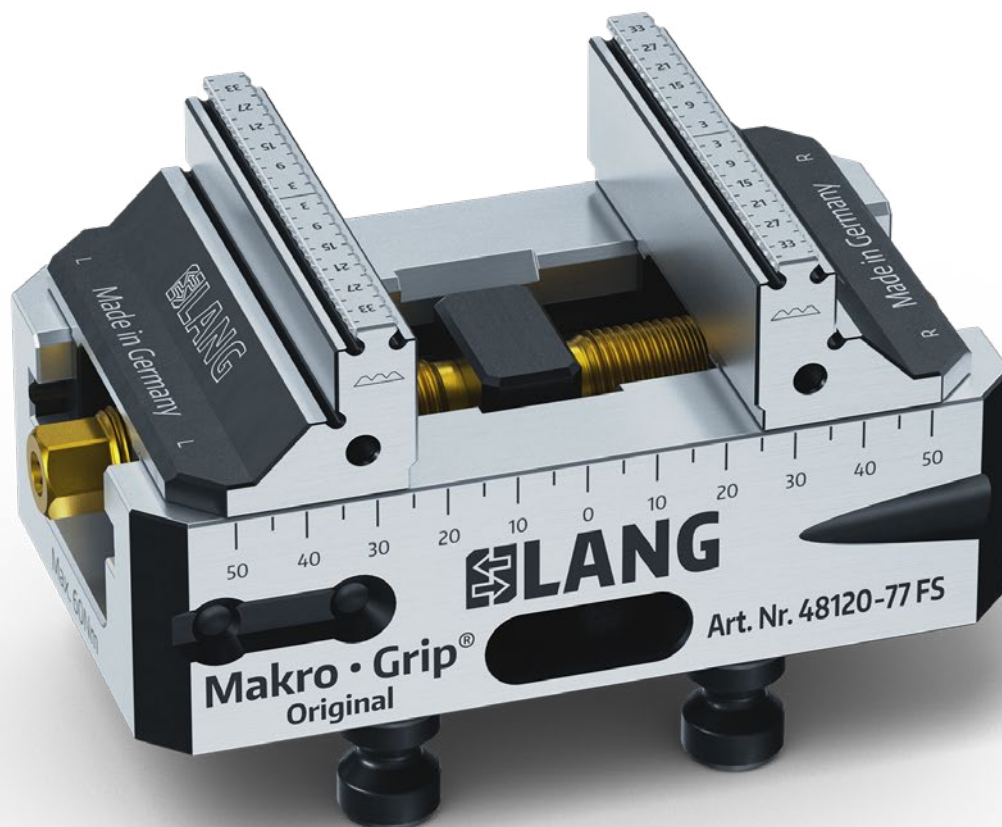


Operating instructions

Original Instructions

Makro·Grip® / Makro·Grip® FS 5-Axis Vise



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Germany



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- 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

Chapter 1 Product Description		On Page
11	General	2
12	Built	3
13	Scope of delivery	4
14	Holding serration of the damping jaws	4
15	Version	4
16	Accessories	4
17	Service option	6
18	Compatibility	8
19	Prerequisite for mounting on a machine table	8
Chapter 2 Technical data		
2.1	General data and tightening torques	9
2.2	Clamping pressure and damping force	9
2.3	Zero point interface	9
Chapter 3 Installation		
3.1	Attach the Makro•Grip® (FS) 5-Axis Vise to the machine table	10
Chapter 4 Operation		
4.1	Clamping of workpieces in the holding serration	10
4.2	Dismantling and turning inserting the damping jaws	11
4.3	Regular inspection during operation	11
Chapter 5 Maintenance		
5.1	Test work	12
5.2	Lubricant	12
5.3	Maintenance plan	12
5.4	Disassembly / assembly	12
5.5	Instructions for disassembling and assembling the 5-Axis Vise	12
5.6	Spare parts	13
Chapter 6 Malfunctions		
6.1	Fault / error	13
Chapter 7 Warning		
7.1	Intended use	14
7.2	Requirements for operating personnel	14
7.3	Personal protective equipment and personal safety	14
Chapter 8 Decommissioning		
8.1	Disposal	14
Chapter 9 Explanation of Symbols		
9.1	Symbols	15

