Rotrex Supercharger '90-05 Introductory

Thank you for purchasing our TDR Rotrex supercharger kit for 90-05 Mazda Miata. Our supercharger (SC) mount fits both the 1.6 and 1.8 liter engines and uses the factory power steering mount for assembly. Both left hand and right hand drive (International) year models are compatible.

The supercharger installation instructions are divided into different categories as listed below. It is recommended that you follow and complete each category before proceeding to the next. There are 3 year model categories that will be referenced 90-93, 94-97 and 99-05.

Due to our intercooler piping design, the stock hood prop rod will not fold down in the front. If you prefer to not install the TDR Hood Struts, you can manually reinstall the Prop Rod to hold the hood up and store in the trunk. We recommend installing the Hood Struts first so you don't have the Prop Rod in the way of the installation.

STEP 1: TDR Hood Struts (90-05 Miata), Time about 30 minutes

STEP 2: TDR Fuel Pump Installation (90-05 Miata), Time about 1 hour

STEP 3: TDR Fuel and Timing Installation (90-05 Miata), Time about 1 hour

STEP 4: TDR Fuel Injector Installation, Time about 45 minutes

STEP 5: TDR Header Heat Shield Installation, Time about 30 minutes

STEP 6A: TDR 90-97 Supercharger Installation, Time about 12-14 hours

STEP 6B: TDR 99-05 Supercharger Installation, Time about 12-14 hours

STEP 7: TDR Fuel and Timing Programing (90-05 Miata), Time about 30 minutes

All year models require upgrading the fuel pump to our 190 LPH Walbro fuel pump. Take safety measures such as having a fire extinguisher close by during the installation since you are working with gasoline.

If you are using the TDR Fuel and/or Timing controls, you will need to run a vacuum line from the intake manifold to the engine management ECU. Each of the 3 year groups ECU is mounted in a different location.

The fuel injectors are upgraded for more flue flow on all models.

The TDR Header Heat Shield will work with either the stock header or aftermarket header and required to keep the heat away from the supercharger and its components.

The 90-97 model supercharger installation is different from the 99-05 model. Pick the instructions for your model. The supercharger installation is comprehensive, read twice, cut once.

The TDR Fuel and Timing controls will be preprogrammed, however if you are using a wide band O2 system then you could add additional fine tuning.

If at any time you have questions and or suggestions please don't hesitate to contact us. Enjoy your new supercharger system and try to keep the speeding tickets down.

If you have any questions at any time, please don't hesitate to contact us by phone or email us at support@trackdogracing.com.

‘90-05 Hood Strut Installation

The TDR Hood Struts eliminates the factory hood prop. When working on your engine area, the hood prop can get in the way. Adding the hood struts eliminates the hood prop and adds about 6” additional hood clearance.

If installing our TDR intercooler setup, all forced induction kits, you are not able to latch down the hood prop into the factory mount due to our piping. You can temporarily use the hood prop in its normal mounting and then remove and place in the trunk. Of course the simpler method is to use the TDR hood struts.

The TDR Hood Lifts are supplied with all the mounting hardware. We have also included the proper size drill bit and tap to simplify the installation. Please read the instructions completely before starting. The following tools will also be needed for installation.

Required Tools

- Power Drill
- 10 mm Wrench or Socket
- Ruler
- Pliers
- Center Punch
- 12 mm Deep Socket
- Marker Pin

Mounting the hood struts requires drilling and tapping the hood hinge. To simplify we have included the proper drill bit size and a tap. This is required for threading in the ball joint on the hood strut. The pictures in the instructions are shown from the right side of the car. Dimensional measurements are identical on both sides.

- Prop the hood up using the factory prop or other means. After the installation you can remove the hood prop permanently.
- The scale shown measures in millimeters and inches as shown in Photo 2. Using a scale, measure 1 1/4" (33 mm) from the angled section of the hinged mount as shown in Photo 2.
- Using a marker pin make a line as shown in Photo 3.
- Next measurement is center of the hinge mount. Using a scale, measure 5/16” (8 mm) from the hinge side as shown in Photo 4.

Photo 1: Hood struts with drill, tap and washer

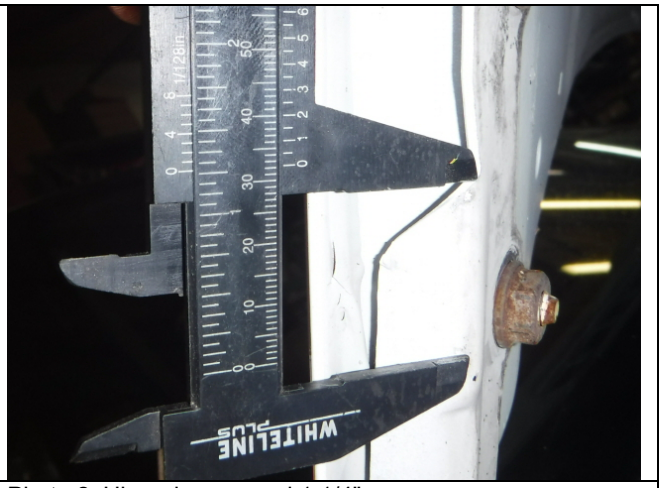

Photo 2: Hinged measured 1 1/4"

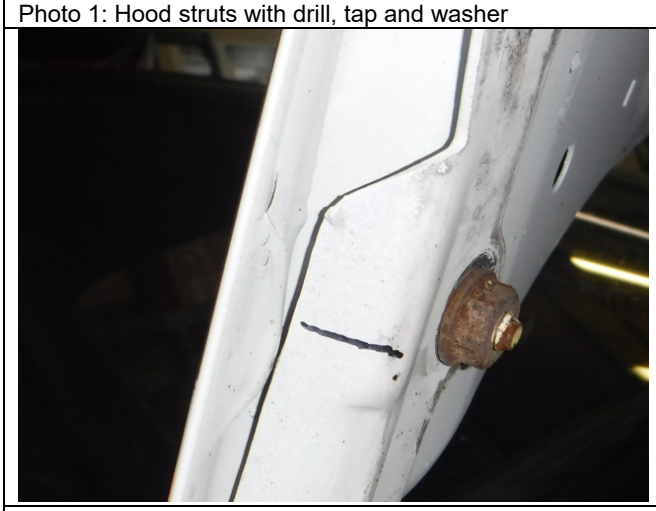

Photo 3: Hinged marked

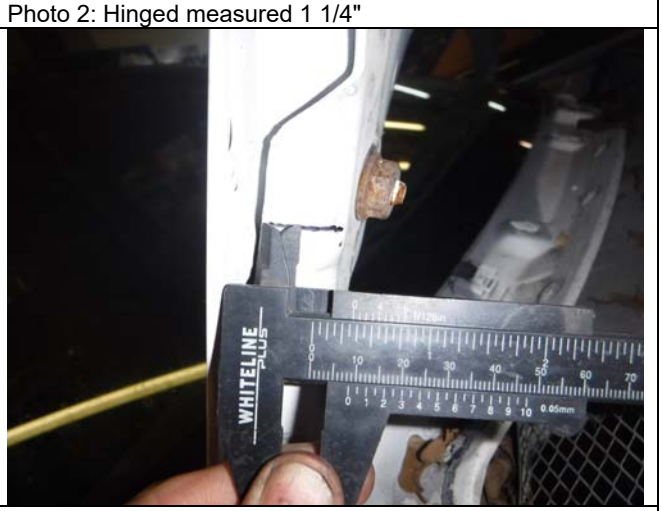

Photo 4: Hinged measured 5/16” or center of mount

- Using a marker pin make a line as shown in Photo 5, this is your center point for drilling.

- Because the hinge mount is angled, it can be difficult to start a drill bit. If you have a means of a center punch as shown in Photo 6 use it to make a starter hole. Sometimes a smaller drill bit used first for a pilot hole will work.

- Use the 5 mm drill bit supplied as shown in Photo 7. Drill through the hinge and the hood as the tap needs the extra depth to cut the threads.

- You can use a tap T-handle if you have one or install the tap into your drill bit as shown in Photo 8. Put a little oil on the tap before using, this will make for cleaner threads and speed the tapping process.

- With the drill, power in the tap until the resistance is too high to enter further. Reverse the drill, this will clean the metal off the tap. You do not need to come completely out of the hole to clean the tap. Power in again to further the thread cutting. You will continue to feel resistance as the tread cuts. Reverse the drill and then continue the process until the threads are complete.

Photo 5: Hinged marked for center

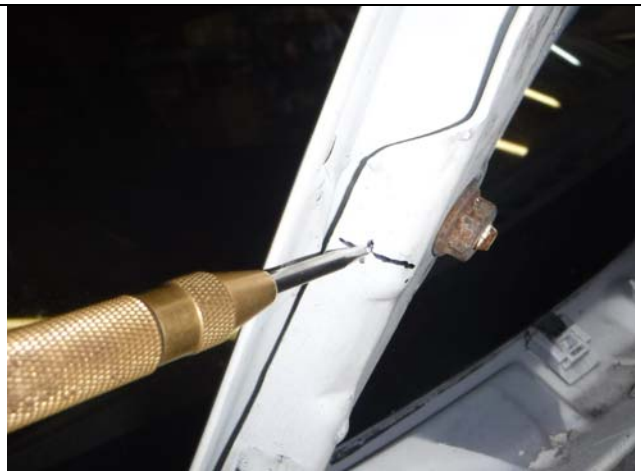

Photo 6: Center punch before drilling

Photo 7: Hinge and hood drilled using 5 mm bit

Photo 8: M6 x 1.0 tap threads hole

- Test fit the threads with the ball joint or a 6 mm bolt, it should have no resistance when threading in. If necessary run the tap through again.

- There are two sizes of ball joints on the strut as sown in Photo 9. The taller ball joint goes into the fender mount. The smaller ball joint goes into the hinge mount.

- The locking pins that hold the ball joint to the strut are easy to loose. Be careful when you remove and install the pins.

- Remove the locking pin from both ball joints on the strut. With a little effort, turn the pin to release from the strut and then pull out of the hole as shown in Photo 10.

- Using a pair of plyers, pull the ball joint out of the strut as shown in Photo 11.

- Install the short ball joint into the hinge as shown in Photo 12.

Photo 9: Tall ball joint fender, short ball joint hood

Photo 10: Pin removed from strut ball joint

Photo 11: Ball joint pulled from strut

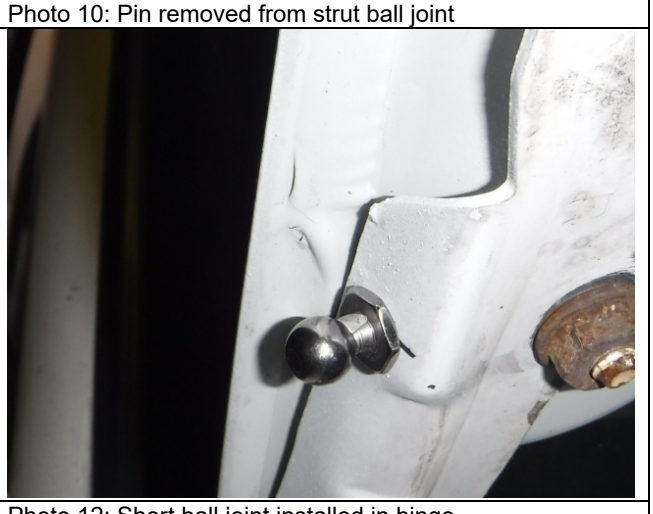

Photo 12: Short ball joint installed in hinge

- Tighten the ball joint using a 12 mm socket or wrench as shown in Photo 13. Don't over tighten and strip the threads. You can use Blue Loctite if you prefer.

- The fender bolt nearest the firewall will be removed. Using a 10 mm wrench, remove the M6 bolt as shown in Photo 14.

- We have supplied a black nylon washer to cover the bare painted area as shown in Photo 15.

- Install the tall ball joint and black washer into the fender as shown in Photo 16. Tighten using a 12 mm wrench.

- You might notice the ball joint mounts on the strut are lose. Check alignment and then tighten by hand. Once installed the strut will not come lose from the ball joint mounts.

- Before pressing on the hood strut, locate the ball joint pin holes. Some are easy to see and others are not.

Photo 13: Ball joint tightened with 12 mm socket

Photo 14: Fender bolt removed

Photo 15: Nylon washer covers bare metal

Photo 16: Fender ball joint installed

- With both ball joints installed and secured, press the hood strut on to the ball joints with the larger spring section installed on the hood end as shown in Photo 17.

- Locating the ball joint pin hole can be a little difficult to feed the pin in. If you cannot locate the pin hole, pull the strut from one end or the other and locate the hole. You can install the pin while one end of the strut is removed from the ball joint. Once you locate the hole, push the pin in and then turn to secure. Photo 18 shows the pin installed on the hinge end.

- Locate the pin hole on the fender ball joint end. Install and secure as shown in Photo 19 and 20.

Photo 17: Strut pressed on the ball joints

Photo 18: Hinge ball joint pin installed and latched

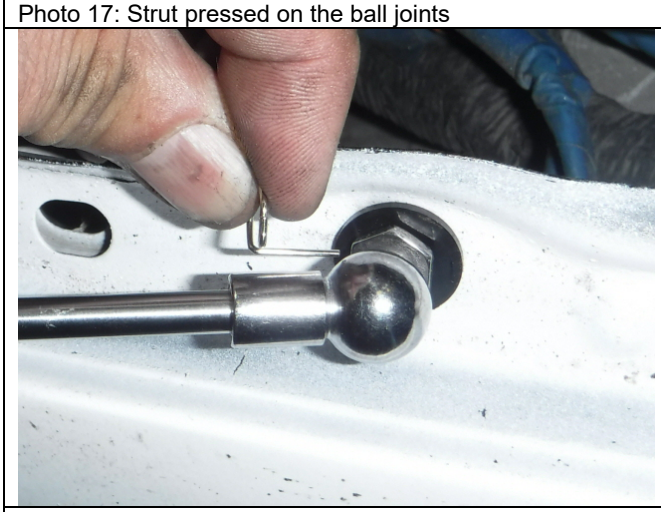

Photo 19: Hood pin guided into hole

Photo 20: Hood pin ready to be latched

Lifting the hood with the struts may start out a little stiff, but will loosen after several uses. Access under the hood will be easier now without the hood prop being in the way. You will also benefit from a higher hood height.

We hope you will be pleased with our product. If at any time you need assistance please contact us by phone or email us at support@trackdogracing.com.

’90-05 Miata Fuel Pump Installation

Please read the entire instructions before beginning installation based on your year model. The removal and reinstallation of the fuel pump assembly on each year model are similar. The 90-93 model inlet tube will be modified to allow the new fuel pump mounting. The 94-05 model we will lower the pump about 1/2 in. (12.5 mm) in the assembly to reduce potential fuel starvation in aggressive driving.

Start with Step 1: Fuel Pump Access which relates to all year models and then proceed to Step 2. Step 2 Fuel Pump Wiring relates to those pumps that had screw terminals instead of plug in terminal. Step 3 Fuel Pump Removal relates to all year models for pump assembly removal. Step 4 instructions is for 90-93 models and Step 5 instructions is for 94-05 models.

Safety Preparation

- You are working with gasoline which is flammable so by all mean have a Fire Extinguisher close by.
- Disconnect your battery negative post.
- Before starting it is recommended that you have minimal amount of gas in your tank. If not then have some paper towels close by to catch the fuel dripping from the fuel pump assembly.
- Put the top up with the rear window closed if removable and both door windows open. Do not perform the installation near open flame and do not smoke.
- Open the vehicle’s doors or windows to prevent gasoline vapor from accumulating.
- Clear an area on a workbench to prepare for exchanging fuel pumps.

STEP 1: General Instructions for Fuel Pump Access

To install the high-pressure fuel pump, you will first need to remove the stock fuel pump. The access panel to the gas tank is located under the carpet on the package shelf behind the driver's seat.

- Disconnect the negative ground wire from the battery as shown in Photo 1-1. Caution: Make sure you know your radio's secret code if you have programmed it (if you haven't programmed a lock code, don't worry, it won't lock up).

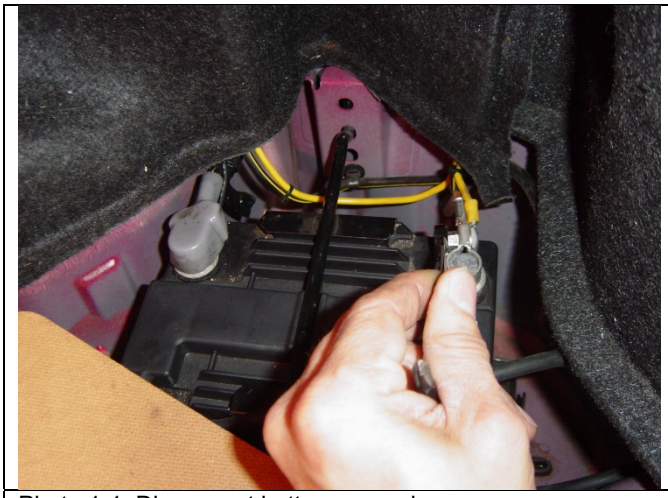

Photo 1-1: Disconnect battery ground

Photo 1-2: Remove gas cap to relieve pressure

- Remove the gas cap as shown in Photo 1-2 to relieve pressure in the fuel system.
- Pull the top up, but don't latch it as shown in Photo 1-3 to allow access and add additional ventilation.
- Pull both seats forward for access to the back panel. Works best to lean in from the left side of the car to remove the fuel pump.
- Remove the five plastic tabs securing the carpet as shown in Photo 1-4. Roll the carpet back so that the silver cover plate on the driver's side is exposed as shown in Photo 1-5.
- Remove the six Phillips head screws in the silver cover plate as shown in Photo 1-6 and place aside.

Photo 1-3: Open top and windows down for ventilation

Photo 1-4: Disconnect tabs from carpet deck

Photo 1-5: Carpet rolled back for access to pump

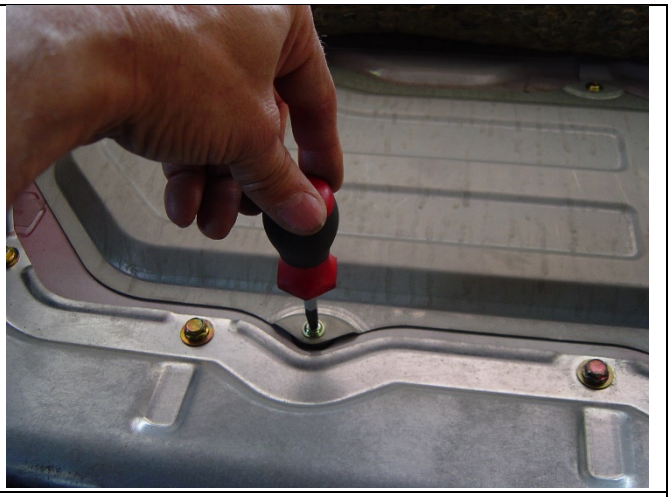

Photo 1-6: Remove cover panel

- You will need paper towels to soak up spilled gas. Notice that the top of the fuel tank has a slight angle that will run the gas towards the front of the car. Place the paper towels between the gas tank and the bottom of the shelf towards the front of the car.

STEP 2: Fuel Pump Wiring

Some models use a screw mounted terminal arrangement on the factory fuel pump. The TDR accessory kit includes a plug style harness that plugs into the new fuel pump.

- Verify which style fuel pump you have. If you have the screw mounted harness type as shown in Photo 2-1 you will cut the wire a couple of inches (50 mm) above the fuel pump.
- If you have the more common plug in fuel pump harness as shown in Photo 2-2 then unplug during the removal instructions and plug into new fuel pump. No wire cutting required.
- If using the new harness, attach by crimping two of the wire connectors as shown in Photo 2-3.
- Attach the Red wire (Hot) to the Blue wire and the two Black (Ground) wires together as shown in Photo 2-4.
- After the fuel pump installation, tie-wrap the harness to the fuel line as shown in Photo 2-4.

Photo 2-1: Screw type fuel pump termination

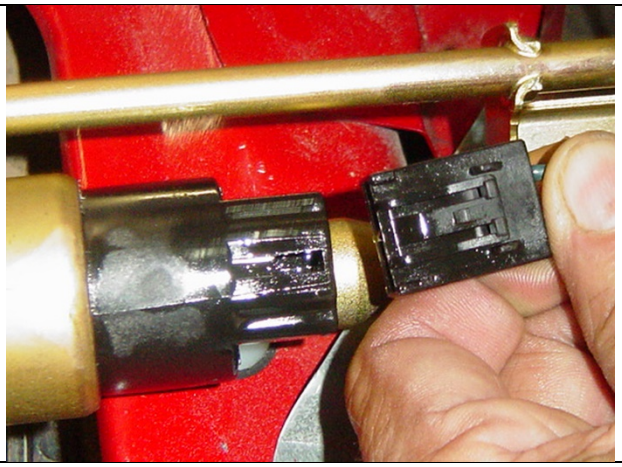

Photo 2-2: Plug in type fuel pump termination

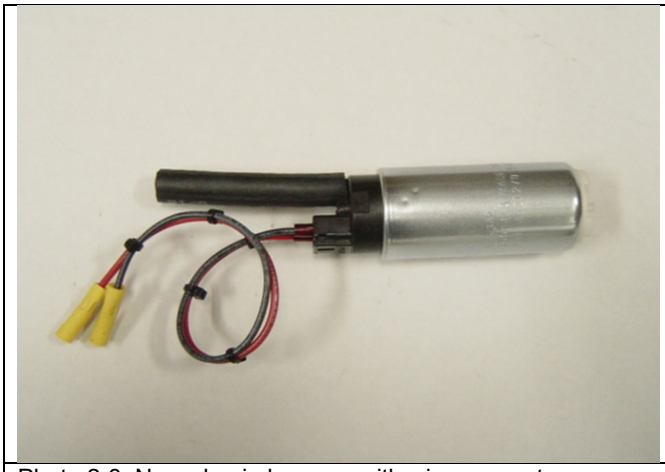

Photo 2-3: New plug in harness with wire connectors

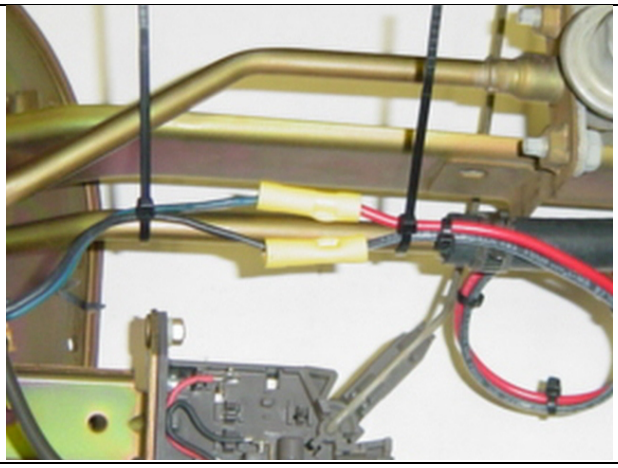

Photo 2-4: New harness connected to existing harness

STEP 3: Fuel Pump Assembly Removal

Section 3-1

The 90-97 fuel pump assembly removal and installation are the same using rubber hose and spring clamps.

- Before removing assembly, mark one of the rubber fuel hoses on both the pipe and the hose as shown in Photo 3-1. You can also use a tie-wrap on each for a marker.
- Remove the nine brass Phillips screw surrounding the assembly cover as shown in Photo 3-2. Be careful not to strip or loose the screws.
- Remove the spring clamps and pull the hose off the metal fitting. Unplug the electrical connection as shown in Photo 3-3.
- Lift the assembly out of the fuel tank as shown in Photo 3-4. The strainer will be holding fuel. Squeeze the strainer to remove as much fuel before moving to a bench to begin modification.

Photo 3-1: Fuel hose marked for reinstallation

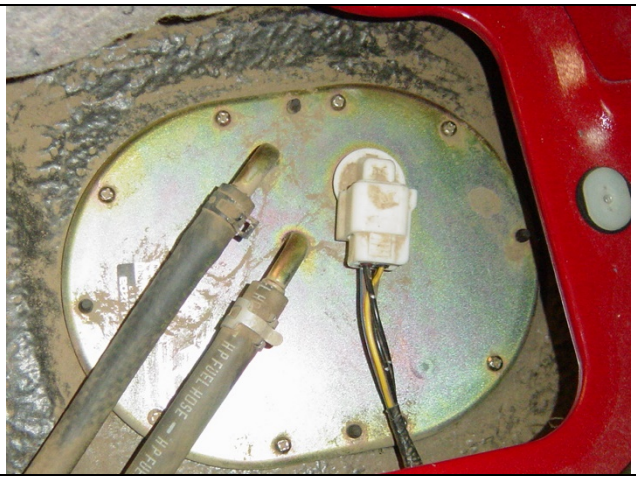

Photo 3-2: Assembly screws removed

Photo 3-3: Remove spring clamps and harness

Photo 3-4: Fuel pump pulled from tank

Section 3-2

The 99-05 fuel pump assembly fuel line connection attaches by using locking clips.

- Squeeze the white clip and then pulling the fuel line off as shown in Photo 3-5.
- Remove the electrical connection by squeezing the connector.
- Remove the Phillips screws and pull the assembly out. The strainer will be holding fuel. Squeeze the strainer to remove as much fuel before moving to a bench to begin modification.

Photo 3-5: Fuel line released

Photo 3-6: Releases electrical connection

STEP 4: 90-93 Fuel Pump Modification

The 90-93 model fuel pump is mounted with the outlet of the pump inserted into the pickup inlet tube. This pickup tube will be modified for the new pump installation.

- Using a Phillips screw driver, unscrew the lower mount as shown in Photo 4-1.
- If you are going to reuse your strainer you need to remove the clip using a small flat-head screwdriver as shown in Photo 4-2 and 4-3. Be careful not to lose this clip. If using the new strainer, the kit comes with a new clip so removal of the old strainer is not necessary.

Photo 4-1: Base removed from pump

Photo 4-2: Strainer clip removed

- Photo 4-4 shows the inlet tube before removing off the widen section.
- Mark the inlet tube and mount as shown in Photo 4-5. You will be cutting the inlet tube wide section off for the new fuel pump hose installation.
- Using a hack saw or band saw, cut the brace first as shown in Photo 4-6.

Photo 4-3: Strainer and clip

Photo 4-4: Fuel pump inlet tube

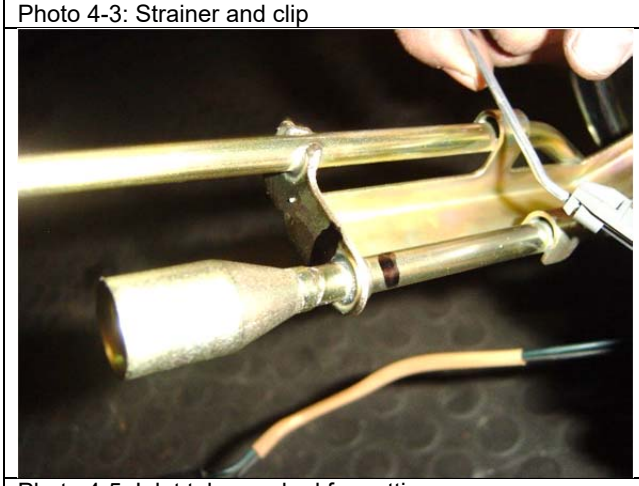

Photo 4-5: Inlet tube marked for cutting

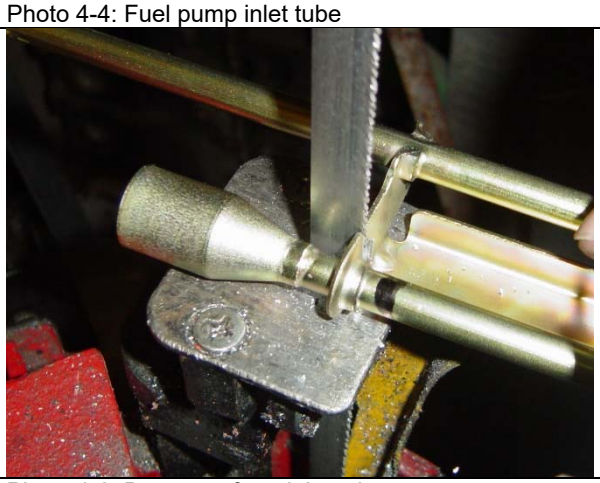

Photo 4-6: Brace cut from inlet tube

- Next cut the tube as shown in Photo 4-7.
- Using a Phillips screwdriver, insert into inlet tube and bend the tube out for the rubber hose clearance as shown in Photo 4-8 and 4-9.
- Blow air or run water through the tube to clear any debris as shown in Photo 4-10. Also make sure there are no burs on the tube inlet so the rubber hose will slide over easily.

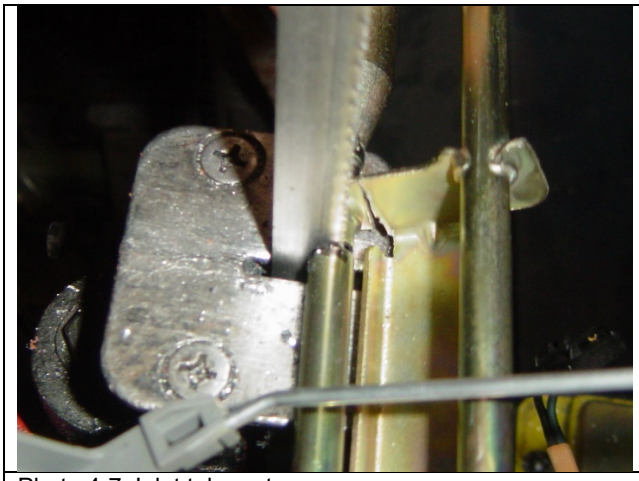

Photo 4-7: Inlet tube cut

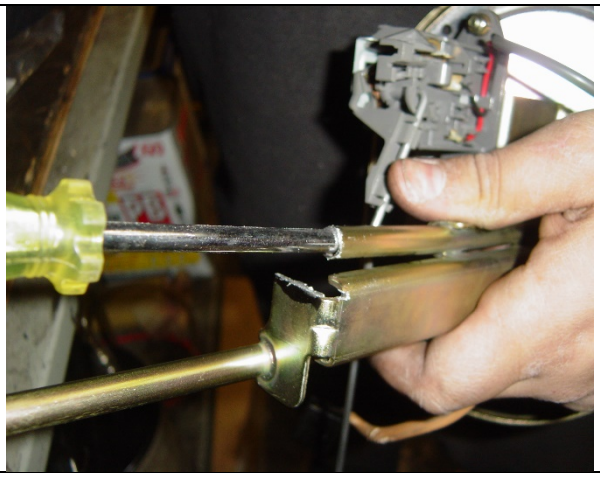

Photo 4-8: Inlet tube bent out from the support

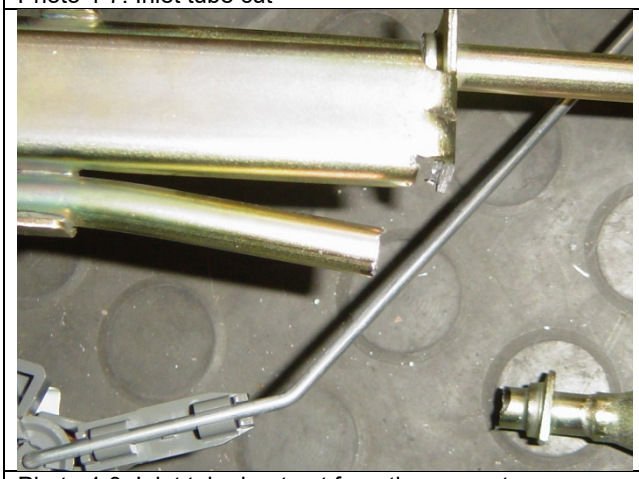

Photo 4-9: Inlet tube bent out from the support

Photo 4-10: Air blown thru inlet tube to clear debris

- Slide the supplied hose and with clamps over the modified inlet tube. Then slide the hose with clamp over the fuel pump outlet as shown in Photo 4-11. Slide the pump to where it is flush with the base
- Install the rubber band back on to the pump assembly. You might add tie-wraps as well to hold the pump assembly when complete.
- Install the strainer with supplied clip. It works best to use a small socket like a 3/16 in. (4 mm) to press the clip down as shown in Photo 4-12.
- Install new rubber mount over pump base. Reinstall base mount using Phillips screw as shown in Photo 4-13.
- The completed assembly should look like the Photo 4-14.
- Install the electrical plug into the fuel pump.

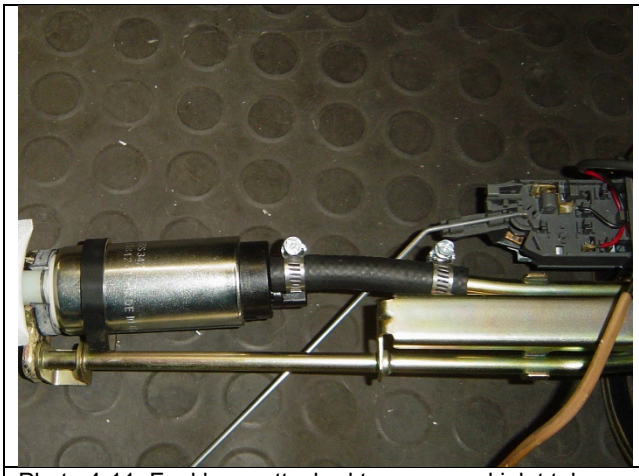

Photo 4-11: Fuel hose attached to pump and inlet tube

Photo 4-12: Strainer clip installed

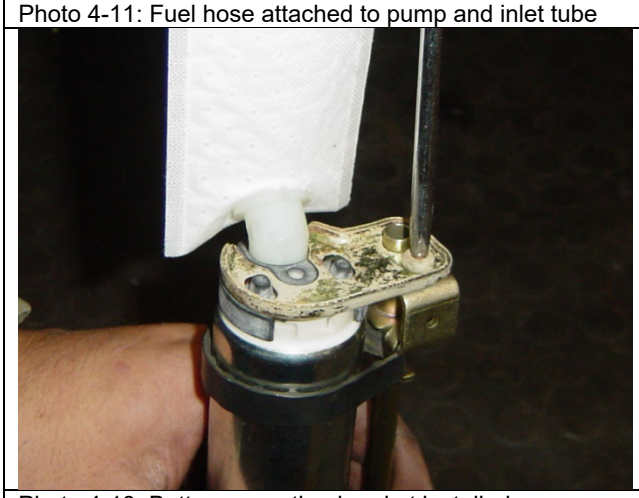

Photo 4-13: Bottom mounting bracket installed

Photo 4-14: Fuel pump assembly complete

- Reinstall assembly into the gas tank.
- Reconnect the fuel pump electrical plug and two fuel lines. Make sure all connections are secure.
- Clean up any gasoline that may be left and any paper towels.
- Reinstall the silver cover plate. Put carpet back in place and reinstall the plastic carpet securing tabs.
- Tighten down fuel cap, and reinstall the negative battery connection.
- Start the engine, there will be a small delay to build up fuel pressure.

STEP 5: 94-05 Fuel Pump Installation

The 94-05 model fuel pump is mounted with rubber hose between inlet pipe and the pump outlet. The base is held on by a Phillips screw on the side. We will be extending the pump lower than stock to help fuel pickup in aggressive driving.

- The fuel pump assembly should be out and on the bench at this time.
- Using pliers, squeeze the lower hose spring clamp on the short rubber fuel hose and slide them off as shown in Photo 5-2.
- Remove the lower bracket by removing the Phillips head screw as shown in Photo 5-3.

Photo 5-1: Fuel pump assembly being removed

Photo 5-2: Spring clamps removed from hose

Photo 5-3: Bottom mount screw removed

Photo 5-4: Strainer clip removed with small screw driver

- Remove the strainer using a small screwdriver to pull the circular clip off a shown in Photo 5-4. Don't discard this clip if you are going to reuse the old strainer. Skip this step if you are using new strainer.
- Install the rubber hose with the clamps onto the new pump as shown in Photo 5-6.
- Install the strainer with supplied clip. It works best to use a small socket like a 3/16 in. (4 mm) to press the clip down as shown in Photo 4-12.

Photo 5-5: Remove strainer clip using a small screwdriver

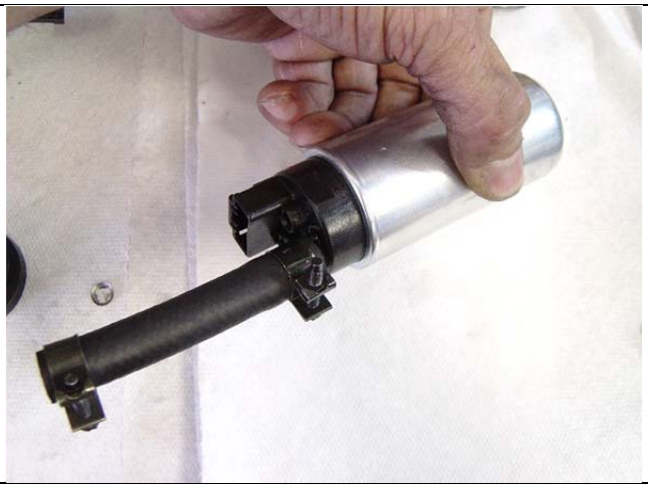

Photo 5-6: New hose installed on fuel pump

Photo 5-7: Clip installed on strainer

Photo 5-8: Rubber mount on bottom of pump

- Install new rubber mount over pump base as shown in Photo 5-8.
- In order to improve low fuel pick up, we reinstall the pump using Phillips screw mounted into the square hole on the L-bracket as shown in Photo 5-9. The rubber hose on the input tube will slide down to meet this slightly lower mounted position.
- Use tie-wrap to secure pump as shown in Photo 5-10.
- Install the fuel pump electrical harness.

Photo 5-9: L-bracket mounted with screw in square hole

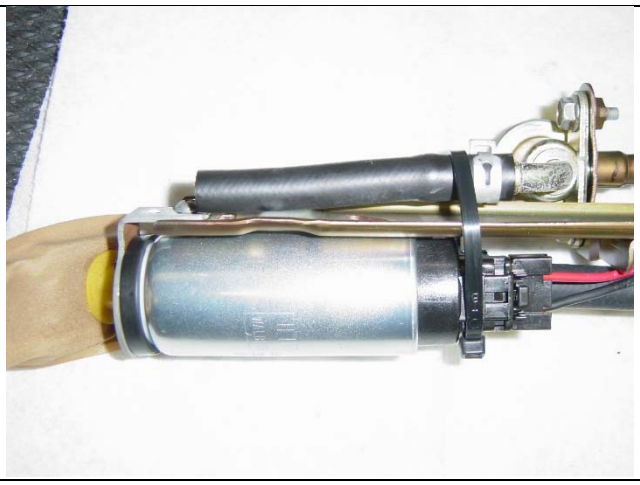

Photo 5-10: Fuel Pump assembly complete

- Reinstall assembly into the gas tank.
- Reconnect the fuel pump two fuel lines and electrical plug. The fuel line connections will snap back in on the 99-05 model when seated. Make sure all connections are secure.
- Reinstall the silver cover plate. Put carpet back in place and reinstall the five, plastic carpet securing tabs.
- Tighten down fuel cap, and reinstall the negative battery connection.
- Start the engine, there will be a small delay to build up fuel pressure.

If at any time you need assistance please feel free to contact us or email us at support@trackdogracing.com. If you have any comments or suggestions, please let us know.

'90-05 Fuel and Timing Control Installation

Thank you for using our TDR Fuel and or Timing Controls (F/T). We have a new fuel and timing card. The main difference is the pressure sender is remote instead of internal. All wiring is identical. There are two options on how to wire the F/T controls. Our preferred method is to use our TDR Patch Harness as shown in Photo 1 and have the F/T controls prewired to the short 8" harness. The TDR setup will include a lengthened vacuum hose on the extended wiring on the older style. We can provide this service or provide the Patch harness separately.

Our preferred method is Plug and Play which simplifies the installation as well as helps in trouble shooting as you can simply unplug the system for testing purposes. We also wire both fans together on the 94-05 models for improved cooling. If you are using our TDR Plug and Play setup, you can skip the wiring instructions and proceed to the vacuum line installation.

When using the Fuel and Timing Controls combined, use the supplied Velcro and attach the two controls together as shown in Photo 4.

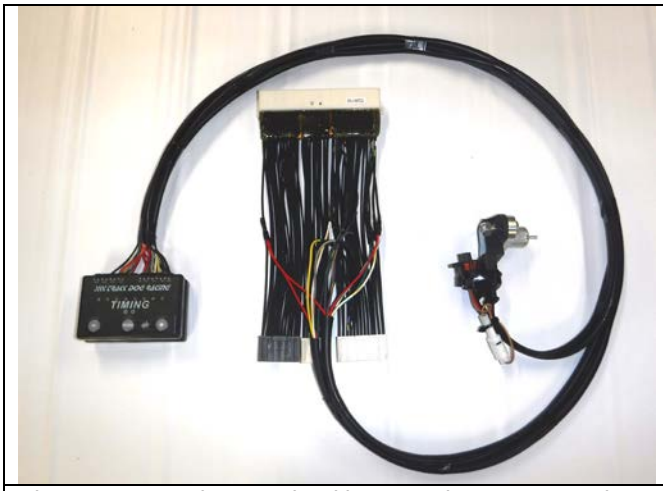

Photo 1: New style controls with external pressure sender

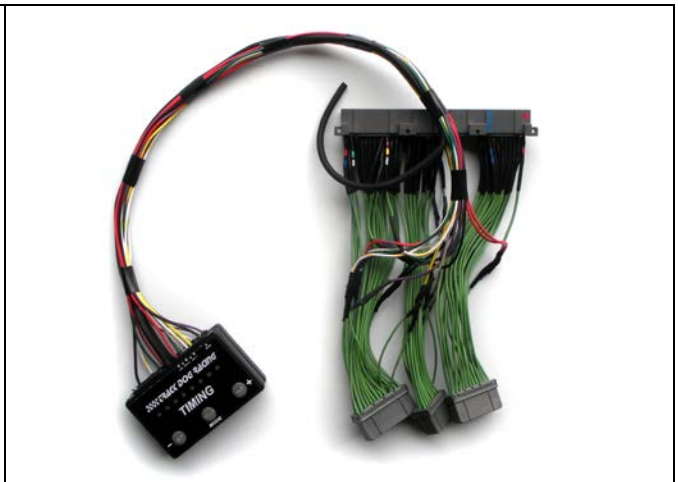

Photo 2: TDR Fuel and Timing Card wired to Patch Harness

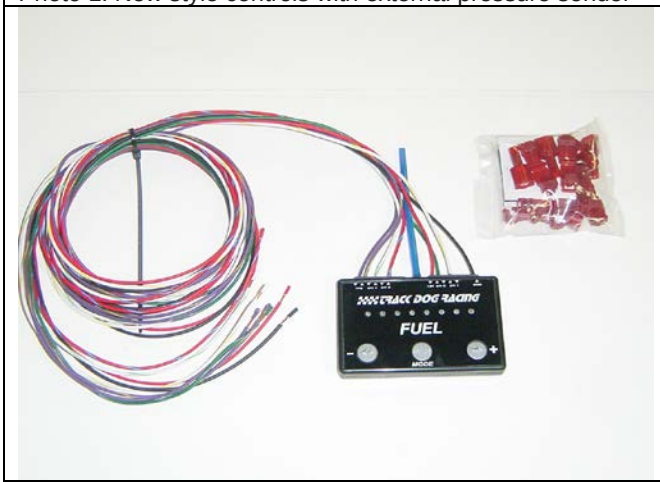

Photo 3: TDR Fuel Card with internal pressure sender

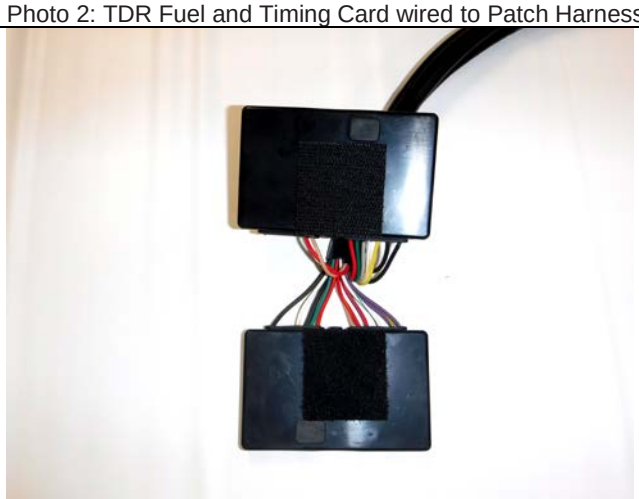

Photo 4: Fuel and timing card Velcro together

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The other installation option is to use the supplied vampire and quick connect connectors as shown in Photo 4. This method requires cutting and splicing into the ECU harness. There are 8 connections on the Fuel Control (FC) and 6 connections on the Timing Control (TC). Installation is more difficult on the 99-05 model since the ECU is in the driver's side footwell area. The instructions to follow will discuss the hand method of wiring.

