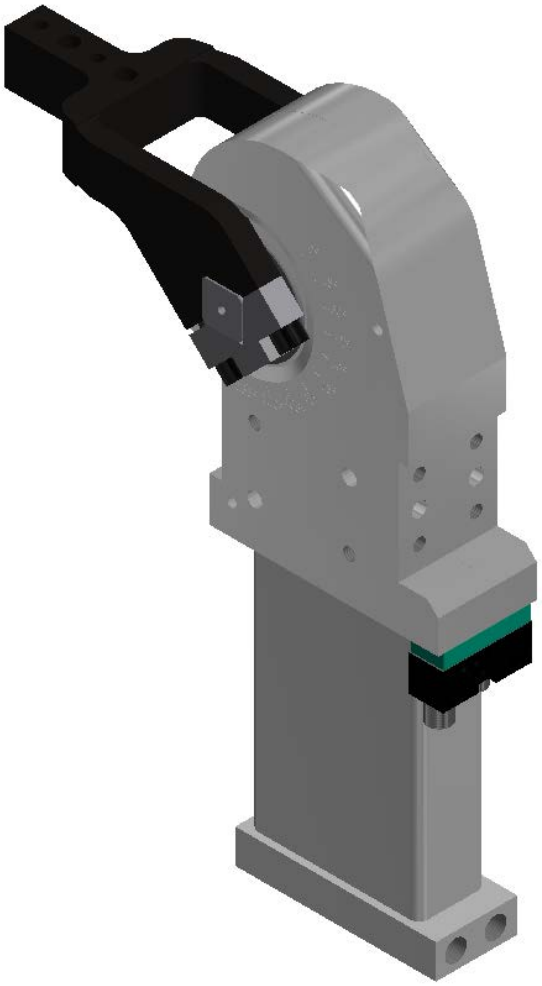
Installation and operating instructions

Plane-parallel clamp UP series

Sizes: UP 40, UP 63, UP 80

Variants: "H"(standard), "HD", "non-blocking"



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1 General description

This chapter contains notes on these Installation and operating instructions, along with general safety instructions for handling the plane-parallel clamp.

The plane-parallel clamp is intended for installation in another machine and is an incomplete machine. In the remainder of this document, the plane-parallel clamp will also be referred to as the machine.

1.1 Information about the Installation and operating instructions

These Installation and operating instructions are an integral part of the user documentation for this machine. Follow all instructions, data, and requirements in the Installation and operating instructions. The Installation and operating instructions will help you to operate the machine safely, and with a high level of availability.

We reserve the right to make technical changes to the Installation and operating instructions that are designed to improve the machine.

1.2 Layout of the Installation and operating instructions

Safety-relevant instructions are identified by the appropriate symbols.

Listings

Listings of features in any order or an order that need not be strictly maintained are labelled with a bullet.

Example:

- Property A
- Property B
  - Sub-property of property B

Orders

Work steps that must be performed in the specified order are numbered and the results of the steps are shown in italics.

Example:

1. Step 1 to be performed
   Result of step 1
2. Step 2 to be performed

   2.1 Sub-step of step 2 to be performed

1.3 Use of the Installation and operating instructions

These Installation and operating instructions help you to familiarise yourself with the machine and make optimum use of its intended applications.

The Installation and operating instructions must be supplemented with instructions based on existing national regulations concerning accident prevention and environmental protection.

Ensure that the Installation and operating instructions are always available at the usage site of the machine and in a legible condition.

The Installation and operating instructions must be read and applied by all persons commissioned to work with/on the machine, e.g.: operating including setting-up, fault repair, care, disposal of operational and auxiliary materials, repairs (maintenance, servicing) and / or transportation.

In addition to the Installation and operating instructions and the binding regulations for accident prevention applicable in the country and site of implementation, the recognized industry-specific rules for safety and professional work must be complied with.

1.4 Obligations of the operating company

The operating company is obliged to only permit persons to work on the machine, who:

- are familiar with current safety at work and accident prevention rules, and have received training in the use of the machine.
- have read and understood the safety instructions and warning instructions in these Installation and operating instructions and have confirmed the same with their signature.
- have been trained or instructed and whose responsibilities for operation, setting up, maintenance and repairs have been clearly defined.
- are regularly instructed about complications, hazards, and other particular rules of conduct.

The operating company is obliged to:

- observe and communicate to staff the current mandatory regulations on accident prevention, environmental protection and handling of dangerous goods in addition to the instructions in these Installation and operating instructions, as required by law.
- provide personal protective equipment.
- determine the responsibility of the machine operator, to allow the machine operator to reject unsafe third party instructions.
- check safety-conscious work of personnel at regular intervals.
- observe legal requirements and rules at the site of the machine.

1.5 Training information

Only use trained or instructed personnel. Clearly define staff responsibilities for operation, setting-up, maintenance and servicing.

Personnel that have not yet completed their tuition or training, or who are taking part in an apprenticeship may only work on the machine under constant supervision of an experienced member of staff.

1.6 Personnel requirements

Before commencing work, all persons tasked with working on the machine must:

- follow the basic instructions concerning work safety and accident prevention.
- read the safety and warning instructions in these Installation and operating instructions and to confirm with their signature that they have understood them,
- use personal/ workplace-related protective clothing and auxiliary materials that serve occupational safety while working, where these are required from a safety/technical point of view.
- comply with specifications of competence.

