440 Rutherford St. P.O. Box 847 Goleta, CA 93117
1-888-888-4079 • FAX 805-692-2525 • www.supercharger.com

Installation Instructions
SUPERCHARGER

'99-'00 Mazda Miata 1.8L

999-200 w/ power steering, w/ AC
999-205 w/ power steering, w/ out AC
999-210 w/ out power steering, w/ out AC
999-215 w/ out power steering, w/ AC

READ THESE INSTRUCTIONS THOROUGHLY!
Follow the instructions STEP-BY-STEP, and your installation will be trouble free. If in doubt, **CALL 1-888-888-4079**. We suggest that as you proceed through the installation, you should read a few steps ahead in the instructions so you are certain to catch all notes and warnings.

TOOLS REQUIRED:
17mm, 14mm, 13mm, 12mm, 10mm, & 8mm sockets
10mm, 12mm, and 17mm open end wrenches
Deep sockets (14mm or 9/16", 10mm)
Phillips and Standard screwdriver
5mm Allen wrench
Paper clip
Timing light

ATTENTION SUPERCHARGER INSTALLER! Before proceeding with the installation, it is important to know that to validate the 2 year, 100K warranty on your new J/R supercharger, you must completely fill out the Moss Motors / Jackson Racing warranty card that comes in every kit, including serial number which is on a small white 'bar code' label on the body of the supercharger. Write down all of the numbers which appear on that label in the appropriate space on the warranty card. Be certain to do this now because once your supercharger is installed, it may be almost impossible to retrieve that serial number.

SPECIAL NOTE: Jackson Racing Supercharger Systems are designed to be installed by individuals with good mechanical sense and with the proper tools. Use your discretion--if you are not a competent mechanic, do not attempt this installation.

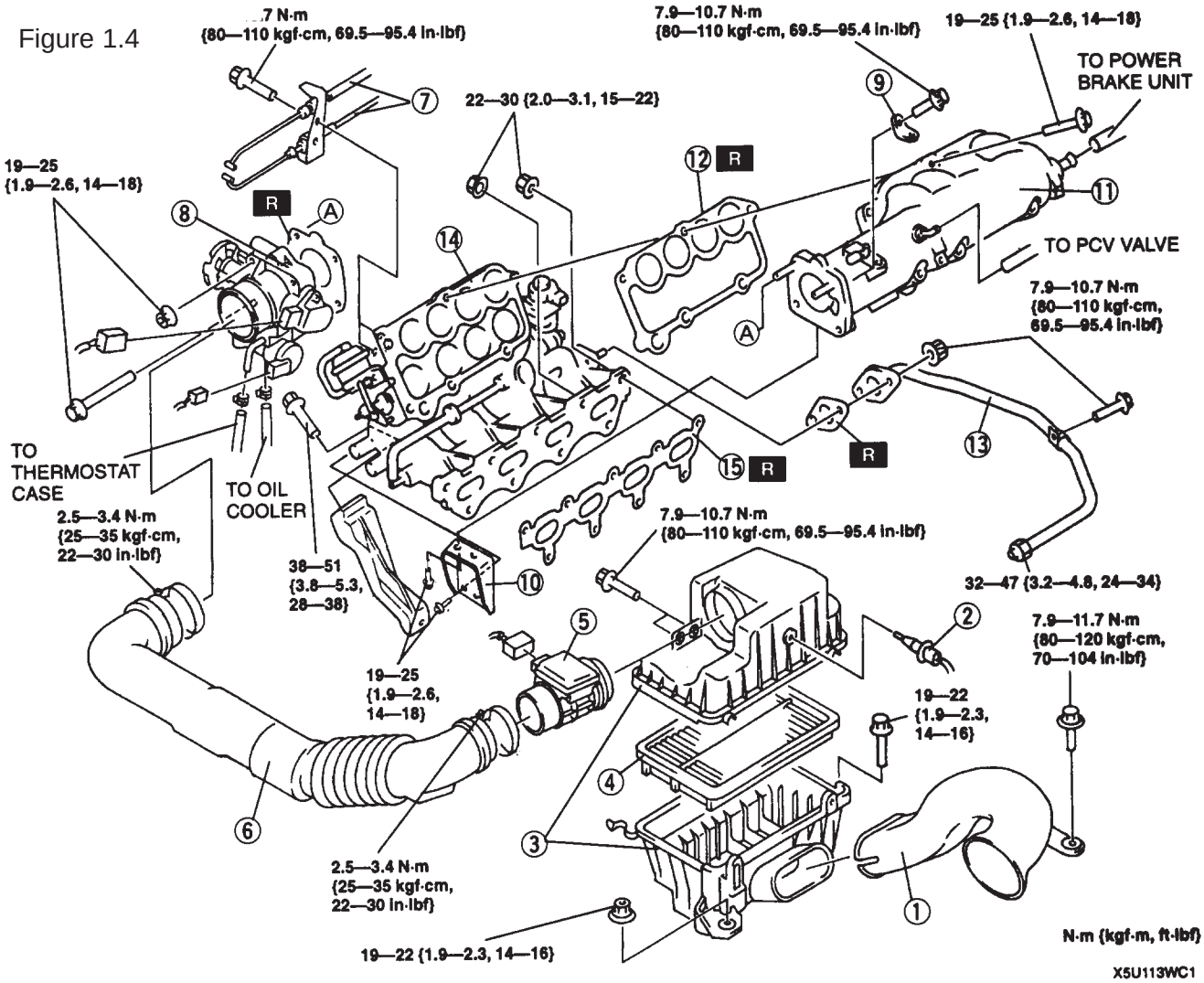
WARNING: Once the installation is complete, CHECK AND RECHECK ALL fuel system connections for possible leaks before operating the vehicle. 91-octane gasoline (or higher) is required when running a supercharger.

During this installation process, you will reuse some parts or hardware and not reinstall others. It is recommended that you make space for those that you will reuse, and a separate space for those that you will not reinstall. In addition, you should save the parts that will not get reused in case you ever have reason to convert the engine back to stock.

Enclosed is a set of labels that we suggest you use to label the electrical connectors that you will be unplugging.

NOTE: Will not work with factory strut tower braces.

Figure 1.4



1.0 DISASSEMEMBLY

1.1 Disconnect your Miata's battery.

1.2 Release the air flow meter harness 5-pin connector by pressing the locking tab on its clip. Remove the stock air flow meter from the air box by removing the two 10mm headed retaining bolts and then remove the Air Temperature sensor with its rubber mounting grommet from the Air filter box. And finally remove the air filter assembly complete with intake snorkel, these parts will not be reused. Move the air flow meter to a safe place on a worktable.

1.3 Remove the molded rubber elbow and hard plastic tube that lead from the throttle body to the airflow meter.

1.4 Remove the crankcase vent hose that is attached to the front of the cam cover. (Figure 1.4). This will not be reused. Also, find the small restrictor inside the rubber hose that ran from the cam cover to the Mazda plastic crossover/intake tube. It can be felt as a lump in the straight section of the hose near the end. Persuade it out by gently clamping the hose with a pair of pliers just behind the lump. If your hose does not have this restrictor there is one provided in the hose bag of the supercharger kit. Save this restrictor for step #7.8.

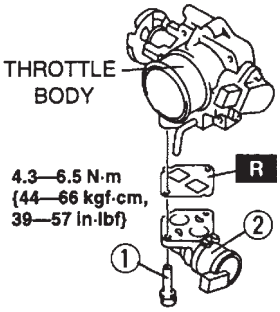
1.5 You can do this entire procedure without losing too much coolant, there is no need to drain your cooling system. In the upcoming step you will be removing the throttle body and Idle Control Solenoid (ICS) valve. If you remove the small coolant hoses that run to the ICS valve (which is mounted under your throttle), you can drain the excess coolant into a coffee can or such. Rest the can on the steering rack down in front of the engine and aim the hoses into the can as they drain. Once the flow stops, you can remove the throttle body without making a mess.

