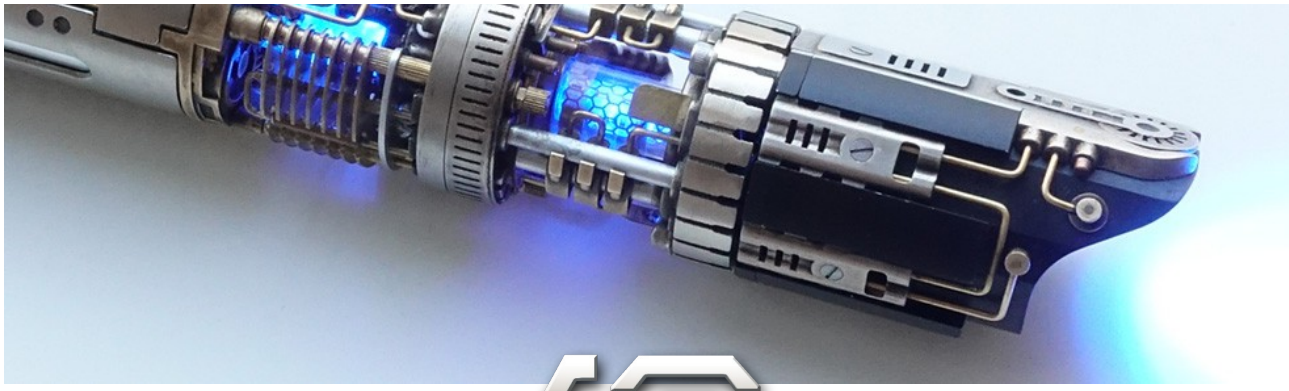


emitter

Manual

The mb-Sabers´ Bladeholder system is designed for 7/8” blade tubes.
It is a simple basic design with a lot room for custom modifications
to create an own individual Emitter Design.

This manual shows the standard modification option
with mb-Sabers´ 3D printed Emitter add-ons.

Available here:

SHAPEWAYS

mb-Sabers.com

This manual will be updated frequently
Last Update: April.25.2019

Content

1. Tools

Tools for preparing the 3D printed parts:

- sandpaper (240 grain)
- small belt sander (for example Proxxon)
- Multi-Tool / Power-Tool / Hand-Tool (Dremel or Proxxon)
- cut-off wheels for Multi-Tool
- drum sanders for Multi-Tool
- diamond files (small and medium)
- UNC 4-40 tap (for 3D printed head parts)
- UNF 10-32 tap (for 3D printed head parts)

Tools for preparing the Bladeholder parts:

- small slot screwdriver
- tap M1.6 (**or similar – depending on used screw size**)
- glue (Epoxy)
- superglue
- screw-lock (medium)
- soldering-iron and solder
- liquid rubber
- drill bits 1mm, 1.2 mm (**or similar UNC size – depending on the rod- and screw-size**)

2. Additional parts

Standard parts (Emitter kit is available in the mb-Sabers shop**)**

- 3x UNC 4-40 threaded rods or mounting screws
- 6x M1.6 x 6mm long countersunk screws (or similar UNC size)
- metal rod/wire (1mm diameter or similar)
- M1.2 threaded rod (or similar UNC size)
- 10-32 UNF Thumbscrew / set screw (Red-button or glass-eye style)

Electronic parts

- high-power LED or Neo-Pixel connector
- electric wire
- power switch
- aux switch

3.Preparing and installing the Bladeholder head

The bladeholder head will be installed permanently into the Graflex front. It is held in place by the original 4-40 mounting screw.

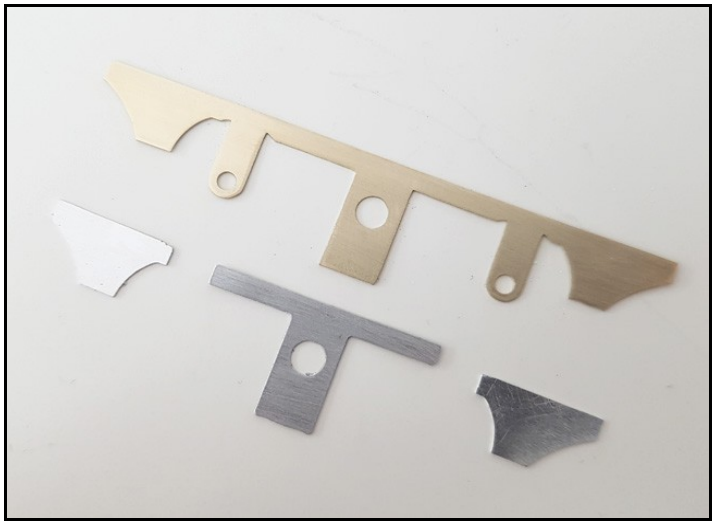
The bladeholder head part has the same dimensions like the vintage Graflex part. The bladeholder head is designed to fit into all vintage or vintage replica Graflex on the marked. Depending on the Graflex version and brand, the accuracy of fit varies. For some Graflex tubes, it is more loose, for others more tight.

