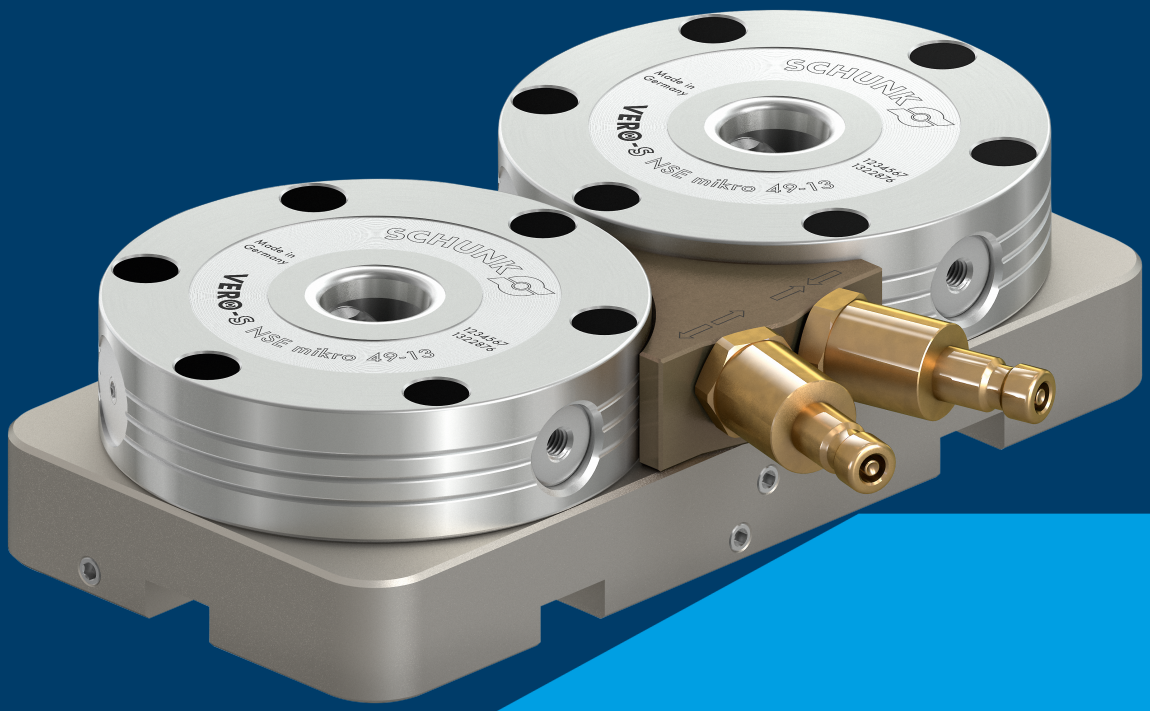
SCHUNK



Quick-change pallet system
VERO-S NSL mikro 50-13 Clamping stations
Assembly and Operating Manual

Hand in hand for tomorrow

Imprint

Technical changes:
We reserve the right to make alterations for the purpose of technical improvement.

Document number: 1425873

Version: 03.00 | 01/08/2025 | en

Dear Customer,

Thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

Tel. +49-7572-7614-1300
Fax +49-7572-7614-1039

cmm@de.schunk.com

Please read the operating manual in full and keep it close to the product.

Table of Contents

1 General

1.1 About this manual

This manual contains important information for the safe, correct use of the product.

It is an integral part of the product and must be kept accessible for personnel at all times.

Personnel must have read and understood this manual before beginning any work. The observance of all safety notes in this manual is a prerequisite to ensure safe work processes.

The illustrations are intended to provide a basic understanding and may deviate from the actual version.

Besides this manual, other documents which apply are those listed under ▸ 1.1.2 [🗋 6]

1.1.1 Illustration of safety notes

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

⚠ DANGER

Denotes a hazard with a high degree of risk that, if not avoided, will result in death or serious injury.

⚠ WARNING

Denotes a hazard with a medium degree of risk that, if not avoided, could result in death or serious injury.

⚠ CAUTION

Denotes a hazard with a low degree of risk that, if not avoided, could result in a minor or moderate injury.

NOTICE

Information about avoiding material damage.

1.1.2 Applicable documents

- General Terms and Conditions *
- Catalog data sheet for the attached product *
- Technical data sheet for optional attachments *
- Approval drawings

The documents labeled with an asterisk (*) can be downloaded from **schunk.com**.

1.1.3 Sizes

This manual applies to the following sizes:

Clamping stations

- NSL mikro 50-13-V10
- NSL mikro 50-13-2

1.2 Warranty

The warranty for standard products is 24 months from the date of delivery from the factory, or 50,000 cycles* for manually operated clamping devices and 500,000 cycles* for power operated clamping devices. For special clamping devices, it is 12 months from the date of delivery from the factory, assuming appropriate use in accordance with the following conditions:

- Observe the applicable documents, ▸ 1.1.2 [🗋 6]
- Observance of the ambient conditions and operating conditions
- Observe the care and maintenance instructions

Parts touching the workpiece and wearing parts are not covered by the warranty.

* One cycle comprises one complete clamping procedure ("opening" and "closing").

1.3 Scope of delivery

The scope of delivery includes:

- Clamping station in the variant ordered.
- Accessory kit: 4 cylindrical clamp blanks (BRR mikro 17), 1 coupling with G1/8" internal thread.

1.3.1 Accessories

(see catalog or data sheets when ordering separately)

- Clamping pallets type PAL mikro
- Clamping pallets type SPA mikro 10, SPB mikro 10, SPC mikro 10
- Protection cover type SDE mikro

2 Basic safety notes

Improper handling, assembly and maintenance of this product may result in risk to persons and equipment if this operating manual is not observed.

2.1 Appropriate use

- This product and the compatible add-on components are intended for positioning and clamping workpieces or clamping pallets on machine tools.
- The product may only be used within the scope of its technical data.
- The product is intended for industrial and commercial use.
- Appropriate use of the product includes compliance with all instructions in this manual.
- Clamping of pallets and workpieces with temperatures between 0°C and 100°C, with clamping devices for higher temperatures (HT variant) up to 200°C.

2.2 Inappropriate use

The product is not being used appropriately if:

- the product is used as a pressing tool, a toolholder, a load-handling device or as lifting equipment.
- the technical data specified are exceeded during usage.
- the clamping pin or clamping ring is not mounted properly.
- the product is used for turning applications over 100 RPM without consulting SCHUNK.
- the product is not fully covered by the pallet, the fixture or the workpiece.
- the product is brought into contact with aggressive media, especially acids.
- the product is used in abrasive blasting processes, especially sandblasting.

2.3 Structural changes

Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

- Structural changes should only be made with the written approval of SCHUNK.

