

# ***GFB DV+***

## ***Installation Instructions***

### ***Part #T9351***



**IMPORTANT!** All GFB pistons are checked for fitment and tolerance before shipment. Please do not drop the GFB piston onto a hard surface as this may cause (invisible) damage that could result in boost leaks or sticking.

**WICHTIG!** Alle Kolben wurden vor Versand auf Freigängigkeit geprüft. Bitte achten Sie bei der Montage darauf, dass \*der Kolben nicht auf den Boden fällt\*, da dieser schon bei kleinster (evtl. Nicht sichtbarer) Beschädigung zur Undichtigkeit oder Kolbenklemmen führen kann!

## INSTALLATION

Locate factory diverter valve solenoid. It will either be mounted directly on the turbo compressor cover, or it can be mounted remotely at the front of the engine bay on cars like the Mk6 Golf R.

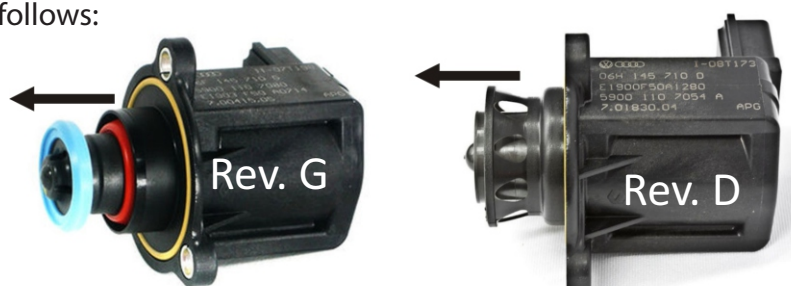
Unclip the wiring connector ( → ) from the top of the solenoid coil – note there is a small locking tab that needs to be pulled in the same direction (as indicated by the white arrow opposite) as you pull the connector to release it.



Unscrew the 3 mounting screws and remove the factory diverter valve from the car.

Now separate the factory valve mechanism from the solenoid coil, and install the GFB valve mechanism onto the factory solenoid as follows:

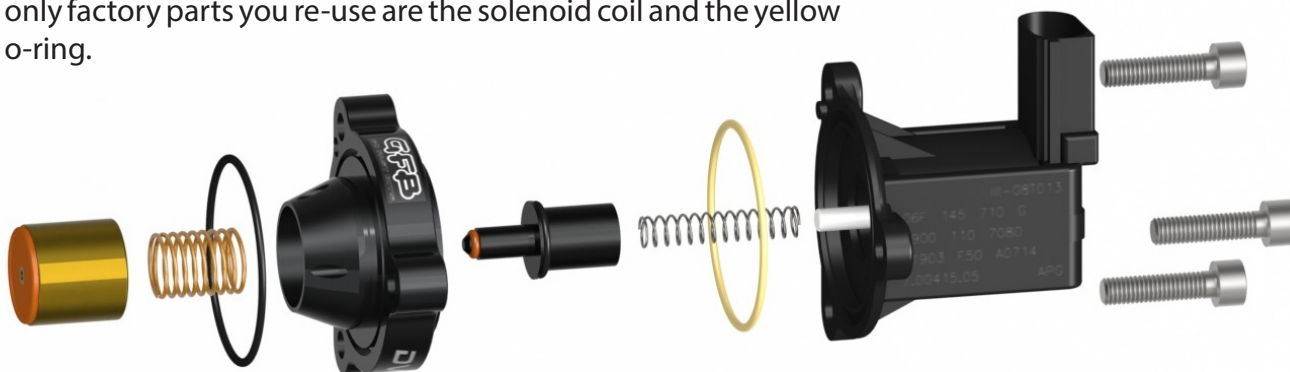
Pull on the plastic “basket” (revision D) or the diaphragm shroud (revision G), the whole assembly will pop off leaving the bare solenoid coil. Keep the yellow o-ring.



For revision C valves, first pull the piston from the body and remove the spring. Then remove the piston shroud - this can usually be pulled out by hand but if it's too tight, it can be carefully levered out with a flat screwdriver.



Install the GFB parts onto the solenoid body as shown below, using a little engine oil on the outside of the piston. **Make sure to use the GFB supplied spring inside the solenoid coil** – the only factory parts you re-use are the solenoid coil and the yellow o-ring.



**Please note:** the amount of force required to “snap” the DV+ body onto the solenoid varies because the solenoid is moulded plastic - some solenoids are quite loose and need to be held together until it is bolted onto the car, others can be quite tight and need a good deal of force (by hand). This variation in factory moulding tolerance does not affect the operation in any way.

Fit the valve/solenoid assembly to the car in the factory location using the supplied longer bolts, and re-connect the wiring loom.

## THE DV+ DIFFERENCE

Whilst the DV+ might look pretty basic, there is a very significant difference in the way it operates compared to the factory diverter valve, and other aftermarket products on the market.

The factory diverter uses the solenoid to directly actuate the valve, but there are multiple problems with this method:

- The valve can only ever be open or closed - it cannot move progressively, which is detrimental to throttle response.
- The stroke of the solenoid is long, meaning the actuating forces are weak (magnetic force diminishes significantly as stroke increases). This means the operation of the factory diverter is not reliable.
- The factory diverter cannot be sealed properly, because a good seal on a plastic piston would increase friction to the point where the weak actuating forces cannot open or close the valve.