2.0 THROTTLE BODY

2.1 Remove the throttle body (FIGURE 1.4) by releasing the two electrical connectors, the two small coolant hoses on either side of the lower Idle Control System (ICS) valve, and the two nuts and two bolts. TIP: THE SPRING

HOSE CLAMPS FROM MAZDA ARE BEST REMOVED BY APPROACHING FROM THE SIDE WITH NEEDLE NOSE PLIERS. GRASP ALL THREE TANGS AT ONCE AND COMPRESS THEM TOGETHER. THIS IS EASIER TO DO WITH THE THROTTLE BODY ALREADY LOOSE FROM THE INTAKE MANIFOLD. Plug the coolant hoses with a screwdriver, golf tee, or pencil to prevent the leakage of coolant (OR - keep the hose ends above the radiator cap level to prevent leakage). Release the throttle cable from the throttle shaft spool. Release the Throttle Position Switch connector. If the throttle body gasket tears as you remove it (even though it is made of metal, it can tear), you will need to clean off the old gasket from both surfaces, the throttle body and the intake manifold. Carefully use a knife or the backside of a hacksaw blade to scrape the mounting surfaces clean. DO NOT SCRATCH OR MAR THE MOUNTING SURFACES IN ANY WAY. Immediately below and behind the throttle body on the intake manifold is a steel support brace in the shape of an inverted “L” attached by four 12mm headed bolts. Remove the brace and re-secure the wiring harness ground wire attached at that point with one of the 12mm headed bolts.

2.2 Moving to a worktable, remove the idle air control (ICS) valve from the bottom of the throttle body by removing the two Phillips head screws. Use a good quality screwdriver and be careful not to strip the Phillips head screw. If you cannot loosen a screw with the screwdriver, use a small set of pliers from the side. Carefully separate the two units making sure not to tear the gasket. The gasket will want to stay with the Mazda ICS valve.



2.3 Take the Dummy Throttle body from your supercharger kit and install the Mazda Idle Air Control Valve (ICS) from step 2.2 on the bottom, rotating the ICS valve 180 degrees so that the electrical connector now points to the rear of the engine. Use the Mazda original ICS to Throttle body gasket.

2.4 Install the Dummy Throttle Body and ICS valve assembly back onto the intake manifold in the same position as the standard Mazda throttle body. Use the original gasket or the1104 adhesive on the mating surfaces and the two new 8mm x 40mm long bolts provided in the lower two holes on the dummy throttle body. Reconnect the coolant hoses to the brass coolant barbs on the front and side of the dummy throttle body.

2.5 Do not connect the ICS electrical connection until after the next step.

2.6 **Wiring Harness Modifications:**
Locate the main engine wiring harness on the left side of the engine (as viewed from the front of the engine) where it runs between the intake manifold and cam cover. Cut the strap of the white plastic harness anchor at the front and release the fire-wall end of the harness by gently prying the release tab on the securing clamp located near the rear engine lifting eye. Starting at the forward point where the four black/yellow wires come out of the harness, cut the black tape binding the plastic corrugated tubing so that you can access the wires within. Locate the wiring branch of the ICS valve connector and follow the wires to the main harness. Pull these two wires (purple and orange) back free from the main harness about 4-5 inches so that you have enough slack to plug the connector in the repositioned ICS valve. Cut a length of the small diameter corrugated tubing supplied in the kit to cover the wires on the ICS branch from the plug to the main harness with an additional inch of tubing to protrude into the main harness tubing. Locate the wiring harness branch for the Throttle Position Switch (TPS) that originally connected at the throttle body connector. Pull these wires back to about 4 inches from the firewall. If the construction of your particular harness is such that you cannot free all three wires (light green/red, green/black and black/pink) all the way back, cut the offending wire (usually light green/red) and pull the wires with the connector back free. Then strip about 1/4 inch of insulation of each end of the cut wire and using the Crimp connector supplied; insert a stripped end into each end of the connector. Crimp (collapse) each end of the connector onto stripped ends, making sure that the connection is secure. With the crimp connector installed on the wire, shrink seal the ends of the Crimp connector by heating it with a heat gun or a hair blow dryer. Using some of the small diameter corrugated tubing provided, cover the TPS harness branch. Wrap the main harness and branches with the roll of tape supplied in the kit, in the same manner as the factory had. Reattach the harness at the rear harness clamp by snapping it back in place and at the front by using a new Ty-Wrap strap through the base of the white plastic anchor. You can now plug in the ICS valve connector by routing the harness branch under and around the intake manifold to the ICS valve. The TPS connector will be plugged in after installation of the supercharger and throttle body assembly.

2.7 Locate the ICS blanking plate and take it over to your Mazda throttle body. Use the 1104 sealant between the blanking plate and the Mazda throttle body. Install the blanking plate onto your Mazda throttle body using the two new Phillips head screws supplied in the kit. Insert the shaft of a Phillips or cross head screwdriver into the ends of the coolant connections. Gently twist the connections 90 degrees counter clockwise to their standard position so that they point in the same direction as the throttle body inlet. Do not worry if you kink the coolant connections, you are only moving them out of the way and they will not be reused.

3.0 BELT DRIVES

3.1 Use a 12mm socket and combination wrench to loosen the power steering slide lock bolt. Then loosen the tensioning bolt. Use a 14mm deep socket and combination wrench to loosen the power steering pivot bolt. You may have to rotate the pulley to access this bolt. Using a 14mm socket loosen and remove the slide anchor bolt at the engine. At this point the power steering pump should be able to pivot. Push the pump downward towards the air conditioning compressor and remove the belt. Now, use a 12mm socket to remove the nut securing the power steering hose to the bracket. Using a 14mm socket, remove the two bolts securing the power steering bracket to the power steering pump. Remove the whole tensioning system including the tensioning and power steering brackets. Then, remove the nut from the power steering pivot bolt. Located above the power steering pump, on the black plastic timing cover, there are two brackets. One securing the Crankshaft Position Sensor wiring harness connector and just above it a second bracket securing the wiring itself. Use a pair of needle nose pliers to release the plastic fasteners from the brackets. Using a 10 mm socket, remove the bolts securing the brackets, set the brackets aside, and reinstall the bolts. The harness and connector will be tucked behind the new tensioner plate when it is installed. Illustration 3.1

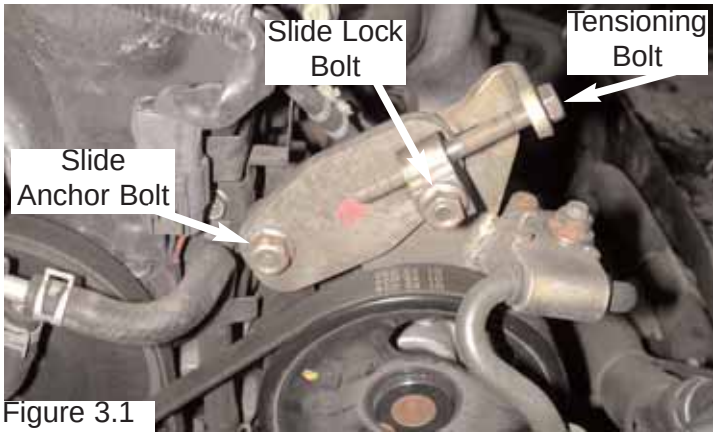


Figure 3.1


Figure 3.1 con't

3.2 Gather together the new belt tensioner

assembly, the new power steering hose support bracket and the supercharger strap bracket. Using a 17mm combination wrench slightly loosen the power steering hose on the top of the power steering pump and swing the hose to clear the new power steering hose support bracket. Then install the new hose support bracket in the same place as the factory bracket. Temporarily install the upper bolt to help with alignment. Tighten the bottom bolt to 36 ft lbs. Once the bottom bolt is tight, remove the upper bolt. Use a 10mm socket to remove the two bolts securing the top of the radiator cooling fan to the top of the radiator. Lift the fan up and set it to the side. Now, slide the power steering pivot bolt forward out of the pump. Remove the rubber sleeve holding the short-headed bolt in the new tensioner assembly. Slip the new tensioner assembly into place behind the power steering pulley, aligning its lower hole with the pivot bolt hole. Reinstall the pivot bolt. At this point tuck the Crankshaft Position Sensor harness connector behind the tensioner plate. Install the short-headed bolt again just above the pivot bolt. It should thread into the cast power steering bracket, bolted to the engine. Finally, install the last bolt through the tensioner assembly and through the power steering hose support bracket into the upper hole in the pump. Slide the round hole of the strap bracket onto the end of the pivot bolt on the back side of the power steering pump and start the flanged nut. Tighten the two upper bolts on the tensioner assembly, securing it to the power steering pump and the cast power steering bracket, bolted to the engine. Tighten to 36 ft lbs. The power steering pump pivot bolt will stay loose until the supercharger is installed. Reinstall the radiator cooling fan. Illustration 3.2

