

## 1. Description

The Universal Clamp is a high-performance tool developed for clamping tasks in sheet metal processing. The clamp consists of a pneumatic cylinder, a metal housing, mountable on the front or rear side, and a clamp arm to which the clamping NC Block is attached.

In the clamping operation, the cylinder acts upon an integrated toggle linkage, actuating the clamp arm and intensifying the pressure. The position of the clamping arm is indicated by an integrated position sensing cartridge.

## 2. Safety

Since the Universal Clamp is designed not to be an independent complete tool, it is not equipped with any unique safety measures or devices. Safety requirements can be met only when properly installed into an assembly system, according to prescribed safety regulations.

In case of malfunction, which may endanger personnel, operation of the Universal Clamp must be terminated at once. Maintenance must only be performed by properly trained personnel with the system stopped.

After system service procedures are completed, all safety devices must be properly reinstalled prior to operation.

## 3. Installation of Universal Clamp

- The clamp is mounted on the front or rear side using screws and dowels.

It is mandatory to adhere to the minimum screw-in depth.

### Front and rear side attachment:

	U 40	U 40.5	U/UA 50	U/UA 63
Thread size	M6x10	M8 x 10	M8x12	M8x12
Screw-in depth min. [mm]	7	7	9	9
Tightening torque max. [Nm]	10	10	25	25

- Connect to supply air between pneumatic control valve and clamp (connections "N"). External throttle valves must be used for the damping of the return stroke (forward and backward). They must be set to the appropriate traverse speed.

**Attention:** The Universal Clamp is equipped with an integrated end position cushion on the return stroke. At excessive clamp arm weight, the safe function of the cushion is not warranted. Maximum permitted clamp arm weight design guidelines must be adhered to.

### A. Inductive position sensing (T12)

Connect sensor per electrical diagram to control line by inserting connector "C" and tightening connector coupling nut.

**Caution:** Operation with wrong current or current higher than specified may short out the system and lead to personnel injury.

Function of the integrated LEDs is as follows:  
 green .....system current  
 red .....clamp closed  
 yellow.....clamp open

### B. Clamp arm mounting

The bars of the flange have different heights. Note the alignment of the flange during assembly, see fig. 2 a and 2 b. Tighten screw "S1" first (no gap between cap and arm body) and then screw "S2" (remaining gap). Use only the supplied fastening elements. Shorter screws will lead to damage of the clamp arm.

