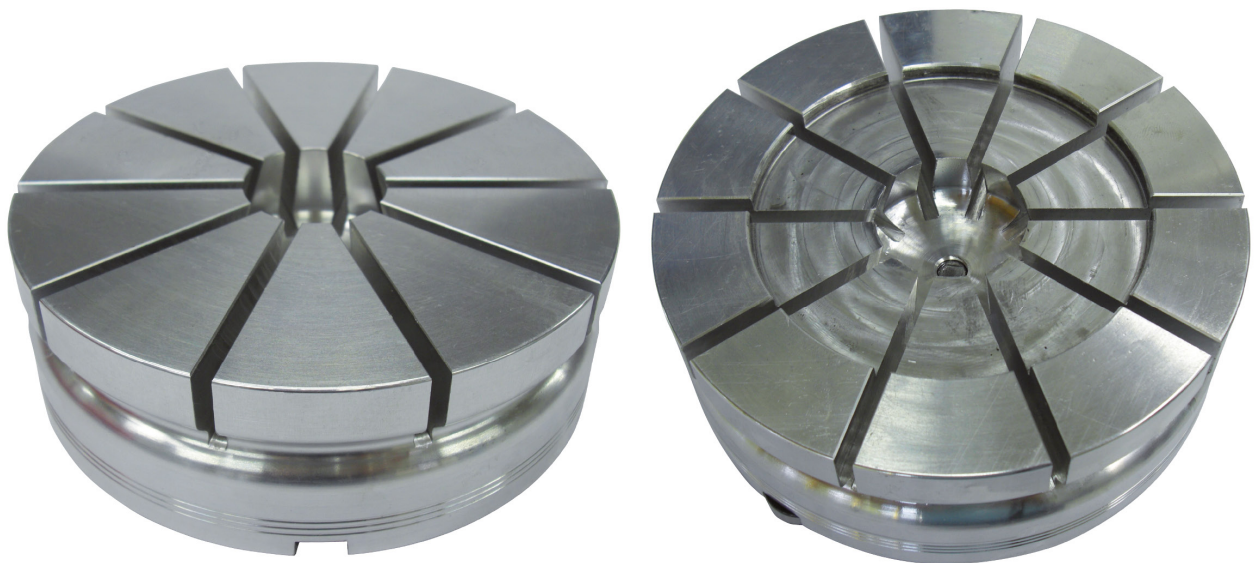


# **VERO-S fixture membrane SPMplus**

## **Id.-No. 0471158, 0471159**

### **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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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

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Reg. No. 003496 QM08



Reg. No. 003496 QM08

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## 1 About this manual

This manual is an integral part of the product and contains important information on safe and proper assembly, start-up, operation, care and maintenance.

Pay particular attention to the chapter "Basic safety notes" prior to using the product described in this manual.

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







**The SPMplus 138 fixture membrane is an accessory component designed for the VERO-S NSEplus 138-V1 quick change pallet system for the direct clamping of workpieces.**

**The SPMplus 138 fixture membrane may only be operated with the VERO-S NSEplus 138-V1 quick change pallet system.**

**This operating manual for the "SPMplus 138 fixture membrane" is valid only in combination with the complete "VERO-S quick change pallet system NSEplus / module for stationary use/application NSLplus, NSDplus" assembly and operating manual.**

### 1.1 Warnings

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

	<div> <b>DANGER</b></div> <div><b>Danger for persons!</b> Non-observance will inevitably cause irreversible injury or death.</div>
	<div> <b>WARNING</b></div> <div><b>Dangers for persons!</b> Non-observance can lead to irreversible injury and even death.</div>
	<div> <b>CAUTION</b></div> <div><b>Dangers for persons!</b> Non-observance can cause minor injuries.</div>

**NOTICE****Material damage!**

Information about avoiding material damage.

**! WARNING****Warning about hand injuries**

## 1.2 Applicable documents

- General terms of business\*
- Catalog data sheet of the purchased product \*

The documents marked with an asterisk (\*) can be downloaded on our homepage **schunk.com**

## 2 Basic safety notes

The SPMplus fixture membrane and the quick change pallet system that is required for operation could pose risks to personnel and property if they are handled, installed and maintained improperly as a result of non-observance of these instructions and the VERO-S quick change pallet system NSEplus assembly and operating manual.

- Read through the instructions carefully prior to assembly and installation.
- Report any failures and damage on the SPMplus fixture membrane and on the quick change pallet system immediately upon detection and repair it without delay to keep the extent of the damage minimal and prevent compromising the safety of the quick change pallet system. **Only use original SCHUNK spare parts when replacing damaged parts.**
- Keep this manual accessible to all users at all times.
- If transferring the product to a third party, be sure to include this manual.

### 2.1 Appropriate use

The SPMplus 138 fixture membrane is an accessory component for the VERO-S NSEplus 138-V1 quick change pallet system for the direct clamping of workpieces. The fixture membrane coupled with the quick change pallet system is used for the form-fitting and force-fitting gripping of workpieces.

The product may only be used within the framework of its technical data. When doing this, the maximum technical specifications must not be exceeded.

The clamping system is intended for industrial use for mounting on the machine table or machine pallets.

Intended use also includes the user having completely read and understood this operating manual and the VERO-S Assembly and Operating Manual NSEplus quick change pallet system, and particularly the "Basic safety notes" chapter.

### 2.2 Inappropriate use

Inappropriate use of the fixture membrane and the quick change pallet system includes using the product as lifting equipment, a toolholder, a press or a gripper.

