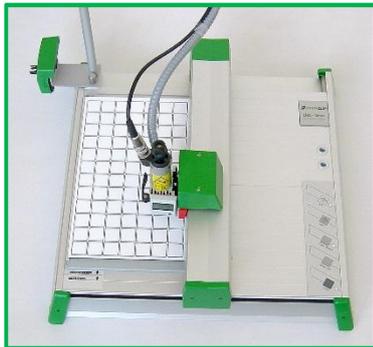


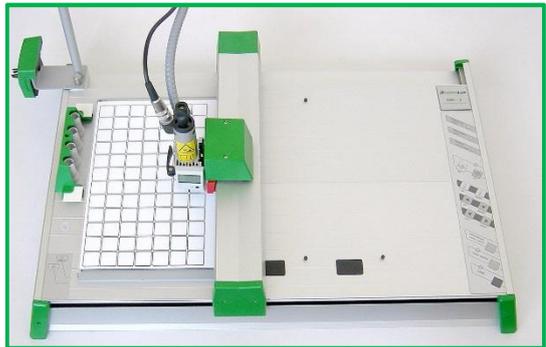
# **CONTA CLIP**

## *Manual* *EMS-3 Engraver*

EMS-3eco (half size)



EMS-3 (full size)



Engraver Controller (EC)



Engraver- Vacuum-Cleaner (EVC)



Release: March 23, 2018

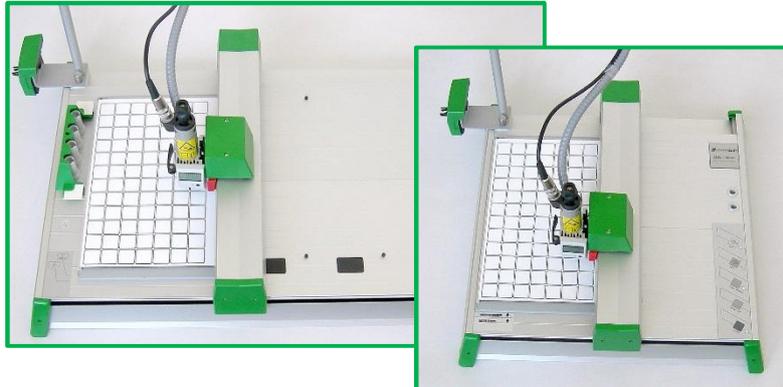
# Guide to adapting the EMS-3 Engraver to the EMS-3 Plotters

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## 1. Adaption EMS-3 Engraver

The EMS-3 Engraver was specifically designed for getting adapted to the EMS-3. Other plotters will not be able to carry the unit.



The main purpose of the EMS-3 Engraver is the engraving of 2-layer plastic mats. Pre-cut mats in different sizes can be delivered by **Conta-Clip Verbindungstechnik GmbH**

With the use of other materials like aluminium, brass, stainless steel and glass special tools will be needed.

The use of lubrication and cooling fluid is not suggested at all, as the Engraver-Vacuum-Cleaner (EVC) cannot handle any fluid.

**Note:** Please use the engraving needles supplied by us only. Any other brand will possibly lower the engraving result and we will not accept any quality claim.



**Important notice:** Please read the **General Safety Rules** carefully and follow them, as **Conta-Clip Verbindungstechnik GmbH** shall under no circumstances be liable for damage or any personal injury caused by not following the **Safety Rules and Instructions**.

## 2. Scope of supply of the EMS-3 Engraver



Engraving spindle



Engraving head



Connecting cable for  
Engraving spindle



Hose for  
Engraver-Vacuum-Cleaner



Engraver Controller (EC)



Connecting cable for  
Engraver-Controller EC – EMS-3



Power cord for  
Engraver-Controller EC



Engraver-Vacuum-Cleaner (EVC)

## 2. Scope of supply of the EMS-3 Engraver



Connecting cable for  
Engraver-Vacuum-Cleaner (EVC)



Holding bracket



Holding pipe



Bracket for holding  
hose and cable



Stud



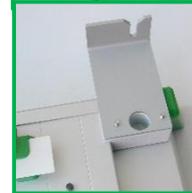
Engraving needle 0.15 mm 15°

### 3. Connection and assembly of the EMS-3 Engraver

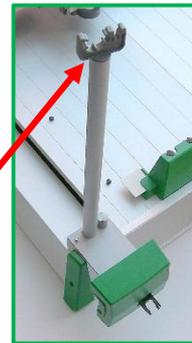
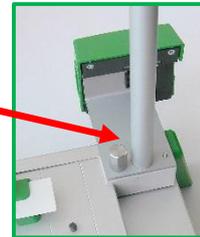
The connection and assembly of the **EMS-3 Engraver** is easy to work through. The components need careful treatment in order to prevent any damage. The following describes the assembly in detail.

