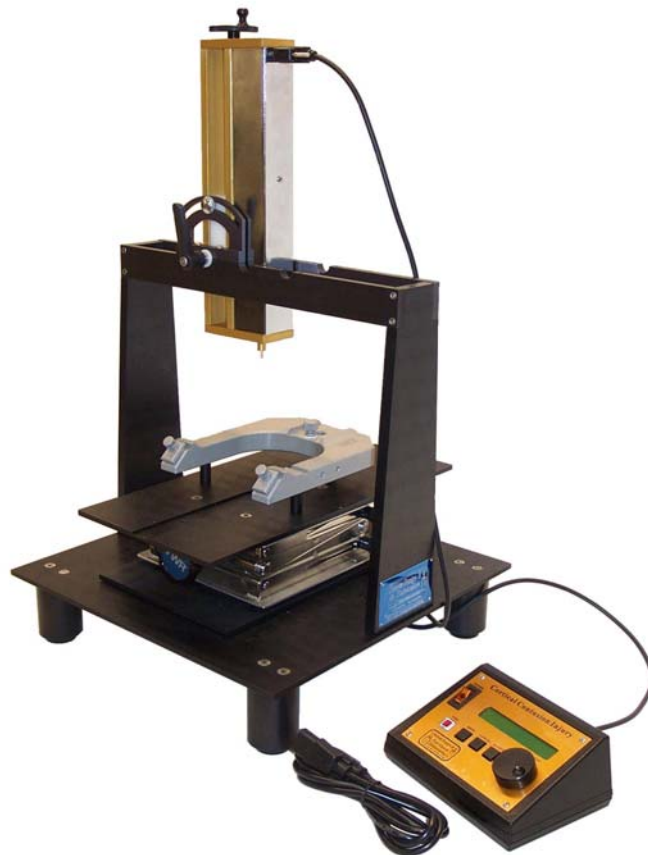


# *Custom Design & Fabrication, Inc.*



## *Cortical Contusion Injury*



*eCCI-6.3 Maintenance Guide*

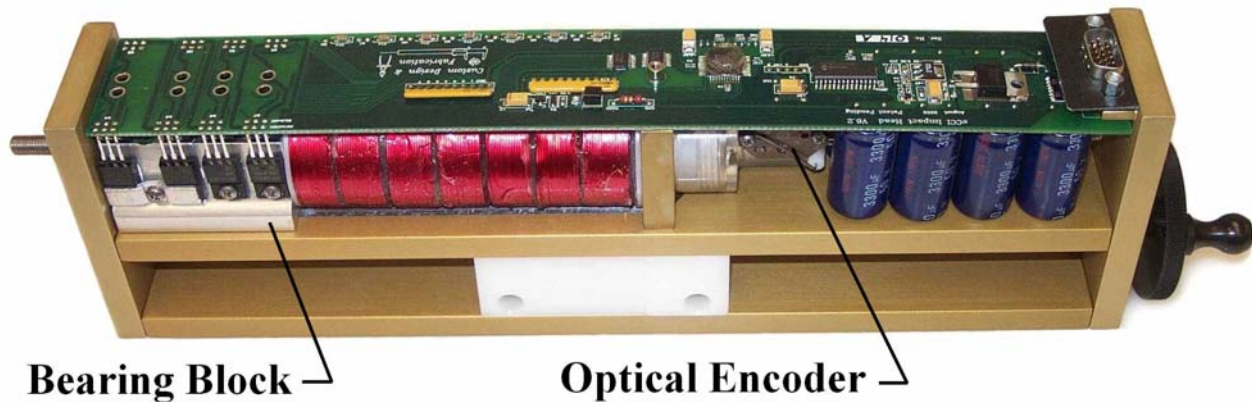
## eCCI-6.3 Maintenance Guide

The *electric* Cortical Contusion Injury device is completely electronic and performs a self calibration every time it is powered up. Maintenance consists of nothing more than removing any dust from the positioning optics and, in rare cases, adjustment of the bearings if they become loose.

### Accessing the Head:

Remove the impactor head from the frame by removing the locking knobs and the carriage bolts.

You will need a 1/16 inch Allen wrench to remove the cover screw. A single screw holds the steel cover on. The cover needs to be lifted straight off. It is a tight fit so you may need two flat blade screwdrivers to pry up both ends simultaneously.



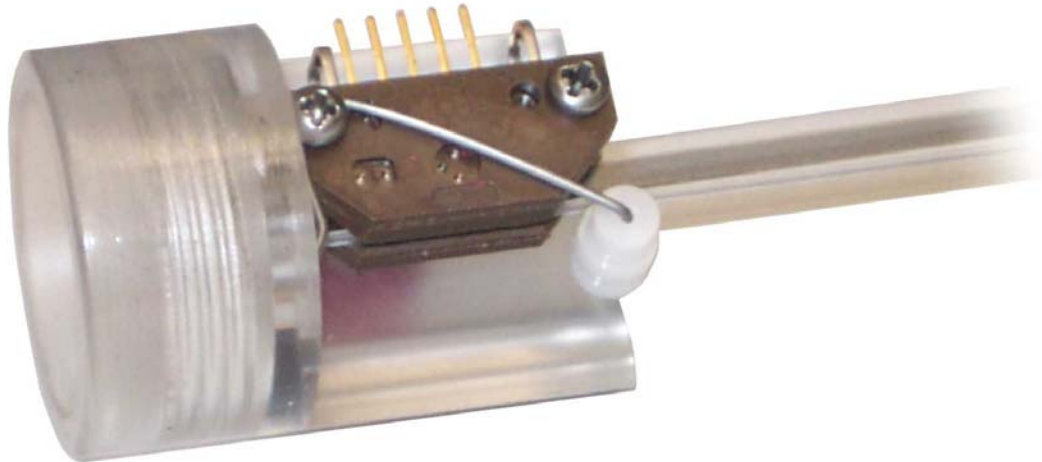
The photograph shows the head with the cover removed and location of the components to be serviced. The maintenance procedures include photographs of these parts removed from the head for better illustration.

