

S.A. ALPINE DEVELOPMENT

Specializing in Turbocharger and Supercharger Systems

KIA Spectra *Turbocharger Kit*

KIA SPECTRA TURBOCHARGER KIT

Installation Instructions

S.A. Alpine Developments
7581 Acacia Avenue, Garden Grove, CA 92841
Phone 714-379-8066 • Fax 714-379-8166

Table of Contents

Table of Contents	2
Contents of kit	3
Before you begin	3
Initial disassembly	4
Cylinder head removal/installation	6
Preparation for installation	8
Exhaust manifold and turbo installation	10
Water and oil line installation	12
Vacuum line installation	18
Final Assembly	21
Before Your First Drive	21

Contents of kit



Before you begin

This kit contains all specialty items required for installation. The kit does not contain common replacement parts that you may acquire at the Dealership, or standard tools required for installation. Below is a list of items you should have available before you begin.

- ✓ Metric socket set
- ✓ Metric Allen head set
- ✓ Metric wrench set
- ✓ Screwdriver set
- ✓ Anti-seize compound
- ✓ 9/16" Drill Bit
- ✓ 3/8 NPT Tap
- ✓ Cutting grease
- ✓ Thread sealer
- ✓ Wire cutter/stripper tool
- ✓ Soldering iron and solder
- ✓ Insulation tape

Initial disassembly

1. Disconnect the battery. Remove battery and the battery tray.
2. Using floor jack, elevate front end and place securely on jack stands.
3. Drain the coolant from the radiator. Capture and save for re-use.
4. Remove both upper and lower radiator hoses.
5. Remove front bumper.
6. Remove both headlights.
7. Remove steel inner bumper.
8. Remove the entire air cleaner assembly, including housing, ducting, and the MAF sensor.
9. Disconnect and remove horns.
10. Remove dipstick and dipstick tube.



11. Remove exhaust manifold. Remove oxygen sensor from manifold for reuse.

12. Loosen alternator tensioner and remove alternator belt.

13. Remove power steering pump belt and then pump (Note: Do not remove lines from pump, lay pump over towards inner fender).

14. Remove power steering pump bracket.

15. Remove bracket holding wires to Crank Position Sensor and Oil Temp Sensor.



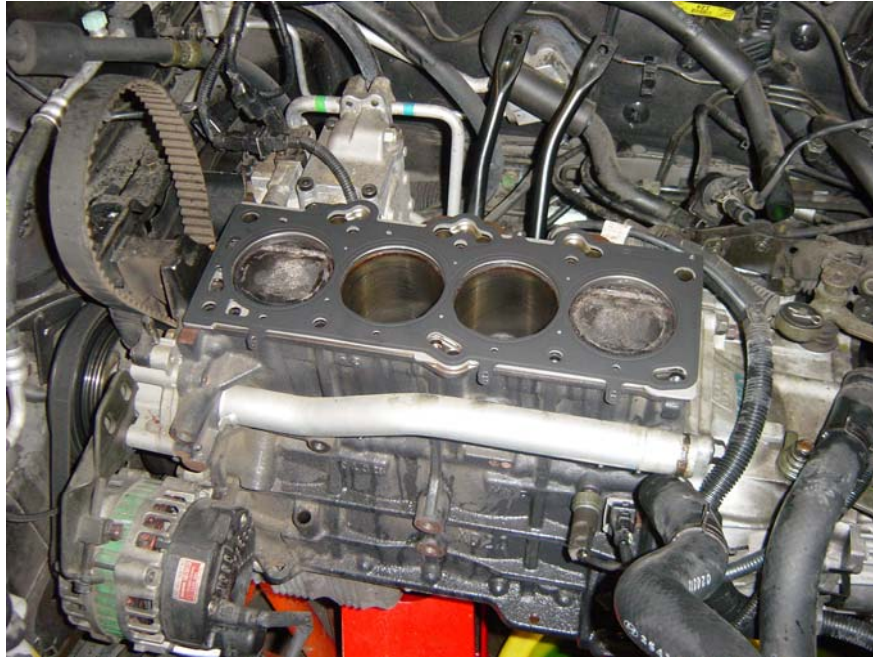
Cylinder head removal/installation

NOTE: THIS PROCEDURE DOES NOT INCLUDE DETAILED INSTRUCTIONS FOR THE REMOVAL/REPLACEMENT OF MAJOR COMPONENTS. PLEASE REFER TO THE MANUFACTURERS SERVICE MANUAL.

1. Remove all electrical connections from the intake manifold. This includes disconnecting all sensor plugs from the throttle body and manifold, removing the fuel injector wiring harness, removing the ground strap, and disconnecting the knock sensor.
2. Disconnect the throttle and cruise control cables from the throttle body and lay cables to sides of engine bay.
3. Disconnect the fuel rail supply hose. Remove fuel rail, complete with injectors.
4. Disconnect the hose from the EVAP canister to the manifold, and unclip canister from manifold.
5. Disconnect the brake booster hose from manifold.
6. Remove the support stay bolts from the manifold.
7. Disconnect plug wires and remove coils.
8. Remove the upper portion of the timing belt cover and locate the timing marks on the cam wheel.
9. Set the engine to TDC and check the cam timing marks to ensure TDC.