3.1 Adapt to the Graflex

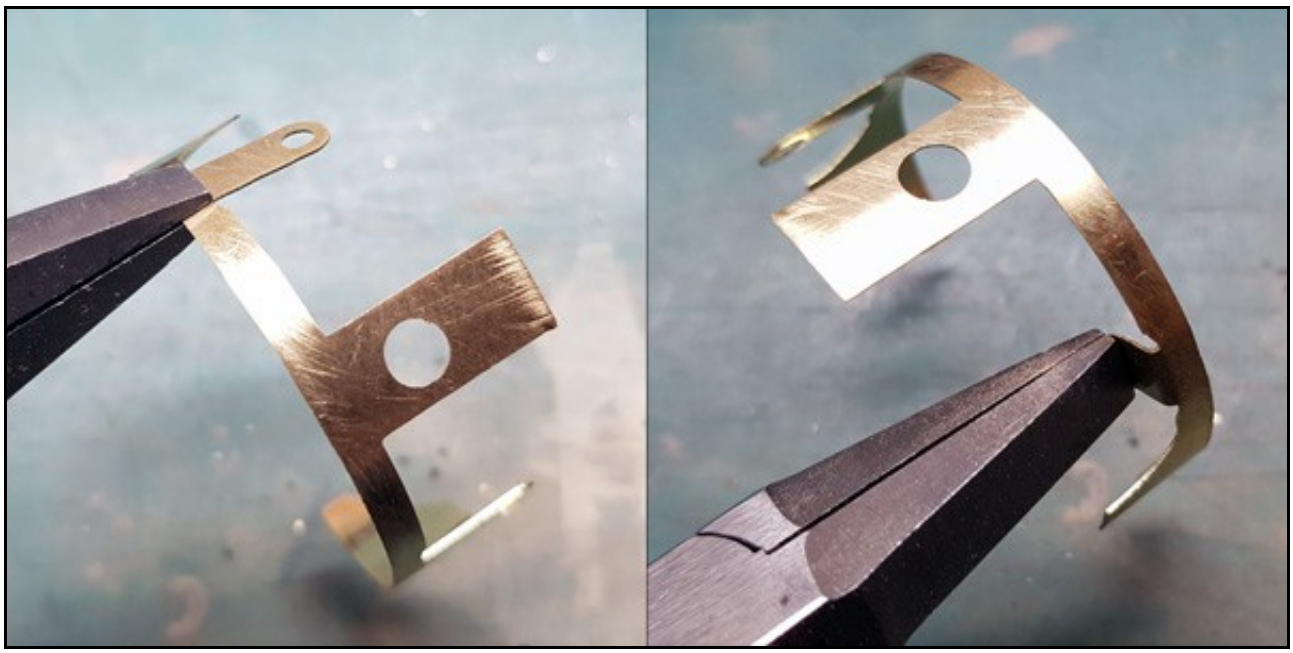
The Bladeholder head part must be installed together with the vintage or replica brass contacts for perfect fit. Most single replica brass contacts must be modified for installation. The brass sheet material is thicker than the vintage brass material.

3.2 Adaptation set

For the fitting accuracy there is an adaptation set for the bladeholder head, consisting of one brass part and three aluminum parts. Use them to adjust the fitting.



The brass adaptation part has the **electronic pin contacts already attached**. No other replica or vintage brass contacts are actually needed. They have to be bent to the correct form. **If these contacts are not needed they can be removed.**



For easy bending, the brass part can be annealed by heating. That makes the brass more soft and prevents breaking.

After bending the whole adaptation part to a bow, bend the contacts with flat-nosed pliers like shown in the pictures above.
Install the adaptation part and screw in two brass pins for locking the final position.

Now the adaptation part needs a fixing pin at each end to prevent a shift. It is very easy...
Drill a 1mm hole (or similar, depending on the used rod diameter) ***picture 1.***
Stick a metal rod into the hole and cut it to length ***picture 2. and 3.***
Smooth it ***picture 4.*** Done...

The adaptation part is now locked in position but still removable.

For detached brass side parts or the aluminum parts install two or three locking pins.

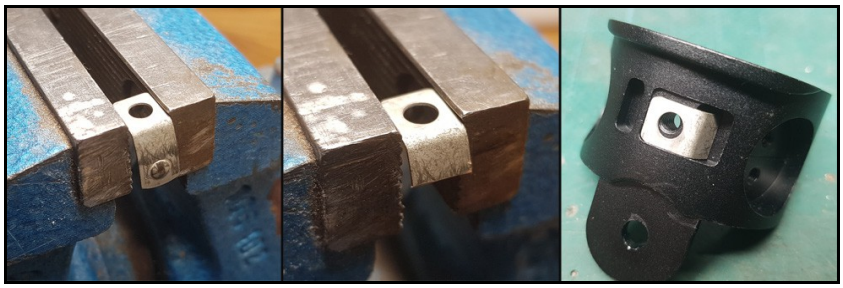
3.3 How to use vintage brass contacts

1. Do not modify them (Do not remove the connecting-bow)
2. If the Emitter head is too loose, place an additional adaptation part from the adaptation set between Graflex tube and Emitter head, down at the mounting screw area. You can use the aluminum adaptation part but also the brass version with removed contact "lips".

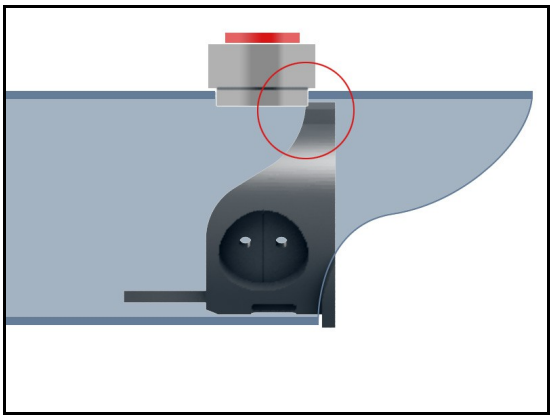
3.4 How to use single replica brass contacts

1. Sand down the brass contacts till the Emitter head fits (together with the brass contacts) into the Graflex tube.
2. If the Emitter head is too loose, place an additional adaptation part from the adaptation set between Graflex tube and Emitter head, down at the mounting screw area. You can use the aluminum adaptation part but also the brass version with removed contact "lips".

It is recommended to use the vintage or vintage replica internal contacts too.
Especially the contact placed around the mounting screw needs to be installed.
These contacts have to be modified for installation! The original shape is too long and will not fit.



