



EN

Operating Instructions Needle gripper SNG-AP

Note

These operating instructions were written in the German language.
This document should be kept in a safe place for future reference.

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Needle gripper SNG-AP



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1 Safety Notes

1.1 Classification of Safety notes

Danger

This warning informs the user of a risk that will result in death or serious injury if it is not avoided.

 DANGER	
	<p>Type and source of the Danger</p> <p>Consequence</p> <p>▶ Remedial action</p>

Warning

This warning informs the user of a risk that could result in death or serious injury if it is not avoided.

 WARNING	
	<p>Type and source of the Danger</p> <p>Consequence</p> <p>▶ Remedial action</p>

Caution

This warning informs the user of a risk that could result injury if it is not avoided.

 CAUTION	
	<p>Type and source of the Danger</p> <p>Consequence</p> <p>▶ Remedial action</p>

Important

This warning informs the user of a risk that could result damage to property if it is not avoided.

IMPORTANT	
	<p>Type and source of the Danger</p> <p>Consequence</p> <p>▶ Remedial action</p>

Notice

This symbol is used when important notes and information regarding use of the machine/the system/the device are provided.

	Information on the use
---	------------------------

1.2 Warnings

Explanation of the warning symbols used in the operating instructions.

Warning symbols	Description	Warning symbols	Description
	General warning symbols		Warning of hearing damage
	Warning of a sharp object		Warning of overpressure
	Warning of environmental damage		

1.3 Signs

Explanation of the mandatory symbols used in the operating instructions.

Signs	Description	Signs	Description
	Use ear protectors		Use eye protection
	Use hand protection		Wear a mask
	Adhere to the operating instructions		Activate prior to maintenance or repair

1.4 General safety instructions

 WARNING	
	<p>Ignoring the general safety guidelines Personal injuries / damage to plants / systems</p> <ul style="list-style-type: none"> ▶ The operating instructions contain important information on using the gripper. Read the operating instructions thoroughly and keep them for later reference. ▶ The system may only be connected and operations started once the operating instructions have been read and understood. ▶ Use only the connections, mounting holes and attachment materials that have been provided. ▶ Carry out mounting or removal only when the device is in an idle, depressurized state. ▶ Only qualified specialist personnel, mechanics and electricians may perform the installation. Qualified specialist personnel are persons who have received technical training and have the knowledge and experience – including knowledge of corresponding regulations – necessary to enable him or her to recognize possible dangers and implement the appropriate safety measures while performing tasks. The same applies to maintenance! ▶ General safety regulations, European standards and VDE guidelines must be observed and complied with. ▶ Personnel and animals are not permitted to sit or stand in the transport area. ▶ No person may sit or stand in the danger zone while the machine or plant is in automatic mode. ▶ It is not permitted to make changes to system components. ▶ Protect the components from damage of any kind.

1.5 Intended use

 WARNING	
 	<p>Extending needles Injuries caused by pricks, cuts and scratches</p> <ul style="list-style-type: none"> ▶ Wear cut resistant gloves

The needle gripper is used for handling (gripping and transporting) non-rigid, porous workpieces (e.g. substances, CFRP mats, foams...).

The gripper needles are extended and retracted using compressed air.

The gripper must only be used with well maintained compressed air (air or neutral gas according to EN 983, filtered 5 µm, oiled or unoled).



The workpiece is used in connection with compressed air when using the blow-off function.

1.6 Requirement for the user

All personnel working with the product must be familiar with basic mechanical and pneumatic principles as well as the appropriate technical terminology.

To ensure safe operation, this work may only be performed by qualified personnel or trained persons working under the supervision of qualified personnel.

"A qualified employee is defined as an employee who has received technical training and has the knowledge and experience – including knowledge of corresponding regulations – necessary to enable him or her to recognize possible dangers and implement the appropriate safety measures while performing tasks. Qualified personnel must observe the pertinent industry-specific rules and regulations".

1.7 Emissions

The lowering of the workpiece is assisted by a blow-off pulse. The needle gripper emits noise through this blow-off pulse. The sound pressure level is listed in the Technical Data. (see chapter **Fehler! erweisquelle konnte nicht gefunden werden.**).

 CAUTION	
 	<p>Noise pollution due to operation of the gripper with compressed air</p> <p>Hearing impairments may occur in the longer term</p> <ul style="list-style-type: none"> ▶ Wear ear protectors

During processing / further processing, the materials to be handled may, in part, be converted to respirable forms.

