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Thank you for purchasing the RAW Design Scorpion Tips for your Suzuki M-109R. The instructional sheets that follow are thoroughly detailed and should be studied BEFORE picking up a tool. Take your time, work safe and you will enjoy your new exhaust within a few hours.

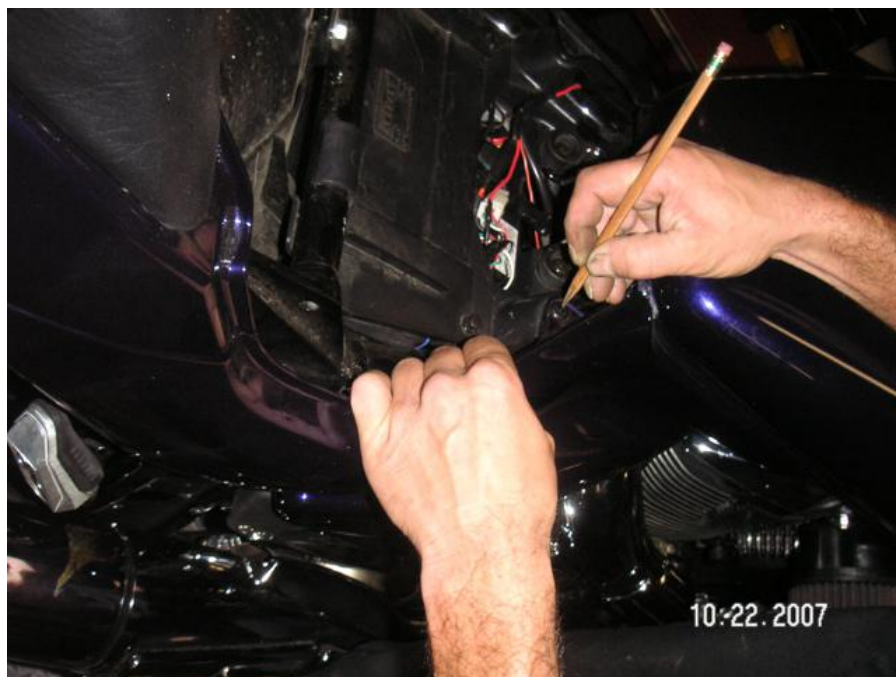


These are the tools you will need:

- Safety Glasses
- Safety Gloves
- Ear Plugs
- Grinder with cutoff wheel and / or Sawzall with fine blade
 - Plastic or rubber mallet
 - Metric Allen Key Set
 - Metric Box Wrench set
- Metric Socket set with assorted extensions, swivels, etc.
 - Cut off pliers
 - Screw Drivers
- Drill Motor with 1/8" bit



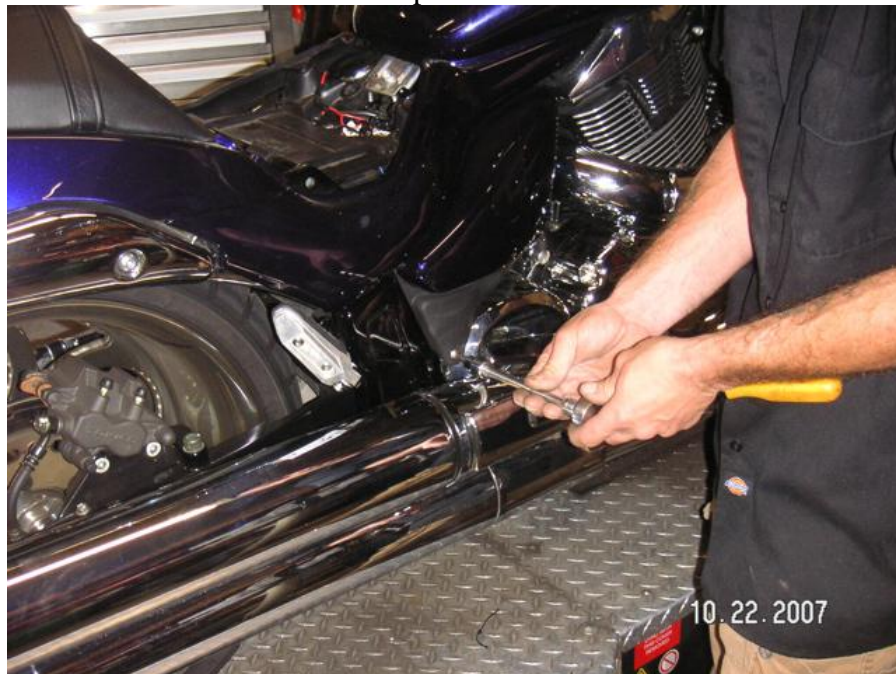
Remove Seat



Remove Snap pin from cover. Use a pencil point or something similar to depress center of pin during removal.



