

# OPERATING INSTRUCTIONS



# MODULGRAV



Kolpingstraße 1-7  
Postfach 280  
Tel. +49 (0) 7731 882-0

D-78224 Singen / Htwl.  
D-78224 Singen / Htwl.  
Fax +49 (0) 7731 882 266

e-mail: [info@elma-ultrasonic.com](mailto:info@elma-ultrasonic.com)  
homepage: [www.elma-ultrasonic.com](http://www.elma-ultrasonic.com)

## Contents

1.	<i>General Information</i>	<i>page 3</i>
2.	<i>Safety Instructions</i>	<i>page 4</i>
3.	<i>Before Initial Operation</i>	<i>page 4</i>
4.	<i>Technical Specifications</i>	<i>page 5</i>
5.	<i>Use and Operation</i>	<i>page 8</i>
6.	<i>Step By Step Instructions</i>	<i>page 10</i>
7.	<i>Proper Care</i>	<i>page 22</i>
8.	<i>Maintenance / Service</i>	<i>page 22</i>
9.	<i>Troubleshooting</i>	<i>page 23</i>
10.	<i>Spare Parts List</i>	<i>page 24</i>
11.	<i>Responsibility of Manufacturer</i>	<i>page 24</i>



## 1. General Information

This engraving device of the type Modulgrav was manufactured in Germany by using high-quality material and state-of-the-art technology and was thoroughly tested before being shipped out.

### **ATTENTION:**

The operating staff must have access to these operating instructions at any time. The instructions concerning maintenance and the information regarding the verification of safety functions specified in these operating instructions must always be observed, otherwise there is no warranty claim and a proper functioning of the machine cannot be guaranteed.

Remodelling and changing the device is only permitted after consulting the manufacturer.

For service questions and technical information, our technical support office can be reached during normal business hours at [+49] 7731-882-120.

### **Address:**

**Fa. ELMA Hans Schmidbauer  
GmbH & Co.KG  
Kolpingstr. 1 - 7  
D-78224 Singen / Htwl.  
GERMANY**

**Phone:                    [+49] 7731-882-0**  
**Fax:                        [+49] 7731-882-266 or 7731-882-114**

## **2. Safety Instructions / Regulations**

- The device is intended exclusively for the engraving of metal and plastic surfaces and for surfaces of artificially manufactured material.
- When operating the milling module, make sure that nothing gets into the operating area of the miller (rotating parts) or severe injuries may occur. This applies specifically to hair and fingers. The miller may not be slowed down with the fingers.
- During milling, safety goggles must be worn to protect the eyes from facings.

## **3. Before Initial Operation**

- Please check the device for possible transportation damage. Such damage cannot always be detected by looking at the shipping box. If the device shows any damage, please contact *Elma* to clarify claims settlements.
- Remove all safety devices which were necessary for transportation.
- The device may only be installed and used on a dry, level and solid surface.

## 4. Technical Specifications

### Mechanical Data:

<b>Clampable rings: Inside diameter</b>	13-20mm	<b>Weight:</b>	10kg
<b>Widths of rings:</b>	2-7mm	<b>Color:</b>	blue, grey silver
<b>Type height with 20mm model: (setting range)</b>	0.8 to 6.5 mm		
<b>Type height with 12mm model: (setting range)</b>	0.5 to 3.9 mm		
<b>Force of the diamond:</b>  Lower case position Medium case position Upper case position	  12N corresp. 1.2kg 14N corresp. 1.4kg 16N corresp. 1.6kg		
<b>Receiving diameter for diamond: Receiving diameter for engraving miller:</b>	∅ 2.5 mm ∅ 3.3 mm	.	
<b>Lift setting, course: Lift setting, fine:</b> <b>Diamond holder</b>	108 mm 11 mm		
<b>Distance between table and top diamond position:</b>	175 mm		
<b>Distance between short clamping device and top diamond position:</b>	115 mm		
<b>Distance between long clamping device and top diamond position:</b>	85 mm		
<b>Dimensions: (depth x width x height)</b>	250 x 350 x 600		

### Clamping Possibilities

<b>Clamping device, short:</b>	
Clamping range "round"	up to Ø15mm; Ø22mm; Ø30mm
Clamping range "cylindric"	starting from Ø6mm
Clamping range "flat"	starting from parts 5mm - 40mm wide
<b>Clamping device, long:</b>	
Clamping range "flat"	up to 180mm
Clamping range "cylindric"	starting from Ø3.6mm
<b>Groove plate:</b>	
Dimensions	250mm x 150mm x 15mm
<b>Universal device:</b>	
Plates	up to Ø150mm
Cups	Ø80mm

### Type factors:

Template model (height)	Type adjustment	Factor V
20 mm	0.8	25
20 mm	1.7	11.7
20 mm	2.7	7.4
20 mm	3.6	5.5
20 mm	4.6	4.3
20 mm	5.5	3.6
20 mm	6.5	3.0
<hr/>		
12 mm	0.5	24
12 mm	1.0	12
12 mm	1.6	7.5
12 mm	2.2	5.4
12 mm	2.7	4.4
12 mm	3.3	3.6
12 mm	3.9	3.0

### Type expansion factors:

Template model (height)	Type adjustment	Factor V
20 mm	7.5 mm	1.5 : 1
20 mm	0.8 mm	2.4 : 1
<hr/>		
12 mm	4.9 mm	1.5 : 1
12 mm	1 mm	2.4 : 1

