

VERO-S Quick-Change Pallet System

NSE plus, NSL plus, NSD plus

Assembly and Operating Manual



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,

congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards

Your H.-D. SCHUNK GmbH & Co.

Spanntechnik KG

Lothringer Str. 23

D-88512 Mengen

Tel. +49-7572-7614-0

Fax +49-7572-7614-1099

info@de.schunk.com

www.schunk.com



Reg. No. 003496 QM08



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1 General

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

Before using the product, read and comply with this manual, especially the chapter "Basic safety notes". Link Grundlegende Sicherheitshinweise

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

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

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

1.1 Warnings

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

	 DANGER Danger for persons. Non-compliance will inevitably cause irreversible injury or death.
	 WARNING Dangers for persons. Ignoring a safety note like this can lead to irreversible injury and even death.
	 CAUTION Dangers for persons. Non-observance can cause minor injuries.
	NOTICE Material damage Information about avoiding material damage.

	 WARNING
	Warning about hand injuries

	 WARNING
	Warning about hot surfaces

1.2 Applicable documents

General terms of business

Catalog data sheet of the purchased product

The documents listed here, can be downloaded on our homepage
www.schunk.com

2 Basic safety notes

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

- Report breakdowns and damages as soon as you detect it and repair immediately, so as to keep the extent of damage as small as possible and to avoid risking the safety of the product.
Only original SCHUNK spare parts may be used.

2.1 Intended use

This product is intended for positioning and clamping of clamping pallets or workpieces. This product may only ever be employed within the restrictions of its technical specifications. The requirements of the applicable directives must be observed and complied with.

The product is intended for industrial use.

Intended use also means that the user has read and understood this operating manual in its entirety, especially the chapter “Basic safety notes”.

2.2 Not intended use

A not intended use of the product is for example:

- it is used as hoisting device, toolholder, compression mold or gripper.
- It is used under working environment conditions that are not permissible.
- People work on machines or technical equipment that do not comply with the EC Machinery Directive 2006/42/EC, disregarding the applicable safety regulations.
- The technical data specified by the manufacturer for using the chuck are exceeded.

2.3 Notes on particular risks

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

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

	 WARNING Risk of injury due falling parts during transport, assembly and disassembly the Quick-Change Pallet System. Improperly secured parts can break off and fall. • Use a suitable lifting equipment and transport. • During transport do not step into the danger area. • Wear personal protective equipment.
	 WARNING Risk of injury to persons during transport of the system and in case of horizontally placed clamping pin axis or overhead applications due to falling down of the fixture or pallet. • Use a crane or trolley for transport. • In case of horizontal or overhead applications, secure the fixture or pallet against falling down during loosening the clamping modules.
	 WARNING Risk of injury to persons due to falling down of the fixture, pallet or workpiece by erroneous or negligent loosening of the clamping pins. • During operation, incorrect or incautious loosening of the clamping pin must be prevented by suitable measures (disconnection of power supply after locking, use of safety valves or safety switches). • The machines and facilities must fulfill the minimum requirements of the EC Machinery Directive 2006/42/EC; specifically, they must have effective technical measures to protect against possible mechanical hazards. • Wear personal protective equipment.



WARNING

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

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



CAUTION

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

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



CAUTION

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

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



CAUTION

There is a risk of limbs being crushed during manual loading and unloading of moving parts and during the clamping process.

- Do not reach into the clamping pin holder.
- Work with the smallest possible clamping and opening strokes.
- Use loading aids.
- Wear protective gloves.



⚠ CAUTION

Risk of slipping or falling if the chuck's operational environment is not clean (e.g. contaminated with cooling lubricants or oil).

- Ensure that the working environment is clean before starting assembly and installation work.
- Wear suitable safety boots.
- Follow the safety and accident-prevention regulations when operating the chuck, especially when working with machine tools and other technical equipment.



⚠ CAUTION

Risk of burns due to workpieces with high temperatures

Workpieces with high temperatures pose the risk of burns.

- Wear protective gloves when removing the workpieces.
- Automatic loading is preferred.



⚠ CAUTION

Risk of exposure to pneumatic's exhaust noise

Noise from air system and pneumatic equipment during the machining process.

- Wear hearing protection.

2.4 Product safety

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

Maintenance instructions

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

Safety during assembly and maintenance

During assembly, connection, setting, commissioning and testing, it is important to eliminate the possibility of the fitter or any other persons accidentally activating the system.

Refrain from all work that could threaten safety.

2.4.1 Holding force and screw strength

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

Only original SCHUNK-Clamping-Pins are to be used.

When the clamping pin is used in the customer's own assembly device, the customer is to provide for a sufficiently dimensioned tap and satisfactory strength of the fastening material.

2.4.2 Constructional changes, attachments, or modifications

Additional threads, bore holes or attachments which are not supplied as accessories by SCHUNK may affect safety. They may only be applied after obtaining the prior consent of SCHUNK.

2.5 Personnel qualification

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

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

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

2.6 Organizational measures

Compliance with the Regulations

The business operator must guarantee that suitable measures in organisation and instruction are taken to ensure that the appropriate safety rules and regulations are complied with by the persons entrusted with operation, maintenance and repair of the system.

Supervision of Conduct

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

Hazard Notices

The business operator must ensure that the notes of safety and hazards for the machine to which the system is mounted are observed and that the notice signs are clearly legible.

Troubles

If troubles occur at the system which could affect safety- or production characteristics indicate that faults are in existence, the machine (to which the system is mounted) must be stopped immediately and stand still as long as required to locate and eliminate the fault. Only allow specialists to remedy faults.

Spare parts

Only use original SCHUNK spare parts.

Environmental Protection Requirements

The current environmental protection requirements must be observed during all maintenance and repair work.

2.7 Using personal protective equipment

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

3 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility under the following conditions:

- Observe the applicable documents
- Observe the environmental and operating conditions.
- The maximum number of clamping cycles is observed
([👉 5, Page 15](#))
- Observation of the maintenance and care instructions
([👉 8, Page 48](#))

Parts touching the work piece and wearing parts are not part of the warranty.

4 Scope of delivery

- **Quick Change Pallet System**
(NSE plus 90, NSE plus 99, NSE plus 138, NSE plus 138-V1, NSE-T plus 138, NSE-T plus 138-V1, NSE plus 176, NSE plus 176-V1, NSE plus 100-75)
- **Assembly and Operating Manual**
- **Enclosed pack**
 - NSE plus 90:* 2 O-rings Ø 4 x 1.5, 2 Set screws M4 x 4
 - NSE plus 99:* 2 O-rings Ø 4.5 x 1.5, 6 Covering caps, 6 Fastening screws M6
 - NSE plus 138:* 3 O-rings Ø 9 x 1.5, 6 Covering caps, 6 Fastening screws M8
 - NSE plus 138-V1:* 3 O-rings Ø 9 x 1.5, 6 Covering caps, 6 Fastening screws M8
 - NSE-T plus 138:* 2 O-rings Ø 9 x 1.5, 6 Covering caps, 6 Fastening screws M8
 - NSE-T plus 138-V1:* 2 O-rings Ø 9 x 1.5, 6 Covering caps, 6 Fastening screws M8
 - NSE plus 176:* 3 O-rings Ø 9 x 1.5, 6 Covering caps, 6 Fastening screws M8
 - NSE plus 176-V1:* 3 O-rings Ø 9 x 1.5, 6 Covering caps, 6 Fastening screws M8
 - NSE plus 100-75:* 3 O-rings Ø 4.5 x 1.5, 4 Covering caps, 4 Fastening screws M8

- **Clamping Station**

(NSL plus 150, NSD plus 150, NSL plus 200, NSD plus 200, NSL plus 400, NSL plus 600, NSL plus 800)

- **Enclosed pack**

NSL plus 150, NSD plus 150: 2 Cylindrical clamp blanks (BRR 50)

NSL plus 200, NSD plus 200, NSL plus 400: 4 Cylindrical clamp blanks (BRR 50)

NSL plus 600: 6 Cylindrical clamp blanks (BRR 50)

NSL plus 800: 8 Cylindrical clamp blanks (BRR 50)

4.1 Accessories

- **Accessories**

(on separate order, see catalog or data sheets)

Clamping pallets Type PAL

Clamping pin Types SPA, SPB, SPC, SPG

Mounting ring Type BRR

Assembly and retrofit station Type MRS

Dome-shaped centering bushing Type ZKA

Protection cover Type SDE

Fitting bolt PBN

5 Technical data

Designation Type	Id.-No.	Retention force* (M10 / M12 / M16 / M20)	Pull-down force without turbo	Pull-down force with turbo
NSE plus 90	0471059	35 kN	2.5 kN	11 kN
NSE plus 99	0471120	30 kN / 50 kN / 75 kN	4.0 kN	16 kN
NSE plus 138	0471150	35 kN / 50 kN / 75 kN / 75 kN	7.5 kN	25 kN
NSE plus 138-V1	0471095	35 kN / 50 kN / 75 kN / 75 kN	7.5 kN	25 kN
NSE-T plus 138	0471076	35 kN / 50 kN / 75 kN / 75 kN	6.0 kN	20 kN
NSE-T plus 138-V1	0471077	35 kN / 50 kN / 75 kN / 75 kN	6.0 kN	20 kN
NSE plus 176	0471060	35 kN / 50 kN / 75 kN / 75 kN	9.0 kN	40 kN
NSE plus 176-V1	0471096	35 kN / 50 kN / 75 kN / 75 kN	9.0 kN	40 kN
NSE plus 100-75	0471130	30 kN / 50 kN / 75 kN	4.0 kN	14 kN

* Retention force mounting the clamping pin with cylindrical head screw – DIN EN ISO 4762/12.9

Operating pressure	6 bar
Repeatability [mm]	< 0.005 mm
Mounting position	optional
Operating temperature	15° – 60°C
Required degree of cleanliness	IP 30 according to DIN EN 60529
Noise emission [dB(A)]	≤ 70
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4
IP rating	IP 67

The air supply must be done via a separate maintenance unit with oiler.

Warranty and maximum clamping cycles

Duration of warranty	24 Months
Maximum clamping cycles	500 000

5.1 Special technical data NSE plus 138

If the technical data for type NSE plus 138 are observed, it can be used as a working face of a welding robot.

Type	NSE plus 138
Id.-No.	0471150
Welding voltage	33.6 V up to 46 V
Welding current	300 A up to 600 A
Gas flow rate	4.0 l/min
Tested protective gas type	Corgon 18 (82% Argon, 18% CO ₂)

Before initial start-up, please make sure that the machine / plant where the Quick Change Pallet System should be integrated to, complies with the stipulations of the EC machinery directives.

Please contact your contact person at SCHUNK, if you intend to use the Quick Change Pallet System for any application other than the system is designed for (other margin of voltage and current, etc.).

6 Assembly

Measures before beginning installation

Install the Quick Change Pallet System carefully (e.g. with lifting equipment).

	CAUTION
Risk of injury due to sharp edges and rough or slippery surfaces Use personal protective equipment, especially gloves.	

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

Only specially trained staff should install, disassemble and modify the Quick Change Pallet System.

Disconnect the energy supply lines and ensure that there is no residual energy in the system when performing assembly, modification, maintenance, or adjustment work.

Wear protective equipment (protective gloves and safety shoes).

	NOTICE In case of installation position 2 the clamping slides may block due to the ingress of chips and dirt. Therefore do not install the unit in this position A damage of the module is possible.
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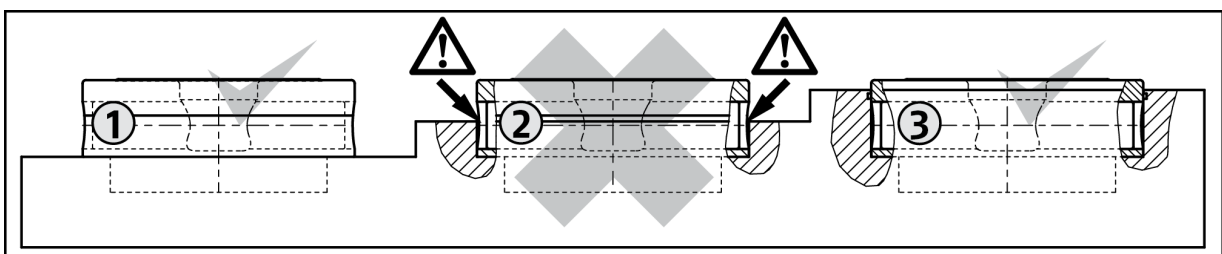


Fig. 1 Installation positions

	WARNING
Risk of injury due to falling down of the Quick Change Pallet System during transport Transport carefully. Use a crane and/or a trolley for transport	

	CAUTION
Risk of injury due to squeezing • Install the Quick Change Pallet System carefully. • Don't get your limbs in a gap between moving parts or clamping fixture of the machine • Wear protective gloves.	

6.1 General assembly notes

If you wish to install the unit yourself, please request our drawing.

If several clamping units are to be mounted in serial connection, please make sure that the evenness and deviation in height of the supporting surfaces from module to module keeps within 0.01 mm (relating to a depth gauge of 200 mm). The deviation of the interface position should not exceed ± 0.015 mm.

Due to the redundancy, clamping systems that are lying further than 160 mm apart from each other or whose positioning tolerance is not within ± 0.01 mm should use clamping pins with positioning accuracy in one direction (SPB 40). For clamping positions which are not used for alignment of the devices or pallets, clamping pins with centric scope (SPC 40) can be used (see also chapter 6.4).

NOTE

When connecting the quick change pallet system, please make sure that a complete deaeration of the piston area during the locking operation is possible through the air ports. Therefore, valves or stop valves for deaeration should be available. If the turbo connection will not be used, it must be possible that the relevant piston side can be deaerated.

If the turbo connection will not be used, please consider the following possibilities of deaerating the unit (see figure 2).

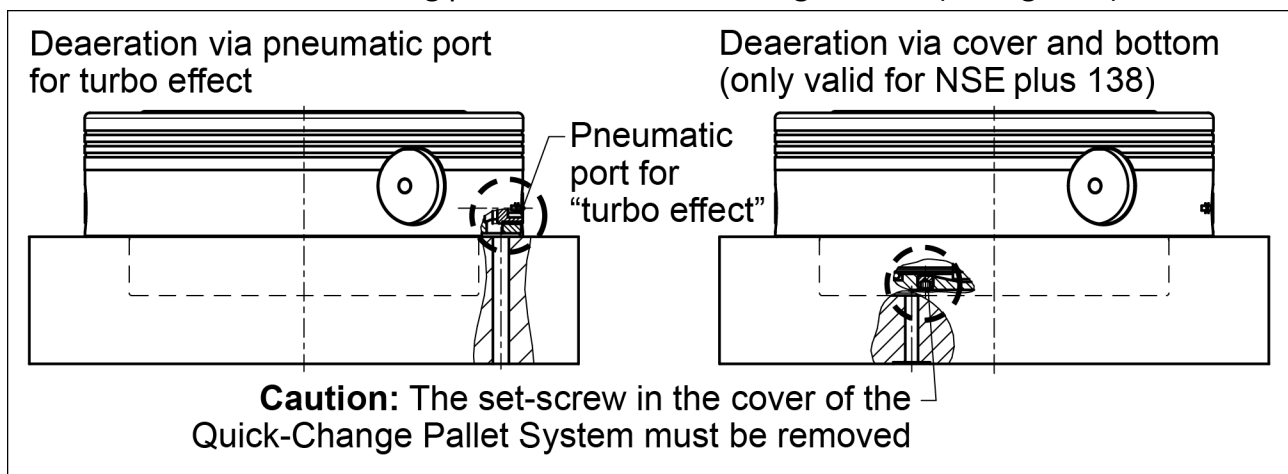


Fig. 2 Possibilities of deaeration

When uncoupling the air hoses the corresponding openings have to be sealed with sealing plugs in order to prevent ingress of dirt or coolant into the module. If several clamping units are actuated with common air hoses, the following minimum cross section of the air feedings have to be respected.

Number of modules	min. internal hose diameter
1	4 mm
2, 3, 4	6 mm
5	8 mm

6.2 Fastening and connection

If you wish to install the unit yourself, please request our drawing.

