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INTELLIGENT PUNCHING SOLUTIONS

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Tools · Reduction Bushes · Strippers // 5

System Extensions // 6

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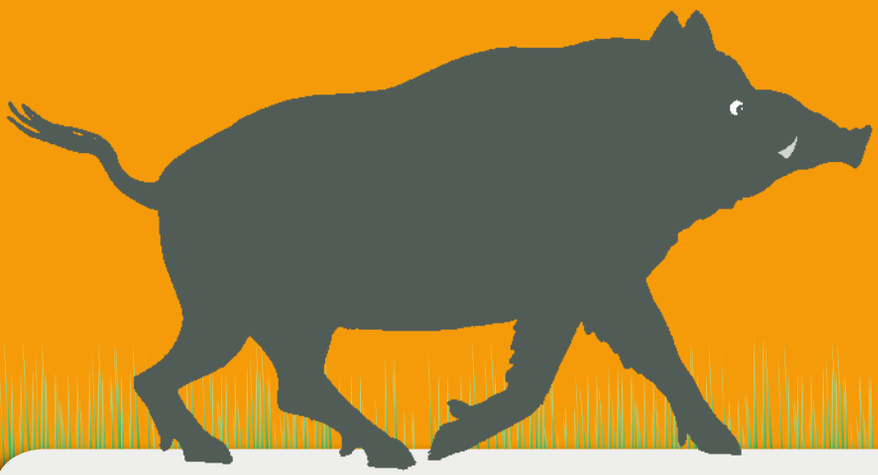
Partner Programs // 8



ips – intelligent, strong and quick …

// Wild Boar Goulash

- 1 kg wild boar goulash
- 3 tbsp oil
- 150 g streaky bacon
- 2 large onions and 2 garlic cloves
- salt, pepper and 3 tbsp flour
- ¼ litre red wine and ½ litre bouillon or game stock
- 1 tbsp tomato purée
- thyme, rosemary and – just as you like - wild game seasoning
- 1 large can of chanterelles and ½ cup of crème fraîche (sour cream)
- garlic powder

// Cooking

- Wash meat and dry thoroughly. Brown meat in hot oil, then keep warm. Dice bacon and onions and brown them also. Add meat and season with salt and pepper. Add red wine and bouillon, season and braise in a closed casserole about 60 minutes.
- Mix flour and a small bit of water and thicken the boiling sauce with the mixture. Taste and season.
- Heat the drained chanterelles in the sauce and refine with crème fraîche.

// Preparation time

- about 30 minutes, level of difficulty: normal

// Enjoy!

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Consulting and Engineering Services //

// Project management and consulting
// Manufacturing optimisation with cost reduction
// Compilation of specifications
// Design services

We raise questions
// Is it possible to design a better product with regard to automation?
// Which dimensional tolerances are necessary?

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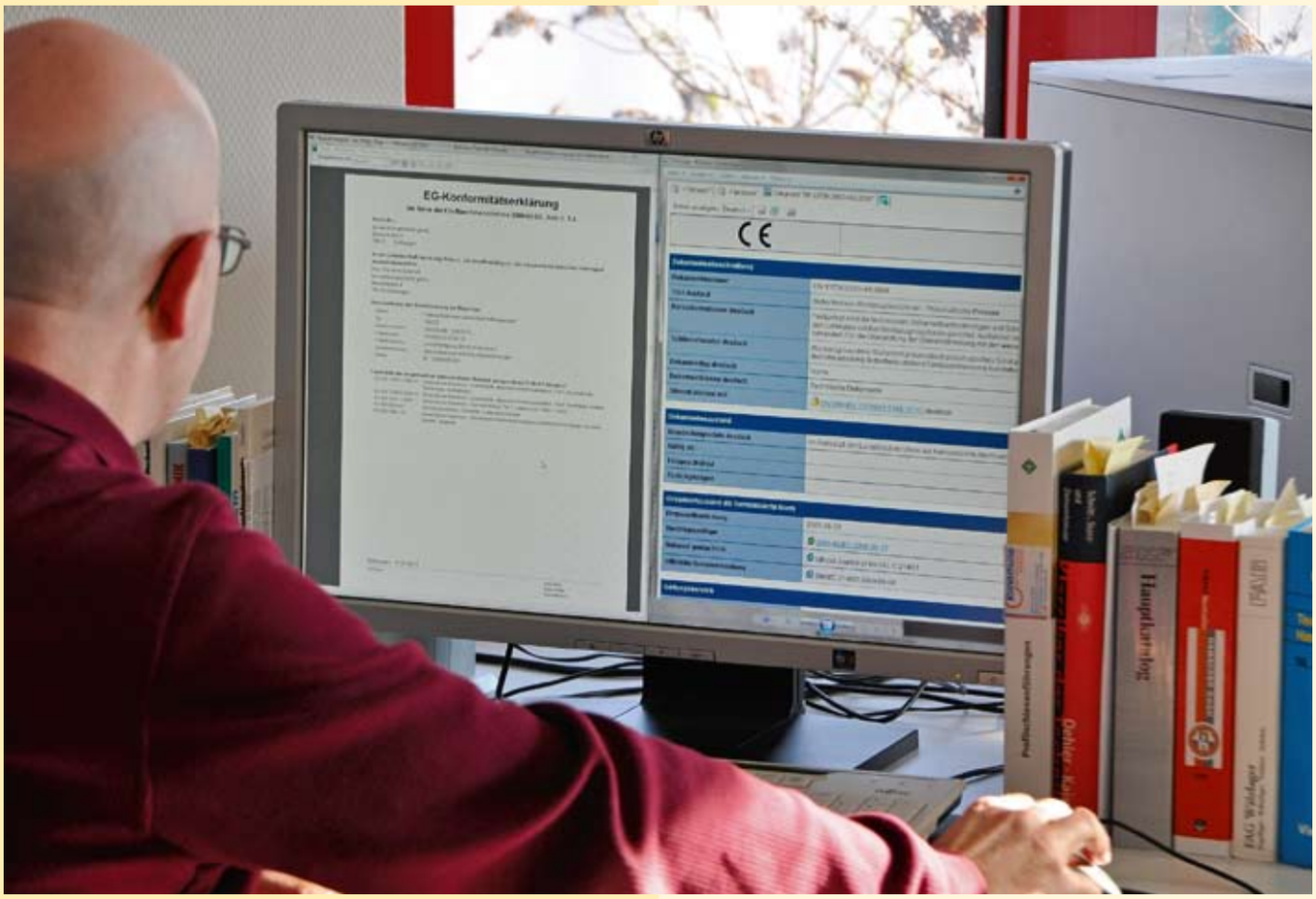

Our consulting services

We search and develop solutions for the specific applications of our customers.

We support you in optimising your products.

We analyse manufacturing sequences and manufacturing processes.

We observe the indicated tolerances and coordinate feasibility with regard to the tools or the unit.

We discuss safety concepts.

We develop ideas for parts handling.

We assist you in the complete planning of the system.

On request, we perform profitability calculations.

Our engineering services

Complete design with SolidWorks including CAD data.

Designs of tools, fixtures, machines, test benches.

Tolerance analysis and agreement on a design concept.

Integrated measuring and testing equipments.

Complete documentation.

CE mark with risk analysis in accordance with the EC Machinery Directive 2006/42/EC.

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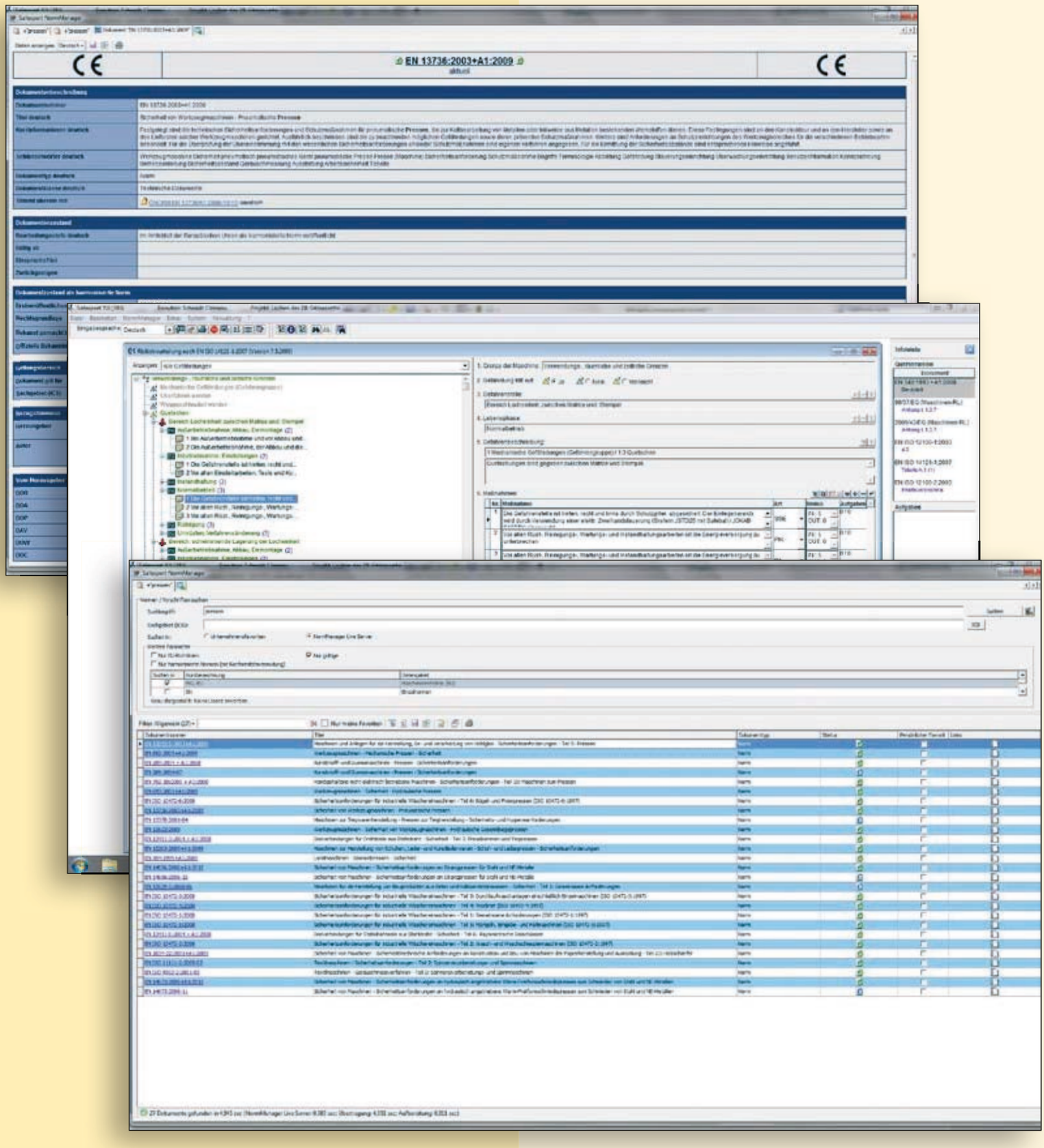
CE declaration and risk analysis with »Safexpert«



Engineering services //

Stamping //

Assembly // insertion //

Crimping //

Laser cutting units //

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Pressure assembly //

Punching // cutting off //

Sawing // drilling // milling //

Pipe punching //

We look forward to meet your requirements

Check list for offers – also available at www.ips-werkzeugtechnik.de

1. Customer address

Company name	Contact person, department
Street	Telephone/fax
Postal code, town	E-Mail

2. Material data

Material details:	Tensile strength in N/mm²:	Material thickness in mm:

3. Current details

Performance specification available?		
Should we supply a quotation for limit stops and guides?		
Free form surfaces – adapted tools – please mark	◯ **yes**	◯ **no**
Should we supply a quotation for a complete unit with CE mark?		
Which safety equipment is required by the customer? (sliding door activated with both hands / light barrier / operation with both hands)		

4. Process data

Cycle time (sec):		Strokes/d:	
Shifts:	1 shift/d	2 shifts/d	3 shifts/d

5. Drive and specific data of the unit

press-operated	pneumatic	hydraulic
Nominal pressure in bar	pneumatic	hydraulic
Quotation for hydraulic equipment required?	What kind of equipment?	
Quotation for integrated counter required?		
Throat depth in mm:	Feed clearance in mm:	

6. Number of units

7. Part name/project name of the customer

8. Description

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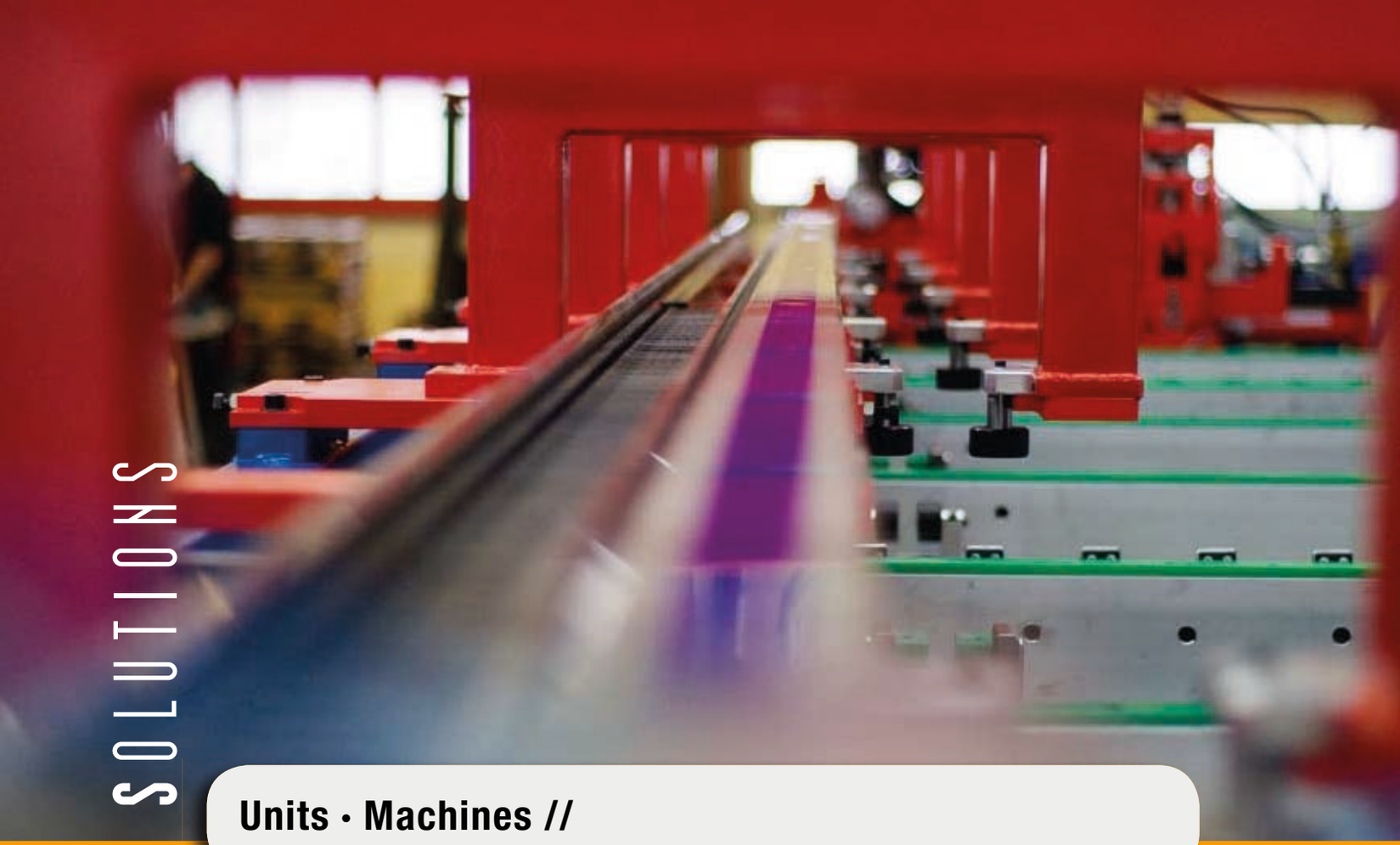

INTELLIGENT PUNCHING SOLUTIONS

Units · Machines //

2

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Units · Machines //

// tailored to your individual requirements

Non-cutting processing
// punching // pressure assembly // stamping // pressing
// insertion // laser cutting …

Metal-cutting processing
// sawing // milling // drilling
// thread cutting …

And much more …
// Insertion and removal by means of pick & place units or robots
// Planning in accordance with the customer performance specification
// Design with SolidWorks
// Control technology in accordance with the latest safety regulations
// CE mark with risk analysis is created by means of SAFEXPERT software
// Commissioning on customer's premises including after-sales services
// Spare parts supply

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Industrial sector: **vehicle registration**

Project: 091002

Material: aluminium

Function: Punching of vehicle registration numbers, the distance between holes is adjustable by means of 14 templates.

Industrial sector: **HVAC**

Project: 101216

Material: polypropylene (PP)

Function: Serial punching unit for punching mist collectors.
Special features:
– power cylinders can be switched on individually
– punching width is 5 times adjustable by means of a plug-in system
– two-hand safety release

Industrial sector: **automotive industry**

Project: 100201

Material: polypropylene

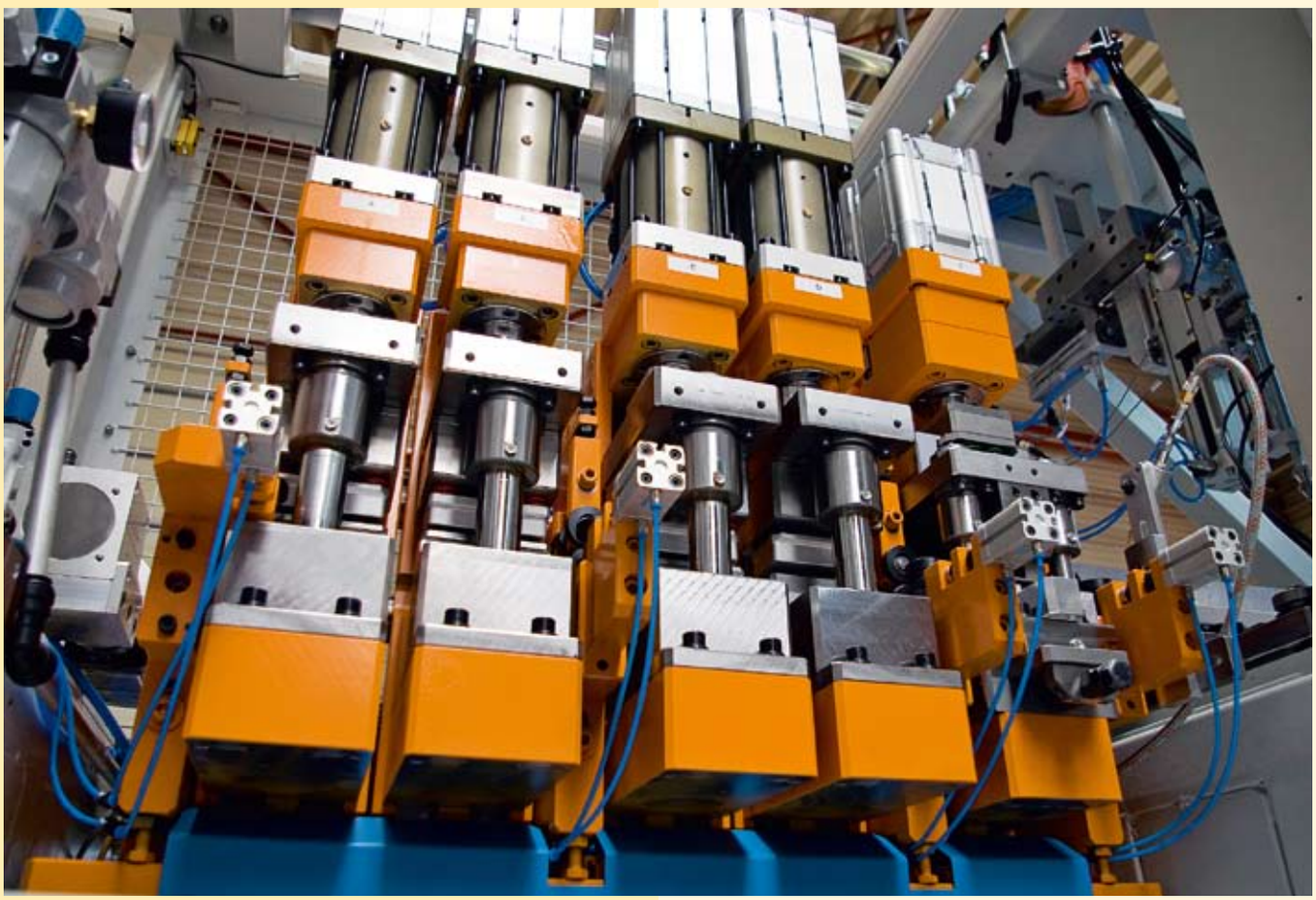
Function: Device for punching the inside lining, indirect lighting.

Industrial sector: **solar industry**

Project: 090129

Material: aluminium profile

Function: Punching unit for the processing of solar profiles. After the punching process, silicone is injected into the sealing joint.

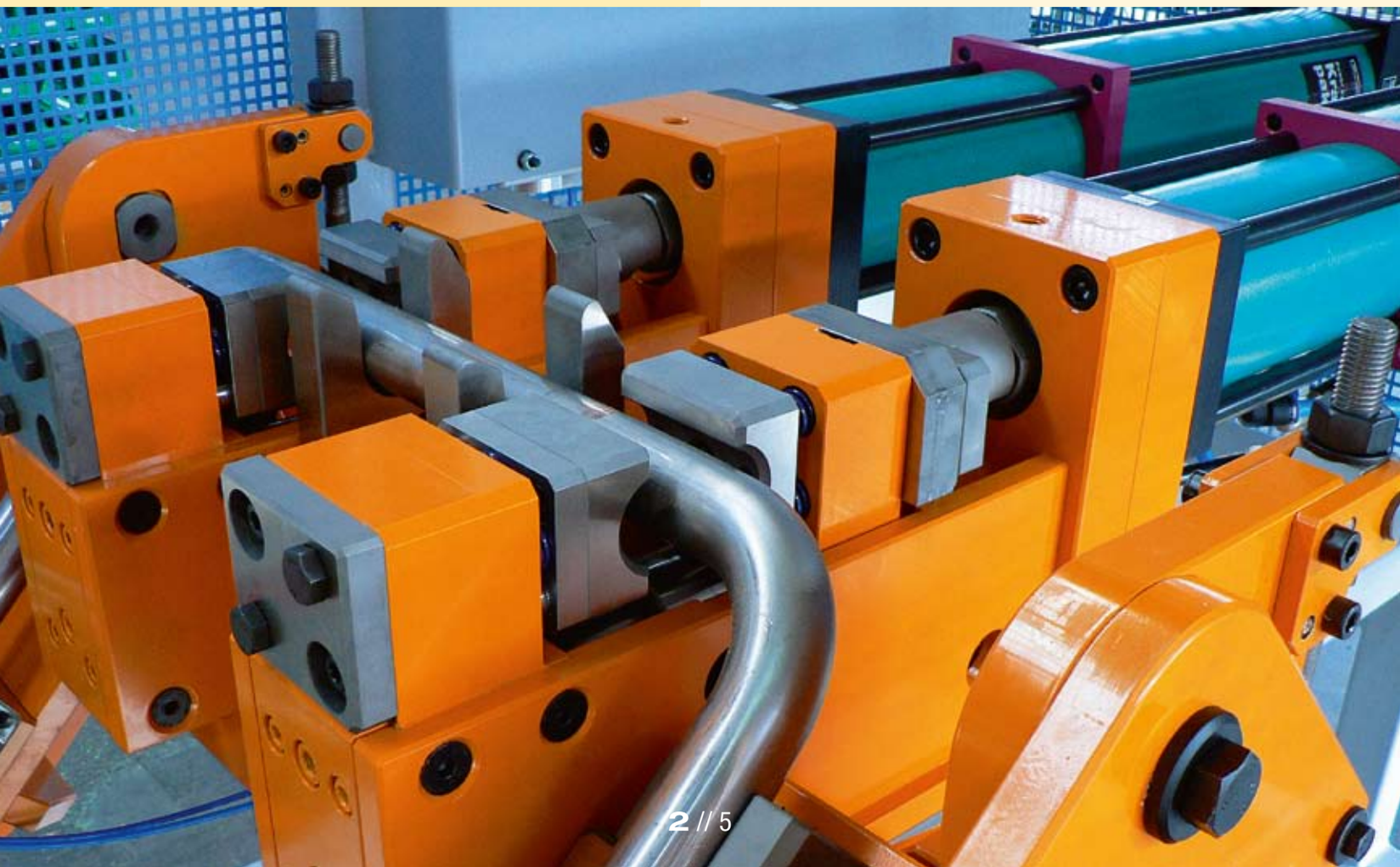


Industrial sector: **furniture industry**

Project: 070227

Material: steel tube

Function: Pneumatic pipe punching unit
for double-face punching with insertion
and reduced insertion.



Industrial sector: **vehicle construction**

Project: 070214

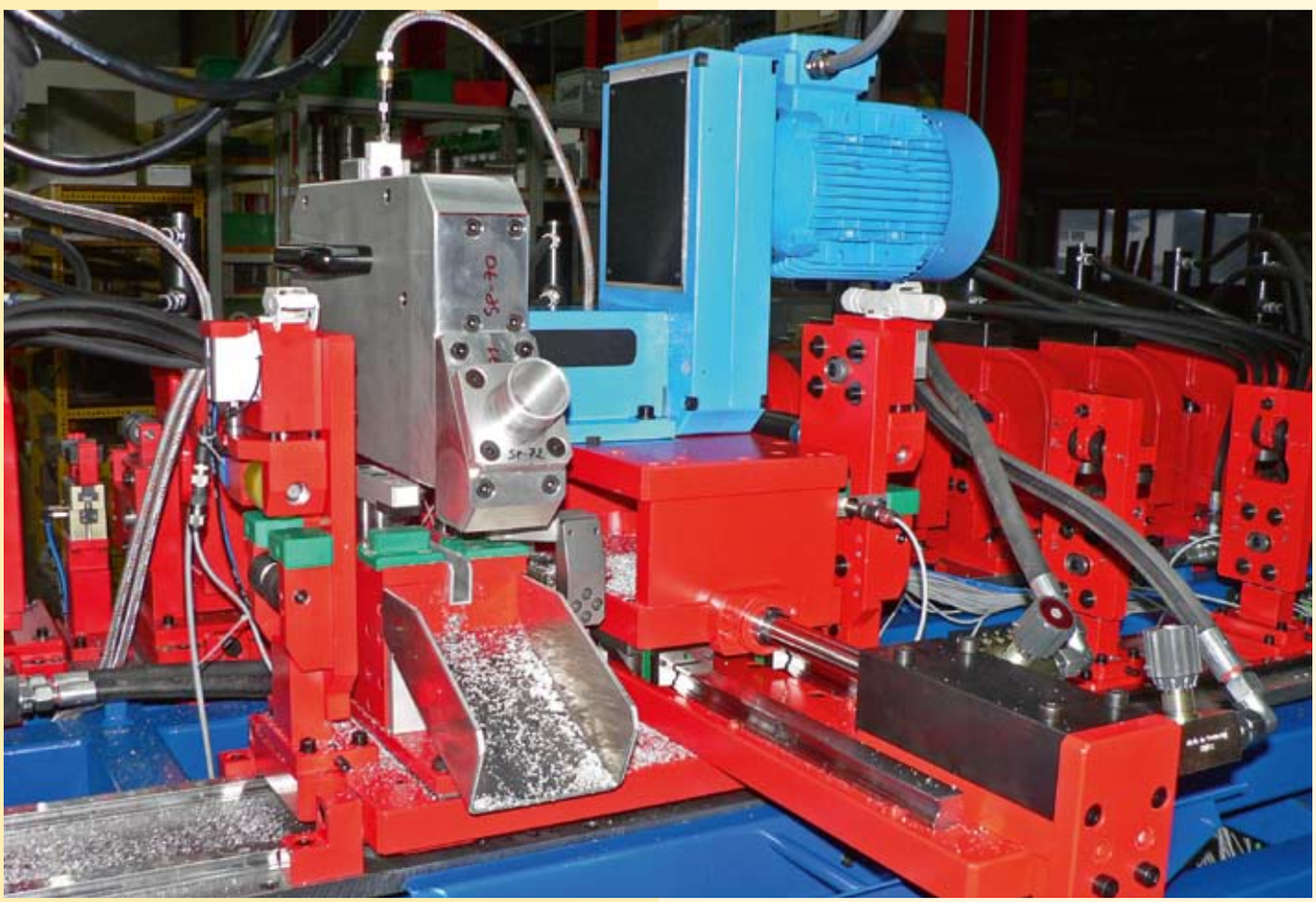
Function: Unit for punching 3m long profiles.
The unit can be operated from both sides and is equipped with two transmitters for length measurements.

Industrial sector: **solar industry**

Project: 090901

Material: aluminium profiles

Function: Special unit (20 x 4 m) for the processing of solar profiles: sawing, punching, nose forming and knurling of six different profiles.

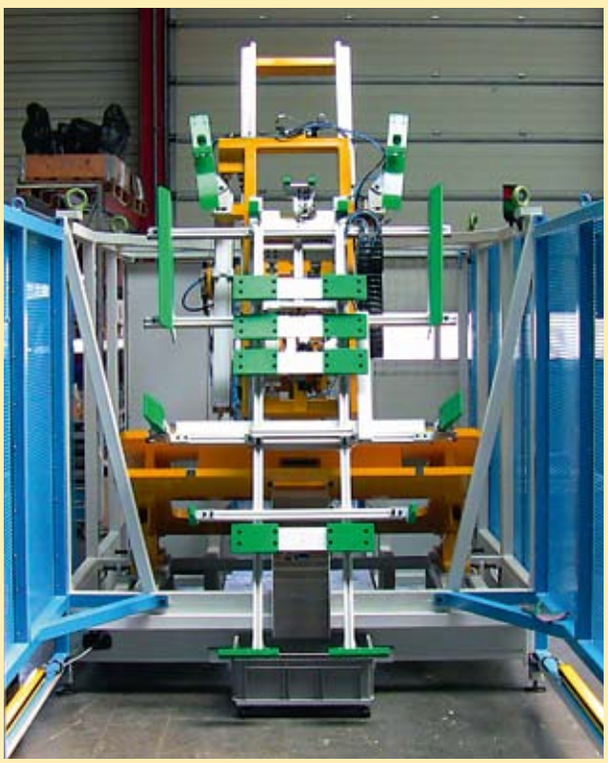


Industrial sector: **automotive industry**

Project: 090126

Material: PP with fabric lining

Function: Punching unit for D-column covering.



Industrial sector: **automotive industry**

Project: 090127

Material: compound material

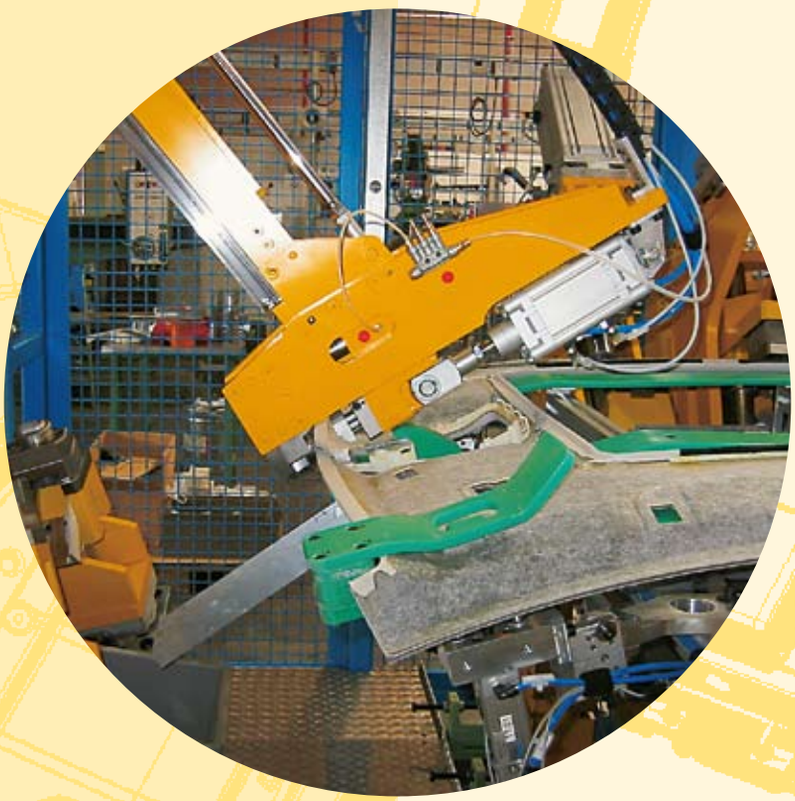
Function: Unit for punching the Parctronic cutout in the inside roof lining.

Industrial sector: **automotive industry**

Project: 080326

Material: PP

Function: Unit for punching the tank cap cutout in the rear mudguard.



Industrial sector:	**automotive industry**
Project:	030715
Material:	compound
Function:	Pneumatically operated punching unit for cutting hole profiles in the inside roof lining of vehicles: make-up, Parctronic, array, window bag, reading lamp, rains sensor. The special unit can be controlled by the SAP software of the customer. The unit ensures positioning and identification of the inside roof lining blanks before starting the required working cycle.

INTELLIGENT PUNCHING SOLUTIONS

Presses · Special Units · Tools //

3

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Presses · Special Units · Tools //

Non-cutting processing
// punching // pressure assembly
// stamping // crimping // insertion
// laser cutting …

Special units
// drive
// hydraulic
// pneumatic
// hydropneumatic
// servo motor

Presses up to 1,000 KN
// pneumatic
// hydraulic
// hydropneumatic
// servo drive

Metal-cutting processing
// sawing
// milling
// drilling
// thread cutting

And much more …
// sawing unit – according to customer's requirements
// drilling-milling unit – according to customer's requirements
// thread cutting unit on request

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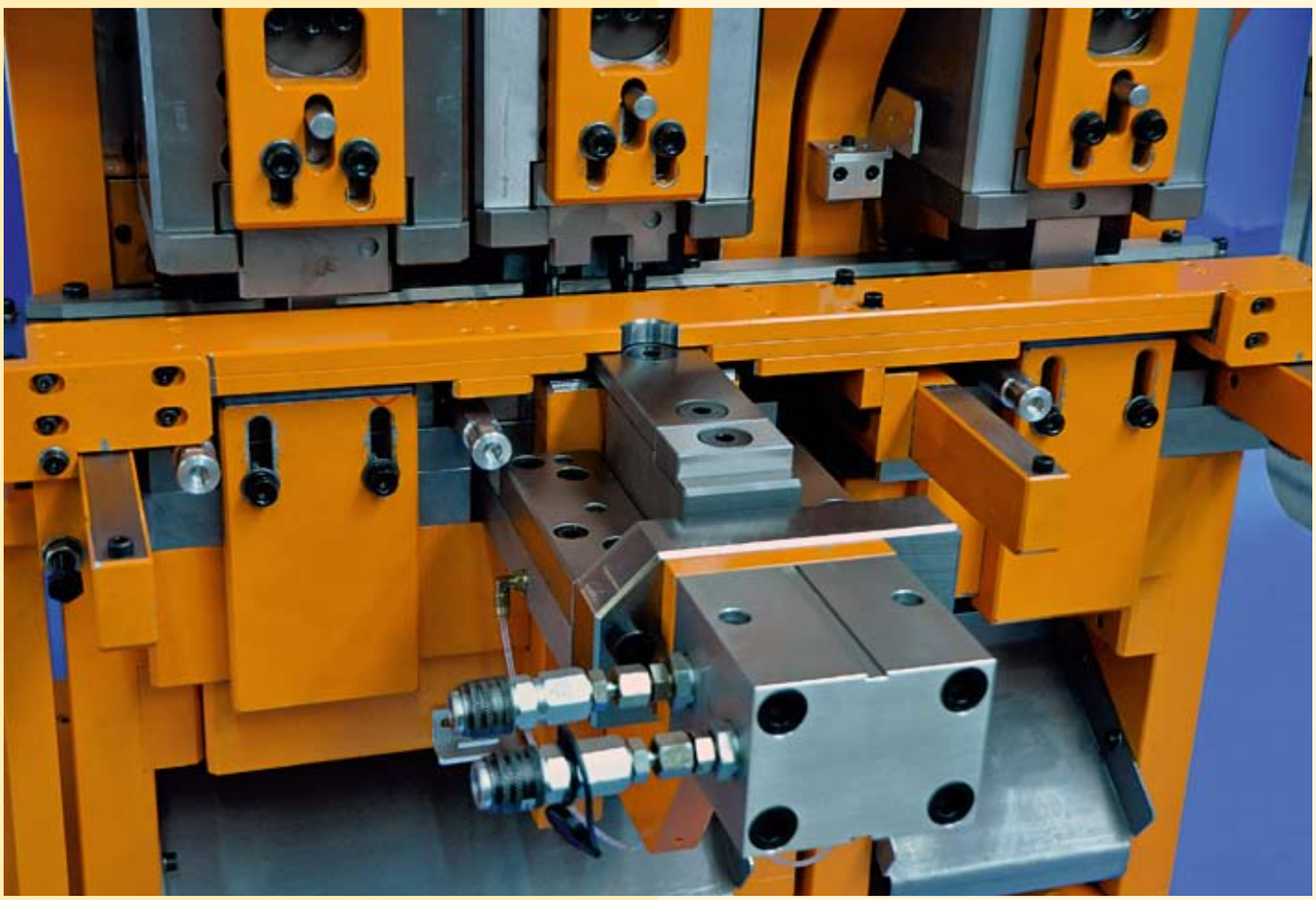
Industrial sector: **machine tools**

Project: 100628

Material: S 235 JRG 2C

Function: Special press unit for notching, pulling and cutting off, 2 x 700 KN plus 1 x 100 KN.



Industrial sector: **automotive supplier**

Project: 080625

Material: deep-drawing sheet

Function: Pressing tool for solenoid valve – Volvo.

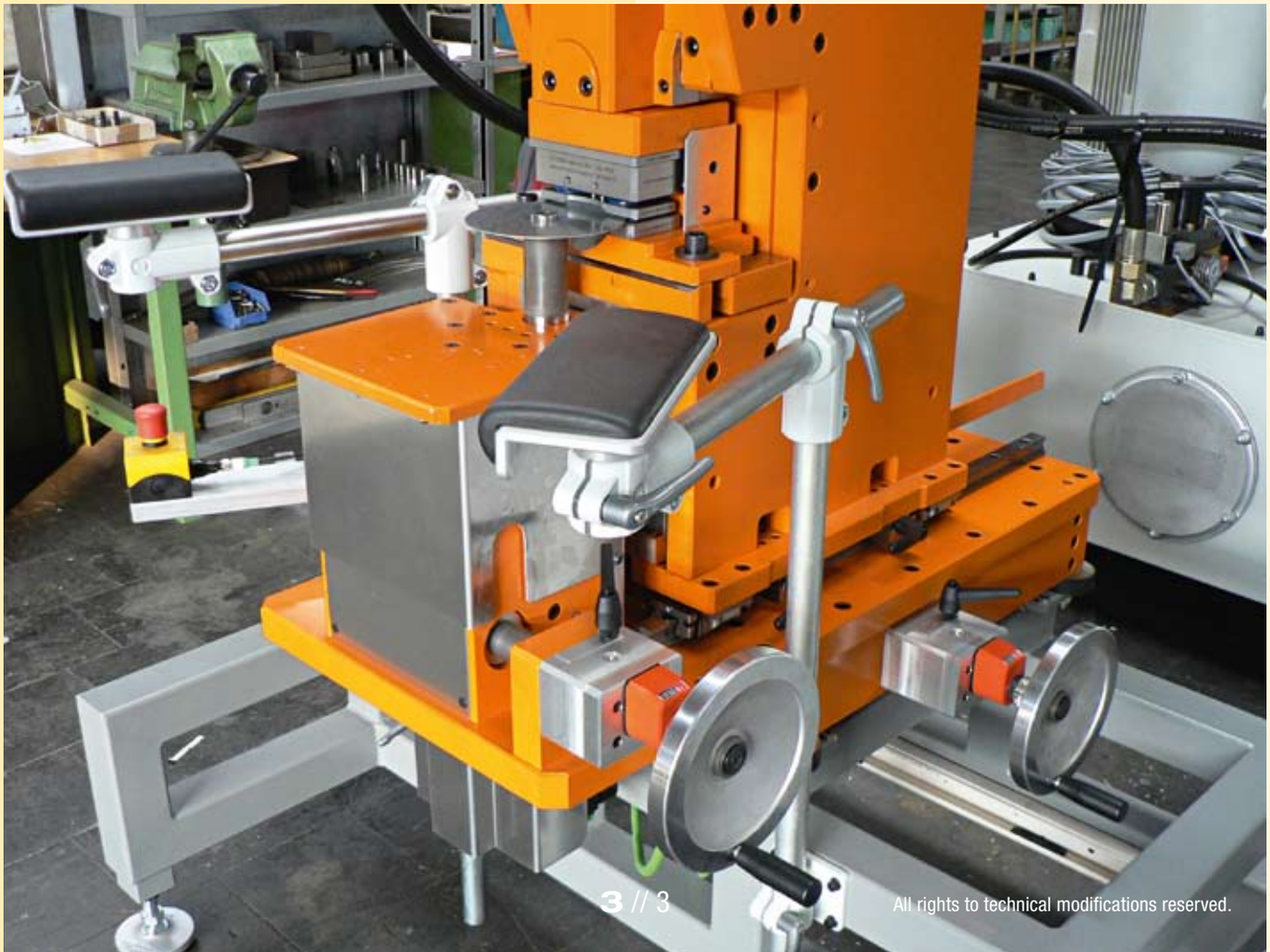
Industrial sector: **ventilation industry**

Project: 071204

Material: steel sheet

Function: Press unit for punching round blanks, the number of strokes is 450 H/min.

