



SHORT RAM SYSTEM

Installation Instructions for:
Part Number 22-466
2003 Toyota Matrix XRS

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Instruction Part Number: 10-346
2003 Toyota Matrix XRS 1.8L DOHC C.A.R.B. E.O. #D-392-19

Congratulations! You have just purchased the finest Air Induction & Filtration system for your car at any price!

The **AEM** Short Ram Air Intake System is the result of extensive development on a wide variety of cars. It is the most advanced short pipe air intake system on the market. Each system is specifically engineered for its application. All **AEM** Short Ram Air Intake Systems deliver maximum performance gains through lightweight, all-aluminum, mandrel-bent tubing that is tuned in both length and diameter. The aluminum will not crack in extended use like plastic. The tube length and diameter are matched for each specific engine to give power over a broad RPM range. Unlike plastic systems that use a continually diverging cross-section, we take advantage of the acoustical energy in the inlet duct to promote cylinder filling during the intake valve-opening event. Every intake is coated with a high-gloss, heat-reducing Zirconia based powder coating. This special blend of powder coating helps reduce heat penetration, which in turn reduces the temperature of the inlet air charge. The cooler inlet air temperature translates to more power during the combustion process because cool air is denser than warm air. The filter element has also been extensively developed. An integral part of all our filter elements is a built-in velocity stack. This velocity stack is specifically engineered to improve the aerodynamic efficiency of the intake system. We have seen airflow gains on a flow bench of 12-15% by using this velocity stack. The air mass flow to the engine is increased because of the increased airflow and reduced inlet temperature, which translates to more power.

Bill of Materials for: 22-466

1	2-4661	Inlet Pipe
1	21-202	2.75" Air Filter & Clamp
1	444.460.04	6mm Locknut
1	559999	6mmx25mmx1mm Washer
1	1228599	Rubber Mount
1	5-273	3.00" to 2.75" Reducer
1	103-BLO-4820	3.00" Hose Clamp
1	103-BLO-4420	2.75" Hose Clamp
2	1-2028	8-32 x 1/2" Cap Screw
23"	516-006	5/16" Vacuum Hose
1	8-105	1/8" Vacuum Cap
2	1-113	6" Zip Tie
1	1-2065	M6 x 1.0 x 12mm Hex Bolt
1	1-2066	M8 x 1.25 x 25mm Hex Bolt
1	32-3015	VSV Bracket Assembly
1	2-665	VSV Bracket Spacer
1	10-346	Instructions
2	10-922S	AEM Silver Decal
1	10-400W	White License Plate Frame

Read and understand these instructions **BEFORE** attempting to install this product.

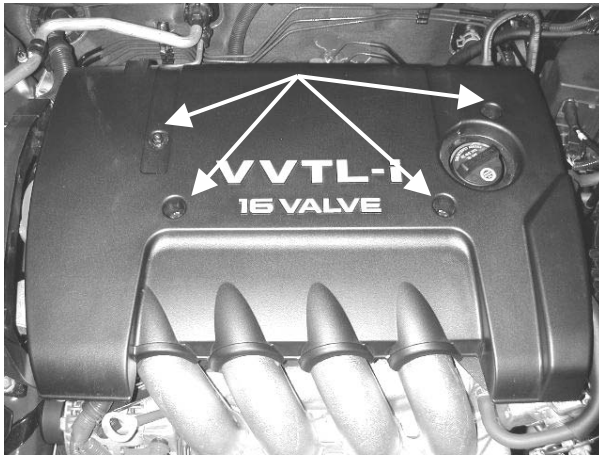
Note: This inlet pipe kit requires the removal and reinstallation of emissions related components. If you are not familiar with the installation and/or the operation of these components then please refer this installation to a qualified professional.

1) Getting started

- a) Make sure vehicle is parked on a level surface.
- b) Set parking brake.
- c) Disconnect both battery terminals.
- d) If engine has run within the past two hours let it cool down.

