

Quick-change pallet system

VERO-S NSE mini 90 & NSE-M mini 90

Assembly and Operating Manual

Translation of Original Operating
Manual

Hand in hand for tomorrow

Imprint

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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.

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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.

CAUTION

Information about avoiding material damage.

1.1.2 Applicable documents

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

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

1.1.3 Sizes

This manual applies to the following sizes in all variants ▶ 3 [13]

Quick-Change Pallet System

- VERO-S NSE mini 90
- VERO-S NSE-M mini 90

1.2 Warranty

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

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

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

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

1.3 Scope of delivery

The scope of delivery includes

- Quick-change pallet system in the variant ordered
- Accessory kit

1.4 Accessories

(see catalog or data sheets when ordering separately)

- Clamping pallet PAL mini
- SPA mini, SPB mini, SPC mini clamping pins
- Protective Cover SDE mini
- Indexing pins IXB V1 PAL mini
- Indexing pins IXB V1 WDS mini
- Fitting screw PSC mini
- Hexagon screwdriver

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

Repeat accuracy [mm]	< 0.005
Operating temperature [°C]	+5 to +60
Installation position	any
Noise emission [dB(A)]	≤70
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]

Designation	NSE mini 90	NSE mini 90-V1	NSE-M mini 90	NSE-M mini 90-V1
ID	0435100	0435105	0435140	0435145
Holding force (M6/M8)* [kN]	15/25	15/25	15/25	15/25
Pull down force without turbo [N]	500	500	1000	1000
Pull down force with turbo [N]	1500	1500	-	-
Actuating pressure	6 bar	6 bar	-	-
Unlocking torque [Nm]	-	-	10	10

* 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.

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.

CAUTION

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.

CAUTION

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

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

4 Assembly

4.1 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.

4.2 General assembly notes

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [□ 36].

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 clothing (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.

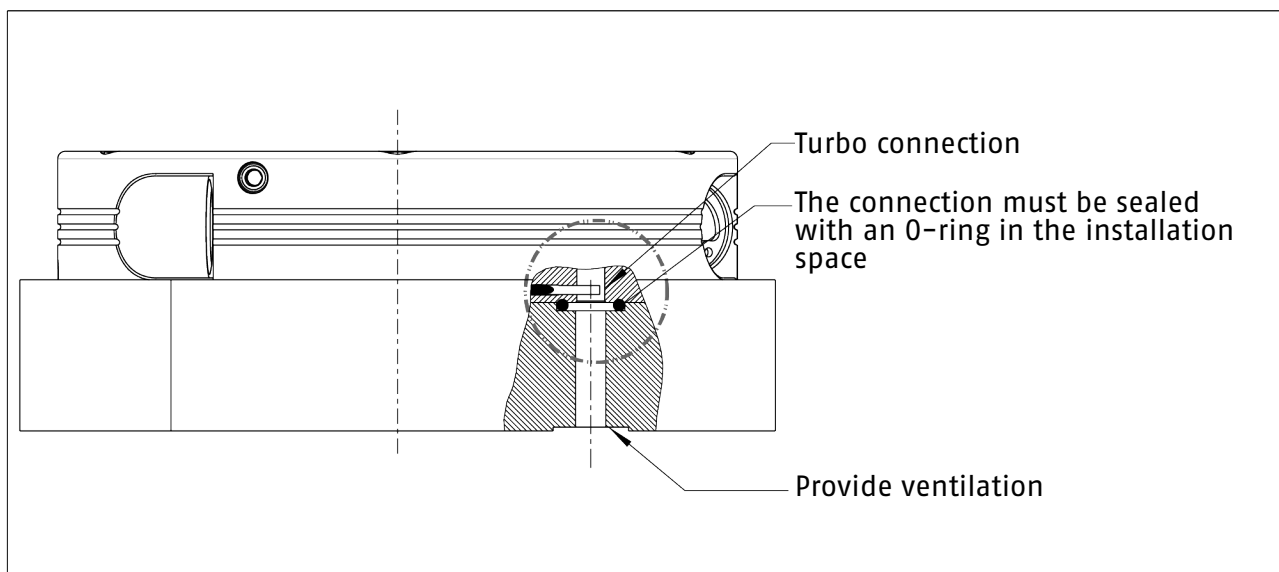
If several linked clamping units are mounted, make sure that the flatness and height deviation of the locating surface from module to module (based on a gauge of 100 mm) lies within 0.01 mm. The interface position deviation must not exceed ± 0.015 mm.

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 100 mm apart or that do not show a positioning tolerance of ± 0.01 mm. For the clamping areas that are not intended for alignment of the device or pallet, clamping pins with centering clearance (SPC mini 20) can be used (refer to ▶ 4.4 [20]).

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, the relevant side of the piston must be able to ventilate. Be sure to take the ventilation methods into account (see Fig. "Air bleed screw via turbo connection").



Ventilation 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.

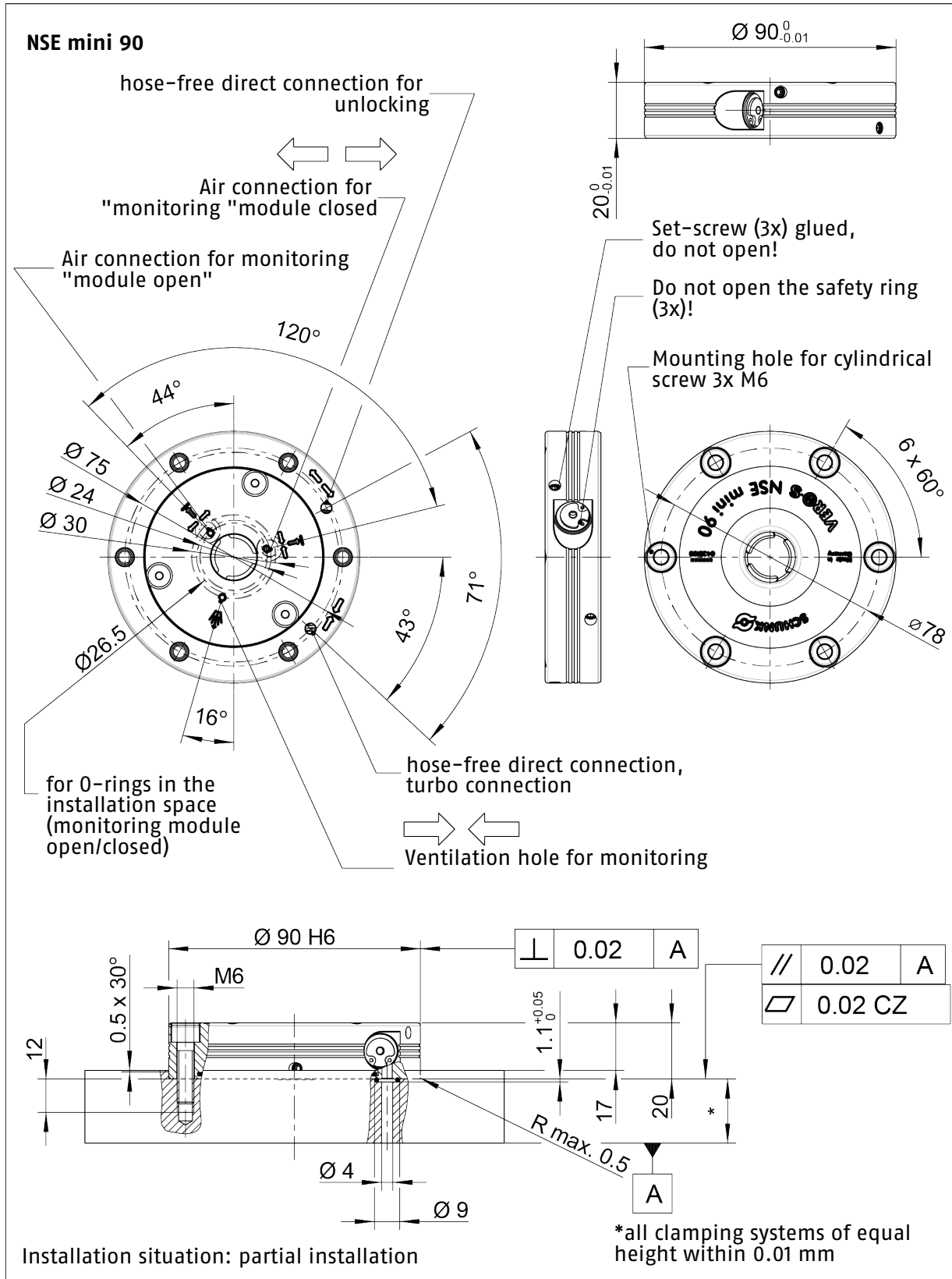
If several units are activated via shared hose lines, feed lines with the following minimum cross-sections must be used.

