

Operating instructions

Original Instructions

Makro·Grip® FS stamping units

51260 · 51410 · 52521 · 53400 · 53402
and the respective High-End and additional versions



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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.

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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.

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- 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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First of all: For your safety

Read the entire manual carefully to ensure safe working with the Makro•Grip® FS stamping units from LANG Technik. The operator must make the instructions available to the user and ensure that the user has read and understood them.

1.1 WHY PRE-STAMPING?

Stamping technology is a technology invented and developed by LANG in which the workpiece to be clamped is provided with a defined contour outside the machine tool before it is clamped in the Makro•Grip® FS 5-Axis Vise. The engagement of the holding serration on the clamping jaws of the 5-Axis Vise with the defined contour in the workpiece is called a form fit. This form fit offers the world's highest holding forces in 5-sided machining and therefore maximum process reliability. It provides the user of a Makro•Grip® FS 5-Axis Vise with enormous added value compared to conventional workpiece clamping. The Makro•Grip® FS 5-Axis Vise is also relieved by the external pre-stamping of the workpiece. Its function in CNC machining is limited to holding the workpiece with a low tightening torque, which is why it is not subject to wear when used correctly. The compact design of the 5-Axis vise offers ideal accessibility to the workpiece. The low clamping depth of the workpiece of just 3 mm results in high material savings and a low cutting volume during backworking.

THE BENEFITS OF STAMPING TECHNOLOGY AT A GLANCE:

- Maximum holding forces and process reliability in workpiece clamping
- Wear-free workpiece clamping even with high-strength material up to 45 HRC
- Drastically reduced preparatory work on the workpiece
- High material savings thanks to minimal clamping edge allowances

**NOTE**

If you pre-stamp workpiece blanks with the Makro•Grip® FS stamping unit, they can also be held by form fit in the holding serration of the previous Makro•Grip® 5-Axis Vise without any problems - even with even higher holding forces than before.

1.2 CONTACT**MACHINE TOOL SOLUTIONS LTD.**

8 Automatic Rd. Unit C-6
Brampton, Ontario L6S 5N4
Phone: +1 (905) 790-8640 Toll free: 1-877-687-7253
Fax: +1 (905) 790-3740
info@machinetoolsolutions.ca

**NOTE: FOR QUERIES**

If you have any queries, please have the serial number on the side of the stamping unit ready for exact identification of your product.

The Makro-Grip® FS stamping units are available in different versions and sizes. Optional accessories are available to make the stamping unit easier to use. All versions, elements and accessories are described below.

2.1 MAKRO•GRIP® FS STAMPING UNITS FOR THE WORKBENCH



- ① Pneumatic hand or foot switch for triggering the stamping process
- ② Pneumatic-hydraulic pressure multiplier with visible oil level indicator
- ③ Protective shield
- ④ Hydraulic pressure gauge for reading the hydraulic pressure
- ⑤ Bow handle for coarse adjustment of the stamping length
- ⑥ Steel hydraulic pressure gauge including T-slot guide block
- ⑦ Scaled workpiece end stop for precise, centered insertion of the workpiece
- ⑧ Stamping jaws including parallels
- ⑨ Pressure control valve for adjustment of the stamping pressure
- ⑩ Adjustment screw for fine adjustment of the stamping length

SCOPE OF DELIVERY:

Stamping base body • Pneumatic-hydraulic pressure multiplier (up to 360 bar) • Stamping jaws with parallels • Gauging blocks for checking the wear of the stamping jaws • Pneumatic switch for manual or foot operation • Scaled workpiece end stop • Protective shield

Item no.	Version	max. stamping width	Stamping jaw type	Weight
51260	Standard	260 mm	Standard stamping jaws for Materials up to 35 HRC	70 kg
51410	Extended	410 mm	Standard stamping jaws for Materials up to 35 HRC	80 kg
51260-HE	Standard	260 mm	High-End stamping jaws for Materials up to 45 HRC	70 kg
51410-HE	Extended	410 mm	High-End stamping jaws for Materials up to 45 HRC	80 kg

2.2 STAMPING TROLLEY WITH MAKRO•GRIP® FS STAMPING UNITS

2.2.1 STAMPING TROLLEY WITHOUT GROOVED PLATE, STANDARD STAMPING UNIT



- ① Possibility of retrofitting a grooved plate
- ② Makro-Grip® stamping unit, standard - stamping length up to 260 mm
- ③ Work and storage surface
- ④ Foot pedal - optional for left or right foot operation
- ⑤ Drawer for storing tools
- ⑥ Pressure control valve for setting the stamping pressure
- ⑦ Quick-release connector for connecting additional stamping bodies

SCOPE OF DELIVERY:

Workshop trolley • Stamping base body • Pneumatic-hydraulic pressure multiplier (up to 360 bar) inside the trolley • Stamping jaws with support rails • Gauging blocks for checking the wear of the stamping jaws • Scaled workpiece end stop - Protective shield

Item no.	Version	max. stamping width	Stamping jaw type	Weight
52521	Standard	260 mm	Standard stamping jaws for Materials up to 35 HRC	218 kg
52521-HE	Standard	260 mm	High-End stamping jaws for Materials up to 45 HRC	218 kg

2.2.2 STAMPING TROLLEY WITH GROOVED PLATE, EXTENDED (DUAL) STAMPING UNIT



ADDITIONAL FEATURES FOR THE STAMPING TROLLEY WITHOUT GROOVED PLATE:

- ① Grooved plate for retrofitting a second or third stamping base body. Grooved plate with grooves and locating holes for easy adjustment of the position or distance between two basic stamping bodies
- ② Extended base body for a stamping length of up to 410 mm

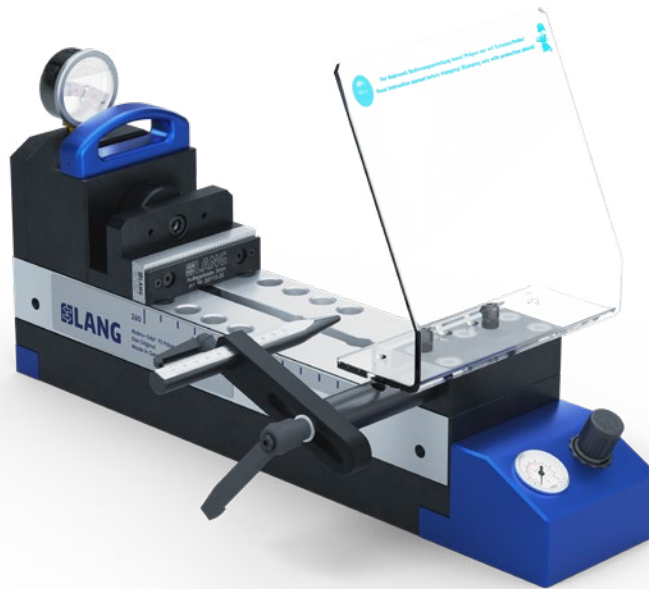
SCOPE OF DELIVERY:

Workshop trolley • Grooved plate 596 x 496 mm • Stamping base body • Pneumatic-hydraulic pressure multiplier (up to 360 bar) • Stamping jaws with parallels • Gauging blocks for checking the wear of the stamping jaws • Pneumatic switch for manual or foot operation • Scaled workpiece end stop • Protective shield(s)

Item no.	Version	max. stamping width	Stamping jaw type	Weight
53400	Extended	410 mm	Standard for Materials up to 35 HRC	325 kg
53400-HE	Extended	410 mm	High-End for Materials up to 45 HRC	325 kg
53402	Extended	2x 410 mm	Standard for Materials up to 35 HRC	373 kg
53402-HE	Extended	2x 410 mm	High-End for Materials up to 45 HRC	373 kg

2.3 ADDITIONAL STAMPING UNIT TO EXTEND EXISTING STAMPING UNITS

Existing stamping units can be extended with additional stamping units. The connecting and fastening material for connecting two stamping units and for mounting on a stamping trolley is included in the scope of delivery.



SCOPE OF DELIVERY:

Stamping jaws with parallels • Scaled workpiece end stop • Protective shield • Connecting material • Fastening material

Item no.	Version	max. stamping width	Stamping jaw type	Weight
53261	Standard	260 mm	Standard for Materials up to 35 HRC	42 kg
53261-HE	Standard	260 mm	High-End for Materials up to 45 HRC	42 kg
53411	Extended	410 mm	Standard for Materials up to 35 HRC	47 kg
53411-HE	Extended	410 mm	High-End for Materials up to 45 HRC	47 kg

2.4 ACCESSORIES

2.4.1 STAMPING JAWS



Makro-Grip® FS stamping jaws are available in two versions:

- „Standard“ version - for materials up to 35 HRC (item no. 50111)
- „High-End“ version - for materials up to 45 HRC (item no. 50112)

Makro-Grip® FS stamping jaws are supplied with mounted parallels. The clamping depth / support height of the workpiece is 3 mm.

Makro-Grip® FS stamping jaws are equipped with four serration rows and can be turned three times after one row of teeth is worn.



NOTE: RECONDITIONING

The stamping jaws of the Makro-Grip® FS stamping jaws are not intended to be sent in for reconditioning due to the quadruple serration!

2.4.2 CENTER MARKING TOOL



The center marking tool (item no. 41010) is mounted on the movable carrier jaw of the stamping unit. Its HSS bolt makes a small marking above the stamping contour in the workpiece blank during the stamping process. The center marking tool makes it easier to place the workpiece blanks exactly in the center after the stamping process in the Makro-Grip® FS 5-Axis Vise.



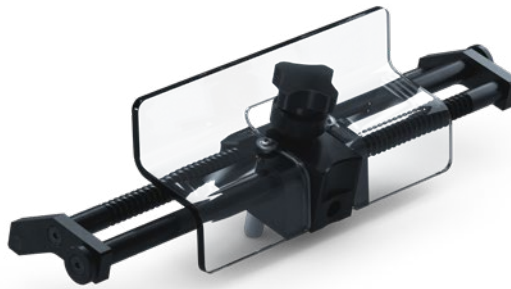
2.4.3 STAMPING DEPTH MEASURING DEVICE



The stamping depth measuring device (item no. 50152) allows the correct inlet pressure to be set conveniently by reading the correct stamping depth on a dial gauge without additional visual inspection.

→ FOR FURTHER INFORMATION, SEE CHAPTER 4.6.1

2.4.4 CENTERING DEVICE



The centering device (item no. 50151) makes it easier to place the workpiece blank exactly in the middle of the stamping unit. Workpieces up to 205 mm wide can be positioned centrally with the centering device without having to measure or set a workpiece end stop beforehand.

→ FOR FURTHER INFORMATION, SEE CHAPTER 4.4.2

2.4.5 GAUGING BLOCKS



Gauging blocks (item no. 50153) are used to measure the wear on the serration of the stamping jaw.

→ FOR FURTHER INFORMATION, SEE CHAPTER 6.3.2

3.1 THE FIRST STEPS

Your stamping unit will be delivered to you ready for operation. If you want to put your stamping unit into operation, there are just a few steps before you can start pre-stamping.

1. Connect the hydraulic housing and the pneumatic-hydraulic pressure multiplier to each other using the quick coupling system. Thanks to the quick coupling system, it is not necessary to vent the air at this point.
2. The first pneumatic hose between the pressure multiplier and the hand and foot pedal is already connected. The second pneumatic hose is used to connect the hand and foot pedal to the stamping unit. The connected pedal can be used as a hand or foot pedal.
3. Fit the protective shield to the fixed carrier jaw.
4. If necessary, mount the scaled workpiece end stop on the fixed carrier jaw of the stamping unit.



NOTE

The stamping unit is operated using compressed air at 6 bar. The delivered stamping unit is already vented and ready for operation.



ATTENTION



For your own safety, wear safety goggles when working with the stamping unit and stay behind the protective shield. Set the pressure to 0 bar after each stamping series to leave a safe stamping unit.

3.2 MOUNTING THE FOOT PEDAL

The stamping trolley version with Makro•Grip® FS stamping units (2.2.1 / 2.2.2) is delivered with the foot pedal removed. The L-bracket ①, to which the foot pedal assembly ② is attached, is pre-assembled on the right foot position as standard. When commissioning the stamping trolley, the foot pedal assembly must be hooked into the L-bracket. If you prefer operation with the left foot, the L-bracket must first be removed from the right-hand position ③ and attached to the left-hand position ④.

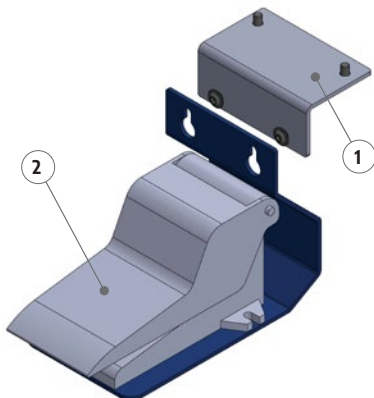


Figure 1: Foot pedal assembly

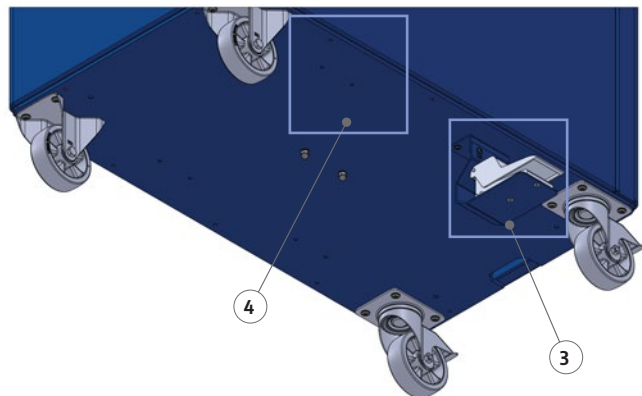


Figure 2: L-bracket with foot pedal assembly mounted in the right-hand position

4.1 PRE-STAMPING

The stamping process is started by pressing the hand and foot pedal. The stamping force can be continuously adjusted up to 360 bar via the inlet pressure using the pressure regulator. The stamping pressure can be read on the hydraulic pressure gauge. A stationary pressure must be set in the system before the stamping process is completed.