The Fuel Control (FC) is shown in Photo 5. The photo shows output wires for Channel 3 and 4, this is for 94-05 models. The 90-93 model fires the injectors two at a time so the FC will not have these two outputs.

The Timing Control (TC) is shown in Photo 6. The 94-05 models use a waste park coil arrangement. Wiring requires a signal in and a signal out. Notice on Channel 1 the Arrow In from the harness is Yellow and Arrow Out is White/Yellow wiring goes to the ECU.

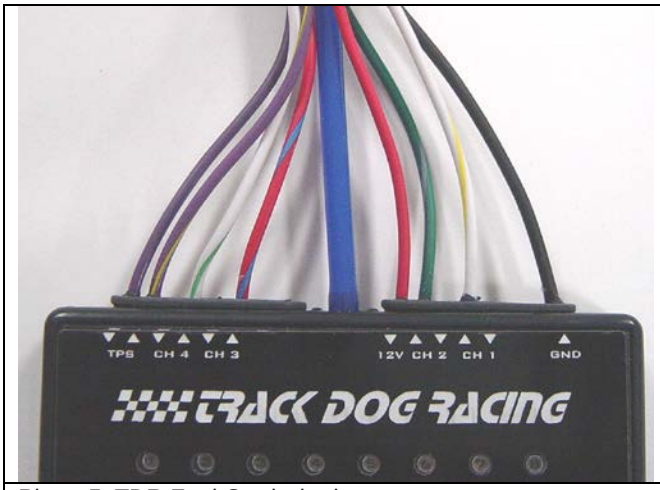


Photo 5: TDR Fuel Card wire layout

Photo 6: TDR Timing Card wire layout

SECTION 1: NEW FUEL AND TIMING CONTROL PRESSURE SENDER

The new Fuel and Timing Control comes with about 30 in. of lead wires. Only one pressure sender is need for this setup. For this reason we have a single wire plug for the signal wire on each harness where the sender plugs is located as shown in Photo 1-1.

- Remove the single wire plug ends as shown in Photo 1-1. Then plug the fuel and timing sender wire together as shown in Photo 1-2.

- Tie-Wrap the sender bundle together as shown in Photo 1-3 and 1-4.

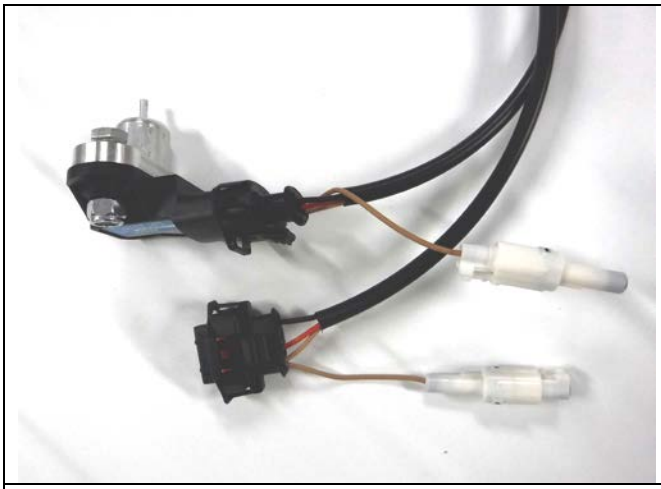


Photo 1-1: Sender signal wire

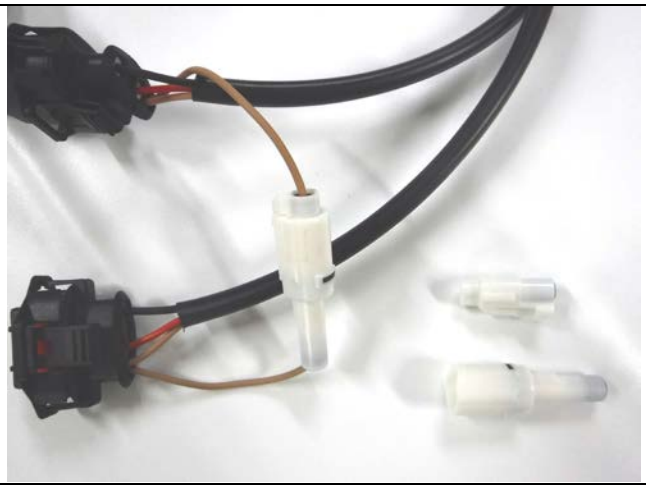


Photo 1-2: Sender signal wire connected

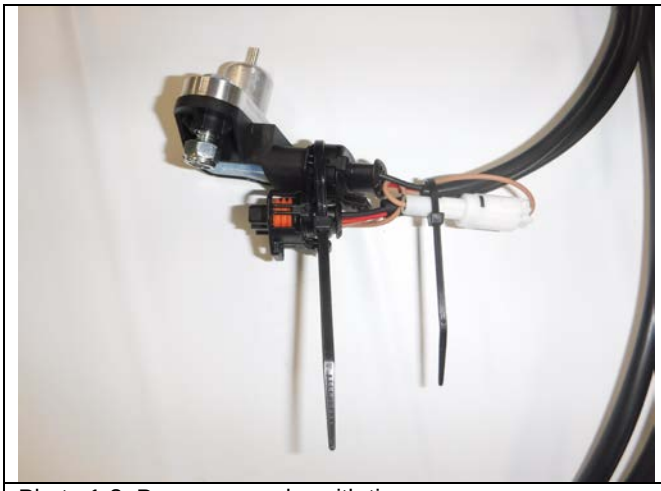


Photo 1-3: Pressure sender with tie-wraps

Photo 1-4: Pressure sender and lead wires

Wiring Color Codes

When there are two designated color codes such as R/B (Red/Black) then the first letter is the predominate color on the wire followed by a thin strip of the second color. White and yellow strips are sometimes hard to distinguish.

COLOR	CODE	COLOR	CODE
Black	B	Orange	O
Blue	L	Pink	P
Brown	BR	Red	R
Dark Blue	DL	Purple	PU
Dark Green	DG	Sky Blue	SB
Gray	GY	Tan	T
Green	G	Violet	V
Light Blue	LB	White	W
Light Green	LG	Yellow	Y
Natural	N		

SECTION 2: VACUUM LINE INSTALLATION

Route the vacuum source from the engine intake to the Fuel and Timing Controls. Begin in the engine bay running the vacuum line through the firewall. You can use a rubber hose all the way, but it can be difficult to push through the firewall area. The simplest way is to use a hard plastic vacuum line as it is simpler to push through the firewall grommet and less chance of pinching. TDR supplies a rigid plastic tubing with our setup.

- You can run the vacuum line through the wiring grommet by the brake booster area, but it is simpler on left hand drive cars to run the rigid vacuum line through the A/C grommet as shown in Photo 2-1. Start with pushing the vacuum line through the grommet. Use a screw driver to open the rubber grommet up works well to provide gap while pushing the hard line tube.

- The hard line will hit the back of the inside fan box when pushed through. Reach behind the fan box to retrieve the hard line as shown in Photo 2-2. It will probably take a few attempts to run the hard line, but once through pull the tubing into the footwell area.

- Locate a free vacuum port on the intake manifold, near the front produces cleaner air pulses. If there are no free ports, splice into an existing vacuum source and use the included Tee to connect as shown in Photo 2-3.

Photo 2-1: Vacuum line ran through A/C grommet

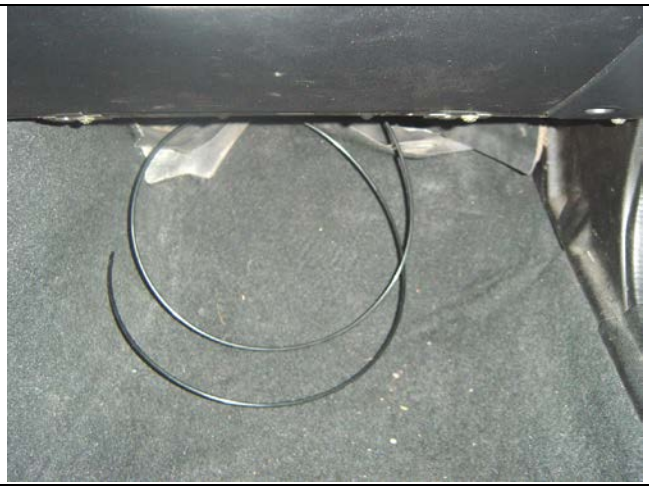


Photo 2-2: Vacuum line pulled through firewall

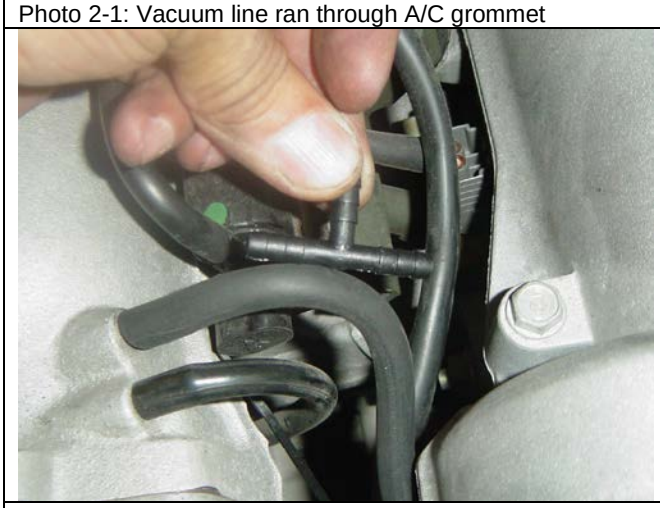


Photo 2-3: Tee fitting for vacuum line

Photo 2-4 Tee fitting attached with hard line

- Attach the hard line using a small section of rubber vacuum hose supplied as shown in Photo 2-4. Use a tie-wrap to add clamping to the hard line as shown in Photo 2-5.

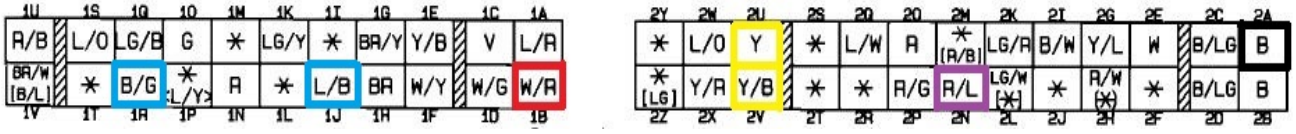
- Run the hard line down the door sill area on 94-97 models as shown in Photo 2-6. On 99-05 models, run the hard line under the dash area to reach the ECU area under the drivers foot well.

Photo 2-5: Hard line inserted into rubber vacuum line

Photo 2-6: Hard line installed on 94-97 models

SECTION 3: 90-93 MODEL FUEL CARD WIRING

Description	ECU Terminal	TDR Fuel & Timing Card	Notes
12V Power	1B (W/R) White/Red	12V Red	Switched power
12V Ground	2A (B) Black	GND Black	Switched ground
Injector 1 & 3	2U (Y) Yellow	Channel 1 White/Yellow	Batch fired injector
Injector 2 & 4	2V (Y/B) Yellow/Black	Channel 2 Green/Gray	Batch fired injector
O2 Sensor In	2N (R/L) Red/Blue	TPS Purple to Harness	O2 Signal in
O2 Sensor Out	2N (R/L) Red/Blue	TPS Purple/Yellow to ECU	O2 Signal out
Main Fan	1R (B/G) Black/Green	Wire these two wires together for dual fan operation, but ONLY for Non A/C application. Track use.	
A/C Fan	1J (L/B) Blue/Black		



If you are using the Plug and Play harness setup you can skip the wiring instructions.

Locate the Fuel Control (FC). We have included enough wire to mount it on the center console or in the glove box (recommended) and still reach the passenger's side foot well where the ECU is located. Decide where you want to mount it, route the wires from that location to the console (or thru the glove box area) back behind the dashboard and down into the passenger's side foot well. We recommend around 30 inches (750 mm) in wiring length (older model FC) if you are going to install in the glove box.

Remove the floor mat and pull back the carpet to expose a large metal plate as shown in Photo 3-1. Remove the four M6 nuts and one M6 bolt that secure the plate to the car. Remove the M6 bolts using a 1O mm wrench. Remove the plate to gain access to the Electronic Control Unit (ECU).

Cut the extra wire to length or loop and wrap it and use tie-wrap to secure. Strip 1/4" of insulation off of each of the FC wires. Gather together one (1) female spade connector and five (5) male spade connectors. Crimp the Female spade connector onto the Purple wire and then crimp the Male spade connectors onto the rest of the wires.

- Locate the ECU's fuel injector wires. Use the pin-out at the end of the instructions to help you find the colored wires. Locate terminal 2U Yellow and terminal 2V Yellow/Black wire located in the connector nearest the driver's side of the car as shown in Photo 3-2. Use the included T-taps (vampire) connectors with multi-purpose pliers to tap into the wires.

Photo 3-1: ECU Cover on passenger foot well

Photo 3-2: Injector wires Yellow and Yellow/Black

- Connect Channel 1 White/Yellow on the Fuel Control to the T-tap on the Yellow terminal 2U injector wire. Connect Channel 2 Green/Gray on the Fuel Control to the T-Tap on the Yellow/Black terminal 2V injector wires at the ECU.

- Locate terminal 2N Red/Blue wire in the same connector as the two injector wires as shown in Photo 2-3. This is the Exhaust Gas Oxygen (02) sensor wire. Cut this wire about 2" from the ECU connector. Strip 1/4" of insulation from both ends of the cut wire. Crimp a Male Spade connector onto the side of the cut wire that leads into the harness. Crimp a Female Spade connector onto the side of the cut wire that leads to the ECU connector.

- Connect the Female spade connector on the TPS Purple wire of the TDR Fuel Control to the Male spade connector on the Red/Blue wire leading into the harness. Connect the Male spade connector on the TPS Purple/Yellow wire of the TDR Fuel Control to the Female spade connector on the Red/Blue wire leading into the ECU connector.

- Locate terminal 2A Black wire in the opposite end of the harness. T-tap the Black wire, this is the system ground. Connect the Fuel Control's Black wire to the T-tap on the Black wire of the ECU.

- Locate terminal 1B White/Red wire. T-tap on the White/Red wire terminal 1B of the ECU, this is the system 12V power. Connect the Fuel Control's Red wire to the T-tap on the White/Red wire of the ECU as shown in Photo 3-4.

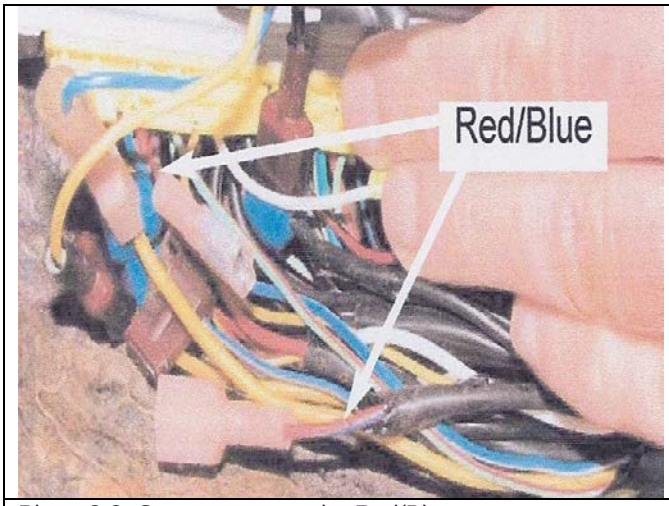


Photo 3-3: Oxygen sensor wire Red/Blue


Photo 3-4: Power wire White/Red

SECTION 4: 94-97 MODEL FUEL CONTROL WIRING

If you are using the Plug and Play harness setup you can skip the wiring instructions.

The Electronic Control Unit (ECU) is mounted behind the passenger seat. Pull the seat all the way forward and angled forward as well. Pull the fasteners that hold the carpet and then pull the carpet up and back to access the ECU as shown in Photo 4-1.

The 94-95 models are OBD1 and use only the two outside harness connections. The 96-97 models are OBD2 and have 3 harness connections. The connectors are sometimes difficult to pull out. Using a flat head screwdriver can help pry the connector out while squeezing the center section clip as shown in Photo 4-2. If you are using the TDR Plug and Play harness, plug the Patch harness between the ECU and the factory harness as shown in Photo 4-3. We make the wiring on the Plug and Play setup about 30 inches (600 mm) on the old style controls. Attach the vacuum line as shown in Photo 4-4. You can bypass the wiring steps if using the TDR Patch setup.

The diagram below shows which color of the ECU terminal mates up to the Fuel Control (FC) and Timing Control (TC). Be sure to use the proper year model diagram. Use the included T-taps (vampire) connectors with multi-purpose pliers to tap into the wires. We would recommend on the older model FC/TC cutting the wires about 24 to 30 inches (600-750 mm) and either tie-wrap or tape the wire bundle together as shown in Photo 4-4. You can also use a vacuum Tee to on the cards vacuum connection to provide one connection to the hard line.

Photo 4-1: Carpet pulled back with ECU shown

Photo 4-2: Harness removed from ECU

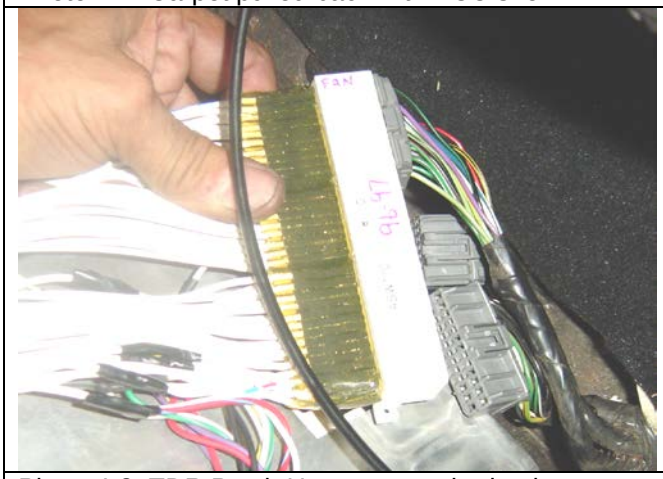


Photo 4-3: TDR Patch Harness attached to harness

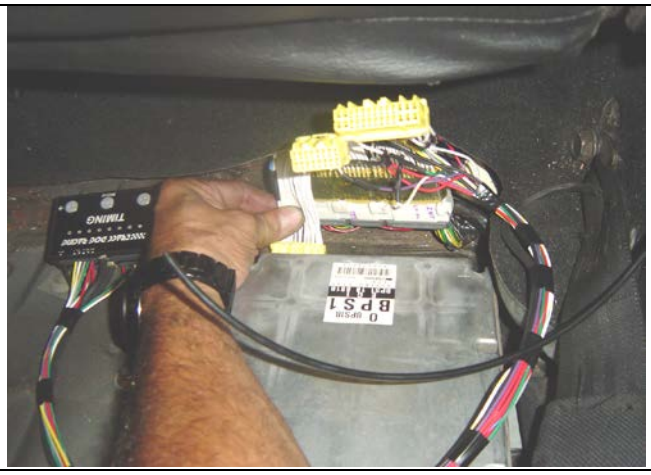
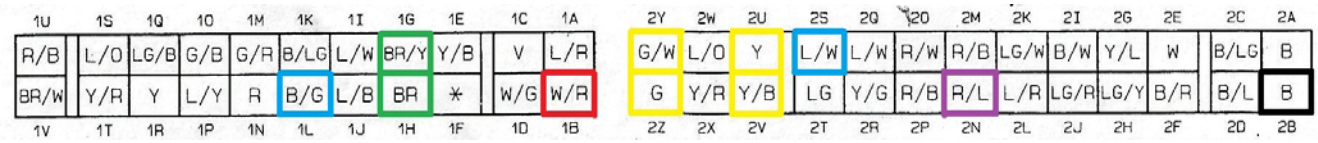


Photo 4-4: Patch Harness and vacuum line

94-95 Terminal Diagram

Description	ECU Terminal	TDR Fuel & Timing Card	Notes
12V Power	1B (W/R) White/Red	12V Red	Power Fuel and Timing
12V Ground	2B (B) Black	GND Black	Ground Fuel and Timing
Injector 1	2U (Y) Yellow	Channel 1 White/Yellow	Injector 1
Injector 2	2V (Y/B) Yellow/Black	Channel 2 Green/Gray	Injector 2
Injector 3	2Y (G/W) Green/White	Channel 3 Red/Blue	Injector 3
Injector 4	2Z (G) Green	Channel 4 White/Green	Injector 4
O2 Sensor In	2N (R/L) Red/Blue	TPS Purple to Harness	O2 Signal in
O2 Sensor Out	2N (R/L) Red/Blue	TPS Purple/Yellow to ECU	O2 Signal out
Coil 1 & 4 In	1G (BR/Y) Brown/Yellow	Channel 1 White/Yellow	In From Harness
Coil 1 & 4 Out	1G (BR/Y) Brown/Yellow	Channel 1 Yellow	Out to ECU
Coil 2 & 3 In	1H (BR) Brown	Channel 2 Green/Gray	In From Harness
Coil 2 & 3 Out	1H (BR) Brown	Channel 2 Gray	Out to ECU
Main Fan	1L (B/G) Black/Green	Recommended wiring these two wires together for dual fan operation for Street and Track use.	
A/C Fan	2S (L/B) Blue/White		



- Both the Fuel and Timing Control require power and ground. Locate the 12V Power and Ground ECU wiring and T-Tap (vampire) connectors on each of the wires about 2 inches (50 mm) from the harness connector. You have two options on wiring, you can either attach two T-Tap connectors on the power wire or install both the FC and the TC power into one Male Spade connector. Use multi-purpose pliers to tap the connector into the power wire.

- Locate the fuel injector wires using the terminal diagrams for you particular year model. Connect injector channels 1 to 4 per the year model terminal diagram. T-Tap (vampire) connectors on each of the injector wires about 2 inches (50 mm) from the harness connector. Use multi-purpose pliers to tap the connector into the injector wire.

- Strip about a 1/4 inch (3 mm) off the Fuel and Timing Control wires after you determine the length. Start with the Power wires and the Injector wires by crimping on a Male Spade connector.

- Press the Male Spade connector into the T-Tap based on the color code and location of the Power and Injector wire on your year model harness.

- The 94-97 Fuel Control uses the O2 sensor input and converts a 3 volt signal to override the Closed Loop system. The Closed Loop system tries to control the air fuel ratio close to 14.7 AFR (Stoic) even under full throttle. This is fine for cruising and idling, but not at full throttle. Our Fuel Control simulates a voltage signal to change to Open Loop and allows adjustability of the fuel map.

- Locate the Oxygen (O2) wire using the terminal diagrams for you particular year model. Cut the wire about 2 inches (50 mm) from the harness connector. Connect a Male Spade connector to the Harness end and a Female connector on the ECU end. If you need to remove the Fuel Card from the harness you can simply plug the two connectors together to complete the signal.

- On the Fuel Control (FC) connect the opposite connectors. The FC Purple wire goes to the harness end. Connect a Female connector to the wire. The FC Purple/Yellow wire goes to the ECU end. Connect a Male Spade connector to the wire. Connect the FC wires to the harness.

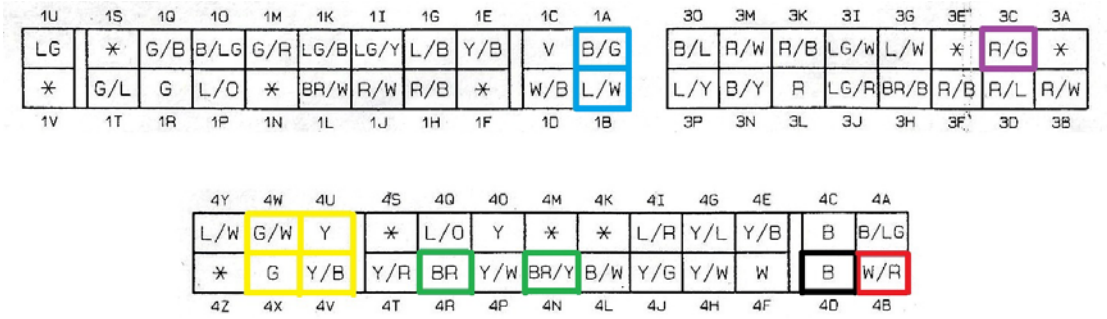
- The Timing Control breaks the Coil signal wire to control the voltage signal. Be sure to wire the Coil wiring properly. Locate the two Coil wires using the terminal diagrams for you particular year model. Cut the wire about 2 inches (50 mm) from the harness connector. Connect a Male Spade connector to the Harness end and a Female connector on the ECU end. If you need to remove the Timing Control from the harness you can simply plug the two connectors together to complete the signal.

- On the Timing Control (TC) connect the opposite connectors. For Coil 1, the Yellow wire goes to the harness end. Connect a Female connector to the wire. The Coil 1 White/Yellow wire goes to the ECU end. Connect a Male Spade connector to the wire. For Coil 2, the Gray wire goes to the harness end. Connect a Female connector to the wire. The Coil 2 Green/Gray wire goes to the ECU end. Connect a Male spade connector to the wire. Plug in the 4 connectors firmly.

- For additional cooling you can jump the main cooling fan and the air conditioning fan relay signal wire. Locate the two Fan wires using the terminal diagrams for you particular year model. Strip the wire and solder together or add a T-Tap to both wires. This can be a permanent connection.

96-97 Terminal Diagram

Description	ECU Terminal	TDR Fuel & Timing Card	Notes
12V Power	4B (W/R) White/Red	12V Red	Power Fuel and Timing
12V Ground	4D (B) Black	GND Black	Ground Fuel and Timing
Injector 1	4U (Y) Yellow	Channel 1 White/Yellow	Injector 1
Injector 2	4V (Y/B) Yellow/Black	Channel 2 Green/Gray	Injector 2
Injector 3	4W (G/W) Green/White	Channel 3 Red/Blue	Injector 3
Injector 4	4X (G) Green	Channel 4White/Green	Injector 4
O2 Sensor In	3C (R/G) Red/Green	TPS Purple to Harness	O2 Signal in
O2 Sensor Out	3C (R/G) Red/Green	TPS Purple/Yellow to ECU	O2 Signal out
Coil 1 & 4 In	4N (BR/Y) Brown/Yellow	Channel 1 White/Yellow	In From Harness
Coil 1 & 4 Out	4N (BR/Y) Brown/Yellow	Channel 1 Yellow	Out to ECU
Coil 2 & 3 In	4R (BR) Brown	Channel 2 Green/Gray	In From Harness
Coil 2 & 3 Out	4R(BR) Brown	Channel 2 Gray	Out to ECU
Main Fan	1A (B/G) Black/Green	Recommended wiring these two wires together for dual fan operation for Street and Track use.	
A/C Fan	1B (L/B) Blue/White		



SECTION 5: 99-05 MODEL FUEL CARD WIRING

If you are using the Plug and Play harness setup you can skip the wiring instructions.

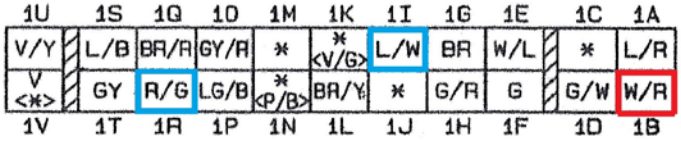
The Electronic Control Unit (ECU) is mounted in the driver's side foot well, to the left of the steering column. It works best if you will remove the driver's seat for easier access to the wiring harness. There are four M10 bolts that requires a 14 mm socket wrench to remove the seat bolts. The 99-00 models harness connectors are different from the 01-05 connectors. Wiring is similar, but the terminal layout are different. The connectors are sometimes difficult to pull out. Using a flat head screwdriver can help pry the connector out while squeezing the center section clip.

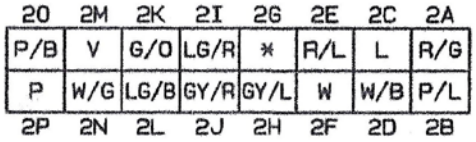
We strongly recommend using our TDR Plug and Play Patch harness between the ECU and the factory harness as wiring the 14 wires required are difficult and tedious to connect. The TDR Plug and Play setup uses 30 inch (760 mm) long wiring extension. When plugged in to the ECU you can extend the FC/TC under the dash where you can access for adjustment.

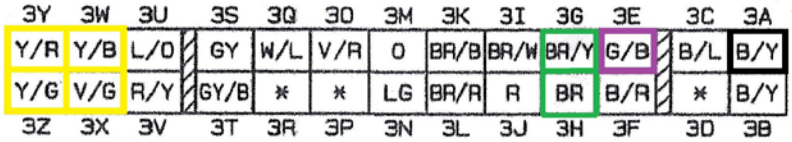
The diagram below shows which color of the ECU terminal mates up to the TDR Fuel Control (FC) and Timing Control (TC). Be sure to use the proper year model diagram. Use the included T-taps (vampire) connectors with multi-purpose pliers to tap into the wires. You can shorten the wires on the F/T controls or tie-wrap the wire bundle together as shown in Photo 4-4. You can also use a vacuum Tee to on the controls vacuum connection to provide one connection to the hard line.

99-00 Terminal Diagram

Description	ECU Terminal	TDR Fuel & Timing Card	Notes
12V Power	1B (W/R) White/Red	12V Red	Power Fuel and Timing
12V Ground	3A (B/Y) Black/Yellow	GND Black	Ground Fuel and Timing
Injector 1	3W (Y/B) Yellow/Black	Channel 1 White/Yellow	Injector 1
Injector 2	3X (V/G) Violet/Green	Channel 2 Green/Gray	Injector 2
Injector 3	3Y (Y/R) Yellow/Red	Channel 3 Red/Blue	Injector 3
Injector 4	3Z (Y/G) Yellow/Green	Channel 4 White/Green	Injector 4
TPS Sensor In	3E (G/B) Green/Black	TPS Purple to Harness	Throttle Position In
TPS Sensor Out	3E (G/B) Green/Black	TPS Purple/Yellow to ECU	Throttle Position Out
Coil 1 & 4 In	3G (BR/Y) Brown/Yellow	Channel 1 White/Yellow	In From Harness
Coil 1 & 4 Out	3G (BR/Y) Brown/Yellow	Channel 1 Yellow	Out to ECU
Coil 2 & 3 In	3H (BR) Brown	Channel 2 Green/Gray	In From Harness
Coil 2 & 3 Out	3H(BR) Brown	Channel 2 Gray	Out to ECU
Main Fan	1R (R/G) Red/Green	Recommended wiring these two wires together for dual fan operation for Street and Track use.	
A/C Fan	1I (L/B) Blue/White		







- Both the Fuel and Timing Control require power and ground. Locate the 12V Power and Ground ECU wiring and T-Tap (vampire) connectors on each of the wires about 2 inches (50 mm) from the harness connector. You have two options on wiring, you can either attach two T-Tap connectors on the power wire or install both the FC and the TC power into one Male Spade connector. Use multi-purpose pliers to tap the connector into the power wire.

- Locate the fuel injector wires using the terminal diagrams for you particular year model. Connect injector channels 1 to 4 per the year model terminal diagram. T-Tap (vampire) connectors on each of the injector wires about 2 inches (50 mm) from the harness connector. Use multi-purpose pliers to tap the connector into the injector wire.

- Strip about a 1/4 inch (3 mm) off the Fuel and Timing Control wires after you determine the length. Start with the Power wires and the Injector wires by crimping on a Male Spade connector.

- Press the Male Spade connector into the T-Tap based on the color code and location of the Power and Injector wire on your year model harness.

- Locate the Throttle Position Sensor (TPS) wire using the terminal diagrams for you particular year model. Cut the wire about 2 inches (50 mm) from the harness connector. Connect a Male Spade connector to the Harness end and a Female connector on the ECU end. If you need to remove the Fuel card from the harness you can simply plug the two connectors together to complete the signal.

- On the Fuel Control connect the opposite connectors. The FC Purple wire goes to the harness end. Connect a Female connector to the wire. The FC Purple/Yellow wire goes to the ECU end. Connect a Male Spade connector to the wire. Connect the FC wires to the harness.

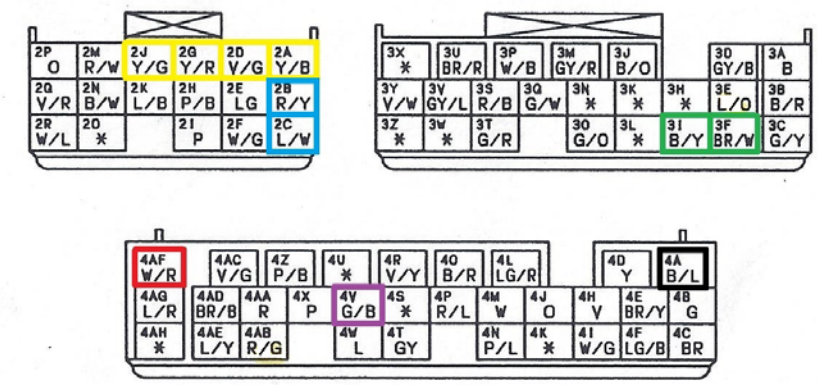
- The Timing Control breaks the Coil signal wire to control the voltage signal. Be sure to wire the Coil wiring properly. Locate the two Coil wires using the terminal diagrams for you particular year model. Cut the wire about 2 inches (50 mm) from the harness connector. Connect a Male Spade connector to the Harness end and a Female connector on the ECU end. If you need to remove the TC from the harness you can simply plug the two connectors together to complete the signal.

- On the Timing Control connect the opposite connectors. For Coil 1, the Yellow wire goes to the harness end. Connect a Female connector to the wire. The Coil 1 White/Yellow wire goes to the ECU end. Connect a Male Spade connector to the wire. For Coil 2, the Gray wire goes to the harness end. Connect a Female connector to the wire. The Coil 2 Green/Gray wire goes to the ECU end. Connect a Male spade connector to the wire. Plug in the 4 connectors firmly.

- For additional cooling you can jump the main cooling fan and the air conditioning fan relay signal wire. Locate the two Fan wires using the terminal diagrams for you particular year model. Strip the wire and solder together or add a T-Tap to both wires. This can be a permanent connection.

01-05 Terminal Diagram

Description	ECU Terminal	TDR Fuel & Timing Card	Notes
12V Power	4AF (W/R) White/Red	12V Red	Power Fuel and Timing
12V Ground	4A (B/L) Black/Blue	GND Black	Ground Fuel and Timing
Injector 1	2A (Y/B) Yellow/Black	Channel 1 White/Yellow	Injector 1
Injector 2	2D (V/G) Violet/Green	Channel 2 Green/Gray	Injector 2
Injector 3	2G (Y/R) Yellow/Red	Channel 3 Red/Blue	Injector 3
Injector 4	2J (Y/G) Yellow/Green	Channel 4White/Green	Injector 4
TPS Sensor In	4V (G/B) Green/Black	TPS Purple to Harness	Throttle Position In
TPS Sensor Out	4V (G/B) Green/Black	TPS Purple/Yellow to ECU	Throttle Position Out
Coil 1 & 4 In	3F (BR/W) Brown/White	Channel 1 White/Yellow	In From Harness
Coil 1 & 4 Out	3F (BR/W) Brown/White	Channel 1 Yellow	Out to ECU
Coil 2 & 3 In	3I (B/Y) Black/Yellow	Channel 2 Green/Gray	In From Harness
Coil 2 & 3 Out	3I (B/Y) Black/Yellow	Channel 2 Gray	Out to ECU
Main Fan	2B (R/Y) Red/Yellow	Recommended wiring these two wires together for dual fan operation for Street and Track use.	
A/C Fan	2C (L/W) Blue/White		



See TDR Fuel and Timing Programming for all of your programing instructions.

We hope you will be pleased with our product. If at any time you need assistance please contact us by phone or email us at support@trackdogracing.com.

'90-05 Fuel Injector Installation

Highly modified, normally aspirated and forced induction engine generally over 6 PSI require larger flowing injectors. The following instructions are for removing and replacing the injectors. There are three year model configurations so use the appropriate section for your installation. The 90-97 model injector setup is similar. The 90-93 has water fitting on the manifold that is removed for better access to the fuel rail. The 94-97 has a vacuum mechanism on the manifold that when removed simplifies removal. The 99-05 model fuel rail setup are similar other than the bolt pattern on the manifold top.

In addition to larger injectors you should also upgrade your fuel pump. Our 190 LPH is more than adequate for 12 PSI and generally makes less sound than the higher flowing 255 LPH pump. On race application we will specify the 255 LPH pump. Although the 255 LPH pump is capable of more flow than we require, its louder whine lets us know it is working. To some it is a little annoying so use the 190 LPH for street applications.

The picture below shows the different injectors that came on each year models. The injector flow rate is based on 43 PSI, an industry standard rating. The 90-97 models use a return fuel system and vary the fuel pressure from around 20 PSI at idle to 43 PSI under full throttle. The 99-05 models use a non-return fuel system and higher fuel pressure. Normally we see around 52 PSI on a stock fuel pump and up to around 56 PSI on the 190 LPH fuel pump. The injectors are rated at 43 PSI, but at around 52 PSI the flow rate increases about 30 cc. This would make the 99-00 models flow around 260 cc and the 01-05 models flow around 290 cc in stock form. Our TDR custom injectors flow rate is also rated at 43 PSI. On the 99-05 model at 56 PSI the flow rate of our 335 cc injector is around 375 cc.

Below are General Instructions for all year models. Refer back to these few steps as you begin your year model instructions. Since you are working with fuel, we recommend you have a fire extinguisher close by.

GENERAL INSTRUCTIONS FOR ALL MODELS

- Start with a cold engine for this installation. Loosen you gas cap before starting as shown in Photo 1, this will relieve any pressure that may build in the gas tank which will push fuel out of the fuel rail.

- When you remove the fuel rail bolts there are 2 or 3 depending on model plastic spacers as shown in Photo 2. These spacers during disassembling are loosely fitted and WILL drop down during removal and installation. When you remove the bolts from the fuel rail, be prepared to grab the spacers before they fall. To prevent the spacers from falling during installation, use a small amount of silicone as shown in Photo 4 and place back onto the head. Usually about 15 minutes will set the glue. Continue with the injector installation.

Photo 1: Fuel cap removed to reduce fuel line pressure

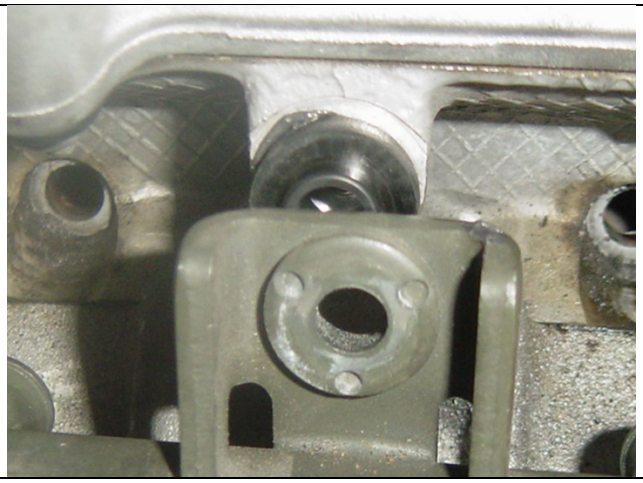


Photo 2: Fuel rail showing spacer

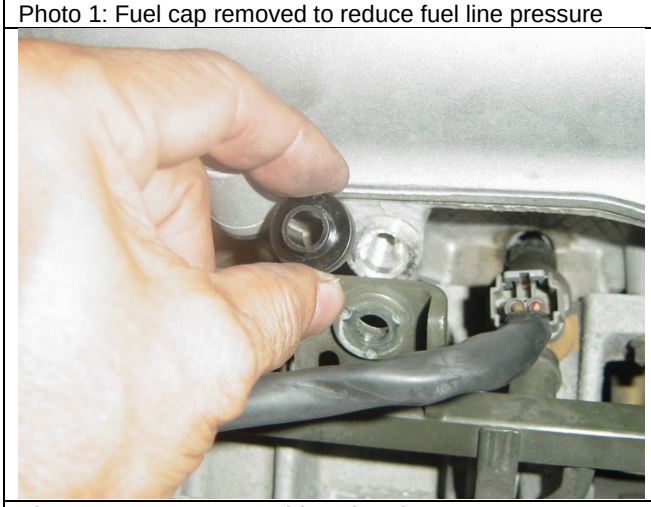


Photo 3: Spacer removed from head

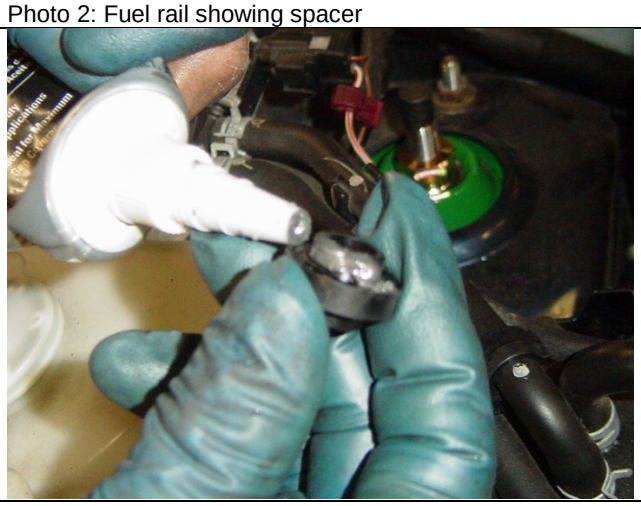


Photo 4: Silicone sealer on plastic spacer

- If your injector port has grime and dirt around the port as shown in Photo 5, you need to carefully remove it from the opening. You need to have a good seal when the injector is reinstalled. A Q-Tip is one method of getting the dirt away from the opening as shown in Photo 5. You could also use a screwdriver tip.

