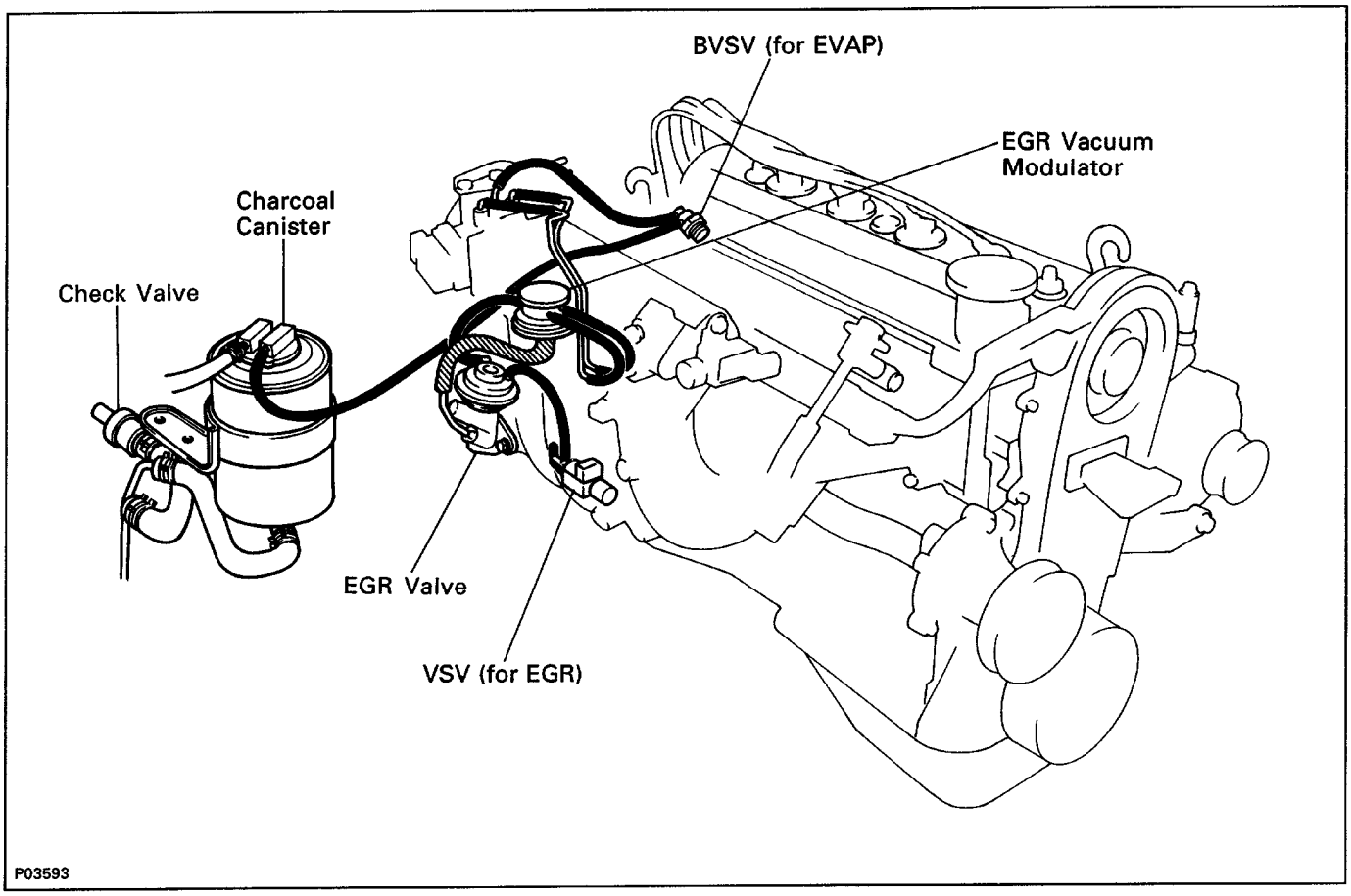
EMISSION CONTROL SYSTEM

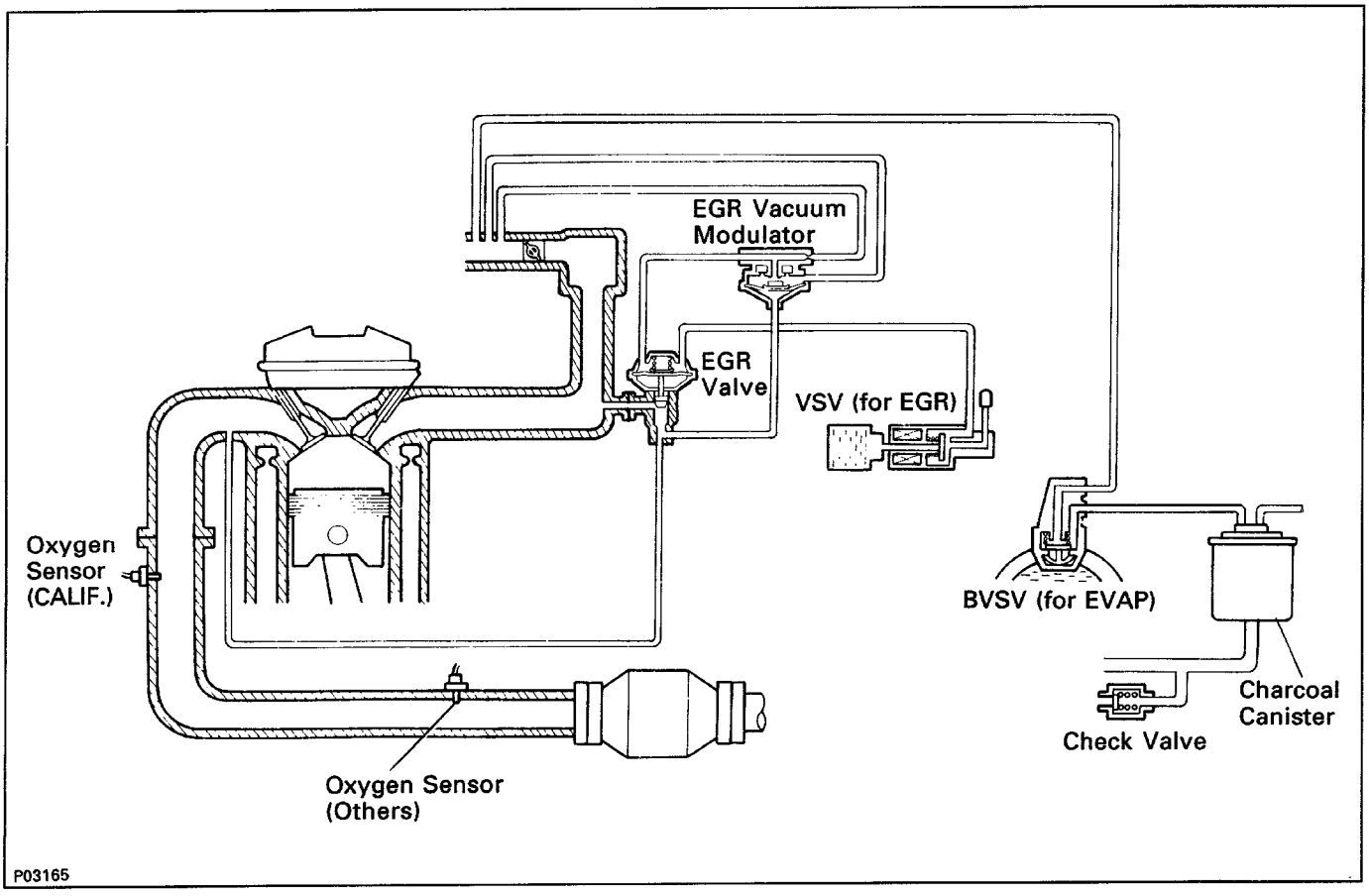
(4A–FE)
SYSTEM PURPOSE

System	Abbreviation	Purpose
Positive Crankcase ventilation	PCV	Reduces blow–by gas (HC)
Fuel evaporative emission control	EVAP	Reduces evaporative HC
Exhaust gas recirculation	EGR	Reduces NOx
Three–way catalyst	TWC	Reduces C0, HC and NOx
Electronic fuel injection*	EFI	Regulates all engine conditions for reduction of exhaust emissions.

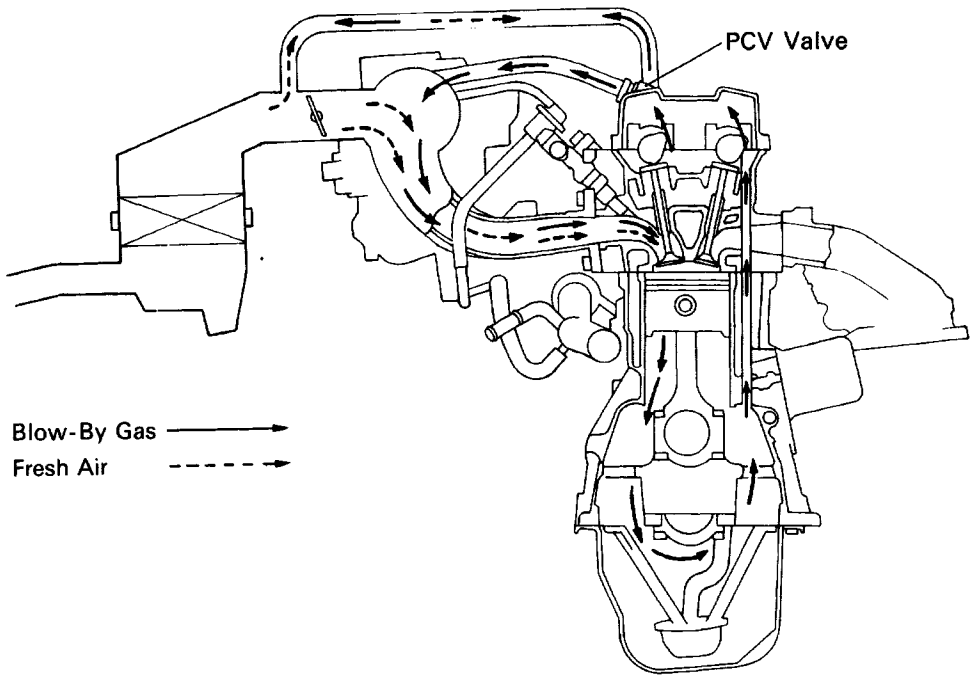
Remark * For inspection and repair of the EFI system, refer to EFI section of this manual.

COMPONENT LAYOUT AND SCHEMATIC DRAWING





POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

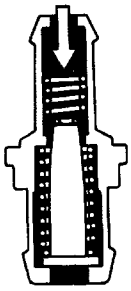


P03592

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 if Backfiring

Intake Manifold Side

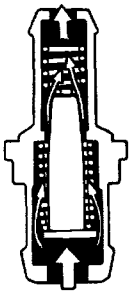


Cylinder Head Side

○ PCV VALVE IS CLOSED.

EC1001

Normal Operation

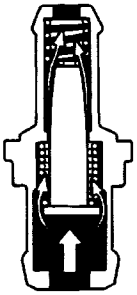


○ PCV VALVE IS OPEN.

○ VACUUM PASSAGE IS LARGE.

EC1002

Idling or Decelerating

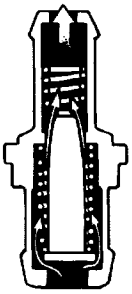


○ PCV VALVE IS OPEN.

○ VACUUM PASSAGE IS SMALL.

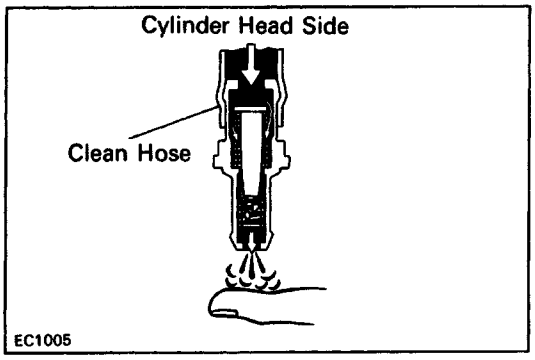
EC1003

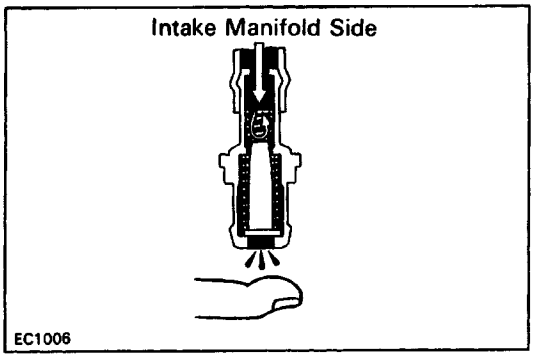
Acceleration or High Load



○ PCV VALVE IS FULLY OPEN.

EC1004





INSPECTION OF PCV VALVE

1. REMOVE PCV VALVE

2. INSTALL CLEAN HOSE TO PCV VALVE

3. INSPECT PCV VALVE OPERATION

(a) Blow air into the cylinder head side, and check that air passes through easily.

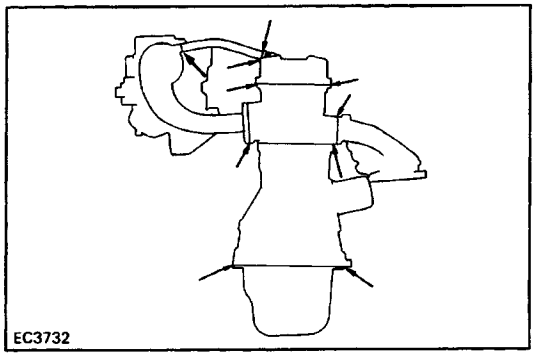
CAUTION: Do not suck air through the valve.
Petroleum substances inside the valve are harmful.

(b) Blow air into the intake manifold side, and check that air passes through with difficulty.

If operation is not as specified, replace the PCV valve.

4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE

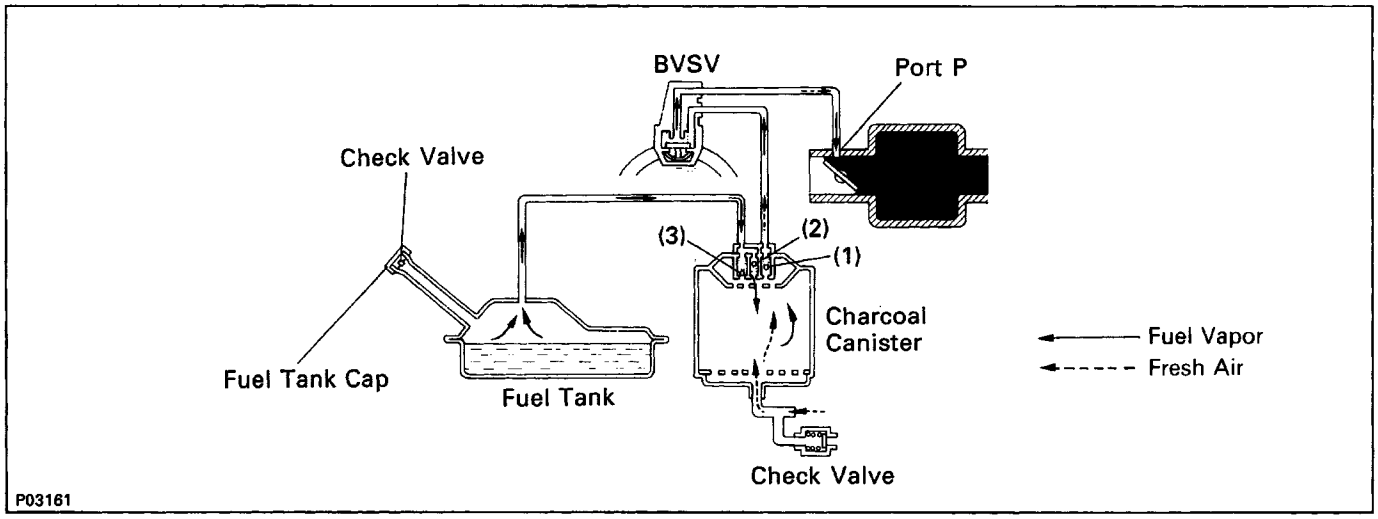


INSPECTION OF PCV HOSES AND CONNECTIONS

VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

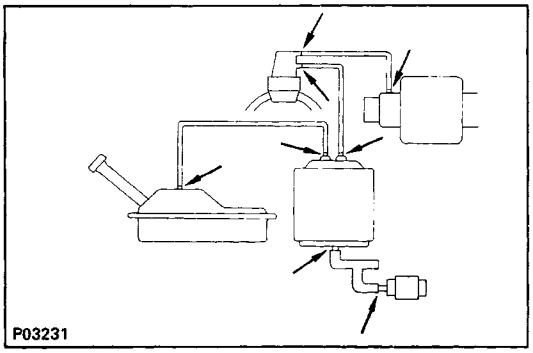
Check for cracks, leaks or damage.

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	Throttle Valve Opening	Canister Check Valve			Check Valve in Cap	Evaporated Fuel (HC)
			(1)	(2)	(3)		
Below 35˚C (95˚F)	CLOSED	–	–	–		–	HC from tank is absorbed into the canister.
Above 54˚C (129˚F)	OPEN	Positioned below port P	CLOSED	–	–	–	
		Positioned above port P	OPEN	–	–	–	HC from canister is led into air intake manifold.
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.



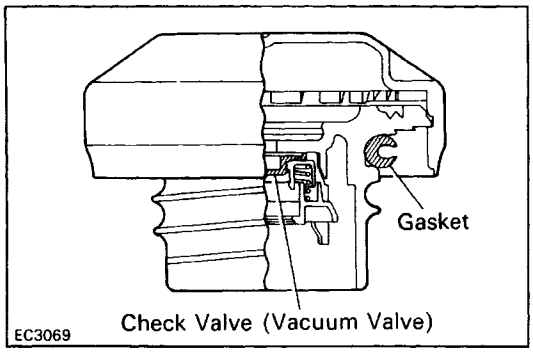
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND TANK CAP

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for loose connections, sharp bends or damage.

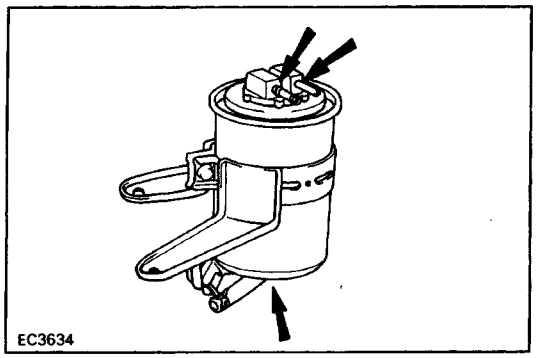
2. VISUALLY INSPECT FUEL TANK

Look for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

Check if the cap and/or gasket are deformed or damaged.
If necessary, repair or replace the cap.

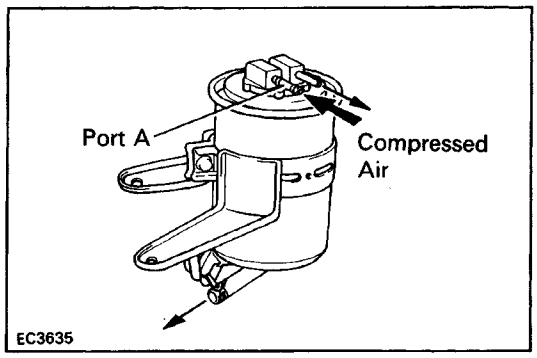


INSPECTION OF CHARCOAL CANISTER

1. REMOVE CHARCOAL CANISTER

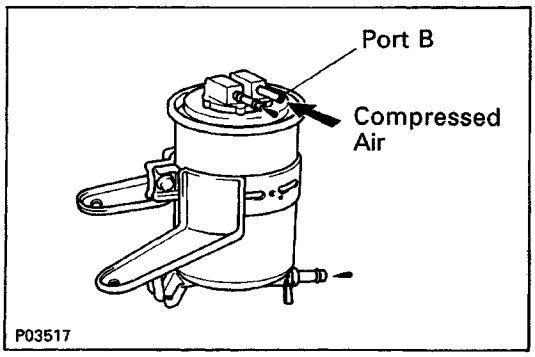
2. VISUALLY INSPECT CHARCOAL CANISTER

Look for cracks or damage.



