VERO-S quick-change pallet system
NSE mini 90, NSE-M mini 90
Assembly and Operating Manual
Imprint

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Technical changes:
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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

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1 General

This operating manual is an integral component of the product and contains important information on safe and proper assembly, commissioning, operation, care, maintenance and disposal. This manual must be stored in the immediate vicinity of the product where it is accessible to all users at all times.

Before using the product, read and comply with this manual, especially the chapter “Basic safety notes”. [Page 7]

If the product is passed on to a third party, these instructions must also be passed on.

Illustrations in this manual are provided for basic understanding of the product and may differ from the actual product design.

We accept no liability for damage resulting from the failure to observe and comply with this operating manual.

1.1 Warnings

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

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danger for persons!</td>
</tr>
<tr>
<td>Non-observance will inevitably cause irreversible injury or death.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangers for persons!</td>
</tr>
<tr>
<td>Non-observance can lead to irreversible injury and even death.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangers for persons!</td>
</tr>
<tr>
<td>Non-observance can cause minor injuries.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material damage!</td>
</tr>
<tr>
<td>Information about avoiding material damage.</td>
</tr>
</tbody>
</table>
1.2 Applicable documents

General terms of business
Katalogdatenblatt des gekauften Produkts

The documents listed here, can be downloaded on our homepage
www.schunk.com
2 Basic safety notes

Risks to persons and property may arise from incorrect handling, assembly and adjustment of this product if these instructions are disregarded.

Report breakdowns and damages as soon as you detect it and repair immediately, so as to keep the extent of damage as small as possible and to avoid risking the safety of the product.

Only original SCHUNK spare parts may be used.

2.1 Intended use

This product is intended solely for positioning and clamping workpieces or clamping pallets on machine tools or other suitable technical devices.

- The product may only be used within the scope of its technical data, (☞ 5, Page 15).
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

The product is not being used as intended if, for example:

- It is used as a pressing tool, a chuck, a load-handling device or as lifting equipment.
- It is used for turning applications without consulting SCHUNK.
- It is used in working environments that are not permissible.
- People work on machines or technical equipment that do not comply with the EC Machinery Directive 2006/42/EC, disregarding the applicable safety regulations.
- The technical data specified by the manufacturer are exceeded during usage.
2.3 Notes on particular risks

This product may pose a danger to persons and property if, for example:

- It is not used as intended;
- It is not installed or maintained properly;
- The safety and installation instructions, local applicable safety and accident prevention regulations or the EC Machinery Directive are not observed.

**WARNING**

Risk of injury due falling parts during transport, assembly and disassembly the Quick-Change Pallet System. Improperly secured parts can break off and fall.

- Use a suitable lifting equipment and transport.
- During transport do not step into the danger area.
- Wear personal protective equipment.

**WARNING**

Risk of injury to persons due to falling down of the fixture, pallet or workpiece by erroneous or negligent loosening of the clamping pins.

- During operation, incorrect or incautious loosening of the clamping pin must be prevented by suitable measures (disconnection of power supply after locking, use of safety valves or safety switches).
- The machines and facilities must fulfill the minimum requirements of the EC Machinery Directive 2006/42/EC; specifically, they must have effective technical measures to protect against possible mechanical hazards.
- Wear personal protective equipment.
**WARNING**

Risk of injury to persons during transport of the system and in case of horizontally placed clamping pin axis or overhead applications due to falling down of the fixture or pallet.

- Use a crane or trolley for transport.
- In case of horizontal or overhead applications, secure the fixture or pallet against falling down during loosening the clamping modules.

**WARNING**

The system is spring-packaged. Risk of injury due to independent motions of components into its end positions after pressing the “Emergency stop” or switching off or failure of the energy supply.

- Wait until the system stops completely.
- Do not reach into the clamping modules.
- Use pressure maintenance valves.

**CAUTION**

Risk of injury due impurities (e.g. metal shavings) in the exhaust and air purge ports of the clamping station.

- The danger zone must be surrounded by a protective enclosure during operation.
- Wear personal protective equipment (safety goggles).

**CAUTION**

Danger of injury due to loosening of incorrectly connected compressed air hoses.