#### 3.1 Assembly of the support arm for cable and hose

Place the support bracket on the top left of the plotter as shown right and push into the side of the plotter profile.



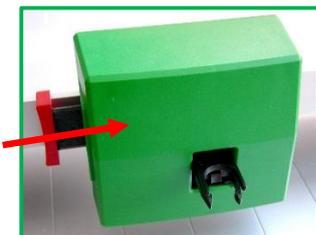
Insert the aluminium pipe into the holding bracket.



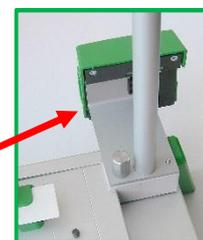
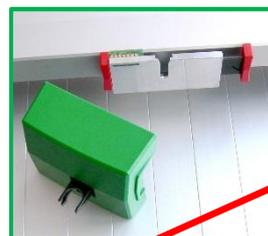
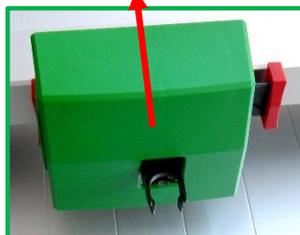
Place the bracket into the top of the pipe, for holding the cable and the hose.

#### 3.2 Disassembly of the Pen holder from the EMS-3 plotter

Push the **Interlocking slide** to the right and unlock the **Pen holder**.



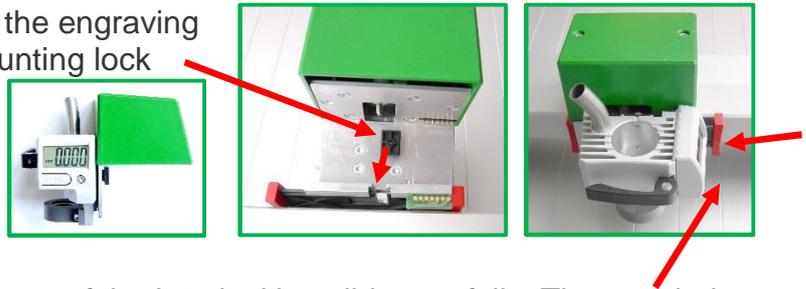
Lift up the **Pen holder** carefully.



Store the **Pen holder** on the holding bracket.

### 3.3 Installing the Engraving head of the EMS-3 Engraver

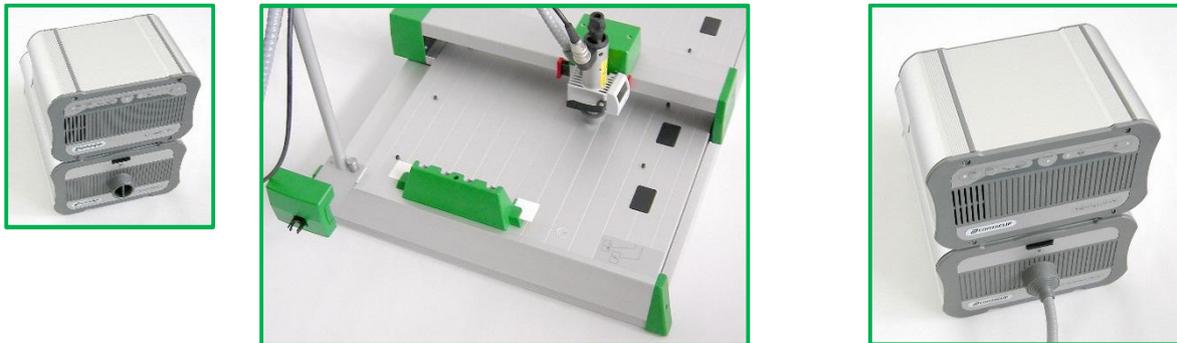
Please pay attention to connect the engraving head by inserting the centre mounting lock carefully.



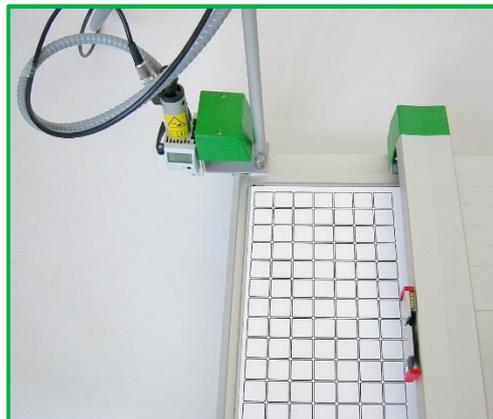
Put the engraving head into the gap of the Interlocking slide carefully. Then push the Interlocking slide with red buttons to the left to fix the engraving head.

