## 1. Description

The ALPHA Clamp is a high-power tool designed for use in clamping tasks processing sheet metal. It consists of a pneumatic cylinder, a metal housing with several mounting possibilities, and a clamp arm with receiver for the contour piece.

When used for clamping, the pneumatic cylinder functions on an integrated curve mechanism and moves the clamp arm. The position control of the clamp arm is achieved through limit switches fixed on an integrated cassette system.

## 2. Safety

The ALPHA Clamp was not conceived to be a complete tool, ready for independent applications and has therefore not been fitted with safety equipment. Only when it is correctly installed in a production system and a corresponding safety control system is added, will all safety requirements be met.

Should any faults occur that place personnel at risk, the ALPHA Clamp is to be switched off immediately. Maintenance measures are only to be undertaken when the machine is at a complete standstill and by suitably qualified specialists.
After maintenance work has been carried out, the protection devices are to be refitted in the correct way.

## 3. Assembly of the ALPHA Clamp

- The clamp is installed by means of socket head cap screws on the mounting face, front or rear.
- Connect to supply air between pneumatic control valve and clamp (connections “N”).

  Installation of flow control valves is recommended to reduce the clamp opening and closing speed and to adjust to the proper system / line speed

  **Attention**: The ALPHA Clamp is equipped with an integrated 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.

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

## 4. Set up for the ALPHA Clamp

**Caution!** Danger of crushing!
When the clamp arm is being set, fingers could be severed or crushed. Do not reach into the swivel area of the clamp arm while the ALPHA Clamp is in operation. Before operations are stated the air supply must be shot off.
The ALPHA Clamp is equipped with a special curve mechanism, which generates a defined clamping force over a clamping angle of ± 1,5°. The contour pieces are to be built so they fit into the work piece in a clamp arm position of 0° and 90°. This ensures a clamping way and so a power reserve in process.

- Tighten contour piece on clamp arm.
- Close the clamp and check the 0 ° position with appropriate measuring equipment. If necessary adjust with shims under the corresponding contour piece. When set correctly, the release pin "P" lifts up slightly from the housing.
- Attention When release pin "P" is fully extended the clamping distance of the ALPHA clamp is exhausted and no more power reserve is available (= release pin "P" is jammed).

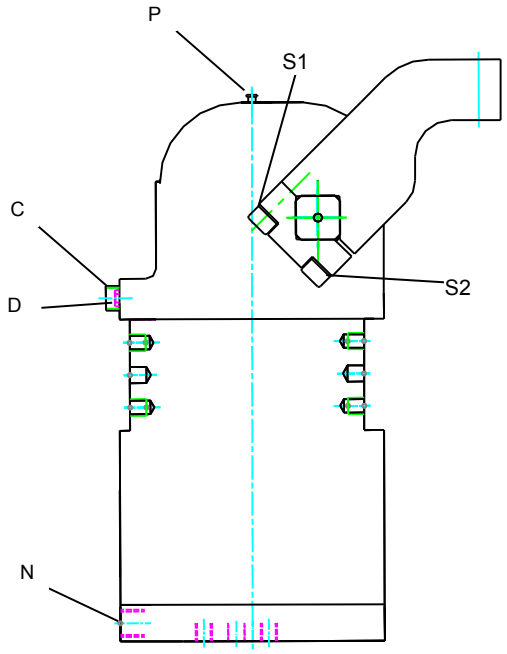


**Fig. 1: ALPHA Clamp**



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## 5. Release of Toggle

When the toggle lever is in the upper dead centre position, the clamp may be mechanically unlocked and thereby opened by operating pin „P“.

**Caution! Danger of crushing!** By operating pin „P“, the clamp arm can open abruptly. Do not reach into the swivel area of the clamp arm!

## 6. Adjusting the opening angle APH 40 (old version)

The opening angle of the APH 40 can be set in phases of 15° each. Changing the opening angle adjusts the pneumatic end of stroke cushion and the position sensors automatically. The standard range is 15° to 135°.

Set Up:

- Bring clamp arm to open position.
- Read the pre-adjusted angle at the scale.
- Remove the side plate (possible without demounting the clamp arm).
- Loosen cylinder screw “A” at the piston rod.
- Adjust both parts of the piston rod in steps of 15°.
- Fix both parts of the piston rod with cylinder screw “A” and mount the side plate.

**CAUTION:** Look out for a correct fastening of the inner hexagon socket screw plug, otherwise the opening angle could be changed by mistake.

**CAUTION:** When mounting the clamp arm in position 2, the max. opening angle is 105°!

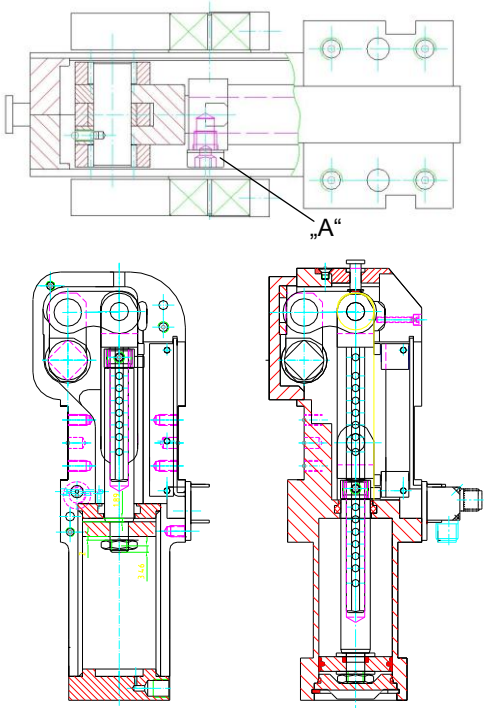


**Fig. 2: Changing the opening angle APH 40 (old version)**

## 7. Adjusting the opening angle APH 50-80

The opening angle on the ALPHA Clamp is infinitely adjustable within the standard range of 15°-135°. Changing the opening angle also changes the end of stroke cushion and the position sensors.