2.4 Spare parts

Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Only use original spare parts and spares authorized by SCHUNK.

2.5 Ambient conditions and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction in the service life of the product.

- Ensure that the product is only used within its technical data.
- Ensure that the product is of a sufficient size for the application.
- Ensure that the contact surfaces of the interface and recesses towards the locating surfaces above the mounting points are kept clean at all times.
  Prevent chips from entering the interface and cooling emulsion from filling the interface.
- Only use cooling emulsions with anti-corrosive additives when machining.
- When using the cone seal, protect it from direct high-pressure spraying with cooling emulsion.

2.6 Material limitations

The product is made of steel alloys, elastomers and aluminum alloys. In addition, Branotect anti-rust oil and Renolit HLT2 are incorporated into the product as auxiliary and operating materials.

2.7 Personnel qualification

Inadequate qualification of personnel

Any work on the product by inadequately qualified personnel can lead to serious injuries and considerable material damage.

- All work must be performed by appropriately qualified personnel.
- Personnel must have read and understood the complete manual before beginning any work on the product.
- Observe country-specific accident prevention regulations and the general safety notes.

The following personnel qualifications are required for the various activities on the product:

Qualified electrician Qualified electricians have the professional training, knowledge, and experience to work on electrical systems, to recognize and avoid potential dangers, and know the relevant standards and regulations.

Specialist personnel Specialist personnel have the specialized training, knowledge, and experience to perform the tasks entrusted to them, to recognize and avoid potential dangers, and know the relevant standards and regulations.

Instructed person Instructed persons have been instructed by the operator regarding the tasks entrusted to them and the potential dangers of inappropriate behavior.

Manufacturer's service personnel The manufacturer's service personnel have the specialized training, knowledge, and experience to perform the work entrusted to them and to recognize and avoid potential dangers.

2.8 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff in the event of a danger that may interfere with their health or safety at work.

2.9 Transport

Handling during transport

Incorrect handling during transport can make the product unsafe and risks the danger of serious injuries and considerable material damage.

- During transport and handling, secure the product to prevent it from falling.

2.10 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly can make the product unsafe and can risk the danger of serious injuries and considerable material damage.

- All work must only be performed by appropriately qualified personnel.
- Secure the system against accidental operation during all work.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

2.11 Protection during commissioning and operation

Falling or violently ejected components

Falling and ejected components can lead to serious injury or death.

- Take suitable protective measures to secure the danger zone.

Manual loading

- If the clamping device is closed, the clamping pallet rests on the clamping slides after loading. When the clamping device is opened, the clamping pallet falls down. This poses a risk of crushing.

2.12 Notes on safe operation

Incorrect manner of working by personnel

An incorrect manner of working can make the product unsafe and risks serious injuries and considerable material damage.

- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. Products for special ambient conditions are excluded here.
- Do not expose the product to any media that lead to swelling or corroding of seals.
- Rectify malfunctions as soon as they occur.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention, and environmental protection regulations for the application field of the product.
- The machine spindle must not be started until the clamping pressure in the clamping device has built up.
- Unclamping may only occur once the machine spindle has come to a standstill.

2.13 Disposal

Handling of disposal

Incorrect handling of disposal can make the product unsafe and lead to risks of environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

2.14 Fundamental dangers

General

- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- Do not reach into the open mechanism or movement area of the product during operation.

2.15 Protection against dangerous movements

Safe condition

Quick-change pallet system with or without chuck jaws clamped and without energy.

Unexpected movements

If the system still retains residual energy, serious injuries can be caused while working on the product.

- Establish a safe state, switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.

2.16 Notes on particular risks

⚠ WARNING

Risk of injury due to falling device, pallet or workpiece if the clamping pin or clamping ring is loosened erroneously or as a result of negligence.

- During operation, unintentional loosening of the clamping pin or clamping ring must be prevented by suitable countermeasures (implementation of the safety functions according to the risk assessment of the integrator).
- Wear personal protective equipment.

⚠ WARNING

Risk of injury during commissioning due to a falling unlocked device, pallet or workpiece.

- During loading, check that the coupling elements, devices, pallets or workpieces are positioned so they are aligned to each other.
- Clamping pallets with torque pin must be fed to the module in the correct orientation before locking.
- For modules with media transfer units, ensure the loading weight on the change interface is sufficient to ensure the surface of the interface is level with the module.

⚠ WARNING

Risk of injury when the clamping pin or clamping ring axis is in a horizontal position or during overhead applications due to the device or pallet falling down.

- Use a crane or a transport truck when transporting workpieces or clamping pallets.
- During horizontal or overhead applications, the device or clamping pallet must be secured before loosening to prevent it from falling.

⚠ WARNING

The quick-change pallet system clamps using spring force. Risk of injury due to parts automatically moving to their end positions following actuation of an >>emergency stop<< or after switching off or failure of the power supply.

- Wait for the system to come to a complete standstill in safe state.
- Do not reach into the clamping module.

⚠ CAUTION

Risk of injury due to contamination (e.g. coolant or splashing water) in the blow-out and air purge connections of the clamping module or in the change interface.

- Clean the quick-change pallet system before loading.
- Wear personal protective equipment (safety goggles).

⚠ CAUTION

Risk of injury from pressurized media transfer unit interfaces. The actuated clamping device on top of these may move unexpectedly as a result.

- Do not control the media transfer units until the device is clamped on the quick-change pallet systems.
- Take suitable protective measures to secure the danger zone.

3 Technical data

Operating temperature [°C]	5 – 60
Installation position	Any
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
Minimum pressure [bar]	5 bar The operating pressure must not fall below 5 bar.
Actuating pressure [bar]	6
Maximum pressure [bar]	6
Repeatability [mm]	< 0.005
Noise emission [dB(A)]	≤ 70

	Clamping station NSL mikro	
Designation	**50-13-V10**	**50-13-2**
ID number	1358958	1358959
Holding force (M3 / M4)* [kN]	3 / 5	6 / 10
Pull-in force without turbo [kN]	0.5	1.0
Pull-in force with turbo [kN]	1.5	3.0
Weight [kg] with cylindrical clamps without cylindrical clamps	 0.55 0.45	 0.87 0.77

* Holding force when fastening the clamping pin with cylindrical screw – DIN EN ISO 4762/12.9

A separate maintenance unit with oiler must be used for the air supply.

Further technical information can be found in the catalog data sheets of the standard products used and the operating instructions of the modules used ▸ 1.1.2 [🗋 6].

3.1 Suitability for welding applications

The clamping device can be used for welding applications with a **welding current of up to 525 A**. The welding current is allowed to flow through the clamping device.

NOTICE

In welding applications, special care must be taken to ensure that the operating temperature of the clamping device is not exceeded due to heat conduction in the workpiece.