### 3.4 Arrange Engraver-Vacuum-Cleaner (EVC) and Engraver Controller (EC)

Arrange the units behind the EMS-3 / EMS-3eco Plotter.



Always store the penholder or engraving head in its dedicated position.



### 3.5 Connecting the cables

Connect the Engraver-Vacuum-Cleaner cable between the Engraver-Vacuum-Cleaner (EVC) and the Engraver-Controller (EC), tighten the plugs on each end.



Connect the Engraver-Controller cable between the EMS-3 plotter and the Engraver-Controller (EC), tighten the plugs on each end.



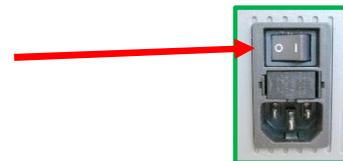
Connect the spindle cable to the Engraver-Controller (EC) and fix it.



Connect the power cord to the Engraver-Controller (EC). Later connect the plug to the electrical outlet.

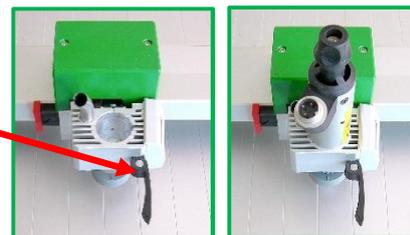


The main fuse is placed under the ON/OFF switch (4A).

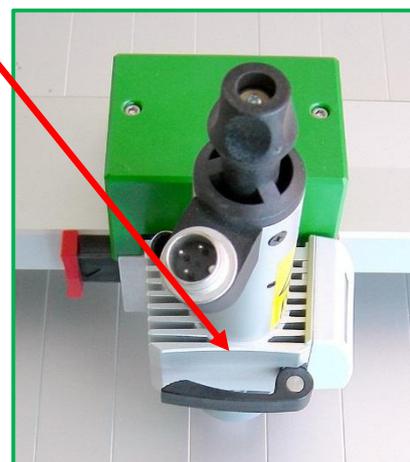


### 3.6 Installing the Engraving spindle into the Engraving head

Insert the engraving spindle into the engraving head shown right and fix the spindle with the lever.



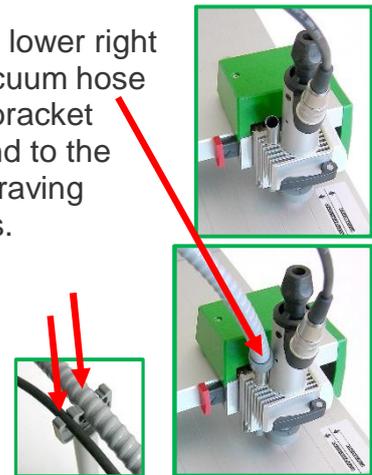
The engraving spindle has a .5 mm 15° engraving needle pre-installed from the factory.



**Attention: Please read and follow the safety instructions for use.**

### 3.7 Connections on the Engraving head

Manually move the plotter arm with the engraving head to the lower right corner, the EMS-3 plotter must be turned off. Connect the vacuum hose to the engraving head shown right and clip the hose into the bracket placed in the pipe with a slight bend. Connect the opposite end to the Engraver-Vacuum-Cleaner (EVC). The connection of the engraving spindle and the Engraver-Controller (EC) is the same process. Tighten all screws at the connection plugs.

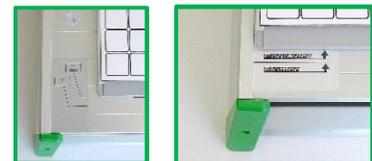


### 3.8 Test run

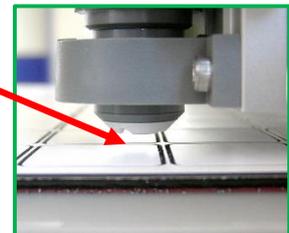
First turn on the power with the switch located at the back of the Engraver-Controller (EC). Then turn on the EMS-3 plotter. The engraving head moves to its zero (home) position. The green LED (Engraving mode) should be on on the EMS-3 plotter, the EMS-3eco has no indication. Turn off the EMS-3 plotter thereafter. It is only a check that the EMS- Engraver is recognised.

### 3.9 Placement of the Engraving material

Place the support plate together with the engraving material on the **EMS-3** or **EMS-3eco**, shown right. Move the plotter arm manually with the engraving head over the engraving material. The plotter must be turned off, the engraving head in the upper position.

