TOOLS

werkzeugtechnik

ips Werkzeugtechnik

Which punching unit or which punching machine do you need to offer efficient, flexible and reliable solutions for individual customer requirements? **ips-werkzeugtechnik's** job is to find the appropriate solution for you ...

... because **ips** stands for **i**ntelligent **p**unching **s**olutions**.** An extensive know-how on both industrial sector and application requirements provide the basis for intelligent solutions. The high-quality tool units in the present catalogue are to a large part the product of this know-how. Depending on the application, these units are ideally suited to be combined and extended to complete systems.

Furthermore, we also develop solutions which are tailor-made to your individual requirements. No matter whether you are looking for a single component, a standard application product or a customised special solution: **ips** will provide you with the perfect punching machine to improve your punching productivity. Developed, manufactured and assembled in Germany: high quality products at competitive prices.

In October 2006, ips-werkzeugtechnik took over the punching technology segment of DE-STA-CO Europe & Co. Werkzeugtechnik, which has earned us a new strategic position on the market. We have gained many years of professional experience, a tried and tested product range, technological know-how, knowledge on the industrial sectors and a high innovation potential. These strengths are now being enhanced in a team which has long since been working together. The goal of our efforts is to be your first-class supplier for every aspect of the punching process.

Roger Schlitter
Dipl-Ing/FH, Managing Director

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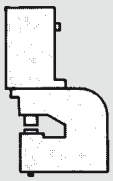
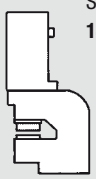
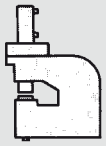
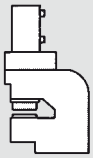
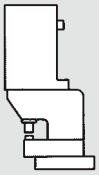
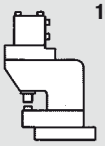
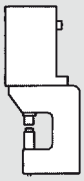
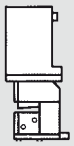
Pneumatic and hydraulic punching units

Series	Illustration	Punch diameter range	Throat depth range	Shapes	Material thickness	Cylinder force [kN]	Page
141 142 143 144	 Series **141** **142** **143** Pneumatic punching units  Series **144**	2–13 8–25 25–40 40–63	100 200		max. 5	20 40 80	38, 39
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	40, 41

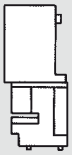
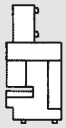
Pneumatic and hydraulic profile punching units

Series	Illustration	Punch diameter range	Throat depth range	Shapes	Material thickness	Cylinder force [kN]	Page
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 68 80 109	42, 43
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		44, 45

Pneumatic and hydraulic 90° notch units

Series	Illustration	Notch size	Notch shape	Material thickness	Cylinder force [kN]	Page
640 660	 Series **640** Pneumatic notch units  Series **660** Hydraulic double-action notch units	63x63	e.g. 	max. 5	68 71 80 109	40 46

Pneumatic and hydraulic rectangle notch units

Series	Illustration	Notch size	Notch shape	Material thickness	Cylinder force [kN]	Page
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	47 109

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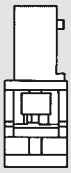
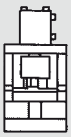
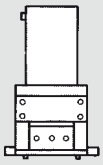
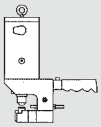
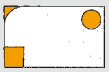
Pneumatic and hydraulic radius cut units

Series	Illustration	Radius range	Cutting ∢ α	Cutting shape	Material thickness	Cylinder force [kN]	Page
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	48

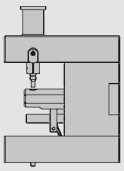
Pneumatic and hydraulic cut-off units

Series	Illustration	Cutting width	Cut-off	Material thickness	Cylinder force [kN]	Page
649	 Serie **649** Pneumatic cut-off unit	125		max. 5	40	49

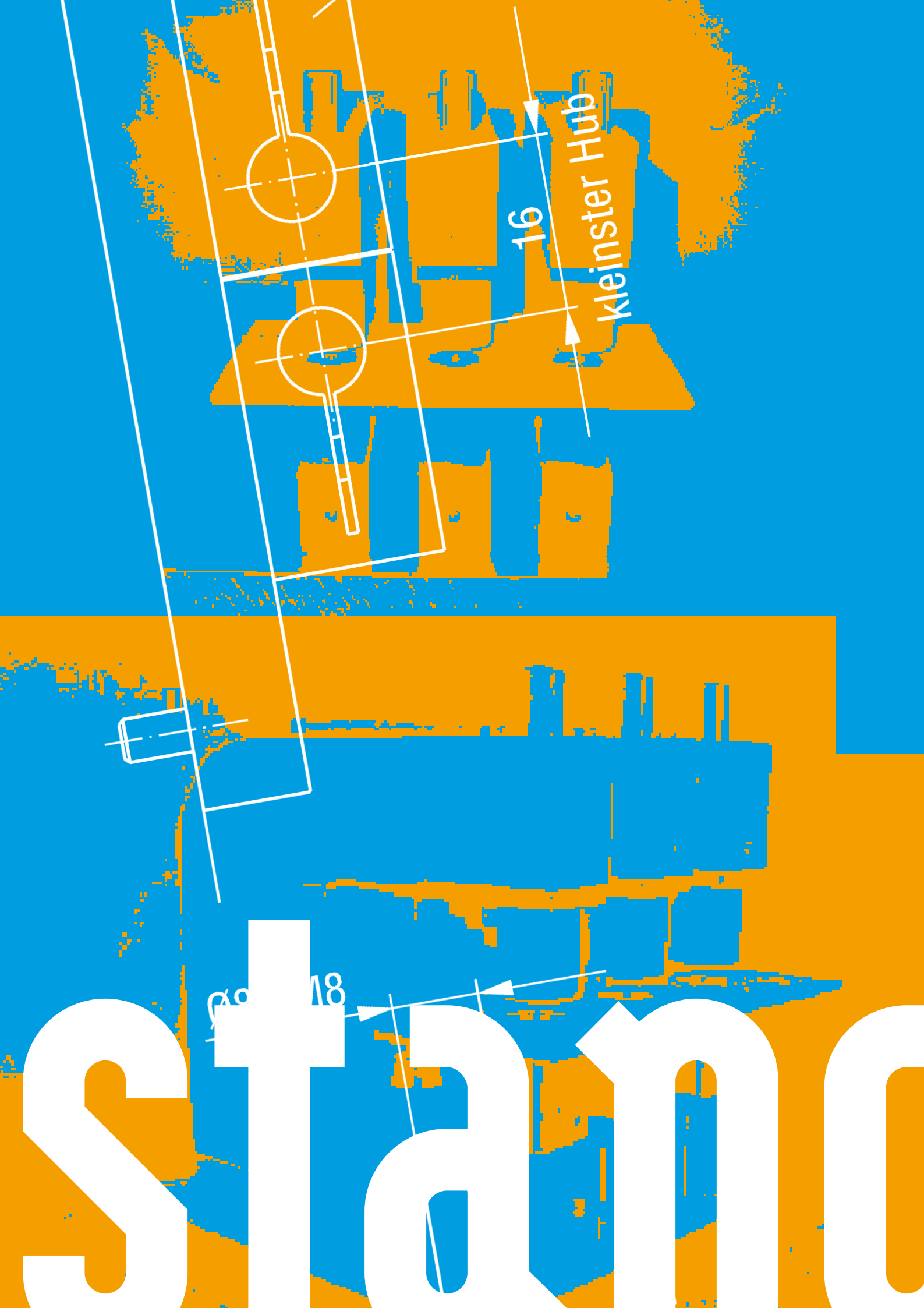
Mobile pneumatic units for punching and notching

Series	Illustration	Punch diameter / radius range	Cutting ∢	Side length	Notch shape	Material thickness	Cylinder force [kN]	Page
1421	 **1421-0512L** **1421-0512R** **1421-0512K**	Ø 2–13 R 3–R 18 –	– 90° max. 90°	– – max. 20x20		max. 3	12	50

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

Series	Illustration	Punch diameter range	External pipe diameter	Pipe thickness	Cylinder force [kN]	Page
101-RLA 141-RLA 161-RLA		2–13	40–60	1–5 1–3 1–5	– 80 68	51–52

Accessories


16
kleinster Hub
ø18


16
kleinster
Ø12 / M12

Description

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.

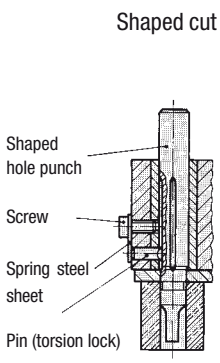
Uniform construction height

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

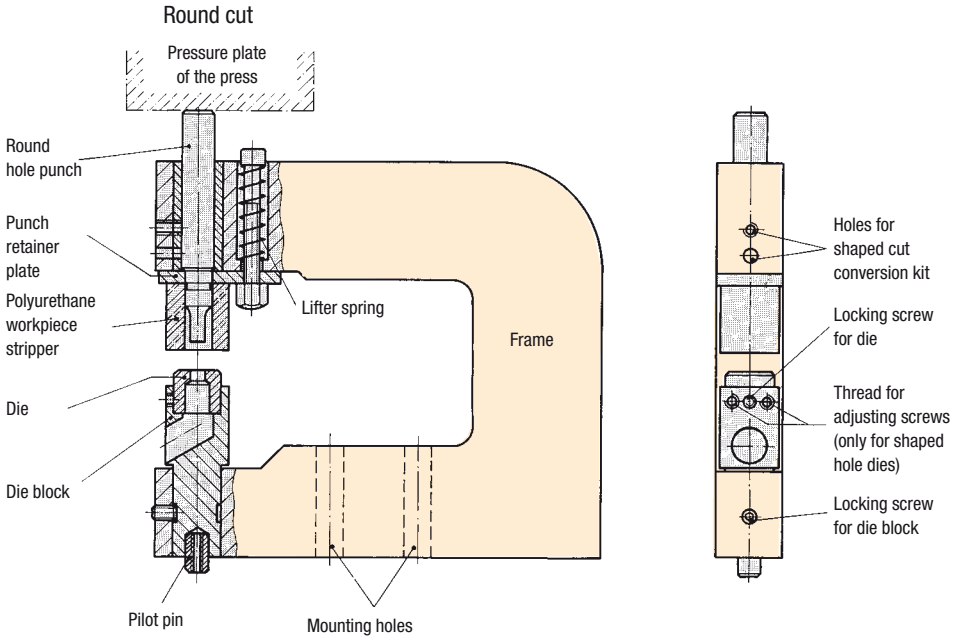
Stable construction

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

Punching units

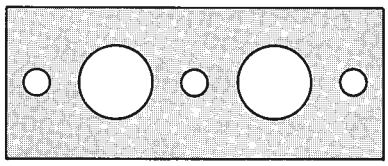


Installation and machining options

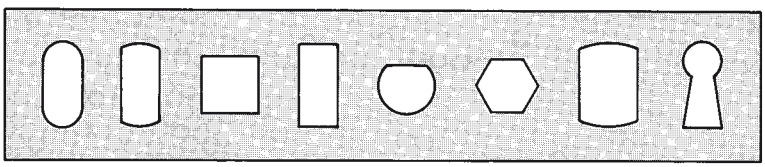


Machining options

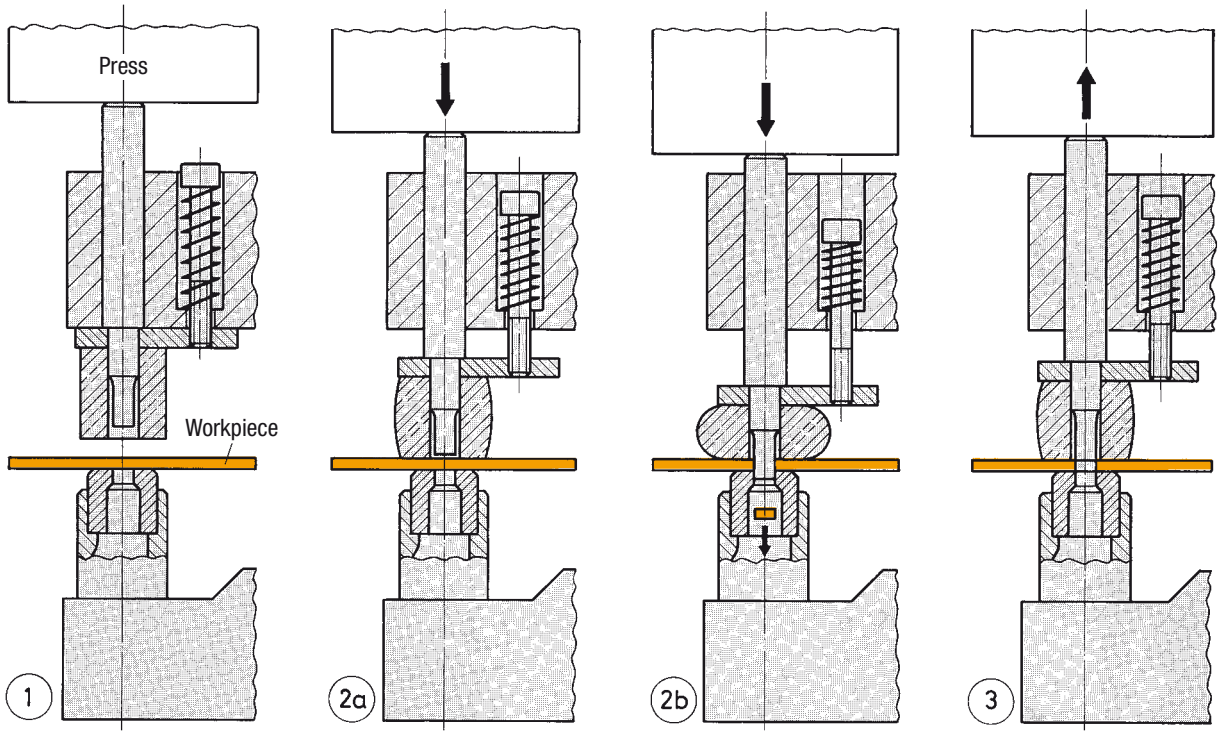
Round cut



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«.

Description

Ⓐ
90° notch unit with gauging table

Ⓑ
Rectangle notch unit

Ⓒ
Radius cut unit

Ⓓ
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.

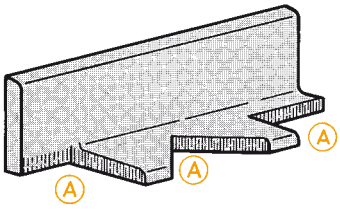
By adjusting the press stroke the difference resulting from the resharpening of the punch blade is compensated for.

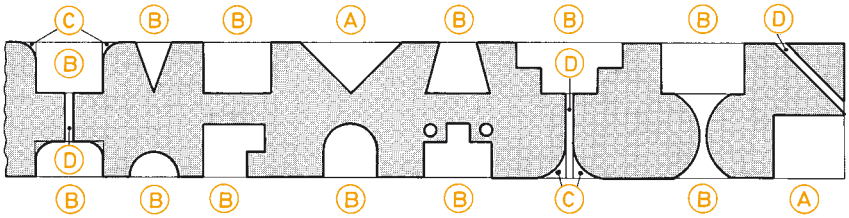
In contrast to the 90° notch units and cut-off units, the cutting tools for the rectangle notch units and the radius cut units are specially made to customer specifications for the respective material thickness and the desired shape.

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



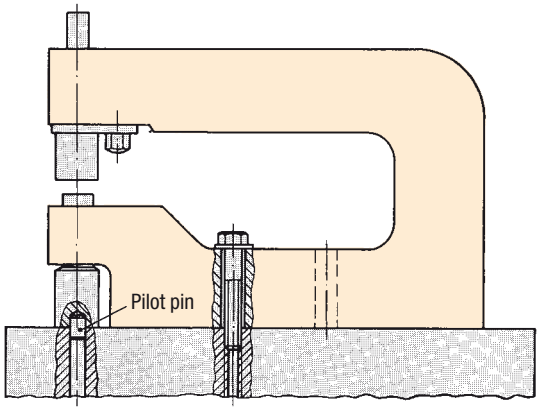


Assembly and adjustment of the tool units

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

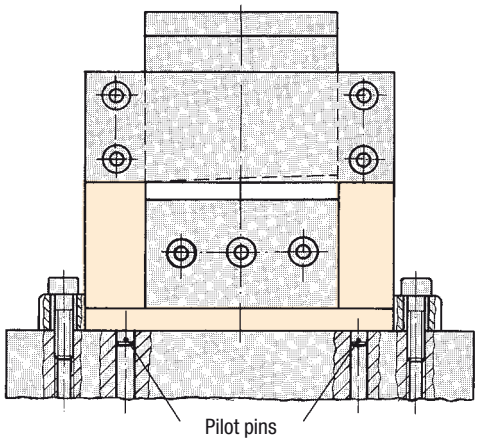


Assembly of the 90° notch units, rectangle notch units, radius cut units and cut-off units

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 on pages 46, 47 and 49.

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.

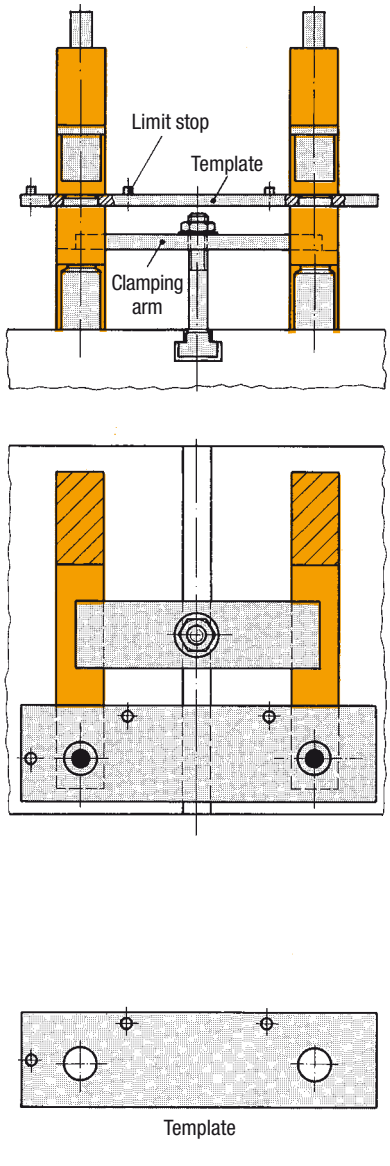
The holes in the template correspond to the outside diameter of the die of the respective punching unit. The thickness of the template should be approximately 6 mm.

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).

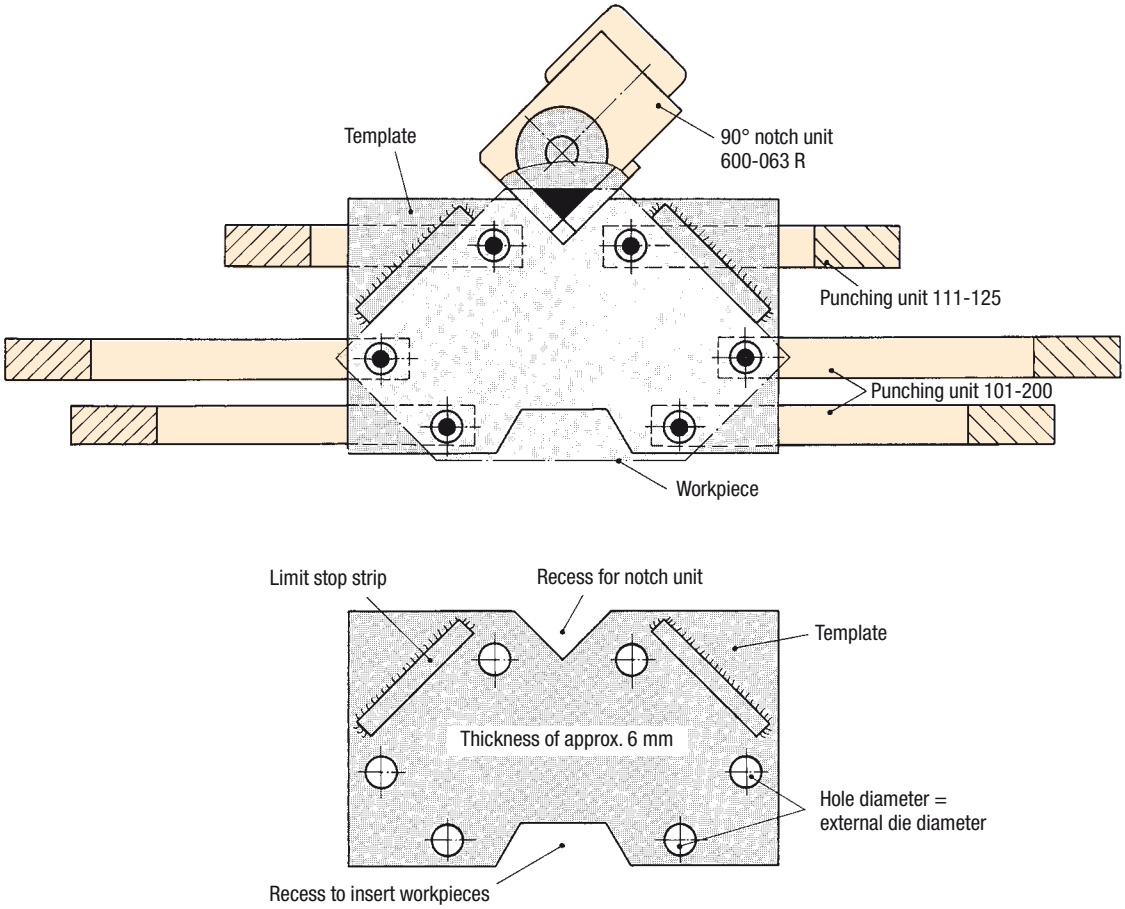
Fig. 3: Tool setting of 2 punching units



Description

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.

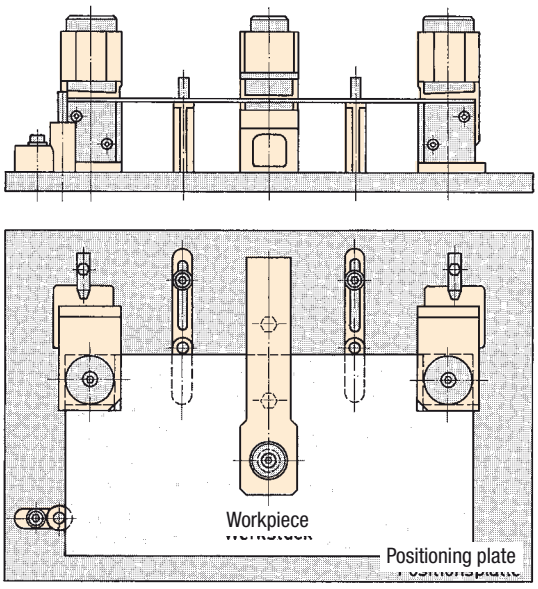
The positioning plate is equipped with holes Ø10^{H7} which correspond to the desired punch layout. The tool units are positioned exactly in these holes by means of the pilot pins in the bottom.

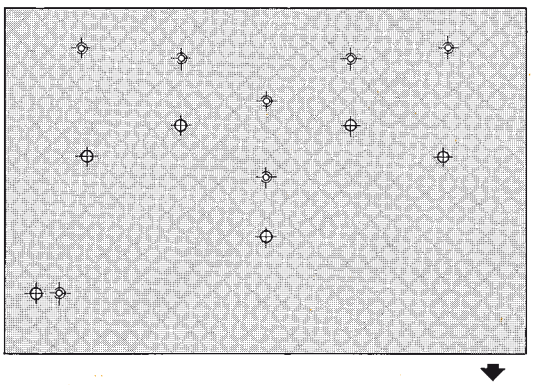
The tool units are fastened in a similar way to that illustrated in figures 1 and 2 on page 13.

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.

