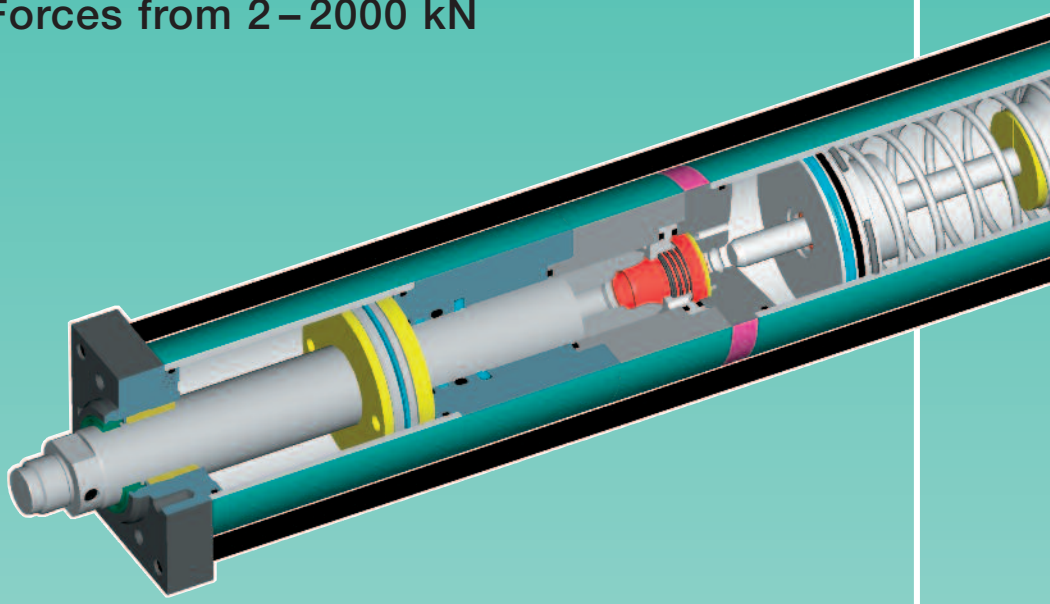
TOX® PRESSOTECHNIK

TOX®-Powerpackage

- Pneumatic Forces from 2 – 2000 kN



TOX®-Powerpackage
Ideal Source for Forces from 2 – 2000 kN

TOX®-Powerpackage - the energy saving Pneumatic intensifier with integrated oil system and automatic activated power stroke. Our technology combines Pneumatics and Hydraulics providing you with the following advantages:

– Lower energy consumption
– Compact, clean design
– High stroke frequency
– Soft-touch: easy on your tooling
– Reduced noise level

The TOX®-Powerpackage operates only on shop air, without hydraulic power units. The controls are very simple, the same as for any double acting pneumatic cylinder.

The operating stroke is divided into three stages:
– air-operated approach stroke
– pneumohydraulic power stroke
– air-operated return stroke

The simple design, with few moving parts, assures you of trouble-free operation for many years. The low approach forces protect your tooling and reduce the noise level.

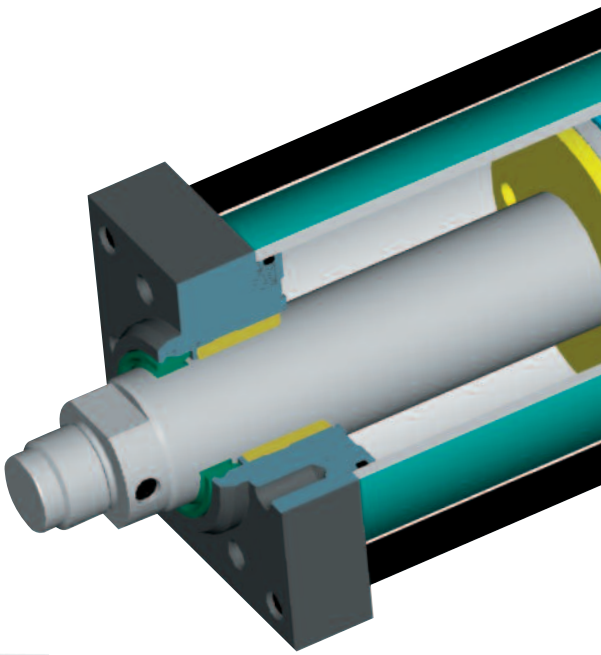
High stroke frequencies are easily achieved with minimal air consumption. In addition, small air connections allow the use of small, compact, more economical valves.

Application:
Any manufacturing operation requiring pressing forces from 2 – 2000 kN with power stroke up to 80 mm and total stroke up to 400 mm.

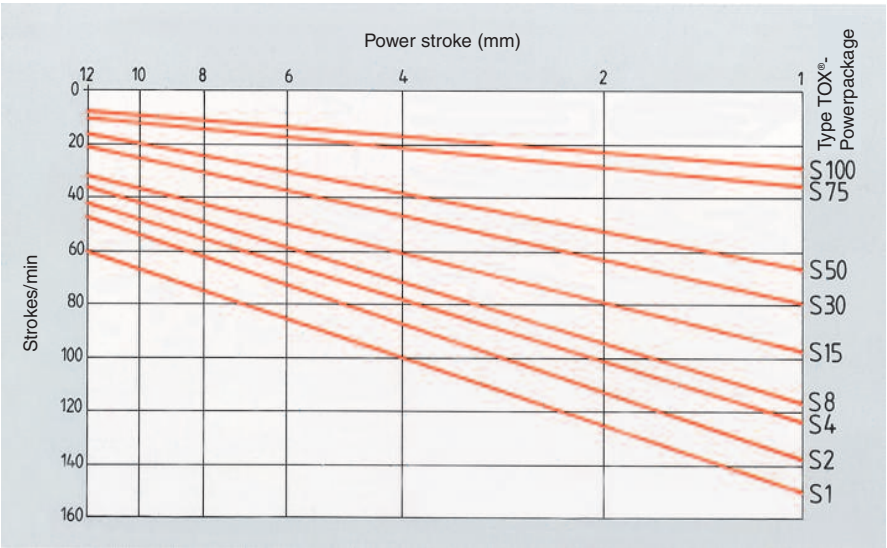
The "Logical" Alternative
Our compact, integrated system puts the pressure on all mechanical, toggle, hydraulic, and air-guzzling pneumatic systems. Simple installation and controls make it the ideal alternative.

