

EUROSPORT HIGH PERFORMANCE

INTAKE FILTER ASSEMBLY AND MANIFOLD INSTALLATION INSTRUCTIONS FOR THE BMW E36 2.8L & 3.2L

Installation note: All installation instructions are provided for informational purposes only. The installation of the Eurosport intake manifold assembly and installation of engine camshaft(s) should be performed by a qualified mechanic using proper BMW factory camshaft fixtures and tooling. Failure to do so could result in personal injury, engine, and/or camshaft damage. If you or your mechanic have any installation questions please contact us at (801) 886 2185.

Recommended Tools and Supplies:

BMW Special Tools #	Description	List Price
88 88 6 115 040	32mm fan nut wrench	\$51.00
88 88 6 115 030	Fan pulley holding wrench	\$24.50
88 88 6 121 171	Spark plug socket	\$21.50
90 88 6 121 200	Spark plug socket extension/torque device	\$92.50
88 88 6 112 300	Flywheel TDC locating rod	\$19.00
88 88 6 113 240	Camshaft TDC fixture blocks	\$365.00
90 88 6 113 292	Secondary chain tensioner locking pin	\$6.20
90 88 6 115 490	Camshaft sprocket wrench	\$16.30
90 88 6 114 220	Chain tension fixture	\$31.75
90 88 6 009 250	Chain tension fixture torque driver	\$352.00
90 88 6 113 450	Pneumatic fitting for Vanos check	\$15.80
90 88 6 126 410 (5 410/11)	Electrical connector for Vanos check	\$132.00
88 88 6 113 260	Camshaft support fixture for removal and inst.	\$660.00
88 88 6 113 250	Tappet brace	\$115.00
Total		\$1902.55

Standard Tools:

Table mounted vice
Shop light
Pick medium or large size
Pocket flat blade screwdriver
Channel lock pliers medium or large size
Needle nose pliers
Medium size flat blade screwdriver
Combination wrench 10mm
Torque wrench(es) with a torque range from 7.4ft/lbs(10Nm) to 250ft/lbs
½ drive shallow socket in 22mm
½ drive hex key in 10mm
½ drive ratchet (long pattern recommended)
3/8 drive deep sockets in sizes 13mm, 11mm, 10mm, and Torx30
3/8 drive ratchet (flexible head recommended)
3/8 drive extension set (wobble/flex-type head recommended)
¼ drive deep sockets in sizes 13mm, 11mm, 10mm, 6mm, and 4mm
¼ drive shallow sockets in size 10mm
¼ drive ratchet (flexible head recommended)
¼ drive extension set (wobble/flex-type recommended)
17mm open end wrench
Razor knife
Heat gun
Scissors

Supplies

Disposable shop towels
Disposable latex exam gloves
Brake part cleaner
Bearing grease
Engine oil
Nylon wire ties
Loctite™ permanent/red

Included in Eurosport OBDII 2.8L cam system



Cam system installed



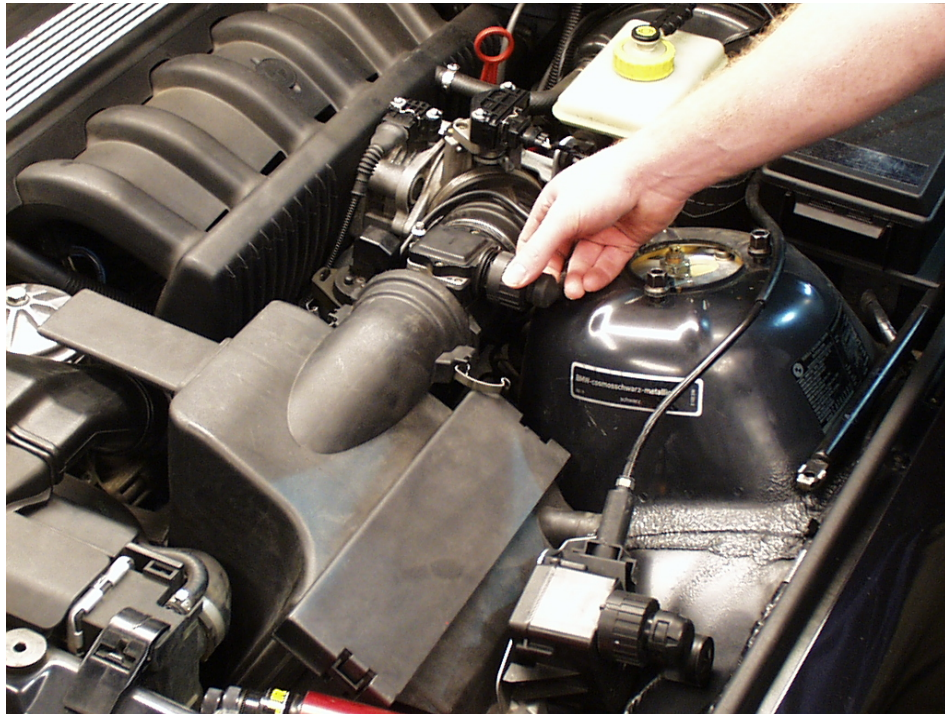
Step 1

Prior to commencing work on vehicle disconnect battery cable ground from battery in trunk. Using a flat blade screwdriver undo the hose clamp securing the Mass Meter to the rubber throttle body elbow



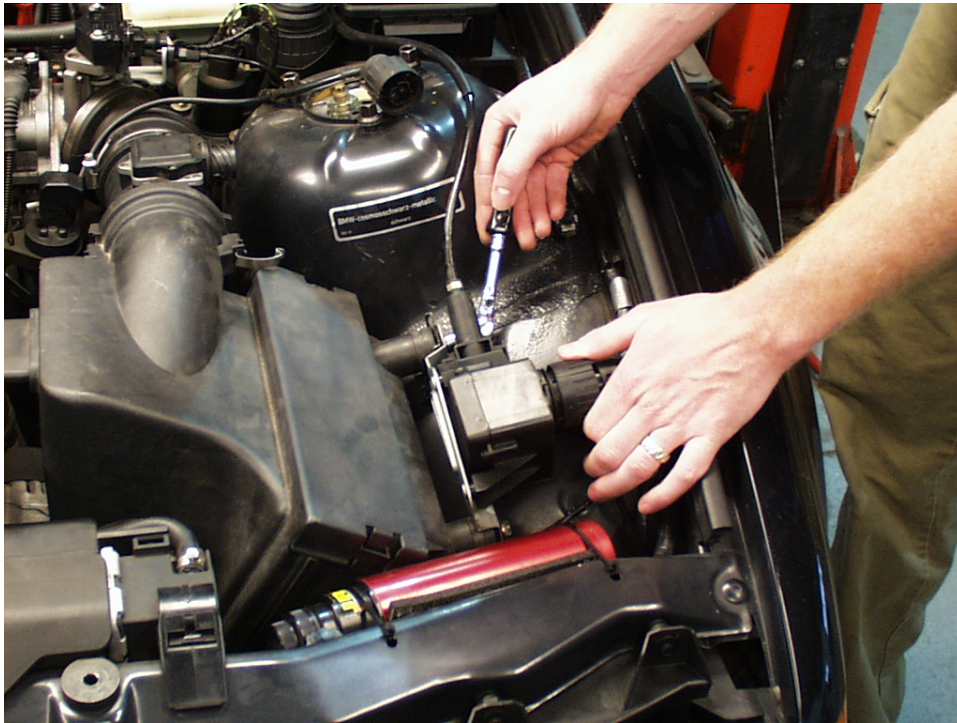
Step 2

Disconnect HFM harness connector by rotating harness connector housing counterclockwise.



Step 3

Undo 6mm nuts securing intake filter box and cruise control assembly and lift air-filter box out of engine compartment.



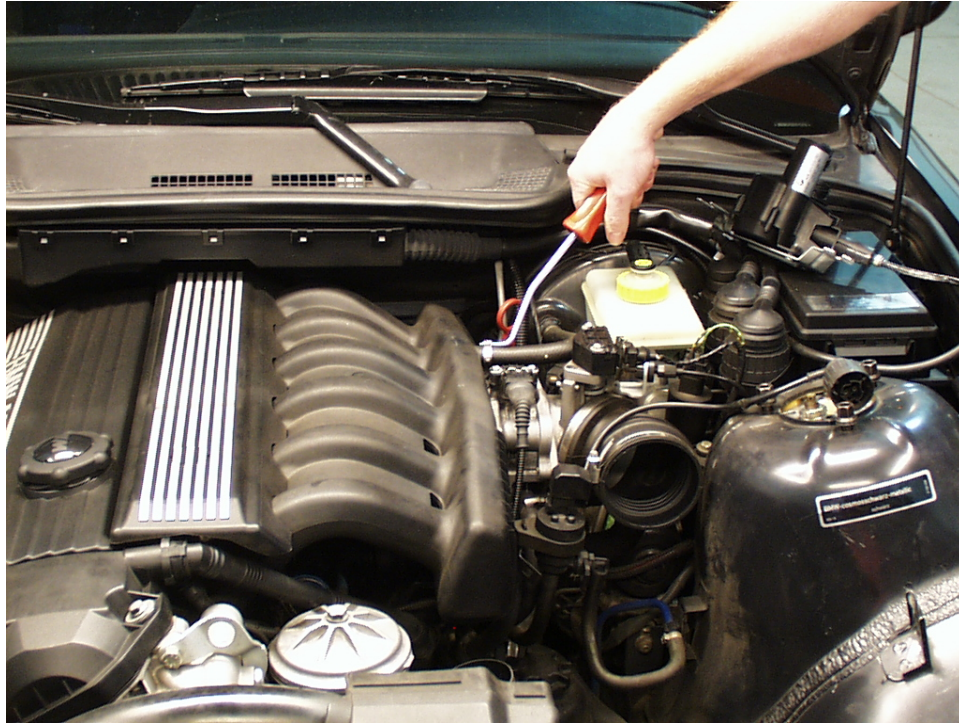
Step 4

Using a flat blade screwdriver loosen alternator duct clamp. After loosening clamp remove alternator cooling duct.



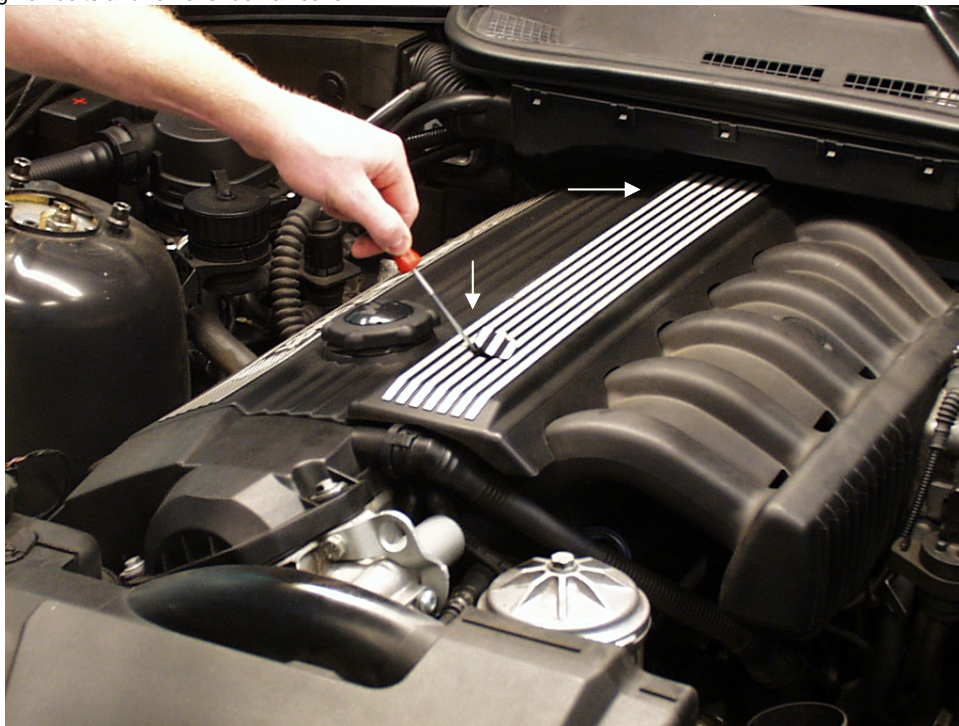
Step 5

Separate the brake booster hose from the manifold by loosening the crimp clamp.



Step 6

Using small pick or flat blade screwdriver, lift both fuel rail fastener covers. With a 10mm socket and wrench remove the 2 underlying hex bolts and remove fuel rail cover.