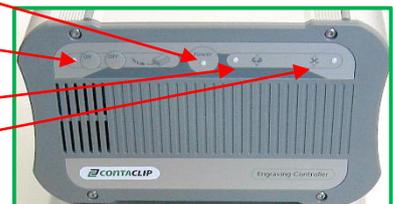


**Important:** The distance between the lower end of the spindle and the surface of the engraving material must be min. 2mm. Now turn on the Engraver-Controller (EC) and then the EMS-3 in order to start the engraving unit. The green LED should be on at the EMS-3 plotter, the EMS-3eco has no indication.



### 3.10 Buttons and indications of the Engraver EMS-3

The power switch of the Engraver-Controller (EC) is placed at the back, once switch on the **green LED** is lit. The Engraver-Controller (EC) controls the Engraver-Vacuum-Cleaner (EVC) automatically. In case the Engraver-Controller (EC) should be operated manually e.g. to clean the engraved material after the job is completed, use the ON and OFF button. The proper operation of the spindle is indicated with the **yellow LED**, any failure of the spindle will be indicated with the **red LED** and the engraving will be stopped immediately.

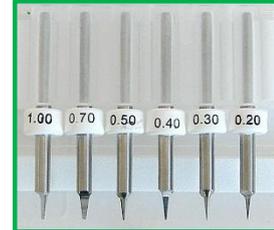


#### 4. Engraving depth

The engraving depth will be adjusted through the depth controller at the bottom of the engraving spindle. Depending on the size and the angle of the engraving needles as well as the engraving depth, certain engraving widths can be achieved.

We suggest engravings with the needle of 15 degrees for 2-layer-pastic mats.

The engraving needles are available in sizes of 0.2; 0.3; 0.4; 0.5; 0.7; 1.0 mm.



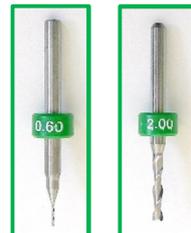
For the engraving of aluminium plates we recommend using needles with an angle of 35 degrees.

The engraving needles are available in sizes of 0.2 and 0.4 mm.



For normal use of 2-layer-plastic mats and large characters and numbers we recommend using the double tooth needles (fish-tail).

The engraving needles are available in sizes of 0.6 and 2.0 mm.



Further sizes are available on request.

#### 4.1 Calibration and Zero setting of the Engraving tool (Standardization of the engraving needle)

The engraving head is equipped with an indicator counting the steps of the depth controller for setting the engraving depth. Usually it is off, just a short click on the front button turns on the counter.

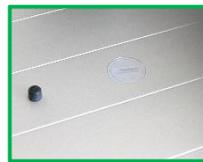


If pressed again for approx. 3 seconds, the counter will change from mm to inch counting and vice versa. If not used for 15 minutes the counter will turn off. Inside the counter you can find a small battery, type CR 2032.

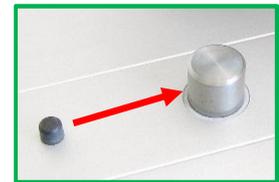


When using the **EMS-3eco** please proceed as follows:

Unscrew the plug with a coin or similar tool and screw onto the holding bracket, take the stud and screw into the same position as shown.



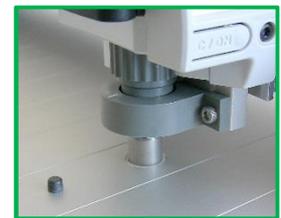
You need to be in the engraving mode, the Engraver-Controller (EC) needs to be switched on first and the green LED must be ON.



When using the EMS-3 Engraver the first time, insert the spindle with the needle sticking out of the depth controller. Now hold down the button **Beep Off** and press the **ON** button at the **EMS-3eco** plotter.

The **Clear buffer** LED flashes, all other LEDs are off. Then press the **Beep Off** button once and then after the **STOP** button.

The plotter in the engraving mode moves to the position of the **zero adjustment point** as shown right. The engraving head lowers until the contact between the needle and the metal stud is made, saves the value and returns to the home position. Now the general calibration of the height between the tip of the needle and the engraving head is done, only needed to be done once with the set-up of the system.



**Note:** If there is no contact made because the needle is not sticking out, the **ON** LED flashes together with the **STOP** LED.

Turn off the plotter, change the needle setting and start again.

Press the **Beep Off** button, the engraving head moves to the position of the zero adjustment and the engraving head will be lowered. With the needle inserted (sticking out of the depth controller) the beep signal is heard. Turn the depth controller to the left until the beep turns off. This sets the engraving needle to the **zero position**.