Adjustable parameters:
– round blank diameter
– division
– speed

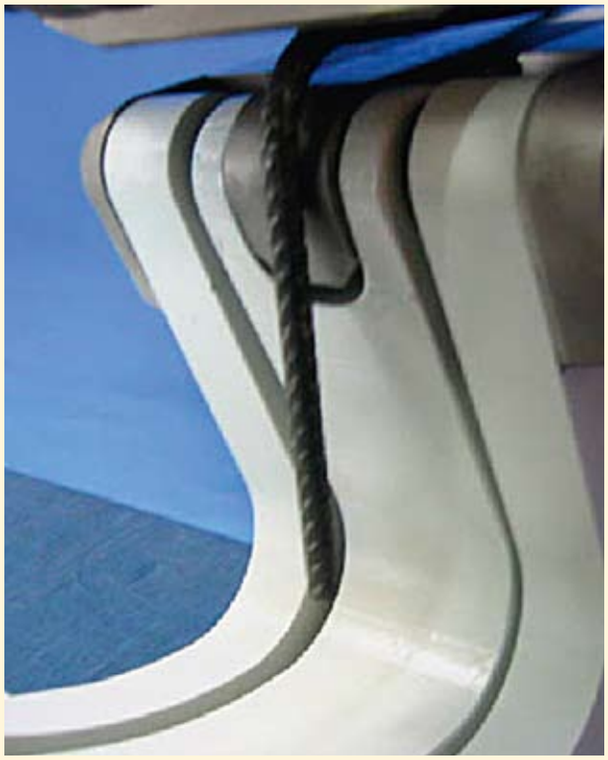


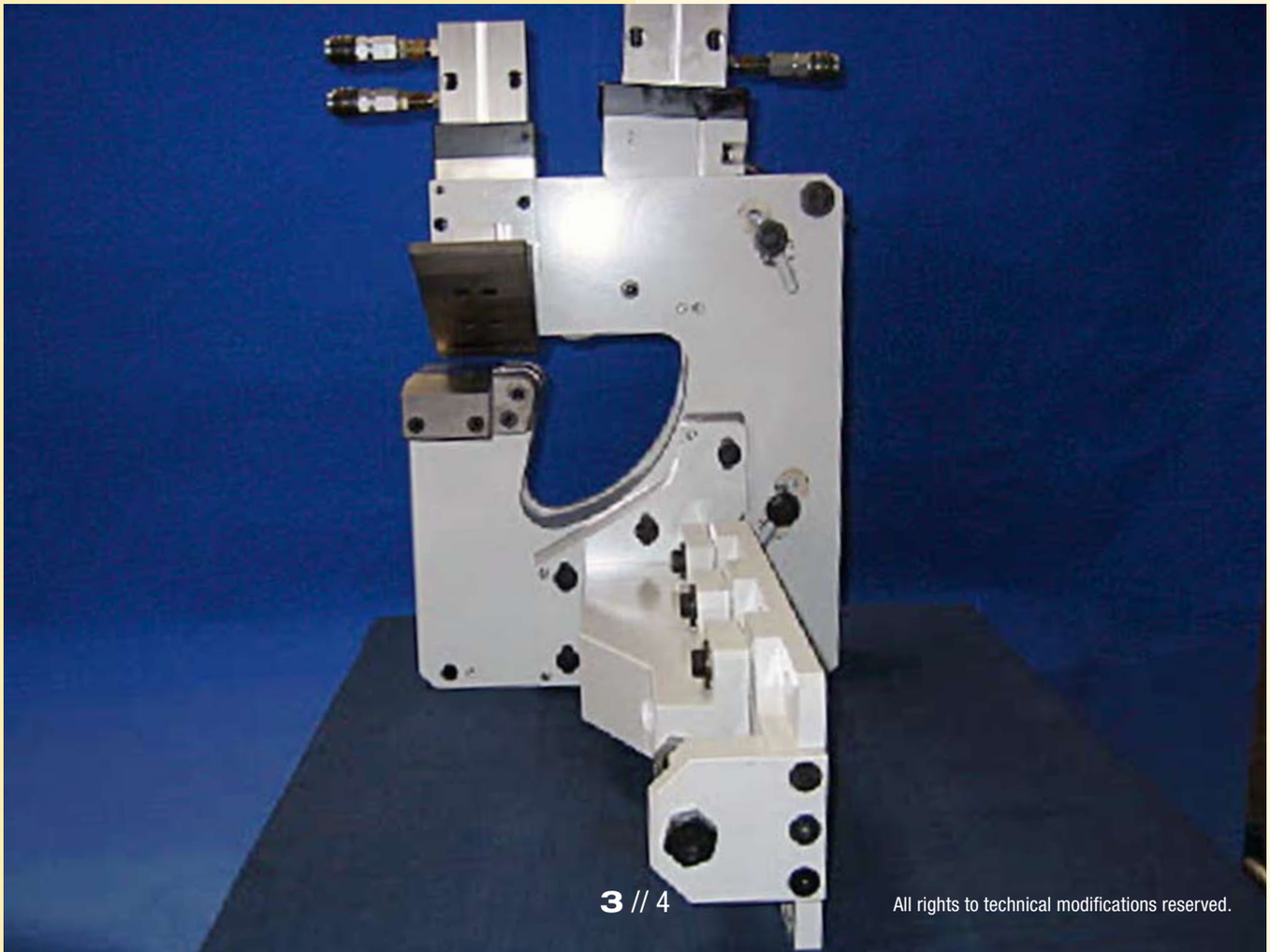
Industrial sector: **construction industry**

Project: 060418

Material: steel wire B 500 / 7

Function: Special hydraulic unit for bending wires (Ø 8 – 10mm);
the angle accuracy can be adjusted.



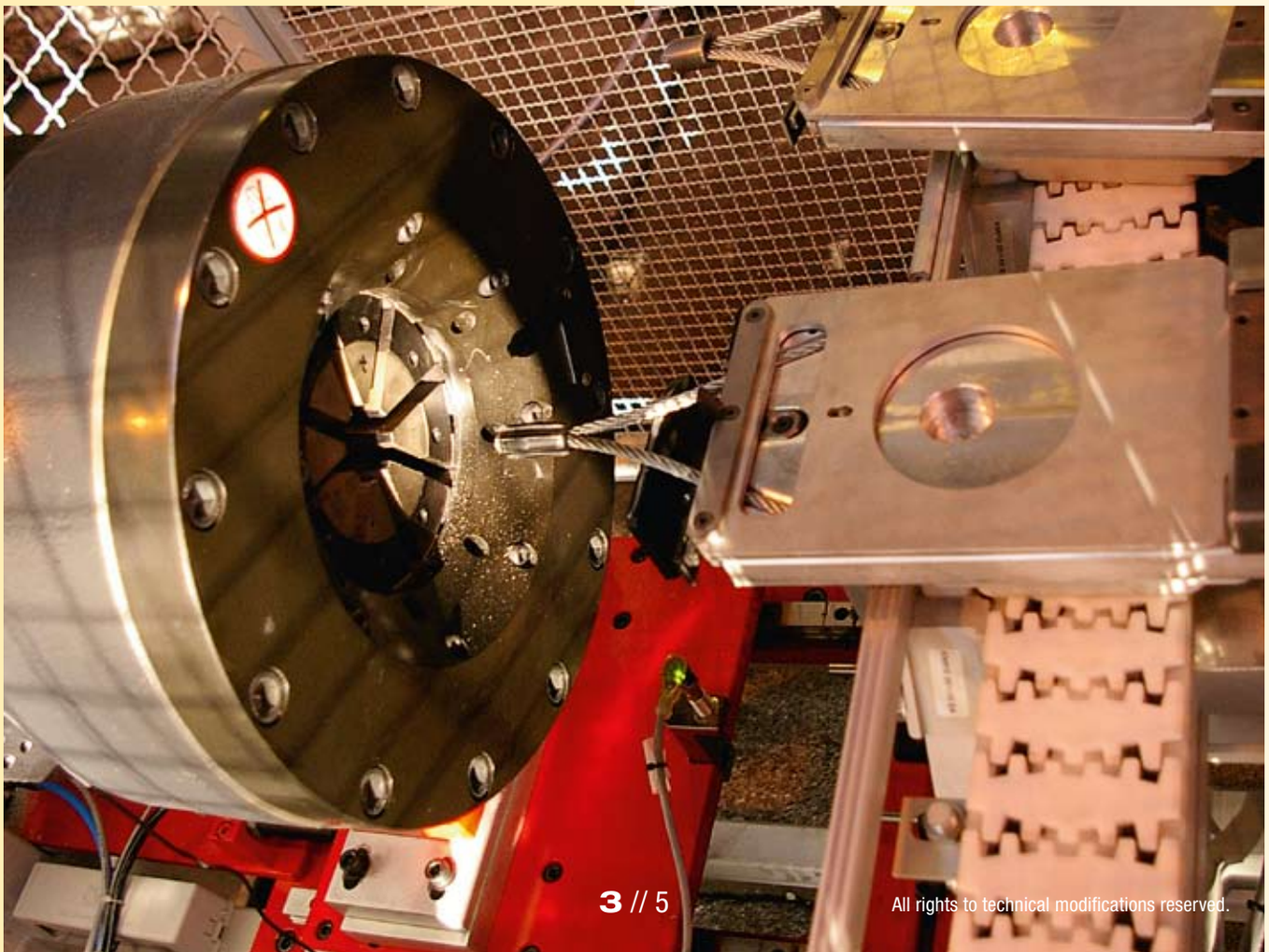


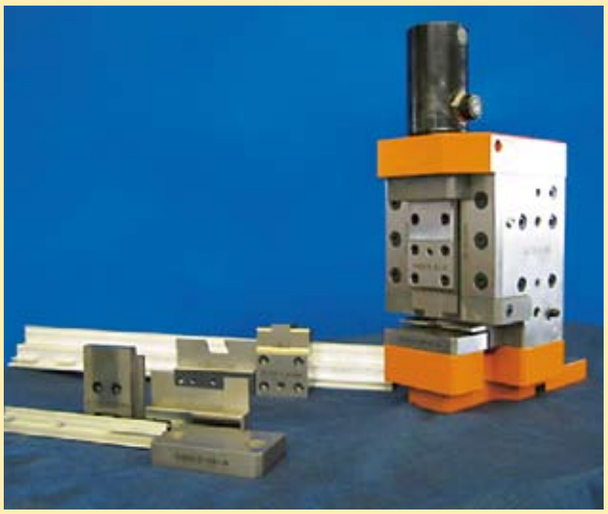
Industrial sector: **construction industry**

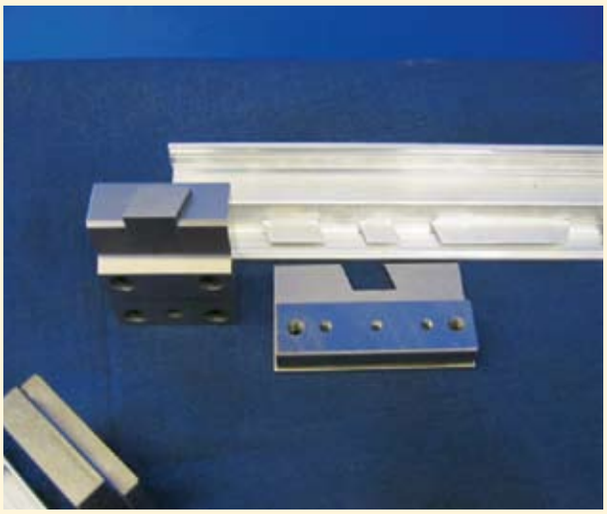
Project: 080318

Material: steel cable with pressing bush

Function: Unit for pressing steel cables.
The hydraulic crimping press
has a pressure force of 2,700 kN.







Industrial sector: **vehicle construction**

Project: 040313

Material: aluminium extruded section

Function: Special hydraulic unit.
The die is flexibly mounted so that
it is possible to notch an intermediate bar
in the aluminium profile.

Industrial sector: **metal constructions**
awnings, doors, window construction, conservatory, door profiles etc.

Project: 001001

Material: aluminium extruded section

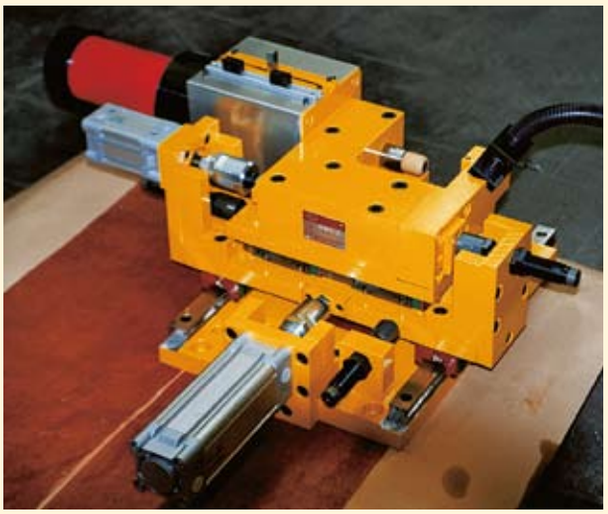
Function: Electrically operated punching press
with integrated notching tool.
The pressure force is 7 t for 60 working cycles.

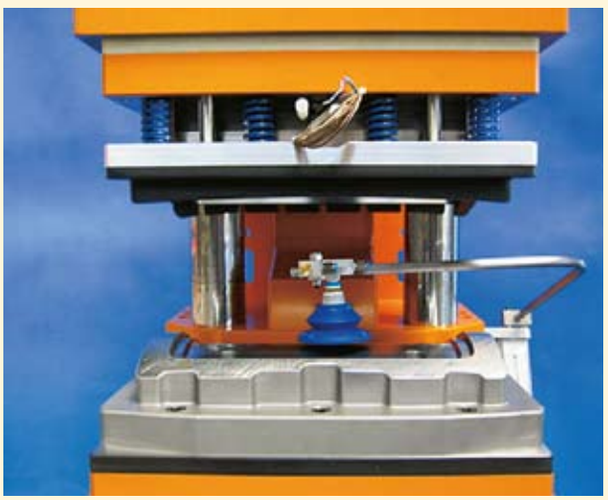
Industrial sector: **automotive industry**

Project: 000731

Material: steel sheet

Function: Special pneumatic unit for punching holes with Ø 12 mm into a steel sheet. The unit is mounted on a base plate by means of linear guides and is led to the workpiece from X/Y directions. The punchings are removed by means of a hose connected with a »venturi nozzle«.





Industrial sector: **automotive industry**

Project: 040217

Material: PPEPDM

Function: Special hydraulic unit for cutting the trailer coupling recess in the rear bumper of a VW Passat B6.


SIMATIC PANEL
SIEMENS
IPS
Technika narzędziowa
German
HELP
ESC
ACK
ENTER
SHIFT
INS
DEL
TAB
NOT-AUS
EMERGENCY STOP
AUTO
HAND
Störung
Reset
AUTO
Start
AUTO
HAND

INTELLIGENT PUNCHING SOLUTIONS

Punching and Cutting Units //

4

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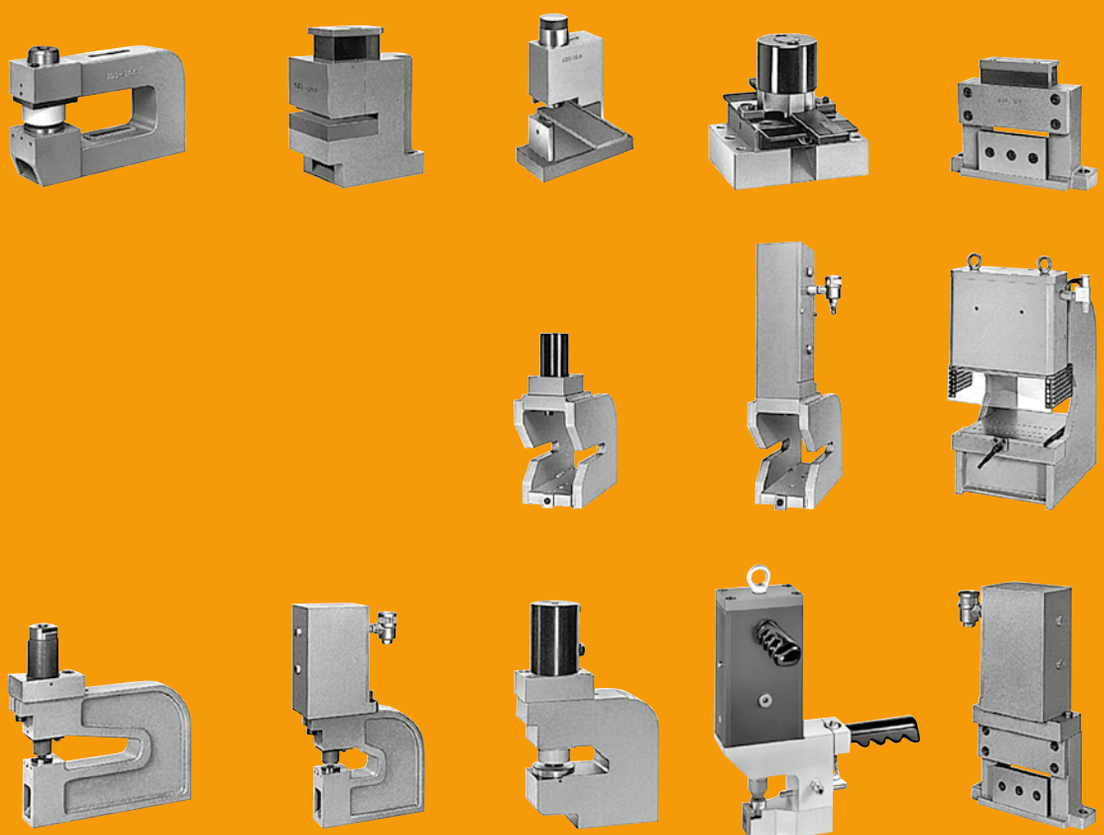
Punching and Cutting Units //



INTELLIGENT PUNCHING SOLUTIONS

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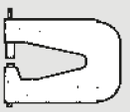
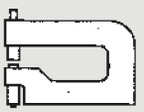
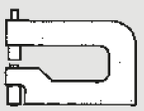
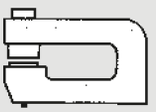
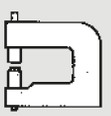
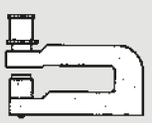
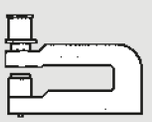
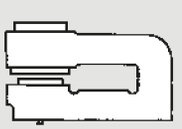
Press-operated punching units for punching round and shaped cuts

Series	Illustration / Order Number	Punch diameter range	Throat depht range	Standard shapes	Material thickness
100	 **100–160**	2–7	160	●	0,3–5
101	 **101–200 F**	2–13	200		0,3–5
102	 **102–200 F**	8–25	200		0,3–5
103	 **103–200 F**	25–40	200		0,3–5
104	 **104–200 F**	40–63	200	● ▬ ▬ ■ ■	0,3–5
105	 **105–300 F**	63–100	300		0,75–5
111	 **111–125F**	2–13	125		0,3–5
112	 **112–200 F**	8–22	200		2–10
113	 **113–200 F**	22–38	200		2–10
114	 **114–200 F**	35–63	200		2–10

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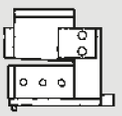
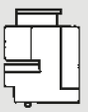
90° notch units, press-operated

Series	Illustration / Order Number		Notch size	Notch shape	Material thickness
600		**600–063 L/R** **600–125 L/R**	63x63 125x125		0.3–8 0.3–8

Rectangle notch units, press-operated

Series	Illustration / Order Number		Notch size	Notch shape	Material thickness
601		**601–050** **601–100**	50x50 100x75	e.g. 	0.3–3

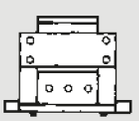
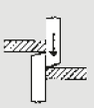
Radius cut units, press-operated

Series	Illustration / Order Number		Radius range	Cutting angle α	Cutting shape	Material thickness
605		**605–16 L/R** **605–20 L/R**	3–16 3–20	max. 180°	e.g. 	max. 6

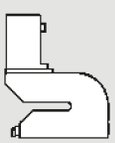
Radius cut units, press-operated

Series	Illustration / Order Number		Radius range	Cutting angle α	Cutting shape	Material thickness
606		**606–30**	5, 10, 15, 20, 25, 30	90°		max. 5

Cut-off units, press-operated

Series	Illustration / Order Number		Cutting width	Cut-off	Material thickness
610		**610–125 N** **610–250 N**	12 250		0.3–8

Pneumatic and hydraulic table presses

Series	Illustration		For use with units from series	Cylinder force [kN]
624 626	Series **624**  Pneumatic single-action table presses	Series **626**  Hydraulic double-action table presses	100, 101, 102 103, 104, 105 600-063L/R 600-125 601-050 606-30	40 68 80 109 120 125

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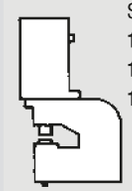
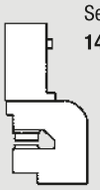
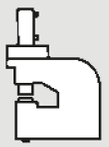
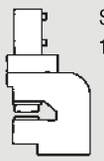
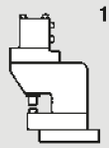
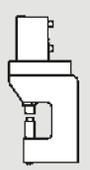
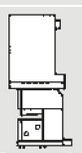
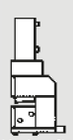
Pneumatic and hydraulic punching units

Series	Illustration	Punch diameter range	Throat depth range	Shapes	Material thickness	Cylinder force [kN]
141 142 143 144	 Series **141** **142** **143**  Series **144** Pneumatic punching units	2–13 8–25 25–40 40–63	100 200		max. 5	20 40 80
161 162 163 164	 Series **161** **162** **163**  Series **164** Hydraulic double-action punching units	2–13 8–25 25–40 40-63	100 200		max. 5	33 68 109 175

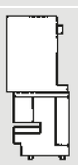
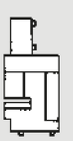
Pneumatic and hydraulic profile punching units

Series	Illustration	Punch diameter range	Throat depth range	Shapes	Material thickness	Cylinder force [kN]
141 161	 Series **141** Pneumatic punching units  Series **161** Hydraulic double-action punching units	2–13	50		0.3–3 max. 5	12 20 33 40
141 142 161 162	 Serie **141** **142** Pneumatic punching units  Serie **161** **162** Hydraulic double-action punching units	2–13 8–25	63		0.3–3 max. 5	68 80 109

Pneumatic and hydraulic 90° notch units

Series	Illustration	Notch size	Notch shape	Material thickness	Cylinder force [kN]
640 660	 Series **640** Pneumatic notch units  Series **660** Hydraulic double-action notch units	63x63	e.g. 	max. 5	68 71 80 109

Pneumatic and hydraulic rectangle notch units

Series	Illustration	Notch size	Notch shape	Material thickness	Cylinder force [kN]
641 661	 Series **641** Pneumatic rectangle notch units  Series **661** Hydraulic rectangle notch units, double-action	50x50 100x75	e.g. 	0.3–3	40 68 80

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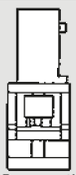
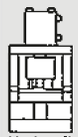
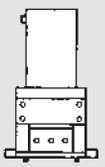
Pneumatic and hydraulic radius cut units

Series	Illustration	Radius range	Cutting ⊀ α	Cutting shape	Material thickness	Cylinder force [kN]
646 666	 Series **646** Pneumatic radius cut units  Series **666-30-063** Hydraulic radius cut units, double-action	5 10 15 20 25 30	90°		max. 5	40 63 80

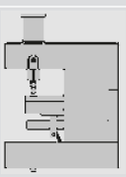
Pneumatic and hydraulic cut-off units

Series	Illustration	Cutting width	Cut-off	Material thickness	Cylinder force [kN]
649	 Serie **649** Pneumatic cut-off unit	125		max. 5	40

Mobile pneumatic units for punching and notching

Series	Illustration		Punch diameter / radius range	Cutting ⊀	Side length	Notch shape	Material thickness	Cylinder force [kN]
1421		**1421-0512L** **1421-0512R** **1421-0512K**	Ø 2–13 R 3–R 18 –	– 90° max. 90°	– – max. 20x20		max. 3	12

Pipe punching units, press-operated, with pneumatic or hydraulic drive unit

Series	Illustration	Punch diameter range	External pipe diameter	Pipe thickness	Cylinder force [kN]
101-RLA 141-RLA 161-RLA		2–13	40–60	1–5 1–3 1–5	– 80 68

The problems encountered during non-cutting production are often similar to those which arise in metal-cutting production. For example, small series, repetitive parts or large series, which frequently take turns.

Due to the high tool costs and set-up time, the suitability of conventional punching and cutting tools for these tasks is limited. As a result, procedures like drilling, milling, sawing and heat erosion are often resorted to, although the use of modern tool units would be much more suitable for the number of pieces required.

Low costs

Savings, as well as a reduction of the production costs, because expensive drilling and sawing work is no longer necessary.

High profitability

The tool units can be reused as often as you like.

Short set-up times

Simple set-up and conversion to the desired punch layout.

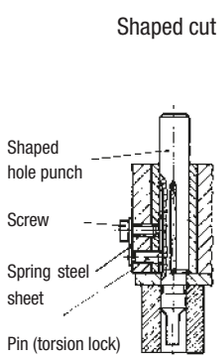
Uniform construction height

The total height and the material support height of the units are the same, therefore, all tool units can be combined.

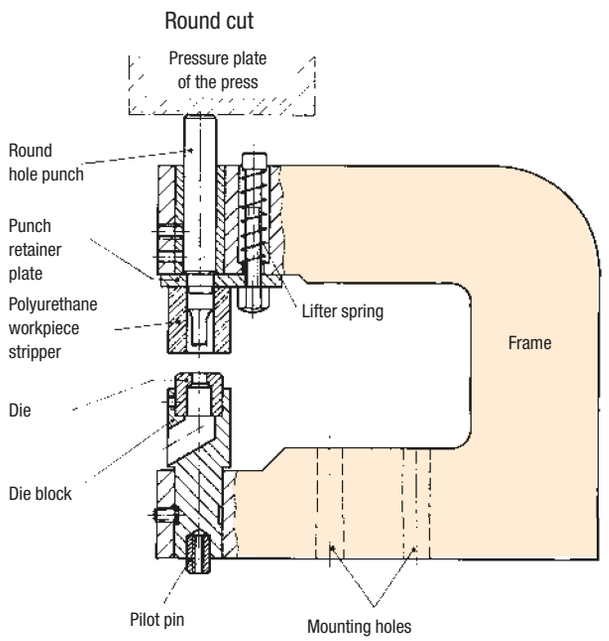
Stable construction

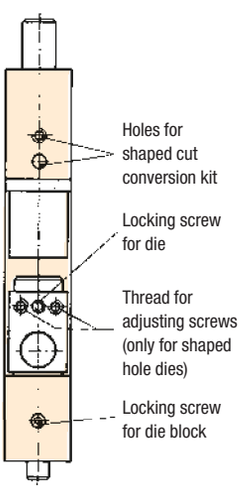
High-quality steel and spheroidal graphite cast iron prevent a risk of breakage and guarantee a long life.

Punching units



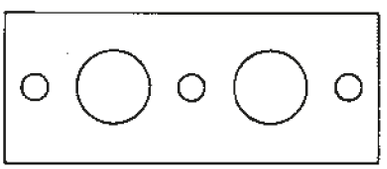
Installation and machining options



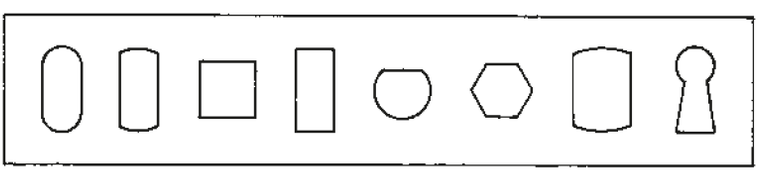


Machining options

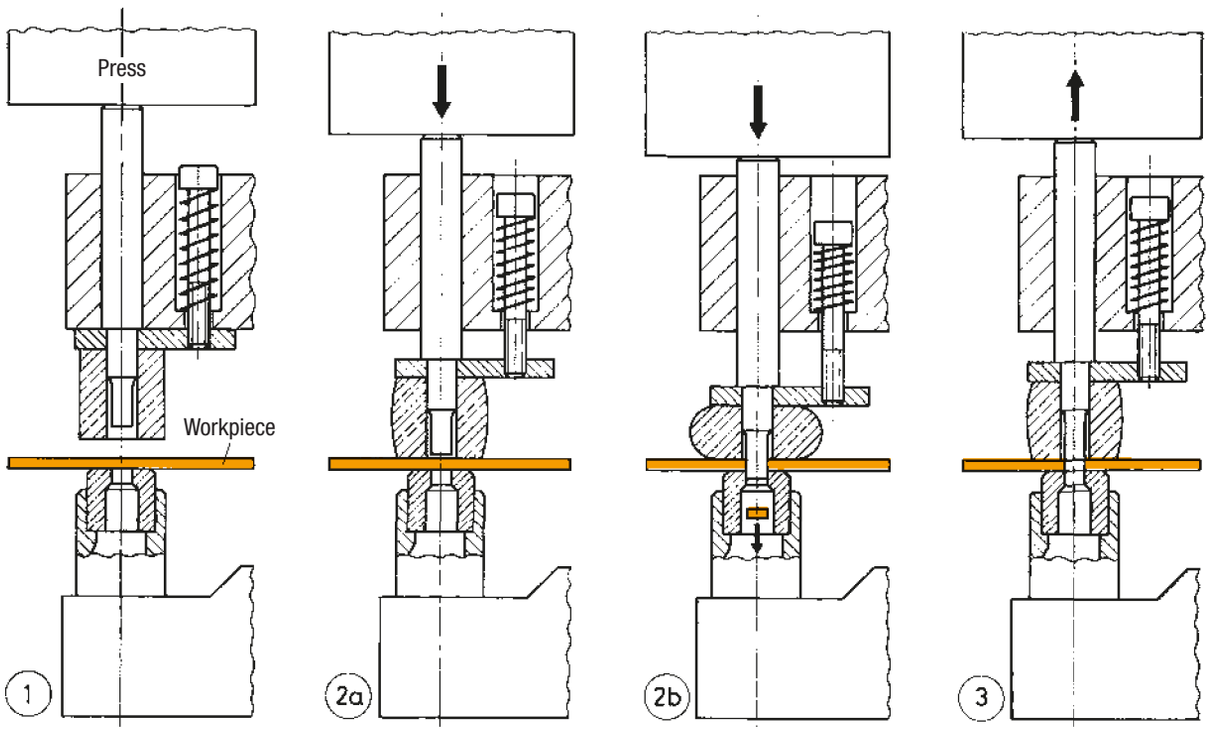
Round cut



Shaped cut



Operation sequence during punching



1 Punching unit inoperative

The punch is held in its upper position by the punch lifter spring, as well as the punch retainer plate which is connected to it.

The workpiece is inserted.

2 Punching unit in operation

2a The press ram moves the punch and the punch retainer plate downwards. The polyurethane workpiece stripper presses the workpiece against the die.

2b The next press stroke carries out the punching procedure and ejection of the scissels. The punch should enter the die to a depth of approximately 1 mm.

The following step is the return stroke of the press ram.

3 Return stroke

The polyurethane workpiece stripper, which has been greatly deformed during the punching process, now fulfils its primary function, i.e. as a result of its pretension the punch is extracted from the workpiece.

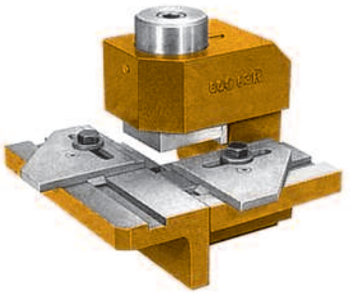
The remaining pretension of the polyurethane stripper and the punch lifter spring act at the same time as the press return stroke to pull the punch back into its initial position.

Punching units of series 100,101,102,103,104 and 111

The operation sequence during punching described above applies generally to these punching units. Series 111 is the only one in which the arrangement of the die block is different which allows so-called block dies – dies without die blocks –, to be used for the punching of L-, U- or Z -profiles.

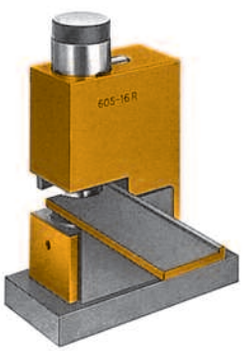
Punching units of series 105,112,113 and 114

The dies of these units are arranged similarly to those in series 100 to 111. For the series 105 to 114 the polyurethane workpiece stripper is situated above or built into the frame. Via the pressure plate the press ram moves the punch, the polyurethane compression spring and the spring-loaded guide bush downwards. The guide bush presses the workpiece against the die and supports the removal of the workpiece during the return stroke. The remainder of the punching process takes place as described in »Operation sequence during punching«.



A
90° notch unit with gauging table

B
Rectangle notch unit



C
Radius cut unit

D
Cut-off unit

90° notch units, rectangle notch units, radius cut units, cut-off units

The sturdy, unbreakable main constructions of these units are equipped with punch and die blades of highly alloyed chrome steel. The punch blades are held by springs in their upper position, respectively pulled back to this position after the cutting process.

For 90° notch units and cut-off units the cutting edges of the punch blades are diagonal to the cutting edges of the die blades. This effectively reduces the cutting length and the cutting force required.

The die clearance is preset at the factory to 0.1 mm for material with a thickness ranging from 0.3 up to 3 mm. Metal compensation sheets for increasing the die clearance are included in the delivery.

The punch blades are resharpened on their lower edge and the die blades are resharpened at the edge facing the unit, i.e. the rear surface of the blade. By turning the die blade 180° another cutting edge is available for further work.

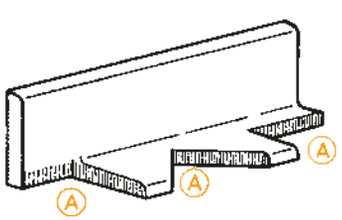
By adjusting the press stroke the difference resulting from the resharpening of the punch blade is compensated for.

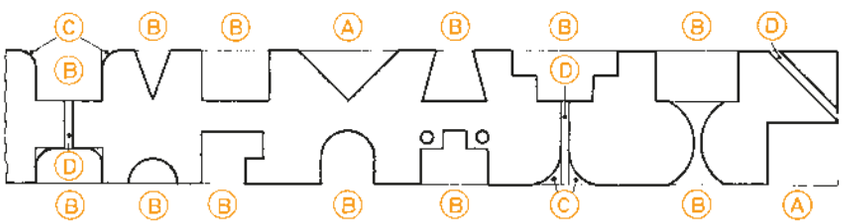
In contrast to the 90° notch units and cut-off units, the cutting tools for the rectangle notch units and the radius cut units are specially made to customer specifications for the respective material thickness and the desired shape.

Examples of possible notch and cut shapes are shown in the illustrations below.

With some of the 90° notch units, it is possible to cut notches for L-profiles as far as the inside edge of the profile.

Machining options using the tool units illustrated above



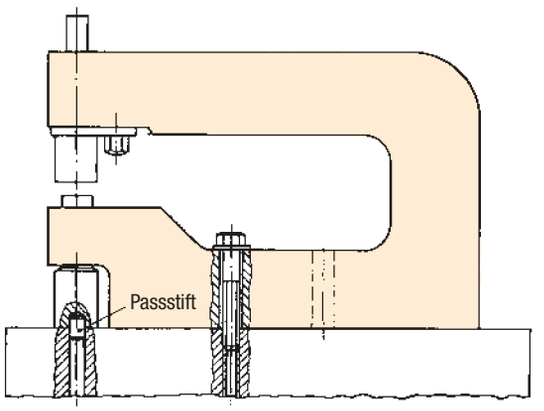


Assembly and adjustment of the tool units

Assembly of the punching units

All punching units are equipped with a pilot pin in the bottom, aligned with the punch and die for positioning in mounting holes or the guide grooves of positioning plates or press tables. The punching units are fixed either by screws in the mounting holes provided or by means of clamping arms and similar clamping elements. See Fig. 1.

Fig. 1

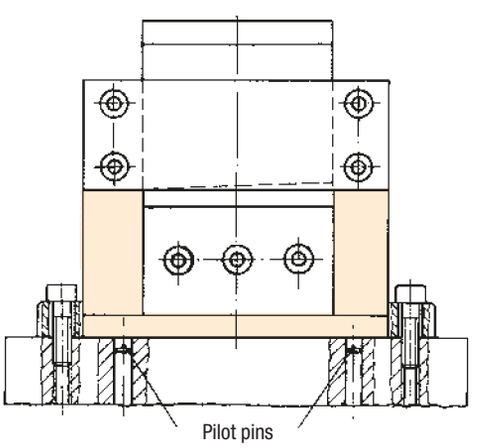


Assembly of the 90° notch units, rectangle notch units, radius cut units and cut-off units

These units have one or two pilot pins in the bottom side for positioning. The units are fixed by clamping arms or for some units by screws in the mounting holes provided (Fig. 2).

The positioning and mounting methods described here also apply to the pneumatic and hydraulic units.

Fig. 2



Tool setting of punching units with templates

When several punching units are used together a template can be used to adjust the distance between the units.

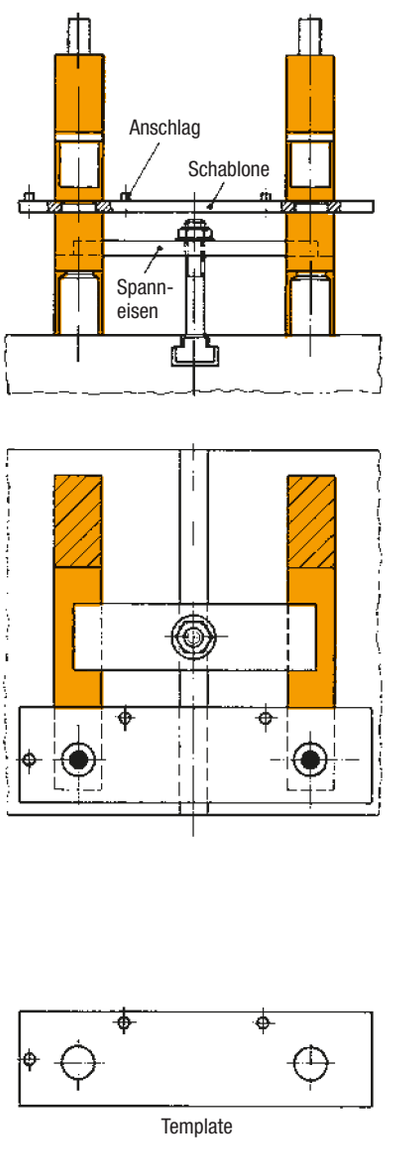
The holes in the template correspond to the outside diameter of the die of the respective punching unit. The thickness of the template should be approximately 6 mm.

The exact distance between holes is obtained by placing the template over the dies.

The punching units are fixed with screws, clamping arms and similar clamping elements.

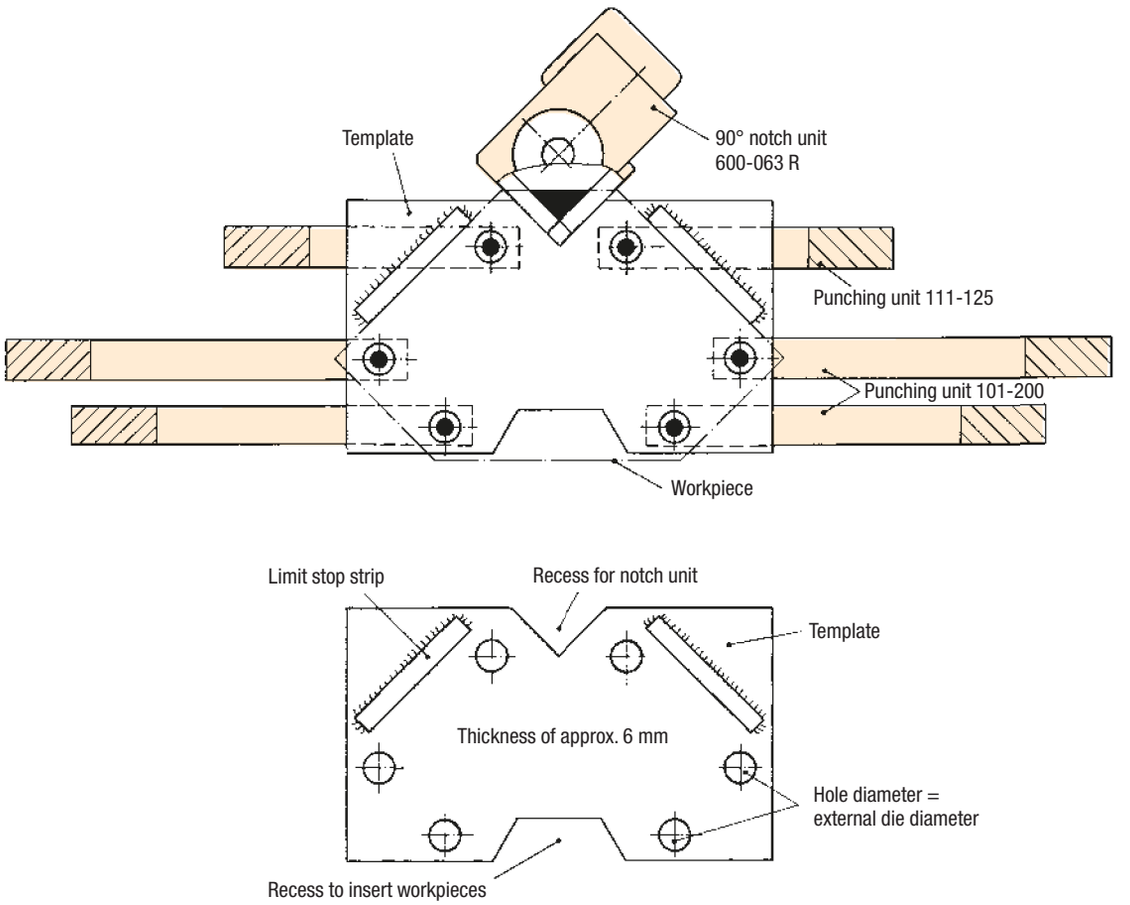
The workpiece is adjusted for processing by means of pins or limit stops in or on the template. See Fig. 3 (below) and Fig. 4 (next page).

Fig. 3: Tool setting of 2 punching units



Tool setting of punching units with templates (continuation)

Fig. 4: Tool setting of 6 punching units together with one 90° notch unit



Punching units positioned with a template

Punching units arranged with a positioning plate

Setting up of tool units with positioning plates

Positioning plates are suitable for the processing of different punch layouts and workpieces.

They enable the combination of punching, notch and cutting units with the required distance between them, see Fig. 5.

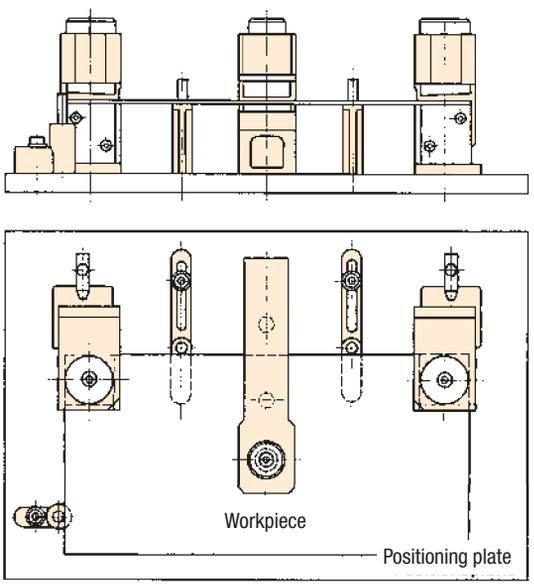
The positioning plate is equipped with holes Ø10^{H7} which correspond to the desired punch layout. The tool units are positioned exactly in these holes by means of the pilot pins in the bottom.

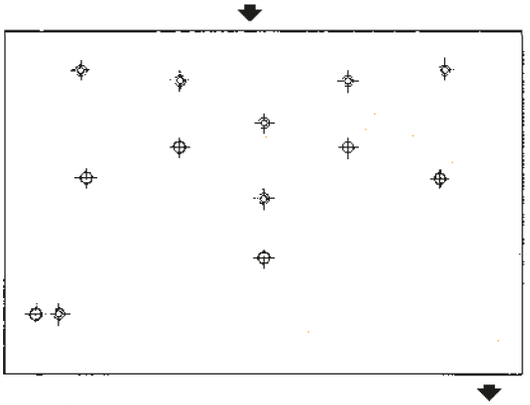
The tool units are fastened in a similar way to that illustrated in figures 1 and 2.

The workpiece limit stops and supports are mounted on the positioning plates in the desired position in the same manner, i.e. by means of positioning holes and mounting holes.