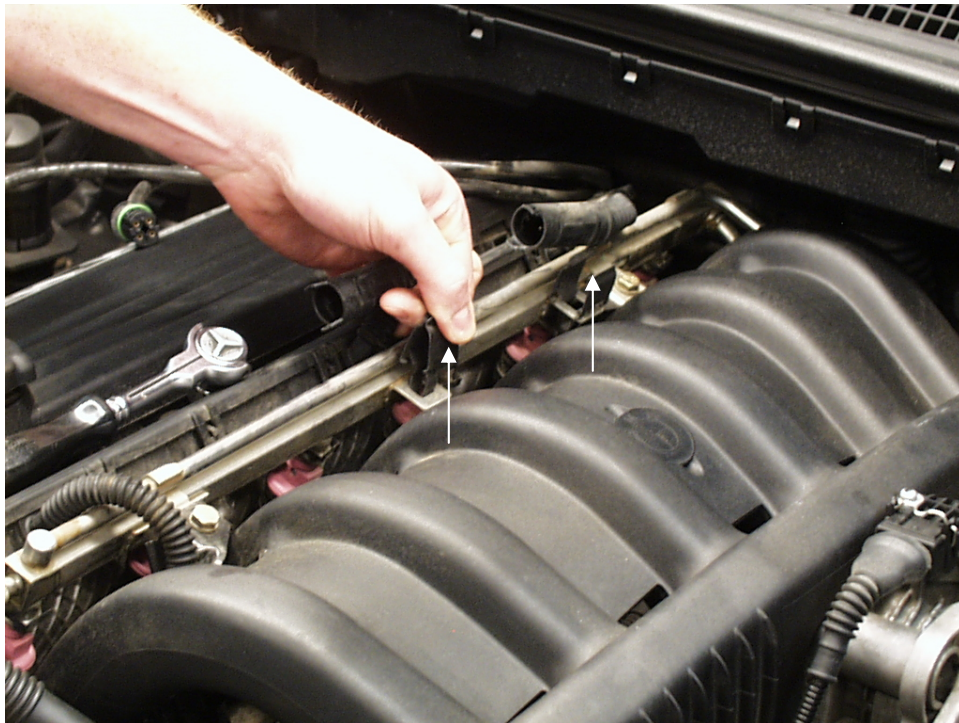
Step 7

Unclip both oxygen sensor connectors from plug cradles at fuel rail and unplug both sensor connectors.



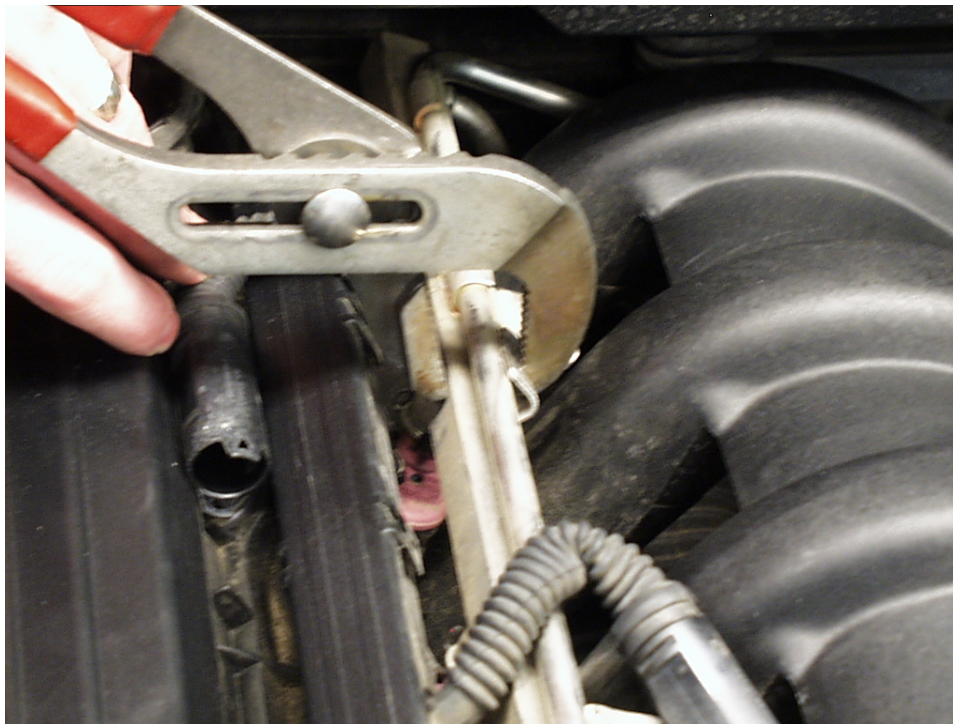
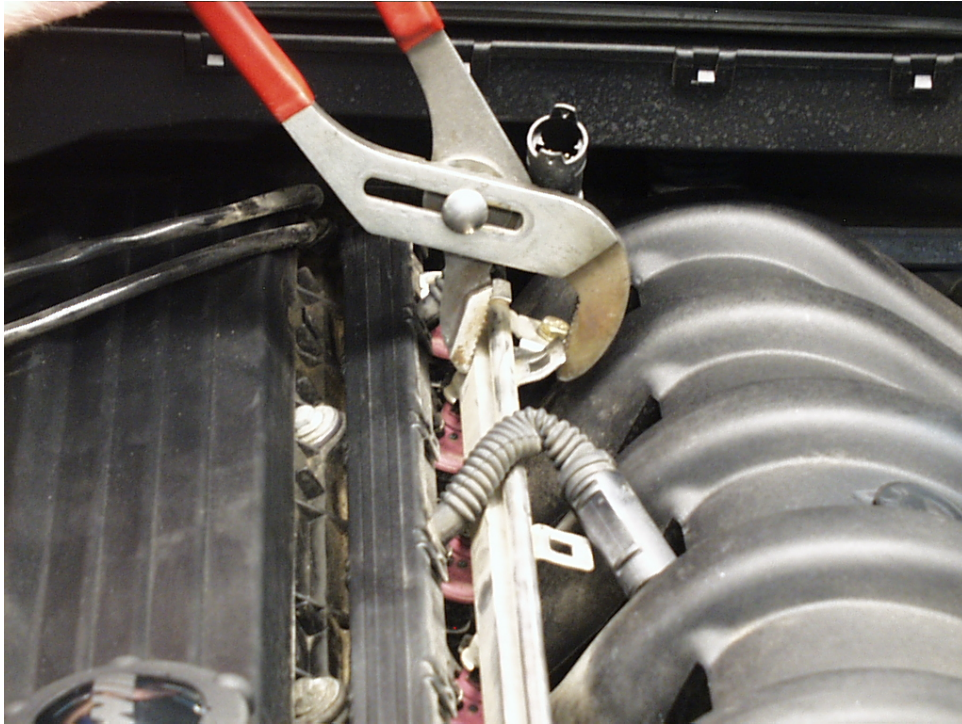
Step 8

Remove both oxygen sensor plug cradles from fuel rail.



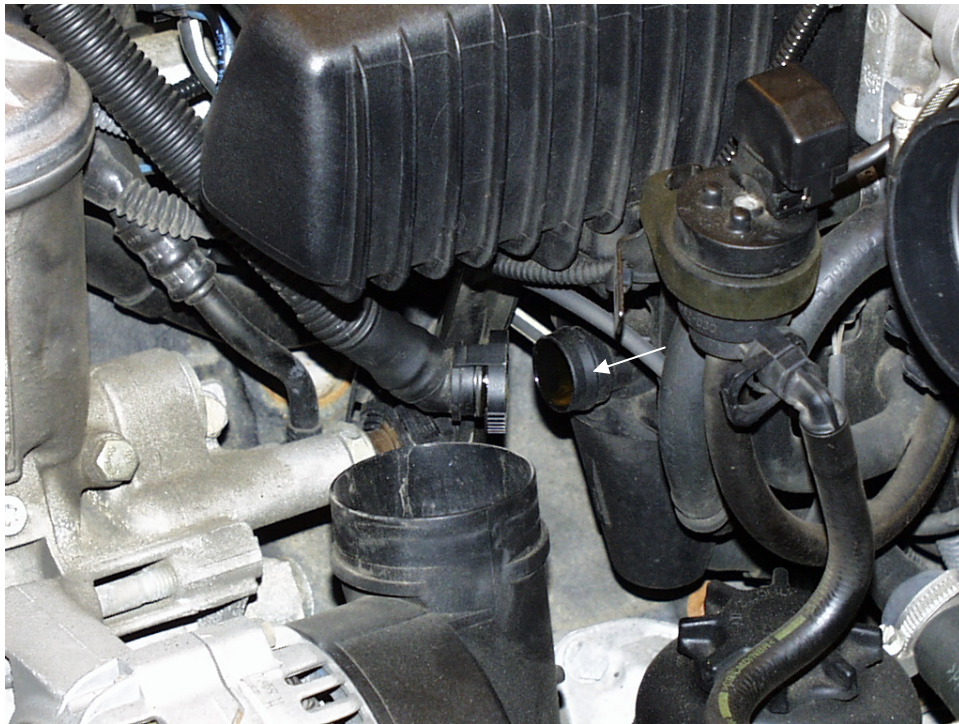
Step 9

Using a pair of Channel Lock pliers, carefully bend back the rear O2 sensor cradle mounting tab until the tip of the tab touches the round return line at the top of the box rail.



Step 10

Disconnect crank case ventilation pipe at valve cover. Release connection by pinching halo connector clip.



Step 11

Unplug emissions air-pump vacuum control solenoid.



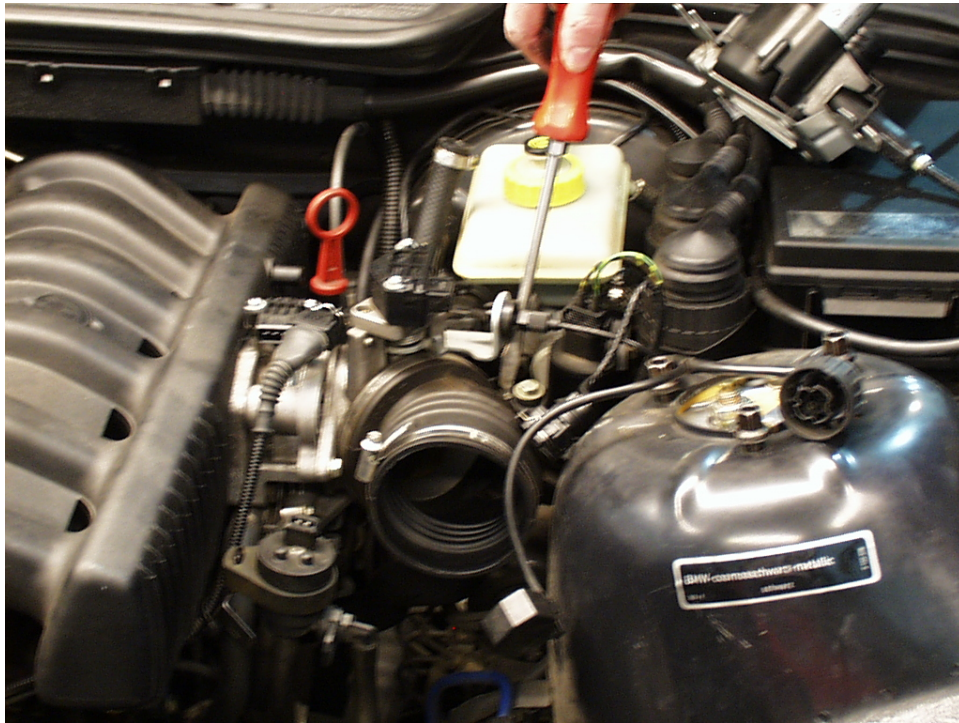
Step 12

Unplug crankshaft sensor connection at front of fuel rail..



Step 13

Undo hose clamp securing rubber elbow to ASC+T throttle-body.