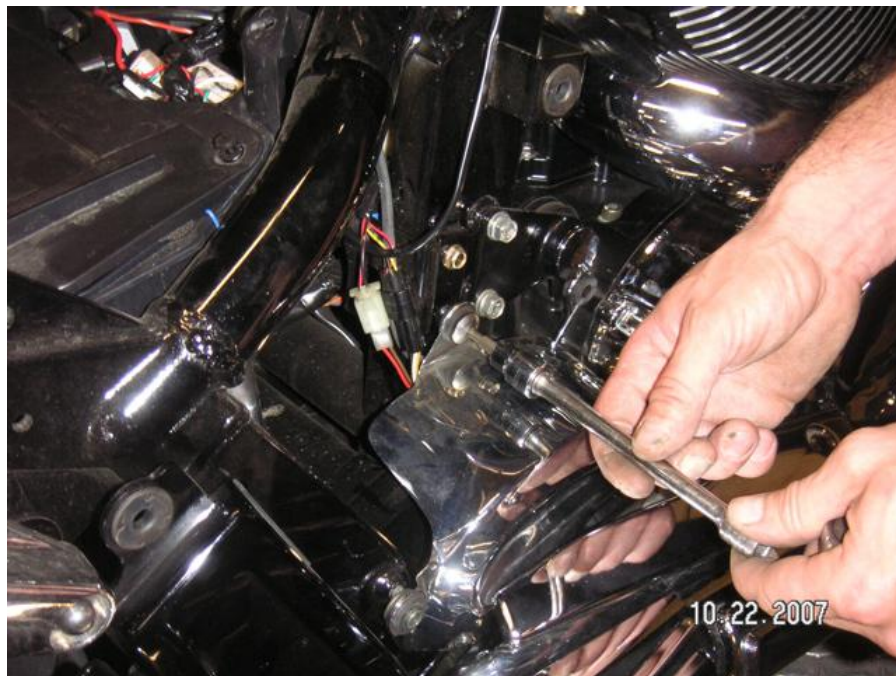
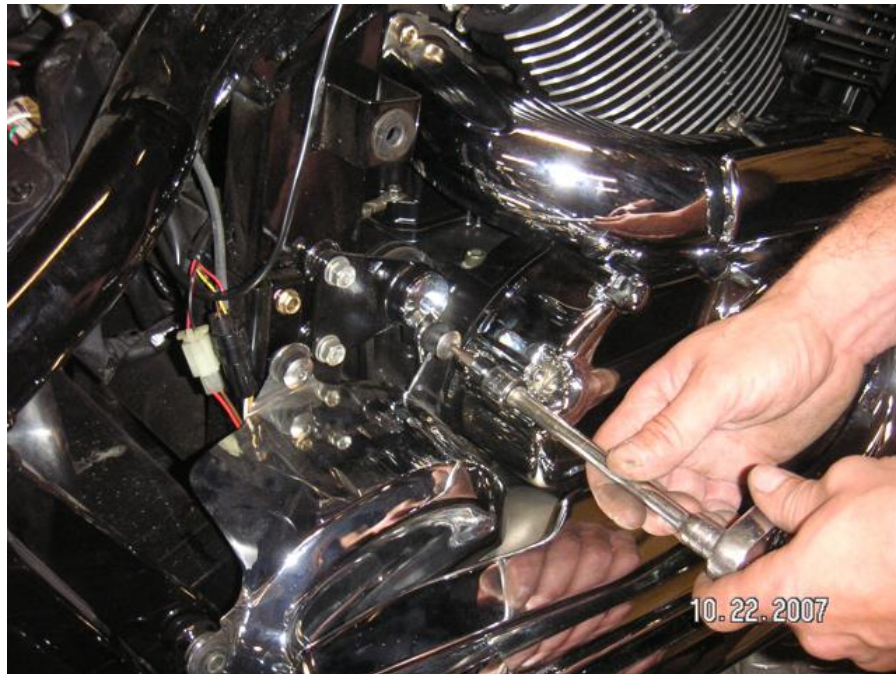
This is the pin. Don't lose it.



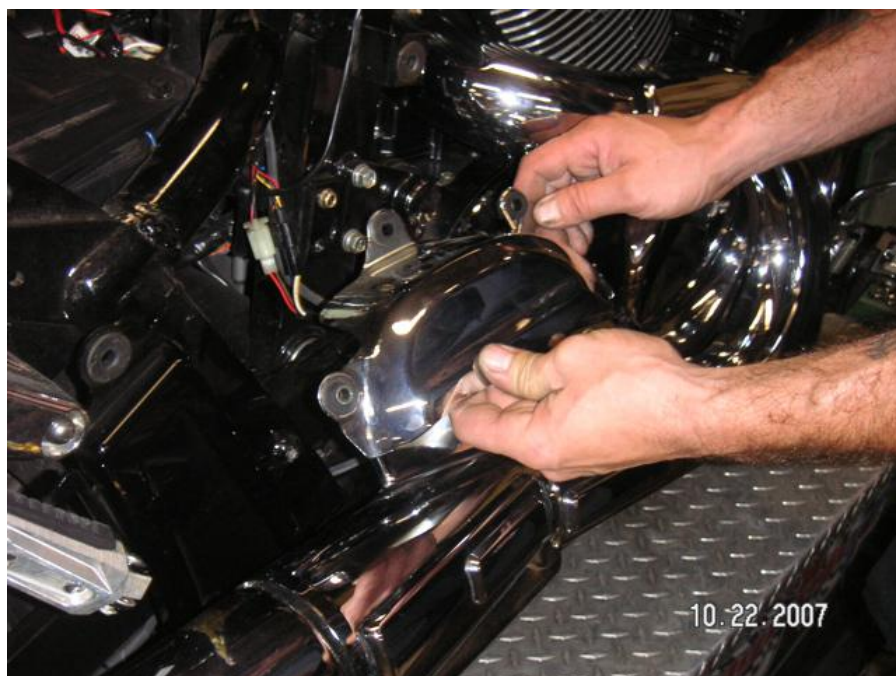
Remove Allen bolt from lower side cover



Gently remove plastic side cover and panel. This will pull off with firm pressure.