1.1 GENERAL

The Makro•Grip® and Makro•Grip® FS 5-Axis Vises are machining vises that are used in milling operations on CNC machine tools. They hold the workpiece (raw or finished part) with their damping jaws in the center of the vise during the machining process. Other names for this type of machine vise include centering vise, center vise, center vise, center damp

Workpieces can be damped in the 5-Axis Vise in two different ways:

- Clamping in the holding serration of the damping jaws by form fit
- Clamping with the smooth surfaces of the damping jaws by friction

Form fit damping is achieved by pre-stamping the workpiece blank on a separate Makro•Grip® stamping unit by providing it with a three-dimensional contour before it is damped in the 5-Axis Vise. During damping, the holding serration of the damping jaws engages with this contour, creating a form fit. External pre-stamping allows the workpiece blank to be held reliably in the Makro•Grip® (FS) 5-Axis Vise with low clamping pressure. Its compact design and the high holding forces due to the form fit damping principle make the 5-Axis Vise the ideal damping device for 5-sided machining of blanks.

Each 5-Axis Vise is equipped with four pre-mounted Quick•Point® damping studs on its underside, which serve as the interface to the matching zero-point damping system. The Makro•Grip® FS 15 Rail 5-Axis-Vise is an exception. Details can be found in a separate documentation.



NOTE

If possible, we recommend pre-stamping workpiece blanks to avoid wear on the 5-Axis Vise and maximize service life.

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 damping with pre-stamped workpiece blanks. These stamping jaws can be fitted to all stamping units (2023 or older) using an additional conversion set (item no 5120-20).

GENERAL SAFETY INSTRUCTIONS

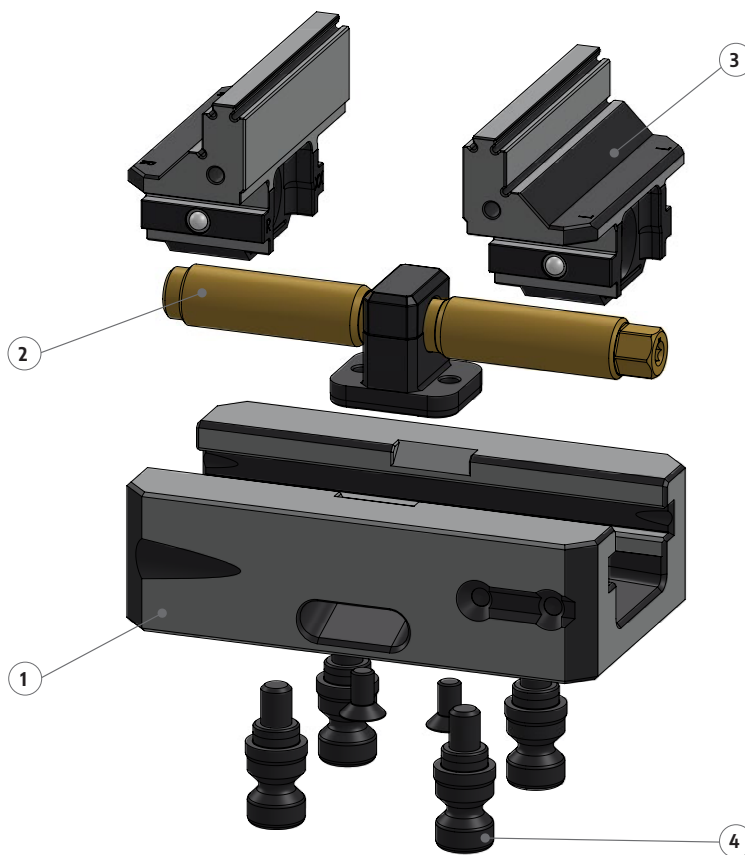
- Damage to the product must be completely and properly repaired by trained specialist personnel before commissioning.
- The product may only be installed by trained and instructed specialist personnel.
- If the 5-Axis Vise has already been used, make sure that there is no contamination (dirt, swarf).



WARNING NOTE

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

1.2 BUILT



- ① Base body made of case-hardened steel
- ② Threaded spindle including center piece
- ③ Clamping jaws with holding serration

! NOTE

The serial number of the two clamping jaws must always be identical!

- ④ Quick•Point® clamping studs / integrated zero point interface

1.3 SCOPE OF DELIVERY

- Complete 5-Axis Vise included
- mounted Makro•Grip® clamping jaws with holding teeth on both sides and
- Four (or two) Quick•Point® 52 or 96 clamping studs
- Operating instructions

1.4 HOLDING SERRATION OF THE CLAMPING JAWS

1.4.1 MAKRO•GRIP®

The holding teeth and depth stop alternate in the holding serration of a Makro•Grip® 5-Axis Vise (see illustration)
The distance from holding tooth to holding tooth is 6 mm.



