
# Quick-change pallet system VERO-S NSL mini 100 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.

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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

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**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**.

## 1.2 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

**Clamping station NSL mini 100**
Clamping station including quick-change pallet system in the version ordered.

**Accessory pack**
The accessory pack includes the required air connections and the appropriate quick coupling for operating the clamping station. Depending on the items ordered it may also contain components that are not fitted for transportation reasons.

### 1.3.1 Accessories

(when ordered separately – see catalog or data sheets)

- Clamping pallets Type PAL mini
- Module height extensions, mini
- Clamping devices height extensions, mini
- Clamping pin types SPA 20 mini, SPB 20 mini, SPC 20 mini
- Clamping pin extensions, mini
- Protective cover type SDE mini
- Coupling kit NSL mini 100-2
- Clamping pin blank (BRR mini 40)

# 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] | 15 – 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<br>The operating pressure must not fall below 5 bar. |
| Actuating pressure [bar] | 6 |
| Maximum pressure [bar] | 10 |
| Repeatability [mm] | < 0.005 |
| Noise emission [dB(A)] | ≤ 70 |

| | Clamping station NSL mini | | | |
|---|---|---|---|---|
| **Designation** | **100-1-V1** | **100-2** | **100-3** | **100-4** |
| ID number | 1304680 | 0435220 | 0435230 | 0435240 |
| Holding force (M6 / M8)* [kN] | 15 / 25 | 30 / 50 | 45 / 75 | 60 / 100 |
| Pull-in force without turbo [kN] | 0.5 | 1.0 | 1.5 | 2.0 |
| Pull-in force with turbo [kN] | 1.5 | 3.0 | 4.5 | 6.0 |
| Weight [kg] | 1.7 | 3.4 | 6.0 | 6.3 |

* 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.**

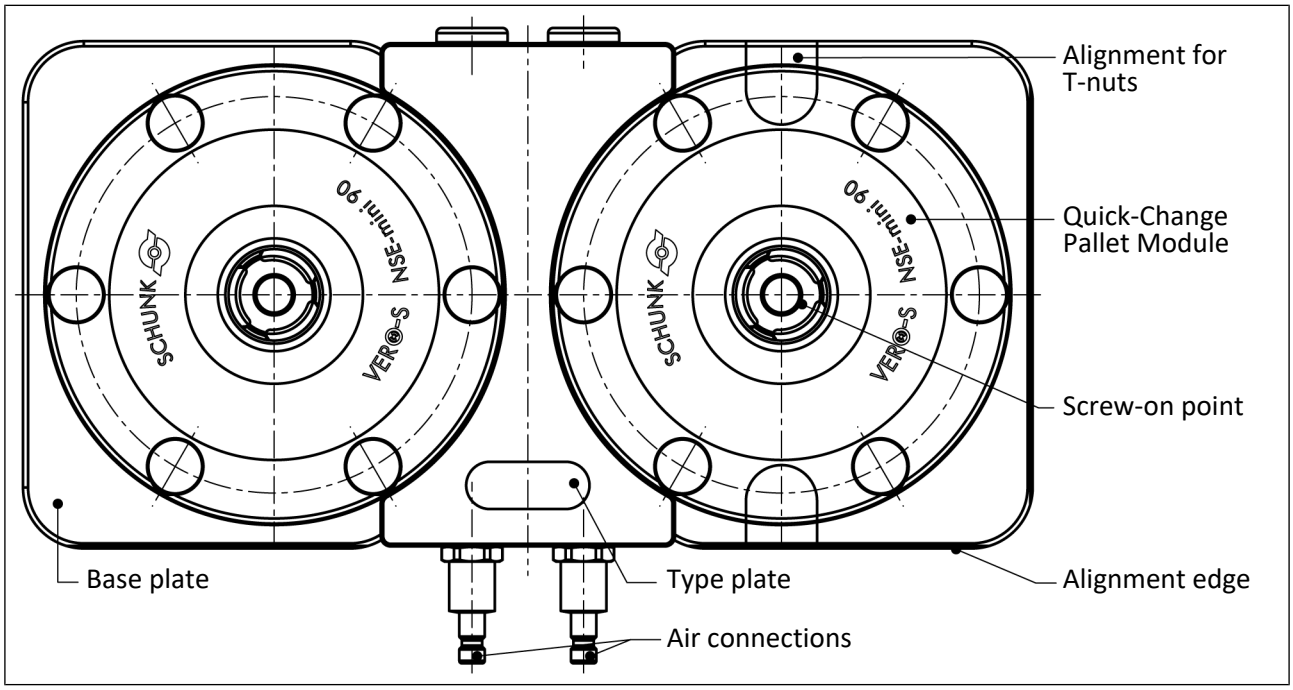
***NOTICE***

**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.**

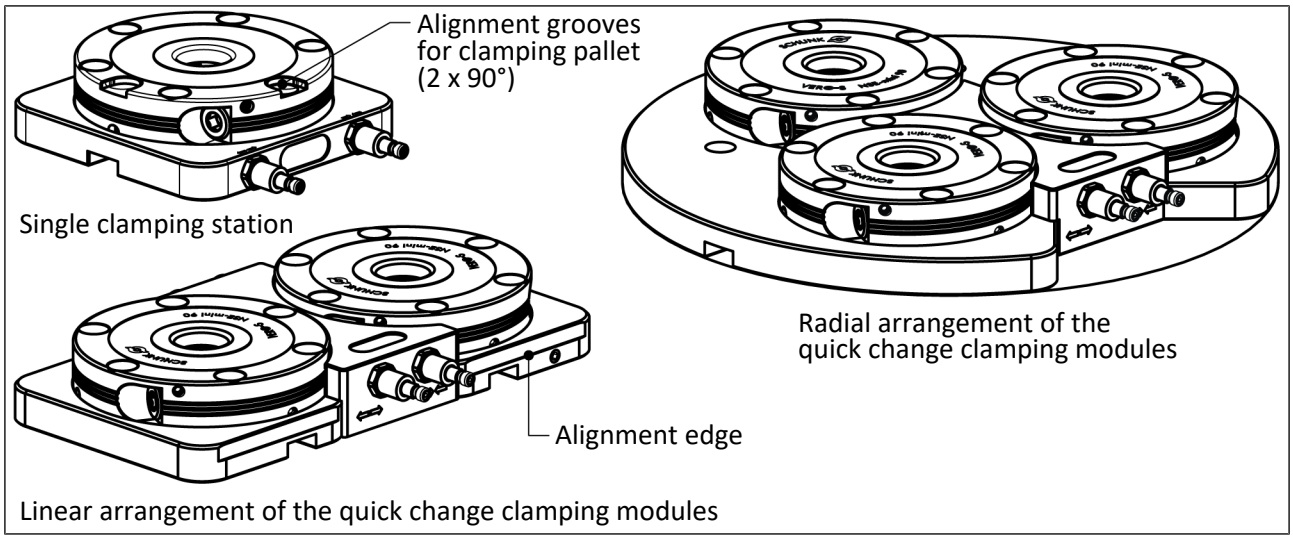
**If the quick-change pallet system is to be used outside the specified welding currents, please contact your SCHUNK contact person.**

# 4 Construction

## Components of a clamping station




## Versions



# 5 Assembly

## 5.1 Screw tightening torques

**Tightening torques for screw connections with screws according to DIN 7984** (strength class 10.9)

| Screw size | M4 | M5 | M8 | M10 |
|---|---|---|---|---|
| Tightening torque (Nm) | 3 | 5.5 | 22 | 40 |

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

| Screw size | M6 | M8 | M10 | M12 | M14 | M16 | M18 | M20 | M22 | M24 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tightening torque (Nm) | 13 | 28 | 50 | 88 | 120 | 160 | 200 | 290 | 400 | 500 |

## 5.2 General assembly instructions

For transport of the clamping station, we recommend the quick change clamping pins available as accessories. Eye bolts can be screwed into the inner threads of the clamping pins.

The quick change clamping modules of the clamping station are released with compressed air for insertion of the clamping pins.

***NOTICE***

**The air supply must be disconnected for transportation,so that the clamping pins remain locked.**

When connecting the Quick-Change Pallet Systems, please make sure that complete deaeration of the piston area during the locking operation is possible. Therefore, valves, sound absorbers or stop valves for deaeration should be available.

The same applies for the turbo connection. If the turbo connection will not be used, it must be possible that the relevant piston side can be deaerated.

When uncoupling the air hoses the corresponding openings have to be sealed with sealing plugs in order to prevent ingress of dirt or coolant into the module.

**⚠ CAUTION**

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

- Wear personal protective equipment, particularly protective gloves.

