

Quick-change pallet system

VERO-S NSE-A3 138

Assembly and Operating Manual

Imprint

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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.

NOTICE

Information about avoiding material damage.

1.1.2 Applicable documents

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

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

1.2 Warranty

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

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

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

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

1.3 Design

This guide applies to the following sizes in all variants ▶ 3.1 [13]

Quick-Change Pallet System

- Size NSE-A3 138

1.4 Scope of delivery

The scope of delivery includes

1 quick-change pallet system in the version ordered

- 1 quick-change pallet system accessory kit
- 1 cone seal accessory kit
- 1 assembly and Operating Manual

1.5 Accessories

(see catalog or data sheets when ordering separately)

- SPA40(-16), SPB(-16), SPC(-16), SPG clamping pins
- Plug (conversion)
- Weaker compression spring for cone seal
- AFS3 138 PMI monitoring system
- AFS3 138 MMS monitoring system
- SDE protection cover
- Coupling nipple for pallet

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 Product description

3.1 Description of design and variant

Clamping module Variant	Torque pin V4	Cone seal	Media transfer unit
NSE-A3 138	-	X	-
NSE-A3 138-V4	X	X	-
NSE-A3 138-V4-P	X	X	Hydrokomp NW3
NSE-A3 138-V4-P1	X	X	SWS

3.2 Technical data

Actuating pressure [bar]	6
Repeat accuracy [mm]	< 0.005
Pull-in stroke [mm]	max. 0.9
Loading weight for versions with cone seal [kg]	min. 3.2
Loading weight for cone seal when using a weaker compression spring (optionally available) [kg]	min. 2
Installation position	any
Operating temperature [°C]	+5 to +60
Required level of cleanliness	IP 30 in accordance with DIN EN 60529
Noise emission [dB(A)]	≤ 70
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
Protection class	IP 67

Designation Variant	ID	Holding force* (M10 / M12 / M16) [kN]	Pull down force without turbo [kN]	Pull down force with turbo [kN]
NSE-A3 138	1364306	35 / 50 / 75	8	28
NSE-A3 138-V4	1364307	35 / 50 / 75	8	28
NSE-A3 138-V4-P	1351708	35 / 50 / 75	8	28
NSE-A3 138-V4-P1	1339726	35 / 50 / 75	8	28

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

The actuating pressure for the turbo function must not exceed 6 bar.

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

Functions and queries of the quick-change pallet system

Type designation	Function	Type / Connection
All variants of: NSE-A3 138	Clamping taper blow-out function	Cleaning of the change interface, connection M7
	Pneumatic dynamic pressure monitoring	<ol style="list-style-type: none"> 1. Clamping slide position clamped (hose-free direct connection) 2. Clamping slide position opened (hose-free direct connection)
	Dynamic pressure monitoring / blow-off internal / external bearing surface	Pallet presence or cleaning of internal / external bearing surface, connections G1/8" or hose-free direct connection
NSE-A3 138-V4 (-P / -P1)	Blow-out torque pin (and media transfer unit)	Cleaning the torque pin (and media transfer unit), connection G1/8" or hose-free direct connection

3.2.1 Suitability for welding applications

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

NOTICE

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

NOTICE

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

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

3.3 Technical data for coupling elements of media transfer unit

Designation Variant	ID number	Coupling elements, nominal width 3
NSE-A3 138-V4-P	1351708	Operating pressure: max. 300 bar Flow rate per minute: max. 8 l Coupling stroke: 2.5 mm Coupling force at 0 bar: min. 51 N Loading weight per module: min. 204 N Coupling function can be connected when depressurized (with 4 couplings) A slight leakage is possible when coupled.

4 Assembly

4.1 Screw tightening torques

Tightening torques for mounting the clamping pins
(Screw quality 12.9)

Screw size	M6	M8	M10	M12	M14	M16
Tightening torque (Nm)	15	32	62	108	170	262

Tightening torques for mounting the clamping modules
(Screw quality 10.9)

Screw size	M4	M5	M6	M8	M10	M12	M14
Tightening torque (Nm)	4.2	7.5	13	28	50	88	120

Tightening torque for the countersunk screw on the cone seal
(Screw quality A2-70)

Screw size	M6
Tightening torque (Nm)	5

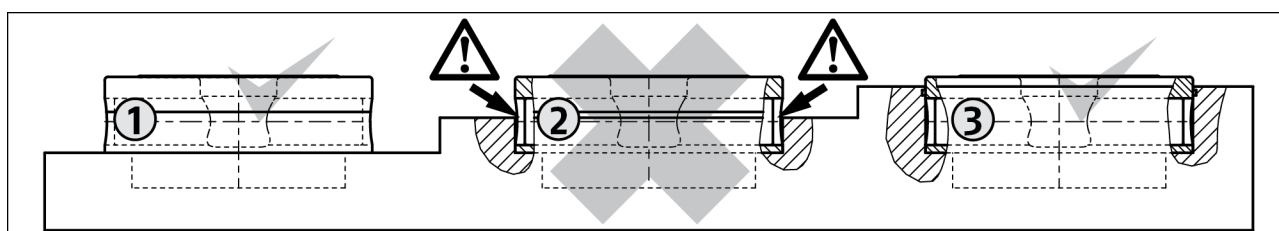
Tightening torques for the plug and cover conversion parts in the clamping pin mounting

Component	Plug (basic version)	Bottom cover
Tightening torque (Nm)	10	10

4.2 Pre-assembly

Request our installation drawings if installing the module in the customer's clamping stations yourself.

The installation position must be observed when performing the installation yourself.



1 Partial installation 2 Do not use 3 Full installation

NOTICE

With installation location 2, the clamping slide can be blocked by chips and dirt. For this reason, do not use this installation position. Otherwise make sure to fit deeper clearance in front of the movable clamping slides.

- Damage to the clamping module is possible.

4.3 Installing and connecting



⚠ WARNING

Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



⚠ WARNING

Risk of injury due to unexpected movements when installing and removing the cone seal!

This can cause components to move unexpectedly when working on the cone seal, resulting in injuries.

- Before starting all work on the product, refer to the cone seal chapter, ▶ 5.1 [📄 29].
- Make sure that components of the gate unit are fitted in accordance with the installation guidelines and safely locked in place.



⚠ CAUTION

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

- Wear personal protective equipment, particularly protective gloves.

1. Check the flatness of the bolting surface, ▶ 4.4 [📄 17].
2. Screw the module with the O-rings inserted onto the clamping station.
 - ⇒ Observe permissible tightening torques for the mounting screws and the strength class, ▶ 4.1 [📄 15].
3. Connect module, ▶ 4.4 [📄 17].
 - ⇒ via the hose-free direction connection in the base of the quick-change pallet system, OR
 - ⇒ via supply lines on the side G1/8" connections
 - remove locking screws G1/8".
 - screw in air connections.
4. If necessary, connect monitoring functions.

4.4 Fastening and connection

Flatness

If several linked clamping modules are mounted, make sure that the flatness and height deviation of the outer ring locating surfaces from clamping module to clamping module (with respect to a 200 mm gauge) is ≤ 0.03 mm. The gauge deviation may not exceed ± 0.015 mm.

Redundancy

Due to redundancy, a clamping pin with positioning accuracy in one direction (SPB 40, sword-shaped position) must be used for clamping modules that are more than 160 mm apart or that do not exhibit a positioning tolerance of ± 0.01 mm. The sword-shaped alignment surfaces on the SPB 40 clamping pin must be aligned at right angles to the longitudinal axis between clamping pins SPA 40 and SPB 40. This allows for compensation of a distance offset between the clamping areas to be aligned. For the clamping areas that are not intended for aligning the device or pallet, clamping pins with centering clearance (SPC 40) must be used (also refer to chapter "Clamping pins" ► 4.5 [21]).

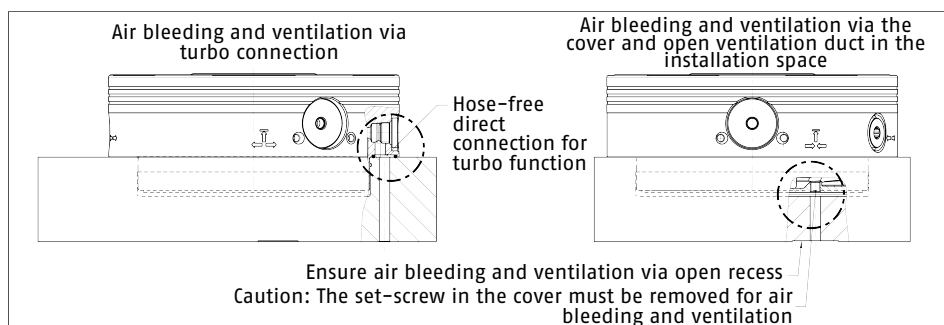
Air bleeding for the piston chamber

When connecting the quick-change pallet systems, it is important to note that the piston chamber can only be ventilated via the air connections 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 have a way of being ventilated.** This is optimally done via the turbo connection itself.

