EMISSION CONTROL SYSTEM

CONTENTS

N25AA--

GENERAL INFORMATION

N25BEAA

The emission control system has the following three major systems.

(1) Crankcase emission control system
(2) Evaporative emission control system
(3) Exhaust emission control system

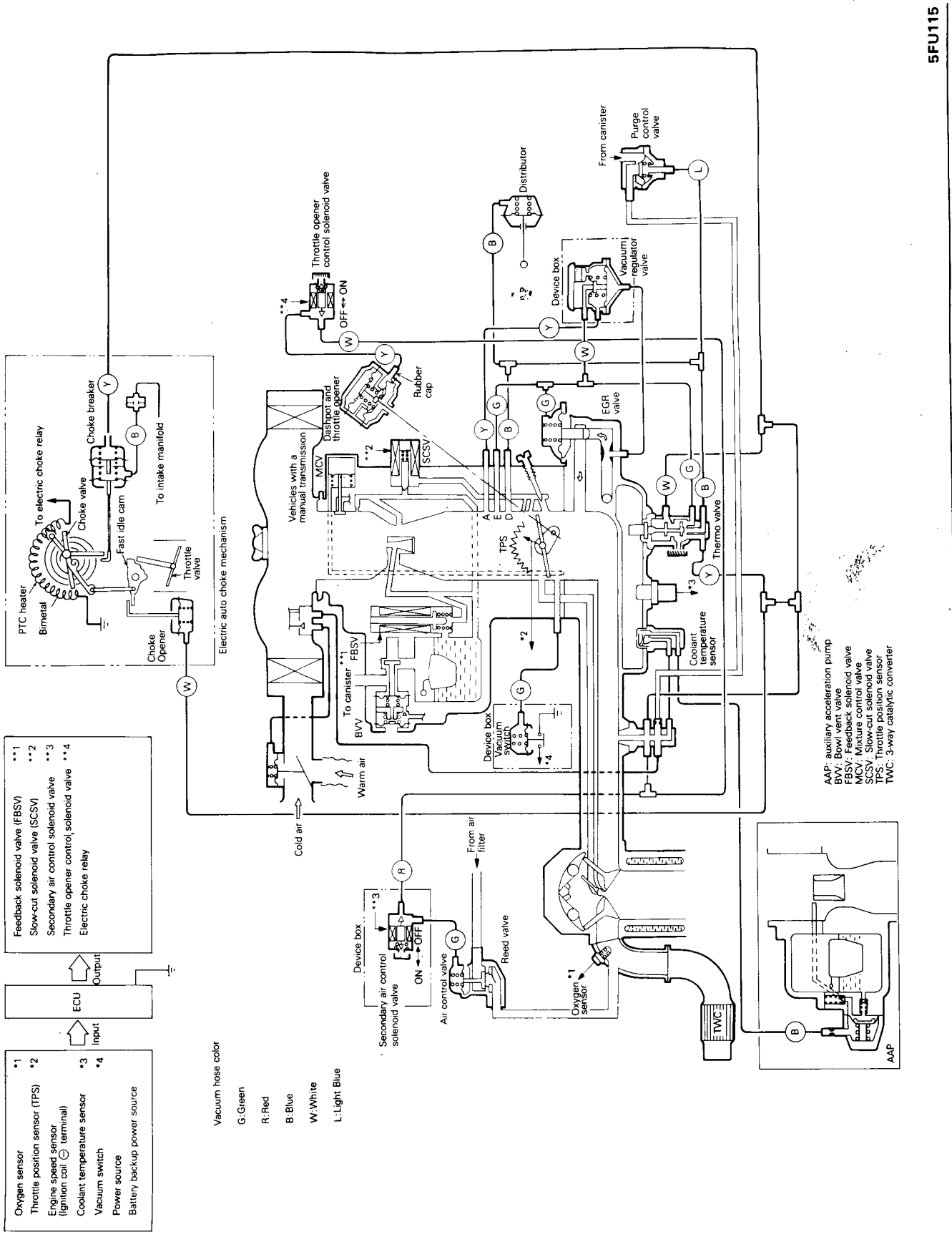
The crankcase emission control system is a system adopting a closed-type crankcase ventilation to prevent blow by gas from escaping into the atmosphere. The blow by gas generated in the crankcase is instead led to the combustion chamber for combustion.

The evaporative emission control system for preventing the emission of fuel vapor from the fuel tank, carburetor, etc. into the atmosphere consists of various components (a canister, purge control valve, 2-way valve and so on) which collect and lead generated fuel vapor to the combustion chamber for combustion.

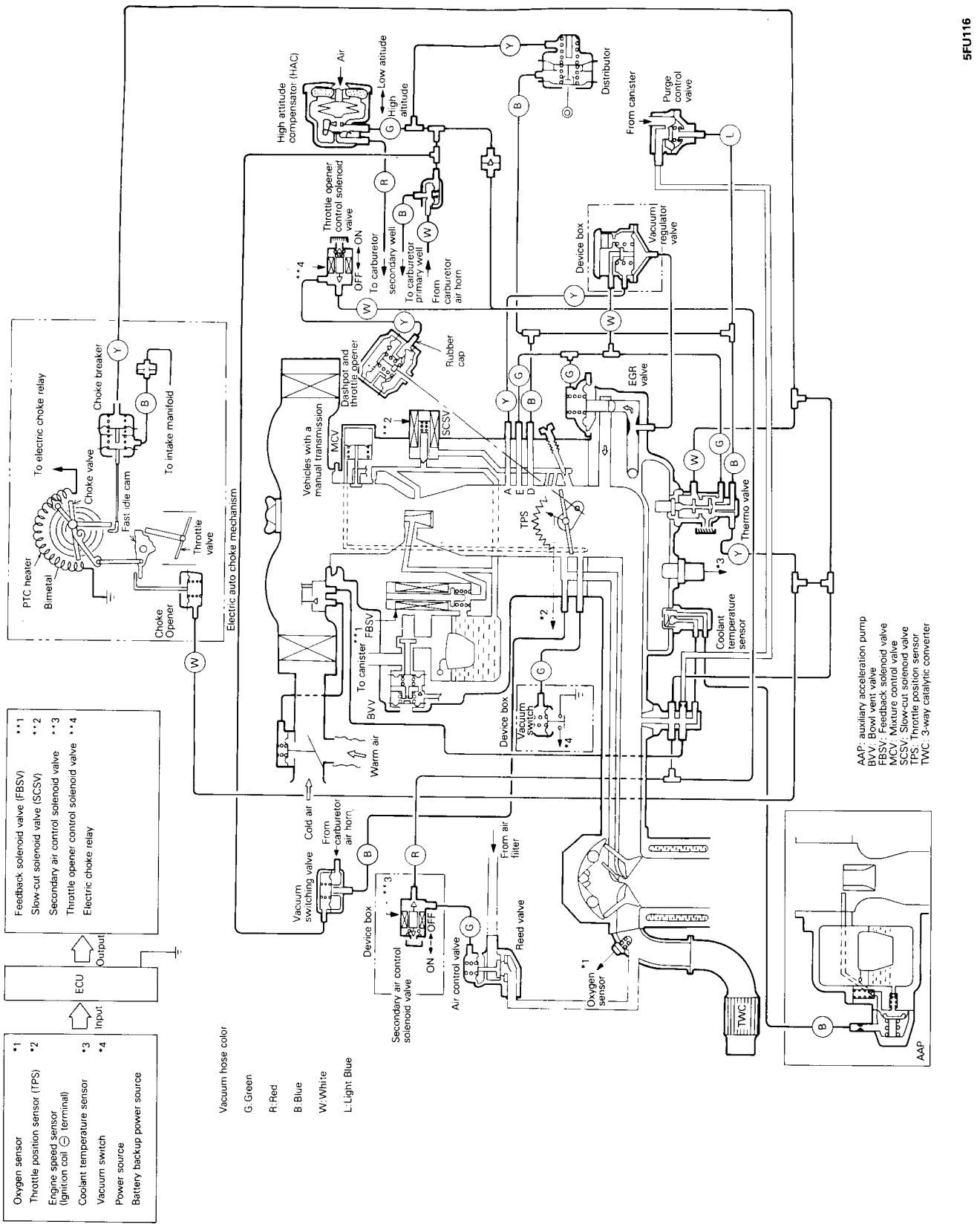
The exhaust emission control system consists of an air-fuel ratio control unit (FBC system), three catalyst converter, exhaust gas recirculation system, secondary air supply system and so on to reduce emission of CO, HC and NOx.

FBC: Feed Back Carburetor

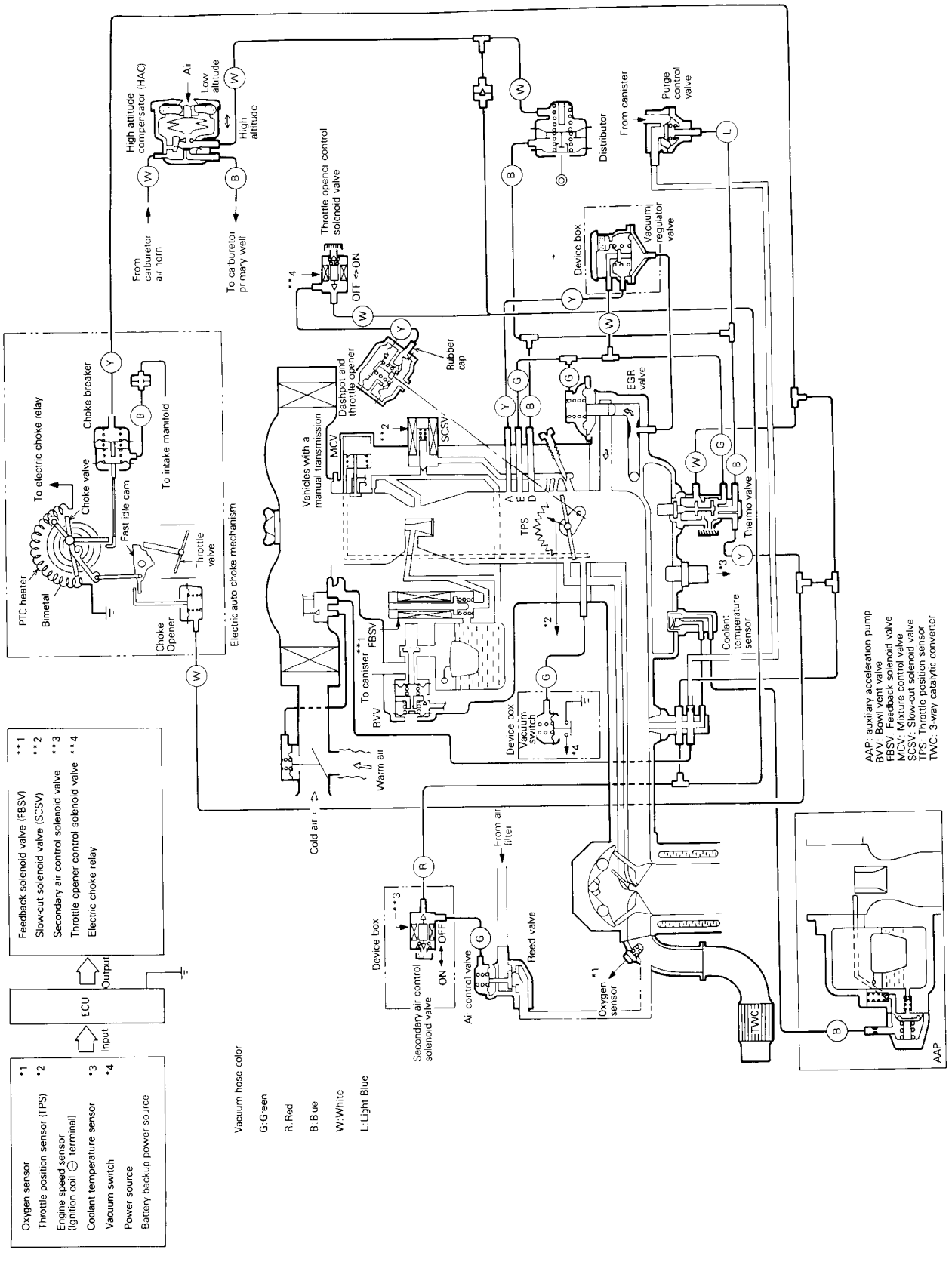
FBC SYSTEM DIAGRAM-vehicles for the 49 states other than California (excluding high-altitude specification)



FBC SYSTEM DIAGRAM-vehicles with high-altitude specifications for the 49 states other than California



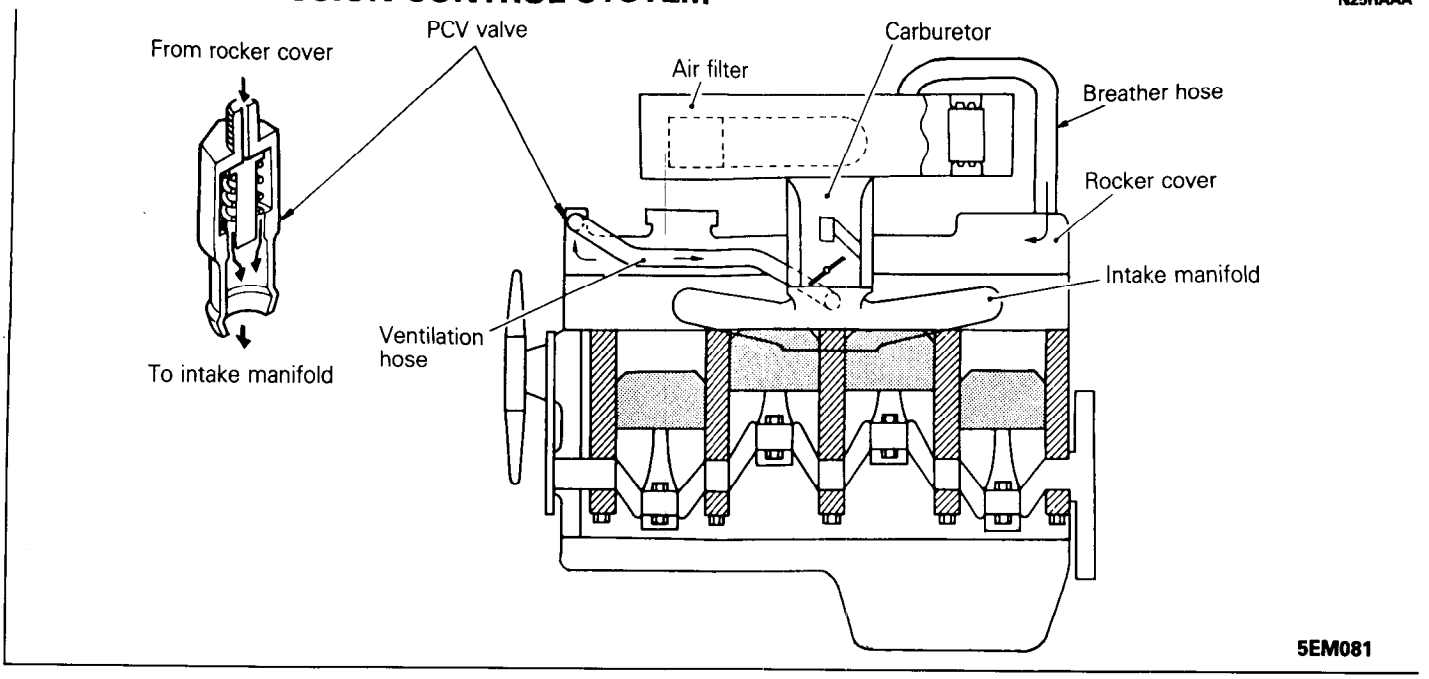
FBC SYSTEM DIAGRAM-vehicles for California