### Clamp arm version size 40/40.5

A10	A40
M6 x 16	M6x20

Conical spring washer DIN 6796-6-FSt.  
Tightening torque 10 Nm

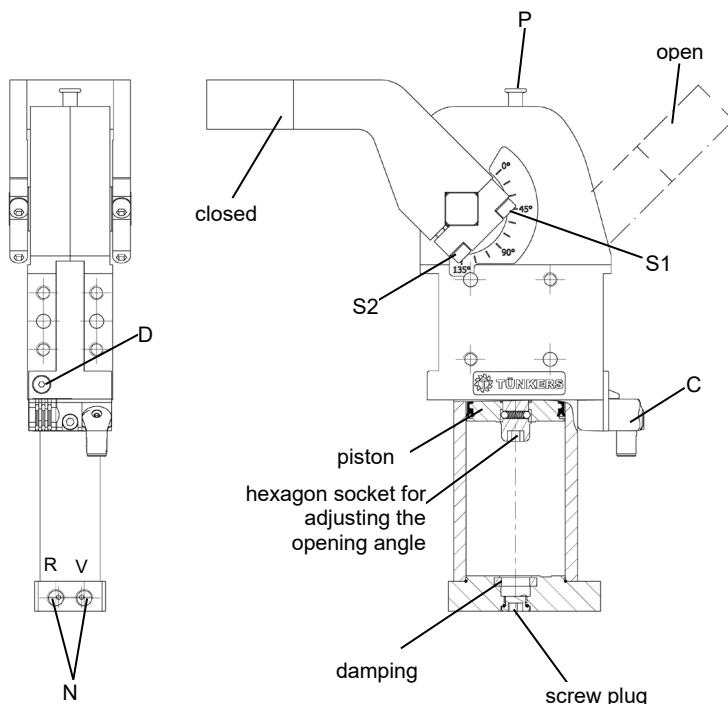


Fig. 1: Clamp

### Clamp arm versions size 50

<b>A10</b>	<b>A40</b>
M 6 x 25	

Conical spring washer DIN 6796-6-FSt.  
Tightening torque 10 Nm

### Clamp arm versions size 63

<b>A10</b>	<b>A40</b>
M 8 x 30	

Conical spring washer DIN 6796-8-FSt.  
Tightening torque 25 Nm

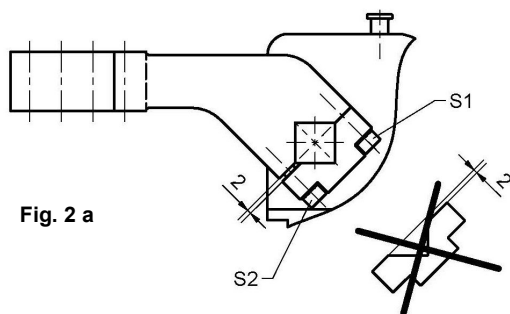


Fig. 2 a

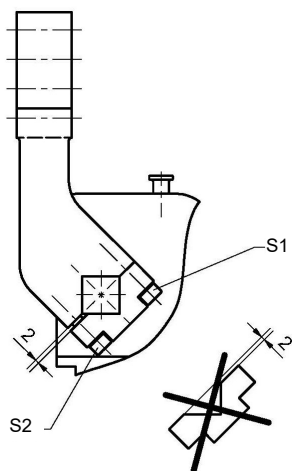


Fig. 2 b

## 4. Holding function HO (option)

For safety-relevant tasks (e.g. gripper system, overhead installation), the Universal Clamp can be equipped with a pneumatic holding function (version "HO"). This pneumatic self-holding keeps the drive cylinder under pressure in the "open clamp" position via a pilot operated check valve integrated in the cylinder bottom. Due to this application of pressure, the clamp can not be closed automatically anymore (Fig. 3 b.). The pneumatic self-holding is unlocked by switching the main valve or by manual operation of the check valve (Fig. 3 a.). A special external pneumatic circuit is not required.

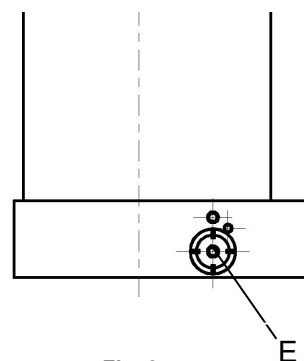


Fig. 3 a

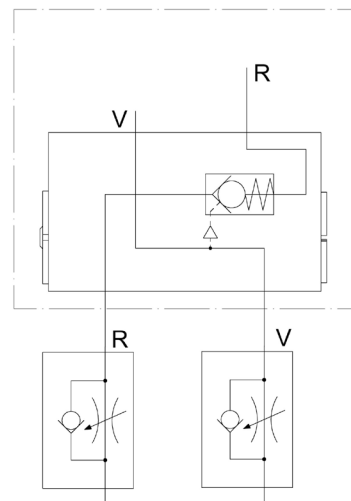


Fig. 3 b

## 5. Adjustment of the Universal Clamp

**Attention!** Before the contour (N/C) block is disassembled, the clamp arm must be removed from the clamp! This is the only way to avoid damage to the clamp.

### Caution – Pinching Danger!

During adjustment of the clamp arm, fingers can be pinched or severed. Do not reach into the swivel area of the clamp arm while the Universal Clamp is actuated. Remove air supply to clamp prior to working in clamping area.

- Attach contour (N/C) block to clamp arm.
- Close clamp. The toggle lever must move audibly to over-center position. Release pin "P" is in extended position.
- Determine dimensional difference between arm/contour block and part.
- Open clamp.
  - a) Adjustment without pre-tension (soft touch)  
Adjust the dimensional difference to 0 mm (!) by assembling the respective adjusting plates (see fig. 4). Please note the OEM project specifications!
  - b) Adjustment with pre-tension  
Adjust the dimensional difference to +0.3 mm (size 40) resp. +0.5 mm (sizes 50/63) by insertion of the respective adjusting plates.
- Close clamp. The toggle lever now moves into the over-center position and the desired pre-tension is achieved.

