

Efficient clamping system

Matrixplate SMPL

Assembly and operating manual



Imprint

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Dear customer,

congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards

Your H.-D. SCHUNK GmbH & Co.

Spanntechnik KG

Lothringer Str. 23

D-88512 Mengen

Tel. +49-7572-7614-0

Fax +49-7572-7614-1099

info@de.schunk.com

www.schunk.com



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1 About this manual

This instruction is an integral part of the product and contains important information for a safe and proper assembly, commissioning, operation, maintenance and help for easier trouble shooting. Before using the product, read and note the instructions, especially the chapter "Basic safety notes".

1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.

	 DANGER Danger for persons! Non-observance will inevitably cause irreversible injury or death.
	 WARNING Dangers for persons! Non-observance can lead to irreversible injury and even death.
	 CAUTION Dangers for persons! Non-observance can cause minor injuries.
	NOTICE Material damage! Information about avoiding material damage.

1.2 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *
- Assembly and Operating manuals of the accessories *

The documents marked with an asterisk (*) can be downloaded on our homepage **www.schunk.com**.

2 Basic safety notes

2.1 Instructions for the operating company

A risk analysis was taken into account during the design and construction of the matrix plate. Carefully selected harmonized standards and further technical specifications were also observed during the process. In this way the matrix plate meets the current state of the art and guarantees the highest levels of safety.

However, these safety levels can only be reached in actual operation when all necessary requirements are met. The operator of the vacuum unit is responsible for planning these measures and inspecting them on a regular basis.

In particular, the operator must ensure the following:

- 1 The matrix plate must not be used for other purposes than the intended.
- 2 The matrix plate must only be operated in a flawless, fully functional condition and the safety equipment must be checked for proper functionality on a regular basis.
- 3 The operating instructions must be kept in a legible and complete condition, and must always be available where the machine is in operation.
- 4 The unit must only be operated, maintained and repaired by sufficiently qualified and authorised personnel.
- 5 Such personnel must be trained regularly in all aspects of work safety and environmental protection, and must be familiar with the operating instructions (especially the safety instructions).

2.2 Instructions for the installing, maintaining and operating personnel

The vacuum unit must only be operated by qualified, instructed and authorised personnel. This personnel must be aware of the instructions in this manual and act on them. The operating personnel's relevant authorisation must be clearly specified.

The device must only be installed and maintained by qualified personnel, mechanics and electricians.

Every person of the operating company instructed with installing, commissioning, operating, maintaining and repairing the device must:

- 1 have read and understood the operating manual
- 2 especially the chapter "safety".

In the operating company the following must be ensured by internal measures:

- 1 The respective users of the matrix plate must be instructed.
- 2 They must have read and understood the operating manual.
- 3 They must have access to the operating manual at all times.

The responsibilities for the different activities at the device must be specified and complied with. Competencies must be clearly defined.

Furthermore, the following activities require special qualification:

- 1 Only instructed and qualified personnel is allowed to commission the device.
- 2 Only instructed persons are allowed to clean the plate.
- 3 Only instructed and qualified personnel is allowed to troubleshoot.
- 4 Only instructed persons are allowed to carry out maintenance works.
- 5 Only instructed persons are allowed to carry out service works.
- 6 Only instructed persons are allowed to repair the plate.

In the beginning, operating personnel in training is only allowed to work on the matrix plate under the supervision of experienced persons. Fully completed and successful instruction must be confirmed in writing.

All persons working at the machine or the matrix plate must read the operating manual in full and acknowledge their understanding of the contents with their signature.

2.3 Intended use

The matrix plate is used for clamping and securing flat workpieces and workpieces with one flat side using a vacuum generated specifically for this purpose.

Corresponding safety measures must be implemented on systems and devices used in connection with the matrix plate in order to avoid danger to persons, animals or property caused by a loss of the operating vacuum. A prerequisite for operating the matrix plate is a machine or system in accordance with Machinery Directive 006/42/EC with suitable safety equipment.

The matrix plate may only be used for clamping workpieces on a CNC machining centre. For this purpose a clamping surface is defined by a sealing cord in the grid of the matrix plate's surface.

Using the plate for other than the intended use is not permitted and may result in hazardous situations!

The matrix plate is not suitable for sucking in body parts or other living things. Evacuating potentially implosive objects or other non-permitted media is strictly forbidden.

For safety reasons, unauthorised modifications and alterations of the matrix plate are not permitted and result, in any event, in the loss of warranty!



! WARNING

Observe the stipulated operation, maintenance and care requirements

Corresponding safety measures must be implemented on systems and devices used in connection with the matrix plate in order to avoid danger to persons, animals or property caused by a loss of the operating vacuum.

For safety reasons, unauthorised modifications and alterations of the matrix plate are not permitted. In case of non-compliance, SCHUNK GmbH & Co. KG assumes no liability whatsoever and provides no warranty in respect of the plate.

Special risks: energy failure, pump failure, line breakage or suddenly occurring leakage.

These events may cause the workpiece being processed to shift or break free on the machine table or in the system.

- Before starting work, ensure that you are familiar with the following:
 - All aspects of the matrix plate
 - Machine equipment and fittings
 - Operating mode of the matrix plate
 - The immediate surrounding of the matrix plate and of the machine or system in which the plate is deployed.
 - The safety equipment of the machine
 - Measures to be taken in the event of an emergency
- Carry out the following tasks before each machine start:
 - Ensure that all safety equipment is present and fully functional
 - Ensure the workpiece is positioned securely, both visually and manually

- Check the vacuum unit and especially the sealing cord for visible damage. Repair defects immediately or notify your supervisor
- The vacuum unit and machine may only be operated in perfect condition
- Check and ensure the clamping force, depending on the combination of the available clamping surface and the reachable vacuum, is sufficient to guarantee a safe processing with the selected tool
- Check the tool regarding its geometry, material and condition
- Select the processing parameters feed rate, rotational speed and material contact corresponding to the available clamping force
- Ensure that only authorised persons are present in the working area of the machine or system and that no other persons are put in danger by switching on the machine.



WARNING

The device may create a suction

When under vacuum, this device may generate very high levels of suction, which can suck in hair, limbs and items of clothing. This may result in permanent eye injury.

- Do not look into the suction connection while the vacuum generation is switched on.