For example, work on the machine's pneumatic equipment must be performed by qualified staff, or by staff who have received appropriate training, monitored by qualified staff in line with current technical rules.

1.7 Dangers when operating the machine

The machine is constructed in line with the current state of art and the current state of recognised safety/engineering rules. In spite of this, hazards for the user or third parties, or impairments to the machine and other capital assets can arise from its use.

Use the machine only when its safety systems are in perfect working order and for the intended use.

WARNING

Observe safety instructions!

- Only operate the machine when all protective existing devices and safety devices, for example detachable protective devices or emergency stop systems, are in place and functional.
- Immediately eliminate any faults that could impair safety.
- Observe the residual risks and dangers in Chapter 2 “Safety instructions".

1.8 Intended use

The partially completed machine is used for clamping components in sheet metal processing.

The partially completed machine must be incorporated into a complete machine. The control unit is not included in the scope of delivery. The manufacturer of the complete system is responsible for designing the control unit and the protective measures implemented by the control technology. The manufacturer of the complete machine is responsible for integrating the machine with the operation, control and safety solution of the complete machine.

The manufacturer or the operator of the complete machine is responsible for correct integration of the electrical equipment into the power supply and correct integration of the machine into the equipotential bonding system.

Risks arising from the integration of the partially completed machine into the control and electrical supply circuitry, must be assessed and covered by the manufacturer of the complete machine. Interfaces to other machines of the complete system and the operator's machinery must be assessed by the manufacturer of the entire system in its risk assessment and covered to the extent necessary.

Access to the partially completed machine must be secured by the manufacturer of the complete system and controlled by the operating company. The manufacturer of the complete system is responsible for providing an instruction manual that allows safe operation of the entire system.

The manufacturer of the complete system must also implement at least the following protective measures to ensure intended use of the partially completed machine:

- The manufacturer of the complete system machine must evaluate the necessity of integrating the partially completed machine into the emergency stop chain of the complete system, and implement this if necessary.
- Mechanical hazards resulting from the integration of the partially completed machine into the complete system must be assessed and, if necessary, safeguarded by the manufacturer of the complete system (e.g., by means of isolating safety devices, fixed location of the operator via enabling switches, etc.).
- Mechanical hazards resulting from the partially completed machine must be assessed and, if necessary, safeguarded by the manufacturer of the complete system/operator (e.g., by means of isolating safety devices, fixed location of the operator via enabling switches, etc.).

The partially completed machine must be operated exclusively within the performance limits stated in chap. 3 “Technical data” of the Installation and operating instructions.

Any other use, or any use beyond this scope shall be regarded as misuse and is unintended; TÜNKERS Maschinenbau GmbH shall not be liable for any damage resulting from unintended use.

Intended use also includes:

- observing all information and directives in the operating instructions and all applicable documents.
- observing the mandatory service and maintenance intervals, or the service and maintenance intervals specified in the operating instructions and applicable documentation.

1.9 Reasonably foreseeable misuse

The following, in particular, are considered foreseeable misuse:

- the use of products not complying with the product specification.
- Using the machine for other purposes.
- Operating the machine with bridged safety devices.
- Operating the machine with incomplete protection.
- Operating, maintaining and repairing the machine by non-authorised and non-instructed persons.
- use of the machine if it is damaged, defective or has been modified.
- Operating the partially completed machine in a complete system without a valid CE label.
- Operating the machine in an area with a risk of explosion.

1.10 Warranty claims and liability

Our "General Terms of Sales and Delivery" always apply. They are available to the operator of the machine upon conclusion of the contract, at the latest.

Claims and liability in the case of personal injury and material damage are excluded if they are due to one or more of the following causes:

- Unintended use
- Incorrect assembly, commissioning, operating, and maintenance.
- Operating the machine with defective safety equipment, or without appropriate safety equipment or with non-functional safety protective devices.
- Failure to follow the instructions for transportation, storage, assembly, commissioning, operation, maintenance and setting-up in the Installation and operating instructions,
- Unauthorised physical/structural changes.
- Inadequate monitoring of machine components that are subject to wear and tear.
- Improper repair works.
- Disasters caused by foreign objects or an Act of God.
- Vandalism.

1.11 Security policy

The safety guideline applies to the components built and delivered by TÜNKERS Maschinenbau GmbH.

The safety guidelines of the component suppliers (e.g., quick-change systems, electrical distributors, valve terminals, external clamping devices, etc.) must be observed.

2 Safety instructions

2.1 Safety symbols used in this Installation and operating instructions

DANGER

"DANGER" identifies an immediate danger which can cause severe or even fatal injury.

WARNING

"WARNING" identifies a potentially dangerous situation which can cause severe or even fatal injury.

CAUTION

"CAUTION" identifies a potentially dangerous situation which could lead to minor injury.

NOTE

"NOTE" identifies a potentially dangerous situation that can harm property and the environmental.

This signal word is also used for application instructions and other useful information.

2.2 Safety instructions

WARNING

Danger to persons and the machine!

- Observe all safety and hazard instructions at and on the machine and maintain in a complete and legible condition!
- Observe all general and special safety information in these operating instructions and that of the third party manufacturers.
- Avoid any unsafe methods of working.
- Keep the Installation and operating instructions available at the machine site at all times.
- Stop the machine immediately and report the fault to the responsible department/person when safety-relevant modifications are made to the machine or the operating behaviour of the machine changes.
- Follow the applicable regulations for occupational safety and health protection (DGUV (German Statutory Accident Insurance) regulations).
- Do not remove or modify safety devices and warning signs from the machine.
- Do not arbitrarily modify the machine.

