

Electro-injectors Supersonic Cleaning

Today's article will deal with cleaning the electro-injectors of our motor. This process is famous for removing any debris originating from impurities of fuel and combustion remains. Alfa technical bulletins propose cleaning them every 50.000 km or 32.000 miles.

Let's start.



Remove ECU, corrugated sleeve and respective coolant hoses



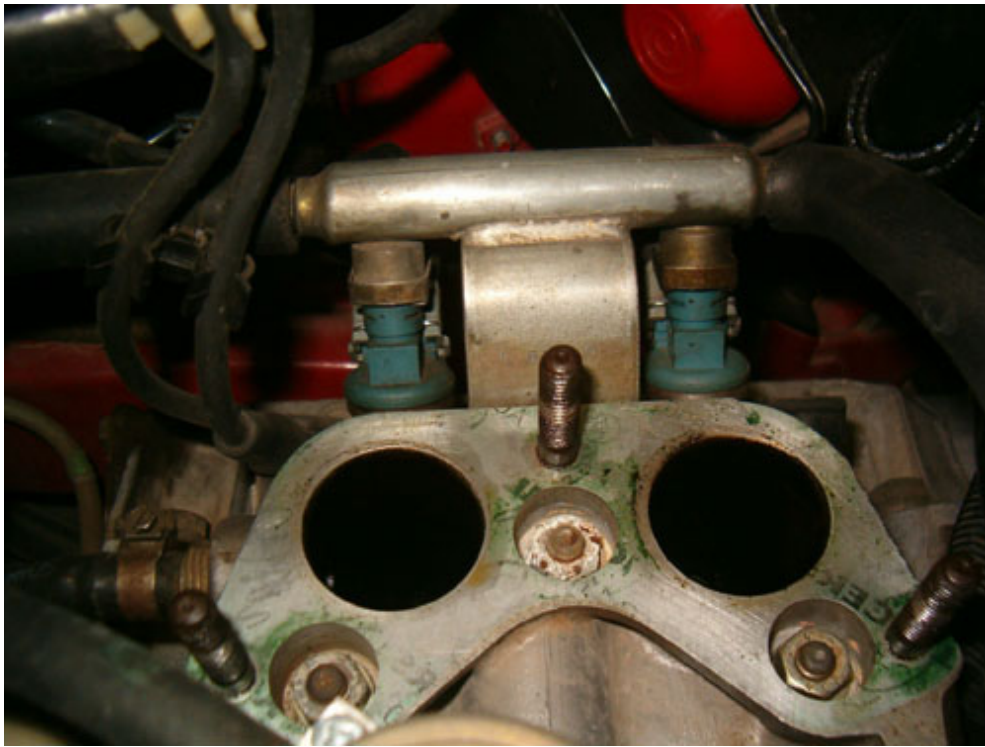
Undo three nuts securing plenum to intake manifold for the right side ...



... do the same for the left side.



Now you have plenty of room to work on the fuel rail and injectors



Let's remove injectors from the fuel rail.



Using a flat screwdriver remove the clip securing injector to fuel rail



Using a small flat screwdriver remove the metal clasp in order to separate injector from socket



Sockets are out



Grab a 10mm nut and undo the bolts securing fuel rail to intake manifold (2 screws per side)

Injectors are out at last. Notice the carbon deposits on the tip of the injector. The right most injector recently replaced a failed one, that's why the tip looks cleaner. The other three injectors are original to the car whereas the right most comes off a L-Jet 33 that I salvaged for parts many years ago. At least it proved practical to have in hand a bunch of spares!



Close up of the tip along with carbon deposits



Old O-rings which will be replaced with new ones



The tips are just plastic hat looking elements which are pressure fitted and it is advisable to discard them and install new ones.



Close up of the injector needle



Old tips.



This is the injector cleaning device. It uses the supersonic method to remove combustion particles and debris from the internals of the injector.



Apostolos programs the device...



...and submerges the injector tips in the cleaning solvent.



Overview of the solvent bath.



The cleaning process has already begun and the display of the device indicates that the injectors are currently operating at 1199rpms for 432.29 sec counting down and the injection time is at 3.593 msec. Actually this device simulates engine running at all phases low, middle and high engine rpm.



Notice the white debris on the wall of the bath. This is actually mineral elements from water which resides in fuel. Darker particles on the surface of the solvent are carbon remains from the combustion process.