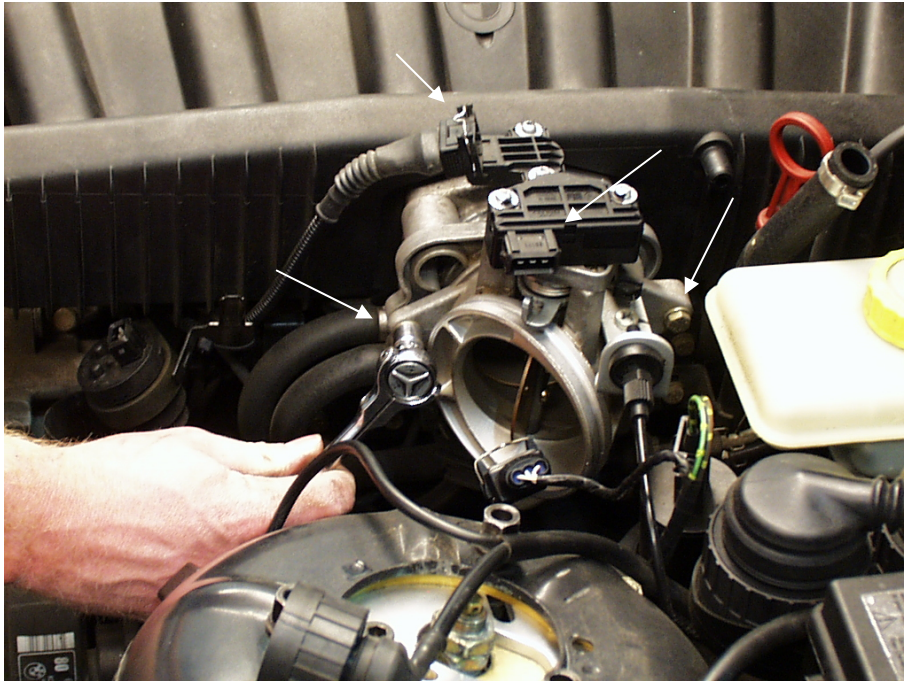
Step 14

Disconnect rubber elbow at idle control hose connection.



Step 15

Using a 10mm socket undo the two 6mm hex bolts securing ASC+T throttle-body (some cars have 5mm hex key cap screws). Unplug the engine and ASC+T throttle-body sensors.



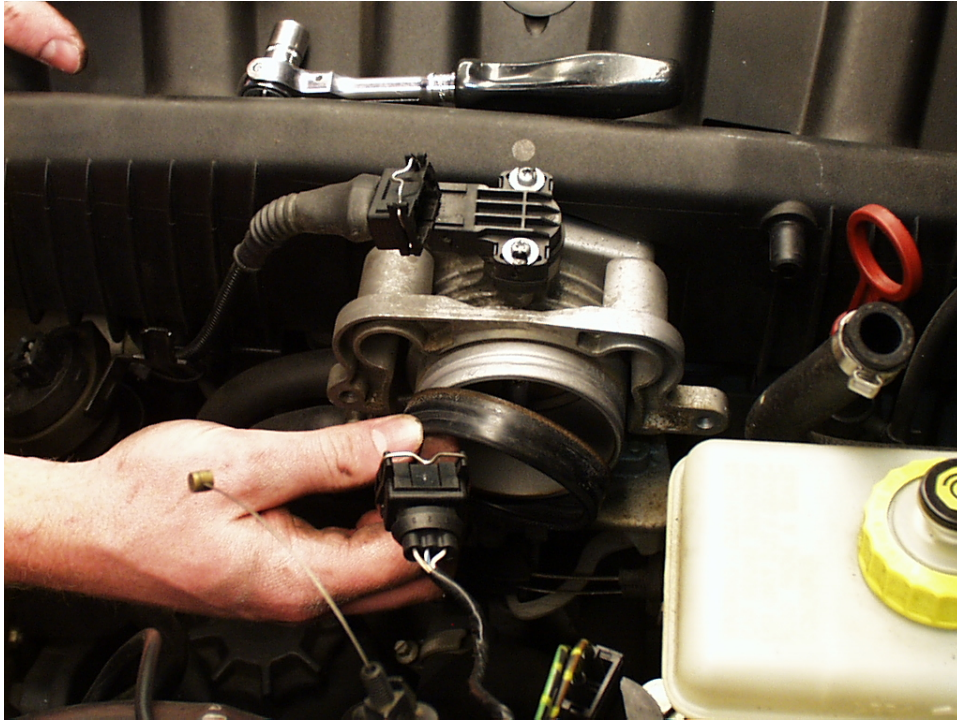
Step 16

Undo actuator cable from ASC+T throttle-body cable cam connection. While depressing barbed plastic cable mounting tips, pull cable free of mount (white arrow). Exercise caution when depressing barbed plastic tips, as they can be easily broken. Remove ASC+T throttle-body from engine throttle-body.



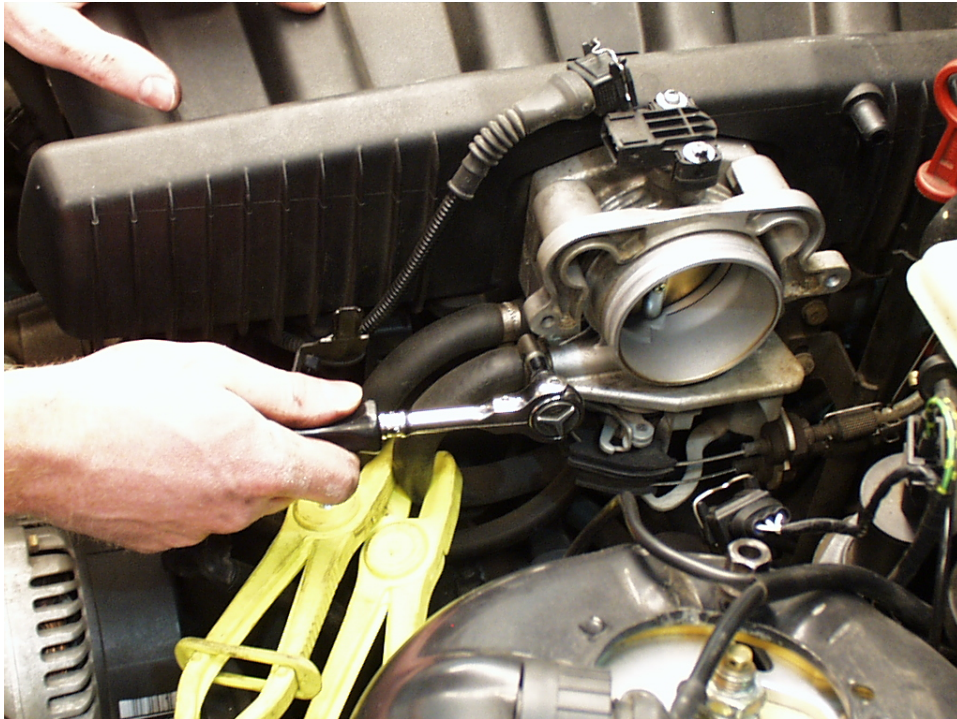
Step 17

Remove rubber ASC+T gasket from engine throttle-body.



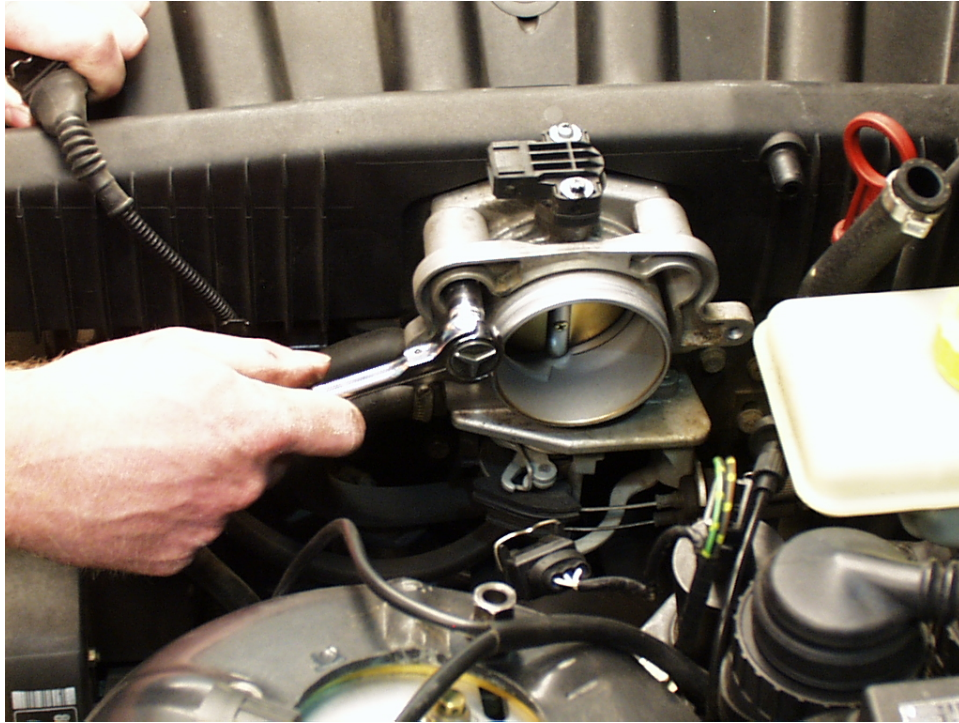
Step 18

Clamp off and disconnect throttle-body heater hoses.



Step 19

Undo four 6mm bolts using a deep 10mm socket.



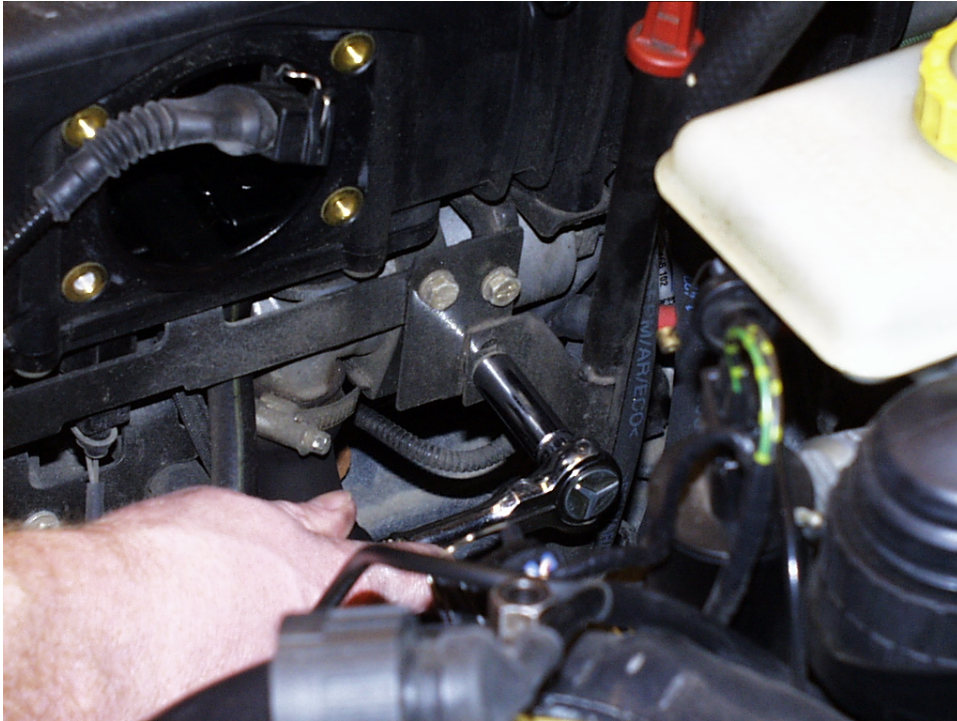
Step 20

Disconnect throttle-body from throttle cables.



Step 21

Using a 10mm deep socket undo three 6mm bolts securing dipstick tube and idle control valve.



Step 22

Remove idle control valve from manifold.



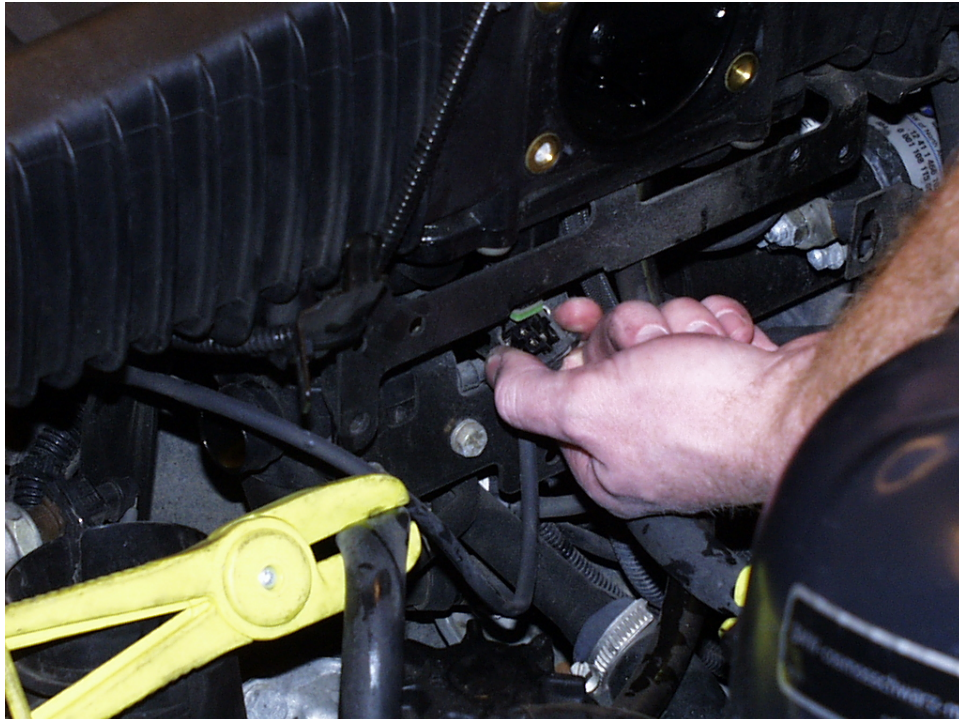
Step 23

Unplug idle control valve from harness connector.