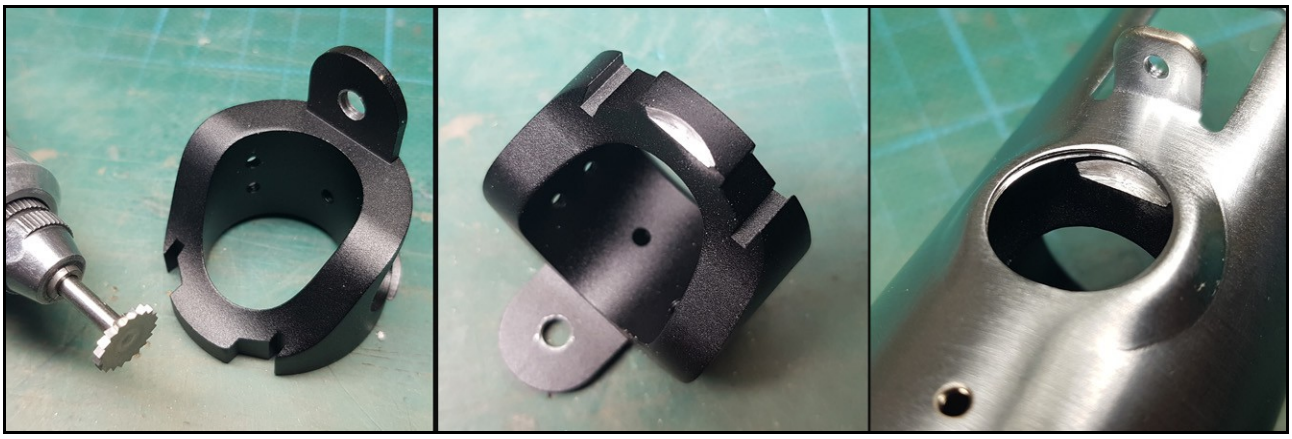
3.5 Indentation for the Red-button (! important !)



If the Red-Button thread reaches too deep into the Graflex, it collides with the bladeholder head and causes an incorrect position of the bladeholder head. **There has to be cut an indentation for the Red-Button. Use a mill wheel or cut-off wheel with a Multi-Tool.**

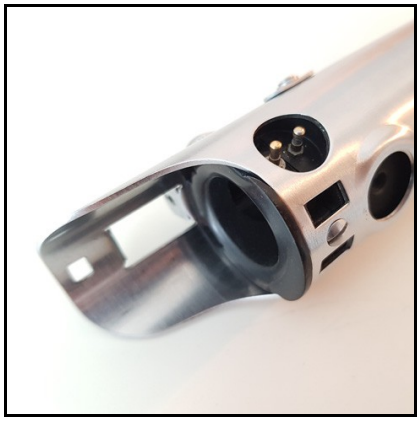
It depends on the Graflex brand. The position varies! **Install the bladeholder head and check if it moves while the Red-Button is screwed in.**
If you look through the Red-Button hole, you can also see if there is enough space for the Red-Button.

If you want mb-Sabers to cut this indentation for you, please send an e-mail at info@mb-sabers.com **after ordering your Bladeholder.**



3.6 NEW Nylon printed head parts preparation NEW

The Emitter head part is also available as 3D printed Nylon Plastic part. **SHOP**



Nylon Plastic can be polished and looks more like the original vintage Graflex emitter.
All original vintage parts (pins, contacts, screw, nut) can be used with the 3D printed head parts.
The 3D printed head is also splitted like the original vintage head.
The front part **emitter head front** is always the same.
The back part is available in four variations:
For using a 10-32 UNF thumbscrew:
- emitter head back A
- emitter head back A-V

For using the Glas-Eye as retention:
- emitter head back B
- emitter head back B-V

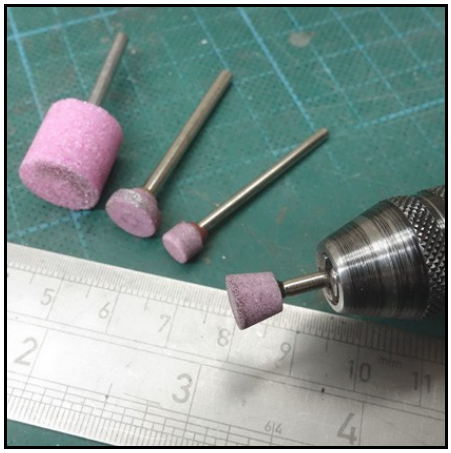
The V versions allow using the **vintage square nut** (picture) for installation.
The standard versions can be used without this nut!

Threads for the **4-40 UNC** mounting screw and the **10-32 UNF** thumbscrew have to be cut. The print has only basic holes without any threads.
The electric pins can be directly screwed into the pin holes without threads.

Surface preparation is easy. To get a nice silk shiny finish follow these work steps carefully:
1. Sand down the front face, lip and the pin holes with **240 grit sand-paper** till it´s even
2. Use **1000-1200 grit sand-paper** with water to smooth the surface
3. For the final finish polish the sanded areas with an **agate burnisher**

Also sand the areas where the front-part and back-part will be glued together with 240 grit. All areas which cannot be seen in the end do not have to be sanded. Keep them rough for better fit.

The pin holes can also be polished with a multi-tool and fine grinding heads. With these heads it is easier to get into the corners and get a nice and even surface.



After preparing the surface the two parts can be **glued together**. Use a flexible strong glue of which remains can easily be removed after drying **(Pattex Repair Extreme or similar).**

4. Preparing and installing the Bladeholder body (Emitter)

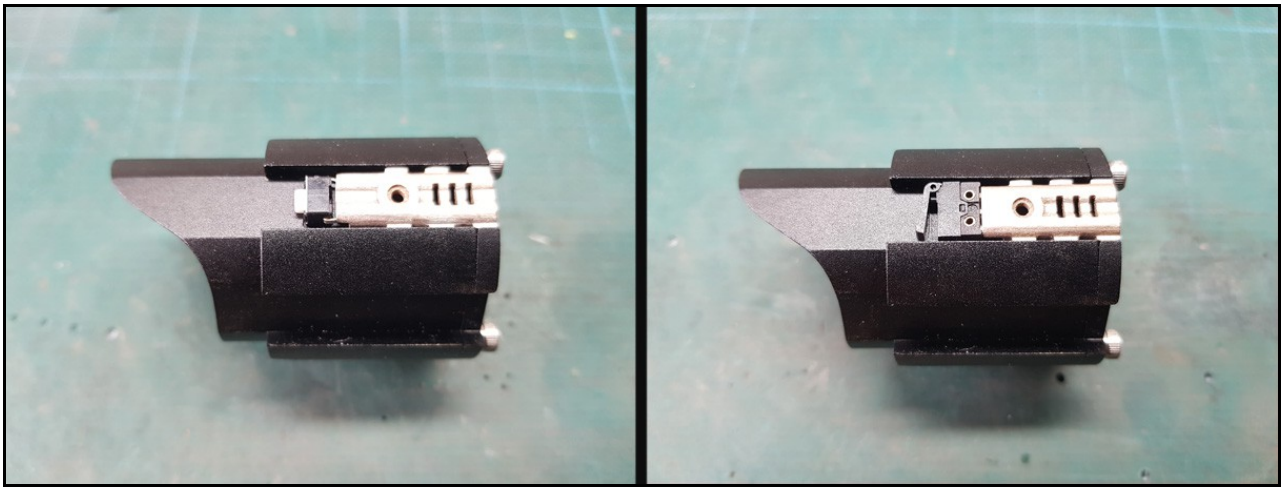
The Emitter is specially designed for the mb-Sabers chassis system.
But it can also be used for custom chassis designs as well. The six 4-40 UNC mounting holes at the bottom give a lot possible ways to mount the Emitter to your custom chassis.

