

HS-MOTORSPORTS.COM



TURBO KIT

6.7L FORD POWER STROKE

INSTALLATION INSTRUCTIONS

TROUBLESHOOTING:

Please read and understand all installation instructions before proceeding with the installation. If you have questions during the installation of this product, please email H&S Motorsports support at tech@hs-motorsports.com

Note: This product WILL fit with the EGR cooler still in place, but some of the installation steps may need to be modified slightly as this installation procedure is intended for vehicles that have already removed the EGR system.

OEM PARTS REMOVAL

STEP 1

Disconnect the negative terminal connection from both batteries.



STEP 2

Drain approximately 4-5 gallons from the primary cooling system using the drain port on the driver side lower portion of the radiator. If the coolant is fairly new and clean, use a clean container so the coolant can be reused. Tighten the drain port once the coolant is drained.



STEP 3

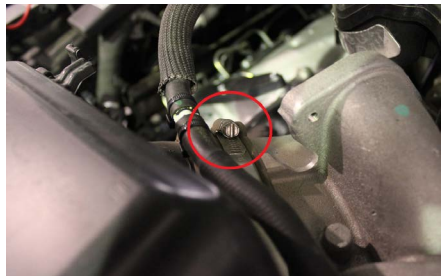
Remove the front passenger inner fender lining and set aside.



STEP 4

Unplug the MAF sensor located on the factory air intake box and remove the OEM air intake box and piping. The OEM intake box assembly will be re-installed later.

Note: Most aftermarket intake systems should be compatible with the H&S Motorsports turbo kit as well.



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STEP 5



Remove the bolt holding the engine and transmission oil dipstick tubes to the plastic intake manifold and unplug the MAP sensor electrical connection on top of the plastic intake manifold. Unclip any electrical harnesses or coolant hoses that are attached to the plastic intake manifold.



STEP 6

Disconnect the plastic/rubber coolant hose from the metal coolant pipe by carefully pinching the grey/white portion of the plastic locking connector and pulling it apart.



STEP 7

Remove the 15 bolts retaining the plastic intake manifold and remove it from the vehicle. Removal clearances can be tight, but it is easiest to pull the passenger side of the manifold out first. On 2015 vehicles, this step is a bit more difficult due to the fact that most of the bolts cannot be pulled out of the plastic manifold completely. After removal, place clean rags inside the intake openings and be extremely careful to NOT drop any items down these chambers!

Note: Removing the hot-side intercooler pipe first can also free up some extra space for the plastic intake manifold removal if necessary.



STEP 8



Disconnect the Intake Air Temperature sensor harness from the OEM cold-side intercooler pipe and remove the OEM intercooler piping, both cold and hot side. The cold-side intercooler pipe to aluminum intake connection has a large locking C-clip that must be removed completely before the pipe can be removed. The hot-side intercooler pipe to turbocharger connection has a metal locking ring that must be disengaged while pulling the pipe off of the turbocharger for removal.



STEP 9



Loosen the air inlet clamps on factory turbo (2011-2014 vehicles may have dual inlets). Unplug the throttle valve electrical connection and disconnect the crank case breather hose from the aluminum intake assembly. The crank case breather connection has a cam lock that must be rotated counter-clockwise for removal. Once the breather hose is disconnected, carefully rotate it towards the driver fender. If you have purchased a crank case breather removal kit (not required), now would be a good time to install that product onto your vehicle.

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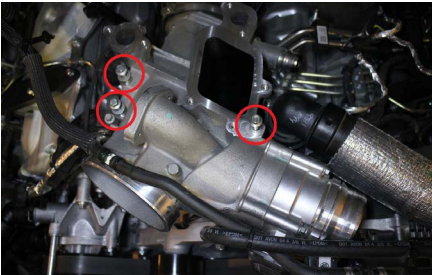


STEP 10



Remove the 3 bolts from the aluminum intake assembly and remove the assembly from the vehicle.

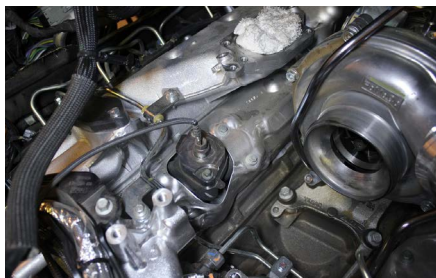
Note: It may be necessary to remove the throttle valve from the intake assembly to clear the fan shroud during removal.