## 2.3 Notes on particular risks

The fixture membrane and the quick change pallet system required to operate it may pose risks to personnel (danger to life and limb) and property if, for example:

- They are not used as intended.
- They are 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 to operating personnel in the event of horizontal position of the clamping pin axis by falling down of the fixture membrane and/or of the clamped workpiece.**

Before releasing the clamping slide lock, the fixture membrane and the clamped workpiece must be secured against falling down.



### **WARNING**

**Danger to life and limb of operating personnel during overhead applications due to falling down of the device or pallet and the clamped workpiece.**



Overhead application of a clamped workpiece is only allowed for a spring-mounted clamping system with decoupled compressed air supply and with suitable safety measures to prevent falling down.



### **WARNING**

**Risk of injury to operating personnel by incorrect or negligent releasing of the coupled fixture membrane as well as by the workpiece clamped in it by parts falling down or being flung out.**

During operation, incorrect or negligent release of the coupled fixture membrane tension and the workpiece that is clamped in it must be made impossible by suitable countermeasures (disconnecting the power supply after locking, use of check valves or switches).

	<p><b>⚠ CAUTION</b></p> <p><b>There is a risk of limbs being crushed during manual loading and unloading of moving parts and during the clamping process.</b></p> <p>Do not reach into the open mechanism of the clamping pin holder of the quick change pallet system.</p> <p>Grip the workpiece sufficiently high up when inserting it in the fixture membrane.</p> <p>When decoupling the compressed air, keep hands out of the danger zone.</p> <p>Use loading devices.</p> <p>Wear protective gloves.</p>
	<p><b>NOTICE</b></p> <p><b>The maximum permissible clamping depth in the collet and the maximum permissible clamping diameter must not be exceeded.</b></p> <p>Damage to the clamping system is possible.</p>

## 2.4 Notes on safe operation

The fixture membrane and the quick change pallet system can be sources of danger to personnel (risk of injury) and to property if, for example:

- it is used other than as intended;
- it is not installed or maintained properly;
- the safety and installation instructions, the safety and accident prevention regulations valid at the usage site or the EC Machinery Directive are not observed.

### Maintenance instructions

The care and maintenance instructions must be observed. The intervals indicated refer to a standard working environment. If the quick change pallet system is to be operated in an environment with abrasive dusts or corrosive or aggressive fumes or fluids, prior approval must be obtained from SCHUNK.

### Safety during assembly and maintenance

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

During assembly, connection, adjustment, commissioning and testing, make sure that no accidental operation of the fixture membrane and the quick change pallet system by the fitter or other persons is possible.

Refrain from all work that could threaten safety.



### **2.4.1 Constructional changes**

#### **Implementation of structural changes**

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.

### **2.5 Personnel qualification**

Only specialist personnel may install, remove, commission and maintain the fixture membrane and the quick change pallet system. Specialist personnel are persons who by their technical training, experience and knowledge are capable of assessing the work to be performed and recognizing potential dangers, and are thus able to take appropriate countermeasures.

If need be, take advantage of the manufacturer's training courses.

Every person called upon by the operator to work on the fixture membrane and on the quick change pallet system must have read and understood the complete assembly and operating manual (SPMplus and NSEplus), especially chapter "Basic safety notes".

The responsibility for operation, maintenance and repair must be clearly specified.

Only allow persons to service or repair parts of the fixture membrane and the quick change pallet system that are relevant to safety who can be considered to be a specialist, as defined in the safety regulations.

Specify the operator's responsibility, also with regard to safe behavior, and authorize the operator to reject instructions from third parties which breach safety regulations.

During training and instruction, personnel must only be permitted to work on the fixture membrane and on the quick change pallet system if continuously supervised by a specialist.

## 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 Quick Change Pallet System.

### **Supervision of Conduct**

The business operator is required, at least from time to time, to check personnel's conduct regarding awareness of safety and hazards.

### **Hazard Notices**

The business operator must ensure that the notes of safety and hazards for the machine to which the Quick Change Pallet 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 ex-works delivery date under the following conditions:

- Observe the applicable documents ([👉 1.2, Page 5](#))
- Observation of the maintenance and care instructions ([👉 8, Page 23](#))
- Observation of the ambient conditions and operating conditions
- The maximum number of clamping cycles is observed ([👉 5, Page 12](#))

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

### 4 Scope of Delivery

- **1 SPMplus 138 fixture membrane** (ID-No. 0471158)  
complete with SPC 40RF clamping pin and IXB V1 indexing pin
- **1 accessory pack**  
1 adjusting ring
- **1 SPMplus 138 fixture membrane** (ID-No. 0471159)  
complete with IXB V1 indexing pin
- **1 accessory pack**  
1 adjusting ring
- **1 Assembly and Operating Manual**

**Note:**

The fixture membrane is delivered without incorporated clamping contour.

The customer performs the adaptation at the individual workpiece contour (see chapter "Production of the clamping contour").

#### 4.1 Accessories

- **Accessories:**  
(ordered separately, see catalog or data sheets)  
NSEplus 138-V1 quick change pallet module  
Clamping pin type SPC40RF  
Clamping ring for quick change pallet module type BRR  
Protection cover for quick change pallet module type SDE

## 5 Technical data

Designation	SPMplus 138	SPMplus 138
ID no.	0471158	0471159
Min. clamping force (NSEplus)	1 kN	1 kN
Max. clamping force with turbo function (NSEplus)	50 kN	50 kN
Actuating pressure for turbo function	6 bar	6 bar
Smallest clamping diameter	Ø 36 mm	Ø 36 mm
Largest clamping diameter	Ø 125 mm	Ø 125 mm
Min. clamping depth	3 mm	3 mm
Max. clamping depth	20 mm	20 mm
Repeat accuracy	< 0.01 mm	< 0.01 mm
Weight	1.5 kg	1.5 kg

### Warranty and maximum clamping cycles

Duration of warranty	24 Months
Maximum clamping cycles	500 000

## 6 Description of clamping system

The SPMplus fixture membrane was developed as a clamping system for direct workpiece clamping in combination with the VERO-S NSEplus 138-V1 quick change pallet system.