Photo 5: Dirt and grim removed from port

Photo 6: Add grease to fuel rail O-ring

Photo 7: Grease installed to lube O-ring.

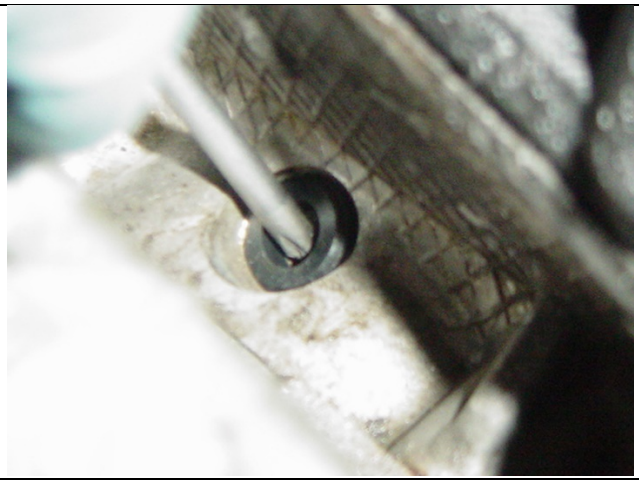


Photo 8: Lower O-ring guided with screw driver in to port

- When installing injectors, it is important to lube the top O-ring as shown in Photo 6. Any type of lube will work, but we do include a small lube pack with our injectors. Apply to the small O-ring on the fuel rail end around the complete surface as shown in Photo 6 and 7.

- The injectors come with new rubber O-rings for the head side. Remove them from the individual injectors. It works best to install these in the head port and then feed the injector into the O-ring. Put the O-ring on a Phillips screwdriver. Hold the O-ring and then aim the screwdriver into the head port. Let the O-ring slide down the screwdriver into the port. Use the screwdriver to push the O-ring around the port opening until it is set completely into the port.

- The rest of the installation are specific to the year model.

STEP 1: 90-93 MODEL INJECTOR REPLACEMENTS

The 90-93 model injector removal and installation is the simplest of all models, only the water valve is removed for access. Be sure to refer back to the General Instructions as needed.

- Remove the vacuum hose attached to the fuel pressure regulator and the intake manifold as shown in Photo 1-1.

- Remove the PCV valve and hose from the valve cover and intake manifold as shown in Photo 1-2.

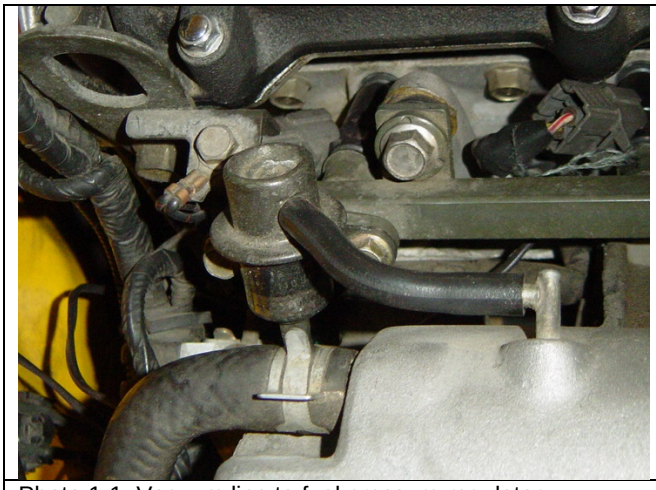


Photo 1-1: Vacuum line to fuel pressure regulator

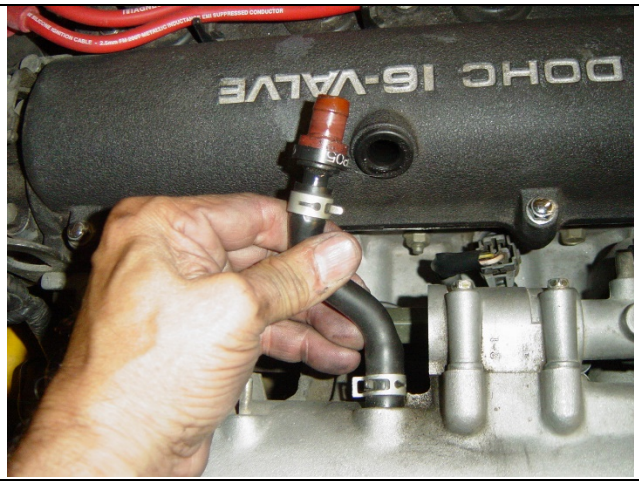


Photo 1-2: PCV valve and hose

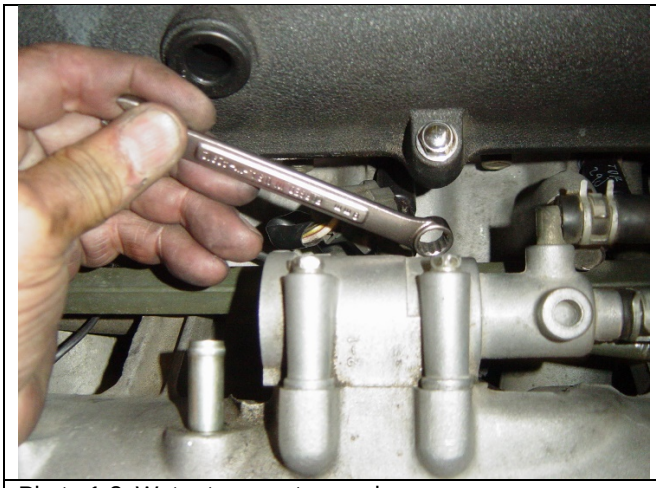


Photo 1-3: Water temperature valve

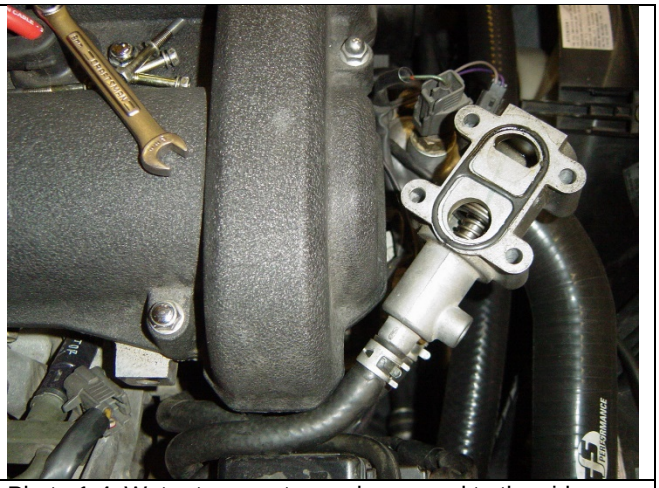


Photo 1-4: Water temperature valve moved to the side

- Using an 8 mm wrench, remove the four bolts on the water temperature valve as shown in Photo 1-3. Leave the water lines attached to the valve. Take caution to not lose the rubber gasket in the valve. Lay the valve unit toward the front as shown in Photo 1-4.

- Remove the two M8 bolts on the fuel rail using a 12 mm socket wrench as shown in Photo 1-7. Take caution in not losing the plastic stand offs on the rail removal. As stated in the General Instructions, glue these plastic stand offs using silicone glue.

- Pull the fuel rail back from with the injectors and then remove each harness attachment as shown in Photo 1-5. Gas will be dripping out but usually a small amount.

- If there is grime around the port opening on the head, refer back to the General Instructions.

- Install the port O-ring to the head using a screw driver to guide the O-ring to the port opening as shown in Photo 8 in the General Instructions.

- Attach the harness to the injector one at a time and lay into the port area. Be sure you have grease on the small O-ring where the injector attaches to the fuel rail as shown in Photo 1-6.

- Make sure the plastic stand offs for the fuel rail are attached. Align the fuel rail over the injectors and insert each one. Careful align all 4 injectors into the port and then align the fuel rail over the plastic stand offs. If the fuel rail aligns with minimal effort then install the two M8 bolts as shown in Photo 1-7.

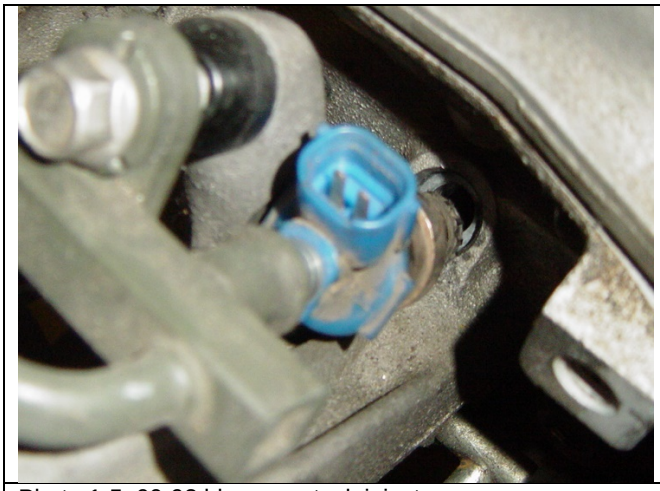


Photo 1-5: 90-93 blue cap stock injector

Photo 1-6: New TDR injector installed

Photo 1-7: Fuel rail with new injectors installed

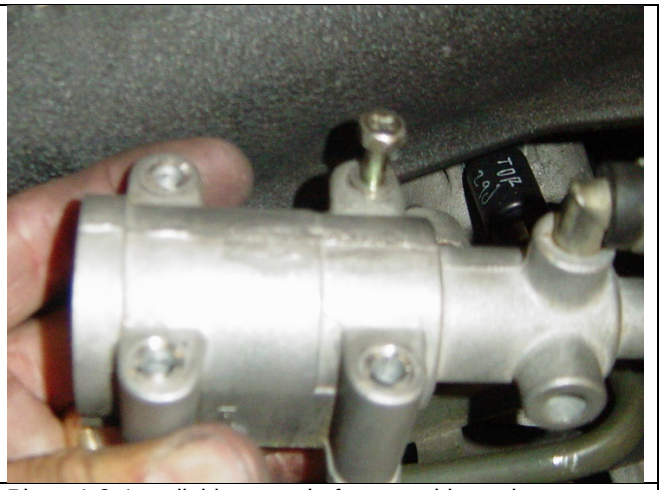


Photo 1-8: Install this screw before attaching valve

- The water temperature valve requires the lower bolt as shown in Photo 1-8 to be installed during placement. Install as shown in Photo 1-3.
- Be sure to test for fuel leaks and misalignment of the injector insertion during the start up.

STEP 2: 94-97 MODEL INJECTOR REPLACEMENTS

The 94-97 model removal and installation requires an electrical harness connection and the fuel regulator electrical connection to be removed for access. Be sure to refer back to the General Instructions as needed.

- Begin with disconnecting the brake booster vacuum line as shown in Photo 2-1.
- Remove the PCV valve and hose setup from the valve cover and intake manifold as shown in Photo 2-2.

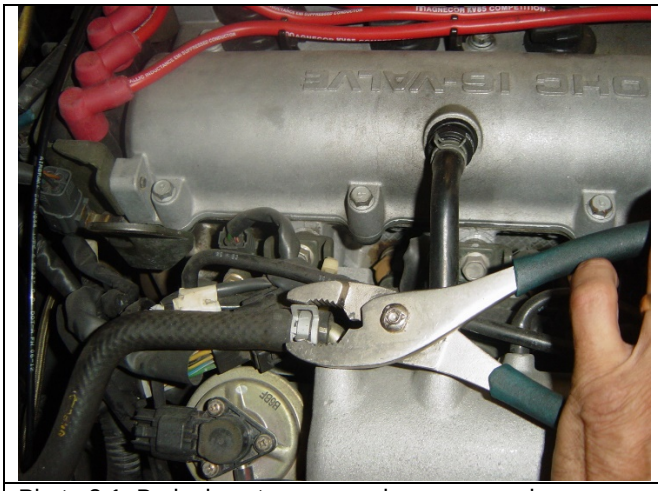


Photo 2-1: Brake booster vacuum hose removed

Photo 2-2: PCV valve and hose removed

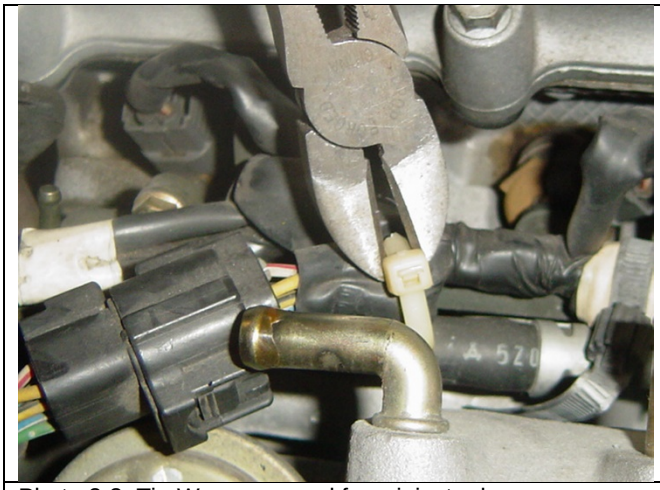


Photo 2-3: Tie-Wrap removed from injector harness

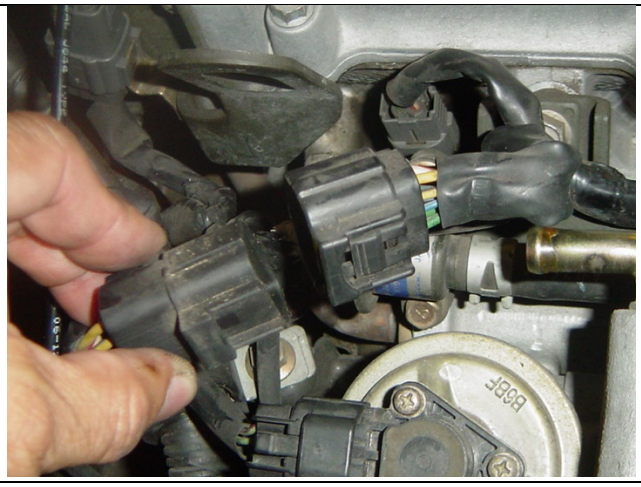


Photo 2-4: Unplug injector harness

- There is a large tie-wrap on the harness bundle, cut and remove as shown in Photo 2-3. If there are any other tie-wraps cut and remove. You do not need to install any tie-wraps after the injector installation.
- Unplug the harness bundle as shown in Photo 2-4.
- Remove the electrical connector to the manifold vacuum actuator and then unbolt the two M6 bolts using a 10 mm wrench as shown in Photo 2-5. Disconnect the vacuum line to the fuel rail and the intake and then place to the side.
- Unplug the injector harness by squeezing the plug as shown in Photo 2-6.
- Pull the harness to the side as shown in Photo 2-7.
- Remove the three M8 bolts on the fuel rail using a 12 mm socket wrench as shown in Photo 2-8. Take caution in not losing the plastic stand offs on the rail removal. As stated in the General Instructions, glue these plastic stand offs using silicone glue.

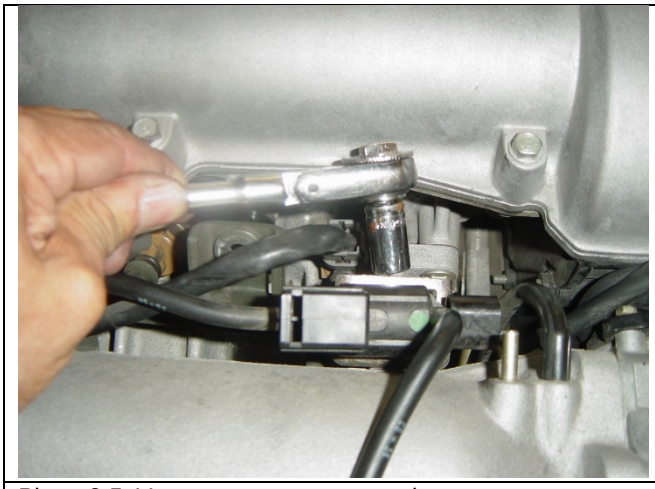


Photo 2-5: Vacuum actuator removed

Photo 2-6: Unplug injector connector

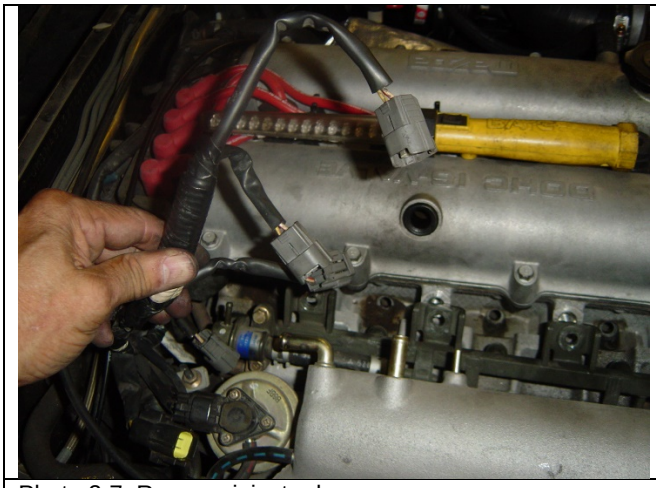


Photo 2-7: Remove injector harness

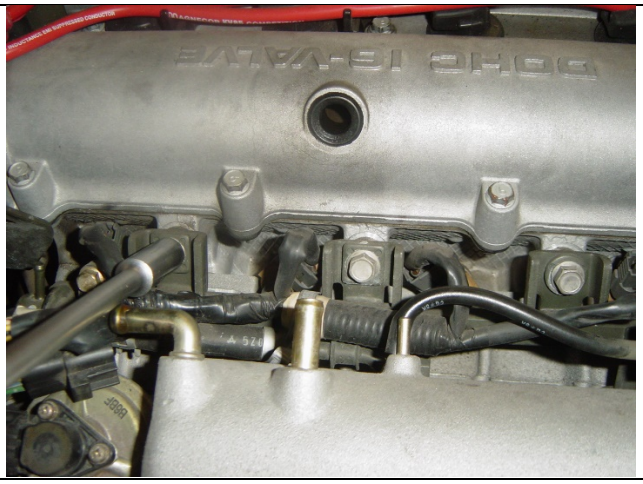


Photo 2-8: Remove bolts from the fuel rail

- Unplug each injector as shown in Photo 2-9. Fuel will leak out initially, but will evaporate quickly.
- If there is grime around the port opening on the head, refer back to the General Instructions.
- Install the harness to the new injectors. Be sure you have greased the fuel rail O-ring as shown in Photo 2-10.
- Install the port O-ring to the head using a screw driver to guide the O-ring to the port opening as shown in Photo 8 in the General Instruction.
- Connect each injector into the proper harness and then place into the head port as shown in Photo 2-10 and 2-11.
- Align the fuel rail and then press each injector into the fuel rail.
- Align the fuel rail over the plastic spacers you glued in earlier as shown in Photo 2-11. If the injectors are aligned properly the fuel rail will easily align with the spacers. Hold in position and install the mounting bolts.
- Reinstall the two M6 bolts into the vacuum actuator using a 10 mm wrench as shown in Photo 2-5.

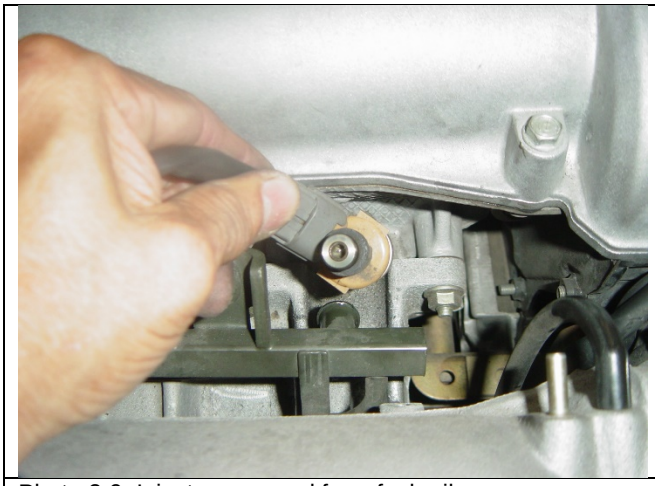


Photo 2-9: Injector removed from fuel rail

Photo 2-10: New injector plugged in to harness with grease

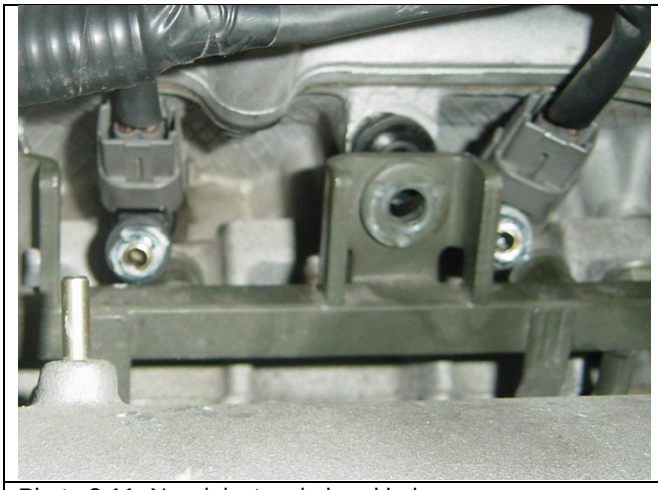


Photo 2-11: New injectors in head hole

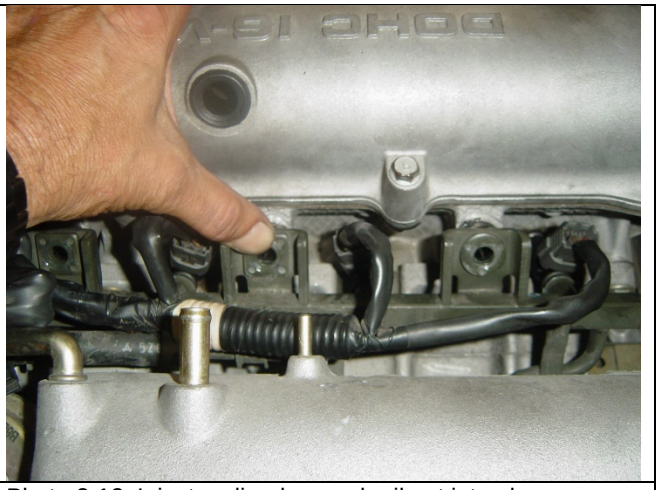


Photo 2-12: Injectors lined up and rail put into place

- Be sure to connect the vacuum lines in the proper ports they were removed from. Some vacuum line rubber can get hard over use. If the rubber hose does not grip the vacuum port, cut about a 1/4 inch (6 mm) off the end and press on again.
- Reinstall PCV valve and hose as shown in Photo 2-5.
- Reinstall the brake booster vacuum hose and any other vacuum hose as shown in Photo 2-1.
- Be sure to test for gas leaks and misalignment of the injector insertion during the start up.

STEP 3: 99-05 MODEL INJECTOR REPLACEMENTS

The 99-00 and the 01-5 intake manifold are similar. For the injector removal and installation the only differences are the bolts holding down the top half of the intake manifold. Be sure to refer back to the General Instructions as needed.

- Remove any intake hose that might be installed at the intake manifold top half.
- Remove the PCV valve and hose from the manifold as shown in Photo 3-1.
- Remove the brake booster vacuum hose and all other vacuum hoses from the top intake manifold as shown in Photo 3-2.

Photo 3-1: Remove PCV valve and hose

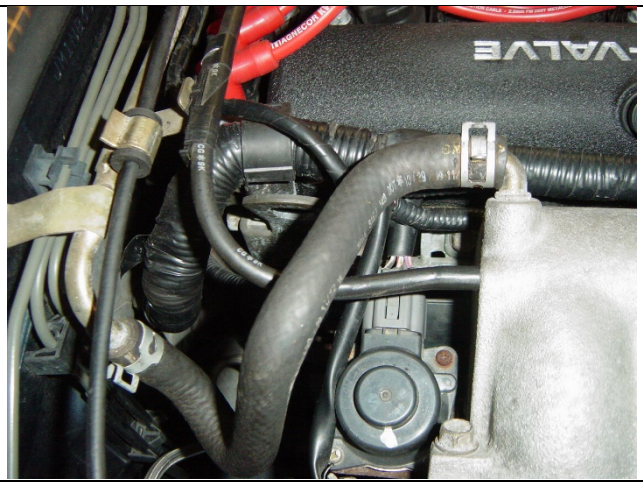


Photo 3-2: Remove brake booster vacuum hose

- Remove the throttle cable from the throttle body by turning the throttle body open to remove the slack and then pulling the cable ball out of the plate as shown in Photo 3-3. Leave the throttle cable attached to the lower intake manifold.

- Remove the ground strap mount on top. Next remove the L-mount that attaches the top manifold and head together using a 10 mm socket wrench as shown in Photo 3-4. You do not need to reinstall this bracket.

- Both the 99-00 model and the 01-05 model intake has lower bolts that need to be removed. The 99-00 model uses an L-bracket as shown in Photo 3-5. We will not reuse this bracket. Remove all four M8 bolts using a 12 mm wrench.

- The 01-05 model intake use two M8 bolts, both viewed from the front as shown in Photo 3-6. Using a 12 mm wrench, remove from the intake. You must remove the throttle body to get access to the inside bolt. We will not reinstall these bolts.

Photo 3-3: Remove throttle cable

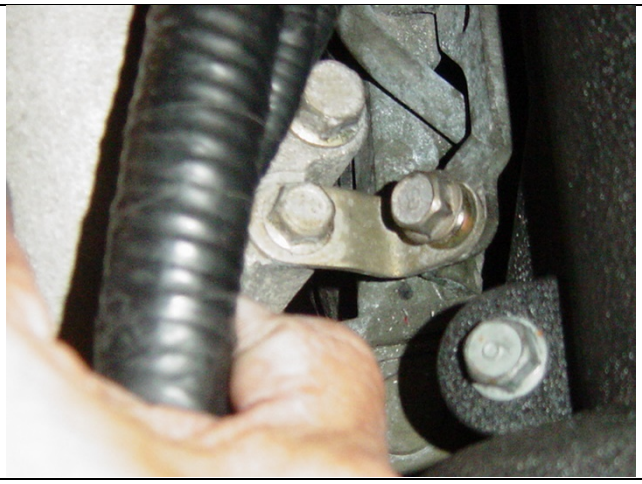


Photo 3-4: Remove the ground strap

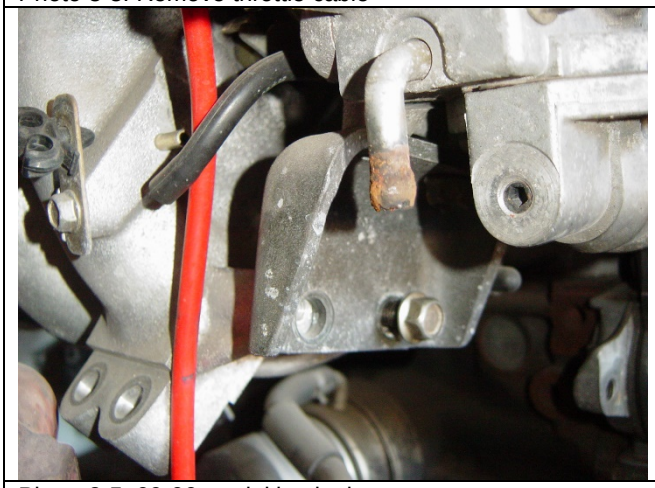


Photo 3-5: 99-00 model intake bottom mount

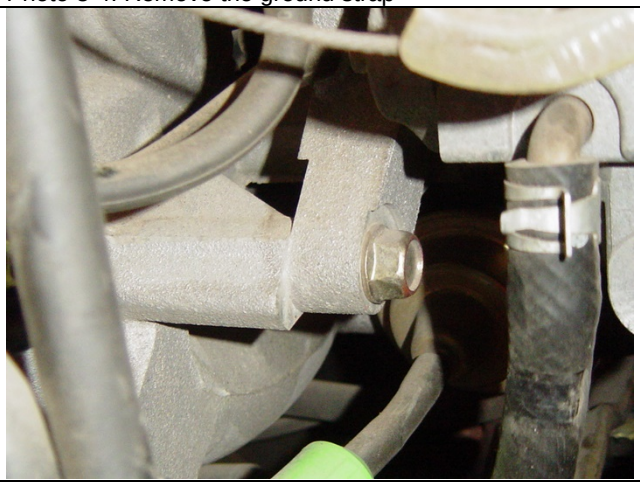


Photo 3-6: 01-05 model intake bottom mount

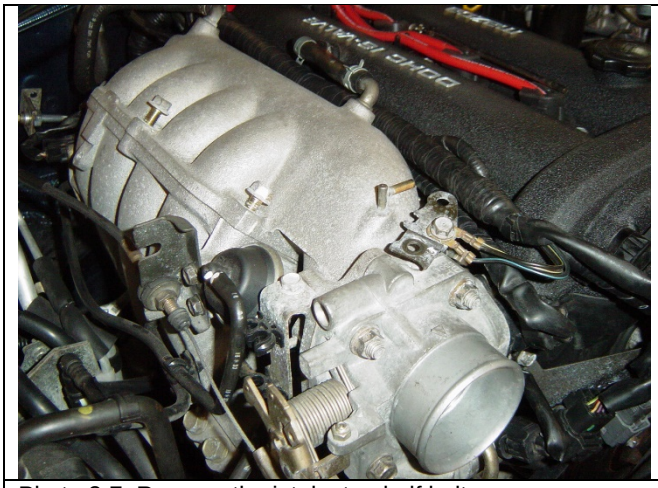


Photo 3-7: Remove the intake top half bolts

Photo 3-8: Manifold metal gasket removed

- Remove the top intake manifold bolts using a 12 mm socket wrench as shown in Photo 3-7. Place to the side.
- Remove the metal gasket so it will not get damaged during the injector removal as shown in Photo 3-8.
- You do not have to remove the EGR valve shown in Photo 3-9, but it is much easier to work with the fuel rail setup. There are two 8 mm bolts on the back of the manifold. Use a 12 mm socket wrench to remove. Disconnect the electrical connection on top. Do not lose the metal gasket as shown in Photo 3-10 when reinstalling.
- Remove the harness bracket as shown in Photo 3-11. There are two M6 bolts holding the bracket in the timing belt cover. Use a 10 mm socket wrench to remove the bolts. You do not need to disconnect the wiring harness from the bracket.
- Remove the fuel rail from the head using a 12 mm socket wrench as shown in Photo 3-12. As stated early in the General Instructions, be careful to not lose the plastic standoffs.

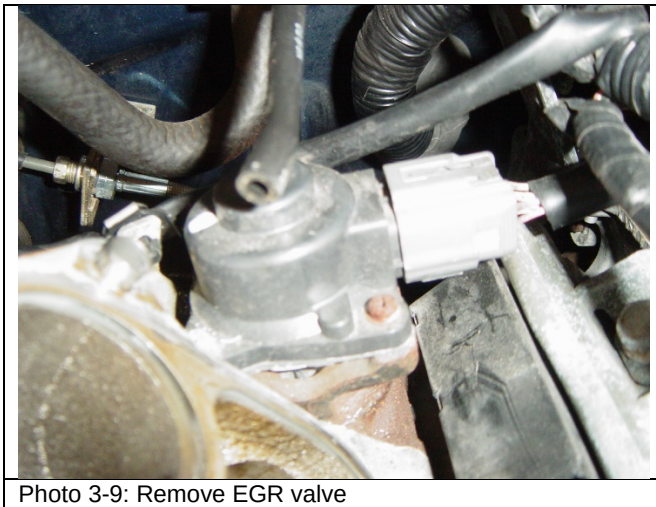


Photo 3-9: Remove EGR valve

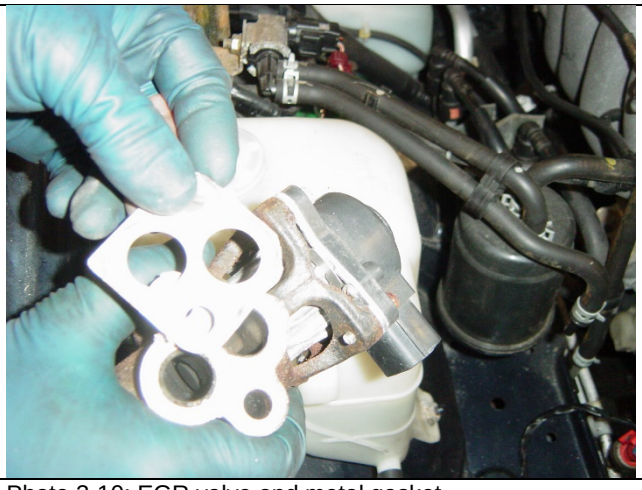


Photo 3-10: EGR valve and metal gasket

Photo 3-11: Remove harness bracket from timing belt cover

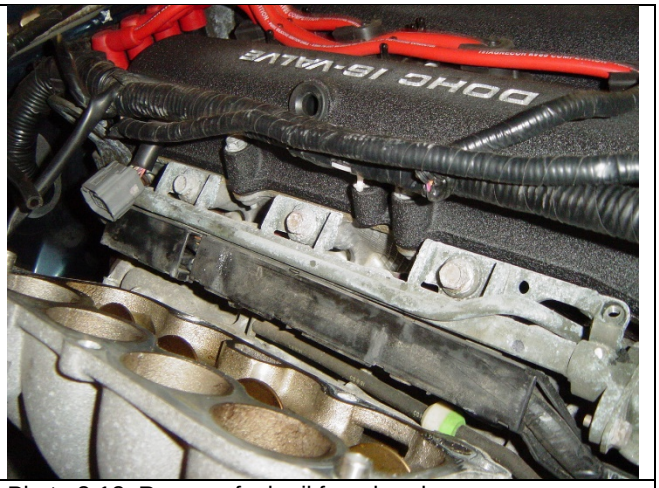


Photo 3-12: Remove fuel rail from head

- Pull the fuel rail back so the injectors can be pulled from the fuel rail as shown in Photo 3-13.
- Unplug the harness from the fuel injector as shown in Photo 3-14. Fuel will leak out initially, but will evaporate quickly.
- If there is grime around the port opening on the head, refer back to the General Instructions.
- Install the port O-ring to the head using a screw driver to guide the O-ring to the port opening as shown in Photo 3-15.
- Install the harness to the new injectors. Be sure you have greased the fuel rail O-ring as shown in Photo 7 of the General Instructions.
- Press each injector into the proper harness and then place into the head port as shown in Photo 3-16.

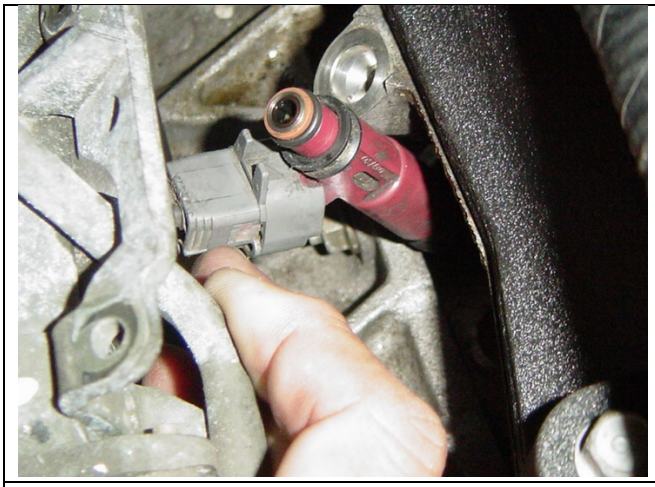


Photo 3-13: Injector removed from fuel rail

Photo 3-14: Injector disconnected from harness

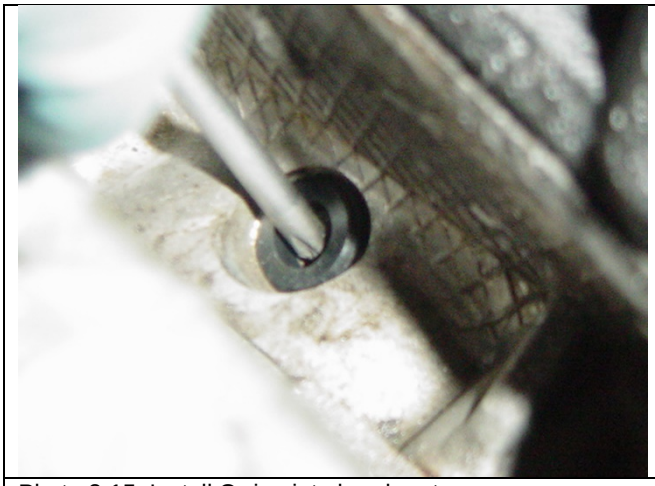


Photo 3-15: Install O-ring into head port

Photo 3-16: Connect new injector to harness

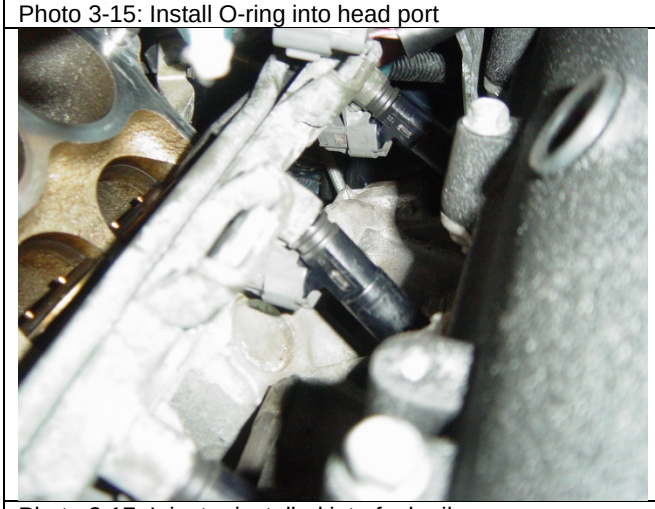


Photo 3-17: Injector installed into fuel rail

Photo 3-18: Install fuel rail to head

- Align the fuel rail and then press each injector into the fuel rail as shown in Photo 3-17
- Align the fuel rail over the plastic spacers you glued in as described in the General Instructions and shown in Photo 3-18. If the injectors are aligned properly the fuel rail will easily align with the spacers. Hold in position and reinstall the M8 mounting bolts.
- Reinstall the harness bracket.
- Install the intake metal gasket and the intake manifold.
- Connect the EGR valve with metal gasket.
- Connect the vacuum lines in the proper ports they were removed from.
- Some vacuum line rubber can get hard over use. If the rubber hose does not grip the vacuum port, cut about a 1/4 inch (6 mm) off the end and press on again. Install the PCV valve and hose.
- Be sure to test for gas leaks and misalignment of the injector insertion during the start up.

If at any time you need assistance please feel free to contact us or email us at support@trackdogracing.com. If you have any comments or suggestions, please let us know.

’90-05 Header Heat Shield Installation

Thank you for purchasing the Track Dog Racing Exhaust Heat Shield, which is designed to help maintain lower temperatures in the engine compartment by isolating elevated header temperatures. The TDR Heat Shield will install on all model years of the Mazda Miata 1990 to current. Both factory exhaust manifolds and aftermarket headers will see the benefits of reduced heat transfer in the engine compartment and cooler air into the intake.

The TDR Heat Shield is manufactured with 4-layers. The bottom uses heavy-grade industrial aluminum to reflect radiant heat and to balance the conducted heat across the surface. The aluminum helps maintain its shape as you form the TDR Heat Shield around the exhaust manifold or header. The second layer is fiberglass cloth mat. The insulation is rated at 2000 degree and is made from ceramic wool. The outer surface is an aluminized fiberglass mat that not only looks good, but also adds to the efficiency of the TDR Heat Shield by dissipating heat, resulting in lower surface temperatures.

The instructions are broken into two installation methods: mounting to an aftermarket header, and mounting to the factory exhaust manifold. In some cases, you may combine installation methods. For supercharger applications using the factory exhaust manifold, install the TDR Heat Shield similar to the aftermarket header with the factory heat shield removed. Hardware for both applications is included.

TOOLS REQUIRED

The following tools may be required in your installation depending on your mounting method.

- 10, 14 and 17 mm wrench or sockets
- Torque wrench
- Phillips screwdriver or power screwdriver
- Needle nose pliers

SECTION 1: INSTALLATION USING AFTERMARKET HEADERS

The TDR Heat Shield attaches to all aftermarket headers for the Mazda Miata and some other brand cars. Attachment is through the use of the header studs and/or through the use of stainless steel wire, depending on your application. The Heat Shield forms easily around the aftermarket header and takes very little time to install. When forming the Heat Shield, a loose fit is better than a snug fit as air is a good insulator and increases efficiency. The small single grommet in the middle is not used in this application.

On non-supercharged setups and the Rotrex supercharger setup, the Heat Shield is attached to the two outer studs as shown in Photos 1-3 using the supplied angle brackets. If this is not the best method for your application use the stainless steel wire supplied for your attachment.

On supercharged applications (BR Performance M62 supercharger shown) attachment is through the use of the factory stud and bracket on the right side and stainless steel wire wrapped around the stud and supercharger bracket on the left side as seen in Photos 1-3 and 1-5.

