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INSTALLATION MANUAL

AEROFLOW PERFORMANCE

EXTERNAL WASTEGATE

WARNING!

BEFORE PROCEEDING WITH INSTALLATION PLEASE READ INSTRUCTIONS CAREFULLY. THIS PRODUCT REQUIRES DETAILED KNOWLEDGE OF AUTOMOTIVE SYSTEMS. WE RECOMMEND THAT THIS INSTALLATION BE CARRIED OUT BY A QUALIFIED AUTOMOTIVE TECHNICIAN.

Use caution when working on a hot engine. Wastegate and turbocharger components are EXTREMELY HOT and can cause severe burns.

Fitting this wastegate may require fabrication or modification to your exhaust manifold.

This wastegate is designed for use with a turbocharger that does not have an internal wastegate.

Aeroflow Performance 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.

Aeroflow Performance recommends that boost pressure is set using a dynamometer and not on public roads.

INTRODUCTION

Congratulations on your purchase of Aeroflow Performance 38mm external wastegate. Aeroflow Performance products cannot and will not be responsible for any damage, or other conditions resulting from misapplication of the parts described herein. However, it is our intention to provide the best possible products for our customer, products that perform properly and satisfy your expectations. Should you have any questions? Please call technical support at +61 2 8825 1900 and have the product part number on hand when calling.

Aeroflow Performance wastegates are designed to control the turbochargers boost by bypassing turbine inlet exhaust gas via a spring-loaded valve diaphragm assembly. Spring rate, in conjunction with boost pressure signal and back pressure, control the opening point of the wastegate valve. Once the spring rate has been overcome, the valve will open. This causes exhaust flow to be diverted away from the turbine side of the turbocharger, effectively slowing and/or stabilizing the turbines wheel speed. This stabilization results in a smooth and steady boost pressure level, created by the compressor wheel of the turbocharger. Open pressure of the valve can be controlled via spring rate and or a boost controller, such as a manual boost controller or an electronic boost controller.

Aeroflow wastegates feature an internal valve constructed from high temp NiCrFe based alloy. Other features include a high temperature silicone nomex reinforced actuator diaphragm and stainless-steel actuator springs that delivers consistent boost pressure at high temperatures. Nitronic stainless steel is used for the valve seat and valve bushing which all offer longer product life at extreme temperatures.

Aeroflow Performance wastegates feature water cooling ports (2 x M8x1.0mm) for those heavy-duty applications. These are optional and can be disregarded if not required. There are also three lower air pressure ports and two top air pressure ports (5 x M10x1.00mm) for easy installation this eliminates the need to rotate the actuator top hat, two stainless steel plugs and gaskets are included for unused lower air ports. Included in the kit for the water cool ports are two stainless steel fittings and gaskets to a -4AN, for the air ports two fittings and gaskets to -4AN both are stainless steel. Two banjo bolts in stainless steel and alloy banjos with gaskets are included for a barb option to use a rubber/silicone 6mm vacuum hose.

Aeroflow Performance wastegates come pre-set to 1 bar (14.7 PSI). This can easily be altered by purchasing and installing springs from Aeroflow's accessory spring range. The wastegate also includes required stainless steel hardware for installation which includes: valve seat, inlet V-band clamp/flange and outlet V-band clamp/flange.

INSTALLATION RECOMMENDATIONS

- Be sure to install the valve seat into the body of the wastegate before final installation.
- Tighten the supplied V-band clamp bolts to 10Nm (**do not overtighten**)
- In order to assure proper boost control, this wastegate needs to be mounted at a smooth transitional angle with the exhaust flow. 90° mounting onto exhaust tubing is not recommended. The inlet fitting should be welded to the exhaust manifold after all the exhaust runners have merged, and in a position that promotes smooth flow to the wastegate – fast-moving exhaust gas is reluctant to make sharp turns, which significantly reduces the flow potential through the wastegate.
- Inlet and Outlet flanges are constructed of, 304 stainless steel and are compatible with most stainless steel and mild steel welding rod material.
- It is recommended to secure all vacuum and boost control hoses securely with zip ties or cushioned clamps. Route all vacuum hoses away from high heat sources such as the turbine housing and exhaust manifold. Aeroflow Performance recommends the use of braided lines and fittings for extra protection against heat sources along with stainless steel fittings on the wastegate.