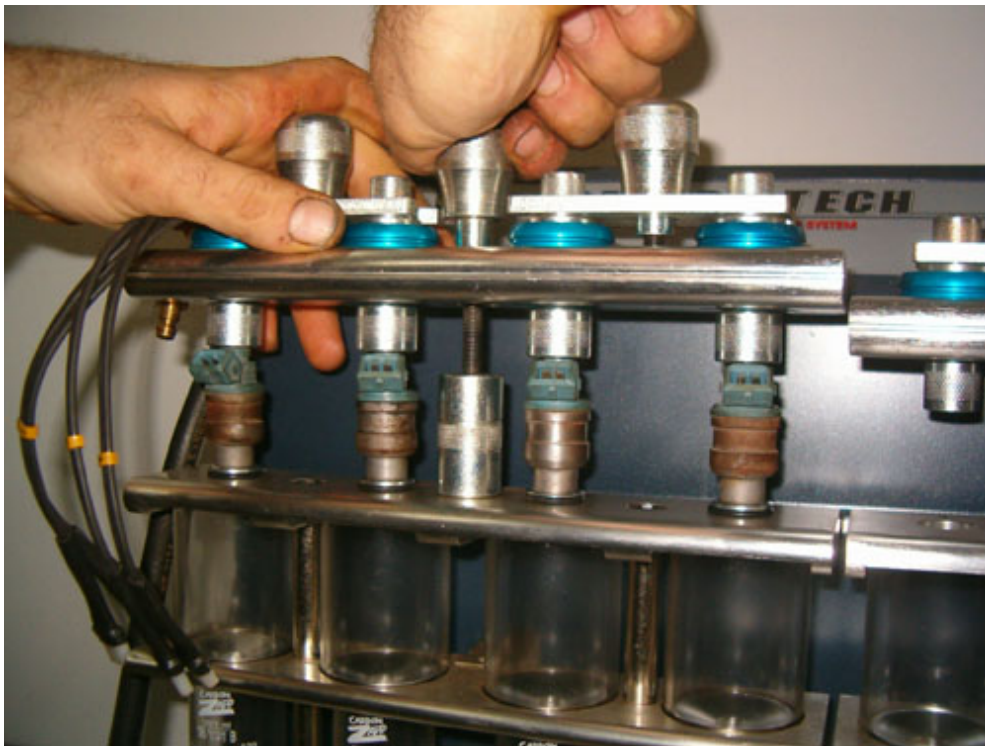


Again, our clever device performs simulation at different duration, rpm, and injection time.



Here is the parts box that we will choose the appropriate O-rings and injector plastic tips.

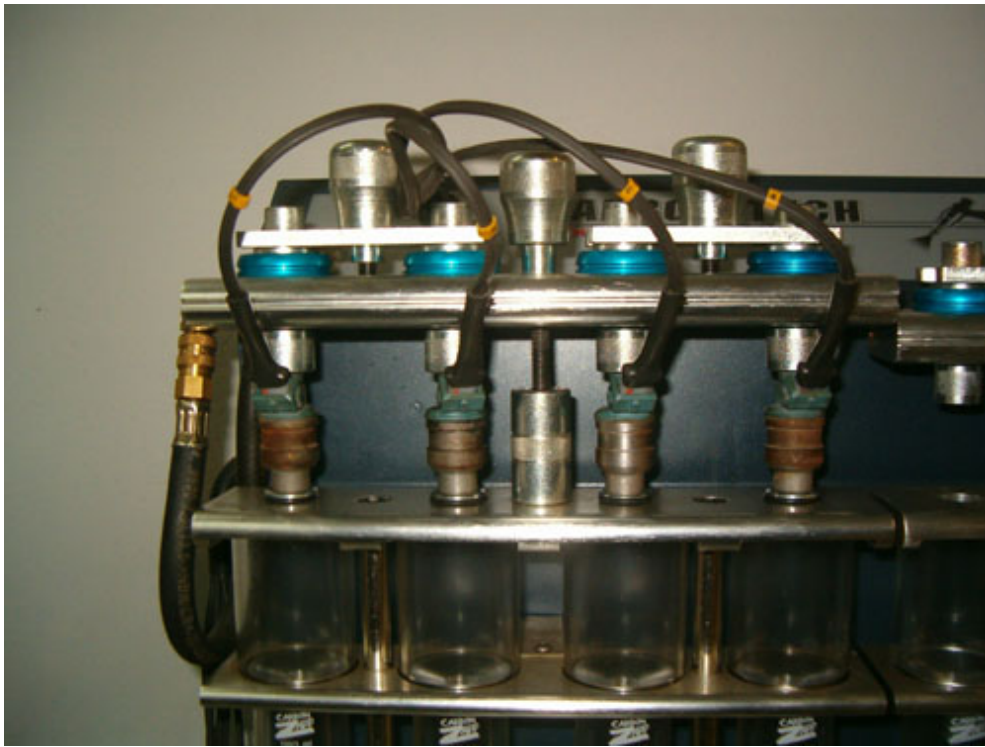
Once the cleaning process is over, the device tests each injector for resistance and should all four be within tolerance then we are ready to proceed in volumetric testing; otherwise the test is rejected and the failed injector needs to be replaced. Here you see the injectors in the test fuel rail that will bolt on the volumetric testing device.



