

Product Name: **vIWG Universal Actuator & Borg Warner**
 Product Description: vIWG Universal Actuator & Borg Warner
 Product Number: TS-06XX-XXXX
 Document Version: V1.00 Rev A



IMPORTANT NOTES ON YOUR VACUUM INTERNAL WASTEGATE

- Turbosmart accepts no responsibility whatsoever for incorrect installation of this product which is potentially hazardous and can cause serious engine damage or personal injury.
- The Vacuum Internal Wastegate (vIWG) is designed as a factory replacement for Vacuum operated turbocharger applications.
- Ensure the engine is **cold** prior to installation.
- Consult your local specialist before setting your desired boost pressure, setting boost beyond your engines capability may result in engine damage.
- The universal range is not vehicle/application specific. The range is not supplied with a bracket or a clevis. The thread on the rod is 1/4" UNF 28 TPI. The product is supplied with a single 1/4" nut.
- Allow for adequate cool airflow around the top diaphragm housing

RECOMMENDATIONS

- Turbosmart recommends that your vIWG is fitted by an appropriately qualified technician
- The vacuum IWG requires the wastegate be set at certain Vacuum pressure to operate correctly. Vacuum Pumps are not usually apart of a basic tool set.
- Turbosmart recommends that boost pressure is set using a Dynamometer and not on public roads.
- Turbosmart recommends that a boost gauge be permanently fitted to the vehicle.
- Turbosmart recommends that the engines Air/Fuel ratio is checked while setting the desired boost pressure, as any increase in boost pressure can cause the engine to run "LEAN", resulting in possible engine damage.

KIT CONTENTS



Please check that the following items have been provided in your Vacuum Internal Wastegate packaging

Part	Description	Use
1	Turbosmart Vacuum Wastegate	Main unit
2	Turbosmart Sticker	
3	4 x M6 Nuts Bolts	Nuts required for installation

Figure 1 - Kit Contents



TOOLS REQUIRED

- Basic Socket Set
- Vacuum Operated hand pump

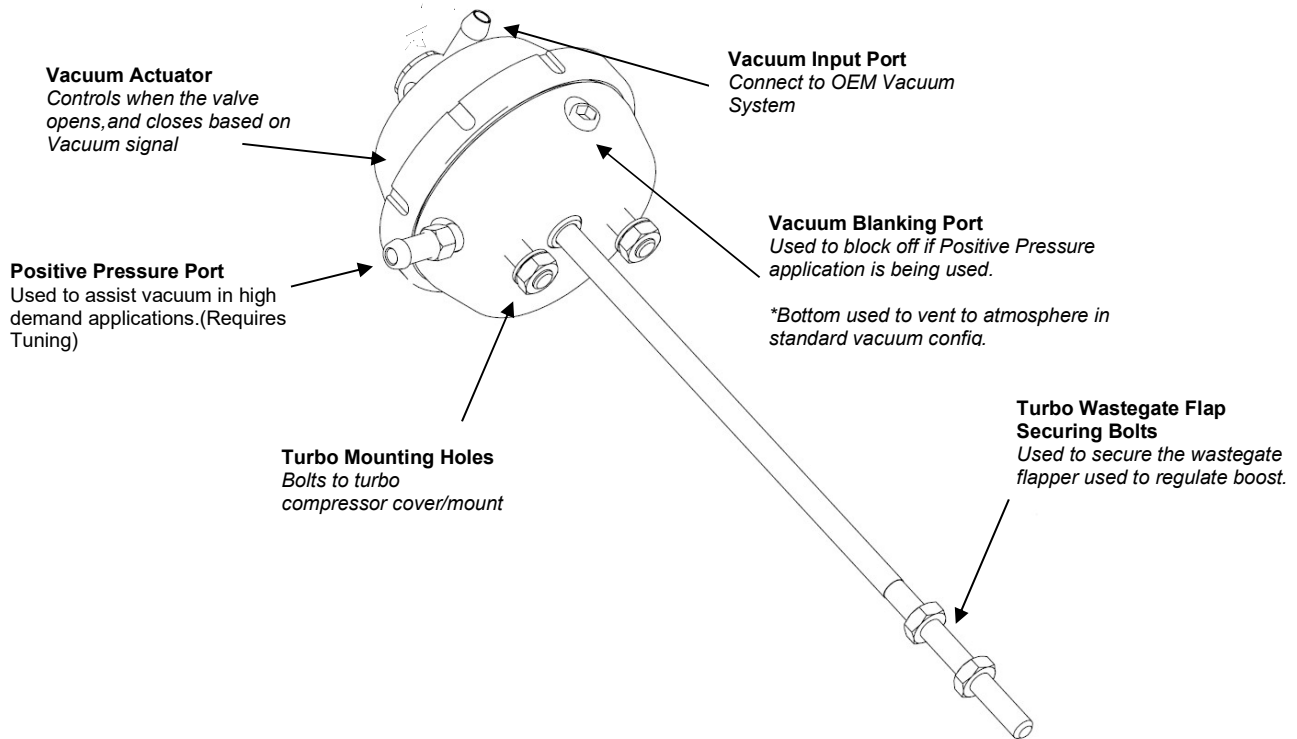
ABOUT YOUR VACUUM INTERNAL WASTEGATE

Turbosmart Upgraded Vacuum-operated Wastegate Actuators have been developed to provide maximum possible boost response for your factory frame turbocharger. The Turbosmart vIWG Series of upgraded Actuators benefit from an increased 'Working Ratio' over the factory equipment resulting in improved boost response, throughout the RPM range.

This Improved 'working ratio' is achieved through an increase to the effective surface area of the diaphragm & revisions to the actual springs fitted resulting in greater leverage of the forces the actuator is working against (boost and backpressure) while still being super-responsive.

Upgrading with the same base pressure as factory, you can expect a broader boost & torque curve through peak boost being achieved earlier in the RPM and being held longer, into higher RPM. These improvements can be amplified with higher base pressures, however tuning & recalibration is recommended for optimal performance

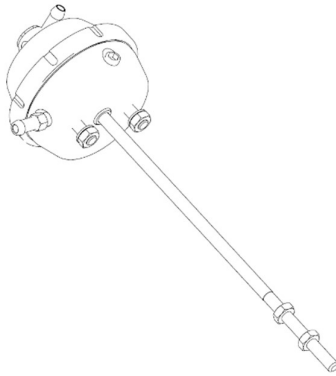
Figure 2 – Vacuum Internal Wastegate Overview
(Figure for illustration purposes only, actual product may vary slightly)



FITTING YOUR VACUUM INTERNAL WASTEGATE

1 Identify OEM Wastegate Actuator location

The Wastegate Actuator valve is located on the compressor cover of the turbo. It may require some components to be removed for ease of installation.



NOTE!

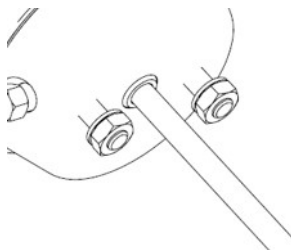
It may be required to remove auxiliary components to access the Vacuum Wastegate Actuator, ensure you consult your local specialist or a service manual for correct disassembly procedures.

Ensure the engine has cooled down to ambient temperature before proceeding.

2 Removing and Fitting Vacuum IWG

The Vacuum IWG has been designed as a direct swap for the OEM component. Therefore we must remove the original Vacuum Actuator from the car, removing the type of clevis as well as the bracket that it is fitted to the vIWG.

We must then fit the Vacuum IWG to the bracket that is supplied on the car using the two 10mm bolts with washers that are supplied. These are to be torqued to 6.5Nm (4.79ft-lb)



3 Determining Vacuum Pressure

It is important that the Vacuum Actuator is set up correctly. To do this correctly we need to understand the vacuum requirements that the manufacture has set for their engine. This can be found online usually. Failing that, we can check the pressure required for the Vacuum actuator to bottom out. This is the actuator completely closed on the seat of the rear turbine housing. A Mitty Vac pump is great way to determine this pressure.

Once this pressure has been determined setting the valve to seat on the rear turbine housing for that pressure.

4 Achieving your Target Boost Pressure

Once the actuator has been set correctly to the correct pressure. We can adjust the rod to reach the correct pressure. It is important to log these factors. Such as Boost Aim and Boost Pressure as well as Wastegate Duty Cycle.

Over-boosting

The wastegate flapper arm is bottoming out on the rear turbine housing too soon. we can fix this by lengthening the rod.