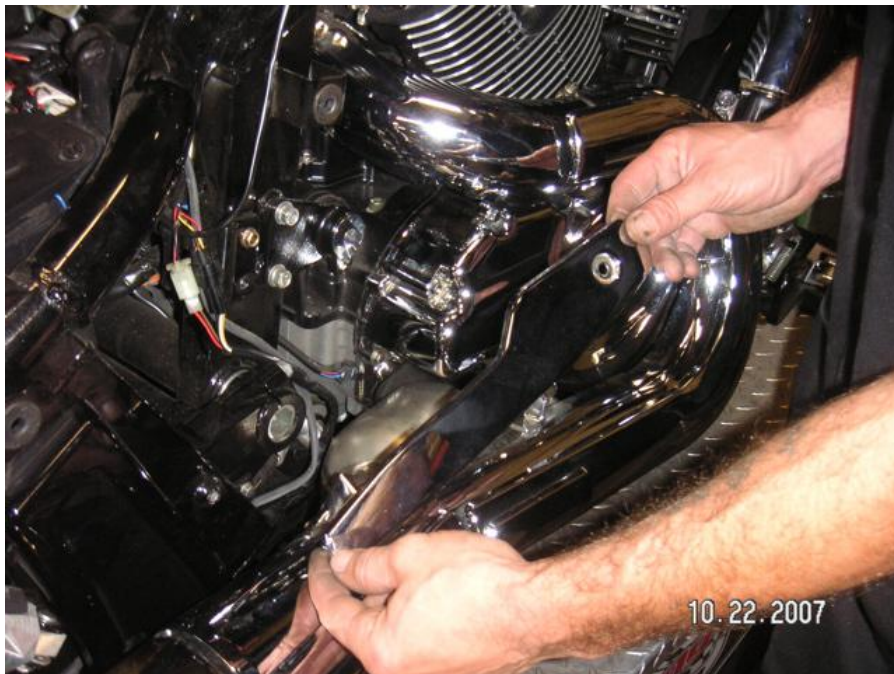
Remove 2 Allen bolts from chrome SET (Synchronized Exhaust Tuning) valve cover