 CAUTION	
	<p>Emission of respirable particles</p> <p>Damage to lungs and respiratory tract</p> <ul style="list-style-type: none"> ▶ Take the data sheets of the materials to be handled into account ▶ Wear respiratory protection

1.8 Definition of the Danger Zone

The danger zone is the area inside, or in the vicinity of working equipment which poses a hazard or potential hazard to the health of persons located within this area.

When lifting the load or transporting it, it is possible that the load could fall, which is why the area directly under the gripper and the load is always considered a danger zone.

A person may not sit or stand under the load for any reason. This applies without exception to both persons and individual body parts (head, hands, arms, legs, etc.).

No person may sit or stand in the designated danger zone.

The working area is to be secured (protective fence or sensors) by the user/operator in such a way that no person can enter the danger zone.

2 Product description

2.1 Versions

The needle gripper has a specific part designation, e.g. SNG-AP 10 0.8 V 3.

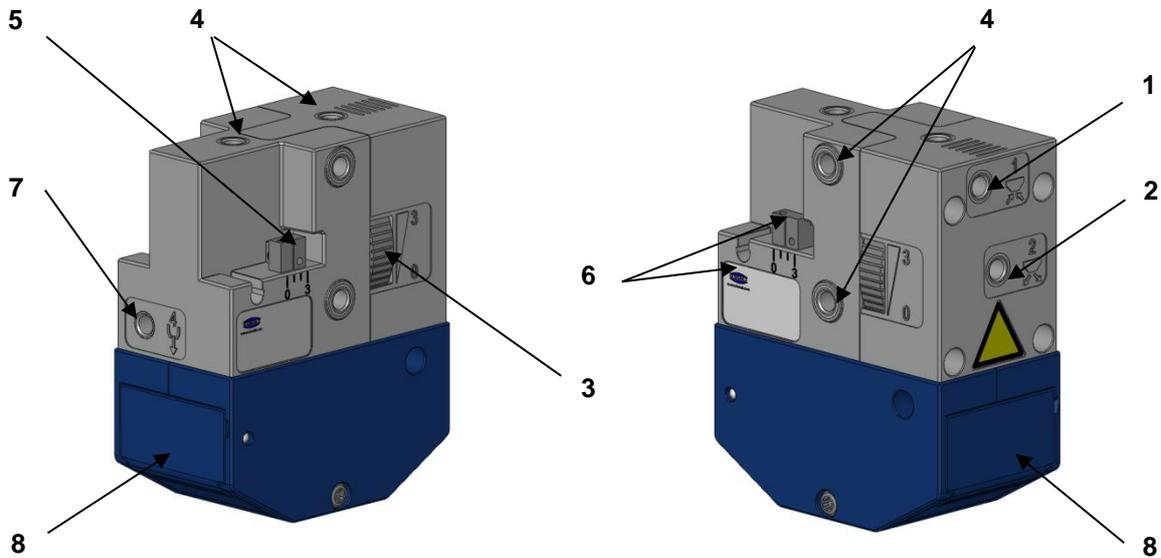
The part designation can be broken down as follows:

Type	Supply energy	No. of needles	Needle diameter	Additional function	Stroke range
SNG	AP Operated pneumatically	10 10 pcs.	0.8 0.8 mm	V Stroke is continuously adjustable	3 3 mm
			1.2 1.2 mm		10 10 mm
					20 20 mm

The needle grippers are classified according to their supply energy as either AP (pneumatically operated) or AE (electrically operated).

This documentation only describes the AP version.

2.2 Design of the needle gripper



Item	Description
1	Compressed air connection M5 "retract needle" (label 1)
2	Compressed air connection M5 "extend needle" (label 2)
3	Adjustment wheel for the needle stroke
4	M5 mounting thread
5	Set needle stroke display
6	Sensor holder
7	Compressed air connection M5 "blow-off" (label 4)
8	Maintenance opening cover

2.3 General description of functions

Needle grippers are designed to handle parts by means of positive locking of the needles with the workpiece. To this end, a distinction is to be made between electrically and pneumatically operated needle grippers. Only the pneumatic version is considered in these operating instructions.

The pneumatic needle gripper works according to the principle of the pneumatic cylinder. The positions "needle extended" and "needle retracted" are achieved by means of compressed air.

