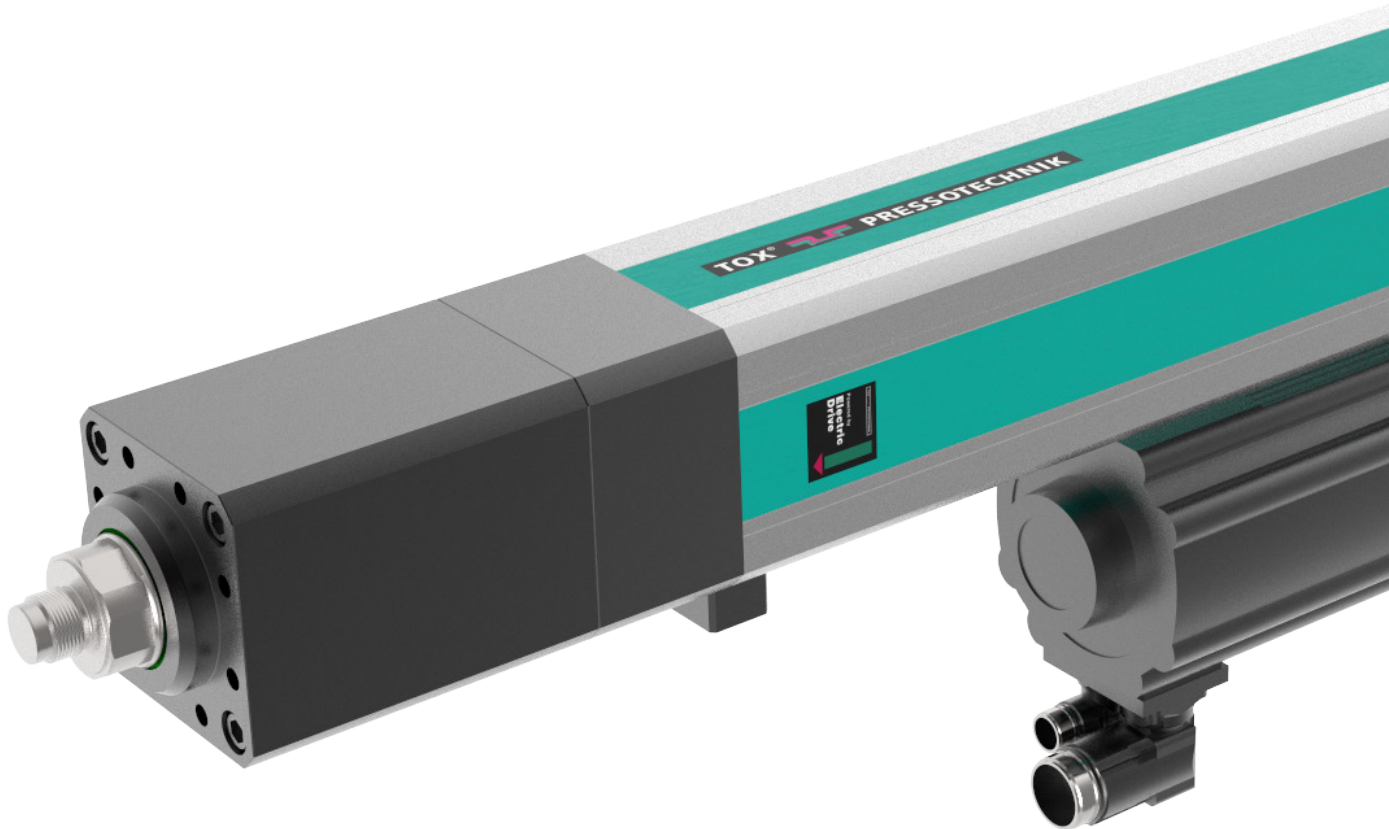


TOX®  PRESSOTECHNIK

TOX®-ElectricDrive

Electrical drive technology with press forces from 2 – 1000 kN



The electromechanical servo drive

When working processes require flexibility and precision, electromechanical servo drives are the right choice.

The range of our TOX®-ElectricDrive provides an energy-efficient drive solution for various applications with a usable press force range up to 1000 kN. The drives can be used for a wide range of applications utilizing ball screws or planetary roller screws.

