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## **Information to help when acquiring a JLR / PSA Diesel engine for conversions.**

*This information is provided in good faith and is based on our current knowledge of the JLR diesel engine systems which we have so far been involved with. Due to the variations in models, we cannot guarantee that this information is entirely accurate for all models. Undertaking a conversion on your vehicle is definitely not a cheap and easy option to upgrade to diesel. However, if you already have the facilities and are an experienced automotive engineer it can be a very interesting and rewarding project. Whilst we cannot advise on the conversion, we can tell you what we did with our conversion and we can supply you with the electrical and electronic components and base map to allow you to start and run your JLR engine in its donor vehicle, boat, etc, although you are likely to need to have the system 'tuned' to suit your application, once the conversion is complete.*

There are multiple variants of the TDV6/V8 engine range but, with all versions, it is important to acquire certain parts when purchasing an engine or disassembling a car to perform a conversion.

The following **MUST** be present to effectively run a common rail diesel engine with fixed non-waste-gate turbo, whatever the engine.

1. Crank Sensor.
2. Cam sensor.
3. Water / cylinder head temperature sensor.
4. Manifold air temperature sensor.
5. Fuel temperature sensor.
6. Fuel fail pressure sensor.
7. Throttle Pedal Position Sensor (we can use most available sensors)

The following **MUST** be present to effectively run a common rail diesel engine with waste-gated or variable turbo, whatever the engine.

1. MAP Sensor (Manifold absolute pressure).
2. Second MAP sensor (Twin staged turbo).
3. VGT Turbo position sensor (If a Variable gate/nozzle turbo is fitted)
4. Balance valve position sensor (Twin staged turbo).

The following is not needed and in some setups are not possible to use.

1. MAF Sensor (Mass air flow sensor/s).
2. Fuel inlet pressure sensor.
3. Lambda sensor.
4. EGT sensor (Exhaust Gas Temperature).
5. Differential pressure sensor.
6. Catalyst unit.
7. Particulate filter.

## TDV6 2.7 Single turbo

Make sure your engine is fully-dressed as the cost of sourcing miscellaneous parts and mounting brackets soon adds up. Make sure you have:

- Turbo.
- Engine section of the wiring harness.
- Alternator.
- Power steering pump.
- Inlet manifold banjo (The right angled inlet pipe with the air temp sensor mounted in it).
- Radiator top hose (It has a special fitting clip).
- Injector sound-proofing.
- Engine cover (With oil filler cap).

Parts that can be bought new or salvaged from the donor.

- Fuel pump.
- Fuel filter.
- Fuel cooler.

Parts that might be able to be used from the donor.

- Intercooler
- Water radiator
- Boost air pipe
- Air filter

The single turbo engine is very forgiving with regard to the intercooler and radiator set up and an up rated TD5 intercooler and radiator are quite up to the job of engine cooling requirements. It is worth making sure you have good fuel cooling through as good if not better than the original installation.

The exhaust needs some thought, a free-flow but baffled system is a benefit to the VGT system as it operates best with some back pressure. A pipe straight-out, 12", from the turbo, reduces the performance of the turbo lower down and in the mid range.

## **TDV6 2.7 Twin turbo**

Make sure your engine is fully dressed as parts and mounting brackets soon add up, make sure you have:

- Both turbos.
- Engine section of the wiring harness.
- Alternator.
- Power steering pump.
- Inlet manifold banjo (The right angled inlet pipe with the air temp sensor mounted in it).
- Radiator top hose (It has a special fitting clip).
- Injector sound proofing.
- Engine cover (With oil filler cap)

Parts that can be brought new or salvaged from the donor.

- Fuel pump.
- Fuel filter.
- Fuel cooler.

Parts that might be able to be used from the donor.

- Intercooler.
- Water radiator
- Boost air pipe
- Air filter

The Jaguar twin turbo configuration suffered from turbo surge at higher boost levels and to stop this they had specially designed pipe to help stop the turbo surge. It is worth considering re-using the surge suppressors mounted in the pipe work and the twin-inlet intercooler if possible. If this is impractical or impossible it is important to avoid long straight pipes as bends and pipe diameter changes help to stop the harmonic pulses that cause surge.

The twin turbo engine is capable of producing higher boost, and therefore more heat, so it requires a good sized intercooler and radiator.

It is worth making sure you have good fuel cooling through as good if not better than the original installation.

As with the single VGT turbo the twin VGT turbo setup used on the Jaguar variants needs some thought, a free flow but baffled system is a benefit as the VGT system is operates best with some back pressure. A pipe straight-out, 12", from the turbo system reduces the performance of the turbo lower down and in the mid range. A very free-flow system also exaggerates the turbo surge at high RPMs.

## TDV6 3.0 Twin staged turbo

Make sure your engine is fully dressed as parts and mounting brackets soon add up, make sure you have

- Both turbos.
- Exhaust transfer pipe
- Engine section of the wiring harness.
- Alternator.
- Power steering pump.
- Vacuum pump (Very important on the Land Rover version of the engine)
- Inlet manifold banjo (The right angled inlet pipe with the air temp sensor mounted in it).
- Second map sensor (Mounted on front of cam belt cover and connected to the outlet pipe from the right hand turbo).
- Boost air control/diverting valve (Mounted on the air outlet pipe from the right hand turbo).
- As much of the boost piping as possible.(Not all will be used BUT what you don't have you can't use)
- Radiator top hose (It has a special fitting clip).
- Injector sound-proofing.
- Engine cover (With oil filler cap)

Parts that can be brought new or salvaged from the donor.

- Fuel pump.
- Fuel filter.
- Fuel cooler.

Parts that might be able to be used from the donor.

- Intercooler.
- Water radiator
- Boost air pipe
- Air filter

If possible use the original front section of the exhaust system as manufactured but with the DPF unit removed.

The twin-staged turbo configuration used on the 3.0Ltr engine is VERY complicated if effective. It is important to get as much of the original pipe work as possible.

There are two versions of the boost air control/diverting valve, one that allows for a twin inlet intercooler (Land Rover) and one for single inlet intercooler (Jaguar). The decision on which type to go with might be down to what is available but in terms of performance the twin inlet intercooler setup is the best option.

The exhaust system design is critical to the staged turbo setup but, in brief, as big as possible from the right hand turbo, a slightly restricted pipe from the left hand turbo and the right hand turbo pipe joining the left hand turbo pipe about 1200mm from the left hand turbo, NOT separate pipes out from each turbo. Once the left and right hand turbo pipes have joined, the diameter can then taper up to a much larger size.