4.1 Switch installation

There are two positions with deepening for mounting AUX and activation switch.
Actually all kinds of small tactile switches can be used.
But it is recommended to use the three following tactile switches, for which the Emitter is designed.
Before gluing the switches in position, the 3D printed add-on parts should be prepared and all holes and threads should be ready to use.

- The activation switch...
Always solder the wires to the switch first. After that the flat tactile switch has to be glued onto a thin plastic sheet for insulation. The plastic sheet should fit into the deepening for the activation switch at the front of the Emitter.

- The AUX / side switch...
It is possible to choose between two different AUX switch designs. The switch can be mounted by two rods or by gluing it into the deepening.



4.2 3D printed mb-Sabers´ add-ons and details installation

The Emitter has a lot room for custom design modifications. This is good for individual chassis designs. But there are also 3D printed add-ons available.
This is the installation guide for the mb-Sabers Emitter add-ons...

There are five different 3D printed add-on parts. Add-on A, B, C, D and E.
Parts **A and B** are the activation (top) switch parts.
Parts **C and D** are the duct covers / details.
Part **E** consists of two round sensors.

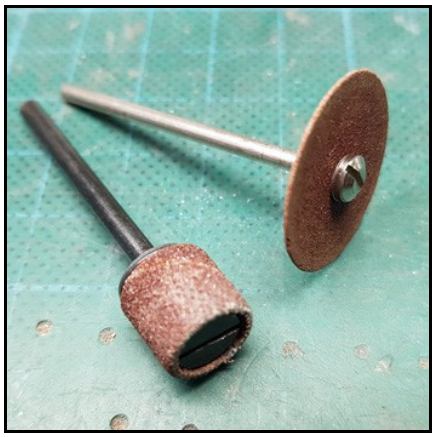
Mounting Screw and rod size

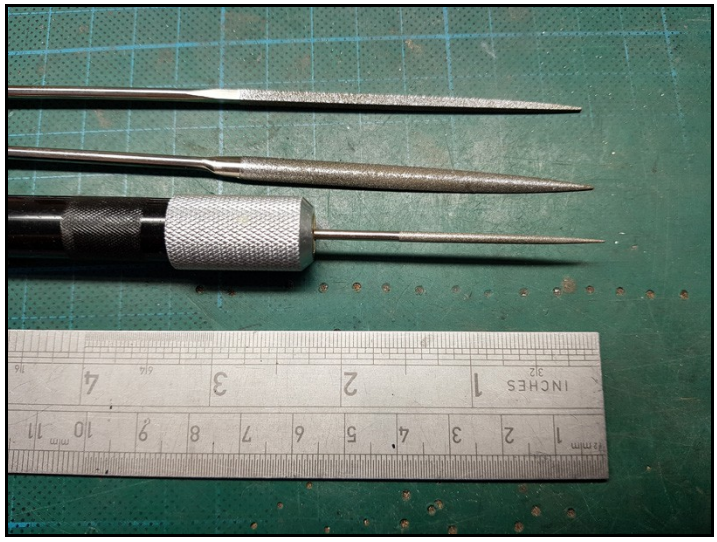
Any screw and rod size can be changed. They do not have to be metric! But they should be similar to the metric sizes shown in the manual.

Steel printed parts

The 3D parts can be printed in steel or precious metals like brass or bronze. **Precious metals** are easy to handle and ready to use in most cases.

Printed steel material is a very difficult material. It cannot be drilled with a regular drill head or be cut with a normal saw blade.
Drilling is actually not possible at all. You can only make holes wider. This is also possible with drill heads. But the best way is always to use **engraving tips** and **grinding heads** with your Multi-Tool (Dremel/Proxxon).
Cutting printed steel parts is only possible with **cut-off wheels** for Multi-Tools!
For sanding and smoothing the surface use **diamond files (small and medium), small belt sander and sandpaper (240 grid).**