4.2 REQUIREMENTS FOR MATERIAL PROPERTIES

A wide range of materials can be pre-stamped with the stamping unit. Normally, no preparatory work is required on the workpiece. Always observe the **parallelism**, the **radius of the workpiece**, the **material properties** and their **degree of hardness**.

4.2.1 PARALLELISM

The parallelism of the workpiece to be stamped must not exceed a deviation of between 0.5 mm and 1.0 mm over the stamping length of 125 mm. Otherwise, the workpiece must be pre-machined to achieve sufficient parallelism.

4.2.2 RADIUS

The maximum permissible radius on the stamping surface is 2.0 mm. This is the only way to ensure that the stamping contour is securely applied to the vertical surface. If your workpiece has a larger radius than the one specified here, the stamping will not be applied correctly. On request, LANG Technik can modify the parallels of the stamping jaws and the clamping step of the Makro•Grip® FS 5-Axis Vise so that a workpiece blank with a radius > 2 mm can be pre-stamped and clamped. Please ask your contact at LANG Technik about this.

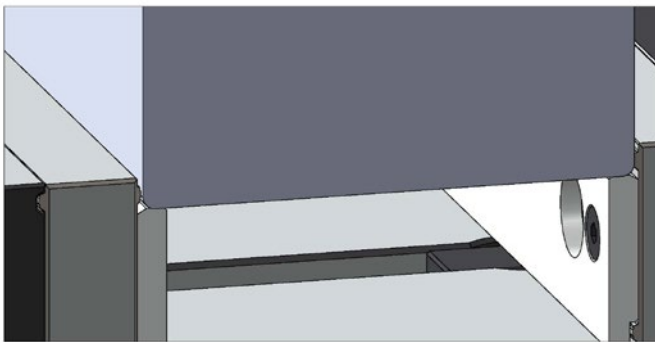


Figure 3: Clamped workpiece blank with radius

4.2.3 MATERIAL PROPERTIES

All non-brittle materials can be stamped. Excluded are, for example, graphite, composite fiber materials such as carbon and, in some cases, cast iron. Hollow and thin-walled workpieces are only suitable for pre-stamping to a limited extent. Please carry out a test stamping in advance.

4.2.4 DEGREE OF HARDNESS OF THE MATERIALS

The hardness of the material must match the hardness properties of the stamping jaws. Stamping jaws are available in two versions: Standard and High-End. The standard stamping jaws are suitable for materials up to 35 HRC. The High-End stamping jaws are suitable for materials up to 45 HRC.

4.3 SETTING THE WORKPIECE DIMENSIONS

! ATTENTION: DANGER OF CRUSHING

There is a risk of crushing fingers during manual adjustment and positioning of the stamping unit according to workpiece length.

Measures:

Take care when reinserting the locking bolts. Do not reach between the pair of jaws.

FOR COARSE ADJUSTMENT

All versions of the stamping vise have a gradual adjustment of the stamping width. The pitch is 25 mm. Pull the bow handle to the upper end position and move the housing to the desired position. Replace the bow handle. Make sure that it is locked as far as it will go to prevent unintentional adjustment.

FOR FINE ADJUSTMENT

The fine adjustment of the movable carrier jaw is carried out via the threaded spindle. Adjust the threaded spindle so that there is an air gap of 0.5 - 1.0 mm between the workpiece and the stamping tooth tip.

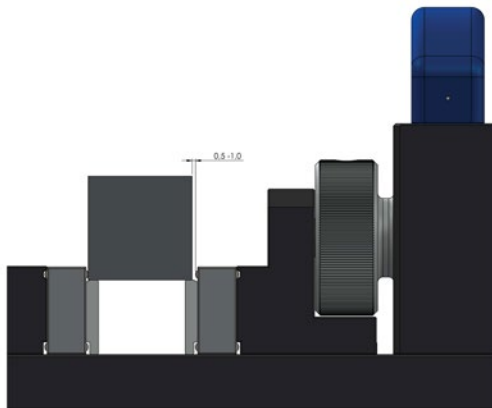


Figure 4: Distance between stamping serration and workpiece

4.4 POSITIONING THE WORKPIECE

Position the workpiece blank in the center between the stamping jaws. Use the scaling on the top of the stamping jaws as an initial rough visual aid. The exact central position of the workpiece can be set using the workpiece end stop (4.4.1) or the centering device (4.4.2).

4.4.1 POSITIONING WITH THE WORKPIECE END STOP

To increase accuracy when positioning the workpiece, you can use the workpiece end stop mounted on the fixed carrier jaw. This ensures that the workpiece is positioned consistently over time. Use the large clamping lever to set the height and alignment in the longitudinal direction. Use the small clamping lever to set the alignment of the lateral stop with the scale. Centered insertion of the workpiece is ensured by setting half the workpiece width on the workpiece end stop (e.g. the value 50 for a workpiece width of 100 mm).

4.4.2 POSITIONING WITH THE CENTERING DEVICE



Place the workpiece on the parallels and position the workpiece roughly in the center between the stamping jaws using the scale. Turn the cross handle as far as it will go. The workpiece is now centered.

The centering device is available separately as an accessory and can be ordered under item no. 50151. It is also available as a set with the stamping depth measuring device under item no. 50150.

4.5 FITTING STAMPING JAWS

Your stamping jaws are already fitted on delivery. If you would like to reattach the stamping jaws with parallels after disassembly, proceed as follows.

1. Position the stamping jaws over the fitting bushes and screw them to the two carrier jaws. The corresponding support strips are already loosely pre-assembled on the stamping jaws.
2. Press down the support bars so that they lie flush on the guide of the stamping base body and tighten the screws. If they are not flush, this will result in the workpiece being stamped at an angle and then clamped at an angle in the 5-Axis Vise.

4.6 SETTING AND CHECKING THE STAMPING PRESSURE

! ATTENTION: DANGER OF CUTTING



There is a risk of injuring yourself on sharp edges when working with the workpiece blank.

Measures:

Wear protective gloves when handling sharp-edged parts.