6.2.1 NSE plus 90

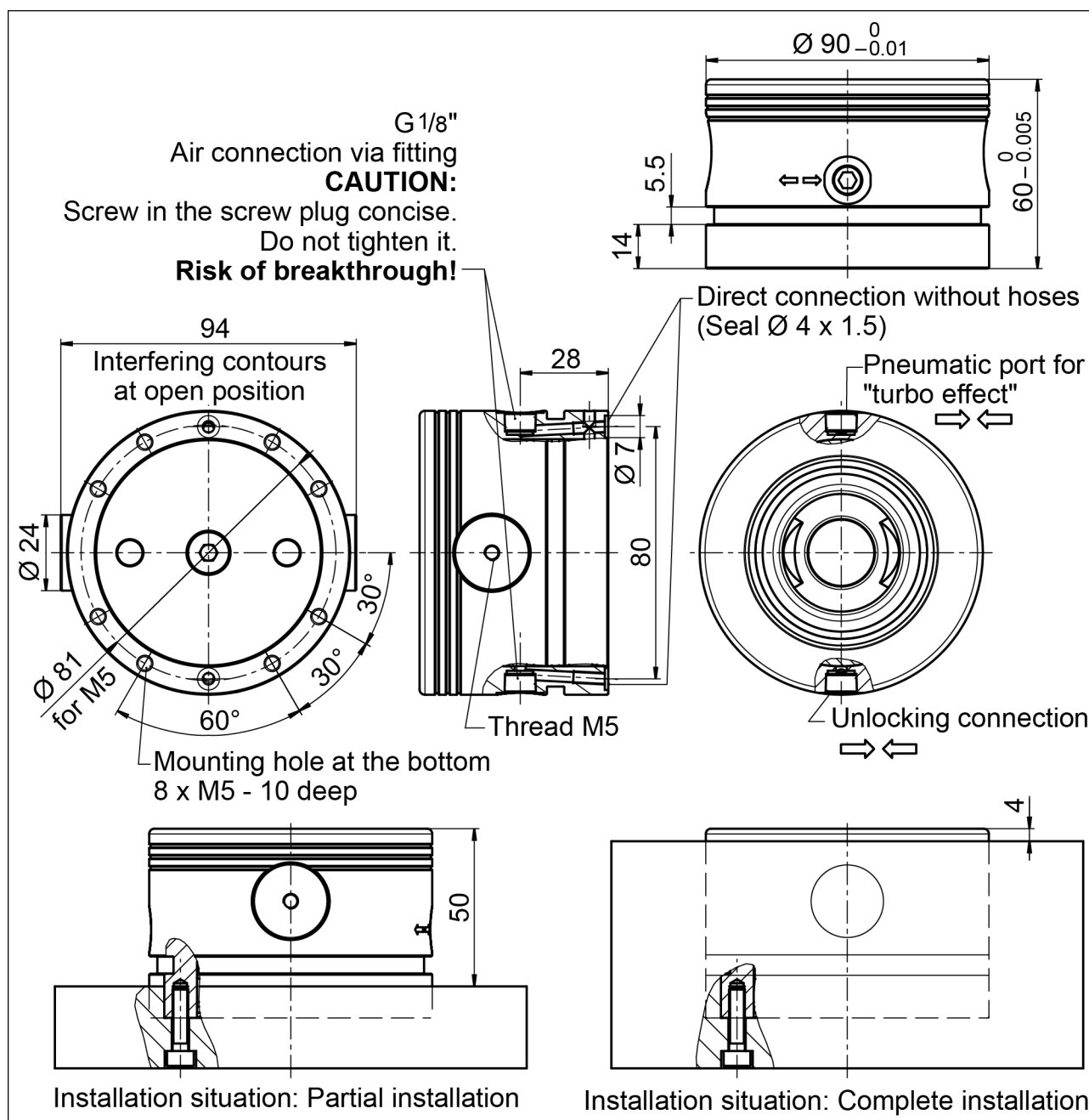


Fig. 3

The NSE plus 90 is fastened in the installation area with 8 screws M5 (see figure 3).

Positioning of the module is done via the centering diameter of the installation area: $\varnothing 90H6$.

The standard air connection is done via connection bores at the bottom of the unit. As an alternative connection possibility, the unit is equipped with two lateral G1/8"-connections. In this case, the openings at the bottom have to be sealed with two set-screws M4 x 4 from the enclosed pack.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

6.2.2 NSE plus 99

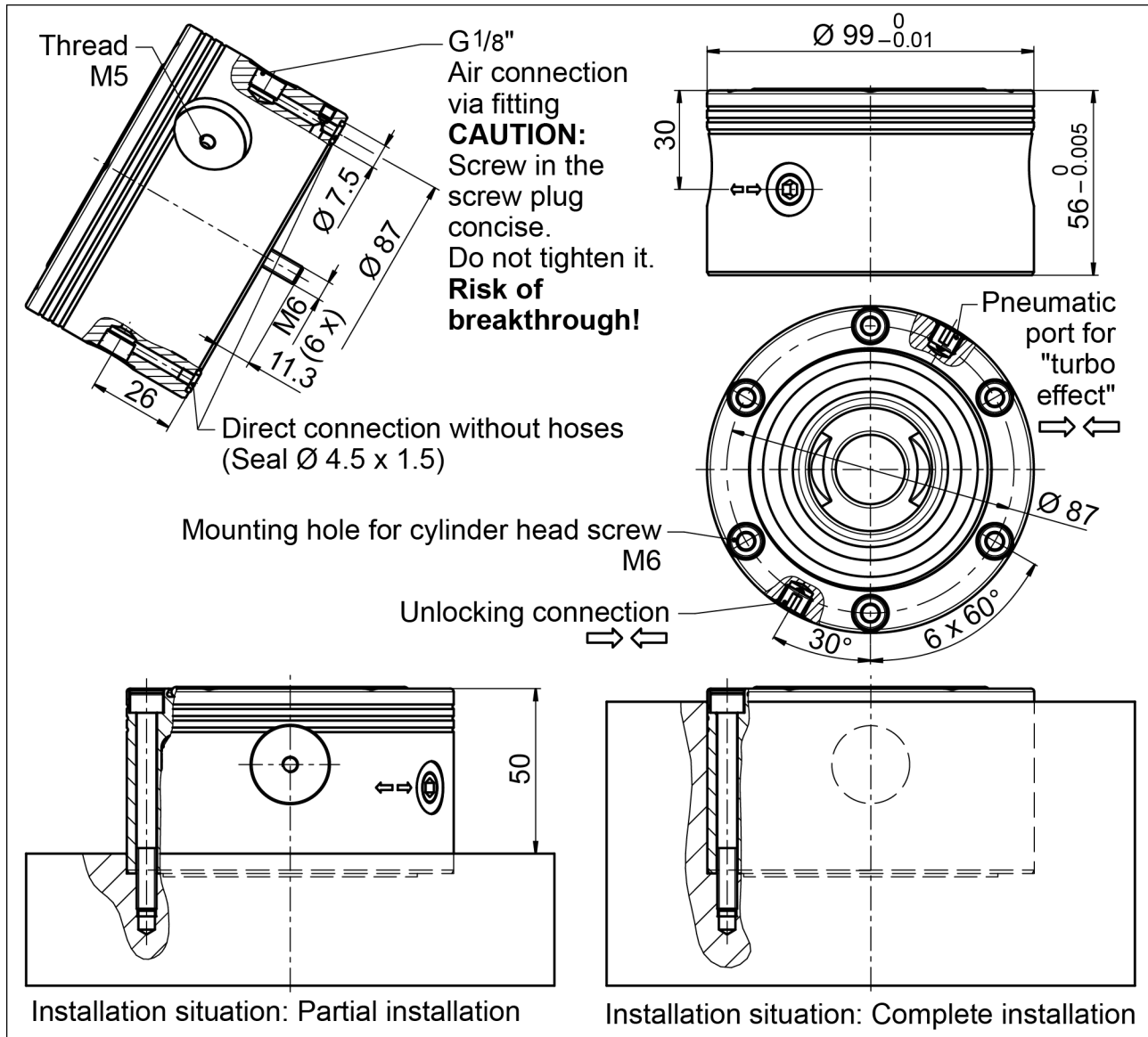


Fig. 4

The NSE plus 99 is fastened in the installation area with 6 screws M6 (see figure 4).

Positioning of the module is done via the centering diameter of the installation area: $\varnothing 99H6$.

The standard air connection is done via connection bores at the bottom of the unit. As an alternative connection possibility, the unit is equipped with two lateral G 1/8"-connections. In this case, the openings at the bottom have to be sealed with two set-screws M4 x 4 from the enclosed pack.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

6.2.3 NSE plus 138

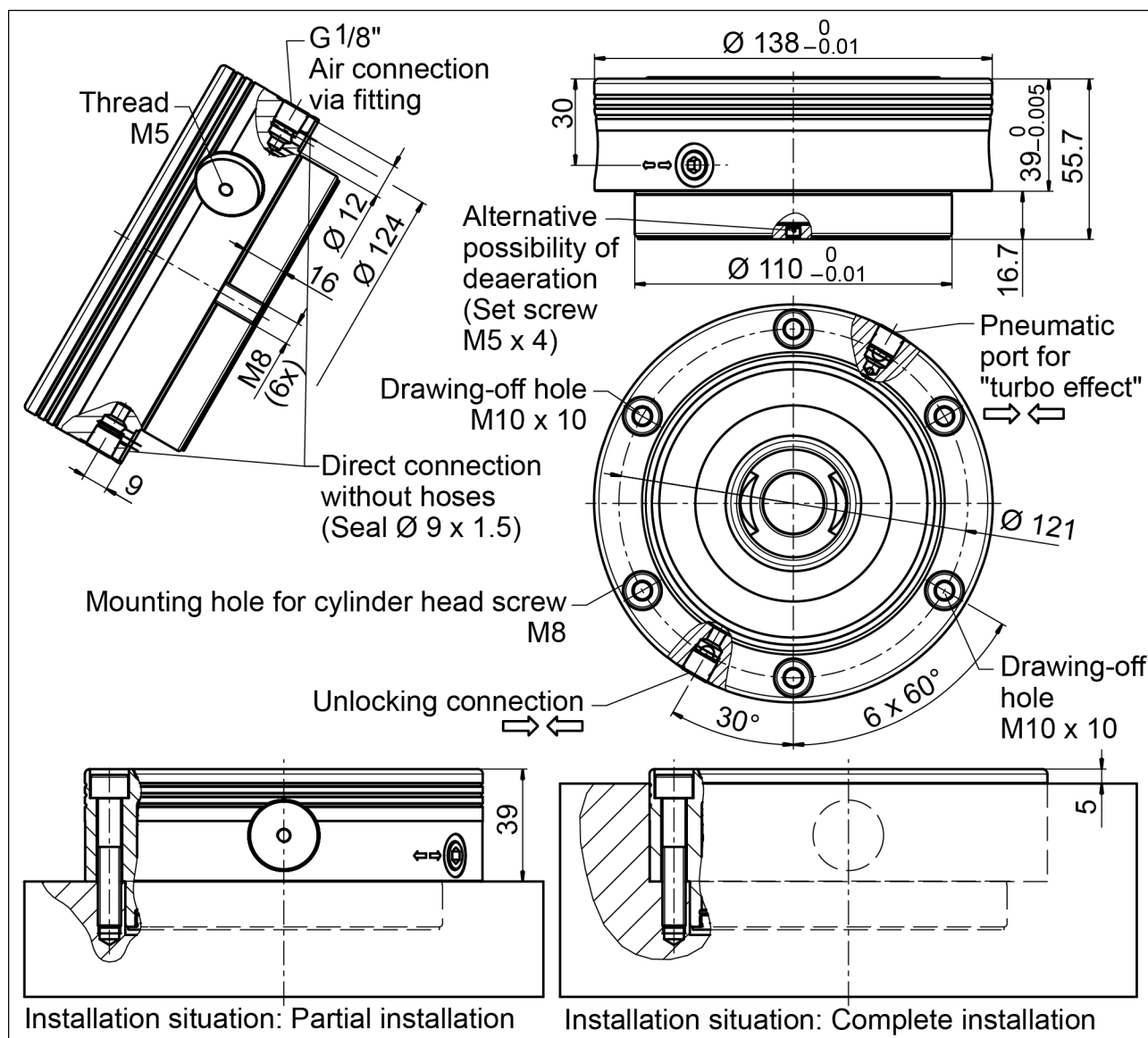


Fig. 5

The NSE plus 138 is fastened in the installation area with 6 screws M8 (see figure 5).

Positioning of the module can be done via two different centering diameters of the installation area:

Ø 138H6 (upper area)

Ø 110H6 (bottom area) depending on the installation version.

The standard air connection is done via connections bores at the bottom of the unit. Alternatively, the unit can be connected via the lateral G1/8"-connection, which is available in case of use of the

bottom centering diameter 110H6. In this case the opening at the bottom must be sealed: either by inserting an O-ring dia. 9 x 1.5 and putting on an even support, or by using sealing plugs.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

This is done ideally via the turbo function. Alternatively, bleeding can also be done by removing the M5 x 4 set-screw in the lid of the quick change pallet system.

The drawing-off holes simplifies the assembly of the modules from the clamping stations (see figure 5).

6.2.4 NSE plus 138-V1

The NSE plus 138-V1 is fastened in the installation area with 6 screws M8 (see figure 6).

The exact position orientation is done with a fitting screw with a diameter of $\varnothing 9 \text{ f7} \times 5 \text{ mm}$.

Precise alignment and positioning of the quick change pallet system requires that the fitting bore $\varnothing 9 \text{ H7}$ on the opposite side is precisely positioned in the mounting position.

Positioning of the module can be done via two different centering diameters of the installation area:

$\varnothing 138\text{H6}$ (upper area)

$\varnothing 110\text{H6}$ (bottom area) depending on the installation version.

The air connection is identical to that of the NSE plus 138 (see chapter 6.2.3).

The drawing-off holes simplifies the assembly of the modules from the clamping stations (see figure 6).

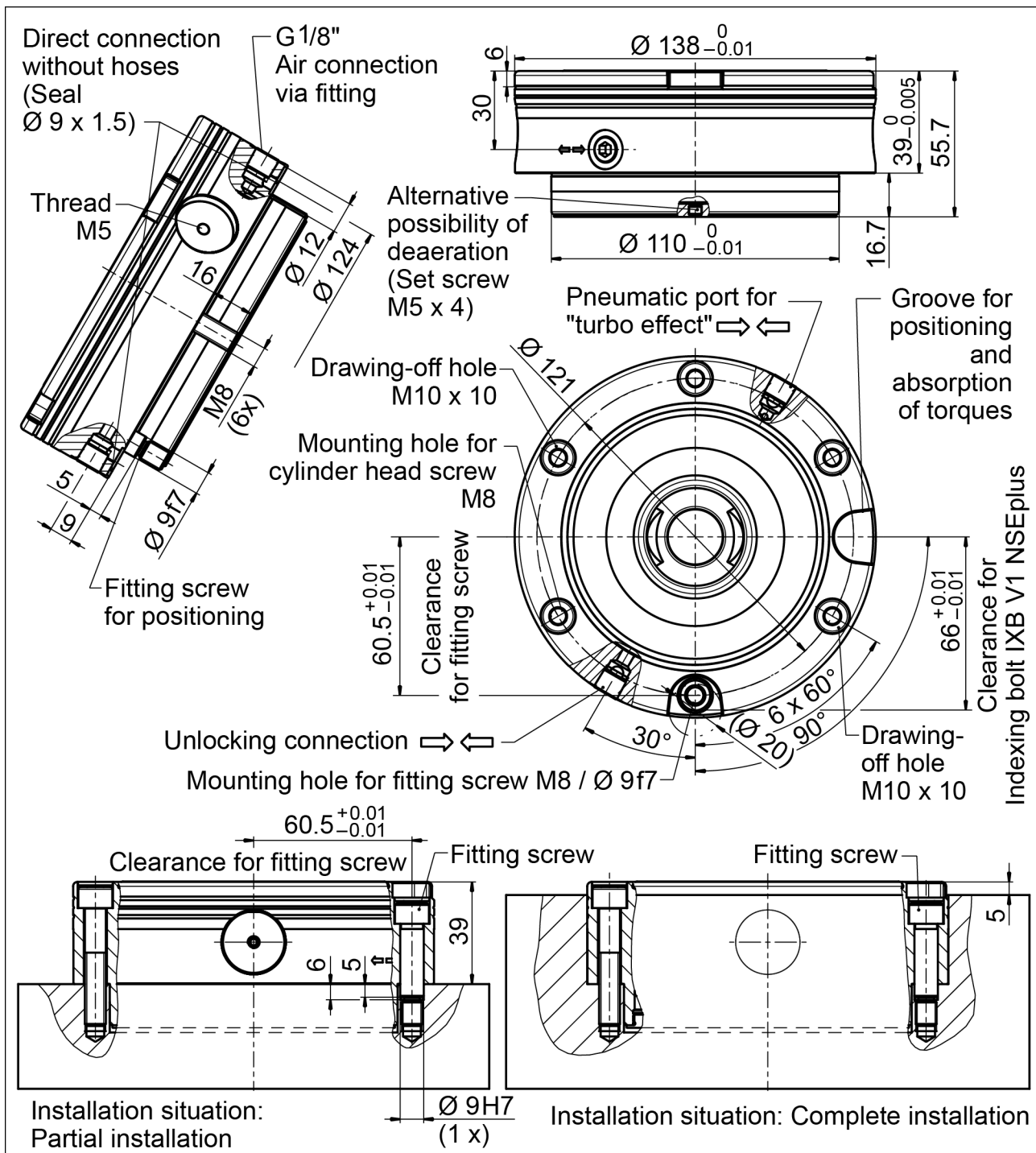


Fig. 6

6.2.5 NSE-T plus 138

The NSE-T plus 138 is fastened in the installation area with 6 screws M8 (see figure 7).