- Wear safety valves or safety switches.
- The danger zone must be surrounded by a protective enclosure during operation.
Basic safety notes

⚠️ CAUTION
There is a risk of limbs being crushed during manual loading and unloading of moving parts and during the clamping process.
- Do not reach into the clamping pin holder.
- Use loading aids.
- Wear protective gloves.

⚠️ CAUTION
Risk of slipping or falling if the chuck's operational environment is not clean (e.g. contaminated with cooling lubricants or oil).
- Ensure that the working environment is clean before starting assembly and installation work.
- Wear suitable safety boots.
- Follow the safety and accident-prevention regulations when operating the chuck, especially when working with machine tools and other technical equipment.

⚠️ CAUTION
Risk of burns due to workpieces with high temperatures
Workpieces with high temperatures pose the risk of burns.
- Wear protective gloves when removing the workpieces.
- Automatic loading is preferred.

⚠️ CAUTION
Risk of exposure to pneumatic’s exhaust noise
Noise from air system and pneumatic equipment during the machining process.
- Wear hearing protection.
2.4 Product safety

- Disconnect the energy supply lines and ensure that there is no residual energy in the system when performing assembly, modification, maintenance, or adjustment work.
- Perform maintenance work, modifications, and attachments outside the danger zone.
- During all work, secure the system against accidental start-up.
- Do not reach into the open mechanical parts of the clamping pin holder.
- All assembly, modifications and disassembly must be performed by trained personnel.

Maintenance instructions
The maintenance and servicing intervals must always be complied with. The intervals indicated refer to a standard working environment. Operating the gripper in an environment in which it is subjected to abrasive dusts or corrosive and/or aggressive vapours and/or liquids requires the prior consent of SCHUNK.

Safety during assembly and maintenance
During assembly, connection, setting, commissioning and testing, it is important to eliminate the possibility of the fitter or any other persons accidentally activating the system.
Refrain from all work that could threaten safety.

2.4.1 Holding force and screw strength

The holding force of the System is essentially limited by the strength of the screwed connections with which the clamping pin is connected to the pallet or device. On this basis fastening screws of the property class 12.9 are to be used only.

Only original SCHUNK Clamping-Pins are to be used.
When the clamping pin is used in the customer’s own assembly device, the customer is to provide for a sufficiently dimensioned tap and satisfactory strength of the fastening material.
2.4.2 **Using personal protective equipment**

When using this product, you must comply with the relevant health and safety at work rules and you must use the required personal safety equipment (minimum: category 2).

2.5 **Personnel qualification**

The assembly and disassembly, commissioning, operation and maintenance of the system may be performed only by trained specialist personnel.

Every person called upon by the operator to work on the system must have read and understood the complete Assembly and Operating Manual, especially chapter 2 "Basic safety notes".

Trainees may work on machines and technical equipment in which a Quick Change Pallet System is installed provided that they are supervised at all times by qualified specialist personnel.

2.6 **Organizational measures**

**Obeying the rules**
The operator must employ suitable organizational measures and instructions in order to ensure that the relevant safety rules are obeyed by the persons asked to operate, maintain and repair the product.

**Checking the behavior of personnel**
The operator must at least occasionally check that the personnel are behaving in a safety conscious manner and are aware of the potential hazards.

**Danger signs**
The operator must ensure that the signs concerning safety and hazards on the machine where the product is mounted are clearly legible and are observed.
Faults
If a malfunction occurs in the product and endangers safety, or if a problem is suspected due to production behavior, the machine on which the product is mounted must be stopped immediately and remain shut down until the malfunction has been located and remedied. Only allow specialists to remedy malfunctions.

Spare parts
Only use original SCHUNK spare parts.

Environmental regulations
The applicable environmental regulations must be observed for all maintenance and repair work.

2.7 Using personal protective equipment
When using this product, you must comply with the relevant health and safety at work rules and you must use the required personal safety equipment (minimum: category 2).
3 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the applicable documents (☞ 1.2, Page 6)
- Observe the ambient conditions and operating conditions, (☞ 8.1, Page 33)
- Observe the maximum number of clamping cycles (☞ 5, Page 15)
- Observance of the specified care and maintenance instructions (☞ 8, Page 32)