BOOST CONTROL RECOMMENDATIONS

There are many different ways to connect the wastegate boost ports. Whilst it is possible to use any number of different methods that are not listed below, you should always remember the following:

- The lowest boost pressure possible is determined by the spring
- The lowest possible boost pressure for a given spring combination is achieved when the full boost pressure is applied to the lower actuator port, and none to the upper port
- Boost pressure increases when you decrease the pressure at the lower port and/or increase the pressure at the upper port
- If no boost controller is being used connect the boost pressure source (often found on a port between cylinder head intake ports & throttle body) to one of the bottom air ports on the wastegate. The boost only pressure source should be sourced from as close to the compressor side of the turbo as possible. This configuration results in a boost pressure that is dictated by the wastegate spring – you must change the spring to alter the boost level you wish to run.
- The unused upper actuator port should be left open to atmosphere, but if there is a chance that containments could enter into the upper port, either remove and rotate the cap, or connect a short length of hose to the nipple and route to a safe location.
- If a manual boost controller is to be used follow the no boost control option and tee piece the boost controller into the pressure hose from the bottom air-port of the wastegate. This will allow the boost to be easily increased above the base level. The controller does this by reducing the pressure getting to the wastegate - the more the controller bleeds off, the higher the boost.
- It is always recommended to consult the instructions of the brand manual boost controller you are using.
- If you are using an electronic boost controller with a mac valve you should consult your brands boost controller instruction manual for specific information on how each of the ports of the solenoid valve should be connected.

WASTEGATE SPRING SELECTION

The Aeroflow Performance wastegate has a variety of springs to suit different boost levels. Pre-installed with 1 Bar (14psi). Different spring combinations may be required to suit different boost requirements and tuning which are sold separately please refer to chart for more information on these springs. The tuner can use combinations of up to 3 springs to achieve the base boost pressures required. To aid in the identification of these springs they are colour coded. When selecting your spring rate, the total boost psi pressure is determined by adding the spring rates together.

Wastegate spring selection will determine the minimum and maximum boost pressure that you want to run, and your control method. Care should be taken when selecting boost pressures until the engine can be run on a dyno to ensure safety. Always consult an expert when making boost changes, and it is recommended that the car be checked on a dyno, as high boost and/or lean air/fuel mixtures can cause engine damage or worse, total failure.

The lowest boost your car can run is determined by the spring installed, and boost can then be increased through the use of a boost controller. It is recommended to select springs so that your maximum boost is no more than double the spring that is installed into the wastegate. Whilst it is possible to increase boost beyond this, you may find that boost becomes less stable and harder to control. This is because the boost controller must bleed most of the control pressure signal to the actuator, so the wastegate is less able to self-correct for changes in manifold pressure.

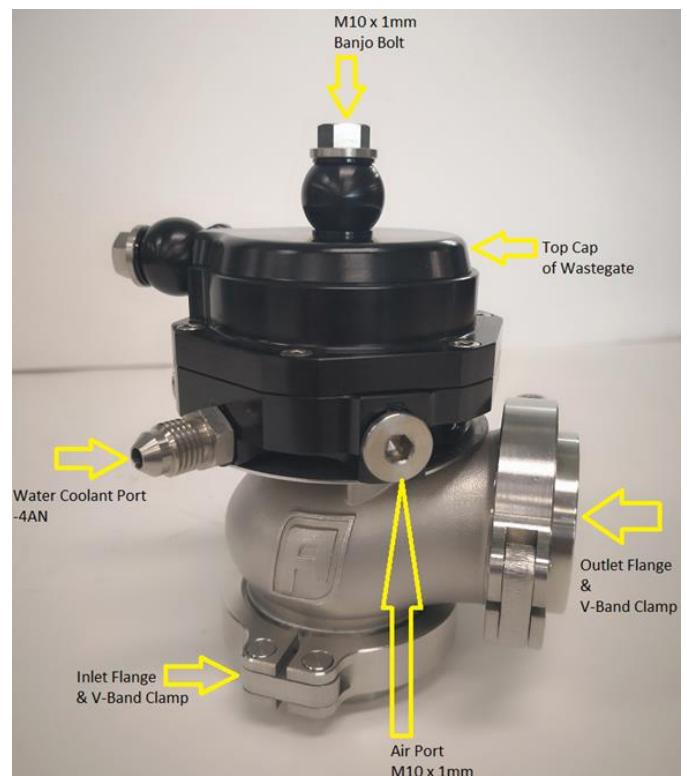
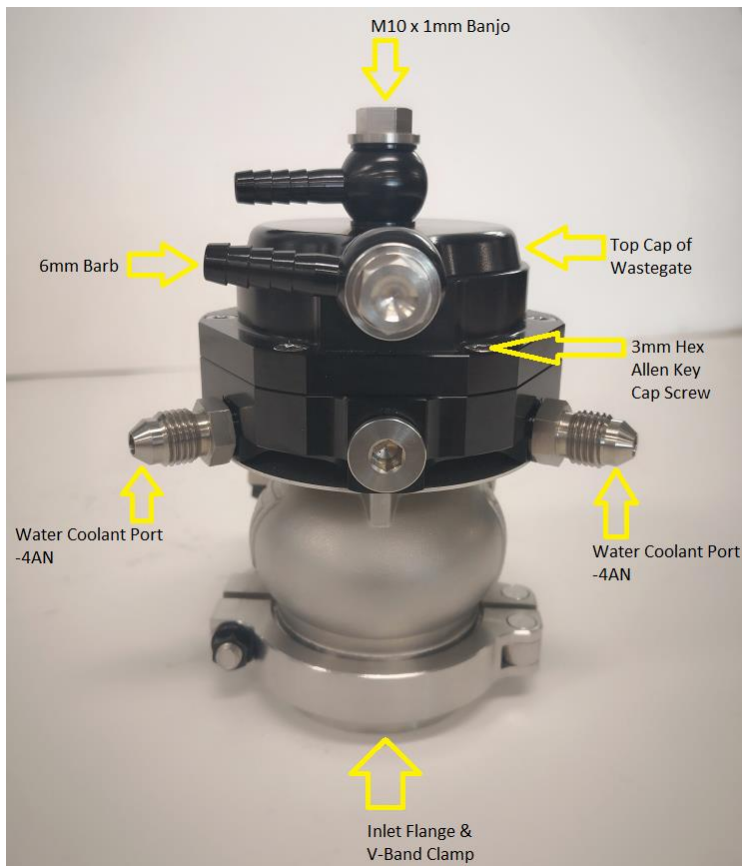
WARNING !

