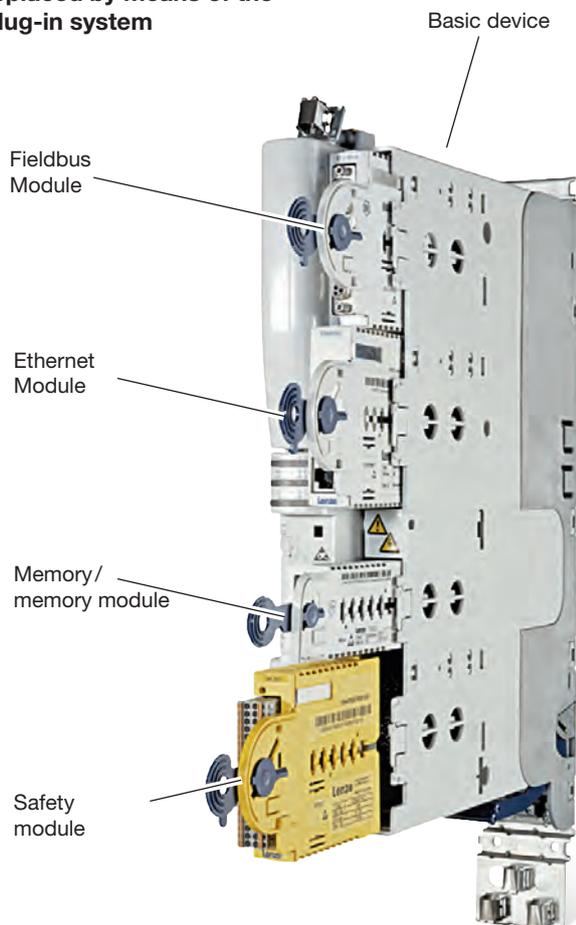
The servo controller is equipped with a variety of interfaces and connections:

- Ethernet
- PROFIBUS DP
- CANbus

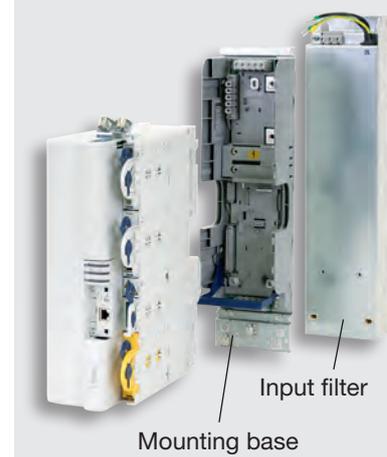
Optional (alternatively to PROFIBUS):

- INTERBUS
- DeviceNet
- PROFINET
- EtherNet/IP
- EtherCAT
- Ethernet POWERLINK
- CANopen

**The modules can be easily replaced by means of the plug-in system**



The servo controller is easily installed by plugging into a mounting base.



# Controls and occupational safety concepts

**When designing production plants, all occupational safety-relevant factors must be considered. We offer you all components required for this.**

## Control cabinet IP 54:

For servo controller assembly incl. fan or cooling unit. Special designs are possible.

## Safety controls

All control versions listed below are type examination tested.

### Basic control:

- Initiation of stroke via 2-hand control.
- Visualisation via IPC with swivel arm for installation on the press frame



### Light barrier control:

There is a choice of two operating modes:

- Light barrier without control function, initiation of stroke via 1-hand or foot switch
- Light barrier with control function, initiation of stroke once the protective field interruption is completed (so-called single-break control)

### Options for the controls:

- Function **automatic return stroke**. The return stroke of a press occurs automatically once the pressing process is complete
- Function **safe, monitored speed** possible for secured return stroke

### Additional special functions

- Additional interfaces are possible, for example for
- Temperature and travel sensors
  - Component scanner