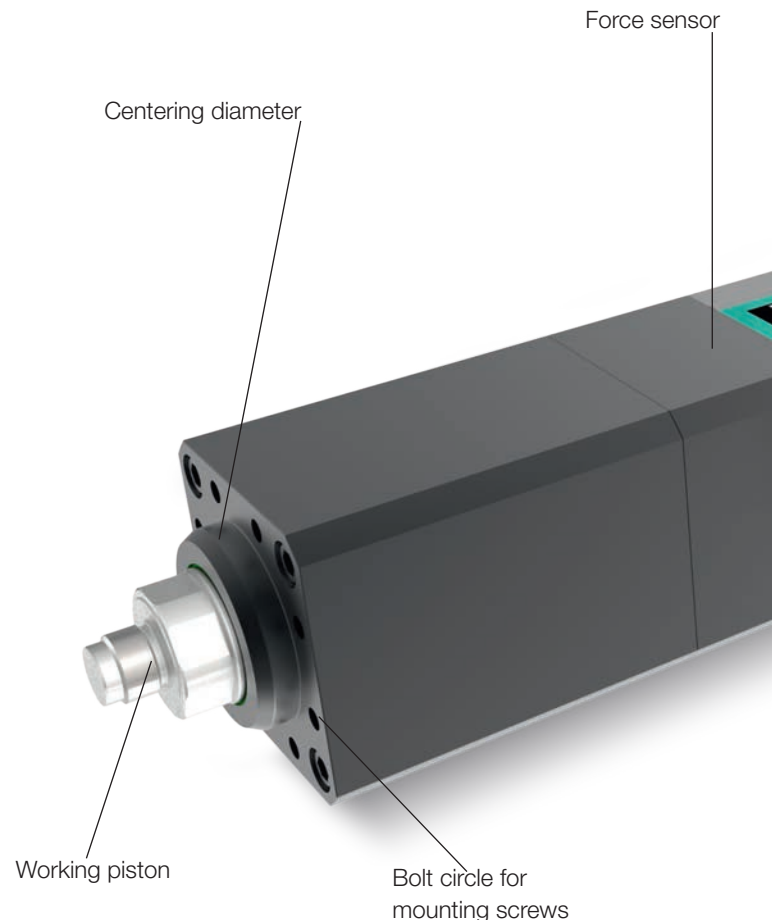
Advantages

- Robust and durable
- High energy efficiency and low operating costs
- High mechanical precision
- Integrated sensors
- Precise repeatability ± 0.01 mm
- Anti rotation feature
- Special versions available
- Simple and comprehensive parameterization, control, operation, monitoring and documentation
- Configurable through force and position control
- The system is preconfigured, calibrated and ready for use (Plug & Work)
- Stand-alone operation possible without PC/PLC
- Highest safety rating is possible. Up to performance level e in compliance with DIN EN ISO 13849-1 and SIL3 in compliance with EN/IEC 62061