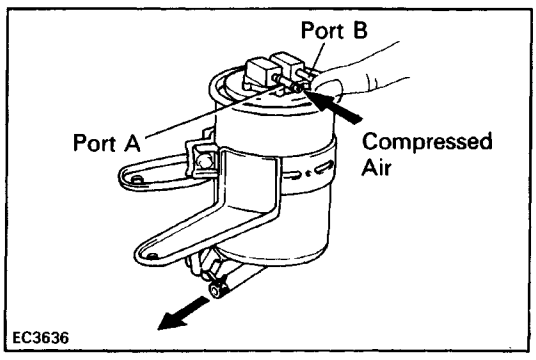
3. INSPECT FOR CLOGGED FILTER AND STUCK CHECK VALVE

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



(b) Blow into port B and check that air does not flow from the other ports.

If a problem is found, replace the charcoal canister.



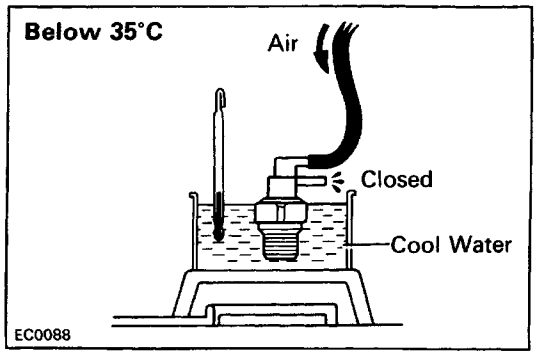
4. CLEAN FILTER IN CANISTER

Clean the filter by blowing 294 kPa (3 kgf/cm^2, 43 psi) of compressed air into port A while holding port B closed.

NOTICE:

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

5. REINSTALL CHARCOAL CANISTER



INSPECTION OF BVSV

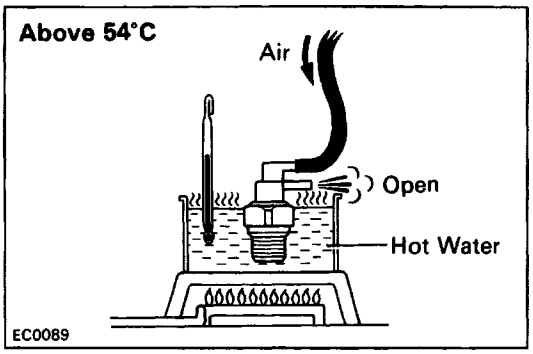
INSPECT BVSV BY BLOWING AIR INTO PIPE

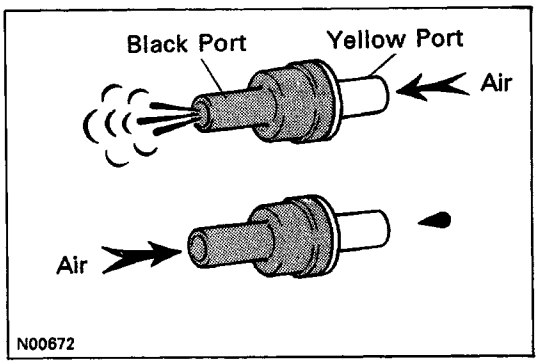
(a) Drain the coolant from the radiator into a suitable container.

(b) Remove the BVSV from the water inlet housing.

(e) Cool the BVSV to below 35˚C (95˚F) with cool water.

(d) Blow air into the port and check that the BVSV is closed.





(e) Heat the BVSV to above 54°C (129°F) with hot water.

(f) Blow air into the port and check that the BVSV is open.

If a problem is found, replace the BVSV.

(g) Apply adhesive to two or three threads of the BVSV, and reinstall.

Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent

(h) Refill the radiator with coolant.

INSPECTION OF CHECK VALVE

1. REMOVE CHECK VALVE

2. INSPECT CHECK VALVE

(a) Check that air flows from the yellow port to the black port.

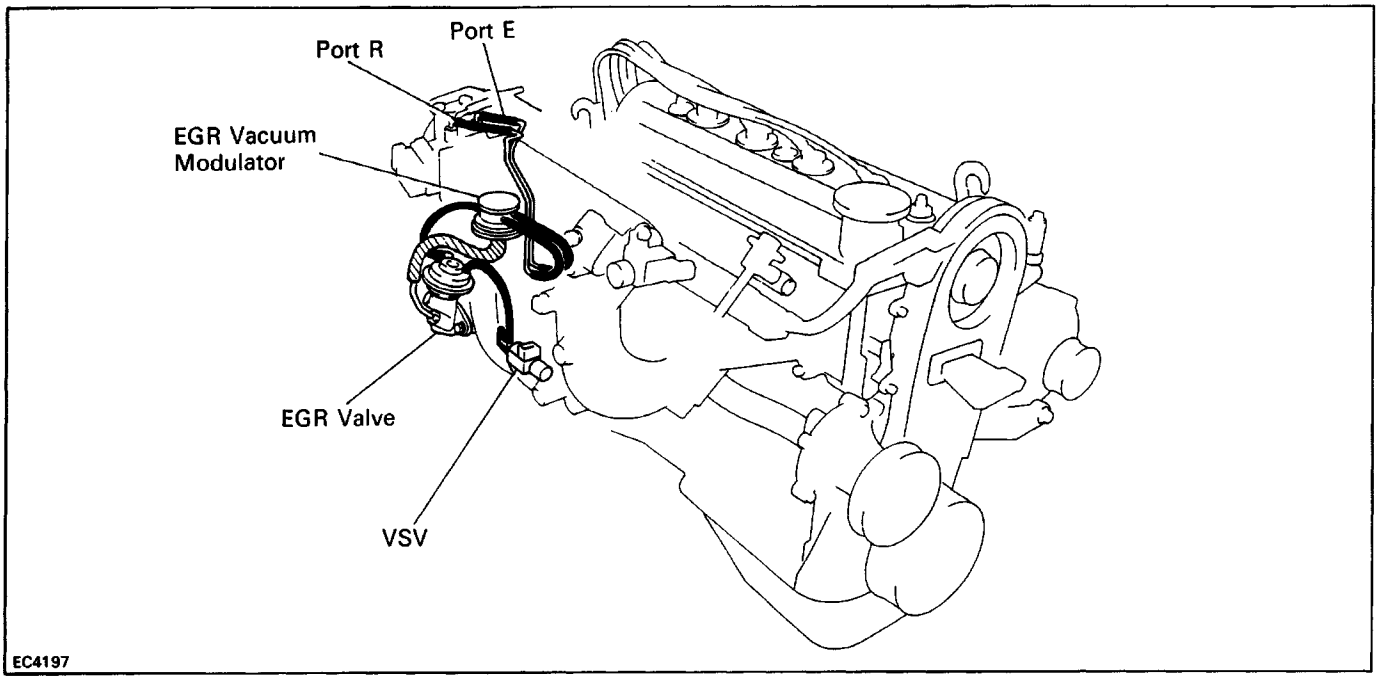
(b) Check that air does not flow from the black port to the yellow port.

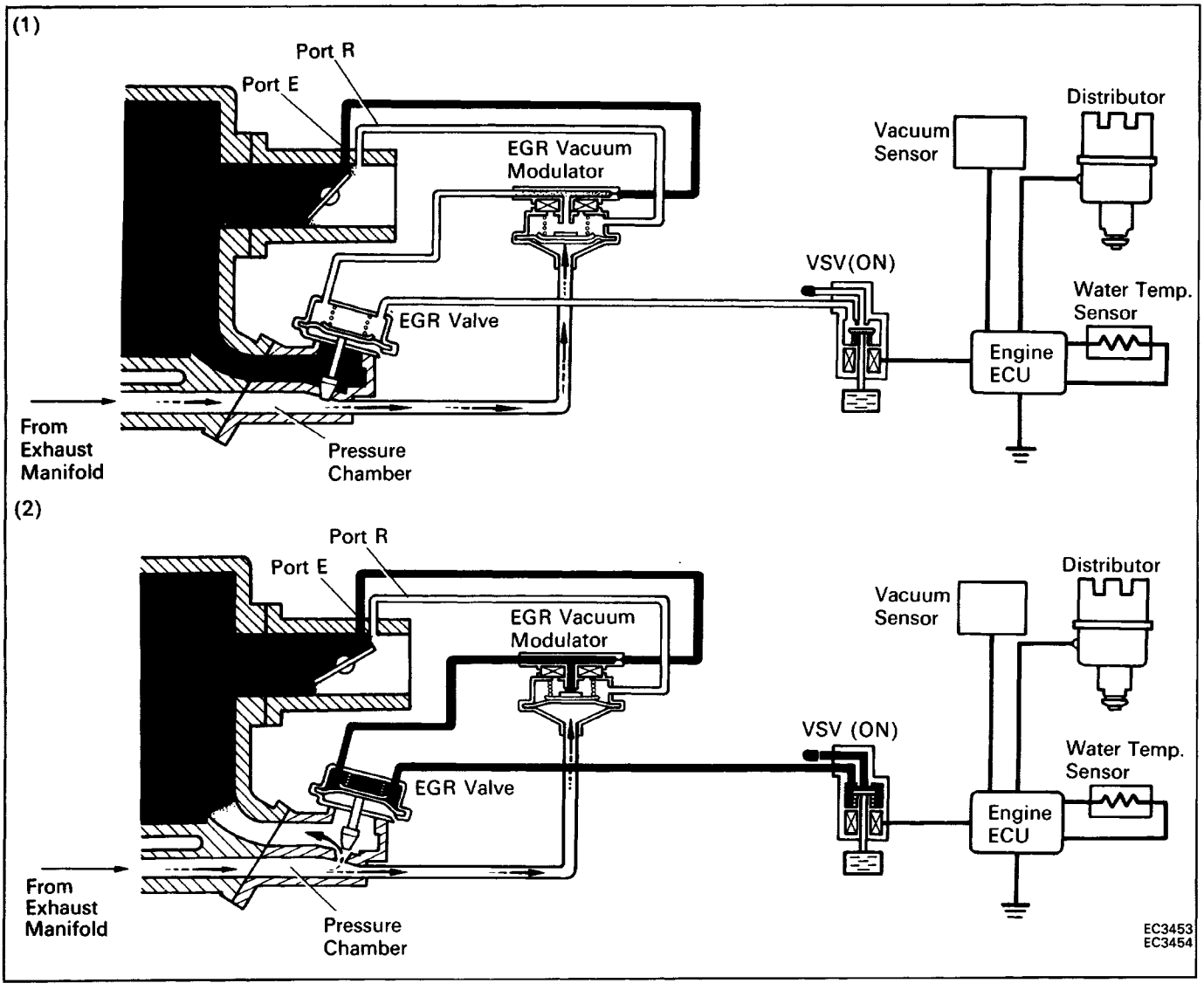
If operation is not as specified, replace the check valve.

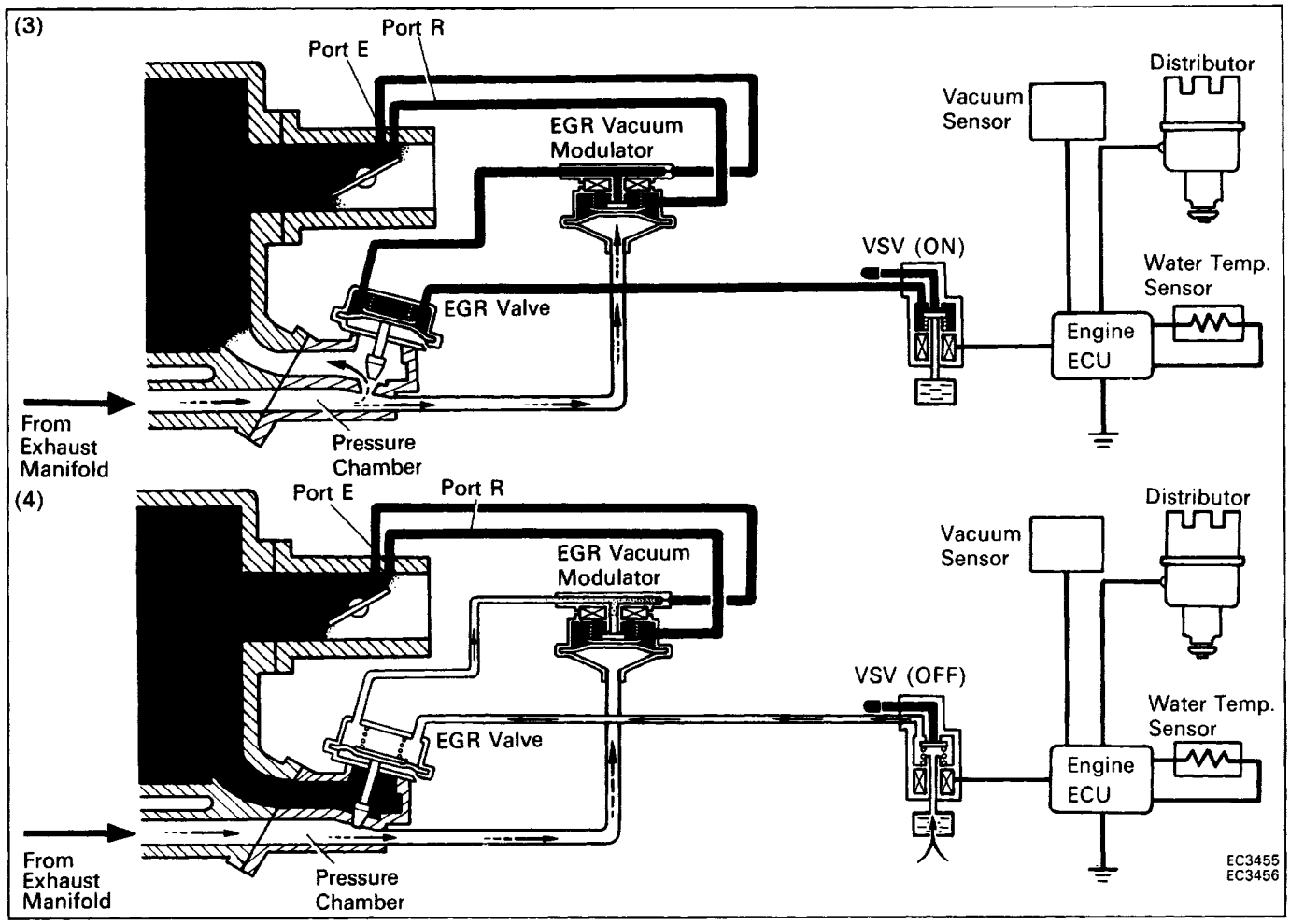
3. REINSTALL CHECK VALVE

HINT: Reinstall the check valve with the black pori facing the charcoal canister side.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM







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

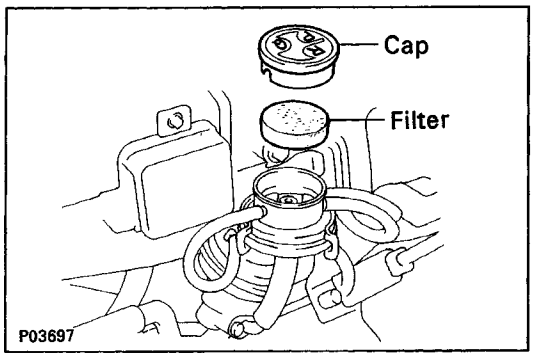
Coolant Temp.	ENGINE rpm	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 47°C (117°F)	–	**** OFF	–	–		–	CLOSED	Not recirculated
Above 53°C (127°F)	Above 1,100 rpm (Federal) & Below 4,000 rpm	OFF	–	–		–	CLOSED	Not recirculated
		*** ON	Positioned below port E	–		–	CLOSED	Not recirculated
			Positioned between port E and and port R	(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 port R	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)
	Below 1,000 rpm (Federal) & Above 4,400 rpm	(4) OFF	–	–		–	CLOSED	Not recirculated

Remarks: * Pressure increase → Modulator closes → EGR valve opens → Pressure drops → EGR valve closes → Modulator opens → Pressure increase

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

*** VSV switched ON when product of engine rpm multiplied by vacuum sensor valve exceeds a specified valve.

**** If terminals TE1 and E1 of check connector are connected, the VSV switches ON.



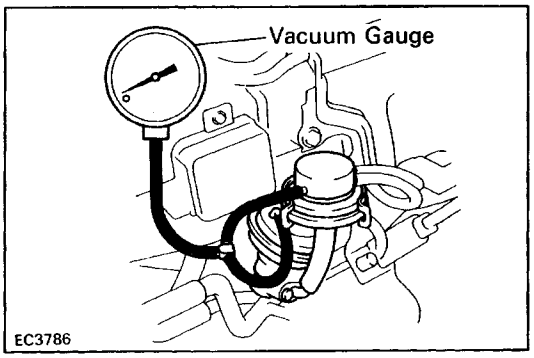
INSPECTION OF EGR SYSTEM

1. INSPECT AND CLEAN FILTERS IN EGR VACUUM MODULATOR

(a) Check the filters for contamination or damage.

(b) Using compressed air, clean the filters.

HINT: Install the filters with the coarser surface facing the atmospheric side (outward).

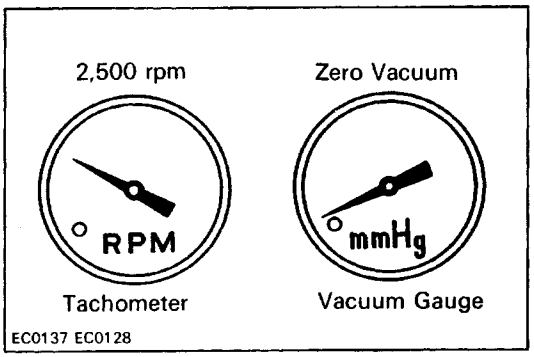


2. INSTALL VACUUM GAUGE

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

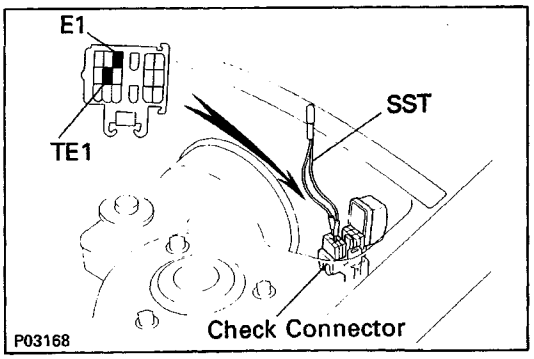
3. INSPECT SEATING OF EGR VALVE

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



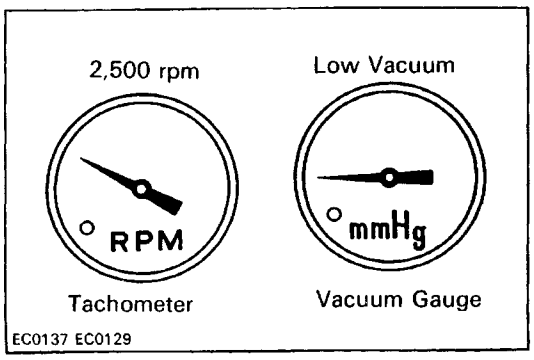
4. INSPECT VSV OPERATION

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



5. CONNECT TERMINALS TE1 AND E1 OF CHECK CONNECTOR

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

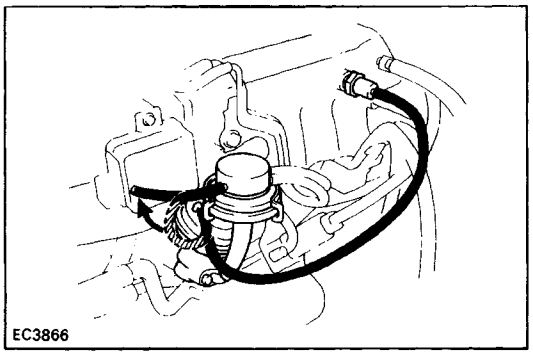


6. INSPECT OPERATION OF VSV AND EGR VACUUM MODULATOR

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

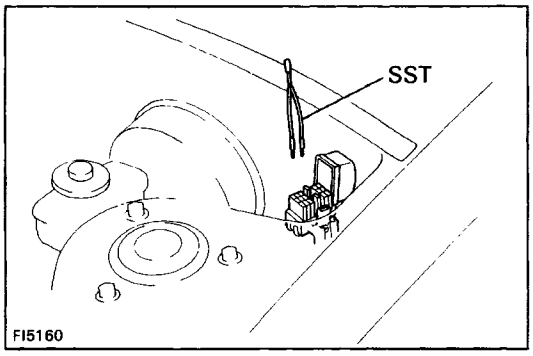
7. REMOVE VACUUM GAUGE

Remove the vacuum gauge, and reconnect the vacuum hoses to the proper locations.