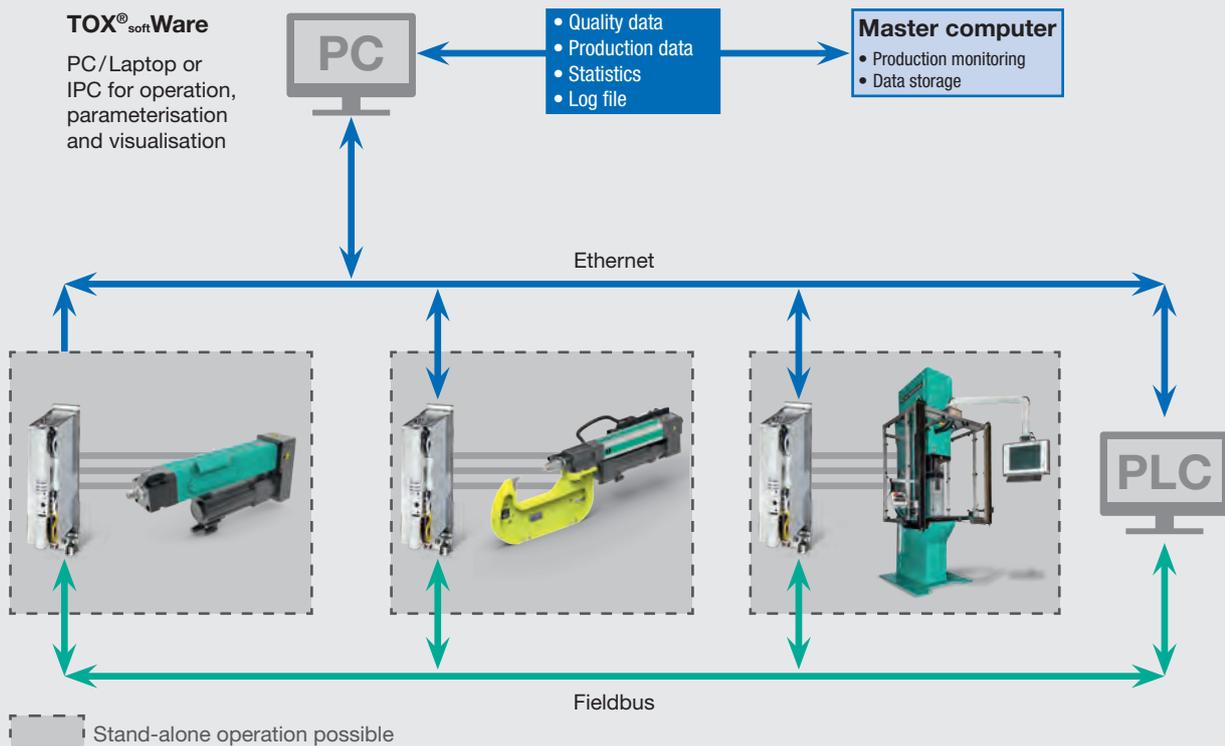


### Safety door control:

- Initiation of stroke via 1-hand switch or foot switch
- Work process only starts once the safety door is closed

## Network integration for modern manufacturing

Operation, configuration, parameterisation and documentation via the network.



# The TOX<sup>®</sup>soft Ware Suite...

- is operating system-independent
- is designed for touchscreen operation
- is user friendly
- is easy to configure
- supports all common communication interfaces
- provides different user levels
- provides integrated documentation

The TOX<sup>®</sup>soft Ware includes the following components:

- Server (connection PC to the servo controller)
- Worx (sequence programming and process control)
- HMI (parameterisation and visualisation)

In addition to the complete control, monitoring and valuation functions, the TOX<sup>®</sup>soft Ware provides an interactive work environment for all applications.

The user can commission the controller without the need of any programming know-how.

User interface and software are programmed in-house at TOX<sup>®</sup> PRES-SOTECHNIK and can be adapted to meet customer requests.

## Work environment

The user interface provides simple and quick project overview. Windows designed like workbooks simplify handling. Dockable windows and toolbars that can be easily adapted to user's demands increase efficiency.