10. Remove cam belt tensioner and slip belt off cam gear.
11. Remove cam cover, head bolts and raise cylinder head. (Note: For ease of head removal use engine hoist to lift head.)
12. Install 2 new head gaskets with supplied stainless steel head spacer sandwiched in between.



13. Re-install cylinder head. Torque head bolts to factory specifications.
14. Reinstall cam belt and tensioner. (Note: Cam is to be installed slightly advanced!)
15. Reinstall all components removed in previous steps, except fuel rail. (Note: It will be necessary to loosen lower manifold support stays and raise them slightly to compensate for head spacer.)

Preparation for installation

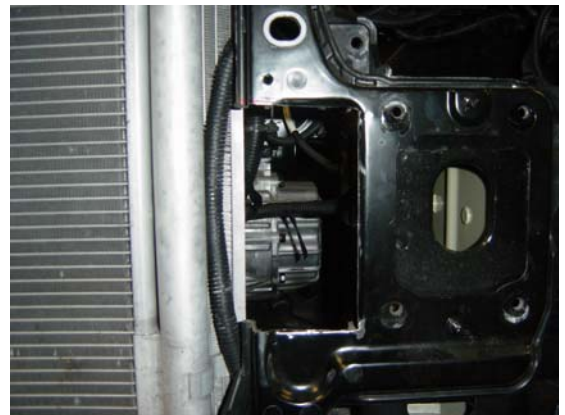
A. Horn Relocation

Using existing 6mm boltholes relocate horns as per picture.



B. Core Support Modification

It is necessary to cut a section from the core support panel on the driver side to allow the intercooler pipes to pass through. Use a cut-off wheel to cut as marked.



C. Modification to power steering bracket

It is necessary to make two modifications to this bracket. Using a cut-off wheel, clearance the bracket as marked "A", and "B".



D. Clearance Motor Mount

As pictured, remove tab from front motor mount, again using cut-off wheel. (It is recommended to touch up bare metal with spray paint to avoid rust.)



F. Battery Tray Modification

It is necessary to remove the plastic tab from the side of the battery tray, as pictured.



Exhaust manifold and turbo installation

Note: Your turbo kit is pre-assembled to ease installation. The turbo assembly includes pre-assembled exhaust down pipe. The turbo, exhaust manifold, and down pipe are installed as a single assembly.

- Perform steps 1 through 5 of the water and oil line installation.
 - Install wiring harness (See Wiring Instructions)
 - Install fuel system (See Fuel System Installation)
1. Mock -install the manifold assembly. Determine the best position for the engine side water hose. Remove manifold and secure hose.
 2. Lightly coat both sides of exhaust manifold gasket with anti-seize. Place gasket into position.
 3. Install exhaust manifold assembly. Torque nuts to factory specifications, using factory torque sequence. It is extremely important to achieve the correct torque on all studs!
 4. Attach exhaust down pipe to the exhaust system. Use supplied 10mm hardware. Lightly coat both sides of gasket with anti-seize.
 5. Install modified power steering pump bracket, PS belt, alternator belt, and then PS pump. (Note: Loosen the alternator bracket to ease install of alternator support bracket bolts)



- Perform step 6 of the water and oil line installation
- Perform step 3 of the vacuum line install
- Perform step 7 of the water and oil line installation
- Install cold air intake system
 - 6. Install O₂ sensor into manifold and reconnect.
- Perform steps 8 and 9 of water and oil line installation
 - 7. Route supplied breather hose from valve cover breather to cold air intake pipe barb.
- Perform step 10 of water and oil line installation
 - 8. Install dipstick tube. Bend to clear manifold and install dipstick.
 - 9. Install manifold heat shield.

Water and oil line installation

Note: In order to prevent metal chips from entering the crankcase, it is recommended that compressed air is used to provide slightly pressurize to the crankcase via the crankcase vent on the cam cover. **Note:** PCV and dipstick holes must be blocked. If you are not comfortable with this method you will have to remove the oil pan to ensure no metal chips enter the crankcase.

1. Using the drilling jig supplied, drill a 9/16 hole between the ribs on the radius of the engine block. Tap hole for 3/8*18 NPT fitting. Use cutting grease to help alleviate ingress of fillings into sump.
2. Install the 3/8*18 NPT to 1/2 JIC fitting into the engine block using a suitable thread sealer.



3. Remove the oil galley plug on the cylinder head, as pictured. (Hint: Drive a T35 Torq bit into plug, ease out slowly).
4. Install 1/8BSPT oil feed fitting into head using pipe sealant.