WARNING

Danger to persons and to the machine due to failure to comply with/observe specific warnings!

- The specific warnings of the operator and/or system manufacturer must be observed.
- For all work on the machine, in addition to the nationally applicable standards and regulations, the factory standards, regulations and safety instructions of the operator and/or system manufacturer must also be observed.

WARNING

Danger of injury due to moving parts!

- Do not reach into moving parts of the machine.

WARNING

Danger of injury due to damage to the pneumatic system!

Compressed air lines can still be pressurised when the machine is switched off.

- In case of damage, immediately depressurise the machine.
- Pneumatic cylinders controlled by valves can perform unexpected movements when releasing jammed pneumatic components; this can cause injury to persons in the danger zone.
- When releasing jammed pneumatic components pay attention to the direction of movement and the possible work area of the jammed units.

WARNING

Danger of injury due to the pneumatic system!

Media escaping under high pressure develop unexpectedly high forces and can cause serious injuries.

- Before carrying out maintenance work, de-energise and de-pressurise the machine.
- If it is not necessary to operate the system for setup work, perform all setup work in de-energised and de-pressurised condition.
- All work on pneumatic equipment can only be carried out by authorised and skilled professionals.
- Depressurise the lines before carrying out work on them.
- Detect leakages with suitable auxiliaries (leak detection spray, cardboard box), do not use your hands.
- Depressurise all pressurised components and system sections to be opened using the pneumatic shut-off circuit, or shut-off valve, before opening the pressure system.
- Regularly check all lines, hoses, and threaded joints for leaks and signs of external damage.
- Repair damage immediately.
- Route and install compressed air lines professionally.
- Use personal protective equipment.

WARNING

Improper use of the machine!

- Use the machine in line with its intended purpose.
- Use the machine in a technically perfect, operationally ready and functionally reliable state.
- Have any damage to the machine professionally repaired before operating the machine.
- Check the machine for damage before starting work.

WARNING

Risk to persons and the machine!

- Only qualified personnel should be tasked with assembly and adjustment.
- During assembly, conversion, maintenance and adjustment work, disconnect the energy supplies and make sure there is no residual energy in the system.

WARNING

Danger due to unexpected restart!

- Deenergise and depressurise the machine during adjustment, maintenance and repair works and lock to prevent an unexpected restart .
- Display a notice not to operate the machine on the control devices.

CAUTION

Danger due to improper work on the machine!

- Call in qualified personnel to perform the specified adjustment, maintenance and servicing work at the required intervals.
- Clean loosened connections and screw fittings.
- Tighten any loosened screw connections to the correct torque.
- Regularly check all threaded connections!
- Observe the maintenance schedules by third-party suppliers.

NOTE

Commonly used clamping and positioning technology does not normally meet the safety technology requirements.

NOTE

Pollution!

- Dispose of replacement parts, consumables and auxiliary materials in a safe and environmentally friendly manner.

3 Technical data

NOTE

For technical data, refer to the assembly documentation and nameplate of the machine.

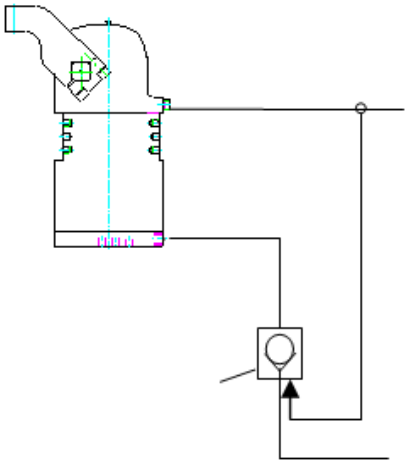
4 Design and function

The plane-parallel clamp is specially designed for clamping sheet metal or components.
Direct sheet metal forming or other tasks not intended for clamping with the clamp are unintended.
The clamp consists of a pneumatic cylinder in a metal housing (f) with front and rear fastening options and a movable clamping arm (a) with a receiving option for the contour part. A lateral mounting option is provided for mounting accessories.
During the clamping process, the pneumatic cylinder acts on an integrated lever joint to amplify the force; this triggers the swivel movement and, at the end of the closing process, a linear lifting movement of the clamping arm.
The position of the clamping arm is checked by the inductive sensors (i) integrated in the cylinder. The inductive sensors detects the open or closed position of the clamping arm. The LEDs (e) in the sensor block (c) indicate the operating voltage and the open or closed position of the clamping arm.
The clamping arm can be attached to the square shaft in various positions by means of the flanges (h). The opening angle of the clamping arm is infinitely variable from 5°-135°. Pneumatic end position damping and position sensing are automatically adjusted.

For safety-relevant tasks (e.g., gripper system, overhead installation) the plane-parallel clamp is equipped with a pneumatic holding function as standard. In the event of a spontaneous failure of the compressed air supply, movement of the clamping arm in the "open" direction is prevented. The pneumatic holding function is unlocked by switching over the shut-off valves or by manually operating the check valve. A special external pneumatic circuit is therefore not required.