## eCCI-6.3 Maintenance Guide

### Cleaning the Optics:

The eCCI uses an optical encoder to measure the motor position and velocity. The encoder tracks the motion of tiny lines on a linear code strip. These lines are less than 43 micrometers wide so dust or lint can corrupt readings from the optical pickup.

With the motor shaft fully retracted you can clean the code strip with compressed air. The code strip runs between the large blue capacitors and will be difficult to see but the air stream will remove any debris.



**Do not use tools or liquids of any kind to clean the code strip.** Use compressed air to blow any dust or foreign objects out of the encoder slot or off of the code strip.

Most eCCI's have a tension roller that helps stabilize the code strip. Ensure that the code strip is still riding in the roller groove after cleaning.

# eCCI-6.3 Maintenance Guide

## Checking the Bearing Adjustment:

A thread locking material has been applied to the adjusting screws so that the bearing block does not normally require adjustment. However, the head experiences very large shock impacts at high velocities which over time can loosen the bearings.

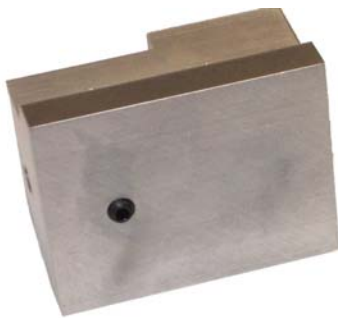
You can test the bearing adjustment by rotating the motor shaft. You should be able to turn the shaft but it should not spin freely. The force resisting the rotation should be about the same as trying to rotate a pencil that is underneath a large dictionary

If the bearings should need adjustment, we recommend that you return the head and base to Custom Design & Fabrication as this can be a difficult task. If you decide to perform this task yourself, you will need some acetone and a 3/32 inch Allen wrench. You will need to bend the Allen wrench as shown below to reach the adjustment screws.

There are two versions of bearing block used in the eCCI V6.3. The Allen wrench shown has bends for both types of blocks but you will only need the bend appropriate for your block.

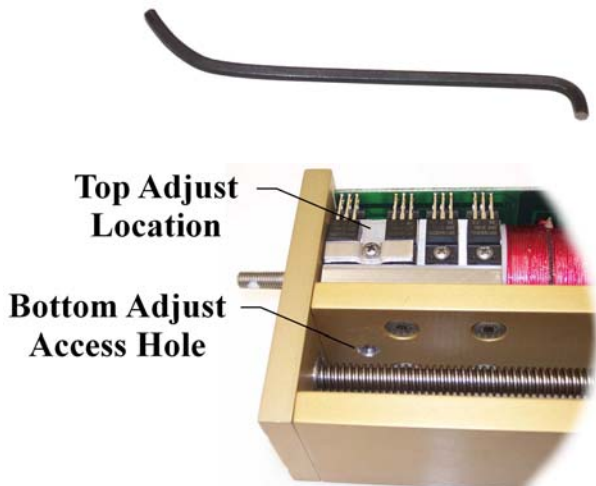
### Bottom Adjust:

This block has one adjustment screw which is reached through an access hole.



### Top Adjust:

This block has two adjustment screws which are reached through the gap between the power transistors.



### Custom 2/32" Allen Wrench:

The larger curve allows the Allen wrench to be inserted into the access hole behind the threaded rod.

( A standard Allen wrench can be used if you remove the bottom plate and threaded rod.)

The small curve allows the Allen wrench to fit under the circuit board to reach the top adjust style screws.

## eCCI-6.3 Maintenance Guide

### Adjusting the Bearings:

The motor shaft rides on radial ball bearings in a triangular configuration. The tension on the bearings affects the lateral stability of the motor shaft. If the bearings are too loose, the anvil can strike the target off center. If the bearings are too tight then the bearings will bind causing bearing wear and cogging. (Cogging is the effect where moving the shaft feels as though there are detents causing jerky motion as the shaft clicks to each detent.)

The first step in adjusting the bearings is to ensure you have a 3/32 inch Allen wrench that can reach the adjustment screws. Once you are sure you have a tool to perform the adjustment, then you may proceed as follows:

Apply acetone to the adjustment screw to loosen the thread locking compound. With the top adjust block, you only need to adjust one of the screws and a single drop of acetone will be sufficient because the treads are exposed. The bottom adjustment type will require several drops applied over a period a few minutes in order for the solvent to penetrate. Do not flood the area with acetone. The object here is just to soften the thread locking compound not to wash it away.

Loosen the adjustment screw until the motor shaft rotates freely then tighten the screw until the shaft becomes difficult to turn. The force required to rotate the shaft should be similar to the force required to rotate a pencil with a large book, such as a dictionary, placed on top of it.

When adjusted properly, the motor shaft should have no noticeable play from side to side and move smoothly in and out.

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