1.4.2 MAKRO•GRIP® FS

The holding teeth of a Makro•Grip® FS 5-Axis Vise do not require a depth stop and consist of a continuous row of holding teeth (see illustration) The distance from holding tooth to holding tooth is 3mm. This is referred to as full serration.



1.5 VERSION

1.5.1 5-AXIS VISE

Makro•Grip® 5-Axis Vise							
Item no.	Description	Jaw width	Base length	Spindle	Spindle length	Clamping range	QTY clamping studs
48040-46	Makro•Grip® 4 6 micro	46 mm	77 mm	Ø 12 mm x Ø1,	82 mm	0 - 65 mm	2
48065-46	Makro•Grip® 4 6	46 mm	77 mm	Ø 12 mm x Ø1,	82 mm	0 - 65 mm	4
48085-46	Makro•Grip® 7 7	46 mm	102 mm	Ø 16 mm x Ø3,	100 mm	0 - 85 mm	4
48120-46	Makro•Grip® 7 7	46 mm	130 mm	Ø 16 mm x Ø3,	135 mm	0 - 120 mm	4
48085-77	Makro•Grip® 7 7	77 mm	102 mm	Ø 16 mm x Ø3,	100 mm	0 - 85 mm	4
48120-77	Makro•Grip® 7 7	77 mm	130 mm	Ø 16 mm x Ø3,	135 mm	0 - 120 mm	4
68120-77	Makro•Grip® 7 7 Night King	77 mm	130 mm	Ø 16 mm x Ø3,	135 mm	0 - 120 mm	4
48160-77	Makro•Grip® 7 7	77 mm	170 mm	Ø 16 mm x Ø3,	175 mm	0 - 160 mm	4
48200-77	Makro•Grip® 7 7	77 mm	210 mm	Ø 16 mm x Ø3,	215 mm	0 - 200 mm	4
48155-77	Makro•Grip® 125	77 mm	160 mm	Ø 20 mm x 15	164 mm	0 - 155 mm	4
48205-77	Makro•Grip® 125	77 mm	210 mm	Ø 20 mm x 15	214 mm	0 - 205 mm	4
48155-125	Makro•Grip® 125	125 mm	160 mm	Ø 20 mm x 15	164 mm	0 - 155 mm	4
48205-125	Makro•Grip® 125	125 mm	210 mm	Ø 20 mm x 15	214 mm	0 - 205 mm	4
48255-125	Makro•Grip® 125	125 mm	260 mm	Ø 20 mm x 15	264 mm	0 - 255 mm	4
48305-125	Makro•Grip® 125	125 mm	310 mm	Ø 20 mm x 15	314 mm	0 - 305 mm	4
48355-125	Makro•Grip® 125	125 mm	360 mm	Ø 20 mm x 15	364 mm	0 - 355 mm	4

Makro-Grip® FS 5-Axis Vise							
Item no.	Description	Jaw width	Base length	Spindle	Spindle length	Clamping range	QTY clamping studs
48040-46 FS	Makro-Grip® F S 46 micro	46 mm	77 mm	Ø 12 mm x 0,1	82 mm	0 - 65 mm	2
48065-46 FS	Makro-Grip® F S 46	46 mm	77 mm	Ø 12 mm x 0,1	82 mm	0 - 65 mm	4
48085-46 FS	Makro-Grip® F S 77	46 mm	102 mm	Ø 16 mm x 3,	100 mm	0 - 85 mm	4
48120-46 FS	Makro-Grip® F S 77	46 mm	130 mm	Ø 16 mm x 3,	135 mm	0 - 120 mm	4
48085-77 FS	Makro-Grip® F S 77	77 mm	102 mm	Ø 16 mm x 3,	100 mm	0 - 85 mm	4
48120-77 FS	Makro-Grip® F S 77	77 mm	130 mm	Ø 16 mm x 3,	135 mm	0 - 120 mm	4
68120-77 FS	Makro-Grip® F S 77 Night King	77 mm	130 mm	Ø 16 mm x 3,	135 mm	0 - 120 mm	4
48160-77 FS	Makro-Grip® F S 77	77 mm	170 mm	Ø 16 mm x 3,	175 mm	0 - 160 mm	4
48200-77 FS	Makro-Grip® F S 77	77 mm	210 mm	Ø 16 mm x 3,	215 mm	0 - 200 mm	4
48155-77 FS	Makro-Grip® F S 125	77 mm	160 mm	Ø 20 mm x 15	164 mm	0 - 155 mm	4
48205-77 FS	Makro-Grip® F S 125	77 mm	210 mm	Ø 20 mm x 15	214 mm	0 - 205 mm	4
48155-125 FS	Makro-Grip® F S 125	125 mm	160 mm	Ø 20 mm x 15	164 mm	0 - 155 mm	4
48205-125 FS	Makro-Grip® F S 125	125 mm	210 mm	Ø 20 mm x 15	214 mm	0 - 205 mm	4
48255-125 FS	Makro-Grip® F S 125	125 mm	260 mm	Ø 20 mm x 15	264 mm	0 - 255 mm	4
48305-125 FS	Makro-Grip® F S 125	125 mm	310 mm	Ø 20 mm x 15	314 mm	0 - 305 mm	4
48355-125 FS	Makro-Grip® F S 125	125 mm	360 mm	Ø 20 mm x 15	364 mm	0 - 355 mm	4