8. INSPECT EGR VALVE OPERATION

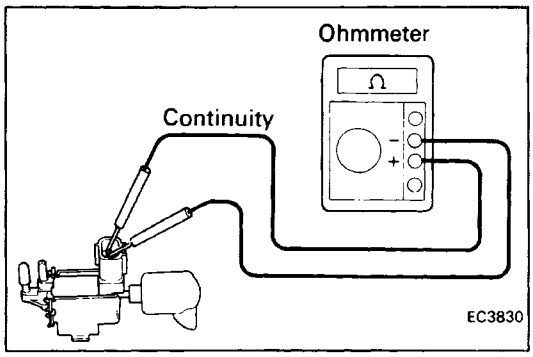
(a) Apply vacuum directly to the EGR valve with the engine idling.
(b) Check that the engine runs rough or dies.
(c) Reconnect the vacuum hoses to the proper locations.



9. REMOVE SST FROM CHECK CONNECTOR

SST 09843–18020

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



INSPECTION OF VSV

1. REMOVE VSV

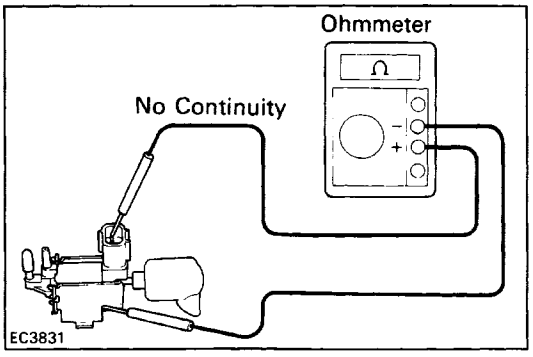
2. INSPECT VSV

A. Inspect VSV for open circuit

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 37 – 44Ω

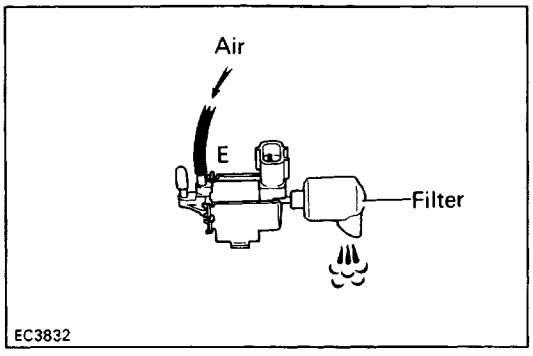
If there is no continuity, replace the VSV.



B. Inspect VSV for ground

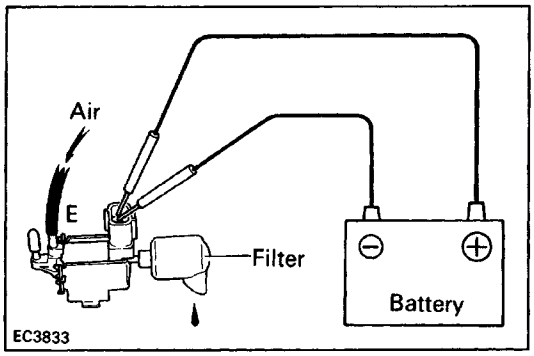
Using an ohmmeter, check that there is no conitnuity between each terminal and the body.

If there is continuity, replace the VSV.



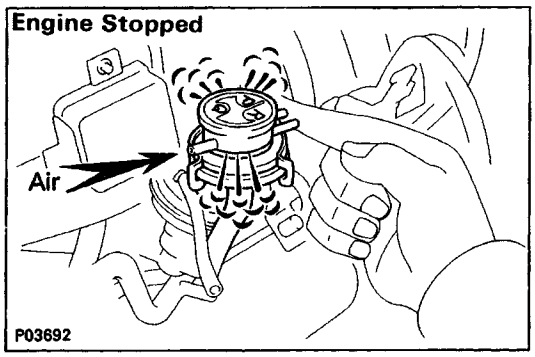
C. Inspect VSV operation

(a) Check that air flows from port E to the filter.



(b) Apply battery voltage across the terminals.
(c) Check that air does not flow from port E to the filter.
If operation is not as specified, replace the VSV.

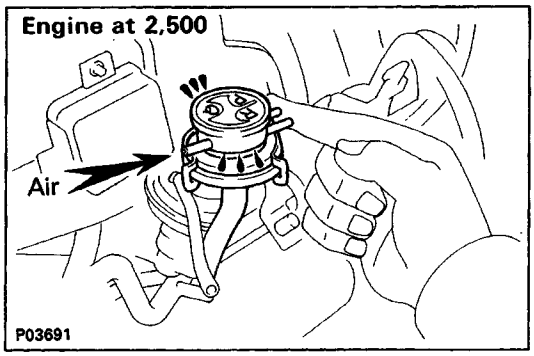
3. REINSTALL VSV



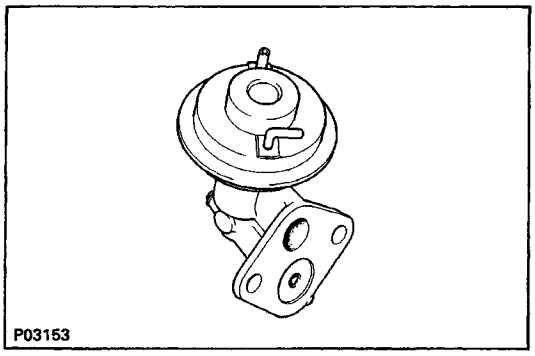
INSPECTION OF EGR VACUUM MODULATOR

INSPECT OPERATION OF EGR VACUUM MODULATOR

(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, and 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 EGR VALVE

1. REMOVE EGR VALVE

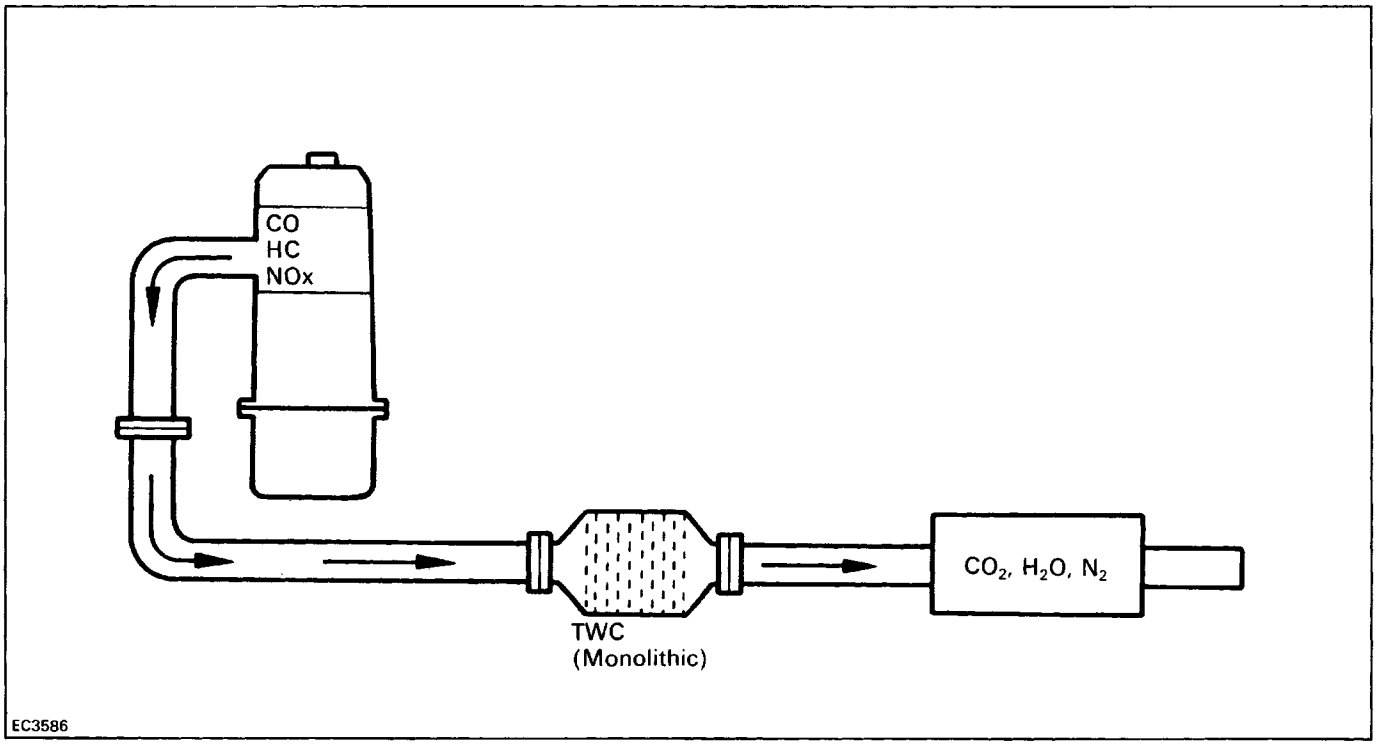
2. INSPECT EGR VALVE

Check for sticking and heavy carbon deposits.
If a problem is found, replace the valve.

3. REINSTALL EGR VALVE

Install a new gasket.

THREE–WAY CATALYST (TWC) SYSTEM



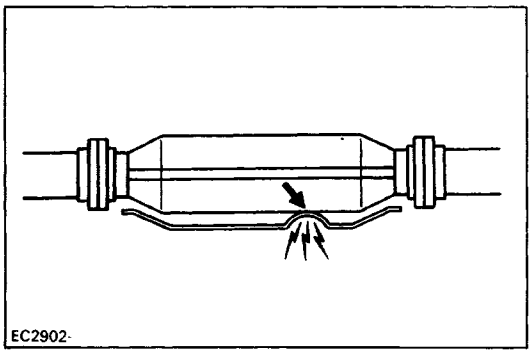
To reduce CO, HC and NOx emissions, they are oxidized, and converted to carbon dioxide (C02), water (1–120) and nitrogen (N2) by the catalyst.

Exhaust Port		TWC		Exhaust Gas
CO HC NOx	→	OXIDATION AND REDUCTION	→	CO_2 H_2O N_2

INSPECTION OF EXHAUST PIPE ASSEMBLY

1. INSPECT CONNECTIONS FOR LOOSENESS OR DAMAGE

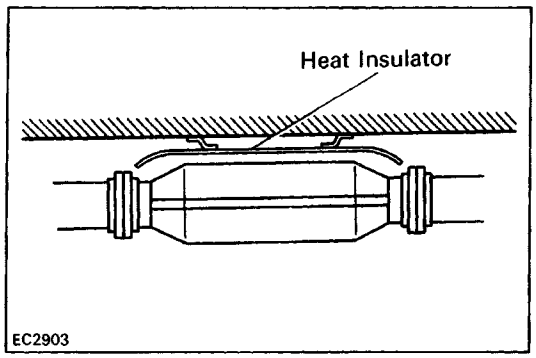
2. INSPECT CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE



INSPECTION OF CATALYTIC CONVERTER

INSPECT FOR DENTS OR DAMAGE

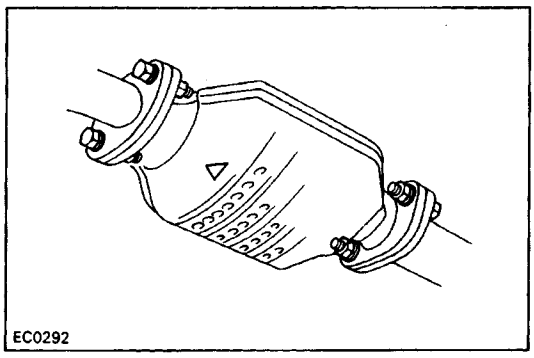
If any part of protector is damaged or dented to the extent that it contacts the converter, repair or replace it.



INSPECTION OF HEAT INSULATOR

1. INSPECT HEAT INSULATOR FOR DAMAGE

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



REPLACEMENT OF CATALYTIC CONVERTER

1. REMOVE CATALYTIC CONVERTER

(a) Check that the converter is cool.

(b) Remove the four bolts and nuts holding the pipes to the converter.

(c) Remove the converter and two gaskets.

2. REINSTALL CATALYTIC CONVERTER

(a) Place two new gaskets on the front and rear pipes.

(b) Install the converter with the bolts and nuts. Torque the bolts and nuts.

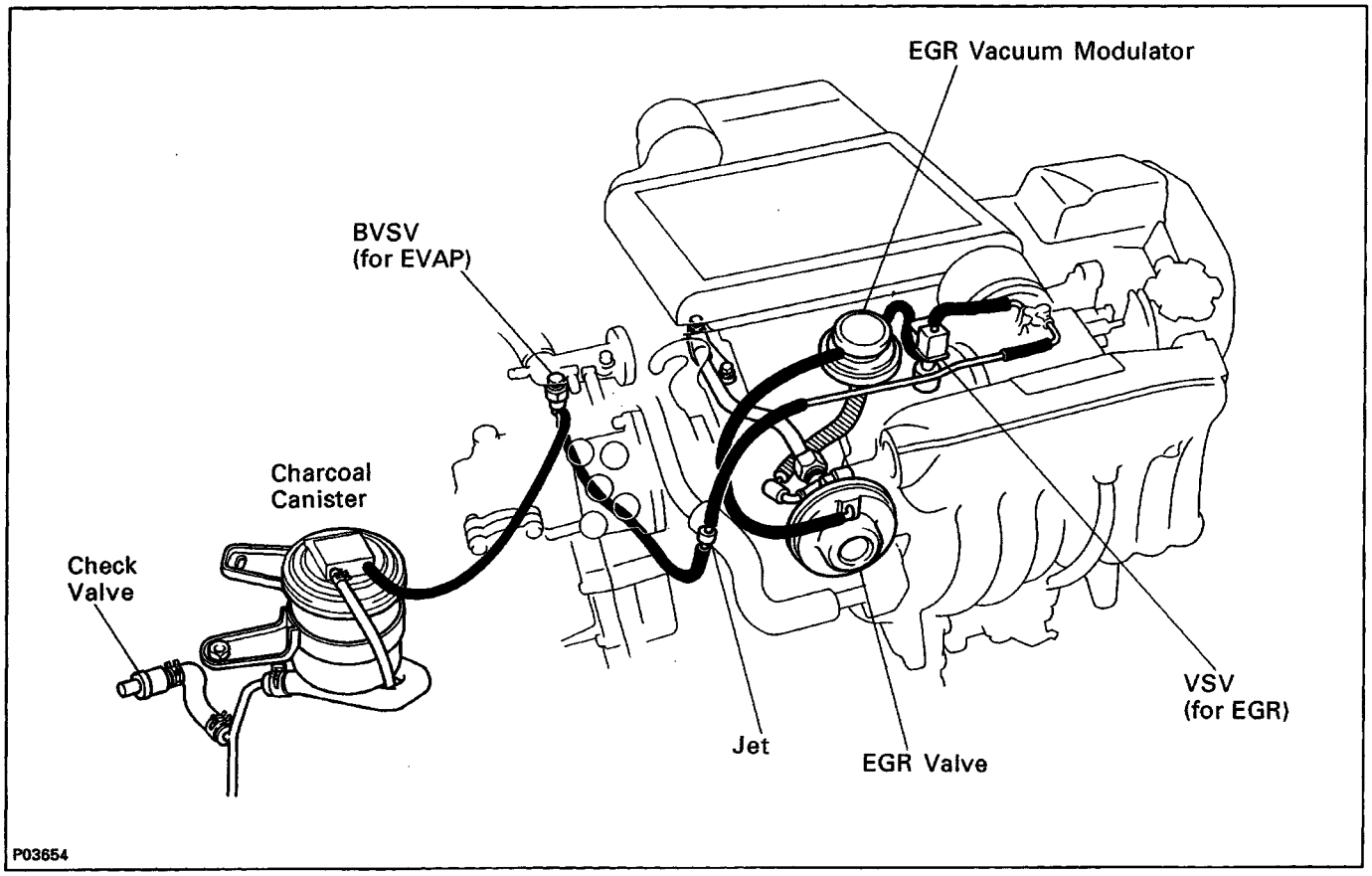
Torque: 43 N–m (440 kgf–cm, 32 ft–lbf)

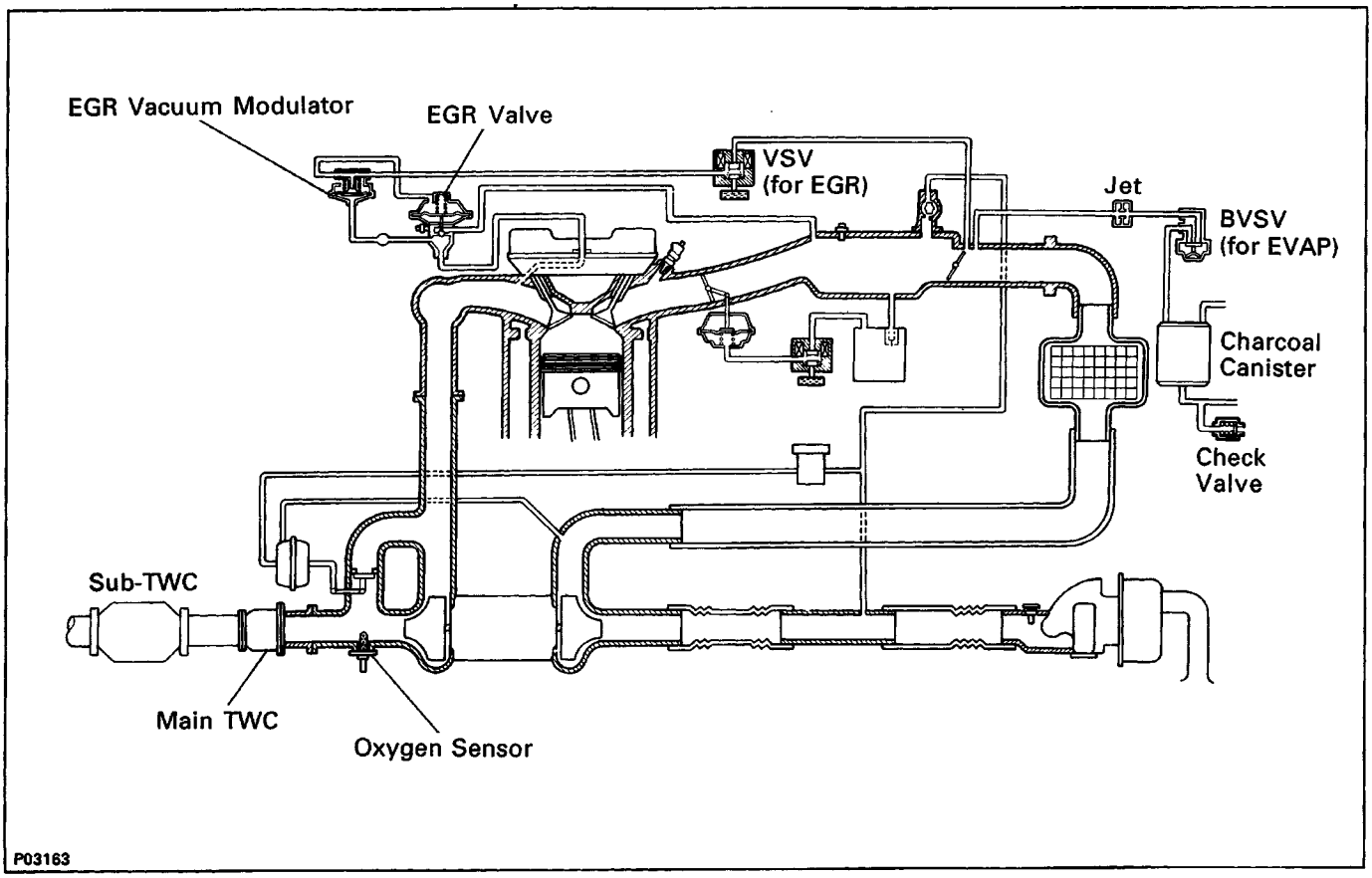
(3S–GTE)
SYSTEM PURPOSE

System	Abbreviation	Purpose
Positive Crankcase ventilation	PCV	Reduces blow–by gas (HC)
Fuel evaporative emission control	EVAP	Reduces evaporative HC
Exhaust gas recirculation	EGR	Reduces NOx
Three–way catalyst	TWC	Reduces CO, HC and NOx
Electronic fuel injection	EFI	Regulates all engine conditions for reduction of exhaust emissions.