3 Technical Data

IMPORTANT	
	<p>Non adherence to the performance limits of the gripper</p> <p>Malfunction and damage to the gripper and the components attached to it</p> <p>► Only operate the gripper within the specified performance limits</p>

3.1 Mechanical Data

3.1.1 General parameters

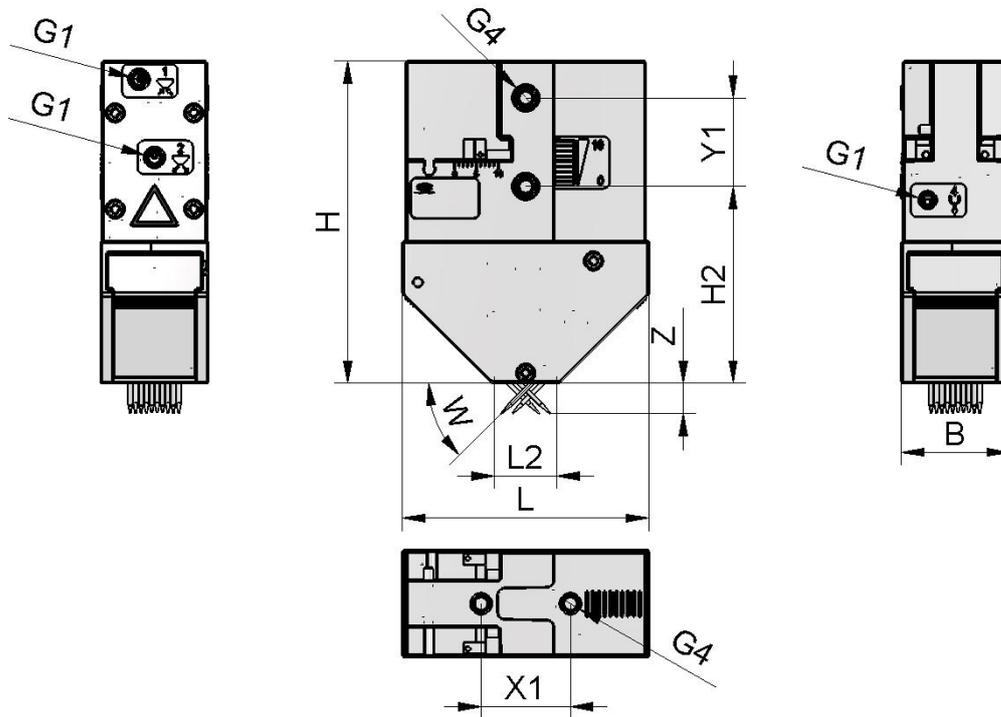
Parameter	Symbol	Limit values			Unit	Note
		min.	typ.	max.		
Working temperature	T _{amb}	5	—	75	°C	
Storage temperature	T _{Sto}	-10	—	75	°C	
Humidity	H _{rel}	10	—	90	% r.h.	Free from condensation
Operating pressure	P	3	5	6	bar	
Operating medium	Air or neutral gas, 5 µm filtered, with or without oil, class 3-3-3 compressed air quality acc. to ISO 8573-1					

3.1.2 Mechanical parameters

Type	No. of needles	Needle diameter	Maximum stroke	Sound level ¹ when blowing-off	Weight
	pcs.	mm	mm	dBA	kg
SNG-AP 10 0.8 V 3	10	0.8	3	73	0.190
SNG-AP 10 1.2 V 3	10	1.2	3	73	0.190
SNG-AP 10 0.8 V 10	10	0.8	10	73	0.225
SNG-AP 10 1.2 V 10	10	1.2	10	73	0.225
SNG-AP 10 1.2 V 20	10	1.2	20	73	0.400

1) at 5bar

3.1.3 Dimensions



Type	L	B	H	L2	H2	X1	Y1	Z	G1	G4	Lg4	W
SNG-AP 10 0.8 V 3	65	35	80	28	46	29	29	3	M5 (female)	M5 (female)	7	30°
SNG-AP 10 1.2 V 3	65	35	80	28	46	29	29	3	M5 (female)	M5 (female)	7	30°
SNG-AP 10 0.8 V 10	80	35	105	22	64	29	29	10	M5 (female)	M5 (female)	7	45°
SNG-AP 10 1.2 V 10	80	35	105	22	64	29	29	10	M5 (female)	M5 (female)	7	45°
SNG-AP 10 1.2 V 20	120	35	160	22	104	29	29	20	M5 (female)	M5 (female)	7	45°

All specifications are in mm

3.1.4 Materials used

Component	Material
Main body	PA6-GF10GK20
Inner components	Aluminum alloy, anodized aluminum alloy, brass, red bronze, stainless-steel, PA, PU, POM steel
Sealings	NBR
Lubrication	Silicone-free
Screws	Galvanized steel

