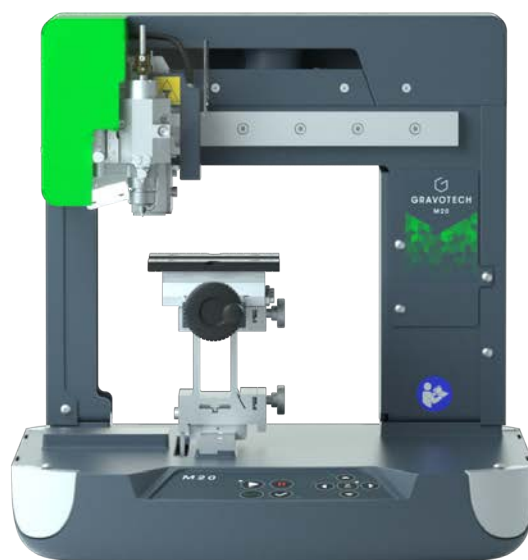


# OPERATING AND MAINTENANCE MANUAL

## M20 SERIES V3

M20 / M20 PIX / M20 JEWEL  
Electronic engraving machine



**GRAVOTECH**  
E X P R E S S I O N   O F   T H I N G S

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# A. Foreword

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## 1. Appreciation



Thank you for choosing M20 series V3 - Gravotech.

Gravotech is pleased to count you among the users of its engraving and traceability solutions.

For help, contact Gravotech.

For more information on products, visit [www.gravotech.com](http://www.gravotech.com) website.

## 2. Information

	<p><b>To ensure security and productivity, read this manual before starting-up the equipment.</b> <b>It provides details about the installation and use of the equipment.</b></p> <p><b>Keep this manual in case you need to refer to it.</b></p>
	<p><b>For the attention of users having an individual cardiac assist device fitted:</b></p> <p><b>Our equipment is designed and manufactured with the greatest care in order to guarantee their compliance with the EMC Directive currently in force. This means that the levels of electromagnetic emissions produced by this equipment when in operation are limited and do not exceed the thresholds defined by the Directive.</b></p> <p><b>However, multiple factors make it impossible to guarantee the total absence of risk for users having a cardiac assist device fitted. Consequently, it is recommended that standing for a prolonged period within less than 1 m (3.281 ft) of an operating machine should be avoided.</b></p>

# B. Legal notices

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Last updated: 09/2020

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The Product's specifications are altered by (i) any Product's modification or alteration, (ii) any adaptation and installation of accessories that are not recommended by Gravotech, (iii) the integration of a control system and (iv) the connection to an external device. Such specifications' alterations may lead to the non-compliance of the Product with applicable rules and standards. Shall the Product be non-compliant, the person in charge of the Product's installation shall be responsible of the final workstation's compliance. In no event, Gravotech shall be liable for any damages arising from such non-recommended or unauthorized Product's alterations. It is precised that the warranty shall not apply in such case.

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# C. Regulation observance

Last updated: 06/2021


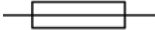


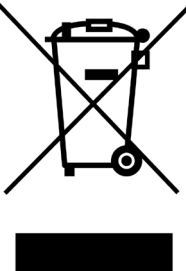

EC declaration of conformity or declaration of incorporation supplied with the machinery

Type of machine	Directives - Standards
<p>Dot peen marking: Machine Impact p, Impact eZ p, Impact m, Impact eZ m</p> <p>Scribing marking: Machine M10, M10 Jewel</p> <p>Sharpening by grinding: Machine CG30</p> <p>Bevelling: Machine B6</p> <p>Engraving by milling: Machine IM3 M20 V3 M40, M40G IS200, IS400, IS400 Volume IS6000, IS7000, IS8000 - XP - XP Milling</p> <p>Dot peen marking: Transportable machinery - Partly completed machinery XF530p, XF530m</p> <p>Dot peen marking: Partly completed machinery XF510Cp-Sp-Dp, XF510Cm-Sm-Dm, XE310Cp-Sp</p> <p>Scribing marking: Partly completed machinery XF510Cr-Sr-Dr, SV510</p> <p>CCU, Rack, TouchPad UC500 SV, UC Laser, XCOM Racks IS</p> <p>Laser fume extractor: ES10, ES30, ES50, ES Mini LE120HP, LE140HP, LE150HP, LE190HP, LNI900</p> <p>Accessory: Partly completed machinery Rotary APF, Laser APF, Dotpeen APF eZ150 Mini-Inline Cylinder attachment: RD1, RD2, RDM, RD Jewel Rotary Device for LS100, Rotary Device for LS100Ex, Rotary Device for LS900/LS1000XP</p>	<p>- Low voltage: 2014/35/EU - EMC: 2014/30/EU - RoHS 2: 2011/65/EU</p>
<p>CO2 and fiber laser marking: Machine (gantry) LS100 Energy, LS100 Ex Energy, LS900 Energy LS100, LS100 Ex, LS900, LS900 XP, LS1000XP LS100 Ex Fibre, LS900 Fibre LS900 Edge</p> <p>CO2, DPSS and fiber laser marking: Machine (galvo) LW2 Touch, LW3, WeLase (Cxx, Fxx, Gxx, Hxx), Laser Solution Hybrid-Series (standard version, Version Energy), Laser Solution Green-Series (standard version, Version Energy), Laser Solution CO2-Series (standard version), FIBER Energy</p> <p>CO2, DPSS and fiber laser marking: Partly completed machinery (galvo) - Class 4 FIBER Standard, FIBER Premium</p>	<p>- Low voltage: 2014/35/EU - EMC: 2014/30/EU - RoHS 2: 2011/65/EU</p> <p>- Safety of laser products - Part 1: Equipment classification and requirements: EN 60825-1:2008 - Safety of laser products - Part 4: Laser guards: EN 60825-4+A1+A2:2006</p>








# D. Description of symbols used

Last updated: 06/2020

## 1. Shared labels

	<i>Refer to instructions manual/booklet.</i>		<i>Fuse</i>
	<i>Alternating current</i>		<i>Direct current</i>
	<p><i>The equipment must be disposed of at an appropriate collection point for processing, sorting, and recycling of Waste Electronic and Electrical Equipment (WEEE).</i></p> <p><i>By following these instructions, you are helping the environment, contributing to the preservation of our natural resources, and protecting human health.</i></p>		<i>European conformity</i>

## 2. Required safety labels

	<i>General warning</i>		<i>Warning: Electricity</i>
	<i>Warning: Crushing of hands</i>		<i>Warning: Hot surface</i>
	<i>Warning: Flammable materials</i>		<i>Warning: Laser beam (only for machines equipped with a marking laser or a laser pointer)</i>
	<i>Warning: Rotation of the spindle (only for machines equipped with a spindle)</i>		



# E. Introduction

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## 1. Presentation

The M20 series V3 machines are electronic engraving machines.

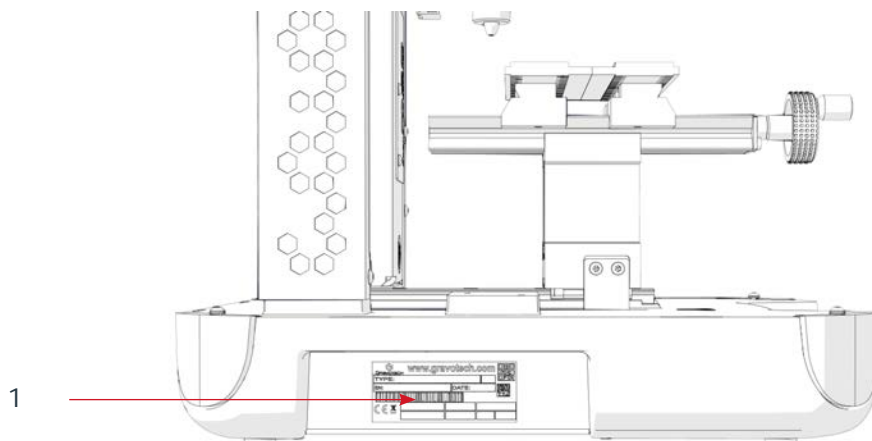
- They are provided with a keypad for controlling the machine.
- The files to be engraved are transferred from the software to the engraving machine.
- Engraving is performed by the tool holder assembly.

## 2. Identification of the marking equipment

The marking equipment is identified by:

- 1 identification plate on the side (left)

Have the model and serial number of the equipment available when contacting Gravotech.



1. *Identification plate*

# F. Unpacking



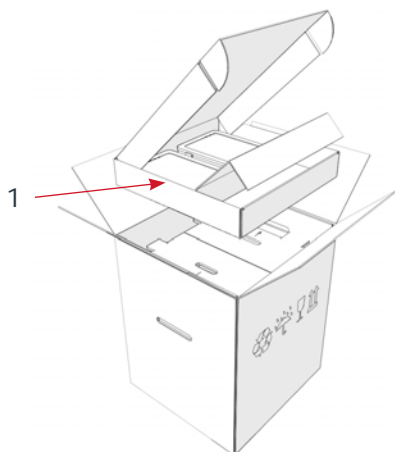
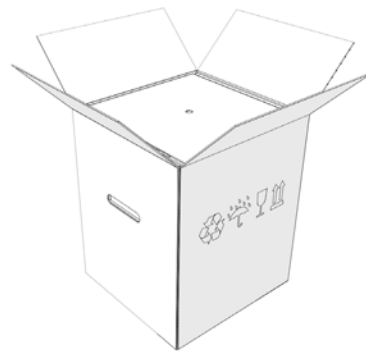
**Unpack the machine with 1 operator.**

## 1. Unpacking

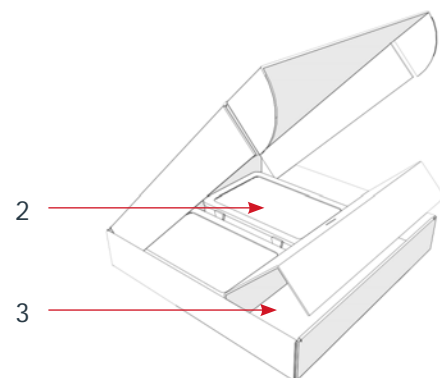
- 1. Remove the accessories package, protective wrappers and cardboard box.**
- 2. Remove the machine from the packaging.**
- 3. Check that nothing is missing from the parcel. If anything is missing, contact Gravotech.**

Keep the packaging in order to move the machine safely. This packaging is designed to protect the machine during shipping (return for repair...).

The packaging complies with European recycling standards.

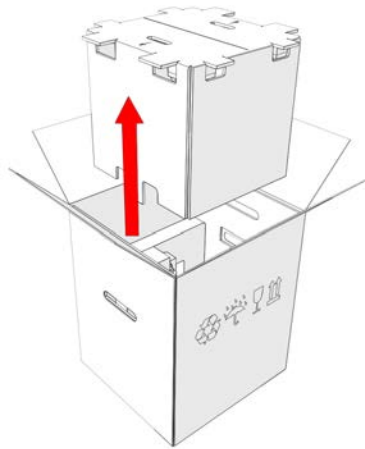


1. *Package containing the accessories*

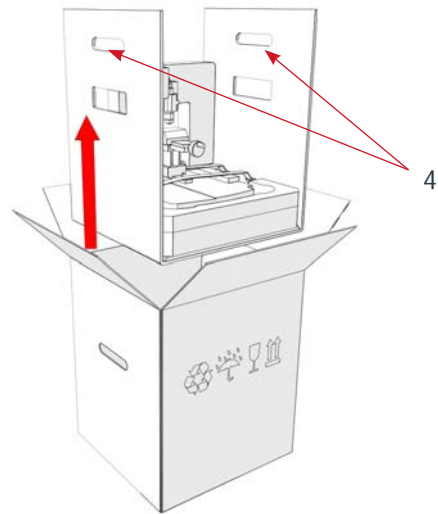


2. *Toolbox*
3. *Power supply + Cables*

# Unpacking

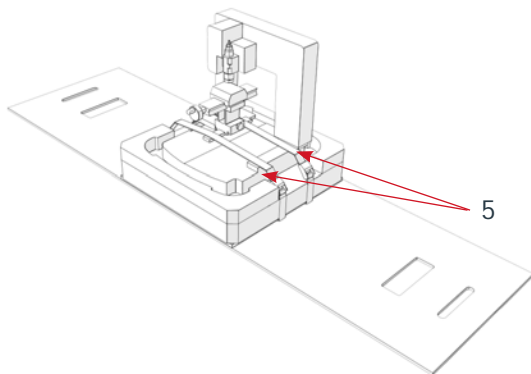


**Remove the cardboard.**



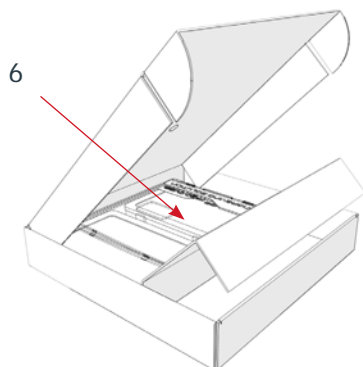
4. *Handles*

**Remove the machine from the packaging.**

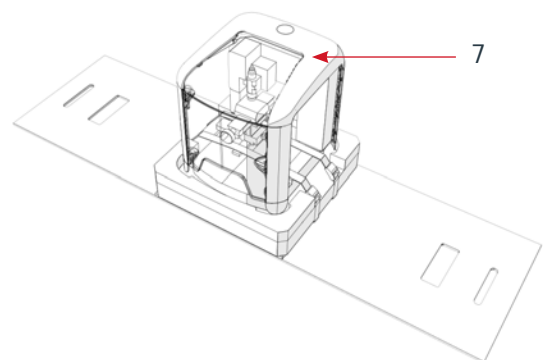


5. *Strap(s)*

■ M20 Cube



6. *Protective panel(s)*

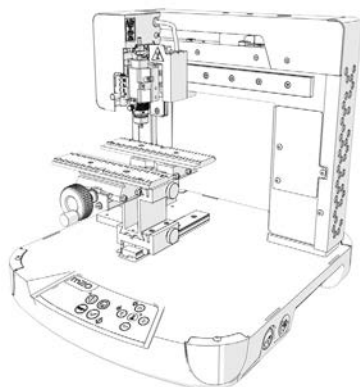


7. *Protective cover*

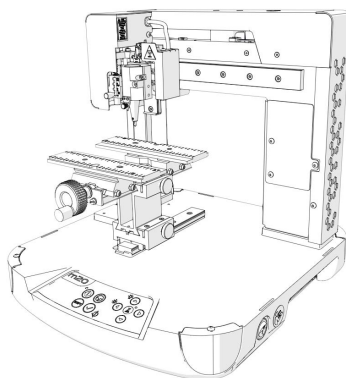
# Unpacking

## 2. Package contents

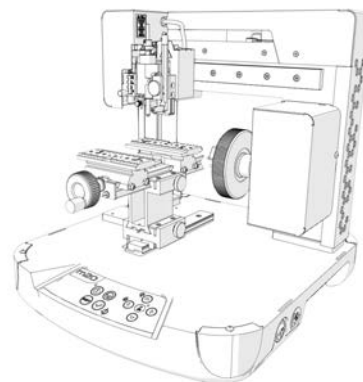
### ■ For all machines



**M20**



**M20 PIX**



**M20 JEWEL**



DVD containing the instruction manual (or USB key)



Power cable

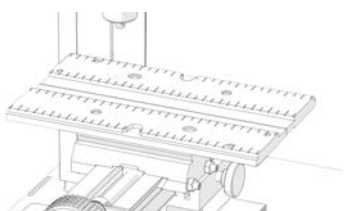


Machine power supply unit (24 V - 100 W)



USB cord

### ■ M20 / M20 PIX

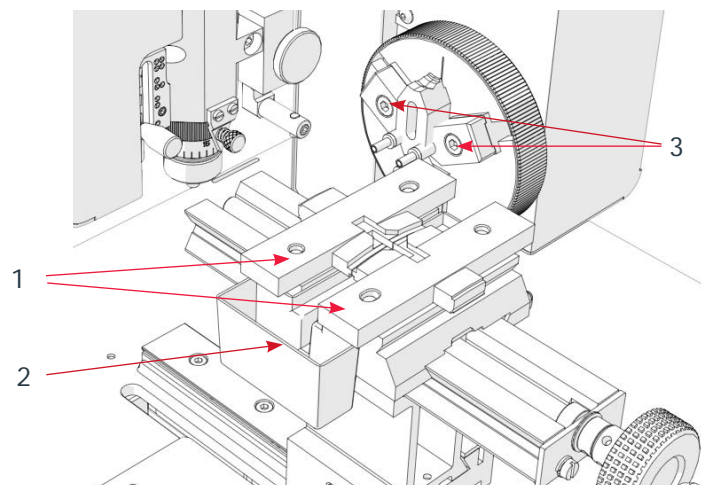


Jig(s) (100 mm (3.937 in))

# Unpacking






## ■ M20 JEWEL

1. Jewelry jigs
2. Chain protection tray - bracelets
3. Machine-mounted aluminum jaws (x3)



## 3. Toolbox: Content

### ■ M20






	Driver (2 mm (0.079 in))
	Brush
	Allen key (1.5 mm (0.059 in))
	Allen key (2.5 mm (0.098 in))
	Allen key (3 mm (0.118 in))

### • Twin Cut:






	Tool holder		Anvil
	Tools (x2) (Ref. 48610 / Soft Metal A = 0.5)		Washer for centering the diode zero point
	Ejector		Centering washer(s)

# Unpacking

## ■ M20 JEWEL

	Driver (2 mm (0.079 in))
	Brush
	Allen key (1.5 mm (0.059 in))
	Allen key (2.5 mm (0.098 in))
	Allen key (3 mm (0.118 in))








### • Twin Cut:

	Tool holder		Anvil
	Tools (x2) (Ref. 48610 / Soft Metal A = 0.5)		Washer for centering the diode zero point
	Ejector		Centering washer(s)
	Reference ring(s) (x7)		
	Allen key (4 mm (0.157 in))		
	Plastic jigs (90 mm (3.543 in))		
	Plastic jaws (x3) + Mounting screw(s) (x3)		
	Spare diamond tip mounting screw		
	Sleeve (x6)		

# Unpacking

---

## ■ M20 PIX

	Driver (2 mm (0.079 in))
	Brush
	Allen key (1.5 mm (0.059 in))
	Allen key (2.5 mm (0.098 in))
	Allen key (3 mm (0.118 in))
	Washer for centering the diode zero point
	Centering washer(s)

# G. Safety

---

## 1. Recommendations and safety

### ■ Personnel safety



**Turn off the machine before beginning any cleaning, maintenance or repair procedure.**

- Only trained personnel aware of the risks posed by the machine are authorized to integrate, start and use it (training tool: operating and maintenance manual).
- The machine is designed for light engraving only and under no circumstances should it be used for other applications.
- Do not use this machine for routing or intensive cutting operations.
- Do not use this marking equipment in an explosive environment.
- Never hold the materials for engraving in hands. Use only Gravotech clamping systems designed for the machine.
- During engraving operations, use this machine with a (regulating or suction) nose in order to prevent flying swarf.
- Do not start engraving without first ensuring that the object to be engraved is securely clamped.
- Never take hold of the material for engraving when engraving is in progress.
- Interrupt engraving by means of the pause function provided for this purpose on the machine control panel.
- Keep away from the area above the machine. Keep clear of the tool-holder.
- Ensure that people are kept clear of the area of travel of the moving parts of the machine and that no objects risk obstructing their movement.
- Warning: Hazardous moving parts - Keep fingers and other body parts away. To prevent any risk of crushing, avoid placing the hands in the locations identified.
- This equipment has undergone a comprehensive certification process, covering operation up to an altitude of 3000 m (9 842.490 ft). The commercial conditions of warranty are maintained for use beyond the limit of 3000 m (9 842.490 ft).



**The use of safety glasses is recommended for protection against flying swarf.**

**To prevent any risk of cutting injury, wear protective gloves when handling the tool.**

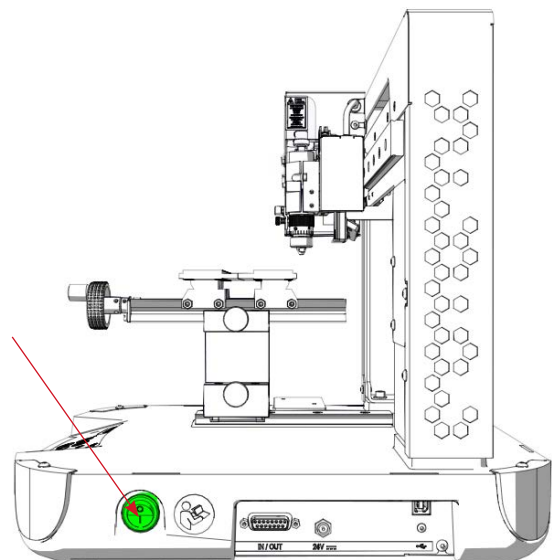


# Safety


## ■ Handling the machine

- Any operations on the machine must be carried out under the responsibility of an adult. Do not allow children to touch the machine, leads or cables.
- Never move the tool holder manually, except in the event of a mechanical blockage of the machine.
- In the event of an extended period of non-use, unplug the power cable and protect the machine.
- Never pour or spill liquid on the machine (drinks, cleaning products, etc.) except where recommended by Gravotech.
- Do not place any object on the machine other than the object to be engraved.
- Use the machine with Gravotech tools only.
- This machine is designed for a single user only. Do not allow its operation by multiple users at the same time.

If there is a major problem or the machine is jammed mechanically: Put the On/Off switch in the "O" (Off) position.