Holding function "H" (Standard)

In the "H" version, the plane-parallel clamp is equipped with a pneumatic holding function. The pneumatic blocking system keeps the drive cylinder in the "clamp closed" position under pressure via a pilot-operated non-return valve integrated in the cylinder base. Due to this pressurisation, the tensioner can no longer open automatically. The pneumatic self-holding device is unlocked by switching the non-return valve or by manual operation of the unlocking button (b) installed in the cylinder base.



Holding function "HD" (option)

The "HD" version also has an integrated pilot-operated non-return valve for the "clamp open" position. This prevents unintentional closing of the clamp.

Without holding function (option)

In this version, the plane-parallel clamp does not have a holding function and can open or close automatically in all positions with the cylinder switched to depressurised state. In the simple version without blocking, no non-return valves are integrated in the cylinder base. For safety-relevant tasks, this option can only be used with a special external pneumatic circuit.

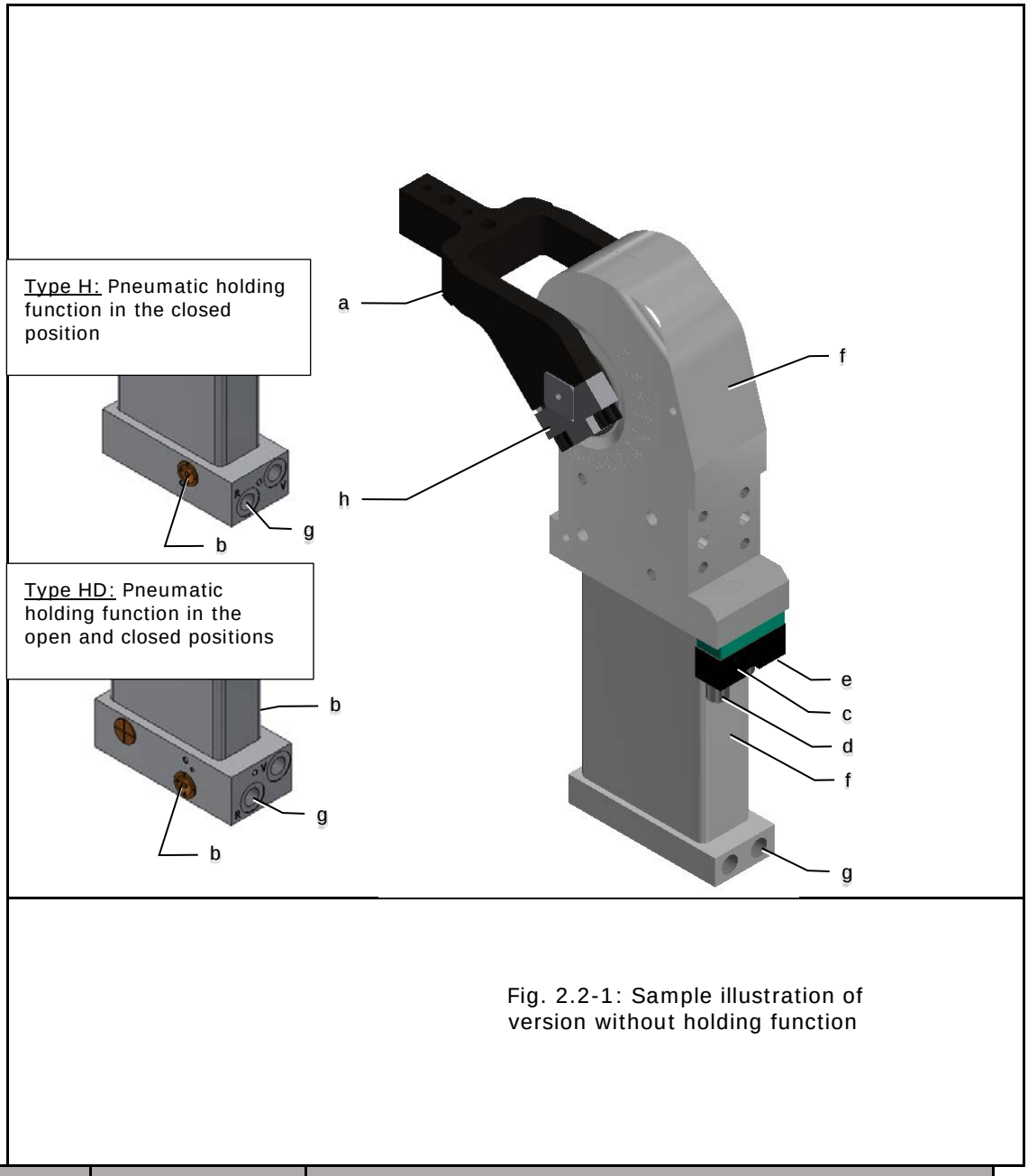


Fig. 2.2-1: Sample illustration of version without holding function

Abbreviation	Designation	Description
a	Clamping arm	Holds the contour part and clamps the workpiece.
b	Release button	Unlocks the cylinder.
c	Sensor block	Holds the LEDs and connection plug.
d	Connection plug	Establishes the electrical signal connection.
e	LEDs	Display the operating voltage. Display the open/closed position of the clamping arm.
f	Metal housing	Holds the pneumatic cylinder and lever mechanism.
g	Compressed air connections	Supply the machine with compressed air.
h	Flange	Attaches the clamping arm to the square shaft.
i*	Inductive sensor	Detects open/closed position of the clamping arm.