Positioning of the module can be done via two different centering diameters of the installation area:

Ø 138H6 (upper area)

Ø 110H6 (bottom area) depending on the installation version.

The standard air connection is done via connections bores at the bottom of the unit.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

The drawing-off holes simplifies the assembly of the modules from the clamping stations (see figure 7).

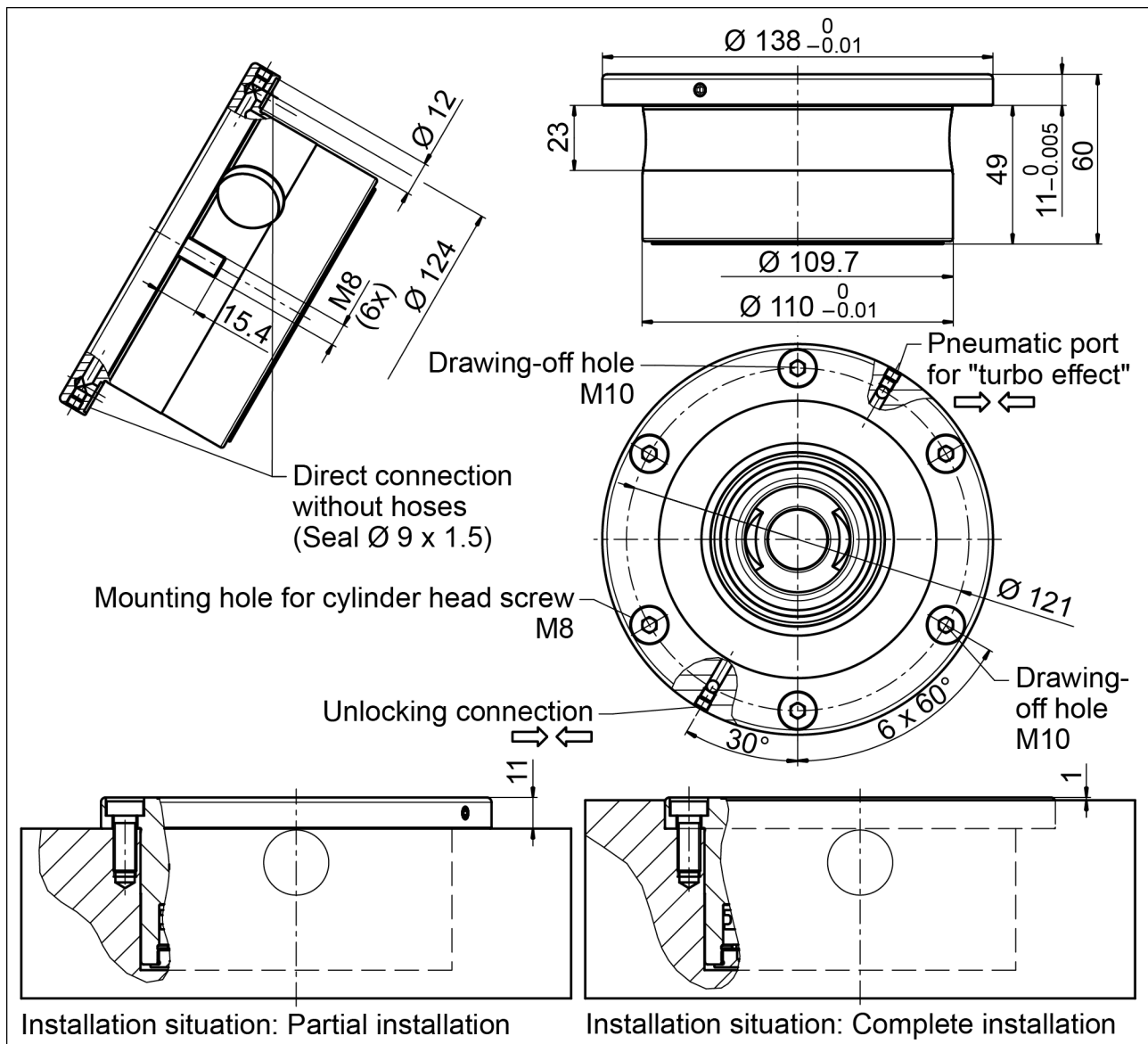


Fig. 7

6.2.6 NSE-T plus 138-V1

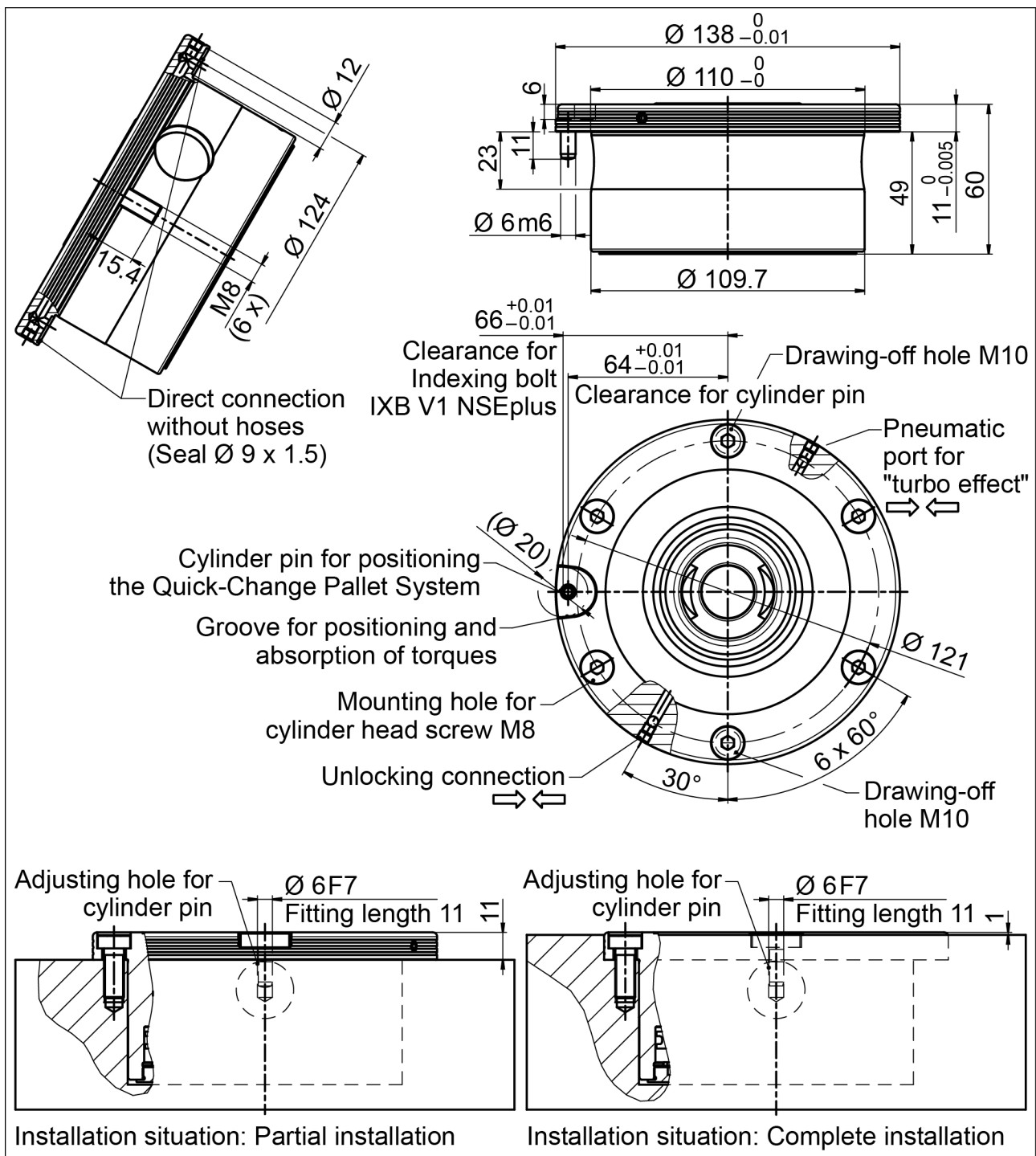


Fig. 8

The NSE-T plus 138-V1 is fastened in the installation area with 6 screws M8 (see figure 8).

Positioning of the module can be done via two different centering diameters of the installation area:

$\varnothing 138H6$ (upper area)

$\varnothing 110H6$ (bottom area) depending on the installation version.

The exact position orientation is done with a fitting screw with a diameter of $\varnothing 6 \text{ m6} \times 11 \text{ mm}$.

Precise alignment and positioning of the quick change pallet system requires that the fitting bore $\varnothing 6 \text{ F7}$ on the opposite side is precisely positioned in the mounting position.

The standard air connection is done via connections bores at the bottom of the unit.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

The drawing-off holes simplifies the assembly of the modules from the clamping stations (see figure 8).

6.2.7 NSE plus 176

The NSE plus 176 is fastened in the installation area with 6 screws M8 (see figure 9).

Positioning of the module can be done via two different centering diameters of the installation area:

$\varnothing 176\text{H6}$ (upper area)

$\varnothing 138\text{H6}$ (bottom area) depending on the installation version.

The standard air connection is done via connections bores at the bottom of the unit. Alternatively, the unit can be connected via the lateral G1/8"-connection, which is available in case of use of the bottom centering diameter 138H6. In this case the opening at the bottom must be sealed: either by inserting an O-ring dia. 9 x 1.5 and putting on an even support, or by using sealing plugs.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

The drawing-off holes simplifies the assembly of the modules from the clamping stations (see figure 9).

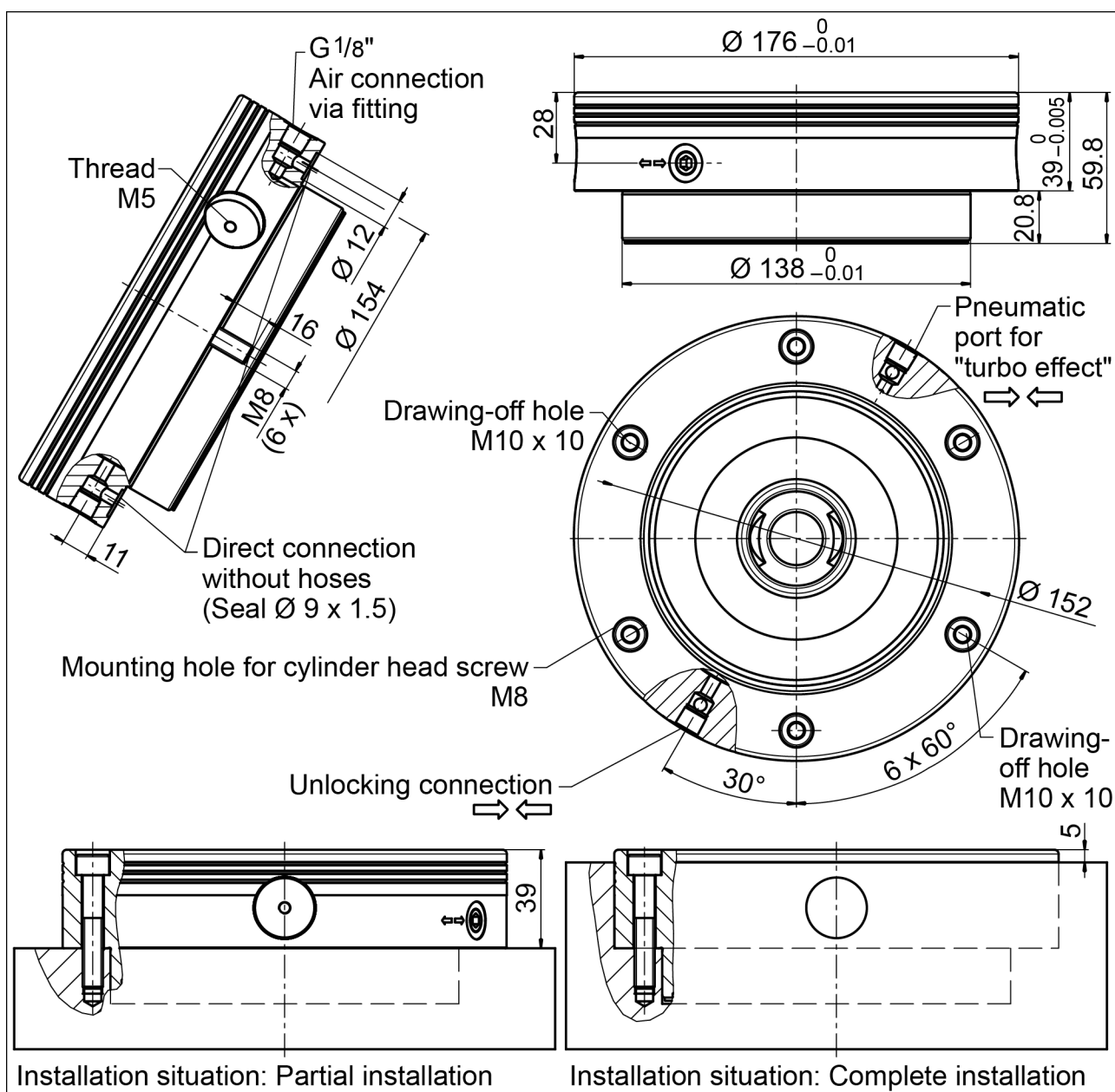


Fig. 9

6.2.8 NSE plus 176-V1

The NSE plus 176-V1 is fastened in the installation area with 6 screws M8 (see figure 10).

The exact position orientation is done with a fitting screw with a diameter of $\varnothing 9$ f7 x 5 mm.

Precise alignment and positioning of the quick change pallet system requires that the fitting bore $\varnothing 9$ H7 on the opposite side is precisely positioned in the mounting position.

Positioning of the module can be done via two different centering diameters of the installation area:

$\varnothing 176$ H6 (upper area)

$\varnothing 138$ H6 (bottom area) depending on the installation version.

The air connection is identical to that of the NSE plus 176 (see chapter 6.2.7).

The drawing-off holes simplifies the assembly of the modules from the clamping stations (see figure 10).