NOTICE

The contact surfaces of the workpiece and the clamping bolt must always be kept clean to ensure the best possible contact with the clamping device.

If the quick-change pallet system is to be used outside the specified welding currents, please contact your SCHUNK contact person.

4 Assembly

4.1 Screw tightening torques

Tightening torques for fastening the clamping station with the cylindrical clamp blanks.

The clamp blanks that have been adjusted by the customer to correspond to the machine table must be fastened to the machine table with fastening screws of strength class 10.9. These fastening screws and any nuts required for the T-slots are not included in the scope of delivery.

Note:

The clamping stations should preferably be fastened with M4 screws in connection with the clamp blanks.

Tightening torques for screw connections with screws according to ISO 4762 (strength class 10.9)

Screw size	M3	M4	M6	M8
Tightening torque (Nm)	1.7	4.2	13	28

Tightening torques for screw connections with screws according to ISO 4762 (strength class 12.9)

Screw size	M3	M4	M6	M8
Tightening torque (Nm)	2.4	5	15	32

4.2 General Installation Notes

The clamping pins are available as accessories and are suitable for transporting the clamping station. The eye bolts can be screwed into the internal threads of the clamping pins.

The quick-change pallet modules of the clamping station are unlocked with compressed air to insert the clamping pins.

NOTICE

For transport, the air supply must be disconnected so that the clamping pins remain locked.

When connecting the quick-change pallet systems, it must be taken into consideration that it is only possible to completely ventilate the piston chamber during the locking process. For that reason, the corresponding valves, sound absorbers or shut-off valves should be fitted with load relief.

This also applies to the turbo connection. If the turbo connection is not used, it must be possible to ventilate the relevant side of the piston.

When disconnecting hose lines, the relevant openings must be secured with seal plugs to prevent ingress of dirt or cooling lubricant.

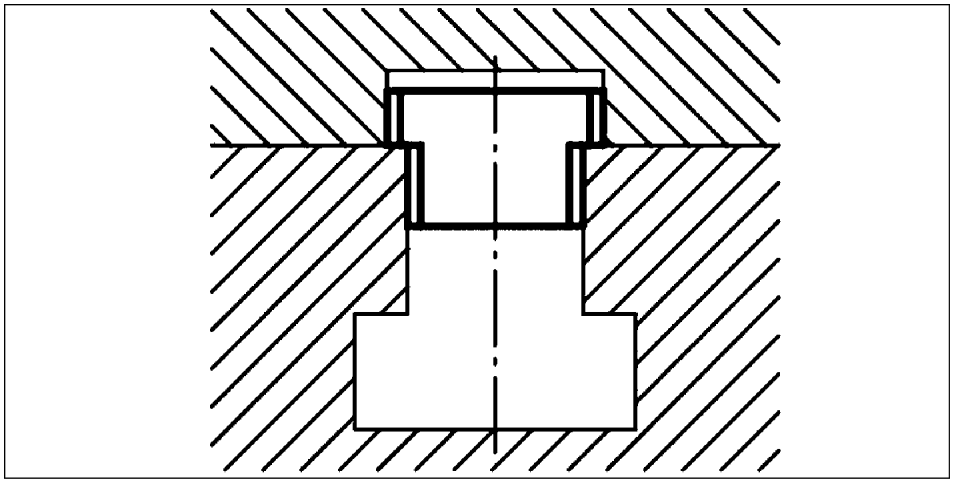
⚠ CAUTION

Danger of injury due to sharp edges and rough or slippery surfaces

- Wear personal protective equipment, particularly protective gloves.

4.3 Aligning the clamping station

The clamping station can be aligned with loose T-nuts along an aligning groove on the machine table. At least two T-nuts offset lengthwise are provided and their size is matched to the aligning groove on the machine table. The T-nuts are not included in the scope of delivery of the clamping station.



Alignment using T-nuts

4.4 Mounting the clamping stations

Flatness and distances

In order to assemble the clamping station, the clamping surface must have a flatness of ≤ 0.02 mm (based on the entire support area of the clamping station). The clamping zone must have sufficient rigidity in order to ensure the relative flatness of the clamping modules. If several clamping stations are installed that are linked, it is important to ensure that the flatness and height deviation of the locating surfaces from module to module (based on a 50 mm gauge for bore holes) is ≤ 0.02 mm. The gauge deviation between the separate clamping stations must not exceed ± 0.015 mm from module to module.

Compliance

For the sake of conformity, clamping pins with positioning accuracy in one direction (SPB mikro 10) should be used for clamping modules within a clamping station or multiple interlinked clamping stations that are more than 160 mm apart or that do not show a positioning tolerance of ±0.01 mm. For the clamping areas that are not intended for alignment of the device or pallet, clamping pins with centering clearance (SPC mikro 10) can be used.▸ 4.5 [🗋 19]

Even height of the clamping modules

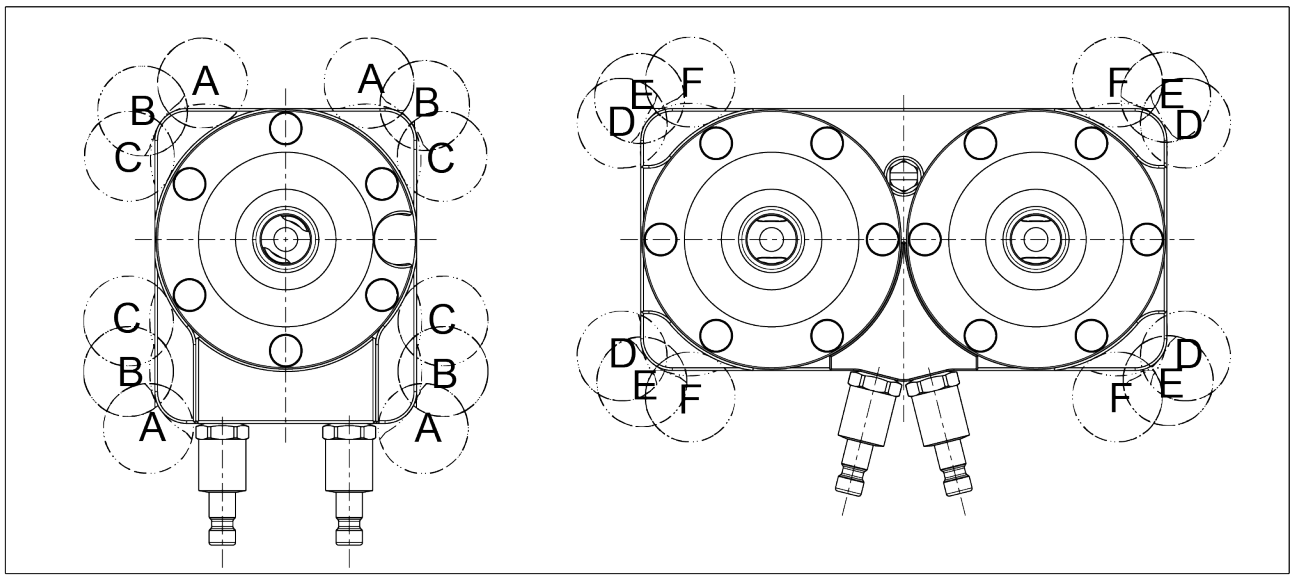
Even height of the clamping modules within a clamping station is only ensured when in a clamped state. The clamping station is to be fastened with the BRR mikro 17 clamp blanks included in the scope of delivery. The clamping station must be fastened on the machine table with all clamp blanks provided to ensure safe

mounting. The clamp blanks must be fastened with adequately dimensioned fastening screws in accordance with DIN EN ISO 4762 of thread size M4 or above. The prescribed arrangement for the clamp blanks can be found in the following clamping diagram.

