

Easy Heater Removal Access Hole

Background

The following instructions will make it possible to change out a future heater element in less than 15 minutes without removing the injector rail. This will apply to Envoy, ENVOY+, and early production MAX machines (S/N 4001-4227).

The left side (7 pin side) of the machine will need a small modification to make removal of the new heater tube much easier in the future. A 1" hole will be drilled behind the power switch to gain access to the side of the injector rail where the heater tube is inserted.

Required Tools:

- 1/8" Allen Wrench
- Tape Measure
- Drill
- 1/4" Drill Bit
- 1 1/8" Hole Saw
- Small Metal File
- Shop Vac or Compressed Air
- Dark color Sharpie
- Super glue (provided in kit)

Optional Tools:

- Compass
- Small Hammer



Note:

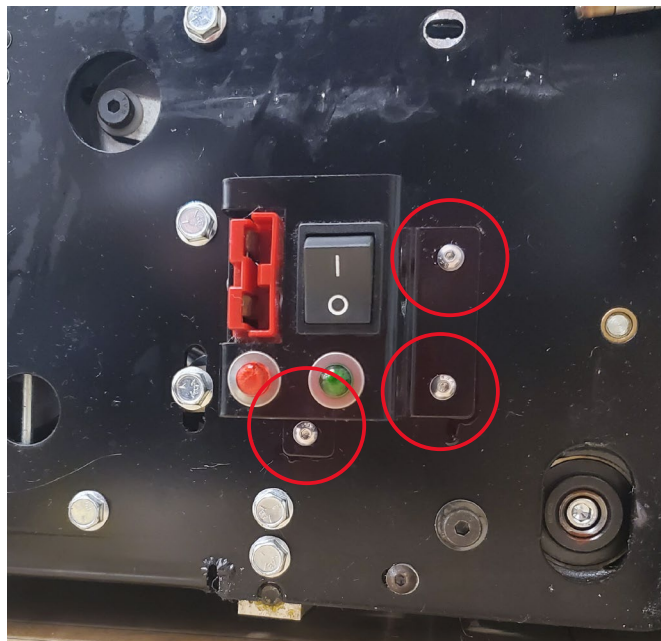
All references and pictures are made with the machine in the conditioning position.

This procedure can be completed in the transport position with care to not tip the machine over.

If performing modifications in the transport position all references and pictures will be rotated 90 degrees clockwise.

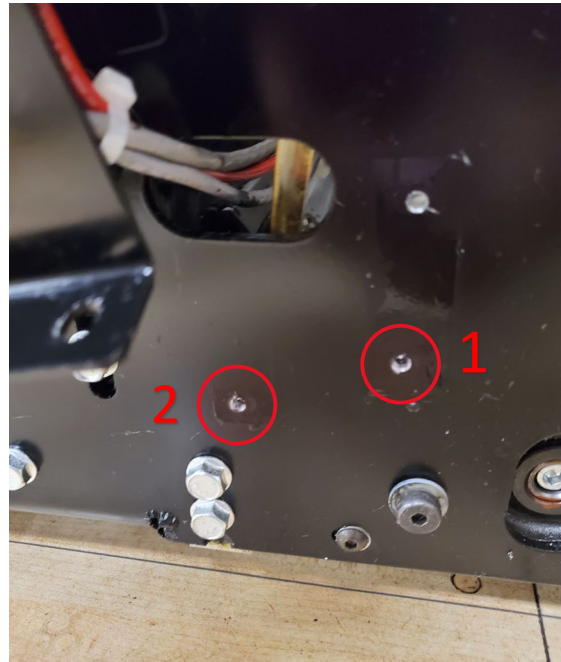
Preparation

1. **UNPLUG THE BATTERY FROM THE MACHINE BEFORE ANY WORK IS PERFORMED.**
2. The injector rail should be removed from the machine prior to any drilling.
3. Remove the left (7-pin) side cover.
4. Using the 1/8" Allen wrench, remove the 3 bolts holding the power switch bracket to the side of the machine.