## Type Template – Areas *Modulgrav* 22.3.99

Maximum area on template rail: - 16 / +16

	Type 0.8 area	Type 1.6 area	Type 2.7 area	Type 3.6 area	Type 4.6 area	Type 5.5 area	Type 6.5 area
<b>FLAT ENGRAVING</b> (Diamond) expansion parts installed, <i>not expanded</i>	☺ -14 / + 14	☺ -14 / +14	☺ -14 / +14	☺ -14 / +14	☺ -14 / +14	☺ -12 / +12	☺ -10 / +10
<b>FLAT ENGRAVING</b> (Diamond) expansion parts installed, <i>fully expanded</i>	☺ -14 / +14	☺ -14 / +14	☺ -14 / +14	☺ -14 / +14	☺ -13 / + 13	☺ -12 / +12	☺ -12 / +12
<b>FLAT ENGRAVING</b> (Diamond) expansion parts installed, <i>standard bearing bolt installed</i>	☺ -16 / +16	☺ -16 / +16	☺ -16 / +16	☺ -16 / +16	☺ -16 / +16	☺ - 15 / +15	☺ -15 / +15
<b>RING-INSIDE</b> Expansion parts installed, <i>not expanded</i>	☺ - 11 / + 11	☺ -10 / +11	☺ - 7 / + 7	☺ - 6 / + 6			
<b>RING-INSIDE</b> Expansion parts installed, <i>fully expanded</i>	☺ - 10 / +10	☺ -10 / +10	☺ -7 / +7	☺ - 7 / +7			
<b>RING-INSIDE</b> Expansion parts not installed, <i>standard bearing bolt installed</i>	☺ -15 / +15	☺ - 15 / +15	☺ -15 / +15	☺ -13 / +13			
<b>OUTER RING</b> Expansion parts not mounted Standard cap bearing mounted	☺ - 11 / + 11	☺ -10 / +11	☺ - 7 / + 7	☺ - 6 / + 6			
<b>OUTER RING</b> Expansion parts not mounted Standard cap bearing mounted	☺ - 10 / +10	☺ -10 / +10	☺ -7 / +7	☺ - 7 / +7			
<b>OUTER RING</b> Expansion parts not mounted Standard cap bearing mounted	☺ -15 / +15	☺ - 15 / +15	☺ -15 / +15	☺ -13 / +13			

## **5. Use and Operation**

### **Function:**

The device is intended for engraving work pieces. With various additional modules, it is possible to create diamond or milling engravings not only on flat or slightly curved objects but also on or in rings.

For engravings on the inside of rings, however, milling engraving is not possible.

Using type models (type height 20 or 12) in the model rail with an adjustable limit stop each on the right and left side is preferred. It is, however, possible to use symbol and picture models.

With the help of the tip of the tracer, the contour is traced in the model rail. Then a translation mechanism translates this movement to the X-Y table.

By setting the translation ratio, the height of the type to be created is set.

For flat engraving, a clamping device or a groove plate is necessary which serves to receive and fix the part to be engraved. The movement of the table is directly translated onto the work piece, independently of the height of the surface to be engraved. If the lever of the mouse module is activated and the engraving tool reaches the surface of the work piece, engraving occurs. If the tracer needs to be moved while a model is being traced, it is absolutely necessary that the lever of the mouse remains inactive while the movement occurs, otherwise engraving mistakes will take place.

For ring engraving, a particular module needs to be installed which translates linear movement into a rotating movement and which contains a clamping device for rings.

For the available type heights or engraving and expanding areas, please consult the technical specifications for the individual module.

Before creating an engraved design, it is advisable to inspect the available space on the surface which will be engraved. To do this, trace the shape of the extreme values of the engraving template with the tracer without activating the mouse and observe the results underneath the engraving tool.





**Note:**

- Since engraving devices have to execute precise movements, all guides and ball bearings are set free of play. For that reason, appropriate care must be taken when handling the device. Avoid any taps and pushes against the device.

**Pressure Setting: Diamond**

To obtain optimum engraving results, the engraving force must be set depending on the material which is to be engraved and the module selected.

A brass case with marks can be seen looking through the window on the side of the diamond holder module. The position of the brass case is set by turning the upper control knob. The designations “down“ and “up“ refer to the marks of the brass case which can be seen through the side window if the necessary force has been set.

“Medium“ means that the brass case is located in an in-between position.

Procedure	Aluminum	Brass	Plastic	Gold	Silver	High-Grade Steel	Copper	Pewter
Ring-inside	-	down	-	down	down	medium	down	down
Milling	up	up	up	up	up	up	up	up
Diamond, outside engraving	medium	medium	up	medium	medium	up	medium	down

**Attention: When the mouse is pressed, the control knob for setting the pressure may not be changed.**

**Milling Speed:**

As in conventional machine shaping, the material to be milled determines the cutting speed. When using our milling module, we recommend the following milling speed settings. Please understand that we cannot give such a recommendation for all possible material:

Procedure	Aluminum	Brass	Plastic	Gold	Silver	High-Grade Steel	Copper	Pewter
Milling	5	4	4-5	4	4	3 - 4	3 - 4	5

No warranty claims can be based on the above information regarding force and speed range settings.

Please check whether you can use our settings, particularly when working with precious metals.