NOTE

The interfering contours and general properties of the 5-Axis Vise (apart from the holding seration) are identical in the same vise size in both series (eg. 48120-77 to 48120-77 FS). Spare parts and accessories, such as threaded spindles are therefore compatible in both series.

1.5.2 CLAMPING OR REPLACEMENT JAWS


Makro-Grip®		
Item no.	Jaw width	for vise type
48046-4620	46 mm	48040-46 micro, 48065-46
48077-4620	46 mm	48120-46
48085-4620	46 mm	48085-46
48077-7720	77 mm	48120-77, 48160-77, 48200-77
48085-7720	77 mm	48085-77
48125-7720	77 mm	48155-77, 48205-77
48125-2520	125 mm	all Makro-Grip® 125 with jaw width 125 mm

Makro-Grip® FS		
Item no.	Jaw width	for vise type
48046-4620 FS	46 mm	48040-46 FS micro, 48065-46 FS
48077-4620 FS	46 mm	48120-46 FS
48085-4620 FS	46 mm	48085-46 FS
48077-7720 FS	77 mm	48120-77 FS, 48160-77 FS, 48200-77 FS
48085-7720 FS	77 mm	48085-77 FS
48125-7720 FS	77 mm	48155-77 FS, 48205-77 FS
48125-2520 FS	125 mm	all Makro-Grip® FS 125 with jaw width 125 mm


NOTE

Other clamping solutions, such as center jaws for multiple clamping or clamping jaws without holding seration, are also included in the product range. Information on this can be found in the current catalog and on the website www.lang-technik.de.

1.6 ACCESSORIES

	Wrenches for Makro-Grip® 5-Axis Vises			
	Item no.	For	5-Axis Vise size	Size
	45510	External hexagon	46	SW 8
	45500	External hexagon	77	SW 12
	45501	External hexagon	125	SW 15
	45515	Allen key	46	SW 4
	45505	Allen key	77/ 125	SW 5

	Hexagon socket			
	Item no.	Drive square	5-Axis Vise size	Size
	45508	3/8"	77	SW 12
	45509	3/8"	125	SW 15

	Cordless drill attachment			
	Item no.	For	Width across flats	
	47005	Allen key	SW5	

1.7 SERVICE OPTION

1.7.1 TUNGSTEN CARBIDE COATING

A tungsten carbide coating can be subsequently applied to the smooth surfaces of the Makro-Grip® (FS) damping jaws to further increase the holding force when smoothly clamping non-damped workpieces. The coating is always applied to a pair of clamping jaws.



Tungsten carbide coating	
Order no.	Jaw width
45046-17	46 mm
45077-17	77 mm
45125-17	125 mm

1.7.2 MILLING OFF THE HOLDING SERRATION (ORDER NO. 47000-01)

The holding serration of the damping jaws can be milled off on request. Please note, however, that the actual case-hardened contact point to the workpiece will then be soft. In this case, we offer case-hardened damping jaws without holding serration. Information on this can be found on our website www.lang-technik.de.