If the beep is not noticeable when the engraving head is fully lowered, turn the depth controller to the right until the beep is noticed. Then turn it by one latch engagement position to the left. The beep will go off and the **zero position** is set.

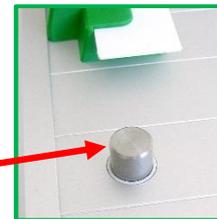
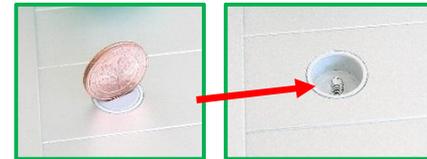
Press the button on the counter in order to zero the number of the indicator. Then press the **Beep Off** button again and the head moves to the home position, ready to use.

When using the **EMS-3** please proceed as follows:

Unscrew the plug with a coin or similar tool and screw onto the holding bracket, take the stud and screw into the same position as shown.

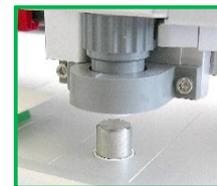
You need to be in the engraving mode, the Engraver-Controller (EC) needs to be switched on first and the green LED must be ON.

When using the EMS-3 Engraver the first time, insert the spindle with the needle sticking out of the depth controller.



Now hold down the buttons **Cursor up** and **Cursor down** and press the **ON** button.

The plotter in the engraving mode moves to the position of the **zero adjustment point** as shown right. The engraving head lowers until the contact between needle and the metal stud is made, saves the value and returns to the home position.



Now the general calibration of the height between the tip of the needle and the engraving head is done, only to be done once with the set-up of the system.



**Note:** If there was no contact made because of the needle not sticking out, the **plotter out of order LED** flashes together with the **STOP LED**. Turn off the power of the plotter, change the needle setting and start again.

Press the **Penstation** button, the engraving head moves to the position of the **zero adjustment** and the head will be lowered. With the needle inserted into the spindle, the beep signal is either on or off, depending on the needle setting. Turn the depth controller to the left until the beep signal turns off. This sets the engraving needle to the "**zero position**". If the beep is not noticeable when the engraving head is fully lowered, turn the depth controller to the right until the beep signal will be noticed. Then turn it by one latch to the left. The beep signal will go off and the "**zero position**" is set.

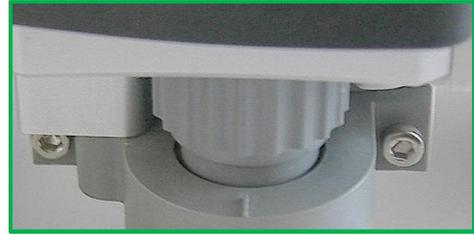


Press the button of the indicator in order to zero the number. Then press the **Penstation** button again and the engraving head moves to the home position.



## 4.2 Adjustment of the Engraving depth

The adjustment of the engraving depth is done by manually turning the depth controller. Each clockwise turn will increase the depth, each counter-clockwise turn will reduce the depth. With the turn of the depth controller a notch is noticeable. The display shows the steps in mm or inch after zero setting.



With each notch the engraving needle will change the position of .050 mm in either direction. One complete turn of the depth controller counts 20 notches and is equal to 1 mm in change of the depth of the engraving needle. The counter indicates the steps on the display.



**Attention:** The tip of the engraving needle is very sensitive and needs to be treated carefully. Prevent damaging the point, if damaged the engraving quality will be extremely limited.

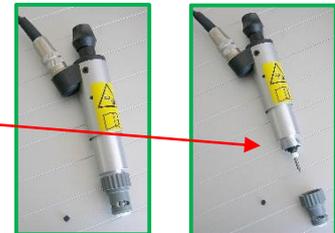
## 5. Changing of the Engraving needle

In order to change the engraving needle, please follow the steps below:  
Open the lever of the clamp on the engraving head and take out the spindle. The hose and cable can be left on.

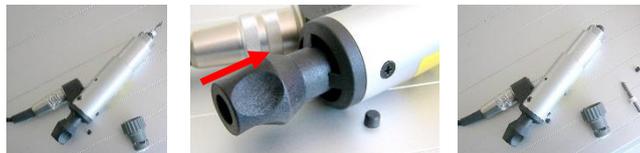


**Attention: Engraving needle and spindle could be hot!**

Unscrew the depth controller of the engraving spindle completely.



Thereafter, the clamp holding the needle needs to be opened by pressing the knob at the end of the spindle towards the needle. Find the position with the lowest point and turn the knob CCW, that opens the clamp and the engraving needle can be pulled out.



**Attention:** Open the clamp only a few turns to pull out the engraving needle, open the clamp completely for cleaning purposes only.