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

4 Scope of delivery

- Quick-change pallet system
  NSE mini 90, NSE mini 90-V1,
  NSE-M mini 90, NSE-M mini 90-V1
- Assembly and Operating Manual
- Accessory kits
  NSE mini 90:
  5 O-rings Ø 6 x 1.5
  6 cover caps
  6 fastening screws M6
  NSE-M mini 90:
  2 O-rings Ø 6 x 1.5
  6 cover caps
  6 fastening screws M6

4.1 Accessories

(see catalog or data sheets when ordering separately)

Clamping pallets PAL mini
Clamping pins SPA mini, SPB mini, SPC mini
Protective covers SDE mini
Indexing pins IXB V1 PAL mini
Indexing pins IXB V1 WDS mini
Fitting screws PSC mini
Allen wrenches
## 5 Technical data

<table>
<thead>
<tr>
<th>Designation</th>
<th>NSE mini 90</th>
<th>NSE mini 90-V1</th>
<th>NSE-M mini 90</th>
<th>NSE-M mini 90-V1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID no.</td>
<td>0435100</td>
<td>0435105</td>
<td>0435140</td>
<td>0435145</td>
</tr>
<tr>
<td>Holding force (M6 / M8)*</td>
<td>15 / 25 kN</td>
<td>15 / 25 kN</td>
<td>15 / 25 kN</td>
<td>15 / 25 kN</td>
</tr>
<tr>
<td>Pull-in force without turbo</td>
<td>500 N</td>
<td>500 N</td>
<td>1000 N</td>
<td>1000 N</td>
</tr>
<tr>
<td>Pull-down force with turbo</td>
<td>1500 N</td>
<td>1500 N</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Actuation pressure</td>
<td>6 bar</td>
<td>6 bar</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Unlocking torque</td>
<td>-</td>
<td>-</td>
<td>10 Nm</td>
<td>10 Nm</td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>&lt; 0.005 mm</td>
<td>&lt; 0.005 mm</td>
<td>&lt; 0.005 mm</td>
<td>&lt; 0.005 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+ 15°C – + 60°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation position</td>
<td>Any</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise emission [dB(A)]</td>
<td>≤ 70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure medium</td>
<td>Compressed air, compressed air quality according to ISO 8573-1:7 4 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**The operating pressure must not fall below 6 bar.**

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

### Warranty and maximum clamping cycles

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of warranty</td>
<td>24 Months</td>
</tr>
<tr>
<td>Maximum clamping cycles</td>
<td>500 000</td>
</tr>
</tbody>
</table>
6 Assembly

6.1 Pre-assembly measures

Carefully lift the product out of the packaging (e.g. with suitable lifting equipment).

⚠️ CAUTION

Risk of injury due to sharp edges and rough or slippery surfaces
Wear personal protective equipment, particularly protective gloves.

Check that the delivery is complete and that there is no transport damage.

6.2 General assembly notes

The item numbers specified for the corresponding individual components relate to chapter drawings. (☞ 11, Page 40)

Assembly, dismantling and modification work on the quick-change pallet system may only be carried out by specialist personnel.

Request our installation drawings if doing the installation yourself.

Disconnect the power supply lines and ensure that there is no residual energy in the system before performing assembly, modification, maintenance, or adjustment work on the pneumatically actuated quick-change pallet system.

Wear protective equipment (gloves, protective shoes).

Access to the drive piston (pos. 4) on the side must be ensured during the assembly of the manually actuated quick-change pallet system, in particular in the event of clamped clamping pallets. Check whether the drive piston is easy to access in order to open or close the clamping module prior to the installation.

⚠️ WARNING

Risk of injury due to dropping the quick-change pallet system during transport
Transport with care.
CAUTION

Risk of injury due to crushing
Install the quick-change pallet system carefully.
Do not place any limbs into the gaps or between the clamping station and the machine.

If several linked clamping units are mounted, make sure that the flatness and height deviation of the locating surface from module to module (based on a gauge of 200 mm) lies within 0.01 mm. The interface position deviation must not exceed ± 0.015 mm.

Due to redundancy, the clamping pins with positioning accuracy in one direction (SPB mini 20) should be used for clamping systems 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 (SPB mini 20) can be used (also refer to chapter "Clamping pins SPA 20 mini, SPB 20 mini, SPC 20 mini" (☞ 6.4, Page 23)).