1.7.3 CUSTOMER-SPECIFIC CLAMPING DEPTH (ORDER NO. 47000-02)

The standard clamping depth / support height of workpieces in the clamping jaws of Makro•Grip® (FS) 5-Axis Vises is 3mm. On request, this support height can be adjusted.

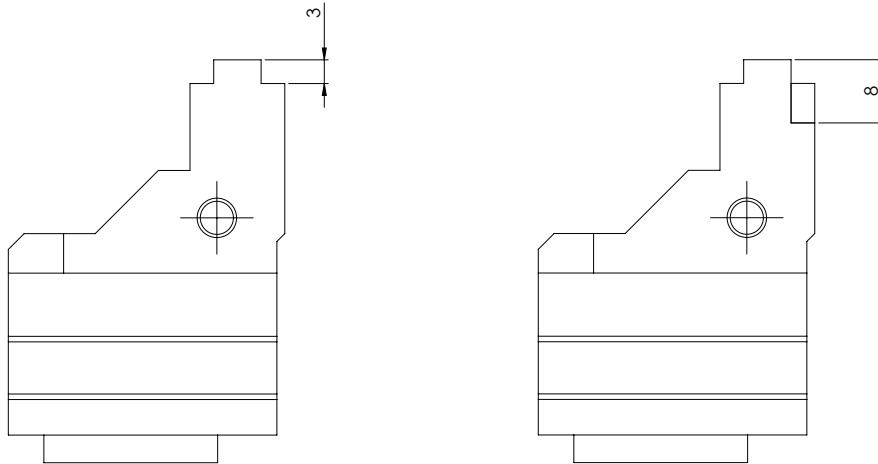


Illustration:

Left: Standard support height or clamping depth (3 mm) Right: Special height 8 mm

1.7.4 CUSTOMER-SPECIFIC BORES ON THE UNDERSIDE OF THE 5-AXIS VISES (ORDER NO. 47000-03)

If the Quick•Point® clamping studs are not used and the 5-Axis Vise is to be mounted directly on other fixtures, customer-specific threaded or fitting holes can be drilled on the underside of the 5-Axis Vise.

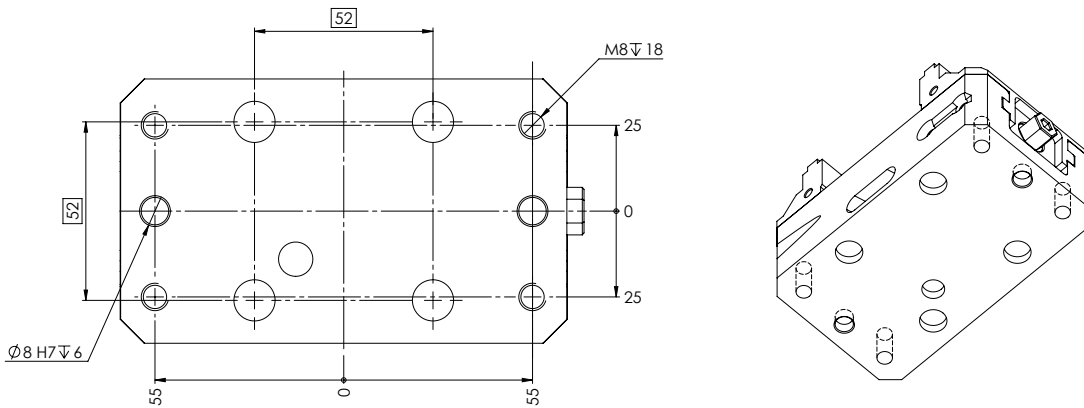
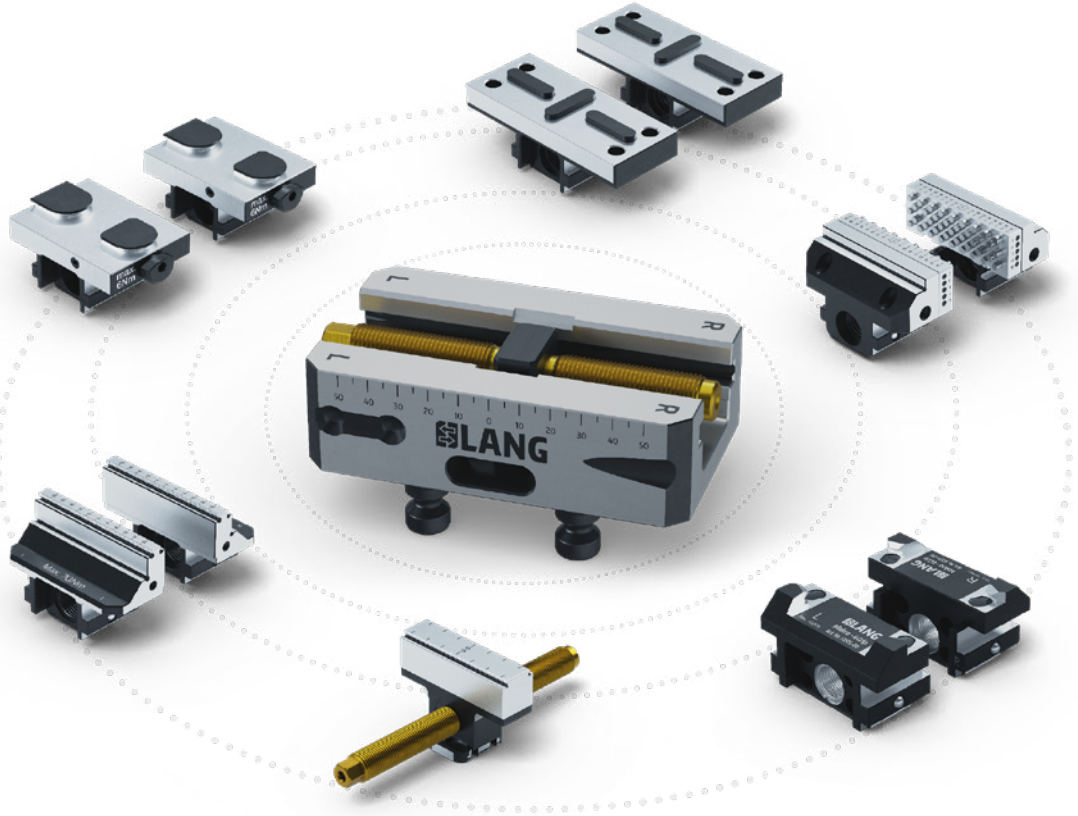