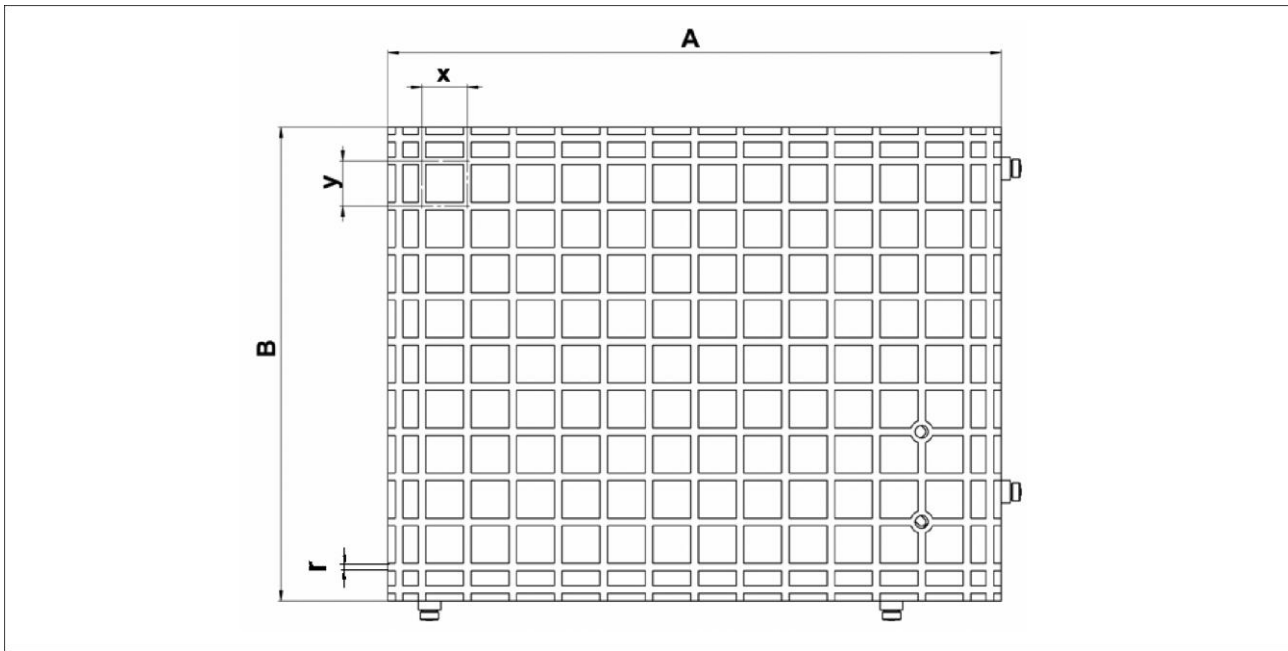
3 Warranty

If the product is used as intended, the warranty is valid for 12 months from the ex-works delivery date under the following conditions:

- Observe the applicable documents ([👉 1.2, Page 4](#))
- Observe the ambient conditions and operating conditions
- Observe the specified maintenance and lubrication intervals ([👉 9, Page 31](#))

Parts touching the workpiece and wearing parts are not included in the warranty.

4 Technical data



Type	ID number	A [mm]	B [mm]	X [mm]	Y [mm]	r [mm]
SMPL-300x200x28-12,5-3	0425000	300	200	12,5	12,5	3
SMPL-300x200x28-25-3	0425001	300	200	25	25	3
SMPL-300x200x28-25-3-R	0425002	300	200	25	25	3
SMPL-300x400x28-12,5-3	0425003	400	300	12,5	12,5	3
SMPL-300x400x28-25-3	0425004	400	300	25	25	3
SMPL-300x400x28-25-3-R	0425005	400	300	25	25	3
SMPL-300x400x28-30-5	0425006	400	300	30	30	5
SMPL-300x400x28-30-5-R	0425007	400	300	30	30	5
SMPL-400x600x28-12,5-3	0425008	600	400	12,5	12,5	3
SMPL-400x600x28-25-3	0425009	600	400	25	25	3
SMPL-400x600x28-25-3-R	0425010	600	400	25	25	3
SMPL-400x600x28-30-5	0425011	600	400	30	30	5
SMPL-400x600x28-30-5-R	0425012	600	400	30	30	5

5 Commissioning



WARNING

Workpiece loss in case of insufficient vacuum supply

Persons may be injured by flying parts.

- Before commissioning, check vacuum unit visually for possible damage.
- Check especially the sealing cord for damage or wear before each use.
- If necessary, clean vents of the matrix plate in order to guarantee the vacuum supply.

Vacuum connection

- Connection hose / vacuum generation = Ø12 mm (included in scope of delivery)
- **If a large suction volume is required (e.g. in case of leakage, ...), an additional vacuum connection may be used, especially for the bigger variants of the matrix plate.**
- Monitoring the operating vacuum
 - The matrix plate's standard scope of delivery does not contain a device for monitoring the operating vacuum
 - Suitable devices are integrated in the pertinent vacuum aggregate, which has especially been designed for generating a vacuum when using it with a matrix plate.
- Adaption to the machine table
- Basically, it is possible to adapt the vacuum unit to each of the following machine tables:
 - Machine table with T-slots
 - Machine table with vices
 - Machine table with quick change pallet system (depending on manufacturer)

Note

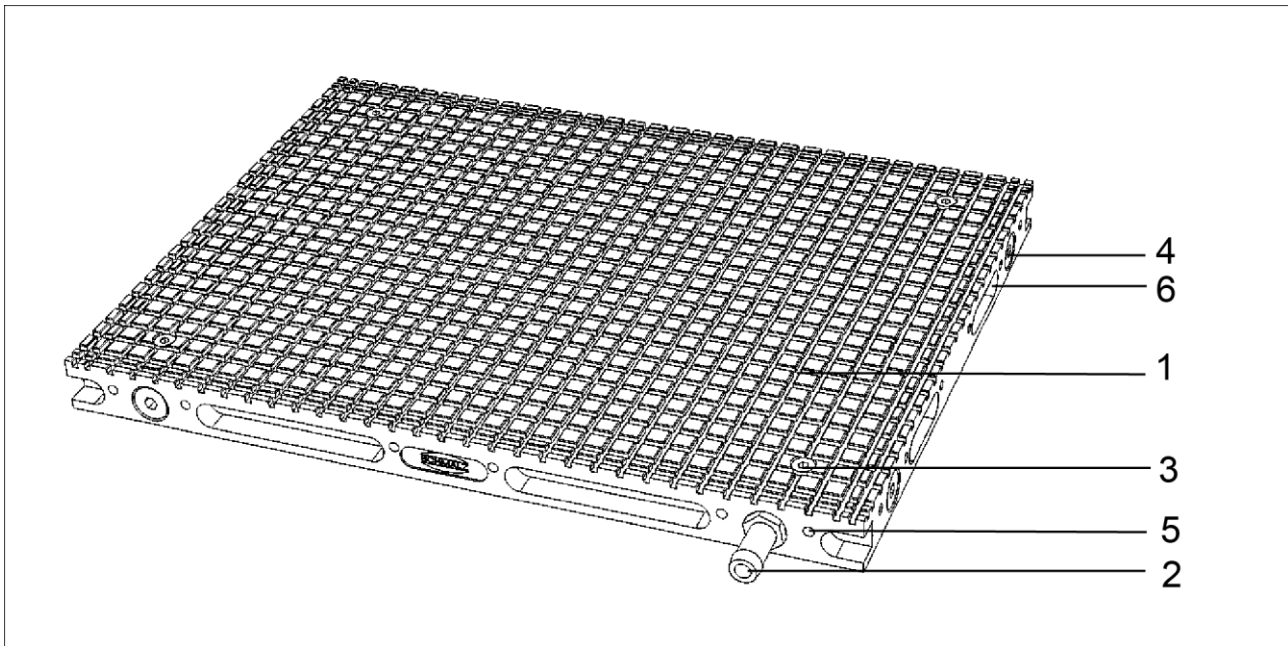
Remove possible adhering chips or impurities from the matrix plate (e.g. from the last use of the vacuum unit) before positioning the plate on the machine table, to guarantee the height tolerance.