*Not depicted

5 Assembly and adjustment

5.1 Safety instructions

WARNING

Observe safety instructions!

- Observe the safety instructions in chapter 2 “Safety instructions”.

WARNING

Risk to persons and the machine!

- Only qualified personnel should be tasked with assembly and adjustment.
- During assembly, conversion, maintenance and adjustment work, disconnect the energy supplies and make sure there is no residual energy in the system.

5.2 Overview machine

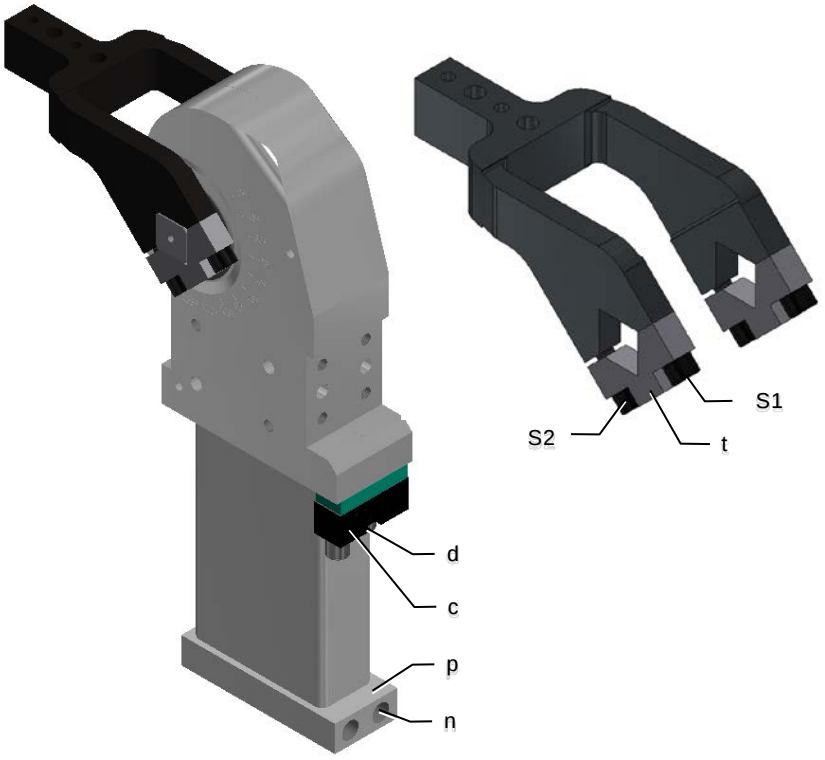


Fig. 5.2-1: Example of assembling the clamping arm type 1

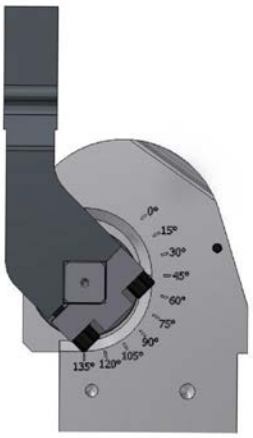


Fig. 5.2-2: Example of clamping arm type 2

Abbreviation	Designation	Description
c	Sensor block	Holds the LEDs and connection plug.
d	Bolt	Fastening the sensor block.
n	Compressed air connections	Supply the machine with compressed air.
p	Cylinder bottom	Supplies compressed air to the cylinder, optionally locks in compressed air (H, HD version)
S1	Fastening screw	Connects the flange (without a gap) to the clamping arm.
S2	Fastening screw	Connects the flange (with a gap) to the clamping arm.
t	Flange	Fixes the clamping arm on the square.

5.3 Assembly of pneumatic clamp

Assemble the machine using socket head screws and a dowel pin (not supplied) on one of the two sides of the housing. The side fastening option is intended for mounting accessories. The minimum screw insertion depth must be adhered to.

Front, rear fastening:

	UP 40	UP 63	UP 80
Thread dimension	M6	M8	M10
Thread depth (mm)	12	12	12
Max. tightening torque (Nm)	10	25	40
Centring pin ø (mm)	6	8	8
Bore depth for dowel pin (mm)	8	12	12

Lateral fastening (accessory mounting only):

	UP 40	UP 63	UP 80
Thread dimension	M6	M8	M10
Thread depth (mm)	10	10	13
Max. tightening torque (Nm)	10	15	40
Centring pin ø (mm)	6	8	8
Bore depth for dowel pin (mm)	6	8	12

5.4 Pneumatic system connection

WARNING

External throttle valves must be used and the corresponding travel speed must be set to cushion the return stroke (forwards and back).

The machine is equipped with integrated end position damping for the return stroke.

Safe operation cannot be guaranteed if the clamping arm weight is too high.

The guidelines for maximum clamping arm weight must be observed (see the design guidelines on www.tuenkers.de).

Work steps

1. *Connect the compressed air supply between the pneumatic control and the clamp (connections "n" Fig. 5.2-1).*

   Maximum operating pressure: 6 bar.