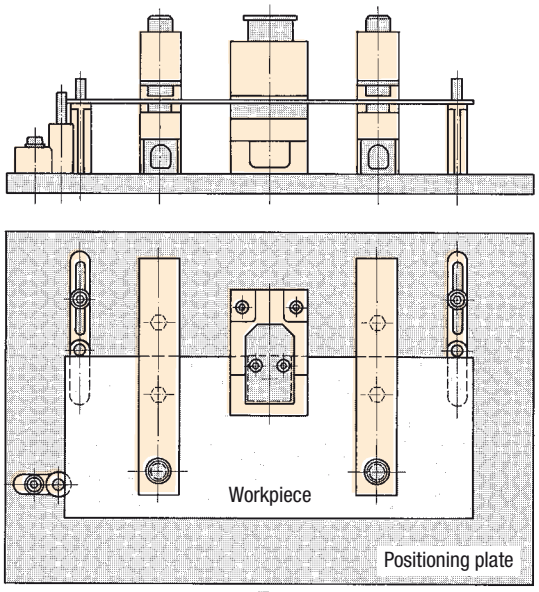
Fig. 5: Design of a combined positioning plate for the processing of 2 different workpieces

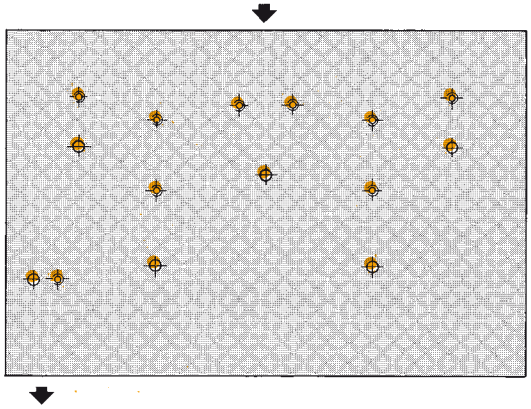
Application example I
for one punching unit and two 90° notch units



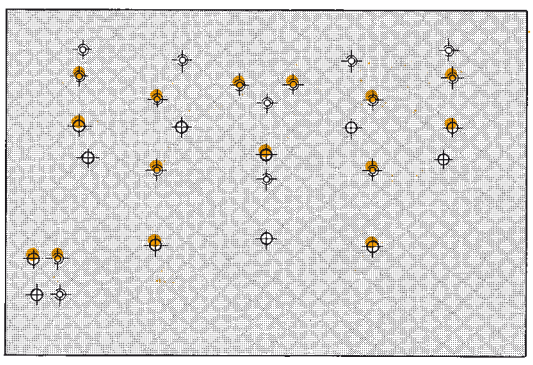


Application example II
for two punching units and one rectangle notch unit





Positioning plate
with positioning and
mounting holes
for application example I



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

Description

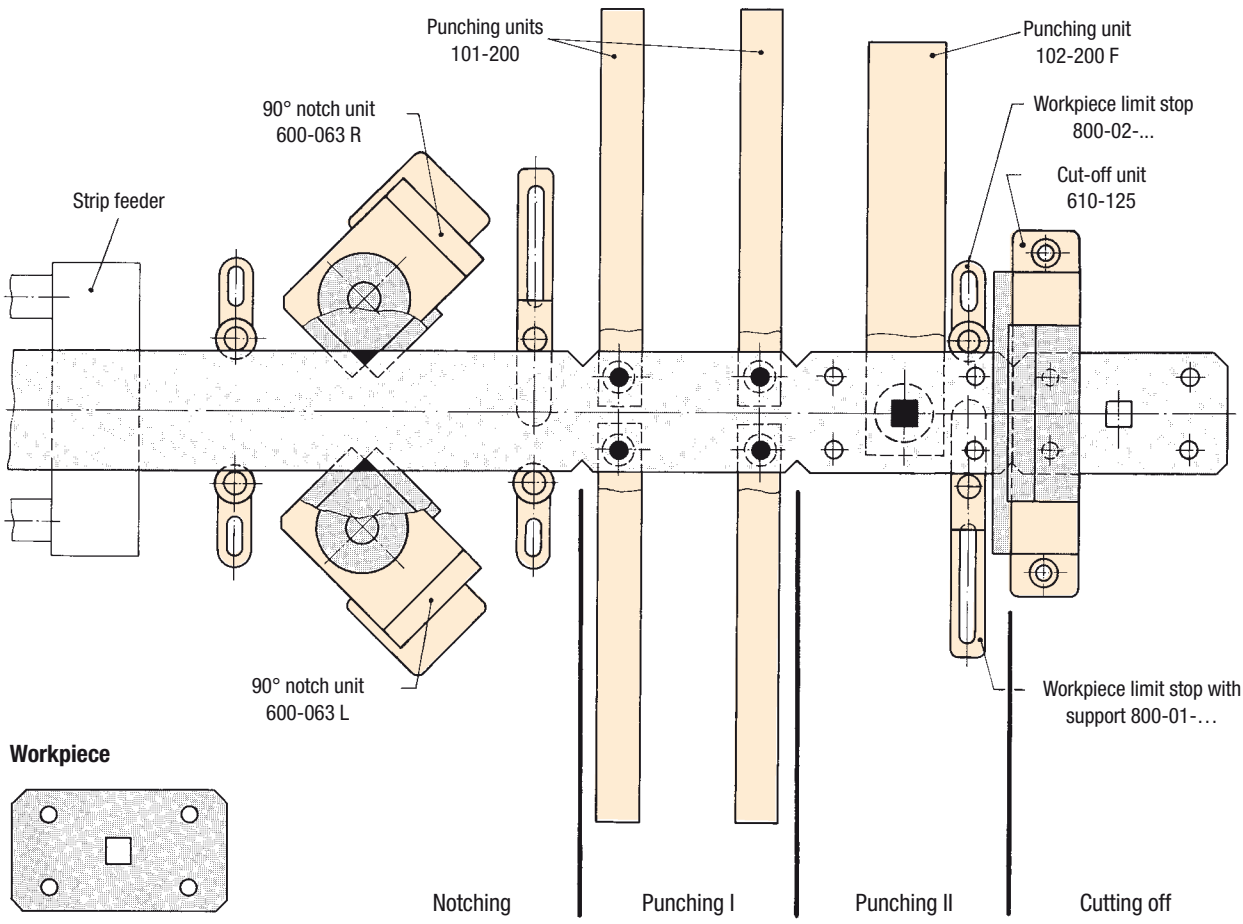
Automation

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.

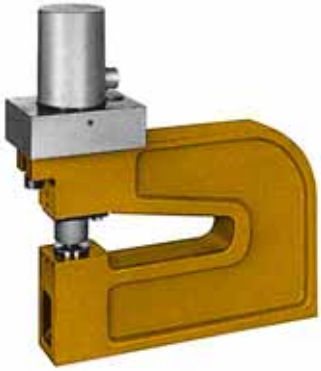
The lower position of the press ram is adjusted in such a way that the distance between the upper edge of the press table and the lower edge of the press ram amounts to 189 ± 1 mm.

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 on page 68 provide a quick overview.

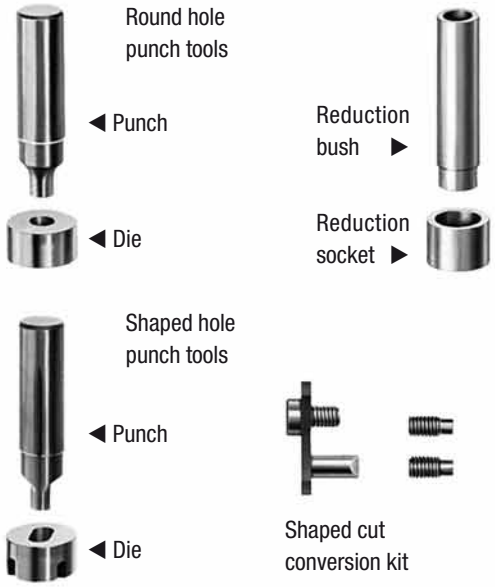
As illustrated on the left, the most important difference to the press-operated tool units is the top mounted drive cylinder.

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.

Description




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, see pages 56 and 57
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**, see page 62. The appropriate polyurethane workpiece stripper is included.

Shaped hole punch tools, see pages 58 and 59
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, see page 63
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, see page 63
Compensation washers are required after sharpening to adjust the die to the height of the material support.

Polyurethane workpiece stripper, see page 64
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, see page 66
Workpiece supports and limit stops are important accessories for the feeding of the workpiece or strip material.

Universal workpiece limit stop, see page 65
This versatile device forms the ideal connection between the workpiece support and limit stop. Examples of a wide variety of uses are illustrated on page 65.

Coordinate limit stop, see page 66
Coordinate limit stops enable the distance between holes to be quickly and easily set. Time consuming set-up work with limit stops is unnecessary.

Tool units for caulking corner connections

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**

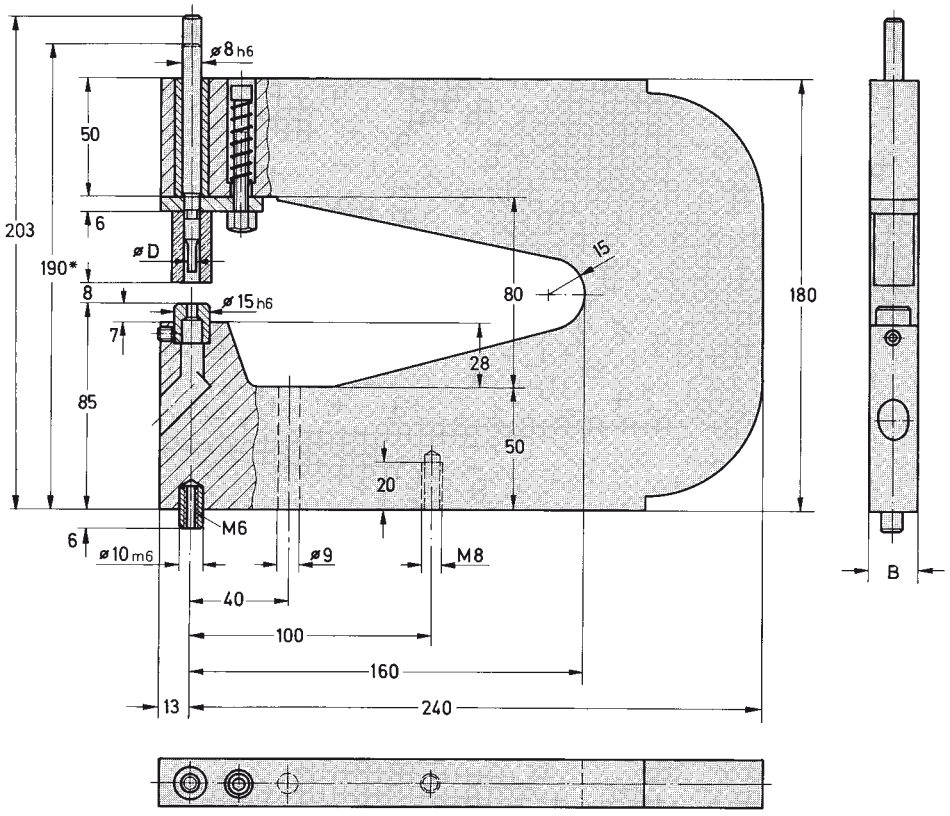
Material thickness for steel St 60 **0.3–5 mm**

[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, as well as pages 56 to 57.

Accessories see pages 62 to 66

Cutting force chart see page 68



* 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** pages 56 and 57

Punching units, 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**

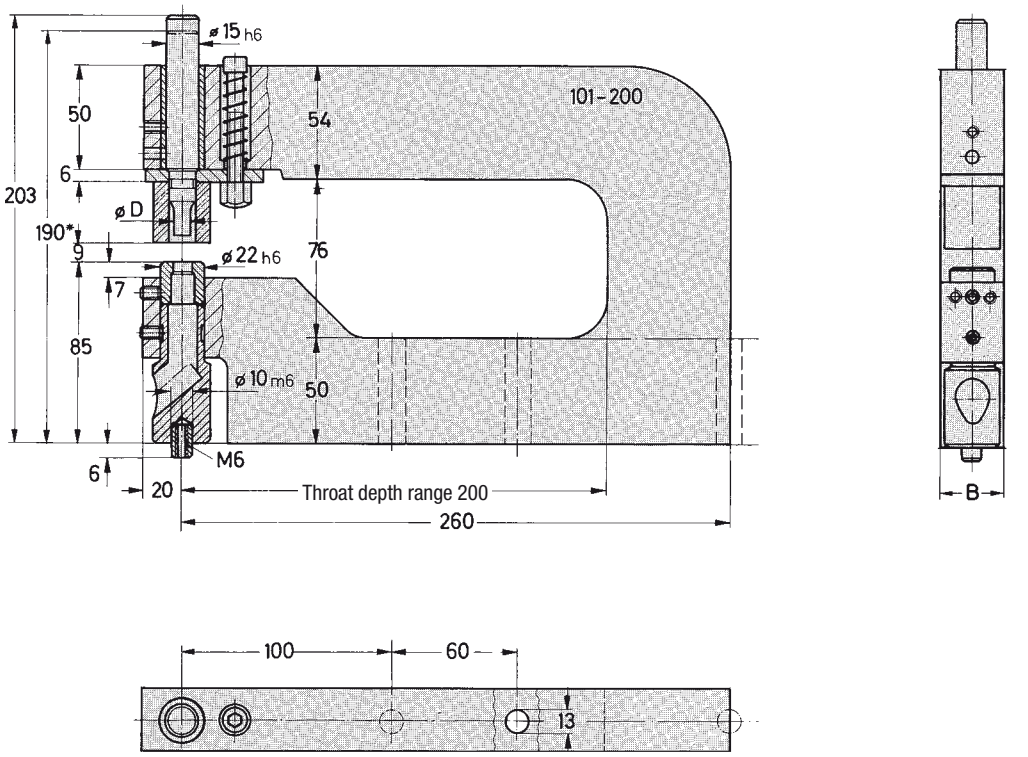
[1)] Hole Ø 12 to 13 mm only in material thickness up to 3 mm.

It is possible to punch holes with Ø 2–7 mm by using reduction bushes and reduction sockets (see page 62), 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, as well as pages 56 to 59.

Accessories see pages 62 to 66

Cutting force chart see page 68



* 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** pages 56 to 59

Punching units, hole Ø 8–25 mm

Round and shaped cuts

Hole diameter **8–25 mm**[1)]

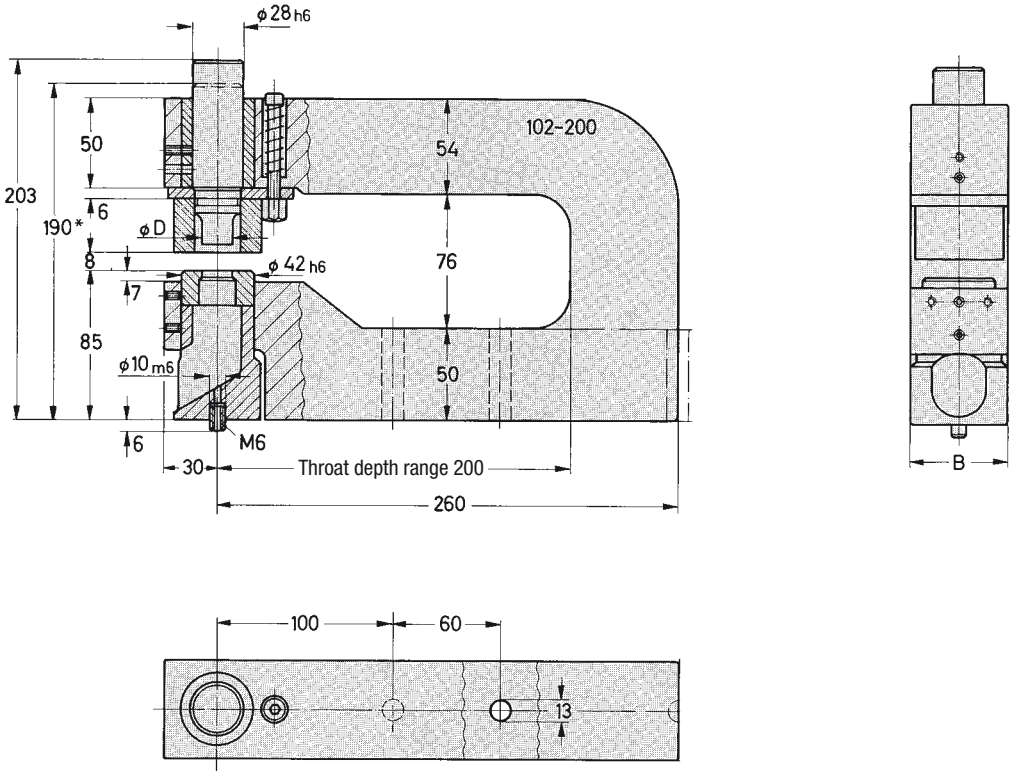
Material thickness for steel St 60 **0.3–5 mm**

[1)] It is possible to punch holes with Ø 2–8 mm by ordering a reduction bush and reduction socket (see page 62)

Punching tools (punch and die) have to be ordered separately. See table below, as well as pages 56 to 59.

Accessories see pages 62 to 66

Cutting force chart see page 68



* 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** pages 56 to 59

Punching units, hole Ø 25–40 mm

Round and shaped cuts

Hole diameter **25–40 mm**[1)]

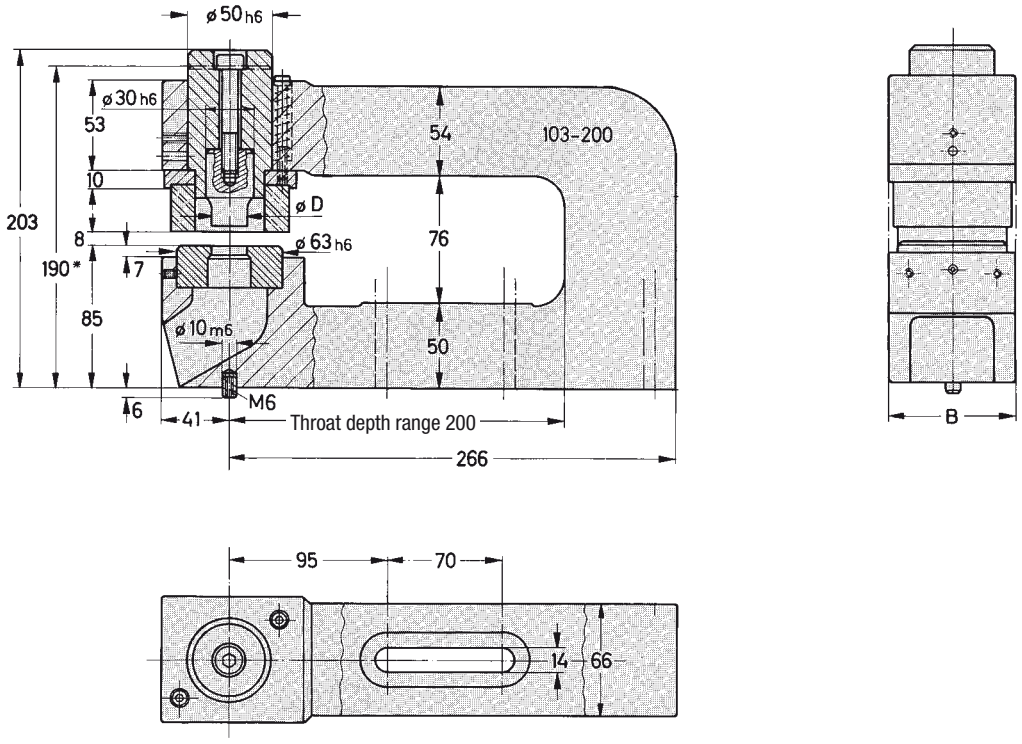
Material thickness for steel St 60 **0.3–5 mm**

[1)] Punching tools for holes with Ø 20–25 mm are available on request in special sizes, see page 57.

Punching tools (punch and die) have to be ordered separately. See table below, as well as pages 56 to 59.

Accessories see pages 62 to 66

Cutting force chart see page 68



* 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** pages 56 to 59

Punching units, hole Ø 40–63 mm

Round and shaped cuts

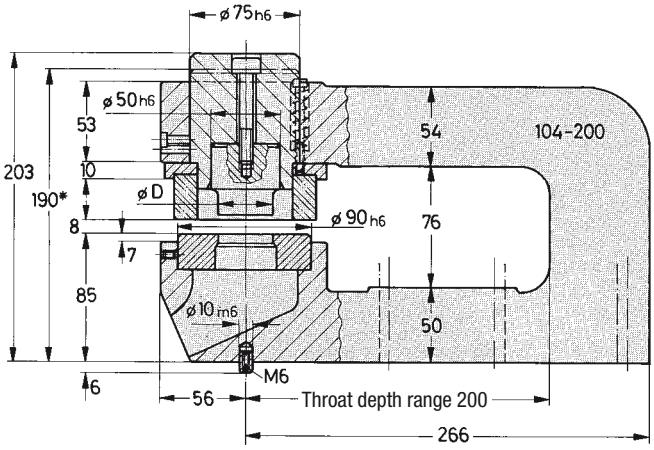
Hole diameter **40–63 mm**

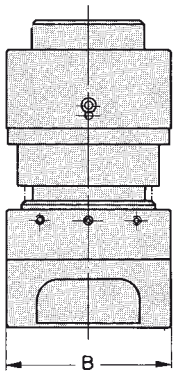
Material thickness for steel St 60 **0.3–5 mm**

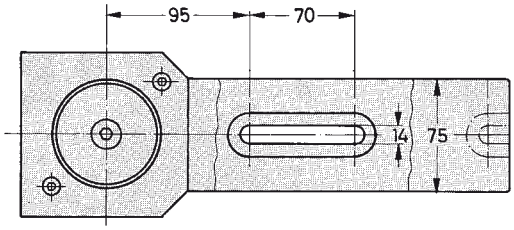
Punching tools (punch and die) have to be ordered separately.
See table below, as well as pages 56 to 59.

Accessories see pages 62 to 66

Cutting force chart see page 68







* 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** pages 56 to 59

Punching units, hole Ø 63–100 mm

Round and shaped cuts

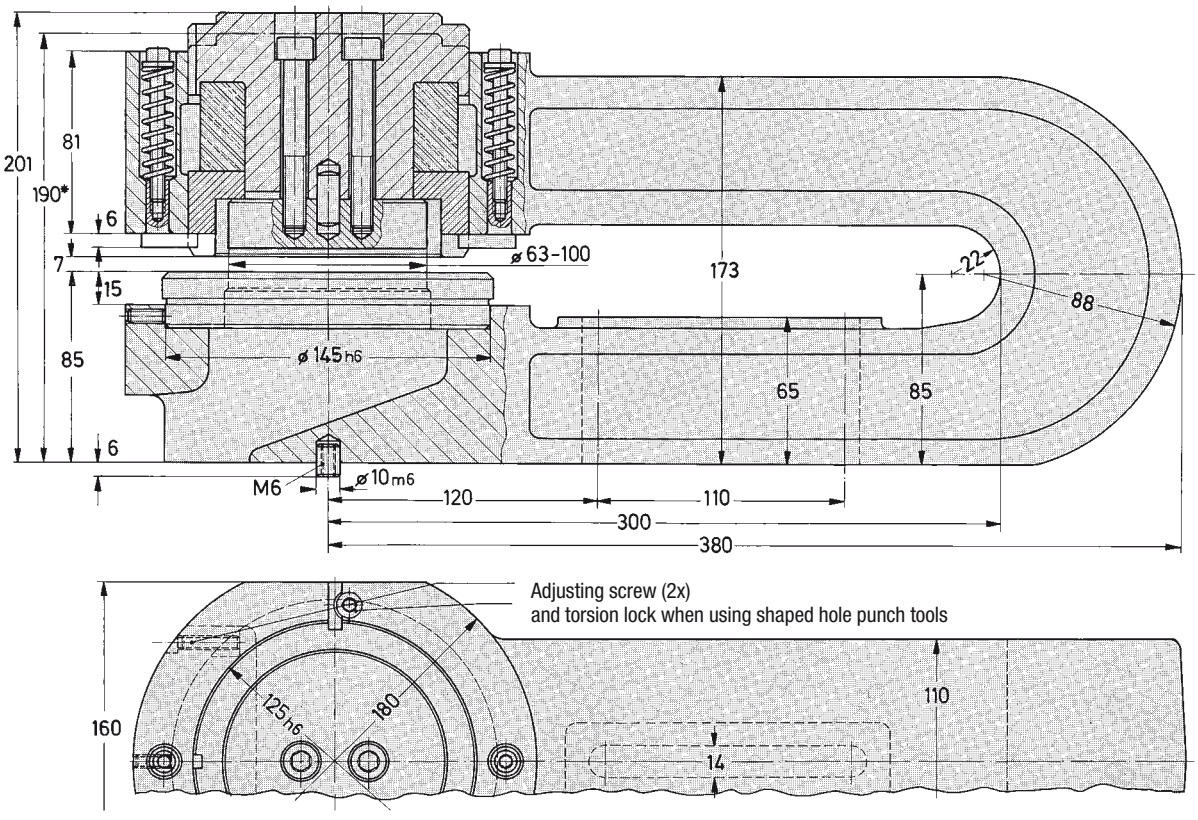
Hole diameter **63–100 mm**

Material thickness for steel St 60 **0.75–5 mm**

Punching tools (punch and die) have to be ordered separately.
See table below, as well as pages 56 to 59.

Accessories see pages 62 to 66

Cutting force chart see page 68



* 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** pages 56 to 59

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).

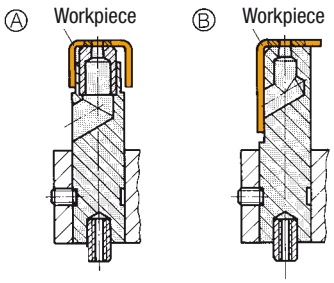
In both cases, the punching of very small profiled parts is possible after removing the standard die block.

Punching tools (punch and die) have to be ordered separately. See table below, as well as pages 56 to 59.

Accessories see pages 62 to 66

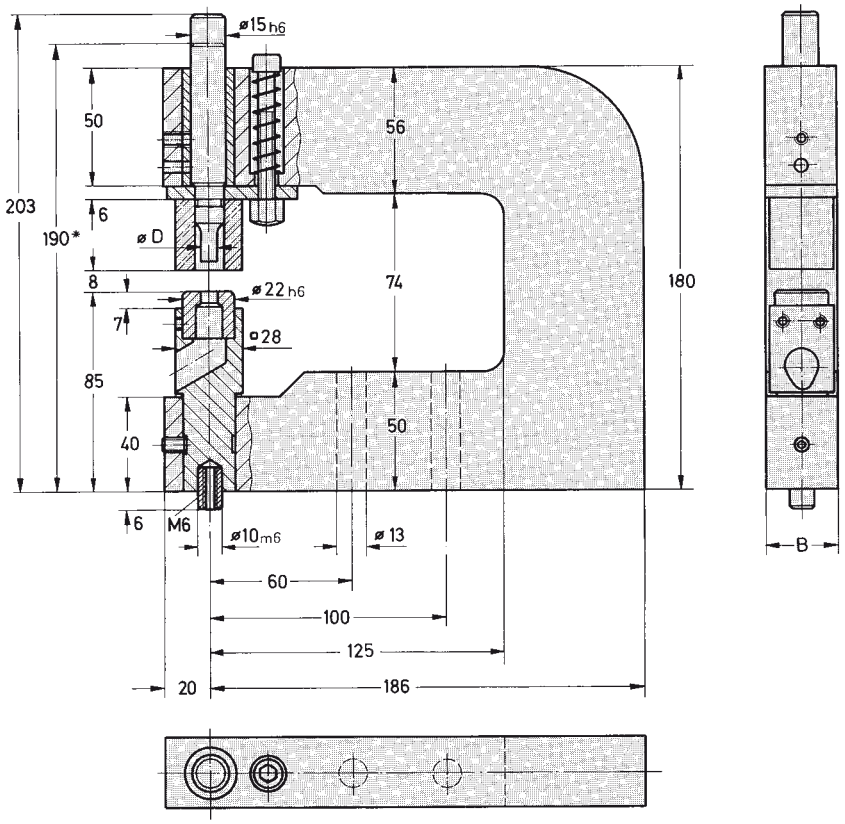
Cutting force chart see page 68

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** pages 56 to 59

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**

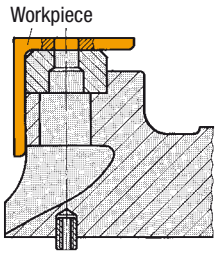
With small modifications these punching units are suitable for punching L-, U-, or Z-profiles, see application example.

Punching tools (punch and die) have to be ordered separately. See table below, as well as pages 56 to 59.