Fastening the matrix plate to the machine table

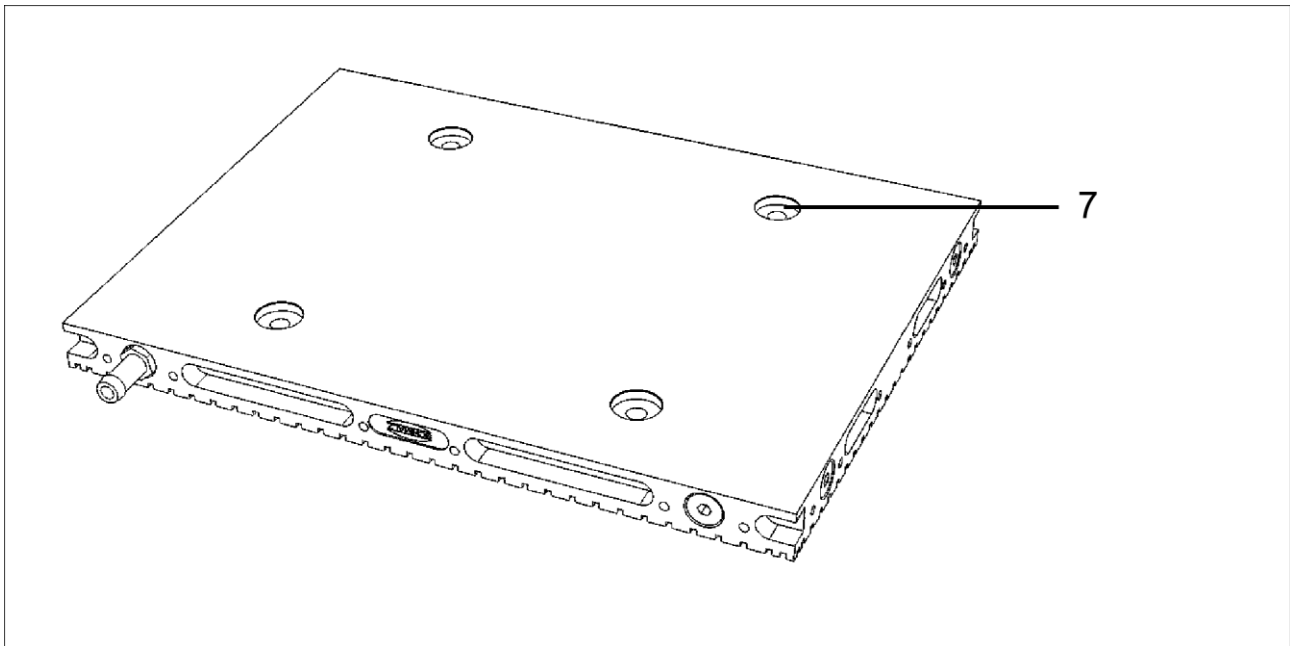
- 1 Remove chips and residues of cooling lubricants from the machine table.
- 2 Position the matrix plate onto the respective machine table and adjust it.
- 3 Fastening the matrix plate to the machine table:
Via clamping claw; use lateral slots for this purpose.
Via quick change pallet system; use clamping pins in the threads on the bottom side of the matrix plate
Via bench vice; matrix plate is directly clamped into the vice
- 4 Use the vacuum hose contained in the scope of delivery for connecting the matrix plate to the vacuum generator.
Fixing the hose additionally with a hose clamp is usually not required.

⇒ Now the matrix plate is ready for its intended use!