## Sequence control – extended process management and simplified conversion scenario

- Component-specific parameterisation at the touch of a button by selecting the desired sequence
- Maximum number of processes only limited by hard disk capacity
- Dynamically controlled process flow based on IO-/NIO case

## Diagram module

The diagram module of the TOX<sup>®</sup>soft Ware serves for visualisation of the force-travel-course of a process. It allows automatic teaching-in of the processes and of the force limits in the target window as well as the envelope.

## Process monitoring with window

The process sequence is built up process-oriented by means of specified functions in a sequence and monitored in the TOX<sup>®</sup>-Servo Controller at runtime.

## Process monitoring by means of envelope

The envelope determines the corridor of the force-travel course with two limiting curves. In case of deviations there are two options:

- Process is continued until the target window is reached
- Process is aborted immediately

## Quality data

Export of process data in CSV format (compatible with Microsoft Excel) is possible for the quality data management.

Customer-specific data can optionally be included in the export file. This for example allows to add a unique component number or barcode to the quality data.

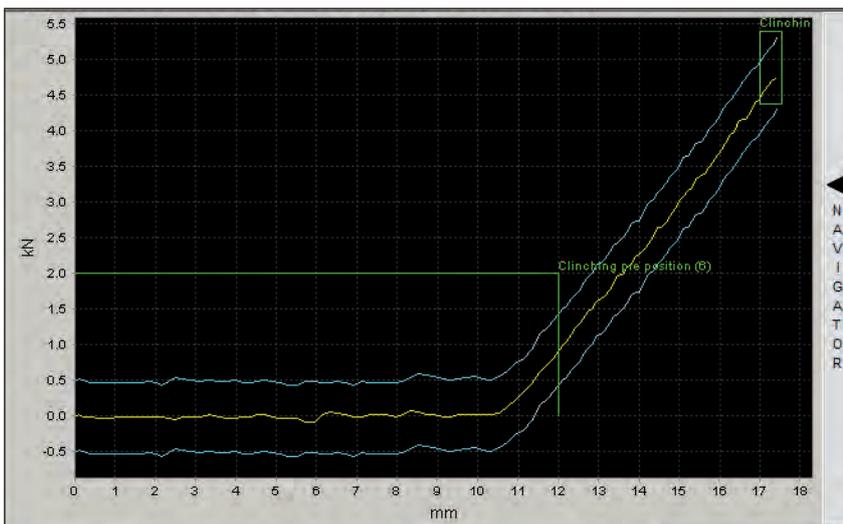
## Archiving

Process curves can be stored and archived. This makes a delayed evaluation of the graphical processing sequence possible. In addition, archived process curves can also be exported in CSV format or as PDF file.

## Backup/Restore

The TOX<sup>®</sup>soft Ware provides comprehensive backup and restore functions:

- Current project (parameter of the controller)
- Configuration settings of the TOX<sup>®</sup>soft Ware HMI



Visualised force-travel course with envelope and window

# The TOX<sup>®</sup> softWare HMI...

...for user-friendly parameterisation and visualisation of the machine used. It records the force-path diagrams and the parameterised intermediate and end values. Values can be zoomed and displayed differently. SPC (Statistic Process Control) quality data can be archived.

## Clinching module for modern sheet metal joining technology

The clinching module is adapted to the special limiting conditions and requirements of the TOX<sup>®</sup>-Sheet Metal joining technology. All required parameters are visualised and support the process definition and control.

In addition, precise monitoring of the control dimension X (resulting residual bottom thickness during clinching) is possible while considering the sheet metal combination, material characteristics as well as the bending up of the machine.