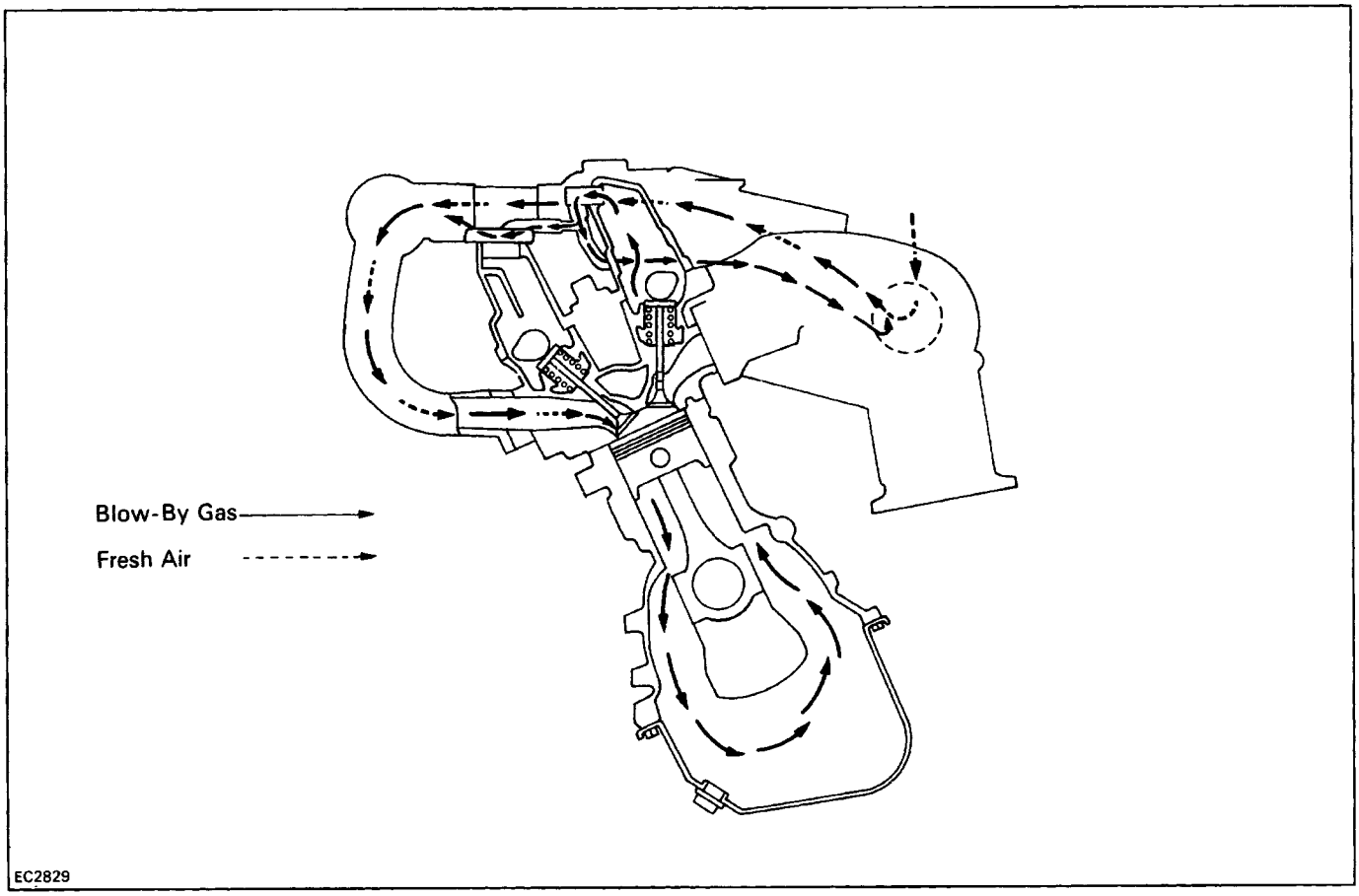
Remark * For inspection and repair of the EFI system, refer to EFI section of this manual.

COMPONENT LAYOUT AND SCHEMATIC DRAWING

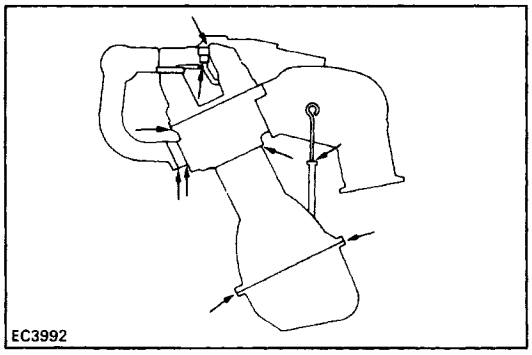




POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



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

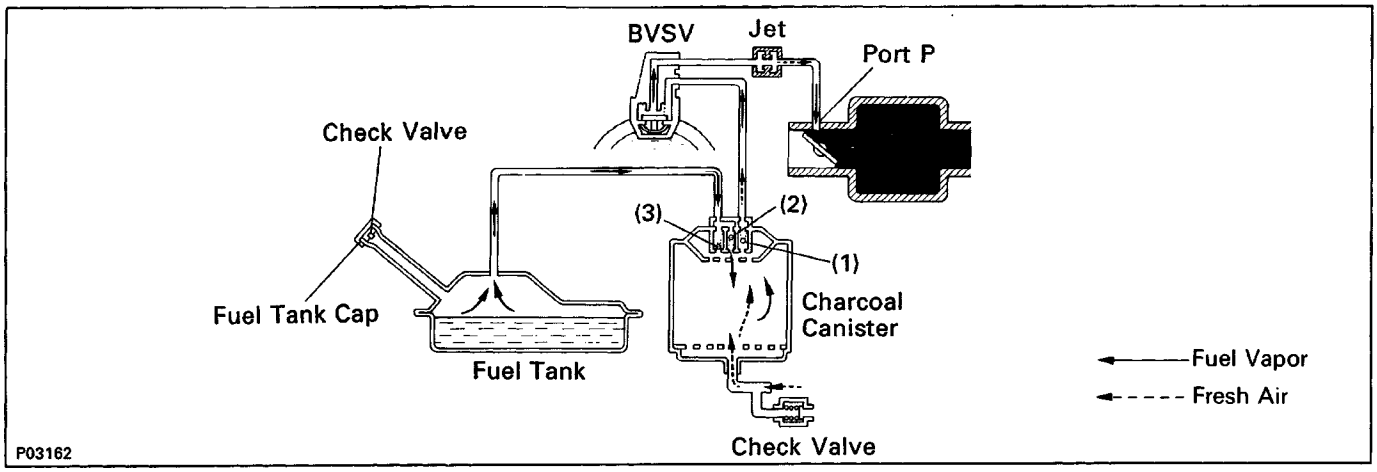


INSPECTION OF PCV HOSE AND CONNECTIONS

VISUALLY INSPECT HOSE AND CONNECTIONS

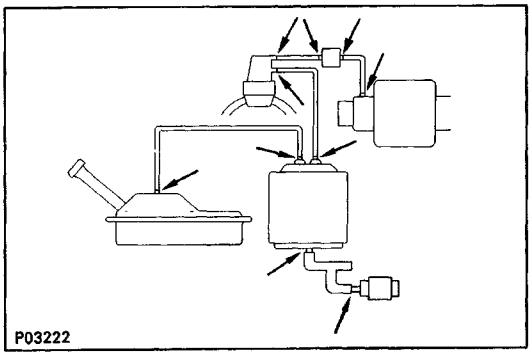
Check for cracks, leaks or damage.

FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM



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

Coolant Temp.	BVSV	Throttle Valve Opening	Canister Check Valve			Check valve in Cap	Evaporated Fuel (HC)
			(1)	(2)	(3)		
Below 35˚C (95˚F)	CLOSED	–	–	–	–	–	HC from tank is absorbed into the canister.
Above 54˚C (129˚F)	OPEN	Positioned below port P	CLOSED	–	–	–	
		Positioned above port P	OPEN	–		–	HC from canister is led into air intake chamber.
High pressure in tank		–	–	OPEN	CLOSED	CLOSED	H C 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

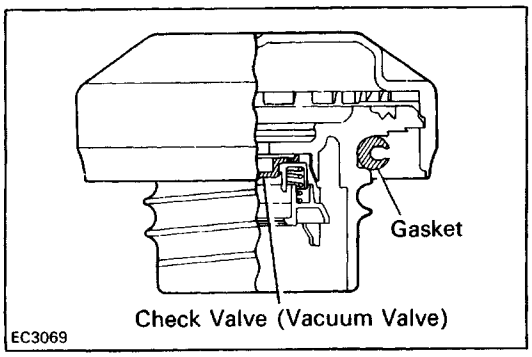
TANK AND TANK CAP

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for loose connections, sharp bends or damage.

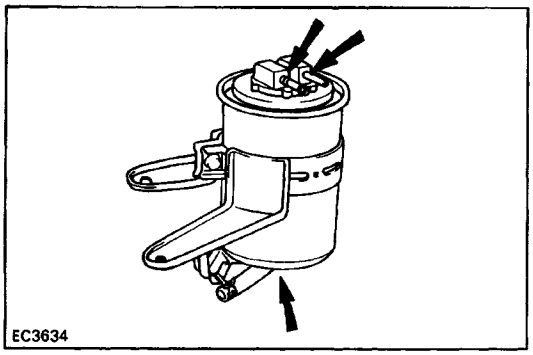
2. VISUALLY INSPECT FUEL TANK

Look for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

Check if the cap and/or gasket are deformed or damaged.
If necessary, repair or replace the cap.



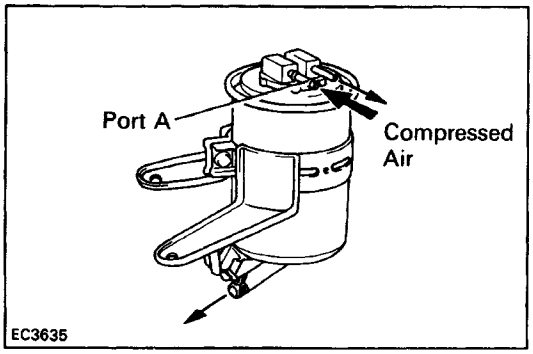
INSPECTION OF CHARCOAL CANISTER

1. REMOVE CHARCOAL CANISTER

2. REMOVE CAP FROM CHARCOAL CANISTER

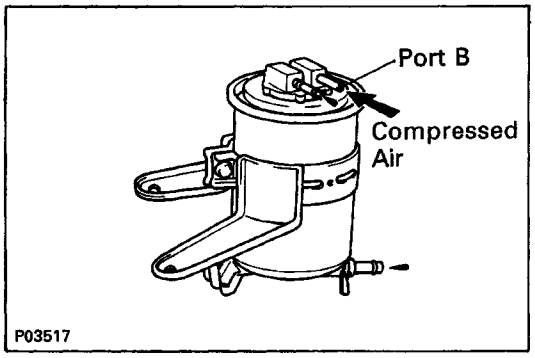
3. VISUALLY INSPECT CHARCOAL CANISTER

Look for cracks or damage.



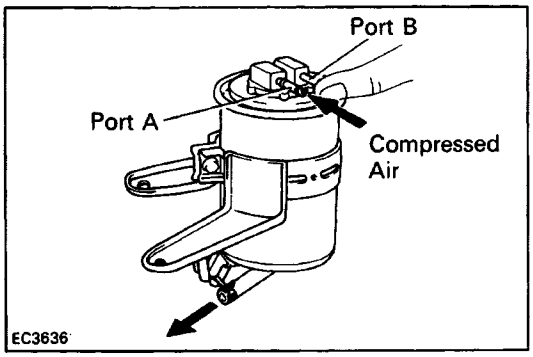
4. INSPECT FOR CLOGGED FILTER AND STUCK CHECK VALVE

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



(b) Blow into port B and check that air does not flow from the other ports.

If a problem is found, replace the charcoal canister.



5. CLEAN FILTER IN CANISTER

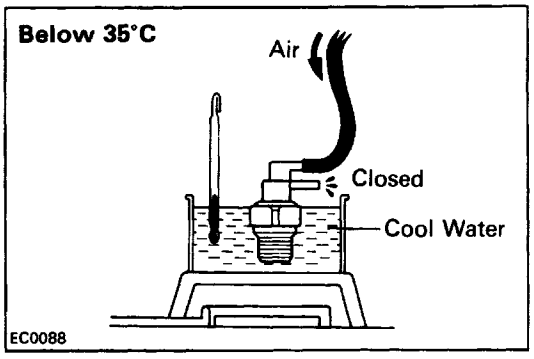
Clean the filter by blowing 294 kPa (3 kgf/cm^{2,} 43 psi) o1 compressed air into port A while holding port6 closed. closed.

NOTICE:

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

6. REINSTALL CAP TO CHARCOAL CANISTER

7. REINSTALL CHARCOAL CANISTER



INSPECTION OF BVSV

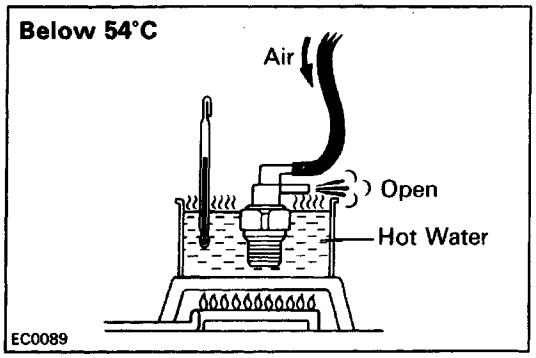
INSPECT BVSV BY BLOWING AIR INTO PIPE

(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 35˚C (95˚F) with cool water.

(d) Blow air into the port and check that the BVSV is closed.



(e) Heat the BVSV to above 54°C (129°F) with hot water.

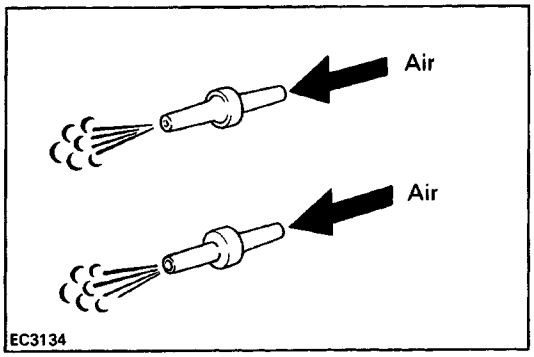
(f) Blow air into the port and check that the BVSV is open.

If a problem is found, replace the BVSV.

(g) Apply adhesive to two or three threads of the BVSV, and reinstall.

Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent

(h) Refill the radiator with coolant.



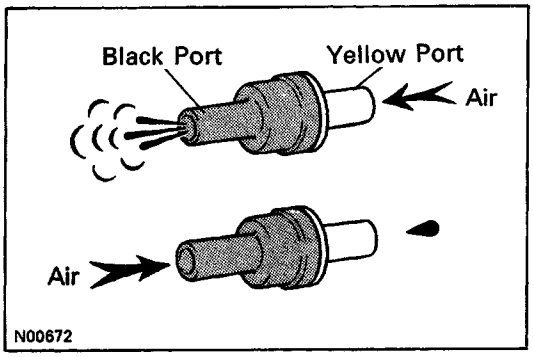
INSPECTION OF JET

1. REMOVE JET

2. INSPECT JET BY BLOWING AIR FROM EACH SIDE

Check for stoppage.

3. REINSTALL JET



INSPECT OF CHECK VALVE

1. REMOVE CHECK VALVE

2. INSPECT CHECK VALVE

(a) Check that air flows from the yellow port to the black port.

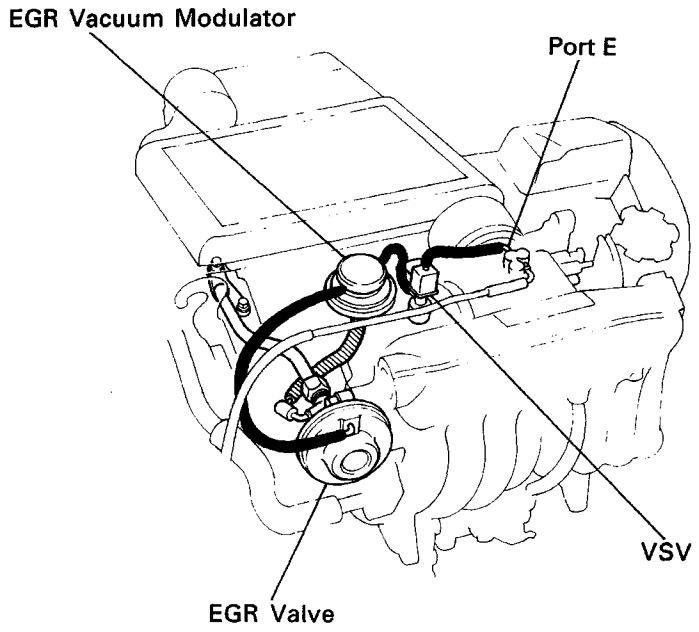
(b) Check that air– does not flow from the black port to the yellow port.

If operation is not as specified, replace the check valve.