Remove chrome SET valve cover



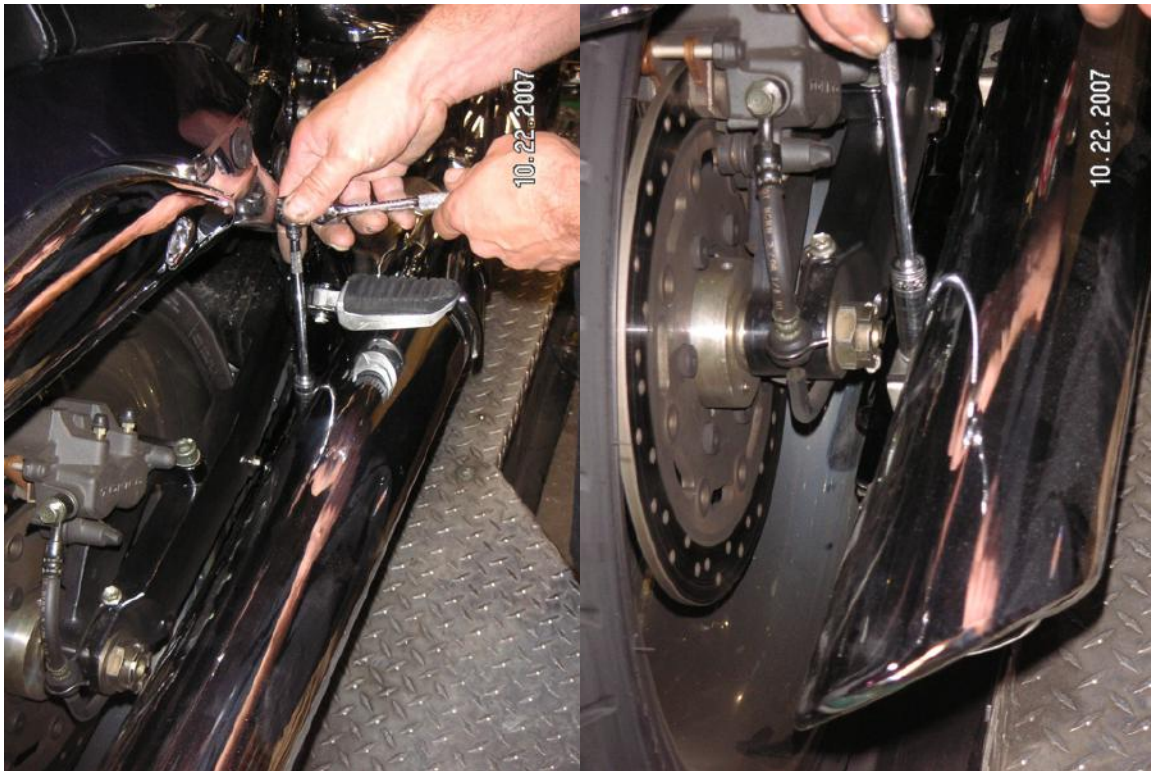
Remove Allen bolt from heat shield



Remove heat shield.



Be careful not to lose this grommet when removing shield. You will need it latter.



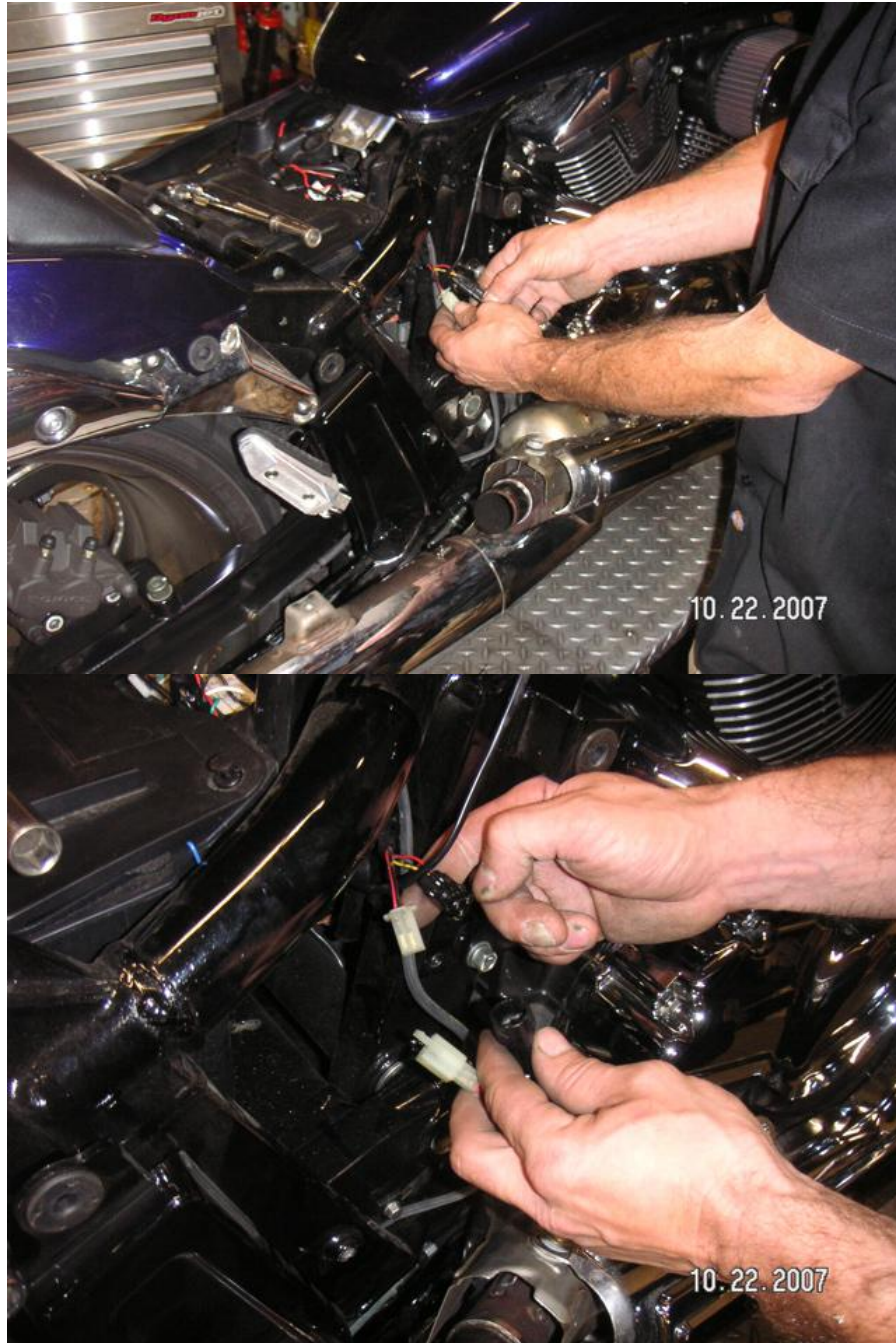
Remove forward and rear support bolts for upper tube.



