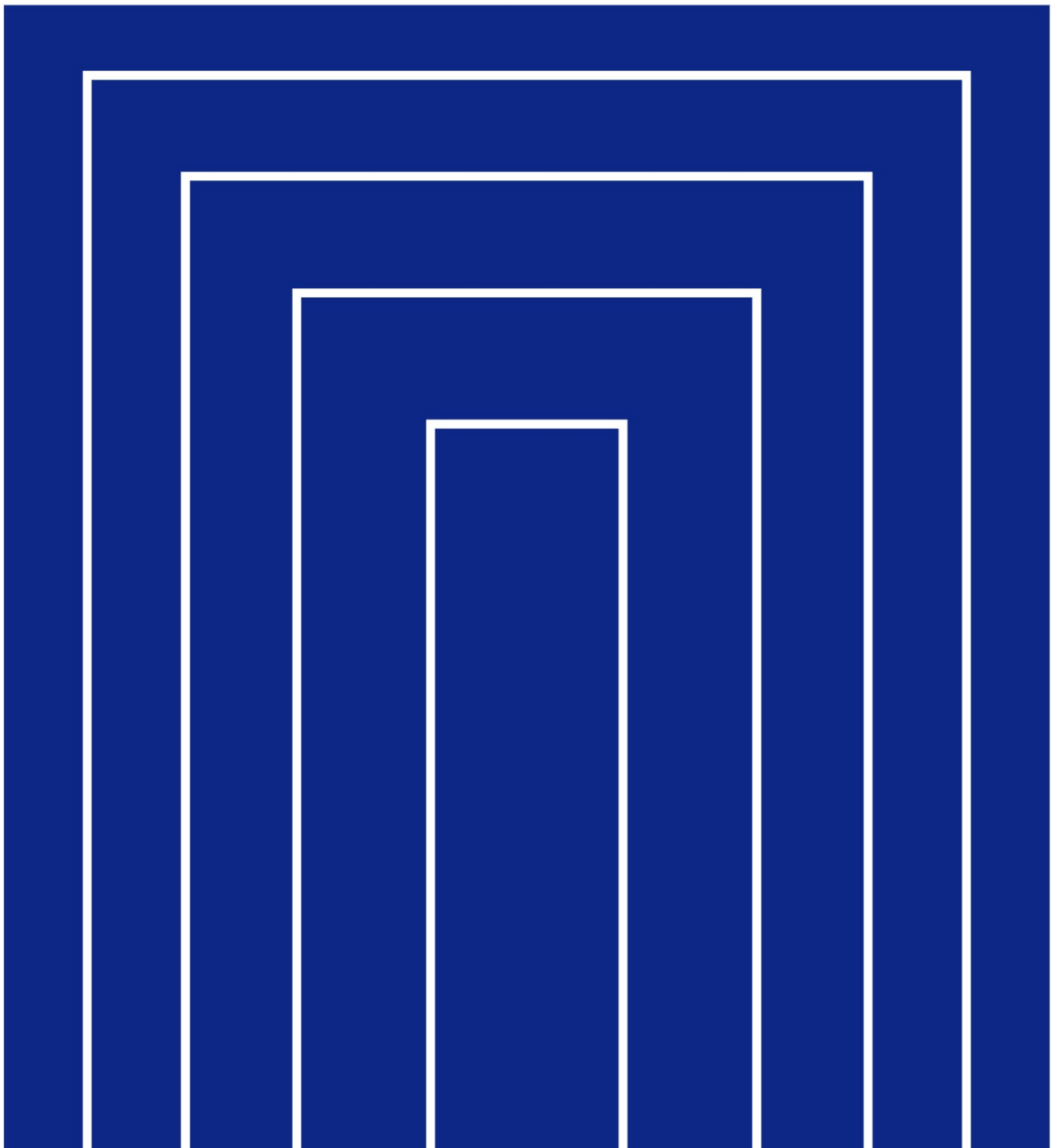
TOYOTA

3F, 3F-E ENGINE

REPAIR MANUAL FOR EMISSION CONTROL

Jan., 1990



Pub. No. ERM068E

FOREWORD

This repair manual has been prepared to provide information covering general service repairs for the Emission Control System of the 3F, 3F-E engines.

Applicable models: FJ80 series

For service of the 3F, 3F-E engines, refer to the following repair manual.

Manual Name	Pub. No.
• 3F Engine Repair Manual • 3F-E Engine Repair Manual Supplement	36253E RM134E

All information contained in this manual is the most up-to-date at the time of publication. However, specifications and procedures are subject to change without notice.

TOYOTA MOTOR CORPORATION

TOYOTA 3F, 3F-E ENGINE EMISSION CONTROL REPAIR MANUAL

INTRODUCTION 1
TROUBLESHOOTING 2
3F ENGINE EMISSION CONTROL SYSTEMS 3
3F ENGINE ADJUSTMENT 4
3F-E ENGINE EMISSION CONTROL SYSTEMS 5
3F-E ENGINE ADJUSTMENT 6
SIMPLE CHECK METHOD 7
SPECIFICATIONS A

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INTRODUCTION

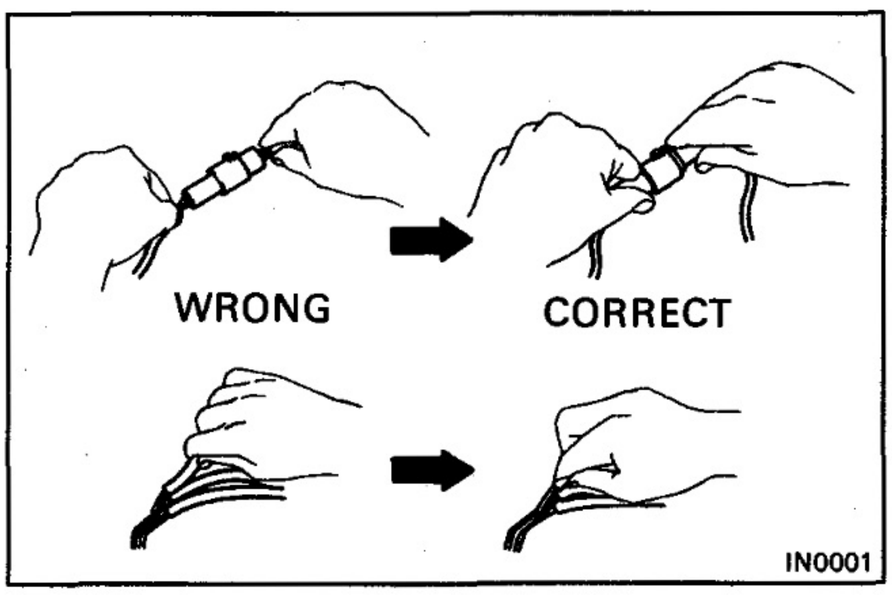
	Page
GENERAL PRECAUTIONS	1-2
PRECAUTIONS FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER	1-3
ABBREVIATIONS USED IN THIS MANUAL	1-4

GENERAL PRECAUTIONS

1. **Know the importance of periodic maintenance.**
   (a) Every service item in the periodic maintenance list must be performed.
   (b) Failing to do even one item can cause the engine to run poorly and increase exhaust emissions.

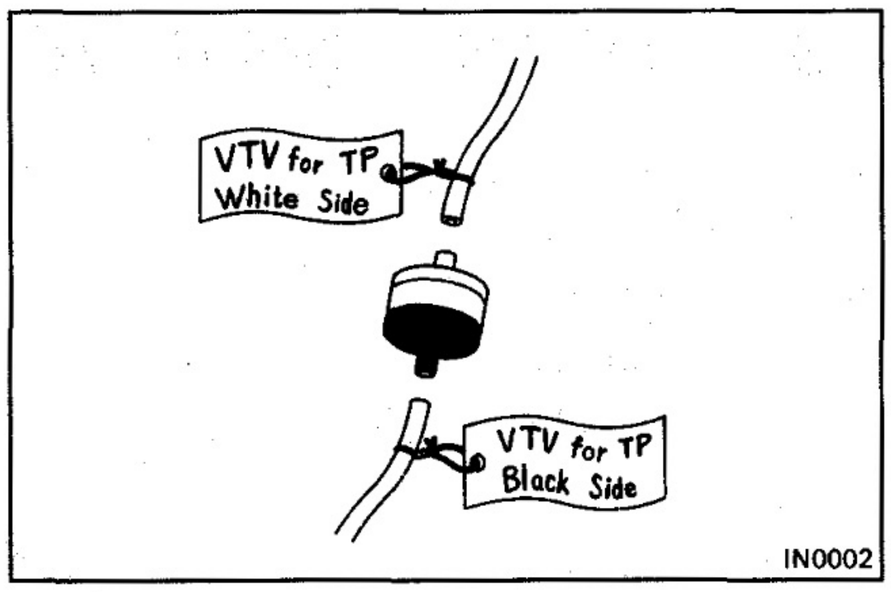
2. **Listen to the customers comments carefully.**
   Always determine exactly what the customer's complaint is, if any, and verify it before proceeding with repairs.

3. **Determine if you have an engine or emission system problem.**
   (a) Engine problems are usually not caused by the emission control systems.
   (b) When troubleshooting, always check the engine and the ignition system first.



4. **Check hose and wiring connections first.**
   The most frequent cause of problems is simply a bad wiring or vacuum hose connection. Always make sure that all connections are secure and correct.

5. **Observe the following precautions to avoid damage to the parts:**
   (a) Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
   (b) To disconnect vacuum hoses, pull on the end, not the middle of the hose.
   (c) To pull apart electrical connectors, pull on the connector itself, not the wires.
   (d) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
   (e) When steam cleaning an engine, protect the distributor, air filter, intake, and EGR vacuum modulator from water.
   (f) Never use an impact wrench to remove or install thermo switches or thermo sensors.
   (g) When checking continuity at a wire connector, insert the tester probe carefully to prevent bending the terminals.
   (h) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter instead. Once the hose has been stretched, it may leak.



6. Tag hoses before disconnecting them:

(a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.

(b) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

7. Use genuine parts.

8. Perform work safely.

(a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels.

(b) After the vehicle is jacked up, do not fail to support it on stands. It is extremely dangerous to do any work on the vehicle raised on a jack alone, even for a small job that can be finished quickly.

(c) Disconnect the battery cable from the negative (–) terminal of the battery to make work safer when replacing electrical parts or working on parts near an electrical source.

PRECAUTIONS FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

CAUTION: If large amounts of unburnt gasoline flow into the catalytic converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

1. Use only unleaded gasoline.

2. Avoid prolonged idling.

Avoid running the engine at fast idle speed for more than 10 minutes and at idle speed for more than 20 minutes.

3. Avoid spark jump test.

(a) Perform spark jump test only when absolutely necessary and as quickly as possible.

(b) Never race the engine while testing.

4. Avoid prolonged engine compression measurement.

Engine compression tests must be make as quickly as possible.

5. Do not run engine when fuel tank is nearly empty.

This may cause the engine to misfire and create an extra load on the catalytic converter.

6. Avoid coating with ignition turned off and prolonged engine braking.

7. Do not dispose of used catalytic converter along with parts contaminated gasoline or oil.

ABBREVIATIONS USED IN THIS MANUAL

AI	Air Injection
ASV	Air Switching Valve
A/T	Automatic Transmission
BTDC	Before Top Dead Center
BVSV	Bimetal Vacuum Switching Valve
CB	Choke Breaker
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
EGR	Exhaust Gas Recirculation
EVAP	Fuel Evaporative Emission Control
G.C.C.	Gulf Cooperation Council Countries
HAI	Automatic Hot Air Intake
IG	Ignition
M/T	Manual Transmission
OVCV	Outer Vent Control Valve
PCV	Positive Crankcase Ventilation
SC	Spark Control
SST	Special Service Tool
TP	Throttle Positioner
TWC	Three-way Catalyst
VCV	Vacuum Control Valve
VSV	Vacuum Switching Valve
w/	With
w/o	Without

TROUBLESHOOTING

Page

(3F engine)

ENGINE OVERHEATING 2-2
HARD STARTING 2-2
ROUGH IDLING 2-2
ENGINE HESITATES/POOR ACCELERATION 2-3
ENGINE DIESELING 2-3
AFTER FIRE, BACKFIRE 2-4
EXCESSIVE OIL CONSUMPTION 2-4
EXCESSIVE FUEL CONSUMPTION 2-4
UNPLEASANT ODOR 2-5

(3F-E engine)

ENGINE OVERHEATING 2-6
HARD STARTING 2-6
ROUGH IDLING 2-6
ENGINE HESITATES/POOR ACCELERATION 2-7
ENGINE DIESELING 2-8
AFTER FIRE, BACKFIRE 2-8
EXCESSIVE OIL CONSUMPTION 2-8
EXCESSIVE FUEL CONSUMPTION 2-9
UNPLEASANT ODOR 2-9

ENGINE OVERHEATING

Problem	Possible cause	Remedy
Engine overheats	Cooling system faulty	Troubleshoot cooling system
	Incorrect ignition timing	Reset timing

HARD STARTING

Problem	Possible cause	Remedy
Engine will not crank or cranks slowly	Starting system faulty	Troubleshoot starting system
Engine will not start/ Hard to start (cranks OK)	No fuel supply to carburetor	Troubleshoot fuel system
	Carburetor problems ● Choke operating ● Flooding ● Needle valve sticking or clogged ● Vacuum hose disconnected or damaged ● Fuel cut solenoid valve not open ● Secondary throttle valve not close	Repair as necessary
	No fuel in tank	
	Fuel pump working	
	Fuel filter clogged	
	Fuel line clogged or leaking	
	Ignition problems	Perform spark test
	● Ignition coil	Inspect coil
	● Igniter	
	● Distributor	Inspect distributor
	Spark plugs faulty	Inspect plugs
	High-tension cords disconnected or broken	Inspect cords
	Vacuum leaks ● PCV hoses ● Intake manifold	Repair as necessary
	Low compression	Check compression

ROUGH IDLING

Problem	Possible cause	Remedy
Rough idle, stalls or misses	Spark plugs faulty	Inspect plugs
	High-tension cords faulty	Inspect cords
	Ignition problems	
	● Ignition coil	Inspect distributor
	● Igniter	
	● Distributor	Incorrect ignition timing
	Inspect coil	Reset timing
	Vacuum leaks	Repair as necessary
	● PCV hoses	
	● Intake manifold	
	● Air intake chamber	Adjust idle
	Incorrect idle speed	Repair as necessary

ROUGH IDLING (Cont'd)

Problem	Possible cause	Remedy
Rough idle, stalls or misses	Carburetor problems ● Incorrect idle speed ● Slow jet clogged ● Incorrect idle mixture ● Fuel cut solenoid valve not open ● Incorrect fast idle speed setting (cold engine) ● Choke system faulty	Repair as necessary
	HAI system faulty (w/ HAI)	Check HAI system
	Engine overheats	Check cooling system
	Low compression	Check compression
	Incorrect valve clearance	Adjust valve clearance

ENGINE HESITATES/POOR ACCELERATION

Problem	Possible cause	Remedy
Engine hesitates/ Poor acceleration	Spark plugs faulty	Inspect plugs
	High-tension cords faulty	Inspect cords
	Carburetor problems ● Float level too low ● Accelerator pump faulty ● Power valve faulty ● Choke valve closed (hot engine) ● Choke system ● Secondary throttle stopper operation faulty (cold engine)	Repair as necessary
	Vacuum leaks ● PCV hoses ● Intake manifold ● Air intake chamber	Repair as necessary
	Incorrect ignition timing	Reset timing
	Fuel system clogged	Check fuel system
	Engine overheats	Check cooling system
	Low compression	Check compression

ENGINE DIESELING

Problem	Possible cause	Remedy
Engine dieseling (runs after ignition switch is turned off)	Carburetor problems ● Linkage sticking ● Idle speed or fast idle speed out of adjustment ● Fuel cut solenoid faulty	Repair as necessary
	Incorrect ignition timing	Reset timing

AFTER FIRE, BACKFIRE

Problem	Possible cause	Remedy
Muffler explosion (after fire) on deceleration only	Deceleration fuel cut system always off Incorrect carburetor idle mixture	Check fuel cut system Idle mixture edjusting
Muffler explosion (after fire) all the time	Air cleaner clogged Choke system faulty Incorrect ignition timing Incorrect valve clearance	Check air cleaner Check choke system Reset timing Adjust valve clearance
Engine backfires	Choke valve open (cold engine) Carburetor vacuum leak Vacuum leak ● PCV hoses ● Intake manifold Insufficient fuel flow Incorrect ignition timing Incorrect valve clearance Carbon deposits in combustion chambers	Check choke system Check hoses and repair as necessary Check hoses and repair as necessary Troubleshoot fuel system Reset timing Adjust valve clearance Inspect cylinder head

EXCESSIVE OIL CONSUMPTION

Problem	Possible cause	Remedy
Excessive oil consumption	Oil leak PCV line clogged Piston ring worn or damaged Valve stem and guide worn Valve stem oil seal worn or damaged	Repair as necessary Check PCV system Check rings Check valves and guides Check oil seal

EXCESSIVE FUEL CONSUMPTION

Problem	Possible cause	Remedy
Excessive fuel consumption	Fuel leak Air cleaner clogged Incorrect ignition timing Carburetor problems ● Choke system faulty ● Idle speed too high ● Deceleration fuel system faulty ● Power valve always open Spark plugs faulty Low compression Tires improperly inflated Clutch slips Brakes drag	Repair as necessary Check air cleaner Reset timing Perform on-vehicle Inspection of carburetor Repair as necessary Inspect plugs Check compression Inflate tires to proper pressure Troubleshoot clutch Troubleshoot brakes

UNPLEASANT ODOR

Problem	Possible cause	Remedy
Unpleasant odor	Incorrect idle speed Incorrect ignition timing Vacuum leaks ● PCV hoses ● Intake manifold	Adjust idle Reset timing Repair as necessary

ENGINE OVERHEATING

Problem	Possible cause	Remedy
Engine overheats	Cooling system faulty	Troubleshoot cooling system
	Incorrect ignition timing	Reset timing

HARD STARTING

Problem	Possible cause	Remedy
Engine will not crank or cranks slowly	Starting system faulty	Troubleshoot starting system
Engine will not start/ hard to start (cranks OK)	No fuel supply to injector ● No fuel in tank ● Fuel pump not working ● Fuel filter clogged ● Fuel line clogged or leaking	Troubleshoot EFI system
	EFI system problems	Repair as necessary
	Ignition problems ● Ignition coil ● Igniter ● Distributor	Perform spark test
	Spark plugs faulty	Inspect plugs
	High-tension cords disconnected or broken	Inspect cords
	Vacuum leaks ● PCV line ● EGR line ● Intake manifold ● Air intake chamber ● Throttle body ● ISC valve ● Brake booster line	Repair as necessary
	Pulling in air between air flow meter and throttle body	Repair as necessary
	Low compression	Check compression

ROUGH IDLING

Problem	Possible cause	Remedy
Rough idle, stalls or misses	Spark plugs faulty	Inspect plugs
	High-tension cords faulty	Inspect cords
	Ignition problems ● Ignition coil ● Igniter ● Distributor	Inspect coil Inspect igniter Inspect distributor
	Incorrect ignition timing	Reset timing
	Vacuum leaks ● PCV line ● EGR line ● Intake manifold ● Air intake chamber	Repair as necessary

ROUGH IDLING (Cont'd)

Problem	Possible cause	Remedy
Rough idle, stalls or misses (Cont'd)	• Throttle body • ISC valve • Brake booster line	
	Pulling in air between air flow meter and throttle body	
	Incorrect idle speed	Check ISC system
	Incorrect valve clearance	Adjust valve clearance
	EFI system problems	Repair as necessary
	Engine overheats	Check cooling system
	Low compression	Check compression

ENGINE HESITATES/POOR ACCELERATION

Problem	Possible cause	Remedy
Engine hesitates/ poor acceleration	Spark plugs faulty	Inspect plugs
	High-tension cords faulty	Inspect cords
	Vacuum leaks • PCV line • EGR line • Intake manifold • Air intake chamber • Throttle body • ISC valve • Brake booster line	Repair as necessary
	Pulling in air between air flow meter and throttle body	Repair as necessary
	Incorrect ignition timing	Reset timing
	Incorrect valve clearance	Adjust valve clearance
	Fuel system clogged	Check fuel system
	Air cleaner clogged	Check air cleaner
	EFI system problems	Repair as necessary
	Emission control system problem (cold engine) • EGR system always on	Check EGR system
	Engine overheats	Check cooling system
	Low compression	Check compression

ENGINE DIESELING

Problem	Possible cause	Remedy
Engine diesels (run after ignition) switch turned off)	EFI system problems	Repair as necessary

AFTER FIRE, BACKFIRE

Problem	Possible cause	Remedy
Muffler explosion (after fire on deceleration only)	Deceleration fuel cut system always off	Check EFI (fuel cut) system
Muffler explosion (after fire) all the time	Air cleaner clogged EFI system problems Incorrect ignition timing	Check air cleaner Repair as necessary Reset timing
Engine backfires	EFI system problems Vacuum leak ● PCV line ● EGR line ● Intake manifold ● Air intake chamber ● Throttle body ● ISC valve ● Brake booster line Pulling in air between air flow meter and throttle body Insufficient fuel flow Incorrect ignition timing Incorrect valve clearance Carbon deposits in combustion chambers	Repair as necessary Check hoses and repair as necessary Repair as necessary Troubleshoot fuel system Reset timing Adjust valve clearance Inspect cylinder head

EXCESSIVE OIL CONSUMPTION

Problem	Possible cause	Remedy
Excessive oil consumption	Oil leak PCV line clogged Piston rings worn or damaged Valve stem and guide worn Valve stem seal worn	Repair as necessary Check PCV system Check rings Check valves and guide bushing Check seals

EXCESSIVE FUEL CONSUMPTION

Problem	Possible cause	Remedy
Excessive fuel consumption	Fuel leak	Repair as necessary
	Air cleaner clogged	Check air cleaner
	Incorrect ignition timing	Reset timing
	EFI system problems ● Injector faulty ● Deceleration fuel cut system faulty	Reset timing
	Idle speed too high	Check ISC system
	Spark plugs faulty	Inspect plugs
	EGR system always on	Check EGR system
	Low compression	Check compression
	Tires improperly inflated	Inflate tires to proper pressure
	Brakes drag	Troubleshoot brakes

UNPLEASANT ODOR

Problem	Possible cause	Remedy
Unpleasant oder	Incorrect idle speed	Check ISC system
	Incorrect ignition timing	Reset timing
	Vacuum leaks ● PCV line ● EGR line ● Intake manifold ● Air intake chamber ● Throttle body ● ISC valve ● Brake booster line	Repair as necessary
	EFI system problems	Repair as necessary

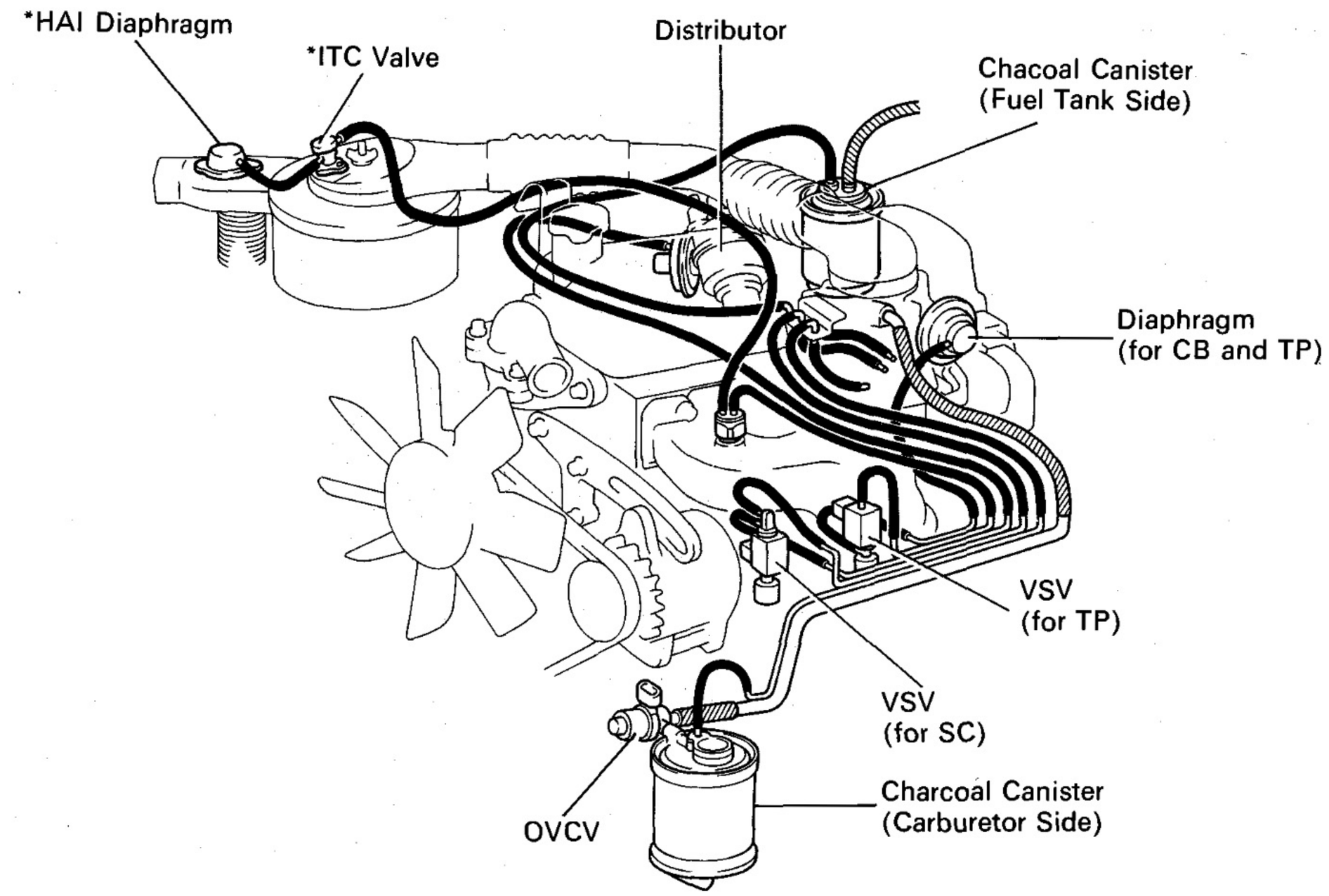
3F ENGINE EMISSION CONTROL SYSTEMS

	Page
SYSTEM PURPOSE	3-2
COMPONENT LAYOUT AND SCHEMATIC DRAWING	3-3
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	3-6
EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM	3-8
THROTTLE POSITIONER (TP) SYSTEM	3-11
SPARK CONTROL (SC) SYSTEM	3-15
AUXILIARY SYSTEM	3-21
1. Automatic Hot Air Intake (HAI) System	3-21
2. Choke Breaker (CB) System	3-23
3. Deceleration Fuel Cut System	3-24

SYSTEM PURPOSE

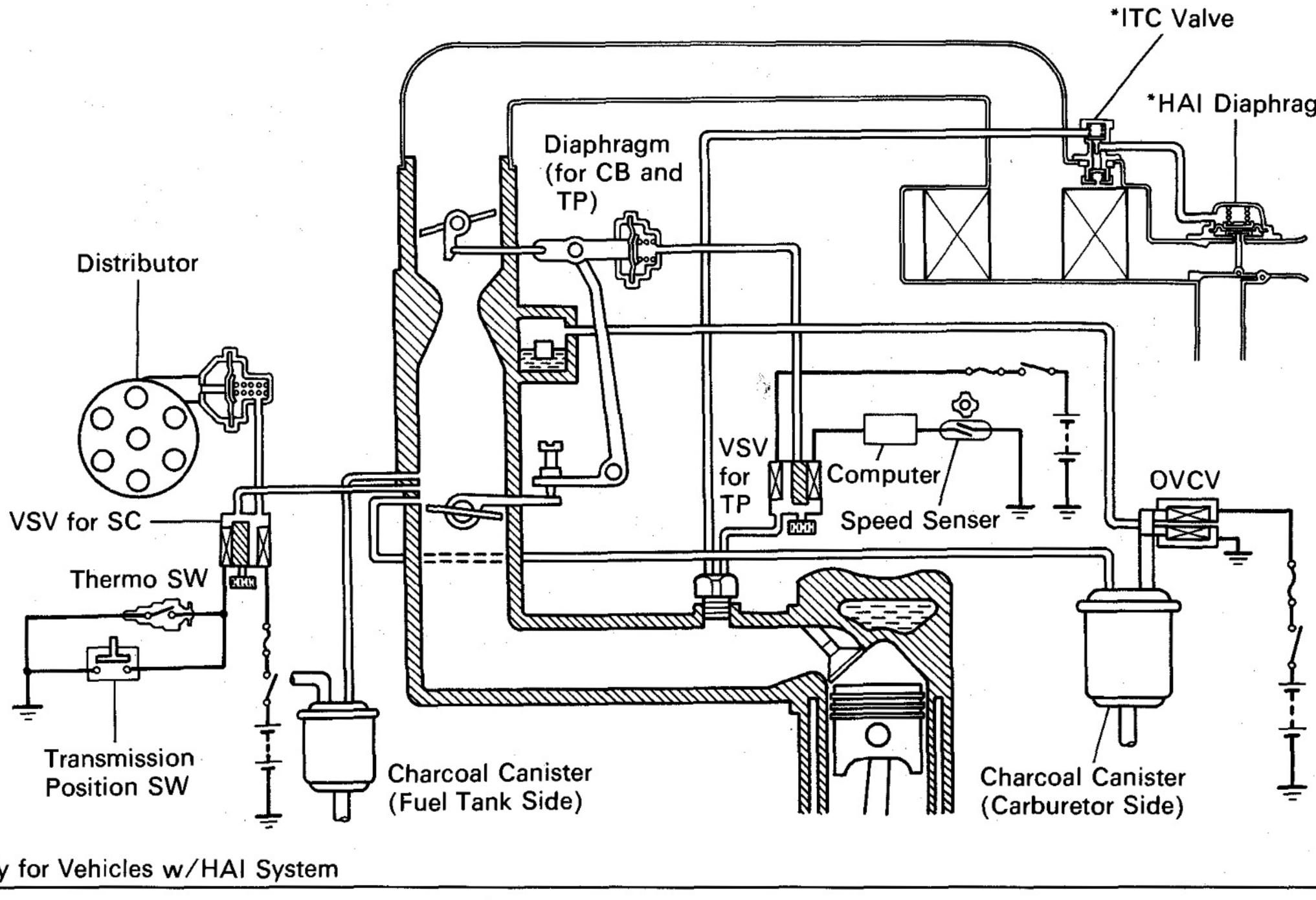
System	Abbreviation	Purpose	Applicable Model
Positive crankcase ventilation	PCV	Reduces blow-by gas (HC)	FJ80 – Q, V
Fuel evaporative emission control	EVAP	Reduces evaporative HC	FJ80 – Q, V
Throttle positioner	TP	Reduces HC and CO	FJ80 – V
Spark control	SC	Reduces NOx and HC	FJ80 – V
Auxiliary system:			
Automatic hot air intake	HAI	Improves driveability-cold	FJ80 – Q, V
Choke breaker	CB	Improves driveability-cold	FJ80 – Q, V
Deceleration fuel cut system	–	Reduces HC	FJ80 – Q

COMPONENT LAYOUT AND SCHEMATIC DRAWING (M/T Vehicles for G.C.C.)



*Only for Vehicles w/HAI System

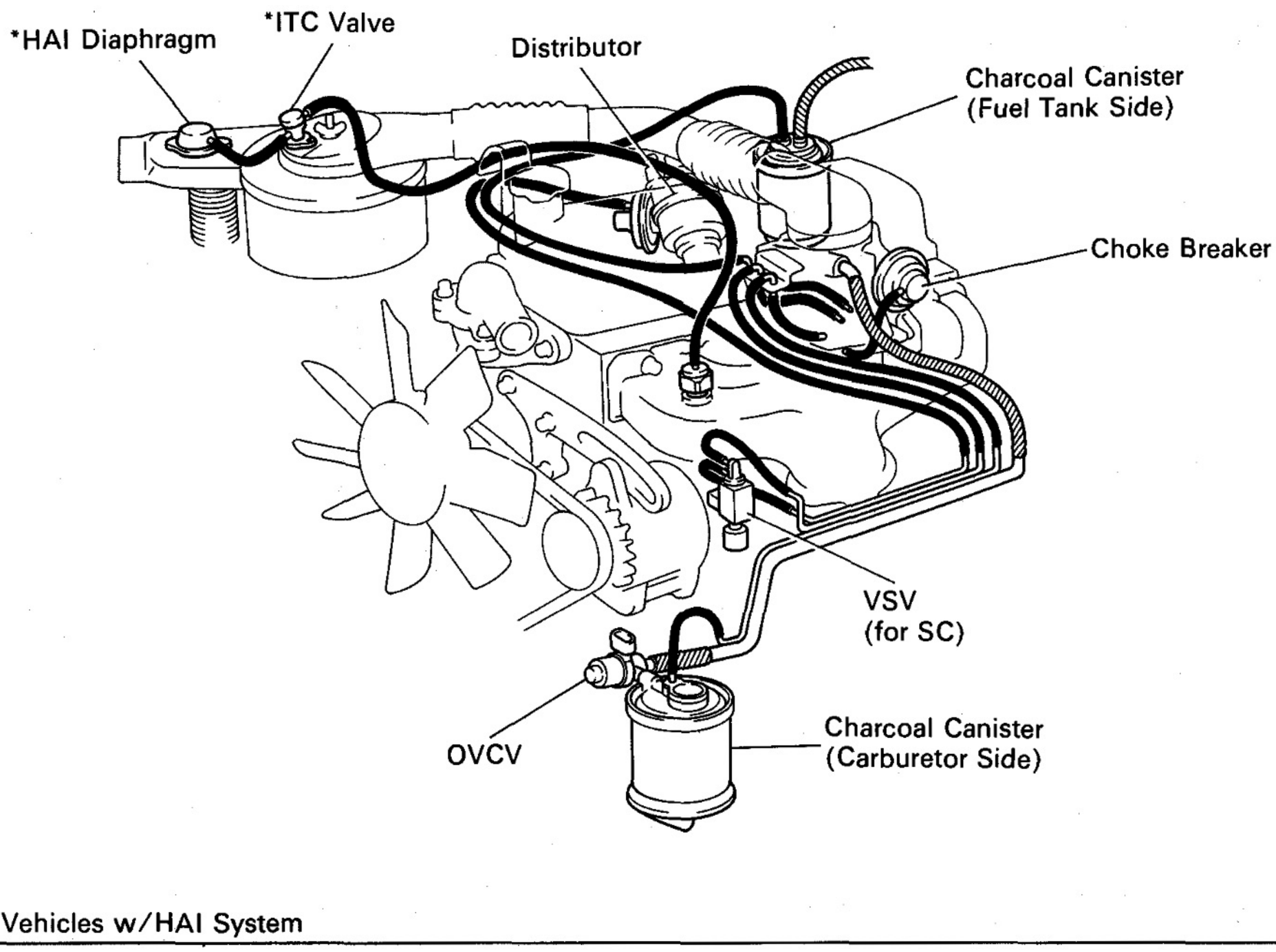
EC4161



*Only for Vehicles w/HAI System

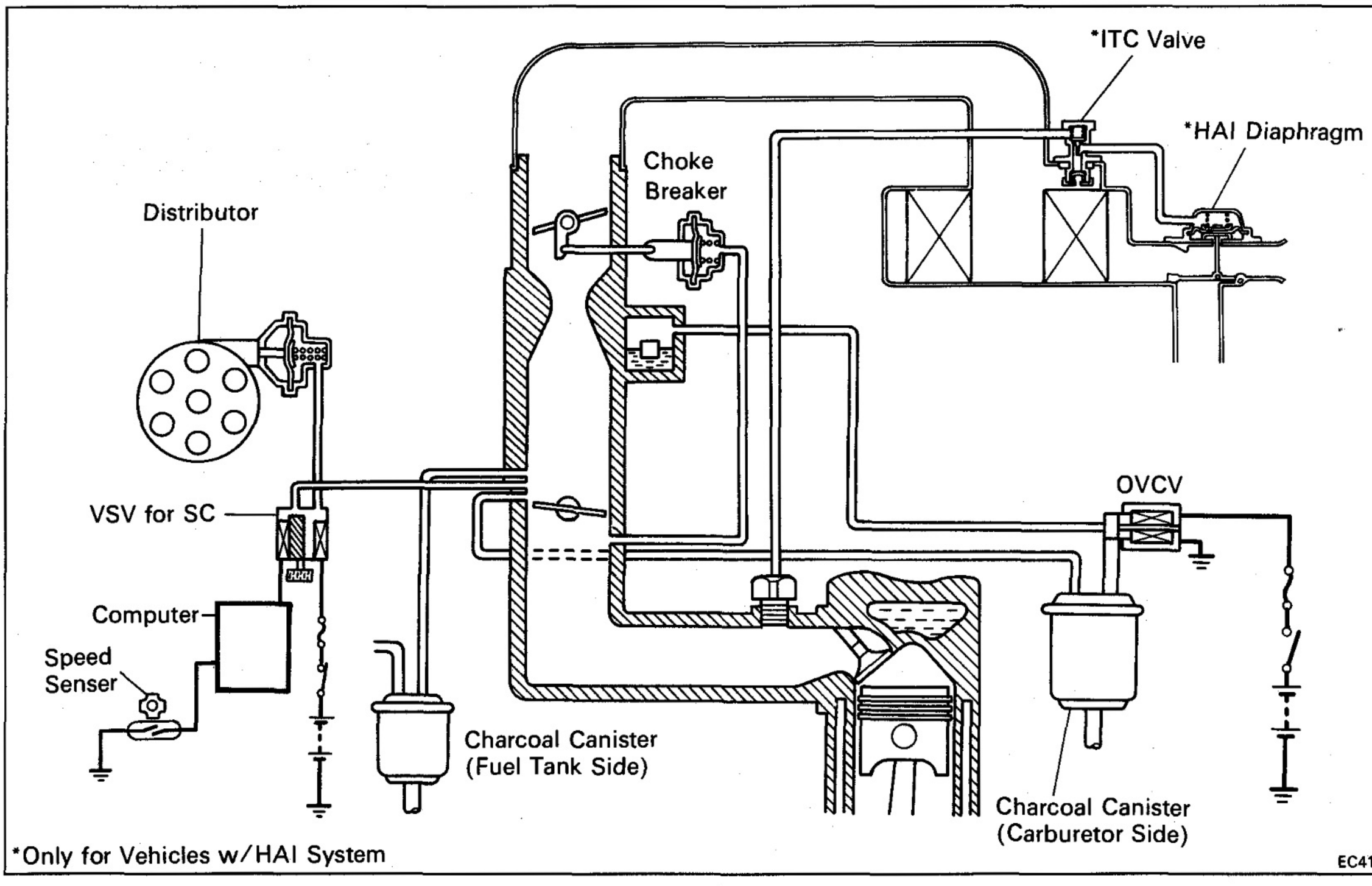
EC4162

COMPONENT LAYOUT AND SCHEMATIC DRAWING (A/T Vehicles for G.C.C.)



*Only for Vehicles w/HAI System

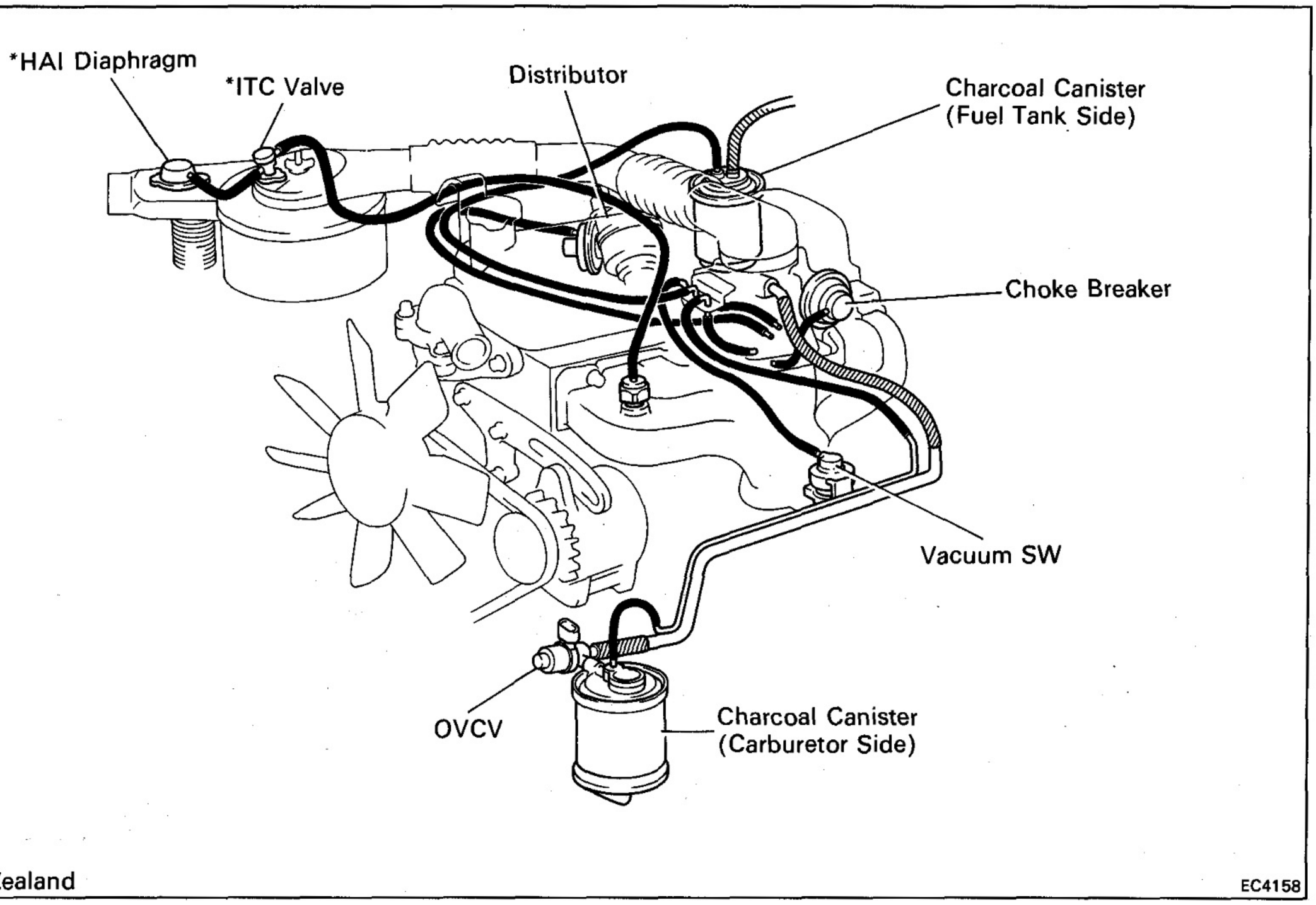
EC4160



*Only for Vehicles w/HAI System

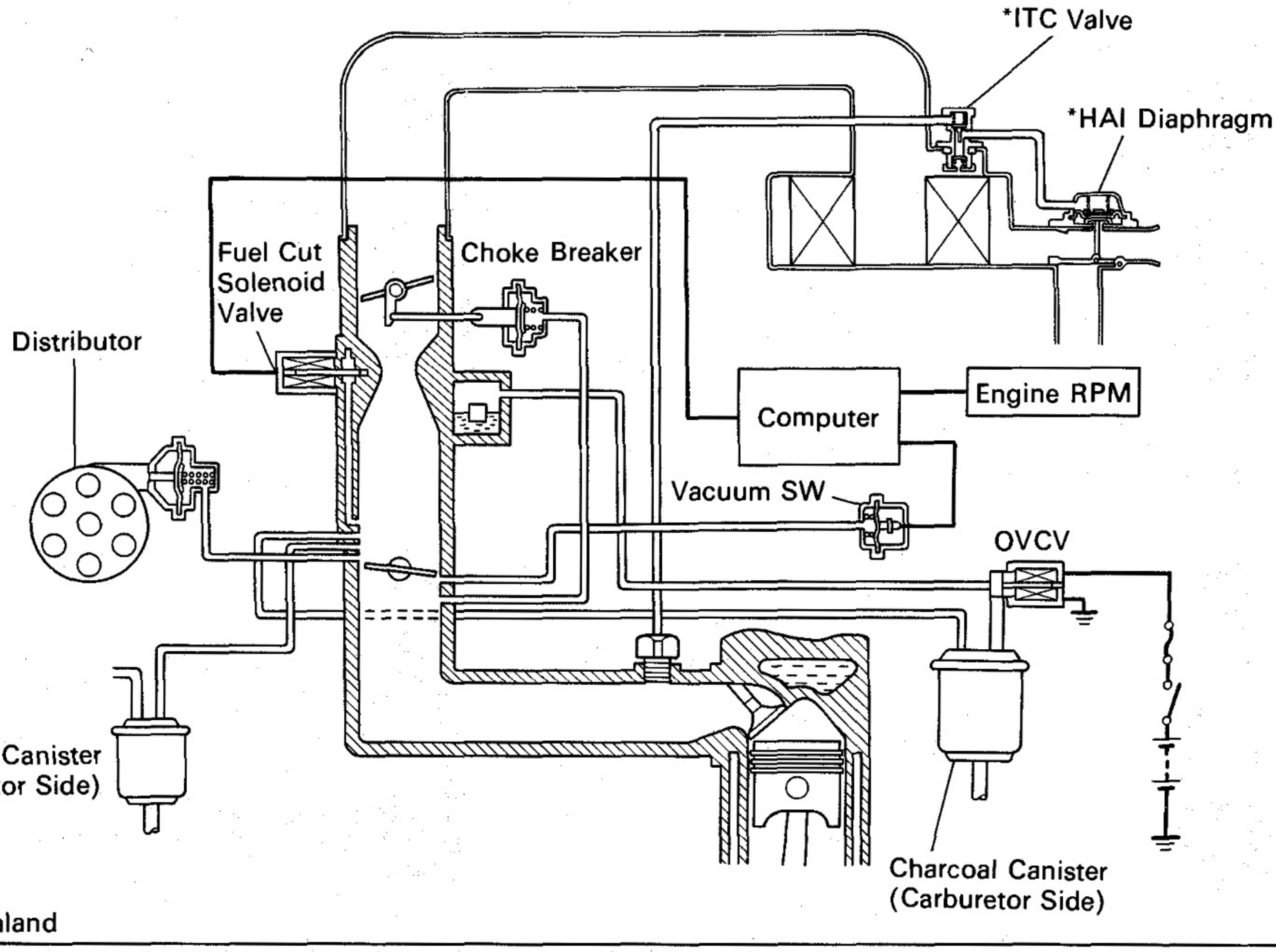
EC4159

COMPONENT LAYOUT AND SCHEMATIC DRAWING (Australia & New Zealand)



*for New Zealand

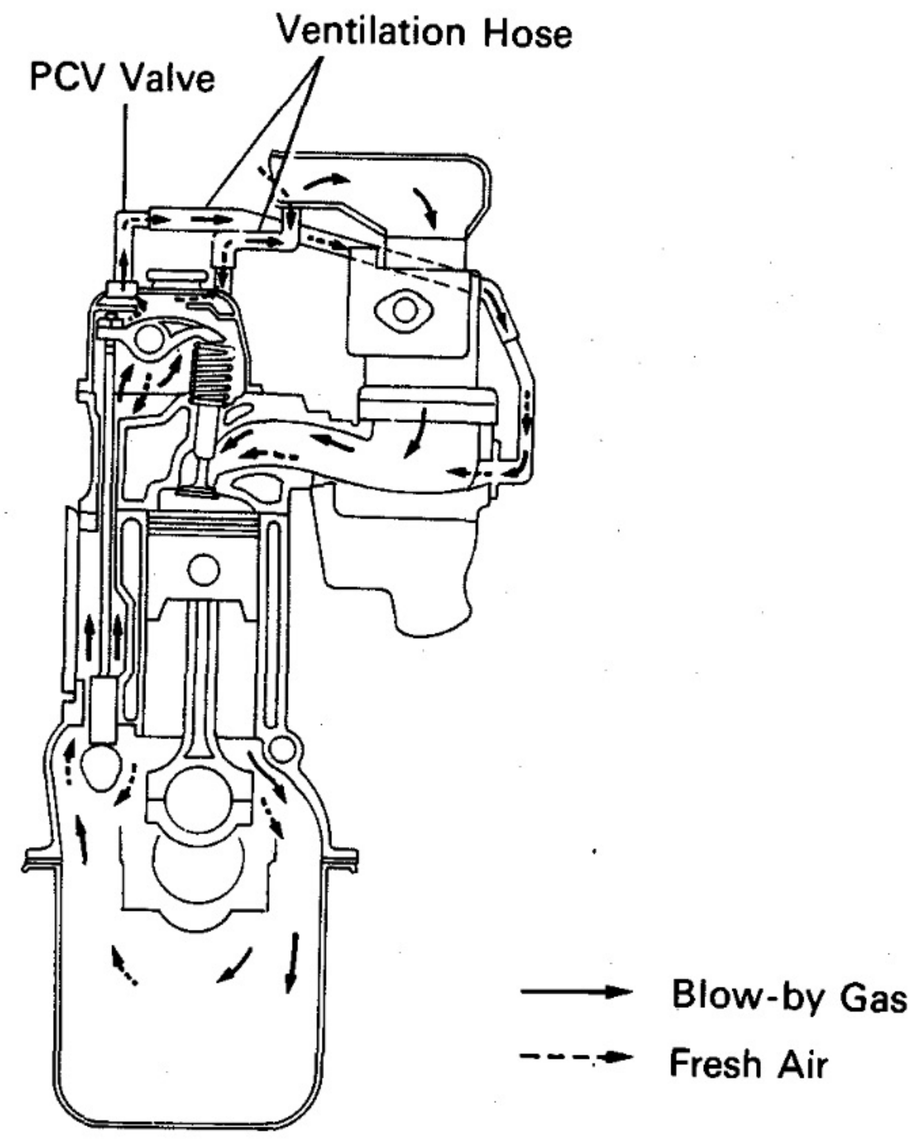
EC4158



*for New Zealand

EC4157

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

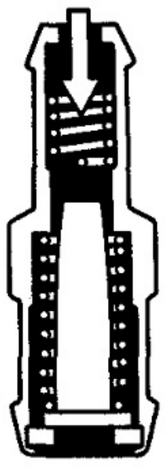


EC1300

To reduce HC emission, crankcase blow-by gas (HC) is routed through the PCV valve to the intake manifold for combustion in the cylinders.

Engine not Running or Backing

Intake Manifold Side

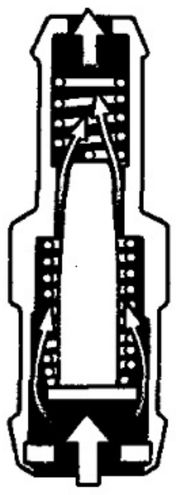


Cylinder Head Side

- PCV VALVE IS CLOSED.

EC1007

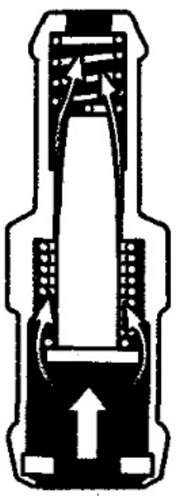
Normal Operation



- PCV VALVE IS OPEN.
- VACUUM PASSAGE IS SMALL.

EC1008

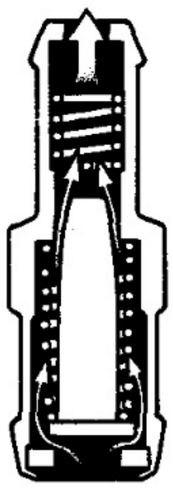
Idling or Decelerating



- PCV VALVE IS OPEN.
- VACUUM PASSAGE IS LARGE.