TECHNICAL DESCRIPTION

CRANKCASE EMISSION CONTROL SYSTEM

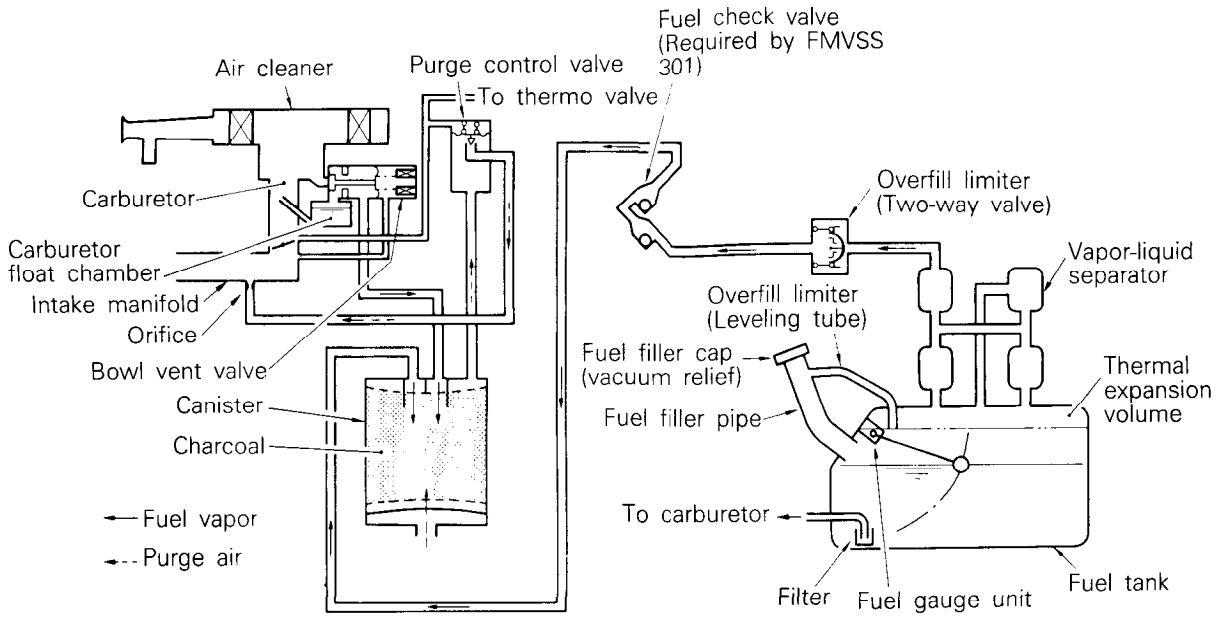
N25HAAA



A closed-type crankcase ventilation system is utilized to prevent the blow-by gas from escaping into the atmosphere. This system has a positive crankcase ventilation valve (PCV valve) at the rocker cover. This system supplies fresh air to the crankcase though the air filter. Inside the crankcase, the fresh air is mixed with blow-by gases, and this mixture passes through the PCV valve into the intake manifold. The PCV valve has a metered orifice through which the mixture of fresh air and blow-by gases is drawn into the intake manifold in response to the intake manifold vacuum. The valve capacity is adequate for all normal driving conditions.

EVAPORATIVE EMISSION CONTROL SYSTEM

N25HBAA



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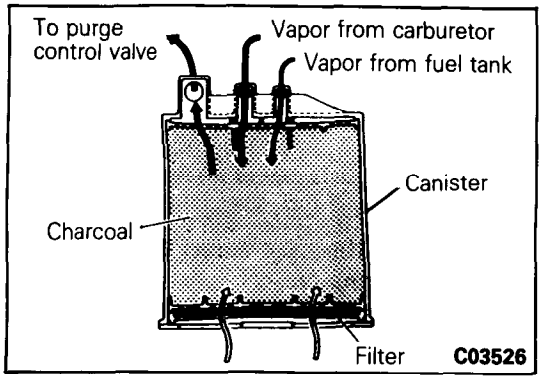
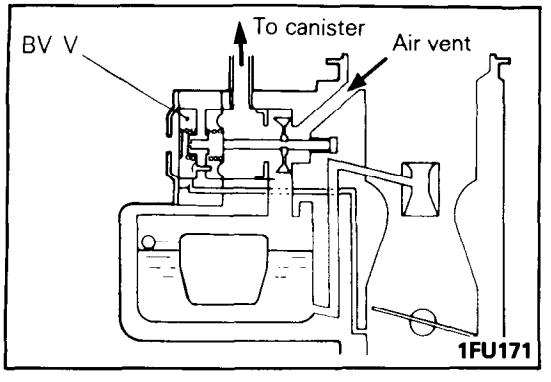
In order to prevent the loss of fuel vapor from the fuel system into the atmosphere, the evaporative emission control system consists of charcoal canister, a bowl vent valve, a purge control valve, etc.



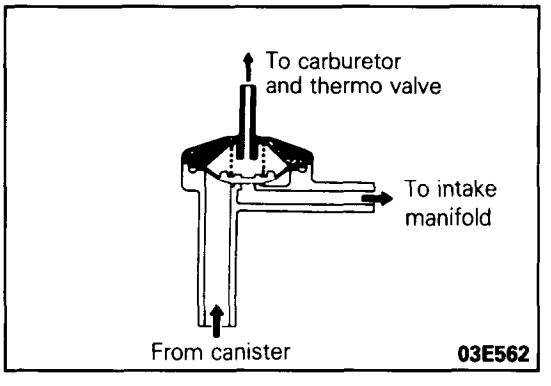
CANISTER N25HBBA

While the engine is inoperative, fuel vapors generated inside the fuel tank and the carburetor float chamber are absorbed and stored in canister. When the engine is running, the fuel vapors absorbed in canister are drawn into the intake manifold through the purge control valve, and an orifice. And the carburetor bowl vapors flow into the carburetor through the bowl vent valve.



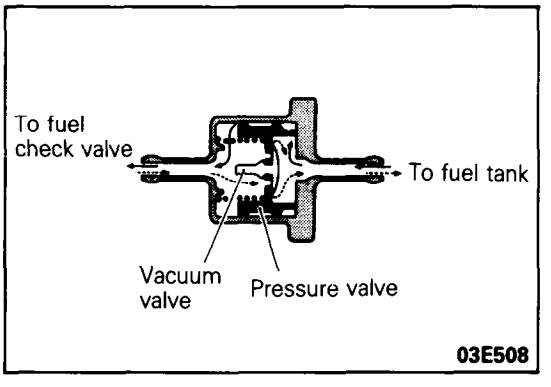
BOWL VENT VALVE N25HBCA

The bowl vent valve controls vapor in the carburetor bowl. While the engine is running, the intake manifold vacuum acts on the diaphragm to close the bowl vent valve so that the carburetor bowl connects to the air vent. When the engine stops, the bowl vent valve opens to connect the carburetor bowl to the canister, causing fuel vapor to be adsorbed by the canister.



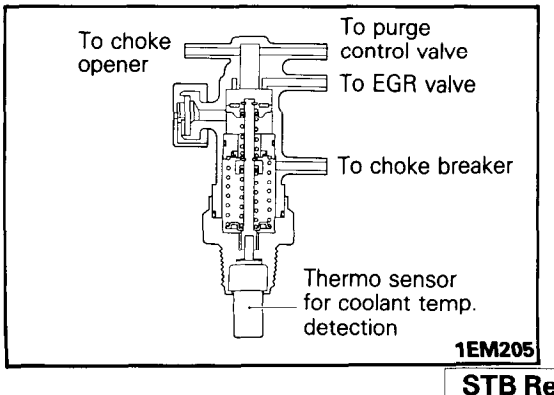
PURGE CONTROL VALVE N25HBDA

The purge control valve is kept being closed during idling to prevent vaporized fuel from entering into the intake manifold for positive control of high-idle CO emission, which is a particular problem under high ambient temperatures condition and once the throttle ported vacuum working on the diaphragm of the valve exceeds the pre-set value, the purge control valve is opened.



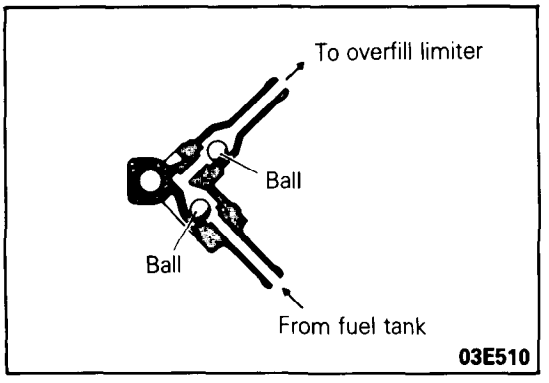
OVERFILL LIMITER (TWO-WAY VALVE) N25HBEA

The overfill limiter consists of a pressure valve and a vacuum valve. The pressure valve is designed to open when the fuel tank internal pressure has increased over the normal pressure and the vacuum valve opens when a vacuum has been producted in the tank.



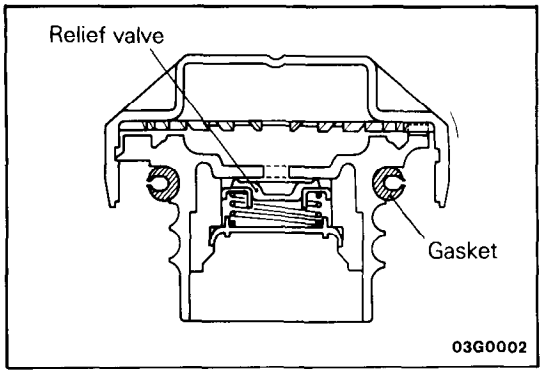
THERMO VALVE N25HBFA

The thermo valve, for sensing the coolant temperature at the intake manifold, closes the purge control valve when the coolant temperature is lower than the pre-set value in order to reduce CO and HC emissions under engine warm-up conditions, and opens the purge control valve when the coolant temperature is above the pre-set temperature.



FUEL CHECK VALVE N25HBGA

The fuel check valve is used to prevent fuel leaks when the car suddenly rolls over. This valve is connected in the fuel vapor line (between fuel tank and overfill limiter) and is installed on the fuel tank.
The fuel check valve contains two balls as shown in the illustration. Under normal conditions, the gasoline vapor passage in the valve is opened, but if roll-over occurs one of the balls closes the fuel passage, thus preventing fuel leaks.



FUEL FILLER CAP N25HBHA

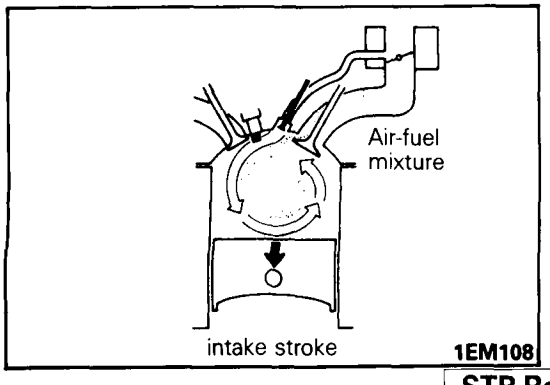
Fuel filler cap is equipped with relief valve to prevent the escape of fuel vapor into the atmosphere.

EXHAUST EMISSION CONTROL SYSTEM N25HCAA

Exhaust emissions (CO, HC, NO) are controlled by a combination of engine modifications and the addition of special control components.
Modifications to the combustion chamber, intake manifold, camshaft, carburetor and ignition system form the basic control system.
Additional control devices include a jet air system, an exhaust gas recirculation (EGR) system, a catalytic converter, a secondary air supply system, a dash pot, a heated air intake system.
These systems have been integrated into a highly effective system which controls exhaust emissions while maintaining good driveability and economy.

JET AIR SYSTEM N25HCBA

In addition to the intake valve and exhaust valve, a jet valve has been provided for drawing jet air (super lean mixture or air) into the combustion chamber.
A jet air passage is provided in the carburetor, intake manifold and cylinder head. Air flows through the intake openings provided near the primary throttle valve of the carburetor, goes through the passage in the intake manifold and cylinder head, and flows through the jet valve and the jet opening into the combustion chamber.
The jet valve is actuated by the same cam as the intake valve and by a common rocker arm so that the jet valve and intake valve open and close simultaneously.
The jet air flowing out of the jet opening scavenges the residual gases around the spark plug and creates a good ignition condition. It also produces a strong swirl in the combustion chamber which continues throughout the compression stroke and improves flame propagation after ignition, assuring high combustion efficiency.