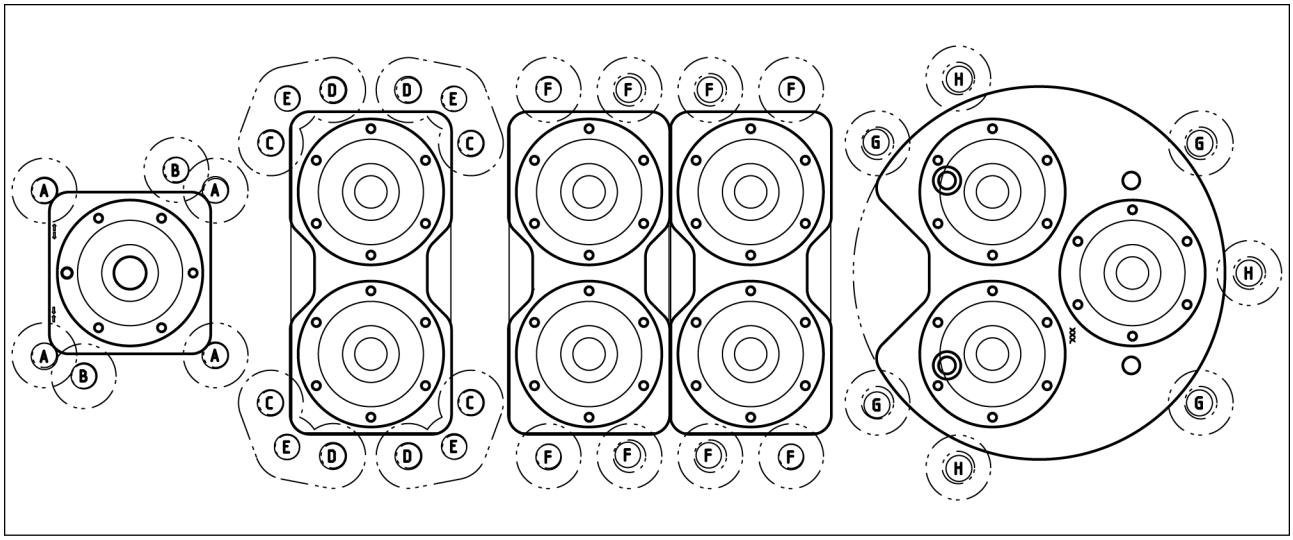
## 5.3 Fastening and alignment of the clamping station

**NOTICE**

**An equal height of the modules is not achieved before the clamping station has been properly fastened on the machine table.**

The clamping station is to be fastened with the BRR mini 40 clamp blanks which are available as accessories. For the arrangement of the cylindrical clamp BRR mini 40, see the "Clamping range" illustration.

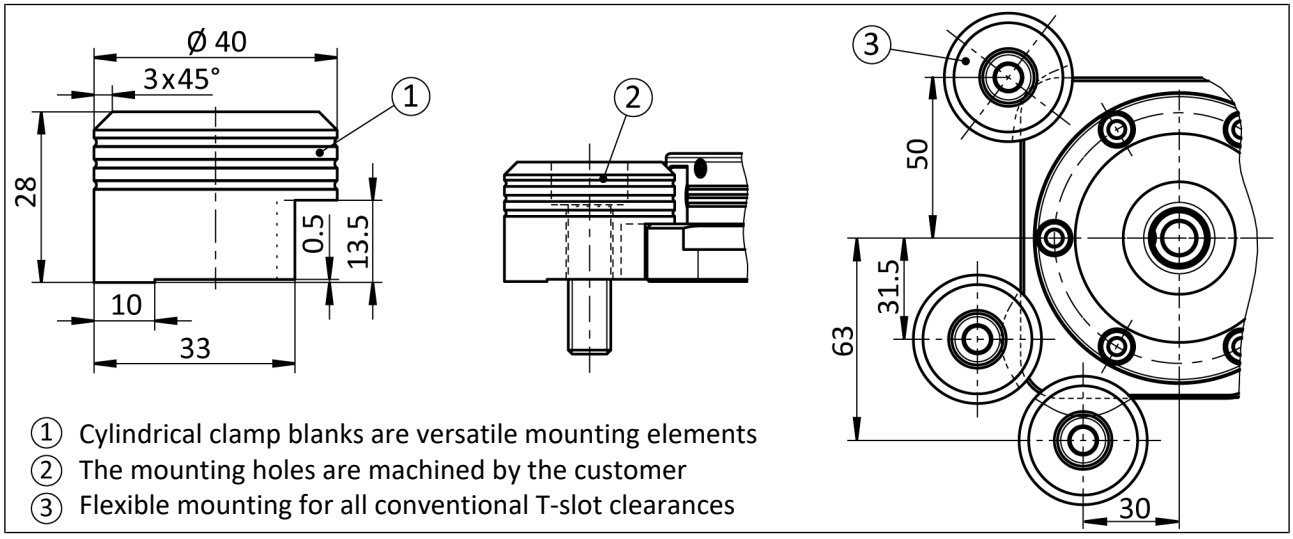
The clamping stations NSL mini 100-1-V1, NSL mini 100-2, NSL mini 100-3 and NSL mini 100-4 also offers additional mounting options. See the descriptions of the clamping station types.




*Clamping range*

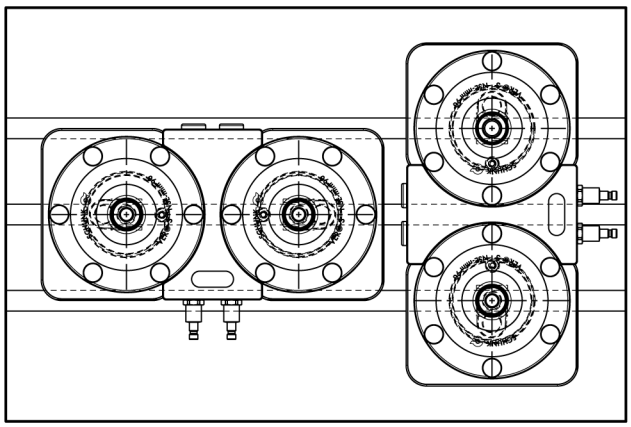
**Clamping areas for mounting using cylindrical clamp blanks**

| NSL mini 100-1-V1 | NSL mini 100-2 | NSL mini 100-3 | NSL mini 100-4 |
|---|---|---|---|
| A / B | C / D / E | F | G / H |

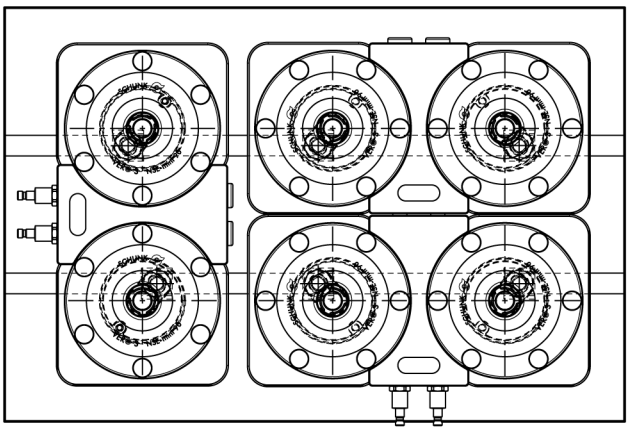



① Cylindrical clamp blanks are versatile mounting elements
② The mounting holes are machined by the customer
③ Flexible mounting for all conventional T-slot clearances

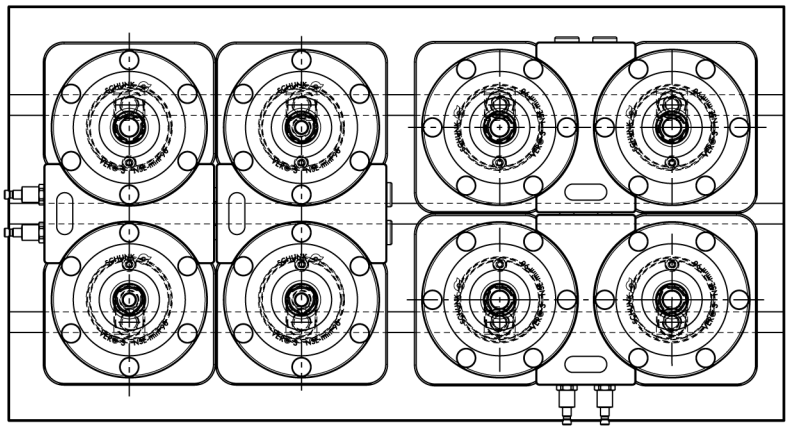
**Mounting variants on different machine tables**



Spacing of table slots: 50 / 100 mm



Spacing of table slots: 80 mm



Spacing of table slots: 63 mm

### 5.3.1 Clamping station NSL mini 100-1-V1

For alignment and fastening, see the illustrations in the chapters "Assembly"▶ 4 [🗋 14], "Fastening and alignment of the clamping stations"▶ 5.3 [🗋 16] and "Alignment and screw-on points"▶ 5.3.5 [🗋 20]. For the required screw tightening torques, see chapter "Screw torques"▶ 5.1 [🗋 15].

The clamping station is aligned on the machine table by means of slots for holding T-nuts. For central alignment of the clamping station there is a center bore hole for receiving an alignment pin.

The NSL mini 100-1-V1 clamping station can alternatively be mounted on the corners of the base plate by means of the BRR mini 40 blank mounting rings. The BRR mini 40 blank mounting rings should be screwed on using cylindrical screws with a property class of 10.9 in accordance with DIN ISO 4762.

A through-hole for a mounting screw can be drilled in the blank mounting rings by the customer. To increase the clamping pressure, the mounting hole should be positioned close to the inner protrusion.

### 5.3.2 Clamping station NSL mini 100-2

For alignment and fastening, see the illustrations in the chapters "Assembly"▸ 4 [🗋 14], "Fastening and alignment of the clamping stations"▸ 5.3 [🗋 16] and "Alignment and screw-on points"▸ 5.3.5 [🗋 20]. For the required screw tightening torques, see chapter "Screw torques"▸ 5.1 [🗋 15].