## ■ Required safety labels

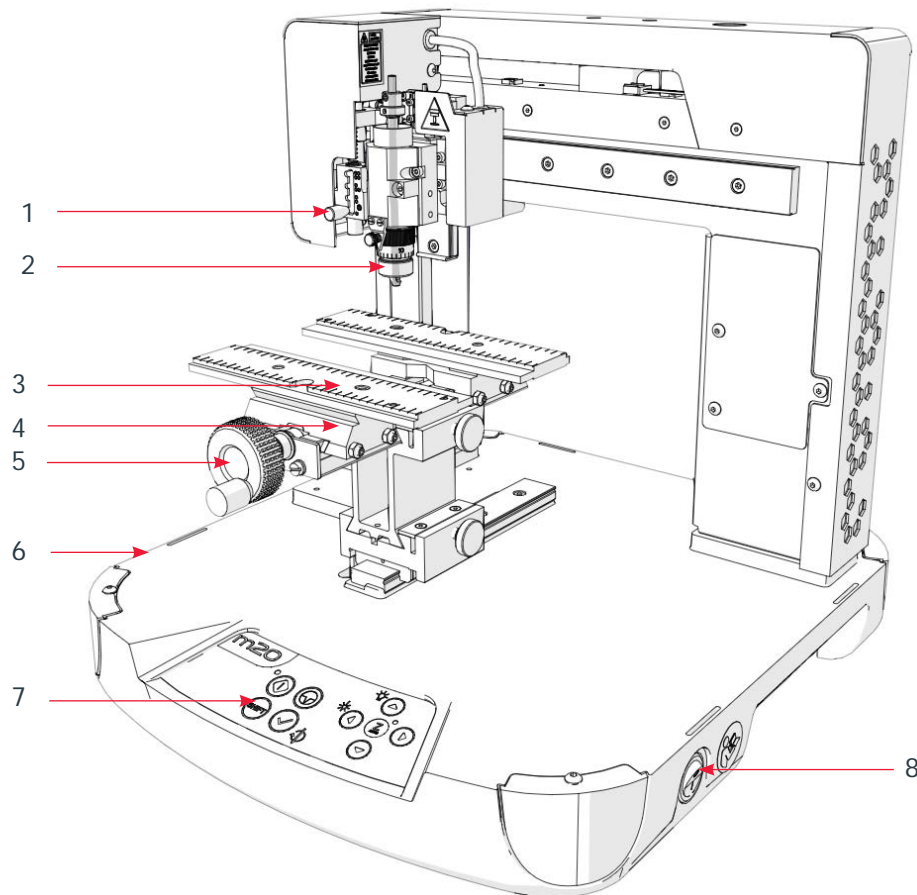
	<p><i>CAUTION LASER RADIATION</i></p> <p><i>Do not stare into beam.</i></p> <p><i>Laser diode Wavelength: 630-680 nm Output (Maximum) &lt; 1 mW</i></p> <p><i>CLASS 2 LASER PRODUCT</i></p>
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# H. Description of the machine

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## 1. M20: Front view of the machine

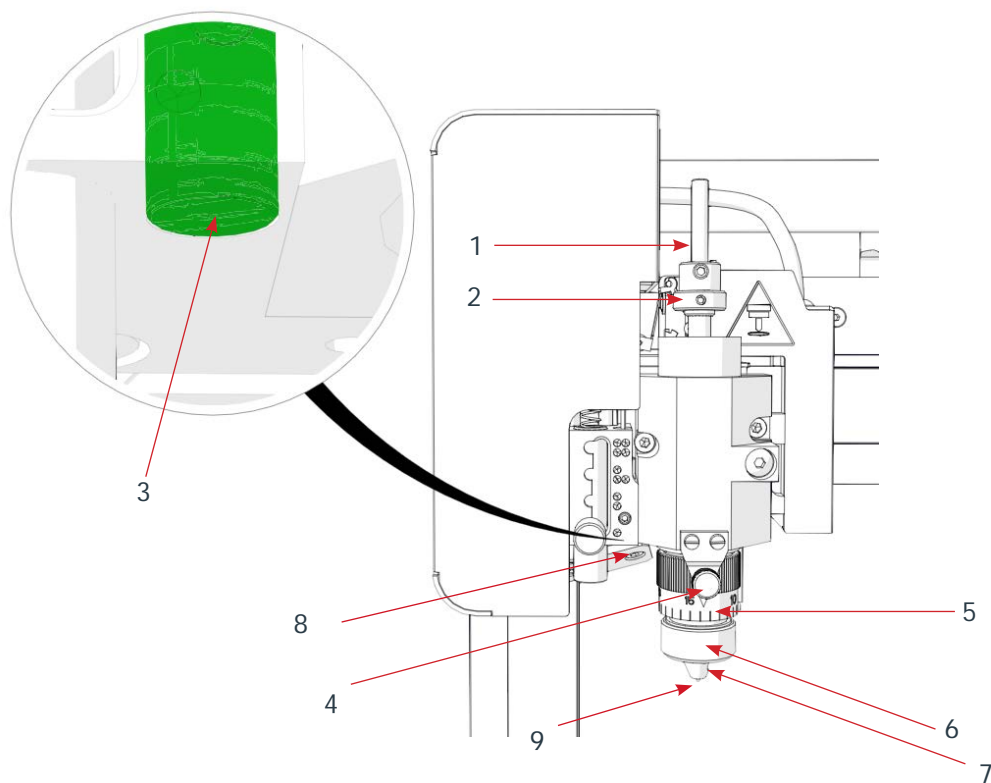
### ■ Engraving table



1. *Spindle pressure adjustment button (4 positions)*
2. *Tool holder assembly*
3. *Jig(s)*
4. *Vice*
5. *Jaw opening and closing adjustment knob*
6. *Frame*
7. *Control panel (9-key flexible keypad)*
8. *On / Off switch*

# Description of the machine

## ■ Tool holder

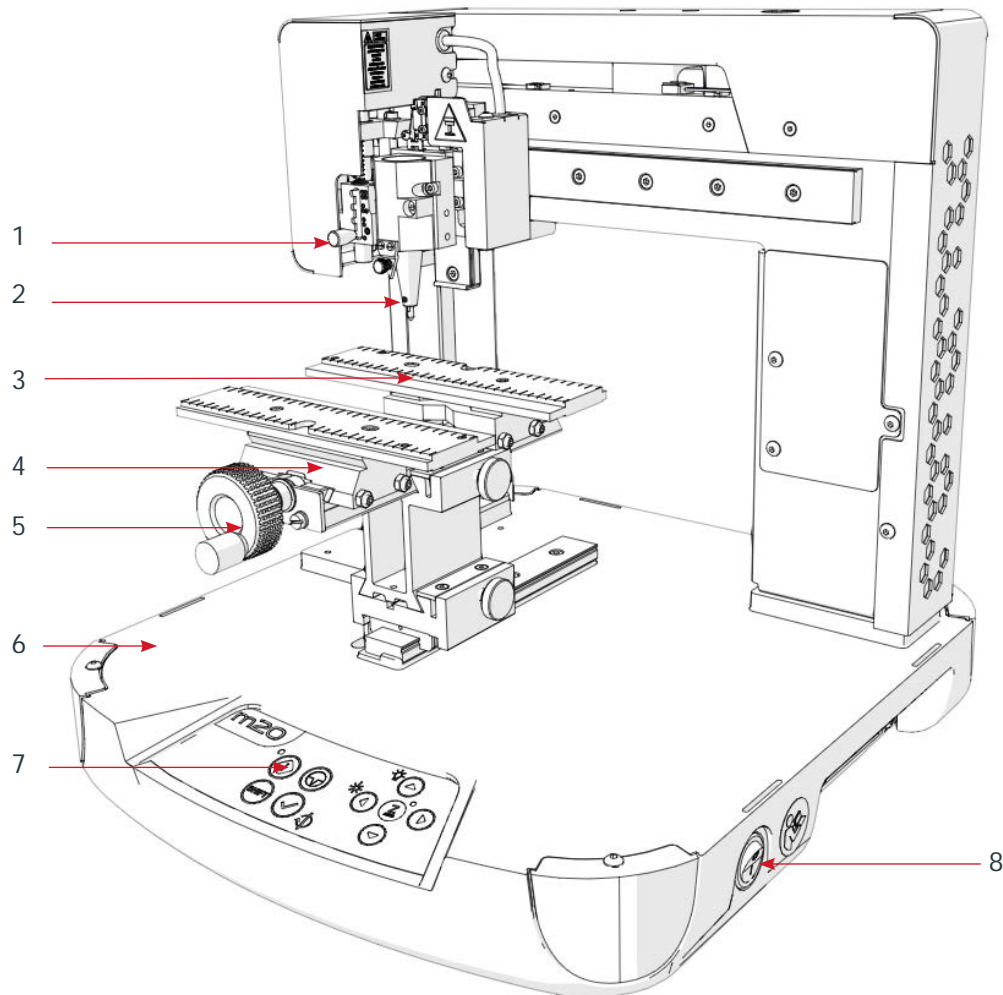


1. Tool holder
2. Cutter button(s)
3. Laser diode
4. Index pin
5. Scaled knob
6. Nose nut
7. Depth regulating nose
8. Marking area lighting
9. Engraving tool(s) (Cutter(s))

# Description of the machine

## 2. M20 PIX: Front view of the machine

### ■ Engraving table

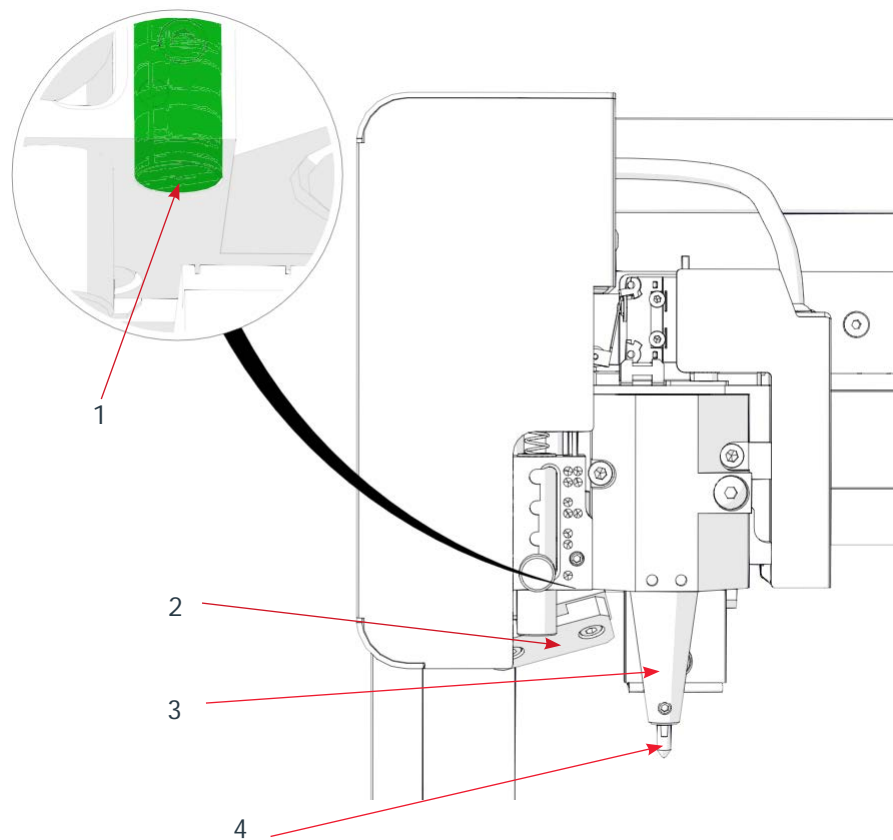


1. *Spindle pressure adjustment button (4 positions)*
2. *Tool holder assembly*
3. *Jig(s)*
4. *Vice*
5. *Jaw opening and closing adjustment knob*
6. *Frame*
7. *Control panel (9-key flexible keypad)*
8. *On / Off switch*

# Description of the machine

---

## ■ Tool holder

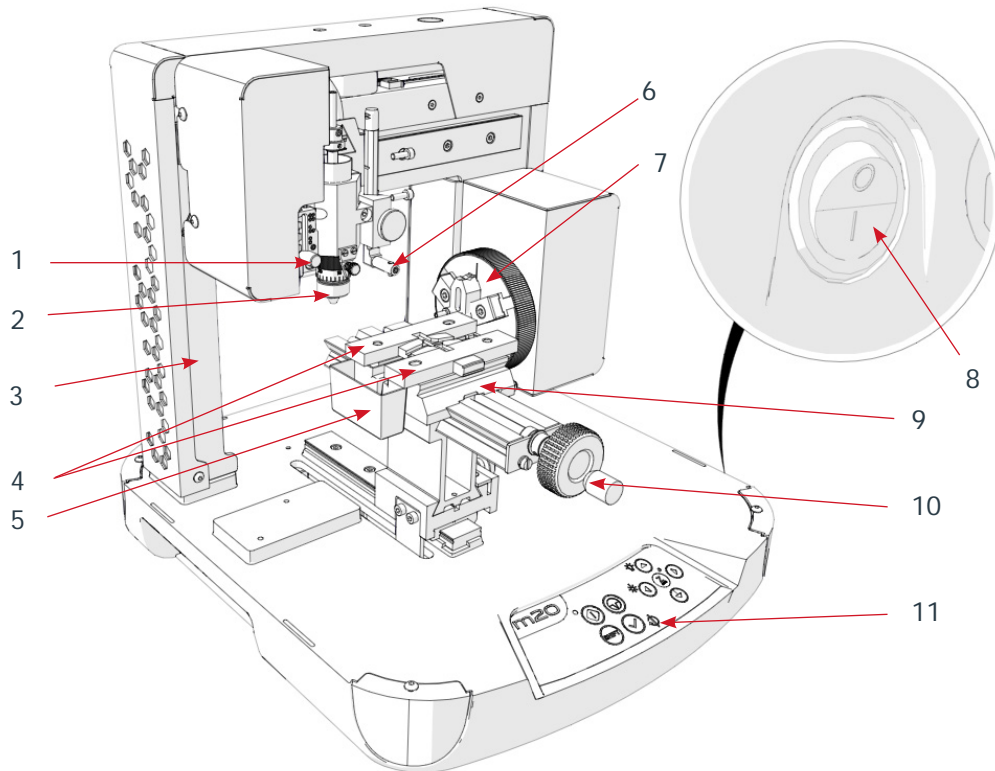


1. *Laser diode*
2. *Marking area lighting*
3. *Tool holder*
4. *Diamond point*

# Description of the machine

## 3. M20 JEWEL: Front view of the machine

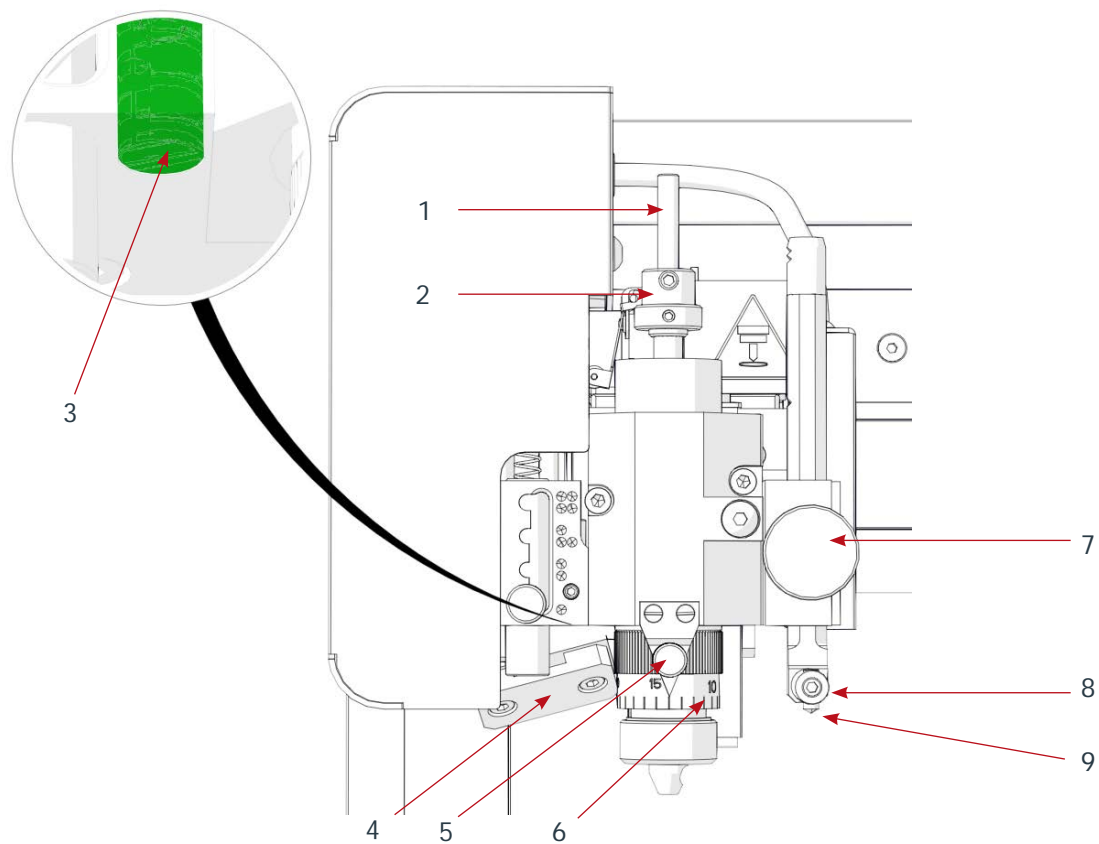
### ■ Engraving table



1. *Spindle pressure adjustment button (4 positions)*
2. *Tool holder assembly*
3. *Frame*
4. *Jewelry jigs*
5. *Chain protection tray - bracelets*
6. *Diamond holder*
7. *Chuck with 3 multifunctional jaws in aluminum*
8. *On / Off switch*
9. *Jewelry vice*
10. *Jaw opening and closing adjustment knob*
11. *Control panel (9-key flexible keypad)*

# Description of the machine

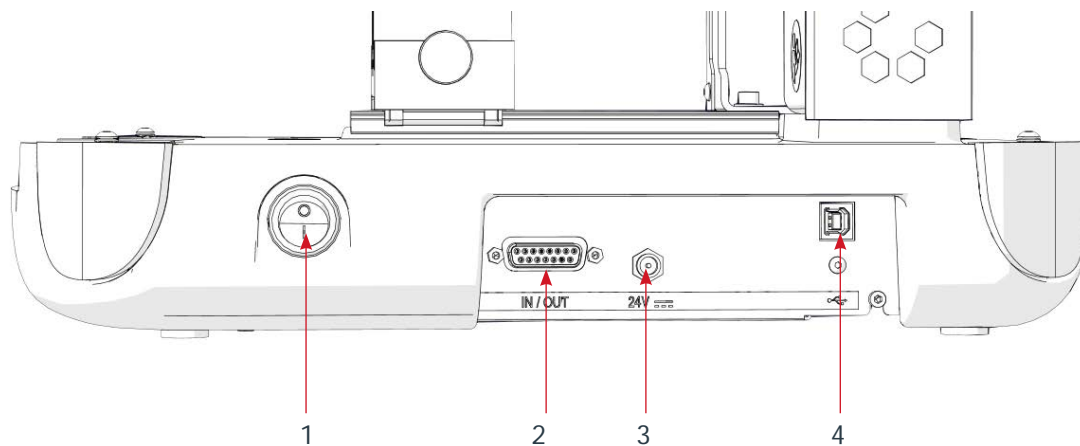
## ■ Tool holder



1. Tool holder
2. Cutter button(s)
3. Laser diode
4. Marking area lighting
5. Index pin
6. Scaled knob
7. Diamond holder shaft mount locking button
8. Diamond holder
9. Diamond point

# Description of the machine

## 4. Side view of the machine











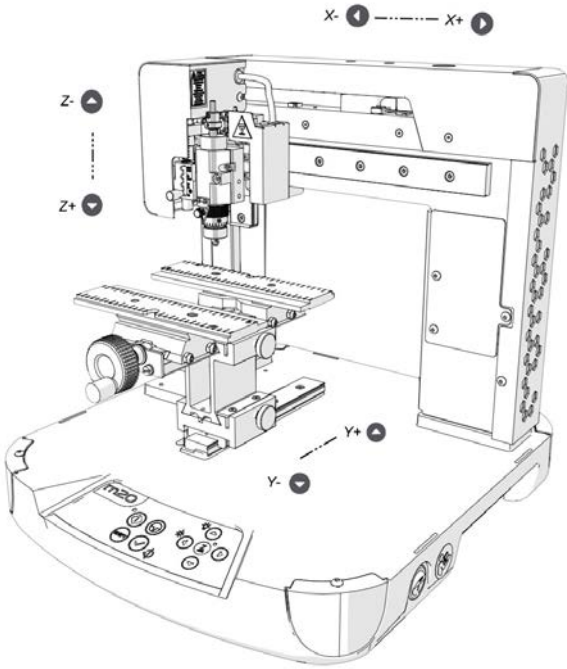
























1. On / Off switch
2. Standard input/output link
3. Power inlet / outlet
4. Port: USB

## 5. Control panel







	Start	Engraving start
	Pause	Marking suspended
		"Check" key
	Z	Activation/deactivation of Z axis travel
	Joystick	Head movement (X, Y, Z)
	Shift	



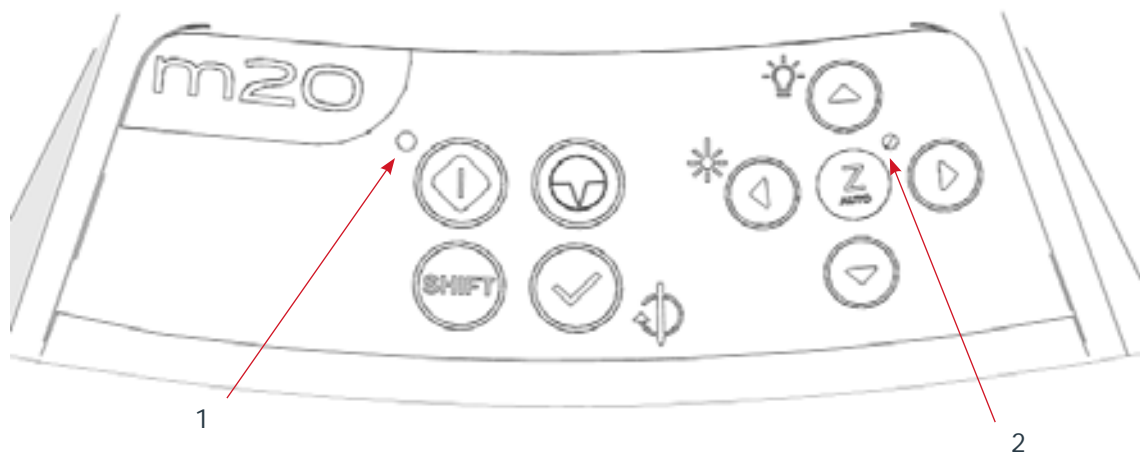
# Description of the machine

 +   +   +   + 		<p>Movement: X+ Y-  Movement: X+ Y+  Movement: X- Y-  Movement: X- Y+</p> 
 + 		Continuous cycle
 +  + 		Continuous cycle - end-of-travel return
 + 		Adjustment: X-Y Origin
 + 		Adjustment: Automatic ZRef.
 + 		Clearance position: X=50, Y=0
 + 		Return to origin
 + 		Automatic ZRef.
 + 	= 	Rotation of the spindle (On/Off) (function not available for the M20 PIX machine)
 + 	= 	Positioning pointer (On/Off) Red pointer
 +  + 		Safe movement: ON (Press simultaneously on the keys)

# Description of the machine

 +  + 	Safe movement: OFF (Press simultaneously on the keys)
 +  = 	Light On/Off

## ■ Indicator light function



1. Indicator light on = Machine powered on
2. Indicator light on = Travel of the Z axis

# I. Recommendations for installation



**Turn off the machine before any intervention (put the On/Off switch in the "O" (Off) position).**

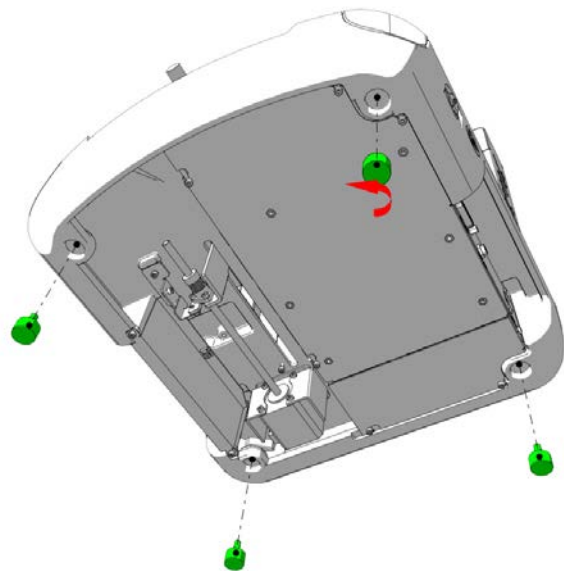
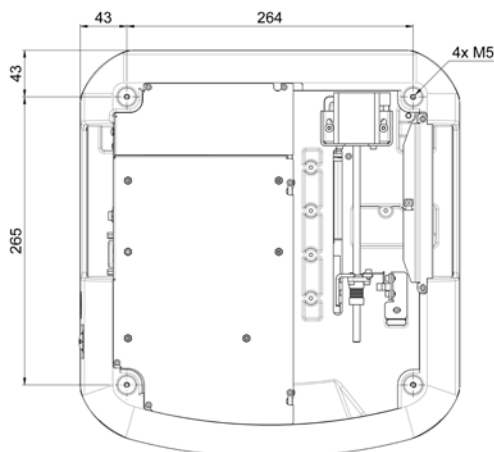
## 1. Physical installation

- Only trained personnel aware of the risks posed by the machine are authorized to integrate, start and use it (training tool: operating and maintenance manual)
- Place the machine on a horizontal, stable and clean surface that can support 100 kg (220.462 lb) or more.
- Place the machine in a clean, ventilated environment.
- Ambient light is enough to light the equipment properly.
- Arrange the work surface for rapid and easy access to each external part of the machine and, if necessary, to the main machine stop button.
- Do not obstruct the movement of the moving parts of the machine.