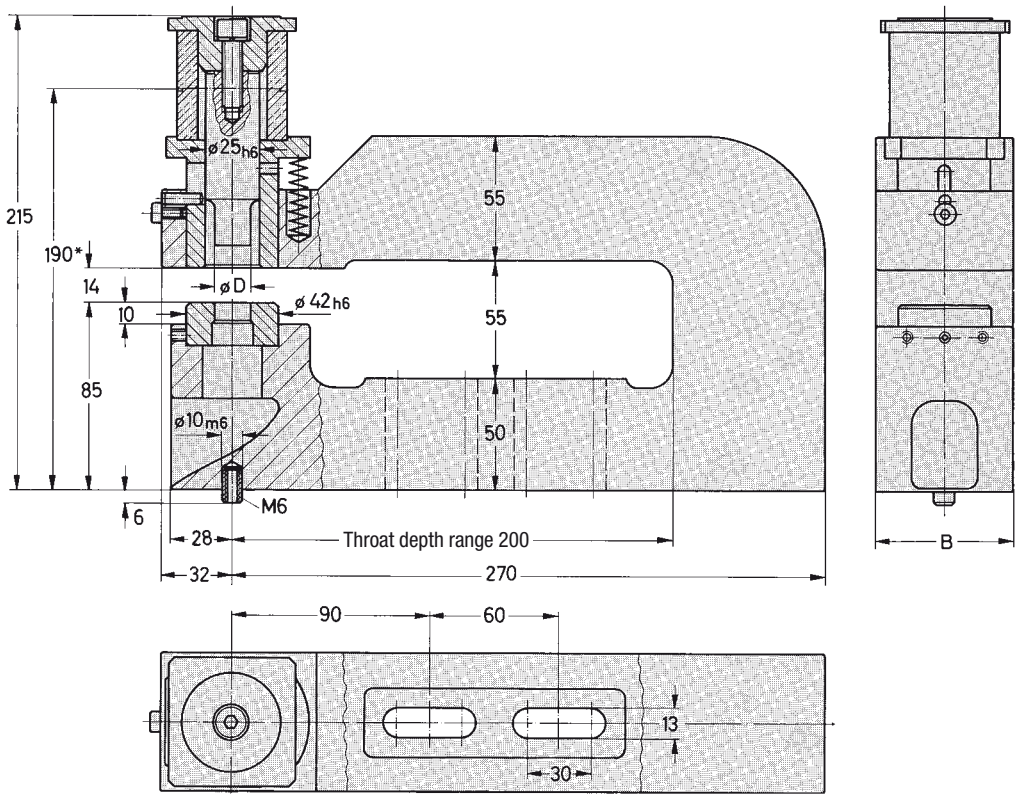
Accessories see pages 62 to 66

Cutting force chart see page 68

Example



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** pages 56 to 59

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**

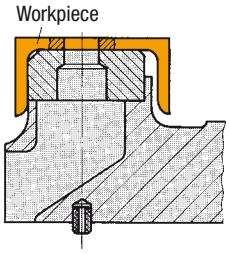
With small modifications these punching units are suitable for punching L-, U-, or Z-profiles, see application example.

Punching tools (punch and die) have to be ordered separately. See table below, as well as pages 56 to 59.

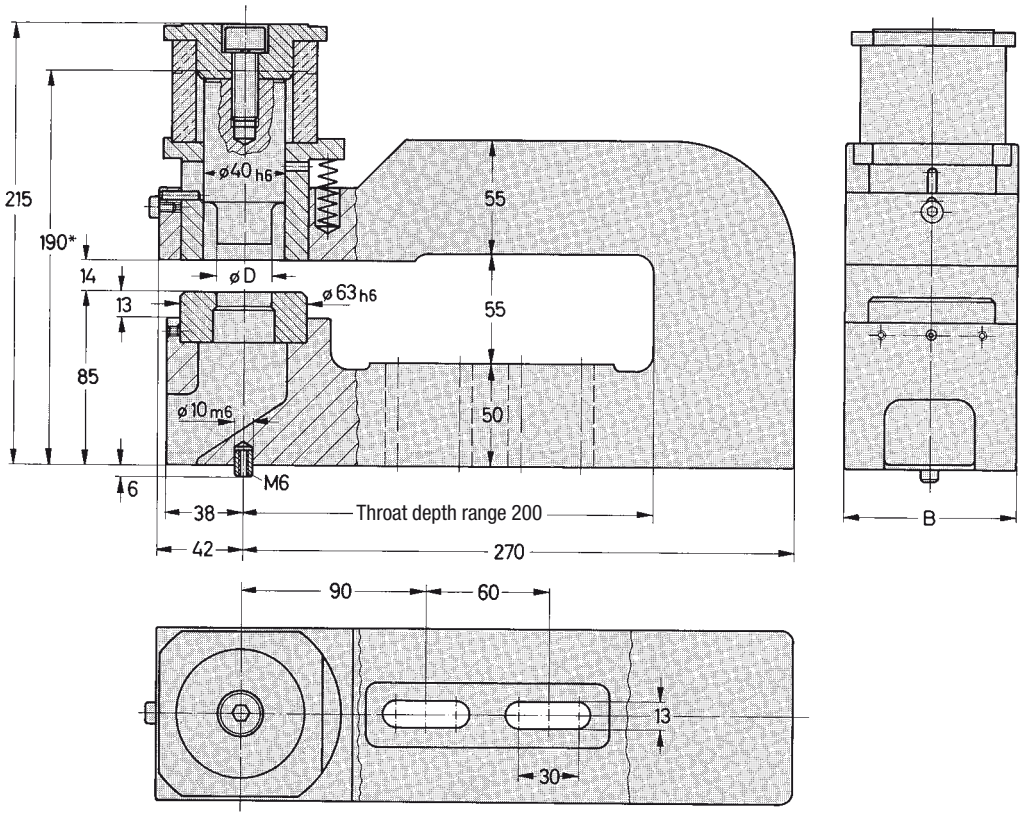
Accessories see pages 62 to 66

Cutting force chart see page 68

Example



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** pages 56 to 59

Punching unit, hole Ø 35–63 mm

Round and shaped cuts

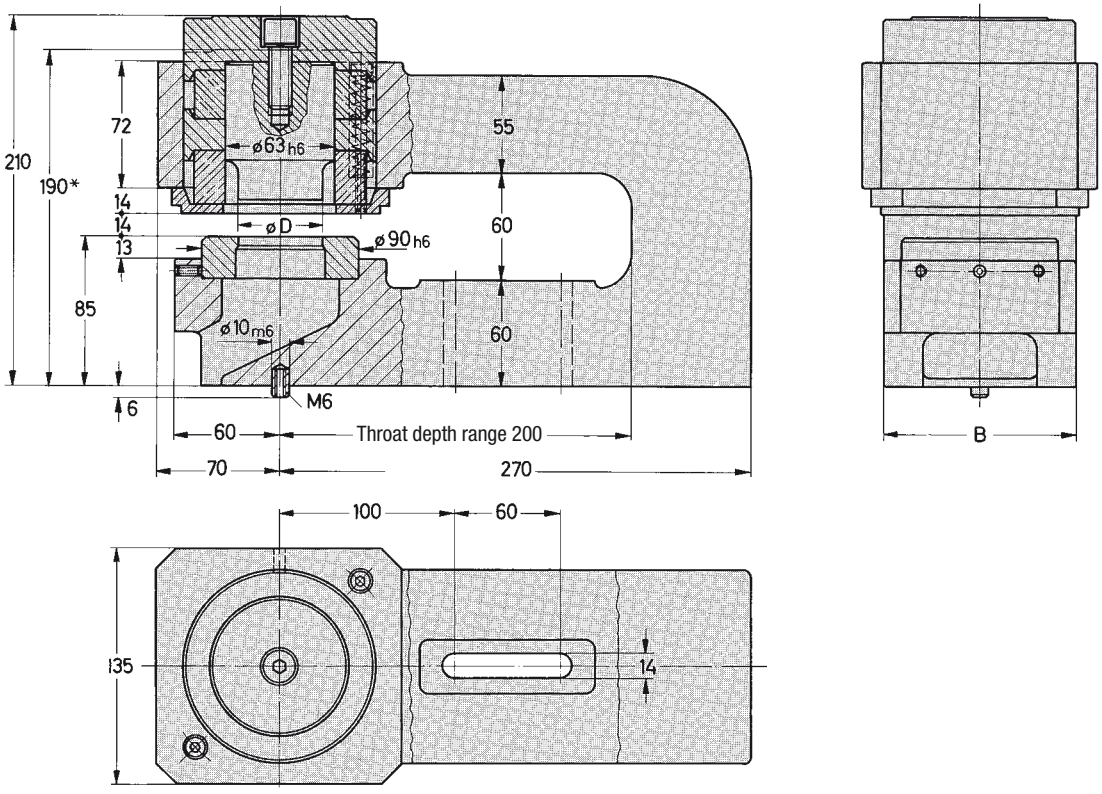
Hole diameter **35–63 mm**

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

Punching tools (punch and die) have to be ordered separately.
See table below, as well as pages 56 to 59.

Accessories see pages 62 to 66

Cutting force chart see page 68



* 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** pages 56 to 59

Complete with cutting tools

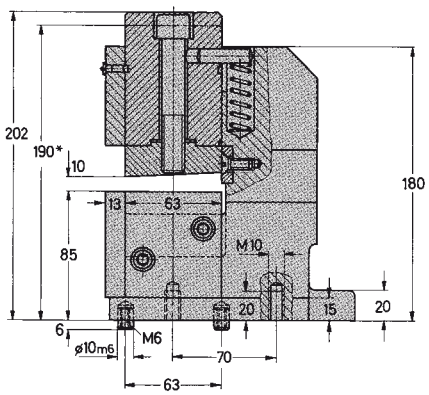
90° notch units, notch size 63x63 mm

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.

Cutting force chart see page 68



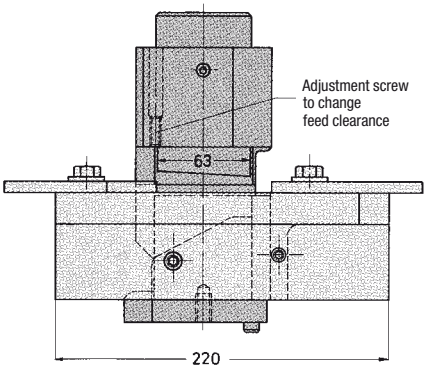
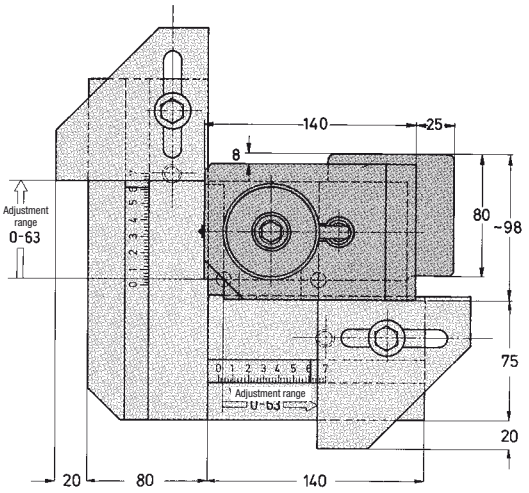
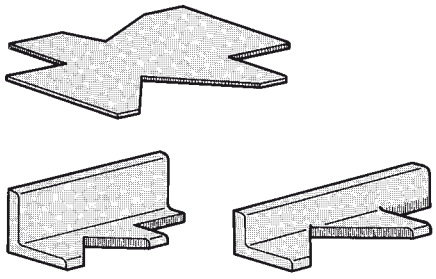


Figure shows 600-063 R with 800-063 S



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 Order No.	**Right hand** Order No.	[kg]	Order No.		[kg]
600-063 L	**600-063 R**	15	**800-063 S**		6.5

90° notch units, notch size 125x125 mm

600-125 R with gauging table 800-125 S

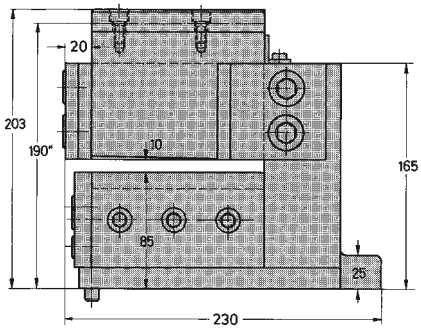
Cutting angle	**90°**
Max. notch size	**125x125 mm**
Material thickness with steel St 60	**0.3–8 mm**

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.

Cutting force chart see page 68



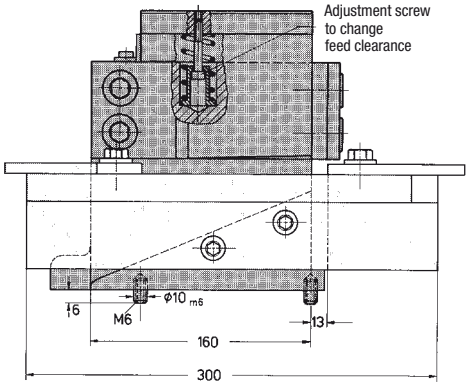
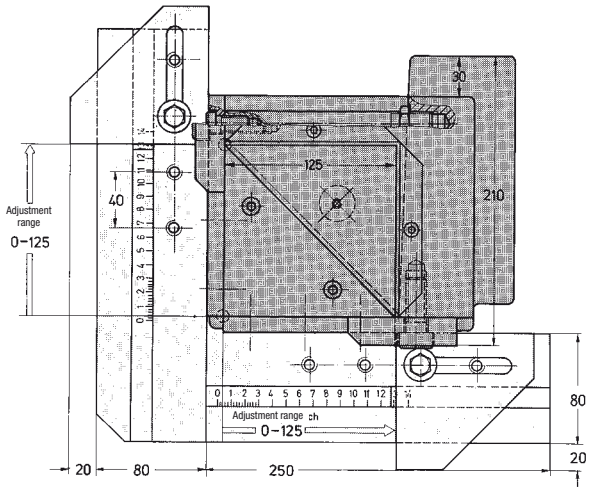
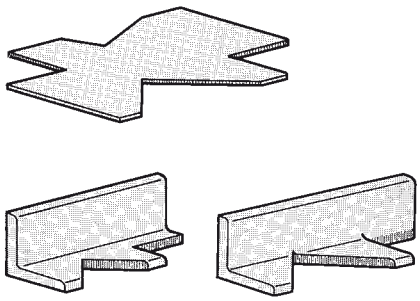


Figure shows 600-125 R with 800-125 S



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

Complete with cutting tools

Rectangle notch units 50x50 und 100x75 mm

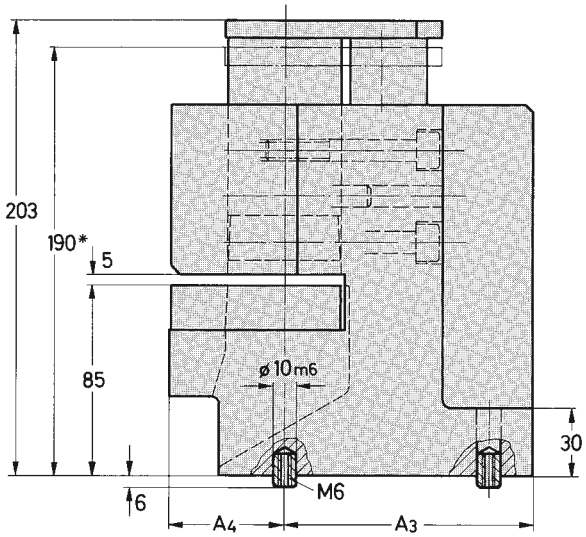
601-050

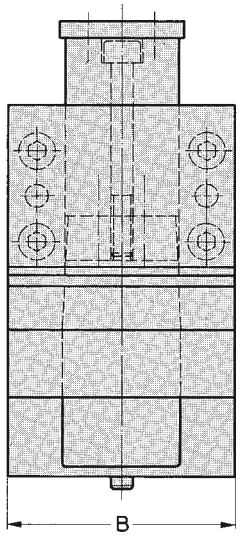
Notch shape	**rectangle**
Notch size	
version 601-050	**50x50 mm**
version 601-100	**100x75 mm**
Material thickness with steel St 60	**0.3–3 mm**

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.

Cutting force chart see page 68





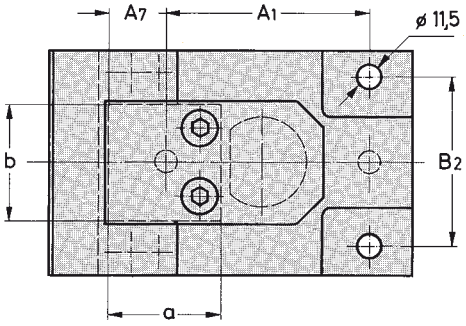
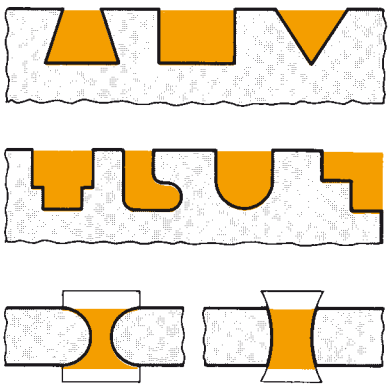


Figure shows 601-050

* Notch unit closed, shaped punch inserted

Possible notch and separation shapes available



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

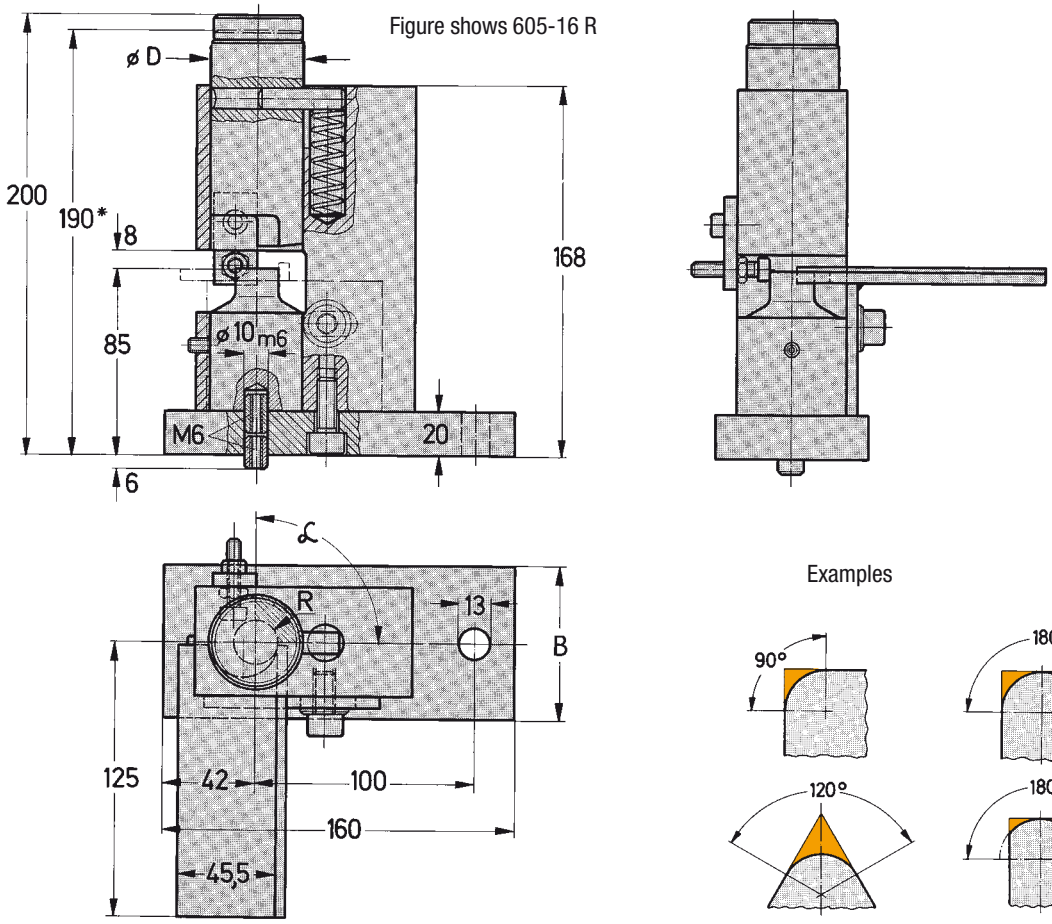
Possible radii	**R 3–20mm**[1)]
Cutting angle α, max.	**180°**
Material thickness for steel St 60, max.	**6 mm**

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	_____

Cutting force chart see page 68

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 **Order No.**	Right hand **Order No.**				**[kg]**	Left hand **Order No.**	Right hand **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**

Complete with cutting tools

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**

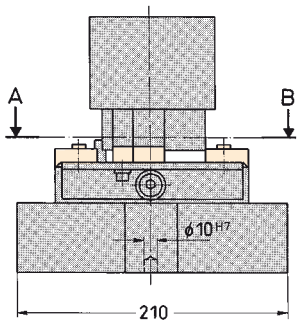
In addition to the pneumatic and hydraulic radius cut units (see page 48), press-operated radius cut units are introduced on this page.

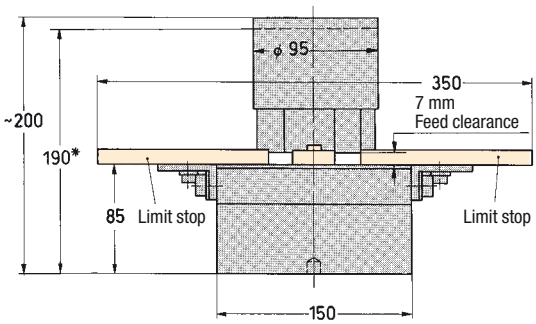
By adjusting the limit stops the radius tool unit enables the production of six different 90° radii with only one punching tool.

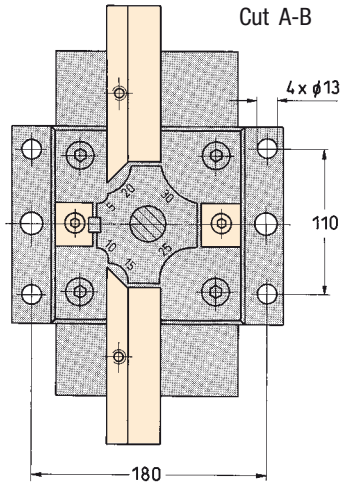
The graduation of the radii is divided into steps of 5 mm from R 5 mm up to R 30 mm.

Other radii are available on request.

See also page 68

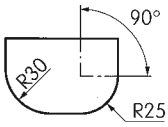


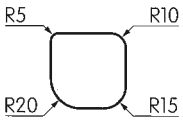




= adjustable limit stops

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.

Cutting force chart see page 68

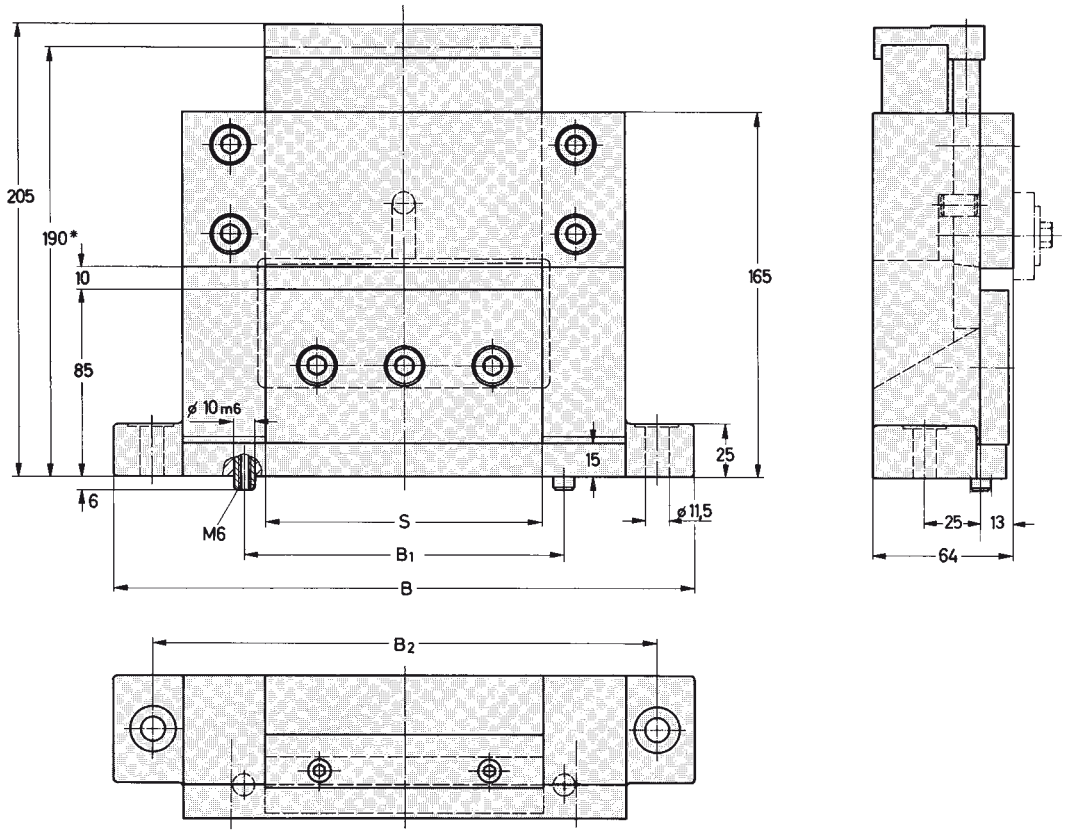


Figure shows cut-off unit 610-125-N

* 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.

Pneumatic table presses

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 on page 68.

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

Regulation of the table presses is set in accordance with the press-independent punching units, presented on pages 38 and 42.

Suitable tool units[2)]

Punching units
100 – 104

+

Notch units
600-063 L/R
601-050

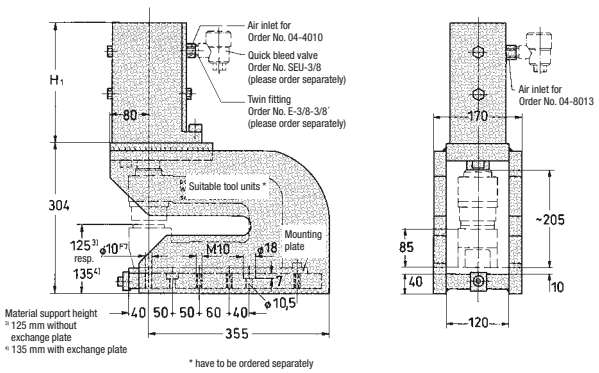
+

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	Pneumatic table presses: Max. force with air supply pressure of 8 bar	Max. force with oil supply pressure of 350 bar	Cylinder type	Flange type	H_1 ~	Weight ~	Exchange plate has to be ordered separately for: Punching units, see pages 20-29	Notch units, see pages 30-31	Cut-off units, see page 35	Weight ~
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

Suitable tool units[2)]

Punching units
100 – 104

+

Notch units
600-063 L/R
601-050

+

Exchange plate has to be ordered separately

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

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.