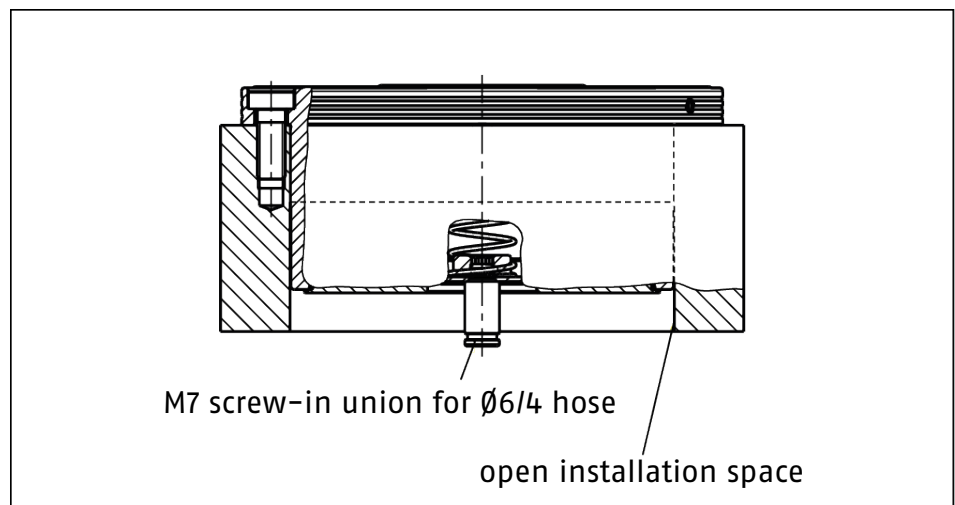
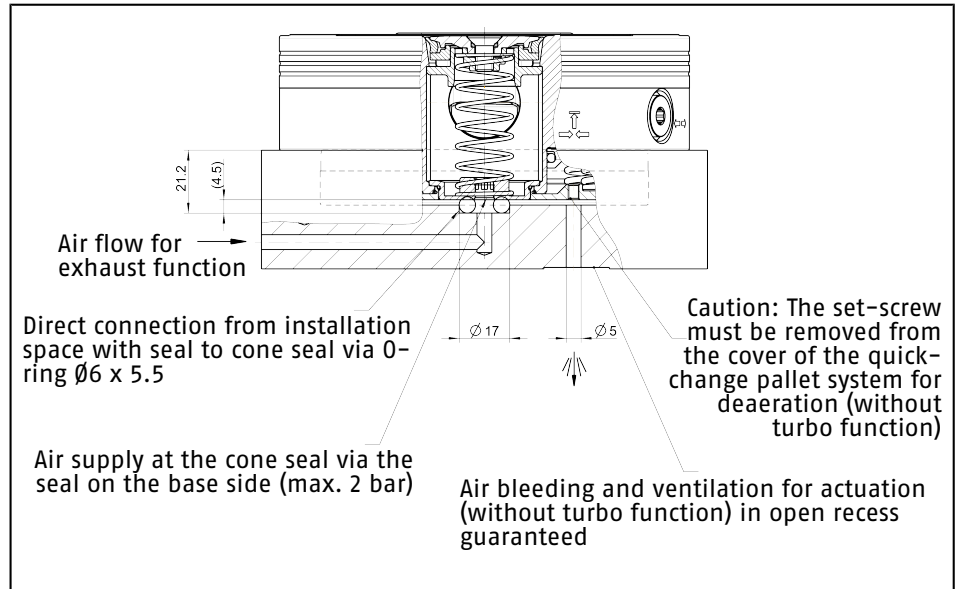
For the NSE-A3 138, a ventilation option for the cylinder chamber can be created by removing the M4 x 4 set-screw in the cover of the clamping module. The following views illustrate the ventilation options.

Air bleeding via turbo connection, air bleeding via the cover



Connection for blow-out / air purge

The air connection for the blow-out air / air purge is achieved via the bottom M7 connection thread by installation of a screw-in union. Alternatively, the air supply can be actuated from a channel bore hole leading out of the installation location of the clamping module. To do this, a channel bore with seal seat must be installed in the installation space. To seal this, the enclosed O-ring $\varnothing 6 \times 5.5$ (item 29) must be inserted in the seal seat.



Blow-off support internal / external / torque pin and media transfer unit

Automatic cleaning of the locating surfaces can be done by blowing off the locating surface via three independent connections:

- Index 5 connection: Blow-off of locating surfaces, internal bolt pitch circle
- Index 6 connection: Blow-off of locating surfaces, external bolt pitch circle
- Index 11 connection: Blow-off of locating surfaces, torque pin or media transfer unit

Turbo connection

When using the turbo connection (if supply is connected), the spring actuated locking procedure is actively supported with air pressure, thereby enhancing the achievable pull down force. One pressure pulse is sufficient to increase the force. The pressure line can be decoupled afterwards without the pull-in force being impaired. If the turbo connection is not used, it must be possible to ventilate the relevant side of the piston.

Media transfer

The NSE-A3 138-V4-P versions are equipped with four media transfer units on the bearing surface that can be connected when depressurized. They can supply the clamping devices with compressed air, hydraulic oil or vacuum pressure, for example. The matching NW3 coupling nipples must be installed in the opposite side to be connected. The transfer interfaces are actuated on the bottom of the module. O-rings are used to seal the channel bores against the bearing surface. The NW3 coupling nipples to be used for the side of the clamping pallet as well as the relevant installation drawing can be requested from SCHUNK.

NOTE

If the media transfer function is used, ensure that the coupling elements are depressurized and ventilated when loading and unloading the clamping pallet. The NSE-A3 138-V4-P1 model has open media transfer sleeves made of rubber. The interface drawing for the clamping pallet side can be requested from SCHUNK.

Before starting the machining process, ensure that the change unit is resting flat on the bearing surface of the quick-change pallet system and is locked.

Connecting hose lines

If several quick-change pallet systems are activated via one jointly connected hose line, feed lines with the following minimum cross-sections must be used.

Number of modules	At least nominal hose width
1	4 mm
2, 3, 4	6 mm
from 5	8 mm

When disconnecting hose lines, the relevant openings of the air supply connections must be protected with seal plugs or sealing caps to prevent the ingress of dirt or coolant.

Removal from the installation space

Detachable threads facilitate removal of the modules from the installation space of the clamping stations. To pull off the clamping module out of the installation space, two levering tools (e.g. long cylindrical screws) are screwed diagonally into the two available internal threads of the mounting holes.

4.4.1 Mounting

Mounting in the installation space is with 6 M8 screws for the version without torque pin V4, or with 5 M8 screws and a fitting screw for the version with torque pin V4.