Fasten the machine to the table in order to prevent it from tipping.

Unscrew the 4 feet by hand.

Drill the support. Attach the machine with 4 M5 screws of a length adapted to the thickness of the support.



# Recommendations for installation

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**Make sure the connector screws are properly tightened to prevent the cables from becoming disconnected while the machine is switched on. This could cause permanent damage to the circuit boards.**

**The power cable must always be easily accessible (Power shut-off device).**

- Protect the equipment against:
  - damp (rain, snow, condensation etc.)
  - heat (exposure to full sun, heating etc.)
  - sudden changes in temperature
  - dust (extraction duct)
  - spillages of liquids onto the electrical unit, cables and connections, and all other parts of the machine; except in situations recommended by Gravotech (lubrication)
  - vibrations
  - electrical/electronic radiation

## 2. Electrical installation



**The connection to the single phase power supply is made with a standard, 3 pin plug with grounding. Grounding must be done according to the regulations in effect to ensure the safety of the personnel.**

To avoid interference problems due to the external environment, observe the following:

- Use the link cables supplied. They comply with EMC radio-frequency interference emission standards and provide protection from external electrical interference (compliant with EMC immunity and susceptibility standards).
- Bring the items of equipment to be linked as close together as possible to reduce the length of cable to be used.
- Separate the power cable from the link cable and make sure the power and link cables do not run through the same cable tray.
- Connect the machine direct to a mains power line and avoid connecting more than one device to that line (by plugging several devices into the same mains socket or into a multi-way adapter). Exception: Where equipment is connected, such as a computer and the machine, supply power to the devices through the same mains power line.
- Do not allow inductive or capacitive devices to be connected to the same mains power line as the machine (motors, solenoid valves, chargers, etc.).

# Recommendations for installation

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- Avoid the installation of manual or automatic switching systems on the same mains power line as the machine (relays, timers, programmers, automatic circuit-breakers, automatic switches, etc.).
- Check that devices in the vicinity of the machine meet the standards for electromagnetic interference. Read the technical data sheet for each device. If they are non-compliant, move them as far away from the machine as possible.
- Use the Gravotech accessories.



**Always switch the machine off before connecting or disconnecting a cable or optional accessory.**

## ■ Electromagnetic compatibility

### **FCC Rules - For USA and Canada only**

**CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# J. Connections - Installation

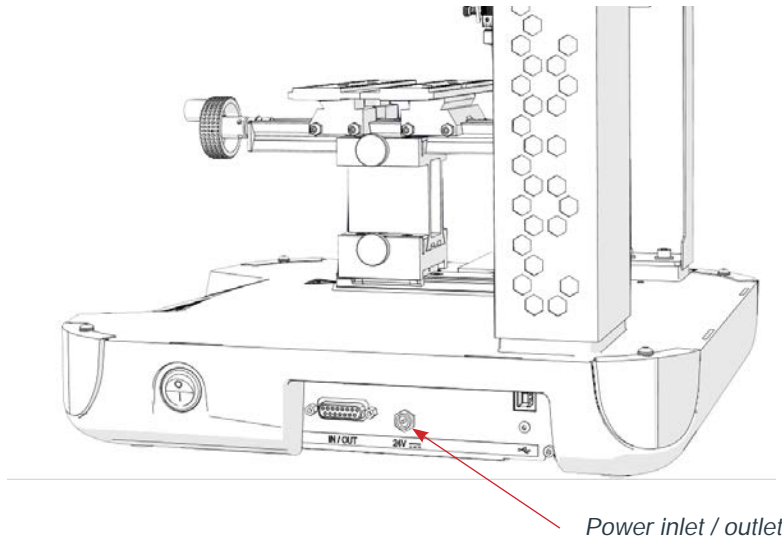
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## 1. Connections

### ■ Power supply connection

*Side view of the machine*

*M20 / M20 PIX / M20 JEWEL*



1. Connect the power supply unit mains lead to the socket connection on the machine.
2. Connect the power supply unit mains lead to the mains socket connection.

To cut off the power to the machine if there is a serious problem, unplug the power cable or operate the On/Off switch (On / Off switch).

## 2. Machine / PC connection

The machine installation and usage procedure is based on a PC-type computer running Windows®. For help, contact Gravotech.

1. Switch off the PC and the machine.

### ■ USB connection

1. Connect the USB cable to the machine's USB port.
2. Connect the USB cable to the PC's USB port.

# Connections - Installation

---

## 3. Installation

### ■ Switching on the machine

#### 1. Machine: Place the switch in the "I" position (On).

The machine emits an audible signal.

The power LED lights up.



**Leave the machine powered on, even if it is only going to be used at intervals.**

### ■ Power down

#### 1. Set the general stop button to the "O"(Stop) position.

Switch off the machine in the following situations:

- when the operator is permanently leaving the machine
- in the event of physical damage (something is dropped on the machine, fire, a liquid is spilled on the machine, etc.)
- mechanical/electrical/electronic faults suggesting a breakdown
- if there is a major problem or the machine is jammed mechanically
- the machine is jammed on the part to be engraved/marked
- the machine is jammed on an object in the work area
- forced restart
- external/internal cleaning

### ■ Restarting

If the machine or the operating program locks, the machine may need to be restarted.

#### 1. Switch off the machine.

#### 2. Wait approximately 30 s.

This waiting time must be respected. It prevents an electric surge likely to damage the machine's power supply.

#### 3. Switch on the machine.

### ■ Program installation

Refer to the user manual for the program.

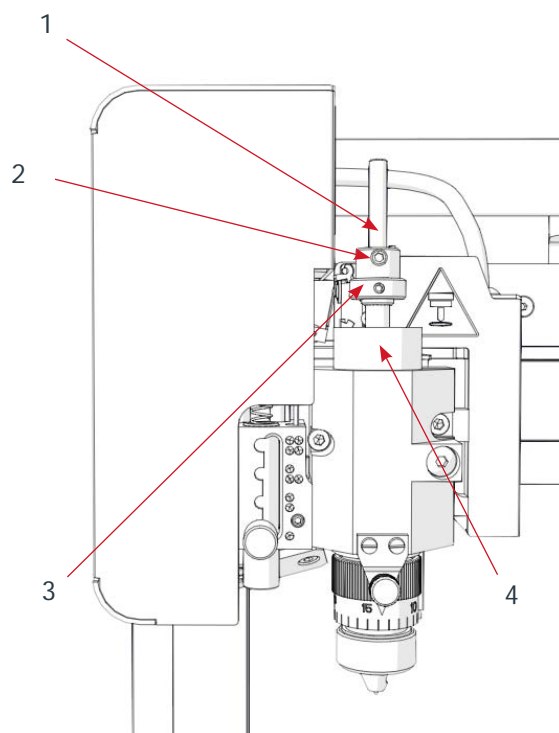
# K. Using the machine

## 1. Quick start guide

- Mounting the cutter on the tool holder (function not available for the M20 PIX machine)

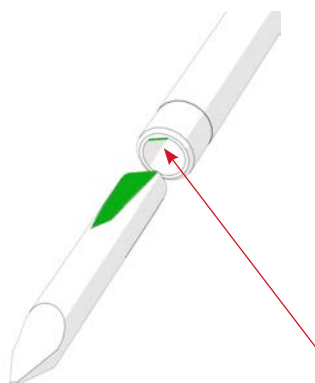


**Because the tool is sharp, use personal protective equipment when handling it.**



1. Tool holder
2. Screw: Cutter button(s)
3. Cutter button(s)
4. Standard spindle

1. Put the cutter in the tool holder.

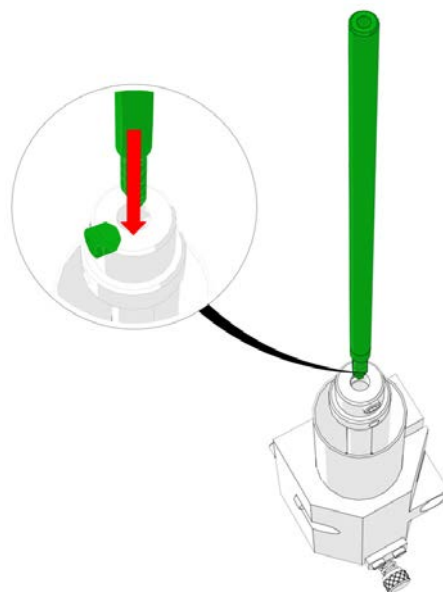




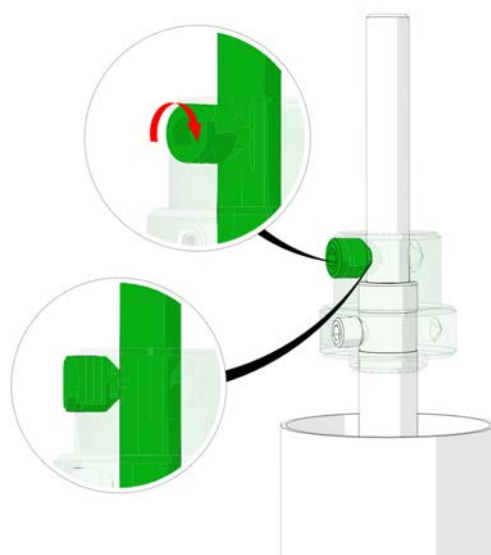
# Using the machine

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2. Unscrew the upper screw (Cutter button(s)).
3. Insert the cutter into the spindle (See: Engraving with a regulating nose (Function not available for the M20 PIX machine))



4. Tighten the upper screw of the cutter button in order to immobilize it, using the following wrench:
  - Driver (1.5 mm (0.059 in))



# Using the machine

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## 2. Introduction to marking

### ■ Creating the composition

#### 1. Switch on the machine.

#### 2. From the program, transfer the composition to the machine. Refer to the user manual for the program.

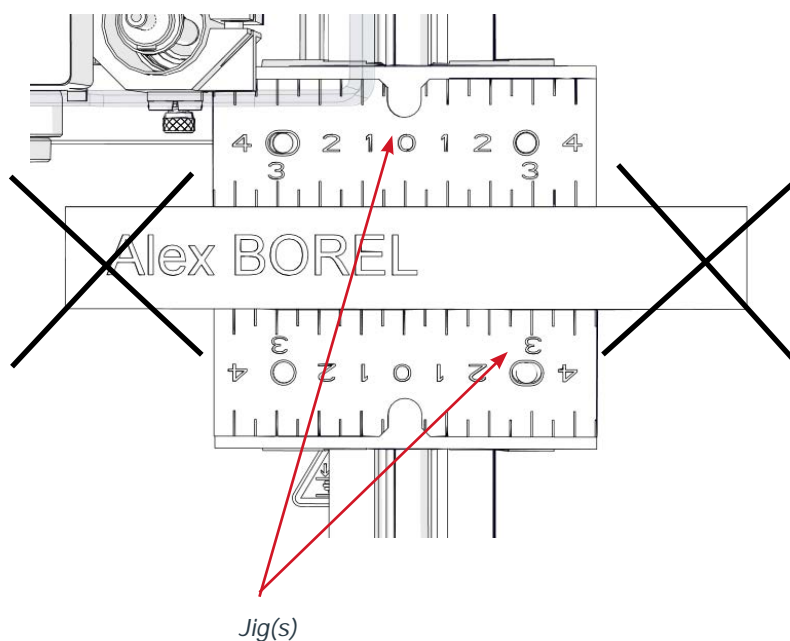
Example: Metal insert:

- Use the spindle with the diamond tip.
- Use the following parameters: Speed (X,Y,Z): 15 mm (0.591 in)/s; Depth: 0.1 mm (0.004 in), Z clearance: 2 mm (0.079 in); Automatic Zref

### ■ Positioning the object to be engraved

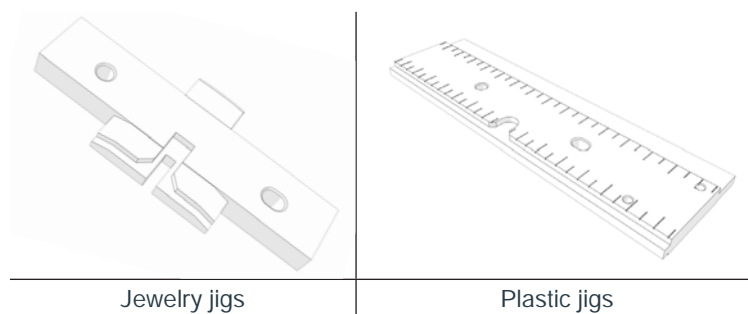
#### 1. Choose the jigs according to the length of the object to be engraved. Consult a Gravotech retailer to find out about the various jigs available.

The length of the object to be engraved must never exceed that of the jigs:



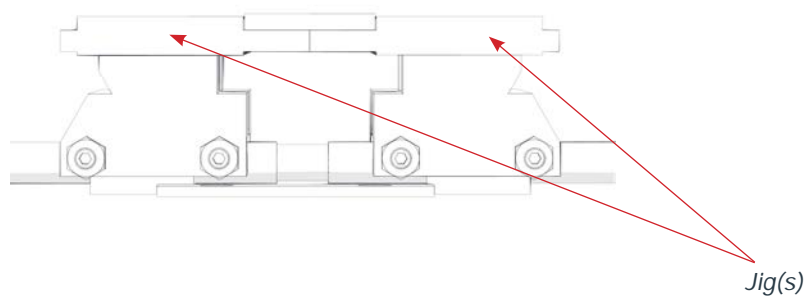
# Using the machine

M20 JEWEL: Choose jewelry jigs or plastic jigs according to the object to be engraved and the length of the plate.

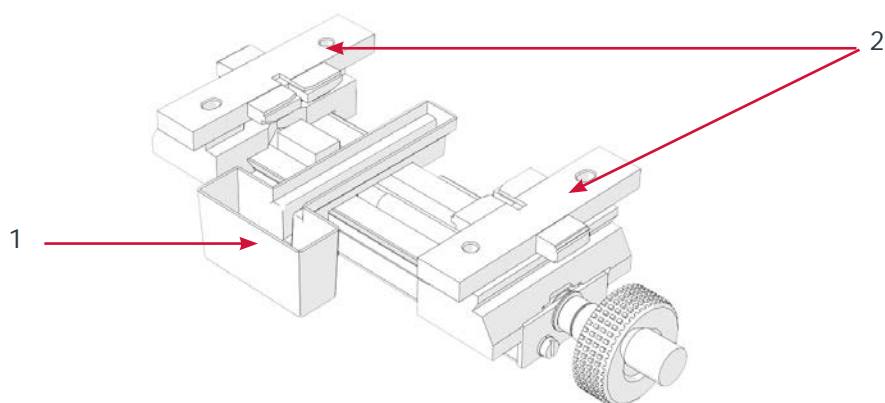


2. Choose the appropriate side of the jig according to the object to be engraved or the thickness of the plate.

The plate must be slightly higher than the jigs in order to prevent the regulating nose from striking the jig:



M20 JEWEL: To engrave a chain bracelet, place the chain bracelet protection on the vice.

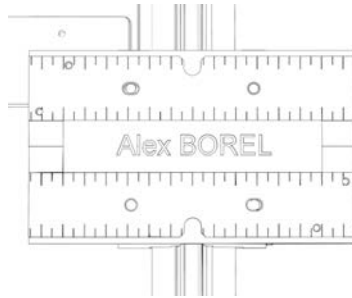


1. Chain protection tray - bracelets
2. Jewelry jigs

# Using the machine

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## 3. Center the object in the vice.



## 4. Using the tightening knob, clamp the object so as to immobilize it during engraving.

Correct clamping helps to reduce the noise of the machine and to minimize vibration during engraving.



**Check that the object is clamped such that it cannot be ejected during engraving.**

**Do not overtighten. The plate(s) may bend.**

**Depending on the height of the object, it may be necessary to use the vice extensions to ensure that the tool reaches the object.**

### ■ Start-up engraving (Diamond engraving)

Engraving is launched from the control panel on the machine.

#### 1. Check that the object is correctly positioned in the engraving area.

#### 2. Press the key: Start (Control panel).

The cutter moves to the first point and begins engraving.

Automatic ZRef: The spindle moves down until the diamond tip touches the plate. When the position of the ZRef. has been stored, engraving starts.

Door open: button(s) Start: Holding the button down causes continuous movement at a higher speed.

- In the event of a problem, press the Pause button.  
The machine pauses momentarily.  
To resume engraving, press the Start key.
- To stop engraving completely, press one of the arrows on the joystick.
- To accelerate the movement speed of the spindle during engraving, press the Up arrow.
- To slow down the movement speed of the spindle during engraving, press the Down arrow.

# Using the machine

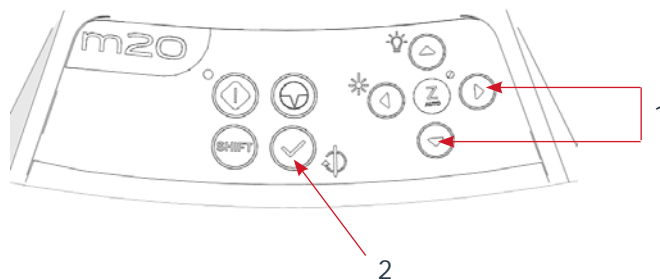
## 3. Advanced settings

### ■ Point & Shoot

#### • Marking area: Dimensions - Positioning

##### 1. Select the Point & Shoot function in the Gravostyle / ABC program.

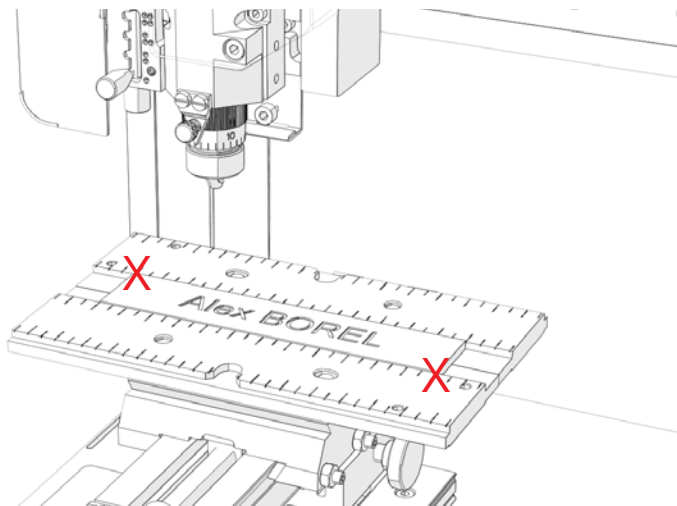
The pointer lights up.



1. X-Y movement
2. "Check" key

2. Move the red pointer on the machine to the location indicated, using the arrow keys (joystick) on the machine: top left corner.
3. Press the "Check" key.
4. Move the red pointer on the machine to the location indicated, using the arrow keys (joystick) on the machine: bottom right.
5. Press the "Check" key.

The head goes back to the origin. The position is saved.



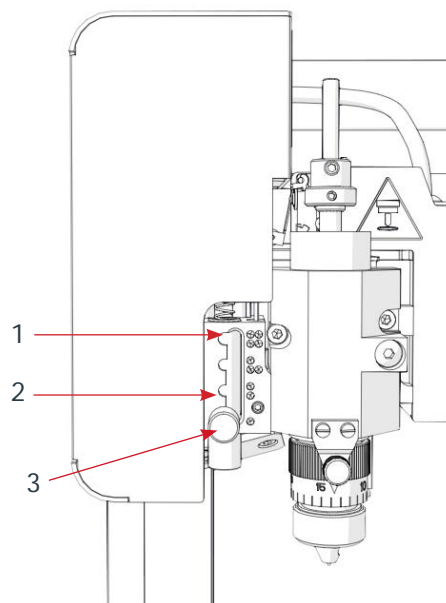
# Using the machine

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## ■ Adjustment on the tool holder (flat engraving)

### • Spindle pressure adjustment

1. *Position 4*
2. *Position 2*
3. *Spindle pressure adjustment button*



Adjust the spindle pressure with the button (Position 1: Flexible spindle / Position 4: Rigid spindle - carriage Z locked).

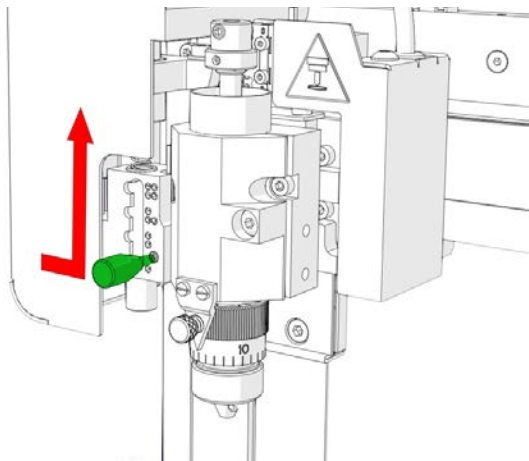
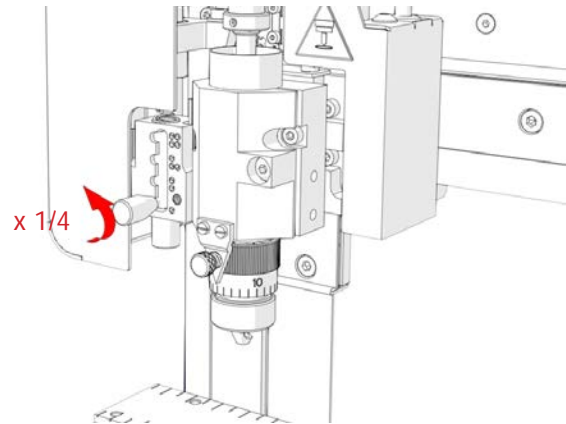


The automatic ZRef does not operate in position 4.