4 Transport and mounting

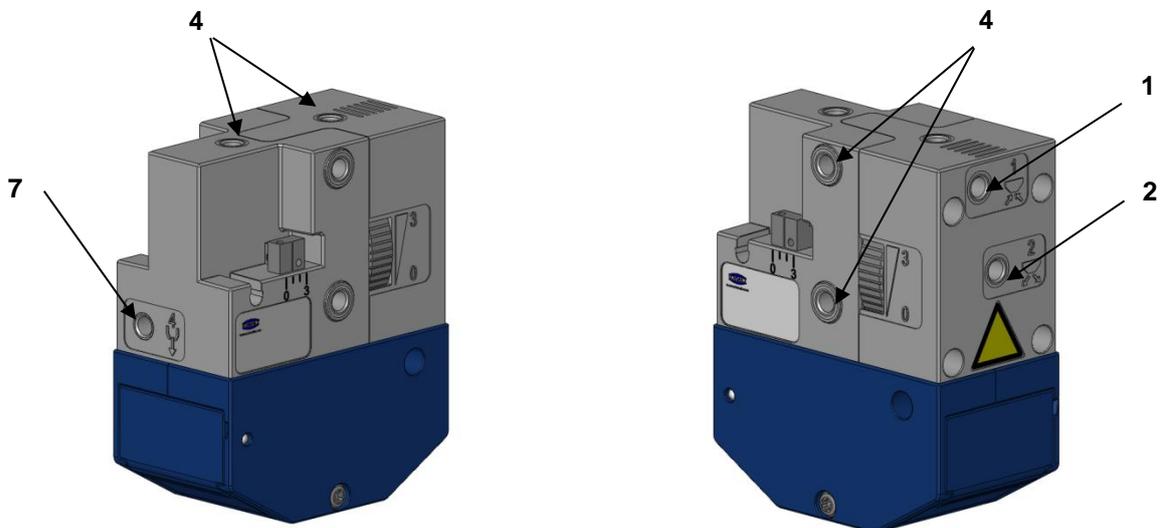
4.1 Transport

The needle gripper comes in cardboard packaging. In order to ensure safe transport, the gripper must be transported in this packaging for all subsequent transports. Transport of the needle gripper is only permitted when the needles are retracted.

! WARNING	
 	<p>Extending needles Injuries caused by pricks, cuts and scratches</p> <ul style="list-style-type: none"> ▶ Wear cut resistant gloves ▶ Make sure that the needles have been retracted

4.2 Mounting

There are two M5 tapped holes on the front, rear and top respectively for mounting the needle gripper (see the table below for tightening torque). The appropriate holder for integrating the needle gripper into a tooling system is available from Schmalz (see accessories). Only the mounting threads provided are to be used for mounting.



Item	Description	Maximum torque
1	Compressed air connection M5 "retract needle" (label 1)	4 Nm
2	Compressed air connection M5 "extend needle" (label 2)	4 Nm
4	M5 mounting thread	2 Nm
7	Compressed air connection M5 "blow-off" (label 4)	4 Nm

IMPORTANT	
	<p>Faulty mountings and connections Damage to the gripper</p> <ul style="list-style-type: none"> ▶ Use only the connections, mounting holes and attachment materials that have been provided ▶ Observe the thread length of the connection thread, c.f. 3.1.3 ▶ Comply with the specified tightening torque



Use washers when mounting.

The needle gripper may be installed in any position.

4.3 Pneumatic connection

Prior to coupling or uncoupling of the needle gripper, the line to the compressed air supply is to be depressurized. Make sure prior to pressurizing the needle gripper with operating pressure that the plug-in screw unions of the compressed air connections are safely screwed together, the supply lines are properly aligned in the plug-in screw union and that the area around the outlet openings of the needle is free of any objects.

 CAUTION	
	<p>Installation of the gripper under compressed air Personal injury and/or damage to property</p> <ul style="list-style-type: none"> ▶ Depressurize the gripper ▶ Screw and / or align the supply lines safely in plug-in screw unions and connections ▶ Secure the machine / plant / system so that it cannot be switched on again



