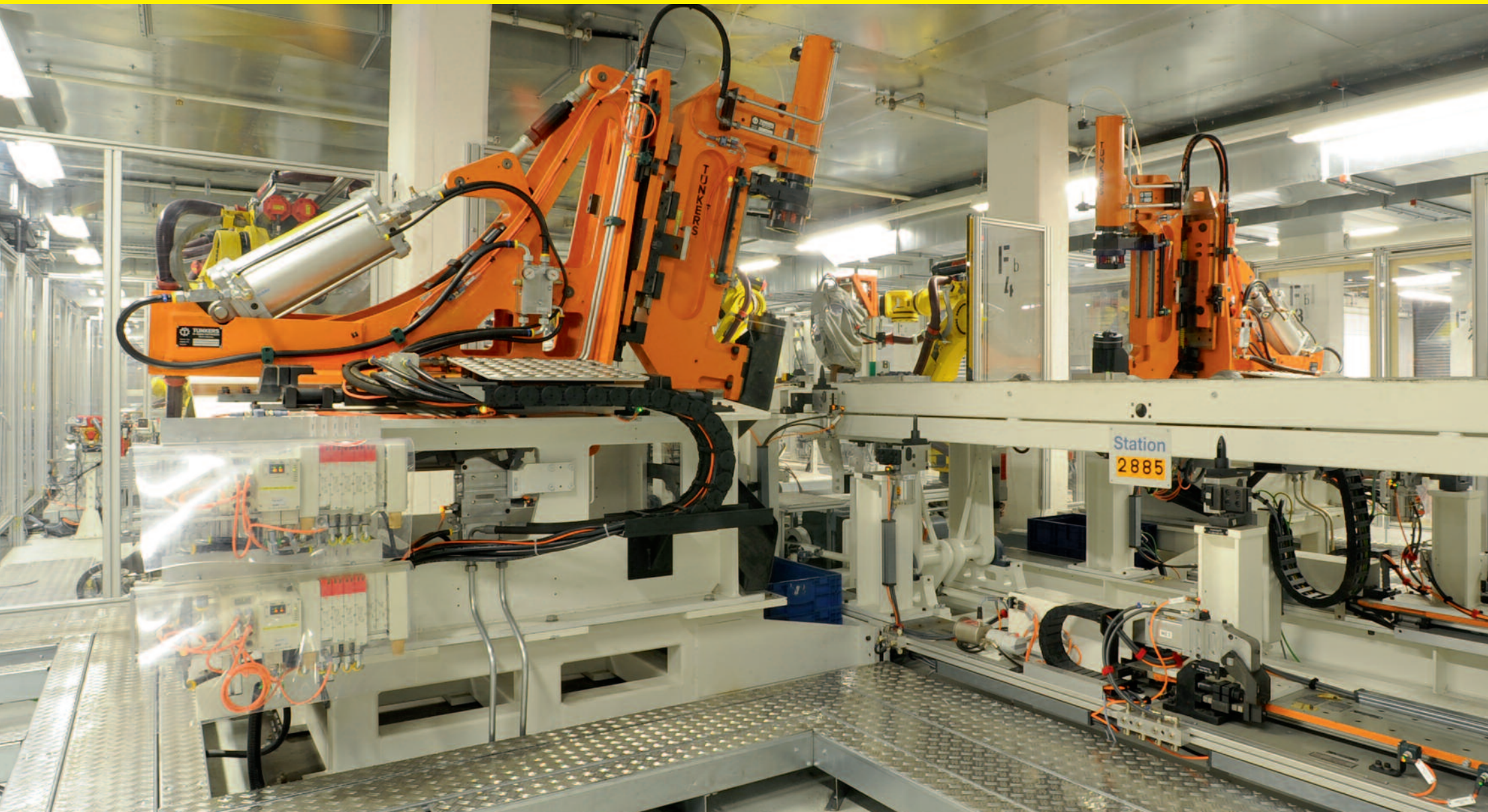