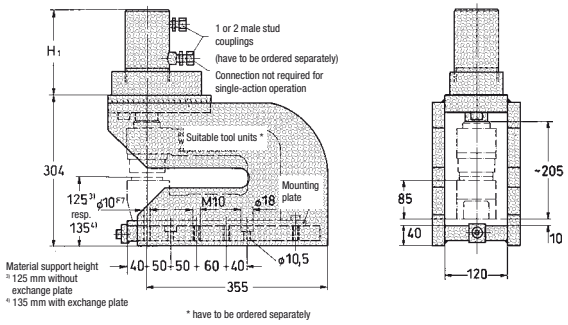
The cutting force required determines the usage limit for the table press, see the cutting force chart on page 68.

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

Regulation of the table presses is set in accordance with the press-independent punching units, presented on pages 40 and 42.

[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, see pages 20-29 Order No.	Notch units, see pages 30-31 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			

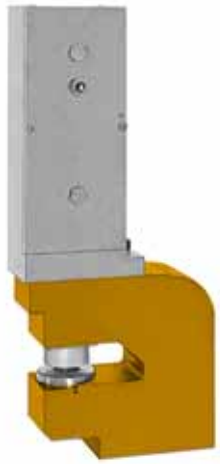
Pneumatic punching units, single-action

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

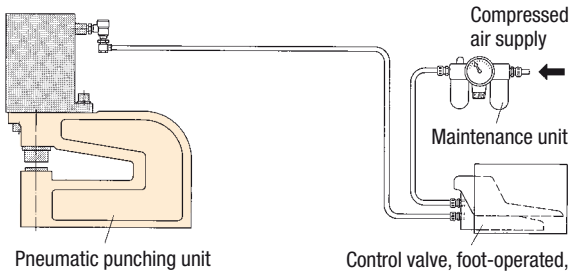
143-1080 F
Cylinder force 80 kN
Throat depth range A=100 mm



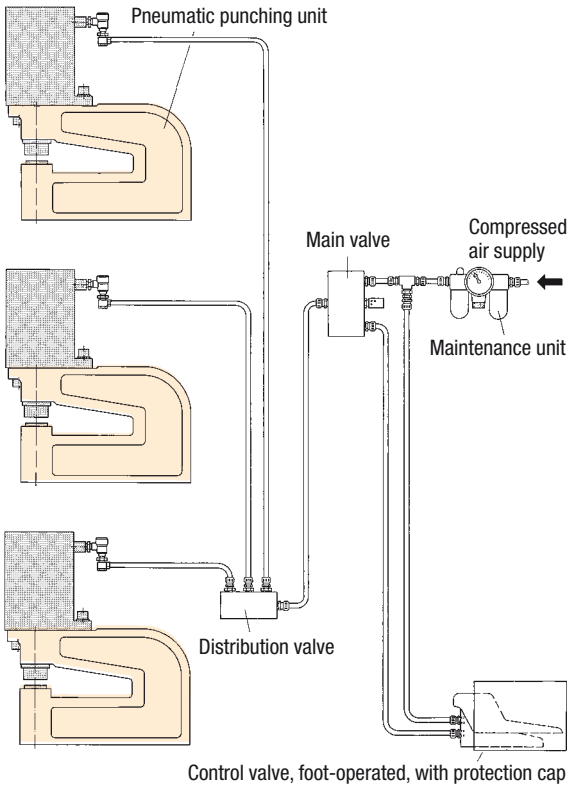
144-1080 F
Cylinder force 80 kN
Throat depth range A=100 mm

Connection examples

for one punching unit



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 cutting force required can be obtained from the chart on page 68.
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. See pages 40 and 41.
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 (see next page).
For additional applications for the pneumatic power cylinders, see pages 71 and 72.
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.

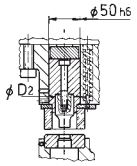
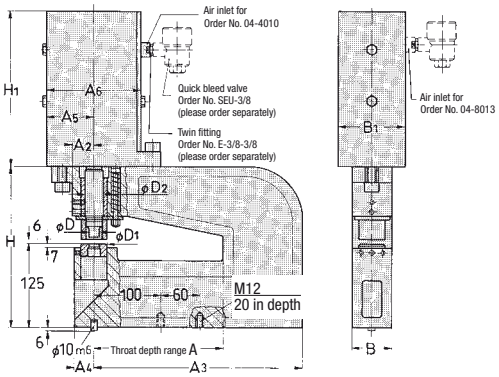
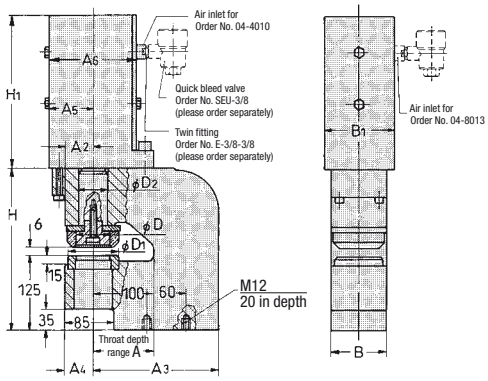


Figure shows tools series 143-…

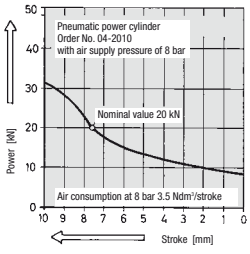


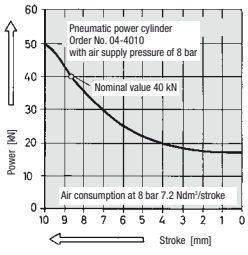
Series **141, 142, 143**

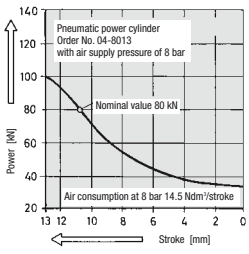


Series **144**

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**
Order No.	Hole diameter meter 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**[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** pages 56 to 59.

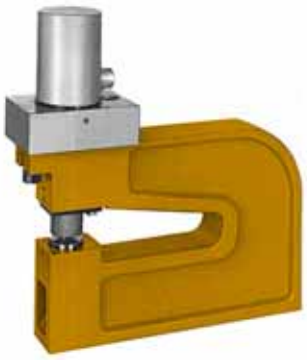
[1] To punch hole diameters from 2–8 mm, you also have to order reduction bushes and reduction sockets, see page 62.

[2] Punching tools for Ø 20–25 mm are available on request, see page 57.

Hydraulic punching units, double-action

Examples

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



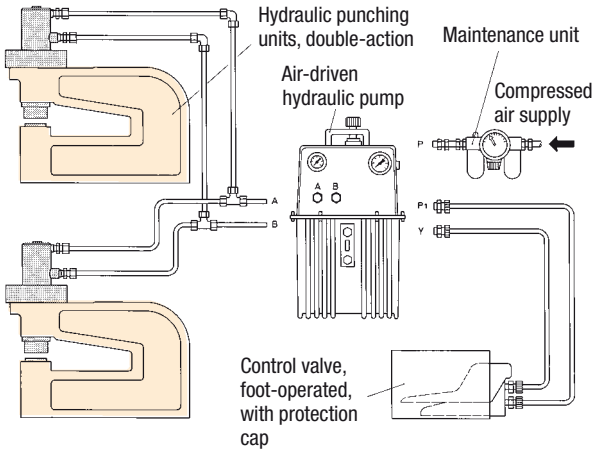
162-2068 F
Cylinder force 68 kN
Throat depth range A=200 mm

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

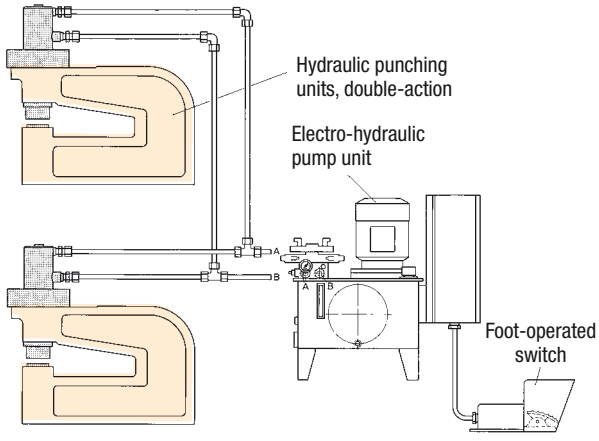
164-1175 F
Cylinder force 175 kN
Throat depth range A=100 mm

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; see page 70.
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 on page 68.
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.

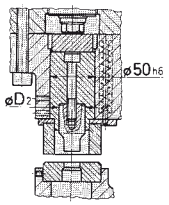
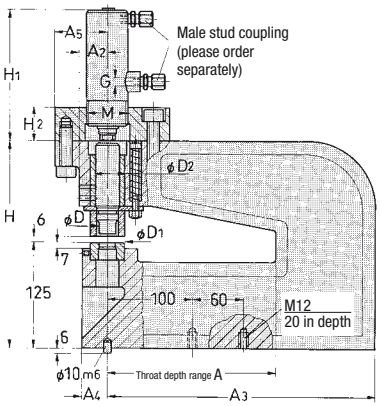
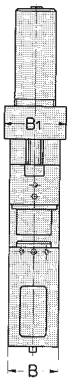
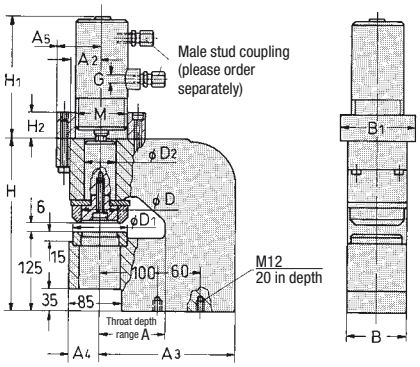


Figure shows tools series 163



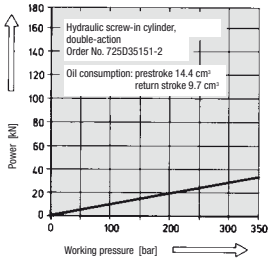
Series **161, 162, 163**

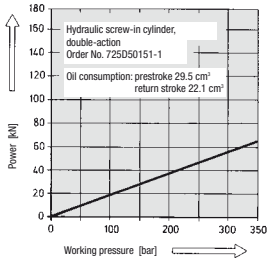


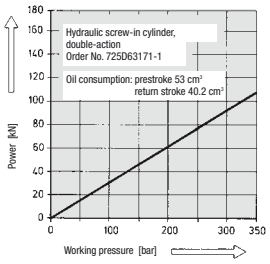


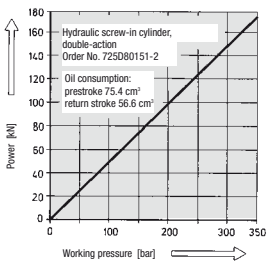
Series **164**

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
164-2175 F	200	40-63	**175**	48	320	48	66	100	105	90	50	270	195	48	M80x2,0	G3/8	725D80151-FL	73









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** pages 56 to 59.

[1] To punch hole diameters from 2–8 mm, you also have to order reduction bushes and reduction sockets, see page 62.

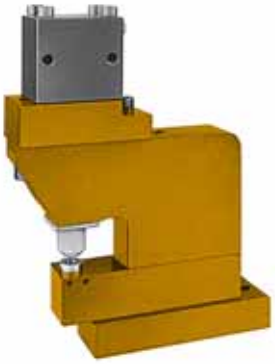
[2] Punching tools for Ø 20–25 mm are available on request, see page 57.

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

Pneumatic and hydraulic profile punching units, single- and double-action

Examples

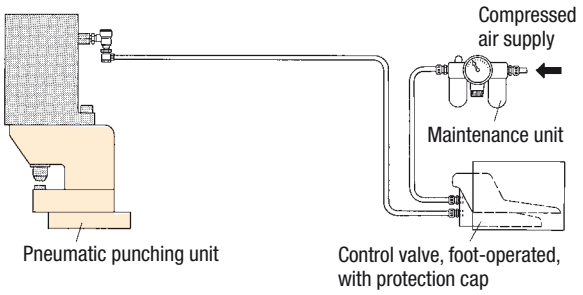
141-0520 F
Cylinder force 20 kN



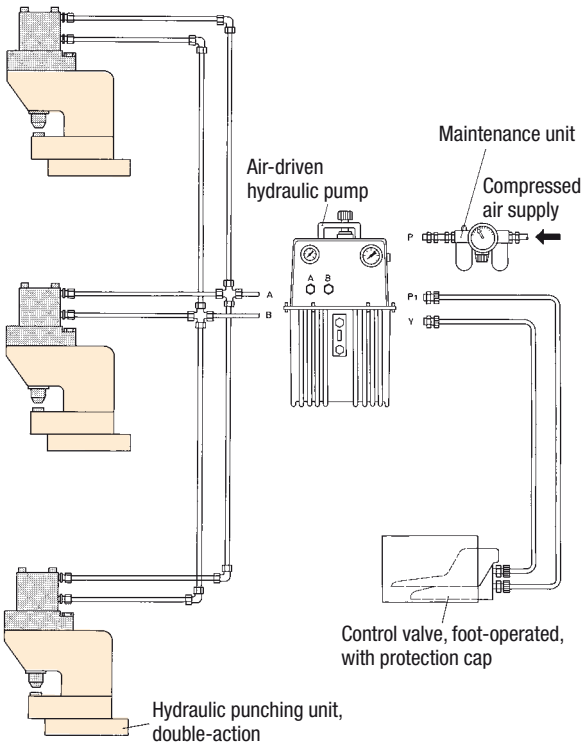
161-0524 F
Cylinder force 24 kN

Connection examples

for one pneumatic profile punching unit



for several hydraulic profile punching units, double-action



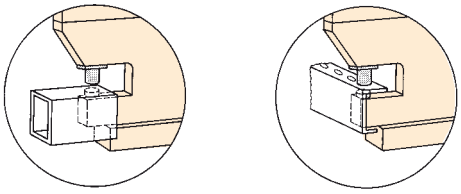
Driven by
pneumatic power cylinder, single-action,
hydraulic cylinder, double-action

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.

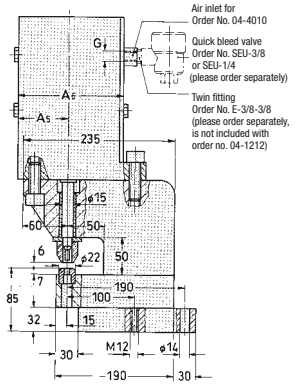
These pneumatic and hydraulic profile punching units are suitable for a wide range of applications. The special die support at the front enables punching of round and square pipes or the shanks of U and H profiles arranged in parallel.
Which available unit to use is determined by the required cutting force. The cutting force results from the hole diameter, material thickness and material strength. Refer to the cutting force chart on page 68.
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.

Application examples

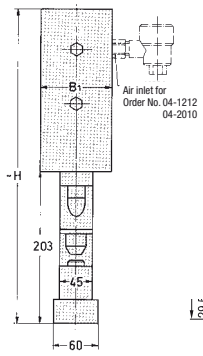


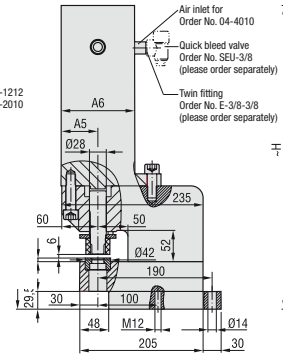
Pneumatic and hydraulic profile punching units, single- and double-action

An obligatory stripping unit can be implemented on request.

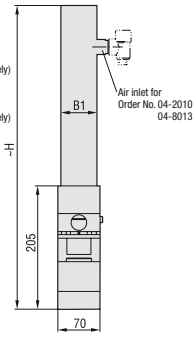


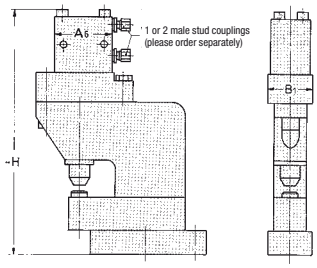
Pneumatic drive
Series **141**





Pneumatic drive
Series **142**

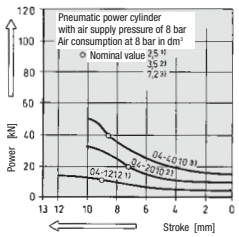


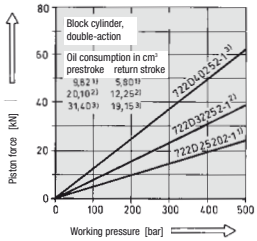


Hydraulic double-action drive
Series **161** and **162**

Profile punching units without punching tools **pneumatic** **Order No.**	**hydraulic, double-action** **Order No.**	**Throat depth range** **A**	**hole Ø** **D**	**Max. force with air supply pressure of 8 bar** **[kN]**	**with oil supply pressure of 500 bar** **[kN]**	**Cylinder type** **[4] combination of cylinder and flange** **Order No.**	**A_5**	**A_6**	**B_1**	**G**	**H** **~**	**Weight** **~** **[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 **Order No.**	**Hole diameter meter 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
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** pages 56 to 59.

Pneumatic and hydraulic profile punching units, single- and double-action

Examples

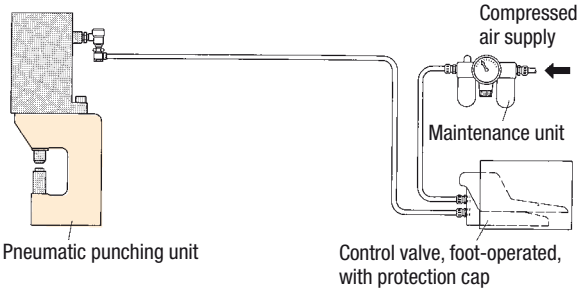
141-0612 F
Cylinder force 12 kN

161-0663 F
Cylinder force 63 kN

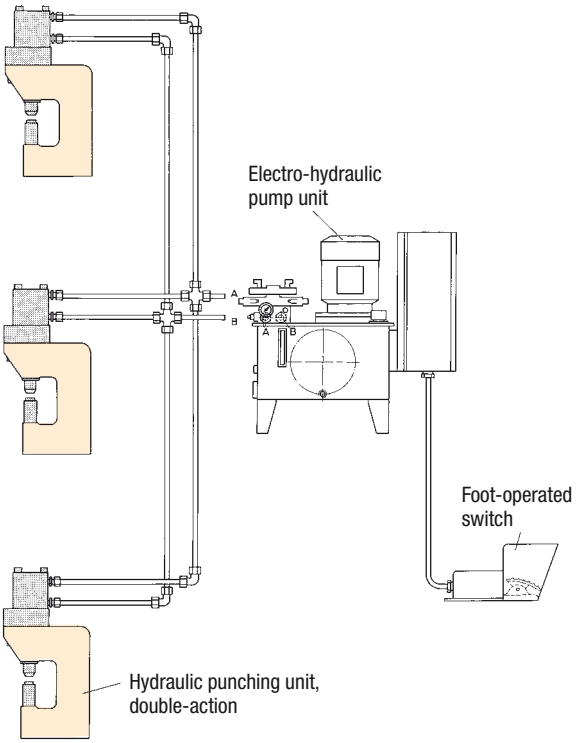
162-6109 F
Cylinder force 109 kN

Connection examples

for one pneumatic profile punching unit



for several hydraulic profile punching units, double-action



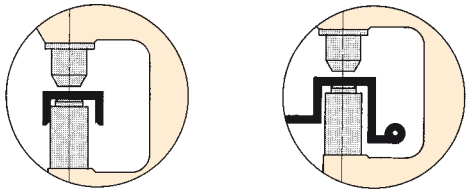
Driven by
pneumatic power cylinder, single-action,
hydraulic cylinder, double-action

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.

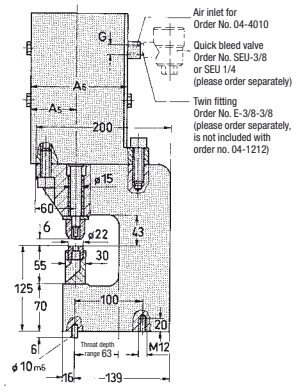
These pneumatic and hydraulic profile punching units are suitable for a wide range of applications.
The clearance zone behind the die support makes them also suitable for punching L- and U-shaped profiles.
Which available unit to use is determined by the required cutting force. The cutting force results from the hole diameter, material thickness and material strength. Refer to the cutting force chart on page 68.
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.**

Application examples

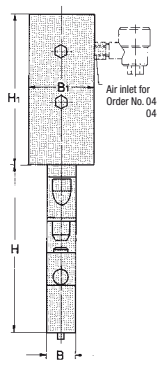


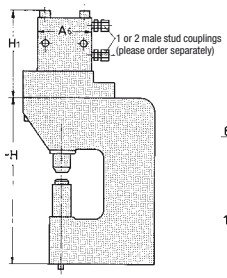
Pneumatic and hydraulic profile punching units, single- and double-action

An obligatory stripping unit can be implemented on request.

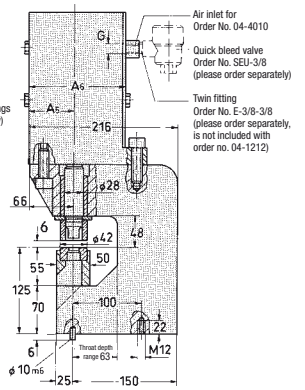


Pneumatic drive
Series **141**

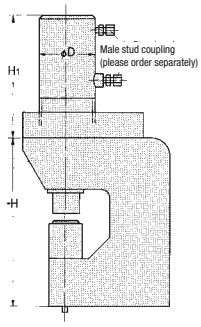




Hydraulic double-action drive
Series **161**



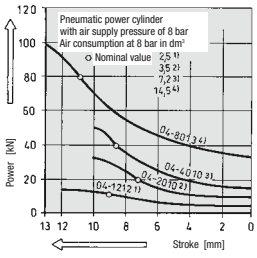
Pneumatic drive
Series **142**

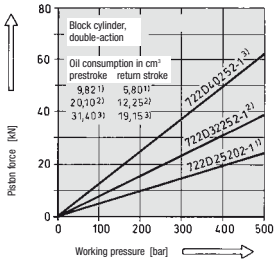


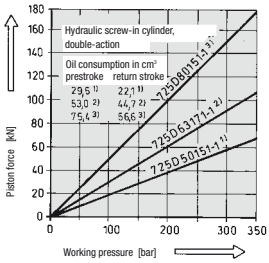
Hydraulic double-action drive
Series **162**

Profile punching units without punching tools		**Hole Ø**	**Throat depth range**	**Max. force**			**Cylinder type** [4] **combination of cylinder and flange**	A_5	A_6	B	B_1	G	H ~	H_1	ØD	**Weight** ~
pneumatic	**hydraulic, double-action**			**with air supply pressure of 8 bar**	**with oil supply pressure of 350 bar**	**with oil supply pressure of 500 bar**										
Order No.	**Order No.**	**D**	**A**	**[kN]**	**[kN]**	**[kN]**										**[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		**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**	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** pages 56 to 59.

Complete with cutting tools

Pneumatic and hydraulic 90° notch units, 63x63 mm

Examples

660-063-068 R
Cylinder force 68 kN

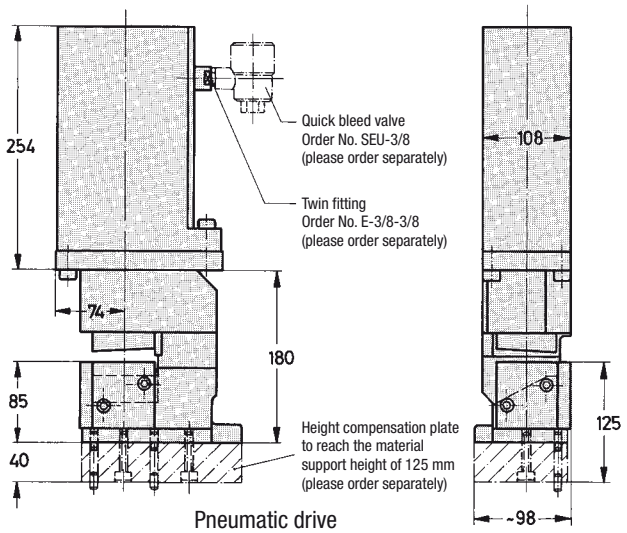
640-063-040 R
Cylinder force 40 kN

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

Cutting angle	**90°**
Max. notch size	**63x63 mm**
Material thickness	
with steel	**0.3–3 mm***
with aluminium and plastics	**0.3–5 mm***

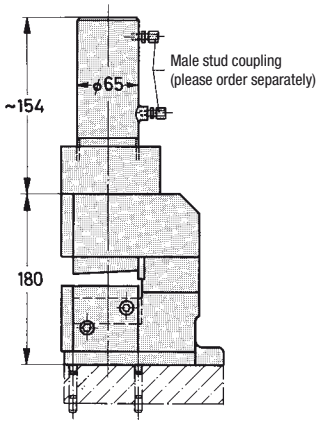
* The cylinder force has to exceed the required cutting force.

In addition to the extremely successful press-operated 90° notch units with a notch size of 63 x 63 mm (see page 30), 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 page 68.
The cutting force, which results from the effective cut length and the material thickness, may not exceed the maximum power of the cylinder.
Regulation of the notch unit is set in accordance with the press-independent punching units, presented on pages 38 to 41.
The material support height is **85 mm.**
To combine these notch units with other pneumatic or hydraulic punching units (pages 38 to 41) it is necessary to install a height compensation plate (see chart below) to reach the material support height of 125 mm.



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

For missing sizes see page 30.