! ATTENTION: RISK OF INJURY DUE TO IMPROPERLY INSERTED PARTS



Parts to be stamped must rest correctly on the support rails of the stamping jaws. If the parts are not positioned correctly, they may move during stamping and injure you.

Measures:

Press the part to be stamped against the workpiece end stop and make sure that the workpiece rests straight on the parallels of the stamping jaws. Wear safety goggles for your safety.

Important NOTE: Before starting, please observe the safety instructions in chapter 7.3.5

PROCEDURE: SET AND CHECK THE STAMPING PRESSURE

Set the stamping pressure:

1. Center the test workpiece between the stamping jaws (using coarse and fine adjustment, chapter 5.3).
2. The stamping pressure is set using the adjusting wheel. Start with a low stamping pressure.
3. Stamp the test workpiece. Stay behind the protective shield.
4. Then check the stamping pressure as described below.
5. Once you have found the correct stamping pressure, you can press in the adjusting wheel to secure it.

Check stamping pressure:

Visual inspection using the depth stop mark in the workpiece (only possible for materials up to $R_m 550 \text{ N/mm}^2$): Please proceed according to chapter 5.6.1 for materials from $R_m 550 \text{ N/mm}^2$, as the visual marking cannot be used from this range.

There is a clear stamping contour on the test workpiece, in which a small surface impression of the depth stop is visible below and above the stamping tooth imprint. This means that the stamping pressure is set correctly. See contour illustrations under chapters 4.7.1 and 4.7.2.

4.6.1 SETTING THE STAMPING PRESSURE WITH THE STAMPING DEPTH MEASURING DEVICE

The stamping depth measuring device is available separately as an accessory and can be ordered under item no. 50152. It is also available as a set with the centering device under item no. 50150.



Tensile strength R_m	stamping depth
up to 550 N/mm^2	approx. 0.3 mm
$550 \text{ N/mm}^2 - 1000 \text{ N/mm}^2$	approx. 0.2 mm
$1000 \text{ N/mm}^2 - 1400 \text{ N/mm}^2$	approx. 0.1 mm

1. Place the workpiece to be stamped on parallels of the two stamping jaws.
2. Now reduce the distance between the two stamping jaws using the fine adjustment (see chapter 5.3) so that the stamping serration is in direct contact with the workpiece.
3. Place the measuring probe of the dial gauge directly on the workpiece. Set the dial gauge to zero.
4. During the stamping process, the stamping depth is displayed on the dial gauge.

After setting the required stamping depth, use the lifting device on the dial gauge to lift off the dial gauge foot or place it back on the next workpiece.

NOTE: Maintain the stamping pressure until you have read the measured value.

CHECKING THE STAMPING CONTOUR WITH THE 5-AXIS VISE:

Check the stamping contour by clamping the workpiece in the 5-Axis Vise. The holding serration of the 5-Axis Vise must engage with the stamping contour of the workpiece without any problems. If the contours do not engage, this may be due to a height difference between the support rails (see chapter „5.5 Fitting the stamping jaws“) or excessive wear on the stamping jaws (see chapter „7.3.1 Problems with the stamping jaws“).

**ATTENTION: MINIMIZE WEAR**

To minimize friction, and thus wear, on the stamping jaws, coat the stamping jaws with a thin layer of extrusion oil (included with High-End stamping jaws).

4.7 STAMPING CONTOUR IMAGES WITH CORRECT STAMPING**ATTENTION: MATERIAL HARDNESS**

The choice of stamping jaws (Standard or High-End) depends on the material hardness. For materials up to 35 HRC, Standard stamping jaws should be used. High-End stamping jaws should be used for materials between 35 and 45 HRC.

4.7.1 STAMPING CONTOUR UP TO TENSILE STRENGTH 550 N/MM²

The stamping contour with the stamping tooth impressions is clearly visible. For materials up to approx. 550 N/mm² tensile strength, the impression of the depth stop may be visible above and below the stamping contour on the material (see Figure 5). The depth of the stamping contour is then approx. 0.3 mm. For materials from 550 N/mm², we recommend our stamping depth measuring device item no. 50152 for setting the correct stamping depth

→ FOR FURTHER INFORMATION, SEE CHAPTER 4.6.1



Stamping contour

Imprint depth stop

Figure 5: Stamping imprint with a material hardness of up to 550 N/mm²**4.7.2 STAMPING CONTOUR FROM A TENSILE STRENGTH 550 N/MM²**

For materials with a hardness between 35 and 45 HRC, the impression of the depth stop must not be visible. The depth of the stamping tooth impressions should be around 0.2 mm for materials up to a tensile strength of 1000 N/mm² and 0.1 mm between 1000 N/mm² and 1400 N/mm². Here too, we recommend using our stamping depth measuring device to set the correct stamping depth.

→ FOR FURTHER INFORMATION, SEE CHAPTER 4.6.1



Stamping contour

Figure 6: Stamping impression at a material hardness of 35 to 45 HRC.

The stamping trolley with Makro•Grip® FS dual stamping unit is designed for stamping extra-long workpieces and clamping them in two 5-Axis Vises in the zero-point clamping system on the machine table. The stamping trolley with Makro•Grip® FS dual stamping unit is available under item number 53402 or 53402-HE. If you have a single Makro•Grip® FS stamping unit, this can be extended to a dual stamping unit by adding an additional stamping unit. The item numbers of the additional stamping units are 53261, 53261-HE, 53411 and 53411-HE → see chapter 2.3). It is also possible to combine three stamping unit base bodies.

5.1 CONNECTION OF A SECOND STAMPING UNIT

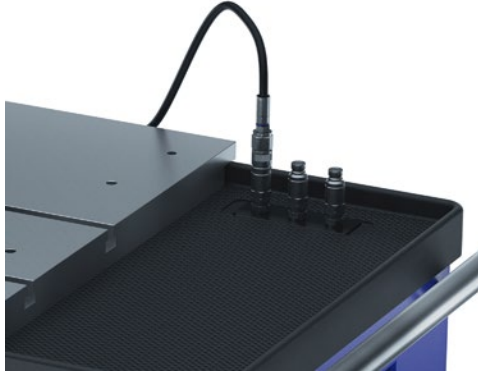


Figure 7: Hydraulic connections on the stamping trolley

After positioning and fastening, the additional stamping unit must be connected with the quick coupling of the hydraulic hose. A hydraulic hose including the quick coupling is included in the scope of delivery. The pneumatic-hydraulic pressure multiplier is supplied already filled with oil and vented and is therefore ready for immediate use.

5.2 SETTING THE CORRECT DISTANCE ON A GROOVED PLATE



The distance between two stamping base bodies on the grooved plate can be set individually - either via their grooves or via the 25 mm spacing holes. There are auxiliary markings (192, 104 and 52) on the grooved plate, which provide an initial visual aid for rough adjustment. Using separately available spacers (item no. 53020), the distance between the two stamping bases can be set exactly so that it matches the distance between two Makro•Grip® FS 5-Axis Vises in the zero-point clamping system.