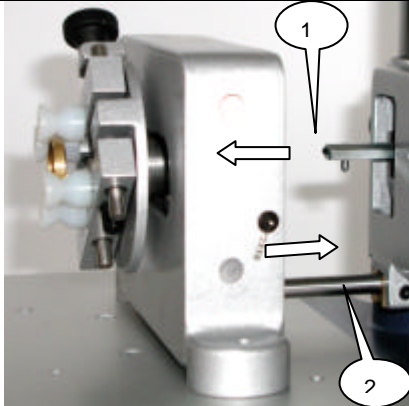
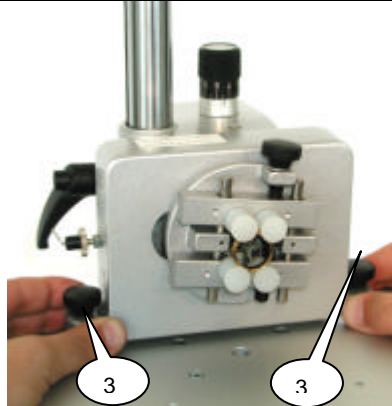
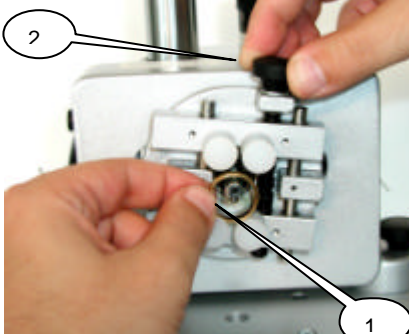
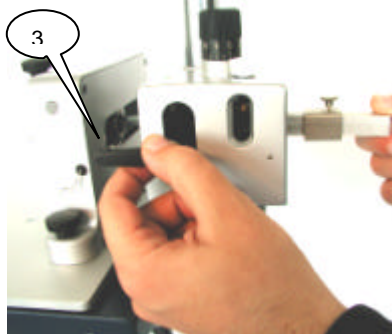
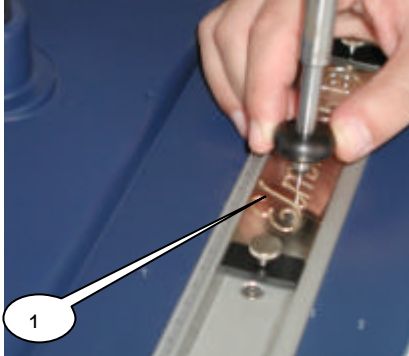
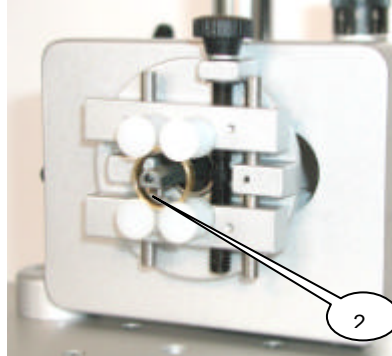
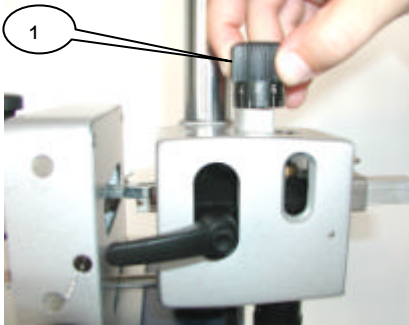
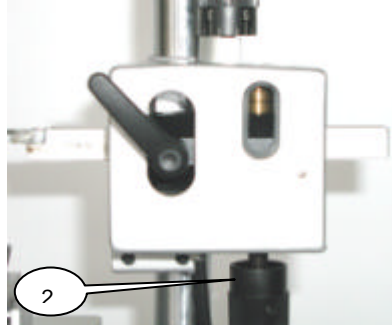
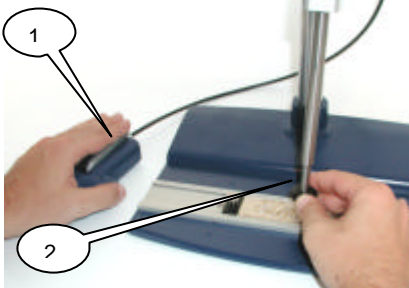

*Note regarding the use of expansion:*

If you use type or symbol models which exceed the dimensions of the central template guide, the expansion lock must be moved from the upper to the lower bore.