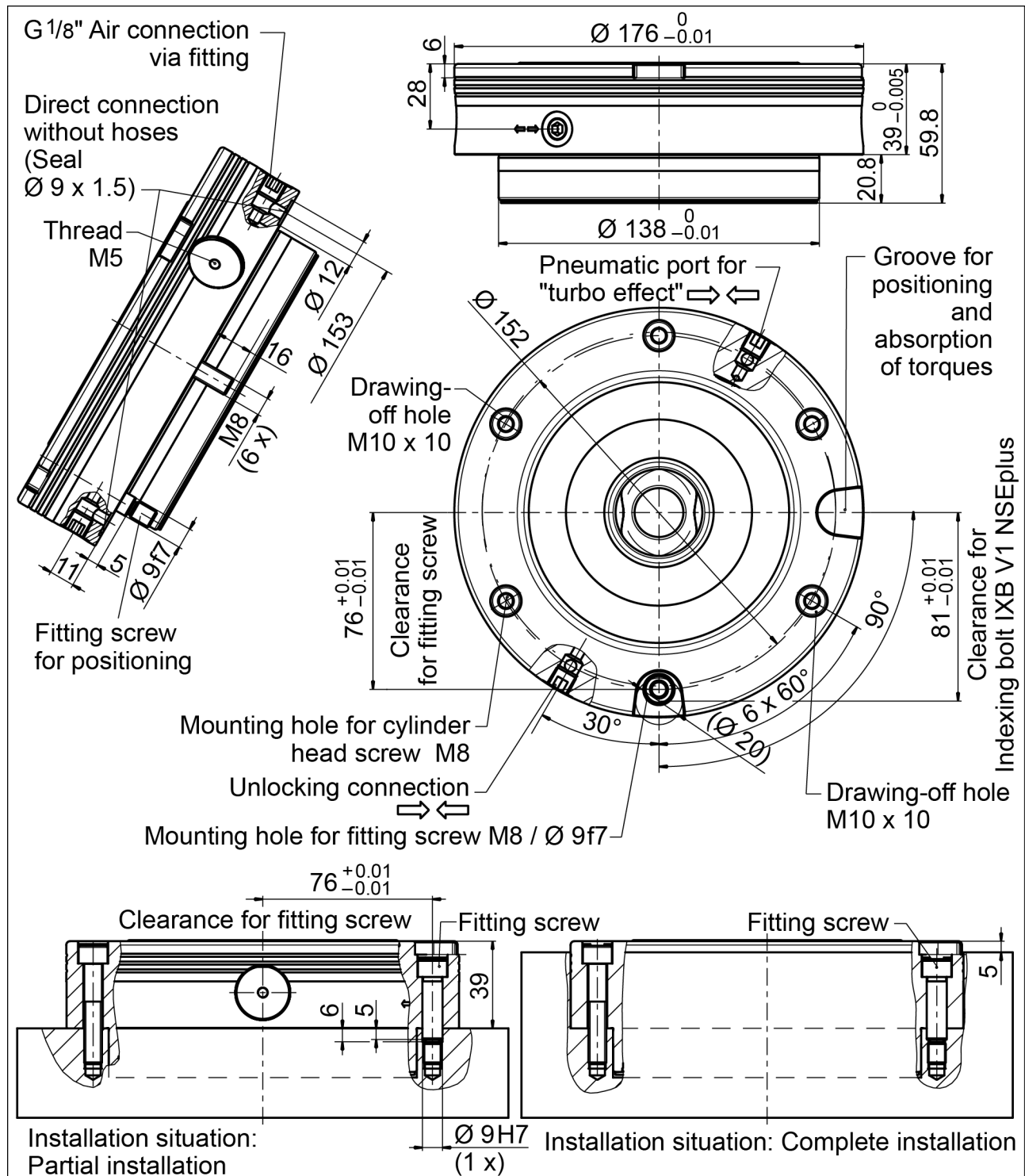


Fig. 10

6.2.9 NSE plus 100-75

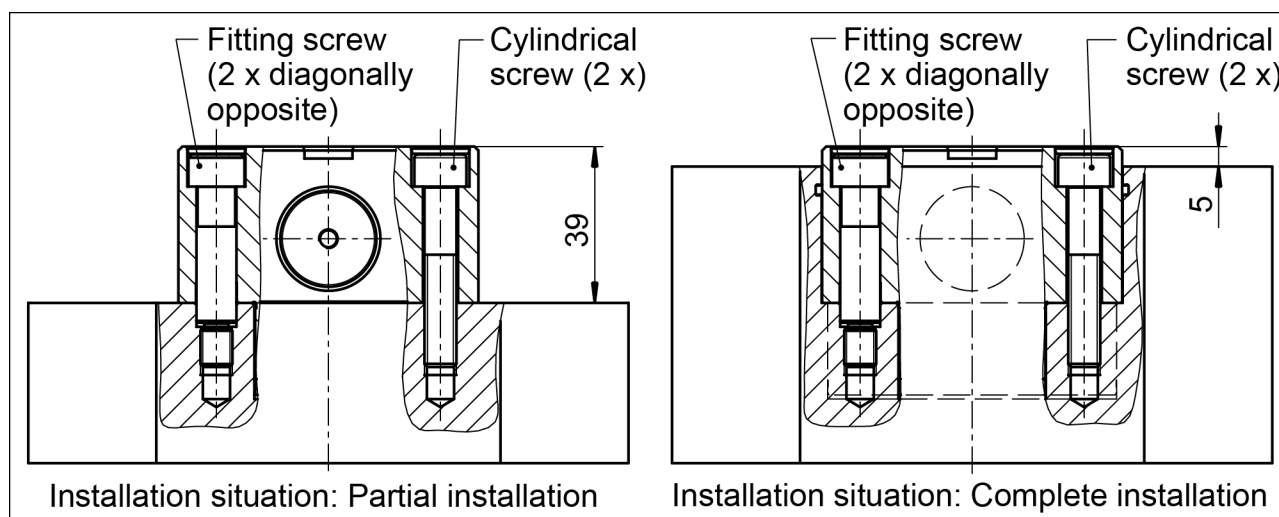


Fig. 11

The NSE plus 100-75 is fastened in the installation area with 4 screws M8 (see figure 11).

Two screws are designed as fitting screws. Positioning of the clamping module is carried out via two diagonally installed fastening screws with fitting diameter dia. 10 f7 x 5 mm. For exact alignment and positioning of the quick-change pallet system, a high-precision positioning of the opposing fitting bores dia. 10 H7 in the fastening area is required.

The quick-change pallet system has three connection options (see figure 12).

The air connection for the functions “unlocking” and “turbo” is done by default via the hose-free direct connections at the bottom of the unit. As an alternative connection option, two G1/8" connections are located at the wide front face of the module, used for “unlocking” and “turbo”.

If the clamping unit is actuated at the lateral connections via hose lines, the hose-free direct connections at the bottom have to be closed pressure-tight.

- The clamping system has to be axially sealed against the plane face of the screw-on area. O-rings dia. 4.5 x 1.5 are inserted into the O-ring-seat of the clamping module
- Alternatively, the bottom-sided air connections can be sealed pressure-tight with the provided Torx set-screws.

Before installing the clamping system in the installation space, the bottom-sided connections have to be checked on tightness.

If the pneumatic port for turbo effect is used, the spring-actuated locking process is actively supported with compressed air. If the pneumatic port for turbo effect should not be used, the concerned piston side must have to possibility to deaerate itself.

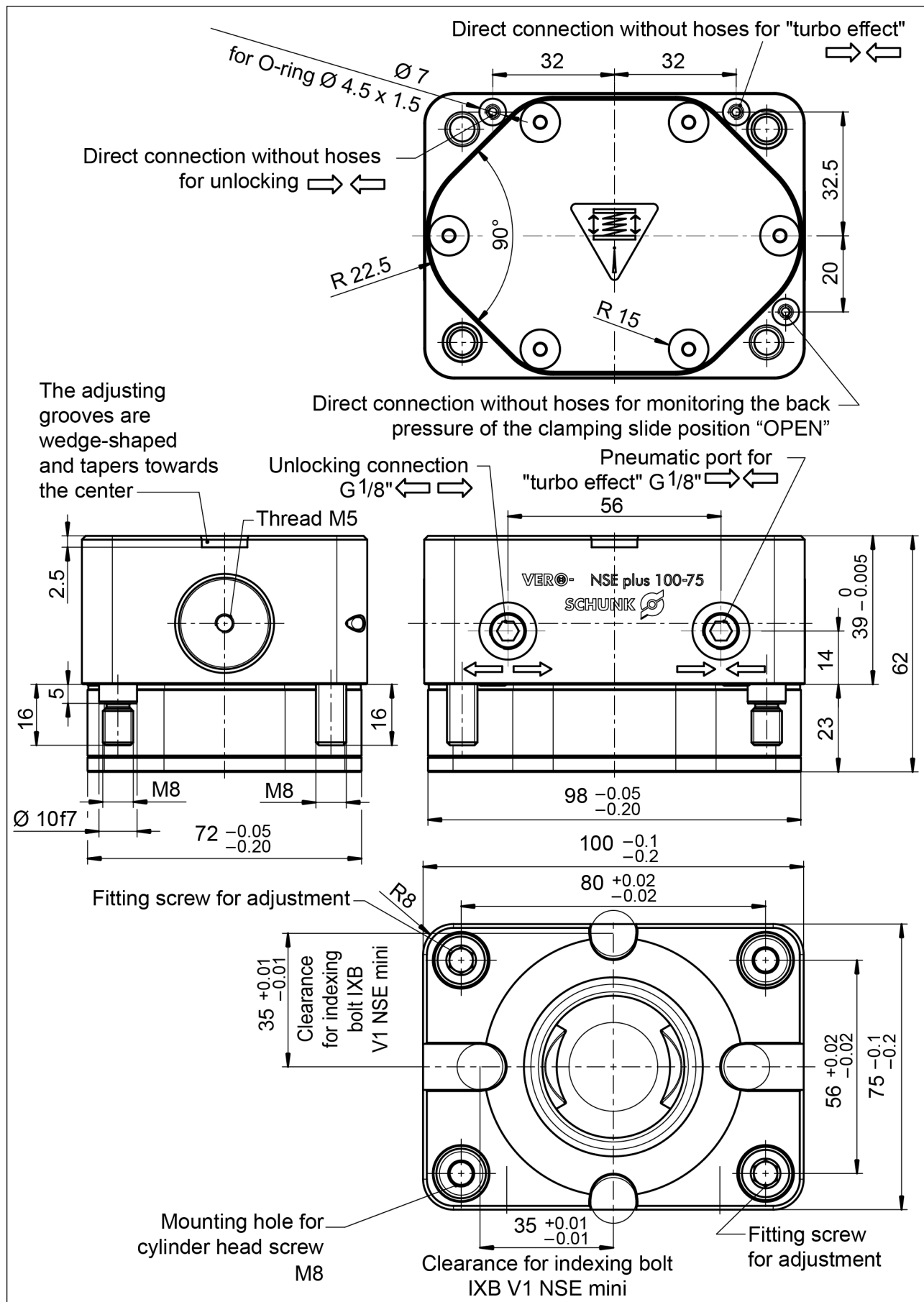


Fig. 12

6.3 Clamping station NSL plus / NSD plus

The evenness in height of the modules on the clamping station is only guaranteed when clamped. The clamping station is mounted using the BRR 50 cylindrical clamp blanks included in the scope of delivery. See the clamping diagram (figure 13) for the arrangement of the BRR 50 cylindrical clamp blanks.

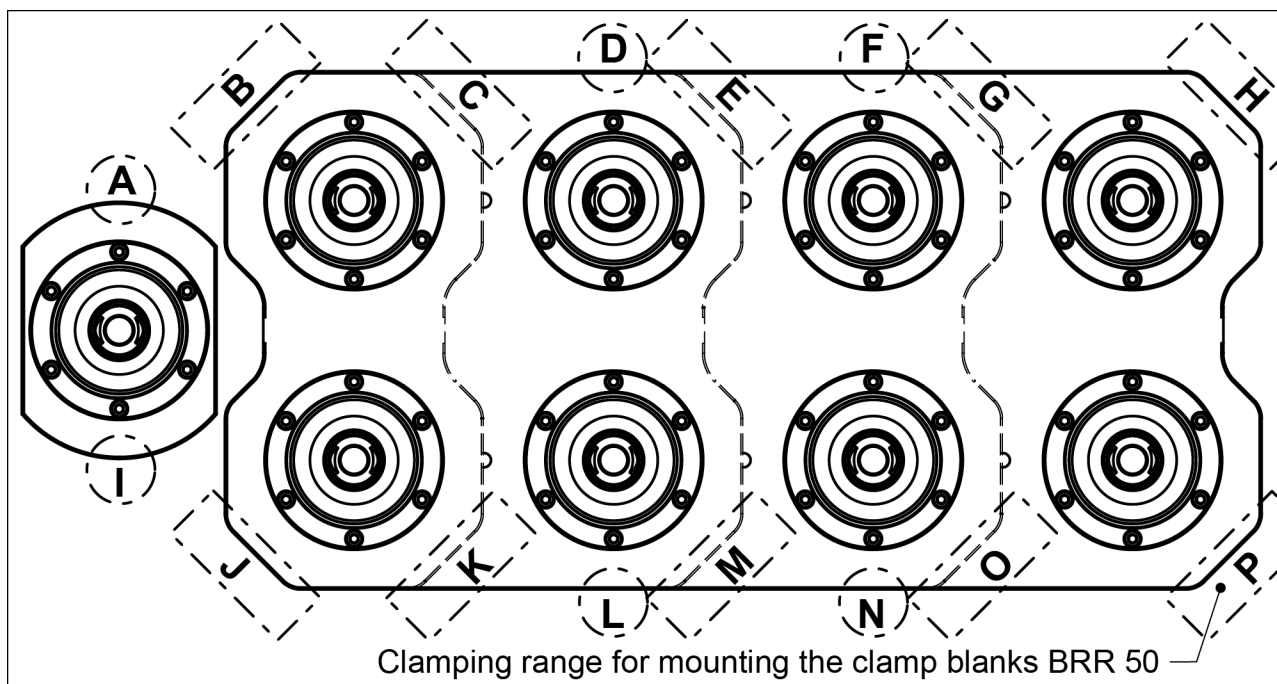


Fig. 13

Clamping range				
NSL plus 150 / NSD plus 150	NSL plus 200 / NSD plus 200	NSL plus 400	NSL plus 600	NSL plus 800
A, I	B, C, J, K	B, E, J, M	B, D, G, J, L, O	B, D, F, H, J, L, N, P

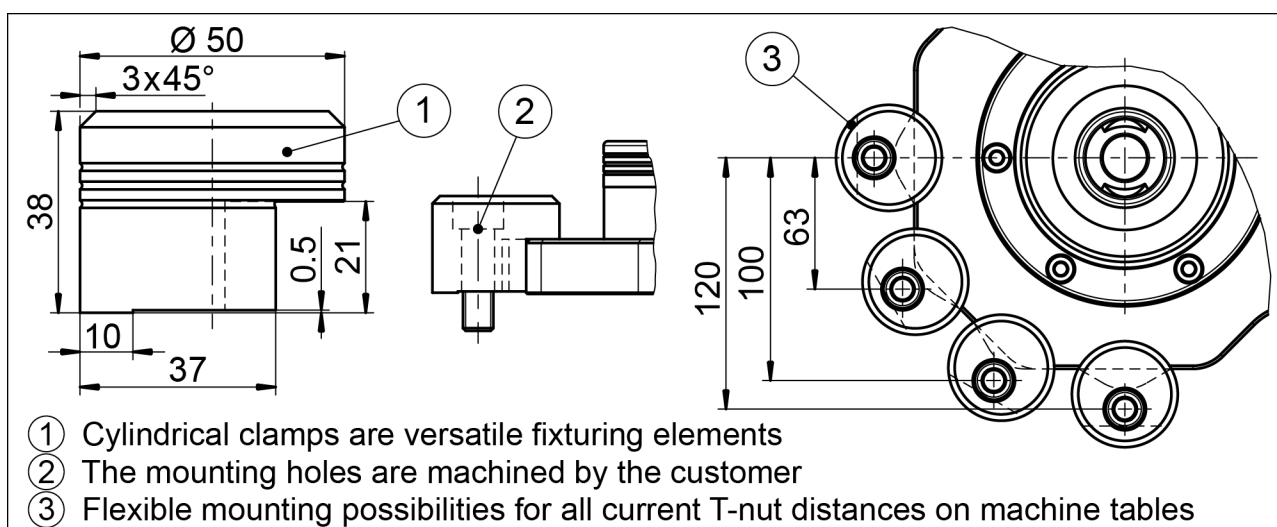


Fig. 14 Mounting of the clamp blanks

6.3.1 NSL plus 150 / NSD plus 150

The NSL plus 150 and NSD plus 150 clamping stations are mounted using the two BRR 50 cylindrical clamp blanks supplied (see figure 13). There are slots on the bottom of the clamping stations to mount T-nuts in order to align the clamping stations to the machine table slots. The NSL plus 150 and NSD plus 150 each have a G 1/8" air connection. It is possible to use single clamping pallets on the NSD plus 150 by installing a dome-shaped centering bushing ZKA 12.

