



DIESEL/VEGETABLE OIL HYBRID VEHICLES
Systems for the conversion of diesel engines to multi-fuel use.
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INSTALLATION MANUAL

Additional information for Mercedes & lift pump vehicles Version 2.6

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The stock Mercedes system is shown in Fig.1. Fuel is drawn from the fuel tank through a small pre-filter by the lift pump mounted to the side of the Injection pump, this pump then forces the fuel under pressure through the primary fuel filter and into the Injection pump.

The Injection pump delivers fuel at high pressure to the fuel injectors via metal fuel lines. Both the excess fuel supplied to the Injection pump, and the excess fuel not delivered by the injectors is returned to the fuel tank via a connection on the top of the fuel filter (Fig.2). This connection is open to the fuel filter via a hollow bolt allowing air to be bled from the filter housing, we will however need to **remove this bolt and replace it with a solid bolt (12x1.5x20 C/S 8.8) or fill the bolt with a suitable epoxy (JB Weld) or weld it solid.**

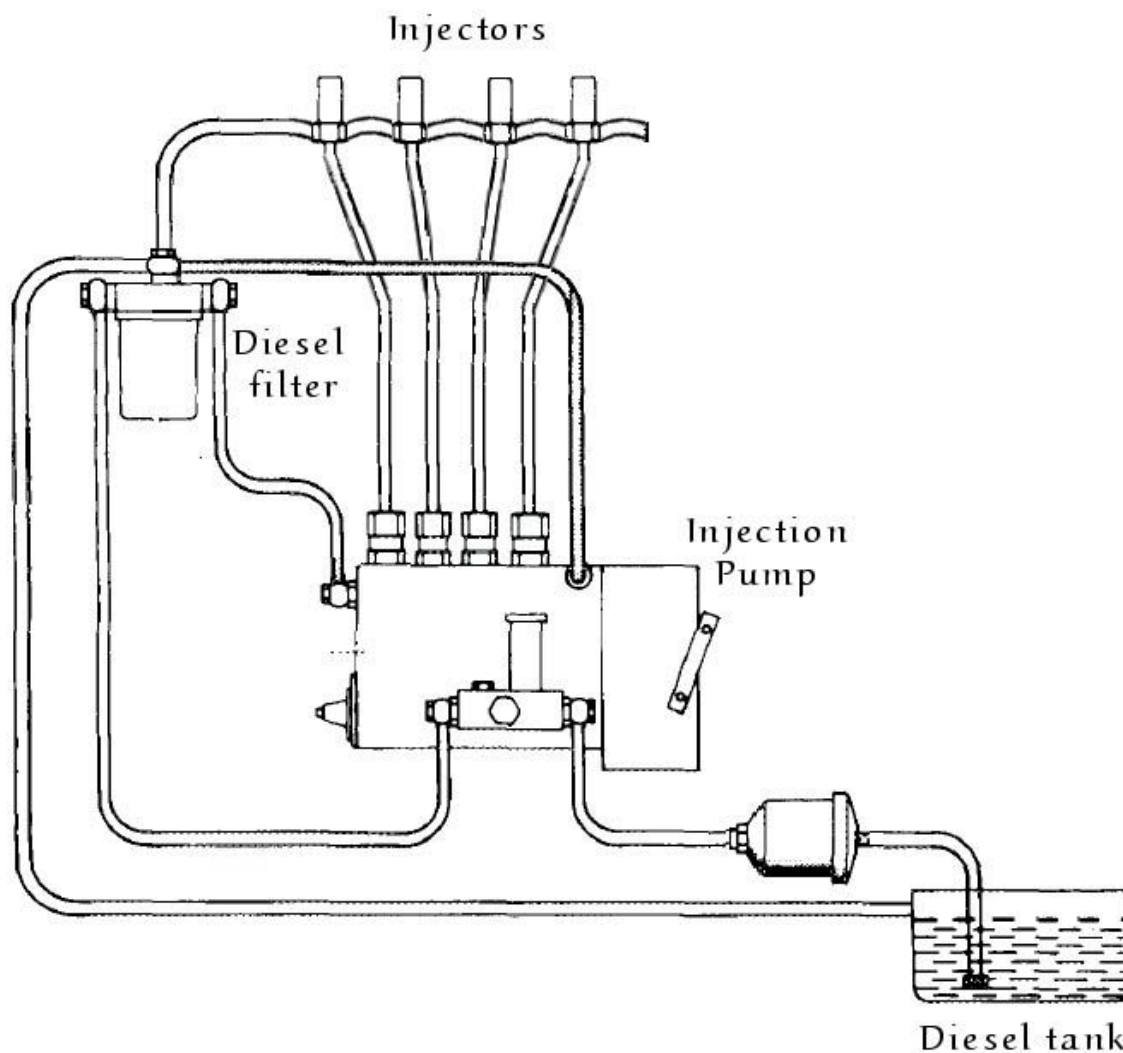


Fig.1