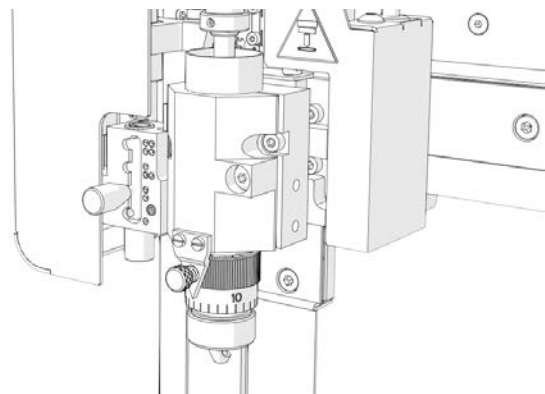
# Using the machine

- To engrave a photograph, set the spindle pressure adjustment button to the 2 position.

1. Turn the adjustment button (1/4 revolution - Counter-clockwise).

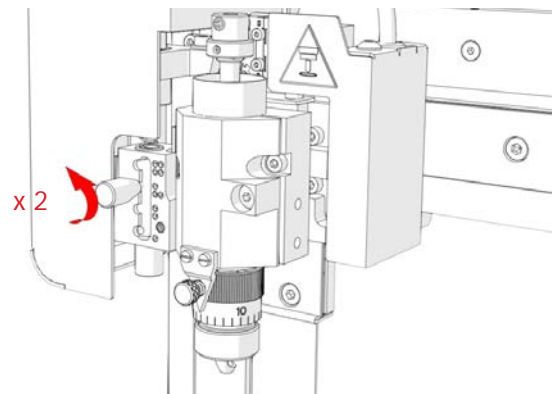


2. Move the button on to the next position (Position 2)
3. Turn the adjustment button (1/4 revolution - Clockwise).



- For engraving without a nose, set the spindle pressure adjustment button to the 4 position, to ensure a rigid spindle.

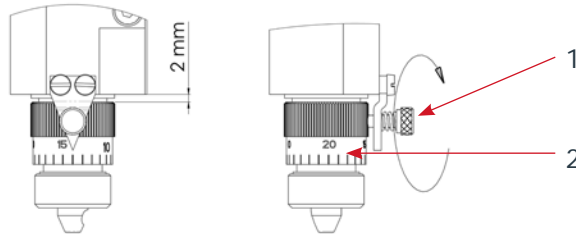
1. Turn the adjustment button (2 revolutions - Counter-clockwise).
2. Turn the adjustment button (1/4 revolution - Clockwise).



# Using the machine

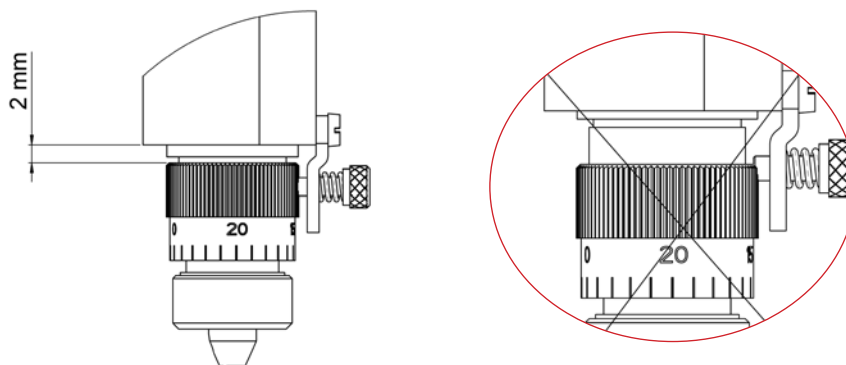
- **Engraving with a regulating nose (Function not available for the M20 PIX machine)**

For engraving with a nose, adjustment is carried out according to the hardness of the material, the width of the cutter and the state of the surface of the plate. If there is any risk that the nose might scratch the surface of the object, reduce the spindle pressure.



1. *Index pin*
2. *Scaled knob*

1. Place the regulating nose in its recess on the spindle. Tighten the nose nut.
2. From the program, transfer the composition to the machine. Select: Zref: Depth regulating nose. Program 0.5 mm (0.020 in) to a depth of 1 mm (0.039 in) in order to compensate for any flatness defects in the plate.
3. Press the key: Start. The tool holder moves at a safe movement speed to the first point of the job.
4. Loosen the index pin. Loosen the scaled knob. Align the 0 of the scaled knob with the index pin.



The scaled knob must be adjusted such that the index pin can lock it.

- Remove the tool.
- Press the "Check" key.

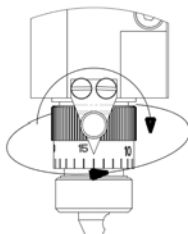
5. The tool holder is lowered until the depth regulating nose touches the plate to be engraved.
6. Insert the cutter into the spindle until it comes into contact with the material to be engraved. Secure the tool. Press the "Check" key.



# Using the machine

## 7. Adjusting the engraving depth (Function not available for the M20 PIX machine)

- Turn the scaled knob a few notches to the right to obtain the desired engraving depth.  
1 division = 0.025 mm (0.001 in)



*The number of notches depends on the engraving depth and the material:*

Material to be engraved	Type of cutter	Depth	Number of notches
Anodized aluminum	carbide point	0.1 mm (0.004 in)	4
Silver	carbide point	0.2 mm (0.008 in)	8
Chrome	diamond point	0.025 mm (0.001 in)	1
Gravometal	carbide point	0.1 mm (0.004 in)	4
Gravoply II	carbide point	0.06 mm (0.002 in)	2
Gravoxal	carbide point	0.1 mm (0.004 in)	4
Stainless steel	diamond point	0.2 mm (0.008 in)	8
Brass	carbide point	0.2 mm (0.008 in)	8
Metallex	carbide point	0.06 mm (0.002 in)	2
Gold	carbide point	0.2 mm (0.008 in)	8
Plastic	carbide point	0.35 mm (0.014 in)	14

- Tighten the index pin in order to secure the scaled knob in this position.

## 8. Start-up engraving: Press the key: Start.

Once this setting operation has been carried out: To engrave a plate of the same thickness with the same settings, omit steps 4 to 9.

# Using the machine

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- **Engraving: no nose**

- Manual Z

- 1. Configuration**

- Select: Zref: None.
- Adjusting the engraving depth
- From the program, transfer the composition to the machine.

- 2. Position the tool carrier above the object (by pressing keys on the machine keyboard).**

- 3. Head moves forward to part to be marked: Press the key: Z. Press the Down key.**

- 4. Insert the cutter into the spindle until it comes into contact with the material to be engraved. Secure the tool. Press the "Check" key. The head rises.**

- 5. Start-up engraving: Press the key: Start.**

Once this setting operation has been carried out: To engrave a plate of the same thickness with the same settings, omit steps 2 to 5.

- Automatic ZRef (Diamond engraving)

- 1. Configuration**

- Select: "Automatic ZRef (Diamond)".
- Choose a depth of between 0 and 1 mm (0.039 in) according to the desired pressure.
- From the program, transfer the composition to the machine.

- 2. Start-up engraving: Press the key: Start.**

## ■ Setting the origin of the tool carrier: M20 / M20 JEWEL

- 1. Press Z. Position the desired origin point using the Up - Down arrows.**

- 2. Store the position of the Z zero point by pressing the "Check" key for 3 seconds. The machine emits an audible signal.**

The tool holder is raised.

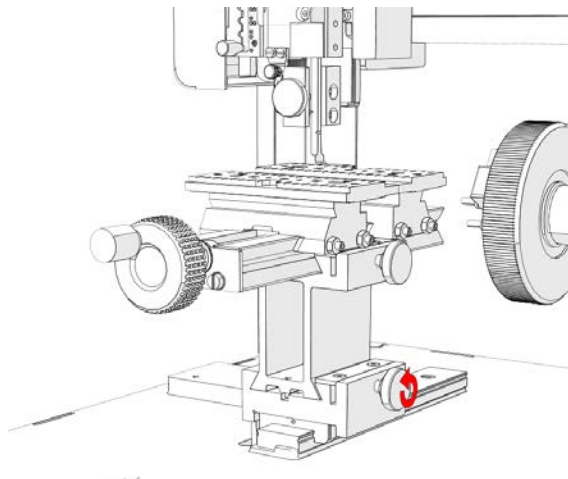
# Using the machine

## ■ Positioning a ring on the chuck

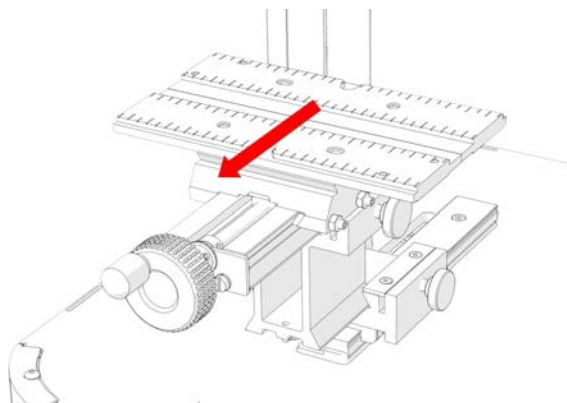


**Always remove the vice before changing to ring engraving mode.**

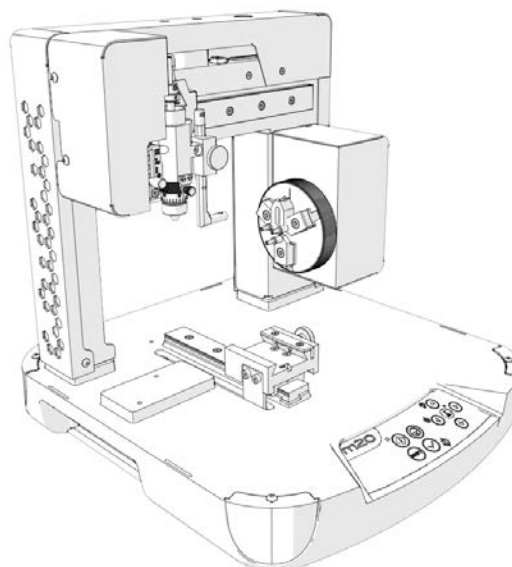
**Always raise the diamond holder to the raised position before changing to flat engraving mode.**



**1. Unscrew the locking buttons.**



**2. Remove the vice.**



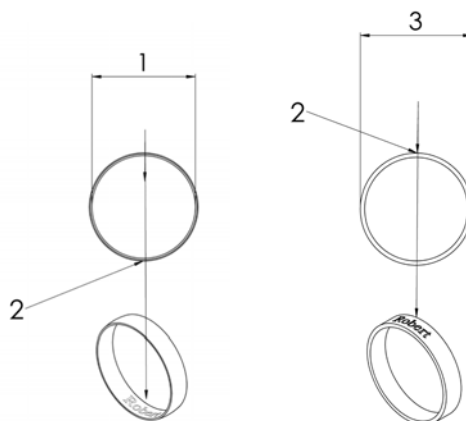
# Using the machine

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## 3. Locate the mid-point of the length of the text to be engraved on the ring.

*Inside engraving*

*Outside engraving*



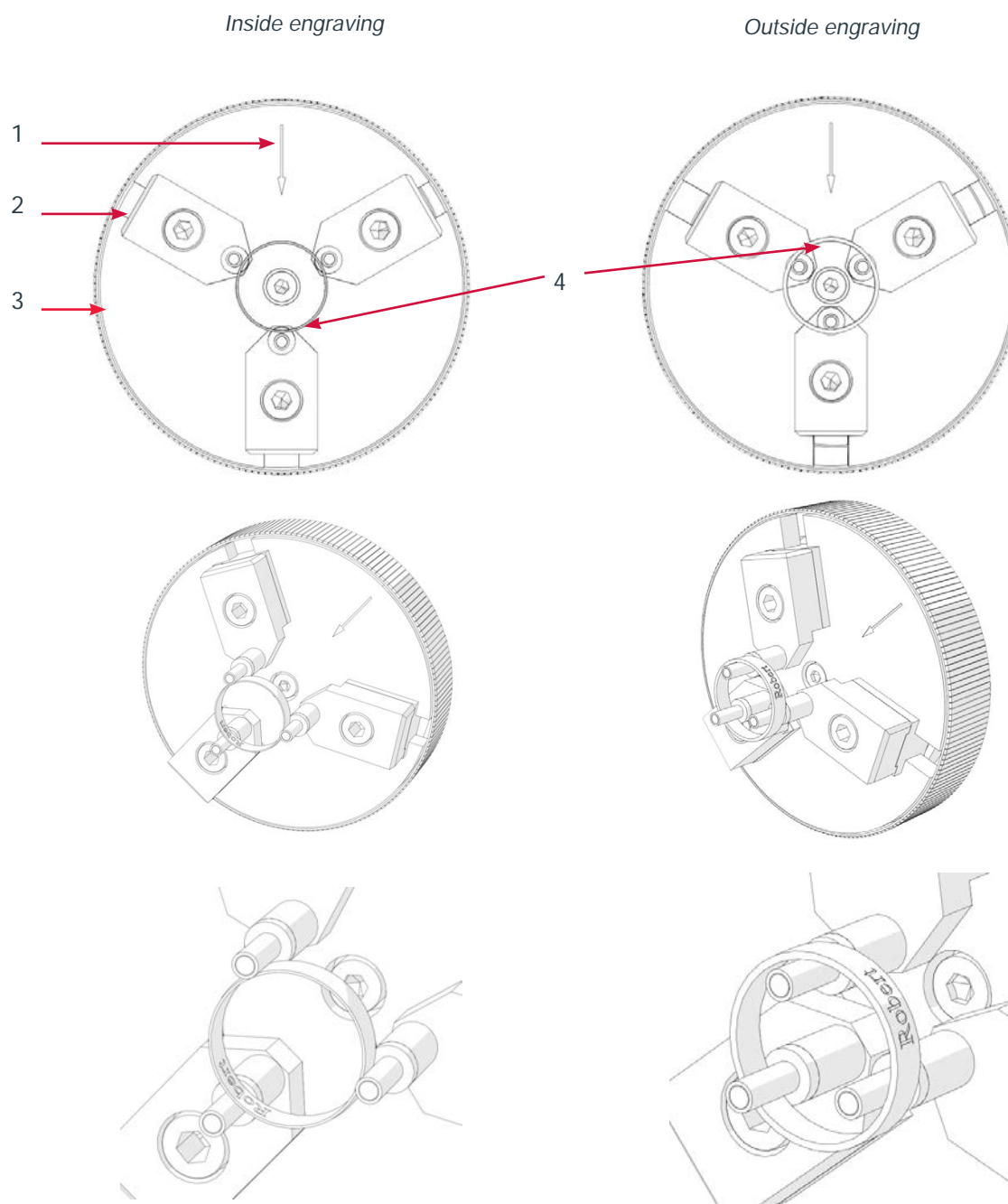
1. *Internal diameter*
2. *Mid-point of the length of the text*
3. *External diameter*

## 4. Place the ring in position such that the mid-point of the engraving area is aligned with the positioning aid arrow:

- down for inside engraving
- up for outside engraving

The positioning aid arrow must be perfectly vertical and pointing downwards.

# Using the machine



1. Positioning aid arrow
2. Jaws
3. Chuck
4. Mid-point of the length of the text

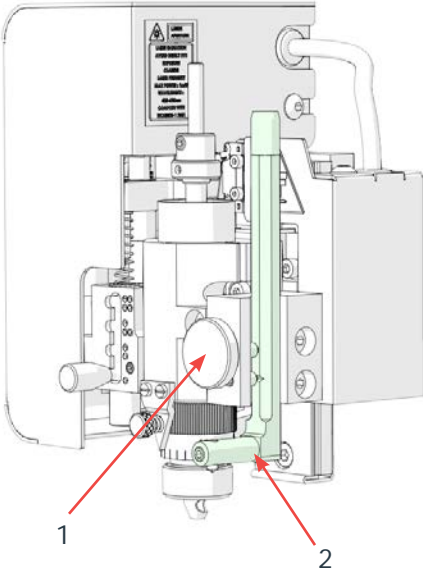
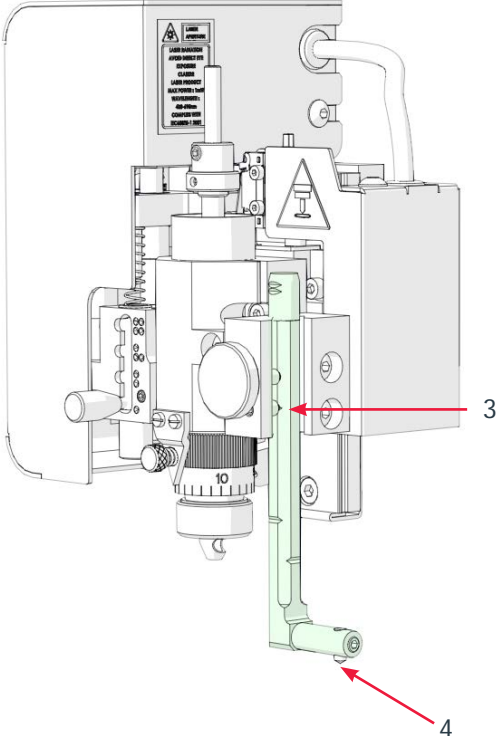
**5. Using the chuck clamping ring, clamp the wedding ring so as to immobilize it during engraving.**

Correct clamping helps to reduce the noise of the machine and to minimize vibration during engraving.

# Using the machine

## ■ Adjustment on the tool holder (ring engraving)

### 1. Adjust the spindle pressure with the button (Position 1).

High position Flat engraving position	Low position Engraving position on a ring
 <p>1. Diamond holder shaft mount locking button 2. Diamond holder</p>	 <p>3. Index 4. Diamond point</p>





2. Loosen the shaft mount locking knob while holding the diamond holder.
3. Lower and place the diamond holder in the ring engraving position (low position).
4. Tighten the locking knob while holding the diamond holder in the pin.
5. Launch the marking cycle.

# Using the machine

## ■ Using the program

1. **Select outside or inside engraving.**
2. **Indicate the diameter and width of the reference ring according to the desired marking.**
3. **Choose a depth of between 0 and 0.5 mm (0.020 in) according to the desired pressure.**
4. **Z clearance: 0.5 mm (0.020 in)**
5. **Select: "Automatic ZRef (Diamond)".**

Enter the data below:

	Width	
	Inside engraving	Internal diameter: 12.5 mm (0.492 in) - 24 mm (0.945 in)
		Width (Maximum): 9 mm (0.354 in)
	Outside engraving	External diameter: 12.5 mm (0.492 in) - 27 mm (1.063 in)
		Width (Maximum): 18 mm (0.709 in)
	For good engraving quality on rings, limit the engraving speed to 5 mm (0.197 in)/s.	

# Using the machine

## ■ Using the PLC function (User standard inputs/outputs)



**Before making any "user standard input/output" connections, check that the electrical and electronic characteristics of the different inputs and outputs are respected. Incorrect connection could permanently damage the machine electronics.**

**Using the PLC function means that it is not just a matter of considering the machine on its own in order to ensure operator safety. The machine becomes part of a larger process (automated line). When completely assembled, the entire work station must meet the regulatory safety requirements. In this case, the machine and equipment installer is responsible for the final work station's compliance.**

The "Inputs/Outputs" function activation menu is accessed via the engraving software installed on the PC.

- 4 inputs can be defined (IN1 - IN4).
- 4 outputs can be defined (OUT1 - OUT4).

### *Input / Output characteristics*

	Voltage and current	Active state	Minimum signal duration (Active state)
<b>Input</b>	TTL-compatible	Low	200 ms
<b>Output</b>	Open commutator	-	-

### *Wiring of the female 15 SubD connector*

Number	Name	Function	Description
1	O1	Output	Output 1
2	O2	Output	Output 2
3	O3	Output	Output 3
4	O4	Output	Output 4
5	5 V		5 V power supply
6	I1	Input	Floating contact 1
7	I3	Input	Floating contact 3
8	0 V		Grounding
9	-		Not available
10	-		Not available
11	0 V		Grounding
12	0 V		Grounding
13	0 V		Grounding
14	I2	Input	Floating contact 2
15	I4	Input	Floating contact 4



# Using the machine

---

- The inputs can activate various functions according to their configuration:

Function	Description
1	Start marking
2	Pause
3	Return to origin (0,0)

- The outputs can be activated according to their configuration:

Function	Description
1	Spindle in operation
2	Machine paused
3	Machine at the origin (0,0)
4	Tool in the lowered position (in the material)
10	Spindle stopped

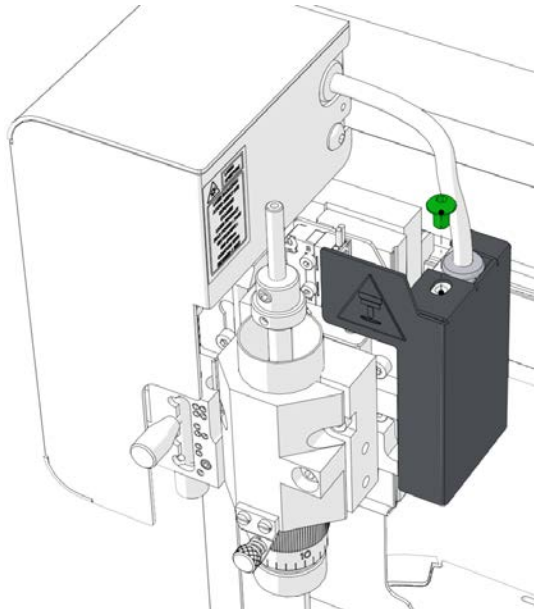
Example:

OUT1 = 2: The 1 (Pin 1) output is activated when the machine is paused.

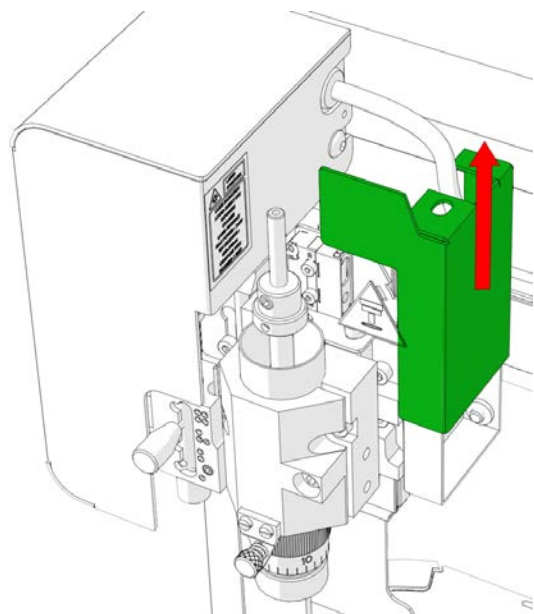
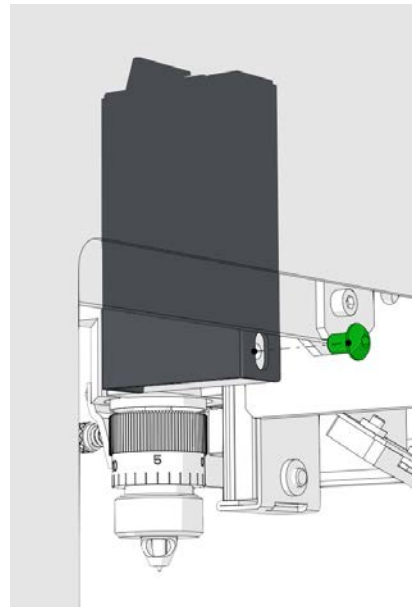
IN2 = 3: The machine returns to the origin when the input 2 (Pin 14) receives a pulse.