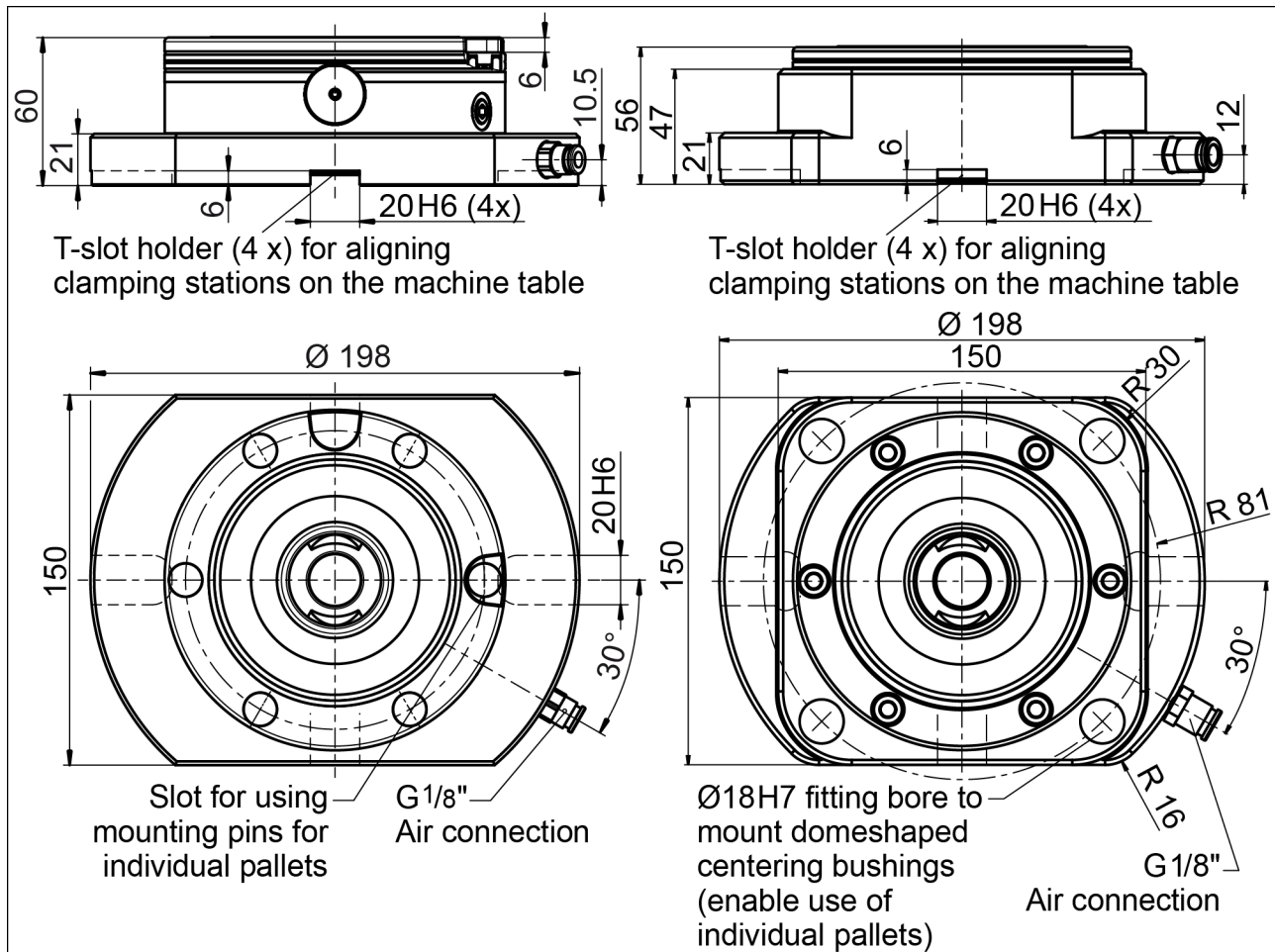


Fig. 15 Left: NSL plus 150, Right: NSD plus 150

6.3.2 NSL plus 200 / NSD plus 200

The NSL plus 200 and NSD plus 200 clamping stations are mounted using the four BRR 50 cylindrical clamp blanks supplied (see figure 13). There are slots on the bottom of the clamping stations to mount T-nuts in order to align the clamping stations to the machine table slots. The NSL plus 200 has two G 1/8", connections, the NSD plus 200 has two G 1/4" connections. The connections are each connected with each other; each connection supplies both clamping areas. It is possible to use single clamping pallets on the NSD plus 200 by installing a dome-shaped centering bushing ZKA 12. Should the application require the separate control of the clamping areas, both connections can be separated from each other by installing a G 1/8" sealing plug. To separate the air systems, the G 1/8" sealing plug is inserted about 80 mm into the supply bore hole and screwed into the thread. Each G 1/4" connection is now supplying a clamping area.

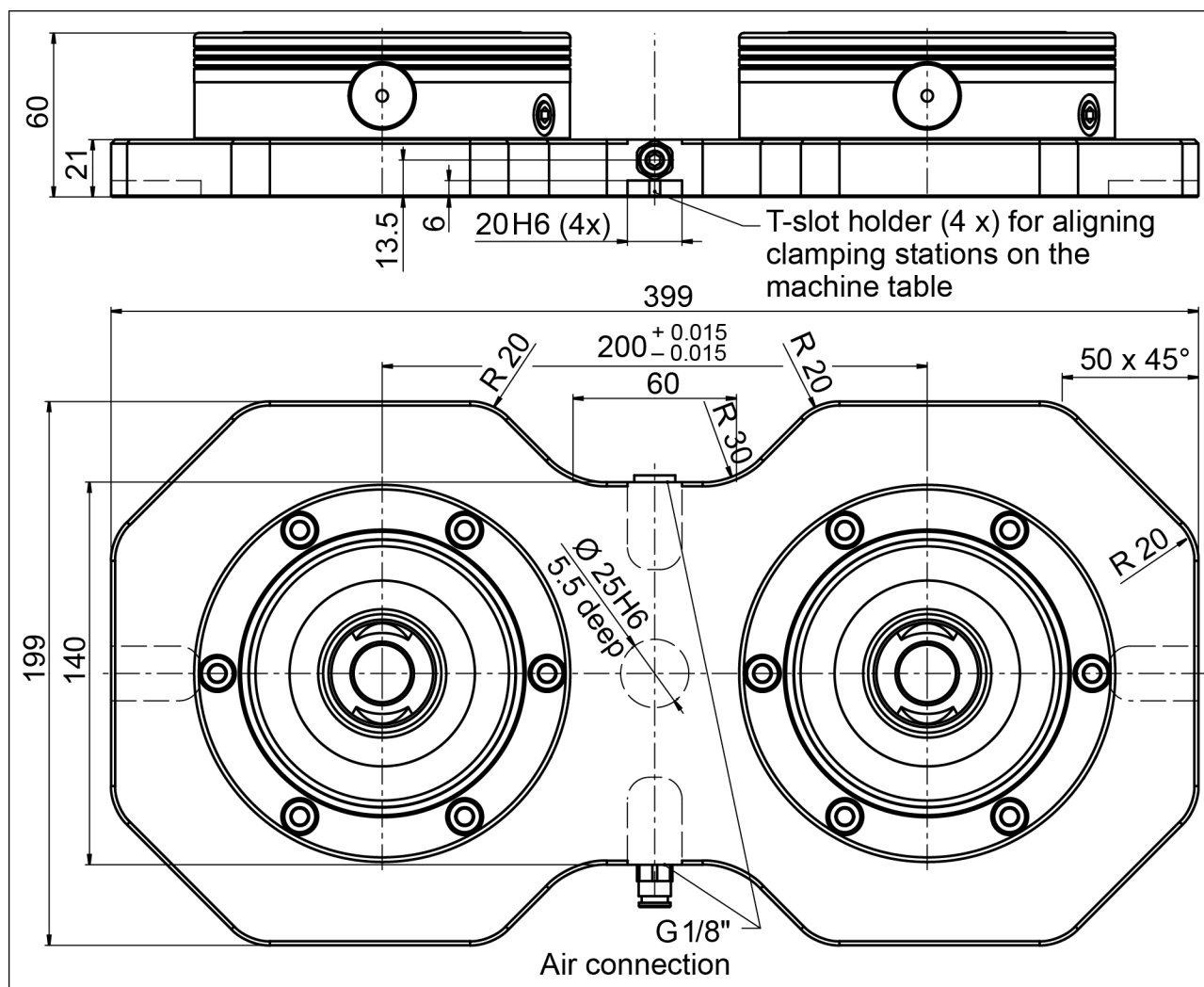


Fig. 16 NSL plus 200

6.3.3 NSL plus 400

The NSL plus 400 clamping station is mounted using the four BRR 50 cylindrical clamp blanks supplied (see figure 13). There are slots on the bottom of the NSL plus 400 clamping station to mount T-nuts in order to align the clamping stations to the machine table slots. The NSL plus 400 has two G 1/4" connections. The connections are each connected with each other; each connection supplies all four clamping areas. If required by the application at hand, both connections can be separated from each other by installing an M10 sealing plug. To separate the air systems, the M10 sealing plug is inserted about 120 mm into the supply bore hole and screwed into the thread. Each G 1/4" connection is now supplying two clamping areas which are next to each other.

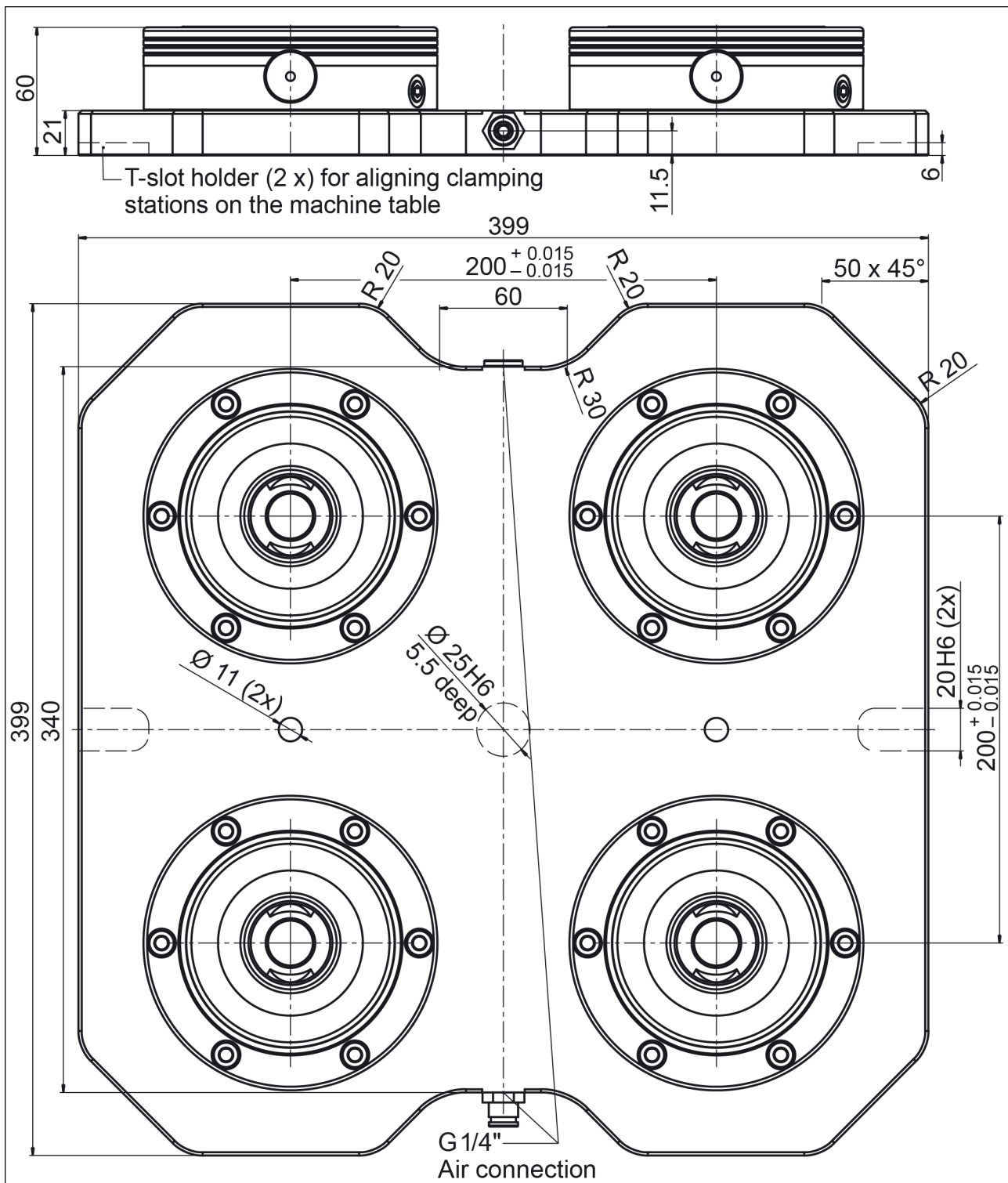


Fig. 18

6.3.4 NSL plus 600

The NSL plus 600 clamping station is mounted using the four BRR 50 cylindrical clamp blanks supplied (see figure 13). There are slots on the bottom of the NSL plus 600 clamping station to mount T-nuts in order to align the clamping stations to the machine table slots.

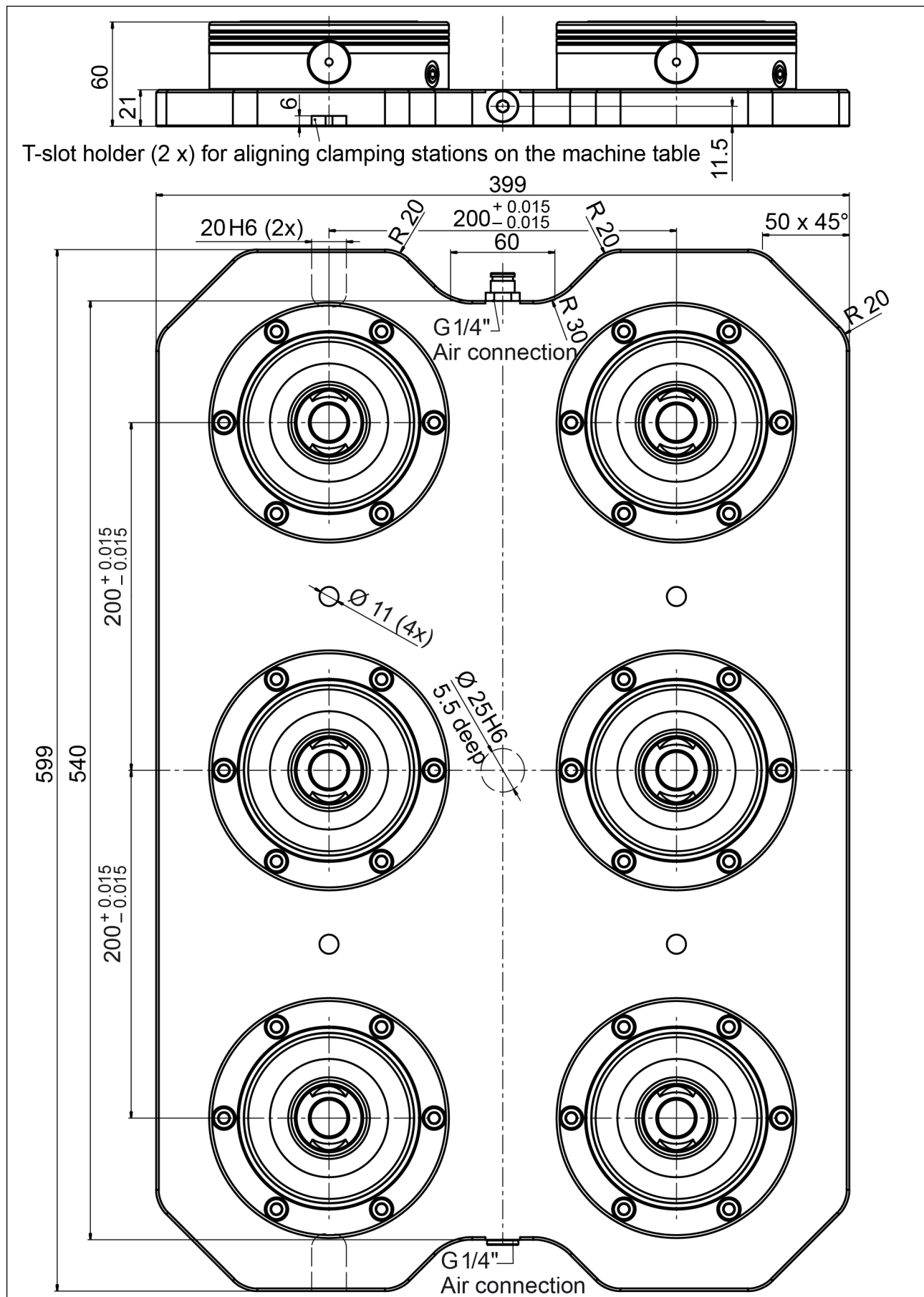


Fig. 19

The NSL plus 600 has two G 1/4" connections. The connections are each connected with each other; each connection supplies all six clamping areas. If required by the application at hand, both connections can be separated from each other by installing an M10 sealing plug. To separate the air systems, the M10 sealing plug is inserted about 120 mm into the supply bore hole and screwed into the thread. Each G 1/4" connection is now supplying two clamping areas which are next to each other.

6.3.5 NSL plus 800

The NSL plus 800 clamping station is mounted using the four BRR 50 cylindrical clamp blanks supplied (see figure 13). There are slots on the bottom of the NSL plus 600 clamping station to mount T-nuts in order to align the clamping stations to the machine table slots.

The NSL plus 600 has two G 1/4" connections. The connections are each connected with each other; each connection supplies all eight clamping areas. If required by the application at hand, both connections can be separated from each other by installing an M10 sealing plug. To separate the air systems, the M10 sealing plug is inserted about 120 mm into the supply bore hole and screwed into the thread. One G 1/4" connection is now supplying the two nearby clamping areas and one G 1/4" connection supplies the contiguous six clamping areas.