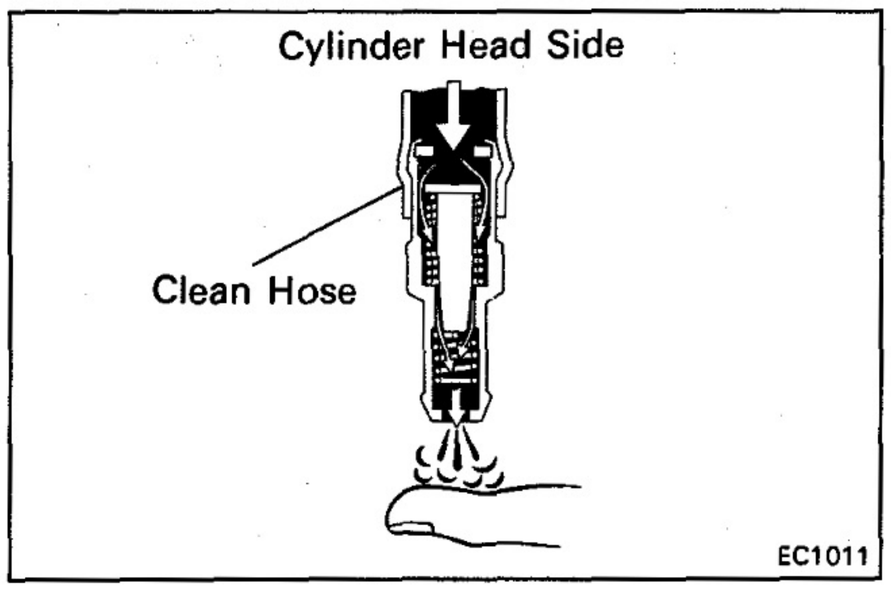
EC1009

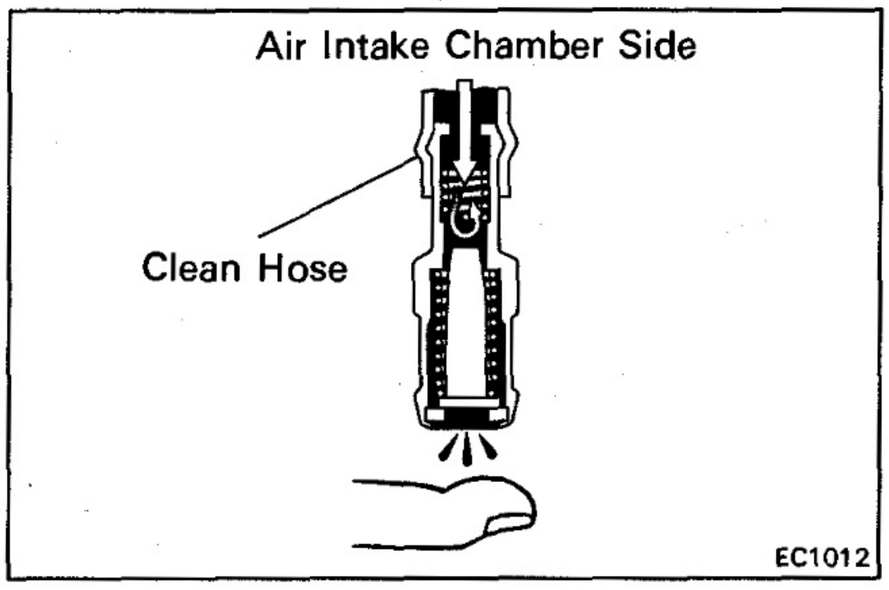
Acceleration or High Load

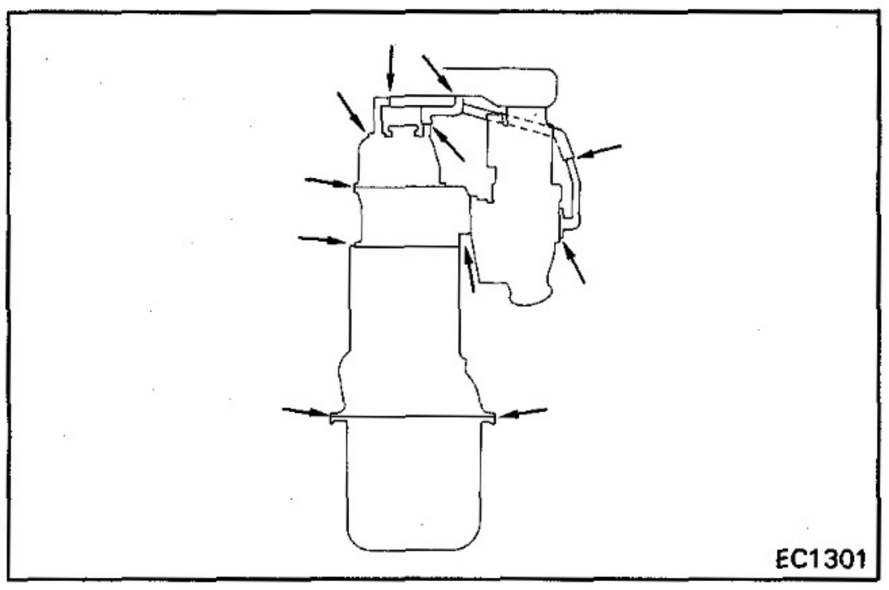


- PCV VALVE IS FULLY OPEN.

EC1010







INSPECTION OF PCV VALVE

1. **REMOVE PCV VALVE**
2. **ATTACH CLEAN HOSE TO PCV VALVE**
3. **BLOW FROM CYLINDER HEAD SIDE**

   Check that the air passes through easily.

   CAUTION: Do not suck air through the valve. Petroleum substances inside the valve are harmful.
4. **BLOW FROM INTAKE MANIFOLD SIDE**

   Check that the air passes through with difficulty.

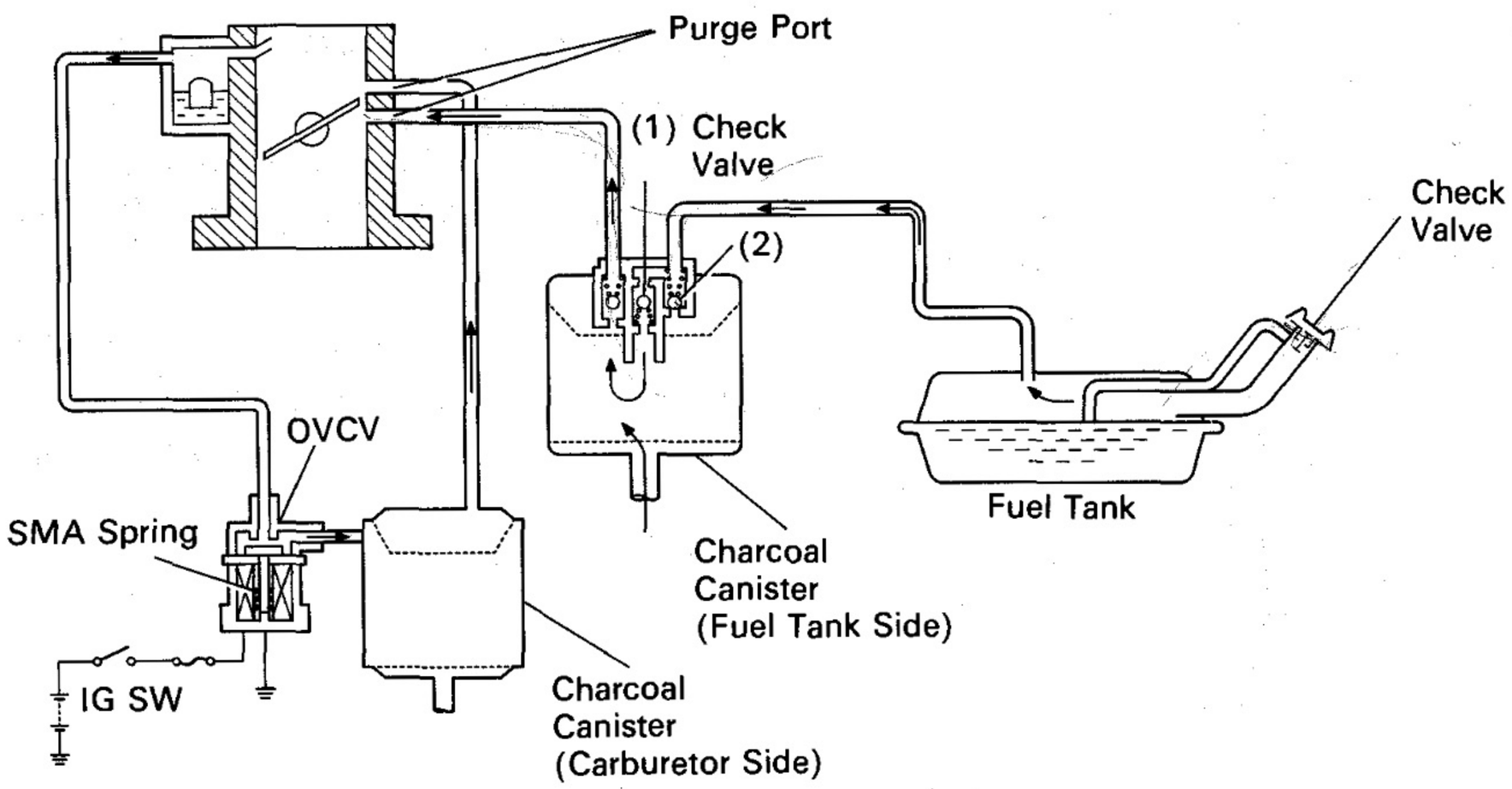
   If the PCV valve fails either of the checks, replace it.
5. **REINSTALL PCV VALVE**

INSPECTION OF PCV HOSES AND CONNECTIONS

VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

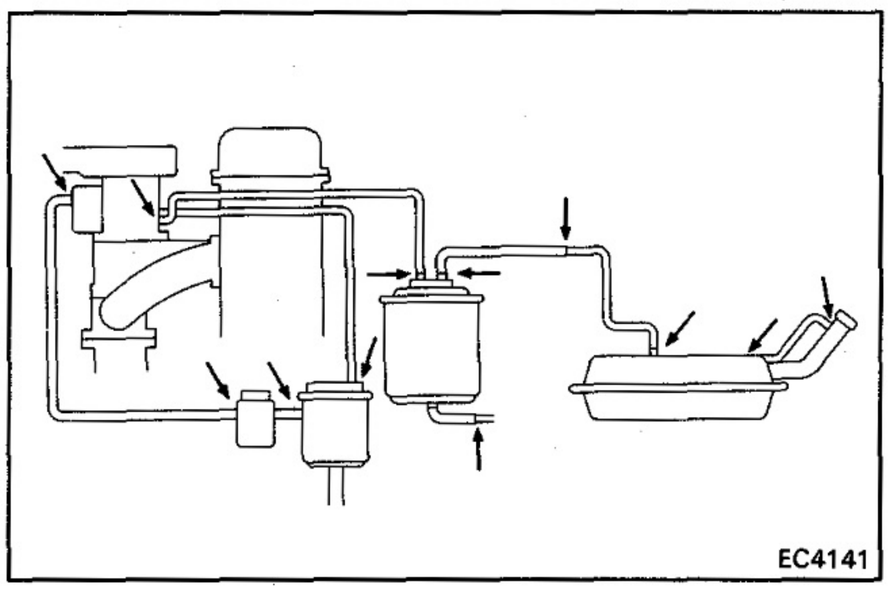
Check for cranks, leaks or damage.

FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM



To reduce HC emission, evaporated fuel from the fuel tank is routed through the charcoal to the carburetor for combustion in the cylinders.

IG SW	Outer Vent Control Valve	Under Hood Temp.	SMA	Throttle Valve Opening	Canister Check Valve (1)	Canister Check Valve (2)	Check Valve in Fuel Tank	Evaporated Fuel (HC)
OFF	OPEN	Below 46°C (115°F)	CLOSED	–	–	–	–	HC from tank is absorbed into the canister.
		Above 60°C (140°F)	OPEN	–	–	–	–	HC from tank and float chamber is absorbed into the canister.
ON	CLOSED	–	–	Positioned below purge port	–	–	–	HC from tank is absorbed in the canister.
				Positioned above purge port	–	–	–	HC from canister is led into carburetor.
High pressure in tank		–	–	–	OPEN	CLOSED	CLOSED	HC from tank is absorbed in the canister.
High vacuum in tank		–	–	–	CLOSED	OPEN	OPEN	(Air is led into the tank.)



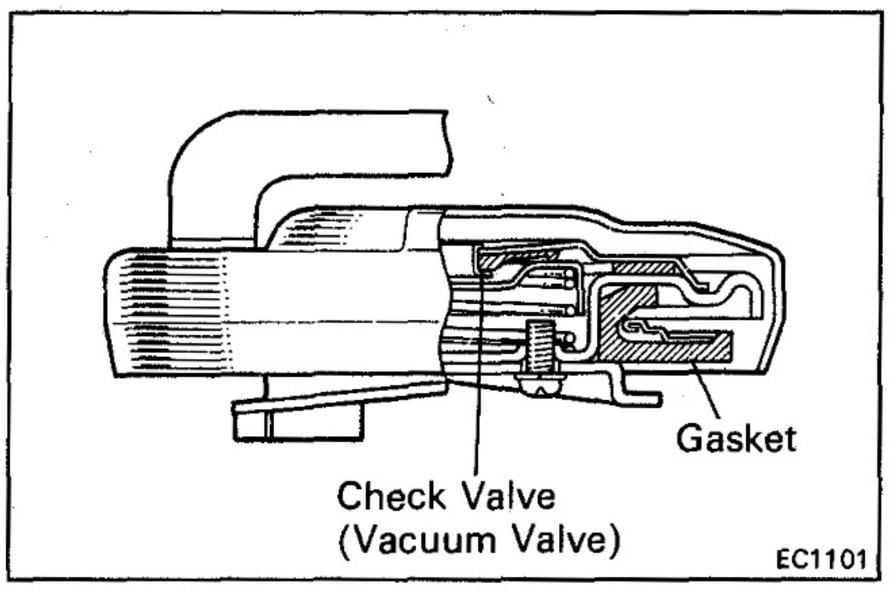
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND TANK CAP

1. **VISUALLY INSPECT LINES AND CONNECTIONS**

   Look for loose connections, sharp bends or damage.

2. **VISUALLY INSPECT FUEL TANK**

   Look for deformation, cranks or fuel leakage.



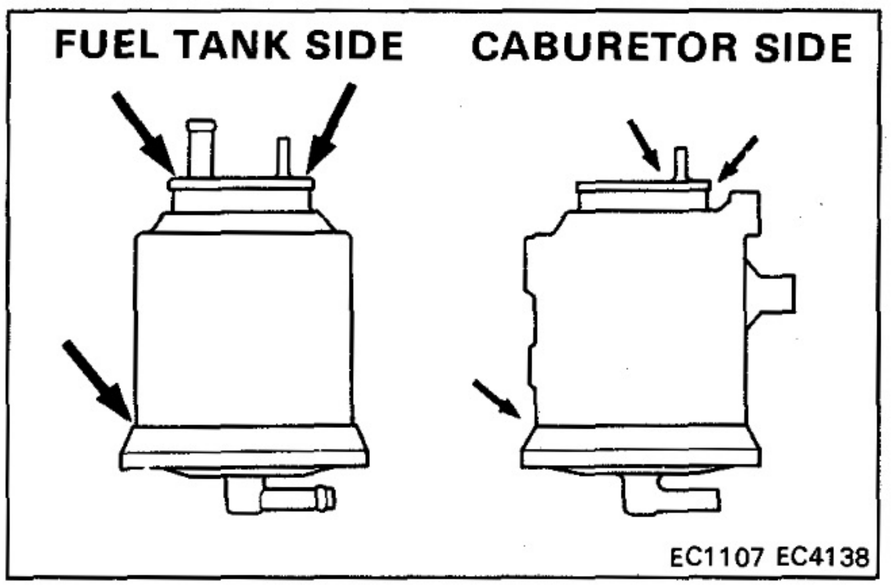
3. **VISUALLY INSPECT FUEL FILTER CAP**

   (a) Remove the four screws and retainer.

   (b) Look for a damage or deformed gasket.

   (c) Reinstall the retainer.

   If a problem is found, repair or replace the cap.



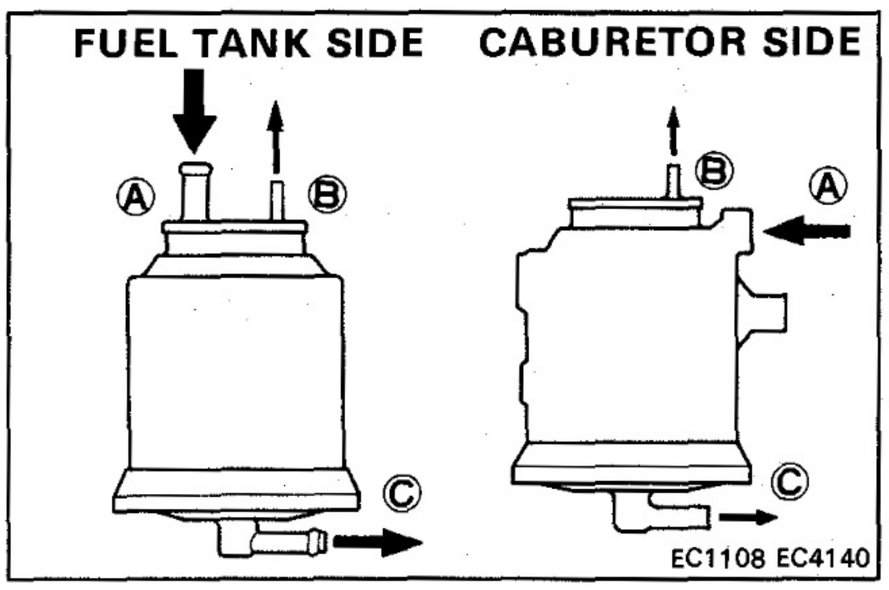
INSPECTION OF CHARCOAL CANISTER (Single Fuel Tank Type)

1. **REMOVE CHARCOAL CANISTER**

2. **REMOVE OUTER VENT CONTROL VALVE**

3. **VISUALLY INSPECT CHARCOAL CANISTER CASE**

   Look for cracks or damage.

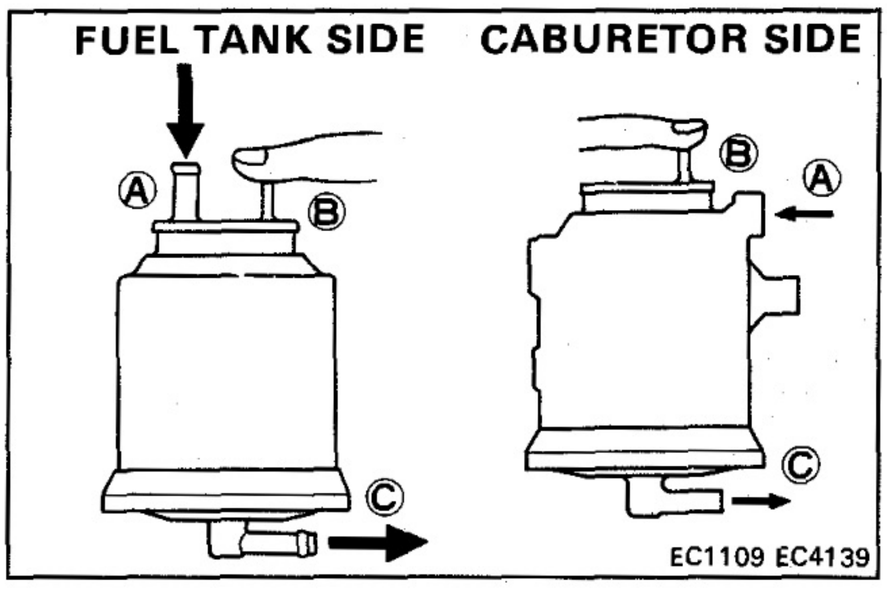


4. **CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE**

   (a) Using low pressure compressed air, blow into the tank pipe (A) and check that the air flows without resistance from the outer pipes.

   (b) Blow into the purge pipe (B) and check that the air does not flow from the other pipes.

   If a problem is found, replace the charcoal canister.



5. **CLEAN FILTER IN CANISTER**

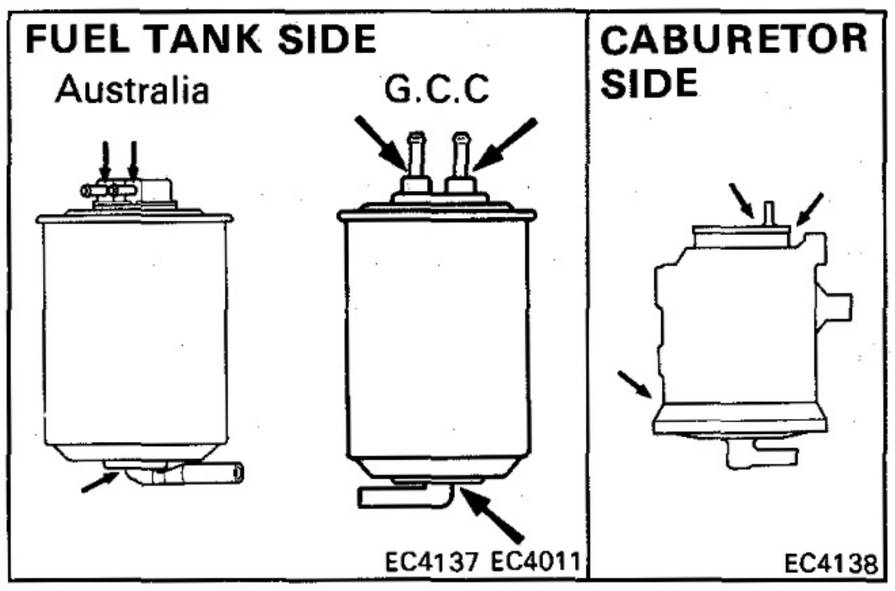
   Clean the filter by blowing 3 kg/cm^2 (43 psi, 294 kPa) of compressed air into the tank pipe (A), while holding the other upper canister pipe (B) closed.

   HINT:

   - Do not attempt to wash the canister.
   - No activated carbon should come out.

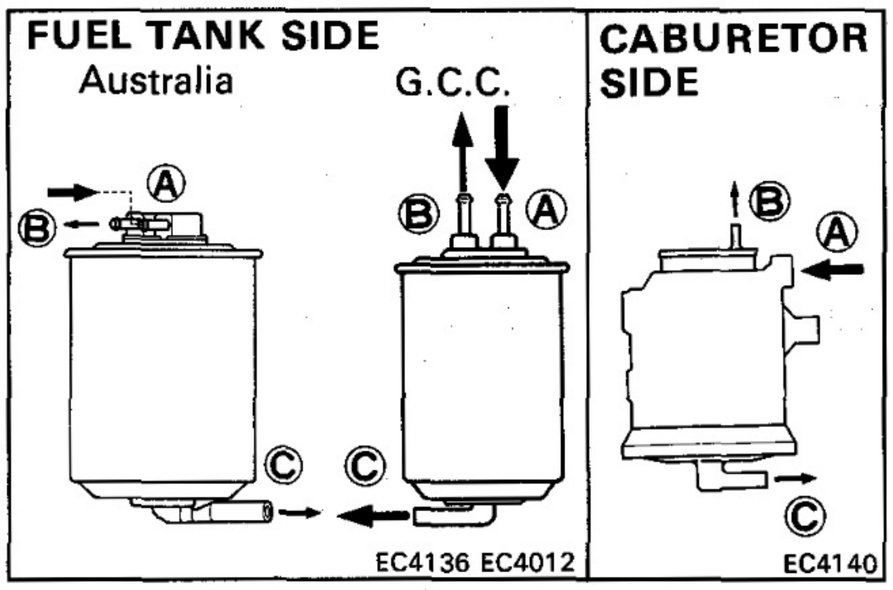
6. **INSTALL OUTER VENT CONTROL VALVE**

7. **INSTALL CHARCOAL CANISTER**



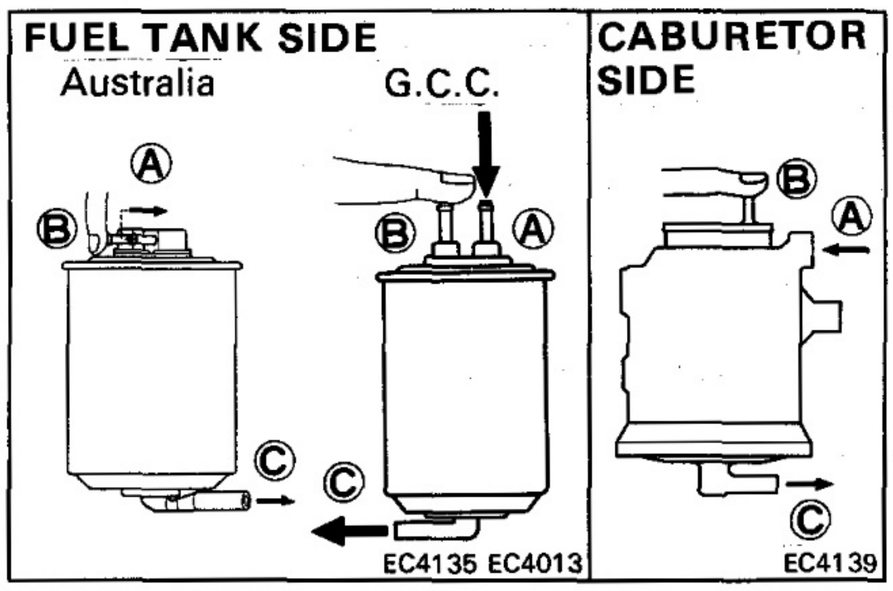
(Dual Fuel Tank Type)

1. **REMOVE CHARCOAL CANISTER**
2. **REMOVE OUTER VENT CONTROL VALVE**
3. **VISUALLY INSPECT CHARCOAL CANISTER**
   Look for cracks or damage.



4. **CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE**
   (a) Using low pressure compressed air, blow into the pipe (A) and check that the air flows without resistance from the other pipes.
   (b) Blow into the pipe (B) and check that the air does not flow from the other pipes.

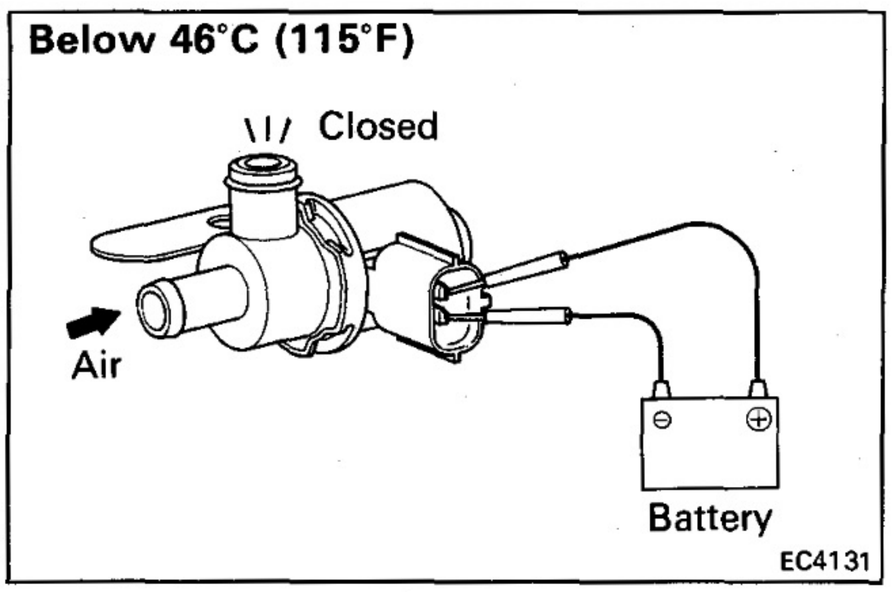
   If a problem is found, replace the charcoal canister.



5. **CLEAN FILTER IN CANISTER**
   Clean the filter by blowing 3 kg/cm² (43 psi, 294 kPa) of compressed air into the pipe (A), while holding the pipe (B) closed.

   HINT:
   - Do not attempt to wash the canister.
   - No activated carbon should come out.

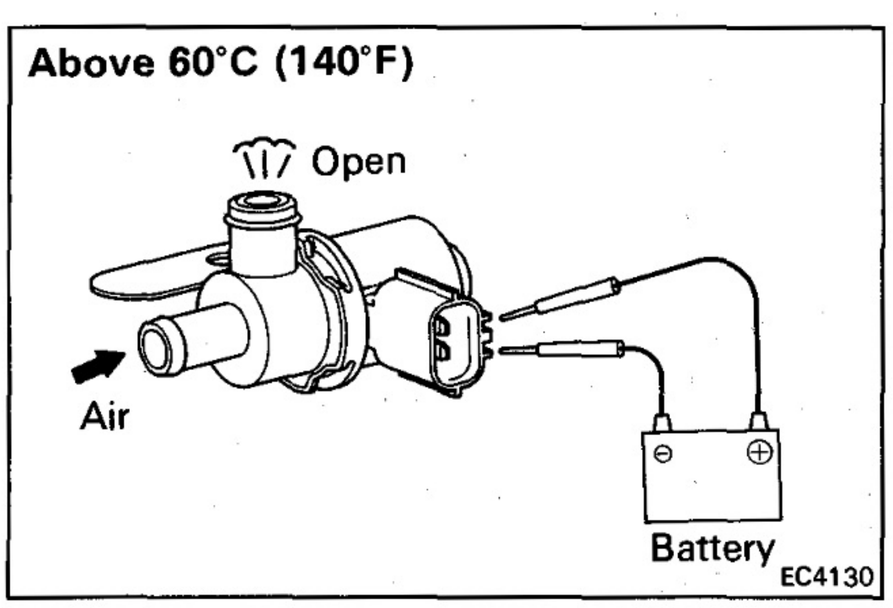
6. **INSTALL OUTER VENT CONTROL VALVE**
7. **INSTALL CHARCOAL CANISTER**



INSPECTION OF OUTER VENT CONTROL VALVE

CHECK OUTER VENT CONTROL VALVE OPERATION

(a) Remove the OVCV.
(b) Connect the OVCV terminal to the battery terminals as shown.
(c) Blow into the pipe and check that the OVCV is closed.



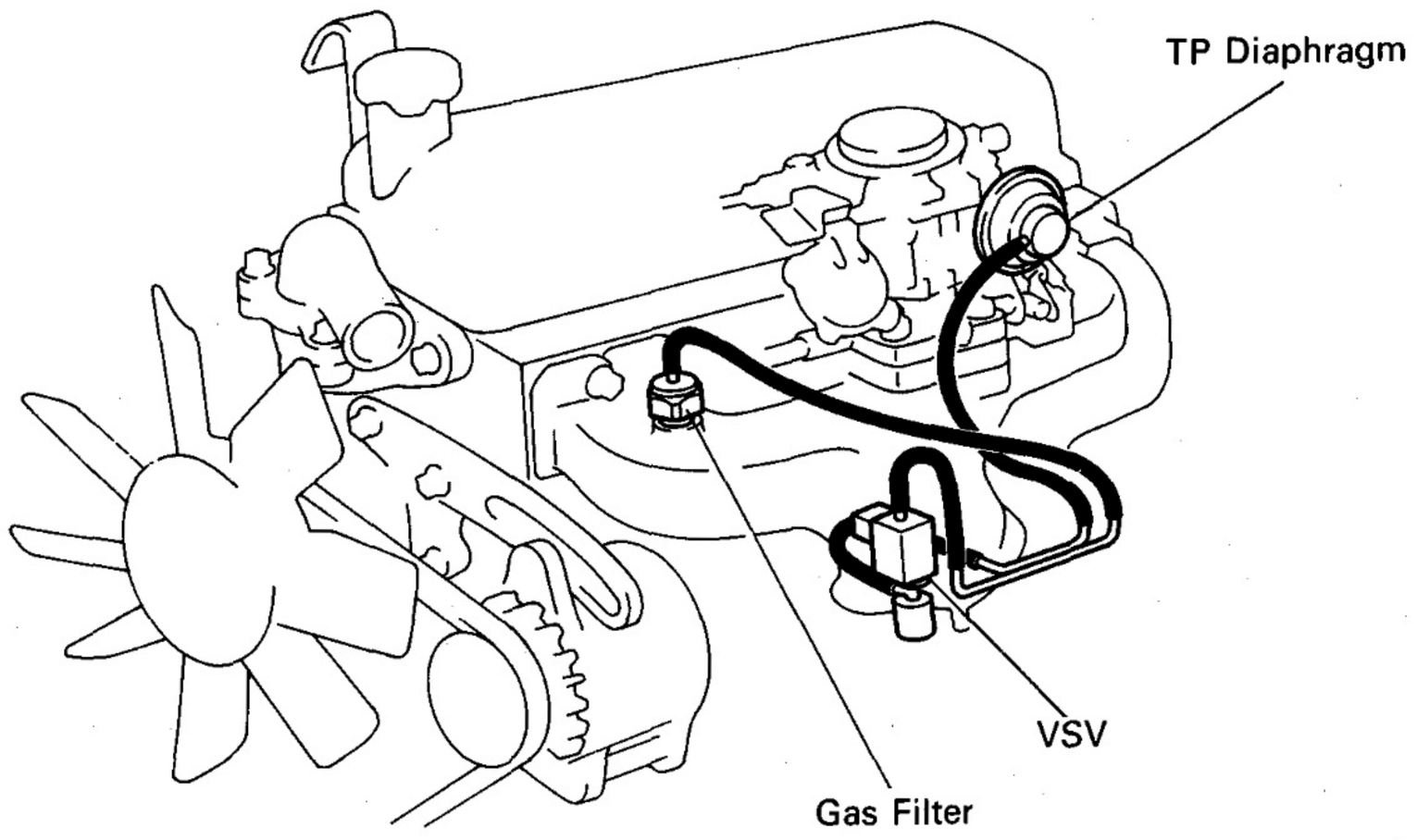
(d) Disconnect battery terminals.
(e) Below 46°C (115°F), blow into the pipe and check that the OVCV is closed.
(f) Above 60°C (140°F), blow into the pipe and check that the OVCV is open.

If a problem is found, replace the OVCV.

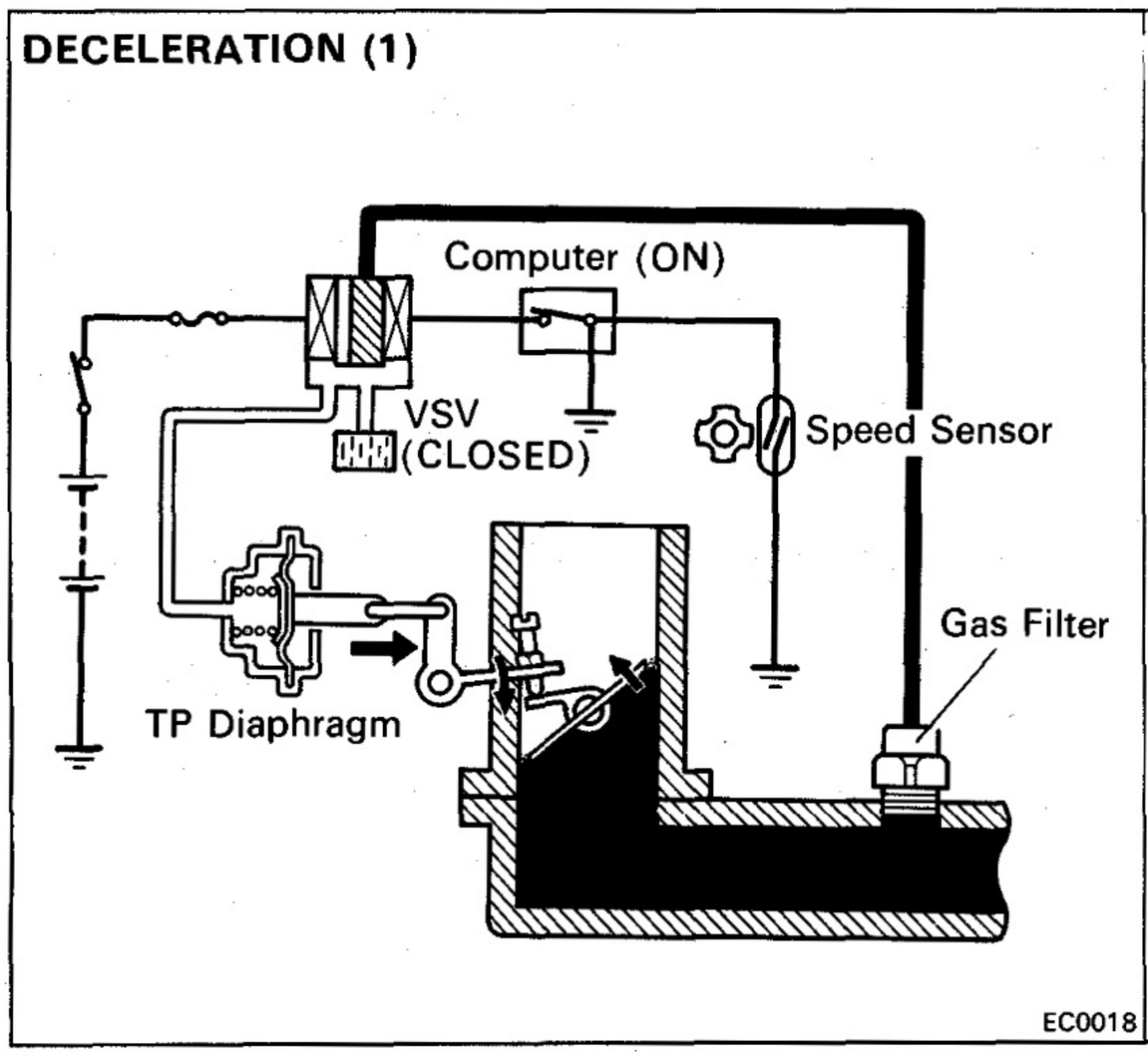
(g) Install the OVCV.

If the valve does not operate, check the fuse and the wiring connections.

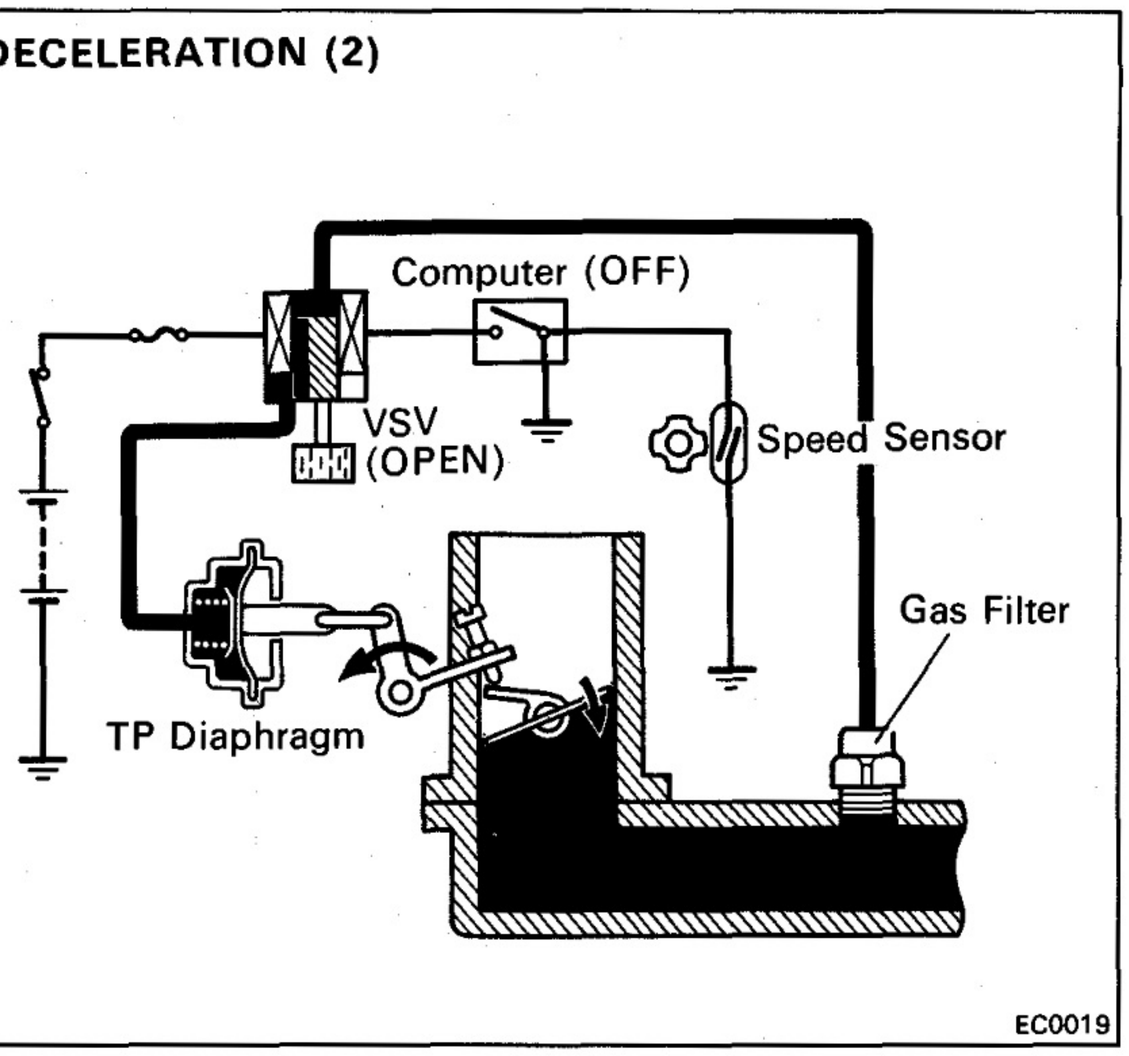
THROTTLE POSITIONER (TP) SYSTEM
(M/T Vehicles only for G.C.C.)



EC4156



EC0018



EC0019

To reduce HC and CO emissions, the throttle positioner opens the throttle valve slightly more than at idle position when decelerating. This causes the air-fuel mixture to burn completely.

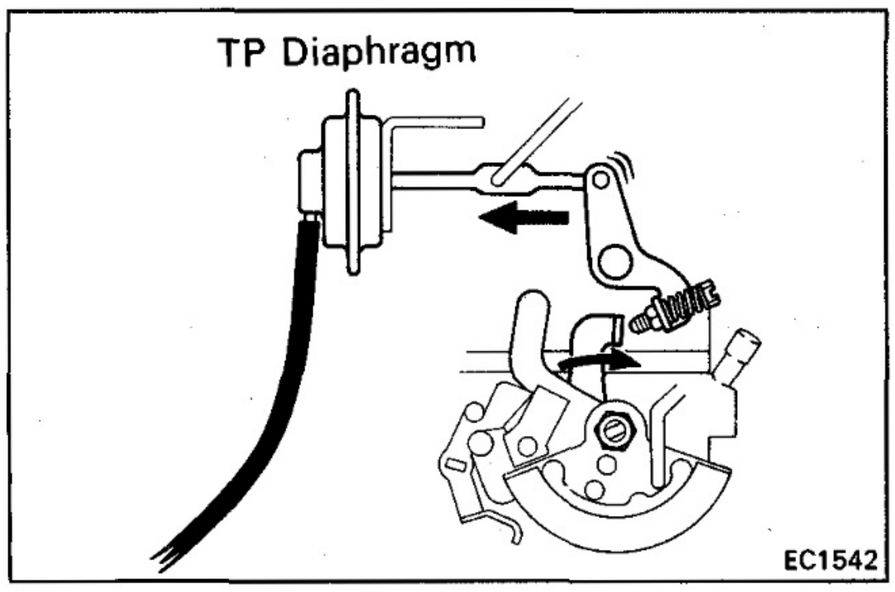
Vehicle Speed	Computer	VSV	TP	Throttle Valve
Deceleration (1) Above 29 km/h	ON	CLOSED	Set Atmospheric pressure acts on TP diaphragm.	Throttle valve is open slightly more than at idle position.
Deceleration (2) Below 15 km/h	OFF	OPEN	Released Intake manifold vacuum acts on TP diaphragm.	Throttle valve is returned to the idle pisition.

INSPECTION OF TP SYSTEM

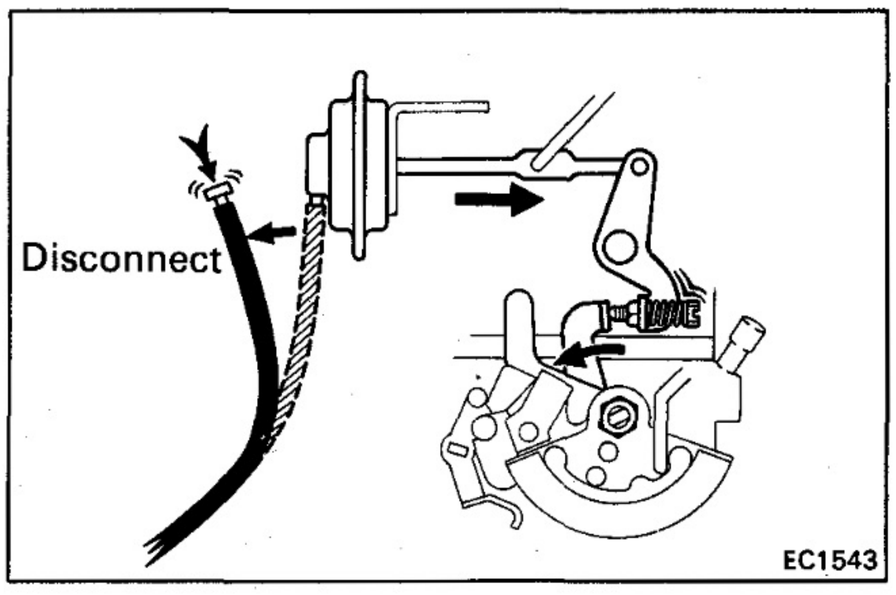
1. WARM UP ENGINE

2. CHECK AND, IF NECESSARY, ADJUST IDLING SPEED

HINT: Turn off the air conditioner, if equipped.



3. CHECK THAT TP IS RELEASED AT IDLE



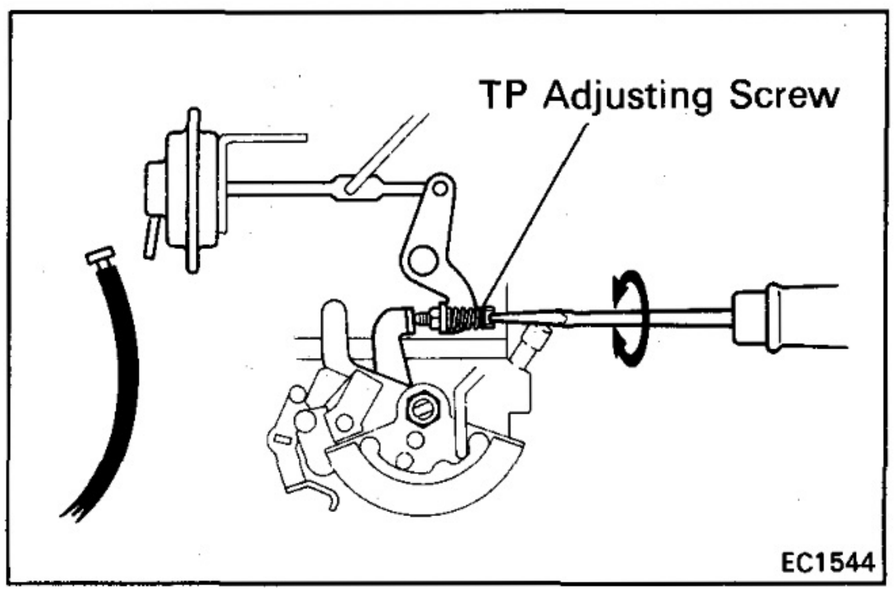
4. CHECK TP SETTING SPEED

(a) Disconnect the vacuum hose from the TP diaphragm and plug the hose end.

(b) Race the engine and then release the accelerator pedal (TP is set).

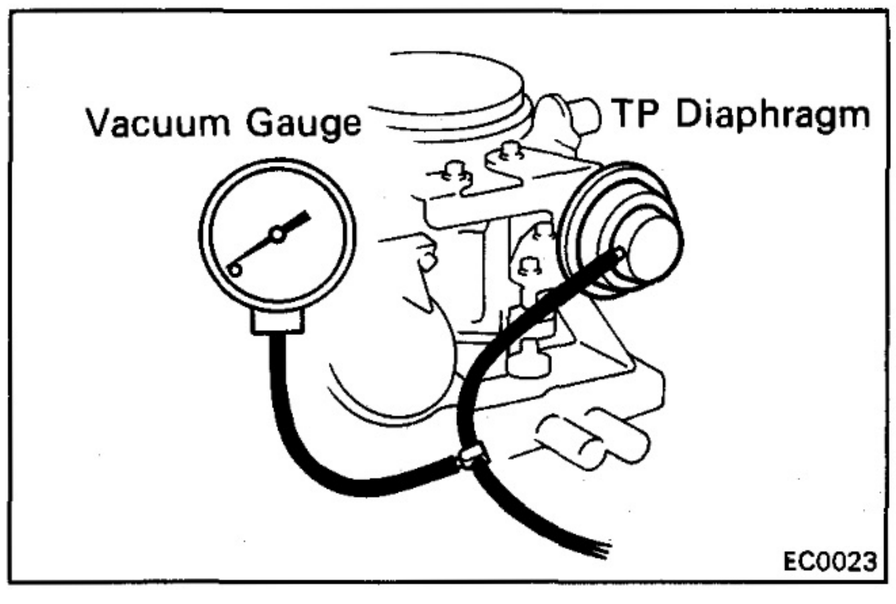
(c) After the TP is set, check the engine speed.

TP setting speed: 1,000 ± 100 rpm



If not at specified speed, adjust with the TP adjusting screw.

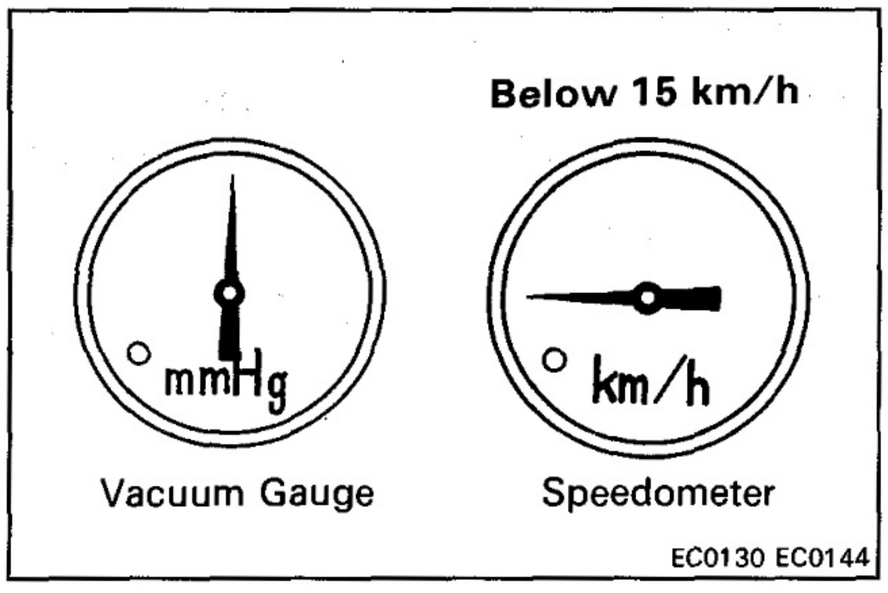
(d) Reconnect the vacuum hose to the TP diaphragm.



5. CHECK SPEED SENSOR

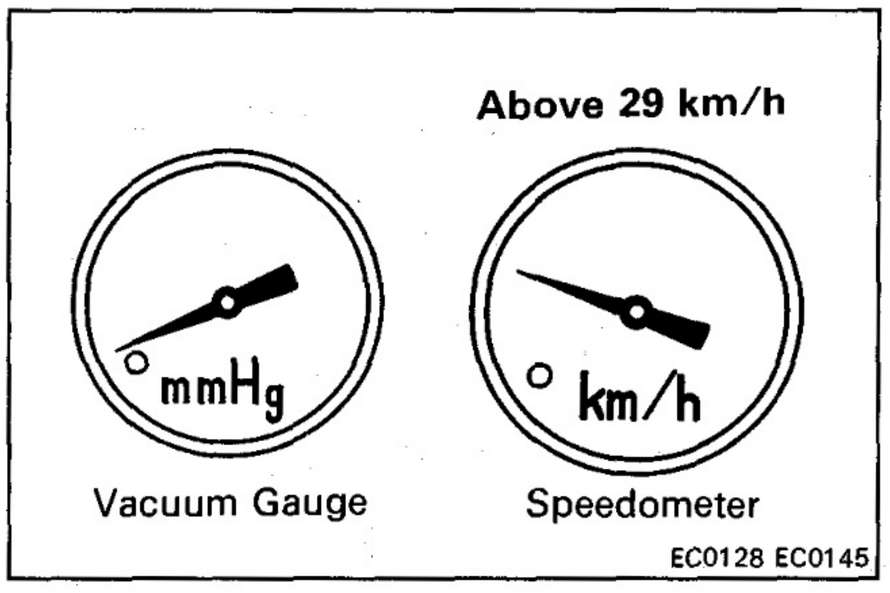
(a) Connect the vacuum gauge to the hose between the VSV and the TP diaphragm using a 3-way connector.

(b) Set the gauge on your lap.



(c) Perform a road test observing the speedometer and the vacuum gauge.

(1) Check that the vacuum gauge indicates intake manifold vacuum at low speed driving (below 15 km/h).



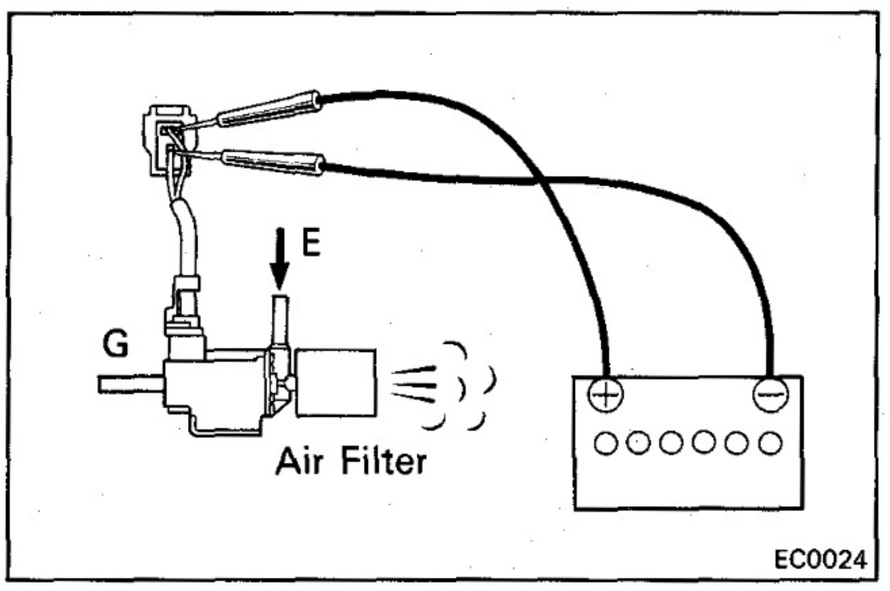
(2) Check that the vacuum gauge indicates zero at middle and high speed driving (above 29 km/h).

(d) Disconnect the vacuum gauge and reconnect the vacuum hose to the proper location.