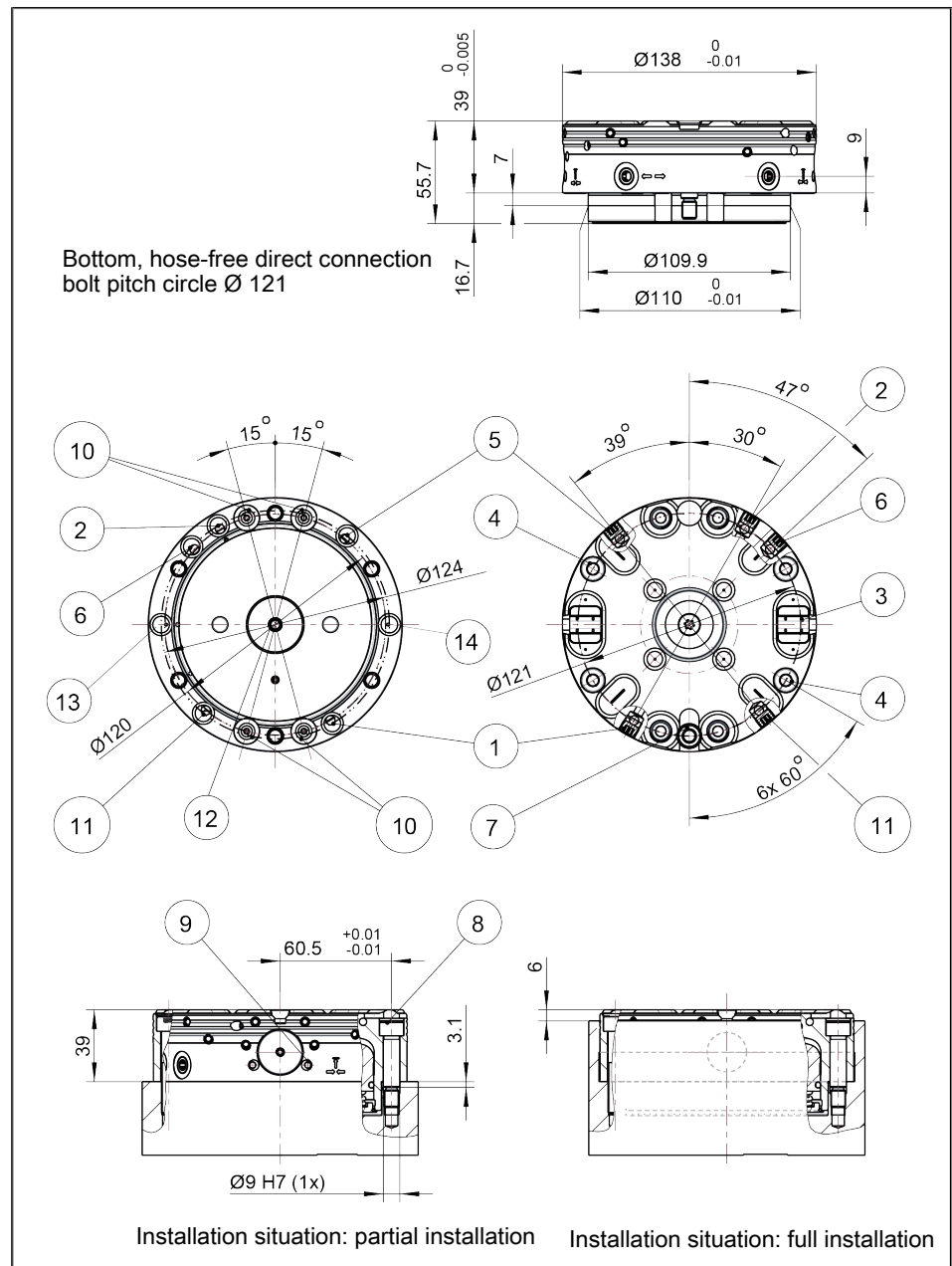
The assembly module can be positioned by means of two centering diameters of the installation space:



Ø 110 H6 in the lower range. For partial and full installation.

Ø 138 H6 in the upper range.

Positional orientation for modules with torque pin V4 is achieved with a fitting screw with a diameter of Ø 9 f7 x 5 mm. In order to do this, make a Ø 9 H7 hole at a distance of 60.5 +/- 0.01 mm from the axis of the centering diameter (Ø110 H6 / Ø138 H6) on the mounting bolt circle.

The air connection is made via the bottom mounting holes in the unit as standard.



No.	Designation
1	Unlocking connection 
2	Turbo connection 
3	V4 torque pin
4	Detaching thread M10 x 10
5	Blow-off support, internal
6	Blow-off support, external
7	Mounting hole for M8 / \varnothing 9 f7 fitting screw
8	Fitting screw
9	Mounting monitoring system AFS3 138
10	Media transfer unit
11	Blow-off support torque pin / media transfer unit
12	Blow-off cone
13	Slide monitoring open
14	Slide monitoring closed

Alternative connection option:

Side G1/8" connections which are free when the lower centering diameter \varnothing 110 H6 is used. In this case, the bottom openings must be sealed. To do so, insert the \varnothing 9 x 1.5 O-rings into the module and seal the bottom direct connections against the flat bearing surface.

Four coupling mechanisms for separate media transfer units are integrated into modules with media transfer units. They are actuated on the bottom of the module. O-rings are located in the transfer units for sealing.

4.5 Clamping pins SPA 40, SPB 40, SPC 40, SPG 40

NOTICE

Notes on clamping pins and mounting screws

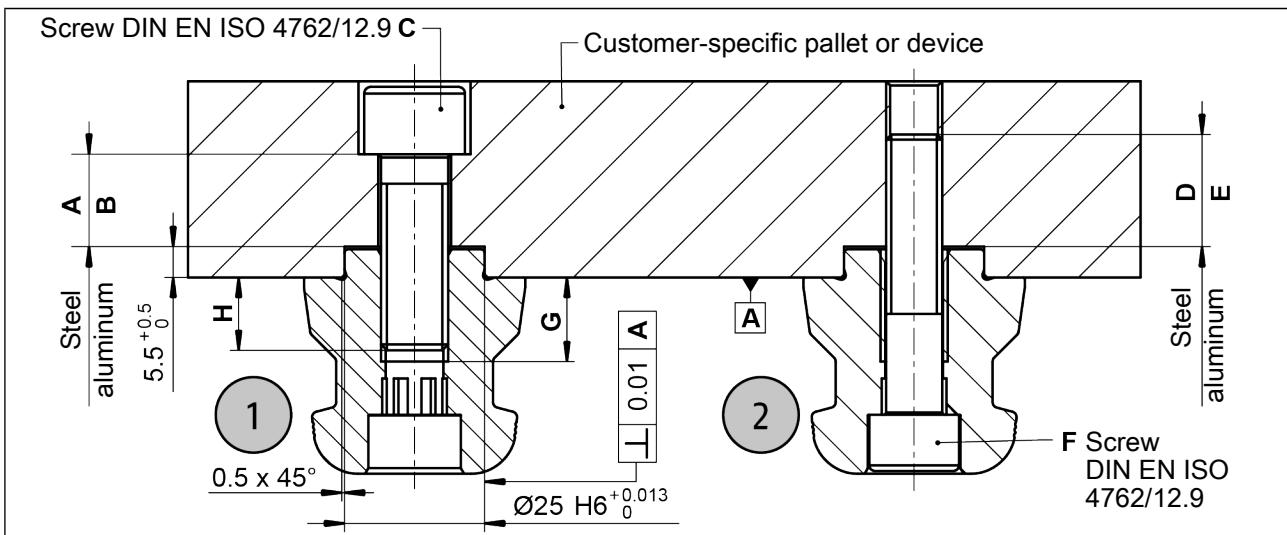
The holding force of the quick-change pallet system is limited essentially by the tightness of the screw connection which connects the clamping pin to the pallet or the device. This is why only screws of strength class 12.9 may be used.

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

The clamping pins can be attached to the workpiece or pallet in two different ways. Preference should be given to the left mounting option in the illustration "Mounting the clamping pins". With this variant, if there is a module failure then the device or pallet can be removed after disassembling the clamping pins. The mounting screw is supplied for the right mounting option as shown in the illustration.

If clamping pins are used outside of SCHUNK pallets, for example in customer-specific devices or workpieces, the outer diameter of the part to be clamped must be large enough to completely cover the inner support area of the quick-change pallet system and the outer support areas of the system must be at least partially covered.