Step 24

Unplug connector at manifold temp sensor.



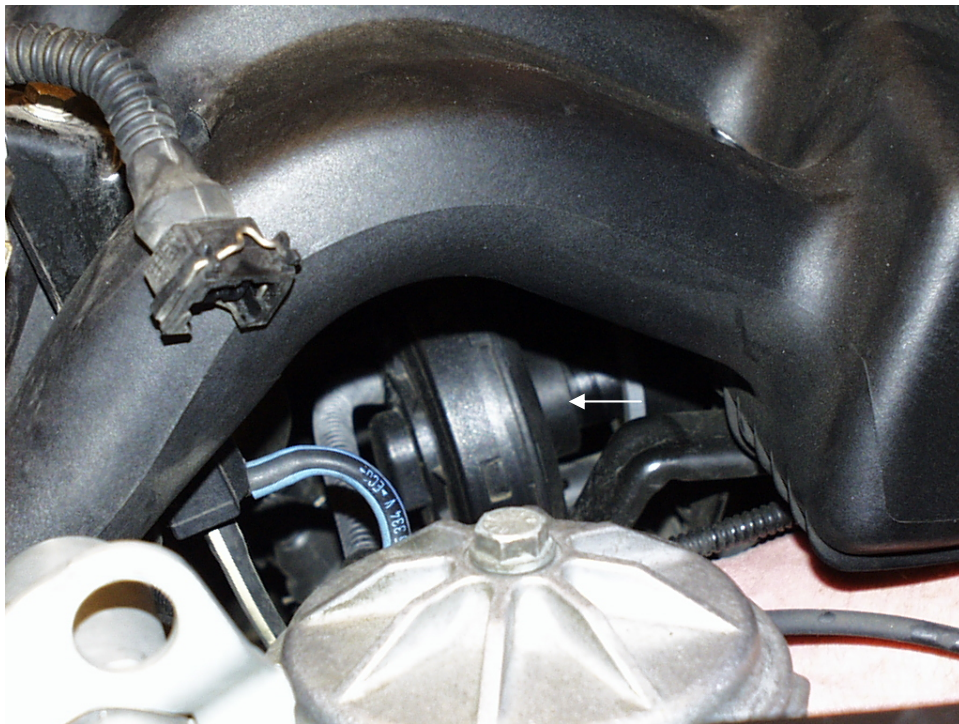
Step 25

Using a deep 10mm socket undo three 6mm bolts securing crank case ventilator oil separator.



Step 26

Disconnect the crank case ventilator oil separator from the manifold by pushing it towards the engine (white arrow).



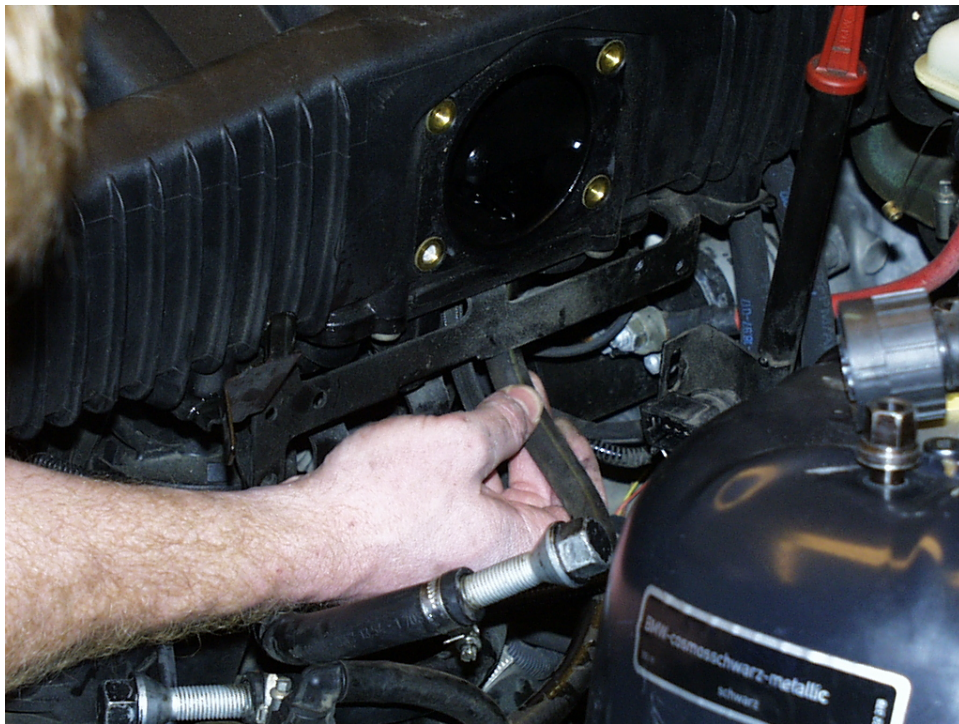
Step 27

Unclip fuel lines from guide at bottom of manifold.



Step 28

Disconnect remaining three vacuum lines from manifold.



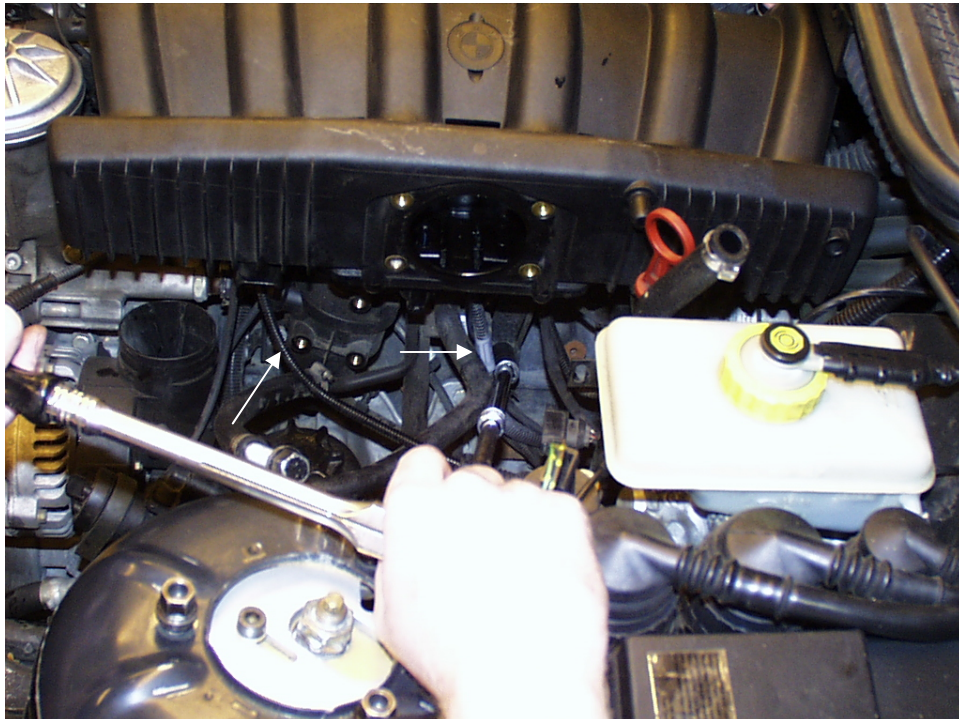
Step 29

Using a deep 10mm socket undo two 6mm bolts securing the manifold to engine support brackets. Using the same socket undo two 6mm bolts securing idle control and crank case ventilator oil separator support bracket (middle arrow).



Step 30

Using deep 13mm socket undo the two 6mm nut securing the manifold support brackets to the engine block.



Step 31

Remove both manifold support brackets from engine compartment.



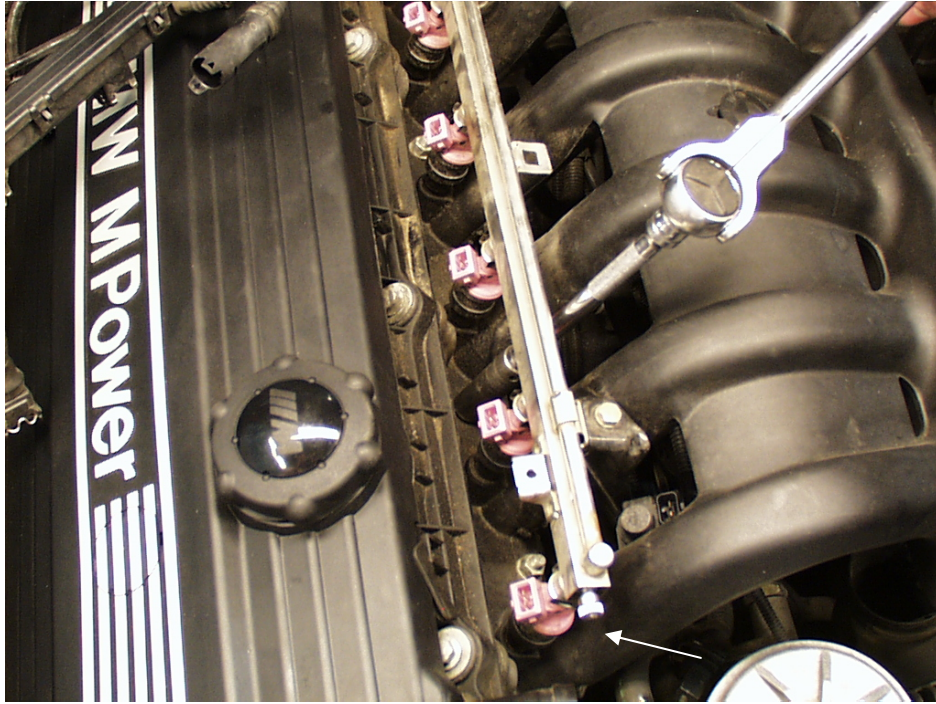
Step 32

Disconnect fuel injector wiring harness from fuel injectors by pulling away from injectors.



Step 33

Using an 11mm socket unbolt all seven 7mm nuts securing the manifold to the engine head.



Step 34

Using a 10mm socket and wrench remove both 6mm bolts securing fuel rail to manifold. Slide air-pump control solenoid bracket through gap in manifold webbing (white arrows counterclockwise).



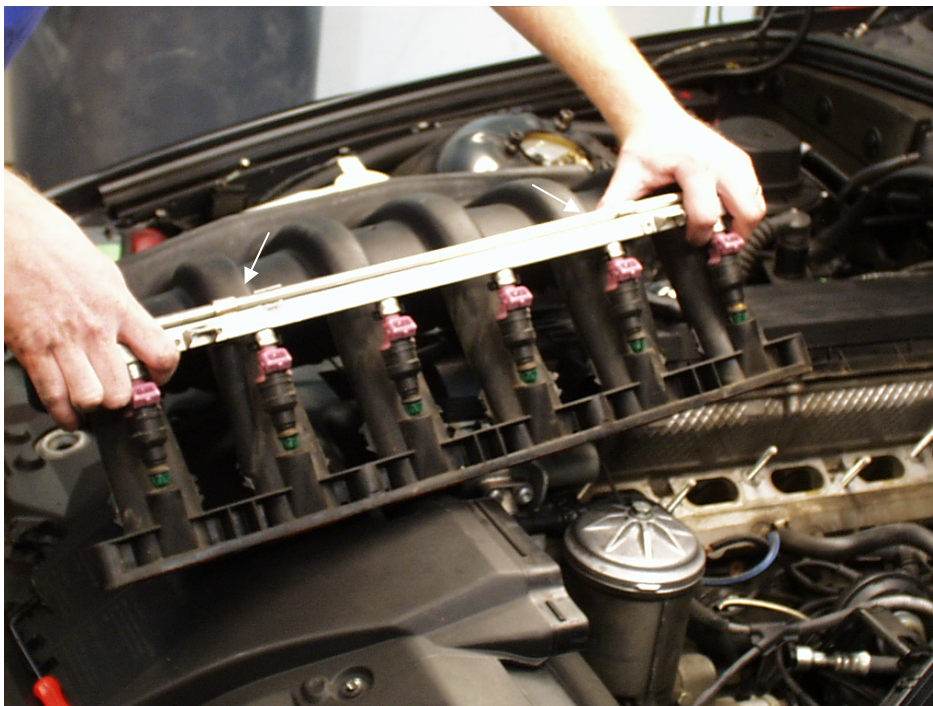
Step 35

Remove the manifold from the engine with the fuel rail attached. With the manifold partially removed disconnect the fuel lines attached at the back of the rail. Prior to disconnecting the fuel lines from the rail make sure to bleed off fuel pressure into a rag and or cup at the valve at the front of the rail (white arrow).