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]**	**Max. force with oil supply pressure of 350 bar [kN]**	**Cylinder type** / **Flange type** Bestell-Nr.	**Weight ~** [kg]	**Gauging table, adjustable, please order separately,** see page 30. 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

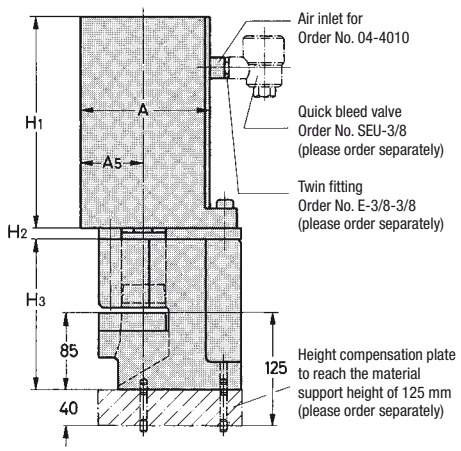
661-100-109
Cylinder force 109 kN

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

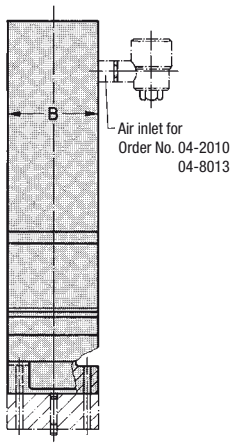
Notch shape	**Rectangle**
Notch size	
for 641-050…, 661-050-…	**50x50 mm**
for 641-050…, 661-100-…	**100x75 mm**
Material thickness	**0.3–3 mm***

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

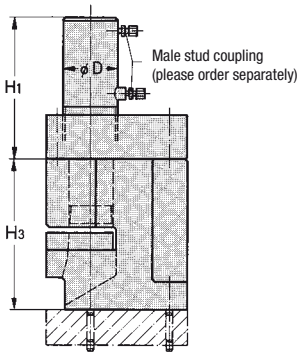
In addition to the extremely successful press-operated rectangle notch units with a notch size of 50 x 50 mm and 100 x 75 mm (see page 32), the corresponding notch units with pneumatic and hydraulic operation are presented on this page.
Limits on the use of these units are determined by the cutting force required, see chart page 68. The cutting force, which results from the effective cut length and the material thickness, may not exceed the maximum power of the cylinder.
Regulation of the rectangle notch units is set in accordance with the press-independent punching units, presented on pages 38 to 41.
The material support height is **85 mm.**
To combine these notch units with other pneumatic or hydraulic punching units (pages 38 to 41) it is necessary to install a height compensation plate (see chart below) to reach the material support height of 125 mm. For the dimensions of the basic structure, see drawing on page 35.



Pneumatic drive
Series **641**



For missing sizes see page 30.



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

Complete with cutting tools

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

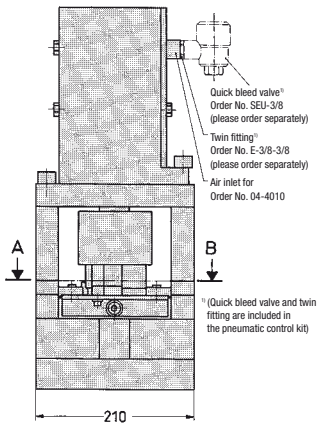
Possible radii	**R 5,10,15,20,25,30 mm**
Cutting angle α	**90°**
Material thickness	
with steel	**0.3–3 mm***
with aluminium and plastics	**0.3–5 mm***

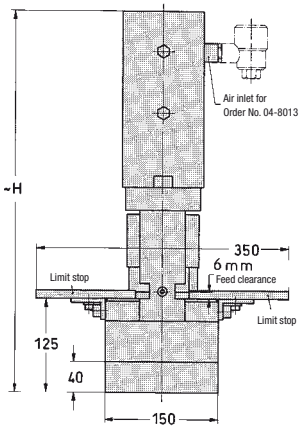
* The cylinder force has to exceed the required cutting force.

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 page 68. 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 (order separately)
For connecting the pneumatic radii cutting units to the compressed air system, we recommend the following accessories:
1 pneumatic control kit, order no. **880-401-G3/8.**
Other radii sizes are available on request.

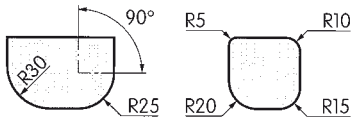
For missing sizes see page 30.

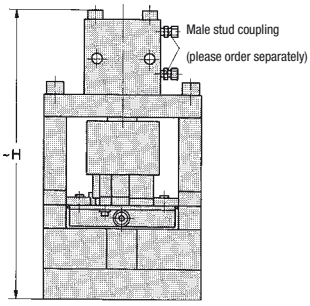


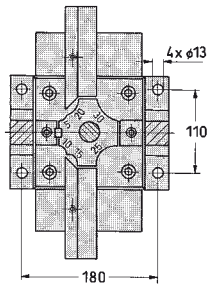


Pneumatic drive
Series **646**

Examples







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

Section A-B

Radii cutting units with cutting tools		Possible	Max. force		Cylinder	H	Weight
pneumatic	hydraulic, double-action	90°-radii in steps of 5 mm	with air supply pressure of 8 bar	with oil supply pressure of 350 bar	type	~	~
Order No.	Order No.		[kN]	[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

Examples

649-125-040-N
Cylinder force 40 kN

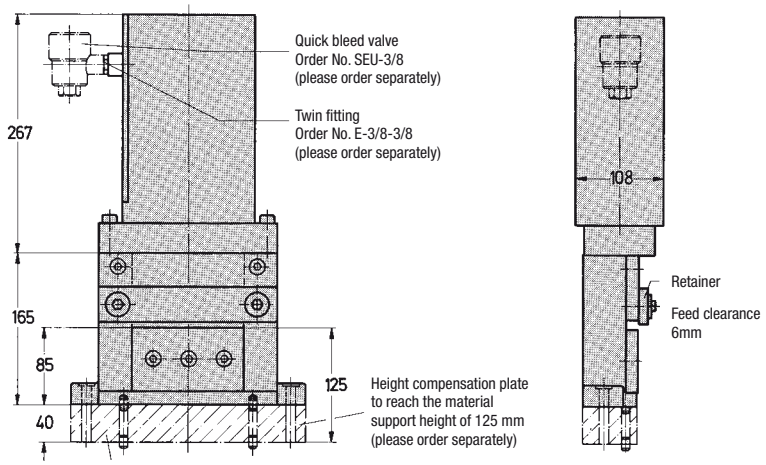
Driven by
pneumatic power cylinder, single-action

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 units with pneumatic operation are presented on this page.
Limits on the use of these units are determined by the cutting force required, see chart page 68. The cutting force, which results from the effective cut length and the material strength, may not exceed the maximum power of the cylinder.
Regulation of the cut-off units is set in accordance with the press-independent punching units, presented on page 38.
The material support height is **85 mm.**
To combine these cut-off units with other pneumatic punching units (pages 38 to 41 and 44 to 45) 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 on page 35.

The retainer has been removed in the illustration.



Pneumatic drive
Series **649**

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, see page 72 [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

Mobile pneumatic punching and notch units

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 thicknes 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

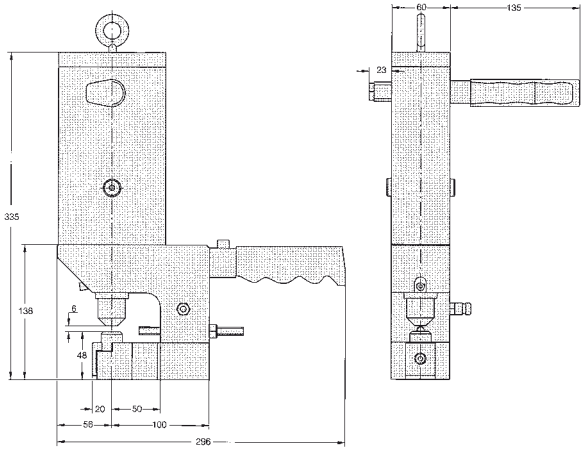
Insert in order no.: **Ø** = hole Ø or »Formloch« (i.e. shaped hole; »Vierkant« = square), **BL** = material thickness, **ST** = material and strength.

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

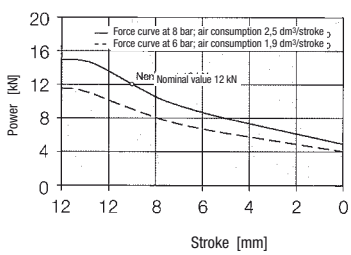
Conversion module for notch unit 1421-05-KU
without punch kit.
Adjustable limit stops are included in the delivery (see illustration below)

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)

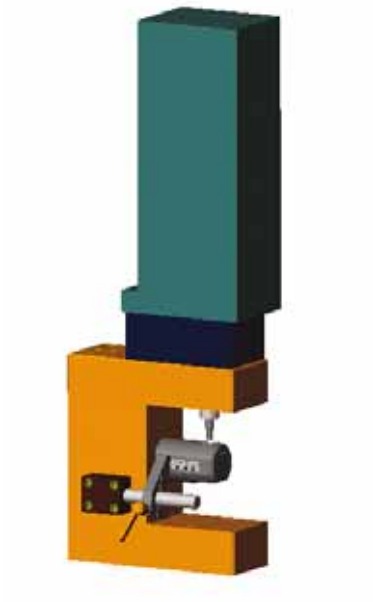


Force/stroke chart for drive cylinder 04-1212

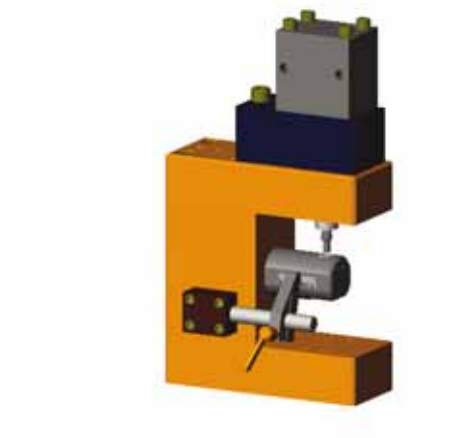


Examples

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		

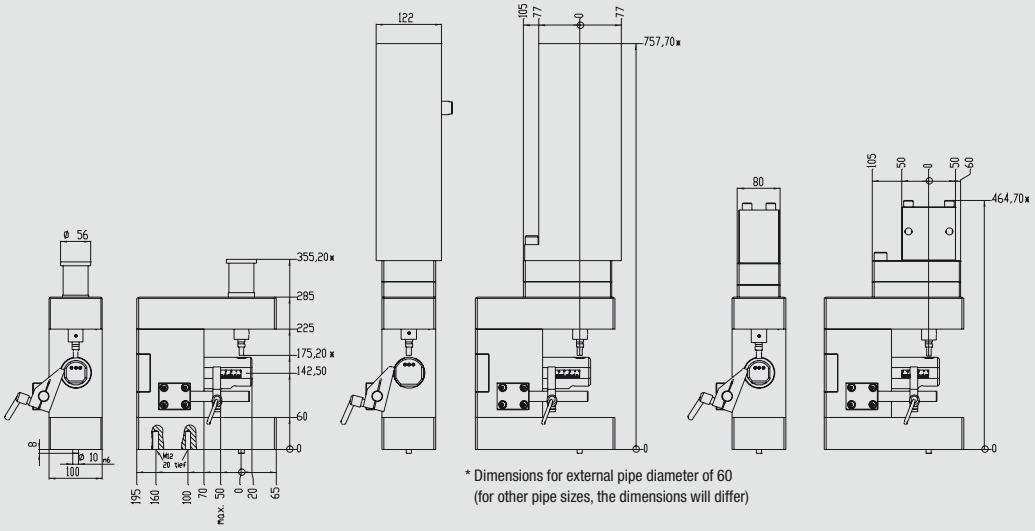
* The cylinder force has to exceed the required cutting force.

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.**

Pipe punching unit



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

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

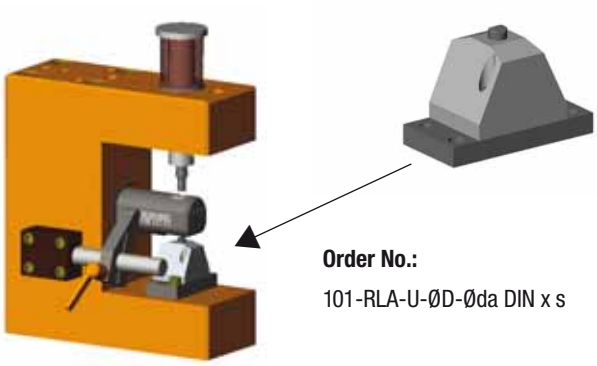
Punching unit without tools and die mandrel			**Hole diameter**	**External pipe diameter**	**Pipe thickness**	**Throat depth range**	**Max. force**		**Cylinder type** see pages 69+73	**Weight**
press-operated	**pneumatic single-action**	**hydraulic double-action**					**with air supply pressure of 8 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:

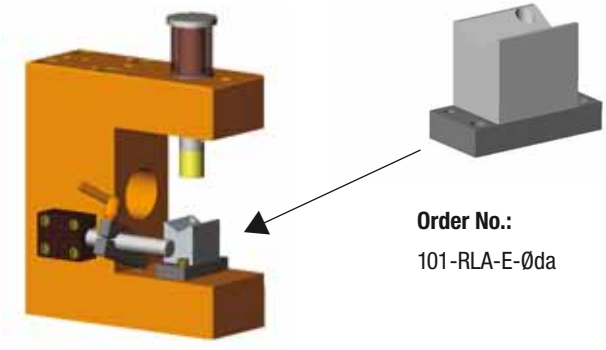
Punching on flap



Order No.:
101-RLA-U-ØD-Øda DIN x s

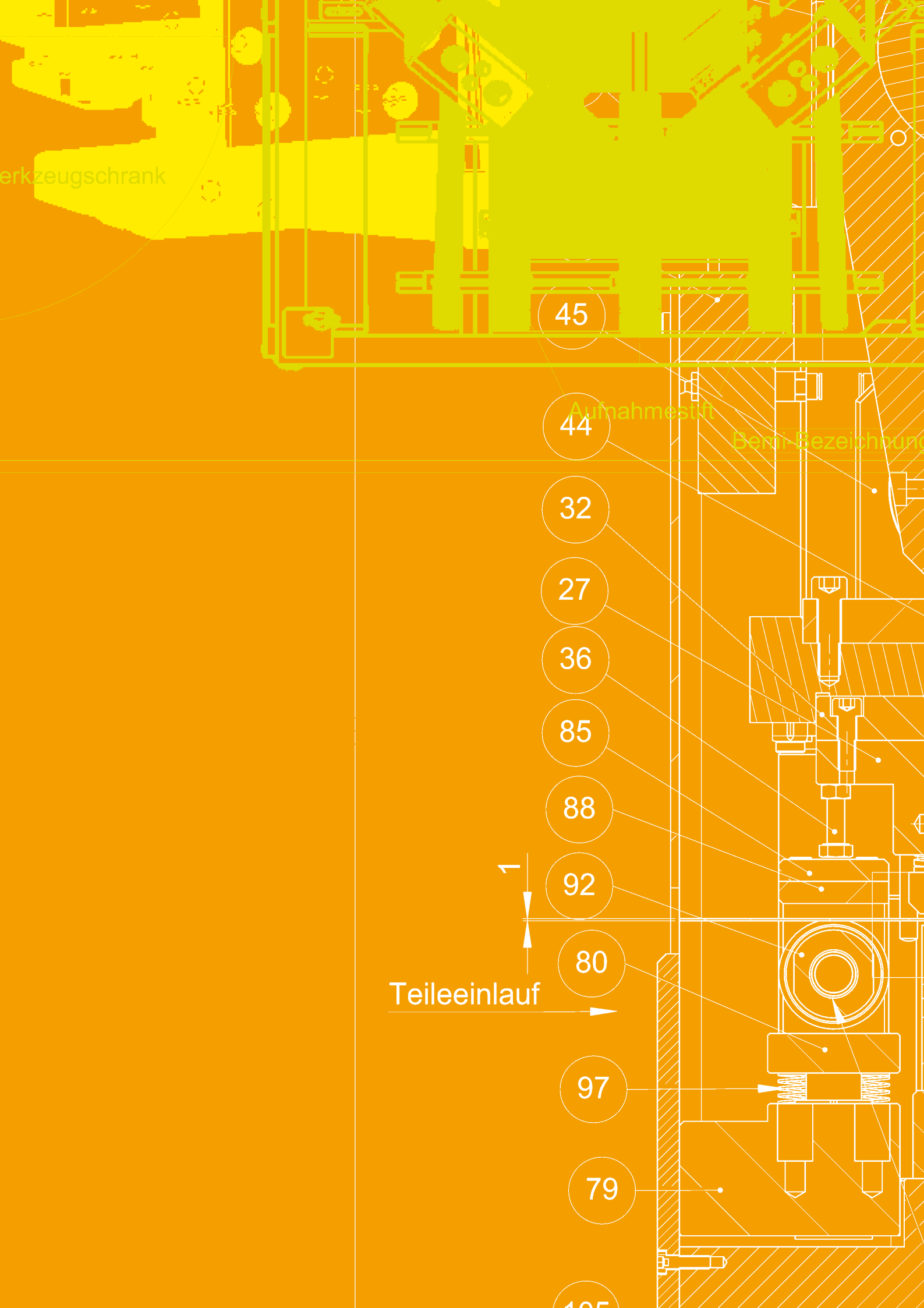
Example:
101-RLA-50 + 101-RLA-U-Ø9-Ø60 x DIN 2393 x 3

Punching without die

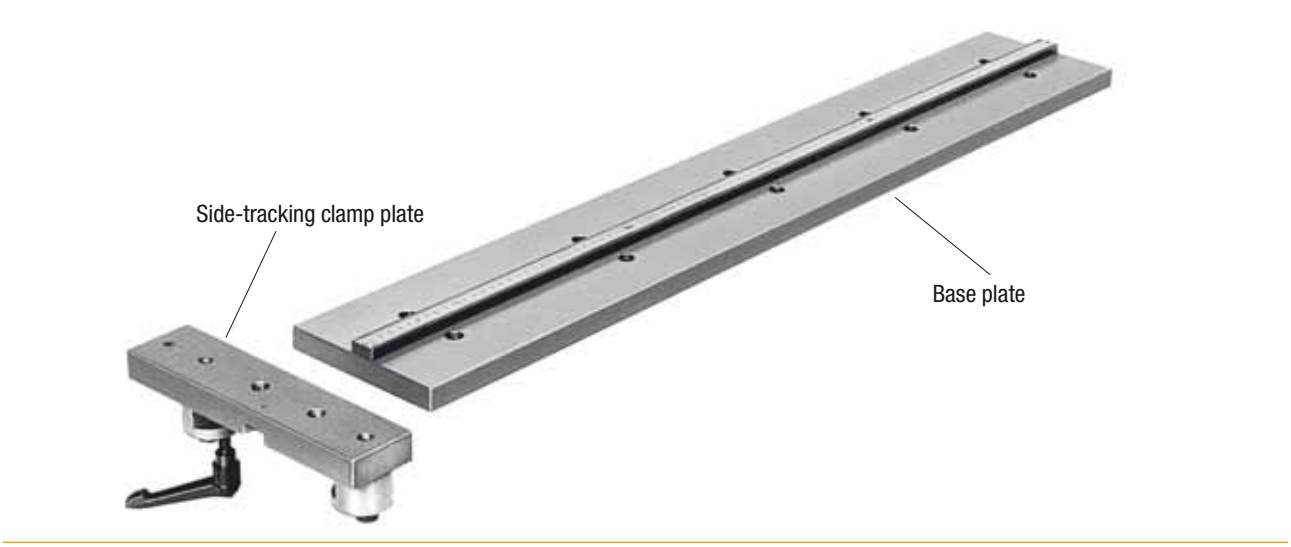


Order No.:
101-RLA-E-Øda

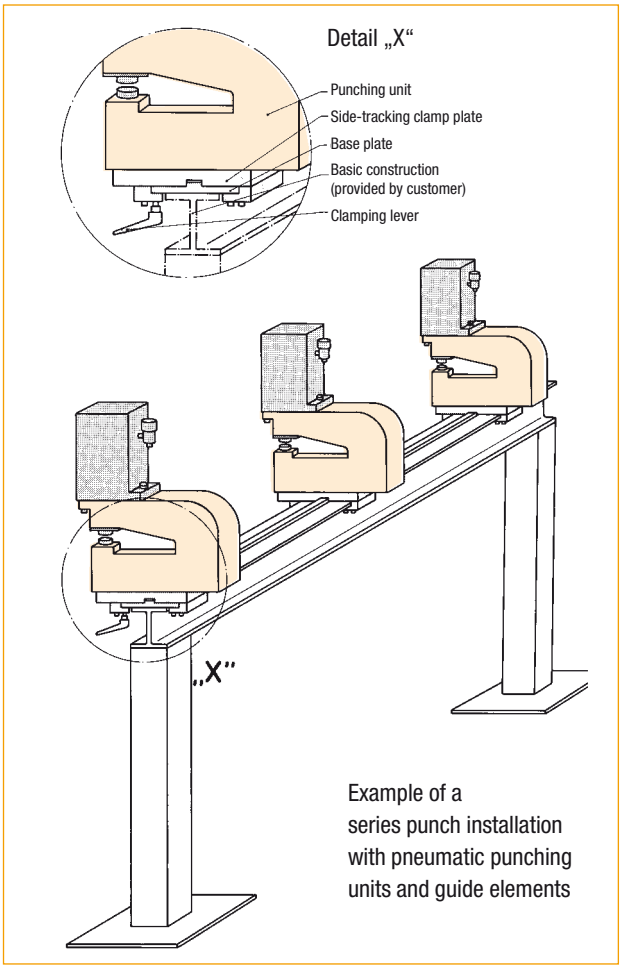
Example: 101-RLA-50 + 101-RLA-E-Ø60
(the die mandrel has to be removed)


erkzeugschrank
45
44
Aufnahmestift
32
27
36
85
88
1
92
80
Teileeinlauf
97
79

Guide elements for series punch installation



Application example



Example of a series punch installation with pneumatic punching units and guide elements

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 changing the distance between the punching units. The side-tracking clamp plates are mounted on the base plate.

Each side-tracking clamp plate has a guide groove at the bottom which fits onto the guide rail of the base plate and guides the side-tracking clamp plate and therefore the punching unit.

The quick-action clamping lever enables the side-tracking clamp plate to be secured in the desired position on the base plate.

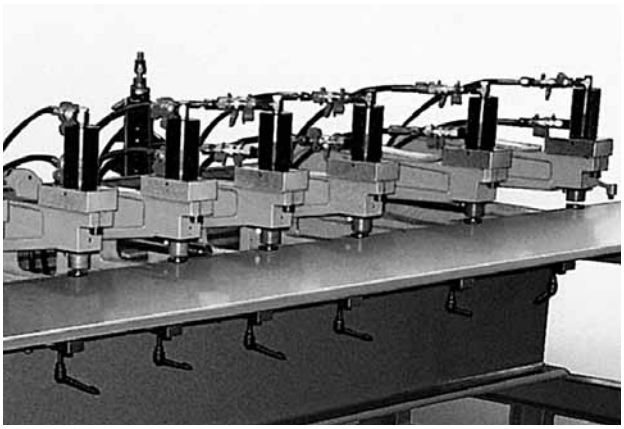
The base plate has threaded holes on the bottom to facilitate mounting on a basic construction. The customer provides the basic construction.

On request, the base plates are also available with a fixed scale on top of the rail.

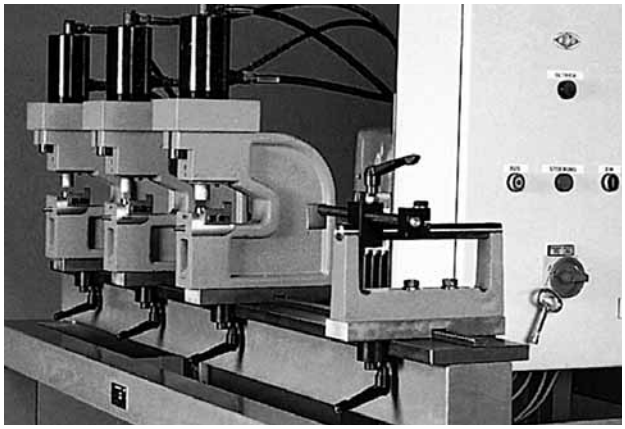
Further combinations of guide elements with pneumatic and hydraulic tool units for notching flat materials and profiles in steel, aluminium and plastics are available on request.

Side-tracking clamp plates		
Order No.	**Width [mm]**	**Weight ~ [kg]**
818-060x150	60	3.5
818-100X150	100	5

Base plates			
Order No. without scale	**Order No. with scale**	**Please add the requested total length to the order no. [mm]**	**Weight ~ [kg]**
820-150x…	**820-150x…M**	1000	24
		1500	35
		2000	47
		2500	59
		3000	71

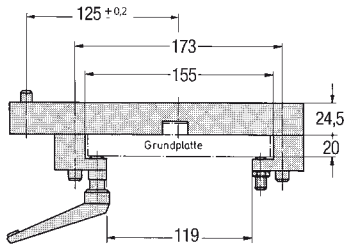


Guide elements in a series punch installation with hydraulic double-action operation.

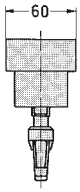


Guide elements in a series punch installation with hydraulic double-action operation for punching a punch layout in steel strips.

Side-tracking clamp plate

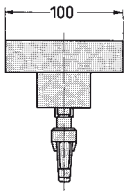


Side view



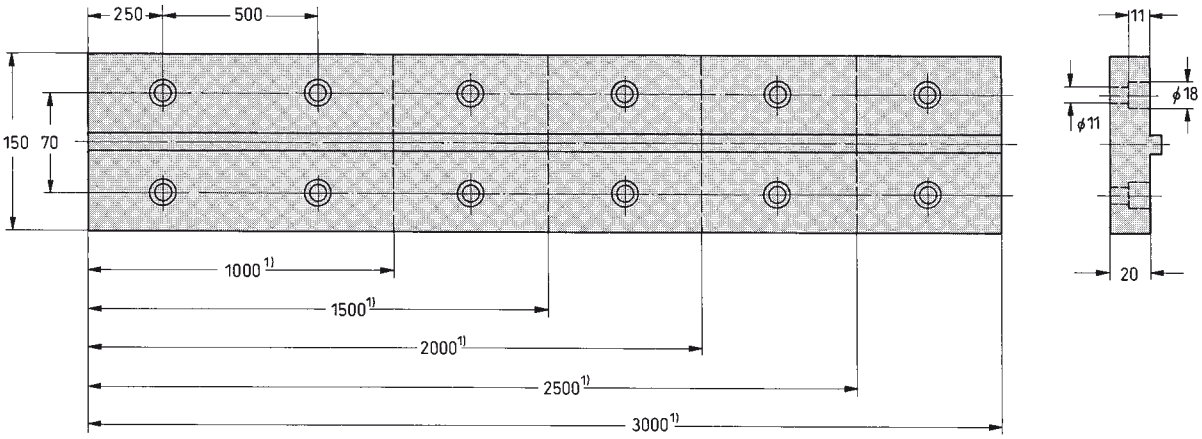
Order No. **818-060x150**

Side view



Order No. **818-100x150**

Base plate

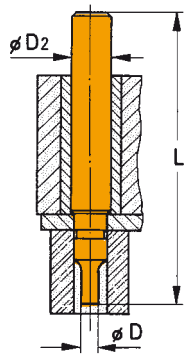


Base plate	Order No. **820-150 x total length**	
Base plate with scale	Order No. **820-150 x total length-M**	1) Total length which can be supplied.

