

Operating Manual

Original Operating Manual

Makro•Grip® Aero Pneumatic 5-Axis Vise



Copyright:



LANG
TECHNIK

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Modifications to the product: In the event of modifications to the product by the customer, the warranty is void. No modifications may be made to the product without the manufacturer's approval.

Only use original spare parts. In the case of externally supplied parts, there is no guarantee that they have been designed and manufactured to withstand the stresses applied or to meet safety requirements. The manufacturer provides a full warranty only and exclusively for the spare parts ordered from it.

The manufacturer is committed to improving its products. It reserves the right to make changes. This does not imply any obligation to make retrospective adjustments to the products already delivered.

General Terms and Conditions of Sale and Delivery:

Our General Terms and Conditions of Sale and Delivery shall apply as a matter of principle. These are available to the plant operator at the latest when the contract is concluded.

Warranty and liability claims for personal injury and property damage are excluded if they are caused by one or more of the following:

- Improper use
- Improper installation, commissioning, operation, or maintenance
- Operating the product in a defective state
- Inadequate monitoring of parts subject to wear and tear
- Failure to follow the instructions in the documentation
- Catastrophic events due to foreign bodies or force majeure

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1.1 GENERAL

The Makro•Grip® vise is designed for clamping pre-stamped and non-pre-stamped raw parts and/or finished workpieces. External pre-stamping enables the stamping technology to hold a workpiece securely in the Makro•Grip® 5-Axis Vise with low clamping force. Its compact design and high holding forces achieved through form-fit clamping make the 5-Axis Vise the ideal workholding solution for 5-sided machining of raw parts.

1.1.1 VERSIONS:

Makro•Grip®, Makro•Grip® FS Aero



IMPORTANT NOTE FOR MAKRO•GRIP® FS:

Please note that the FS series requires the appropriate stamping jaws (item no. 50111 or 50112) for form-fit clamping with pre-stamped workpiece. These stamping jaws can be fitted to all stamping units (2023 or older) using an additional conversion set (item no. 51260-20).

1.1.2 GENERAL SAFETY INSTRUCTIONS

- Damage to the product must be completely and properly repaired by trained specialist personnel before commissioning.
- The product may only be installed by trained and instructed specialist personnel.
- If the 5-Axis Vise has already been used, make sure that there is no contamination (dirt, swarf).