The clamping station is aligned on the machine table by means of alignment edges. The clamping station can be aligned parallel to the machine table by tracing the alignment edge over a particular length.

The NSL mini 100-2 clamping station features various options for mounting on the machine table.

The adjustment screws (no. 3) beneath the clamping modules allow flexibility in selecting the spacing for mounting of the clamping station. Position the adjustment disks as needed and fasten with screws (no. 8). Mounting of the clamping station at the screw points beneath the clamping modules requires the use of cylindrical screws with a property class of 10.9 in accordance with ISO 7984. They should be accessible from above. When tightening the mounting screws, use a torque wrench to prevent damage to the screws.

An offset screw pattern to the clamping modules by means of the rotating adjustment disks requires that the clamping modules first be removed. Removal of the clamping modules is necessary for example if the clamping station is to be installed on machine tables with T-nut spacings of 63 mm, 80 mm or 126 mm. Once the clamping modules of the clamping station are removed the required screw spacing can be adjusted. Align the clamping station on the machine table and tighten the screws to the permissible torque. Afterwards, you can again mount the quick change clamping modules (no. 6) and the corresponding bottom-side sealing rings (no. 12). After mounting the clamping modules and the sealing rings, cover the screw heads of the mounting screws with new plastic end caps (included in scope of delivery).

Prior to mounting the quick change clamping modules, clean the receiving bores of the base plate (no. 1) and check all components for damage. Damaged sealing rings must be replaced.

The NSL mini 100-2 clamping station can alternatively be mounted on the corners of the base plate by means of the BRR mini 40 blank mounting rings. The BRR mini 40 blank mounting rings should be screwed on using cylindrical screws with a property class of 10.9 in accordance with DIN ISO 4762. A through-hole for a mounting screw can be drilled in the blank mounting rings by the customer. To increase the clamping pressure, the mounting hole should be positioned close to the inner protrusion.

### 5.3.3 Clamping station NSL mini 100-3

For alignment and fastening, see the illustrations in the chapters "Assembly" ▶ 4 [🗋 14], "Fastening and alignment of the clamping stations" ▶ 5.3 [🗋 16] and "Alignment and screw-on points" ▶ 5.3.5 [🗋 20]. For the required screw tightening torques, see chapter "Screw torques" ▶ 5.1 [🗋 15].

The clamping station is aligned on the machine table by means of slots for holding T-nuts. For central alignment of the clamping station there is a center bore hole for receiving an alignment pin.

The NSL mini 100-3 clamping station features various options for mounting on the machine table. In general, the system is designed for mounting table tops with starshaped slots. A screw pattern can be selected at three or four fixed-position screw points. The screw head countersinks for the mounting screws are located in the center of the clamping modules. The screw spacing for the 4-screw arrangement of the mounting screws is 114 mm x 114 mm. If the screw pattern with four clamping points is selected, the two clamping modules must be removed symmetrically next to the housing.

Mounting of the clamping station at the screw points beneath the clamping modules requires the use of cylindrical screws with a property class of 10.9 in accordance with ISO 7984. They should be accessible from above. When tightening the mounting screws, use a torque wrench to prevent damage to the screws.

After mounting the clamping modules and the sealing rings, cover the screw heads of the mounting screws with new plastic end caps (included in scope of delivery).

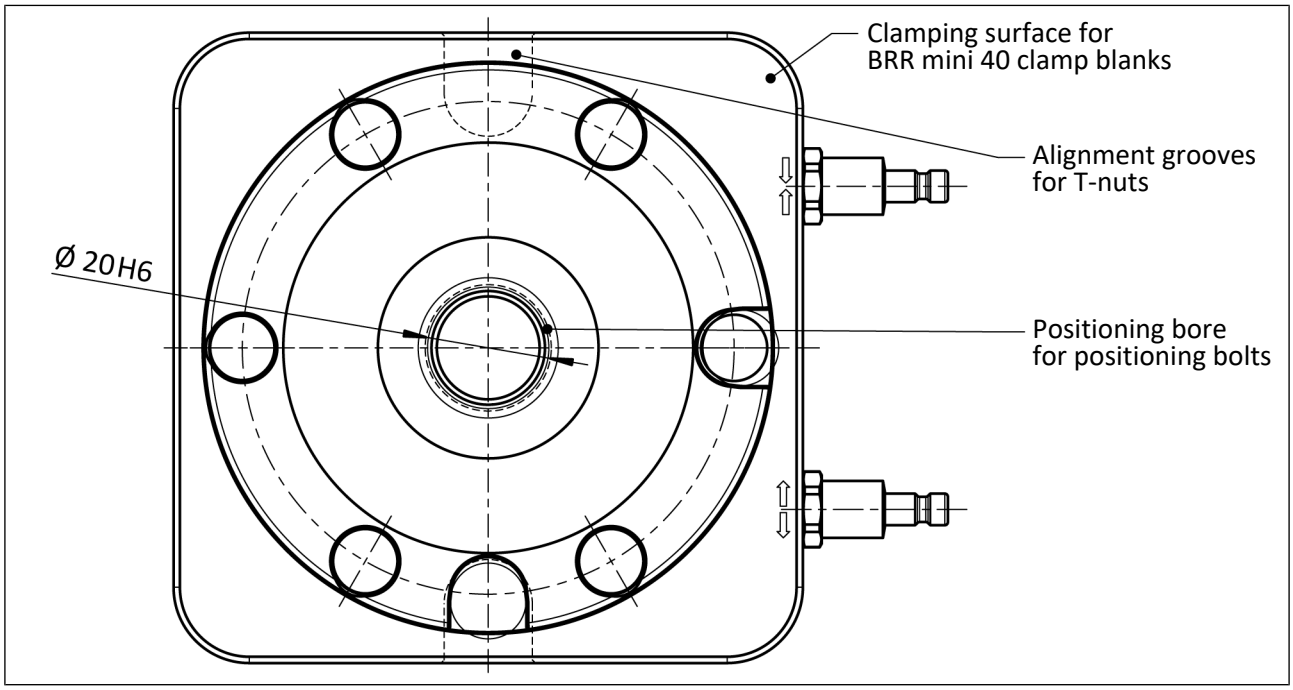
The NSL mini 100-3 clamping station can alternatively be mounted on the corners of the base plate by means of the BRR mini 40 blank mounting rings. The BRR mini 40 blank mounting rings should be screwed on using cylindrical screws with a property class of 10.9 in accordance with DIN ISO 4762.

### 5.3.4 Clamping station NSL mini 100-4

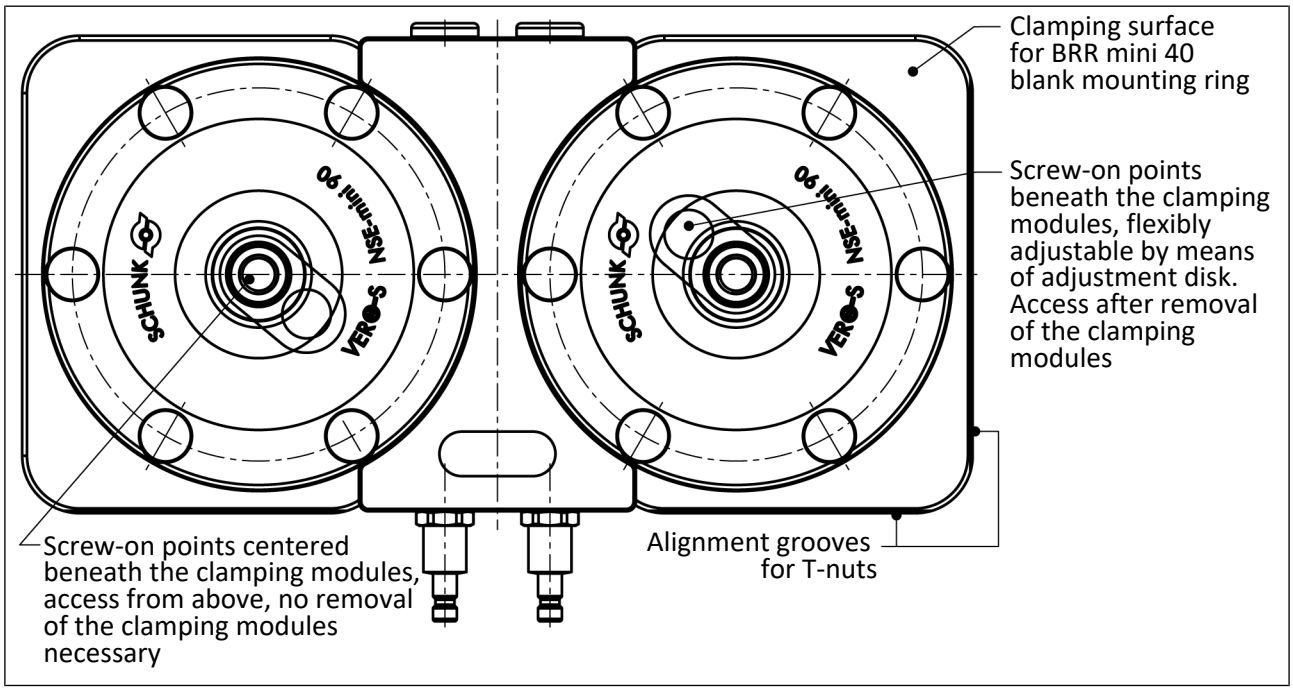
The NSL mini 100-4 clamping station consists of two NSL mini 100-2 clamping stations that are connected to the coupling set (scope of delivery NSL mini 100-4). The air supply for the unlocking functions and turbo function is continued via the connection adapters.