- Be sure the surfaces around the engine exhaust area are cool to the touch.
- Remove the factory M10 nut on the top left or right side of the exhaust manifold as shown in Photo 1-1 using a 14 mm wrench.
- Install the supplied angle bracket over the exhaust manifold stud and hand tighten the M10 nut. Turn the bracket face up as shown in Photo 1-2. We will torque the M10 nuts after a trial fit of the Heat Shield, but don't forget!
- Form the Heat Shield around the header starting with the right side. Bring the side in first, followed by the top section overlapping it. The Heat Shield will go between the heater hoses and the manifold. The right side heater hose has a clamp down low that will require you to push and form the Heat Shield between it and the header.

Photo 1-1: Remove factory nut left or right side as required

Photo 1-2: Attach supplied bracket and using the factory nut torque to 28-34 ft. lbs.

- Make sure the Heat Shield is close to the head in the middle section as well as the sides as shown in Photo 1-4.
- Attach the M6 bolt and washer to the angle brackets through the grommet. Do not tighten down until both sides have been started. The L-brackets can be adjust by loosening the exhaust nut.
- After fitting the Heat Shield, remove and torque the exhaust manifold M10 nuts to factory specifications, 28-34 ft. lbs. as shown in Photo 1-2.

	
Photo 1-3: Brackets face up with taped hole on top	Photo 1-4: Fold in the sides under the bracket and attach the M6 bolts

- On supercharged applications you will use the stainless steel wire supplied since the manifold stud is being used by the supercharger brace as shown in Photo 1-5.

- Thread the stainless steel wire behind the flange, through the grommet, and back up the other side of the manifold stud as shown in Photo 1-5. Using a pair of needle-nose pliers, twist the wire snug and trim off the excess.

	
Photo 1-5: Stainless steel wire on left side behind supercharger bracket	Photo 1-6: Stainless steel wire on right side of factory manifold with shield removed

- If using the factory exhaust manifold, you may be required to remove the factory heat shield for clearances between the supercharger and the exhaust manifold. If so you may be required to use the stainless steel wire mounting method as shown in Photo 1-5. The stainless steel wire can be attached around the dip stick or around the EGR (exhaust gas recirculation) tube below the exhaust manifold and to the rear.

- After the two sides are firmly attached, form the rest of the Heat Shield around the header. Remember: a loose fit is better than a tight fit.

SECTION 2: INSTALLATION ON FACTORY EXHAUST MANIFOLDS

The TDR Heat Shield attaches to the factory exhaust manifolds on all model years. Although aftermarket headers generate more heat, the factory exhaust manifold could use a little help as well. The Heat Shield forms easily around the factory exhaust manifold heat shield and takes little time to install.

Attachment is by the existing center bolt or by using a single self-tapping mounting screw fitted into the factory metal heat shield. Some manifolds do not have the center bolt for mounting so use the self-tapping installation method.

When forming the Heat Shield, a loose fit is better than a snug fit as air is an excellent insulator and increases efficiency. Note that the two side grommets are not used on the factory exhaust manifold installation.

- Be sure the surfaces around the engine exhaust area are cool to the touch.
- Form the Heat Shield around the factory metal shield starting with the right side as shown in Photo 2-1. Bring the side in first, followed by the top section overlapping it. The Heat Shield will go between the heater hoses and the manifold. The right side heater hose has a clamp down low that may require you to push and form the Heat Shield between it and the factory shield.
- Form the left side similar to the right side by bringing the side in first, followed by overlapping the top section.

Photo 2-1: Right side of the Heat Shield. Fold in first followed by the top

Photo 2-2: The center hole is between the two valve cover bolts and a rib on the head

- Make sure the Heat Shield is close to the head in the middle section as well as the sides before you mark your hole.
- Once the Heat Shield is formed over the manifold, align it so the center hole above the name plate is in line between the valve cover bolts and the rib on the head as shown in Photo 2-2.
- Using a marker or pen, mark the factory shield as shown in Photo 2-3.
- A self-tapping screw is supplied with the TDR Heat Shield. In some applications, the factory bolt can be substituted for the self-tapping screw.
- Using a power screwdriver insert the self-tapping screw on the mark you made on the factory shield as shown in Photo 2-4. Remove the screw after the threads have been made. All remaining hardware supplied with the Heat Shield is not used.

Photo 2-3: Hole on the header shield centered with the head rib between the two valve cover bolts

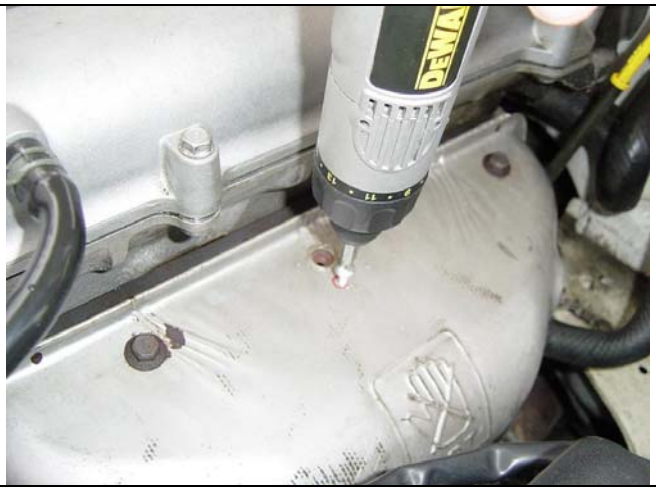


Photo 2-4: Screw the self-tapping screw into the factory metal shield, then remove for reinstall

- Install the Heat Shield onto the factory exhaust manifold. Center the hole over the spacer and screw in the self-tapping screw as shown in Photo 2-5. Careful not to over-tighten—a snug fit is plenty.

- Form the Heat Shield around the exhaust manifold. A loose fit is better than a tight fit. Pressing the Heat Shield around the exhaust manifold will reduce the Heat Shield's efficiency.

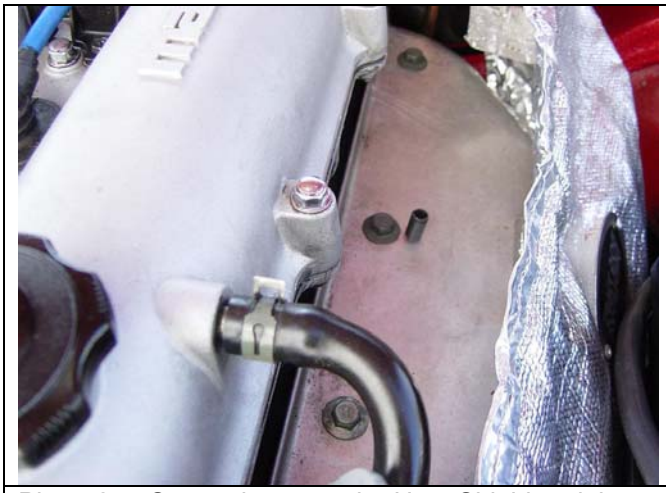


Photo 2-5: Spacer between the Heat Shield and the factory exhaust manifold

Photo 2-6: Form the Heat Shield back around the factory manifold and attach the self-tapping screw

The TDR Heat Shield is easy to maintain using simple water and soap if necessary. If the Heat Shield is removed you will notice that it has become a little stiffer, but it will still form back around your exhaust manifold or aftermarket header. In some cases you may see some of the foil has burned off from contact with the header. This has been noticed on some aftermarket headers that are not ceramic coated. However, this will not affect the performance of the Heat Shield as the ceramic wool insulation will continue to perform.

We hope you will be pleased with our product. If at any time you need assistance please contact us by phone or email us at support@trackdogracing.com.

’90-97 Miata Rotrex Supercharger Installation

Thank you for purchasing our TDR supercharger kit for 90-97 Mazda Miata. Our supercharger (SC) mount fits both the 1.6 and 1.8 liter engines and uses the factory power steering mount for assembly, see Photo 1. Also both left hand and right hand drive cars are compatible except mounting of the reservoir and catch can. The Rotrex SC comes in three sizes for our application, see Photo 2. We call the C30-74 our STREET model and used on the 1.6 motors as it is ideal for around 10-13 PSI using stock internals. The Street setup will work with and without your mass air flow MAF unit. The C30-84 we use for 1.8 motors 94-05.

The C30-94 is our TRACK model and is capable of 14-16 PSI, but forged internals are strongly recommended. This SC uses a larger 3 inch (76 mm) intake opening and works well with a Standalone fuel management such as our Mega Squirt PNP2 systems. Your mass air flow MAF unit has a diameter of 2 ¾ inch (70 mm) and would be a restrictor to the Rotrex intake. We can custom configure either blower to meet your current and future needs. Installation of either model is similar as outlined in these instructions.

We have street and track tested several configurations for 2 years on different year models before releasing what we think is the best kit in the industry. Since 2003 we have been designing and developing supercharger systems exclusively for Miata’s and our experience shows in every one of our kits. We want you to be proud to lift your hood. If at any time you have any questions during the installation please do not hesitate to contact us. Picture below is our 92 Miata with a stock 1.6 engine setup using the C30-74 blower at 12 PSI. Fuel management uses our TDR fuel card and produces about 205 RWHP.

NOTE: Our SC kit mounts to the factory power steering mount as see below in Photo 1. If you do not have power steering then you will be required to buy one of these mounts. Check with us first or contact a salvage yard.

Photo 1: Factory power steering mount all year models

Photo 2: C30-74 on left and C30-84 and C30-94 on right

90-97 Model Intercooler Installation

We will begin installation with the intercooler mounting. Our installation instructions have been developed so that even the average weekend mechanic can install our system. It should take a little over an afternoon to install the TDR Intercooler using standard hand, air and or electric tools. The instructions include over 70 pictures to help detail the eleven steps involved in installing the TDR Intercooler.

Due to the Intercooler piping, the Factory Hood Prop cannot be stored in its normal latched position across the front of the engine. Include with our kit are our dual pneumatic hood struts. You can also keep the hood prop in your trunk and bring out when necessary. Install these first to eliminate propping the hood.

The TDR Intercooler unit installs in front of the air conditioning condenser and bolts in using factory mounting holes. The TDR Intercooler does require some modifications in the engine bay and radiator area, but the modifications are not extensive.

The brushed stainless steel mandrel-bent I/C piping are designed to keep the length of the airway as short as possible to maintain quick throttle response and reduce pressure drop. All TDR panels are CAD-designed and cut on a CNC router to ensure a perfect fit. Additionally, the radiator shield is powder-coated in a beautiful black crinkle finish on the radiator support area. This panel supports the radiator top mount.

As you can see from Photos 3 thru 6, the TDR components are of the highest quality. Our design was engineered to be the most efficient Intercooler system on the market. We believe our instructions are extremely thorough, and we have provided pictures of every step of the installation.

Photo 3 is the supercharger and oil cooler components. Photo 4 are the intercooler panel components. Photo 5 consist of the 90-93 model intercooler components and Photo 6 consist of the 94-97 model intercooler components.

Photo 3: Supercharger components

Photo 4: Intercooler panel components

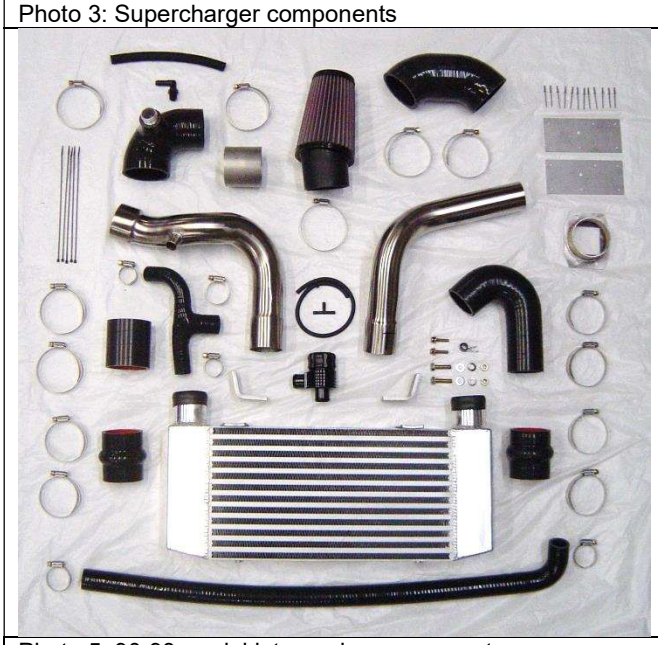


Photo 5; 90-93 model intercooler components

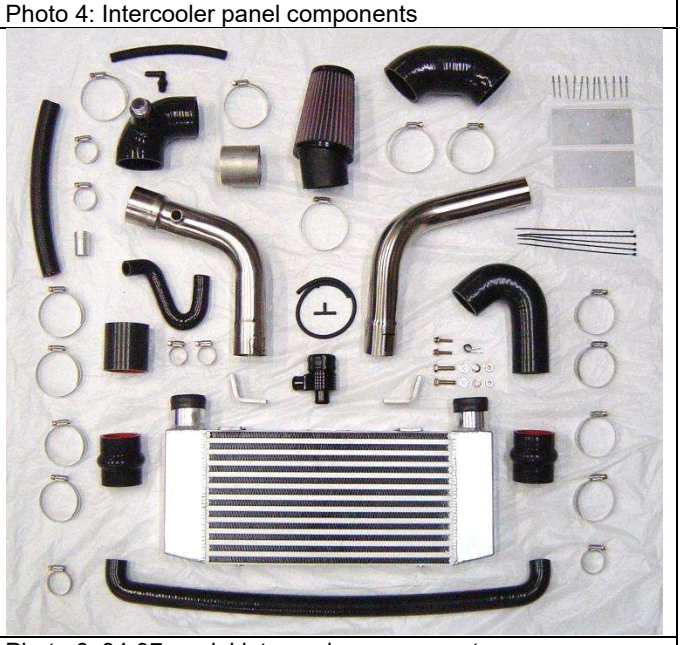


Photo 6; 94-97 model intercooler components

Required Tools

The chart below lists some of the tools required for the supercharger installation and materials that will be needed. Feel free to use tools other than what we recommend to help in the installation.

- Open-end wrenches and sockets:8,10,12,13,14, 17mm
- Air-operated reciprocating saw or electric jig saw
- Phillips and flat head screwdrivers
- Wire crimp tool
- Large crescent wrench
- Electric drill - air-operated models are smaller and will simplify installation
- 7/16 in. open wrench
- 5 mm Allen wrench or socket
- 4 mm Allen wrench or socket
- Socket wrenches
- Allen wrenches
- Metal files: rat tail and flat file
- Rivet gun
- Zip-Ties
- Wire cutters
- Power steering fluid
- Hacksaw
- Masking tape
- Spray bottle with soapy water
- Touch-up paint
- 1/8" and 1/4" drill bit
- Lighter

INDEX PAGE

STEP 1: REMOVAL OF FACTORY PARTS

Drive your car onto a level surface, keep the car in gear and apply the parking brake. Jack up the car and secure with four jack stands. Remove both front wheels. The following intake removal instructions are for both the 90-93 and 94-97 models as removal is similar.

1.1 Removal of Factory Intake Setup

- Remove the factory tie-down hooks that are located in the radiator area as shown in Photo 1-1. You do not need to remove the right side, but the plastic side panel will require cutting for additional clearance. TDR offers a flat plate model tow hook that does not require additional panel clearances. There are three M10 bolts requiring a 14mm wrench.

- The stock air filter setup needs to be removed. Only the mass air flow or air box will be reused. Start with removing the hose from the intake to the MAF unit as shown in Photo 1-3 using an 8 mm nut driver or Phillips screw driver to loosen clamp. There are also spring clamps on the intake side to be released.

Photo 1-1: Left side tow hook removal

Photo 1-2: Air filter and cruise control setup

Photo 1-3: Remove the intake hose

Photo 1-4: Cruise control removed

- If you have cruise control, remove from the fender and place on the valve cover as shown in Photo 1-4. We will relocate at the end of the supercharger install. The 90-93 model cruise control cannot be reinstalled due to the intake configuration with the large airflow unit.

- On the 90-93 model, remove the airflow unit connector using a small flat head screwdriver to pull the spring clip back. Do one side and then the next as shown in Photo 1-5.

- Use a 10 mm wrench and remove the 4 nuts holding the airflow unit to the filter box as shown in Photo 1-7. Keep the nuts with the unit for attaching the adapter plate later in the instructions.

- On the 94-97 model, remove the mass air flow MAF from the air box using a 10 mm wrench as shown in Photo 1-8.

- Finish removing the filter box and inlet tube as shown in Photo 1-9.

Photo 1-5: 90-93 Airflow harness spring connector

Photo 1-6: 90-93 airflow harness removed

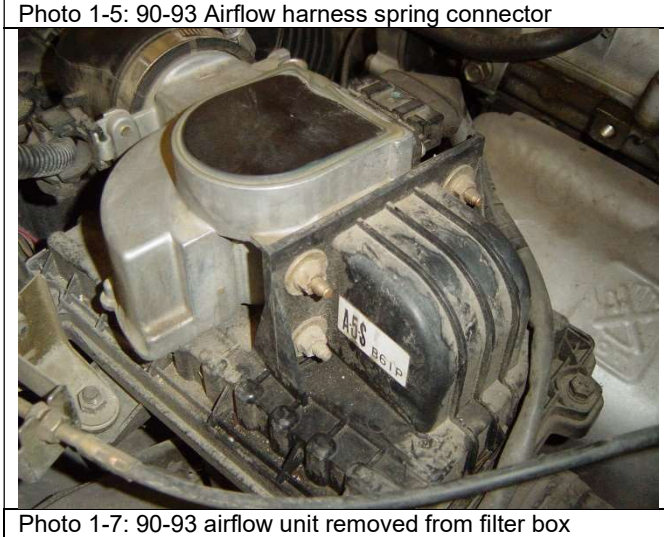


Photo 1-7: 90-93 airflow unit removed from filter box

Photo 1-8: 94-97 MAF unit removed from filter box

- Early models had the air bag sensor mounted with the harness laying over the chassis and radiator. If you have this sensor, you need to reroute the harness and remove the plastic cover on the sensor.

- The air bag harness needs to be rerouted as well as the bracket removed. Start with unplugging the orange connector first followed by the blue connector as shown in Photo 1-10.

- Remove the diagnostic box off the bracket. Using your finger nail, pull the clip out and lift up as shown in Photo 1-11.

- Remove the air bag connector from the bracket using needle nose plyers as shown in Photo 1-12. We will not use the bracket, instead the diagnostic box and rerouted air bag harness will be placed in a new position for additional clearance.

Photo 1-9: Air filter box and inlet tube removed

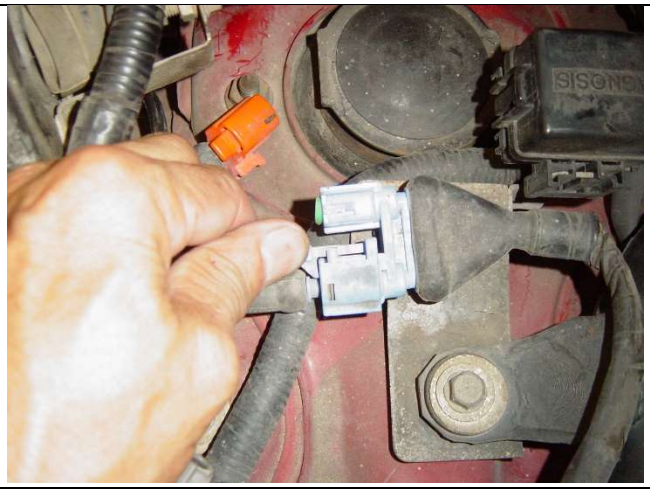


Photo 1-10: Air bag connector released, orange then blue

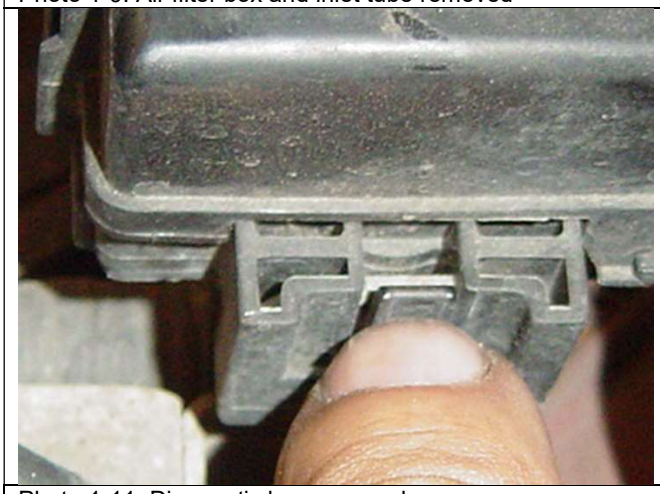


Photo 1-11: Diagnostic box removed

Photo 1-12: Bracket with air bag connector removed

- If you have the plastic cover as shown in Photo 1-13, removed and discard.
- Remove the plastic cover off the air bag sensor as shown in Photo 1-13 and 1-15.
- Reroute the harness under the chassis support as shown in Photo 1-14. Continue to route harness under the headlight is and up the side of the fender. Tie-wrap to existing harness.
- If you have ABS brake setup then your windshield washer filler neck is located in front of the radiator as shown in Photo 1-15.
- Remove the acorn nut using a 10 mm wrench. Afterwards push the filler neck down below the chassis as shown in Photo 1-16.
- Later in the instructions you will install the stainless steel panel that will cover this filler. Please take note that you may only fill this container once a year so the slight inconvenience of removing the SS panel to fill should not be a burden.

Photo 1-13: Air bag harness before relocation

Photo 1-14: Harness relocated under frame

Photo 1-15: ABS equipped model washer bottle

Photo 1-16: Washer bottle push down below deck

1.2 Belly Pan Removal

Remove the factory belly pan. It will be reused. The hardware uses M6 bolts and Phillips screws as shown in Photo 1-17.

1.3 Radiator Removal

If the radiator fluid is still good, drain into a container for reuse. Radiator fluid is toxic so keep away from children and pets.

- From below the car, remove the radiator drain plug. After the radiator fluid begins to drain, remove the radiator cap to increase the fluid flow.
- Disconnect the lower radiator hose and have a bucket handy to catch radiator fluid leaking out from the hose as shown in Photo 1-18.
- Using a 10mm socket, remove the bolt that holds the bracket for the A/C hoses as shown in Photo 1-20.
- Push small rag into the throttle body opening to make sure metal filings don't get into the engine during modifications. Remember to remove the rags.
- Disconnect the upper radiator hose from both the radiator and thermostat housing as shown in Photo 1-19. This will be trimmed in a later step before reattaching. Disconnect the radiator overflow hose.
- Disconnect the two power connections for the radiator fans.

Photo 1-17: Remove belly pan

Photo 1-18: Lower radiator hose

Photo 1-19: Upper radiator hose

Photo 1-20: A/C hose bracket

- Remove the two M6 nuts that hold the radiator brackets in place as shown in Photo 1-21.
- Once everything is disconnected, lift the radiator out careful and place in a safe location.

Photo 1-21: Radiator bolts

Photo 1-22: Radiator removed

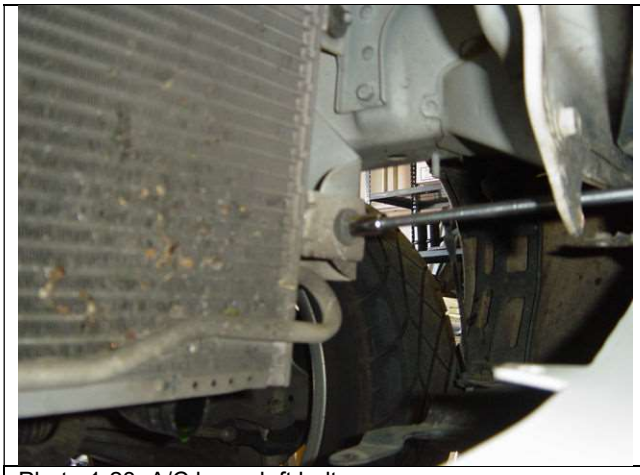


Photo 1-23: A/C lower left bolt

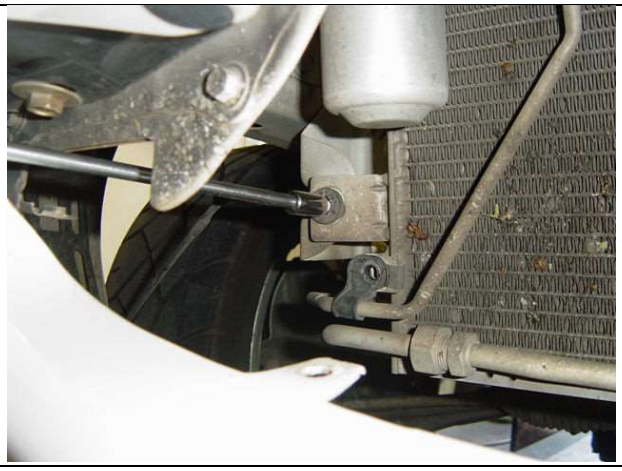


Photo 1-24: A/C lower right bolt

1.4 A/C Condenser Coil Removal

The A/C condenser is removed to modify the mounting brackets. If you don't have A/C you can pass on this step.

- Remove the four M6 bolts using a 10 mm wrench from the A/C condenser's upper and lower locations as shown in Photo 1-22 to 1-25.
- Gently pull up on the condenser to remove it from the lower mounts. Then push it towards the engine. Be careful not to damage the unit. Use a bungee cord to gently hold back the coil.
- Remove the factory horn. You will reinstall it after the intercooler completion.

1.5 Front Intake Area

There are several plastic screw clips that hold the shroud in place. When all the screws, clips, nuts and bolts are removed, pull the shroud out through the bottom of the car. This will not be reused.

- Remove the plastic plugs under the bumper. If you are unable to remove the plastic fasteners using a screwdriver, use a hacksaw and cut between the bumper and the plastic support as shown in Photo 1-26. These will be replaced with new ones included with the kit.

Photo 1-25: A/C upper bolt

Photo 1-26: Remove front radiator shroud panel

Photo 1-27: Cut off metal tabs

Photo 1-28: Cut of lower bumper tabs

- Cut straight across on the two metal tabs that are blocking the opening as shown in Photo 1-27. They serve no purpose anymore. A single-ended hacksaw works best with the minimal area to work with.

- The 3 tabs on the bumper as shown in Photo 1-28 can be cut off for appearance. If reinstalling the cowling in the future the tabs do not affect the integrity of the mounting.

1.6 Power Steering Cooler Removal

If you have power steering you will see the cooling tube that needs to be removed. This will be modified later on. If you do not have powering steering or a cooling tube, then skip this step.

- Remove the two M6 bolts that hold the cooling tube in position as shown in Photo 1-29.

- Using pliers bend the tabs back on each brackets side as shown in Photo 1-30 and remove the bracket from the tube. Place P/S tube off to the side until Step 8 where we will continue the modification.

Photo 1-29: Remove bracket

Photo 1-30: Remove bracket

STEP 2: MODIFYING THE RADIATOR BRACKETS

There are two radiator brackets that hold the radiator in place. We will relocate the bottom mount about ½ in. (12 mm) to allow the radiator to be lowered.

- Remove the M6 bolts that hold the brackets on the radiator as shown in Photo 2-1.

- Remove the C-clip from the rubber support bracket using a small screwdriver as shown in Photo 2-2. Do not lose this C-clip!

- Using a ruler, measure and mark about a ½ in. (12 mm) from the stock mounting hole location as shown in Photo 2-4.

- Using a ¼ in. (7 mm) drill bit, drill a hole through both sides of the support as shown in Photo 2-4.

- Reinstall the rubber support bracket into the new hole on the bracket. Be sure the rubber support is on the fan side as shown in Photo 2-1.

Photo 2-1: Remove side mounting brackets

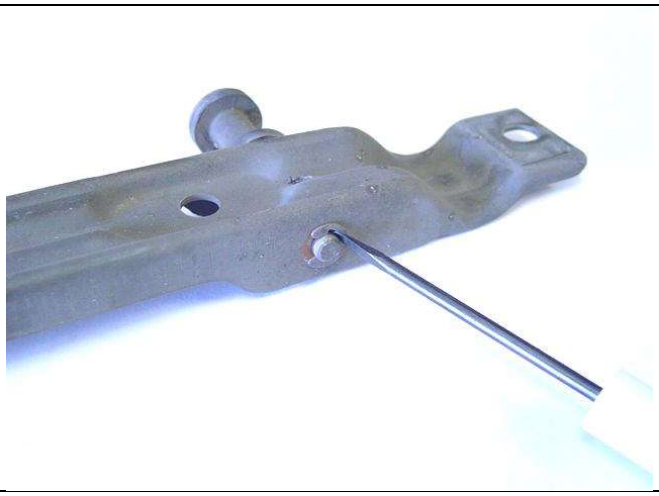


Photo 2-2: Remove the lower mounting support clip

Photo 2-3: Support and clip removed

Photo 2-4: New hole drilled

STEP 3: MODIFYING THE RADIATOR CROSS MEMBER

3.1 Cross Member Modification

The front cross member has to be trimmed to allow access to the Intercooler. The measurements drawn in Photo 3-1 below, shows the area that needs to be cut. The best tool to use is an air-operated reciprocating saw as shown in Photo 3-2, but an electric jig saw will work as well. This cut will be covered up by the aluminum radiator shield that will be installed later. Mark the area using a Sharpie or other ink pen and double-check all dimensions before cutting.

- Not shown in the picture, but apply masking tape to the working area to be cut can avoid scratching the painted surface.

- Photo 3-1 shows the dimensions for the center non-cut area. There is a hole in the center that will be your measuring mark. Mark 3 1/8" from the center make on both sides as shown in Photo 3-1.

- Draw a radius line equal to the rubber hood stand-off about 1/2" (12 mm) out on the right side as shown in Photo 3-2. On the left side (driver's side) draw a similar line at the base of the rubber hood stand-off as this side requires more clearance. Once you install the intercooler pipes some additional cutting may be required as shown in Photo 3-5.

- One option before cutting is to drill holes in the radius area. Use a pilot bit first and then a 3/8" drill bit. Drill holes on each corner where you will have a radius as shown in Photo 3-3. This will help with access for the saw in the turns and improve the appearance of the cut. If you are using a narrow saw blade you may not need these pilot holes as your saw will allow tight radius bends.

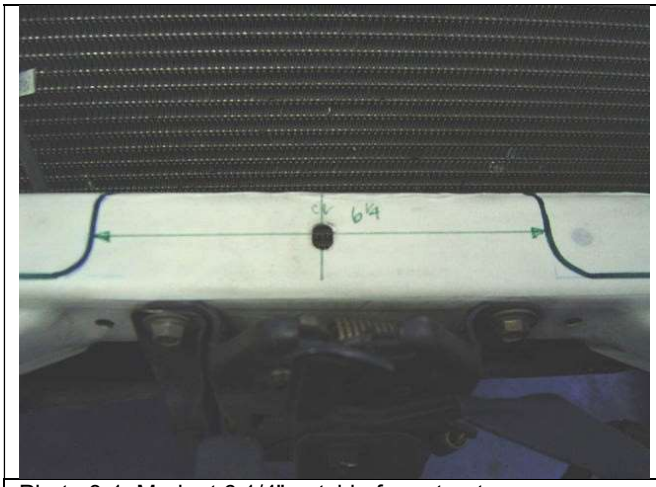


Photo 3-1: Mark at 6 1/4" outside for cut-out

Photo 3-2: Use a reciprocating saw to cut out

- Using the jig saw or air-operated saw as shown in Photo 3-2 with a metal cutting blade, cut across the front cross member.

- It is important that you take a flat file or your Dremel Tool and round off the edges and corners so you don't cut your hands or arms when working in this area. Make sure you clean these areas of metal chips since you would not want them to fall into your intercooler during installation.

- Additional cutting, particularly on the driver's side, may be required as shown in Photo 3-5 after the intercooler is mounted and the pipes are being installed.

- Use some factory touch-up paint on the cut edge if you prefer.

Photo 3-3: Left side cut out

Photo 3-4: Right side cut out

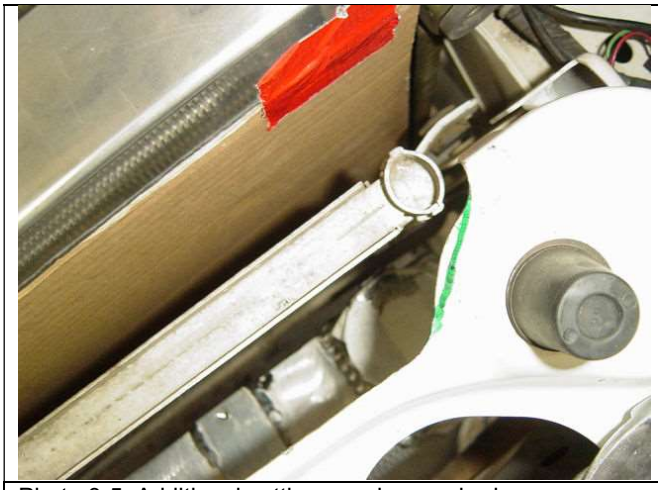


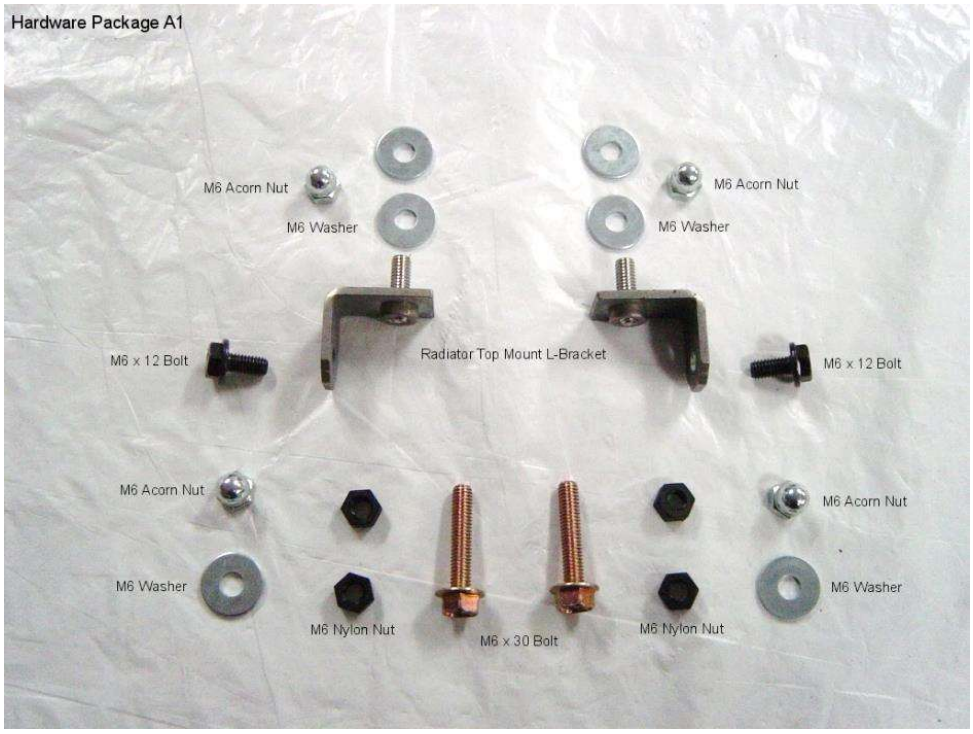
Photo 3-5: Additional cutting may be required

Photo 3-6: Remove sharp edges

3.2 Stainless Steel Cover Hardware Installation

The SS panel covers the large openings above the radiator. To follow is the mounting hardware.

Hardware Package A1



- Remove the M6 bolts on top between the rubber hood stopper and the front bumper as shown in Photo 3-7.

- Thread in from the bottom an M6x30 mm long bolt with threads on top as shown in Photo 3-8. Install the supplied nylon nut (steel nut shown). This nut is used as a spacer for the new stainless steel cover.

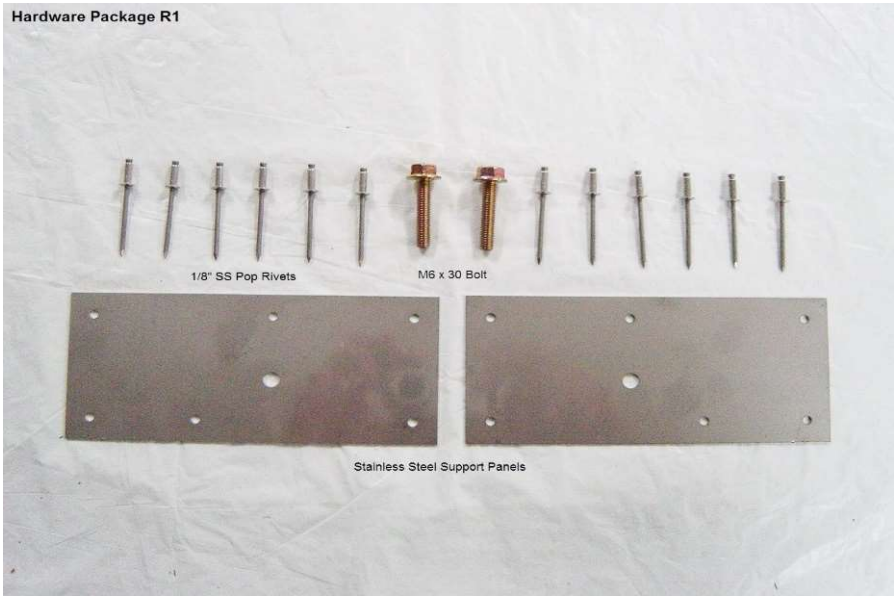
Photo 3-7: Remove factory M6 mm bolt on both sides

Photo 3-8: Screw in the M6x30 mm bolt from below

STEP 4: INSTALLING INTERCOOLER MOUNTING SUPPORT PANELS

The stainless steel support panels mount to the subframe for added structural strength. The rivets supplied are stainless steel for strength. Do not replace them with aluminum rivets. Clearance between the A/C condenser coil and the subframe is minimal. Using a bungee cord, relocate the A/C condenser to give more room for drilling. Be careful to not overstress the A/C condenser coil when relocating.

Hardware Package R1



- The larger center hole is offset a little and mounts toward the top when installed. The longer side of the panel from the bolt hole goes toward the middle of the frame as shown in Photo 4-1. The top and bottom surfaces should be flush with the subframe.

- Attach both mounting plate**s** using the supplied M6 x 25 mm long bolt as shown in Photo 4-1.

Photo 4-1: Drill 1/8" holes using the plate as a guide

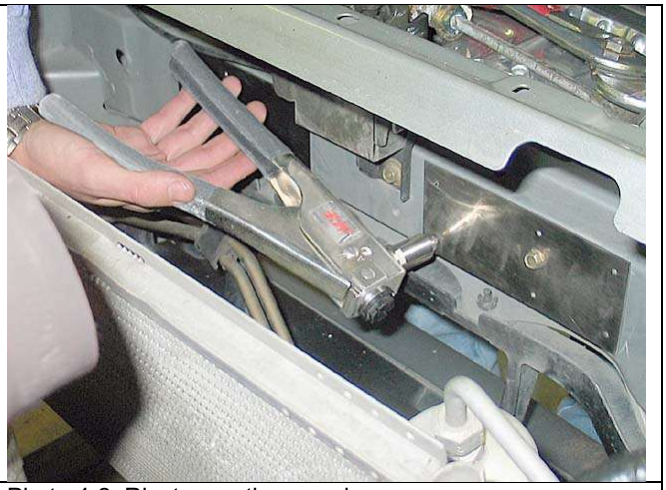


Photo 4-2: Rivet mounting panel

- Using a 1/8" drill bit, drill one pilot hole and then rivet that hole to help keep the plate in place as shown in Photo 4-2. Use the stainless steel rivets supplied. The stainless steel rivets are considerably harder to press, but add additional strength over aluminum rivets.

- Drill remaining holes and attach rivets to the holes on both plates. Remove the M6 bolt until attachment of the Intercooler.

STEP 5: MODIFYING THE DRYER CANISTER

This modification is for A/C equipped Miata's only. If you do not have A/C, skip this step and continue on to Step 6. Depending on the thickness of your radiator you may be required to bend the upper A/C mounting tab and use the supplied tie-wrap setup in Step 10.

5.1 Modify A/C Mounting Tabs

The upper mounting tab on the front passenger side may need to be bent depending on your setup for the A/C dryer tube for additional clearance.

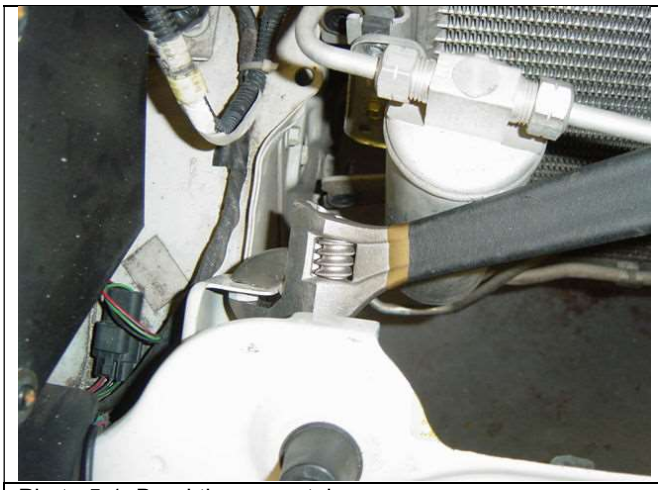


Photo 5-1: Bend the upper tab

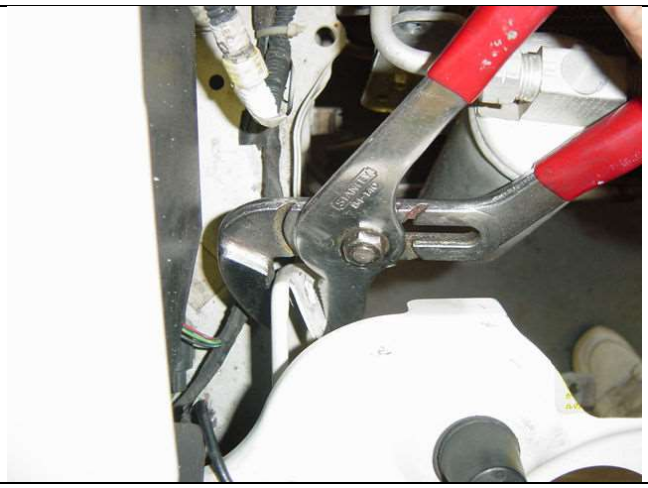


Photo 5-2: Finish the bend of the upper tab using pliers

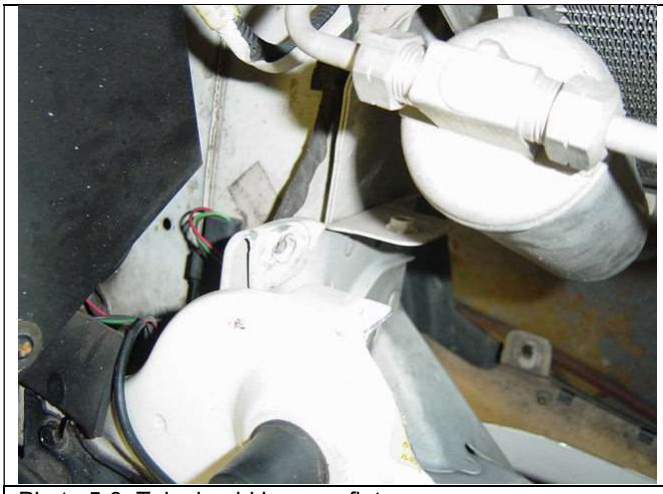


Photo 5-3: Tab should be near flat

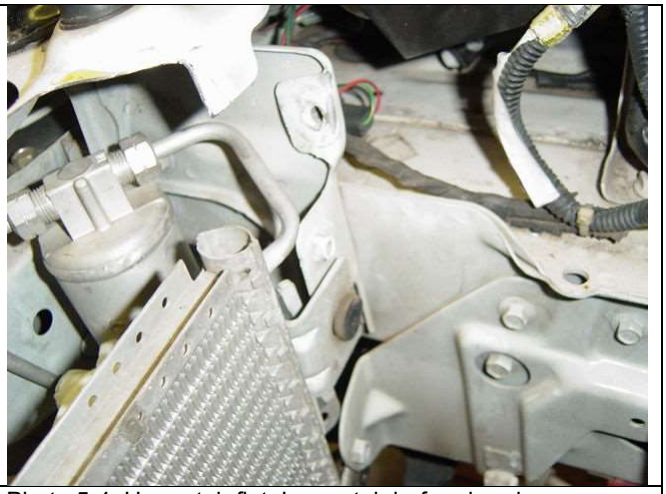


Photo 5-4: Upper tab flat. Lower tab before bend

- Bend the upper radiator tab on the passenger side close to flat or until there is enough clearance for the A/C dryer tube as shown in Photo 5-1 thru 5-4. This tab bends pretty easily.