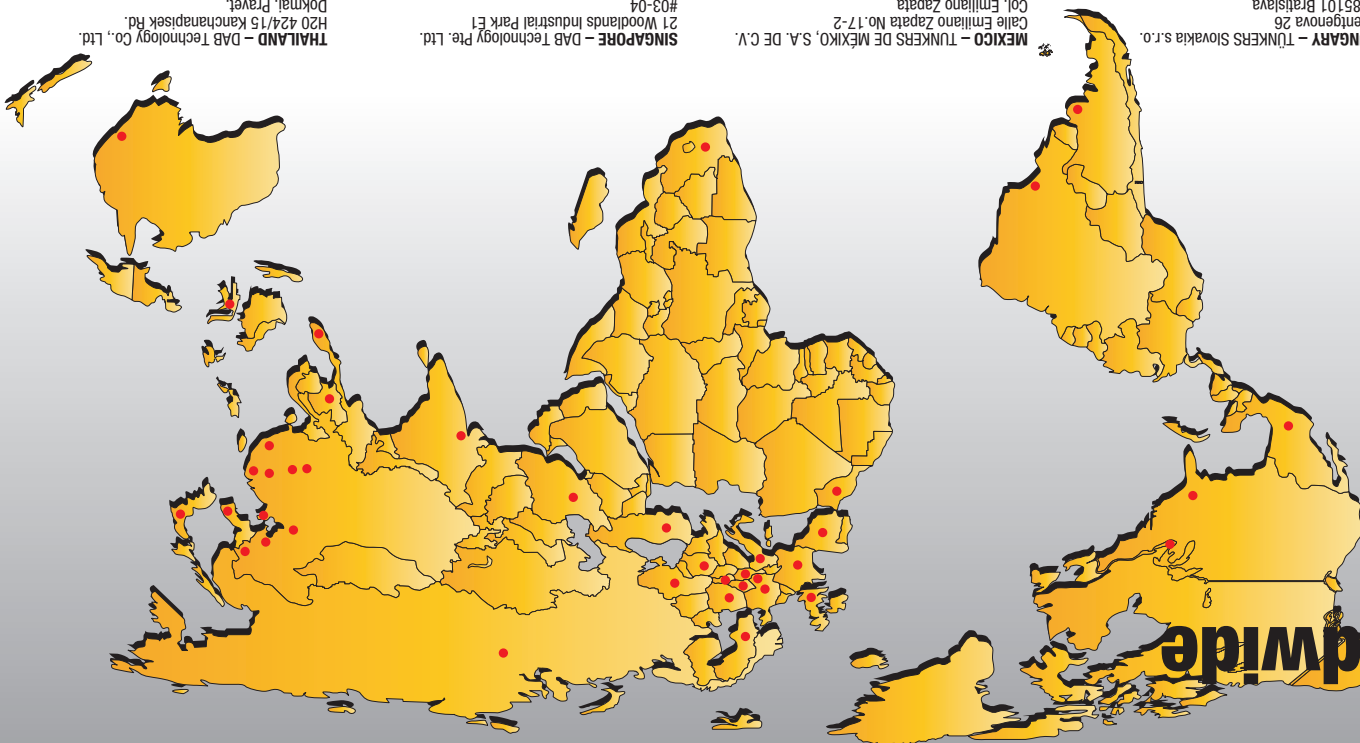