To support the longevity of your stamping unit, check and clean all running surfaces, grooves, staking holes and hoses if they are dirty. Clean the grooves and staking holes with a grease solvent and then lubricate them with extrusion oil. In addition, visually inspect all parts, especially the hydraulic and pneumatic hoses for leaks and check that the screw connections and pressure gauge are intact.



NOTE: REPAIR REQUIREMENTS FOR YOUR STAMPING UNIT

Your stamping unit must always be in perfect, well-maintained condition. Defects in your stamping unit must be rectified immediately. Only use the stamping unit when it is undamaged. If you have any questions about repairs, please contact LANG Technik.



ATTENTION: RISK OF INJURY DURING THE REPLACEMENT OF COMPONENTS

Improper handling when replacing components can lead to injuries.

Measures:

Maintenance work, such as the replacement of components, may only be carried out by trained specialist personnel.

NOTE Venting:



After this process, the stamping unit must be vented. Proceed as described in chapter „6.1.1 Venting the hydraulic system“

6.1 REASONS FOR MALFUNCTIONS

There are two main causes for a possible malfunction of the stamping unit:

1. The hydraulic housing or the hydraulic hose must be vented. Signs and reasons for this:
 - Stamping pressure builds up very slowly, not at all or not to the maximum
 - Movable carrier and stamping jaw returns very slowly to its starting position
 - Red indicator bolt on the pressure multiplier triggers and becomes visible
 - Seals or springs have been replaced
2. Springs or seals in the hydraulic housing must be replaced.

Problem description	Troubleshooting
Stamping pressure builds up very slowly, not at all or not to the maximum	It is necessary to vent the hydraulic housing or the hydraulic hose (see chapter 6.1.1)
Movable carrier and stamping jaw returns very slowly to its starting position	
Red indicator bolt on the pressure multiplier triggers and becomes visible	
Visible oil loss at the hydraulic housing	Seals in the hydraulic housing must be replaced (see chapter 6.1.2)
Oil leaks from the sealing points of the multiplier. This problem should be avoided by replacing the seals in good time. As a rough guide, which depends on the frequency of stamping and the temperature conditions, we recommend replacing the seals every 7 years.	The seals of the pressure multiplier must be replaced. These are available as a set from LANG Technik (see chapter 6.3.3)
Oil disappears without any visible leaks.	The piston rod and seal set of the pressure multiplier must be replaced. These are available as a set from LANG Technik (see chapter 6.3.4)

6.1.1 VENTING THE HYDRAULIC SYSTEM

Tools required: Hexagon socket, open-end wrench

1. Set the pressure on the pressure control valve to 0 bar.
2. Unscrew the sealing cap (Pos. ① figure 8) on the oil reservoir of the multiplier.
3. Replace this sealing cap with the L-connector included in the scope of delivery using an open-end wrench
4. Disconnect the pneumatic hose from the quick exhaust valve at the base of the pressure multiplier.
5. Insert the pneumatic hose into the L-connector.
6. Slowly turn up the pressure on the pressure control valve to 0.2 bar.
7. Press the foot pedal and hold the foot pedal.
8. Slowly loosen the venting screw on the back of the hydraulic housing with an Allen key approx. 4 turns until oil comes out free of bubbles. (Pos. ② Figure 9)
9. Close the venting screw again while keeping the pedal depressed.
10. Release the foot pedal.
11. Reset the pressure at the pressure control valve to 0 bar.
12. Remove the pneumatic hose from the L-connector on the pressure multiplier.
13. Insert the pneumatic hose back into the quick-release valve at the base of the multiplier.
14. Unscrew the L-connector.
15. Replace the L-connector with the sealing cap.

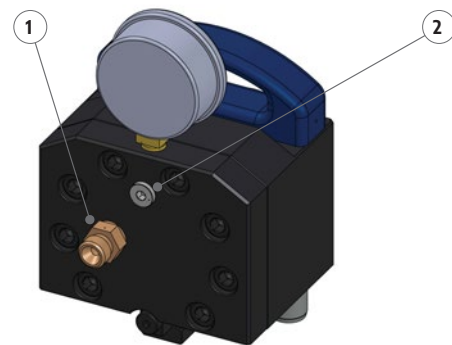
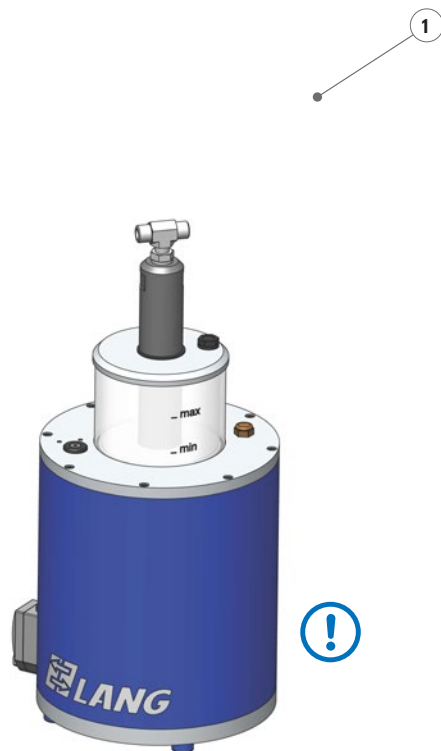


Figure 9: Hydraulic housing

is bled simultaneously at the double stamping

6.1.2 REPLACING THE SEALS AND SPRINGS ON THE HYDRAULIC HOUSING

MATERIAL REQUIRED: HEXAGON SOCKET, NEW GROOVE RING, NEW HOUSING SEALING RING, RETURN SPRINGS

1. For your safety: Disconnect the main air supply.
2. Depressurize the stamping unit by turning the blue pressure control valve.
3. Loosen and remove the hydraulic hose on the rear of the hydraulic housing (Pos. ① Figure 9).
4. Loosen the fastening screw between the movable carrier jaw and the knurled screw using an Allen key. Make sure that the spacer sleeve on the fastening screw is not lost.
5. Loosen the screw inside the knurled screw using an Allen key (Figure 10).
6. Loosen and remove the screws on the housing cover (Figure 11).
7. Remove the stop screw in the guide of the base body
8. Pull the hydraulic housing out of the guide of the base body.
9. Lift off the hydraulic cover.
10. Pull out the piston by tapping it lightly from behind (e.g. using a soft-face mallet).
11. Replace the blue groove sealing ring and the black housing sealing ring. Ensure that the rings are evenly positioned (Figure 12).
12. In this context, we also recommend replacing the return springs (included in the kit), as these become tired over the years.
13. Replace the cover on the housing. When reassembling, the four springs must slide easily into the recesses on the piston. The fitting screw helps you to find the exact position when attaching the cover. This must first be tightened firmly.
14. Screw in the remaining screws of the housing cover. Tighten the screws crosswise to 70 Nm.
15. Push the hydraulic housing back into the guide of the base body.
16. Fasten the knurled screw hand-tight to the piston.
17. Reattach the movable carrier jaw to the knurled screw (hand-tight). Do not forget the spacer sleeve!
18. Reattach the hydraulic hose to the housing (Pos. ① Figure 9).