Fig. 5: Design of a combined positioning plate for the processing of 2 different workpieces

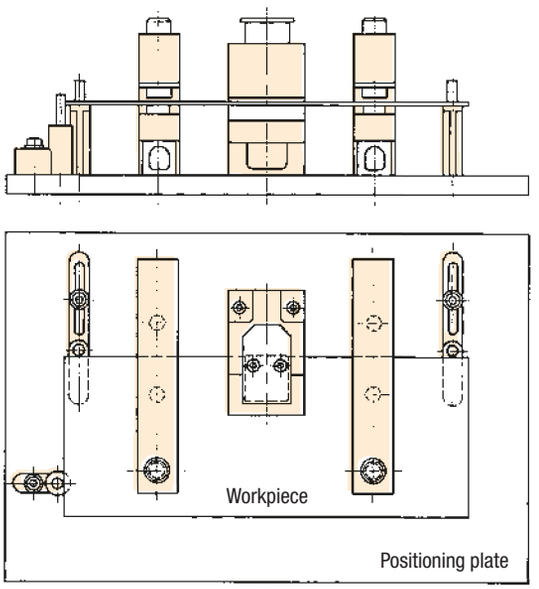
Application example I
for one punching unit and two 90° notch units

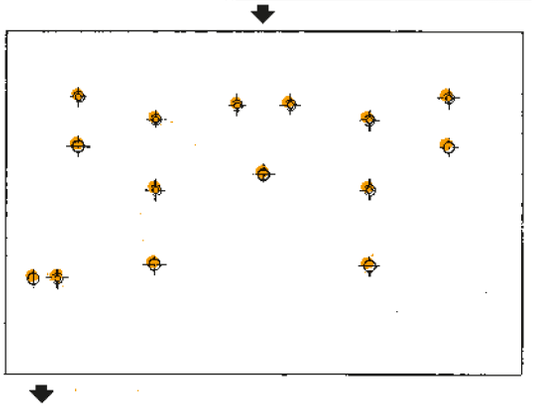




Positioning plate
with positioning and
mounting holes
for application example I

Application example II
for two punching units and one rectangle notch unit





Positioning plate
with positioning and
mounting holes
for application
example II

Combined positioning plate
with positioning and
mounting holes for application
examples I and II

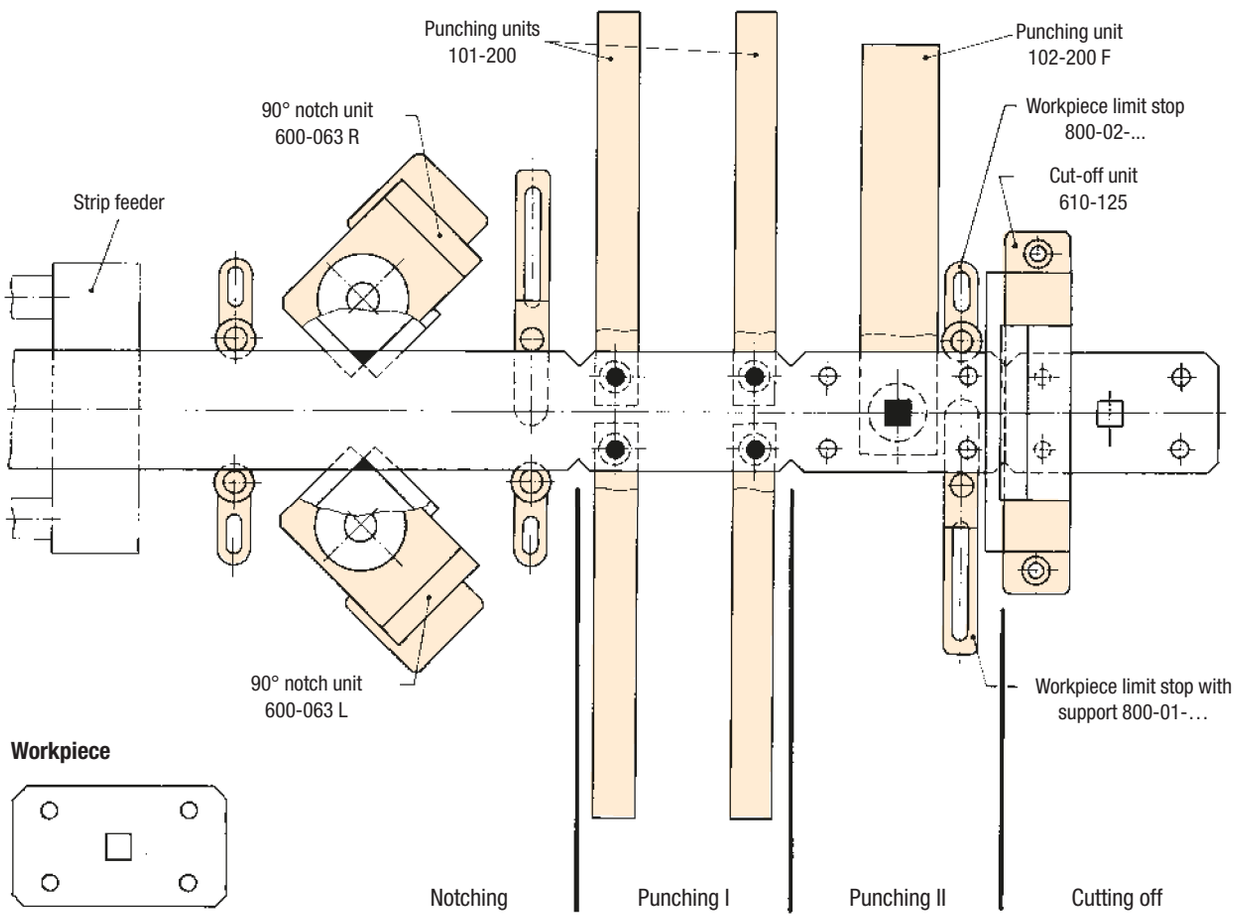
Automation

For large numbers of workpieces, there is frequently a requirement for automation technology, especially if workpieces are not inserted individually but introduced in the form of rods or strips. In this case it is advisable to combine punching and notch units with cut-off units (see Fig. 6).

The material can be fed in manually against a fixed limit stop or by means of an automatic advancing device. The precision of this device is decisive for the precision of the workpiece. In both cases, flawless guidance of the material has to be guaranteed.

Punched holes which are very close together can be produced by positioning the punching units with an offset of one working step. Every press stroke yields a finished workpiece.

Fig. 6



Please note

All tool units, except press-independent units, have an universal installation height of 190 mm in a closed position. This means that the lower edge of the punch and the upper edge of the die are at the same level.

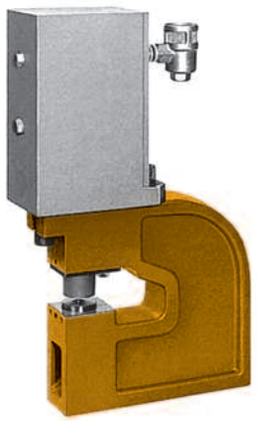
For notch and cut-off units the closed position of 190 mm is reached, when the upper blade is inserted to its full length.

The lower position of the press ram is adjusted in such a way that the distance between the upper edge of the press table and the lower edge of the press ram amounts to 189 ± 1 mm.

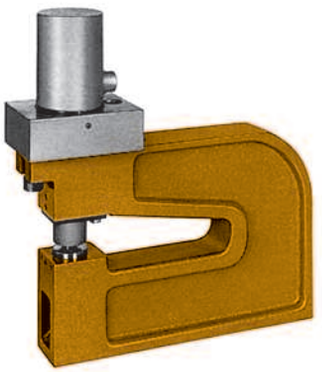
The tool units will be damaged if the setting is less than 185 mm.

Note

The forces in this catalogue are indicated in kN (kilo Newton). 1 kN = 1,000 N



Punching unit, pneumatically operated



Punching unit, hydraulically operated

90° notch unit, hydraulically operated

Cut-off unit, pneumatically operated

Pneumatic and hydraulic tool units

In addition to the press-operated tool units, a large number of punching units, notch units and cut-off units equipped with their own drive are offered in this catalogue. These units do not require a press. They are equipped either with powerful, patented pneumatic power cylinders or with double-action hydraulic cylinders.

Pneumatic or hydraulic tool units can be used wherever there is no suitable press available or the appropriate press is being used for other parts.

The tool units are suitable for the treatment of big, bulky and moulded workpieces which are processed outside the press area, i.e. the units can be used at any location.

The only prerequisite is the availability of air or oil pressure.

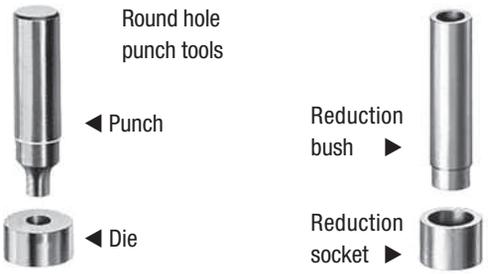
The restrictions on pneumatic or hydraulic tool units are the load capacity and the cutting force required. Prior to using these units it is, therefore, necessary to determine the cutting force. The cutting force charts provide a quick overview.

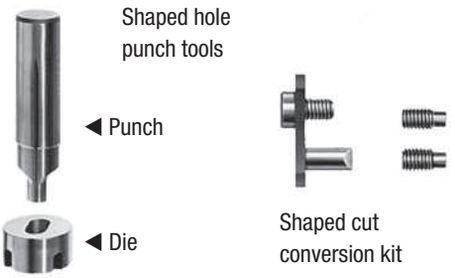
As illustrated on the left, the most important difference to the press-operated tool units is the top mounted drive cylinder.

The cutting process for punching, notching and cutting is the same as that which has been described for the press-independent tool units.

In contrast to tool units which operate independently from presses, the tool frame has to withstand the effective cutting force during processing. Solid construction of the tool frames is, therefore, a prerequisite.

For this reason the height of the material support for these tool units is 125 mm.






Compensation washers
(set)


Polyurethane
workpiece stripper


Workpiece limit stop
with support


Universal workpiece limit stop


Coordinate limit stop

Punching tools and accessories

Round hole punch tools

When punching, the diameter of the punch tool corresponds to the nominal diameter of the hole. When ordering a complete punch tool kit, (punch and die), or a single die, the die is produced with the die clearance required taking the max. material thickness and material strength into account. The die clearance is the difference between the die diameter and the punch diameter. The thickness of the material to be punched should not exceed 0.8 times that of the punch diameter, as this would result in premature wear and tear to the tool.

For a number of punching units for round cuts smaller hole diameters than those indicated in the overviews and tables can be produced by using **reduction bushes** and **reduction sockets**, The appropriate polyurethane workpiece stripper is included.

Shaped hole punch tools

The special design of shaped hole punch tools enables them to be installed in the shaped cut punching units simply and quickly. The punch and die can be used »lengthways« and »crosswise«.

Two adjusting screws on the lower part of the frame allow the die to be positioned in line with the punch and secured against twisting.

Shaped cut conversion kit

If required at a later date, punching units for round cuts can be converted quickly and easily for the use of shaped cuts by means of conversion kits.

Compensation washers

Compensation washers are required after sharpening to adjust the die to the height of the material support.

Polyurethane workpiece stripper

The punched workpiece has a tendency to cling to the punch. With the aid of the workpiece stripper which must have a stripping force of approximately 15 (of the cutting force, the workpiece is removed from the punch.

Polyurethane workpiece strippers are highly resistant to wear and are insensitive to oil and grease.

For especially high stripping forces needed for thick workpieces, reinforced workpiece strippers are available for some punching units.

Workpiece limit stop with support

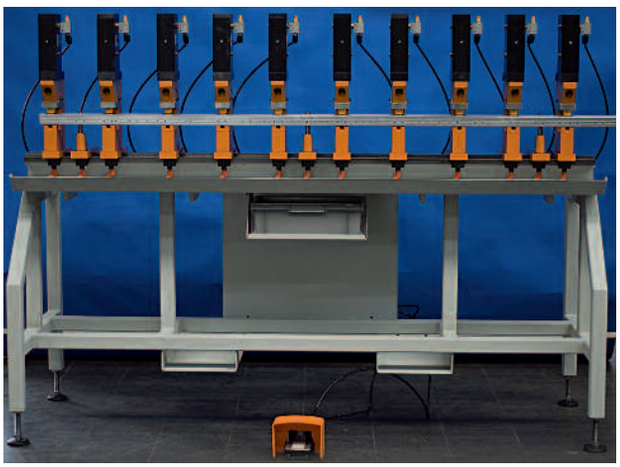
Workpiece supports and limit stops are important accessories for the feeding of the workpiece or strip material.

Universal workpiece limit stop

This versatile device forms the ideal connection between the workpiece support and limit stop. Examples of a wide variety of uses are illustrated.

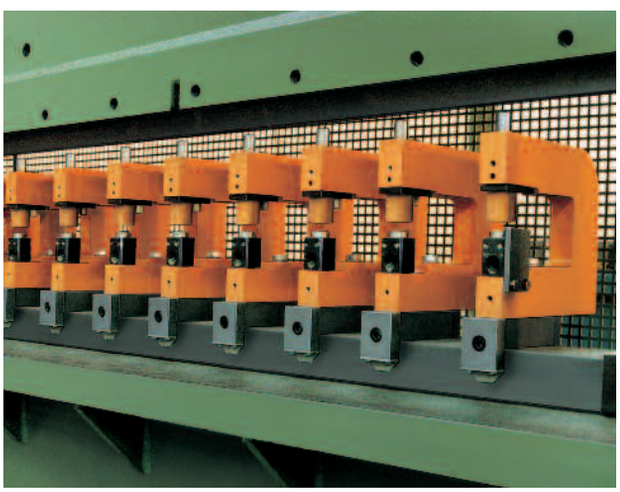
Coordinate limit stop

Coordinate limit stops enable the distance between holes to be quickly and easily set. Time consuming set-up work with limit stops is unnecessary.



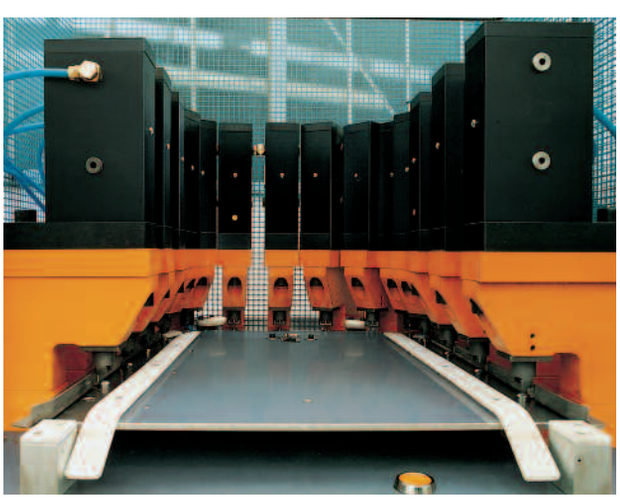
Application examples

The illustrated examples are typical applications for the tool units presented in this catalogue for units with press-dependent and press-independent operation.

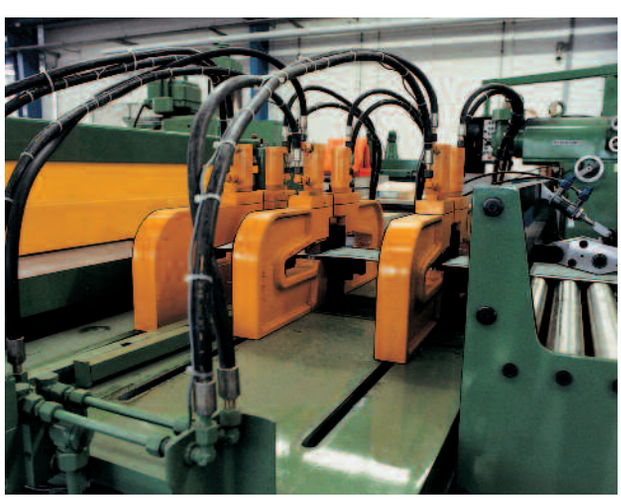


Tool units for punching in a bending press

Tool units for punching in an eccentric press



Pneumatic single-action punching units
for punching shaped cuts



Hydraulic double-action punching units mounted on movable elements
for punching steel from coil strips in different widths.

Punching unit, hole Ø 2–7 mm

Only round cut ●

Hole diameter with material thickness 3 **2–7 mm**[1)]

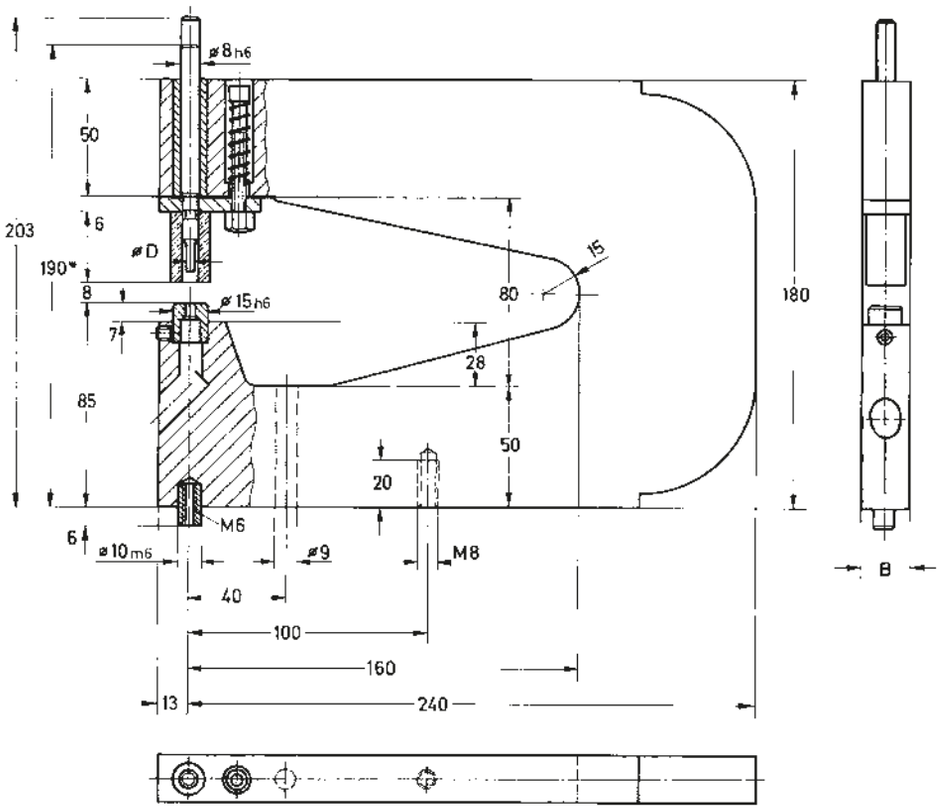
Hole diameter with material thickness 5, max. **5 mm**

Material thickness for steel St 60 **0.3–5 mm**

[1)] Hole Ø 6 to 7 mm only in material thickness up to 3 mm.

Punching tools (punch and die) have to be ordered separately. See table below.

Accessories See pages accessories.



* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately		
					Round punch ●		
● **Order No.**	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**
100-160	160	2–7	20	5.2	500-Ø-BL-ST	300-Ø	400-Ø-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 2–13 mm

Round and shaped cuts

Hole diameter with material thickness 3 **2–13 mm**[1)]

Hole diameter with material thickness 5, max. **11 mm**

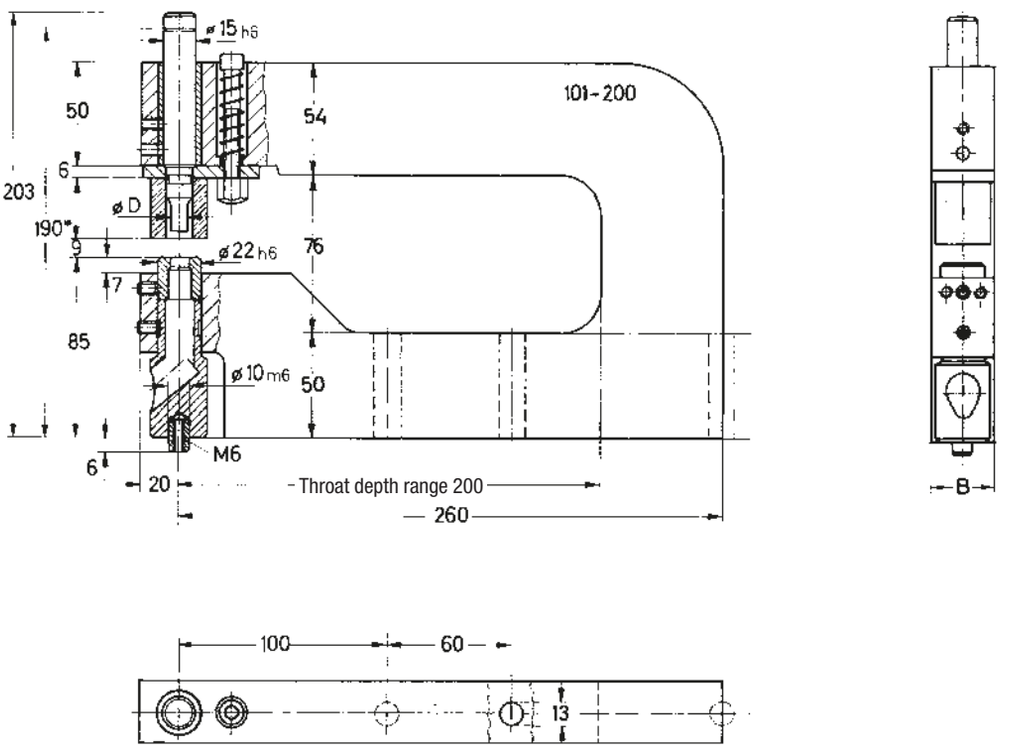
Material thickness for steel St 60 **0.3–5 mm**

[1)] Hole Ø 12 to 13 mm only in material thickness up to 3 mm.

It is possible to punch holes with Ø 2–7 mm by using reduction bushes and reduction sockets, which enable the use of the punch and die from the next smaller size of punching units.

Punching tools (punch and die) have to be ordered separately. See table below.

Accessories See pages accessories.

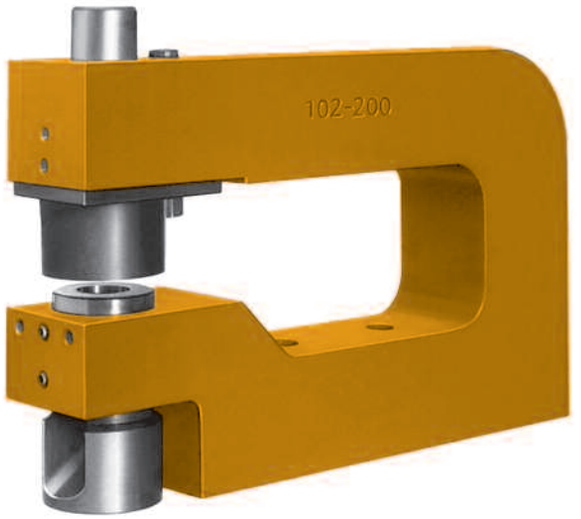


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
					Round punch			**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
101-200 F	200	2–13	30	7.8	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 8–25 mm



Round and shaped cuts

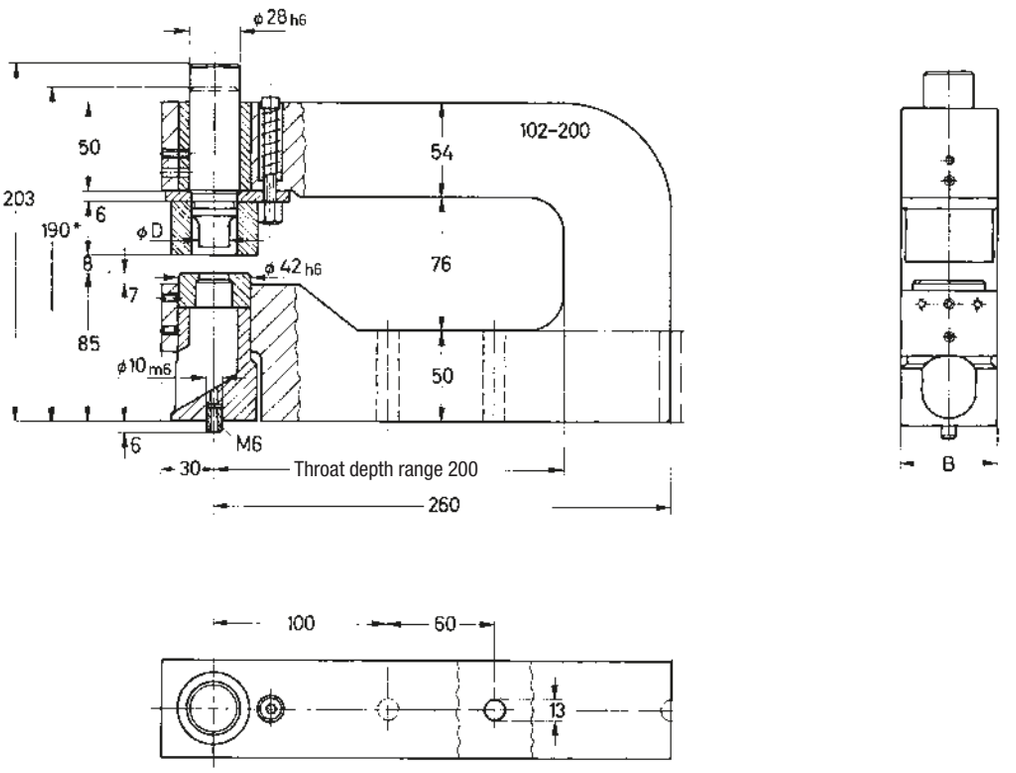
Hole diameter **8–25 mm**[1)]

Material thickness for steel St 60 **0.3–5 mm**

[1)] It is possible to punch holes with Ø 2–8 mm by ordering a reduction bush and reduction socket

Punching tools (punch and die) have to be ordered separately. See table below.

Accessories See pages accessories.

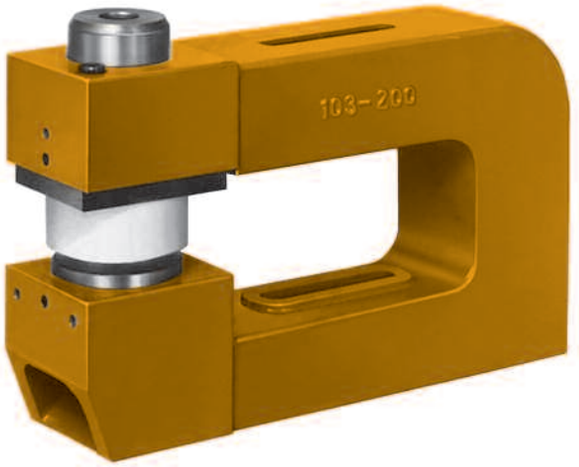


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
					Round punch			**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
102-200 F	200	8–25	55	15	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 25–40 mm



Round and shaped cuts

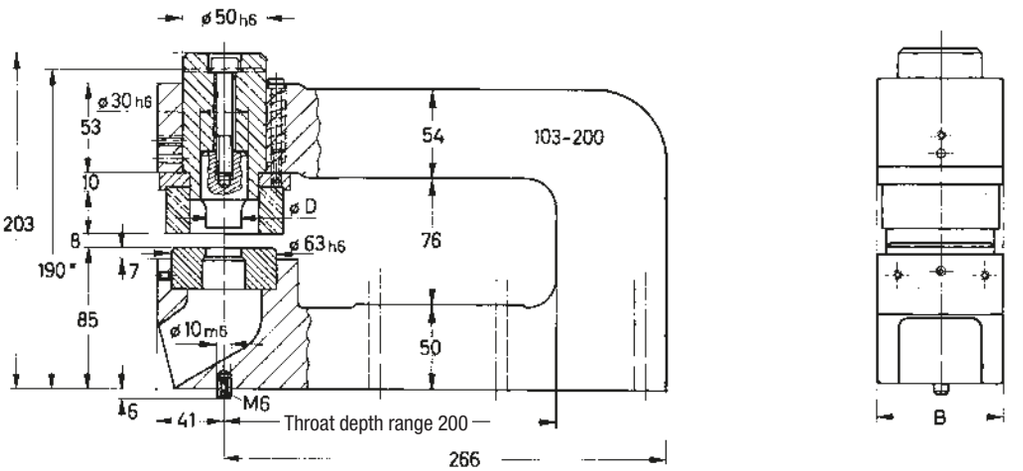
Hole diameter **25–40 mm**[1)]

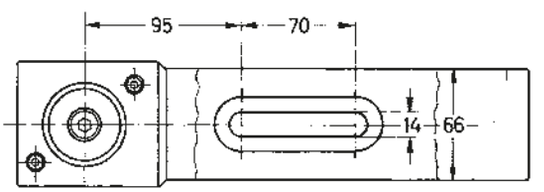
Material thickness for steel St 60 **0.3–5 mm**

[1)] Punching tools for holes with Ø 20–25 mm are available on request in special sizes

Punching tools (punch and die) have to be ordered separately. See table below.

Accessories See pages accessories.





* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
					Round punch			**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
103-200 F	200	25–40	75	14	503-Ø-BL-ST	303-Ø	403-Ø-BL-ST	503-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 40–63 mm

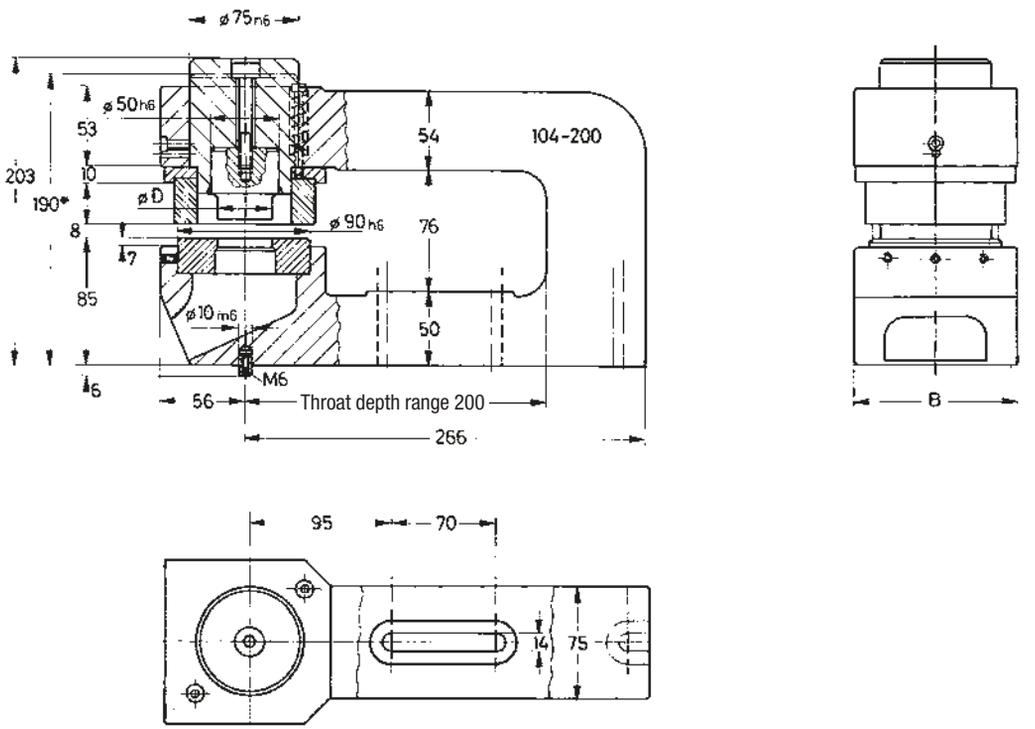
Round and shaped cuts

Hole diameter **40–63 mm**

Material thickness for steel St 60 **0.3–5 mm**

Punching tools (punch and die) have to be ordered separately.
See table below.

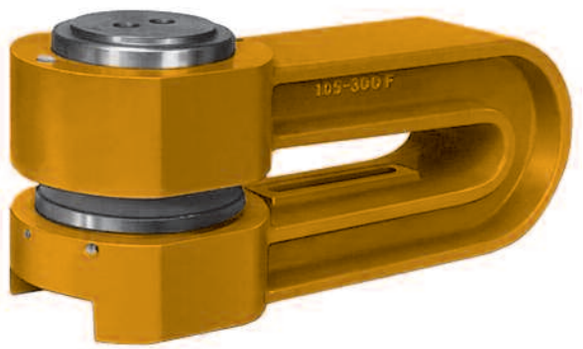
Accessories See pages accessories.



* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
					Round punch			**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
104-200 F	200	40–63	108	20	504-Ø-BL-ST	304-Ø	404-Ø-BL-ST	504-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

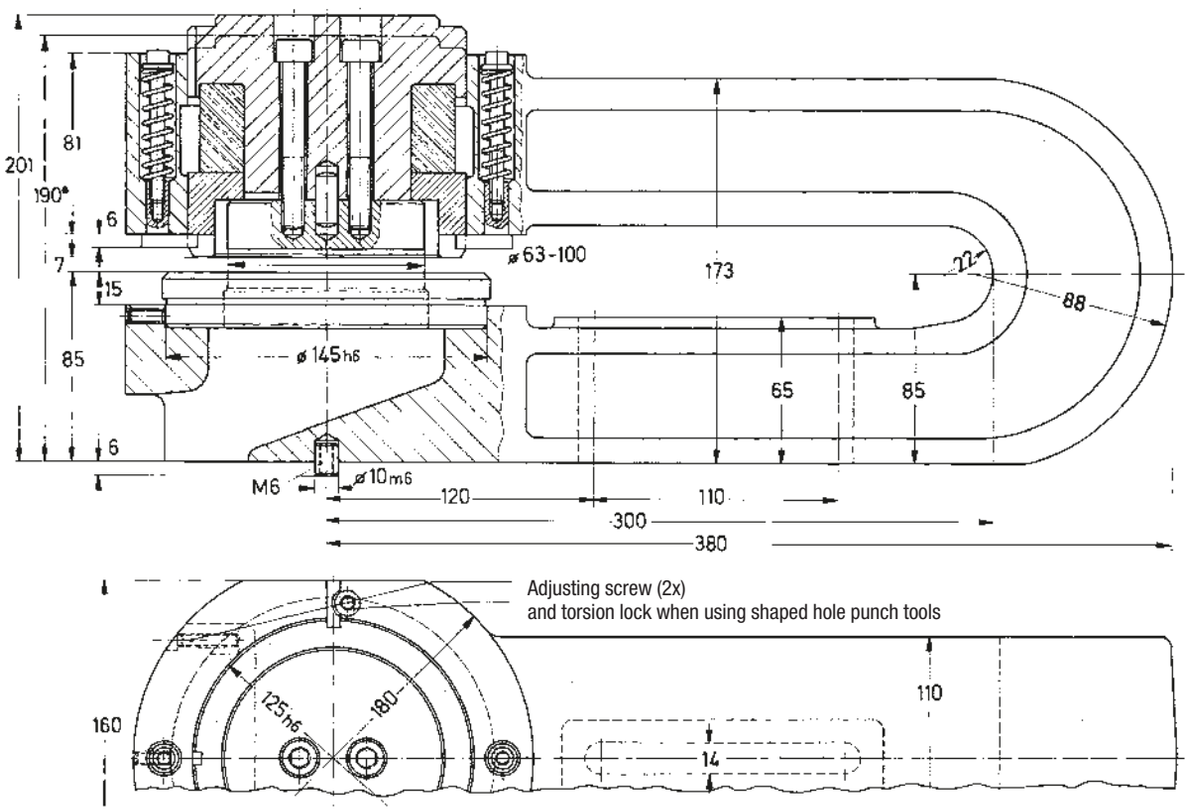


Round and shaped cuts

Hole diameter	**63–100 mm**
Material thickness for steel St 60	**0.75–5 mm**

Punching tools (punch and die) have to be ordered separately. See table below.

Accessories See pages accessories.

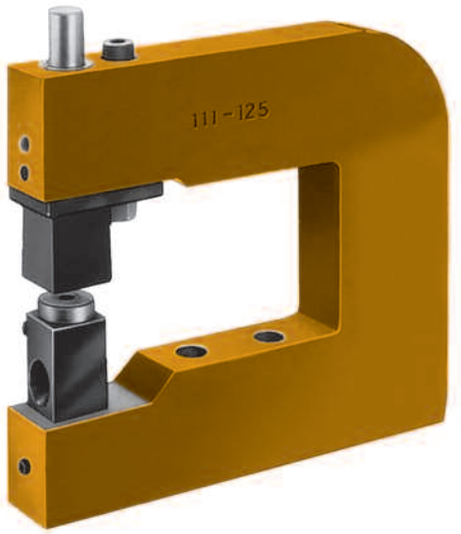


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
					Round punch			**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
105-300 F	300	63–100	160	42	505-Ø-BL-ST	305-Ø	405-Ø-BL-ST	505-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 2–13 mm



Round and shaped cuts

Hole diameter with material thickness 3 **2–13 mm**[1)]

Hole diameter with material thickness 5, max. **11 mm**

Material thickness for steel St 60 **0.3–5 mm**

[1)] Hole Ø 12 to 13 mm only in material thickness up to 3 mm.

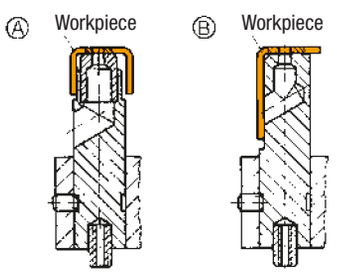
Punching units of series 111 are particularly suitable for punching small profiles. For special applications, either a special die block with a small special die (see illustration) can be used or a one-piece block die (see illustration).

In both cases, the punching of very small profiled parts is possible after removing the standard die block.

Punching tools (punch and die) have to be ordered separately. See table below.

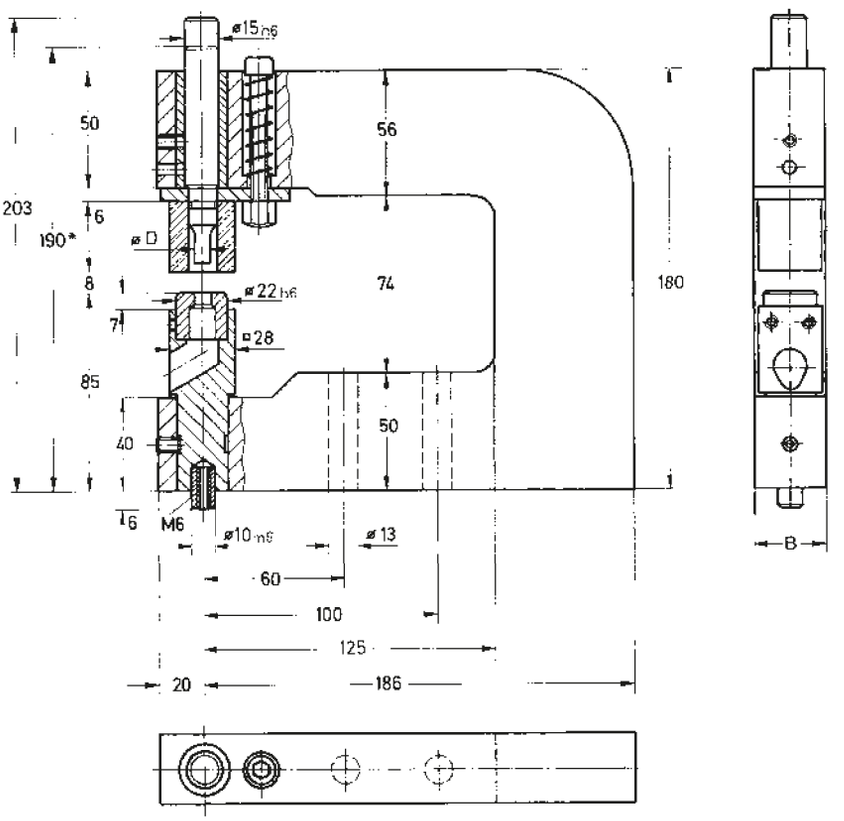
Accessories See pages accessories.

Examples for the two versions



Ⓐ Special die block with small special die, adapted to the U-profile

Ⓑ Block die, adapted to the L-profile

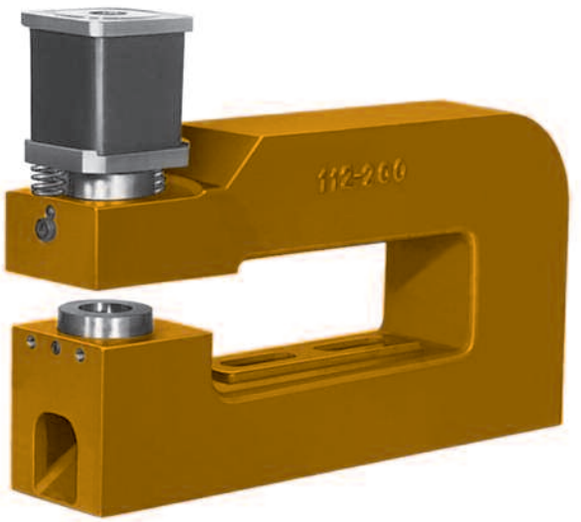


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
						Round punch		**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
111-125 F	125	2–13	30	6	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 8–22 mm



Round and shaped cuts

Hole diameter **8–22 mm**

Material thickness for steel St 60 **2–10 mm**

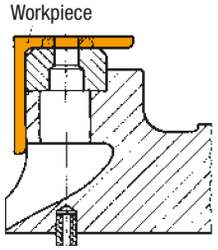
With small modifications these punching units are suitable for punching L-, U-, or Z-profiles, see application example.

Punching tools (punch and die) have to be ordered separately. See table below.

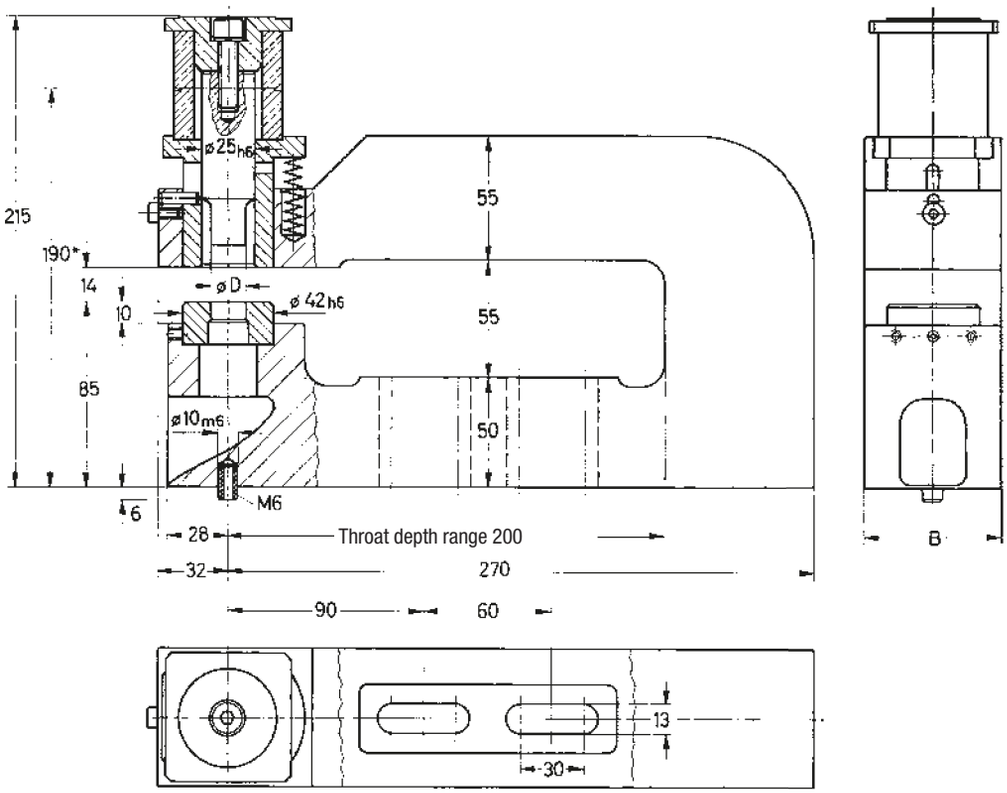
Accessories See pages accessories.

Example

Workpiece



Punching unit adapted to the L-profile

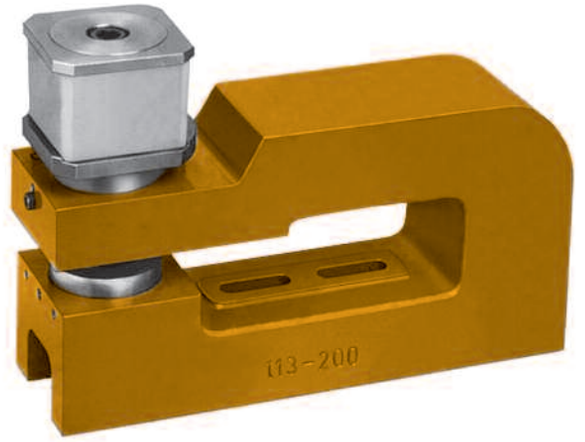


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
						Round punch		**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
112-200 F	200	8–22	63	16	512-Ø-BL-ST	312-Ø	402-Ø-BL-ST	512-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 22–38 mm



Round and shaped cuts

Hole diameter **22–38 mm**

Material thickness for steel St 60 **2–10 mm**

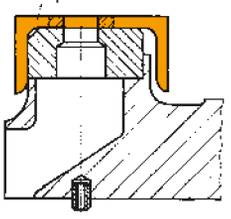
With small modifications these punching units are suitable for punching L-, U-, or Z-profiles, see application example.

Punching tools (punch and die) have to be ordered separately. See table below.