If not, inspect the VSV and speed sensor.

INSPECTION OF VSV

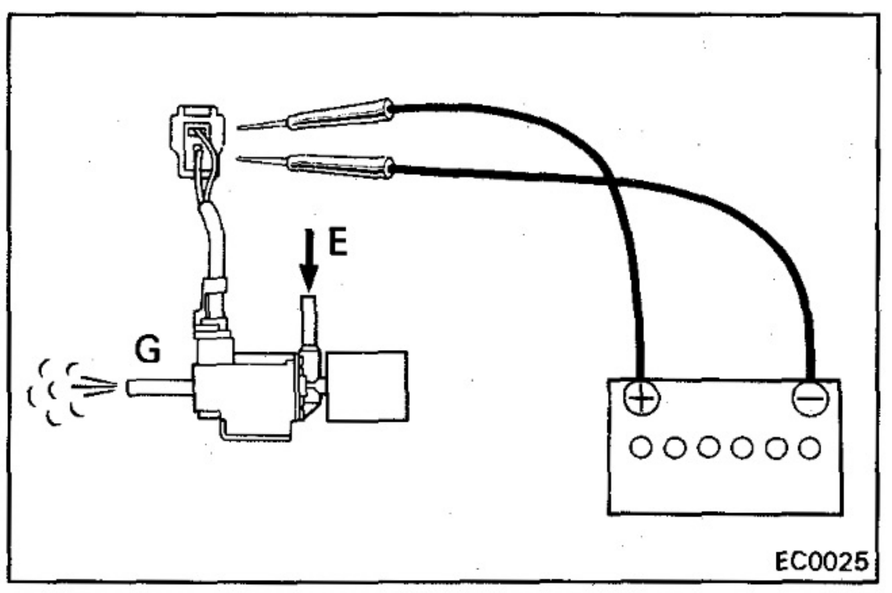
1. CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR INTO PIPE



(a) Remove the VSV.

(b) Connect the VSV terminals to the battery terminals as shown.

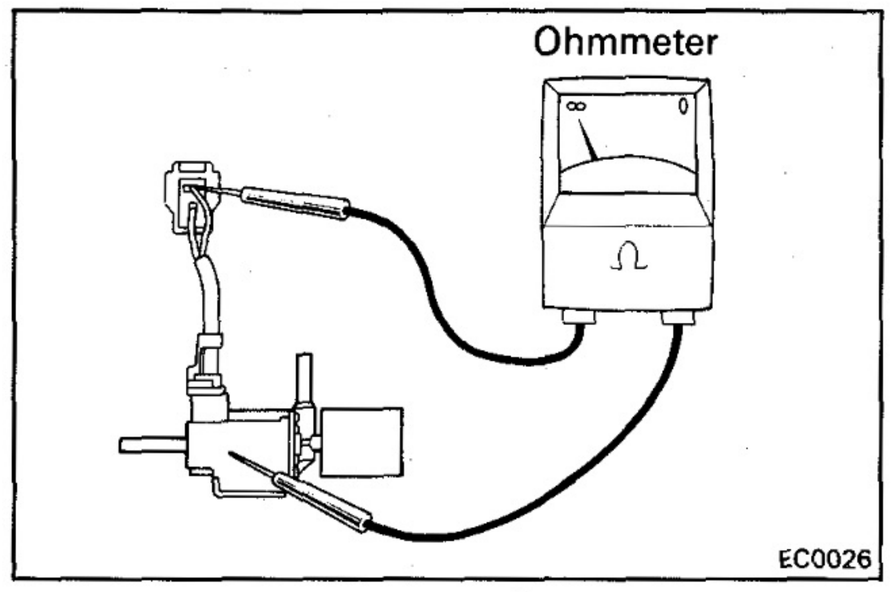
(c) Blow air into pipe E and check that the air comes out of the air filter.



(d) Disconnect the battery connections.

(e) Blow air into pipe E and check that the air comes out of pipe G.

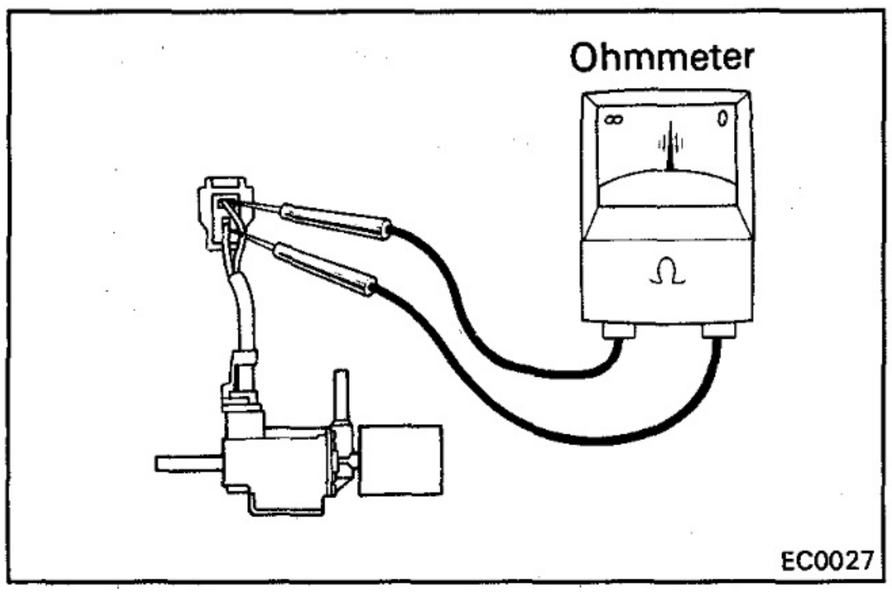
If a problem is found, replace the VSV.



2. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between the positive (+) terminal and the VSV body.

If there is continuity, replace the VSV.



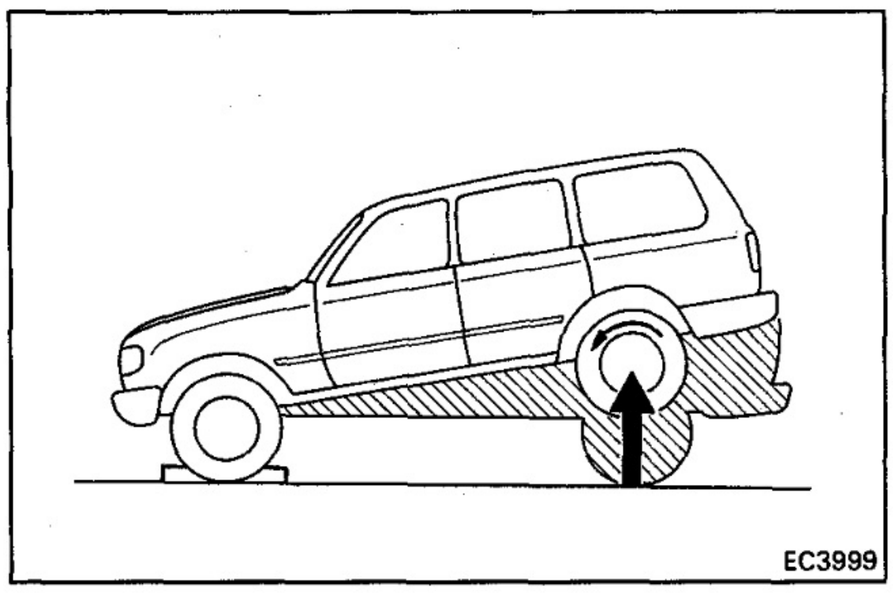
3. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the positive (+) terminal and the other terminals as shown.

Specified resistance: 38 – 43 Ω at 20°C (68°F)

If resistance is not within specification, replace the VSV.

INSPECTION OF SPEED SENSOR



1. JACK UP ONE REAR WHEEL TO CLEAR GROUND AND CHECK FRONT WHEELS

2. RELEASE PARKING BRAKE

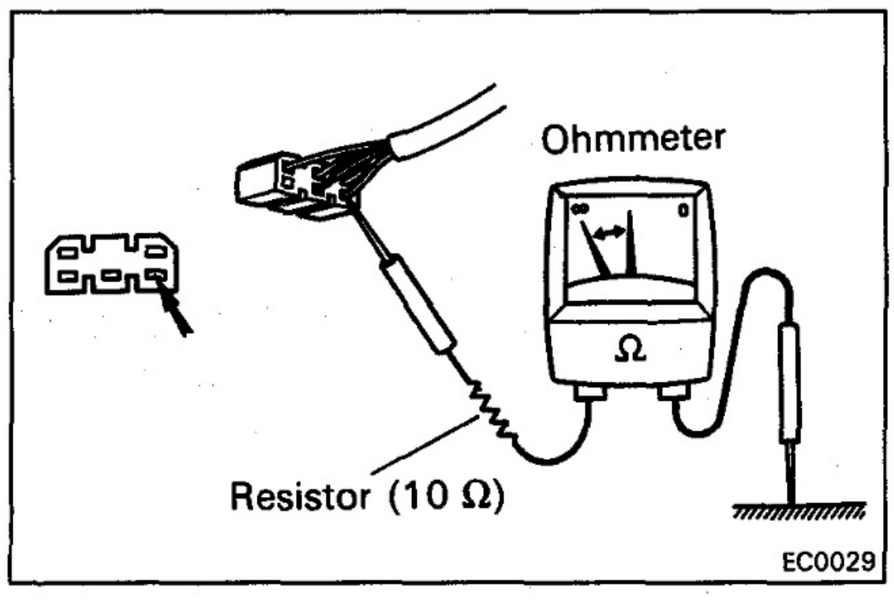
3. SET SHIFT LEVER INTO NEUTRAL

4. FOUR WHEEL DRIVE CONTROL LEVER TO H

5. CENTER DIFFLOCK SWITCH TO OFF

6. UNPLUG WIRING CONNECTOR FROM COMPUTER

Computer location: Left cowl side



7. CHECK ON-OFF CYCLES OF SPEED SENSOR

(a) Place the positive (+) terminal of the ohmmeter on the wiring connector terminal and the negative (–) terminal on ground.

(b) Turn the rear wheel slowly.

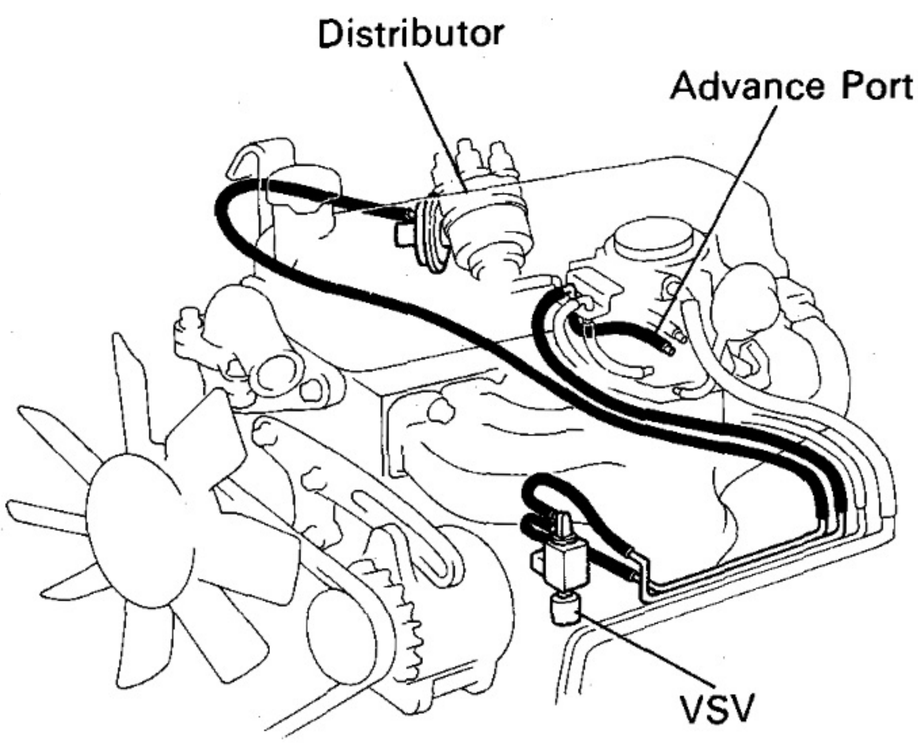
(c) Check that the ohmmeter needle deflects consistently.

NOTICE: The ohmmeter probe should be inserted from the rear side of the connector.

If the ohmmeter needle does not deflect, check that the speed sensor terminals at the back side of the speedometer are properly connected. If the connection is OK, replace the speedometer assembly.

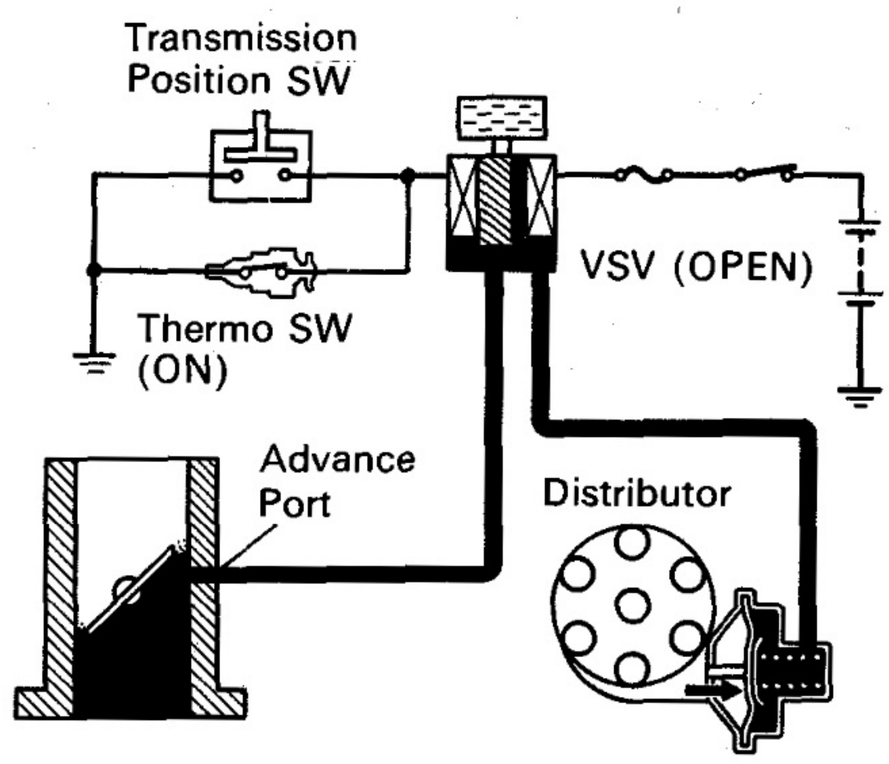
8. RECONNECT WIRING CONNECTOR TO COMPUTER

SPARK CONTROL (SC) SYSTEM (M/T Vehicles only for G.C.C.)



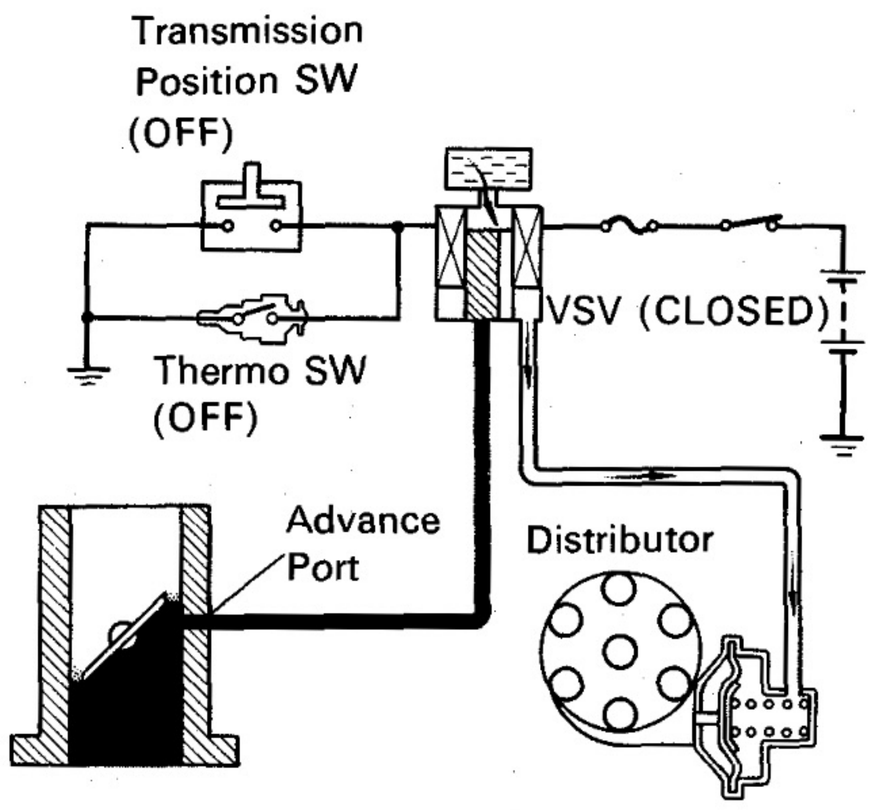
EC4129

Coolant Temp. Below 43°C

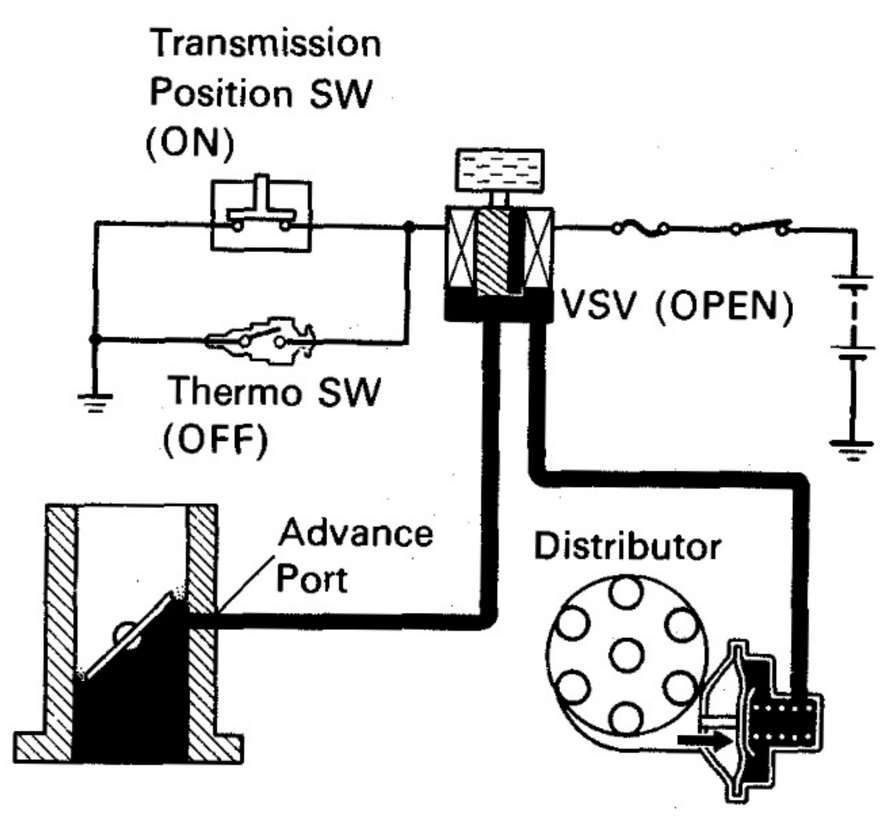


EC1372

Coolant Temp. Above 55°C
Other than 4th or 5th Gear



4th or 5th Gear

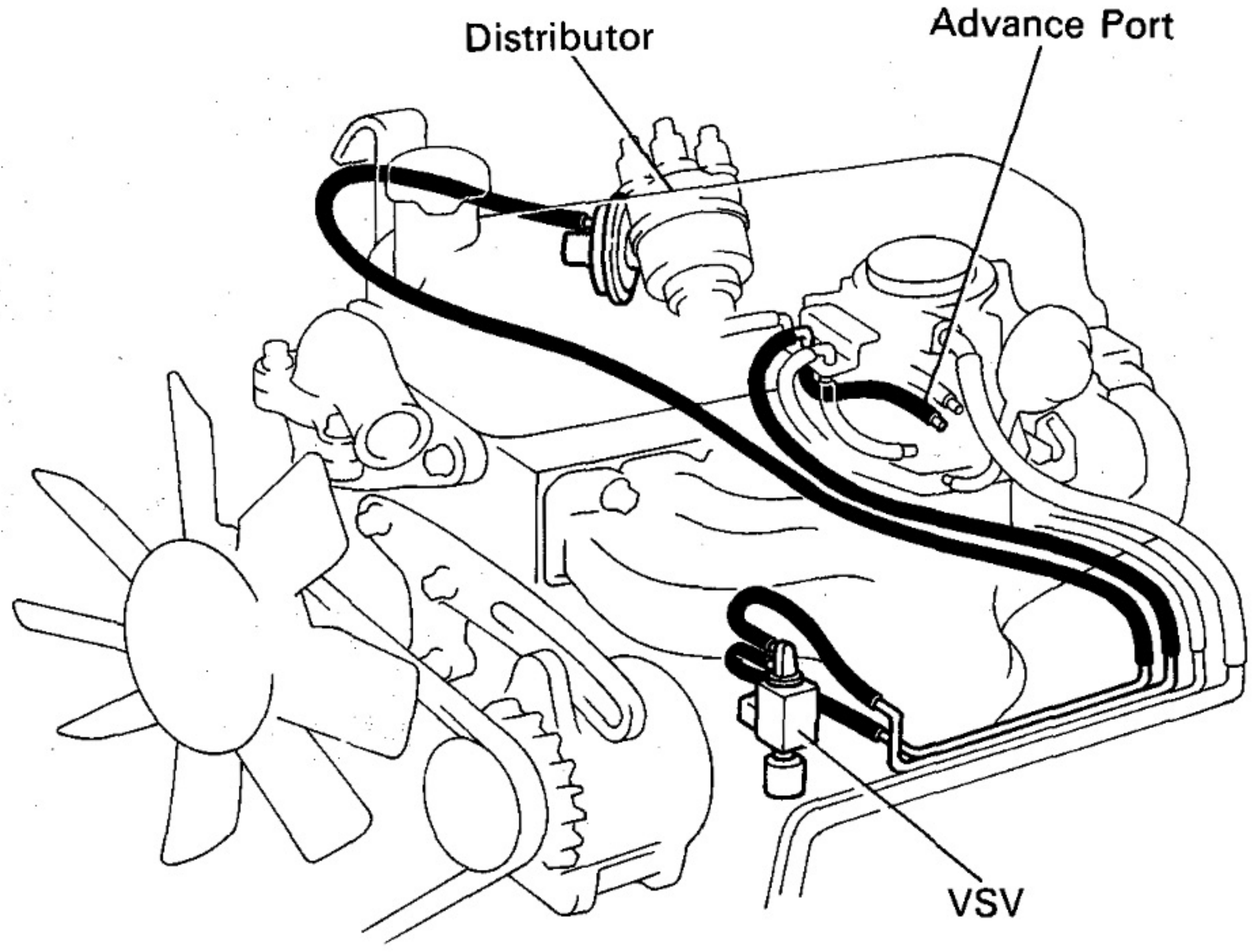


EC1373 EC1374

To reduce NOx and HC emissions, this system controls ignition timing and lowers the maximum combustion temperature.

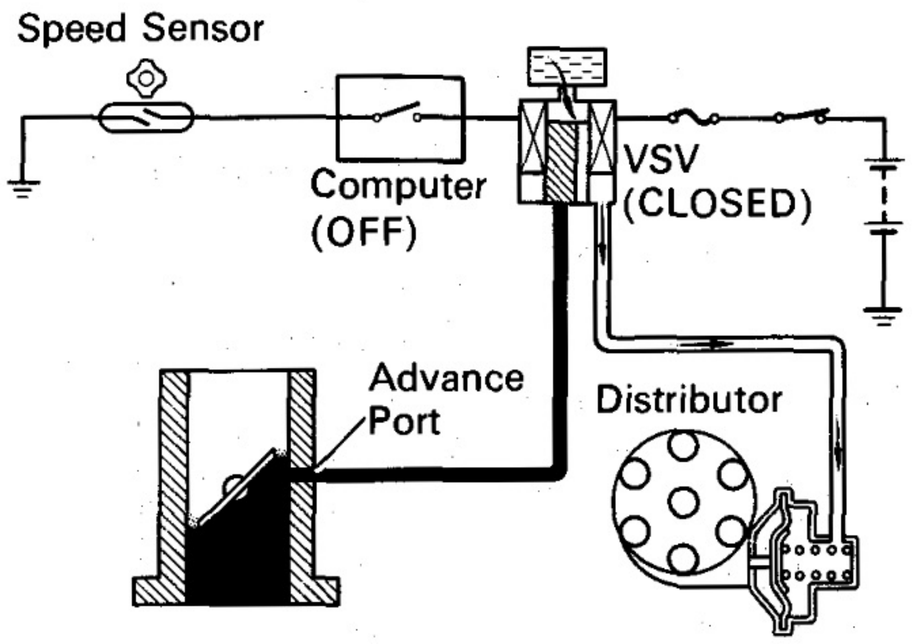
Coolant Temp.	Thermo SW	Transmission Position SW	VSV	Distributor Diaphragm	Vacuum Ignition Timing
Blow 43°C (109°F)	ON	–	ON (Open)	Pulled by advance port vacuum	Normally advanced
Above 55°C (131°C)	OFF	OFF	OFF (Closed)	Not pulled	Not advanced
		ON	ON (Open)	Pulled by advance port vacuum	Normally advanced

SPARK CONTROL (SC) SYSTEM (A/T Vehicles only for G.C.C.)



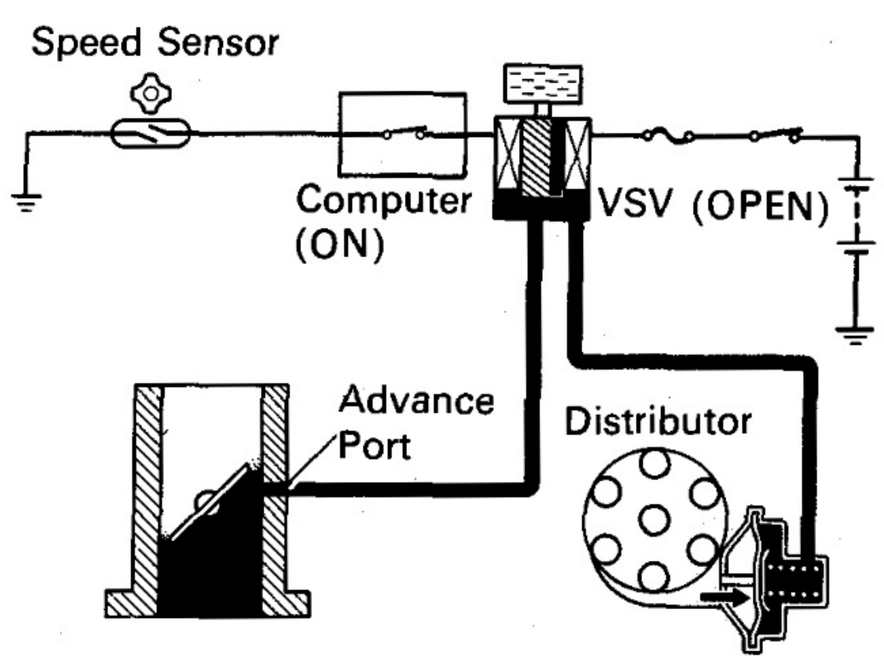
EC4129

Vehicle Speed Below 51 km/h



EC1376

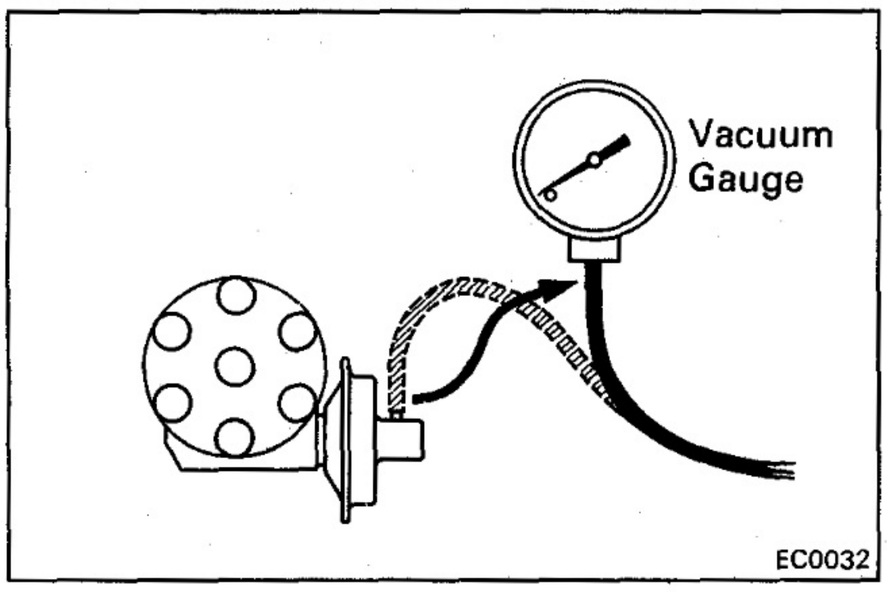
Vehicle Speed Above 64 km/h



EC1377

To reduce NOx and HC emissions, this system controls ignition timing and lowers the maximum combustion temperature.

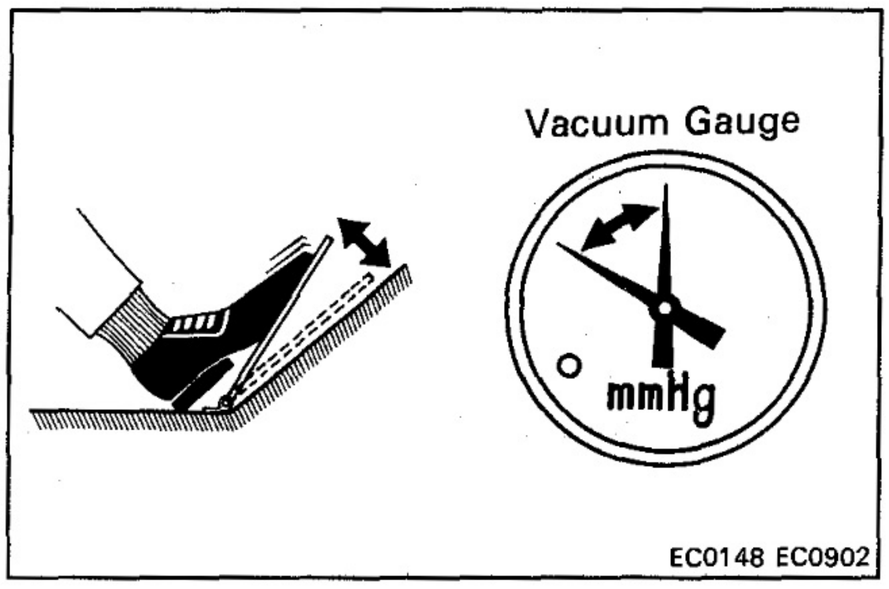
Vehicle Speed	Computer	VSV	Distributor Diaphragm	Vacuum Ignition Timing
Below 51 km/h	OFF	OFF (Closed)	Not pulled	Not advanced
Above 64 km/h	ON	ON (Open)	Pulled by advance port vacuum	Normally advanced



NSPECTION OF SC SYSTEM

1. CONNECT VACUUM GAUGE TO DISTRIBUTOR

Connect a vacuum gauge to distributor diaphragm hose.



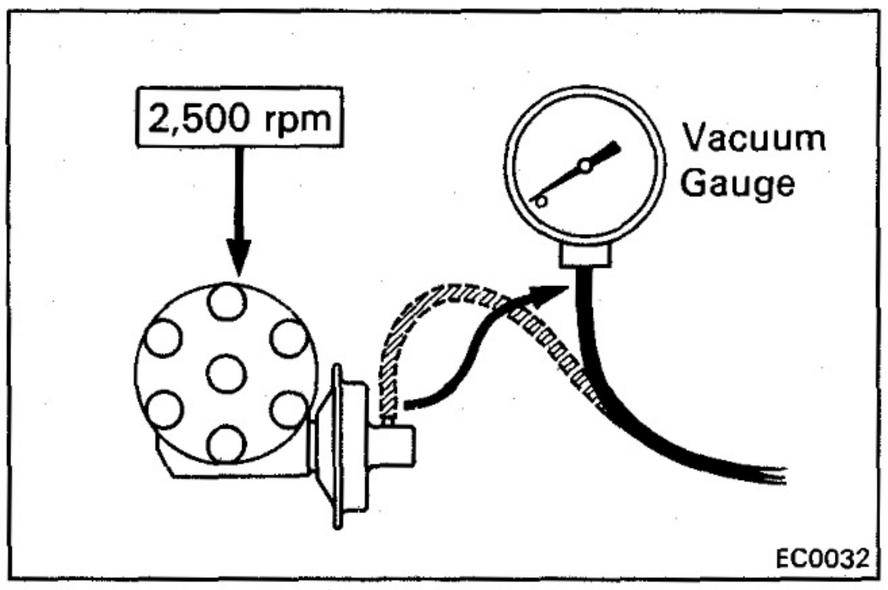
[M/T Vehicles]

2. CHECK THERMO SWITCH WITH COLD ENGINE

(a) The coolant temperature should be below 43°C (109°F).

(b) Start the engine.

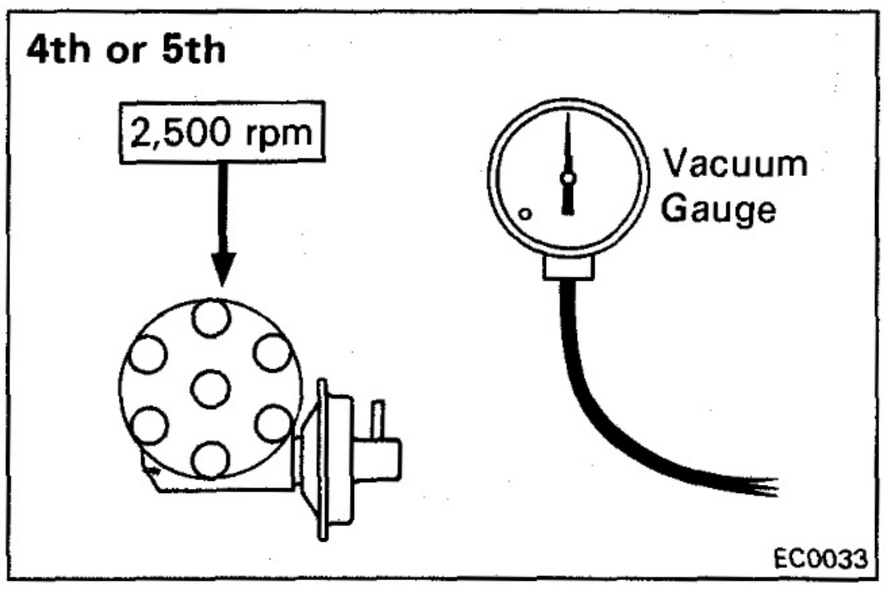
(c) Check that the vacuum gauge indicates advance port vacuum, and there is change in the vacuum indication when the throttle valve is open and closed.



3. CHECK THERMO SWITCH AND TRANSMISSION POSITION SWITCH WITH HOT ENGINE

(a) Warm up the engine to normal operating temperature.

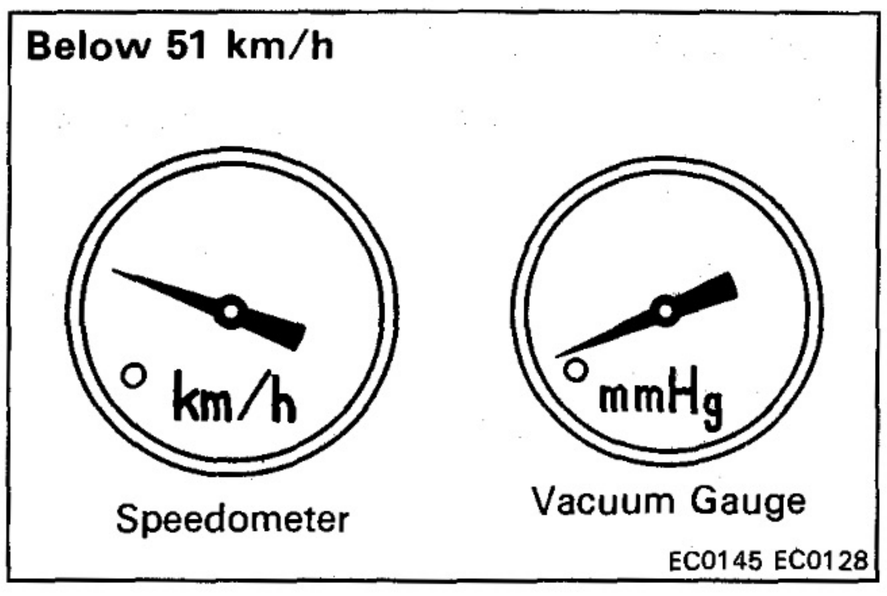
(b) In 1st, 2nd or 3rd gear, increase the engine speed to 2,500 rpm and check that the vacuum gauge indicates zero.



(c) With the engine speed at 2,500 rpm and the transmission in the 4th or 5 th gear, check that the vacuum gauge indicates high vacuum.

(d) Disconnect the vacuum gauge and reconnect the vacuum hose to the distributor diaphragm.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



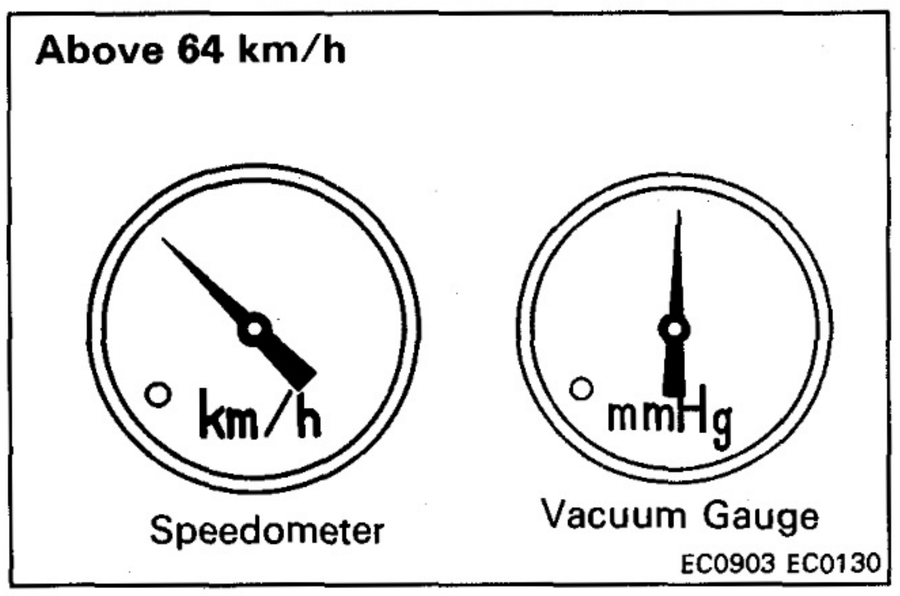
[A/T Vehicles]

2. CHECK SPEED SENSOR

(a) Set the vacuum gauge on your lap.

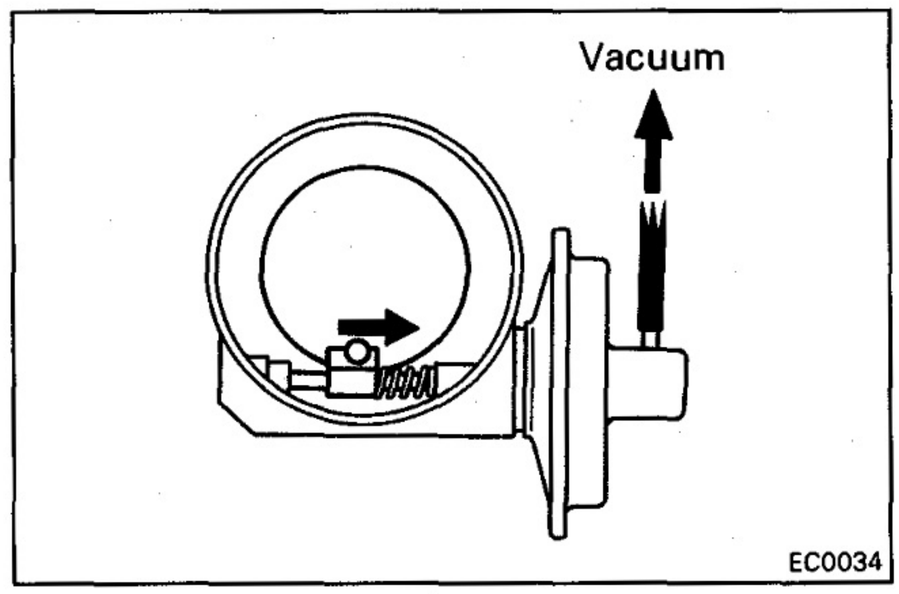
(b) Perform a road test observing speedometer and the vacuum gauge.

- The vacuum gauge should indicate nearly zero at about 15 km/h or below.



- The vacuum gauge should indicate advance port vacuum at about 64 km/h or above.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



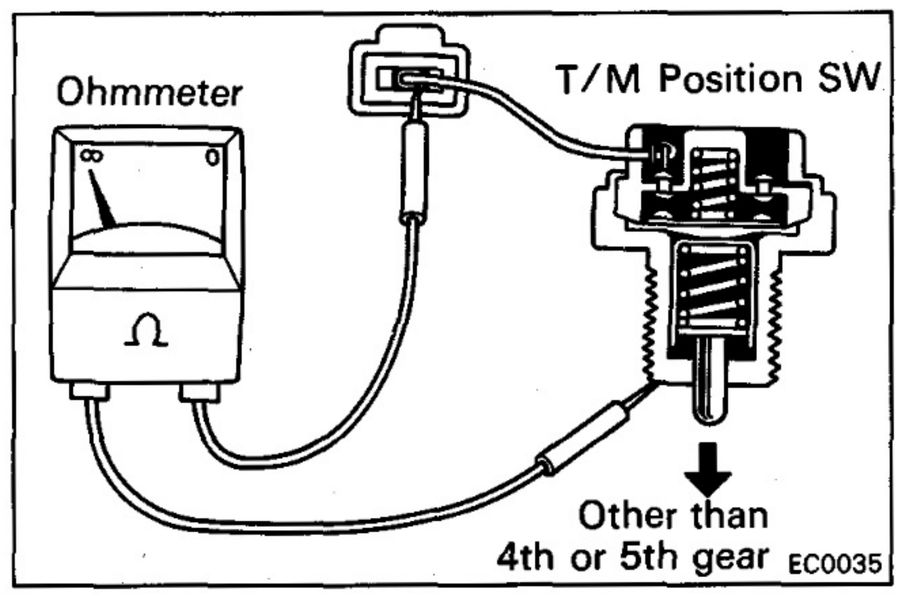
INSPECTION OF DISTRIBUTOR VACUUM ADVANCER

CHECK OPERATION OF DISTRIBUTOR VACUUM ADVANCER

(a) Remove the distributor cap and rotor.

(b) Apply vacuum to the diaphragm, and check that the vacuum advancer moves in accordance with the vacuum.

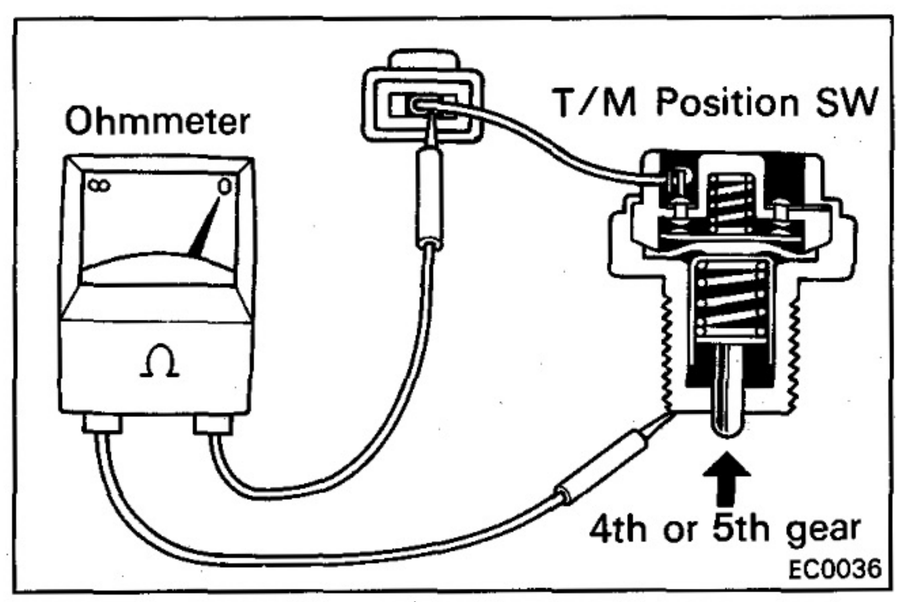
(c) Reinstall the rotor and distributor cap.



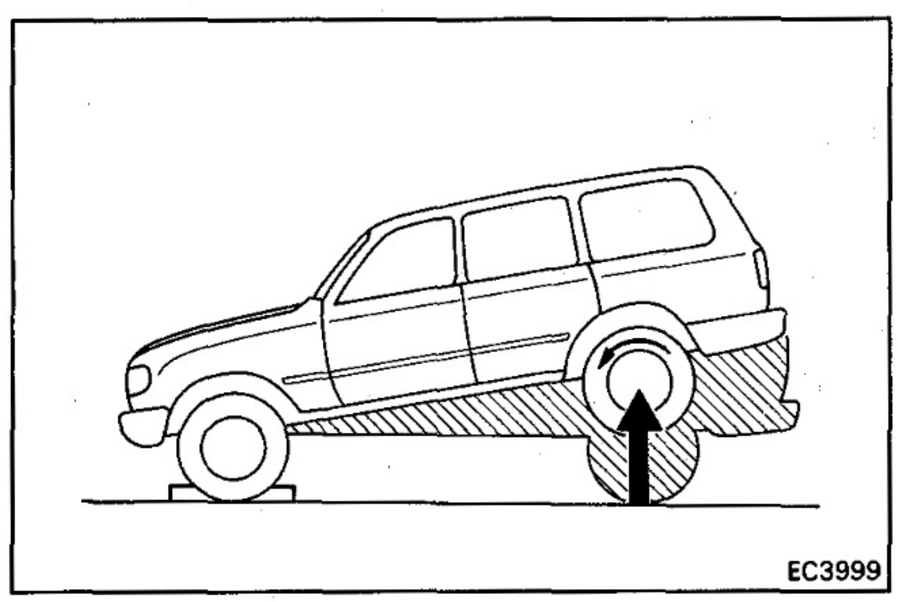
INSPECTION OF TRANSMISSION POSITION SWITCH (M/T Vehicles only)

USING OHMMETER, CHECK ELECTRICAL CIRCUIT CONTINUITY IN SWITCH

(a) There should not be continuity when shift position is other than 4th or 5th gear.

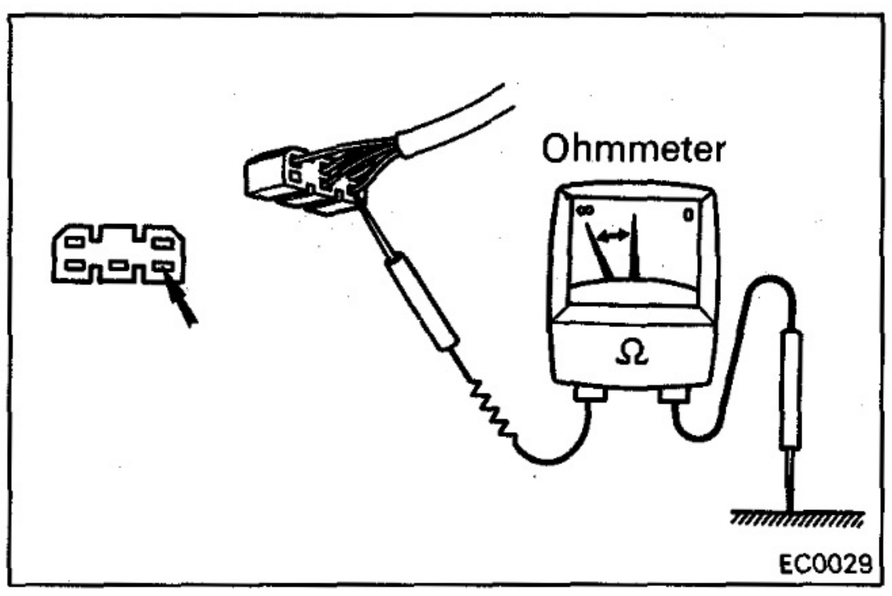


(b) There should not be continuity when shift position is in 4th or 5th gear.



INSPECTION OF SPEED SENSOR

1. **JACK UP ONE REAR WHEEL TO CLEAR GROUND AND CHECK FRONT WHEELS**
2. **RELEASE PARKING BRAKE**
3. **SET SHIFT LEVER INTO NEUTRAL**
4. **SET FOUR WHEEL DRIVE CONTROL LEVER TO H**



4. UNPLUG WIRING CONNECTOR FROM COMPUTER

Computer location: Left cowl side

5. CHECK ON-OFF CYCLES OF SPEED SENSOR

(a) Place the positive (+) terminal of the ohmmeter on the wiring connector terminal and the negative (–) terminal on a ground.

(b) Turn the rear wheel slowly.

(c) Check that the ohmmeter needle deflects consistently.

NOTICE: The ohmmeter probe should be inserted from the rear side of the connector.

If the ohmmeter needle does not deflect, check that the speed sensor terminals at the back side of the speedometer are properly connected. If the connection is OK, replace the speedometer assembly.

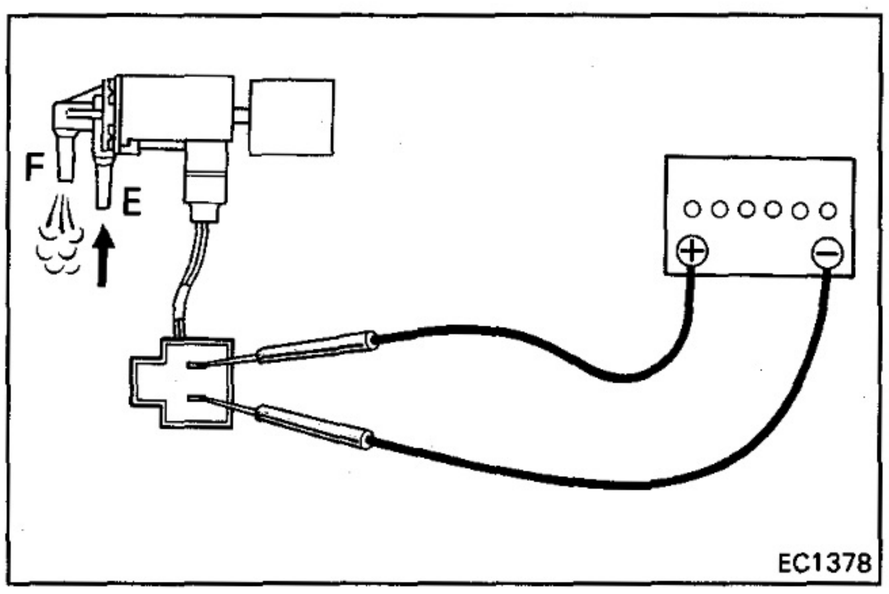
6. RECONNECT WIRING CONNECTOR TO COMPUTER

INSPECTION OF VSV

1. CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR INTO PIPE

(a) Connect the VSV terminals to the battery terminals as shown.

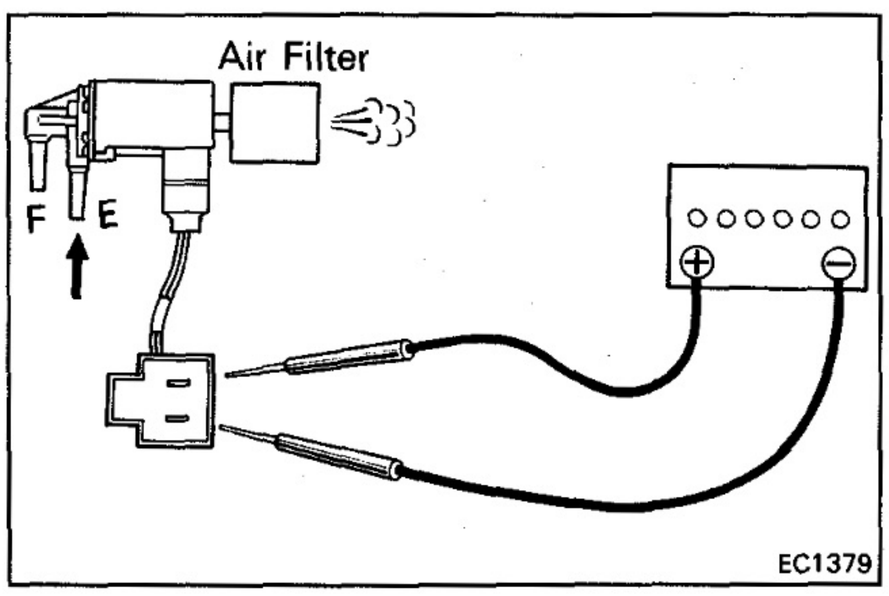
(b) Blow into pipe E and check that the air comes out of pipe F.

