

# Kårde-(epee) vedligeholdelse og reparation

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## 1. Synopsis

### Epee overview

Epee developed from the dueling swords that developed in the court of Louis XIV of France. In Epee the weapon used is a maximum of 770grams, with a maximum length of 110cm. The valid target area is the whole body, head to toe, including arms and hands. Any hit upon the earthed piste or on the opponent's grounded weapon will not cause the apparatus to register. Epee evolved from the sword, favored by duelists of the time. It follows that, in modern fencing, the whole body is valid target area for epee, and that the basic rule of engagement is that the first to hit his or her opponent, has scored. Training for sword fighting (for dueling or combat purposes) concentrated on thrusts to the torso, where hits would have the most lethal effect. This training led to the development of blunt lightweight weapons, protective clothing, and limited "valid" target areas, which are now applicable to foil fencing.

### How a hit is made

The Epee circuit is normally "open" and is "closed" when the point is depressed, registering the hit. The epee point travels in and out against the pressure of the larger weightspring and carries with it a smaller contact spring. When the contact spring touches the ends of the two blade wires it closes the circuit. The Regulations for Competitions require that the weightspring must be able to support a 750 g weight before a hit is registered and that the contact spring must not close the circuit until the last 0.5 mm of its travel. In addition, the total travel of the point must be at least 1.5 mm

1. In the normal state there is no connection through the apparatus. This state produces no light and would be the state of the circuit as the fencers come on guard.
2. When the point is depressed by any surface except the opponents guard or a connected metallic floor (piste) the circuit is made and a red or green "hit" light comes on

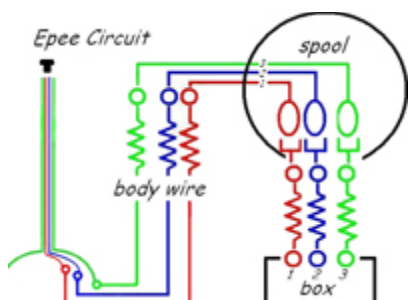
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3. When the point is depressed at the same time as it is in contact with the opponents guard or piste a new circuit is made. This new circuit causes no light to come on

As well as being electrical, the system also has a mechanical component. That is, moving parts and electronics working in conjunction cause the lights to come on.

**The nature of the system means that both mechanical and electrical faults can cause the system to function incorrectly.**



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## 2. Parts.

Most designs epee points contain the same basic elements shown in the model on the left. These parts are:

- The Point Tip which moves within the barrel
- The point insulator or sleeve which is sometimes built into the tip
- The barrel/base which screws onto the blade
- Two contacts within the barrel/base which are separated by a small gap and attached to the two wires running down the blade. The two contacts must be electrically insulated from the barrel/base and each other
- Grub screws which hold the point within the barrel/base however, some screwless designs exist
- A spring to provide the required 750g resistance
- A small contact spring that completes the circuit

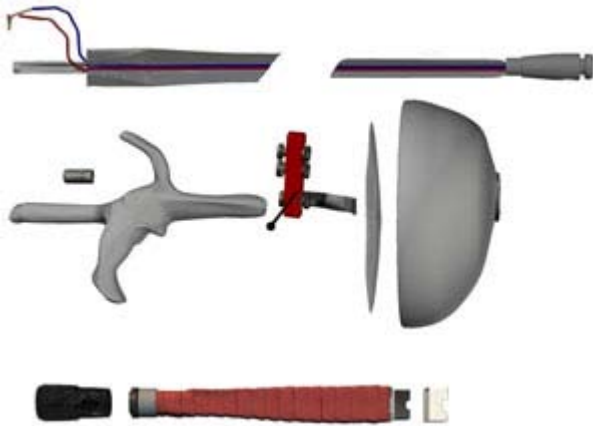
Here is what happens when the tip is depressed : The circuit is normally open between the two brass contacts inside the point on the farthest right of the model. When the tip depresses it travels for a minimum of 1 mm before the contact spring touches the two contacts and completes the circuit. If the point is not in contact with an earthed piste or the opponents weapon this causes a coloured hit light to come on.