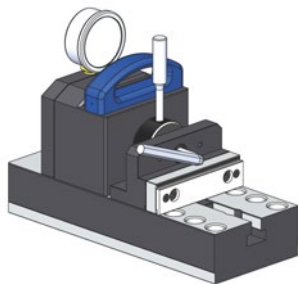


Figure 10

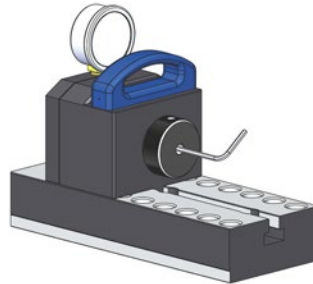


Figure 11

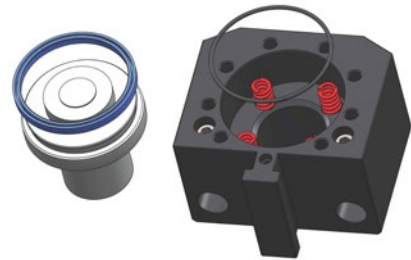


Figure 12

NOTE Venting:

After replacing the seals or return springs (or dismantling the hydraulic pressure gauge), the stamping unit must be vented. Proceed as described in chapter „6.1.1 Venting the hydraulic system“.

6.2 STAMPING JAWS

Stamping jaws are available in two versions: Standard and High-End.

- The standard stamping jaws are suitable for materials up to 35 HRC
- The High-End stamping jaws are suitable for materials up to 45 HRC

For hard materials, we recommend wetting the stamping teeth with extrusion oil (included with High-End stamping jaws). This reduces frictional resistance and increases the service life of the stamping jaws.

6.2.1 WEAR OF THE STAMPING JAWS

The serration of the stamping jaws is subject to a certain amount of wear. Due to the fact that different materials and hardnesses are stamped with different stamping pressures, the service life of the stamping teeth cannot be defined in general terms. The wear is shown by the fact that the serration becomes blunt. If a row of teeth is worn, the stamping jaw can be turned, as it has a total of four rows of teeth.

6.2.2 GAUGING BLOCKS

To ensure consistent holding forces during subsequent workpiece clamping in the 5-Axis Vise, regularly check the wear of the stamping teeth using the supplied gauging blocks.

Procedure: Check the wear of the stamping teeth:

Place the two gauging blocks with the grooves at the outer ends of the stamping jaws and clamp them lightly. Make sure that the stamping serration engages in the grooves of the gauging blocks. If the measuring stone (without groove) fits between the stamping serration, the jaws should be turned over to insert a fresh row of teeth.



NOTE Reconditioning:



Makro•Grip® FS stamping jaws are no longer reconditioned due to their quadruple serration and long service life!

6.3 PNEUMATIC-HYDRAULIC PRESSURE MULTIPLIER

6.3.1 OIL LEVEL AND CHECK

The oil level must be monitored continuously. Check the oil for the following criteria:

- The oil level is between the „min“ and „max“ display.
- The oil is not discolored.

If one of the criteria does not apply, you must change the oil.

NOTE Hydraulic Oil:



**Ensure that there is always sufficient hydraulic oil in the pressure multiplier!
The oil level must be between the min. and max. indicator.
LANG Technik uses HLP 32 hydraulic oil.**

6.3.2 OIL CHANGE

The multiplier is filled with HLP 32 hydraulic oil. The required quantity is approx. 0.5 and 0.8 liters. We recommend changing the oil every 12-18 months. This guide value applies to a usage of approx. 200 stampings per day.

Material required: Oil (min. 0.5 - 0.8 l), collecting container (e.g. measuring cup), hexagon socket, open-end wrench
In the case of a mobile stamping trolley, we recommend loosening the fastening screws on the inside and removing the pressure multiplier from the trolley.

1. Set the pressure on the blue pressure control valve to 0 bar.
2. For your safety: Disconnect the main air supply.
3. Remove the black cap from the oil reservoir of the multiplier.
4. Replace this cap with the L-connector supplied.
5. Disconnect the pneumatic hose from the quick exhaust valve at the base of the pressure multiplier.
6. Insert the pneumatic hose into the L-connector.
7. Connect the main air supply.
8. Slowly turn up the pressure on the pressure control valve to 0.2 bar.
9. Loosen the hydraulic hose on the back of the hydraulic housing
10. Place the loose end of the hose in a collecting container (e.g. measuring cup).
11. Press the foot pedal continuously and wait until no more oil escapes from the hydraulic hose.
12. Release the foot pedal.
13. Set the pressure at the pressure control valve to 0 bar.
14. Reconnect the hydraulic hose to the hydraulic housing
15. Fill new hydraulic oil into the sight glass on the pressure multiplier up to the „max“ mark.
16. Slowly turn up the pressure on the pressure control valve to 0.2 bar.
17. Loosen the vent screw. (approx. 4 turns)
18. Press the foot pedal continuously and wait until the hydraulic oil comes out without bubbles.
19. Close the vent screw.
20. Release the foot pedal.
21. Reset the pressure at the pressure control valve to 0 bar.
22. Remove the pneumatic hose from the L-connector.
23. Insert the pneumatic hose back into the quick-release valve.
24. Unscrew the L-connector.
25. Replace the L-connector with the black cap. It may be necessary to top off the hydraulic oil.
The oil level should be just below the „max“ mark.

NOTE Test stamping:



Before using the stamping unit again, we recommend that you carry out a test stamping.

6.3.3 REPLACING THE SEAL ON THE PRESSURE MULTIPLIER

Material required: Sealing set (item no. 41250-20), oil (0,5 – 0,8 l), collecting container (e.g. measuring cup), screwdriver, cloth and oil, grease for greasing, funnel, grease solvent. We also recommend an assistant!

1. Remove the sealing cap from the lid of the oil container.
2. Remove the remaining oil from the oil container by letting it flow into a collection container.
3. Start by loosening the screws on the cylinder cover.


 **NOTE: RISK OF INJURY**

The cover of the cylinder is under pressure due to springs:

Measures:

Remove screw by screw until only two screws are left. Have someone help you push the cover down while you loosen the last two screws.