The advantages in detail
The thoroughly thought out design of our TOX®-Powerpackage is proved by the patented details. So, for example, the oil refill system is equipped with an anti-overfill safety for trouble-free maintenance. Overfilling is avoided.

Our patented intensifier with absolute air/oil separation is unique in its simplicity. Due to the intensifier piston being equipped with spring reset, savings of 85% of the energy needed for the power stroke of a double-acting cylinder are realized.

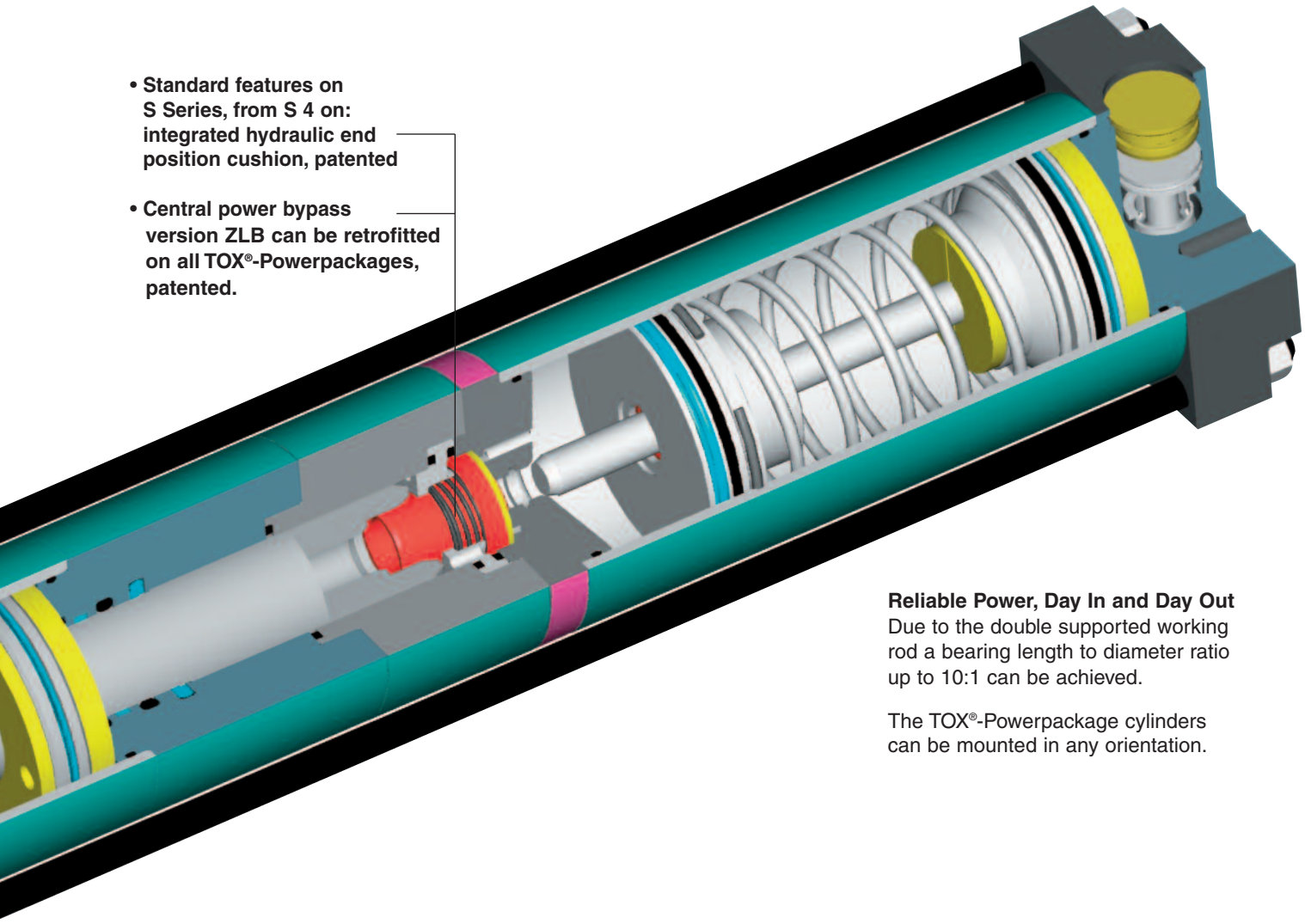


Stroke Frequency Diagram at 70% Force Capacity



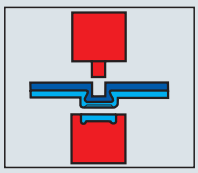
Note: Precise stroke frequency and air consumption figures are available on request.

- **Standard features on S Series, from S 4 on: integrated hydraulic end position cushion, patented**
- **Central power bypass version ZLB can be retrofitted on all TOX®-Powerpackages, patented.**

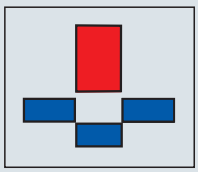


Reliable Power, Day In and Day Out
Due to the double supported working rod a bearing length to diameter ratio up to 10:1 can be achieved.

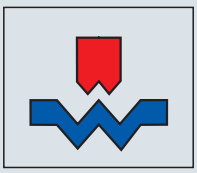
The TOX®-Powerpackage cylinders can be mounted in any orientation.



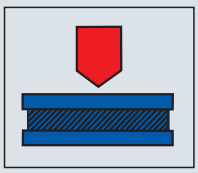
Clinching
TOX®-sheet metal joining



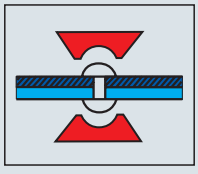
Punching, Piercing



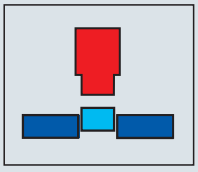
Coining, Marking, Stamping



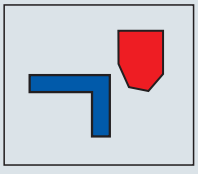
Pressing, Compressing, Straightening



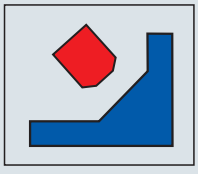
Riveting, Crimping, Flaring



Assembling, Press-Fitting, Mounting



Bending, Edging



Clamping, Tensioning, Peening

TOX®-Powerpackage – Simple to handle like a Pneumatic

The Power in Detail
The TOX®-Powerpackage is a completely integrated power drive. The different configurations and the specially developed accessories make it universally adaptable. In special applications, such as spotwelding, the TOX®-Powerpackage is optimized according to your requirement.