STEP 11



Remove the two bolts holding the metal coolant pipe to the engine and carefully slide it out of the aluminum thermostat housing to remove it. Set the coolant pipe and hardware aside for re-use later.



STEP 12



On 2011-2014 vehicles, slide the plastic retaining ring back on the turbo coolant feed line and remove the now exposed metal locking ring to disconnect the coolant line from the turbo. Be careful not to lose this ring and re-install it in the turbo fitting after the coolant line is disconnected. On 2015 vehicles, unbolt the metal coolant pipe from the top of the turbo to disconnect the coolant feed line from the turbo.

2011-2014 VEHICLES



2011-2014 VEHICLES



2015+ VEHICLES



2015+ VEHICLES



STEP 13



Remove the spring clamp connecting the turbo coolant feed hose to the thermostat housing and remove the entire turbo coolant feed line.



STEP 14

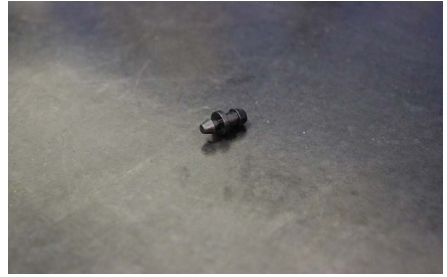


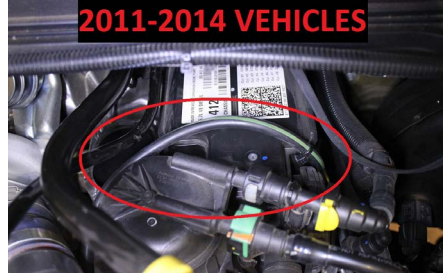
Unplug the VGT (Variable Geometry Turbocharger) electrical connection from the top of the turbo. On 2011-2014 vehicles, disconnect the vacuum hose from the turbo wastegate and install the supplied plastic vacuum plug into the end of the previously disconnected wastegate hose. Re-route and zip-tie the wastegate hose away from hot/moving parts as it will not be re-used.



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2011-2014 VEHICLES

2011-2014 VEHICLES

2011-2014 VEHICLES

STEP 15


Remove the bolts holding the turbo exhaust housing heat shield and remove the heat shield from the vehicle. Now is a good time to spray all exhaust V-band connections, intermediate exhaust pipe nuts, and exhaust manifold nuts with penetrating oil to aid in removal.

2011-2014 VEHICLES

2015+ VEHICLES


STEP 16



Disconnect the exhaust back-pressure sensor tube from the passenger side intermediate exhaust pipe. If applicable, unbolt the back-pressure sensor support bracket from the EGR cooler and set the back-pressure sensor aside for re-installation later. On 2015+ vehicles, there may also be an EGT sensor located in the passenger side intermediate exhaust pipe. Unplug the electrical connection for this sensor, but leave the sensor installed in the pipe as it will be removed with the pipe (the sensor will not be re-installed).



STEP 17



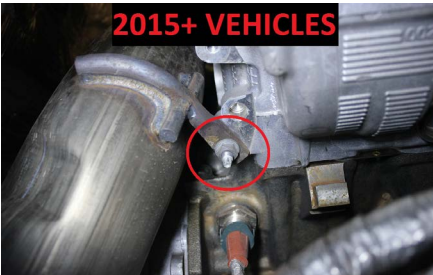
Remove the V-band clamp from the passenger side intermediate pipe and also remove the 3 nuts connecting the pipe to the exhaust manifold. Remove the passenger exhaust intermediate pipe from the vehicle. The OEM exhaust V-band clamps WILL be reused, do not damage or discard!



STEP 18



The OEM downpipe is a 2-piece assembly. Underneath the vehicle, disconnect the 2 bolt downpipe-to-exhaust connection and fully loosen the clamp connecting the upper downpipe section to the lower downpipe section. On 2015 vehicles, remove the nut attaching the lower downpipe section to the passenger side cylinder head. Remove the lower downpipe section from the vehicle. With the lower section removed, it provides much easier access to a bolt that connects the upper downpipe section to the transmission bell-housing (especially on 2015 vehicles). Remove this bolt and disconnect the V-band connection on the OEM downpipe. Remove the upper downpipe section from the vehicle.



