



Performance Spoken Fluently

Instruction Manual



3.6 Pentastar

Supercharger Drive System



**JEEP Grand Cherokee 3.6
2011-2014**

INSTALLER: Read and understand entire instruction manual before starting installation of system.

Take note of the following before proceeding:

1. Proper installation of this supercharger kit requires general automotive mechanic knowledge and experience. Please browse through each step of this instruction manual prior to beginning the installation to determine if you should refer the job to a professional installer/technician. Please contact your RIPP or Vortech dealer for possible installers in your area.
2. This product was designed for use on stock (un-modified, OEM) vehicles. The PCM (computer), engine, transmission, drive axle ratios and tire O.D. must be stock (unless kits have been designed otherwise such as Jeep Wrangler kits). **If the vehicle or engine has been modified in any way, check with RIPP or Vortech prior to installation and use of this product.**
3. **Use only premium grade fuel with a minimum of 91octane (R+M/2).**
4. Always listen for any sign of detonation (knocking/pinging) and discontinue hard use (no boost) until the problem is resolved.
5. RIPP is not responsible for any clutch, transmission and/or drive-line/engine damage.
6. **The factory transmission cannot be tuned directly. Please make sure you have the proper gear ratio for your vehicle's wheel/tire set-up to maximize its potential.**

Exclusions from RIPP/Vortech warranty coverage consideration includes, but not limited to:

1. Neglect, abuse, lack of maintenance,

OFF-HIGHWAY USE

When driving vehicle on non-public roads (off-road applications such as racing/high RPM) RIPP strongly recommends reducing the factory spark plug gap down to .032" or otherwise follow *Spark Plug Installation Steps* (Page 12).

*May vary from kit to kit.

- abnormal operation or improper installation.
2. Continued operation with an impaired vehicle or
 3. The combined use of RIPP components with other modifications such as, but not limited to, exhaust headers, aftermarket camshafts, nitrous oxide, throttle bodies, third party PCM programming or other such changes.

Transmission (Auto/6spd)

- **6SPD:** Extreme care must be taken when driving a supercharged vehicle with the stock clutch. If clutch slippage is detected, discontinue hard use. RIPP recommends replacing the stock clutch with a higher capacity unit if slippage occurs.
- **Automatic transmission:** Auto transmissions may not up shift at full throttle when driving in "D" (drive) mode, THIS IS a Direct product of OEM programming and not the provided tuning. In order to shift at full throttle, end users may either "lift to shift" by raising the accelerator slightly (partially). RIPP makes no claims as to the reliability of the transmission with the supercharger installed. An email to Tech@rippmods.com with questions or concerns is always a good idea, do not take it upon yourself to interpret or troubleshoot vehicle characteristics.

Cruise Control:

Please take note - the factory Cruise Control cannot be programmed with any custom mapping. It is a normal condition to feel a slight surge during some CC functions. It's best to manually clear and reset the CC if this happens.

INSTALLER: Read and understand entire instruction manual before starting installation of system.

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Introduction:

Congratulations on your investment into the RIPP *Supercharger* designed for the 2011-2014 Jeep Grand Cherokee 3.6 Pentastar V6 engine. With proper installation, use and maintenance, you will enjoy many happy trouble-free miles.

RIPP Supercharger systems are a simple but effective way of increase your engine's total output without compromising its integrity. Intended for **off road use only**, but designed to be daily driven, its superior ingenuity is what makes it all worth it. These instructions are a necessary guide to the proper installation and maintenance of your RIPP Supercharger system.

The SDS is intended to be installed by a professional technician and should not be attempted by the hobbyist. We feel it's best to source out a local performance oriented shop before attempting to install your system. Without proper knowledge of fuel and ignition mapping, permanent damage can and will occur.

Whenever adding more power to any vehicle, the steering, braking and handling of the vehicle will differ from standard passenger vehicles and trucks. Avoid unnecessary abrupt maneuvers, sudden stops, or over aggressive turns. If larger tires are installed your speedometer will read lower than the vehicles actual speed, we highly recommend a speedometer calibrator (included in some kits)

BE LAWFUL, TREAD-Lightly, Drive With Care, Reduce Speeds and Wear Seat Belts at All Times

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RIPP Supercharger kits feature products from these manufactures; we also recommend using them for routine service thereafter.



The following is a list of tools recommended by RIPP for proper installation of your supercharger system.

- Chassis lift or ramps
- Air or electric impact tools
- Basic mechanics tools (Metric tools will be required)
- Thread lock
- Coolant and Catch Pan
- Emery Cloth
- Torque Wrench

Recommendations:

- It is essential to start with a cold vehicle.
- Secure any radio or alarm codes beforehand.
- Disconnect any large audio systems until AFTER fuel/ignition computers have calibrated.
- Confirm the end user's oil grade and type (synthetic or conventional) and change oil and filter at this time. We recommend a **premium oil and filter.**
- Spark plugs should be changed to NGK brand plugs and gapped to .032" (some kits come supplied with proper plugs, however they are not gapped see instructions for gapping).


INSTALLER: Read and understand entire instruction manual before starting installation of system.

Reverse out any and all Performance Tuners before tuning with RIPP products; including speedometer correction devices, gear correction or performance tuners. Email RIPPTUNING@gmail.com for tuning and device questions.

Run *only* the gear and tire calibration portion of any additional hand held programmer. Do not combine any performance tuner or tune with the supercharger unless otherwise advised to by a RIPP professional.

DO THIS BEFORE INSTALLING SUPERCHARGER
THE SUPPLIED DIABLO DOES HAVE A SUPERCHARGED TUNE ON IT

STEP (1): Updating Tool THERE ARE INSTRUCTIONS IN THE BOX ALSO

1. Bring Diablo Intune to your PC and plug it in using the supplied USB cord to both the PC and the top of the tool (For Owners using APPLE Computers, please contact Diablo Sport for proper procedure)
2. Give it a few minutes to boot, it's slower than most modern electronics
3. Once fully booted it will show up as a drive on your PC
4. There are two drives: 1) The first with a folder showing Tunes, Logs and Run Time, these will be used in later steps. 2) The second will have  a small black diablo Intune icon - **PRESS THAT**
5. A full size Diablo Intune should display and boot up on your PC's screen, it may start auto updating on its own and start the process (leave it alone). If auto update process does not start, press "Update" button.
6. Let the tool update, once done it will reboot this could take 10-20min depending on the update size
7. The tool will go through many steps on its own do not unplug it or touch anything while it's updating.
8. Once rebooted repeat steps 1-8 until the TOOL reads "This Tool is Up To Date."

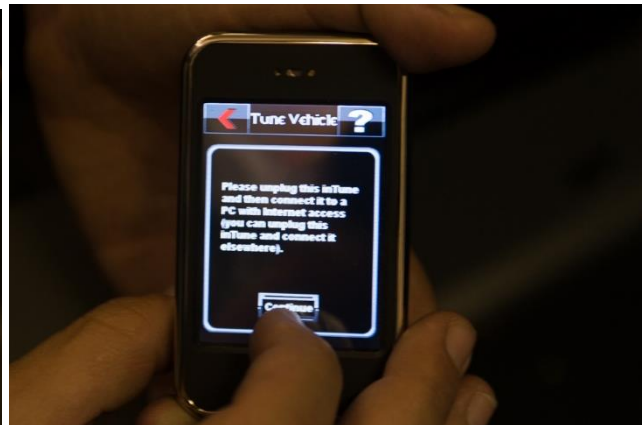
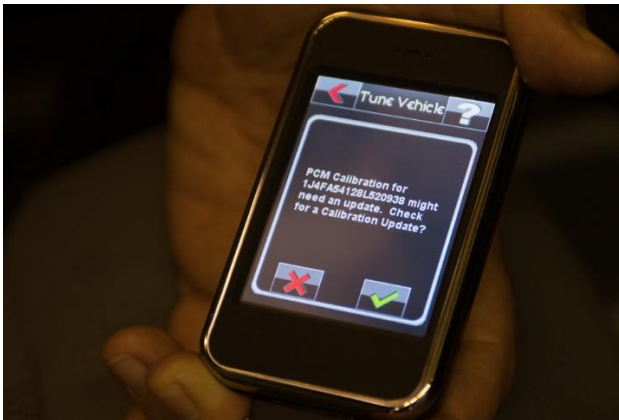
Step (2): Diablo Sport Instruction Steps

- 2012-2014 SRT Diablo's are Pre- Programmed (unless supplemental instructions provided)

During the file writing process your dash board will flash and ring several times.
Please follow the tools steps, using this pictorial as a guideline



During installation of the Diablo it's normal to come across a Calibration ID Update on the Diablo's screen. This will require you to go to a PC with internet conductivity and plug in your Diablo with the supplied USB cable before you are able to retrieve the original back up and finally install the RIPP tune. Then you will go back to your vehicle and commence tuning.