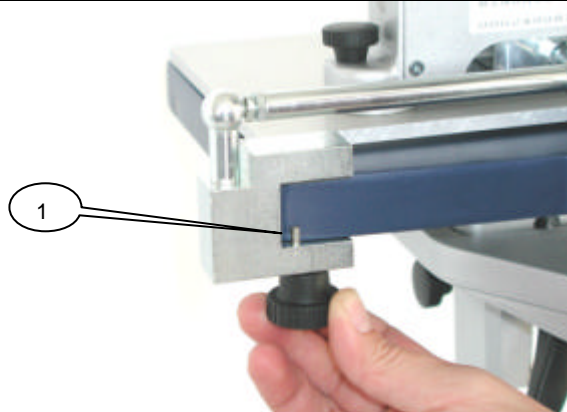


## **6. Step By Step Instructions**

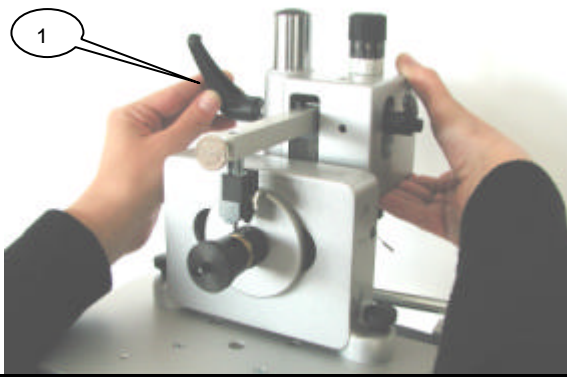
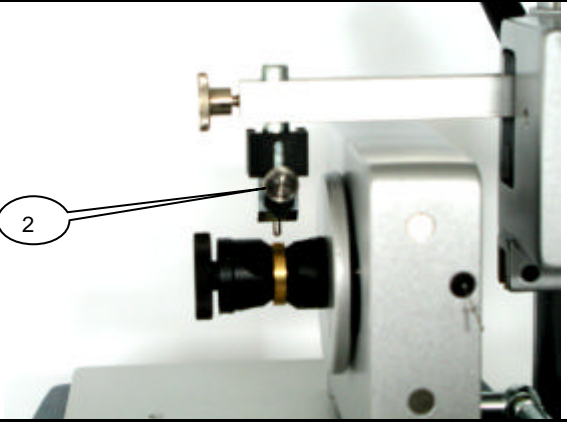

- ✓ Ring-Inside Engraving with Ring-Inside Module  
page 11
  
- ✓ Ring-Outside Engraving with Ring-Outside Module  
page 13
  
- ✓ Flat Engraving with Clamping Device  
page 15
  
- ✓ Milling Engraving with Clamping Device  
page 17
  
- ✓ Stretching Device – Mounting and Operating Instructions  
page 20

<b>Ring-Inside Engraving with Ring-Inside Module</b>		
<p><b>Preparation</b></p>	<p>Ring-inside module (1), 2 grip screws (2), the limit stop (3), 1 Allan key are available.</p>	
<p>1. Step</p>	<p>Put tracer (1) to park position.</p>	
<p>2. Step</p>	<p>Loosen clamping lever (1) at the diamond holder case and push module (2) to the height of the column mark (3) with other hand. Retighten clamping lever (1). Put chisel back.</p>	
<p>3. Step</p>	<p>Fix the limit stop (1) at the mark on the chisel holder (2) and lock with the srew.</p>	
<p>4. Step</p>	<p>Loosen clamping lever (1) at the type height adjustment and position fork (3) at the required type height (2) with thumb. Retighten clamping lever (1).</p>	

<p>5. Step</p> 	<p>Place ring-inside module on table top. Guide chisel (1) through case of ring-inside module. At the same time, put guide pin on the back of the ring-inside module in its place (2), to couple the diamond holder module. Push module on the designated threads in table top and fasten with the two grip screws (3).</p>	
<p>6. Step</p> 	<p>Adjust ring (1) in ring receiver with one hand and with the other one, turn black control knob (2) clockwise for clamping. Loosen clamping lever (3) of chisel holder and push chisel to the limit stop in the direction of the work center. Retighten clamping lever (3).</p>	
<p>7. Step</p> 	<p>Testing diamond position: Take tracer out of its park position and bring to half height of engraving template (1). The tip of the diamond is now in the center over the inner surface of the ring (2).</p>	
<p>8. Step</p> 	<p>Adjusting the distance diamond to engraving surface: Turn knob of chisel height fine adjustment (1) anti-clockwise. Best at approx. 3mm. Furthermore, the engraving force may be adjusted at the chisel height fine adjustment (2) (see table for suggestion).</p>	
<p>9. Step</p> 	<p>Put tracer on first letter of word and start engraving. While tracing the letters, the lever of the mouse (1) must be activated. When replacing (2) the tracer, let go of the mouse lever.</p>	

**Ring outside engravings with ring outside module**

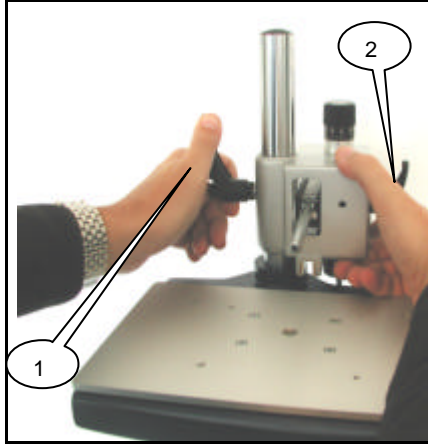
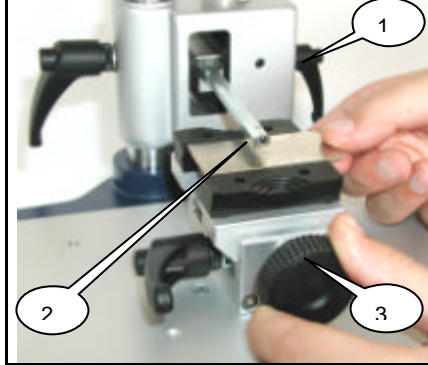
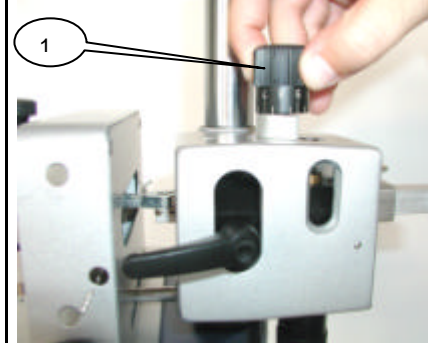
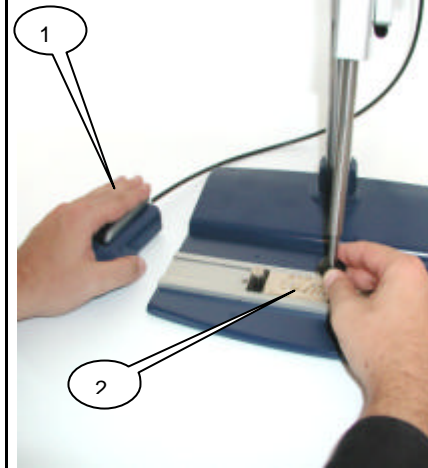
<p>1. step</p> 	<p>Mount the module on the work surface of the Modulgrav. Tighten the two black fly nuts.</p>
<p>2. step</p> 	<p>Tighten the spanner on the side until stop (1) in the blue sections.</p>
<p>3. step</p> 	<p>Put in the ring (knurled screw). Hold the disk while fixing the ring with the other hand.</p>
<p>4. step</p> 	<p>Push in the diamond holder from the front and fix it (1).</p>