NOTICE

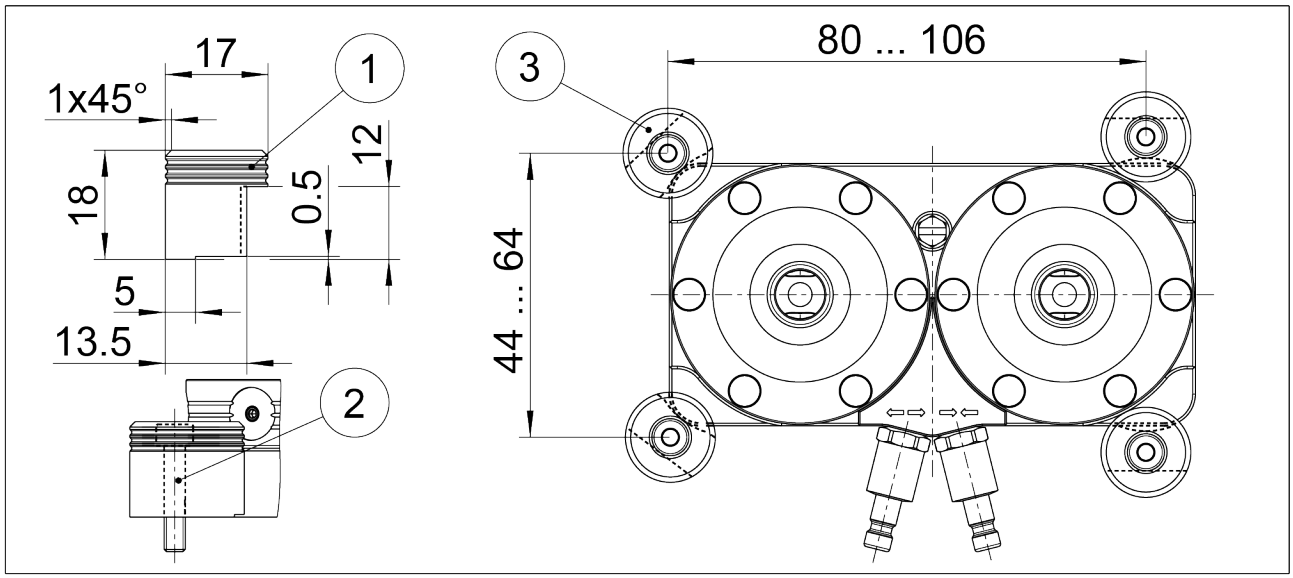
The height of the modules will only be even once the clamping station has been properly mounted on the machine table.

For the arrangement of the BRR mikro 17 clamps see the "Clamping range" illustration.



Clamping areas for mounting using cylindrical clamp blanks

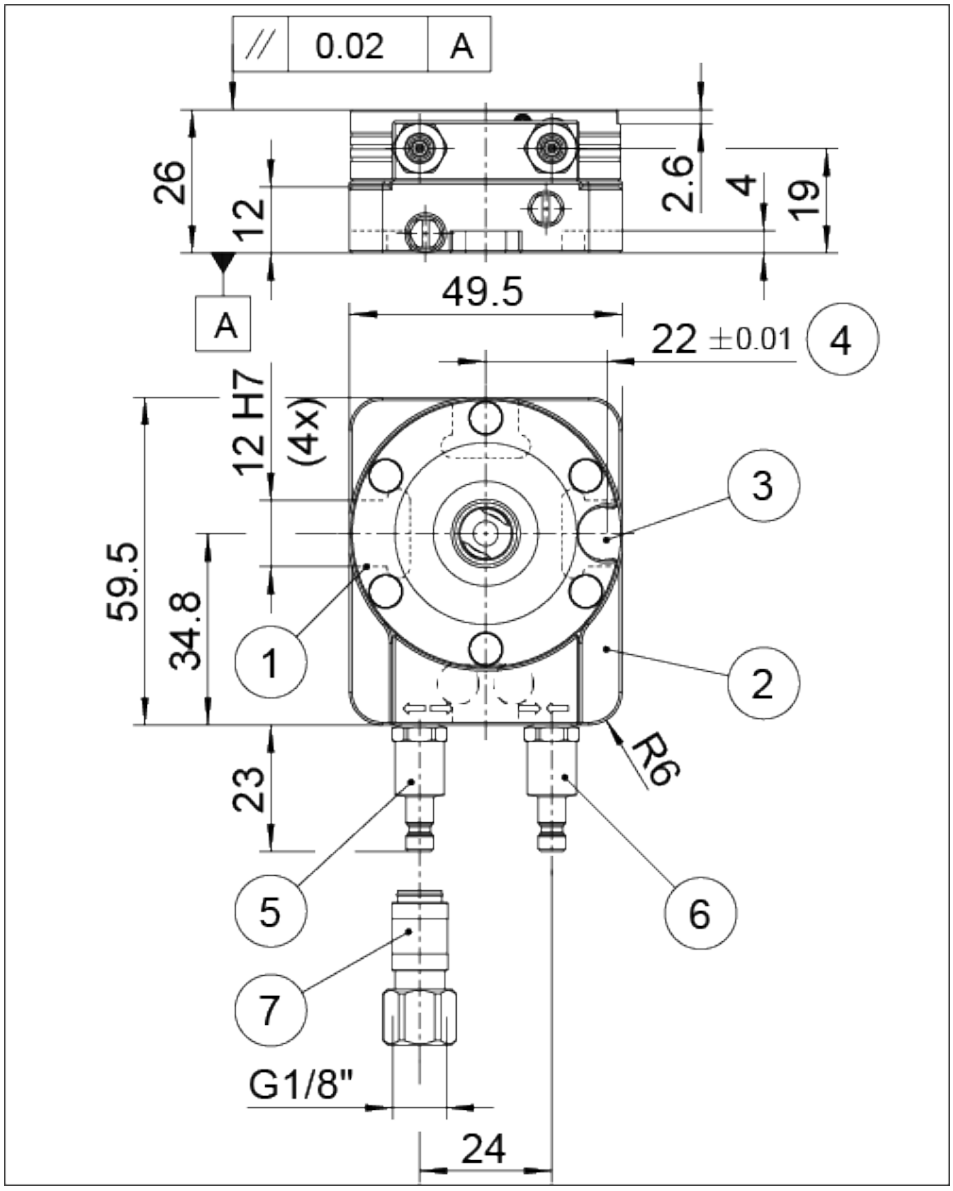
NSL mikro 50-13-V10	NSL mikro 50-13-2
A / B / C	D / E / F