In Fig.2 you can see a stock filter housing for a Mercedes, this is an early vehicle but later vehicles will be very similar. There are four connections on most filter housings, the center marked "1" is the bolt which holds the filter itself to its mount. The Bolt marked "2" is the hollow bolt and passes through a "Banjo" fitting to which the IP return line, the injector return line and the return line to the fuel tank all attach. Connections marked "3" & "4" are almost always marked with arrows cast into the housing, the arrow pointing into the filter is the supply connection, and the one with the arrow pointing away is the filter outlet.

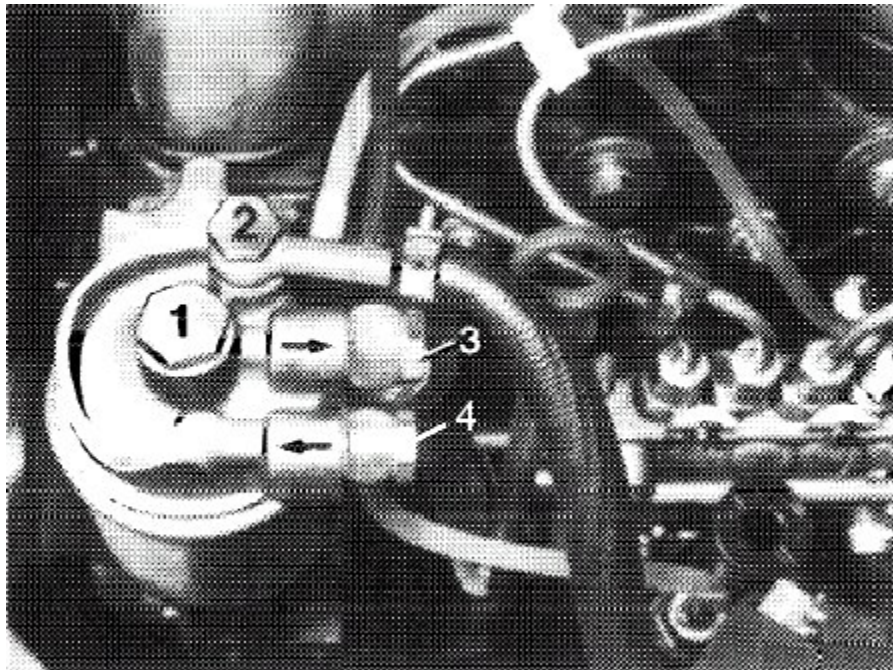


Fig.2

Because we will be utilizing the single lift pump for both fuels, some re-plumbing will be required; a diagram can be seen in Fig.3. In this system the lift pump draws fuel through a selector valve which can be directed to draw from either the Diesel or VO tanks via their respective filters. Returned fuel passes through the "Banjo" fitting on top of the diesel filter assembly (bolt replaced or made solid) then through a selector valve which directs the returned fuel to either the Diesel or VO tank.

This insures that each fuel has its own filter and that the volume of fuel, which needs to be purged upon switching fuels, is kept to a minimum. In addition the use of two independent valves enables each to be controlled separately allowing for full fuel return and very fast purge times.