5.5 Assembly/replacement of clamping arm

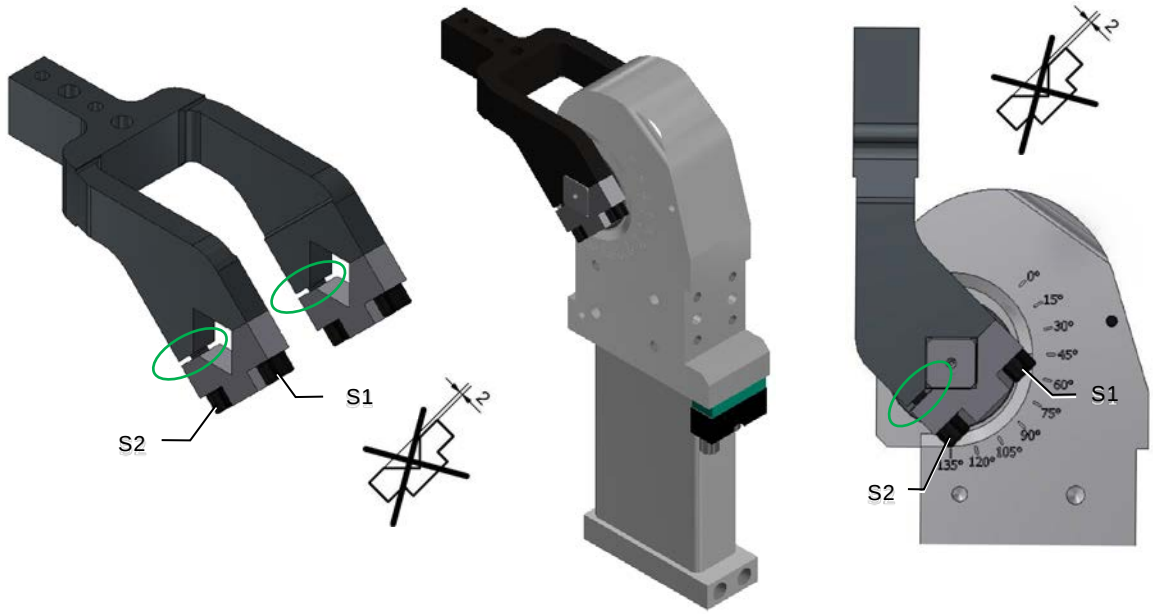


Fig. 5.5-1: Example of assembling clamping arm versions 1 and 2

Prerequisite

The flanges are removed from the clamping arm.

Work steps

	NOTE
	The webs on the flange have different heights. During assembly, observe the alignment of the flange (see Fig. 5.5-1). Use only the supplied fasteners. Shorter screws will damage the clamping arm.

1. Place the clamping arm in the desired position on the square and hold it in place.
2. Tighten both fastening screws hand-tight.
3. Tighten fastening screw S1 (no gap) (see table below for tightening torque).
4. Tighten fastening screw S2 (gap) (see table below for tightening torque).
   The clamping arm is correctly assembled.