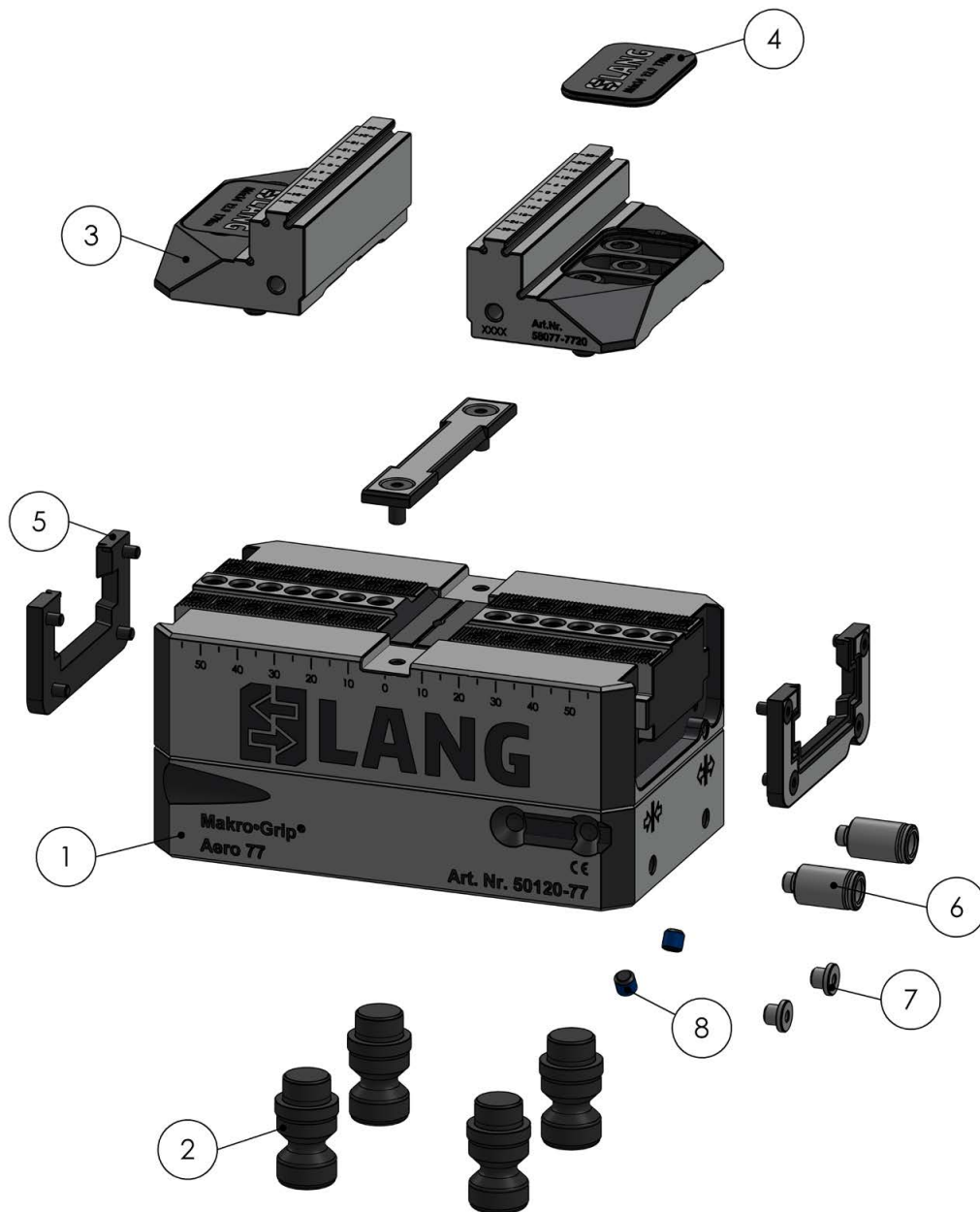


WARNING NOTE

If the workpiece is clamped incorrectly, parts of the product or the workpiece may come loose and cause injury or damage.

1.2 ASSEMBLY

1. Base body incl. base jaws
2. Quick•Point® clamping studs / integrated zero point interface
3. Pair of jaws with serration (Note: Not included in the scope of delivery)
4. Cover
5. Wiper set
6. External pneumatic interface (Ø 6 push-in fitting)
7. Sealing screws for the external pneumatic interface
8. Sealing screws for the internal pneumatic interface



1.3 SCOPE OF DELIVERY

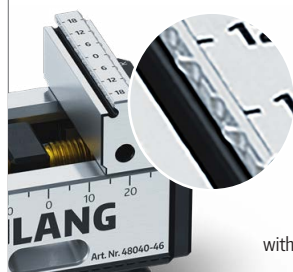
- 4x threaded Quick-Point® 52 or 96 mounting studs (Item 2)
- 2x threaded Ø 6 push-in fittings
- 2x threaded M5 sealing screws
- 2x M5 sealing screws included
- Operating instruction



Note: Item 3 (pair of jaws) is not included in the scope of delivery.

1.4 ACCESSORIES & SERVICE

Makro•Grip® 5-Axis Vises are equipped with alternating holding teeth and depths stops (see illustration).



with control marks

Makro•Grip® FS 5-Axis Vises are equipped with a continuous serration (full serration).

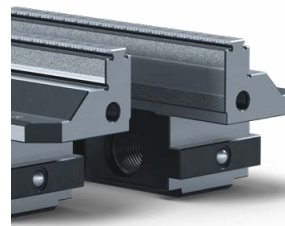


full serration

1.5 MAINTENANCE AND REPAIR

In the event of damage or faults, please directly contact
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A tungsten carbide coating can be applied subsequently to the smooth surfaces of the Makro•Grip® Aero jaws to further increase the holding force during smooth-surface clamping.