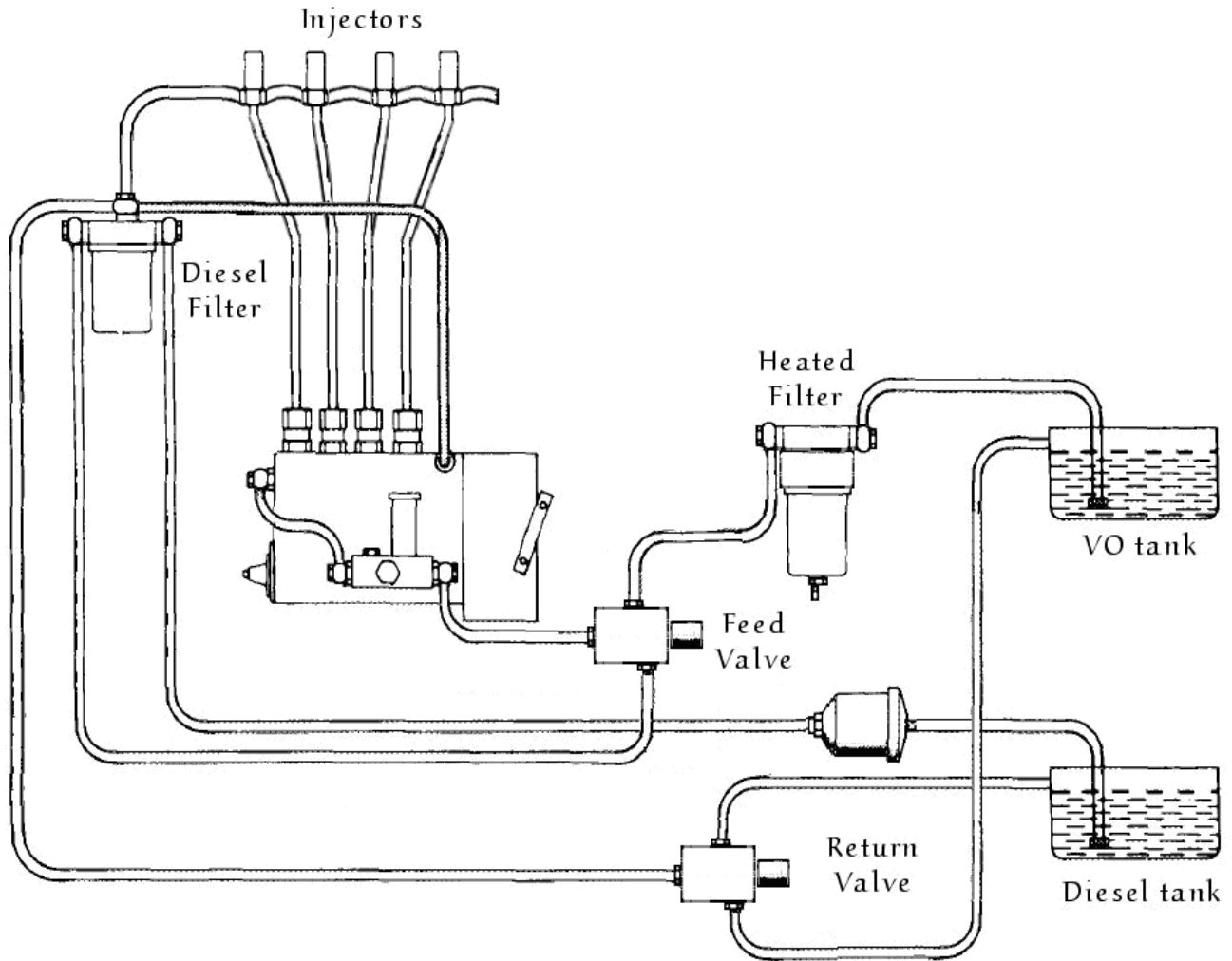


Fig. 3

While this plumbing diagram can be used with other vehicles where the fuel pump is attached to the Injection pump, it is not the best method for vehicles where the fuel pump is remotely located. On vehicles with a remotely mounted fuel pump it is advisable to install an additional fuel pump for the vegetable oil. This pump can be powered via a relay triggered by the feed valves electrical supply so that it comes on when the system is switched to VO as illustrated in Fig.4. The plumbing of this system is illustrated in Fig.5

