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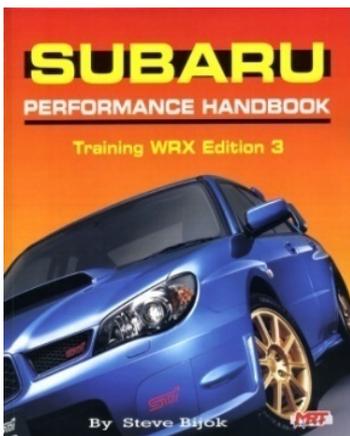
## Subaru Impreza WRX MY01-05



### Introduction - The Standard Car

When the GD model Impreza WRX range was first released back in late 2000, it is fair to say the initial specifications didn't quite live up to what traditional WRX lovers had in mind. From the light, nimble and responsive MY99-00 GC model, Subaru went straight into the heavy, slow and ugly MY01 WRX. Nicknamed "Bugeye" pretty much straight away, it was all downhill from there. The locally delivered MY01 model missed out on the new VVT equipped engine found in the JDM spec cars and whilst quieter and more refined inside, overall it was a bit of a disappointment. Much of the car had been designed with the US market in mind (the MY01 WRX was the first WRX released to US customers), and many of the things previous WRX owners loved about the earlier models disappeared as part of the process.

Subaru attempted to fix some of the issues with the release of the MY02 model (revised gearing in an attempt to give the car a sportier feel being the most obvious change), but that didn't help the looks any. It also still carried the same specification engine as the MY01.



Then came the MY03-05 model. This was the car that Subaru should have released back at the end of 2000 but didn't. Revised styling, new VVT equipped engine with increased torque and 165kw, and a host of other minor but likeable changes helped bring some respect back to the WRX badge. Volumes have been written elsewhere about exact specifications and other changes between models so we won't go into more detail here.

All of the MY01-05 models retained the same TD04 turbo, however the MY03-05 engine also ran a slightly higher compression ratio (9.0:1), and was no longer fitted with a cat converter in the uppipe leading into the turbo (fitted by Subaru to the MY01-02 to help the car meet emissions requirements for sale in some US markets). Standard boost levels in the MY03-05 were around 14 Psi, also up slightly compared to the MY01-02 model.

This article focuses specifically on the MY03-05 WRX in all examples given, however similar gains can be achieved with the MY01-02 model also. What the MY01-02 engine loses in not having variable valve timing and a lower compression ratio can be compensated for with a catless uppipe, a little more boost and changes to other tuning parameters. ☺

## Performance Improvement – Our Goal

In looking to achieve increases in performance, there are several areas that need attention – our key aim is always to improve efficiency of the package as a whole in order to achieve well balanced results. Most of our clients buy their cars for enjoyment in a variety of environments (day to day commuting, spirited highway use, occasional track days, etc), but by far the most common is as a daily driver. On that basis, modifications which make a car too loud, consume fuel like someone else is paying for it, drive poorly with no torque at lower rpm, ride harshly, etc aren't our focus.

Gone are the days when you simply bolted on an exhaust and hoped for the best. We aim to take what the factory supplied you and improve on it after thorough testing and development – this is also why we guarantee and provide a warranty for all of the work completed by us or our resellers.

## Factory Warranty Guarantee

When sold new, the manufacturer of your car provides a fairly specific warranty that covers a variety of things for a predetermined amount of time or distance travelled. Problems caused by poorly thought out or performed modifications however are generally not one of them! Where a problem with your car is completely unrelated to any modifications made (for example, your air conditioning fails 12 months after you have a power kit fitted) this is generally STILL covered by your factory warranty. However if you increase the performance output of your engine and your transmission fails, it is unlikely they will be too interested in repairing it under warranty.



Fortunately, where a full MRT Power Kit is fitted (by either us or one of our resellers) we will generally take up where your factory warranty ends to the extent that the vehicle is affected by our modifications. Of course there are some exceptions (such as outright race or track use – more information on our website at <http://www.mrtperformance.com.au/about-us/the-best-warranty>), but put simply, if we fit something to your car which impacts on its reliability, we will rectify the problem under the terms of our warranty.