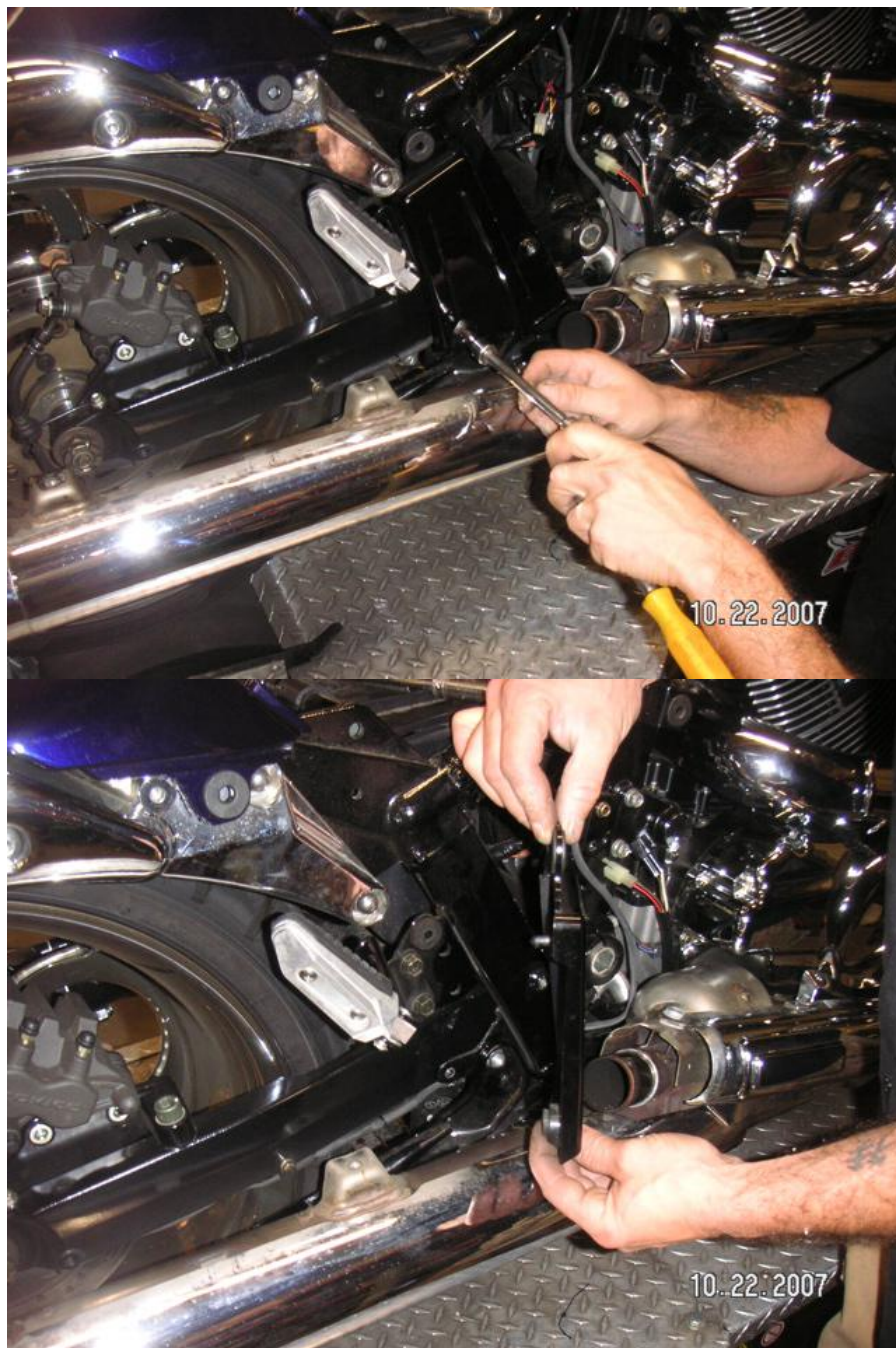
Loosen 2 clamp bolts on top tube



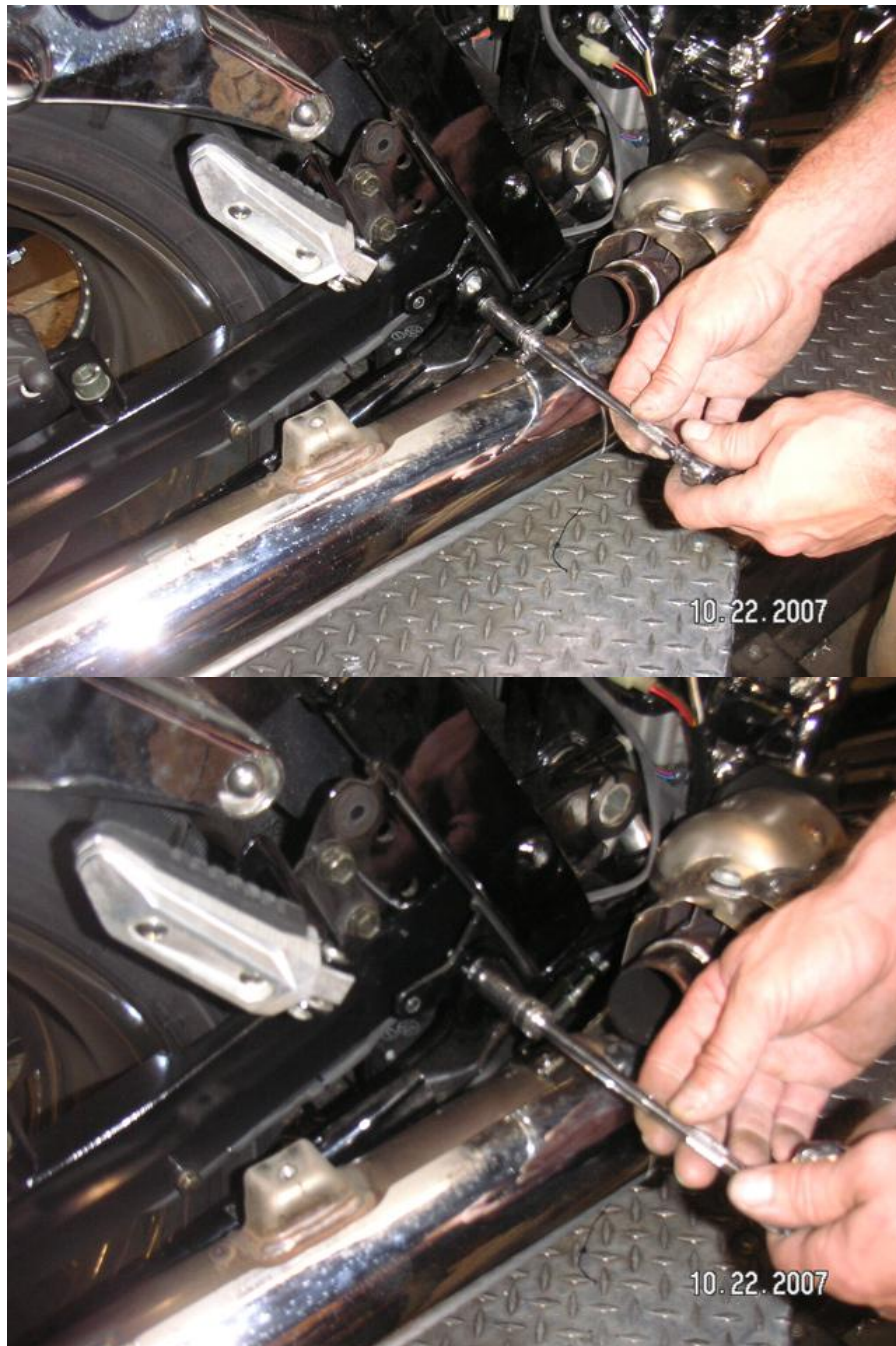
Pull back and up to remove top tube. Slight twisting may help.