3. REINSTALL CHECK VALVE

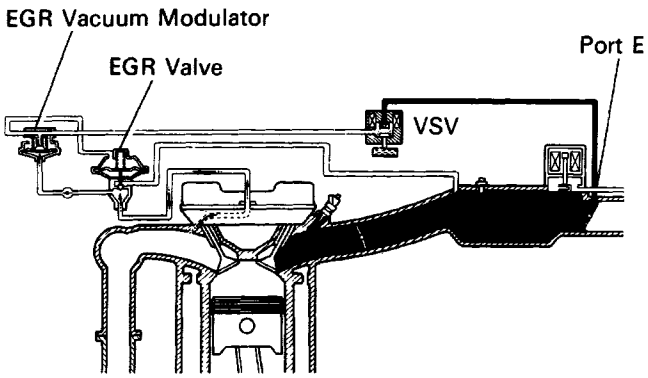
HINT: Reinstall the check valve with the black port facing the charcoal canister side.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM



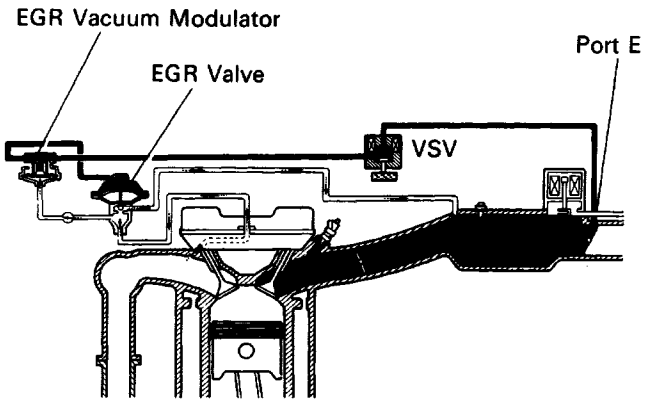
P03591

(1)



EC2834

(2)

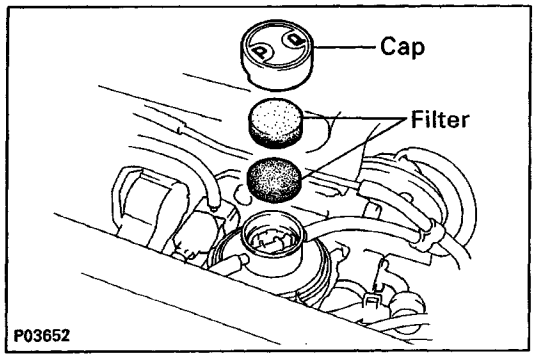


EC2833

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

Coolant Temp.	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EG R Vacuum Modulator	EG R Valve	Exhaust Gas
Below 54˚C (129˚F)	CLOSED	–	–		–	CLOSED	Not recirculated
Above 60˚C (140˚F)	OPEN	Positioned above port E	(1)	–	–	CLOSED	Not recirculated
		Positioned below port E	(2)	*	CLOSED passage to atmosphere	OPEN	Recirculated (increase)

Remark: * When the throttle valve is positioned above port E, 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

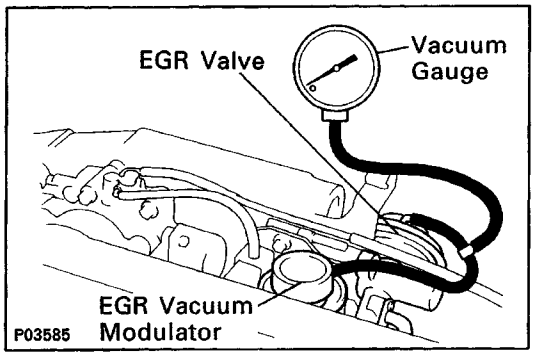
1. INSPECT AND CLEAN FILTERS IN EGR VACUUM MODULATOR

(a) Remove the cap and two filters.
(b) Check the filters for contamination or damage.
(e) Using compressed air, clean the filters.
(d) Reinstall the two filters and cap.

HINT: Install the filters with the coarser surface facing the atmospheric side (outward).

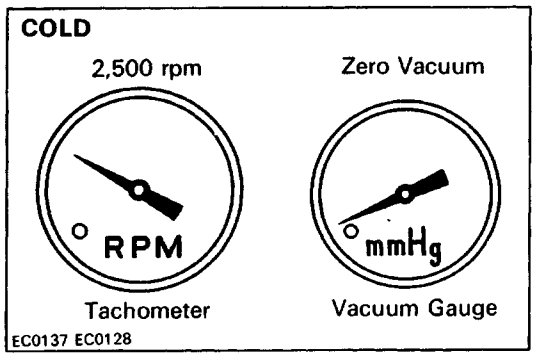
2. INSTALL VACUUM GAUGE

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



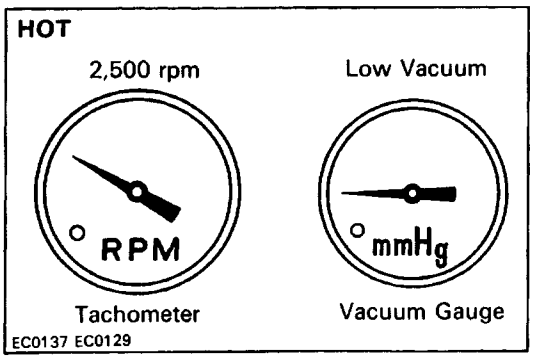
3. INSPECT SEATING OF EGR VALVE

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



4. INSPECT VSV OPERATION WITH COLD ENGINE

(a) The coolant temperature should be below 54°C (129°F).
(b) Check that the vacuum gauge indicates zero vacuum at 2,500 rpm.

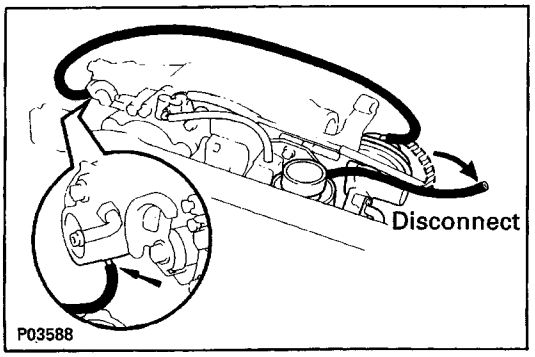


5. INSPECT VSV OPERATION WITH HOT ENGINE

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

6. REMOVE VACUUM GAUGE

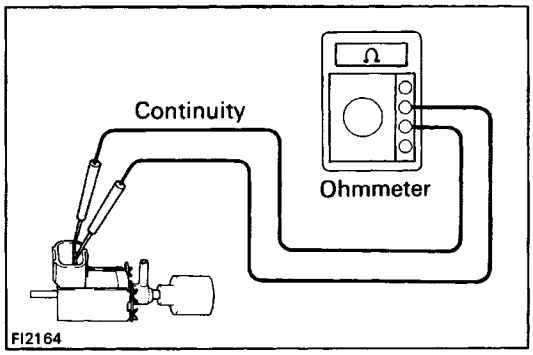
Remove the vacuum gauge, and reconnect the vacuum hoses to proper locations.



7. INSPECT EGR VALVE OPERATION

(a) Apply vacuum directly to the EGR valve with the engine idling.
(b) Check that the engine runs rough or dies.
(c) Reconnect the vacuum hoses to the proper locations.

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



INSPECTION OF VSV

1. REMOVE VSV

2. INSPECT VSV

A. Inspect VSV for open circuit

Using an ohmmeter, check that there is continuity between the terminals.

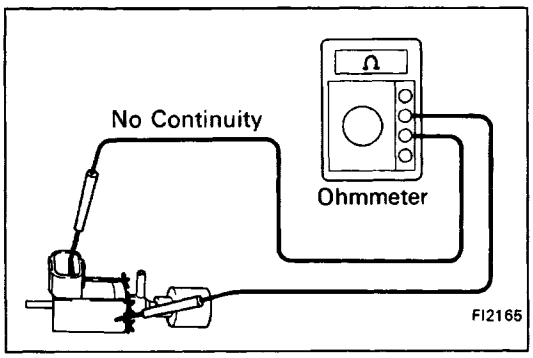
Resistance (Cold): 33 – 39Ω

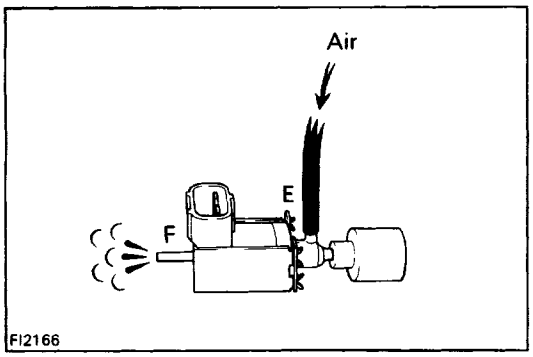
If there is no continuity, replace the VSV.

B. Inspect VSV for ground

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

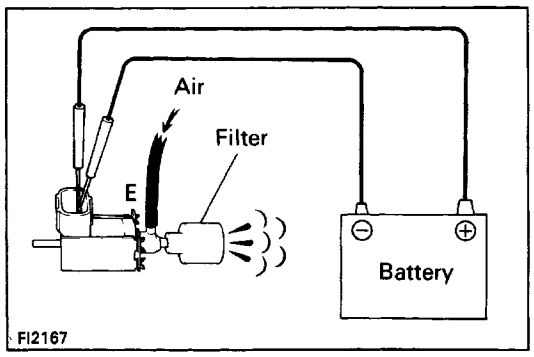
If there is continuity, replace the VSV.





C. Inspect VSV operation

(a) Check that air flows from ports E to F.

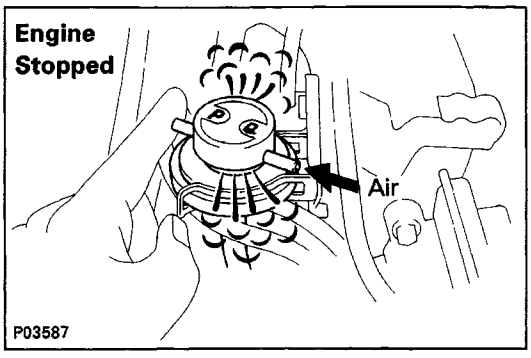


(b) Apply battery voltage across the terminals.

(c) Check that air flows from port E to the filter.

If operation is not as specified, replace the VSV.

3. REINSTALL VSV



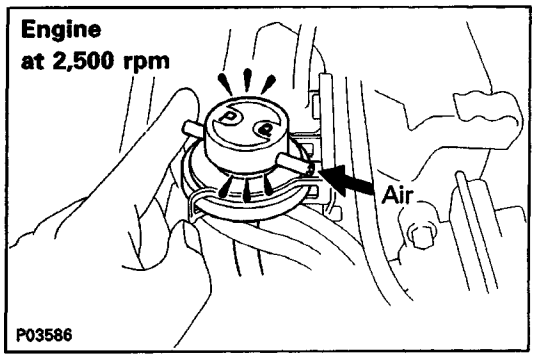
INSPECTION OF EGR VACUUM MODULATOR

INSPECT OPERATION OF EGR VACUUM MODULATOR

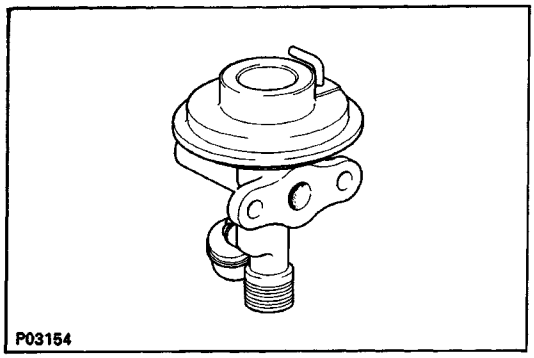
(a) Disconnect the vacuum hoses from ports P and Q of the EGR vacuum modulator.

(b) Block port one side with your finger.

(c) Blow air into another port, and 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 EGR VALVE

1. REMOVE EGR VALVE

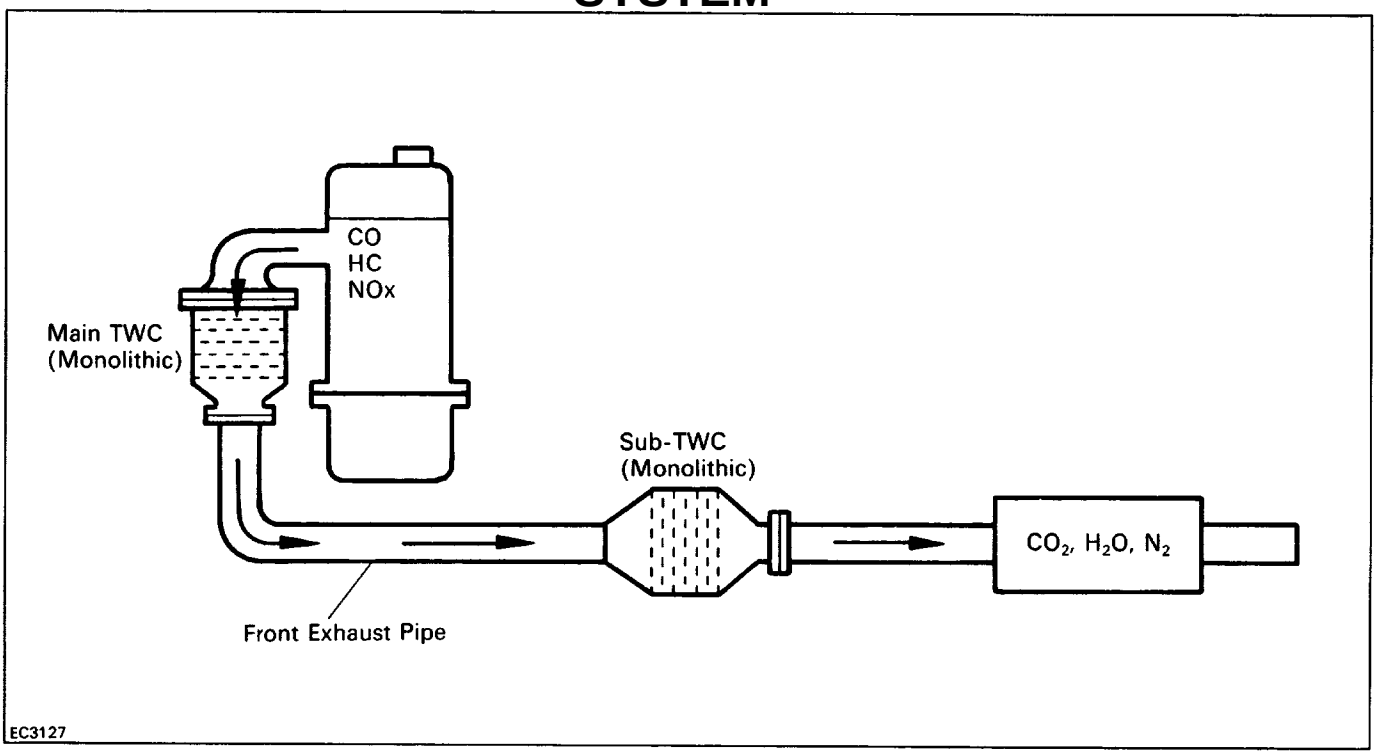
2. INSPECT EGR VALVE

Check for sticking and heavy carbon deposits.
If a problem is found, replace the valve.

3. REINSTALL EGR VALVE

Install a new gasket.

THREE–WAY CATALYST (TWC) SYSTEM



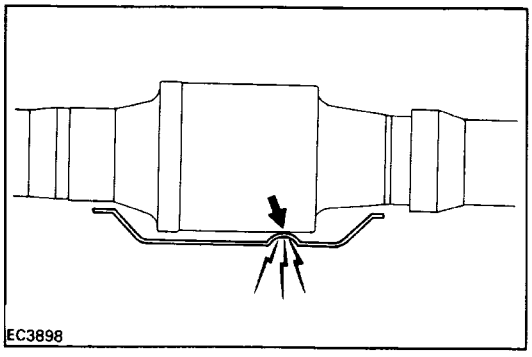
To reduce C0, HC and NOx emissions, they are oxidized, reduced and converted to carbon dioxide (C02), water (1–120) and nitrogen (N2) by the catalyst.

Exhaust Port		Main TWC		S u b–TWC		Exhaust Gas
CO HC NOx	→	OXIDATION AND REDUCTION	→	OXIDATION AND REDUCTION	→	CO_2 H_2O N_2

INSPECTION OF EXHAUST PIPE ASSEMBLY

1. INSPECT CONNECTIONS FOR LOOSENESS OR DAMAGE

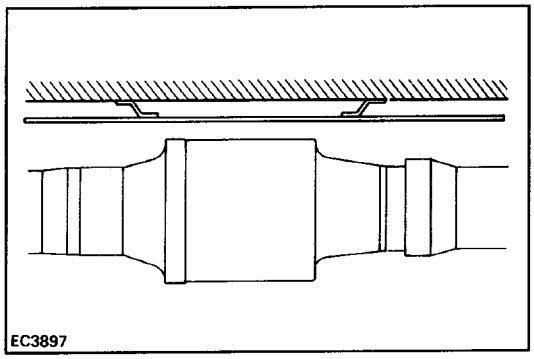
2. INSPECT CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE



INSPECTION OF CATALYTIC CONVERTER (Sub–Catalytic Converter)

INSPECT FOR DENTS OR DAMAGE

If any part of protector is damaged or dented to the extent that it contacts the converter, repair or replace it.



INSPECTION OF HEAT INSULATOR (Sub–Catalytic Converter)

1. INSPECT HEAT INSULATOR FOR DAMAGE

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

REPLACEMENT OF CATALYTIC CONVERTER (Main Catalytic Converter)

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. REMOVE ENGINE UNDER COVERS

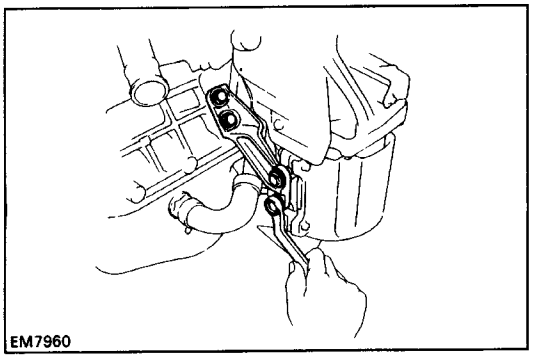
3. REMOVE FRONT EXHAUST PIPE

(See step 2 on page EC–30)

4. REMOVE ALTERNATOR (See page CH–7)

5. REMOVE IDLER PULLEY BRACKET AND A/C COMPRESSOR WITHOUT DISCONNECTING HOSES

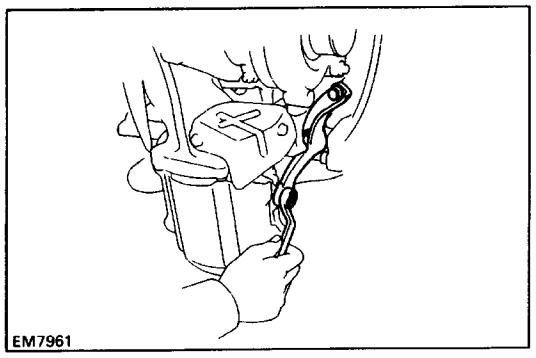
(See step 40 on page EM–229)



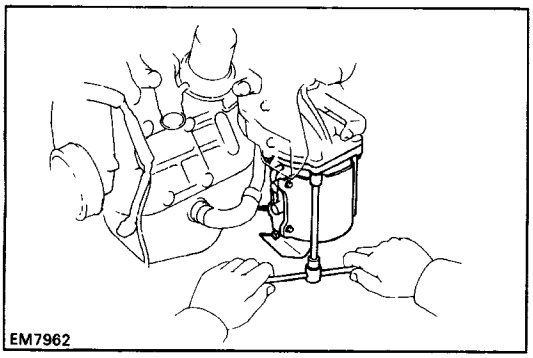
6. REMOVE MAIN CATALYTIC CONVERTER

(a) Check that the converter is cool.