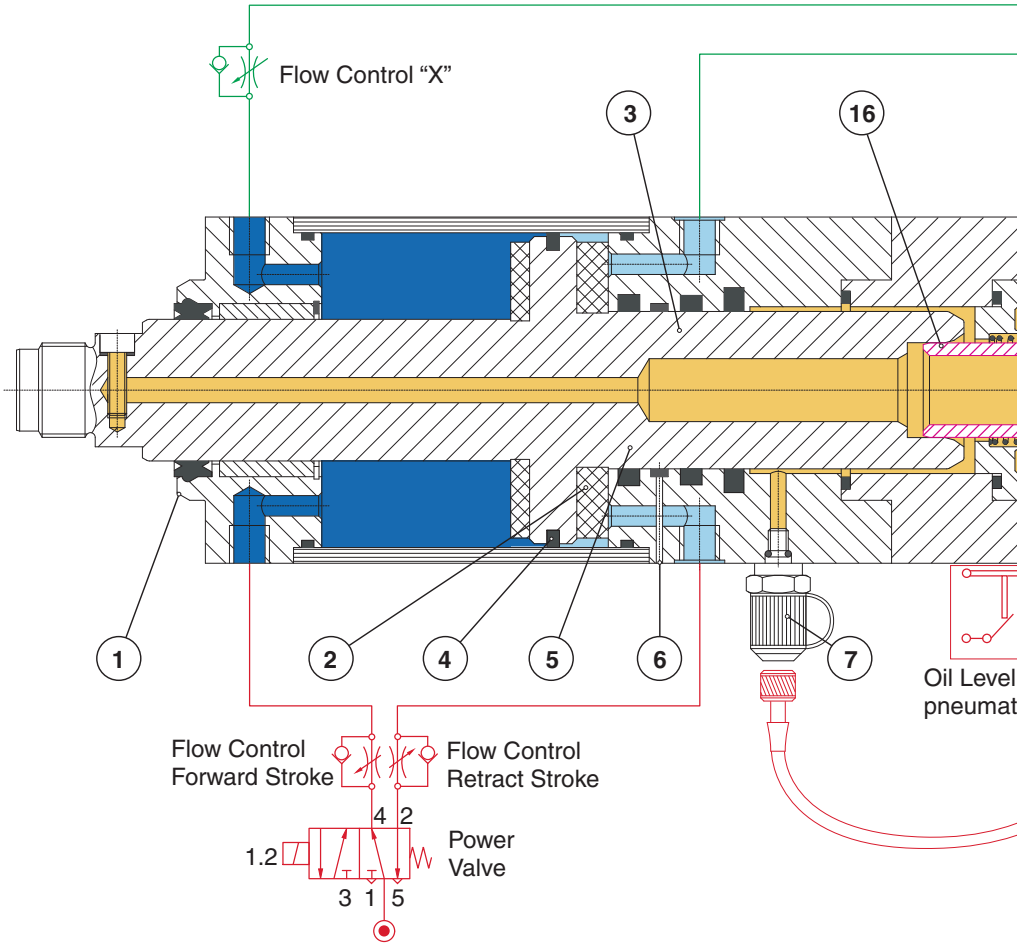
Developed to the smallest detail: More than 150.000 successful worldwide applications have proven it.

1. The pilot mounting gives precise location, and the standard bolt pattern allows for quick and easy mounting.

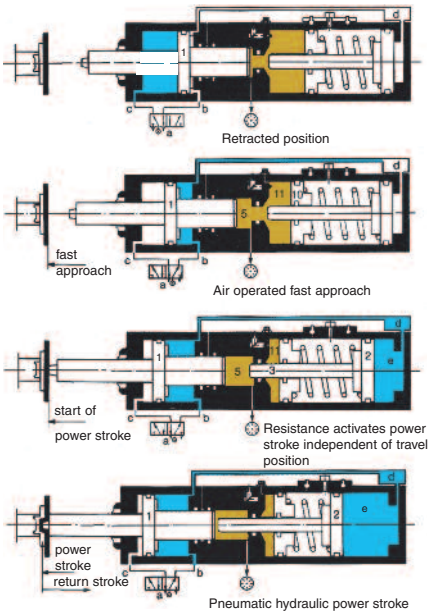
2. The working rod is cushioned in both end positions with long-life cushions; this is the key to smooth operation, even at high frequencies.

3. The seals have been optimized through extensive endurance testing.

4. Special seals allow for operation with non-lubricated compressed air.



Functioning of the TOX®-Powerpackage



Fast approach - the main control valve “a” is switched. The working piston 1 extends at high speed until it meets resistance at any point of the stroke. This resistance causes the changeover of the included power stroke sequence valve “d”.

