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**For Your Total Auto Care
& Suspension Specialists**

Modifying your Evolution VIII Lancer

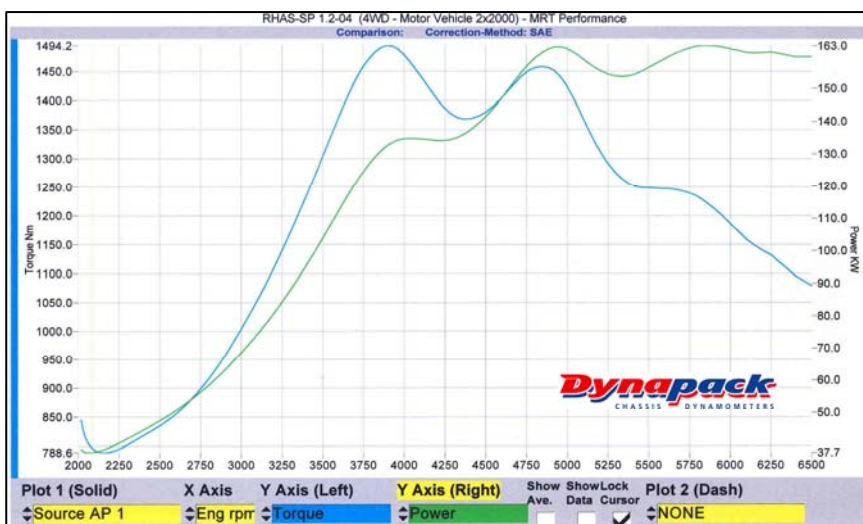
March 2005

What a 3" Exhaust System won't do for you car!

Turbo cars love good exhaust systems and it's a well known fact that once your engines exhaust gas has passed through the Turbocharger, the aim is to make an exhaust system that has the least amount of restriction possible balanced with suitable noise. A well designed exhaust system maximises both power, torque and throttle response.

What is less well understood is the effect that changing such an exhaust system will have on your EVO's electronic engine control system.

Mitsubishi use a relatively simple boost control system that cannot be considered a full "closed-loop" system. Your EVO's ECU determines boost pressure according to engine RPM, Gear, barometric pressure and Mass Air Flow only. Other systems such as Subaru will use all of the previously mentioned parameters, but also actual manifold boost pressure, greatly improving boost control accuracy. In plain English, the type of boost control system that Mitsubishi uses, even with the car in standard form, doesn't do a very good job of accurately controlling boost.

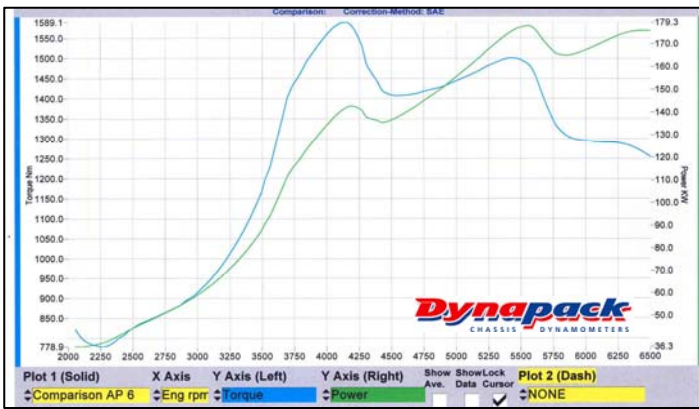


Pic:
Dyno Graph of Stock EVO8
Showing:
Torque (blue line)
Power (green line)

Note, boost is closely related to torque, check out that horrible dip!

The EVO 8 (in Oz) is a real mis-match of different Turbocharger hardware and control software resulting in a real messy combination of Japanese and European/US specifications. As you can see by the Dyno graph Torque comes on exceedingly fast, peaking at 3700RPM, at which point the factory computer intervenes to try and control torque delivery, but only succeeds in overcompensating, causing Torque to plummet at 4500RPM. Once again the factory computer attempts to regain control

of the situation and starts to increase Torque once again till it peaks at 4800RPM. Predictably the factory computer overreacts to this latest rapid increase, and yet again torque delivery heads south, except this time there is not enough engine RPM's left for the Factory computer to try get things under control, as it's time for the driver to change up a gear, causing the whole ugly cycle to repeat itself over and over.