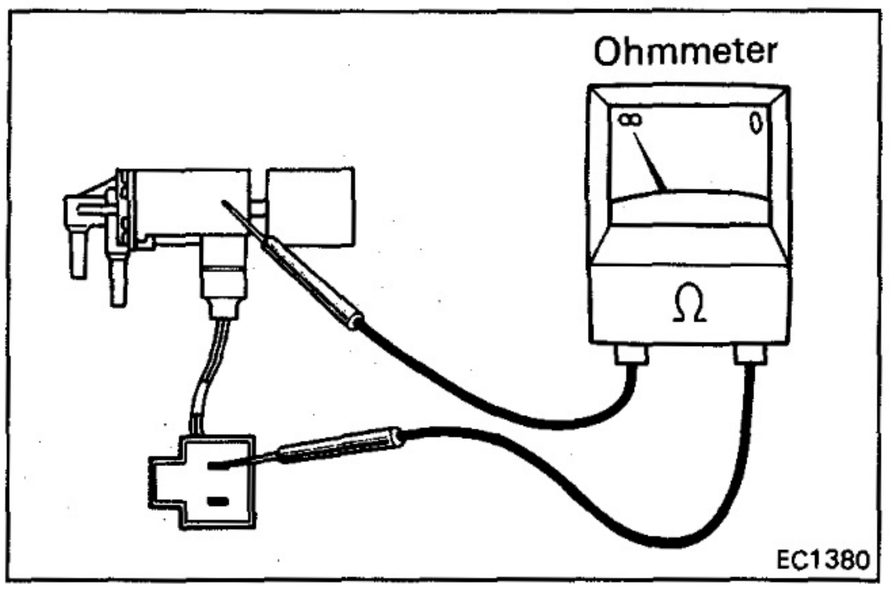


(c) Disconnect the battery.

(d) Blow into pipe E and check that the air comes out of the air filter.

If a problem is found, repair or replace the VSV.

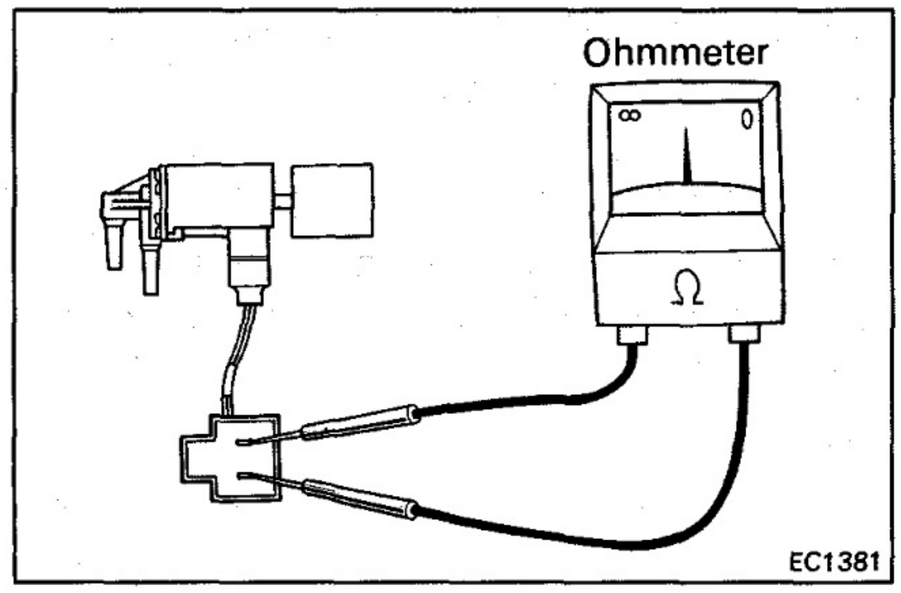




2. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between the terminal and the VSV body.

If there is continuity, replace the VSV.



3. CHECK FOR OPEN CIRCUIT

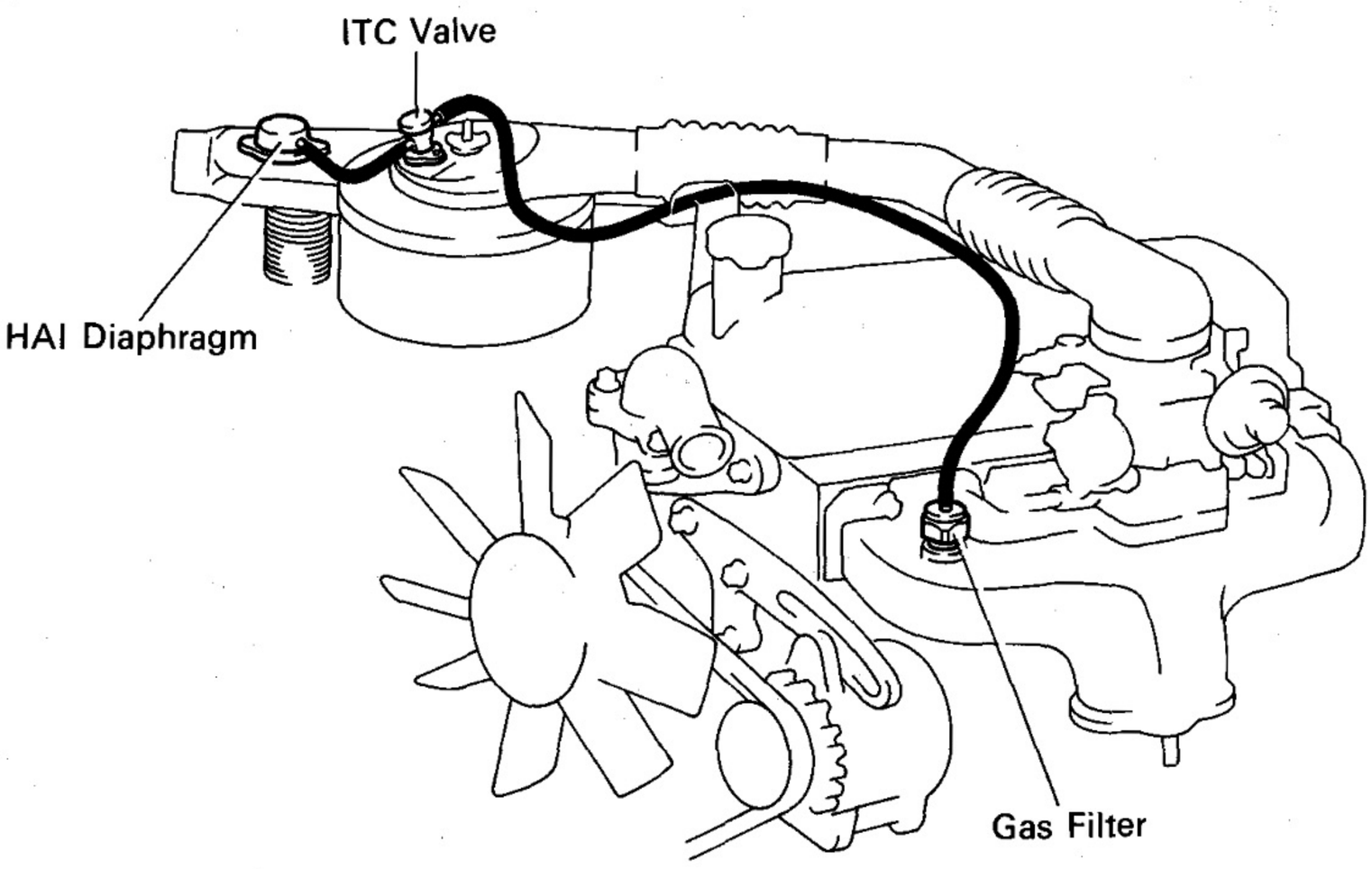
Using an ohmmeter, measure the resistance between the terminals as shown.

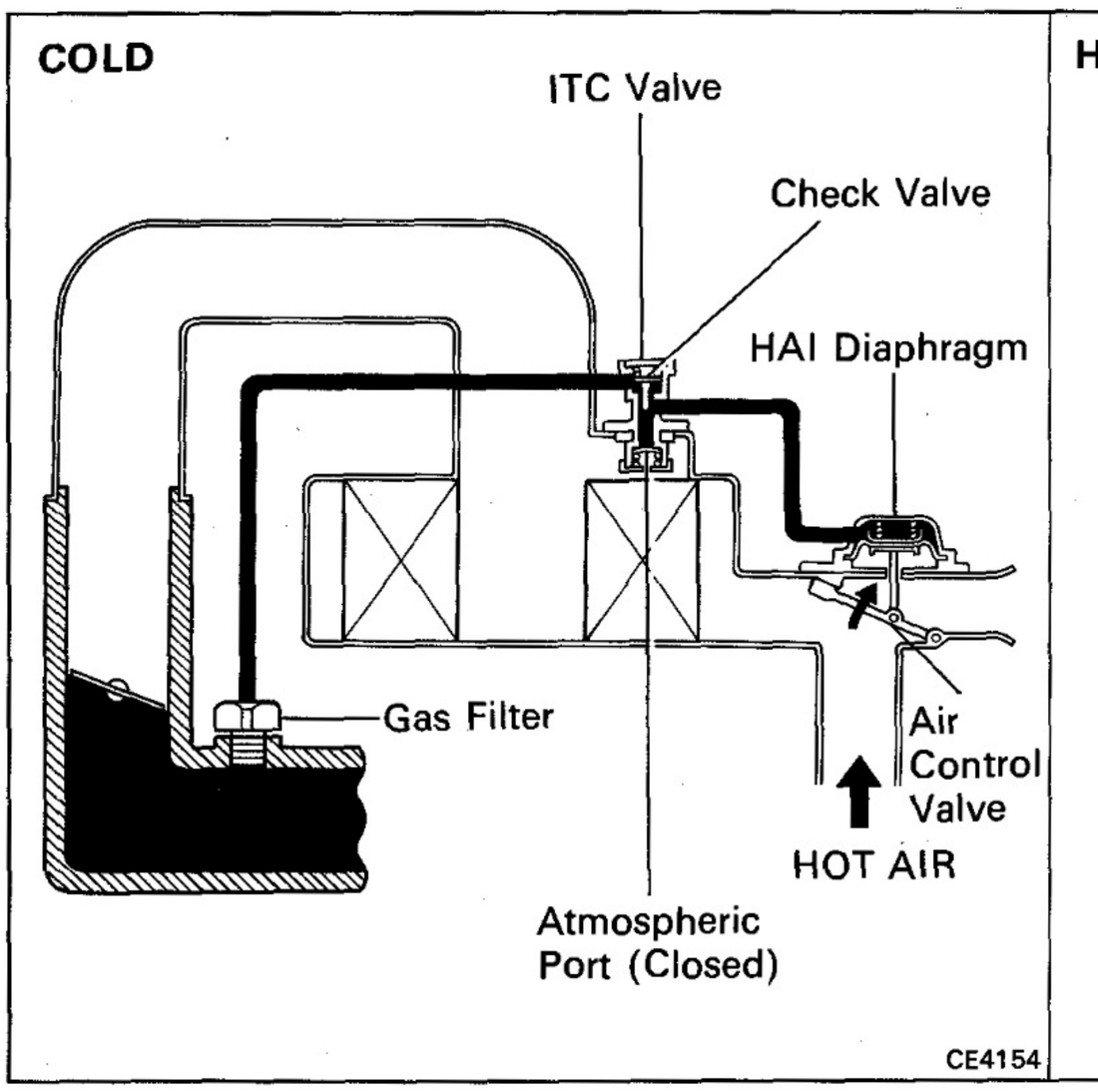
Specified resistance: 38 – 43 Ω at 20°C (68°F)

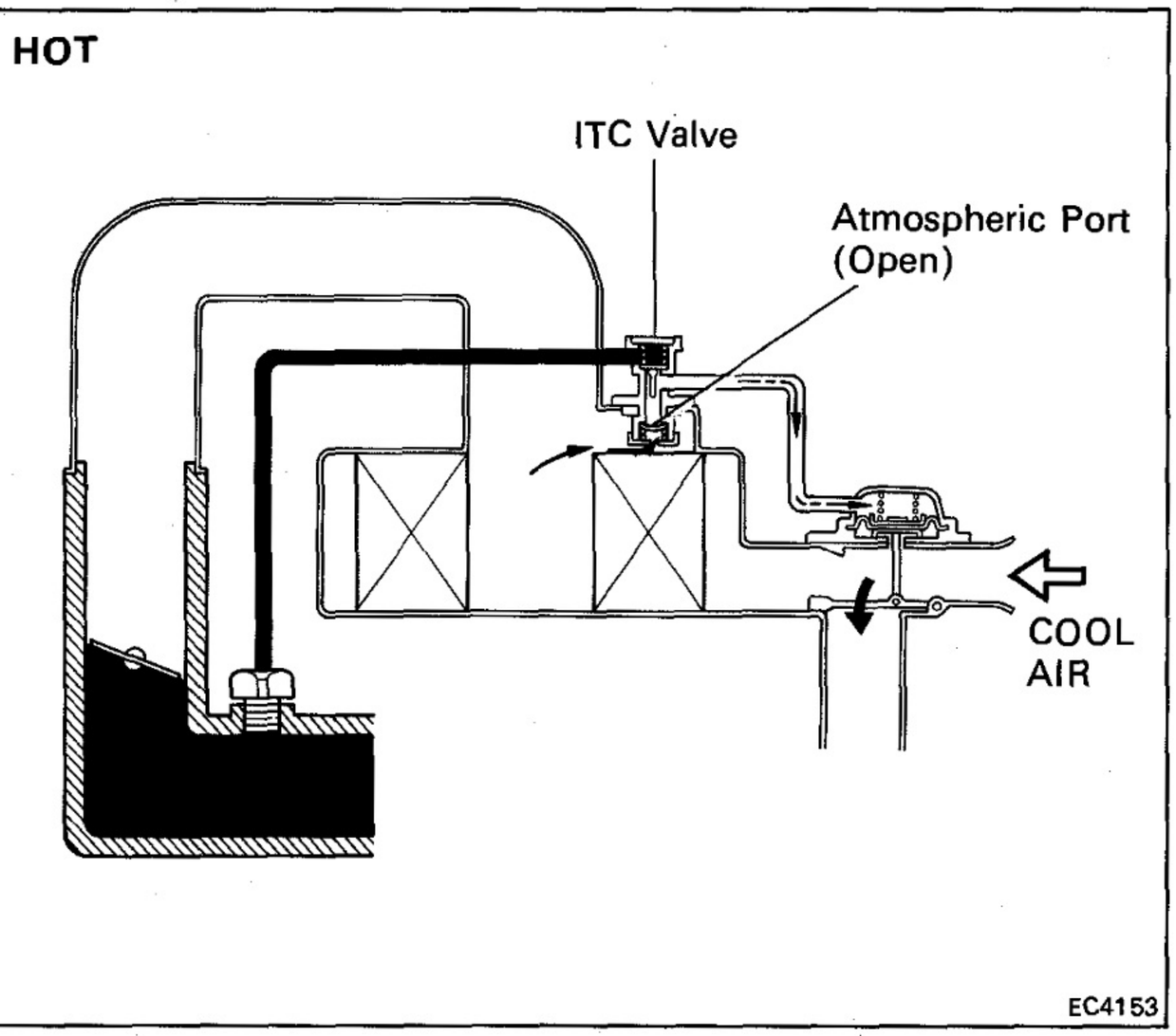
If resistance is not within specification, replace the VSV.

AUXILIARY SYSTEM

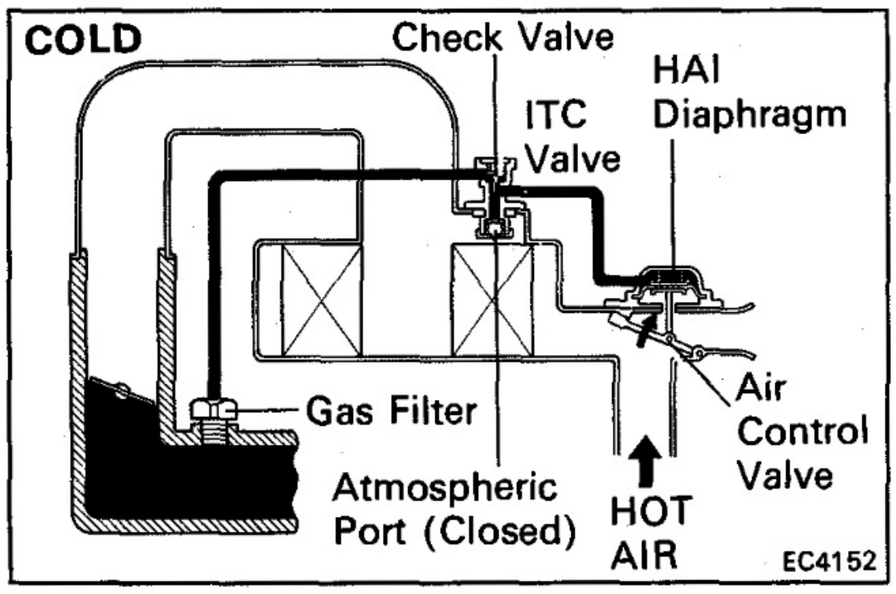
1. Automatic Hot Air Intake (HAI) System

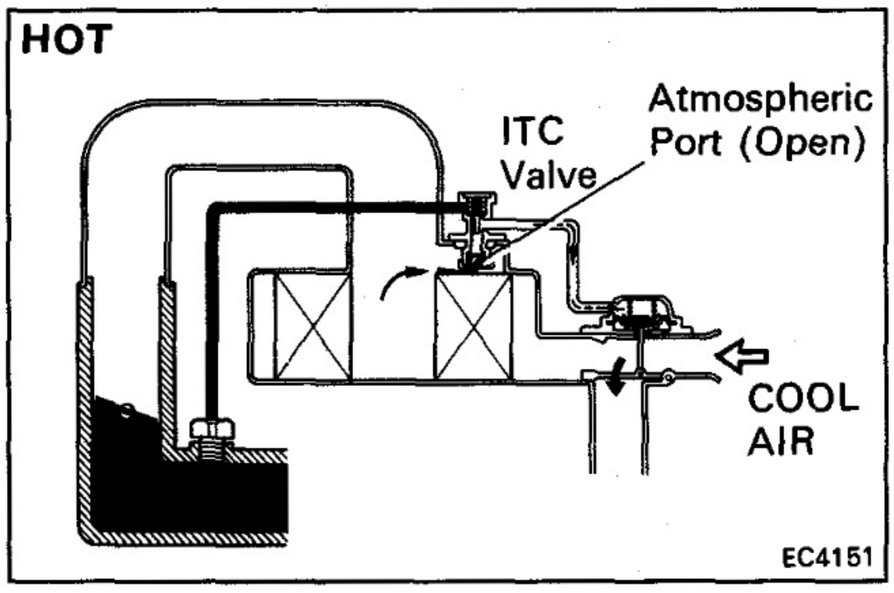






This system leads a hot air supply to the carburetor in cold weather to improve driveability and to prevent the carburetor from icing in extremely cold weather.			
Temperature in Air Cleaner	**ITC Valve**	**Air Control Valve**	**Intake Air**
Cold Below 31°C (88°F)	Atmospheric port is CLOSED	Hot air passage is OPEN	HOT
Hot Above 43°C (109°F)	Atmospheric port is OPEN	Cool air passage is OPEN	COOL





INSPECTION OF HAI SYSTEM

1. CHECK AIR CONTROL VALVE OPERATION

(a) Remove the air cleaner cover nut.

(b) Cool the ITC valve by blowing compressed air on it.

(c) Check that the air control valve opens the hot air passage at idle.

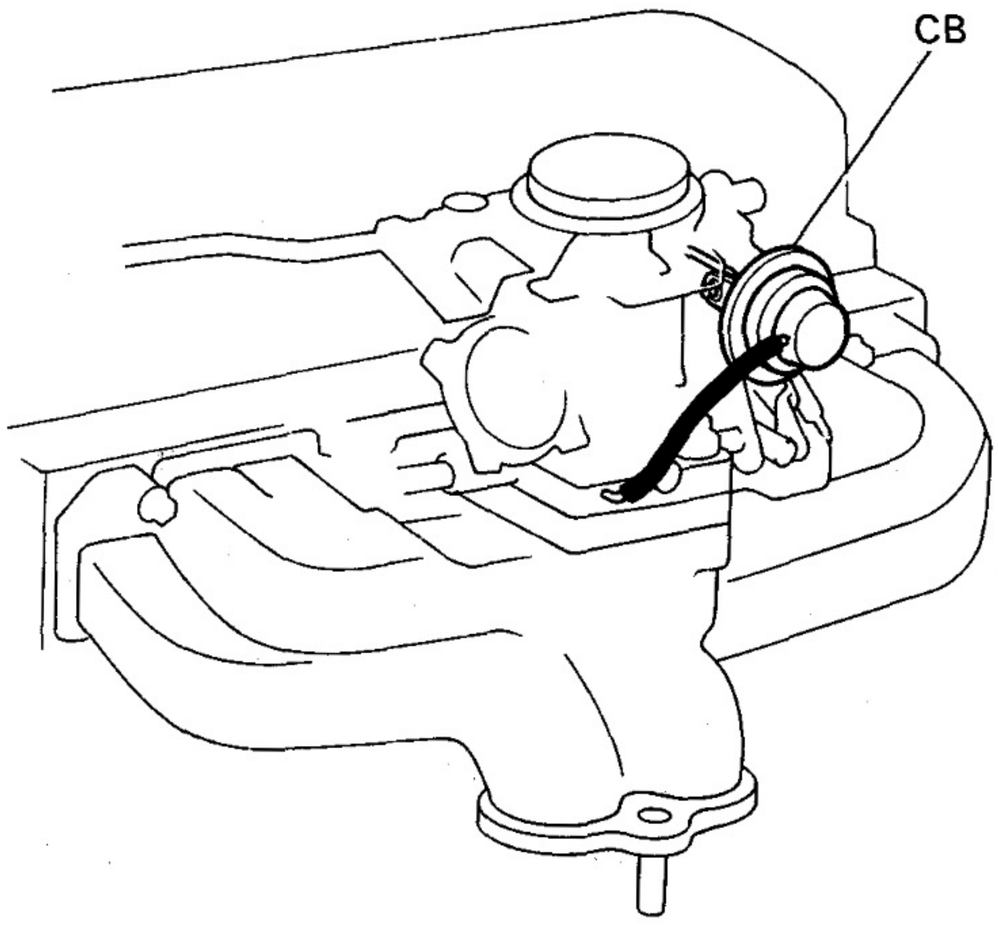
(d) Reinstall the air cleaner cover nut and warm up the engine.

(e) Check that the air control valve closes the cool air passage at idle.

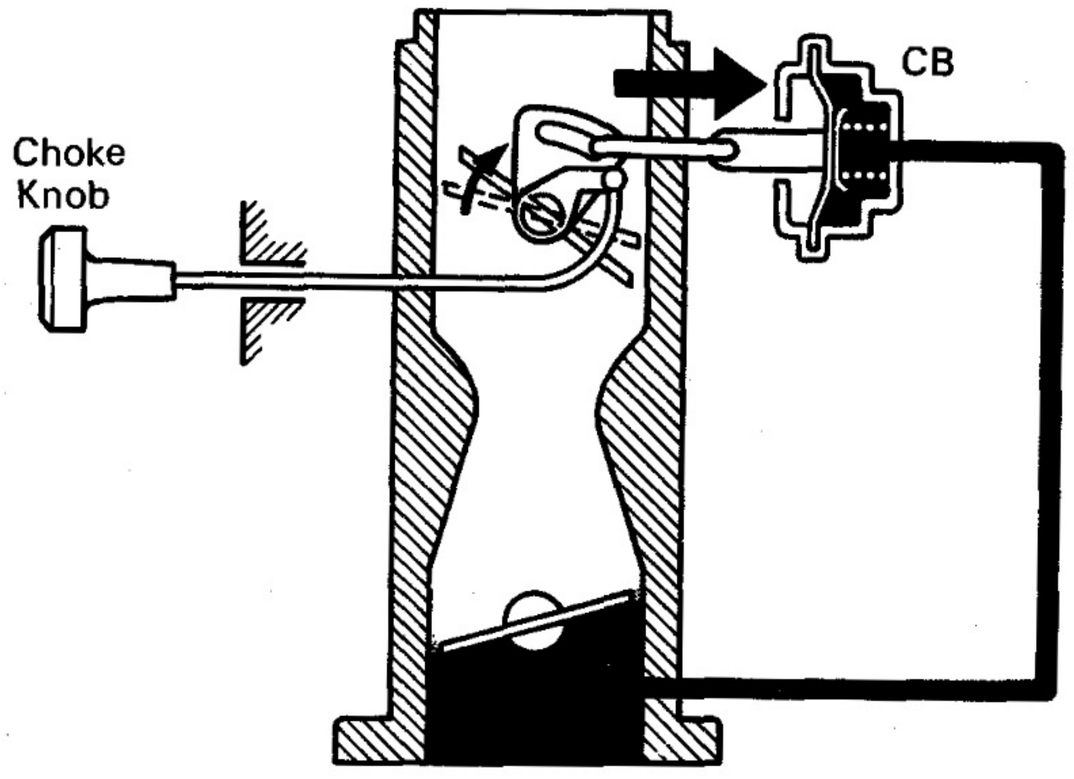
2. CHECK HOSES AND CONNECTIONS

Visually check the hoses and connections for cranks, leaks or damage.

2. Choke Breaker (CB) System

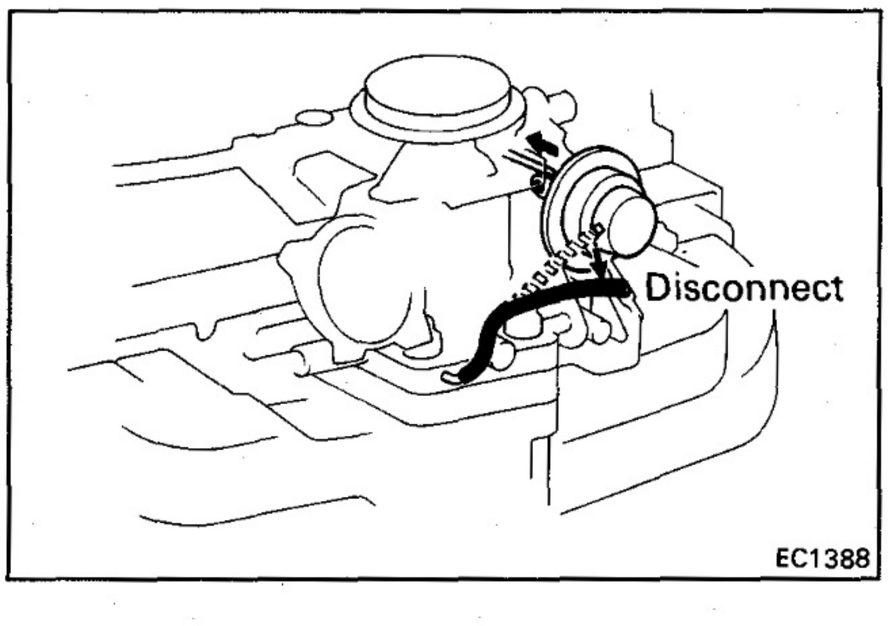


EC1387



EC3526

This system slightly opens the choke valve to prevent too rich a mixture after firing when the choke is closed.



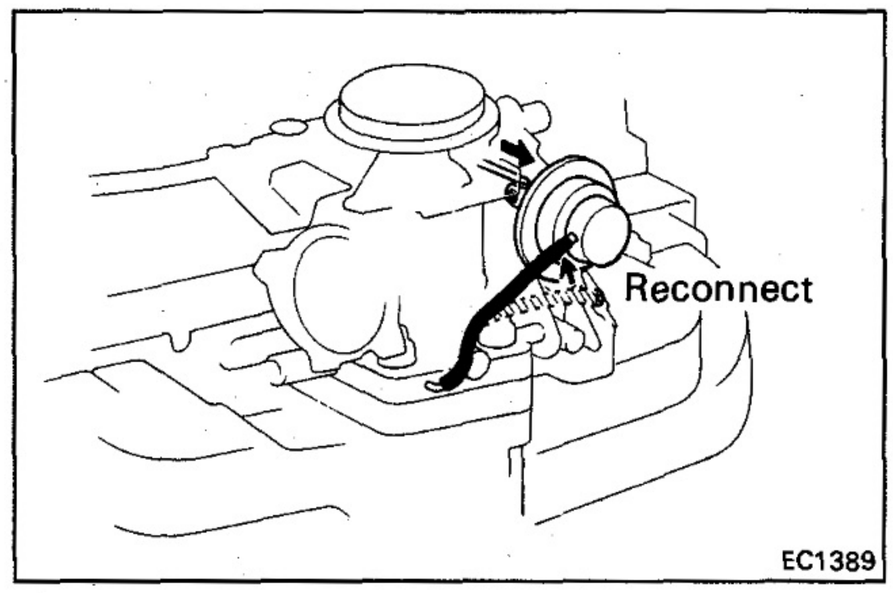
EC1388

INSPECTION OF CB SYSTEM

CHECK CHOKE LINKAGE AND DIAPHRAGM

(a) Start the engine.

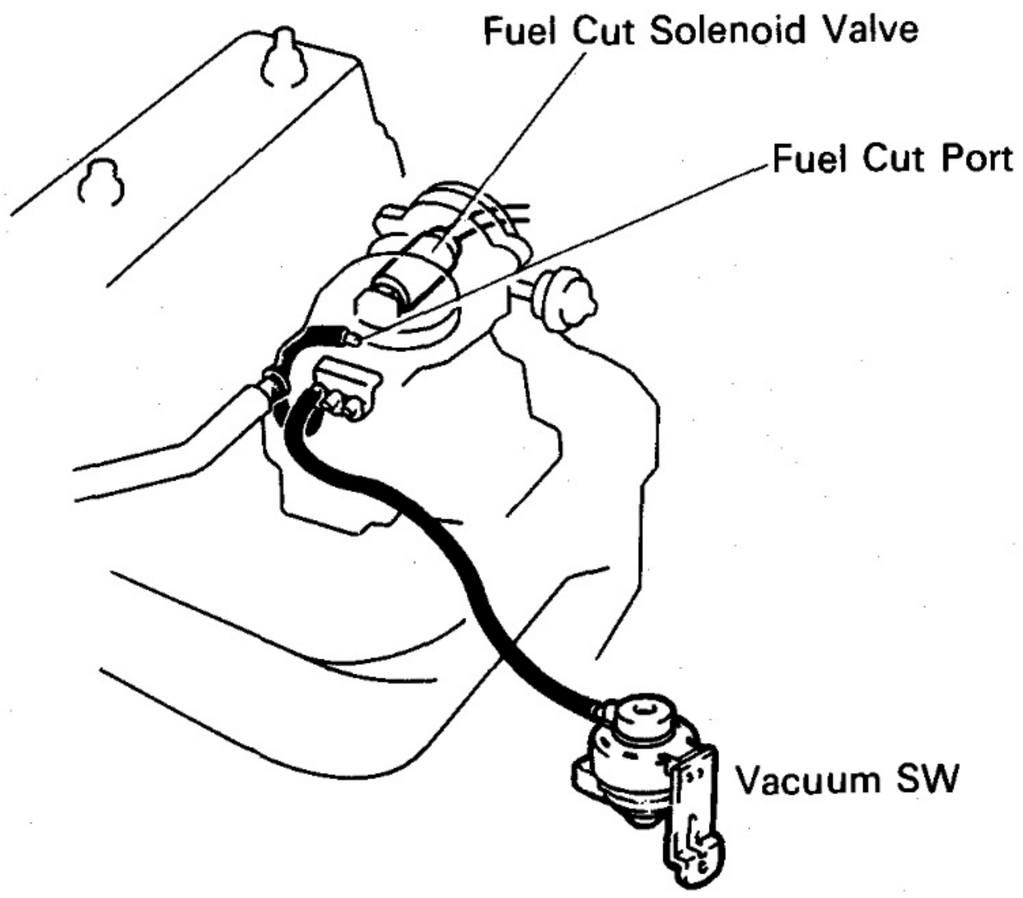
(b) Disconnect the hose from the CB diaphragm and check that the choke linkage returns.



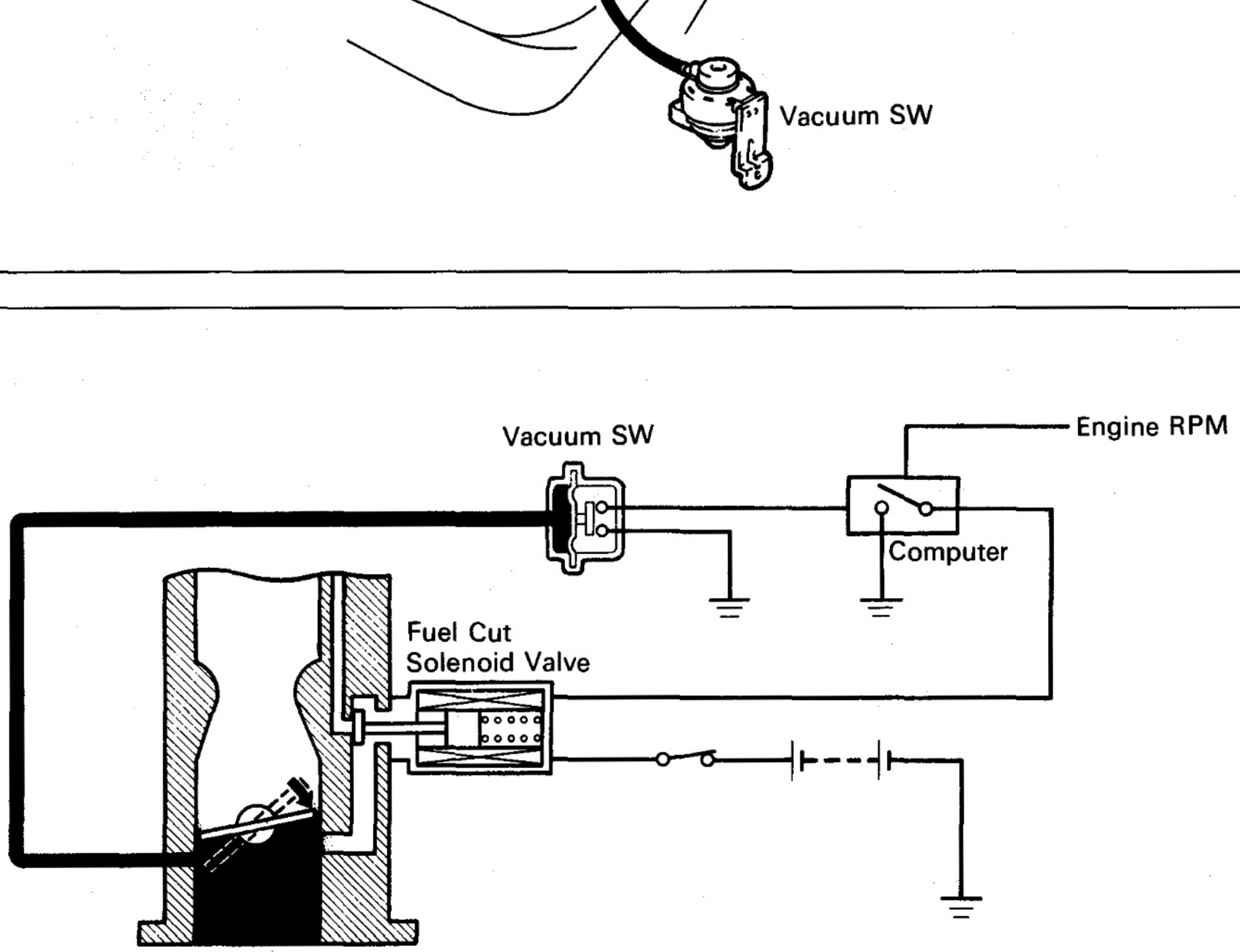
EC1389

(c) Reconnect the hose to the diaphragm and check that the choke linkage is pulled by the diaphragm.

2. Deceleration Fuel Cut System (Australia Vehicle)



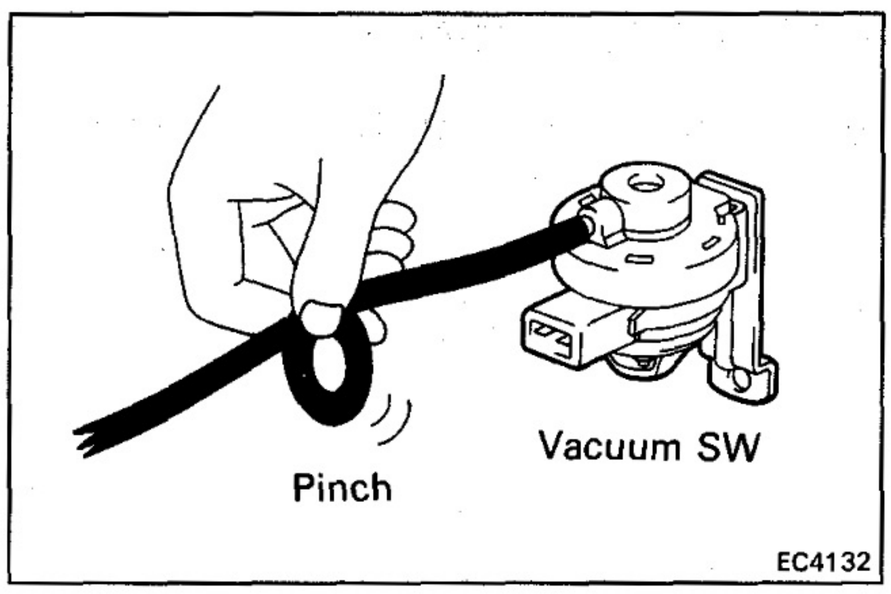
EC4134



EC1299

This system cuts off part of the fuel in the slow circuit of the carburetor to reduce HC and to prevent afterburning in the exhaust system.

Engine RPM	Vacuum in the Vacuum SW	Vacuum SW	Computer	Fuel Cut Solenoid Valve	Slow Circuit in Carburetor
Below 1,700 rpm	Below 365 mmHg (14.37 in.Hg, 48.7 kPa)	ON	ON	ON	OPEN
	Above 415 mmHg (16.34 in.Hg, 55.3 kPa)	OFF	ON	ON	OPEN
Above 2,090 rpm	Below 365 mmHg (14.37 in.Hg, 48.7 kPa)	ON	ON	ON	OPEN
	Above 415 mmHg (16.34 in.Hg, 55.3 kPa)	OFF	OFF	OFF	CLOSED



INSPECTION OF DECELERATION FUEL CUT SYSTEM

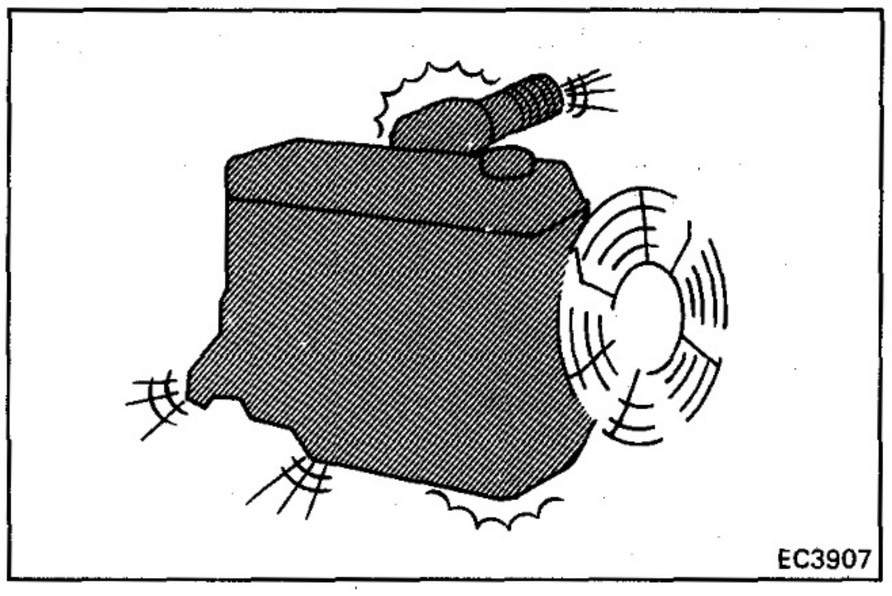
CHECK SYSTEM OPERATION

(a) Connect a tachometer to the engine.

(b) Start the engine.

(c) Check that the engine runs normally.

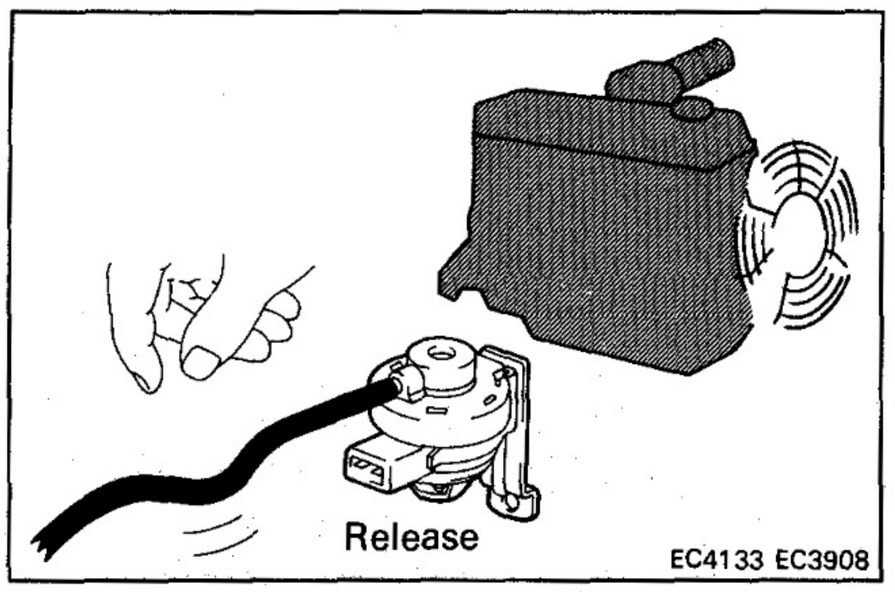
(d) Pinch off the vacuum hose to the vacuum switch.



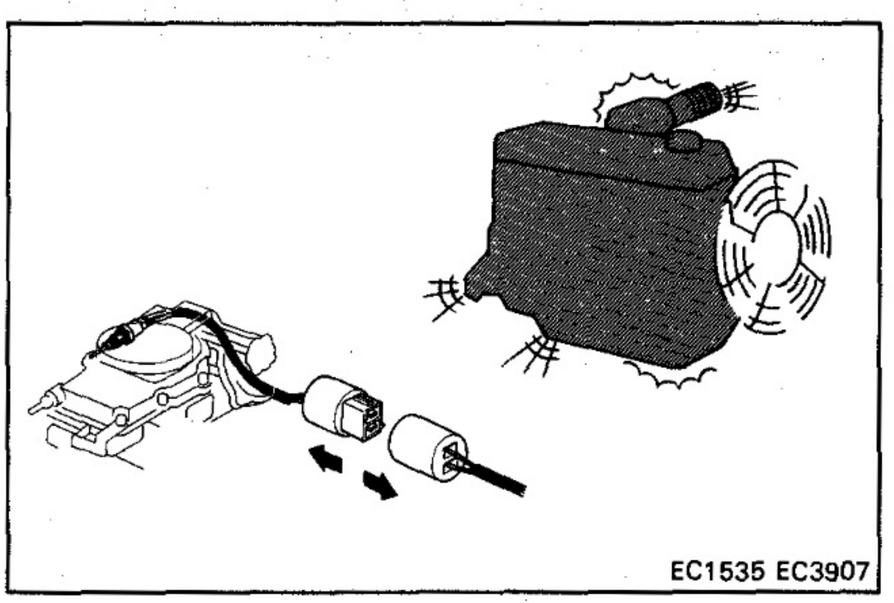
(e) Gradually increase the engine speed.

Check that the engine misfires slightly at the following engine speed.

Engine speed: 1,700 – 2,090 rpm



(f) Release the pinched hose. Again gradually increase the engine speed and check that the engine operation returns to normal.

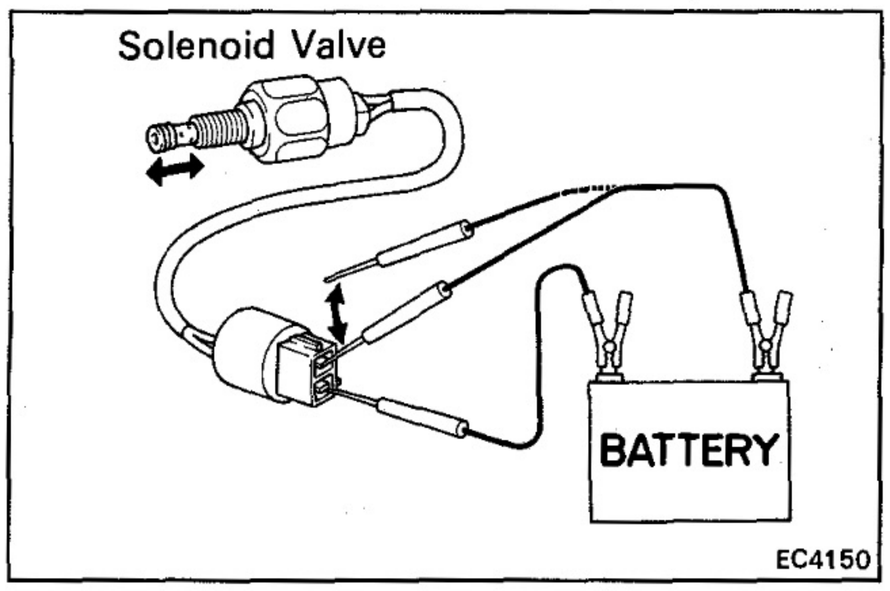


(g) With the engine idling, unplug the wiring connector from the solenoid valve. Check that the engine dies.

(h) Stop the engine, and reconnect the wiring. Remove the tachometer.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY, OTHERWISE INSPECT EACH PART

INSPECTION OF FUEL CUT SOLENOID VALVE



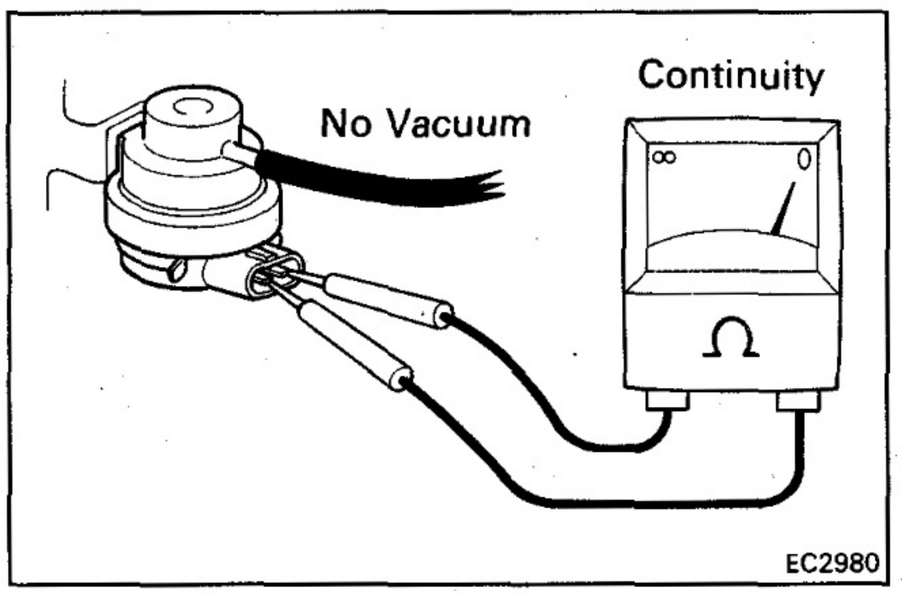
(a) Remove the solenoid valve.

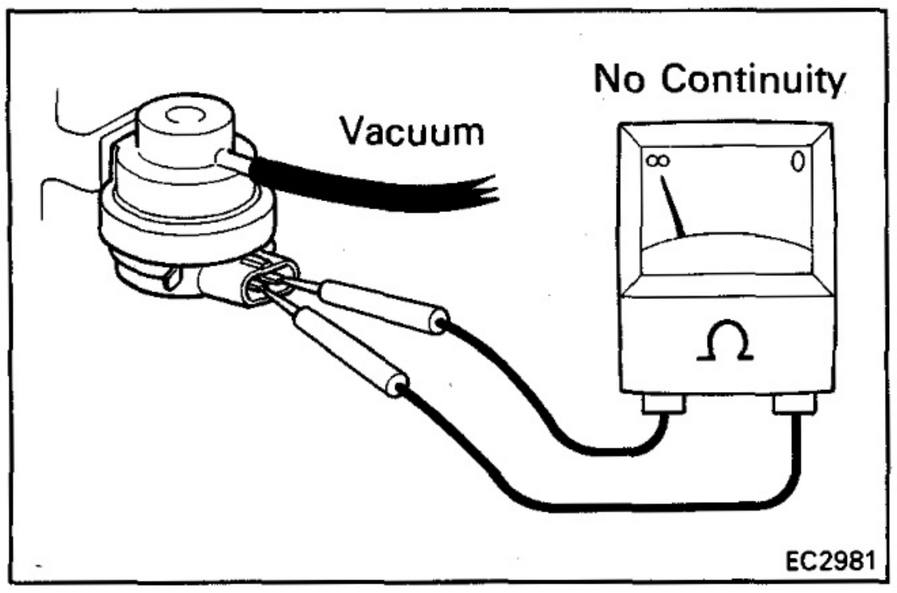
(b) Connect the two terminals and the battery terminals as shown.

(c) Check that you can feel a "click" from the solenoid valve when the battery is connected and disconnected.

(d) Reinstall the valve and reconnect the wiring connector.

If a problem is found, replace the solenoid valve or O-ring.





INSPECTION OF VACUUM SWITCH

(a) Using an ohmmeter, check that there is continuity between the switch terminals.

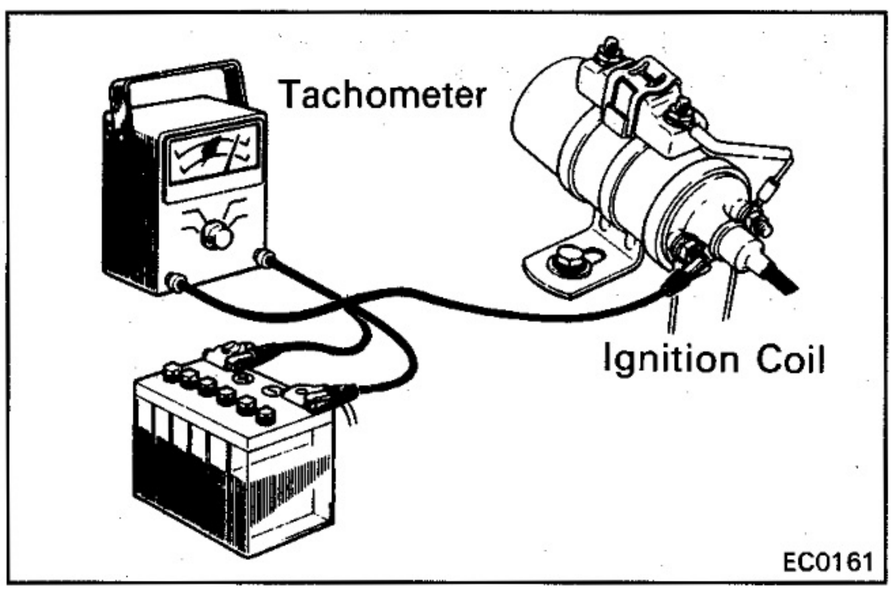
(b) Warm up the engine to normal operating temperature.

(c) Using an ohmmeter, check that there is no continuity between the switch terminals.

3F ENGINE ADJUSTMENT

Page

IGNITION TIMING AND DWELL ANGLE 4-2
IDLE SPEED AND IDLE MIXTURE 4-3
FAST IDLE SPEED 4-7



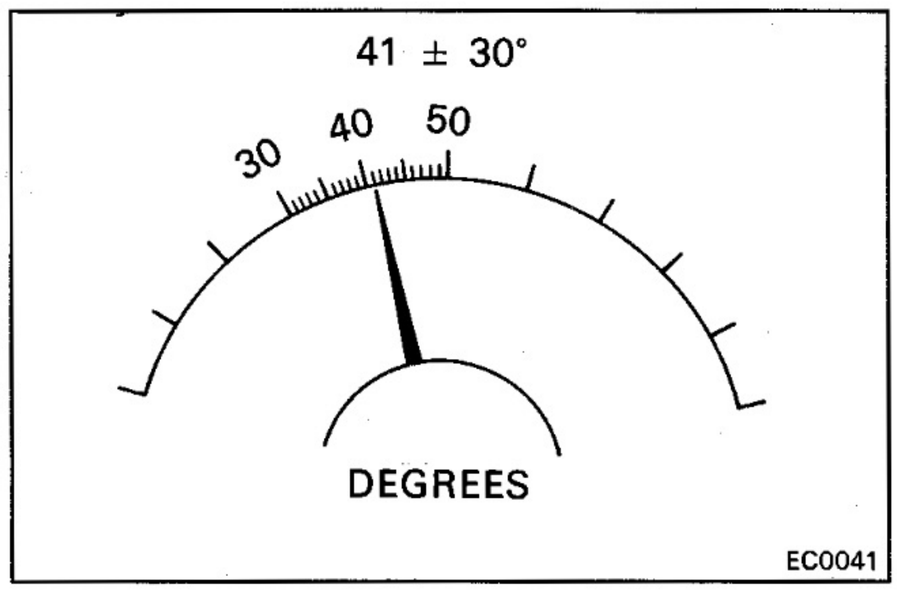
IGNITION TIMING AND DWELL ANGLE

1. CONNECT TACHOMETER AND TIMING LIGHT TO ENGINE

Connect the tachometer positive (+) terminal to the ignition coil negative (–) terminal.