Punching tools

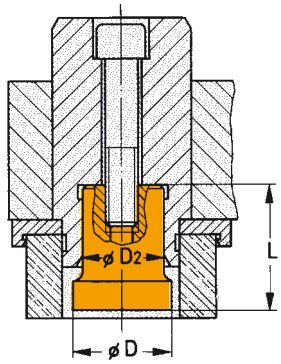
Round hole punching tools ● technical illustration of punches and dies

①



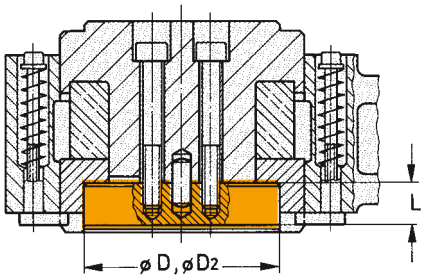
Punch shape for punching units of series 100, 101, 102, 111, 141, 142, 161, 162

②



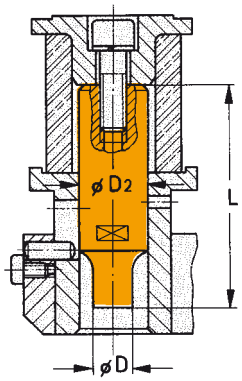
Punch shape for punching units of series 103, 104, 143, 163

③



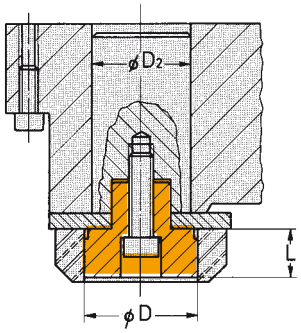
Punch shape for punching units of series 105

④



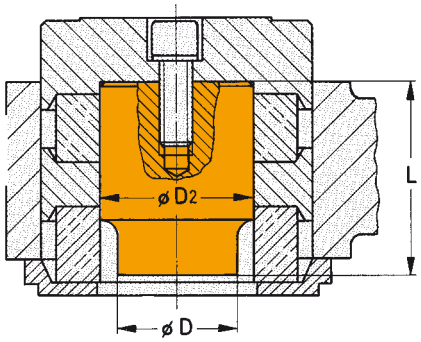
Punch shape for punching units of series 112 and 113

⑤



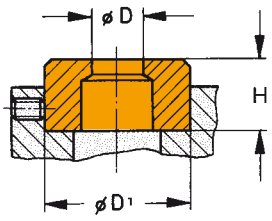
Punch shape for punching units of series 144 and 164

⑥



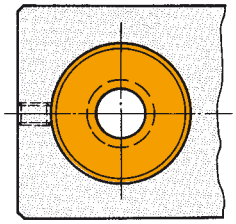
Punch shape for punching units of series 114

Die shape applies to all series



⑦

View »X«



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 thicknes and material strength.

By using reduction bushes and sockets (see page 62) 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 (see page 63).

Order example

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

Punch kit — 502-Ø-15-BL3-St42

Punch and die

Punch without die — 302-Ø-15

Die without punch — 402-Ø-15-BL3-St42

Nominal size

Hole diameter = 15 mm

Material thickness **BL** = 3 mm

Material and strength **ST** = St42

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

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

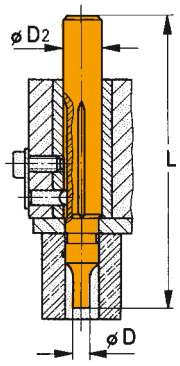
for punching units of series	Sizes on stock: Punch kit Order No.	Punch Order No.	Die Order No.	Available hole diameters: Range ØD	Graduation [mm]	Dimensions (Drawings on the left): $ØD_2$	L	$ØD_1$	H	Corresponding drawings (left page)
100-	**500-Ø-BL-ST**	**300-Ø**	**400-Ø-BL-ST**	2-7	0.5	8	105	15	16	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

Punching tools

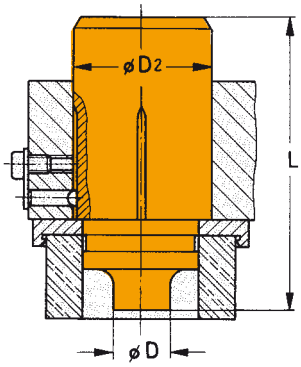
Shaped hole punching tools punch kits, **sizes on stock and special sizes**

①



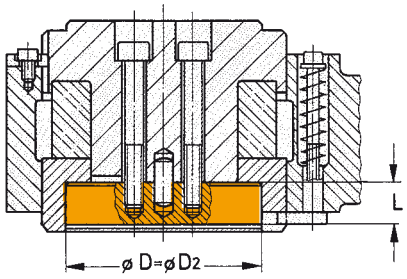
Punch shape for punching units of series 100, 101, 102, 111, 141, 142, 161, 162

②



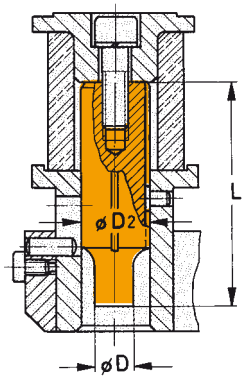
Punch shape for punching units of series 103, 104, 143, 163

③



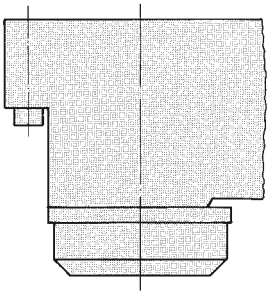
Punch shape for punching units of series 105

④



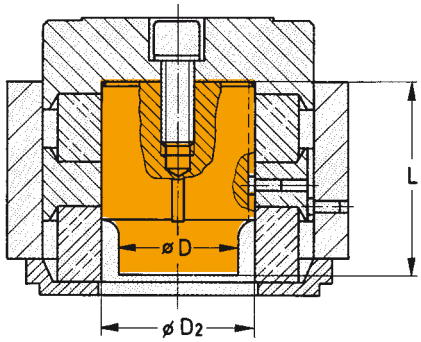
Punch shape for punching units of series 112 and 113

⑤



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

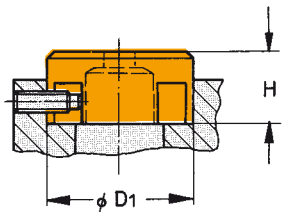
⑥



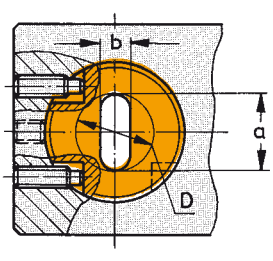
Punch shape for punching units of series 114

Die shape applies to all series

⑦



View »X«



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

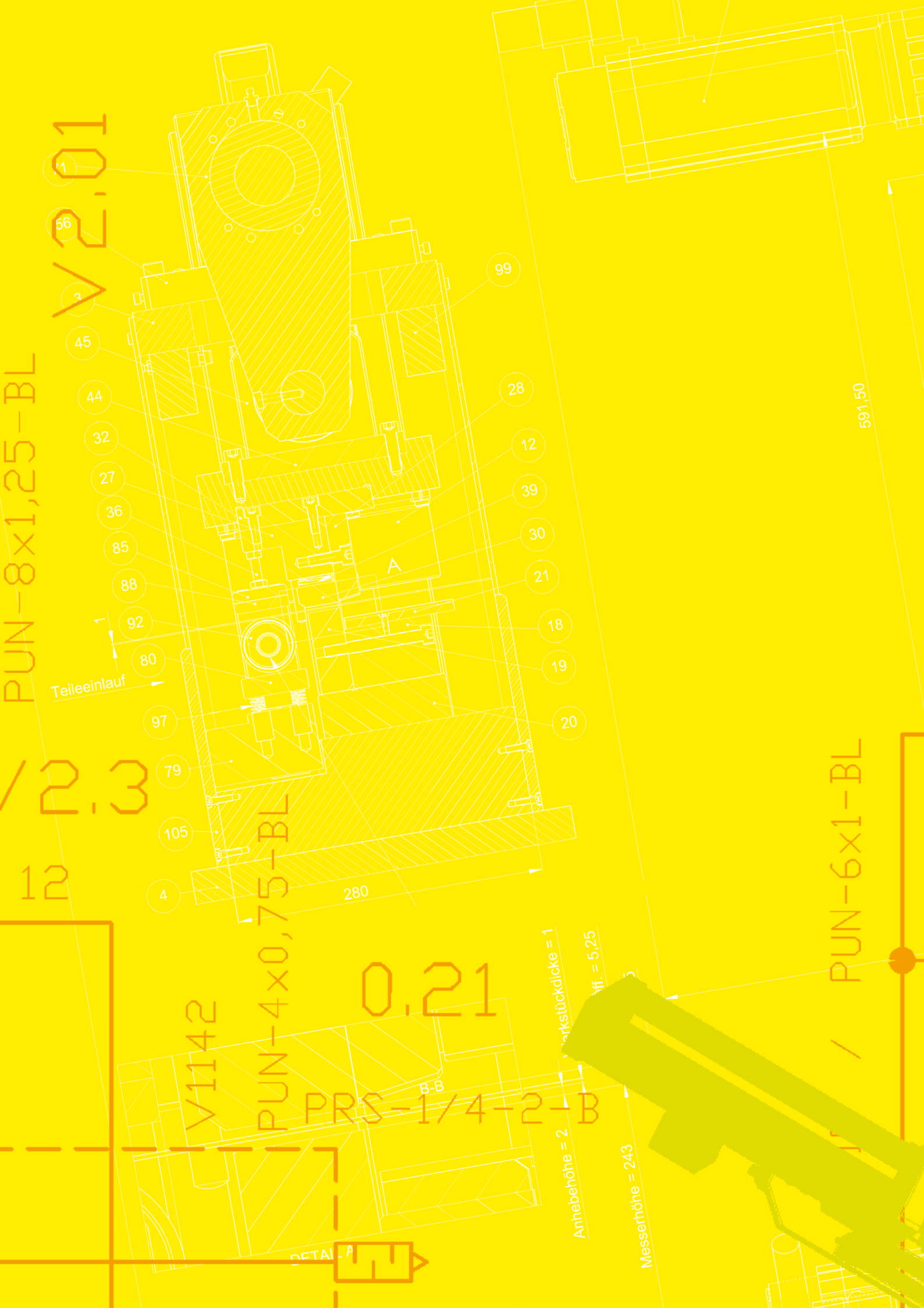
(for nonferrous material, e.g.: Al F22)

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 left page	Shaped cut conversion kits only for punching units which have been ordered without shaped cut conversion kit, see page 63 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


PUN-8x1,25-BL
V 2.01
11
56
3
45
44
32
27
36
85
88
92
80
Teileeinlauf
97
79
105
4
99
28
12
39
30
21
18
19
20
A
280
591,50
V 2.3
12
PUN-4x0,75-BL
V1142
0.21
PRS-1/4-2-B
B-B
Anhebehöhe = 2
Messerhöhe = 243
PUN-6x1-BL
DETAIL A

acessórios

Accessories

◀ Reduction bush

◀ Reduction socket

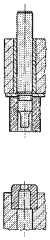
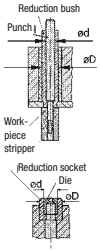
Reduction bushes and sockets

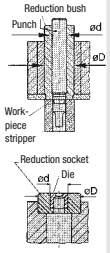
only for round hole punching tools

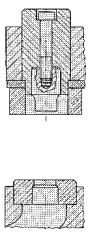
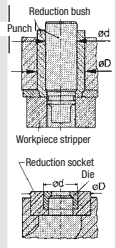
When using reduction bushes and sockets with the punching units of the series 101 to 163, the punch and die of the next smaller punching unit may be used.

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

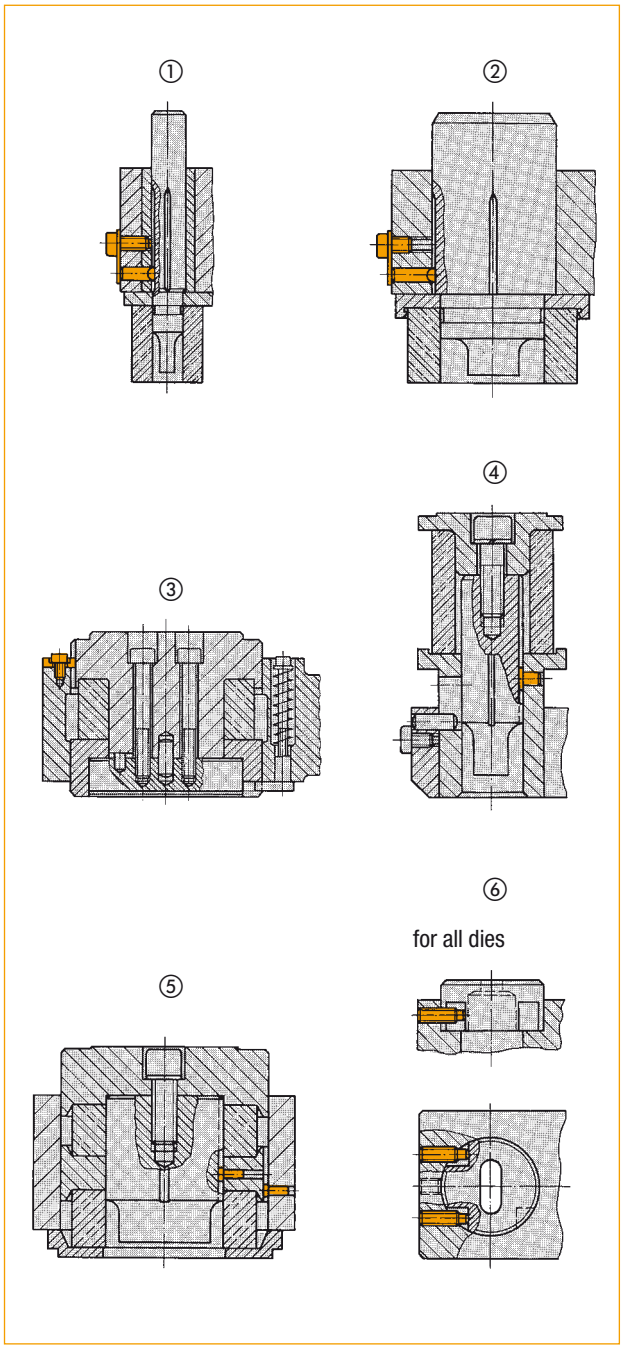
Due to the possibility of using the next smaller punching tool size, additional tool units are no longer required and, thereby, costs are reduced.

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 wokpiece stripper **Order No.**	ØD	Ød	Reduction parts: Reduction socket **Order No.**	ØD	Ød	Required cutting tools: **Punch** see page 57 **Order No.**	**Die** see page 57 **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 wokpiece stripper **Order No.**	ØD	Ød	Reduction parts: Reduction socket **Order No.**	ØD	Ød	Required cutting tools: **Punch** see page 57 **Order No.**	**Die** see page 57 **Order No.**
102 142 162	8–25		2–13	from 2–8		**850-28x15**	28	15	**860-42x15**	42	15	301-Ø…	400-Ø-BL-ST
				from 8–13[1)]									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 wokpiece stripper **Order No.**	ØD	Ød	Reduction parts: Reduction socket **Order No.**	ØD	Ød	Required cutting tools: **Punch** see page 57 **Order No.**	**Die** see page 57 **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.

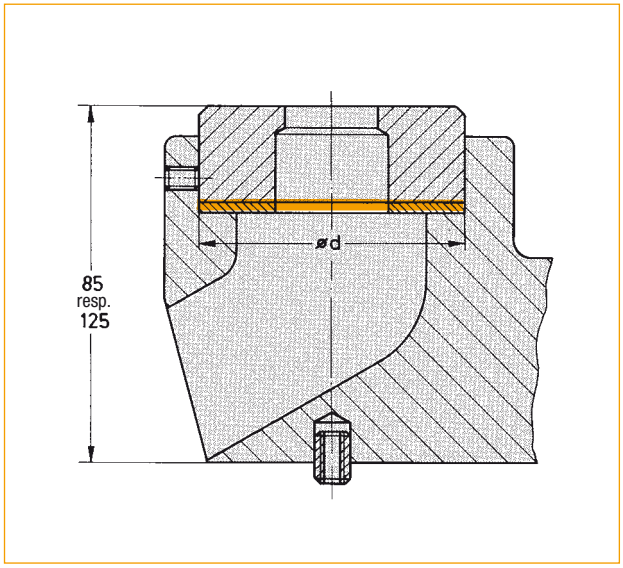


Shaped cut conversion kits

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

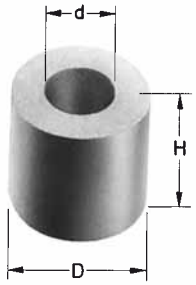
Compensating washers are required to bring reworked dies to the working or material support height of 85 or 125 mm.

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.

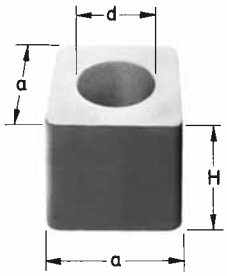
Ød	for dies Series	for dies to be used for punching units of series	1 kit = 4 pieces thickness	Order No.
15	400	100		**806-15**
22	401	101, 111, 141, 161	0.1 0.3	**806-22**
42	402, 412	102, 112, 142, 162	0.5 1.0	**806-42**
63	403, 413	103, 113, 143, 163	mm	**806-63**
90	404, 414	104, 114		**806-90**

Accessories

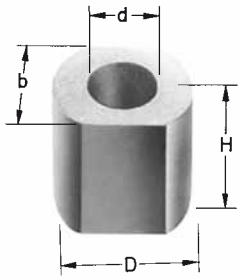
Polyurethane workpiece stripper



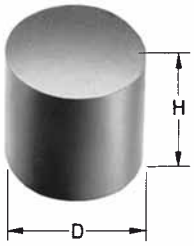
Shape **A**



Shape **B**

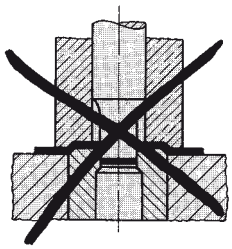


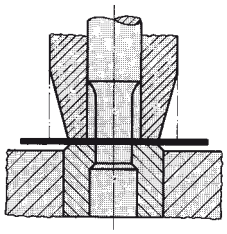
Shape **C**



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.





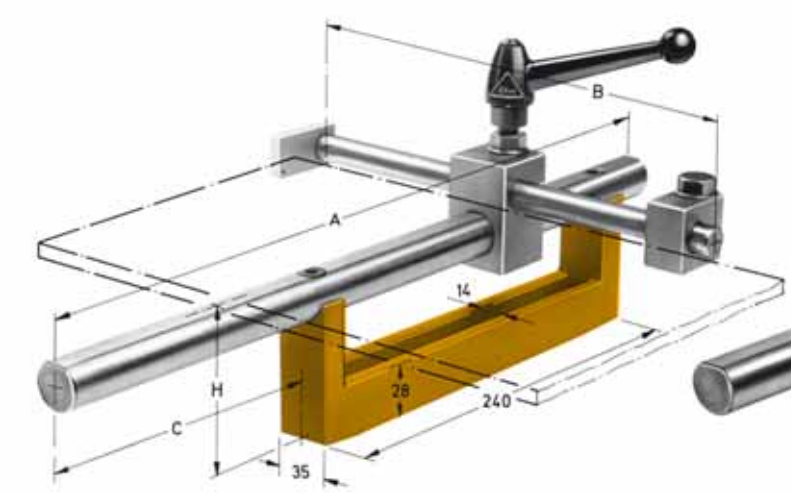
for punching units of series													Shape	Stripping force	Dimensions a	b	Ød	ØD	H	Order No.
100	101 111	102	103	104	105	112	113	114 1 kit = 2 pieces	141 161	142 162	143 163	144 164								
●													A	medium	–	–	6,5	18	30	**801-018x30**
									●				A	small	–	–	12	28	27	**801-028x27**
	●												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**
													D	–	–	–	–	28	*	**803-028xH***
													D	–	–	–	–	50	*	**803-050xH***
													D	–	–	–	–	70	*	**803-070xH***
													D	–	–	–	–	100	*	**803-100xH***

* **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.

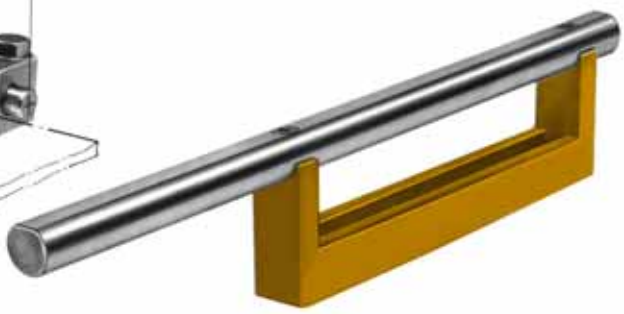
[1] Reinforced version for higher retraction forces when punching thick materials

[2] 1 kit = 2 pieces

Universal limit stop and workpiece support

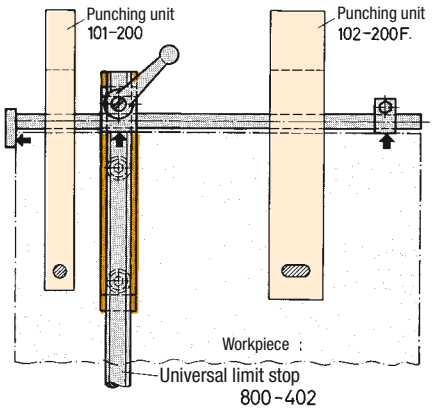


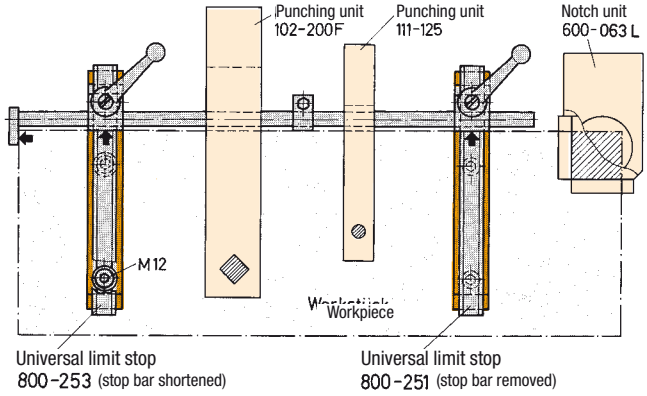
Universal limit stop

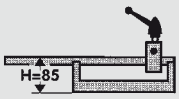
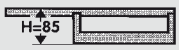
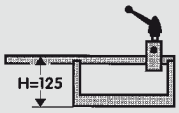
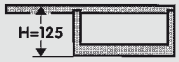


Workpiece support

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

Accessories

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.

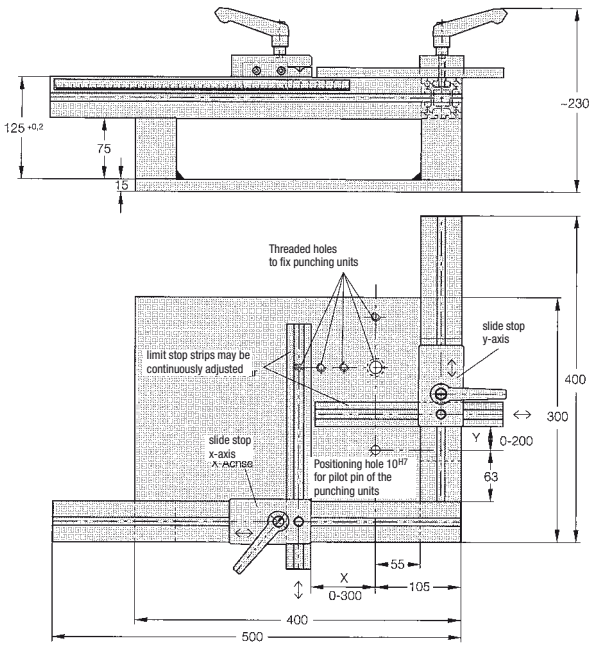
For press-operated punching units with a material support height of 85 mm, a height compensation plate is required (order no. **815-200x300**).

