

RED ALPHA VR30

RA338 & RA405 HPFP

This pump is CFD-Optimized, all Stainless Steel, and Laser Welded.

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Introduction

The goal of Alpha Performance is to provide the highest quality, best performing products available. By utilizing research and development, and rigorous testing programs Alpha Performance will never compromise the quality or performance of our products. In addition, Alpha Performance will only provide the finest customer service offering only parts and advice that are in the best interests of the customer. Alpha Performance was built on a foundation of integrity. This is who we are; this is what you can count on.

A vehicle modified by the use of performance parts may not meet the legal requirements for use on public roads. Federal and state laws prohibit the removal, modification, or rendering inoperative of any part or element of design affecting emissions or safety on motor vehicles used for transporting persons or property on public streets or highways. Use or installation of performance parts may adversely affect the drivability and reliability of your vehicle, and may also affect or eliminate your insurance coverage, factory warranty, and/or new OEM part warranty. Performance parts are sold as-is without any warranty of any type. There is no warranty stated or implied due to the stresses placed on your vehicle by performance parts and our inability to monitor their use, tuning, or modification.

These instructions are provided as a guide only as there are many variables that cannot be accounted for concerning your particular vehicle, including but not limited to model year differences, model differences, the presence of non-OEM parts, and modifications that may already be or were previously installed. A basic knowledge of automotive parts and systems is helpful but a better understanding of the parts and systems on your particular vehicle may be required.

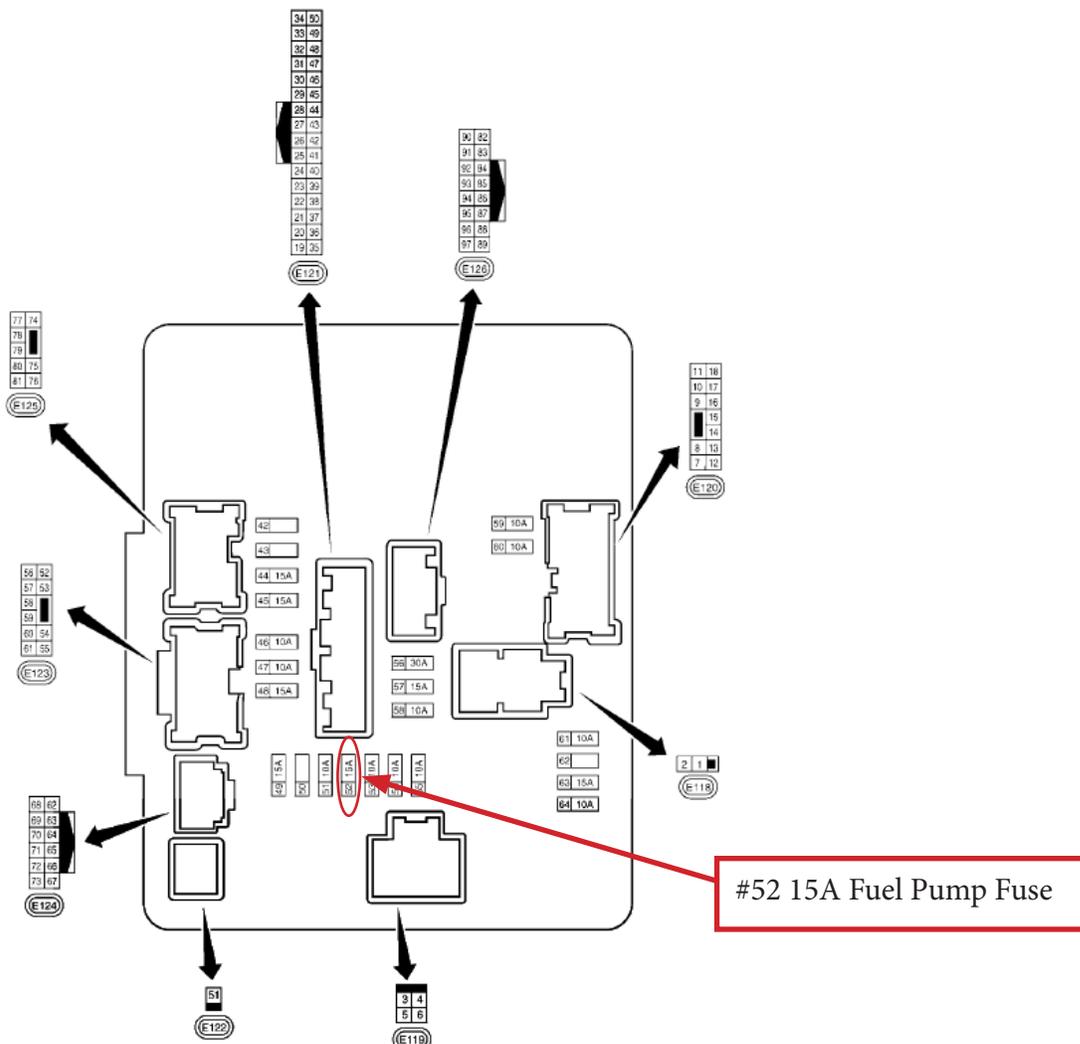
If you have any questions or issues at any time during the installation of your Alpha Performance product(s) please call us for technical assistance. The Alpha Performance tech line can be reached during business hours at 847-709-0530 for Alpha Performance products only.