Figure 3.2

Figure 3.2 con't

3.3 Gather one M8 x 20mm flanged bolt, one M8 flange nut, one M8 lock nut, one M8 hex nut, and the power steering link. Thread the hex nut all the way down the stud on the power steering bracket. Install the power steering link over the stud on the power steering bracket and start the lock nut. Align the clamp on the power steering hose with the remaining hole in the power steering link. (The hose and the link can be rotated to help with alignment.) Slip the bolt through the hole and start the flange nut. Once the bolts and nuts are started, pull the hose away from the power steering reservoir and tighten the bolts and nuts to 18 ft lbs. Now, using a 17mm combination wrench, tighten the hose on the power steering pump. Illustration 3.3

Figure 3.3

Figure 3.3 con't

VERY IMPORTANT:
Check the clearance between the small coolant hose that runs from the base of the thermostat housing and the passenger side idler pulley. If the clearance is less than 1/2" between the hose and the pulley, trim three quarters of an inch of length off of the thermostat end of the small hose. Reinstall the hose, reusing the spring clamp. By removing a small piece of the hose end, the hose will be pulled away from the idler pulley, avoiding any damage during operation. This is a critical area for attention since a hose failure could cause severe engine damage. Not all cars need this modification.

3.4 NON POWER STEERING CARS: Locate your lower bracket assembly from the kit. The end with the small 90 degree bracket mounts to the idler bracket (standard on AC equipped cars) or to new idler bracket (supplied with kit for non-AC, non-PS cars). Use the new, longer 10mm bolt provided to attach this bracket to the engine (Review figure 3.4 for bolt location).

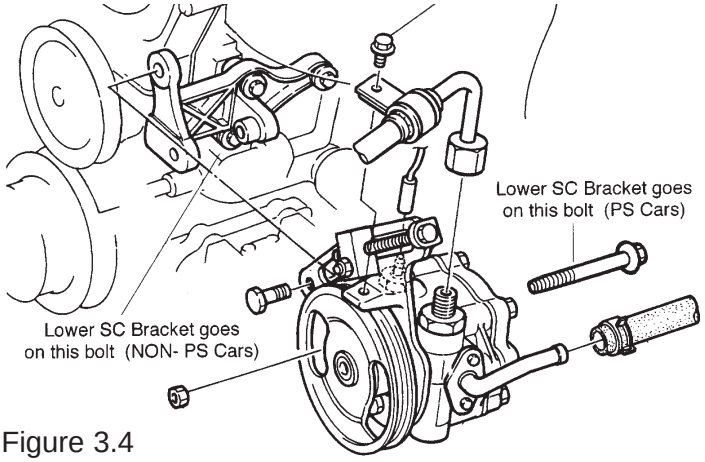


Figure 3.4

4.0 FUEL MANAGEMENT

4.1 Locate the PowerCard (Fuel Management System) from your kit. We have included enough wire with the Card to mount it in one of three places. On the center console, in the glove box, or tucked away behind the fuse box cover. Decide where you want to mount them and cut the wires to length as necessary. Strip 1/4” of insulation off each of the PowerCard’s wires. Gather together one (1) female spade connector and seven (7) 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. Slip the wires into the included split loom. The split loom can be cut to length as necessary. If the PowerCard will be mounted to the center console or to the inside of the glove box, we recommend routing the wires under the dash, behind the center console to keep them out of the drivers way. Tie wraps are included to help secure the wires out of harms way.

4.2 The car’s Electronic Control Unit (ECU) is located on the drivers (left) side of the car directly above the clutch pedal. The ECU has three connectors attached to it. A Top, Middle, and Bottom. Release all three connectors from the ECU. Illustration 4.1

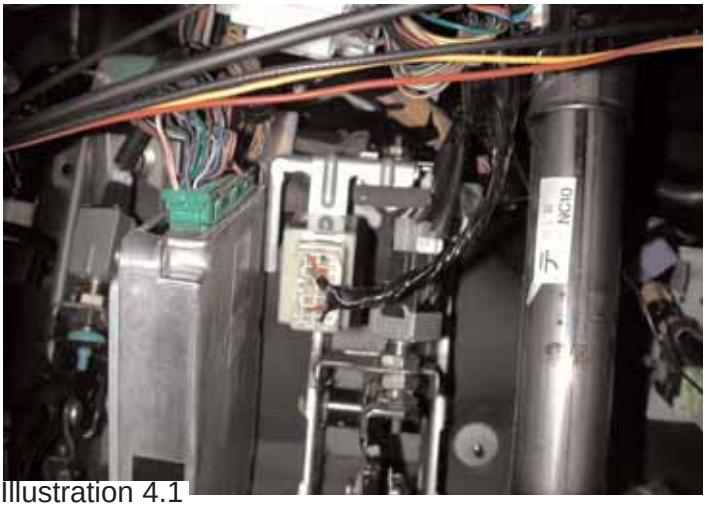
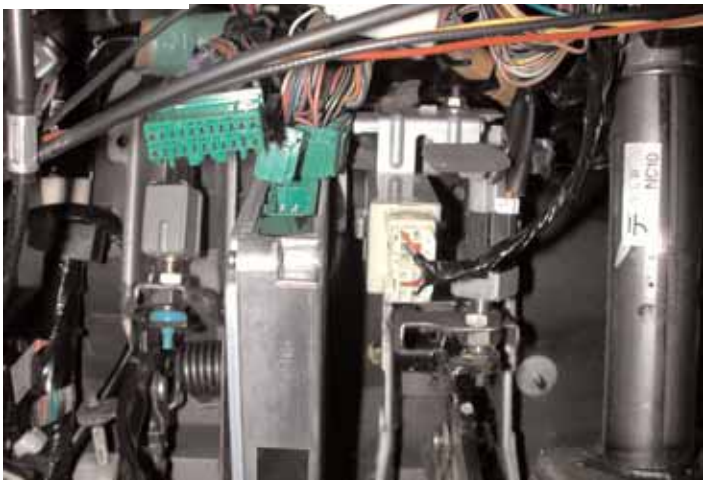
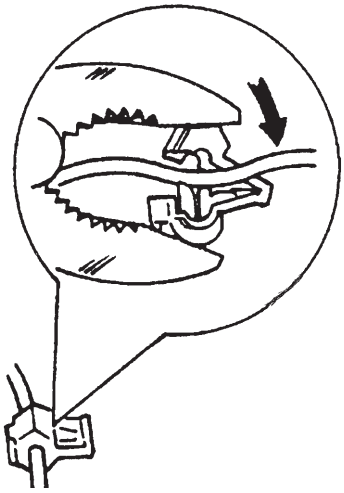


Illustration 4.1



4.3 Use the attached ECU pin out diagram to help locate the wires. First, locate the White/Red wire in the bottom connector at the 1B pin location. This is a switched 12V power source. Use multi-purpose pliers to install a T-tap onto the White/Red wire 1”-2” from the ECU connector.



4.4 Next, locate the ground wire and the four injector wires in the top connector at the 3A (ground), 3W, 3X, 3Y, and 3Z pin locations. The ground wire is a Black/Yellow wire and the injector wires are Yellow/Black, Violet/Green, Yellow/Red, and Yellow/Green. Install a T-tap onto each of these wires.

4.4 Next, locate the Green/Black wire at the 3E pin location in the top connector. 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.

4.6 Connect the Red wire of the PowerCard to the T-tap on the White/Red wire of the ECU, connect the Black wire to the T-tap on the Black/Yellow wire. Connect the White/Yellow, Green/Gray, Red/Blue, and White/Green wires of the PowerCard to the T-taps on the Yellow/Black, Violet/Green, Yellow/Red, and Yellow/Green wires at the ECU connector. These wires can be connected in any order. Connect the Female spade connector on the Purple wire of the PowerCard to the Male spade connector on the Green/Black wire leading into the harness. Connect the Male spade connector on the Purple/Yellow wire of the PowerCard to the Female spade connector on the Green/Black wire leading into the ECU connector.