# L. Adaptable accessories

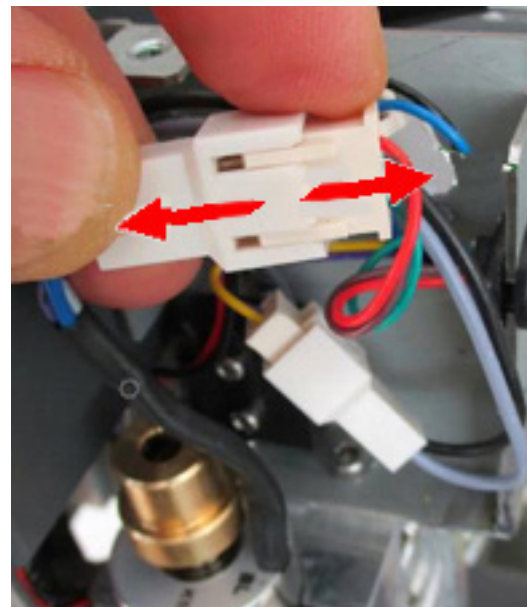
## 1. M20Pix: Assembly



**1. Unscrew the screws (x2)**



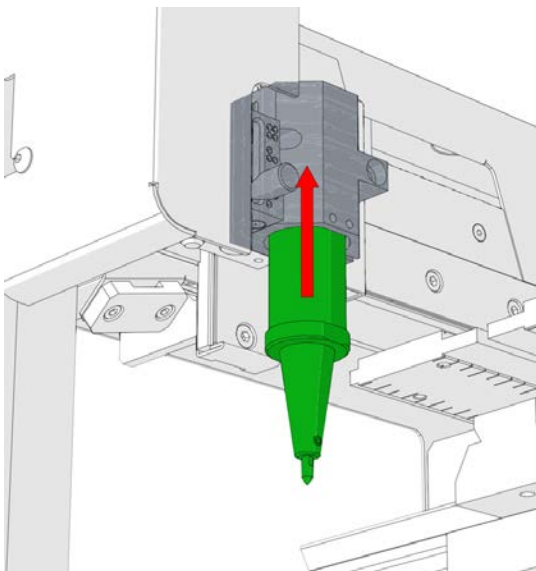
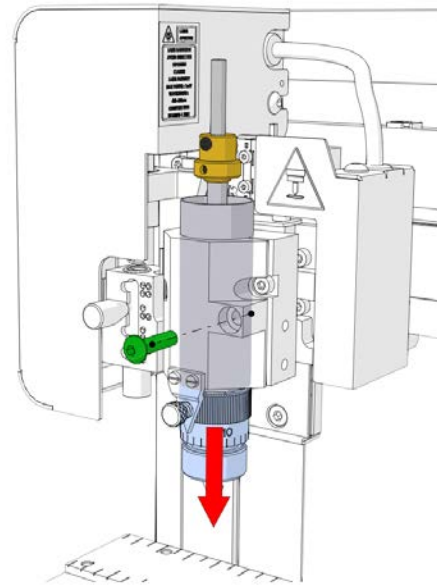
**2. Remove the protection cap.**



**3. Disconnect: Machine connection / Standard spindle**

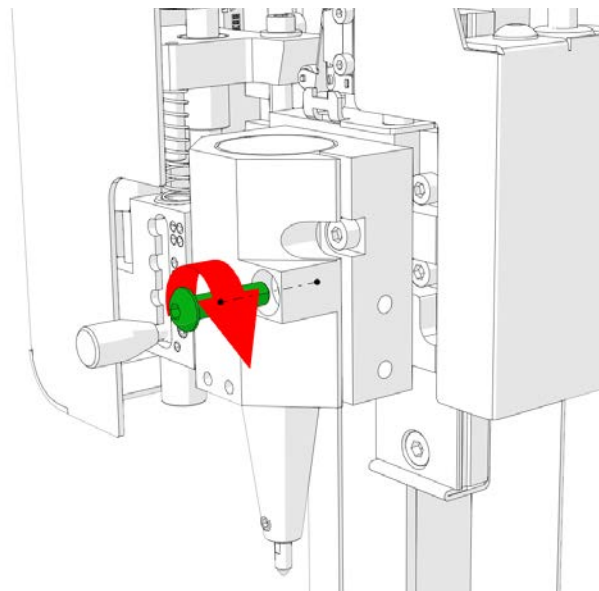
# Adaptable accessories

4. Remove the tool.



5. Insert the diamond holder into the tool holder.

6. Replace in the reverse order.

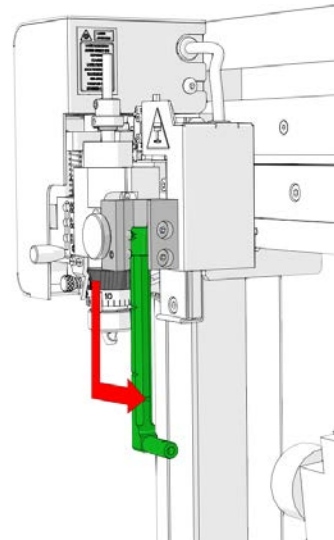
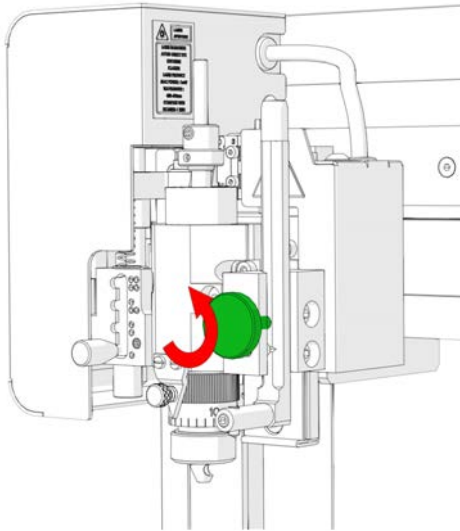


# Adaptable accessories

## 2. M20 JEWEL: ring engraving (Built-in system mounted in factory)

The cylinder attachment is an accessory designed to clamp objects that are cylindrical or conical in shape (Outside engraving - Inside engraving)

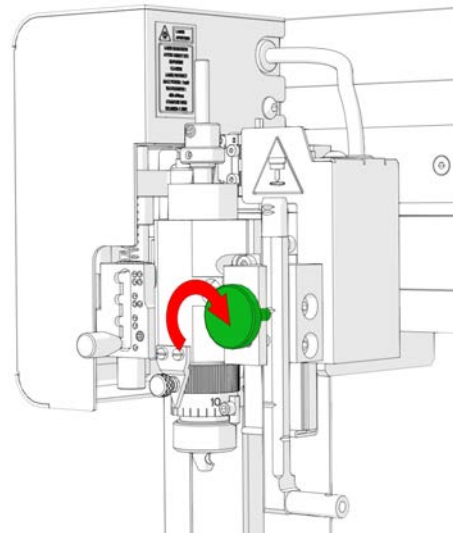
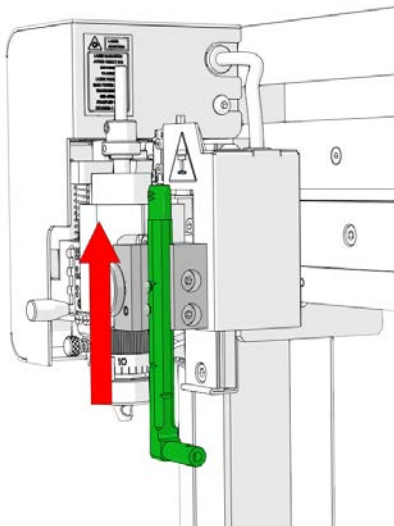
- Engraving tool(s): Rest position --> Engraving position on a ring



1. Unscrew the locking buttons.

2. Lower the tool.

3. Pivot the tool (1/4 revolution).



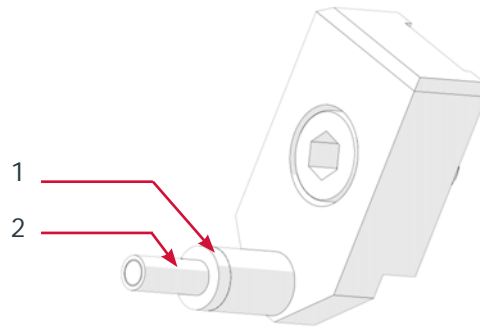
4. Raise the tool.

5. Tighten the locking knob --> Engraving position on a ring

# Adaptable accessories

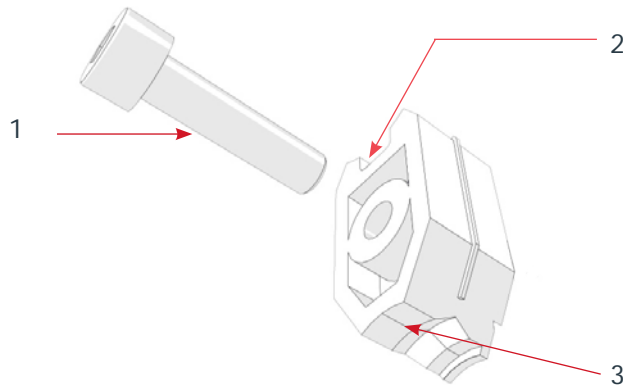
## ■ Choose appropriate jaws: Ring(s)

- Jaws:
  - Inside engraving: Width (Maximum) = 9 mm (0.354 in)  
Internal diameter = 12.5 mm (0.492 in) - 24 mm (0.945 in)
  - Outside engraving: Width (Maximum) = 18 mm (0.709 in)  
Internal diameter = 12.5 mm (0.492 in) - 27 mm (1.063 in)



1. *Support ring*
2. *Sleeve*

- Plastic jaws:
  - Inside engraving: Width (Maximum) = 9 mm (0.354 in)  
Internal diameter = 12.5 mm (0.492 in) - 24 mm (0.945 in)



1. *Mounting screw(s)*
2. *Impression for common rings*
3. *Impression for narrow rings*

The plastic jaws must be mounted to the chuck with the mounting screws.

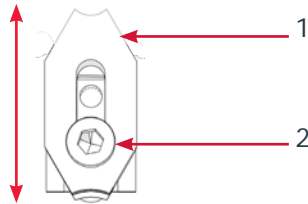
The plastic jaws have 2 impressions:

- Impression for common rings
- Impression for narrow wedding rings with a U-shaped slot which has 12 clamping points for rigid securing without any deformation

# Adaptable accessories

- Adjustable jaw (optional):

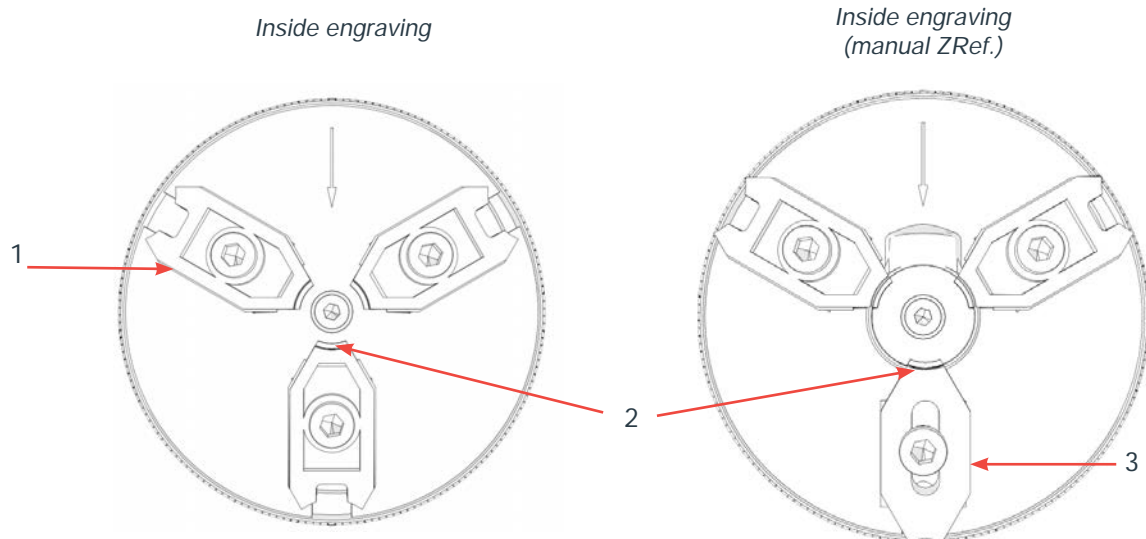
It is possible to use an adjustable jaw with plastic jaws. Allows the clamping of stone or signet rings for inside engraving.



1. *Adjustable jaw (optional)*
2. *Mounting screw(s)*

- To use the adjustable jaw, selection the manual ZRef. mode.
- Position the adjustable jaw opposite the positioning aid arrow indicated on the chuck.
- Mount the adjustable jaw to the chuck with a mounting screw.
- Adjust the adjustable jaw according to the shape of the rings by loosening the mounting screw and centering the ring.

Before retightening the mounting screw, ensure that the guide has entered the centering groove.



1. *Plastic jaws*
2. *Mid-point of the length of the text*
3. *Adjustable jaw*

# Adaptable accessories

## ■ Cutting out kit (optional)

Allows you to cut thin metal plates.  
Mounts directly on the vice.

Clamp the plate and check that it is firmly held in place.

Delivered with 3 non-slip martyr plates. Holds the cutting plate in place. Protects the cutting table.  
Cut between 0.05 mm (0.002 in) and 0.1 mm (0.004 in) deeper than the plate to ensure that the plate is cut properly.

Use lubricating gel to improve cutting quality and tool life.

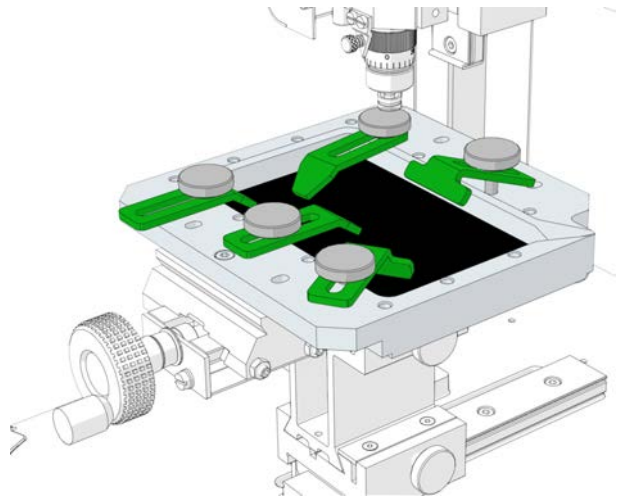


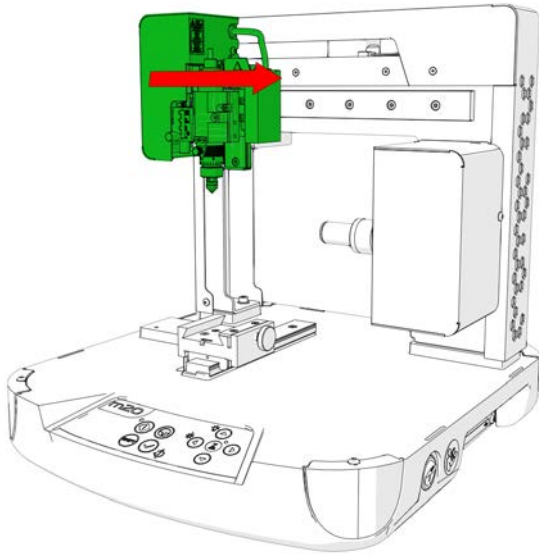
Plate dimensions (Maximum): 80 mm (3.150 in) x 120 mm (4.724 in)  
Plate thickness (Maximum): 8 mm (0.315 in)

Tools	Reference
15°	48713
0° - 2 lips	48657
Lubricant	83957

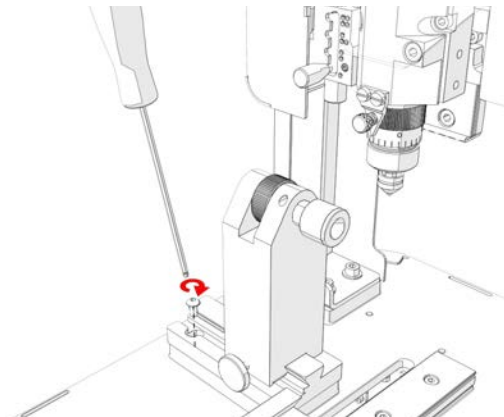
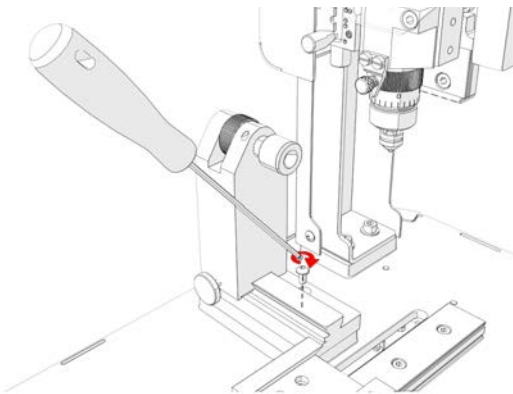
# Adaptable accessories

## 3. M20 PEN (optional): Positioning a pen on the pen attachment

### ■ Installation: Pen attachment tailstock



#### 1. Positioning at the clearance position:

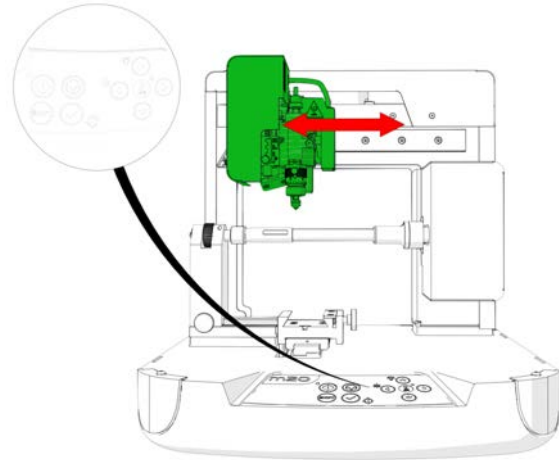
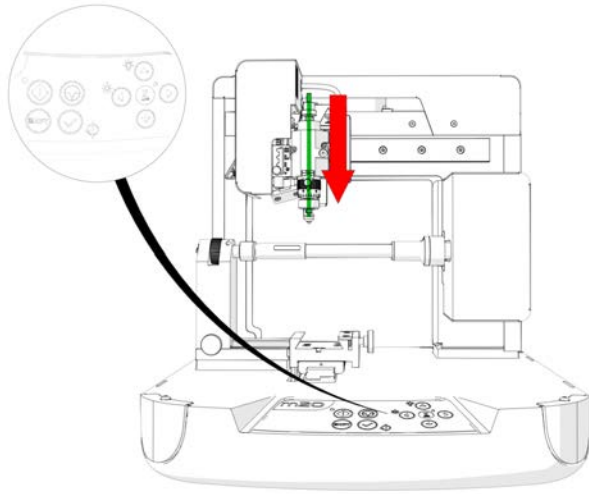


#### 2. Install the tailstock and the slider.

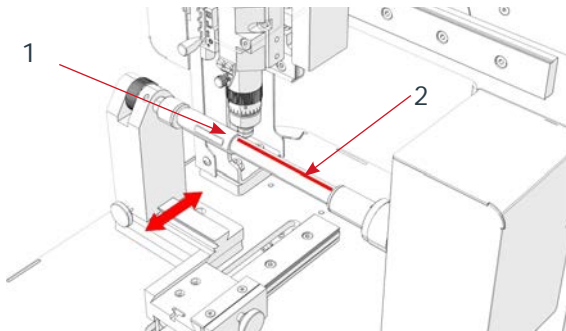
#### 3. Start the screws (without tightening).



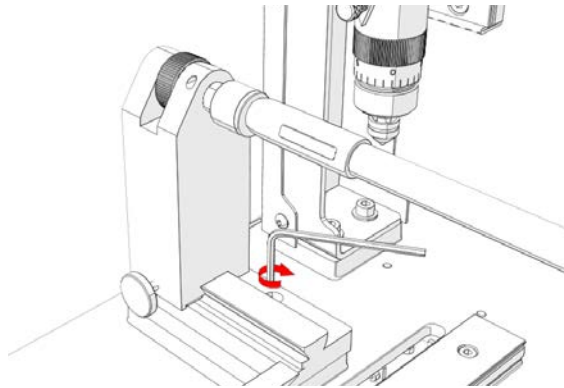
# Adaptable accessories



4. Move the tool to a distance of 2 mm (0.079 in) from the object. 5. Move the tool along the X axis.



1. Tool trajectory  
2. Generator axis (Pen)



6. Move the tailstock such that the generator axis and the tool trajectory are superimposed. 7. Tighten the screws (x2) (Allen key).

# Adaptable accessories

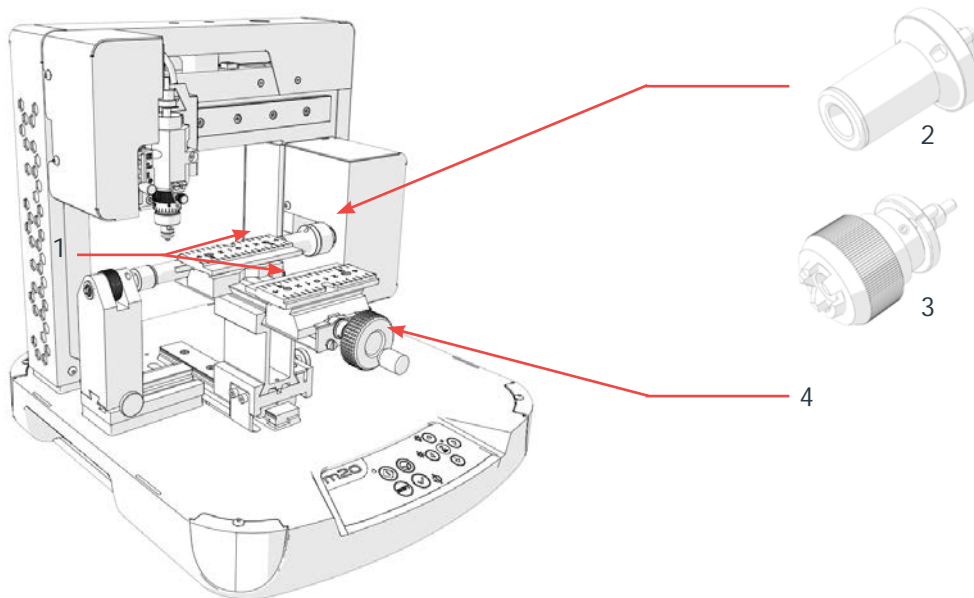
## ■ Use



**Always remove the jigs and open the vice to the fullest extent before changing to pen attachment mode.**

**Check that the object is clamped such that it cannot be ejected during engraving.**

**Check that the locking button and the thumb wheel are firmly securing the object before starting work.**



1. *Jig(s)*
2. *Right hand cone*
3. *Pen attachment chuck*
4. *Jaw opening and closing adjustment knob*

In the program: Select the pen attachment. Indicate the diameter of the cylindrical object to be engraved.