Pic:
Dyno Graph EVO8 with exhaust and pipe type custom exhaust manf.

Showing:
Torque (blue line)
Power (green line)

Note: Now that dip is even worse!

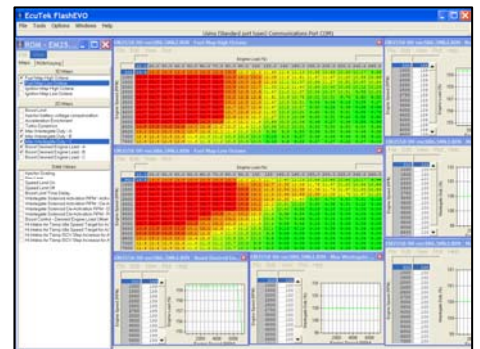
As bad as it is in Standard form, the ECU in your EVO VIII gets even more confused and out of its depth when modified parts are fitted. Changing the Exhaust system to a larger diameter or freer-flowing item only magnifies the shortcomings of the factory boost control system. Installing a 3" exhaust system doesn't result in huge power gains as

normally would be expected, but instead causes the stock ECU to totally lose control of boost and Torque delivery, resulting in wild peaks and troughs in the power and torque curves. At its worst point it cuts torque by 15% between 4000 and 5500RPM. Power delivery is also greatly affected as well, with the wild surges in Torque being reflected in peak power as well.

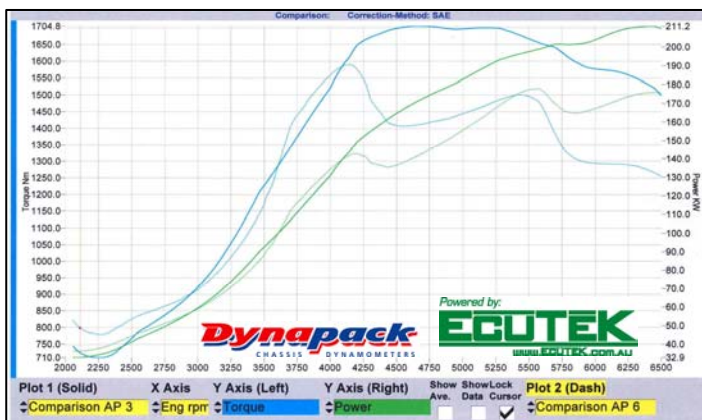
Lumpy Dyno graphs aside, even actual peak power and torque numbers achieved with the new exhaust system are nothing to write home about. Peak Torque only increases a little over 6% (With a much narrower range than stock) with power jumping 8% over stock only for the briefest of instants. Out on the road all of the lumps and bumps in the Torque curve feel awful, with the driver being left with the feeling that the car has some serious mechanical problems.

Pic:

Screen image (of some !!) of the "Maps" that the EcuTeK PC software shows when communicating with the factory Mitsubishi ECU



Thankfully something can be done to rectify the situation. Now that access can be made to the stock ECU using MRT's newly released EcuTeK software, some real gains can be made, along with a huge improvement in driveability. Fixing boost control issues does not require any hardware changes, simply a reprogram of the boost control maps contained within the EVO's ECU. Once accurate control of boost pressure is achieved, the wild fluctuations in Power and Torque are finally gone, which when coupled with some carefully made changes to Fuel and Ignition Maps result in massive increases in Power and a much fatter more consistent torque band.



Pic:

Dyno Graph EVO8 with exhaust and pipe type custom exhaust manf. And then exactly the same with a retuned factory ECU (and a modest increase in boost of 2psi.)

Showing:
Torque (blue line) before (light), after (dark)
Power (green line) before (light), after (dark)

Note: Finally some nice smooth curves!

Best news of all is reserved for out on the road. Whereas before, accelerating through the gears was all ugly lumps and bumps, now the car feels totally transformed, with a fantastic acceleration and a great spread of torque across the RPM range.

MORE INFORMATION:

- www.EcuTeK.com.au
 - Road or custom dyno tunes available.
- www.MRTrally.com.au
- Complete tuned suspension kits available.
 - Refer the MRT web site under "products"
- Ready made bolt on parts such as:
 - Exhausts
 - Airfilter kits
 - Fuel pumps
 - Intercoolers
- For discussion on this model, refer the www.MRTrally.com.au/forums

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