- Use a combination of pliers and Crescent wrenches to push it over as shown in Photos 5-2.

5.2 90-93 Models Modify the A/C Condenser Coil

The A/C dryer canister needs to be bent to allow clearance for the intercooler, take caution when bending the A/C dryer and bracket. Section 5.3 shows details using a Crescent wrench to aid bending.

- Remove the 10mm bolt holding the A/C tube as shown in Photo 5-5.

- Grind or Saw Cut the A/C dryer bracket to increase bending radius as shown in Photos 5-6 through 5-9. Be sure to cut both the top and bottom.

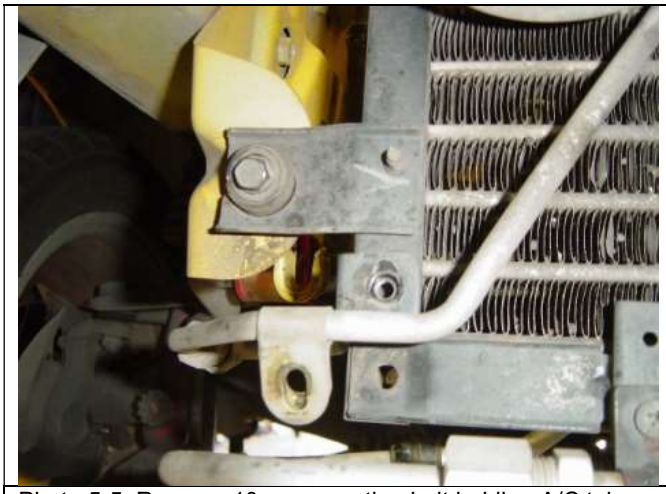


Photo 5-5: Remove 10mm mounting bolt holding A/C tube

Photo 5-6:Saw cut into bracket

Photo 5-7: Cut upper and lower area in the bracket for bending

Photo 5-8: Notch out saw cut

Photo 5-9:Saw cut bottom bracket

Photo 5-10: Unscrew top A/C tube bracket

- Unscrew the bolt holding the top A/C tube as shown in Photo 5-10 and remove bracket.
- Saw cut the bracket as shown in Photos 5-11 and 5-12 for additional intercooler pipe clearance.

Photo 5-11: Saw Cut bracket to remove it

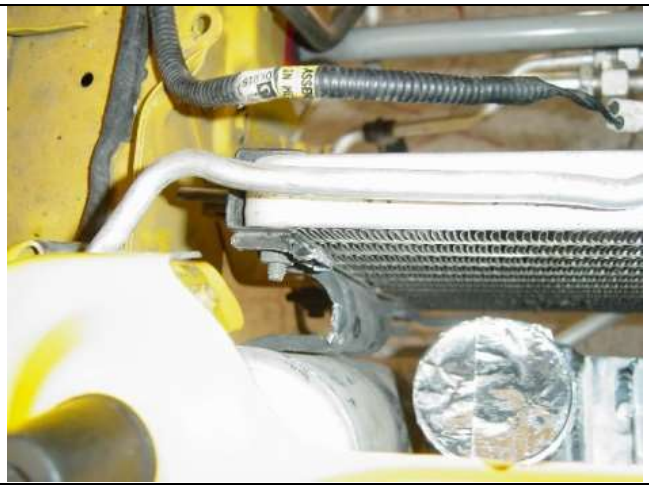


Photo 5-12: Bracket removed for pipe clearance

5.3 Bending the Dryer Mount

The later Miata had a different A/C condenser coil and dryer canister configuration, but bending is similar.

- Remove the 10mm bolt holding the A/C tube as shown in Photo 5-13.
- Use a large Crescent wrench and clamp it to the aluminum bracket as shown in Photo 5-14. Stick a screwdriver through the hole at the end of the Crescent wrench for leverage and rotate the bracket.

Photo 5-13: Remove 10mm mounting bolt holding A/C tube

Photo 5-14: Use a Crescent wrench to bend the bracket

Photo 5-15: Use a Crescent wrench to bend the bracket

Photo 5-16: Dryer should look similar to this photo

- Rotate from the top and bottom as you bend in small increments until the canister has rotated a little less than 90 degrees as shown in Photo 5-14 and 5-15. On 90-93 models, see Photo 5-12.
- Don't overdo it. Bend in small increments, making sure you don't damage anything. You might have to go back and add a little more bend after the intercooler is in place to get good clearance. You do not want the A/C unit and the intercooler to rub.

5.4 Condenser Coil Support

The condenser coil is supported using the lower support brackets in the factory position and a tie-wrap setup for the upper half. In STEP 14 we will complete the upper support for the condenser coil.

- Mount the condenser coil toward the front side of the frame bracket as shown in Photo 5-17.

- Bend the upper tabs at an increasing angle toward the engine to act as a stand-off. Bend the tab back flat as shown in Photos 5-19 and 5-20 to increase surface contact against the radiator. You should have approximately 1/2" (12 mm) of space between the radiator and the condenser coil when complete.

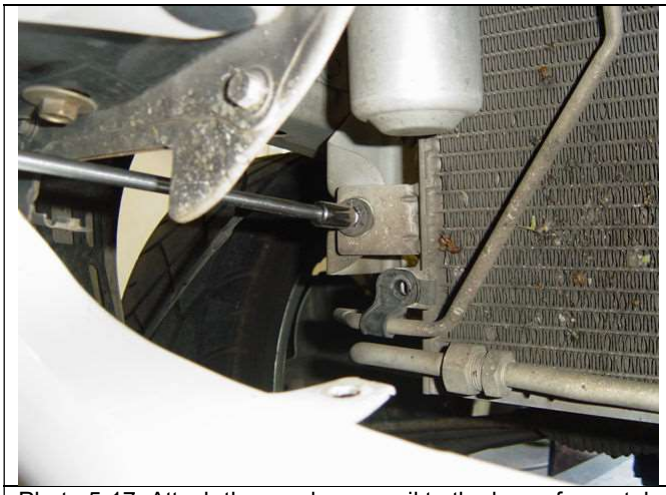


Photo 5-17: Attach the condenser coil to the lower frame tab

Photo 5-18: Bend the upper tab toward the engine

Photo 5-19: Bend the tab back flat to increase surface contact

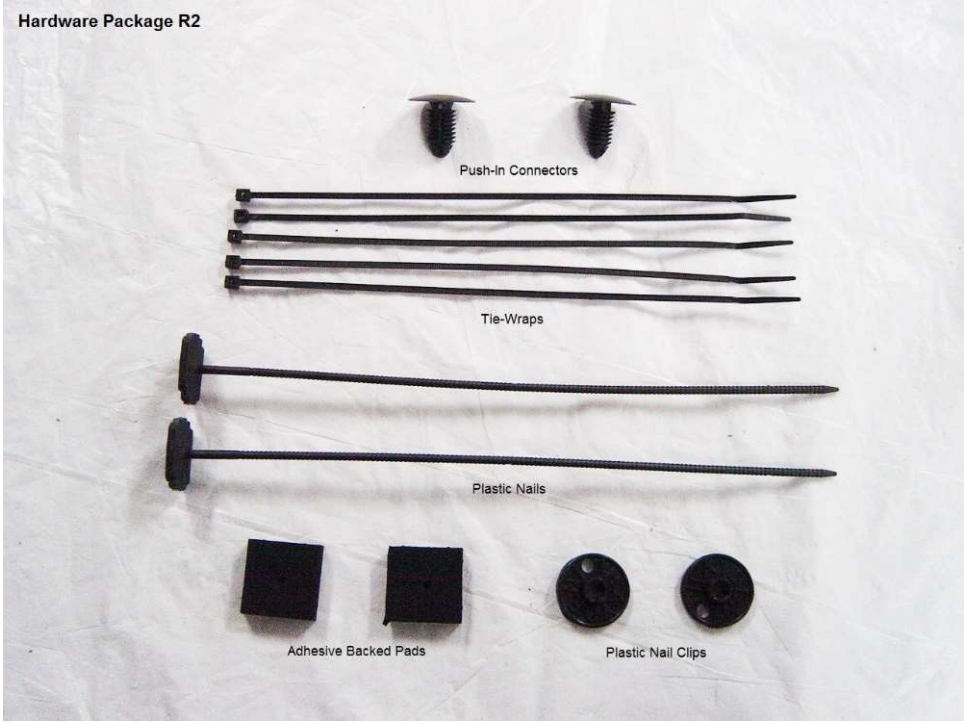
Photo 5-20: Bend the tabs to get approximately 1/2" of space between radiator and evaporate coil

STEP 6: INSTALLING THE RADIATOR SHROUD PANEL

Only the upper panel will be installed now. The bottom panel and the side panels will be installed after the intercooler installation. These plastic panels help seal off the air passage and improve the efficiency of the Intercooler and cooling system. The increase in the frontal area improves air flow compared to the factory shrouding. The sides will now be more closed off, with the new panels providing better airflow through the A/C condenser and the radiator. If the panels require any additional trimming, use tin snips to cut the plastic.

This panel mounts in the mouth of the front opening between the bumper and the bumper supports of the car. The plastic panel comes pre-drilled for the two outside holes. The upper panel is also used on the NB Miatas. The NB Miata does not have a center mounting hole like the NA Miatas so only 2 plugs are supplied. Photo 6-2 shows a center plug installed, but not included with the kit.

Hardware Package R2



- Mount the panel so the textured side is visible and the three small mounting holes are at the back. From the radiator opening, pull the bumper down a little so that you can slide the panel into position.
- Push the new plastic mounting plugs partially in through the bumper on the two sides. Do not lock them until the tie-wraps are installed on the other end.
- Use the supplied tie-wrap and loosely attach the back section of the upper panel as shown in Photo 6-2.
- Bend the tie-wrapped tabs up using your hand. This panel will improve the air flow into the radiator area as shown in Photo 6-3.
- Push the plastic plugs securely in place and tighten the tie-wraps.

Photo 6-1: Upper panel and hardware

Photo 6-2: Upper panel under bumper lip with hardware

	
Photo 6-3: Plugs in upper panel	Photo 6-4: No Photo

STEP 7: INSTALLING THE INTERCOOLER CORE

The TDR Air to Air Intercooler has been cleaned and sealed before shipping however, it is recommended that before installing the Intercooler, you run clean water through it to make sure there are no foreign objects in it. After rinsing, shake out any water that may be left. The Intercooler does not have to be completely dry, but remove any excess water. Use the red caps to seal off while installing.

The TDR Intercooler is supported by two top L-brackets. The power steering cooling tube in Step 8 will be modified for clearance around the intercooler. In the mean-time, move the P/S cooling tube upwards out of the way for installing the intercooler.

Hardware Package A2

- Attach the two aluminum L-brackets using two M8 x 30 bolts, washers, lock washers and nuts as shown in Photo 7-1. The Slot section goes on the subframe mounting. Attach the L-brackets onto the Bottom of the Intercooler mount as shown in Photo 7-2 and hand-tighten.

- Pull the A/C condenser coil back toward the engine. A bungee cord may help with this step.

- From the bottom, insert the Intercooler between the A/C condenser coil and the front bumper. Be careful not to scratch the finish.

- Using the two M6 x 30 bolts from Package A2, mount the Intercooler into position as shown in Photo 7-2. Hand-tighten the two upper bolts. The upper section of the L-bracket is slotted to ease installation. Align so the Intercooler is clear of the A/C dryer and then firmly tighten the M8 bolts using a 12 mm wrench first, followed by the M6 bolts in the sub frame.

- If you need more clearance from the dryer canister, refer back to STEP 5 on bending the unit.

- The factory horn can be reinstalled on the same mounting holes when complete. If you use aftermarket horns you'll need to decide where they will work best for you. A common mounting area is the front fender well area behind the bumper.

Photo 7-1: Intercooler L-Bracket and hardware

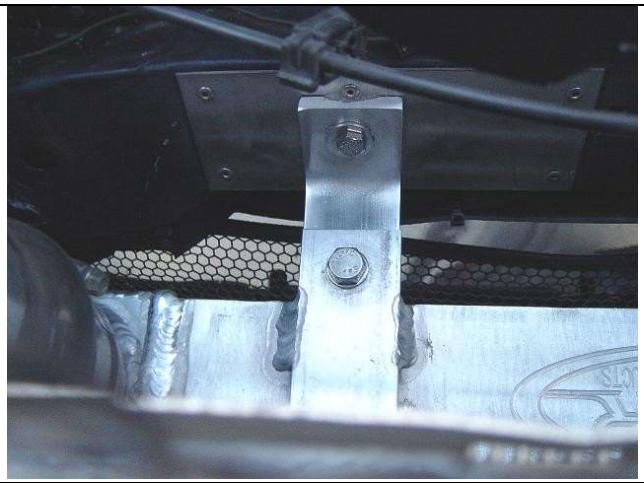


Photo 7-2: L-Bracket mounted

STEP 8: INSTALLING THE POWER STEERING COOLER

If your car does not have power steering or if your model has the reservoir only you can proceed to STEP 9. From STEP 7 you installed the intercooler, check for clearances of the power steering tube as shown in Photo 8-2. The modification requires bending the tubes for clearances around the intercooler.

Hardware Package A2

- Test fit the power steering tube as shown in Photo 8-2.

- Use the intercooler corner and bend the P/S tube in the corner to help in clearances. Bend a little and test fit. Bend as required to fit in position as shown in Photo 8-2.

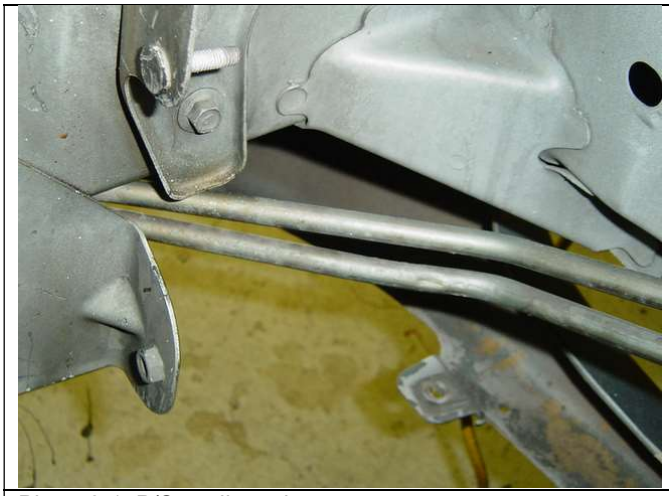


Photo 8-1: P/S cooling tube

Photo 8-2: Using the intercooler to bend the tubing

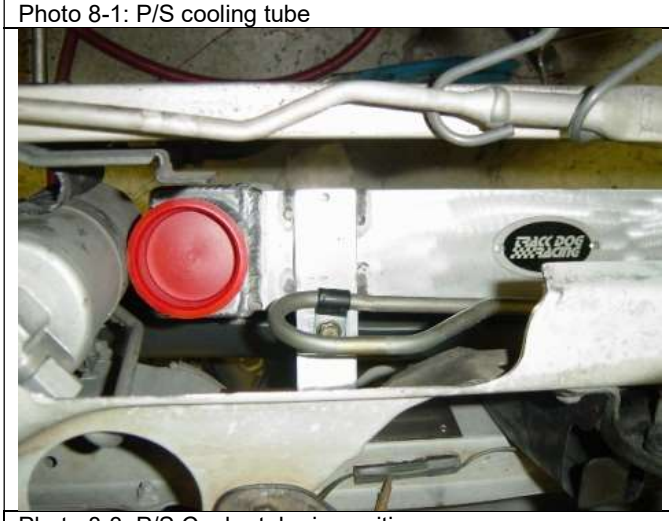


Photo 8-3: P/S Cooler tube in position

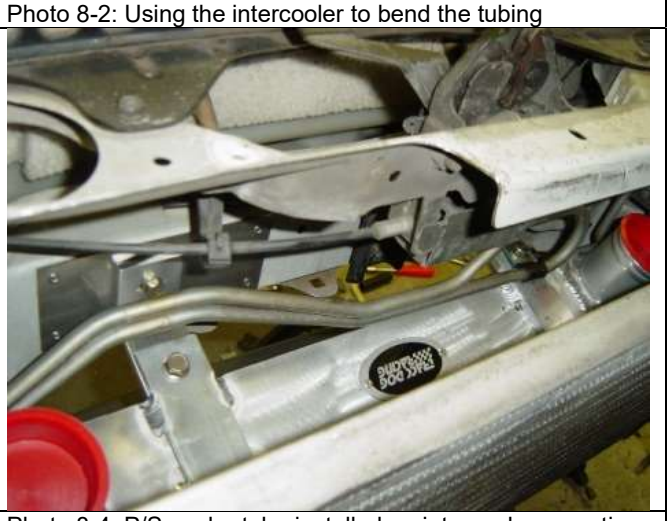


Photo 8-4: P/S cooler tube installed on intercooler mounting

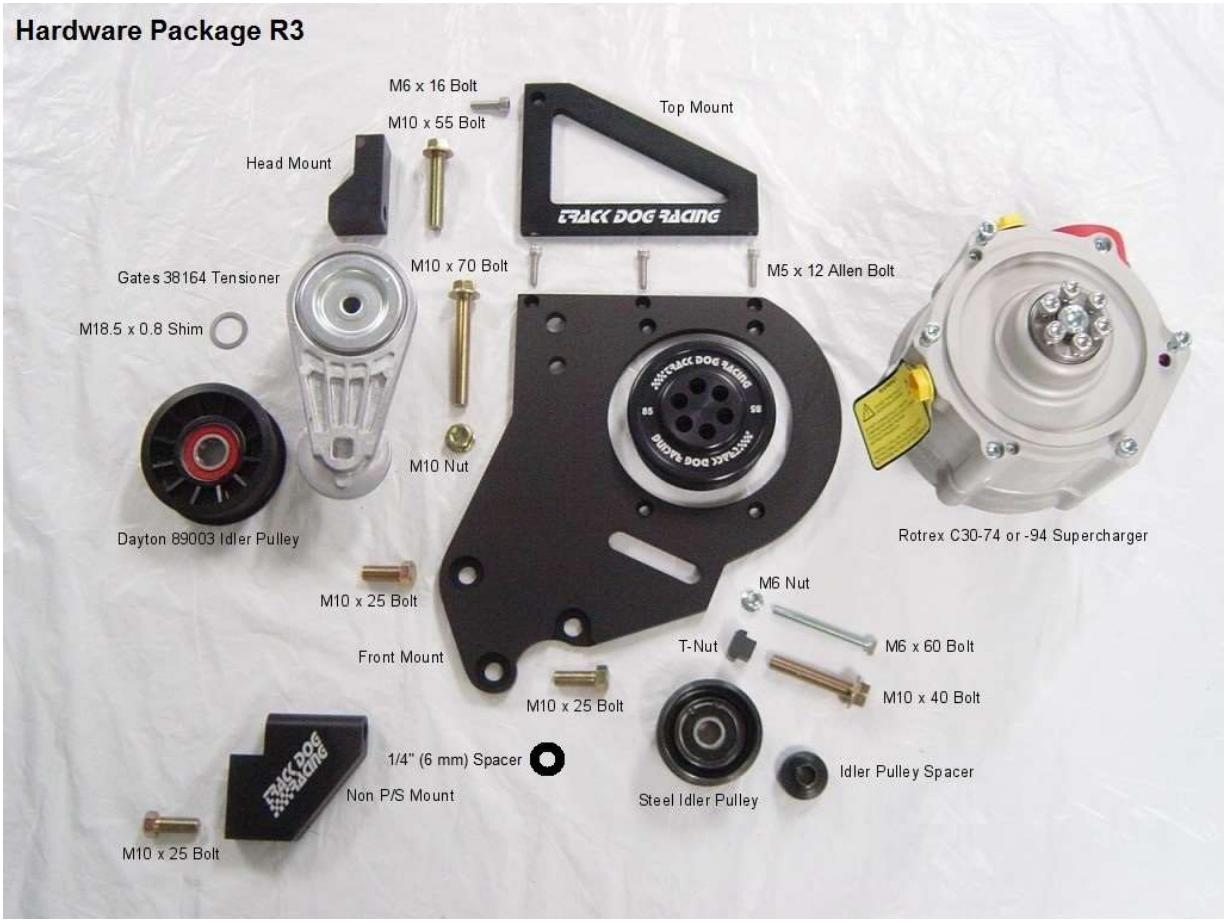
- You are looking for about a 1/4" of clearance where the tubes wrap around the intercoolers end tank.
- Attach the P/S tube mounting bracket as shown in Photo 8-3 and then test fit for clearances on the intercooler end tank. Adjust as necessary,
- When satisfied with the fit securely tighten the intercooler hardware including the P/S mounting bracket as shown in Photo 8-4.

STEP 9: INSTALLING THE ROTREX SUPERCHARGER BRACKET

If you are eliminating your P/S pump then you can go to Section 9.2 for installing the P/S delete block. Hardware Package R3 shows the power steering delete block in the lower left. This block is not included with powering steering setups.

- The radiator should be out to simplify installation.
- Note that some pictures are for illustration and may require components removal for access.

Hardware Package R3



9.1 Supercharger Bracket

We need to prepare the power steering pump assembly for the new SC bracket.

- Loosen the P/S tensioner and remove and store power steering P/S belt as shown in Photo 9-1.
- Remove the front hose bolt on the bracket as shown in Photo 9-2. With a flat head screwdriver pry the tabs back and discard the bracket.

Photo 9-1 P/S tensioner bracket

Photo 9-2: Discard the hose bracket

Photo 9-3: Upper and lower tensioner bolts

Photo 9-4: Tensioner bracket removed

- Using 12 mm socket, remove both the upper and lower bolts that hold the tensioner on to the P/S pump as shown in Photos 9-3 and 9-4. Store in a dry place with hardware.
- Remove the M10 bolt that the slider section is attached the P/S pump as shown in Photo 9-3.
- Loosen the P/S hose as shown in Photo 9-5 just enough to turn the hose toward the rear as shown in Photo 9-6. Bending the tube afterwards may be required for additional clearance.

Photo 9-5: P/S hose loosened

Photo 9-6: P/S hose rotated toward the rear

Photo 9-7: Radiator must be out to remove P/S bolt

Photo 9-8: Install lower bolts into P/S mount

- The M10 P/S bolt has a nut on the inside. Use a 17mm wrench to hold the nut and loosen the bolt as shown in Photo 9-7. You may have to have the radiator removed to remove the bolt as shown in Photo 9-8.

- The TDR bracket when used with P/S reuses the long M10x65 mm bolt and nut. Early cars may have had the long bolt come in from the header side. Replace from the front is easier to work with, but not necessary.

- Using the hardware from Package R3, install the front mount with the M10x25 bolt just above the P/S as shown in Photo 9-8 and loose fit.

- There are two M10 flanged bolts that are used in the P/S assembly and one non-flanged M10 bolt used in the upper mount in Photo 9-8 for belt clearance.

- Install spacer between bracket as shown Photo 9-9 and upper P/S assembly using M10x25 bolt and hand tighten.

- Install the nut on the long bolt and tighten as shown in Photo 9-10.

- Hand-tighten all three bracket bolts. After the top mount is installed for alignment, you can tighten these 3 bolts.

- Install the head block assembly shown in Photo 9-11 using the M10x50 bolt and hand tighten.

Photo 9-9 Spacer between P/S pump and bracket

Photo 9-10: Lower long bolt on bracket

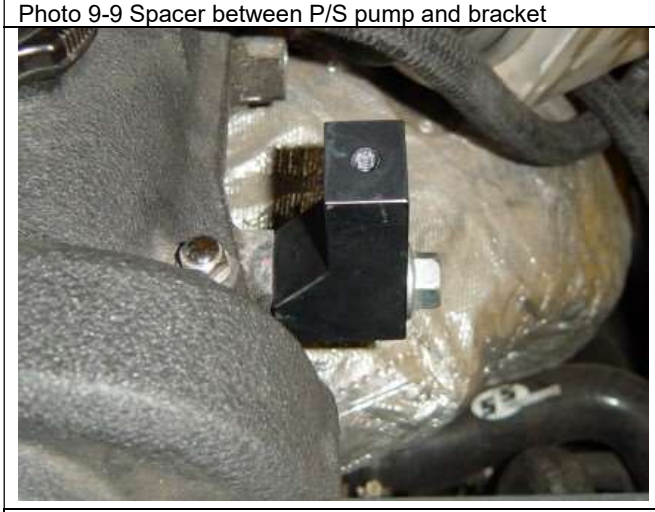


Photo 9-11: Head block assembly

Photo 9-12: Triangle mount positioned

- Install the triangle mount using three M5 Allen bolts on the front and one M6 Allen bolt at the rear as shown in Photo 9-12 and 9-13 and hand-tighten.
- Tighten the head block assembly as shown in Photo 9-14.
- Tighten the three M10 bolts that hold the front mount.
- Remove the top triangle mount for supercharger installation. The triangle mount will be reinstalled after the supercharger and hose installation.

Photo 9-13: Triangle mount temporarily installed

Photo 9-14: Head block tightened down


Photo 9-15: Triangle mount removed


Photo 9-16: Shim placed on tensioner mount

- The auto-tensioner comes assembled with a M18.5 x 0.8 mm shim installed under the flanged pulley as shown in Photo 9-16. If the pulley is replaced be sure the shim stays on the tensioner. We also use a flanged pulley that is not part of the Gates tensioner. Contact TDR for replacement pulley or tensioner.
- Install the tensioner using the M10x70 mm bolt and nut into the front mount as shown in Photos 9-17 and 9-18.

Photo 9-17: Tensioner assembly installed

Photo 9-18: Adjustable pulley installed

Photo 9-19: Adjustable pulley with t-nut installed

Photo 9-20: Bend rigid section of hose by hand to add hose clearance at chassis

- NOTE: Check for hose clearance. Photo 9-20 shows bending the pipe up for more clearance around the frame area. Also check lower hose area by the A/C and P/S pulleys that they will not rub. Use tie-wraps to pull back if necessary.

9.2 INSTALLING THE NON P/S DELETE BLOCK

If you are not using power steering then you will install the Optional P/S delete block in its place. If you never had P/S then you will need to install the P/S bracket as shown in Photo 9-21. The spacer will already be knocked back as it is required when the bracket was removed.

- Once you remove the P/S pump or installing the P/S bracket for the first time installation, the spacer as shown in Photo 9-22 may require pushing back a small amount for the non P/S delete block to fit. Be sure to test fit first before installing the front plate as shown in Photo 9-23.

- Install the supercharger front mount using the factory M10x65 mm bolt threw the block and add the lock washer and nut as shown in Photo 9-23. Loose fit until all bolts are attached.

- Install the M10x25 mm bolt from the front into the block and the upper P/S mount as shown in Photo 9-24. Tighten down all the supercharger bracket hardware.

Photo 9-21: Power steering mount

Photo 9-22: Adjust spacer if necessary

Photo 9-23: P/S block installed

Photo 9-24: Front bolt installed in P/S block

9.3 Installing Tensioner Pulley

We supplied a small packet of anti-seize to use on the pulley and adjustment bolt as shown in Photo 9-25.

- Locate the tensioner pulley. <u>The stand-off is to be installed on the side with the C-clip as shown in Photo 9-26.</u>
- Install anti-seize on the T-nut and the slide area as shown in Photo 9-27.

Photo 9-25: Anti-seize packet supplied

Photo 9-26: Pulley standoff on the C-clip position

- Thread the M6 nut with the flange facing towards the SC mount as shown in Photo 9-28.
- Install anti-seize on the M6 x 60 adjustment bolt as shown in Photo 9-28.
- Install the adjustable pulley using M10x40 bolt and t-nut as shown in Photo 9-29. Be sure the M6 adjustable bolt is threaded out to allow maximum belt adjustment. Hand tight until belt is installed.

Photo 9-27: Anti-seize on T-nut and slide area

Photo 9-28: Anti-seize on adjustment bolt.

Photo 9-29: Tensioner pulley installed

Photo 9-30: Blank

STEP 10: 96-97 Models Crank Sensor and Harness Clearances

On 96-97 models, the crank sensor harness needs to be removed from the factory bracket and stretched further toward the water outlet neck as shown in Photo 10-1.

- Check clearances of the wiring harness from the crank location up to the connector. Tie-wrap the harness as shown in Photo 10-2.
- Continue to pull harness tight and tie-wrap as required as shown in Photo 10-3.
- The harness attachment near the throttle body has a plastic clip held in the mount and electrical tape supporting the harness. Cut the tape and separate from the plastic mount.
- Pull the harness tight and tie-wrap as shown in Photo 10-4.

Photo 10-1: Crank sensor connector to be repositioned

Photo 10-2: Crank sensor harness Tie-wrapped to mount

Photo 10-3: Tie-wrapped for clearance over the water outlet

Photo 10-4: Crank sensor harness pulled tight and Tie-wrapped

STEP 11: INSTALLING THE RADIATOR

You should have the modified side mounts complete and ready to drop in at this point from STEP 2. The radiator is now positioned lower and angled back a little toward the engine. Depending on the type of radiator you are using, the plastic support arms for the fans might need to be trimmed to clear the sway bar. The stock radiator does not require additional trimming.

If you are using the Racing Beat Sway Bar Brace you will have to discontinue using the brace member or modify it for clearance. To modify, you can cut out the side of the RB brace member were the fan support was touching and then use Plumbers Epoxy to fill the modified cut out. Another option is to use the hardware blocks only as supports in the frame bracket for additional sway bar support. This is common with the Auto-crossers that cannot add the additional brace due to rules.

11.1 Installing the Radiator Shield Hardware

Hardware Package A1

- Locate the L-bracket and hardware from package A1 as shown in Photo 11-1.
- Remove the M6 bolt from the top of the radiator bracket using a 10 mm wrench and install the L bracket using the supplied M6 x 12 bolt as shown in Photo 11-2.
- Install M6 washer on top as a spacer for the radiator cover as shown in Photo 11-2.

Photo 11-1: Radiator bracket hardware

Photo 11-2: L bracket installed on radiator with washer

11.2 Installing the Radiator

- With the A/C condenser coil bolted to the lower mounting brackets as discussed in STEP 5, slide the radiator into place. Make sure it seats into the lower J-brackets firmly. Lay the top cover over the radiators new top mount and then check for clearance issues with the fan supports and sway bar. If the fan supports touch, mark as shown in Photo 11-3, pull the radiator out and trim as needed.

- Use a Dremel or jig saw to cut away the plastic fan support for clearance as shown in Photo 11-4.

- Once the clearances are sufficient, attach the lower radiator hose to the bottom outlet of the radiator as shown in Photo 11-5.

- Reattach the 10 mm bolt to the bracket that secures the A/C plumbing on the bottom of the fan housing.

Photo 11-3: Marking fan shroud for clearance

Photo 11-4: Fan support trimmed for clearance

Photo 11-5: Lower radiator hose installed

Photo 11-6: Upper radiator hose trial fit and cut

- If using the stock upper radiator hose configuration, you may need to cut up to about 1 3/4" of the radiator hose end. Lay the hose on top of the radiator fittings and cut as required. The Photo 11-6 shows the supercharger version using the dummy throttle body and idler air hose. Better to not cut enough than to cut too much. Attach the radiator hose using original factory clamps.

- If you are using the new Coolant Reroute setup, cut hose as required.

- Make sure the radiator drain is back in place and all hoses are connected. Refill the radiator when the complete installation is done.

STEP 12: ATTACHING THE A/C CONDENSER COIL TO THE RADIATOR

In STEP 5 you bent the upper brackets that have the factory rubber grommets to provide clearance between the radiator and the evaporator coil. The A/C condenser coil is supported by the two mount tabs and bolts on the bottom. The top we use a push-on tie-wrap also called a plastic nail that goes between the radiator and the condenser.

You should have a minimum of about 1/2" clearance between the radiator and the A/C condenser coil. Even though the condenser coil is close to the radiator, the A/C fans are always turned on, pulling cool air through it. Efficiency might be reduced a little in stop-and-go situations, but highway cooling should be normal.

Hardware Package R2

- Double check the condenser coil to radiator clearance one more time before installing the tie-wrap Nail. If necessary go back to STEP 5 for clearance adjustment.

- The tie-wrap plastic nail square base may need to be narrowed to fit between the two fans. You cut the sides off easily with a pair of wire cutters as shown in Photo 12-2.

- Push the plastic nail threw the radiator between the two fans about 2 inches from the top as shown in Photo 12-3. The Tie-Wrap will go through both the radiator and condenser coils.

- ONLY ONE PLASTIC NAIL IS USED; A SECOND ONE IS SUPPLIED AS AN EXTRA. Cut the remaining plastic nail off after installation.

Photo 12-1: Plastic nail

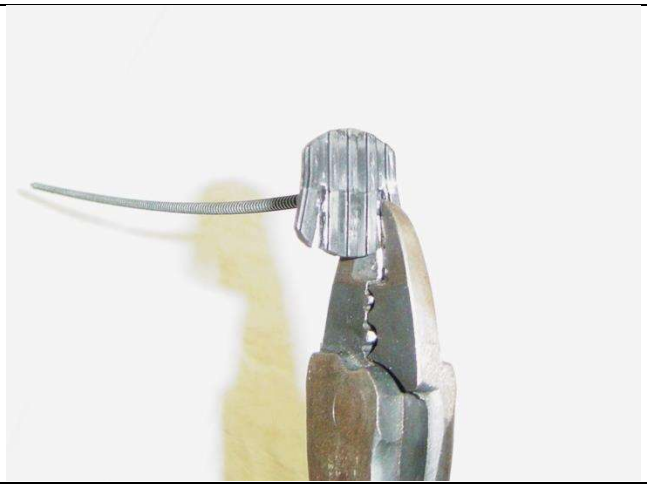


Photo 12-2: End cut to narrow the base

Photo 12-3: Plastic nail pushed in between the fans

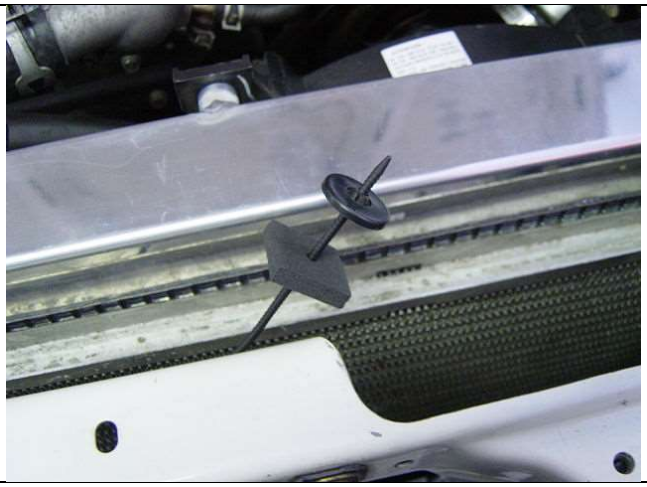


Photo 12-4: Rubber pad and clip installed

- Peel the tape off the pad and attach the sticky side toward the condenser. Add the locking clip on the plastic nail as shown in Photo 12-4.

- Pull the radiator and the A/C coils just enough to pull the evaporator coil against the rubber grommets. DO NOT over-tighten and place unnecessary stress on the radiator or evaporator coil.

- If you need to remove your radiator, use wire cutters to cut the plastic nail. You can push the condenser coil inwards some to give slack to the plastic nail for clipping.

STEP 13: INSTALLING THE RADIATOR SHIELD

There are two upper radiator shields. The stainless steel shield is mounted close to the bumper and closes off the opening. The black cover will be installed after the piping installation.

Hardware Package A1

- In STEP 3.2 you should have installed the two bolts for the SS shield installation. Lift up the hood latch and slide the stainless steel panel, (plastic film side up) into place over the bolts on the two ends as shown in Photos 15-1. Peel the plastic film off before or after the installation.

- Install the nylon nut from hardware package A1 over the stainless steel panel. This nut holds the stainless steel panel down and is also a spacer for the black aluminum radiator panel as shown in Photo 13-2. Do not over-tighten; it takes little effort to tighten the nylon nut.

	
Photo 13-1: Latch held up to install SS panel	Photo 13-2: Nylon nut installed over SS panel

STEP 14: INSTALLING THE BOTTOM PANEL

The Bottom panel is installed to the bumper using retainer nuts and bolts. Retainer nuts are also installed on the new panel for the belly pan installation.

Hardware Package A3

- Install the bottom panel with the texture side up.
- Install retainer nuts on the lower section of the bumper as shown in Photo 14-2.
- Install one M6 x 20 bolt through the bottom panel to help in aligning the bottom panel as shown in Photo 14-3. The bolts install from the top.

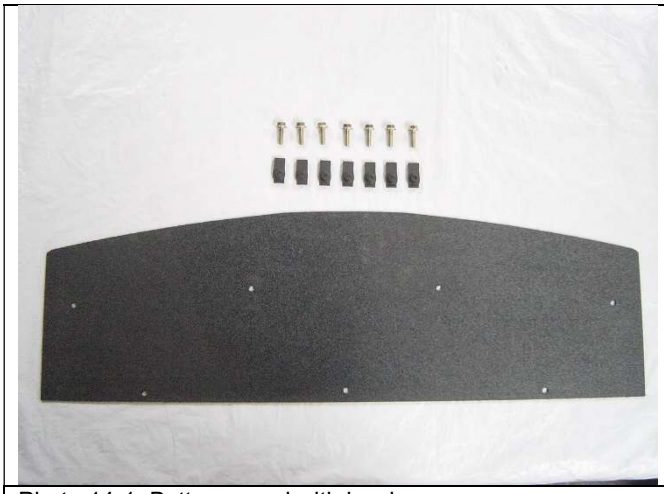


Photo 14-1: Bottom panel with hardware

Photo 14-2: Retainer nut installed on bumper

- Install only the three M6x20 bolts from the right into the bottom panel and tighten as shown in Photo 14-4. The left mounting hole will have the oil cooler panel placed over the panel prior to installing this bolt.
- Install the 3 retainer nuts to the bottom panel as shown in Photo 14-5 with the tread extension section on the upside.
- Photo 14-6 shows the belly pan as it should look when attached. However, do not attach at this time.

Photo 14-3: Aligning bolt into retainer nut

Photo 14-4: Bottom panel installed into bumper mount

Photo 14-5: Retainer nut installed on bottom panel

Photo 14-6: Belly pan installed to bottom panel

STEP 15: INSTALLING THE ROTREX OIL COOLER

There are four plastic panels to aid the oil cooler and the radiator cooling. The stainless steel cooler mount is laser cut and precisely bent to fit the large Rotrex oil cooler in the fender area. All hardware is supplied including oil/gas resistant cloth wrapped hose that is kink proof and abrasion resistant.

In the Intercooler instructions, you removed the front factory radiator cowling in the mouth opening. You also installed a lower plastic panel in the mouth that the belly pan or also called an under tray mounts to on the front section. The side panels below are mounted on both sides of the radiator area and stop after the radiator mounted position. This opens the engine bay area on the sides to aid in removing hot air.

Custom made L-brackets with captive nuts are used to mount the panels securely. If you have a custom brake duct setup, you can route the tubing between the oil cooler and the radiator area. Plastic panels can be modified with tin-snips or a heavy duty pair of scissors for a custom fit.

Hardware Package A4

15.1 Installing Oil Hose

The cloth wrapped hose is used for the oil system. The fittings at the cooler are a little tight and take good pressure to push them on. The banjo fittings for the reservoir and supercharger are easy to insert. The hose fitting may feel a little loose, but the rubber swells to seal and never leaks. There are spring clamps provided as well.

- If you have not removed the factory tow hook as shown in Photo 15-1 on the driver's side or left side, do so at this time. You can leave the right side mount, but you may be required to modify the plastic side panel a small amount for additional clearance. If necessary use a pair of tin-snips or scissors to cut the plastic. We offer a flat tow hook option that also comes with a rear tow hook, contact TDR.

- Remove the reinforcing rod that goes from the lower bumper to frame held on with M6 bolt as shown in Photo 15-2 on the left side of the car. This is where the supercharger oil cooler will be mounted.

Photo 15-1 Left side tow hook removed

Photo 15-2 Remove reinforcement rod

Photo 15-3: 12 inch hose piece to be used for the reservoir

Photo 15-4: Cloth hose pulled through the sway bar mount

- Before feeding the oil hose down to the cooler area, **cut off a length of about 12 in. (305 mm) off one end**, this will be used for the reservoir as shown in Photo 15-3.

- Push the hose through the sway bar mount from the top as shown in Photo 15-4 and out from the sway bar mount as shown in Photo 15-5. Pull as much as you need for the installation as cutting will be done in the engine bay after the hose is attached to the oil cooler.

Photo 15-5: Oil cooler hose pulled threw sway bar mount

Photo 15-6: Apply heat to soften rubber for fitting install

Photo 15-7: Push connector on with extreme pressure

Photo 15-8: M6x30 mm bolt threaded from the bottom

- Locate the two brass barb fittings for the oil cooler. Install a spring clamp from Hardware Package R5 on the hose before installing the brass fitting. The fitting is a tight fit in the hose and works best if you will apply a small amount of oil or grease to the barb fitting first.