STEP 19



Remove the V-band clamp from the driver side exhaust intermediate pipe. It is NOT necessary to remove the intermediate pipe separately here, as it can be removed while still attached to the OEM exhaust manifold.

Note: *On some vehicles, it may be easier to access the v-band clamp through the passenger fender-well.*



STEP 20



Remove the 4 OEM turbocharger pedestal mounting bolts and set aside for re-use. Ensure there is nothing left connected to the turbocharger/pedestal assembly and lift the entire OEM turbocharger/pedestal assembly out of the vehicle. This can be made much easier with the help of another individual since the assembly is quite heavy and awkward. Remove the OEM pedestal gasket from the vehicle. Place a clean rag over the now exposed hole in the engine valley and be extremely careful to NOT drop any items down this cavity!

Note: *It may be helpful to soak the front guide-dowels on the pedestal with penetrating oil to aid in removal.*



STEP 21



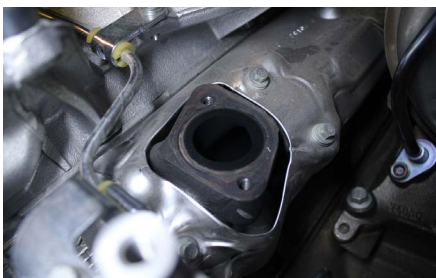
Using brake cleaner and compressed air or other suitable media, clean the driver side high pressure outlet on the CP4 fuel pump. After cleaning, loosen and disconnect the nut on the high pressure line and loosen the two high pressure line hold down bolts as shown. Rotate the high pressure line towards rear of vehicle slightly. Moving this line will provide better access to the driver side top-front manifold nut. It is very important that no dirt or other contaminants get into the CP4 outlet or fuel line while it is disconnected! Possible pump or injector damage could occur!



STEP 22



If the vehicle is equipped with an EGT solution, unplug the EGT sensor harness and remove the sensor from the bung. The EGT sensor will be re-installed in one of the HSM exhaust manifolds later. Unbolt and remove the EGT solution plate and gasket (or regular block-off plate if applicable). Stuff a small rag into the now exposed exhaust port on the passenger exhaust manifold.



STEP 23



Remove the bolts holding the manifold heat shields to the exhaust manifolds and remove the heat shields from the vehicle. Remove all 16 exhaust manifold nuts/spacers and remove the OEM exhaust manifolds from the vehicle. Retain the OEM exhaust manifold hardware for re-use. With the exhaust manifolds removed, the exhaust ports on the cylinder heads are now exposed! **DO NOT drop anything into these ports!**

Note: *The clearance between the driver side manifold and the fuel lines can be tight, be extremely careful not to apply excessive pressure to these fuel lines while disconnecting the hardware or removing the manifold.*



STEP 24



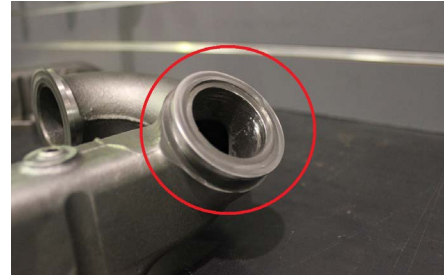
If some of the exhaust manifold studs were pulled out of cylinder heads during the removal of the OEM exhaust manifolds, carefully remove the nuts from the studs and re-install the studs into the cylinder heads now. Ensure they bottom out correctly into the cylinder heads but DO NOT over-tighten as the cylinder heads are aluminum.



STEP 25



If you are not using a factory EGT solution, install the supplied plug into the appropriate location on the driver side HSM manifold. Using high temperature thread sealant, install the supplied 1/8" NPT to -5AN adapter into the side port near the rear of the passenger side manifold as shown. This connection will be used for the OEM back-pressure sensor. Each of the HSM exhaust manifolds has an extra 1/8" NPT port that can be used for extra sensors such as EGT or drive-pressure. Now is a good time to install these external sensors if applicable. If you will not be using any external sensors, apply anti-sieze and install the supplied 1/8" NPT plugs into the ports that you will not be using. If you are not using an external wastegate, also plug the wastegate port at this time with the supplied plug and clamp.