Above : British and German tips.

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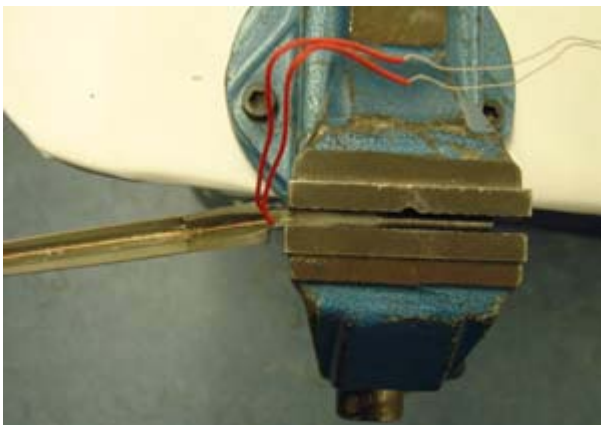
Each manufacturer has their own design of tip which has its own relative strengths and weaknesses. The points are often referred to as being from a particular country (French, German, British) however, this is not entirely accurate as some countries produce more than one design of tip



The model above shows the different parts that fit together to make an electric epee.

## 3. Assembly

### Mounying an epee from scratch

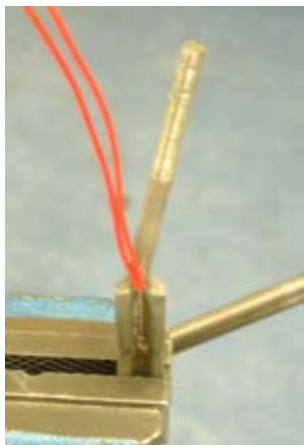


1

A set is put in a blade before mounting. A set brings the tip of the blade more centrally towards the target when you are standing en garde. This is done by placing the tang of the blade in a vise and pulling gently on the forte of the blade (the thicker end of the blade just above the tang). A set should be down and to the left or right (left for a right-handed fencer, right for a left-handed fencer). The set shown here is a standard set of about 7-9 degrees; a heavy set is bent more and a light set is less. People favoring flick hits usually have a heavy set.

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2

After setting the blade, lock the blade in a vise with the tang vertical. Slide on the guard making sure the blade wire runs inside the indent (as shown by the arrow).



3

Slide on the inside-guard socket, making sure the red blade wires are inside the guard socket's hole (otherwise the wires would be trapped between the guard and the socket and split).

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4

Then push the wires flat against the guard so they run directly away from the blade.



5

Slide on the pad with the red blade wires still running along the guard so they are between the inside guard socket and pad.