Number of modules	at least nominal hose width
1, 2	4 mm
3, 4, 5, 6	6 mm

4.3 Fastening and connection

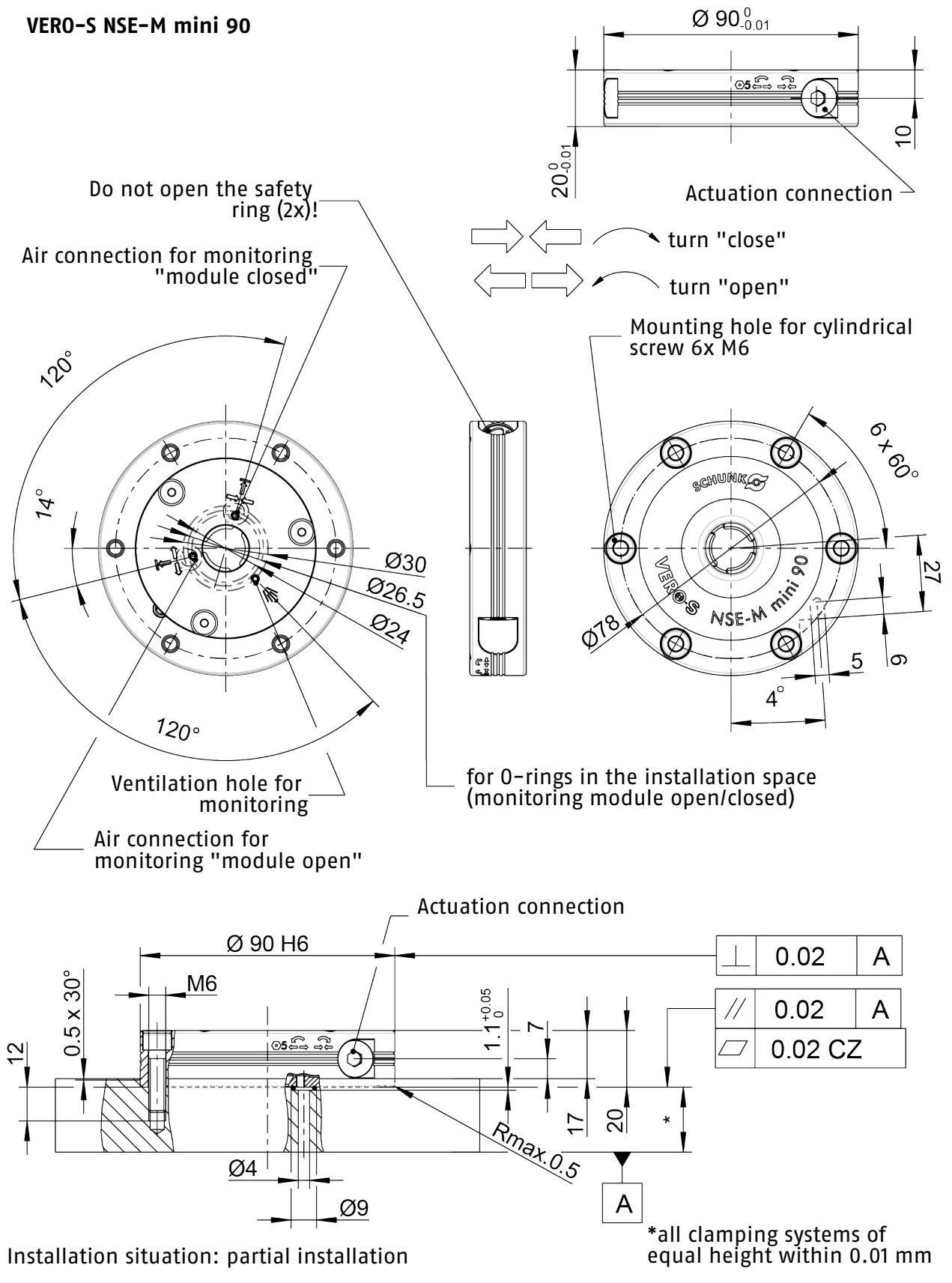
The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [36].

Request our installation drawings if doing the installation of the module yourself.