AIR FUEL RATIO CONTROL SYSTEM [FEED BACK CARBURETOR (FBC) SYSTEM]

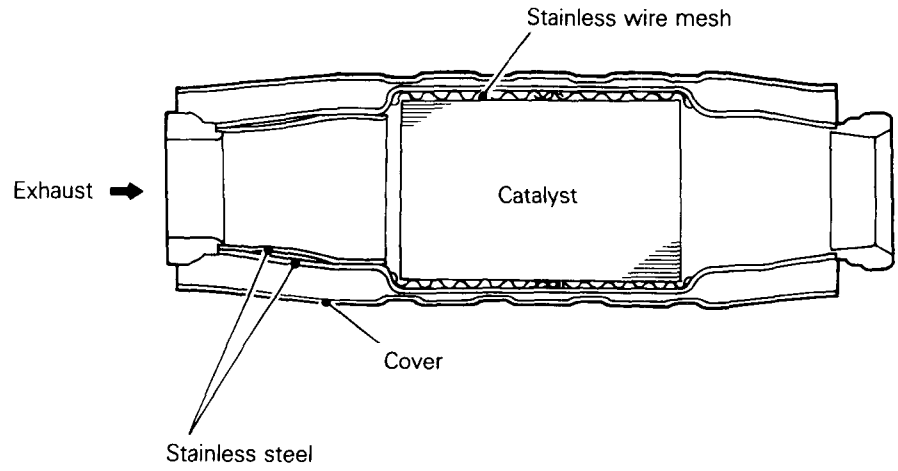
N25HCCA

The FBC system is essentially an emissions control system which utilizes an electronic signal, generated by an exhaust gas oxygen sensor to precisely control the air-fuel mixture ratio in the carburetor. This in turn allows the engine to produce exhaust gases of the proper composition to permit the use of a three-way catalyst. The three-way catalyst is designed to convert the three pollutants (1) hydrocarbons (HC), (2) carbon monoxide (CO), and (3) oxides of Nitrogen (NOx) into harmless substances.
There are two operating modes in the FBC system:
(1) Open Loop-air fuel ratio is controlled by information programmed into the ECU at manufacture.
(2) Closed Loop-air fuel ratio is varied by the ECU based on information supplied by the oxygen sensor.

NOTE
Refer to GROUP 14 FUEL SYSTEM – General Information for detailed description of the FBC system.

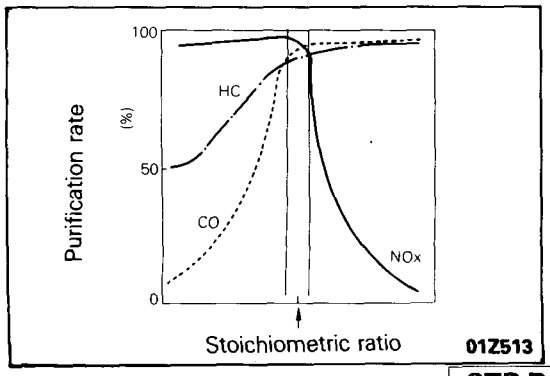
CATALYTIC CONVERTER

N25HCDA



1EM127

The three catalyst converter which is a monolithic type with catalytic compositions applied to the integrally constructed honeycomb carrier surface is installed in the center of the exhaust pipe. The converter working in combination with the air fuel ratio feedback control oxidizes CO and HC and reduce NOx.



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Function

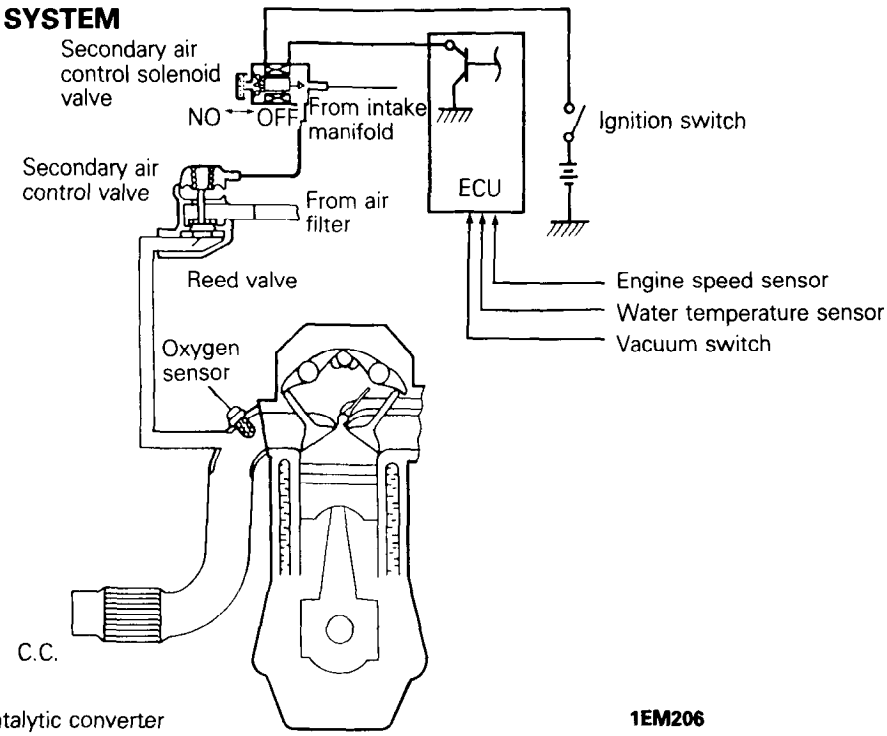
The three catalytic converter removes CO, HC and NOx most effectively in the vicinity of the stoichiometric ratio. The air fuel ratio feedback control by oxygen sensor controls the air fuel mixture to the stoichiometric ratio and the catalytic converter promotes both oxidation and reduction of resultant exhaust gas to make it clean before it is released to atmosphere.

STB Revision

Caution
The catalytic converters require the use of unleaded gasoline only. Leaded gasoline will destroy the effectiveness of the catalysts as an emission control device.
Under normal operating conditions, the catalytic converters will not require maintenance. However, it is important to keep the engine properly tuned. If the engine is not kept properly tuned, engine misfiring may cause overheating of the catalysts. This may cause heat damage to the converters or vehicle components. This situation can also occur during diagnostic testing if any spark plug cables are removed and the engine is allowed to idle for a prolonged period of time.

SECONDARY AIR SUPPLY SYSTEM

N25HCEC



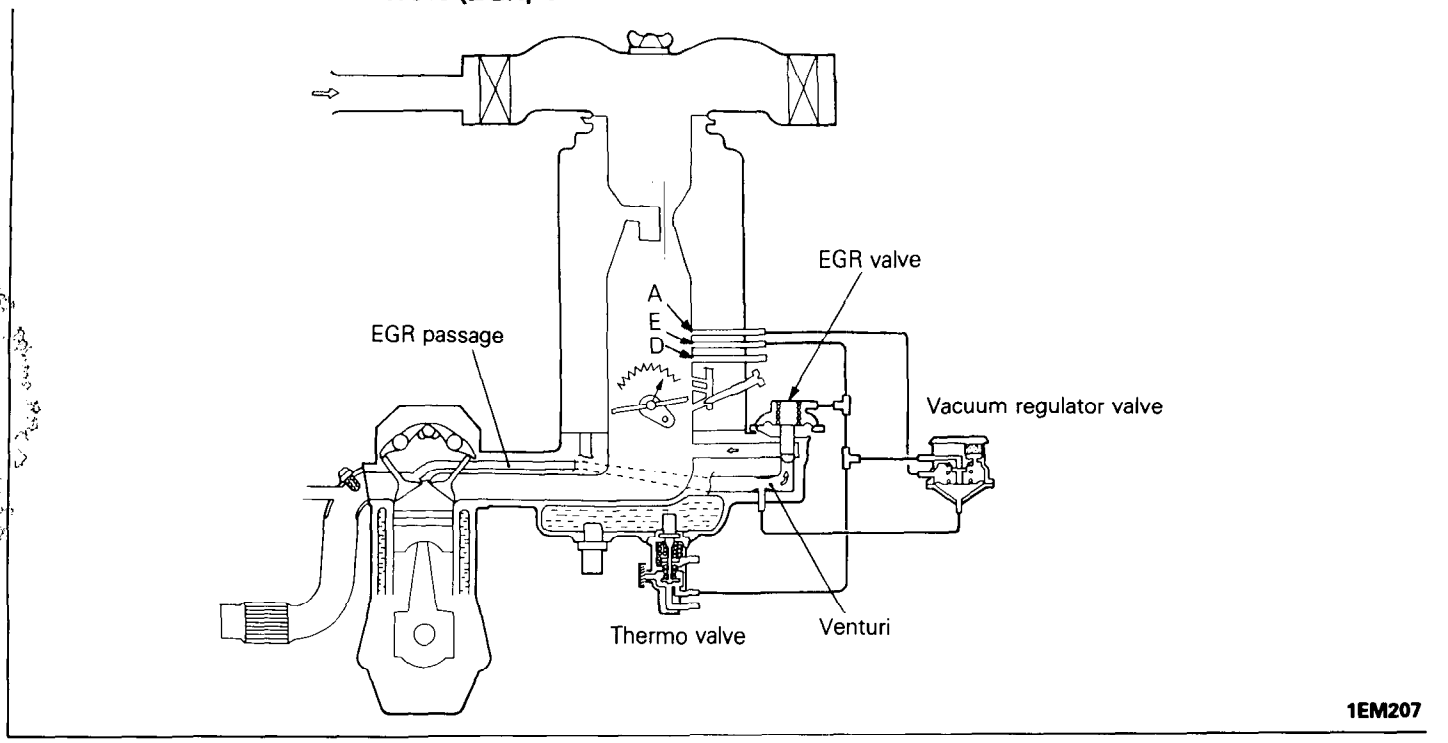
The reed valve supplies secondary air into the exhaust manifold for the purpose of promoting oxidation of exhaust emissions. The reed valve is actuated by exhaust vacuum being generated from pulsation in the exhaust manifold, and additional air is supplied into the exhaust manifold through the secondary air control valve.

Contents of Control

When the engine coolant is cold [18 – 52°C (65 – 125°F)] or when the vehicle is decelerating, the ECU turns on the power transistor to energize the secondary air control solenoid valve.
As a result, the intake manifold vacuum is introduced to the secondary air control valve and the secondary air is supplied to the exhaust manifold.

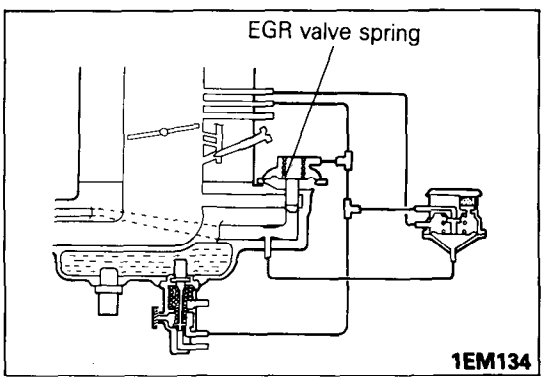
EXHAUST GAS RECIRCULATION (EGR) SYSTEM

N25HCFA



1EM207

Exhaust Gas Recirculation (EGR) system is designed to reduce oxides of nitrogen in the vehicle exhaust. In this system, the exhaust gas is partially recirculated from an exhaust port at the cylinder head into a port located at the intake manifold while the EGR flow is controlled by an EGR control valve, a vacuum regulator valve (VRV), and a thermo valve.



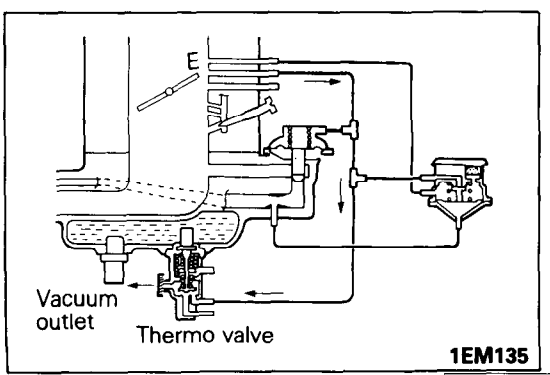
1EM134

Operation

During Idling or Throttle Wide Open Operation

In this case, the E port vacuum is low and the EGR valve is closed by spring force. As a result, EGR gas does not flow.

NOTE
The EGR is not made to ensure stable idling operation.



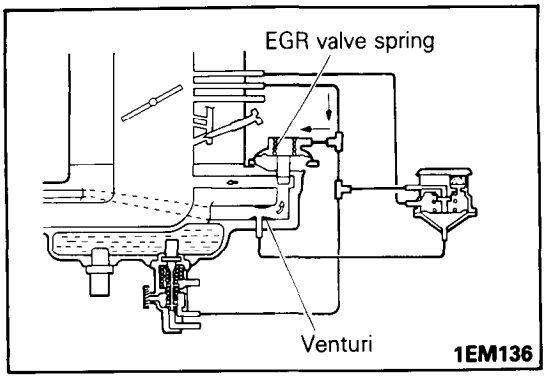
1EM135

When Engine Coolant is Cold

In this case, the thermo valve opens to allow the E port vacuum to escape to atmosphere. As a result, the EGR valve does not operate.

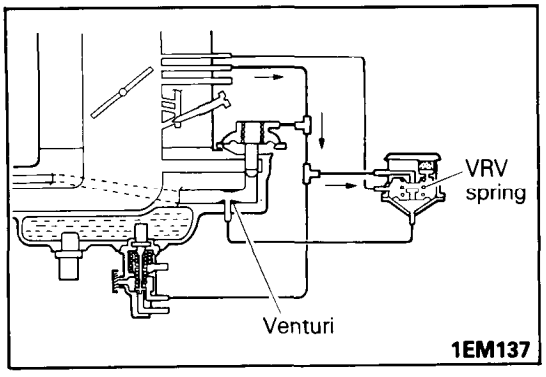
NOTE
The EGR is shut off to secure driveability when the engine is cold.

STB Revision



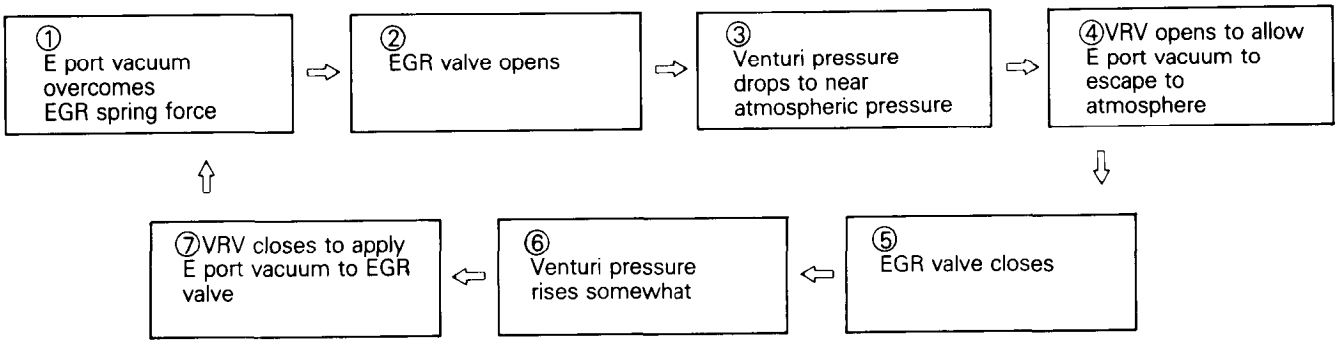
During Low to Middle Load Operation

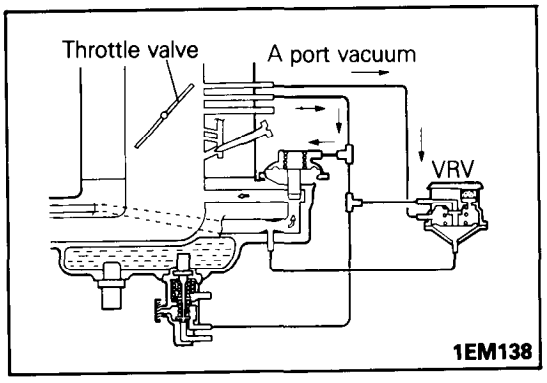
As the throttle valve is opened, the E port vacuum increases to overcome the spring force of the EGR valve. As a result, the EGR valve opens to cause the exhaust gas to recirculate to the intake manifold, causing drop of the venturi pressure.