STEP 26



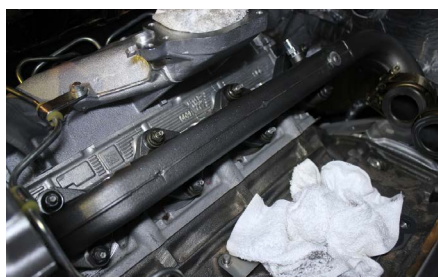
Slide one of the previously removed OEM V-band clamps onto the driver side HSM exhaust manifold. It is best to orient the bolt of the V-band clamp facing UP as shown. Slide the other OEM V-band clamp onto the passenger side HSM manifold as well.



STEP 27



Ensure the OEM exhaust manifold gaskets are in good condition. If they are not, please replace them with new OEM gaskets (not supplied). Starting with the driver side first, very loosely install the HSM exhaust manifolds into the vehicle using the OEM manifold hardware. Make sure the V-band clamps are oriented as shown during installation of the manifolds with the driver side clamp between the manifold outlet flanges. On 2015 vehicles, be sure to install the thicker spacers on the rear studs of each manifold. Be careful not to pinch or crush the V-band clamps during installation. Do NOT fully tighten the manifold hardware at this time and ensure that the manifolds are still able to be moved slightly.



STEP 28



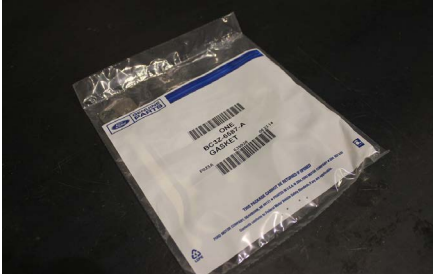
Clean and inspect the HSM pedestal assembly thoroughly to ensure no foreign materials are present in oil, coolant, or exhaust passages. Install the HSM intermediate exhaust pipes onto the HSM pedestal using the supplied two-bolt gaskets and (4) 8mm bolts as shown (the longer pipe needs to be installed on the passenger side). Torque these bolts to 22 lb/ft.



STEP 29



Carefully install the HSM pedestal assembly into the vehicle using the new supplied OEM pedestal gasket and previously removed OEM bolts. Use the loose exhaust manifolds to your advantage when installing the pedestal assembly. Ensure that the pedestal is aligned correctly on the guide-dowels and that it is fully seated against the engine block before tightening the pedestal hardware. Torque the pedestal bolts to 35 lb/ft.



STEP 30



Starting with the driver side first, slide the OEM V-band clamps onto exhaust manifold to intermediate pipe connection points. Ensure the connection points are flush and that the machined flanges fit together well. Adjust the manifolds accordingly until the flanges fit together correctly and tighten the V-band clamps securely.

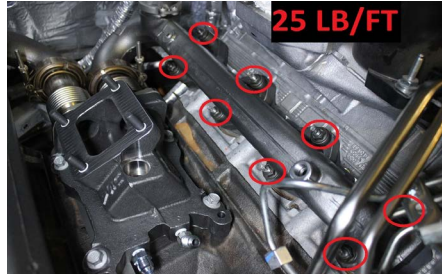
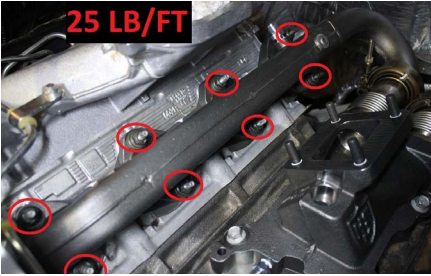
Note: *The V-band clamps can be a tight fit, so use the loose manifolds to your advantage while working the clamps into place.*



STEP 31



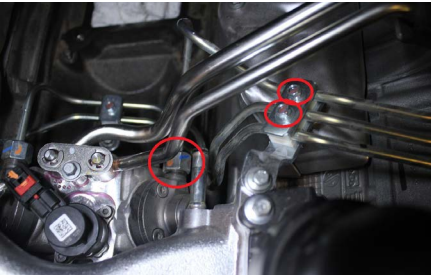
Ensure that the manifold and pedestal assembly are aligned correctly and no potential exhaust leaks or other issues can be found. Torque the exhaust manifold mounting hardware to 25 lb/ft.



STEP 32



Re-install the previously disconnected high pressure fuel line onto the CP4 pump, tighten the nut and line support hardware.



STEP 33



On early 2011 model year vehicles, sometimes there is a stud protruding from the firewall that must be trimmed for downpipe clearance. Using a grinder or saw, carefully trim approximately 1/2" from this stud. Slide the supplied HSM upper downpipe section into its approximate location from the top. It will be connected at a later time.