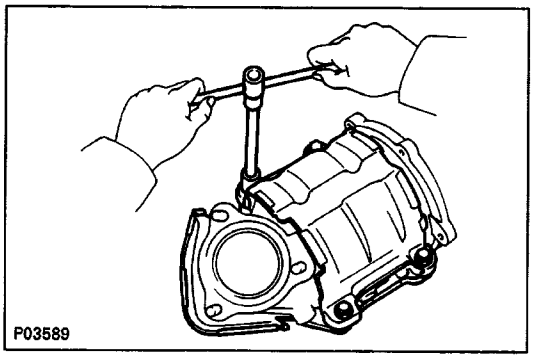
(b) Remove the four bolts and RH converter stay.



(c) Remove the three bolts and LH converter stay.

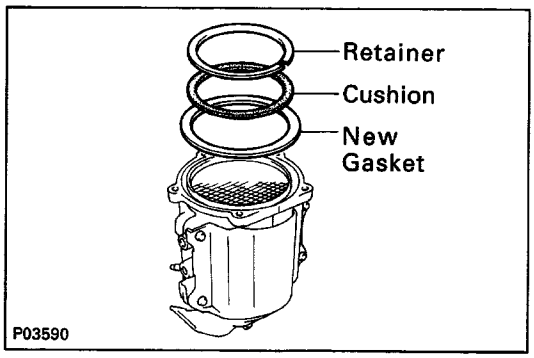


(d) Remove the three bolts, two nuts, converter, gasket, retainer and cushion.
(e) Remove the nine bolts and two heat insulators from the converter.

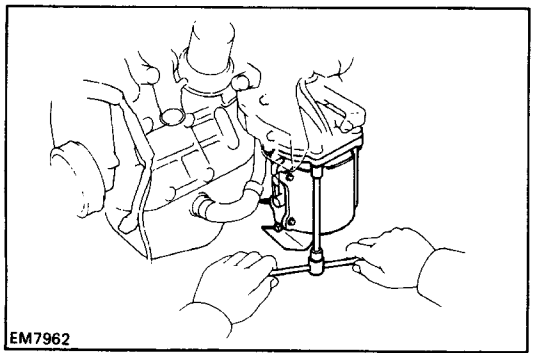


7. REINSTALL MAIN CATALYTIC CONVERTER

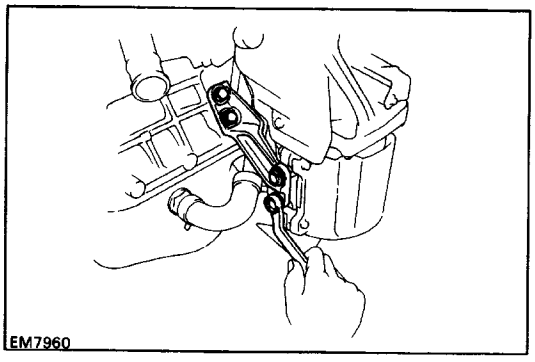
(a) Install the two heat insulators to a new converter with the nine bolts.



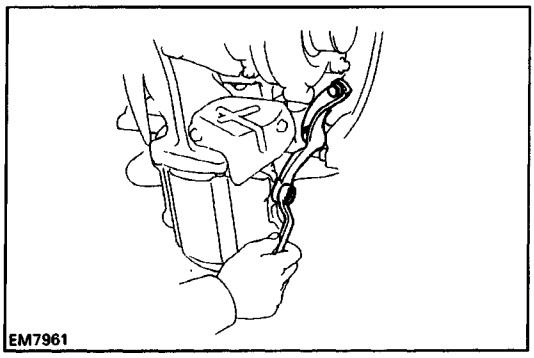
(b) Place the cushion, retainer and a new gasket on the converter.



(c) Install the converter with the three bolts and two new nuts.
Torque: 29 N–m (300 kgf–cm, 21 ft–lbf)

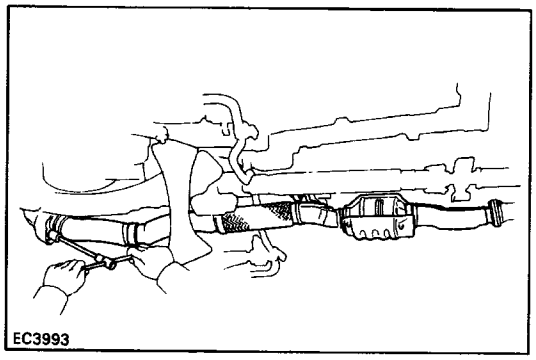


(d) Install the RH converter stay with the four bolts.
Torque: 59 N–m (600 kgf–cm, 43 ft–lbf)



(e) Install the LH converter stay with the three bolts.
Torque: 59 N–m (600 kgf–cm, 43 ft–lbf)

8. REINSTALL IDLER PULLEY BRACKET AND A/C COMPRESSOR WITHOUT DISCONNECTING HOSES
(See step 12 on page EM–261)
9. REINSTALL ALTERNATOR (See page CH–23)
10. REINSTALL FRONT EXHAUST PIPE
(See step 3 on page EC–30)
11. REINSTALL ENGINE UNDER COVERS
12. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY



(Sub–Catalytic Converter)

1. REMOVE RH ENGINE UNDER COVER

2. REMOVE FRONT EXHAUST PIPE (SUB–CATALYTIC CONVERTER)

(a) Loosen the bolt, and disconnect the clamp from the bracket.

(b) Remove the two bolts and nuts holding the front exhaust pipe to the center exhaust pipe.

(c) Using a 14 mm deep socket wrench, remove the three nuts holding the front exhaust pipe to the main catalytic converter.

(d) Disconnect the support hook on the front exhaust pipe from the support bracket, and remove the front exhaust pipe and two gaskets.

3. REINSTALL FRONT EXHAUST PIPE (SUB–CATALYTIC CONVERTER)

(a) Install the support hook on the front exhaust pipe to the support bracket

(b) Place the two new gaskets on the front and rear of the front exhaust pipe.

(c) Temporarily install the two bolts and two new nuts holding the front exhaust pipe to the center exhaust pipe.

(d) Using a 14 mm deep socket wrench, install the three nuts holding the front exhaust pipe to the main catalytic converter.

Torque: 62 N–m (630 kgf–cm, 46 ft–lbf)

(e) Tighten the two bolts and nuts holding the front exhaust pipe to the center exhaust pipe.

Torque: 43 N–m (440 kgf–cm, 32 ft–lbf)

(f) Install the clamp with the bolt.

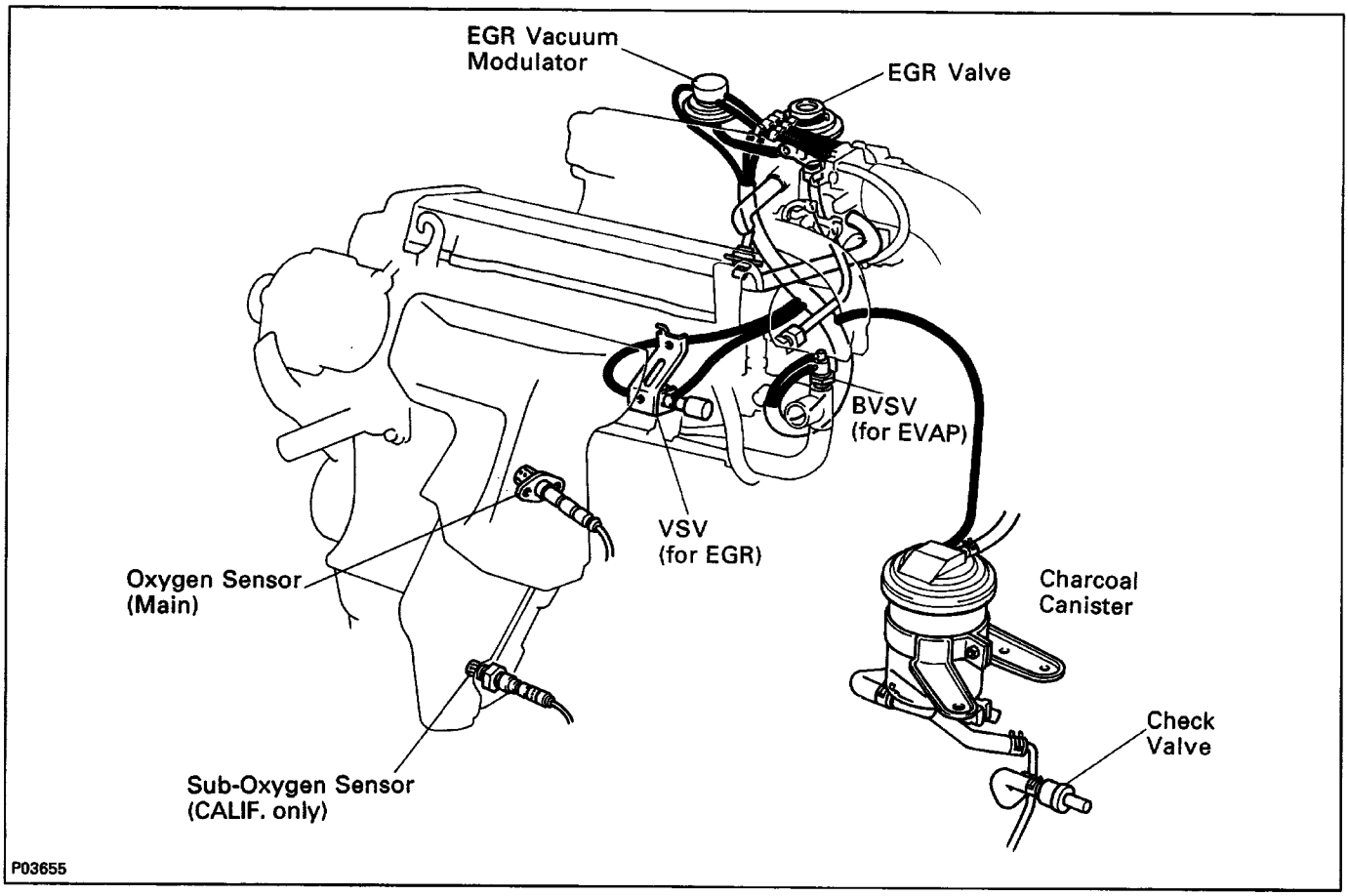
4. REINSTALL RH ENGINE UNDER COVER

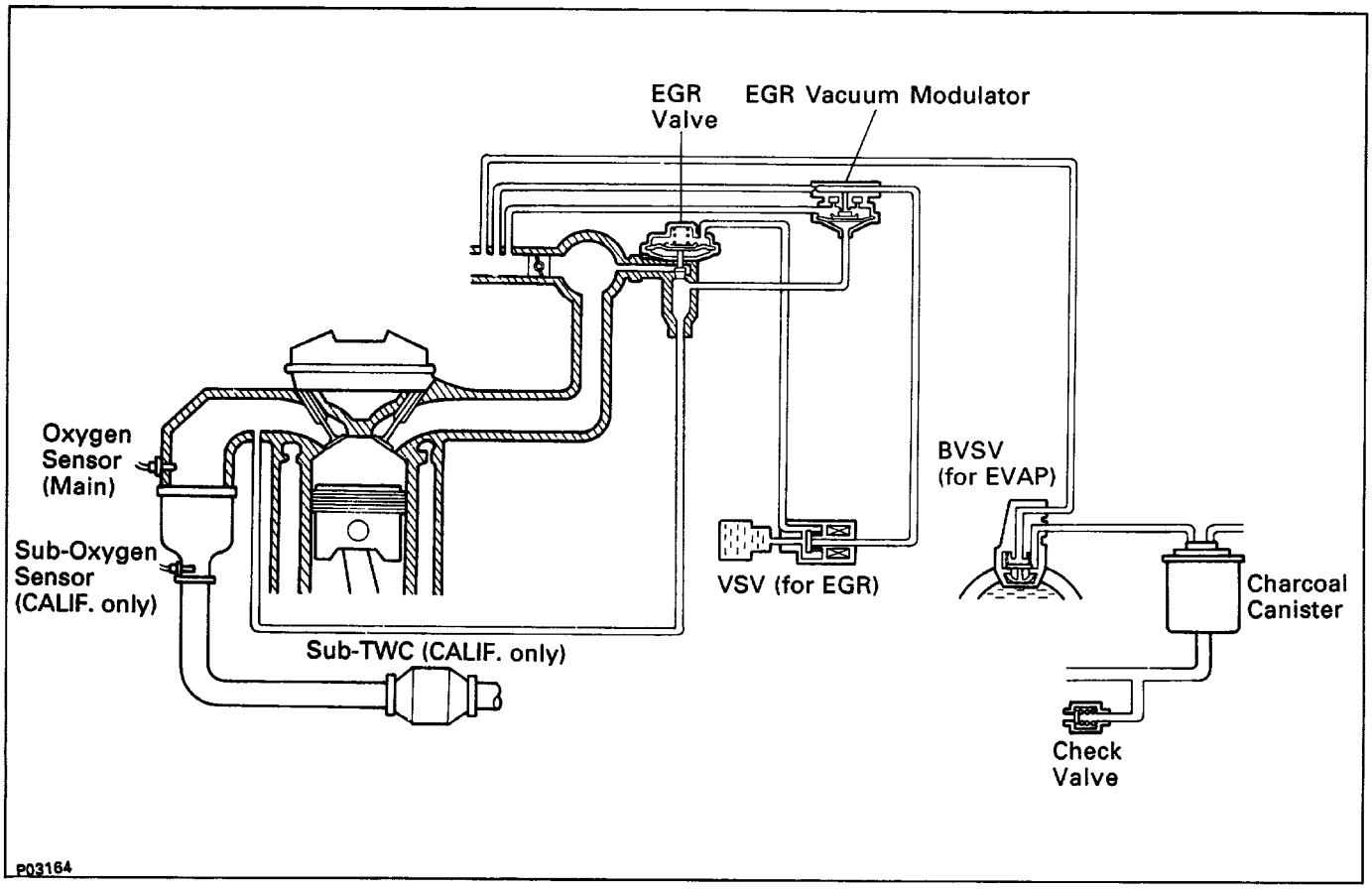
(5S–FE)
SYSTEM PURPOSE

System	Abbreviation	Purpose
Positive Crankcase ventilation	PCV	Reduces blow–by gas (HC)
Fuel evaporative emission control	EVAP	Reduces evaporative HC
Exhaust gas recirculation	EGR	Reduces NOx
Three–way catalyst	TWC	Reduces CO, HC and NOx
Electronic fuel injection*	EFI	Regulates all engine conditions for reduction of exhaust emissions.

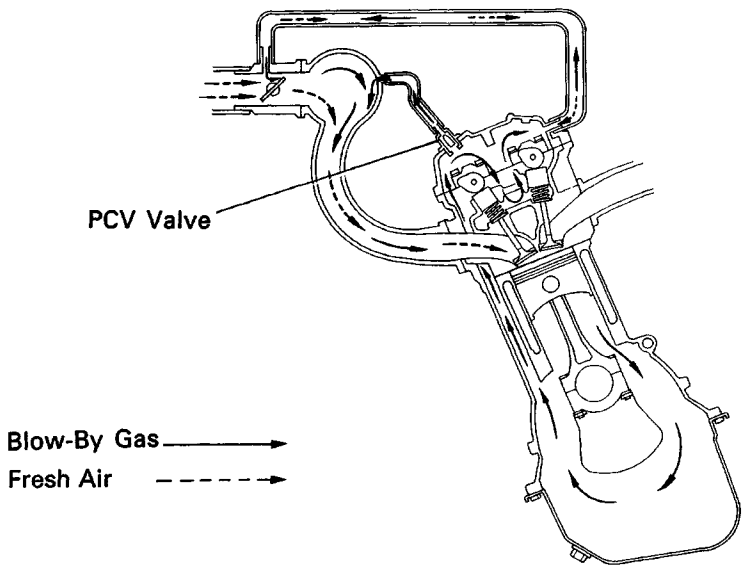
Remark * For inspection and repair of the EFI system, refer to EFI section of this manual.

COMPONENT LAYOUT AND SCHEMATIC DRAWING





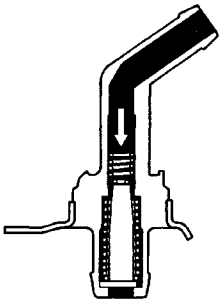
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



P01100

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

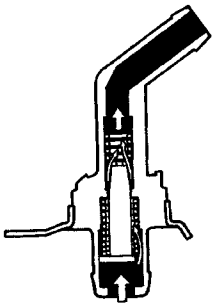
Engine not Running or if Backfiring



○ PCV VALVE IS CLOSED.

N00936

Normal Operation

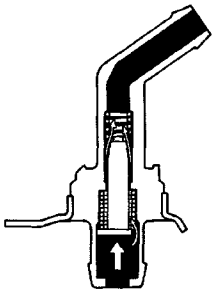


○ PCV VALVE IS OPEN.

○ VACUUM PASSAGE IS LARGE.

N00940

Idling or Decelerating

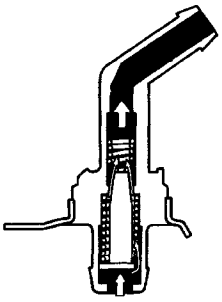


○ PCV VALVE IS OPEN.

○ VACUUM PASSAGE IS SMALL.

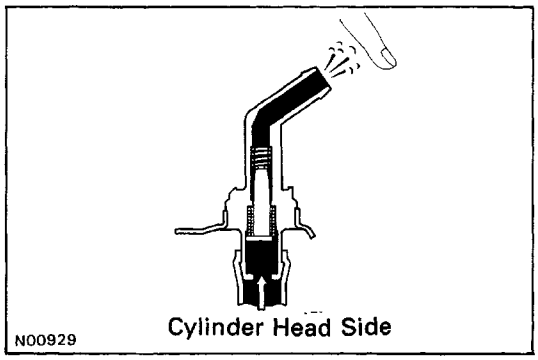
N00937

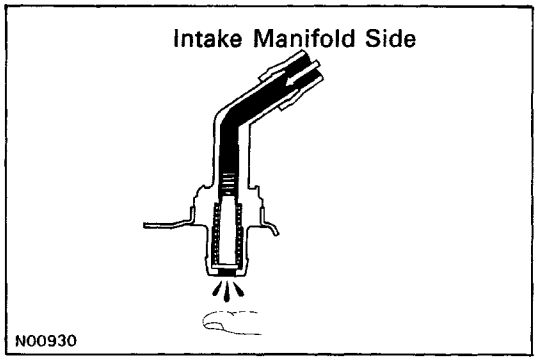
Acceleration or High Load



○ PCV VALVE IS FULLY OPEN.

N00939





INSPECTION OF PCV VALVE

REMOVE PCV VALVE

2. INSTALL CLEAN HOSE TO PCV VALVE

3. INSPECT PCV VALVE OPERATION

(a) Blow air into the cylinder head side, and check that air passes through easily.

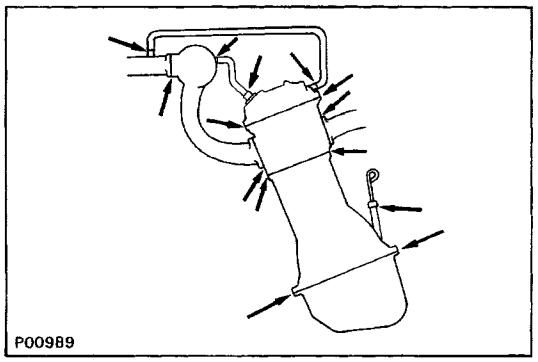
CAUTION: Do not such air through the valve. Petroleum substances inside the valve are harmful.

(b) Blow air into the intake manifold side, and check that air passes through with difficulty.

If operation is not as specified, replace the PCV valve.