Under-boosting

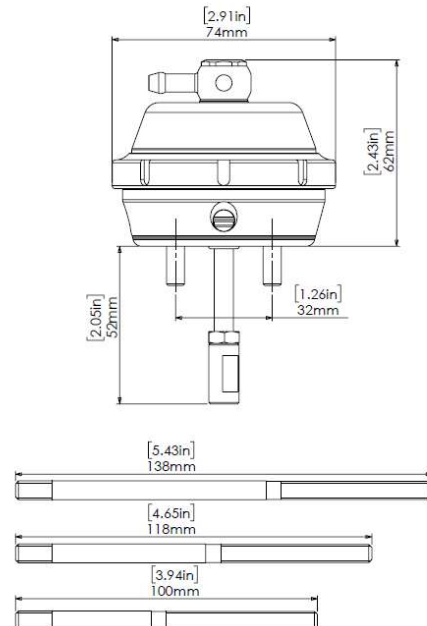
The wastegate flapper arm isn't sealing correctly on the rear turbine housing and not allowing the turbo to build boost. We can fix this by shortening the rod.

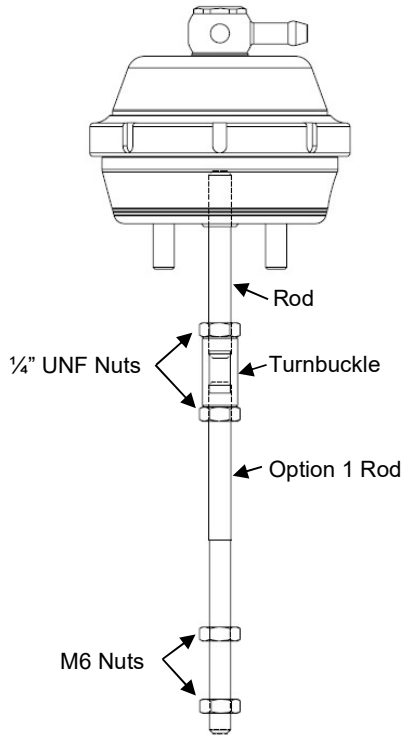
6 OPTIONAL Borg Warner Rods

Borg Warner Framed Turbo chargers are classified by Turbosmart over three rod lengths.

Correctly set the rod length by reviewing the previous actuator for the length.

Once selected we must use the turnbuckle and another 1/4 UNF nut to connect the rod to the actuator.





As seen above, we have two 1/4 inch UNF nuts that are holding the turnbuckle to the three selectable rods.

5 Completing your Install

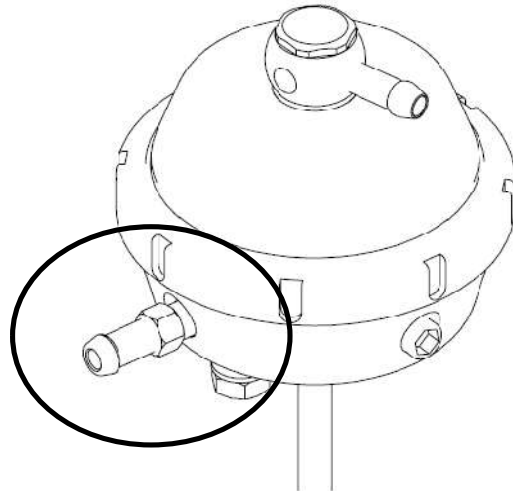
Once completed we can double check that all fittings are tighten to the correct torque, if a Vacuum pump is available, we can test the operation of the wastegate through its range of motion.

Congratulations, your Turbosmart vIWG is installed and ready for use. Double check all connections and mounting screws. Start your engine and check for leaks.

7 OPTIONAL Positive Pressure Assistance Plumbing

The vIWG can be used with Postive Pressure assistance. This is located by the black circle. We can use positive pressure that is controlled by the ECU to assist the vacuum system(Top Port) from not being overcome.

The grub screw must be used in this application to allow for pressure to be maintained in the bottom port.



TROUBLE SHOOTING

- **It is important that any issues are resolved before heavy driving.**
 - Car feels sluggish, rod length and pressure required to seat flap is incorrectly set. Ensure correct pressure is achieved to fully seat.
 - Car over boosts, the exact same as above, the rod is set at a pressure too low allowing for it to close before commanded.
 - Failing the above, submit a technical request to tech@turbosmart.com.au with information of your engine configuration and photos of installation.
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