2) Removing the stock air inlet system

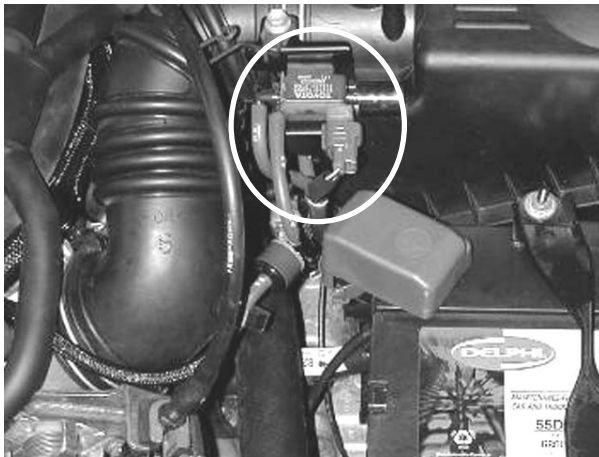
- a) Before removing any of the O.E. components, label each individual part so that no components become mixed up during the installation process. There are three Vacuum Switching Valves (VSV), and one air flow meter that have electrical and/or vacuum connections going to them. Be sure to label these connections before disconnecting them.



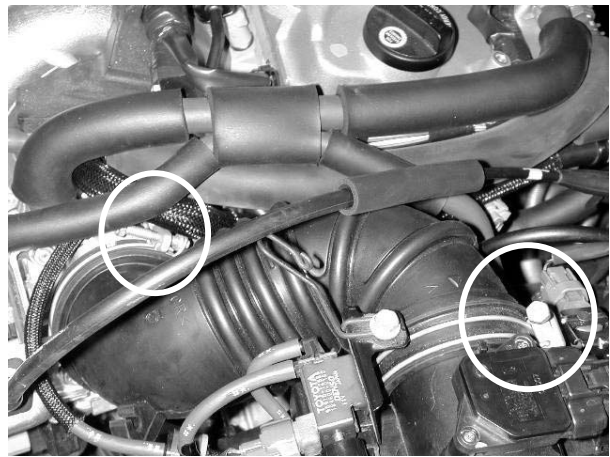
b) Remove the three bolts and one nut that hold the plastic engine cover on. Remove the cover.



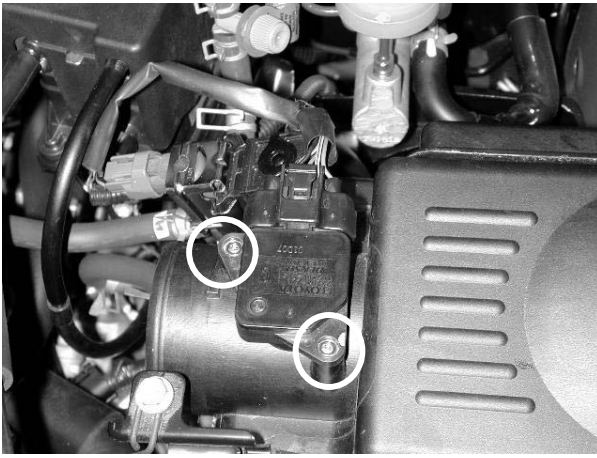
c) Remove the bolt in the radiator support that holds the battery bracket. Unhook the rod at the rear of the battery bracket. Remove the battery from the vehicle.



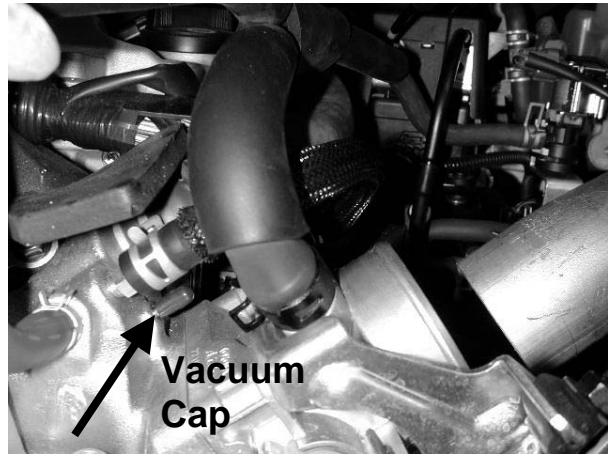
d) Unplug the brown connector from the VSV on the front of the air box cover. This VSV controls the auxiliary intake air control. This VSV will be removed from the vehicle and will not be used in conjunction with the **AEM** inlet system.



