



## WRX Enhancement - Blow-Off Valves

Part 4 of the most complete WRX parts buyers guide - EVER!

*By Michael Knowling*

### Standard Blow-off Valve

Early WRXs were released with a plastic blow-off valve located in the flexible pipe that led into the back of the top-mount intercooler. This set-up was superseded with the MY97's system of plumbing the blow-off valve onto the engine-side intercooler end-tank. The valve itself was also significantly larger (at about 32mm, as opposed to around 19mm). During the MY99's stint, a similar metal version of this valve was then mounted directly onto the intercooler end-tank via a 2-bolt flange. The main problem associated with all of these standard WRX valves, however, is that they leak even under moderate boost - causing a lack of power and potentially over-speeding the turbo. The standard valve is also known to stay open under verging-on-boost cruise conditions. That's when there's j-u-s-t positive pressure in the turbo system, but vacuum present in the manifold.

Aftermarket valves are aimed at preventing these two problems - but it should be pointed out that any externally venting (as opposed to plumb-back or hybrid) valve confuses the airflow meter and causes rough running and flat-spots. Adjustable valves help to remedy this, however.

### The Guide

Get ready for **GReddy**... This company's Type-S blow-off valve features a "voluminous diaphragm system that is ideally suited to high-boost engines". It holds pressure very capably and can dump a large volume of air out of the charge-air pipe, thus keeping the all-important turbo speed as high as possible. This gives noticeably "quicker boost recovery".

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Installation of the GReddy BOV is straight forward, however - depending on the MY - a short adapter pipe may be needed.

GReddy blow-off valves can be purchased through Evolution R in Melb.

A relative newcomer to the WRX performance parts scene is Sydney's **Go-Fast Bits** (GFB). This company offers a long line-up of blow-off valves. All come with the choice of blue, purple, red, clear and gunmetal finishes and (unless stated) are fully vacuum adjustable. Adapters are also available to let them fit any model WRX...



The Mach 1 (GFBBOV1) is the loudest valve in the entire GFB range and will "scare the pants off your average pedestrian!" This trumpeted BOV features eye catching design and is said to be engineered using the latest aerospace materials. Note that it is most recommended for cars with stand-alone MAP sensors, but it can be run on the airflow meter'd WRX with some fine trigger-vacuum adjustment.



Next is the GFBBOV2 Plumbback. This valve takes compressed purge-air and puts it back into the pre-turbo intake system (rather than to the atmosphere). This gives the benefit of full airflow meter compatibility, and it's also ideal where the noise of an externally venting BOV is not desired. Adjustable for throttle response, this valve is also capable of operating at any boost level.



The GFBBOV3 is a 2-stage hybrid blow-off valve - half external venting and half plumb-back. It is purpose designed for airflow metered vehicles, where the owners want that distinctive blow-off valve "pssht". At light load conditions, purge air is directed back after the airflow meter - virtually eliminating the usual problem of stalling and excessively rich mixtures. At high pressure - when maximum venting is required - "the hybrid unleashes an external venting trumpet" to give the desired sound effects. This valve is non-adjustable.



Now we come to the big daddy of the GFB range. The GFBBOV5 (aka BOVUS Maximus!) is only for use on high volume turbo systems - and really only those with a stand-alone MAP sensor conversion. With its twin "staged trumpet" design, this BOV is designed for lots of boost (16 psi+) and vents an enormous amount of charge-air. It is available with only the 32mm mounting adapter and is supplied with a suitable blanking plug.

Go Fast Bits vent their stuff in Sydney.

**BPM** says "protect your investment and stay on boost". Their in-house blow-off valve is claimed to help maintain turbine rpm after a gear change (to give improved throttle response) and prevents potentially destructive compressor surge. Being well suited to high boost pressures, it also prevents pressure leakage and extends the life of the turbo (by not over-working it to generate a given amount of boost). "A bolt-on solution."

BPM are in Queensland.

The Super Sequential Blow-Off Valve from **HKS** claims to be the only BOV that increases useable power. While most valves open under the force of boost pressure and leak out induction air, the HKS valve is forced **closed** by boost pressure. The only way to open the release is with a manifold vacuum signal. The SQV also features a dual valve arrangement and comes complete with all components for installation (though an adapter may be needed to suit some model WRXs).