It is recommended to reduce your boost controller back to its minimum setting, and monitor your new minimum boost level with the new spring or springs, before increasing your boost pressure. Failure to do so can lead to severe detonation and engine damage. Any damage incurred, as a result of detonation from excessive high boost levels or improper installation is the customer's responsibility. Aeroflow Performance recommends that the air/fuel ratio be checked while setting the boost levels, as raising your boost levels will change your air/fuel ratio of your tune up and could cause engine detonation or damage.

CHANGING THE WASTEGATE SPRING

1. Remove boost pressure source hose from the wastegate as well as the breather hose if fitted.
2. Remove the wastegate from the exhaust manifold. Use CAUTION! The wastegate may still be HOT! We recommend to allow the vehicle to cool down before attempting this spring change.
3. The use of a press or vice may be used to hold down the wastegate top cap while loosening the bolts as the top cap is under the high spring tension. Ensure to use all safety gear necessary during this procedure.
4. Using a 3mm hex allen key, remove the six hex key cap screws that secure the billet aluminium top to the wastegate.
5. Remove the cap slowly, using care to secure the spring/springs upon removal.
6. Remove the spring/springs from the wastegate. Determine which spring/springs you will be installing. A spring chart is located at the end of these instructions. Install the spring/springs into the wastegate, on top of the diaphragm ensure they sit into the corresponding grooves in the wastegate. Use care to ensure that you do not to tear or scratch the diaphragm.
7. Visually align the bolt holes of the top cap and wastegate base. Now compress the wastegate top cap until it is seated with the wastegate base. Make sure that the bolt holes are aligned before tightening. It may be necessary to rotate the wastegate top cap to align the bolt holes. If needed, relieve tension on top, rotate and recompress. Once bolt holes are aligned, install the six 3mm hex head cap screws. Tighten the cap screws in a criss-cross pattern to 6Nm.

WARNING: Make sure that the lip of the diaphragm is not pinched between the top cap and the wastegate base



SPRING COLOUR		DARK GREEN	YELLOW	LIGHT BLUE	RED	WHITE	BLACK
PART NUMBER		AF9552-1102	AF9552-1101	AF9552-1104	AF9552-1103	AF9552-1106	AF9552-1105
FREE LENGTH		62.80mm	64.70mm	87.74mm	91.00mm	92.11mm	102.90mm
OUTSIDE DIAMETER		28.80mm	29.25mm	38.30mm	37.70mm	47.80mm	48.30mm
SPRING PRESSURE		6 PSI (0.41 BAR)	10.10 PSI (0.69 BAR)	11.20 PSI (0.77 BAR)	7.80 PSI (0.53 BAR)	10.30 PSI (0.71 BAR)	12.60 PSI (0.87 BAR)
SPRING LOCATION		INNER	INNER	MIDDLE	MIDDLE	MIDDLE	OUTER
SPRING COLOUR		DARK GREEN	YELLOW	LIGHT BLUE	RED	WHITE	BLACK
PSI	BAR						
6	0.34	AF9552-1102					
8	0.55				AF9552-1103		
10	0.69		AF9552-1101				
11	0.76			AF9552-1104			
12	0.82						AF9552-1105
14	0.96	AF9552-1102			AF9552-1103		
16	1.1	AF9552-1102				AF9552-1106	
17	1.17	AF9552-1102		AF9552-1104			
18	1.24		AF9552-1101		AF9552-1103		
20	1.38				AF9552-1103		
21	1.44		AF9552-1101	AF9552-1104			
22	1.51		AF9552-1101				AF9552-1105
23	1.59					AF9552-1106	AF9552-1105
24	1.65			AF9552-1104			AF9552-1105
26	1.79	AF9552-1102			AF9552-1103		AF9552-1105
29	1.99	AF9552-1102				AF9552-1106	AF9552-1105
30	2.06	AF9552-1102		AF9552-1104			AF9552-1105
33	2.27		AF9552-1101			AF9552-1106	AF9552-1105
34	2.34		AF9552-1101	AF9552-1104			AF9552-1105



For more information or technical enquires

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