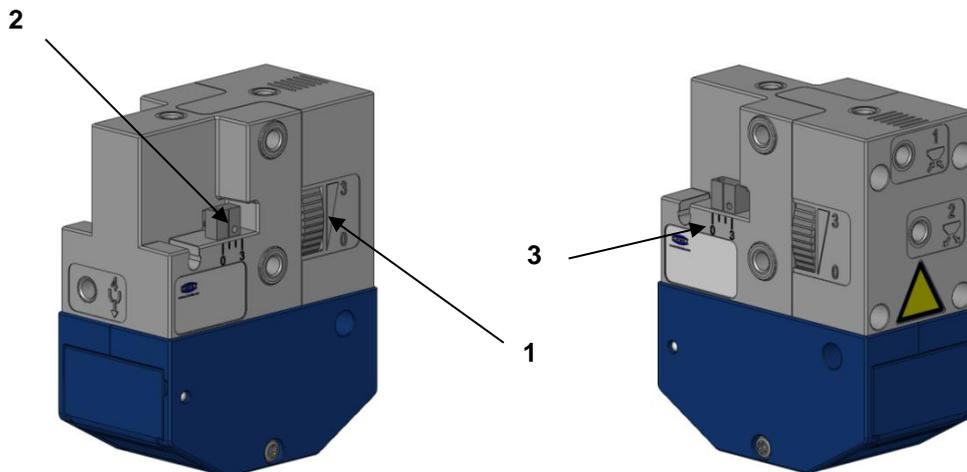
High quality compressed air prolongs the service life of the needle gripper. Use only well maintained compressed air (air or neutral gas according to EN 983, filtered 5 µm, oiled or unoled). See also chapter 1.5

The workpiece is used in connection with compressed air when using the blow-off function.

Lay hose and pipe lines as short as is possible and without bends or crimps.

5 Start of Operations

! WARNING	
	<p>Extending needles Injuries caused by pricks, cuts and scratches</p> <p>▶ Wear cut resistant gloves</p>
! CAUTION	
	<p>Pressure can cause closed devices to explode Personal injury and/or damage to property</p> <p>▶ Wear protective glasses</p>



Item	Description
1	Adjustment wheel for the needle stroke
2	Set needle stroke display
3	Scale for needle stroke

Start of operations is not permitted until mounting has been completed successfully (see chapter 4.2). For safety reasons, the needle gripper is supplied with a needle stroke of zero millimeter. The needle stroke is set to the appropriate workpiece using the adjustment wheel (from rasterpoint to rasterpoint = 0,1mm stroke). The scale displays the set needle stroke. One graduation mark corresponds to 1 millimeter needle stroke.

! IMPORTANT	
	<p>Inserting the needle into hard surfaces Damage to the needles</p> <p>▶ Adjust the needle gripper for soft surfaces. The material thickness must be greater than the maximum stroke of the gripper.</p>

6 Operation

 WARNING	
 	<p>Extending needles Injuries caused by pricks, cuts and scratches</p> <ul style="list-style-type: none"> ▶ Wear cut resistant gloves
 CAUTION	
 	<p>Pressure can cause closed devices to explode Personal injury and/or damage to property</p> <ul style="list-style-type: none"> ▶ Wear protective glasses
IMPORTANT	
	<p>Non adherence to the performance limits of the gripper Malfunctions and damage to the gripper and the components attached to it</p> <ul style="list-style-type: none"> ▶ Only operate the gripper within the specified performance limits

6.1 Description of Functions

6.1.1 Extending the needles (grabbing the workpiece)

If input 2 is pressurized with compressed air and input 1 is vented, the needles extend below the given angle (depending on the version). The adjustment wheel is used to adjust the stroke of the needles to the workpiece to be handled. The set stroke is displayed in the scale in order to improve control.



It is required to ensure safe transport of the workpiece that input 2 is supplied with operating pressure for the entire duration of the transport and that input 1 is vented and depressurized.

6.1.2 Retracting the needles (depositing the workpiece)

In order to retract the needles, input 2 must be vented and input 1 must be energized with operating pressure. After the needles have been fully retracted into the housing, the needle gripper can be removed from the workpiece again.



In order for the needles to remain safely in the housing of the gripper when moving the system, the operating pressure must continue to be applied to input 1 even after the workpiece has been deposited.

6.1.3 Blowing-off (assisted deposition)

In order to reliably deposit adhesive workpieces in particular, there is the option of generating a flow of compressed air through the needle outlet openings.

To this end, input 4 on the gripper is energized with compressed air.

 CAUTION	
	<p>Heavy exhaust air flow at the air outlet openings</p> <p>Damage to the eyes</p> <ul style="list-style-type: none"> ▶ Do not look into the exhaust air flow ▶ Wear protective glasses

 CAUTION	
 	<p>Noise pollution due to operation of the gripper with compressed air</p> <p>Hearing impairments may occur in the longer term</p> <ul style="list-style-type: none"> ▶ Wear ear protectors

The gripper must only be used with well maintained compressed air (air or neutral gas according to EN 983, filtered 5 µm, oiled or unoled).