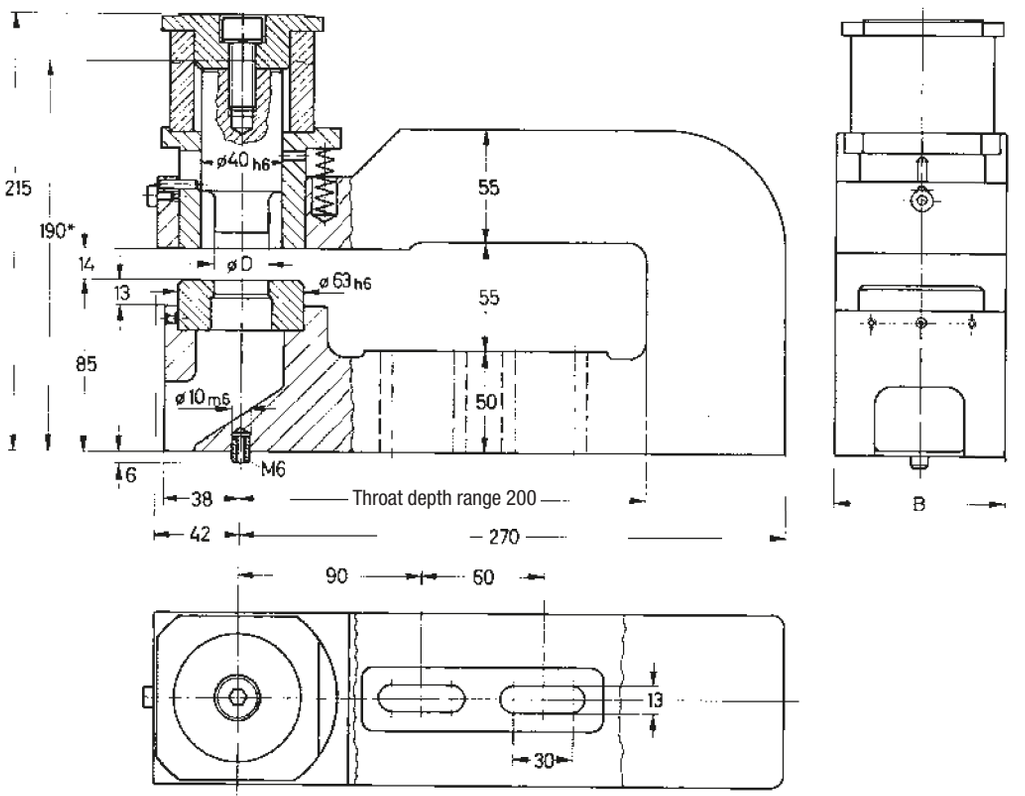
Accessories See pages accessories.

Example

Workpiece



Punching unit adapted to the U-profile

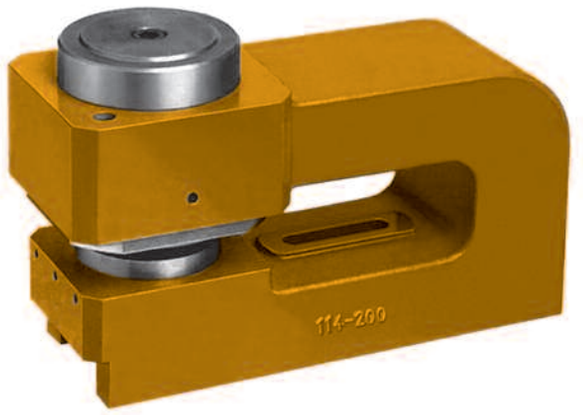


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
					Round punch			**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
113-200 F	200	22–38	85	21	513-Ø-BL-ST	313-Ø	403-Ø-BL-ST	513-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Punching unit, hole Ø 35–63 mm



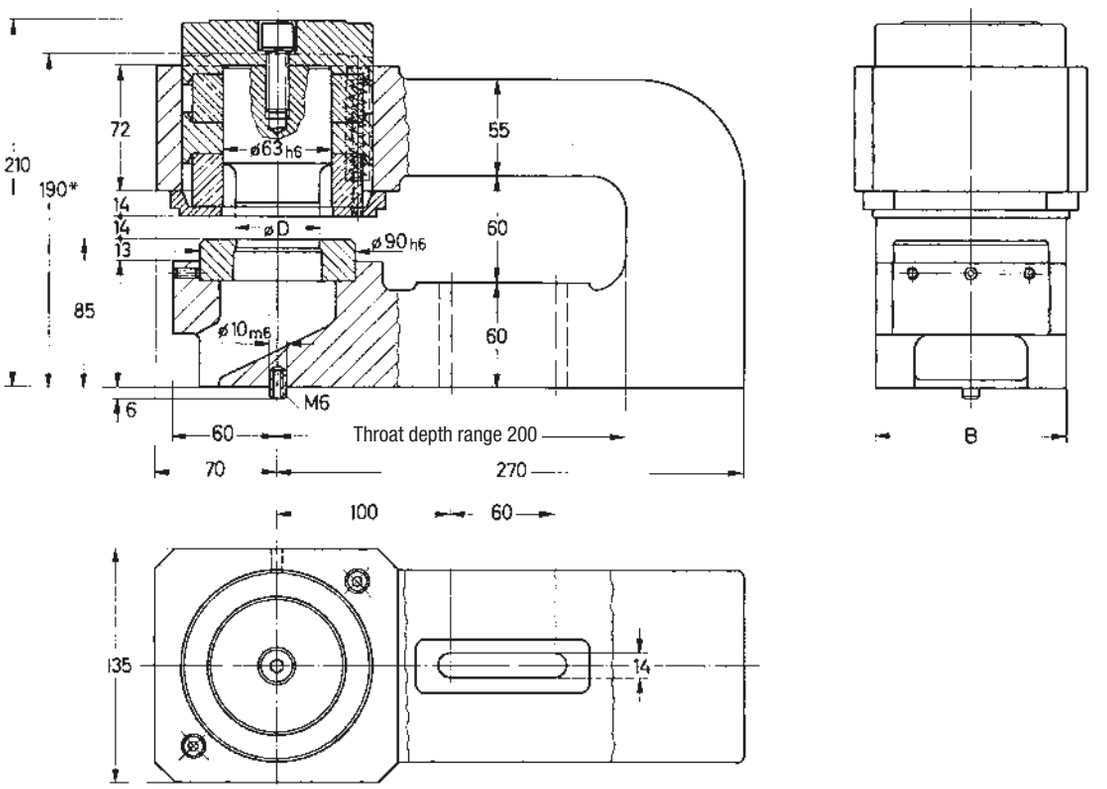
Round and shaped cuts

Hole diameter **35–63 mm**

Material thickness for steel St 60 **2–10 mm**

Punching tools (punch and die) have to be ordered separately. See table below.

Accessories See pages accessories.

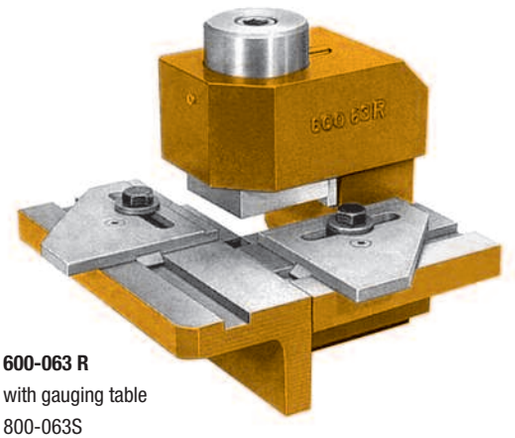


* Lower edge of punch and upper edge of die are flush

Punching unit without punching tools					**Punching tools** have to be ordered separately			
						Round punch		**Shaped punch**
Order No.	**Throat depth range**	**Hole Ø D**	**Width B**	**Weight ~** [kg]	**Punch kit Order No.**	**Punch Order No.**	**Die Order No.**	**Punch kit Order No.**
114-200 F	200	35–63	112	34	514-Ø-BL-ST	314-Ø	404-Ø-BL-ST	514-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø, **BL** = material thickness, **ST** = material and strength. See also **punching tools**

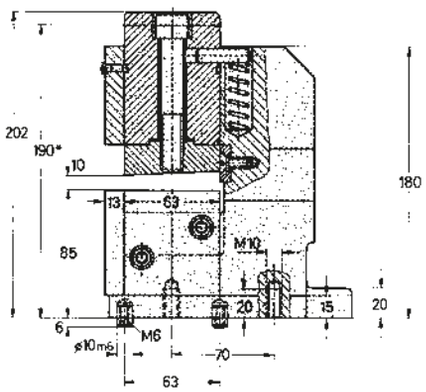
90° notch units, notch size 63x63 mm



600-063 R
with gauging table
800-063S

Cutting angle	**90°**
Max. notch size	**63x63 mm**
Material thickness with steel St 60	**0.3–8 mm**

The **notch units**, adjusted to a die clearance of 0.1 mm, are pre-set in the factory for cutting material with a thickness of 0.3–3 mm. With the metal compensation sheets (0.2 mm) included in the delivery, the die clearance can be set to 0.2 or 0.3 mm for greater material thickness. With the adjustable **gauging table** the notch size can be adjusted continuously in two directions from 0–63 mm. The gauging table has to be ordered separately.



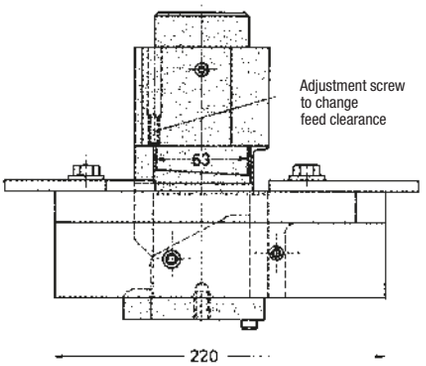
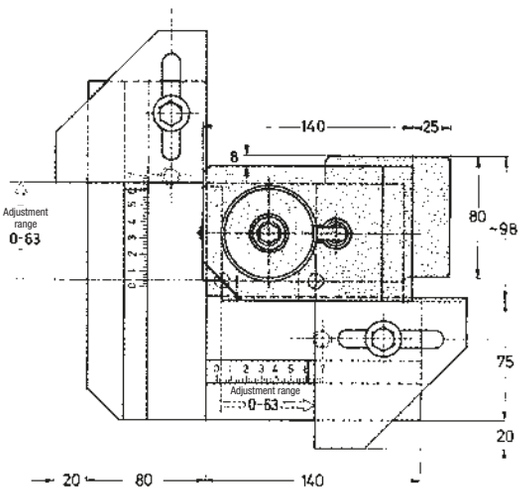
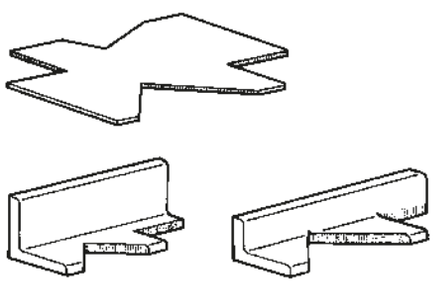


Figure shows 600-063 R with 800-063 S



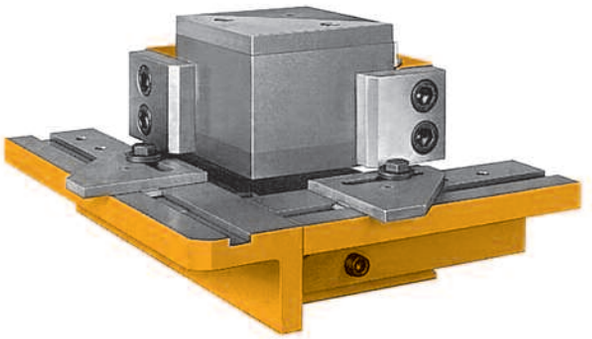
Notch examples



* Notch unit closed, upper blade inserted to full depth

90° notch units without gauging table with cutting tools			**Gauging table (adjustable)** has to be ordered separately		
Version		**Weight** ~	Appropriate for notch units 600-063 L 600-063 R		**Weight** ~
Left hand	Right hand				
Order No.	**Order No.**	**[kg]**	**Order No.**		**[kg]**
600-063 L	**600-063 R**	15	**800-063 S**		6.5

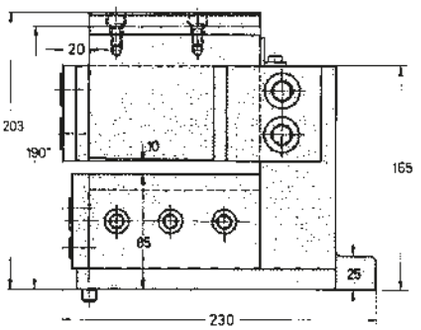
90° notch units, notch size 63x63 mm



600-125 R with gauging table 800-125 S

Cutting angle	**90°**
Max. notch size	**125x125 mm**
Material thickness with steel St 60	**0.3–8 mm**

The **notch units**, adjusted to a die clearance of 0.1 mm, are pre-set in the factory for cutting material with a thickness of 0.3–3 mm. With the metal compensation sheets (0.2 mm) included in the delivery, the die clearance can be set to 0.2 or 0.3 mm for greater material thickness.
With the adjustable **gauging table** the notch size can be adjusted continuously in two directions from 0–125 mm. The gauging table has to be ordered separately.
Quotations for notch units with notch sizes 25x25 mm, 160x160 mm and 200x200 mm can be provided on request.



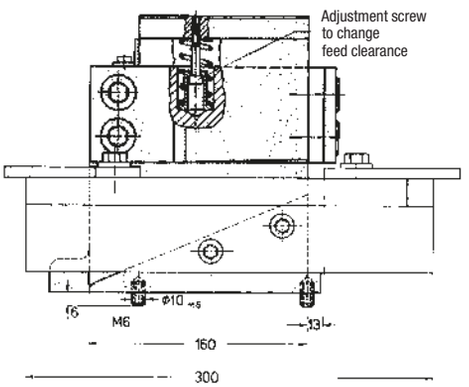
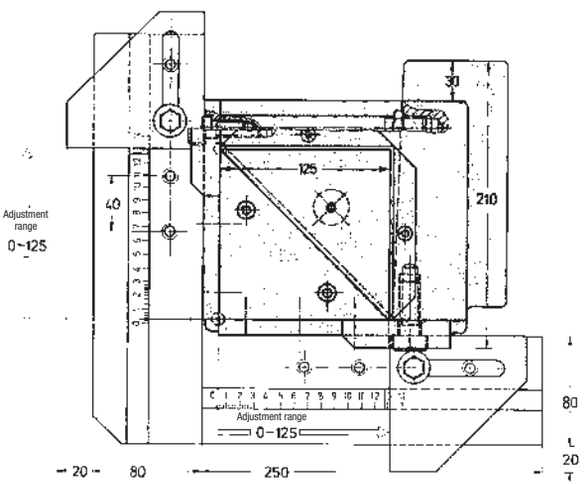
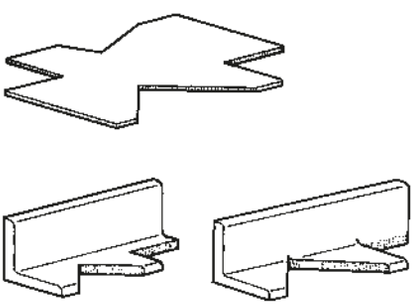


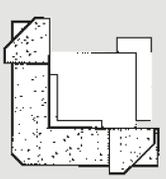
Figure shows 600-125 R with 800-125 S



Notch examples



* Notch unit closed, upper blade inserted to full depth

90° notch units without gauging table with cutting tools			**Gauging table (adjustable)** has to be ordered separately		
Version		**Weight** ~	 Appropriate for notch units 600-125 L 600-125 R		**Weight** ~
Left hand Order No.	**Right hand** Order No.	[kg]	Order No.		[kg]
600-125 L	**600-125 R**	36	**800-125 S**		5

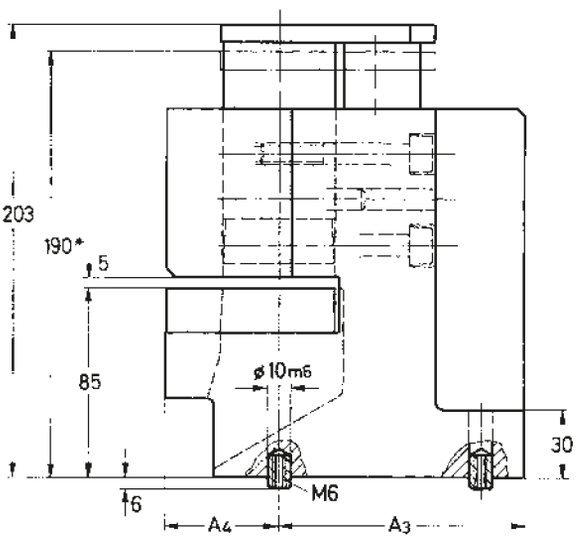
Rectangle notch units 50x50 und 100x75 mm

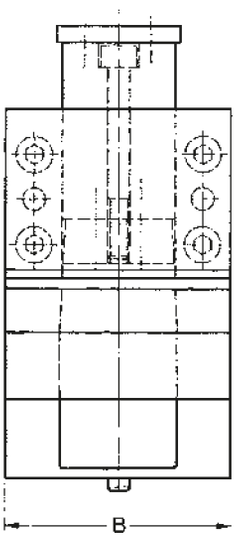
601-050

Notch shape	**rectangle**
Notch size	
version 601-050	**50x50 mm**
version 601-100	**100x75 mm**
Material thickness with steel St 60	**0.3–3 mm**

The various possibilities for using these rectangle notch units are illustrated below.

The required die clearance is set in the factory in accordance with the material thickness indicated in the order.





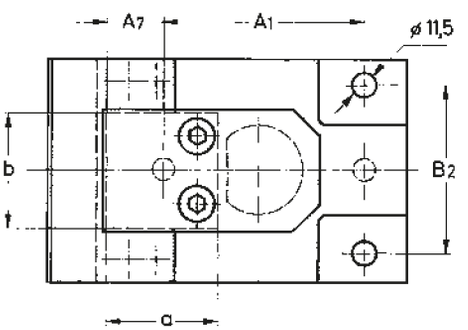
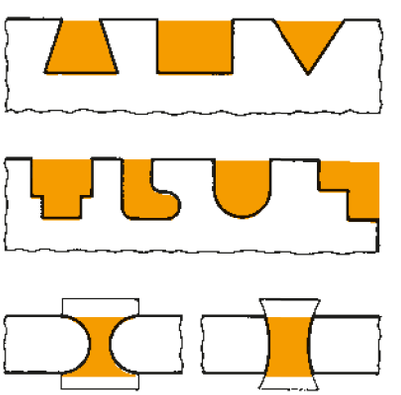


Figure shows 601-050

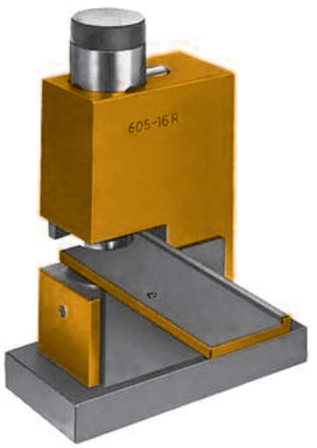
Possible notch and separation shapes available



* Notch unit closed, shaped punch inserted

Rectangle notch units with cutting tools **Order No.**	**Notch size** **Width x depth**	**a**	**b**	**A_1**	**A_3**	**A_4**	**A_7**	**B**	**B_2**	**Weight ~** [kg]
601-050	50 x 50	50	50	90	110	50	25	100	75	16
601-100	100 x 75	75	100	100	120	75	37.5	150	100	27

Radius cut unit, R 3–20 mm



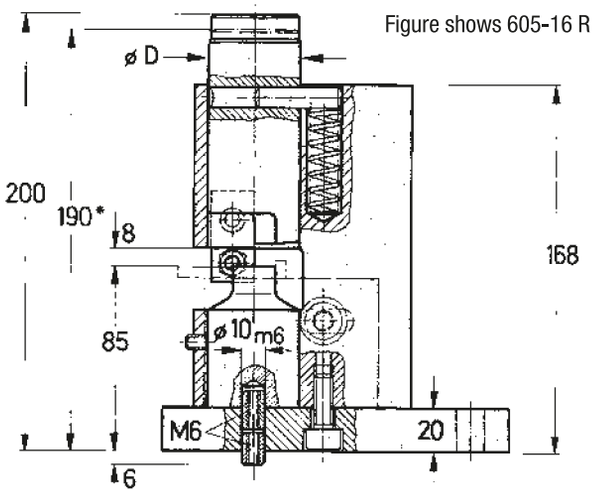
605-16 R

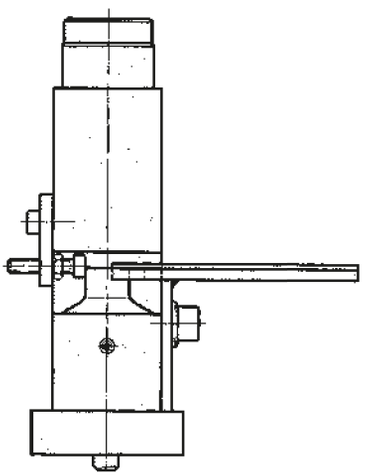
Possible radii	**R 3–20mm**[1)]
Cutting angle α, max.	**180°**
Material thickness for steel St 60, max.	**6 mm**

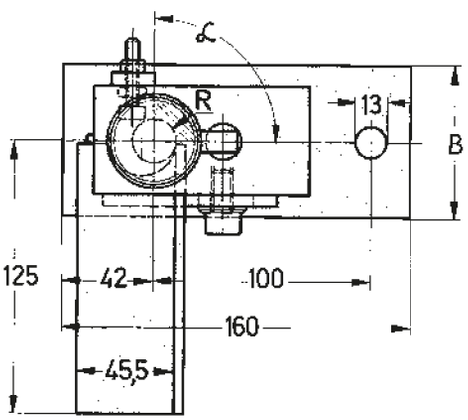
Order specifications for punch kit (please order separately)

Version **r**ight hand or **l**eft hand	R oder L
Radius R	R_____ mm
Cutting angle α, (see examples)	_____°
Material thickness	_____ mm
Material and strength	_____

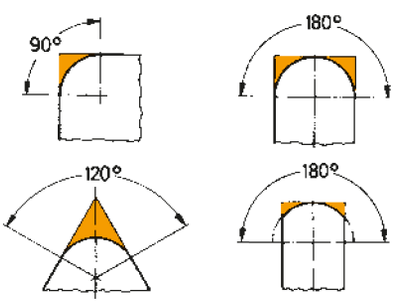
Figure shows 605-16 R



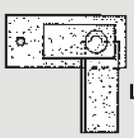
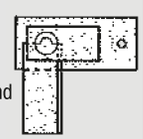
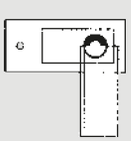
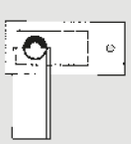




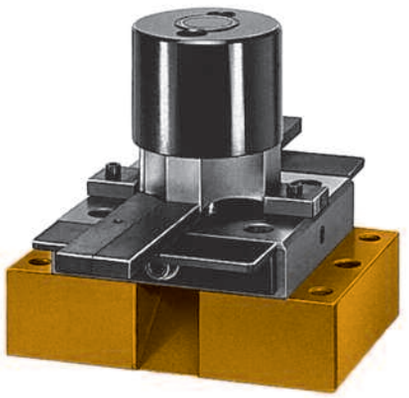
Examples



* Radius cut unit closed, upper punch completely inserted

Radius cut units with gauging table, without cutting tools						**Punch kit** has to be ordered separately. Additional order specifications see above.	
Version		Radius cut sizes	B	ØD	Weight ~	Corresponding to radius cut unit Version	
 Left hand	 Right hand					 Left hand	 Right hand
Order No.	**Order No.**				[kg]	**Order No.**	**Order No.**
605-16 L	**605-16 R**	R3-16	70	42	6.5	**605-16-05 L**	**605-16-05 R**
605-20 L	**605-20 R**	R3-20	70	50	7.5	**605-20-05 L**	**605-20-05 R**

Radius cut units, R 5–30 mm



Possible radii **R 5, 10, 15, 20, 25, 30 mm**

Cutting angle α, **90°**

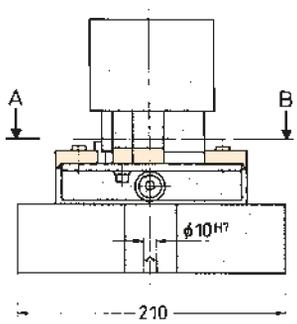
Material thickness for steel St 37, max. **5 mm**

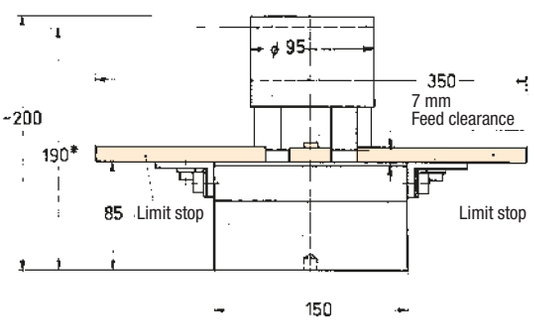
In addition to the pneumatic and hydraulic radius cut units, press-operated radius cut units are introduced on this page.

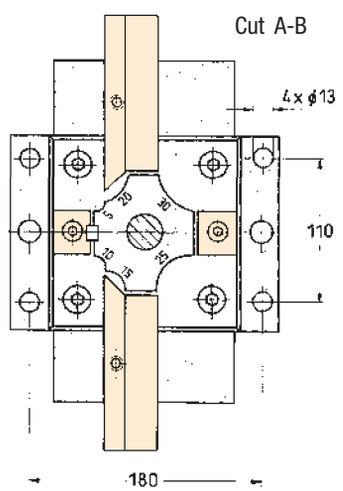
By adjusting the limit stops the radius tool unit enables the production of six different 90° radii with only one punching tool.

The graduation of the radii is divided into steps of 5 mm from R 5 mm up to R 30 mm.

Other radii are available on request.

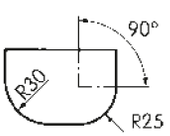


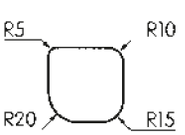




= adjustable limit stops

Examples





* Radius cut unit closed, upper punch completely inserted

Radius cut unit with cutting tools

Order No.	Possible radii R	Weight ~ [kg]
606-30	5,10,15 20,25,30	22

Note:

Please state preferred material quality and thickness when ordering

Cut-off units, cutting width 125 und 250 mm

610-125-N

Cutting width, max.

version 610-125-N	**125 mm**
version 610-250-N	**250 mm**
Material thickness with steel St 60	**0.3–8 mm**

The **cut-off units**, adjusted to a die clearance of 0.1 mm, are pre-set in the factory for cutting material with a thickness of 0.3–3 mm. With the metal compensation sheets (0.2 mm) included in the delivery, the die clearance can be set to 0.2 or 0.3 mm for greater material thickness.

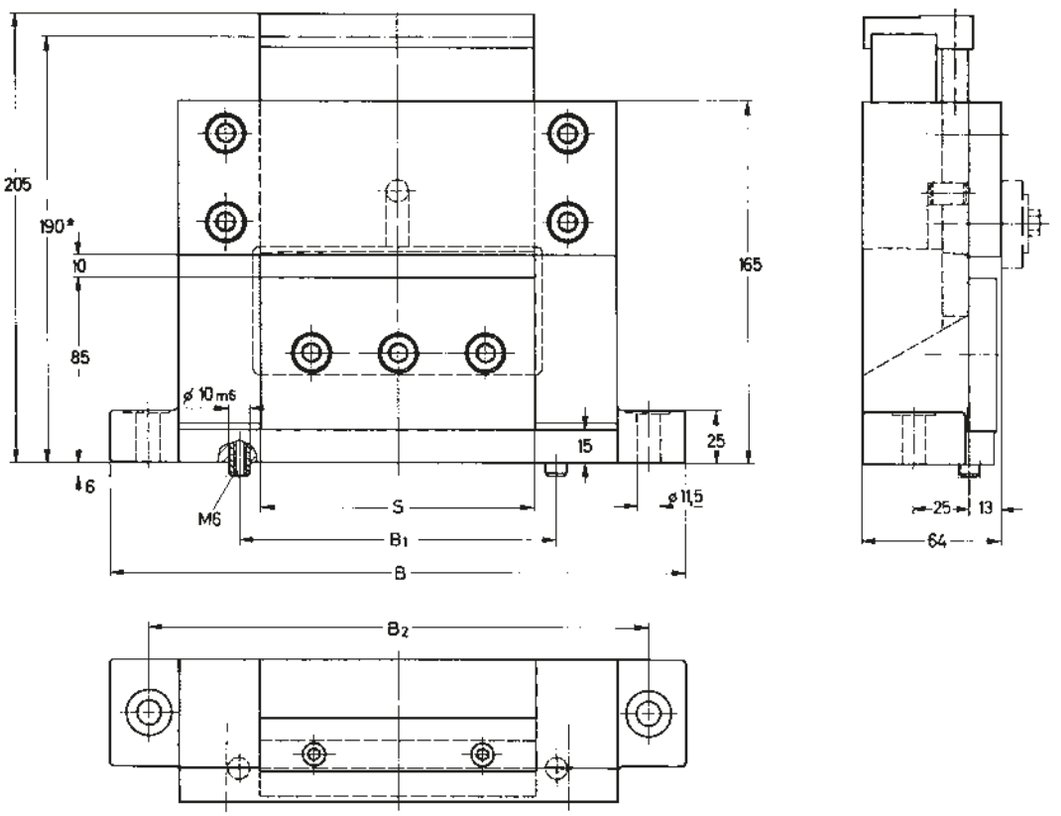


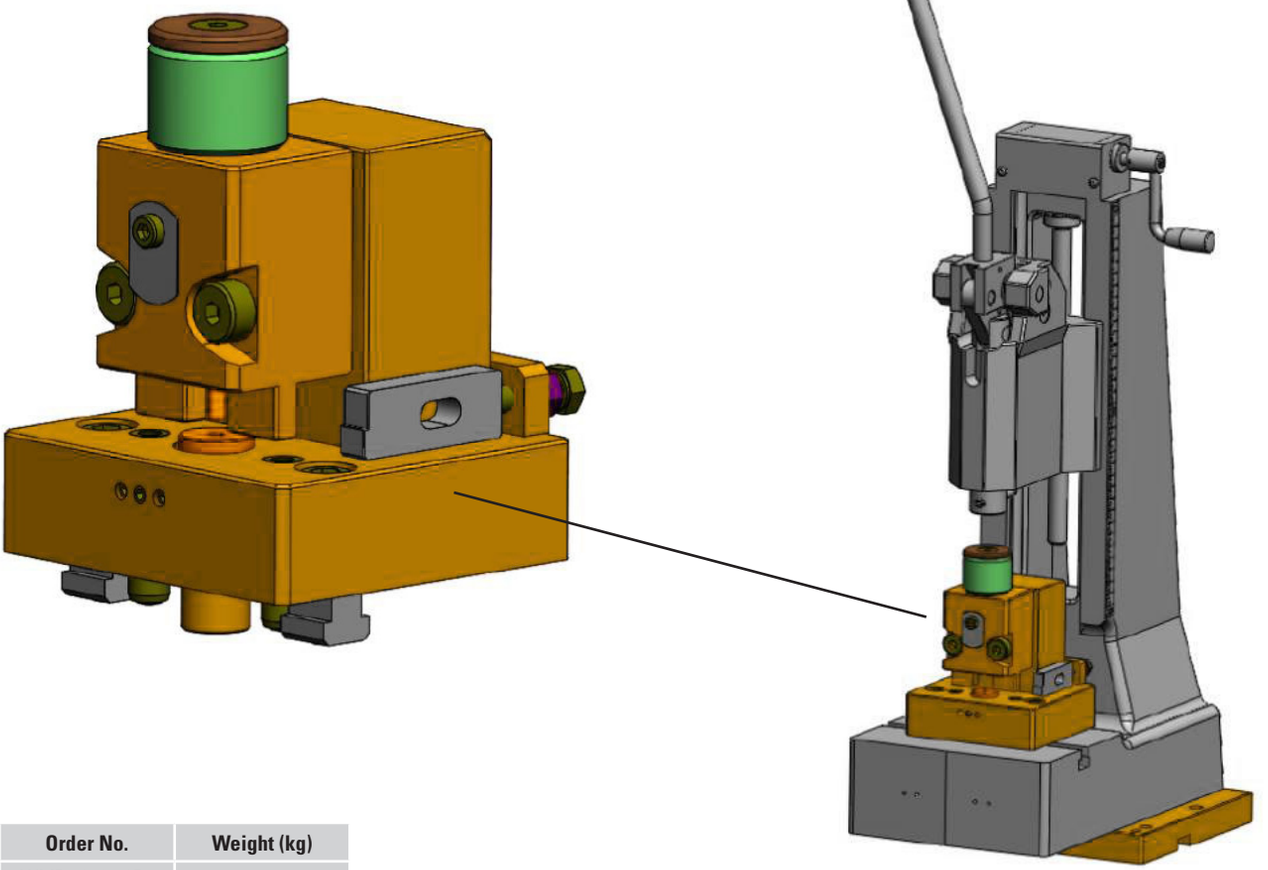
Figure shows cut-off unit 610-125-N

* Cut-off unit closed, upper blade inserted to full depth

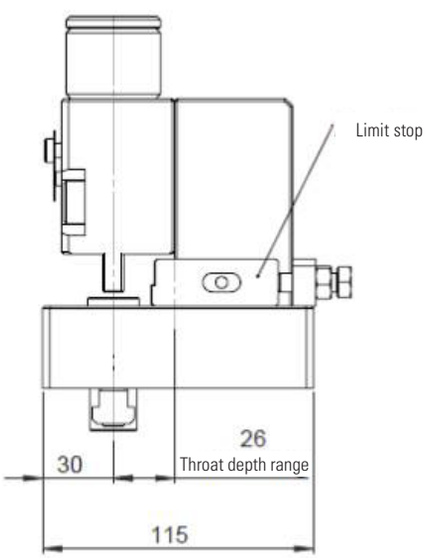
Cut-off units with cutting tools and retainer **Order No.**	**Cutting width** **S**	**Total width** **B**	**B_1**	**B_2**	**Weight** **~** **[kg]**
610-125-N	125	266	150	230	15
610-250-N	250	412	250	380	26
Cut-off units with larger cutting widths (e.g. 350, 400, 500 mm) are available on request.					

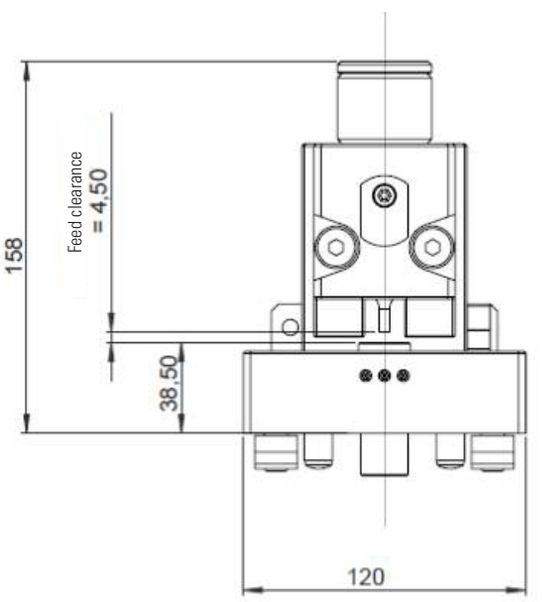
Round and shaped cut
Hole -Ø for material thickness 3 2-13 mm[1)]

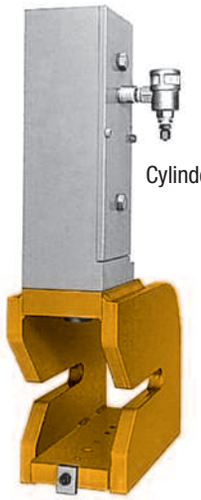
Please contact us for any inquiry regarding these tools.



Order No.	Weight (kg)
WMP-0000-00B1	8







Cylinder force 80 kN

624-2080

These pneumatic table presses have been designed for use with a press-operated punching, notch or cut-off unit.

One advantage of these table presses is their mobility, i.e. they can be used at any location. By using additional exchange plates, it is possible to mount the tool units outside of the press.

As a result, the tool units can be inserted or removed quickly and easily.

The material support height is **135 mm** with exchange plate, **125 mm** without exchange plate.

The cutting force required determines the usage limit for the table press, see the cutting force chart.

The cutting force, which results from the hole diameter, the material thickness and the material strength, may not exceed the maximum cylinder force.

Suitable tool units [2)]

Punching units
100 – 104

+

Notch units
600-063 L/R
601-050

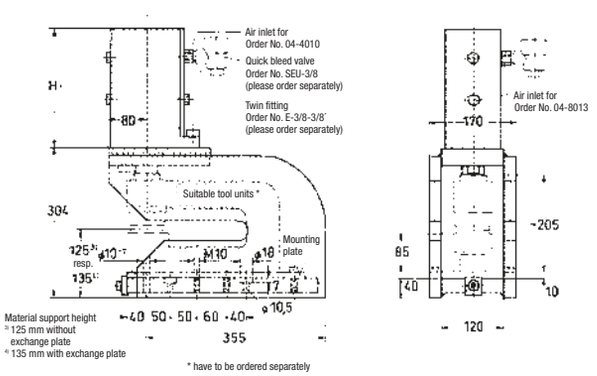
+

Exchange plate has to be ordered separately

[2)] Further combinations of tool units with pneumatic table presses are available on request.

Example
of a pneumatic table press with the punching unit inserted, together with an exchange plate ▶

Pneumatic table presses



Pneumatic table presses							Exchange plate has to be ordered separately for			
Pneumatic	Max. force		Cylinder type	Flange type	H_1 ~	Weight ~	Punching units,	Notch units,	Cut-off units,	Weight ~
	with air supply pressure of 8 bar	with oil supply pressure of 350 bar								
Order No.	[kN]	[kN]	Order No.	Order No.		[kg]	Order No.	Order No.	Order No.	[kg]
624-2040	40	–	04-4010	–	234	76	816-120-350L	816-120-350K	816-120-350A	3
624-2080	80	–	04-8013	–	405	94				

Cylinder force 109 kN

626-2109

These hydraulic table presses have been designed for use with a press-operated punching, notch or cut-off unit.

One advantage of these table presses is their mobility, i.e. they can be used at any location. By using additional exchange plates, it is possible to mount the tool units outside of the press.

As a result, the tool units can be inserted or removed quickly and easily.

The material support height is **135 mm** with exchange plate, **125 mm** without exchange plate.

The cutting force, which results from the hole diameter, the material thickness and the material strength, may not exceed the maximum cylinder force.

Suitable tool units[2)]

Punching units
100 – 104

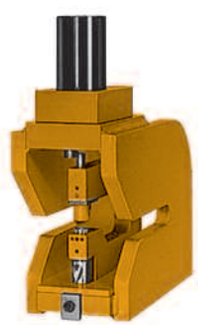
+

Exchange plate has to be ordered separately

Notch units
600-063 L/R
601-050

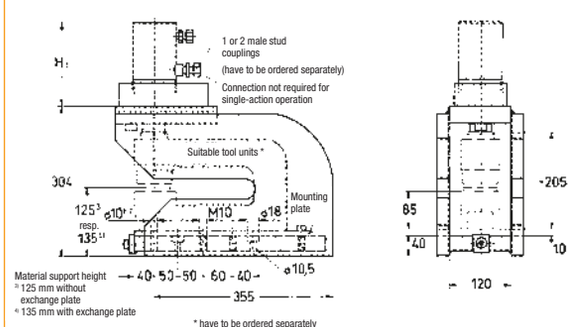
+

Example of a hydraulic table press with the punching unit inserted, together with an exchange plate ▶

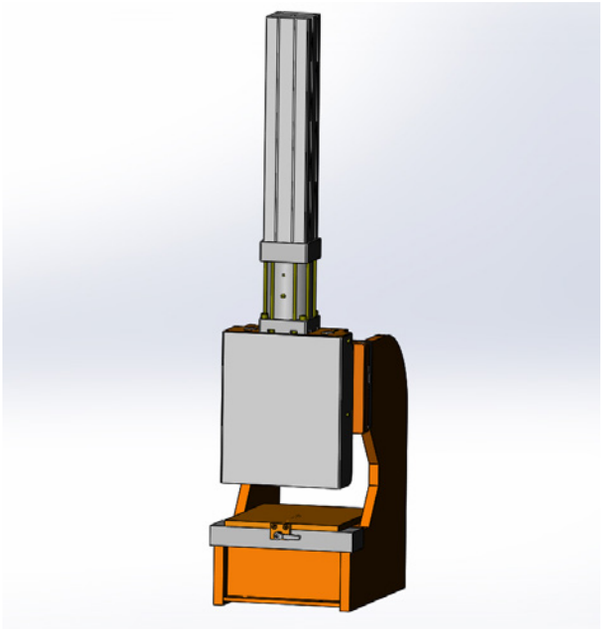


[2)] Further combinations of tool units with hydraulic table presses are available on request.

Hydraulic table presses



Hydraulic double-action Order No.	Hydraulic table presses: Max. force with oil suply pressure of 350 bar [kN]	Cylinder type Order No.	Flange type Order No.	H_1 ~	Weight ~ [kg]	**Exchange plate** has to be ordered separately for: Punching units, Order No.	Notch units, Order No.	Weight ~ [kg]
626-2068	68	725D50151-1	F004-A011-0000	154	55	816-120-350L	816-120-350K	3
626-2109	109	725D63171-1	F004-0023-0000	169	62			

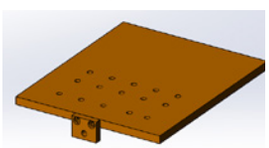


This pneumatic table press has been specially designed to drive several press-operated punching, notch or cut-off units presented in this catalogue. The basic structure of the pneumatic table press is a C-frame. Due to the special bearing of the ram plate, the punching, notch or cut-off units can easily be positioned asymmetrically in the table press. The exchange plate included as standard in the delivery allows combining the tool units as desired. The unit 15 driven by a hydropneumatic power cylinder (PHZ-110-015) with a force of 110 kN and a maximum air supply pressure of 6 bar. The cutting force may not exceed the maximum cylinder force. Sensors for the cylinder position monitoring device are included in the scope of supply.