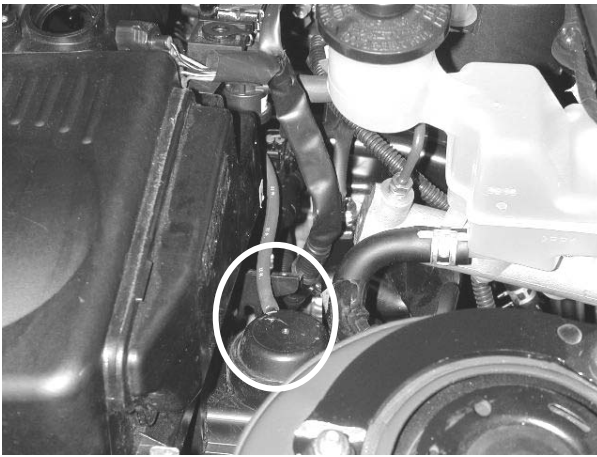
e) Loosen the two 10mm hose clamps at the throttle body and air box. Remove the stock rubber intake hose from the engine bay.



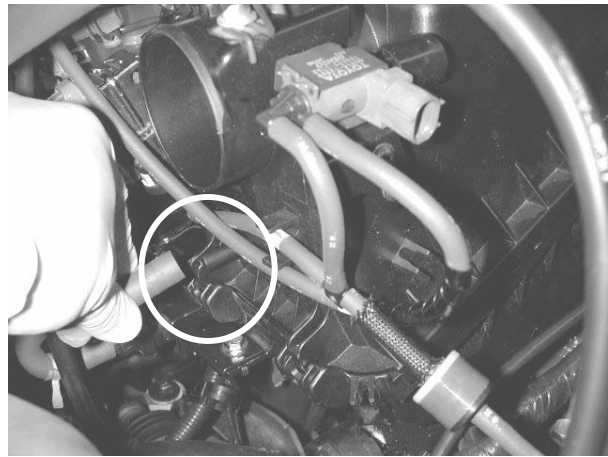
f) Remove the air flow meter connector, and then remove the air flow meter by loosening the two small screws. Be extremely careful with this component as it can be damaged easily. Set the air flow meter aside in a safe place.



g) Remove the small vacuum line from the nipple on the intake manifold above the throttle body. Place the **AEM** supplied 1/8" vacuum cap on the exposed vacuum nipple.



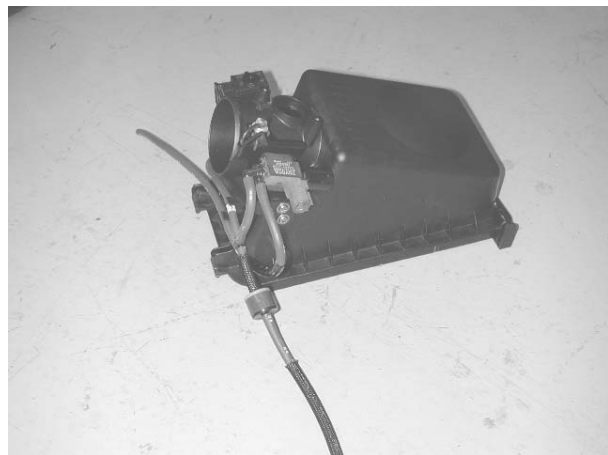
h) Remove the vacuum line from the auxiliary intake air control vacuum diaphragm. This diaphragm is located on the backside of the air box.



i) Remove the large vacuum line from the engine side of the air box cover.



j) Release the two air box cover clips and lift the air box cover to gain access to the VSV with the blue connector on the back side of the cover. Press the tab on the VSV and slide **upwards** to release the VSV from the air box cover.