4.7 Now is a good time to run the plastic vacuum tube through the firewall. Connect the tube to a vacuum port on the intake manifold, using the included 90º, rubber fitting and route it back toward the firewall. (There is a Tee included if there is no available vacuum port. Cut a small vacuum hose and install the Tee into the hose and insert the plastic tube into the Tee. Use a small tie wrap to secure the hose connections.) Once at the firewall, route it over to the left (drivers) side of the car and locate the main wiring harness grommet, over near where the firewall meets the fender. Cut a small slice in the rubber grommet and push a screwdriver through to make sure you can push the tube through. Don’t

push the screwdriver through too far and look inside if you feel any resistance. Feed the plastic tube through the grommet and into the interior through the opening you just made. Pull all of the slack inside the car. Route the tube to the PowerCard location and cut it to length. Connect the tube to the PowerCard's hose. Make sure the hose is not kinked and the plastic tube is routed along a safe path and will not be damaged. Use tie wraps to secure the tube. Illustration 4.2

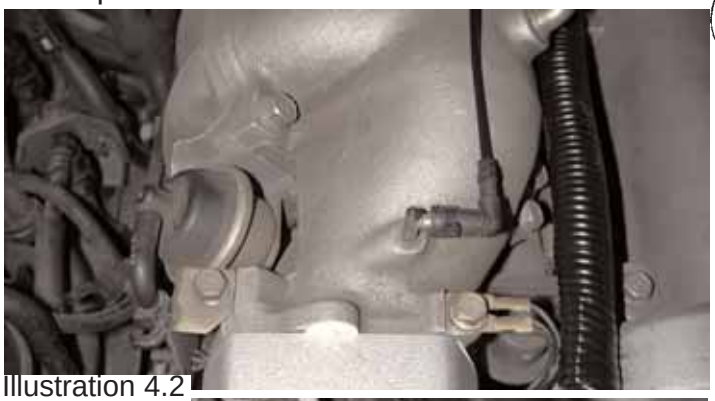
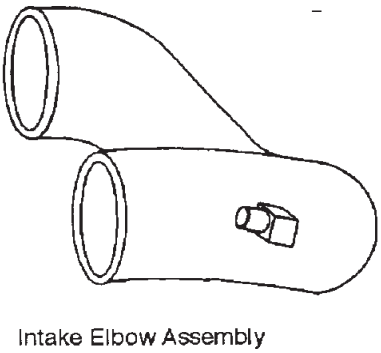


Illustration 4.2

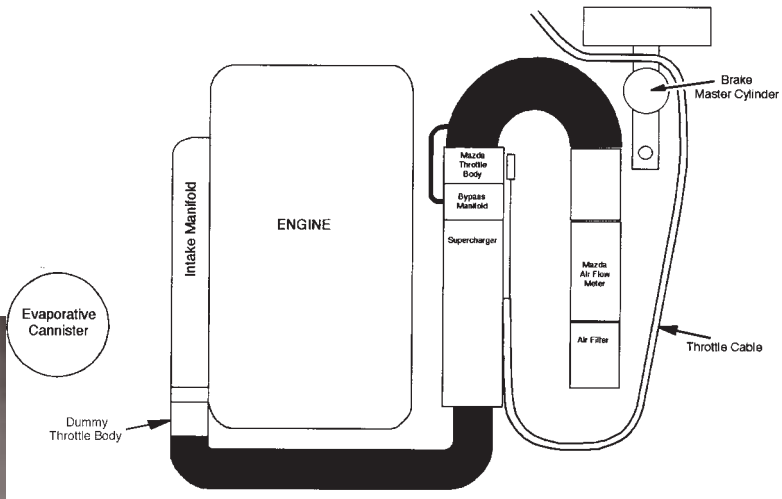
5.0 SUPERCHARGER PREPARATION

5.1 Working on a table or bench, set the supercharger in a position easy to work with. Be careful not to bump the supercharger pulley in any way as it can easily damage the front bearing. Install your Mazda throttle body with the ICS blanking plate as installed in step #2.7 and mount it to the supercharger using the new gasket or 1104 adhesive and the two new 8mm x 35mm long bolts supplied in the kit.

5.2 Locate your throttle cable bracket that is bolted



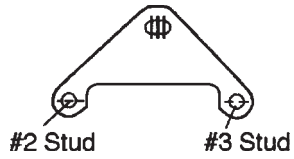
Intake Elbow Assembly



SUPERCHARGER LAYOUT SCHEMATIC

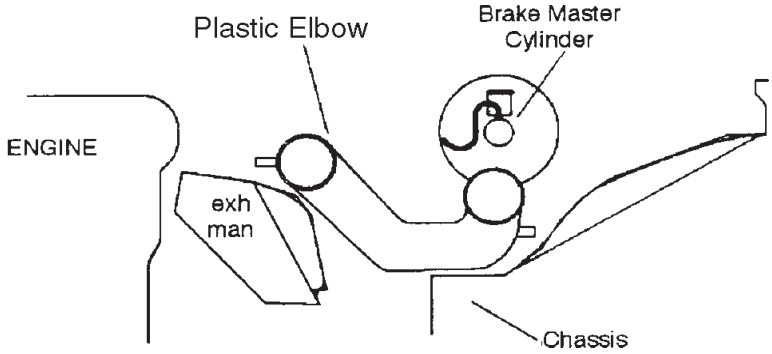
to your standard intake manifold and remove the throttle cable by loosening the pinch nuts surrounding the cable end on either side of the bracket. Once the nuts are loose, you can pull the cable out of the bracket - the grommet will deform and let you do this. Remove the throttle cable bracket by removing the two 10mm headed bolts. Unclip the throttle cable from the firewall anchors. Begin rerouting the throttle cable by looping the end behind the brake master cylinder and laying its length along the driver's side fender well.

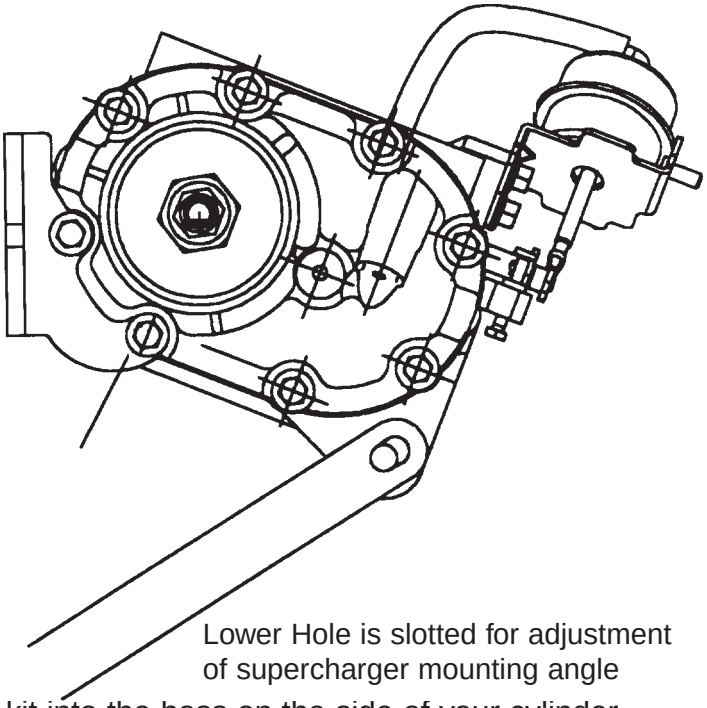
5.3 Locate the black plastic Roto-mold elbow from your kit. Check inside the elbow for any debris and clean it out if necessary. You will be placing the assembly into the position shown (Fig. 5.3) prior to installing the supercharger. Make sure to install the 2.50" to 2.750" reducer hose to the air-flow meter end of this elbow prior to setting it in place. This will greatly assist in air flow meter installation. Also, install the 2.50" diameter hump hose to the throttle body end of this plastic elbow. Use the clamps provided to secure the hoses to the elbow.