Please use the engraving needles only delivered by  
**Conta-Clip Verbindungstechnik GmbH.**

With the use of other brands the company will not be responsible for the lack of quality or any other damage of the unit.

**Attention:** The point of the engraving needle is very sensitive and needs to be treated carefully. Prevent damaging the tip, if damaged the engraving quality will be extremely limited.

Insert and fix a new engraving needle by pushing the needle fully into the spindle to the indicator ring and close the clamp by turning the knob CW.



Screw the depth controller onto the spindle.

Insert the spindle into the engraving head and tighten the lever.

Proceed with the zero setting adjustment. (chapter 4.1).

## 6. Engraver-Vacuum-Cleaner (EVC) Bag and Filter change

The **Engraver-Vacuum-Cleaner (EVC)** was specifically designed for use with the **EMS-3 Engraver** in order to pick up the engraving dust directly at the spindle and store it in a bag.

### 6.1 Changing the Vacuum bag

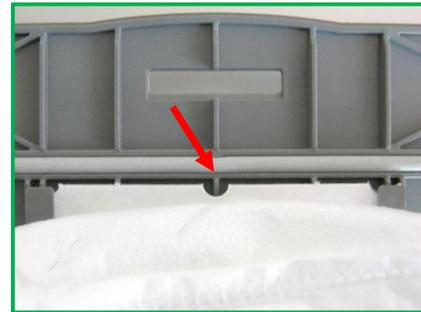
The vacuum cleaner bag are standardized. Replacement bags are available in our product range. First pull out the hose. Press up the knob at the front panel.



Then the front panel with the bag will open.



The card fixing of the bag is marked with a gap for the insert.



Insert a new bag in the reverse order.

### 6.2 Changing or cleaning the Motor dust-filter

Once the front panel is open the internal motor dust-filter can be removed. You need to follow the housing of the bag and take out the filter with your hand. Depending on the numbers of engravings the filter needs to be cleaned from time to time. The motor-filter is part of the Vacuum bag set.



## 7. Instructions for cleaning the Engraving spindle

The engraving spindle is a very sensitive item and needs to be treated carefully. Use the spindle in low dust environments only. A high dust concentration at the work bench will cause clogging of the ball bearings and consequently the spindle can be off-centred. Never use pressurized air for cleaning the spindle because of losing the inside lubrication of the bearings. Never use lubrication during the engraving process. Do not clean the spindle with water.

If any dust has collected within the clamp, take out the needle and unscrew the clamp completely by using the knob. Clean the front part of the clamp saddle carefully using a Q-Tip.

## 8. Troubleshooting

***Engraver-Controller (EC) cannot to be switched on.***

***The green „Power“-LED is not on.***

Check if the power cord is connected correctly and the mains supply is available at the outlet.

Next check the AC input fuse at the back of the Engraver-Controller (EC). Disconnect the cable at both ends and pull out the fuse holder, located beneath the on/off switch.

***The red LED „spindle failure“ on the Engraver-Controller (EC) is on.***

**Attention:** The engraving will be stopped immediately.

The high RPM-spindle is either faulty or overloaded. To verify, hold down the ON and OFF button on the front panel of the Engraver-Controller (EC) and switch on.

The Engraver-Vacuum-Cleaner (EVC) starts to run and shortly after the engraving spindle. The RPM of the spindle can be altered using the ON or OFF buttons on the front panel of the Engraver-Controller (EC).

The spindle needs to be replaced if the red LED is still on.

***Unable to engrave.***

Check the connection cable between Engraver-Controller (EC) and the **EMS-3** plotter. Pay attention to the message of the labeling software on the screen. Switch on the Engraver-Controller (EC) first and then the plotter. Verify also the correct mounting of the engraving head and the cable connection between the Engraver-Controller (EC) and the spindle.

The green LED on the EMS-3 plotter must be on (no indication on the EMS-3eco).

***The engraved result is poor, letterings are inconsistent, lines are not sharp.***

First check if the engraving needle is broken or somehow damaged, if so the needle needs to be replaced.

Check if engraving dust remains in the head, depth controller or clamp of the spindle. Unscrew the depth controller and the clamp carefully. Clean the depth controller and the clamp of the spindle according to the manual “Instructions for cleaning the Engraving Spindle” (chapter 7).