Clamping arm version size 40

Screw 12.9
Spring washer DIN 6796-6-FSt.
Tightening torque 8.7 Nm

A10	A40
M6 x 16	M6x20

Clamping arm version size 63

Screw 12.9
Spring washer DIN 6796-8-FSt.
Tightening torque 41 Nm

A10	A40
M 8 x 30	

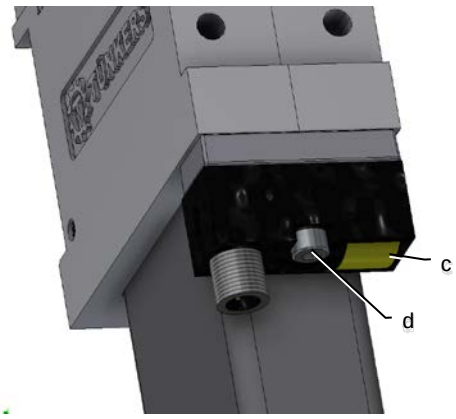
Clamping arm version size 80

Screw 12.9
Spring washer DIN 6796-10-FSt.
Tightening torque 80 Nm

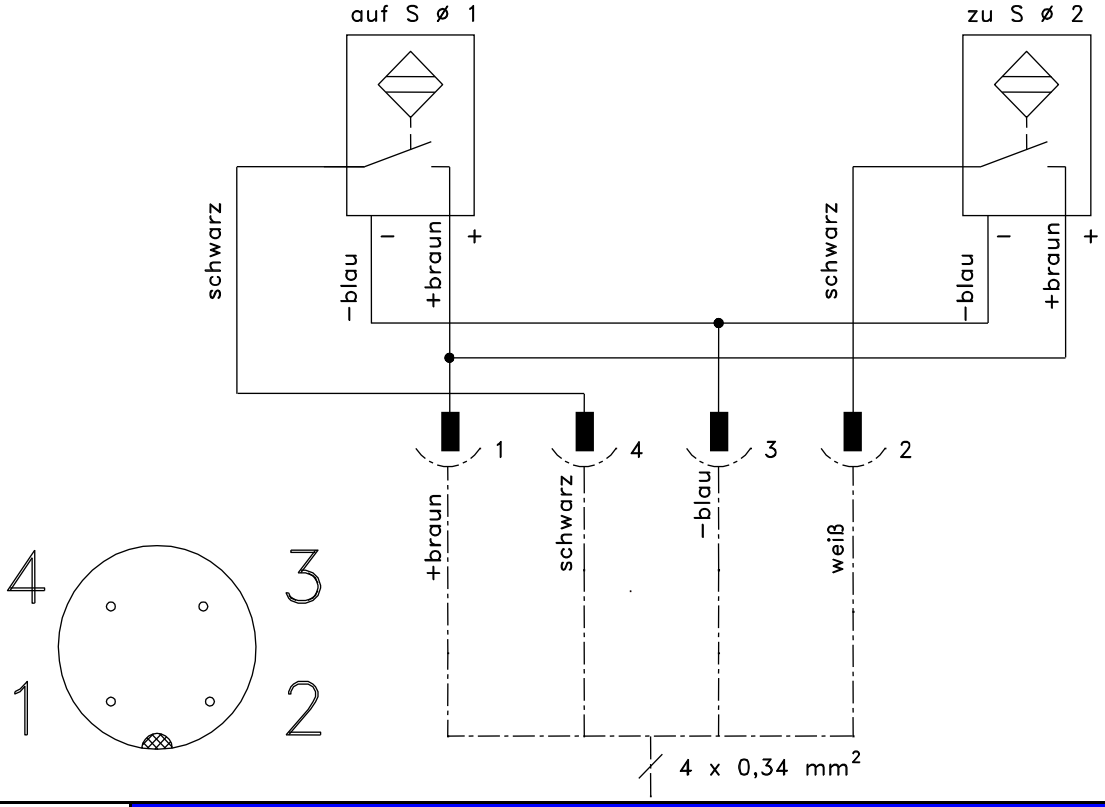
A10	A40
M 10 x 40	

5.6 Inductive sensor T24.x Assembly / Connection / Replacement

1. Fit the sensor block (c) and bolt it onto the T24.1 contact flange with screw (d)
   Sensor block is assembled.
2. Fit the plug (electrical coupling) on the sensor block to match the electrical design of the machine (see circuit diagram) and screw the plug tight with the knurled nut.
   Electrical connector is connected to sensor block.
3. Remove the sensor block (c) by loosening screw (d). Replace sensor block (c) and screw it back onto the T24.1 contact flange with a torque of 3 Nm .
   Inductive sensor system replaced.



Technical data: Inductive switch short-circuit proof, normally open contact, PNP output



NOTE

The inductive sensor shows the states by means of an integrated LED on the sensor block.

Green: Operating voltage present.

Red: Clamp closed.

Yellow: Clamp open.

WARNING

Operation with incorrect or excessive voltage can lead to a short circuit and injury to persons.

5.7 Adjusting the pneumatic clamp

WARNING

Crushing hazard!

When adjusting the clamping arm, fingers can be severed or crushed.

- Do not reach into the swivel range of the clamping arm while the machine is operational.
- Before working in the tool area, interrupt the compressed air supply.

The plane-parallel clamp is equipped with a special lever mechanism which generates a defined clamping force when the clamping stroke is compensated for (UP 63 - 4mm, UP 40 - 3mm, UP 80 - 5mm). The contour parts must be designed accordingly so that component support is achieved at a clamping arm position of 0 mm (position of the swivel pin at the bottom). This ensures that sufficient clamping stroke compensation and thus a sufficient power reserve is available in the process.

Prerequisite

Air supply is connected.

Inductive sensor system is connected.

Work steps

1. Bolt the contour part onto the clamping arm.
2. Close the clamp and check the lower "0 mm" position (swivel pin in bottom position).
3. Determine the gap dimension between the clamping arm/contour part and clamping support.
4. Open the clamp.

4.1 Adjustment without preload (soft touch)

- Compensate the dimensional tolerance to 0 mm by fitting appropriate shims (see Fig. 5.7-1). Close the clamp and check the bottom "0 mm" position.

4.2 Adjustment with preload

- Compensate the dimensional tolerance to +0.8 mm by fitting appropriate shims (see Fig. 5.7-1). Close the clamp. The maximum clamping force is applied at the bottom clamping position. The plane-parallel clamp is thus preloaded. The force level is kept within a defined range (metal sheet thickness compensation).

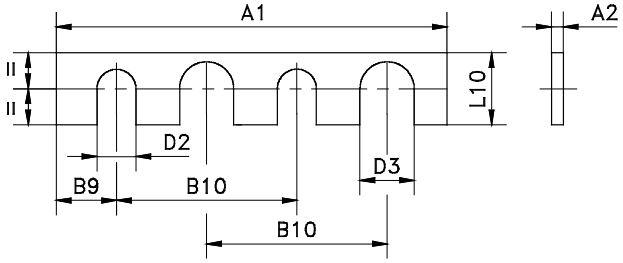


Fig. 5.7-1: Example showing shims

Shim 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

NOTE

See the list of accessories for more shims.

5.8 Unlocking the machine

Prerequisite

- Clamp is blocked in the closed position (version H)
- Clamp is blocked in closed or open position (version HD)

The pneumatic block in the cylinder base can be manually unlocked for maintenance. For this purpose, the keyed non-return valve actuator (b) on the cylinder bottom side must be actuated with a suitable tool (screwdriver, Allen key).

WARNING

Crushing hazard!

When the release button (b) is pressed, unpredictable movements of the clamping arm may occur.

- Do not reach into the clamping arm swivel area.
- Disconnect the pneumatic air supply during emergency unlocking

Work steps

Press the release button (b) firmly into the cylinder base (fig. 2.2-1). machine can be manually opened or closed

5.9 Changing the opening angle

The opening angle is continuously adjustable from 5° - 135°. Both the position sensor and pneumatic end position cushioning are automatically adjusted. The standard angle is 135°.