## Fuel Economy

In these times of ever increasing fuel costs, one of the main queries we get is how your car will be impacted by any modifications. Truth be known, in order to get better performance from your car two things happen:



- We need to make the engine more efficient throughout the rev range. Whether this comes through fitment of additional parts or changes to engine operating parameters, the aim is the same.
- ECU mapping is optimized to ensure the engine is operating with the most suitable settings for the combination of parts fitted.

As a result, during normal day to day driving your engine is actually working more efficiently and burning less fuel as a result. Of course when you are working the engine harder to extract higher levels of performance, you will burn more fuel (no way around the basic fundamentals of a combustion engine there sorry!) however remember that this is less than 10% of the time you are driving.

On balance, most of our customers who have had an MRT power kit fitted over previous years have provided feedback which confirms this. Depending on driving style, many notice no increase in overall fuel consumption and many have come back with gains of 0.5-1.5L/100km.

## MRT Power Kits – What Options Do I Have?

We have many customers who come to us with a predetermined figure in mind - how much faster they want to go, a certain amount of power, or a preset budget are all common. We have many years behind us of preparing custom combinations to suit specific requirements for customers, be it road, race or rally.

However through our years of experience on both Subaru and Mitsubishi performance models, we know that certain combinations of parts produce certain results. Of course different engine configurations respond differently to various combinations, however we are able to break it down into various stages to suit each model. This allows you the peace of mind of knowing how much you are going to spend and the performance gains you will receive well in advance of any work starting.

Typically most of our supported vehicles come with 2 – 3 performance upgrade kit options:

- **XA Kit**

Entry level kit with a mild power increase but primary focus on improvements to mid range torque and day to day drivability. The XA Kit typically has a minimal (if any) noise increase over a standard vehicle.

- **XB Kit**

Mid range kit designed more for the owner who wants that little bit more from their vehicle, both in terms of performance and sound. Significant improvements in torque and power, with a much broader torque curve compared to the standard vehicle. Good improvements in turbo lag are also seen with notably better throttle response.

- **XC Kit**

Upper level kit for the more performance orientated owner. Typically these kits include a turbo change along with supporting modifications in the quest for much larger outright power gains over a standard vehicle.



Upgrading between kits is feasible (check FAQ section at the end of this document for further information).

All of our kits are designed for engines that will be run on 98 Octane fuel (eg Shell V-Power, Caltex Vortex 98, BP Ultimate 98, etc). However if you are in a remote part of Australia and can't get 98 RON fuel on a regular basis, then we can still help. Please contact your nearest MRT reseller for further details on any potential impacts on performance (engines generally need to be detuned slightly to retain reliability to suit lower octane fuel).

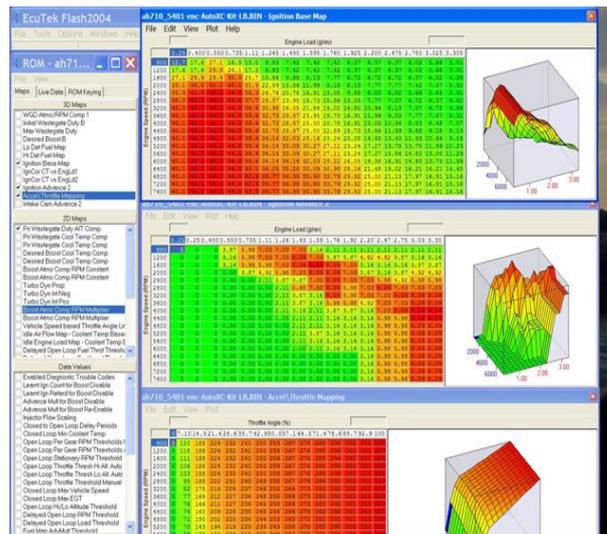
All initial testing, development and verification of results has been (and continues to be) completed on our in house 4WD Dynapack Chassis Dyno. Dyno time is not normally included as part of our kits due to the level of testing and development already completed on associated mapping work, however if you wish for any specific kit to be custom tuned to your requirements it can be easily done at a slight extra cost.

# Why EcuTek?

All MRT power kits retain the use of the factory engine management system hardware, recalibrated for optimum engine control through the use of EcuTek software.

Some people prefer to remove the factory management system and fit a complete replacement ECU (or interceptor style unit which overrides some aspects of the factory management systems control), however this is not our preferred method for several reasons.