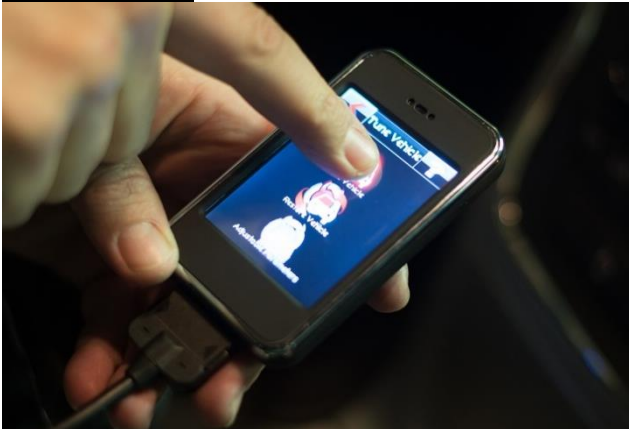
RIPP Supercharger for 2011-2014 Jeep Cherokee 3.6 Pentastar VVTi



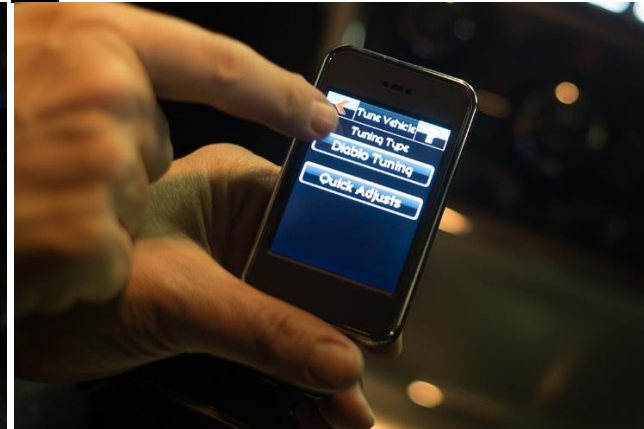
Tune Vehicle



YES



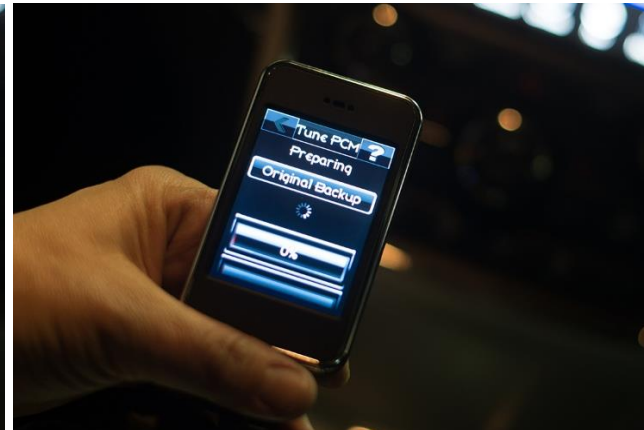
Write Vehicle



Diablo Tuning



YES



- Ripptuning@gmail.com tuning related issues NOT tech@rippmods.com

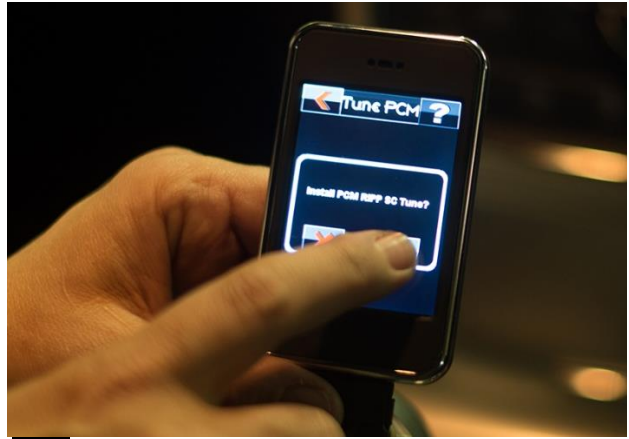
Select the appropriate tune for your set up -

RIPP SC Tune is for the SC at any elevation using 91+ fuel

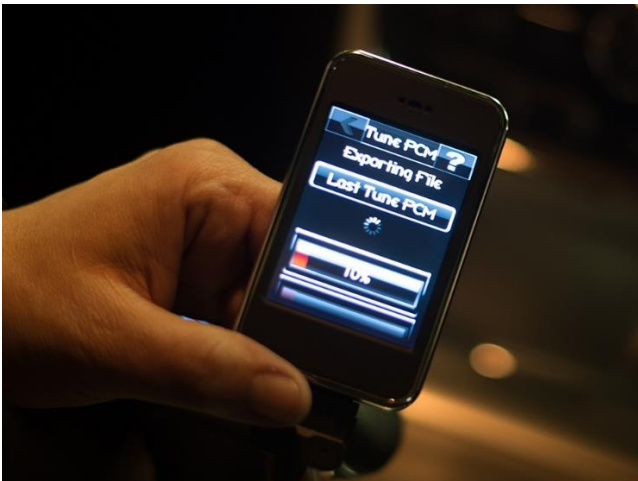
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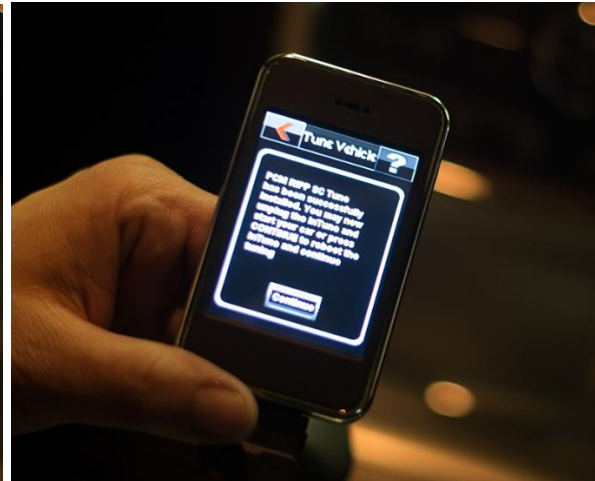
YES



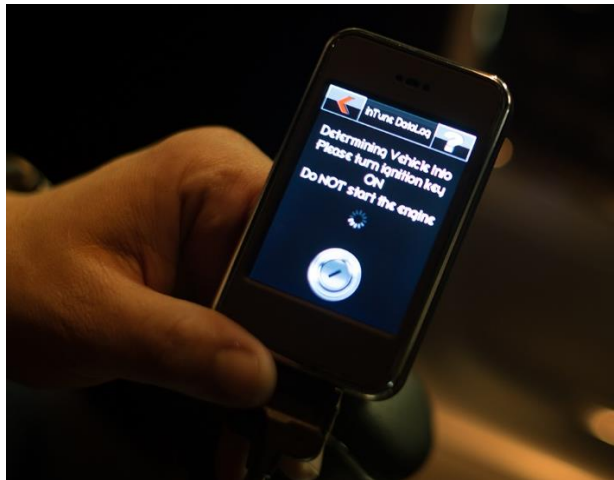
YES



CONTINUE



YES





CONTINUE

Your Diablo is equipped with a RIPP SC tune, this is what will be selected to calibrate your vehicle. If you're experiencing a connection error or problem communicating with your PC or vehicle please contact Diablo Sport tech dept. [561-908-0040](tel:561-908-0040)

START OF SUPERCHARGER INSTALLATION

Note: A chassis lift or ramps will help you access the lower pieces in the bumper removal. If you have these please exercise extreme caution in properly securing the vehicle on the mechanical lift and or ramps. If using ramps please be sure to properly chock the rear wheels and apply the emergency brake. If using a jack and jack stands please make sure to properly cock the rear wheels and apply the emergency brake.

Step: (1) Remove Front Bumper:

Lower Valance/Brake Duct Removal (plastic clips will be reused)

- 6pc 8mm Bolts in lower wheel well
- 2pc 13mm bolts and pop clips rear of valance
- 2pc 10mm Bolts on each side of the lower bumper
- 5pc Pop clips along lower front bumper where valance meets the bumper cover
- Remove from vehicle and set aside, this will be reinstalled (see following step)



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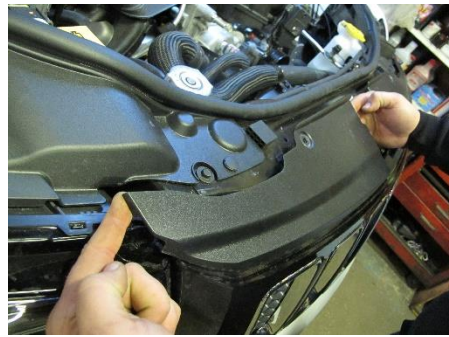
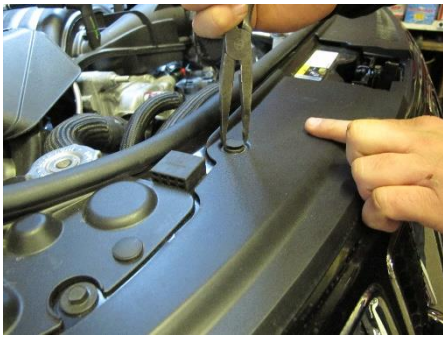


Step: (2) Remove Front Bumper: (3.6, 5.7 & 6.4) 2013+ pictured

NOTE: 2011-12 Vehicles Remove grill separately and continue

Upper Bumper Cover:

- 2pc Pop clips on upper radiator support
- Pull on top of bumper & radiator support until the clips pop loose
- Carefully pull out the 4 inner fender-well rivets
- Can be drilled, (new push in clips supplied)



Disconnect plugs on Passenger side if equipped:

- Fog Light
- Parking Sensor
- Parking Light

Disconnect plugs on Drivers Side:

- Parking Light
- Fog Light

- Unplug the following Plugs on Drivers and Passengers side inner bumper/fender-well

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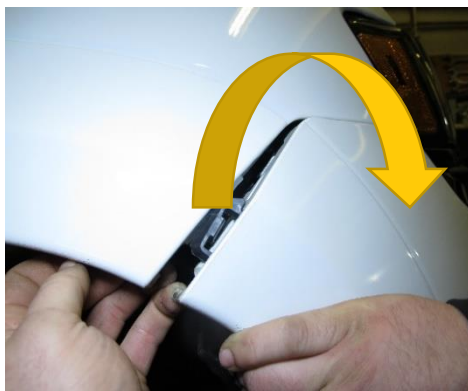


Passengers Side



Drivers Side

Summit and SRT Style fenders



Gently pull the fender toward you with controlled force to separate the locking tabs that connect the bumper to the fender. Hold the fender and the bumper and push the bumper in towards the vehicle while also pulling down in one motion. You will hear a popping sound once bumper is free, this is normal.