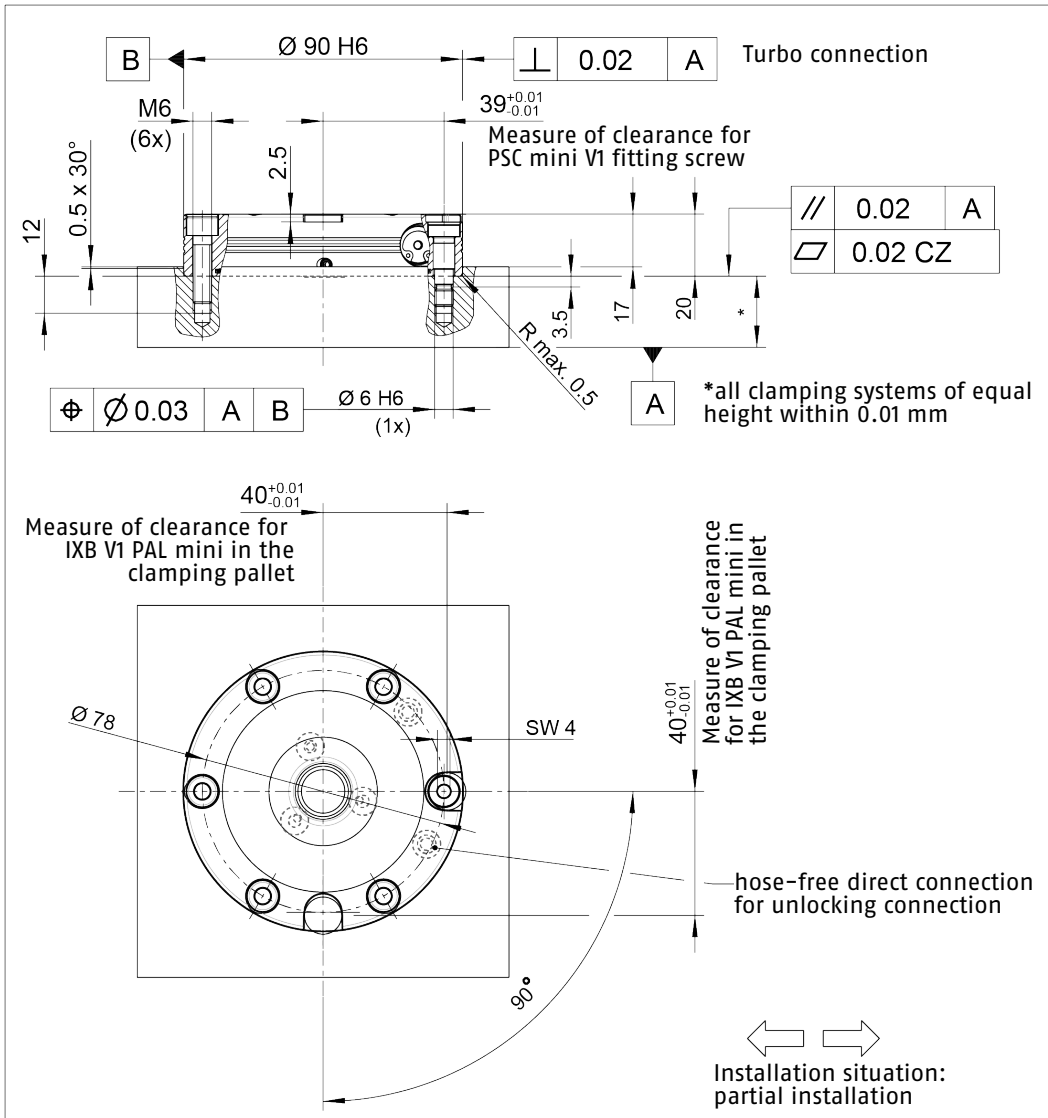


Fastening and connections NSE mini 90

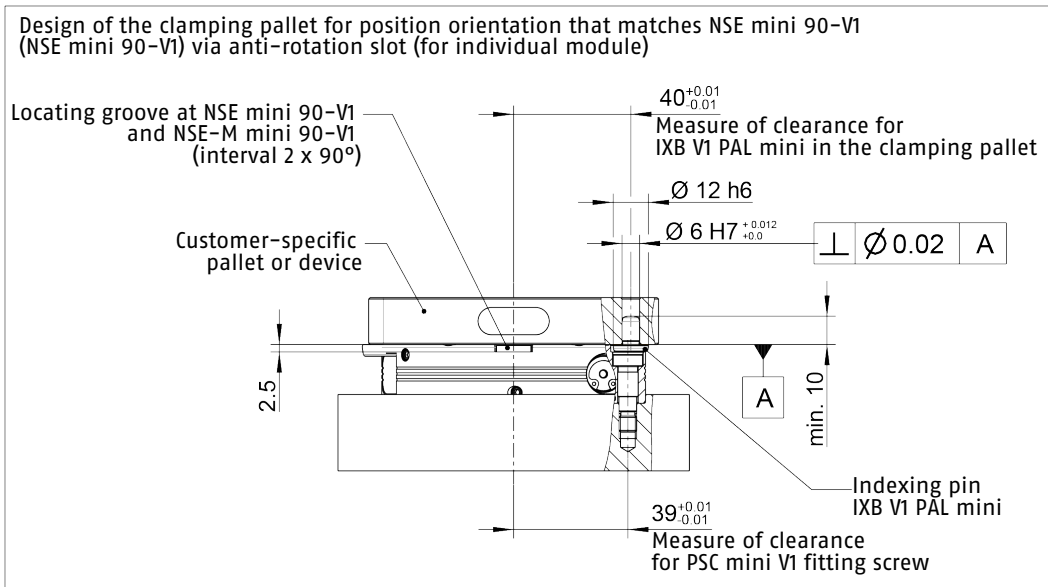
VERO-S NSE-M mini 90



Fastening and connections NSE-M mini 90



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



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

4.3.1 Fastening and connection NSE mini 90

The NSE mini 90 is fastened in the installation space by 6 M6 screws ▶ 4.7 [24] (see Fig. "Fastening and connections NSE mini 90").

The assembly module is positioned using the centering diameter of the installation space: $\emptyset 90H6$.

The air connection is made the standard way via the coupling hose 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: $\emptyset 9^{+0.1} \times 1.1^{+0.05}$.

The accessory kit of the NSE mini 90 contains the O-rings $\emptyset 6 \times 1.5$ (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 vent.

4.3.2 Fastening and connection NSE-M mini 90

The NSE-M mini 90 is fastened in the installation space by 6 M6 screws ▶ 4.7 [24] (see Fig. "Fastening and connections NSE-M mini 90").

The assembly module is positioned using the centering diameter of the installation space: $\emptyset 90H6$.

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.

4.3.3 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 ▶ 1.4 [6]).

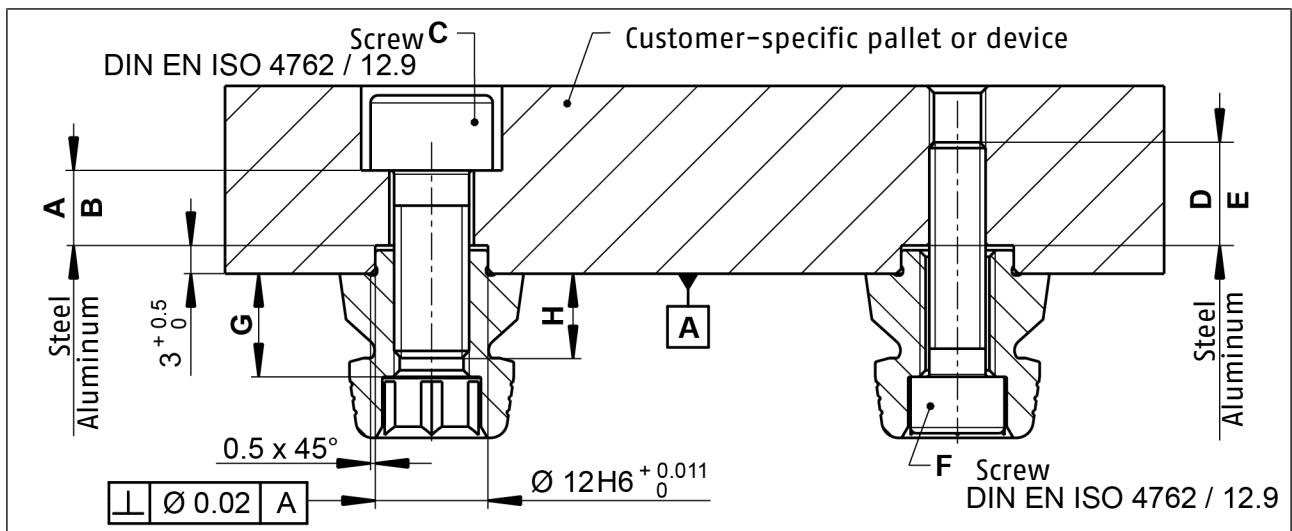
4.4 SPA mini 20, SPB mini 20, SPC mini 20 clamping bolts

CAUTION

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 ▶ 4.7 [24]. 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

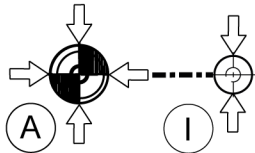
Tolerances and installation conditions

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

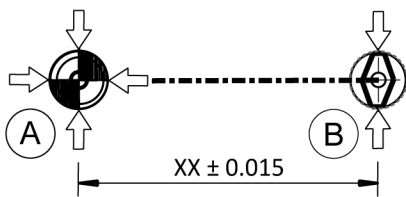
Usage/arrangement of the different types of clamping pins