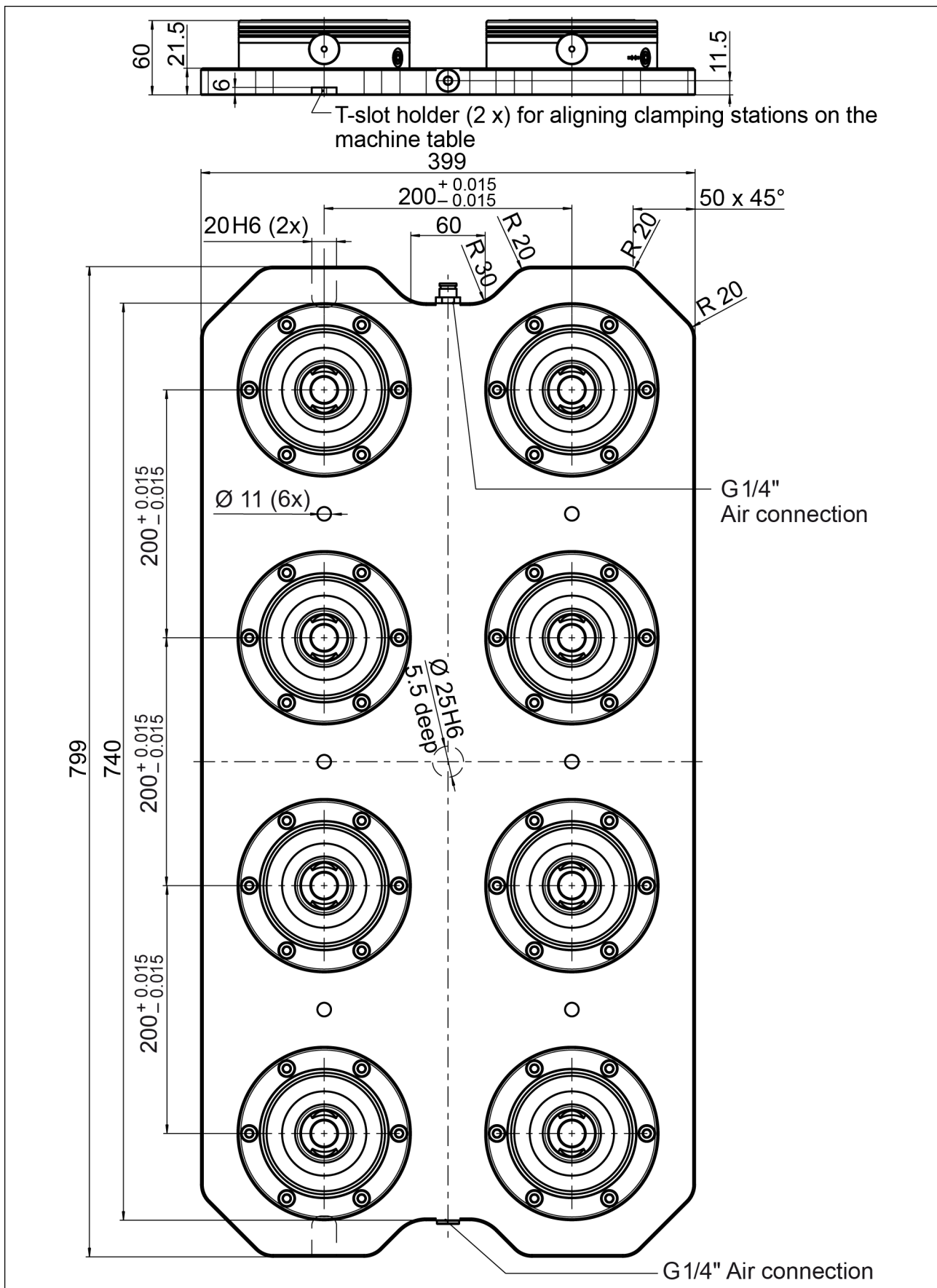


Fig. 20

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



NOTICE

Notes on clamping pins and fastening 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

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 fastened onto the workpiece or pallet in 2 different ways, the fastening variations are numbered in the preferred sequence.

If the clamping pins have to be used for pallets that are not from SCHUNK, e.g. customer-owned devices or items, the outer diameter of the piece that has to be strained, has to be chosen at least so big that the O-ring on the top of the particular quick change pallet system is entirely covered.

Designation Type	Id.-No.	min. outer diameter on the support of the unit
NSE plus 90	0471059	60 mm
NSE plus 99	0471120	75 mm
NSE plus 138	0471150	115 mm
NSE plus 138-V1	0471195	115 mm
NSE-T plus 138	0471076	60 mm
NSE-T plus 138-V1	0471077	60 mm
NSE plus 176	0471060	125 mm
NSE plus 176-V1	0471096	125 mm
NSE plus 100-75	0471130	100 mm

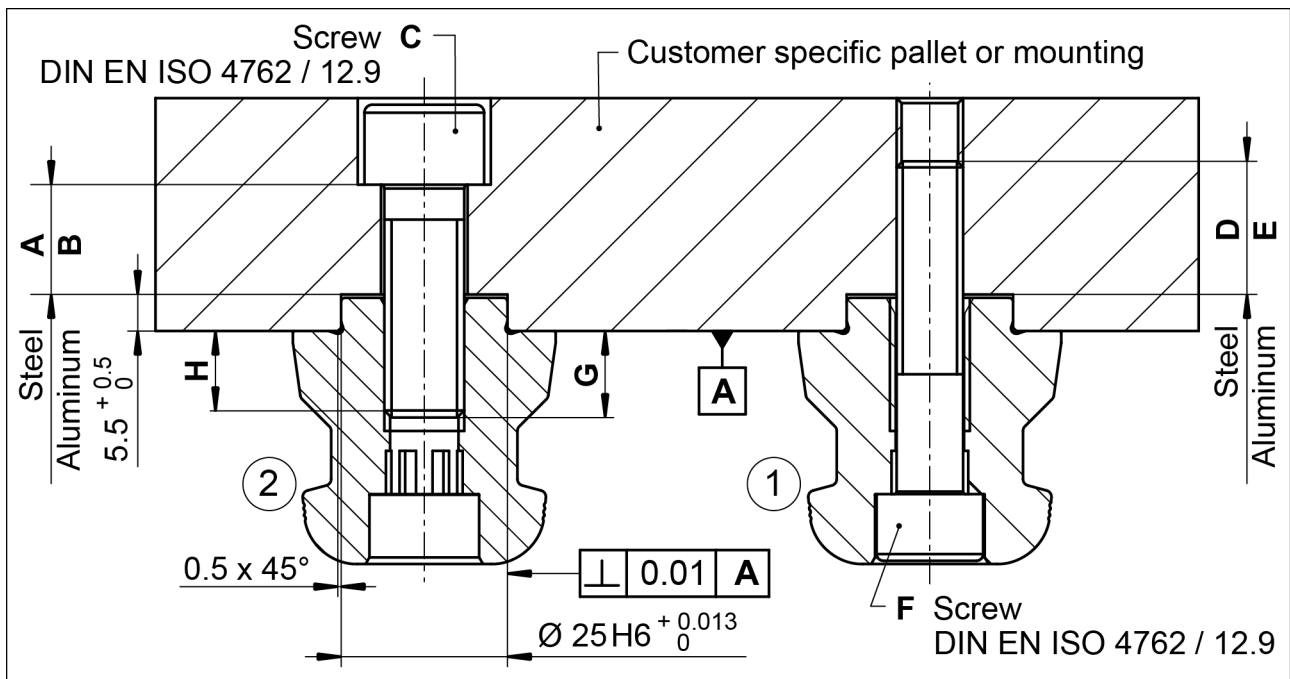


Fig. 21

Tolerances and assembly conditions

Type	Id.-No.	A	B	C	D	E	F	G*	H
SPA 40 RF	0471151	> 12	> 17	M12	> 15	> 20	M10	15	>12
SPB 40 RF	0471152	> 12	> 17	M12	> 15	> 20	M10	15	>12
SPC 40 RF	0471153	> 12	> 17	M12	> 15	> 20	M10	15	>12
SPG 40 RF	0471154	> 12	> 17	M12	> 15	> 20	M10	25	>22
SPA 40-16 RF	0471064	> 13	> 18	M16	> 18	> 24	M12	20	>16
SPB 40-16 RF	0471065	> 13	> 18	M16	> 18	> 24	M12	20	>16
SPC 40-16 RF	0471066	> 13	> 18	M16	> 18	> 24	M12	20	>16

* The length of the screwed thread should never exceed the size "G".

Admissible torques for clamping pins (Screw grade 12.9)

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

Application / Disposition of different clamping pin types (Application example: pallet with 6 clamping areas)

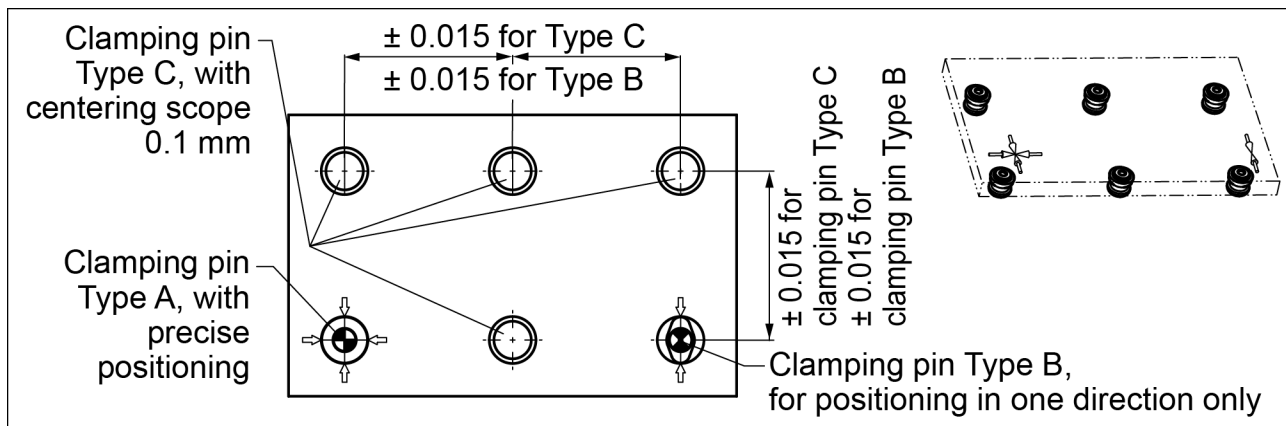


Fig. 22

6.4.1 Information to clamping pin SPG 40

At a tie point the SPG 40 RF can be used instead of the SPA 40 RF. In case of multiple tie points all three clamping pins may be exchanged with the SPG 40 RF.

When using the RF SPG 40, the repeatability increases to <0.002 mm.

When screwing from above, according to preferred sequence 2, use a 10 mm longer M12-screw of the screw grade 12.9.

6.5 Options

For the sizes NSE plus 138, NSE plus 138-V1, NSE plus 176, NSE plus 176-V1 and NSE plus 100-75 dynamic pressure monitoring of the clamping slide is possible. Pressure build-up in "OPENED" status. Control of the clamping slide requires a reduced pressure supply limited to 2 bar (see circuit diagram – chapter 6.6, figure 26).

The measurable differential pressure must reach a minimum of 0.5 bar in order for a reliable evaluation to be done via the air gap sensor. The maximum pressure is 2 bar. Monitoring requires a pressure gauge, an adjustable throttle and an air gap sensor.

For monitoring of the clamping slide, the predefined connection (see figures 23 or 24) must be accessed via a base side bore hole and the M5 set-screw on the clamping slide must be removed. For the NSE plus 100-75 the predefined connection (see figure 25) must be accessed via a base side bore hole.

If you wish to install the unit yourself, please request our drawing.