- With a cigarette lighter, soften the rubber some with the flame as shown in Photo 15-6 and immediately press on the fitting using the floor or other means for leverage as shown in Photo 15-7. Keep applying pressure until seated at the bottom.

15.2 Installing Bottom and Side Panels

- Replace the factory M6 bolt with the new M6x30 mm bolt from the bottom as shown in Photo 15-8.

- If you do not have a belly pan or under tray pan you should have one to improve cooling. In our kit we will remove the side panels from the belly pan to improve cooling efficiency.

- The easiest way to cut the belly pan sides are with tin-snips as shown in Photo 15-10, but a good pair of scissors or jig saw will work.

- Cut the belly pan about a 1 inch (25 mm) above the base as shown in Photo 15-11.

- Mount the belly pan using your existing mounting hardware. There are 3 bolts in front and 2 bolts in the rear as shown in Photo 15-12.

Photo 15-9: Belly pan before modification

Photo 15-10: Using tin-snips cut side panels off both sides

Photo 15-11: Side panel removed about 1 inch from bottom

Photo 15-12: Belly pan installed

- Install bottom panel into the bumper with the back side installed over the M6x35 mm bolt as shown in Photo 15-15. The front bolt as shown in Photo 15-14 uses the M6x20 mm bolt. Lightly tighten until the side bolt is in place.

- Install the ½" (12.5 mm) spacer over the bottom panel as shown in Photo 15-15, but don't install the nut until the oil cooler bracket is installed.

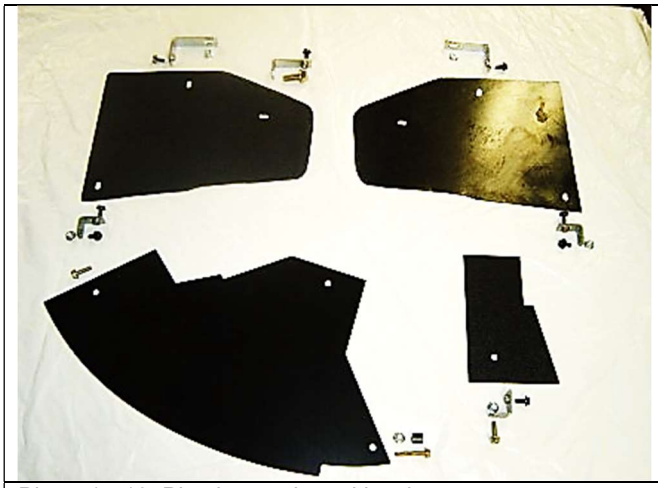


Photo 15-13: Plastic panels and hardware

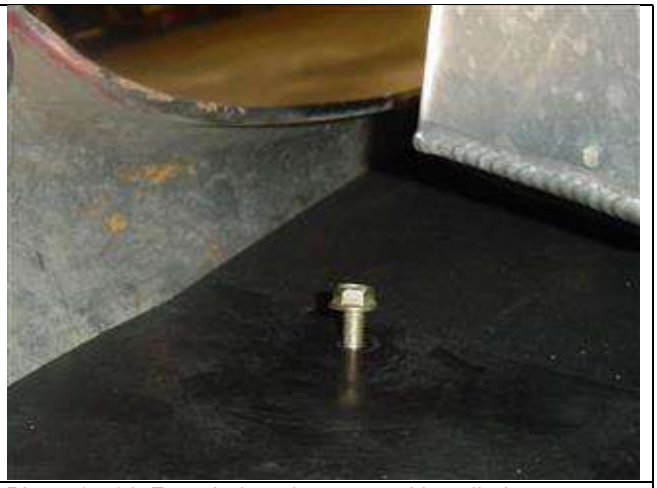


Photo 15-14: Front bolt on lower panel installed

Photo 15-15: Rear bottom panel bolt and spacer

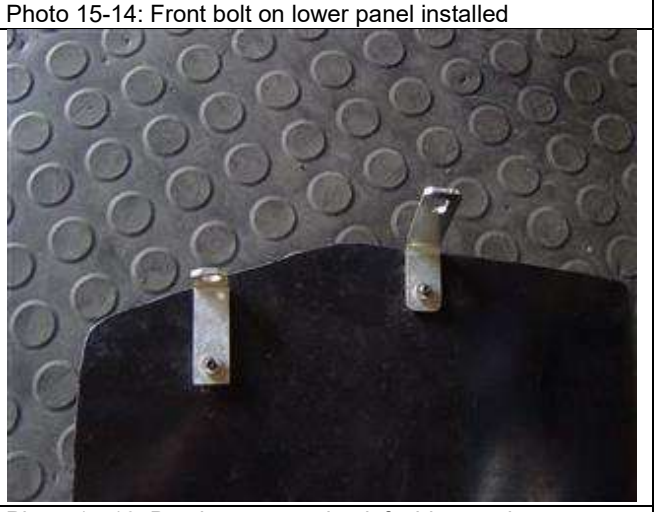


Photo 15-16: Bracket mounted to left side panel

- There are three different L-brackets. On the left side panel you will use all three. The right side panel you will use two. Install the large L-bracket with the large hole opening on the front or curved section of the panel as shown in Photo 15-16. Use an M6x12 mm bolt and hand tight as shown in Photo 15-16.

- Install the large L-bracket with a slotted hole using an M6x12 mm bolt in the position shown in Photo 15-16.

- Tighten the M6x12 mm bolt parallel to the side panel as shown in Photo 15-17.

- Install the side panel into the bumper area and install a M6 nut on the stud as shown in Photo 15-18. Loosely tighten until the other L-bracket is installed.

- Install the M10x25 mm bolt into the L-bracket and into the frame as shown in Photo 15-19.

  NOTE: If you have other means of directing airflow to the oil cooler then you can eliminate this L-bracket and insert the plastic panel between the opening and factory bracket. Photo 15-19 shows the bracket bent back about 90 degrees. This adds more clearance for inserting the panel.

Photo 15-17: Slotted L-bracket installed on panel

Photo 15-18: L-bracket and panel installed on frame stud

Photo 15-19: M10 bolt installed in L-bracket

Photo 15-20: L-bracket pushed inwards and tighten down

- Push on the slotted L-bracket toward the radiator as shown in Photo 15-20 and tighten the 6M nut. Tighten the M10 bolt as well.

- Tighten the front bolt on the side panel from the front area as shown in Photo 15-21.

- The rear mount on the side panel uses the small L-bracket and attaches to the belly pan as shown in Photo 15-22.

Photo 15-21: Front M6 bolt tighten on side panel

Photo 15-22: L-bracket installed into side panel

Photo 15-23: Small L-bracket in side panel rear

Photo 15-24: L-bracket positioning for hole

- Using an M6x12 mm bolt, install bracket loosely on the side panel as shown in Photo 15-23.
- To aid in aligning the hole to be drilled into the belly pan, use some contrasting tape such as masking tape and position as shown in Photo 15-23.
- Install the M6x20 mm bolt as shown in Photo 15-24. Add a little dirt or grease to the bottom of the bolt and position the panel and bracket into position. Turn the bolt by hand and scribe a mark onto the tape as shown in Photo 15-24.
- Drill a 1/4" hole into the belly pan. Remove the M6 bolt from the top of the mount and reinstall from the bottom of the belly pan as shown in Photo 15-25.
- The right side panel install similar to the left side. The right side does not require the air diffusion to the side so the large L-bracket with the M10 hole is not used. If you decide to use our remote engine oil cooler, you can use this fitting to redirect the airflow.
- Install the large L-bracket with the slotted opening onto the side panel using an M6x12 mm bolt. Tighten the bolt prior to installing parallel to the plastic panel as shown in Photo 15-26. You may require trimming for the front tie-down mount. Our TDR tow mount will clear the plastic panel with no trimming.

Photo 15-25: Rear L-bracket mounted to belly pan

Photo 15-26: Right side panel installed with L-bracket

- Install the side panel with the front section between the radiator mouth and the bracket. Install with an M6 nut as shown in Photo 15-26. Push the bracket inwards as you did with the right panel and tighten down securely.

- The rear mount on the side panel uses the small L-bracket and attaches to the belly pan as shown in Photo 15-27.

- Using an M6x12 mm bolt, install bracket loosely on the side panel as shown in Photo 15-28.

- To aid in aligning the hole to be drilled into the belly pan, use some contrasting tape such as masking tape and position as shown in Photo 15-28.

- Install the M6x20 mm bolt from the top as shown in Photo 15-28. Add a little dirt to the bottom of the bolt and position the panel and bracket into position. Turn the bolt by hand and scribe a mark onto the tape as shown in Photo 15-24.

- Drill a 1/4" hole into the belly pan as shown in Photo 15-30. Remove the M6 bolt from the top of the mount and reinstall from the bottom of the belly pan as shown in Photo 15-31 and 15-32.

Photo 15-27: Install L-bracket to belly pan

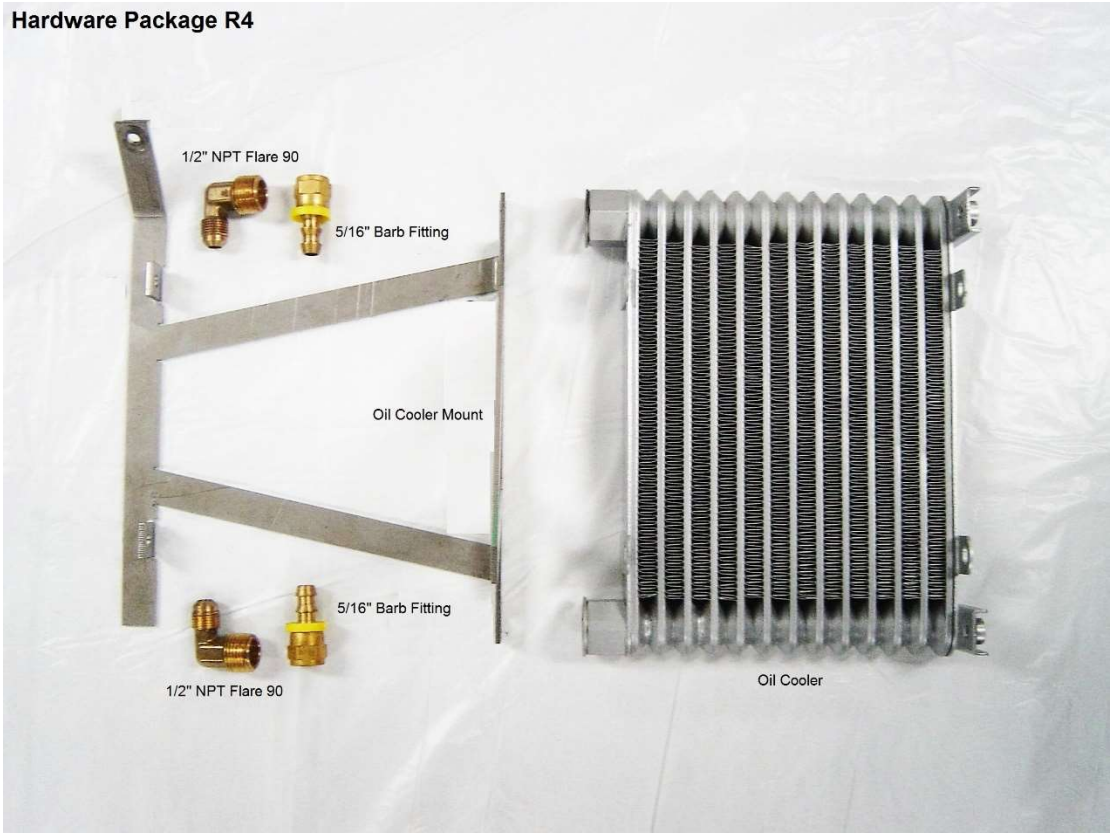
Photo 15-28: Mark the bolt and onto the masking tape

	
Photo 15-29: Adding a little dirt to the bolt tip for marker	Photo 15-30: Hole drilled into belly pan
	
Photo 15-31: L-bracket installed into belly pan	Photo 15-32: Side panel installed

15.3 Installing the Oil Cooler

Our high quality oil cooler uses a custom bent stainless steel mount that is held in by upper and lower bolts. The large volume dissipates the Rotrex supercharger oil to prolong life. The added plastic panels aid in directing airflow. The SS bracket installs on the inside of the cooler.

Hardware Package R4



- The oil cooler will easily slide into the cooler mount. If one of the mounts is bent a little, straighten as required before installing. Install using M6x12 bolt and nut as shown in Photo 15-34 on the top mount.

- On the bottom mount, install the M6x20 bolt and washer only on the left rear as shown in Photo 15-35. The right bottom mount will be installed later with an L-bracket.

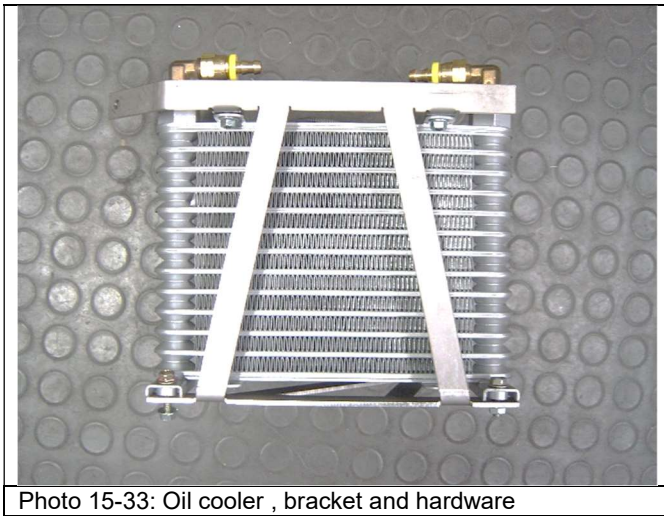


Photo 15-33: Oil cooler , bracket and hardware

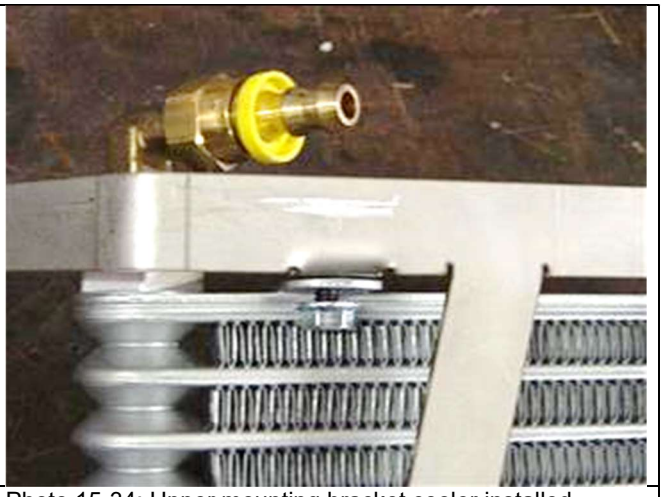


Photo 15-34: Upper mounting bracket cooler installed

Photo 15-35: Left bottom bolt mounted

Photo 15-36: Fitting installed on the oil hose

- The fittings on the hose should already be installed from earlier instructions as shown on Photo 15-36, if not refer back to Section 15.1.
- The two 90 degree flare fittings are preinstalled on the cooler and angled as shown in Photo 15-37. This will allow the hoses to bend freely.
- The fittings are SAE not Metric and use a 3/4" open wrench or adjustable wrench to tighten the flare fittings to the cooler.
- Allow extra slack in the hose for accessibility, but not so much that it binds or causes obstruction in airflow as shown in Photo 15-37.
- Mount the cooler to the bumper as shown in Photo 15-38 using the M6x35 mm bolt installed earlier with ½" (12.5 mm) spacer shown in Photo 15-15. Hand tight until the side frame hardware is attached.
- Mount the oil cooler frame to the chassis frame using an M6x20 mm bolt as shown in Photo 15-39.

Photo 15-37: Hoses attached to cooler

Photo 15-38: Bumper mount

Photo 15-39: Cooler bracket mounted to frame M6x20 mm

Photo 15-40: Cooler bracket mounted to base

- Photo 15-40 shows the orientation on the L-bracket for the small side panel. Install the L-bracket using M6x30 mm bolt and nut. Hand-tighten until the side panel is attached as shown in Photo 15-40 and 15-41.

- Using an M6x12 mm bolt, attach the side panel as shown in Photo 15-43. Position so the side panel is up against the belly pan side.

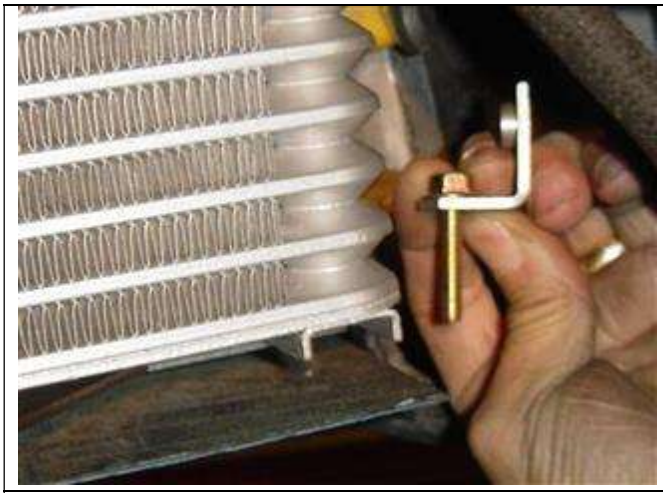


Photo 15-41: Small L-bracket for side panel with bolt

Photo 15-42: Installed L-bracket with nut

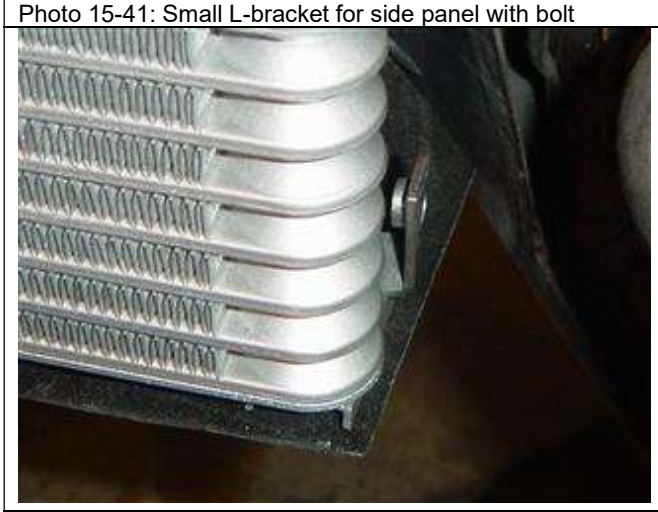


Photo 15-43: L-bracket orientation

Photo 15-44: Side panel check for hose clearance

- Check clearance for the hoses as shown in Photo 15-44.
- If the side panel requires trimming, mark and cut using scissors or sheet metal cutters as shown in Photo 15-46.
- Photo 15-47 shows how the side panel should be mounted with cut out for hose pass through.

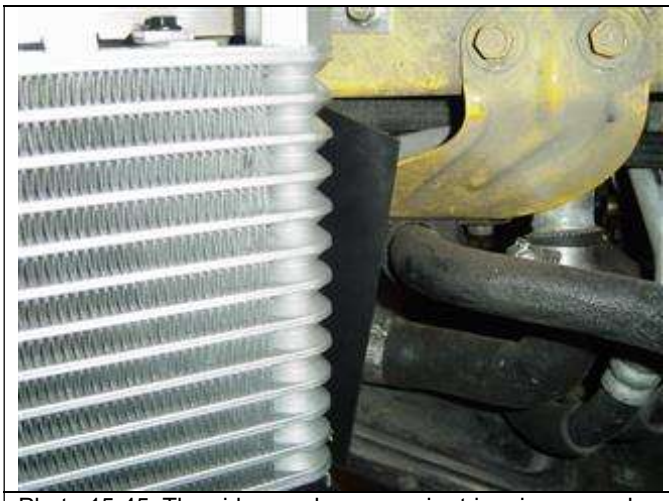


Photo 15-45: The side panel may require trimming around hose orientation

Photo 15-46: Trim with scissors or sheet metal cutters

Photo 15-47: Side panel in position with hose clearance

Photo 15-48: Installation complete

STEP 16: INSTALLING THE RESERVOIR AND OIL LINES

The Rotrex oil reservoir has a SS mount that you will install as seen below. Hardware Package R5 contains necessary components for this step of the installation. The two clamps that surround the oil cooler will allow the cooler to slide for adjustment during installation.

Hardware Package R5

- You should have the oil hose pulled up into the engine bay at this time. It does not matter which hose from the cooler goes to the supercharger or reservoir.
- The two clamps that surround the oil cooler will allow the cooler to slide for adjustment.
- Install the two oil reservoir clamps using supplied hardware with the mounting tabs placed downwards as shown in Photo 16-1.
- Install the SS mount using the M6x12 mm bolt and nut in the position as shown in Photo 16-1. The mount has two smaller 6mm holes and one larger 8mm hole for the brake boost mount. Set aside to install in another step.

Photo 16-1: Reservoir with mount installed

Photo 16-2: Reservoir with hose attached

Photo 16-3: Banjo fitting attached to hose

Photo 16-4: Banjo fitting with crush washers

- Earlier in the installation we suggested cutting off 12 inch (300 mm) length of oil line. If you did not cut a section off the hose then continue with the reservoir top installation so you can cut the oil hose to size. Afterwards, cut a 12 inch section and install.
- Install a banjo fitting and spring clamp to the hose as shown in Photo 16-3. Apply grease to the fitting to ease installation.
- Install the short hose to the bottom of the reservoir with a banjo bolt and two crush washers as shown in Photo 16-4.
- Tighten using a 14 mm wrench with the hose facing toward the engine as shown in Photo 16-5.
- Remove the 12 mm nut from the brake booster as shown in Photo 16-6.
- Install the reservoir mount with the hose toward the engine. Test fit the reservoir for clearance and adjusts as necessary before tightening the 12 mm nut as shown in Photo 16-7.

Photo 16-5: Oil hose from reservoir to filter

Photo 16-6: Brake booster area for reservoir

Photo 16-7: Oil reservoir installing to brake booster

Photo 16-8: Reservoir to fender clearance

- If necessary, loosen and slide the reservoir so that you have about a 1/4-3/8 inch (7-10 mm) clearance at the fender as shown in Photo 16-8.
- Bring the looped hose from the oil cooler up to and around the brake master cylinder. Cut to length for mounting on top of the reservoir as shown in Photo 16-9.
- Install the banjo fitting and spring clamp to the hose. Install banjo bolt and two crush washers using a 14 mm wrench on to the top of the reservoir as shown in Photo 16-9.
- The oil filter has an arrow showing the direction of the flow as shown in Photo 16-10.
- Cut the hose to length long enough to attach to the oil filter as shown in Photo 16-10. Attach hose with spring clip.
- Install oil filter to chassis using clamp provided and M6x20 mm bolt using a 10 mm wrench as shown in Photo 16-10.
- Pull the other hose from the oil cooler toward the head as shown in Photo 16-11
- Install the Rotrex to the mount, but only install one bolt with a few threads at the top as shown in Photo 16-12. This will allow the SC to have more gap from the mount for installing the outlet hose.

Photo 16-9: Return oil line attached to reservoir

Photo 16-10: Oil lines attached to filter

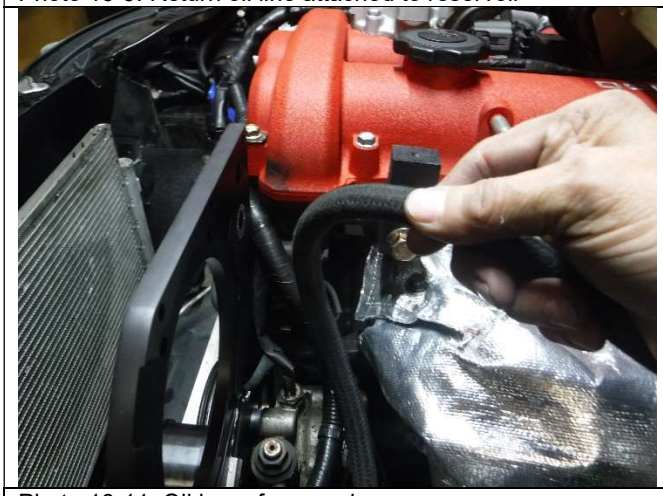


Photo 16-11: Oil hose from cooler

Photo 16-12: Oil hose measuring to cut

- Bring the hose up to the SC oil line OUTLET and with a little slack, cut the hose as shown in Photo 16-13.
- Burn the threads off the hose after cutting as shown in Photo 16-14.
- Install the bayonet fitting and clamp on the hose as shown in Photo 16-15. Add some grease to the fitting will help installation.

Photo 16-13: SC outlet hose cut

Photo 16-14: Burning off the threads

Photo 16-15: Bayonet fitting installed with clamp

Photo 16-16: SC oil cooler hose attached to SC

- Install the bayonet bolt to the fitting using two copper crush washers. Angle the fitting away from the SC mount as shown in Photo 16-16 and tighten using a 14 mm wrench.

- Cut another section of hose to go from the filter to the INLET of the SC as shown in Photo 16-17. Attach spring clamp on the filter end and a banjo fitting and spring clamp on the other end. Install banjo bolt with two crush washers and mount hose as shown in Photo 16-18.

- Do Not Tighten the INLET banjo fitting at this time. When the oil is installed we will need to bleed from this fitting. After bleeding the fitting should be at the angle shown in Photo 16-18.

Photo 16-17: Hose installed from filter to SC

Photo 16-18: Filter hose attached the SC

STEP 17: INSTALLING THE SUPERCHARGER TO THE MOUNT

The Rotrex supercharger use 4 long SS Allen bolts requiring a 5 mm Allen wrench. You can use standard Allen wrenches, but we would prefer to use a 3/8" socket with 5 mm Allen as shown in Photo 17-4. Maximum torque should be 90-100 inch lbs. which is a good snug. Loctite is not required.

- While still accessible, pull the dip stick out of the power steering reservoir and with a hack saw, cut off the handle section as shown in Photo 17-1 and 17-2. This is required for added pipe clearance.

- Place the supercharger into the mount as shown in Photo 17-3.

- Reinsert the four M6 bolts and tighten uniformly around the mount using a 5 mm Allen as shown in Photo 17-4. The SC pulley shows installed already, but this will be the next step.

- Lay the triangle mount in position and start with installing the three M5 Allen bolts in the front plate as shown in Photo 17-5.
- Start the M6 Allen bolt at the back mount location as shown in Photo 17-6. If necessary, loosen the 14 mm bolt on the head mount and readjust.
- Tighten all 4 bolts using the Allen wrenches.

Photo 17-1: Power steering reservoir dip stick shortened

Photo 17-2: View of dip stick cut off.

Photo 17-3: SC bolts installed with 4 mm Allen socket

Photo 17-4: Tighten evenly the 4 Allen bolts

Photo 17-5: Front 4 mm Allen bolts installed

Photo 17-6: Back 5 mm Allen bolt installed

STEP 18: INSTALLING THE SUPERCHARGER PULLEY

The supercharger pulley mounts using 6 each Allen head bolts. Both the 4-rib and 6-rib setups are the same.

- The center mount is preinstalled on the supercharger as shown in Photo 18-1.
- Mount the SC pulley using the M6x12 Stainless Steel Allen head bolts. Loctite can be used on these bolts. Only turn the pulley if necessary clockwise.
- Hand-tighten each bolt while holding the pulley in your hand as shown in Photos 18-2 and 18-3.
- After the drive belt gets installed and tightened you can use this as leverage to hold the pulley while tighten the 6 each Allen bolts on the pulley as shown in Photo 18-4.

Photo 18-1: Supercharger pulley mount

Photo 18-2: First Allen bolt installed

Photo 18-3: Remaining Allen bolts installed

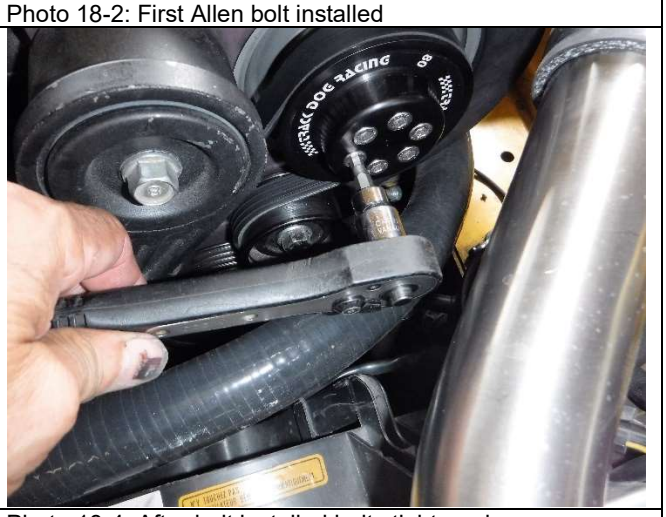


Photo 18-4: After belt installed bolts tightened

STEP 19: INSTALLING THE SUPERCHARGER DRIVE BELT

Most setups will include power steering and air conditioning which uses a Gates K040510 or 514 belt. If you do not have one or the other, the drive belt installation is similar. The 6-Rib setup is also similar except uses a 7-rib pulley. The 6-rib setup the front 6 teeth on the SC pulley.

- Pull the sliding pulley toward the adjustment bolt to give full access when installing the drive belt as shown in Photo 19-2. Loosen the 10 mm bolt and jam nut if necessary.

- The sliding pulley uses a 14 mm wrench to tighten as shown in Photo 19-3. Make sure there is about 1 turn out on the sliding pulley bolt while installing the belt. Leaving the pulley too loose during tensioning can misalign the t-nut and gouge the bracket during tensioning.

- You may require pulling back the auto tensioner to install the drive belt. Use a 3/8 inch socket wrench or breaker bar as shown in Photo 19-4. Release after the belt is on.

- Install the drive belt on all pulleys. Mount on the supercharger pulley as shown in Photo 19-1. The 6-rib configuration uses the front six ribs as shown in Photo 19-9 and 19-10.

Photo 19-1: Turn tightener bolt out to install belt

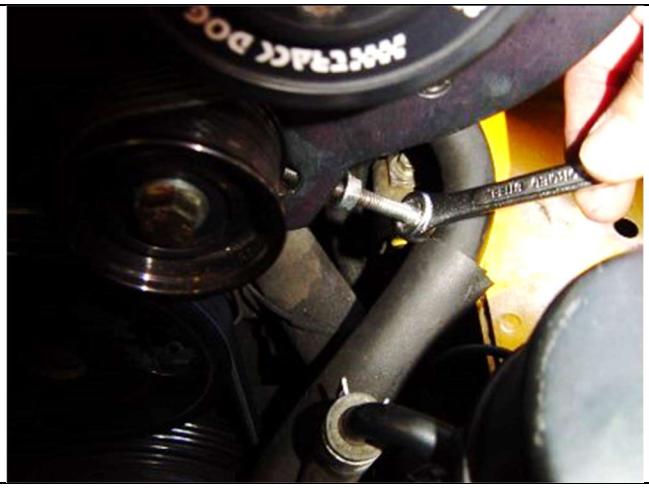


Photo 19-2: Sliding pulley10 mm adjustment bolt

Photo 19-3: Sliding pulley uses 14 mm wrench

Photo 19-4: 3/8” breaker bar to loosen the auto tensioner

- Pull in the slider pulley to remove the drive belt slack as shown in Photo 19-5 while tightening the slider pulley adjustment bolt using a 10 mm wrench.

- Adjust the belt tension slider pulley. Watch for the auto tensioner to start moving and continue until the tensioner pulley moves about 1/4” (6 mm). On the long section of the belt the belt tension takes about 20 ft. lbs. of force to push about a 1/4 inch (6 mm).

- Tighten the slider pulley with the 14 mm wrench as shown in Photo 19-6.

- Tighten the jam nut on the slider pulley adjuster with a 10 mm wrench a shown in Photo 19-7.

Photo 19-5: Taking up the slack with the adjustment bolt

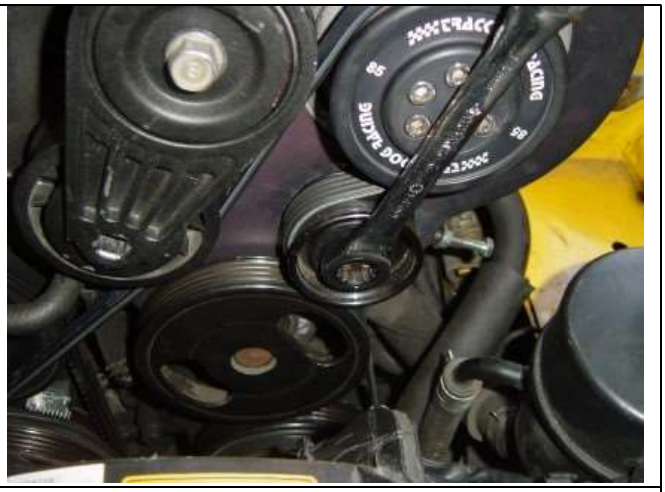


Photo 19-6: Tighten slider pulley with 14 mm wrench

Photo 19-7: Lock jam nut when complete

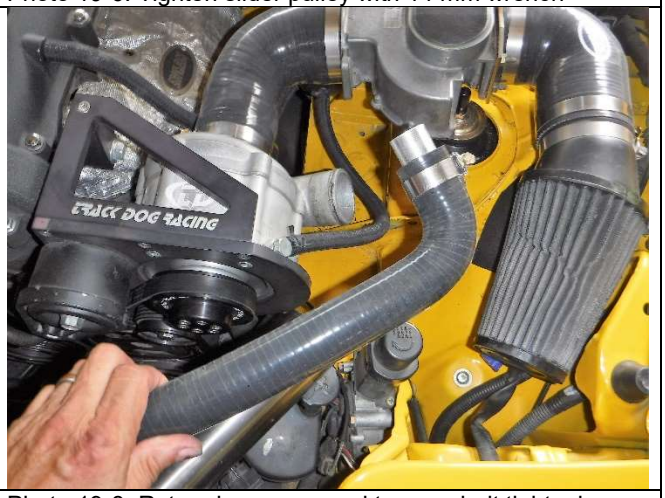


Photo 19-8: Return hose removed to ease belt tightening

- Adjusting the drive belt is easiest if you will remove the return air hose from the BOV or supercharger intake hose and bend the hose out of the way of the tensioner bolt area as shown in Photo 19-8.
- The drive belt stretches throughout its life. Check the belt tension often.
- The 6-rib setup requires replacing the crank pulley with our aluminum 6-rib crank pulley. Remove the alternator belt and then the four M6 bolts from the pulley. Install the new aluminum.

8

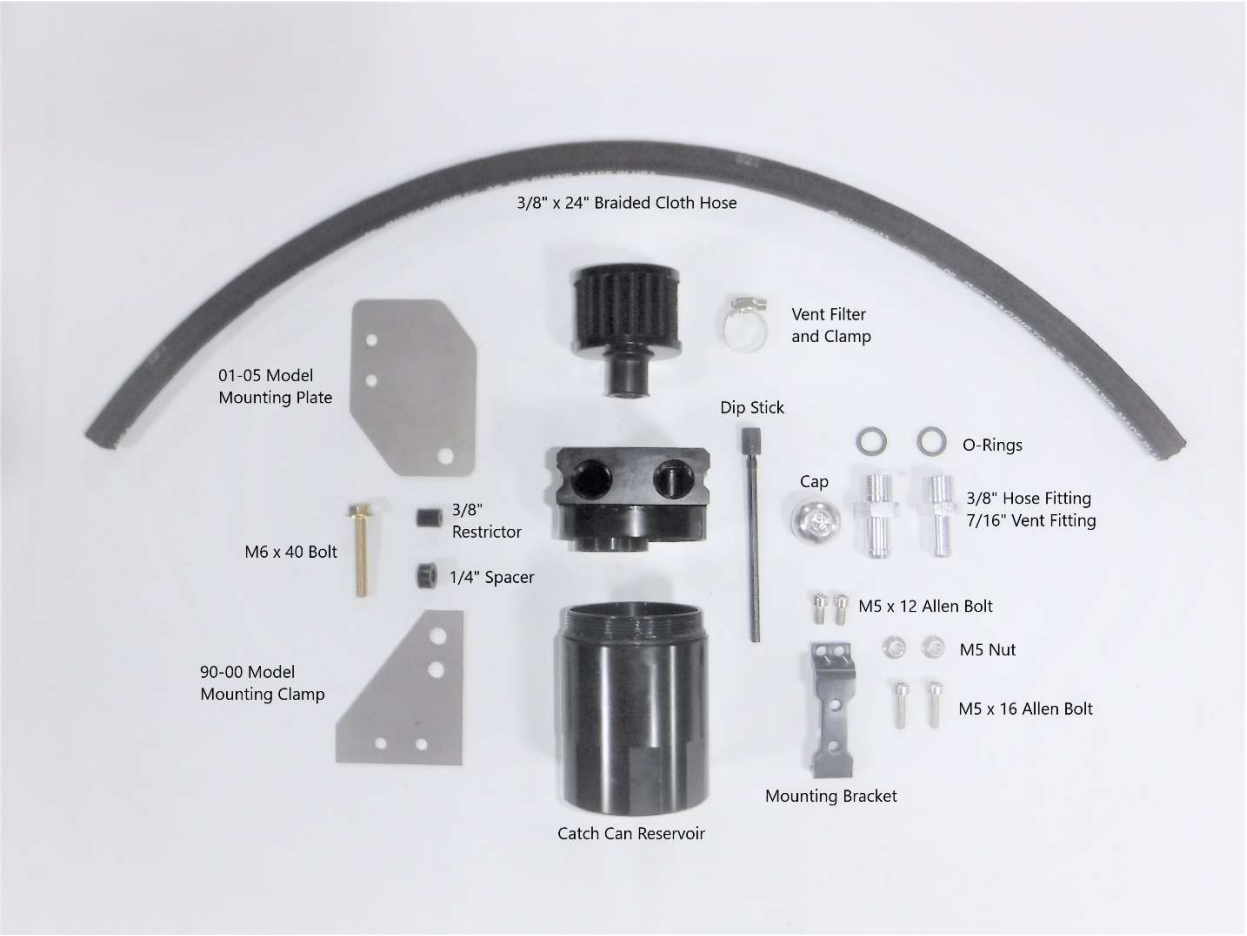
Photo 18-9: 6-rib crank pulley

Photo 18-10: 6-rib setup installed

STEP 20: INSTALLING THE CATCH CAN

Your crank case builds up high pressure with RPMs and with high boost. The breather hose relieves this pressure normally back into the intake track. We do not want oil vapor being sucked into the supercharger and into the intercooler as this will reduce cooling efficiency. For this reason we include an oil catch can. The catch can is open to atmosphere through a cleanable filter. At boost levels of 10-12 PSI you should see little to no amounts of oil accumulation. On a track day you may see some accumulation, this is normal.

Hardware Package R6



20.1 Preparing the Catch Can

The catch can needs to have the aluminum barb fittings, mounting plate and filter installed.

- Remove the plug on top using an 8 mm Allen wrench as shown in Photo 20-1. There is an O-ring on the plug, be careful not to lose it.

- Install the plug into the left threaded port as shown in Photo 20-2.

Photo 20-1: Cap removed from top with Allen wrench

Photo 20-2: Cap installed on left side of catch can

- Locate the 3/8 inch (10 mm) aluminum barb fitting and install an O-ring as shown in Photo 20-3.
- Install the barb fittings on the side port as shown in Photo 20-4.
- Locate the 7/16 inch (12 mm) aluminum barb fitting and install an O-ring as shown in Photo 20-3.
- Install the barb fittings on the top port as shown in Photo 20-4.

Photo 20-3: 3/8” hose fitting with O-ring

Photo 20-4: 3/8” hose fitting front, 7/16” hose fitting top

- Remove the mounting clamp using a 4 mm Allen wrench as shown in Photo 20-5.
- Determine which location you are going to mount the catch can. The triangle mounting bracket is angled to the left for the brake booster mounting as shown in Photo 20-7.
- Install the SS plate onto the mount using the 5 mm Allen bolts supplied with the nuts on the outside as shown in Photo 20-6.
- Reinstall the mounting clamp use the two M5 bolts with the 4 mm Allen wrench as shown in Photo 20-7.
- Install oil filter on the top barb fitting using the clamp supplied to secure as shown in Photo 20-8.

Photo 20-5: Mounting clamp removed

Photo 20-6: Clamp mounted to SS plate

Photo 20-7: Mounting clamp installed with SS plate

Photo 20-8: Oil filter installed

20.2 Installing Catch Can on the Proportioning Valve

Installing the catch can on the proportioning valve offers more room to remove the bottom reservoir for draining. The 90-93 Miata uses only one bolt to hold the proportion valve to its mount, otherwise mounting is the same for all years.

- Remove the lower M6 bolt on the proportioning valve using a 10 mm wrench as shown in Photo 20-9.
- Locate the supplied M6 x 40 mm bolt and ¼ inch spacer as shown in Photo 20-10.
- Install new bolt and spacer onto the bracket mounted on the catch can and install into the proportioning valve as shown in Photo 20-10.
- The catch can bracket has two mounting holes. Use the hole closest to the catch can as the first option. This will bring the catch can further inwards as shown in Photo 20-11.
- Straighten the catch can and tighten the M6 bolt as shown in Photo 20-12.

Photo 20-9: Proportioning valve location

Photo 20-10: Spacer on proportioning valve

Photo 20-11: Catch can mounted to inside hole

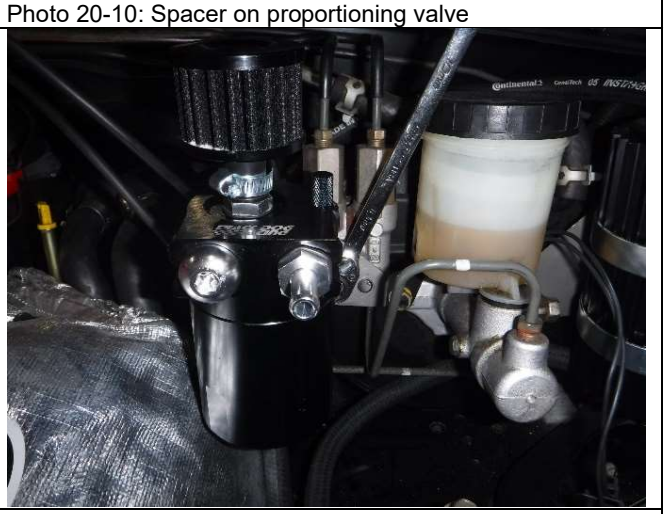


Photo 20-12: Catch can installed

20.3 Installing the Cloth Braided Hose

The cloth braided hose is 24 inches in length and expected to be cut to length per your installation.