Tolerances and installation conditions

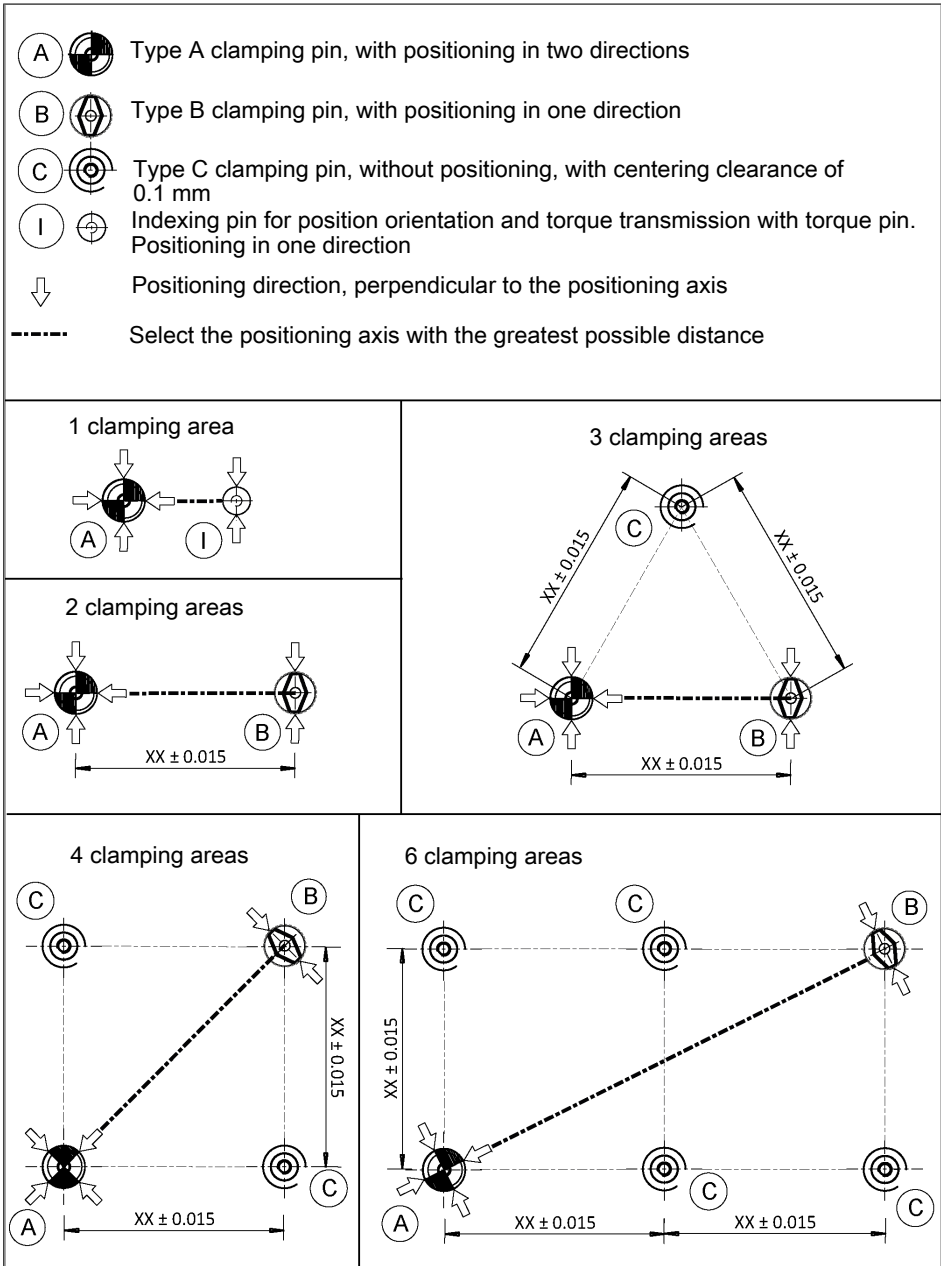


Mounting the clamping pins

Type	ID	A	B	C	D	E	F	G*	H
SPA 40	0471151	> 12	> 17	M12	> 15	> 20	M10	15	> 12
SPB 40	0471152	> 12	> 17	M12	> 15	> 20	M10	15	> 12
SPC 40	0471153	> 12	> 17	M12	> 15	> 20	M10	15	> 12
SPG 40	0471154	> 12	> 17	M12	> 15	> 20	M10	25	> 22
SPA 40-16	0471064	> 13	> 18	M16	> 18	> 24	M12	20	> 16
SPB 40-16	0471065	> 13	> 18	M16	> 18	> 24	M12	20	> 16
SPC 40-16	0471066	> 13	> 18	M16	> 18	> 24	M12	20	> 16

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

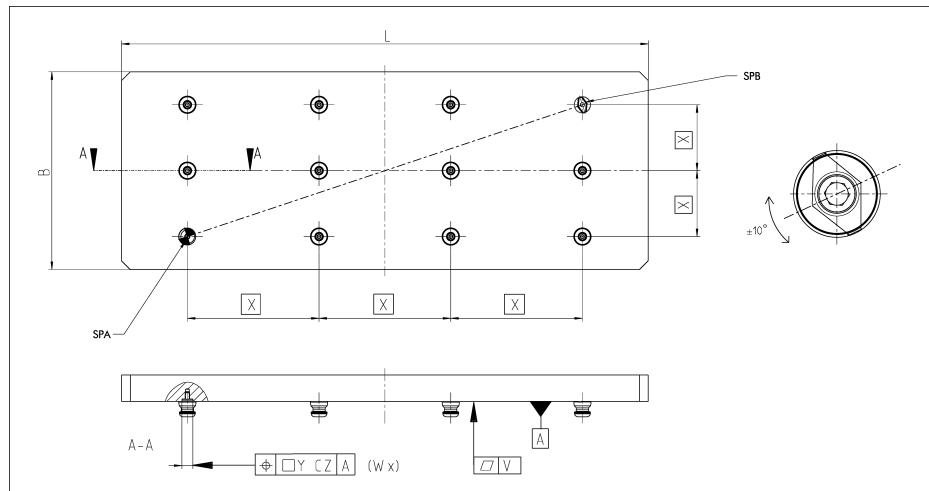
Usage/arrangement of the different types of clamping pins



When positioning the clamping pins, deviating from the previous arrangement examples, the position tolerances given in the following illustration must be observed.

Furthermore, the customer workpiece or the clamping pallet must always have the described flatness.

The clamping pin type B may deviate in its twisting position by max. +/-10°.



X = gauge of the clamping pins is variable
 W = number of clamping pin interface

Plate size [mm]	Position when using clamping pin type A, B and C [mm]	Recommended flatness for optimal results [mm]	Prescribed flatness to ensure the function [mm]
L x B	Y	V	V
0 – 600	0.03	0.02	0.05
600 – 1200	0.04	0.04	0.08
1200 – 1800	0.05	0.05	0.10

4.5.1 Notes on clamping pin SPG 40

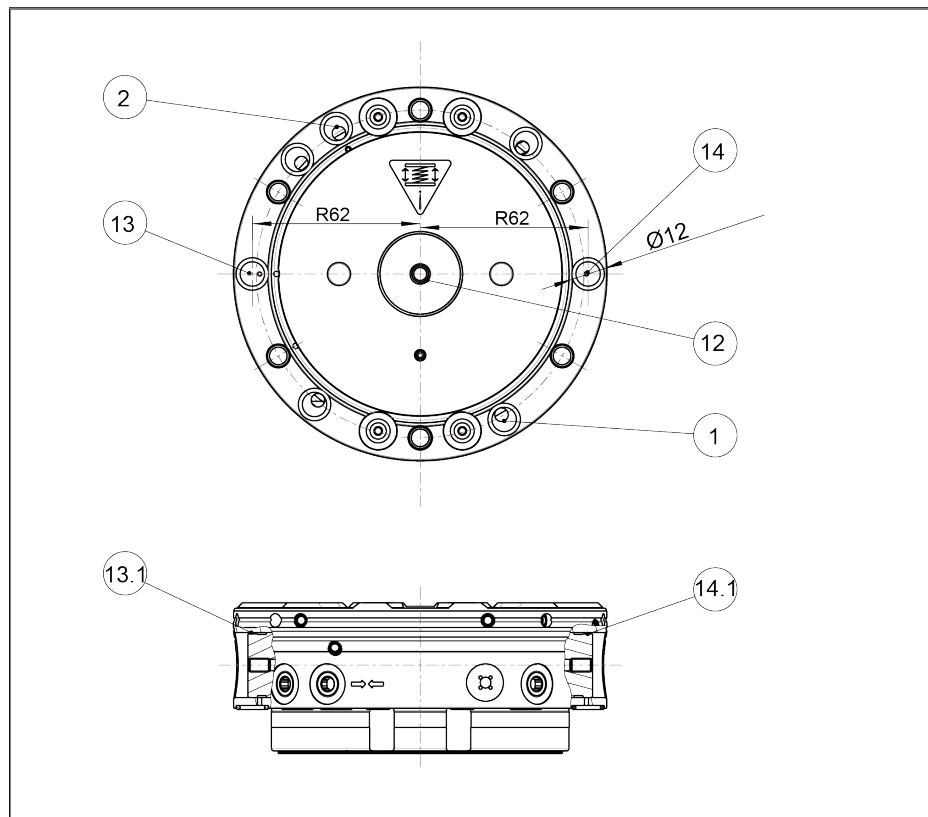
The SPG 40 can be used at a clamping area instead of the SPA 40. The repeat accuracy increases to < 0.002 mm when using the SPG 40. When fitting the screws from above, an M12 screw that is 10 mm longer of strength class 12.9 must be used according to the left mounting option in the illustration "Fastening the clamping pins".