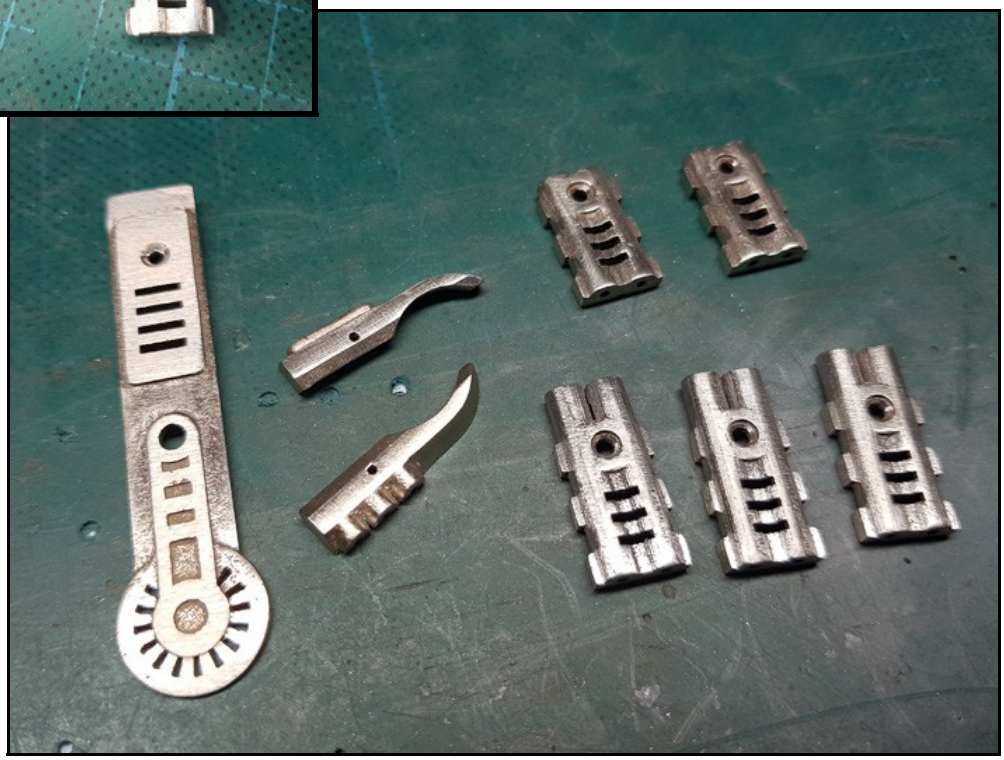
4.3 First Work-steps for all 3D printed parts before installation

1. Check all printed parts for damages or closed holes etc.
If there are issues with the 3D prints reclaim them at Shapeways. They will reprint them!

2. Clean all holes and sand down the rough surface
All holes have to be cleaned. Check if the rods fit.
Sand the surface with grinding heads, belt sanders or 240 grid sandpaper.
Do not sand down the bottom sides of the add-on-parts. They have to be adjusted at the end to make the Emitter fit perfectly into the Graflex hilt. They serve as spacers.

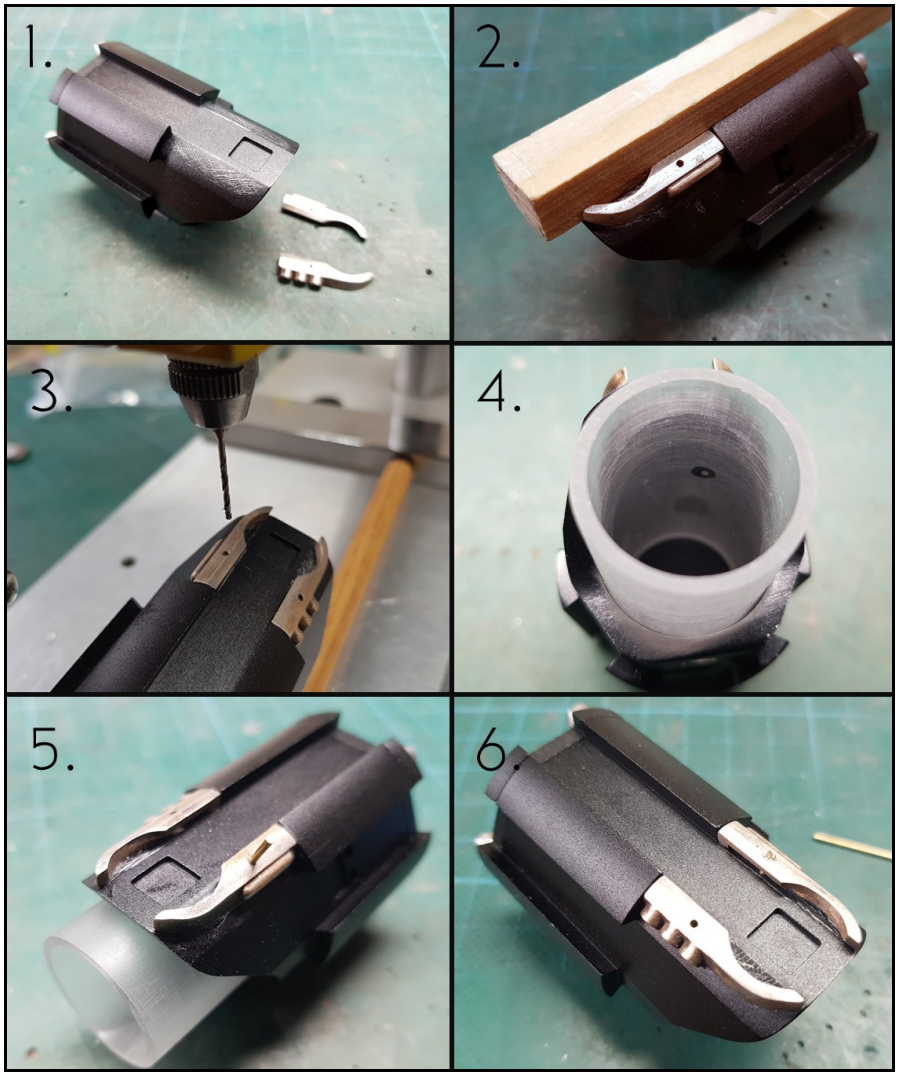
3. Separate the parts
Some parts are connected by sprues. Cut these sprues with cut-off wheels. Then clean the surface.

4. Make the parts fit
Check if all parts fit into position. Adjust the form by sanding the surface till each part fits.



4.4 Switch "Frame" installation (add-on part B)

The switch cover has two frame parts which have to be installed first!
Take your time to get these parts fit perfectly into position.



1. Check the mounting hole size. **Do all rods fit into the holes?** If not make them fit first.

2. The best way to make sure the parts line up perfectly is using a squared wooden staff (10mm x 10mm). Put it Into the cable duct of the Emitter body ***Picture 2.***

3. Clean the surface where the two frame parts will be placed and roughen it a bit ***Picture 1***.

4. Glue both parts with superglue in position. Make sure the parts line up to the cable duct.

5. After the glue dried, the mounting holes can be drilled ***Picture 3***. If you use the *mb-Sabers Emitter kit* the holes have to be 1mm in diameter.
Use a drill-stand to get a perfect result. Align the Emitter to the drill head so that the mounting holes in the frame parts can be continued into the Emitter body. Stick a short rod into the mounting holes temporarily for easy alignment!