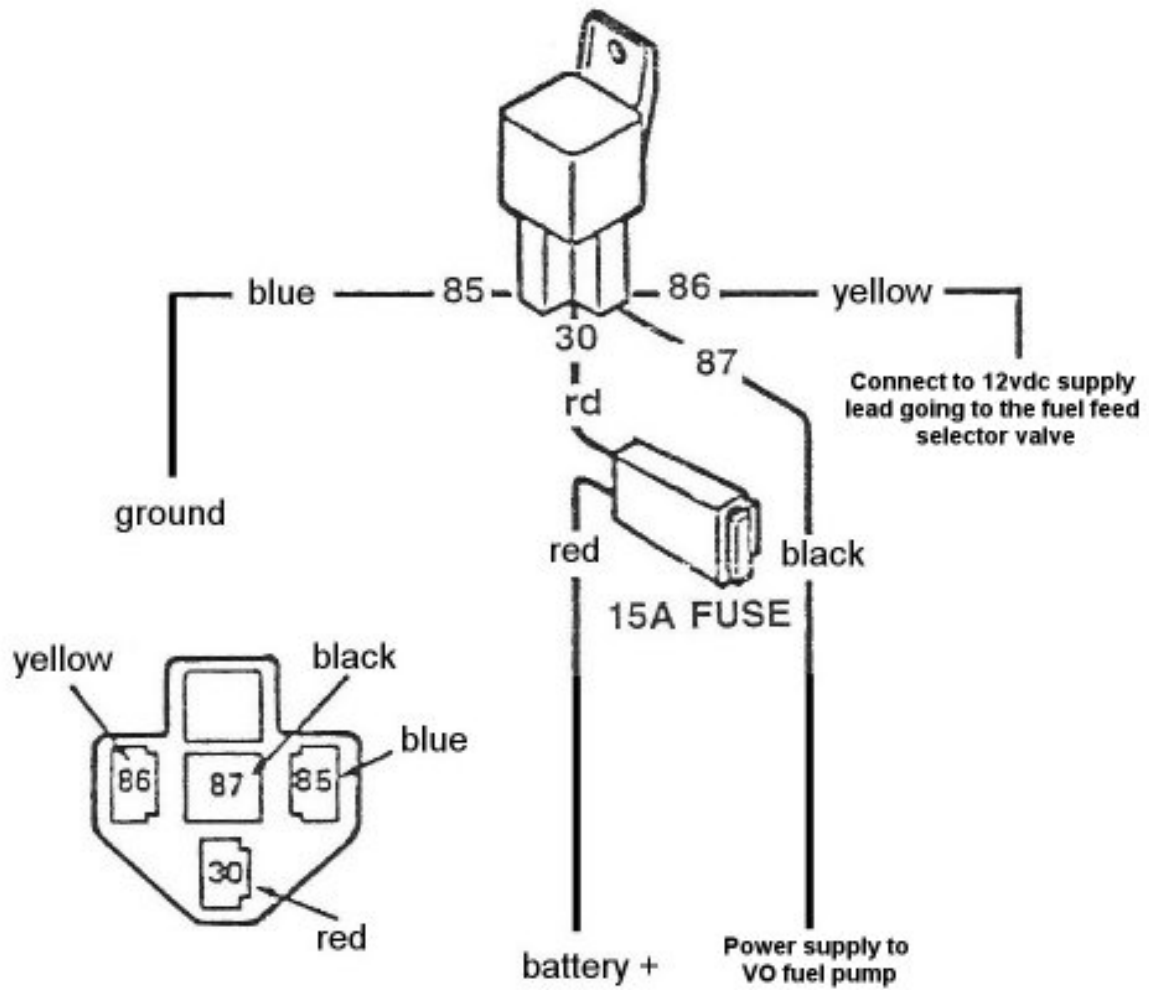


Fig.4

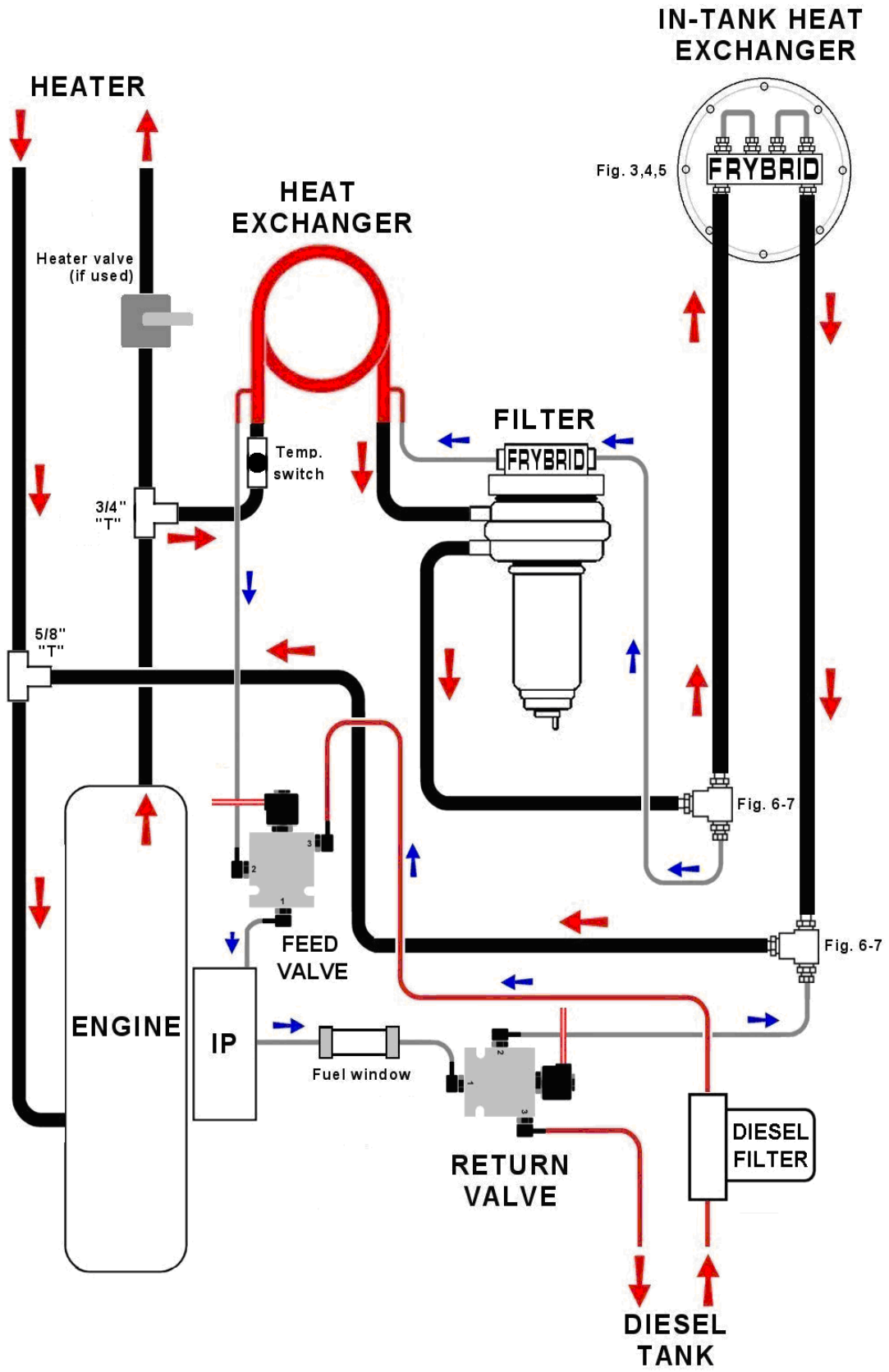


Fig.5

Some Ford, Chevrolet and GMC engines have a cooling system designed to flow coolant through the heater core in the cabin at all times, in these systems plumbing the coolant supply and return of the Frybrid system must be done differently to insure proper heating. While in most vehicles the coolant side of the Frybrid system can be plumbed in parallel to the vehicles normal cabin heater, in the vehicles which have constant flow through the heater core, it should be plumbed in series as shown in Fig.6 (a typical Chevrolet 6.5 TD)