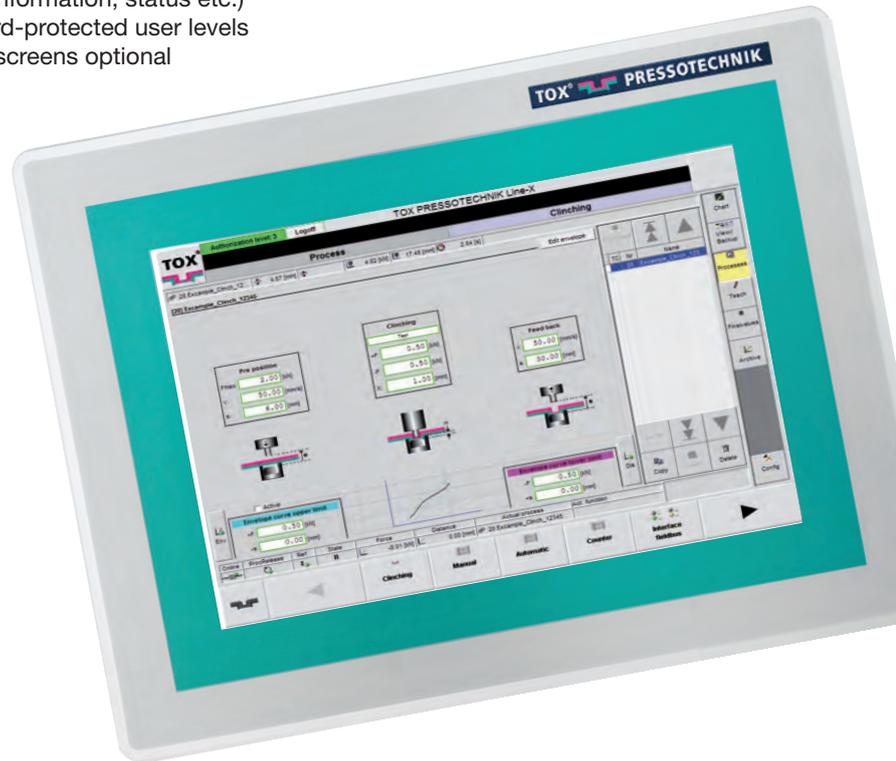
## Module for pressing processes

This module is setup for the special features of pressing.

## Additional modules

TOX<sup>®</sup> PRESSOTECHNIK provides additional application-specific modules, i.e. for riveting, stamping in and pressing in of bearings, bolts, nuts, screws etc.

- Adjustable user interface
- Manual / automatic screen
- Diagnostic screen with log book
- Counter (total, IO, NIO, maintenance interval)
- Freely definable messages (errors, information, status etc.)
- Password-protected user levels
- Special screens optional



Screen view of the clinching module



Screen view of the pressing module

# TOX<sup>®</sup>-ElectricDrive

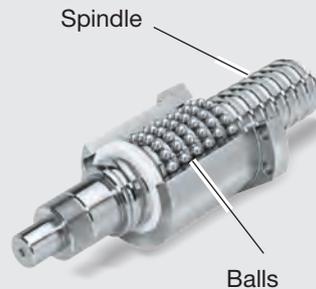
## Technical background and details

### The threaded spindles

For translating the rotary motion to a linear force, high quality threaded spindles are used in the servo drives. The very high rigidity of the entire system stands out here above all. This allows very simple and precise control of position and speed.

Due to the direct drive of the spindles by means of the servo motor, the efficiency is a lot higher than for hydraulic systems and thus results in energy savings. Two spindle types are used:

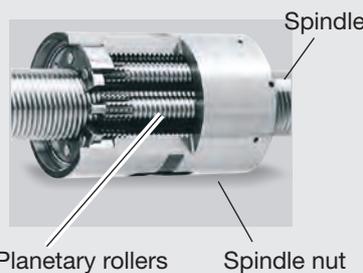
#### Ball screw



This spindle consists of a thread and a nut, circulating balls in a closed system. Benefits here are the very low rolling friction, the minimal breakaway torque, as well as a very low stick-slip effect.

With an increasing load a larger number of balls is required for the power transmission and the spindles require more installation space.

#### Planetary threaded spindle



Here, planetary rollers installed in the spindle nut rotate around the spindle. The high number of force-transmitting contact surfaces can take very high loads, with compact dimensions.