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6

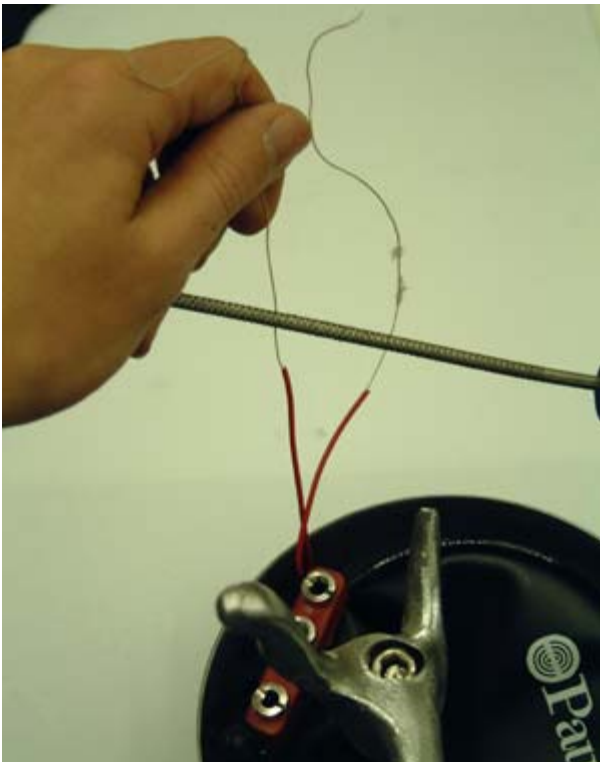
Install the handle

IMPORTANT! THE SLOT SHOWN ABOVE BY THE ARROW IS WHERE THE RED BLADE WIRES MUST GO; OTHERWISE THE WIRE WILL BE TRAPPED BETWEEN THE GUARD AND THE ALUMINIUM HANDLE AND WILL BREAK. FOR A FRENCH GRIP, A SLOT MUST BE MADE BY USING A FILE AS SHOWN ABOVE RIGHT.



7

After placing the nut on the tang, tighten it using an Allen key. For French grips, install the handle, install the brass inset, and then tighten the pommel by hand.

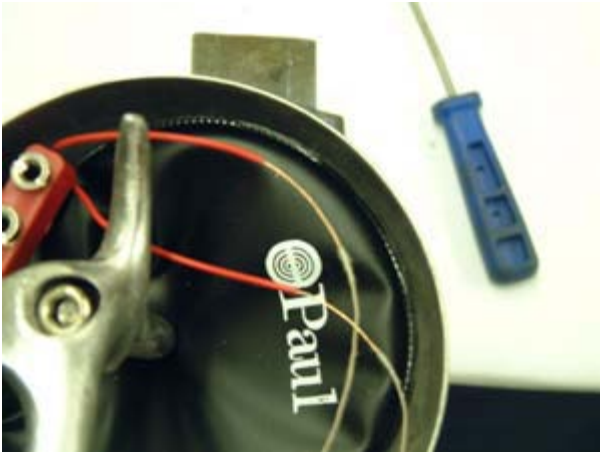


8

Using the round file, gently pull away the white cotton insulation that surrounds the copper on the end of the red blade wires, exposing the copper wires themselves.

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9

Wrap each copper wire once around one of the two sockets closest to each other, between the washer and guard socket itself, with the insulating sleeve coming to the socket. Repeat with the other copper wire and the other of the close sockets. Tighten the sockets using a screw driver.



10

The wires should come from the inside-guard socket, go towards the outside of the guard, and then down and underneath to the blade.

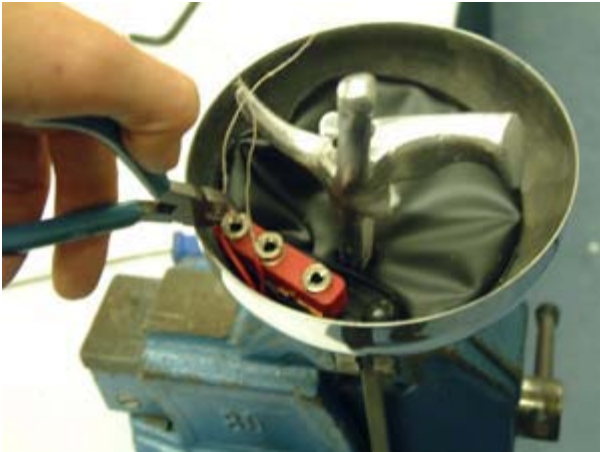


11

Cut off the excess copper wire and tuck the red blade wires under the guard socket and pad.

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12

Push the pad back into place and check the tightness of all the nuts.