NOTE
When connecting the pneumatically actuated quick-change pallet system, ensure that it is only possible to completely ventilate the piston chamber via the air connection on the base side during the locking process. The relevant valves or shut-off valves should therefore be equipped 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. Be sure to take the ventilation methods into account (see Fig. "Air bleed screw via turbo connection").

When dismantling the clamping system from the machine table, the corresponding openings must be secured with set-screws to prevent ingress of dirt.

If several units are activated via shared hose lines, feed lines with the following minimum cross-sections must be used.
6.3 Fastening and connection

The item numbers specified for the corresponding individual components relate to chapter drawings. (☞ 11, Page 40)

Request our installation drawings if doing the installation of the module yourself.
Fastening and connections NSE mini 90
Assembly

Fastening and connections NSE-M mini 90
Design of the clamping pallets suitable for NSE mini 90-V1 (NSE-M mini 90-V1)
Position orientation via anti-turn protection groove (for individual clamping module)

Fastening and connections NSE mini 90-V1, NSE-M mini 90-V1
6.3.1 Fastening and connection NSE mini 90

The NSE mini 90 is fastened in the installation space by 6 M6 screws (see Fig. "Fastening and connections NSE mini 90").
The assembly module is positioned using the centering diameter of the installation space: Ø 90H6.
The air connection is made the standard way via the coupling bore on the lower face side of the quick-change pallet module. This requires that the bottom opening be sealed with an O-ring, which is inserted into the O-ring seat in the table top.
Machine the axial sealing O-ring seat according to the following dimensions: Ø 9 + 0.1 x 1.1 + 0.05.
The accessory pack of the NSE mini 90 contains the O-rings Ø 6 x 1.5 (item 14) for sealing the hose-free direct connections on the base side.
When the turbo connection is used, the spring-actuated locking procedure is actively supported with air pressure.
If the turbo connection is not used, the relevant side of the piston must be able to ventilate.

6.3.2 Fastening and connection NSE-M mini 90

The NSE-M mini 90 is fastened in the installation space by 6 M6 screws (see Fig. "Fastening and connections NSE-M mini 90").
The assembly module is positioned using the centering diameter of the installation space: Ø 90H6.
As standard, the clamping system is driven manually by rotary movement at the drive piston (item 4), which is on the side in the base body (item 1).
The clamping system can be operated by means of a hexagonal screwdriver (angled pin wrench).
No air supply is required for the operation of the clamping system. The openings on the base side therefore do not have to be sealed.

6.3.3 Fastening and NSE mini 90-V1, NSE-M mini 90-V1 connection

The NSE mini 90-V1 and NSE-M mini 90-V1 clamping modules have fitting grooves for position orientation of the clamping pallet.
The modules are fixed in the installation space with 6 M6 screws. One of them is a mounting location fixed with a fitting
screw (see fig. "Fastening and connections NSE mini 90-V1, NSE-M mini 90-V1").

The fitting screw is designed for position orientation and anti-turn protection of the quick-change pallet module in the installation space. In the installation space an additional fitting bore is required for position orientation via the fitting screw.

The Fig. "Fastening and connections NSE mini 90-V1, NSE-M mini 90-V1" below shows how a clamping pallet is connected to the VERO-S NSE mini 90-V1 quick-change pallet system (NSE-M mini 90-V1). Individual clamping pallets and clamping devices can be attached to the interface of the VERO-S NSE mini 90-V1.

When producing clamping pallets in-house, pay attention to the exact positioning clearance of the indexing pin bore to the middle of the clamping pin. For dimensions, please refer to the illustration. The indexing pin IXB V1 PAL mini is not included in the scope of delivery of the quick-change pallet system and must be ordered separately (see "Accessories" chapter (☞ 4.1, Page 14)).

6.4 SPA 20 mini, SPB 20 mini, SPC 20 mini clamping bolts

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.
Tolerances and installation conditions