- Lay out the braided hose and cut to length using a knife cutter to fit between the valve cover and the catch can port.
- After trimming the braided hose to length, consider burning the frayed threads with a cigarette lighter as shown in Photo 20-13.
- Locate the black plastic restrictor (white in the photo) included in the kit. Press the restrictor into the end of the braided hose closes to the valve cover port as shown in Photo 20-14.
- Press the braided hose onto the catch can and on to the valve cover port as shown in Photo 20-15. Lube hose if necessary.
- Make sure the braided hose is not in a position where it can get damaged from heat.

Photo 20-13: Burn fraying on the hose end

Photo 20-14: Restrictor fitting being installed

Photo 20-15: Press breather hose onto the valve cover fitting

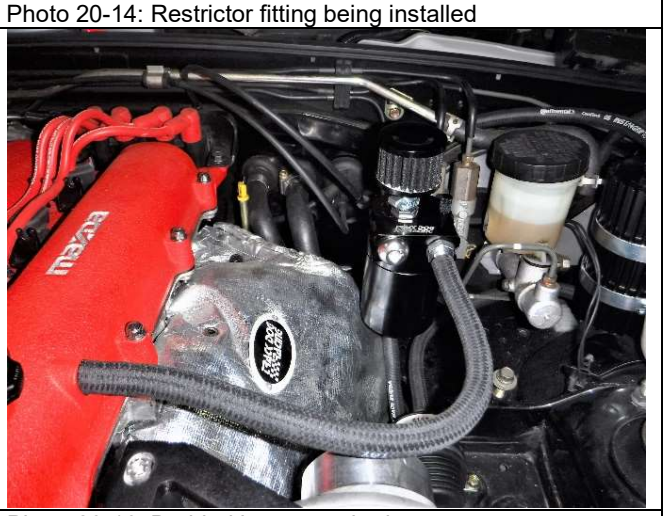


Photo 20-16: Braided hose attached

20.4 Servicing the Catch Can

As your crank case increases in RPMs the crank case pressure increases. Normally only oil vapor comes through to the catch can. However, in high boosted applications and or weak cylinder rings, this will increase crank case pressures and push excessive oil into the catch can.

- The catch can oil level can be checked by unthreading the oil dip stick as shown in Photo 20-17.
- The marks on the dip stick help show the level as shown in Photo 20-18.
- The bottom reservoir unthreads from the base as shown in Photo 20-17. There is an O-ring at the threaded section to seal the reservoir.
- Depending on where the catch can is mounted, you may not have an easy access to removing the reservoir. In this case you would have to unbolt the unit to empty. If your forced induction setup pushes a lot of oil into the catch can then consider changing the location for easier accessibility.
- The oil filter can be removed and cleaned with any cleaning solvent.

	
Photo 20-17: Catch can reservoir and dip stick removed	Photo 20-18: Dip stick oil level marks

STEP 21: 90-93 MODELS

INSTALLING THE INTERCOOLER AND SUPERCHARGER PIPING

Go to STEP 22 for 94-97 model intercooler and supercharger piping installation.

The intercooler should be installed at this time. The piping installation is similar on all year models. Majority of the applications will use our TDR Fuel and or Timing control for fuel management. This will require the use of your Airflow AF unit for the 90-93 models or the Mass Air Flow MAF unit for 94-97 models.

If you are going to use a Standalone fuel management setup such as our Mega Squirt PNP then we suggest you keep the recirculating section of the BOV. The BOV can be vented to atmosphere, but under vacuum it still leaks to atmosphere so suggest venting back to the inlet. We have different silicone hoses for this setup, but you can also modify your existing hoses.

Hardware Package A5

21.1 Installing the Intercooler Hoses

The intercooler uses two silicone hump hoses as it allows for additional movement due to engine torque. The clamps provided on each hose are sized properly for each hose application. The SS clamps are special lined clamps that do not pinch into the hose and should be the only clamp style used.

- As with ALL hose attachments, use some soapy water to help the hose slide on as shown in Photo 21-3. The soapy water also acts as a sealant when dried.

- Spray some soapy water on the two silicone Hump hoses and install onto the intercooler with clamps (#36). The clamps should be on the front side as shown in Photo 21-2. Press the hose down to wear the intercooler pipe meets the beginning of the hump as shown in Photo 21-2.

Photo 21-1: Hump hose on intercooler

Photo 21-2: Intercooler hump hose clamps facing forward

Photo 21-3: Soapy water applied on pipe

Photo 21-4: Tighten TB clamp first and align

- Install both hoses and tighten the bottom clamps snuggly using an 8 mm nut driver.

21.2 Installing the SS Intake Pipe

- The 90-93 throttle body TB angles downward requiring our intake pipe to have multiple angles. The BOV setup will mount into the idle air hose mounted below the SS pipe.
- We need to install the SS pipe first and align. Start by install the 2 ½" straight silicone hose with two clamps (#40) to the pipe end going to the TB as shown in Photo 21-3.
- Install the SS intake pipe into the intercooler hose and position toward the TB.
- Slide hose over and position up against the TB. Don't fully tighten yet as shown in Photo 21-4.
- Position the radiator cover over the mounting studs as shown in Photo 21-5, but don't install the nuts as you will remove the cover after alignment.
- Align pipe clearance around opening of the radiator cover as shown in Photo 21-5.
- While holding the pipe in position, tighten down the second clamp as shown in Photo 21-6. Tighten both clamps at this time.
- Remove the radiator cover and tighten the clamps on the intercooler outlet as shown in Photo 21-7.

Photo 21-5: Center pipe through opening on radiator cover

Photo 21-6: Tighten clamp while holding in position

21.3 Installing the Blow-Off Valve and Idle Air Hose

Locate the idle hose and two each of the Clamp 10.

- Install the two clamps (#10) to the hose as shown in Photo 21-8.
- With soapy water on the hose, slide the hose onto the idle air unit and intake pipe as shown in Photo 21-8.
- Install the 1” x 3’” hose using two clamps (#16) onto the intake pipe as shown in Photo 21-9.
- Insert the BOV in the position shown in Photo 21-10. After the return air hose is installed, you can tighten the clamps.

Photo 21-7: Tighten clamp on intercooler outlet

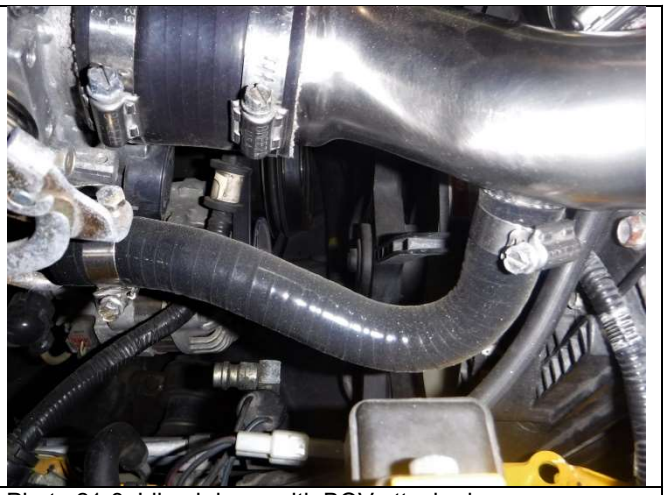


Photo 21-8: Idle air hose with BOV attached

Photo 21-9: 1” x 3” hose installed in intake pipe

Photo 21-10: BOV installed in hose

- Locate the long return air hose that has the double 90. Run it behind the radiator fans and up and over the coolant return hose as shown in Photo 21-11. Install using clamp (#16). Tighten all of the clamps on the BOV location.
- Install the vacuum hose supplied to the BOV and to the intake manifold as shown in Photos 21-12 and 21-13.
- The 1” (25 mm) aluminum fitting was shipped installed into the inlet elbow shown in Photo 21-14. Install a clamp (#16) in the elbow. Make sure the clamp is assessable and tightening.

Photo 21-11: BOV return air flow hose

Photo 21-12: Vacuum hose attached to BOV

Photo 21-13: Vacuum hose attached to intake manifold

Photo 21-14: Rotrex inlet hose with clamp on return fitting

- With a camp (#16) installed on the return air hose, install as shown in Photo 21-15. Do not tighten the clamp until the elbow is attached to the supercharger.

- Squirt soapy water on the intake hose along with clamp (#40 or #48) and then position the intake elbow onto the supercharger inlet. Do not tighten the clamps until all in position with air flow unit.

- Install the Velcro pad to the brake master cylinder as shown in Photo 21-16, this is for rub protection.

Photo 21-15: Inlet hose with return air hose attached

Photo 21-16: Hose adapter mounted to airflow unit

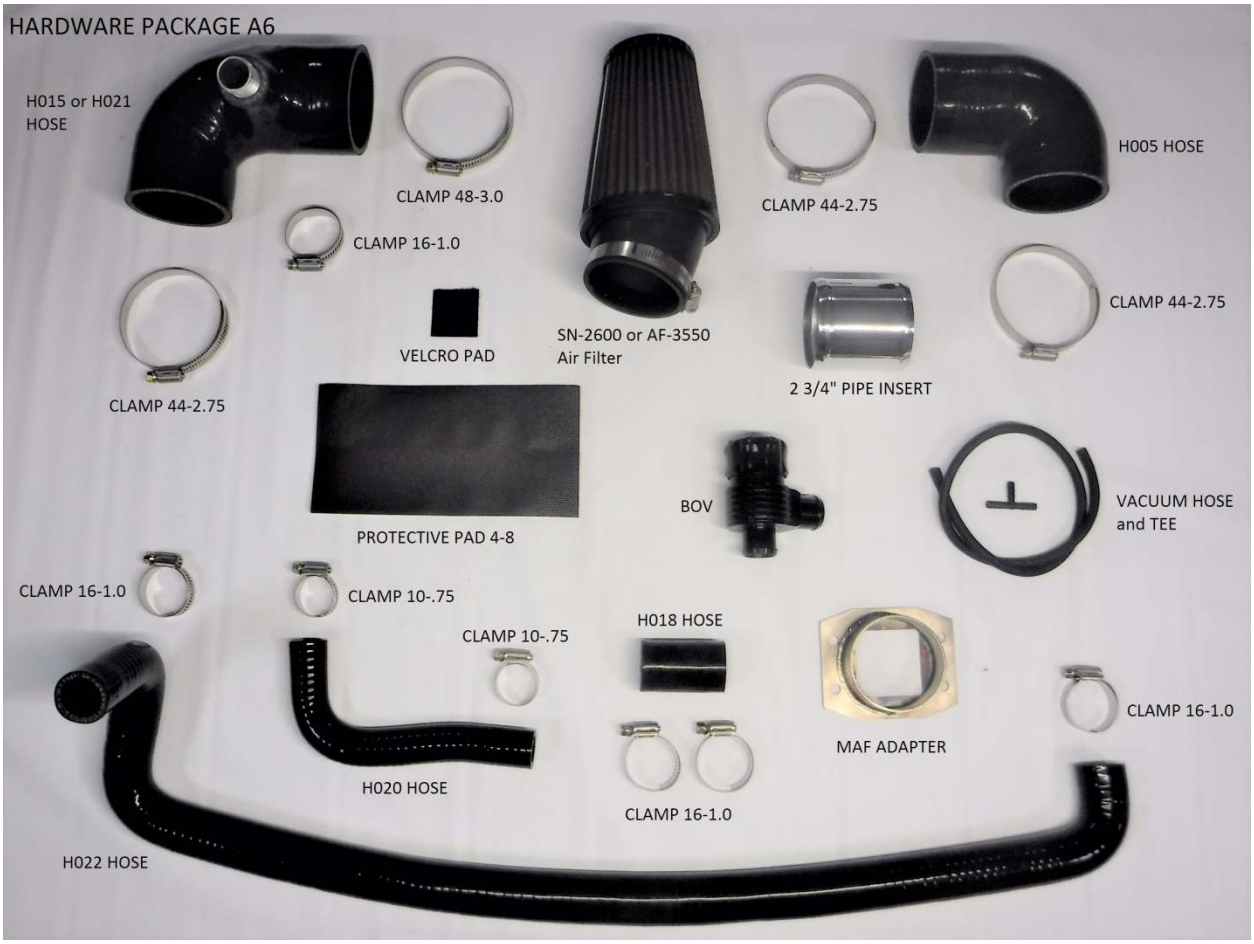
- The 90-03 model uses an airflow unit that requires our metal hose adapter on the inlet side. The air filter arrangement will connect to the metal adapter.

- Keep the gasket that was on the airflow unit and install the new adapter using the 10 mm nuts as shown in Photo 21-16.

21.4 Installing the Intake Setup

The intake hose arrangement consists of two hoses. The 90-93 Airflow unit is rather large. For protection and to reduce contact we have included adhesive backed pads. The clamps provided for each hose are sized properly for each hose application. The SS clamps are special lined clamps that do not pinch into the hose and should be the only clamp style used.

Hardware Package A6



21.5 Protector Pad Installed

There are three different pad locations to be installed. One is a Velcro pad for the brake master cylinder and the larger pad will have a section cut off and installed on the airflow unit and on the fender.

- Install the Velcro pad to the end of the brake master cylinder as shown in Photo 21-17. Make sure the surface is clean.

- A 4” x 8” (101 x 202 mm) protective pad with adhesive tape is supplied to attach to the fender and to the Airflow unit as shown in Photos 21-18 and 21-19.

- Cut about a 1” (25 mm) length off the long section of the protective pad to install on the airflow unit as shown in Photo 21-18.
- Apply the protective pad to the airflow unit and apply pressure as shown in Photo 21-19. Make sure the surface is clean.
- For tall threaded shock shafts, add the rubber cap supplied as shown in Photo 21-20.

Photo 21-17: Velcro pad installed on brake master cylinder

Photo 21-18: Protective pad to be installed on Airflow unit

Photo 21-19: Protective pad installed on airflow unit

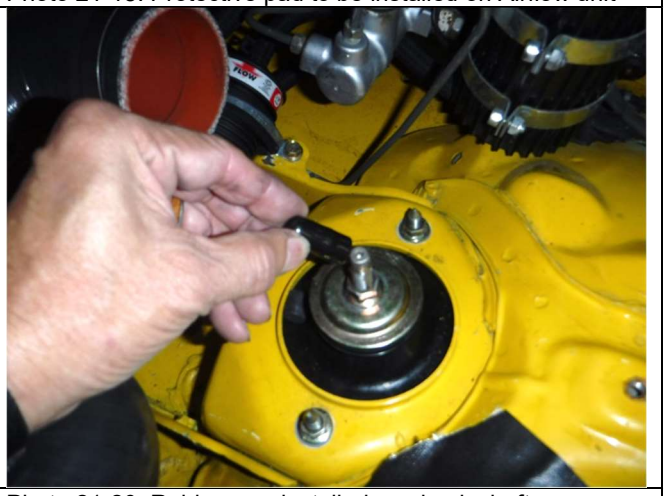


Photo 21-20: Rubber cap installed on shock shaft

Photo 21-21: Airflow unit with rubber cap installed

Photo 21-22: Fender area to install protective pad

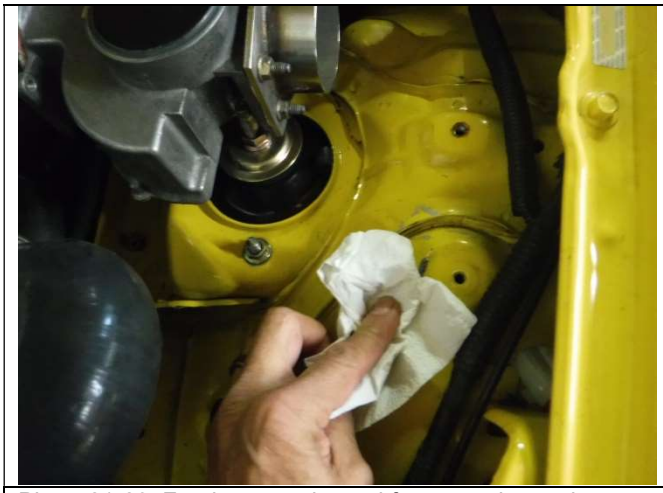


Photo 21-23: Fender area cleaned for protective pad

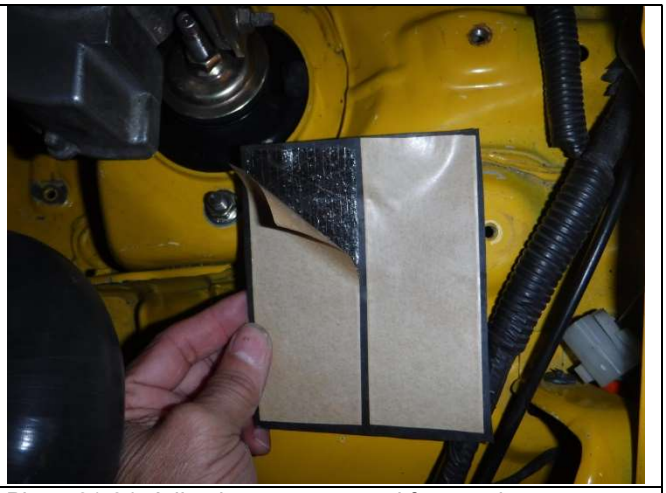


Photo 21-24: Adhesive tape removed from pad

- Use the additional protective pad section to attach to the fender area as shown in Photos 21-22.
- Clean surface of the fender to improved sticking of the adhesive tape as shown in Photo 21-23.
- The pad adhesive tape is sticky and does not pull off easily. When you are prepared to attach to the fender, confirm position and press firmly while conforming to the fender as shown in Photo 21-25.
- Photo 21-26 shows the clamps and filter resting on the protective pad.

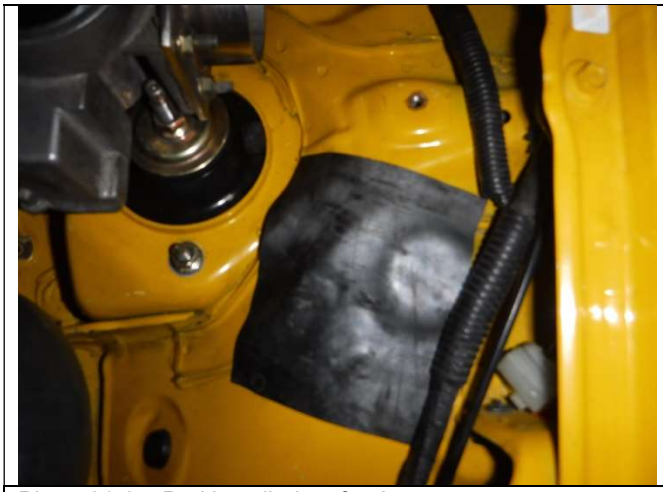


Photo 21-25: Pad installed on fender

Photo 21-26: Air filter and clamps resting on protective pad

- If you need to remove the protective pad, the adhesive glue may stick to the fender surface. Use WD-40, Goof-Off or some other oil penetrate to soften the glue. Afterwards use a cleaner such as paint thinner or brake cleaner to remove the residue followed by soapy water.
- Install the airflow unit into the 90 degree hose on the Rotrex inlet as shown in Photo 21-27. Position clamps (#40 and #44) as shown, but don't tighten until air filter setup is installed.
- Install the 90 degree hose onto the airflow unit with clamps (#44). The shorter end installs onto the airflow unit as shown in Photo 21-28.
- Install pipe insert into 90 degree hose and tighten down as shown in Photo 21-28.
- Install air filter over pipe insert and rotate as required for clearance as shown in Photo 21-28.

Photo 21-27: Airflow unit installed into the intake hose

Photo 21-28: Pipe insert in 90 degree hose

- Air filter should be low as shown in Photo 21-29. Adjust as necessary and tighten all of the intake clamps.

- For standalone fuel management system that eliminate the MAF unit, we have a custom intake setup using a 3 in (76 mm) silicone hose and K & N filter as shown in Photo 21-30.

Photo 21-29: Check for clearance and tighten

Photo 21-30: Intake with no MAF unit requiring standalone fuel management

Photo 21-31: Rotrex outlet hose installed

Photo 21-32: Radiator cover temporarily installed for alignment

21.4 Installing the SC Outlet Setup

Install the Rotrex SS outlet pipe and hose. Use soapy water on the pipe to aid the silicone hose installation.

- Slide the long side of the 135 degree hose over the pipe with lose clamps (#36) as shown in Photo 21-31.
- Install the flared end of the SC outlet pipe into the intercooler hose and position toward the supercharger as shown in Photo 21-31.
- With all connections loose, temporarily install the radiator cover as shown in Photo 21-32.
- Adjust for alignment and tighten down the silicone hose at the Rotrex outlet and at the pipe section.
- Remove the radiator cover and tighten the clamps on the intercooler as shown in Photo 21-33.
- If both SS pipes are installed and secured, install the radiator cover with the 4 washers and 4 acorn nuts using a 10 mm wrench as shown in Photo 21-34.

Photo 21-33: Tighten clamps at intercooler

Photo 21-34: Install radiator cover

STEP 22: 94-97 MODELS

INSTALLING THE INTERCOOLER/SUPERCHARGER PIPING

Go to STEP 21 for 90-93 model intercooler/supercharger pipe installation.

The intercooler should be installed at this time. The piping installation is similar on all year models. Majority of the applications will use our TDR Fuel and or Timing card for fuel management. This will require the use of your Airflow unit for the 90-93 model or the Mass Air Flow MAF unit for 94-97 models.

Hardware Package A7

When using this setup you must use a recirculating blow off valve BOV for proper idling.
If you are going to use a standalone fuel management setup such as our Mega Squirt PNP then we suggest you keep the recirculating section of the BOV. The BOV can be vented to atmosphere, but under vacuum it still leaks to atmosphere so suggest venting back to the inlet. We have different silicone hoses for this setup, but you can also modify your existing hoses.

22.1 Installing the Intercooler Hoses

The clamps provided on each hose are sized properly for each hose application. The SS clamps are special lined clamps that do not pinch into the hose and should be the only clamp style used.

- As with ALL hose attachments, use some soapy water to help the hose slide on as shown in Photo 22-3. The soapy water also acts as a sealant when dried.

- Spray some soapy water on the two silicone Hump hoses and install onto the intercooler with clamps (#36). The clamps should be on the front side as shown in Photo 22-2. Press the hose down to wear the intercooler pipe meets the beginning of the hump as shown in Photo 22-2.

- We need to install the SS pipe first and align. Start by install the 2 ½" straight silicone hose with 2 clamps (#40) to the pipe end going to the TB as shown in Photo 22-4.

- Install the SS intake pipe into the hose on the intercooler and position toward the TB as shown in Photo 22-4.

Photo 22-1: Hump hose on intercooler

Photo 22-2: Intercooler hump hose clamps facing forward

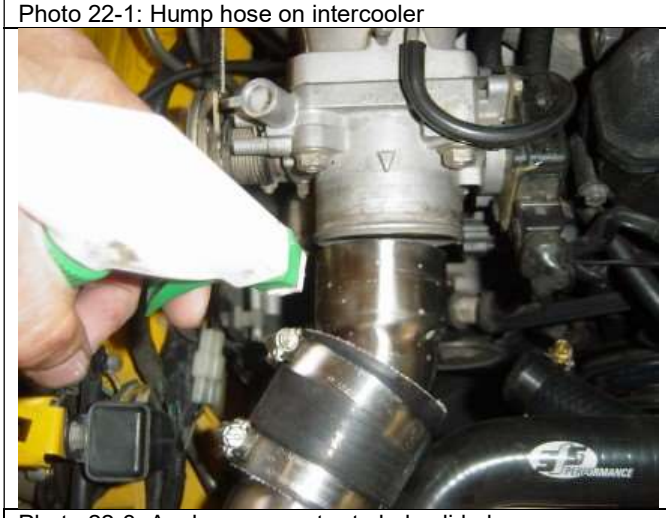


Photo 22-3: Apply soapy water to help slide hose on

Photo 22-4: Clamp tightened at throttle body

- Slide hose over and position up against the TB. Don't fully tighten yet as shown in Photo 22-4.

- Position the radiator cover over the mounting studs as shown in Photo 22-5, but don't install the nuts as you will remove after alignment.

- Align pipe clearance around opening of the radiator cover as shown in Photo 22-5.

- While holding the pipe in position, tighten down the second clamp as shown in Photo 22-6. Tighten both clamps at this time.

- Remove the radiator cover and tighten down the clamps on the intercooler outlet as shown in Photo 22-7.

Photo 22-5: Align pipe for good clearance

Photo 22-6: Clamp tightened after alignment

Photo 22-7: Tighten intercooler clamp

Photo 22-8: Idle air hose with clamps

- Locate the idle hose as shown in Photo 22-8. Install the two clamps (#10) to the hose as shown in Photo 22-8.
- Align clamps so they will be assessable for tightening.
- Install the idle hose to the TB as shown in Photo 22-9 adjust and tighten.
- Install idle hose on to intake pipe as shown in Photo 22-10 and tighten.

Photo 22-9: Clamp tightened at throttle body

Photo 22-10: Clamp tightened at pipe

22.2 Installing the BOV Return Hose

Locate the BOV return hose as show in Photo 22-12. The hose can be installed with either end to the BOV.

- Install clamp (#16) on the 1 in. x 3 in. (25 x 75 mm) return hose section on the intake hose as shown in Photo 22-11.

- Attach the Return hose to the BOV using the clamp (#16) provided as shown in Photo 22-13. Position the clamps for easy access. Do not tighten completely until you are satisfied with the alignment.

Photo 22-11: BOV hose installed to intake pipe

Photo 22-12: Return hose for BOV

- Locate the Rotrex intake 90-90 degree hose. The larger end 3 in. (75 mm) installs into the Rotrex intake. Use clamp #44 in the SC end and clamp #40 on the MAF end as shown in Photo 22-15.

- Attach a small pipe clamp (#16) onto the 1" (25 mm) fitting below the hose as shown in Photo 22-16. Make sure the aluminum insert is about half way in and then tighten the clamp.

- Insert the return hose with clamp (#16) onto the Rotrex intake fitting as shown in Photo 22-16. Do not tighten completely until you are satisfied with the alignment.

Photo 22-13: BOV installed in the return hose

Photo 22-14: Return hose with clamp

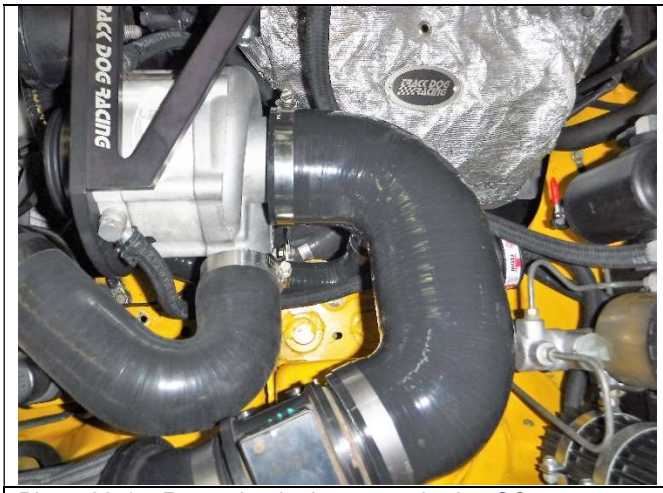


Photo 22-15: Rotrex intake hose attached to SC

Photo 22-16: Return hose attached to Rotrex intake hose

- Install the BOV into the short hose mounted into the intake as shown in Photo 22-17. Align the return hose setup and tighten the clamps as shown in Photo 22-18.
- If necessary, use tie-wraps to secure the return hose to the fan shroud as shown in Photo 22-19.
- The BOV uses a small vacuum hose that will be attached to the intake. We usually attach to the front vacuum fitting as shown in Photo 22-20. We also supply a Tee fitting in case this vacuum port is being used. Attach the vacuum hose to the BOV as shown in Photo 22-18.

Photo 22-17: BOV inserted into intake hose

Photo 22-18: Clamps tightened on the BOV

Photo 22-19: Return hose tie-wrapped to fan area

Photo 22-20: Vacuum hose attached to intake and BOV

22.3 Installing the Intake Setup

The 94-97 model uses more common and efficient mass airflow MAF setup.

Hardware Package A8

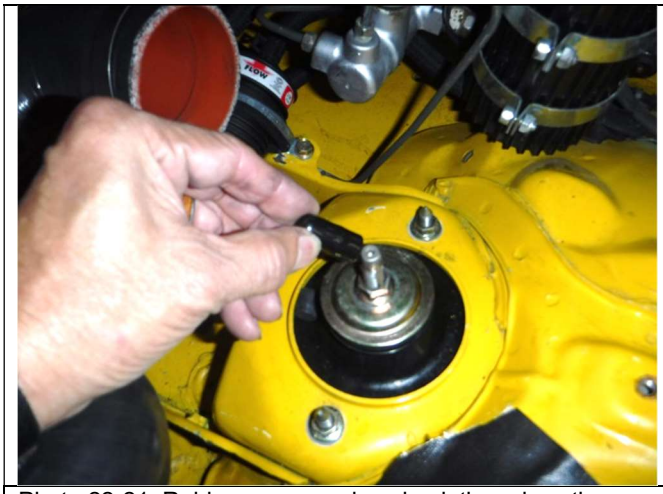
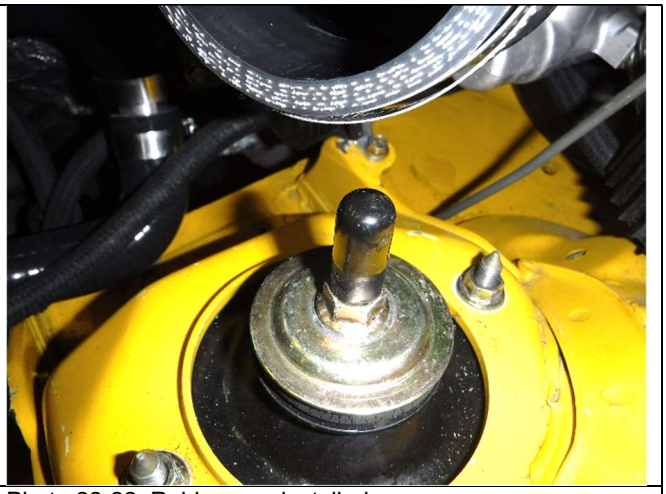
	

Photo 22-21: Rubber cap covering shock thread section	Photo 22-22: Rubber cap installed

- Some front shocks have a tall threaded shaft extending higher than stock height. Use the rubber cap supplied or from the catch can hose attachment. This cap slides over the threaded section as shown in Photo 22-22 and can be removed for adjusting. Keep the rubber cap height to a minimum.

- Mount the mass airflow MAF unit to the intake hose with clamp #40 and lightly tighten. Be sure to mount in the proper air flow direction, smaller end towards filter as shown in Photo 22-24.

- Mount the air filter onto the MAF using the air filter clamp provided as shown in Photo 22-25.

- Rotate the air filter as required for clearance as shown in Photo 22-26. View the filter and hose arrangement from the fender.

- Tighten all the clamps on the supercharger intake setup.

- For standalone fuel management system that eliminate the MAF unit, we have a custom intake setup using a 3 in (76 mm) silicone hose and K & N filter as shown in Photo 22-27.

Photo 22-23: 90-90 intake hose

Photo 22-24: Adhesive tape removed from pad

Photo 22-25: Air filter installed on to MAF unit

Photo 22-26: Air filter clearance

22.4 Installing the SC Outlet Setup

Install the Rotrex SS outlet pipe and hose. Use soapy water on the pipe to aid the silicone hose installation.

- Slide the long side of the 135 deg. hose over the pipe with lose clamps (#36) as shown in Photo 22-28.

- Install the flared end of the SC outlet pipe into the intercooler hose and position toward the supercharger as shown in Photo 22-30.

- With all connections loose, temporarily install the radiator cover as shown in Photo 22-29.
- Adjust for alignment and tighten down the silicone hose at the Rotrex outlet and at the pipe section.
- Remove the radiator cover and tighten the clamps on the intercooler as shown in Photo 22-30.
- If both SS pipes are installed and secured, install the radiator cover with the 4 washers and 4 acorn nuts using a 10 mm wrench as shown in Photo 22-31.

Photo 22-27: Intake with no MAF standalone fuel setup

Photo 22-28: Rotrex outlet hose installed

Photo 22-29: Radiator cover temporarily installed

Photo 22-30: Tighten clamps at intercooler

Photo 22-31: Install radiator cover

Photo 22-32: Left blank

STEP 23: CRUISE CONTROL AND DIAGNOSTIC BOX

Due to the 90-93 large Airflow unit and the silicone hose arrangement, we are not able to provide enough clearance to reinstall the cruise control. If you were to upgrade to a Standalone fuel management such as our Mega Squirt PNP, you can eliminate the airflow unit and provide additional fender space.

Hardware Package A9

- The 94-97 uses the smaller mass air flow MAF setup. This silicon hose arrangement provides the needed space to relocate the cruise control. You can also eliminate the cruise control all together. If eliminating the cruise control you can leave the throttle cable and tie-wrap under the brake boost area.

- Remove the throttle cable using an open 10 mm wrenches. Only loosen the front nut as shown in Photo 23-2. Leaving the back nut alone will provide proper throttle cable tension when and if you reinstall to the new location.

- Remove the rubber boot on the front by gently squeezing and pulling away from the housing as shown in Photo 23-3.

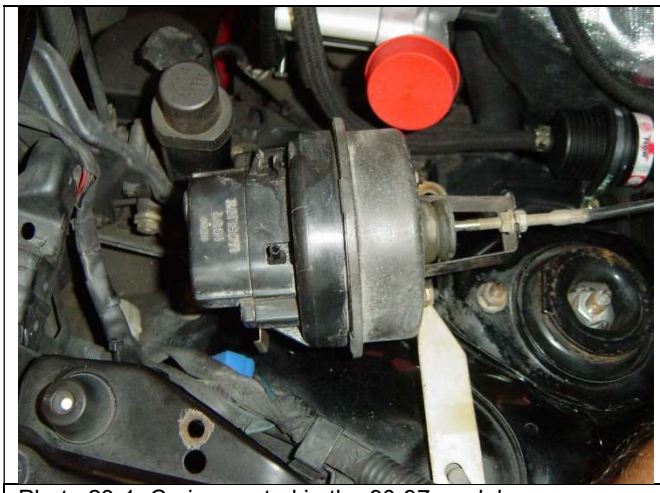


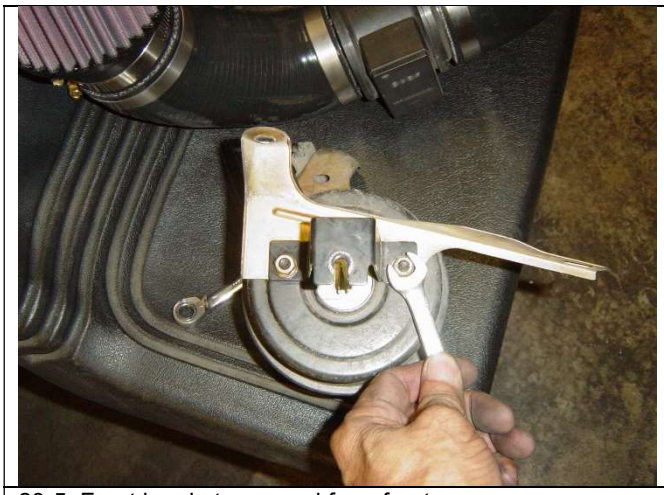
Photo 23-1: Cruise control in the 90-97 model

Photo 23-2: Throttle cable nut loosened

Photo 23-3: Boot removed from cruise control housing

Photo 23-4: Throttle cable removed from cruise control

- Pull the throttle cable ball end out of the cruise control as shown in Photo 23-4.
- If you are Not going to reinstall the cruise control then you do not need to continue further with the instructions.
- Remove the front bracket as shown in Photo 23-5. Using a 10 mm wrench, remove both nuts. Pull the throttle cable mount off to remove the bracket and then reinstall as shown in Photo 23-6.



23-5: Front bracket removed from front

Photo 23-6: Cable support reinstalled

Photo 23-7: Back bracket removed cruise control

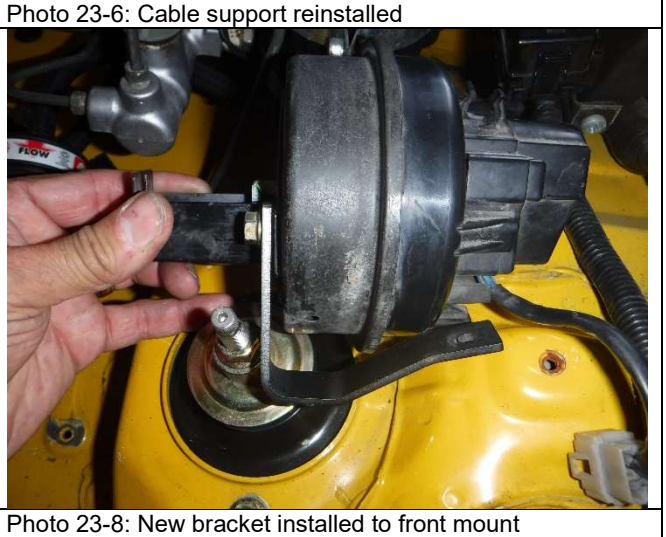


Photo 23-8: New bracket installed to front mount

- Remove the rear bracket using a Phillips screwdriver as shown in Photo 23-7.
- Remove the nut on the front, left side of the cruise control to install the TDR bracket as shown in Photo 23-8. The bracket needs to be installed on the fender before installing on the cruise control unit.
- Install The TDR cruise control bracket and diagnostic box bracket to the fender using a M6 x 12 mm bolt as shown in Photo 23-9.
- Install diagnostic box bracket on top.
- You can install the diagnostic box before or after the cruise control unit is installed

Photo 23-9: Bracket installed on fender

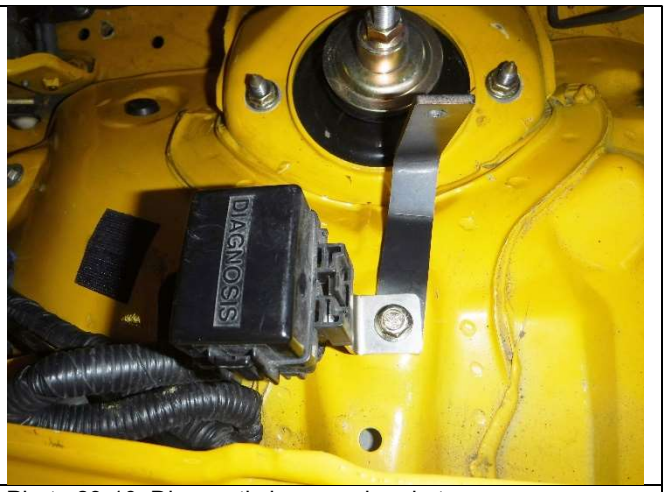


Photo 23-10: Diagnostic box new bracket

- With the front left nut removed install the cruise control unit under the fender. Place the stud through the bracket hole and install the nut as shown in Photo 23-11.
- Reinstall the cruise control cable in the reverse order of its removal.
- Reroute the vacuum line around the firewall area. You may need to buy more vacuum line to complete the cruise control relocation. Plug in the electrical connection.
- If using the new L-bracket without cruise control, bolt down to the fender using a M6 x 20 mm bolt as shown in Photo 23-12.

Photo 23-11: Diagnostic box installed on mount with cruise

Photo 23-12: 94-97 model diagnostic bracket without cruise

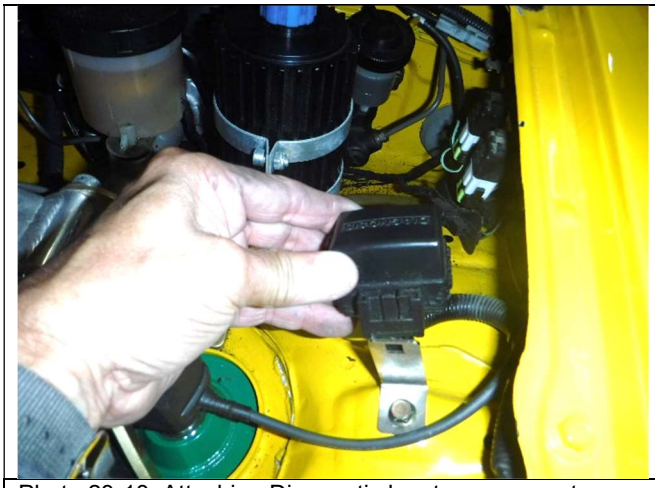


Photo 23-13: Attaching Diagnostic box to new mount

Photo 23-14: 90-93 model diagnostic box tied back

- Attach the diagnostic box as shown in Photo 23-13.
- The 90-93 diagnostic box will need to be tie-wrapped to another harness to allow clearance for the intake setup as shown in Photo 23-14.
- To clean up the wiring you can disconnect the air bag and move it under the fender area and tie-wrap the bundle. This will increase additional air filter clearances.

STEP 24: INSTALLING THE ROTREX SUPERCHARGER OIL

The Rotrex SX-150 Supercharger Traction Fluid is a one of kind oil and the only oil that can be used in a Rotrex supercharger. There is not a substitute. A liter cost over $125, so do not drip or waste any fluid. If you need to drain the system, do so into a clean container so that you can reuse the fluid.

When used within specifications, the Rotrex supercharger does not wear due to the traction design that has no metal to metal contact. The life span of a Rotrex supercharger is hundreds of thousands of miles and kilometers, assuming operating conditions are within specifications and recommended oil change frequencies are followed.

The recommended oil and filter change interval for the Rotrex supercharger is 50,000 miles (80,000 km) or two years. I would look at your driving habits as consideration to when you change your oil. One or two track day weekends a year; I would change the oil after two seasons. A daily driver with minimal hard driving perhaps longer, maybe around 3 years. Like changing your motor oil, a rougher environment requires oil changes more often. Be smart and not frugal.

To ensure proper traction fluid circulation and adequate lubrication, it is important to prime the oil system before the engine is started for the first time after the supercharger installation.

NOTE: Measure the oil with the dip stick threaded in. In normal operation, measure the oil when it is warm. There are hash marks on the dip stick to hold oil and makes it easier to read. Oil expands when heated and if checked cold and oil added, it could overflow as it warms up. From cold it takes about 10-15 minutes to warm up. Normal oil level is between the MIN and MAX marks on the dipstick.

Hardware Package R7

- Remove the dip stick from the reservoir and install the funnel as shown in Photo 24-2.
- Fill the reservoir about 3/4 full with the traction fluid or oil. Use the dipstick or a flash light so you can see the level.
- Loosen the banjo bolt a couple of turns at the oil INLET line as shown in Photo 24-3. This will allow air to escape the system.
- The red bulb as shown in Photo 24-4 is used to pressurize the system by pushing oil into the Inlet of the Rotrex supercharger. The rubber grommet has a tube for the bulb to attach to and seal the reservoir.