STEP 34



Install the previously removed OEM back-pressure sensor onto the 1/8" NPT to -5AN adapter on the passenger side HSM exhaust manifold and tighten securely. On 2011-2014 vehicles, the OEM back-pressure mounting bracket can be bent to connect to the original location on the EGR cooler assembly if applicable. Make sure the back-pressure sensor electrical connection is secure and fasten the OEM VGT electrical connection away from heat using zip ties.



STEP 35



Locate the HSM turbine flange adapter, adapter gasket, and (6) 5/16" x 5/8" stainless bolts. Install the turbine flange adapter onto HSM turbocharger and tighten hardware to 25 lb/ft.

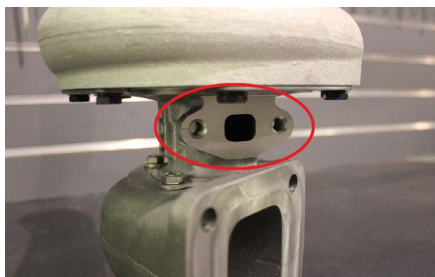


STEP 36



Clean the turbo oil drain surface and install the supplied HSM oil drain adapter onto your HSM turbocharger assembly using the supplied gasket and (2) 3/8" 12-point flange bolts as shown. Apply some assembly grease or clean engine oil to the supplied rubber oil drain fitting and push it into the bottom of the oil drain adapter, leaving the more tapered end of the rubber fitting protruding from the adapter. Ensure your oil drain fitting is not damaged and will make a leak-free seal.

Note: The oil drain is not centered on the adapter. The drain needs to be offset TOWARDS the DRIVER side as shown.



STEP 37



Install two of the supplied pedestal studs into the top two holes on the pedestal and slide the supplied T4 flange gasket onto the HSM pedestal. Apply assembly grease or clean engine oil to the rubber oil drain fitting and also to the oil drain hole on the pedestal. **VERY** carefully install the turbocharger assembly onto the HSM pedestal by rotating the turbocharger counter-clockwise to get the oil drain fitting started in the pedestal before **SLOWLY** lowering the turbocharger onto the two pedestal studs. Ensure that as the turbo slides onto the studs and that the oil drain adapter is aligned correctly in the pedestal. If the rubber oil drain adapter is damaged during installation, it must be replaced.



STEP 38



Install the two remaining studs in the pedestal and fasten the turbo assembly to the pedestal using the supplied 3/8" flange nuts. Tighten these nuts to 30 lb/ft.

Note: A short 9/16" wrench will be the easiest way to tighten the driver side mounting nuts as they are a very tight fit. The passenger side nuts can be easily reached with a ratchet and extension.



STEP 39



Using the supplied downpipe V-band clamp, connect the supplied upper downpipe section to the previously installed turbine housing adapter on the turbo. Leave this connection slightly loose at this time. Slide the supplied flat-band clamp onto the lower downpipe section as shown and then slide the lower downpipe section onto the upper downpipe section. Loosely bolt the lower downpipe section to the exhaust system using the supplied hardware.

Note: It may be necessary to temporarily strap the exhaust system towards the rear of the vehicle in order to provide room for the lower downpipe section.

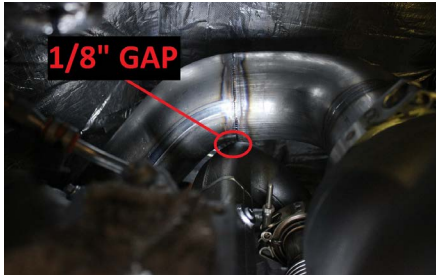


STEP 40



Adjust the upper downpipe section so that it is not coming in contact with the exhaust manifold or firewall and tighten the V-band clamp at the turbo. A gap of about 1/8" between the manifold and downpipe is ideal. Tighten the 2-bolt ball flange and flat-band clamp while ensuring that the downpipe or exhaust system is not making contact with the firewall or any other part of the vehicle.