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:

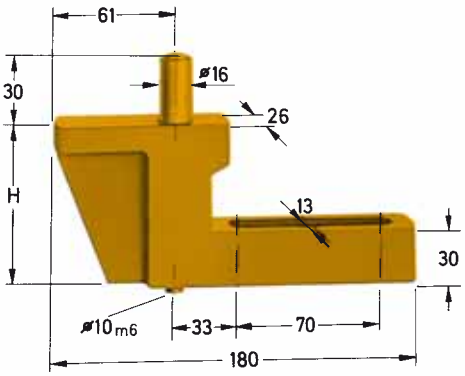
x-axis: 0–300 mm

y-axis: 0–200 mm

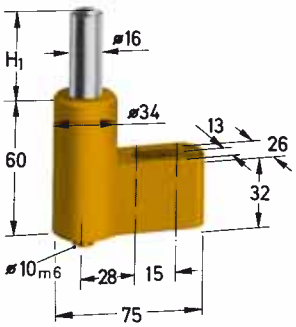


Additional coordinate limit stops
with other working ranges are available on request.
Dimensions: 400 x 500 x 230 mm

Workpiece limit stop

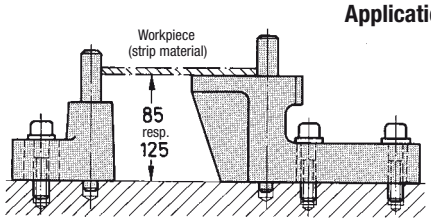


Workpiece limit stop with support

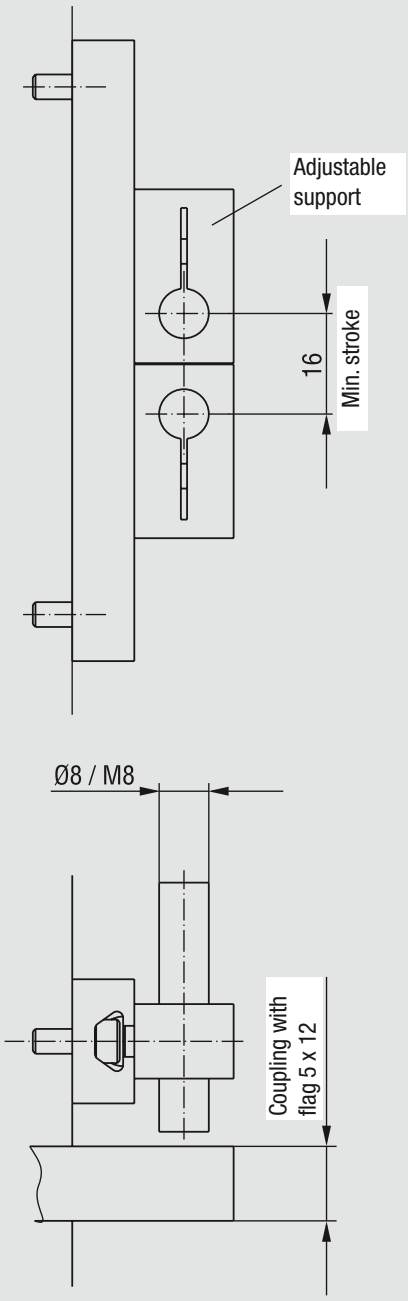


Workpiece limit stop

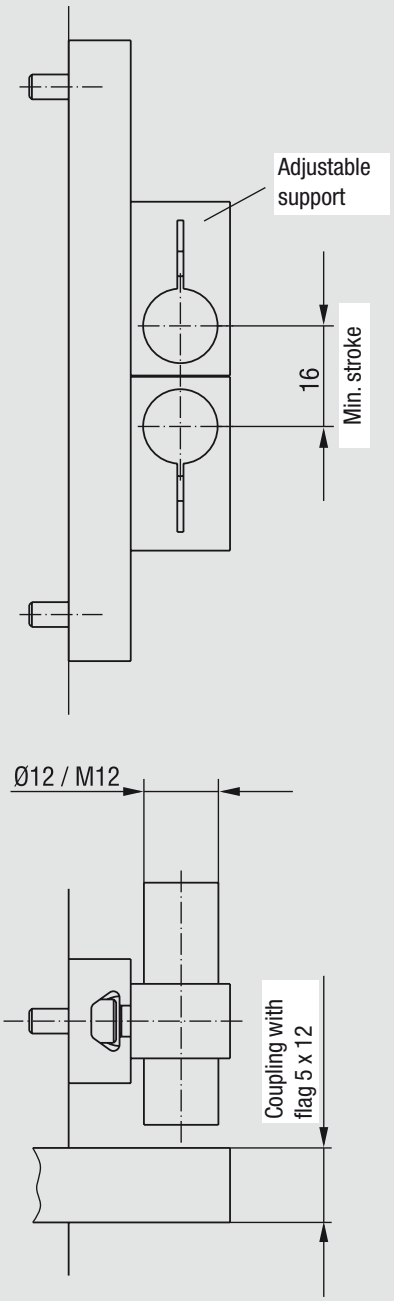
Application example



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**



870-008



870-012

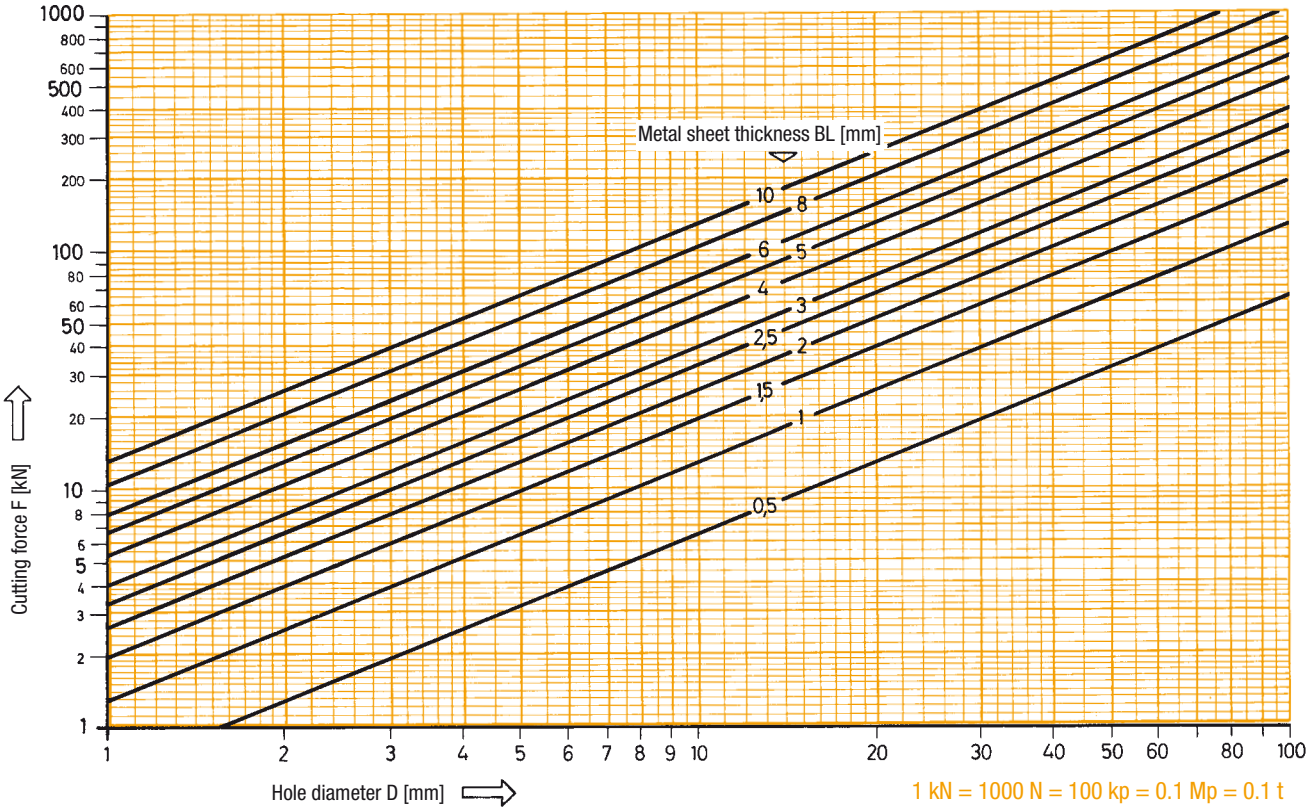
On request, the punching units of series 141-144 and 161-164 can be equipped for cylinder position query. The query is completed at a coupling flag. Inductive sensors with diameters of 8 or 12 may be used alternatively (not included in the delivery).

Order No.	Sensor-Ø
870-008	Ø8 / M8
870-012	Ø12 / M12

Cutting force charts

Cutting force chart for round cuts

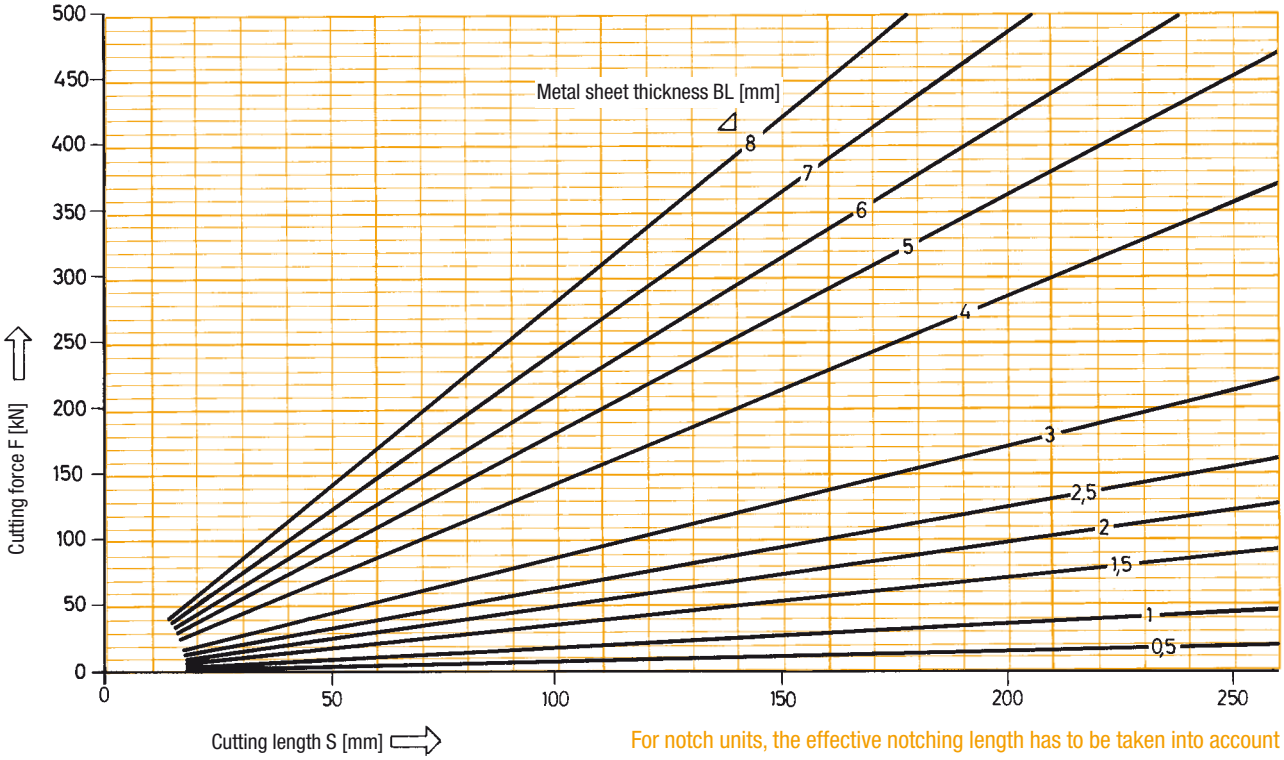
for steel St42 (shear strength 0.4 kN/mm²), stripping force taken into account



1 kN = 1000 N = 100 kp = 0.1 Mp = 0.1 t

Cutting force chart for 90° notch units and cut-off units

for bevelled cuts, for steel St42 (shear strength 0.4 kN/mm²)



For notch units, the effective notching length has to be taken into account

For punching, notching and cutting of materials with different shear strength, the cutting force changes proportionally.

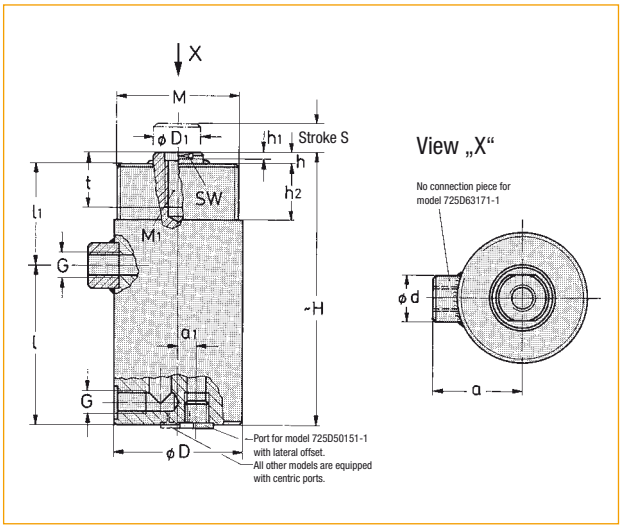
Example: Cutting force for steel St42 = 50 kN (~ 5 t)
Cutting force for steel St37 = 50 kN · 37 : 42 = 44 kN (~ 4.4 t)

Hydraulic short-stroke cylinder, double-action

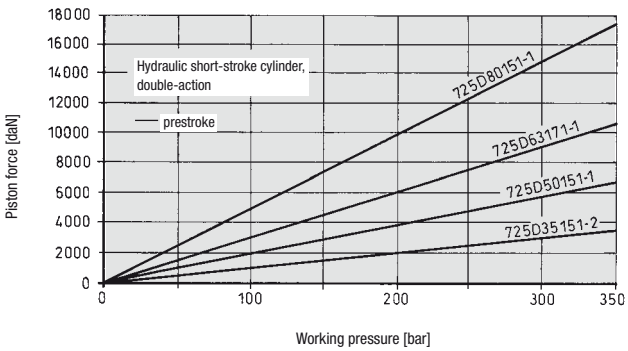
These hydraulic short-stroke cylinders are only used to operate hydraulic double-action punching, notch and cut-off units.
They may be interchanged between the individual hydraulic punching units using a mounting flange. Suitable mounting flanges are available on request.

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]	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]
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

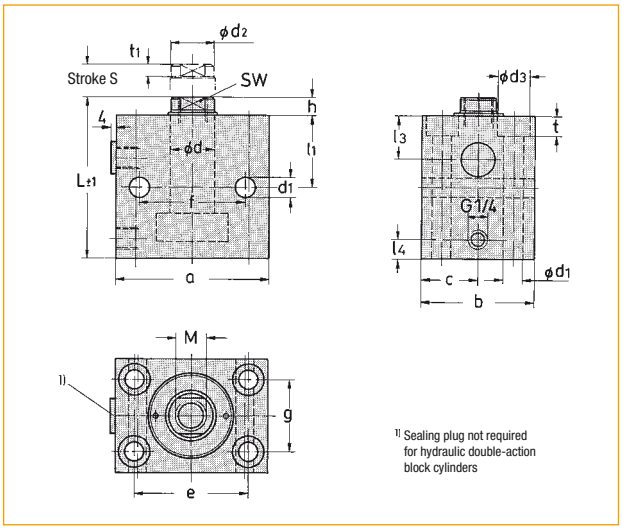
Order No.	a	a¹	Ød	ØD	ØD1	h	h1	h2	~H	l	l1	M	M1	SW	t1
725D35151-2	40	–	25	50	20	9	7	30	159	98	52	M48x1.5	M10	17	25
725D50151-1	47	9.5	25	65	25	6	7	30	145	85	54	M64x1.5	M12	20	30
725D63171-1	–	–	–	97	32	9	7	32	150	96	45	M80x2	M16	27	30
725D80151-1	65	–	28	105	40	9	7	29.5	183.5	102	72.5	M80x2	M16	36	31

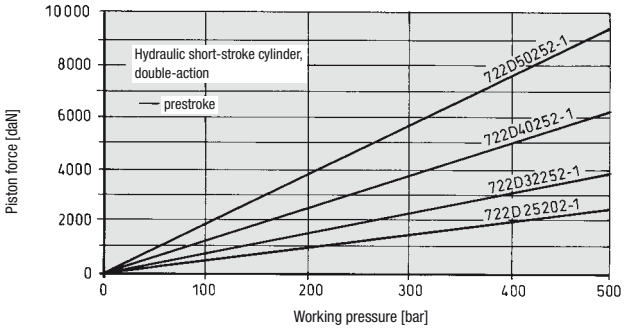
Hydraulic block cylinder, double-action

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



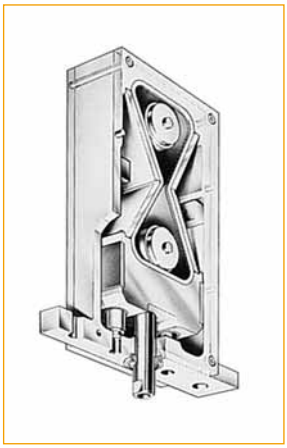


Order No.	Piston force at 100 bar Prestroke [daN]	Return stroke [daN]	Piston force, comparable with old Order No.	Piston Ø [mm]	Max. stroke S [mm]	Max. working pressure [bar]	Piston surface Prestroke [cm²]	Return stroke [cm²]	Oil consumption/stroke Prestroke [cm³]	Return stroke [cm³]	Port G 3x	Weight ~ [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

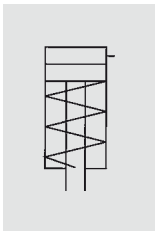
Order No.	a	b	c	Ød	Ød$_1$	Ød$_2$	Ød$_3$	e	f	g	h	L	l$_1$	l$_3$	l$_4$	M x depth	SW	t	t$_1$
722D25202-1	65	45	22.5	16	8.5	15	13.5	50	50	30	7	84	46	32	11	M10x15	13	9	5.5
722D32252-1	75	55	27.5	20	10.5	19	18	55	55	35	10	97	50	34	11	M12x18	17	11	7
722D40252-1	85	63	31.5	25	10.5	24	18	63	63	40	10	98	49	33	11	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

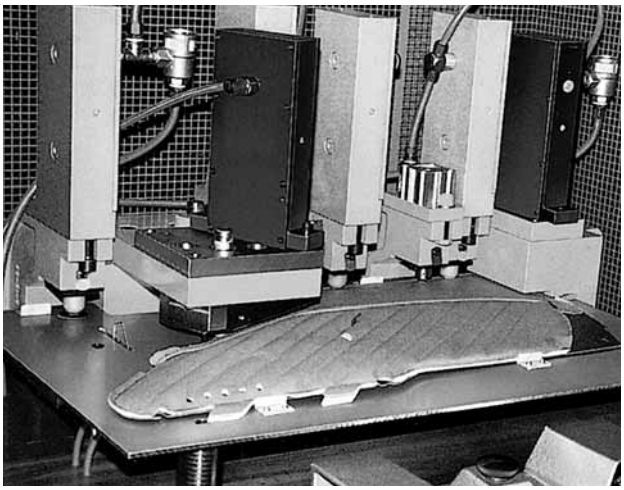
Pneumatic power cylinder, single-action

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.

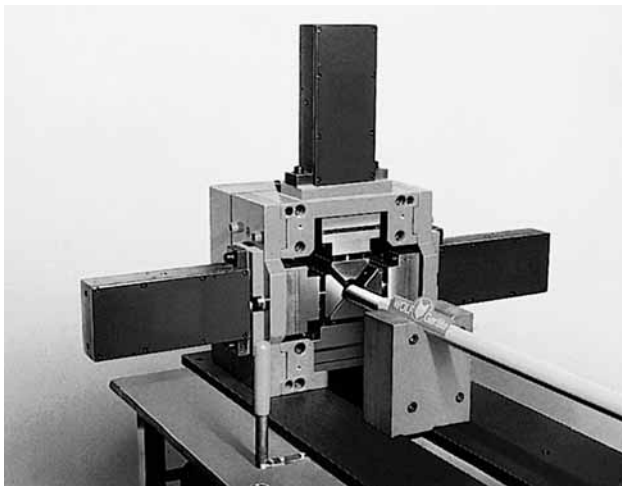


Symbol





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

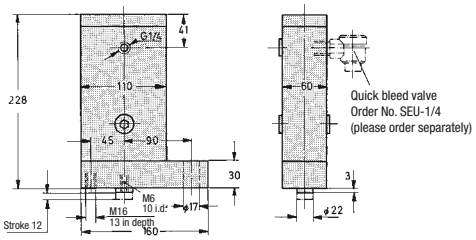


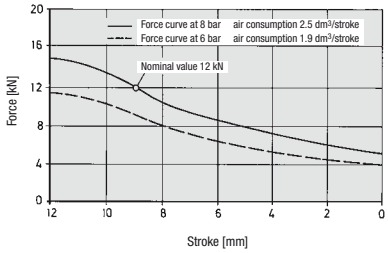
Pneumatic power cylinder for caulking of bushes

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 [dm³/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

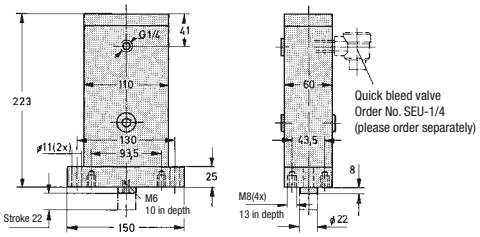
Pneumatic power cylinder, single-action

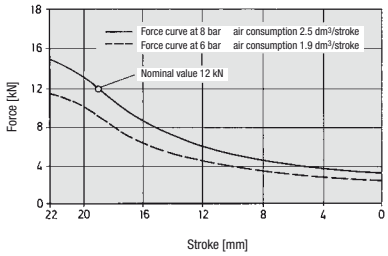
Order No. **04-1212**



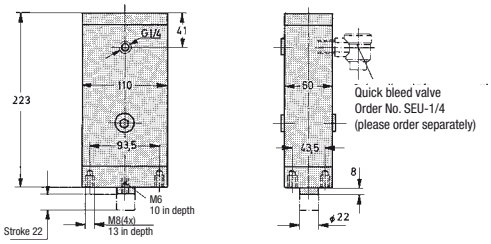


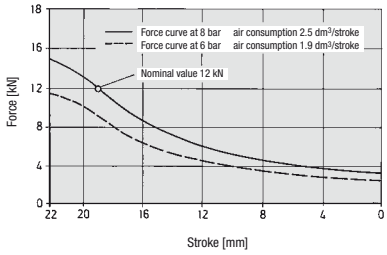
Order No. **04-1222-1**





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





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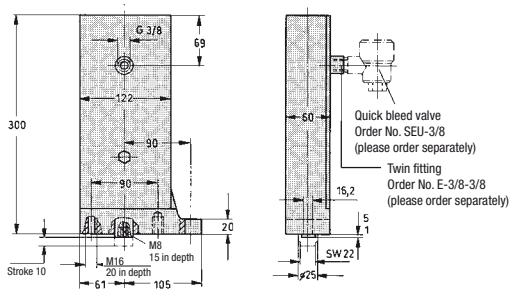

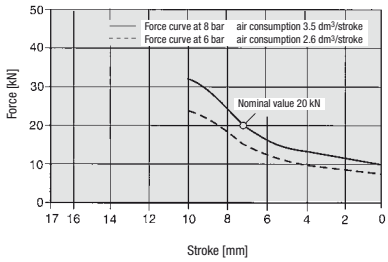

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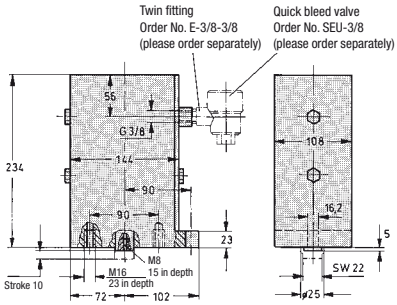
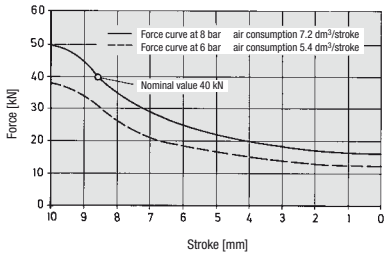
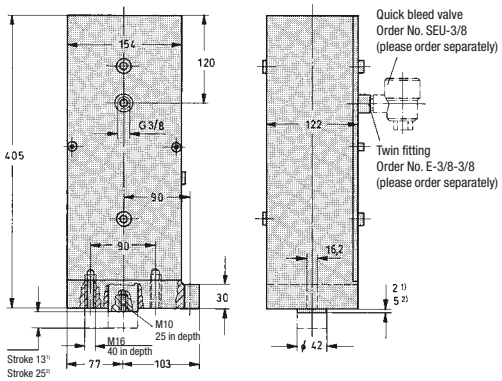
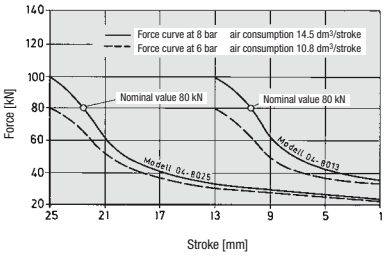




Order No. **04-8013**
and **04-8025**





¹⁾Model 04-8013 ²⁾Model 04-8025

Abfallkiste

Griffmuldenauss

Schutzgitter

1

4

5

6

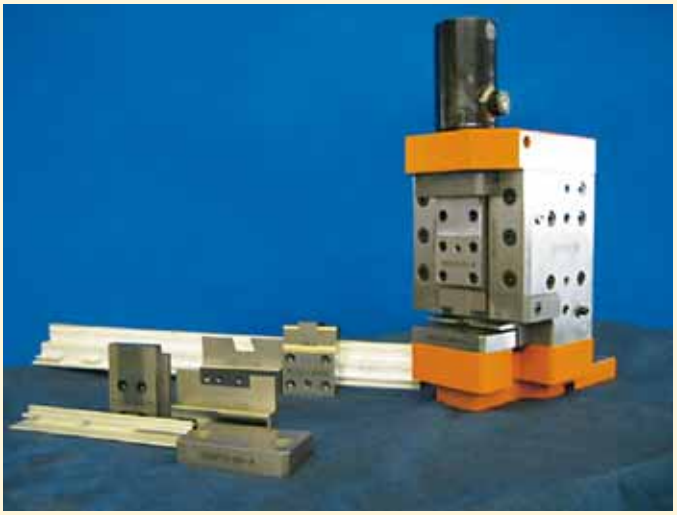
Sicherheitsabstand = 1291

60°

1800

1949

Tools and devices – tailor-made for specific customer requirements



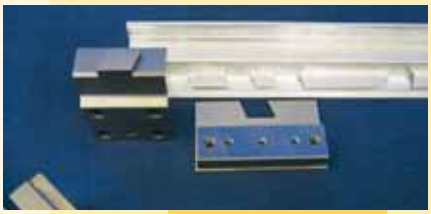
Industrial sector: **Automotive engineering**

Project: 040313

Special hydraulic unit

The die is flexibly fastened which enables the notching of an intermediate web in aluminium profiles.

Material: Aluminium extruded section



Industrial sector: **Metal constructions**

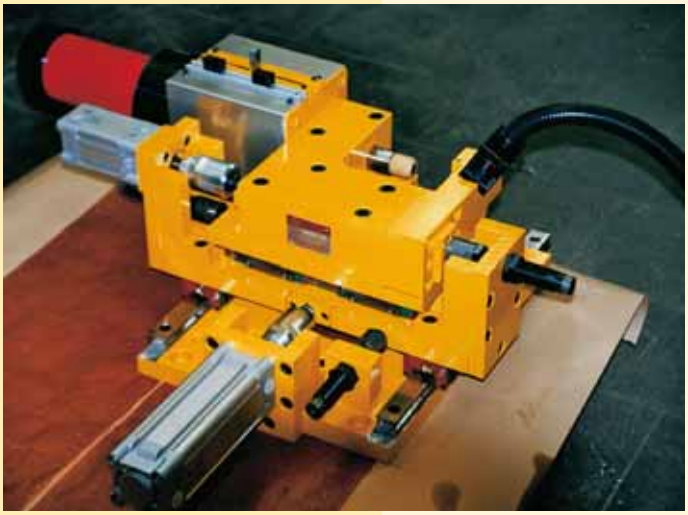
Awnings, doors, window constructions, conservatories, door profiles, etc.

Project: 001001

Punching press with electric motor and integrated notching tool.

Pressing force: 7 t at 60 working strokes/min.

Material: Aluminium extruded section



Industrial sector: **Automotive industry**

Project: 000731

Special pneumatic unit for the punching of Ø 12 mm in a steel sheet.