<p>5. step</p> 	<p>Move the diamond close down to the ring (approx. 5 mm) and fix it (1).</p>
<p>6. step</p> 	<p>Place the copying pin in the centre of letter. Slide down the black plastic arrow (loosen the knurled nut) (2) and set the distance of the diamond so that it is positioned above the centre of the ring.</p>
<p>7. step</p> 	<p>Now push up the plastic arrow and start engraving.</p>

Please note: Choose your required size of engraving  
Adjust the engraving pressure to the material you work on.

## Flat Engraving with Clamping Device

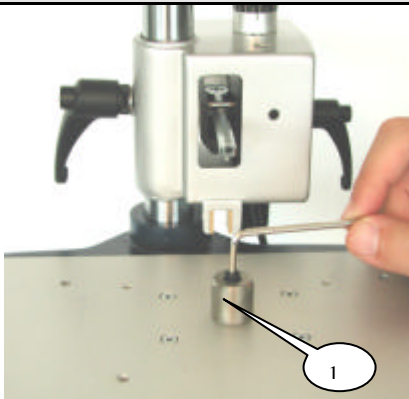
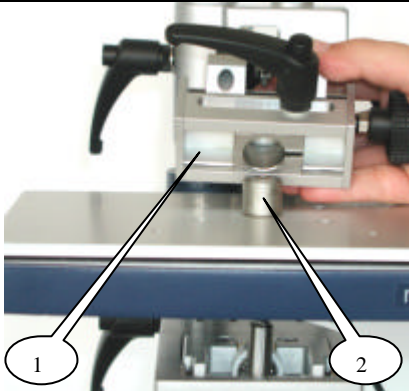
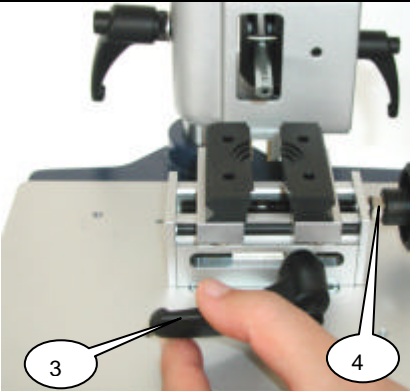
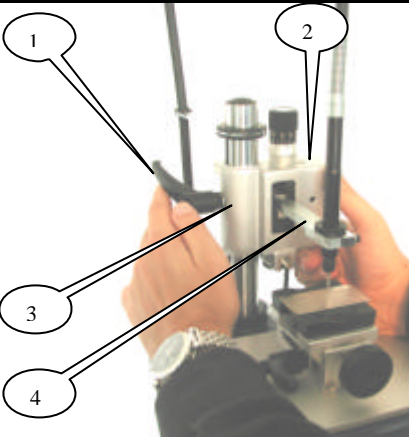
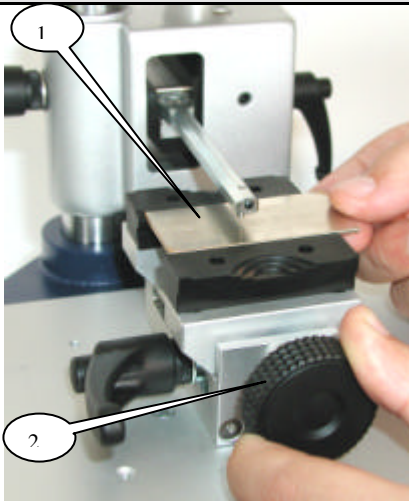

<p><b>Preparation</b></p>	<p>The clamping device (1) 1 allan key (2), the diamond holder (3) the center bolt (4) are available. No modules are clamped on the table top. vorhanden.</p>	
<p>1. Step</p>		
	<p>Put tracer in park position (1). Loosen clamping lever (2) on diamond holder module (3) and hold module with other hand (4) and push it up to the limit stop. Retighten clamping lever (1).</p>	
<p>2. Step</p>		
	<p>Loosen clamping lever at type height adjustment (1) and position fork at required type height with thumb (2). The reference is set by the lower end of the fork (3). Retighten clamping lever (1).</p>	
<p>3. Step</p>		
	<p>Fix centering pin (1) on table top with the help of the allan key.</p>	
<p>4. Step</p>		
	<p>Position short clamping device (1) on centering pin (2). If necessary, clamping devices must be adjusted with an angle tool. Lock clamping device by rotating it clockwise half a turn at black lever (3). Close grip jaws at clamping device by turning black control knob (4) (clockwise).</p>	