- A**  Type A clamping pin, with positioning in two directions
 - B**  Type B clamping pin, with positioning in one direction
 - C**  Type C clamping pin, without positioning, with centering clearance of 0.1 mm
 - I**  Indexing pin for positional alignment and torque transmission with torque pin V1 und V10. Positioning in one direction
- ↓ Positioning direction, perpendicular to the positioning axis
- Select the positioning axis with the greatest possible distance

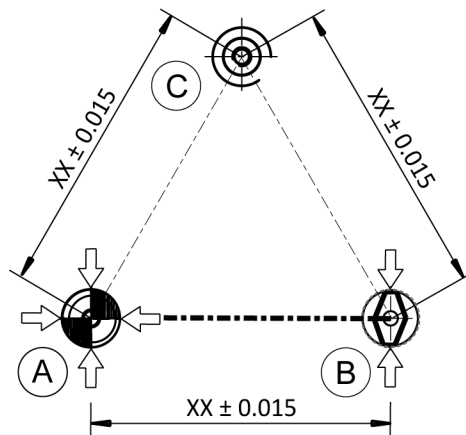
1 clamping area



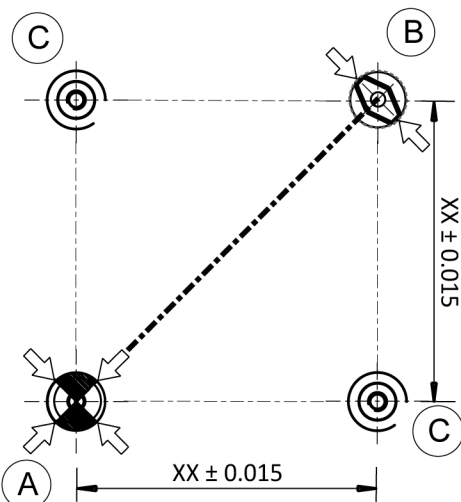
2 clamping areas



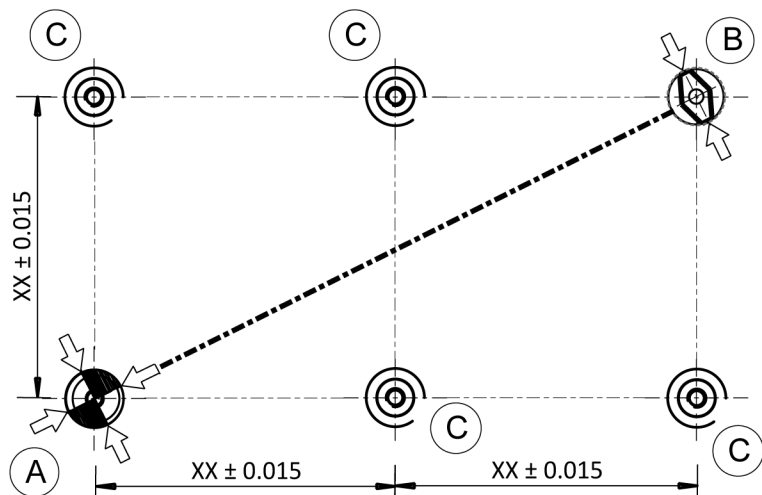
3 clamping areas



4 clamping areas



6 clamping areas

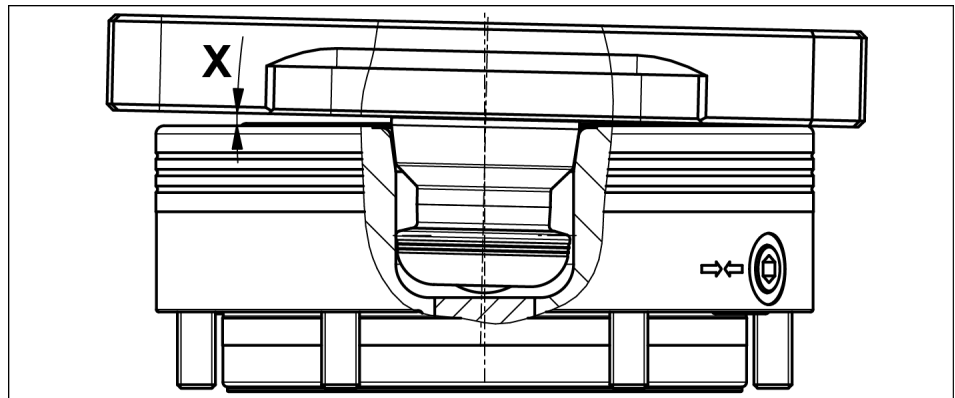


4.5 Note about pallet changing

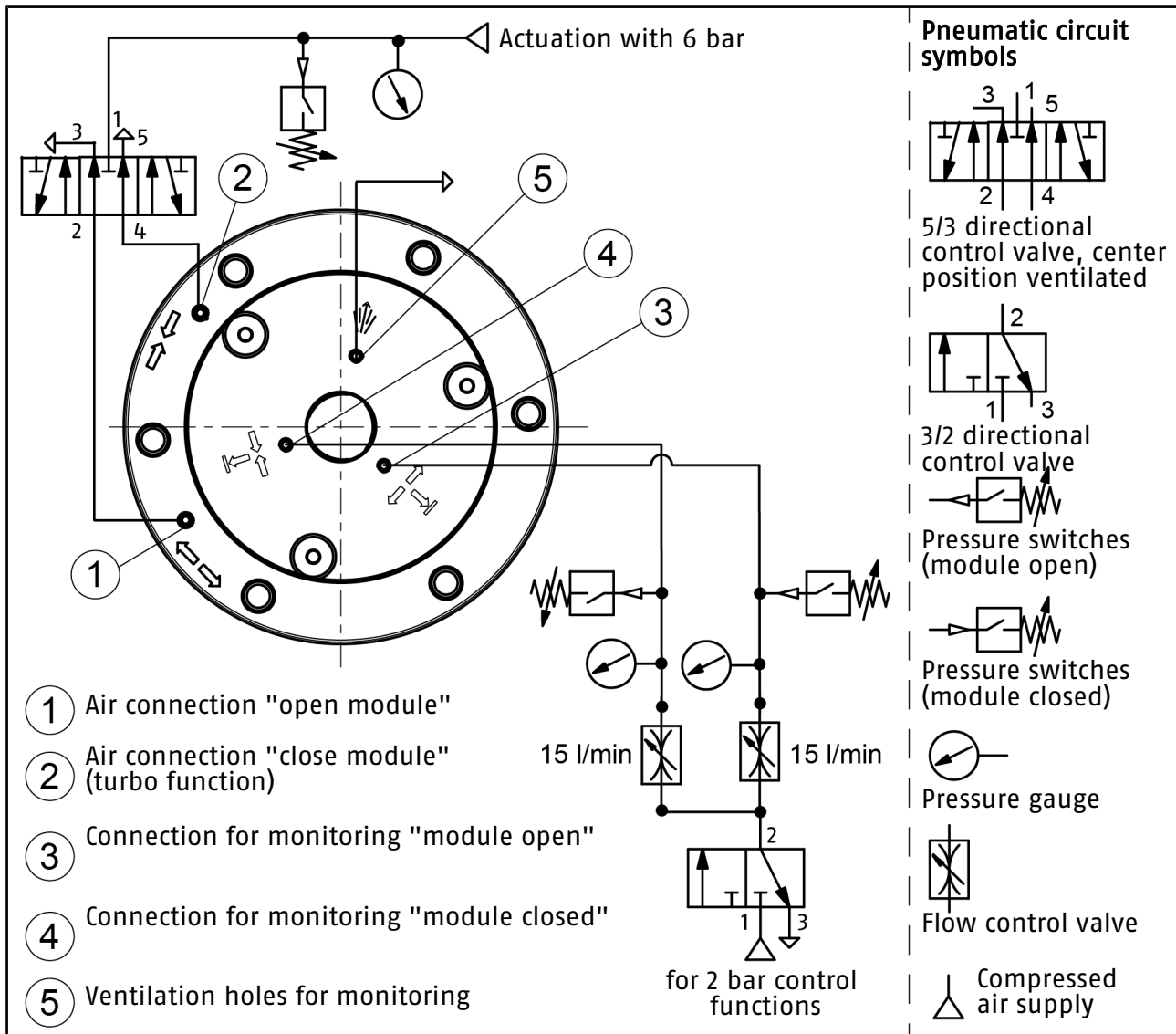
CAUTION

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!