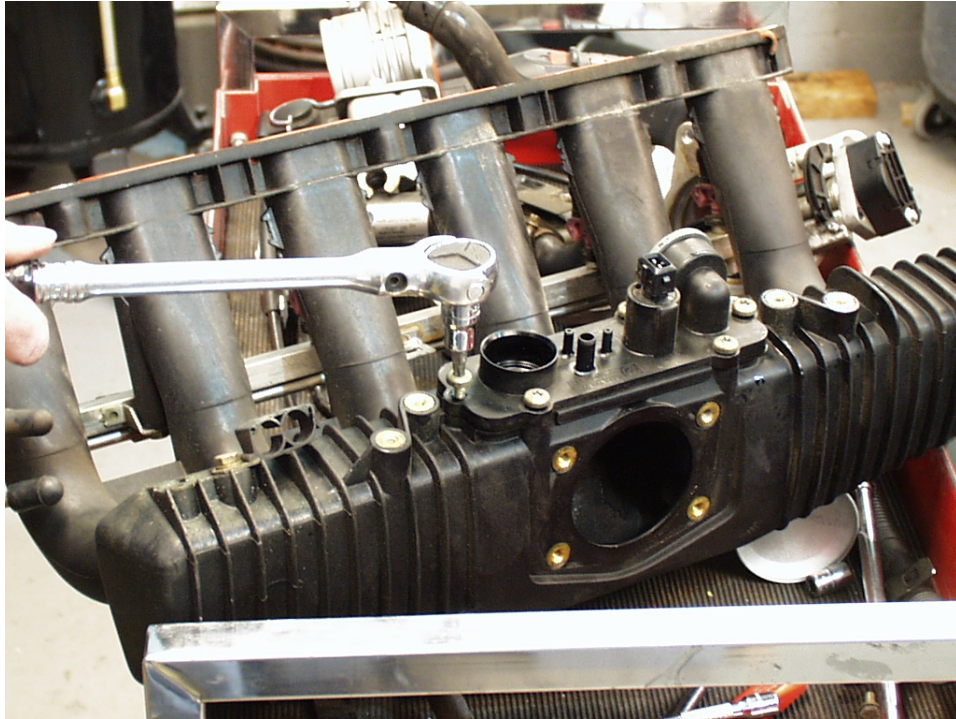
Step 36

Using a 10mm socket undo two 6mm bolts (white arrows) and remove fuel rail from the stock manifold.



Step 37

Using a Torx 30 remove all six Torx screws securing idle control/crank case ventilator manifold mounting hub.



Step 38

Remove crank case ventilator o-ring prior to manifold install. For proper attachment of both crankcase ventilator and idle control valve, the o-ring must first be inserted into the manifold hub.



Step 39

Disconnect vacuum lines from emissions air-pump control solenoid.



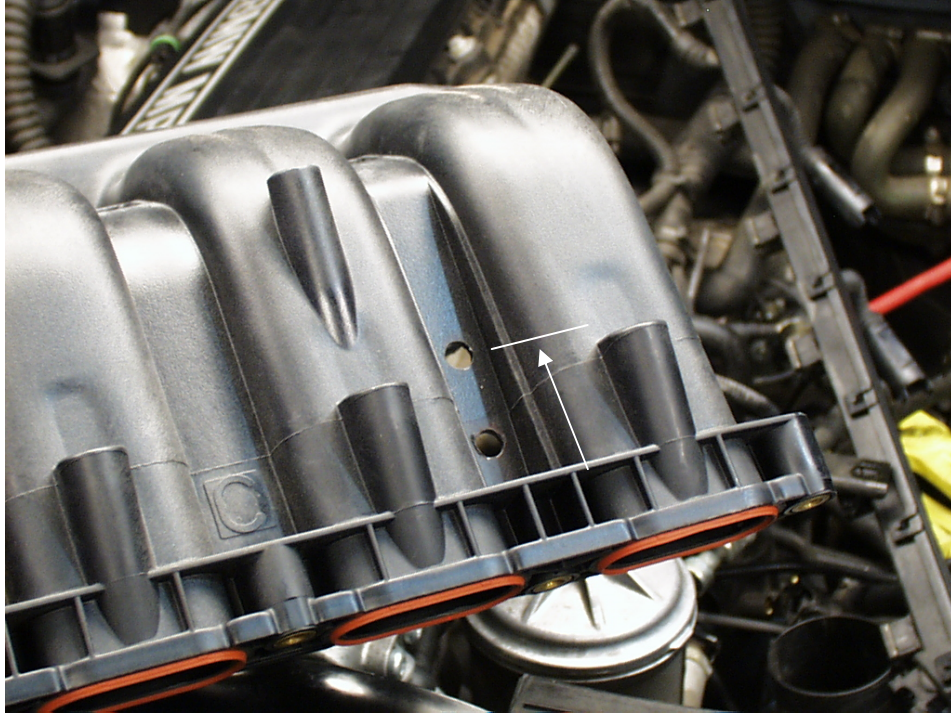
Step 40

Slide emissions air-pump control solenoid from stock mounting bracket.



Step 41

If not already drilled, use a 21/64ths drill bit drill two holes centered between intake runner 1 and 2. Space hole centers at 1" and 2.25" from base of white arrow up.



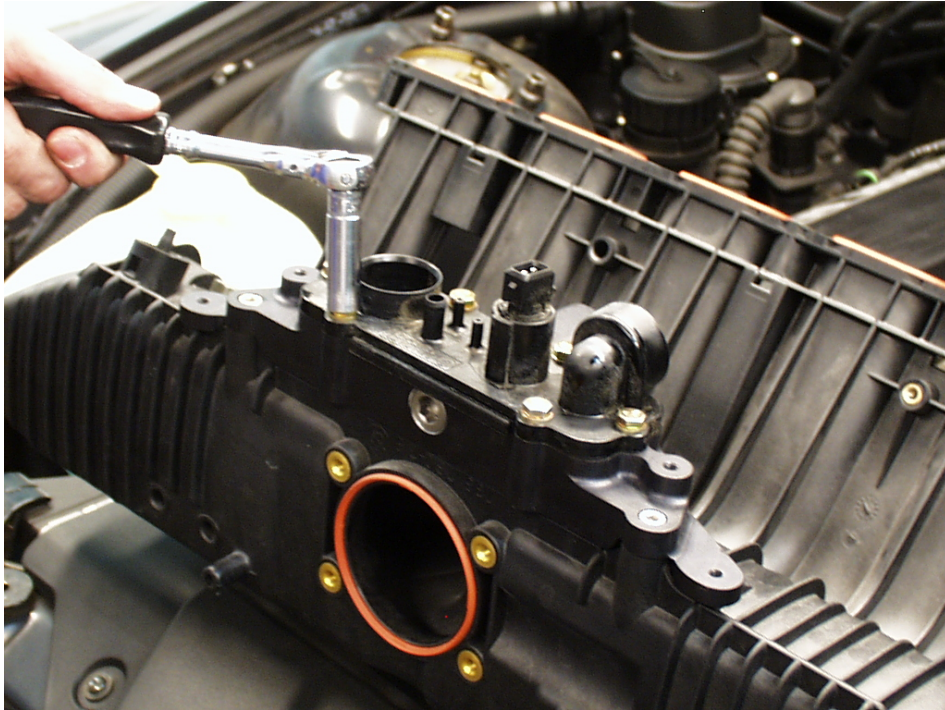
Step 42

Install aluminum manifold hub adapter into the intake manifold.



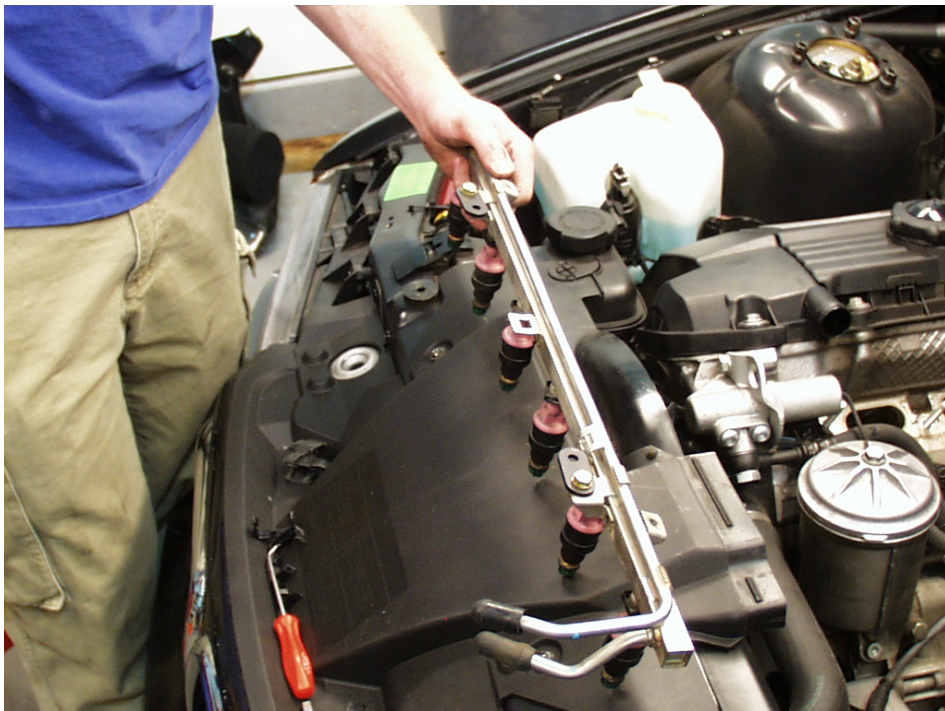
Step 43

Install idle control/crank case ventilator mounting hub to aluminum manifold adapter hub.



Step 44

Use a small amount of grease applied the injector o-rings to ease the insertion of the injectors the intake manifold.



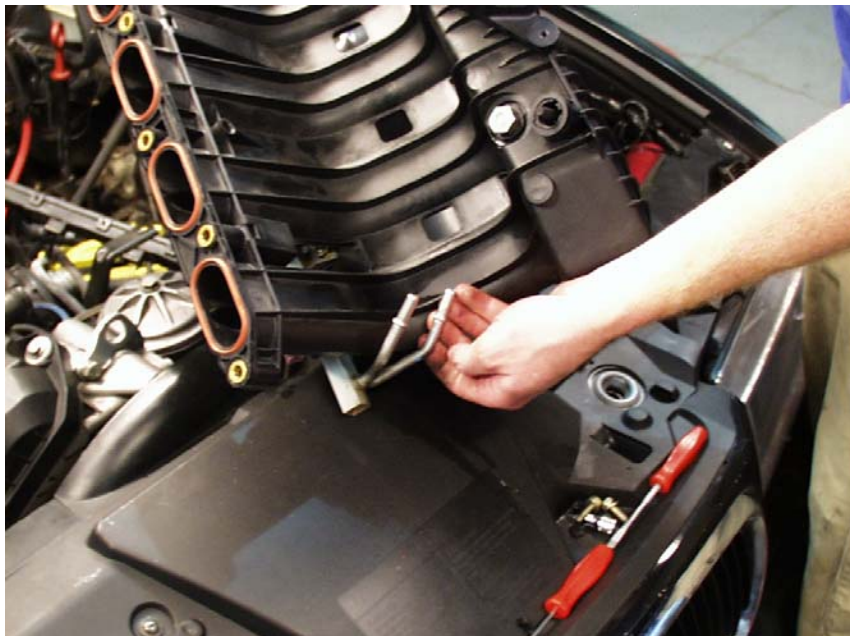
Step 45

Prior to installing the manifold, test fit the fuel rail to the manifold. Depending on the fit clearance, you may need to trim some plastic from the fuel rail mounting bosses of the manifold and or carefully bend the metal fuel rail mounting bracket. Using the fuel rail adapter tabs mount rail to manifold for a test fit and slight bending of fuel lines for clearance around the back of #6 runner.



Step 46

While test fitting the fuel rail to the intake manifold, be sure to pull/bend fuel lines away from the side of the intake runner so as to allow enough clearance for easy fitting of chassis fuel line connectors. **After test fit and bending of fuel lines remove the fuel rail from the manifold. It is significantly more difficult to install the manifold with the rail attached.** Leave the fuel rail mounting tabs attached to the rail.