### 5.3.5 Alignment and screw-on points

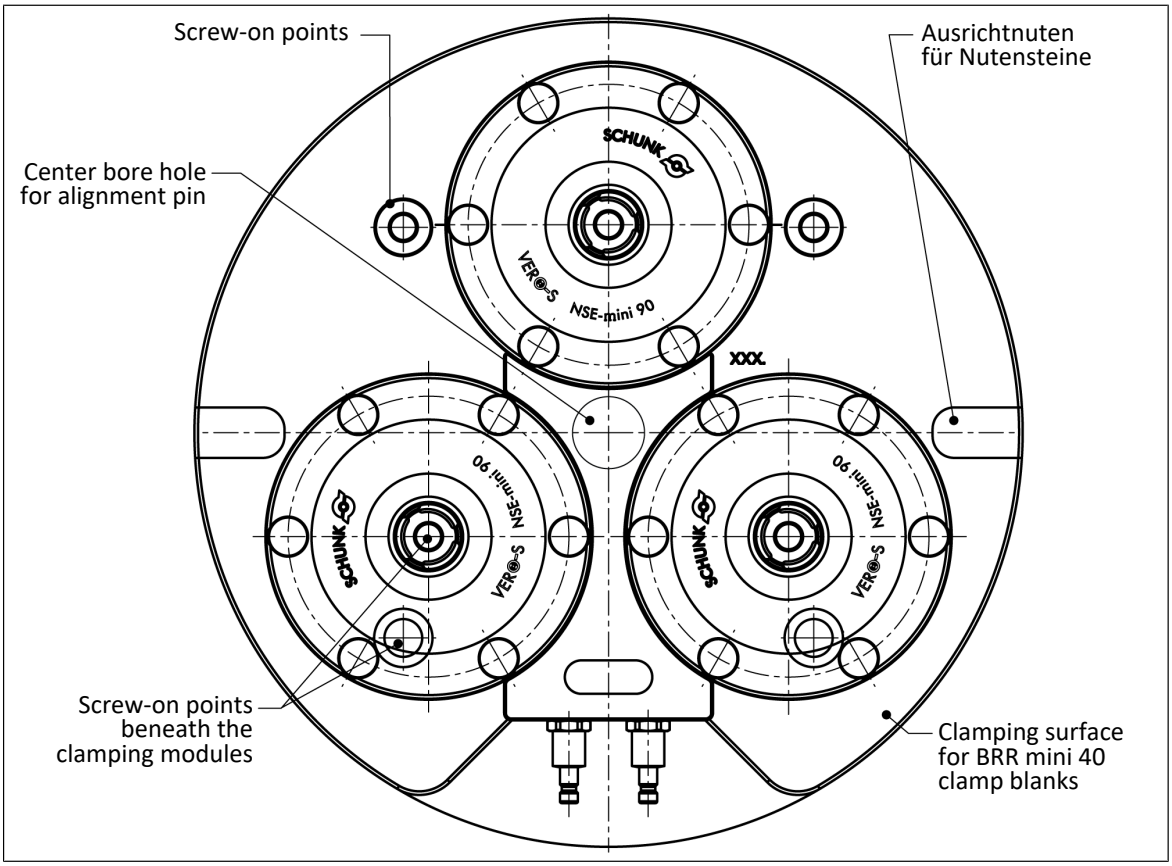
**Alignment elements and screw-on points of the NSL mini 100-1-V1**




**Alignment edge and screw-on points of the NSL mini 100-2**



**Alignment elements and screw-on points of the NSL mini 100-3**



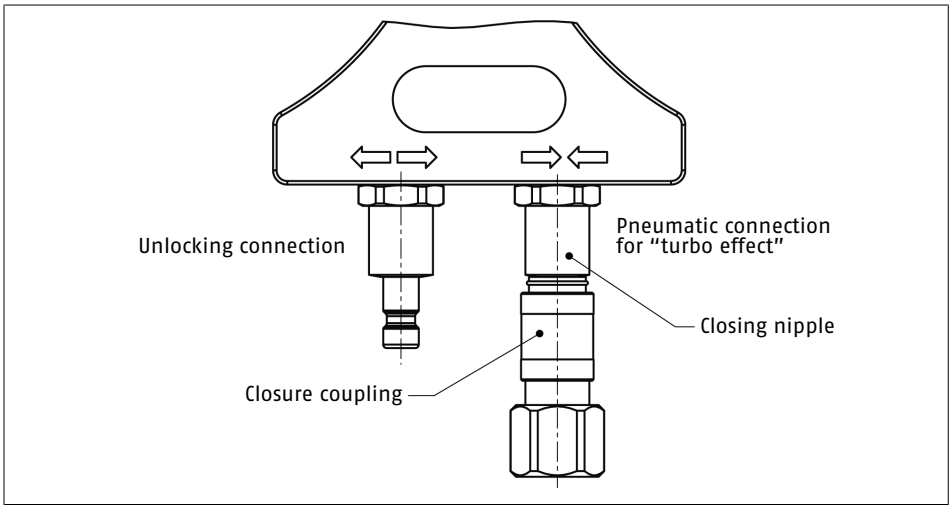

## 5.4 Connections

The NSL mini clamping station in standard design is actuated via an air connection with a closing nipple and closure coupling.

They are supplied in the required size in the accessory pack of the clamping station.

**NOTICE**

**If customer's own systems are used, please use closing nipples without shut-off function, since the chambers of the module has to be deaerated during actuation.**



### 5.4.1 Unlocking connection

If the unlocking connection of the clamping station is actuated, all the modules will be unlocked at the same time. Clamping pallets, devices or workpieces can be removed from the clamping station, or be inserted now.

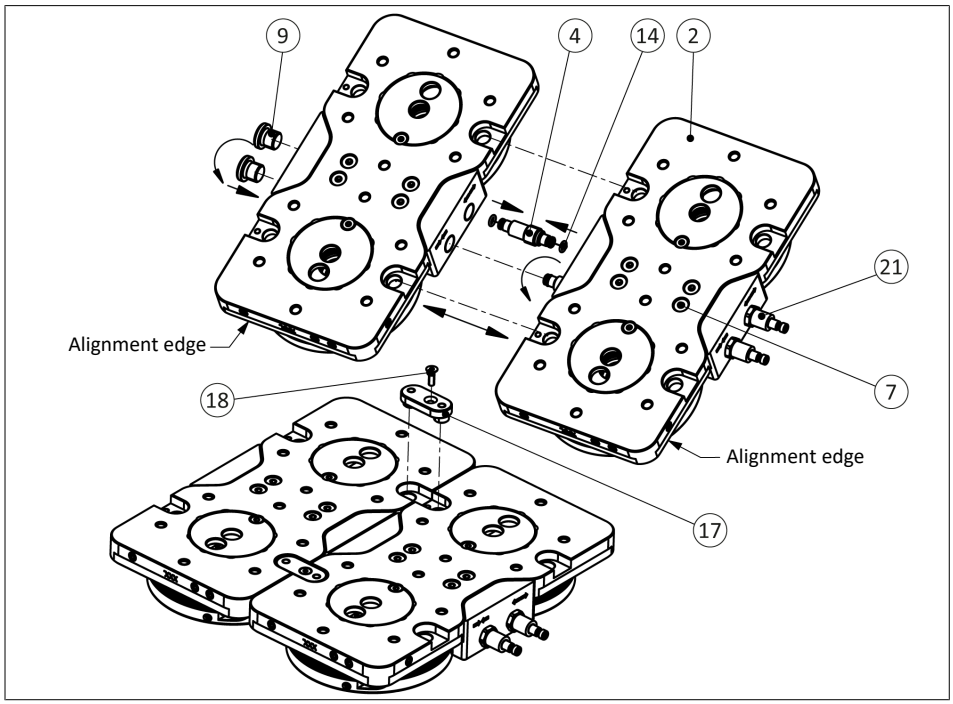
### 5.4.2 Turbo connection

The clamping station features a turbo connection as standard equipment. If it is actuated with compressed air, it supports the spring-actuated locking process actively with air pressure. The pull-in force is increased for all modules simultaneously.

For more technical details on the turbo connection, see the assembly and operating manual for NSE mini and NSE-M Quick-Change Pallet Systems.

## 5.5 Connection of several NSL mini 100-2 clamping stations

The NSL mini 100-2 clamping station can be connected with additional clamping stations of the same type. The connecting adapter transfers the air supply to the coupled clamping station. The installation of an NSL mini 100-4 is described below. Several clamping stations can be coupled and supplied via one air connection per function. The coupling set is also available separately for this purpose. The necessary components are supplied with the NSL mini 100-4 coupling kit.



When connecting several clamping stations, make sure that the symbols of the operating type are connected linearly one after the other. The alignment edges of the clamping stations can be used for orientation.

First establish the air connection between the two clamping stations.