4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE

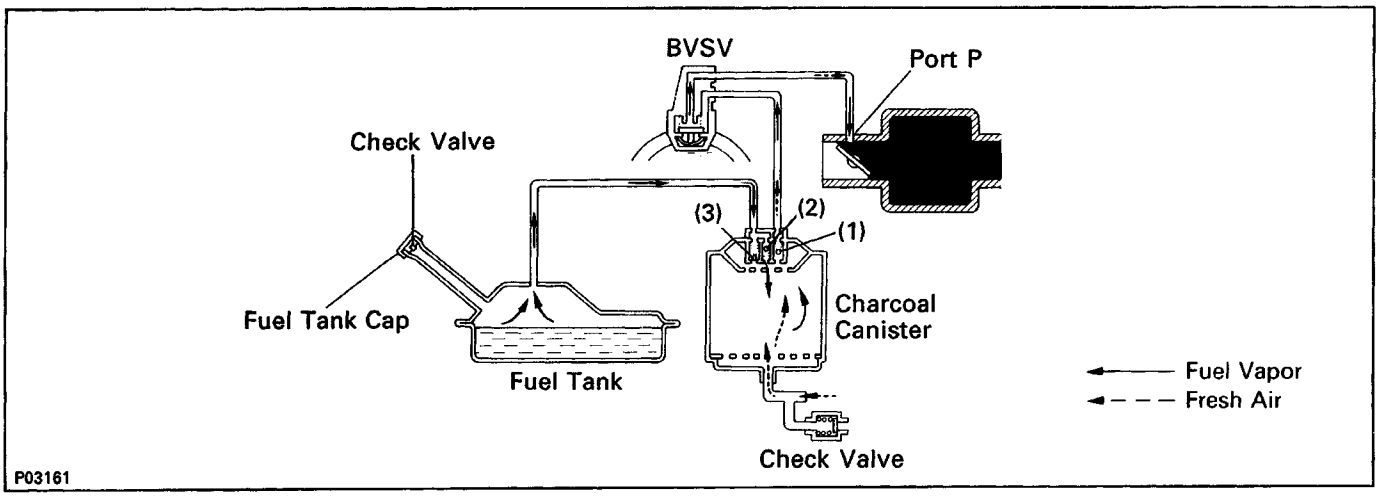


INSPECTION OF PCV HOSE AND CONNECTIONS

VISUALLY INSPECT HOSE AND CONNECTIONS

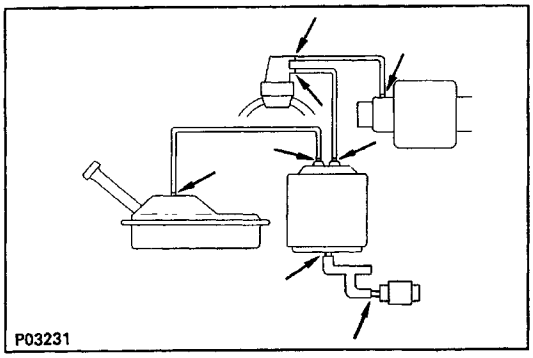
Check for cracks, leaks or damage.

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	Throttle Valve Opening	Canister Check Valve			Check Valve in Cap	Evaporated Fuel (HC)
			(1)	(2)	(3)		
Below 35˚C (95˚F)	CLOSED	–	–	–	–	–	HC from tank is absorbed into the canister.
Above 54˚C (129˚F)	OPEN	Positioned below port P	CLOSED	–	–	–	
		Positioned above port P	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.



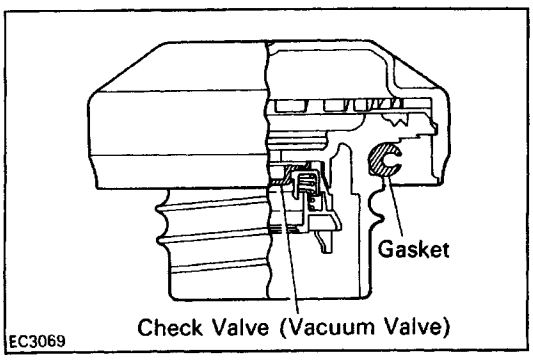
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND TANK CAP

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for loose connections, sharp bends or damage.

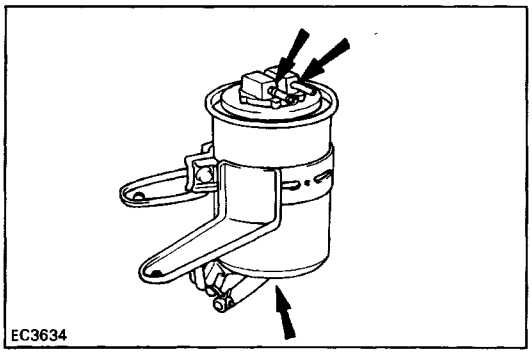
2. VISUALLY INSPECT FUEL TANK

Look for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

Check if the cap and/or gasket are deformed or damaged.
If necessary, repair or replace the cap.



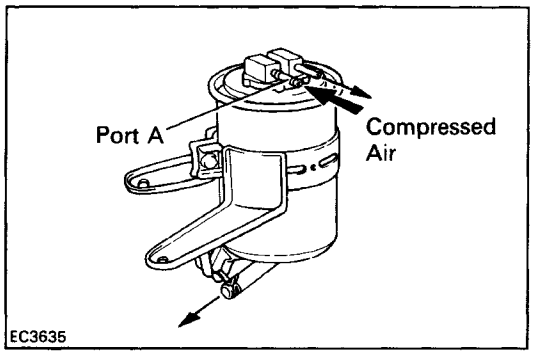
INSPECTION OF CHARCOAL CANISTER

1. REMOVE CHARCOAL CANISTER

2. REMOVE CAP FROM CHARCOAL CANISTER

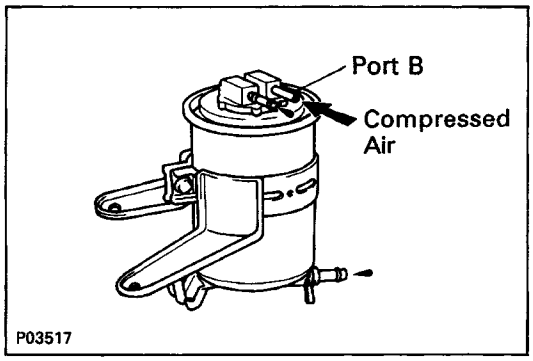
3. VISUALLY INSPECT CHARCOAL CANISTER

Look for cracks or damage.

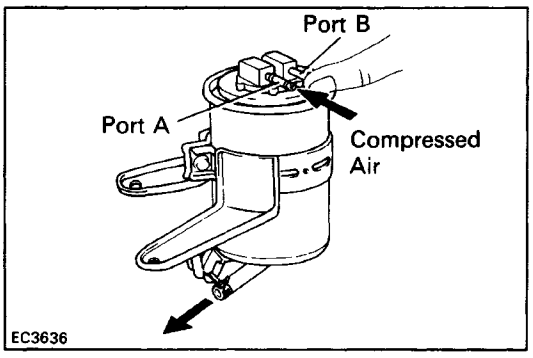


4. INSPECT FOR CLOGGED FILTER AND STUCK CHECK VALVE

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



(b) Blow into port B and check that air does not flow from the other ports.
If a problem is found, replace the charcoal canister.



5. CLEAN FILTER IN CANISTER

Clean the filter by blowing 294 kPa (3 kgf/cm^{2,} 43 psi) of compressed air into port A while holding port B closed. closed.

NOTICE:

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

6. REINSTALL CAP TO CHARCOAL CANISTER

7. REINSTALL CHARCOAL CANISTER

INSPECTION OF BVSV

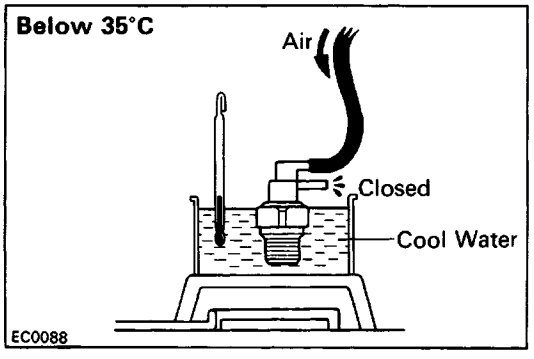
INSPECT BVSV BY BLOWING AIR INTO PIPE

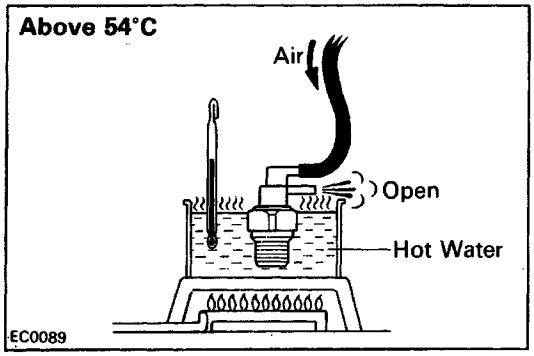
(a) Drain the coolant from the radiator into a suitable container.

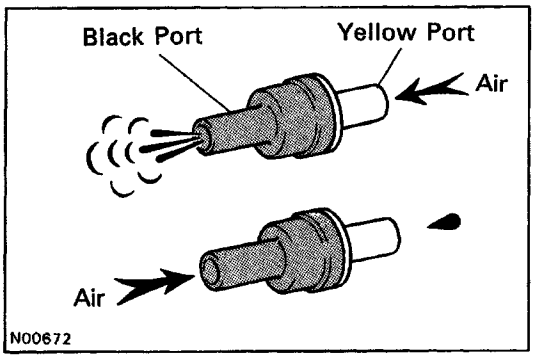
(b) Remove the BVSV from the water outlet.

(c) Cool the BVSV to below 35˚C (95˚F) with cool water.

(d) Blow air into the port and check that the BVSV is closed.







(e) Heat the BVSV to above 54°C (129°F) with hot water.

(f) Blow air into the port and check that the BVSV is open.

If a problem is found, replace the BVSV.

(g) Apply adhesive to two or three threads of the BVSV, and reinstall.

Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent

(h) Refill the radiator with coolant.

INSPECTION OF CHECK VALVE

1. REMOVE CHECK VALVE

2. INSPECT CHECK VALVE

(a) Check that air flows from the yellow port to the black port.

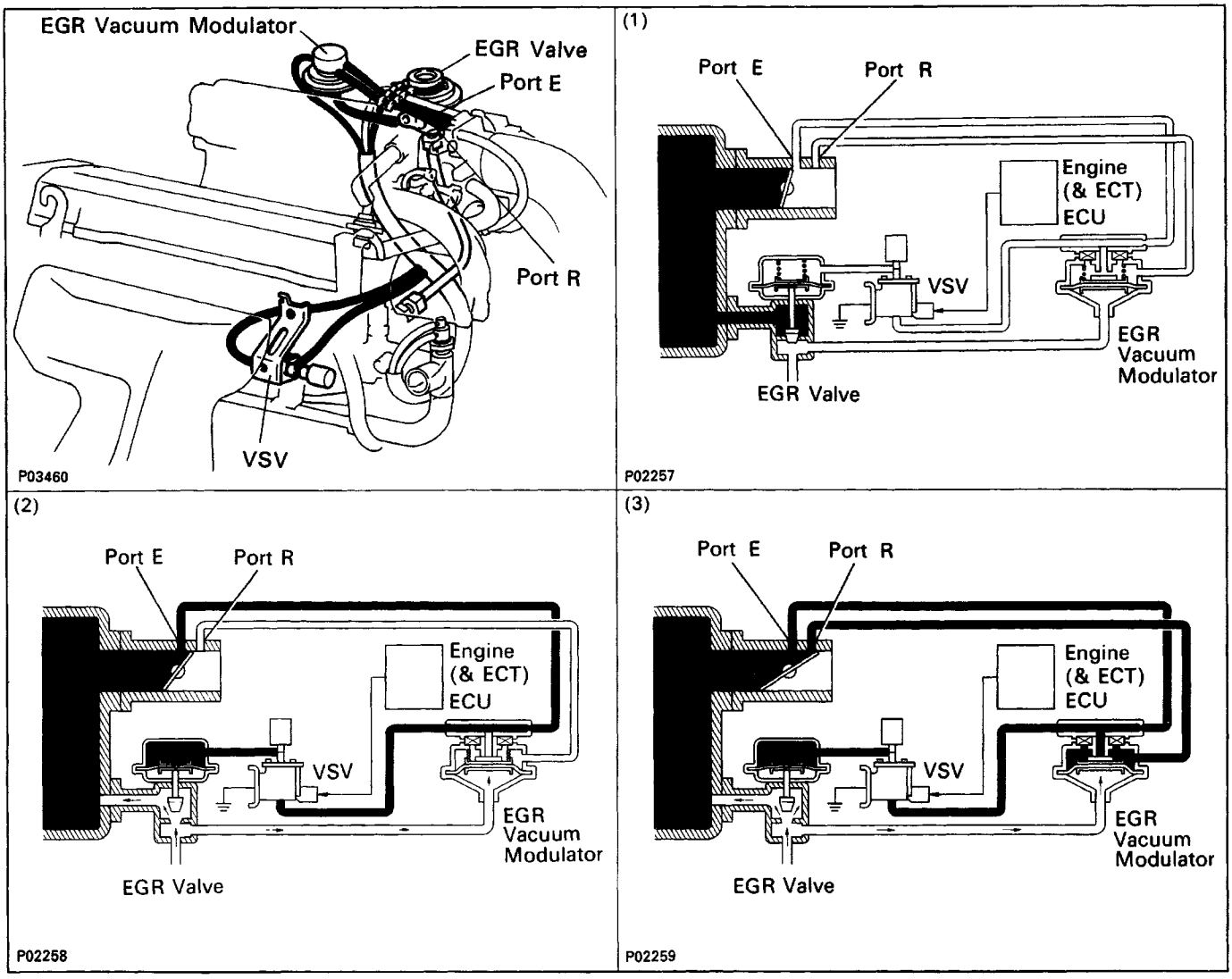
(b) Check that air does not flow from the black port to the yellow port.

If operation is not as specified, replace the check valve.

3. REINSTALL CHECK VALVE

HINT: Reinstall the check valve with the black port facing the charcoal canister side.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

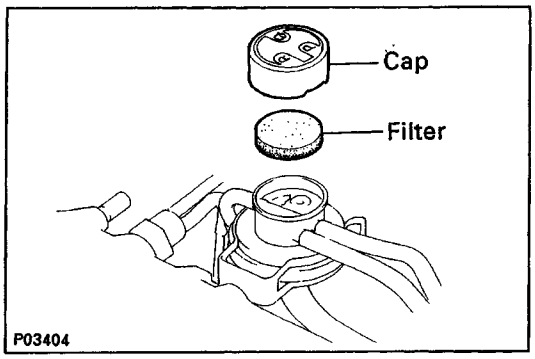


Coolant Temp.	Engine RPM	PIM (ECU)	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 55°C (131°F)	–	–	CLOSED	–	–		–	CLOSED	Not recirculated
Above 60°C (140°F)	Below 4,000 rpm	OFF	CLOSED	Positioned below port E	–		–	CLOSED	Not recirculated
			CLOSED	Positioned below port E	(1)	–	–	CLOSED	Not recirculated
		***ON	OPEN	Positioned between port E and port R	(2) HIGH	*	CLOSES passage to atmosphere	OPEN	Recirculated
				Positioned above port R	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)
	Above 4,000 rpm	OFF	CLOSED	–	–		–	CLOSED	Not Recirculated

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

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

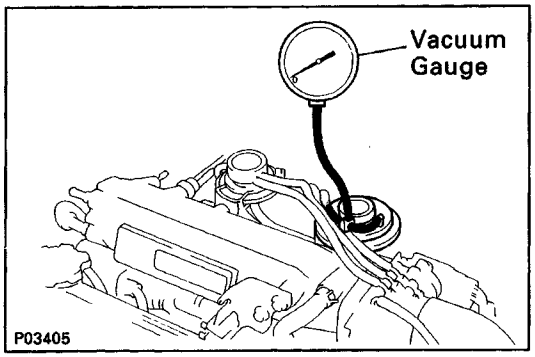
*** If terminals TE1 and E1 of check connector are connected, the VSV switches ON.



INSPECTION OF EGR SYSTEM

1. INSPECT AND CLEAN FILTERS IN EGR VACUUM MODULATOR

(a) Remove the cap and filter.
(b) Check the filters for contamination or damage.
(e) Using compressed air, clean the filter.
(d) Reinstall the filter and cap.
HINT: Install the filters with the coarser surface facing the atmospheric side (outward).

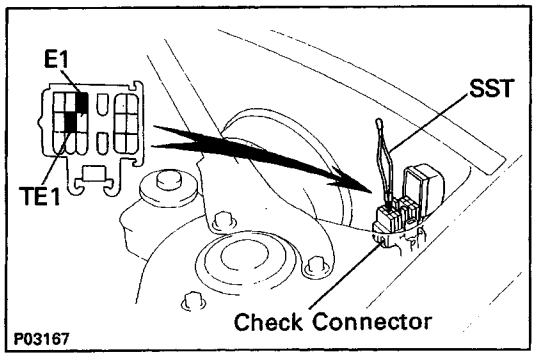


2. INSTALL VACUUM, GAUGE

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

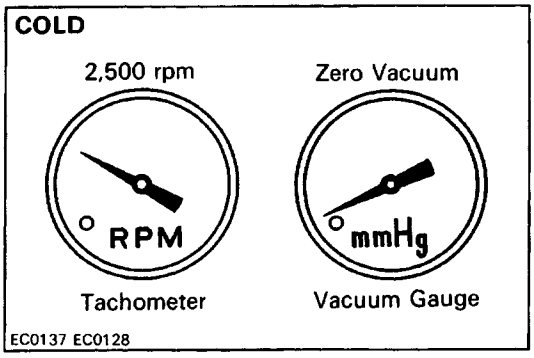
3. INSPECT SEATING OF EGR VALVE

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



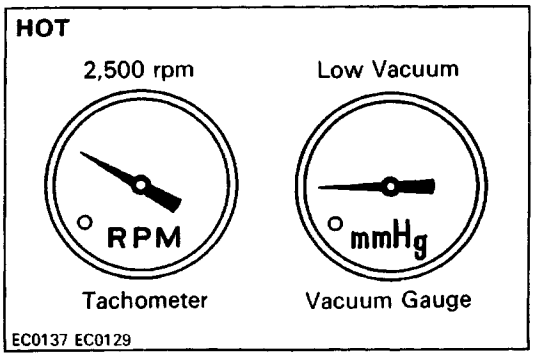
4. CONNECT TERMINALS TE1 AND E1 OF CHECK CONNECTOR

Using SST, connect terminals TE1 and E1 of the check connector.
SST 09843–18020



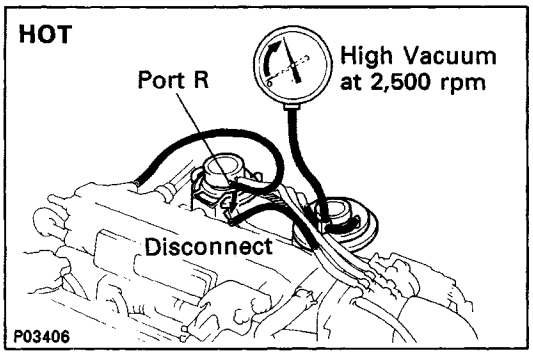
5. INSPECT VSV OPERATION WITH COLD ENGINE

(a) The coolant temperature should be below 55°C (131 °F).
(b) Check that the vacuum gauge indicates zero at 2,500, rpm.



6. INSPECT VSV OPERATION OF AND EGR VACUUM MODULATOR WITH HOT ENGINE

(a) Warm up the engine above 60°C (140°F).
(b) Check that the vacuum gauge indicates low vacuum at 2,500 rpm.