Step 47

If not already installed prior to shipment, be sure to plug manifold vacuum ports using supplied cam system parts.



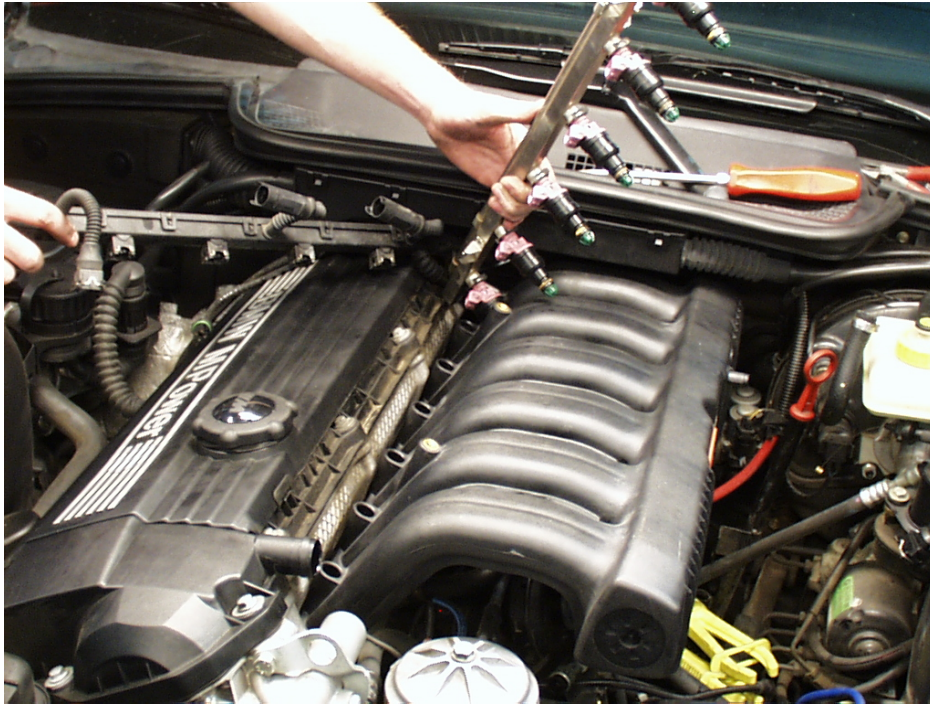
Step 48

Install intake manifold. Torque all seven of the 7mm manifold attaching nuts with an 11mm socket and torque wrench to 11ft/lbs (15Nm).



Step 49

Install the fuel injector rail assembly into the manifold. With the right twist and rotation of the fuel rail you should be able to easily put it in place without having to fight with the rear fire-wall and harness holder.



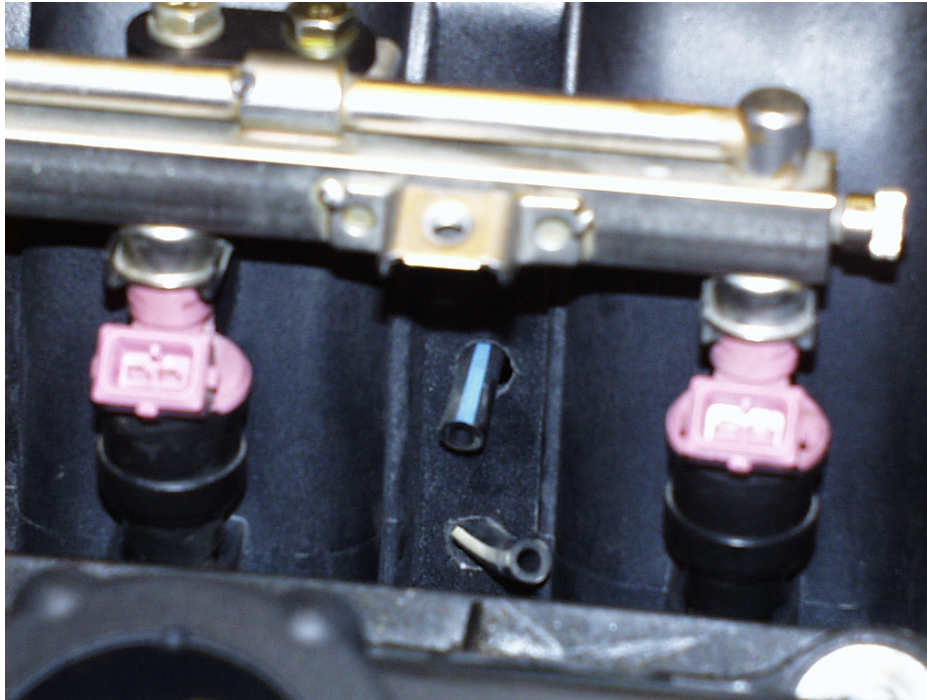
Step 50

Using a 10mm socket, tighten all four 6mm fasteners securing fuel rail to intake manifold.



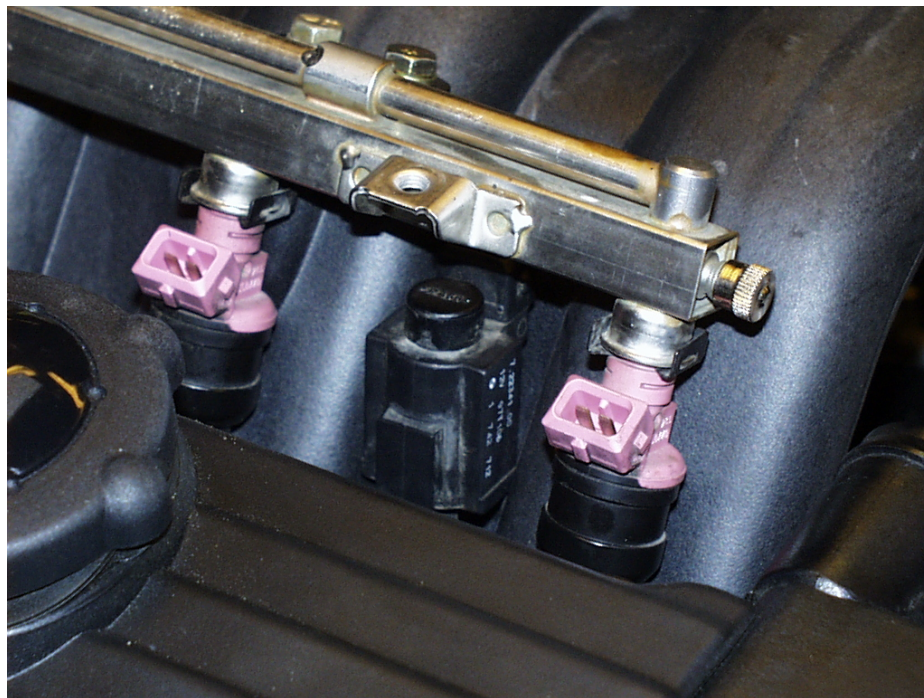
Step 51

Push through drilled holes in manifold the vacuum lines of the air-pump control solenoid (reference instruction 40,41). Blue striped line goes in the top hole and the white striped line goes in the bottom hole.



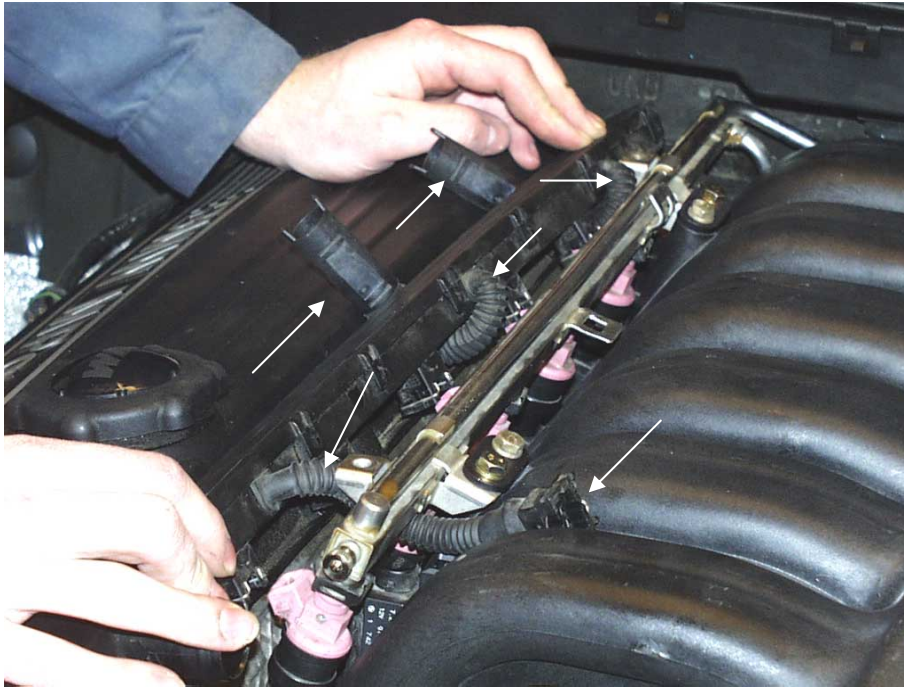
Step 52

Re-connect vacuum lines to air-pump control solenoid and seat against manifold webbing. For proper reconnection of vacuum lines refer to installation instruction 41.



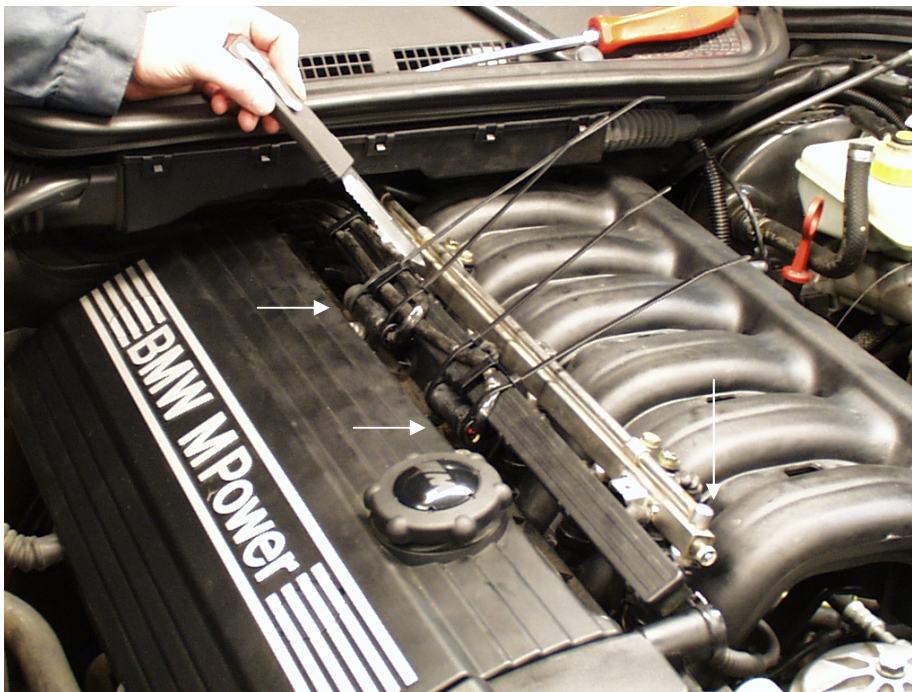
Step 53

Install injector wiring harness rail to fuel injectors making sure to match the oxygen sensor connector(s) and air-pump solenoid harness positions (white arrows).



Step 54

Reconnect air-pump vacuum control solenoid and both oxygen sensors (3 white arrows). Secure the oxygen sensors to the wiring harness connector rail in the depicted manor via wire-ties and stock harness clips. Save the next mechanic or yourself from laceration by not using wire cutters to remove excess wire-tie, use a razor or sharp knife instead.



Step 55

The photo below is an illustration of the proper wiring harness mounting position(s).



Step 56

Using a 5mm Hex key install supplied fuel rail cover. Use Loctite™ to keep cap screws from vibrating loose.