FORMING



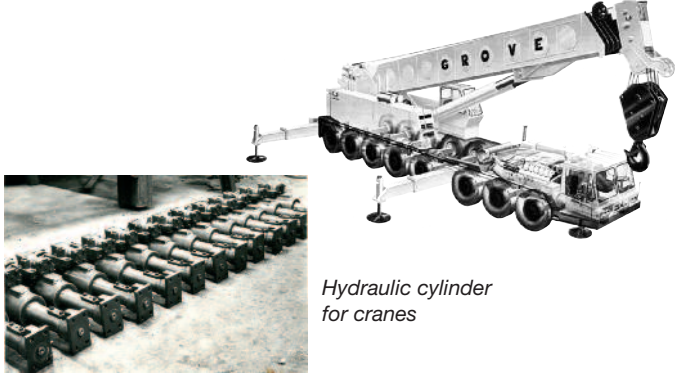
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FORMING

Forming – Our specialty



Hydraulic cylinder for cranes

In the beginning, TÜNKERS produced special hydraulic cylinders and systems for presses, oven manufacturing or mobile cranes – often with pressure forces up to 100t. This expertise was very useful for the development of the first clinching clamp that were developed for a German automotive manufacturer in the late 1980's and operated by water hydraulics (HFA).

Today, the drive technology behind forming technology remains a core competence of the TÜNKERS Group. Here, we use hydraulic and pneumatic drives with force transmission as well as servo-electrical drives with forming forces of 10 to 200kN.

In forming technology, the challenge is in the development of tool concepts which comply with the very tight space available in welding systems. Extremely compact solutions tailored to individual requirements are a specialty of TÜNKERS. After all, we can refer to a very broad product range that has evolved in more than 20 years of operation.

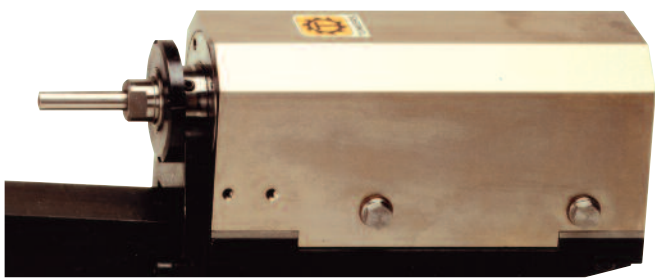
When we speak of forming, we think of the classical applications such as stamping, piercing, flanging, or cutting body sheets. Usually we have to adapt or modify a process that cannot be implemented in the press shop or that is required for a special order, as e.g. punching holes for the roof rails of a station wagon. It is often the large number of variants listed in the table of accessories which requires additional processes such as cutting, stamping or flanging.

But forming processes also includes joining technology. With similar processing forces of 30 to 60kN, components of various qualities, such as aluminum and steel are joined by clinching or adding stamping rivets. Similar processes are used to add stamping nuts or stamping bolts to the material. The following product overview shows a very small number of examples of technical solutions we have developed and supplied to the automotive industry so far. We are looking forward to receiving your request.

Drive technology

Hydraulic cylinder

Special cylinder from in-house production designed for the extreme requirements of forming tasks and guided by a long precision bush. Suitable for forces ranging from 20 to 200kN.

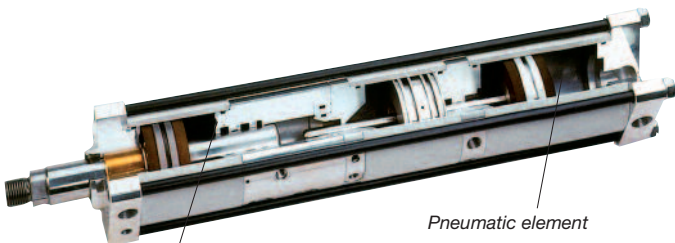


Cylinder in monoblock design 80 mm stroke for joining

HydroAir cylinder

Hydraulic- /pneumatic force transmission for drive forces up to 200kN with the following specifications:

- splitting of the cylinder stroke into a pneumatically operated fast stroke and power stroke of 6-12 mm generated by hydraulic force transmission
- stroke function for fast closing and opening for short time cycles



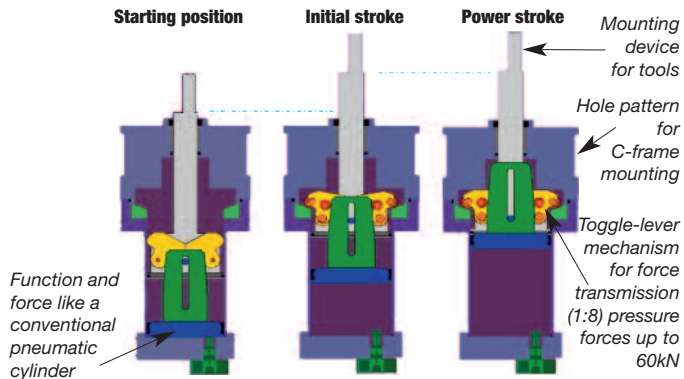
Hydraulic high pressure side

Pneumatic element

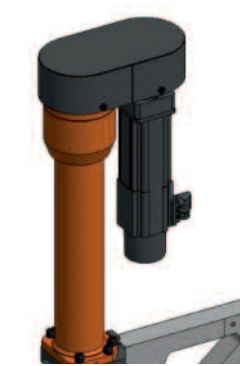
Multi-force cylinder



Pneumatic cylinder which operates a toggle-lock mechanism in the final position, thus generating a force amplification of 1:8 up to 1:10. Pressing forces up to 8t (80 kN).