## Epee tip Maintenance

All weapons are fully tested before they leave the Leon Paul factory however, the nature of the point means that sometimes a weapon that tests perfectly before dispatch can either become faulty in transit or stop working after the first few hits. This is because the point contains a contact spring which closes the circuit to register a hit sometimes this will test as the correct length on our test rig but after the weapon has been jarred a few times in transit or when first used the spring can move. There is no way to test for this without bashing each blade before it leaves us, something that would probably not be well received by our customers! This failure happens on about 1 in 4-500 blades and is usually very easy to rectify using a small screwdriver. Maintenance of the travel within your point is something that needs to be done as a matter of course every 3 months or so during the normal use and as such all long term epeists should be able to help. If a club armourer is available then they will certainly be able to show you how to fix the problem. If not then the explanation below will guide you through the simple process.

If you are unable to find someone to help or to have a go for yourself then please contact us at sales [ AT ] leonpaul.com to make arrangements for the return of the weapon.

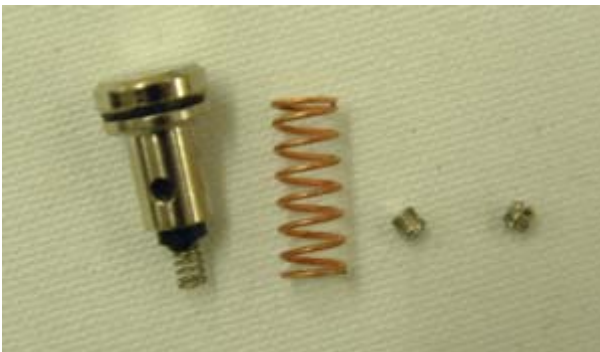
## Contact spring adjustment

Most problems with epees occur in the point and the most common problems usually involve one of the two springs. Epee points contain two springs which each serve a very different purpose. The first of these is the pressure spring which must lift more than 750g for the weapon to be legal. The second is the contact spring which sits inside the larger pressure spring and is responsible for completing the circuit that registers a hit.

If your weapon will not register a hit or fails the travel test then you will need to replace or stretch the contact spring. To do this you will need a small flatbladed screwdriver and if available a vice or volunteer pair of hands to hold the weapon while you work. Clamp the epee in the vice or have someone hold it so the top stays still and, using a magnetized point screwdriver (you can magnetise a screwdriver by rubbing it against a fridge magnet), remove the two small tip/grub screws. It is best to keep one finger over the point as you remove the second screw to prevent the point from springing off onto the floor.

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These are the parts found in an epee point. You can clearly see the difference between the copper coloured pressure spring and the small steel coloured contact spring that is attached to the point.

**If hits do not register hits or register intermitantly:**

The contact spring is too short and it can be stretched. To stretch the spring you should insert your fingernail or a small screwdriver near where the spring enters the point and then pull the end of the spring gently to stretch it. You will need to stretch the spring approximately 0.5mm to get the correct travel.

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In order to stretch the spring evenly you may find it best to rotate the point your nail/screwdriver is inserted into the spring at several different locations around the spring and stretch it slightly with your nail at each location.

## **If hits do register but the weapon fails the travel test:**

The contact spring is too long and it is best to replace the spring. This problem is much rarer than the spring being too short. You can replace the spring by twisting the itanti clockwise to unscrew it and replacing it with a new spring reference number E23. The weapon can then be tested either with a test box or apparatus to ensure that the new spring is the correct length.

## **If the weapon fails the weight test:**

The large copper colourd spring is old and needs to be replaced this can be swapped for a new spring reference E18. Once re assembled the weapon should be checked with a weight top ensure that it will lift 750g.



## **Point adjustment and cleaning**

Most problems with epees can be fixed in the point. Plug the epee into your test box using the bodywire/cord. No light should show.

When the tip is depressed, the red light should light. In the illustration, the epee is locked in the vice and the tip depressed by my foot.