1.6 COMPATIBILITY

The following jaw types are compatible with the Makro•Grip® Aero base body:

- Makro•Grip® (Art.-Nr. 58077-7720)
- Makro•Grip® FS (Art.-Nr. 58077-7720FS)
- Avanti (Art.-Nr. 58077-7744)

The jaws of the manual Makro•Grip® vises are not compatible.



Note: All suitable components can be found in the catalog or on our website.



1.7 PREREQUISITE FOR MOUNTING ON A MACHINE TABLE

The centering vise is supplied with four Quick•Point® clamping studs.

This enables clamping in the Quick•Point® 52 zero-point clamping system from LANG Technik GmbH, which is mounted on the machine table of the machine tool.

Info: Under certain circumstances, direct bolting to the machine table/pallet is possible.

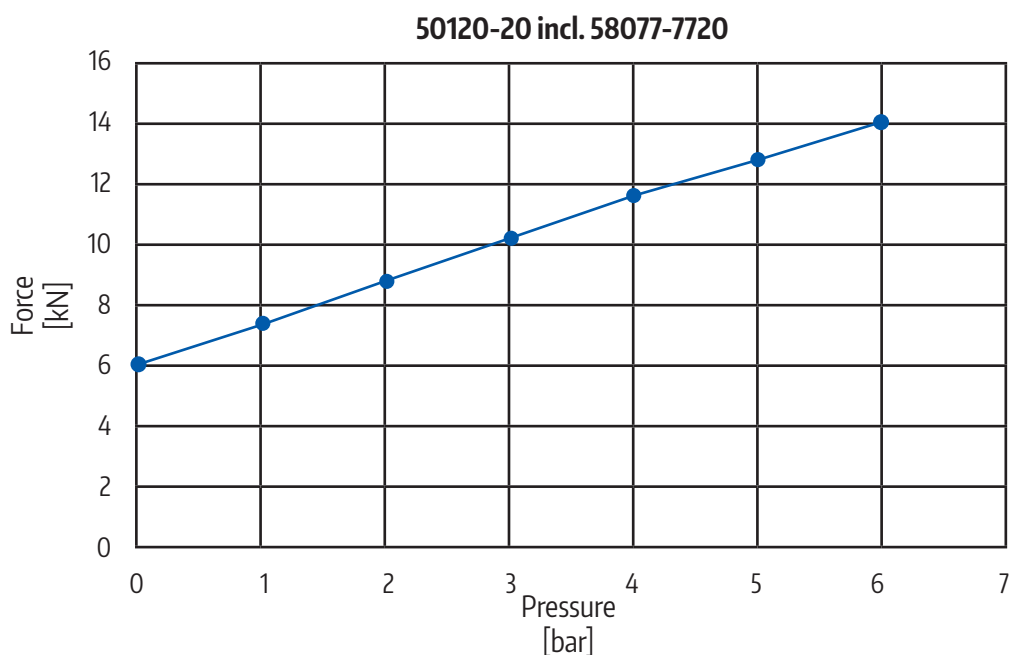
Please contact support@lang-technik.de

2.1 GENERAL DATA AND TIGHTENING TORQUES

Base body width	Max. Operating Pressure [bar]
77	6

2.2 CLAMPING PRESSURE AND CLAMPING FORCE

The following table shows the clamping force as a function of the clamping pressure. The clamping force is specified as the arithmetic sum of the forces generated by both clamping jaws.



2.3 ZERO POINT INTERFACE

The 5-Axis Vise is clamped with its four clamping studs with a repeat accuracy of < 0.005 mm and holding forces of up to 6,000 kg.