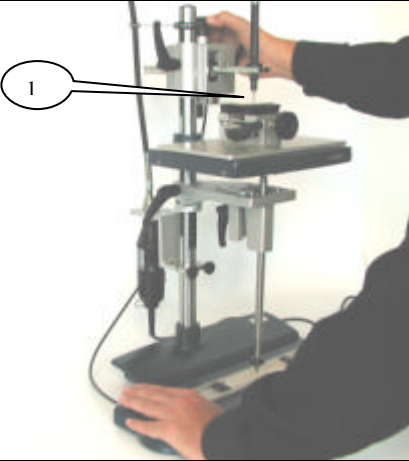
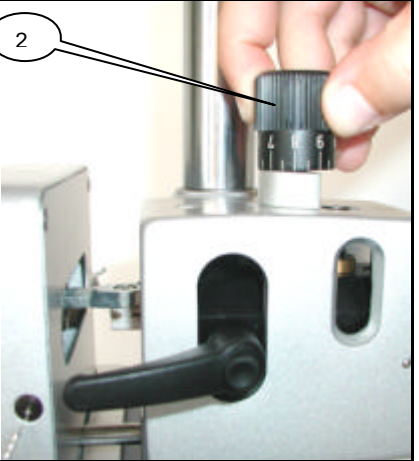
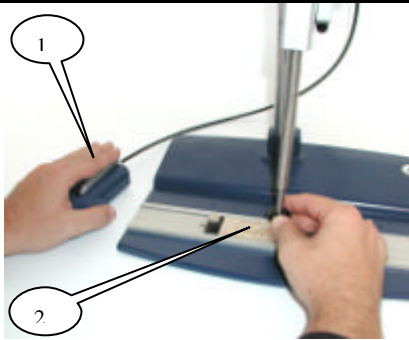
5. Step		
	<p>Loosen clamping lever (1) at diamond holder, with the other hand, push module down until about 10mm above clamping device.</p> <p>Retighten clamping lever (1). Loosen clamping lever and adjust diamond holder in the middle of clamping device. Retighten clamping device (2).</p>	
6. Step		
	<p>Open grip jaws of clamping device by turning black control knob (3). Clamp the piece which is to be engraved.</p> <p>Grip jaws can be adjusted differently according to the type of engraving piece.</p> <p>Set the diamond into the center of the engraving piece (2) by open and fix the clamp.dev.(1)</p>	
7 Step		
	<p>Lower diamond holder with the help of the fine adjustment handle (1) and adjust about 5mm above engraving piece.</p>	
8.Step		
	<p>Check the type range, i.e. trace the shape of first and last letter and middle part of the word with tracer.</p> <p>If necessary, verify and correct: type height, position of template and position of clamping device.</p> <p>While tracing the letters, the lever of the mouse (1) must be activated. While replacing the tracer (2), let go of the mouse lever.</p>	




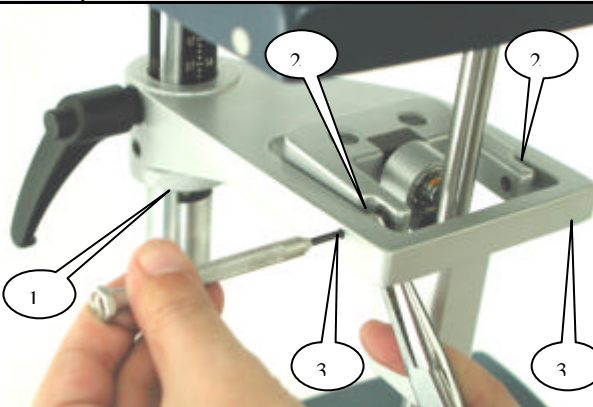
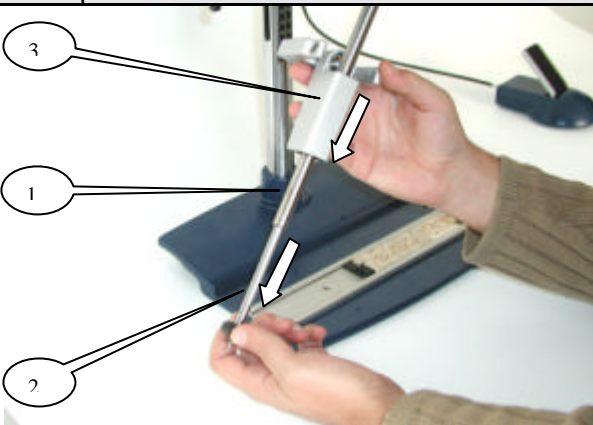
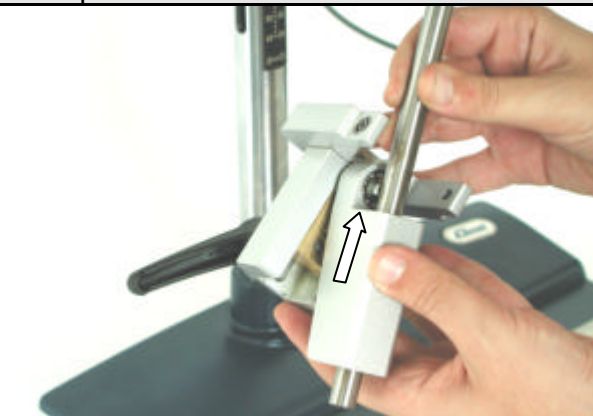
**Milling Engraving with Clamping Device**