Servo-electric cylinder



Drive unit consisting of a servo-electric motor which drives a precisely guided piston rod by means of a toothed belt drive and threaded drive. Freely programmable force/transport characteristics, e.g. for sophisticated joining processes. Force range up to about 200kN.

C-frame systems

Operational compact press with hydraulic cylinder, multi-force cylinder, HydroAir cylinder or servo-electric cylinder. With strokes up to a maximum of 300mm and throat depths up to a maximum of 800mm, the simple C-frame design enables the development of large toggle-lever windows for a wide range of standard applications in forming technology.



Weight-optimized servo C-frame

Drive unit e.g. multi-force cylinder MZ 100

Adapter plate e.g. for robot flange

Stripper with tools

Die

Toggle-lever Unit

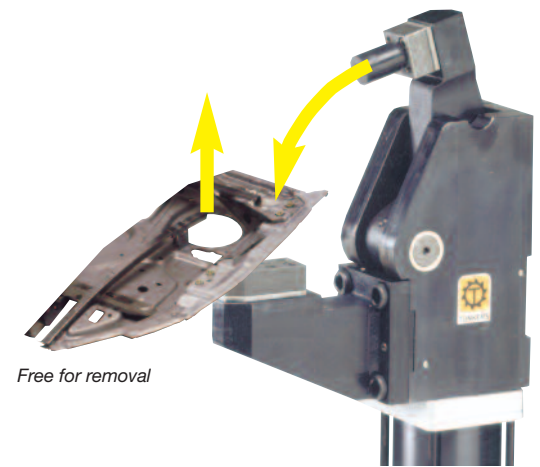


Dual stamping unit

Compact forming unit which generates high pressing forces of up to 80kN (8t) by means of a toggle mechanism integrated in the body of the Unit. In the final position, the force is thus amplified by 1:8, which is why usual pneumatic cylinders with an operating pressure of 5 bar or simple electric drives are sufficient to drive these clamps.



Clinching unit with electric drive



Free for removal

The stamp guided at the swivel arm turns into the die – without compromising on quality or quantity.

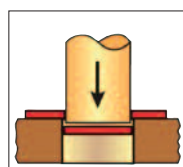
The fully opening swivel arm releases the component for vertical removal. An additional transporting unit is not required.

Overview product range C-frame

Type	Force (kN)	Stroke (mm)	Throat depth (mm)	Length (mm)	Width (mm)	Depth (mm)
CBMZ 10	10	50-200	50-600	763	80	150
CBMZ 25	25	50-200	50-600	813	80	250
CBMZ 45	45	50-200	50-600	863	80	400
CBMZ 60	60	50-200	50-600	913	80	500
CBHA 60	60	50-200	50-600	985	110	150
CBHA 110	110	50-200	50-600	1095	110	200
CBHZ 50	50	50-200	50-600	534	60	250
CBHZ 80	80	50-200	50-600	617	80	250
CBHZ 150	150	50-200	50-600	667	120	250

Overview product range toggle-lever technology

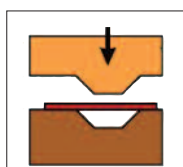
Type	Torque	Force at 90 mm throat depth (kN)	Max. opening angle (mm)	Throat depth (mm)	Length	Width	Depth
PFS 100	600	6	75°	60-200	418	62	138
PFS 200	2000	12,8	75°	60-200	433	72	145
PFS 400	4000	22,8	75°	60-200	504	100	165
PFS 900	9000	51,5	75°	50-250	671	100	165