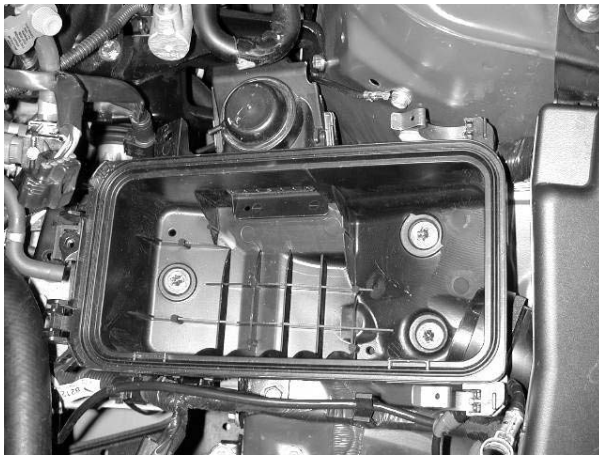
k) Remove the air box cover from the vehicle. The VSV for the auxiliary intake air control and the associated vacuum lines should come out with the air box cover.



l) Remove the bolt holding the lower VSV bracket to the air box.



m) Remove the Phillips head screw that holds the metal bracket to the VSV. This bracket will not be reused with the **AEM** inlet system.



n) Remove the three bolts retaining the lower air box. Remove the lower air box from the vehicle.



o) Remove the stock intake air duct from the engine bay. The duct is retained by one bolt and one plastic rivet. Pry the center of the plastic rivet up with a small screwdriver, then the entire rivet should pull out.

3) Installing the AEM Short Ram Intake

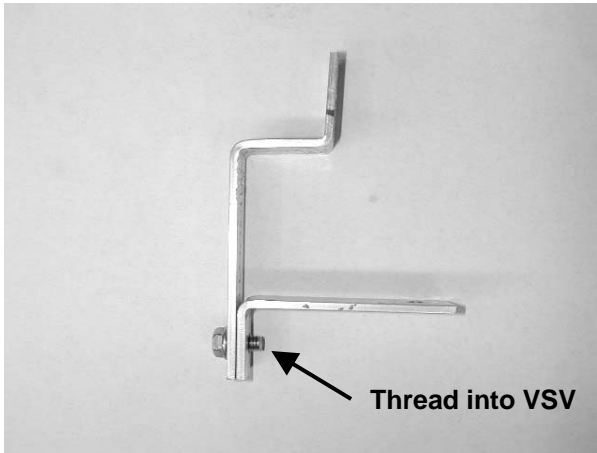
a) When installing the Short Ram Intake System, DO NOT completely tighten the hose clamps or mounting tab hardware until instructed to do so later in these instructions. Check to see that the inside of the **AEM** inlet pipe and air filter are clean and free from any foreign objects and/or obstructions.



b) Remove the forward-most M8 bolt from the black bracket under the brake master cylinder.



c) Place the supplied VSV bracket spacer in line with the hole exposed in the previous step.



d) Using the supplied M6 bolt, mount the VSV bracket assembly to the lower VSV from step 2m.



e) Use the supplied M8 bolt to secure the assembly to the bracket beneath the master cylinder. Be sure that the spacer remains in place. Rest the upper VSV on the bracket as shown. The rear vacuum line may need to be pulled back slightly to clear the bracket.



f) Use one of the supplied zip ties to secure the upper VSV to the bracket. Make sure the zip tie rests in the notches in the bracket to ensure that it does not slide off.



g) Mount the MAF sensor to the adaptor on the underside of the **AEM** inlet pipe using the two supplied 8-32 cap screws.



h) Place the supplied silicone coupler on the throttle body. Use the 3.00" hose clamp on the throttle body end and the 2.75" clamp on the **AEM** inlet pipe end.