This quick change pallet system has additional alignment grooves on the flat surface which ensure a repeatable position orientation of the fixture membrane to the machine table.

In the aluminum one-piece collet, workpieces can be surrounded with individual clamping contours on their entire surface. The quick change pallet system causes the targeted warping of the slotted clamping segments by an axial pull-down function.

By contraction of the clamping range, the clamping force is thus applied all around the entire workpiece contour.

Since the process takes place in the elastic area of the aluminum, this clamping procedure can be repeated many thousands of times. The resulting force-fit gripping ensures an evenly gentle clamping that is also rigid and secure.

Workpieces can be inserted and machined in seconds once they have been prepared with the individually introduced clamping contour. Due to the clamping contour with a clamping depth of only a few millimeters (at least 3 mm), an almost unlimited accessibility of the workpiece on five sides is ensured.

The fixture membrane is activated using a screwed VERO-S SPC 40 quick change pallet clamping pin which connects it via the clamping slide lock of the pneumatically actuated VERO-S NSEplus 138-V1 quick change pallet module. The workpiece clamping is clamped in a self-locking way during the machining via the VERO-S quick change pallet module and is not connected to a compressed air supply.

The fixture membrane needs no additional clamping devices and can be milled multiple times as necessary and given different workpiece contours.

The clamping device is suitable for light machining of the most varied materials and workpiece contours.

## 7 Assembly and installation

### 7.1 General installation notes

The SPMplus 138 fixture membrane can only be operated in combination with the pneumatically operated NSEplus 138-V1 quick change pallet system.

When disconnecting the compressed air from the unlocking connection of the quick change pallet system, the fixture membrane is form-fit locked and simultaneously initiated the warping of the clamping segments.

During machining, the fixture membrane is held solely by the clamping slide lock of the quick change pallet module without further screwing.

If the quick change pallet module is unlocked, the locking of the fixture membrane is also released and it can be lifted. **For this reason, the safety notes absolutely must be observed (see chapter "Basic safety notes").**

**The prerequisite for a high holding force for workpiece machining is an exact shape accuracy (rectangularity) of the workpiece as well as the clamping contour in the fixture membrane.**

NOTE:

When joining, make sure that the indexing pins of the fixture membrane and the alignment groove of the quick change pallet system are precisely aligned.

NOTE:

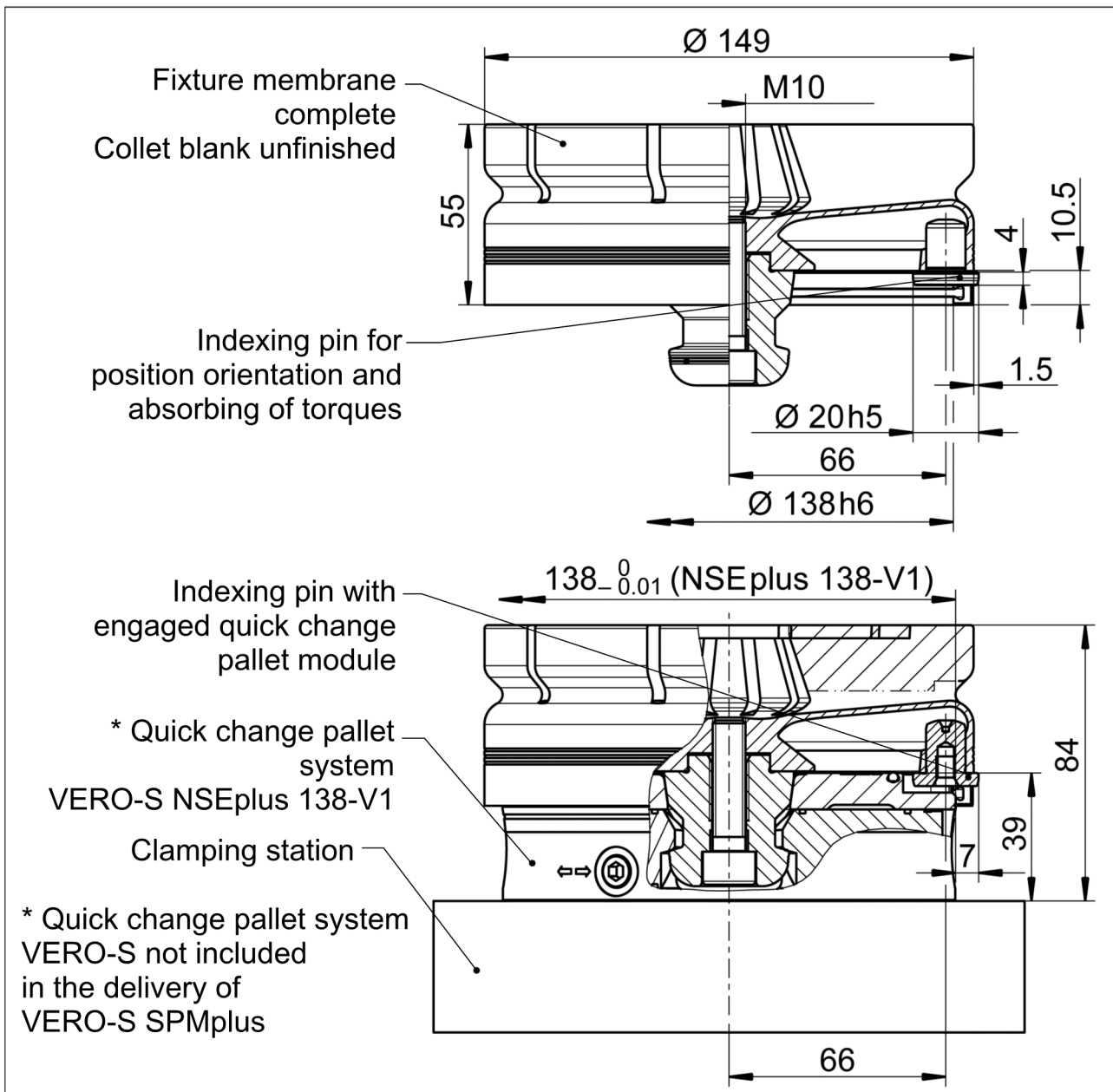
For the horizontal application of the fixture membrane, the O-ring section must be inserted in the collet.

