



INSTALLATION INSTRUCTIONS – **Raptor Performance Bypass/Blow-off Valve**

IMPORTANT: Read instructions completely before proceeding with installation.

SUMMARY: The **Raptor Performance Bypass/Blow-off Valve** has been specifically designed to protect your high performance turbocharger from damage and/or failure due to compressor discharge pressure spikes. Design features include a polished investment cast aluminum housing, a 1.5" diameter flat stainless steel valve with *captured o-ring seal* (a design feature unique to the performance aftermarket), fabric-reinforced viton elastomer diaphragm, polished diaphragm cover, and unique mounting system that allows the valve assembly to be rotated 360 degrees, mounted in any orientation.

OPERATION: In the event of a rapid deceleration of a turbocharged or supercharged engine, the sudden closing of the throttle plate will block the compressor discharge flow, which will normally result in a severe pressure spike, which can cause damage to the turbocharger or supercharger. The **Raptor Valve** prevents this by sensing the intake manifold pressure (which will normally experience a high vacuum during rapid deceleration), and act upon the diaphragm to instantly open the valve, and relieve the sudden pressure spike. The response of the valve can be further enhanced by sensing the compressor discharge pressure, which acts on the lower side of the diaphragm to accelerate the opening of the valve. The static spring load acting on the diaphragm has been designed to keep the valve closed during normal engine operation, in most applications.

KIT CONTENTS: Remove valve assembly from carton and inspect for any obvious physical damage. All products are thoroughly inspected prior to your shipment. If any shipping damage is evident, return the unit to your supplier and request that he process a claim with the shipper involved. Shipment damage is not a Turbonetics responsibility. Do not return shipping-damaged units to Turbonetics, as they will be refused.

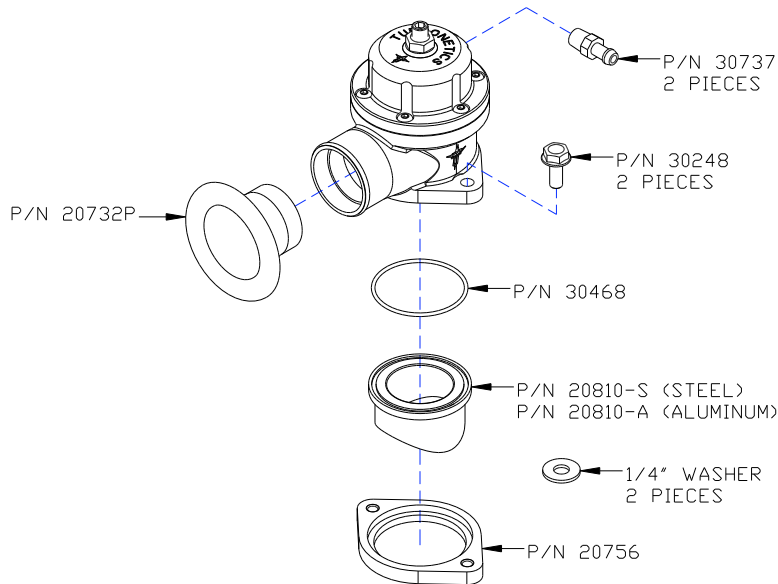


Figure 1 (Kit Contents / Replacement Parts)

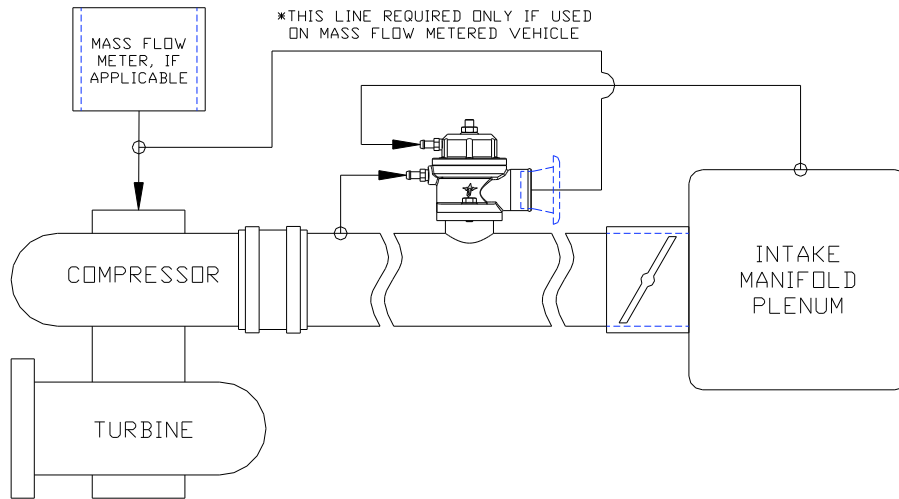


Figure 2

INSTALLATION:

1. The **Raptor Valve** can be installed in any position or orientation between the turbocharger compressor discharge and the throttle body per Figure 2. Care should be taken to insure that the valve assembly is NOT exposed to extreme heat, as the diaphragm and o-ring seals have a 450 degree F temperature limit.
 - On engines fitted with mass flow meters, the **Raptor Valve** discharge MUST be routed back to the engine between the air mass flow meter and turbocharger compressor intake, otherwise this will result in the meter sending an excess air flow signal to the ECU, which will result in an extra rich fuel signal to the injectors. The standard discharge connection is sized for a 1.50" I.D. hose (customer supplied).
 - On engines equipped with speed/density engine management systems, OR "blow-through" carbureted engines, the **Raptor Valve** discharge may be routed overboard, using the standard hose connection or with the supplied discharge horn. To install the horn, simply press the horn into the counterbore inside the discharge until firmly seated.
 - Use of the **Raptor Valve** is not recommended for "draw-through" carbureted engines.

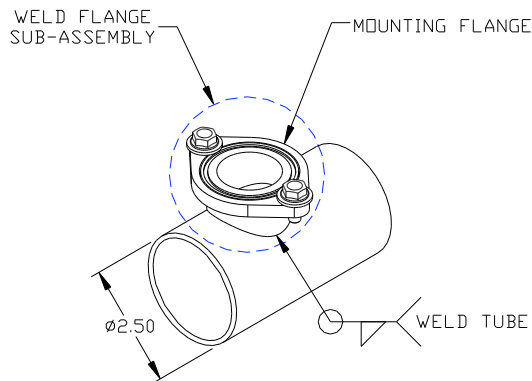


Figure 3

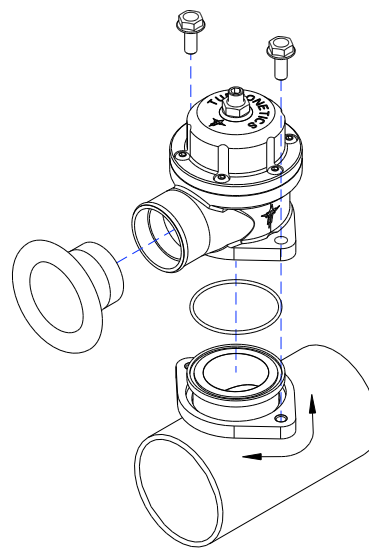


Figure 4

2. Select a desired engine bay mounting location and mark the location accordingly. Remove the intake tubing or other component where the **Raptor Valve** will be installed, and clean the area where the weld tube will be located. The supplied weld flange sub-assembly is designed to be welded to 2.50" O.D. tubing (stainless or mild steel, 14-16 gauge) per Figure 3. The weld tube included in the weld flange sub-assembly is made of mild steel (an alternate weld tube made of aluminum is included in the kit). If desired mounting location is something other than 2.50" tube, modify the weld tube to suit your application.
3. Weld the weld tube to the intake tubing, with the entire weld flange sub-assembly intact. **IMPORTANT: The mounting flange is designed to be trapped under the large diameter of the weld tube. The flat washers & hex bolts hold the mounting flange in place during welding.** After welding, use the center hole of the weld tube as a pilot to cut a hole into the intake tubing. Suggest using a small rotary tool to dress the hole, and remove all burrs and sharp edges.
4. Install the o-ring seal in the pocket on top of the weld tube, using a small amount of silicone grease to keep it in place during assembly. Rotate the mounting flange to your desired position, and install the **Raptor Valve** re-using the supplied hex bolts per Figure 4.
5. Refer to the sensing line schematic shown in Figure 2. A minimum sensing line size of 1/8" I.D. is recommended for best response. The sensing line ports on the backside of the **Raptor Valve** are tapped 1/8" NPT. Use Teflon tape on all fitting pipe threads. Sensing line material should be suitable for automotive under-hood environment, and compatible with gasoline vapor. Care should be taken in routing sensing lines to preclude damage from any sharp edges or excessive temperatures.
 - The vacuum sensing line (top port) may be connected to any convenient intake manifold pressure source (suggested connection location is on the intake manifold plenum, since runner locations may cause pulsing, which may affect control stability).
 - The boost sensing line (bottom port) may be connected to any convenient source between the turbocharger compressor discharge and throttle plate (location isn't critical). Since most of the valve motion is controlled by intake manifold vacuum, the valve will operate without this sensing line, but will have quicker response with it connected. Suggest using a small "filter" fitting, if not used for sensing. **IMPORTANT: Do not plug this hole, it needs to be able to breath.**
6. The **Raptor Valve** has been factory calibrated to sense boost levels under normal driving conditions for most applications, but be sure to road test the vehicle to ascertain proper operation. To fine-tune the valve response, it is fitted with a load control adjustment screw on top of the actuator. To adjust, loosen the locknut on the load screw and rotate the load screw clockwise (into the actuator cover) to increase the initial spring load and associated control pressure. Re-tighten load screw and road test to verify setting. To lower the spring load, rotate the load screw counterclockwise (out of the actuator cover). **NOTE: When increasing the setting, adjust load screw a maximum of 1 turn at a time.**