When tuned correctly the factory engine management system allows you the best of both worlds – factory or better than factory drivability, with the best possible performance from your chosen combination of modifications.



## Certificate Of Authenticity

Be sure you get what you pay for! With the success of the MRT Power kits over the years, some companies try to pass off inferior parts and options that replicate what we do. However we guarantee our results because we only use proven parts and the best engine management system technology in EcuTek software.

With each tune or upgrade completed, you will be provided with an individually numbered Certificate Of Authenticity to show what has been completed on your vehicle. To register it, simply complete the detachable feedback details and drop it in the (reply paid) post.



This isn't something just anyone can do however, we (and our resellers) use proven EcuTek engine management software to upgrade your existing OEM engine management system with the required settings. In doing this, you'll get:

- Good fuel economy via accurate closed loop fuel control.
- No wiring or hardware modifications to the electronics of your car (100% reliability).
- The same or better emissions output from your engine (many OEM setups run quite rich air/fuel ratios at higher rpm levels).
- All of the OEM safety parameters such as active knock control and boost limiting adjusted to suit. This means if something isn't going according to plan (eg detection of detonation due to the use of poor quality fuel for example), your ECU can respond accordingly to prevent engine damage in most cases.
- Optimum setup and control of the latest engine management system features such as variable valve control, electronic throttle control (including access to all 3x SI Drive modes on Subaru models where fitted) and more.

We have used EcuTek software to reprogram the Subaru and Mitsubishi factory engine management systems on everything from standard cars right through to heavily modified cars with enlarged engine capacity, massive turbo and intercooler combinations and nitrous of all things!

Road or race, the results are on the board – why use anything else?