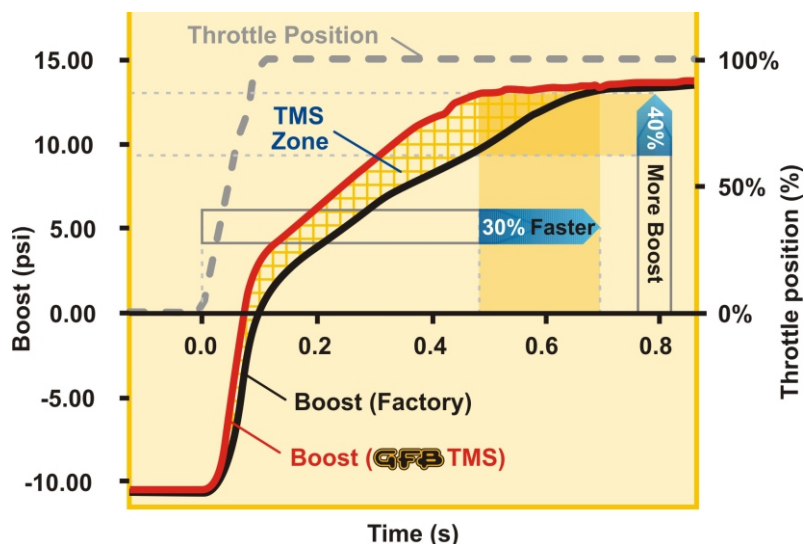
The GFB DV+ overcomes all of these issues whilst still retaining the factory solenoid coil. However, the solenoid's role is to move a smaller valve (the plunger) which controls the pressure signal used to open and close the piston, which is known as "pilot actuation". Think of it like pneumatic "leverage". The plunger stroke is reduced from 5mm to 0.8mm, which increases the actuation force and speed, meaning the DV+ is faster AND more reliable than the factory diverter!

When it comes to holding boost, the DV+ has another trick up its sleeve. When the solenoid is off and the plunger is closed, there is equal pressure on both sides of the piston. BUT, the area the pressure acts on is about 25% LARGER on the back of the piston than the front. This area differential means that boost pressure actually blows the DV+ piston shut, so it doesn't matter how much boost you run, the DV+ will never crack open when it's not meant to.

When the solenoid activates and retracts the plunger, the pressure on the back of the piston is relieved, which allows boost pressure on the front to blow the piston open against the spring. This operation method means that unlike the factory diverter, the DV+ can open and close progressively in response to the amount of boost pressure it needs to relieve. If there's no boost, it won't open even if the ECU tells it to. If there is boost, the DV+ will only open as long (and as far) as required. It will close itself as boost pressure drops, where under the same conditions the factory diverter would remain open. The result is less turbo lag, because the valve is not opened unnecessarily.

This is the basis behind GFB's TMS principle, which is this; turbo lag is minimised when the valve only vents just enough air to prevent compressor surge – the graph opposite illustrates the reduction in lag after a gearshift.

To read more about the TMS principle, visit our website: [www.gfb.com.au](http://www.gfb.com.au)



## WHAT TO EXPECT FROM YOUR DV+

The DV+ is designed to offer three key improvements over the OE diverter:

**Longevity:** The DV+ will outlast any version of the factory diverter. If you've ever replaced a factory diverter, chances are it won't be your last. Fitting a DV+ is good insurance and pays for itself after one or two factory diverter replacements.

**Boost holding:** There are a number of revisions of factory diverter valves, each with their shortcomings. The diaphragm types typically seal well, until they begin to fail - which is almost assured on a tuned engine. The piston-type revision D and later model C valves are not as fragile, but their ability to seal ranges dramatically from average to terrible, even when brand new.

The DV+ will seal properly even up to 50psi, ensuring all of your hard-earned boost gets to the engine. Of course, the performance benefits you notice from the driver's seat will depend entirely on the condition of the factory diverter you replace. For example, if your factory valve is not (yet) leaking significantly, there will be no change to your peak boost.

However, if your factory diverter is leaking only a small amount, a DV+ may show the same peak boost, but with an improvement in the amount of boost held to redline. If your factory valve is leaking significantly, fitting the DV+ will result in higher peak boost pressure, as well as less drop-off at high RPM.

**Throttle response:** When using the DV+ with the main spring installed, it will preserve as much boost pressure as possible when the throttle is lifted. This means that when you lift off to shift, or when using slight on-off-on throttle modulation, the DV+ can help recover boost faster.

What the DV+ can't do however, is create more boost, or cause the turbo to spool faster. Quite simply, whatever boost the turbo makes, the DV+ will deliver to the engine, and it will also preserve as much boost pressure as possible during a brief throttle lift-off, which is where the faster boost recovery comes from. If there is no boost to preserve, or if boost still drops off at high RPM, that is simply highlighting the limitations of the turbo.

## WARRANTY

### **WARNING:**

GFB recommends that only qualified motor engineers fit this product. GFB products are engineered for best performance, however incorrect use or modification may cause damage to or reduce the longevity of the engine/drive-train components.

### **GFB LIFETIME WARRANTY:**

Our commitment to quality means that when we put our name to something, we are also staking our reputation on it. That's why we back our products with the best warranty in the business!

You should expect a lifetime of use from a well-engineered product, so if your GFB product fails as a result of defective materials or faulty workmanship whilst you remain the original owner, we will repair or replace it (limited only to the repair or replacement of GFB products provided they are used as intended and in accordance with all appropriate warnings and limitations. No other warranty is expressed or implied).

If a fault occurs as a result of usage outside of the terms of the warranty, or you are not the original owner, fear not, we can still help you. You should never need to throw a GFB product away, as spare parts are available and won't cost the earth.

### **TECH SUPPORT:**

We want you to get the best advice, first time. That's why our engineers are available to answer any technical questions you may have. Head to [www.gfb.com.au/contact-us](http://www.gfb.com.au/contact-us) to get in touch.