Limited Style Fender



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Pull out from under lights on both side



Step (3): Remove air filter box from vehicle

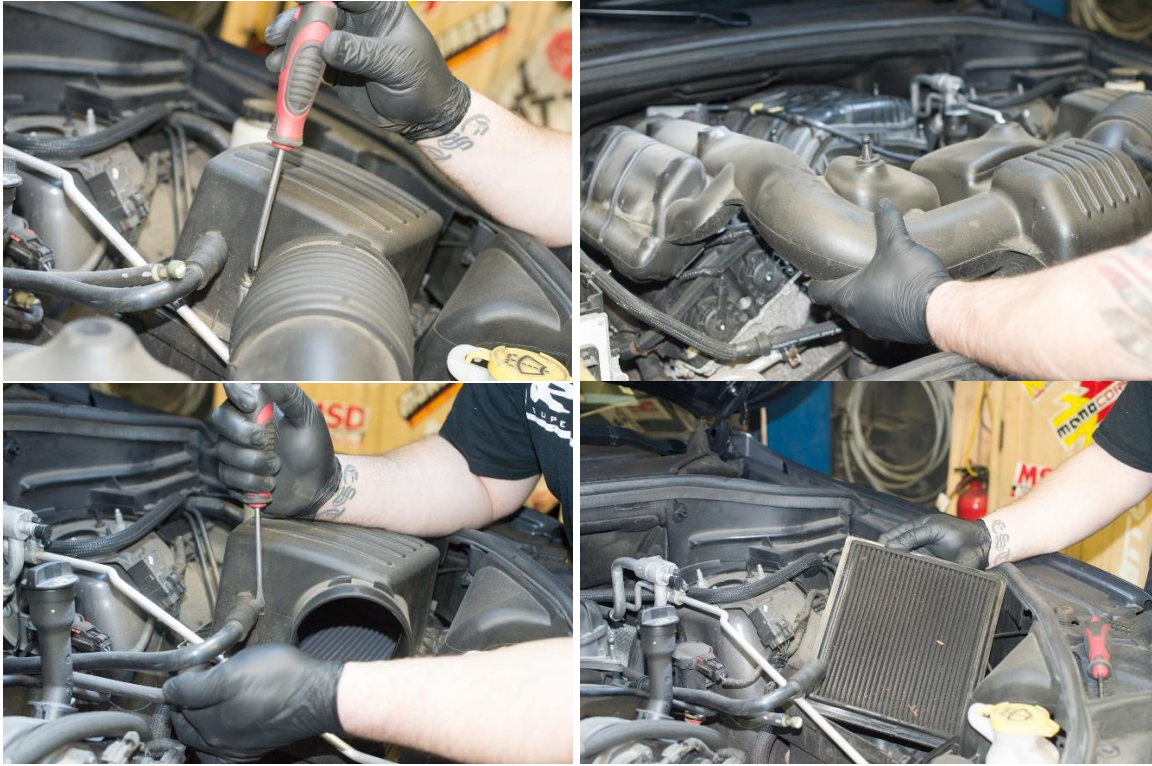
- Pull air temp sensor from factory air tube.

Note: Twist to unlock slowly on the Air Temp Sensor and straight as it will break coming out on an angle - THIS WILL BE REUSED IN LATER STEPS

- Unplug Intake Air Temp Sensor
- Disconnect Breather Hose
- Unclip Retaining clips
- Loosen Clamps
- Lift and remove Air Intake Pipe (Factory air box will be reused, do not remove)
- Remove breather from air box
- Replace filter with drop in air filter

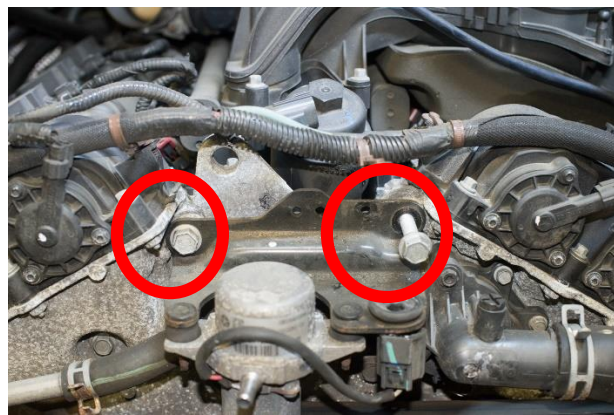
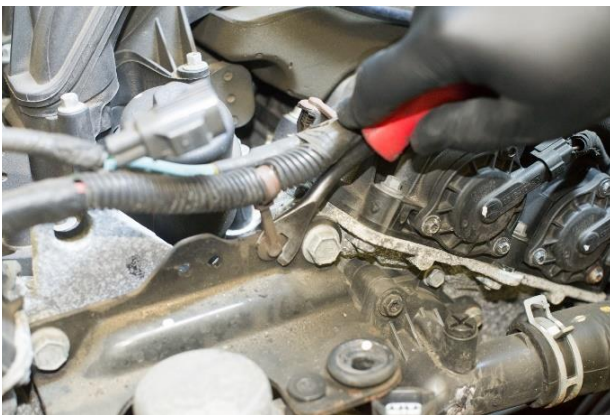


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Step (4): Remove Factory Vacuum Canister:

- Unclip vacuum hose
- Unclip vacuum wire harness
- Remove plastic fastener holding wire harness to mount
- Unbolt circled bolts



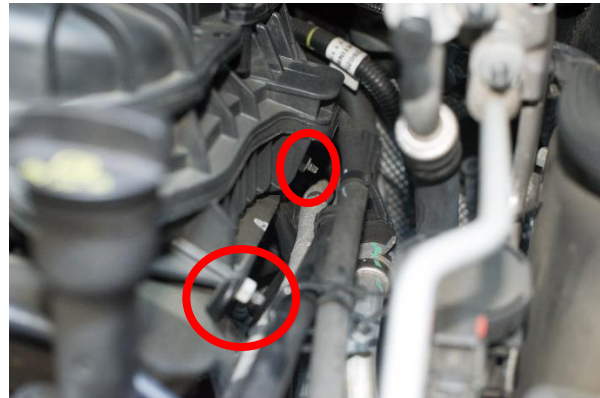
Step (5): Remove Throttle Body:

Prepare to remove the intake manifold with the following steps

- Unplug Vacuum line behind throttle body
- Unplug Throttle Body
- Unscrew and remove Throttle body
- Unplug MAP sensor and remove



Step (6): Remove Intake Manifold



- Remove seven, 8mm bolts holding manifold down
- Remove two 10mm Bolts on drivers side manifold
- Remove bracket behind throttle body

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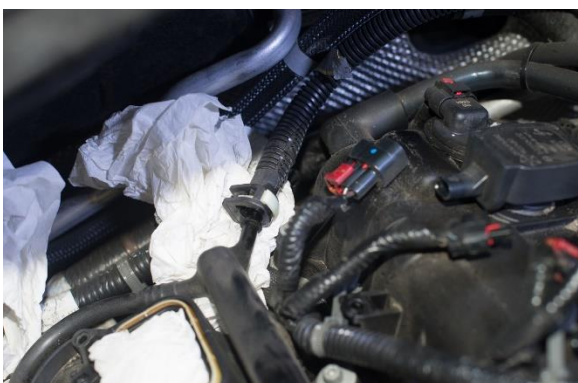
- Remove braided line from drivers side rear corner of manifold
- Remove foam insulator



- Once intake manifold is removed, cover intake ports with tape or rags to avoid getting debris in intake runner

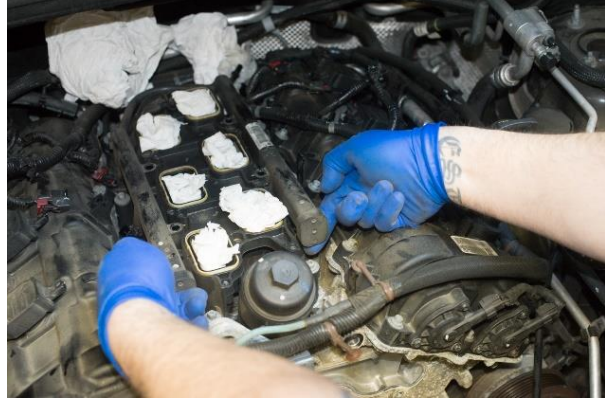
NOTE: Vacuum any sand or debris around injectors before removing injectors to avoid getting dirt in engine.

Step (7) Replacing Injectors



1. Unplug injector by pulling back on the red safety latch, then unplug injector, do this for all six
2. Using T-27 Torx-Head socket removed four bolts holding the fuel rail onto the lower Plenum
3. (note: fuel will spill out of injector rail be prepared)
4. Slowly remove fuel rail and injectors

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- Leave fuel rail in vehicle; flip over to driver's side. Remove stock injectors from rail - make sure stock O-rings are all accounted for
- The supplied injectors are taller than the stock ones, shims are provided to compensate in later steps.
- Please note the color of the bottom grommet (Green - existing, will be replaced) on the new injectors as pictured, you will need to install the supplied Black/grey grommet. If you choose to you can also use the factory bottom injector grommet.



- Grease o-rings as shown, this will make installation easier





- Install provided shims
- Reinstall fuel rail
- Use supplied longer hardware
- Tighten

Step (8): Gap Factory Sparkplugs



Note: Spark-Plug boots can get stuck inside the head. Pulling on them with a pliers or poking at them with a screwdriver will break them. Please spray a small amount of lubricant in the inner-and-outer walls and work gently until loose.