3 INSTALLATION

3.1 ATTACH THE MAKRO•GRIP® (FS) AERO 5-AXIS VISE TO THE MACHINE TABLE

Prerequisite for mounting on a machine table:

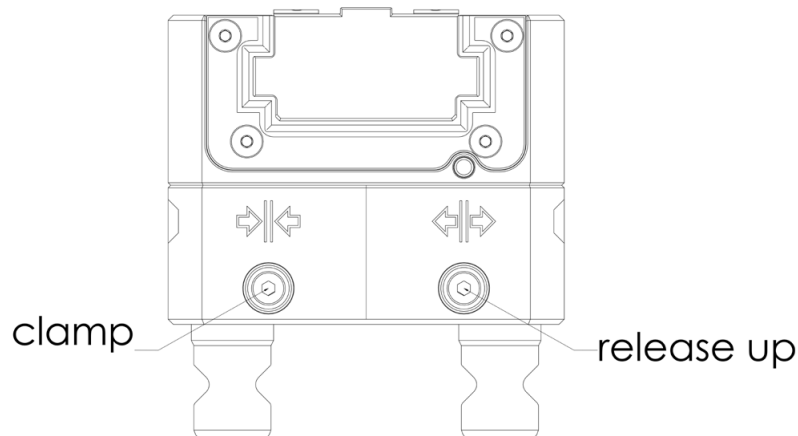
To mount the vise on a machine table, a compatible zero-point clamping system is required. The vise is supplied with four pre-installed Quick•Point® mounting studs. These studs enable zero-point clamping on the machine table of a machine tool or machining center in combination with compatible mounting systems (optional accessories) from LANG Technik GmbH.

For example:

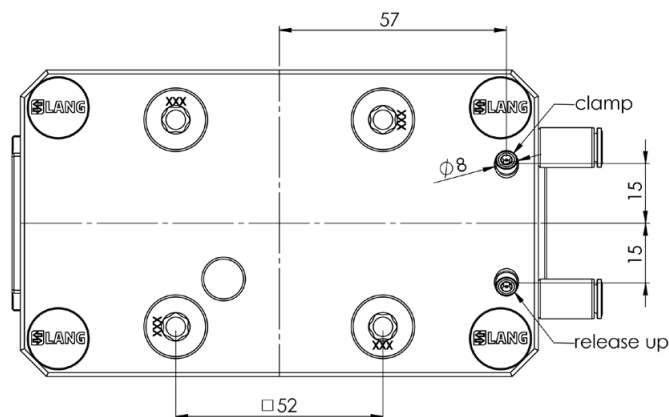
- A Quick•Point® zero-point plate with a 52 mm grid spacing and no pneumatic connection. The air supply is provided via two Ø 6 hoses.
- A Quick•Point® zero-point plate with a 52 mm grid spacing and an integrated pneumatic interface.
- A RoboTrex 52/96 automation tower without a pneumatic connection. The air supply is provided via two Ø 6 mm air lines.

Procedure for setup using Ø 6 pneumatic hoses:

1. Install the push-in fittings (6) and seal the threaded holes on the underside with the set screws (8).
2. Clean the mounting surfaces of the vise and the support surface. Ensure that they are free of dirt and chips.
3. Place the vise into the zero-point clamping system or an alternative mounting device.
4. Actuate the clamping mechanism of the zero-point clamping system or the alternative mounting device.
5. Connect the pneumatic hoses for clamping and unclamping to the vise and check proper operation.
No air must escape.
6. The vise is now ready to clamp a workpiece. See the Operation chapter.