Test rail is secured on the volumetric device ...



... testing fluid supply is connected.



Injector leads are connected.



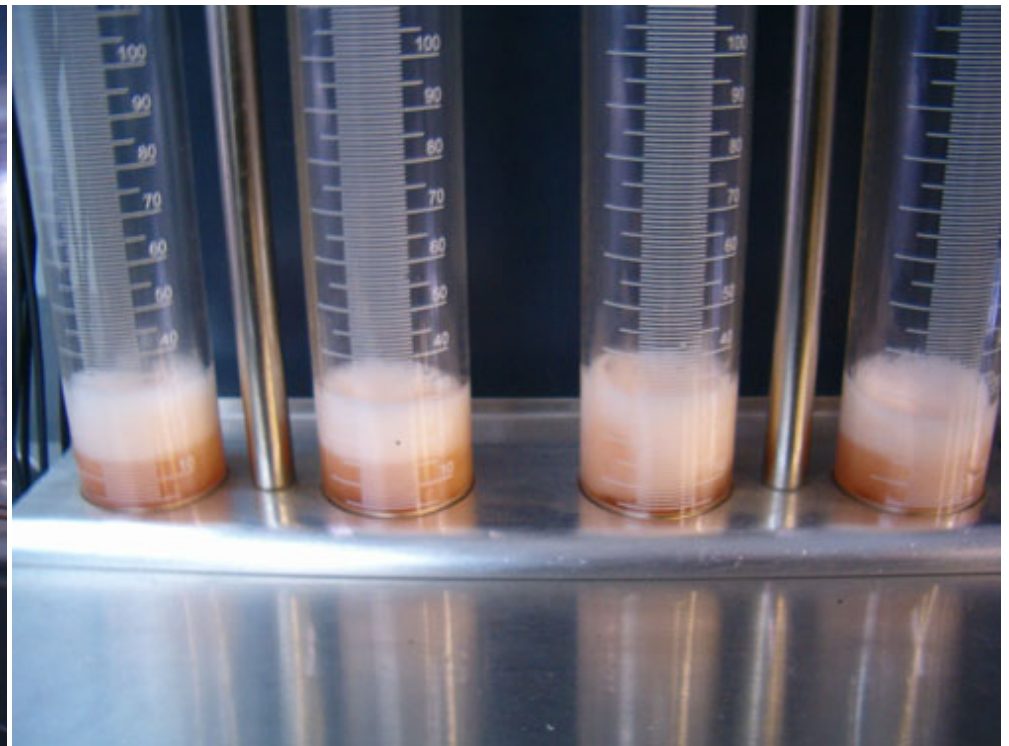
These test tubes are scaled and the prerequisite for the injectors to pass the test is that all four should yield the same volume of fluid.



Here you see the injectors spraying liquid in an intermittent way...



... and all being at the same volume of liquid.