Fuel Pressure Relief

Warning! Make sure the engine has cooled down. Disconnecting fuel lines on a hot engine can lead to fuel rushing out of fuel lines at random caused by fuel boiling when opened to atmosphere. Fuel temperatures in the low side fuel line can be as high as 150 degrees Fahrenheit at the inlet of the HPFP and the high side can be significantly higher especially at pressures of 200 bar. At a minimum, fuel in the high side rails and lines will follow engine bay temperature. Make sure to follow the OEM fuel pressure relieving procedure. (Without Consult Tool)

01. Pull the #52 (15A) Fuse listed as Fuel Pump in the IPDM. The IPDM (Intelligent Power Distribution Module) is the fuse box located next to the battery in the engine compartment.
02. Start the engine.
03. After the engine stalls, crank it for two or three times to release all the fuel pressure.
04. Turn the ignition OFF.
05. Disconnect the battery
06. Reinstall the fuel pump fuse after HPFP installation. See step #17



Disassembly

01. Remove the engine cover.



02. The HPFP is located on the left side of the engine (Driver's Side), just in front of the intercooler. First start by removing the bracket in front the pump. It is held in place by two 12mm bolts and holds three main harness clips plus one fuel line holder. Disconnect the harness clips and fuel line from its holder, remove the bracket.



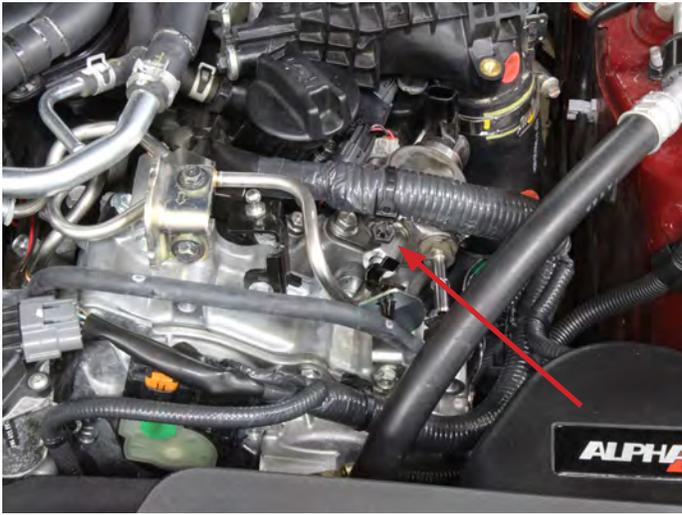
03. If equipped, remove the 10mm bolt and bracket bolted to the intercooler holding the sound deadening cover for the HPFP. Disconnect the connector at the HPFP and remove the cover.