Illustration: Example drawing sketch for customized bores on the underside

1.8 COMPATIBILITY

All vise types from LANG Technik (Makro•Grip® / Makro•Grip® FS / Profilo / Avanti / Vario•Tec) use the same base body in different lengths and widths. This ensures that all jawtypes are fully compatible with each other. Suitable jaw types can be added as required.



! NOTE

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

1.9 PREREQUISITE FOR MOUNTING ON A MACHINE TABLE

The 5-Axis Vise is supplied with four Quick•Point® damping studs as standard. An exception is the Makro•Grip® (FS) micro 5-Axis Vise, which only has two damping studs. This enables precise positioning in the Quick•Point® 52 or 96 zero point damping system, which is mounted on the machine table of the CNC machine tool.

! INFO

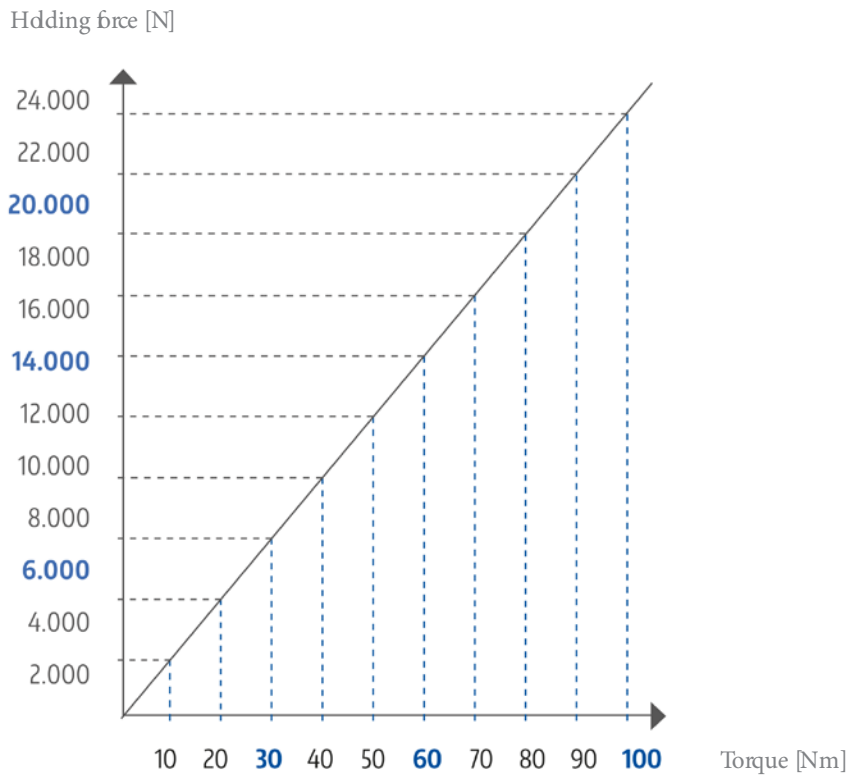
Under certain circumstances, direct bolting to the machine table/pallet is possible.
Please contact support@lang-technik.de