Low maintenance costs

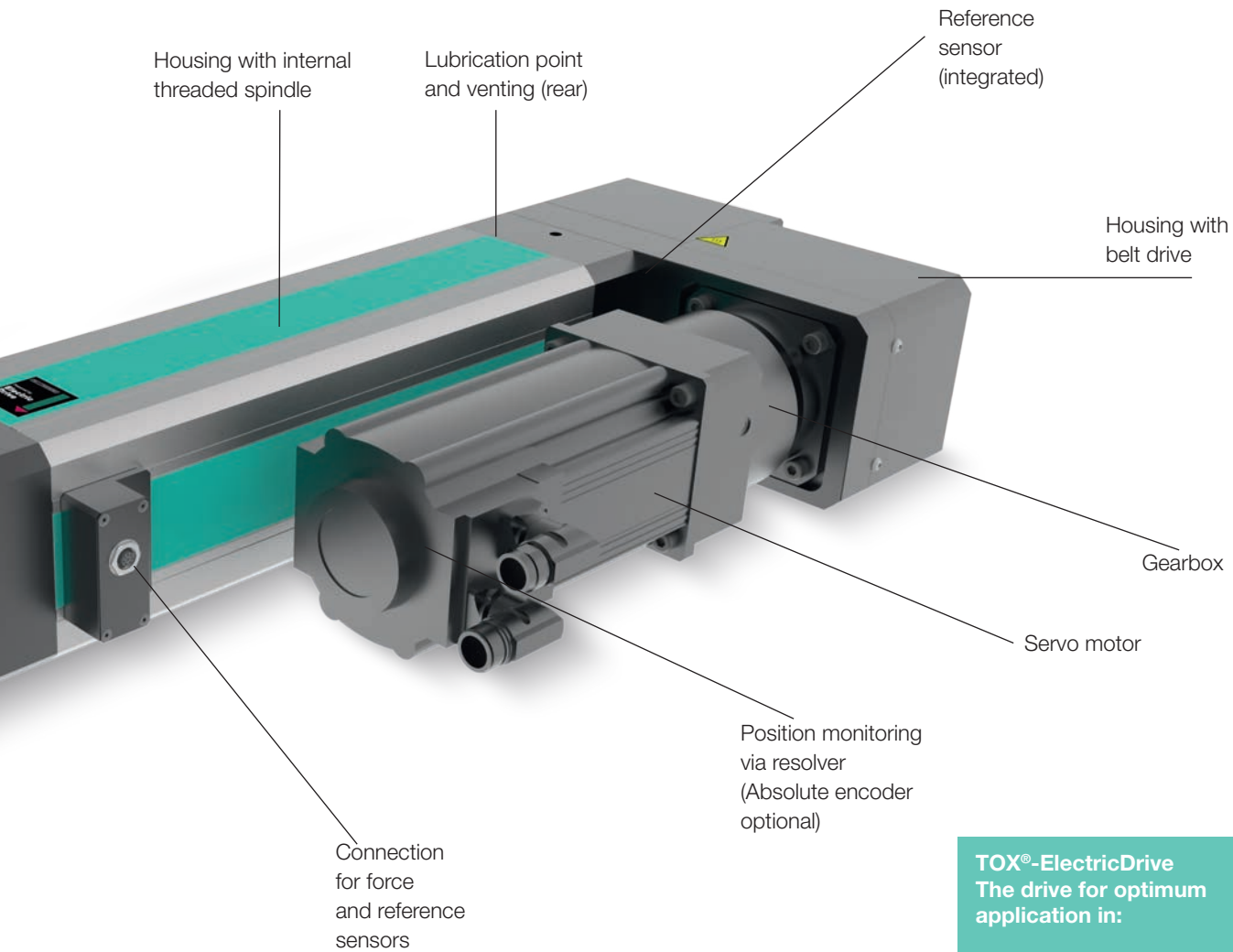
The electromechanical servo drives TOX®-ElectricDrive are designed in such a way that minimal maintenance is required.

- Maintenance-free servo motors
- Maintenance-free belt drive
- Long lubrication intervals of the drives (automatic lubrication systems are available)



Your competent partner

- Close partnership from planning to operation of the system
- Comprehensive experience with different applications in different industries
- Strong support for commissioning and process optimization
- Training at TOX® PRESSOTECHNIK or at your premises
- Remote maintenance available
- Factory calibration and repair service



TOX®-ElectricDrive
The drive for optimum application in:

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

Ideal for precise and powerful use in various applications



Clinching,
TOX®-Sheet
Metal Joining



Assembling,
press-fitting



Pressing-in,
Insertion of
functional
elements



Riveting



Punching,
piercing



Coining,
marking



Tensioning,
clamping



Pressing,
compressing

The complete electromechanical drive family

Reliable and energy efficient

line-Q

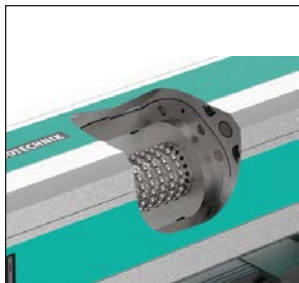
- Cost effective

TOX®-ElectricDrive EQ-K

- 4-element force measurement
- Press force 2 – 100 kN
- Total stroke 150/300/450 mm
- Speed up to 300 mm/s