6 Product description

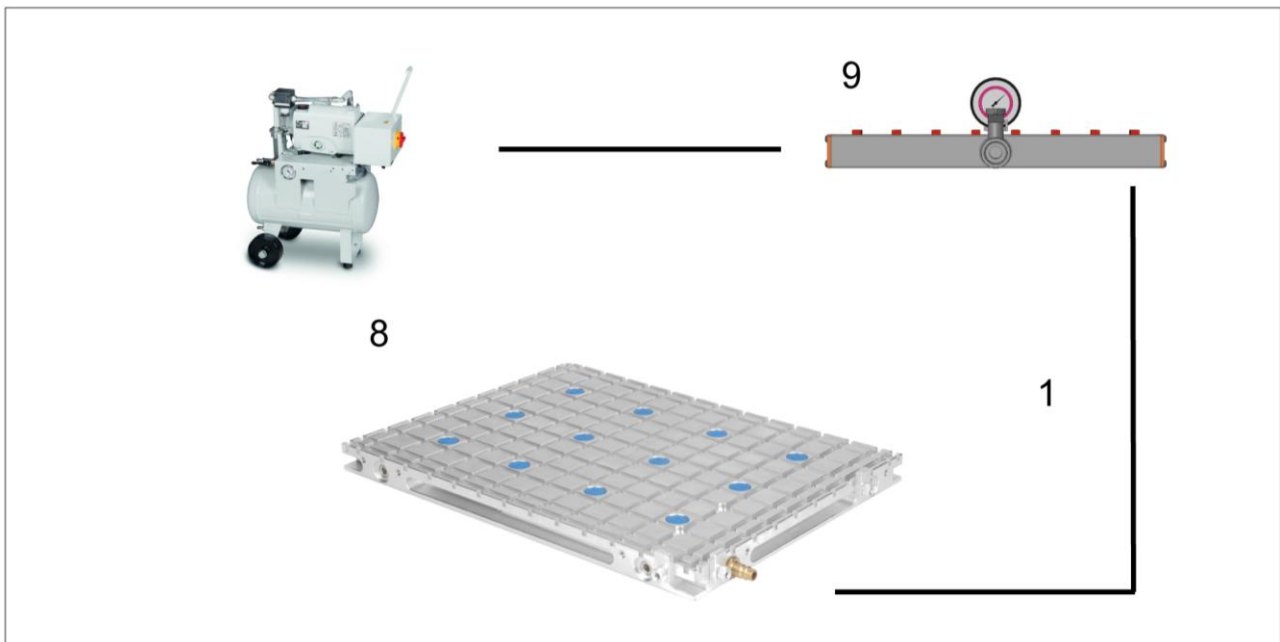


1	Matrix plate with grid grooves
2	Hose nozzle $\varnothing = 12$ mm (vacuum connection)
3	Vacuum vents with filter and G1/8" seal plugs
4	Side vacuum vents with G1/4" seal plugs
5	Additional threads for side stops
6	Groove for clamping claw



Bottom of matrix plate

7	Thread for connecting quick change pallet system (distance 200 mm)
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Configuration and connection of matrix plate to the generator

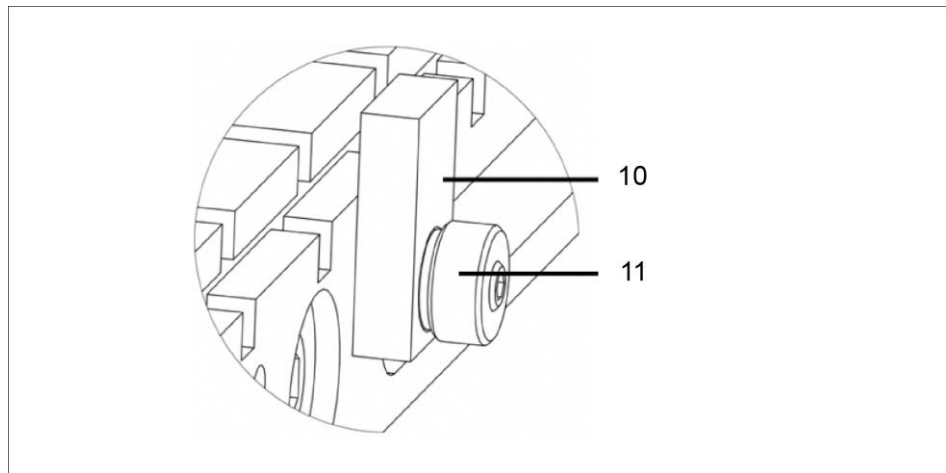
8	Vacuum aggregate
9	Vacuum distributor
1	Matrix plate (multiple matrix plates can be connected with each other!)

The matrix plate (1) is a flat plate out of high-strength aluminium. It has a grid on the surface for mapping the workpiece geometry and distributing the vacuum. The seals plugs on the matrix plate's upper side (1) are used for opening or closing the vacuum vents and consequently also the vacuum supply.

6.1 Description of function

The matrix plate is used for clamping and securing flat workpieces and workpieces with one flat side in a machine tool using a vacuum generated specifically for this purpose. The product of the available clamping surface and the reachable pressure difference in relation to the atmosphere provides the necessary holding force ([7.1.1, Page 23](#)). As soon as the vacuum unit (1) is securely fastened to the machine table and ready for operation, observe the following steps to prepare it for machining.

Step 1: Aligning the side stops



10	Side stop
11	Knurled nut

To align the side stops (10), loosen the knurled nut (11) manually. Now the side stop (10) can be positioned as desired and fixed again by tightening the knurled nut (11). For this purpose, there are several thread holes (5) around the matrix plate (1). If there are not sufficient stops or if stops are damaged in the course of time, they can be ordered as spare parts ([10, Page 32](#)).

The side stops do not only serve as positioning aid in adjusting the workpiece, but also for absorbing the transverse forces during machining and should therefore remain in upright position during the work process



NOTICE

The zero point of the workpiece may be shifted!

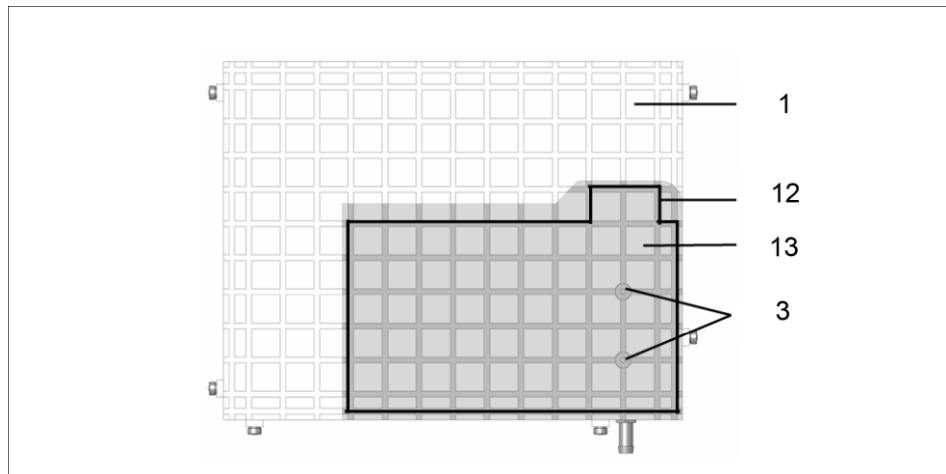
If there are impurities between stop and matrix plate, the zero point may be shifted!

- Check if there are residues (chips) between stop and matrix plate.

Step 2: Inserting the sealing cord

The sealing cord (12) included in the scope of delivery must be inserted in the grid grooves of the vacuum unit's (1) surface to define the necessary clamping surface. In order to attain the maximal clamping force, the outer contour of the workpiece must be mapped as exactly as possible. Breaches in the workpiece must be sealed. If possible pay also attention to smaller crosspieces while inserting the sealing cord (12), as otherwise it could lead to vibration of the workpiece during subsequent machining.

Position the workpiece of the matrix plate (1) and, if required, correct the position of the sealing cord (12). Pay attention that the sealing cord (12) is completely covered by the workpiece. Only in this way the required vacuum can be generated.



Inserting the sealing cord

1	Matrix plate
12	Sealing cord (maps workpiece contour)
13	Workpiece (depicted transparently)
3	Vacuum vents with filter and G1/8" seal plugs

**NOTICE****Loosening the workpiece**

If there is an opened vacuum vent (3) outside of the mapped workpiece contour, the necessary vacuum is not reached and the workpiece may loosen during machining or the workpiece may not clamped at all.