If the O-ring is damaged, it should be replaced (see chapter parts lists).

**If the fixture membrane is not used for a longer time, it should not stay in the clamping module but rather be kept in an unclamped condition.**

### 7.2 Mounting of the fixture membrane on the quick change pallet system

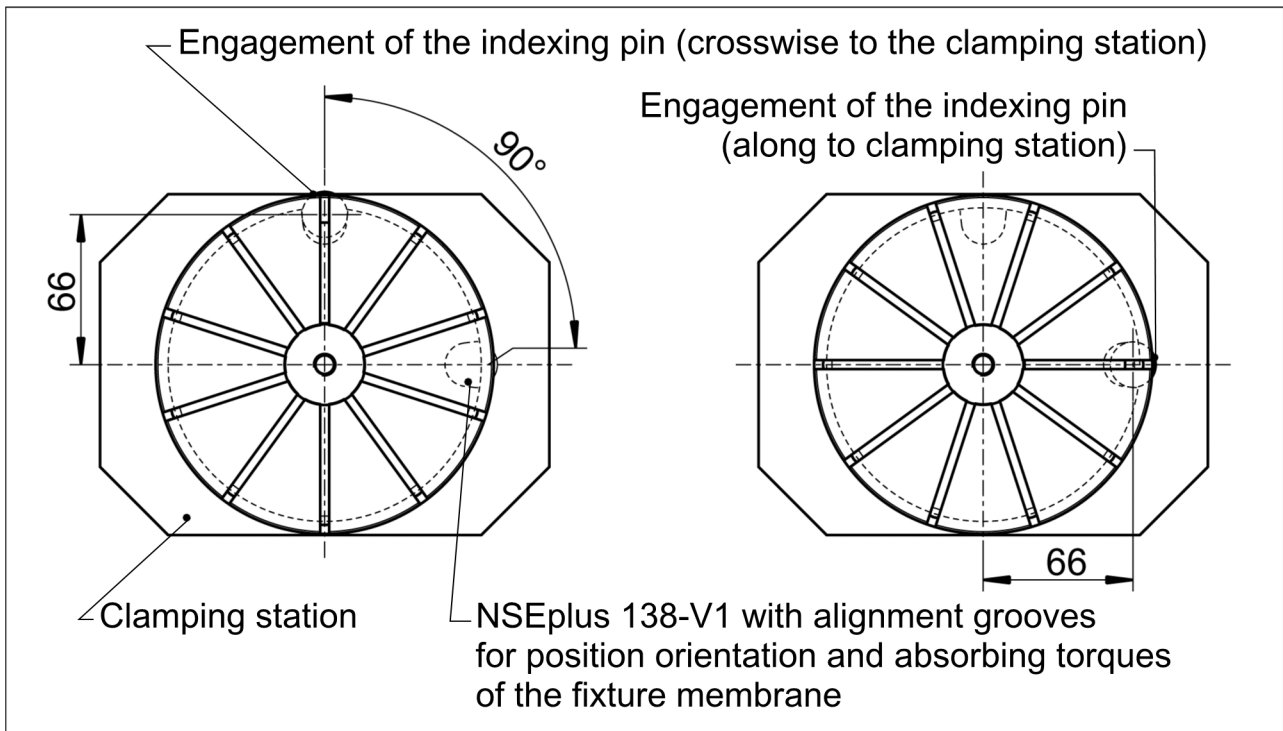
The positioning of the fixture membrane is done using the upper centering diameter of the NSEplus 138-V1 quick change pallet module:  $\varnothing 138_{0/-0.01}$ .



Mounting of the fixture membrane on the quick change pallet system

The collet blank has an internally mounted O-ring section. The O-ring is used to ensure that the fixture membrane does not fall out of the quick change pallet system; for example, during horizontal application on a clamping tower/tombstone. Two alignment grooves on the flat surface of the quick change pallet module permit the fixture membrane to be inserted laterally or longitudinally to the machine table.

The IXB V1 NSEplus indexing pin ensures that the position orientation to the fixture membrane is exact and is used to absorb the resulting torque during machining. The fixture membrane is inserted into the quick change pallet module, which is switched to "unlock". The indexing pin must engage in one of the two alignment grooves. The clamping system is already then fixed for direct workpiece clamping with high repeat accuracy and ready for operation.