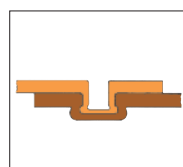
Piercing



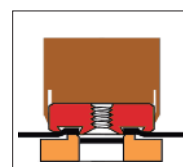
Number stamping



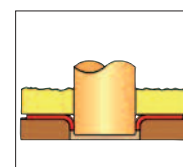
Embossing



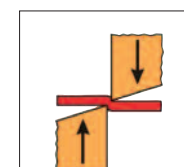
Joining



Replacing stamping nuts



Collar forming

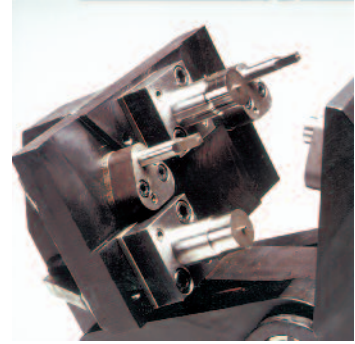


Cutting

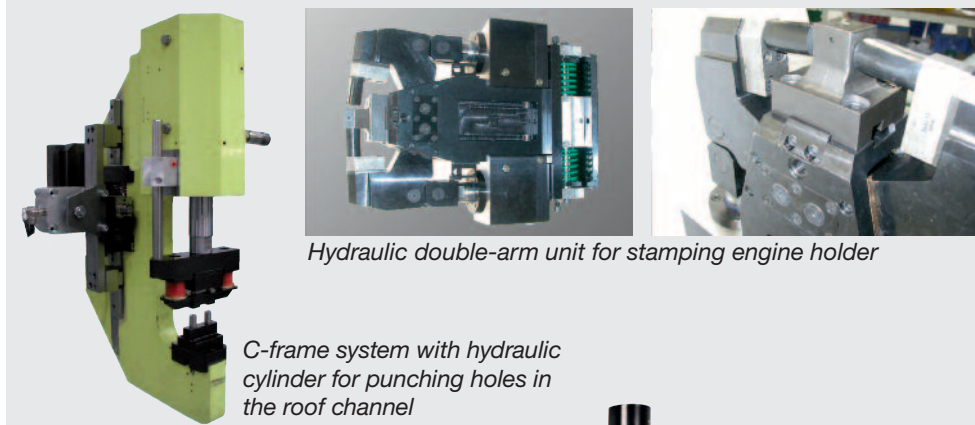
FORMING

Piercing

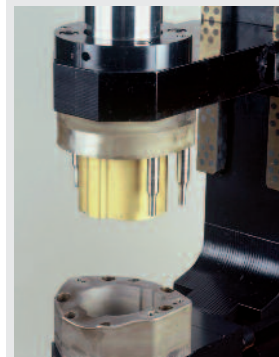
Hole punching in steel, aluminum sheets or plastic with round or form stamp, straight or contoured dies.



Applications



C-frame system with hydraulic cylinder for punching holes in the roof channel



Front punch clamp, right-hand drive aperture

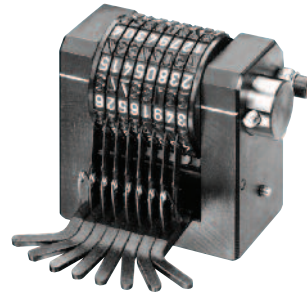


Stamping of suspension strut dome with servo-electric unit

Tools used
Highly rigid stamps and die tools which guarantee quantities up to 200,000 in connection with the Tünkers clamping systems.

Number stamping

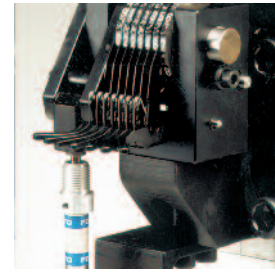
Similar to ordinary stamps, the component is marked with letters, numbers or symbols by means of a forming process at forces > 5kN. Frequent applications of number stamping are shift and day stamps, type labels or company stamps.



Die press unit (manual)

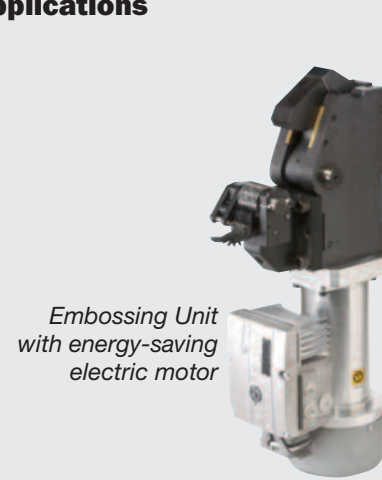
Tools

Sturdy type holders and die press units with key or automatic operation for figure heights of 2-8 mm.