4.6 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.

4.7 Screw tightening torques

Tightening torques for mounting clamping pins

(Screw quality 12.9)

Screw size	M3	M4	M5	M6	M8	M10	M12	M14	M16
Tightening torque M_A (Nm)	2.4	5	9	15	32	62	108	170	262

Tightening torques for mounting clamping modules

(Screw quality ≥ 10.9)

Schraubengröße	M3	M4	M5	M6	M8	M10	M12	M14
Tightening torque M_A (Nm)	1.7	4.2	7.5	13	28	50	88	120

5 Function

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [□ 36].

5.1 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 ▶ 4.4 [□ 20]). 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.

5.2 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 ▶ 3 [□ 13]). 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 ▶ 4.4 [□ 20]). 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.

5.3 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, see ▶ 4.3 [□ 16].

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 ▶ 4.6 [□ 23]).

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 ▶ 4.3 [□ 16]) 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 $\varnothing 6 \times 1.5$ (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.

CAUTION

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.

- **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.

6 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.



⚠ 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 8573-1:2010 [7:4:4]

CAUTION

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

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 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.

7 Troubleshooting

7.1 Malfunctions in the pneumatically actuated clamping system

The clamping area does not unlock

Possible cause	Remedial measures
Defective air connections	Check air supply ▶ 4.3 [16]
Pressure below minimum	Check operating pressure (min. 6 bar)
A component is broken (e.g. due to overloading)	Replace the module or send it to SCHUNK for repair
Excess tensile load on clamping pins	Reduce support weight

If the clamping area does not unlock perfectly

Possible cause	Remedial measures
Pressure below minimum	Check operating pressure (min. 6 bar)
The module was not operated with oiled compressed air	Install maintenance unit with oiler
Hose diameter below minimum	For required hose diameters see ▶ 4.2 [14]
The turbo connection is still pressurized	Ventilate the connection

7.1.1 Emergency unlocking in case of malfunctions in the pneumatically actuated clamping system

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [36].

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.

On the perimeter of the base body (item 1) there are three built-in center plugs (item 8) at an angle of 3 x 120°. The clamping system can be unlocked at one of these three accesses.



⚠ WARNING

Risk of injury due to the pressurized center plug (item 8) being hurled out of the machine

Make sure that the module is depressurized before disassembly.

To operate the clamping system manually, one of these three center plugs must be dismantled.

For this purpose, the safety ring (item 17) must be removed using suitable pliers. Afterwards the center plug can be removed, if necessary with the help of an M3 screw which can be screwed into the thread of the center plug (item 8).

The piston (item 4) and a compression spring (item 10) are located behind this center plug (item 8). **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 as well as the O-rings (item 16) installed on the center plug (item 8) are not damaged.

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

7.2 Malfunctions in the manually actuated clamping system

The clamping area does not unlock

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

7.2.1 Emergency unlocking in case of malfunctions in the manually actuated clamping system

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [36].

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 unlocking is recommended.

On the circumference of the base body (item 1), two center plugs (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 operate the clamping system manually, one of these two center plugs must be dismantled.

For this purpose, the safety ring (item 17) must be removed using suitable pliers. Afterwards the center plug can be removed, if necessary with the help of an M3 screw which can be screwed into the thread of the center plug (item 11).

The piston (item 8) and a compression spring (item 10) are located behind this center plug (item 11). **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-ring (item 18) installed on the center plug (item 11) is not damaged.

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

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 Seal kit and part lists

9.1 Seal kit lists

NSE mini 90 / NSE mini 90-V1

Sealing kit*	ID
NSE mini 90	0435117
NSE mini 90-V1	0435117

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

9.2 Parts lists

NSE mini 90 (ID 435100) / Accessory kit (ID 8508404)

NSE mini 90-V1 (ID 435105) / Accessory kit (ID 8508405)

Item	Designation	Quantity	Note
1	Base body	1	
2	Cover	1	
3	Drive ring	1	
4	Piston	3	
5	Clamping slide	3	
7	Countersunk screw	3	
8	Center plug	3	
10	Compression spring	3	
11	O-ring \varnothing 7.5 x 1	6	X / *
12	Setscrew	5	
13	O-ring \varnothing 62 x 1.5	1	X / *
14	O-ring \varnothing 6 x 1.5	5	X / Z / *
15	Bearing bush	3	
16	O-ring \varnothing 10 x 1	3	X / *
17	Safety ring	3	
20	Screw	6	Z
	Screw	5	Z / V1
21	Cover plug	6	X / Z
	Cover plug	5	X / Z / V1
22	Fitting screw PSC mini	1	Z / V1
23	Cover plug mini	1	Z / V1

Parts list key

V1	only for NSE mini 90-V1	X	included in the sealing kit
		Z	included in the accessory kit

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

NSE-M mini 90 (ID 435140)**NSE-M mini 90-V1** (ID 435145)

Item	Designation	Quantity	Note
1	Base body	1	
2	Cover	1	
3	Drive ring	1	
4	Drive piston	1	
5	Setting piston	1	
7	Clamping slide	3	
8	Piston	2	
10	Two-part compression spring	3	
11	Center plug	2	
12	Steel ball	1	
13	Cylindrical pin	1	
14	Bearing bush	3	
15	Countersunk screw	3	
16	O-ring \varnothing 6 x 1.5	2	*
17	Safety ring	2	
18	O-ring \varnothing 10 x 1	2	*
20	Screw	6	
	Screw	5	V1
21	Cover plug	6	
	Cover plug	5	V1
22	Fitting screw PSC mini	1	V1
23	Cover plug mini	1	V1