2. WARM UP ENGINE

Allow the engine to reach normal operating temperature.

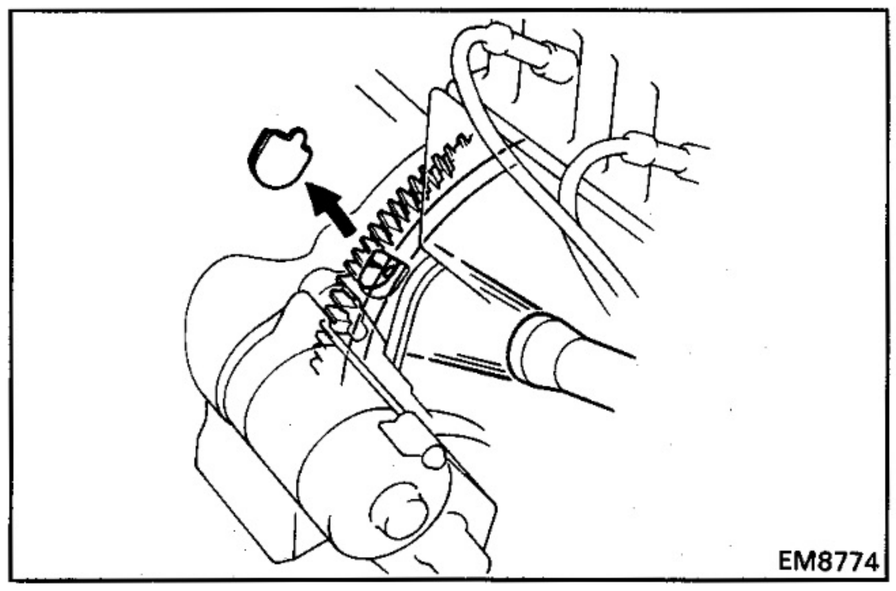


3. CHECK DWELL ANGLE

Dwell angle: 41 ± 3°

With the engine idling as specified, make sure that the dwell angle is within the specified range.

If angle is too small, increase the rubbing block gap, if too large, decrease the gap.



4. CHECK IGNITION TIMING

Ignition timing: 7 ± 2° BTDC @ Max. 900 rpm

(a) With the engine idling as specified, use a timing light to check the timing.

(b) If necessary, loosen the distributor bolt and turn the distributor to align the marks. Recheck the timing after tightening the distributor.

Torque: 100 – 160 kg-cm (8 – 11 ft-lb, 10 – 15 N·m)

IDLE SPEED AND IDLE MIXTURE

CHECK AND ADJUSTMENT OF IDLE SPEED AND IDLE MIXTURE

1. CONNECT TACHOMETER TO ENGINE

2. WARM UP ENGINE

Allow the engine to reach full operating temperature.

3. CHECK IDLE SPEED

Idle speed: M/T 650 ± 50 rpm
A/T 750 ± 50 rpm

If not as specified, adjust according to the following procedure.

A. METHOD WITH CO METER

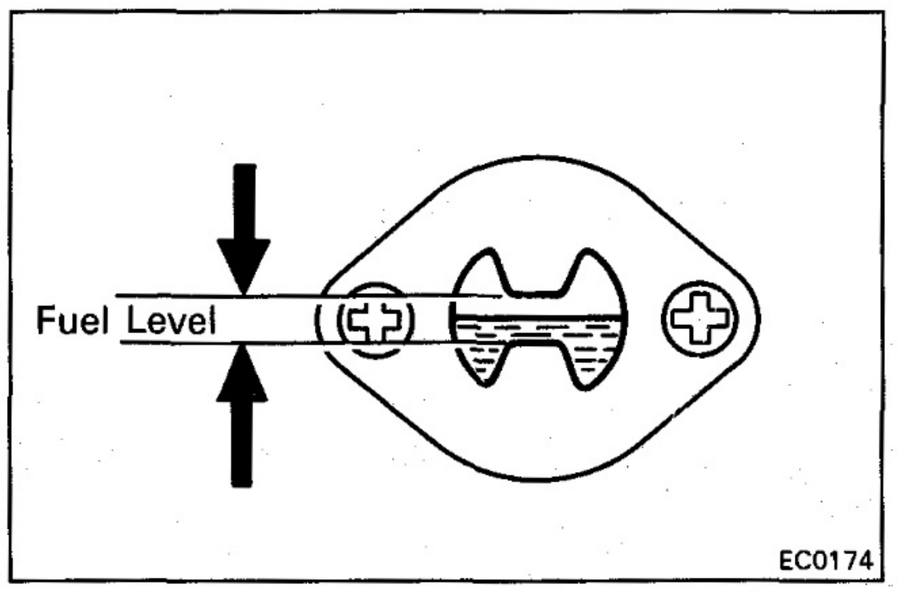
1. VISUALLY INSPECT CARBURETOR

(a) Check for loose screws or loose mounting to the manifold.

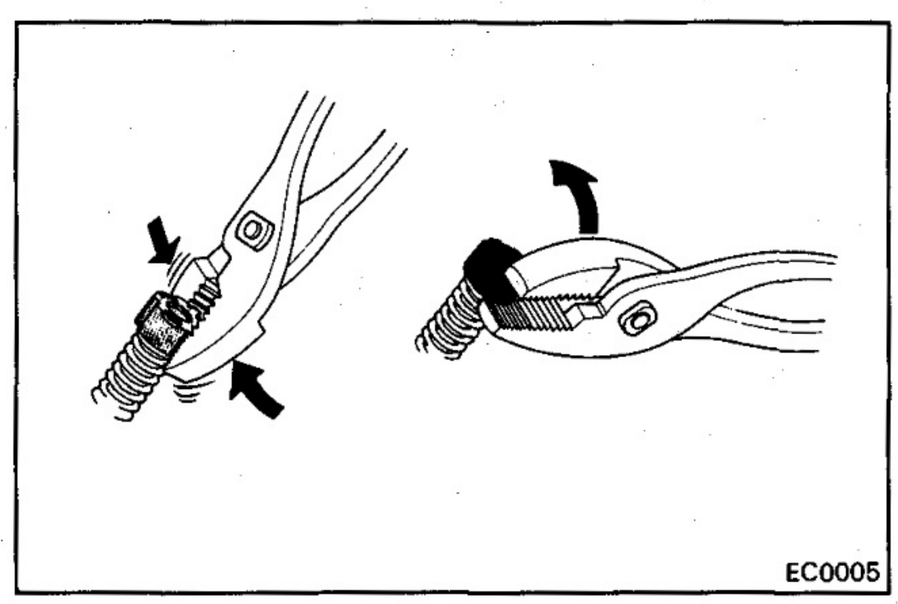
(b) Check for wear in the linkage, missing snap rings or excessive looseness in the throttle shaft. Correct any problems found.

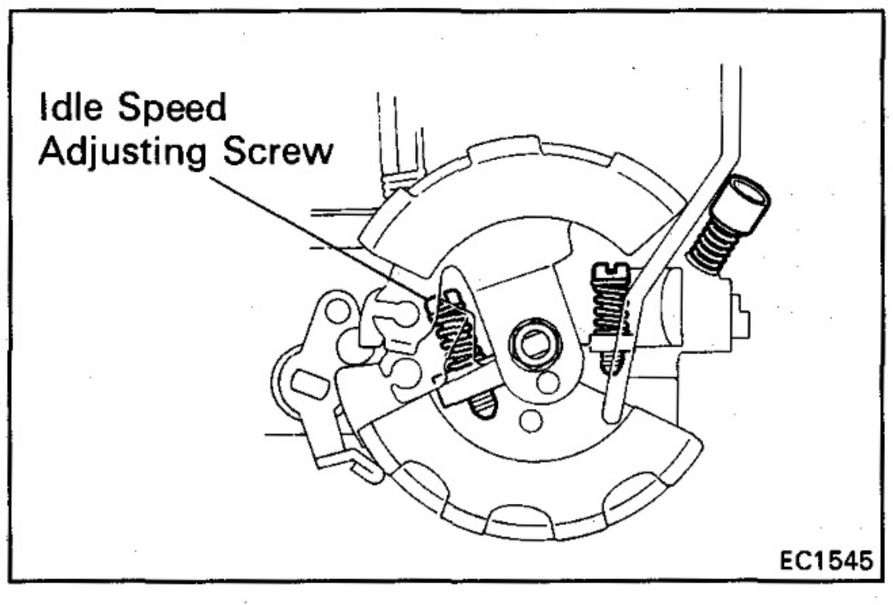
2. INITIAL CONDITIONS

(a) Air cleaner installed
(b) Coolant at normal operating temperature
(c) Choke fully open
(d) All accessories switched off
(e) All vacuum lines connected
(f) Ignition timing set correctly
(g) Transmission in "N" range
(h) Fuel level should be about even with the correct level in the sight glass
(i) CO meter operates normally
(j) Vacuum gauge installed



3. BREAK OFF IDLE LIMITER CAP, IF INSTALLED (Australia Vehicles)



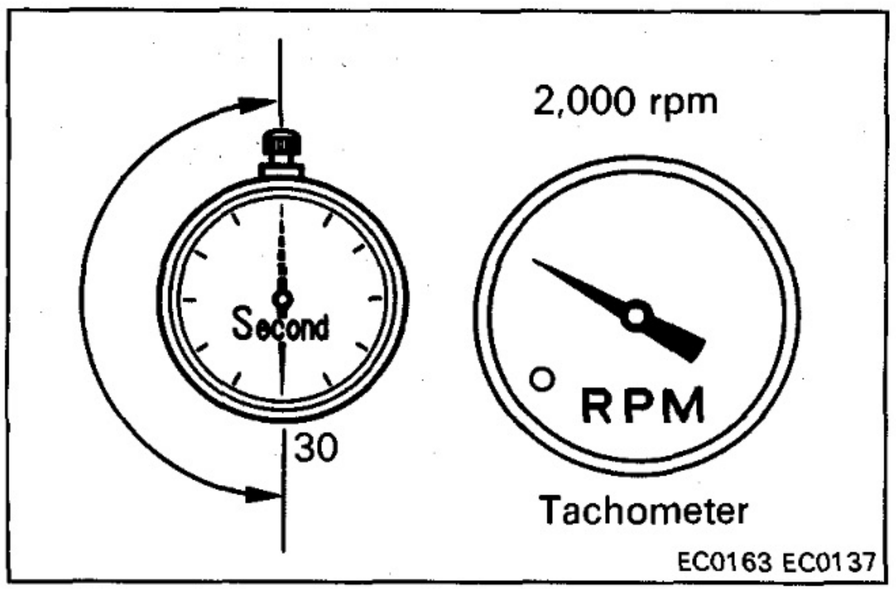


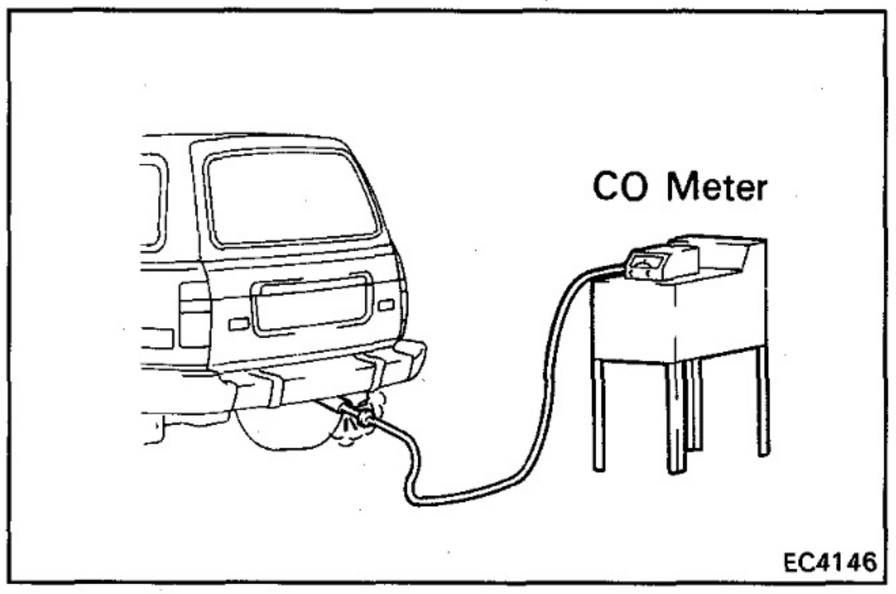
4. ADJUST IDLE SPEED

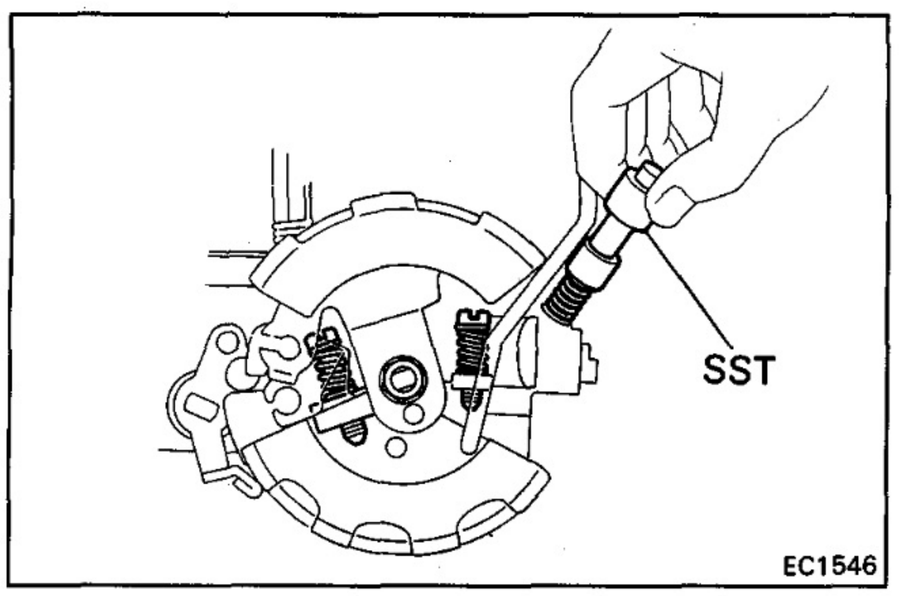
(a) Start the engine.

(b) Turn the idle speed adjusting screw to obtain the specified idle speed.

Idle speed: M/T 650 rpm
A/T 750 rpm







4. MEASURE CO CONCENTRATION

(a) Make sure that the CO meter is properly calibrated.

(b) Race the engine for 30 – 60 seconds at about 2,000 rpm before measuring concentration.

(c) Wait 1-3 minutes after racing the engine to allow the concentration to stabilize.

(d) Insert a tester probe at least 40 cm (1.3 ft) into tailpipe, and measure the concentration within a short time.

Idle CO concentration: 1.5 ± 0.5 %

- If the CO concentration is within specification, this adjustment is complete.

- If the CO concentration is not within specification, turn the idle mixture adjusting screw to obtain the specified concentration value.

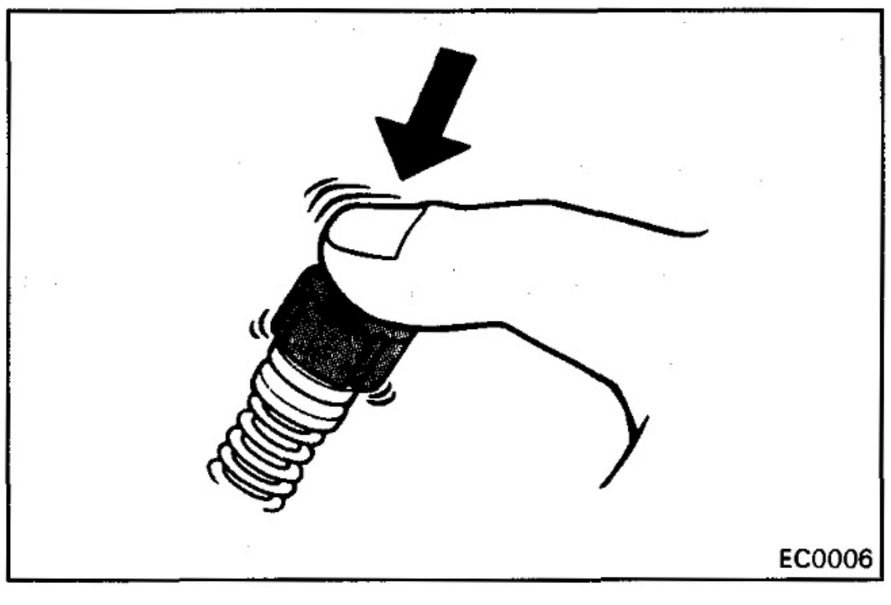
HINT: Adjust the idle mixture adjusting screw with SST.

SST 09243-00020

- If the CO concentration cannot be corrected by an idle mixture adjustment, see table below for other possible causes.

TROUBLESHOOTING

HC	CO	Problems	Causes
High	Normal	Rough idle	1. Faulty ignition: ● Incorrect timing ● Fouled, shorted or improperly gapped plugs ● Open or crossed ignition wires ● Cracked distributor cap 2. Incorrect valve clearance 3. Leaky exhaust valves 4. Leaky cylinder
High	Low	Rough idle Fluctuating HC reading	1. Vacuum leak: ● Vacuum hose ● Intake manifold ● PCV line ● Carburetor base
High	High	Rough idle Black smoke from exhaust	1. Restricted air filer 2. Plugged PCV valve 3. Faulty carburetion: ● Faulty choke action ● Incorrect float setting ● Leaking needle or seat ● Leaking power valve



5. **INSTALL NEW LIMITER CAP (Australia Vehicles)**

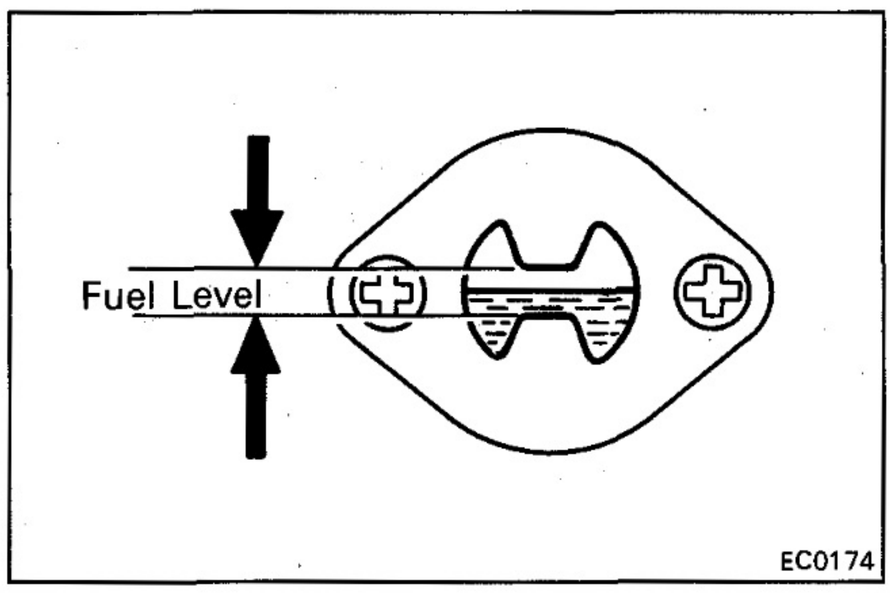
After this adjustment is completed, install the idle limiter cap (blue) on the idle mixture adjusting screw.

NOTICE: After completing adjustment, perform a road test to make certain that the engine performance has not changed.

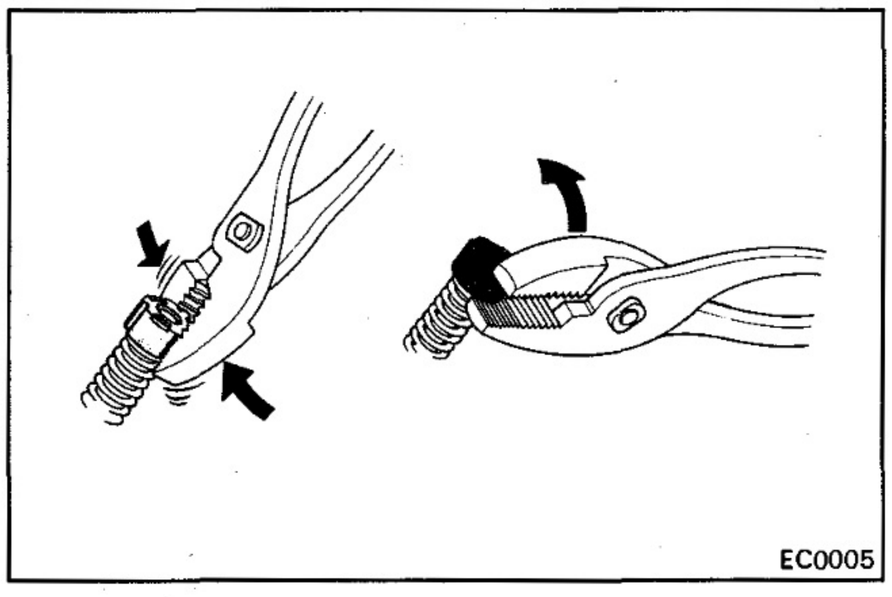
B. ALTERNATIVE METHOD

To be use only if CO meter is not available.

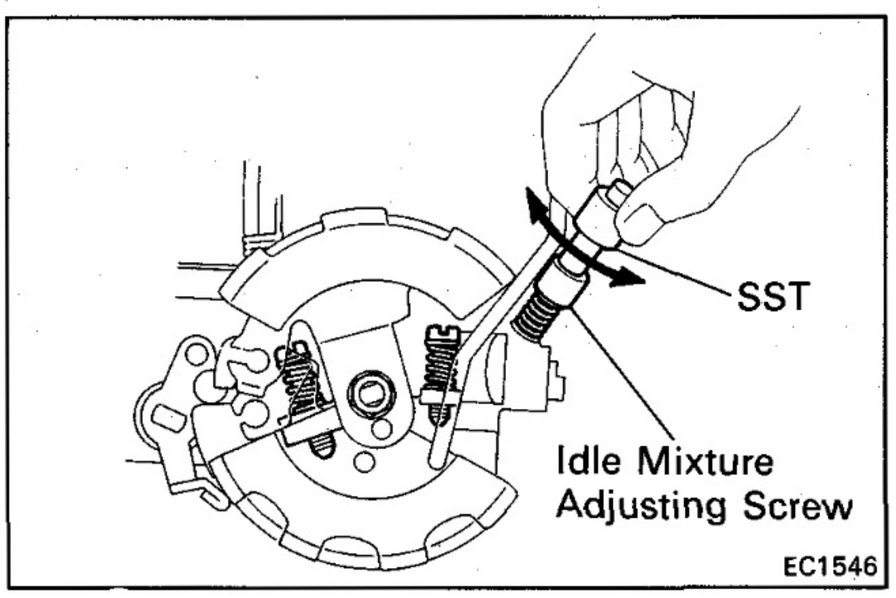
1. **VISUALLY INSPECT CARBURETOR**
   (a) Check for loose screws or loose mounting to the manifold.
   (b) Check for wear in the linkage, missing snap rings or excessive looseness in the throttle shaft. Correct any problems found.

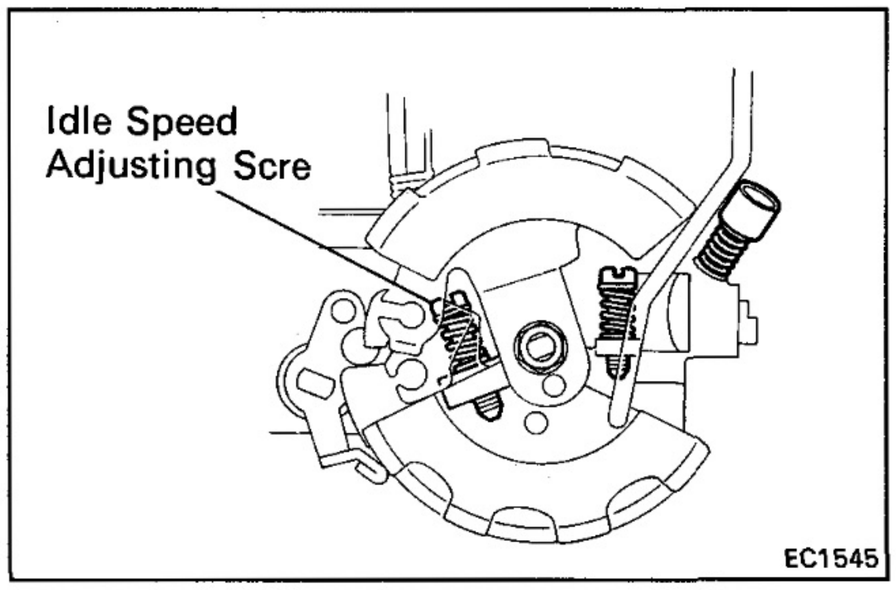


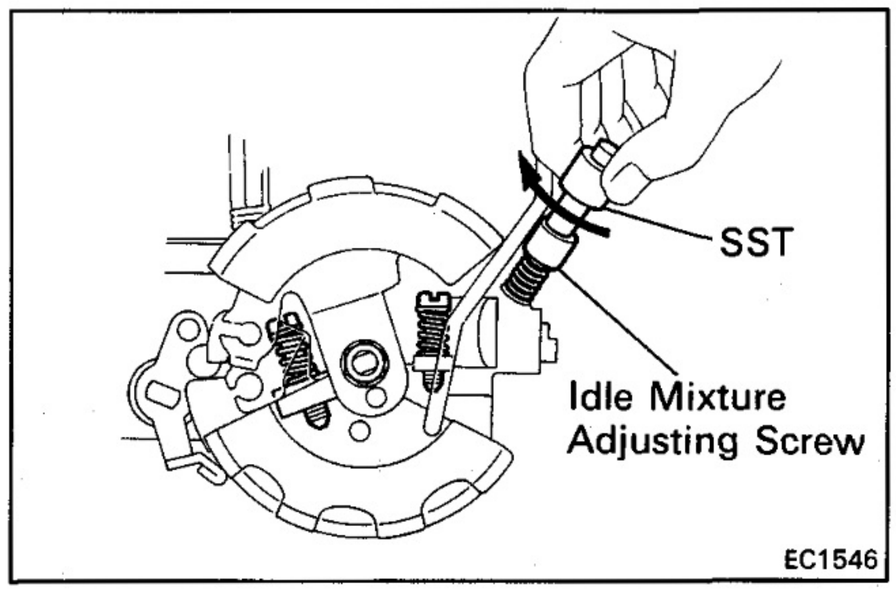
2. **INITIAL CONDITIONS**
   (a) Air cleaner installed
   (b) Coolant at normal operating temperature
   (c) Choke fully open
   (d) All accessories switched off
   (e) All vacuum lines connected
   (f) Ignition timing set correctly
   (g) Transmission in "N" range
   (h) Fuel level should be about even with the correct level in the sight glass.

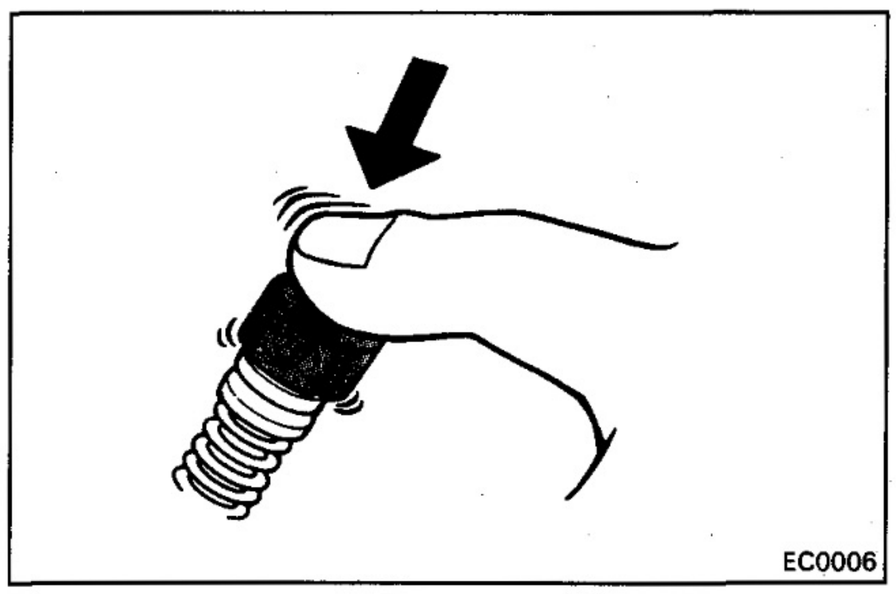


3. **BREAK OFF IDLE LIMITER CAP, IF INSTALLED (Australia Vehicles)**









4. ADJUST IDLE SPEED AND IDLE MIXTURE

(a) Start the engine.

(b) Set to the maximum idle speed by turning,the idle mixture adjusting screw.

HINT: Adjust the idle mixture adjusting screw with SST.

SST 09243-00020

(c) Set to the idle mixture speed by turning the idle speed adjusting screw.

Idle mixture speed: M/T 690 rpm
A/T 790 rpm

(d) Before moving to the next step, continue adjustments (b) and (c) until the maximum idle speed will not rise any further no matter how much the idle mixture adjusting screw is adjusted.

(e) Set to the idle speed by screwing in the idle mixture adjusting screw.

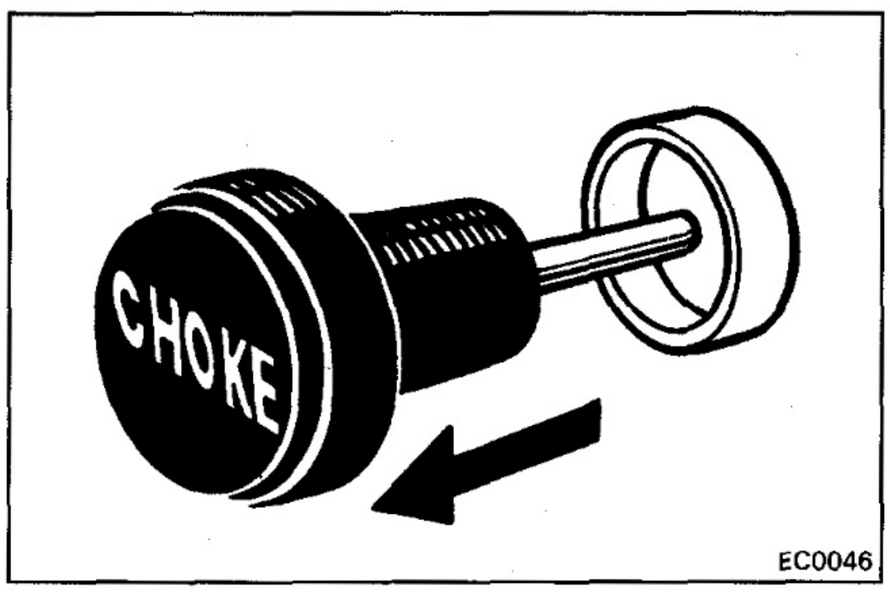
Idle speed: M/T 650 rpm
A/T 750 rpm

This is the Lean Drop Method for setting idle speed and mixture.

5. INSTALL NEW LIMITER CAP (Australia Vehicles)

After this adjustment is completed, install the idle limiter cap (blue) on the idle mixture adjusting screw.

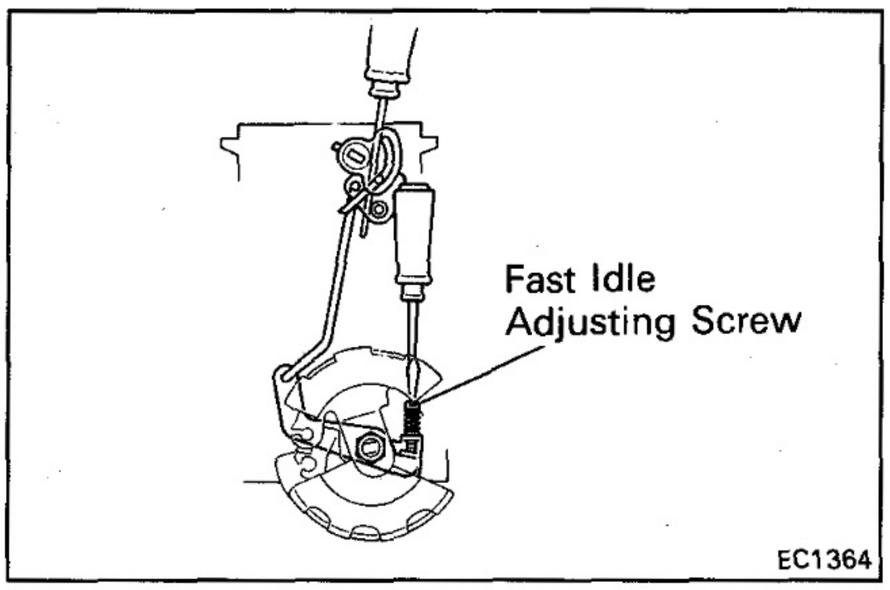
NOTICE: After completing adjustment, perform a road test to make certain that the engine performance has not changed.



FAST IDLE SPEED

ADJUSTMENT OF FAST IDLE SPEED

1. **WARM UP AND STOP ENGINE**
2. **REMOVE AIR CLEANER COVER**
3. **FULLY PULL OUT CHOKE KNOB**



4. **OPEN CHOKE VALVE WITH SCREWDRIVER AND START ENGINE**
5. **ADJUST FAST IDLE SPEED**

   Adjust the fast idle speed by turning the fast idle adjusting screw.

   Fast idle speed: 1,800 ± 200 rpm
6. **INSTALL AIR CLEANER COVER**

3F-E ENGINE EMISSION CONTROL SYSTEMS

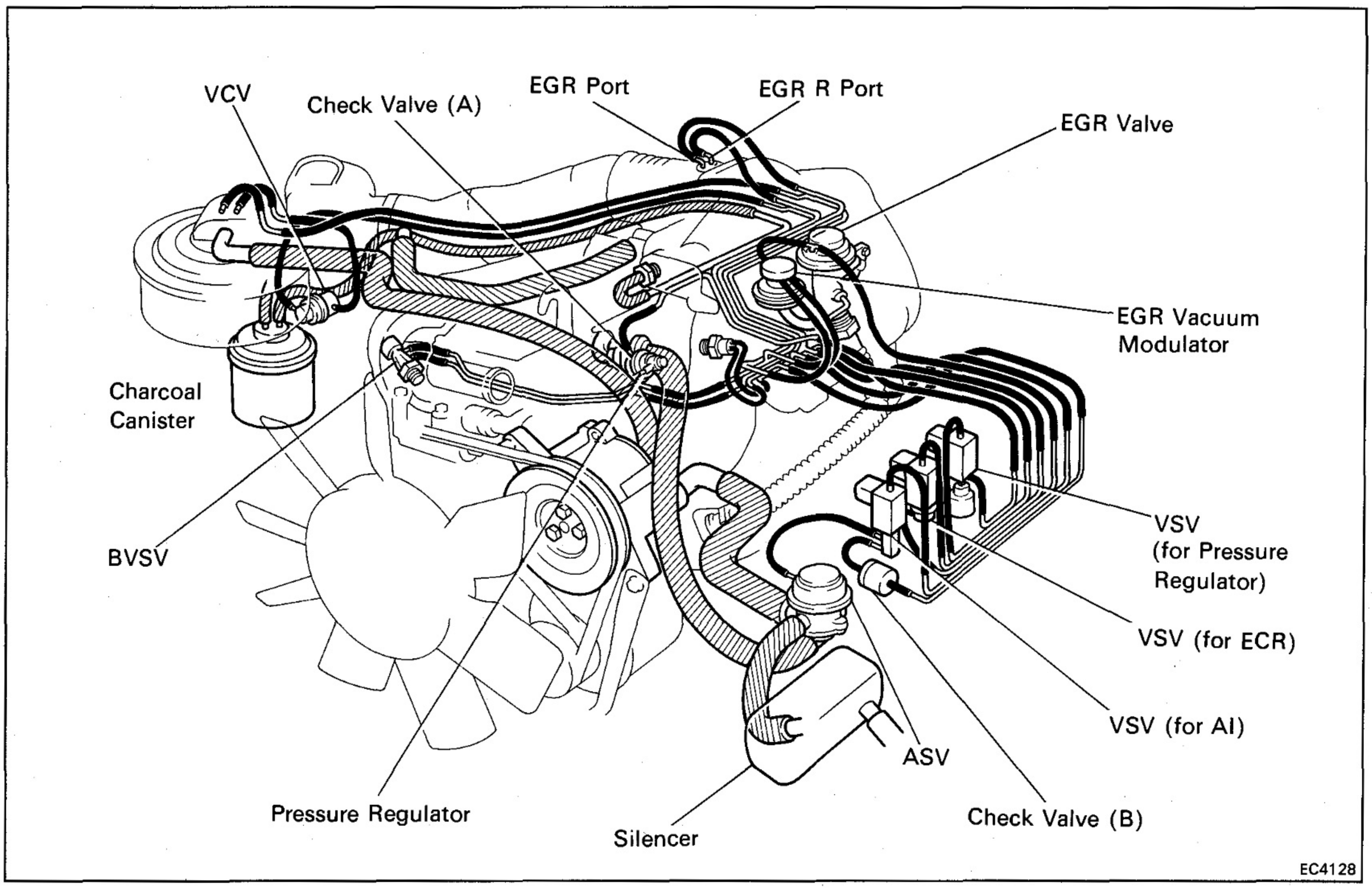
	Page
SYSTEM PURPOSE	5-2
COMPONENT LAYOUT AND SCHEMATIC DRAWING	5-3
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	5-4
FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM	5-6
EXHAUST GAS RECIRCULATION (EGR) SYSTEM	5-9
AIR INJECTION (AI) SYSTEM	5-15
THREE-WAY CATALYST (TWC) SYSTEM	5-20

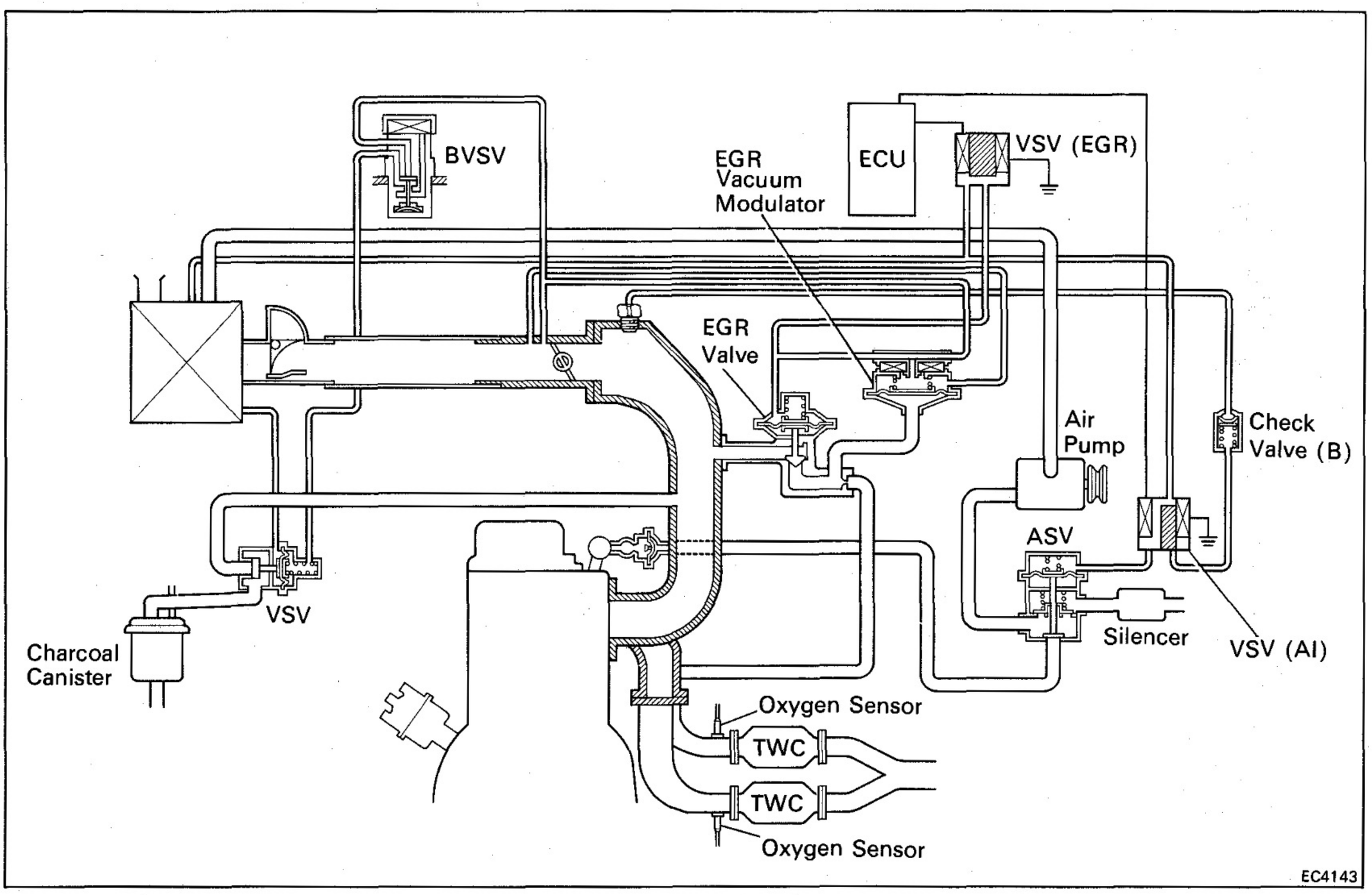
SYSTEM PURPOSE

System	Abbreviation	Purpose	Applicable Model
Positive crankcase ventilation	PCV	Reduces blow-by gas (HC)	FJ80-W, FJ80-Q
Fuel evaporative emission control	EVAP	Reduces evaporative HC	
Exhaust gas recirculation	EGR	Reduces NOx	
Air injection	AI	Reduces HC and CO	
Three-way catalyst	TWC	Reduces HC, CO and NOx	
Electronic fuel injection	EFI	Regulates all engine conditions for reduction of exhaust emissions	

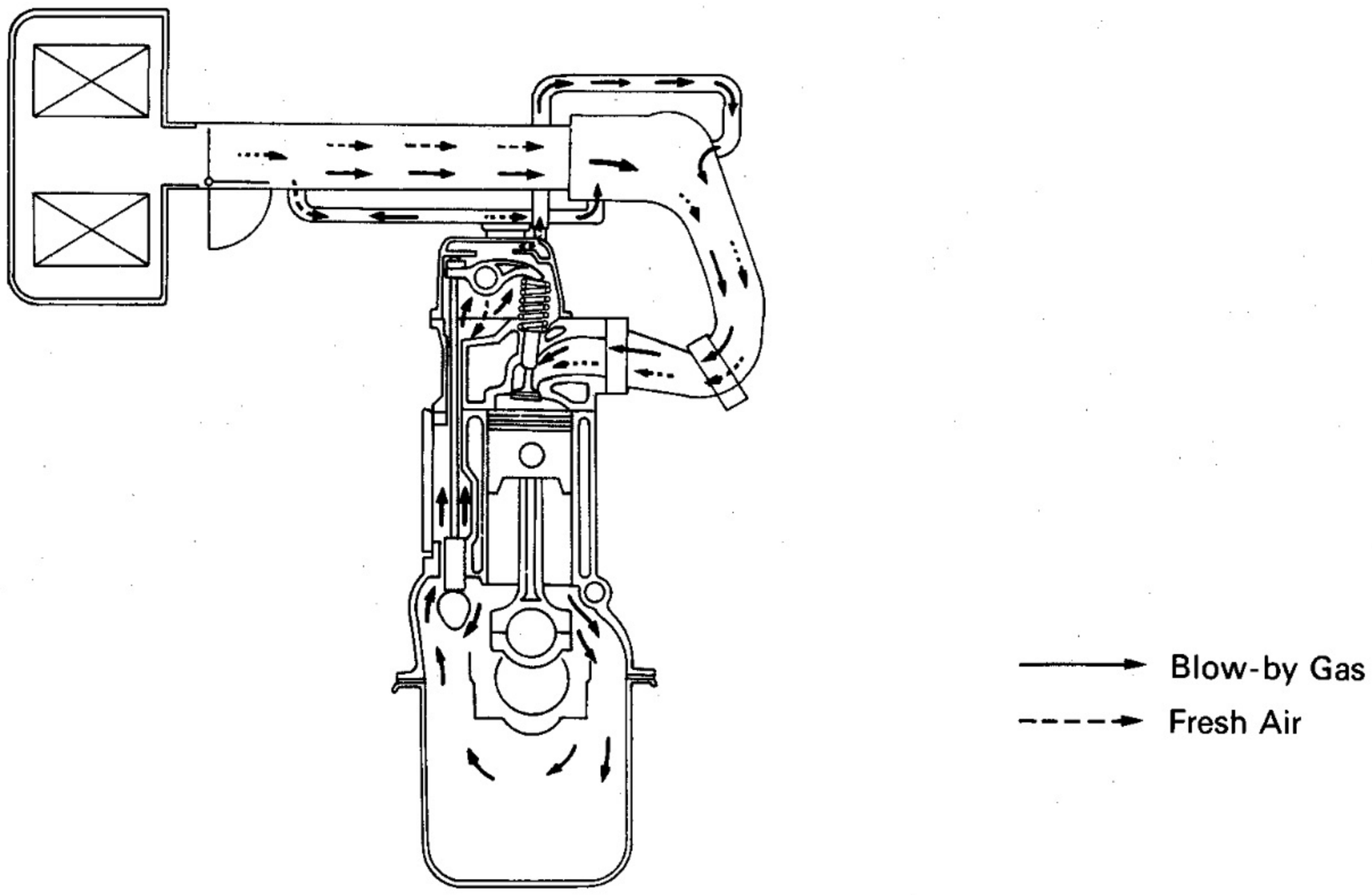
* For inspection and repair of the EFI system, refer to the EFI section of 3F-E Engine Repair Manual Supplement (Pub. No. RM134E)

COMPONENT LAYOUT AND SCHEMATIC DRAWING





POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

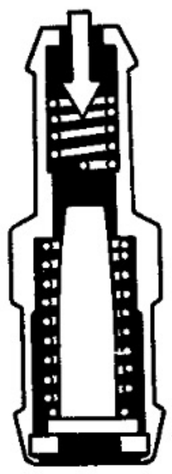


EC4016

To reduce HC emissions, crankcase blow-by gas (HC) is routed through the PCV valve to the intake manifold for combustion in the cylinders.

Engine not Running or Backfiring

Intake Manifold Side

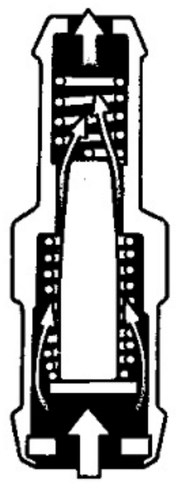


- PCV VALVE IS CLOSED.

Cylinder Head Side

EC1007

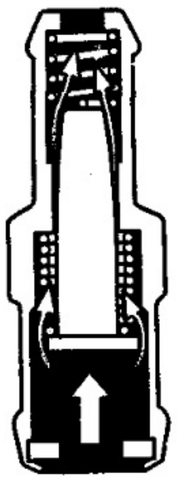
Normal Operation



- PCV VALVE IS OPEN.
- VACUUM PASSAGE IS LARGE.

EC1008

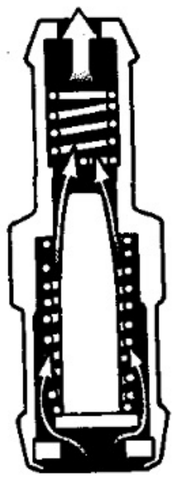
Idling or Decelerating



- PCV VALVE IS OPEN.
- VACUUM PASSAGE IS SMALL.

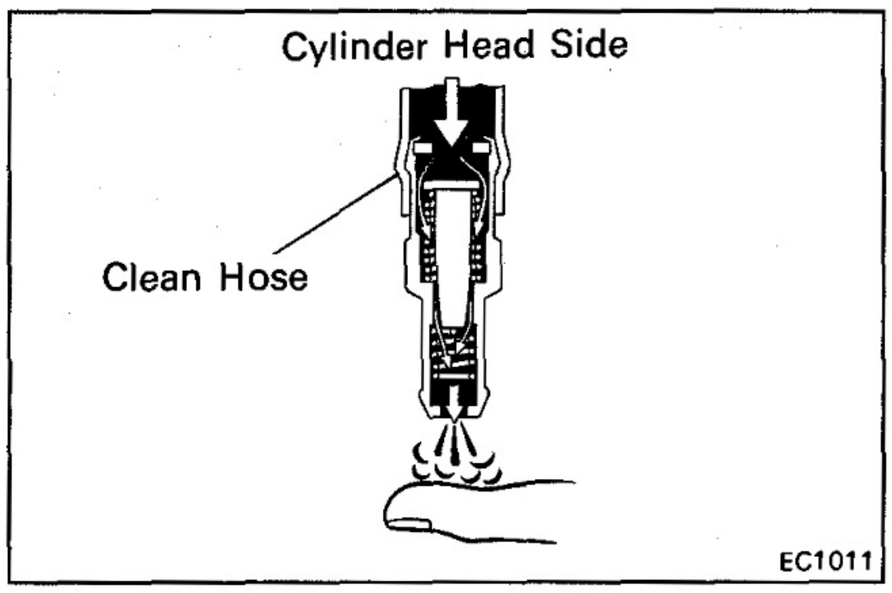
EC1009

Acceleration or High Load



- PCV VALVE IS FULLY OPEN.

EC1010

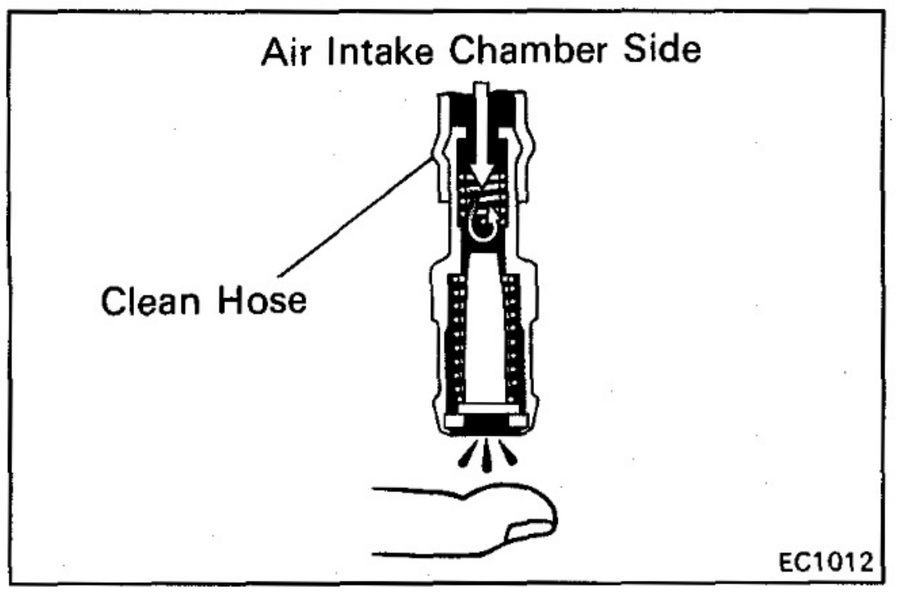


INSPECTION OF PCV VALVE

1. **REMOVE PCV VALVE**
2. **ATTACH CLEAN HOSE TO PCV VALVE**
3. **BLOW FROM CYLINDER HEAD SIDE**

   Check that air passes through easily.

   NOTICE: Do not suck air through the valve. Petroleum substances inside the valve are harmful.

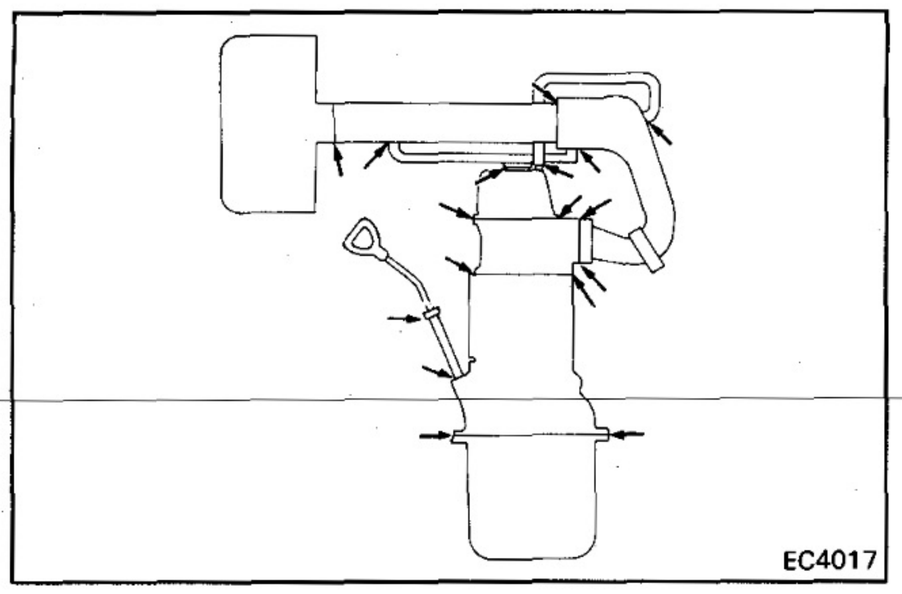


4. **BLOW FROM AIR INTAKE CHAMBER SIDE**

   Check that air passes through with difficulty.

   If the PCV valve fails either of the checks, replace it.