2.1 GENERAL DATA AND TIGHTENING TORQUES

Base body width	External hexagon size	Allen key size	Max. Tightening torque [Nm]	Centering accuracy [mm]
46	8	4	30	±0,02
77	12	5	60	±0,02
125	15	5	100	±0,02

2.2 CLAMPING PRESSURE AND CLAMPING FORCE

The following table shows the torque values in relation to the clamping force.



2.3 ZERO POINT INTERFACE

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

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

Prerequisite for mounting on a machine table:

The appropriate zero point damping system is required to mount the 5-Axis Vise on a machine table. With its four (or two) mounted Quick•Point® damping studs, the 5-Axis Vise is placed in the corresponding locating holes of the zero point damping system. The 5-Axis Vise is placed into the zero-point damping system either manually by the machine operator or automatically by an automation system. For automated feeding, a pneumatic zero point clamping system is required, which is controlled either by the CNC machine tool or externally via the pneumatic interface of a robot. The mechanical opening and closing of a mechanical zero point damping system by the robot is also possible.

Procedure for setting up for manual processing:

1. Clean the mounting surfaces of the 5-Axis Vise and the contact surface of the zero point damping system. There must be no dirt or chips there.
2. Place the 5-Axis Vise in the zero point damping system.
3. Actuate the damping mechanism of the zero point damping system (with 30 or 60 Nm depending on the type of zero point plate).
4. The 5-Axis Vise is now ready to hold the workpiece. See chapter Operation.

4 OPERATION

4.1 CLAMPING OF WORKPIECES IN THE HOLDING SERRATION

1. Make sure that the pre-stamped workpiece and all contact surfaces are free of dirt, burrs and chips
2. Insert the pre-stamped workpiece into the holding serration. The pre-stamped workpiece engages in the serration every 6 mm (with Makro•Grip®) or every 3 mm (with Makro•Grip® FS).



Form fit clamping with Makro•Grip®



Form fit clamping with Makro•Grip® FS



NOTE

We recommend pre-clamping the workpiece with a hexagon wrench and then setting the desired holding force with the torque wrench. This ensures maximum reproducibility and helps to avoid deformations in the workpiece.



Tip! If possible, we recommend pre-stamping workpieces to prevent wear on the clamping device and thus achieve a long product service life.

4.2 DISMANTLING AND TURNING / INSERTING THE CLAMPING JAWS



NOTE

The instructions for disassembling and assembling the jaws apply to all types of vises from LANG &chnik. Turning the jaws refers exclusively to Makro-Grip® (FS).

4.2.1 DISMANTLING THE CLAMPING JAWS

Unscrew the threaded spindle anticlockwise until the damping jaws no longer move. They can then be easily removed.

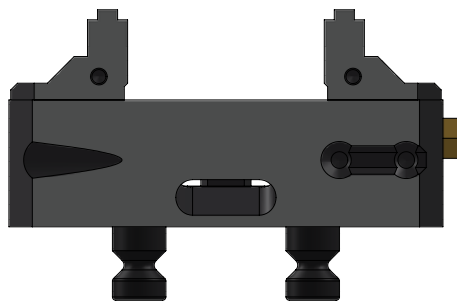
4.2.2 TURNING / INSERTING THE CLAMPING JAWS

1. Turn the left and right damping jaws by 180° and insert them as far as the stop on the threaded spindle.
2. Press the damping jaws evenly towards the center with light pressure and turn the spindle counterclockwise.