5. Install water tee fitting into lower radiator hose by first installing fitting into lower end of hose, and then adding supplied 115mm length to other side of fitting. Secure using supplied 25-40mm hose clamps. Use picture below as guide.



6. Connect oil return hose from fitting on turbo to oil fitting installed in block.



7. Connect water hose between lower radiator hose fitting and banjo fitting on radiator side of turbo.
8. Re-install upper radiator hose. Cut and insert water tee fitting, trimming hose as necessary to eliminate excessive kinks.

9. Connect water hose from engine side turbo fitting to upper radiator hose.



10. Connect oil feed hose from fitting in head to oil feed fitting top center on turbo.



Wiring Harness Installation

1. Mount the Unichip and bracket to the center bolt on the strut tower.



2. Locate the MAF sensor plug. Open the MAF wiring harness at the factory blue tape marking (200mm back from the connector). These sensor wires need to be lengthened to reach the relocated MAF sensor. There are two pink wires, cut at uneven points to indicate which ones go together. Cut remaining wires.



3. MAF connections

- MAF Blue wire is signal wire. This signal is interrupted.
- White wire from harness connects to blue wire on ECU side.
- Black wire from harness connects to blue wire sensor side.
- MAF black wire is sensor ground wire. This wire is extended through the harness.
- Short brown leg from harness connects to black wire on ECU side.
- Long brown wire from harness connects to black wire on sensor side.
- Lengthen the white and both pink wires 300mm.

4. Crank Position Sensor

- CPS white wire is signal wire. This signal is interrupted.
- Red w/white/White w/red wires from harness connect to white wire sensor side.
- Green wire from harness connects to white wire ECU side.

5. Power/Ground

- 12v power is obtained from the diagnostic port. Red wire from harness tees into Red w/ yellow on diagnostic port.
- 12v ground is obtained directly from the battery. Thick brown wire from harness must be routed to negative terminal and attached by means of supplied eyelet.

6. Fifth Injector

- Red wire from injector plug must be teed into 12v positive from an existing injector.

Fuel system installation

1. Remove fuel feed hose from fuel rail. (**Note: System may be pressurized, use caution not to spray fuel when opening**).
2. Unbolt and remove fuel rail and injectors intake manifold.
3. Remove stock injectors from fuel rail and replace with supplied injectors.



4. Reinstall fuel rail.
5. Locate most suitable location for fuel tee. Cut fuel feed hose and install fuel tee. Secure with hose clamps.



6. Reconnect fuel feed hose to fuel rail.
7. Connect 5th injector fuel feed hose from tee fitting to injector.
8. Attach the 5th injector electrical connector to the 5th injector.



9. Re-install accelerator cable. Check adjustment.

Vacuum line installation

1. Cut and insert supplied vacuum tee into EVAP hose between manifold and EVAP valve.
2. Route vacuum hose from tee to Unichip module vacuum port.
3. Block PCV valve with supplied 5/16 rubber vacuum cap.
4. Connect stepped actuator hose from port on intake manifold to actuator canister port on turbo.

Intercooler System Installation

1. Install intercooler-mounting bracket, using original horn mounting location. Use supplied 6mm hardware.
2. Mount the intercooler, using supplied 8mm hardware.



3. Referencing the pictures below, install the intercooler pipes, using the supplied silicon hoses and hose clamps.



Cold Air Intake installation

1. Install MAF sensor into cold air intake using supplied silicon hose and clamps. The system can be pre-assembled and installed as one unit (see picture below).



2. Secure air filter bend to inside of wheel well using supplied brackets and hardware.



3. Connect MAF sensor plug into MAF sensor.

Final Assembly

1. It is necessary to change spark plugs to a colder plug. These are supplied in your kit.
2. Fill the cooling system with a proper antifreeze mix. Check coolant system for leaks.
3. Re-install battery tray and battery.
4. Connect the negative battery terminal to the battery. Look, listen and smell for any possible problems.
5. Prime the fuel system by turning the ignition key to the on position for 15 seconds and then turning off. Check the fuel system for leaks! Once again look, listen and smell for any problems
6. Start engine and run for 2 to 3 minutes. Check coolant system for leaks. Check the fuel system for leaks. Check the oil system for leaks Look, Listen and Smell for any possible problems.
7. Top off coolant.
8. Re-install front bumper assembly.
9. Allow engine to reach operating temperature and ensure proper operation of cooling fan.

Before Your First Drive

Your vehicle has the ability to learn as you drive. The electronic control system runs in closed loop during normal driving and adjusts settings accordingly. As the battery was disconnected the system has lost its memory. In order to let the system start to adjust itself you should drive using light throttle for at least the first 10 minutes of driving time after the vehicle is at operating temperature. While it may be hard not to use your newfound horsepower, the vehicle will drive much better as it learns where settings should be.

Have fun and be safe!