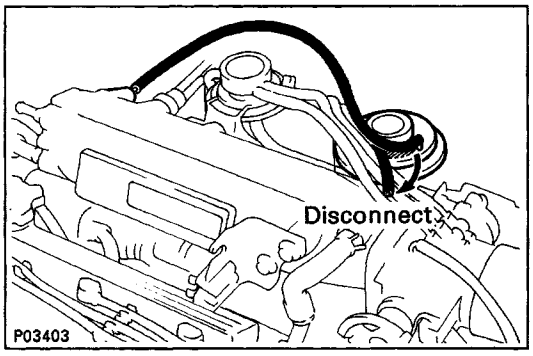
(c) Disconnect the vacuum hose port R of the EGR vacuum modulator and connect port R directly to the intake manifold with another hose.
(d) Check that the vacuum gauge indicates high vacuum at 2,500 rpm.
HINT: As a large amount of exhaust gas enters, the engine will misfire slightly.

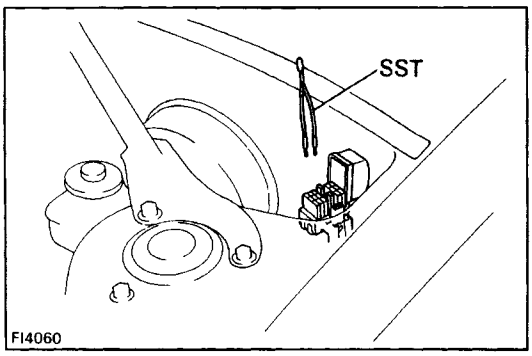
7. REMOVE VACUUM GAUGE

Remove the vacuum gauge, and reconnect the vacuum hoses to the proper locations.

8. INSPECT EGR VALVE OPERATION

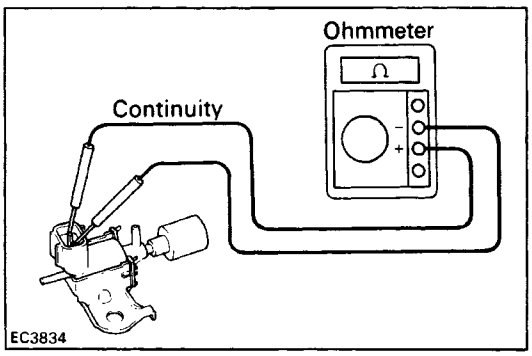
(a) Apply vacuum directly to the EGR valve with the engine idling.
(b) Check that the engine runs rough or dies.
(c) Reconnect the vacuum hoses to the proper locations.

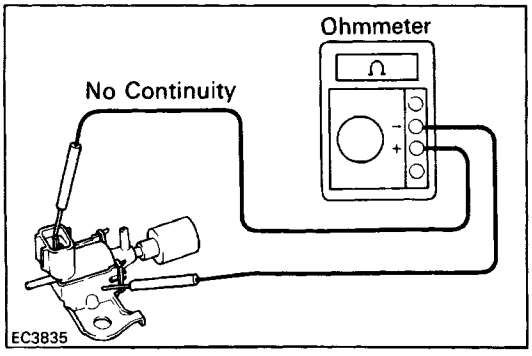




9. REMOVE SST FROM CHECK CONNECTOR
SST 09843–18020

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





INSPECTION OF VSV

1. REMOVE VSV

2. INSPECT VSV

A. Inspect VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

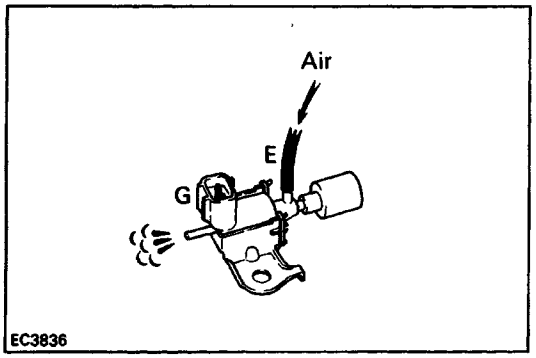
Resistance (Cold): 33 – 39Ω

If there is no continuity, replace the VSV.

B. Inspect VSV for ground

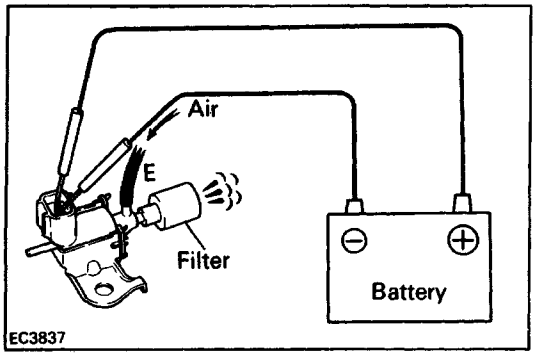
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



C. Inspect VSV operation

(a) Check that the air flows from ports E to G.

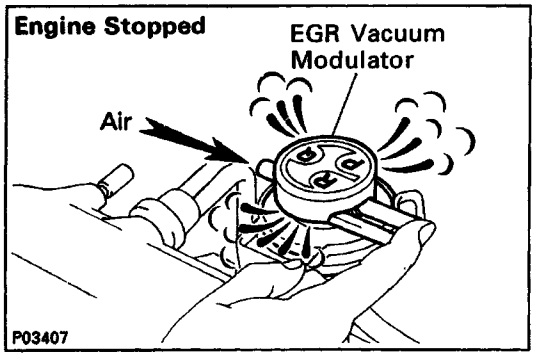


b) Apply battery voltage across the terminals.

(c) Check that the air flows from port E to the filter.

If operation is not as specified, replace the VSV.

3. REINSTALL VSV



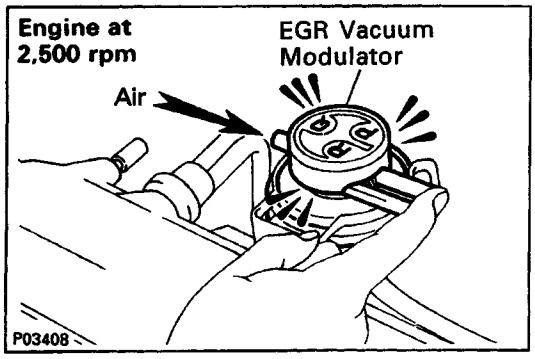
INSPECTION OF EGR VACUUM MODULATOR

INSPECT OPERATION OF EGR VACUUM MODULATOR

(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, and check that the air passes through to the air filter side freely.

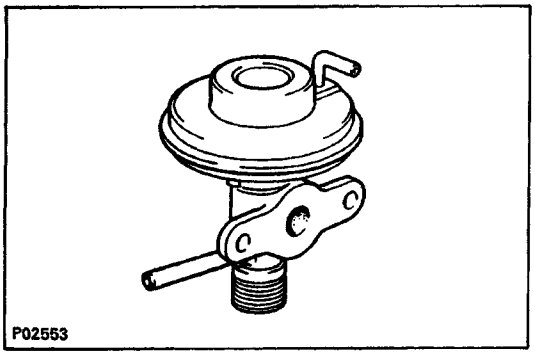


(d) Start the engine, and maintain speed at 2,500 rpm.

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

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

If operation is not as specified, replace the vacuum modulator.



INSPECTION OF EGR VALVE

1. REMOVE EGR VALVE

2. INSPECT EGR VALVE

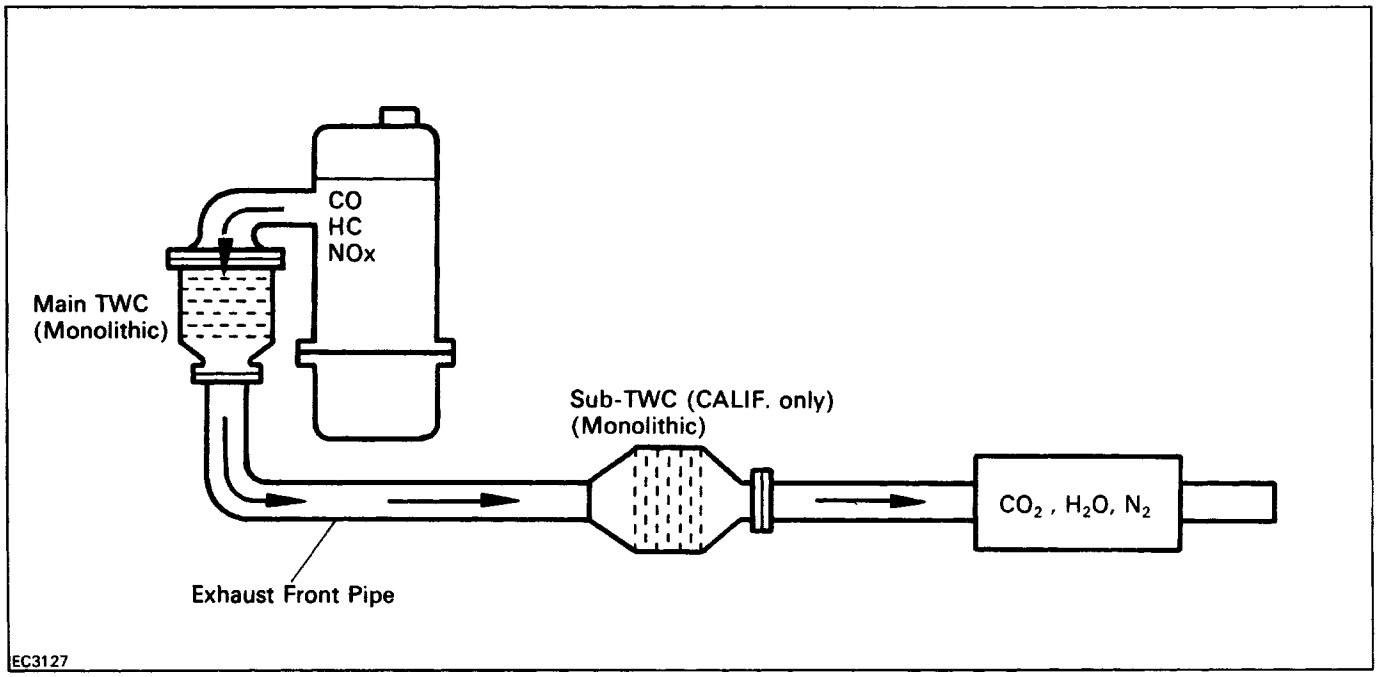
Check for sticking and heavy carbon deposits.

If a problem is found, replace the valve.

3. REINSTALL EGR VALVE

Install a new gasket.

THREE–WAY CATALYST (TWC) SYSTEM



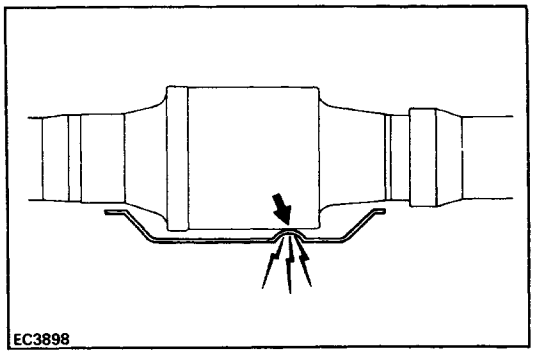
To reduce C0, HC and NOx emissions, they are oxidized, reduced and converted to carbon dioxide ($C0_2$), water (H_20) and nitrogen (N_2) by the catalyst.

Exhaust Port		Main TWC		Sub–TWC (CALIF. only)		Exhaust Gas
CO HC NOx	⇒	OXIDATION AND REDUCTION	⇒	OXIDATION AND REDUCTION	⇒	CO_2 H_2O N_2

INSPECTION OF EXHAUST PIPE ASSEMBLY

1. INSPECT CONNECTIONS FOR LOOSENESS OR DAMAGE

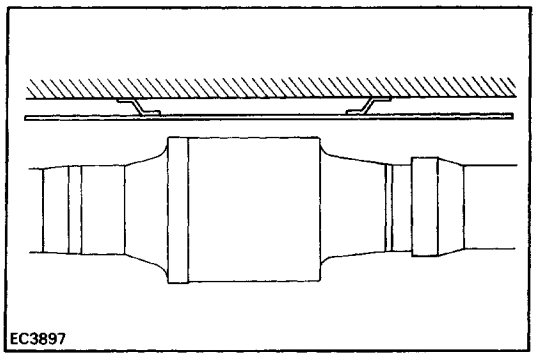
2. INSPECT CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE



INSPECTION OF CATALYTIC CONVERTER (Sub–Catalytic Converter (CALIF. only))

INSPECT FOR DENTS OR DAMAGE

If any part of protector is damaged or dented to the extent that it contacts the converter, repair or replace it.



INSPECTION OF HEAT INSULATOR (Sub–Catalytic Converter (CALIF. only))

1. INSPECT HEAT INSULATOR FOR DAMAGE

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

REPLACEMENT OF CATALYTIC CONVERTER (Catalytic Converter (Main))

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after. approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. REMOVE RH ENGINE UNDER COVER

3. REMOVE FRONT EXHAUST PIPE

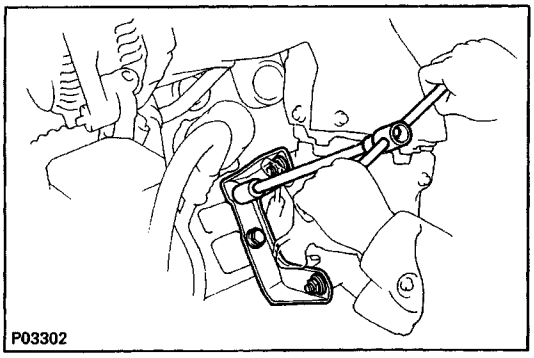
(See step 2 on page EC–45)

4. REMOVE MAIN CATALYTIC CONVERTER

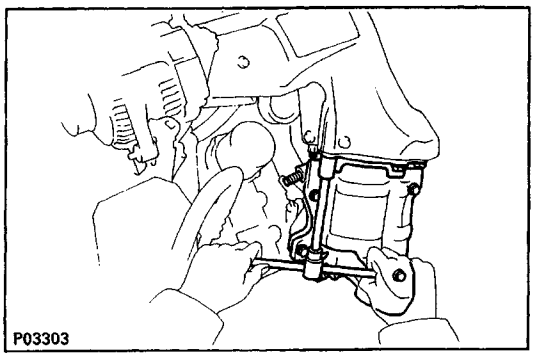
(a) Check that the converter is cool.

(b) Disconnect the main oxygen sensor connector.

(c) (CALIF. only)
Disconnect the sub–oxygen sensor connector.

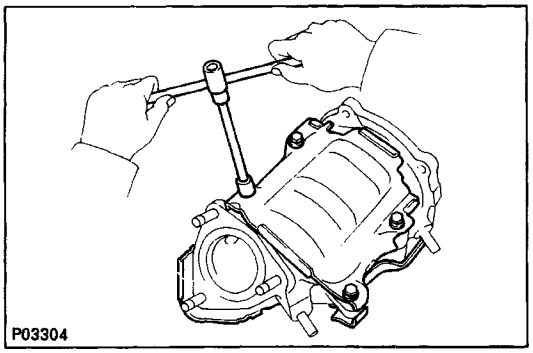


(d) Remove the two bolts, two nuts and converter stay.



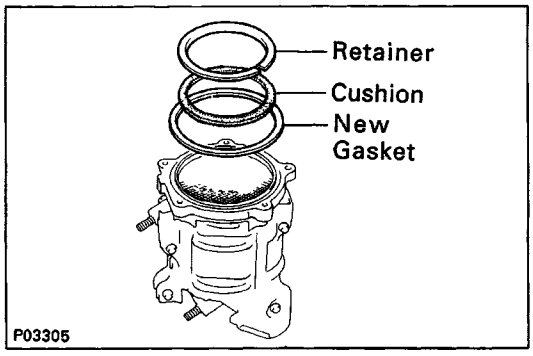
(e) Remove the three bolts, two nuts, converter, gasket, retainer and cushion.

(f) Remove the eight bolts and two heat insulators from the converter.

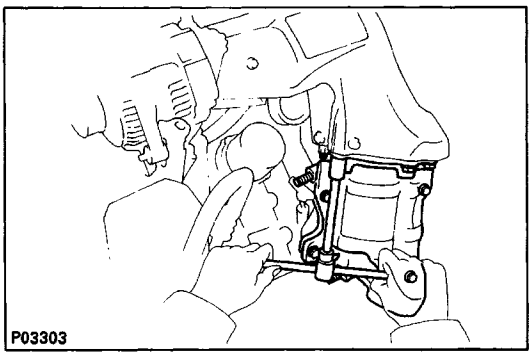


5. REINSTALL MAIN CATALYTIC CONVERTER

(a) Install the two heat insulators to a new converter with the eight bolts.

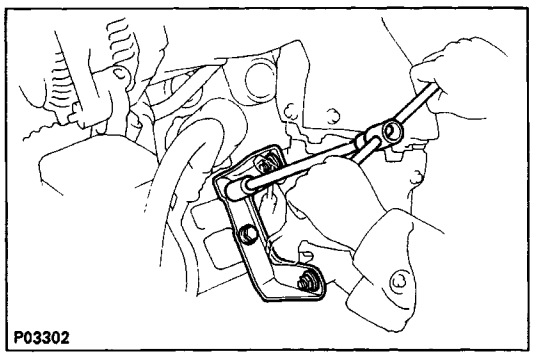


(b) Place the cushion, retainer and a new gasket on the converter.



(c) Install the converter with the three bolts and two new nuts.

Torque: 29 N–m (300 kgf–cm, 21 ft–lbf)



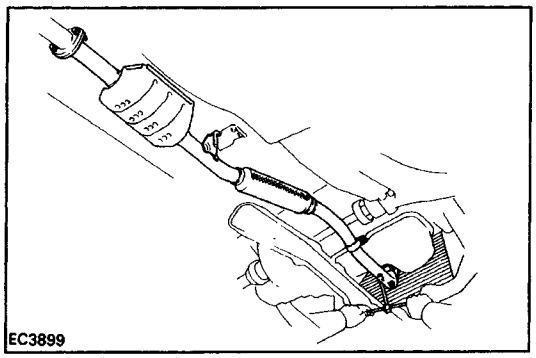
(d) Install the converter stay with the two bolts and two nuts.

Torque: 42 N–m (425 kgf–cm, 31 ft–lbf)

(e) Connect the main oxygen sensor connector.

(f) (CALIF. only)
Connect the sub–oxygen sensor connector.

6. REINSTALL FRONT EXHAUST PIPE
(See step 3 on page EC–45)
7. REINSTALL RH ENGINE UNDER COVER
8. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY



(Sub–Catalytic Converter (CALIF. only))

1. REMOVE RH ENGINE UNDER COVER

2. REMOVE FRONT EXHAUST PIPE (SUB–CATALYTIC CONVERTER)

(a) Loosen the bolt, and disconnect the clamp from the bracket.

(b) Remove the two bolts and nuts holding the front exhaust pipe to the center exhaust pipe.

(c) Using a 14 mm deep socket wrench, remove the three nuts holding the front exhaust pipe to the main catalytic converter.

(d) Disconnect the support hook on the front exhaust pipe from the support bracket, and remove the front exhaust pipe and two gaskets.

3. REINSTALL FRONT EXHAUST PIPE (SUB–CATALYTIC CONVERTER)

(a) Install the support hook on the front exhaust pipe to the support bracket.

(b) Place two new gaskets on the front and rear of the front exhaust pipe.

(c) Temporarily install the two bolts and two new nuts holding the front exhaust pipe to the center exhaust pipe.

(d) Using a 14 mm deep socket wrench, install the three new nuts holding the front exhaust pipe to the main catalytic converter.

Torque: 62 N–m (630 kgf–cm, 46 ft–lbf)

(e) Tighten the two bolts and nuts holding the front exhaust pipe to the center exhaust pipe.

Torque: 43 N–m (440 kgf–cm, 32 ft–lbf)

(f) Install the clamp with the bolt.

4. REINSTALL RH ENGINE UNDER COVER