The ultra-hi performance Racing Blow off valve is a "high tune version of the proven SQV". It uses a single aluminium piston to withstand extreme boost and vent the maximum air volume. HKS endurance tests were carried on the valve for over 1000 cycles at 3.0 Bar pressure. Due to the Racing valve's similar dimensions to the SQV, it also fits in almost all the same spaces.

HKS valves can be sought through Evolution R, BD4s and WAR Motorsports.



**AVO** (Advanced Vehicle Operations) have this polished purge valve that's perfect to do away with any 94 - 99 WRX valve (or post '99 with an adapter). Featuring adjustable vacuum triggering, the AVO valve is said to remove between-gear compressor surge and give quicker boost response after changes. It can also extend life of turbo under high boost.

AVO is a long-time Victorian workshop.



The Type 2 is a high performance blow-off valve that provides superior venting of excess pressure. It is fully "quick wrist" adjustable and can handle any pressure your turbo can pump out. The valve comes complete with a mild-steel weld-on adapter for intercooler pipe fitment. Note that the Type 2 is also available for the new MY01.



And here is the now-famous **TurboSmart** selection of blow-off valves. Adapters are available to make fitment universal on all WRXs

The TurboSmart blow-off valve Type 1 is ideal for the "beginner" and is relatively cheap. This valve can be plumbed into 25mm ID pressure hose - or can be fitted straight into place of standard blow-off valve on pre MY97 Subaru WRXs. Adjustment is via the unique set-and-forget shim system and its max rated boost pressure is said to be unlimited.



TurboSmart blow-off valve Type 3 is available in two specs - the Plumb Back and the Supersonic. Featuring the quick-wrist vacuum-trigger adjustment system, these offer superior venting flow and - depending on which model you select - is either unobtrusive or "supersonic". As above, a weld-on intercooler pipe adapter is also supplied.



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TurboSmart is in Sydney, but there are many agents around Australia - such as the [AutoSpeed shop](#)...



The **A'PEXi** Twin Chamber Blow-Off Valve not only looks sensational, it incorporates a "revolutionary design in boost pressure release systems". Being adjustable, it is also claimed that "you can adjust the desired boost response between shifts". The Twin Chamber Blow-Off Valve uses two separate chambers - which allows for a stiff spring in the main chamber while retaining a soft spring in the secondary chamber. The result is reputedly quicker valve response under both low and high boost pressures. Interestingly, the A'PEX Blow Off Valve also gives the user the facility to adjust the blow-off sound to normal, loud and extra loud! It can be adapted to suit any WRX with the use of an adapter.

A'PEXi Twin Chamber blow-off valves sound off at BEL Performance, Jap Trading, G-Tech, BGT and the [AutoSpeed shop](#).



**Blitz** says that "when the boost is increased on a modified turbo car, the standard dump valve usually cannot cope with the extra air it has to release when the throttle is shut". Blitz, therefore, have come up with their high performance piston-type dump valves, which are designed for modified engines right up to 750hp... Finished in polished aluminium, these valves use a brass internal piston to ensure total durability - in fact, over 2 Bar (30 psi) boost pressure poses no problem for these valves. And - at that sort of pressure - they emit a sound very similar to the current breed of turbo rally cars. Blitz has a blow-off valve kit to suit all WRX models, though an adapter flange will be required for post MY99s.

Find Blitz dump valves at Evolution R and RaceLogic (UK).



The **Power Engineering** range of high-flow dump valves won't give any rough-running problems like some externally venting valves. All are CNC machined from billet aluminium and use nylon pistons with O-ring seals. Of the three valves shown above, the left one is for the STi Version 5, the recirculating one on the right will fit all WRXs (except the STi V5) and the single entry valve in the centre is the Bailey Piston EVO - which "makes a nice sound on gear changing". It is also said that the Power Engineering blow-off valves will reduce lag and stabilise boost control.

Power Engineering is a UK company.

## Universal BOV Adapters...



If you purchase any of the above blow-off valves and it doesn't directly fit onto your WAX, companies like TurboSmart, GFB and MRT sell adapters to suit. For example, this bolt-on adapter from MRT allows you to fit a variety of large-bore external BOVs to the flanged MY99 intercooler.