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- 1 Place a 750 gram test weight gently on the tip of the epee; the light should remain off. The tip has to have more than a 750 gram weight resistance to be legal

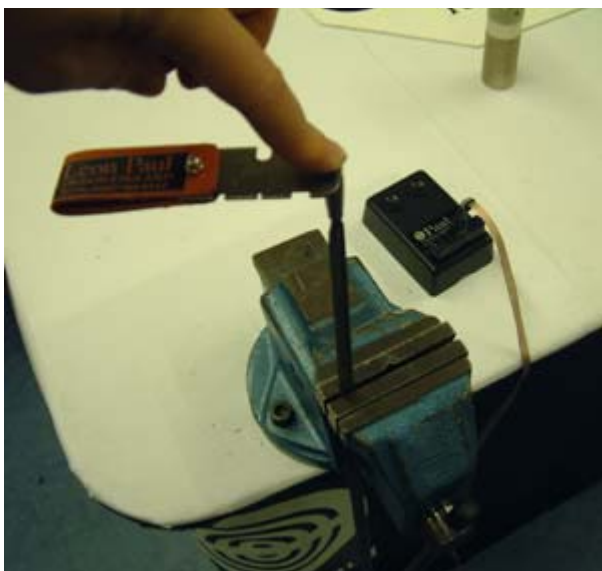
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2

Next, place your finger gently on the test weight and increase the pressure applied. This should make the tester's red light turn on.

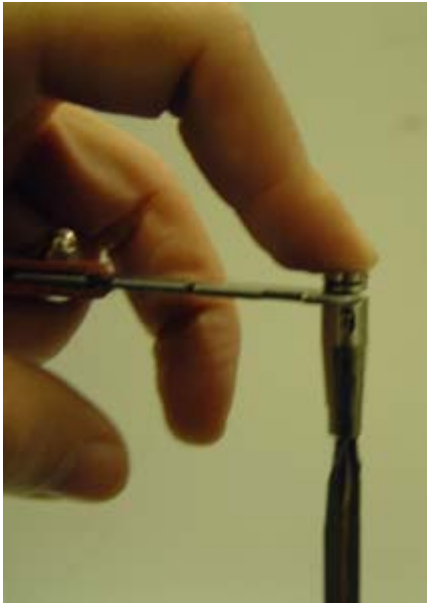


3

To test the travel of an epee use the 0.50 mm feeler gauge. "Travel" is how far the tip has to move before a hit is registered. When the 0.50 mm front gauge is placed between the barrel and the tip and the tip depressed until there is no space between the tip gauge and barrel, no light should show on the tester.

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4

If any of these tests do not work, follow these instructions:



5

Clamp the epee in the vise so the top stays still and, using a magnetized point screwdriver, remove the two small tip/grub screws.



7

The tip has a small contact spring which is what closes the circuit and makes a hit register. When this contact spring is too long, the epee will fail the 0.50 mm feeler gauge test. When the spring is too short the weapon will either not register hits or will register intermitantly. If the spring is too short it can be either replaced or stretched. To stretch the spring you should insert your fingernail or a small screwdriver near where the spring enters the point and then pull the spring gently to stretch it. In order to stretch the spring evenly you may find it best to rotate the point at which your nail/screwdriver is inserted into the spring. If the large spring, which controls the pressure needed to score a hit, fails the 750 gram

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weight test ie. the spring no longer lifts a 750g weight then this spring is too weak and should be replaced.

## 4. Repair and Rewire

Clamp the epee securely in the vice, with the handle up and the wires facing towards you. Remove the Hex nut and any washers, as well as the handle.



Unscrew the wire holders in the inside guard socket, and remove the Pad and IGS.



Remove both the Guard and the two plastic sleeves insulating the wires. Retain the sleeves for re-assembly.



Remove both the Guard and the two plastic sleeves insulating the wires. Retain the sleeves for re-assembly.

Rotate the blade in the vice so that the tip can be worked on, and disassemble the point. Place the parts( complete epee tip, weight spring and two grub screws)in a dish or on a magnet and remove the epee point base. Once this is removed, use a point setting screwdriver and poke out the nylon wire cup inside the base.