- Put the O-rings (item 14) on the adapters (item 4). Unscrew the sealing plugs (item 9) on the back of the base clamping station (NSL mini 100-2). Using a hexagon screwdriver, screw the adapter into the housing of the clamping station and tighten only slightly when the screw-in depth is reached.
- On the clamping station to be coupled, screw out the closure nipple (item 21) on the front of the housing (item 2). Screw in the closure plugs (item 9) on the back to seal the air ducts.
- Slightly loosen the housing of the clamping station at the four screws (item 7) on the bottom, so that the housings of both clamping stations can automatically align when connected.
- Carefully push the clamping station to be coupled with the base clamping station on a flat table top. Make sure not to damage the O-rings of the connecting adapters.
- Secure the two clamping stations so they fit together exactly.
- Insert the two plug gauges (item 17) as connecting elements into the base plates of the clamping stations and screw tight with the contersunk screws (item 18) to prevent them from falling out. The connection can be separated by means of disassembly threads in the plug gauges.
- The four screws (item 7) on the bottom of the housings of the connected clamping stations must be tightened again.
- During transport, do not allow the connected clamping stations to sag in the middle.
- When mounting on the machine table, check the alignment edges on the narrow sides of both clamping stations to make sure they are the same height.

**A maximum of four clamping stations can be connected with each other.**

## 5.6 SPA mini 20, SPB mini 20, SPC mini 20 clamping pins

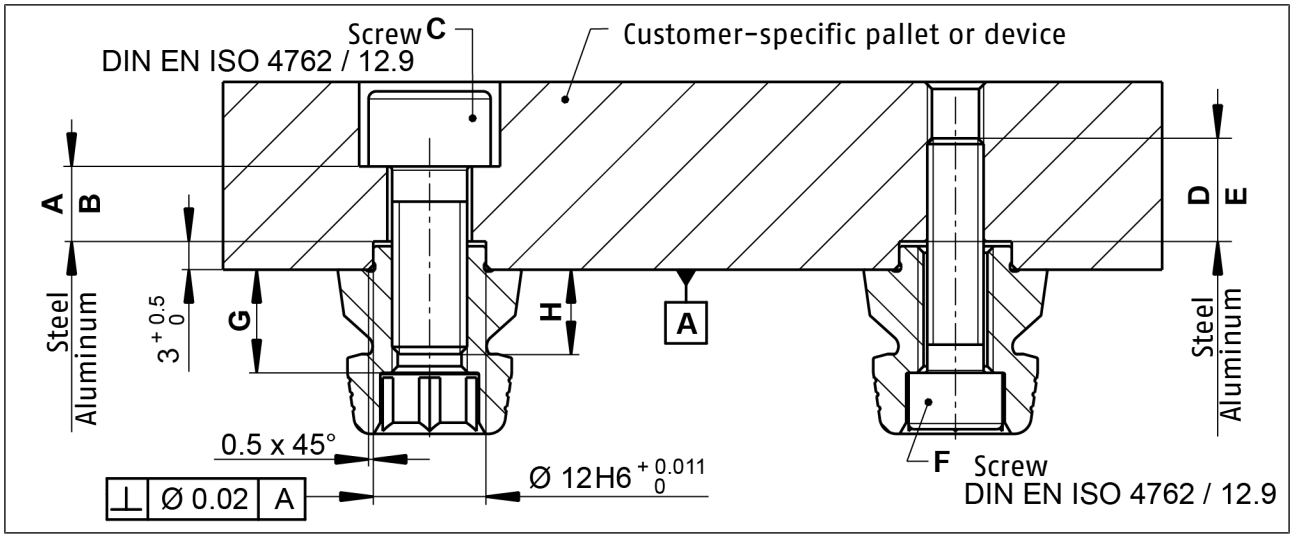
**NOTICE**

**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 device or pallet in two different ways. The mounting variant on the left in the illustration, which is screwed from above, is the preferred variant. 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*

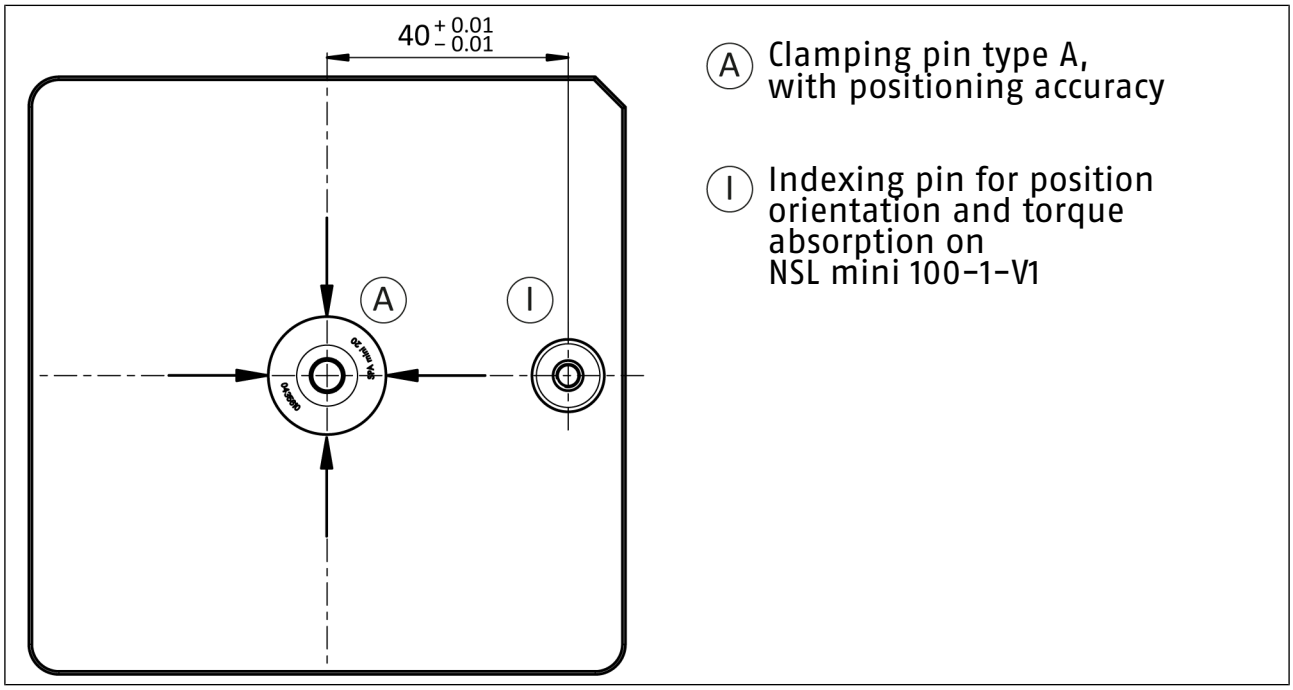
**Tolerances and installation conditions**

| Type | ID | A [mm] | B [mm] | C | D [mm] | E [mm] | F | G [mm] | H [mm] |
|---|---|---|---|---|---|---|---|---|---|
| SPA mini 20 | 0435610 | > 8 | > 13 | M8 | > 9 | > 11 | M6 | 11 | > 8 |
| SPB mini 20 | 0435620 | > 8 | > 13 | M8 | > 9 | > 11 | M6 | 11 | > 8 |
| SPC mini 20 | 0435630 | > 8 | > 13 | M8 | > 9 | > 11 | M6 | 11 | > 8 |

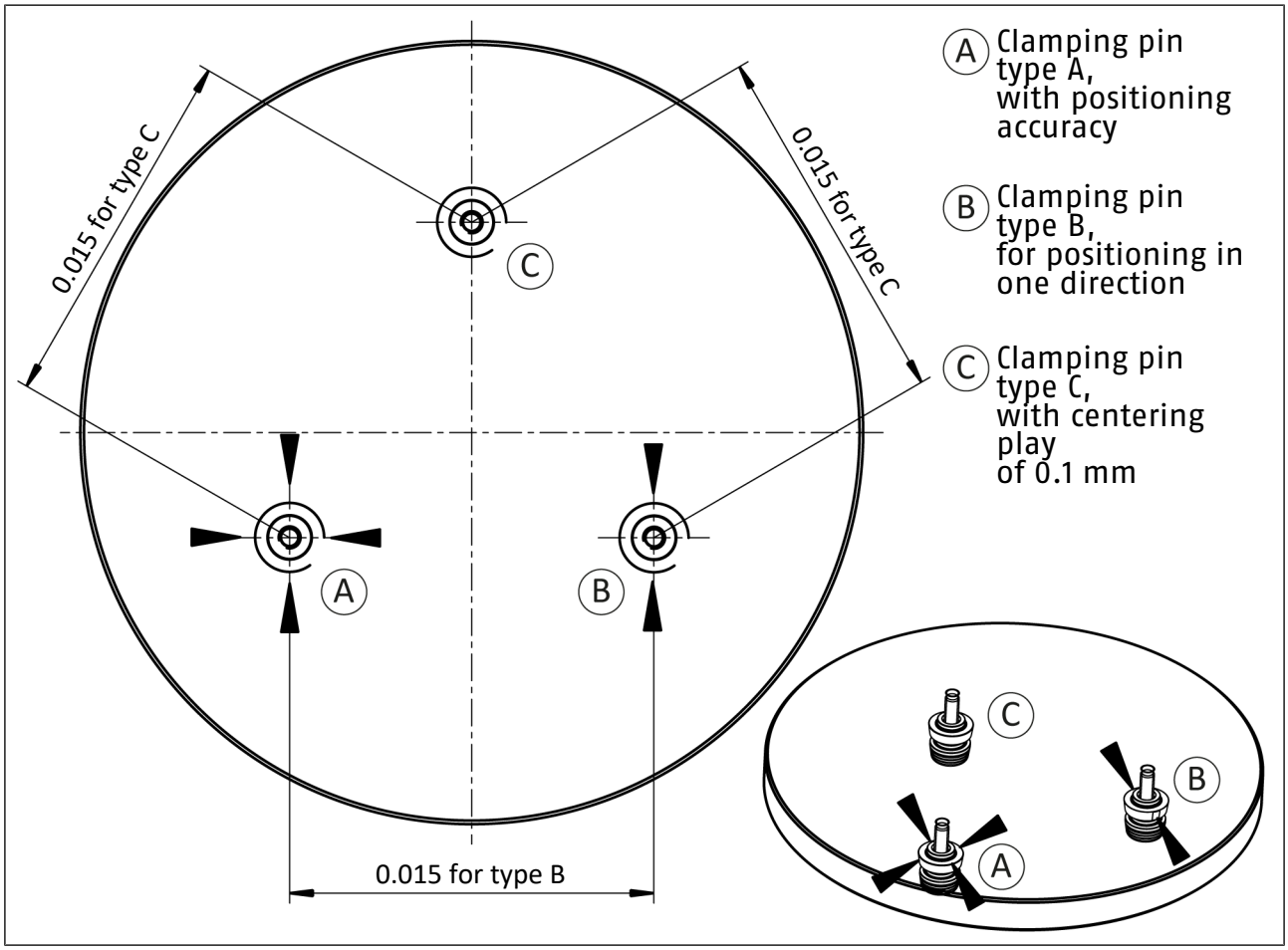
* The length of the screwed thread must not exceed the dimension "G" under any circumstances!