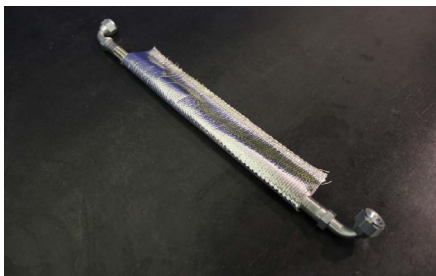
Note: *If you are using an external wastegate, now would be a good time to make the necessary connections to the downpipe if desired.*



STEP 41



fitting (passenger side fitting, marked "O" for OIL) and turbo oil feed fitting on top of the turbocharger center section. Route the oil feed line in a manner so that it does not interfere with any other parts and is away from heat as shown. Double check that the oil feed line is connected to the correct PASSENGER SIDE fitting on the HSM pedestal! Connecting it to the incorrect port will almost certainly result in turbocharger damage and possibly other engine damage!



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STEP 42



Using the supplied 3/8" hose clamp, install the supplied coolant hose between the pedestal coolant fitting (driver side fitting) and factory thermostat housing as shown. If you are using an EGT solution, install the previously removed EGT sensor into the appropriate port on the driver side exhaust manifold and plug in the EGT sensor electrical connection.



STEP 43



Remove the rubber gaskets from the OEM plastic intake manifold and wipe any oil or debris from them using a clean rag. Install the rubber gaskets into the gasket locations on the HSM intake manifold assembly. The HSM intake manifold assembly has two extra 1/8" NPT ports. Plug any un-used 1/8" NPT ports with the supplied plugs and teflon tape.

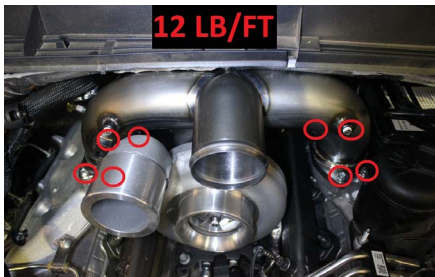


STEP 44



Clean the OEM intake manifold flange surfaces before installing the HSM intake manifold and supplied dipstick bracket with the supplied (8) M6 x 25 flange bolts. The dipstick bracket will be mounted to the driver rear manifold bolt as shown. Tighten the intake manifold hardware to 12 lb/ft.

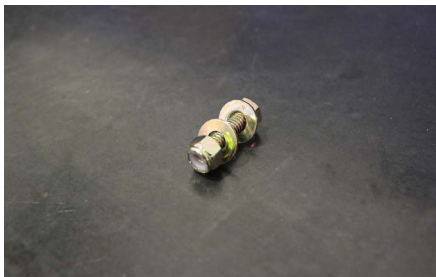
Note: *The clearance between the turbo compressor housing and firewall is tight. The easiest method to install the intake manifold is by sliding the driver side in first, then work the passenger side between the turbo and firewall.*



STEP 45



Attach the engine and transmission oil dipsticks to the previously installed dipstick bracket using the supplied 1/4" hardware as shown.



STEP 46



Remove the MAP sensor from the OEM plastic intake manifold and clean any oil/debris from it with a clean rag. Apply a small amount of assembly grease or clean engine oil to the MAP sensor O-ring and install the MAP sensor into the HSM intake manifold using the supplied M10 x 32 button-head allen bolt. Reconnect the MAP sensor electrical connection.



STEP 47



Apply a small amount of assembly grease or clean engine oil to the O-ring on the previously removed OEM metal coolant pipe and re-install it in the factory location. Securely fasten the pipe using the OEM hardware and reconnect the plastic locking connection on the OEM coolant hose.



STEP 48



Re-install the factory air intake box (or aftermarket if applicable) using the previously removed factory hardware and reconnect the MAF sensor.

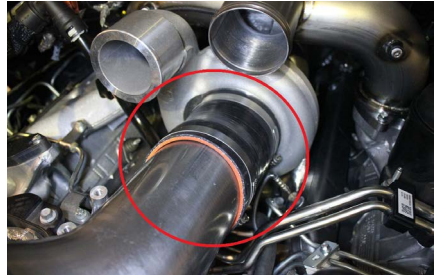


STEP 49



Locate the HSM 4" intake pipe, 20-degree 4" ID boot, 4.25" ID to 4" ID straight boot, and (4) 4" worm-gear clamps. Install the HSM intake pipe assembly with the 20-degree boot on the turbocharger and the straight adapter boot on factory air box as shown. Clock the boots and pipe to ensure that there is adequate clearance on all parts before tightening the clamps. The intake pipe needs to sit as low as possible without coming in contact with the thermostat housing.