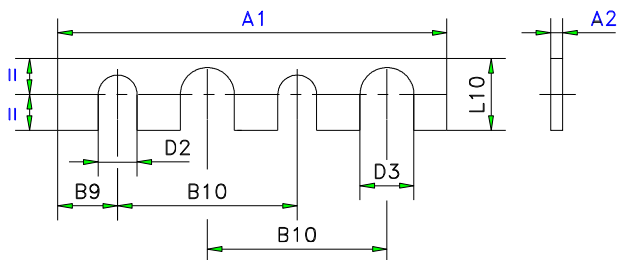
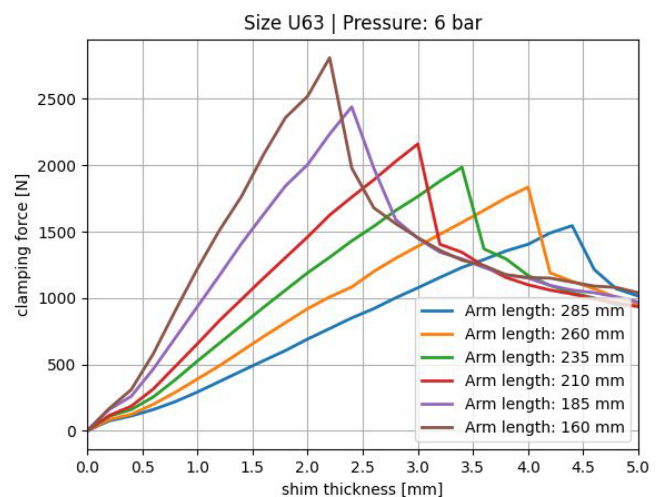
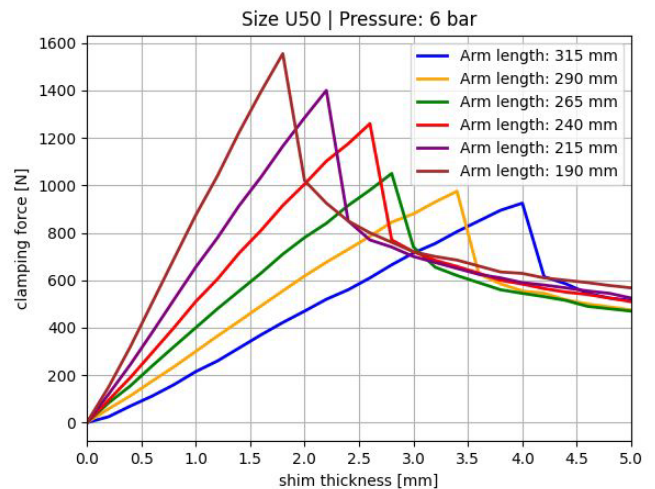


Fig. 4: adjusting plates - example

Adjusting plate no.	A1	A2	D2	D3	B9	B10	L10
AP 4005		0,5					
AP 4010	42	1,0	6,5	7	6	20	12,4
AP 5005		0,5					
AP 5010	65	1,0	6,5	9	10	30	16

## 6. Adjustment of the clamping point



## 7. Unlocking the clamp

If the toggle joint is located in the over-center position, the clamp can be unlocked mechanically and therefore opened by turning the driving spindle "P".

### Caution – Pinching Danger!

If screw "P" is actuated, the clamp arm can open suddenly. Do not reach into the swivel range of the clamp arm!

## 8. Changing the opening angle

The opening angle on the Universal Clamp is infinitely adjustable within the standard range of 5° to 135°. Changing the opening angle also changes the end of stroke cushion and the position sensors.

### Set Up:

- Move clamp arm to opened position.
- Read the preset angle at the scale on the side of the clamp housing.
- Remove the locking screw in the cylinder bottom.
- Screw the hexagon socket at the piston rod until the desired opening angle is reached.
- Mount the locking screw.

**Caution:** Look out for a correct fastening and seat of the sealing, because the inner space of the cylinder is sealed this way.

With changing the opening angle, the position of the trip cam changes automatically, so it is not necessary to set it separately.

Please note the max. opening angle in clamp arm position 2 (see fig. 2 b and the corresponding data sheet of the clamp)!

## 9. Changing of position sensing cartridge

Remove position sensing cartridge by loosening screws "D".

**Caution:** Move clamp arm to the open position before replacing the position sensing cartridge!

## 10. Changing of clamp arm

To avoid cramping and distorting of the square shaft when replacing the clamp arm, make sure that fixing screw S1 is fastened at first and only then, fasten the fixing screw S2 (with gap, see fig. 2).

Recommended tightening torque:

U 40/40.5 BR5	10 Nm
U 50 BR5:	10 Nm
U 63 BR5:	25 Nm

## 11. Changing the position of the air connections

If absolutely necessary, the air connections "N" can be positioned at the front by the following procedure