## Usage/arrangement of the different types of clamping pins

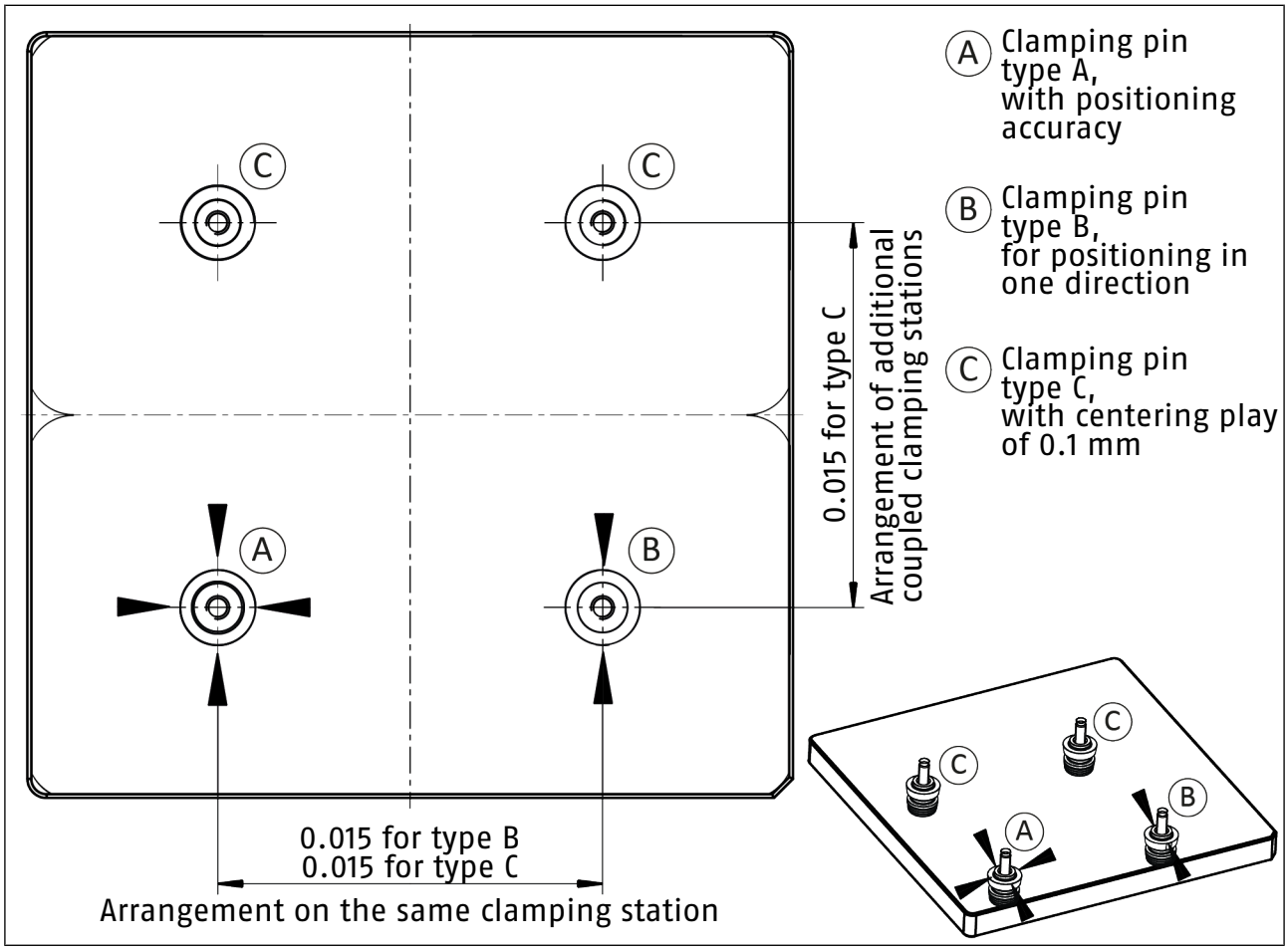
Application: pallet with one clamping area




Application: pallet with three clamping areas



Application: pallet with four clamping areas



# 6 Maintenance and care

The quick-change pallet system is designed for low-maintenance operation, so that opening and disassembling the clamping modules is only necessary in exceptional cases.

**⚠ CAUTION**

**Risk of injury and risk of damage to the clamping module when opening the housing cover.**

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

**The covers of the clamping modules are spring preloaded and must only be removed and installed 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 are to be observed:**

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

***NOTICE***

**A separate maintenance unit must be used for the air supply. The quick-change pallet system is designed for operation with dry compressed air. If oiled compressed air is used for operation, this must be done every time. The compressed air should be prepared with 1 to 2 drops of oil for an air volume of 1000 liters.**

## 6.1 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 both of these is to use the SDE mini 20 or SDE mini 90 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 units at regular intervals (at least every two weeks or after 1000 clamping operations). The system is functioning correctly if the clamping slides move smoothly at minimum system pressure (5 bar).
- 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 up again once the faults have been corrected, for instance by replacement of a damaged module.

## 6.2 Disassembly and assembly of the Clamping Station

**Observe the following sequence when replacing wearing parts (e.g. seals):**

1. Dismount the clamping system from the machine table.
2. If necessary, remove the installed clamping modules from the base plate (item 1). For removing the quick change clamping modules, the end caps of the mounting screws must be removed. Then you can loosen the mounting screws and remove the clamping modules. Plastic sealing plugs are inserted in the clamping modules. If necessary, they can be removed with a flattipped screwdriver.
3. 3. Remove the 0-rings inserted in the base plate from the 0-ring seats.
4. Remove the 0-ring sections inserted on the side of the housing (item 2).
5. For the NSL mini 100-2 clamping station unscrew the screws (item 8) and remove the adjustment disks (item 3). In addition, you can remove the mounting screws (item 20) from the adjustment disks.
6. Unscrew the screws (item 7) on the bottom and lift the housing (item 2) off of the base plate (item 1).
7. Remove the seals under the bottom of the housing.
8. The set screws in the housing (item 2) and the base plate (item 1) should be removed only if necessary so that the clamping system remains tightly sealed. When re-inserting set screws, use thread sealing agent.
9. Clean all parts thoroughly and check for damage and wear. Damaged and worn parts must be replaced.

**Replace damaged parts only with original SCHUNK replacement parts!**

Assembly of the clamping station in reverse order.

1. Lubricate new seals (item 8, 12) with Renolit HLT 2 or an equivalent grease.
2. Proceed with caution when inserting the new seals in order to prevent damage.
3. Lubricate the moving adjustment disks of the NSL mini 100-2 on all sides with a thin coat of Renolit HLT 2 or an equivalent grease.
4. Mount the housing (item 2) only after mounting the quick change clamping modules on the side and center prior to securing with the mounting screws (item 7).
5. Conduct a functional and leak test

## 6.3 Functionality test

The functional test should confirm proper functioning of the quick change clamping systems for several coupled clamping stations, if applicable.

Correct functioning is ensured if:

- the clamping slides move smoothly at the minimum system pressure (5 bar)
- the coupled clamping station is controlled via the air transfer interface
- the desired functions correspond to the switching symbol on the housing of the clamping station
- the clamping system has no leaks

## 6.4 Leak test

The leak test must include testing of the air and plug-in connections as well as the clamping stations coupled by connecting adapters.

Leaks, for example at the plug-in connections, the connecting adapters or the set screws for sealing channels, must be eliminated. Defective components must be replaced with new components.