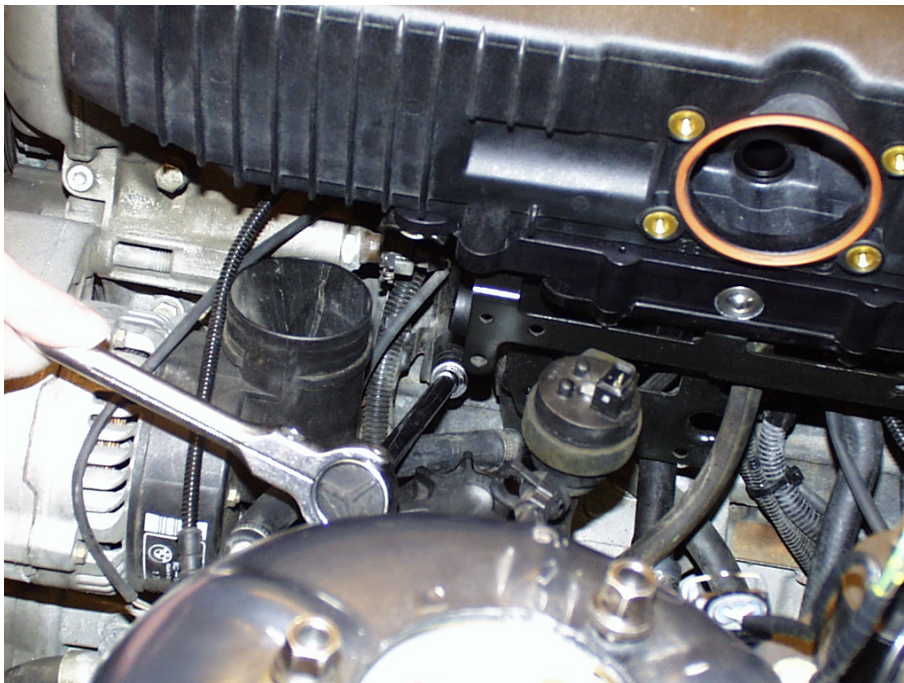
Step 57

Bend metal coolant lines downward so that they will not make contact with the idle control valve/crankcase ventilator support bracket (refer to step 60).



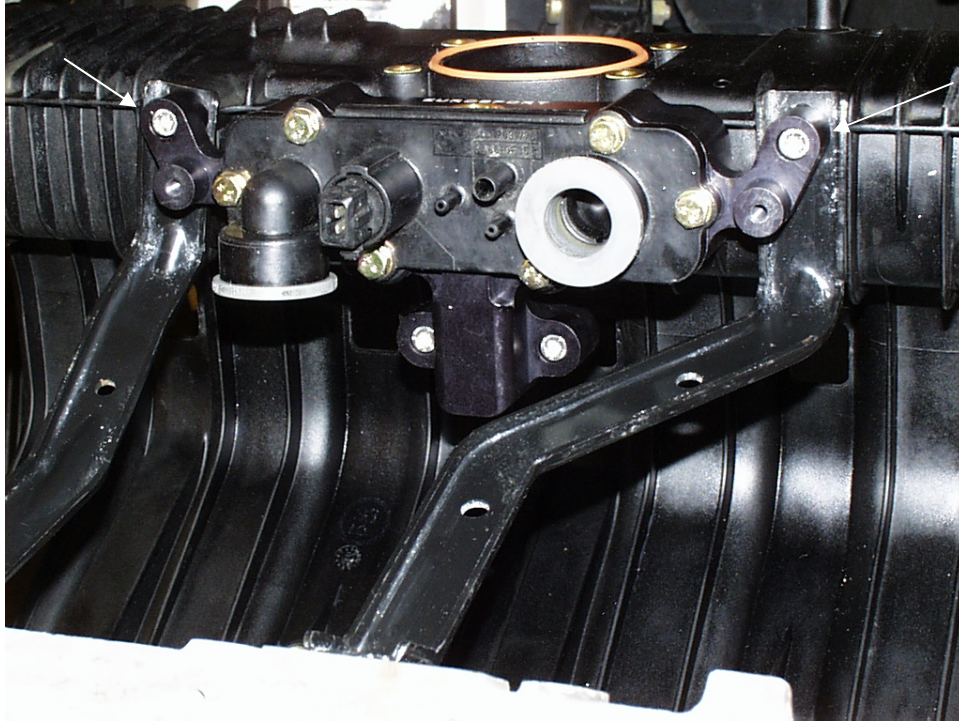
Step 58

Install the manifold support brackets to at the engine block. Depending on variances in actual fit, these brackets may require some bending adjustment. Prior to installing the rear bracket it is recommended that it be bent into a tighter radius (e.g. compress it into a tighter "C" shape as viewed from the bracket side/edge). See step 59 for proper position of brackets between manifold and aluminum manifold adapter.



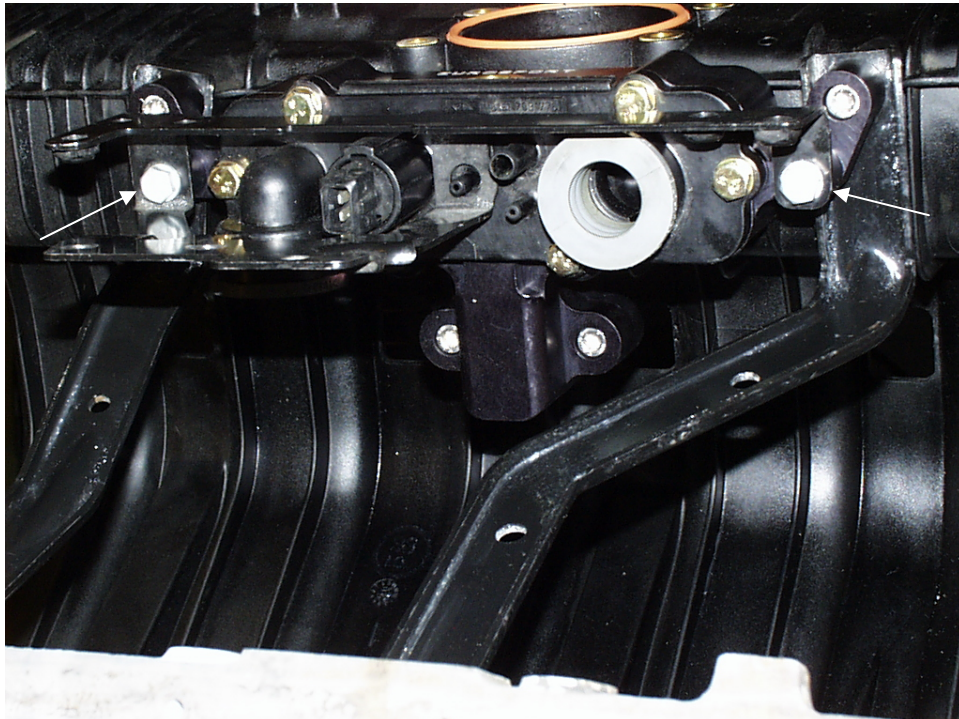
Step 59

The brackets mount to manifold sandwiched between the aluminum adapter and manifold mounting bosses (white arrows).



Step 60

Install idle control valve/crank case ventilator support bracket with two 6mm X 10mm hex bolts (white arrows).



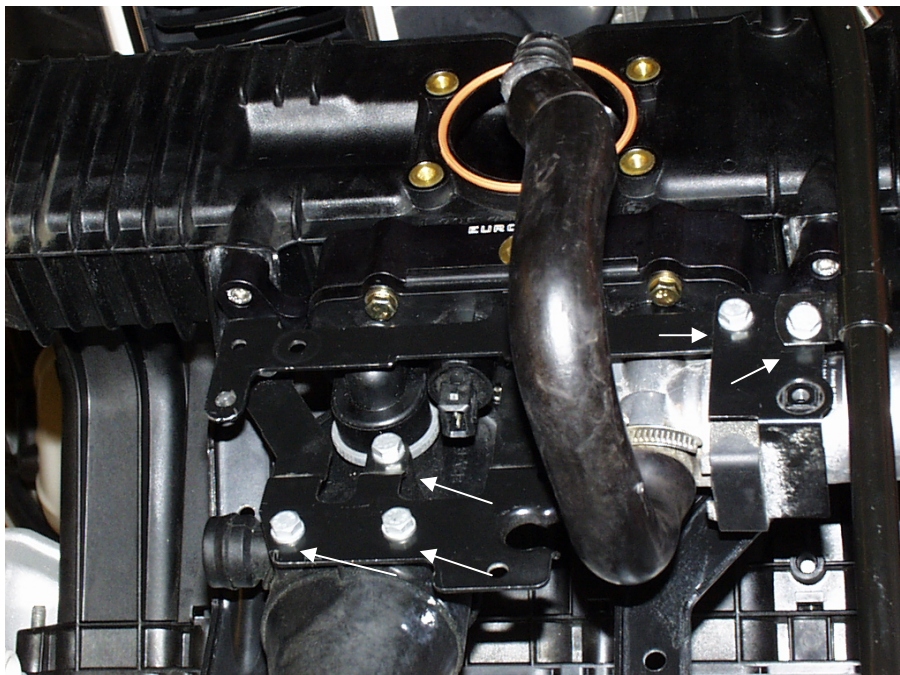
Step 61

Undo the starter battery cable. Using a pair of pliers put an ~30 degree bend in the starter battery cable. This bend will help keep good clearance between the starter battery cable and the back of the idle control valve connector. Re-attach the battery cable to starter. The purpose of bending the starter cable terminal will make more sense during step 62.



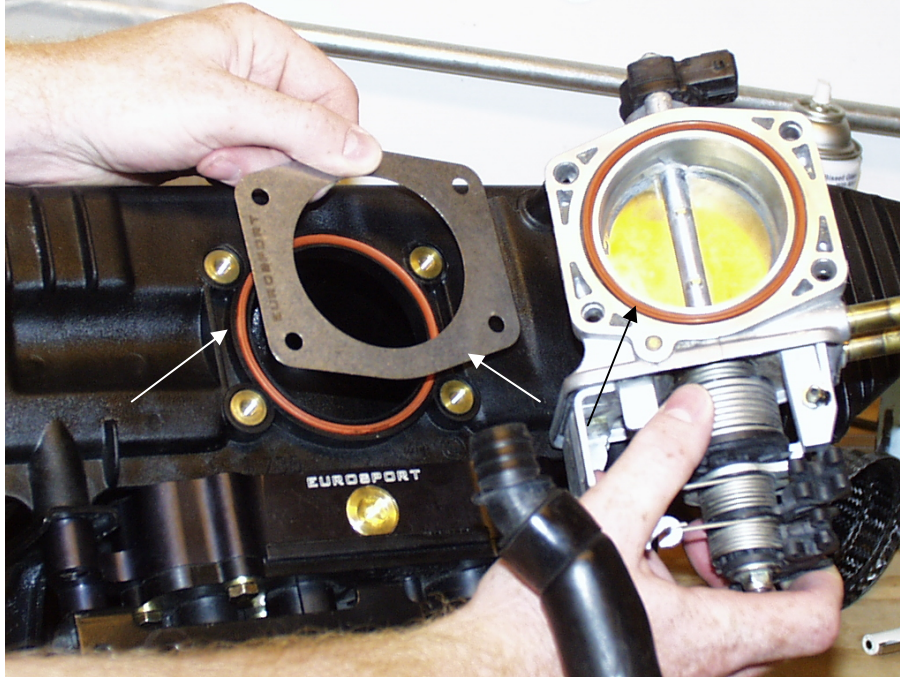
Step 62

Using five 6mm X 10mm bolts attach the idle control valve and crank case ventilator to support bracket (white arrows). Installation of idle control valve will be made SIGNIFICANTLY easier if it is first connected to engine harness prior to installation in manifold support bracket.



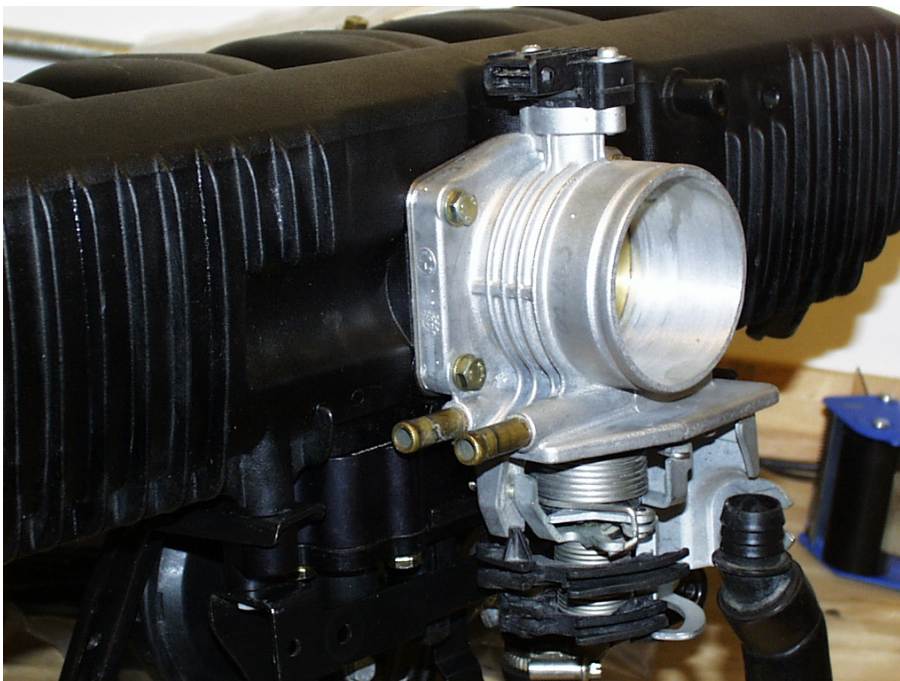
Step 63

Insert o-rings into manifold and back of throttle-body. Sandwich stainless steel oring sealing plate between throttle-body manifold and attach via supplied 6X25mm hex bolts (if removing traction control) or stock 6mmX35mm throttle-body mounting bolts (if keeping traction control). Be sure to reinstall the throttle cables prior to bolting down throttle-body (refer to step 15,16, & 20 for proper cable and plug reconnection).