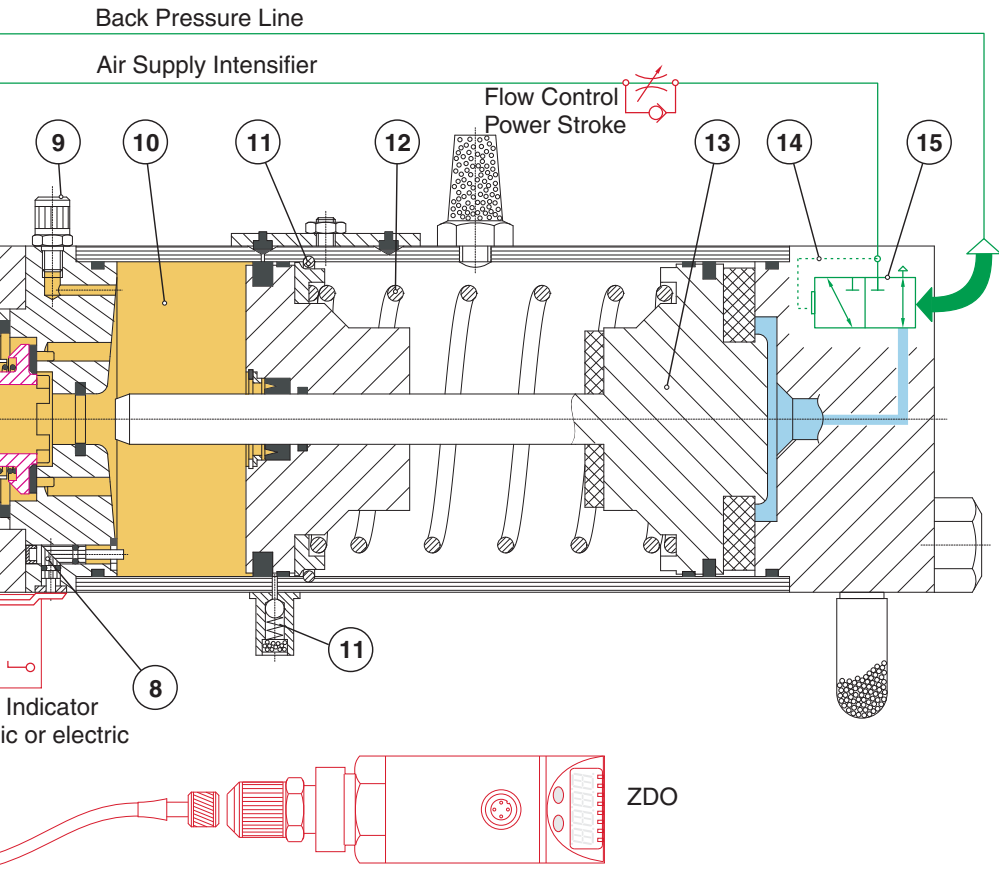
Power stroke - the intensifier plunger 3 passes the high pressure seal and compresses the oil in the working area 5 up to 400 bar. This oil pressure acts on the back of working rod 1 and generates the power stroke.

Return stroke - switching the main control valve “a” again results in switching of the power stroke valve “d” and venting of chamber “e”. The working piston 1 and the intensifier piston 2 return to their initial position.

5. The TOX®-Powerpackage delivers high forces in a compact design. The double supported working rod has enormous significance for tolerating the most rugged working environments.

6. The absolute air/oil separation is the reason for low maintenance, high stroke frequencies and trouble-free operation. An annular groove, between the seals separating the air and oil sections and vented to the atmosphere, prevents the air from mixing with the oil.

Cylinder, powerful like a Hydraulic Cylinder



The components shown in green are included with each unit.
The components shown in red are optional and available as accessories.

7. Each TOX®-Powerpackage features a standard high pressure measuring connector. The following functions can be performed:
- constant press force independent of the supply air pressure by activating the return stroke when a preset oil pressure has been reached
- monitoring supply pressure to aid in quality control
- activation of subsequent operations
- pressure gauge, etc.

8. Oil level indicator. Accessories include pneumatic and electric monitoring, also available with remote controls.

9. Oil refill connection.

10. Constant pressure, closed system, oil reservoir for extended refill intervals.

11. The patented anti-overfill system eliminates problems when refilling the cylinder with oil. The snap ring mounted inside the intensifier barrel limits the travel of the feed piston. If the cylinder is overfilled, the excess oil is removed by the integrated pressure relief valve.

12. The intensifier spring serves a dual function, the return of the intensifier piston and provide a constant pressure on the oil reservoir without any pneumatic hookup. This results in a trouble-free operation of the TOX®-Powerpackage in any mounting orientation, e.g. in robotic applications. In addition, the patented spring provides savings in air consumption of the TOX®-Powerpackage. The return stroke does not require a high consumption pneumatic supply.

13. The intensifier piston generates the high force during the power stroke. Different power stroke requirements can be easily achieved by changing the dimensions of the plunger on the intensifier piston.

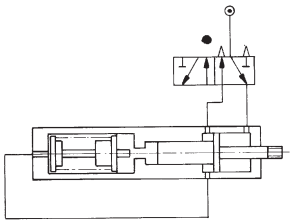
14. The change-over from approach stroke to power stroke takes place automatically as soon as the working rod meets resistance. The change-over time can be adjusted with the flow control valve “X”.

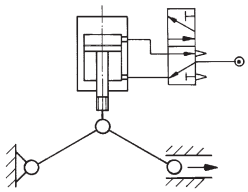
15. The complete controls are either mounted to the TOX®-Powerpackage or have been integrated into the flange for an even more compact design. What this means to you: the TOX®-Powerpackage is controlled like any double acting pneumatic cylinder with a 4/2- or a 5/2-way directional valve.

16. From cylinder size S 4 upwards all TOX®-Powerpackages are equipped with the integrated, patented, hydraulic end position cushion. Thus an optimal dampening in the retracted position is guaranteed – especially in case of applications with high tool weight.

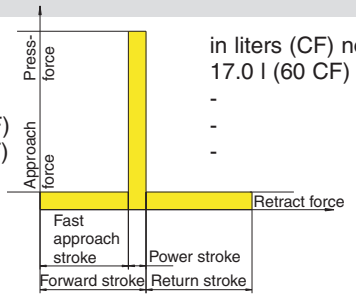
Other functions can be easily done, e.g., travel dependent activation of the power stroke, approach or power stroke at different air pressures, or use of proportional valves.

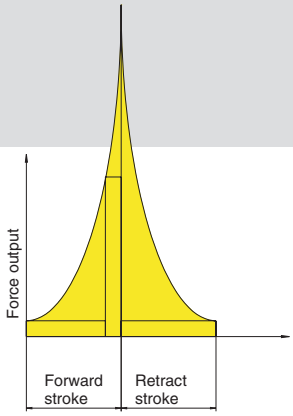
TOX®-Powerpackage:
Comparison with other Systems