<table>
<thead>
<tr>
<th>Type</th>
<th>ID no.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPA mini 20</td>
<td>0435610</td>
<td>&gt; 8 mm</td>
<td>&gt; 13 mm</td>
<td>M8</td>
<td>&gt; 9 mm</td>
<td>&gt; 11 mm</td>
<td>M6</td>
<td>11 mm</td>
<td>&gt; 8 mm</td>
</tr>
<tr>
<td>SPB mini 20</td>
<td>0435620</td>
<td>&gt; 8 mm</td>
<td>&gt; 13 mm</td>
<td>M8</td>
<td>&gt; 9 mm</td>
<td>&gt; 11 mm</td>
<td>M6</td>
<td>11 mm</td>
<td>&gt; 8 mm</td>
</tr>
<tr>
<td>SPC mini 20</td>
<td>0435630</td>
<td>&gt; 8 mm</td>
<td>&gt; 13 mm</td>
<td>M8</td>
<td>&gt; 9 mm</td>
<td>&gt; 11 mm</td>
<td>M6</td>
<td>11 mm</td>
<td>&gt; 8 mm</td>
</tr>
</tbody>
</table>

Usage/arrangement of the different types of clamping pins
(Application: pallet with 6 clamping positions)

Tightening torques for mounting clamping pins
(Screw quality 12.9)

<table>
<thead>
<tr>
<th>Screw size</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
<th>M14</th>
<th>M16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>15</td>
<td>32</td>
<td>62</td>
<td>108</td>
<td>170</td>
<td>262</td>
</tr>
</tbody>
</table>
6.5 Note about pallet changing

**NOTICE**

When changing the pallet using lifting equipment or a robot, ensure that the pallet is lifted exactly parallel to the modules. The inclination (X) during lifting may not exceed 1.2°. If the inclination is larger, the clamping pins can jam and the system components could be damaged or destroyed. In this case, the system must be inspected and damaged parts must be replaced immediately.

Only original SCHUNK spare parts may be used!
6.6 Pneumatic circuit diagram

The pneumatic circuit diagram shows the supply lines and the pneumatic components for actuating the different functions of the clamping system. When the monitoring function is connected, the measurable differential pressure should reach at least 1 bar when one clamping module is shut down so that secure evaluation can be performed via the air gap sensor. The maximum pressure of the monitoring function is 2 bar. In order for the monitoring function to be actuated, a flow control valve with a preset air volume flow of approx. 15 l/min must be connected upstream in the feed line.

In order to guarantee reliable evaluation, the pressure and air volume must be held constant. Pressure fluctuations can affect the settings of the pressure switch and lead to incorrect measurement results.
The length and cross-section of the line can affect the switching time of the control components. It may be necessary to readjust the control components. Check the control components of the monitoring functions at regular intervals. If errors occur in the monitoring control system, you must detect the cause of the error.
7 Function

The item numbers specified for the corresponding individual components relate to chapter drawings. [11, Page 40]

7.1 Clamping functions in the pneumatically actuated clamping system

The pneumatically actuated clamping system is actuated with compressed air. An external compressed air supply is required for it to function.

Unlocking

1. Supply compressed air through the hose-free direct connection on the base side (operating pressure 6 bar).
2. The clamping slides (item 5) move outward in a radial direction and release the clamping pin.
3. The pallet can be removed.

The clamping pins are available as separate accessories in three models (see chapter "Clamping pin SPA 20 mini, SPB 20 mini, SPC 20 mini" Link Spannbolzen). The clamping pins are mounted on customized pallets or devices.

Locking

1. Depressurize the system.
2. The clamping slides are guided inwards by spring force. When locking, the pallet is pulled onto the contact surface of the clamping module and the clamping pin is clamped in the clamping module in a self-locking and form-fitting manner. It is therefore not necessary to apply pressure to the clamping module during machining.
3. When the turbo connection is used, the spring-actuated locking procedure is actively supported with air pressure. A turbo impulse is sufficient for a higher pull down force. If the turbo connection is not used, the relevant side of the piston must be able to ventilate. The clamping pin is centered at the taper bore of the clamping module, which is why the angular alignment of the clamping system can be selected as desired.
7.2 Clamping functions with the manually actuated clamping system

The manually actuated clamping system can be operated by means of a hexagonal screwdriver (angled pin wrench). No compressed air is required for the function. This makes the clamping system extremely flexible and allows it to be used wherever no pressure medium is available.

Unlocking

1. The manually operated clamping system is unlocked by a rotary movement on the side drive piston (item 4) with the required unlocking torque (see chapter "Technical Data" (‗5, Page 15)). Insert the spanner wrench into the hexagon socket of the actuator spindle and turn counter-clockwise.