Be very careful handling spark plugs, damage to electrodes when gapping or incorrect installation can cause misfires and unfavorable driving conditions.

Take your time!



- Unplug all coils and unbolt from valve cover
- Remove coils
- Take out spark plugs and gap down to .032in
- Reinstall - reverse previous steps.

Step (9): Grind Intake Manifold down as shown to clear fuel rail and reinstall

Critical Step

Note: Special care must be taken during this step. A small piece of plastic the thickness of a quarter (.025 cents) 16th of an inch or 1.5-1.8mm max needs to be shaved from the intake manifold to make clearance for the larger injectors. If you shave down the manifold too much you will go through to the other side and cause a major vacuum/boost leak. Please look at the picture and understand the amount that needs to be shaved down it's best to use a hand file for this step instead of an air saw or grinder to get more control.

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NOTE:

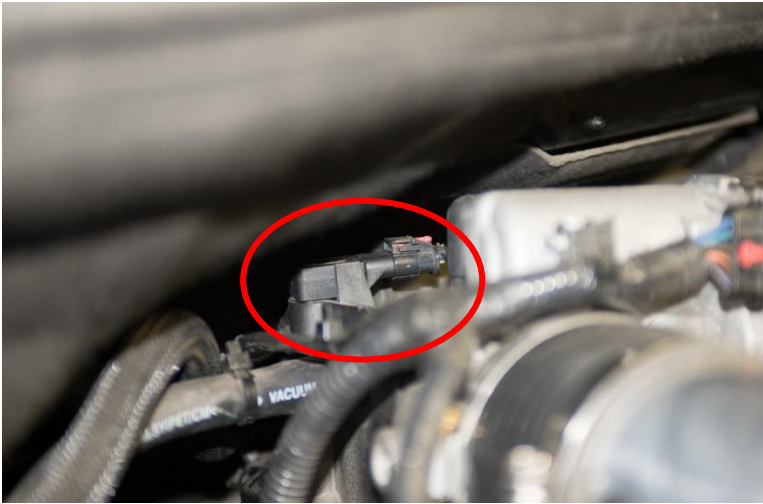
- Take care in shaving down the manifold. Too much shaving will go through to the other side causing vacuum leak.
- Make sure to clean shavings from inlet runners
-



- Reinstall intake manifold reversing the steps previously used to remove it
- Reinstall the throttle body and plug in

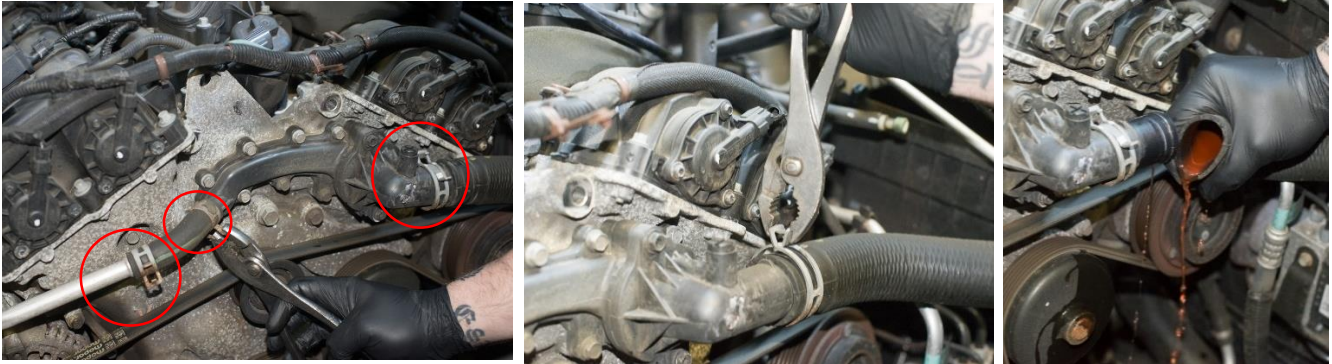


Step (10) Installing RIPP MAP Sensor

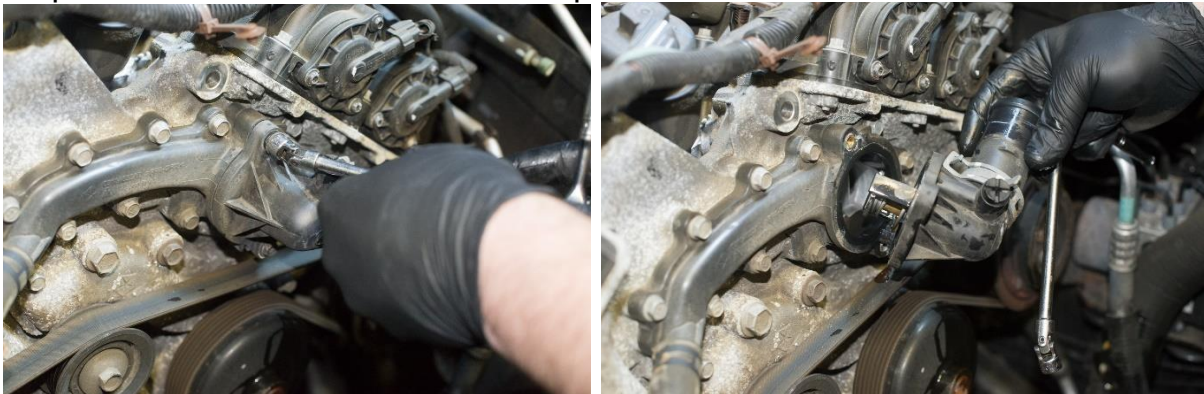


- The OEM MAP sensor is located at the rear of the passenger side upper intake manifold (plenum)
- Locate it and unplug it
- It twists out
- **Install The RIPP provided one** (With RIPP Log on top) and twist into place

Step (11): Installing RIPP coolant transfer housing



- Unclip thermostat hoses and remove. Prepare for coolant to drain

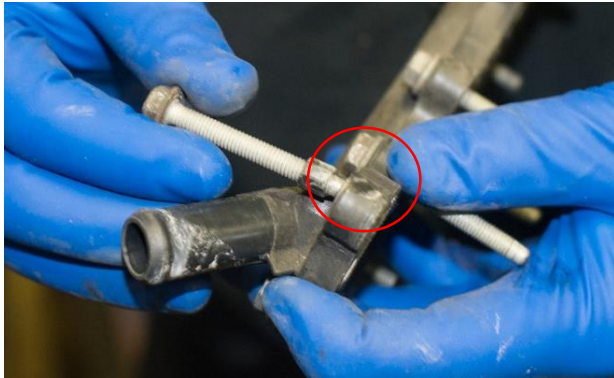


- Unbolt thermostat housing and remove bolt
- Unbolt and remove coolant transfer plate

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- Remove screws from coolant transfer plates as well as black plastic retainers. Take note of different lengths as these need to go back in their respected locations



NOTE: Apply a thin coat of the supplied RTV onto the RIPP coolant transfer plate and spread as shown. Take care in making sure no RTV gets into the coolant passage. Wait 15 minutes for RTV to get tacky before installation.



- While waiting for RTV to get tacky, get bolts in place from existing coolant housing and transfer them over to the new hardware.
- Wipe block with an emery cloth ensuring a clean surface for the new coolant housing plate.

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- Install new housing into the block, tightening bolts at the same rate progressively.



- Reconnect coolant lines and retainer clips
- Reconnect thermostat housing

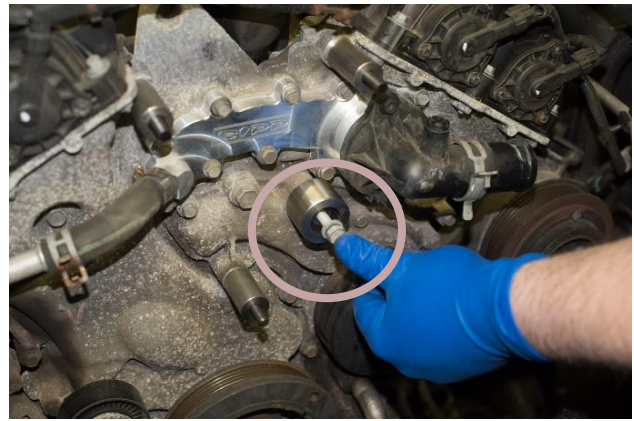
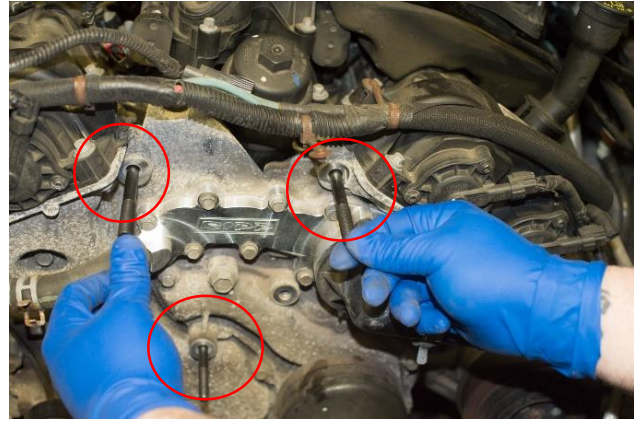
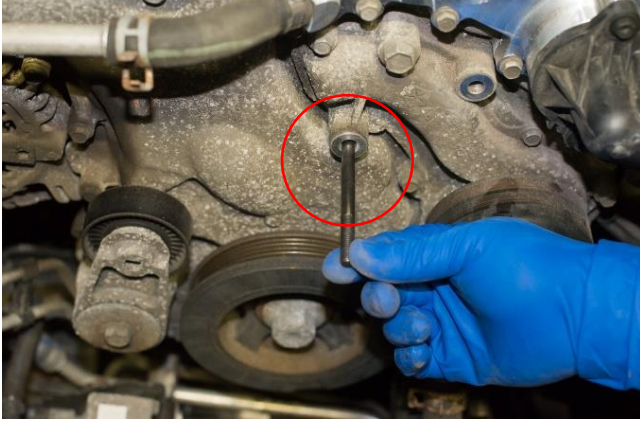
Step (12): Installing supercharger and bracket to the engine