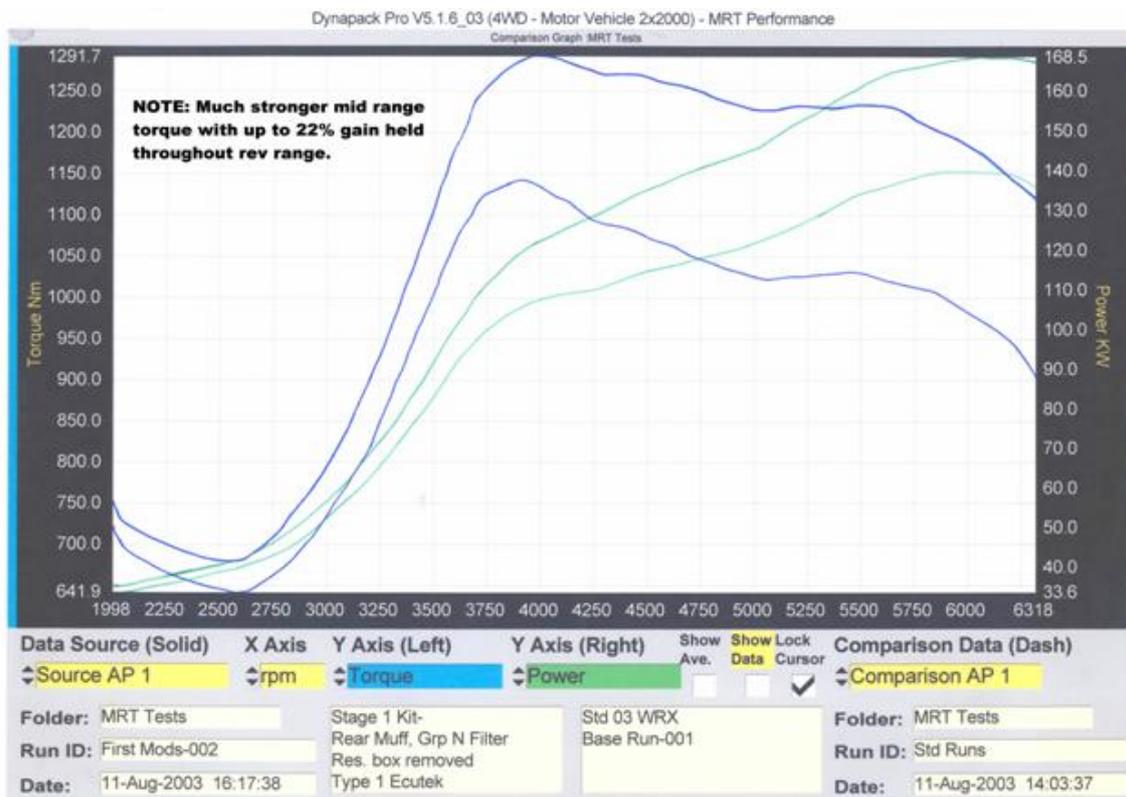
## Subaru Impreza WRX – XA Kit

One of the most common questions we get is “I want to go faster but I’ve only got \$XX to spend”. The first instinct by many is to race out and fit a full exhaust to the car, but a combination of things that focus on the next weakest link in terms of engine efficiency will always yield the best result.

On the MY01-05 WRX, the best combination of entry level modifications we’ve found to date is:

- Upgraded rear muffler (improves flow, is compatible with an upgrade to a full turbo back system at a later stage, and gives a better exhaust note to boot!)
- Modifications to the resonant box inside the inner guard to free up flow to the standard airbox.
- Replacement flat panel air filter to suit the standard airbox
- And to tie it all together, a full recalibration of the factory engine management system to optimize the new combination and ensure the engine is running at its most efficient.

Boost control is also adjusted, although at this level a mild increase of around 1 Psi over standard boost levels is all that is used. With the standard front and centre sections of the exhaust in place (including standard cat converters etc), more boost at this stage doesn’t yield any further increases in performance.



The results speak for themselves with up to 20% more torque and an increase of 20-25kw from the mid range all the way through to redline. As indicated above, this is with barely a 1 Psi increase in boost over standard...! On the road the car felt just as strong with drivability far improved over the standard car, and mid range performance noticeably improved (especially when overtaking!). 😊

That is more power, more economy, better drivability and above all, more safety than bolting on that exhaust system you first had in mind. And better yet, in many cases cheaper than a full exhaust as well!

# Subaru Impreza WRX – XB Kit

With the basics in place, now we can look to turn up the wick a little. The key to any high performing four cylinder turbo engine is airflow, and lots of it. With that in mind, the next steps revolve around further removing restriction in the exhaust and intake side of things.