	<p>The workpiece is used in connection with compressed air when using the blow-off function.</p>
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7 Maintenance and Accessories

7.1 General maintenance

7.1.1 Exterior dirt

Remove exterior dirt with a soft cloth and soap suds (max. 60°C).

7.1.2 Interior dirt

In the event of interior dirt, open the maintenance openings on the gripper module as described in chapter 7.1.3 and remove the dirt with a compressed-air gun.

 CAUTION	
 	<p>Air flow due to blowing out with compressed air</p> <p>Damage to eyes</p> <ul style="list-style-type: none"> ▶ Do not look into the exhaust air stream ▶ Wear protective glasses

 CAUTION	
 	<p>Emission of respirable particles</p> <p>Damage to respiratory tract</p> <ul style="list-style-type: none"> ▶ Wear respiratory protection

7.1.3 Opening and sealing the maintenance openings

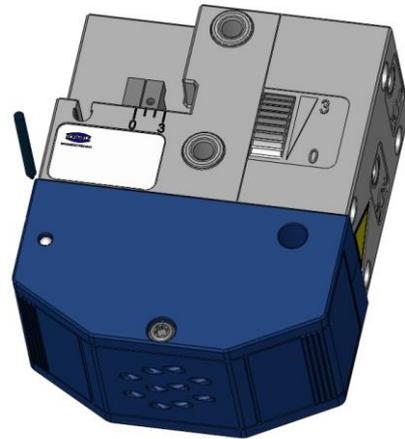
 WARNING	
 	<p>Exposed needles</p> <p>Injuries caused by pricks, cuts and scratches</p> <ul style="list-style-type: none"> ▶ Wear cut resistant gloves

 CAUTION	
	<p>Falling needle holder</p> <p>Damage to eyes</p> <ul style="list-style-type: none"> ▶ Wear protective glasses

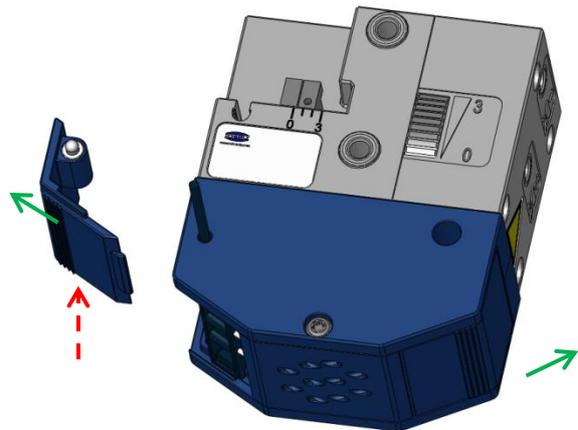
CAUTION	
	<p>Maintenance of the gripper under compressed air Personal injury and/or damage to property</p> <ul style="list-style-type: none"> ▶ Disconnect the gripper completely from the supply lines ▶ Secure the machine / plant / system so that it cannot be switched on again

Unlocking and removing the cover

Press the bolts of the spring-loaded pressure piece out of the holes with a sharp object (e.g. a pen, screwdriver).

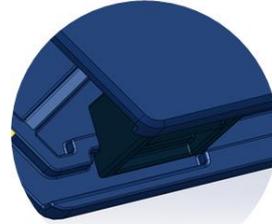


The cover must be pushed out of the housing at the same time as the spring-loaded bolt is actuated. The area (red arrow) is serrated.



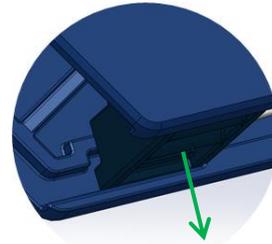
Removal of the needle holder

Needle holder start position



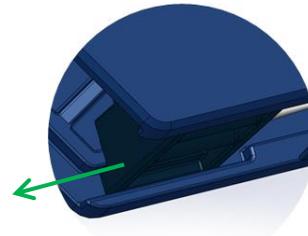
1. Removal step

Push the needle holder into the lower position. In doing so, the needle holder is released from engagement with the worm wheel.



2. Removal step

Pull the needle holder out of the housing



Inserting the needle holder

Insertion of the needle holder occurs in the same way as removal but in the reverse order.



Hold the opposite needle holder securely when inserting the needle holder. This allows the position "needle retracted" to be secured.

