



Tech Sheet

‘Frequently Asked’

‘Turbo Questions’

(In no particular order)

Your turbocharger is engineered to match the specific requirements of the engine it is fitted to. Each is dependent on the other to maintain optimum performance. Don't think of the turbo as a bolt-on accessory, rather as an integral part of the engine. The turbo's requirements are similar to the engine's. It is, therefore, essential that scheduled servicing, using good quality oils and parts, is central to caring for your turbo.

In many instances Berrima Diesel receive turbochargers which have been misdiagnosed as having a turbo problem, when actually the turbo is not at fault. Incorrect fault finding is often caused by a lack of product knowledge. Many contributory items around the engine bay can trick the unsuspecting into believing the turbo is the culprit, when in fact it is not. Unfortunately, if the real problem is not diagnosed before a replacement turbocharger is fitted, the problem still exists!

We have a saying at Berrima Diesel which goes, "Turbos don't die. They're killed". A turbo can be killed in many ways.

Foreign object damage results in either the air intake "compressor wheel" or exhaust "turbine" wheel being damaged. The former is often caused by someone accidentally leaving a nut or other foreign body in the air induction hoses. Please be extremely careful if going to an aftermarket air-filter. Genuine is best there! In the latter case, this may be caused by part of an engine component, such as a piece of valve, exiting the engine in rather a hurry! In both cases it results in severe turbocharger damage instantly.

Turbochargers are simple in operation, but manufactured to precise tolerances as fine as 1/1,000,000 of an inch. The turbo unit manufacturers balance and test every single turbocharger many times, including final assembly. The balancing methods and procedures are unique. Without them, no turbocharger can be balanced to the ultra-fine tolerances required for today's high speed turbos. It is now common for turbochargers to spin up to 150,000 rpm +.

That's approximately 35 times faster than most diesel engines rev at the red line! Sophisticated machinery and highly trained factory staff ensure that the highest standards are always maintained.

Useful tips when driving any turbocharged engine, whether it be petrol or diesel, are to always allow the engine to warm-up fully, until the water temperature gauge reaches normal, before full throttle is used. Try to plan the end of your journey sympathetically. Don't use full throttle or allow the engine to labour during the last few miles. This will prevent excessive heat build-up within the turbo when the engine is turned off. Also, when coming to a standstill, try to leave the engine idling for a few extra seconds to allow the heat to decrease. No need for a timer though, just undo your seat belt first and then turn off the engine. Never rev the engine just as the ignition is turned off. Remember the turbo spins at a far greater speed than the engine, but is lubricated with engine oil. Once the engine stops the oil supply ceases within a few seconds. In reality, none of the above traits will cause a turbocharger to fail immediately, but repeatedly over a long period, they could reduce the life of your turbocharger.

If it becomes necessary to seek advice about a turbocharger or a turbo related problem, always rely on a professional. Berrima Diesel, together with DTS turbochargers, are Australia's leading turbo specialist, and are acknowledged as one of the most experienced turbo installation companies in the world. We can advise customers with turbocharged 4WD's on a wide variety of questions and issues relating to owning and running a turbo car.

It cannot be stressed too much how important it is, when purchasing turbocharger system, always to choose the top brand name -Berrima Diesel. Consider this. As with so many things in life, quality costs, and there are sometimes cheaper turbos for sale. Without the safeguard of using a Berrima Diesel turbocharger, you run a serious risk that your short-term saving may turn out to be a long-term nightmare.

What is 'Boost'?

Boost is a term used to describe the increase in pressure, provided by the turbocharger, to the volume of air, entering the engine. This pressure is expressed in a number of different units, (BAR, ATM, Kpa, P.S.I.), but they all mean the same thing. For purposes of approximate comparison; 1 BAR = 1 ATM = 100 Kpa 14.7P.S.I. When the pressure of the engine's inlet air is increased, the engine's power output is increased. This pressure increase is called 'boost'.

How does fitting a Dynamic Turbosystem effect the power of my vehicle?

Modern 4WD diesel engines, typically produce peak torque (pulling power), at around 2,000-2,500 R.P.M. and peak horsepower at around 3,500-4,000 R.P.M. Turbo boost starts at approximately 750 R.P.M. and rises progressively to its maximum pressure of approx. 70 Kpa (10 P.S.I.) by approx. 2,000 R.P.M. At this point, the percentage torque increase of a correctly tuned installation is approx. 40%, at the wheels. This continues to the peak horsepower point of 3,500-4,000 R.P.M. At no point is it ever any less than standard. e.g. at 1500 R.P.M. it is at least 25% greater than the standard vehicle at the same R.P.M.