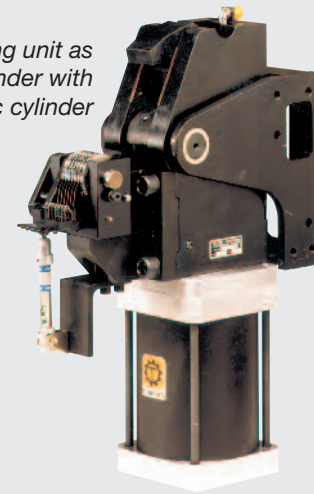
Automatic stamping mechanism
Switching by means of a pneumatic cylinder

Applications



Embossing Unit with energy-saving electric motor

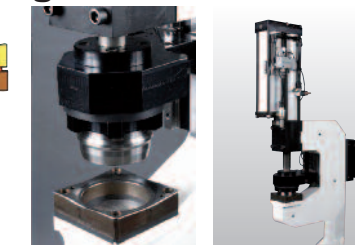
Embossing unit as toggle-lever cylinder with pneumatic cylinder



Embossing Unit as C-frame system with multi-force cylinder

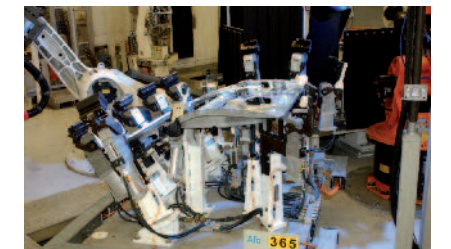
Special Applications

Collar forming



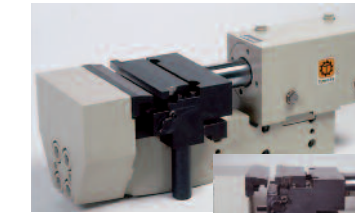
C-frame system with HydroAir cylinder

Stamping



Application for toggle-lever Unit for piercing embossings/beads in sheet steel

Folding

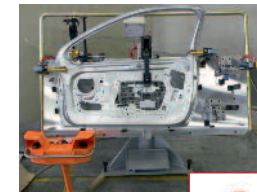


C-frame system for folding short sheet overhangs with integrated holding-down device

Embossing mounting plates with cut threads

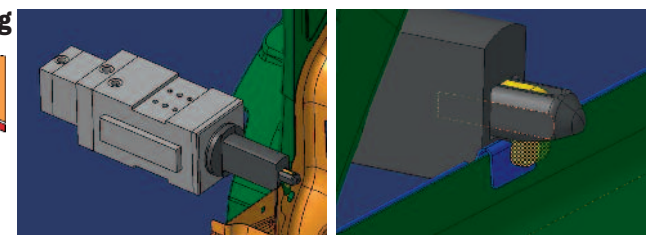
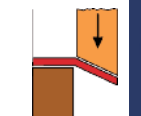
Pneumatic toggle-lever Unit for piercing a thread in a metal component by means of a stamp and die

Cutting



Cutting sheet in door right/left

Bending



Bending unit for metal clips / tabbing clamp
Forming hook bending the clip up to 180°

Joining

Clinching – the alternative joining procedure for spot welding. With comparable rigidities, pre-coated and coated sheets, combinations of steel and aluminum and compound materials with intermediate layers can be joined easily and more safely.

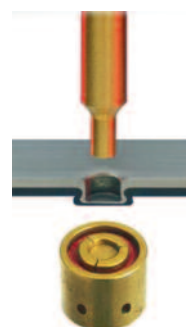
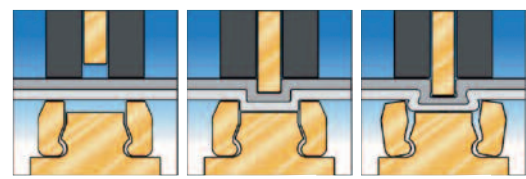
Joining process



Cut Sample
Material: Aluminum 1,5 mm

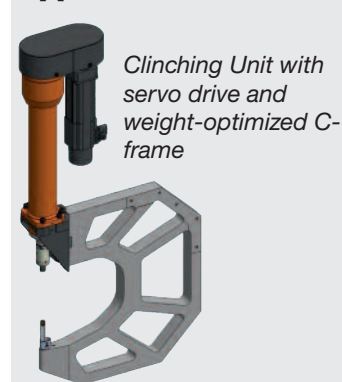
With a shaped stamp and die tool, the sheets are formed by means of a deep drawing procedure in such a way that an undercut is formed under the bottom layer.