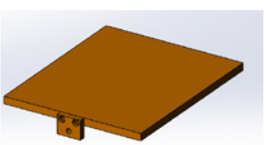
Suitable tool units

Punching units	Notch units	Cut-off units
100 bis 105	600-025 L/R	610-125
	600-063 UR	610-250
	600- 125L/R	
	601-050,601-100	
	606-30	

Exchange plate with punch layout included as standard

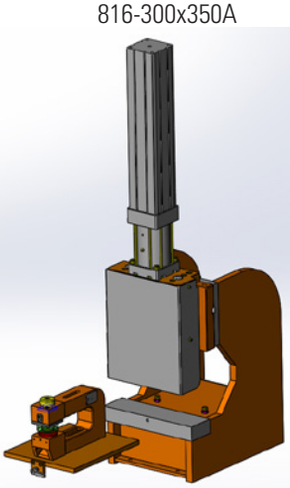


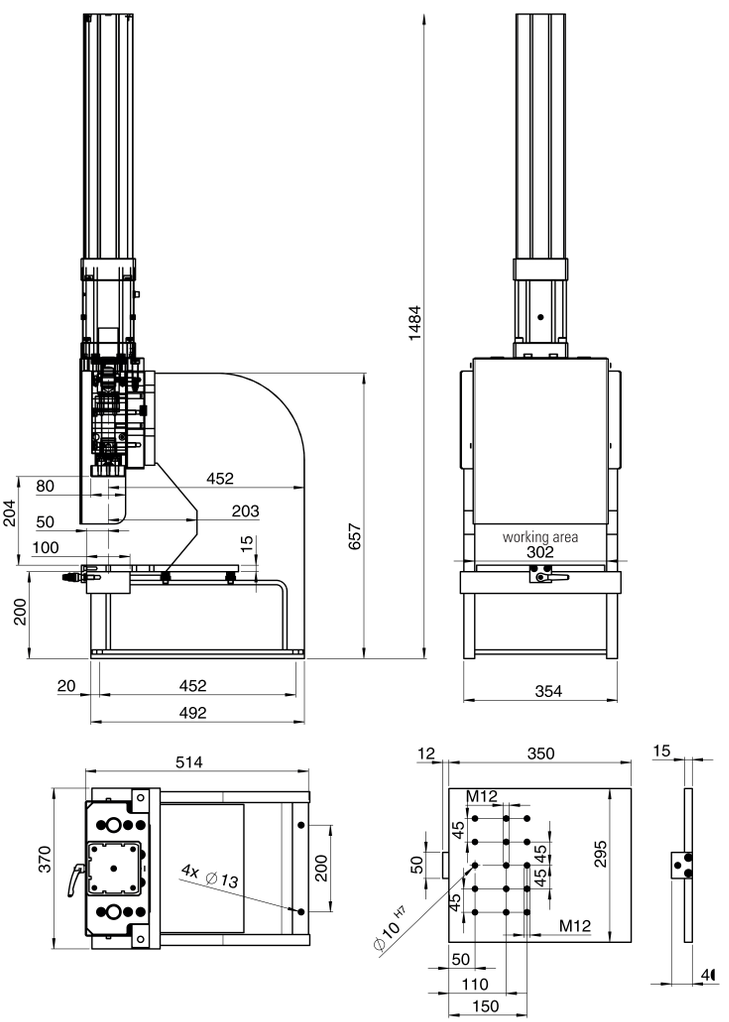
Exchange plate with punch layout has to be ordered separately 816-300x350L



Exchange plate without punch layout has to be ordered separately 816-300x350A

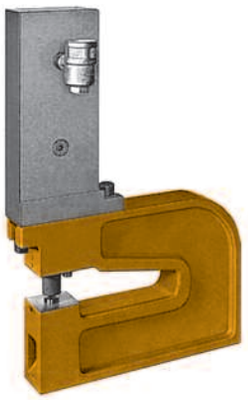
Example of a pneumatic table press with the tool units inserted, together with an exchange plate



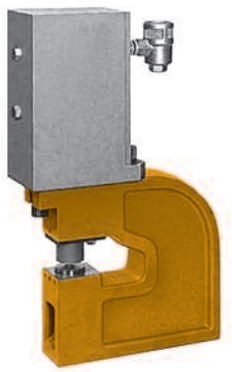


Pneumatic table press					
Order No.	**Throat depth range (mm)**	**Working width (mm)**	**Stroke (mm)**	**Maximum force with air pressure of 6 bar (kN)**	**Weight (kg)**
624-2110	203	302	14	110	240

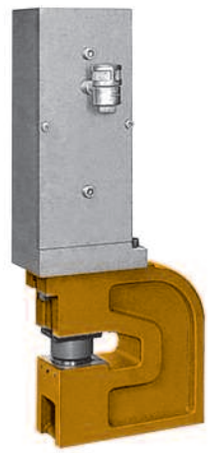
Examples



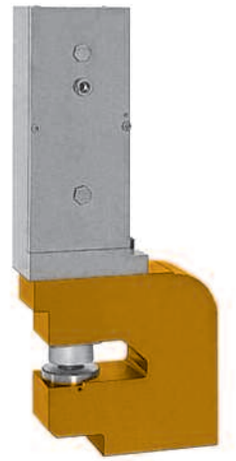
141-2020
Cylinder force 20 kN
Throat depth range A=200 mm



142-1040 F
Cylinder force 40 kN
Throat depth range A=100 mm

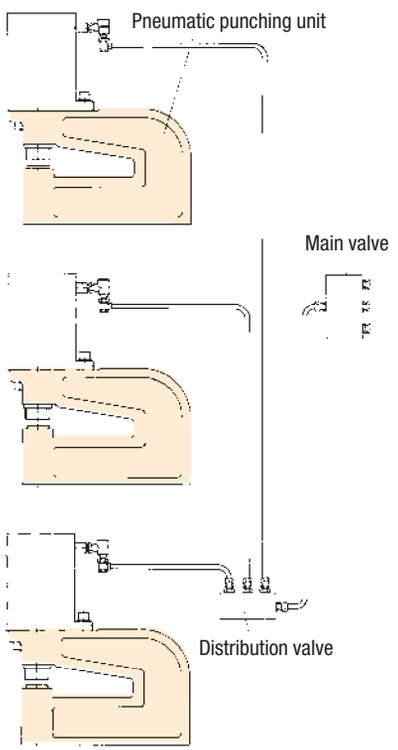


143-1080 F
Cylinder force 80 kN
Throat depth range A=100 mm



144-1080 F
Cylinder force 80 kN
Throat depth range A=100 mm

Connection examples
for several punching units



Driven by
pneumatic power cylinder, single-action

Round and shaped cut		
Hole diameter	**for series 141**	**2–13 mm**
	for series 142	**8–25 mm**
	for series 143	**25–40 mm**
Only round cut	Shaped cut on request	
	for series 144	**40–63 mm**
Material thickness		
with steel		**0.3–3 mm***
with aluminium and plastics		**0.3–5 mm***

* The cylinder force has to exceed the required cutting force.

Pneumatic punching units can be used independently from a press, as they are driven by the powerful pneumatic power cylinder and only need compressed air as a power source.
The pneumatic power cylinders are single-action; for optimum fast reversal, they additionally require a 3/2 way valve, as well as a quick bleed valve; see also the illustrated connection examples.
The material support height is **125 mm**.
The punching units should be selected according to the punch diameter, material thickness, material strength and the resulting cutting force required.
The different cylinder sizes are interchangeable, as they have the same mounting dimensions. If the cutting force is insufficient the next more powerful cylinder can be used. Double-action hydraulic cylinders, including the mounting flange, can be retrofitted.
The best application for pneumatic punching units is punch work with thin metal sheets up to 3 mm thickness because of their progressive power characteristic feature.
With an air supply pressure of maximum 8 bar the cylinder force achieves capacities of 12, 20, 40 or 80 kN depending on the cylinder type.

An obligatory stripping unit can be implemented on request.

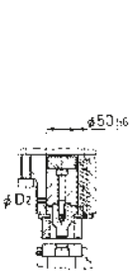
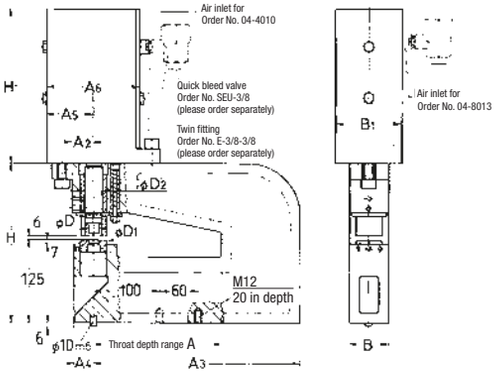
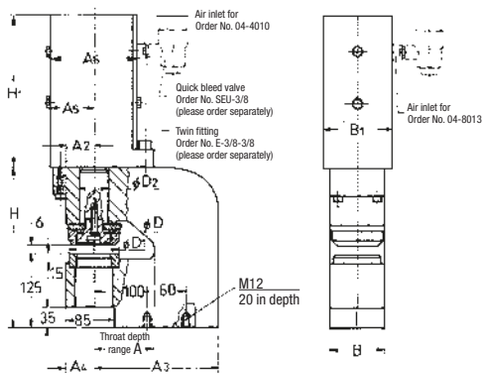


Figure shows tools series 143-…

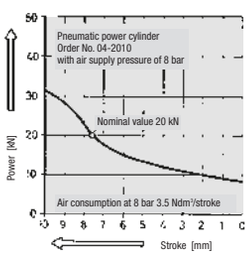


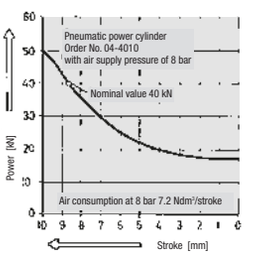
Series **141, 142, 143**

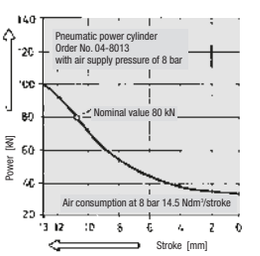


Series **144**

Order No.	Throat depth range A	Hole diameter D	Max. force at 8 bar [kN]	A_2	A_3	A_4	A_5	A_6	B	B_1	D_1	D_2	H	H_1	Cylinder type Order No.	Weight ~ [kg]
141-1012F	100	2-13	**15**	30	220	30	65	110	60	50	22	15	244	228	04-1212	22
141-1020F	100	2-13	**20**	30	220	30	61	122	60	65	22	15	244	300	04-2010	28
141-1040F	100	2-13	**40**	30	220	30	72	144	60	108	22	15	244	234	04-4010	33
141-1080F	100	2-13	**80**	30	220	30	77	154	60	122	22	15	244	405	04-8013	53
141-2012F	200	2-13	**15**	30	320	30	65	110	60	50	22	15	244	228	04-1212	28
141-2020F	200	2-13	**20**	30	320	30	61	122	60	65	22	15	244	300	04-2010	34
141-2040F	200	2-13	**40**	30	320	30	72	144	60	108	22	15	244	234	04-4010	39
141-2080F	200	2-13	**80**	30	320	30	77	154	60	122	22	15	244	405	04-8013	59
142-1012F	100	8-25[1]	**15**	30	220	30	65	110	60	50	42	28	244	228	04-1212	22
142-1020F	100	8-25[1]	**20**	30	220	30	61	122	60	65	42	28	244	300	04-2010	28
142-1040F	100	8-25[1]	**40**	30	220	30	72	144	60	108	42	28	244	234	04-4010	33
142-1080F	100	8-25[1]	**80**	30	220	30	77	154	60	122	42	28	244	405	04-8013	53
142-2012F	200	8-25[1]	**15**	30	320	30	65	110	60	50	42	28	244	228	04-1212	28
142-2020F	200	8-25[1]	**20**	30	320	30	61	122	60	65	42	28	244	300	04-2010	34
142-2040F	200	8-25[1]	**40**	30	320	30	72	144	60	108	42	28	244	234	04-4010	39
142-2080F	200	8-25[1]	**80**	30	320	30	77	154	60	122	42	28	244	405	04-8013	59
143-1040F	100	25-40[2]	**40**	45	220	40	72	144	90	108	63	30	265	234	04-4010	46
143-1080F	100	25-40[2]	**80**	45	220	40	77	154	90	122	63	30	265	405	04-8013	66
143-2040F	200	25-40[2]	**40**	45	340	40	72	144	90	108	63	30	265	234	04-4010	59
143-2080F	200	25-40[2]	**80**	45	340	40	77	154	90	122	63	30	265	405	04-8013	79
144-1040F	100	40-63	**40**	48	220	50	72	144	100	108	90	50	270	234	04-4010	60
144-1080F	100	40-63	**80**	48	220	50	77	154	100	122	90	50	270	405	04-8013	85
144-2040F	200	40-63	**40**	48	320	50	72	144	100	108	90	50	270	234	04-4010	79
144-2080F	200	40-63	**80**	48	320	50	77	154	100	122	90	50	270	405	04-8013	102







Punching tools suitable for the punching units above

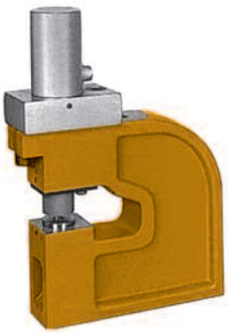
Punching unit without punching tools		**Punching tools** have to be ordered separately			
		Round punch			**Shaped punch**
	Hole diameter meter range	**Punch kit**	**Punch**	**Die**	**Punch kit**
Order No.	**ØD**	**Order No.**	**Order No.**	**Order No.**	**Order No.**
141-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST
142-.... F	**8–25**[1]	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST
143-.... F	**25–40**[2]	503-Ø-BL-ST	303-Ø	403-Ø-BL-ST	503-Formloch-BL-ST
144-.... F	**40–63**	524-Ø-BL-ST	324-Ø	404-Ø-BL-ST	on request

Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**

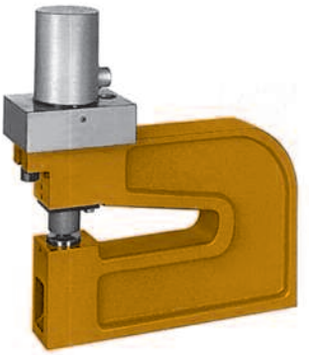
[1] To punch hole diameters from 2–8 mm, you also have to order reduction bushes and reduction sockets.

[2] Punching tools for Ø 20–25 mm are available on request.

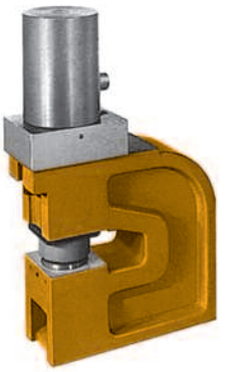
Examples



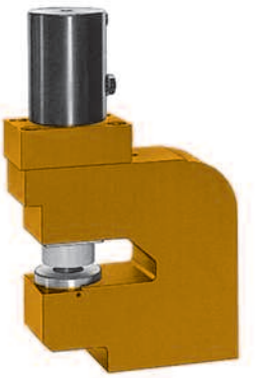
162-1068 F
Cylinder force 68 kN
Throat depth range A=100 mm



162-2068 F
Cylinder force 68 kN
Throat depth range A=200 mm



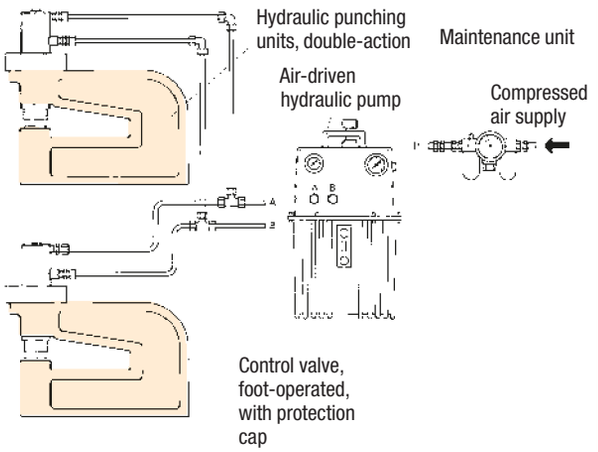
163-1175 F
Cylinder force 175 kN
Throat depth range A=100 mm



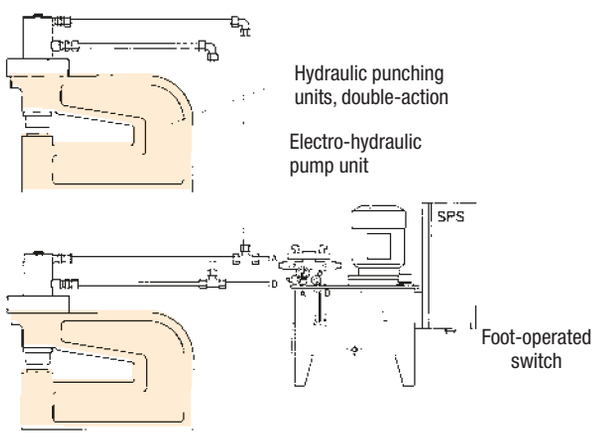
164-1175 F
Cylinder force 175 kN
Throat depth range A=100 mm

Connection examples
for one or several punching units

Power supply
Air-driven hydraulic pump



Power supply
Electro-hydraulic pump unit



Driven by
hydraulic cylinder, double-action

Round and shaped cut

Hole diameter	**for series 161**	**2–13 mm**
	for series 162	**8–25 mm**
	for series 163	**25–40 mm**

Only round cut Shaped cut on request

	for series 164	**40–63 mm**

Material thickness

with steel	**0.3–3 mm*; max. 5 mm***
with aluminium and plastics	**0.3–5 mm***

* The cylinder force has to exceed the required cutting force.

Hydraulic punching units, fit with double-action hydraulic cylinders are capable of working independently from a press. They are driven by a hydraulic power supply, e.g. an air-driven hydraulic pump, or an electro-hydraulic pump unit.
With the available hydraulic cylinders, cylinder forces of 33, 68, 109 or 175 kN can be achieved for an oil supply pressure of max. 350 bar.
The material support height is **125 mm**.
The punching units should be selected according to the hole diameter, material thickness, material strength and the resulting cutting force required. The cutting force required can be obtained from the chart.
The type of power supply also depends on the number of punching units in operation and the desired cycle time.
The connection examples on the left illustrate the operation of one or several hydraulic punching units.
The mounting flanges of the hydraulic cylinders have the same mounting dimensions. As a result the cylinder size, including the mounting flange, can be exchanged if the cutting force is insufficient.

An obligatory stripping unit can be implemented on request.

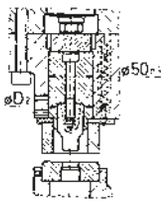
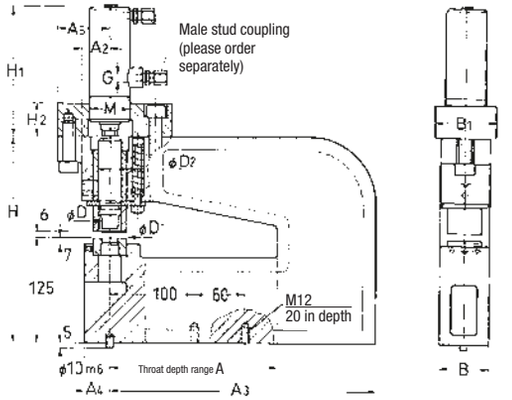
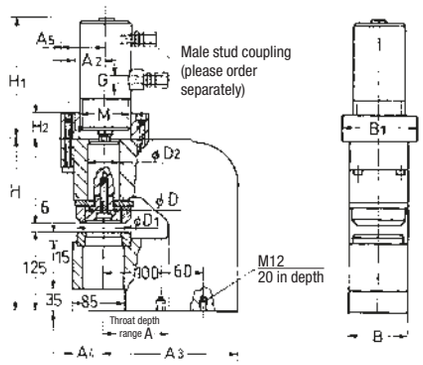


Figure shows tools series 163

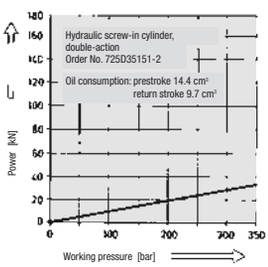


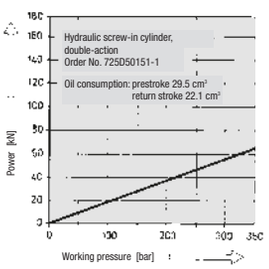
Series **161, 162, 163**

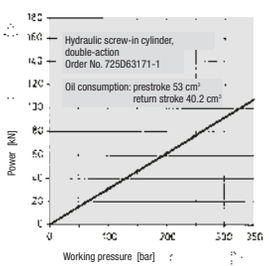


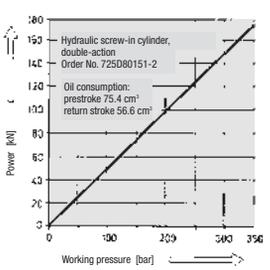
Series **164**

Order No.	Throat depth range	Hole diameter D	Max. force at 350 bar [kN]	A_2	A_3	A_4	A_5	B	B_1	D_1	D_2	H	H_1 ~	H_2	M	G	Cylinder type including flange[4] Order No.	Weight ~ [kg]
161-1033 F	100	2-13	**33**	30	220	30	58	60	60	22	15	244	165	40	M48x1,5	G1/4	725D35151-FL	21
161-1068 F	100	2-13	**68**	30	220	30	60	60	80	22	15	244	151	40	M64x1,5	G1/4	725D50151-FL	23
161-1109 F	100	2-13	**109**	30	220	30	66	60	100	22	15	244	158	48	M80X2,0	G1/4	725D63171-FL	26
161-2033 F	200	2-13	**33**	30	320	30	58	60	60	22	15	244	165	40	M48x1,5	G1/4	725D35151-FL	27
161-2068 F	200	2-13	**68**	30	320	30	60	60	80	22	15	244	151	40	M64x1,5	G1/4	725D50151-FL	29
162-1033 F	100	8-25[1]	**33**	30	220	30	58	60	60	42	28	244	165	40	M48x1,5	G1/4	725D35151-FL	21
162-1068 F	100	8-25[1]	**68**	30	220	30	60	60	80	42	28	244	151	40	M64x1,5	G1/4	725D50151-FL	23
162-1109 F	100	8-25[1]	**109**	30	220	30	66	60	100	42	28	244	158	48	M80X2,0	G1/4	725D63171-FL	26
162-2033 F	200	8-25[1]	**33**	30	320	30	58	60	60	42	28	244	165	40	M48x1,5	G1/4	725D35151-FL	27
162-2068 F	200	8-25[1]	**68**	30	320	30	60	60	80	42	28	244	151	40	M64x1,5	G1/4	725D50151-FL	29
163-1033 F	100	25-40[2]	**33**	45	220	40	58	90	60	63	30	265	170	40	M48x1,5	G1/4	725D35151-FL	34
163-1068 F	100	25-40[2]	**68**	45	220	40	60	90	80	63	30	265	156	40	M64x1,5	G1/4	725D50151-FL	36
163-1109 F	100	25-40[2]	**109**	45	220	40	66	90	100	63	30	265	161	48	M80x2,0	G1/4	725D63171-FL	39
163-1175 F	100	25-40[2]	**175**	45	220	40	66	90	105	63	30	265	195	48	M80x2,0	G3/8	725D80151-FL	45
163-2033 F	200	25-40[2]	**33**	45	340	40	58	90	60	63	30	265	170	40	M48x1,5	G1/4	725D35151-FL	47
163-2068 F	200	25-40[2]	**68**	45	340	40	58	90	80	63	30	265	156	40	M64x1,5	G1/4	725D50151-FL	49
163-2109 F	200	25-40[2]	**109**	45	340	40	66	90	100	63	30	265	161	48	M80x2,0	G1/4	725D63171-FL	52
164-1109 F	100	40-63	**109**	48	220	48	58	100	100	90	50	270	169	48	M80X2,0	G1/4	725D63171-FL	49
164-1175 F	100	40-63	**175**	48	220	48	66	100	105	90	50	270	195	48	M80X2,0	G3/8	725D80151-FL	55
164-2109 F	200	40-63	**109**	48	320	48	58	100	100	90	50	270	169	48	M80X2,0	G1/4	725D63171-FL	68









Punching tools suitable for the punching units above

Punching unit without punching tools		**Punching tools** have to be ordered separately			
			Round punch		**Shaped punch**
Order No.	Hole diameter meter range ØD	Punch kit Order No.	Punch Order No.	Die Order No.	Punch kit Order No.
161-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST
162-.... F	**8–25**[1]	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST
163-.... F	**25–40**[2]	503-Ø-BL-ST	303-Ø	403-Ø-BL-ST	503-Formloch-BL-ST
164-.... F	**40–63**	524-Ø-BL-ST	324-Ø	404-Ø-BL-ST	on request

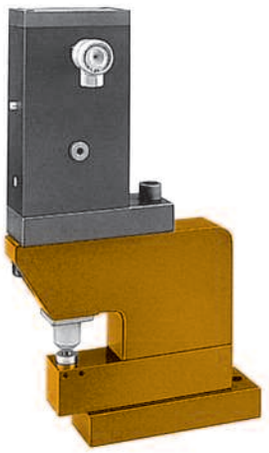
Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**

[1] To punch hole diameters from 2–8 mm, you also have to order reduction bushes and reduction sockets.

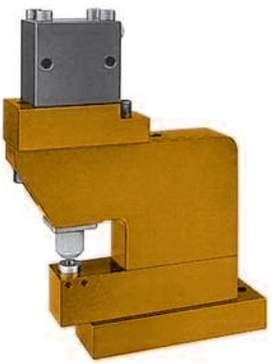
[2] Punching tools for Ø 20–25 mm are available on request.

[4] If you require the cylinder without the mounting flange, omit the letters »FL« in the order no..

Examples

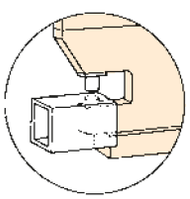


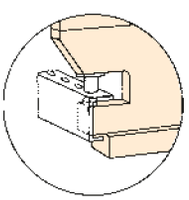
141-0520 F
Cylinder force 20 kN



161-0524 F
Cylinder force 24 kN

Application examples





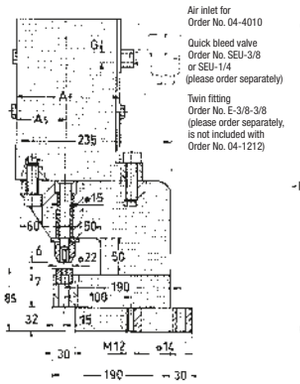
Driven by
pneumatic power cylinder, single-action,
hydraulic cylinder, double-action

Round and shaped cut	
Hole diameter	**2–13 mm**
Material thickness	
with steel	**0.3–3 mm***
with aluminium and plastics	**0.3–5 mm***

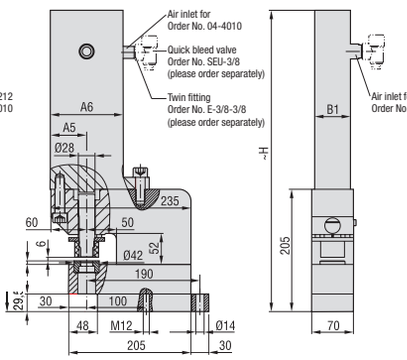
* The cylinder force has to exceed the required cutting force.

These pneumatic and hydraulic profile punching units are suitable for a wide range of applications. The special die support at the front enables punching of round and square pipes or the shanks of U and H profiles arranged in parallel.
Which available unit to use is determined by the required cutting force. The cutting force results from the hole diameter, material thickness and material strength. Refer to the cutting force chart.
The type of power supply also depends on the number of punching units to be operated and the desired cycle time.
The pneumatic power cylinders are single-action and, in addition, require a quick bleed valve for quick reversal.
The material support height is **85 mm**.
A height compensation plate for a material support height of 125 mm is available on request.

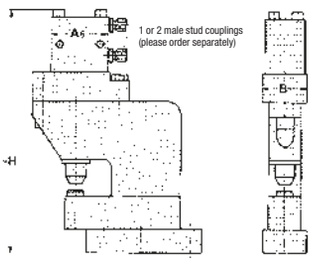
An obligatory stripping unit can be implemented on request.



Pneumatic drive
Series **141**



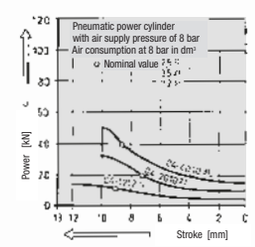
Pneumatic drive
Series **142**

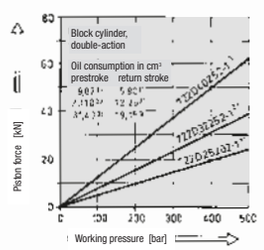


Hydraulic double-action drive
Series **161** and **162**

Profile punching units without punching tools		**Throat depth range**	**hole Ø**	**Max. force**		**Cylinder type**	A_5	A_6	B_1	G	H ~	**Weight** ~
pneumatic	**hydraulic, double-action**			**with air supply pressure of 8 bar**	**with oil supply pressure of 500 bar**	**[4] combination of cylinder and flange**						
Order No.	**Order No.**	**A**	**D**	**[kN]**	**[kN]**	**Order No.**						**[kg]**
141-0512 F	–	50	2-13	**12**	–	04-1212	55	110	60	1xG 1/4	431	19
141-0520 F	–	50	2-13	**20**	–	04-2010	61	122	60	1xG3/8	504	24
141-0540 F	–	50	2-13	**40**	–	04-4010	72	144	108	1xG3/8	438	31
142-0520 F	–	50	8-25	**12**	–	04-2010	61	122	60	1xG 3/8	505	31
142-0540 F	–	50	8-25	**20**	–	04-4010	72	144	108	1xG 3/8	439	37
142-0580 F	–	50	8-25	**40**	–	04-8013	77	154	122	1xG 3/8	610	39
–	**161-0524 F**	50	2-13	–	**24**	722D25202-FL[4]	–	65	45	2xG 1/4	333	14
–	**161-0540 F**	50	2-13	–	**40**	722D32252-FL[4]	–	75	60	2xG 1/4	344	15
–	**161-0563 F**	50	2-13	–	**63**	722D40252-FL[4]	–	85	70	2XG 1/4	348	16
–	**162-0524 F**	50	8-25	–	**24**	722D25202-FL[4]	–	65	45	2XG 1/4	325	21
–	**162-0540 F**	50	8-25	–	**40**	722D32252-FL[4]	–	75	60	2XG 1/4	342	22
–	**162-0563 F**	50	8-25	–	**63**	722D40252-FL[4]	–	85	70	2XG 1/4	343	23

[4] If you require the cylinder without the mounting flange, omit the letters »FL« in the Order No.

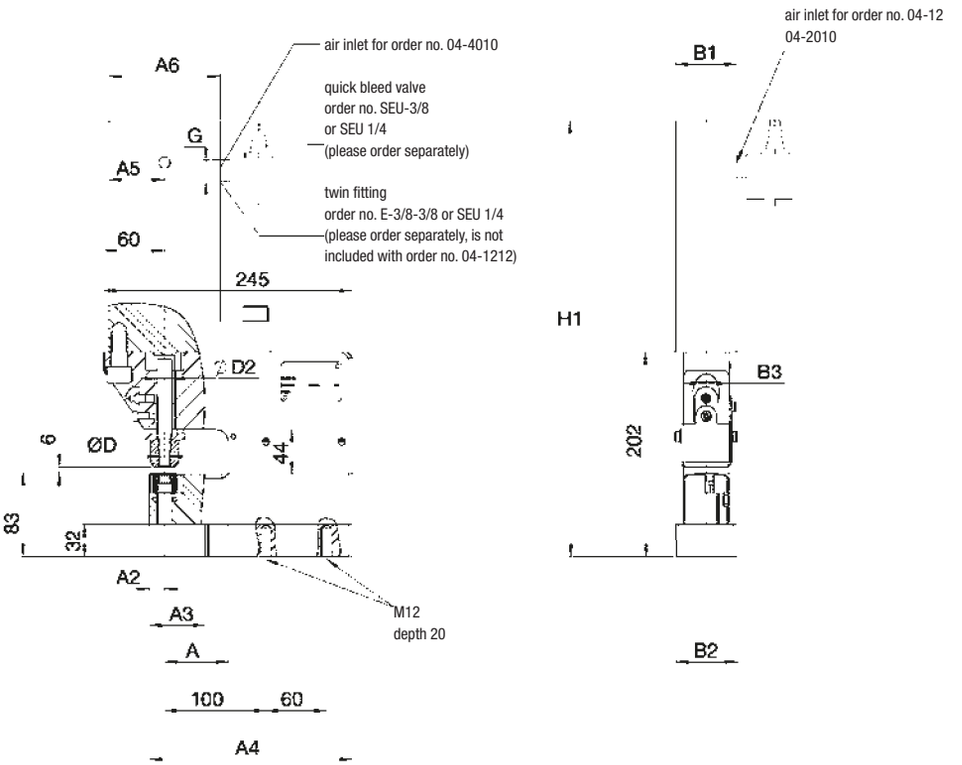


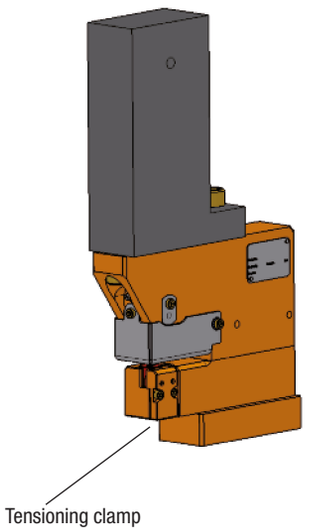


Punching tools suitable for the punching units above

Punching unit without punching tools		**Punching tools** have to be ordered separately				
		Round punch			**Shaped punch**	
	Hole diameter meter range	**Punch kit**	**Punch**	**Die**	**Punch kit**	
Order No.	**ØD**	**Order No.**	**Order No.**	**Order No.**	**Order No.**	
141-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST	
161-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST	
142-.... F	**8–25**	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST	
162-.... F	**8–25**	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST	

Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**





Pneumatic profile punching units, single-action – without punching tools

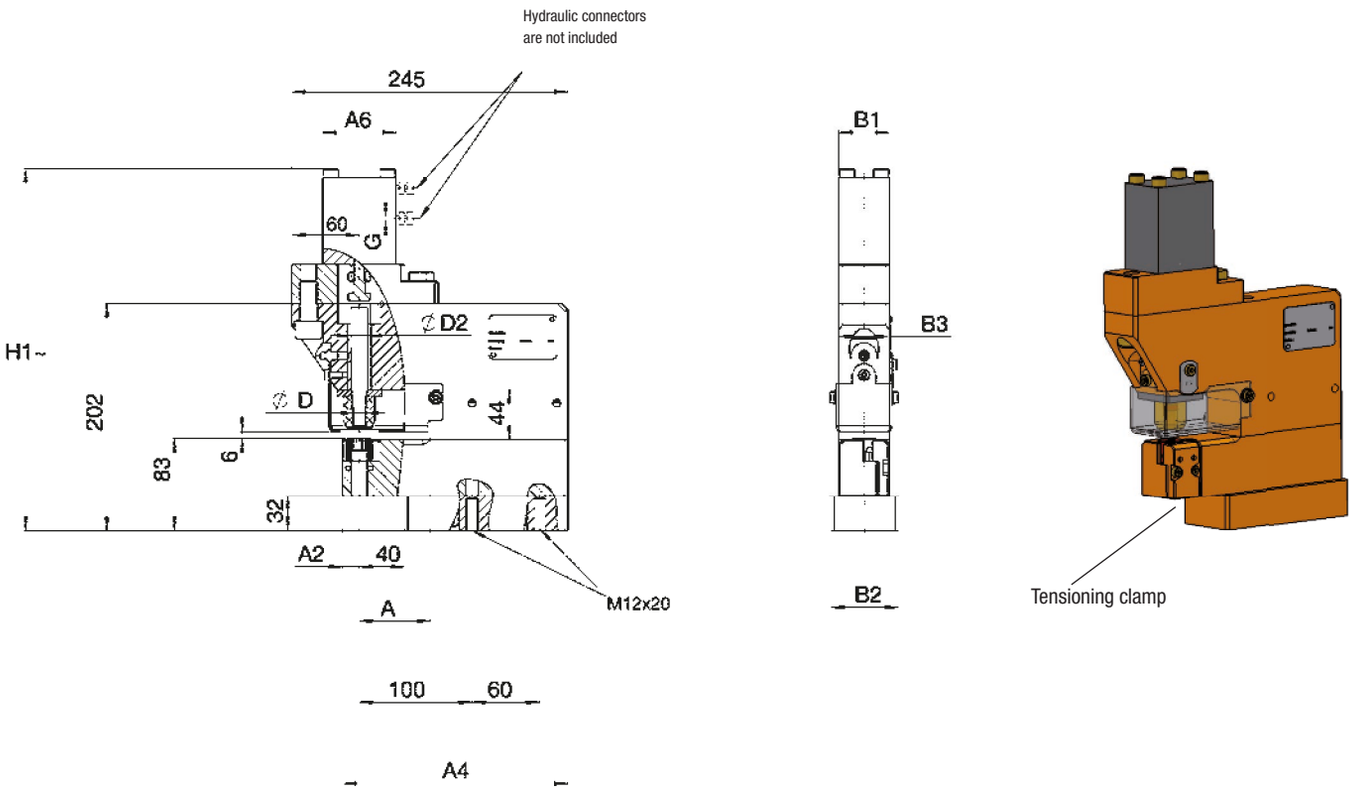
Order no.	Hole ØD	Throat depth range A	Max. force with air supply pressure of 8 bar [kN]	Cylinder type[4] Order no.	ØD2	A2	A3	A4	A5	A6	B1	B2	B3	G	H1	Weight ~ [kg]
141-0712F-01	2-13	63	12	**04-1212**	15	15	55	200	55	110	60	54	45	1xG1/4	430	19
141-0720F-01	2-13	63	20	**04-2010**	15	15	55	200	60	120	60	54	45	1xG3/8	502	24
141-0740F-01	2-13	63	40	**04-4010**	15	15	55	200	72	147	108	54	45	1xG3/8	436	30
142-0720F-01	8-25	63	12	**04-2010**	28	26	66	211	60	120	60	70	70	1xG3/8	502	32
142-0740F-01	8-25	63	20	**04-4010**	28	26	66	211	72	147	108	70	70	1xG3/8	436	37
142-0780F-01	8-25	63	40	**04-8013**	28	26	66	211	77	154	122	70	70	1xG3/8	607	59

[4] An obligatory stripping unit can be implemented on request. Order example: 141Z-07…

Punching tools suitable for the punching units above

Punching unit without punching tools		**Punching tools** have to be ordered separately							
		Round punch						**Shaped**	
Order no.	Hole-Ø diameter range ØD	Punch kit Order no.		Punch Order no.		Die Order no.		Punch kit Order no.	
141-.... F	**2–13**	501-Ø-BL-ST		301-Ø		401-Ø-BL-ST		501-shaped-hole-BL-ST	
142-.... F	**8–25**	502-Ø-BL-ST		302-Ø		402-Ø-BL-ST		502-shaped-hole-BL-ST	

Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**



Hydraulic profile punching units, double action — without punching tools

Order no.	Hole ØD	Throat depth range A	Max. force with air supply pressure of 500 bar [kN]	Cylinder type[4] Order no.	ØD2	A2	A4	A6	B1	B2	B3	G	H1	Weight ~ [kg]
161-0724F-01	2-13	63	24	**722D25202-FL** [4]	15	15	200	65	45	60	45	2xG1/4	322	16
161-0740F-01	2-13	63	40	**722D32252-FL** [4]	15	15	200	75	55	60	45	2xG1/4	339	18
161-0763F-01	2-13	63	63	**722D40252-FL** [4]	15	15	200	85	63	60	45	2xG1/4	340	19
162-0724F-01	8-25	63	24	**722D25202-FL** [4]	28	26	211	65	45	70	70	2xG1/4	317	24
162-0740F-01	8-25	63	40	**722D32252-FL** [4]	28	26	211	75	55	70	70	2xG1/4	339	25
162-0763F-01	8-25	63	63	**722D40252-FL** [4]	28	26	211	85	63	70	70	2xG1/4	340	26

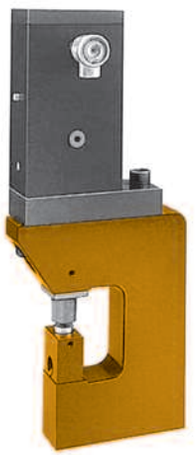
4) If you require the cylinder without the mounting flange, omit the letters »FL« in the order no. | An obligatory stripping unit can be implemented on request. Order example: 141Z-08 …

Punching tools suitable for the punching units above

Punching unit without punching tools		**Punching tools** have to be ordered separately					
		Round punch				**Shaped**	
Order no.	Hole-Ø diameter range ØD	Punch kit Order no.		Punch Order no.	Die Order no.	Punch kit Order no.	
161-.... F	**2–13**	501-Ø-BL-ST		301-Ø	401-Ø-BL-ST	501-shaped-hole-BL-ST	
162-.... F	**8–25**	502-Ø-BL-ST		302-Ø	402-Ø-BL-ST	502-shaped-hole-BL-ST	

Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Examples

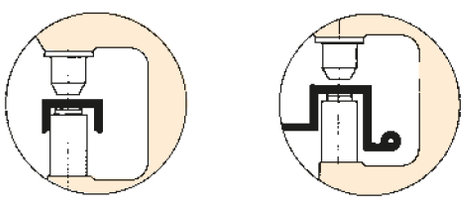


141-0612 F
Cylinder force 12 kN

161-0663 F
Cylinder force 63 kN

162-6109 F
Cylinder force 109 kN

Application examples



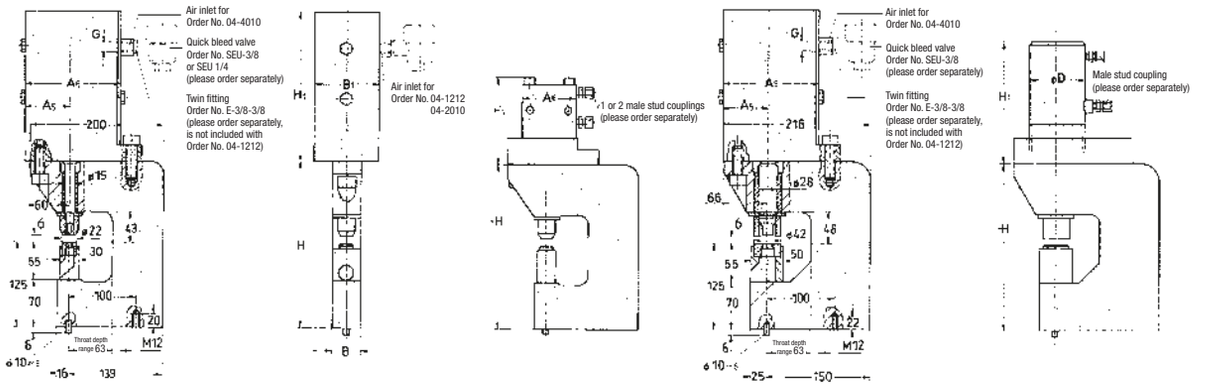
Driven by
pneumatic power cylinder, single-action,
hydraulic cylinder, double-action

Round and shaped cut		
Hole diameter	**for series 141, 161**	**2–13 mm**
	for series 142, 162	**8–25 mm**
material thickness		
with steel		**0.3–3 mm***
with aluminium and plastics		**0.3–5 mm***

* The cylinder force has to exceed the required cutting force.

These pneumatic and hydraulic profile punching units are suitable for a wide range of applications.
The clearance zone behind the die support makes them also suitable for punching L- and U-shaped profiles.
Which available unit to use is determined by the required cutting force. The cutting force results from the hole diameter, material thickness and material strength. Refer to the cutting force chart.
The type of power supply also depends on the number of punching units to be operated and the desired cycle time.
The pneumatic power cylinders are single-action and, in addition, require a quick bleed valve for quick reversal.
The material support height is **125 mm.**

An obligatory stripping unit can be implemented on request.



Pneumatic drive Series **141**

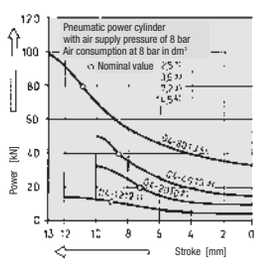
Hydraulic double-action drive Series **161**

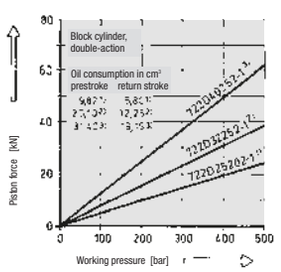
Pneumatic drive Series **142**

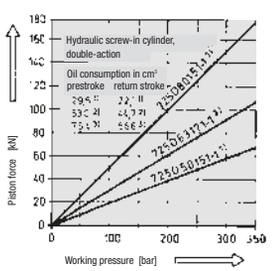
Hydraulic double-action drive Series **162**

Profile punching units without punching tools **pneumatic** Order No.	**hydraulic, double-action** Order No.	**Hole Ø** D	**Throat depth range** A	**Max. force with air supply pressure of 8 bar** [kN]	**with oil supply pressure of 350 bar** [kN]	**with oil supply pressure of 500 bar** [kN]	**Cylinder type [4] combination of cylinder and flange**	A_5	A_6	B	B_1	G	H ~	H_1	ØD	**Weight** ~ [kg]
141-0612 F	–	2-13	63	**12**	–	–	04-1212	55	110	45	60	1xG1/4	244	228	–	17
141-0620 F	–	2-13	63	**20**	–	–	04-2010	61	122	45	60	1xG3/8	244	300	–	23
141-0640 F	–	2-13	63	**40**	–	–	04-4010	72	144	45	108	1xG3/8	244	234	–	29
142-6320 F	–	8-25	63	**20**	–	–	04-2010	61	122	80	60	1xG 3/8	250	300	–	35
142-6340 F	–	8-25	63	**40**	–	–	04-4010	72	144	80	108	1xG 3/8	250	234	–	40
142-6380 F	–	8-25	63	**80**	–	–	04-8013	77	154	80	122	1xG 3/8	250	405	–	62
–	**161-0624 F**	2-13	63	–	–	**24**	722D25202-FL[4]	32,5	65	45	45	2xG1/4	244	129	–	16
–	**161-0640 F**	2-13	63	–	–	**40**	722D32252-FL[4]	37,5	75	45	60	2xG1/4	244	140	–	17
–	**161-0663 F**	2-13	63	–	-	**63**	722D40252-FL[4]	42,5	85	45	70	2XG1/4	244	144	–	18
–	**162-6368 F**	8-25	63	–	**68**	–	725D50151-FL[4]	32,5	–	80	80	2XG1/4	250	154	65	26
–	**162-6109 F**	8-25	63	–	**109**	–	725D63171-FL[4]	48,5	–	80	100	2XG1/4	250	169	97	29
–	**162-6175 F**	8-25	63	–	**175**	–	725D80151-FL[4]	52,5	–	80	105	2XG3/8	250	195	105	34

[4] If you require the cylinder without the mounting flange, omit the letters »FL« in the Order No.