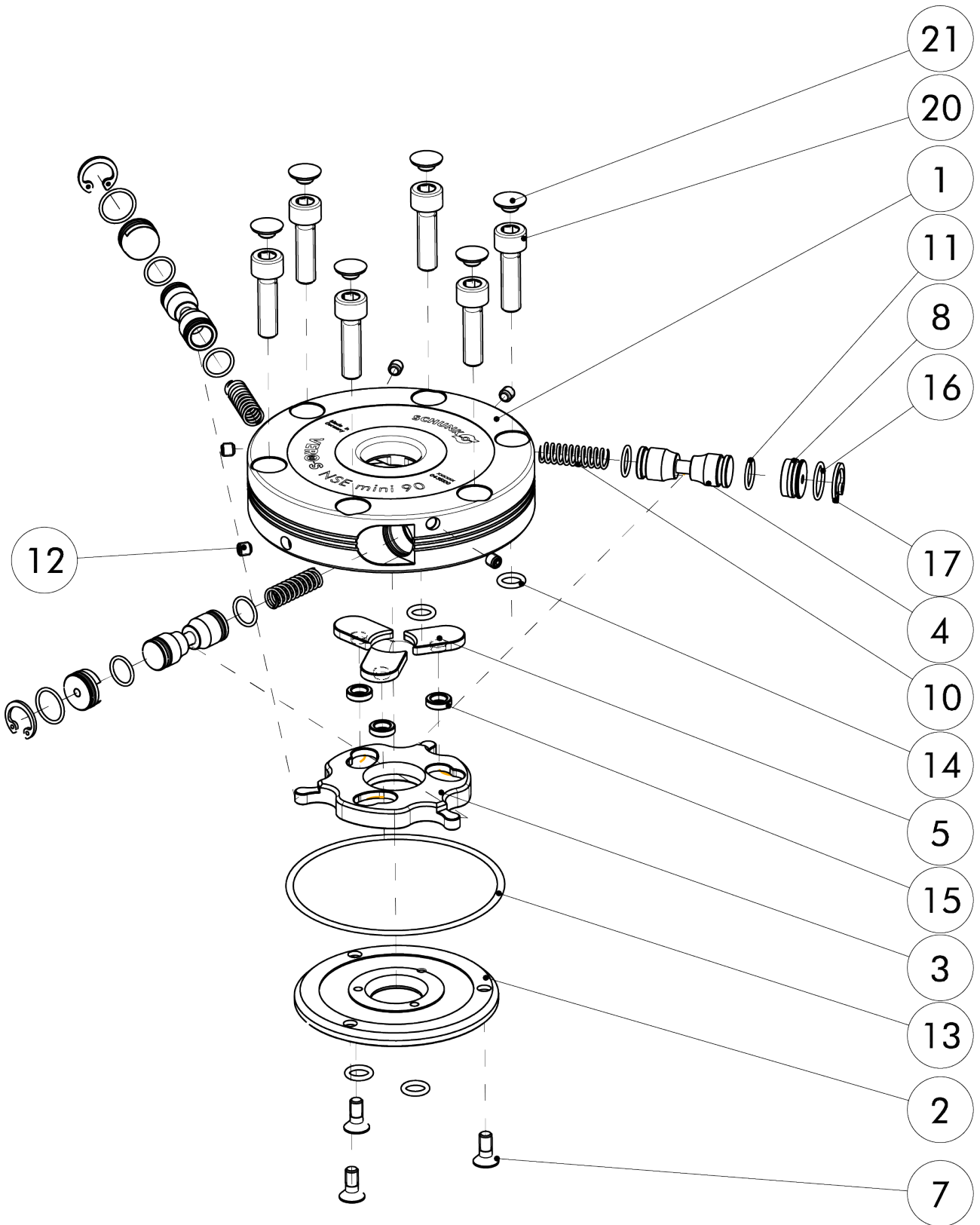
Parts list key

V1 only for NSE-M mini 90-V1

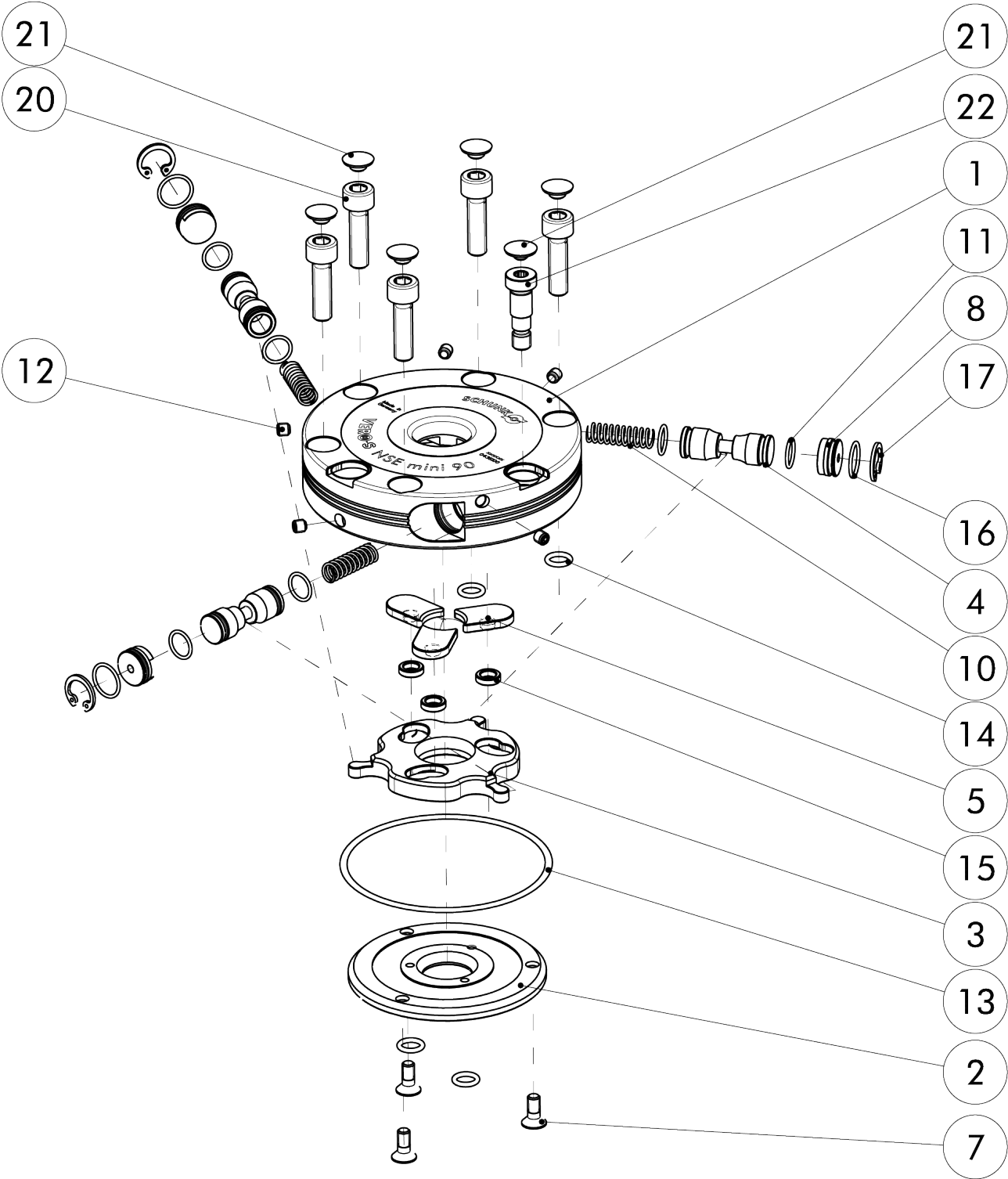
* Seals are wearing parts and are recommended to be replaced during maintenance.