2. The clamping slides secured by springs (item 7) move outwards until the final position of the rotary movement noticeably engages. If the rotary movement is not carried out to the end position during opening, the drive piston can turn back and lock the clamping system again.

3. The clamping pin is released.

   The clamping pins are available as separate accessories in three models (see chapter "Clamping pin SPA 20 mini, SPB 20 mini, SPC 20 mini"). The clamping pins are mounted on customized pallets or devices.

4. The pallet can be removed.

Locking

1. The pallet can be inserted in the clamping system as soon as the clamping slides are unlocked and the rotary movement on the drive piston noticeably engages.

2. Insert the pallet in the clamping system.

3. Insert the spanner wrench into the hexagon socket of the actuator spindle and turn clockwise.

4. The clamping slides are guided mechanically inwards by spring force. When locking, the pallet is pulled onto the contact surface of the clamping module and the clamping pin is clamped in the clamping module in a self-locking and form-fitting manner. The clamping pin is centered at the taper bore of the clamping module, which is why the angular alignment of the clamping system can be selected as desired.
7.3 Clamping slide position monitoring

The quick-change pallet systems NSE mini 90 (-V1) and NSE-M mini 90 (-V1) have a standard pressure monitoring of the clamping slide position.

This way, an electronic differential pressure switch can for instance be used to monitor the dynamic pressure at the clamping sides of the quick-change pallet system. This means the slide position can be monitored electronically in order to ensure that the clamping slides are in an unlocked position as soon as the pallet can be lifted. A pressure switch signals to the operator or the machine which position the clamping slides are in. This way, the clamping system can be protected from any possible damage.

The air connection is performed as standard via the base-side connection bore of the quick-change system on the cover (item 2). For information on sealing the air connection, please refer to chapter "Fastening and attachment" (☞ 6.3, Page 18).

Pressure build-up in the "OPEN" and/or "CLOSED" mode. One of the two monitors, or when necessary both monitoring connections, can be connected and overseen for mutual security. Control of the clamping slide monitor requires a reduced pressure supply limited to 2 bar (see "Pneumatic circuit diagram" (☞ 6.6, Page 26)).

The measurable differential pressure must reach a minimum of 0.5 bar in order for a reliable evaluation to be done via the air gap sensor. The maximum pressure is 2 bar.

Monitoring requires a pressure gauge, an adjustable throttle and an air gap sensor.

The control of the module is performed using the hose-free direct connections.

For this purpose, the provided connections (see illustrations in chapters "General assembly instructions" and "Fastening and connection (☞ 6.3, Page 18)) must be controlled via bore holes on the base side and the M3 set-screw in the cover (item 2) must be removed.

The air bleed screw must lead through an open groove in the table top. This requires that the bottom opening be sealed with an O-ring, which is inserted into the O-ring seat in the table top.

Machine the axial sealing O-ring seat according to the following dimensions: $\varnothing 9 + 0.1 \times 1.1 + 0.05$. The accessory pack of the NSE mini
90 contains the O-rings Ø 6 x 1.5 (item 14) for sealing the hose-free direct connections on the base side.

Use of the dynamic pressure monitoring function is not mandatory for the basic operation of the clamping module.

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the pneumatic monitoring function for monitoring the clamping slide position is not used, it must be ensured that the quick-change pallet systems can be loaded or unloaded without being damaged.</td>
</tr>
</tbody>
</table>

- **Before loading or unloading the clamping pallet** it must be ensured that all integrated clamping modules are unlocked.

- **Before beginning the machining process** it must be ensured that the integrated clamping modules are locked, and that the clamping pallet is placed flat on the locating surface.

Monitoring of the operating status can be ensured by lifting or shaking the clamping pallet.

In the case of clamping modules with manual actuation, attention must be paid to the correct position of the drive piston (stop limit on the left or right). A marking with the directions of rotation at the circumference of the clamping system shows the selected operating state.
8 Maintenance and care

NSE mini 90 and NSE mini 90-V1
The pneumatically actuated quick-change pallet systems NSE mini 90 and NSE mini 90-V1 are designed for low-maintenance operation, meaning the clamping modules must only be opened or disassembled in exceptional circumstances.

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**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. Drive ring and piston are 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.

NSE-M mini 90 and NSE-M mini 90-V1
The manually actuated quick-change pallet systems NSE-M mini 90 and NSE-M mini 90-V1 are designed for low-maintenance operation, meaning the clamping modules must only be opened or disassembled in exceptional circumstances.