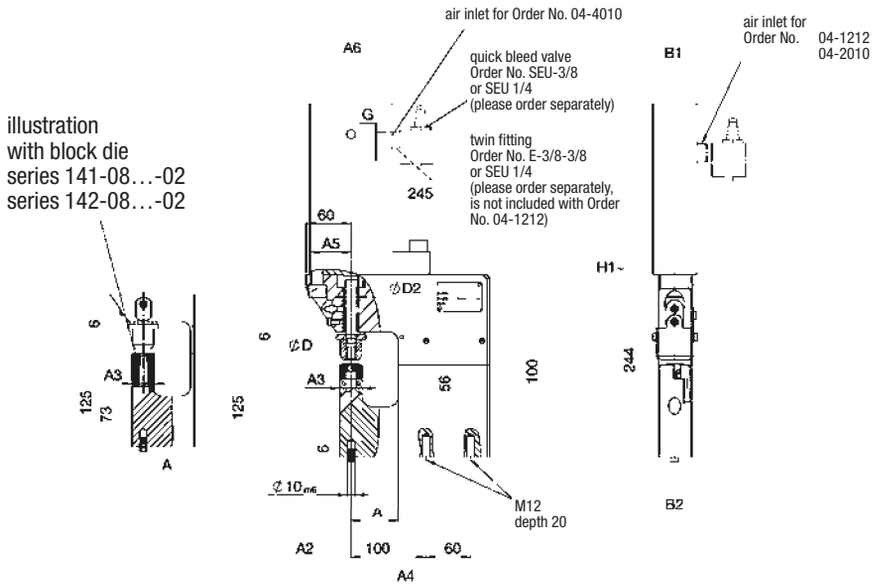


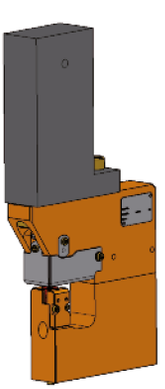
Punching tools suitable for the punching units above

Punching unit without punching tools **Order No.**	**Hole diameter range ØD**	**Punching tools** have to be ordered separately: **Round punch** **Punch kit** Order No.	**Punch** Order No.	**Die** Order No.	**Shaped punch** **Punch kit** Order No.
141-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST
142-.... F	**8–25**	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST
161-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST
162-.... F	**8–25**	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST

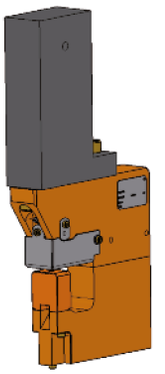
Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**

illustration
with block die
series 141-08…-02
series 142-08…-02





series: 141-08…-01
142-08…-01



series: 141-08…-02
142-08…-02

pneumatic single-action drive

Pneumatic profile punching units, single-action — without punching tools

Order No.	Hole ØD	Throat depth range A	Max. force with air supply pressure of 8 bar [kN]	Cylinder type	ØD2	A2	A3	A4	A5	A6	B1	B2	G	H1~
141-0812F-01	2-13	63	12	**04-1212**	15	15	30	200	55	110	60	45	1xG1/4	472
141-0820F-01	2-13	63	20	**04-2010**	15	15	30	200	60	120	60	45	1xG3/8	544
141-0840F-01	2-13	63	40	**04-4010**	15	15	30	200	72	147	108	45	1xG3/8	478
141-0812F-02	2-13	63	12	**04-1212**	15	15	30	200	55	110	60	45	1xG1/4	472
141-0820F-02	2-13	63	20	**04-2010**	15	15	30	200	60	120	60	45	1xG3/8	544
141-0840F-02	2-13	63	40	**04-4010**	15	15	30	200	72	147	108	45	1xG3/8	478
142-0820F-01	8-25	63	20	**04-2010**	28	25	50	210	60	120	60	70	1xG3/8	544
142-0840F-01	8-25	63	40	**04-4010**	28	25	50	210	72	139	108	70	1xG3/8	478
142-0880F-01	8-25	63	80	**04-8013**	28	25	50	210	77	154	122	70	1xG3/8	649
142-0820F-02	8-25	63	20	**04-2010**	28	25	50	210	60	120	60	70	1xG3/8	544
142-0840F-02	8-25	63	40	**04-4010**	28	25	50	210	72	139	108	70	1xG3/8	478
142-0880F-02	8-25	63	80	**04-8013**	28	25	50	210	77	154	122	70	1xG3/8	649

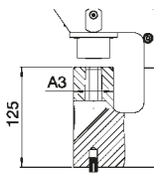
An obligatory stripping unit can be implemented on request. Order example: 141Z-08 ...

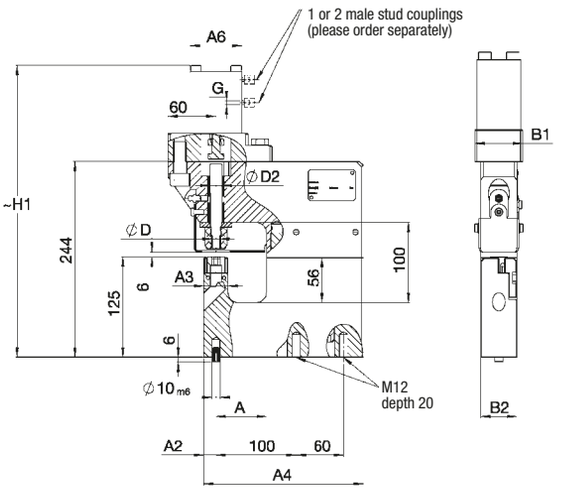
Punching tools suitable for the punching units above

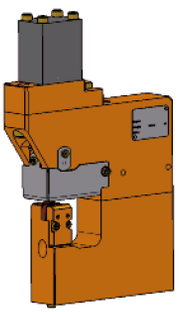
Punching unit without punching tools		**Punching tools** have to be ordered separately			
		Round punch			**Shaped punch**
Order No.	Hole diameter range ØD	Punch kit Order No.	Punch Order No.	Die Order No.	Punch kit Order No.
141-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST
142-.... F	**8–25**	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**

illustration
with block die
series 141-08…-02
series 161-08…-02

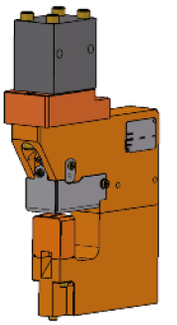






series: 161-08…-01
162-08…-01

hydraulic drive



series: 161-08…-02
162-08…-02
with block die

Hydraulic profile punching units — without punchout punching tools

Order No.	Hole ØD	Throat depth range A	Max. force with oil supply pressure of 350 bar [kN]	Max. force with oil supply pressure of 500 bar [kN]	Cylinder type [4] flange for combination	ØD2	A2	A3	A4	A6	B1	B2	G	H1~	Gewicht Kg
161-0824F-01	2-13	63	–	24	**722D25202-FL** [4]	15	15	30	200	65	45	45	2xG1/4	364	28
161-0840F-01	2-13	63	–	40	**722D32252-FL** [4]	15	15	30	200	75	60	45	2xG1/4	381	20
161-0863F-01	2-13	63	–	63	**722D40252-FL** [4]	15	15	30	200	85	70	45	2xG1/4	382	21
161-0824F-02	2-13	63	–	24	**722D25202-FL** [4]	15	15	30	200	65	45	45	2xG1/4	364	18
161-0840F-02	2-13	63	–	40	**722D32252-FL** [4]	15	15	30	200	75	60	45	2xG1/4	381	20
161-0863F-02	2-13	63	–	63	**722D40252-FL** [4]	15	15	30	200	85	70	45	2xG1/4	382	21
162-08068F-01	8-25	63	68	–	**725D50151-FL** [4]	28	25	50	210	Ø65	80	70	2xG1/4	405	31
162-08109F-01	8-25	63	109	–	**725D63171-FL** [4]	28	25	50	210	Ø97	100	70	2xG1/4	405	34
162-08175F-01	8-25	63	175	–	**725D80151-FL** [4]	28	25	50	210	Ø105	100	70	2xG3/8	440	41
162-08068F-02	8-25	63	68	–	**725D50151-FL** [4]	28	25	50	210	Ø65	80	70	2xG1/4	405	31
162-08109F-02	8-25	63	109	–	**725D63171-FL** [4]	28	25	50	210	Ø97	100	70	2xG1/4	405	34
162-08175F-02	8-25	63	175	–	**725D80151-FL** [4]	28	25	50	210	Ø105	100	70	2xG3/8	440	41

[4] If you require the cylinder without the mounting flange, omit the letters »FL« in the Order No. | An obligatory stripping unit can be implemented on request. Order example: 161Z-08 ...

Punching tools suitable for the punching units above

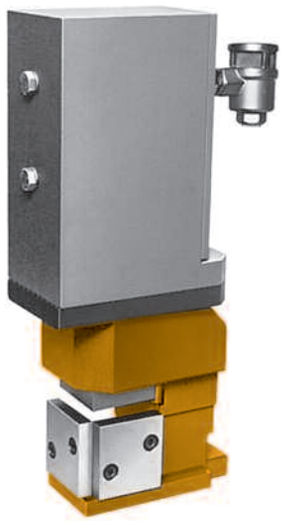
Punching unit without punching tools		**Punching tools** have to be ordered separately			
		Round punch			**Shaped punch**
Order No.	Hole diameter range ØD	Punch kit Order No.	Punch Order No.	Die Order No.	Punch kit Order No.
161-.... F	**2–13**	501-Ø-BL-ST	301-Ø	401-Ø-BL-ST	501-Formloch-BL-ST
162-.... F	**8–25**	502-Ø-BL-ST	302-Ø	402-Ø-BL-ST	502-Formloch-BL-ST

Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength. See also **punching tools**

Pneumatic and hydraulic 90°-notch units, 63x63 mm

Examples

660-063-068 R
Cylinder force 68 kN



640-063-040 R
Cylinder force 40 kN

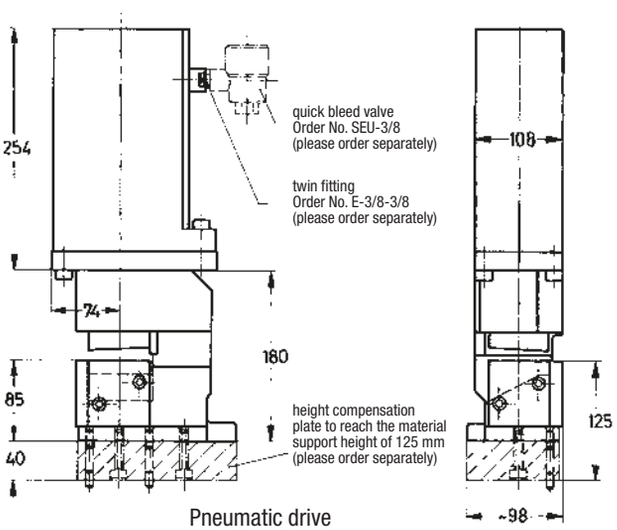
Driven by
pneumatic power cylinder, single-action,
hydraulic cylinder, double-action

Notching angle	**90°**
max. notch size	**63x63 mm**
material thickness	
with steel	**0.3–3 mm***
with aluminium and plastics	**0.3–5 mm***

*The cylinder force has to exceed the required cutting force.

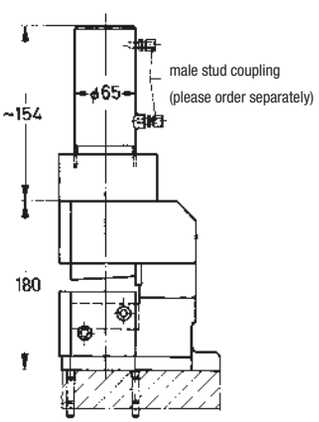
In addition to the extremely successful press-operated 90° notch units with a notch size of 63 x 63 mm, the corresponding notch units with pneumatic and hydraulic operation are presented on this page.
Limits on the use of these units are determined by the cutting force required.
The cutting force, which results from the effective cut length and the material thickness, may not exceed the maximum power of the cylinder.
The material support height is **85 mm.**

To combine these notch units with other pneumatic or hydraulic punching it is necessary to install a height compensation plate (see chart) to reach the material support height of 125 mm.



Pneumatic drive
Series **640-063-..**

For missing sizes see unit 600 – 063



Hydraulic double-action drive
Series **660-063-..**

[2] Combination of cylinder and flange

Notch units with cutting tools **pneumatic** Order No.	**hydraulic, double-action** Order No.	**Notch size**	**Max. force with air supply pressure of 8 bar [kN]**	**with oil supply pressure of 350 bar [kN]**	**Cylinder type** / **Flange type** Order No.	**Weight ~** [kg]	**Gauging table, adjustable,** please order separately Order No.	**Height compensation plate,** please order separately Order No.
640-063-040 L	–	63x63	**40**	–	04-4010-05[2]	23	800-063 S	815-063
640-063-040 R	–				F004-0018-0000			
–	**660-063-068 L**	63x63	–	**68**	725D50151-1	21		
–	**660-063-068 R**				F004-0019-0000			

Pneumatic and hydraulic rectangle notch units

Examples

641-050-040
Cylinder force 40 kN

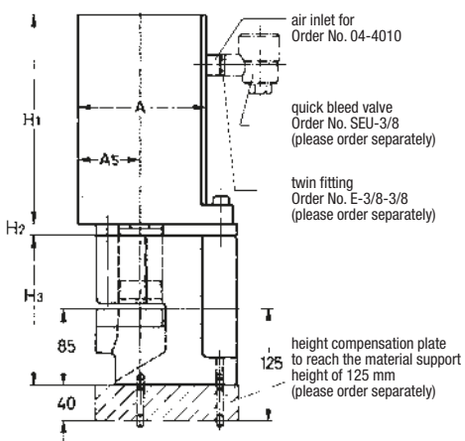
661-100-109
Cylinder force 109 kN

Driven by
pneumatic power cylinder, single-action,
hydraulic cylinder, double-action

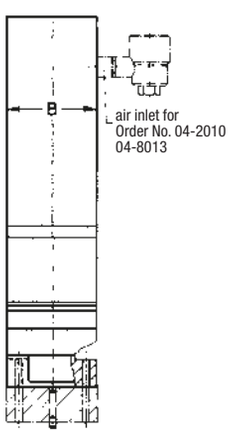
Notch shape	**rectangle**
for 641-050…, 661-050-…	**50x50 mm**
for 641-050…, 661-100-…	**100x75 mm**
material thickness	**0.3–3 mm***

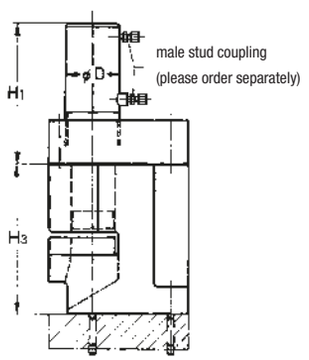
*The cylinder force has to exceed the required cutting force.

In addition to the extremely successful press-operated rectangle notch units with a notch size of 50 x 50 mm and 100 x 75 mm, the corresponding notch units with pneumatic and hydraulic operation are presented on this page.
Limits on the use of these units are determined by the cutting force required, see chart. The cutting force, which results from the effective cut length and the material thickness, may not exceed the maximum power of the cylinder.
The material support height is **85 mm.**
To combine these notch units with other pneumatic or hydraulic punching units it is necessary to install a height compensation plate (see chart) to reach the material support height of 125 mm. **For the dimensions of the basic structure, see drawing for units 601 – 050 or 601 – 100.**



Pneumatic drive
Series **641**



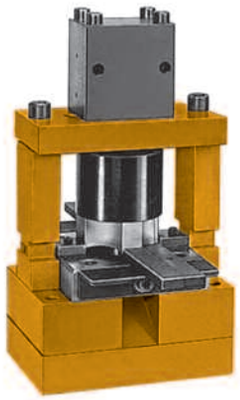


Hydraulic double-action drive
Series **661**

Notch units with cutting tools pneumatic Order No.	hydraulic, double-action Order No.	Notch size width x depth	Max. force with air supply pressure of 8 bar [kN]	with oil supply pressure of 350 bar [kN]	Cylinder type [2] Combination of cylinder and flange Order No.	Cylinder dimensions A	A_5	B	ØD	H_1 ~	H_2 ~	H_3 ~	Weight ~ [kg]	Height compensation plate, please order separately Order No.
641-050-040	**–**	50x50	40	–	04-4010-06 [2]	144	72	108	–	234	20	165	32	815-050
641-100-040	**–**	100x75	40	–	04-4010	144	72	108	–	234	40	182	39	815-100
641-100-080	**–**	100x75	80	–	04-8013	154	77	122	–	405	40	182	63	
–	**661-050-068**	50x50	–	68	725D50151-1	–	–	–	65	174	20	165	23	815-050
–	**661-100-109**	100x75	–	109	725D63171-1	–	–	–	97	189	40	182	37	815-100

Pneumatic and hydraulic 90° radii cutting units, R5-30mm

Examples



666-30-063
Cylinder force 63 kN

646-30-040
Cylinder force 40 kN

Driven by
pneumatic power cylinder, single-action
hydraulic cylinder, double-action

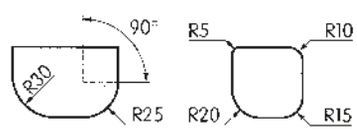
possible radii	**R 5,10,15,20,25,30 mm**
cutting angle α	**90°**
material thickness	
with steel	**0.3–3 mm***
with aluminium and plastics	**0.3–5 mm***

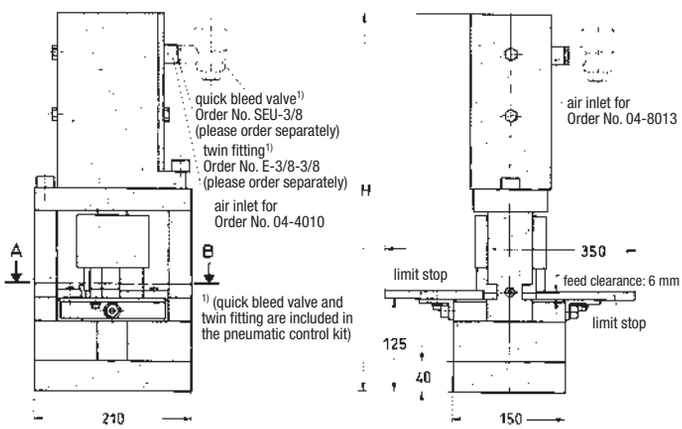
*The cylinder force has to exceed the required cutting force.

In addition to the press-operated radii cutting units, the corresponding hydraulic or pneumatic units are presented on this page.
With these units it is possible to notch 6 different 90° radii with only one tool. The radii are graduated in steps of 5 mm from R 5 mm up to R 30 mm.
Limits on the use of these units are determined by the cutting force required, see chart. The cutting force, which results from the effective cut length and the material strength, may not exceed the maximum power of the cylinder.
The material support height is **125 mm.**

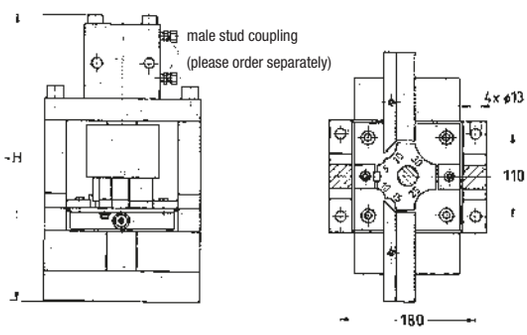
Recommended accessories (please order separately)
For connecting the pneumatic radii cutting units to the compressed air system, we recommend the following accessories:
Other radii sizes are available on request.

Examples





Pneumatic drive
Series **646**



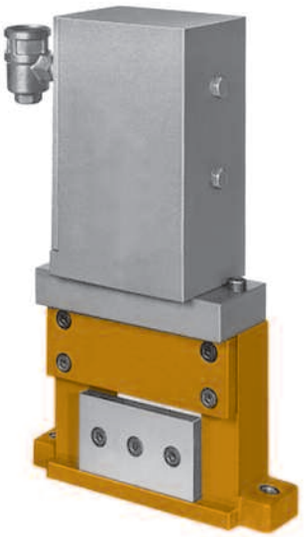
Hydraulic double-action drive
Series **666-30-063**

Section A-B

Radii cutting units with cutting tools		Possible 90° radii in steps of 5 mm	Max. force		Cylinder Type	H ~	Weight ~
pneumatic Order No.	hydraulic, double-action Order No.		with air supply pressure of 8 bar [kN]	with oil supply pressure of 350 bar [kN]	Order No.		[kg]
646-30-040	**–**	R5, R10,	40	–	04-4010	504	58
646-30-080	**–**	R15, R20,	80	–	04-8013	675	79
–	**666-30-063**	R25, R30	–	63	722D50252-1	375	45

Pneumatic cut-off unit, 125 mm

Examples



649-125-040-N
Cylinder force 40 kN

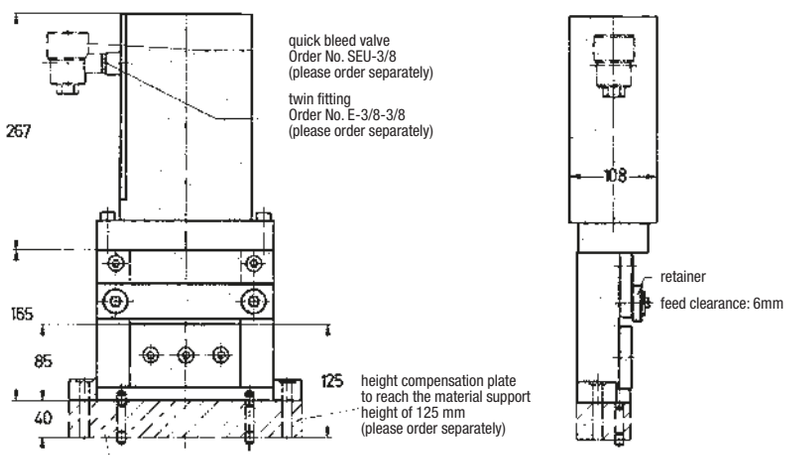
Driven by
pneumatic power cylinder, single-action

max. cutting width	**125 mm**
material thickness	
with steel	**0.3–3 mm***
with aluminium and plastics	**0.3–5 mm***

* The cylinder force has to exceed the required cutting force.

In addition to the extremely successful press-operated cut-off units with a cutting width of 125 mm, the corresponding cut-off unit with pneumatic operation is presented on this page.
The cutting force, which results from the effective cut length and the material strength, may not exceed the maximum power of the cylinder.
The material support height is **85 mm.**
To combine this cut-off unit with other pneumatic punching units it is necessary to install a height compensation plate (see chart) to reach the material support height of 125 mm. **For the dimensions of the basic structure, see drawing for unit 610 – 125 N.**

The retainer has been removed in the illustration!



Cut-off unit with cutting tools with retainer **pneumatic Order No.**	**Cutting width**	**Max. force with air supply pressure of 8 bar [kN]**	**Cylinder type** [2] **Combination of cylinder and flange [kN]**	**Weight [kg]**	**Height compensation plate,** please order separately **Order No.**
649-125-040-N	125	40	04-4010-03 [2]	32	815-125

Example

1421-0512L

Cylinder force: **12kN at 8 bar**
Weight: **6.5 kg**

For punching and notching of all punchable materials, such as steel, aluminium, plastics, wood, cardboard, etc. Tools can be changed quickly. The size of the maximum hole diameter or the maximum notch depends on the material thickness and the material strength. It has to be calculated on an individual basis. Recommended material thickness ranging from 1–3 mm, (see also the force / stroke chart below). Economical expansion possibilities are provided by conversion kits, see below.

Tools suitable for the mobile units above (please order separately)

Notch unit:	1421-0512K
Punch kit:	521-Vierkant-21-BL-ST
Radius cutting unit:	1421-0512R
Punch kit:	521-Radius-BL-ST
Punching unit:	1421-0512L
Punch kit:	521-Ø-BL-ST
Punch:	321-Ø
Die:	421-Ø-BL-ST
Shaped hole:	521-Formloch-BL-ST

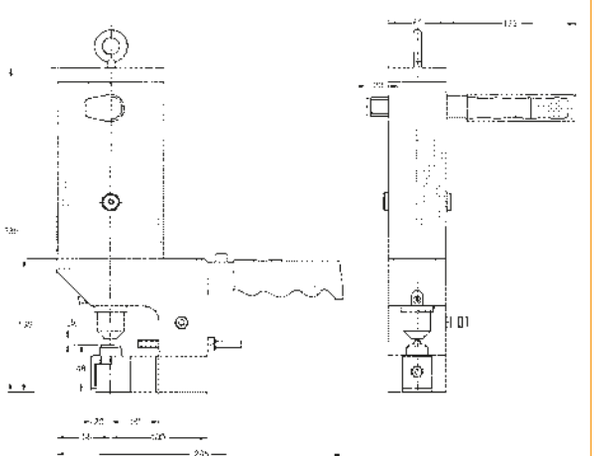
Insert in Order No.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole; »Vierkant« = square), **BL** = material thickness, **ST** = material and strength.

Conversion module for punching unit 1421-05-LU
without punch kit

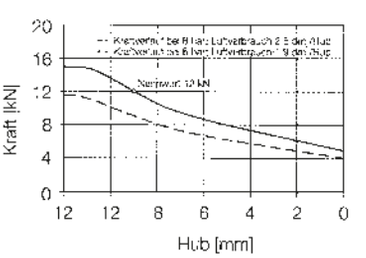
Conversion module for notch unit 1421-05-KU
without punch kit.
Adjustable limit stops are included in the delivery (see illustration below)

Adjustable limit stops

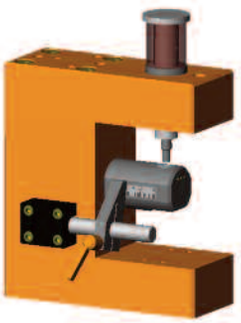
Conversion module for radius cutting unit 1421-05-RU
without punch kit.
Adjustable limit stops are included in the delivery (see illustration below)



Force/stroke chart for drive cylinder 04-1212

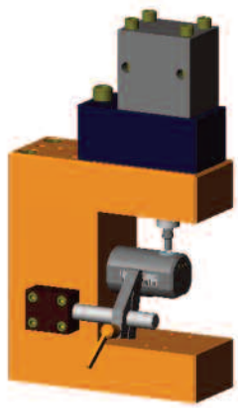


Examples



101-RLA-50
Press-operated
Throat depth range A = 50 mm

141-RLA-50
Pneumatic single-action unit
Throat depth range A = 50 mm
Cylinder force 80 kN
with air supply pressure of 8 bar



161-RLA-50
Hydraulic double-action unit
Throat depth range A = 50 mm
Cylinder force 68 kN
with oil supply pressure of 350 bar

Round and shaped cut

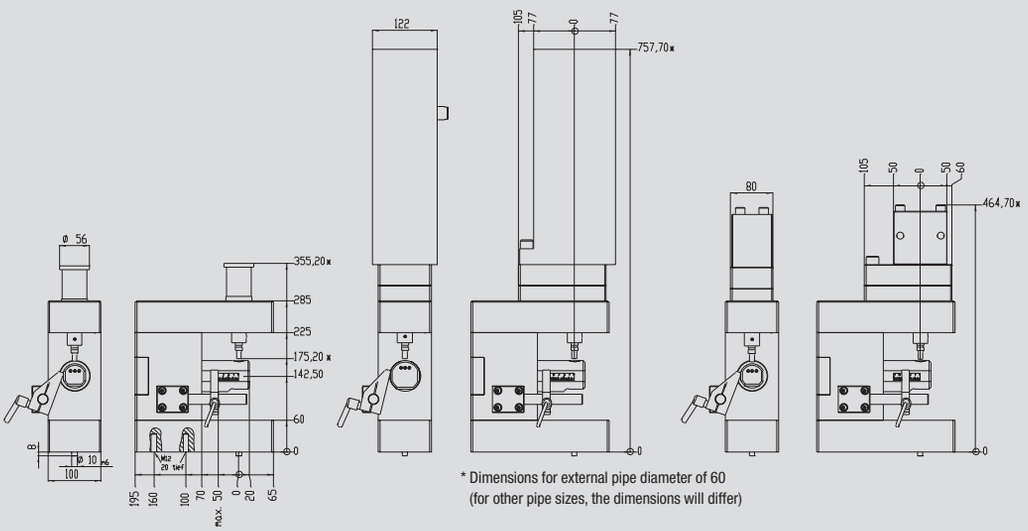
Hole diameter	D	2 – 13 mm
External pipe diameter	da	40 – 60 mm
Pipe thickness	s	1 – 5 mm*
Material with Rm_{max} <630 N/mm²		

* The cylinder force has to exceed the required cutting force.

The pipe punching unit has a modular construction. It is possible to equip a press-operated unit with a hydraulic or a pneumatic drive at a later date.

It is possible to punch a large variety of pipe dimensions and shapes. The punch kit and the mandrel can be exchanged easily which enables various pipe shapes and hole diameters to be punched with a single unit. The position of the hole can be set by means of an adjustable limit stop using a scale of 0-50 mm (centre of hole to pipe end).

To ensure correct dimensioning of the mandrel we need to know the DIN designation of the pipe. For welded pipes we assume that the welding is in the flat area of the mandrel. If there are any burrs due to sawing these have to be removed prior to punching. **Additional pipe dimensions and accessories are available on request.**



* Dimensions for external pipe diameter of 60
(for other pipe sizes, the dimensions will differ)

101-RLA-50 **141-RLA-50** **161-RLA-50**

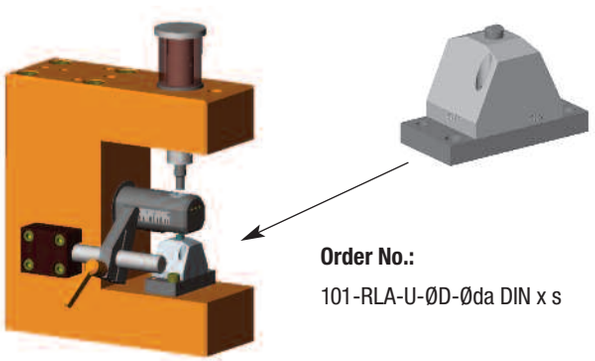
Punching unit without tools and die mandrel			**Hole diameter**	**External pipe diameter**	**Pipe thickness**	**Throat depth range**	**Max. force**		**Cylinder type** see pages 69+73	**Weight**
press-operated	**pneumatic single-action**	**hydraulic double-action**					**with air supply pressure of 8 bar**	**with oil supply pressure of 350 bar**		
Order No.	**Order No.**	**Order No.**	**D [mm]**	**da [mm]**	**s [mm]**	**A [mm]**	**[kN]**	**[kN]**		**[kg]**
101-RLA-50	–	–			1–5		–	–	–	44
–	141-RLA-50	–	2–13	40–60	1–3	50	80	–	04-8013	90
–	–	161-RLA-50			1–5		–	68	722D50252-1	55

Punching tools have to be ordered separately				**Die mandrel** has to be ordered separately	
Punch kit Order No.	**Round hole Punch Order No.**	**Die Order No.**	**Shaped hole Punch kit Order No.**	**Round pipe Order No.**	**Rectangular pipe Order No.**
551-ØD-Øda-DIN x s-ST	351-ØD	451-ØD-Øda-DIN x s-ST	551-Formloch-Øda-DIN x s-ST	461-Øda-DIN x s	471-axb-DIN x s

Insert in order no: **ØD =** diameter or »Formloch« (i.e. shaped hole), **Øda =** external pipe diameter, **DIN** = industrial standard reference for the pipe (e.g. DIN 2393)
s = pipe thickness, **ST =** material and strength, **a =** height of pipe, **b =** width of pipe

Accessories:

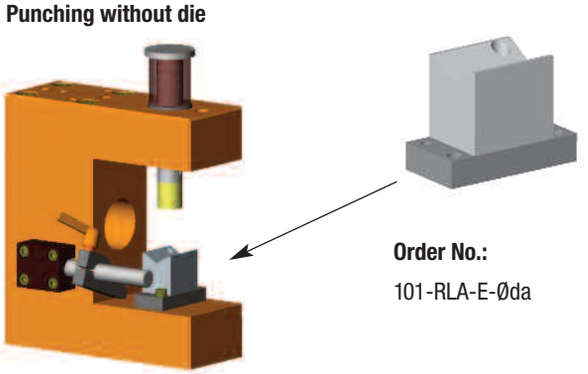
Punching on flap



Order No.:
101-RLA-U-ØD-Øda DIN x s

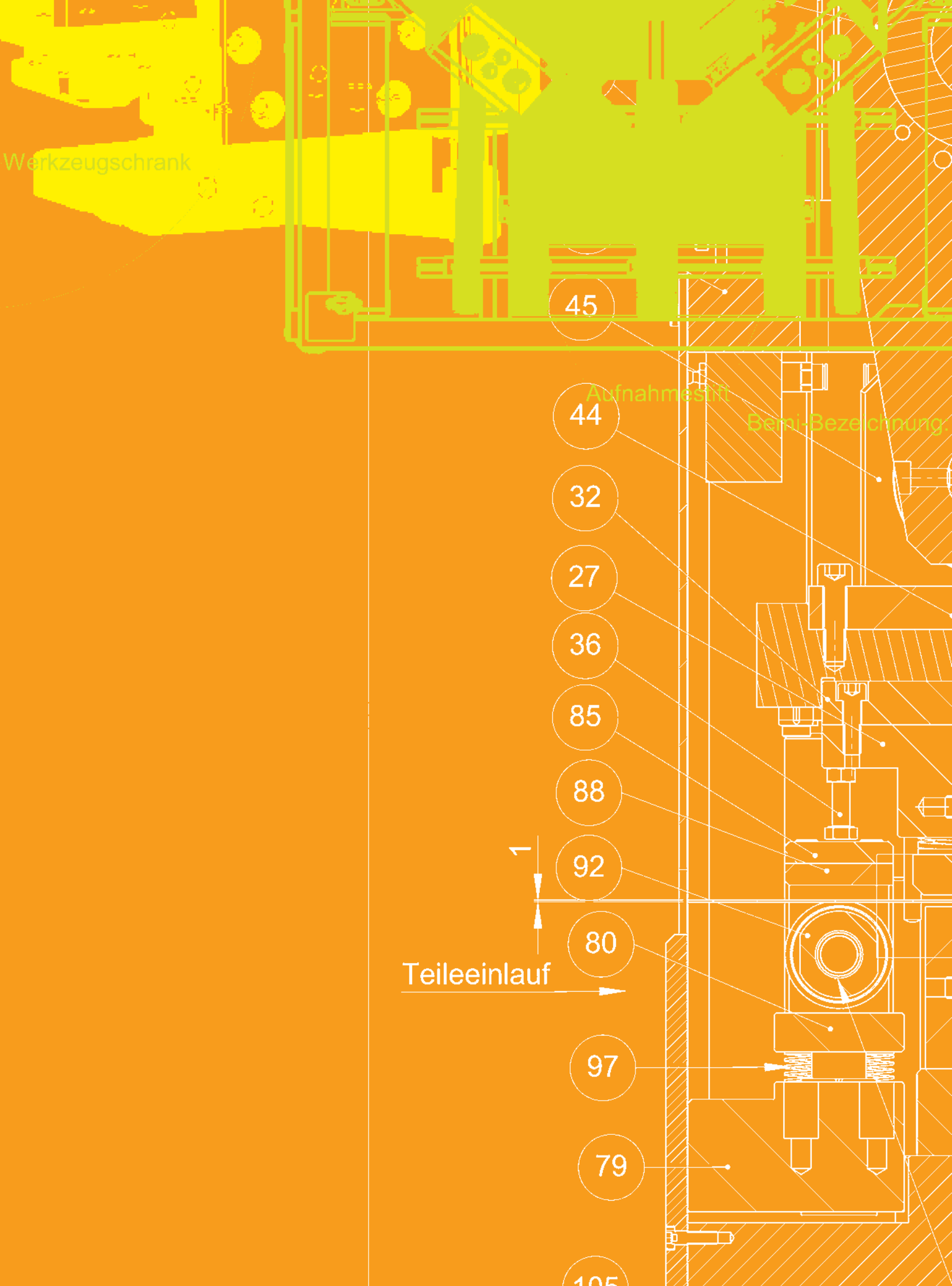
Example:
101-RLA-50 + 101-RLA-U-Ø9-Ø60 x DIN 2393 x 3

Punching without die



Order No.:
101-RLA-E-Øda

Example: 101-RLA-50 + 101-RLA-E-Ø60
(the die mandrel has to be removed)


Werkzeugschrank
45
Aufnahmestift
44
Bemi-Bezeichnung
32
27
36
85
88
1
92
80
Teileeinlauf
97
79

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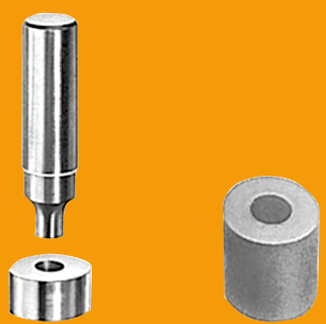

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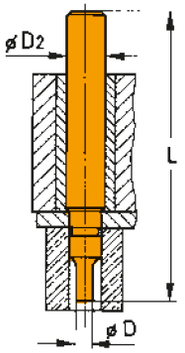
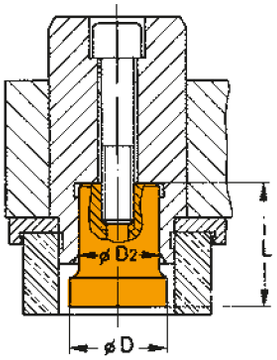
Round hole punching tools ● technical illustration of punches and dies

①



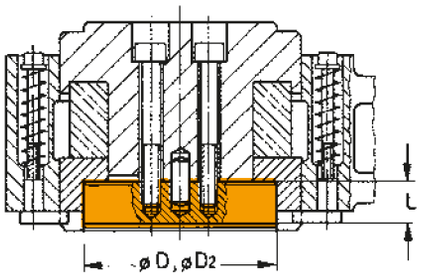
Punch shape for punching units of series 100, 101, 102, 111, 141, 142, 161, 162

②



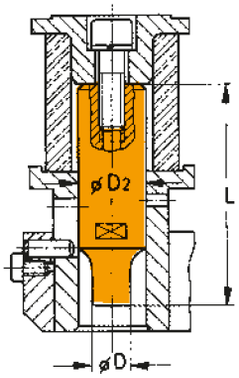
Punch shape for punching units of series 103, 104, 143, 163

③



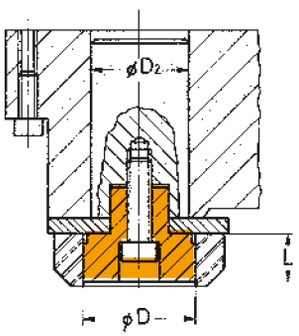
Punch shape for punching units of series 105

④



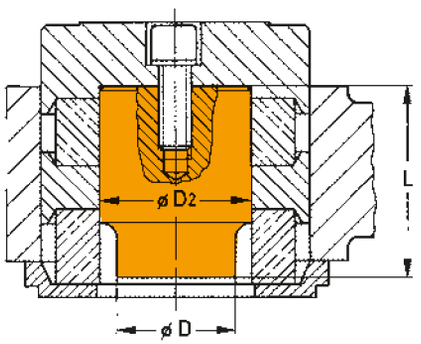
Punch shape for punching units of series 112 and 113

⑤



Punch shape for punching units of series 144 and 164

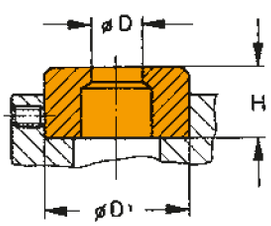
⑥



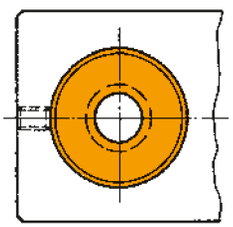
Punch shape for punching units of series 114

Die shape applies to all series

⑦



View »X«



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Round hole punching tools

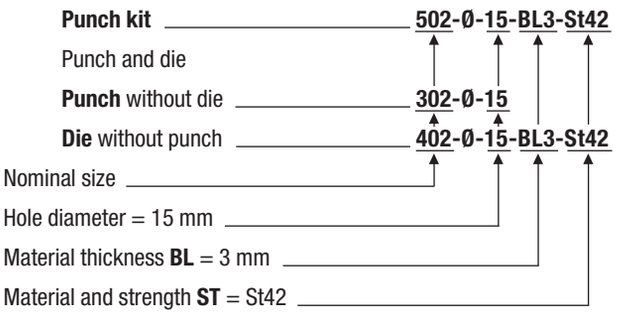
The required die clearance is preset in the factory in accordance with the desired hole size, while considering the specified material thickness and material strength.

By using reduction bushes and sockets holes can be punched with a smaller hole diameter than specified for the particular series for some of the punching units.

Punching units for round cuts can easily and quickly be converted to shaped hole punching units, using a shaped cut conversion kit.

Order example

Round hole punching tool for punching unit order no. 102-200F



(for nonferrous material, e.g.: Al F22)

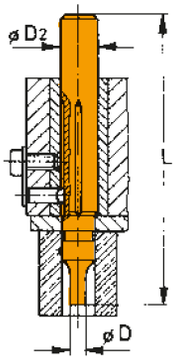
Round hole punching tools ● punch kits, punches, dies, **sizes on stock**

for punching units of series	Sizes on stock: Punch kit Order No.	Punch Order No.	Die Order No.	Available hole diameters: Range ØD	Graduation [mm]	Dimensions (Drawings on the left): $ØD_2$	L	$ØD_1$	H	Corresponding drawings (page before)
100-	**500-Ø-BL-ST**	**300-Ø**	**400-Ø-BL-ST**	2-7	0.5	8	105	15	16	① + ⑦
101- 111- 141- 161-	**501-Ø-BL-ST**	**301-Ø**	**401-Ø-BL-ST**	2-13	0.5	15	105	22	20	
102- 142- 162-	**502-Ø-BL-ST**	**302-Ø**	**402-Ø-BL-ST**	8-25	1	28	105	42	20	
103- 143- 163-	**503-Ø-BL-ST**	**303-Ø**	**403-Ø-BL-ST**	25-40 special size 20-25 available	1	30	45	63	25	② + ⑦
104-	**504-Ø-BL-ST**	**304-Ø**	**404-Ø-BL-ST**	40-63	only hole diameter 40, 42, 45, 50 55, 60, 63	50	45	90	25	
105-	**505-Ø-BL-ST**	**305-Ø**	**405-Ø-BL-ST**	63-100	all sizes available as special size	63 bis 100	22	145	25	③ + ⑦
112-	**512-Ø-BL-ST**	**312-Ø**	**402-Ø-BL-ST**	8-22	1	25	80	42	20	④ + ⑦
113-	**513-Ø-BL-ST**	**313-Ø**	**403-Ø-BL-ST**	22-38	1	40	80	63	25	
114-	**514-Ø-BL-ST**	**314-Ø**	**404-Ø-BL-ST**	35-63	all sizes available as special size	63	80	90	25	⑥ + ⑦
144- 164-	**524-Ø-BL-ST**	**324-Ø**	**404-Ø-BL-ST**	40-63		50	24	90	25	⑤ + ⑦

Special sizes are available for each size within the diameter range

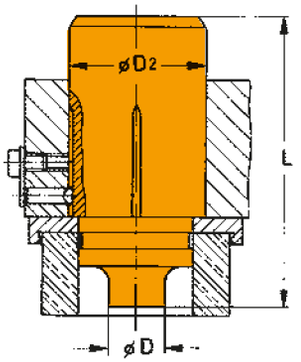
Shaped hole punching tools punch kits, **sizes on stock and special sizes**

①



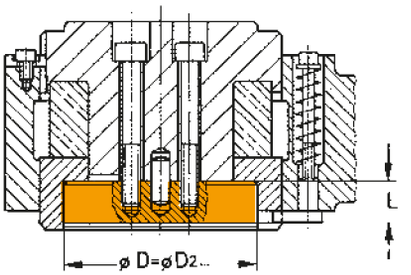
Punch shape for punching units of series 100, 101, 102, 111, 141, 142, 161, 162

②



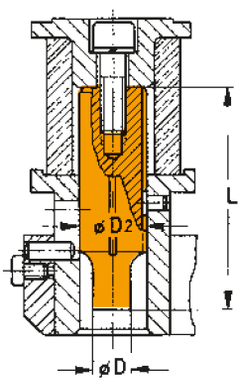
Punch shape for punching units of series 103, 104, 143, 163

③



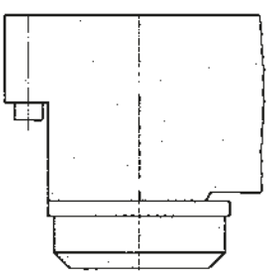
Punch shape for punching units of series 105

④



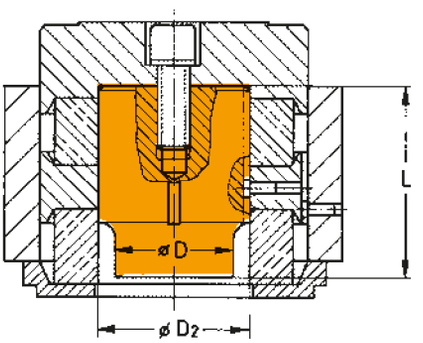
Punch shape for punching units of series 112 and 113

⑤



Shaped hole punching tools for series 144 and 164 are available only on request.