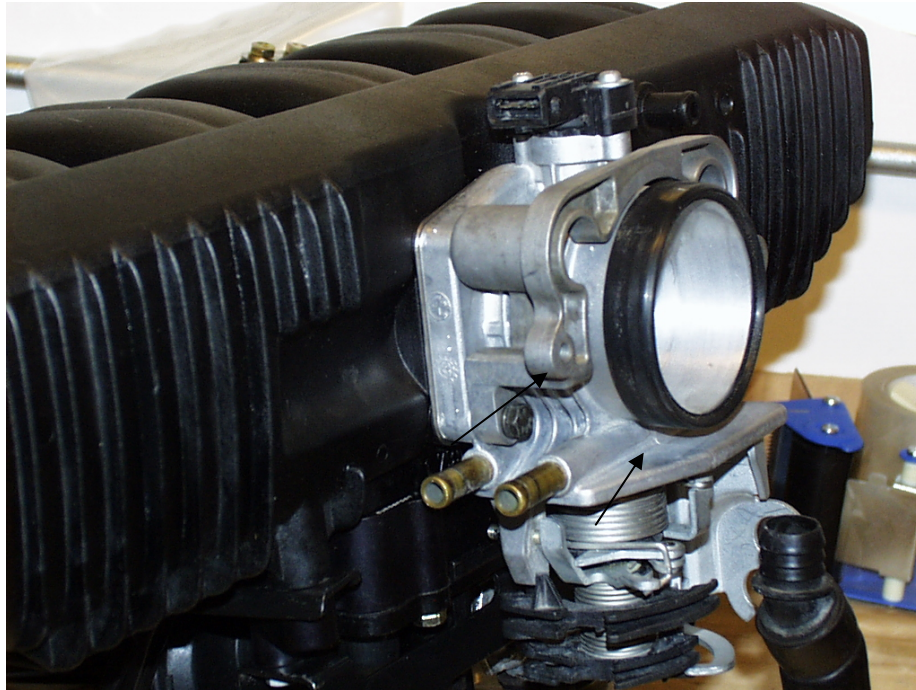
Step 64

Below is the depiction of the throttle-body installation configuration if removing traction control.



Step 65

Below is a depiction of the throttle-body installation configuration if keeping traction control. Note installation of traction control mounting bracket and sealing ring. Bracket requires the use of the stock 6mmX35mm hex bolts.



Step 66

Using a sharp knife or razor blade cut crank case ventilator to valve cover hose midway between ribbed sections (black arrows) of pipe.



Step 67

Insert the now separated ends of the crank case ventilator hose into the supplied adhesive shrink tubing hose extender. Using a heat gun shrink tubing until it fully seals and reconnects ventilator hose ends. To achieve proper lengthening of ventilator tube be sure to butt the ventilator hose ends against the internal spacer pipe within the shrink tubing.



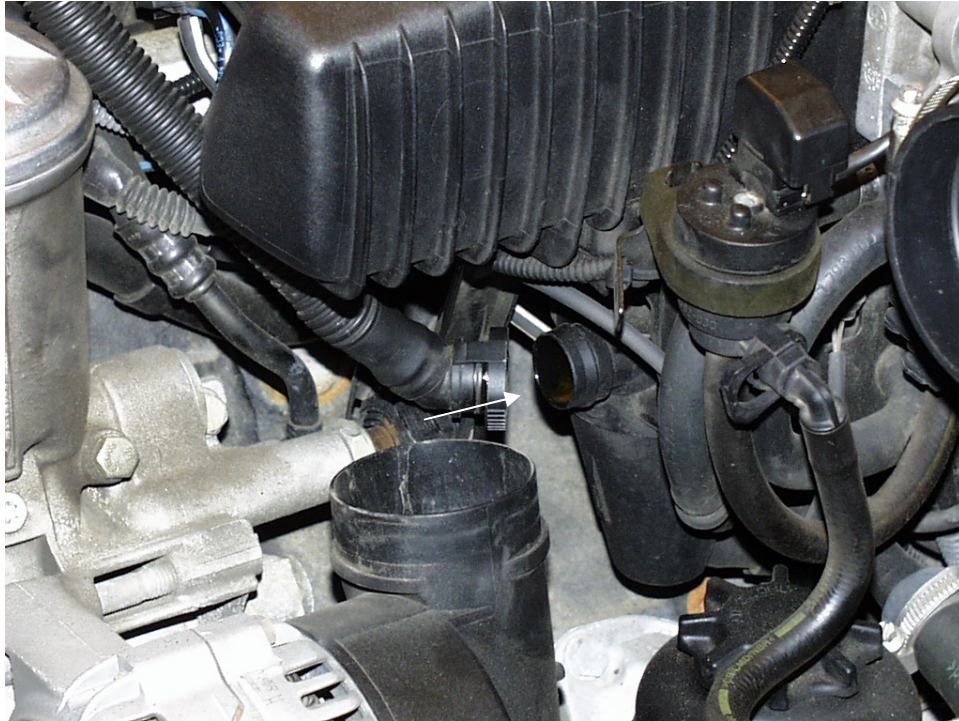
Step 68

Re-connect crank case ventilator oil separator hose to valve cover.



Step 69

Re-connect crank case ventilator oil separator hose at valve



Step 70

Insert idle control hose into throttle-body elbow. Make sure to fully seat fitting in rubber elbow (tip of white arrow)



Step 71

Remove the two sheet metal screws located between the headlight and radiator (white arrows). Also remove air filter box bumper mount at frame rail stud.



Step 72

Install the rubber edge grommet strip on the inside of the large hole of the intake shield. Using a pair of scissors or razor blade trim to fit length.



Step 73

Apply the supplied foam tape strip along the bottom contact edge of shield. Use scissors to trim foam tape to fit length.



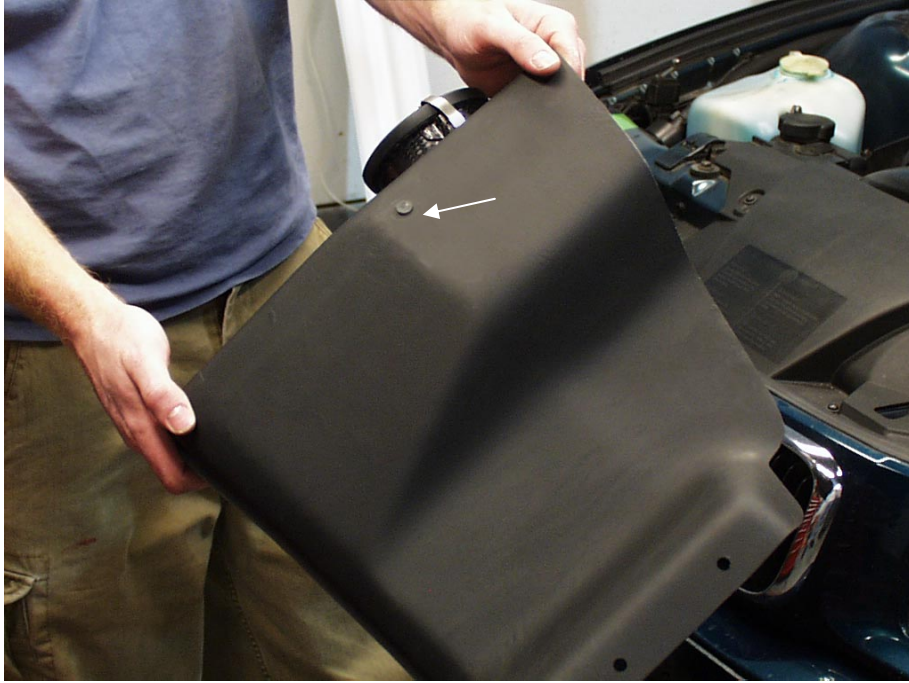
Step 74

Insert the carbon fiber intake pipe into the intake shield. The pipe depicted in steps 79-87 is smaller than actual intake pipe used in the OBDII cam system. Refer to step 88 & 89 for view of actual cam system intake pipe and filter.



Step 75

Install the ¼" rubber plug that is included in the intake hardware kit into the shield hole.



Step 76

Install intake shield and pipe assembly into vehicle. It will take some effort to get the forward portion of the shield into its proper position. Notice how the notch in the front of the shield interlocks with the sheet metal cup at the head of the frame rail (area depicted by bottom white arrow). The forward vertical edge of the shield must be to the outside of the two holes in the front grill (area depicted by gray arrows). With the front of the shield in position the stud on the frame rail will fit through the slot on the bottom edge of the shield (see step 84 for reference)



Step 77

Secure the mass meter to carbon fiber intake pipe via metal spring latches.



Step 78

Using a 10mm socket and ratchet fasten the forward portion of the shield in place with the two 6.4mm X 18mm sheet metal screws w/captive washer (supplied). Use of a flexible head ratchet or wobble extension is recommended for this step. Initial start of screw threads will require patience.



Step 79

Before attaching shield to frame rail, check to make sure that the mounting tab on the inner fender passes through the slot in the shield. Use the supplied plastic body nut to fasten the intake shield to the frame rail.



Step 80

Slip the 1/4" ID rubber grommet supplied in the hardware kit around the cruise control cable (upper left arrow). Seat the cable via the grommet in the notch in the top edge of the shield (white arrow). Use two 6mm nuts with oversized washers and two 6mm X 16mm bolts to fasten the shield and cruise control to the fender mounting points. **The Cruise control bracket should be mounted as low as possible and so that it is sandwiched between the intake shield and the fender tab.** Reconnect the cruise control electrical connector.



Step 81

Oil your new ITG® reticulated foam filter as per the instruction listed on the back of the JDR-1 dust retention oil aerosol container. To avoid spreading filter oil onto the headlamp and heatshield, cover the filter with the plastic bag in which it was shipped and install the ITG® filter. Make sure to fully insert the aluminum trumpet of the intake filter into the carbon fiber pipe flange. Using a flat blade screwdriver or 6mm socket and wrench, secure the intake filter in the carbon fiber pipe. **Tighten the hose clamp just enough to hold the filter in place as over tightening will make later removal of filter difficult.** Don't forget to also tighten the hose clamps at the rubber elbow connected to the mass meter and throttle body. Adjustment of the rubber elbow prior to tightening of the hose clamps will allow for optimal the location of the intake filter.



Step 82

Install the weather stripping on the edge of the shield with. Notice that one end of the seal has a notch cut out of one side. Install the seal with the notched end on the outboard end of the shield (white arrow).



Step 83

Because of the limited space available in the E36 engine compartment your intake filter may come in contact with the headlamp, heat/turbulence shield, hood liner, or cruise control bracket. Don't worry if the air filter comes in contact with any these things. This type of contact with a reticulated foam filter will not have a significant or noticeable effect on the performance of your intake system.



Step 84

This is an installation reference photo taken from driver side.



Step 85

Make sure that all tools associated with the installation have been removed from the engine compartment. Carefully close the vehicle hood. If the hood appears to be slightly higher than the fender (e.g. greater than $\frac{1}{4}$ inch different) proceed with the following hood height adjustment via the hood latch set peg. **If the hood is Less than $\frac{1}{4}$ " different in height when compared to the fender, do not adjust the hood as the hood will settle over time due to break-in compression of both the hood liner and shield seal.** To adjust the hood height, first loosen the 17mm latch pin lock nut at the base of hood latch pin (white arrow). Insert a flat blade screwdriver into the slot at the tip of the hood latch pin (black arrow). Twist the hood latch pin clockwise to lower the hood and counterclockwise to raise the hood. Close the hood and recheck hood height. Once you have obtained the proper hood position, tighten the latch pin lock nut.