Set Up:

- Bring clamp arm to open position.
- Read the pre-adjusted angle at the scale.
- Remove the inner hexagon socket screw plug at the cylinder bottom.
- Screw the hexagon socket inside the cylinder bottom until the desired opening angle is reached.
- Screw down the inner hexagon socket screw plug at the cylinder bottom.

Adjust the position sensing to the new end position after adjusting the opening angle. Push the “teach-in”-bottom at the position sensing. The system teaches in the new end positions within the next working strokes.

**CAUTION:** Look out for a correct fastening of the inner hexagon socket screw plug, otherwise the opening angle could be changed by mistake.

**CAUTION:** When mounting the clamp arm in position 2, the max. opening angle is 105°!

## 8. Replacement of limit switch cartridge

- Remove limit switch cartridge by releasing the screw “D”.
- Set new limit switch cartridge for relevant opening angle (see 5) and assemble.

## 9. Changing of Clamp Arm

In order to avoid warping of the square-section shaft, it must be ensured when changing the clamp arm that fixing screw "S1" (flange contact surface, clamp arm at stop) is tightened first, followed by the second fixing screw, "S2" (see figure 1).

Recommended tightening torque:

| | |
|---|---|
| APH 40 | 8.7 Nm |
| APH 50: | 17 Nm |
| APH 63: | 41 Nm |
| APH 80: | 41 Nm |

## 10. Maintenance

Bearings and wear faces on the ALPHA Clamp have been designed with consideration for high production applications. This technical concept allows 2 million cycles without significant component 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 ALPHA Clamp mechanism.

TÜNKERS® Erfindergeist serienmäßig.



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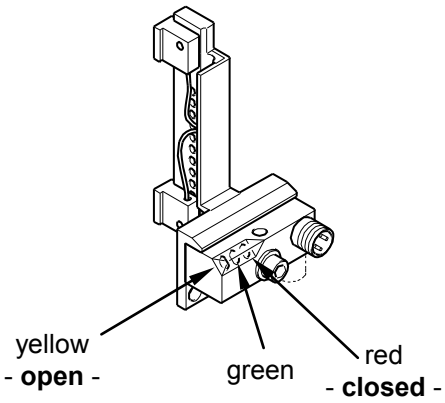


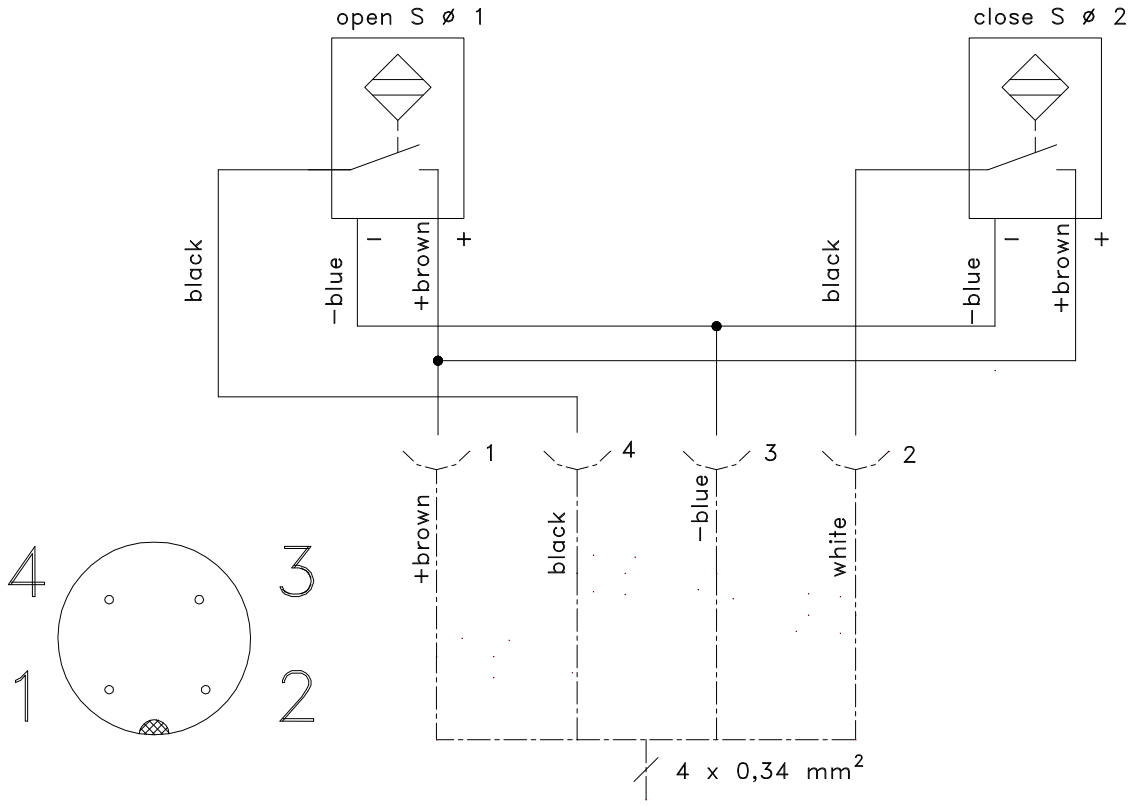


Technical Specifications:

Inductive switch, short circuit proof

| | |
|---|---|
| Rated voltage | 10-30 V |
| Working current | 32 mA (one initiator connected with PLC) |
| Closer | PNP exit |



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