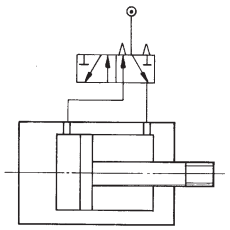


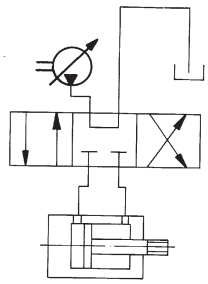
	The TOX®-Powerpackage	Alternative 1 Toggle with pneumatic cylinder
1. Costs - Investment	Relatively low to medium costs; inexpensive pneumatic controls: simple mounting (examples). 24 kN € 1.900,- 80 kN € 2.270,- 300 kN € 4.040,- 1000 kN € 10.600,-	Low to medium costs. Limited force range. 24 kN € 2.659,- 80 kN not available 300 kN not available 1000 kN not available
- Process speed	Based on cycle rates: for 24 kN 100 strokes/min for 80 kN 80 strokes/min for 300 kN 50 strokes/min for 1000 kN 30 strokes/min	60 strokes/min - - -
- Energy Consumption per Stroke	in liters (CF) normal air: for 24 kN 4.75 l (.17 CF) for 80 kN 16.00 l (.57 CF) for 300 kN 59.00 l (2.08 CF) for 1000 kN 198.00 l (7.00 CF)	in liters (CF) normal air: 17.0 l (60 CF) - - -
- Maintenance	Easy to exchange; compact design; minimal wear; seals last many millions of cycles. Simple maintenance consists of oil refilling and bleeding when low oil level indicator pops out.	Large ports and connections requirements. Prone to linkage wear and excessive play affecting end product quality.
2. Quality	Easy on tooling due to soft touch during approach stroke. Independent speed controls for approach, retract and power strokes. Force can be precisely controlled with a pressure switch and monitored with a gauge. Workpiece tolerance stackups are compensated automatically by the resistance activated power stroke. Stroke adjustment is not required when changing tooling. Precise rod guidance is provided by supporting it on both ends.	The force curve rises parabolically and is not adjustable. Therefore, ram position must be adjusted for proper force output. Power stroke adjustment is not possible. The force is position dependent. Part tolerances are critical. External ram guidance is required.
3. System Flexibility	Very flexible: units available in many stroke lengths. In special cases, the units can be stroked repeatedly to achieve longer power strokes.	Stroke is constant. No choices are available
4. Environment	Ideal for clean room applications. Low noise due to soft touch. Low air consumption also provides low noise levels of exhausts.	Same as the TOX®-Powerpackage
5. Disadvantages	Units are long for very long power stroke requirements (split execution can be used in such cases).	Design results in large, bulky pressframes



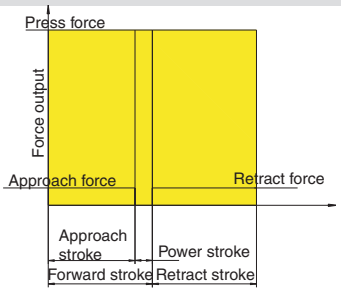


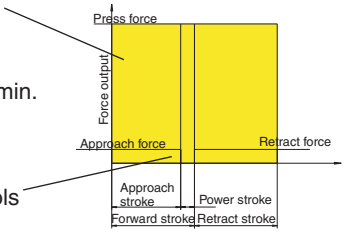
The following parameters were considered for comparison of the different systems: 6 bar air pressure, 60 mm total stroke, 3 mm included power stroke, press force 24 kN / 80 kN / 300 kN / 1000 kN





Alternative 2 Pneumatic cylinder	**Alternative 3** Hydraulic system
Low costs. Limited force range. 24 kN € 1.023,- 80 kN € 2.250,- 300 kN not available 1000 kN not available	Medium to high costs. Complicated controls and installation. 24 kN € 3.426,- 80 kN up to 300 kN 1000 kN € 21.730,-
60 strokes/min 30 strokes/min - -	80 strokes/min 60 strokes/min 30 strokes/min 20 strokes/min
in liters (CF) normal air: 35.0 l (1.24 CF) 117.0 l (4.13 CF) - -	Depending on controls. For simple controls and small loads, up to 80 kN/80 strokes/min. Very complicated controls required for large units.
Large ports and connections requirements. Large in size. Low wear.	Change of oil and filters required periodically. Oil leakage, contamination requires continuous maintenance. Complicated installation and plumbing.
High impact forces. Forward and retract strokes are adjustable in speed and force. No possibility for power stroke adjustments. Power throughout stroke. No compensation for variations in part tolerances.	Low-force approach stroke is possible only with special systems. Approach and retract speeds are adjustable; power stroke can be controlled with pressure switch. Force available throughout stroke, compensates for variations in part tolerances.
Force available throughout stroke.	Force available throughout stroke.
High air consumption. High noise level due to exhaust of large ports.	High noise levels. Contamination, oil leakage. Heat generated by pump.
Large bores result in large mounting envelopes and high air consumption.	High energy consumption. Leakage.



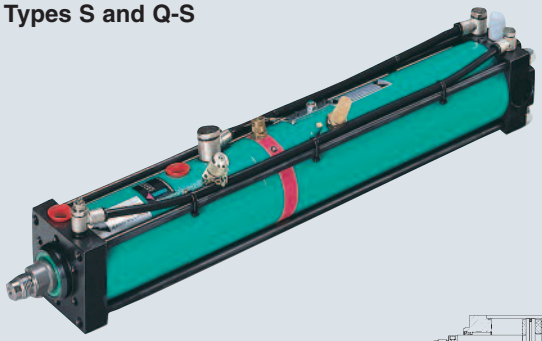


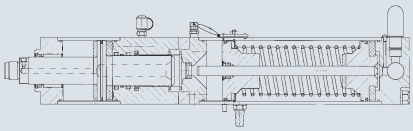
TOX®-Powerpackage – the Complete Power Source Program

Type S (Standard)
Application: general
Fast Approach/Return Strokes
High Stroke Frequencies
Pneumatic Forces: 2 – 1000 kN
Total Stroke: up to 400 mm
Power Stroke: up to 80 mm
Operating Pressure: up to 10 bar
(Version .30 up to 6 bar)