When the venturi pressure drops to near the atmospheric pressure, the VRV opens to allow the E port vacuum to escape to atmosphere. Then, the EGR valve closes.
By repeating this cycle (closed loop control), EGR flow rate proportional to the intake air volume can be obtained.

NOTE
By controlling the EGR rate to optimum level, exhaust emission (NOx) is minimized without loss of driveability.



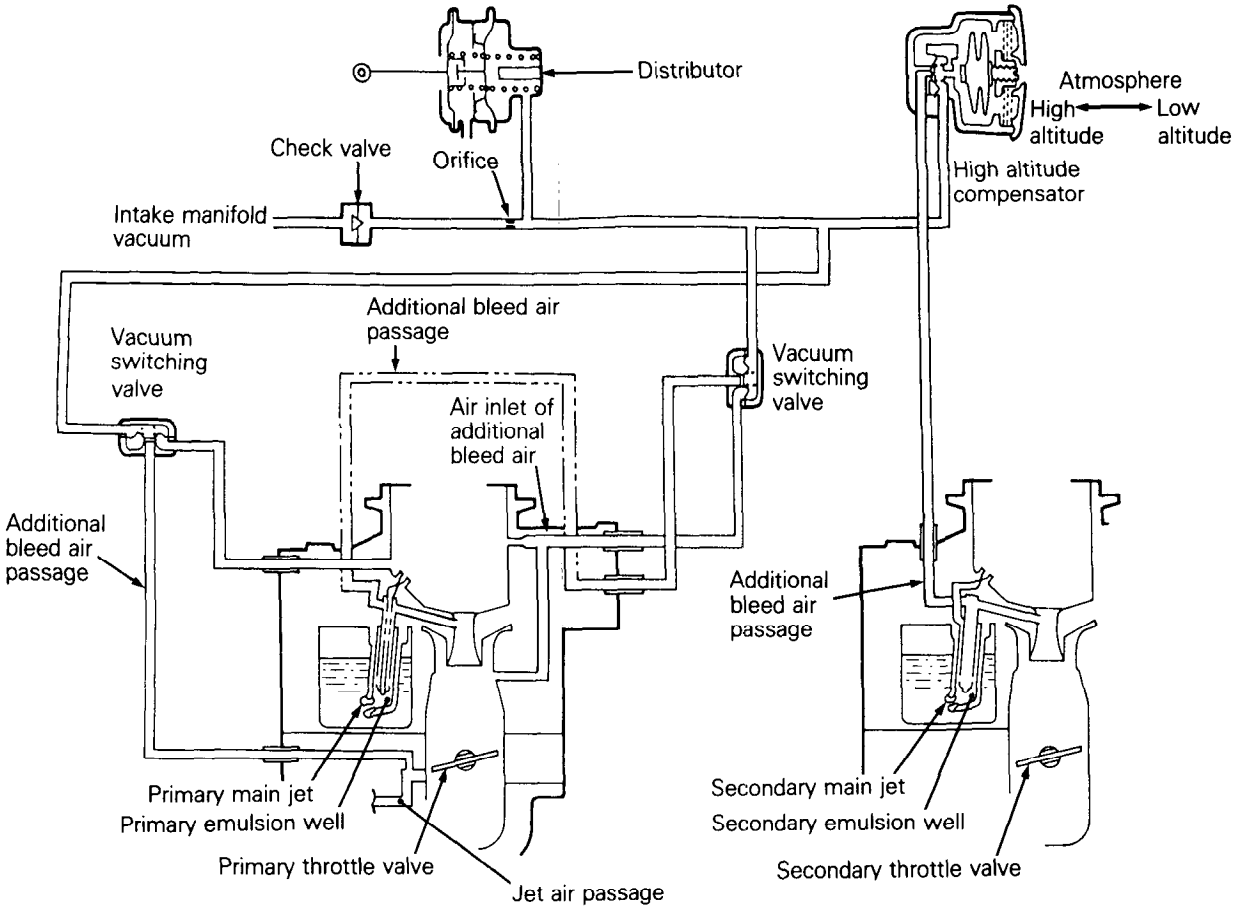


During High Load Operation

During high load operation, acceleration or other conditions in which much NOx is produced, A port vacuum is made to act on the VRV to shut off E vacuum's escape passage to atmosphere and to stop EGR exhaust pressure control action. As a result, the EGR valve is controlled by E vacuum only and the EGR flow rate increases.

HIGH-ALTITUDE COMPENSATION SYSTEM [High altitude specifications for the 49 states (excluding California)]

N25HCGC



High-altitude compensation system [High altitude specifications for the 49 states (excluding California)]

1EM208

In order to meet the high-altitude requirements for the 49 states (ex. California), all the high-altitude specification carburetor vehicles are equipped with high altitude compensation system in addition to feedback carburetor system.

The carburetor meters fuel according to the volumetric flow rate of air and supplies the resultant mixture to the engine. Therefore, even if the carburetor is set for optimum air-fuel rate at low altitude, the mixture becomes too thick at high altitude since air is less dense at high altitude.

At high altitude, this high altitude compensation system supplies additional bleed air to the carburetor emulsion well and jet air passage to dilute fuel, preventing overrich air-fuel mixture that could otherwise be caused by drop of air density at high altitude.

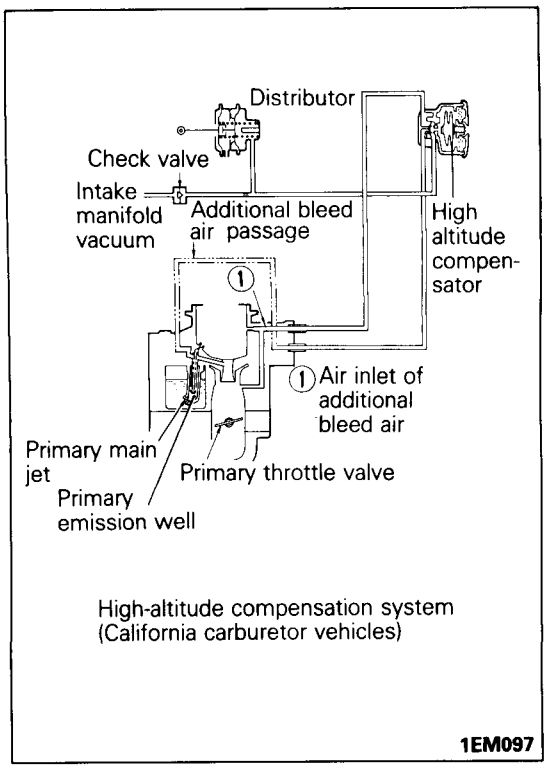
The system also advances the ignition timing by a fixed amount to reduce CO and HC emission and to secure driveability at high altitude.

Operation

At low altitude, the HAC opens to allow the intake manifold vacuum to escape from the HAC to atmosphere. Therefore, the vacuum switching valve and HAC's additional bleed air passage remain closed and bleed air is not supplied to the carburetor.

At high altitude, the HAC closes and the intake manifold vacuum is applied to the vacuum switching valve, HAC's additional bleed air passage and distributor.

As a result, the vacuum switching valve and HAC's additional bleed air passage are opened to supply bleed air to the carburetor. At the same time, the distributor advances the ignition timing.



High-altitude compensation system (California carburetor vehicles)

1EM097

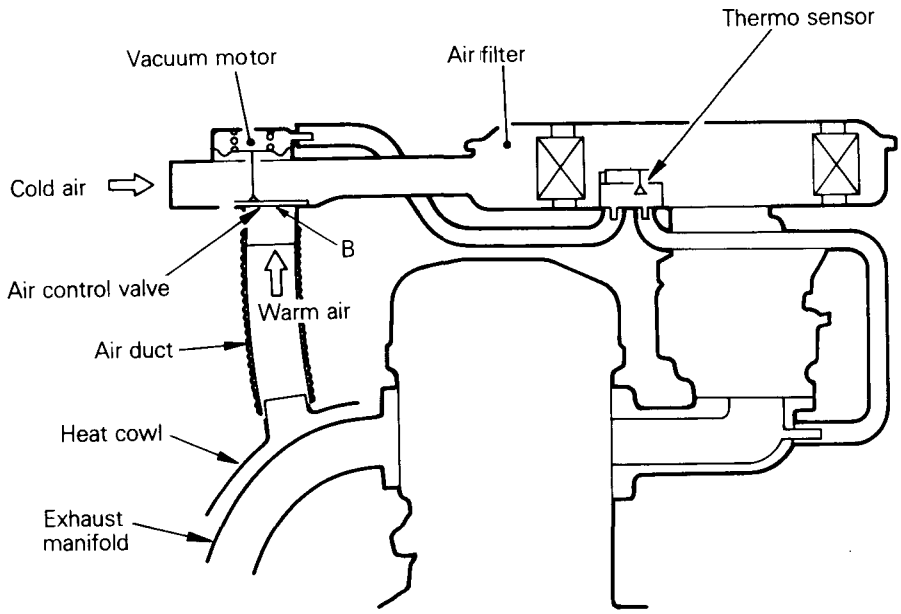
HIGH ALTITUDE COMPENSATION SYSTEM FOR CALIFORNIA VEHICLES

N25HCGD

In order to meet the California high-altitude requirements all the California carburetor vehicles are equipped with high altitude compensation system in addition to feedback carburetor system.
Refor to HIGH ALTITUDE COMPENSATION SYSTEM [High altitude specifications for the 49 states (excluding California)], P.25–14 for the contents of the system.

INTAKE AIR TEMPERATURE CONTROL SYSTEM

N25HCHA



6EM071

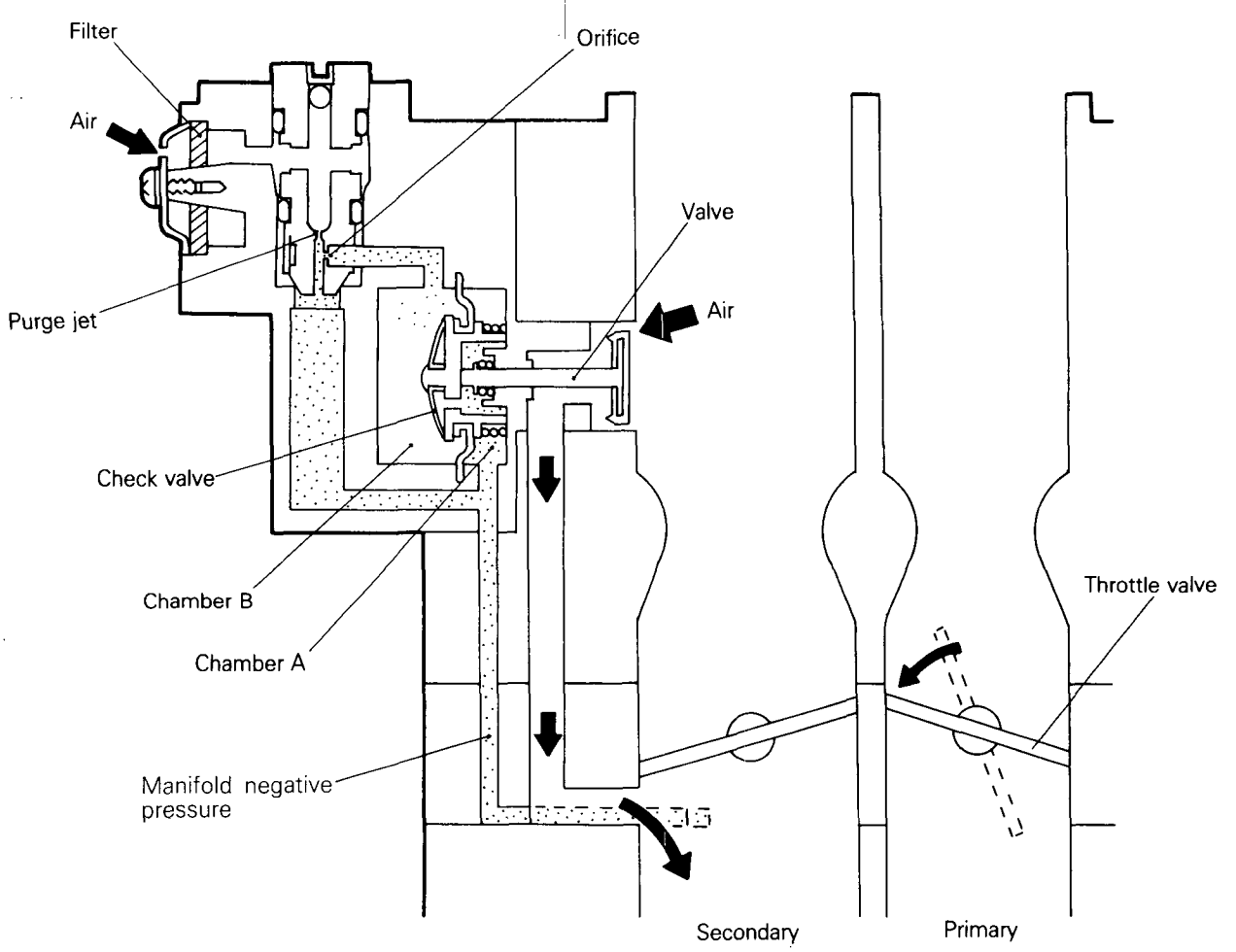
All vehicles are equipped with a temperature regulated air filter, as shown in illustration, so that the carburetor can be calibrated leaner to reduce CO and HC emissions and improved engine warm-up characteristics and minimized carburetor icing can be attained. The air filter is provided with an air control valve, inside the snorkel, to modulate temperature of carburetor intake air which flows through two routes. The air control valve is operated by a bi-metal which responds to the intake air temperature, or controlled by a vacuum motor/temperature sensor combination system which responds to the intake manifold vacuum and temperature inside the air filter.