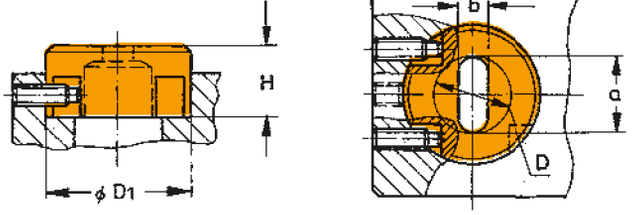
⑥



Punch shape for punching units of series 114

Die shape applies to all series

⑦



View »X«

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Shaped hole punching tools

The max. outside profile of a shaped cut may not exceed the max. possible hole diameter.

The required die clearance for the die is preset in accordance with the desired hole size, while considering the specified material thickness and material strength.

Shaped hole punching tools can be used »lengthways« or »crosswise« to the punching unit.

Order example

Shaped hole punching tool »DSW-Form« (means DAF shape, with D = diameter and AF = width across flat) as special size for punching unit order no. 103-200 F

Punch kit, punch and die **503 - DSW-Form - Ø30 x SW20 - BL4 - St60**

Nominal size

Cutting shape

Dimensions, hole diameter = 30 mm

SW = 20 mm

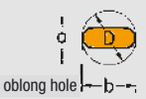
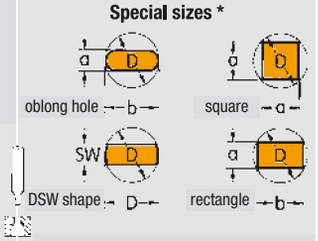
Material thickness **BL** = 4 mm

Material and strength **ST** = St60

(for nonferrous material, e.g.: Al F22)

Shaped hole punching tools

punch kits, **sizes on stock and special sizes**

for punching units of series	Sizes on stock  Order No.	Special sizes *  Order No.	Range ØD	Dimensions Drawings on the left $ØD_2$	L	$ØD_1$	H	Corresponding drawings page before	Shaped cut conversion kits only for punching units which have been ordered without shaped cut conversion kit Order No.
100-	–	–	2-7	–	–	–	–	–	–
101- 111- 141- 161-	**501-Langloch-4.5x10-BL-ST** **501-Langloch-5.5x12-BL-ST** **501-Langloch-7x12-BL-ST**	**501-Langloch-a x b-BL-ST** **501-DSW-Form-DxSW-BL-ST** **501-Quadrat-a x a-BL-ST** **501-Rechteck-a x b-BL-ST**	2-13	15	105	22	20	① + ⑦	805-101 805-111 805-141 805-161
102- 142- 162-	**502-Langloch-5,5x20-BL-ST** **502-Langloch-7x20-BL-ST** **502-Langloch-9x22-BL-ST** **502-Langloch-11x25-BL-ST** **502-Langloch-13x25-BL-ST**	**502-Langloch-a x b-BL-ST** **502-DSW-Form-DxSW-BL-ST** **502-Quadrat-a x a-BL-ST** **502-Rechteck-a x b-BL-ST**	8-25	28	105	42	20		805-102 805-142 805-162
103- 143- 163-	–	**503-Langloch-a x b-BL-ST** **503-DSW-Form-DxSW-BL-ST** **503-Quadrat-a x a-BL-ST** **503-Rechteck-a x b-BL-ST**	20-40	50	105	63	25	② + ⑦	805-103 805-143 805-163
104-	–	**504-Langloch-a x b-BL-ST** **504-DSW-Form-DxSW-BL-ST** **504-Quadrat-a x a-BL-ST** **504-Rechteck-a x b-BL-ST**	40-63	75	105	90	25		805-104
105-	–	**505-Langloch-a x b-BL-ST** **505-DSW-Form-DxSW-BL-ST** **505-Quadrat-a x a-BL-ST** **505-Rechteck-a x b-BL-ST**	63-100	63 to 100	22	145	25	③+ ⑦	805-105
112-	**512-Langloch-7x20-BL-ST** **512-Langloch-9x22-BL-ST** **512-Langloch-11x22-BL-ST** **512-Langloch-13x22-BL-ST**	**512-Langloch-a x b-BL-ST** **512-DSW-Form-DxSW-BL-ST** **512-Quadrat-a x a-BL-ST** **512-Rechteck-a x b-BL-ST**	8-22	25	80	42	20	④ + ⑦	805-112
113-	–	**513-Langloch-a x b-BL-ST** **513-DSW-Form-DxSW-BL-ST** **513-Quadrat-a x a-BL-ST** **513-Rechteck-a x b-BL-ST**	22-38	40	80	63	25		805-113
114-	–	**514-Langloch-a x b-BL-ST** **514-DSW-Form-DxSW-BL-ST** **514-Quadrat-a x a-BL-ST** **514-Rechteck-a x b-BL-ST**	35-63	63	80	90	25	⑥ + ⑦	805-114

* Special sizes / shapes: Langloch = oblong hole, DSW-Form = DSW shape, Quadrat = square, Rechteck = rectangle

Reduction Bushes

◀ Reduction bush

◀ Reduction socket

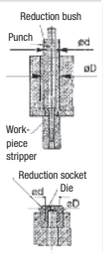
Reduction bushes and sockets

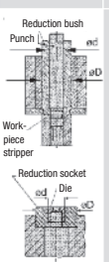
only for round hole punching tools

When using reduction bushes and sockets with the punching units of the series 101 to 163, the punch and die of the next smaller punching unit may be used.

This extends the application range of the listed punching units by the reduced diameter given in the table below.

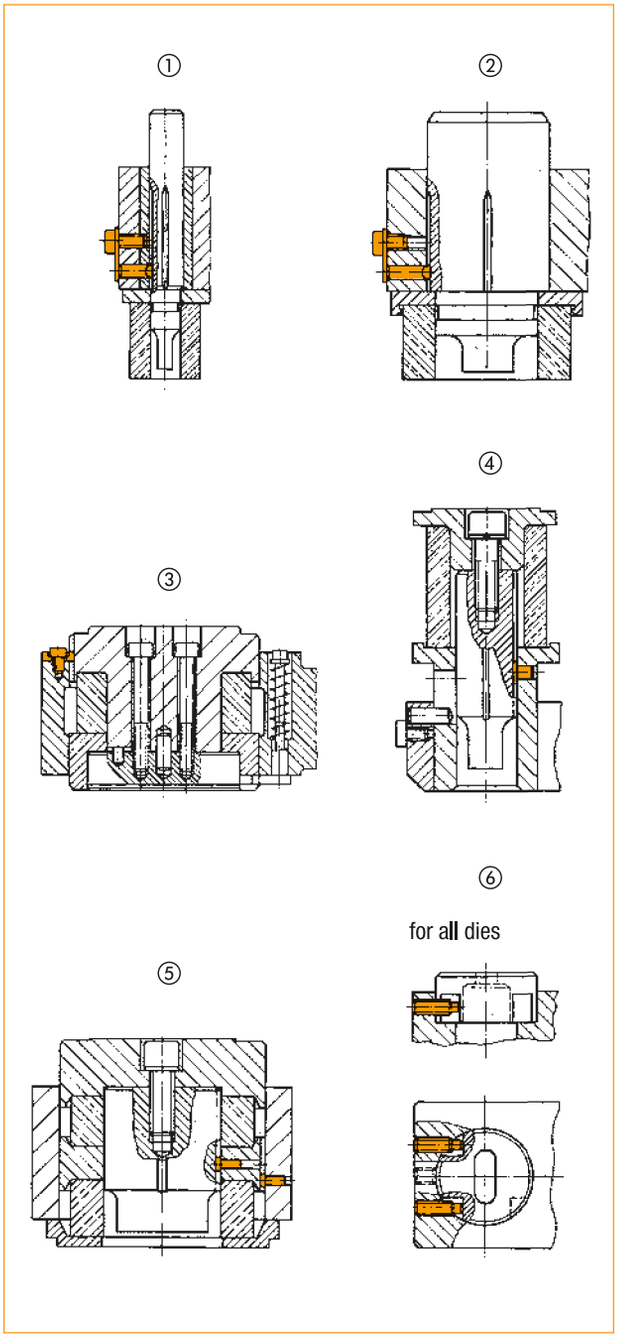
Due to the possibility of using the next smaller punching tool size, additional tool units are no longer required and, thereby, costs are reduced.

for punching units of series	Punch diameter range **without** reduction parts: standard Ø	Fig.	Punch diameter range **with** reduction parts: reduced Ø	Fig.	Reduction parts: Reduction bush complete with workpiece stripper Order No.	ØD	Ød	Reduction parts: Reduction socket Order No.	ØD	Ød	Required cutting tools: Punch Order No.	Die Order No.
101 111 141 161	2–13		2–7		**850-15x08**	15	8	**860-22x15**	22	15	300-Ø…	400-Ø-BL-ST

for punching units of series	Punch diameter range **without** reduction parts: standard Ø	Fig.	Punch diameter range **with** reduction parts: reduced Ø		Fig.	Reduction parts: Reduction bush complete with workpiece stripper Order No.	ØD	Ød	Reduction parts: Reduction socket Order No.	ØD	Ød	Required cutting tools: Punch Order No.	Die Order No.
102 142 162	8–25		2–13	from 2–8 from 8–13[1]		**850-28x15**	28	15	**860-42x15**	42	15	301-Ø…	400-Ø-BL-ST From hole diameters of 8 mm onwards, use die 402-Ø-BL-ST.

for punching units of series	Punch diameter range **without** reduction parts: standard Ø	Fig.	Punch diameter range **with** reduction parts: reduced Ø	Fig.	Reduction parts: Reduction bush complete with workpiece stripper Order No.	ØD	Ød	Reduction parts: Reduction socket Order No.	ØD	Ød	Required cutting tools: Punch Order No.	Die Order No.
103 143 163	25–40		8–25		**850-50x28**	50	28	**860-63x42**	63	42	302-Ø…	402-Ø-BL-ST

Insert in order no.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole), **BL** = material thickness, **ST** = material and strength.

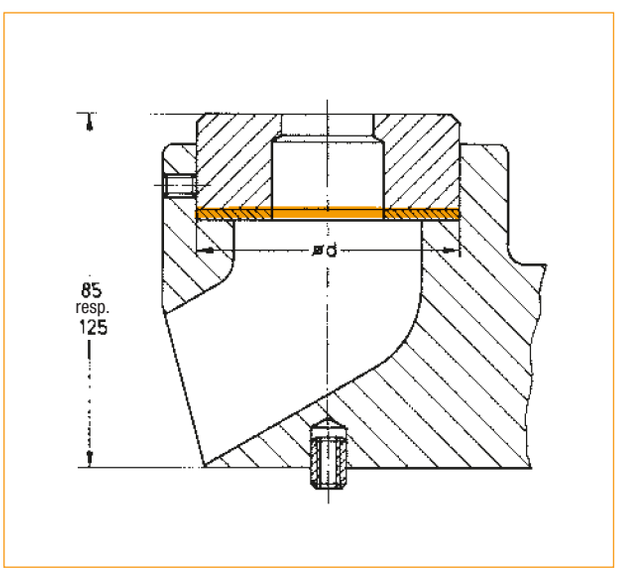


Shaped cut conversion kits

All punching units for round cuts (except for series 100) can easily and quickly be converted to shaped hole punching units, using a shaped cut conversion kit.

A shaped cut torsion lock is included in the standard delivery of all punching units (except for series 100).

for punching unit series	Corresponding figures	Order No.
101	① + ⑥	**805-101**
102	① + ⑥	**805-102**
103	② + ⑥	**805-103**
104	② + ⑥	**805-104**
105	③ + ⑥	**805-105**
111	① + ⑥	**805-111**
112	④ + ⑥	**805-112**
113	④ + ⑥	**805-113**
114	⑤ + ⑥	**805-114**
141	① + ⑥	**805-141**
142	① + ⑥	**805-142**
143	② + ⑥	**805-143**
161	① + ⑥	**805-161**
162	① + ⑥	**805-162**
163	② + ⑥	**805-163**



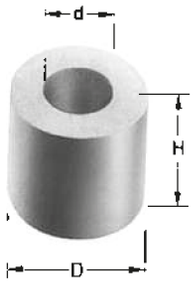
Compensating washers

Compensating washers are required to bring reworked dies to the working or material support height of 85 or 125 mm.

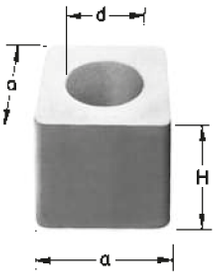
This height compensation is particularly important when several punching units are to be combined to a series punch installation. In this case, uniform working and material support height is essential.

Ød	for dies Series	for dies to be used for punching units of series	1 kit = 4 pieces thickness	Order No.
15	400	100		**806-15**
22	401	101, 111, 141, 161	0.1 0.3	**806-22**
42	402, 412	102, 112, 142, 162	0.5 1.0	**806-42**
63	403, 413	103, 113, 143, 163	mm	**806-63**
90	404, 414	104, 114		**806-90**

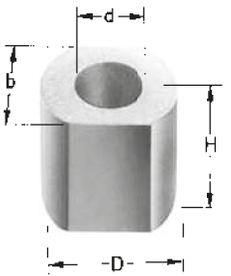
Polyurethane workpiece stripper



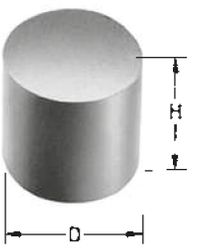
Shape **A**



Shape **B**

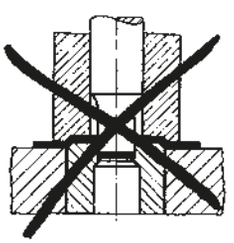


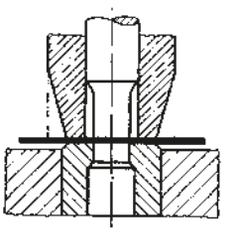
Shape **C**



Shape **D**

Note When punching in thin metal sheets, the outside diameter of the polyurethane stripper lying on the metal sheet should be skewed and adapted to the diameter of the die. This prevents undesirable deformation of the metal sheet caused by the stripper.





for punching units of series													Shape	Stripping force	Dimensions					Order No.
100	101 111	102	103	104	105	112	113	114 1 kit = 2 pieces	141 161	142 162	143 163	144 164			a	b	Ød	ØD	H	
●													A	medium	–	–	6,5	18	30	**801-018x30**
									●				A	small	–	–	12	28	27	**801-028x27**
	●												A	medium	–	–	12	28	30	**801-028x30**
										●			A	small	–	–	25	40	27	**801-040x27**
										●			A	medium	–	–	25	40	30	**801-040x30**
		●											A	large	–	–	25	50	30	**801-050x30**
											●		A	small	–	–	41	60	28	**801-060x28**
											●		A	medium	–	–	41	60	30	**801-060x30**
			●										A	large	–	–	41	70	30	**801-070x30**
								●					A	large	–	–	64	95	30	**801-095x30**[2]
												●	A	large	–	–	on request	100	27	**801-100x27**
				●									A	large	–	–	64	100	30	**801-100x30**
					●								A	large	–	–	76	112	40	**801-112x40**
●[1]													C	large	–	17	6.5	25	31	**802-025x31**[1]
	●[1]												B	large	28	–	12	–	31	**802-028x31**[1]
						●							B	large	50	–	29	–	50	**802-050x50**
							●						B	large	70	–	45	–	50	**802-070x50**
*** Polyurethane strippers, shape D** (full material), are provided for special applications and are supplied in the requested length. Add the requested length »H« to the order no. The hole (Ød) is provided by the customer.													D	–	–	–	–	28	*	**803-028xH***
													D	–	–	–	–	50	*	**803-050xH***
													D	–	–	–	–	70	*	**803-070xH***
													D	–	–	–	–	100	*	**803-100xH***

[1] Reinforced version for higher retraction forces when punching thick materials

[2] 1 kit = 2 pieces


1.02
HGL-1/4
010
PUN-8x
2
1
111
10
115
11
51
32
28
88
94
19
83
80
9
98
97
91
92
525
548
426
22,50
30
40
591,50
509
5,25
esserhöhe = 243

INTELLIGENT PUNCHING SOLUTIONS

System extensions //

6

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System extensions //

// frames
// limit stop systems
// hydraulic units
// hydraulic cylinders
// pneumatic power cylinders
// hydropneumatic power cylinders
// cylinder position monitoring device
// foot switches
// minimum quantity lubrication systems

Machine control system
// safety PLCs
// quality assurance
// power monitoring
// visual inspection
// insertion monitoring
// measuring equipment

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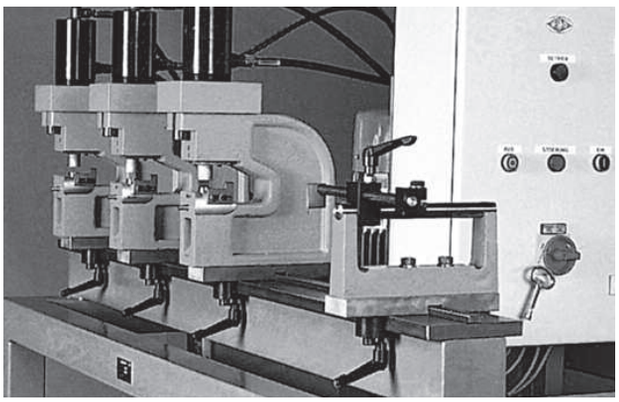
Guide elements for series punch installations



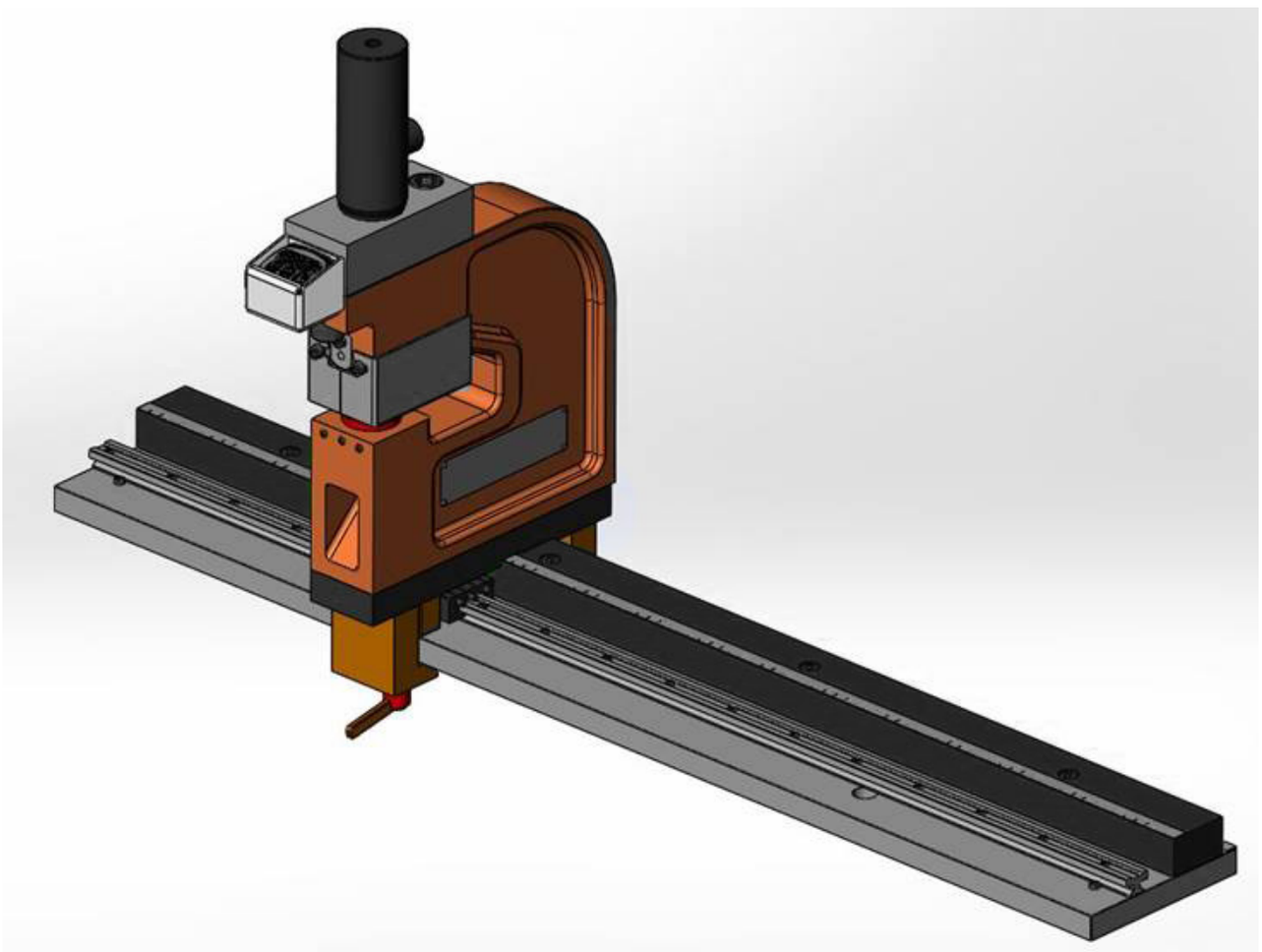
Guide elements in a series punch installation with hydraulic double-action.

Operation for punching a punch layout in steel strips.

These guide elements provide a simple and cost effective side-tracking solution for all pneumatic and hydraulic punching units used in series punch installations. The side-tracking clamp plates are used to mount the punching units and enable stepless adjustment of distance between the punching units. The base plate serves as guide element and accepts the weight. The quick-action clamping lever enables the side-tracking clamp plate to be fixed in the desired position on the base plate.

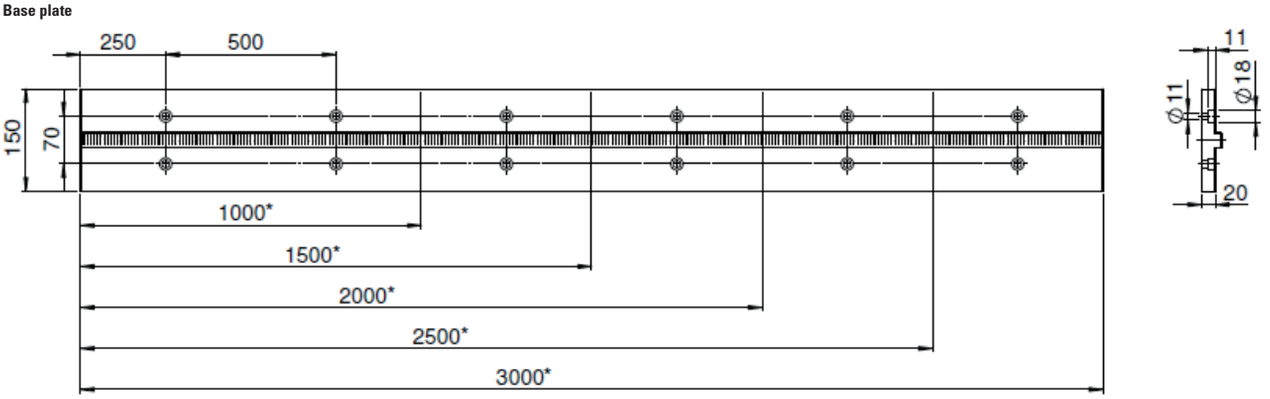
The most cost-efficient system is **820-150x…M**.
The side-tracking clamp plate slides directly on the base plate.

The **822-150x…M** system provides a more convenient solution. The side-tracking clamp plate is guided by means of a linear guide and slides on a special plastic support.
In case of frequent set-up processes, costs can be saved by using this solution. This system can also be extended by including a digital length measuring device. All punching units are available with digital display, so that they can be precisely moved to the position required and then be fixed there.



Base plate			
Order No.	**Please add the requested total length to the order no. (mm)**	**Remark**	**Weight (kg)**
820-150x …M	1000	with mm scale	24
	1500		35
	2000		47
	2500		59
	3000		71
822-150x …M	1000	with mm scale and linear guide	25
	1500		38
	2000		51
	2500		64
	3000		76
822-150x …D	1000	with linear guide and magnetic tape for length measurement	25
	1500		38
	2000		51
	2500		64
	3000		76

Base plate

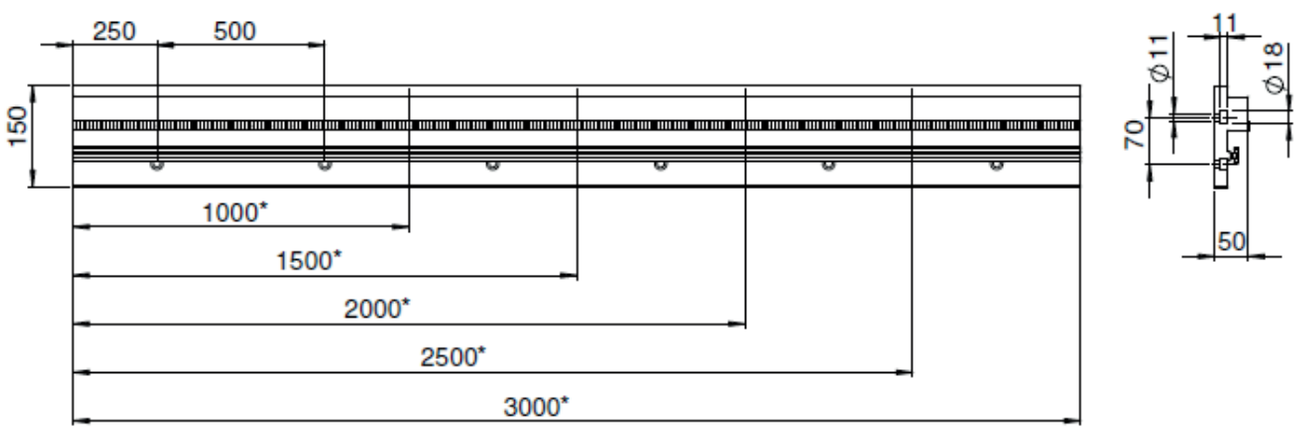


Base plate with scale

Order no. 822-150 x total length M

[1] Available total length

Base plate with linear guide



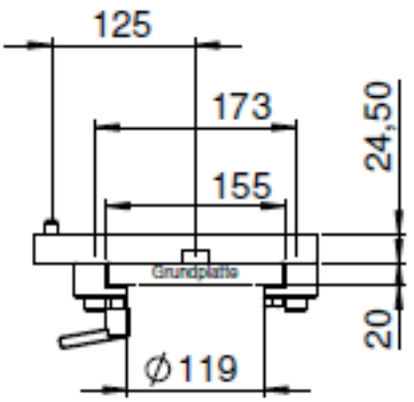
Base plate with scale

Order no. 820-150 x total length M

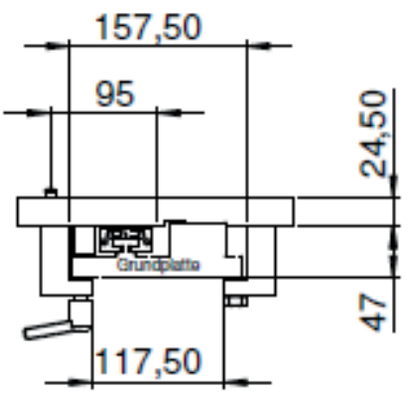
[1] Available total length

Side-tracking clamp plate			
Order No.	Width (mm)	Remark	Weight (kg)
818-060x150	60		3.5
818-100X150	100		5
821-060x150	60	with guide carriage	4.4
821-100X150	100	with guide carriage	6.2

Side-tracking clamp plate

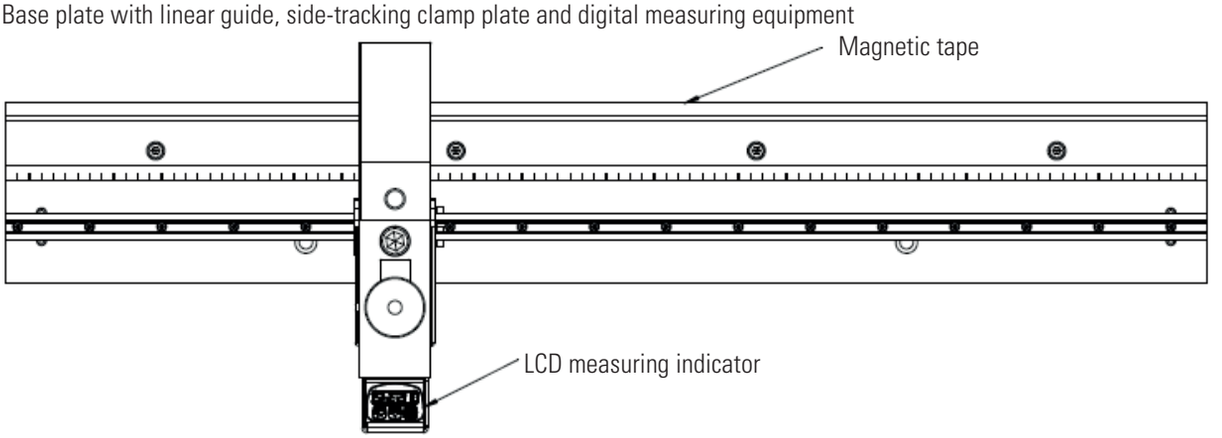


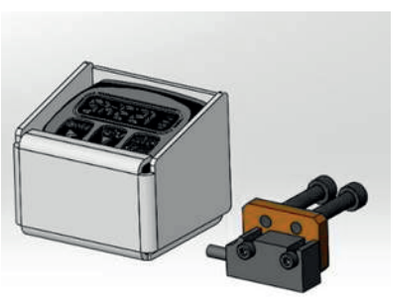
Side-tracking clamp plate with linear guide carriage



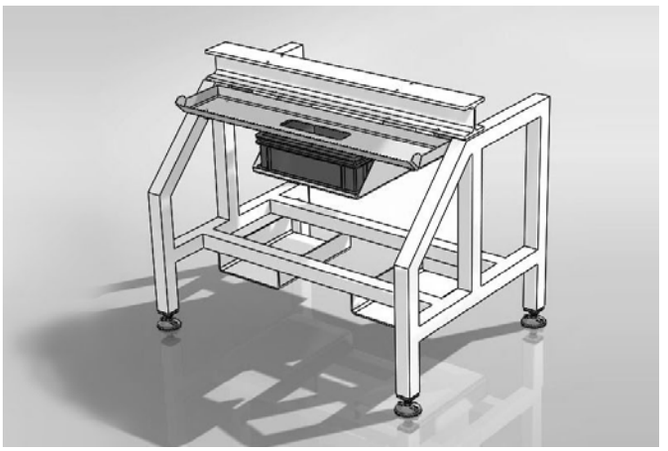
Digital display with sensor for a punching unit

Base plate with linear guide, side-tracking clamp plate and digital measuring equipment

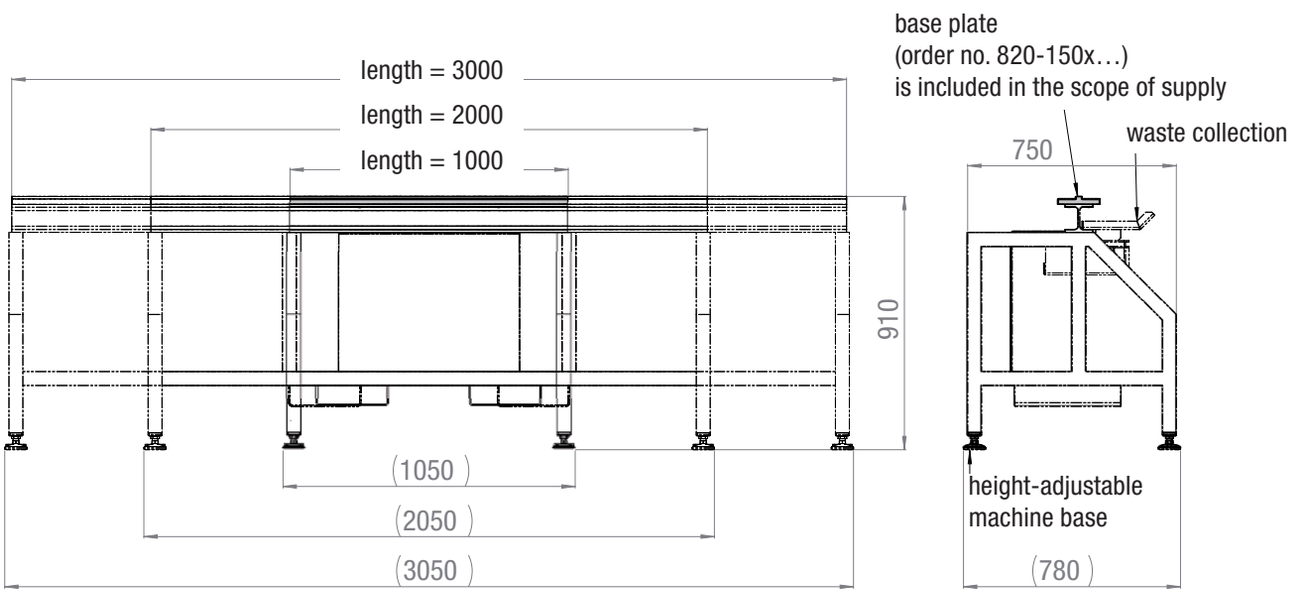




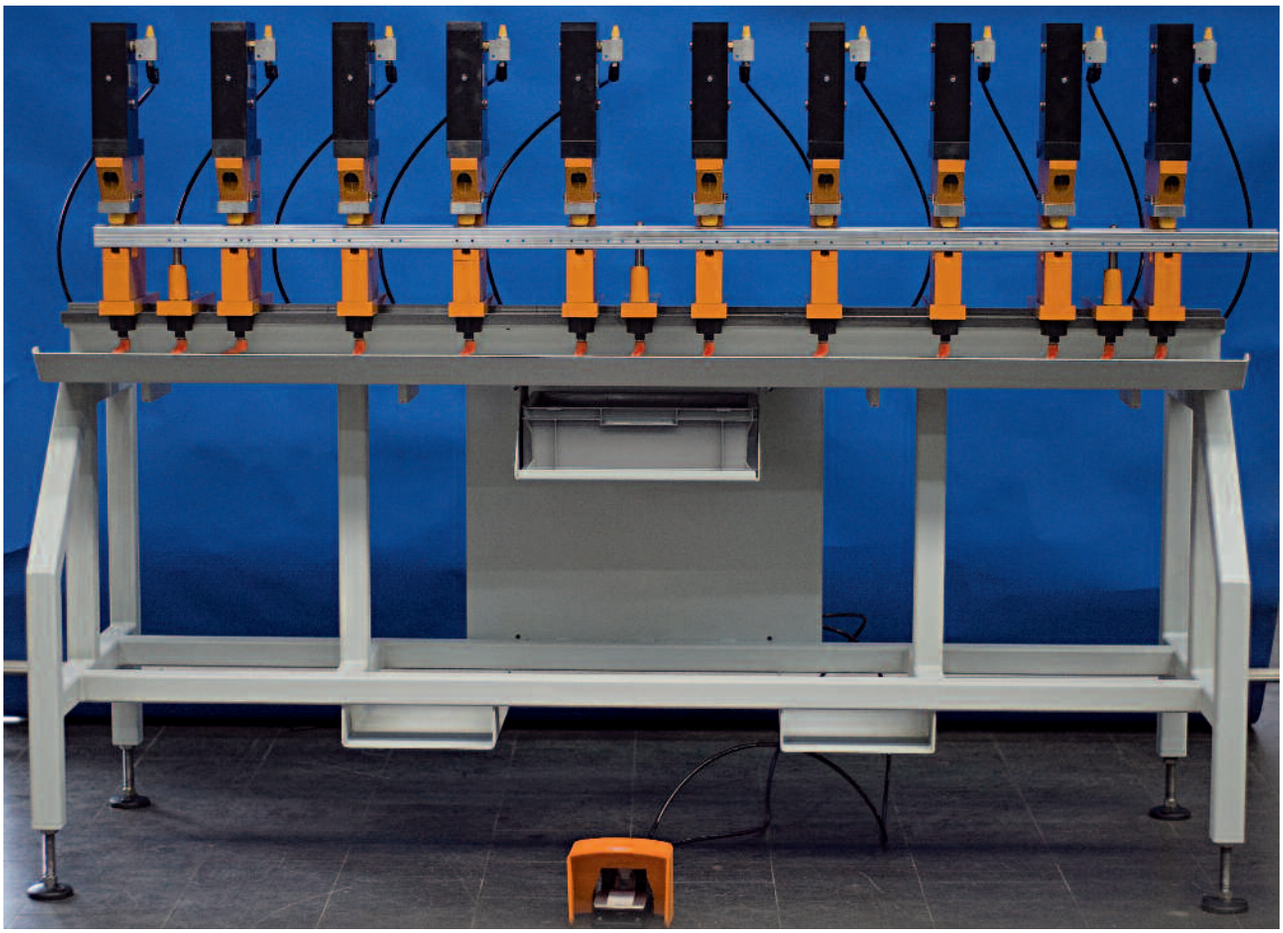
Digital display with sensor	
Order No.	**Remark**
823-001-000	Digital display with battery, sensor and add-on components for side-tracking clamp plate. measuring accuracy: ± 0.1 mm



frame
with waste collection
order no. 820-X000-002



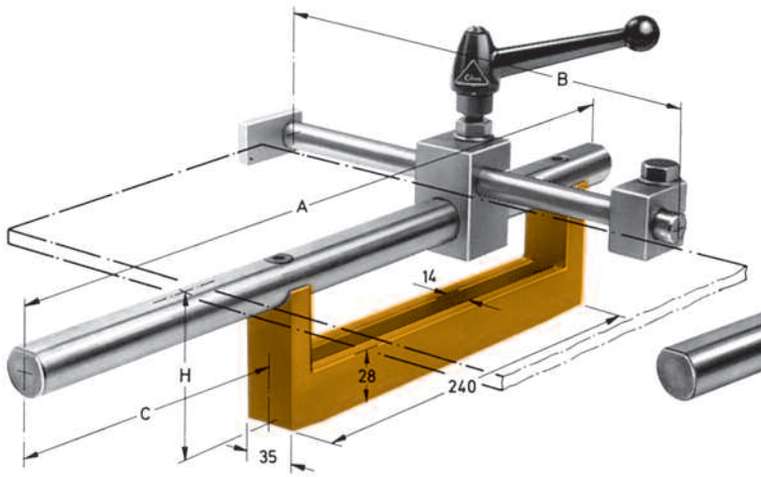
RAL no. 7035, light grey



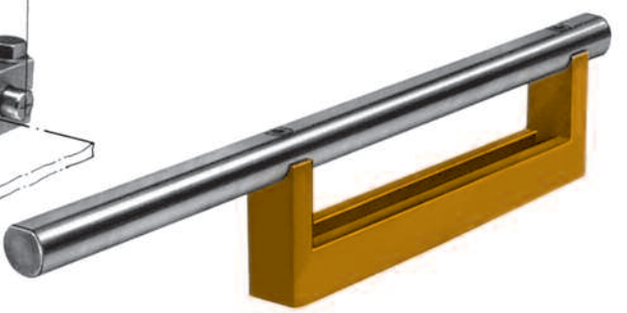
Unit for punching aluminium profiles

Standard frame without waste collection order no.	Standard frame with waste collection order no.	Waste collection order no.	Length:	Weight [kg] without / with waste collection
820-1000-001	820-1000-002	820-1000-101	1000	102 I 115
820-2000-001	820-2000-002	820-2000-101	2000	146 I 166
820-3000-001	820-3000-002	820-3000-101	3000	182 I 208

Universal limit stop and workpiece support

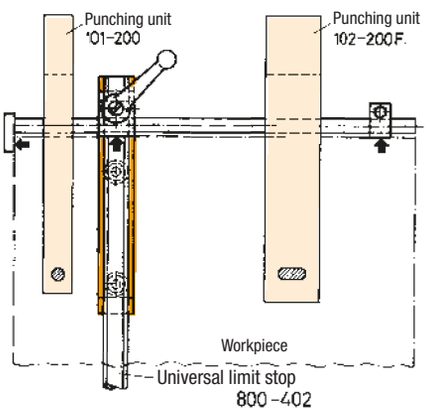


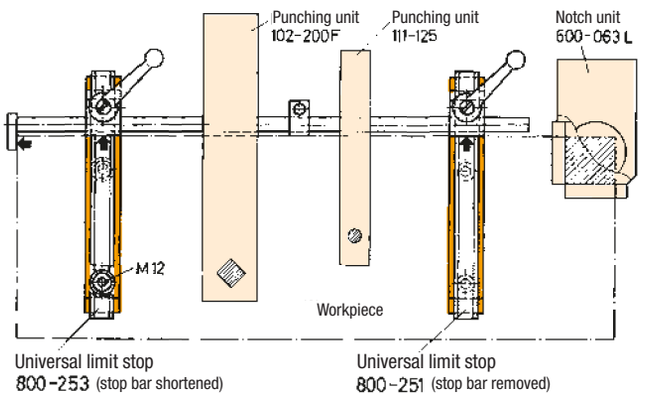
Universal limit stop

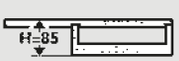
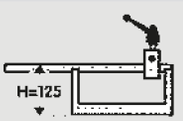
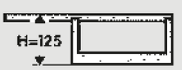


Workpiece support

Application examples



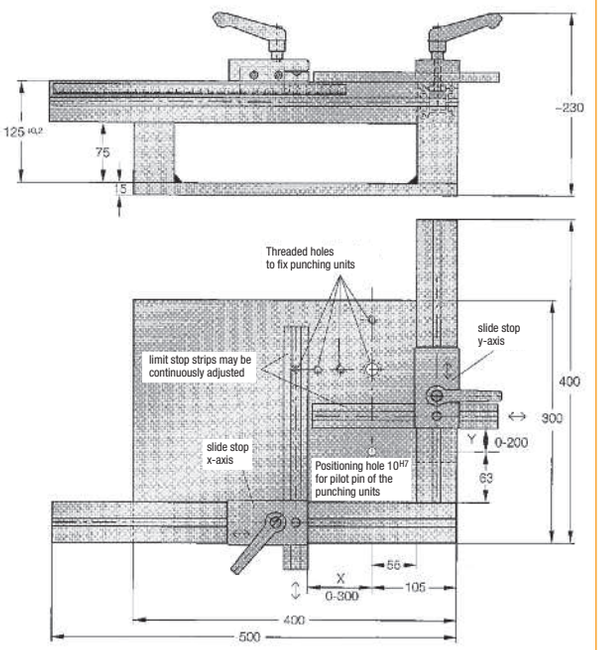


Support height **H=85 mm**		Support height **H=125 mm**				
						
Workpiece limit stop Order No.	**Workpiece support Order No.**	**Workpiece limit stop Order No.**	**Workpiece support Order No.**	**A**	**B**	**C**
800-251-085	**810-250-085**	**800-251-125**	**810-250-125**	250	250	5
800-252-085	–	**800-252-125**	–	250	400	5
800-253-085	–	**800-253-125**	–	250	630	5
800-401-085	**810-400-085**	**800-401-125**	**810-400-125**	400	250	135
800-402-085	–	**800-402-125**	–	400	400	135
800-403-085	–	**800-403-125**	–	400	630	135
800-631-085	**810-630-085**	**800-631-125**	**810-630-125**	630	250	255
800-632-085	–	**800-632-125**	–	630	400	255
800-633-085	–	**800-633-125**	–	630	630	255

Coordinate limit stop

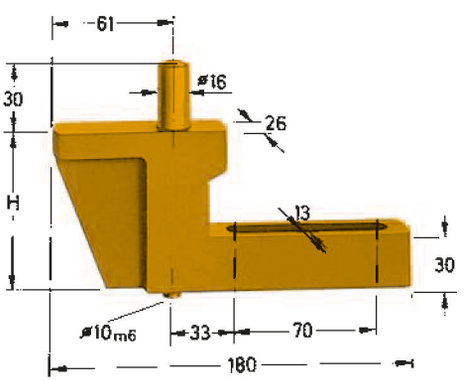
Order No. **813-200x300** (also available laterally reversed)

