

# GFB VTA

## Installation Instructions

Part # T9460



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# INSTALLATION

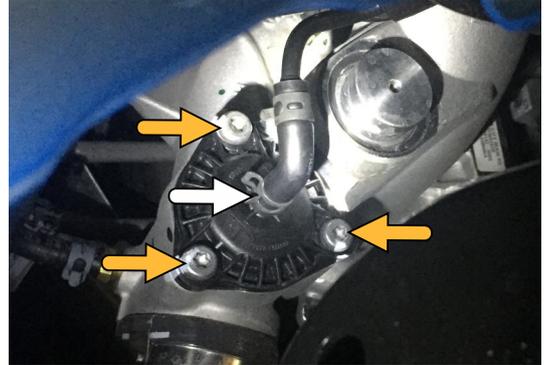
Note that installing the DV+ on the Focus RS must be done with the front right wheel removed, which requires raising the car on axle stands or a hoist.

**WARNING:**

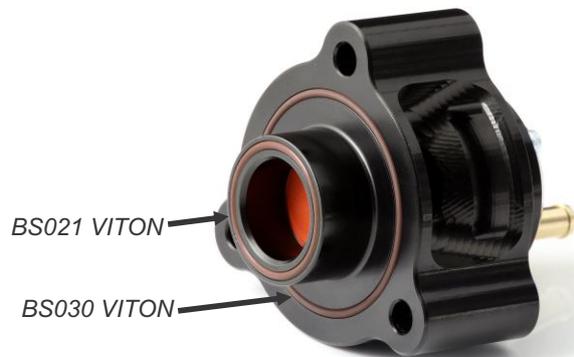
**NEVER work under a car supported only with a jack.**

Remove the factory vacuum hose clamp (⇐⇒), then pull the vacuum hose off the diverter valve.

Unscrew the 3 mounting screws (⇨) using a T30 Torx driver and remove the factory diverter valve from the car.



Before installing the VTA, check that the sealing o-rings are installed in the grooves on the VTA body as shown opposite.



Insert one of the supplied longer mounting screws into the VTA body to begin with, and position it onto the turbo with the cutout in the body aligned with the turbo intake (it can only fit in this orientation), and tighten only gently at this stage.

Insert the remaining two mounting screws into the VTA, and tighten all three screws.

Push the vacuum hose onto the VTA hose barb and secure with the factory clamp.

It is suggested that you set the spring pre-load about 3 full turns clockwise from the softest setting as a starting point. See the next page for more details on spring pre-load adjustment.



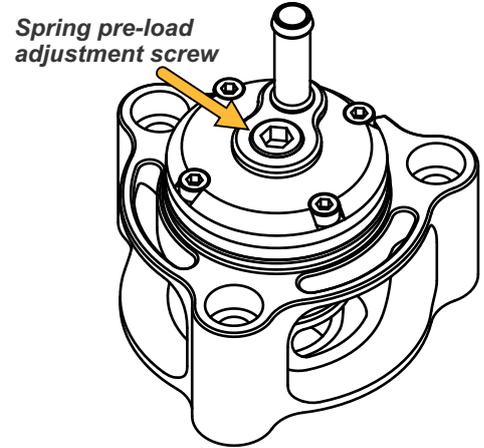
# SPRING ADJUSTMENT

The GFB VTA **DOES NOT** require spring pre-load adjustment to suit specific boost pressures. The pressure-balancing design of the VTA means that until the ECU decides to open the diverter there is equal boost pressure on both sides of the piston, so it will stay shut under boost REGARDLESS of the spring setting or the boost pressure.

Adjustments to the spring pre-load can often help improve throttle response and reduce lag, so it can pay to experiment.

The screw in the centre of the BOV cap is the spring preload adjustment screw, and the direction of adjustment is engraved on the cap. Please use a **metric 5mm hex key** for this screw.

There are 10 complete turns of adjustment, and the softest setting is achieved when the adjustment screw is flush with the head of the valve as shown. Do not set the screw to a position above the top of the cap or it may come loose and fall out.