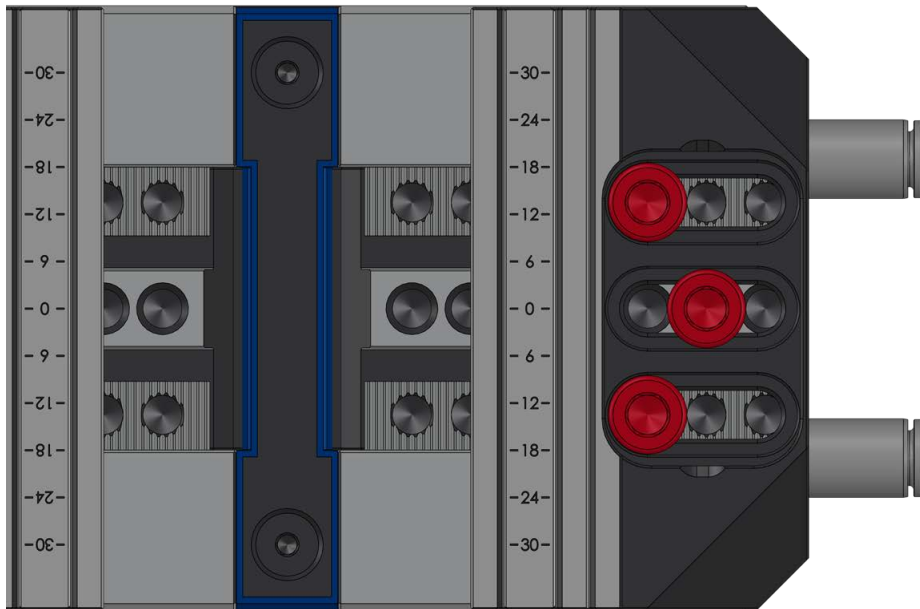
**Procedure for Setup Using the Integrated Pneumatic Interface:**

1. Install the sealing screws (7) and open the threaded holes on the underside.
2. Clean the mounting surfaces of the vise and the support surface. Ensure that they are free of dirt and chips.
3. Insert an O-ring into the pneumatic transfer interface.
4. Place the vise into the zero-point clamping system or an alternative mounting device.
5. Actuate the clamping mechanism of the zero-point clamping system or the alternative mounting device.
6. Check the clamping and unclamping functions. No air must escape.
7. The vise is now ready for workpiece clamping. See the Operation chapter.



3.2 CLAMPING JAWS INSTALLATION

1. Clean the serrations on the base body (1) and the clamping jaws (3).
2. Position the jaws symmetrically on the base body.
3. Remove the three M6 set screws from each jaw. See the illustration for their positions.
4. Secure the jaws using ISO 4762 M6×14 property class 12.9 socket head cap screws. Tighten to 17 Nm.
5. Check that the jaws are positioned symmetrically on the base body.
6. Perform a test clamping of the workpiece. (See "Operation – Clamping".)
7. Press the screw covers (4) into the jaws to protect them from contamination.



3.3 CLAMPING JAWS REMOVAL

1. Remove coolant and chips from the base body and the jaws.
2. Open the screw covers using a magnet (accessory 45000-30).
3. Remove the socket head cap screws and take off the jaws.



Tip! Adjust the clamping width so that the workpiece dimension is centered within the clamping range. This allows variations in workpiece size to be compensated for.

4.1 CLAMPING AND RELEASING WORKPIECES IN THE SERRATION

Clamping

1. Ensure that the workpiece and all contact surfaces are free of dirt, burrs, and chips.
2. Open the vise by applying 6 bar of pneumatic pressure to the "Open" port.
3. Place the fully prepared workpiece with the pre-stamped serration into the matching serration of the jaws. (For detailed information, refer to the operating instructions for the stamping systems.)
4. Stop the pneumatic supply to the "Open" port. The vise now clamps the workpiece using the spring pack.
5. Then apply 0 to max. 6 bar of pneumatic pressure to the "Close" port to achieve the required clamping force (see Section 2.2, Clamping Force Diagram).

! The pressure must be maintained throughout the entire machining process.

The pre-stamped workpiece engages in the serration at 6 mm intervals (FS version: 3 mm)..



! Note: Internal-to-external clamping of a workpiece is not possible. Attempting to do so may cause the workpiece to come loose and may damage the Makro-Grip® Aero 5-axis vise.