Note: *The 4.25" ID end of the straight adapter boot will be installed on the factory air intake box, and the 4" ID end on the metal intake pipe.*



STEP 50



If you chose NOT to remove factory crank case breather assembly, locate the supplied HSM breather hose adapter and push it into factory breather hose until it locks into place as shown. Using the supplied 5/8" rubber hose, push the hose onto the end of the HSM breather hose adapter (no clamp is necessary here since it will not be seeing any pressure). Route the hose toward the driver side inner fender-well and down under the vehicle to a location away from any hot or moving parts. Make sure the hose is not kinked or pinched and zip-tie in a desired location.

Note: You may need to unclip the crank breather electrical harness from the nearby bracket to provide more slack for routing.



STEP 51



Install the supplied HSM power steering reservoir relocation bracket as shown using the supplied 1/4" hardware and OEM bolt.



STEP 52



Since the intercooler is now reverse-flow, the wiring harness for the charge air temperature sensor must be moved from the OEM location to up near the oil fill location. The wire can be un-clipped (3 clips) from the fan shroud and re-routed using zip-ties. Zip-tie the harness to the lower power-steering reservoir hose as shown and route the wiring away from the serpentine belt and other moving or hot parts to ensure it will not be damaged.



STEP 53

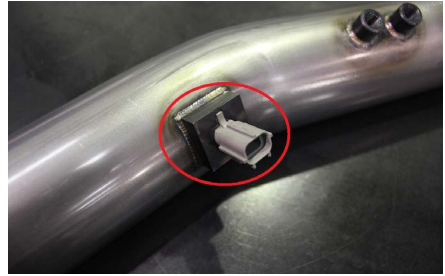


Remove the charge air temperature sensor from the OEM intercooler piping by carefully disengage small locking tab while twisting the sensor counter-clockwise. Clean the sensor of any oil/debris and install it into the supplied HSM cold-side intercooler pipe with a small amount of assembly grease or clean engine oil on the O-ring to aid in installation and prevent damage. Ensure the sensor is fully locked into place as shown.



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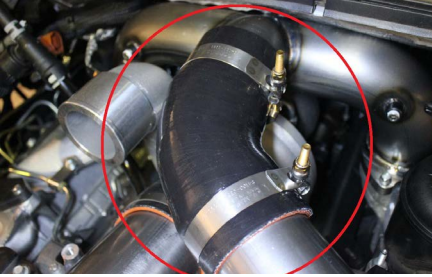
STEP 54



The HSM cold-side intercooler pipe has two extra 1/8" NPT ports. Plug any un-used ports with the supplied plugs and teflon tape. Thoroughly clean the intercooler clamp locations on the OEM intercooler before using the supplied 60-degree 3" ID boot, straight 3" ID boot, and (4) T-bolt clamps to install the cold-side intercooler pipe onto the vehicle as shown. Be careful not to damage the charge air temperature sensor during installation. Position the pipe as shown and ensure that the pipe and boot are fully seated against the intercooler before tightening all connections.

Note: We recommended using glass cleaner on all boot connections for ease of install and a clean connection surface.





STEP 55



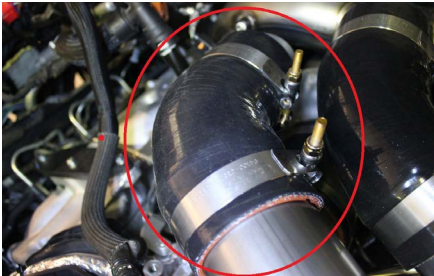
Plug in the charge air temperature sensor to the previously re-routed wiring harness.



STEP 56



Install the supplied HSM hot-side intercooler pipe using the supplied 60-degree 3" ID boot, 90-degree 3" ID boot, and (4) T-bolt clamps. The 90-degree boot will be used on the intercooler. Position the pipe as shown and tighten the clamps securely.



STEP 57



Refill the coolant system with the recommended coolant and reconnect the negative battery terminals. Reinstall the passenger inner fender lining.



STEP 58



If required, install the proper tuning calibration(s) onto your vehicle.



STEP 59



Start the vehicle and check for any fuel, oil, coolant, exhaust, or air leaks. Bleed the coolant system and add additional coolant as necessary.



STEP 60



ENJOY THE FINEST 6.7L POWER STROKE TURBOCHARGER KIT ON THE MARKET!





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