04. Make sure fuel pressure has been relieved as was explained in the first section of the instructions, and the engine is cool. Place a rag under the inlet and outlet fitting on the HPFP to catch any fuel left over in the lines. Start by releasing the red lock tab on the low side inlet fitting. Make sure not to force the red lock tab off as it could break. Carefully spread the two tabs at the top outwards and slide the lock tab downwards. Disconnect the fitting from the HPFP.



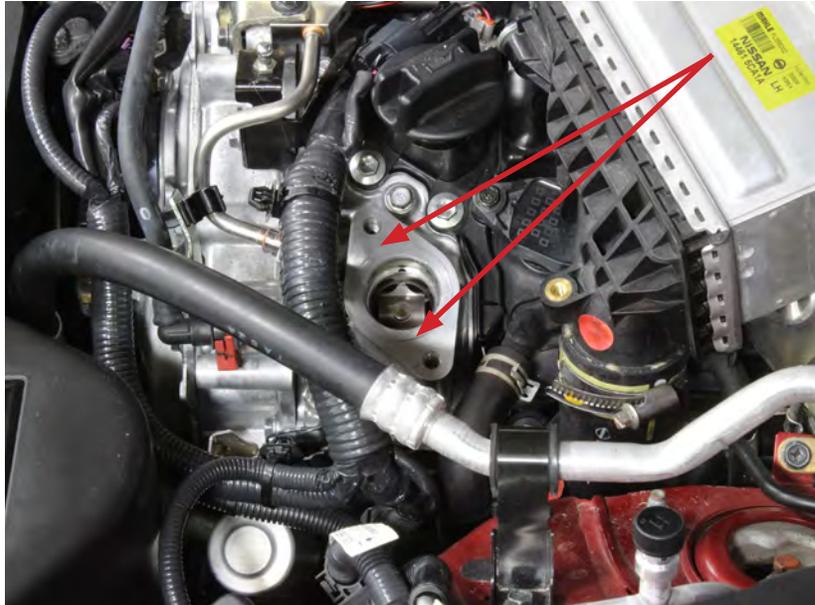
05. Next disconnect the high side line by using a 19mm open end wrench.



06. Loosen but do not remove the two 10mm bolts on the bracket supporting the high pressure line. Unbolt the HPFP but do so in steps loosening the bolts one turn at a time. You must do this due to the possibility of cam shaft lobe being at the top and the HPFP being under the load from its return spring. Remove the HPFP once fully disconnected.



07. Make sure the surface of the cylinder head flange is clean. The OEM HPFP seals internally with an O-ring and the new Red Alpha HPFP seals on the surface of the flange with an O-ring installed in the base plate of the HPFP.



NOTES: The next step will require the help of an additional person. You will be required to make sure the fuel pump bucket that rides on the cam is at its lowest position. Due to the heavy spring installed on the Red Alpha HPFP for high RPM use, damage to the cylinder head threads for the HPFP could happen if this is not done. Do not draw the pump down using the bolts if the cam lobe is not at its lowest point!

08. Inspect the fuel pump bucket. If the bucket is at its highest point, the top edge of the bucket will align with the bottom of the chamfered section of the bore shown in the picture. The second picture shows the bucket at approximately its lowest point. If the bucket is at its highest point, you will need to gain access to the crank pulley to rotate the engine over. Raise the vehicle safe manner and remove the lower under tray. Using a short 19mm socket and long ratchet, rotate the engine over clockwise while the second person watches the bucket. The second person may need to push the bucket down during the process. Stop rotating the engine over once the bucket is at its approximate lowest point.