Unclamping

1. Stop the pneumatic supply to the "Close" port. The vise now clamps the workpiece using only the spring pack.
2. Open the vise by applying 6 bar of pneumatic pressure to the "Open" port.
3. Remove the workpiece.
4. Stop the pneumatic supply to the "Open" port. The jaws are closed by the spring pack. In this state, the vise can be stored without pneumatic pressure.

4.2 REGULAR INSPECTION DURING OPERATION

Carry out a regular visual inspection for contamination. If necessary, the operation and clean the 5-Axis Vise (see also chapter „Maintenance“).

Please observe the general safety instructions.

5.1 TEST WORK

The load-bearing and moving parts must be checked before each use to ensure that they are in perfect condition. Damaged parts must be replaced immediately with faultless parts.

5.2 LUBRICANT

SMW Autoblock special grease K05

5.3 MAINTENANCE PLAN

<i>Before each use of the product</i>	<i>Visual inspection for condition and function</i>
<i>During operation</i>	<i>Regular visual inspection for contamination</i>
<i>After each operation</i>	<i>Manual or automated cleaning</i>
<i>After 50,000 cycles / Annually</i>	<i>Disassemble, clean, and re-grease. Replace seals if necessary.</i>

5.4 SPARE PARTS

Spare parts may be required for the maintenance and repair of the Makro•Grip® Aero 5-Axis Vise.

Information that you should have ready for ordering spare parts from the manufacturer LANG Technik GmbH:

Minimum specification when ordering:

- Designation of the Makro•Grip® (FS) 5-Axis Vise
- Article number (item no.)
- Designation of the spare part
- Order quantity

5.5 DISASSEMBLY / ASSEMBLY

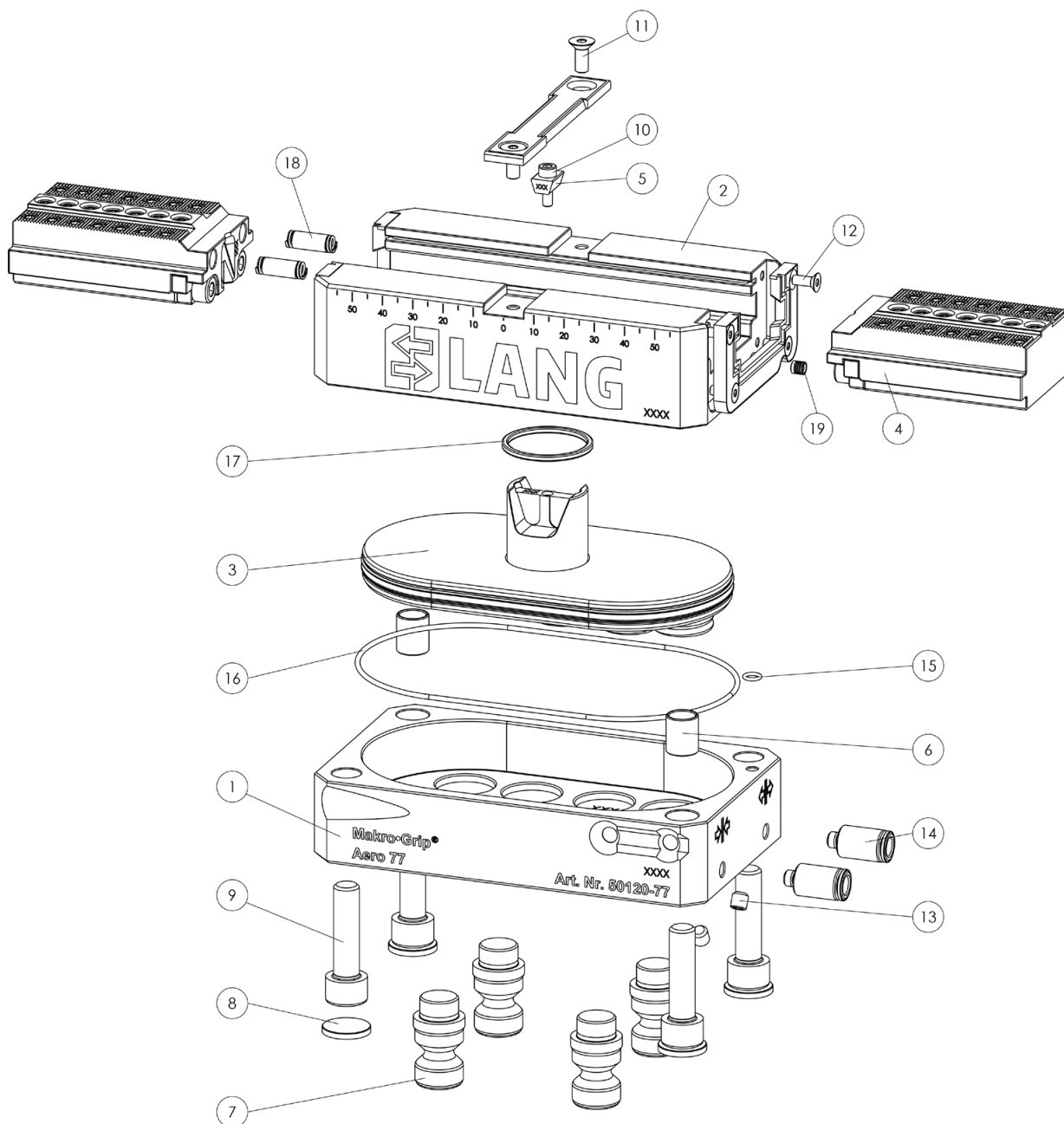
Tools required:

- Torque Wrench, 1 to 40 Nm
- Soft-Faced Hammer
- Screwdriver
- Needle-Nose Pliers
- Screw Clamp
- Cloth
- Multipurpose Grease
- SMW Autoblock special grease K05

<i>Position</i>	<i>Component</i>	<i>Hex Key</i>	<i>Tightening torque [Nm]</i>
12	Side Wiper incl. countersunk screw M3	2	1
11	Top Wiper incl. countersunk screw M4	2,5	1
7	Mounting Stud	6	40
10	M3 Socket Head Cap Screw	2,5	2,2
9	M8 Socket Head Cap Screw	6	40

Re-Greasing the Clamping Wedge and Jaw Guide:

1. Remove all wipers. (11+12).
2. Open the vise using pneumatic pressure.
3. Loosen the M3 socket head cap screw (10) and use needle-nose pliers to remove it together with the wedge (5).
4. Disconnect the vise from the compressed air supply.
5. Remove the plastic covers (8) by driving a screwdriver into the center of each cover. Then lever the plastic covers (8) out.
6. Loosen the M8 socket head cap screws (9) evenly to prevent binding.
7. Remove the lower base body (1), the piston (3), and the base jaws (4) in the following order.
8. Clean the components with a cloth and inspect the contact surfaces, seals, and wipers for wear.
9. Replace any defective or heavily worn components. We recommend replacing all wear parts. These are available in the 58077 kit.
10. Apply multipurpose grease to all seals and sealing surfaces.
11. Apply SMW Autoblock special grease K05 to the guide surfaces, the angled contact surfaces of the base jaws (4), and the four angled contact surfaces of the piston (3).
12. Insert the base jaws (4) with the springs (18) into the upper base body (2) and secure them with a screw clamp.
13. Press the piston into the upper base body (2) and install all springs. The screw clamp can now be removed.
14. Fasten the lower base body (1) to the upper base body (2) evenly and tighten the M8 socket head cap screws (9) to 40 Nm. Make sure that the X-ring on the piston (3) is not pinched during assembly.
15. Install the new plastic covers (8) using a soft-faced hammer.
16. Open the vise by applying compressed air pressure.
17. Use needle-nose pliers to position the wedge (5) on the piston (3), then secure it with the M3 socket head cap screw (10) tightened to 2.2 Nm.
18. Install all wipers and secure them with the M4 (11) and M3 (12) countersunk screws tightened to 1 Nm.
19. Check the clamping and unclamping functions.