Disconnect wires for SET exhaust valve.



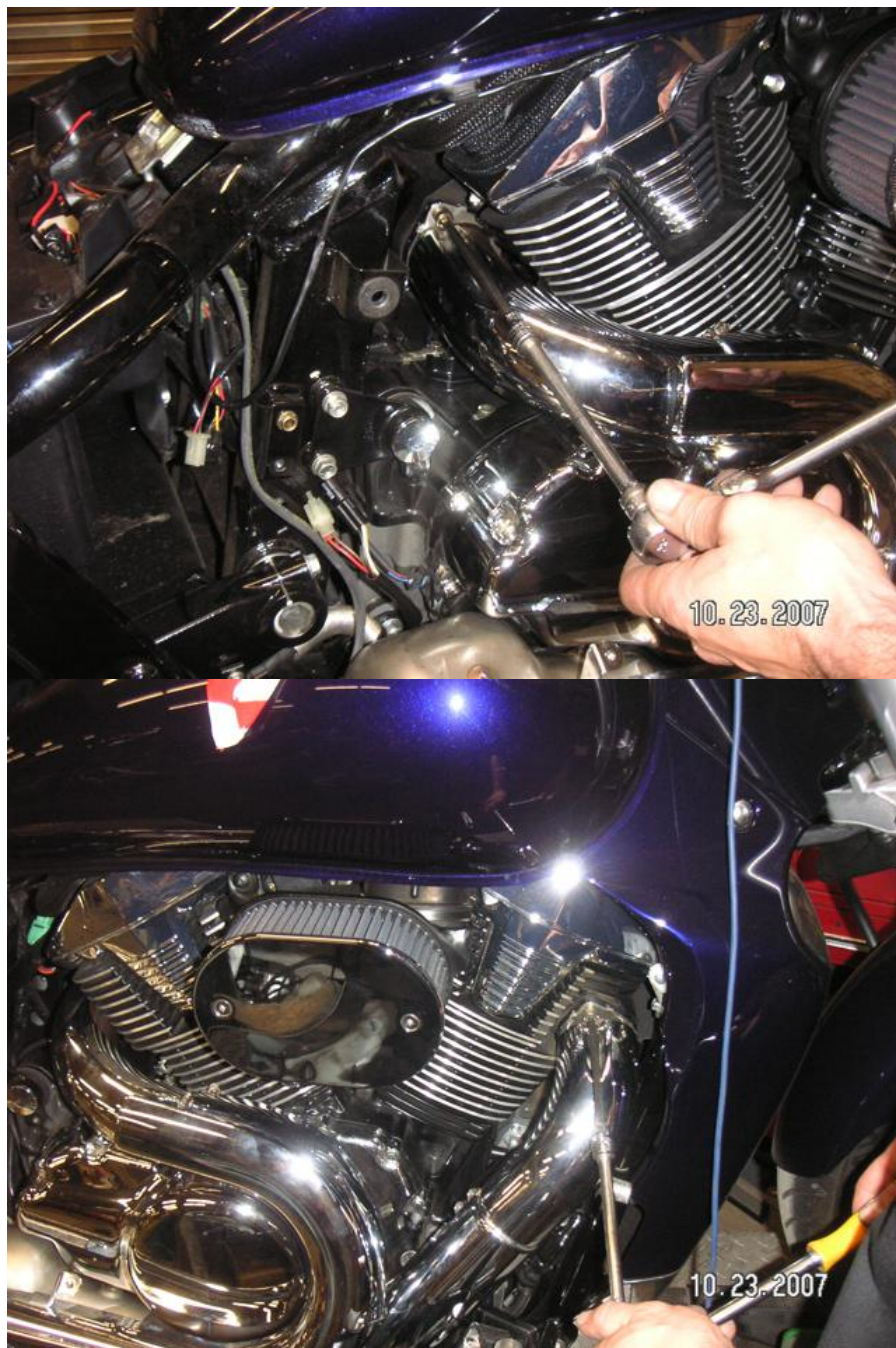
Remove 1 Allen bolt and plastic side cover with gentle pressure.