Can I fit a Dynamic Turbosystem myself and, if not, how long and what is the cost of having it fitted for me ?

While most competent mechanics could probably fit a **Dynamic Turbosystem**, tuning requires specialised knowledge. The lack of this knowledge could have serious consequences. In addition, warranty can only be provided on **Dynamic Turbosystems** which are installed by authorised facilities.

The cost of having the installation performed by **Andrew** at **Berrima Diesel** is only about 10% of the total purchase price. This provides a warranted, correctly tuned, "no hassle" installation for the customer. All diesel vehicle installation can be performed in one day.

What creates the most heat? Fuel or turbo boost?

Diesels do not need an air control (eg. manifold butterfly valve. The only ones requiring a butterfly are vacuum operated governor pumps) to operate. The more air the better. **Add too much fuel to the equation and the exhaust gas temperature rises rapidly.**

What type of oil and how often should it be changed ?

Turbos must have good quality oil. Use either a mineral, semi or fully-synthetic engine oil. Berrima Diesel recommends Shell Rimula range or Shell Helix Ultra . Change oil at intervals recommended by the vehicle manufacturer.

How long does a turbo last ?

On average, as long as the engine or longer with regular engine servicing and good quality engine oil.

What is a 'dump' valve or 'blow-off' valve ?

A valve which relieves boost-pressure between the compressor outlet and engine as the throttle is closed (Only required on throttle valve controlled diesels which are rarely seen these days). These are commonly fitted to hotted up petrol cars so it sounds good changing gears among other reasons!

Can I fit a turbo from another 4WD ?

No, virtually all turbochargers are different inside, even if they appear similar on the outside. The turbo model e.g. Mitsubishi TD04, is only the model, not the specification.

Should I leave my engine 'ticking over' before it is turned off ?

Not for normal every day driving, but still worthwhile if the engine has been under load or raced before being turned off. e.g. Towing a caravan or after climbing a long incline.

Why is it important to balance a turbocharger ?

Without highly accurate balancing, vibration will create a whining noise, reduce turbo bearing life and reduce turbo efficiency.

How much boost does my turbo produce?

Correctly set up diesel 4WD turbochargers run up to between 10 PSI to 12 PSI with Intercooler turbocharged engines running upwards of 13PSI.

How many psi in one bar ?

14.7 psi = 1 bar.

Are all actuators the same ?

No, each has a different opening pressure and rate.

Oil in the turbo inlet pipe - Should I be concerned ?

A small amount of oil usually exists, drawn in from the engine's crankcase breather system. High engine wear will increase the amount of oil found, and will require further engine tests (not turbo).

Should a turbo be serviced ?

No specific turbo servicing is required, but regular quality engine servicing is needed to reduce the chance of turbocharger problems.

What is a water-cooled turbo ?

The central part of the turbo, housing the bearings, is surrounded by a water jacket through which the engine's water coolant is passed. This water continues to circulate after the engine is turned off, cooling the turbo, and preventing heat soak.

Do I need to up grade my exhaust ?

Generally not. Our systems are designed to run utilising as much genuine component as possible. Some systems on the market promote exhaust change as it is required by that particular turbo. Doing so usually picks up more noise than performance.

How noisy should a turbo be ?

Only an unbalanced, worn out or damaged turbo will produce any significant turbo noise.

What is an intercooler ?

A special type of radiator which cools air before it enters the engine. As a turbo compresses air, the air heats up. Power can be increased if the air entering the engine is cooler. The cooler air is more dense meaning that more fuel can be injected for more power.

Will my vehicle run 'cooler' with an intercooler ?

Theoretically, but not always the case! We commonly find Intercooled 4WD vehicles running hot due to over-fuelling and radiator restriction. Restriction meaning that hot air passes out of the Intercooler over the air conditioning condenser and finally the radiator. The poor old radiator is left with scraps of extremely hot air and then is expected to cool the engine. We don't advise fitting them as hot Australian conditions can often be the catalyst for engine heat problems.

What will happen to my fuel consumption?

More power generally means more fuel. With a diesel turbo system, fuel consumption stays generally the same and can become better under towing conditions