

# Modifying the Niva's drivetrain breathing system

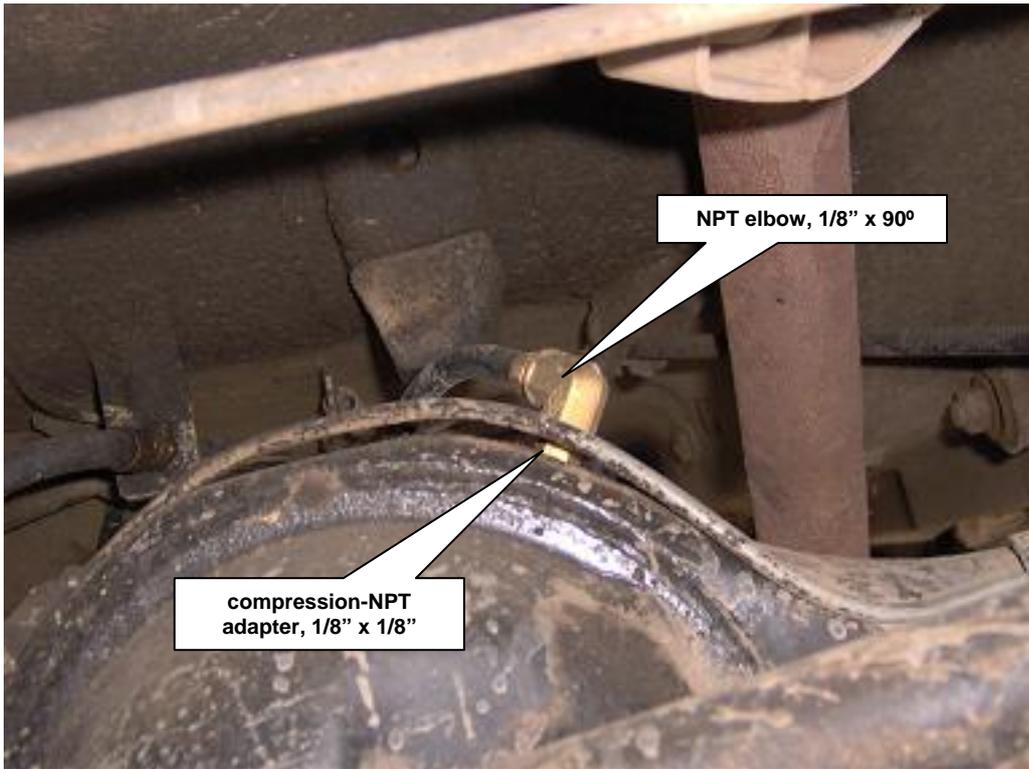
I few months ago I happened to have a leak through the rear axle pinion oil seal, but during the replacement job I found out the rear axle breather to be missing. Knowing the rain season was still going on, I removed the drain plug and discovered much to my grief that the diff was being lubricated by something that looked like mayonnaise! With the seal replaced, the axle thoroughly washed on the inside and fresh gear oil added on, now it was time to find a way of improving the watertightness of the breathing system.

## 1.- Rear axle:

The rear axle breather is different from the ones installed in the rest of the drivetrain components, it's threaded-on while the remaining three are a press-fit in the casing. I found the threads to be close to a 1/8" compression, so I got me a 1/8" compression by 1/8" NPT adapter (ditched the nut and barrel, of course), put on a little PTFE tape on the compression end for added tightness and proceeded to thread it on the axle. A 1/8" NPT 90-degree elbow, a 1/8" NPT by 1/4" hose adapter and as much 8 mm O.D. PVC flex hose as needed to reach the engine bay complete the connections:

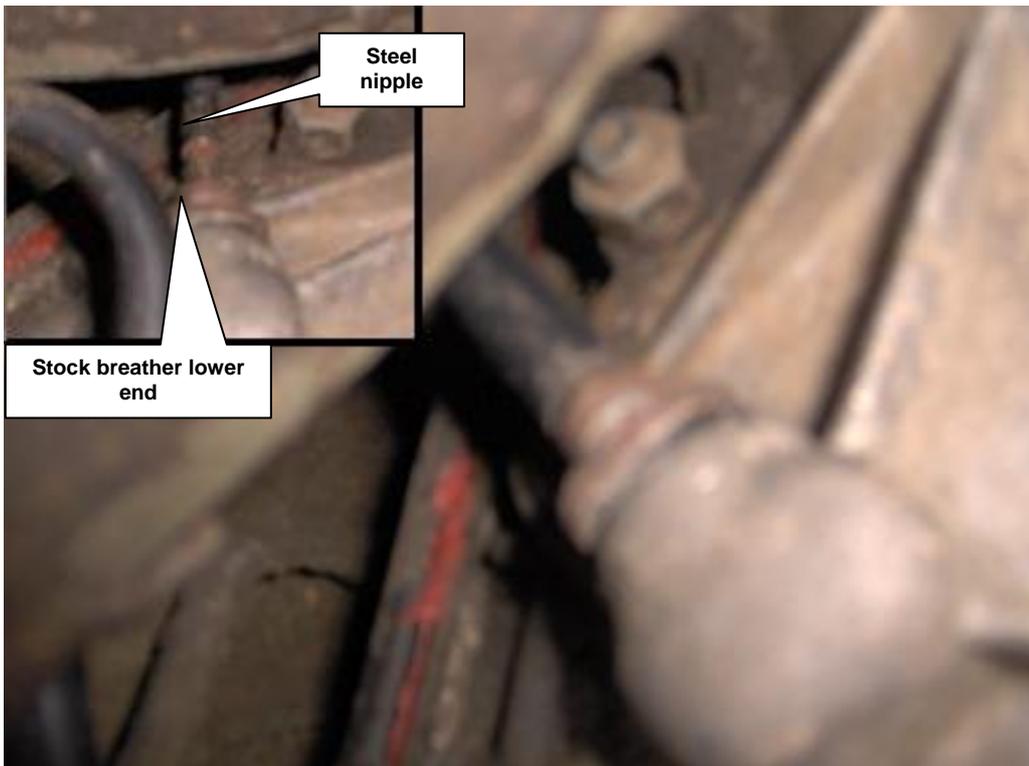


You can see in the picture that the hose looks to be too long, I left some slack in order to compensate for the somewhat amazing Niva rear axle articulation.



## **2.- Transfer case:**

First I thought of drilling and tapping the transfer case breather hole to  $\frac{1}{4}$ " NPT, but that would have meant taking the TC out. I decided it was a lot easier to remove the existing breather and modifying it a little bit, so I took the cap off the breather and had a local hose shop weld a steel nipple on top of it. The picture isn't too good, but you still can see it makes the trick:



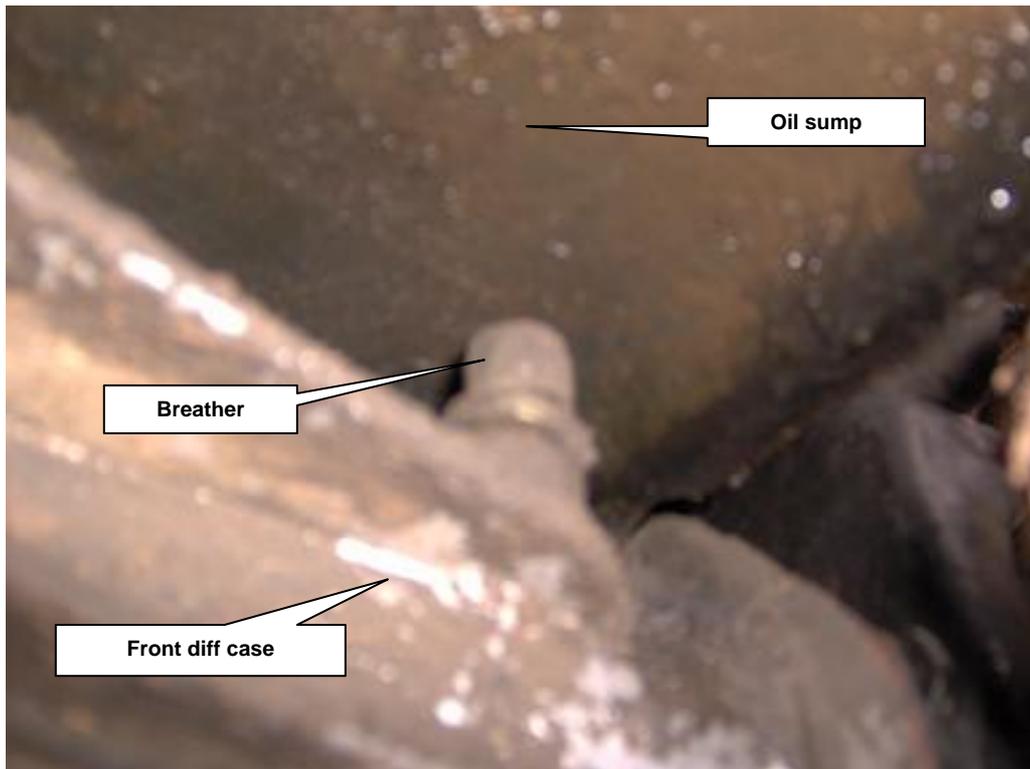
### **3.- Gearbox:**

This would prove to be the most difficult part of the whole project. As you can see in the pictures there's not a lot of room between the bellhousing and the car's body, so simply put, there's no way of working around without removing the gearbox. Since nobody in their right mind would spend an hour or two removing the gearbox just to drill and tap a hole for a fitting, this part of the project is best left for when its time to replace a worn clutch or do a transmission overhaul.



Back in those days I had the bad luck of breaking the clutch release bearing fork, so that made a great opportunity to keep working on the project. I used a couple of Vise-Grips to remove the old breather after which I took the bellhousing to a local shop to have the breather hole drilled and tapped to 1/4" NPT. Then I put in a 1/4" x 1/4" brass hose adapter and enough PVC hose to reach the engine bay. Since the gearbox was out, I took the opportunity to route the rear axle and TC breather hoses using the same metal clips which hold the fuel and brake lines to the body's underside for this purpose.

### **4.- Front differential:**



As you can see there ain't a lot of room around the front diff breather either, but at least it can be reached with one hand. I used the Vise-Grips to loosen the breather from the diff case and then used a hammer and cold chisel to finally free it out. Since the exhaust manifold sits quite close I thought of using a length of copper tubing to avoid burning the PVC hose, so I modified the breather again but this time I welded a 90-degree female x male 1/8" elbow in order to fit a female 1/4" x 1/8" compression fitting. This is what I came up with:





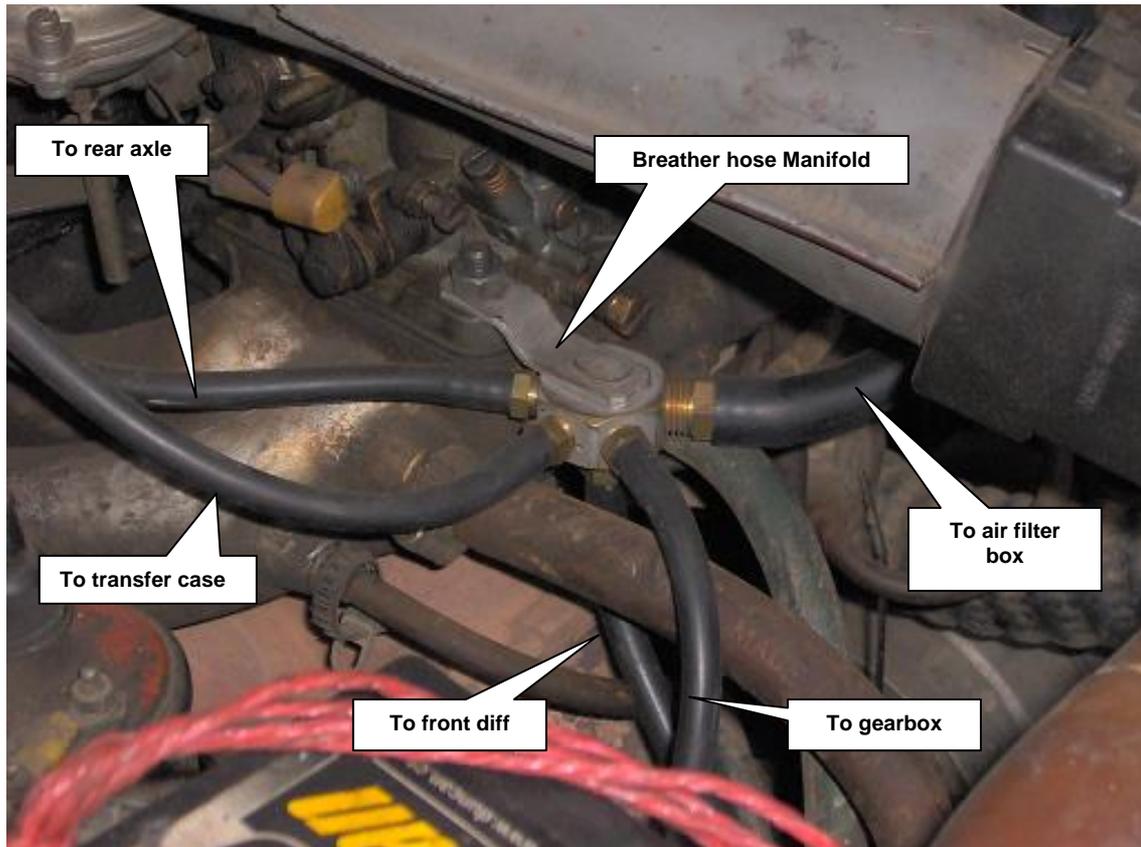
I smeared a little red RTV on the breather lower part before installing it back in the diff case. Now is time to do a series of bends on the copper tubing in order to clear both the exhaust manifold and main steering rod. The PVC hose is then fitted to the free end of the tubing and routed to the hose manifold (keep on reading for more on this).