- Loosen factory tensioner and remove belt
- Unbolt factory idler pulley and bolt as shown



- Insert stud into the labeled holes, then add the machined spacers.
- Insert supplied idler into the (green) labeled hole underneath thermostat housing

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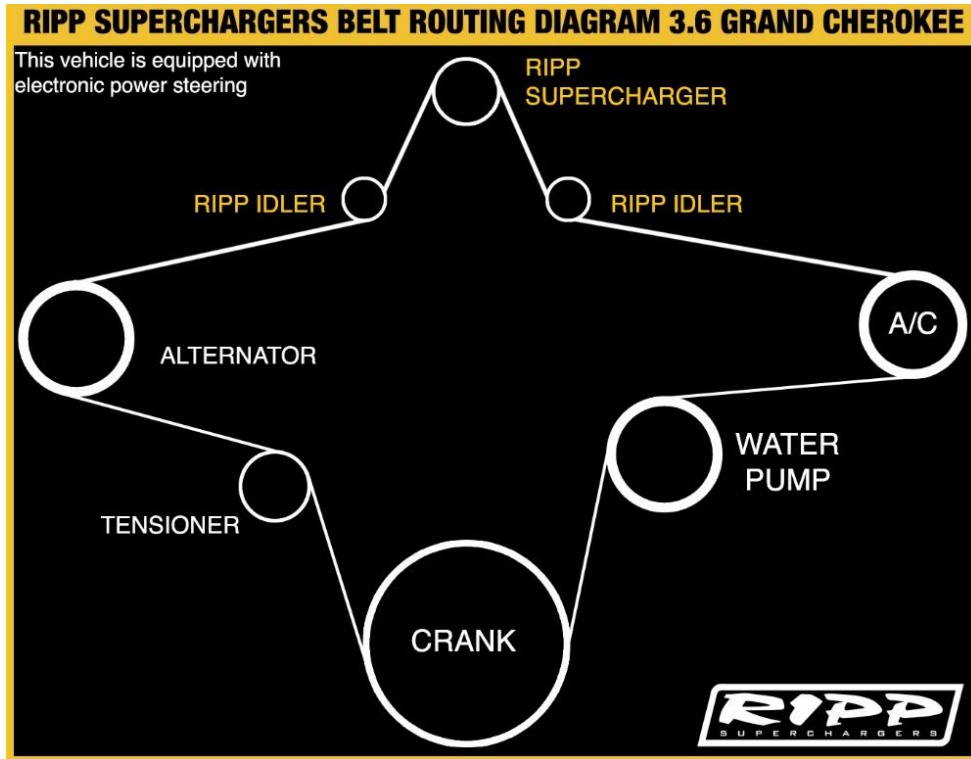


- Prepare blower unit to be mounted, take note of belt routing and hold as shown



- Fit blower bracket into the previously installed studs.
- Tighten down bolts as shown
- Route belt according to below diagram
- Tighten down tensioner

Step (13): Serpentine Belt Routing



- Remove bolt above alternator circled, insert bracket and replace with supplied bolt as shown
- Remove vacuum pump from factory bracket and bolt into new mount.
- Reconnect vacuum line and harness connector from vacuum pump



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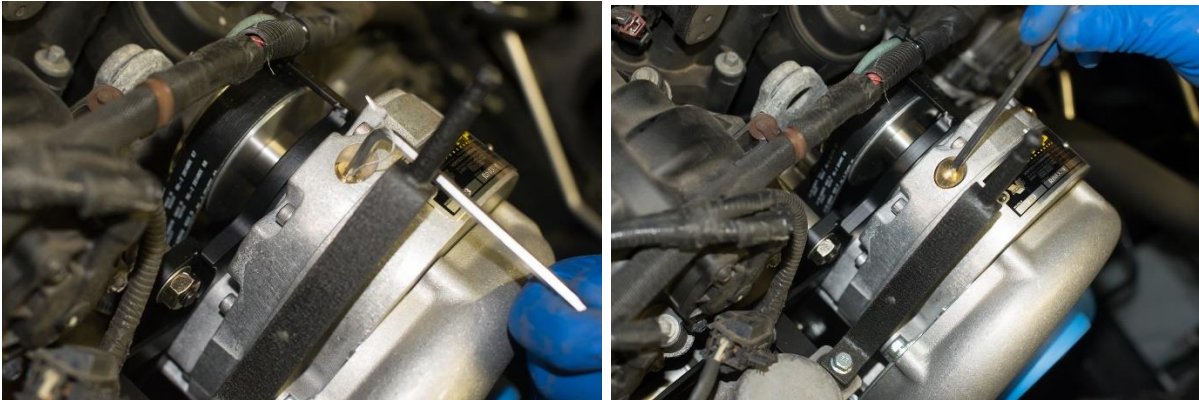
- Zip-tie engine harness so it does not come into contact with the running pulley/belt
- Connect engine cover bracket to the top of the blower bracket



Step (14): Install Supplied Supercharger Gear Case Vent:

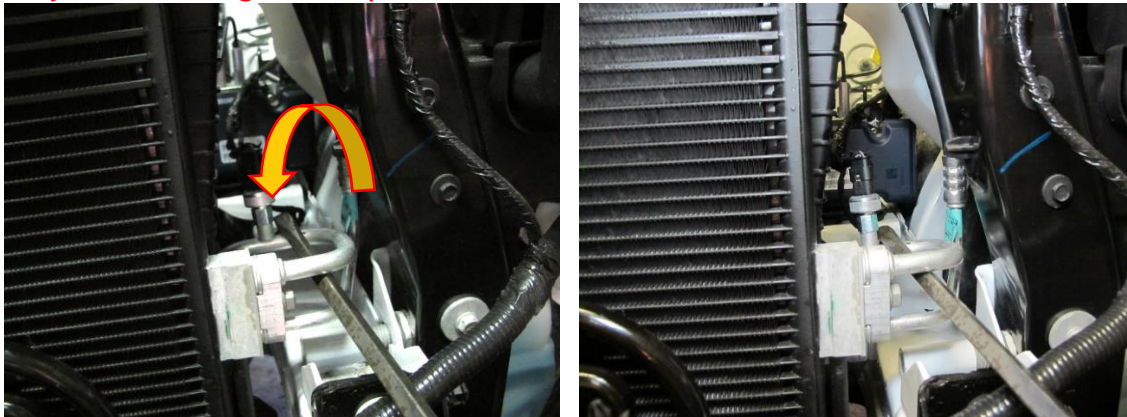
- The supercharger came with a tag and brass fitting attached to it
- This is the Gear-Case Vent, Remove shipping plug and save for future service or sale.

NOTE: If this is not installed you will blow the seals out of the blower, leaking oil and causing irreversible damage to the unit. Vortech will instantly know this is wrong and void any warranties expressed or implied.



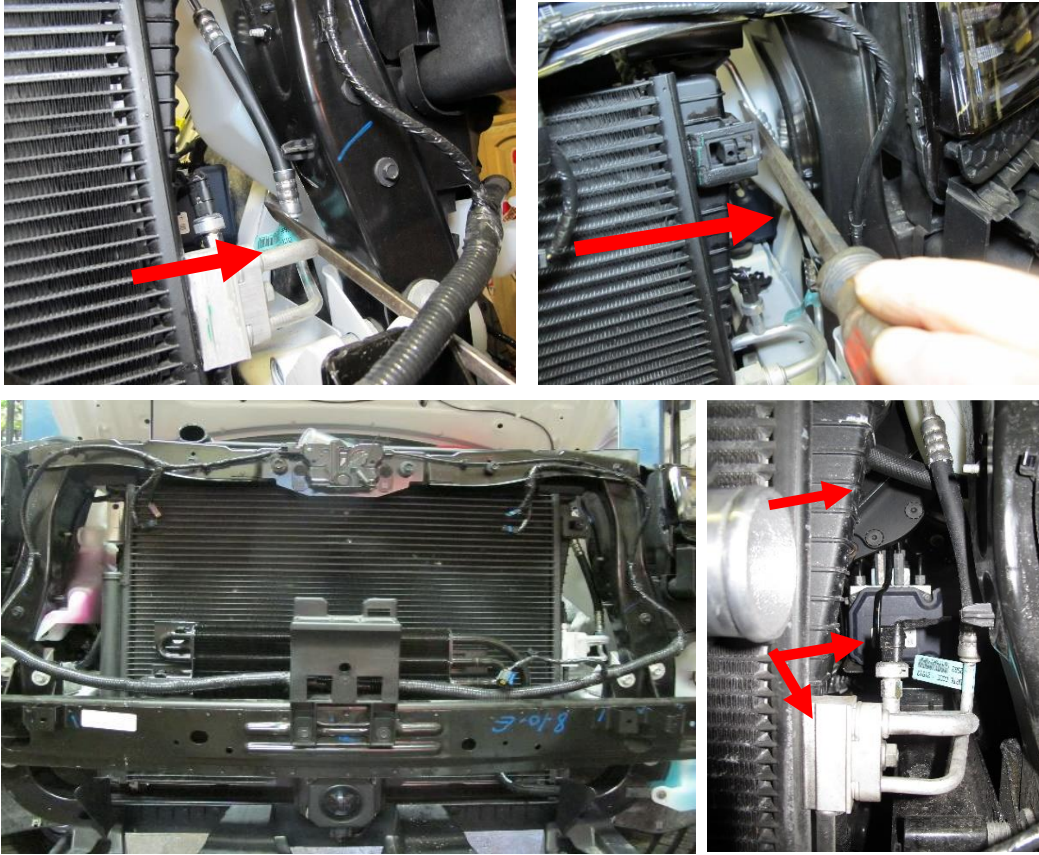
Step (15): (CRITICAL STEP) Adjust AC Line to Clear Supercharger in Later Steps

- This step is to make room for the intercooler pipe in later steps. **It is critical that you do the following steps as requested. RIPP will take no responsibility for damages you may occur during this step.**



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- **Slowly** use large screw-driver to slightly bend aluminum A/C lines out of the way. This will make room for the boost pipes in later steps. Use a controlled even force when bending these, over forcing them can break them causing Freon to escape.