mechanisches Prinzip BTM

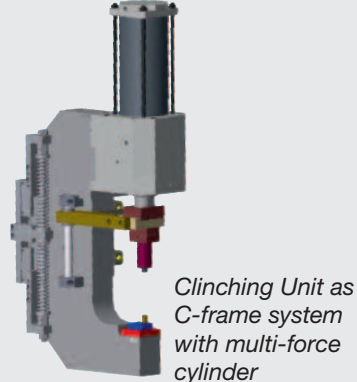


Example of tools used – here BTM Tog-L-Loc System

Applications



Clinching Unit with servo drive and weight-optimized C-frame



Clinching Unit as C-frame system with multi-force cylinder



Toggle-lever operated clinching system

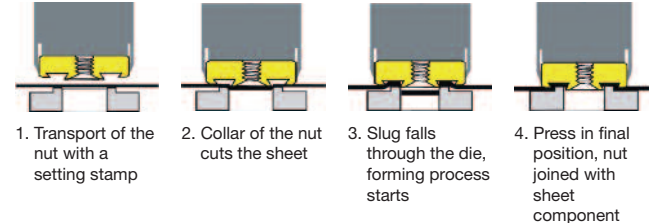
Detail of die holder

Setting

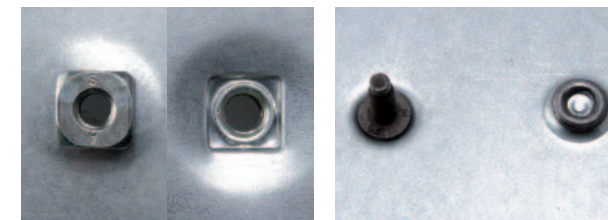
Pressing nut, stamping bolt, setting nut – these are terms for add-on elements which are added directly to the sheet component by a special forming process, in contrast to the weld-on element, as e.g. the welding nut. Increased process safety also for coated or galvanized sheet steel as well as the option of fixing to aluminum sheets are the particular benefits of this procedure. As an independent system manufacturer, we offer you complete systems including transport and technology for almost any nut/bolt element as well as for special elements such as riveting.

Process

Example of a self-piercing nut



Examples

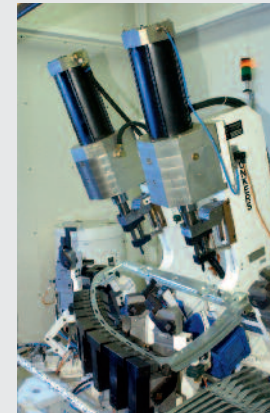


Example of stamping nut

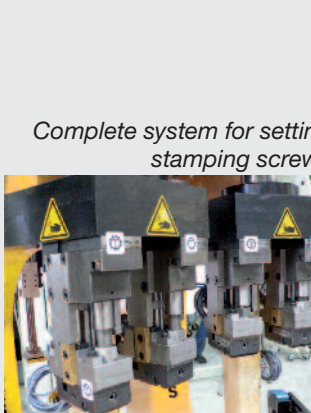
Example of stamping nut

Applications

C-frame Unit with multi-force cylinder for setting stamping nuts



Dual system for setting stamping nuts



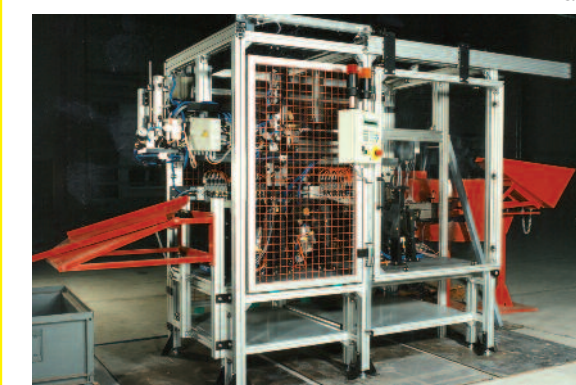
Complete system for setting stamping screws

Turnkey Solutions

As a mechanical engineering company based in Ratingen near Düsseldorf, we have the expertise and the capacities not only to produce tools and forming Units but also to supply complete solutions and systems.



System for setting bolts and cutting the component "door"



System for joining the cover sheet of an exhaust manifold