IMPORTANT

The position "needle retracted" was adjusted
Malfunctions and damage to the gripper is possible

- ▶ The position "needle retracted" of the gripper must be reached before needle holders can be inserted - see chapter 7.3.
- ▶ No further changes to the position of the worm wheels may be made after the needle holders have been inserted

Installation of the cover

Installation of the covers occurs in the same way as removal but in the reverse order.



The pressure bolts make an audible click if the covers have been mounted correctly.

IMPORTANT

Operation of the gripper without covers

Malfunctions and damage to the gripper

- ▶ Covers of the needle holder must be ensured

Inspecting the gripper after the needle holders have been changed

If the aforementioned installation steps were carried out successfully,

- 1.) the needles do not protrude from the grip surface of the housing
- 2.) the two needle holders have the same stroke
- 3.) the needle stroke corresponds to the set stroke in the scale

Should one of the requirements not be met, the following steps are to be performed:

1. Remove the two needle holders. See 7.1.3
2. Start up the position "needle retracted" again
 3. Insert the two needle holders. See 7.1.3



We recommend a test run prior to start of operations for the gripper.

7.2 Warranty, Spare Parts and Wearing Parts

This system is guaranteed in accordance with our general terms of trade and delivery. The same applies to spare parts, provided that these are original parts supplied by us. We are not liable for any damage resulting from the use of non-original spare parts or accessories. Wearing parts are not covered by the warranty. The following list contains the primary spare and wearing parts.

7.2.1 Spare and Wearing Parts

Type	Designation	Content	Part no.	Legend
SNG-AP 10 0.8 V 3	Spare parts set	2 Mounting adapters needle	10.01.29.00405	S
SNG-AP 10 1.2 V 3	Spare parts set	2 Mounting adapters needle	10.01.29.00406	S
SNG-AP 10 0.8 V 10	Spare parts set	2 Mounting adapters needle	10.01.29.00407	S
SNG-AP 10 1.2 V 10	Spare parts set	2 Mounting adapters needle	10.01.29.00408	S
SNG-AP 10 1.2 V 20	Spare parts set	2 Mounting adapters needle	10.01.29.00409	S
SNG-AP 10 0.8 V 3	Spare parts set	Cover	10.01.29.00419	S
SNG-AP 10 1.2 V 3	Spare parts set	Cover	10.01.29.00419	S
SNG-AP 10 0.8 V 10	Spare parts set	Cover	10.01.29.00420	S
SNG-AP 10 1.2 V 10	Spare parts set	Cover	10.01.29.00420	S
SNG-AP 10 1.2 V 20	Spare parts set	Cover	10.01.29.00421	S