1	Cylindrical clamp blanks are versatile fastening elements
2	The mounting holes are machined by the customer
3	Flexible mounting options for common slot spacings of the machine tables

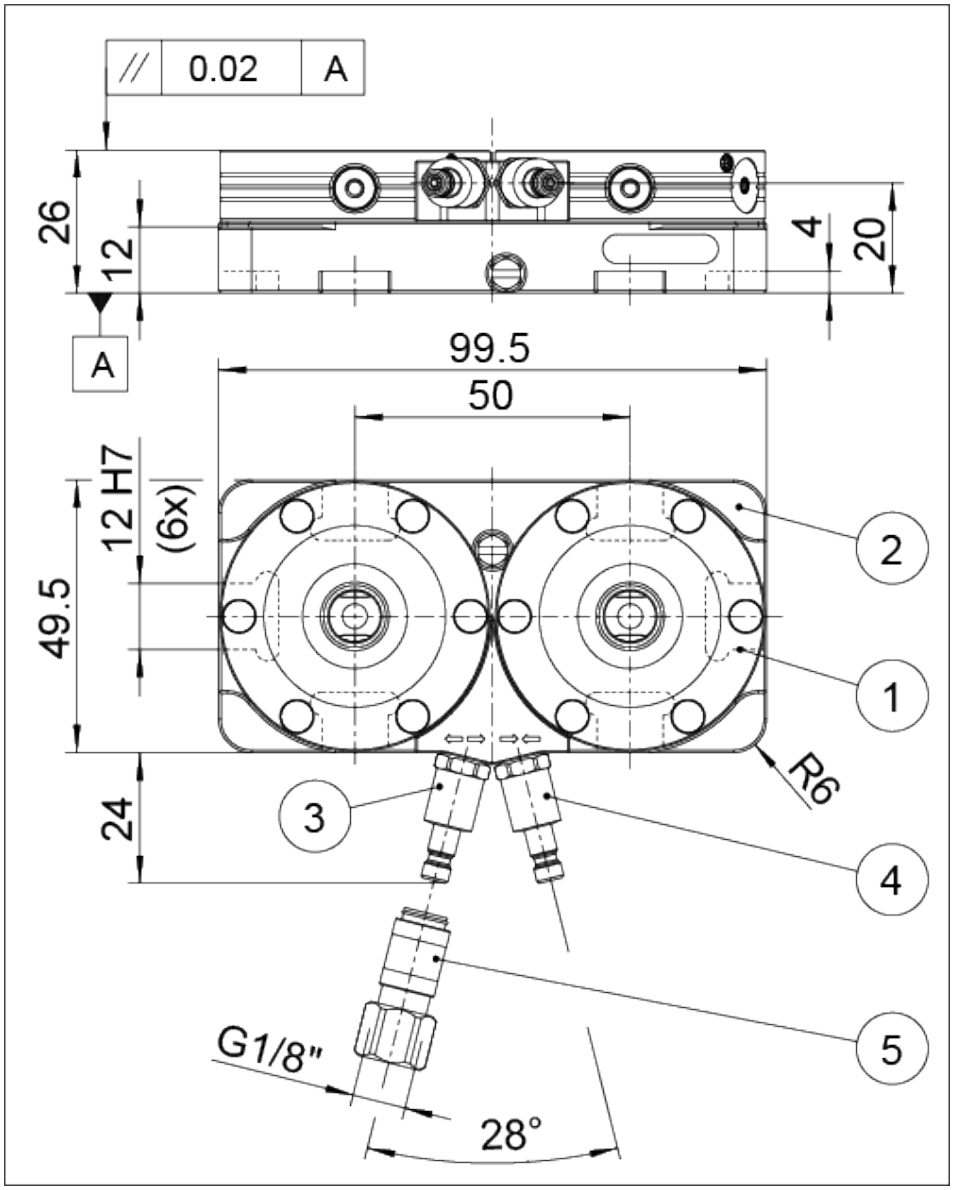
4.4.1 Assembly and connections

Clamping station NSL 50-13-V10



1	T-slot holder (4x) for alignment on the machine table
2	Bearing surface of the four BRR mikro 17 clamp blanks for fastening the clamping station to the machine table.
3	Short taper segment for position orientation of the clamping pallet
4	Measure of clearance for IXB V10 PAL mikro in the clamping pallet
5	Air connection for "Open module" with M6 connection thread
6	Air connection for "Turbo function" with M6 connection thread
7	Supply via coupling NW2.7 with G1/8" internal thread (included in scope of delivery)

Clamping station NSL mikro 50-13-2



1	T-slot holder (6x) for alignment on the machine table
2	Bearing surface of the four BRR mikro 17 clamp blanks for fastening the clamping station to the machine table
3	Air connection for "Open module" with M6 connection thread
4	Air connection for "Turbo function" with M6 connection thread
5	Supply via coupling NW2.7 with G1/8" internal thread (included in scope of delivery)

4.4.2 Unlocking connection

When the unlocking connection of the clamping station is actuated with compressed air, all of the modules are unlocked simultaneously.

Clamping pallets, devices and workpieces can be inserted in and removed from the clamping station.

4.4.3 Turbo connection

⇨⇦

The clamping station comes with a turbo connection as standard. When compressed air is applied, this actively provides air pressure to support the spring-actuated locking procedure. This increases the pull-down force simultaneously in all the modules.

The increase in the pull-down force of the clamping modules is achieved with a pressure pulse at the air connection. After actuation of the turbo function, the compressed air supply can be disconnected again, the increased pull-down force is retained.

NOTICE

When using customer systems, sealing nipples without a shut-off function are to be used. The chambers in the modules must be ventilated on actuation.