Remove lower bolt from exhaust hanger. Remove nut from upper stud. Exhaust hanger should stay in place on stud for now. (Shown below)



Remove lower hanger mount bolt.



Remove bolts from front and rear exhaust pipes.



Remove exhaust and place on a covered workbench so you don't scratch any chrome.



Remove exhaust actuator from support frame. There is no need to disconnect cables.



Remove front and rear bolts from exhaust support frame



Remove 3rd bolt from exhaust support frame and remove frame.



Remove 1 bolt and heat shield.



Remove 1 bolt and clamp. Put lower tube and exhaust manifold assembly to the side for now.





On the upper exhaust tube, remove bolts on the clamp that holds on the heat shield. With a screwdriver, spread flanges of the clamp and remove heat shield.

EXTREMELY IMPORTANT!!!

The upper and lower tubes of your exhaust need to be cut differently from each other in order for the Scorpion Tips to attach properly. **DO NOT CUT** until you are absolutely positive you understand where they are to be cut. It's not rocket science, but you have to pay attention.

Upper Tube



The upper pipe must be cut just **behind** the weld bead (towards the fat end of the pipe) so that the weld remains with the flange. See above picture. It does not have to be perfectly straight or perfectly on the edge of the weld; just as close as you can get it without removing the weld.



This is what it should look like after the cut. Take the inner piece of scrap you see above and discard.



The welds on each pipe are slightly different. They will need to be ground until the Scorpion tip fits snugly. DO NOT screw or weld them on yet. You will want to be able to turn them up or down later to get the angle you want for your bike.



This is what the upper pipe should now look like.

Now put the upper pipe to the side.



On the lower pipe there are 2 welds holding on the heat shield. Grind off these welds and remove the heat shield.



Picture shows weld ground off

EXTREMELY IMPORTANT!!!

The upper and lower tubes of your exhaust need to be cut differently from each other in order for the Scorpion Tips to attach properly. **DO NOT CUT** until you are absolutely positive you understand where they are to be cut. It's not rocket science, but you have to pay attention.

LOWER PIPE



The lower pipe must be cut just **ahead of** the weld bead (towards the inlet end of the pipe) so that the weld is removed from the flange. See above picture. It does not have to be perfectly straight or perfectly on the edge of the weld; just as close as you can get it while removing the weld.



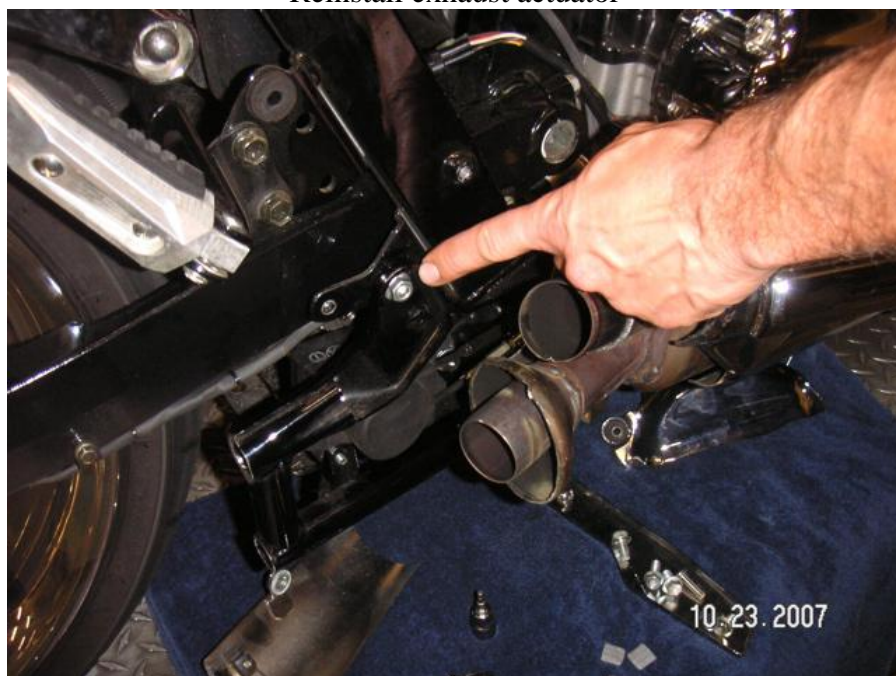
Cut exhaust support as shown above. Discard part on left. Clean up the cut on the part on right and paint exposed steel with something like Rustoleum black spray paint.