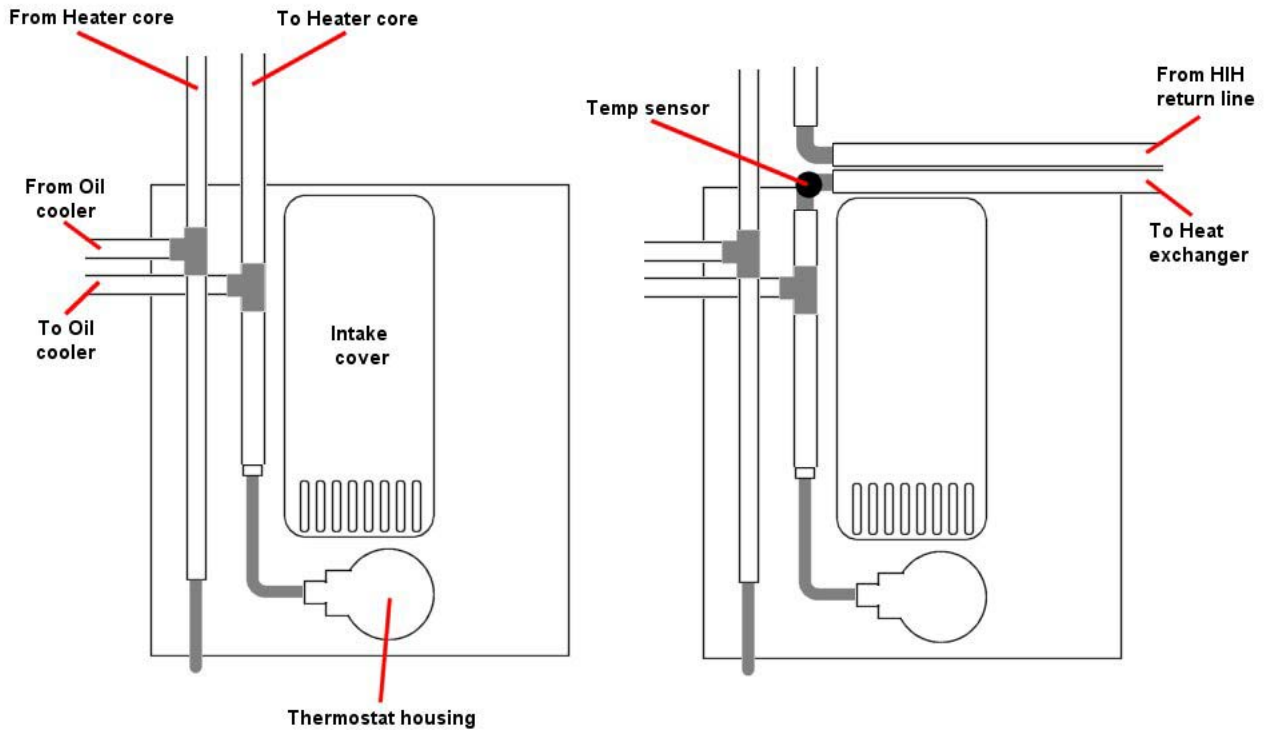


Fig.6

For this system to function properly the coolant line coming from the thermostat housing must be cut and two right angle fittings installed, one of the right angle fittings supplied will have a coolant temp sender installed in it, this will be installed on the feed side.

TIP: On VW and Mercedes vehicles the lines between the filter, lift pump and IP are often hard lines pressed onto the banjo fittings, if you remove this hard line you will find several different sized barbs, all are quite small and getting fuel lines to fit securely over the barbs is difficult. We typically cut this hard line leaving 2" attached to the banjo fitting barb. A standard 3/8" fuel line can then be slid over the hard line and a fuel injection hose clamp tightened at the fitting securing the 3/8" line to the barb using the hard line as a spacer. We have found this to be the most reliable way to insure a leak proof fitting using readily available materials.