4.6 Clamping slide monitoring

Two dynamic pressure monitoring systems are integrated into all versions of the NSE-A3 138. With these, the respective clamping slide position effects a build up of pressure in the "OPEN" or in the "CLAMPED" condition. Either one of the two monitoring functions can be used or both simultaneously for alternating monitoring. Actuating clamping slide monitoring requires a reduced pressure supply that is limited to 2 bar (see chapter "Pneumatic circuit diagram" ▶ 4.7 [26]).

The measurable differential pressure must reach a minimum of 1 bar for assessment via the air gap sensor to be reliable. The maximum pressure is 2 bar. Monitoring requires a pressure gauge, an adjustable throttle and an air gap sensor.

For clamping slide monitoring, the designated connection must be actuated via a hole in the bottom. The installation drawings can be requested from SCHUNK in case of self-installation.



Dynamic pressure NSE-A3 138

No. Designation

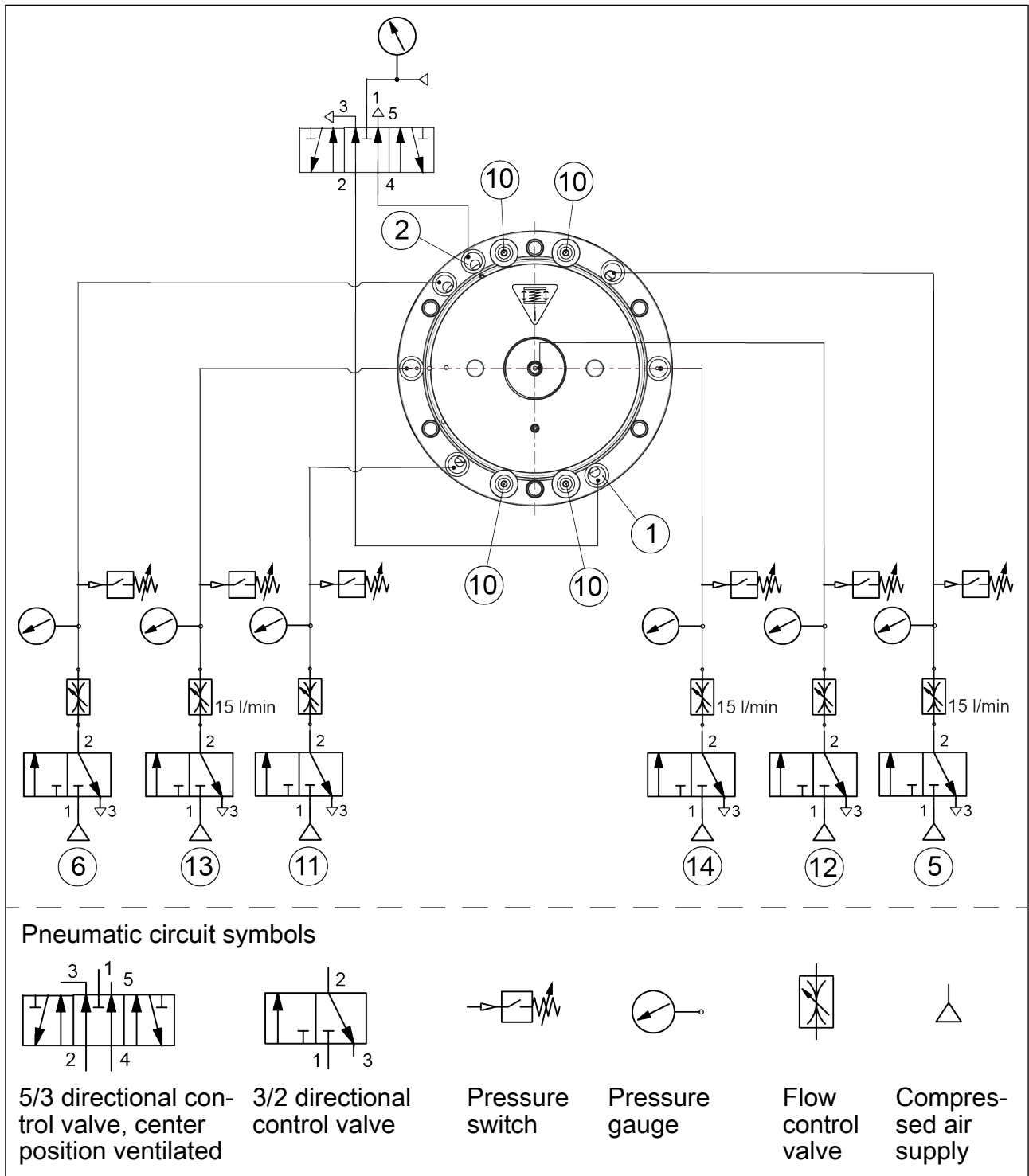
1	Hose-free direct connection for unlocking $\leftarrow \rightleftarrows \rightarrow$
2	Hose-free direct connection for turbo $\rightleftarrows \leftarrow$
14	Hose-free direct connection for dynamic pressure monitoring of the "CLAMPED" clamping slide position
13	Hose-free direct connection for dynamic pressure monitoring of the "OPEN" clamping slide position
14.1	Air outlet for dynamic pressure monitoring of the "CLAMPED" clamping slide position
13.1	Air outlet for dynamic pressure monitoring of the "OPEN" clamping slide position
12	Air connection M7 for air purge / blow-out air for cleaning the change interface

NOTICE

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, ensure that all integrated clamping modules are unlocked.
- **Before beginning the machining process**, ensure that the integrated clamping modules are locked, and that the clamping pallet is placed flat on the bearing surface.

4.7 Pneumatic circuit diagram



Pneumatic circuit diagram with media transfer unit for pneumatics, hydraulics, vacuum

Connection	Function
1	Unlocking connection; actuation with max. 6 bar
2	Turbo connection; actuation with max. 6 bar
5	Internal support: <ul style="list-style-type: none"> • Air purge/contact monitoring: actuation with 2 bar • Blow-out air: actuation with max. 6 bar
6	External support: <ul style="list-style-type: none"> • Air purge/contact monitoring: actuation with 2 bar • Blow-out air: actuation with max. 6 bar
10	Media transfer unit for pneumatics, hydraulics or vacuum, can be coupled when depressurized; Operating pressure max. 300 bar
11	Support torque pin / media transfer unit: <ul style="list-style-type: none"> • Air purge: actuation with 2 bar • Blow-out air: actuation with max. 6 bar
12	Cone: <ul style="list-style-type: none"> • Blow-out air: actuation with max. 6 bar
13	Slide monitoring for module "OPEN"; actuation with max. 2 bar
14	Slide monitoring for module "CLAMPED"; actuation with max. 2 bar

Observe the following when controlling:

Turbo function:

- The actuating pressure for the turbo function must not exceed 6 bar.

Clamping slide monitoring

- The max. pressure for clamping slide monitoring is 2 bar.
- Limit volumetric flow to 15 l/min.
- Pressure difference upon failure of a module min. 1 bar.

Air purge:

Connection via the bottom connection thread:

- Max. pressure 2 bar.
- Limit volumetric flow to 15 l/min.

Blow-out air:

Connection via the bottom connection thread: M7:

- Max. pressure 6 bar, max. 3 bar directly during loading.
- The blow-out air must be switched off before the modules are locked, as otherwise an air cushion may form.

Automatic cleaning of the contact surfaces

Every contact surface of the quick-change pallet module has a bore hole that can be used to control the pallet using dynamic pressure measurement. Due to the decreasing gap between the quick-change

pallet system and the pallet during the approach, there is an cleaning effect for the contact surface of the quick-change pallet module. The areas can be controlled via the connections 5, 6, 11 & 12.

Contact monitoring

The inner and outer contact surfaces of the quick-change pallet module each have a bore that can be used for independent cleaning and for checking the pallet's contact surface by measuring the dynamic pressure. The areas can be controlled via connections 5 and 6.

4.7.1 Connection recommendation for limited control channels

If only a limited number of control channels are available on the machine side, the following assignment of the connections on the module is recommended. The connection numbers refer to the "Pneumatic circuit diagram" ▶ 4.7 [26].

Connection	4 connections	3 connections	2 connections	1 connection
A	1	1	1	1
B	2	2	2 or 12 + 5*	
C	12 + 5	12 + 5 (+6)		
D	13			

* Depending on the machining forces or whether the turbo function is required.

4.8 AFS 138 electronic monitoring systems (optional)

The quick-change pallet system can be optionally equipped with one of two electronic monitoring systems to monitor the clamping slide position and the workpiece mounting function. This replaces pneumatic clamping slide monitoring.