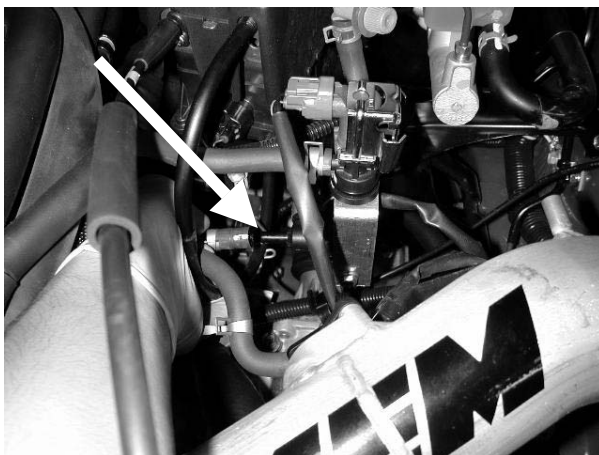
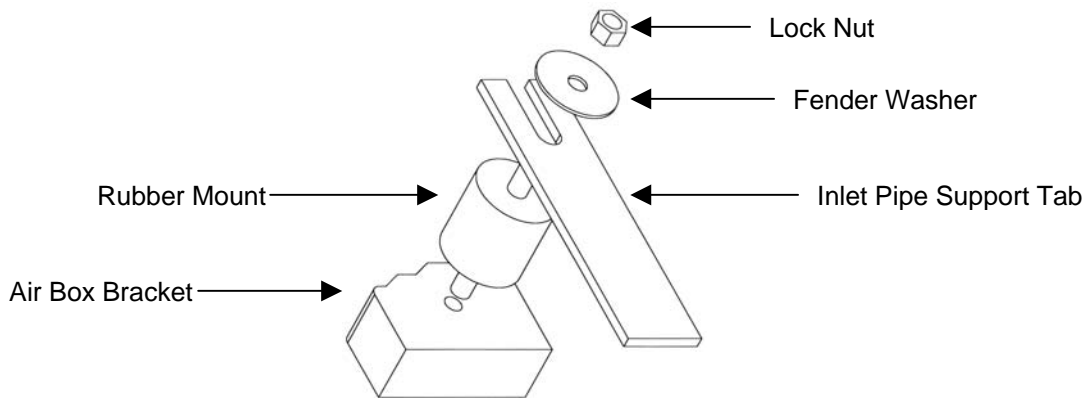
i) Install the supplied rubber mount into the metal lower air box bracket.



j) Install the **AEM** inlet pipe into the engine bay with the **AEM** filter already installed. The bracket should line up with the rubber mount. Loosely secure the bracket to the rubber mount with the supplied M6 washer and lock nut. Refer to the following diagram for proper soft mount installation.



k) Install the throttle body end of the pipe into the silicone coupler. Plug in the MAF sensor on the back side of the pipe. **Note: Failure to plug the MAF sensor in will cause the check engine light to illuminate and the vehicle to run poorly.**



l) Remove the engine-side vacuum line from the lower VSV. This is the line that is not connected to anything at this point.



m) Replace the vacuum line removed in the previous step with the supplied length of 5/16" vacuum hose. Reuse the stock spring clamp.



n) Use the other stock spring clamp on the inlet pipe side of the 5/16" vacuum hose. Route the hose carefully to avoid kinks.



o) Use the second supplied zip tie to secure the brown VSV connector to the positive battery cable. This connector will not be used with the *AEM* intake system.

- p) Re-install the battery in the reverse order of removal.
- q) Position the inlet pipe for best fitment. Be sure that the pipe or any other components do not contact any part of the vehicle. Tighten the hose clamps at the throttle body and then tighten the nut on the rubber mount.
- r) Check for proper hood and radiator clearance. Re-adjust pipe if necessary.
- v) Inspect the engine bay for any loose tools and check that all fasteners that were moved or removed are tight.
- w) Start vehicle and check for proper operation of all the components that were removed.

Note: If vehicle was started without one of the VSV's or the air flow meter connected then the "Check Engine" light may come on. If this happens turn the engine off and disconnect the battery for one minute. Reconnect the battery and restart the engine.



Before



After

For Technical Inquiries
E-Mail Us At
tech@aempower.com