Operation

- When the bi-metal senses the temperature inside air filter of below about 30°C (86°F) the air bleed valve of temperature sensor assembly remains closed. Then, the intake manifold vacuum is applied to the diaphragm of vacuum motor, which in turn, opens the air control valve so as to let the pre-heated intake air flow through the heat cowl and air duct into the air filter.
- When the bi-metal senses the temperature inside air filter of above about 45°C (113°F) the air bleed valve is fully opened. As a result, the intake air to the carburetor comes directly through the fresh air duct, since the air control valve is positioned at B, regardless of the intake manifold vacuum.
- At intermediate temperatures, the air entering the carburetor is a blend of fresh air and pre-heated air as regulated by the thermostatically actuated air control valve.

MIXTURE CONTROL VALVE (MCV)–VEHICLES WITH A MANUAL TRANSMISSION

N25HCIB



5FU076

When the throttle is closed suddenly during deceleration or shifting, the fuel remaining in the inlet manifold causes an over rich mixture temporarily.
In order to prevent this, air is supplied temporarily from another passage so as to keep correct air fuel ratio and reduce emission (HC).

Operation

When the throttle is closed suddenly, the manifold vacuum increases sharply. This increased manifold vacuum acts on the chamber A of the MCV to open the valve so that air is supplied to the inlet manifold. The vacuum is also supplied to chamber B but with some delay due to the orifice. When the vacuum is supplied to both chambers B and A, they are at vacuum and hence the spring causes the valve to close, stopping supply of air. The check valve located at the diaphragm is to prevent high vacuum from remaining in chamber B when acceleration/deceleration is repeated successively. (If a high vacuum remains in chamber B, the valve may fail to operate when vacuum acts on chamber A.)

SPECIFICATIONS

GENERAL SPECIFICATIONS

N25CA--

Items		Specifications
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow rate type (Purpose: Control of HC emission)
Evaporative emission control system	Canister 2-way valve Purge control valve (PCV) Bowl vent valve (BVV)	Equipped Equipped Single diaphragm type Vacuum type (Purpose: Control of HC emission)
Exhaust emission control	Jet control combustion type system	Jet swirl type (Purpose: Control of CO emission)
	Air fuel ratio control system – FBC system	Oxygen sensor feedback type (Purpose: Control of CO, HC, NOx emission)
	Three catalyst converter	Monolithic type (Purpose: Control of CO, HC, NOx emission)
	Secondary air supply system Reed valve Secondary air control solenoid valve	With air control valve (Purpose: Control of On-off solenoid valve CO, HC emission)
	Exhaust gas recirculation system EGR valve Vacuum regulator valve (VRV) Thermo valve	Single type With vacuum control (Purpose: Control of Wax type NOx emission)
	High altitude compensation system – High altitude specifications for the 49 states and California High altitude compensator (HAC)	(Purpose: Control of CO, HC emission) Bellows type
	Intake air temperature control system	Vacuum control type (Purpose: Control of CO, HC emission)
	Mixture control valve (MCV) – Vehicles with a manual transmission	Differential pressure type valve (Purpose: Control of CO, HC emission)

SERVICE SPECIFICATIONS

N25CB--

Items	Specifications
Secondary air control solenoid valve coil resistance Ω	38 – 44 [at 20°C (68°F)]
Thermo valve opening temperature °C (°F)	18 (64) 65 (149)
High altitude compensator operating altitude m (ft.)	Approx. 1,200 (3,900)

TORQUE SPECIFICATIONS

N25CC--

Items	Nm	ft.lbs.
Secondary air pipe control valve side joint	50 – 60	37 – 44
Secondary air pipe exhaust manifold side joint	70 – 100	52 – 74
EGR valve attaching bolt	19 – 28	14 – 20
Thermo valve (for nipples)	20 – 40	15 – 30

SEALANTS AND ADHESIVES

N25CE--

Items	Specified sealants and adhesives	Quantity
Thermo valve	3M Adhesive Nut Locking 4171 or equivalent	As required

TROUBLESHOOTING

N25EA--

Symptom	Probable cause	Remedy	Reference page
Engine will not start or is hard to start (Cranking possible)	Vacuum hose disconnected or damaged	Repair or replace	–
	Mixture control valve kept open	Replace	–
	EGR valve kept open	Repair or replace	25-33
Rough idle or engine stalls	Vacuum hose disconnected or damaged	Repair or replace	–
	High altitude compensation system faulty – High altitude specifications for the 49 states, and California	Troubleshoot the system and check components under suspicion	25-36
	EGR valve kept open	Repair or replace	25-33
	Faulty purge control system	Troubleshoot the system and check components under suspicion	25-28
	Faulty bowl vent valve	Replace	25-27
	Mixture control valve kept open	Replace	25-42
	Faulty PCV valve	Replace	25-28
Engine hesitates or poor acceleration	Exhaust gas recirculation system faulty	Troubleshoot the system and check each component under suspicion	25-33
	High altitude compensation system faulty – High altitude specifications for the 49 states, and California	Troubleshoot the system and check components under suspicion	25-36
	Thermo valve faulty – cold engine	Replace	25-29
	Intake air temperature control system faulty	Troubleshoot the system and check components under suspicion	25-41
Excessive oil consumption	Positive crankcase ventilation line clogged	Check positive crankcase ventilation system	Refer to GROUP 0.
Poor fuel mileage	Intake air temperature control system faulty	Troubleshoot the system and check components under suspicion	25-41
	Exhaust gas recirculation system faulty	Troubleshoot the system and check components under suspicion	25-33
	High altitude compensation system faulty – High altitude specifications for the 49 states, and California	Troubleshoot the system and check components under suspicion	25-36

STB Revision

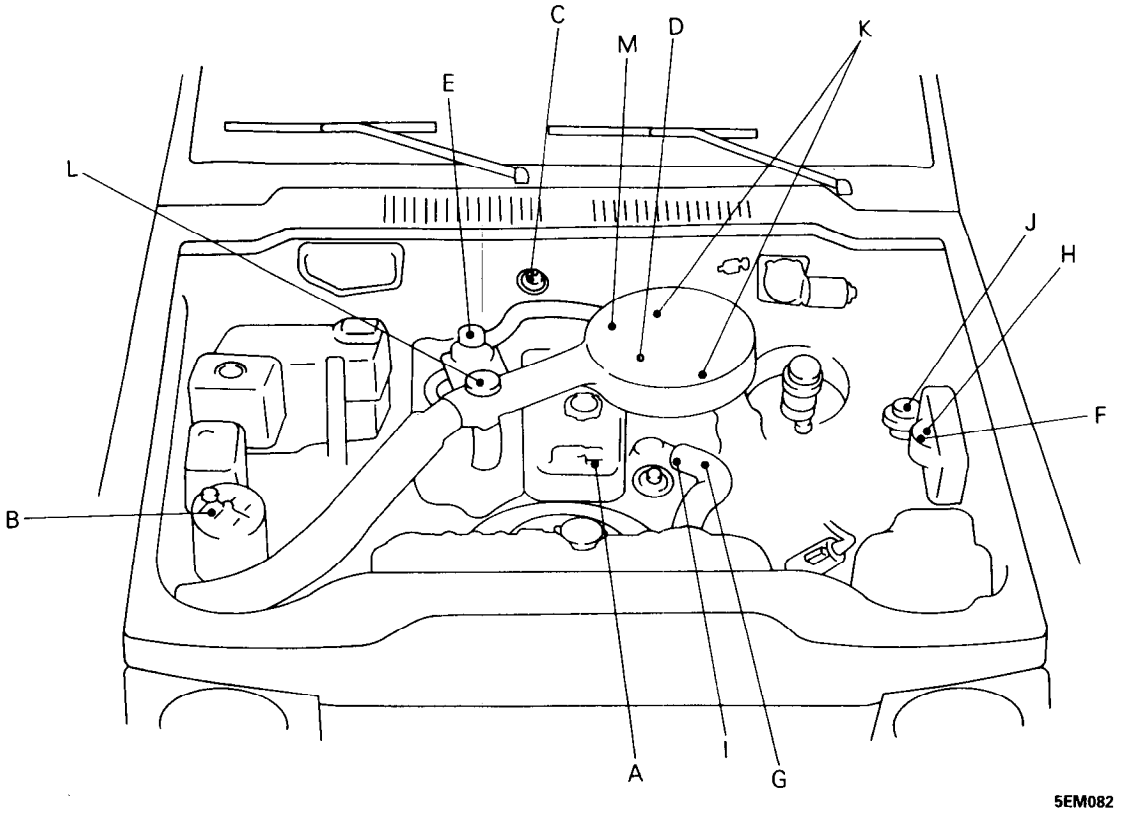
Related parts \ Emission control system	Crankcase emission control system	Evaporative emission control system	Jet air system	Air fuel ratio control system	Three catalyst converter	Secondary air supply system	Exhaust gas recirculation (EGR) system	High-altitude compensation system	Intake air temperature control system	Transmission	Reference page for each part inspection
PCV valve	×										Maintenance (Group 0)
Bowl vent valve		×									25-27
Purge control valve		×									25-28
Thermo valve		×					×				25-29
Canister		×									25-8
Overfill limiter (2-way valve)		×									25-30
Jet valve			×								Engine (Group 9)
FBC system component				×		×					Fuel (Group 14)
Three catalyst converter					×						25-30
Secondary air control valve (with reed valve)						×					25-31
Secondary air control solenoid valve						×					25-32
EGR valve							×				25-33
Vacuum regulator valve							×				25-34
High altitude compensator [High altitude specifications for the 49 states (excluding California)]								×			25-36
High altitude compensator....California								×			25-40
Vacuum switching valve [High altitude specifications for the 49 states (excluding California)]								×			25-41
Check valve								×			25-37
Air control valve									×		25-37
Thermo sensor									×		25-41
Mixture control valve....M/T*										×	25-42

*M/T: Vehicles with a manual transmission

COMPONENT LAYOUT AND VACUUM HOSE PIPING

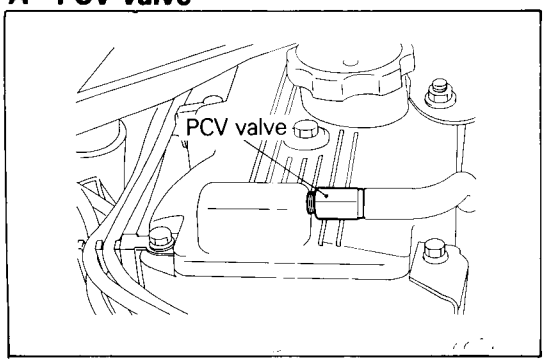
N25EA-A–

COMPONENT LAYOUT

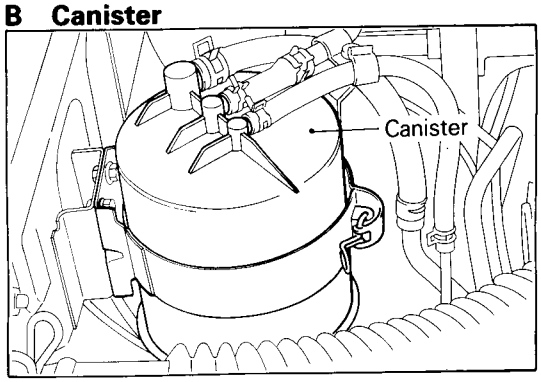


A PCV valve
B Canister
C Purge control valve
D Bowl vent valve
E Reed valve
F Secondary air control solenoid valve
G EGR valve
H Vacuum regulator valve
I Thermo valve
J High-altitude compensator [High-altitude specifications for the 49 states (ex. California), vehicles for California]
K Vacuum switching valve [High-altitude specifications for the 49 states]
L Air control valve
M Mixture control valve (Vehicles with manual transmission)