Replace worn wipers. Remove and install them using the specified tools and tightening torques.



Tip: We recommend pre-stamping workpieces whenever possible to achieve higher workpiece holding force and prevent wear on the clamping device. This helps maximize the service life of the product.

6.1 FAULT / ERROR

Attention: If clamping devices are repaired or replaced incorrectly, parts of the product or workpiece may come loose and cause injury or damage.

- Repair and replacement work on the product may only be carried out by trained and instructed personnel who have also been trained and instructed in the operation of the machine tool.
- Carry out maintenance and care work outside the machine tool.

Possible causes of errors

Error	Malfunctions	Repair
Drop in clamping force	Clamping jaws or stamping jaws damaged or worn.	Check clamping jaws or stamping jaws, clean and replace if necessary
	Pressure loss in the vise or the compressed air supply.	Inspect the seals on the vise and the compressed air supply, and replace them if necessary.
The vise does not open.	Contact surfaces dirty or damaged	Check clamping jaws and base body, clean, replace if necessary
The vise is jammed in the zero-point plate.	Zero point plate dirty, damaged or worn	Dismantle, check and clean the zero point plate, replace wedges if necessary

7 WARNING

7.1 INTENDED USE

The operator undertakes to use the product properly with caution and under appropriate conditions. No liability or reimbursement is accepted for improper use.

- Only use the Makro•Grip® / Makro•Grip® FS Aero 5-Axis Vise if you have read and understood the operating instructions in full beforehand.
- The instructions are an integral part of the Makro•Grip® Aero 5-Axis Vise and must be kept accessible to personnel at all times.

7.2 REQUIREMENTS FOR OPERATING PERSONNEL

The operator is responsible in particular for:

- Only allow trained specialist personnel to work with the product.
 - The responsibilities of the personnel for installation, commissioning, operation, maintenance and repair must be clearly defined.
 - Personnel to be trained only under the supervision of an experienced and authorized specialist.
- Otherwise, no liability or reimbursement will be accepted for damage resulting from improper use.

7.3 PERSONAL PROTECTIVE EQUIPMENT AND PERSONAL SAFETY

- Caution: Improper repair work may result in personal injury or damage to the machine.
- Repair and replacement work on the product may only be carried out by trained and instructed personnel.
- Perform maintenance and servicing on the product outside the machine tool.
- Personal protective equipment must be worn in accordance with the guidelines and regulations of the employers' liability insurance association and the company (work clothing, non-slip safety shoes, gloves, hairnet, etc.). Ask your employer's safety officer for more information.



8.1 DISPOSAL IN ACCORDANCE WITH DIRECTIVE (EU) 2018/851

Observe the country-specific disposal regulations when disposing of the product.



LANG Technik products do not belong in household waste. Non-observance is an administrative offense.



Accessories and packaging are recycled in an environmentally friendly way.

Product	Material	Waste disposal
Base body	Steel	Scrap metal
Kolbenteile	Steel	Scrap metal
O-ring	Nitrile rubber	Residual waste
Small parts	Stahl	Scrap metal
PE films	Plastic	Feeding for recycling
Packaging material	Cardboard / Wood	Feeding for recycling

9 EXPLANATION OF SYMBOLS

9.1 SYMBOLS

Please pay attention to the following warning symbols	
	<i>Read all the operating instructions carefully before commissioning for the first time and keep it in a safe place for future use</i>
	<i>Please read and follow the technical and safety instructions</i>
	<i>The use of protective gloves made of tough, resistant material is recommended</i>
	<i>A helmet and safety goggles are recommended for personal safety</i>
	<i>To reduce the risk of eye injuries, wearing protective goggles as specified in EN 166 is recommended</i>
	<i>Safety footwear are part of the protective equipment</i>
	<i>Materials are recycled in an environmentally friendly manner</i>
	<i>Do not dispose of the material in household waste</i>



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