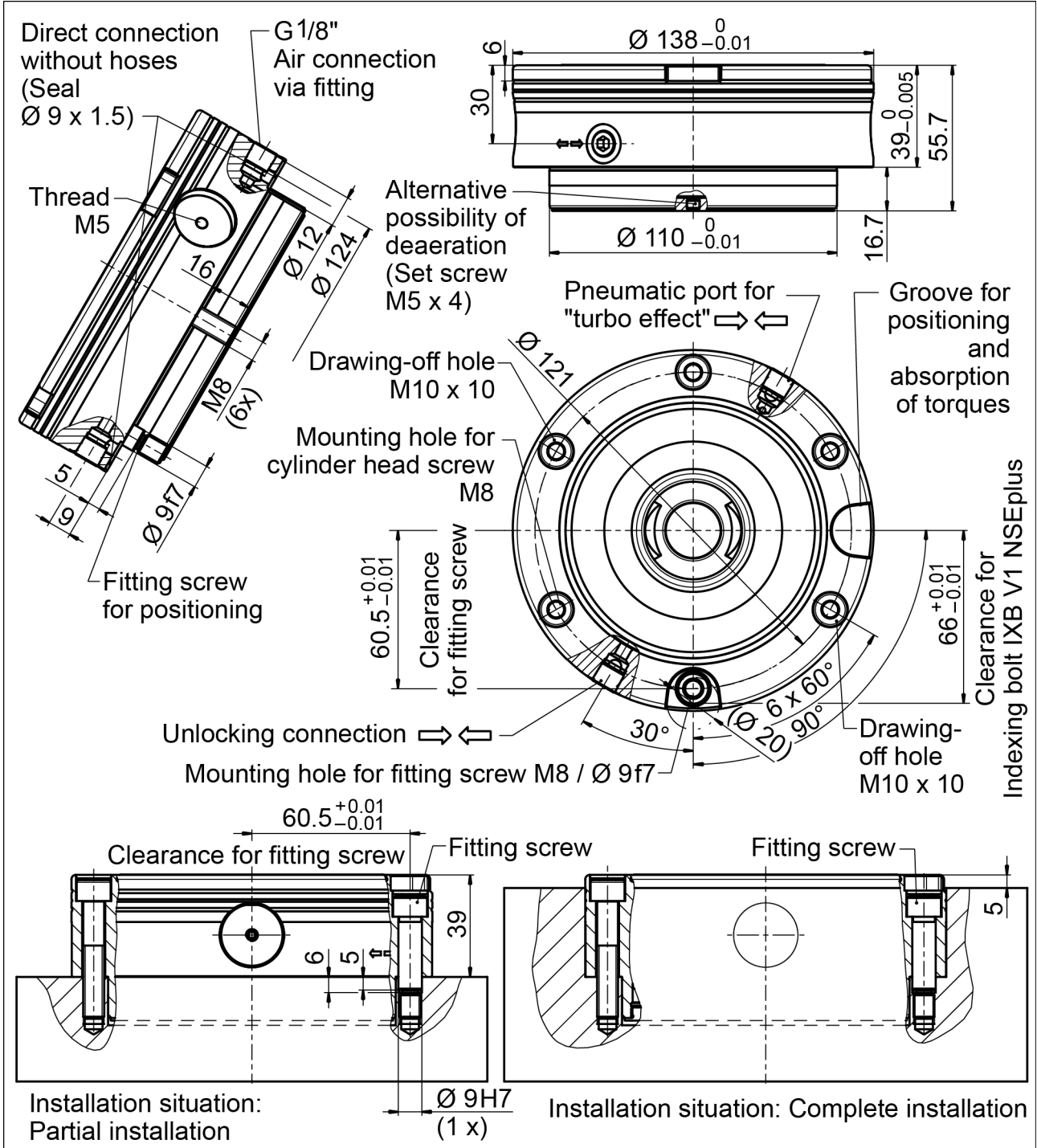


Angle orientation of the fixture membrane on the quick change pallet system

### NOTE:

The technical data and descriptions for operation of the VERO-S NSEplus 138-V1 quick change pallet system can be found in the "VERO-S quick change pallet system NSEplus / module for stationary use/ application NSLplus, NSDplus" assembly and operating manual.





## Mounting and connecting the VERO-S NSEplus 138-V1

### 7.3 Production of the clamping contour

### Production of the clamping contour in the collet:

- Check the work piece dimensions with the maximum permissible milling out area of the fixture membrane as well as the effective clamping depth (see chapter technical data).

- Provide the complete fixture membrane with the mounted quick change pallet clamping pin as well as the separately included adjusting ring. The adjusting ring enables the targeted initial tension of the clamping segment.
- **Place the adjusting ring concentrically to the clamping pin axis on the flat surface of the quick change pallet system.**  
For horizontal application, the adjusting ring is placed on the flat surface of the fixture membrane behind the quick change pallet clamping pin.
- Actuate the quick change pallet system at the unlocking connection with compressed air.
- Insert the fixture membrane into the unlocked quick change pallet system. Observe the positioning of the indexing pin to the alignment groove when doing this (see figure "Preparation for production of the clamping contour").
- Decouple the compressed air supply at the unlocking connection.
- Switch on the air supply at the port for "Turbo function" and then uncouple after a short air pulse. The fixture membrane is now pre-loaded by 0.05 mm.
- Mill in the clamping contour following the exact workpiece dimensions **without joint play** into the fixture membrane blank of the fixture membrane (see figure "Production of the clamping contour"). A maximum production tolerance to the workpiece contour (diameter or width dimension) of 0.05 mm is permissible.
- After the opening of the quick change pallet module, the circumference of the fixture membrane widens to 0.5 mm. This results in the ideal insertion gap.