10 Drawings

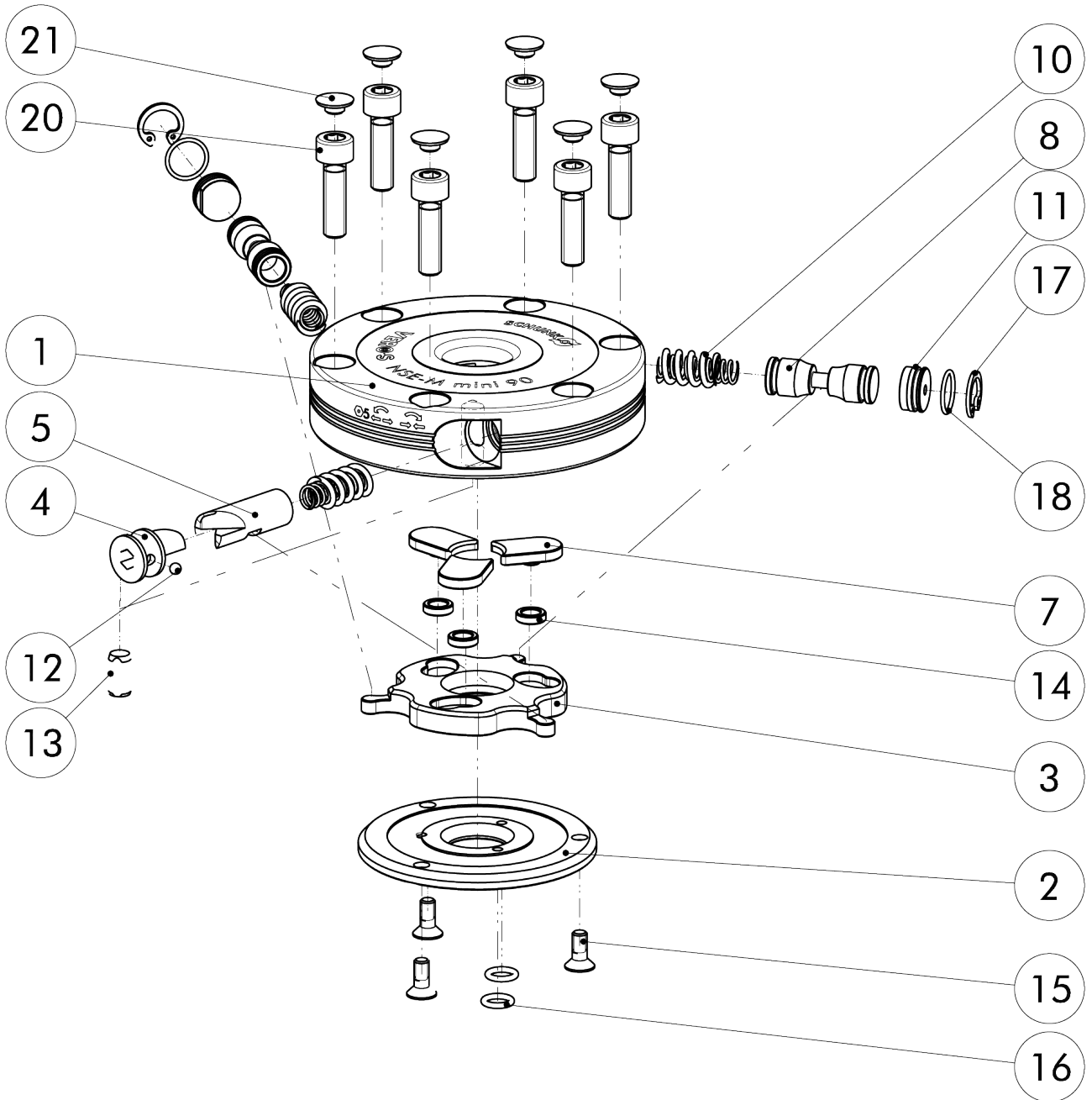
NSE mini 90



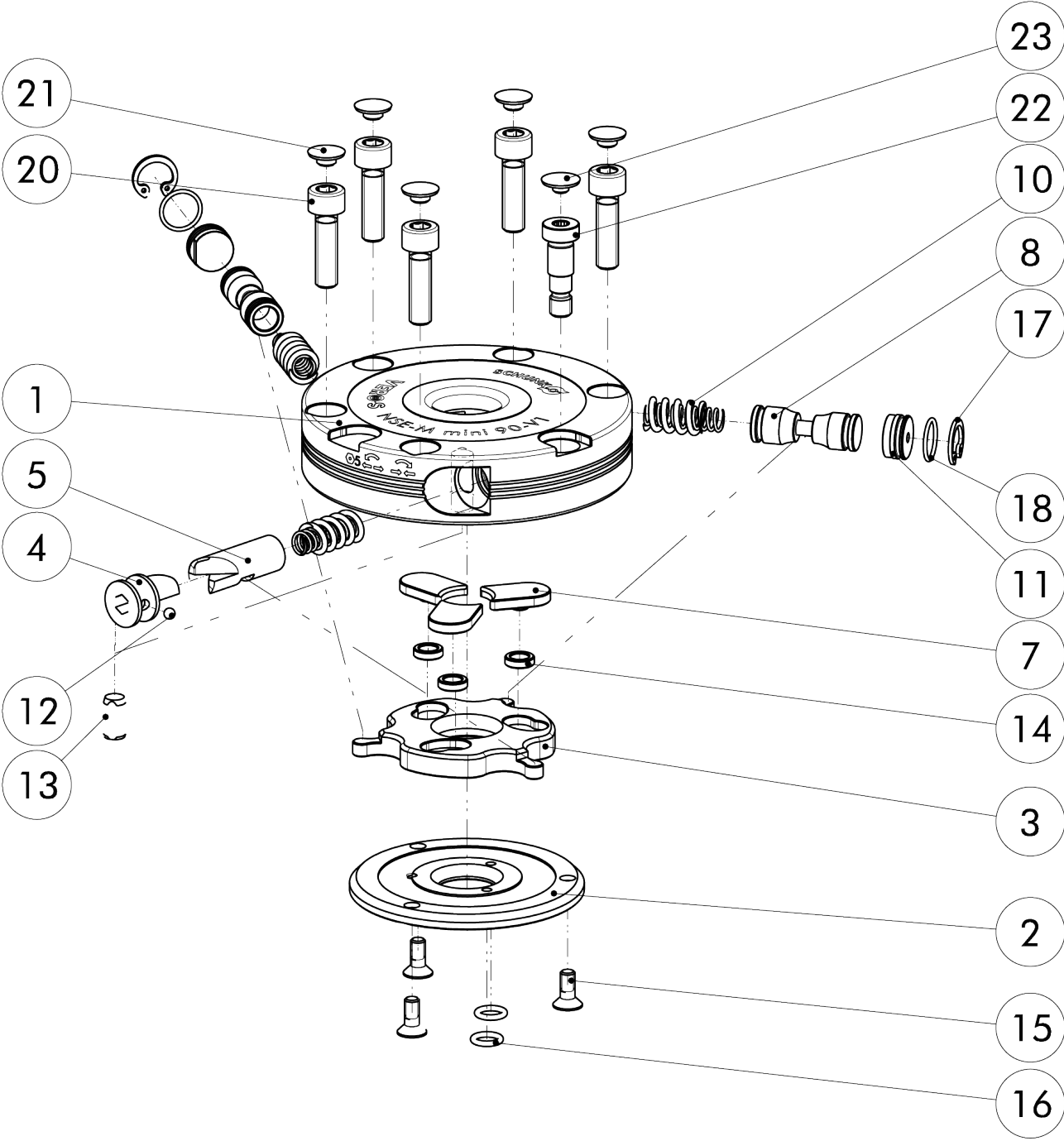
NSE mini 90-V1



NSE-M mini 90



NSE-M mini 90-V1



11 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen
Product:	Quick-change pallet system
Designation:	VERO-S
Type designation:	NSA, NSE, E-compact, AV CU

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

Signature: see original declaration

p.p. Philipp Schröder
Head of Development standard products

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

12 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen
Product:	Quick-change pallet system
Designation:	VERO-S
Type designation:	NSE-M

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.
- 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.