6. Place a short blade tube into the emitter to limit the mounting rod depth position ***Picture 4***.

7. Glue a 1mm rod into the mounting hole (use screw-lock or adjustable superglue) ***Picture 5***.

8. After the glue dried, cut the rod to length ***Picture 6***.

9. Fill the frame parts (inside around the mounting rods) with Epoxy glue.

4.5 Switch cover installation (add-on part A)

After the frame parts have been installed...

1. Check the switch cover shape and size. Make it fit into position. **Sometimes it is bend or twisted. It can be corrected easily by bending. But be careful!**

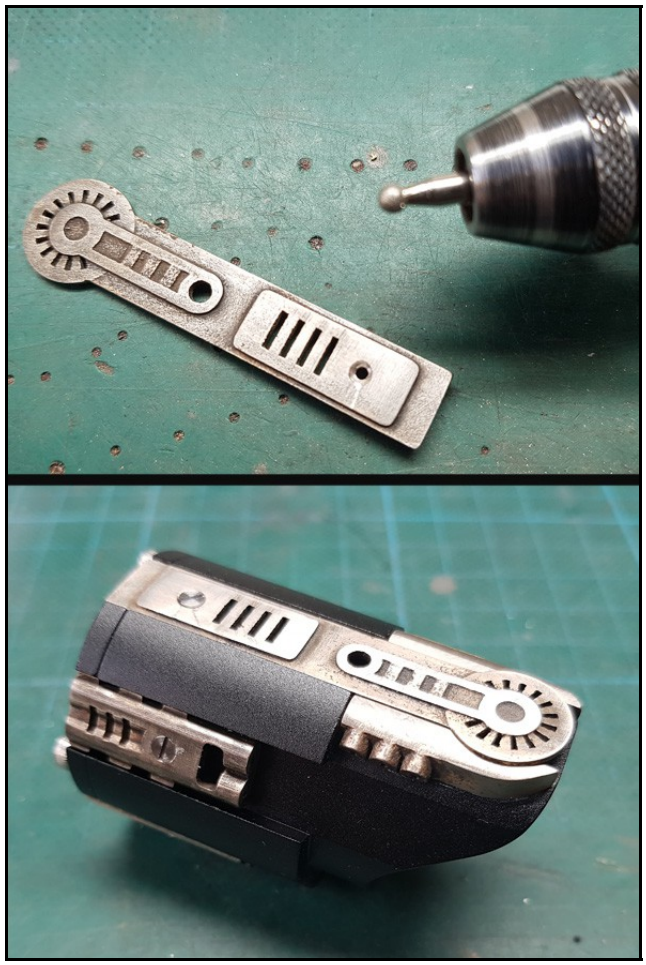
2. Create a recess for the screw. Use a grinding head or a mill ***(right picture)***.

3. Check if the screw fits into the recess.

4. Place the switch cover into the final position and drill the mounting hole into the Emitter body.

5. Cut a thread into the mounting hole. If you use the mb-Sabers kit use 1.2mm holes and a M1.6 tap (three steps set recommended!) for the M1.6 screws.

6. Install the switch cover



Tap-set with three cutting steps for best result...

4.6 Duct details/covers installation (add-on parts C and D)

Before installing the duct details/covers make sure the Emitter back plate is temporarily installed!

Before installing the details permanently, check if the Emitter body fits into the Graflex tube with added details.

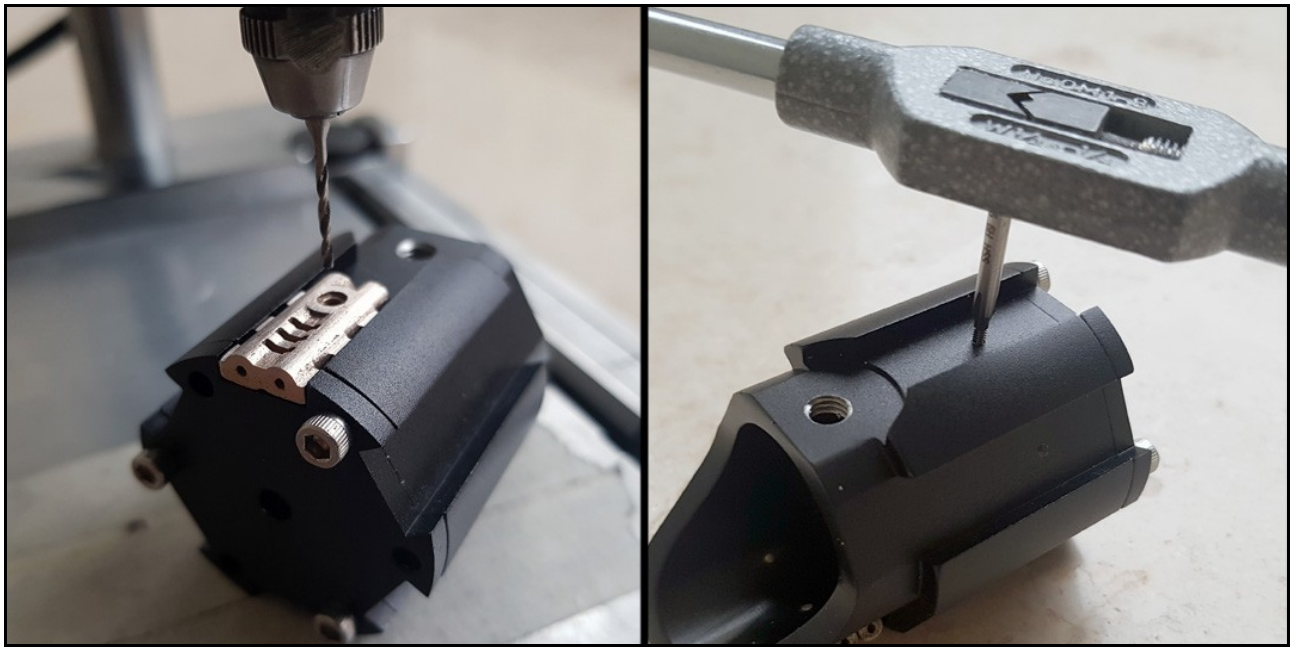
Part C consists of the short cover for the Emitter bottom and the cover for the AUX switch duct.
Part D consists of three identical long duct covers.