If disassembly of the manual quick-change pallet systems is necessary, observe the following instructions:

1. Clean all the parts thoroughly and check for damage and wear. Replace any damaged or worn parts. **Only use original SCHUNK spare parts.**

2. Grease the sliding surfaces of all movable components with Renolit HLT 2.

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 8573-1:7 4 4

---

**NOTICE**

A separate maintenance unit with oiler must be used for the air supply.
8.1 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 positioning 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 (6 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.
## 9 Troubleshooting

### 9.1 Malfunctions in the pneumatically actuated clamping system

#### The clamping area does not unlock

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Remedial measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defective air connections</td>
<td>Check air supply (^{6.3, \text{Page 18}})</td>
</tr>
<tr>
<td>Pressure below minimum</td>
<td>Check operating pressure (min. 6 bar)</td>
</tr>
<tr>
<td>A component is broken (e.g. due to overloading)</td>
<td>Replace the module or send it to SCHUNK for repair</td>
</tr>
<tr>
<td>Excess tensile load on clamping pins</td>
<td>Reduce support weight</td>
</tr>
</tbody>
</table>

#### If the clamping area does not unlock perfectly

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Remedial measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure below minimum</td>
<td>Check operating pressure (min. 6 bar)</td>
</tr>
<tr>
<td>The module was not operated with oiled compressed air</td>
<td>Install maintenance unit with oiler</td>
</tr>
<tr>
<td>Hose diameter below minimum</td>
<td>For required hose diameters see chapter &quot;General Assembly Notes&quot;</td>
</tr>
<tr>
<td>The turbo connection is still pressurized</td>
<td>Ventilate the connection</td>
</tr>
</tbody>
</table>

### 9.1.1 Emergency unlocking in case of malfunctions in the pneumatically actuated clamping system

The item numbers specified for the corresponding individual components relate to chapter drawings. \(^{11, \text{Page 40}}\)

The pneumatically actuated clamping system can also be manually unlocked in the case of a functional fault or interrupted air supply. If the clamping system cannot be unlocked automatically, it is recommended that you unlock it manually.

At the circumference of the base body (item 1) three set-screws (item 8) are screwed in at an angle of 3 x 120°. The clamping system can be unlocked at one of these three accesses.

To manually operate the clamping system, one of these three set-screws must be unscrewed with a hexagon screwdriver.

The piston (item 4) and a compression spring (item 10) are located behind this set-screw. **The piston and the compression spring must not be removed from the base body.**
In order to initiate unlocking, carefully apply pressure to the end face of the piston against the spring force with a suitable tool. Now the clamping system can be opened and the clamping pin is unlocked.

When assembling the dismantled parts, please make sure that the O-rings (item 11) installed on the piston are not damaged.

The set-screw (item 8) should be sealed with a screw sealant.

In order to start operation again, detect the cause of error and clean the clamping system.

### 9.2 Malfunctions in the manually actuated clamping system

The clamping area does not unlock

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Remedial measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect direction of rotation on the actuating screw</td>
<td>Change direction of rotation on the actuating screw</td>
</tr>
<tr>
<td>A component is broken (e.g. due to overloading)</td>
<td>Replace the module or send it to SCHUNK for repair</td>
</tr>
<tr>
<td>Clamping bolt receptacle heavily soiled</td>
<td>Clean clamping pin holder</td>
</tr>
<tr>
<td>Excess tensile load on clamping pins</td>
<td>Reduce support weight</td>
</tr>
</tbody>
</table>

### 9.2.1 Emergency unlocking in case of malfunctions in the manually actuated clamping system

The item numbers specified for the corresponding individual components relate to chapter drawings. ([11, Page 40](#))

The mechanically operated clamping system can also be unlocked in the event of a malfunction.

If the clamping system cannot be unlocked by turning the drive piston (item 4) counterclockwise, the emergency release is recommended.

On the circumference of the base body (item 1), two set-screws (item 11) are additionally screwed in next to the drive piston (item 4). The clamping system can be unlocked at one of these two accesses.

To manually operate the clamping system, one of these two set-screws must be unscrewed with a hexagon screwdriver.