5. **REINSTALL PCV VALVE**

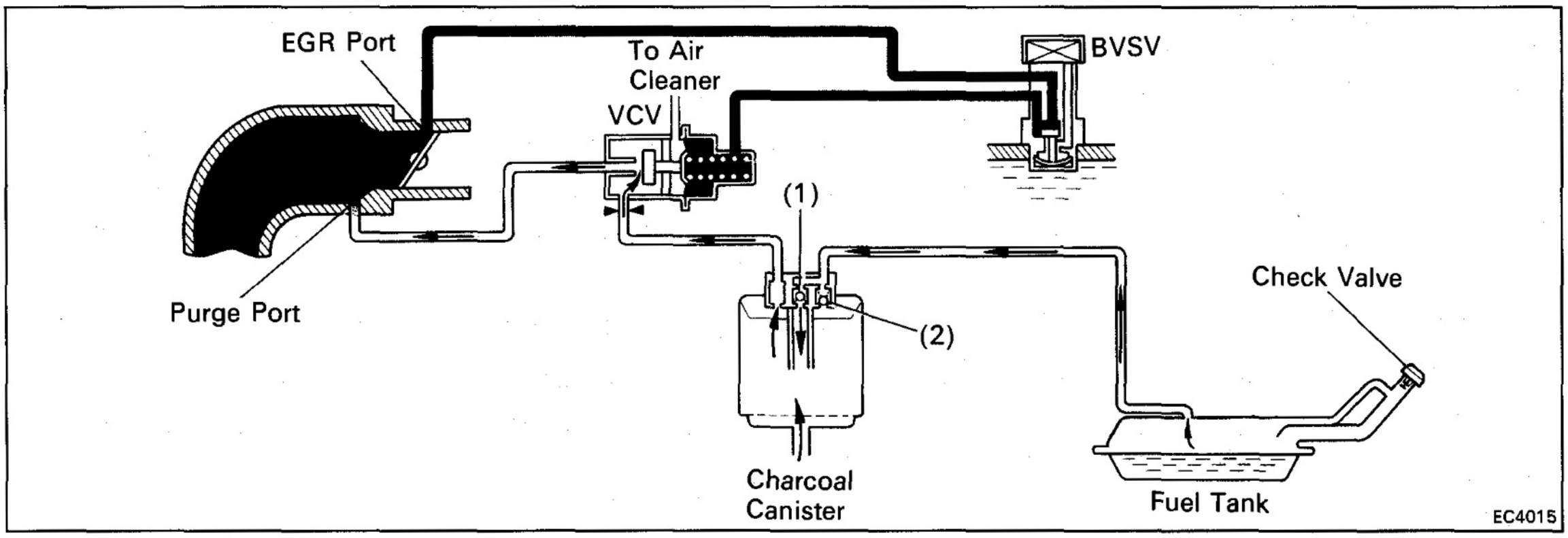


INSPECTION OF PCV HOSES AND CONNECTIONS

VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

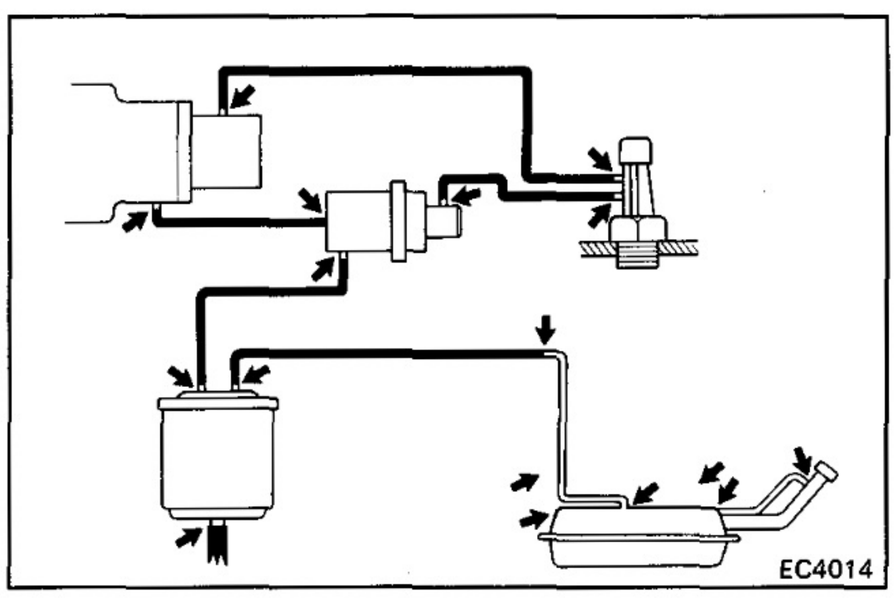
Check for cracks, leaks or damage.

FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM



To reduce HC emission, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.

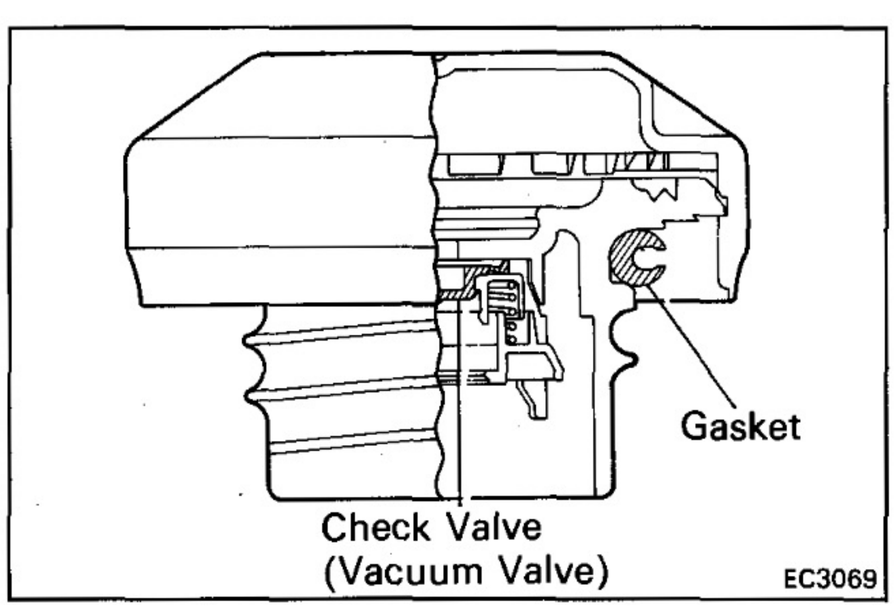
Coolant Temp.	BVSV	Vacuum at EGR Port	VCV	Check Valve (1)	Check Valve (2)	Check Valve in Cap	Evaporated Fuel (HC)
Below 45°C (113°F)	CLOSED	—	CLOSED	—	—	—	HC from tank is absorbed into the canister.
Above 64°C (147°F)	OPEN	Below 50 mmHg. (1.97 in.Hg)	CLOSED	—	—	—	HC from tank is absorbed into the canister.
		Above 70 mmHg. (2.76 in.Hg)	OPEN	—	—	—	HC from canister is led into air intake chamber.
High pressure in tank	—	—	—	OPEN	CLOSED	CLOSED	HC from tank is absorbed into the canister.
High vacuum in tank	—	—	—	CLOSED	OPEN	OPEN	Air is led into the fuel tank.



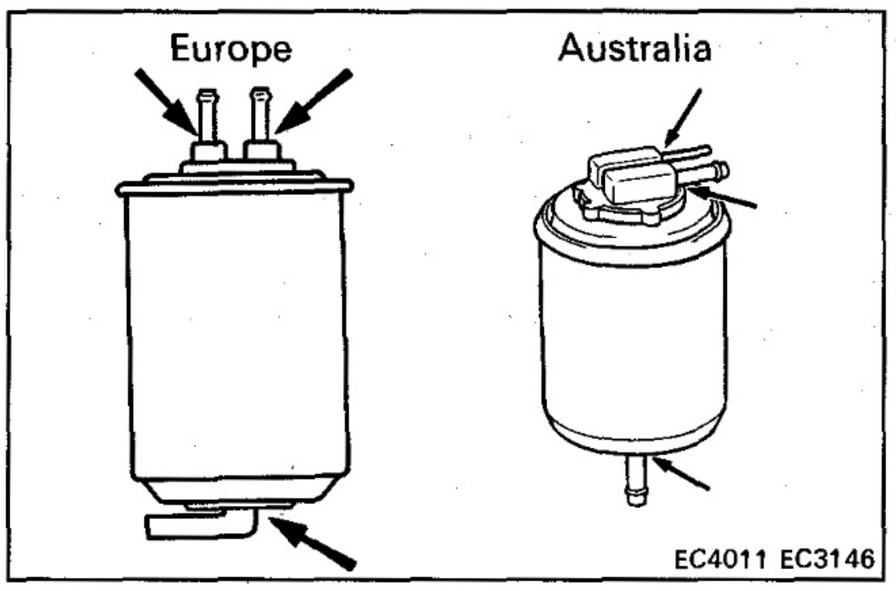
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND TANK CAP

1. **VISUALLY INSPECT LINES AND CONNECTIONS**
   Look for loose connections, kinks or damage.

2. **VISUALLY INSPECT FUEL TANK**
   Look for deformation, cracks or fuel leakage.



3. **VISUALLY INSPECT FUEL TANK CAP**
   Lock for a damaged or deformed gasket and cap.
   If necessary, repair or replace the cap.

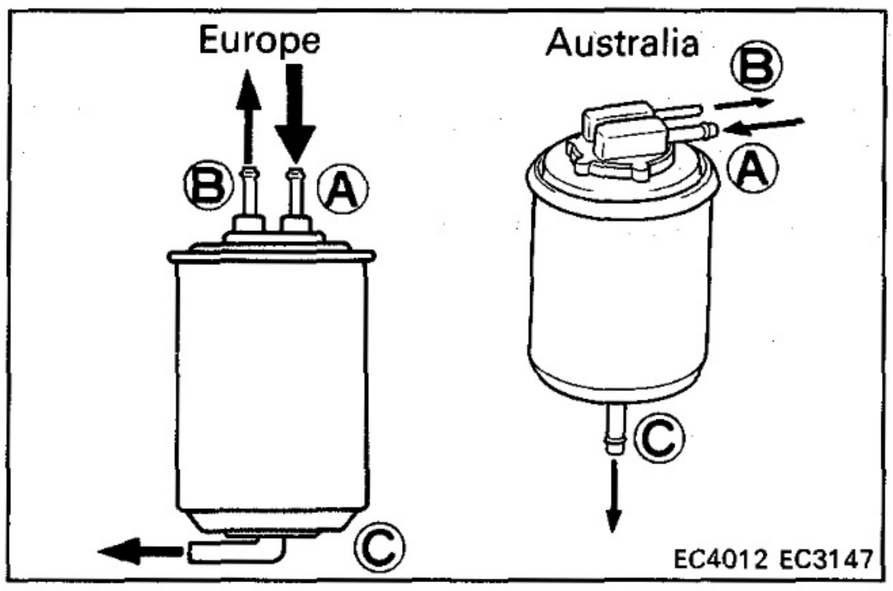


INSPECTION OF CHARCOAL CANISTER

1. **REMOVE CHARCOAL CANISTER**

2. **VISUALLY INSPECT CHARCOAL CANISTER CASE**

   Look for cracks or damage.

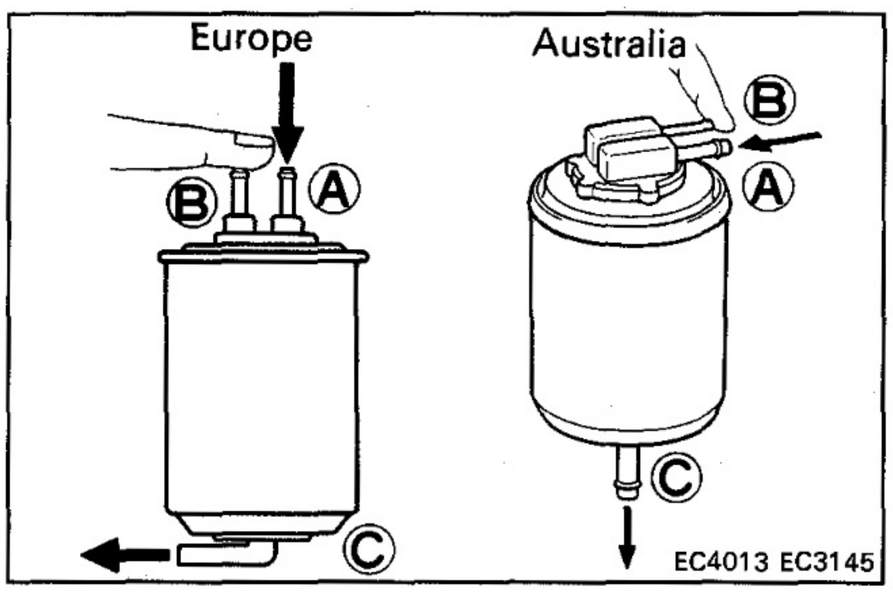


3. **CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE**

   (a) Using low pressure compressed air, blow into the tank pipe (A) and check that the air flows without resistance from the other pipes.

   (b) Blow into the purge pipe (B) and check that the air does not flow from the other pipes.

   If a problem is found, replace the charcoal canister.

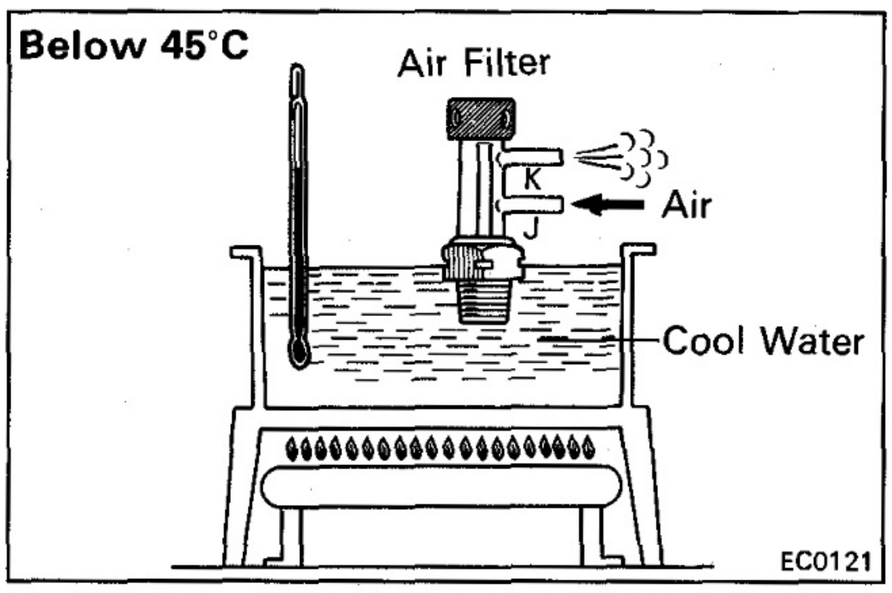


4. **CLEAN FILTER IN CANISTER**

   Clean the filter by blowing 3 kg/cm^2 (43 psi, 294 kPa) of compressed air into the tank pipe (A), while holding the other upper canister pipe (B) closed.

   HINT:
   - Do not attempt to wash the canister.
   - No activated carbon should come out.

5. **INSTALL CHARCOAL CANISTER**



INSPECTION OF BVSV

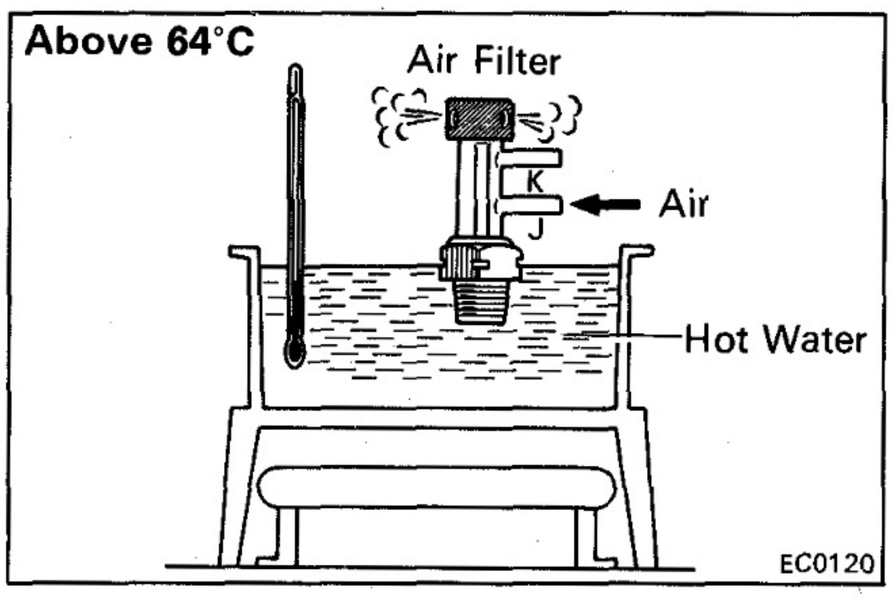
CHECK BVSV BY BLOWING AIR INTO PIPE

(a) Drain the coolant from the radiator into a suitable container.

(b) Remove the BVSV from the water outlet.

(c) Cool the BVSV to below 45°C (113°F) with cool water.

(d) Check that the air flows from pipe J to the air filter.



(e) Heat the BVSV to above 64°C (147°F) with hot water.

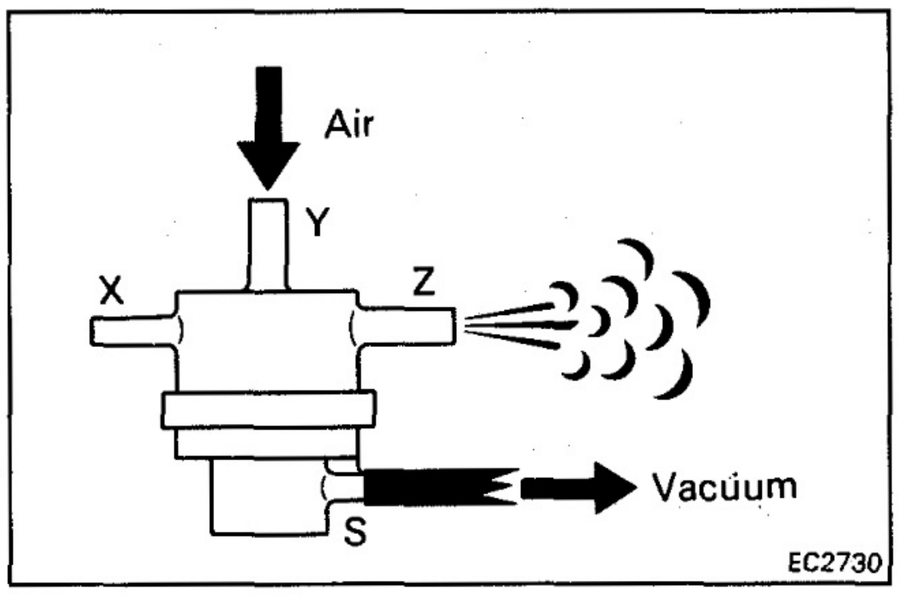
(f) Check that the air flows from pipe J to pipe K.

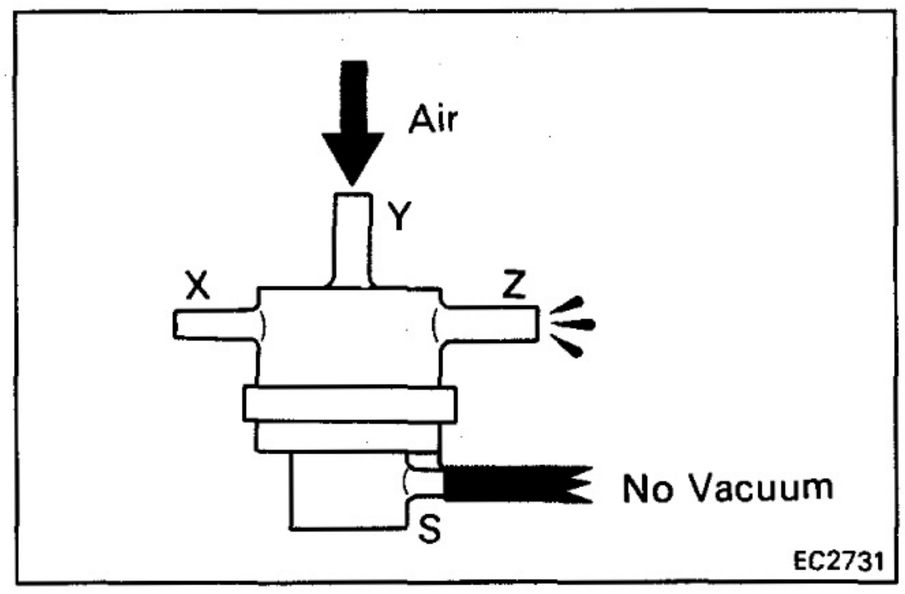
If a problem is found, replace the BVSV.

(g) Apply sealant to the threads of the BVSV and reinstall.

Sealant: Part No. 08833-00070, THREE BOND 1324 or equivalent

(h) Fill the radiator with coolant.





INSPECTION OF VSV

CHECK VCV BY BLOWING AIR INTO PIPE

(a) Apply vacuum above 70 mmHg (2.76 in.Hg) to pipe S.

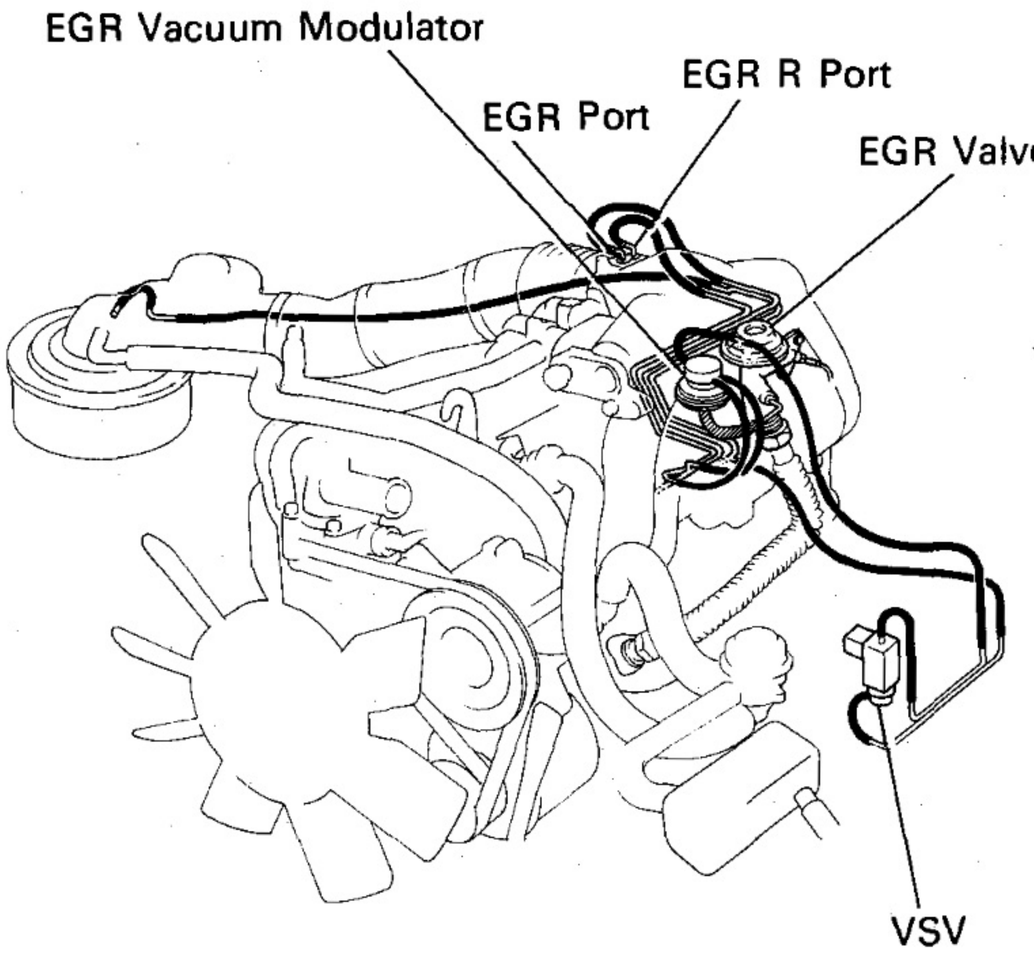
(b) Blow air into pipe Y and check that the air comes out of pipe Z.

(c) Stop the applied vacuum.

(d) Blow air into pipe Y and check that the air does not come out of pipe Z.

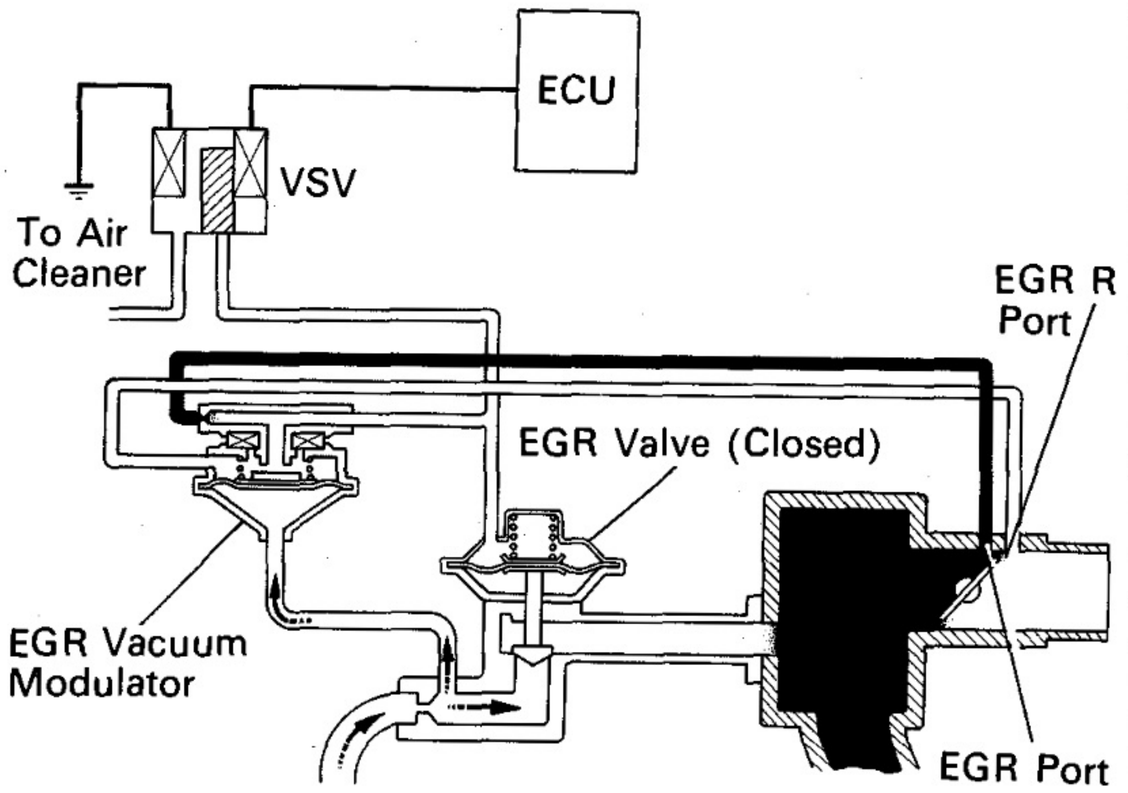
If a problem is found, replace the VSV.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM



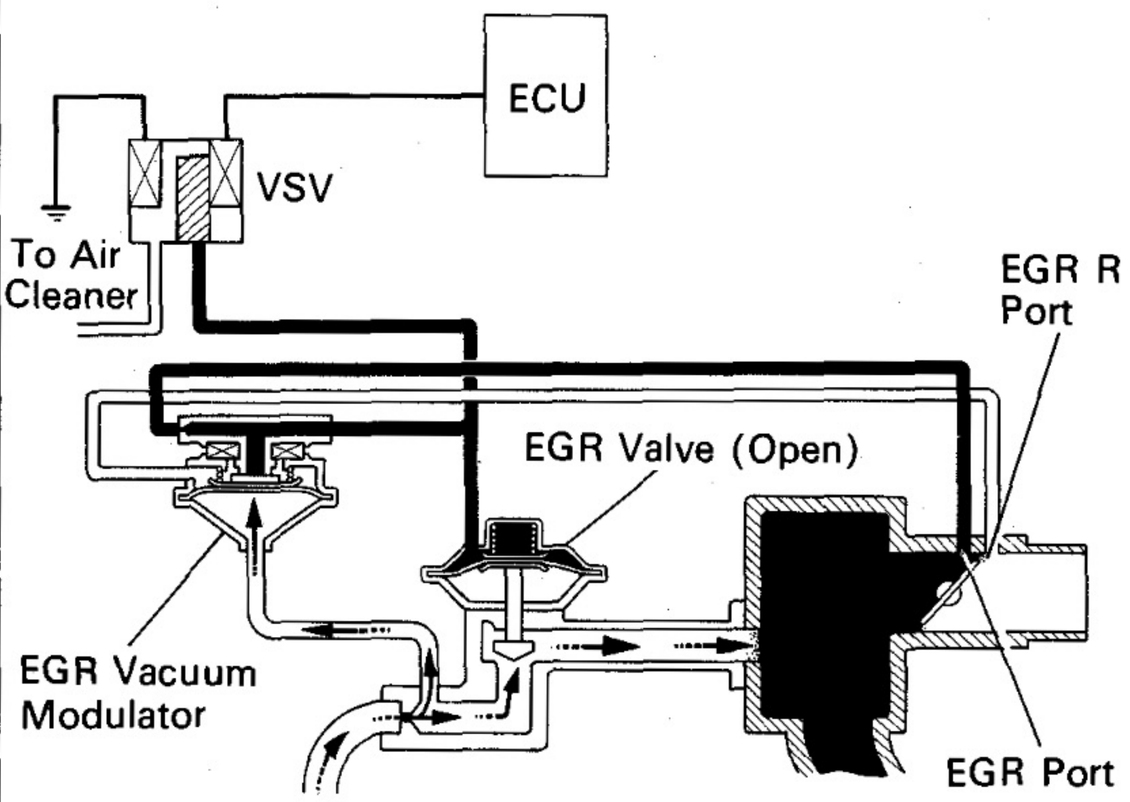
EC3980

(1)



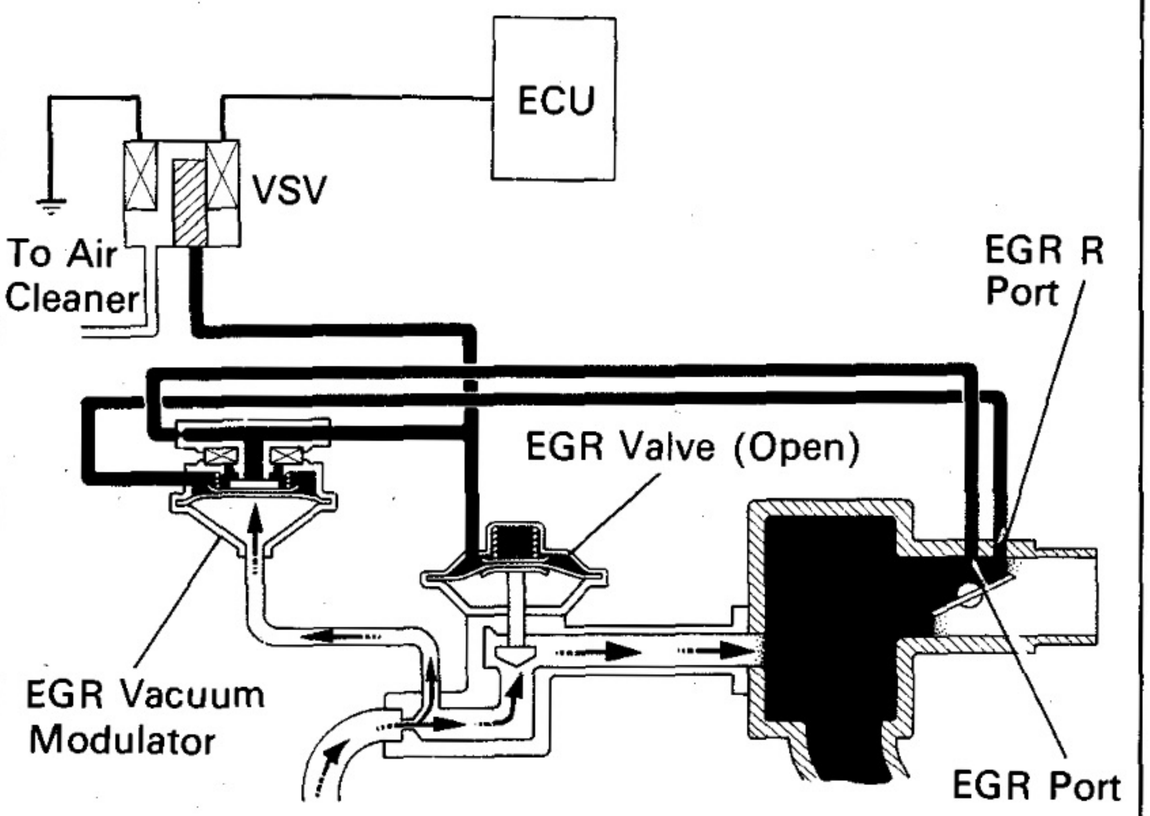
EC2931

(2)



EC2932

(3)



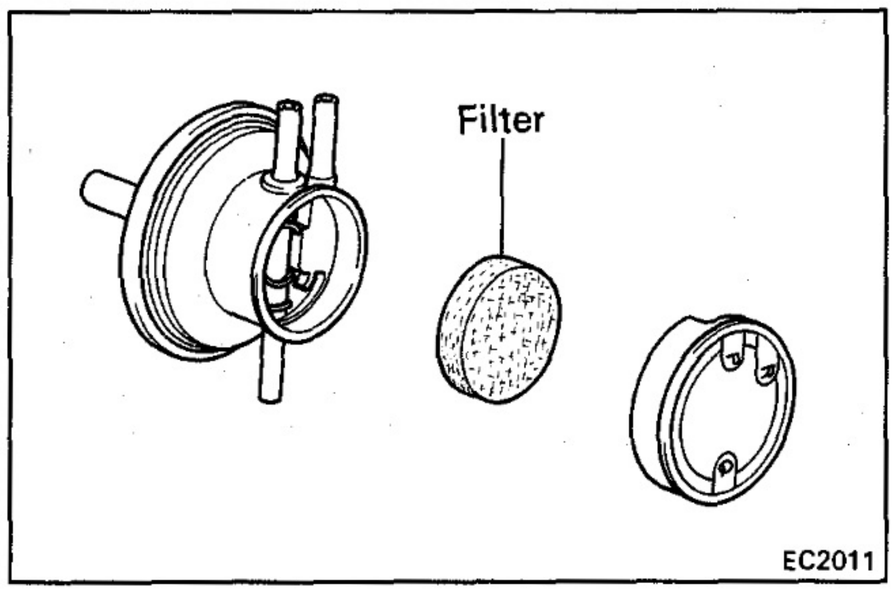
EC2933

To reduce NOx emission, part of the exhaust gases are recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Coolant Temp.	Engine RPM	Driving Condition	Intake Air Volume	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 47°C (117°F)	—	—	—	OFF	—	—		—	CLOSED	Not recirculated
Above 53°C (127°F)	Above 3,500 rpm	—	—	OFF	—	—		—	CLOSED	Not recirculated
	Below 3,500 rpm	Deceleration	—	OFF	—	—		—	CLOSED	Not recirculated
		Ex. deceleration	LOW	OFF	—	—		—	CLOSED	Not recirculated
			HIGH	OFF	—	—		—	CLOSED	Not recirculated
					Positioned below EGR port	—		—	CLOSED	Not recirculated
				ON	Positioned between EGR port and EGR R port	(1) LOW	*Pressure constantly alternating between low and high	OPENS passage to atmosphere	CLOSED	Not recirculated
						(2) HIGH		CLOSES passage to atmosphere	OPEN	Recirculated
					Positioned above EGR port	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)

* Pressure increases → Modulator closes → EGR valve opens → Pressure drops → EGR valve closes ← Modulator opens ←

** When the throttle valve is positioned above the R port, the EGR vacuum modulator will close the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.

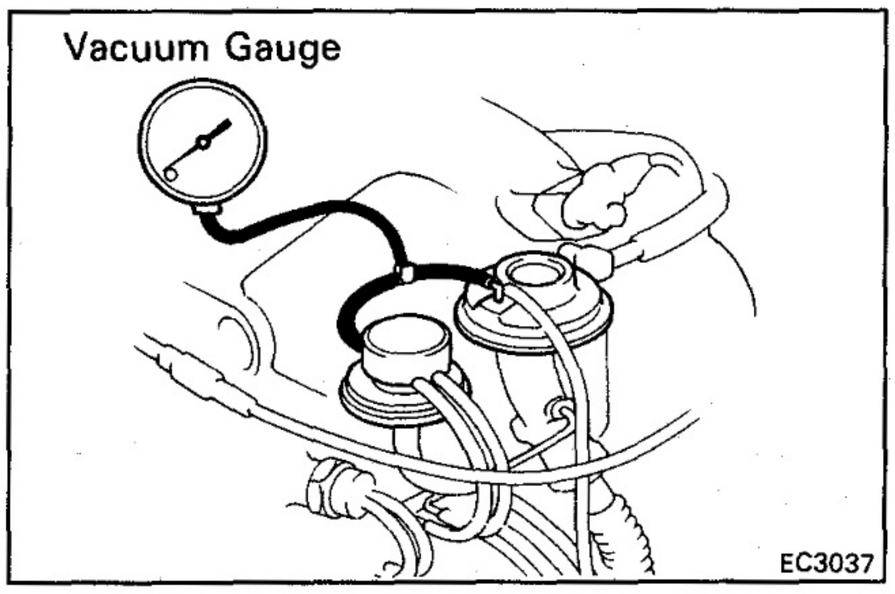


INSPECTION OF EGR SYSTEM

1. CHECK AND CLEAN FILTER IN EGR VACUUM MODULATOR

(a) Check the filter for contamination or damage.

(b) Using compressed air, clean the filter.

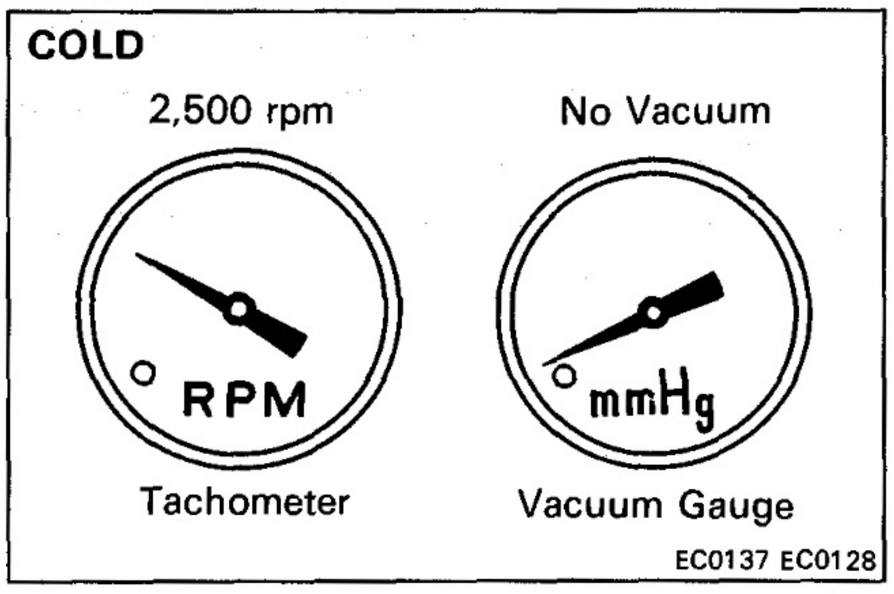


2. PREPARATION

Using a 3-way connector, connect a vacuum gauge to the hose between the EGR valve and vacuum pipe.

3. CHECK SEATING OF EGR VALVE

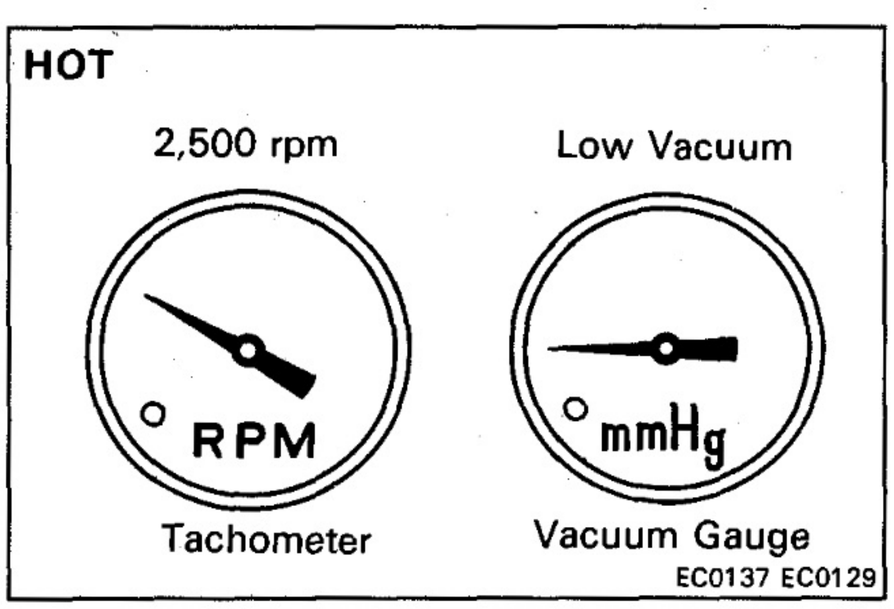
Start the engine and check that the engine starts easily and runs smoothly at idle.



4. CHECK VSV WITH COLD ENGINE

(a) The coolant temperature should be below 53°C (127°F).

(b) Check that the vacuum gauge indicates zero at 2,500 rpm.

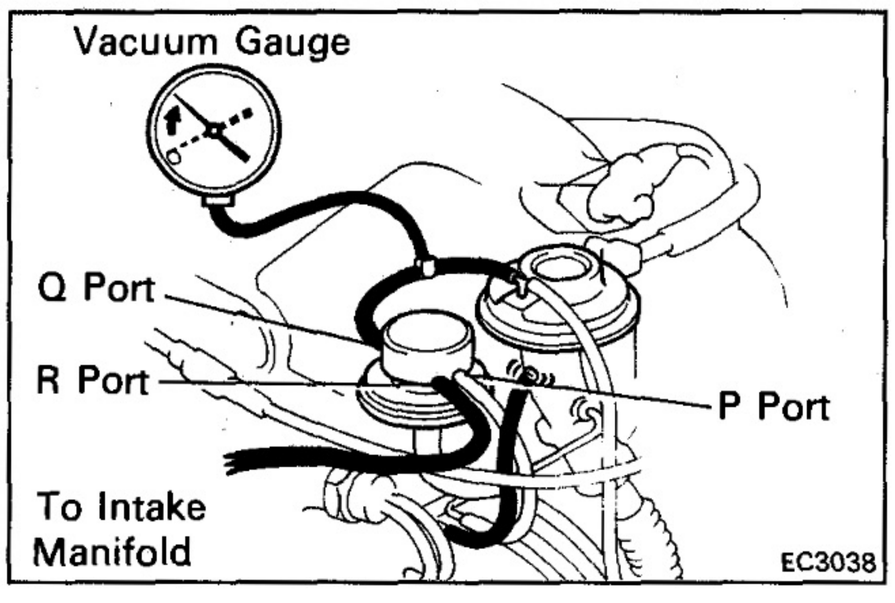


5. CHECK VSV AND EGR VACUUM MODULATOR WITH HOT ENGINE

(a) Warm up the engine.

(b) Check that the vacuum gauge indicates low vacuum at 2,500 rpm.

(c) Check that the vacuum gauge indicates zero at idle.

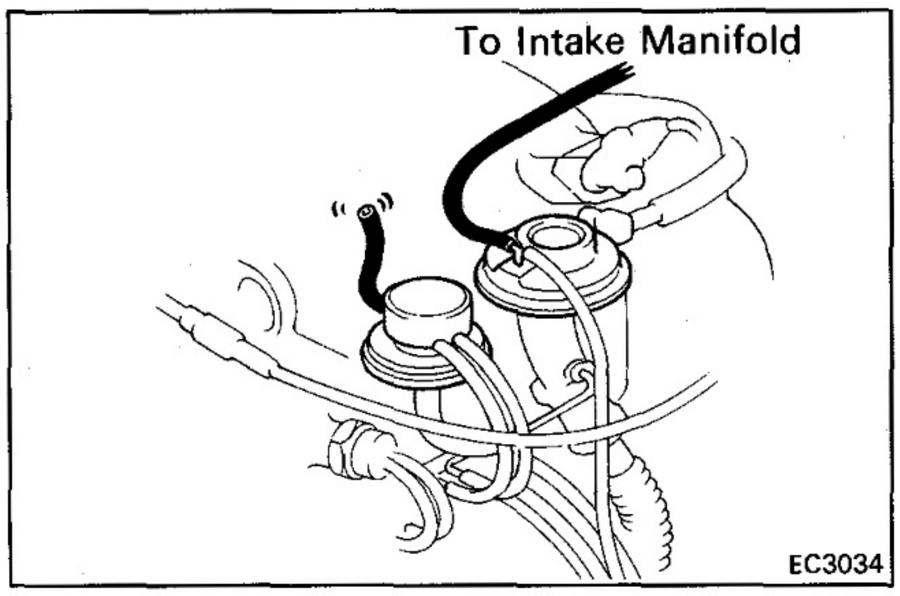


(d) Disconnect the vacuum hose from port R of the EGR vacuum modulator and connect port R directly to the intake manifold with another hose.

(e) Check that the vacuum gauge indicates high vacuum at 2,500 rpm.

HINT: As a large amount of EGR gas enters, the engine will misfire slightly.

(f) Remove the vacuum gauge and reconnect the vacuum hoses to the proper locations.



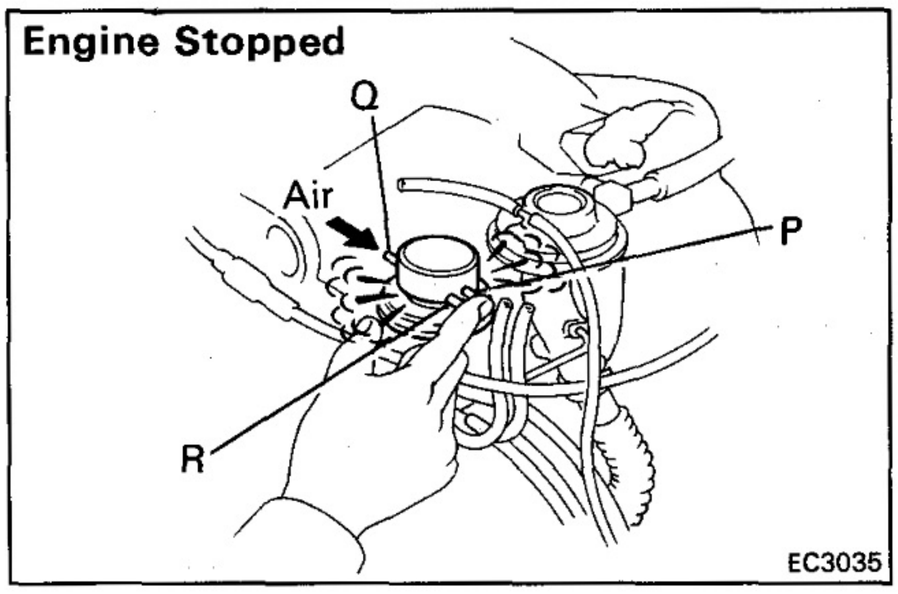
6. CHECK EGR VALVE

(a) Apply vacuum directly to the EGR valve with the engine idling.

(b) Check that the engine runs rough or stops.

(c) Reconnect the vacuum hoses to the proper location.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, SYSTEM IS FUNCTIONING; OTHERWISE INSPECT EACH PART



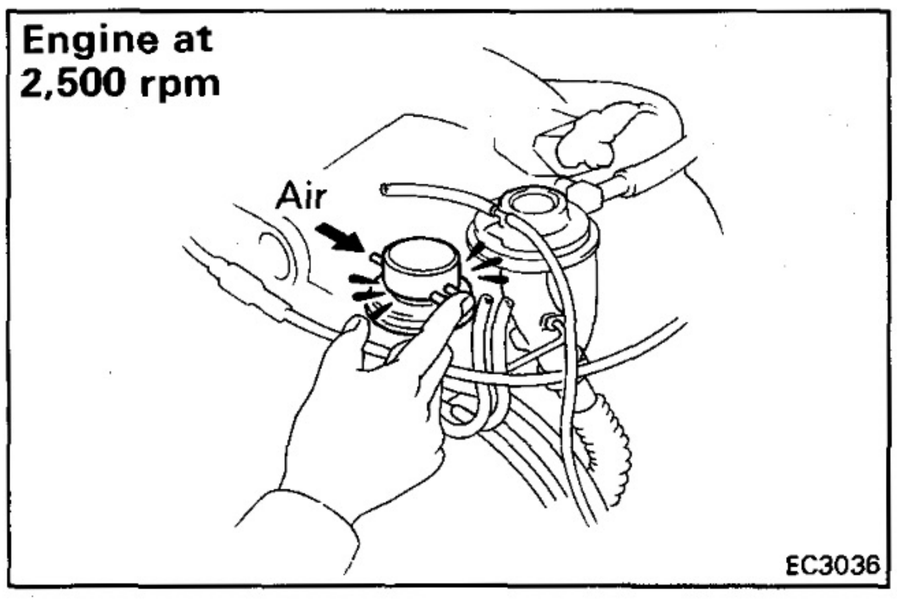
INSPECTION OF EGR VACUUM MODULATOR

CHECK EGR VACUUM MODULATOR OPERATION

(a) Disconnect the vacuum hoses from ports P, Q and R of the EGR vacuum modulator.

(b) Block ports P and R with your finger.

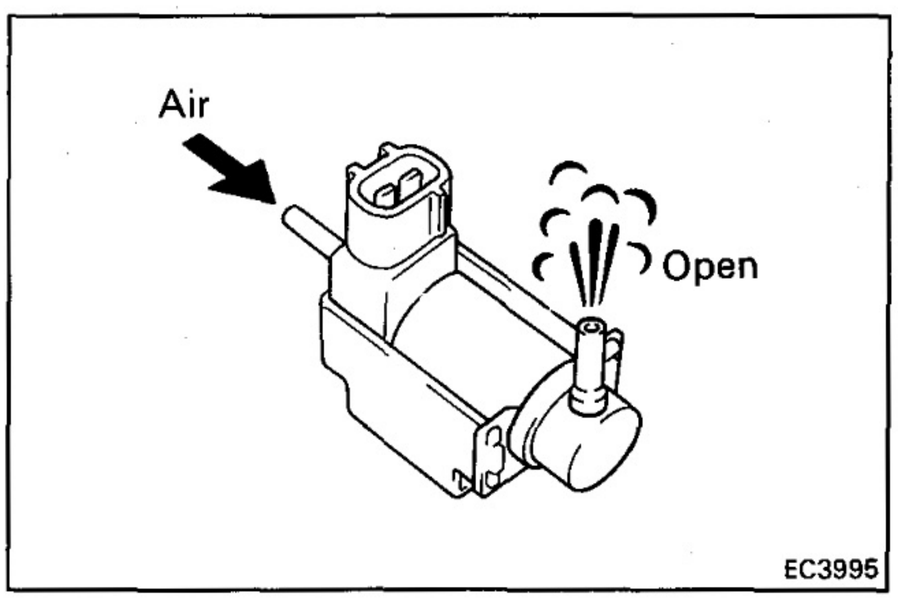
(c) Blow air into port Q. Check that the air passes through to the air filter side freely.



(d) Start the engine and maintain speed at 2,500 rpm.

(e) Repeat the above test. Check that there is a strong resistance to air flow.

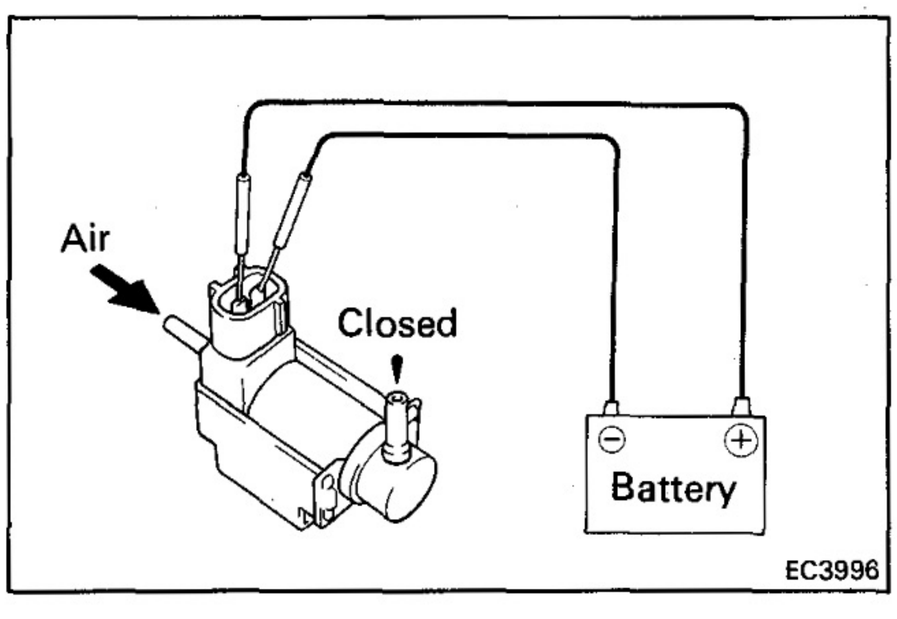
(f) Reconnect the vacuum hoses to the proper locations.