**For carrying out the leak test, the following parts are required: pressure gauge, supply line with coupling nipple.**

Carrying out the leak test:

1. The parts have to be connected in the following order to the air connection: Pressure gauge, supply line with coupling nipple.
2. Actuate the clamping system with compressed air.
3. Check the clamping system for leaks in both switching positions to the module controller.
4. Check the connecting adapters between the coupled clamping stations for leaks in both switching positions.

For controlling the coupling conversions on tightness, no clamping plate should be connected.

If the clamping system should be untight, inspect the whole pneumatic system (e.g. with Metaflux leak detection spray).

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

If leaks are determined at seals and the connecting adapters, inspect and, in case of wear or defects, replace them.

# 7 Troubleshooting

**The clamping area does not unlock or does not unlock properly**

| Possible cause | Remedial measures |
|---|---|
| Pressure below minimum | Check operating pressure (min. 5 bar) |
| The module was not operated with oiled compressed air | Install maintenance unit with oiler |
| Defective air connections | Check air supply |
| Excess tensile load on clamping pins | Reduce support weight |
| The turbo connection is still pressurized | Ventilate the connection |
| The air supply or the air connection is leaking | Carry out a leak test ▸ 6.4 [🗋 29] |
| The coupled clamping stations are connected crosswise | Connect clamping stations linearly ▸ 5.5 [🗋 22] |

## 7.1 Emergency release in case of malfunctions of the clamping station

In case of malfunctions or interrupted air supply, the pneumatically actuated clamping system can be manually unlocked. If an automatic unlocking should not be possible, we recommend the manual unlocking.

Three set-screws are screwed onto the circumference of the base body at an angle of 3 x 120°. At one of the three accesses the clamping system can be emergency released.

For manual actuation of the clamping system, one of these three set-screws have to be unscrewed with an Allen wrench. Behind the set-screw the piston and a pressure spring are located. Do not remove the piston and the pressure spring from the base body.

For unlocking carefully press with a suitable tool onto the piston face against the pressure force. Now the clamping system can be opened, and the clamping pin is unlocked.

During assembly of the disassembled components please take care that the inserted O-rings which are located on the piston, are not damaged. The set-screw should be sealed with a screw sealing agent.

Before restart of the clamping system, the reason for malfunction should be found, and the clamping system has to be cleaned.

# 8 Storage

When storing the product for a longer period of time, observe the following points:

- Clean the product and lubricate it lightly.
- Store the product in a suitable transport container.
- Only store the product in dry rooms.
- Protect the product from major temperature fluctuations.

**NOTE:** Before recommissioning, clean the product and all attachments, check for damage, functionality and leaks.

# 9 Sealing kits, accessory kits and parts lists

When ordering spare parts, the type, size and, if possible, the serial number of the clamping system must always be stated to avoid delivery mistakes.

**Seals, sealing elements, fittings, springs, bearings, screws, wiper bars and parts that come into contact with the workpiece are not covered by the warranty.**

## 9.1 Sealing Kit List

| Size / Sealing kit* | ID |
|---|---|
| NSL mini 100-1-V1 | 1151956 |
| NSL mini 100-2 | 0435224 |
| NSL mini 100-3 | 0435234 |
| NSL mini 100-4 | 2x 0435224 |

* For included items, see note **X** in the Parts List chapter below. Seals are wearing parts and are recommended to be replaced during maintenance. The sealing kit can only be ordered as a complete kit.

## 9.2 Accessory kits

| Accessory kit * | ID |
|---|---|
| NSL mini 100-2 | 8508200 |
| NSL mini 100-3 | 8508252 |
| NSL mini 100-4 | 2x 8508200 |

* For included items, see note **Z** in the Parts List chapter below.

## 9.3 Parts list

**NSL mini 100-1-V1** (ID 1304680)

| Item | Designation | Quantity | Note |
|---|---|---|---|
| 1 | Base plate | 1 | |
| 2 | NSE mini 90-V1 | 1 | |
| 3 | O-ring | 1 | X |
| 4 | O-ring | 1 | X |
| 5 | Locking nipple | 2 | |
| 7 | Hexagon nut | 1 | |
| 11 | Closure coupling | 2 | |

**NSL mini 100-2** (ID 0435220)

| Item | Designation | Quantity | Note |
|---|---|---|---|
| 1 | Base plate | 1 | |
| 2 | Housing | 1 | |
| 3 | Adjustment disc | 2 | |
| 5 | Locking plug (plastic) | 2 | |
| 6 | NSE mini 90 | 2 | |
| 7 | Screw | 4 | |
| 8 | Screw | 2 | |
| 9 | Locking screw G1/8" with sealing ring | 4 | |
| 10 | Set-screw | 5 | |
| 11 | Set-screw | 6 | |
| 12 | O-ring | 3 | X |
| 13 | O-ring | 1 | X |
| 16 | Locking nipple | 2 | Z |
| 20 | Screw | 2 | Z |
| 21 | Closure coupling | 1 | Z |
| 22 | End caps | 12 | Z |

**Coupling kit NSL mini 100-2** (ID 1543512)

| Item | Designation | Quantity | Note |
|---|---|---|---|
| 4 | Adapter | 2 | |
| 14 | O-ring | 8 | |
| 17 | Plug gauge | 2 | |
| 18 | Countersunk screw | 2 | |

**NSL mini 100-3** (ID 0435230)

| Item | Designation | Quantity | Note |
|---|---|---|---|
| 1 | Base plate | 1 | |
| 2 | Housing | 1 | |
| 3 | Locking plug (plastic) | 3 | |
| 4 | NSE mini 90 | 3 | |
| 5 | Set-screw | 1 | |
| 6 | Set-screw | 3 | |
| 7 | Set-screw | 5 | |
| 8 | O-ring | 2 | **X** |
| 9 | O-ring | 1 | **X** |
| 10 | Countersunk screw | 4 | |
| 11 | Locking screw G1/8" with sealing ring | 2 | |
| 12 | Locking nipple | 2 | **Z** |
| 13 | Screw | 4 | **Z** |
| 21 | Closure coupling | 1 | **Z** |
| 23 | End caps | 18 | **Z** |

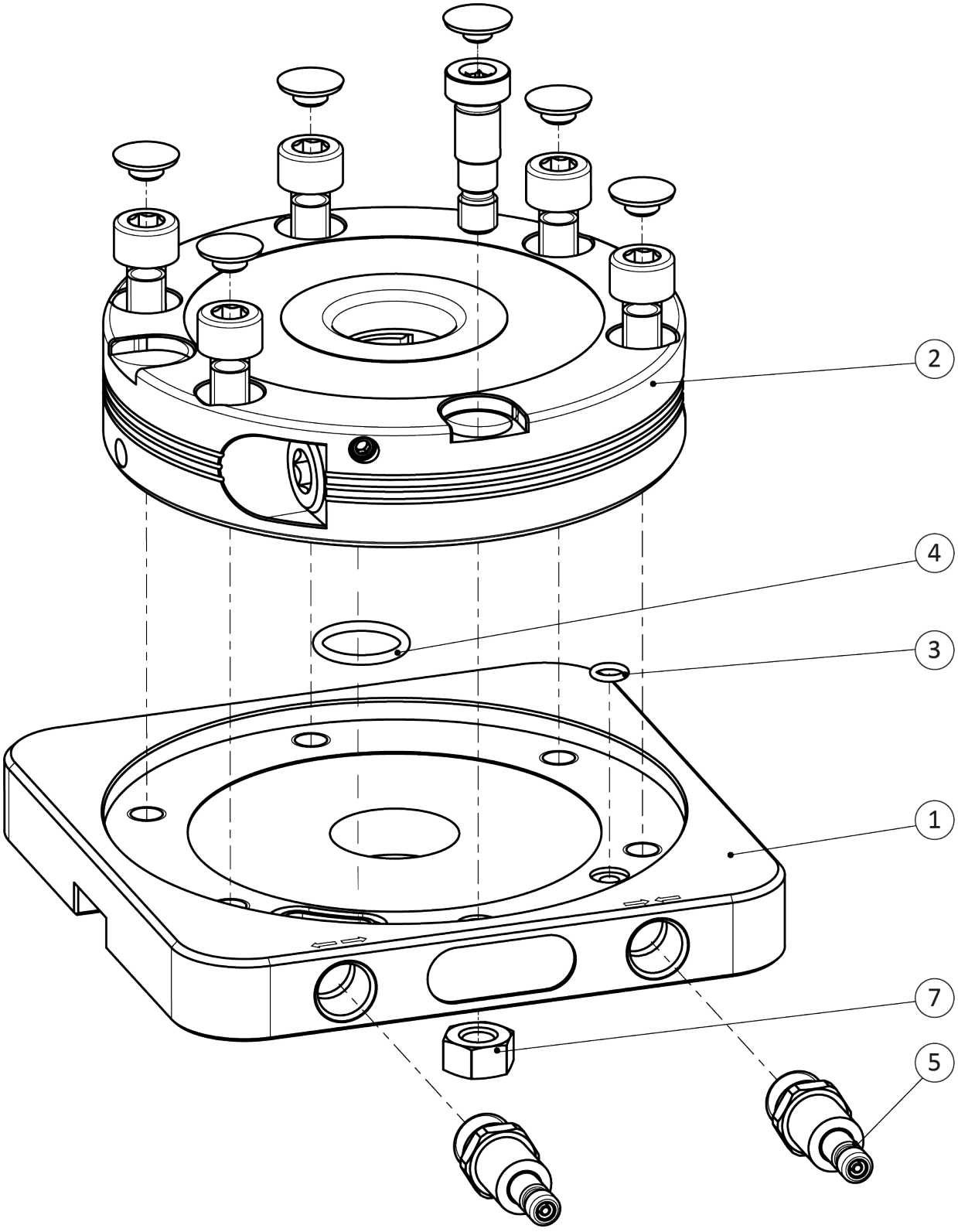
**NSL mini 100-4** (ID 0435240)

| Item | Designation | Quantity | Note |
|---|---|---|---|
| 1 | NSL mini 100-2 | 2 | |
| 2 | Coupling kit NSL mini 100-2 | 1 | |
| 16 | Locking nipple | 4 | **Z** |
| 20 | Screw | 4 | **Z** |
| 21 | Closure coupling | 2 | **Z** |
| 22 | End caps | 24 | **Z** |