Applications:
Pressing,
single drive with medium space requirement



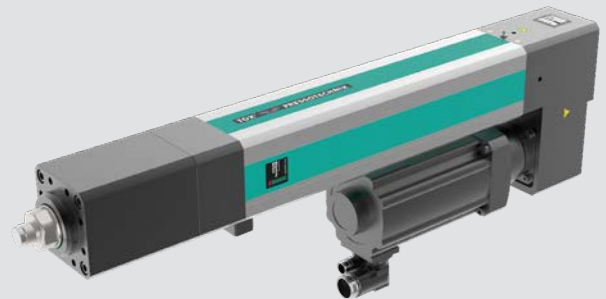
Ball screw

line-X

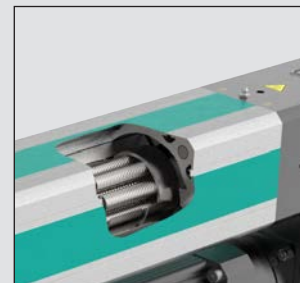
- Smaller space requirement
- High precision, 4-element force measurement
- High power density with low weight
- Special versions for individual customer needs (length, speed, protection class, ...)

TOX®-ElectricDrive EX-K

- Press force 10 – 200 kN
- Total stroke 150/300/450 mm
- Speed up to 300 mm/s



Applications:
Insertion of fasteners, clinching, riveting
Space limited pressing applications, punching

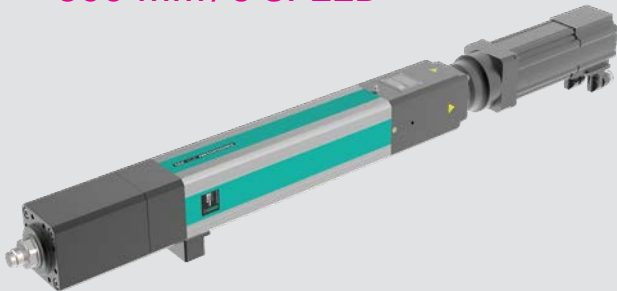


Planetary roller screw for higher precision

TOX®-ElectricDrive EX-F

- Press force 5 – 100 kN
- Total stroke 150/300 mm
- Speed up to 800 mm/s
- Increased service life

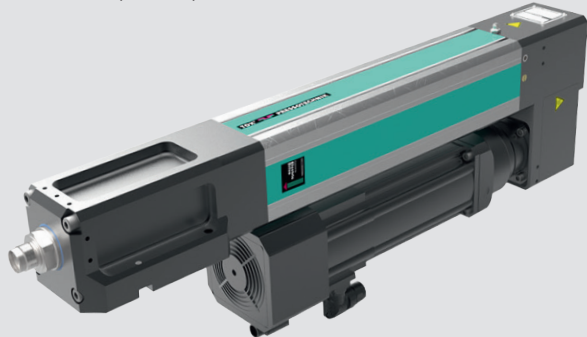
800 mm/s SPEED



Applications:
Press applications requiring short cycle times

**The robot tong drive
TOX®-Electric Power Module EPMR**

- With special flange for TOX®-Robot Tongs
- Press force 55/80/100 kN
- Total stroke 150/240 mm
- Speed up to 200 mm/s



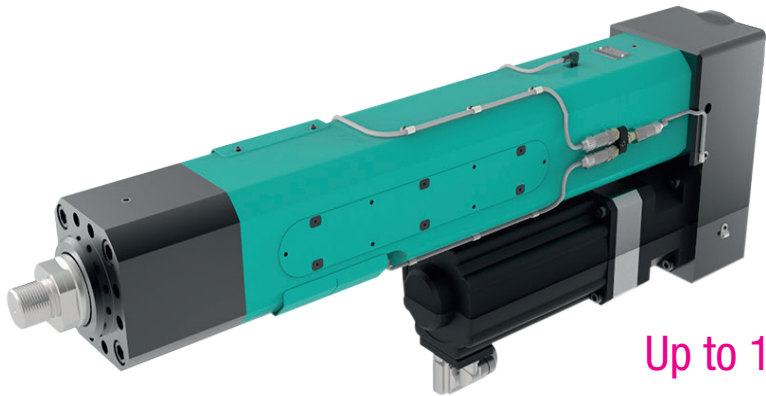
Applications:
Clinching, riveting

EPMK

TOX®-Electric Power Module EPMK

- Press force 300 – 1000 kN
- Total stroke 300 mm
- Speed up to 90 mm/s
- Planetary roller screw for higher precision

Applications:
Multi-point clinching and riveting,
high force press applications



Up to 1000 kN

Special versions for individual customer needs
(length, speed, protection class, ...)