INSPECTION OF VSV

INSPECT VSV

(a) Blow air into a pipe and check that the VSV is open.



(b) Apply battery voltage across the terminals.

(c) BLow air into pipe and check that the VSV is closed.

If a problem is found, replace the VSV.

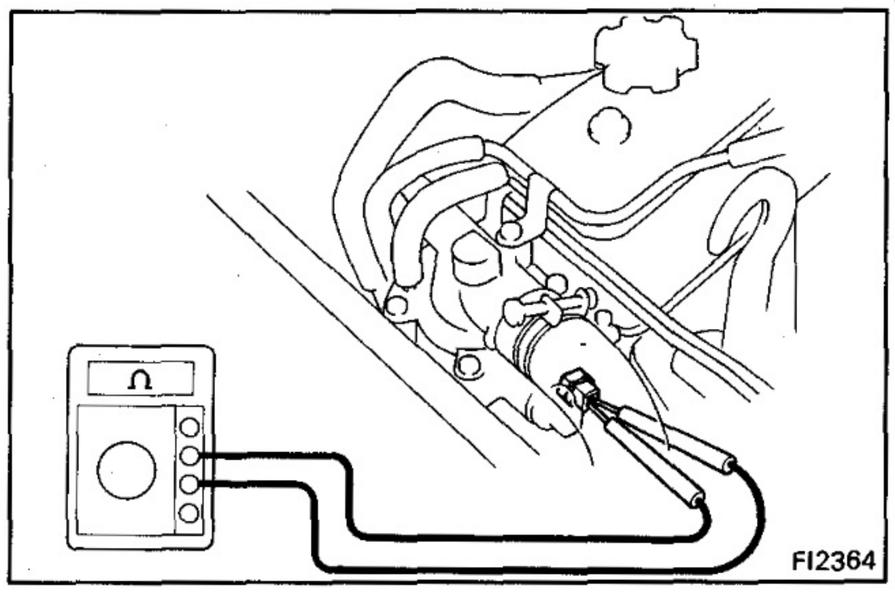
INSPECTION OF EGR VALVE

1. **REMOVE EGR VALVE**

   Check the valve for sticking and heavy carbon deposits.

   If a problem is found, replace it.

2. **REINSTALL EGR VALVE WITH NEW GASKET**



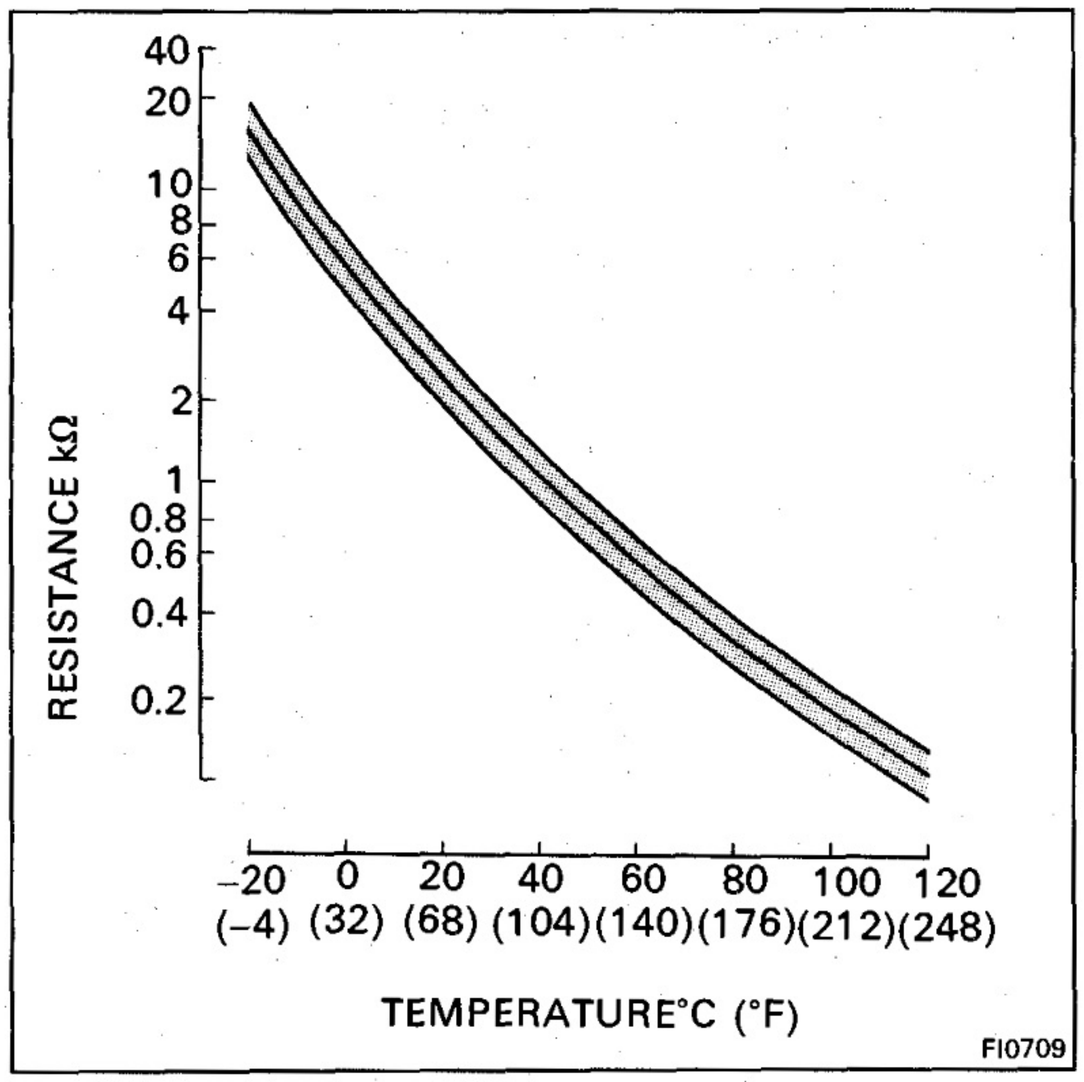
INSPECTION OF WATER TEMPERATURE SENSOR

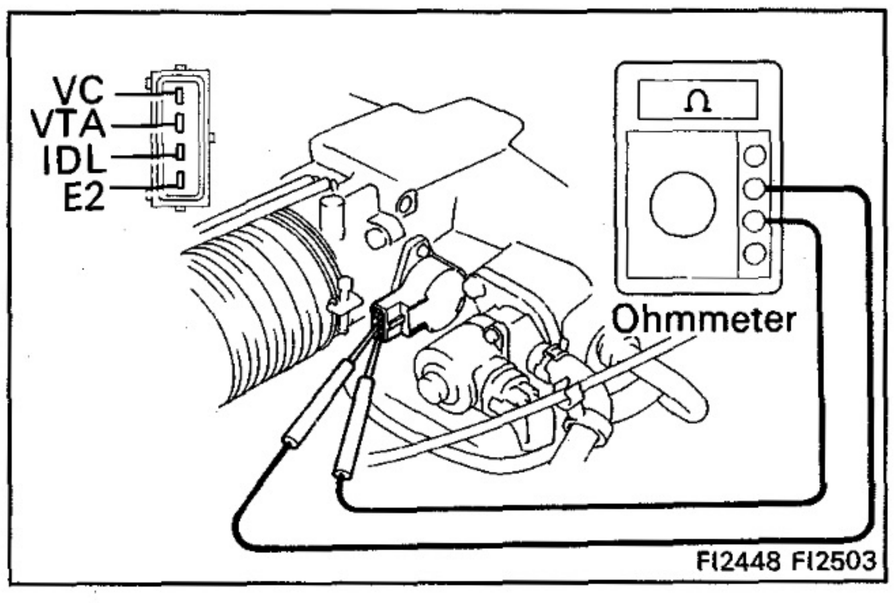
INSPECT RESISTANCE OF WATER TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to chart

If the resistance is not as specified, replace the sensor.



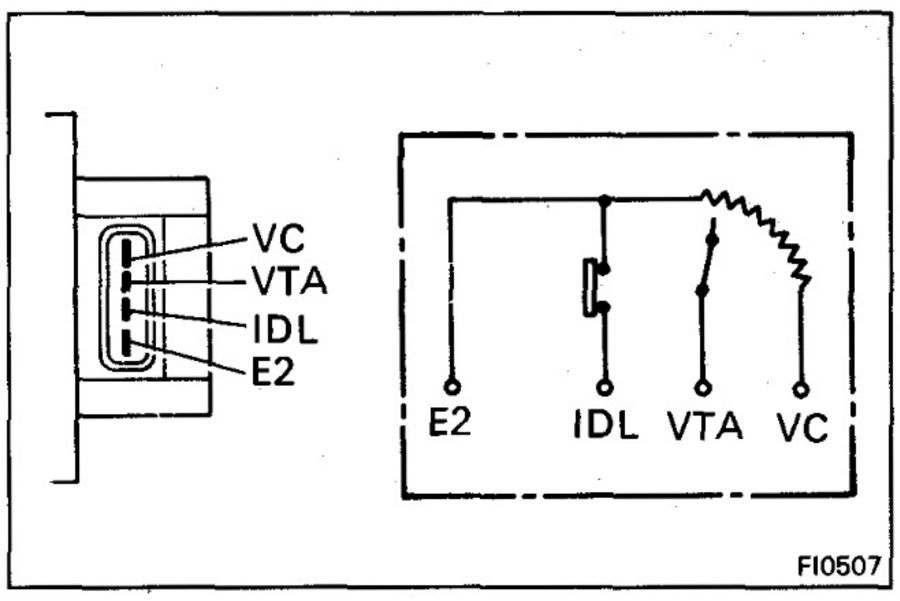


INSPECTION OF THROTTLE POSITION SENSOR

(a) Disconnect the sensor connector.

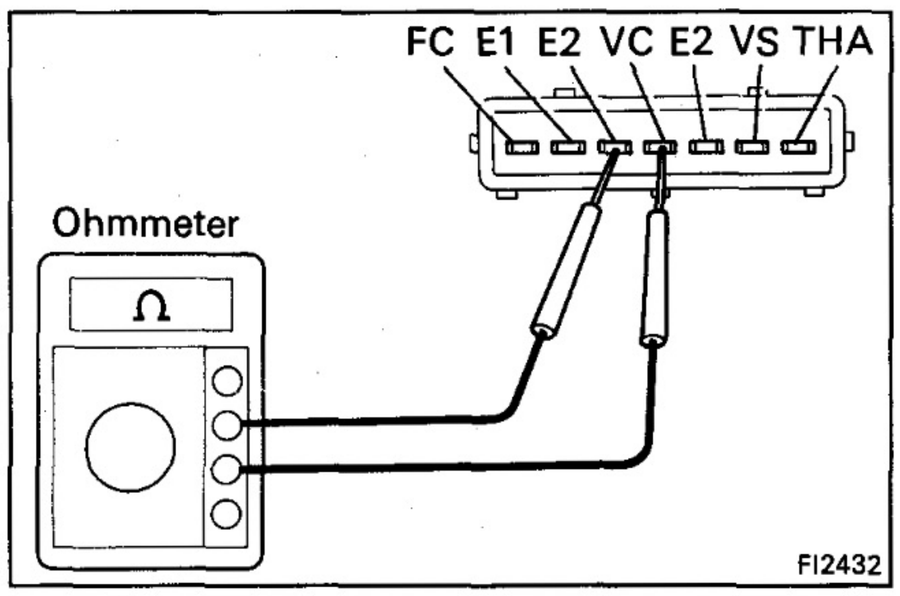
(b) Insert a thickness gauge between the throttle stop screw and stop lever.

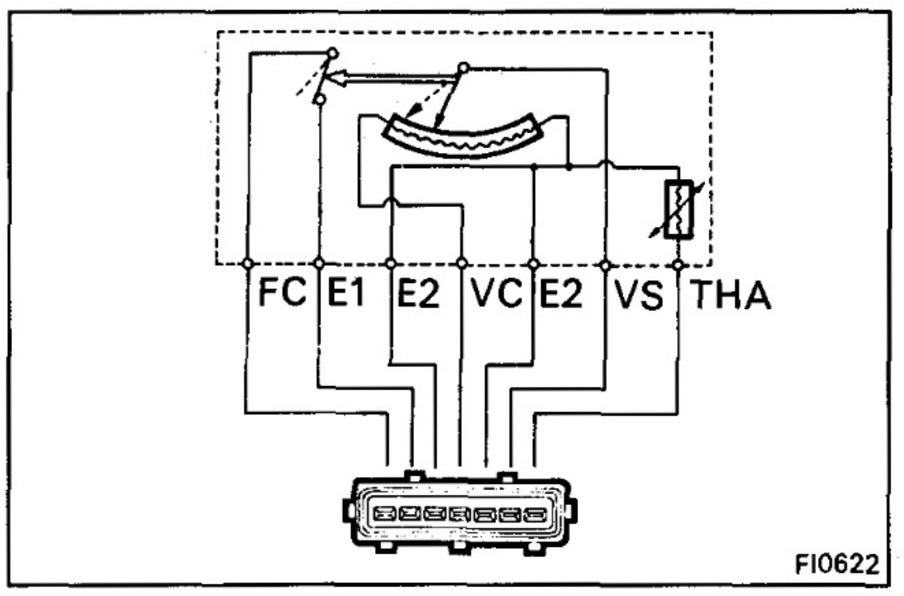
(c) Using an ohmmeter, measure the resistance between each terminal.



Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA – E2	0.3 – 6.3 kΩ
0.77 mm (0.0303 in.)	IDL – E2	Less than 2.3 kΩ
1.09 mm (0.0429 in.)	IDL – E2	Infinity
Throttle valve fully open position	VAT – E2	3.5 – 10.3 kΩ
–	VC – E2	4.25 – 8.25 kΩ

(d) Reconnect the sensor connector.





INSPECTION OF AIR FLOW METER

INSPECT RESISTANCE OF AIR FLOW METER

(a) Disconnect the air flow meter connector.

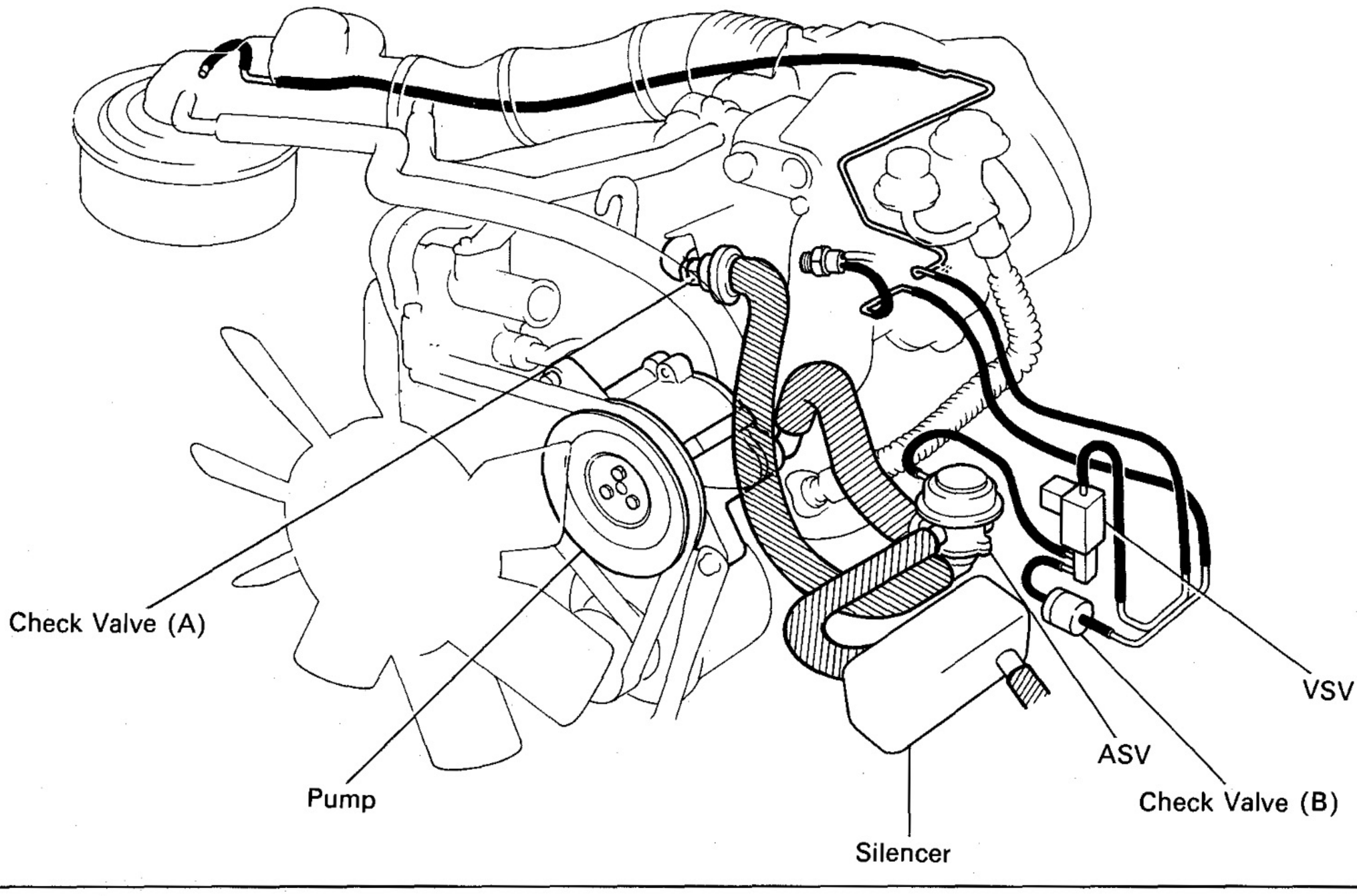
(b) Using an ohmmeter, measure the resistance between each terminal.

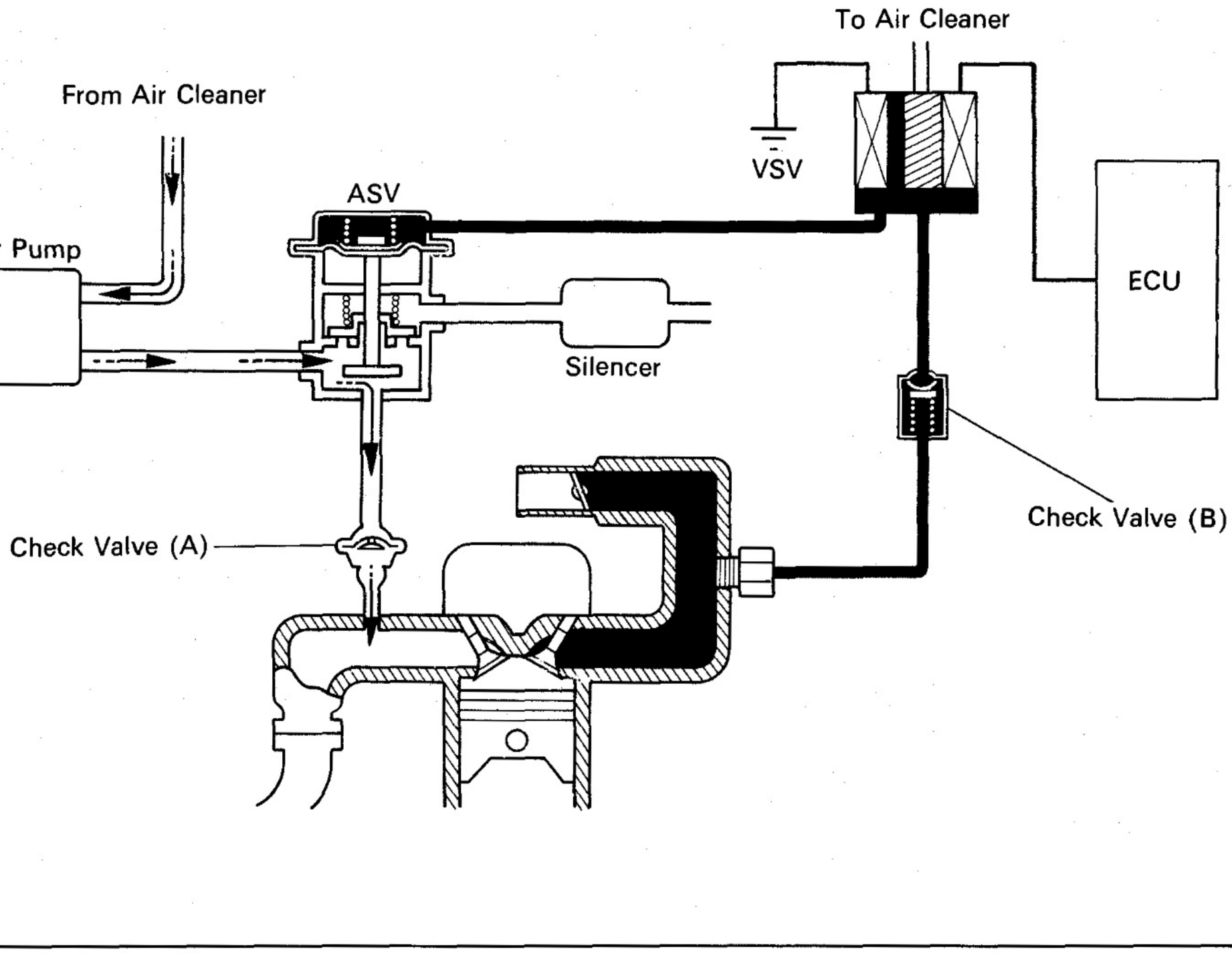
Between terminals	Resistance	Temperature
E2 – VS	200 – 600 Ω	–
E2 – VC	200 – 400 Ω	–
E2 – THA	10 – 20 kΩ 4 – 7 kΩ 2 – 3 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ	–20°C (–4°F) 0°C (32°F) 20°C (68°F) 40°C (104°F) 60°C (140°F)
E1 – FC	Infinity	–

If the resistance is not as specified, replace the air flow meter.

(c) Reconnect the air flow meter connector.

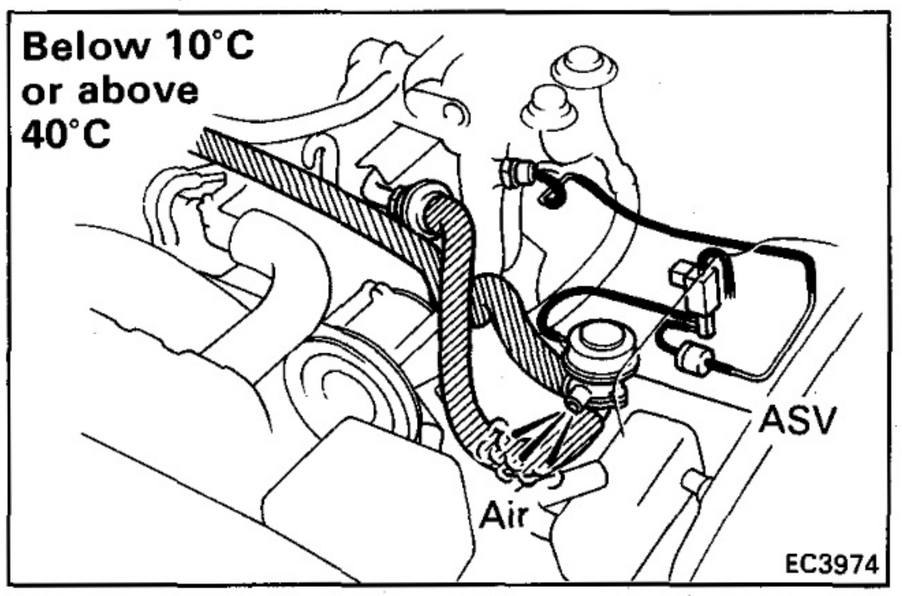
AIR INJECTION (AI) SYSTEM

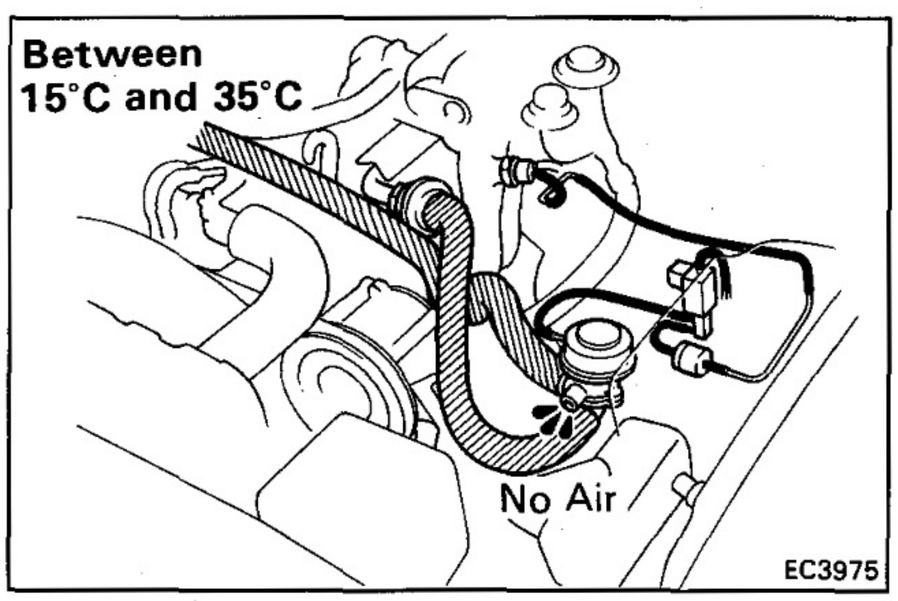


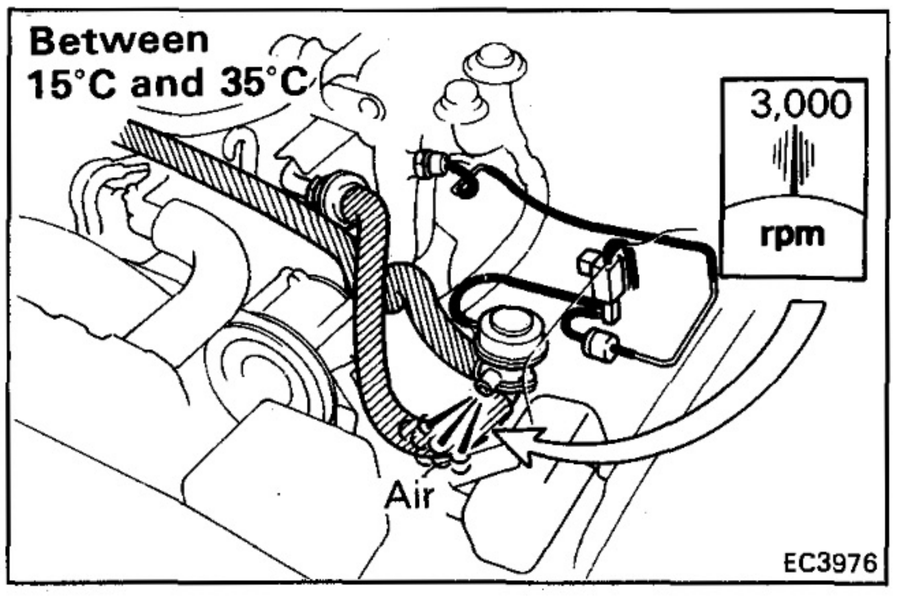


For reburning the unburnt HC and CO in the exhaust port, compressed air from the air pump is blown into the exhaust port.

Coolant Temp.	Driving Condition	Engine RPM	Vehicle Speed	VSV	ASV	AI System
Below 10°C (50°F)	—	—	—	OFF	CLOSED	OFF
Between 15 – 35°C (59 – 95°F)	—	—	—	ON	OPEN	ON
Above 40°C (104°F)	Ex. deceleration	—	—	OFF	CLOSED	OFF
	Deceleration	Above 2,000 rpm	—	OFF	CLOSED	OFF
		Blow 2,000 rpm	Above 6 mph (10 km/h)	ON	OPEN	ON







INSPECTION OF AI SYSTEM

1. VISUALLY CHECK HOSES AND TUBES FOR CRACKS, KINKS, DAMAGE OR LOOSE CONNECTIONS

2. PREPARATION

Disconnect the air by-pass hose from the ASV.

3. CHECK ASV WITH FOLLOWING TEMPERATURE:

(a) The coolant temperature should be below 10°C (50°F) or above 40°C (104°F).

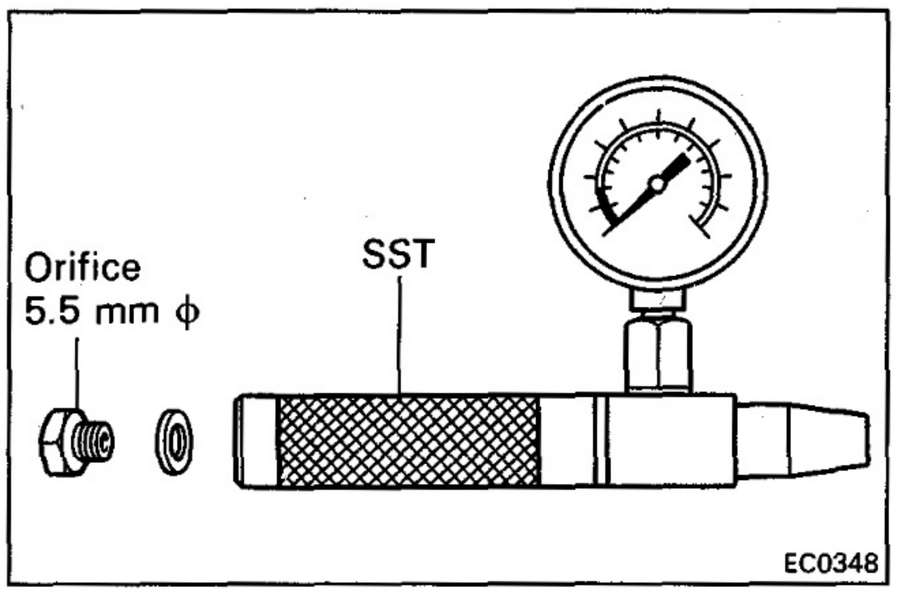
(b) Start the engine and check that the air is discharged from the ASV.

(c) The coolant temperature should be between 15°C (59°F) and 35°C (95°F).

(d) With engine idling, check that the air is not discharged from the ASV.

(e) The coolant temperature should be between 15°C (59°F) and 35°C (95°F).

(f) Increase the engine speed to 3,000 rpm and check that the air is discharged from the ASV.



INSPECTION OF AIR PUMP

1. CHECK AIR PUMP FOR ABNORMAL NOISE

2. CHECK AIR PUMP DISCHARGE PRESSURE

(a) Connect SST (air pump tester) to the hose at the air pump outlet.

SST 09258-14010

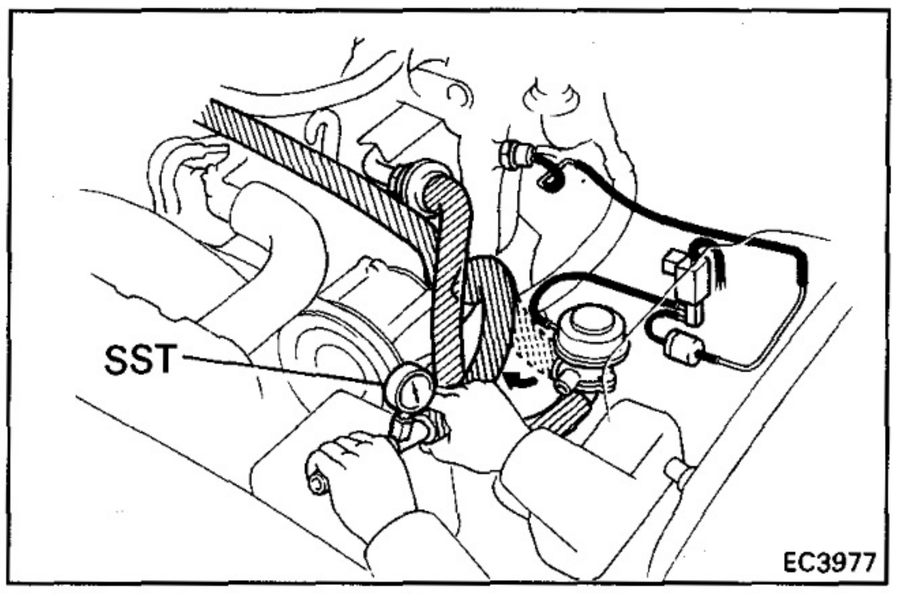
(b) Select and use a specified orifice (5.5 mm dia. or 0.217 in.) on th SST.

(c) Set the engine speed at 1,200 rpm.

(d) The gauge of the SST should indicate in the green zone.

If the SST indicates in the red zone, replace the pump assembly.

(e) Reconnect the hose to the proper location.

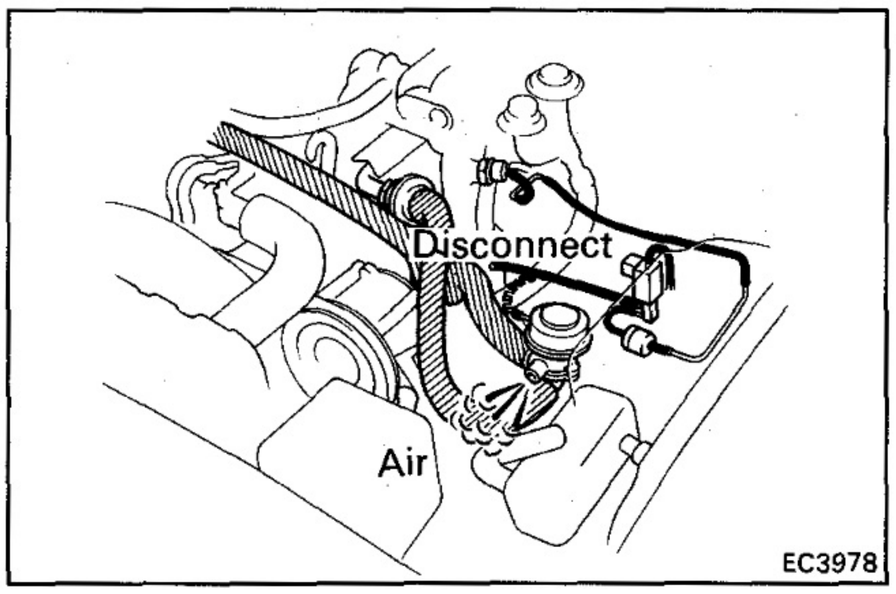


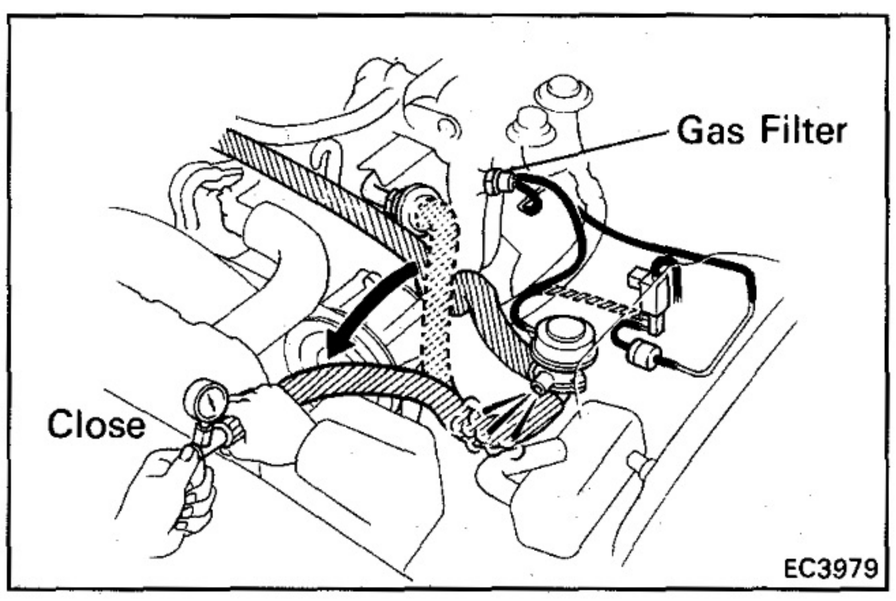
INSPECTION OF ASV

1. CHECK ASV OPERATION

(a) Disconnect the vacuum hose from the ASV.

(b) Check that the air comes out from the ASV.





2. CHECK OPENING PRESSURE OF RELIEF VALVE

(a) Disconnect the air hose from the check valve.

(b) Connect SST (air pump tester) to the hose.

SST 09258-14010

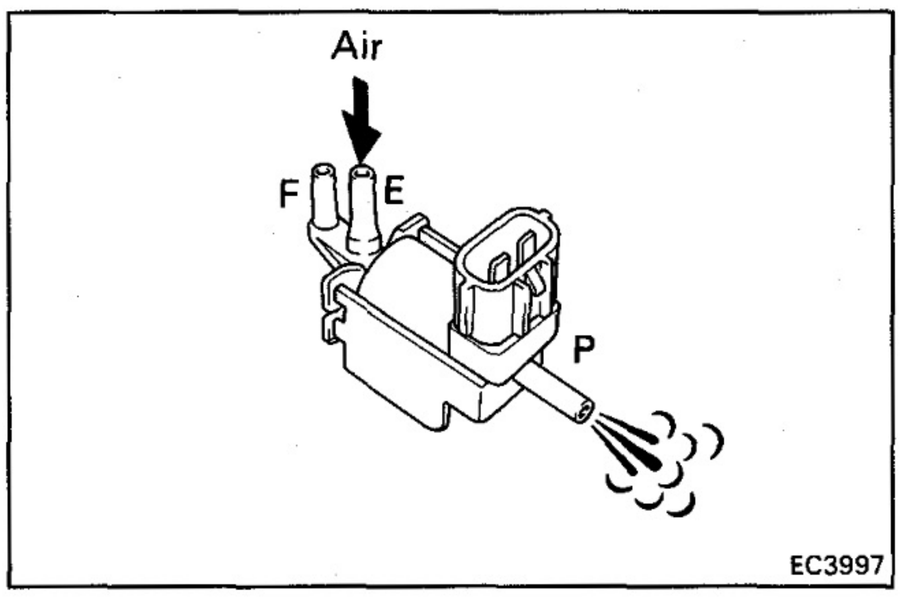
(c) Disconnect the vacuum hose from the VSV and connect the vacuum hose the gas filter.

(d) Close the orifice on the SST with your finger.

(e) Increase the engine speed gradually and measure the relief valve opening pressure.

Opening pressure: 0.40 – 0.60 kg/cm² (5.7 – 8.5 psi, 39 – 59 kPa)

(f) Remove the SST and reconnect the hose to the proper location.



INSPECTION OF VSV

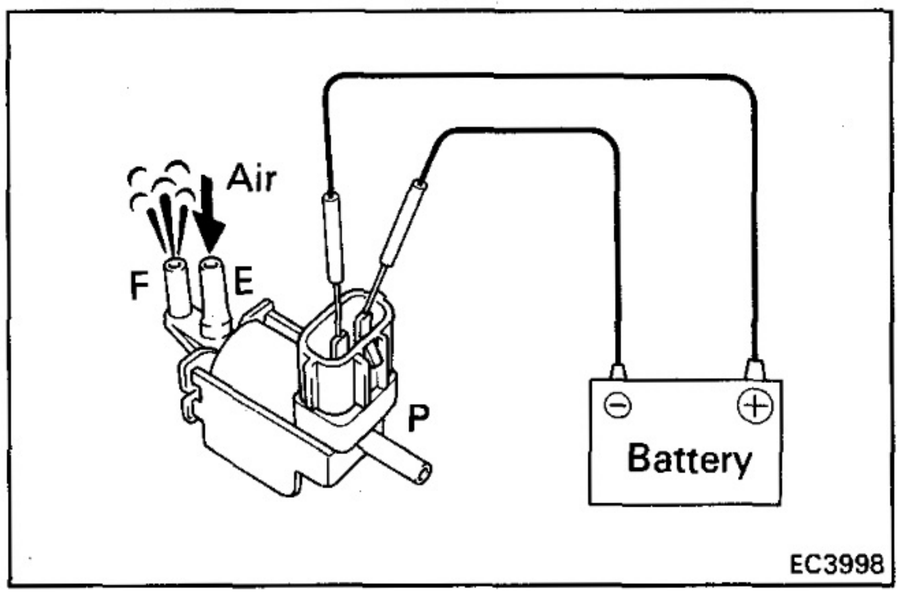
INSPECT VSV

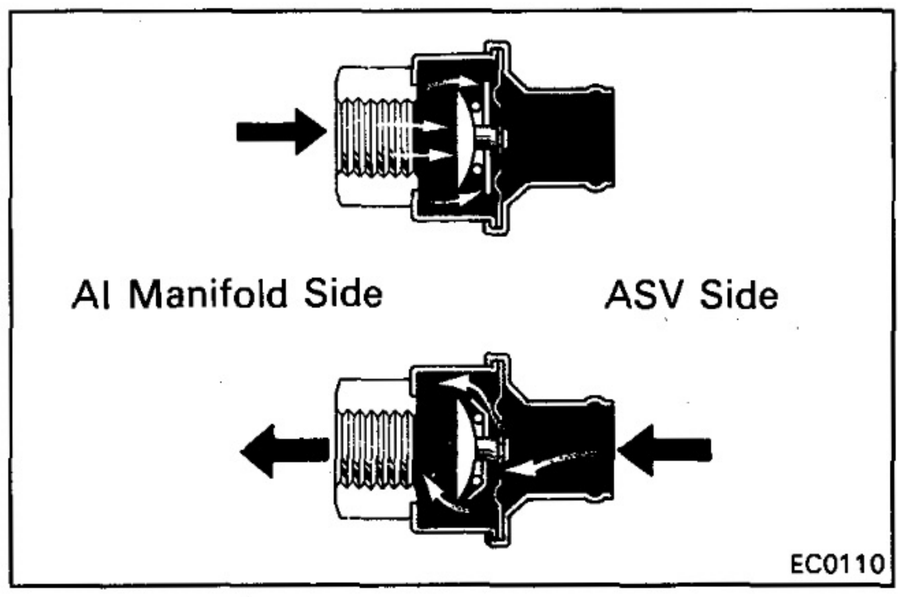
(a) Blow air into pipe E and check that the air comes out of pipe P.

(b) Apply battery voltage across the terminals.

(c) Blow air into pipe E and check that the air comes out of pipe F.

If a problem is found, replace the VSV.





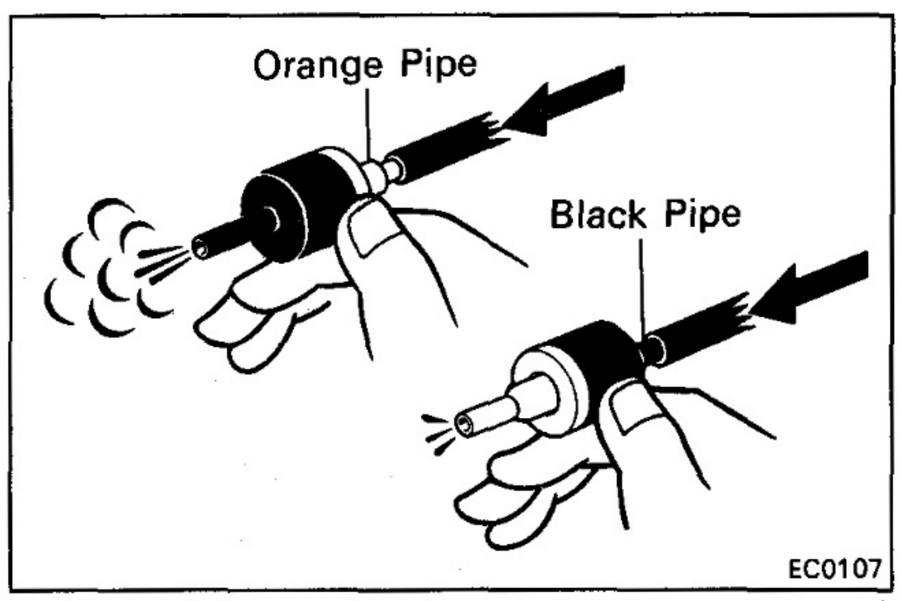
INSPECTION OF CHECK VALVE (A)

CHECK VALVE BY BLOWING AIR FROM EACH SIDE

(a) Check that the air does not flow from manifold side to ASV side.

(b) Check that the air flows from ASV side to manifold side.

If a problem is found, replace the valve.



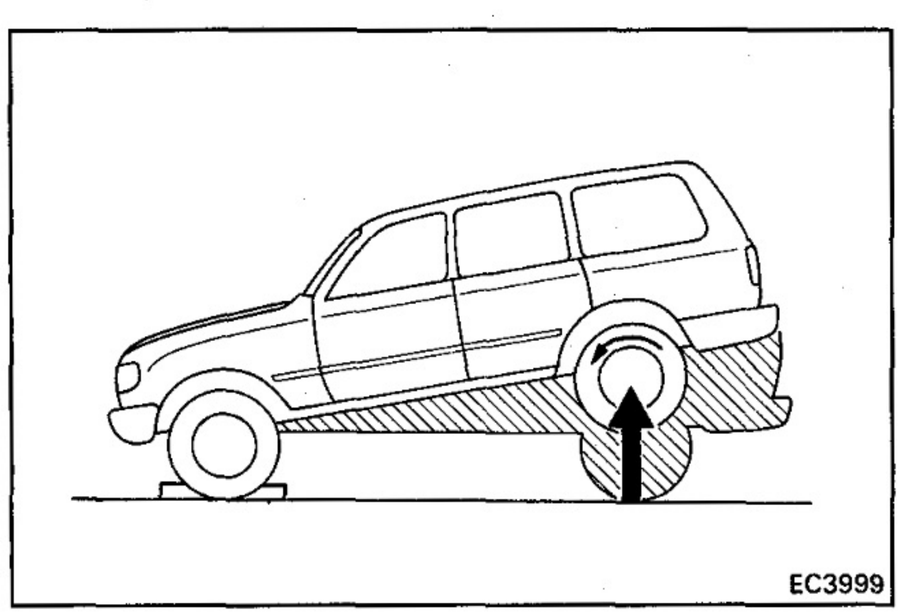
INSPECTION OF CHECK VALVE (B)

CHECK VALVE BY BLOWING AIR FROM EACH SIDE

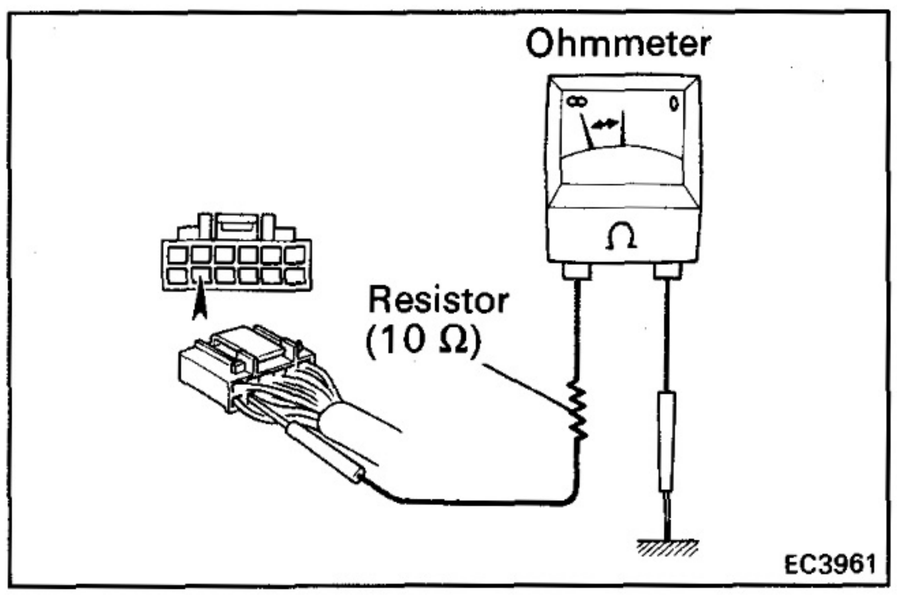
(a) Check that the air flows from the orange pipe to the block pipe.

(b) Check that the air does not flow from the black pipe to the orange pipe.

INSPECTION OF SPEED SENSOR



1. **JACK UP ONE REAR WHEEL TO CLEAR GROUND AND CHECK FRONT WHEELS**
2. **RELEASE PARKING BRAKE**
3. **SET SHIFT LEVER INTO NEUTRAL**
4. **SET FOUR WHEEL DRIVE CONTROL LEVER TO H**
5. **TURN CENTER DIFFLOCK SWITCH TO OFF**
6. **UNPLUG WIRING CONNECTOR FROM EFI ECU**
   EFI ECU location: Behind the glove box



5. CHECK ON-OFF CYCLES OF SPEED SENSOR

(a) Place the positive (+) terminal of the ohmmeter on the wiring connector terminal and the negative (–) terminal on ground.

(b) Turn the rear wheel.

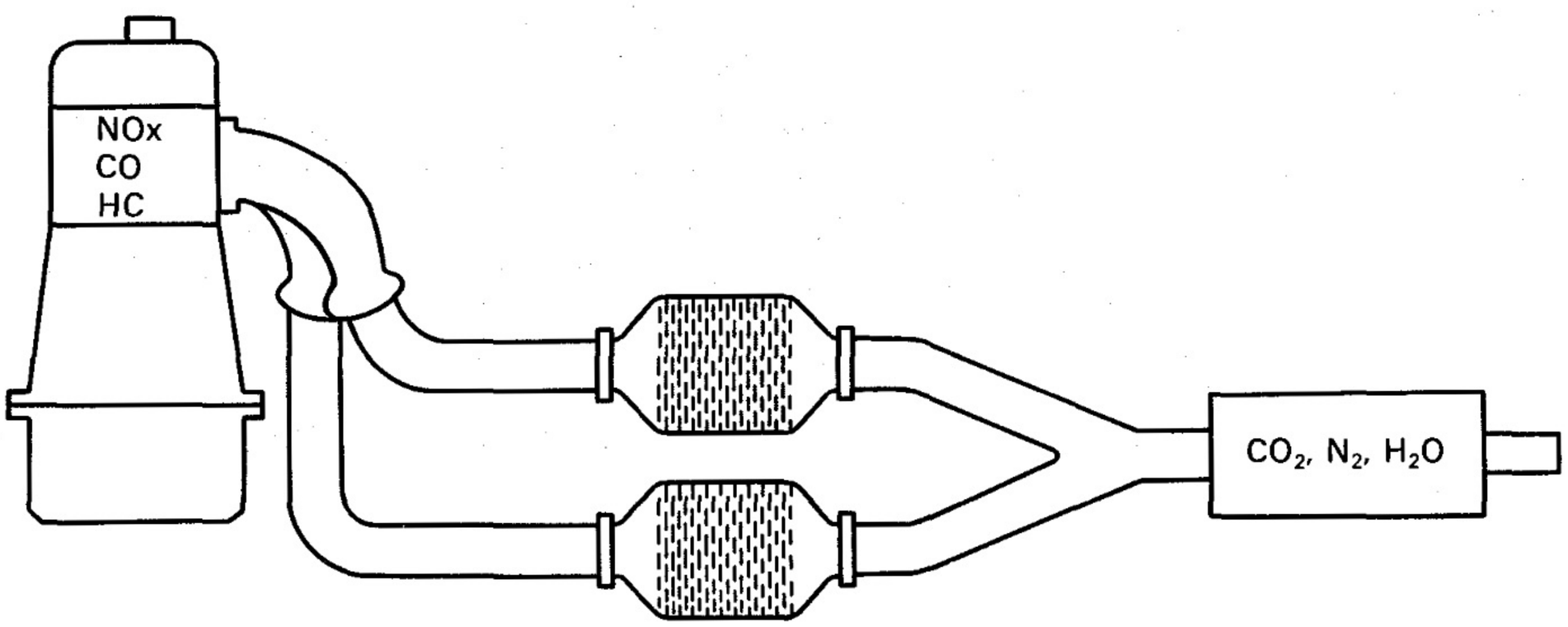
(c) Check that the ohmmeter needle deflects consistently.

NOTICE: The ohmmeter probe should be inserted from the rear side of the connector.

If the ohmmeter needle does not deflect, check that the speed sensor terminals at the back side of the speedometer air are properly connected. If the connection is proper, replace the speedometer assembly.

6. RECONNECT WIRING CONNECTOR TO COMPUTER

THREE-WAY CATALYST (TWC) SYSTEM



Three-Way Catalyst
(Monolithic)

EC2736

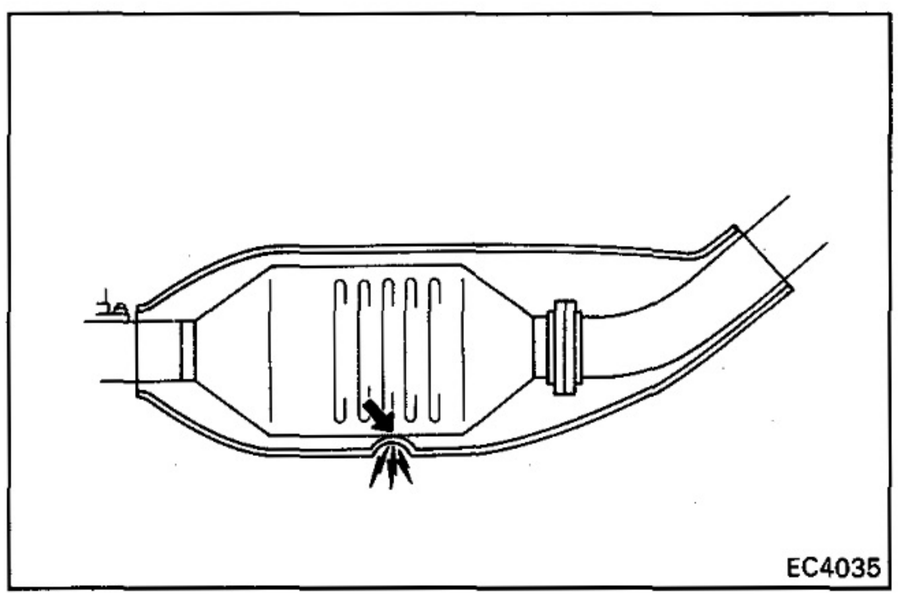
To reduce HC, CO and NOx emissions, they are oxidized, reduced and converted to nitrogen (N_2), carbon dioxide (CO_2) and water (H_2O) by the catalyst.