Please do one after the other. Take time for a perfect result...

1. Place the part into position and drill the mounting hole into the Emitter body. **Use a drill stand!**

2. Cut threads into each mounting hole. (If you use the mb-Sabers kit use 1.2mm holes and a M1.6 tap (**three step set recommended!**)

3. Install the duct details temporarily an check how the Emitter fits into the Graflex tube. If necessary sand down the cover bottoms to adjust the fitting of the Emitter body.

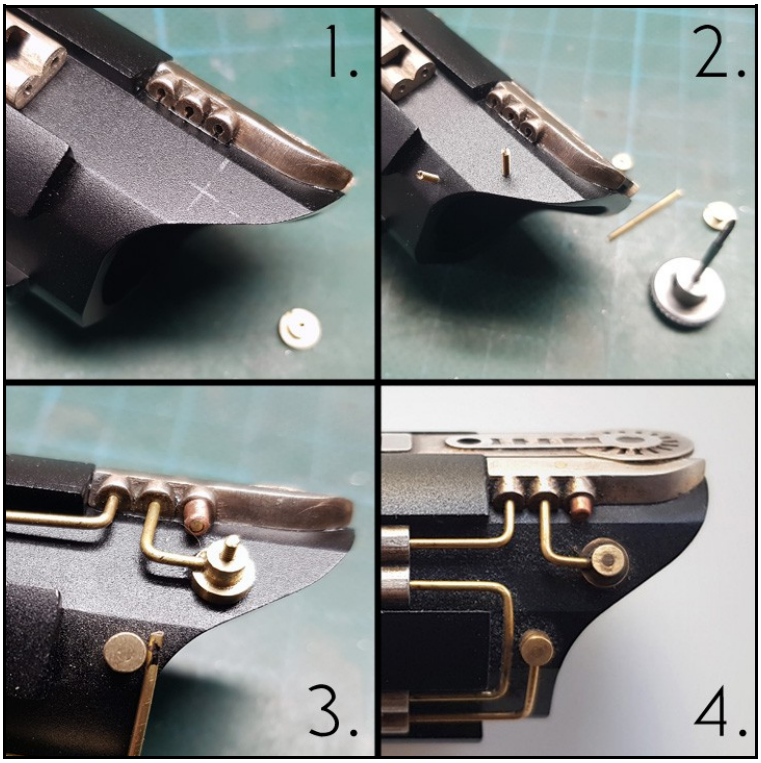


4.7 Installing the sensors (Add-on part E)

There are a lot possible positions on the Emitter to place the sensors (Add-on part E).
It´s up to you how and where final details are added.

Before installing the details permanently, check if the Emitter body fits into the Graflex tube with added details.

The two sensors (part E) already have 1mm mounting holes. But these holes can be modified to the size you need!
They sensors can be mounted by gluing onto a normal rod or by screwing onto a threaded rod.
Before separating the two sensors, cut the threads into the mounting holes. If you use the mb-Sabers kit with M1.2 threaded rods, cut a M1.2 thread. Then remove the sprue.



1. Cut threads into the sensor´s mounting holes

2. Find the final position for both sensors. ***Picture 1.***

3. Drill holes into the Emitter body for the mounting rods.

4. Cut threads into the holes.

5. Install the threaded rods (lock them with medium screw-lock). ***Picture 2.***

6. Screw the sensors onto the installed rods.
Do not glue the sensors onto the threaded rods. They must be able to rotate for easy wire installation.
If the distance between the sensor and emitter becomes too large when aligning the mounting holes for the wires by rotating the sensor, you can sand the bottom of the sensor until the hole is aligned correctly when the sensor is completely screwed down.

7. Cut some brass wires for the sensors to length and anneal them to make them soft and easy to deform.

8. Install the sensor wires and (if necessary) glue them into position. ***Picture 4.***

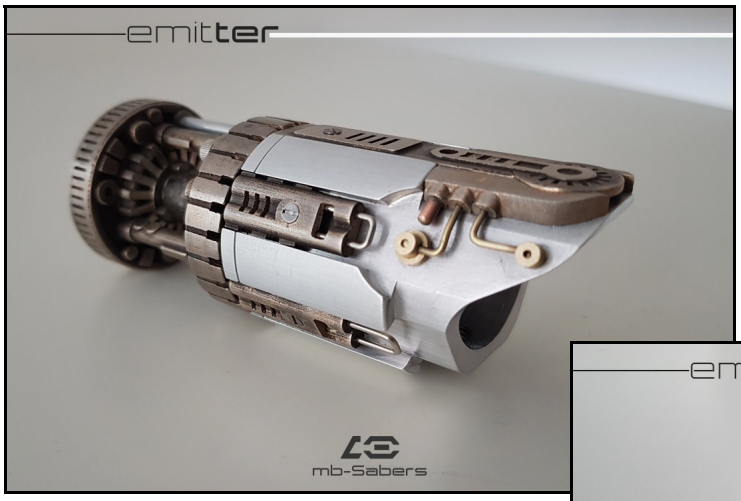
4.8 Installing the rod/wire details

There are a lot installation holes for adding wires to the 3D printed parts.
It does not necessarily have to be rods/wires. Use what ever you want to customize your Emitter design! It´s up to you how and where final details are added.

- Make a design concept.
- Don´t bend the rods to often at one spot. It will break.
- To avoid breaking, make the metal rods soft by annealing.
- Glue the rods into the final position.

Now all wires and 3D printed parts are ready to be installed. ***Picture below.***
Install them on the Emitter and lock all screws with medium screw-lock.

Examples:



4.9 NEW Modification for Glass-Eye use NEW

For using the vintage or vintage replica Glass-Eye for retention the emitter parts can be modified.

First of all you need the **emitter glass-eye adapter** from the mb-sabers Shapeways shop **HERE**.

Then follow the following steps. Start with the Emitter body part...
This is just an example. There are different methods to get the same result. But not everybody has a mill at home. This is a way with basic tools.