Suitable for all pneumatic and hydraulic punching units with a material support height of 125 mm.
For press-operated punching units with a material support height of 85 mm, a height compensation plate is required (order no. **815-200x300**).
With the coordinate limit stops the desired distance between workpiece holes can be adjusted easily and quickly. Time consuming set up with conventional limit stops is unnecessary.
Working range or adjustment possibilities:
x-axis: 0–300 mm
y-axis: 0–200 mm

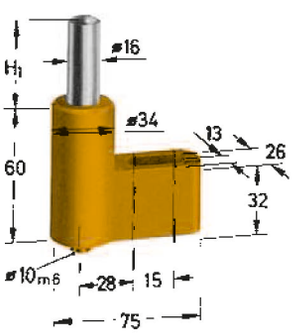


Additional coordinate limit stops
with other working ranges are available on request.
Dimensions: 400 x 500 x 230 mm

Workpiece limit stop

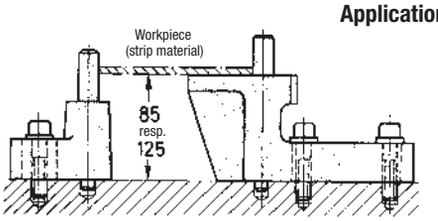


Workpiece limit stop with support



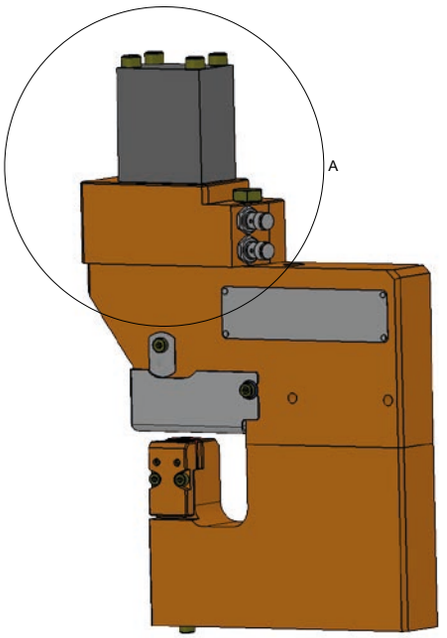
Workpiece limit stop

Application example

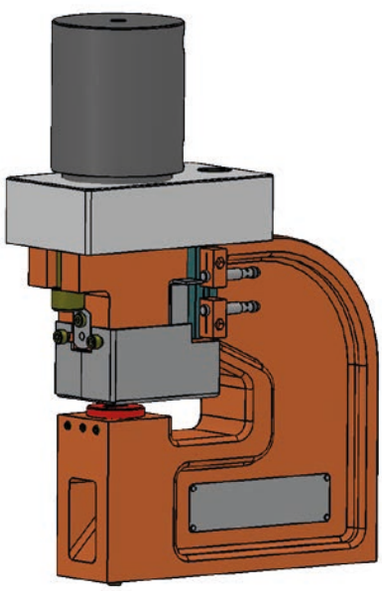


H	H_1	Workpiece limit stop with support Order No.	Workpiece limit stop Order No.
85	–	**800-01-085**	–
–	40	–	**800-02-085**
125	–	**800-01-125**	–
–	80	–	**800-02-125**

Cylinder position monitoring device for hydraulic cylinder

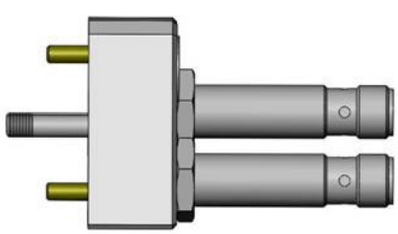


Monitoring kit tor hydraulic block cylinder including special flange with two M12 sensors and monitoring device	
Hydraulic cylinder	Order no. for monitoring kit
722D2520	870-722D2520
722D3225	870-722D3225
722D4025	870-722D4025
Monitoring kit for hydraulic block cylinder with obligatory stripping unit including special flange with two M12 sensors and coupling	
Hydraulic cylinder	Order no. for monitoring kit
722D2520	870-722D2520-Z
722D3225	870-722D3225-Z
722D4025	870-722D4025-Z



Monitoring kit tor hydraulic short-stroke double-action cylinder including coupling with monitoring angle, special finger guard and two M8 sensors	
Hydraulic cylinder	Order no. tor monitoring kit
725D35151-2	870-008
725D50151-1	870-008
725D63171-1	870-008
725D80151-1	870-008

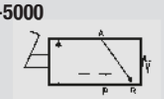
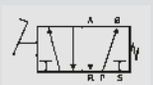
Cylinder position monitoring device for pneumatic power cylinder, single-action

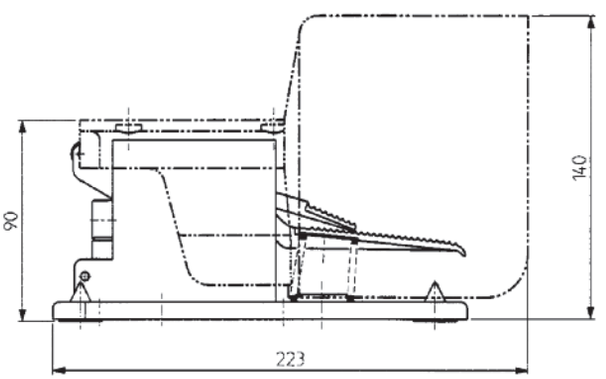


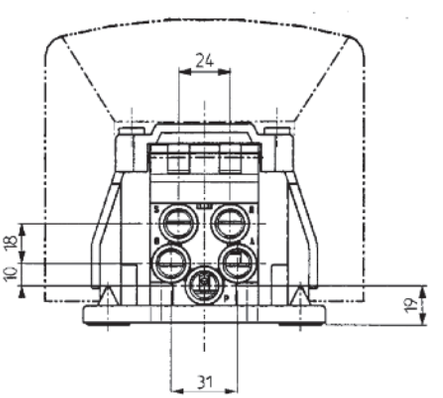
Subsequent mounting may only be performed by IPS-Werkzeugtechnik	
Power cylinder	Order no. for monitoring kit
04-1212/ 041222	870-004-001
04-2010	870-004-003
04-4010	870-004-002
04-8013/048025	870-004-002

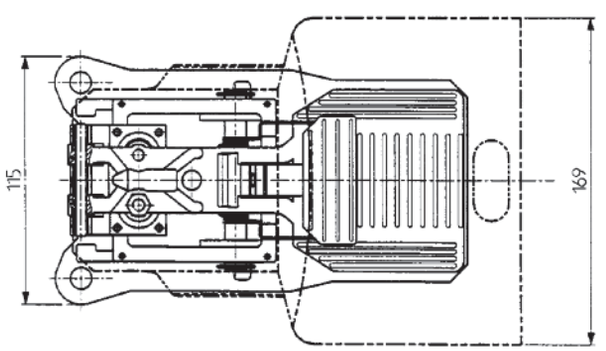
pneumatic features:
max. working pressure: 10 bar
ambient temperature: from -10 °C to 70 °C
medium temperature: from -10 °C to 50 °C
operation with or without lubrication
flow rate: 800 Nl/min.

mechanic features:
housing and protection cap made of nylon
reinforcing web made of steel
Zamak diecast valve housing
gaskets and washers made of oil- and
wear-resistant materials

Pneumatisches Pedal	Steuerung	Rückstellung	Ventil	Anschlüsse	ø in mm	Durchfluß Nl/min	Betätigungskraft/N	Masse/kg
AM-5000 	Pedal	Feder	3/2NC	G 1/4	6	800	20	1,25
AM-5001 	Pedal	Feder	5/2	G 1/4	6	800	20	1,45

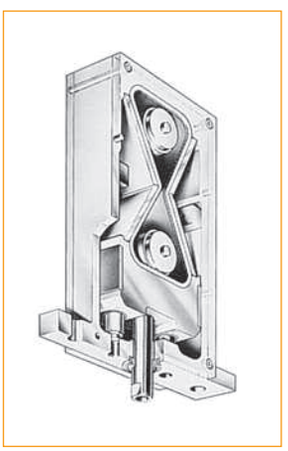




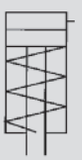


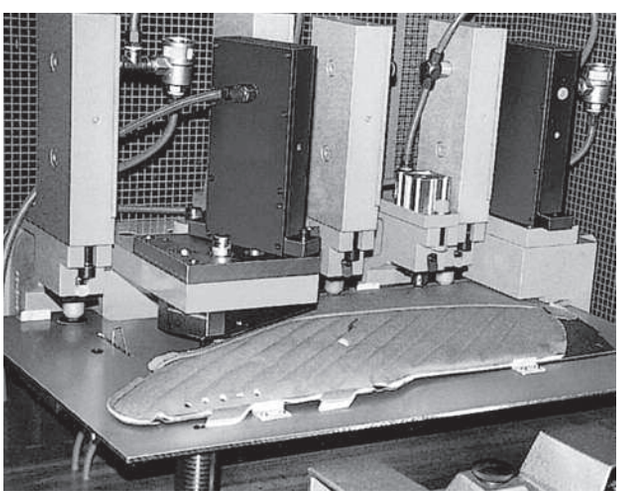
Pneumatic power cylinder, single-action

The patented pneumatic power cylinders, shown on this page, order numbers 04-1212 to 04-8025, are designed for use with the pneumatic punching, notch and cut-off units.
Due to their high tensile strength and their stroke of up to 25 mm, as well as the favourably positioned mounting flange, these elements are suitable for a wide range of operations where high forces are required. The flat and compact design enables series installation.
As illustrated in the sectional view, a pair of toggles is supplied with compressed air via the sleeve positioned behind. The generated force is transmitted directly to the piston rod. The resulting stroke force ratio fulfills all practical requirements for increased stroke accompanied by increased force, see force / stroke chart.
Up to 30 strokes per minute are achieved. For optimum use of the cylinder, i.e. high stroke frequency, the use of quick bleed valves is recommended as the cylinder is a single-action cylinder.
Further applications for these power cylinders are stamping, cold forming, pressing in of sockets and in gluing equipment where parts have to be joined under great pressure.
These power cylinders can even be used where high pretensioning forces are needed, e.g. for closing foam moulds or as clamping elements used during leak tests.

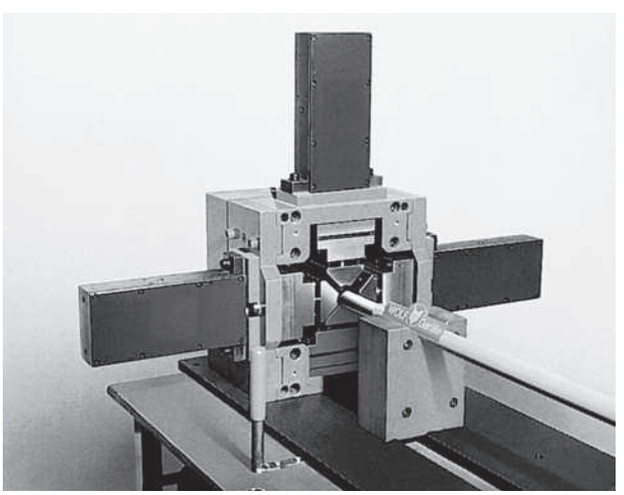


Symbol





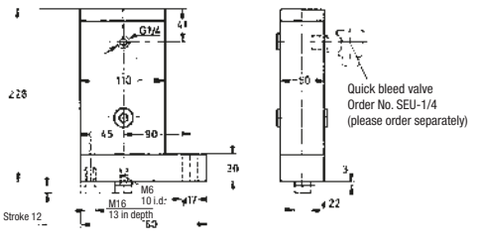
Pneumatic punching unit for punching and notching of pressboard parts covered with leather

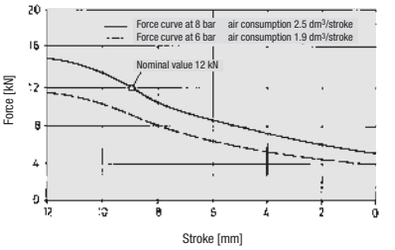


Pneumatic power cylinder for caulking of bushes

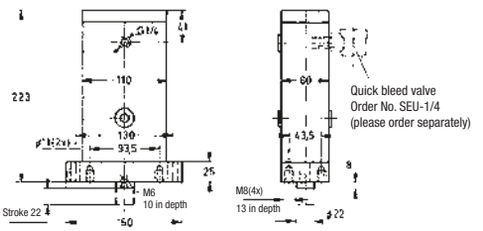
Order No.	Nominal force at 8 bar [kN]	Max. force at 8 bar [kN]	Stroke	Working pressure [bar]	Max. stroke frequency [strokes/min.]	Temperature range	Air consumption at 8 bar [dm^3/Hub]	Weight ~ [kg]
04-1212	12	15	12	2-8	30		2.5	4.8
04-1222-1	12	15	22	2-8	30		2.5	4.7
04-1222-2	12	15	22	2-8	30	– 0°C	2.5	4.7
04-2010	20	32	10	2-8	30	to	3.5	11.0
04-4010	40	50	10	2-8	20	+40°C	7.2	16.5
04-8013	80	100	13	2-8	15		14.5	39.0
04-8025	80	100	25	2-8	15		14.5	39.0

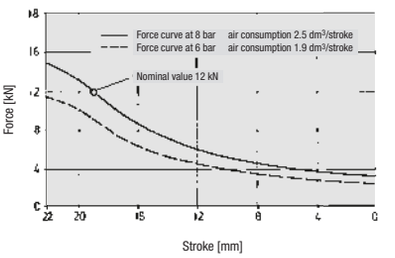
Order No. **04-1212**



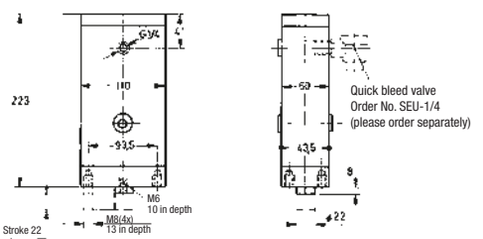


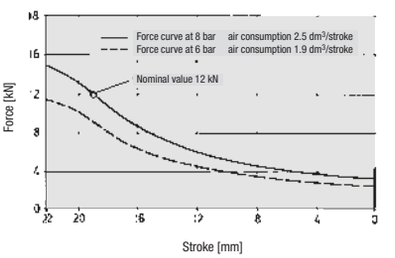
Order No. **04-1222-1**



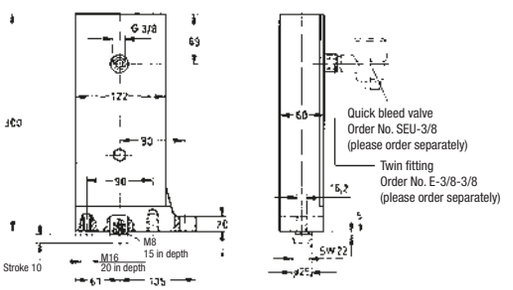


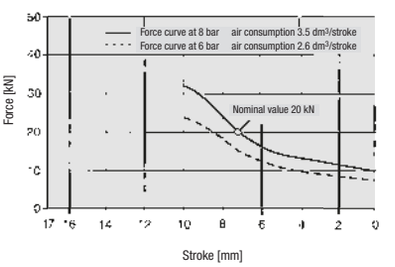
Order No. **04-1222-2**



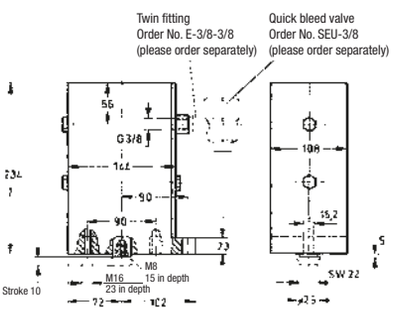


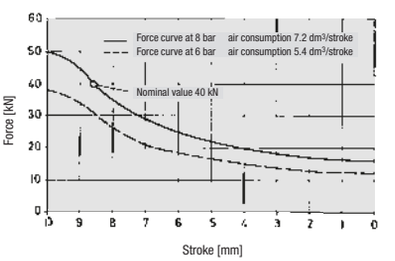
Order No. **04-2010**



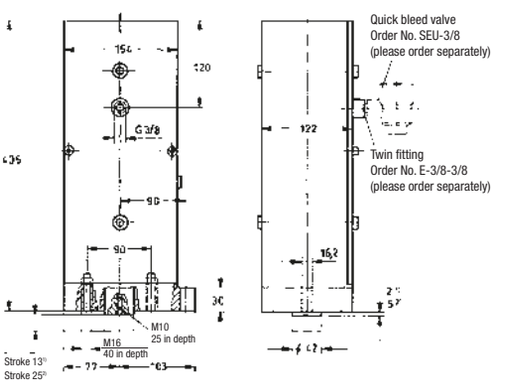


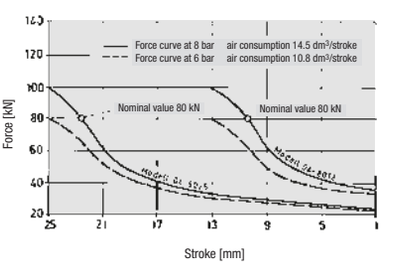
Order No. **04-4010**





Order No. **04-8013**
and **04-8025**





¹⁾Model 04-8013 ²⁾Model 04-8025

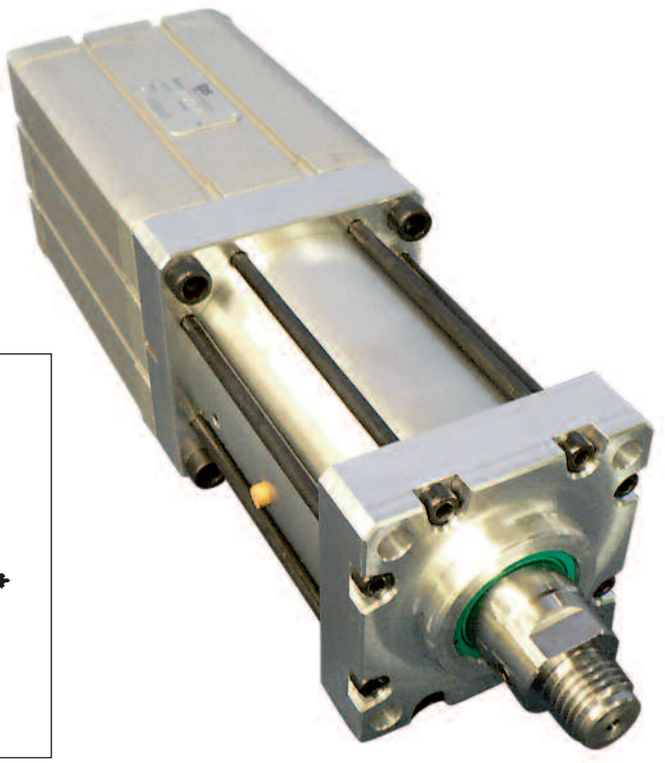
Hydropneumatic power cylinder, double action

The new power cylinder may be used for many applications, where high forces are required within a small space. Due to the compressed air operation, a hydraulic unit is not necessary. The cylinder provides complete air/oil separation and a modular design. Control is ensured by standard pneumatic valves. The cylinder is easy to maintain and guarantees a low-noise operation. The force curve during the complete stroke is linear.

The excellent price/performance ratio of these cylinders makes them very attractive for use in fixture and special machine engineering.

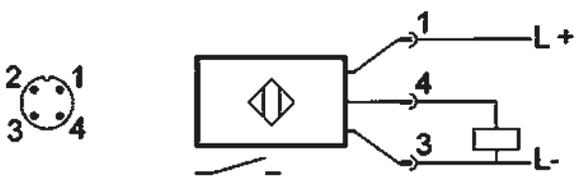
Please note the high restoring force.

The power cylinder can be mounted from »above« and from »below« by means of the four through holes (Ø 13.5).

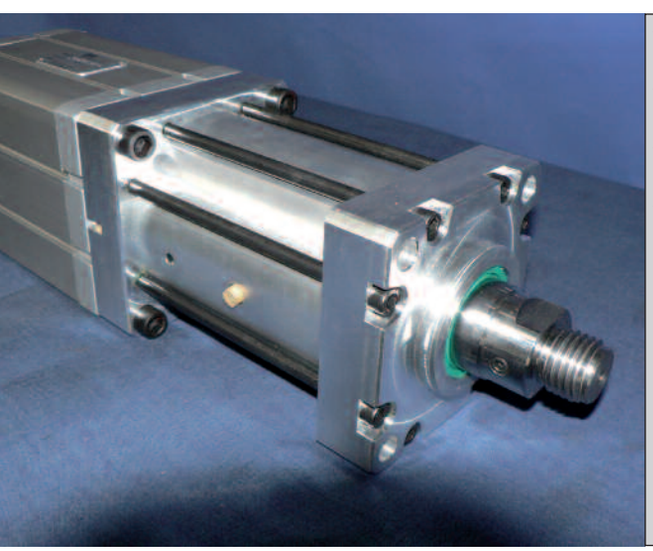


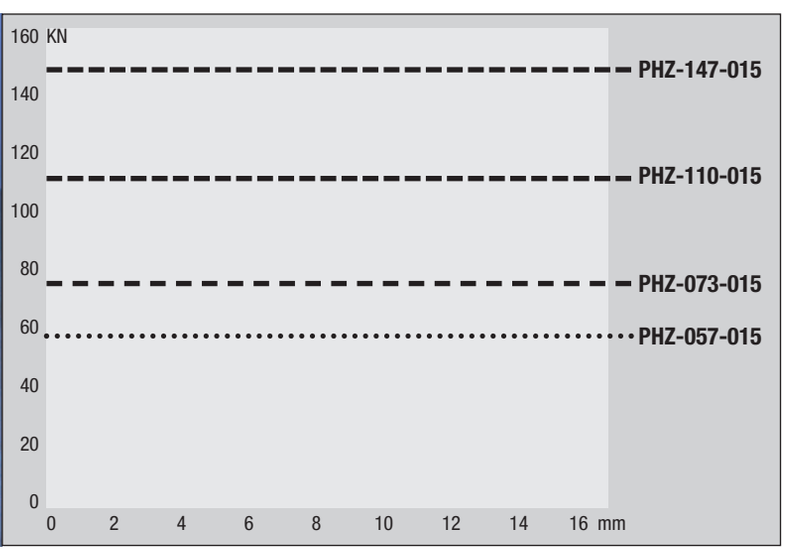
Optional cylinder position query by means of a cylinder switch (PNP, NO contact, M12 plug, 4 poles)
Order number: E999-0001-0000

Pin configuration and circuit, see drawing:

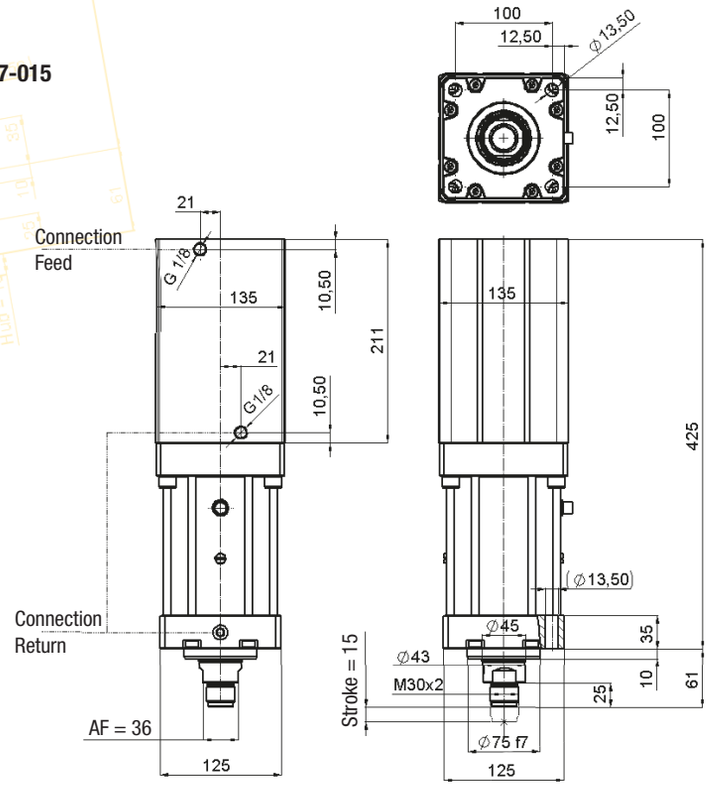


Order no.	Nominal force at 6 bar (kN)	Restoring force at 6 bar (kN)	Stroke = power stroke in mm	Max. stroke frequency (strokes/min.)	Temperature range	Air consumption at 6 bar (dm³/stroke)	Weight (kg)
PHZ-057-015	57	3.5	15	60	from 0°C to +40°C	22.2	18.5
PHZ-073-015	73	3.5	15	60		28.2	22
PHZ-110-015	110	3.5	15	60		42	25
PHZ-147-015	147	3.5	15	60		56	28





PHZ-057-015

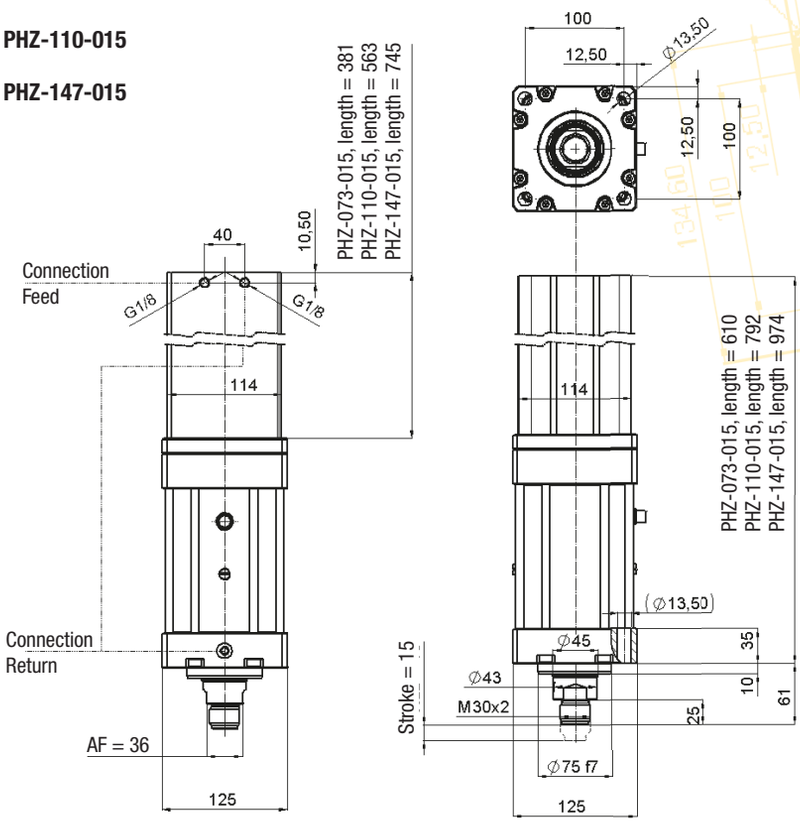


Pneumohydraulic cylinder
57 kN
Order no.: PHZ-057-015
Connection: G 1/8
Working pressure: 6 bar

PHZ-073-015

PHZ-110-015

PHZ-147-015



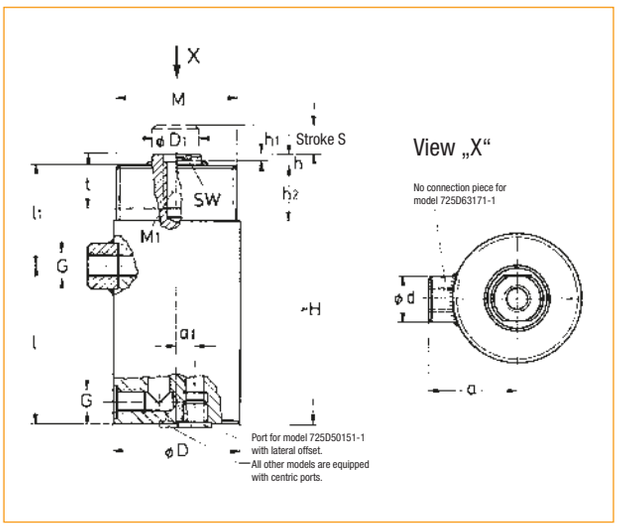
Pneumohydraulic cylinder
Order no.: PHZ-073-015 = 73 kN
PHZ-110-015 = 110 kN
PHZ-147-015 = 147 kN
Connection: G 1/8
Working pressure: 6 bar

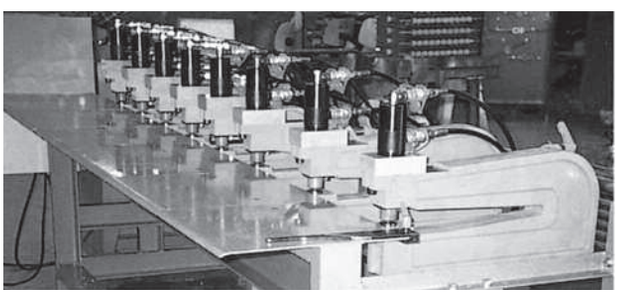
Hydraulic short-stroke cylinder, double-action

These hydraulic short-stroke cylinders are only used to operate hydraulic double-action punching, notch and cut-off units.
They may be interchanged between the individual hydraulic punching units using a mounting flange. Suitable mounting flanges are available on request.

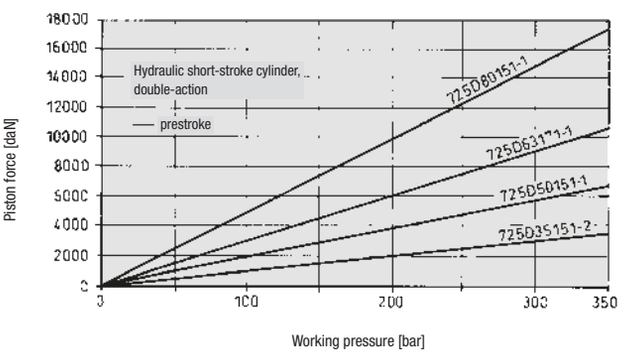
Technical features:

- Solid construction.
- Optimum piston rod guide: hardened piston rod for protection against corrosion and wear, as well as for improved gliding.
- Honed cylinder tubes.
- Slide surfaces for lip seal and piston rod are finely ground and polished to extend the service life and improve the functionality of the seals.
- All seals have standard dimensions.
- Lateral oil ports, plus the prestroke port on the cylinder bottom
- Model 725D80151-1 is equipped with G3/8 oil ports.





Hydraulic short-stroke cylinder to operate punching units as series punch installation.



Order No.	Piston force at 100 bar Prestroke [daN]	Piston force at 100 bar Return stroke [daN]	Piston force, comparable with old Order No.	Piston Ø [mm]	Max. stroke S [mm]	Max. working pressure [bar]	Piston surface Prestroke [cm²]	Piston surface Return stroke [cm²]	Oil consumption/stroke Prestroke [cm³]	Oil consumption/stroke Return stroke [cm³]	Port G 3x	Weight ~ [kg]
725D35151-2	**962**	**647**	7112	35	15	350	9.62	6.47	14.4	9.7	G1/4	1.9
725D50151-1	**1963**	**1472**	7100	50	15	350	19.63	14.72	29.5	22.1	G1/4	3
725D63171-1	**3117**	**2267**	7111	63	17	350	31.17	23.13	53	39.3	G1/4	4.5
725D80151-1	**5026**	**3769**	7113	80	15	350	50.26	37.69	75.4	56.6	G3/8	10

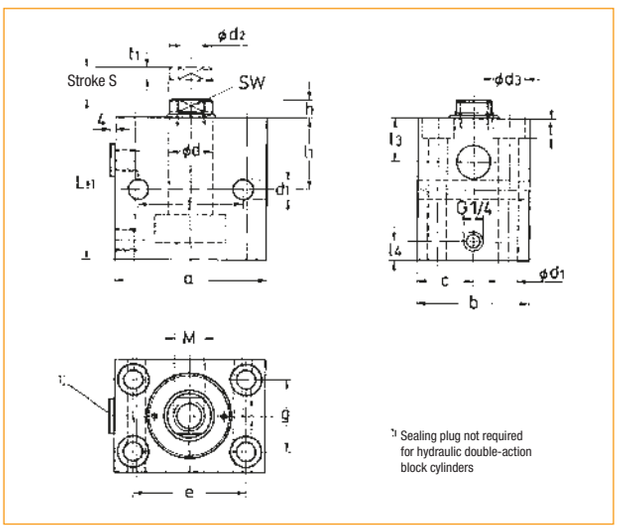
Order No.	a	a¹	Ød	ØD	ØD1	h	h1	h2	~H	l	l1	M	M1	SW	t1
725D35151-2	40	–	25	50	20	9	7	30	159	98	52	M48x1.5	M10	17	25
725D50151-1	47	9.5	25	65	25	6	7	30	145	85	54	M64x1.5	M12	20	30
725D63171-1	–	–	–	97	32	9	7	32	150	96	45	M80x2	M16	27	30
725D80151-1	65	–	28	105	40	9	7	29.5	183.5	102	72.5	M80x2	M16	36	31

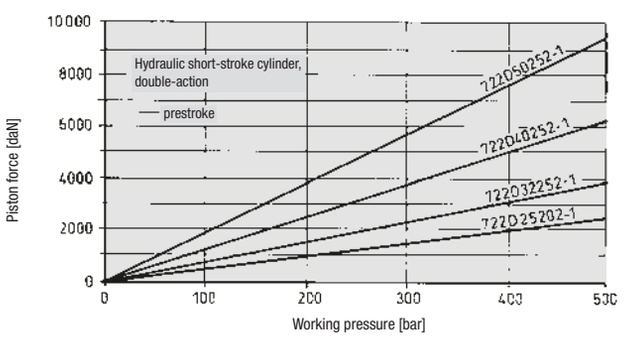
Hydraulic block cylinder, double-action

These hydraulic double-action block cylinders are designed for use with hydraulic tool units of series 161 and 666.
Their block design makes them suitable for a wide range of applications, such as clamping, pressing, aligning and straightening.

Technical features:

- Lateral hydraulic connections
- Spring retraction
- Slide ring seal with extended service life
- No stick-slip effect
- Hardened piston rod
- High resistance to transversal forces through extended piston rod guide.
- Piston rod with internal thread





Order No.	Piston force at 100 bar Prestroke [daN]	Return stroke [daN]	Piston force, comparable with old Order No.	Piston Ø [mm]	Max. stroke S [mm]	Max. working pressure [bar]	Piston surface Prestroke [cm²]	Return stroke [cm²]	Oil consumption/stroke Prestroke [cm³]	Return stroke [cm³]	Port G 3x	Weight ~ [kg]
722D25202-1	480	284	7551-1	25	20	500	4.91	2.9	9.82	5.8	G1/4	1.4
722D32252-1	788	480	7552-1	32	25	500	8.04	4.9	20.1	12.25	G1/4	2.0
722D40252-1	1232	751	7553-1	40	25	500	12.56	7.66	31.4	19.15	G1/4	2.8
722D50252-1	1925	1136	7554-1	50	25	500	19.64	11.59	49.1	29	G1/4	5.7

Order No.	a	b	c	Ød	$Ød_1$	$Ød_2$	$Ød_3$	e	f	g	h	L	l_1	l_3	l_4	M x depth	SW	t	t_1
722D25202-1	65	45	22.5	16	8.5	15	13.5	50	50	30	7	84	46	32	11	M10x15	13	9	5.5
722D32252-1	75	55	27.5	20	10.5	19	18	55	55	35	10	97	50	34	11	M12x18	17	11	7
722D40252-1	85	63	31.5	25	10.5	24	18	63	63	40	10	98	49	33	11	M16x25	21	11	7
722D50252-1	100	75	37.5	32	13	31	20	76	76	45	10	110	54	38	13	M20x30	27	13	8

Standard hydraulic unit

The compact units are perfectly suitable for continuous use and ensure low-noise operation. They create maximum working pressures between 275 bar and 350 bar. One working cycle is included in the scope of supply. Extensions are possible. Please check which options are appropriate for your particular application.

Special units with higher power, modified working pressures, multiple working cycles and special control circuits are designed according to customer's request. We are pleased to advise you on our solutions.

Technical data

Item number	**12972-0015**	**12972-004**	**12972-005**	**12972-007**
Power	1,5kW	4 kW	5,5 kW	7,5 kW
Weight	30 kg	110 kg	130 kg	160 kg
Power supply	240V, 50Hz	400 V, 50 Hz	400 V, 50 Hz	400 V, 50 Hz
Output capacity	4,5 l/min.	7,4 l/min.	9,1 l/min.	14,5 l/min.
Working pressure	275 bar	350 bar	350 bar	350 bar
Pump type	external geared wheel pump	internal geared wheel pump	internal geared wheel pump	internal geared wheel pump
Tank	8 litres special tank	63 litres DIN steel tank	63 litres DIN steel tank	100 litres DIN steel tank
Cooling	without	oil/air heat exchanger	oil/air heat exchanger	oil/air heat exchanger
Filter	20 µm filling and ventilation filter	return filter 10 µm filling and ventilation filter	return filter 10 µm filling and ventilation filter	return filter 10 µm filling and ventilation filter
Filter monitoring	optic	optic	optic	optic
Level monitoring	optic	optic	optic	optic
Temperature monitoring	optic	optic	optic	optic
Acoustic press. level of hydr. pump	75 dB(A)	65 dB (A)	65 dB (A)	65 dB (A)
Theoretical cycle times for 1 cylinder Ø 50 mm / stroke 10 mm	0,9 sec (move out and in)	0,6 sec (move out and in)	0,5 sec (move out and in)	0,3 sec (move out and in)
Valve	4/3-way valve, electric	4/3-way valve, electric	4/3-way valve, electric	4/3-way valve, electric

Electric control units

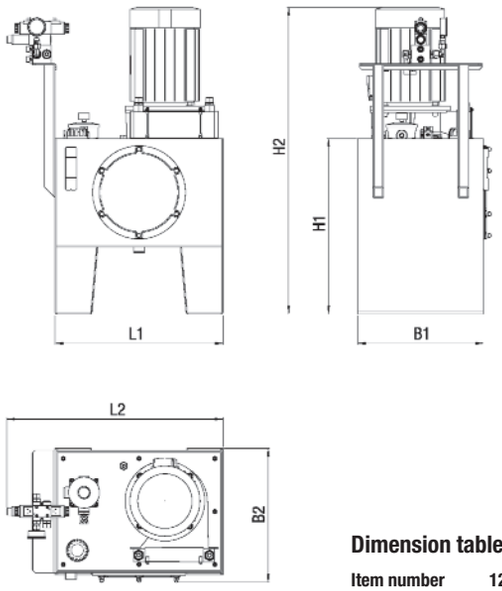
The design of the control unit and the safety components can be discussed and checked in the individual case.
Some control types are shown on the rear.

Options:

- oil collection container according to Water Resources Act, § 19.1
- electric filter monitoring
- electric level and temperature monitoring (not available for item no. 12972-0015)
- pressure filter
- water cooling
- mechanical or digital pressure switches in the pressure line for monitoring
- mechanical or digital pressure switches in the consumer devices for control
- proportional and servo valves (not available for item no. 12972-0015)
- one-way check valve leading to the different consumer devices
- hydraulic pilot-controlled check valves leading to the different consumer devices

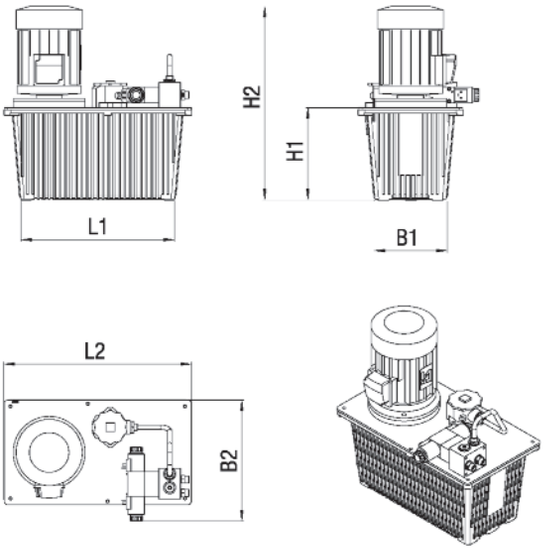
Hydraulic unit: 12972-004, 12972-005 and 12972-007

Dimension X depends on the control type



Hydraulic unit: 12972-0015

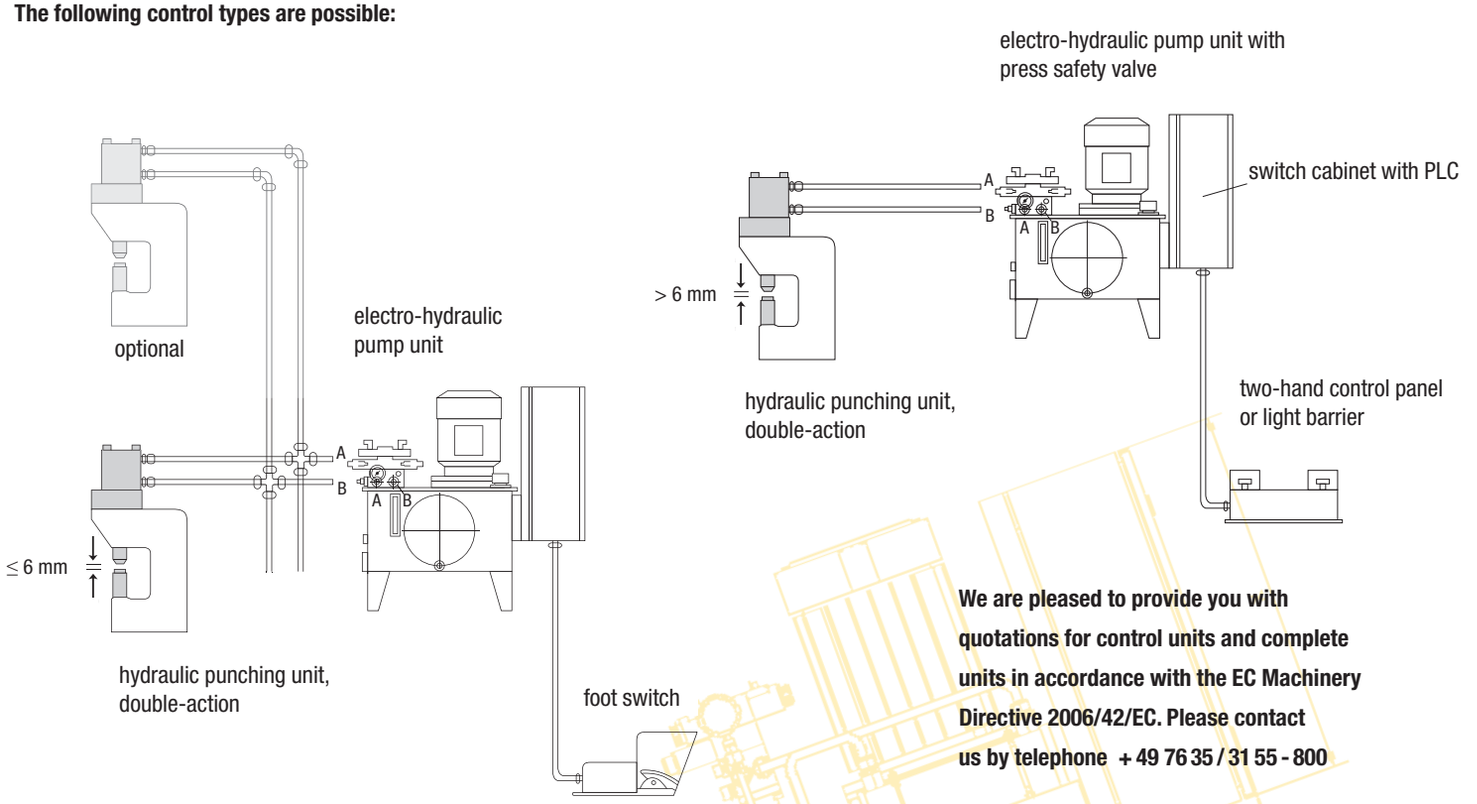
Dimension X depends on the control type



Dimension table

Item number	12972-002	12972-004	12972-005	12972-007
length L1	427	508	508	633
length L2	521	690	690	815
width B1	203	375	375	474
width B2	336	406	406	503
height H1	256	660	660	660
height H2	537	1065	1065	1153

The following control types are possible:



We are pleased to provide you with quotations for control units and complete units in accordance with the EC Machinery Directive 2006/42/EC. Please contact us by telephone + 49 76 35 / 31 55 - 800

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