## **5.- Final fitting operations:**

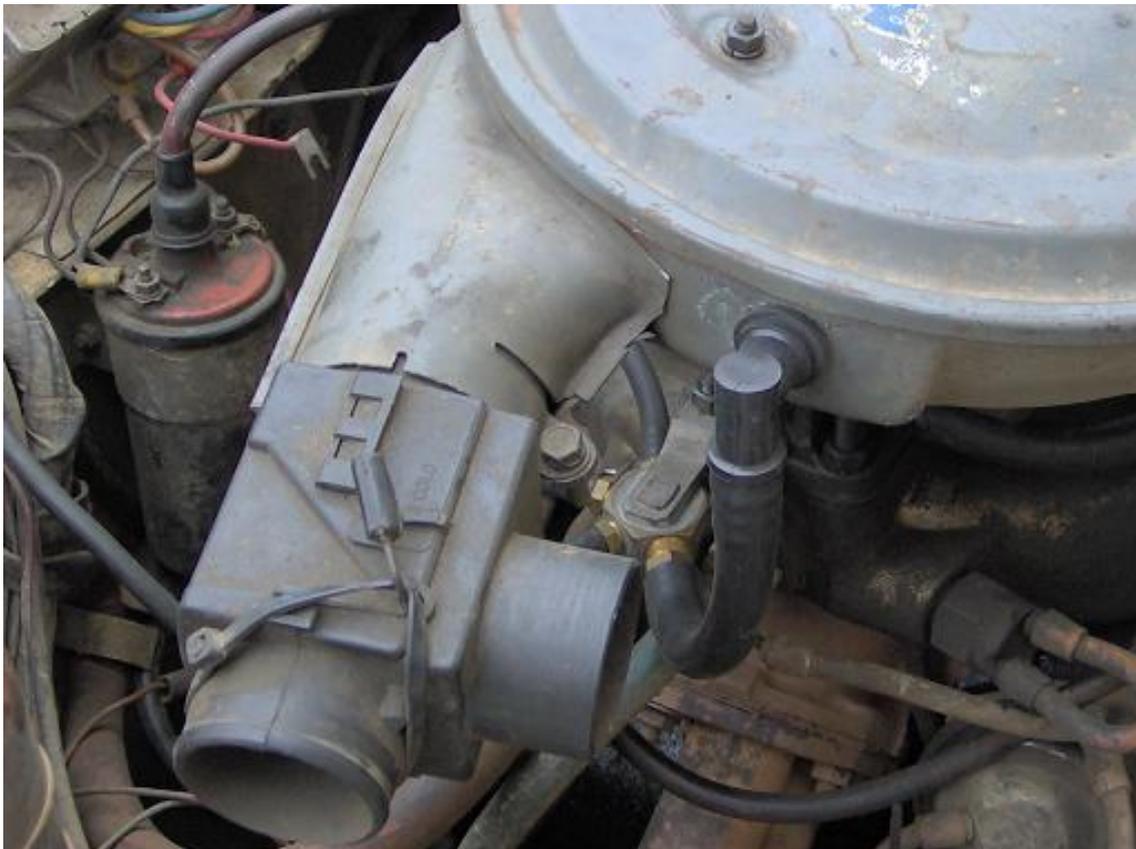
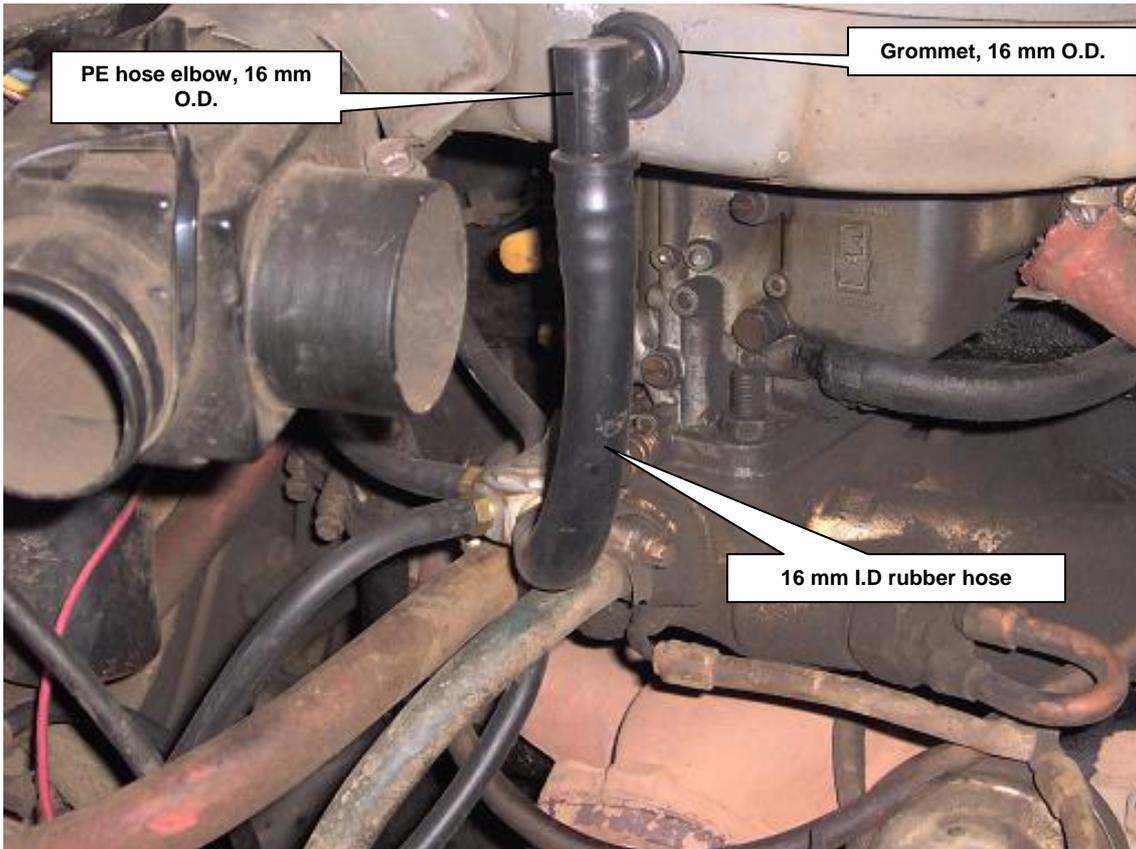
Once all the components of the drivetrain have their own breather hose installed it's time to focus in finding a way of connecting everything to the air filter box. There's lots of room for creativity here...