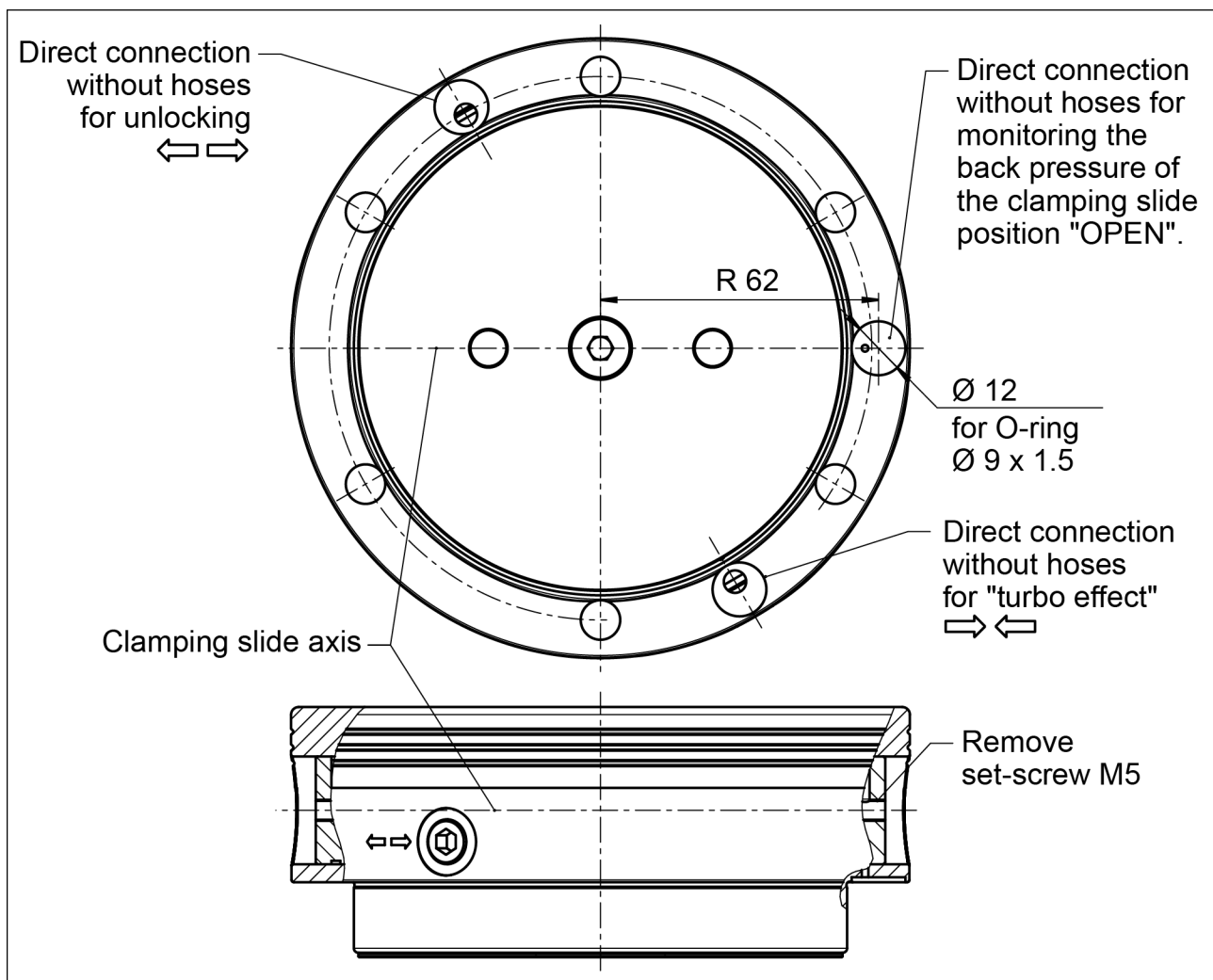


Fig. 23 NSE plus 138 / NSE plus 138-V1

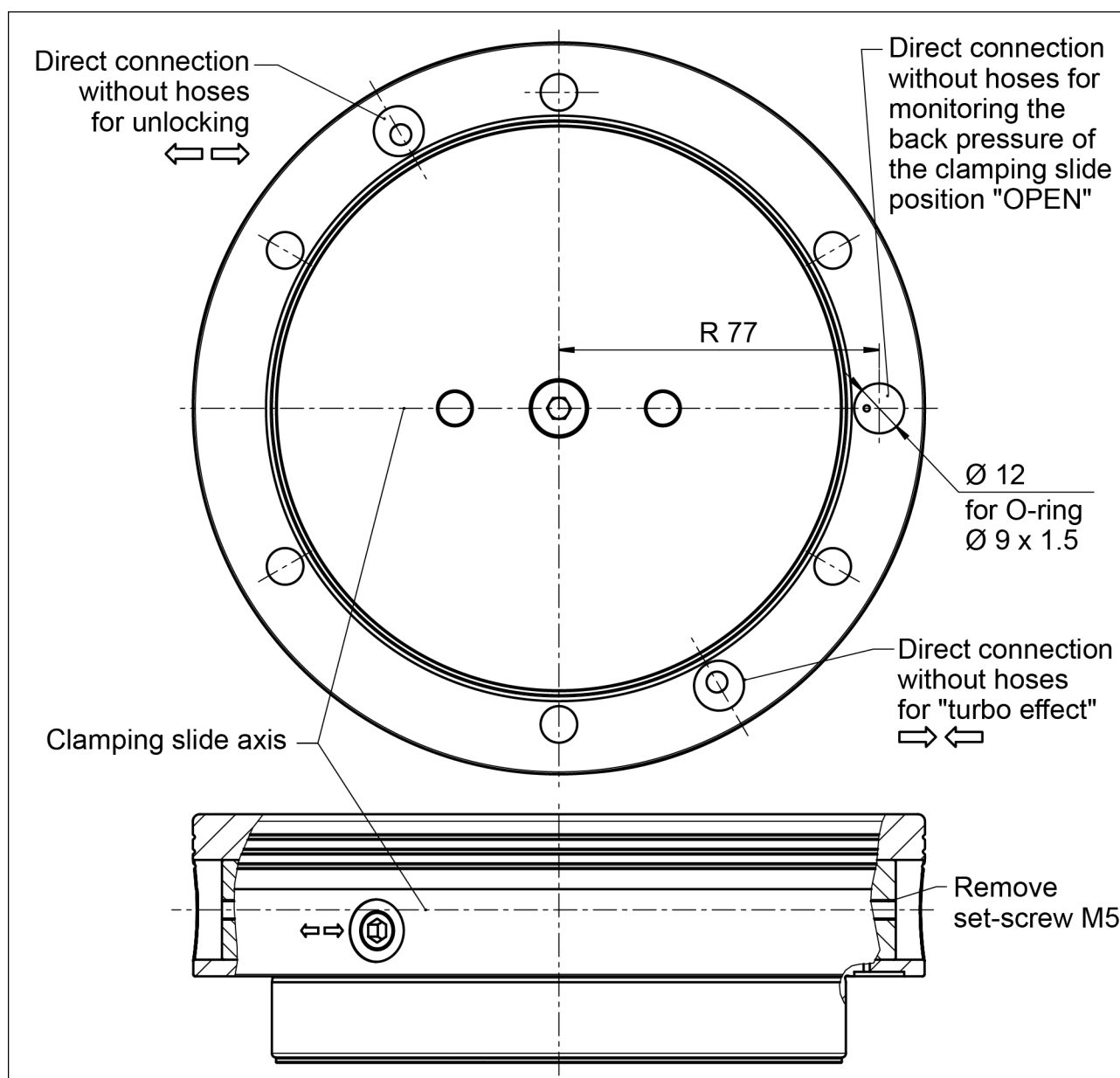


Fig. 24 NSE plus 176 / NSE plus 176-V1

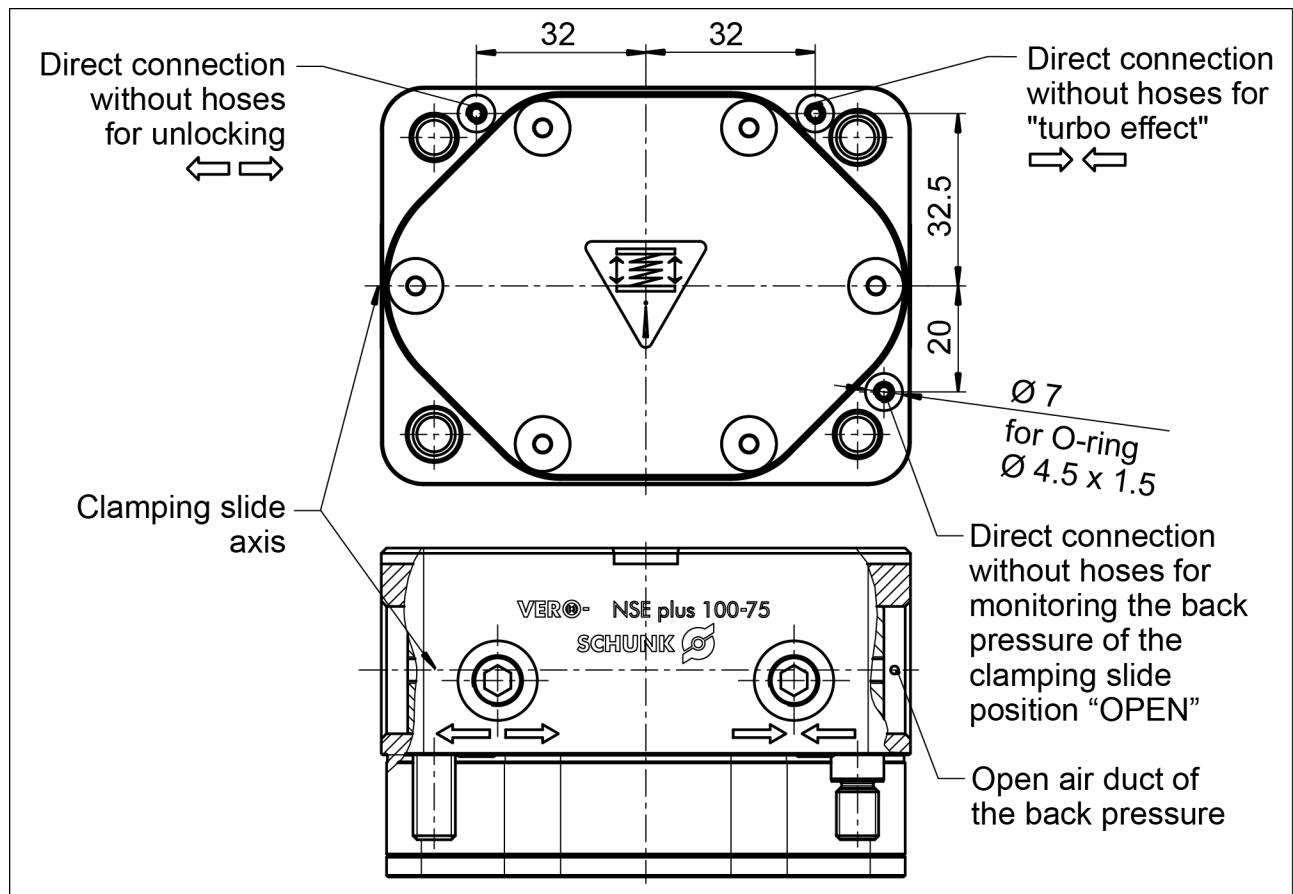


Fig. 25 NSE plus 100-75

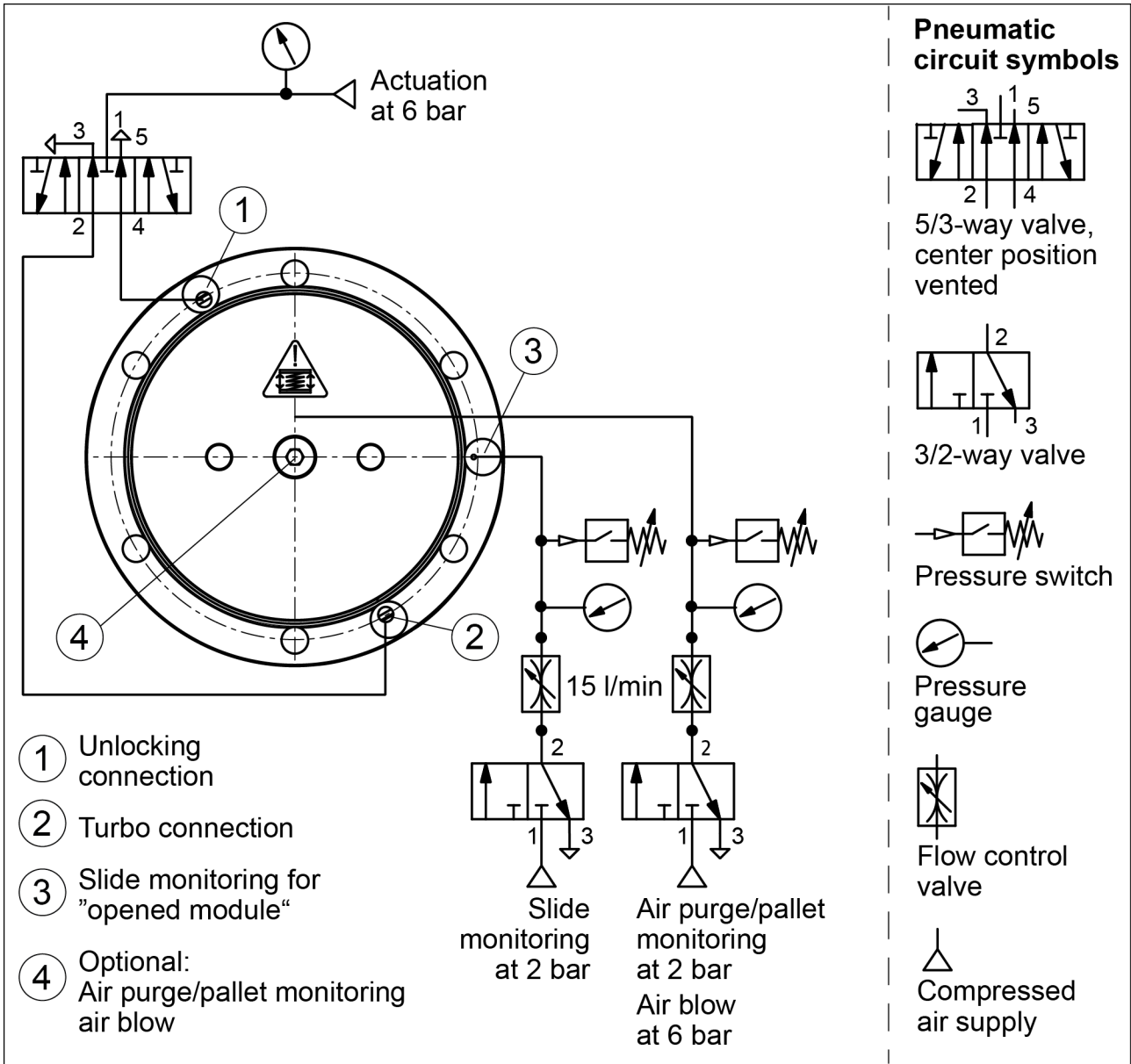


Fig. 26 Pneumatic circuit diagram

The following points have to be observed when the NSE plus quick-change pallet systems are controlled (see figure 26):

Clamping slide monitoring:

- The max. pressure of the slide monitoring amounts to 2 bar.
- Limit the volume flow to 15 l/min.
- The difference in pressure in case of module failure amounts to min. 1 bar.
- If the slide monitoring of several standard NSE plus modules are connected in series, just the evaluation of the “OPENED” position functions (dynamic pressure = all modules are opened).

Air purge/contact control (on option):

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

Air blow (on option):

- Max. pressure 6 bar.
- The blow-out air connection has to be switched off before the modules are locked. Otherwise an air cushion will form.

In order to ensure a reliable evaluation, the value of the pressure and air volume has to be maintained constantly. Fluctuations in pressure may influence the pressure setting and may lead to wrong results. Cable length and cable cross section may influence the switching time of the control components. It may be necessary to adjust the control components. Regularly control the control components of the monitoring function. If errors should occur in the monitoring control unit, the cause of the fault has to be determined.

7 Operation



WARNING

Risk of injury due to losing 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 falling parts during transport of the quick change pallet system, when the axis of the clamping pin is in a horizontal position, or in the case of overhead application

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



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.
- Apply pressure maintenance valves.
- Use loading devices.



CAUTION

There is a risk of limbs being crushed during manual loading and unloading of moving parts and during the clamping process.

- Do not reach into the clamping pin holder.
- Work with the smallest possible clamping and opening strokes.
- Use loading devices.
- Wear protective gloves.

8 Maintenance and care

The Quick Change Pallet System is designed for minimum-maintenance operation, so that opening and disassembly of the clamping modules is only necessary in exceptional cases.

	 CAUTION
	Risk of injury and risk of damage to the clamping module when opening the housing cover. If the clamping module has to be disassembled, ship the module to SCHUNK for repair. The covers of the clamping modules are spring-packaged may be removed only by trained personnel. The cover of the sizes NSE plus 138, NSE plus 138-V1, NSE-T plus 138, NSE-T plus 138-V1, NSE plus 176 and NSE plus 176-V1 can be only removed and assembled again with a special assembly tool and if the corresponding disassembly and assembly instructions are respected.

In order to maintain proper function of the system please consider the following notes:

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

	NOTICE
	The air supply must be done via a separate maintenance unit with oiler.

- Make sure that the bearing surface of the interface is always clean.
- Please arrange the necessary, so that chips of any type can't get into the interface. Moreover, please avoid that coolant emulsion fills up in the interface, especially if the axis of the clamping pin is vertically aligned. Both can be avoided by using a protection cover SDE 40, SDE 138 or SDE 176. If the interface should nevertheless fill with coolant emulsion, start locking and dry the interface during actuation.
- For operation, only high-quality coolant emulsions with rust-protection additions should be used.
- Regularly inspect the units (at least every 2 weeks or after 1000 clamping cycles). A proper function is assured, if the clamping bars are moving smoothly at minimum pressure (5 bar) without jerks.
- Regularly inspect the system visually and control proper function. In case of visible damages or signs of malfunction, please stop the operation immediately. The system should not be started up again, before all the damages are repaired by exchanging the damaged unit.

9 Trouble shooting

The clamping area does not unlock

Possible cause	Corrective action
Faulty air connections	Check the air supply (see chapter 6.6)
Pressure drops below minimum	Check operating pressure (min. 5 bar)
Component is broken, e.g. through overloading	Replace module or send it to SCHUNK for repair
Tensile load to the clamping pin is too high	Reduce load

The clamping area does not unlock perfectly

Possible cause	Corrective action
Pressure drops below minimum	Check operating pressure (min. 5 bar)
Module has not been operated with lubricated air	Install a maintenance unit with oiler
The hose diameter is below minimum	Required hose diameter, see chapter 6.1
The pneumatic port for "turbo effect" is still actuated with pressure	Vent the connection

The quick change pallet system no longer opens quietly

Possible cause	Corrective action
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.