NEW **Preferred series Q-S**
Pneumatic Forces: 10 – 300 kN

Types S and Q-S

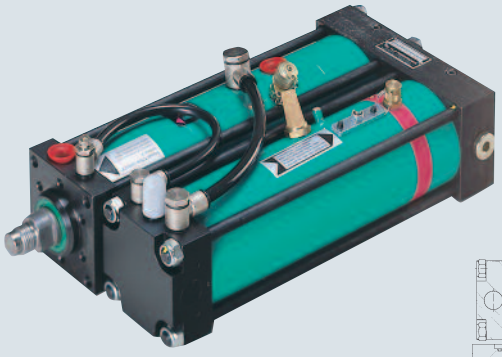




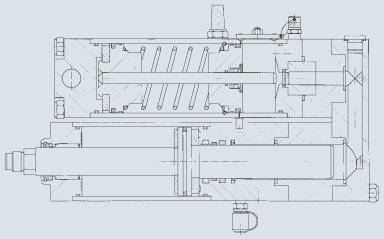
Type K (Compact)
Application: general
Fast Approach/Return Strokes
High Stroke Frequencies
Short Design - Side by Side
Pneumatic Forces: 2 – 500 kN
Total Stroke: up to 400 mm
Power Stroke: up to 50 mm
Operating Pressure: up to 10 bar
(Version .30 up to 6 bar)

NEW **Preferred series Q-K**
Pneumatic Forces: 10 – 150 kN

Type KT
Pneumatic Forces: 2 – 2000 kN
Total Stroke: up to 400 mm
Power Stroke: up to 400 mm
Operating Pressure: up to 10 bar



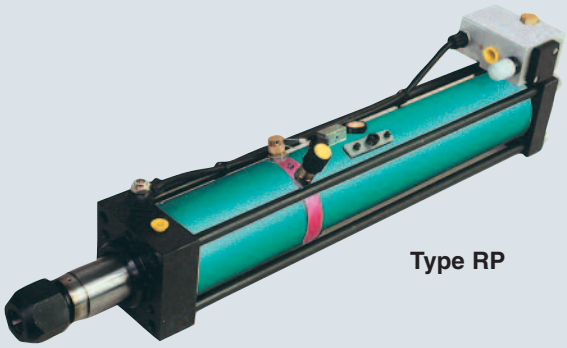
Types K and Q-K



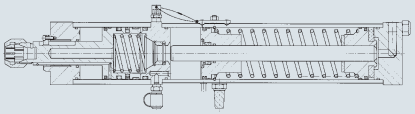
Type RP (Marking Cylinder)
Application: Marking
Pneumatic Force: up to 150 kN
Total Stroke: 32 mm
Power Stroke: 3 mm

Type T (Turbo)
Application: high-speed frequencies
up to 550 strokes/min.
Pneumatic Force: up to 120 kN
Power Stroke: 6 and 12 mm

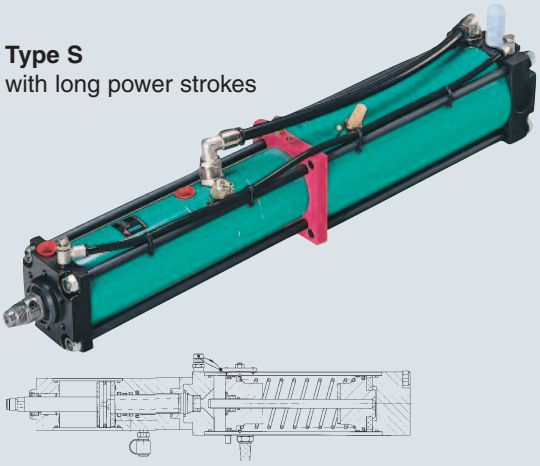
Type P/K/VH
(Spot Welding Cylinders)
Application: Welding engineering
for portable and robotic tongs as
well as for stationary fixtures.