The two AFS 138 PMI and AFS3 138 MMS monitoring systems can be mounted on the left and right of the clamping slide axis.

4.9 Flat seal (option)

The bearing surface of the quick-change pallet system can be optionally protected against contamination such as chips with a circumferential sealing lip. This rests against the exchanged clamping pallet from below and closes the gap between the clamping pallet and the module.

The flat sealing kit (material no. 1469411) contains a sealing ring, which is hooked into the uppermost of the three SCHUNK grooves, as well as an aluminum ring, which is pulled over the sealing ring from the direction of the contact surface and holds it in place.

5 Function

5.1 Cone seal

The quick-change pallet system is equipped with a cone seal to protect the change interface. The sealing unit can be spring-loaded and reset when the module is unlocked.

The change interface is sealed when the clamping module is closed without clamping pins. On the floor, the cone seal has an air connection to actuate a cleaning or air purge function.

Note

The blow-out function must be actuated with the clamping module closed without clamping pins. In this case, the blow-out air is discharged at the sealing position and in so doing blows coolant and chips from the bearing surface. During the loading process, the quick-change pallet system should be supplied with blow-out air before unlocking.

Note

If several clamping modules with a cone seal are fitted in one clamping station, the loading weight of the clamping pallet or the device to be installed must be appropriate to prevent the any lifting away.

Cone seal force: 30 N

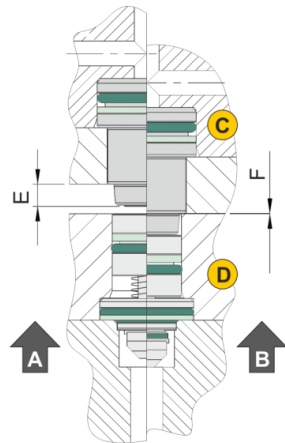
5.2 Media transfer unit

NSE-A3 138-V4-P's have two media transfer interfaces for pneumatics, hydraulics or vacuum.

The pressure-sealed coupling mechanisms do not open until coupling elements are connected. The coupling process can be connected when depressurized. Pressure may only be transmitted to the clamping device when the clamping pallet is fully locked on the clamping modules. The NW3 coupling nipples to be used (I.D. no. 1374387) for the side of the clamping pallet as well as the relevant installation drawing can be requested from SCHUNK.

During the coupling process, make sure that the coupling elements are positioned within ± 0.3 mm of each other from the start of the coupling stroke. A slight leakage is possible when coupled.

The clutch conversions are designed in a way, that the front system seal (item 41.2, ► 10.3.2 [📄 36]) can be exchanged. For carrying out this exchange of seals easily and securely, a suitable assembly tool (item 41.1, ► 10.3.2 [📄 36]) was developed.



- A status uncoupled
- B status coupled
- C coupling nipple
clamping pallet
- D coupling mechanism
clamping module -P -Variant
- E coupling stroke
- F axial position tolerance

The old, damaged seal is pulled out with a punch nail. The new seal is inserted at the front of the assembly tool, and is positioned then via the clutch conversion. By manually pressing it in, the seal is inserted exactly and in the correct position in the axial groove of the clutch conversion. After some minutes, the coupling system is ready. For further information, please visit <https://hydraulische-komponenten.de/en/coupling-technology/coupling-elements.html>.

How to exchange the system seal of the clutch conversion

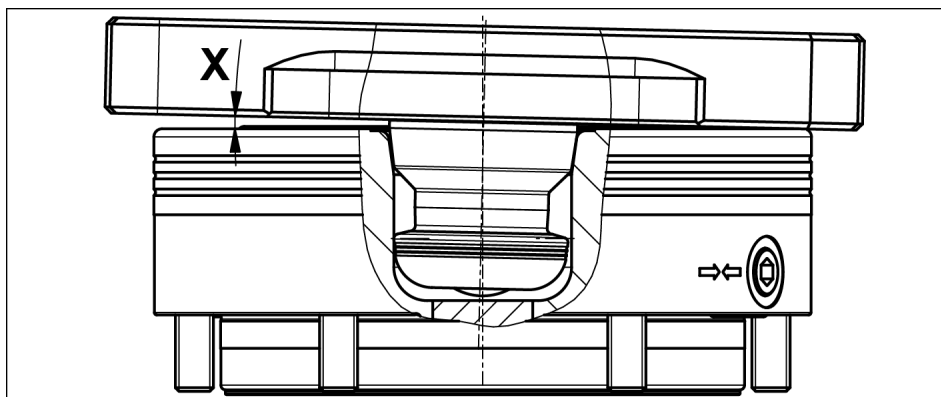


NSE-A3 138-V4-P1 has four open media transfer unit interfaces. The coupling side is to be made with a $\varnothing 5$ mm bore hole with 90° counterbore $\varnothing 9$ mm. While coupling, always make sure that the media transfer unit interfaces are positioned so they are aligned with each other.

6 Operation

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!



⚠ WARNING

Risk of injury due to destruction of pallets or workpieces in the case of incorrect actuation caused by incorrect operation. Risk of injury due to compressed air hoses coming loose when connected improperly.

- Disconnect the energy supply after locking.
- Use check valves or safety switches.
- The danger zone must be surrounded by a protective enclosure during operation.



⚠ WARNING

Risk of injury due to losing pallets or workpieces if the supply of compressed air drops or fails, and due to the clamping pins immediately closing

- Do not reach into the clamping module.
- Use pressure maintenance valves.
- Use loading devices.



⚠ WARNING

Risk of injury due to sudden movements! If the energy supply to the media transfer units is switched on or if residual energy is still present, this can cause the clamping device to move unexpectedly during loading, which may result in serious injuries.

- Before starting any work on the product: Switch off the energy supply and secure against re-connection.
- Ensure that no residual energy remains in the system.
- Do not actuate media transfer units until loading is completed.

7 Maintenance and care

NOTICE

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

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

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



CAUTION

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

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

The back cover of the clamping module is spring preloaded and must only be removed by trained specialist personnel. The cover can only be disassembled and assembled using a special assembly tool and by observing the corresponding disassembly and assembly instructions.

- Check the units at regular intervals (at least every two weeks or after 1000 clampings).
The system is functioning correctly if the clamping slides move smoothly at minimum system pressure (5 bar).
- 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 commissioned again once the faults have been removed. For example, by replacing the damaged unit.

8 Troubleshooting

8.1 The clamping area does not unlock

Possible cause	Remedial measures
Defective air connections	Check air supply
Pressure below minimum	Check operating pressure (min. 5 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

8.2 The clamping area does not unlock properly

Possible cause	Remedial measures
Pressure below minimum	Check operating pressure (min. 5 bar)
The module was not operated with oiled compressed air	Install maintenance unit with oiler
Hose diameter below minimum	Required hose diameters, see chapter "Securing and connecting" ▶ 4.4 [17]
The turbo connection is still pressurized	Ventilate the connection

8.3 The quick-change pallet system no longer opens quietly

Possible cause	Remedial measures
The clamping faces on the clamping slides and on the clamping pin are dirty	Remove the clamping pin and clean the clamping faces on the clamping slides and on the clamping pin

8.4 If the clamping area does not unlock properly

Possible cause	Remedial measures
Clamping pallet is not flat	Depressurize media transfer units, bleed supply to transfer units
Clamping pallet is not flat	Increase the force applied to the coupling connection until the flat contact surface of the module has been reached
Clamping pallet is not flat	Check installation position of coupling elements

8.5 Malfunctions when loading and unloading the change interface with fitted cone seal

Possible cause	Remedial measures
Cone seal jams when actuated	Remove cone seal from the module and clean it
The pressed down cone seal does not return to its original position	Remove cone seal and clean it. Check components for damage.
Clamping area has been filled with accumulated chips	Remove cone seal and clean it. Clean clamping pin holder, replace sealing ring Actuate blow-out function for supplying compressed air
The cone seal is jammed	Check whether the thrust washer is installed in the correct position on the mounting
A component is broken (e.g. due to overloading)	Replace damaged component of the cone seal. Check change interface of the module for damage
Clamping pallet clamps when unlocking the module from the change interface	Increase loading weight or pressure force.

8.6 The cone seal does not seal

Possible cause	Remedial measures
Sealing ring is damaged or deformed	Remove seal and replace sealing ring
Sealing ring is damaged	Initiate loading and unloading process only when clamping slides are fully retracted
Sealing ring insufficiently splayed when closing the clamping module	Ensure that the components are installed in the correct position

8.7 The media transfer unit of the NSE-A3 138-V4-P is not working

Possible cause	Remedial measures
Coupling elements are not positioned correctly in alignment to each other	Check the positioning of the pallet, connect it so that it is aligned to the module functions
Failure to observe installation recommendation for coupling nipple in clamping pallet	Check installation recommendation for the coupling nipple
Clamping pallet is not resting flat on the modules	Ensure that the media transfer units are depressurized and ventilated

9 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.