Very small thread pitches can be realised. As no return mechanism is required, high revolution speeds are possible. This spindle is perfect for high loads and medium speeds.

#### Fan

The servo drives EX and EPMR 500 + 700 can be equipped with a fan on request. It cools down the motor to enable higher power density and thus higher cycle times.



#### Safety brake (optional)

All TOX<sup>®</sup>-ElectricDrives can be equipped with a safety brake. It stops the drive in case of a malfunction. (Meets the occupational safety regulations and standards according to BG).



#### Automatic lubrication device (optional)

The drives EQ, EX and EPMR 500 + 700 can be equipped with an automatic lubrication device. This ensures optimum minimal lubrication of the drive.



#### Motor holding brake (optional)

The drives EQ, EX and EPMR 500 + 700 can be equipped with a motor holding brake. In case of a currentless stop of the system, a safety rod catcher prevents the weight-loaded working piston from dropping. This protects the drive, tools and piece parts to be machined against damage.

# Possible applications

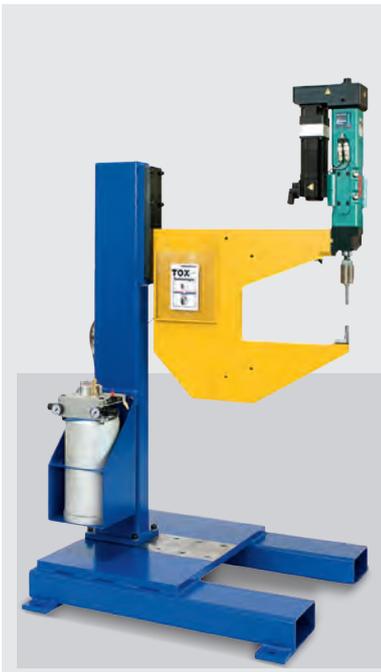
We plan, design and build complete presses and special machines



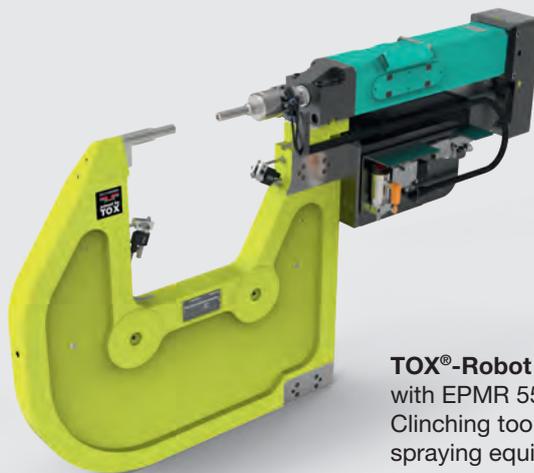
**TOX®-Press CMB series**  
with 2 x EPMK 55 with brake,  
3-sided safety guards with light  
curtain, safety controls with  
1-hand button and touchscreen.



**TOX®-Press PC series**  
with 2-column ram guide, EPMK 100  
with brake, protective hood, 3-sided  
safety guards with light curtain, safety  
controls with 1-hand button and  
touchscreen.



**TOX®-Press CEJ series**  
with EPMP 55, TOX®-Clinching  
Tools and spraying equipment.



**TOX®-Robot Tongs**  
with EPMP 55, TOX®-  
Clinching tools and  
spraying equipment.



TOX® PRESSOTECHNIK GmbH & Co. KG  
Riedstrasse 4  
D-88250 Weingarten

Find your local contact at:  
[www.tox-pressotechnik.com](http://www.tox-pressotechnik.com)

## Product Range

TOX®-Powerpackage



TOX®-ElectricDrive



TOX®-PowerKurver



TOX®-FinePress



TOX®-Presses



TOX®-Tongs



TOX®-Controls  
TOX®-Monitoring



TOX®-Joining-  
Systems



TOX®-Punching  
TOX®-Coining



TOX®-Press-Fitting



TOX®-Production  
Systems