Scope of delivery

The TOX®-ElectricDrives are complemented by the following components:

Servo controller



Load resistor



Cable set



TOX®softWare

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

Human Machine Interface (HMI)

The user-friendly configuration, operation and visualization of the system can be done using the optional touchscreen.



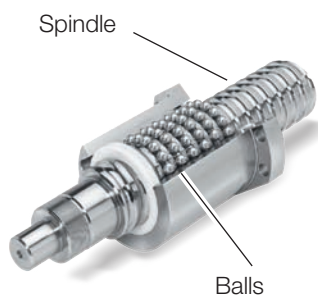
Technical background and details

The threaded spindles

For converting rotary motion to a linear force, high quality threaded spindles are used in the servo drives. The rigidity of the entire system is the key to our quality. This allows very simple and precise control of position and speed.

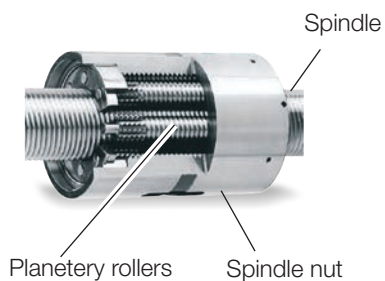
Two screw types are used:

Ball screw



This screw assembly consists of a thread and a nut with recirculating balls in a closed system. Benefits here are the very low rolling friction as well as the minimal break-away torque.

Planetary roller screw



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

Accessories

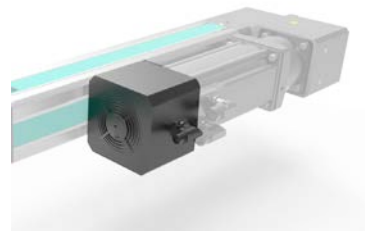
Piezo-electric sensors

Upon request, a piezo sensor can be integrated.



Fan

The fan for the servo drives EX and EPMR cools down the motor to enable higher power draw and thus shorter cycle times.



Safety brake

The drives EQ-K, EX-K and EPMK 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

All drives can be equipped with an automatic lubrication device. This ensures optimum, minimal lubrication of the drive.



Motor options

Motor holding brake

The motor holding brake prevents the working piston and tool from lowering when the machine is de-energized. The brake is available for all drives.