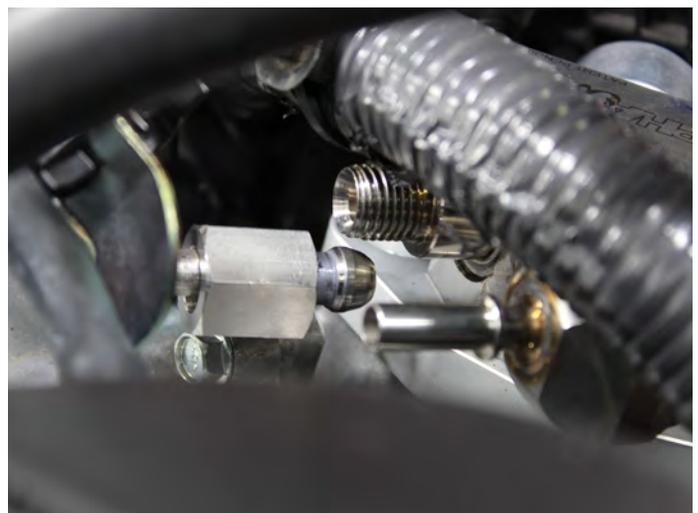
Installation

09. Once the bucket is at its lowest point, set the Red Alpha HPFP in place but do not bolt it in just yet.



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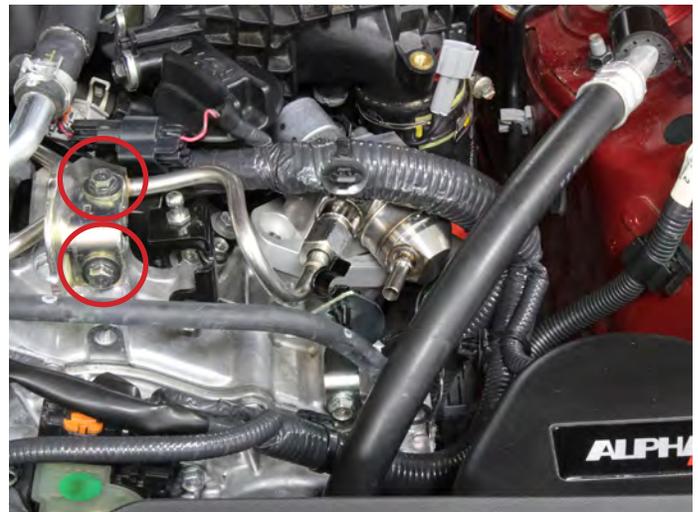
10. The high pressure feed line that connects to the HPFP needs to be modified. Due to the increased size of the pump and the outlet fitting location, the line needs to be modified in order to line up. Below are two pictures showing the misalignment. The clocking and orientation of the fittings are correct, the only correction that needs to be made is the height. The RA 338 is shown below and you can see the difference in height between the OEM high pressure line and the outlet fitting of the HPFP. The RA405 pump outlet is 7mm higher than the RA338.



11. Tighten the two 10mm bolts on the high pressure line support bracket first before modifying the high pressure line. The Y block and lines connected to the fuel rails must remain untouched. The only section to modify is the short run from the HPFP to the Y block and mounting bracket. Carefully bend the high pressure line until it perfectly matches up with the outlet fitting on the HPFP. The fitting must match up in height, clocking, and orientation. Continue to adjust until the alignment is correct. Once the alignment is correct, apply a tiny amount of engine oil to the threads of the HPFP fitting and thread the coupler on. Do not tighten the fitting yet. The top line in the first picture below show the modified line vs the unmodified version just below it.

CAUTION: Take care when modifying the line. Make sure to remove the HPFP when doing this. This is to protect the fittings from damage. If the line or fitting sealing area on the HPFP is scratched and damaged in anyway, the parts will need to be replaced.

Note: The threaded collar on the OEM high pressure line should thread on only using your finger tips and no tools. If any extra amount of force is required, continue adjusting the high pressure line until the alignment is perfect.