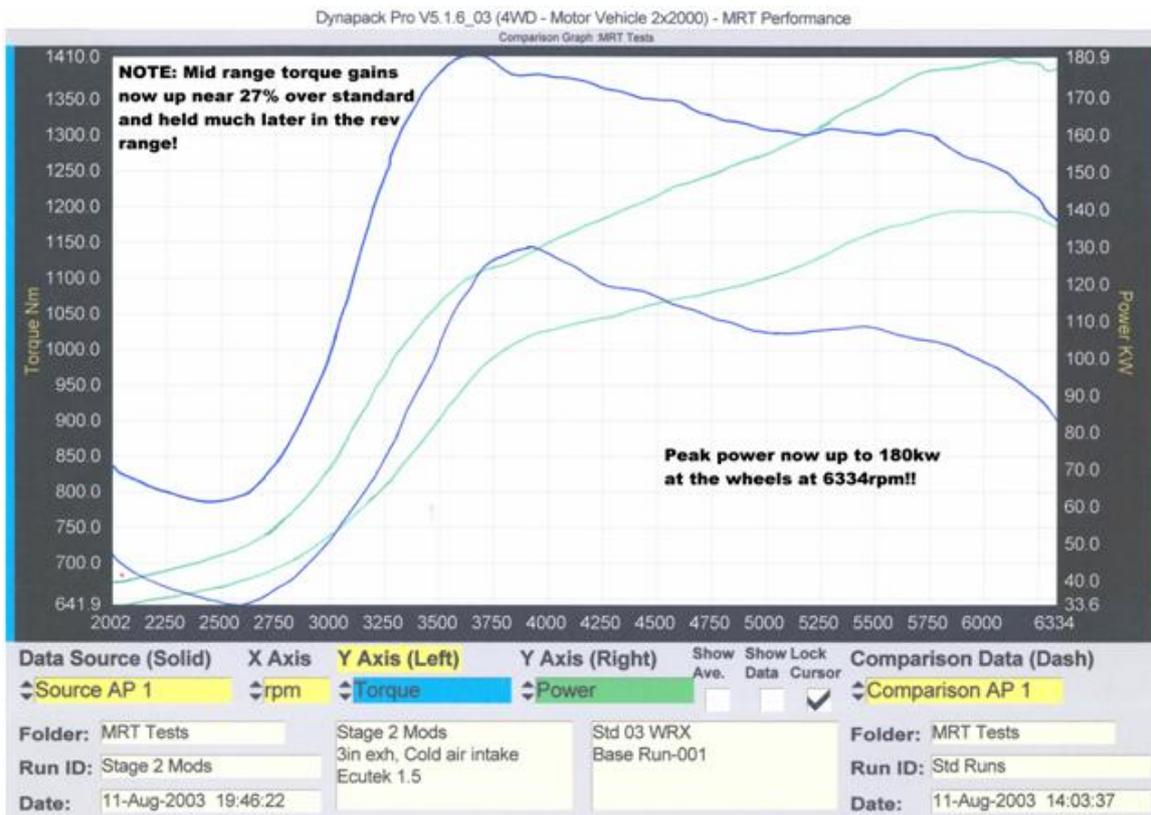


Into the bin goes the standard engine pipe and centre pipe – in its place are a new custom designed dump pipe from the turbo back, complete with custom designed splitter for improved response and high flow cat converter. A new 3” centre pipe completes the system, mounting up nicely to the upgraded 3” muffler fitted initially as part of the XA Kit.

On MY01-02 models a new catless uppipe is also fitted, replacing the restrictive standard item. This allows for significantly improved exhaust flow, and improved reliability (the standard uppipe has been known to have cats fail and pass directly through the turbo on occasion!).

Additionally, with the MY01-05 WRX for some unknown reason Subaru also decided to go back to a lesser capacity fuel pump and smaller 380cc injectors (compared to the 440cc items in the MY99-00 model). With the XB Kit upgrade taking the standard setup to its limits, changes to the standard fuel system are also required. At this level, a higher capacity in tank pump is fitted to help squeeze the most from the standard injectors.

In place of the standard airbox, a new polished cold air intake is fitted to better allow clear airflow from the inner guard to be ingested by the engine. If you are concerned about noise or about potential unwanted attention from the authorities however, you can opt to retain the factory airbox and will only sacrifice a couple of kw in gains by comparison.