Reattach frame to lower exhaust and manifold.



Reinstall exhaust actuator



Put lower exhaust system back on bike. Reinstall nut on stud.



Reinstall nuts / studs from manifold to engine, front and back pipes. This is a good time to inspect your exhaust gaskets in the heads. Replace if you have any question as to their integrity.



Reinstall lower bolt in exhaust support.



Reinstall exhaust support bottom bolt



Reattach SET control wires.



Reinstall Black Trim panel and bolt



Reinstall heat shield on upper tube. Do Not set the clamp tight. Just finger tight on the bolts.

EXTREMELY IMPORTANT!!!

The following shows how to **TEMPORARILY** attaché your new Scorpion Tips. They must be tack welded in place to permanently affix. See “Welding instructions” below.



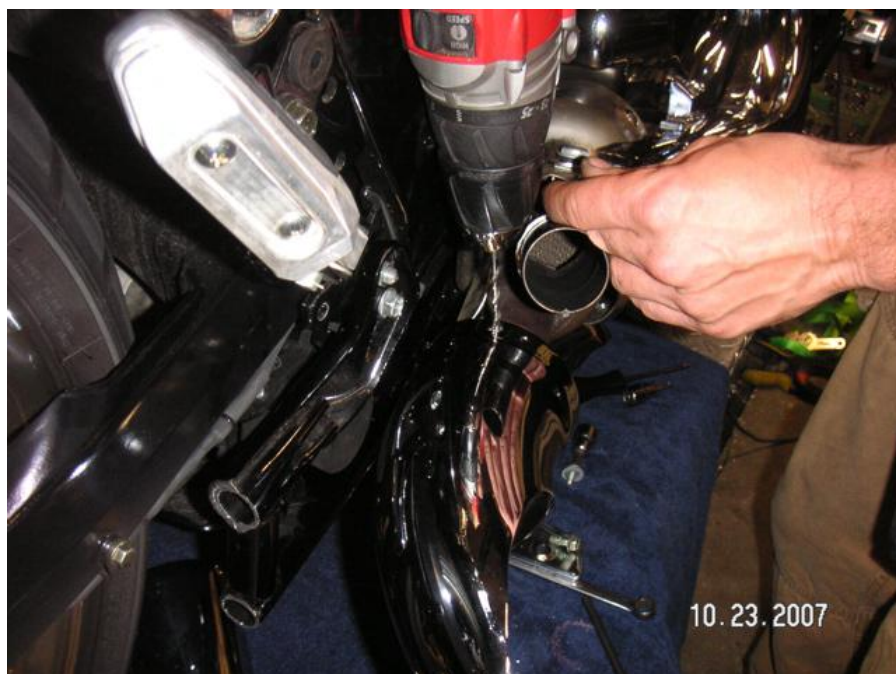
Slip on Scorpion pipe tip to lower flange. Rotate to desired angle



Slip upper tube and heat shield onto upper manifold. You will need to twist and adjust the inner tube, heat shield and Scorpion tip as a loose assembly to get the desired angle you want for the tips. Do the same for the bottom tip to make sure both are aligned. Take your time. This *sounds* more complicated than it is.

Once you have everything lined up where you like it, use a felt tip pen or similar marker to mark a small line across each of the adjoining parts. This creates a reference point to realign everything during the next step.

Move to top heat shield so you can get at the joint of the inner tube and Scorpion Tip. With a 1/16" drill bit, use one of the pilot holes in the tip to drill through the inner tube. Use one of the supplied sheet metal screws to fasten Tip to inner tube.



Remove the top tube heat shield and Scorpion tip to gain access to the lower assembly.
Make sure your alignment marks are in-line.
Drill and screw Tip to inner tube as you did above.



Reinstall upper tube and heat shield. Check for alignment. Tighten clamp on front of heat shield. This will hold shield and inner tube to manifold.

Reinstall remaining guards, trim pieces and seat.

Make one more thorough check of all the pieces you just assembled to make sure everything is correct and tight. If you are sure everything is in order, go ahead and start your bike. Check for any exhaust leaks.



Now take the bike DIRECTLY to a qualified welder. A muffler shop may be good. Have the welder place 2 or 3 tack welds on each pipe to tip joint. Each one should be approximately $\frac{3}{4}$ " long.



Spare parts and approximately 15 pounds removed from you bike

Enjoy and Ride Safe