10 Sealing kits, accessory kits and part lists

10.1 Sealing Kit List

Size / Sealing kit*	ID
NSE-A3 138	1579089
Cone seal	1153525

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

10.2 Accessory kits

Accessory kit*	ID
NSE-A3 138	1474891
NSE-A3 138-V4	1354216
NSE-A3 138-V4-P	1354216
NSE-A3 138-V4-P1	1354216

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

10.3 Parts lists

10.3.1 Cone seal

Item	Description	Quantity	Note
31	Mount	1	
32	Thrust washer	1	
33	Cover plate	1	
34	Cover	1	
35	Sealing ring	1	
36	Compression spring	1	
37	Countersunk screw	1	
38	O-ring	1	
39	O-ring	1	

10.3.2 Size NSE-A3 138

Item	Designation	Quantity	Note
1	Base body	1	
2	Cover	1	
3	Clamping slide	2	
4	Piston	1	
5	Cone seal	1	
6	Slide washer	1	X
8	Fitting screw	1	V4 / Z

Item	Designation	Quantity	Note
10	Cover cap	6	X / Z
12	O-ring	4	X
13	O-ring	1	X
14	O-ring	1	X
15	Round cord section	2	X
16	O-ring	1	X
17	O-ring	1	X
19	O-ring	6	X / Z
	O-ring	7	V4 / X / Z
20	Slide bearing collar bushing	4	
21	Cylindrical pin	2	
22	Cylindrical screw	4	
23	Pressure spring	8	
24	Set screw	1	
25	Set screw	1	
26	Set screw	2	
27	Locking screw G1/8"	5	
28	Cylindrical screw	6	Z
	Cylindrical screw	5	V4 / Z
29	O-ring	1	Z
30	Flex insert	2	V4
41	Coupling mechanism	4	P
41.1	Assembly tool (9985594)	1	E
41.2	Spare seals blue (1649904)	4	E
42	Stop sleeve	2	P
43	O-ring	4	P1 / Z
44	O-ring	1	

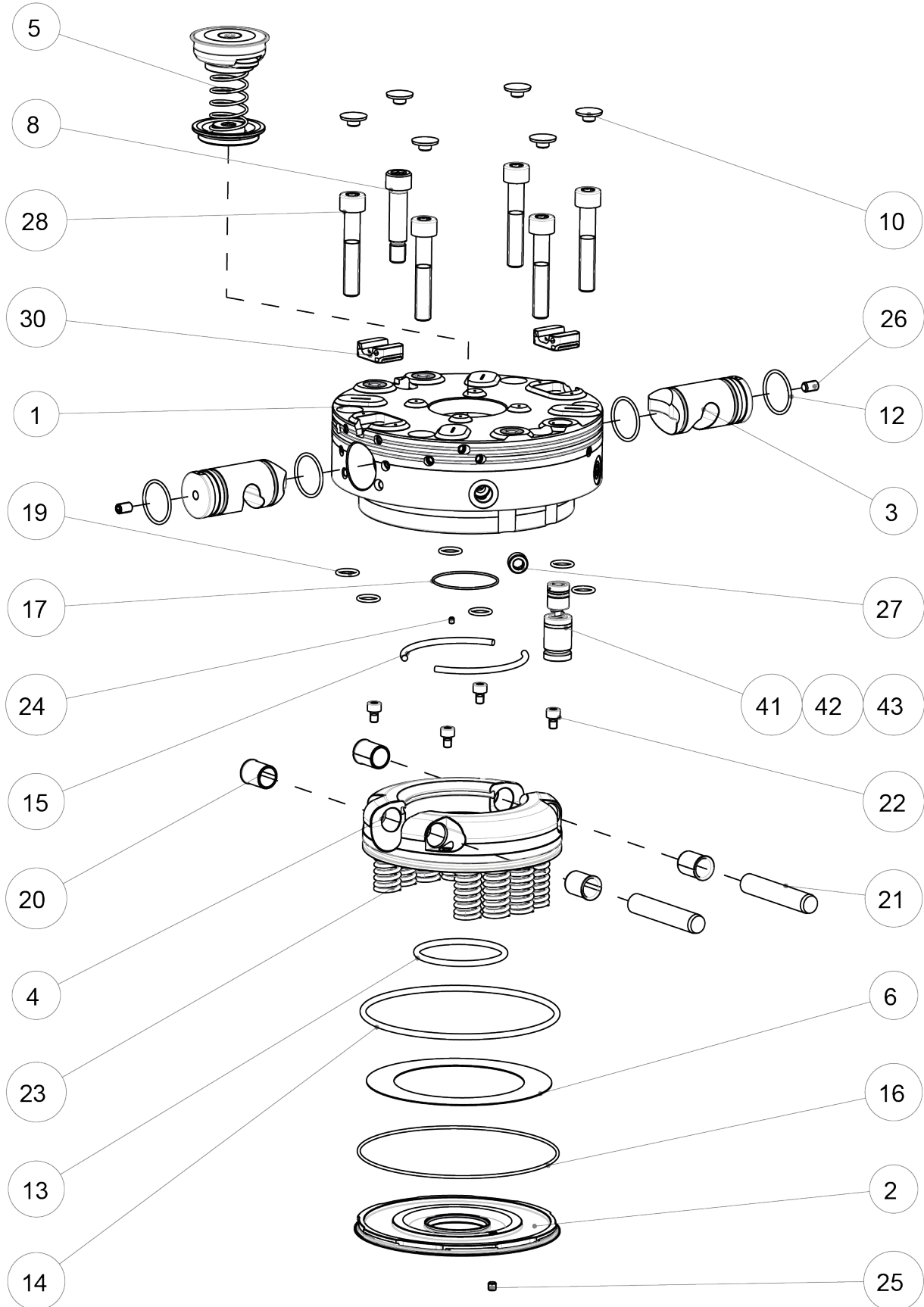
The bearing bushings may only be replaced in case of damage as part of maintenance work by SCHUNK. For this purpose, the quick-change pallet module must be sent to the company SCHUNK for maintenance.

Parts list key

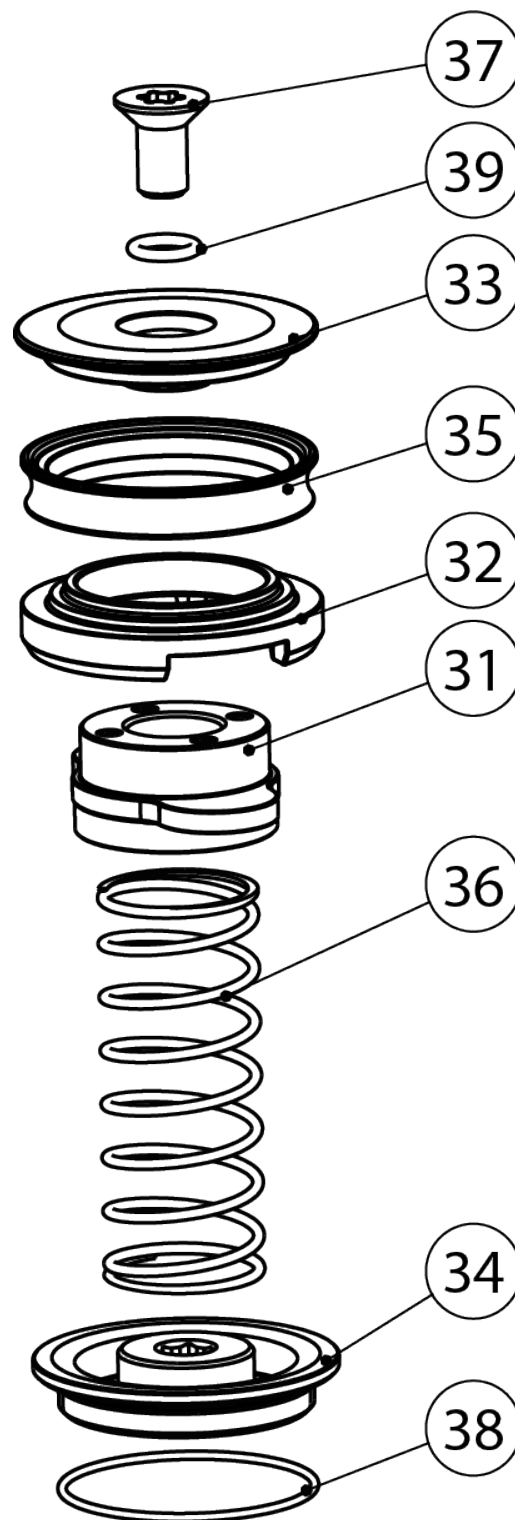
E	Spare part	V4	-V4 -Variant
P	-P -Variants	X	Included in the sealing kit
P1	-P1 -Variant	Z	Included in the accessory kit