4. Slowly release the pressure on the cylinder cover.
5. Remove the lid.
6. Remove the large spring inside the cylinder.
7. Remove the piston.
8. Clean the piston carefully with a grease solvent.
9. Remove the remaining oil from the cylinder by letting it flow into a collection container.
10. Remove the X-ring with a screwdriver or similar.
Take care not to damage the piston!
11. Grease the groove of the piston plate for the new X-ring.
12. Pull the new X-ring over the plate by hand and place it carefully in the groove. Check the inserted X-ring for damage caused by the insertion process. Only an intact X-ring ensures tightness!
13. Coat the inside of the cylinder with oil. Use an oily cloth for this. Make sure that no particles remain in the cylinder.
14. Place the piston in the cylinder and press it down.
15. Place the large spring in the cylinder in the groove provided.
16. Place the cylinder cover on the cylinder and press it down.
17. Secure the cover with the screws. Ask for help with this.
18. Fill the oil from the collection container into the oil container using a funnel.
19. If the oil level is then below the minimum limit „min“, fill with new hydraulic oil (HLP 32) until the level is between „min“ and „max“.
20. Close the oil container with the sealing cap on the lid of the oil container.

NOTE Venting:  **After this process, the stamping unit must be vented. Proceed as described in chapter „6.1.1 Venting the hydraulic system“.**

6.3.4 REPLACING THE PISTON ROD AND SEAL SET ON THE POWER MULTIPLIER

Problem description:

The hydraulic oil disappears without any visible leaks.

Troubleshooting:

The piston rod and some seals are replaced.

Replace piston rod and seal

Materials required: New piston rod, new X-ring, oil (max. 0.5 l), collection container (e.g. measuring cup), screwdriver, cloth and oil, grease, funnel, grease solvent. We also recommend an assistant!

**NOTE: RISK OF INJURY**

The cover of the cylinder is under pressure due to springs.

Measures:

Remove screw by screw until only two screws are left. Have someone help you push the cover down while you loosen the last two screws.

1. Remove the sealing cap from the lid of the oil container.
2. Remove the remaining oil from the oil container by letting it flow into a collection container.
3. Start by loosening the screws on the cylinder cover.
4. Slowly release the pressure on the cylinder cover and remove the cover.
5. Remove the large spring inside the cylinder.
6. Remove the piston.
7. Clean the piston carefully with a grease solvent.
8. Remove the remaining oil from the cylinder by letting it flow into a collection container.
9. Now that the cylinder has been dismantled, it is advisable to replace the seal around the piston plate.
Remove the X-ring with a screwdriver or similar.
Take care not to damage the piston!
10. Remove the piston rod by loosening the screw at the bottom of the plate.
11. Fit the new piston rod. Leave the protective cover on the piston rod to protect it.
12. Grease the groove of the piston plate for the new X-ring (if you want to insert a new X-ring).
13. Pull the new X-ring over the plate by hand and place it carefully in the groove. Check the inserted X-ring for damage caused by the insertion process. Only an intact X-ring ensures tightness.
14. Coat the inside of the cylinder with oil. Use an oily cloth for this. Make sure that no particles remain in the cylinder.
15. Place the piston in the cylinder and press it down.
16. Remove the protective cover from the piston rod.
17. Place the large spring in the cylinder in the groove provided.
18. Place the cylinder cover on the cylinder and press it down.
19. Secure the cover with the screws. Ask for help with this.
20. Fill the oil from the collection container into the oil container using a funnel.
21. If the oil level is then below the minimum limit „min“, fill with new hydraulic oil (HLP 32) until the level is between „min“ and „max“.
22. Close the oil container with the sealing cap on the lid of the oil container.

NOTE Venting:

After this process, the stamping unit must be vented. Proceed as described in chapter „6.1.1 Venting the hydraulic system“.

6.4 REPAIRS BY LANG TECHNIK GMBH

LANG Technik GmbH must be commissioned for repairs. A loan unit can be ordered for the duration of the repair.

NOTE: RENTAL DEVICE

We would like to take this opportunity to point out that a rental device is always delivered in perfect condition. When returning the rental device, please repack it as it was when you received it.

7 SAFETY INSTRUCTIONS

7.1 PLEASE NOTE IN ADVANCE

Read the operating instructions completely. Observe all safety instructions listed in this chapter. Make sure that everyone who works with the stamping unit has read these operating instructions in full.
Handling the documentation: Always keep the instructions to hand in the immediate vicinity of the stamping unit.

NOTE: TRAINING

Training of personnel by the manufacturer can only be regarded as the passing on of individual pieces of information. They do not release the operator from reading the operating instructions.

7.2 INTENDED USE

7.2.1 INTENDED USE

The stamping unit is intended exclusively for stamping suitable workpieces using hydraulic pressure. Any other use is considered improper use. The manufacturer is not liable for any resulting damage.

7.2.2 SUITABILITY OF THE STAFF

The operator undertakes to only allow persons to work with the stamping unit who:

- have been instructed in the operation of the Makro-Grip® FS stamping units
- are familiar with the basic regulations on safety and accident prevention
- have read and understood the operating instructions in full

GENERAL DANGER

The operator bears the ultimate responsibility for safety. This responsibility cannot be delegated!

7.2.3 INCORRECT OPERATION AND MISUSE

There is a risk of danger in the event of incorrect operation or misuse:

- for the health of the operator, third parties and animals in the immediate vicinity of the stamping unit
- for the stamping unit itself and other tangible assets of the operator

7.3 DANGERS DURING STAMPING PRESSURE ADJUSTMENT

- In addition to the instructions in the documentation, observe the generally applicable local safety and accident prevention regulations. Check the stamping unit for operational safety before each commissioning. Any faults that occur must be rectified immediately. Damaged parts must be replaced immediately. The stamping unit must not be operated until the fault has been rectified.
- Workplace ergonomics: The workstations must be designed in accordance with ergonomic guidelines. The operator must ensure free access, adequate lighting, etc.
- Personal protective measures: 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, hairnet, safety goggles, etc.).



7.3.1 DANGERS DURING THE STAMPING PRESSURE SETTING

NOTE: DANGER OF CRUSHING

During loading and unloading, there is a risk of injury and crushing to your fingers if the stamping process is accidentally triggered.

Measures:

Unintentional operation of the switch during loading and unloading must be prevented. Proceed with care. Work in a secured area in which external influences are excluded.

NOTE: DANGER OF CRUSHING

There is a risk of crushing your fingers during the stamping process.

Measures:

Proceed with care. Do not reach between the pair of jaws. Grip the workpiece as far up as possible.

NOTE: SPLINTERING AND FLYING PARTS

Only workpieces within the respective permitted hardness range may be stamped. If the hardness of the material exceeds the maximum permissible value, correct, reliable stamping cannot be guaranteed.

Measures:

Never exceed the specified material hardness of 35 HRC or 45 HRC when stamping. Stay behind the protective shield during the stamping process.