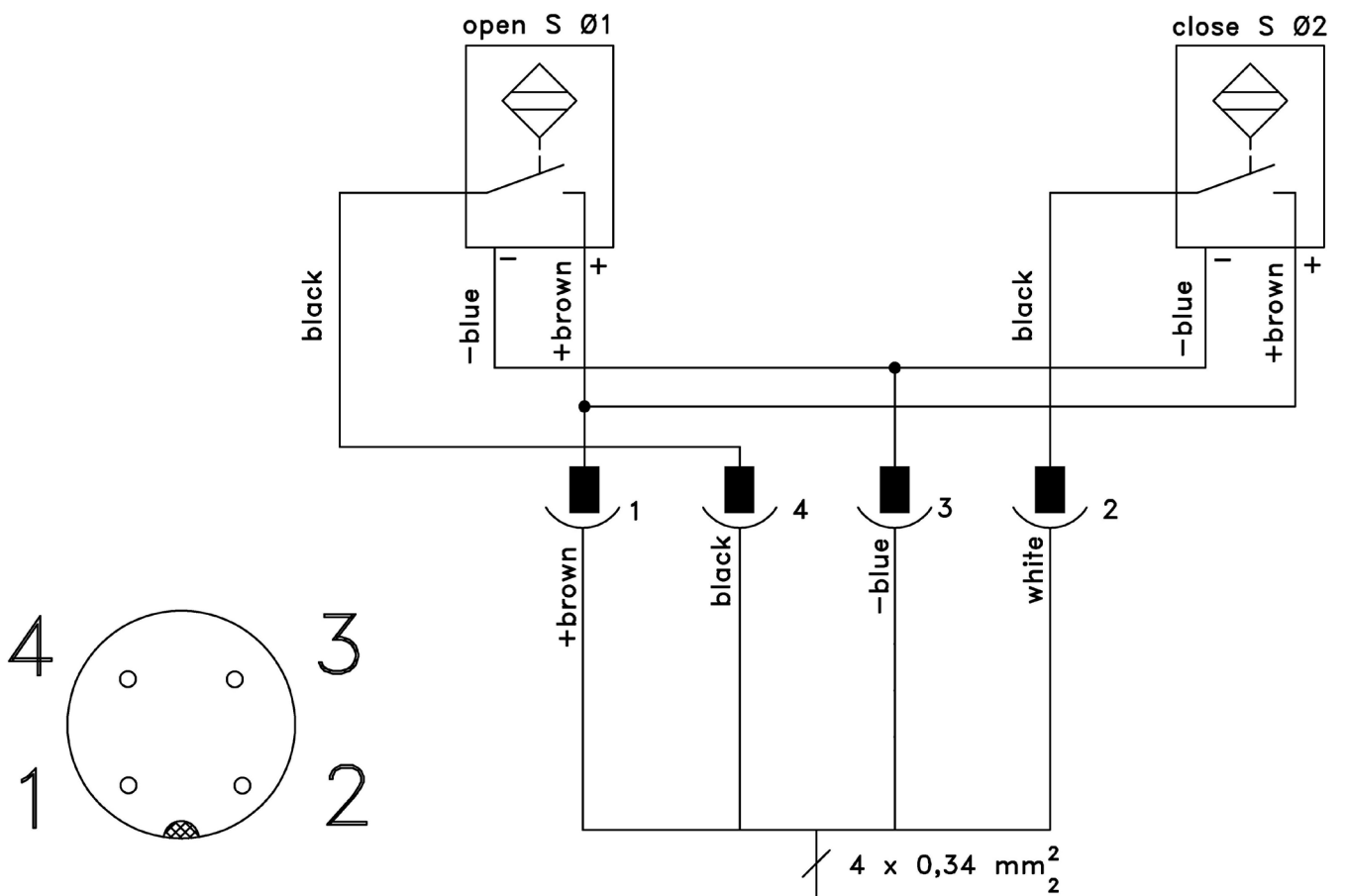
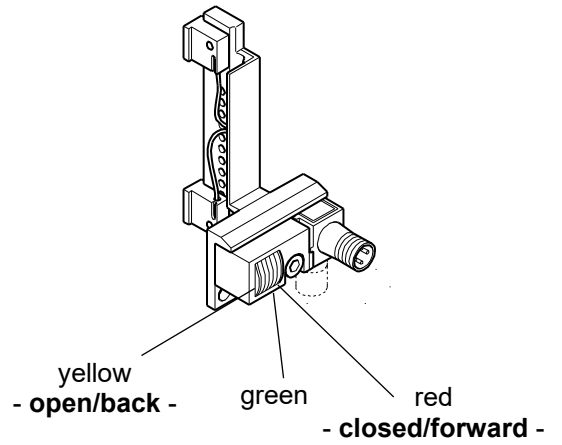
- Loosen the screws on the cylinder bottom and pull of the drive cylinder.
- Turn cylinder bottom and tube together by 180° so that the air connections are at the front.
- Reassemble the cylinder and tighten the screws on the cylinder bottom.

**Attention:** It is important to ensure piston seal and cylinder tube seal are not damaged or slip. If in doubt, it is recommended to replace the seals completely. The corresponding seal kit is listed in the spare parts documentation.

## 12. Maintenance

The Universal Clamp is fitted with low-maintenance bearings and guides designed for operation in large-scale series production. The technical design of the clamps provides a service life of 3 million power strokes without significant signs of wear.

**Attention:** To provide protection from welding slag and other debris, the clamp is equipped with a fully closed housing. Therefore, no special maintenance is required. Cleaning with high-pressure steam or dry ice may damage the Universal Clamp.



Technical specifications

Inductive switch (standard version)  
 Short circuit proof  
 Rated voltage 10-30 V  
 Working current 32 mA (one initiator connected with PLC)  
 Closer PNP exit



Subject to technical modifications.

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