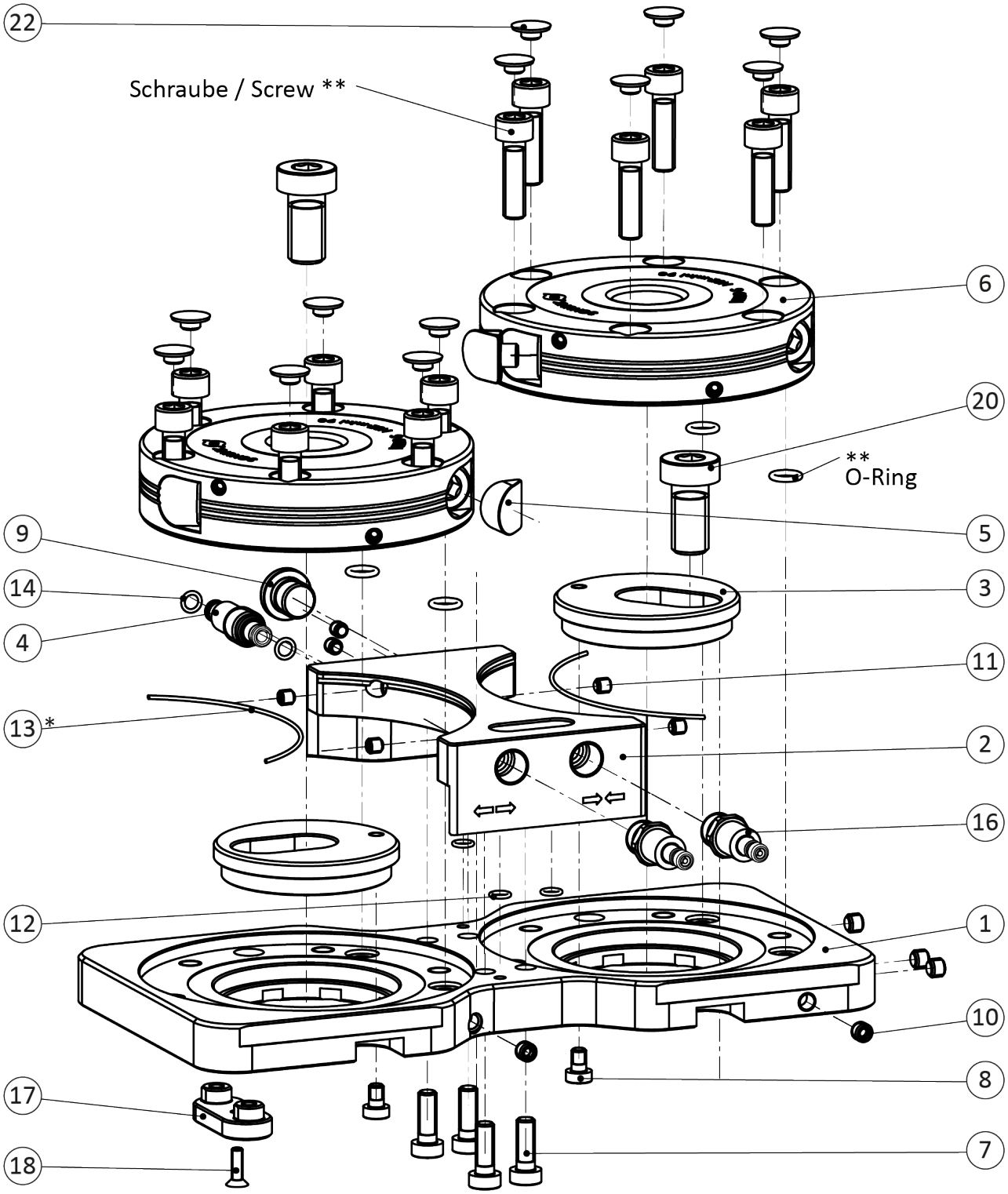
| Parts list key | | | |
|---|---|---|---|
| **X** | included in the sealing kit | **Z** | included in accessory kit |

# 10 Drawings

## NSL mini 100-1-V1



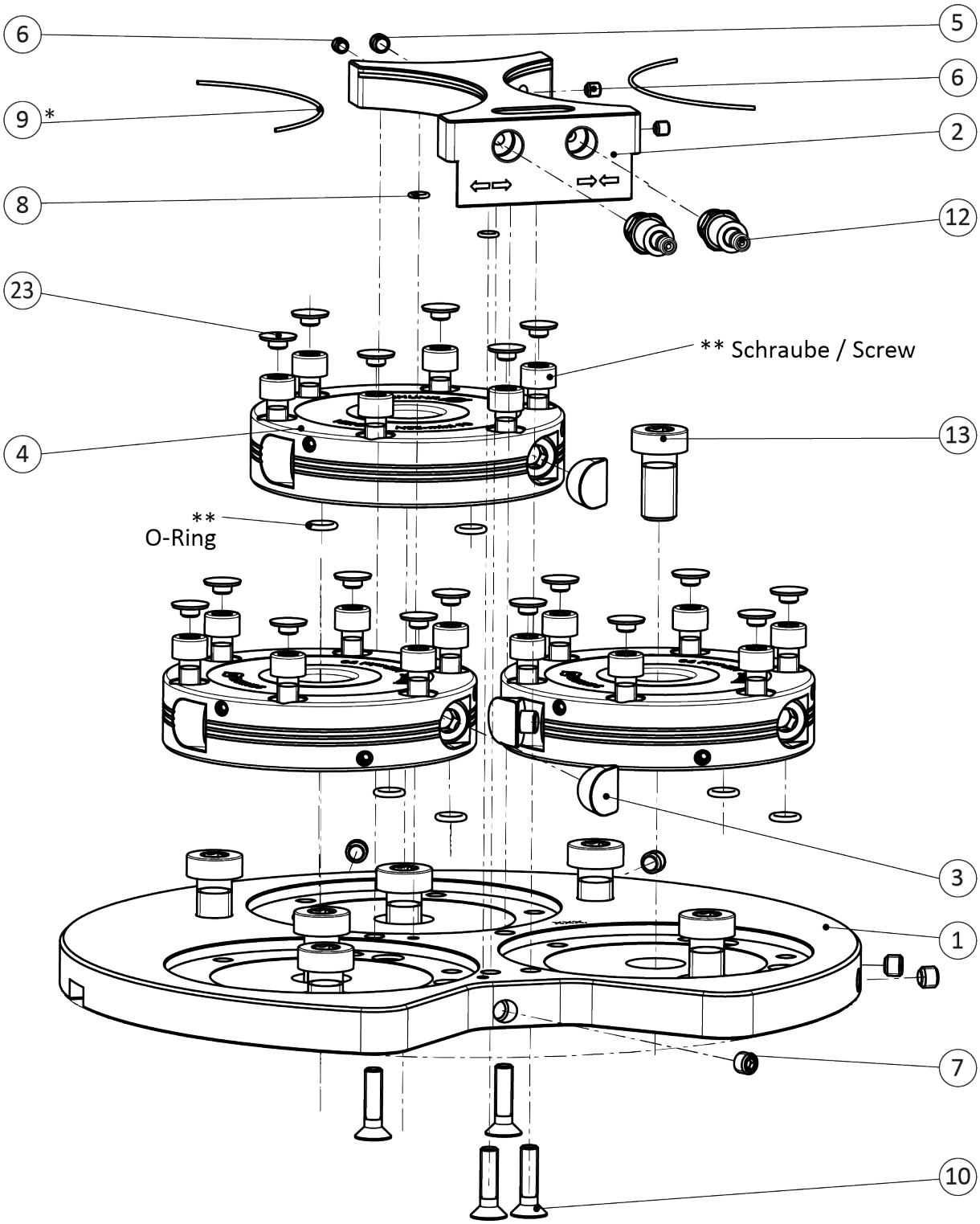
**NSL mini 100-2**




* 0-ring section

** Scope of delivery of the quick change pallet system

## NSL mini 100-3




* 0-ring section

** Scope of delivery of the quick change pallet system

# 11 Manufacturer certificate

| | |
|---|---|
| Manufacturer / Distributor: | H.-D. SCHUNK GmbH & Co. Spanntechnik KG<br>Lothringer Str. 23<br>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**

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03.00 | VERO-S NSL mini 100 Clamping stations | Quick-change pallet system | en | 1155723