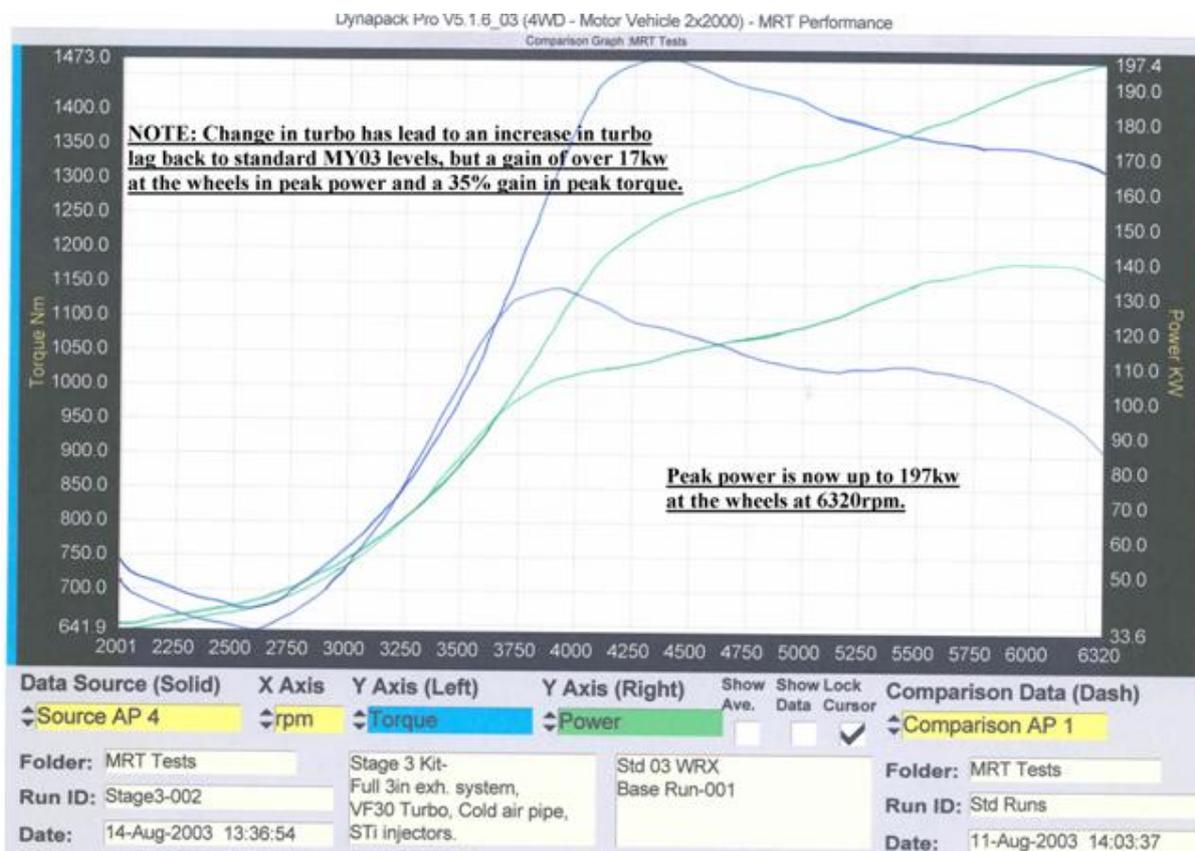


With the ability to flow a much larger amount of air, the WRX is now really starting to come alive. The cold air intake replacement and full exhaust system (with additional tuning to suit) have lead to a dramatic reduction in turbo lag, with the car now proving to be incredibly responsive throughout the rev range. This culminates in a peak power gain of over 40kw more than the standard car, and a nice flat torque curve means good response in most gears.

However it is about now that the limits of several standard components is reached. Injector duty cycles are now up to around 90-92% and no matter how hard it tries, the standard TD04 turbo is now struggling to keep up at higher rpm. On the road this also showed above 6000rpm, with the car losing urge noticeably. But of course, there are easy fixes to these... ☺

## Subaru Impreza WRX – XC Kit

With the deficiencies discovered at the completion of XB kit testing well known, the upgrades at this stage are fairly obvious. Larger 550cc injectors from the JDM spec STI model are fitted, as is a larger VF34 turbo. The engine management system mapping is again thoroughly revised to suit the new modifications, and last but not least boost is increased to around 16.5 Psi.



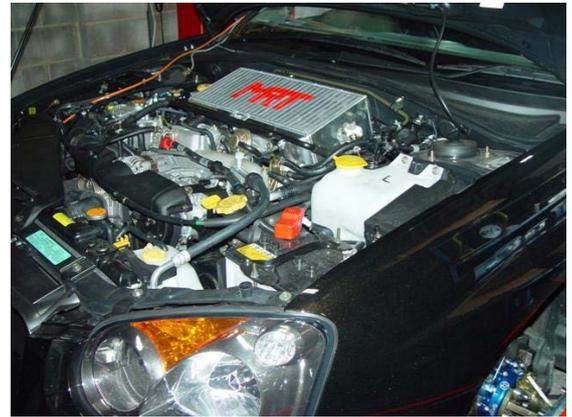
There is a slight increase in lag over XB Kit levels as a result of fitting the larger turbo, however as shown above, the gains in overall efficiency actually mean the car is no laggier than a standard car! Top end gains on the other hand are on another level all together, with the car now making just under 60kw more than the standard car with a commensurate increase in torque.

By comparison, with other dyno testing we have done this level of modification actually gives you around 20kw more than a standard Australian delivered MY02-05 STi for substantially less money!

At this level of performance however, whilst reliable, pushing things harder can cause potential reliability issues. Items such as a larger top mounted intercooler can be fitted for a few extra kw, however standard pistons and rods are nearing their effective limitations in terms of strength.

For owners with dreams of big hp, there are no other alternatives other than to start planning for an engine rebuild with specific items to suit. Often this ends up with fitment of a larger 2.5L bottom end from a later model STi, or the consideration of a 2.2L or 2.4L stroker kit for the existing bottom end. And don't forget the gearbox, whilst it will withstand the levels of torque generated up to this point (NB: It will handle the torque, but not outright abuse – this includes flat shifting and launching the car from a standstill with 6000rpm on board), even higher levels of output will start to stretch the friendship.