Step (16): Installing Front Mount Intercooler, Brackets, Core and Piping

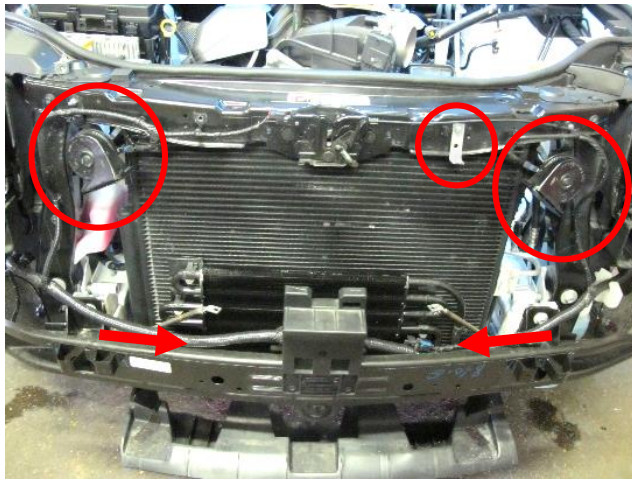


Figure 1



Figure 2 Drill these holes first

- Relocate horns as shown
- Install supplied lower front mount intercooler supports where you previously removed the factory upper radiator support cross braces FIG 1. Use factory hardware, leave loose.
- Install Upper Intercooler L brackets FIG 2 (Page 21) onto the intercooler (RIPP facing forward)
- Bolt the lower mounts onto the Intercooler using supplied 8mm bolts and washers
- NOTE: Make sure the intercooler is level to the upper radiator support before next step
- Once in place mark the upper holes and Drill mounting holes into upper radiator support for upper front mount intercooler supports

RIPP Supercharger for 2011-2014 Jeep Cherokee 3.6 Pentastar VVTi

- Use supplied hardware to tie down upper intercooler to radiator support



- Tighten all supports from lower to upper

Step 17: Installing Intercooler Pipes:

- Place Air Temp Sensor Into 3IN Straight coupler FIG 1&2 make sure tab faces throttle body FIG 3



FIG 1

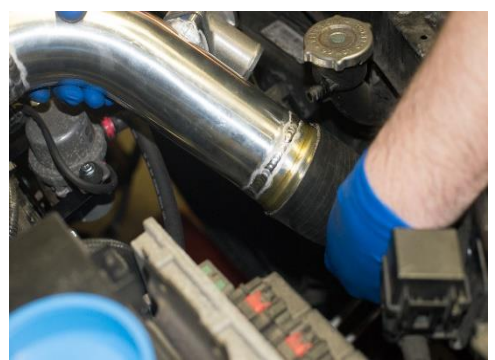


FIG 2



FIG 3

- Place 3in straight coupler on throttle body with clamps and tighten onto throttle body only
- Place one 2.5in 90deg coupler on end tanks of intercooler with clamps, leave loose (short side to FMIC)
- Place 3in to 2.5inch reducing coupler onto Pipe 1 with clamps leave loose



* Passenger Side (LHD) may have to bend the A/C Line slightly too clear using same technique as drivers side (LHD)

RIPP Supercharger for 2011-2014 Jeep Cherokee 3.6 Pentastar VVTi

- Adjust pipes for proper clearance, make sure there are no pipes interfering with air conditioning or other lines. Once adjusted tighten all clamps.
- Once you are sure that all things are clear- tighten all clamps from the blower to the inlet of the intercooler.

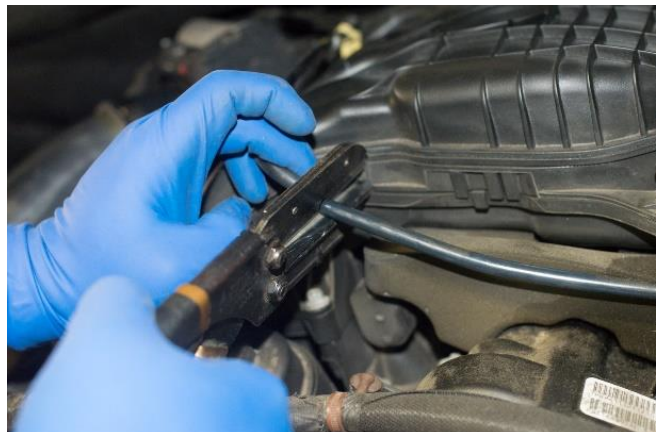


Step 18: Intake

- Install couplers and pipe onto inlet of supercharger then on the factory airbox.
- The factory airbox clamp will be reused
- Adjust pipes until the fitment is correct
- Tighten down

Step (19): Installing Vacuum/Boost Reference Source FOR Blow Off Valve

- Install blow off valve into intercooler piping
- Locate the hard vacuum line off the intake plenum behind the throttle body
- Cut as shown and install **supplied Tee fitting** with attached vacuum lines by pushing into place.



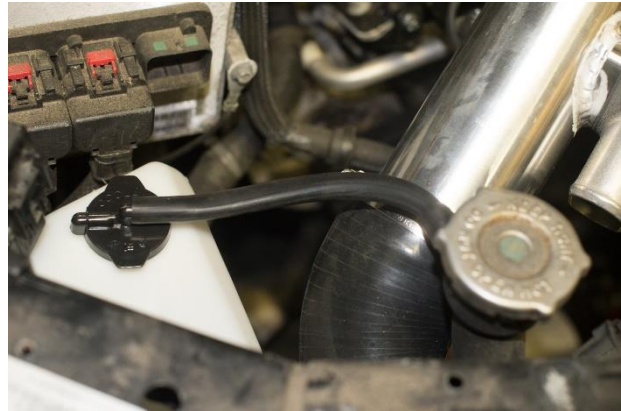
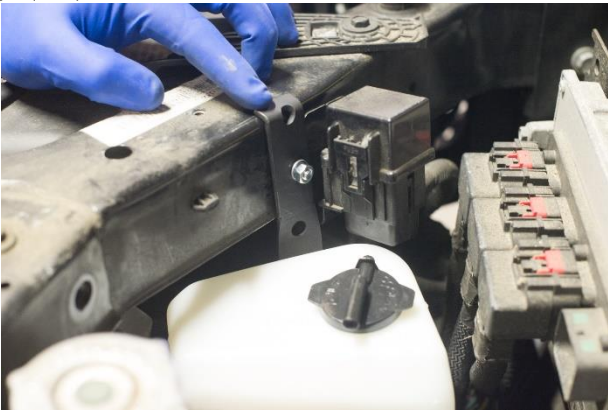
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Step (20) Air TEMP Sensor Cut tab from back of outside air temp sensor and mount as pictured



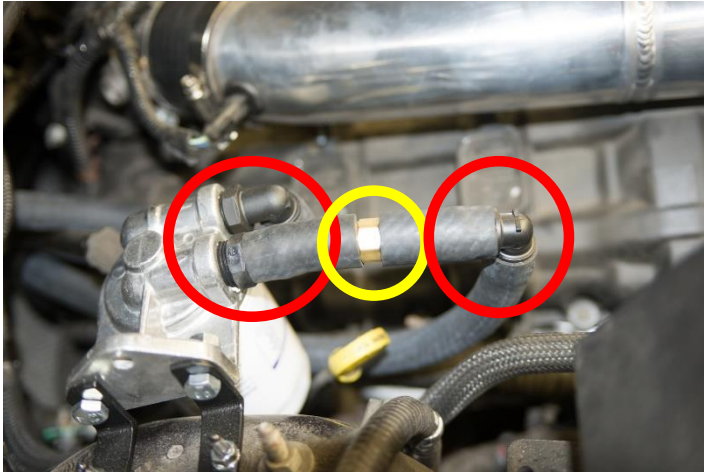
Step (21): Install coolant over flow bottle



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Step (22): Installing 30psi PCV Valve and Filter **(Attention Critical Step)**

- The PCV valve is a **ONE WAY** check valve and is critical to the proper running of your kit. It stops boost from entering the crank-case, but allows vacuum to travel back in for proper crank-case ventilation.
- Remove any aftermarket Catch Can System from vehicle and replace with supplied kit



RIPP Catch Can Setup



- Remove Crank Case Vent hard line located on the pass side rear intake manifold
- Cut approximately 2.5in out of OEM tubing
- Install **supplied PCV Valve** as pictured with stamped arrow pointing towards throttle body.
 - Zip ties can be used to additionally in this step
 - Install filter on Passenger Side shock tower using supplied hardware

Step (23): Wrapping it up (Attention Critical Step)

- Going over all your bolts, clamps, hoses, tie wraps, and fluids **twice** (Don't skip this step).
- Reinstall just the plastic clip holding the AC lines removed in **Step 7**
- Refill your engine oil with fresh oil and filter
- Make sure you followed the oil breather instructions for self-contained blowers
- Check oil level in self-contained units before starting the vehicle
- Refill your coolant (as per the factory guide lines)
- Make sure all plug connections are solid and no wires are exposed
- Go over vacuum diagram making sure your sending vacuum properly
- Make sure all hoses are tight
- Make sure all ignition wires are tight and clicked in

Step (24): Starting the vehicle and dialing it in for the first time:

NOTE: WHEN STARTING VEHICLE FOR THE FIRST TIME, KEEP AN EYE ON THE BELT ALIGNMENT.