- To guarantee the vacuum supply, at least one vacuum hole (3) must be within the mapped workpiece contour.
- No opened vacuum vent (3) must be within the mapped workpiece contour.
- Unused vacuum vents (3) must be closed with the intended plugs.
- The sealing cord must not run outside the workpiece contour.

Step 3: Removing the seal plugs The seal plugs (3) may be removed or screwed-in with a hexagon key. By removing the plug, the operating vacuum is fed from the matrix plate (1) to the surface.

**NOTICE****Guaranteeing the vacuum supply**

At least one seal plug (3) must be removed to guarantee the vacuum supply. Depending on type and nature of the workpiece, it may make sense removing further seal plugs (3) to provide a higher volume flow in order to compensate possible leakage. This flow, however, must be within the workpiece contour and the sealed area.

- Seal plugs **outside** the clamping area must be sealed.

Step 4: Clamping the workpiece After the sealing cord (12) is inserted according to the workpiece geometry, the workpiece can be positioned on the matrix plate (1) and be adjusted. The side stops (10) serve as positioning aid.

Activate the operating vacuum. The workpiece should now be secured. If necessary press the workpiece on the matrix plate (1) until the operating vacuum is generated.

If the side stops (10) are located within the machining area of the workpiece, they must be either flapped down completely or lowered until they are no longer in the collision area. ([👉 7.2, Page 26](#))

Step 5: Checking the system for leaks Check with appropriate safety devices (e.g. vacuum manometer or vacuum switch) if the necessary operating vacuum of **at least - 600mbar** has been reached. These safety devices are already integrated in the vacuum aggregate that is compatible with the matrix plate and are supported by acoustic and electronic warning devices. If the vacuum is generated without SCHUNK products, it is the matrix plate operator's responsibility to care for the relevant safety devices.

Once the required vacuum has been reached and the workpiece is securely attached, the machining can begin.



NOTICE

Check the collision area

Check if the matrix plate's stops (10) are within the collision area. If so, retrace or lower them.

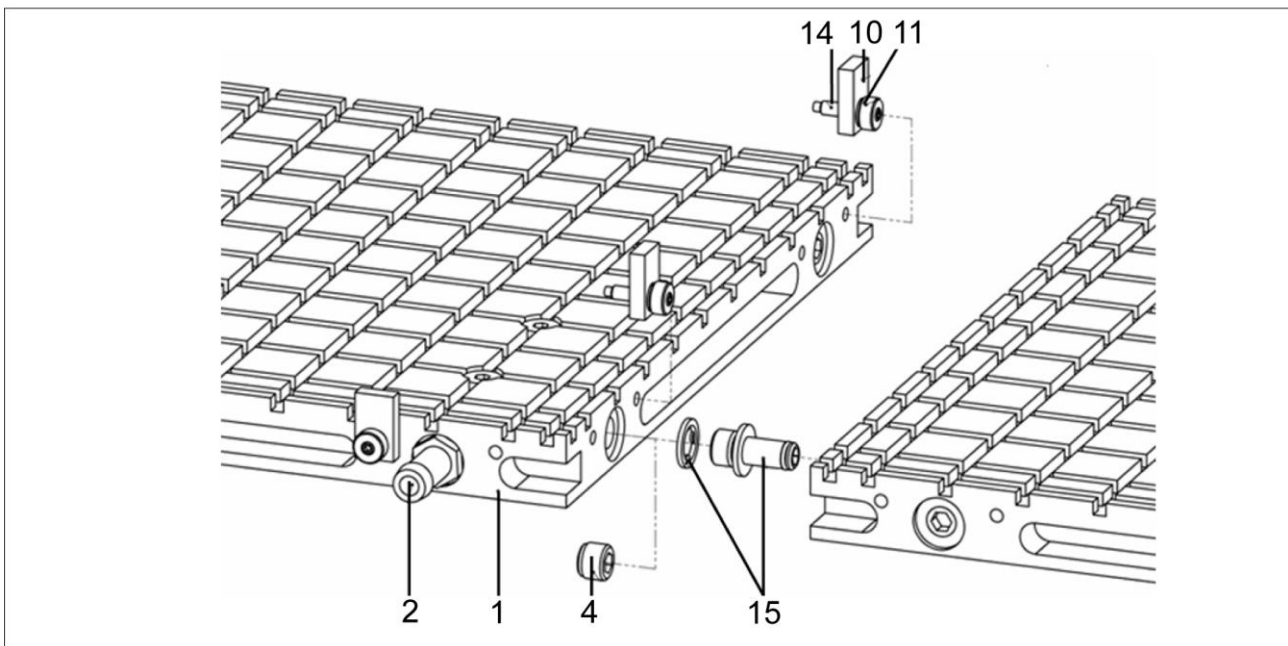
- Check if the matrix plate (1) is securely clamped to the machine table.

Due to the vacuum generated at the workpiece's bottom side, the atmosphere pressure at the workpiece's top side presses it to the plane and clean table!

6.2 Extended functions

6.2.1 Connecting multiple matrix plates

The necessary clamping area can be increased as desired by connecting multiple matrix plates. Several plates with the same groove size can be connected with each other on all of the four sides, enabling even large workpieces to be clamped with ease. The vacuum units' exterior dimensions are no longer an issue as long as the grids on the plates have the same groove dimensions.



Connecting multiple vacuum units

14	Threaded pin
10	Side stop
11	Knurled nut
2	Hose nozzle $\varnothing = 12$ mm (vacuum connection)
1	Vacuum unit
4	Side vacuum vents with seal plugs G1/4"
15	Hollow screw with O-ring and sealing ring

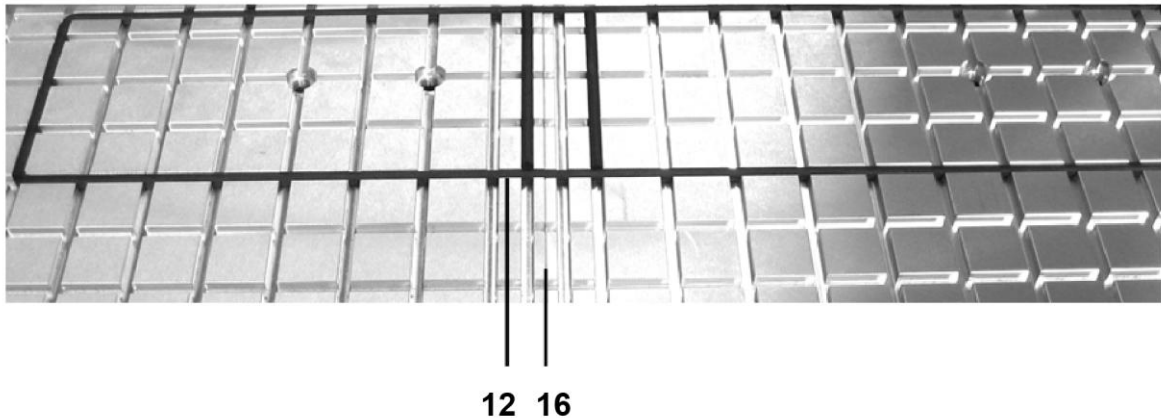
The following steps describe the connection of multiple matrix plates:

- 1 Remove side stops (10) including hollow nuts (11) and threaded pins (14) on that side to which the second matrix plate shall be connected.
- 2 Remove at least one of the locking screws (4) (both is better) on the same side and replace it/them by the supplied hollow screw (15). Remove the locking screws (4) of the second matrix plate as well.
However, these drill holes (4) remain open and will be closed later by putting them together with the hollow screw (15).
- 3 Press the second matrix plate against the first plate until the gap between them is as small as possible.
Pay attention that the both surfaces are as flush with each other as possible.
- 4 Fasten the second matrix plate to the machine table.
⇒ The operating vacuum is then fed from the first matrix plate to the second through the hollow screw (15).
- 5 If a high suction volume is required, the volume flow can be increased by connecting hose nozzles (2) to the matrix plates.

6.2.2 Sealing the plate join edge

When connecting multiple matrix plates, there may be minimal leakage at the join (16). The reason is that the matrix plate is sealed at the bottom side only by the flushness of the join surfaces. Seal the join edge (16) additionally with suitable cuts of the supplied sealing cord (12) to prevent this effect.

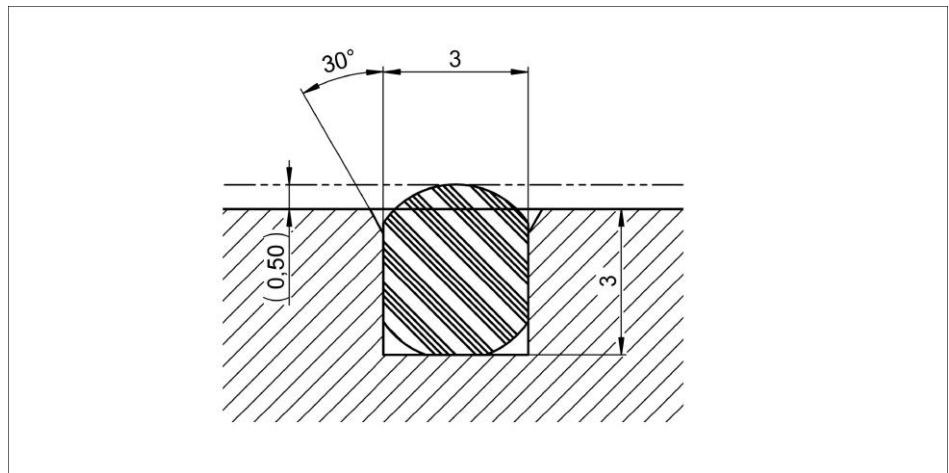
By inserting additional sealing cords (12), further "vacuum fields" are created. Within this area there must be at least one opened vacuum vent (3) to guarantee the vacuum supply.



Inserting the sealing cord

12	Sealing cord
16	Matrix plate join edge

6.2.3 Additional milling of the matrix plate



In order to guarantee maximal precision during subsequent machining, the vacuum unit (1) can be further milled (also multiple times) while clamped on the machine table. This also makes sense in case of damage of the vacuum unit's surface, if a new plane surface is needed.

Please consider the following:

- The system's zero point changes
- The groove point of the grid is reduced
- In case of a material removal of more than 0.5 mm, another sealing cord (12) $\varnothing = 3$ mm must be inserted to prevent the sealing cord from compacting between matrix plate and workpiece, which can lead to inaccuracies.
- If the sealing cord (12) protrudes more than 0.5 mm above the top surface of the matrix plate (1), another diameter must be chosen. For order data regarding spare sealing cords, see [\(👉 10, Page 32\)](#).

7 Operation

7.1 Notes on machining

7.1.1 Calculating the clamping force

Calculating the clamping force Unlike in the case of mechanical clamping devices, it is not possible to indicate general clamping forces for matrix plates. They vary considerably in each case of application. For this reason, this chapter will teach you how the clamping forces arise and on which parameters they depend.

The normal force acting on the workpiece during the clamping process – due to the vacuum – increases proportionally with the clamping surface (see the following sample calculation) while the vacuum remains the same. Since the vacuum can't be increased economically anymore once a certain level is reached, you can only raise the normal force by extending the clamping surface.

Therefore, the following applies:

The bigger the actual suction surface, the more normal force is available!

Sample calculation A suction surface of 100 x 100 mm results in a theoretical suction surface of 10,000 mm².

If there is a vacuum of -0.8 bar (=0.08N/mm²) in the system, with the following formula:

$$p = F/A \rightarrow F = p * A$$

a theoretical normal/suction force of:

$$F_N = 0,08 \text{ N/mm}^2 * 10.000 \text{ mm}^2 \text{ can be obtained.}$$

$$F_N = 800 \text{ N}$$

The horizontal friction force is calculated using the following formula:

$$F_R = \mu * F_N$$

With the fictional value $\mu=0,1$ and the normal force calculated above, we receive a friction force (horizontal force) of:

$$F_{R\ 0,1} * 800N = 80N$$

p = pressure [N/mm^2]

F = Force [N]

A = Area [mm^2]



NOTICE

The indicated values serve only for sample calculation.

The operator must verify these theoretical values in practice according to the individual application.

To set a theoretical minimum holding force as reference point, the operator must consider parameters such as material, cutting materials, machine data (rotational speed, forward speed, cutting speed).



NOTICE

If the matrix plate is used in wet areas, it is important to pay attention that the vacuum generator is equipped with an upstream water condensor to prevent the generator from damage. SCHUNK's vacuum aggregates (8) are the optimal generators for the operation in wet areas, because, among other things, exactly this function is already integrated ex works.

**NOTICE**

Basically it needs appropriately qualified personnel to check whether the application of vacuum in certain clamping or handling devices is reasonable.

By observing the instructions, very large clamping and holding forces can be released on bigger clamping surfaces. In contrast, only small forces can be released on small clamping areas.

In order to release these forces, the competent personnel needs a certain degree of experience and the ability to evaluate the situation correctly.