If this sounds more like what you are chasing, then simply give either us or your nearest reseller a call for further information.



## Frequently Asked Questions

### Do the modifications void my new car warranty?

*(Also refer the details on the Factory Warranty Guarantee listed separately in this document)*

One of the most common queries we get in relation to performance upgrades on new models is the potential effects on factory warranty. To that extent, Subaru retain the right to refuse claims on warranty where the item being claimed on has been modified or changed from factory specification.

However, to date we are yet to have any vehicle fitted with one of the MRT Power Kit upgrades fail as a direct result of the improvements made, with hundreds of kits supplied and fitted to date Australia wide. We also offer a warranty against manufacturer defect on all parts we supply. We also spend countless hours on research and development of parts, tuning, and the associated effects of these changes on the rest of the vehicle.

### If I have one type of kit, can I upgrade at a later stage if I want more?

Easily! All of our parts are designed to be compatible with other items. For example if you have one type of kit, upgrading to the next level simply consists of adding any additional parts that may be required (eg upgrading from a rear muffler only to a full exhaust system, updating ECU tuning to suit, etc).

The cost to upgrade depends on what parts you already have fitted. As a guide it's generally around the difference in price between your kit and the next + any additional labour associated with the changeover that isn't covered in the kit.

### How long does the work take?

Both the XA and XB kits can be completed within 1 day, the XC kit takes a little longer at around 2 days due to the extra parts that require fitment. When booking your car with us (or your local authorised outlet) the total time your vehicle is required will be reconfirmed for you as well.

## 7 Reasons why you can rely on MRT.

1. **Extensive R&D program** - each MRT Power Kit is the result of hundreds of hours of road and dyno testing. Different performance components are tested and retested to find an optimal solution to the question of "How can I cost effectively upgrade my car to be quick, reliable, economical AND fun to drive, without voiding my factory warranty?"

### 2. **Our Unique Triple Guarantee:**

i) **Guaranteed Performance Outcome** – We guarantee our kits will deliver at least our quoted figures for Power and Torque. You benefit from the hundreds of dyno tests we have performed to optimize our power kits and your car is individually tuned by our expert tuners to give you the best possible result.

ii) **Factory Warranty Guarantee** – Where our modified parts have been fitted to your car by us (or a reseller), should your new car warranty be voided as a result we will cover repair/replacement of any OEM parts negatively impacted by the modified parts under the same terms as the factory new car warranty.

iii) **Parts Guarantee** – All of the parts we supply are of high quality and covered by a full 6 month/10,000km warranty or for the life of your factory warranty, whichever is greater.

3. **Proven Track Record** – Why risk your money playing mix and match with components not designed to work together with no guarantee of a performance outcome or risk of engine failure? We have invested many hundreds of hours in developing each kit offered to find the best performance enhancement solution at realistic price points for you. Thousands of happy customers use their cars with our parts every day.

4. **How fast do you want to go** – Each kit has been designed specifically to suit your particular model car with different levels of performance based upon your budget and individual needs. Custom solutions are also available where required.

5. **Single Supplier** – if you encounter any issues, you have a single point of contact to get them resolved to your satisfaction. The possibility of vendors passing the buck and not accepting responsibility is eliminated.

6. **Improved Fuel Economy** – thousands of km of road testing has proven that your fuel economy will be as good as or better than prior to fitting the kit when the car is driven in the same manner under similar conditions.

7. **Drivability Focus** – our kits are not about massive outright power levels (although we can do this separately!), they are designed for practical enjoyment.

\* For full details refer your MRT reseller and additional information within this document. MRT is independent of Subaru.

### **I have already made some modifications, can I get the same results as seen above?**

A lot of customers perform modifications in stages, partly due to budget constraints and partly because it starts in stages and then the bug bites and performance becomes an obsession. All of the modifications listed above can be performed around what you already have. Depending on the quality and type of items fitted, we will get performance gains as close as feasible to the above. Of course to make sure you get the gains the vehicle is capable of, just make sure you use MRT parts from the beginning! 😊

### **Will my ECU still allow me to service my car with a dealer?**

We would like you to choose us for your regular servicing, but should you choose not to there are no hardware or software changes that will stop a Subaru dealer using the factory equipment. Additionally if they reset your ECU it will still retain its “enhanced” settings.