- Start the vehicle and bring to idle.
- **Check for leaks**
- **Fuel leaks**
- Oil leak feed (if so optioned)
- Oil Leak return (if so optioned)
- Blow off valve is open at idle
- Vacuum leaks
- No misfires (running on five or not starting at all)
- No immediate engine lights (**Attention Critical Step**)
- If anything is loose shut it down and repair.
- If everything seems in order, let it run for 30-60 seconds, then shut down and let the vehicle sit for a minute. Recheck the oil level on the dipstick. (CHECK the entire fuel feed and return system for leaks-if so optioned).
- Test drive vehicle by gradually working up to full throttle and paying close attention to any abnormal sounds or engine detonation.

CAUTION!!! Make sure there are no fuel leaks upon initial startup. Proper inspection of all fuel connection must be assessed before starting the vehicle. If there are fuel leaks, shut the vehicle down and repair.

STEP (25) REINSTALL SUPPLIED PUSH CLIPS & PLASTICS GASKETS BUMPER AND LOWER DEFUSER reversing removal steps

Trouble Shooting Guide:

This is a reference guide to help you tech any issues you may encounter during or after the installation. The following are the most common issues that are resolved.

No start (Includes long crank-no start):

- Check fuses; if there is a no start situation it could be a blown fuse. If a fuse is blown it could have happened during installation and went unnoticed. If it blows again there is a direct short somewhere, trace your steps
- Make sure all sensors you may have touched are plugged in

Running rough and Check Engine lights:

- Is the RIPP MAP Sensor & TUNE installed?
- Make sure the air temp sensor is plugged in.
- Make sure Vacuum lines are hooked up correctly
- Make sure all vacuums are sound
- Make sure PCV valve is correctly installed, if backwards you will pump boost directly into the crank case. This will blow every seal out, examples being valve cover gasket.
- Make sure your spark plug wires are snug AND CLICKED IN (if equipped)
- Make sure you coil packs are plugged in and bolted down
- Do not use ANY other electronic power this will conflict with the RIPP mapping and cause run faults.

Maintenance/Guidelines

The RIPP Supercharger systems require minimal maintenance, beyond normal vehicles regularly scheduled maintenance. Use guidelines listed below and you will receive many years and miles of enjoyment from your system. **BLOWER COMES PREFILLED WITH V3 FLUID FROM RIPP**

Changing The Oil in the V3 Compressor

V3 supercharger long term maintenance and care:

- **CAUTION: Use of any fluid other than the Vortech supplied synthetic lubricating fluid will void the warranty and may cause component failure. Replacement Vortech SL lubricating fluid part numbers: 009035: Package of three 4 oz. bottles**
- Check the fluid level using the dipstick at least every 2,500 miles.
- Initial supercharger fluid change must be performed at 2,500 miles. The supercharger fluid must then be changed at least every 7,500-10000 miles.
 - Drain the fluid VIA THE Stainless Steel Line on bottom of blower; re-fill the unit only with 4 oz. of Vortech/Paxton supplied synthetic lubricating fluid.
 - Confirm proper oil level using the dipstick. **DO NOT OVERFILL!!**
 - Verify that the drive belt is running smoothly.
 - Turn off vehicle and recheck all fluid levels and verify that no hoses, wires, etc. are near exhaust headers or moving parts and that there is no fluid leakage.
 - Re-install the splash pan (if equipped)



Extreme Conditions

1. **Check blower oil levels more often, running it low or empty will cause irreversible damage and will not be covered under warranty.**
2. If you operate your vehicle under extreme cold weather, follow the heavy duty/severe usage maintenance schedule in your vehicles owners' manual. Use the manufactures engine oil and filter recommendations. We strongly recommend oil changes from 3000 to 5000 miles to maintain integrity.
3. If you frequently submerge your vehicle in water, inspect all idlers including OEM units to keep belt alignment straight. This can cause premature ware and is considered a wearable item not covered under warranty.

Ignition

1. Spark plug/ignition system guidelines should be tuned up regularly. The entire ignition system should be checked bi-annually and fresh plugs installed during the first install. We recommend installing NGK Brand Iridium core plugs in a one-step colder range. These should be changed once every two years and checked more frequently in race conditions GAP TO .032in.
2. Every 15000 miles, check to ensure the spark plugs are within factory specified resistance. Replace whenever beyond specification or every 30,000 miles or whichever comes first.

Fuel

1. The use of an injector cleaner can be used yearly to help keep older injection system efficient.
2. Under race-only conditions high octane/race gas (100octane or above) can be used, but only a small amount should be used. In a quarter tank, condition (3.5 gallons) use only one gallon of race gas. Additional will burn up oxygen sensor and catalytic converters. Check with tuners first.

Mechanical

1. Inspect serpentine belt on every service interval for wear and aging, and replace if there is any sign of premature wear. If there is, abnormal wear that is reoccurring, there may be an alignment issue. Inspect pulley alignment or have a professional assess the problem.
2. Under boosted condition and with increased under hood temperatures, its normal for clamps to come loose. Inspect all clamps regularly.
3. The high flow air filter that is supplied with your kit can be cleaned with a mild detergent, or the use of an air filter cleaning and oiling kit.
4. Biannually check O2 resistance as per the technical guide in the trouble-shooting guide

RIPP/VORTECH SUPERCHARGER OWNER INFORMATION

The following information and recommendations are designed to promote years of trouble-free service for your supercharger. Each RIPP/Vortech supercharger system is built to precise tolerances using the finest materials available. Every system is subjected to an intensive quality audit procedure from the time we first receive raw castings to the time the precision machined components become a completed supercharger system. Air fuel ratios, ignition timing requirements and all aspects required to build fully integrated systems are tested rigorously. When applied to a stock engine, in sound working order, the installation of a complete RIPP/Vortech supercharger system results in the highest street legal performance with a minimum of engine wear. If the unit is given proper care and is operated using the recommendations and instructions set forth in this guide, the unit will last the life of most vehicles. If the vehicle is modified in addition to the supercharger (i.e., heads, cam, etc.) or you have increased the impeller speed, you must follow guidelines outlined in the Owners Manual.

IMPORTANT COLD WEATHER INFORMATION

In order to achieve the low noise level of Vortech superchargers, RIPP/Vortech specifies manufacturing procedures that call for minimal internal clearance. These precise tolerances however are not conducive to temperatures below 25° F . Therefore, storing the vehicle in a heated garage and/or employing the use of an engine block heater/aftermarket engine blanket is required when the vehicle is subjected to a "cold startup" in ambient temperatures below 25° F . Failure to comply with this may result in immediate supercharger failure and invalidate the supercharger warranty.

Section 1

EVERY RIPP SUPERCHARGER SYSTEM IS ENGINEERED TO MEET THE FOLLOWING DESIGN OBJECTIVES:

1. To render the highest performance within the constraints of the stock engine and its various support systems, such as the fuel and ignition systems, compression ratio and known or tested weak points.
2. To operate within the range of peak compressor efficiency by not exceeding maximum impeller speed at the engine's redline.

NOTE: Increased impeller speeds can increase boost pressure, but may do so with a penalty to supercharger efficiency. Compressors must be properly matched to each application (matching available from RIPP/Vortech).

3. To maintain long term engine life (must be installed properly on an engine which is

known to be in good operating condition prior to the installation of the supercharger). Understanding these design goals is important when applying the supercharger to custom applications. We strongly advise that when using the supercharger in a custom application, you make every effort to achieve the goals outlined.

Section 2

ENGINE STARTUP AND FUEL CONSIDERATIONS

1. Never operate your engine at full throttle when the engine is cold. When starting the engine each day, allow plenty of time for the oil to reach full operating temperature before running above 2,500 RPM. Full supercharger operating temperature is generally achieved after

the engine water temperature has been at the normal operating range for two or three minutes.

2. Always utilize the highest octane premium unleaded fuel available in your area. RIPP recommends that you always use national brands whenever possible.
3. After filling up with fuel from a source other than the one you use regularly, carefully listen for engine detonation.
4. If any detonation is audible, you may have a fuel problem. Cease utilizing heavy-throttle and drive with greater care until the fuel is consumed. If detonation is still evident, inspect for other causes such as:
 - a. Faulty fuel pump(s). Some vehicles are now equipped with more than one pump. Check fuel pressures when detonation is occurring.
 - b. Dirty injector(s), clogged fuel filter or pinched fuel line.
 - c. Faulty spark plug(s) or spark plug wires with too much resistance. Consult your factory vehicle service manual. Most wires should not exceed 10 ohms of resistance.
 - d. Improper initial timing (not set to factory specification).
 - e. Faulty ignition coil.
 - f. Cooling system not functioning properly. Check for a faulty thermostat, faulty or improper calibration of the thermostatic fan switch, water pump belt slippage, a plugged radiator, or bad fan clutch.
 - g. Dirty air cleaner.
 - h. If your vehicle is equipped with a boost timing retard device as part of the supercharger kit or an ignition amplifier, check to be sure that the unit and the timing retard knob (if equipped) is working.
 - i. Faulty or loose computer chip, if equipped.
 - j. Ensure that the spark plugs and spark plug gap are correct for a supercharged application.