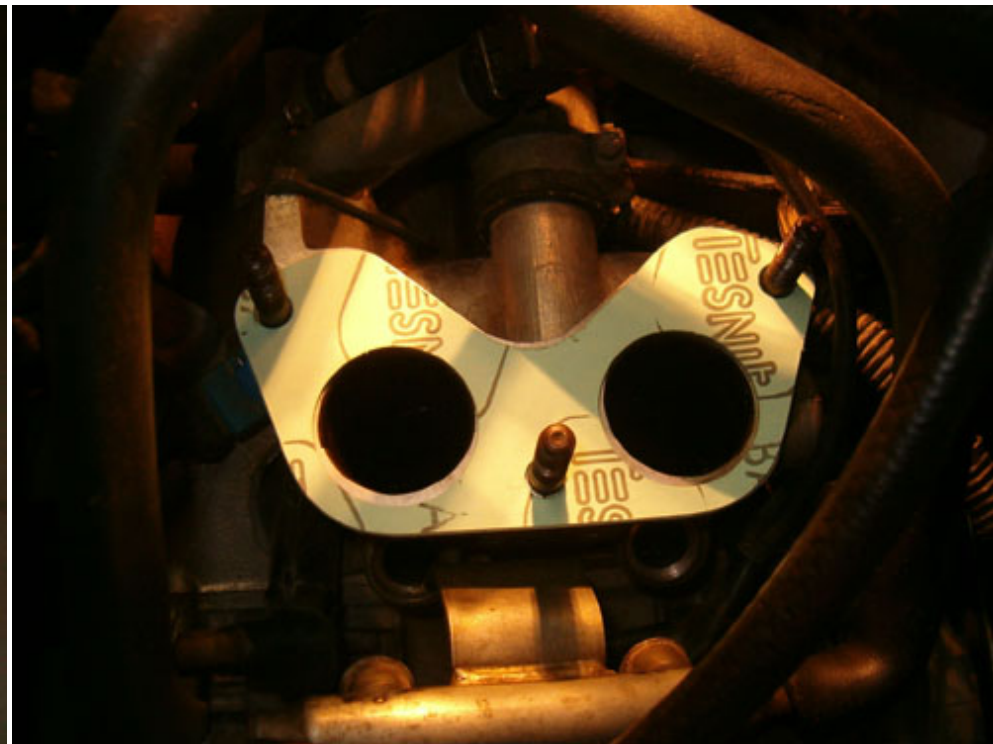


This part of testing involves a continuous flow of liquid ...

... again the volume sprayed is equal in all four tubes. The final part of volumetric test is the sealing test. The device pushes liquid at full pressure whereas no current is supplied to the injector. Should liquid drip from the injector tip then this injector is rejected and it needs to be replaced. The final test is passed with flying colors and off we go home to mount everything together.



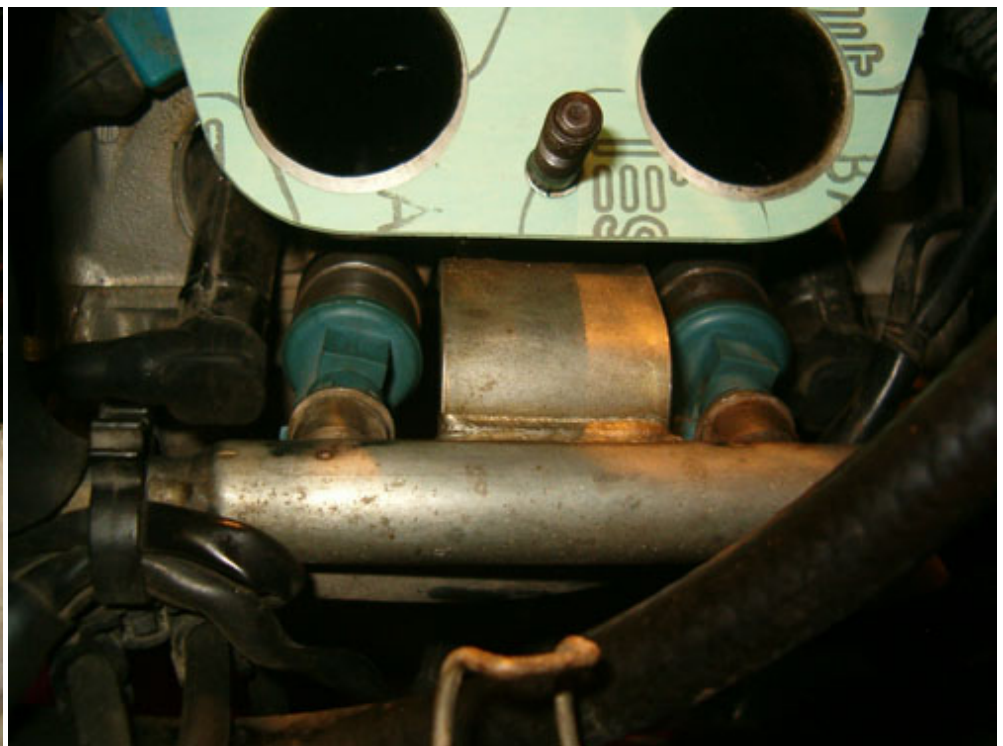
Here you see the already cleaned injector along with its new tip and O-ring.