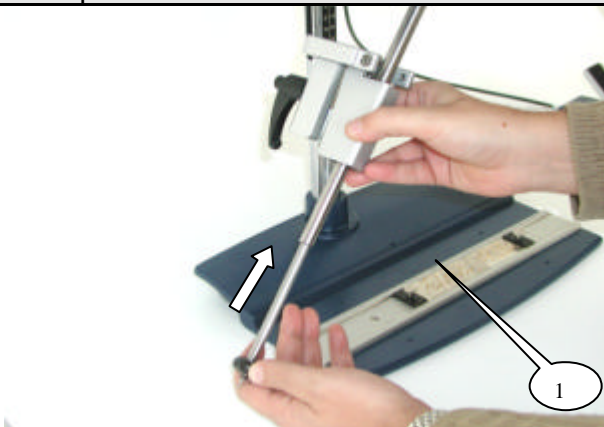
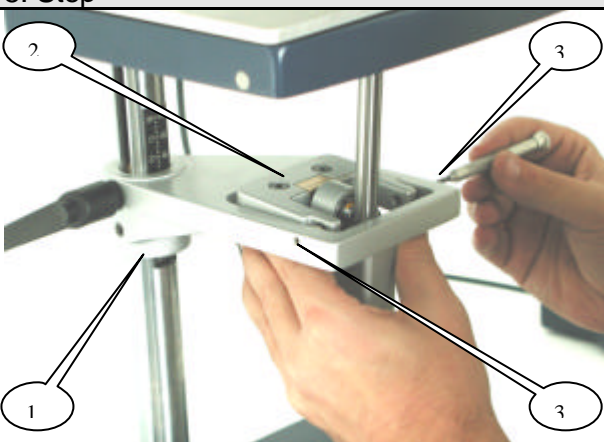
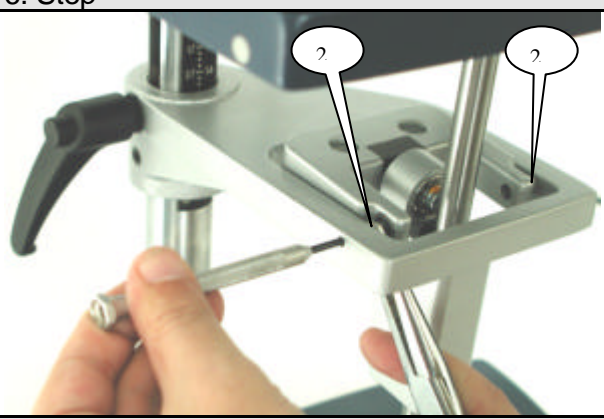
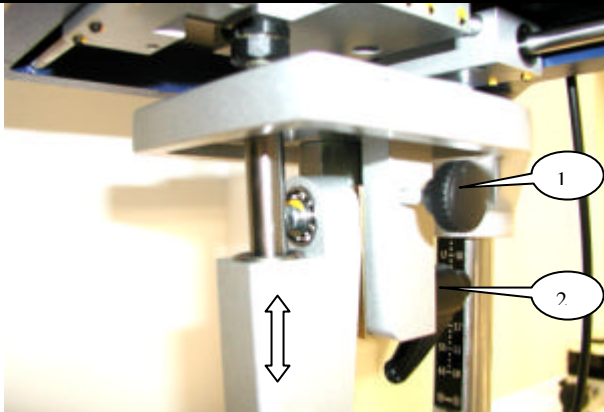
<p><b>Preparation</b></p>	<p>The Miller (1) the miller holding plate (2) and a 3mm allen key are available. The flexible shaft has a wire mounting (3), which makes it possible to stabilize the flexible shaft.</p>	
	<p>The miller is attached to the tube underneath the type adjustment 6.5mm (1), the miller holding plate (2) is fixed to the chisel base (3).</p>	
<p><b>1.Step</b></p>		
	<p>Put tracer (1) into park position. Loosen clamping lever (2) at miller holding module and hold module with other hand (3) and push it up to the limit stop. Retighten clamping lever (1).</p>	
<p><b>2. Step</b></p>		
	<p>Loosen clamping lever at type height adjustment (1) and position fork to the required type height (2) with thumb (3). Retighten clamping lever (1). The reference height will be the underside of the fork (2).</p>	

<p>3. Step</p> 	<p>Fix centering pin (1) on table top with the help of the allen key.</p>	
<p>4. Step</p> 	<p>Position clamping device (1) on the centering piece (2). Adjust the clamping device with an angle tool. Lock the clamping device by rotating the black lever (3) clockwise half a turn. Close grip jaws at the clamping device by turning the black control knob (4) (clockwise).</p>	
<p>5. Step</p> 	<p>Loosen clamping lever (2) and pick up milling holder (4) in the milling holder module (3). Adjust miller to the center of the clamping device. Retighten clamping lever (2). Loosen clamping lever at milling holder module (1). With the other hand, push the module down to approximately 5 mm above clamping device. Retighten clamping lever (1).</p>	
<p>6. Step</p> 	<p>Open grip jaws of clamping device by turning black control knob (2). Clamp in the piece which is to be engraved (1). Check type range with the tracer (3), i.e. trace the shape of first and last letter and the middle part of the word. If necessary, verify and corrected: type height, position of template, miller position and position of the clamping device.</p>	