It is absolute necessary to use a drill-stand! Also, do not hurry. Take your time.

1. Place the glass-eye adapter on the Emitter and mark the inner line with a sharp object (scalpel for example)

2. Remove the glass-eye adapter. Use a small drill bit and place holes inside along the marked line.

3. Fill the area inside the outline with holes. You can also use bigger drill bits for this step.

4. Use a cutting wheel or milling bit with a multi-tool to cut out the material.
Protect the surface around the outline with tape!

5. Sand down the rough outline with a 80 grit grinding head. Use a drill-stand to get a perfect 90° angle.

6. Install the glass-eye adapter and use fine sand-paper and files to adapt the rounding.

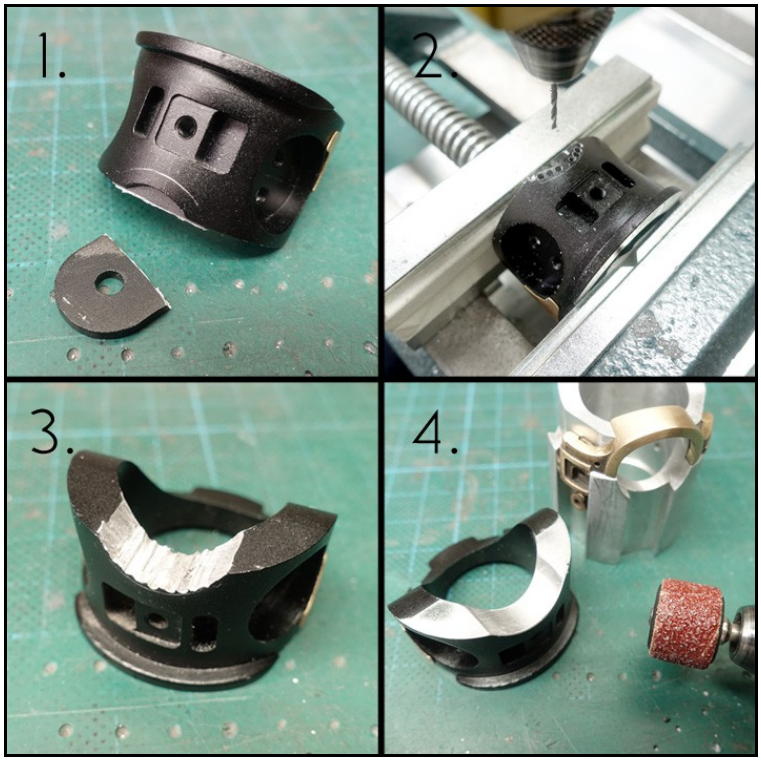
Do the same with the Emitter head part...

1. Use the existing curved edge to draw or scratch a new parallel line in 2mm distance. You can also remove the lip. But it can help to place the head perfectly into the vase!

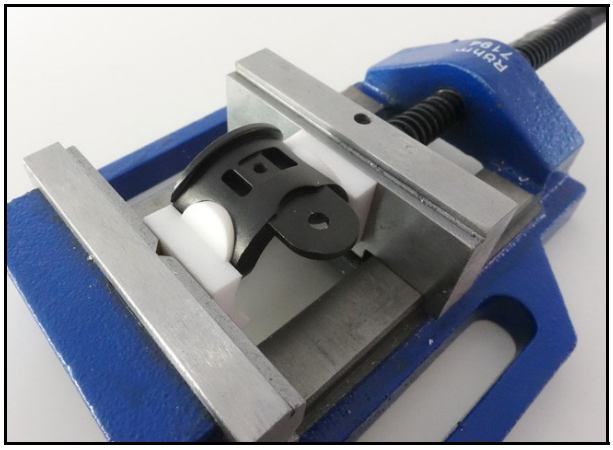
2. Place the head part into a vase. Make sure it is aligned exactly. You can use the **emitter head holder** **LINK** (*see also pictures below*).
Use a small drill head to place holes along the outline.

3. Use cutting disks with a multi-tool to cut out the material.

4. Smooth the surface with a 80 grit grinding head.
Adapt the shape to make the Emitter body fit perfectly.

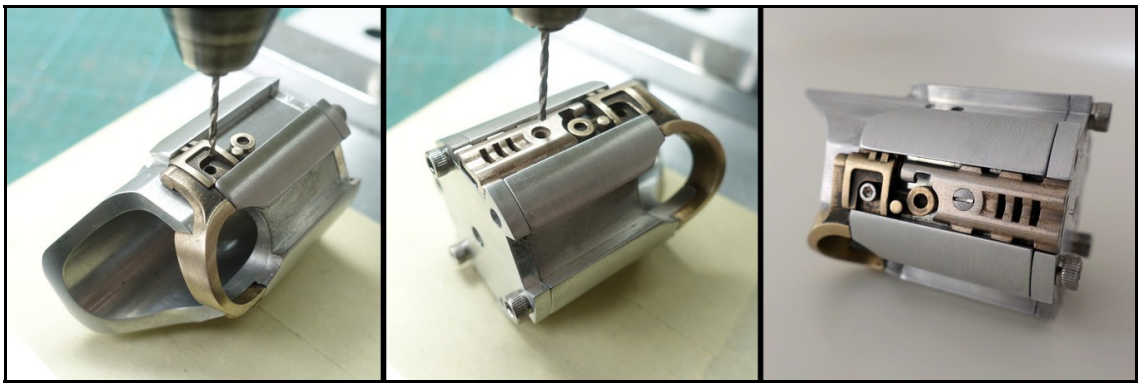


The emitter head holder can be used to make sure all modifications are aligned perfectly. It also protects the head part while working on it.
LINK to the shop



The glass-eye adapter has his own **add-on D part LINK.** The Standard add-on D parts do not fit. The glass-eye adapter and the add-on parts have mounting holes for M1.6 screws. But you can also use UNC screws with similar size.

Place the adapter and the add-on parts in the final position and drill the mounting holes into the Emitter body. Cut the threads and insert the mounting screws.



Thank you for using mb-Sabers designs.

For questions please contact:

info@mb-Sabers.com