Legend: Spare part = **S** Wearing part = **W**

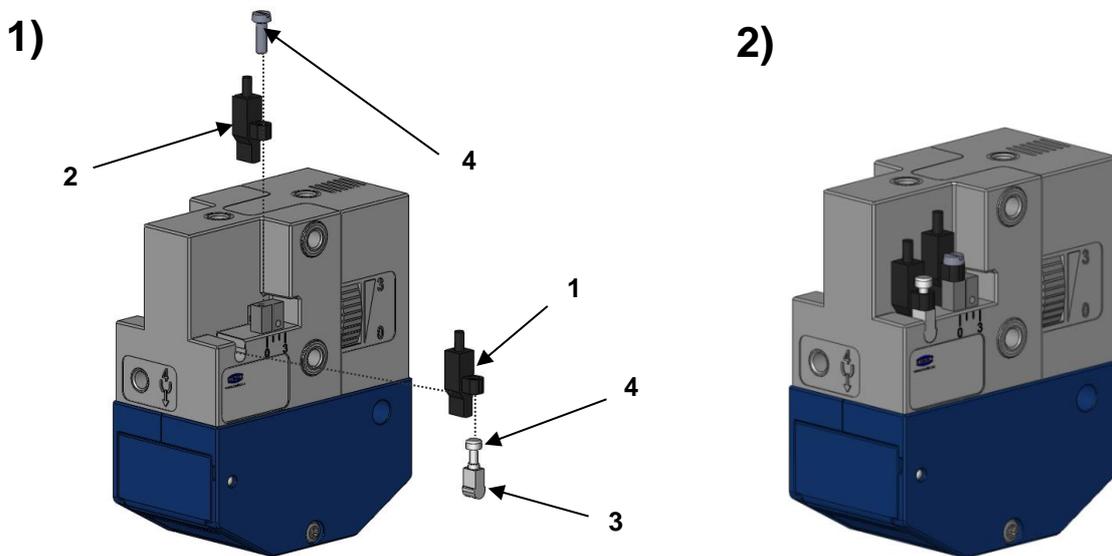
7.3 Troubleshooting

Fault	Possible Cause	Solution
Needle does not extend	Needle stroke set to zero millimeter	Adapt the needle stroke to the workpiece
	Leakage in hose line	Check hose connections
	Operating pressure too low	Increase operating pressure (observe max. limits)
	Needle holders were inserted in extended state	<ol style="list-style-type: none"> 1. Remove the two needle holders. See 7.1.3 2. Start up the position "needle retracted" again 3. Insert the two needle holders. See 7.1.3
Workpiece cannot be held	Needle stroke too low	Increase needle stroke
	Needle sags	Select a needle gripper with a greater needle diameter
	Needle is broken	Replace the needle holder
Needle holders have different strokes	The position of the worm wheels was changed between insertion of the first and second needle holder	<ol style="list-style-type: none"> 1. Remove the two needle holders. See 7.1.3 2. Start up the position "needle retracted" again 3. Insert the two needle holders. See 7.1.3
The entire stroke range is no longer available	Significant dirt in the interior of the gripper module	See general maintenance - interior dirt
	The position of the worm wheels was changed prior to inserting the needle holders	<ol style="list-style-type: none"> 1. Remove the two needle holders. See 7.1.3 2. Start up the position "needle retracted" again 3. Insert the two needle holders. See 7.1.3
The preset stroke is no longer reached after changing the needle	The position of the worm wheels was changed prior to inserting the needle holders	<ol style="list-style-type: none"> 1. Remove the two needle holders. See 7.1.3 2. Start up the position "needle retracted" again 3. Insert the two needle holders. See 7.1.3

7.4 Accessories

Designation	Designation 2	Part no.
Holder system	HTS-A2 AP SNG	10.01.29.00402
Holder system	HTS-A3 AP SNG	10.01.29.00322
Retrofitting kit Sensor	NAEH-SCHA SMAGN 24V-DC	10.01.29.00400
Mounting plate	BEF-PL 15x38x11.5 G1/4- IG SNG	10.01.29.00403
Plug union, elbow	STV-W M5-AG6	10.08.02.00296

7.4.1 Mounting the limit switch



Item	Description
1	Sensor S1
2	Sensor S2
3	Holder for sensor
4	M2.5 screw

There is the option of attaching two sensors in order to monitor the end positions and thereby increase process reliability.

The sensors detect the operating positions "retracted needle" and "extended needle" and transmit the signal to a superordinate controller.

Ex works, the two sensors are already combined on an M12 plug and delivered with the corresponding attachment and tool set.

For mounting, the S1 sensor is always mounted on the holder as described in the enclosed mounting instructions and then in the sensor slot of the needle gripper with the enclosed threaded spindle and aligned with the corresponding tool. A label is imprinted on the cable coating of the S1 sensor. There is also a labeling banner with a description of the part on the cable of the S1 sensor.

The S2 sensor is screwed directly onto the display of the needle stroke using the screws provided.

Both end positions of the set needle stroke can be measured independently of one another using the sensor SET SNG AP for the SNG-AP series.

SNG-AP met max. 10 mm resp. 20 mm naaldslag: naaldeindstand van 1,3 mm t/m 10 mm resp. t/m 20 mm slagIn addition to the 0 mm position (needles completely retracted), the following end position ranges (needles extended) can be reliably measured:

- SNG-AP with max. 3 mm needle stroke: Needle end position from 0.75 mm to 3 mm stroke
- SNG-AP with max. 10 mm or 20 mm needle stroke: Needle end position from 1.3 mm to 10 mm or 20 mm stroke



It is not necessary to adjust the sensor when the needle stroke is changed. The maximum torques are to be complied with when mounting the sensor - see the mounting instructions of the attachment set and specifications on the sensor

Pin layout of the M12 connector

Plug	Pin	Symbol	Function
	1	U _s	Power supply for sensor
	2	S2	Signal S2
	3	Gnd _s	Sensor ground
	4	S1	Signal S1

7.5 Decommissioning

After being exchanged or after final decommissioning, the needle gripper, as well as the components and assemblies that were replaced, are to be disposed of in accordance with country-specific guidelines.

IMPORTANT	
	<p>Incorrect disposal of the gripper Environmental damage</p> <p>▶ Disposal according to country-specific guidelines</p>

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