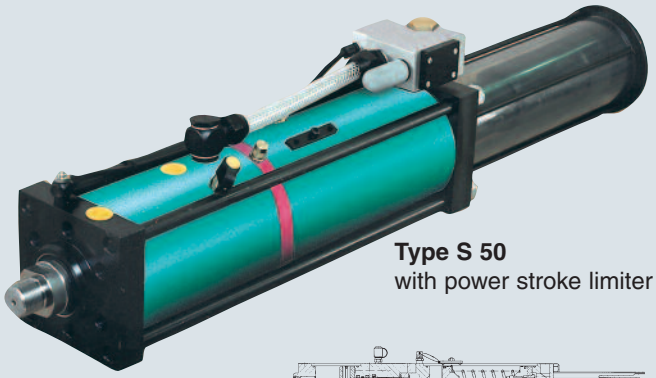


Type RP

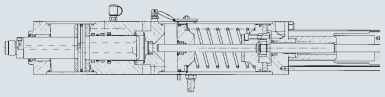


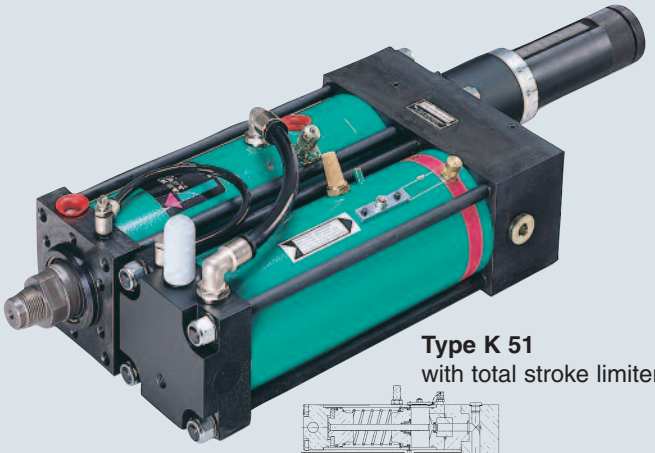
Type S
with long power strokes



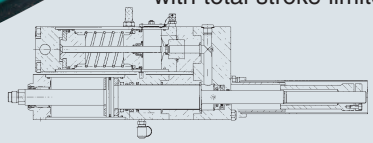


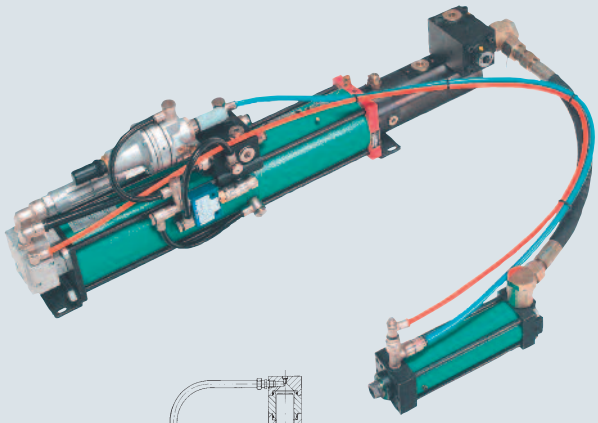
Type S 50
with power stroke limiter

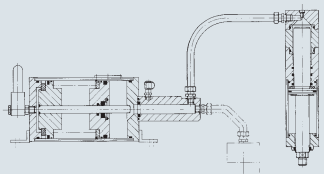




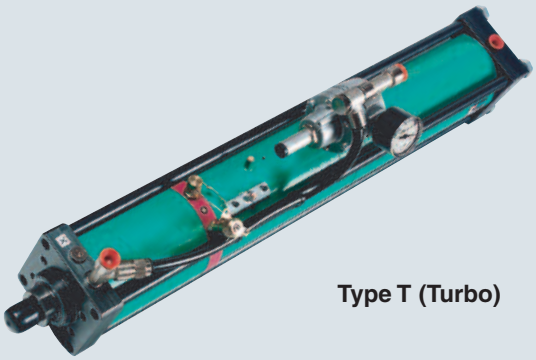
Type K 51
with total stroke limiter



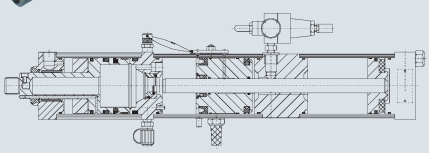




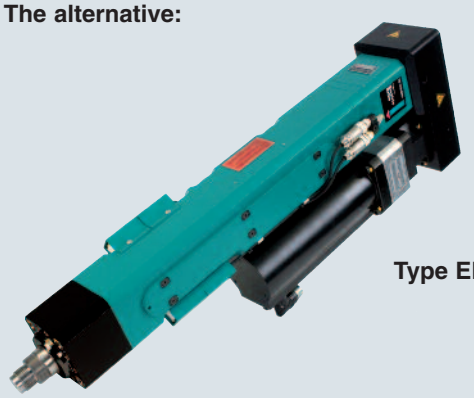
Type KT
with separate booster for
multiple working cylinders



Type T (Turbo)



The alternative:



Type EPMK

A drive from the TOX®-ElectricDrive Program.
A Servo-System with 0.25 – 500 kN press force.

Special versions upon request.

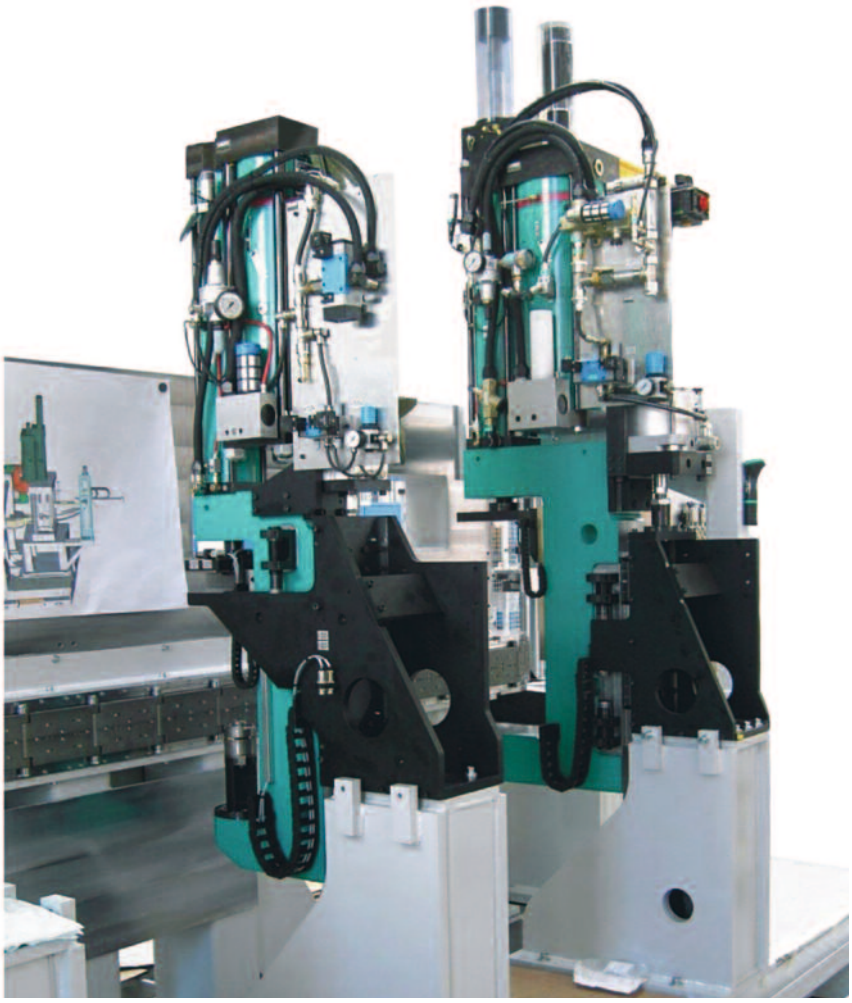
TOX®-Powerpackage in Industrial Applications

TOX®-Powerpackage Presses
The functional building-block principle of the TOX®-Presses simplifies the match to the individual application and results in an efficient, economical solution. The power is supplied by the TOX®-Powerpackage, the ideal solution for efficiency and trouble-free operation.

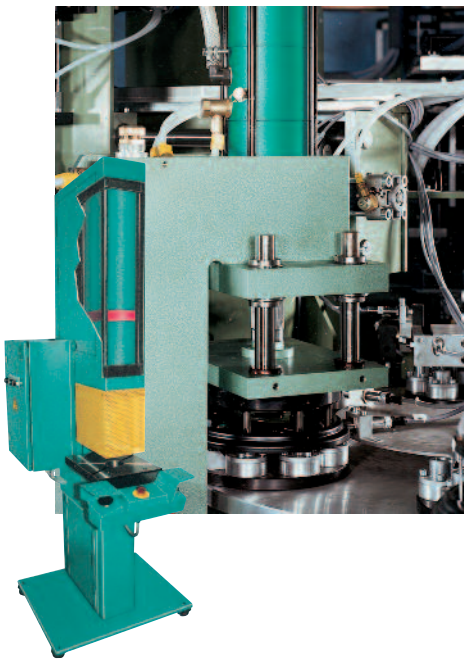
The TOX®-Powerpackage is the ideal drive for sheet metal joining tasks using the innovative TOX®-Clinch or TOX®-ClinchRivet technologies, invented by and patented for TOX® PRESSOTECHNIK, whether used in portable tongs, robot tongs or in single and multipoint fixtures.