12. On the RA 405 HPFP, we have supplied a high pressure line template. The template is 3D printed and aids in the bending of the line properly. This tool is not used to bend the line but to check it being bent correctly. The plastic template slides over the top of the high pressure line as shown.



13. Once everything is lined up properly, install the two supplied M8 allen bolts. Make sure to tighten the bolts in steps the same way as was done during removal. Tighten the allen bolts to 22 ft lbs (29.5 N.m). Once the HPFP is torqued into place, tighten the high pressure fuel line coupler. Tighten the coupler nut to 27 ft lbs (36 N.m). Last, unbolt and re-tighten the high pressure line support bracket to take any unwanted stress off the line after the HPFP and fittings are tight.



14. On the RA338 HPFP, reconnect the low pressure line and slide the red lock into place. A little silicone spray is recommended on the fitting to prevent damage to fitting O-rings. There is a support bracket that can be removed since the low side line location changes with the HPFP.



15. On the RA405 HPFP, the inlet fitting is a -6AN male fitting. The OEM plastic feed hose does not have the correct fittings. There are 3 options listed below for a low pressure feed hose...

1. Our Alpha Flex Fuel Kit lines included in the product are already setup for the RA405 HPFP.
2. If another Flex Fuel kit or filter assembly is used, we offer a low pressure feed line kit that replaces the plastic OEM line with a -6AN hose assembly, ALP.28.07.0005-1 Alpha Performance Infiniti Q50/Q60 VR30DDTT Big Bore High Pressure Fuel Pump Low Pressure Feed Line.
3. You can build your own custom line assembly if needed.

16. The front bracket can be reused on the RA338 HPFPs utilizing the OEM low pressure feed line. Make sure the clip the harness back into its three mounting locations. If the RA405 HPFP or the RA338 HPFP is being used with the Alpha Performance Flex Fuel Kit, this bracket may need to be removed.



17. Double check all your connections. Reinstall the #52 (15A) fuse removed in the pressure relieving section. Prime and start the engine. Check all lines and fittings for leaks. Reinstall the engine cover once complete.

Note: Due to the nature of performance parts with modifying the high pressure line and routing of the low pressure line, routine inspection should be made to all connections and components of your fuel system. We have seen and experienced OEM component failures on these vehicles with zero modifications to the fuel system. Precautions must be made. Enjoy!

Tuning

In order to take full benefits of our HPFP, special Alpha calibrations to your tune will need to be made. Once the HPFP is installed, the vehicle will run. However, tuning may be required and must be checked! Please contact a AMS sales representative for your needs and see the link below to the HPFP Tuning Guides.

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18. AMS Fuel Sensor Upgrade Offset & Multiplier Values

The “Offset” and “Multiplier” values are only for customers that have replaced their OEM fuel sensor with the AMS Red Alpha High Pressure Fuel Sensor (ALP.28.07.0010-1) on the direct injection rail.

Offset (MPa) = - 3

Multiplier (MPa/V) = 6.12

Codes That May Appear During Installation:

Turning off these codes ensures that the ECU will not falsely throw a DTC when running the Alpha FPS. The reasoning for turning off these codes, is that during normal operation the voltage from the sensor will differ from that of the factory sensor. The ECU compares these new sensor voltage readings to a known value range for diagnostics, and since the voltage differs from the predetermined diagnostic thresholds, error reporting function is then determining an error and reporting the DTC. Ideally, the better route for calibration other than turning off the codes would be to calibrate the diagnostic thresholds for the fuel pressure sensor, but these tables are currently unavailable in the current software revision.

P0193 - Fuel rail pressure sensor “A” circuit high

P119C - FUEL PRESSURE SENSOR (Fuel pressure sensor)

Any questions or concerns that are not outlined in this guide should be forwarded to your AMS sales representative.

Thank you and enjoy!