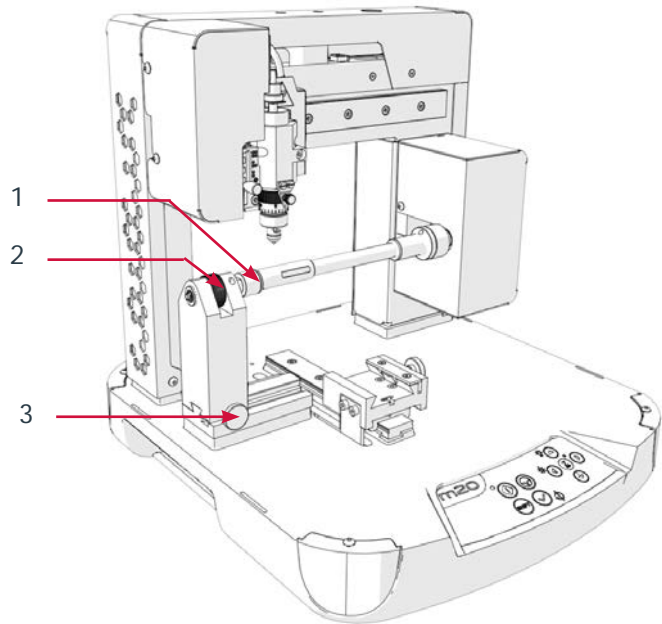
Marking area: Dimensions - Positioning (See: Point & Shoot).

- 1. Remove the vice.**
- 2. Place the object against the right hand cone or secure it in the chuck.**

# Adaptable accessories

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1. *Tailstock*
2. *Thumbwheel*
3. *Locking screw*



**3. Hold the object horizontally and slide the tailstock by pressing the locking button.**

Engage the object such that it is held securely by the cone or the tailstock.

**4. Lock the tailstock mount by releasing the locking button.**

**5. Adjust the clamping with the thumb wheel if necessary.**

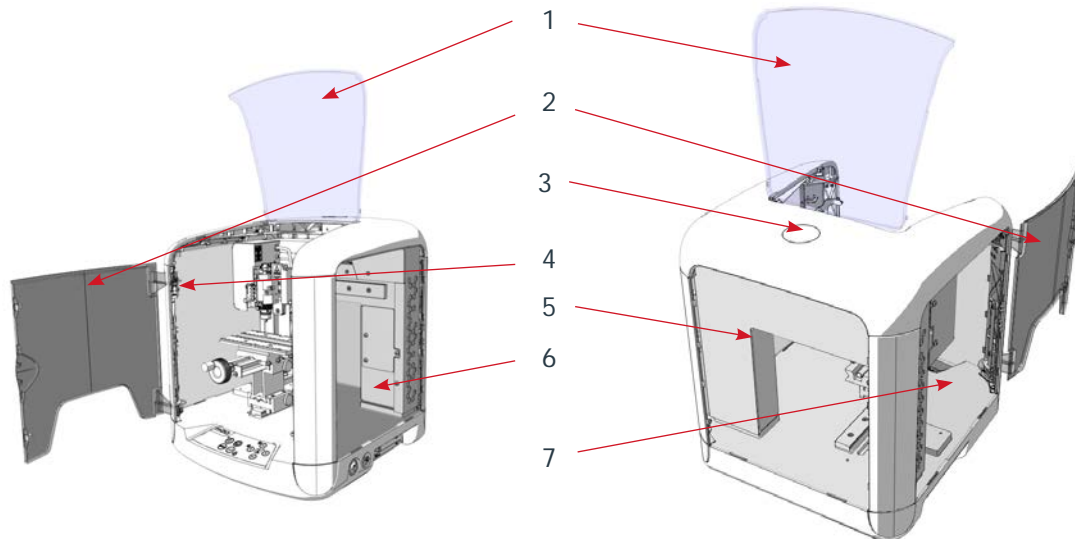
**6. Launch the marking cycle.**

# Adaptable accessories

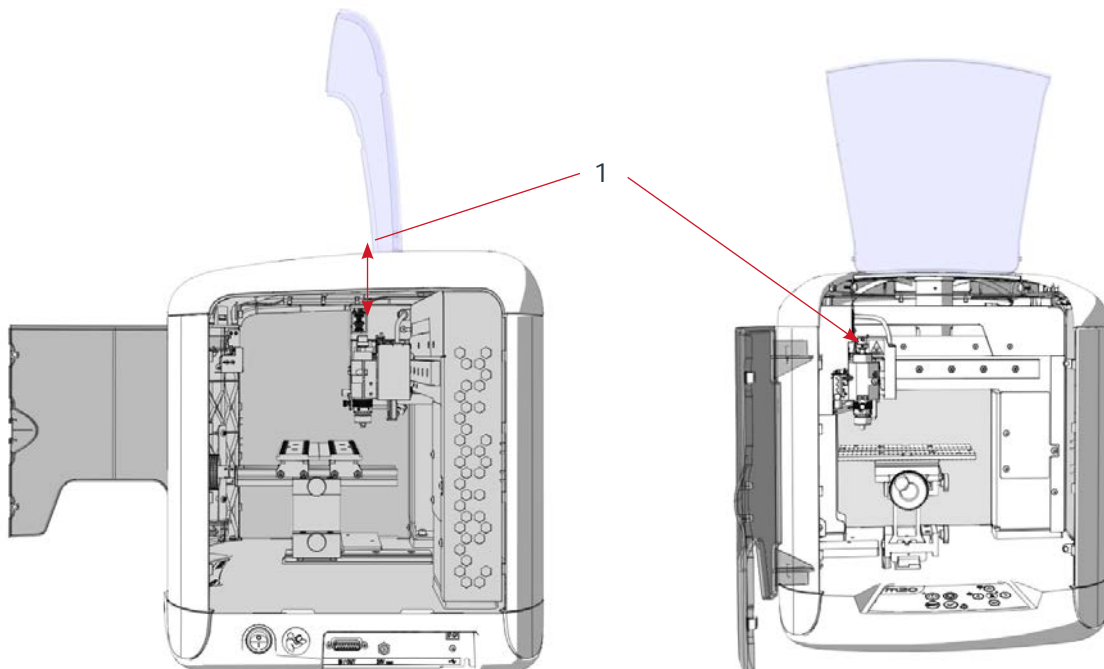
## 4. M20 Cube

The machine may be equipped with an additional enclosure. A safety option can be activated when the cover is raised.

### ■ Description



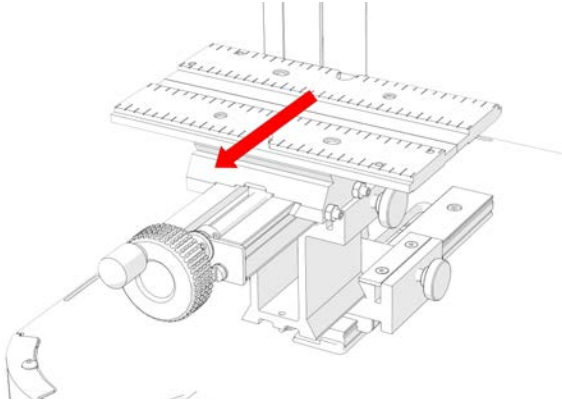
1. Door: To change tools
2. Door: Loading
3. Plug
4. Safety (Door)
5. Rear
6. Right side of the machine
7. Left side view of the machine



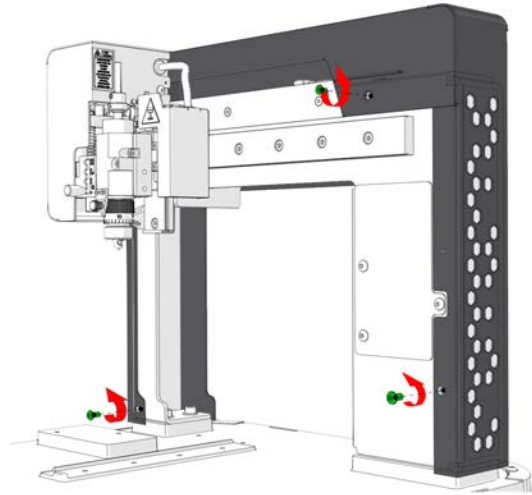
1. Tool manipulation (Remove the tool / Repositioning the tool)

# Adaptable accessories

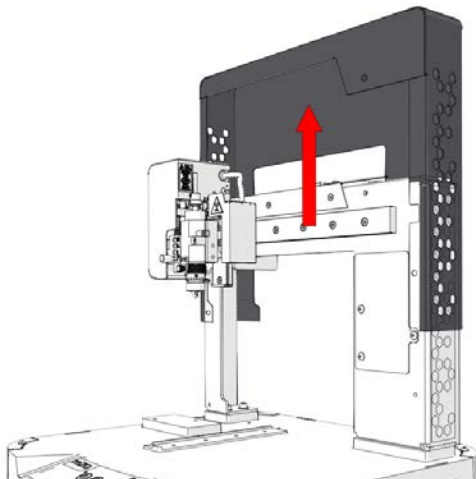
## ■ Preparation: machine M20



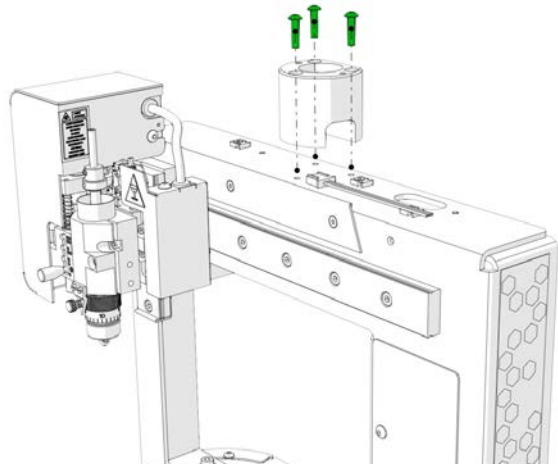
1. Remove the vice.



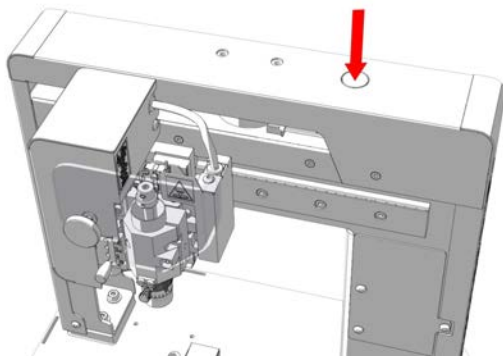
2. Unscrew the screws (x3)



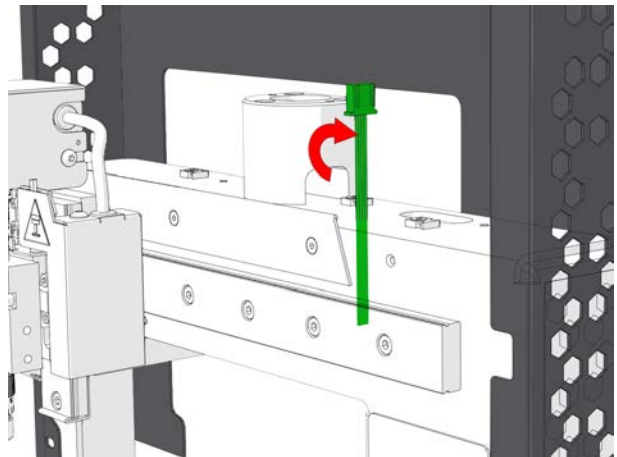
3. Remove the casing.



4. Adapter - Mounting bracket (Tablet): Start the 3 screws.



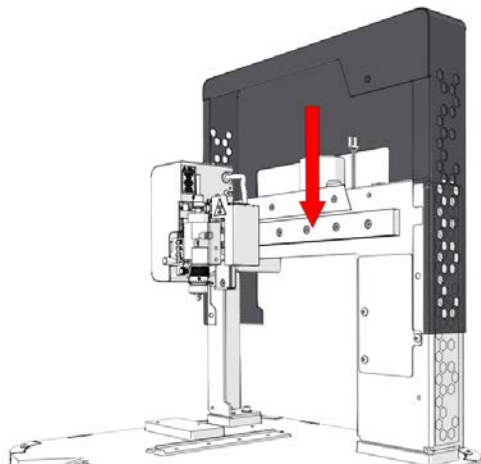
5. Press down the pre-cut area.



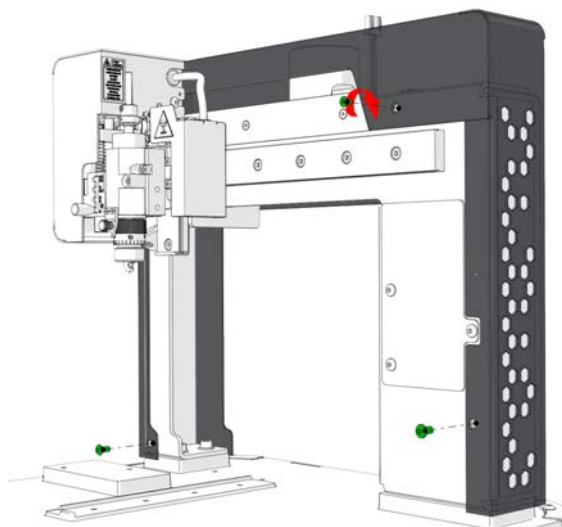
6. Marking area lighting: Remove the connector.

# Adaptable accessories

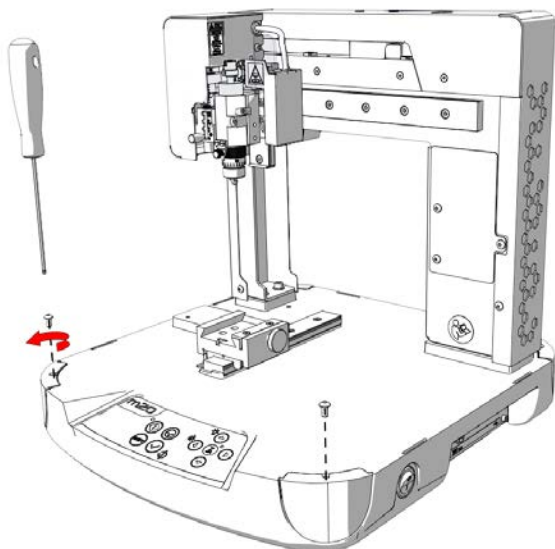
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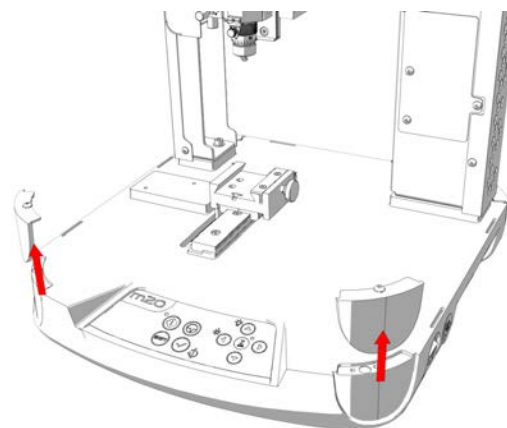
7. Replace the casing.



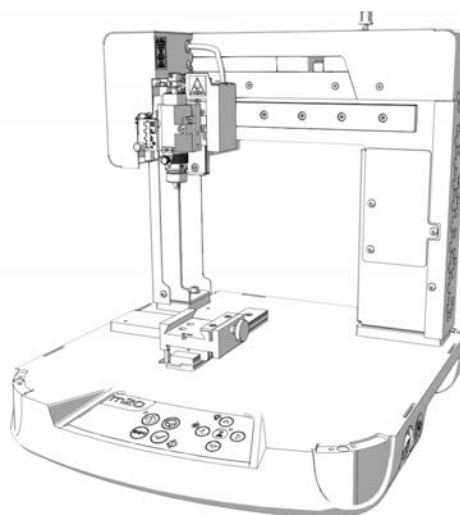
8. Start the 3 screws.



9. Unscrew the screws (x4).



10. Remove the corner covers (x4).

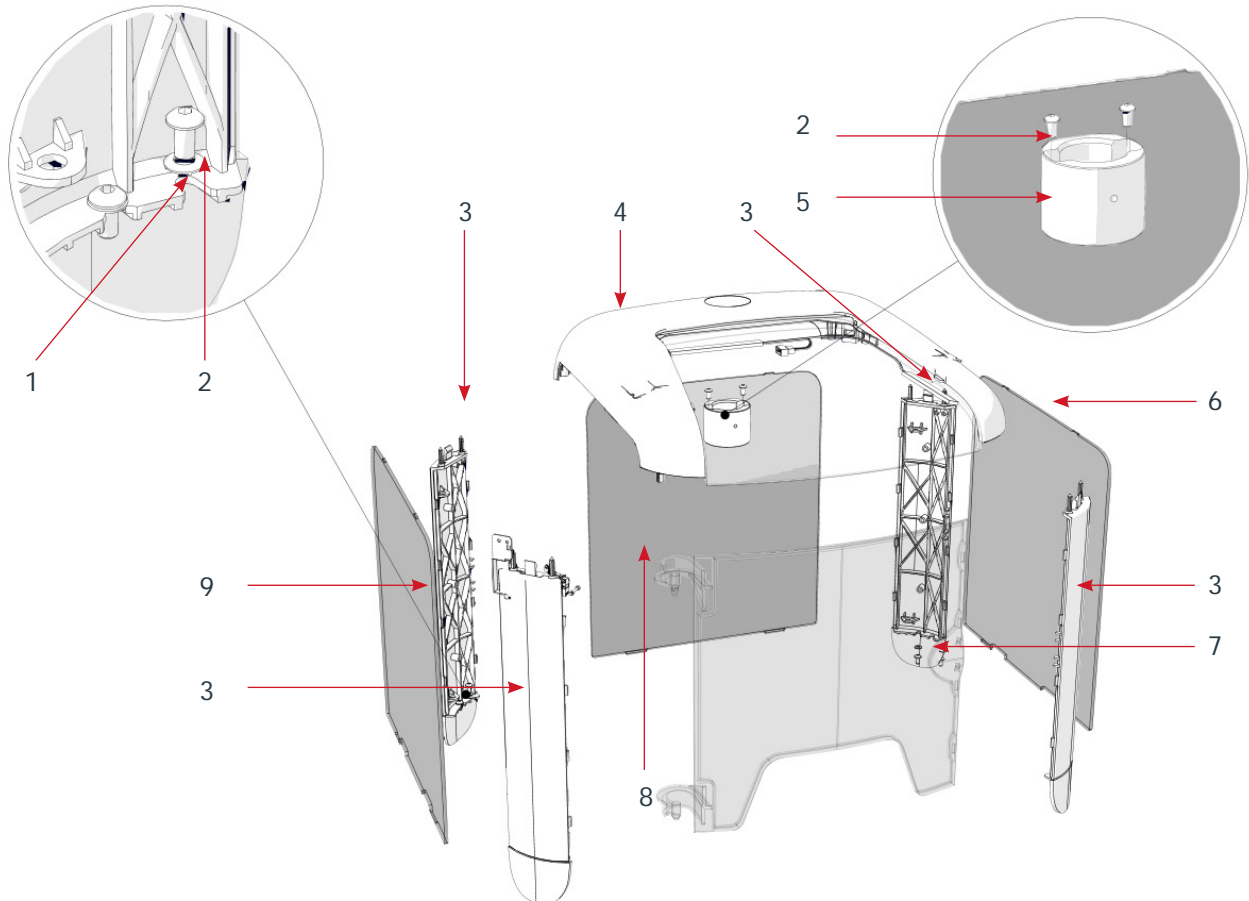




# Adaptable accessories

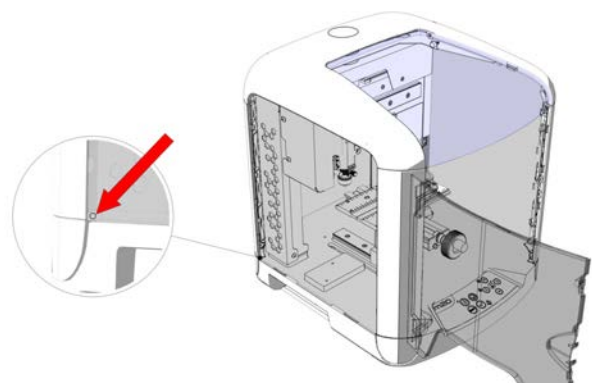
## ■ Cube kit

The kit comprises:



1. Washer (x8)
2. M4 screw (x 10) + Allen key 2.5 mm (0.098 in)
3. Post(s) (A, B, C, D)
4. Protective cover
5. Mounting bracket (Tablet)
6. Protective panel(s) (Right)
7. Door
8. Protective panel(s) (Back)
9. Protective panel(s) (Left)

Protective panel(s) (left): Circle

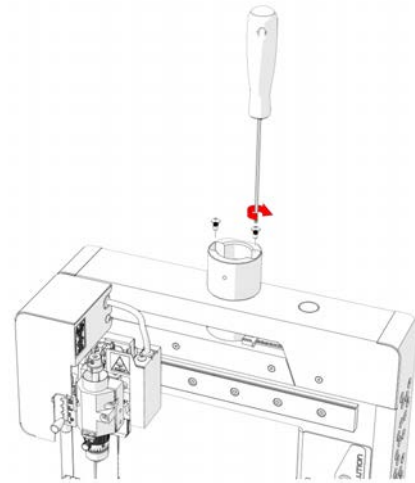


# Adaptable accessories

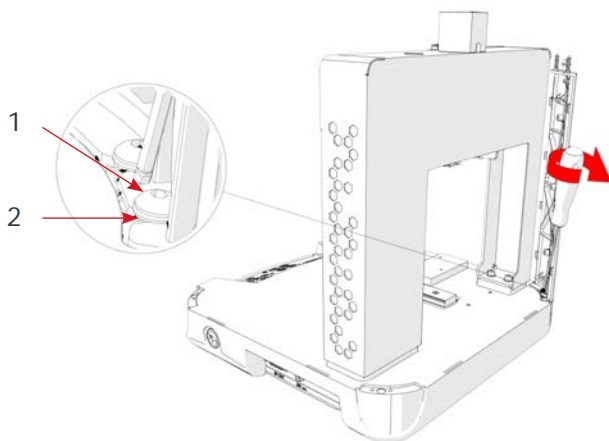
## ■ Fitting the posts

### 1. Assembly: Mounting bracket (Tablet)

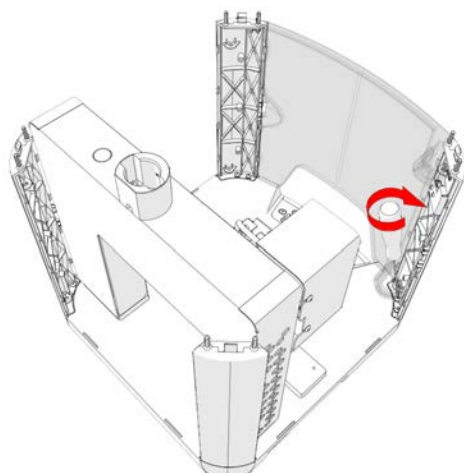
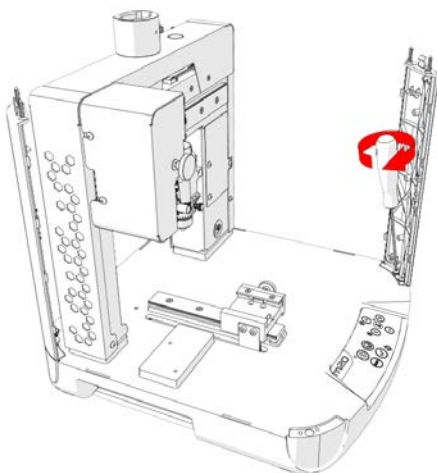
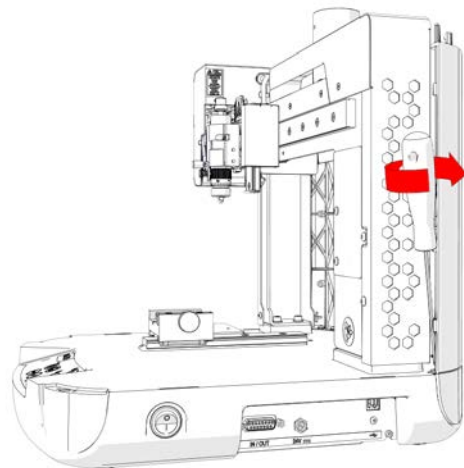
Start the 2 screws M4 (without tightening).