10 Seal kit and part lists

10.1 Seal kit lists

NSE plus 90 (Id.-No. 0471219)

Item	Description	Quantity
20	O-ring Ø 45 x 3	1
21	O-ring Ø 68 x 2	2
22	O-ring Ø 25 x 3	1
23	O-ring Ø 20 x 1.5	2
24	O-ring Ø 4 x 1.5	2
25	O-ring Ø 18 x 2	1
26	O-ring Ø 65 x 1.5	1
27	O-ring Ø 19 x 1	1
40	Sliding disc	1

NSE plus 99 (Id.-No. 0471122)

Item	Description	Quantity
20	O-ring Ø 71.5 x 1.5	1
21	O-ring Ø 62 x 3	1
22	O-ring Ø 26 x 1.5	1
23	O-ring Ø 20 x 1.5	4
24	O-ring Ø 4.5 x 1.5	2
25	O-ring Ø 18 x 2	1
26	O-ring Ø 71.5 x 1.5	2
27	O-ring Ø 18 x 1.5	1
40	Sliding disc	1

NSE plus 138, NSE plus 138-V1 (Id.-No. 0471052)

Item	Description	Quantity
20	O-ring Ø 82 x 3	1
21	O-ring Ø 96 x 3	2
22	O-ring Ø 25 x 3	1
23	O-ring Ø 20 x 1.5	4
24	O-ring Ø 9 x 1.5	3
25	O-ring Ø 18 x 2.5	1
26	O-ring Ø 100 x 1	1
27	O-ring Ø 19 x 1	1
40	Sliding disc	1

NSE-T plus 138, NSE-T plus 138-V1 (Id.-No. 0471164)

Item	Description	Quantity
19	O-ring Ø 82 x 3	1
20	O-ring Ø 45 x 3	1
21	O-ring Ø 90 x 3	1
22	O-ring Ø 25 x 3	1
23	O-ring Ø 20 x 1.5	4
24	O-ring Ø 9 x 1.5	2
25	O-ring Ø 18 x 2.5	1
26	O-ring Ø 90 x 1	1
27	O-ring Ø 19 x 1	1
40	Sliding disc	1

NSE plus 176, NSE plus 176-V1 (Id.-No. 0471225)

Item	Description	Quantity
19	O-ring Ø 62 x 3	1
20	O-ring Ø 96 x 3	1
21	O-rRing Ø 122 x 3	1
22	O-ring Ø 25 x 3	1
23	O-ring Ø 20 x 1.5	4
24	O-ring Ø 9 x 1.5	3
25	O-ring Ø 18 x 2.5	1
26	O-ring Ø 112 x 1.5	1
27	O-ring Ø 19 x 1	1
40	Sliding disc	1

NSE plus 100-75 (Id.-No. 0471132)

Item	Description	Quantity
23	O-ring Ø 4.5 x 1.5	3
24	O-ring Ø 3.5 x 1	1
25	O-ring Ø 6 x 1	4
26	O-ring Ø 20 x 1.5	4
27	Sealing element	2

Wearing parts, it is recommended to be changed when maintenance

10.2 Part lists

NSE plus 90 (Id.-No. 0471059)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
31	Cylindrical pin $\varnothing$ 6 x 30	2
32	Screw plug G1/8"	2
33	Compression spring	14
35	Set screw M4 x 4	3
36	Set screw M5 x 4	2

NSE plus 99 (Id.-No.. 0471120)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
30	Cylindrical screw M6 x 60	6
31	Cylindrical pin $\varnothing$ 8 x 40	2
32	Screw plug G1/8"	2
33	Compression spring	12
36	Set screw M5 x 3	2
37	Set screw M5 x 8	3
45	Protective caps	6

NSE plus 138 (Id.-No. 0471150)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
19	Ring-Schnur 126 x 3	1
30	Cylindrical screw M8 x 45	6

31	Cylindrical pin $\varnothing$ 10 x 55	2
32	Screw plug G1/8"	2
33	Compression spring	8
35	Set screw M2.5 x 3	1
36	Set screw M5 x 8	2
45	Protective caps	6

NSE plus 138-V1 (Id.-No. 0471095)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
19	Ring-Schnur 126 x 3	2
29	Fitting screw PSC NSE PLUS 138-V1	1
30	Cylindrical screw M5 x 45	6
31	Cylindrical pin $\varnothing$ 10 x 55	2
32	Screw plug G1/8"	2
33	Compression spring	8
35	Set screw M2.5 x 3	1
36	Set screw M5 x8	2
37	Set screw M5 x4	1
45	Protective caps	6

NSE-T plus 138 (Id.-No. 0471076)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
30	Cylindrical screw M85 x 20	6
31	Cylindrical pin $\varnothing$ 10 x 40	2
32	Set screw M5 x 4	2
33	Compression spring	10
35	Set screw M4 x 4	1
45	Protective caps	6

NSE-T plus 138-V1 (Id.-No. 0471076)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
30	Cylindrical screw M8 x 20	6
31	Cylindrical pin Ø 10 x 40	2
32	Set screw M5 x 4	2
33	Compression spring	10
35	Set screw M4 x 4	1
36	Cylindrical pin Ø m6 x 16	1
45	Protective caps	6

NSE plus 176 (Id.-No. 0471060)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1
6	Plug	1
30	Cylindrical screw M8 x 45	6
31	Cylindrical pin Ø 10 x 65	2
32	Screw plug G1/8"	2
33	Compression spring	8
35	Set screw M2.5 x 3	1
36	Set screw M5 x8	2
45	Protective caps	6

NSE plus 176-V1 (Id.-No. 0471096)

Item	Description	Quantity
1	Base body	1
2	Cover	1
3	Clamping bar	2
4	Piston	1

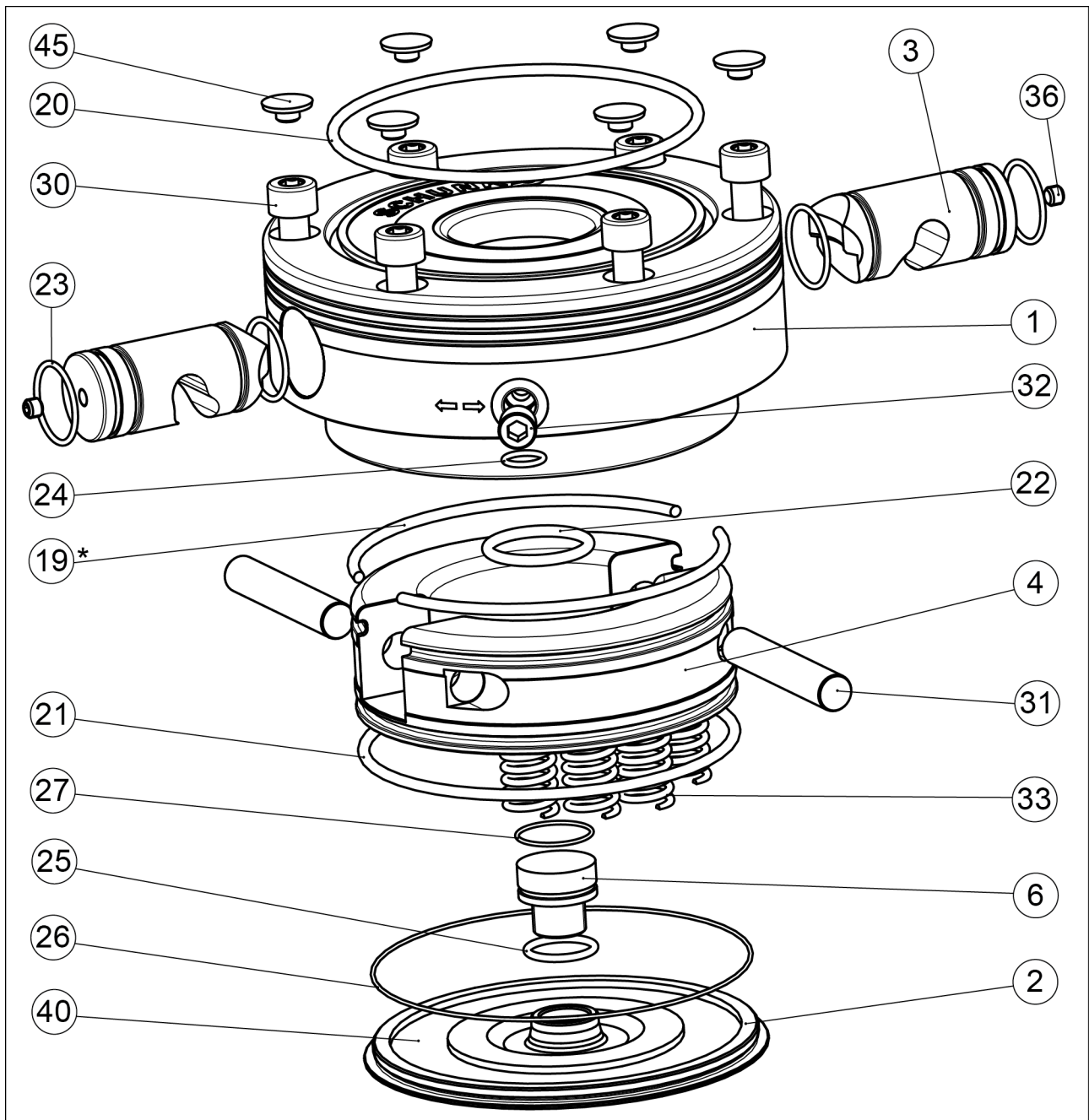
6	Plug	1
29	Fitting screw PSC NSE PLUS 138-V1	1
30	Cylindrical screw M8 x 45	5
31	Cylindrical pin $\varnothing$ 10 x 65	2
32	Screw plug G1/8"	2
33	Compression spring	8
35	Set screw M2.5 x 3	1
36	Set screw M5 x 8	2
45	Protective caps	6

NSE plus 100-75 (Id.-No. 0471130)

Item	Description	Quantity
1	Base body	1
2	Clamping bar	2
3	Piston	1
4	Cover	1
5	Drive spindle	2
6	Fitting screw NSE plus 100-75	2
7	Protective caps	4
9	Compression spring	8
19	Countersunk screw DIN EN ISO 10642 M5 x 14	6
	Cylindrical screw M8 x 45	2
21	Screw plug G1/8"	2
22	Set screw DIN EN ISO 4026 M4 x 4	4
28	Cylindrical pin $\varnothing$ 8 x 36	2
29	Cylindrical screw M5 x 12	4

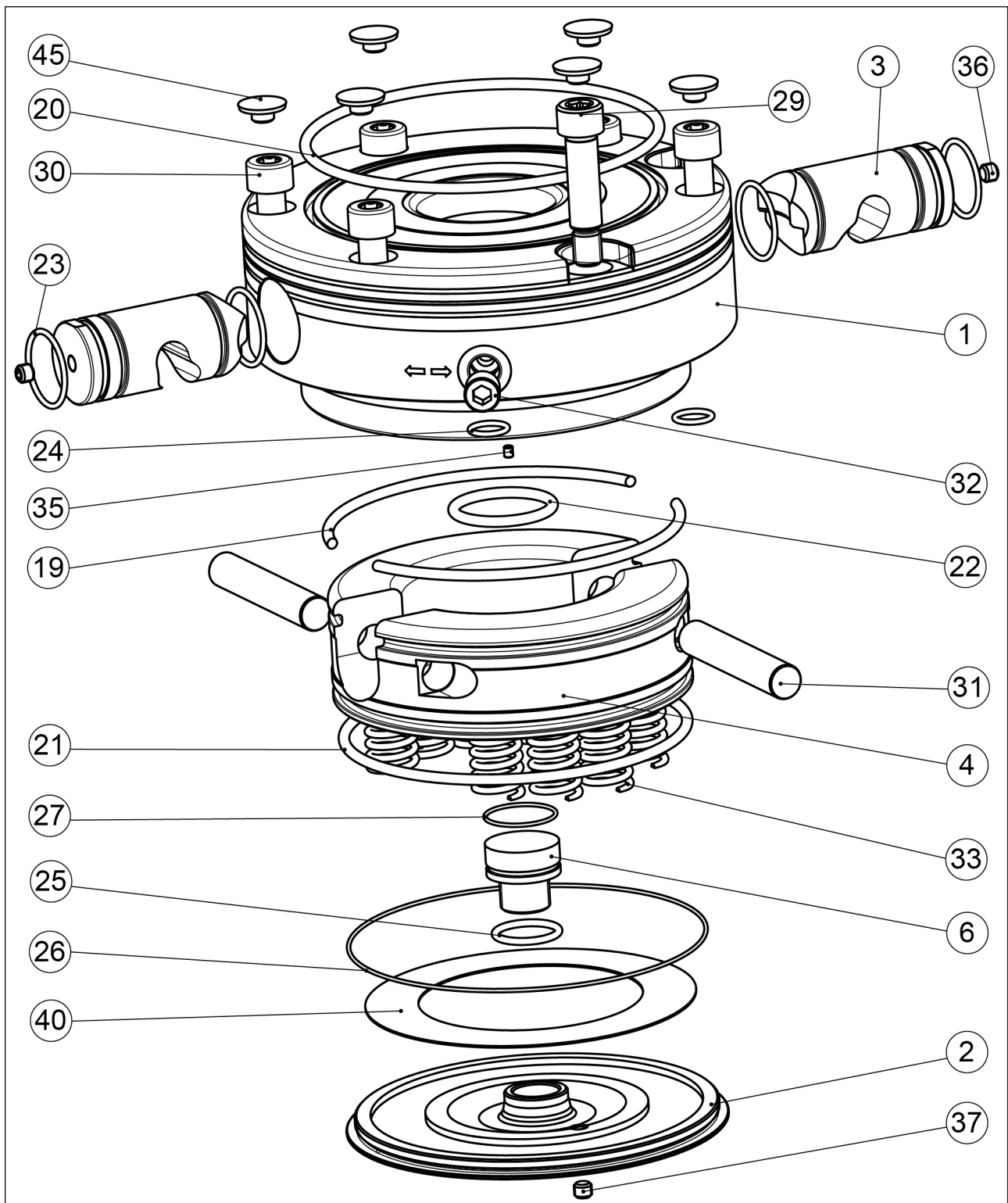
11 Assembly Drawings

11.1 NSE plus (cylindrical version)

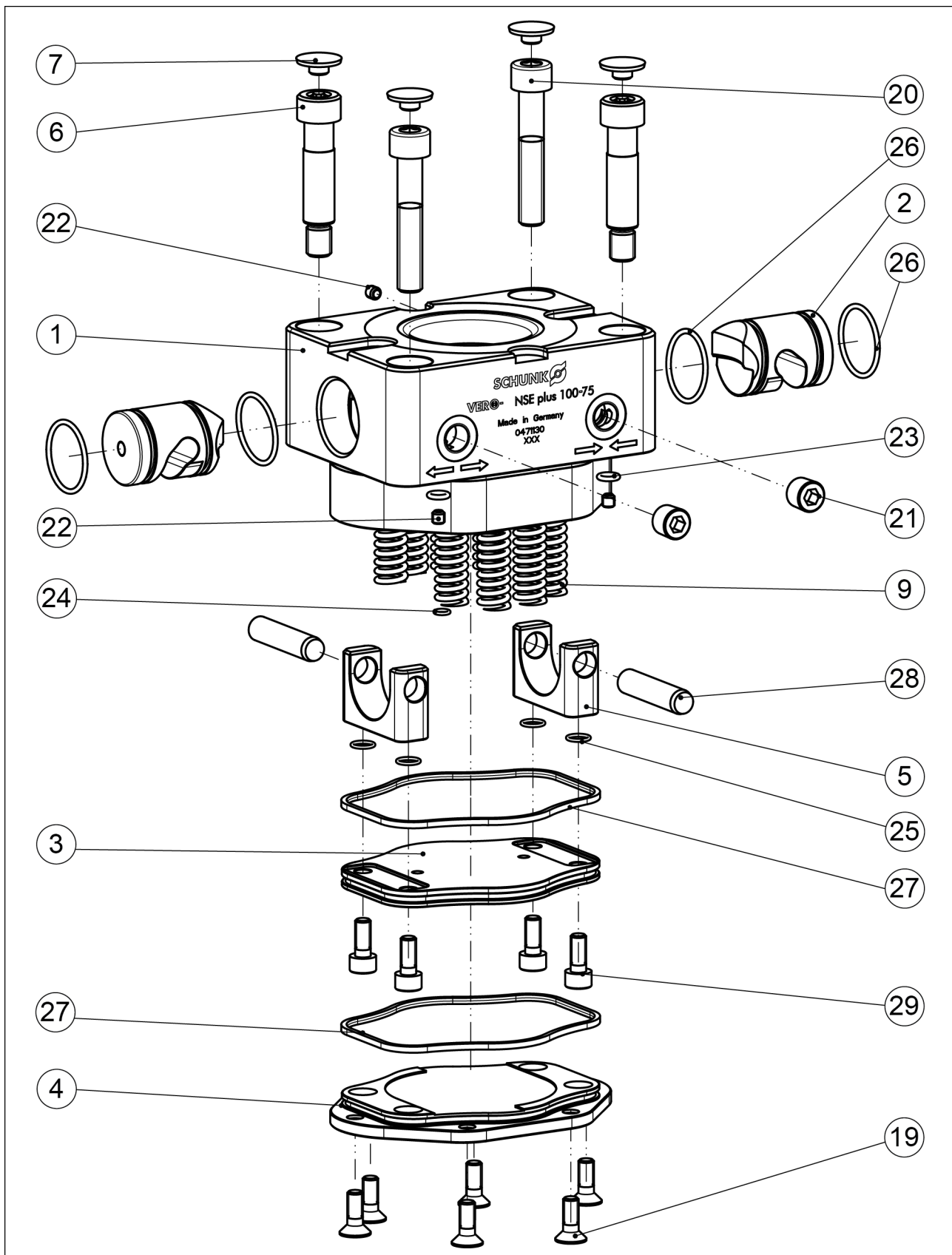


*	for NSE plus 99, NSE plus 138, NSE-T plus 138 and NSE plus 176
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11.2 NSE plus-V1 (cylindrical version)



11.3 NSE plus 100-75



12 Translation of original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1.B of the European Parliament and of the Council on machinery.

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

We hereby declare that the following product:

Product designation: VERO-S Quick-Change Pallet System
ID number

meets the applicable basic requirements of the **Machinery Directive (2006/42/EC)**.

The incomplete machine may not be put into operation until conformity of the machine into which the incomplete machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

EN ISO Safety of machinery - General principles for design - Risk assessment
12100:2011-03 and risk reduction

EN 62079:2001 Preparation of instructions - Structuring, content and presentation

The manufacturer agrees to forward on demand the special technical documents for the incomplete machine to state offices.

The special technical documents according to Annex VII, Part B, belonging to the incomplete machine have been created.

Person responsible for documentation: Mr. Philipp Schröder, Address: see address of the manufacturer.

Philipp Schröder

Mengen, October 2014

p.p. Philipp Schröder; Director for Development/Design