**The following points have to be observed when machining the clamping contour:**

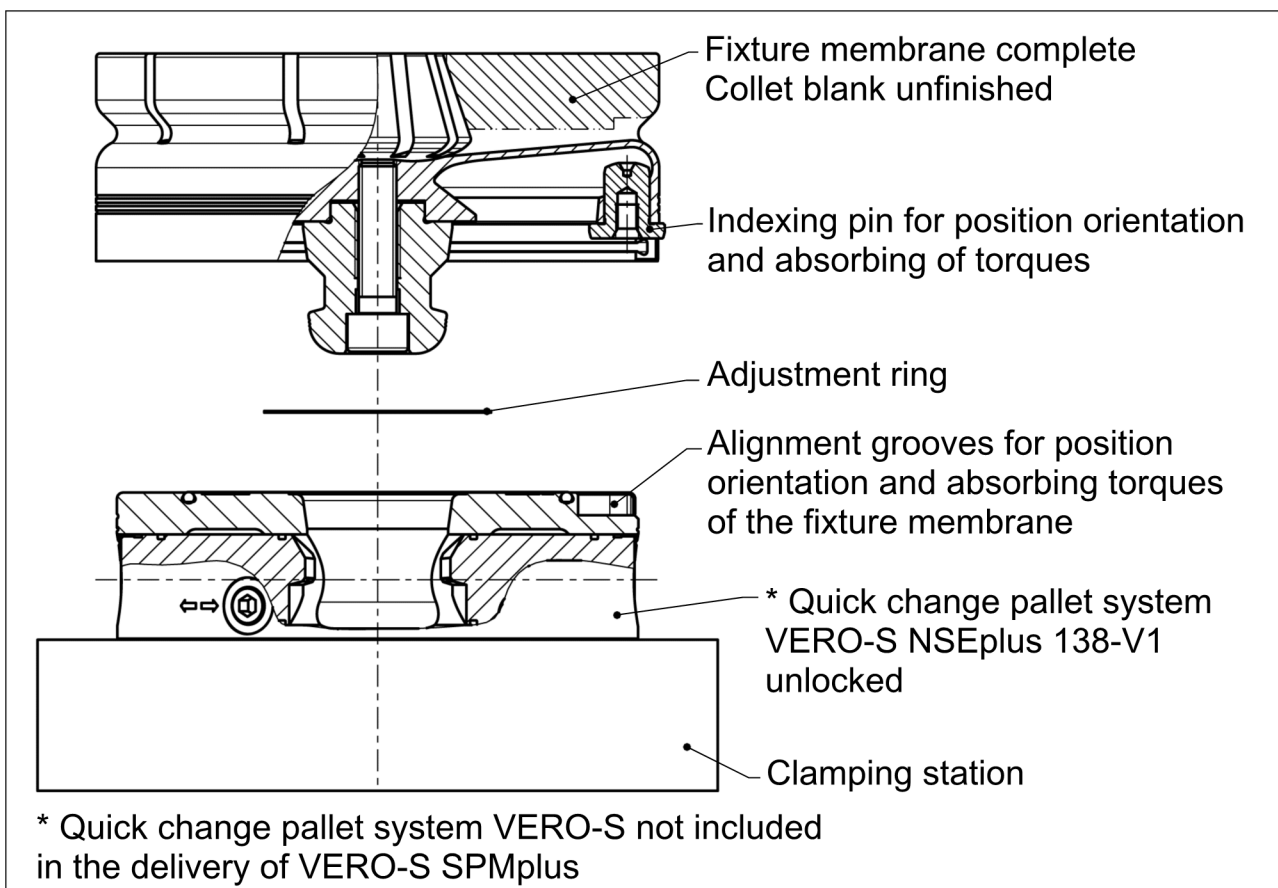
- To ensure a secure workpiece clamping, a clamping depth (clamping edge) of at least 3 mm to 5 mm is needed. A clamping depth of 3 mm is sufficient for a workpiece height of maximum 40 mm.
- The clamping contour should be milled in as close as possible to the center of the fixture membrane.
- The clamping contour must be recessed parallel to the machine table.
- The workpiece should preferably only rest on the edge in the milled out workpiece locating surface to ensure the greatest clamping precision. The internal area should be recessed by 0.1 to 0.2 mm.

- The clamped workpiece must have a rotating chamfer so that a support with a flat surface in the fixture membrane body is ensured.
- The corner radius of the clamping contour must be smaller than the rotating chamfer at the workpiece.
- The fixture membrane can be used more than once by multiple plane milling of the clamping contour.
- The maximum clamping depth in the fixture membrane may not be exceeded (see chapter Technical data).  
A raised clamping edge of 3 mm height is imperative.  
The higher the remaining overall stroke of the clamping segment, the greater the achievable radial clamping stroke.