The following factors play a role in using clamping systems:

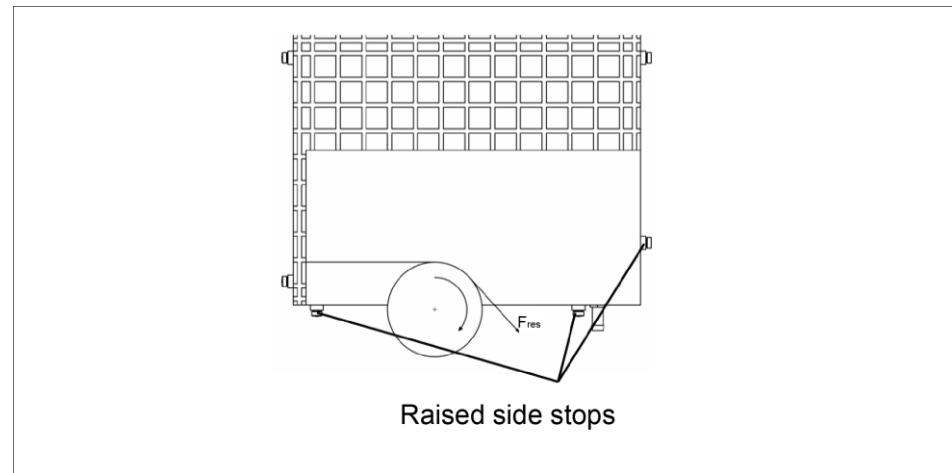
- Size of the clamping surface (available clamping surface in mm²)
- Available vacuum (vacuum in mbar)
- Available suction volume of vacuum generator (suction volume in m³/h)
- Type, nature and condition of the workpiece (porous, solid, hard, soft, tenacious, brittle, air-permeable)
- Type, nature and condition of the tool (prescribed cutting data, tool diameter, cutting forces)
- Operating speed (rotational speed rpm, forward speed mm/min, forward speed per cog)
- Operating cross-sections (plunging depth, clamping volume)
 - **The vacuum clamping force cannot be increased or multiplied randomly! For this reason, the qualified personnel has to select the parameters that cause minimal cutting forces acting on the tool!**

7.2 Notes on using side stops

In addition to their function as positioning aid, the side stops also absorb processing forces in horizontal direction, therefore they should always remain upright even during machining of the workpiece. If a stop is located in the collision area, it must be flapped down or lowered.

Note

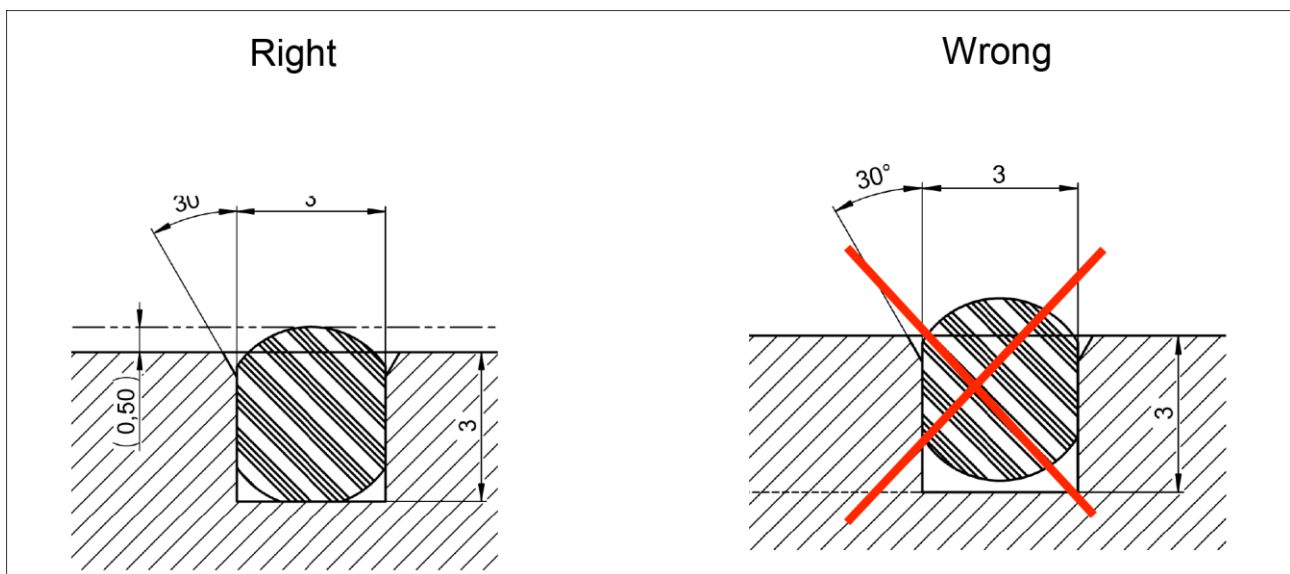
When machining a workpiece, always ensure that the chipping forces are applied in direction of the side stops.



Stop positions

7.3 Sealing cord

Inserting the sealing cord The sealing cord (12) is laid into the grooves on the matrix plate's (1) top surface to map the contour of the workpiece and to seal the actual suction area. Ensure that the inserted sealing cord (12) lies all the way at the bottom of the grid groove and protrudes no more than 0.5 mm above the top surface of the matrix plate (1). Pulling the sealing cord (12) makes insertion easier but also decreases the diameter, which can lead to the sealing cord (12) no longer protruding above the top surface of the matrix plate (1) at all.



NOTICE

Cooling lubricants or dirt particles may enter the system

If the sealing cord (12) does not reach the groove's bottom, the groove running across it may be exposed to the outer atmosphere. This causes the risk of cooling lubricants or dirt particles entering the system.