Photo 24-1: Rotrex oil to be poured into reservoir

Photo 24-2: Reservoir filled about 3/4 to start

Photo 24-3: Hose connector loose for bleeding oil

Photo 24-4: Reservoir pressure fitting with bulb

- Insert the grommet and tube into the top of the reservoir as shown in Photo 24-5. With pressure, turn the grommet to get a good seal. Install the red bulb on to the top.

- Squeeze pressure on the bulb as shown in Photo 24-6. As the bulb collapses, remove from the bulb from the reservoir, allow the bulb to expand and place back on the reservoir. Again squeeze the bulb to apply pressure to the system.

Photo 24-5: Pressure fitting pressed into reservoir opening

Photo 24-6: Pressure applied with the bulb

Photo 24-7: Oil push into Inlet of Rotrex

Photo 24-8: Close up of oil pushed into Rotrex inlet

- As shown in Photo 24-7 and 24-8, the pressurized system should be pushing oil out of the SC INLET fitting. If you are not seeing oil coming out, continue to apply pressure to the bulb.

- As soon as oil seeps out on the Inlet fitting, tighten the fitting with a 14 mm wrench as shown in Photo 24-9.

- Check the oil in the reservoir. To start bring the reservoir up to 3/4 full. Use the dip stick to measure as shown in Photo 24-10.

Photo 24-9: Fitting tightened down after priming

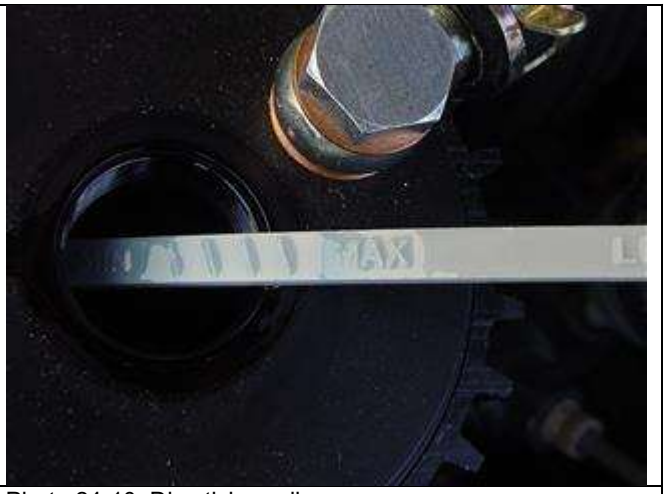


Photo 24-10: Dip stick reading

STEP 25: STARTING THE ENGINE AND PRIMING THE SYSTEM

Before starting the motor we need to replace the spark plugs with one step cooler plug and smaller gap. Your stock spark plugs are the NGK BKR-6E11 or equivalent manufacture. These plugs are gapped at around .040 - .042" gap. Using forced induction you are required to reduce the gap at the electrode to prevent blow out of the flame. We have supplied the NGK BKR6E which are pregapped at .030 - .032".

Forced induction runs richer than normally aspirated engines. Consider replacing the spark plugs yearly. For this reason, using Platinum or Iridium plugs does not benefit enough to pay the much higher expense. Be sure to use anti-seize on the plugs before installing and tighten down properly.

- Start the engine and hold around 2000 RPM. With a flashlight, watch the oil level as it should be dropping slowly. As the level drops, bring the car to an idle.

- Place the funnel back in the reservoir and add more oil, but don't fill more than about 1/2 full.

- Continue monitoring the oil level for about 5 minutes or so. We would estimate you will use a little over 3/4 of the liter of friction oil.

- If you overfill the reservoir, use the bulb unit to suck some oil out. If you remove too much you can always add more.

- Check the oil level regularly with a warm engine. Always keep the oil level between minimum and maximum. Over filling the canister may cause oil to exit the top of the reservoir and too little oil may cause severe damage to the supercharger.

- It is recommended you break-in the Rotrex system a minimum of 65 miles (100 km). During this run-in period, drive the vehicle carefully and avoid unnecessary revving and heavy acceleration. Otherward hop on the freeway and head to the farthest Starbucks, stop and admire your work and head back home. She is ready to be tuned.

- Upon completion, identify any leaks, noise, drive belt alignment, overheating or other faults in the installation. Insure the engine is running properly with the correct air/fuel ratio AFR and ignition timing. Incorrect installation or use of the supercharger can cause severe damage to the product and/or the engine.

If at any time you have questions during or after the installation, please do not hesitate to contact us by phone or by email at support@trackdogracing.com. As the developer of this kit, you should address your questions and comments to us and not the Forums, you will usually get bad information.

We hope you will be proud of your TDR Rotrex supercharger setup and will be proud to show it off.

Thanks again,

Gary Shuhart
Head Dog

'90-05 Fuel and Timing Control Programming

If you have purchased out TDR Rotrex supercharger and are using our TRD Fuel and or Timing Control your setup is preprogrammed. However, we would strongly recommend you read these instructions to better understand how the controls work.

TDR Fuel Control Capability

The TDR Fuel control is capable of controlling fuel injectors up to about 50% larger then stock. The 90-97 Miata uses a return fuel system and limits the fuel to about 43 PSI. The 90-93 Miata with the 1.6 engine comes with 190 cc/43 PSI. We use up to 310 cc injectors in this setup. Using the larger injectors will run a little rich at idle due to the Batch Fired Injector setup (fires two injectors at a time) but, will be adequate up to about 13 PSI. This does require our TDR Fuel pump 190 LPH if you are running 8 PSI or higher. For boost levels of around 6 PSI or lower, usually non-intercooled, your stock injectors and stock fuel pump will be adequate.

The 94-97 Miata with the 1.8 engine uses 230 cc/43 PSI. We limit our injector size to 335 cc. The 94-05 Miata injectors are Sequential meaning they fire individually. This improves idle over Batch firing. This will also provide power levels up to 12 PSI. You do require our TDR Fuel pump 190 LPH if you are running 7 PSI or higher. For boost levels of around 7 PSI or lower, usually non-intercooled, your stock injectors and stock fuel pump will be adequate.

The 99-05 Miata fuel system uses a Non-Return fuel system. This setup uses fuel pressure of around 56 PSI. Injector industry standard rate injectors at 43 PSI. The 99-00 Miata injectors are rated at 230 cc/43 PSI, but at 56 PSI they are around 260 cc. The 01-05 models injectors are rated at 260 cc/ 43 PSI, but at 56 PSI they are rated at around 290 cc. The 99-00 models we limit injectors to 335 cc. The 01-05 models we limit injectors to 350 cc. This will provide power levels of up to 12 PSI. You do require our TDR Fuel pump 190 LPH if you are running 8 PSI or higher. For boost levels of around 7 PSI or lower, usually non-intercooled, your stock injectors and stock fuel pump will be adequate.

Measuring Air Fuel Ratio

The TDR Fuel control comes preprogrammed for boost levels of around 6 PSI. Our TDR Rotrex setup will be programmed for its own application. The 90-05 Miata comes standard with a Narrow Band Oxygen (O2) sensor to control the engines proper air fuel ratio (AFR). This uses a low voltage, 0-1 Volts signal to feedback the engine management (ECU). At idle and cruising the voltage signal is around 0.7 Volts. This sensor is mounted into the exhaust and measures the burnt gas ratio to properly control the fuel intake.

Below 4200 RPM the engine is in Closed Loop meaning it uses the O2 sensor to maintain 14.7 AFR. This is known as Stoic ratio and has been determined to be the best fuel to air ratio that admits the least carbons and produces the best gas mileage. At idle and cruising you will see around 14.0-15.0 AFR ratio.

The narrow band O2 is not accurate enough to use as your AFR for tuning. Therefore, the Wideband 0-5 Volt offers a more accurate signal. In order to adjust the TDR Fuel Card you need to have a wideband AFR reading. A Dyno usual offers a wideband O2 and can adjust the fuel card for optimum AFR.

We also sell the Innovate Wideband unit that has a digital display for accurate readings. Having a wideband allows you to tune yourself and to monitor the proper AFR so you are driving safely under boosted conditions. This gauge requires a bung mounted to the exhaust. If you were going to have only one gauge this would be the most important gauge. You can use a single A-pillar mount option to mount the gauge or add two more gauges such as vacuum/boost and water temperature and use our gauge panels mounted above the radio. Contact TDR for more information.

Understanding the TDR Fuel Control

The Fuel Control (FC) has 5 Modes that are adjustable. The adjustment to the injectors only adds fuel in boost, not when in vacuum such as idle or cruising. Fuel is added by manipulating the voltage signal which intern changes the on/off pulse width of the injectors. As the load changes, meaning the boost increases, the fuel control (FC) will increase the fuel requirement.

There are 8 digits on the FC. Each of the five Modes has a different color arrangement using either one light in the first three Modes or two lights in the last two Modes. If a Mode is to be Off, we call this Zero. Zero is determined by a Fast Flashing One. After you power the FC, you will need to know the difference between a Zero setting and a One setting. On the One light display, a fast flashing 1 equals Zero. A slow flashing 1 equals One. All lights 2-8 will be a slow flashing light. Two lights lit up such as 4-5 equals 4 ½ as shown in Photo 5.

Each time you press the Mode button, you will go to the next Mode and then rotate back to the start. You have about 2-3 seconds when you enter the Mode to make a change. After the time out, the control returns back to ready state. Make sure you know what adjustment you want to make before you enter the Mode. Sometimes the Mode button can be sensitive and skip the next Mode, if this happens continue pressing the Mode.

Photo 1: Mode 1 Green 0-1850 RPM setting

Photo 2: Mode 2 Amber 1850-5500 RPM setting

Photo 3: Mode 3 Red 5500-7000 RPM setting

Photo 4: Mode 4 Green/Blue Load setting

Tuning the TDR Fuel Control

The first 3 modes are for fine tuning. The Mode 1 Green, we do NOT use and should be set on Zero, a fast flashing one. Photo 1 shows the Mode 1 Green on number 1. Below is a quick reference of each Mode.

- Mode 1 Green: 0-1850 RPM. This should be on Zero as you will not use this mode.
- Mode 2 Amber: 2500-5500 RPM. This is the mid range and sometimes we will add 1 or 2.
- Mode 3 Red: 5500-7000 RPM. This is for fine tuning the top end but not used often.
- Mode 4 Green/Blue: This is your main Load setting and should used first to determine your fuel requirement.
- Mode 5 Amber/Blue: This is the throttle tip in setting and adjusted after you have the AFR set up.

Photo 5: Mode 4 Green/Blue

Photo 6: Mode 5 Amber/Blue Throttle tip in setting

To start, make sure Mode 1 through 3 are on Zero. Put the Mode 4 at 6 and do a run watching your AFR. Ideally we want to see around 11.2 to 12 AFR. The higher the AFR the leaner. If you see leaner than 12.2 on acceleration stop at that RPM and add more fuel in Mode 4. Retest again evaluating the AFR. When you add or remove fuel this is across the full RPM range. Here are two common examples.

Example 1:

The AFR reading is around 12.5 below 5500 RPM, but good 11.2-12.0 AFR from 5500 RPM to red line. You can add say 1 ½ to the Mode 2 Amber range which is the mid RPM range and retest.

Example 2:

The AFR reading is around 11.5 until we reach around 6500 RPM and then it gets leaner, say 12.5 AFR. Try increasing the Mode 3 Red say 1 which is a slow flashing One and test again. This will add fuel from 5500 to 7000 RPM range.

Usually you can get close by adjust the Mode 4 Only and by all mean try this first. You don't need a perfect flat fuel curve, just stay between 11.0 and 12.0 AFR. Sometimes fine tuning the RPM Modes will help.

Mode 5 Throttle Tip in- Amber and Blue Light

Once you are good with the AFR you can adjust the 5th Mode which is acceleration or throttle tip in. This function adds additional fuel when you first press the accelerator. Drive in second gear cruising at about 2500 RPM and then floor it. If you feel a delay then adding more fuel will help. Start with maybe a 2 setting. If you add too much fuel it will be sluggish when you floor it. Usually around 1 ½ to 3 is ideal. The Rotrex setup does not usually require any throttle tip in.

TDR Fuel Control Default Settings

The TDR Fuel Card comes preset for boost levels of around 5-6 PSI. As stated above you should consider fine tuning for your application. Below is the preset FC settings based on stock injectors.

Base Fuel Settings

- **90-93 Model 1.6 liter engine**
  Mode 1: Zero, fast flashing one
  Mode 2: Zero, fast flashing one
  Mode 3: Zero: fast flashing one
  Mode 4: 6
  Mode 5: Zero: fast flashing one

- **94-97 Model 1.8 liter engine**
  Mode 1: Zero, fast flashing one
  Mode 2: Zero, fast flashing one
  Mode 3: Zero: fast flashing one
  Mode 4: 6
  Mode 5: Zero, fast flashing one

- **99-05 Model 1.8 liter engine**
  Mode 1: Zero, fast flashing one
  Mode 2: Zero, fast flashing one
  Mode 3: Zero: fast flashing one
  Mode 4: 6
  Mode 5: Zero, fast flashing one

TDR Rotrex Fuel Control Settings

The TDR Rotrex setup uses our custom injectors sized from 310 cc for the 90-93 models and 335 cc for the 94-05 models. These setups run around 10-12 PSI and requires our larger 190 LPH fuel pump. These settings are default, but may require adjusting. If you have a wide band O2 setup, fine tune the fuel control to best meet your application.

- **90-93 Model 1.6 liter engine, 310 cc injectors, 12 PSI**
  Mode 1: Zero, Fast flashing one
  Mode 2: Zero, Fast flashing one
  Mode 3: Zero: Fast flashing one
  Mode 4: 6-7 Light
  Mode 5: Zero: Fast flashing one

- **94-97 Model 1.8 liter engine, 335 cc injectors, 11 PSI**
  Mode 1: Zero, Fast flashing one
  Mode 2: Zero, Fast flashing one
  Mode 3: Zero: Fast flashing one
  Mode 4: 6-7 Light
  Mode 5: Zero: Fast flashing one

- **99-00 Model 1.8 liter engine, 335 cc injectors, 10 PSI**
  Mode 1: Zero, Fast flashing one
  Mode 2: One, Slow flashing one
  Mode 3: Zero: Fast flashing one
  Mode 4: 4-5 Light
  Mode 5: Zero: Fast flashing one

- **01-05 Model 1.8 liter engine, 335 cc injectors, 10 PSI**
  Mode 1: Zero, Fast flashing one
  Mode 2: One, Slow flashing one
  Mode 3: Zero: Fast flashing one
  Mode 4: 4-5 Light
  Mode 5: Zero: Fast flashing one

About Octane

Octane can make a difference in your timing retard settings. The higher the octane number, example 93 verse 89 the colder the fuel. Higher octane fuels burn slower and intern cooler which help lower the combustion temperature. It also takes more energy to burn a higher octane fuel. A stock horsepower Miata has low compression and a lower octane fuel is more efficient at burning and intern will produce better gas mileage. As the compression ratio is increased the combustion temperatures increase. This is why Mazda recommends using 91-93 octane in the 01-05 models. Forced induction also increase combustion temperature which is why we only use 91-93 octane fuel.

Race gas commonly is around 100 octane. Some race engines are subject to higher combustion temperatures either from high compression or high boost levels. If your combustion temperatures go up then your engine temperatures go up and cooling becomes critical. In this case the higher octane fuel is beneficial.

There is a balancing act between octane and timing advance. You don't want to use full race gas in a 15 PSI or lower setup, it is not necessary. Unless you tune specifically for the race octane, you will not see gains in performance. However, for track use we will sometimes add 2 gallons of race gas to our 91-93 octane for a little assurance.

Setting the Base Timing

The 90-97 model timing can be adjusted by turning the Cam Angle Sensor CAS. Factory base timing is 10 degrees as shown in Photo 8. The 99-05 are fixed at 10 degrees and are non-adjustable. You will require a timing light and a M12 wrench to loosen the swivel bolt on the CAS. If you don't have a timing light you can purchase one from any auto parts store. When setting the base timing, you want to jump TEN and Ground GND with a paper clip or other means as highlighted in Yellow in Photo 7.

You want the engine to be warm and the idle to be around 850 RPM, this is Important. If the RPM reads higher, then the base timing will be incorrect. If you require idle adjustment, use a Phillips or flat head screwdriver and adjust the idle screw located on the throttle body. The idle screw is recessed in a small round pocket. The 90-93 TB has a black rubber cap covering it. Search the internet for location of the screw if necessary. If you ever need to test the fuel pump, jump the Fuel Pump F/P and Ground GND with a paper clip as highlighted in Green in Photo 7. Turn the key on and listen for the pump.

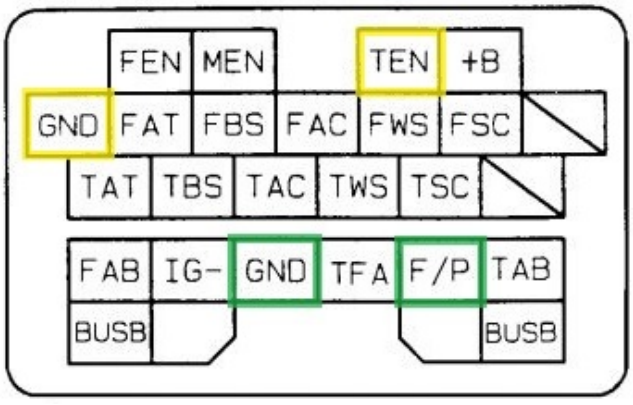


Photo 7: Diagnostic box layout

Photo 8: 10 degree timing mark on pulley. Use left dot

Setting the Timing Retard 90-93 Model Using Your CAS

The TDR Timing Control does not work with the 90-93 model. This model uses what is called an Ignitor setup to control the coils. However, a simple way to retard the timing is by adjusting the Cam Angle Sensor CAS. See how to adjust above. Below is a recommended retard settings. This works as well for the 94-97 models without our TDR Timing Control. The following are recommended settings for 91 and 93 octane set as your base timing. International customers with higher octane fuel can retard less.

• 5-7 PSI and Non-intercooled	91 Octane 7 deg., 93 Octane 8 deg.
• 6-8 PSI Intercooled	91 Octane 9 deg., 93 Octane 10 deg.
• 8-10 PSI Intercooled	91 Octane 7 deg., 93 Octane 8 deg.
• 10-12 PSI Intercooled	91 Octane 6 deg., 93 Octane 7 deg.
• 12-14 PSI Intercooled	91 Octane 5 deg., 93 Octane 6 deg.

Tuning the TDR Timing Control

The TDR Timing Control is for 94-05 models only. We have a new program we are using on the timing control. We will refer to them as TC1 before 11/1/15 and TC2 after 11/1/15. Because we have a lot of the TDR Fuel and Timing Controls in the field, we want customers to be able to tune either one with minimal ease. The one difference in the programming is the TC1 uses a fixed RPM timing retard setup where the TC2 retards timing based on boost and also add fixed RPM settings for additional timing retard.

We also changed the indicating lights relating to the timing retard per degree. The TC1 has 2 degrees retard indicated by 1 light on the display for a maximum of 15 degrees retard. The TC2 has 1 degree retard indicated by 1 light on the display for a maximum of 8 degrees retard. Always start with a base timing of 10 degrees.

TC1 Timing Control-Programmed Before November 1, 2015

The TC1 works similar to the fuel control in programming, but with 4 settings. The Mode 1 Green, low RPM is not used and inactive. We use Mode 2 Amber and Mode 3 Red to adjust timing retard. Mode 4 Green/Blue is not used. Mode 2 is for 2500-5500 RPM range and Mode 3 is for 5500 to 7000 RPM range. There are 8 lights. Each light indicates 2 degrees of timing retard. So example, if we set Mode 2 to 2 you are retarding 4 degrees. If you set the Mode 2 to lights 2 and 3 that equals 2 ½ or times 2 for 5 degrees retard. This is based on 10 degree base timing. Always listen for detonation, if you hear it retard one more degree or light and test.

In a Non-Intercooled setup, with a maximum of 7 PSI you should use higher settings around 2 lights (4 degrees) in Mode 2 Amber and 2 lights (4 degrees) in Mode 3 Red. With our TDR intercooler we often setup boost around 10-12 PSI. With this boost level you don't need as much timing retard due to the cooler air from the intercooler. We would suggest settings of 1-2 (3 degrees) in Mode 2 Amber and 1-2 (3 degrees) in Mode 3 Red. This is based on your timing set at a base of 10 degrees at 850 RPM.

Photo 7: Mode 1 Green 0-1850 RPM setting

Photo 8: Mode 2 Amber 1850-5500 RPM setting

	
Photo 8: Mode 3 Red 5500-7000 RPM setting	Photo 4: Mode 4 Green/Blue progressive retard setting TC2

TC2 Timing Control-Programmed After November 1, 2015

The new TC2 programming allows us to use progressive timing retard as the boost increase. The TC2 works similar to the Fuel control in programming, but with 4 settings. The Mode 1 Green, low RPM is not used. We use Mode 2 Amber and Mode 3 Red to add additional timing retard. Mode 2 is for 2500-5500 RPM range and Mode 3 is for 5500 to 7000 RPM range. Mode 4 Green/Blue is the main retard setting based on boost across the full RPM range.

There are 8 lights on the timing control. Each light indicates 1 degree of timing retard on the TC2 verses 2 degrees of timing retard on the TC1. So example, if we set Mode 2 to 3, you are retarding 3 degrees. If you set the Mode 2 where lights 2 and 3 are on, you are 2.5 degrees of timing retard based on 10 degrees base timing.

Setting the TC2 Timing Control

The TC2 comes preset at 5 degrees timing retard in Mode 4, Green-Blue. This will progressively retard the timing as the boost increase. For the Rotrex setup this should be fine since this supercharger has lower boost in the low RPM range. However, if you hear detonation, add another degree of retard. The M45 and MP62 superchargers start with at least 50 percent of their boost at low RPM. For this I would suggest adding 1 to 2 setting in the Mode 2 Amber. Turbo applications may be similar where adding additional retard in Mode 2 may be required.

Suggested Timing Retard with TC2

Blower	Boost	Setting
• Rotrex Supercharger	10-12 PSI	Mode 4-5 Default
• M45 and MP62 Supercharger Non-Intercooled	5-7 PSI	Mode 4-6
• M45 Supercharger Intercooled	7-9 PSI	Mode 4-2
• MP62 Supercharger	7-10 PSI	Mode 2-2, Mode 4-4
• Turbo Intercooled	7-10 PSI	Mode 2-2, Mode 4-4

Be Aware of Detonation

Always listen for detonation. Miatas will knock pretty loud when detonation starts. Detonation sounds like marbles in a can and generally starts around 4000 RPM. Detonation will continue up the RPM range and will burn a piston in short order. If you hear detonation at low RPM, say 2000 RPM at partial throttle then this would be bad gas. If you run lower octane like regular at 87 you will hear detonation. If you have a tank full of low octane fuel, drive in low boost until about a 1/3 of a tank is used and then add higher 91-93 octane. Again don't drive too hard until the gas has run through the engine.

You don’t need to retard timing much more than 1-2 degrees if you hear knock. Sometimes as little as 1 degree is all you need to stop detonation. If you ever suspect detonation, pull your spark plugs to evaluate. Detonation will burn the top of the piston near the ring land. Particles of aluminum will attach to the white porcelain and will look like shinny specs. Anything worse than this, you may be looking for a rebuild. Be careful and tune properly. Better to have too much timing retard than not enough.

Please understand, when it comes to tuning a forced induction car, it is extremely important you are confident in your tuning. If in doubt, stop and contact us or find a local automotive shop to help you out. Not enough timing retard will kill an engine fast. Track Dog Racing cannot be held liable for a poor tune. If at any time you need assistance please feel free to contact us or email us at support@trackdogracing.com. If you have any comments or suggestions, please let us know.

NA Rotrex Components List

Package A1 Components (Radiator Bracket)

Check	Qty	Part Number	Description	Packaging
	1	PANEL-RAD-COVER	Black texture aluminum radiator cover	Individual
	1	PANEL-RAD-SS	Stainless steel radiator panel	Individual
	1	PANEL-RAD-BUMPER	Bumper panel	Individual
	1	PANEL-RAD-PAN	Lower belly pan panel	Individual
	2	RAD-L-BRKT-NA	Radiator L-braket with stud installed for 90-97	PKG
	2	M6-FEND-WASH	M6 fender washer	PKG
	4	M6-WASH	M6 standard washer	PKG
	4	M6-1.00-ACRN-NUT	M6 acorn nut	PKG
	2	M6-12-1.00-BOLT	M6 x 12 mm bolt	PKG
	4	M6-1.00-NYLN-NUT	M6 black nylon nut	PKG
	2	M6-30-1.00-BOLT	M6 x 30 mm bolt	PKG

Package A2 Components (Intercooler Mount)

Check	Qty	Part Number	Description	Packaging
	2	NA-IC-LBRKT	NA 90-97 models intercooler L-bracket	PKG
	2	M8-30-1.25-BOLT	M8 x 30 mm bolt	PKG
	2	M8-WASHER	M8 washer	PKG
	2	M8-L-WASHER	M8 lock washer	PKG
	2	M8-1.25-NUT	M8 nut	PKG
	1	CLAMP-PS-TUBE	Clamp for power steering cooler tube	PKG

Package A3 Components (Lower Panel)

Check	Qty	Part Number	Description	Packaging
	7	M6-20-1.00-BOLT	M6 x 20 mm bolt for plastic panels	PKG
	7	M6-1.00-SPD-NUT	M6 speed nut for plastic panels	PKG

Package A4 Components (Oil Cooler Panel Setup)

Check	Qty	Part Number	Description	Packaging
	1	PANEL-NA-LEFT	Left side radiator plastic panel	Individual
	1	PANEL-NA-RIGHT	Right side radiator plastic panel	Individual
	1	PANEL-OC-BOTTOM	Oil cooler bottom plastic panel	Individual
	1	PANEL-OC-SIDE	Oil cooler side plastic panel	Individual
	3	L-BRKT-SHOLE	Small L-bracket with small hole	PKG
	2	L-BRKT-SLOT	Larger L-bracket slotted end	PKG
	1	L-BRKT-LHOLE	Large L-bracket with large hole	PKG
	1	1/2"-NYLON-SPCR	1/2" black nylon spacer	PKG
	1	M10-25-1.25-BOLT	M10 x 25 mm bolt	PKG
	1	M6-35-1.00-BOLT	M6 x 35 mm bolt	PKG
	1	M6-30-1.00-BOLT	M6 x 30 mm bolt	PKG
	2	M6-20-1.00-BOLT	M6 x 20 mm bolt	PKG
	6	M6-12-1.00-BOLT	M6 x 12 mm bolt	PKG
	6	M6-1.00-NUT	M6 nut	PKG

Package A5 90-93 Components (Supercharger Piping)

Check	Qty	Part Number	Description	Packaging
	1	R1-PIPE	R1 stainless steel pipe intake TB, 90-93 model	Individual
	1	T-PIPE	T stainless steel pipe SC outlet, 90-05 model	Individual
	1	HOSE-2.5-H024	2 1/2" x 3" straight hose intake TB	Individual
	1	HOSE-H006	135 deg. 2" hose SC outlet	Individual
	2	HOSE-2.25-H026	2 1/4" hump hose for I/C	Individual
	2	CLAMP-40-2.5	Clamp 40 hose clamp for H024	PKG
	4	CLAMP-36-2.25	Clamp 36 hose clamp for H026	PKG
	2	CLAMP-32-2.0	Clamp 32 hose clamp for H006	PKG

Package A6 90-93 Components (Intake Hose Setup)

A6-1 With MAF Setup

Check	Qty	Part Number	Description	Packaging
	1	AF-2600	Air filter K & N SN-2600 with MAF (Select one)	Individual
	1	BOV	Blow-off valve	Individual
	1	2 3/4"-PIPE	2 3/4" aluminum pipe insert	Individual
	1	MAF-ADPT	Air flow unit adapter	Individual
	1	HOSE-H015	Supercharger air flow hose, 90 deg, 1" inlet (-74 blower)	Individual
	1	HOSE-H021	Supercharger air flow hose, 90 deg, 1" inlet (-84 blower)	Individual
	1	HOSE-H005	Air flow to air filter, 90 deg hose	Individual
	1	HOSE-H029	BOV to intake pipe hose 1" x 3"	Individual
	1	HOSE-H020	Idle air hose	Individual
	1	HOSE-H022	Return air hose 90-90 deg-straight	Individual
	1	PATCH-4-8	Rubber patch 4" x 8" adhesive tape	PKG
	1	VELCRO-1-1	Soft side Velcro adhesive patch	PKG
	1	VAC-HOSE-18"	Vacuum hose 5/32 x 18"	PKG
	1	VAC-TEE	5/32" black vacuum tee	PKG
	1	CLAMP-48-3.0	Clamp 48 hose clamp for H021	PKG
	3	CLAMP-44-2.75	Clamp 44 hose clamp for H021, H005	PKG
	5	CLAMP-16-1.0	Clamp 16 hose clamp for H029, H022	PKG
	2	CLAMP-10-.75	Clamp 10 hose clamp for H020	PKG
	1	RUBBER-CAP	Rubber cap for shock post	PKG

A6-2 With NON-MAF Setup

Check	Qty	Part Number	Description	Packaging
	1	AF-3550	Air filter K & N RU-3550 with NON-MAF (Select one)	Individual
	1	BOV	Blow-off valve	Individual
	1	HOSE-H003	Intake hose setup-NO MAF	Individual
	1	HOSE-H029	BOV to intake pipe hose 1" x 3"	Individual
	1	HOSE-H020	Idle air hose	Individual
	1	HOSE-H022	Return air hose BOV to intake	Individual
	1	PATCH-4-8	Rubber patch 4" x 8" adhesive tape	PKG
	1	VAC-HOSE-18"	Vacuum hose 5/32 x 18"	PKG
	1	VAC-TEE	5/32" black vacuum tee	PKG
	1	CLAMP-48-3.0	Clamp 48 hose clamp for H003	PKG
	5	CLAMP-16-1.0	Clamp 16 hose clamp for H029, H022	PKG
	2	CLAMP-10-.75	Clamp 10 hose clamp for H020	PKG

	1	RUBBER-CAP	Rubber cap for shock post	PKG

Package A7 94-97 Components (Supercharger Piping)

Check	Qty	Part Number	Description	Packaging
	1	R2-PIPE	R2 stainless steel pipe intake TB, 94-97 model	Individual
	1	T-PIPE	T stainless steel pipe SC outlet, 90-05 model	Individual
	1	HOSE-2.5-H024	2 1/2" x 3" straight hose intake TB	Individual
	1	HOSE-H006	135 deg. 2" hose SC outlet	Individual
	2	HOSE-2.25-H026	2 1/4" hump hose for I/C	Individual
	2	CLAMP-40-2.5	Clamp 40 hose clamp for H024	PKG
	4	CLAMP-36-2.25	Clamp 36 hose clamp for H026	PKG
	2	CLAMP-32-2.0	Clamp 32 hose clamp for H006	PKG

Package A8 94-97 Components (Intake Hose Setup)

A8-1 With MAF Setup

Check	Qty	Part Number	Description	Packaging
	1	AF-2600	Air filter K & N SN-2600 with MAF	Individual
	1	AF-9250	Air filter K & N RC-9250 with MAF (C30-94 SC Only)	Individual
	1	BOV	Blow-off valve	Individual
	1	HOSE-H029	BOV 1" x 3" hose	Individual
	1	HOSE-H009	Return air hose double 90 deg.	Individual
	1	HOSE-H008	3/4" Idle air hose	Individual
	1	HOSE-H017	SC Intake hose with MAF setup	Individual
	1	HOSE-H028	SC Intake hose with MAF setup (C30-94 SC Only)	Individual
	1	PATCH-4-8	Rubber patch 4" x 8" adhesive tape	PKG
	1	VAC-HOSE-18"	Vacuum hose 5/32 x 18"	PKG
	1	VAC-TEE	5/32" black vacuum tee	PKG
	1	CLAMP-48-3.0	Clamp 48 hose clamp for H017	PKG
	1	CLAMP-44-2.75	Clamp 44 hose clamp for H017	PKG
	5	CLAMP-16-1.0	Clamp 16 hose clamp for H029, H009	PKG
	2	CLAMP-10-.75	Clamp 10 hose clamp for H008	PKG

A8-2 With NON-MAF Setup

Check	Qty	Part Number	Description	Packaging
	1	AF-3550	Air filter K & N RU-3550 with NO MAF setup	Individual
	1	BOV	Blow-off valve	Individual
	1	HOSE-H029	BOV 1" x 3" hose	Individual
	1	HOSE-H009	Return air hose two 90 deg.	Individual
	1	HOSE-H008	3/4" Idle air hose	Individual
	1	HOSE-H003	SC Intake hose NON-MAF setup	Individual
	1	PATCH-4-8	Rubber patch 4" x 8" adhesive tape	PKG
	1	VAC-HOSE-18"	Vacuum hose 5/32 x 18"	PKG
	1	VAC-TEE	5/32" black vacuum tee	PKG
	1	CLAMP-48-3.0	Clamp 48 hose clamp for H003	PKG
	5	CLAMP-16-1.0	Clamp 16 hose clamp for H009, H029	PKG
	2	CLAMP-10-.75	Clamp 10 hose clamp for H008	PKG

Package A9 94-97 Components (Cruise and Diagnostic)

Check	Qty	Part Number	Description	Packaging
	1	DIAG-MNT	Diagnostic mount	PKG
	1	CRUISE-MNT	Cruise control mount	PKG
	1	M6-20-1.00-BOLT	M6 x 20 mm bolt	PKG

Package R1 Components (Support Panel)

Check	Qty	Part Number	Description	Packaging
	2	SS-PANEL	Stainless steel support panel	PKG
	12	SS-RIVETS	Stainless steel rivets	PKG
	2	M6-30-1.00-BOLT	M6 x 30 mm bolt	PKG

Package R2 Components (Radiator Panel)

Check	Qty	Part Number	Description	Packaging
	2	PUSH-IN-PLUGS	Push in plugs for radiator panel	PKG
	2	PLASTIC-NAIL	Plastic nail, pad and clip for A/C core	PKG
	5	TIE-WRAP-L	Long tie-wrap	PKG
	2	SMALL-PAD	Adhesive back pads	PKG

Package R3 Components (Supercharger Mount)

Check	Qty	Part Number	Description	Packaging
	1	SC-MOUNT-FRONT	Supercharger front mount	Individual
	1	SC-MOUNT-TOP	Supercharger top mount	Individual
	1	SC-MOUNT-HEAD	Supercharger head mount	Individual
	1	SP4-_____	4-Rib pulley (Specify)	Individual
	1	SP6-_____	6-Rib pulley (Specify)	Individual
	1	CRNK-PUL6-130	6-Rib crank pulley with 4 ea. Harden M6 x 20 mm bolt	Individual
	1	CRNK-PUL6-110	6-Rib crank pulley with 4 ea. Harden M6 x 20 mm bolt	Individual
	1	GAT4-_____	Gates Belt 4-rib (See Chart)	Individual
	1	GAT6-_____	Gates Belt 6-rib (See Chart)	Individual
	1	IDLR-PULLY	Idler pulley, spacer included in box	Individual
	1	GATES-38164	Gate tensioner 38164	Individual
	1	DAYTON-89003	Dayton 89003 plastic pulley-installed	Installed
	1	SHIM-080	M18.5 x .080 shim for Dayton pulley-installed	Installed
	1	M10-70-1.25-BOLT	M10 x 70 mm bolt	PKG
	1	M10-50-1.25-BOLT	M10 x 50 mm bolt	PKG
	1	M10-40-1.50-BOLT	M10 x 40 mm bolt	PKG
	2	M10-25-1.25-BOLT	M10 x 25 mm bolt	PKG
	1	M10-1.25-NUT	M10 nut for 50 mm bolt	PKG
	1	M10-1.50-TNUT	M10 T-nut for sliding tensioner	PKG
	1	M10-WASHER	M10 washer	PKG

	1	M6-70-1.00-BOLT	M6 x 70 mm bolt tensioner adjuster	PKG
	1	M6-1.00-NUT	M6 nut for 60 mm bolt	PKG
	6	M6-12-1.00-A-BOLT	M6 x 12 mm Allen bolt for pulley	PKG
	1	M6-16-1.00-A-BOLT	M6 x 16 Allen bolt for triangular mount	PKG
	3	M5-12-.80-A-BOLT	M6 x 12 Allen bolt for triangular mount	PKG
	1	ALUM-SPACER	.230 aluminum spacer SC bracket	PKG
	1	ANTI-SEIZE	Anti-seize lubricant packet	PKG
			NON-P/S BLOCK HARDWARE	
	1	NON-PS-BLOCK	Non P/S block. **(Delete the ALUM-SPACER)**	PKG
	1	M10-30-1.50-BOLT	M10 x 30 mm bolt	PKG

Package R4 Components (Oil Cooler Mount) (BOXED)

Check	Qty	Part Number	Description	Packaging
	1	OC-BRACKET	Oil cooler bracket	PKG
	1	OIL-COOLER	Oil cooler	PKG
	10	HOSE-5/16"-10	10 ft. x 5/16" cloth hose	PKG
	2	FITTING-90-1/2"	90 deg. fitting 1/2" NPT, flare-INSTALLED ON COOLER	Installed
	2	FITTING-AN-5/16"	AN flare fitting for 5/16" hose-INSTALLED ON COOLER	Installed

Package R5 Components (Oil Reservoir Kit)

Check	Qty	Part Number	Description	Packaging
	1	C30-84-BLOWER	C30-84 blower 94-05 model	Individual
	1	C30-94-BLOWER	C30-94 blower 94-05 model (TRACK SETUP)	Individual
	1	RESERVOIR	Aluminum reservoir (located with SC)	Individual
	2	RES-CLAMP	Reservoir clamps (located with SC)	Individual
	1	OIL-FILTER	Rotrex oil filter (located with SC)	Individual
	1	RES-BRKT	Reservoir triangle mount	PKG
	1	OIL-FILTER-CLAMP	Oil filter clamp 1/2" W x 2 1/4" D	PKG
	4	BANJO-FITTING	Banjo fitting (located with SC)	PKG
	4	BANJO-BOLT	Banjo bolt (located with SC)	PKG
	8	CRUSH-WASHER	M10 Crush washer (located with SC)	PKG
	8	SPRING-CLAMP	Spring clamp for hose	PKG
	1	M6-20-1.00-BOLT	M6 x 20 mm bolt	PKG
	2	M6-12-1.00-BOLT	M6 x 12 mm bolt	PKG
	2	M6-1.00-NUT	M6 nut	PKG

Package R6 Components (Catch Can) (BOXED)

Check	Qty	Part Number	Description	Packaging
	1	CATCH-CAN	Catch can	PKG
	1	CC-FILTER	Catch can filter	PKG
	24"	HOSE-3/8"-24	3/8" x 24" L cloth hose	PKG
	1	CATCH-BRKT-9000	Triangular catch can bracket 90-00 models	PKG
	1	CATCH-BRKT-0105	Parallelegram catch can bracket 01-05 models	PKG
	1	M6-40-BOLT	M6 x 40 bolt	PKG
	1	SPACER-1/4"	1/4" plastic spacer	PKG
	1	INSERT-3/8"	3/8" plastic insert restrictor	PKG
	2	O-RING-FITTING	O-rings for threaded fittings	PKG

	2	FITTING-3/8"	Barb fitting for hose	PKG
	2	FITTING-7/16"	Barb fitting for hose	PKG
	2	M5-NUT	M5 nuts	PKG
	2	M5-16-ABOLT	M5 Allen bolt	PKG

Package R7 Components (SC Oil Setup)

Check	Qty	Part Number	Description	Packaging
	1	SX-150-OIL	Rotrex supercharger oil (located with SC)	Individual
	1	FUNNEL	Funnel any size	PKG
	1	PRESSURE-BULB	Red pressure bulb	PKG
	1	RES-RUBBER-SEAL	Reservoir rubber seal with tube	PKG

Package R8 Components (Hood Struts)

Check	Qty	Part Number	Description	Packaging
	1	TDR-HD-LFT-NAB	Hood lift struts	PKG
	1	M5-DRILL-BIT	M5 drill bit	PKG
	1	M6-1.0-TAP	M6 thread tap	PKG

Package R9 Components (Heat Shield)

Check	Qty	Part Number	Description	Packaging
	1	TDR-HS-NANB	Header heat shield	Individual
	2	HDR-L-BRKT	Header L-bracket	PKG
	1	HS-SPACER	Spacer	PKG
	1	HS-SCREW	Sheet metal screw	PKG
	2	M6-12-1.00-BOLT	M6 x 12 mm bolt	PKG

Package R10 Fuel Management

Check	Qty	Part Number	Description	Packaging
	1	PROGRAM	Is the F/T controls programmed?	Individual
	1	FCARD-9093	90-93 Fuel control setup PNP (select one model year)	Individual
	1	FCARD-9495	94-95 Fuel and Timing control setup PNP	Individual
	1	FCARD-9697	96-97 Fuel and Timing control setup PNP	Individual
	1	VAC-SENSOR	Vacuum/Boost sensor-attach to Fuel Control harness	Individual
	1	INJ-335	90-97 model 335 cc custom injectors	Individual
	1	INJ-350	94-97 model 350 cc custom injectors (-94 Blower)	Individual
	1	INJ-700	90-05 model 700 cc Mega Squirt setup	Individual
	8 ft	RIGID-TUBE	8 ft. x 3/16" rigid plastic tubing	PKG
	1	VAC-3/16-TEE	Vacuum Tee fitting 3/16"	PKG
	1	HOSE-3/16-2	Rubber hose 3/16" x 2" long	PKG
	1	HOSE-3/16-6	Rubber hose 3/16" x 6" long	PKG

Spark Plugs

Check	Qty	Part Number	Description	Packaging
	1	BKR6E-PLUGS	NGK BKR6E Spark plugs box of 4 ea.	Individual

Fuel Pump

Check	Qty	Part Number	Description	Packaging
	1	FPUMP-190	190 LPH fuel pump-STREET setup (Select one)	Individual
	1	FPUMP-255	255 LPH fuel pump-TRACK Setup (Select one)	Individual
	1	FPUMP-KIT	Fuel pump strainer installation kit	Individual

Intercooler

Check	Qty	Part Number	Description	Packaging
	1	INTERCOOLER	Intercooler pre-packaged in box	Individual

Accessories

Check	Qty	Part Number	Description	Packaging
	1	TDR-HAT	TDR Hat	Individual
	1	TDR-LPLATE	TDR license plate	Individual
	1	TDR-INSTR	Instruction manual	Individual
	1	TDR-DRIVE	Thumb drive with instructions	Individual
	2	DECAL	TDR Black decals	Individual
	1	BUS-CARD	Business card-Gary	Individual