6.0 SUPERCHARGER INSTALLATION

6.1 Remove the engine lift eyelet at the front of the engine, just above the exhaust manifold by removing the bolt using a 14mm socket. Install the new flanged headed bolt supplied with your



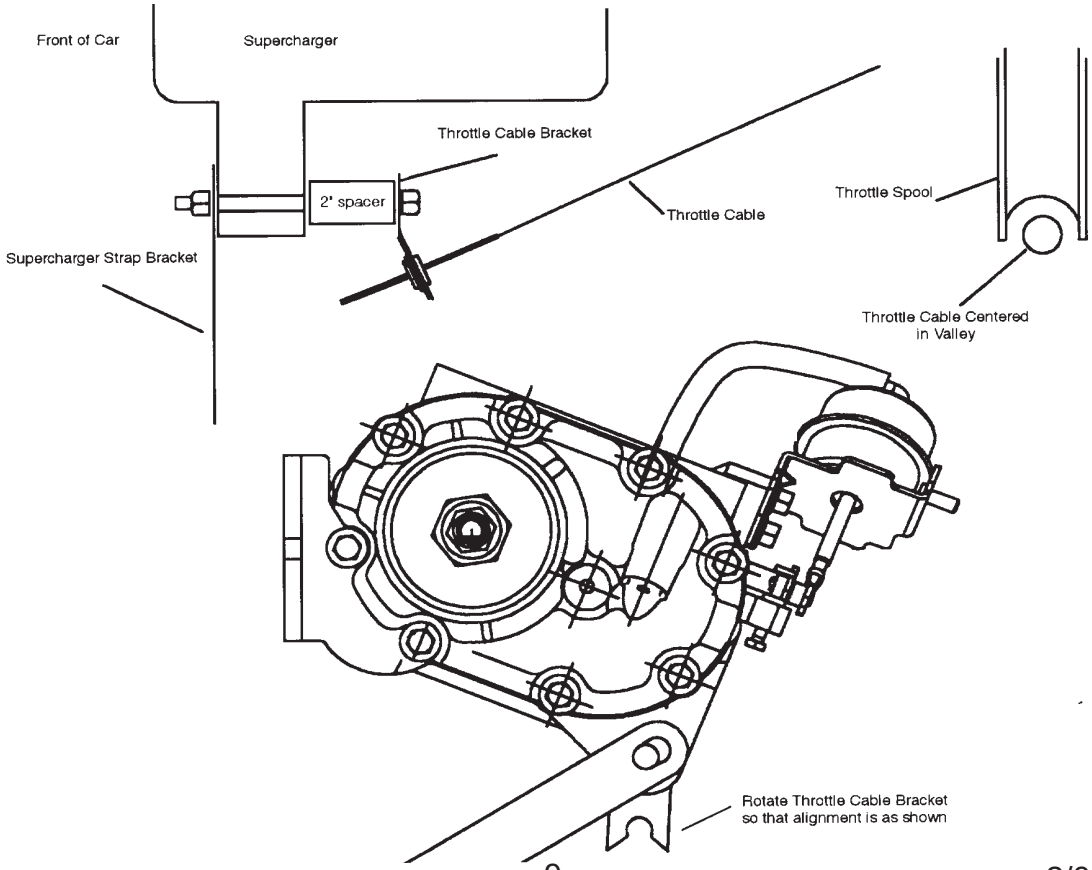


Lower Hole is slotted for adjustment of supercharger mounting angle

kit into the boss on the side of your cylinder head. Leave at least 1/2" of thread exposed on the bolt. Remove the heat shield from the exhaust manifold. Make sure to spray the small bolts with WD 40 or such and let them soak for a bit to make sure that they do not shear off during removal. Spray your exhaust manifold nuts with WD 40 or equivalent and let soak for ten minutes, reapplying at the five minute point. Remove the nuts from the two top center exhaust manifold studs (#2 and #3, counting from the front).

Install the exhaust manifold to supercharger bracket over the two exposed studs. The third hole on the bracket should be offset upwards and away from the engine. Reinstall and tighten the two nuts. Mount rear bracket on the exhaust studs #2 & #3 Reusing Mazda Exhaust Nuts. Remove the counter sunk bolt and nut which hold the main supercharger bracket to the small L-bracket attached to the supercharger unit. Discard the nut, it is for shipping purposes only. Locate the jam nut from the appropriate hardware bag (self locking prevailing torque nut: M10).

6.2 Bring the supercharger over to the engine. Feed the throttle body end into the hump hose already installed on the plastic Air flow meter to throttle body elbow (make sure to slip a fully opened hose clamp over the hose first). Orient the supercharger so that you can slip the forward large "keyhole" in the bracket attached to the supercharger over the bolt head installed in step #6.1. Make sure that the bolt moves up the respective vertical slot and seats against the upper edge of the horizontal slot in the bracket. Slide the supercharger towards the firewall as far as it will go. Reinsert the countersunk bolt removed earlier through the L-bracket, through the main S/C bracket, and through the hole in the exhaust manifold to S/C bracket. The jam nut that goes on this bolt fits tightly between the rear support bracket and the engine's cam cover. Use an open-end wrench and some masking tape to



hold the nut to the wrench while you feed it into place. Start the countersunk-head bolt with your other hand and run the pair down tight. Tighten down the front pinch bolt using an open-end wrench. If you find that the bracket/supercharger assembly collides with your cam cover vent tube during initial installation, it means you did not leave enough threads exposed on the main mounting bolt installed in step #6.1. Retry it with the bolt further out.

6.3 Swing the flat lower bracket up into place in front of the supercharger boss. Locate the small stamped throttle cable bracket from your kit and thread the new bolt through the throttle cable bracket hole, through the spacer, through the supercharger boss and through the flat steel lower bracket. Secure with the locking nut and bolt supplied. Make sure that the head of the bolt is on the throttle bracket side of the assembly.

6.4 Route your throttle cable so that it is looped back toward the firewall, routing the cable just behind the driver's side headlamp. Install the cable's threaded end into the small bracket attached to the underside of the supercharger. Make certain that the cable/grommet is fully nested within the slot (this may require some muscle – we made it tight so your throttle cable won't ever fall out). Open the throttle by hand and insert the cable end into the throttle spool. Make sure that the cable runs in the center of the groove of the throttle spool. If it does not, adjust the throttle cable bracket left or right until it is centered in the spool's groove. Have an assistant operate the gas pedal multiple times to confirm that the action is free and easy without binding or interference. Make sure that the cable has a bit of "sloppy" slack with the gas pedal released and that full throttle is available when the gas pedal is fully depressed. If it does not "flop" in the idle position, you will have trouble setting your idle speed. Make sure that the cable is run in such a way as to allow for engine movement from side to side. **Make very certain that all throttle cable mounting points are secure - this installation area is critical for safe operation of your car. This bracketry has been carefully designed for correct operation. It is your responsibility as the installer to insure that it is bolted together successfully without binding or interference.**

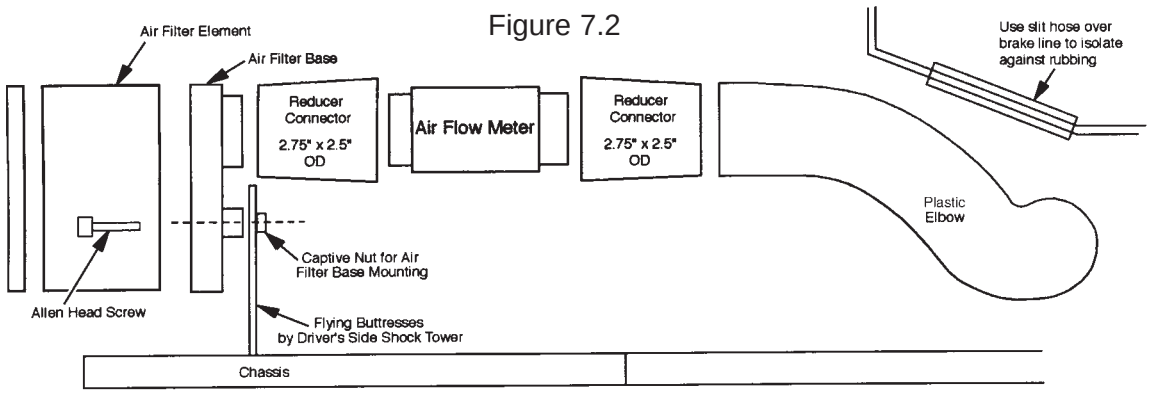
7.0 AIRFLOW METER WORK

7.1 Locate the new air filter base from your kit and install it to the air flow meter intake port using the reducer hose and clamps. Note the "Arrow" cast into the side of the air flow meter, it denotes the direction of airflow through the meter. It should point away from the air filter base, towards the firewall of the car. The correct orientation of the air flow meter will be such that the electrical plug connection will be facing the LEFT side near the bottom, when looking in the inlet port of the air filter base.