The unit is fixed on a base plate by means of linear guides and is guided to the workpiece in x/y directions.

The punchings are removed by means of a hose connected with a »venturi nozzle«.

Material: Steel sheet

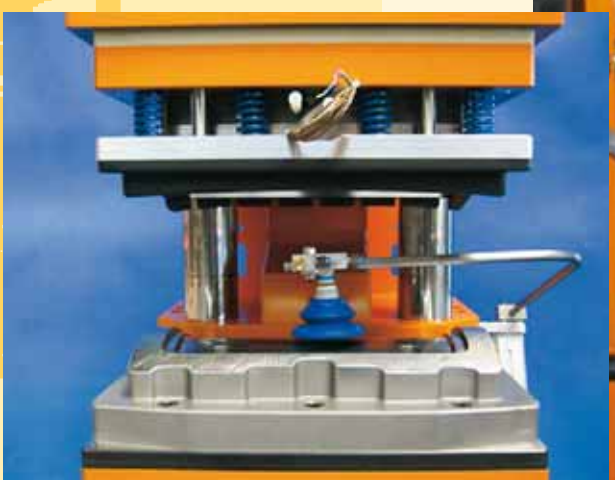
Industrial sector: **Automotive industry**

Project: 040217

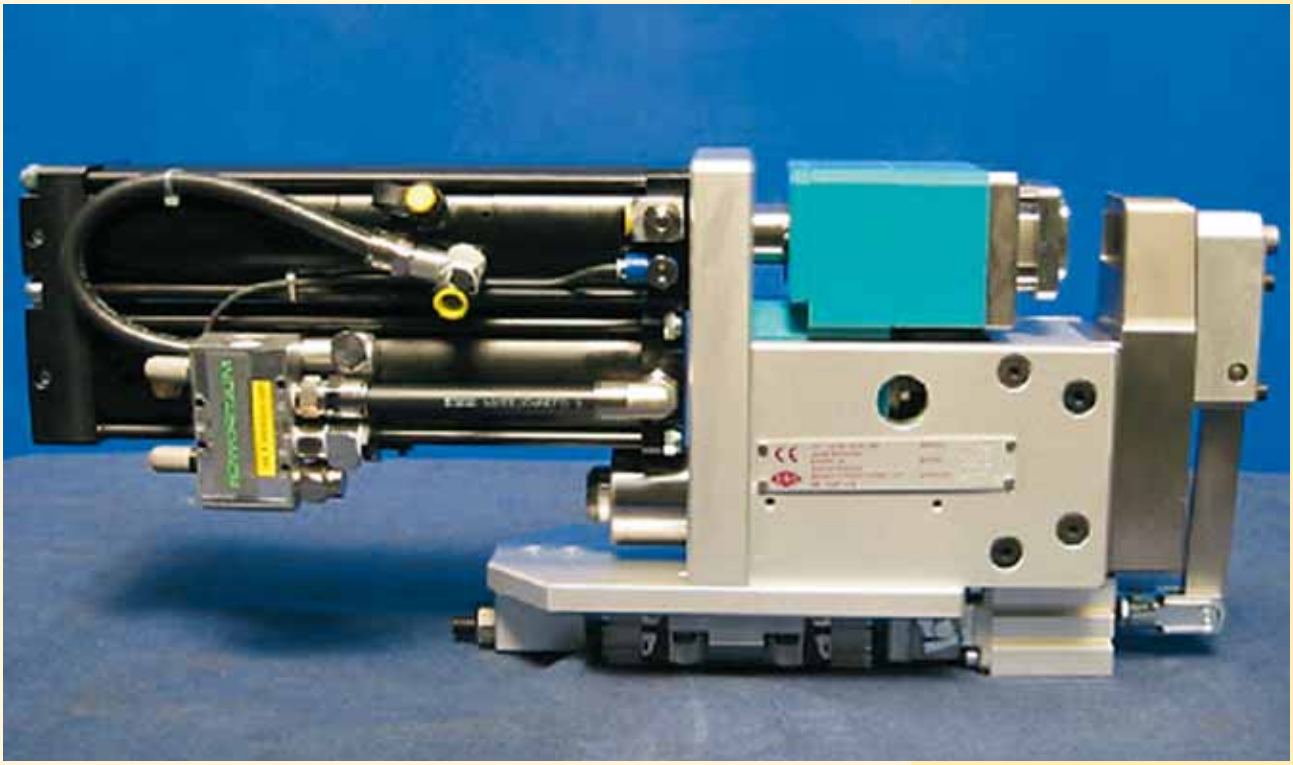
Special hydraulic unit for cutting the trailer coupling recess in the rear bumper of a VW Passat B6.

des VW Passat B6

Material: PPEPDM



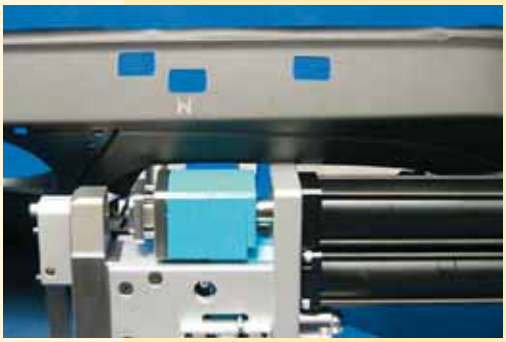
Tools and devices – tailor-made for specific customer requirements



Industrial sector: **Automotive industry**

Project: 050415
Punching of a rectangular recess for a puddle warn lamp in the inside door lining of the Audi A4.
The unit comprises a floating bearing and a waste ejector.

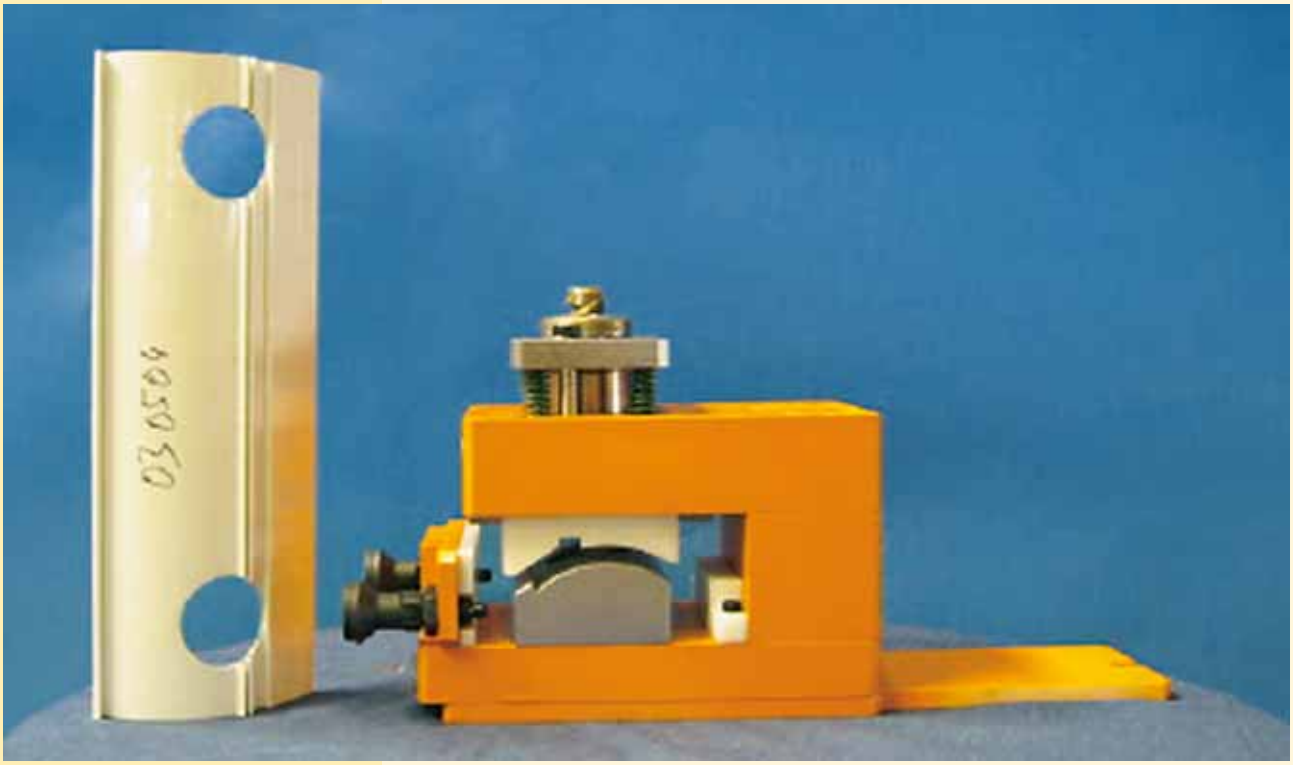
Material: Plastic composite material

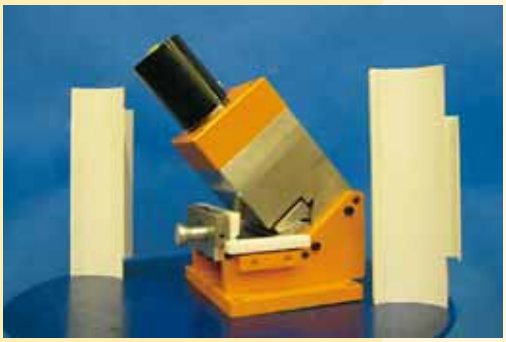


Industrial sector: **Automotive industry**

Project: 010705
Pneumatic mobile manual unit for the punching of an automobile crosswise support (Ø 6,2mm).
The unit is used in combination with a balancer.
The punchings are removed according to the venturi nozzle principle.

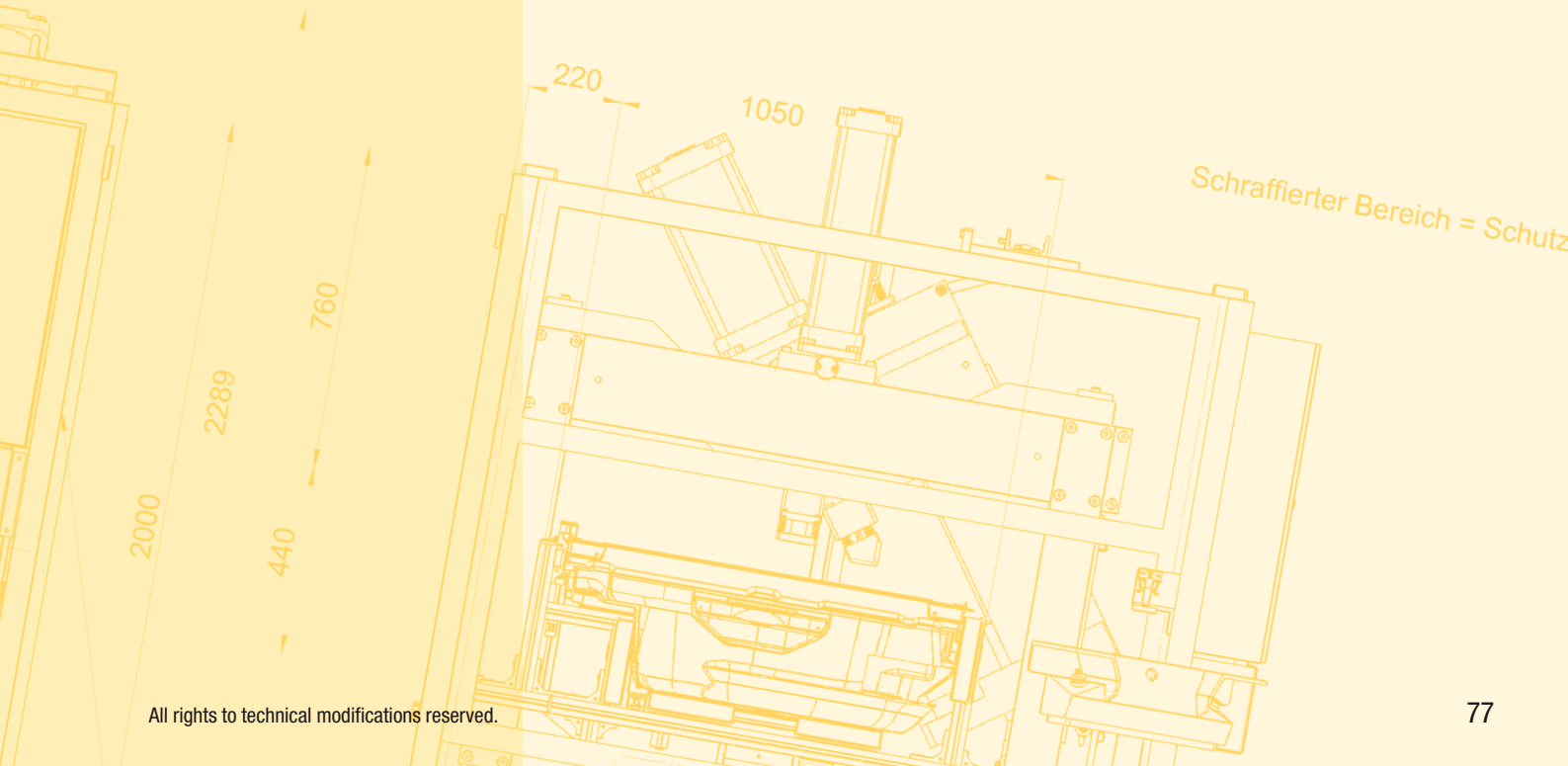
Material: high-tensile automotive metal





Metal constructions

Industrial sector:	Awnings, doors, window constructions, conservatories, door profiles, etc.
Project:	040203-A to H Tool change kits for standard press frames, enabling notching of different hole sizes and diameters, such as 20x40 mm, Ø 48x18 mm, Ø 57 mm, 70x17 mm …
Material:	Aluminium extruded section, powder coated



Tools and devices – tailor-made for specific customer requirements

Medical technology

Industrial sector:

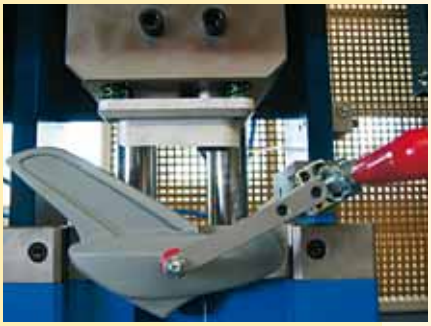
Project: 060202

Punching unit with TÜV (TMA) approved high-speed protective door for cutting outside contours of finger sensors.

The die set in the press frame can be exchanged and adapted to the sensor type.

(Set-up time: 3 min.)

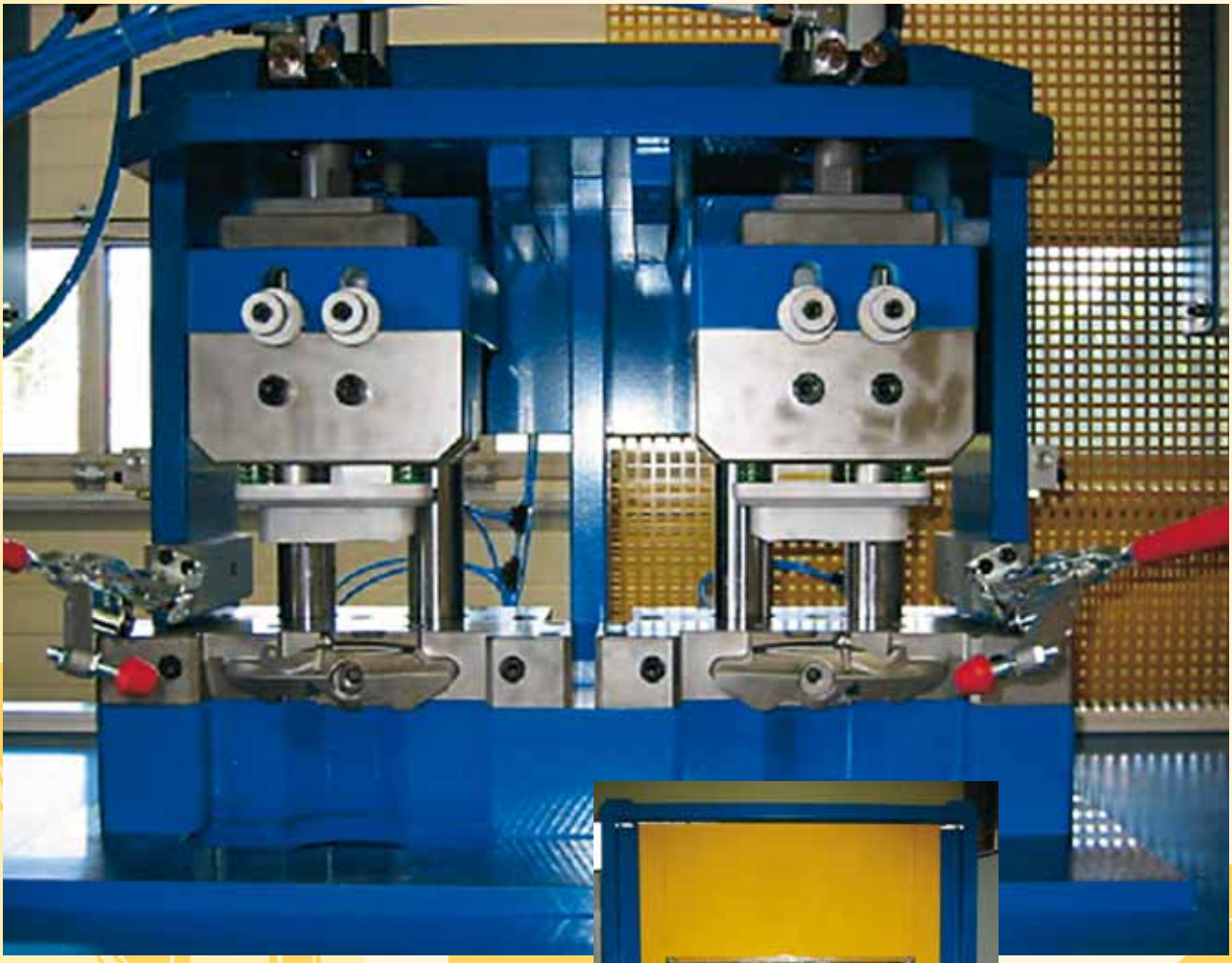
Material: Composite material



Industrial sector: **Automotive industry**

Project: 050525
Pneumohydraulic punching unit with TÜV (TMA) approved high-speed protective door for cutting out two free form holes in the left and right seat liner.
The cutting punches can be switched on and off individually as required.

Material: ABS



Tools and devices – tailor-made for specific customer requirements

Industrial sector: **Automotive industry**

Project: 030715

Punching unit with pneumatic drive for cutting hole profiles into inside roof linings of passenger cars (make-up, Parctronic, array, window bag, reading lamp, rain sensor).
The special unit may be controlled by the SAP system provided by the customer.
The inside roof lining blanks are positioned and identified by the machine before starting the working cycle.

Material: Composite material

We look forward to meet your requirements

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F + 49 (0) 76 35 / 31 55 - 880
info@ips-werkzeugtechnik.de

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

1. Customer address

Company name	Contact person
Street	Department
Postal code, town	Telephone/fax

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

Order number index

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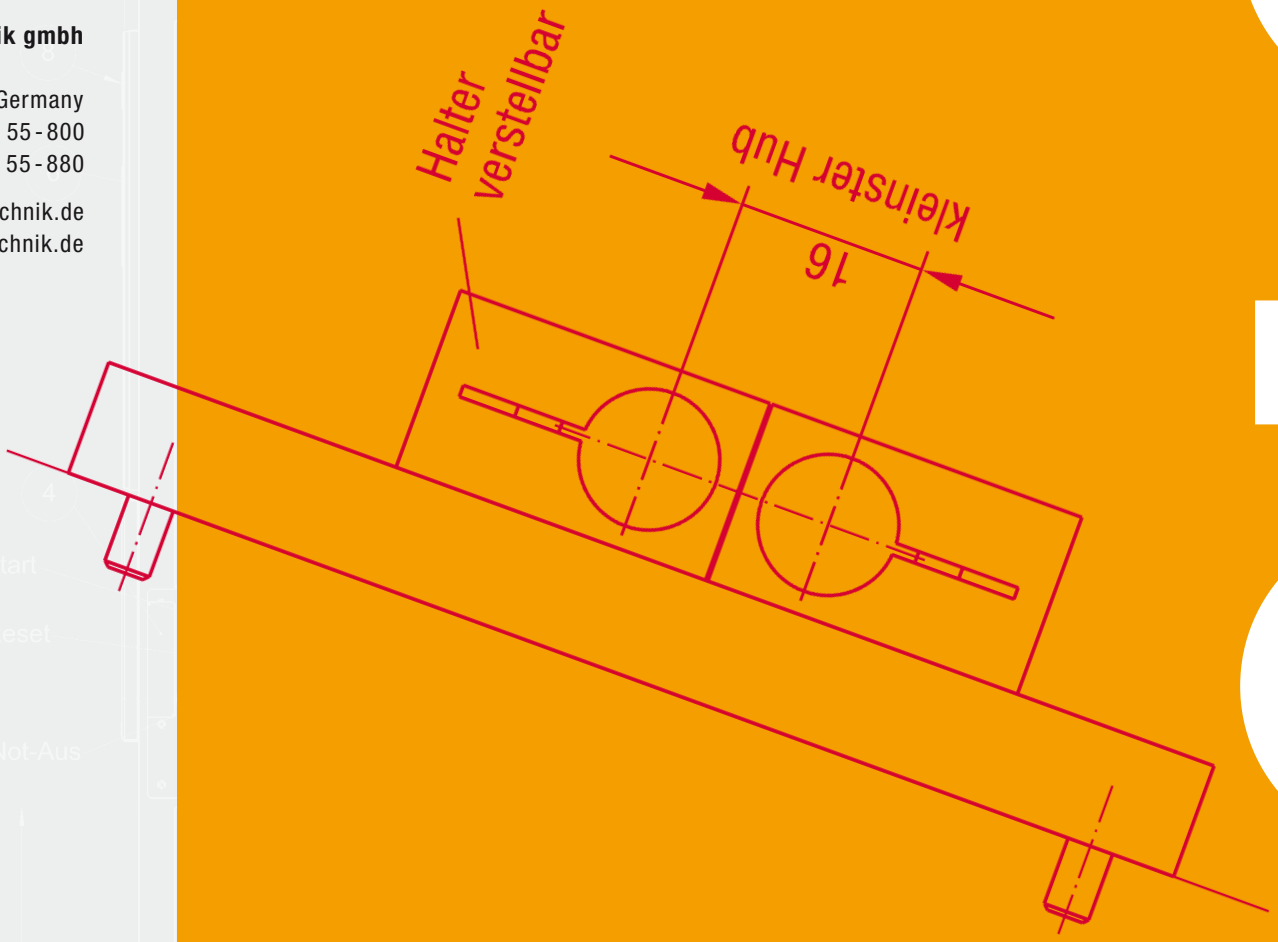

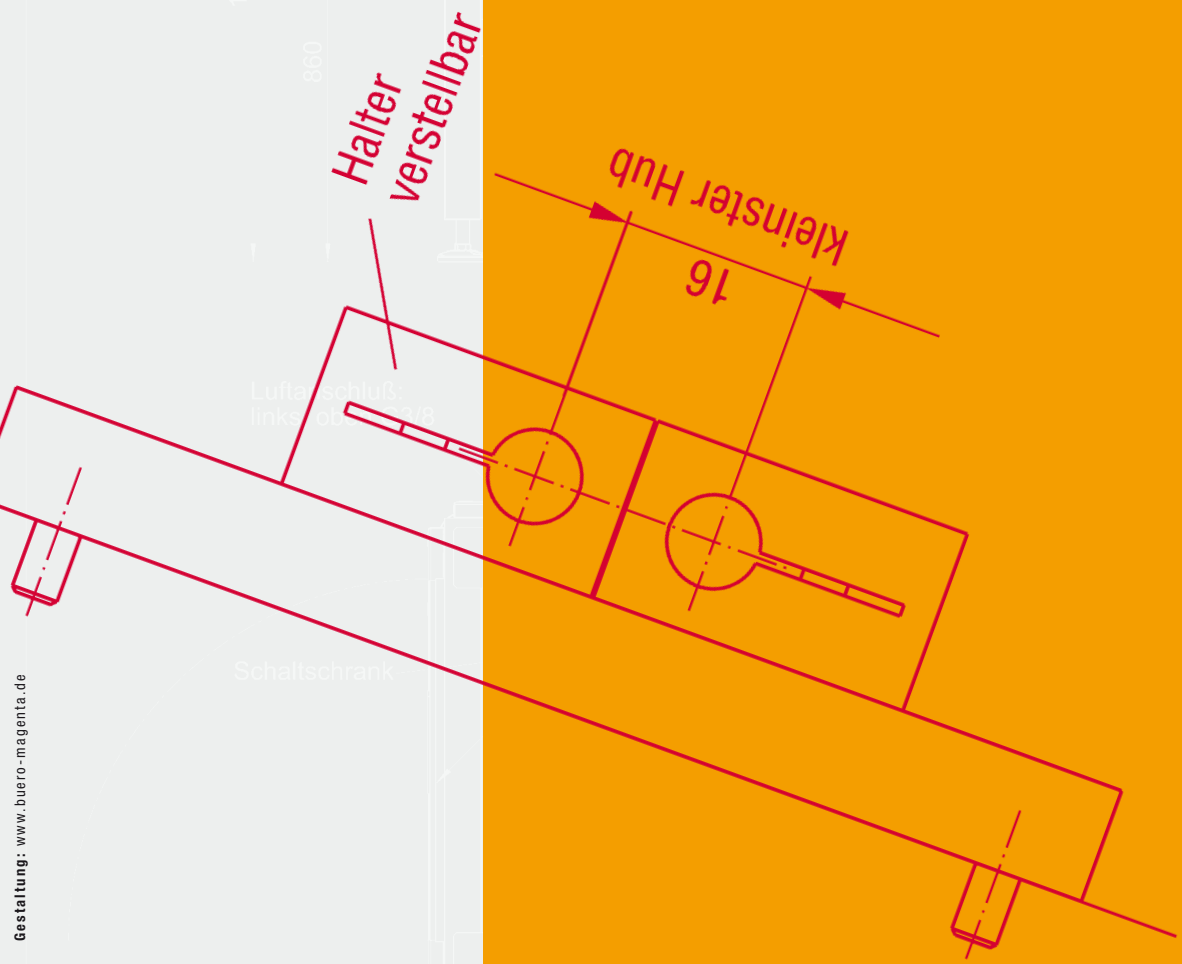

Gestaltung: www.buero-magenta.de