Exhaust Port		TWC		Exhaust Gas
HC, CO and NOx	→	Oxidation and reduction	→	CO_2 H_2O N_2

INSPECTION OF EXHAUST PIPE ASSEMBLY

1. **CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE**

2. **CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE**

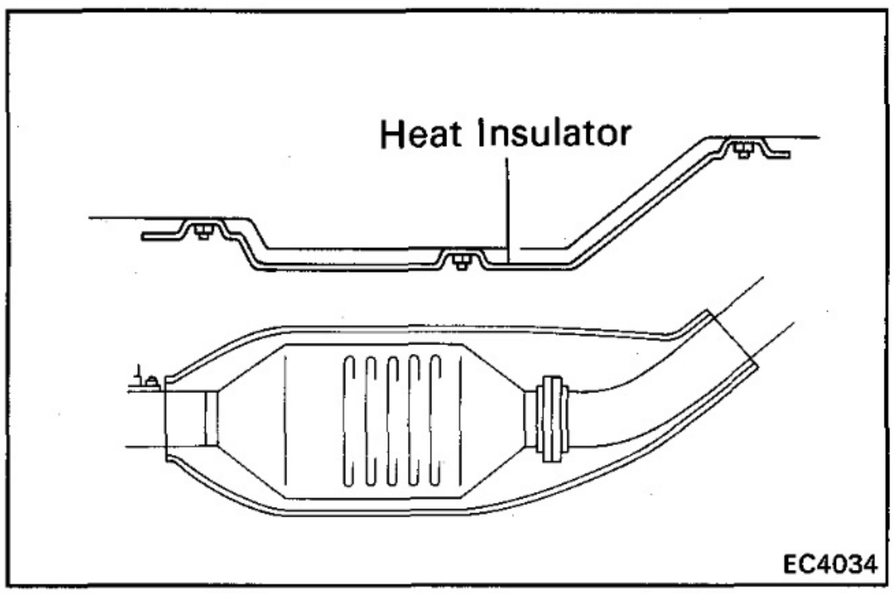


EC4035

INSPECTION OF CATALYTIC CONVERTER

CHECK FOR DENTS OR DAMAGE

If any part of the protector is damaged or dented to the extent that it comes into contact with the catalyst, repair or replace it.



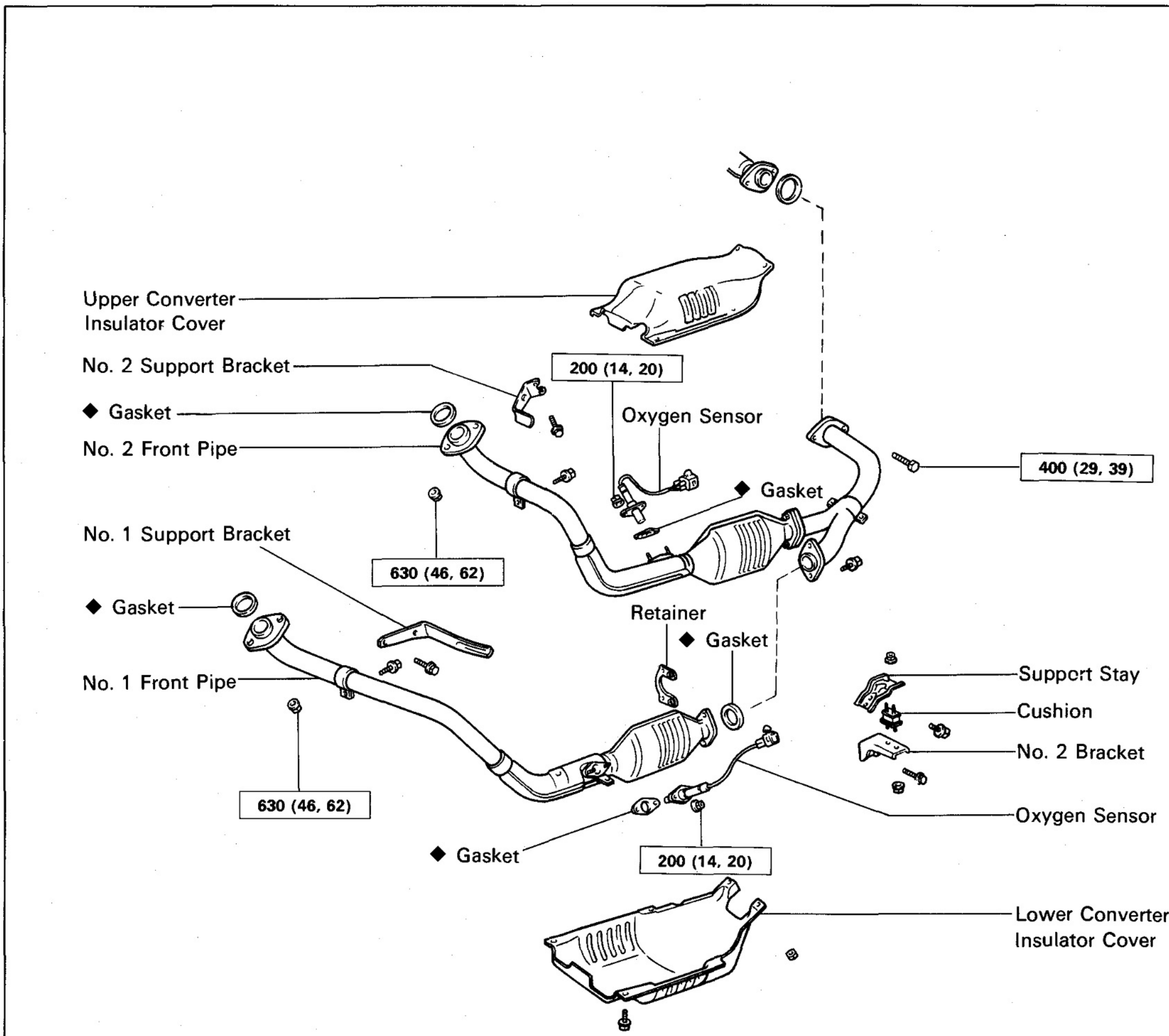
INSPECTION OF HEAT INSULATOR

1. CHECK HEAT INSULATOR FOR DAMAGE

2. CHECK FOR ADEQUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR

REPLACEMENT OF CATALYTIC CONVERTER

COMPONENTS



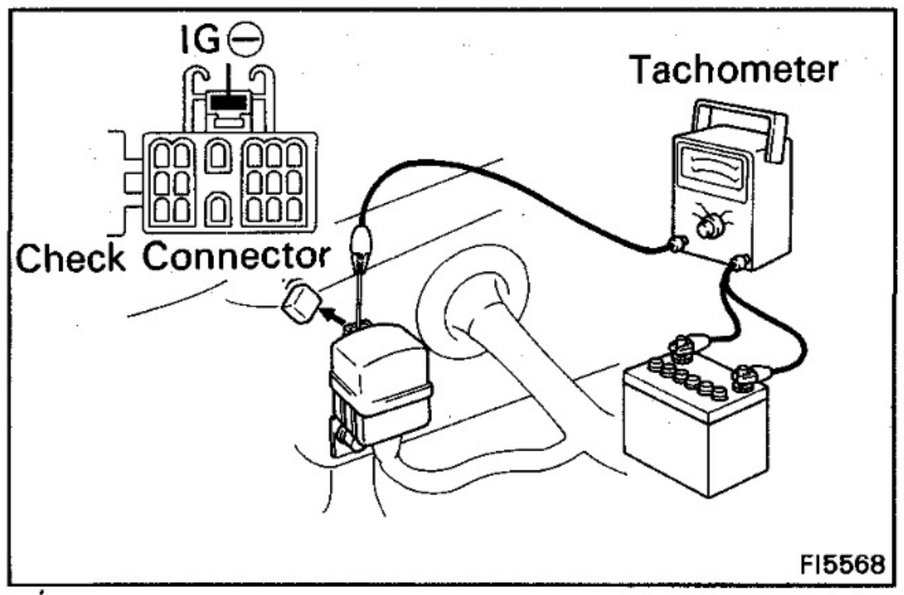
kg-cm (ft-lb, N·m) : Specified torque

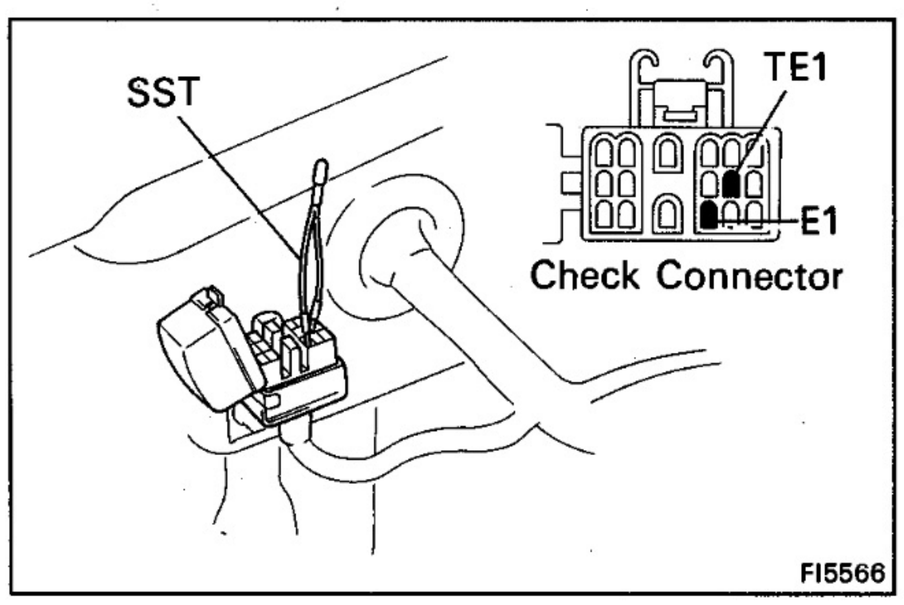
◆ Non-reusable part

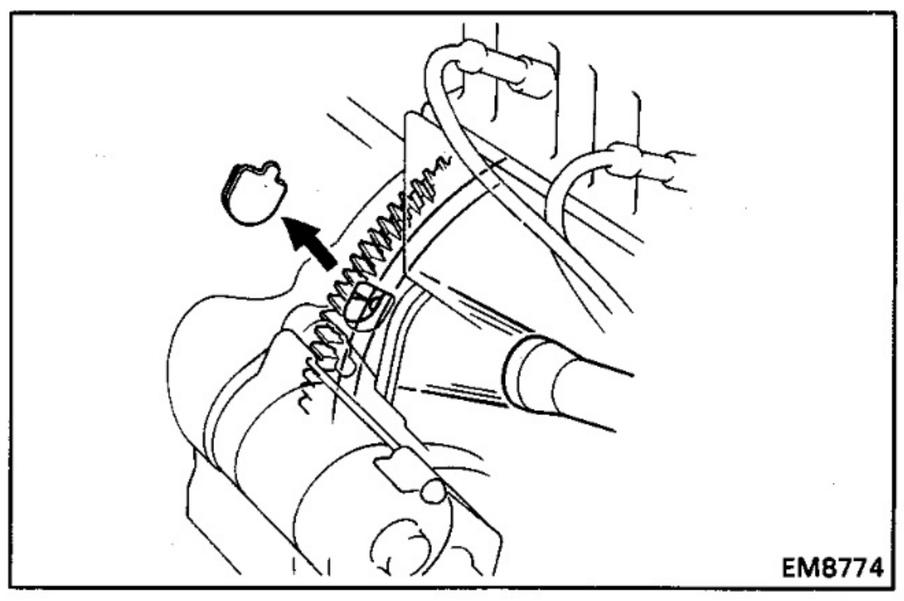
EC4026

3F-E ENGINE ADJUSTMENT

	Page
IGNITION TIMING	6-2
IDLE SPEED	6-3
IDLE CO CONCENTRATION CHECK METHOD	6-4







IGNITION TIMING

INSPECTION AND ADJUSTMENT OF IGNITION TIMING

1. WARM ENGINE

Allow the engine to reach normal operating temperature.

2. CONNECT TACHOMETER AND TIMING LIGHT TO ENGINE

Connect the tachometer test probe to terminal IG ⊖ of the check connector.

NOTICE:

- NEVER allow the tachometer terminals to touch ground as it could result in damage to the igniter and/or ignition coil.
- As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before using.

3. ADJUST IGNITION TIMING

(a) Using SST, connect terminals TE1 and E1 of the check connector.

SST 09843-18020

(b) Check the idle speed.

Idle speed: 650 ± 50 rpm

(c) Using a timing light, slowly turn the distributor until the timing mark on the drive plate is aligned with the 7° mark.

Ignition timing: 7° BTDC @ idle

(d) Tighten the distributor bolt and recheck the ignition timing.

Torque: 175 kg-cm (13 ft-lb, 17 N·m)

(e) Disconnect the check connector.

4. FURTHER CHECK IGNITION TIMING

Ignition timing: Approx. 12° BTDC @ idle

5. DISCONNECT TACHOMETER AND TIMING LIGHT FROM ENGINE

IDLE SPEED

INSPECTION OF IDLE SPEED

1. INITIAL CONDITIONS

(a) Air cleaner installed

(b) All pipes and hoses of air induction system connected

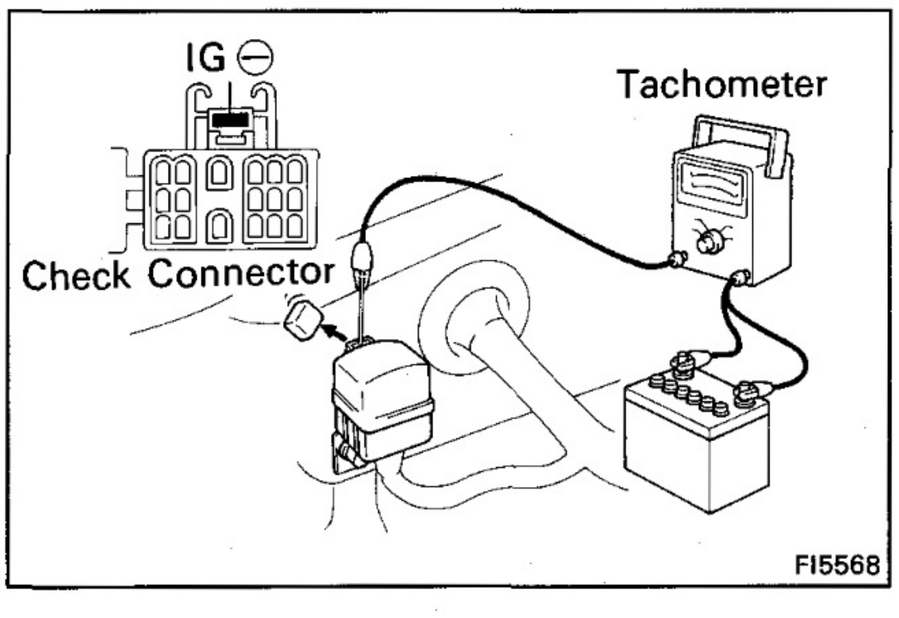
(c) All accessories switched off

(d) All vacuum lines properly connected

(e) EFI system wiring connectors fully plugged

(f) Ignition timing set correctly

(g) Transmission in neutral range



2. CONNECT TACHOMETER TO ENGINE

3. WARM UP ENGINE

Allow the engine to reach normal operating temperature.

4. CHECK IDLE SPEED

(a) Check the idle speed

Idle speed: 650 ±50 rpm

If not as specified, check the ISC system.

IDLE CO/HC CONCENTRATION CHECK METHOD

HINT: This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature

(b) All pipes and hoses of air intake system connected

(c) Air cleaner installed

(d) All accessories switched off

(e) All vacuum lines properly connected

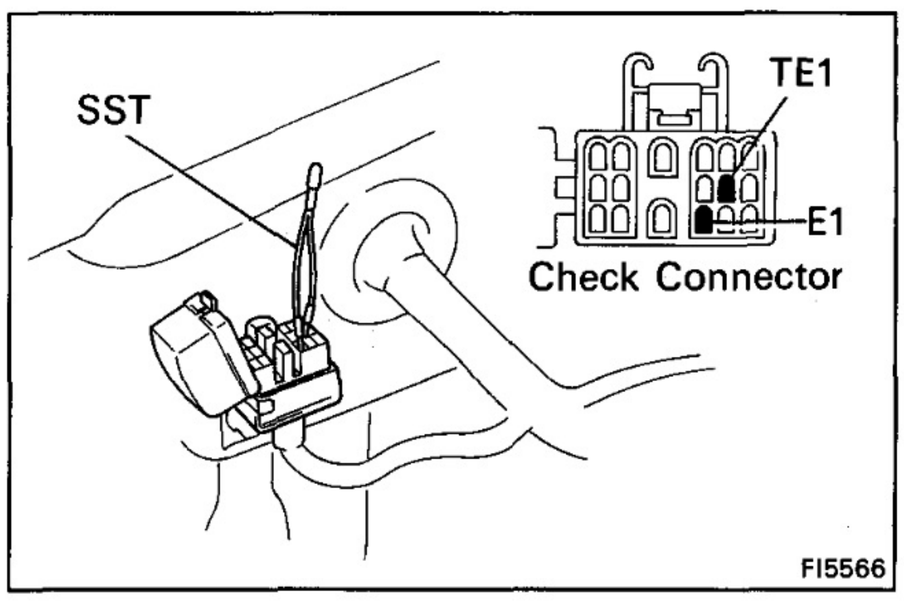
HINT: All vacuum hoses for EGR system, etc., should be properly connected.

(f) Ignition timing set correctly

(g) EFI system wiring connectors fully plugged

(h) Tachometer and CO meter at hand and calibrated

(i) Transmission in neutral range



2. START ENGINE

3. CHECK OXYGEN SENSOR OPERATION

(a) Using SST, connect terminals TE1 and E1 of the check connector.

SST 09843-18020

(b) Connect the voltmeter to the check connector. Connect the positive (+) testing probe to the VF1 (VF2) terminal and negative (–) testing probe to the E1 terminals.

(c) Race the engine at 2,500 rpm for approx. 120 seconds.

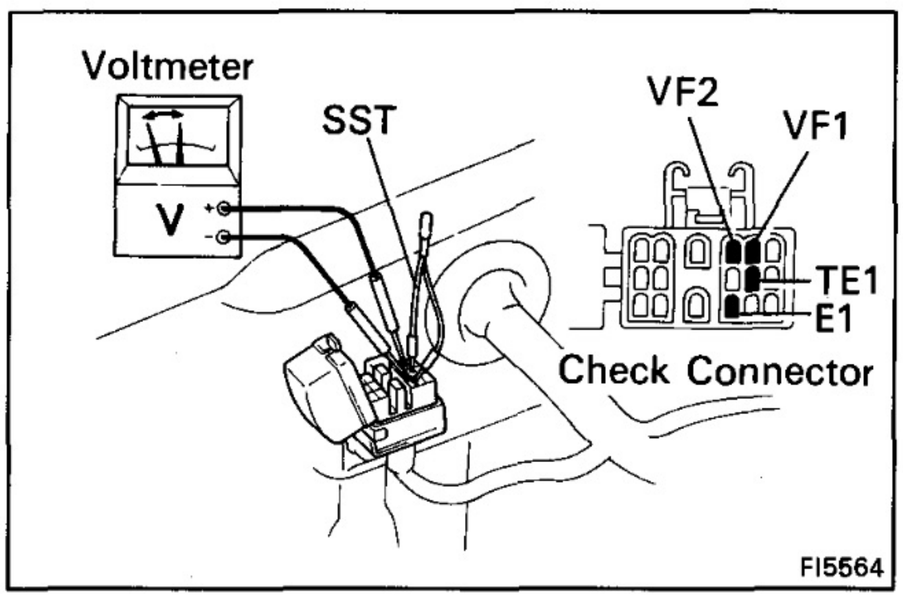
(d) Maintain engine speed at 2,500 rpm.

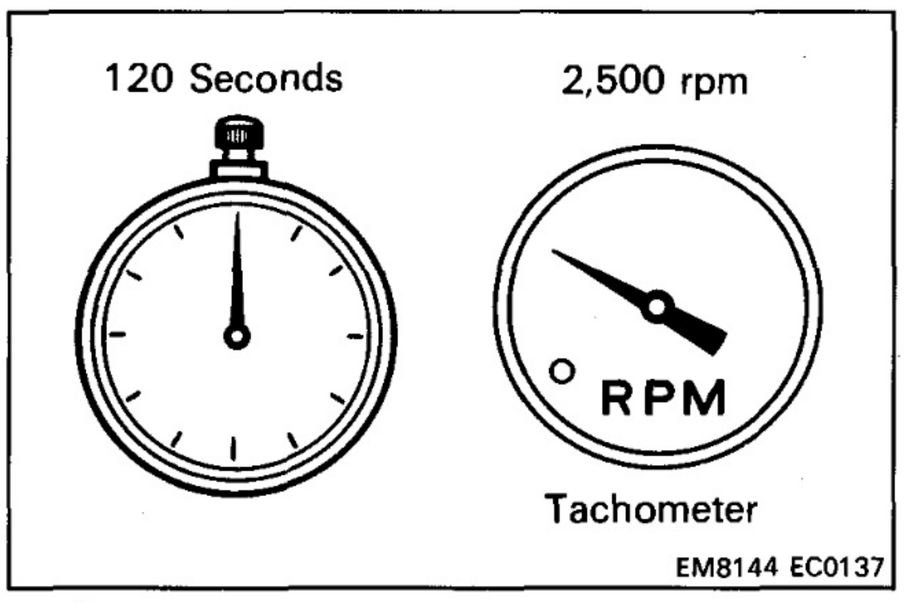
(e) Check that the needle of the voltmeter fluctuates 8 times or more in 10 seconds within 0 – 5 volts.

If the VF1 (VF2) voltage is not as specified, check the air induction system. If necessary, see EFI SYSTEM.

(f) Remove the SST from the check connector.

SST 09843-18020



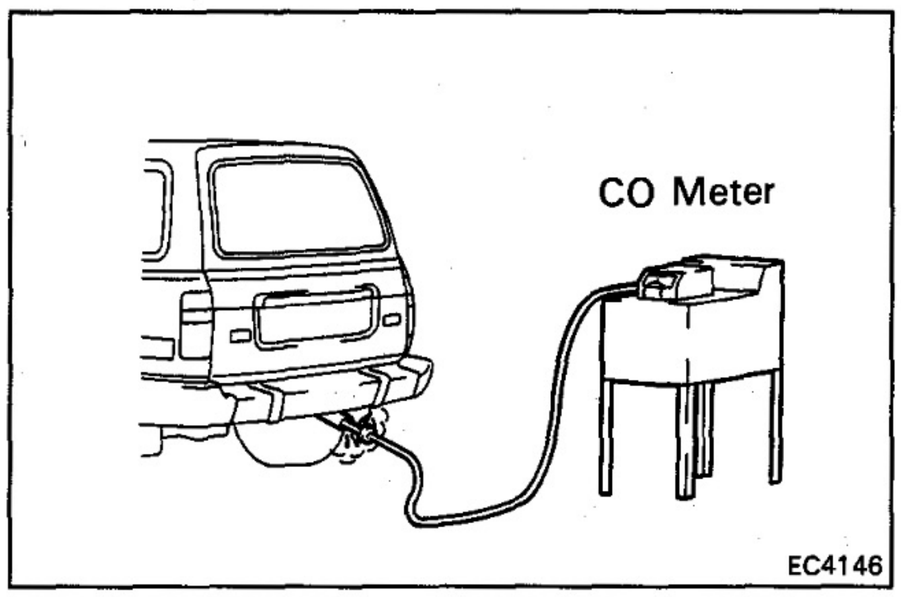


4. MEASURE CO/HC CONCENTRATION

(a) Make sure that the CO/HC meter is properly calibrated.

(b) Race the engine for 120 seconds at approx. 2,500 rpm before measuring concentration.

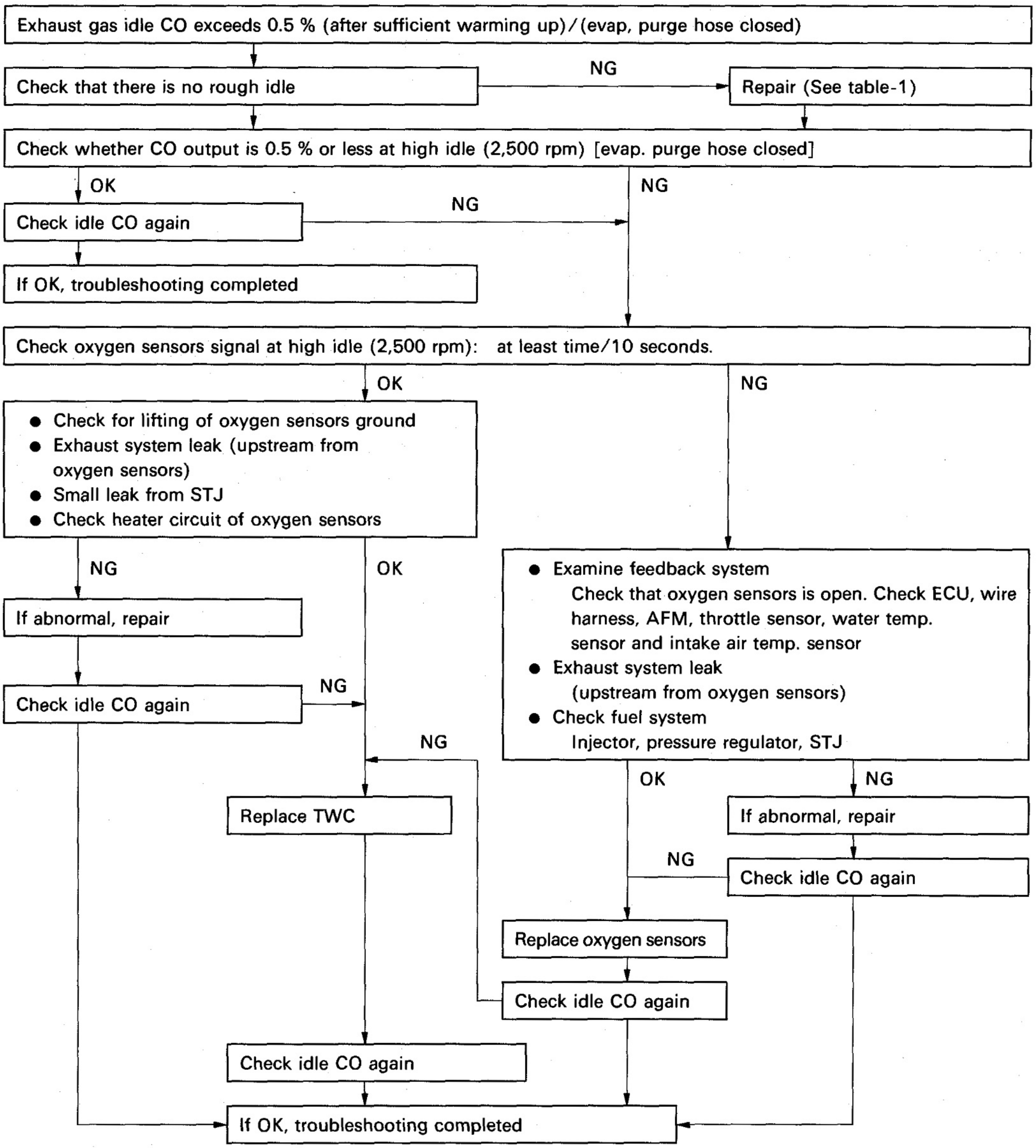
(c) Wait 1 – 3 minutes after racing the engine to allow the concentration to stabilize.



(d) Insert a tester probe at least 40 cm (1.3 ft) into the tailpipe, and measure the concentration within a short time.

Idle CO concentration: 0 – 0.5 %

If the CO/HC concentration does not conform to regulations, see the table below for possible causes.



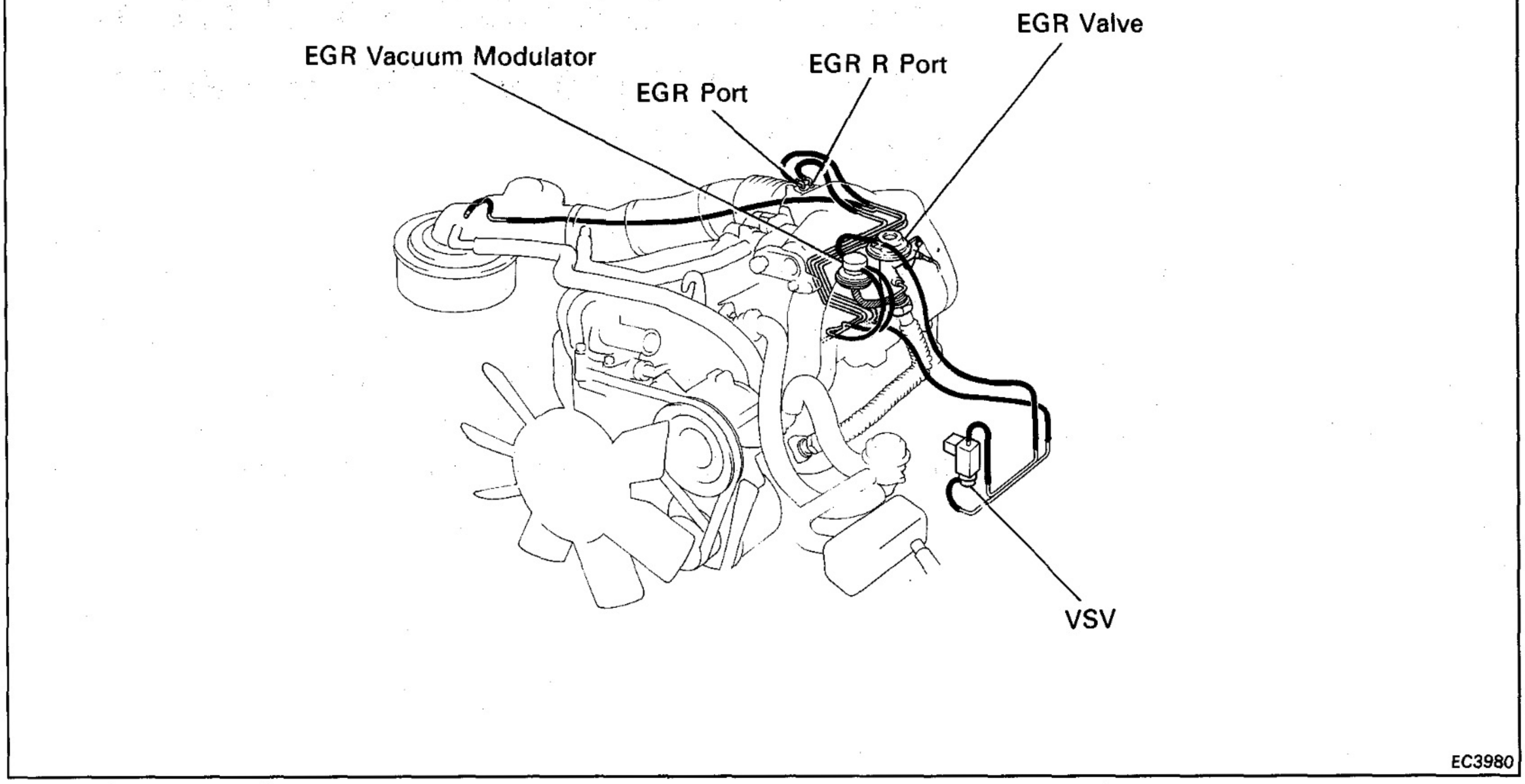
For details of how to perform each of the above checks, refer to the engine repair manual.

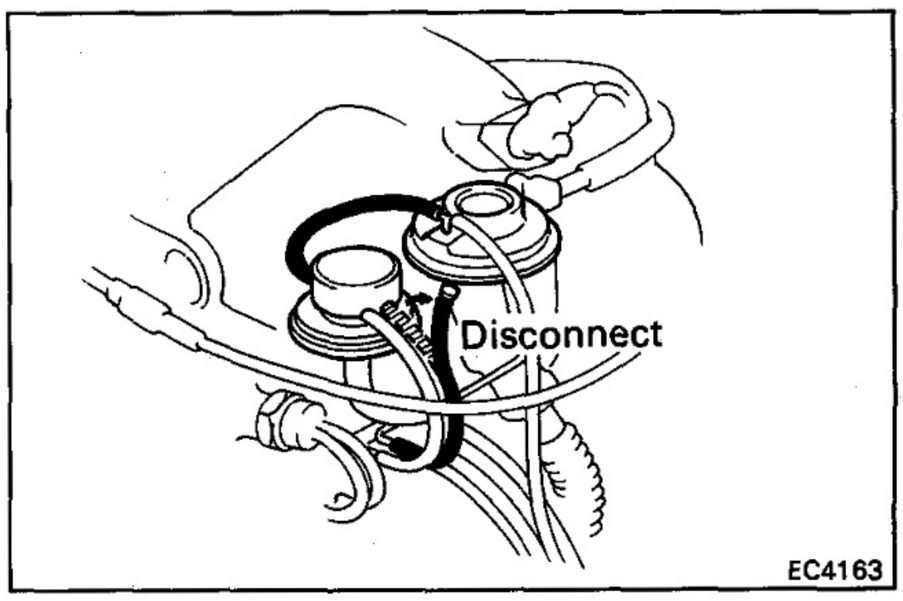
Table-1

HC	CO	Symptom	Cause
High	Normal	Rough idle	1. Faulty ignition: ● Incorrect timing ● Fouled, shorted or improperly gapped plugs ● Open or crossed high-tension cords ● Cracked distributor cap 2. Incorrect valve clearance 3. Leaky EGR valve 4. Leaky intake and exhaust valves 5. Leaky cylinder
High	Low	Rough idle (Fluctuating HC reading)	1. Vacuum leak: ● PCV hose ● EGR valve ● Intake manifold ● Air intake chamber ● Throttle body ● ISC valve ● Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Faulty EFI system ● Faulty pressure regulator ● Clogged fuel return line ● Defective water temp. sensor ● Defective air temp. sensor ● Faulty ECU ● Faulty injector ● Faulty cold start injector ● Faulty throttle position sensor ● Air flow meter

SIMPLE CHECK METHOD (For Europe Vehicle with Catalyst)

	Page
EGR SYSTEM	7-2
IGNITION TIMING	7-2
AIR INJECTION (AI) SYSTEM	7-3
OXYGEN SENSOR	7-4
IDLE CO CONCENTRATION CHECK	7-4





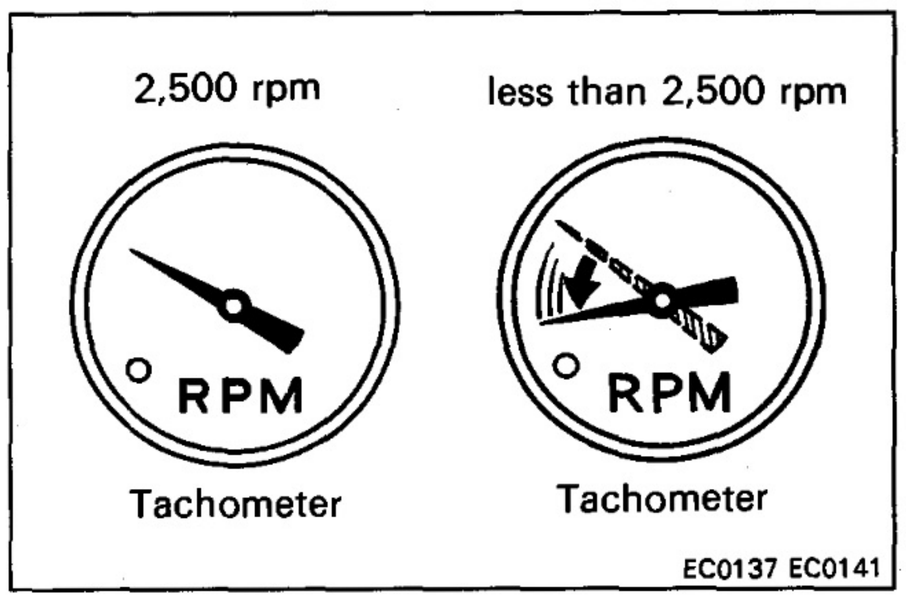
INSPECTION OF EGR SYSTEM

(a) Warm up the engine.

(b) Disconnect the vacuum hose from EGR port of the throttle body, and plug the EGR port.

(c) While keeping the engine speed at 2,500 rpm, connect the vacuum hose to EGR port of the throttle body.

HINT: At this time VSV hose must be disconnected from EGR valve and plug the EGR valve.

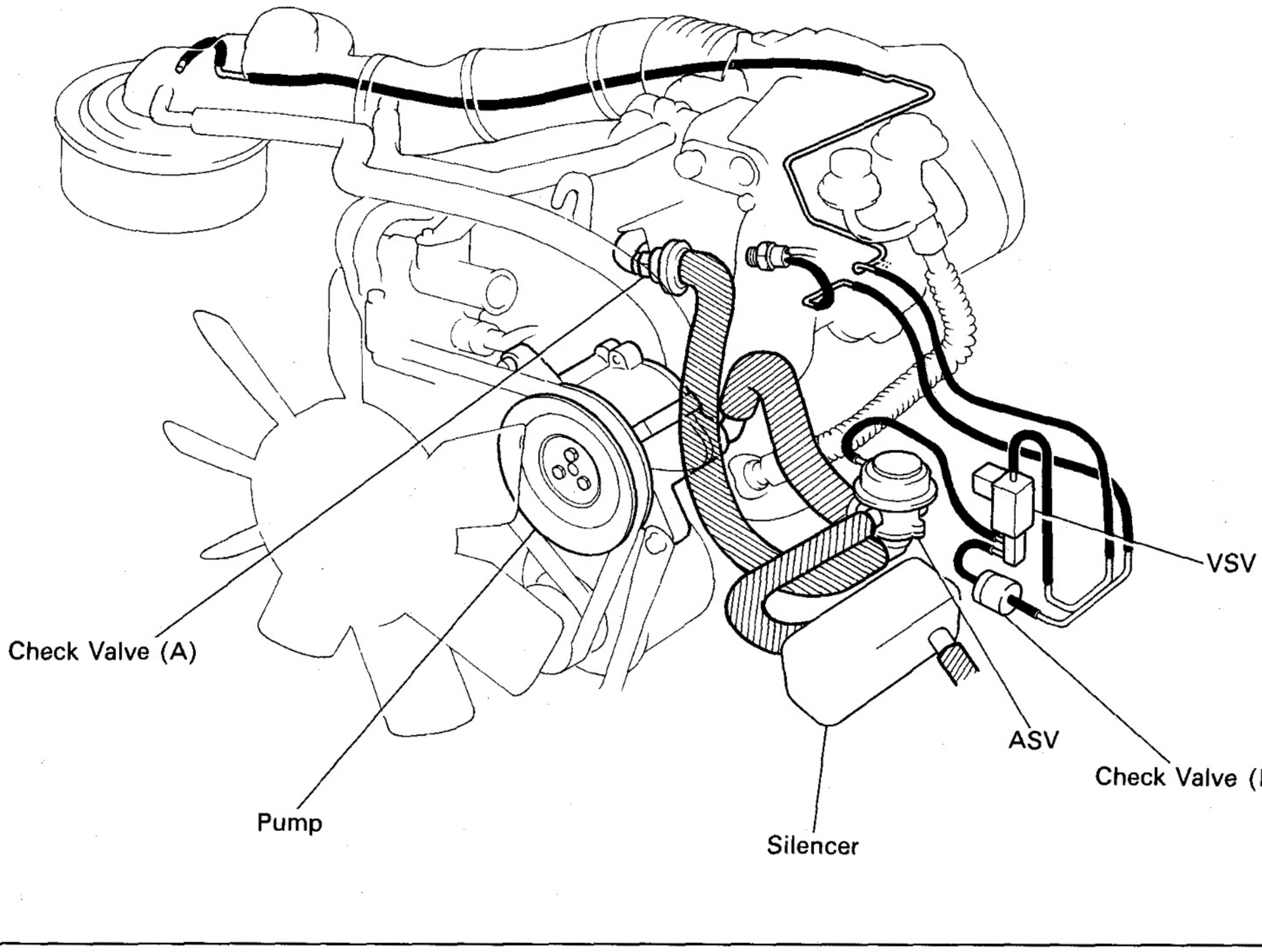


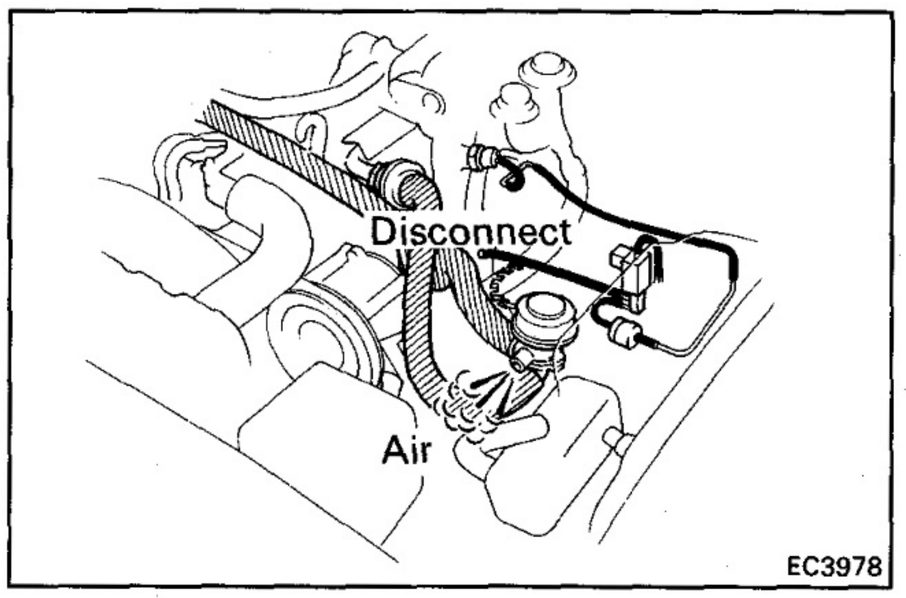
(d) Confirm the engine speed decreasing from 2,500 rpm by the exhaust gas flowing in.

INSPECTION OF IGNITION TIMING

(See page 6-2)

AIR INJECTION (AI) SYSTEM



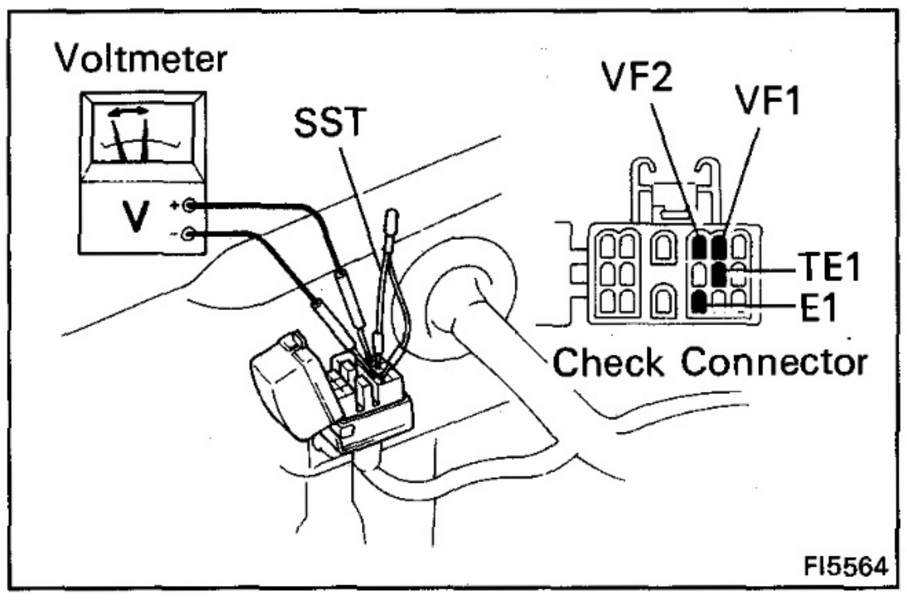


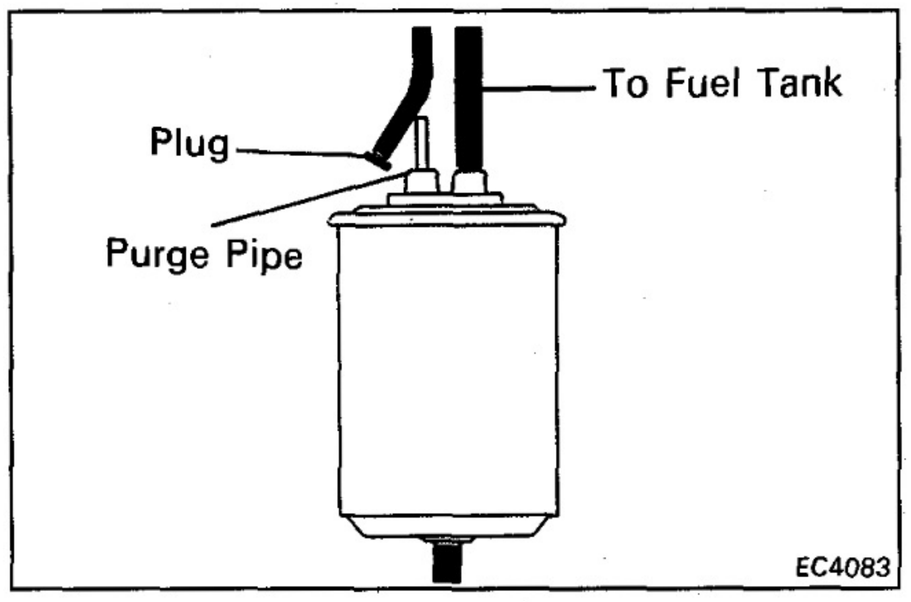
INSPECTION OF ASV

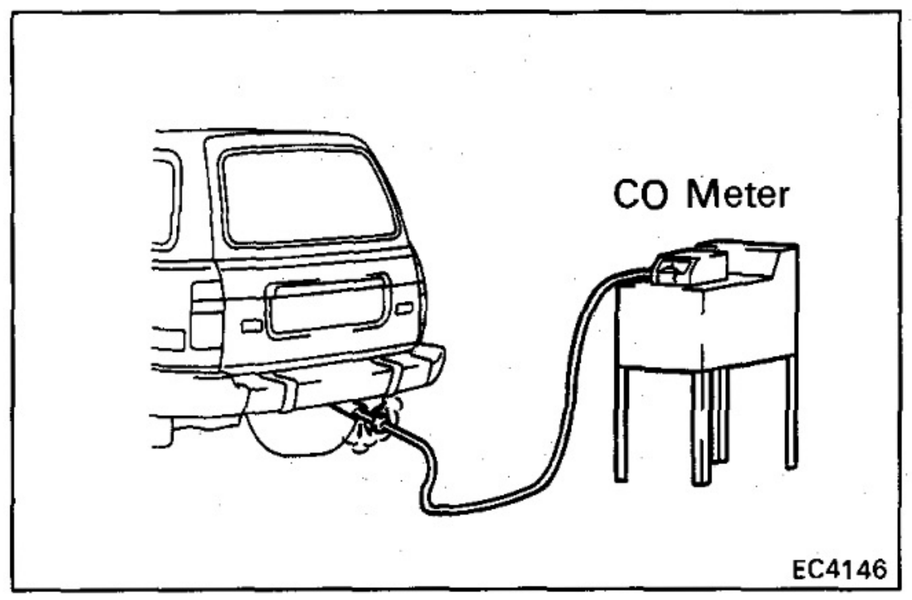
1. CHECK ASV OPERATION

(a) Disconnect the vacuum hose from the ASV.

(b) Check that the air comes out from the ASV.







Oxygen Sensors

INSPECTION OF OXYGEN SENSOR

(a) Warm up the engine.

(b) Using SST, connect terminals TE1 and E1 of the check connector.

SST: 09843-18020

(c) Connect the positive (+) probe of a voltmeter to terminal VF1 (VF2) of the check connector, and negative (–) probe to terminal E1.

(d) Disconnect the vacuum hose from the canister and plug the hose.

(e) Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 seconds.

(f) Then, maintaining engine at 2,500 rpm, count how many times needle of voltmeter fluctuates between 0 and 5 V.

Minimum needle fluctuation:
8 times for every 10 seconds

IDLE CO CONCENTRATION CHECK

(a) Warm up the engine.

(b) Keep the engine speed at 2,500 rpm for 120 seconds.

(c) Insert the sampling probe of the CO meter into the tail pipe at least 40 cm (1.3 ft)

(d) Measure CO concentration at idle. Complete measuring it within 3 minutes.
Confirm the CO concentration at idle;

Idle CO concentration: 0 – 0.5 %

If the idle CO concentration is more then 0.5 % perform troubleshooting.
(See page 6-5)

SPECIFICATIONS

	Page
3F ENGINE TUNE-UP DATA	A-2
3F-E ENGINE TUNE-UP DATA	A-3

3F ENGINE TUNE-UP DATA

Drive belt deflection with 10 kg (22.0 lb, 98 N)				
Fan – Alternator	New belt	7 – 9 mm		0.28 – 0.35 in.
	Used belt	9 – 12 mm		0.35 – 0.47 in.
Battery specific gravity				
When fully charged at 20°C (68°F)		1.25 – 1.27		
Coolant capacity	w/ Heater	16.5 liters	17.4 US qts	14.5 Imp. qts
Engine oil capacity	Dry fill	8.0 liters	8.5 US qts	7.0 Imp. qts
	Drain and refill			
	w/ Oil filter change	7.8 liters	8.2 US qts	6.9 Imp. qts
	w/o Oil filter change	7.0 liters	7.4 US qts	6.2 Imp. qts
Spark plug				
Type	ND	W14EX-U		
	NGK	BP4EY		
Gap		0.8 mm		0.031 in.
Distributor				
Dwell angle		41 ± 3°		
Rubbing block gap		0.3 mm (reference only)		0.012 in.
Firing order		1 – 5 – 3 – 6 – 2 – 4		
Ignition timing		7 ± 2° BTDC @ Max. 900 rpm		
Valve clearance (Hot)	Intake	0.20 mm		0.008 in.
	Exhaust	0.35 mm		0.014 in.
Idle speed	M/T	650 ± 50 rpm		
	A/T	750 ± 50 rpm		
Idle CO concentration		1.5 ± 0.5 %		
Fast idle speed		1,800 ± 200 rpm		
Throttle positioner setting speed		1,000 ± 100rpm		
Intake manifold vacuum	at Idle speed	More than 420 mmHg (16.54 in.Hg, 56.0 kPa)		
Compression pressure at 250 rpm	STD	More than 10.5 kg/cm^2 (149 psi, 1,030 kPa)		
	Limit	8.0 kg/cm^2	114 psi	785 kPa
Difference of pressure between each cylinder		Less than 1.0 kg/cm^2 (14 psi, 98 kPa)		

HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that if fits properly in the ribbed grooves.

3F-E ENGINE TUNE-UP DATA

Drive belt deflection with 10 kg (22.0 lb, 98 N)				
Clankshaft – Alternator	New belt	7 – 9 mm		0.278 – 0.354 in.
	Used belt	9 – 12 mm		0.354 – 0.472 in.
Drive belt tension				
Alternator	New belt	55 – 65 kg		
	Used belt	30 – 45 kg		
Battery specific gravity				
When fully charged at 20°C (68°F)		1.25 – 1.27		
Coolant capacity	w/ Heater or air conditioner	18.5 liters	19.5 US qts	16.3 Imp. qts
Engine oil capacity	Dry fill	8.0 liters	8.5 US qts	7.0 Imp. qts
	Drain and refill			
	w/ Oil filter change	7.8 liters	8.2 US qts	6.9 Imp. qts
	w/o Oil filter change	7.0 liters	7.4 US qts	6.2 Imp.qts
High tension cord	Resistance Limit	Less than 25 kΩ per cord		
Spark plug				
Type	ND	W16EXR-U11		
	NGK	BPR5EY11		
Gap		1.1 mm		0.043 in.
Ignition timing (T/M in neutral)		7° BTDC @ idle		
		(Check connector TE1-E1 connected)		
Firing order		1 – 5 – 3 – 6 – 2 – 4		
Valve clearance (Hot)	Intake	0.20 ± 0.05 mm		0.0079 ± 0.0020 in.
	Exhaust	0.35 ± 0.05 mm		0.0138 ± 0.0020 in.
Idle speed		650 ± 50 rpm (w/ISC)		
Idle CO concentration		Less than 0.5 %		
Idle HC concentration	Max	100 ppm		
Compression pressure at 250 rpm	STD	10.5 kg/cm^2	149 psi	1,030 kPa
	Limit	8.0 kg/cm^2	114 psi	785 kPa
Differential of pressure between each cylinder		Less than 1.0 kg/cm^2 (14 psi, 98 kPa)		

HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves.