Compressed Gas (CO2) Boost Gate - TS-026X-12X2

Important Notes on Your New Compressed Gas Boost Gate

- 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 compressed gas boost gate is designed for use with a forced induction engine. The boost gate bypasses some of the intake air flow(boost pressure)in order to control total boost delivered to the engine.
- 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. Optional Turbosmart fitting kit available.

Recommendations

- Allow for adequate cool airflow around the top diaphragm housing

- DO NOT Mount the boost gate so that the top diaphragm housing is less than 100mm from a heat source

- Fitting your compressed gas boost gate may require fabrication or modification to your intake piping. Turbosmart recommends that your boost gate is fitted by an appropriately qualified technician.

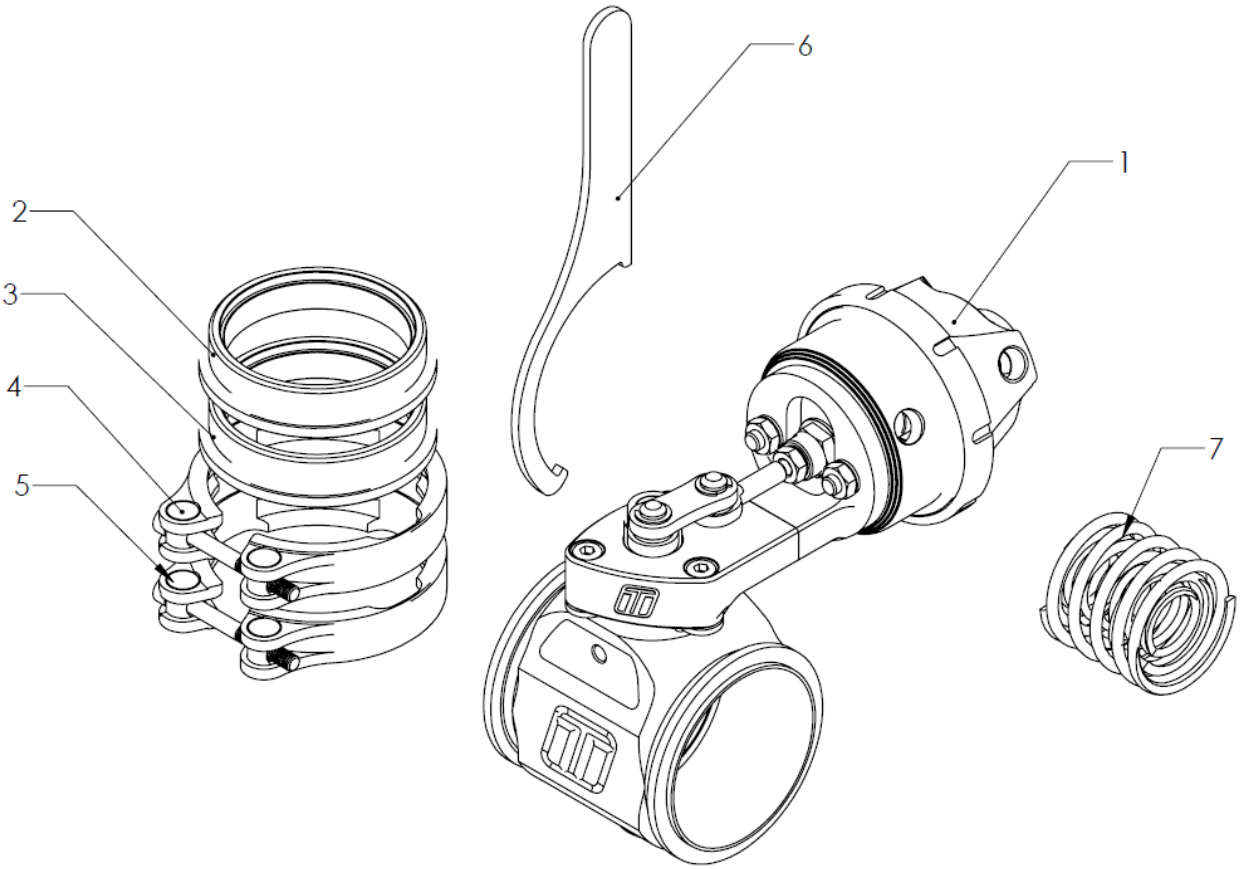
- Turbosmart recommends that the engines Air/Fuel ratio is checked while setting the desired boost pressure, as any increase in boost pressure can cause the engine to run “LEAN”, resulting in possible engine damage.

- 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

Part	Description	Use
1	Turbosmart Compressed Gas Boost Gate	Main Unit
2	Inlet Weld Flange	Inlet Weld Flange
3	Outlet Weld Flange	Outlet Weld Flange
4	Inlet V-Band Clamp	Inlet V-Band Clamp
5	Outlet V-Band Clamp	Outlet V-Band Clamp
6	Collar Tool	Collar Tool
7	Spring Kit	4 x Springs ** (1x Spring pre installed)**
8	Turbosmart Sticker	Turbosmart Sticker



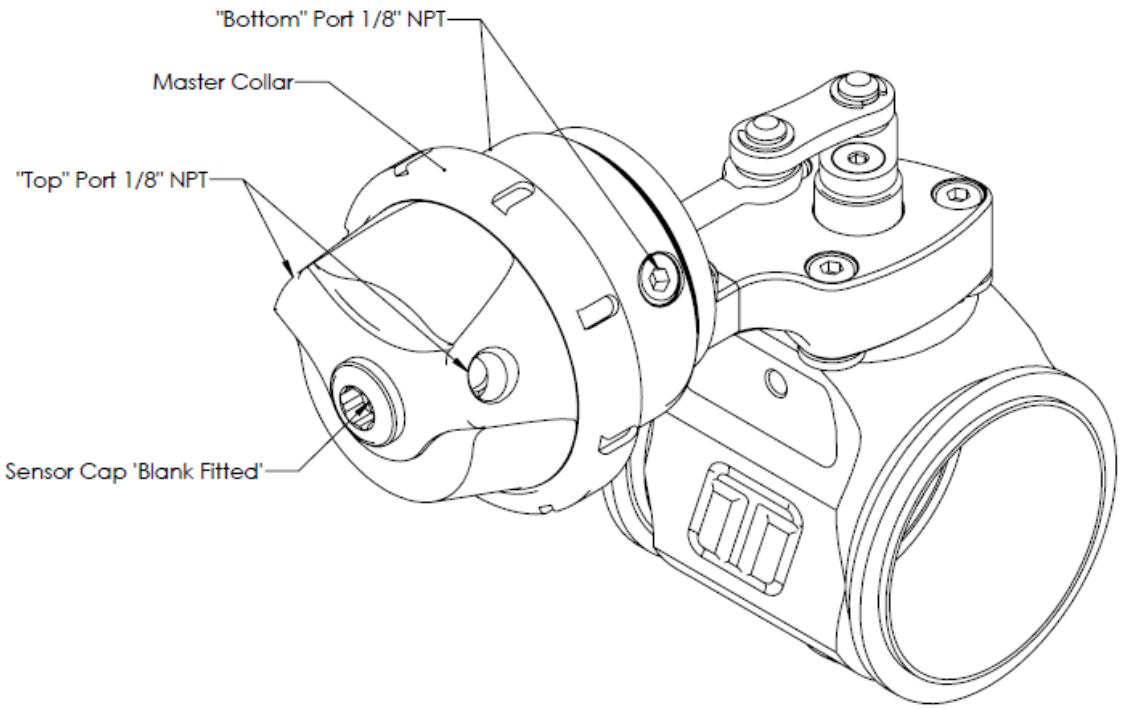
Tools Required

1. 3/8" square drive deep socket
2. Square drive ratchet wrench
3. Torque wrench (3/8" drive)
4. Non-marking spanners to tighten fittings
5. 3/16" hex key
6. Supplied collar tool
7. 14mm 12-point (double hex) socket
8. Flat blade screwdriver

SUGGESTED LUBRICANTS AND SEALANTS

1. Loctite 243 Thread locker
2. Loctite 567 Thread Sealant
3. Resbond 907TS Red
4. Penetrating oil

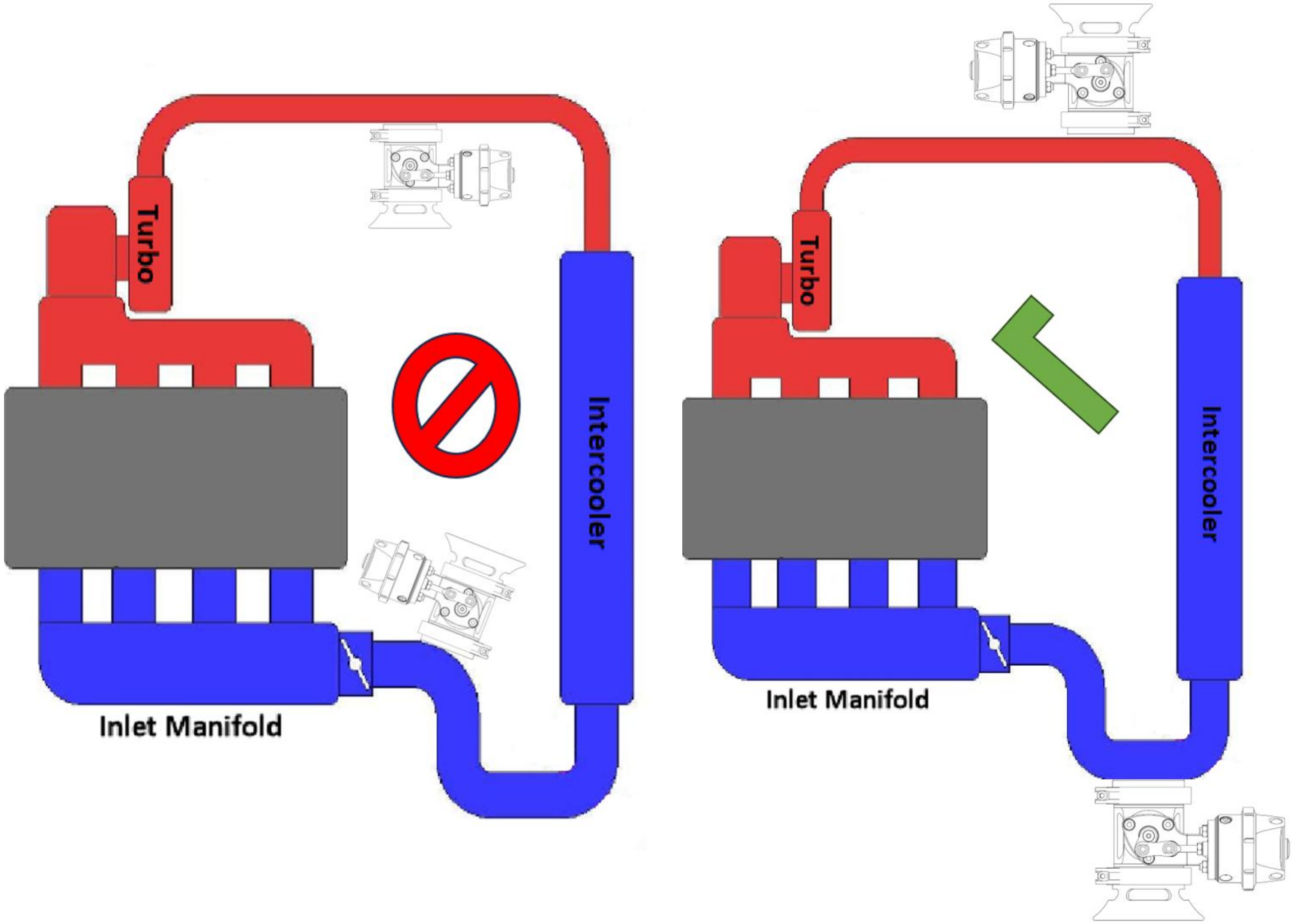
Compressed Gas Boostgate Overview (Pictured without Solenoids)



Fitting Your CO2 Boost Gate

Mounting your new Turbosmart Pneumatic CO2 Boostgate

The Weld flanges should be welded to your intake system. The weld flanges are compatible with aluminum rod material.
The Boost Gate utilises the Pro Port Weld Flanges, this allows for a straight swap over for engines running those blow off valves.

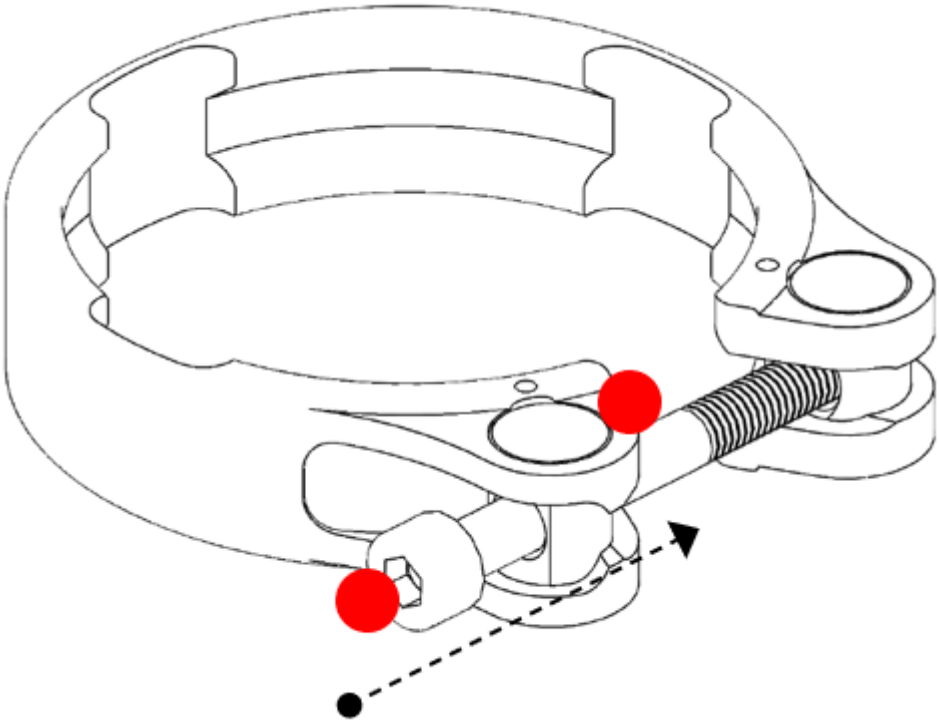

Turbo
Intercooler
Inlet Manifold
Turbo
Intercooler
Inlet Manifold

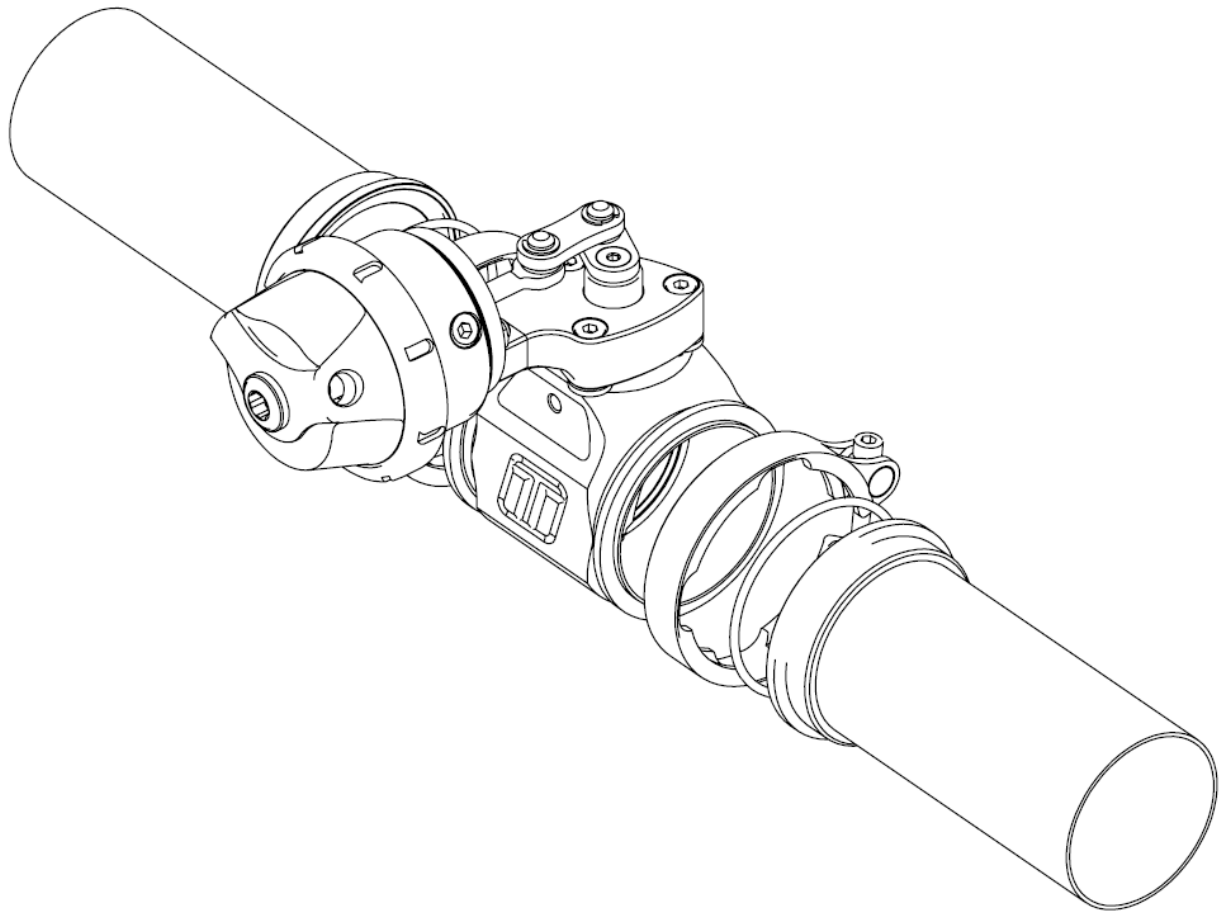
Do not place the actuator cap near a significant heat source as this could shorten the life of the diaphragm.

Fitting the Compressed Gas Boost Gate

Prior to mounting the Boost Gate, place v-band over weld on flange by unscrewing the nut on the v-band as 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 boost gate 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 boost gate is home correctly while torquing the nut to not have a false torque as this will likely contribute to exhaust leaks.





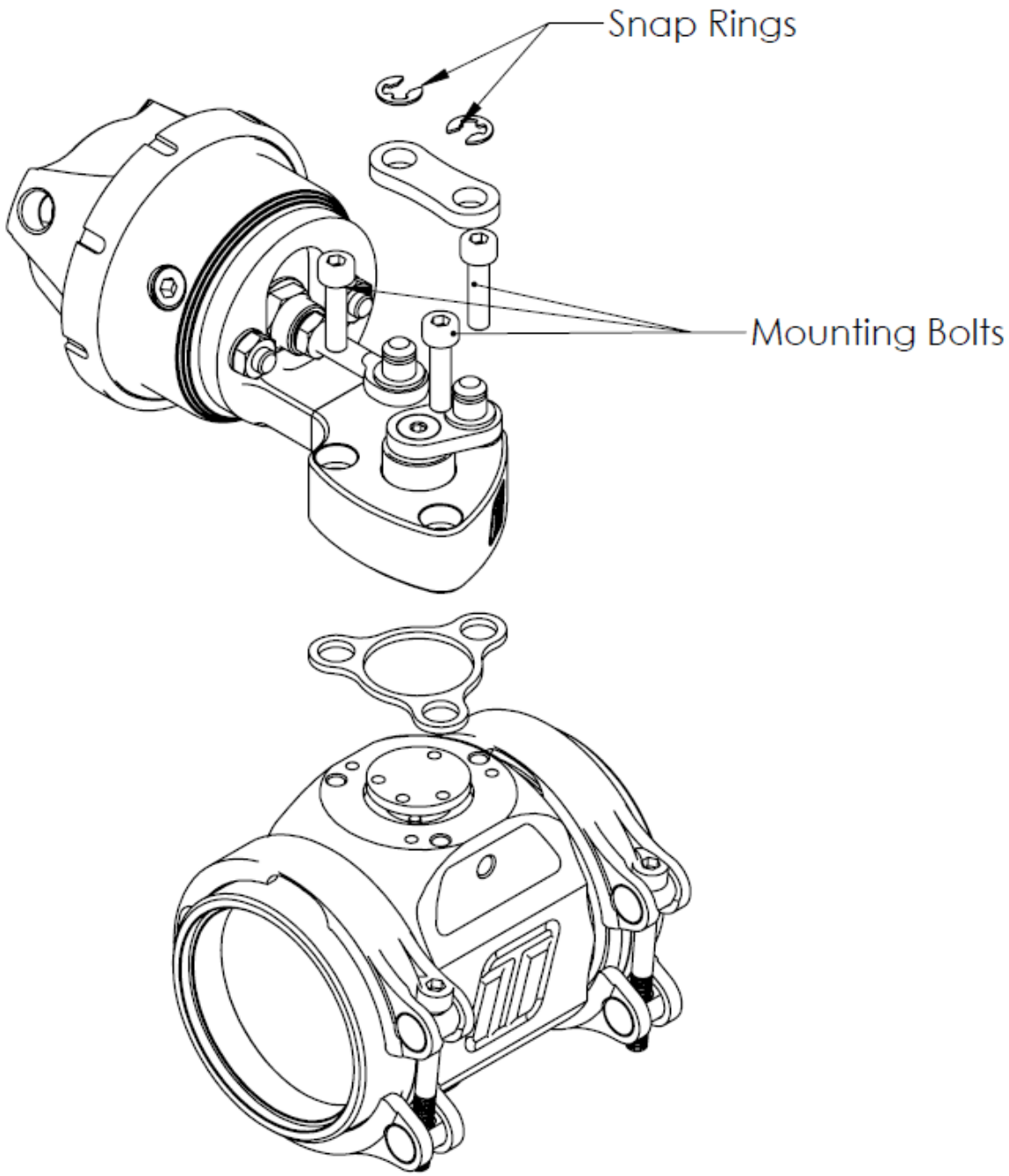
Fit Actuator Port Fittings

Fit lower chamber port fittings prior to mounting the boost gate, install 1/8” NPT blank with 3/16” hex key and signal nipple from boost pressure source into lower chamber ports. Port order or orientation is not important, select which suits your packaging requirements. Apply thread lubricant and screw in clockwise until finger tight, then tighten further 1-2 turns for seal. Congratulations, your boost gate is installed and ready for use. Double check all fittings, lines and mountings then proceed to start engine and check for leaks. See Compressed Gas Boost gate Hookup for further information on hookup.

NOTE! If you are unsure which port to install fittings into, please refer to ‘Boost Control Hookup’ section, refer to table of contents for page number. CAUTION! Do NOT insert fittings and blank into Top Ports unless advanced boost control methods are to be used as this can affect the performance of the product. See ‘Boost Control Hookup’

Clocking Actuator

The Actuator can be removed and rotated to three different orientations, each spaced 120 degrees apart. It is secured to the body using three M5 Allen bolts, which must be removed to adjust the orientation. Additionally, a snap ring may need to be removed - ensure this is done carefully to avoid losing the ring. Once the bolts and snap ring are removed, the actuator can be rotated to any of the three positions before reassembly.



Compressed Gas Boostgate Hook-Up

Compressed Gas Setup

A boost controller system is required for CO2 Boost Control. The "bottom" port is hooked up to the pressure reference from the turbocharger.

The Plumbing is as follows

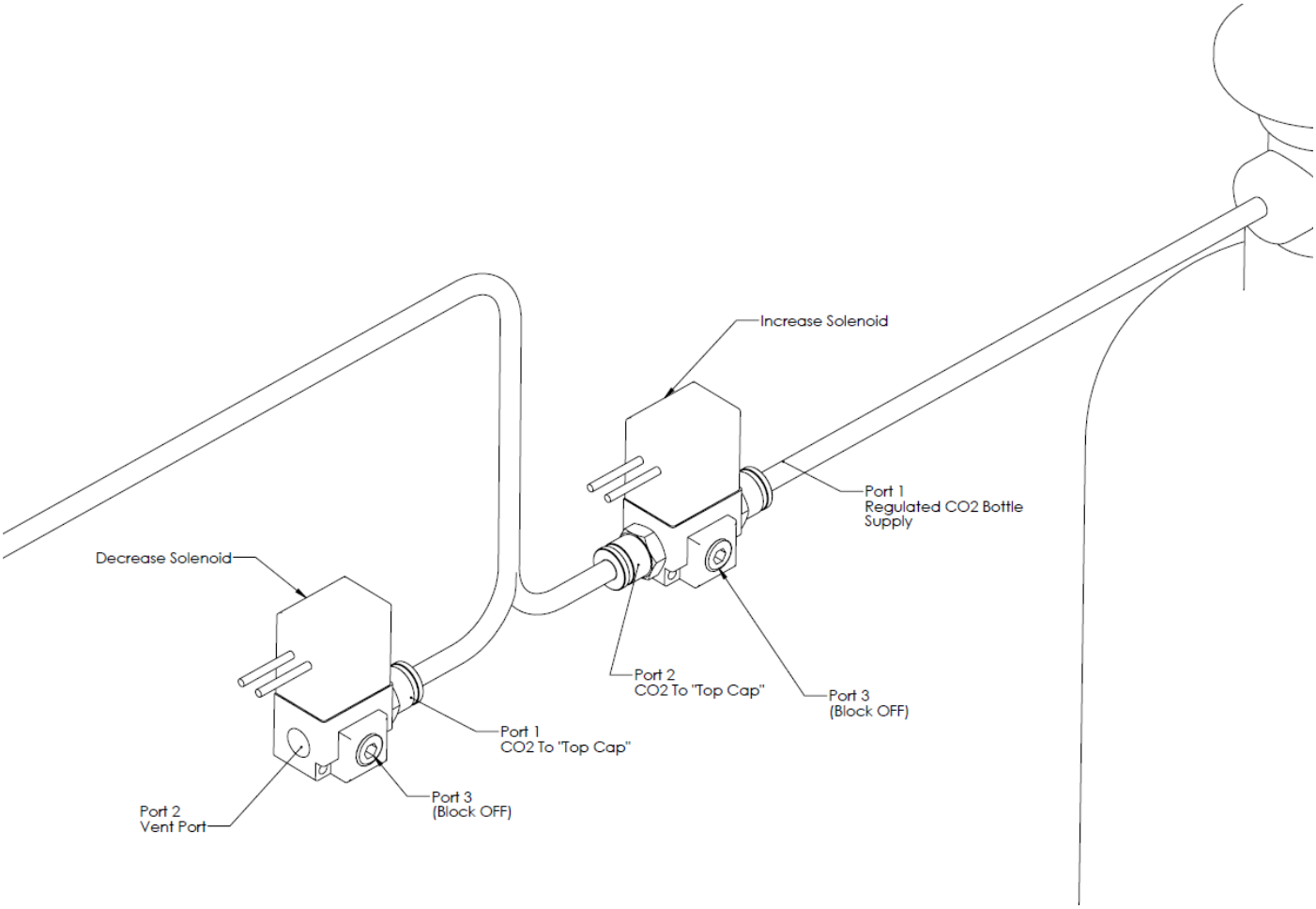
Increase Solenoid

1. Port 1 (Regulated CO2 Supply)
2. Port 2 (CO2 "Top Cap")
3. Port 3 (Blocked)

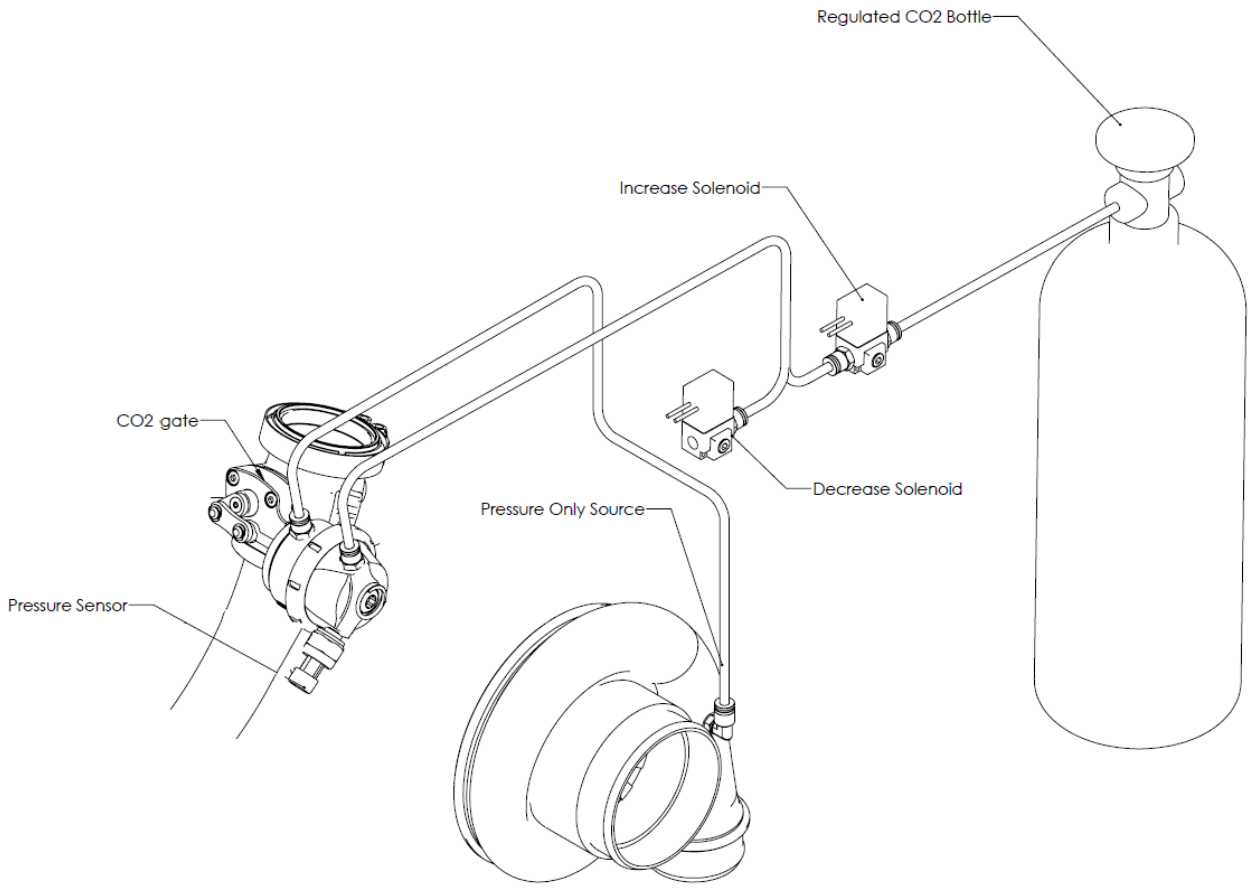
Decrease Solenoid

1. Port 1 (CO2 "Top Cap")
2. Port 2 (Vent to Atmosphere)
3. Port 3 (Blocked)

Although orientation isn't important. The Top Cap requires a Dome Pressure sensor to control the pressure in the "Top Cap".



CAUTION!Do NOT source signal from the intake manifold as this is subject to vacuum and pressure losses across the system and could over-speed the turbocharger.



(Optional) Integrated Solenoid Gas Setup

An Integrated Solenoid Cap is available as a CO2 option. Ports A and B are interchangeable, provided the port and its corresponding solenoid remain paired. For example, Port A must always be used with Solenoid A, and the same applies to Port B and Solenoid B.
Increase Solenoid

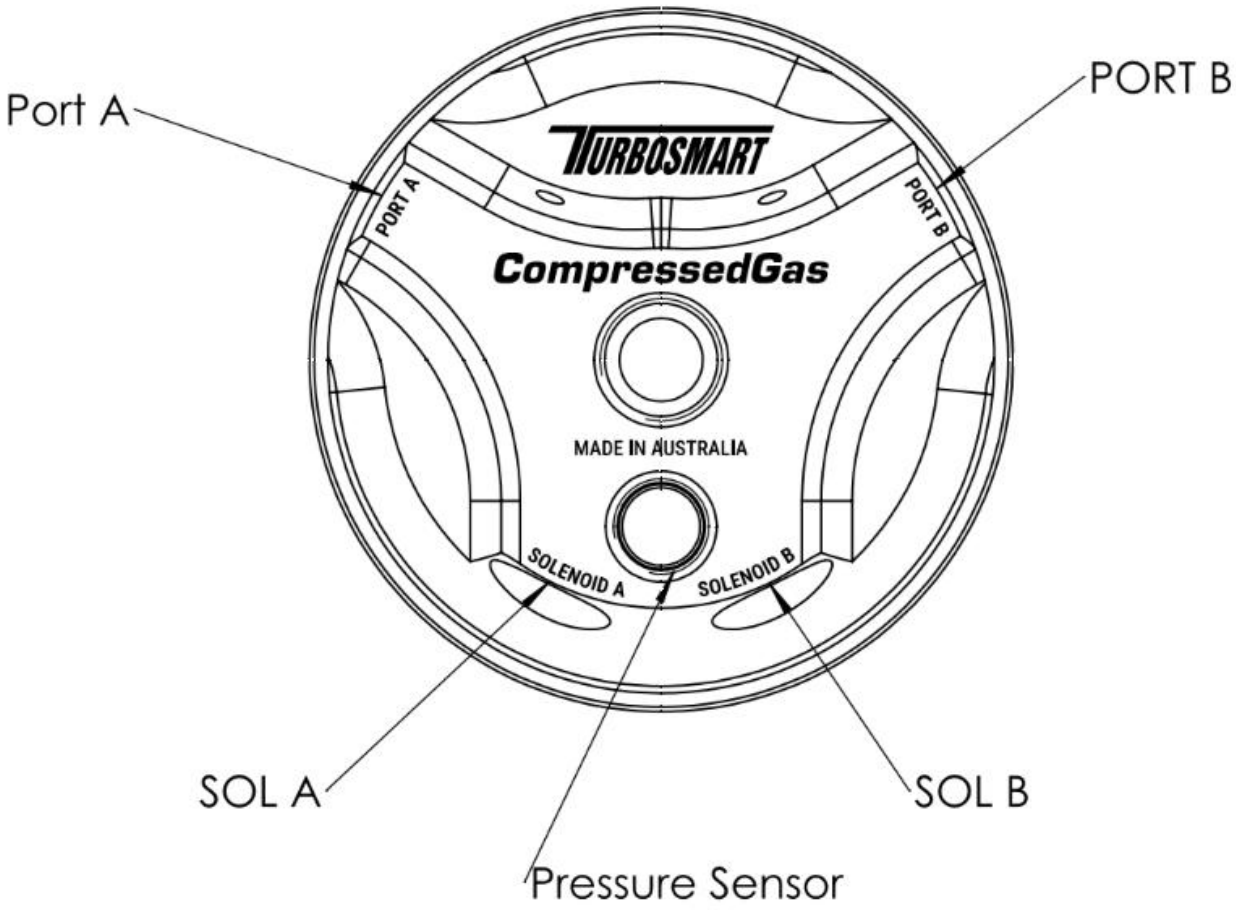
1. Port A (Regulated CO2 Supply)

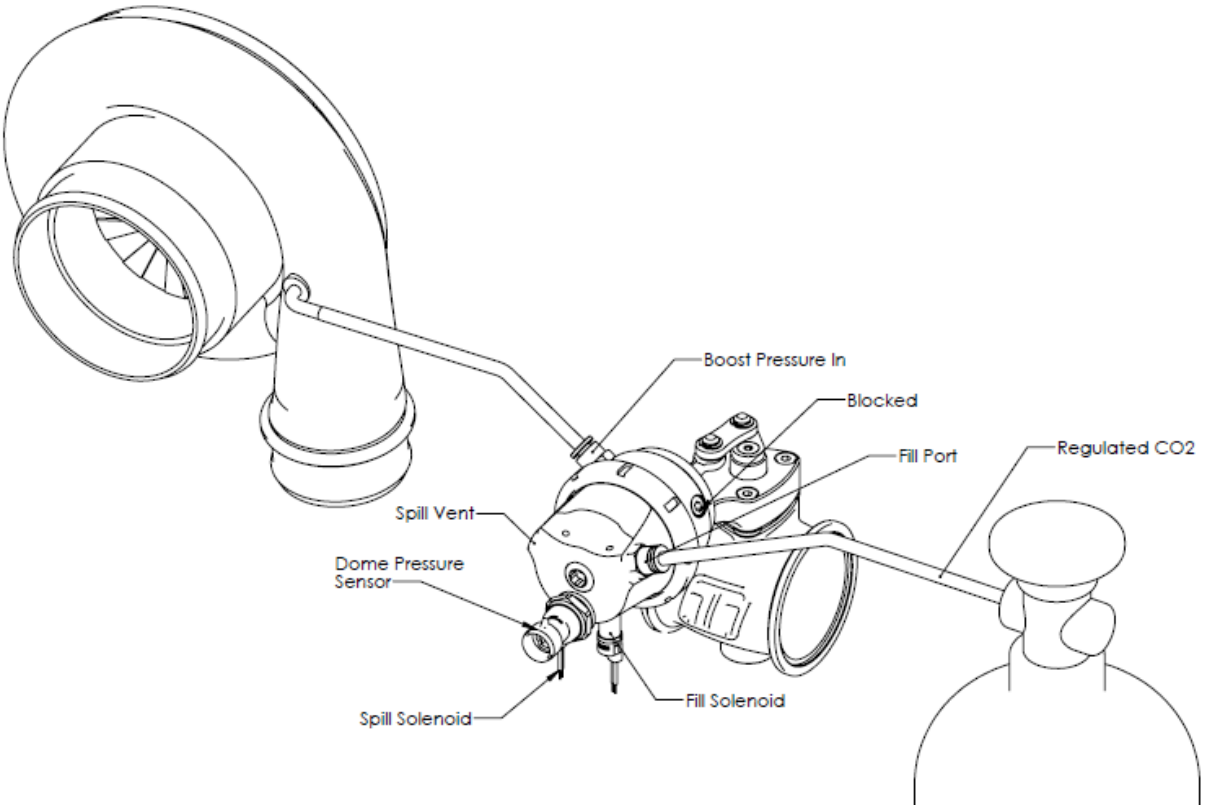
2. Solenoid A

Decrease Solenoid

1. Port B (Vent to Atmosphere)

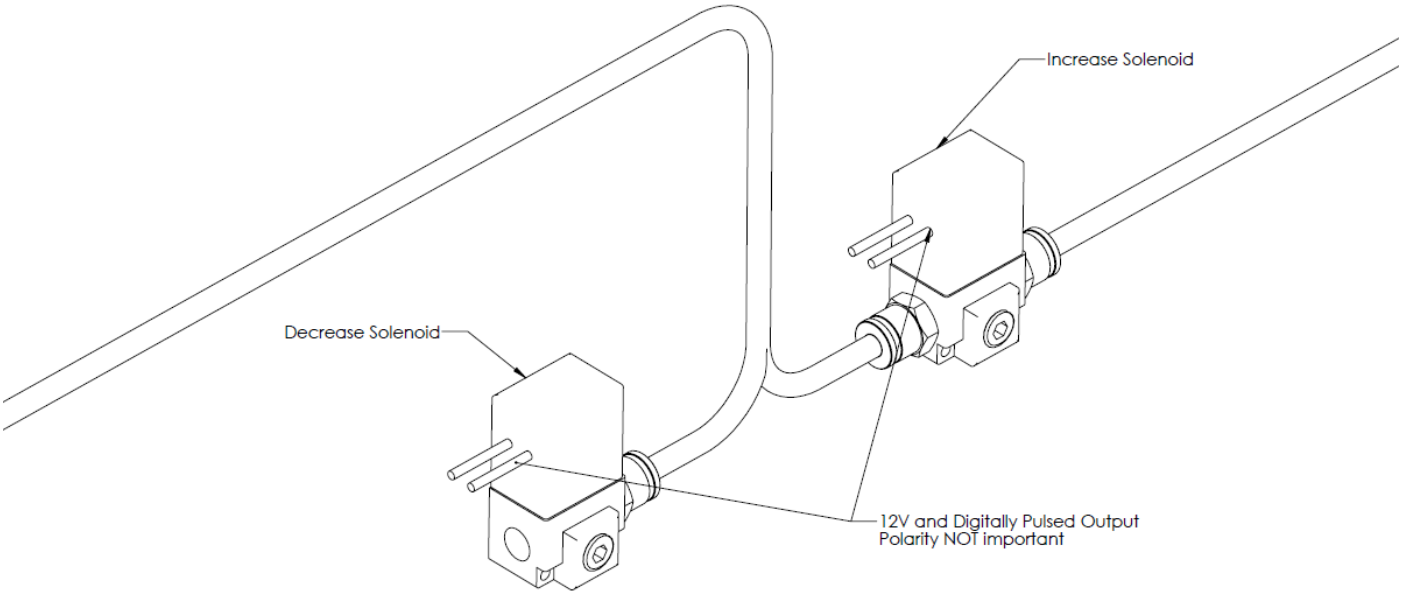
2. Solenoid B


Port A
PORT B
TURBOSMART
PORT A
PORT B
CompressedGas
MADE IN AUSTRALIA
SOLENOID A
SOLENOID B
SOL A
SOL B
Pressure Sensor


Boost Pressure In
Blocked
Fill Port
Regulated CO2
Spill Vent
Dome Pressure Sensor
Fill Solenoid
Spill Solenoid

Wiring Hookup

The solenoids require a 12V Supply as well as two digitally pulsed outputs from your ECU or Boost Controller. The 12V can be common and can be fused if required. The digitally pulsed output must be run two seperate inputs in the ECU, ensuring that they are correctly labeled as the correct output before running. Polarity isn't important on the solenoid.



Start Engine and check for leaks.

Congratulations, your CO2 Boost Gate is installed and ready for use. Double check all fittings, lines and mountings then proceed to start engine and check for leaks.

HOW TO CHANGE YOUR COMPRESSED GAS SPRING

The compressed gas boost gate has a variety of springs to suit different boost levels. Turbosmart provides the compressed gas boost gate pre-installed with a 7psi spring. With your boost gate four springs will be provided, 3psi inner, 5psi inner, 7psi middle and 14psi outer. Different spring combinations may be required to suit different boost requirements and tuning.

Remove Compressed Gas Boost Gate from Manifold

Remove associated plumbing and electrical connectors from the boost gate. Unscrew outlet V-band nut in an anti-clockwise direction to the very end of the thread, squeeze the nut against the V-band in a syringe like motion to expand the V-band over the flange. Repeat for inlet V-band. Remove boost gate.

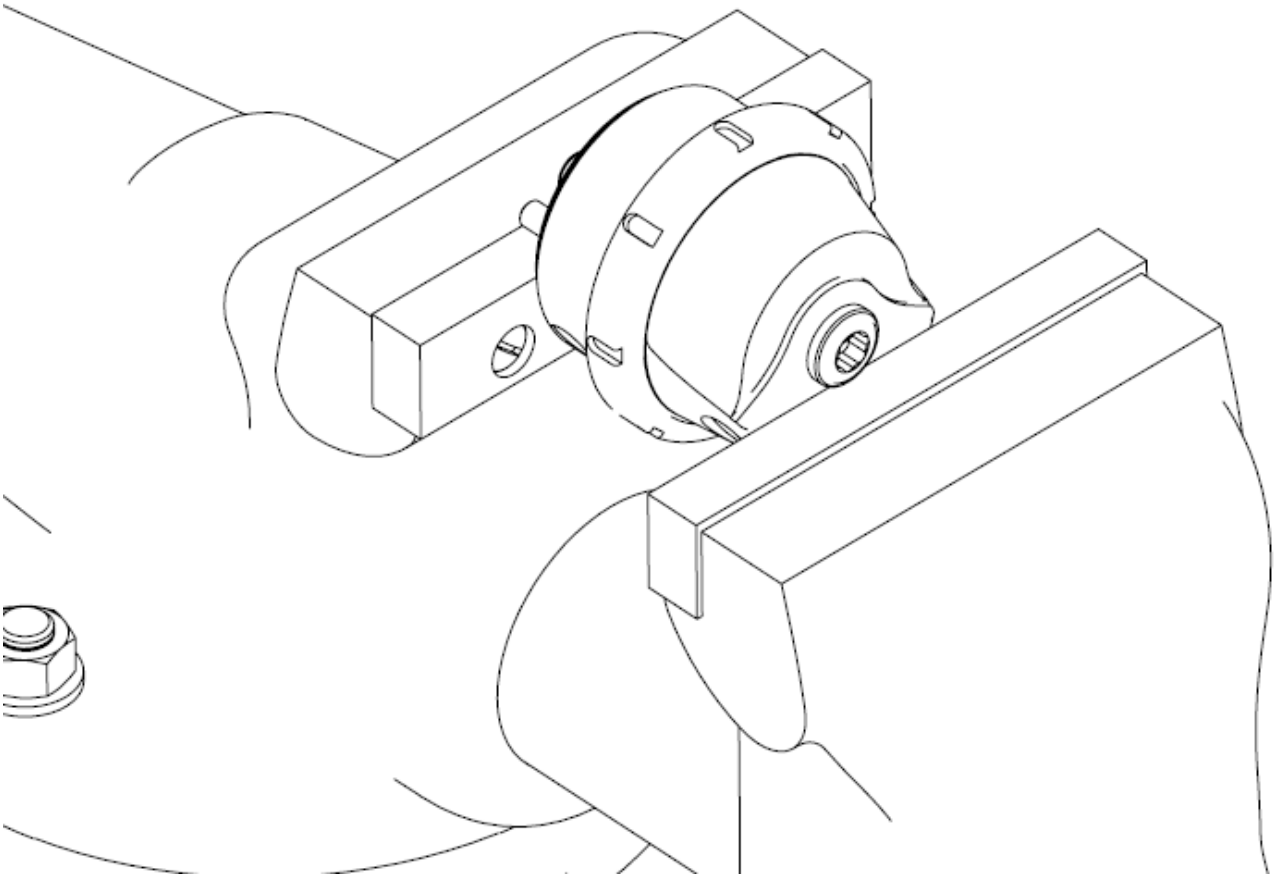
CAUTION! Allow engine to cool down before removing your compressed gas boost gate.

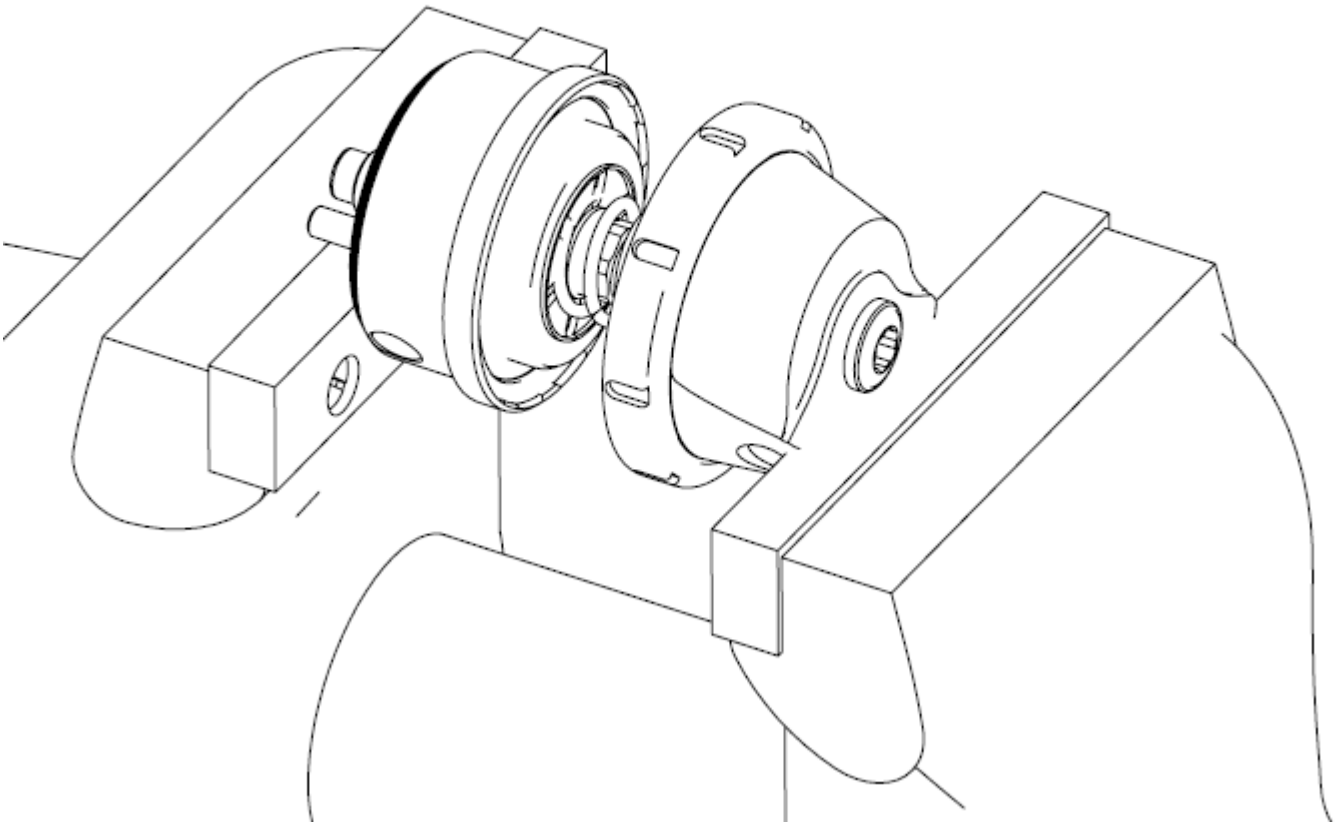
Remove Top Cap

Prior to removing the straight gate cap, remove all fittings from the 1/8”NPT ports. Press down with light to medium load on the cap in a press or vice. Unscrew locking collar with the large end of the provided collar tool in an anti-clockwise direction until completely disengaged and slowly remove tension from the press or vice allowing the spring to expand, finally remove cap when the spring has stopped expanding.

CAUTION! Use soft jaws to prevent cosmetic damage

Configure boost gate with preferred spring combination of inner, middle and outer springs

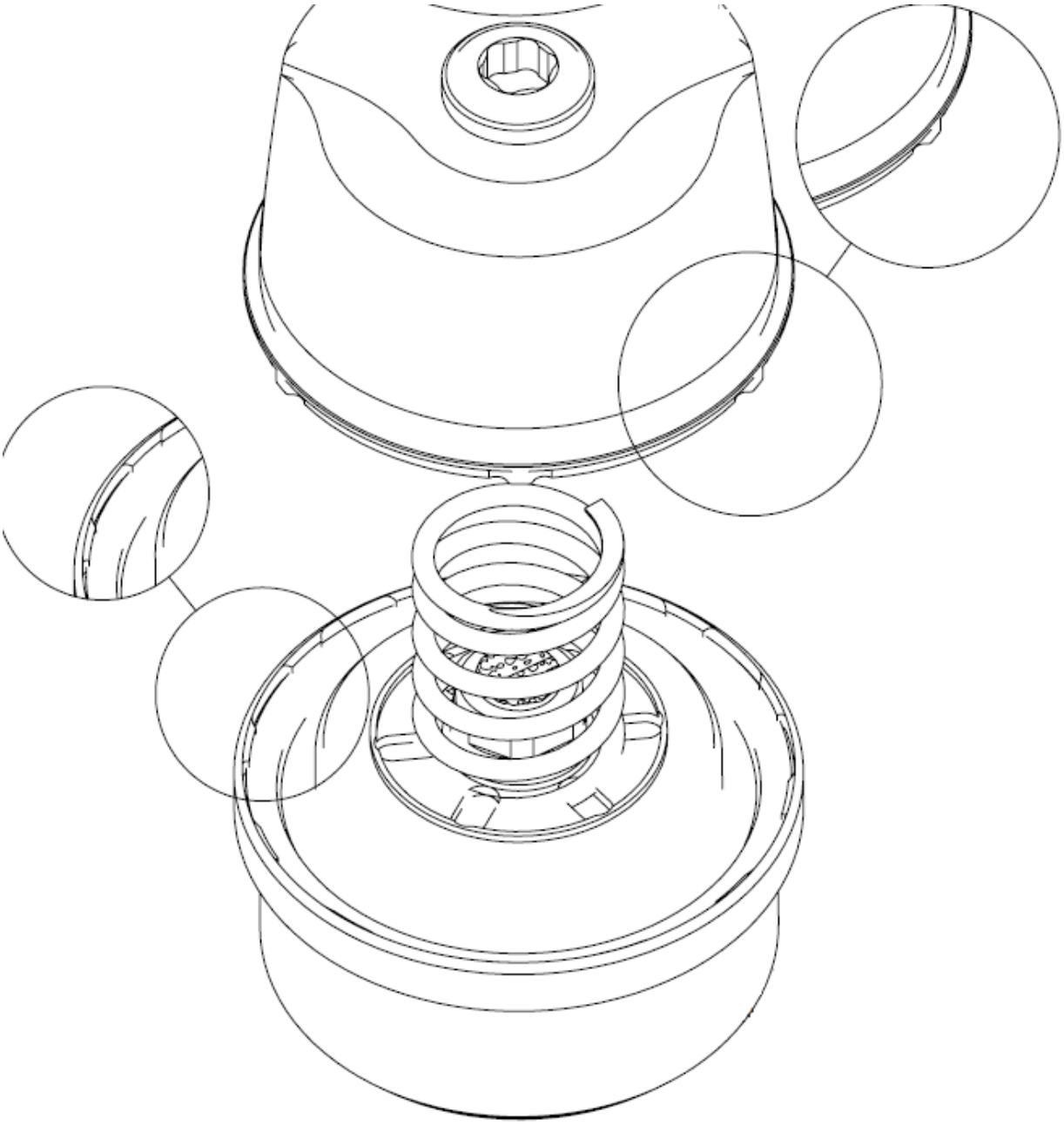




Familiarise Yourself with Cap and Body Notches

Locate cap and body notches and grooves which dictate the alignment of the cap. These notches are used to locate the cap onto the body and must be aligned prior to compression of the cap onto the body.

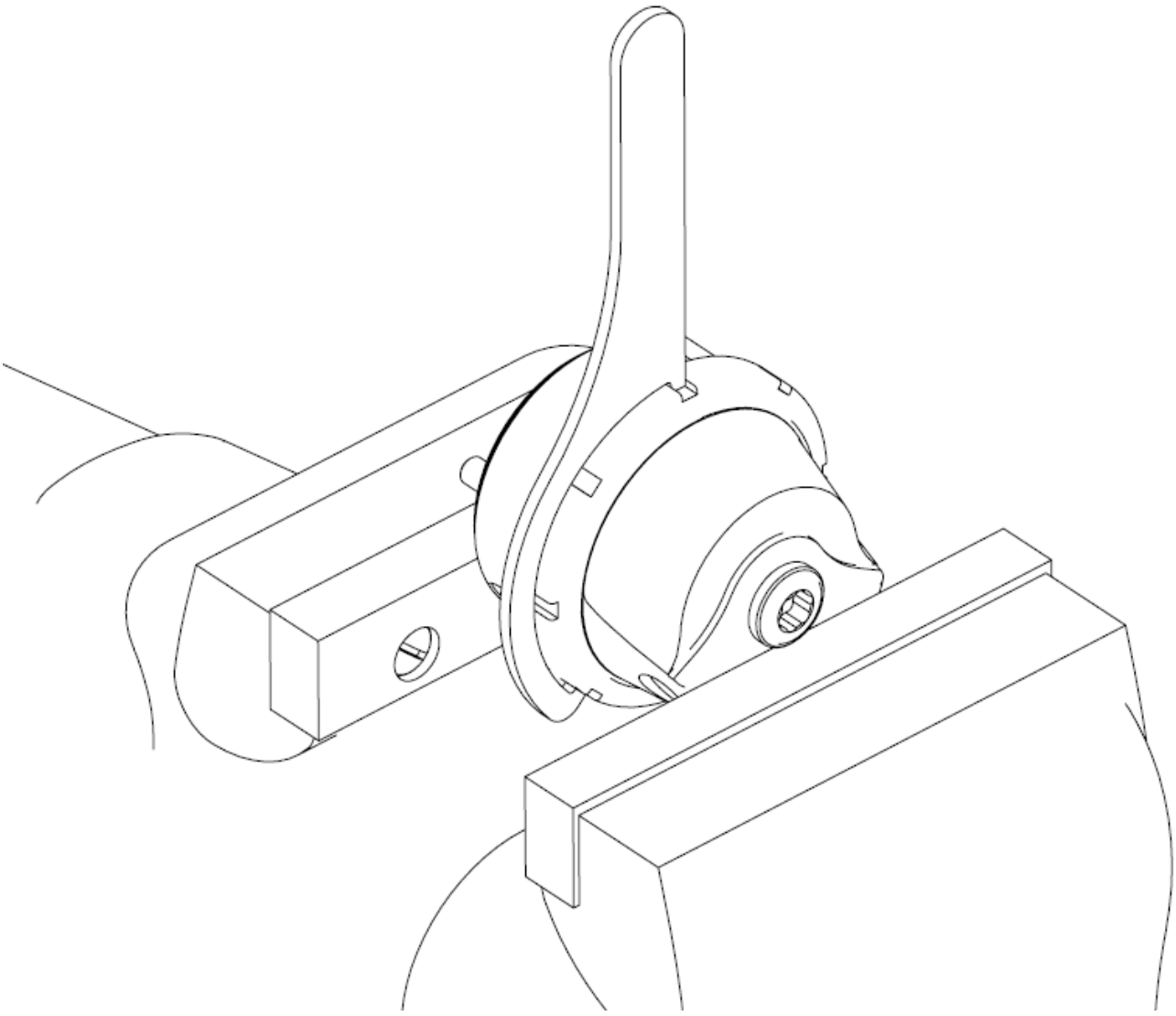
CAUTION! Ensure notches are aligned and seated home correctly prior to exerting force to tighten collar, permanent damage will occur if these are not aligned correctly.



Press Cap onto Body

Using a press or vice, comp the notches are remaining aligned. Once the cap has seated home onto the body, screw the collar down by hand in a clockwise direction. While still in the press or vice, Tighten the collar further with the collar tool until the collar will not turn.

CAUTION! Maintain downward pressure on cap while tightening collar or non-repairable thread damage will occur.



Reinstall fittings to the cap of the boost gate using fresh Loctite 567 thread sealant.

Reinstall Compressed Gas Boost Gate

Pace V-band over weld on flange by unscrewing the nut on the V-band as far out as possible and then squeezing the bolt in a syringe motion to expand the V-band. Once the V-band is in its fully expanded position, slide the v-band over the flange to allow for the boost gate to be installed.

Do not forget to put the valve seat into the body before mounting the unit on the exhaust manifold. Using the 3/8” deep socket and a torque wrench tighten the V-Band to **7N.m (5 ft/lbs).**

Achieving Your Target Boost Pressure

There are various factors involved in achieving your target boost pressure including.

1. The size of the spring fitted in your boostgate i.e. the boost pressure achieved by the boostgate spring only.

2. The desired level of boost pressure and the difference between this and your boostgate spring pressure.
3. The size of your turbocharger and boostgate and the resulting exhaust manifold back pressure in your system.

4. The amount of dome pressure that is fed into the top cap.

IMPORTANT NOTES ON SETTING THE BOOST GATE SPRING PRESSURE A stiffer spring should only be used when necessary. The Compressed Gas Boost Gate different combinations of spring pressures. All springs that are adaptable with the GenV IWG (These are the same springs) are shown in the table below. The tuner can use combinations of up to 3 springs to achieve the following base boost pressures. To aid in the identification of these springs they are supplied colour coded. The springs chosen should be rated to the lowest boost level desired.

Location	Inner	Inner	Middle	Outer
Pressure	**6psi**	**9psi**	**12psi**	**21psi**
Colour	**Black**	**Grey**	**Pink**	**Red**
6psi	●			
9psi		●		
12psi			●	
18psi	●		●	
21psi				●

How to Change Your Boost Gate Diaphragm

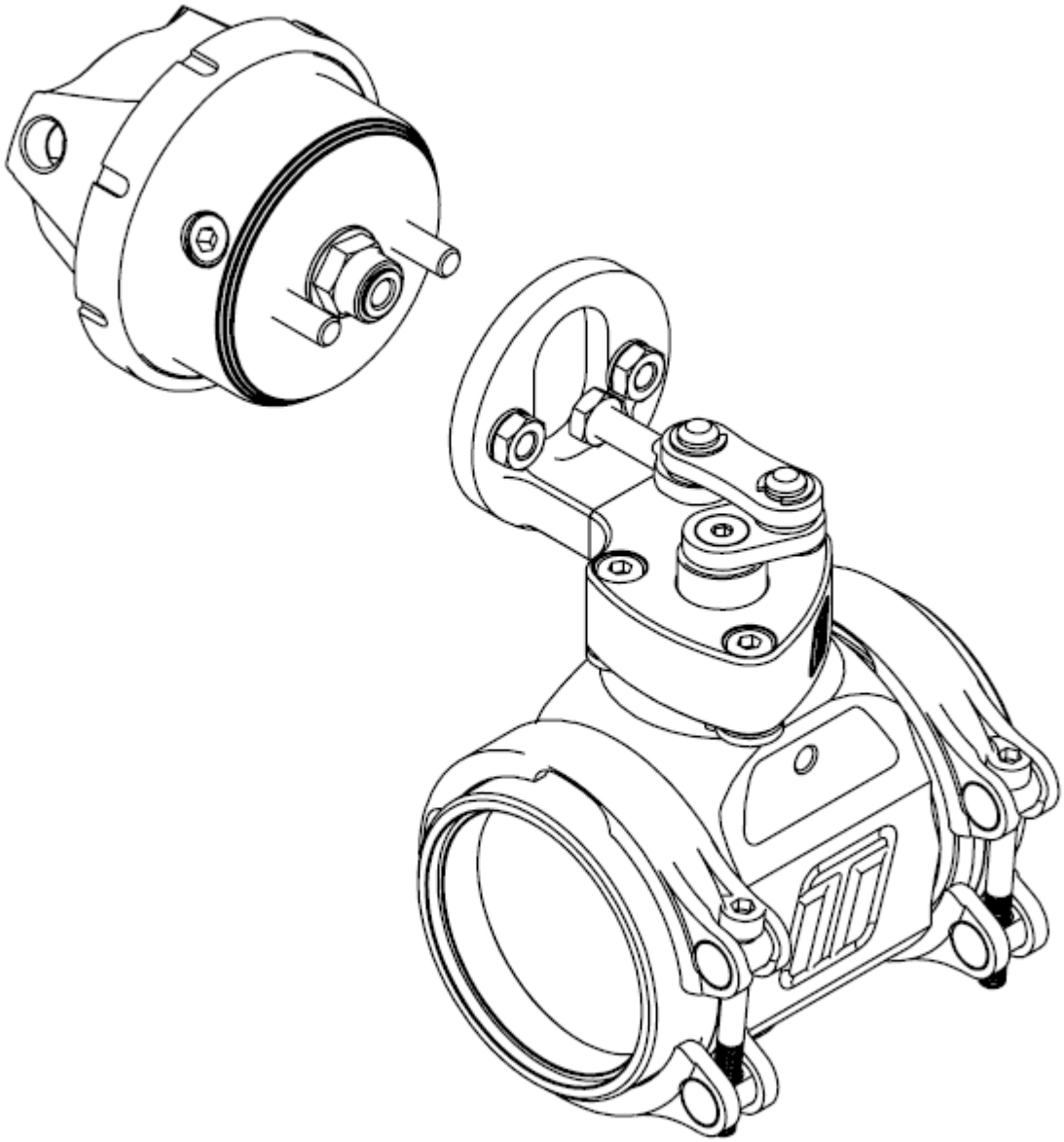
Remove Actuator from Body

Remove fittings from the boost gate as well as the breather hose if fitted. Unscrew outlet V-Band nut in a anti-clockwise direction to the very end of the thread, Squeeze the nut against the V-Band in a syringe like motion to expand the V-band over the flange. Repeat for inlet V-Band. Remove boost gate. Mark the orientation of the valve to the body with tape or a paint pen.

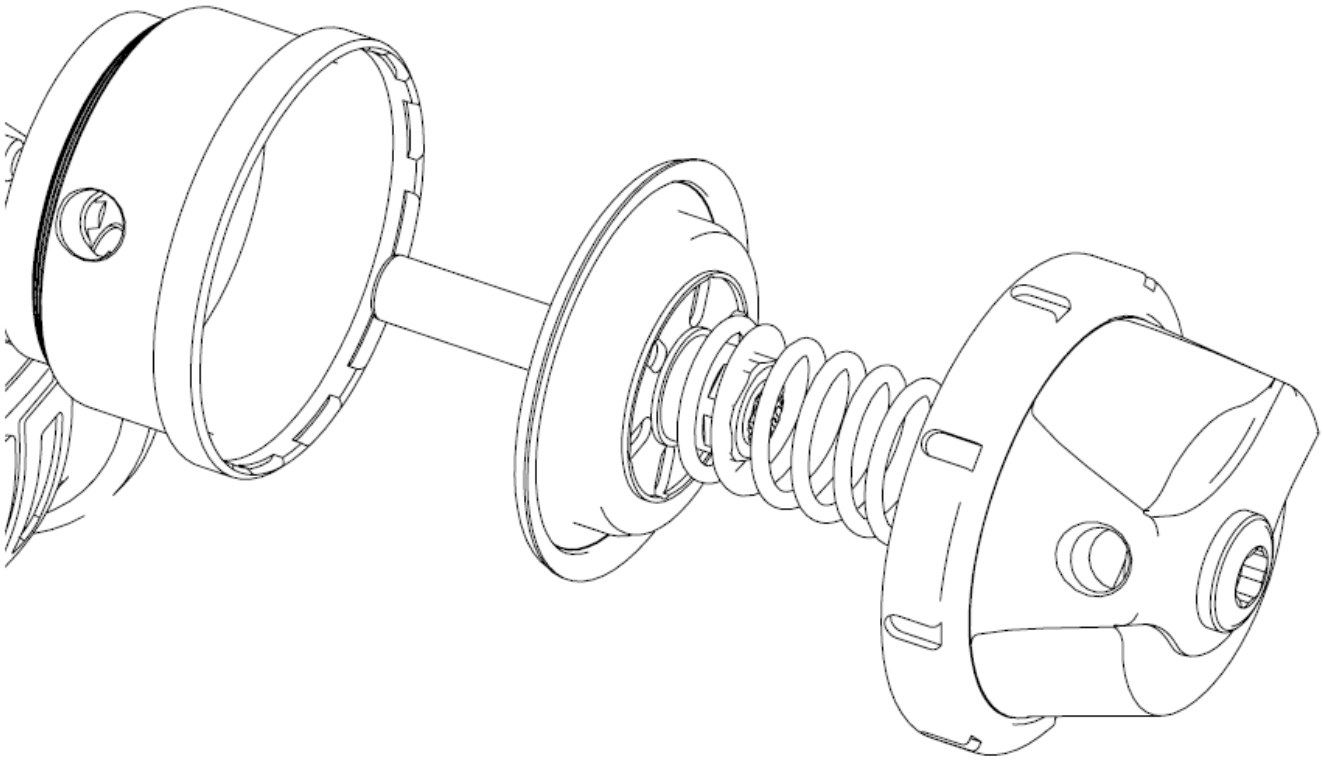
CAUTION! Allow engine to cool down before removing your boost gate.

Diaphragm Replacement

The actuator must be removed for ease of disassembly of the diaphragm replacement. The once removed the top cap can come off and the diaphragm can be swapped out.



Align the valve orientation marks and confirm the diaphragm bead is seated in the groove of the actuator. Install desired spring combination. Configure Boost Gate with preferred spring combination of inner, middle and outer springs



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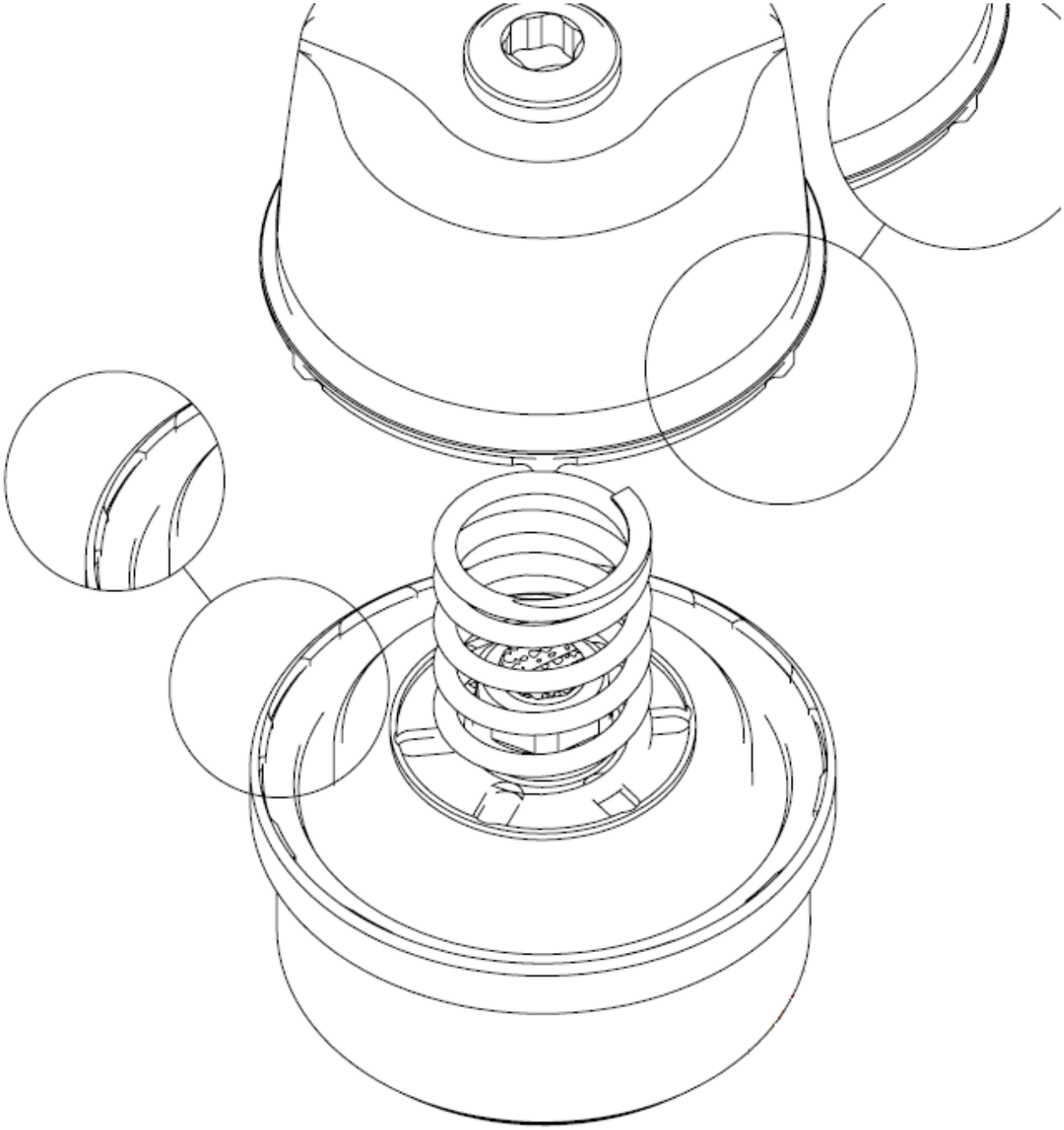
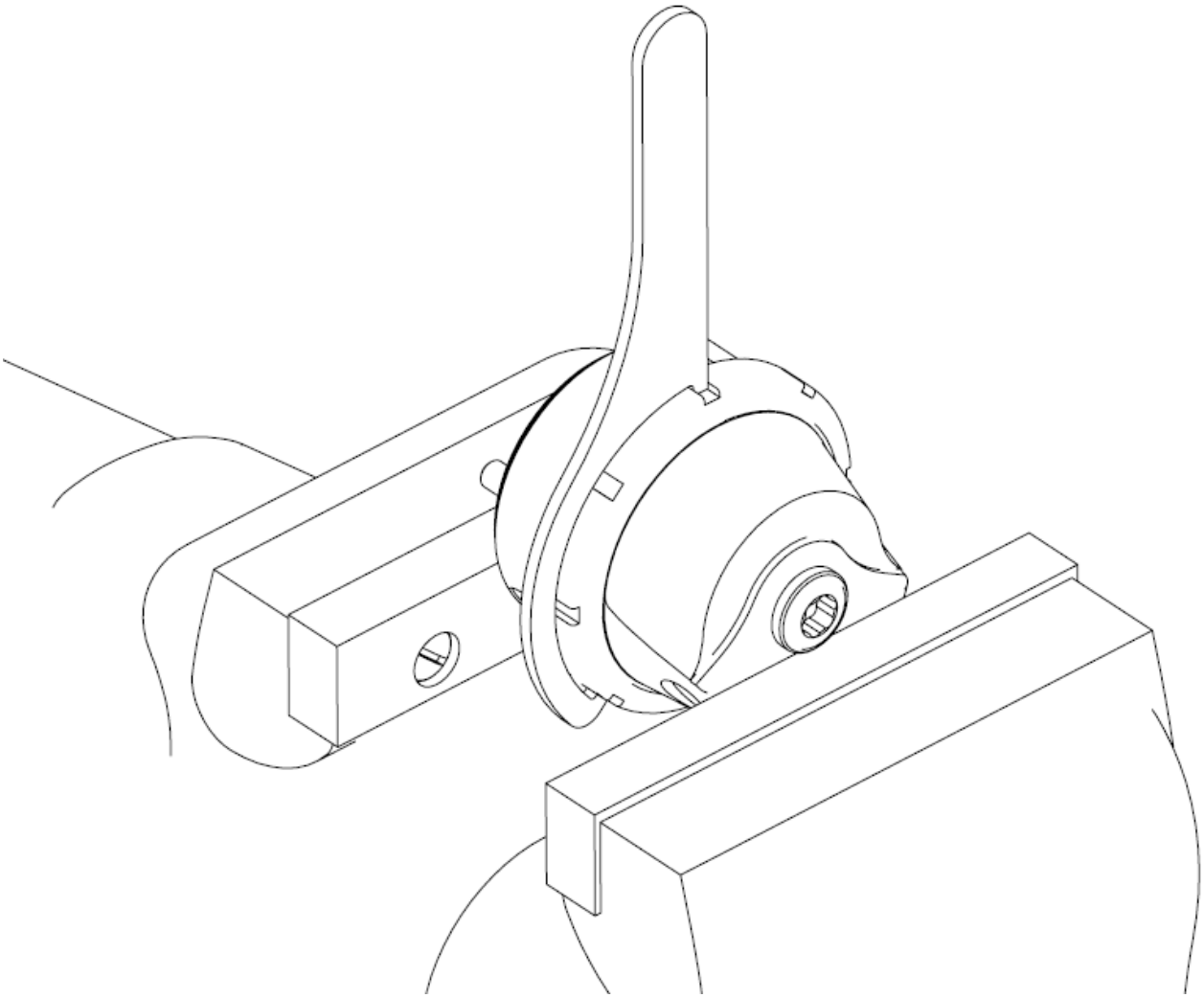


CAUTION! Ensure notches are aligned and seated home correctly prior to exerting force to tighten collar, permanent damage will occur if these are not aligned correctly.

Press cap onto body

Using a press or vice, compress the cap onto the body ensuring the notches are remaining aligned. Once the cap has seated home onto the bod, screw the collar down by hand in a clockwise direction. While still in the press or vice, Tighten the collar further with the collar tool until the collar will not turn.



CAUTION! Maintain downward pressure on cap while tightening collar or non-repairable thread damage will occur.

Reinstall fittings to the cap of the boost gate using fresh sealant.

Reinstall boost gate

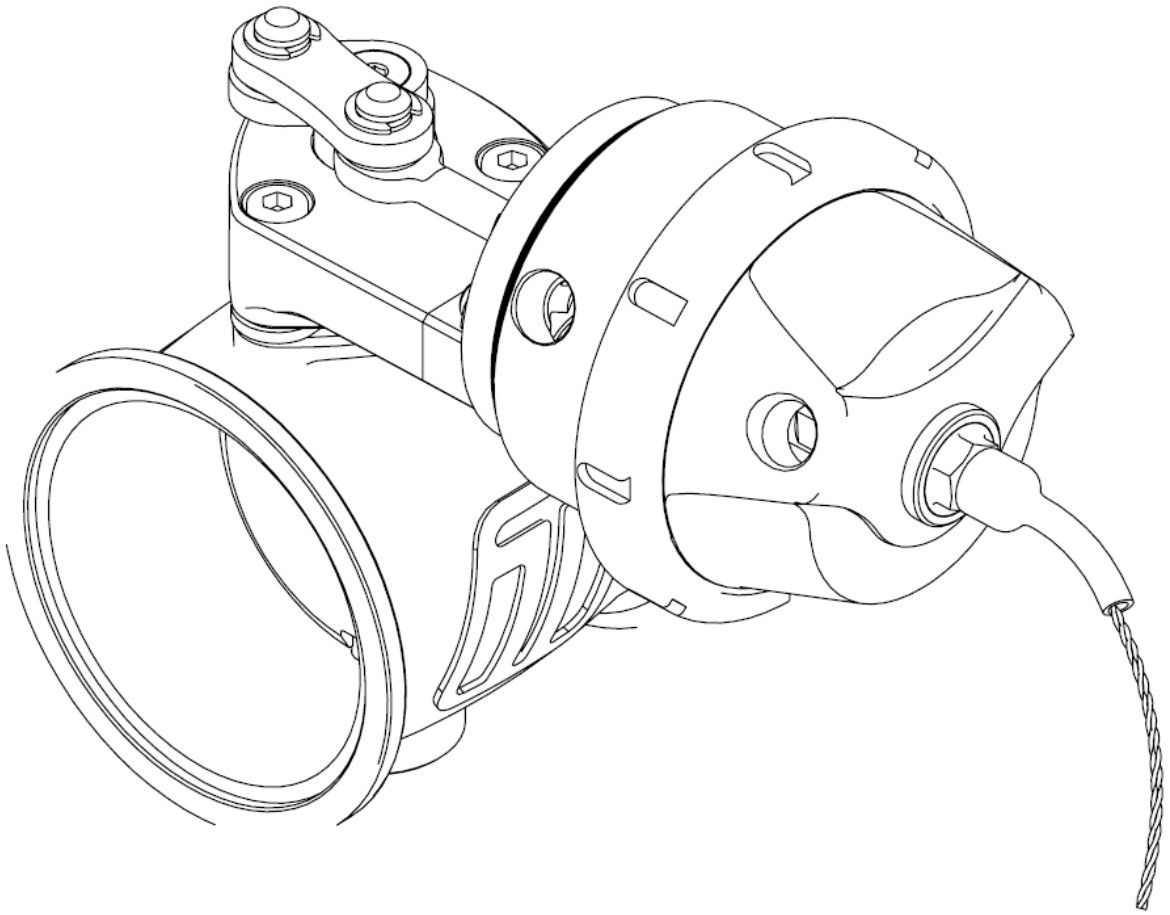
Place v-band over weld on flange by unscrewing the nut on the v-band as far out as possible and then squeezing the bolt in a syringe motion to expand the v-band (squeeze the dots together below). Once the v-band is in its fully expanded position, slide the v-band over the flange to allow for the boost gate to be installed. Do not forget to put the valve seat into the body before mounting the unit on the exhaust manifold. Using the 3/8” deep socket and a torque wrench Tighten the V-Band to 7N.m (5 ft/lbs).

HOW TO INSTALL A SENSOR CAP TO YOUR COMPRESSED GAS STRAIGHTGATE

Remove Blanking Cap

The Compressed Gas Boost Gate comes with a pre-installed magnet on the diaphragm, essential for HE sensor operation. To install the sensor (sold separately), simply remove the top blanking plate and fit the HE sensor in its place. Calibration may be required depending on your system.

CAUTION! Allow engine to cool down before fitting sensor cap



Wire	Note	Rating
Red	Sensor Supply (V_{sup})	4.5-5.5 V_{dc}
Black	Sensor Ground (V_0)	0V
White	Sensor Output (V_{out})	0-V_{supply}

Connect the wires to your data logger accordingly. Use a high-quality connection to reduce noise and calibration fluctuation.

CAUTION! Ensure that the wiring is properly shielded from external heat sources.

To ensure longevity from the sensor, ensure adequate airflow is supplied directly to the sensor to avoid overheating or sensor failure.

Turbosmart HE sensor has an operation temperature window of -40C up to 170°C (340°F) junction temperature, for temperatures outside of this window the V_{OUT} will revert to less than 2.5V

Temperature exposure above 260°C (500°F) can cause permanent damage to the sensor.

Calibration*

Insert the relevant calibration curve into your data logger for the Compressed Gas Boost Gate

Magnetic interference from solenoid activation may produce a small offset in position

Rod Travel (mm)	Voltage Out
0	0.44
2	1.21
4	1.58
6	1.84
8	2.00
10	2.13
12	2.21
14	2.27
16	2.32
18	2.36

***NOTE!** For best results, each boost gate should be calibrated to your setup.

Troubleshooting

1. Boost Gate not actuating - Confirm signal hose is plumbed to a pressure only source, confirm preload on valve seat during installation

2. Poor boost gate actuation - Ensure signal hose is not shared and is sourced as close to the compressor as possible, check seal on fittings

3. Poor boost gate actuation - Confirm Top ports are not blocked and free from debris

4. Boost creeping at high rpm - boost gateflow path is poor, boost gate is too small for the application

5. Failing the above, submit a Technical Request Form with information about your engine, oil type and photos of the installation and one our expert technicians will respond as soon as possible.

Was this article helpful