Section 3

Supercharger Support System Guidelines

1. Air Filters - Use the air filter system provided in your RIPP system.
2. Air Intake/Air Discharge - Must be in good condition and properly secured. If equipped with flex hose, this must be free of damage/leaks.
3. Belt Tension - Excessive belt tension can lead to supercharger or crankshaft bearing failure. Do not use a non-slipping or cog-type belt on a supercharger designed to be driven with a serpentine drive belt (non heavy duty). Replacement belts for your application are available from RIPP.
4. Computer Programming - The use of an aftermarket computer tuning is generally not recommended as they may not be calibrated for use with a supercharger and can cause detonation. RIPP offers computer calibrations and programs specifically developed and/or calibrated to maximize the performance of a particular RIPP supercharger system.
5. Crankcase Ventilation System - You must use the system provided in your RIPP kit to prevent excessive crank case pressures and possible engine damage.
6. Pulleys - If your supercharger drive belt comes off or squeaks it may be due to misalignment of the supercharger pulleys caused by installation problems or movement of the mounting plate. Misalignment can also be caused by over tightening (and failing) of the belt, which can negatively affect the supercharger and crankshaft bearings. For years of trouble free operation when used for street applications, we recommend the drive ratios not be changed from the standard specification.

Section 4

Normal Maintenance Guidelines - Self Oiling Units Only

1. Check the supercharger fluid level using the dipstick at least every 2,500 miles.
2. Initial supercharger fluid change must be performed at 500 miles. The supercharger fluid must then be changed at least every 5,000 miles.
 - i. Drain the fluid, re-fill the unit only with 4 oz. of Vortech supplied lubricating fluid.
 - ii. Confirm proper oil level using the dipstick. **DO NOT OVERFILL!!**

3. Fluid level checking procedure:
 - i. Ensure that the .06" copper sealing washer is located on the dipstick base.
 - ii. Thread the clean dipstick into the unit until it seats.
 - iii. Once the dipstick has seated, remove the dipstick from the unit. Fluid should register in the crosshatched area on the dipstick.
 - iv. **DO NOT OVERFILL!!** Drain excess fluid from the unit if it is above the maximum level on the dipstick.

WARNING: Use of any fluid other than the Vortech supplied special lubricating fluid will void the warranty and may cause component failure.

Glossary

Air By-Pass Valve: Device designed to eliminate compressor surge. It functions by allowing air to be dumped (or routed back to the supercharger inlet on MAF engines) from the discharge side of the supercharger. It employs pressure sensor lines that operate an internal diaphragm connected to a valve. This is an essential performance improving device that also improves durability.

Air Fuel Ratio: The amount of air compared to the amount of fuel in the air fuel ratio mixture, almost always expressed in terms of mass (see stoichiometric). Ideal air fuel ratio at idle and low engine load is 14.7:1 (see Fuel rich/lean).

Ambient Temperature: The current temperature of the surrounding outside air.

Atmospheric Pressure: Normal pressure in the surrounding atmosphere, generated by the weight of the air above us pressing down. At sea level, in average weather conditions, atmospheric pressure is approximately 100 kPa (about 14.5 psi) above vacuum or zero absolute pressure.

Barometric Pressure: Another term for atmospheric pressure. Expressed in inches of Mercury (in.Hg.). How high atmospheric pressure (relative to zero absolute pressure) forces Mercury up a glass tube. 14.5 psi= 29.92 in.Hg.

Blower: Term often applied to all types of superchargers.

Boost: Condition of over pressure (above atmospheric in the intake manifold) caused by intake air being forced in by a supercharger.

Charge Air Cooler (CAC): A heat exchanger which reduces the temperature of the compressed charge before it enters the combustion chamber.

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Choke Line: Area on compressor map where the compressor can no longer efficiently deliver the amount of airflow the engine needs. It is the point where boost pressure falls off on a compressor map, even though air flow continues to increase. Can be caused by reaching the capacity of the impeller, the capacity of the compressor housing passageway, or the inlet. For example, if a Vortech V-5 F- Trim is used on a 700 hp big block engine, the supercharger would operate on the choke side of the compressor map. Proper compressor matching to the application eliminates this problem.

Compression Ratio: The ratio of maximum engine cylinder volume (when the piston is at the bottom of its stroke) to minimum engine cylinder volume (with the piston at TDC). Thus, the theoretical amount that the air to fuel mixture is compressed in the cylinder.

Compressor Housing: The housing which makes up the enclosure portion of the compressor. Also referred to as the volute, scroll or snail.

Compressor Maps: Graphic summaries of supercharger performance data (with respect to pressure and flow) generated using test equipment and procedures.

Density: The ratio of the mass of something to the volume it occupies. Air has less density when it is warm, and less density at higher altitudes.

Detonation: (Knock) Sudden increase in cylinder pressure caused by pre-ignition of some of the air-fuel mixture as the flame front moves from the spark-plug ignition point. Pressure waves in the combustion chamber crash into the piston or cylinder walls. This results in the sounds known as knock or ping. Strongly influenced by fuel octane rating, ignition timing, and compression ratio as well as boost level. May be caused by hot carbon deposits on the piston or cylinder head.

EFI: (Electronic Fuel Injection) A computer controlled fuel system that distributes fuel through an injector located in each intake port of the engine. The fuel injectors are usually fired using individual circuitry.

Efficiency Islands: The percentage values that designate the efficiency expressed in an island representation on a compressor map. The area inside the islands designate maximum efficiency, the area to the left of the efficiency islands designate the temperature is too high on the surge side, and the area to the right of the efficiency islands designate that drive horsepower is high on the choke side.

Fuel Pressure Regulator: A spring loaded relief valve that returns excess fuel to the tank to maintain system pressure.

Fuel Rich/Lean: An evaluation of air to fuel ratio based on an air-fuel value known as stoichiometric or 14.7:1. In most fuel injection systems rich/lean is determined by voltage signal from the oxygen sensor.

FMU: (Fuel Management Unit) A vacuum/boost referenced fuel pressure regulator. Used to increase the pressure by regulating fuel flow returning to the tank from the stock fuel pressure regulator.

Impeller: The finned or bladed rotating wheel housed inside the compressor housing.

Inducer: The air inlet portion of a centrifugal compressor.

Intercooler: A heat exchanger which reduces the temperature of the charge air between stages of compressors or superchargers.

MAF: (Mass Air Flow Sensor) An electric hot wire used to measure the mass or weight of intake air.

MAP: (Manifold Absolute Pressure [or its signal circuit]) Manifold pressure measured on the absolute pressure scale, an indication of engine load. At sea level, with the engine off, MAP=100 kPa (14.7 PSIG)

Naturally Aspirated: An engine without a supercharger.

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PCV: (Positive Crankcase Ventilation) Engine crankcase fumes ducted back to the intake manifold to reduce air pollution.

Pressure Boost: The difference in pressure between barometric and intake manifold absolute pressure on a supercharged engine (read as gauge pressure).

Pressure Absolute: The sum of gauge pressure and atmospheric pressure. One standard atmosphere = 29.92 in. of mercury (Hg) = 14.696 lb/in (PSI).

Pressure Ratio: Manifold absolute pressure divided by standard barometric pressure. Pressure Ratio = gauge pressure + atmospheric pressure divided by the absolute pressure. The vertical scale on a compressor map and it indicates the pressure rise across the compressor. It is scaled this way instead of psi because the inlet conditions are unknown.

PSI: (Pound Per Square Inch) PSI can be a measure of air or fluid pressure.

SAE J1723: The only way to properly evaluate the efficiency of a centrifugal supercharger. It outlines the procedures for testing and then presenting results in accurate and usable compressor maps. See www.sae.org/Prodserv/stds/J1723_199508.htm.

Speed Lines: On a compressor map, pressure at any given speed is relatively the same until the inlet chokes and the pressure falls off. Usually, when the pressure falls off, the efficiency also falls off.

Stoichiometric: The correct chemical mixture of air and fuel to yield complete combustion.

Supercharge: Increase the density of charge by compressing it before it enters the combustion chamber.

Surge: Compressor surge is a condition that occurs when there is insufficient air flow to support a specific pressure on the compressor outlet side. It often occurs during vehicle deceleration when the throttle is closed, but the compressor is still at high speed. It can occur at high RPM and small throttle opening conditions if the compressor has been refit to run faster and it can be a chronic problem if the incorrect supercharger has been selected. It can cause catastrophic supercharger failure. It heats the discharge air, reduces engine response and, if prolonged, can heat soak the supercharger. Mass air flow sensors do not function well during compressor surge.

Surge Line: The lowest flow for any speed. It is audibly identified by a coughing or banging noise and physically by a very high temperature. A volume of air rushes out the inlet, only to be sucked back in when the compressor recovers. The temperature increases every time this occurs. For example, if a Vortech V-4 XX-Trim supercharger is installed on a 2.0 liter engine, the supercharger would operate in surge or the left side of the compressor map. Proper compressor matching to the application eliminates this problem.

TPS: (Throttle Position Sensor) Sensor that provides the control module with a variable voltage that represents the position of the throttle. The TPS is usually located in the throttle housing.

Valve Overlap: The number of crankshaft degrees expressing the time when both the intake and exhaust valves are open.

Volute: A scroll or snail shape housing used to contain the impeller and diffuser. Located at the rear of the supercharger unit where the air enters the supercharger. Sometimes referred to as a scroll or compressor housing.

Vortex: Free flowing inward spiral such as seen at the drain of a bathtub.

Questions? Call us [718-815-1313](tel:718-815-1313) Monday - Friday Between 9am-5pm EST.

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