4.5 Clamping pins SPA mikro 10, SPB mikro 10, SPC mikro 10

NOTICE

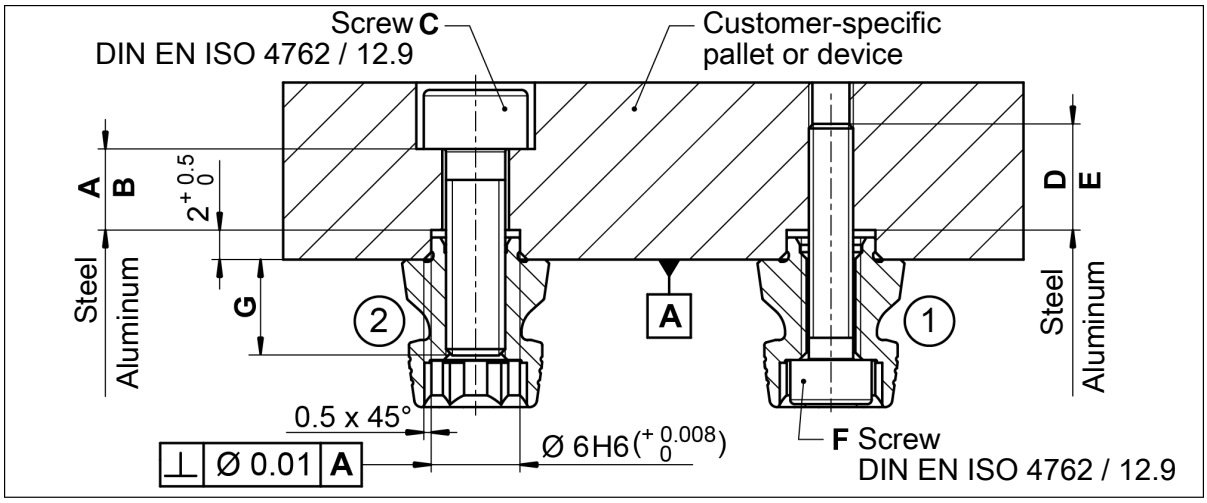
Notes on clamping pins and mounting screws

The holding force of the quick-change pallet system is limited essentially by the tightness of the screw connection which connects the clamping pin to the pallet or the device. This is why only screws of strength class 12.9 may be used.

- Only original SCHUNK clamping pins may be used.
- If the clamping pins are to be used in customer-owned devices, the customer must provide sufficiently dimensioned threaded holes or a sufficiently thick mounting material.

The clamping pins can be attached to the workpiece or pallet in two different ways.

Preference should be given to the left mounting option in the illustration "Mounting the clamping pins". With this variant, if there is a module failure then the device or pallet can be removed after disassembling the clamping pins.



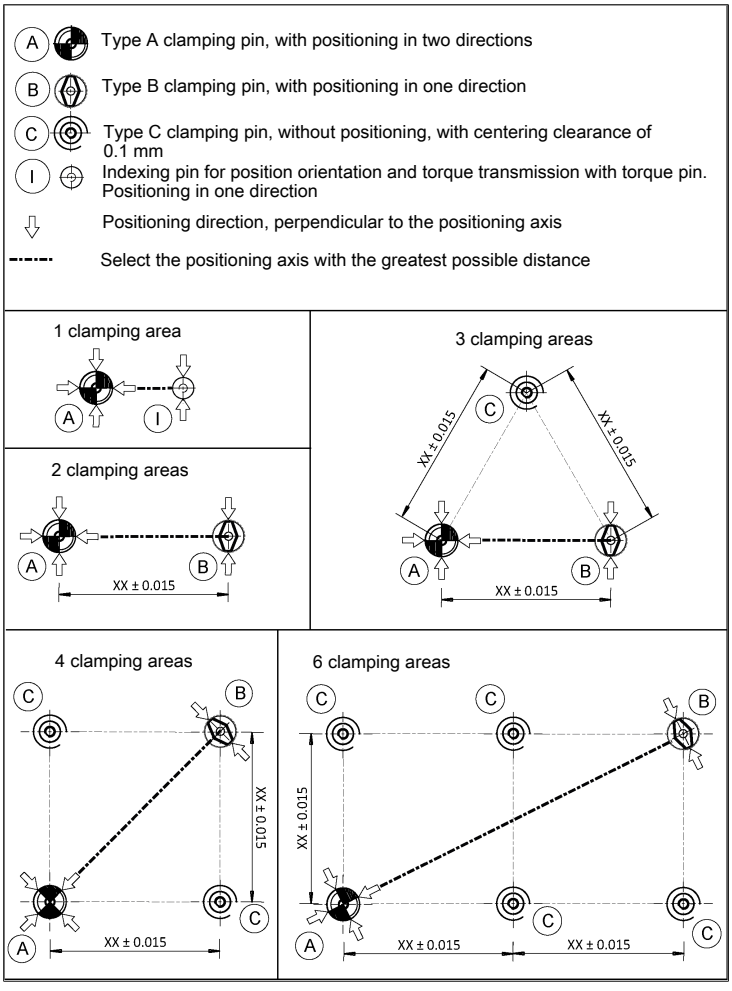
Mounting the clamping pins

Tolerances and installation conditions

Type	ID	A	B	C	D	E	F	G*
SPA mikro 10	0436610	> 5 mm	> 8 mm	M4	> 5 mm	> 6 mm	M3	5 mm
SPB mikro 10	0436620	> 5 mm	> 8 mm	M4	> 5 mm	> 6 mm	M3	5 mm
SPC mikro 10	0436630	> 5 mm	> 8 mm	M4	> 5 mm	> 6 mm	M3	5 mm

* The length of the inserted thread must not be lower than the "G" dimension!

Usage/arrangement of the different types of clamping pins



5 Maintenance and care

The clamping station is designed for low-maintenance operation. As such opening and disassembly of the clamping modules is only necessary in exceptional cases.

⚠ CAUTION

Risk of injury and risk of damage to the pneumatic clamping modules when opening the modules.

If a pneumatic clamping module has to be disassembled, send the module to SCHUNK for repair.

The rear cover of the clamping module is spring preloaded and must only be removed and installed using a special installation tool by trained specialist personnel and in line with the appropriate removal and installation manual.

To ensure the quick-change pallet system operates perfectly, the following instructions must be observed:

Pressure medium: Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]

NOTICE

A separate maintenance unit with oiler must be used for the air supply.

5.1 Ambient conditions and operating conditions

- Make sure that the contact surfaces of the interface are always clean.
- Make absolutely sure that no chips of any kind can enter the interface and that the interface does not fill with cooling emulsion, which is particularly possible with vertical alignment of the clamping pin axis. The best way to ensure neither of these occur is to use the SDE mikro protection covers.
  If the interface should fill with cooling emulsion, initiate the unlocking process and dry out the interface in actuated state.
- Only use high-quality cooling emulsions with anti-corrosive additives during processing.
- Check the clamping stations at regular intervals (at least every two weeks or after 1000 clampings). The system is functioning correctly if the clamping slides move smoothly at minimum system pressure (5 bar) and open completely.
- Carry out regular visual/functional checks. In case of visible damage or signs of malfunction, shut down the quick-change pallet system immediately. The system may only be started again once the faults have been corrected, for instance by replacing a damaged module.