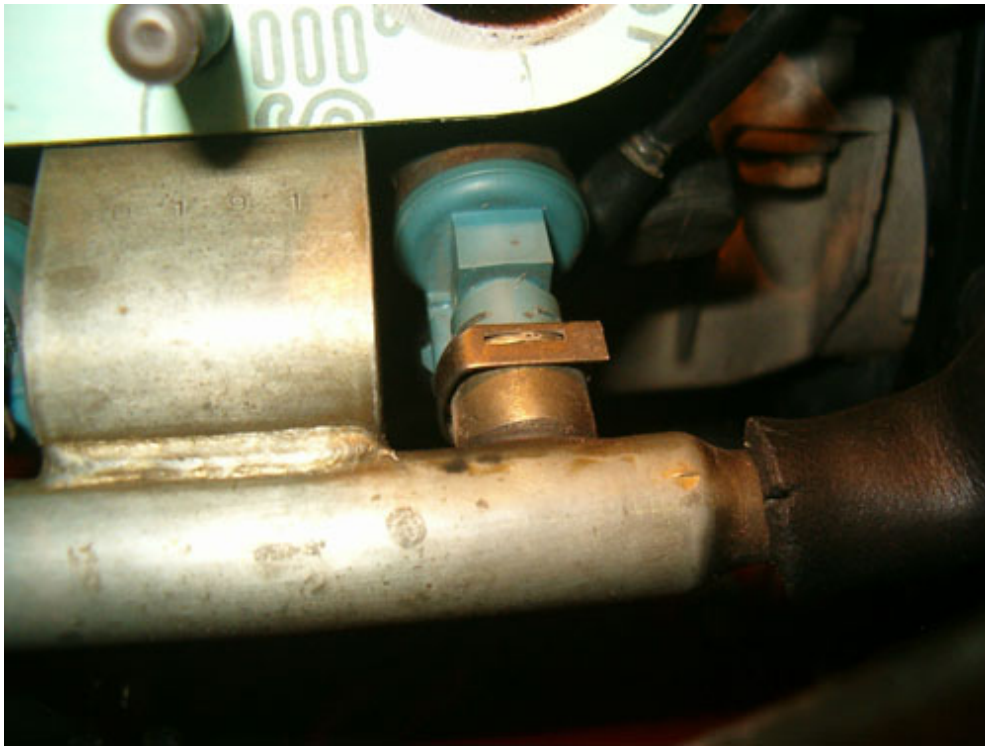
Don't hesitate to install new intake gasket...



... and use vaseline at the O-rings. It will ease your life during installation.



Place the injectors in their seat and carefully press the fuel rail on the injector top.



Install securing clips and the two screws securing fuel rail to intake manifold.

Restore the intake plenum and all relative electrical connections, ECU and coolant hoses. Crank the engine and be prepared to keep it cranking for a couple of seconds more than it normally does until it fires up. This happens so because we have disturbed the fuel line, and the fuel pump now needs some more seconds in order to build up pressure. Don't forget that the injectors need a min. pressure in order to function correctly and depend on fuel pump pressure capabilities.

As a final word I would like to pinpoint the fact of always keeping the tank above half and refueling from a trusted gas station. One would say, "how are injectors and fuel level related?"... actually they are closely co-related. I always have the injectors cleaned every 50.000 km. Last time these were cleaned was at approximately 100.000 km and I remember a hell of debris coming out during the cleaning process compared to today's cleaning. However due to having a failed injector at 135.000 km I was forced to replace it and clean again all four before reaching the scheduled 150.000 km cleaning. The volume of removed debris was much less compared to last cleaning despite the difference of just 15.000 km until 150.000 km.

As I always keep the fuel level always above half and refueling from a trusted gas station, I was paid back by this choice. If the fuel tank is always above half then the fuel pump sucks clean fuel avoiding debris, rust and water that is found on the bottom of EVERY fuel tank.

I advise you to follow this practice and you will be paid back; no premature fuel pump failure, longer life of fuel tank (Alfa 33 tanks are metal and Do rust), longer injector service intervals and low emissions.

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1991 Alfa 33 1.4 IE

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