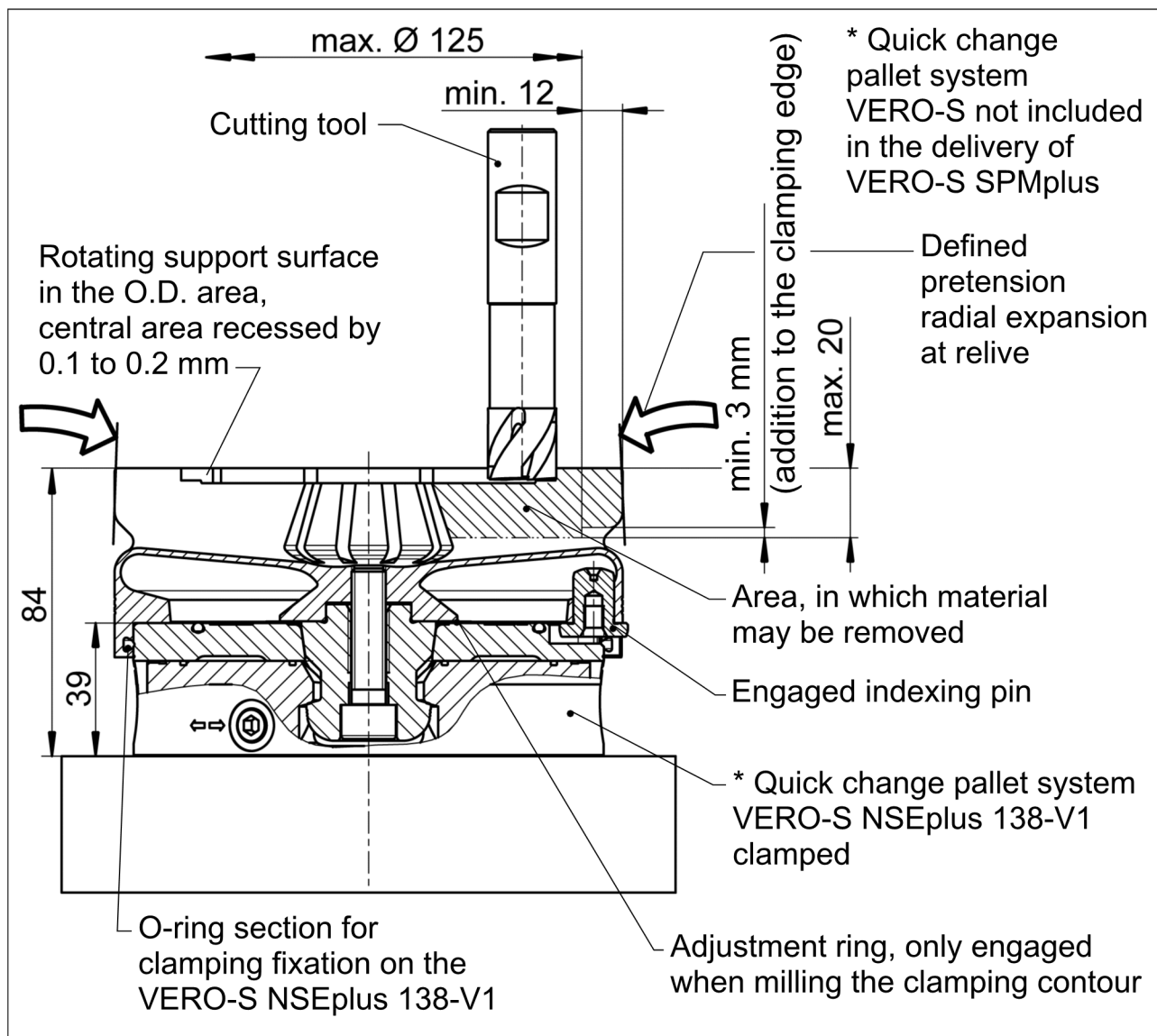
**Important:**

**The adjustment ring is aligned to the exact height of the fixture membrane and cannot be replaced by a user-made component.**

If the adjustment ring is lost or damaged, it can be ordered as a spare part from SCHUNK (see chapter Parts lists).



Preparation for production of the clamping contour



Production of the clamping contour

## 7.4 Clamping the workpiece

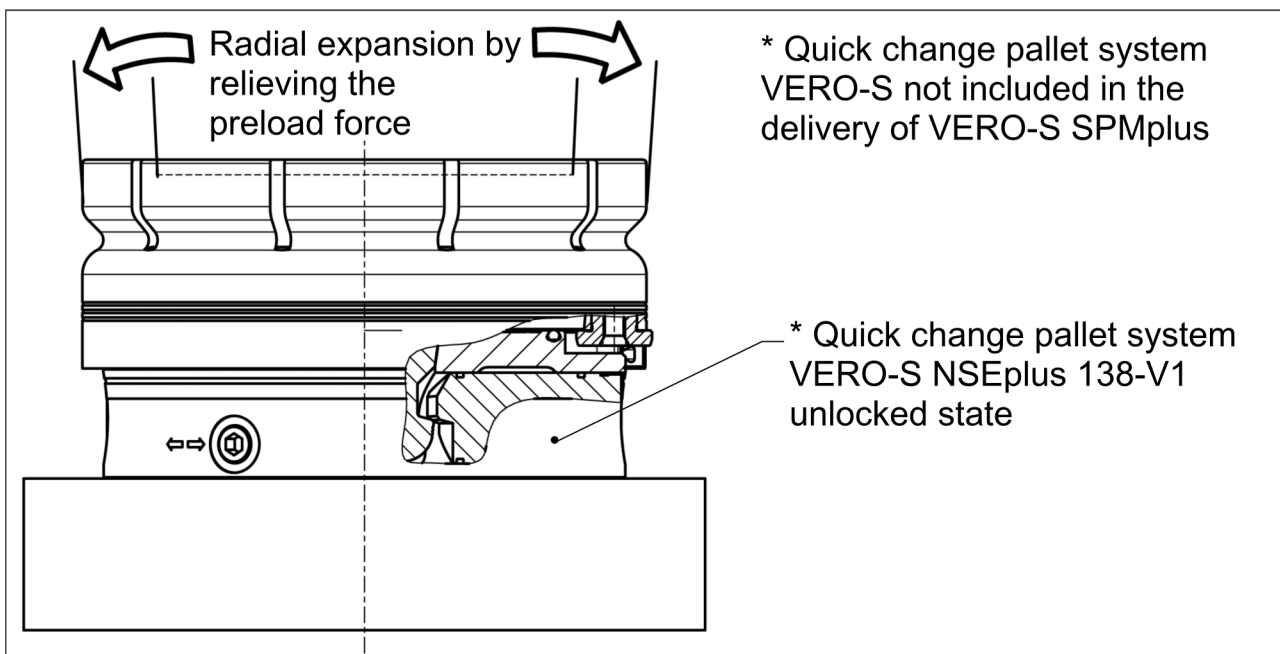
- After the production of the clamping contour, open the quick change pallet system with compressed air at the unlocking connection.
  - After the opening of the quick change pallet module, the fixture membrane's circumference widens by 0.5 mm so that the workpiece can be inserted with joint play.
- Lift up the fixture membrane.
- **Be sure to remove and keep the adjusting ring.**
- Re-insert the fixture membrane (without adjusting ring) in the quick change pallet module.
- Insert the workpiece in the prepared clamping contour (see figure "Insertion and machining of the workpiece", left).