The piston (item 8) and a compression spring (item 10) are located behind this set-screw. **The piston and the compression spring must not be removed from the base body.**
In order to initiate unlocking, carefully apply pressure to the end face of the piston against the spring force with a suitable tool. Now the clamping system can be opened and the clamping pin is unlocked.

In order to start operation again, detect the cause of error and clean the clamping system.
10 Seal kit and part lists

10.1 Seal kit lists

NSE mini 90 / NSE mini 90-V1

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>O-ring Ø 7 x 1</td>
<td>6</td>
</tr>
<tr>
<td>13</td>
<td>O-ring Ø 62 x 1.5</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>O-ring Ø 6 x 1.5</td>
<td>5</td>
</tr>
</tbody>
</table>

Wearing parts - we recommend replacing when maintenance is performed

10.2 Parts lists

NSE mini 90

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<th>Item</th>
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<th>Quantity</th>
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</thead>
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<tr>
<td>3</td>
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<tr>
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<td>Piston</td>
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<tr>
<td>7</td>
<td>Countersunk screw</td>
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<tr>
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<td>Set-screw</td>
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<td>Set-screw</td>
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<tr>
<td>10</td>
<td>Compression spring</td>
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</tr>
<tr>
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<td>O-ring Ø 7 x 1</td>
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</tr>
<tr>
<td>12</td>
<td>Set-screw</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>O-ring Ø 62 x 1.5</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>O-ring Ø 6 x 1.5</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>Bearing shell</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>Screw</td>
<td>6</td>
</tr>
<tr>
<td>21</td>
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NSE mini 90-V1

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</table>
### Seal kit and part lists

#### NSE mini 90

<table>
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<td>Clamping slide</td>
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<tr>
<td>7</td>
<td>Countersunk screw</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Set-screw</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Set-screw</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Compression spring</td>
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<tr>
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<tr>
<td>12</td>
<td>Set-screw</td>
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<tr>
<td>13*</td>
<td>O-ring Ø 62 x 1.5</td>
<td>1</td>
</tr>
<tr>
<td>14*</td>
<td>O-ring Ø 6 x 1.5</td>
<td>5</td>
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<tr>
<td>15</td>
<td>Bearing shell</td>
<td>3</td>
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<td>Cover cap</td>
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<tr>
<td>22</td>
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#### NSE-M mini 90

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<tr>
<td>3</td>
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<tr>
<td>4</td>
<td>Drive piston</td>
<td>1</td>
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<td>5</td>
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<tr>
<td>9</td>
<td>Set-screw</td>
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<tr>
<td>10</td>
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<td>14</td>
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<tr>
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<td>Countersunk screw</td>
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### Seal kit and part lists

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<th>Designation</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>16*</td>
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**NSE-M mini 90-V1**

<table>
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</thead>
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<td>Two-part pressure spring</td>
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<td>14</td>
<td>Bearing shell</td>
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<td>15</td>
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<td>16*</td>
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<tr>
<td>22</td>
<td>Fitting screw PSC mini</td>
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<tr>
<td>23</td>
<td>Cover plug mini</td>
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</tr>
</tbody>
</table>

* Wear parts, replacement recommended during maintenance
11 Drawings

NSE mini 90
12 Translation of original EC declaration of incorporation


Manufacturer/ H.-D. SCHUNK GmbH & Co.Spanntechnik KG
Distributor Lothringer Str. 23
D-88512 Mengen

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

Product designation: VERO-S quick-change pallet system
NSE mini, NSE mini-V1, NSE-M mini, NSE-M mini-V1

ID number 0435100; 0435105; 0435140; 0435145

The partly completed machinery may not be put into operation until it has been confirmed that the machine into which the partly completed machinery is to be installed complies with the provisions of the Machinery Directive (2006/42/EC).

Applied harmonized standards, especially:
DIN EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN ISO 4414:2010 Hydraulic fluid power – General rules and safety requirements for pneumatic systems and their components

Other related technical standards and specifications:
VDI 3035:2008-05 Design of machine tools, production lines and peripheral equipment for the use of cooling lubricants

The manufacturer agrees to forward on demand the special technical documents for the partly completed machinery to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:
Philipp Schräder, Address: refer to manufacturer's address

Signature: see original declaration

Mengen, January 2015 p.p. Philipp Schräder; Head of Engineering Design