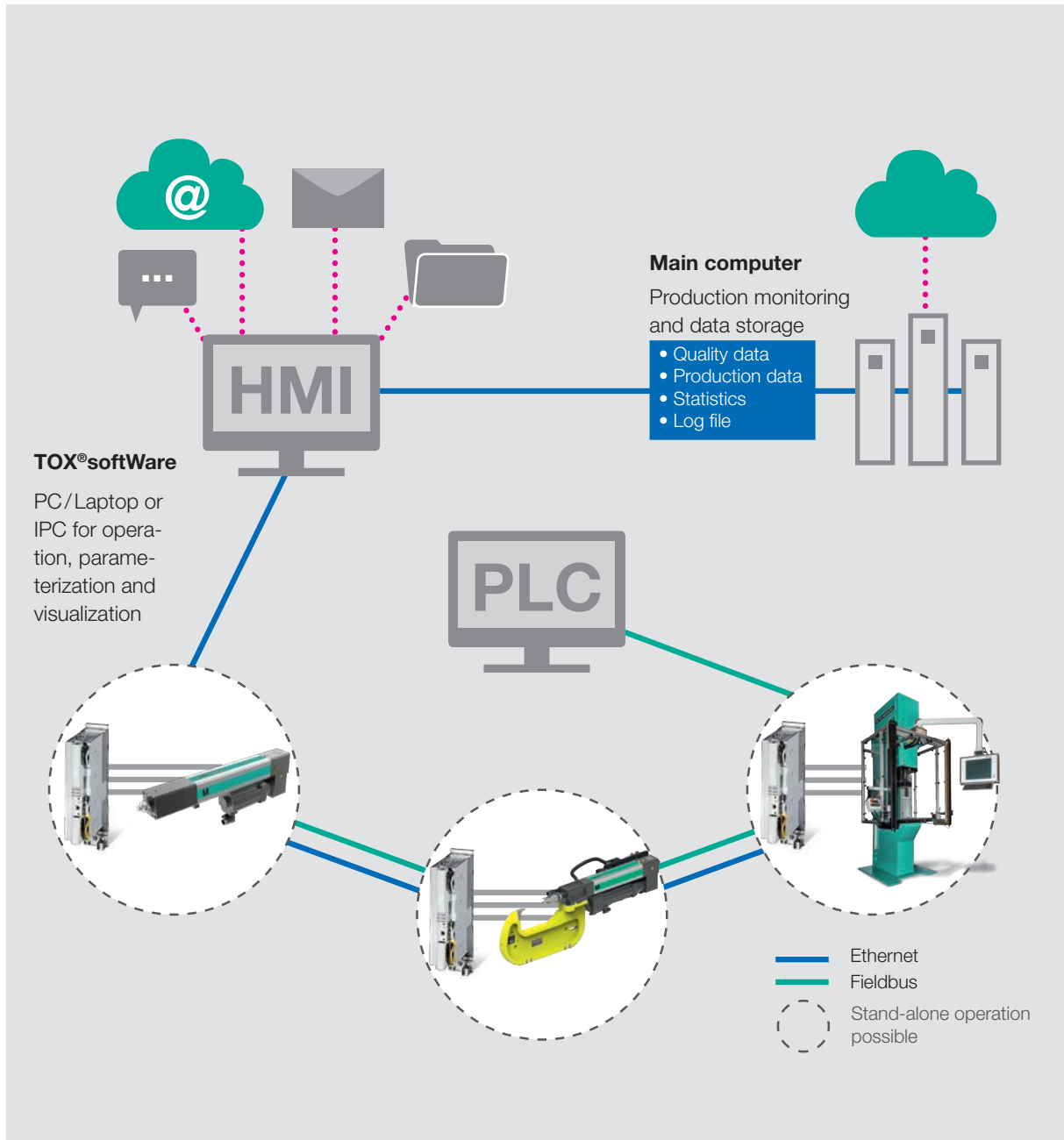
Reference hold

When using a reference hold, no referencing is needed after switching on.



Networked manufacturing

Network-Integration for modern manufacturing



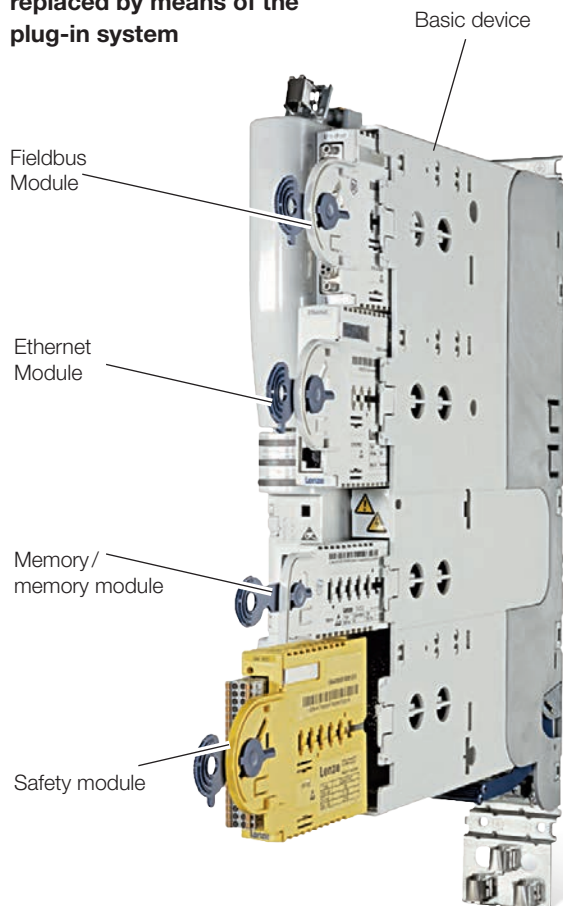
TOX[®]-Servo Controller

The central intelligence: The easily programmed servo controller is a single-axis controller with integrated logic. It controls and regulates the TOX[®]-ElectricDrive system for all required functions. The controller immediately processes the process data and reacts directly to any abnormalities. These data can be viewed during and after production for a complete quality analysis and documented accordingly.

Configuration and parameterization

All configurations and parameterizations required in the servo controller are performed using the TOX[®]softWare.