5.2 Control of proper function

For the functional test, the proper functioning of the quick-change pallet systems should be tested.

The systems is working perfectly if:

- the clamping slide moves smoothly at minimum system pressure (5 bar).
- the desired functions correspond to the symbol on the clamping station housing.
- the clamping system shows no signs of leaking.

5.3 Leak test

As part of a leak test, the air and plug-in connections and the entire clamping station are tested for leaks.

Leaks must be sealed, for example at the plug-in connections or at the set-screws for the duct closure. Defective components must be replaced with new parts.

The following components are required for the leak test: pressure gauge, supply line with coupling nipple.

Performing the leak test:

1. Connect the components at the air connection in the following order:
   pressure gauge, supply line with locking coupling.
2. Pressurize the clamping system with compressed air.
3. Check the clamping system for tightness in both switch positions for module control.

To test the tightness of the clamping system, no clamping pallet should be fitted.

If the clamping system has leaks, check the entire pneumatic system (e.g. using Metaflux leak detector spray).

Leaks must be sealed, for example at the set-screws of the base plate or the plug-in connections.

If leaks in the seals or connections are found, check them and replace if worn or defective.

6 Troubleshooting

The clamping area fails to unlock properly, or at all

Possible cause	Remedial measures
Pressure below minimum	Check operating pressure (min. 5 bar)
The clamping station was not operated with oiled compressed air	Install maintenance unit with oiler
Defective air connections	Check air supply
A component is broken (e.g. due to overloading)	Replace the module or send it to SCHUNK for repair
Excess tensile load on clamping pins	Reduce support weight
The turbo connection is still pressurized	Ventilate the connection
Leaky air supply or air connection	Check for leaks ▶ 5.3 [🗋 22]

The quick-change pallet systems no longer open quietly

Possible cause	Remedial measures
The clamping faces on the clamping slides and on the clamping pin are dirty	Remove the clamping pallet and clean the clamping faces on the clamping slides and on the clamping pins. Clean all clamping modules installed on the clamping slides

7 Parts list

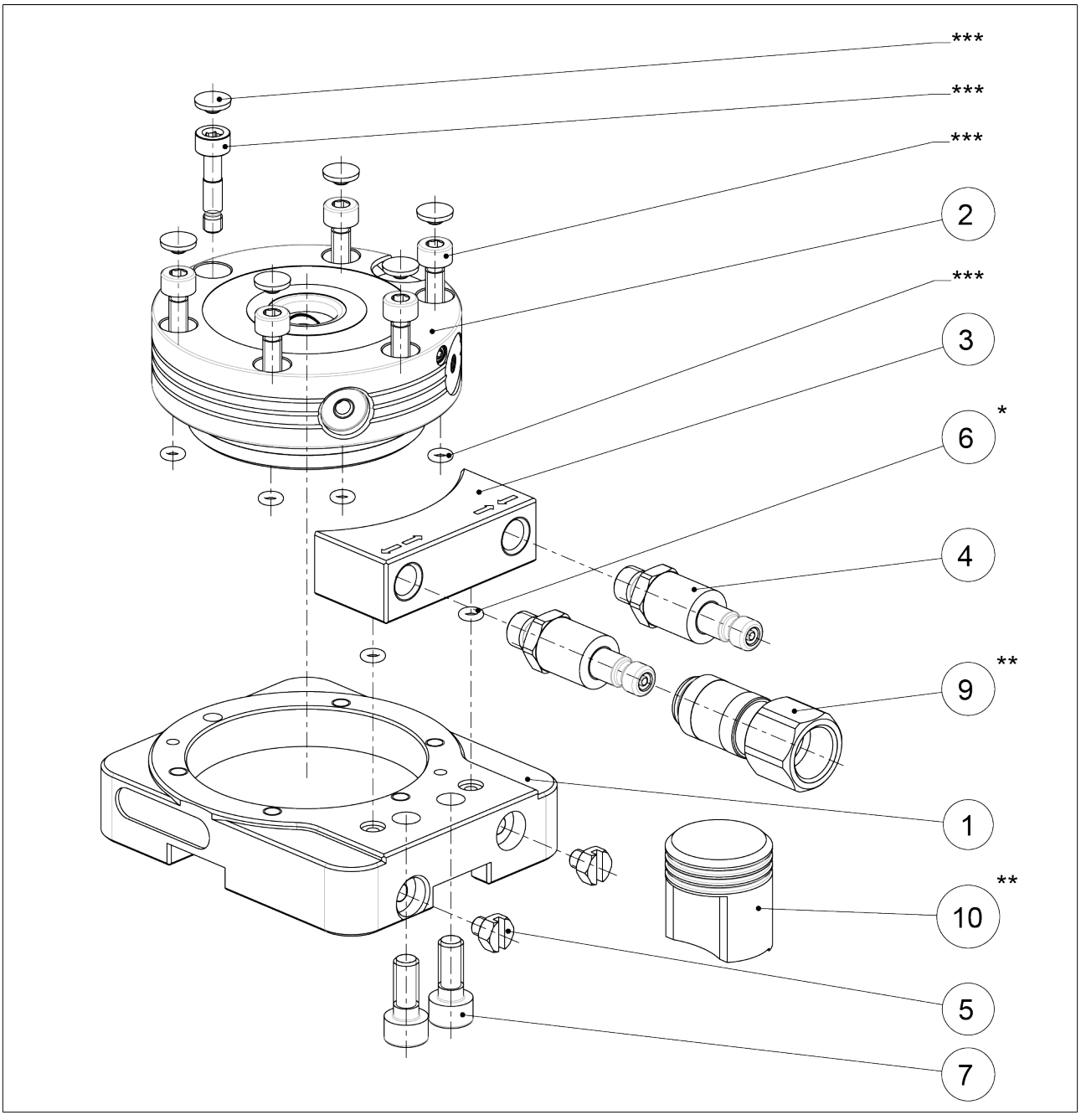
NSL mikro 50-13-V10 (ID 1358958)

NSL mikro 50-13-2 (ID 1358959)