Adjusting the spring pre-load changes how easily the valve vents when the ECU triggers. The best throttle response is typically found when the spring is set as firm as possible without causing compressor surge (turbo fluttering) when the throttle is closed on a high boost/high RPM gearshift.

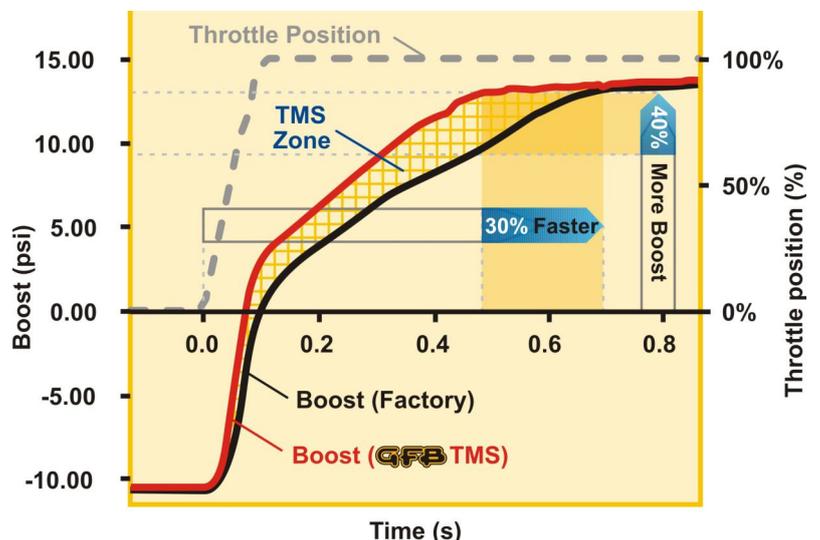
To explain further, contrary to popular belief, venting as much air as possible to “let the turbo freewheel” does not reduce lag. Perhaps 20 years ago it may have been true, but turbos these days spool up very quickly, and the greater benefit comes from setting the valve up to keep as much pressure in the intercooler as possible during a gear-shift or partial throttle lift.

Here's where adjusting the spring pre-load can help. A firmer spring pre-load can help retain a small amount of pressure in the intercooler during a gearshift, which leads to a faster return to peak boost. The limiting factor in how much you can increase the spring pre-load is compressor surge. Once this starts to occur at high boost/RPM, there is no further gain to be had, and for the life expectancy of the turbo it is best avoided.

Note that it is common however for compressor surge to occur at low RPM/boost, even if it doesn't occur at high boost/RPM. This is not really a concern for the turbo because the shaft speed and loads on the turbo at this point are much smaller, and the pressure spikes from compressor surge are much lower than those experienced at peak boost.

This is the basis behind GFB's TMS principle:

Turbo lag is minimised when the valve only vents enough air to prevent compressor surge - the graph opposite illustrates the reduction in lag. To read more about the TMS principle, visit our website: [www.gfb.com.au](http://www.gfb.com.au)



## Notes on VTA Operation

You might hear the VTA vent at seemingly odd times, but this is determined by the ECU and is not a fault with the VTA. The ECU turns on the solenoid to vent the diverter any time the throttle is closing faster than a specific rate. The throttle doesn't even have to be completely closed - as long as the rate of closure meets the ECU's requirements, it will attempt to open the diverter. The ECU turns the solenoid on for approximately 2 seconds, unless the throttle is re-opened sooner, in which case it turns the solenoid off immediately.

The spring inside the factory diverter is so soft that the valve will be sucked open completely by the vacuum when the ECU turns the solenoid on. This means the factory diverter opens fully whenever the solenoid is on, regardless of whether there is boost pressure to vent or not.

The VTA on the other hand balances the opening force from the vacuum when the solenoid turns on, which means the valve uses the existing boost pressure AND the vacuum from the solenoid to determine when and how far to open. So if the ECU turns on the solenoid at low RPM when there is only a small amount of boost pressure, the VTA will only open as far as it needs to vent the existing boost. This effect helps improve throttle response and boost recovery (particularly on gearshift), and also smooths boost transitions when you modulate the throttle, i.e. when balancing the car mid-corner with the throttle.