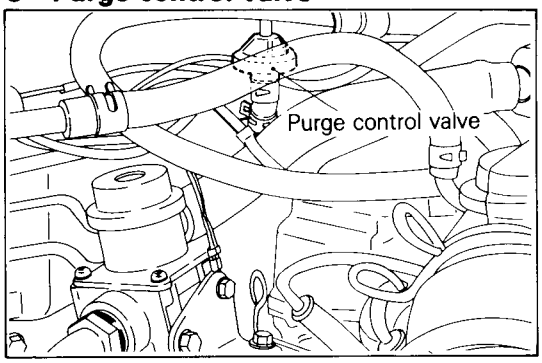
A PCV valve



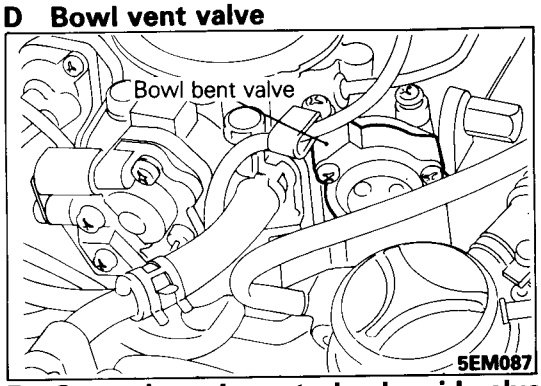
B Canister



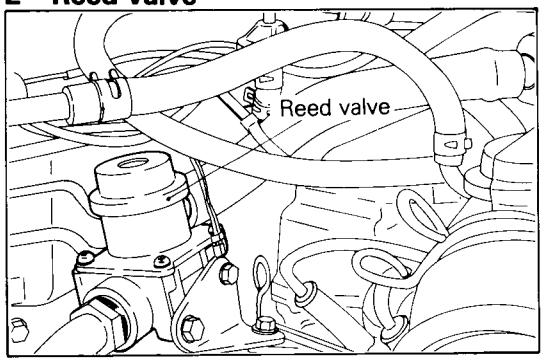
C Purge control valve



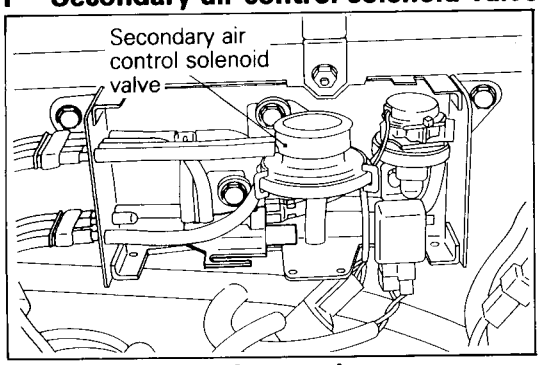
D Bowl vent valve



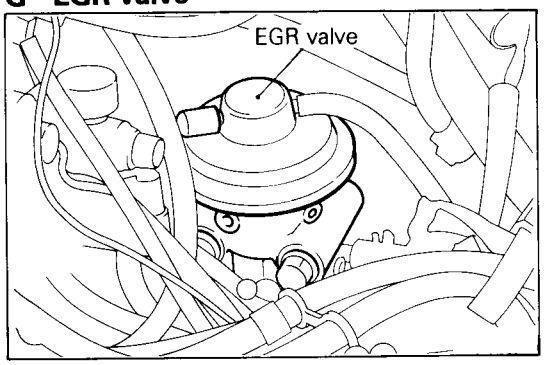
E Reed valve



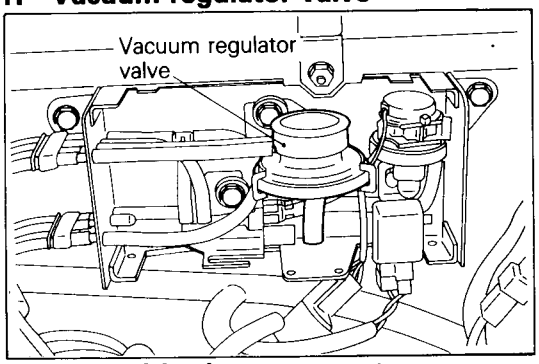
F Secondary air control solenoid valve



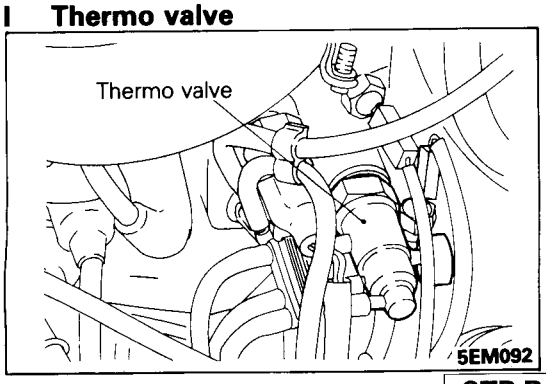
G EGR valve



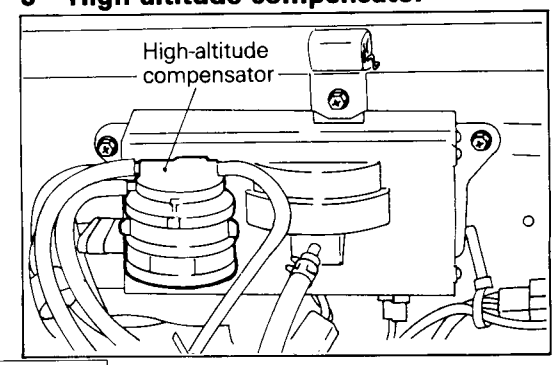
H Vacuum regulator valve



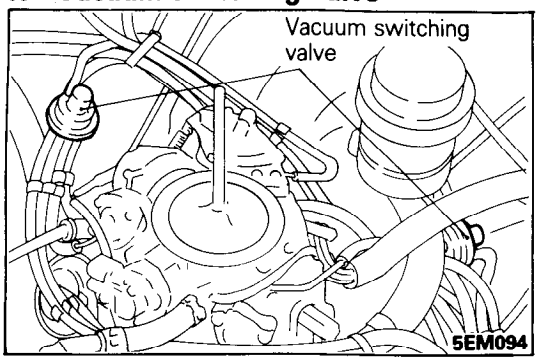
I Thermo valve



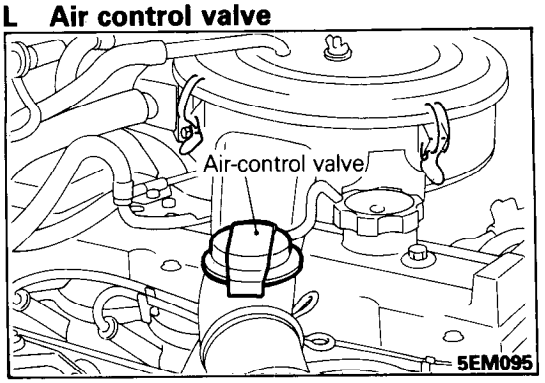
J High-altitude compensator



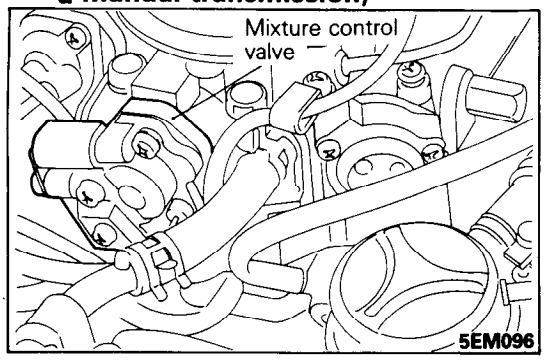
K Vacuum switching valve



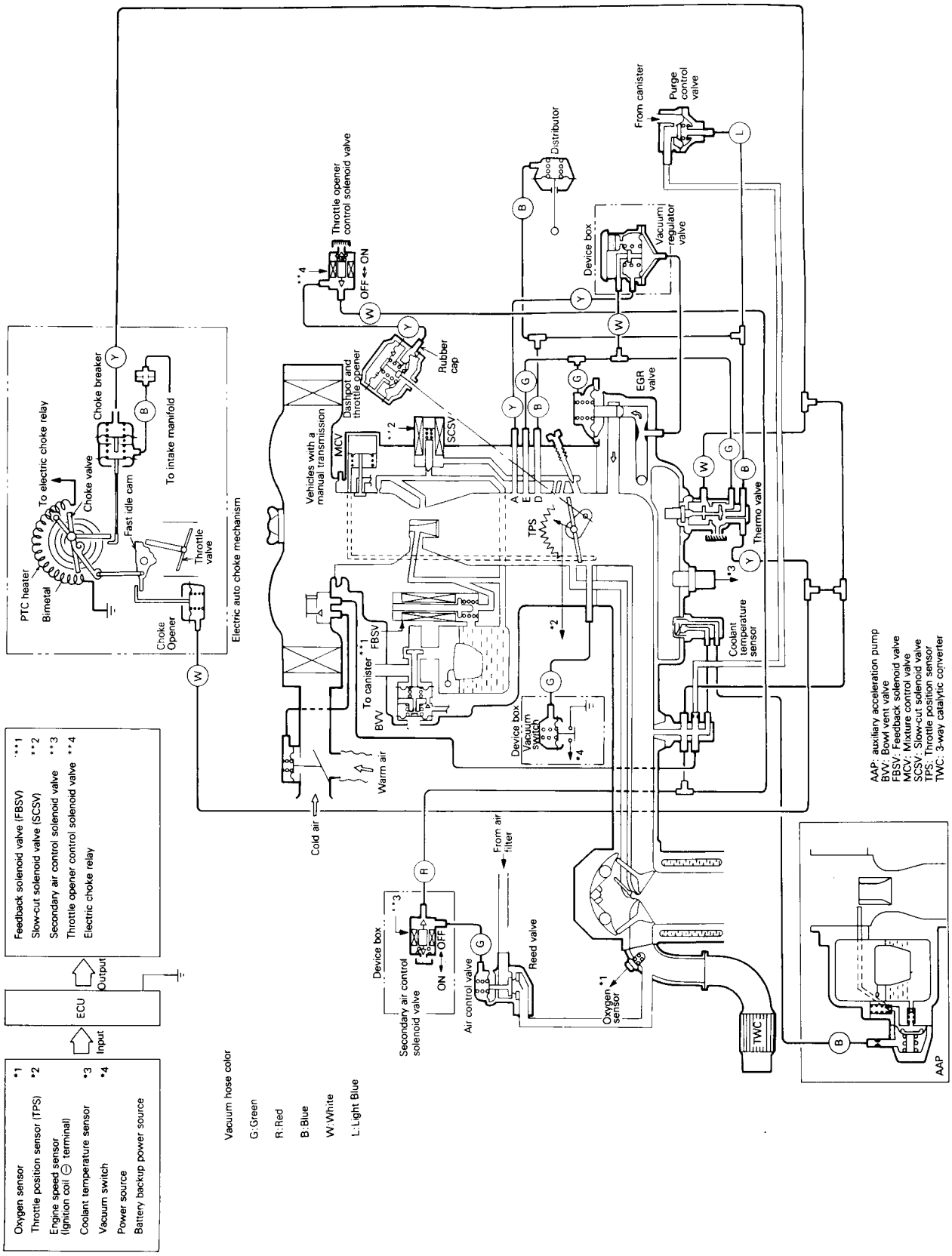
L Air control valve



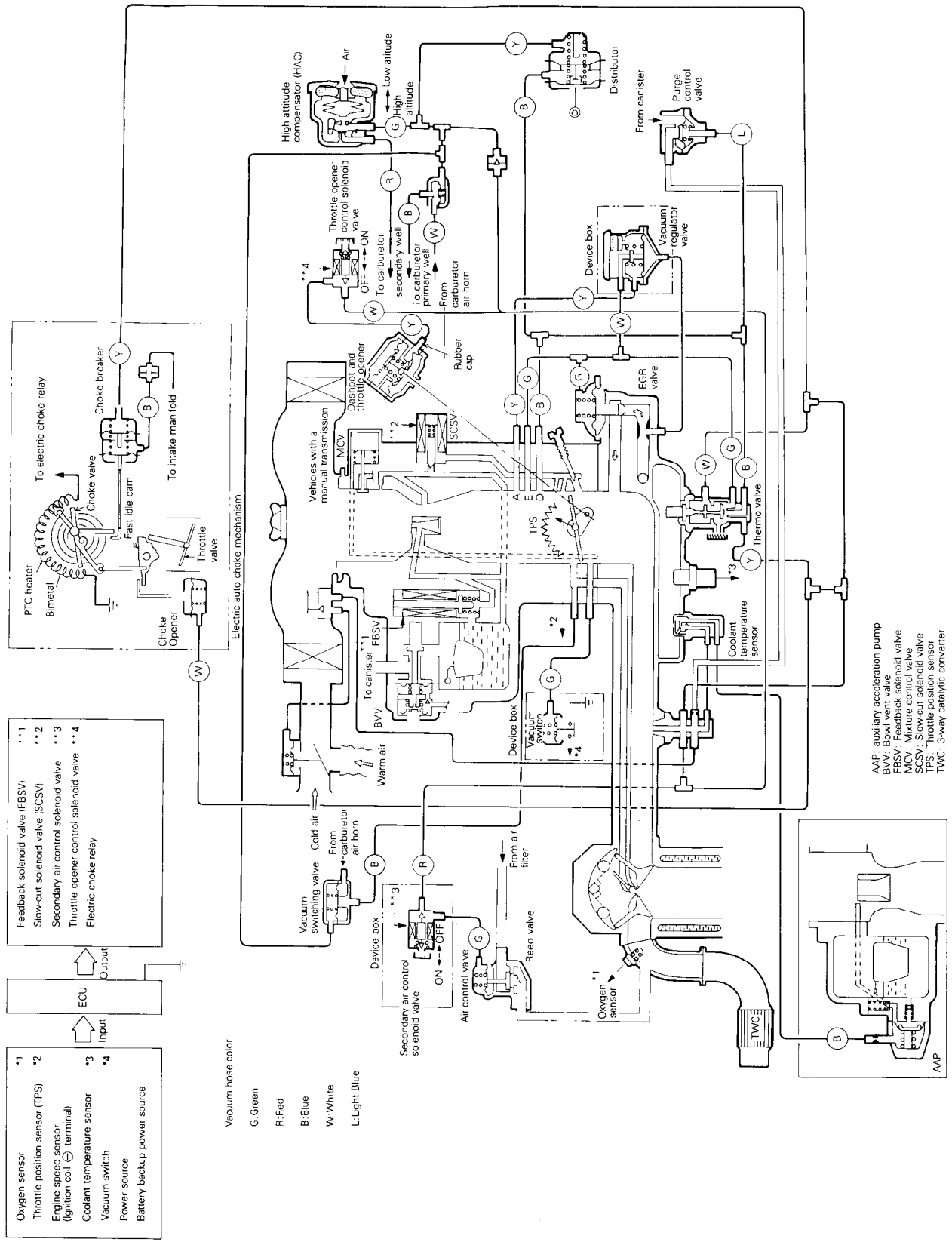
M Mixture control valve (Vehicles with a manual transmission)



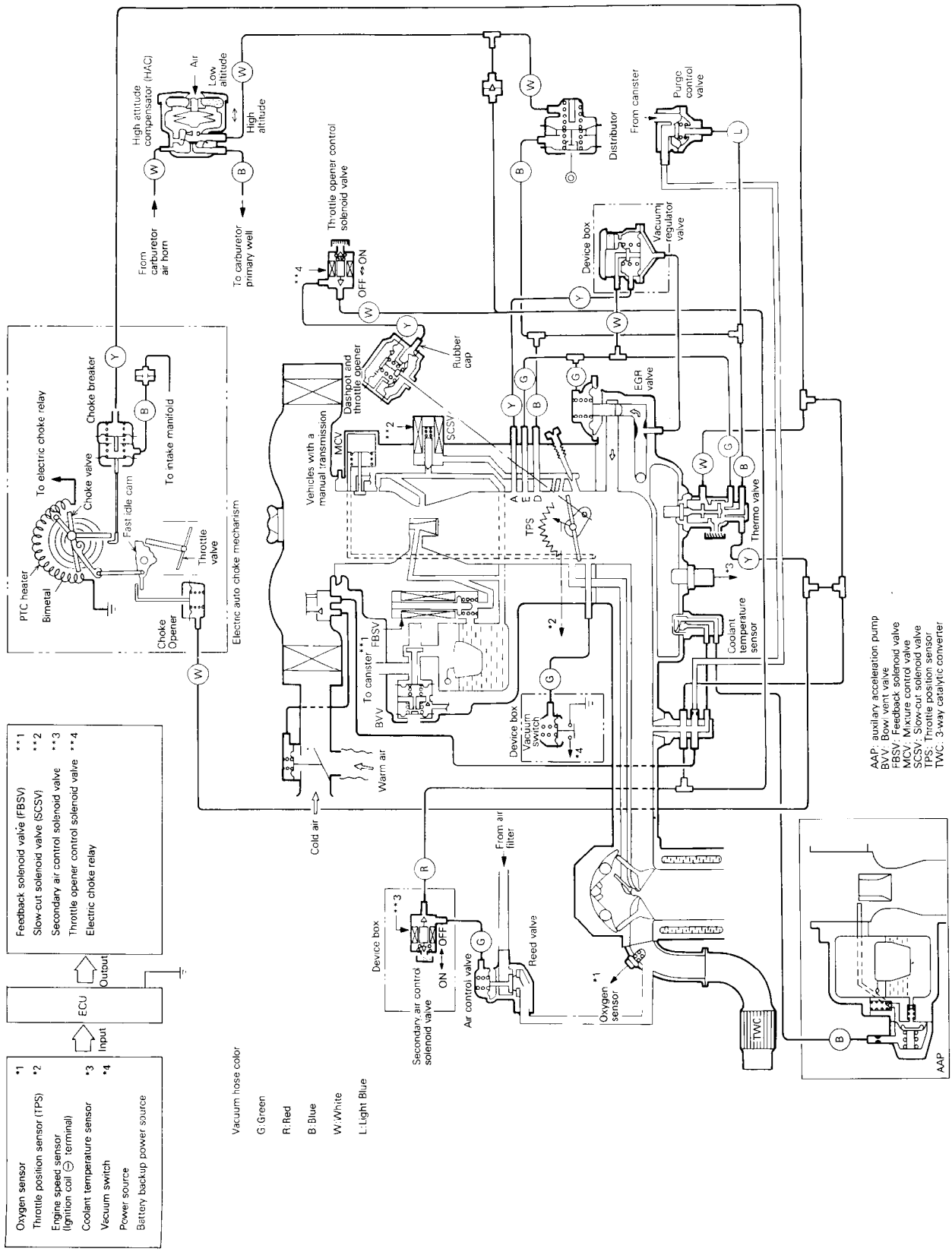
VACUUM HOSE PIPING DIAGRAM-vehicles for the 49 states other than California (excluding high-altitude specification)