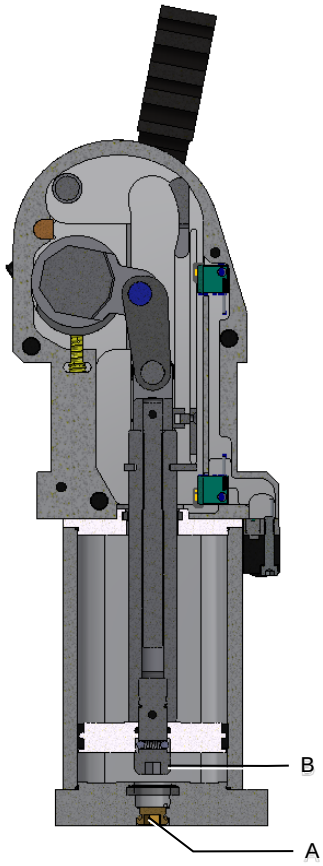


Fig. 5.9-1: Example showing changing the opening angle

Prerequisite

Clamping arm is in open position.

Work steps

1. Read off the preset angle from the scale on the side of the clamp housing.
2. Remove the screw plug (A) in the cylinder base.
3. Turn screw (B) with an Allen key until the desired angle is reached, adjustment range 5° - 135°.
4. Turn screw (B) until the ball latch engages with an audible click.
5. Screw the screw plug (A) back into the cylinder bottom.

NOTE

For clamping arm version 2 (see Fig. 5.2-2) the maximum opening angle is 105°.

WARNING

Make sure that the gasket is correctly fastened and seated on the screw plug (A), as this seals the cylinder chamber.

6 Operation

The machine must only be used in line with its intended use (see chapter 1.8 "Intended use"). Specific regulations and safety instructions apply for the different operating modes of the machine.

The machine can be operated in the following operating modes:

- e.g., automatic mode
- e.g., manual mode

The tasks associated with operation, tooling, maintenance, and troubleshooting can be assigned to these operating modes.

6.1 Safety instructions

WARNING

Observe safety instructions!

- Observe the safety instructions in chapter 2 "Safety instructions" and in particular chapter 2.2 "Safety instructions".

WARNING

Observe safety instructions!

- Observe the safety instructions in chapter 2 "Safety instructions" and in particular chapter 2.2 "Safety instructions".

6.2 Operating the machine

The machine does not have any controls. The machine is operated via the customer's control of the complete system in which the machine is integrated, or it is actuated via a pneumatic valve.

NOTE

For information on operation, observe the operating instructions of the complete system.

6.3 Basic checks before and during operation

Familiarise yourself with your work environment before starting work. Check the machine for visible defects (visual inspection) at least once per shift from a position outside the safety perimeter. Before starting work, make sure that service and maintenance intervals have been observed in line with the maintenance schedule.

Before switching on the machine, and during operation, check constantly for irregularities around the machine. The following features may indicate irregularities when the machine is switched on:

- increased noise, or irregularly occurring/unusual noises.
- unusual smell
- leaks in the pneumatic system.
- reduced performance during operations
- positions are not correctly approached.

Stop the machine immediately upon the first signs of any of the above issues. Inform the maintenance staff immediately for an exact assessment of the technical condition.

Maintenance staff must then decide if operation can continue without limiting the functionality of the machine. If a failure is expected due to detected damage, repair tasks must be started straight away.

All controls must be documented by the operator.

7 Maintenance

7.1 Safety instructions

WARNING

Observe safety instructions!

- Observe the safety advice for maintenance and repair and the general safety advice in chapter 2.2.

7.2 Maintenance and repair work

The machine is designed for low-maintenance operation in view of its use in large series production. The care, maintenance and repair work described in this chapter is required to maintain trouble-free use of the machine as intended. Regular care and maintenance extends the service life and increases the usability.

The machine is equipped with low-maintenance bearings and guides. The technical design of the machine allows a service life of 3 million working cycles without significant signs of wear.

The housing of the machine is designed to be fully encapsulated to protect against weld spatter. Special maintenance is therefore not required. However, cleaning the machine with a steam jet cleaner or dry ice can cause damage.

8 Fault repair

8.1 Safety instructions

WARNING

Observe safety instructions!

- Observe the safety instructions in Chapter 2 "Safety instructions" and in particular Chapter 2.2 "Safety instructions".

8.2 Failures

Clamp does not open

Possible cause	Repair measures
Errors/damages in the air supply	Check the air supply.
Falls below the minimum air pressure	Check the operating pressure.
Clamping arm error	The clamping arm weight has been exceeded. Observe the instructions in "Permissible weight of the clamping arm depending on the outreach at the clamping arm".
Fault/damage to the clamp	Check and repair the clamp. Replace the clamp if needed.

Holding valve (option H/HD) fails to lock/unlock

Possible cause	Repair measures
Errors/damages in the air supply	Check the air supply.
Falls below the minimum air pressure	Check the operating pressure.
Fault/damage to the clamp	Check and repair the clamp. Replace the clamp if needed.

Sensor does not detect component

Possible cause	Repair measures
Proximity switch does not switch	Proximity switch is incorrectly positioned Adjust the position
Proximity switch does not switch	Cabling, connections are defective or loose.
Proximity switch does not switch	Proximity switch is defective. Replace proximity switch
Error in the clamping unit area	Check sensor (e.g., on clamps, sensor systems, etc.), replace if necessary.