8.1 STORAGE AND DISPOSAL

Storage

If you want to take your stamping unit out of operation and store it, make sure that:

- the stamping unit is disconnected from the compressed air supply
- bare areas are provided with corrosion protection

Waste disposal

The individual parts of the stamping unit can be recycled if disposed of properly and are therefore environmentally friendly. Details on disposal and recyclability can be found in the table.

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.

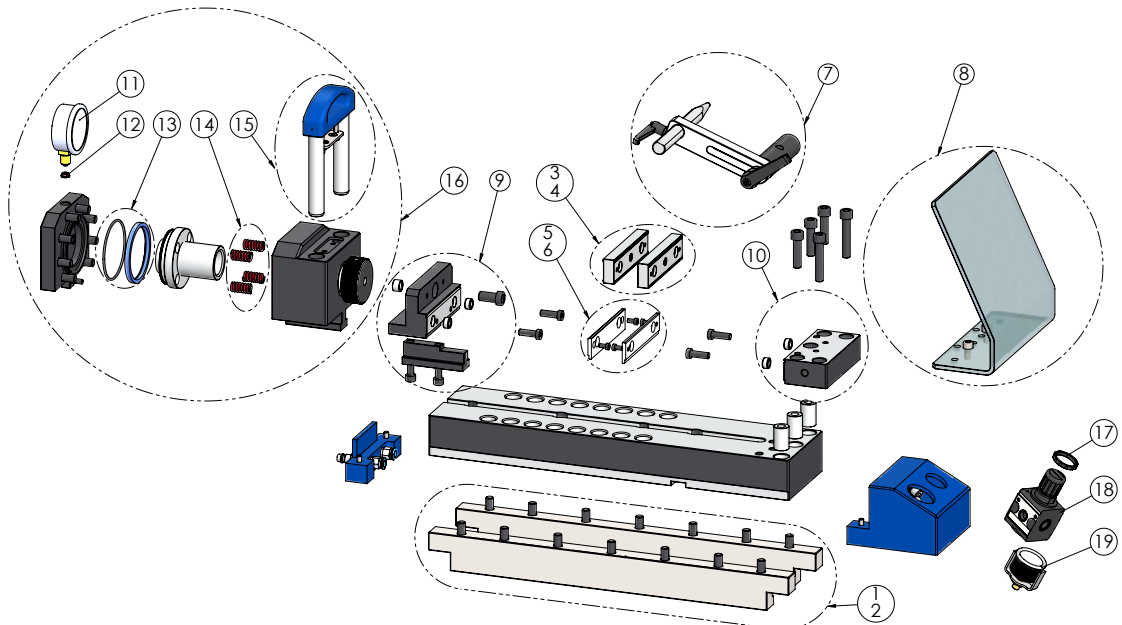


Accessories and packaging are recycled in an environmentally friendly way.

Product	Material	Waste disposal
Housing, screws, nuts, etc.	Metal	Separation of materials Feed for recycling by melting down
Protective shield	Plastic	Feeding for recycling
Cables etc.	Rubber, PVC, silicone	Separation of materials Feeding for recycling
PE films	Plastic	Feeding for recycling
Packaging material	Paper, cardboard	Feeding for recycling

9.1 SPARE PARTS LIST

Pos	Item number	Designation
1	51262	Standard reinforcement strips (260)
2	51412	Reinforcing strips Extended (410)
3	50111-20	Standard stamping jaws (full serration) up to 35 HRC
4	50112-20	High-End stamping jaws (full serration) up to 45 HRC
5	50110-30	Support strips 3 mm
6	50110-50	Support strips 5 mm
7	41261	workpiece end stop
8	41200-34	Makrolon® protective shield with screws
9	51020	Movable carrier jaw
10	51021	Fixed carrier jaw
11	KT1000285	Hydraulic pressure gauge
12	41200-29	Copper gasket
13	51012	Sealing kit
14	41200-25	Springs for hydraulic housings
15	51011	Bow handle
16	51010	Hydraulic block
17	KT1003032	Panel nut
18	KT1002489	Pressure regulator
19	KT1003033	Pneumatic pressure gauge
	41250	Pneumatic-hydraulic pressure multiplier
	41250-20	Seal kit for pneumatic-hydraulic pressure multiplier
	41250-25	Foot pedal for pneumatic-hydraulic pressure multiplier
	41200-19	Hydraulic hose
	41200-20	Pneumatic hose



EU-DECLARATION OF CONFORMITY

Manufacturer:	LANG Technik GmbH Albstraße 1-6 73271 Holzmaden
Designation of the machine/system:	Makro•Grip® FS stamping units
Description:	The stamping unit is used for the external pre-stamping of work pieces using hydraulic pressure up to 360 bar. The workpiece is provided with an stamping contour for form fit clamping in the LANG Technik Makro•Grip® FS 5-Axis Vise.
Serial/article number:	51260, 51260-HE, 51410, 51410-HE, 52521, 52521-HE, 53400, 53400-HE, 53402, 53402-HE, 53261, 53261-HE, 53411, 53411-HE
Applied harmonized standards:	DIN EN ISO 12100:2010 DIN EN 349:2008 DIN EN 842:2009 DIN EN ISO 4414:2011-04



Philipp Lang, Managing Director

Holzmaden, 16.02.2024

11.1 TO THE DOCUMENTATION

This documentation contains instructions and information that may not be reproduced, distributed or transmitted in whole or in part using data technology methods or used without authorization for competitive purposes. Errors or mistakes in the documentation are reserved. All rights to this documentation remain with LANG Technik GmbH.

11.2 CHANGES TO THE PRODUCT

Changes by the customer

The warranty is void if the customer makes changes to the product.

CAUTION: CHANGES TO THE PRODUCT

No modifications may be made to the product without the manufacturer's approval. Only use original spare parts. There is no guarantee that externally sourced parts are designed and manufactured to withstand the stresses and ensure safety.

NOTE Warranty Service:



The manufacturer provides the full warranty only and exclusively for the spare parts ordered from him.

11.3 CHANGES BY THE MANUFACTURER









The manufacturer endeavors to improve its products. He reserves the right to make changes. This does not entail any obligation to subsequently adapt the stamping unit already supplied.

11.4 GENERAL TERMS AND CONDITIONS OF SALE AND DELIVERY

In principle, our General Terms and Conditions of Sale and Delivery apply. These are available to the operator at the latest when the contract is concluded. Warranty and liability claims for personal injury and damage to property are excluded if they are attributable to one or more of the following causes:

- Non-intended use
- Improper installation, commissioning, operation and maintenance
- Operating the stamping unit in a defective condition
- Inadequate monitoring of parts that are subject to wear and tear
- Failure to observe the instructions in the documentation
- Catastrophes caused by foreign bodies and force majeure

12.1 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>

MACHINE TOOL SOLUTIONS LTD.

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