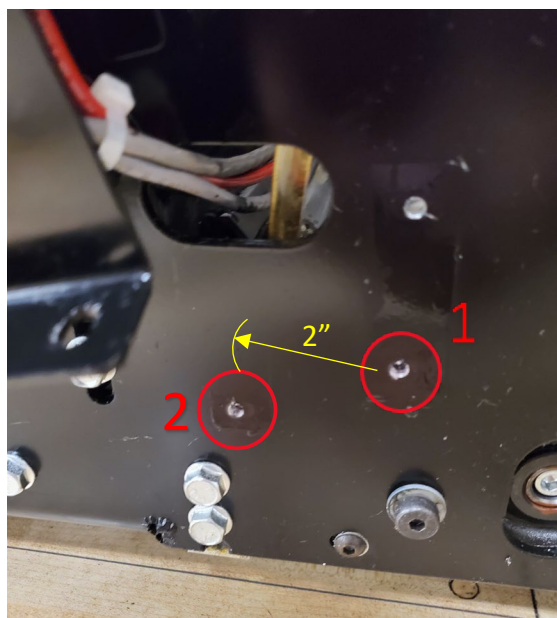


Locating the Hole

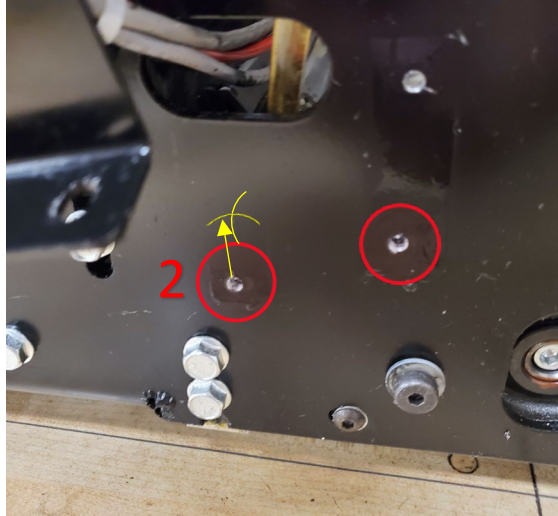
1. Once the bolts are removed locate the 2 bottom holes for the bracket. These are the holes that will help locate the access hole.



2. Measure horizontally 2 inches from hole 1, in the direction of the arrow, and make a mark. Using the compass, swing an arc.



3. Measure vertically $\frac{7}{8}$ of an inch from hole 2, in the direction of the arrow, and make an arc.



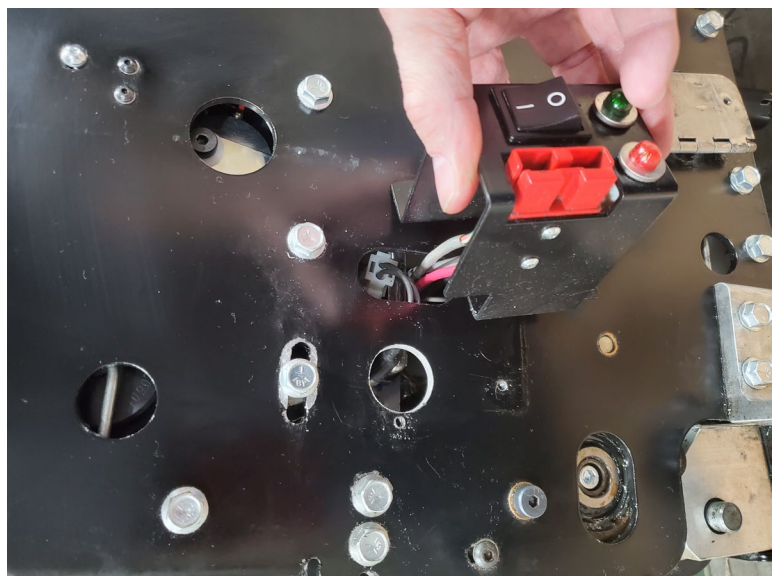
4. The place that the two arcs intersect is the center of the hole. **Recommended: Use a center punch to mark the intersection to keep the drill bit from walking away from the center.**
5. Check to make sure that there are no wires on the inside where the hole will be drilled, prior to drilling.
6. Use tape or some other way to secure the power switch bracket up out of the way while drilling to prevent accidental damage.

Drilling the Hole

1. Using the ¼ inch drill bit, drill a pilot hole on the center punched mark where the 2 arcs intersected.



2. Using the 1-1/8 inch hole saw and the pilot hole as a guide, drill the larger hole through the side panel. Take care to not drill deeper than necessary to not contact other components inside the frame of the machine.



Finishing Up

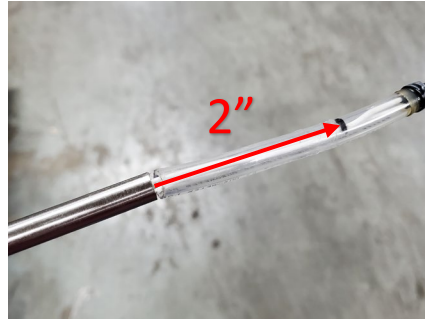
1. The inside of the hole will have a sharp edge from the hole saw. This should be removed using the metal file taking care not to damage the wires or other parts inside the machine.
2. Using a shop vacuum or compressed air clean out all the metal filings from the machine before re-installing the injector rail. *This is critical to ensure metal shards to not end up on approaches/lane surface as the machine is in used in the future.*
3. DO NOT re-install the power switch bracket until the injector rail has been re-mounted. The cables from the new heater tube will exit the machine through the new hole just drilled. Then plug into the cable from the enclosure under the power switch bracket. The bracket will cover much of the hole when installed.

Changing the Heater Tube

1. Remove the old heater tube by removing as much of the silicone sealant around the wired end and gently pulling on the wires. If the tube does not pull out easily remove the silicone from the other end.
2. Once the old heater tube is out, make sure that all the silicone sealant has been removed from the injector rail hole.



3. Using a Sharpie, place a mark 2 inches from the end of the metal tube on clear protector tube.



4. Slide the new heater tube into the injector rail to the line marked on the clear protector tube.



5. Place a small drop of thick super glue on the clear protector tube where it exits the injector rail. **DO NOT USE THIN SUPER GLUE, IT WILL MAKE THE HEATER TUBE EXTREMELY DIFFICULT TO REMOVE IF THE HEATER FAILS IN THE FUTURE.**



6. The injector rail is now ready to re-install in the lane machine.