- Decouple the compressed air supply at the unlocking connection.
- Switch on the compressed air supply at the port for "Turbo function" with a brief air pulse.
- Decouple the compressed air supply at the port for "Turbo function".
- The workpiece is securely clamped and can be machined (see figure "Insertion and machining of the workpiece", right).

**NOTE:**

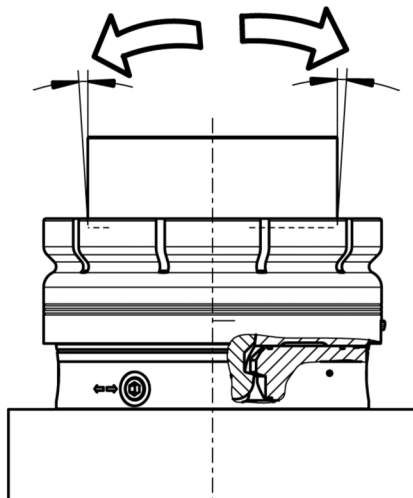
**The adjusting ring absolutely must be removed before the workpiece clamping so that the clamping force can act on the workpiece.**

**The adjusting ring is used to produce the clamping contour.**

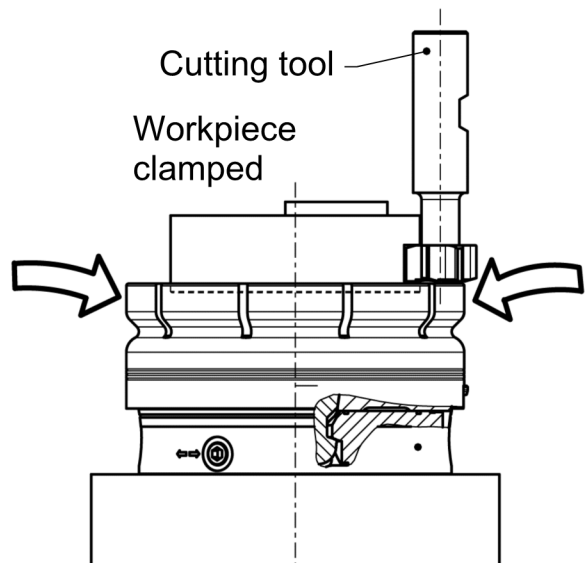


Expansion of the fixture membrane after the opening of the quick change pallet system

Workpiece loaded in unclamped fixture membrane.  
Clearance during expansion  
after pre-processing



\* Quick change pallet system  
VERO-S NSEplus 138-V1  
unlocked state



\* Quick change pallet system  
VERO-S NSEplus 138-V1  
clamped

Insertion and machining of the workpiece

## 8 Maintenance and care

The fixture membrane is designed for low-maintenance operation, so a disassembly of the unit is only necessary in exceptional cases.

- The contact surfaces of the interfaces between the quick change pallet module and the fixture membrane must always be clean.
- No chips of any sort may enter the interface, thereby reducing the clamping stroke.
- Only use high-quality cooling emulsion with anti-corrosive additives during processing.
- The fixture membrane and the quick change pallet system, which is also required for operation, should be checked at regular intervals (at least every two weeks or after 1,000 clampings). The functioning can be seen as excellent if the individual clamping segments of the fixture membrane warp evenly and then reassume concentric initial positions.
- If the quick change pallet system is noticeably loud when the fixture membrane is opened, grease can be applied between the clamping pins and the clamping slide to improve the sliding characteristics of the components.
- Carry out regular visual/functional checks.  
If there is visible damage or signs of operative malfunctions, take the fixture membrane and the quick change pallet system, which is also required for operation, out of operation.  
The system may only be started up again once the faults have been corrected (for example, by replacement of a damaged fixture membrane).

**Use original SCHUNK spare parts only when exchanging damaged parts.**

## 9 Problem analysis

### **The workpiece is not clamped securely enough in the fixture membrane:**

- The turbo port at the quick change pallet system was not pressurized.
- The operating pressure at the quick change pallet system is smaller than 6 bar.
- The necessary recommended workpiece clamping depth is not sufficient.
- The workpiece height is too great.
- The tolerance of the clamping contour in the fixture membrane is too great.
- The tolerance variation of the workpieces was exceeded, so the clamping collet can therefore no longer be warped enough in the elastic area.
- The interface between the quick change pallet module and the fixture membrane is dirty.
- The fixture membrane is permanently warped.

### **The workpiece can not longer be inserted in the recessed clamping contour:**

- The quick change pallet module does not unlock without trouble.
- The fixture membrane is permanently warped.
- A clamping segment of the collet is damaged.
- The tolerance variation of the workpieces was exceeded.
- The shape accuracy of the clamping contour and the workpiece contour have not been made to go together.



## 10 Spare and wearing parts

### SPMplus 138 (ID-No. 0471158)

Item	Designation	Quantity
1	Collet	1
2	Clamping pin SPC 40RF	1
3	IXB V1 NSEplus indexing pin	1
4	Socket head screw, M10 x 40 10.9	1
5*	Adjusting ring	1
6**	O-ring Ø 130 x 3	1

### SPMplus 138 (ID-No. 0471159)

Item	Designation	Quantity
1	Collet	1
3	IXB V1 NSEplus indexing pin	1
5*	Adjusting ring	1
6**	O-ring Ø 130 x 3	1

\* Part is included in the accessory pack.

\*\* Wearing parts, recommended to replace when maintenance is performed

11 Assembly drawing