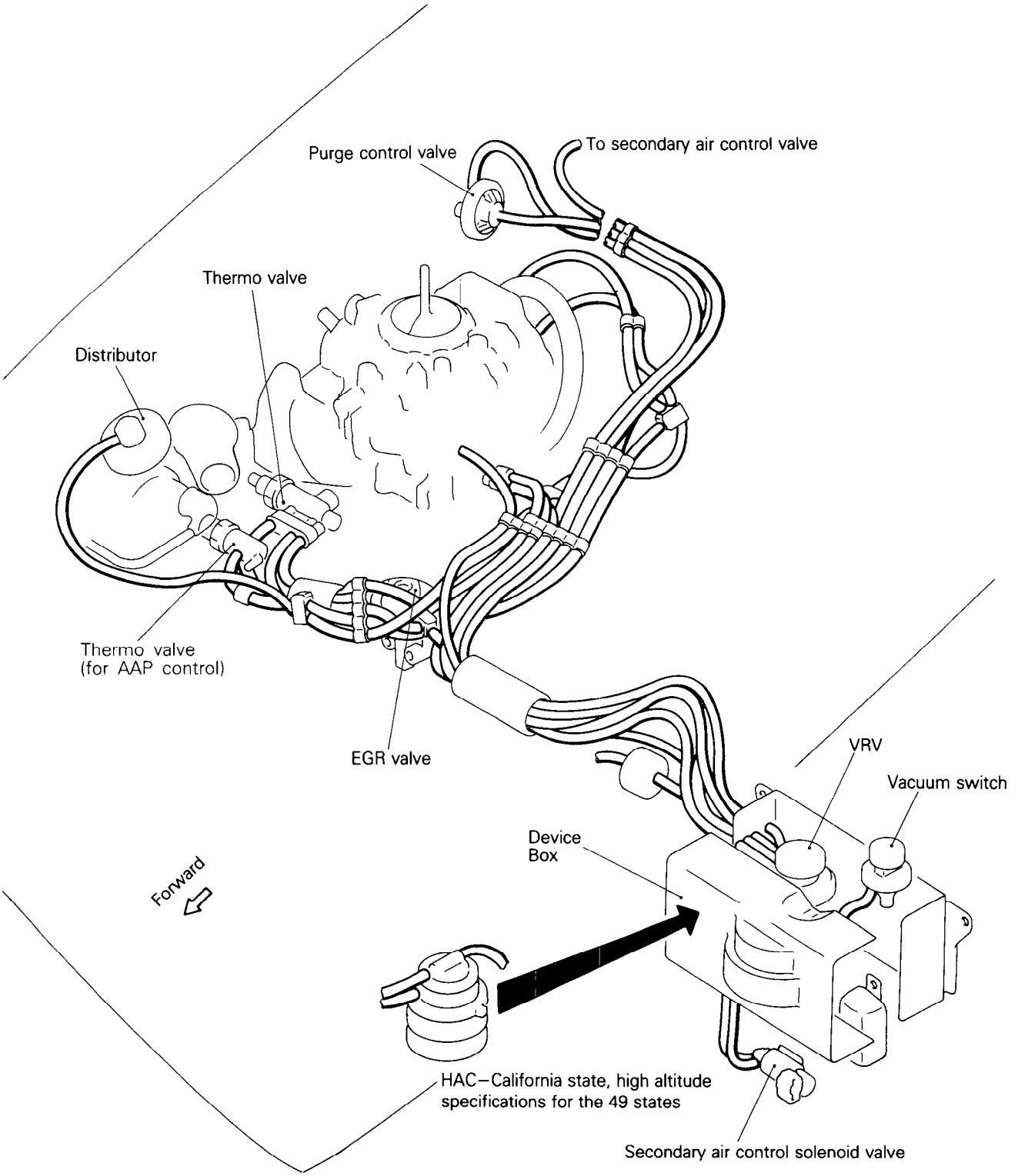


VACUUM HOSE PIPING DIAGRAM-vehicles with high-altitude specifications for the 49 states other than California



VACUUM HOSE PIPING DIAGRAM-vehicles for California




Purge control valve
To secondary air control valve
Thermo valve
Distributor
Thermo valve
(for AAP control)
EGR valve
VRV
Vacuum switch
Device
Box
Forward
HAC–California state, high altitude
specifications for the 49 states
Secondary air control solenoid valve

5FU190

CAUTIONS ON INSPECTION N25GALA

1. Adjust the engine before checking the system components.
2. Check hose connections (disengagement, looseness, etc.) and check for break, incorrect piping and damage.
3. Check hoses, pipes and ports for clogging and check hoses and pipes for cracks and damage.
4. When hoses are replaced, be sure to connect to original position (and in original direction).
5. After service, check piping connections referring to service label or service manual.

CRANKCASE EMISSION CONTROL SYSTEM N25IAAA

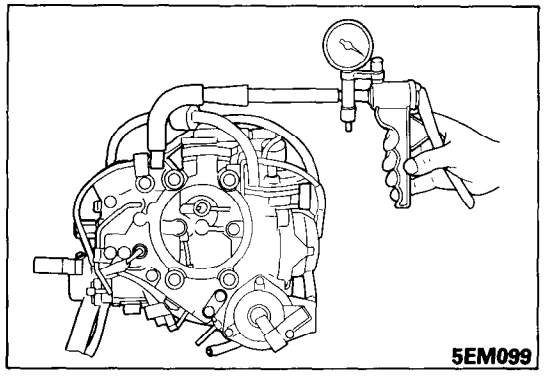
INSPECTION OF POSITIVE CRANKCASE VENTILATION (PCV) VALVE

Refer to GROUP 0 LUBRICATION AND MAINTENANCE– Maintenance Service

EVAPORATIVE EMISSION CONTROL SYSTEM N25IBAA

INSPECTION OF BOWL VENT VALVE (BVV)

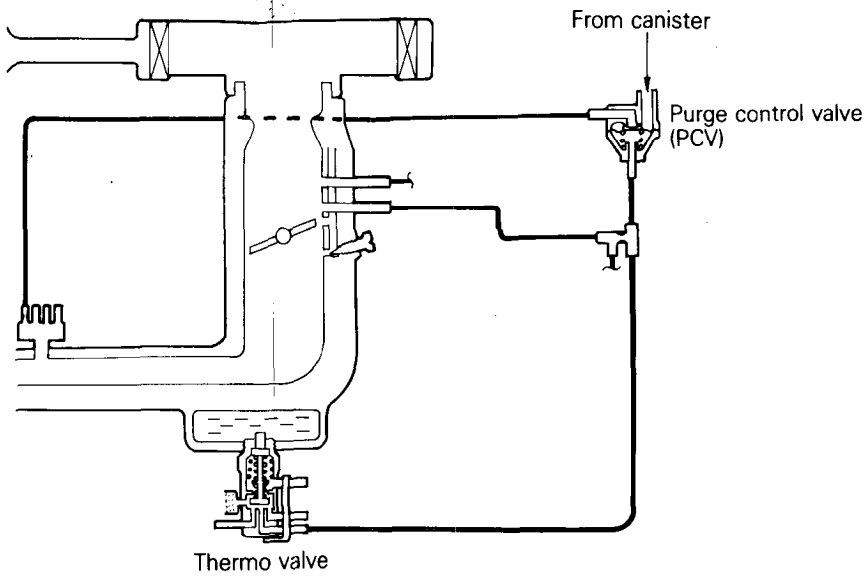
Caution
Check after the engine is allowed to cool enough. If the engine is not cold, fuel could gush out from the BVV.


5EM099

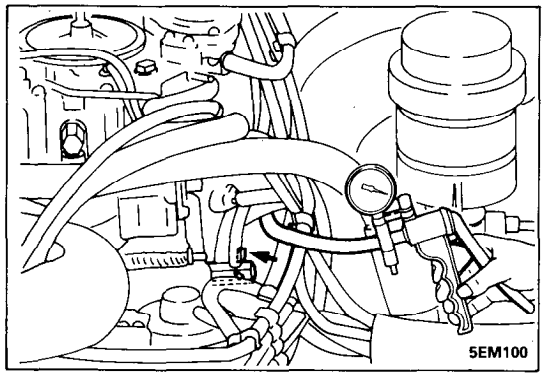
(1) Remove the air filter.
(2) Disconnect the bowl vapor hose from the bowl vent valve (BVV) nipple and connect a hand vacuum pump to the BVV nipple.
(3) Apply a vacuum of 20 kPa (3.0 psi) to the BVV to check the condition as follows.

Engine state	Normal condition
Stopped	Vacuum leaks
Idling	Vacuum holds

INSPECTION OF PURGE CONTROL SYSTEM



5EM030



5EM100

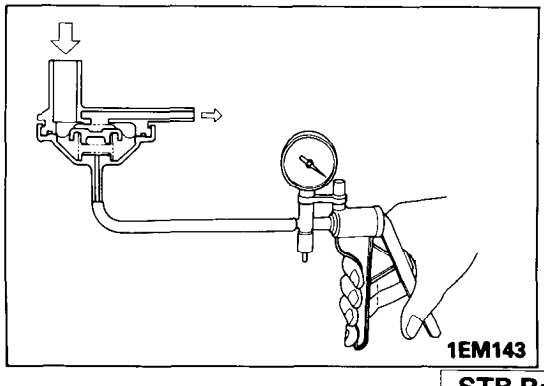
(1) Disconnect the black vacuum hose from the intake manifold nipple and plug the nipple. Then, connect a hand vacuum pump to the disconnected black vacuum hose.
(2) Check the following both when the engine is cold [engine coolant temperature 50°C (122°F) or less] and when it is hot [engine coolant temperature 85 to 95°C (185 to 205°F)]

When engine is cold

Vacuum	Engine state	Normal condition
53 kPa (7.7 psi)	2,500 rpm	Vacuum is held

When engine is hot

Vacuum	Engine state	Normal condition
53 kPa (7.7 psi)	Idling	Vacuum is held
53 kPa (7.7 psi)	2,500 rpm	Vacuum leaks



1EM143

INSPECTION OF PURGE CONTROL VALVE (PCV) N25IBCA

(1) Remove the purge control valve.
(2) Connect a hand vacuum pump to the vacuum nipple of the PCV.

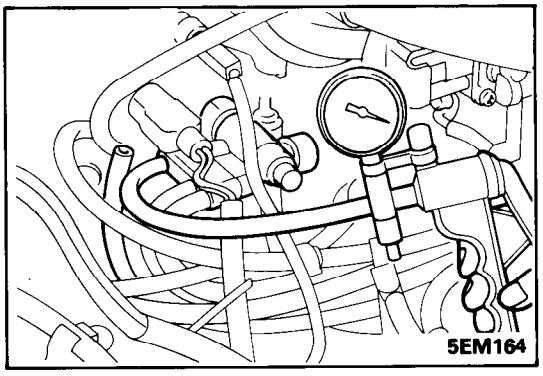
(3) Apply a vacuum of 53 kPa (7.7 psi) to check air tightness.
(4) Blow in air lightly from the canister side nipple to check conditions as follows.

Hand vacuum pump vacuum	Normal condition
0 kPa (No vacuum is applied)	Air does not blow through
27 kPa (3.9 psi) or more	Air blows through

INSPECTION OF THERMO VALVE N25IBDA

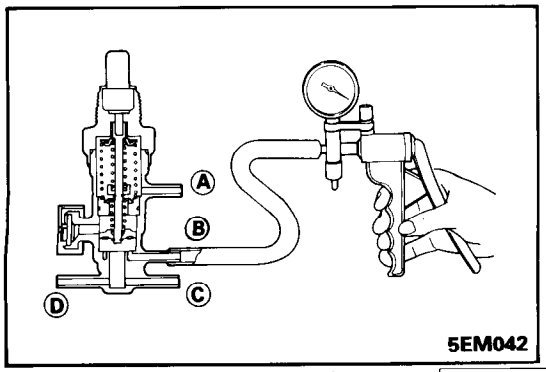
NOTE
This thermo valve also controls the choke breaker, EGR and choke opener.

Caution
1. **When removing or installing the thermo valve, do not use wrenches or other tools on the resin part.**
2. **When installing, apply 3M Adhesive Nut Locking 4171 or equivalent to the threads and tighten to 20 to 40 Nm (15 to 30 ft.lbs.).**
3. **When disconnecting the vacuum hose, put a mark on the hose so that it may be reconnected at original position.**


5EM164

(1) Disconnect the vacuum hose (white stripe) from the thermo valve and connect a hand vacuum pump to the thermo valve.
(2) Apply vacuum to check thermo valve condition as follows.

Engine coolant	Normal condition
10°C (50°F) or less	Vacuum leaks
25°C (77°F) or more	Vacuum holds



5EM042

(3) Disconnect all vacuum hoses from the thermo valve.
(4) Connect a hand vacuum pump to nipples (B), (C) and (D) and apply vacuum to check thermo valve condition as follows.

NOTE
Plug nipples other than one to which the hand vacuum pump is connected.

Engine coolant temperature	Normal condition
40°C (104°F) or less	Vacuum leaks
80°C (176°F) or more	Vacuum holds

INSPECTION OF OVERFILL LIMITER (TWO-WAY VALVE) N25IBEA

Refer to GROUP 14 FUEL SYSTEM–Fuel Tank.