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



Technical details

- Protective function for motor and servo technology
- Galvanic separation between logic and power
- 3-cable connection
- Protection class IP20
- Compact design with direct AC mains connection and integrated resolver and motor connection
- Maintenance-free
- Expandable inputs/outputs
- Integration of external analog sensors possible
- Highest safety category possible
- Fast commissioning with Plug & Work

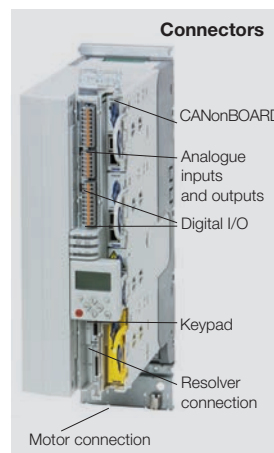
Interfaces

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

- Ethernet TCP/IP
- PROFINET
- CANbus

Optional (alternatively to PROFINET):

- INTERBUS
- DeviceNet
- PROFIBUS DP
- EtherNet/IP
- EtherCAT
- Ethernet POWERLINK
- CANopen



Controls and occupational safety concepts

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

Control cabinet IP 54

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

PLe kit

For safe and type-tested integration of the EQ-K and EX-K servo controller and brake. Ready for installation on base plate.



Control cabinet (climate control optional)



PLe kit mounted on base plate, with servo controller, brake switching module and cable set

Safety controls

All control versions listed below are type examination tested.



Basic control

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

Safety door control

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

Light curtain 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** once the pressing process is complete
- Function **safely reduced speed** (rotary encoder)

Additional special functions

Additional interfaces are possible, for example for

- Temperature and travel sensors
- Component scanner

The TOX[®]softWare

The TOX[®]softWare includes the following modules:

- **Server** (connection PC to the servo controller)
- **Worx** (sequence programming and process control)
- **HMI** (parameterization and visualization)

In addition to the complete control, monitoring and valuation functions, the TOX[®]softWare 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 can be adapted to meet customer requests.

Advantages

- Independent of the operating system
- Designed for touchscreen operation
- User friendly
- Easy to configure
- Supports all common communication interfaces
- Provides different user levels
- Provides integrated documentation

Work environment

The intuitive user interface facilitates the project overview. Windows designed like workbooks simplify handling. Dockable windows and toolbars can be arranged individually.

Sequence control – extended process management and simplified customization

- Component-specific parameterization 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[®]softWare visualizes the force-position curve of a process. It allows the automatic teaching of the processes and of the force limits in the target window as well as the envelope curve.

Visualized force-position curve with envelope and window functions

Process monitoring with window

The process-oriented sequence is constructed using specified functions in a sequence and monitored in the TOX[®]-Servo Controller at runtime.

Process monitoring by means of envelope curves

The envelope determines the path of the force-position curve 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

Exporting of process data in CSV format (compatible with Microsoft Excel) is possible. Customer-specific data can also be included in the export file. This allows the addition of your unique component number or barcode to the quality data.

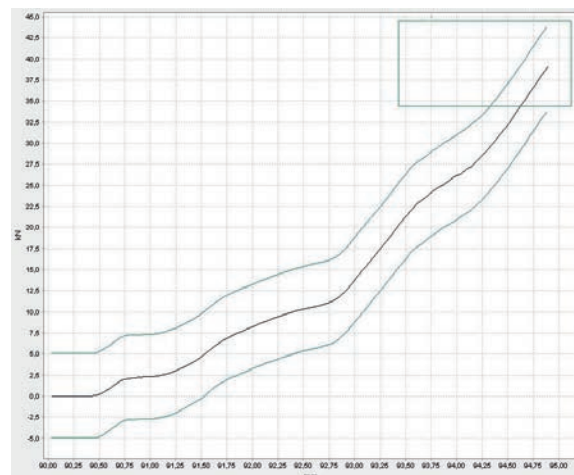
Archiving

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

Backup / Restore

The TOX[®]softWare provides comprehensive backup and restore functions:

- Current project (parameter of the controller)
- Configuration settings of the TOX[®]softWare HMI



The TOX®softWare HMI is used for user-friendly parameterization and visualization of the machine. It records the force-position diagrams and the parameterized intermediate and end values. Values can be displayed in different formats. Quality data can be archived.