**Attention:** Do not use pressurized air for cleaning the spindle.

***The engraving depth is not sufficient.***

The 2 mm distance between the depth controller and the surface of the engraving material must be correct. Move the engraving head of the EMS-3 plotter manually over the engraving material, the plotter must be turned off and check the distance. (chapter 7)

Make sure the engraving head and depth controller are adjusted correctly. (chapter 4.1)

## 9. Accessories

| Description  | Part no.   | Picture   |
|--|------------|---|
| Engraving needle Set, 15 °<br>.2; .3; .4; .5; .7; 1.0 mm     | 1629.0     |    |
| Engraving needle 15°, 0.2 mm                                 | 1623.0     |   |
| Engraving needle 15°, 0.3 mm                                 | 1624.0     |   |
| Engraving needle 15°, 0.4 mm                                 | 1625.0     |   |
| Engraving needle 15°, 0.5 mm                                 | 1626.0     |    |
| Engraving needle 15°, 0.7 mm                                 | 1627.0     |   |
| Engraving needle 15°, 1.0 mm                                 | 1628.0     |   |
| Engraving needle for aluminium 0.2mm                         | 1635.0     |    |
| Engraving needle f. aluminium 0.4mm                          | 1636.0     |    |
| Engraving needle 0.60<br>Fishtail – double tooth cutter      | 1637.0     |  |
| Engraving needle 2.00<br>fishtail – double tooth cutter      | 1638.0     |  |
| Vacuum cleaner bag set<br>1 x motor filter<br>(set of 5 + 1) | 1659.0     |  |
| Universal Engraving- and Plot support plate<br>(half size)   | 1604.0     |  |
| Universal Engraving- and Plot support plate<br>(full size)   | 1622.0     |  |
| Engraving material   | on request |   |

## 10. Technical data

|  |  |
|--|--|
| Environmental conditions:<br>For all units | Operation: 10°C (50°F) up to 35°C (95°F)<br>rel. Humidity: 35% to 75% no condensation<br>Storage: -10°C (14°F) up to 50°C (122°F)<br>rel. Humidity: 10% to 90% no condensation |
| Safety certificate:                        | EN 60950-1   |
| Interference safety compliance:            | EN 55022 B<br>EN 61000-3-2 and 3<br>EN 61000-4-2 to 6, EN 61000-4-11<br>EN 61000-6-2, EN 61000-6-3   |
| <b>Engraving spindle</b>                   |  |
| Revolution speed:                          | min. 5000 RPM, max. 50.000 RPM   |
| Torque:                                    | 6 Ncm  |
| Frequency:                                 | 83-830 Hz  |
| Power consumption:                         | max. 60 W  |
| Clamp:                                     | Shaft diameter 3 mm (.118 inch)  |
| Clamp mechanism:                           | Head clamp   |
| Revolution accuracy with clamp:            | 0.03 mm  |
| Motor details:                             | Three-phase asynchronous, brushless  |
| Housing:                                   | Aluminium  |
| Holding diameter:                          | 25 mm (.984 inch)  |
| Ball bearing:                              | Double, steel, permanent lubricated  |
| Cooling:                                   | Air through integrated fan   |
| Weight:                                    | approx. 280 g (.62 pounds)   |
| Overall length:                            | approx. 175 mm (6.89 inch)   |
| Usage:                                     | Engraving only   |
| Guaranteed bearing lifetime:               | min. 1000 hours at appropriate usage   |
| <b>Engraver Controller (EC)</b>            |  |
| Voltage supply:                            | 110-240 V ~ 50-60 Hz   |
| Main fuse:                                 | 4A, slow-blow  |
| Measurements:                              | 180 mm x 250 mm (7.08 inch x 9.84 inch)  |
| Weight:                                    | approx. 2.7 KG (5.95 pounds)   |
| <b>Engraver- Vacuum-Cleaner (EVC)</b>      |  |
| Input voltage:                             | 24 VDC   |
| Power consumption:                         | max. 55 W  |
| Vacuum cleaner bag:                        | Swirl Type Y98   |
| Measurements:                              | 350 mm x 250 mm (13.78 inch x 9.84 inch)   |
| Weight:                                    | approx. 4.6 KG (10.15 pounds)  |

## 11. General Safety Rules

### **WARNING: READ ALL INSTRUCTIONS**

Failure to follow the **SAFETY RULES** listed below, and other safety precautions, may result in serious personal injury.

**Note: Save these instructions!**

#### **Work Area**

Keep work areas clean. Cluttered areas and benches invite accidents.

Avoid dangerous environments. Don't use this unit in damp, wet locations or outdoors. Do not expose the unit to rain. Keep work area well lit.

Avoid gaseous areas. Do not operate with the unit in an explosive atmosphere or in presence of flammable liquids or gases. The unit can generate sparks and the sparks might ignite fumes.

Keep children away. Do not let visitors contact the unit or the extension cord. All visitors should be kept away from the work area.