7.2 Locate the driver's side shock tower support and notice the Mazda air filter box mounting bracket (painted body color) on the forward edge. This vertical bracket is held in place by a horizontal bolt (also painted body color). Remove the bolt using a 10mm socket and store the bracket.

7.3 Bring the air flow meter with the air filter base installed over to the engine bay. Tilting the assembly at an angle, feed the air flow meter outlet into the rubber reducer sleeve already in place on the plastic elbow (install loose hose clamp first). The air flow meter assembly fits into the space just inside the shock tower. Install the rubber grommet that you earlier removed from the stock Mazda air filter box into the 3/4" hole in the base of the new Air Filter. Insert the grommet from the backside so that the grommet's flange is on the outside of the filter base. The small hole and boss in the air filter base will line up with the horizontal hole you just removed the 6mm body colored bolt from. Using the longer bolt provided (M6 x 30mm, Allen head), attach the air filter

Figure 7.2



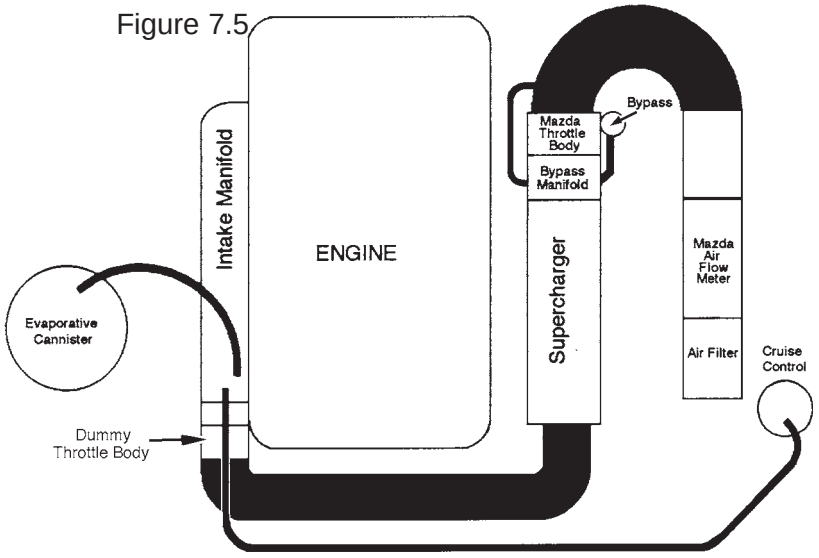
Side View of Air Flow Meter Mounting

base/air flow meter assembly to the car using this bolt (it mounts horizontally, through the air filter base, the flying buttress, and into the Mazda captive nut on the flying buttress). Use thread-locking compound. Make sure that the electrical connector on the air flow meter is still accessible for the main wiring harness connector to be installed.

7.4 Make sure that there is no chaffing or rubbing anywhere along the plastic elbow assembly, even though it is a very tight fit. Gently reposition any brake lines that are pressing against the elbow. Make sure all joints and clamps are secure - a leak in this area will keep your car from idling correctly. However, never over tighten your clamps, they may break somewhere down the road. Install the small piece of vacuum line supplied from the bypass block vacant nipple to the 'small' nipple on the plastic elbow. Use the small length of rubber hose (1/4" dia.) that is slit along its length to cover the brake line running just above the plastic elbow. This will prevent any contact at this point, which may result in noise during operation.

7.5 Locate the 3/4" diameter idle air hose (5' length) from your kit. Attach one end to the 'large' outside fitting on the plastic elbow downstream of the airflow meter (just below the brake master cylinder once the elbow is in place). Use a clamp to secure the hose to the short 3/4" nipple. Run the hose toward the front of the engine compartment, at approximately 15" from the elbow cut the hose and install the silver Check Valve in the hose with the clamps provided. Install the check valve with the large flanged end towards the elbow, so that air can flow from the elbow, and not back towards it. Continue the hose across the engine side of the radiator and under the upper radiator hose. Using the Ty-Wrapp straps provided, attach the rubber hose securely to the fan shroud supports near the fan motor(s). Attach the end of the hose to the Brass Elbow fitting attached to the bottom of the new Dummy Throttle Body. Make sure that the hose is attached in a way that will not interfere with either fan operation or with the engine belts. The hose supplied is a bit longer than it needs to be, feel free to trim its length if you prefer. Be careful not to pinch the hose at any point, doing so will affect your idle stability. On some cars, there might be a slight kink in the hose where it attaches to the plastic elbow nipple. This is acceptable, orient the hose so it remains open.

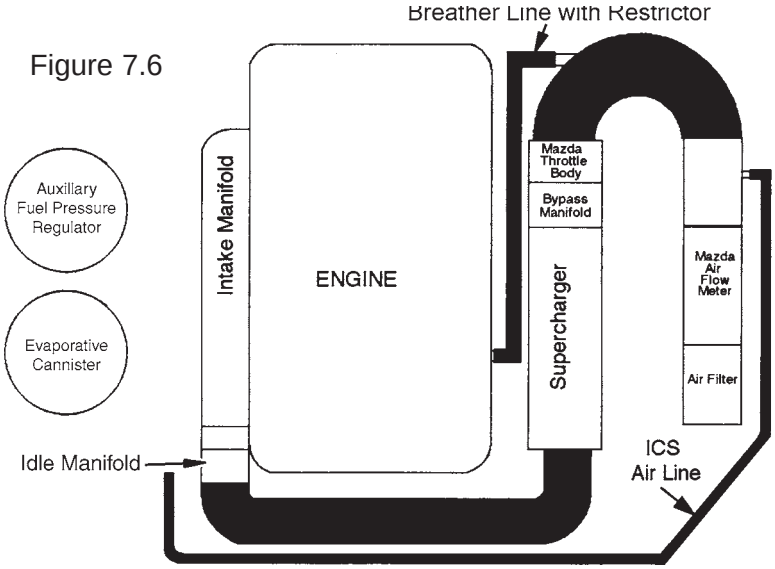
Figure 7.5



Vacuum Line Routing

7.6 Install the air filter element over the air filter base. Install the waffle patterned air filter cap and secure using the nuts provided. Use the Ty-Wrapps provided to secure all components and keep them clear from the belt runs, exhaust manifolds and throttle cables.

Figure 7.6



Idle Air (ICS) and Breather Line Routing

7.7 Take the throttle body wiring harness as left in step #2.6 and route the harness along the back of the engine. Route the branch of the harness, which has the Air Flow Meter and Air Temp Sensor connectors, along the front of the engine and under the supercharger, so that you can plug in these connectors. Tie-wrap the harness in at least two places. Connect the plug to the throttle position sensor and push the Air Temperature sensor into the grommet in the back of the air cleaner base.

7.8 Find the internal restrictor taken out of your

breather hose in step #1.4 or in the hose bag. Locate the 3/8” internal diameter hose from your kit and press the restrictor into this hose at least one inch. Attach this hose from the ‘medium’ fitting on the plastic elbow (near the throttle body, pointing to the engine). Cut to length and attach the other end to the camshaft cover fitting on the exhaust side. Make sure the hose does not kink at any point and that the restrictor is not left out. If you leave the small restrictor out, the engine will not idle correctly. The diagram in figure #7.5 shows the bypass actuator signal line being attached to the engine side nipple on the bypass manifold. It may be connected to the fender side nipple - either is acceptable.