### 2. Post(s) (A, B, C, D): Start the 2 screws M4.



- 1. M4 screw (x 2)
- 2. Washer (x2)

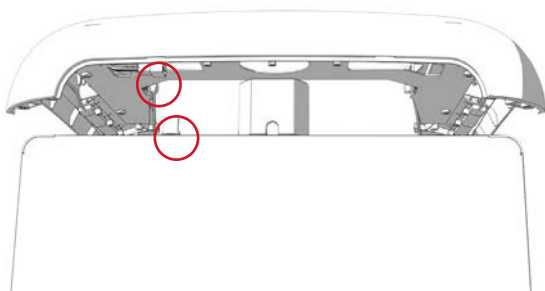




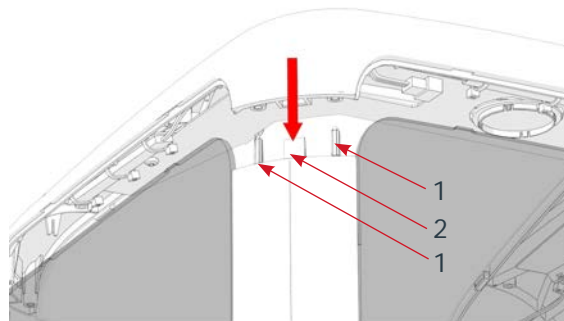
# Adaptable accessories

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## ■ Assembly: Upper casing assembly - Post(s)

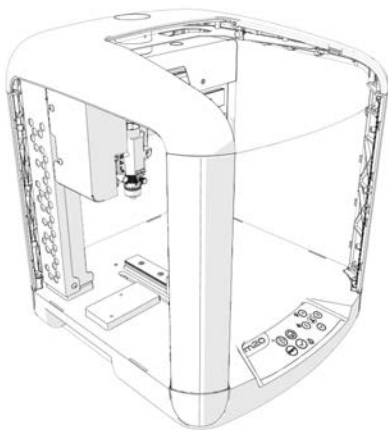


**1. Plug in connectors together.**



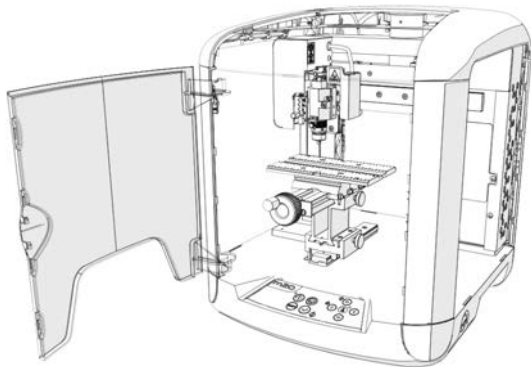
- 1. *Locating device(s)*
- 2. *Clip(s)*

**2. Clip on the protective cover**

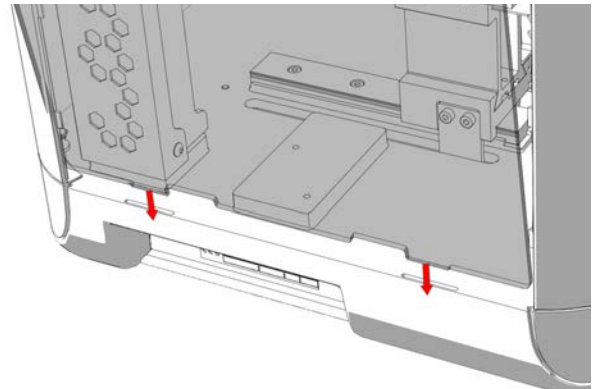


# Adaptable accessories

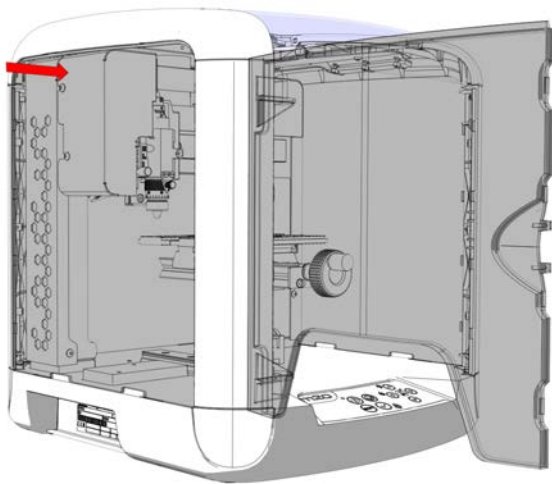
## ■ Assembling the panels



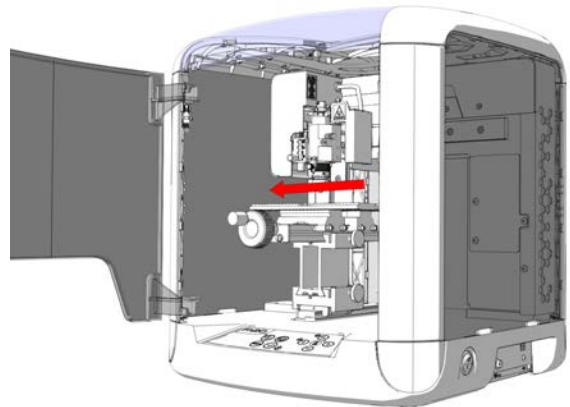
**1. Open the front door.**



**2. Insert the panel into the grooves.**



**3. At the top, at the center: Press on the panel until it snaps into place correctly (from the outside towards the inside of the machine).**



**4. At the center: Press on the panel until it snaps into place correctly (from the inside towards the outside of the machine).**

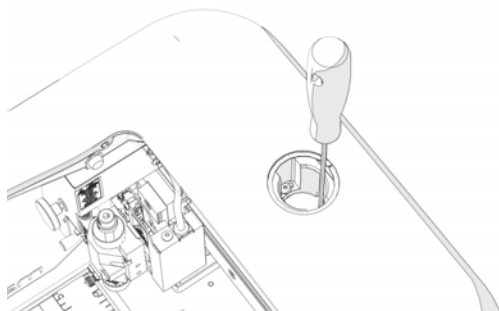
**5. Repeat operations 2-3-4 for the other panels.**

Fitting sequence:

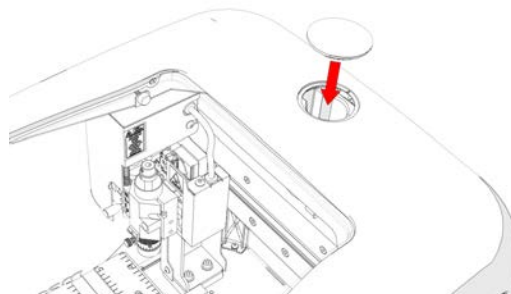
- Right
- Back
- Left

# Adaptable accessories

## ■ Locking the mounting bracket (Tablet)



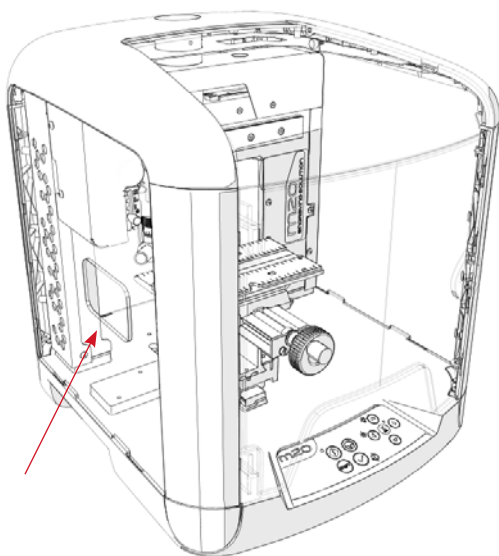
**1. Tighten the screw(s).**



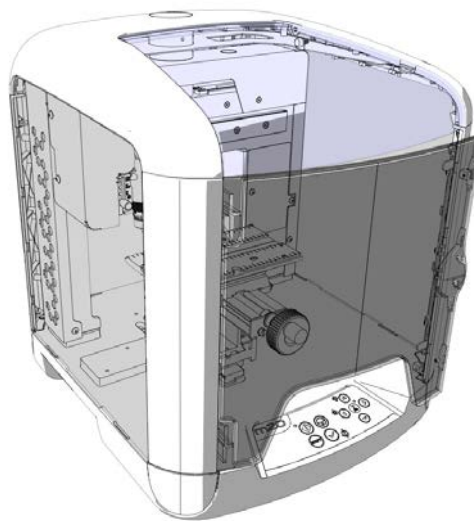
**2. Replace the protective cap(s).**

## ■ Assembly: Chip collector

This system vacuums chips from the marking area.

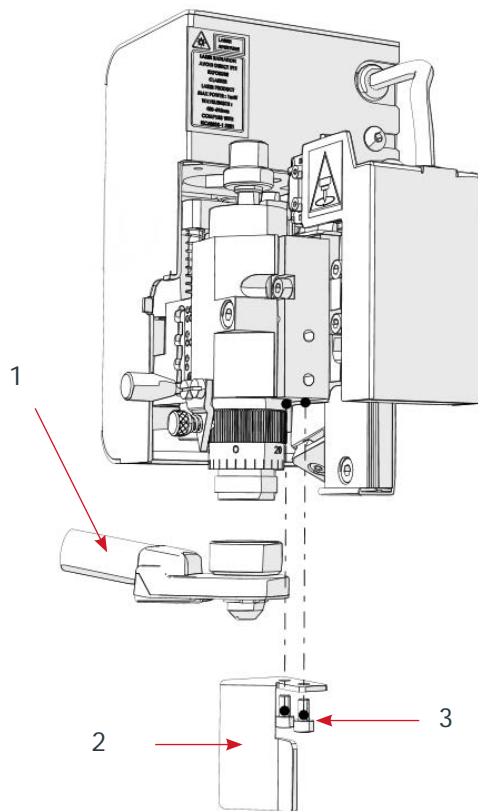


*Opening for the suction hose*

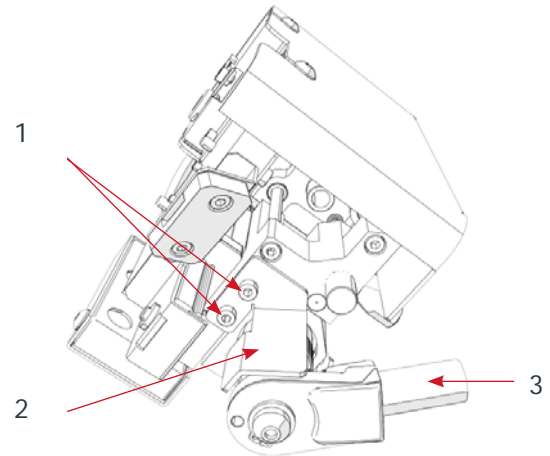


*Panel with no suction system*

# Adaptable accessories



Bottom view



- 1. Screw
- 2. Stop
- 3. Vacuum nose

1. Install the suction nose of the suction hose on the machine spindle.
2. Install the end stop.
3. Start the screws.

Fit the vacuum hose.

## ■ Security mode

The machine is in mode: Non-safe movement (by default).

### • Enable/disable: Security mode.

1. **Activate:**  
**Press: Shift + Down arrow + Left arrow (for 3 seconds).**

The machine emits an audible signal (the light flashes: high speed).

2. **Deactivate:**  
**Press: Shift + Down arrow + Right arrow (for 3 seconds).**

The machine emits an audible signal (the light flashes: low speed).

# Adaptable accessories

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- **Security mode: Activated**

Cover closed: There is no safe movement speed.

Cover open: Movements are executed at a safe speed (Speed (X, Y, Z): 5 mm (0.197 in)/s).

- Engraving does not start if the cover is open. The following message is displayed: "Cover open ". The machine emits an audible signal (x3). The light flashes.
- Opening the cover during engraving causes a pause.
- The machine waits on standby when the cover is open. The software displays alternating messages: "Cover open " - "Ready to receive ".

- **Security mode: Deactivated**

There is no safe movement speed.


Opening the cover has no effect.

Engraving is possible with the cover open.

# M. Preventive maintenance

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## 1. General maintenance

	<p><b>Unplug the power supply plug before beginning any cleaning or maintenance operation.</b></p> <p><b>The mains power cable must be replaced immediately if it is cut or crushed, cracked or a conductor is stripped bare.</b></p>
---	---

The machine's maintenance needs depend on the type of material used, the quantity of material removed, frequency of operation, environment and the effectiveness of the air extraction system. It is the user's responsibility to define them.

Dust and debris that accumulate on the machine's components can cause irregular or imprecise engraving, or the loss of the engraving position and the premature failure of components.

Regularly cleaning the machine improves its operation, extends the life of parts and reduces the risk of failure.

Recommendations: Check and, if necessary, clean the machine every 8 hours of engraving/marketing or cutting.

For help, contact Gravotech.

No internal parts of the machine require user intervention. Routine maintenance only involves external cleaning of the engraving area.

To clean other parts of the machine, call a Gravotech technician.

## 2. Adjusting the machine

The center of the engraving area of the machine must be aligned with the clamping system.

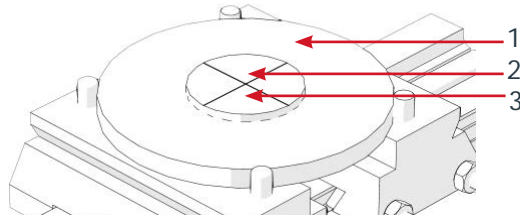
The M20 series machines have a machine reference point adjustment system which can be deployed by the user.

Adjust these settings every 3 months or whenever the machine has been moved.

# Preventive maintenance

## ■ XY setting of the machine with vice

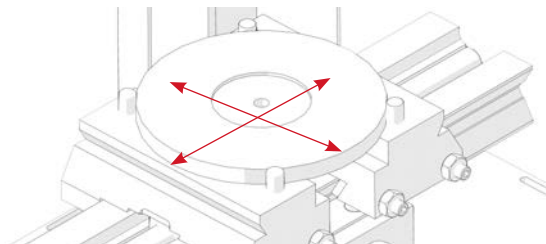
To set the XY zero point, use 2 centering washers (Supplied with the machine).



1. *Centering washer(s)*
2. *Zero point*
3. *Washer for centering the diode zero point*

**1. Switch on the machine.**

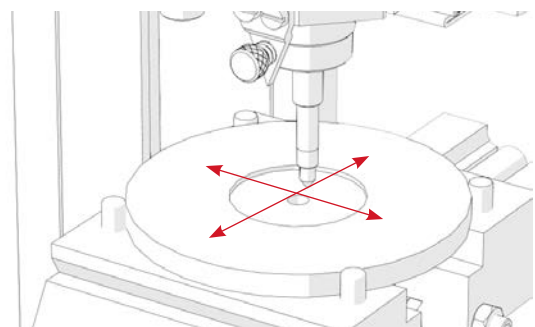
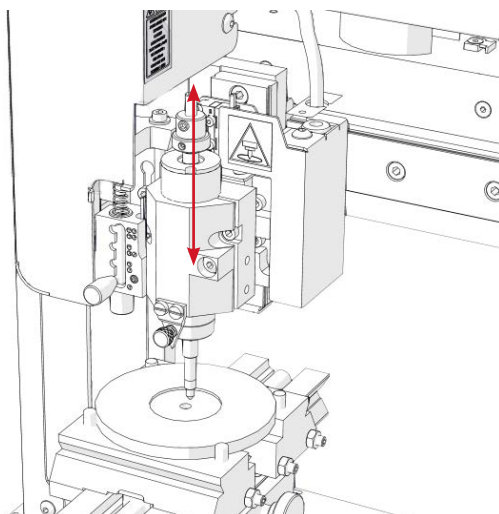
**2. Place the centering washer between the jaws of the vice. Tighten using the tightening knob.**



**3. Press simultaneously on the 2 keys: Pause - Left arrow.**

The tool holder moves to the center of the vice in order to set the zero point of the tool. It must match the zero point hole in the centering washer.

**4. Place the tool in the spindle. This must slide easily into the centering washer.** If not, remove the tool and adjust the position of the tool holder using the joystick:



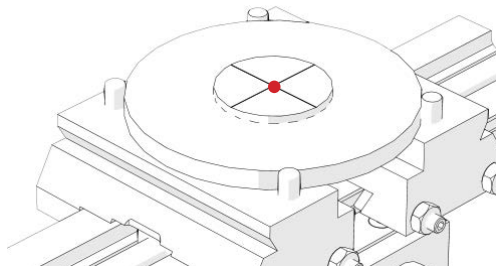
# Preventive maintenance

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Zero point axis	Control panel
Y	Up - Down arrows
X	Left arrow - Right arrow

5. Remove the tool from the spindle once the adjustment is complete.
6. Store the position of the XY zero point by pressing the "Check" key for 3 seconds. The machine emits an audible signal.

The tool holder moves to the center of the vice in order to set the zero point of the diode. It must match the zero point hole in the centering washer.



7. Set the diode zero point in the XY axis of the machine using the following keys: Up - Down - Left - Right arrows (Joystick).
8. Store the position of the XY diode zero point by pressing the "Check" key for 3 seconds. The machine emits an audible signal.



# Preventive maintenance

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## ■ Adjustment: Automatic ZRef

1. **Switch on the machine.**
2. **Use the spindle with a nose, without a cutter and without pressure (Position 1) or use the spindle with the diamond tip.**

M20 PIX: Use the spindle with the diamond tip.

3. **Position a plate in the vice.**
4. **Press simultaneously on the 2 keys: Pause - ZRef.**

The tool holder moves to the center of the vice. The spindle moves down until the tool touches the plate.

5. **Set the zero point in the Z axis of the machine using the following keys: Up - Down arrows. The point must come into contact with the surface to be marked.**
6. **Store the position of the Z zero point by pressing the "Check" key for 3 seconds. The machine emits an audible signal.**

## ■ Adjustment: JEWEL kit (ring engraving)

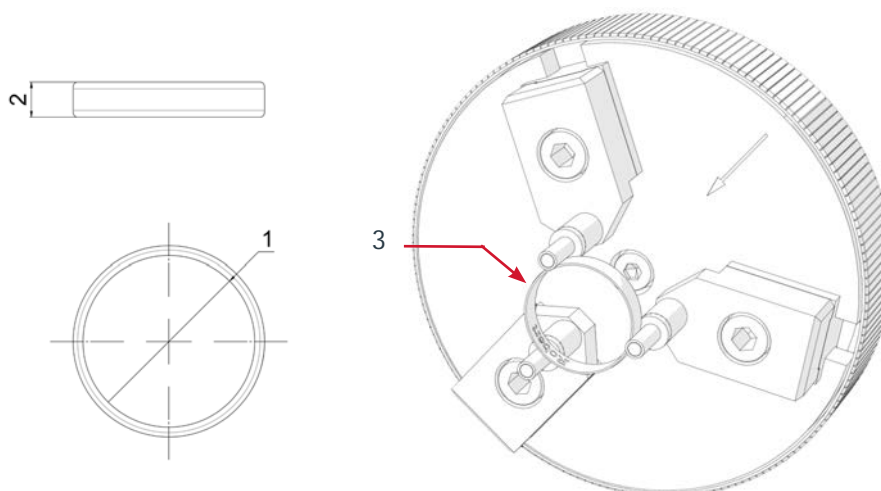
The machine needs to be adjusted after the diamond tip has been changed or after any change to the electronics.

**Adjust these settings every 3 months or whenever the machine has been moved.**

### • Adjusting the machine in X-Y:

1. **Place a reference ring in position on the chuck according to the desired marking (Exterior or Interior).**

*Inside engraving*

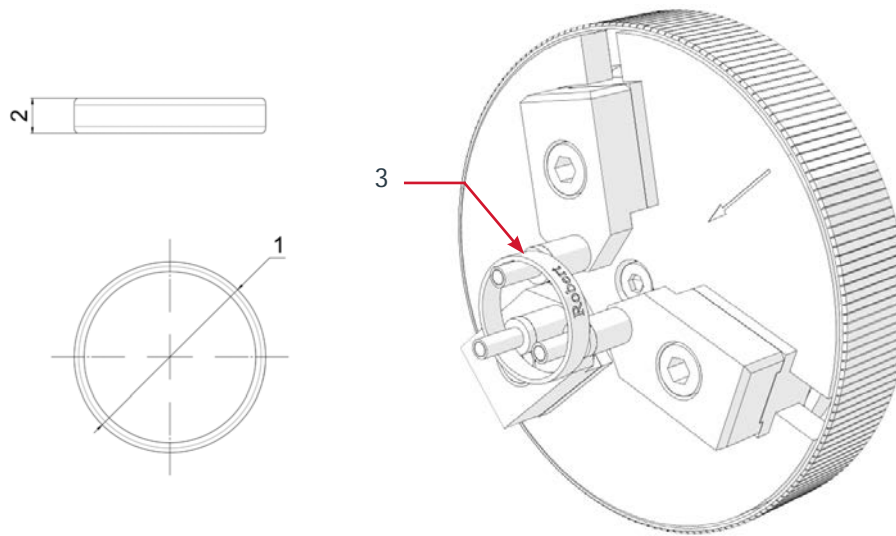


1. *Internal diameter*
2. *Width*
3. *Reference ring(s)*

# Preventive maintenance

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## Outside engraving



1. *External diameter*
2. *Width*
3. *Reference ring(s)*

**2. Switch on the machine.**

**3. Execute a composition in the engraving software, indicating the parameters of the reference ring.**

Select outside or inside engraving. Indicate the diameter and width of the reference ring according to the desired marking.