11 Assembly Drawings

11.1 Assembly



11.2 Cone seal



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:	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

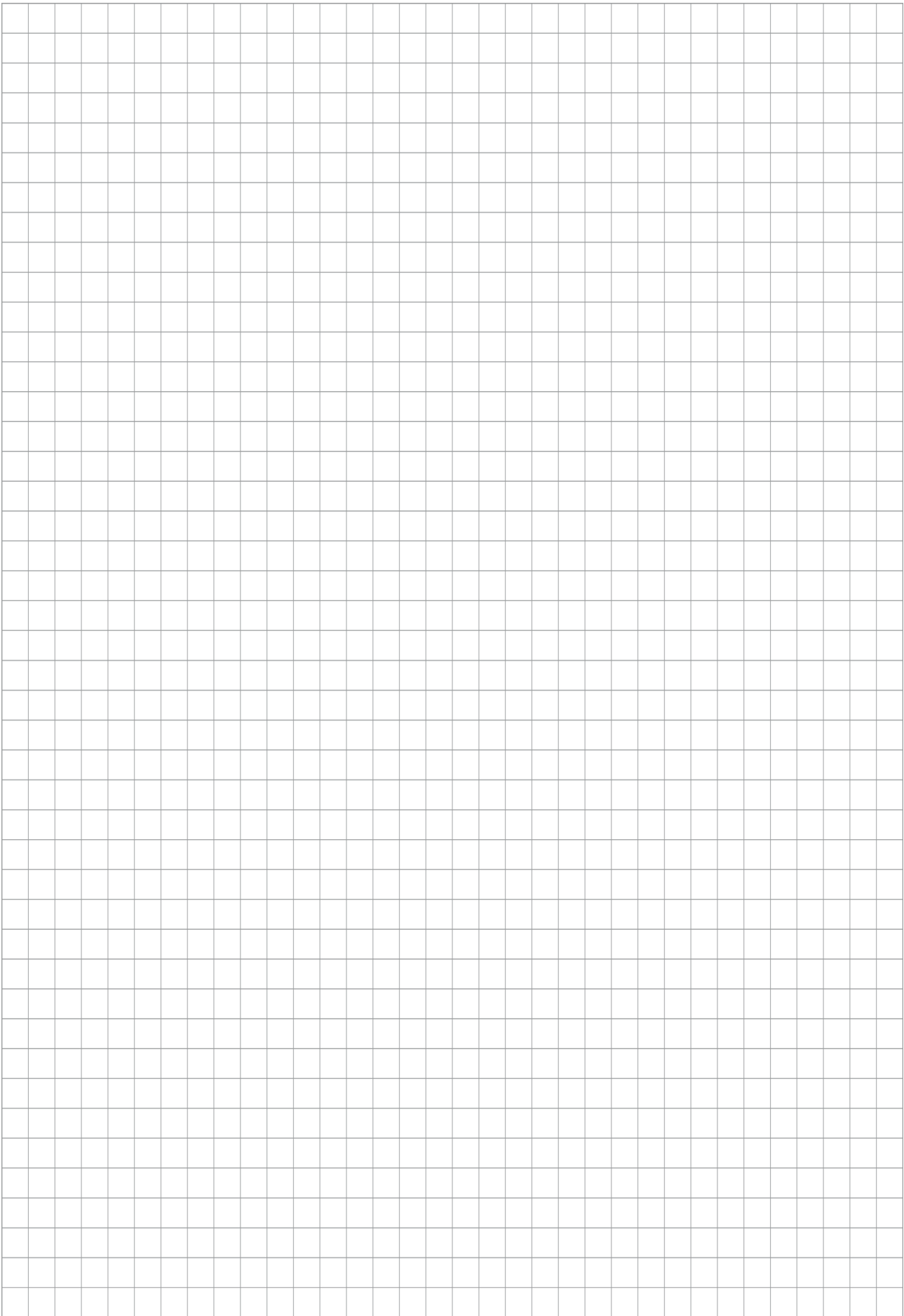
Mengen, 19th of July 2023

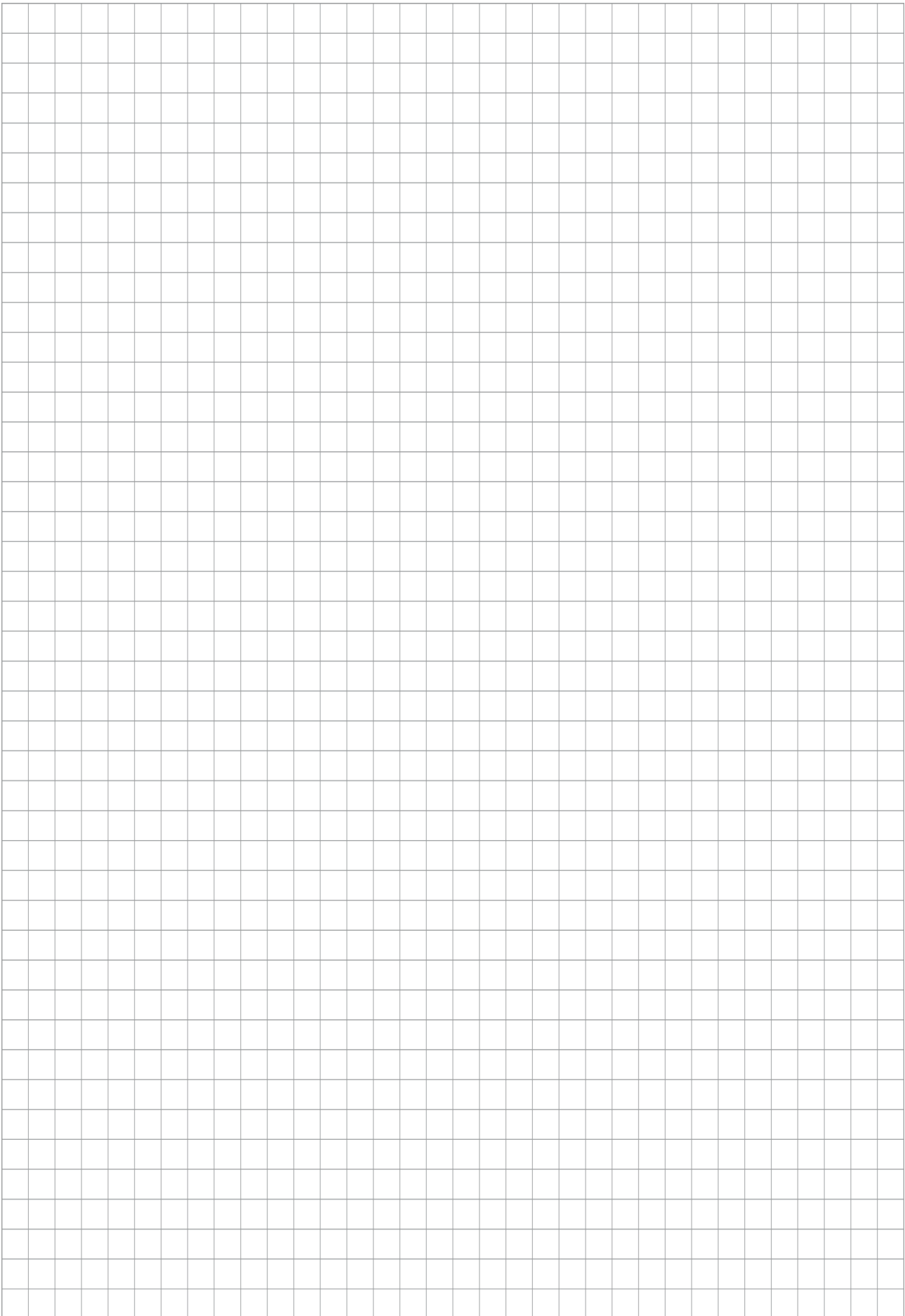
Signature: see original declaration

Signature: see original declaration

p.p. Philipp Schröder
Head of Development standard products

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









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