#### **Personal Safety**

Guard against electric shock. Prevent body contact with grounded surfaces. For example; pipes, radiators, ranges and refrigerator enclosures. A **Ground Fault Circuit Interrupter** protects the power line and should be used in any case.

Dress properly. Do not use loose clothing or jewelry. They can get caught in moving parts. Wear protective hair covering to contain long hair.

Use safety equipment, wear safety goggles or glasses with side shields. Wear hearing protection during extended use of the unit and a dust mask for dusty operations.

Stay alert. Use common sense. Watch what you are doing. Do not operate with the unit when you are tired or under influence of drugs.

Remove adjusting keys, wrenches and other things. Make a habit of checking to see that all things are removed from the unit worktop which are not needed before switching on the unit.

Avoid accidental starting. Don't carry the unit plugged in with a finger on the switch. Be sure the switch is OFF when plugged in.

Don't overreach. Keep proper footing and balance at all times.

Before connecting the unit to a power source be sure voltage supplied is the same as that specified in the technical data or on the nameplate of the unit. A power source with voltage greater than specified for the unit can result in serious injury to the user – as well as damage to the unit. If in doubt, **do not** plug in the unit. Using a power source with voltage less than the nameplate rating is harmful to the unit. VOLTS AC are designated units for *Alternating Current 50 – 60 Hz* only. VOLTS DC are designated units for *Direct Current*. Do not use AC designated units with DC power source.

## 11. General Safety Rules

### **WARNING: READ ALL INSTRUCTIONS**

**Failure to follow the SAFETY RULES listed below, and other safety precautions, may result in serious personal injury.**

**Note: Save these instructions!**

### **Unit Use and Care**

Don't force unit. It will do the job better and safer at the rate for which it was designed. Use the right unit. Don't use the unit for purposes not intended. Use only as described in the manual.

Use the spindle only when inserted in the engraving head.

Secure work. Make sure the support plate is always adhesive enough hold the material, if not clean the plate with clear water. Never use your hand to hold the material in place. Use only our support plates for holding the material.

Don't abuse cord. Never carry the unit by cord or yank it to disconnect from receptacle. Keep cord from heat, oil and sharp edges. Always keep cord from spinning blade, bits or any other moving parts while the unit is in use.

Indoor use only!

The use of any other accessories not specified in manual may create a hazard and is strictly forbidden.

Disconnect the unit. When it is not in use, before servicing; or when changing part of the unit.

Store the idle unit. When not in use, the unit should be stored in dry high or locked up place – out of the reach of children.

Do not alter or misuse the unit. This unit is precision built. Any alteration or modification not specified is misuse and may result in a dangerous condition.

Maintain tool with care. Keep unit clean for better and safer performance. Follow instructions for changing accessories. Inspect unit cords periodically and replace it if damaged. Keep engraving unit dry, clean and free from oil and grease.

Check damaged parts. Before further use of the unit, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may effect its operation. A guard or other part that is damaged should be properly repaired or replaced. Do not use the unit if the switch is faulty.

All repairs, electrical or mechanical, should be attempted only by a trained repairman. Contact our repair service facility. Only the use of original spare parts is permitted any other may create a hazard.

Do not reach into the area of the spinning engraving needle. The proximity of the spinning engraving needle may not always be obvious.

Never start the unit while engaged, by any reason, in the material. The engraving needle may grab the material causing loss of control of the unit.

Always disconnect the power cord from the power source before making any adjustments or attaching any accessories. You may unintentionally cause the unit to start, leading to serious personal injury.

Do not leave a running unit unattended, turn power off. Only when the unit comes to a complete stop it is safe to change the engraving needle.

## 11. General Safety Rules

### **WARNING: READ ALL INSTRUCTIONS**

Failure to follow the SAFETY RULES listed below, and other safety precautions, may result in serious personal injury.

**Note: Save these instructions!**

### **Unit Use and Care**

Do not touch the engraving needle or spindle after use. After use the engraving needle and spindle are too hot to be touched by bare hands.

Do not use the unit for any other purposes than described in the manual!

If the workpiece or engraving needle becomes jammed or bogged down, turn the unit off by the switch. Wait for all moving parts to stop and unplug the unit, then work to free the jammed material. If the switch of the unit is "ON" the engraving spindle could restart unexpectedly causing serious personal injury.

Do not allow familiarity gained from frequent use of your rotary engraving spindle to become commonplace. Always remember that a careless fraction of a second is sufficient to inflict severe injury.

**WARNING:** Some dust created by the engraving process can be dangerous, depending on the material. Use dust masks that are specially designed to filter out microscopic particles. If not, it can cause cancer or other diseases.

## Technical Support:



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