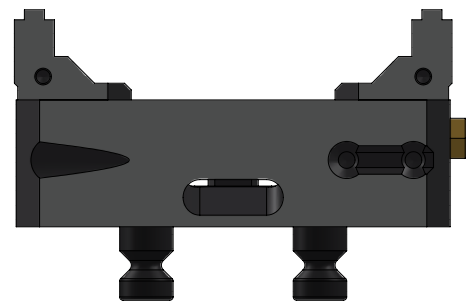


INFO

When screwing in the damping jaws, check that they are flush with the base body to ensure that the jaws are inserted evenly and thus damped centrally.



Clamping jaw position in delivered condition



Clamping jaw position in turned state



Tip: For longer base bodies, we recommend using a mounting aid (see accessories).

4.3 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. In the event of damage or faults, please directly contact
LANG Technik GmbH • Albstraße 1-6 • D-73271 Holzmaden • Phone: +49 7023 9585-0

5.2 LUBRICANT

The Makro•Grip® (FS) 5-Axis Vise is supplied without lubrication points.

5.3 MAINTENANCE PLAN

Before each use of the product	Visual inspection for condition and function
During operation	Regular visual inspection for contamination
After each operation	Manual or automated cleaning

5.4 DISASSEMBLY / ASSEMBLY

Tools required:

- Torque wrench (up to at least 50 Nm)
- Allen wrench (various wrench sizes - internal and external hexagon)

Base body width of vise	Torque wrench (size)	Allen wrench (size)	Tightening torque for mounting bolt [Nm]
46	8	3; 4; 6	40
77	12	4; 5; 6	40
125	15	5; 8	50

5.5 INSTRUCTIONS FOR DISASSEMBLING AND ASSEMBLING THE 5-AXIS VISE

5.5.1 DISMANTLING

1. Remove the damping jaws (item 3 in 12 Assembly). See point 4.2.
2. Remove the threaded spindle +center piece set (item 2 in 12 Assembly). To do this, the two countersunk screws on the underside of the base body must be removed.
3. Remove Quick•Point® damping studs (item 4 in 12 Assembly)

5.5.2 ASSEMBLY

With one exception, assembly is carried out in the reverse order. The exception is the insertion of the damping jaws. The procedure is described in section 4.2.2.

5.6 SPARE PARTS


Spare parts may be required for the maintenance and repair of the Makro-Grip® (FS) 5-Axis Vise. Information that you should have ready for ordering spare parts from the manufacturer LANG Technik GmbH is as follows:

Minimum specification when ordering:

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

6 MALFUNCTIONS

6.1 FAULT / ERROR

 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. Before starting the uninstallation/installation, switch off the machine tool and secure the machine against being switched on again (see machine tool operating instructions)
- After completing maintenance and repair work, make sure that any safety equipment on the machine tool that may have been removed has been restored (such as protective covers,...).
- Damage and defects to the product must be reported to the operator immediately and repaired by qualified personnel without delay in order to minimize the extent of the damage and not impair the safety of the product.

POSSIBLE CAUSES OF ERRORS

Pos.	Malfunction	Description
Drop in clamping force	Clamping jaws or stamping jaws damaged or worn.	Check clamping jaws or stamping jaws, clean and replace if necessary
Centering accuracy not given	Serial number of the clamping jaws not identical	Insert clamping jaws with the same serial number
Clamping jaw jams in the guide	Contact surfaces dirty or damaged	Check clamping jaws and base body, clean, replace if necessary
5-Axis Vise jams	Zero point plate dirty, damaged or worn	Dismantle, check and clean the zero point plate, replace wedges if necessary
5-Axis Vise is not pushed upwards when the plate is opened	Plastic nipple of the zero point plate damaged or missing	Replace plastic nipple

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® (FS) 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® (FS) 5-Axis Vise and must be kept accessible to personnel at all times.

7.2 REQUIREMENTS FOR OPERATING PERSONNEL

The operator undertakes to:

- 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.

7.3 PERSONAL PROTECTIVE EQUIPMENT AND PERSONAL SAFETY

- 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 DECOMMISSIONING

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
Spindle	Steel	Scrap metal
O-ring	Nitrile rubber	Residual waste
Spindle cover	Plastic	Feeding for recycling
Small parts	Steel	Scrap metal
PE films	Plastic	Feeding for recycling
Packaging material	Pallet wood	Feeding for recycling

9.1 SYMBOLS

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

MACHINE TOOL SOLUTIONS LTD.

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Brampton, Ontario L6S 5N4

Phone: +1 (905) 790-8640 Toll free: 1-877-687-7253

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