7.Step		
	<p>Fix the 0-position (1) with the miller height fine adjustment (2). Press the button on the mouse and simultaneously turn the black knob (2) carefully until the tip of the miller touches the surface of the work piece.</p> <p>Selecting the engraving depth: Press mouse button and turn the knob (2) clockwise. The interval between 2 numbers corresponds to 0.1 mm)</p>	
8.Step		
	<p>Turn the miller on and adjust it to the correct speed (see table: Milling Speed). Put the tracer (2) on the first letter of the word and start milling. While tracing the letters, the mouse lever (1) must be activated. When replacing the tracer (2), let go of the mouse lever (1).</p>	

**Stretching Device – Mounting and Operating Instructions**

	<p>Hinged fork without letter stretching (1). Hinged fork with letter stretching (2), stretching device</p>
<p>1. Step</p>	
	<p>How to remove the hinged fork (without stretching device): Move the fork down as far as it will go (1) Loosen both locknuts (7mm) at the fork fastening (2). Use a suitable screw driver to remove the fixing screws from the hinged fork (3).</p>
<p>2. Step</p>	
	<p>Move the fork up as far as it will go. Put the guiding bushing aside (1). Remove the copying pin from the guiding bushing (2). Take the hinged fork off the guiding bushing (3).</p>
<p>3. Step</p>	
	<p>Slide the stretching device onto the guiding bushing.</p>

<p>4. Step</p> 	<p>Push the copying pin back into the guiding bushing. Place the head of the copying pin into parking position in the centre of the template (1).</p>
<p>5. Step</p> 	<p>Move the hinged fork down as far as it will go (see Step 1) (1). Position the stretching device in the centre of the recess at the fork (2). Fix the stretching device by means of the two grub screws in the fork (3). Ensure that the device is positioned exactly at the centre of the recess. Caution: Tighten the two grub screws only until the module is fixed without lateral play. (sluggishness of the hinged arm)</p>
<p>6. Step</p> 	<p>Retighten the two locknuts on the fastening screws (2).</p>
<p>How to adjust the stretching device</p>	
	<p>The letter stretching device is now ready for use. To select the degree of letter stretching use the turning knob (1) and open the clamping lever (2). Move the stretching device into the required direction on the guiding bushing: Upper stop: no stretching Lower stop: maximum stretching After adjustment fix the stretching device.</p>

## **7. Proper Care**

- The device is composed of high-quality material and components.
- Avoid dirt accumulation on the engraving device by cleaning it regularly, or its functioning may be impaired.
- Do not use any scratching or scraping tools for cleaning the device.

## **8. Maintenance / Service**

### **Note:**

- The fixing screws of the table top may not be loosened since the table top is specifically set for this device, loosening the screws will impair the engraving result.
- No changes may be made to the settings of the linear guides.
- Performing changes to the linear guides will void your guarantee or warranty claim.
- If you require help from our technical support office, contact our service department in writing specifying the defect or problem in detail.

## 9. Troubleshooting

### Flat Engraving / Milling Engraving:

The engraving runs at a slant if:

- the clamping device is not positioned at right angles to the table,
- the fixing screws of the table top have been loosened.

The engraving runs with double contours if:

- the piece which is to be engraved has not been clamped correctly,
- mobile parts (type height adjustment, diamond holder module, clamping device and chisel holder) have not been locked properly after they were adjusted,
- the ball joint has play, the lock or the cap nut is loose,
- the permissible range for type length and expansion was exceeded.

### Ring-Inside Engraving:

The engraving runs at a slant if:

- the ring has not been clamped correctly,
- the ring-inside module has not been pressed against its fixing screws when installed,
- the fixing screws of the table top have been loosened (see table).

The engraving runs with double contours if:

- the tension wire is not tensioned properly,
- the centering pieces are not screwed in tight enough,
- the ring is not clamped in tight enough,
- mobile parts (type height adjustment, diamond holder module, clamping device and chisel holder) have not been locked properly after they were adjusted,
- the ring-inside module was not coupled properly to the diamond holder module or there is some play,
- the permissible range for type length and expansion was exceeded (see table)

### Ring-Outside Engraving:

- see ring-inside engraving



## 10. Spare Parts

<b>ARTICLE</b>	<b>PART NUMBER</b>
Engraving diamond No. 6	4070120000
Engraving miller 1a	4070070000
Tension wire w/ nipple	4603000018
Multi-grip jaw	4604000008
Centering piece (ring-inside)	4603000012
Grip jaw right	4000008552
Grip jaw left	4000008553

When ordering spare parts, please provide us with the device number and the part number according to the attached spare parts list.

Please direct spare part orders in writing to *Elma*.

There will be no warranty for any consequence arising from the use of parts other than original spare parts.

## 11. Responsibility of Manufacturer

The manufacturer of this engraving device considers itself responsible for any consequence to the safety, reliability and performance of the device if:

assembly, additions, new settings, changes or repair jobs are performed by people authorized by *Elma*, and if the device is used in compliance with the operating instructions.

Device subject to technical changes!