### **Where can I get the work done?**

Any authorised MRT reseller can easily complete the above work for you, or assist in designing a series of modifications around your requirements. For further information and contact details please check out our website at <http://www.mrtperformance.com.au/resources/mrt-partners-and-authorised-outlets>.

Of course if you have any other queries that we have missed, or need further information either give us a call directly on (02) 9767 4545 or get in touch with your local reseller.

## Subaru Impreza WRX MY01-05 – Kit Pricing And Inclusions



### XA Kit

Guaranteed minimum 20kW gain\* (up to 20% more torque)

**Includes:**

- 1 x Factory Warranty Guarantee \*\*\*
- 1 x MRT 3" Rear Muffler (Cannon muffler available as no cost option)
- 1 x Adaptor flange to suit new muffler fitment with standard centre pipe
- 1 x Flat Panel air filter replacement with intake resonectomy
- 1 x EcuTeK MRT ECU software upgrade
- 1 x Recalibration of factory ECU using mapping extensively developed on dyno and road \*\*
- 1 x Full on road diagnostics and testing with all labour to fit/tune/test vehicle
- 1 x Label kit (1x petrol cap cover, 1x engine bay and 1x radiator support panel) with EcuTeK embossed label
- 1 x EcuTeK Certificate of Authenticity

For pricing and more details refer to your local MRT Supplier



### XB Kit

Guaranteed minimum 40kW gain\* (up to 30% more torque)

**Includes:**

- 1 x Factory Warranty Guarantee \*\*\*
- 1 x MRT 3" Rear Muffler (Cannon muffler available as no cost option)
- 1 x MRT 3" Centre pipe (Centre resonator available at slight additional cost)
- 1 x MRT 3" Engine pipe with high flow cat converter and splitter on collector for improved response
- 1 x MRT Cold Air Intake pipe with reusable air filter to suit with removal of intake resonator
- 1 x 500hp In Tank Fuel Pump replacement
- 1 x EcuTeK MRT ECU software upgrade
- 1 x Recalibration of factory ECU using mapping extensively developed on dyno and road \*\*
- 1 x Full on road diagnostics and testing with all labour to fit/tune/test vehicle
- 1 x Label kit (1x petrol cap cover, 1x engine bay and 1x radiator support panel) with EcuTeK embossed label
- 1 x EcuTeK Certificate of Authenticity

For pricing and more details refer to your local MRT Supplier



### XC Kit

Guaranteed minimum 55kW gain\* (up to 40% more torque)

**Includes:**

- 1 x Factory Warranty Guarantee \*\*\*
- 1 x MRT 3" Rear Muffler (Cannon muffler available as no cost option)
- 1 x MRT 3" Centre pipe (Centre resonator available at slight additional cost)
- 1 x MRT 3" Engine pipe with high flow cat converter and splitter on collector for improved response
- 1 x MRT Cold Air Intake pipe with reusable air filter to suit with removal of intake resonator
- 1 x 500hp In Tank Fuel Pump replacement
- 1 x VF34 turbo upgrade
- 4 x 550cc STi Injector upgrade
- 1 x EcuTeK MRT ECU software upgrade
- 1 x Recalibration of factory ECU using mapping extensively developed on dyno and road \*\*
- 1 x Full on road diagnostics and testing with all labour to fit/tune/test vehicle
- 1 x Label kit (1x petrol cap cover, 1x engine bay and 1x radiator support panel) with EcuTeK embossed label
- 1 x EcuTeK Certificate of Authenticity

For pricing and more details refer to your local MRT Supplier

\* Whilst realistic and achievable on all MY01-05 WRX models, power gains quoted are subject to 10% variation due to fuel quality and temperature variations in various areas of Australia. If you've concerns about any aspect of the work to be completed, please just ask us (or your local Authorised MRT Distributor)!

\*\* Kits are NOT dyno tuned at time of fitment in most cases. We spend hundreds of hours on dyno and road at the development stage to eliminate unnecessary expense for you. This knowledge is incorporated in mapping designed for each kit, then refined in your car with road testing and diagnostics. Before and after power runs, or custom dyno tuning for every last kw are both feasible however additional costs will apply.

\*\*\* Refer Warranty details within document.