Pressing module

This module is setup for the special features of pressing. All required parameters are visualized and support the process definition and control.

Clinching module

The clinching module is adapted to the special limiting conditions and requirements of the TOX®-Sheet Metal joining technology.

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 deflection of the machine.

Additional modules

TOX® PRESSOTECHNIK provides additional application-specific modules, i.e. for riveting, fastener insertion 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.)
- Special screens optional



Screen view of the pressing module



Screen view of the clinching module

Possible applications

We plan, design and build complete presses and special machines



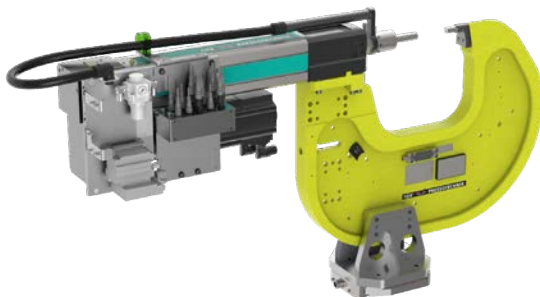
TOX®-Press CMB series

with 2 servo drives EPMK with brake, 3-sided safety guards with light curtain, safety controls with 1-hand button and touchscreen.



TOX®-Press CMB Series

with servo drive EX-K, protective door control.



TOX®-Robot Tongs

with servo drive EPMR 55, TOX®-Clinching tool and lubrication equipment.



TOX®-Press PC series

with 2-column ram guide, protective hood, 3-sided safety guard with light curtain, safety controls with 1-hand button and touchscreen.

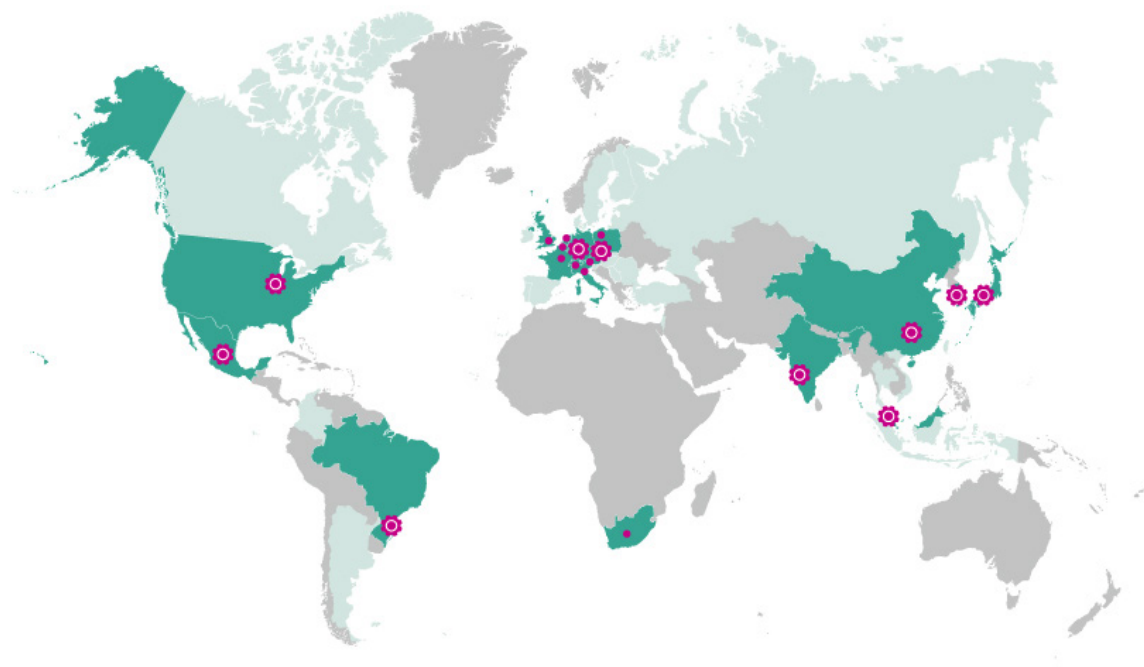


TOX®-Press MAG Series

Bearing press station with servo drive EPMK, safety guarding and safety controls.



Customer application in a production cell using the servo drive EPMK.



TOX®  PRESSOTECHNIK

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