In my case I used a brake line distributor from an old Dodge truck (according to the seller) which had four 1/8" flare outlets and a single 1/4" NPT inlet hole, plus it had its own mounting bracket. I had the shop to drill and tap the four flare outlets to 1/8" NPT so I could install four 1/8" NPT x 1/4" hose adapters and a 1/4" NPT x 1/2" one:



I drilled a 18 mm hole on the side of the air filter box and installed a 16 mm I.D. rubber grommet, after which I fitted a 16 mm elbow for PE hose (I sell irrigation supplies for a living, so these were damn easy to get) and finally hooked up the elbow to the hose manifold using a short length of 16 mm I.D. rubber hose.

The following pictures show all the connections in detail:



## LIST OF MATERIALS



PVC flex hose, 8 mm O.D.  
Qty: 8 – 10 meters.



Copper tubing, 1/4" O.D.  
Qty: 0.80 m.



Rubber hose, 16 mm" O.D.  
Qty: 0.25 meters



Brass NPT elbow, 1/8" x 90°  
Qty: 1



Compression x NPT female adapter,  
1/4" x 1/8"  
Qty: 1



Compression x NPT male adapter,  
1/8" x 1/8" (less nut & barrel)  
Qty: 1



NPT hose adapter  
Qty: - (7) 1/8" x 1/4"  
- (1) 1/4" x 1/4"  
- (1) 1/4" x 1/2"



Male x female NPT elbow, 1/8" x 90°  
Qty: 1



PE tubing elbow, 16 mm x 90°  
Qty: 1



Grommet, 16 mm I.D.  
Qty: 1



Stock breather (less cap)  
Qty: 2