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

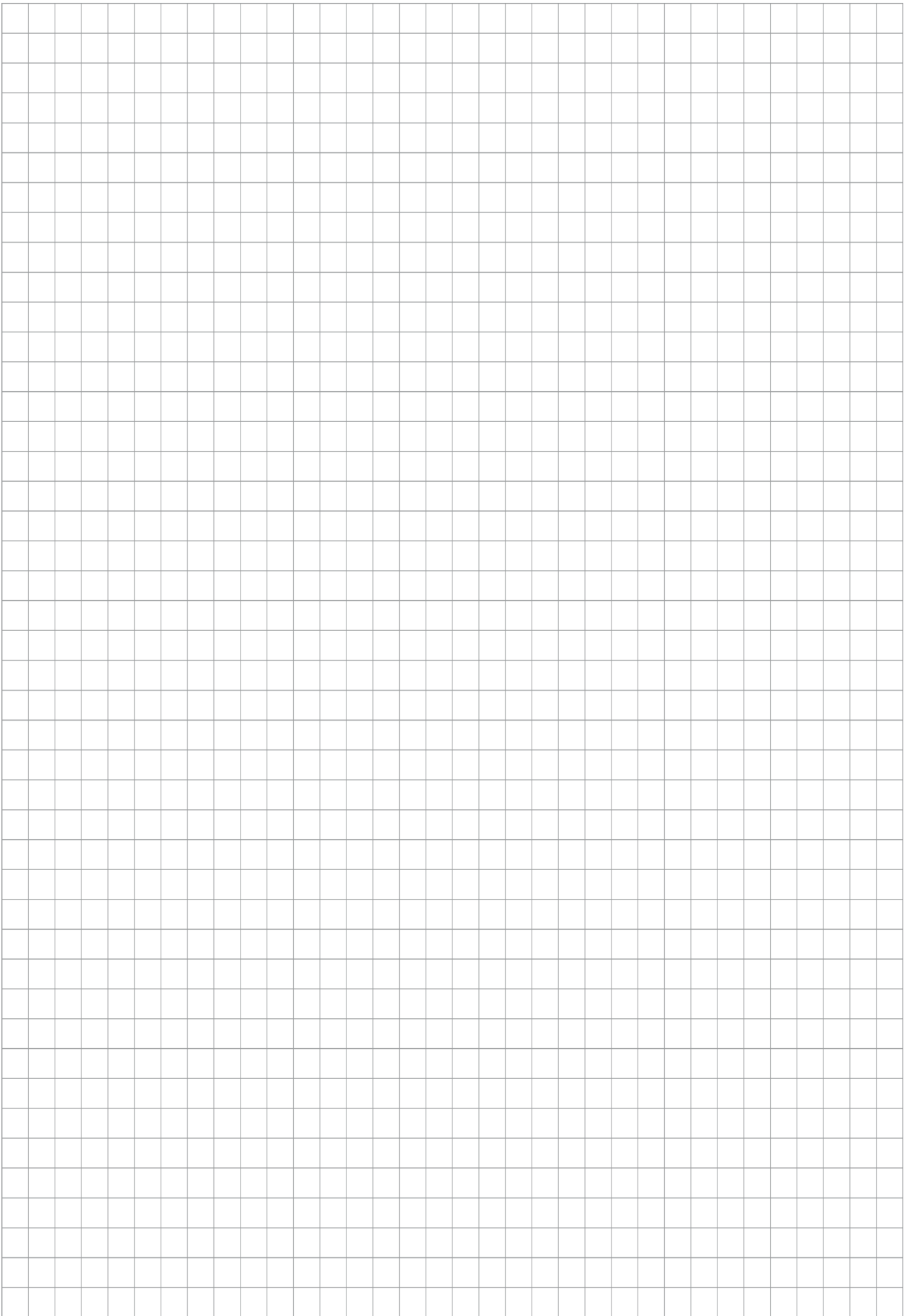
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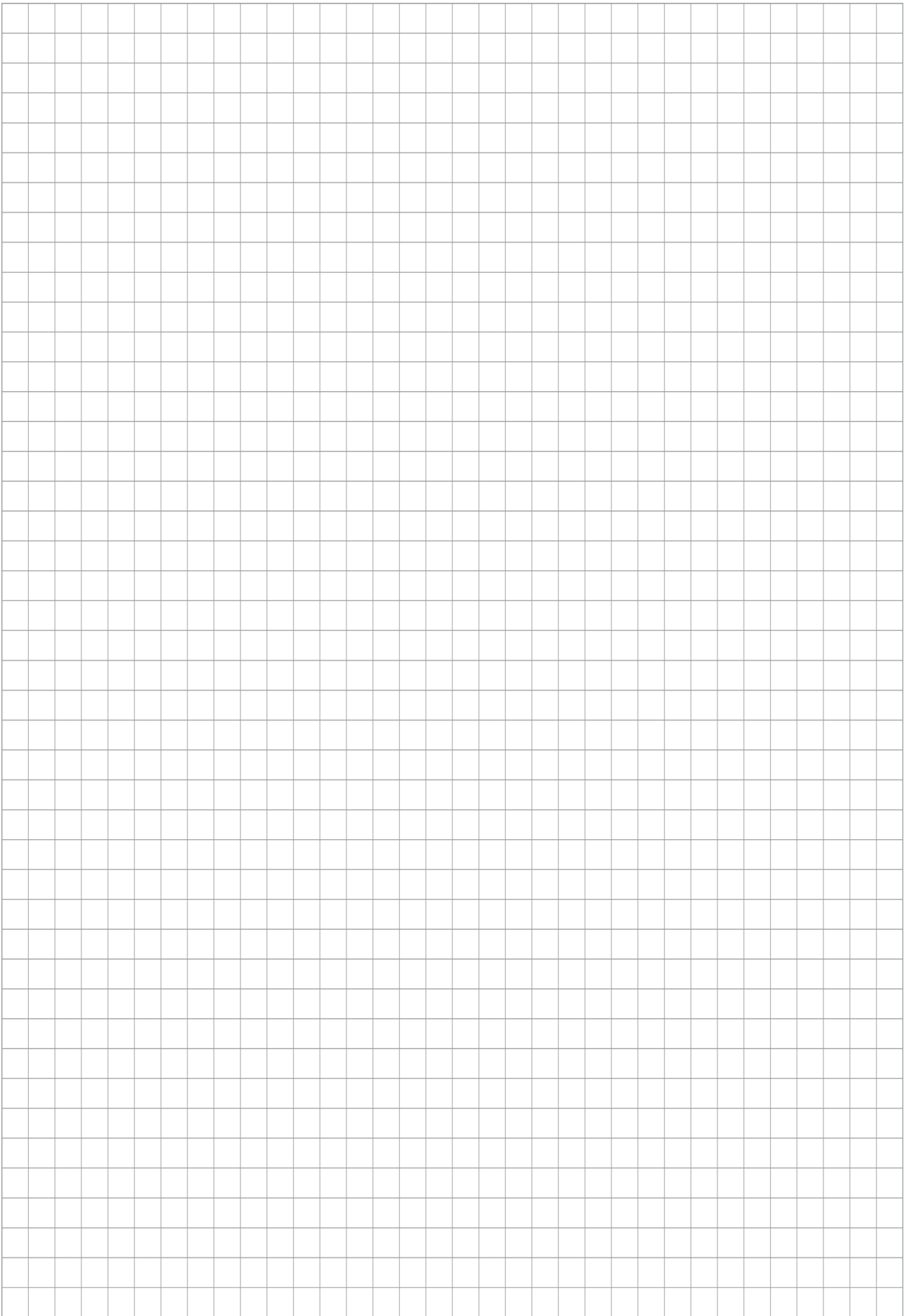
Signature: see original declaration

Signature: see original declaration

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