**Note: If you are a manufacturer of high performance blow off valves for the WRX - and you're not listed here - we'd be delighted to add your products to the guide, free of charge. Contact Michael at [michael@autospeed.com](mailto:michael@autospeed.com)**

### Contacts:

TurboSmart (NSW)  
+61 2 9798 2866

<http://www.turbosmart.com.au/>

Go-Fast Bits (NSW)  
+61 2 9569 7648

[www.gofastbits.com.au](http://www.gofastbits.com.au)

Evolution R (Vic)  
+61 3 9543 6255

[www.evo-r.com](http://www.evo-r.com)

APS (Vic)  
+61 3 9720 9170

[www.airpowersystems.com.au](http://www.airpowersystems.com.au)

MRT (NSW)  
+61 2 9809 2110

<http://www.mrtrally.com.au/>

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BGT (Vic)  
+61 3 9874 8866

[www.bgtperformance.com.au](http://www.bgtperformance.com.au)

G-Tech (Vic)  
+61 3 9813 0722

[www.gtech.com.au](http://www.gtech.com.au)

AVO (Vic)  
+61 3 9584 4499

<http://www.avoturbo.com/>

BPM (Qld)  
+61 7 3272 8885

[www.bpmsports.com](http://www.bpmsports.com)

WAR Motorsport (NZ)  
[www.warmotorsport.com](http://www.warmotorsport.com)

Jap Trading (Vic)  
+61 3 9879 7799

[www.jap-trading.com.au](http://www.jap-trading.com.au)

Race Logic (UK)  
[www.racelogic.co.uk](http://www.racelogic.co.uk)

BEL Performance (NSW)  
0412 262 888

[www.belpformance.com.au](http://www.belpformance.com.au)

BD4s (NSW)  
+61 2 9879 3322

[www.bd4s.com.au](http://www.bd4s.com.au)

Power Engineering (UK)  
[www.powerengineering.co.uk](http://www.powerengineering.co.uk)

## Pssst!!

A throttle-closed blow-off valve is designed to vent any pressure build-up between the turbo (or intercooler) and the closed throttle blade. This pressure build-up occurs when the car is on boost and then the throttle is suddenly shut. To allow simple valve triggering, the blow-off valve (BOV) is opened only at high manifold vacuums (ie light loads - especially on the over-run). Manufacturers fit BOVs to reduce the turbo surge noise that otherwise occurs when the throttle is suddenly snapped shut while the turbo is still spinning, while in some applications they can also help keep the turbo on boost during gearchanges. However, the main reason that most people change the factory valve to an aftermarket unit is to get a "psssst" noise when backing off or changing gears. This noise occurs because the valve is configured to dump air to the atmosphere, rather than feeding it back to the intake of the turbo, as all factory blow-off valves do.

It should be noted that if a relatively normal sized turbo is being used and the factory valve isn't leaking under boost, fitting an aftermarket blow-off valve will **not** transform performance in the same way that winding up the boost or fitting a large exhaust will.

Ascertaining the effect that the blow-off valve is having (eg if it is leaking and limiting boost) can be easily determined by blocking it off and then going for a drive. But don't just pull off the BOV's vacuum hose - it will then open more easily and will almost certainly drain away boost.

Externally venting valves give the loudest noise, but can cause some engine running problems. This is the case because the air that has been measured by the airflow meter is exhausted to atmosphere, rather than passing into the engine. To attempt to overcome this problem, some aftermarket manufacturers sell valves that return ("plumb-back") most of the air to the turbo intake, while still venting enough to make the noise. (Others dump high load air externally and recirculate low-load air.) Another problem of an externally venting BOV is that, if the valve is open at idle, the engine will run badly as air is drawn in through the BOV, bypassing the airflow meter (and also the airfilter!). Some manufacturers allow adjustment of the BOV opening vacuum, so that the valve can be configured to be shut at idle, but still open on the over-run. Cars fitted with aftermarket MAP-sensed management will not experience either of these engine running problems when fitted with externally-venting BOVs, though the lack of filtration when the valve is open at idle is still a concern.

However, it is the AutoSpeed editorial team's viewpoint that BOVs are largely a waste of money, and that the factory BOV should be replaced only if it leaks under boost (resulting in less boost than would otherwise be possible), or an aftermarket turbo is being used. When an aftermarket BOV is fitted to a car retaining airflow meter management, it should be of the plumb-back type.

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