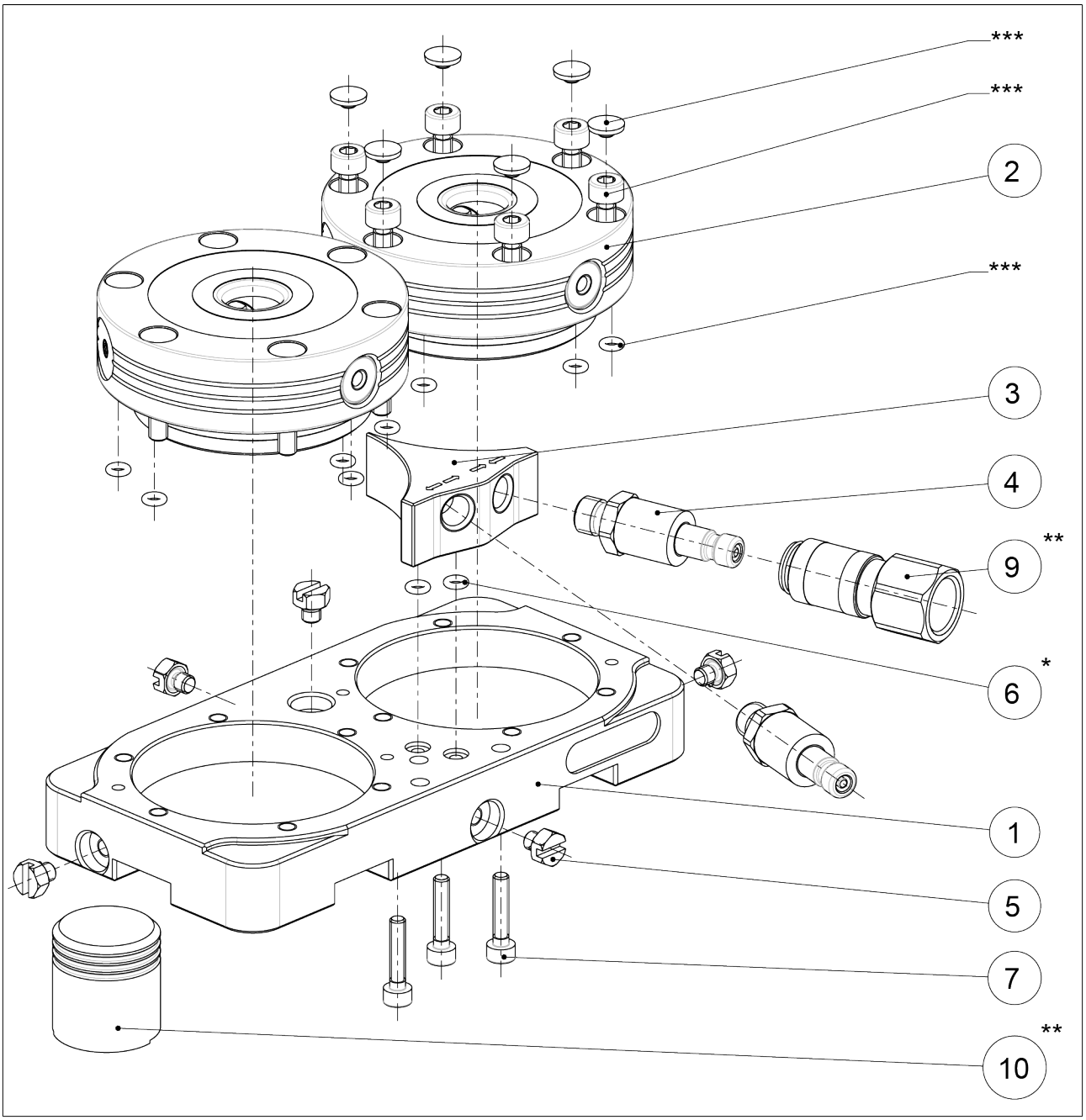
Item	Designation	Quantity	Note
1	Base plate	1	
2	VERO-S NSE mikro 49-13-V10	1	50-13-V10
	VERO-S NSE mikro 49-13	2	50-13-2
3	Connecting strip	1	
4	Sealing nipple	1	
5	Locking screw	2	50-13-V10
	Locking screw	5	50-13-2
6	O-ring	2	*
7	Fastening screw	2	
	Fastening screw	3	
9	Locking coupling	1	
10	Cylindrical clamp blanks BRR mikro 17	4	

Parts list key	
*	Seals are wearing parts and are recommended to be replaced during maintenance.

8 Drawings



*	Wearing parts; replacement is recommended when maintenance is performed
**	Parts are unassembled on delivery
***	For scope of delivery of quick-change pallet system, see parts list in NSE mikro 49-13 operating manual



*	Wearing parts – replacement is recommended when maintenance is performed
**	Parts are unassembled on delivery
***	For scope of delivery of quick-change pallet system, see parts list in NSE mikro 49-13 operating manual

9 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen
Product:	Quick-change pallet system
Designation:	VERO-S
Type designation:	NSL, NSD, NST, GSL, SSN, SSN turn

Heinz-Dieter SCHUNK GmbH & Co. Spanntechnik KG certifies that the above-mentioned products, when used as intended and in compliance with the operating manual and the warnings on the product, are safe according to the national regulations and:

- a **risk assessment** has been carried out in accordance with ISO 12100:2010.
- an **operating manual** for the assembly instructions has been created in accordance with the contents of the Machinery Directive 2006/42/EC Annex I No. 1.7.4.2. and the contents of the provisions of Annex VI of the Machinery Directive 2006/42/EC.
- **Markings** have been made in accordance with EN 1550:1997+A1:2008 Section 6.3.1, VDMA 34192:2019 Section 6.3 or ISO 16156:2004 Section 6.3. The requirements of Annex I No. 1.7.3. of the Machinery Directive 2006/42/EC have been complied with.
- the relevant basic and proven safety principles of the Annexes of **ISO 13849-2:2012**, taking into account the requirements of the documentation have been observed for the component. The parameters, limitations, ambient conditions, characteristic values, etc. for proper operation are defined in the operating manual.
- an $MTTF_D$ value of 150 years can be estimated for mechanical components using the informative procedure in Table C.1 of ISO 13849-1:2015.
- **fault exclusion** against the fault "Unexpected release without pending release signal".
- the **fault exclusion** against the fault "Breakage during operation" in compliance with the parameters, limitations, ambient conditions, characteristic values and maintenance intervals, etc., specified in the operating manual.
- that internal bore diameters in the **pipe or control lines** are at least 2 mm for pneumatic clamping systems and at least 3 mm for hydraulic clamping systems

Harmonized Standards applied:

- **ISO 12100:2010** Safety of machinery - General principles for design - Risk assessment and risk reduction

Other related technical Standards and specifications:

- **VDMA 34192:2019** Safety requirements for clamping devices for use on machines

Mengen, 19th of July 2023

Signature: see original declaration

p.p. Philipp Schräder
Head of Development standard products

Signature: see original declaration

p.p. Alexander Koch
Head of Engineering Design special products

H.-D. SCHUNK GmbH & Co.
Spanntechnik KG

Lothringer Str. 23
D-88512 Mengen
Tel. +49-7572-7614-0
info@de.schunk.com
schunk.com

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