NOTICE

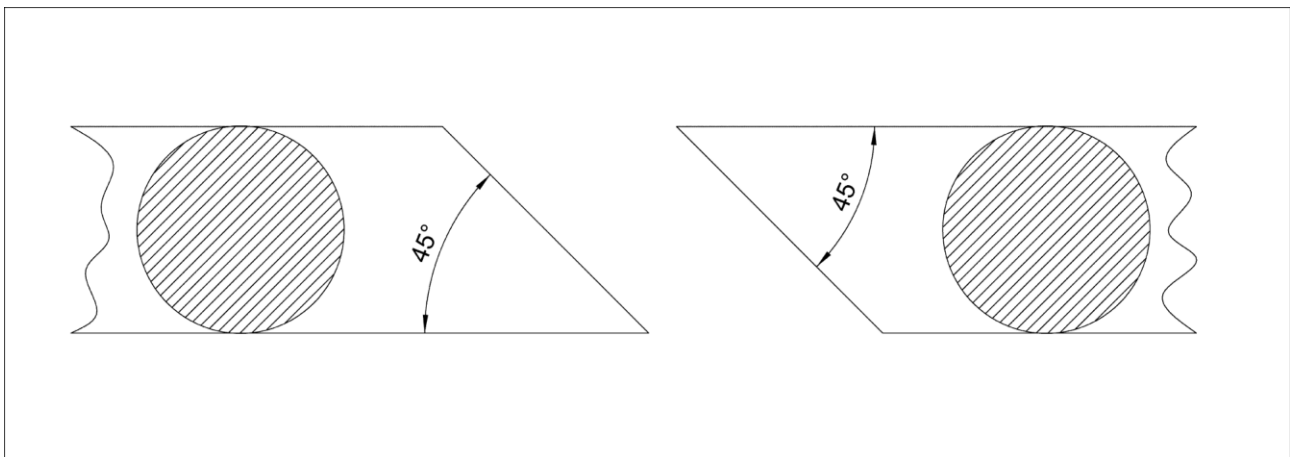
Breaking free of the workpiece

Depending on the size of the leakage, the required vacuum may no longer be reached and therefore the workpiece may no longer be clamped securely. This can lead to the workpiece shifting or loosening during machining.

Bonding the sealing cord In order to avoid leakage, it is extremely important that the sealing cord (12) is laid in the grid groove of the matrix plate meticulously and without gaps. This means the beginning and the end of the sealing cord (12) must be connected properly with each other. To minimize the leakage at this join, we recommend bonding the sealing cord together to create an unbroken seal.

When cutting the sealing cord (12), pay attention that you grab the beginning and the end of the cord in a 45° angle (see illustration below). Ensure that both cord ends are cut at a 45° angle oppositely to each other and that the sealing cord (12) is not twisted.

Use the special superglue 401 for this procedure. The cord bond remains elastic and guarantees a long lasting sealing (temperature range: -10°C to +80°C, tube contents 3 g).



Adhesive bond of the sealing cord

Sealing cord wear If the sealing cord (12) is cracked or damaged, it must be replaced or the damaged part must be exchanged. Check the sealing cord (12) for damage before each use to ensure that the necessary operating vacuum is reached.



NOTICE

Workpiece is not positioned properly on the matrix plate.

If the sealing cord (12) protrudes more than 0.5 mm above the matrix plate's (1) top surface, the sealing cord (12) possibly may not be sufficiently compressed. This can cause the workpiece not to sit flush on the matrix plate (1) but rather on the sealing cord (12) ([👉 6.2.3, Page 22](#)). It can no longer be complied with the tolerance which results in the risk of a deep-drawing effect.

8 Troubleshooting

The clamping system must only be installed and maintained by qualified personnel.

After performing repair and maintenance work, check the safety devices as described in Basic safety notes .

	Error description/ situation	Possible cause	Solution
1.0	Workpiece cannot be secured despite sufficient clamping surface		
1.1		Leakage due to contamination	Check the matrix plate's whole surface and, if necessary, clean it. When positioning the workpiece, there must be no dirt particles on the sealing cord.
1.2		Leaky seal plug	Remove chips or other impurities from the seal plugs (3 and 4). Replace damaged seal plugs.
1.3		Clogged dirt filter (3)	Clean the filter (3). If necessary, remove from vacuum vent for cleaning.
1.4		Error in the geometry of the workpiece	Check workpiece for exact fitting. Check visually if the workpiece is warped. A high-powered vacuum aggregate (8) can compensate low leakage caused by slight warpage! Attention! When selecting the processing parameters please note that in case of elongated workpieces, tools pulling into z-direction exert a relatively high leverage when machining the corresponding ends (clamping force - point of origin in centre of gravity).
1.5		Leaky vacuum lines	Check vacuum lines and, if necessary, clean them!
1.6		Vacuum generator does not work properly	Check vacuum of vacuum generator without matrix plate (operating vacuum: -0.8bar)!

	Error description/ situation	Possible cause	Solution
1.7		Error when connecting multiple matrix plates	Check connections and, if necessary, seal gap on the join edge (16) with sealing cord (12)(👉 6.2.2, Page 21)
1.8		Seals are missing or damaged	Check seals and, if necessary, replace them!
1.9		The vacuum generator's suction volume is too low	Exchange the vacuum generator with a generator that has a higher suction volume!
1.10		Vacuum vents on the matrix plate's top side are not sealed	Seal the vacuum holes (3) that are not needed.

9 Maintenance and care

The clamping system must only be installed and maintained by qualified personnel. After performing repair and maintenance work, check the safety devices as described in Basic safety notes .



NOTICE

Regular cleaning

Clean the matrix plate (1) before each use.

- Vacuum or blow off any of the visible contamination and wipe with a slightly moist cloth. Do not use solvents.
- Regularly remove all seal plugs (4) of the matrix plate (1) and flush the canals with compressed air or liquid.



NOTICE

Spare sealing cord

Spare sealing cord can be ordered by the meter with different diameters.

- When bonding the sealing cord, ensure that the join is not hardening.
- For bonding the sealing cord, we recommend using special superglue 401.

10 Recommended spare parts

Designation	Id.-No.
Sealing cord 3 mm SDI-SCHN-CR20 3	0425100
Sealing cord 3.5 mm SDI-SCHN-CR20 3.5	0425101
Sealing cord 5 mm SDI-SCHN-CR20 5	0425102
Sealing cord 5,5 mm SDI-SCHN-CR20 5,5	0425103
Clamping claw SSPAN-PRA-M12	0425104
Stop SANSG-MPL (with threaded pin and knurled nut)	0425105
Friction pad SREIB-IN	0425106
Vacuum hose SVSL 21-12 PVC-G	0425107
Vacuum hose SVSL 34-25 PVC-DS	0425108
Hose clamp SSSB 16-27	0425109
Hose clamp SSSB 20-32	0425110
Hose nozzle SST G1/4-AG 12	0425111
Hose nozzle SST G3/4-AG 12	0425112
Hose nozzle SST G3/4-AG 25	0425113
Mini-Plate-R	0425120
Mono-Base-8	0425121
Quad-Base-R	0425122
Mono-Base-R R30	0425123
Mini-Plate 30	0425124
Mechanical clamp R 30 for grid tables	0425125
Suction cup 1 for metal machining	0425126
Suction cup 2 for metal machining	0425127
Suction cup 3 for metal machining	0425128
Vacuum aggregate SVAGG-6-L basic	0425050
Vacuum aggregate SVAGG-18-L basic	0425051
Vacuum aggregate SVAGG-40-L basic	0425052
Vacuum aggregate SVAGG-63-L basic	0425053