7.9 Reconnect the electrical connector to the air flow meter. Make sure the harness is not pinched at any point.

8.0 BELT INSTALLATION

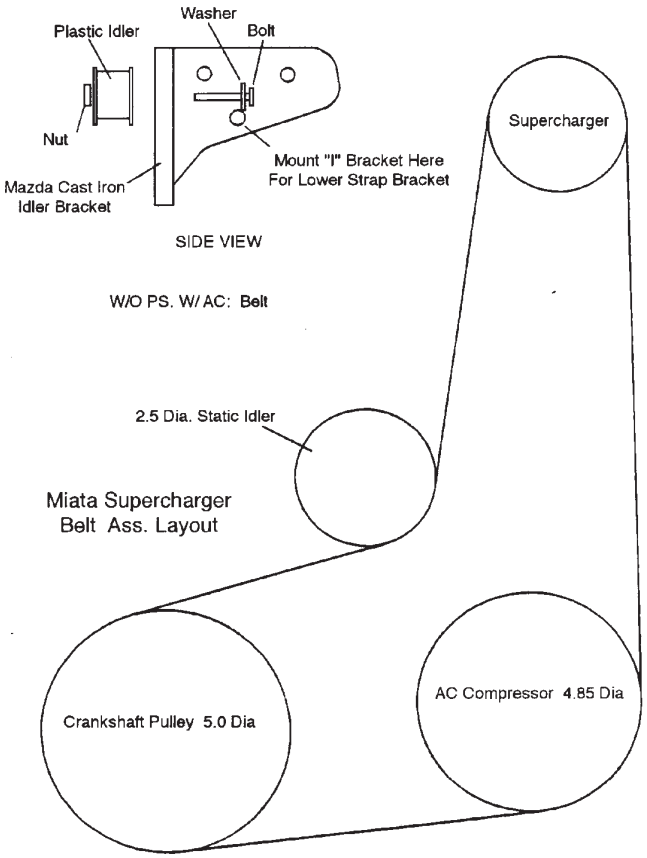
8.1 Route the drive belt around the crank pulley, over to the air conditioning compressor pulley (if present, if not, route to the P/S pulley), up to the power steering pump pulley, between the idler and tensioner pulleys, over the supercharger pulley, down between the idler and tensioner pulleys and back to the crank. On some applications the belt may have to be rolled on. If you find this to be the case, install the belt on all the pulleys except for the supercharger. Use an 18mm socket to turn the supercharger pulley clockwise while guiding the belt onto the pulley. Make sure the belt doesn’t come off either of the idler pulleys. Do not use the engine’s starter motor to roll the belt on. Tension the belt using a 17mm socket on the tensioner bolt. Tighten the bolt until there is 1/2" of deflection when you press firmly on the belt between the idler and the crank pulleys. Thread the jam nut on the tensioner bolt down against the tensioner bracket. Use a 17mm combination wrench to lock the jam nut into place. Torque the tensioner pulley bolt to 36 ft-lbs. Also double check the torque on the fixed idler pulley bolt. If you hear belt squeal with the air conditioning on or when you turn the steering wheel, the belt is not tight enough. Check the belt tension again after 500 miles. Illustration 8.1

Figure 8.1

Figure 8.1

INSTRUCTIONS FOR NON-POWER STEERING MIATAS WITH AIR CONDITIONING

To install the supercharger belt drive in your particular situation, follow the instructions as outlined in the installation manual except for section 3.0 on Belt Drives. Since you do not have a power steering bracket to attach your lower bracket to, you will use special bracketry that we have included with your kit. Turn to figure 3.4 in the installation manual and find the note describing the bolt that will be used for the non-power steering car’s lower strap bracket anchor. The Mazda idler pulley set-up for your 4-rib belt has a cast iron bracket that is bolted to the engine block. This bracket is held on by three large bolts. The lower bolt of the triangle pattern will be the one you attach our “L” bracket to. It is in the position noted in figure 3.4. This is where you will attach the small “L” bracket to the engine block using the new Ml0x50 fine thread bolt we provide. The lower strap bracket can then be attached to this “L” bracket, supporting the outside of the supercharger. For the belt drive, please remove all the adjustment hardware from the cast iron Mazda idler bracket (the idler pulley, the special mounting bolt, the vertical adjustment bolt, etc.). You will be left with just the naked iron bracket on the engine. Using the 2.5” diameter idler we provide, and the Ml0x50 bolt, washer and nyloc nut, mount the nylon idler to the front of the Mazda cast iron bracket. Make sure to put the Mazda Cast Iron washer under the bolt’s head and to aim the bolt toward the radiator (see diagram). Run the belt over the crank pulley the supercharger and around the air conditioning compressor. Push the idler downward and tighten its center bolt to properly tension the 4-rib belt. If you are careful, a screwdriver can be placed in the cast iron Bracket’s vertical slot to lever the pulley downward. This will help you get the proper tension on the belt. You should have less than 3/8inch deflection on the longest run of the belt.



9.1 Locate the rubber sleeves and the front cross over pipe. Check inside the cross over pipe for debris and clean it out if necessary. Install the cross over tube between the idle air manifold (dummy throttle body now on the intake manifold) and the supercharger manifold. If you find the outlet rubber sleeves hard to slip over their respective landings, use some spray light oil such as WD40 which dries off to lubricate the situation. Do not use gasoline products or pure silicone products. The best technique for installing the cross over tube involves putting the 2.75" diameter rubber sleeve on the supercharger manifold and the 2.5" diameter sleeve on the cross over tube, and attach both with clamps. Then install the cross over tube, starting at the supercharger end first. Note that the cross over pipe goes over the radiator hose.

9.2 Once the cross over pipe is installed correctly, double-check all your hose and tube connections. There should be no loose ends or connections. Do not overtighten any hose clamps, but eisure that they are snug. Double check your power steering belt and supercharger belt for correct tension.

9.3 You are now ready to start your engine.

9.4 CLEARANCES
IMPORTANT! MAKE SURE THAT YOU HAVE AT LEAST 3/4" INCH CLEARANCE BETWEEN ANY ENGINE MOUNTED COMPONENT AND ANY BODY MOUNTED COMPONENT. CRITICAL AREAS:
• BYPASS ACTUATOR TO BRAKE LINES (VERY CRITICAL - The engine "rocks" strongly to the driver's side upon deceleration. If clearance is too tight, your brake lines can be gently deformed away from the supercharger bypass actuator by hand.)
• SUPERCHARGER OUTLET MANIFOLD TO AIR FILTER (INCLUDING CLAMPS)
• ALL VACUUM LINES TO THROTTLE SPOOL & CABLE

9.5 SUPERCHARGER BELT DRIVE ADJUSTMENT
Start your engine and observe your belt drive. The belt should line up with itself as it passes between the two idlers. To put it a different way, the portion of the belt running up to the supercharger should lay directly over the portion leaving the supercharger and heading toward the power steering pulley. If the upward run is more forward or rearward than the downward run, you need to move your supercharger slightly forward or backward with respect to the crankshaft pulley. Remember the two bolts attaching the superchargers bracket to the cylinder head from step 6.1? You can now access these two bolts with an open-end wrench. Loosen each bolt slightly to allow for adjustment. Start the engine. You can now move the supercharger assembly slightly forward or rearward to correctly align the drive pulleys. The slots in the supercharger mounting bracket will allow you to find the perfect alignment for the belt run. **NOTE: Do not attempt to move the supercharger with your hands with the engine running. Use an appropriate tool.** The best tool to use is a flat blade screwdriver placed between the forward bracket bolt and the front inside edge of the bracket. Move the supercharger assembly while watching the belt run the idler pulley. If you have the two bracket bolts too loose, the supercharger will be out of alignment from side to side. Make sure the two bolts are snug enough to just allow some leveraged movement. Once you have the belt running true in the center of the idler pulleys, tighten the rear bolt to secure the position. Shut off the engine and tighten the other bracket bolt securely. Recheck all mounting bolts for tightness.

9.6 Start your engine. The lights on the PowerCard display will energize. With a proper installation, you will see a continuous sequence of lights run from left to right and then a single green light at position one. This single green light will flash every two seconds when the engine is running and there is no boost. If PowerCard doesn't power up after 4 seconds double check your power and ground. One or both are incorrectly hooked up. The single green light may "flicker," however a flashing green and flashing red together indicate improper hookup of the injector leads and PowerCard is not getting an injector signal. If this happens, recheck installation of wiring to the injector leads. Again, make certain spade connectors are inserted properly into the

square slot of the t-tap, and not off to the side. If you can see the silver spade connector through the translucent insulation, then you need to disconnect and properly reconnect this connection. Although it doesn't matter which injector lead is connected to the injector wire, the PowerCard injector leads are "numbered", which can aid in troubleshooting. When you have a flashing green and flashing red together, the position of the flashing green indicates which lead is improperly connected. Trace the problematic lead to the injector wire and carefully inspect its connection. NOTE: When driving, it is possible to see the flashing green and red together. This is perfectly normal as most engine ECUs will shut off the injectors under extended periods of deceleration. However, if you get a flashing green and red at idle, PowerCard is not seeing the injector signal and you must recheck your installation.

