

Product Name: **PSG50V Vacuum Pneumatic Straight Gate**
 Product Description: PSG50V Vacuum Pneumatic Straight Gate
 Product Number: TS-0565-1212
 Document Version: V1.00 Rev A



IMPORTANT NOTES ON YOUR EXTERNAL 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 Straight external Wastegate is designed for use with a turbocharger that does not have an internal wastegate.
- Consult your local specialist before setting your desired boost pressure, setting boost beyond your engines capability may result in engine damage.
- Use only high-quality fittings ensuring maximum sealing reliability.
- Correctly setting up a sensible boost control strategy to ensure engine safety is highly recommended.

RECOMMENDATIONS

- Allow for adequate cool airflow around actuator.
- **DO NOT Mount the wastegate so that the actuator is less than 100mm from a heat source.**
- **DO NOT wrap the body of the wastegate with exhaust wrap.**
- **Fitting your Straight Wastegate may require fabrication or modification to your exhaust manifold. Turbosmart recommends that your wastegate is fitted by an appropriately qualified technician.**
- **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.**
- 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.

KIT CONTENTS

Please check that the following items have been provided in your Straight Wastegate kit.

Part	Description	Use	QTY
1	Turbosmart Straight Wastegate	Main unit	1
2	Inlet V-Band clamp	Inlet V-band clamp	1
3	Inlet Weld flange	Inlet V-band weld flange	1
4	Outlet V-Band clamp	Outlet V-band clamp	1
5	Outlet weld flange	Outlet V-band weld flange	1
6	Turbosmart Sticker	Turbosmart sticker	1

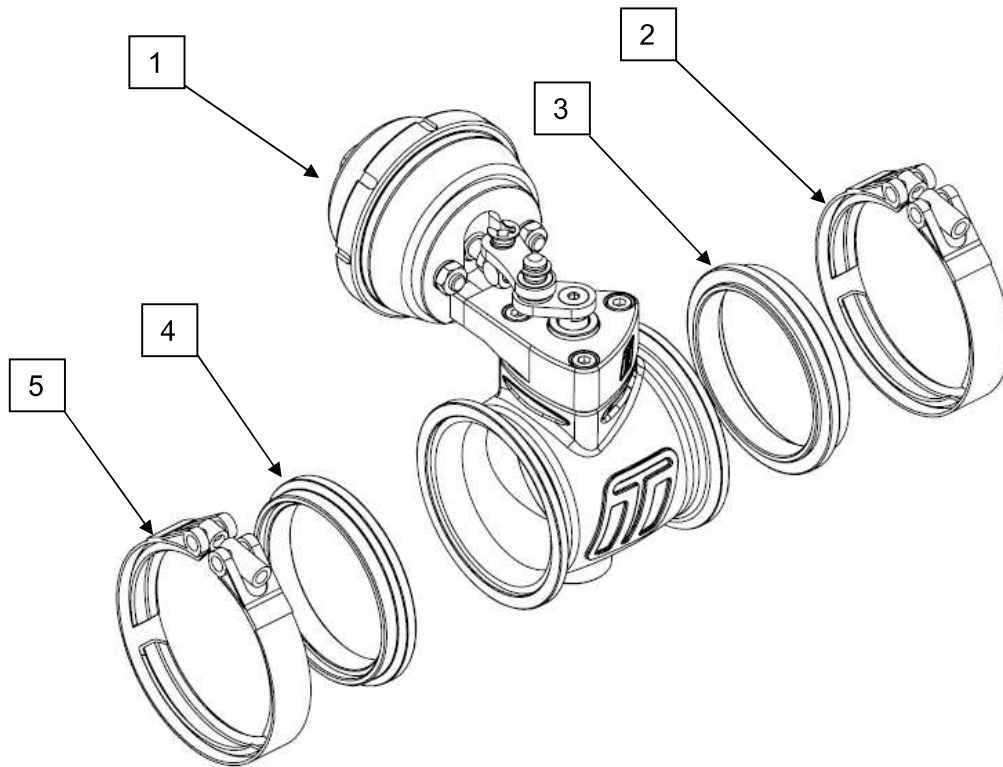


Figure 1 - Kit Contents

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TOOLS REQUIRED

- 3/8" square drive deep socket
- Square drive ratchet wrench
- Torque wrench (3/8" drive)
- Metric Allen Key set

PART NUMBERS

TS-0565-1712 = PSC50 Vacuum Pneumatic Straight Gate, 6psi Black
 TS-0565-1762 = PSC50 Vacuum Pneumatic Straight Gate, 6psi Black

STRAIGHT PNEUMATIC WASTEGATE OVERVIEW

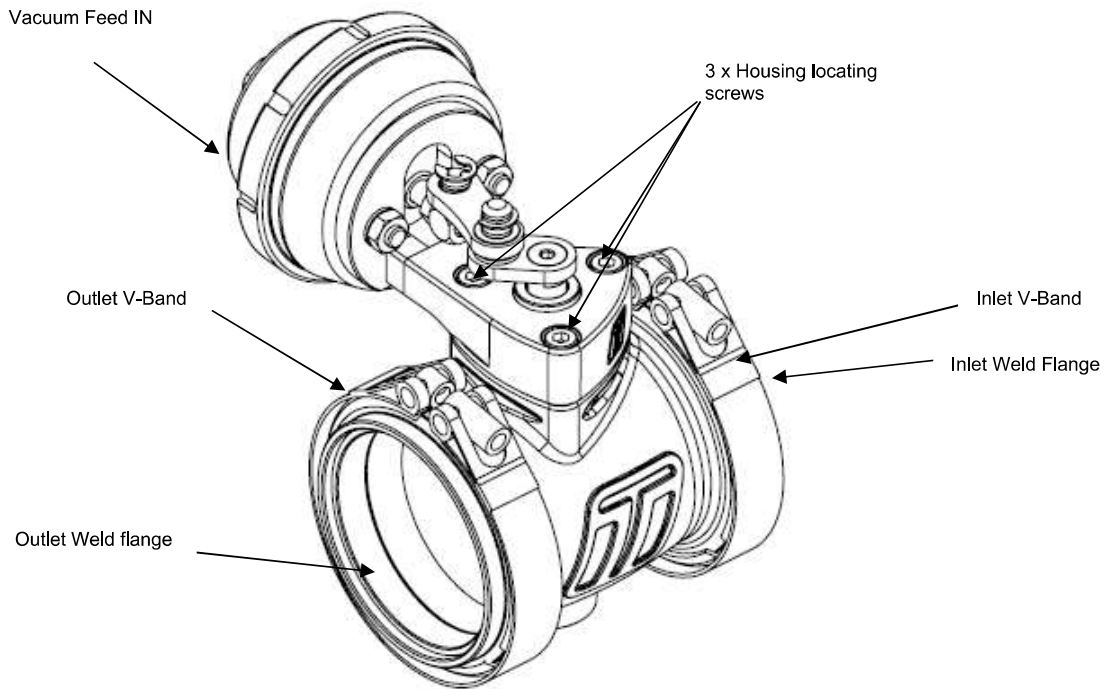


Figure 1 - Pneumatic Straight Gate Overview

FITTING YOUR PNEUMATIC STRAIGHT GATE

1 Mounting your new Pneumatic Straight Wastegate

The weld flanges should be welded to your exhaust system. The weld flanges are compatible with Stainless Steel and Mild steel welding rod material.

The Straight Gate utilises WG60 Outlet Flanges to connect the Pneumatic straight gate to exhaust manifolds.

For best results, an attempt should be made, if space allows, to mount the Straight Gate at an angle to the exhaust flow to allow for better flow than a 90-degree mounting. See the schematic diagrams below for examples of mounting positions.

NOTE!

The Straight Gate can be used in both directions. Both directions will regulate the same. It is advisable however to place the Butterfly Valve pins exhaust side up.

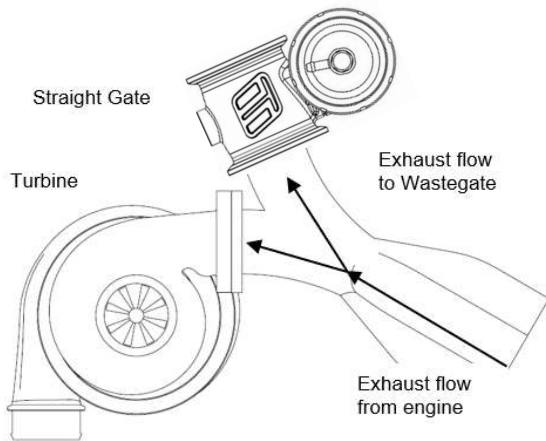


Figure 4 - Best flow - Symmetric mounting

Symmetric mounting allows an excellent flow of exhaust to the Straight Gate.

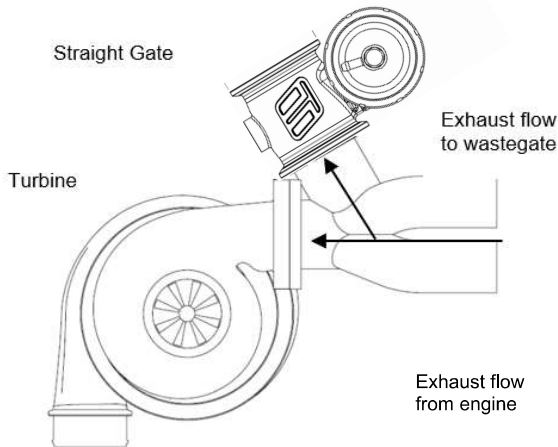


Figure 5 - Good Flow - Angle mounting

Angle mounting allows a good flow of exhaust flow to the Straight Gate.

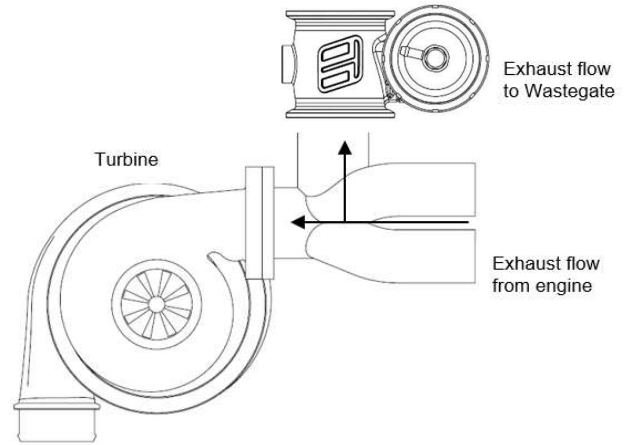


Figure 6 - 90 Degree mounting

90 Degree mounting gives poor exhaust flow to the Straight Gate and in some circumstances may contribute to over boosting.

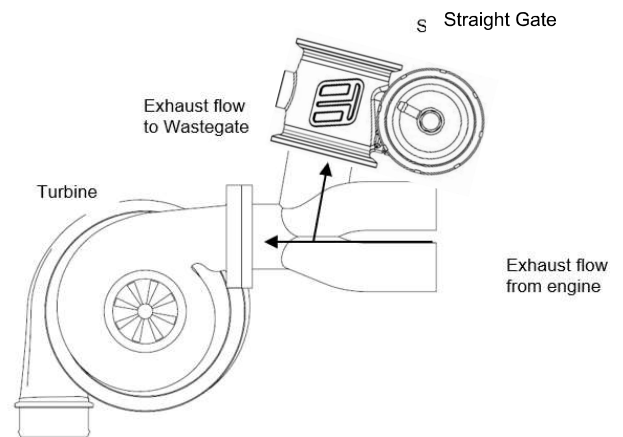


Figure 7 - Not Recommended - Less than 90 Degree Mounting.

An angle mounting as shown in not recommended and gives extremely poor exhaust flow to the Straight Gate which can contribute to poor boost control and over boosting.

CAUTION!

Do not place the Straight Gate near a significant heat source as this could shorten the life of the internal actuator.

2 Fitting the Pneumatic Straight Gate

Even though possible to mount the Straight gate in both directions, it is suggested that the Butterfly valve pins (Figure 8) are facing towards the exhaust exit.

3 Clocking Actuator Housing

The actuator can be removed and rotated through 3 different orientations; these are every 120 degrees. The actuator 3 x M5 Allen bolts that lock the body to the actuator. It may be

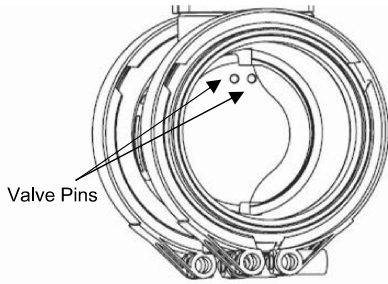


Figure 8 – Butterfly Valve Pins

Before mounting the Straight Gate, place v-band (Figure 10) far out as possible and then squeezing the bolt in a syringe motion to expand the v-band (squeeze the dots together below). Once the v-band is in its fully expanded position, slide the v-band over the flange to allow for the wastegate to be installed.

Using the 3/8" deep socket and a torque wrench Tighten the V-Band to 7N.m (5 ft/lbs). Ensure the wastegate is home correctly while torquing the nut to not have a false torque as this will likely contribute to exhaust leaks.

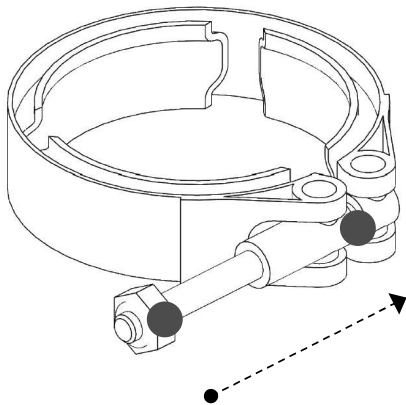


Figure 10 – V Band Clamp

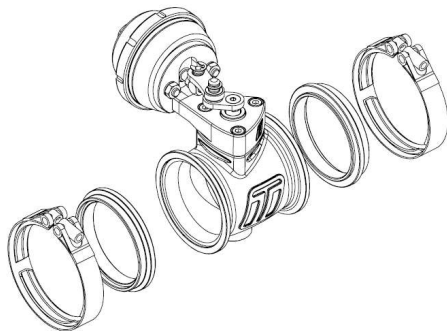
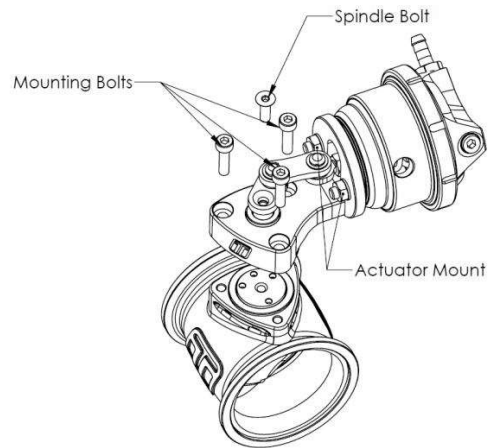


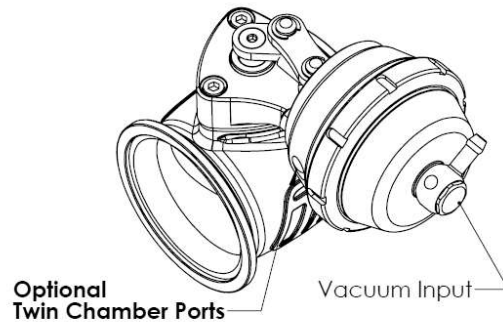
Figure 11 – Exploded drawing of assembly of Pneumatic Straight Gate.

required to remove the snap ring ensuring not to lose it. And one Spindle Bolt that locate the linkage to the shaft. Once these are removed the actuator can be rotated to two other po



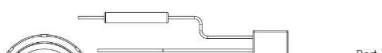
4 Connecting Your Wastegate

The Vacuum Wastegate is plumbed up utilising the top swivel nipple. This source is connected to an adjustable vacuum pressure source used to control the boost. The standard hook-



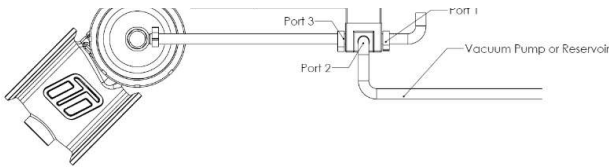
5 Top Port

- Port 1 - Vent
- Port 2 - Vacuum Pressure In
- Port 3 – Top Port



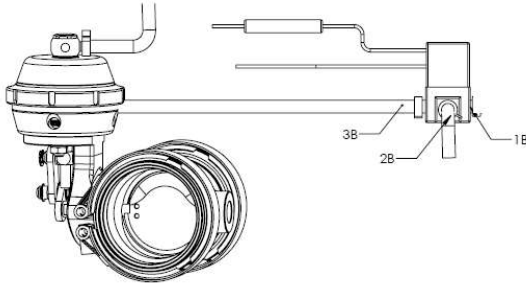
6 Flow Characteristics

Due to the nature of the butterfly valve design, the flow characteristics are nonlinear. In some cases, it may be advantages to correlate the linear sensor output to match the flow of the valve. The following plot compares butterfly valve position with valve flow. A 3rd order polynomial is provided to relate valve position to flow.



IF REQUIRED Bottom Port

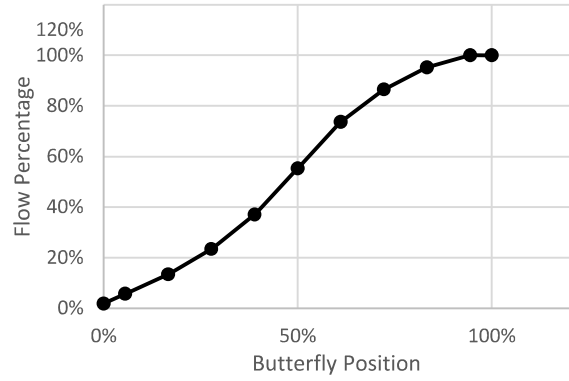
- Port 1B - Vent
- Port 2B - Boost Pressure IN
- Port 3B – Bottom Port



Ensure all connections are high quality and away from any heat source.

$$y = -2.1519x^3 + 3.0586x^2 + 0.0582x + 0.0326$$

$$R^2 = 0.999$$



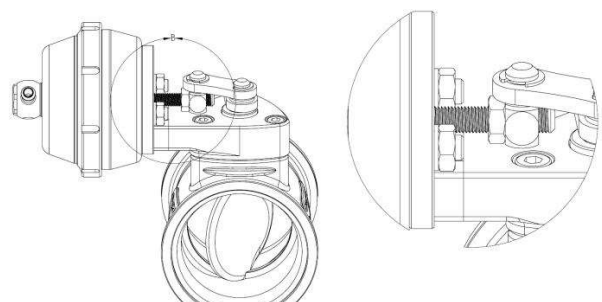
Butterfly Position	Flow Percentage
0%	0%
3%	3.7%
6%	4.7%
10%	6.7%
20%	14.9%
30%	26.7%
40%	40.8%
50%	55.7%
60%	70.4%
70%	83.4%
80%	93.5%
90%	99.4%
100%	100.0%

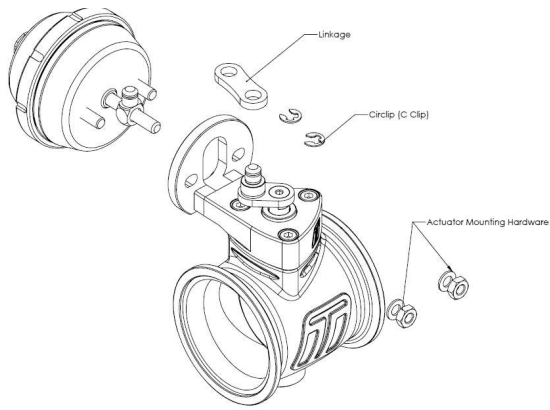
4 Checking/Adjusting Preload

NOTE!
Turbosmart sets preload from factory and should only need to be set after changing springs.

To correctly preload the wastegate, ensure wastegate valve is in the full closed position by applying vacuum to the valve to set preload.

To apply 1mm/0.039" preload, simply turn the adjuster nut 1





DETAIL B
SCALE 2:1

CAUTION!
This step is important

To lock the actuator in this position, turn the locking nut by hand until finger tight, then proceed to tighten nut firmly to secure actuator in place. (6.5Nm / 4.8 ft lb)

TROUBLESHOOTING

- Wastegate not actuating - Confirm signal hose is plumbed to a pressure only source, confirm preload during installation
 - Poor wastegate actuation - Ensure signal hose is not shared and is sourced as close to the compressor as possible, check seal on fittings
 - Poor wastegate actuation - Confirm no obstructions in actuator rod path
 - Boost creeping at high rpm - Wastegate flow path is poor, wastegate is too small for the application, ensure linkage joints are not seized
 - 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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