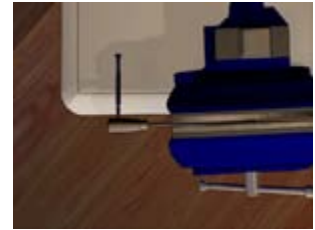
Rotate the blade in the vice so that the tip can be worked on, and disassemble the point.



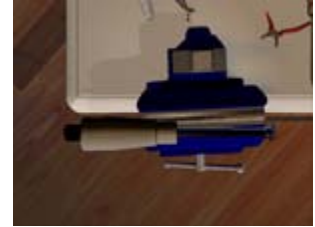
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Once the point is apart, carefully examine for wear and place to one side. Then either insert a suitable tool into both screw holes or use a spanner to unscrew the barrel.



Use a small screwdriver or stiff paperclip and push out the plastic contact block from the epee point base.



Then rotate the blade in the vice again so that the wires are uppermost.



Then using a pair of pliers, remove both the wires.



Once the wire is out, use a broken hacksaw blade or craft knife to clean the last of the glue out. This will also score the surface slightly and provide a good key for the blade glue.



Carefully unwind the new wire and ensure that it is straight and free of knots. Then thread the wire through the barrel, stopping just above so that the wire can rotate freely.



Rotate the blade in the vice point uppermost. Drip a small amount of Locknut onto the thread (do not use superglue)



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Then screw on the barrel, tightening with a small spanner. During this process it is essential that you do not trap the wires, so ensure that they are free running by moving them up and down whilst tightening.

Use an epee point seating tool to correctly press home the plastic cap into the point base. If you do not have one, use a small screwdriver, but be aware that any uneven pressure on the two contact points may cause you problems with the travel spring.

Once this is done re-assemble the point, checking for signs of wear and tear. (see point reassembly)

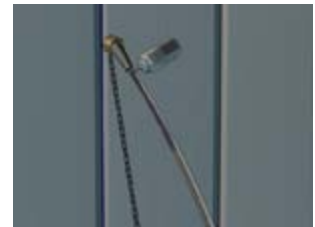
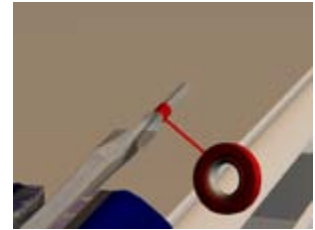
Turn the blade round in the vice and wrap some tape around the tang as shown. This will protect the wire whilst securing the wire to the tang.

Run your fingers down the epee wire, ensuring that there are no kinks and run the wires down the bottom of the blade groove, side-by-side and parallel to each other along the entire length of the blade. Then double the wire back along itself, then around the tang several times to secure it. (wrap\_wire1180.jpg)

Pre-tension the blade, either with string or using a length of chain. Use an epee wire seating tool to ensure that the wire is held in the correct position for glueing, and glue the handle end first. (glue\_wire1230.jpg)

When this is dry, undo the wire from the tang. This will prevent the wire from sticking to the tang if too much glue is run down the blade. Rotate the blade in the vice again, and allow several drops of glue to run down the blade. Do not use excess glue, and do not start glueing to near the barrel. Capillary pressure will put glue inside the point if you do not leave a gap of 3mm. (glue\_wire\_length1254.jpg)

Once the blade glue has dried, remove the tensioner and place tang upermost in the vice. Slide on two plastic insulating sleeves and ensure they rest just on the shoulders. It is possible to fix them in place with a drop of glue. (glue sleeves.jpg)



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Re-assemble the handle. This process is essentially a reversal of the disassembly, however care must be taken to ensure that the wires pass under the recess cut in the handle and guard.(under arch.jpg)If they do not, the wires are likely to be pinched, causing problems later.This can be very easily examined if you use one of LP's new see through guard pads.

Once the weapon is re-assembled and working, check both travel(link)and weight(link) before using.