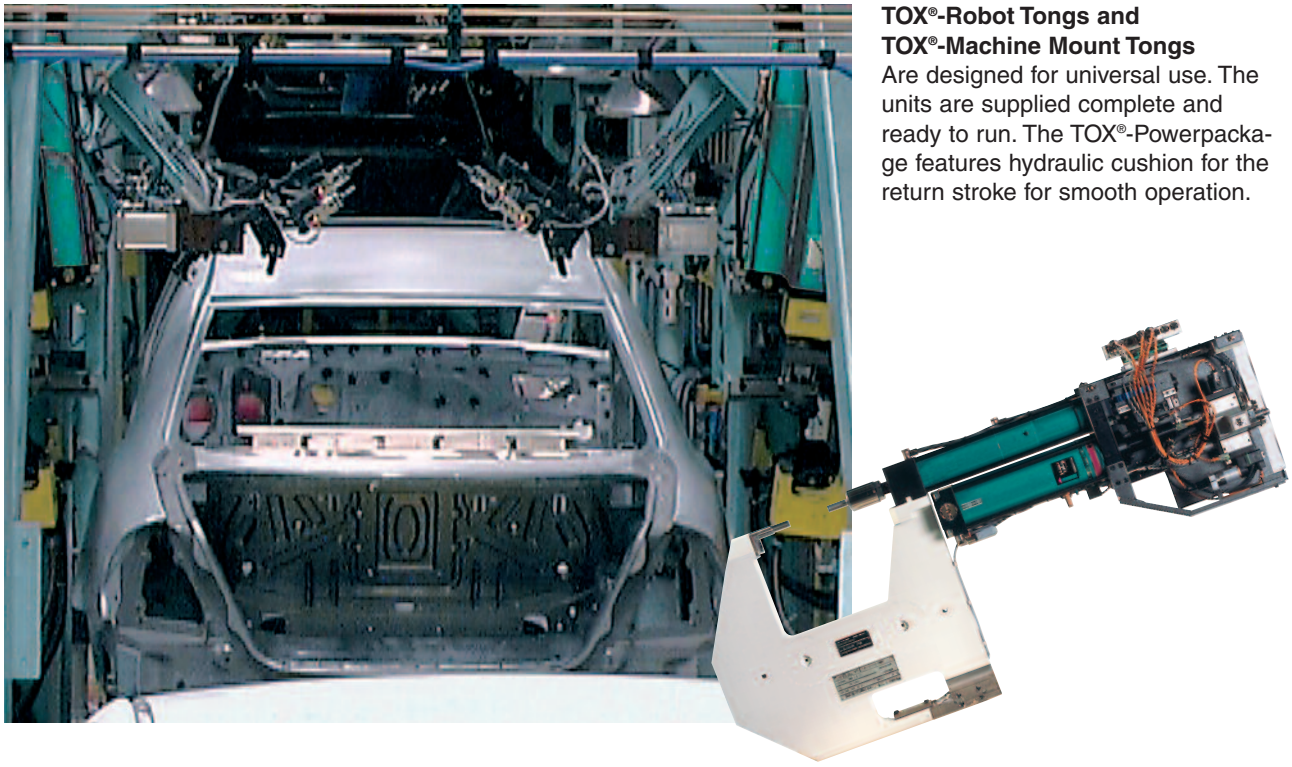
With TOX®-Clinching all types of sheet metal can be joined, replacing spot welding, forming a strong, burr-free connection. TOX® also joins galvanized and prepainted materials. Dissimilar materials of different thicknesses, even sandwiched layers are easily joined with TOX®-Clinch technology.

The picture below shows a 6-point TOX®-Clinching machine to join electric cable channels, with 3 S-type TOX®-Powerpackage cylinders of 80 kN press force each.



The TOX®-Powerpackage can be easily mounted on linear tracks, thereby providing a simple, flexible customized machine. Simplicity is further provided by the lack of hydraulics and the use of simple controls.





TOX®-Robot Tongs and TOX®-Machine Mount Tongs
Are designed for universal use. The units are supplied complete and ready to run. The TOX®-Powerpackage features hydraulic cushion for the return stroke for smooth operation.

Application of 3 TOX®-Powerpackage cylinders in a series valve production. High frequencies, compactness and reliability over millions of cycles are the basis for satisfied customers.

Extract from our customer list:
AGFA, AUDI, BASF, Bauknecht, BMW, Bosch-Siemens, Buderus, Daimler, FAG, Ferrari, Fiat, Ford, GEZE, GM, Kienzle, Mann & Hummel, Metabo, Michelin, MTU, Olympia, Opel, Peugeot, Philips, Phoenix, Porsche, Renault, Siemens, Thyssen, VARTA, VDO, VW, etc.

In the countries:
Argentinia, Austria, Belgium, Brazil, China, Czechia, Denmark, Egypt, Finland, France, Great Britain, Hungary, India, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slowakia, Slowenia, Spain, South Africa, Sweden, Switzerland, Thailand, Turkey and USA we are present either with daughter companies, joint ventures or representatives.

TOX® PRESSOTECHNIK

Our Worldwide Sales and Service Network

Product Range

TOX®-Powerpackage

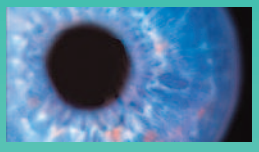
TOX®-PowerKurver

TOX®-ElectricDrive

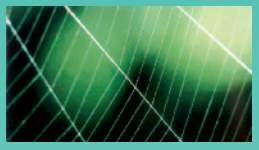
TOX®-FinePress

TOX®-Presses

TOX®-Controls
TOX®-Monitoring

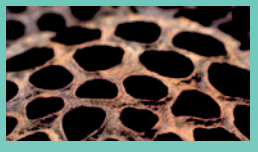


TOX®-Joining-Systems



TOX®-Tongs

TOX®-Punching
TOX®-Coining



TOX®-Press-Fitting

TOX®-Production Systems

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