9.7 IDLE ADJUSTMENT:
Using the idle air screw on your throttle body (now on the back of the supercharger), adjust your idle speed to 950 rpm after the engine is warm. This is done by backing the adjustment screw out a half turn at a time until the correct speed is achieved (counter-clockwise rotation increases idle speed). Next, turn your headlights on BRIGHT and put your heater fan on HIGH. Leave the air conditioning off. Rev the engine briskly in neutral to at least 2500 rpm and release. Notice if the idle stops at 900 rpm. If it dips below this level and feels like it will stall, then recovers to 950 rpm, open the idle airscrew (counterclockwise rotation) one tenth of a turn at a time until most of this “droop” disappears. A slight droop of 100 rpm or so is acceptable and normal. More than that may create a stalling problem during driving. Turn off the lights and heater fan and double check that your idle speed is 950 rpm.

FUEL QUALITY
It is recommended that unleaded gasoline of 91 octane rating or better should be used when your Miata is supercharged.

DRIVING TIP:
If you should find yourself in a situation where you cannot find high-octane fuel, you can bypass the supercharger temporarily. Note the position the bypass actuator arm is in during idle. This is the position that bypasses the boost air back into the supercharger inlet. As you blip the throttle, the actuator arm will move and close a butterfly valve inside the bypass manifold. Using a short piece of wire, fix the bypass actuator arm in the “bypass” position that it holds at idle. This will prevent boost from being developed and thus, detonation will not occur. Of course, your engine will now run like a stock Miata’s, but will be quite operable for as long as you need. When you find higher-octane fuel, simply remove the wire to release the actuator arm and the bypass will function normally, closing during acceleration, bypassing during idle and cruise. Try to run the low octane fuel out of your tank before filling up. Mixing fuels of different octane will lower the overall rating and detonation could still be a problem.

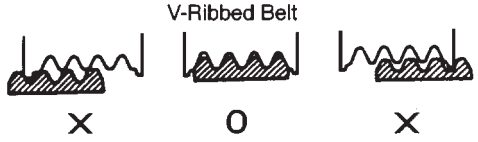
9.8 Starting procedure: Start your engine as you would a standard Miata. Remember to bring the engine up to operating temperature (as indicated by your water temperature gauge) before running it hard. Full boost on a cold engine will greatly increase your engine wear.

9.9 Oil changes: we suggest you use synthetic oil such as Mobil 1 and change it regularly (5000 miles maximum). If you use a mineral oil, change it every 2500 miles. While your supercharger does not use any engine oil for its lubrication, your engine will be working a little harder with the addition of a supercharger. The synthetic oil provides an extra measure of protection, but is not necessary for safe and reliable operation.

9.9.1 Breaking-in: Your supercharger will work perfectly from the first time you fire it up. However, it does need about 500 miles to fully seat the rotors. Up to that time, you may notice a slight noise coming from the supercharger at idle. This is normal.

10.0 Performance: You will notice that your engine runs stronger during cold days than on very hot ones. This is due to the nature of the internal combustion engine. When the air is cold, the engine receives a denser charge of air, thus more power can be produced. While this is true with any engine, the supercharger amplifies this cold air benefit.

10.1 BELTS
The only item to watch with your supercharger system will be the belt tension for the supercharger drive. If you have a tension gauge for a poly-vee belt, the tension is to be 90 pounds. Without a gauge, look for less than 1/2” deflection on the long run of the belt. If you see a large accumulation of belt dust on your supercharger, it is an indication that your belt is slipping. A slight amount of belt dust is normal.



CHECKING YOUR BELT FOR WEAR: As the belt wears, small cracks will form in each of the ribs on the inside run of the belt. Replace your belt when you can count six cracks within one inch of length (six cracks total from all ribs combined).

10.2 Every six months or so, check your hose clamps for correct tension. The rubber hoses will take a set and the clamps may not be holding as tight. Also check all mounting bolts and nuts, particularly the throttle cable anchor bracket.

10.3 Your air filter is a long-life unit needing service only every 15,000 miles. To clean, you can wash the filter element in soap and water. Use a dish detergent soap such as Dawn, etc. Rinse thoroughly and allow to dry. Wet the filter element with a light application of ATF (automatic transmission fluid). Alternatively, a special cleaning kit is available (901-970)

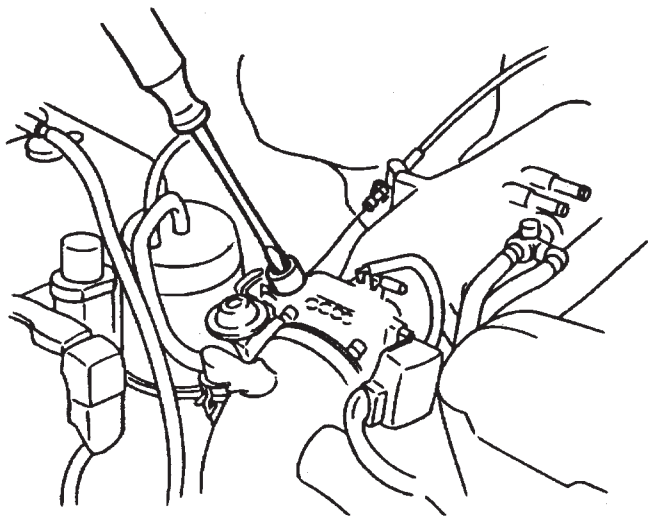
10.4 At every oil change, lubricate the bypass actuator arm contact point and shaft bushing with light grease to insure long life - these parts are exposed to underhood dirt and grime.

TROUBLESHOOTING
SYMPTOM: Engine cranks but will not start.
PROBABLE CAUSES: Airflow meter disconnected; Idle air line open; Low battery voltage.
CURE: Double check that the connector to airflow meter is well connected. Re-check the 3/4" ICS line and the PCV line to see that they are not leaking. Use a known good battery to "jump" the Miata's battery. It is possible to have enough voltage to crank a Miata but not enough to correctly run the engines control computer.

SYMPTOM: No power during boost.
PROBABLE CAUSES: Cross over tube loose.
CURE: Check the cross over tube to see that it is well connected at both ends. Check electrical connections,

SYMPTOM: Unstable Idle.
PROBABLE CAUSE: Idle airscrew set incorrectly; Restrictor left out in step #7.8; air leak in intake track.
CURE: Re-check restrictor. Check idle adjustment procedure in step 8.1 above. Check for air leaks - vacuum at idle should be at least 17.7 in Hg.

11.0 FURTHER MODIFICATIONS
Now that your Miata has a stronger engine, there are a few changes you might want to make to the rest of the car to improve its performance. The following are not required for your supercharged Miata, but are presented as tuning hints for a



better all-around car. When it comes time to put in a new clutch, we recommend the Jackson Racing Stage 1 clutch kit. While your new supercharger and the standard Mazda clutch work well together, it is a good idea to step up to the Jackson Racing unit when you are changing your clutch. Now is the time to upgrade your suspension. Jackson Racing sway bars will tighten your steering response. A set of Jackson Racing Sport lowering springs will lower the car 25mm and make for better handling without the harsh ride of competition springs. Have your car aligned afterward (driver's equivalent weight in the driver's seat) to factory specifications after any suspension changes. A performance muffler will make your supercharged Miata that much faster. Since you are now flowing 300 cubic feet per minute through a muffler designed for 177 cfm, an improvement can be made.

WARRANTY
The supercharger unit itself carries a 2 year or 100,000 mile warranty (for the original purchaser of the kit) against defects in material and workmanship. No other warranties apply. This warranty is void if the subject vehicle is used in any racing activities of any sort.

HELP
If you experience any problems with your kit during installation or operation, contact your retailer or Moss Motors at 888-888-4079.

99-00 Miata ECU Pin-Out Diagram