**4. Ensure that the ZRef. auto functions and center origin are selected in the engraving program.**

**5. Transfer the composition to the machine from the program.**

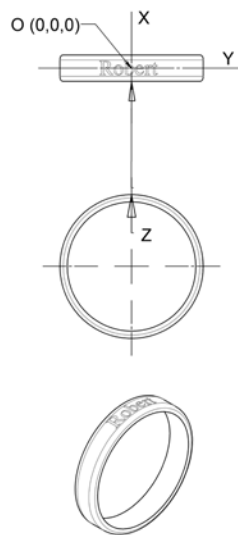
**6. Press simultaneously on the 2 keys: Pause - Left arrow.**

The diamond holder moves to the zero point.

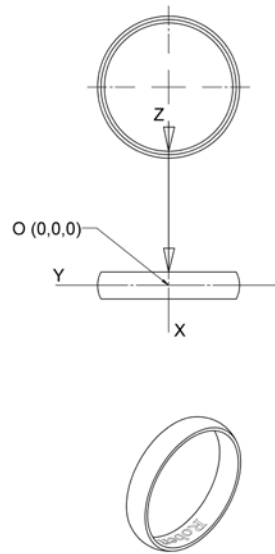
**7. Set the zero point in the Y axis of the machine using the following keys: Up - Down arrows.**

# Preventive maintenance

*Outside engraving*



*Inside engraving*



The zero point must be located at the mid-point of the width along X of the reference ring (6 mm (0.236 in)):

- Engrave O with a height of 4 mm (0.157 in) on the ring with the diamond tip.
- Visually check that the margin above and below the engraved "O" is the same (1 mm (0.039 in)). If not, move the diamond tip along the X axis with the keys: Left arrow - Right arrow.
- Perform another engraving for verification. Use the arrows to rotate the ring to avoid engraving over the top of the first O.

**8. Set the zero point in the X axis of the machine using the following keys: Right arrow - Left arrow.**

Check that the positioning aid arrow on the chuck is perfectly vertical and pointing downwards.

**9. Store the position of the XY zero point by pressing the "Check" key for 3 seconds. The machine emits an audible signal.**

The diamond tip returns to the origin.

# Preventive maintenance

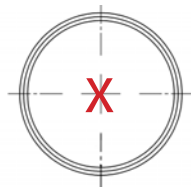
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- **Adjusting the machine in Z**

1. **Execute a composition in the engraving software, indicating the parameters of the reference ring.**
2. **Transfer the composition to the machine from the program.**
3. **Press simultaneously on the 2 keys: Pause + Z.**

The diamond holder moves to the zero point.

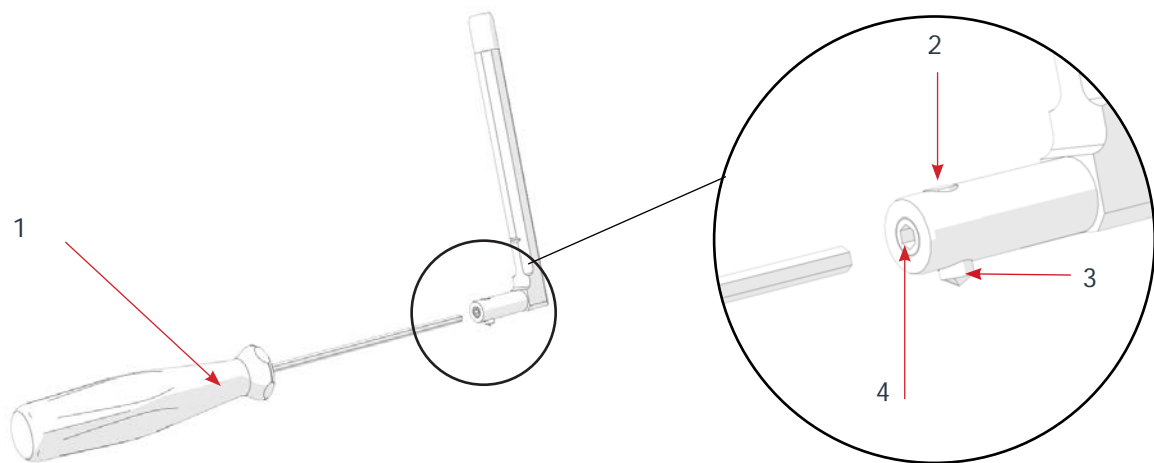
4. **Bring the diamond point to the center of the diameter of the ring (Inside engraving).**



5. **Store the position of the Z zero point by pressing the "Check" key for 3 seconds. The machine emits an audible signal.**

The diamond tip returns to the origin.

- **Changing the diamond tip**



1. *Driver (1.5 mm (0.059 in))*
2. *Half flat*
3. *Diamond point*
4. *Screw (a spare screw is supplied with the machine)*

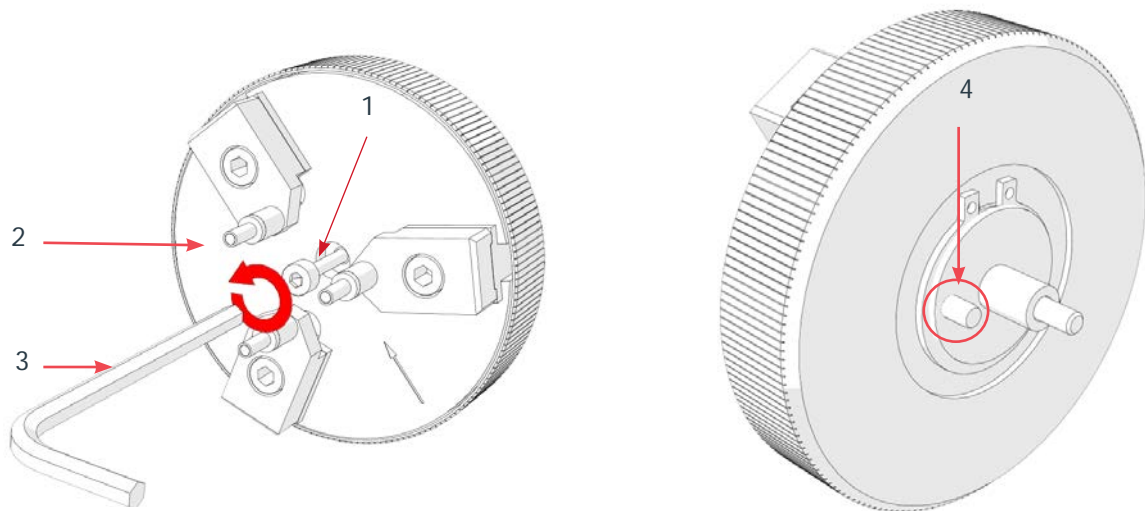
1. **Loosen the screw with the wrench. Remove the diamond tip.**
2. **Place the new diamond tip in position. Tighten the screw with the wrench.**
3. **Adjust the machine for ring engraving.**

# Preventive maintenance

- Removal and mounting of the chuck



The chuck should always be removed for flat engraving of an object of more than 85 mm (3.346 in) along Y. Otherwise, there is a risk that the tool holder might strike the jaws or the chuck.



1. Center screw
2. Chuck
3. Allen key (4 mm (0.157 in))
4. Dowel

## Removing the chuck:

1. Loosen and remove the center screw of the chuck with the wrench.

If necessary, open the jaws with the chuck clamping ring.

2. Remove the chuck.

## Mounting the chuck:

1. Position the chuck on the shaft, with the dowel.
2. Place in position and tighten the center screw of the chuck with the wrench.

# N. Marking assistance

## 1. Resolution of the problems

Incident	Resolution of the problems
The machine does not start.	<ul style="list-style-type: none"><li>- Check that the power cord is correctly plugged in to both the machine and the power supply.</li><li>- Check that there is power to the mains plug.</li></ul>
The machine is not recognised by the computer or the tablet.	<ul style="list-style-type: none"><li>- Check that the USB cable is connected to the PC and to the machine or check the Bluetooth pairing (optional)</li><li>- Check that the driver is correctly installed (Refer to the user manual for the program).</li><li>- Check that the correct spooler is selected in the program (Refer to the user manual for the program).</li><li>- Reinstall the driver (Refer to the user manual for the program).</li></ul>
"Wireless" mode is not operating (optional)	<ul style="list-style-type: none"><li>- Refer to the user manual for the program (Installation: Bluetooth).</li></ul>
Engraving is offset with respect to the centre of the jig.	<ul style="list-style-type: none"><li>- Adjustment of the X-Y axis origin (See: XY setting of the machine with vice)</li><li>- Center the object in the vice.</li></ul>
Engraving is too shallow or too deep.	<ul style="list-style-type: none"><li>- Check the depth value input into the program.</li><li>- Check the regulating nose adjustment (if used).</li><li>- Check the spindle pressure.</li><li>- Check that the cutter is coming into contact with the object.</li></ul>
There are lines on the object between the letters.	<ul style="list-style-type: none"><li>- Increase the clearance in the program.</li></ul>
The cutter is not reaching the object.	<ul style="list-style-type: none"><li>- Manual Z: Check the tool setting (See: Engraving: no nose).</li></ul>
The light is not lighting up.	<ul style="list-style-type: none"><li>- Press simultaneously on the keys: Shift + Up arrow.</li></ul>

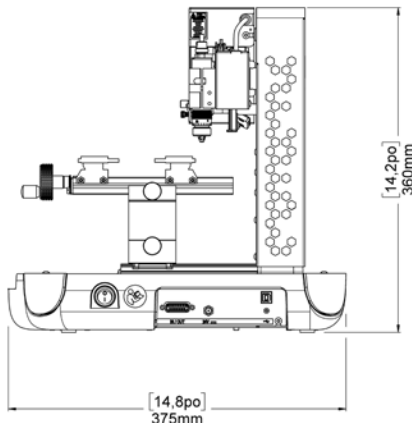
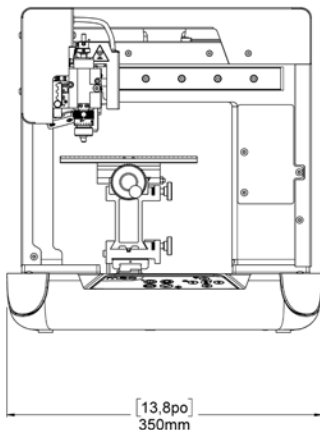


**If the machine emits a long beep followed by a short beep and there is no movement, call a Gravotech technician.**

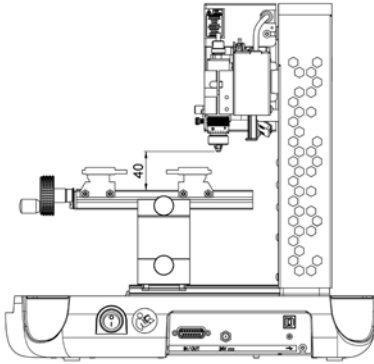
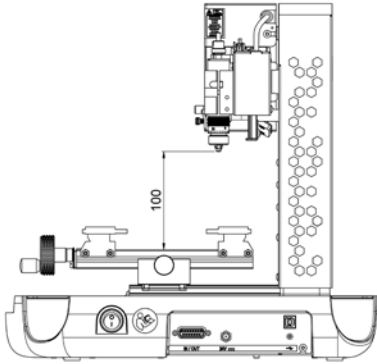
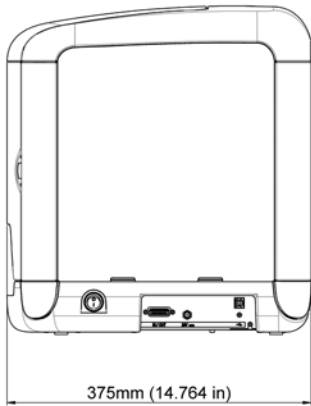
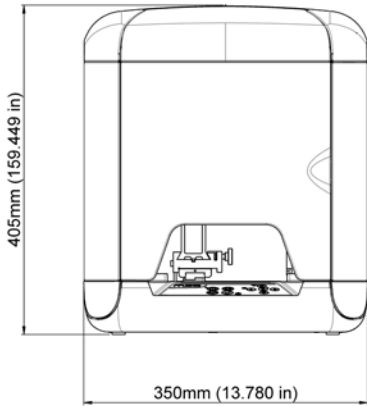
If the problem persists, contact the reseller.

# O. Technical specifications

## 1. Physical characteristics

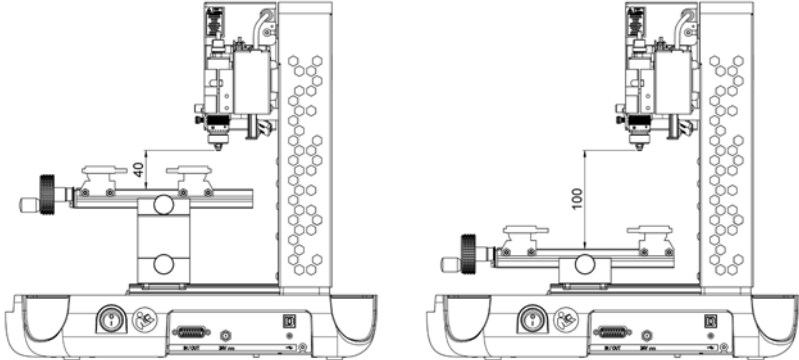
	M20 - M20 PIX	M20 JEWEL	M20 PEN
Dimensions (L x w x h): Machine	<div></div> <div></div>		
Net weight: Machine (no accessories)	11.9 kg (26.235 lb)	13.5 kg (29.762 lb)	
Dimensions (L x D x H): with packaging	480 mm (18.898 in) x 500 mm (19.685 in) x 600 mm (23.622 in)		
Weight: with packaging	17.6 kg (38.801 lb)	19.2 kg (42.329 lb)	
Engraving area (useful surface area)	100 mm (3.937 in) x 100 mm (3.937 in) / 120 mm (4.724 in) x 100 mm (3.937 in) (Maximum)		
Engraving area (with chuck)	-	Maximum: 95 mm (3.740 in) x 100 mm (3.937 in)	Maximum: 100 mm (3.937 in) x 100 mm (3.937 in)
Object to be engraved: Dimensions	190 mm (7.480 in) x 110 mm (4.331 in) (Maximum)		
Pen: Diameter: - Minimum - Maximum Length: - Minimum - Maximum	-	-	3 mm (0.118 in) 28 mm (1.102 in)  70 mm (2.756 in) 140 mm (5.512 in)
Travel distance Z	30 mm (1.181 in)		

# Technical specifications

	M20 - M20 PIX	M20 JEWEL	M20 PEN
Clearance under spindle Z (Maximum)	 		
	40 mm (1.575 in) - 100 mm (3.937 in)		
Surface flatness	< 0.1 mm (0.004 in) (Vice)		
	M20 CUBE		
Dimensions (L x w x h): Machine	 		
Net weight: Machine (no accessories)	15 kg (33.069 lb)		
Dimensions (L x D x H): with packaging	480 mm (18.898 in) x 500 mm (19.685 in) x 600 mm (23.622 in)		
Weight: with packaging	20.7 kg (45.636 lb)		
Engraving area (useful surface area)	100 mm (3.937 in) x 100 mm (3.937 in) / 120 mm (4.724 in) x 100 mm (3.937 in) (Maximum)		
Engraving area (with chuck)	-		
Object to be engraved: Dimensions	190 mm (7.480 in) x 110 mm (4.331 in) (Maximum)		



# Technical specifications

	M20 CUBE
Travel distance Z	30 mm (1.181 in)
Clearance under spindle Z (Maximum)	 <p>40 mm (1.575 in) - 100 mm (3.937 in)</p>
Surface flatness	< 0.1 mm (0.004 in) (Vice)

	Diameter	Pen / Cup
Depth regulating nose: standard nose Scaled knob fully tightened	Minimum	20
	Maximum	70
Depth regulating nose: 3.3 mm (0.130 in) Scaled knob fully tightened	Minimum	4
	Maximum	54
Depth regulating nose: diamond point - fixed Scaled knob fully tightened	Minimum	20
	Maximum	70
Depth regulating nose: diamond point - fixed (L16) Scaled knob fully tightened	Minimum	5
	Maximum	55

# Technical specifications

## 2. Engraving characteristics

	M20 / M20 JEWEL	M20 PEN	M20 PIX
Opening the vice (Maximum)	105 mm (4.134 in)		
Clearance under spindle Z (Maximum)	40 mm (1.575 in) - 100 mm (3.937 in)	32 mm (1.260 in) - 92 mm (3.622 in)	-
Clearance under spindle Z: with jigs + standard nose (Maximum)	20 mm (0.787 in) - 80 mm (3.150 in) Scaled knob fully tightened	12 mm (0.472 in) - 72 mm (2.835 in) Scaled knob fully tightened	16 mm (0.630 in) - 76 mm (2.992 in)
Clearance under spindle Z: with jigs - no nose (Maximum)	28 mm (1.102 in) - 88 mm (3.465 in)	26 mm (1.024 in) - 86 mm (3.386 in)	
Clearance under spindle Z (Total): standard nose (Maximum)	38 mm (1.496 in)	-	
Clearance under spindle Z (total): no nose (Maximum)	45 mm (1.772 in) - 105 mm (4.134 in)		37 mm (1.457 in) - 97 mm (3.819 in)
Automatic adjustment of the Z origin (Automatic ZRef.)	Yes		
Red pointer	Laser diode < 1 mW - 650 nm		
Engraving precision along XY (Maximum)	< 0.2 mm (0.008 in) < 0.5% of the movement value		
Type of spindle(s)	Rotating spindle / through spindle with cutter button brushless motor		Tool holder: Fixed
Diameter (tool)	4.36 mm (0.172 in)		3.17 mm (0.125 in)
Speed of rotation (Maximum)	19200 rpm		-
Power	25 W		-
Depth regulating nose	Compatible with all the depth regulating noses Gravotech		-

# Technical specifications

## ■ Movement speed

	Axis	For all machines
Movement speed: No load (Maximum)	X,Y	40 mm (1.575 in)/s
	Z	40 mm (1.575 in)/s
Movement speed: Engraving (Maximum)	X,Y	40 mm (1.575 in)/s
	Z	40 mm (1.575 in)/s
Movement speed: Diamond engraving (Maximum)	X,Y	40 mm (1.575 in)/s
	Z	40 mm (1.575 in)/s
Acceleration: Engraving (Maximum)	X,Y	1000 mm (39.370 in)/s <sup>2</sup>
	Z	1000 mm (39.370 in)/s <sup>2</sup>
Acceleration: PIX mode (Maximum)	X,Y	5000 mm (196.850 in)/s <sup>2</sup>
	Z	15000 mm (590.550 in)/s <sup>2</sup>
Repeatability	-	< 0.05 mm (0.002 in)

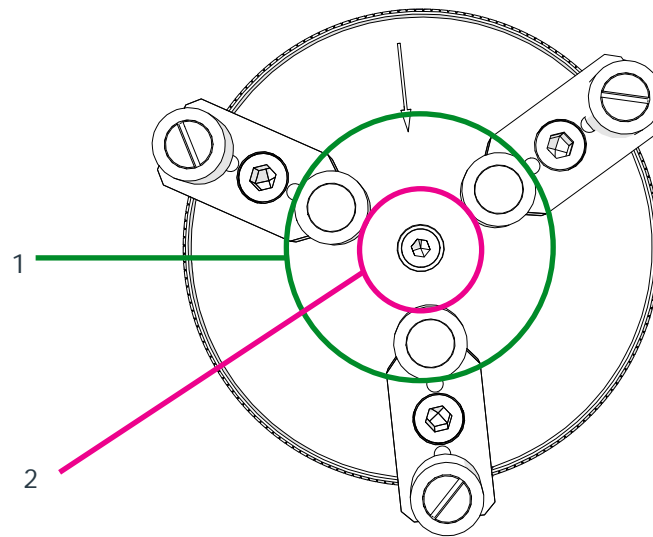
## ■ M20 JEWEL (ring engraving)

Internal diameter (Minimum - Maximum) Width (Maximum)	12.5 mm (0.492 in) - 24 mm (0.945 in) 9 mm (0.354 in)
For interior clamping: External diameter (Minimum - Maximum) Width (Maximum)	12.5 mm (0.492 in) - 27 mm (1.063 in) 18 mm (0.709 in)
For exterior clamping (Plain band wedding ring): External diameter (Minimum - Maximum) Width (Maximum)	12.5 mm (0.492 in) - 26 mm (1.024 in) 18 mm (0.709 in)

## ■ M20 JEWEL (Cup)

Diameter: Minimum Maximum	10 mm (0.394 in) 80 mm (3.150 in)
Width: Minimum Maximum	2 mm (0.079 in) 130 mm (5.118 in)
Diameter 1 For interior clamping (Outside marking): Minimum Maximum	20 mm (0.787 in) 89 mm (3.504 in)
Diameter 2 For exterior clamping (Inside marking): Minimum Maximum	5 mm (0.197 in) 65 mm (2.559 in)

# Technical specifications



1. Diameter 1: for exterior clamping
2. Diameter 2: for interior clamping

## 3. Noise emission of the machine (ISO 11201 standard)

<b>L<sub>Aeq</sub> - when awaiting engraving</b>	51 dB (A) +/- 1
<b>L<sub>Aeq</sub> - during nominal engraving</b>	69 dB (A) +/- 2
<b>L<sub>pc</sub> peak - peak at rated engraving</b>	< 89 dB (C)

## 4. Electrical characteristics

<b>Electronics</b>	Integrated
<b>Nominal voltage / Type of current</b>	External power supply unit Input: AC 100 - 240 V Output: 24 V
<b>Current</b>	Maximum: 1.7 - 0.75 A
<b>Frequency</b>	50-60 Hz
<b>Consumption</b>	180 W
<b>Protection(s)</b>	-

## 5. Environment

<b>Operating temperature</b>	5 °C (41 °F) - 40 °C (104 °F)
<b>Storage temperature</b>	-5 °C (23°F) - 45 °C (113 °F)
<b>Humidity level</b>	20 - 80 %

# Technical specifications

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## 6. Point & Shoot

<b>Type</b>	Laser diode
<b>Wavelength</b>	630 - 680 nm
<b>Power</b>	1 mW (Maximum)
<b>Class</b>	Class 2

## 7. Connection(s)

<b>Connection to computer</b>	USB - 1.1
<b>Input/output link</b>	Sub-D 15 (Female)
<b>Control panel</b>	Tactile dome membrane
<b>Number of keys</b>	9
<b>Screen</b>	No

## 8. Accessories available upon request

### ■ Tailstock (pen engraving)

<b>Pen: Diameter</b>	28 mm (1.102 in) (Maximum)
<b>Pen: Length</b>	70 mm (2.756 in) (Minimum) 140 mm (5.512 in) (Maximum)