EXHAUST EMISSION CONTROL SYSTEM N25ICAA

INSPECTION OF AIR FUEL RATIO CONTROL (FBC) SYSTEM

Refer to GROUP 14 FUEL SYSTEM-Inspection of FBC System.

INSPECTION OF THREE CATALYST CONVERTER N25ICBA

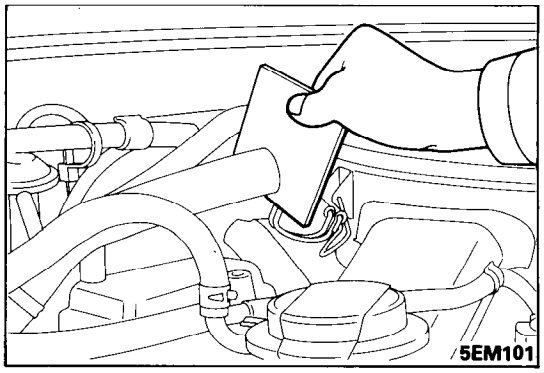
For removal and installation procedures, refer to GROUP 11 INTAKE AND EXHAUST-Exhaust Pipes and Main Muffler.

INSPECTION

Check for damage, cracks or fusion and replace if faulty.

Caution

1. **Operation of any type, including idling, should be avoided if engine misfiring occurs. Under this condition the exhaust system will operate at abnormally high temperature, which may cause damage to the catalyst or under-body parts of the vehicle.**
2. **Alteration or deterioration of ignition or fuel system, or any type of operating condition which results in engine misfiring must be corrected to avoid overheating the catalytic onveters.**
3. **Proper maintenance and tuneup according to manufacturer's specifications should be made to correct the conditions as soon as possible.**


5EM101

INSPECTION OF SECONDARY AIR SUPPLY SYSTEM N25ICCA

(1) Disconnect the air suppy hose from the air filter and hold a small steel plate at the disconnected hose end to check air suction.

Engine coolant temperature	Engine state	Air suction
20–40°C (68–104°F)	Idling	Yes
70°C (158°F) or more		Yes (within 70 seconds after start)
		No (70 seconds or more after start)
	Rapid deceleration from 4,000 rpm	Yes

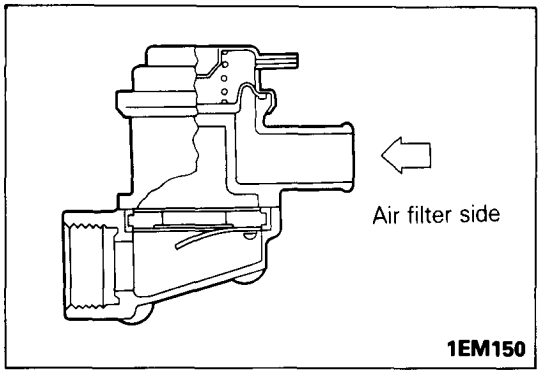
Caution

Note that if secondary air control valve is broken, emission may blow back.

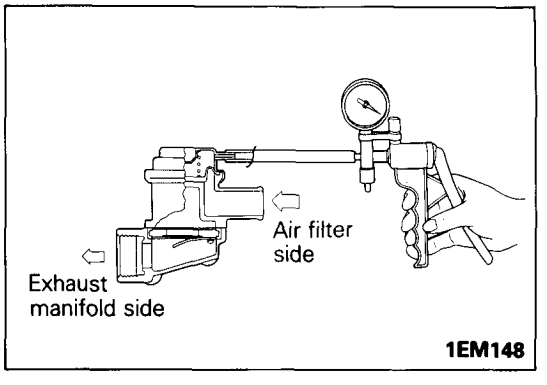
INSPECTION OF SECONDARY AIR CONTROL VALVE

N25ICFA

(1) Remove the secondary air control valve.



(2) Blow in air from the air filter side to check that air does not blow through.



(3) Connect a hand vacuum pump to the secondary air control valve nipple.
(4) Apply a vacuum of 67 kPa (9.7 psi) and check air tightness.

(5) Apply a vacuum of 20 kPa (3.0 psi) and blow in air to check condition as follows.

Air blow direction	Normal condition
Air filter side to exhaust manifold side	Air blows through
Exhaust manifold side to air filter side	Air does not blow through

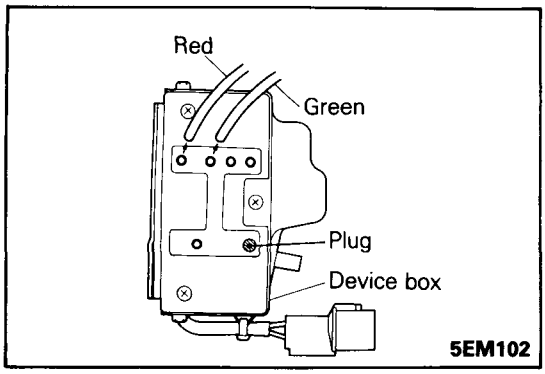
(6) If any fault is found in above checks, replace the secondary air control valve.

Secondary air control valve tightening torque :
50–60 Nm (37–44 ft.lbs.)

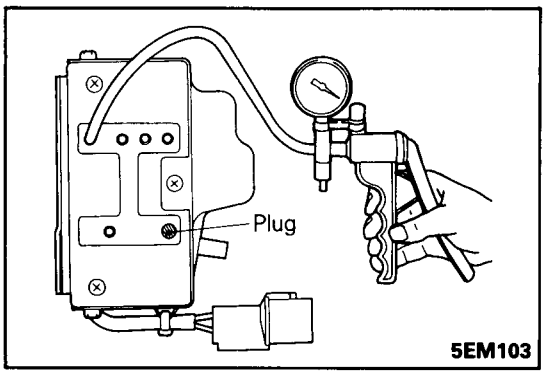
INSPECTION OF SECONDARY AIR CONTROL SOLENOID VALVE

N25ICGC

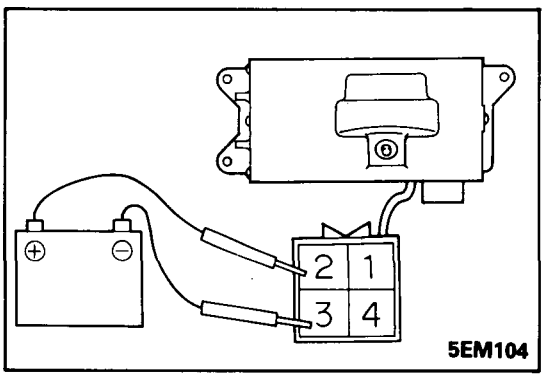
NOTE
When disconnecting the vacuum hose, put a mark on the hose so that it may be reconnected at original position.



(1) Disconnect the vacuum hoses, (red stripe, green stripe) from the device box.
(2) Separate the harness connector.

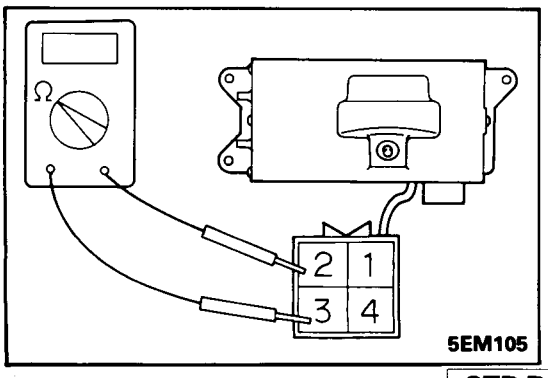


(3) Connect a hand vacuum pump to the nipple to which red stripe vacuum hose has been connected.



(4) Apply vacuum and check air tighteness both when the battery voltage is applied directly to the solenoid valve terminal and when not applied

Battery voltage	Other nipple of device box	Normal condition
When applied	Open	Vacuum leaks
	Closed with finger	Vacuum holds
When not applied	Open	Vacuum holds



(5) Measure solenoid coil resistance.

Standard value : 38 – 44 [at 20°C (68°F)]

INSPECTION OF ENGINE COOLANT TEMPERATURE SENSOR N25ICHA

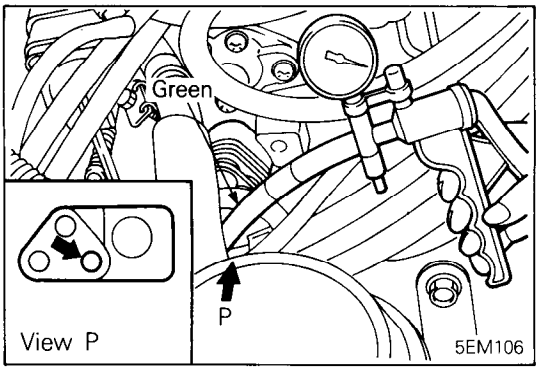
INSPECTION OF ENGINE SPEED SENSOR

INSPECTION OF VACUUM SWITCH

Refer to GROUP 14 FUEL SYSTEM – Service Adjustment Procedures.

INSPECTION OF THERMO VALVE

Refer to PURGE CONTROL SYSTEM, P.25-28.



INSPECTION OF EXHAUST GAS RECIRCULATION (EGR) SYSTEM N25ICJA

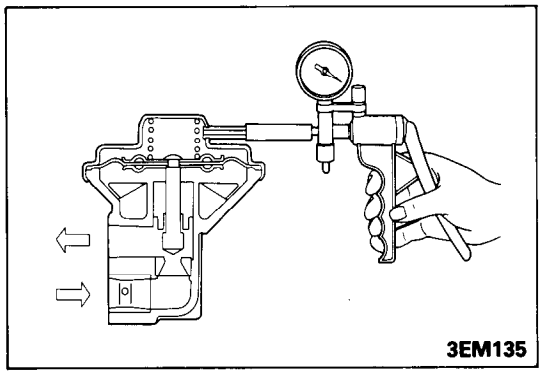
(1) Disconnect the vacuum hose (green stripe) from the carburetor throttle body and connect a hand vacuum pump to the vacuum hose.
(2) Check the following both when the engine is cold [engine coolant temperature 45°F (113°F) or less] and when it is hot [engine coolant temperature 85 to 95°C (185 to 205°F)]

When engine is cold

Vacuum	Engine state	Normal condition
Apply vacuum	3,500 rpm	Vacuum leaks - from thermo valve into atmosphere

When engine is hot

Vacuum	Engine state	Normal condition
Apply vacuum	Idling	Vacuum leaks
	3,500 rpm	Leaks until vacuum reaches about 11 kPa (1.5 psi)

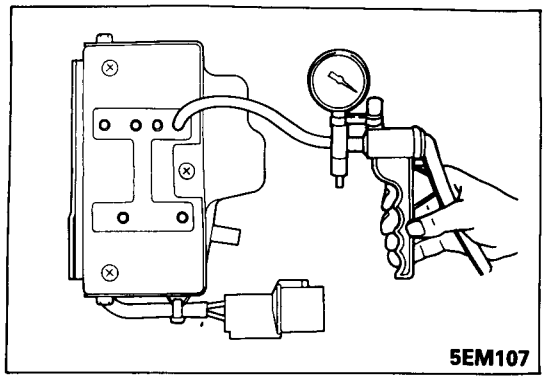


INSPECTION OF EGR VALVE N25ICKA

(1) Remove the EGR valve and check it for sticking, deposit of carbon, etc. If such condition exists, clean with adequate solvent to ensure tight valve seat contact.
(2) Connect a hand vacuum pump to the EGR valve.
(3) Apply a vacuum of 67 kPa (9.7 psi) and check air tightness.
(4) Blow in air from one passage of the EGR to check condition as follows.

Vacuum	Normal condition
8 kPa (1.2 psi) or less	Air does not blow through
23 kPa (3.3 psi) or more	Air blows through

Caution
When installing the EGR, use a new gasket and tighten to 7 to 11 Nm (5 to 8 ft.lbs.).



INSPECTION OF VACUUM REGULATOR VALVE (VRV) N25ICLA

(1) Disconnect the vacuum hose (white stripe) from the device box and connect a hand vacuum pump to the device box.
(2) Apply a vacuum of 53 kPa (7.7 psi) and check VRV condition as follow.

Engine state	Normal condition
Stopped	Vacuum leaks
3,500 rpm	Vacuum holds

INSPECTION OF EGR VALVE CONTROL VACUUM N25ICMA

INSPECTION OF VRV CONTROL VACUUM

Refer to GROUP 14 FUEL SYSTEM – Service Adjustment Procedures.

INSPECTION OF THERMO VALVE N25ICNA

Refer to PURGE CONTROL SYSTEM, P.25-28.

INSPECTION OF HIGH ALTITUDE COMPENSATION SYSTEM – High altitude specifications for the 49 states (excluding California) N25ICOE

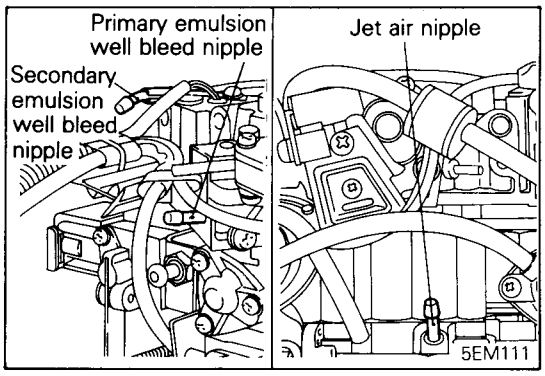
INSPECTION AT ALTITUDE BELOW 1,200 m (3,900 ft.)

NOTE
When disconnecting the vacuum hose, put a mark on the hose so that it may be reconnected at original position.

Inspection Condition

Engine coolant temperature:85 - 95°C (185 - 205°F)

(1) Set the timing light.
(2) Remove the air filter.

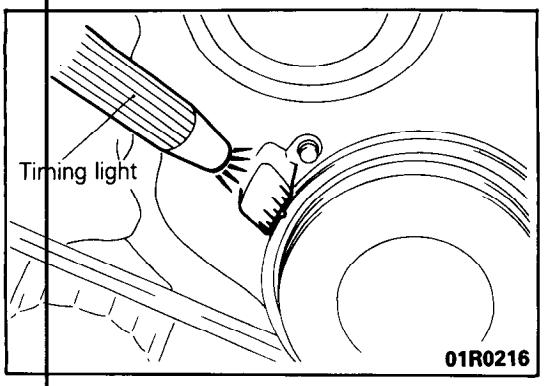


(3) Disconnect the vacuum hoses (black, red stripe, black) from the carburetor primary emulsion well bleed nipple, secondary emulsion well bleed nipple and jet air nipple and plug the nipples.

(4) Connect a hand vacuum pump to the vacuum hoses, one hose at a time, and check air tightness while running the engine at idle.

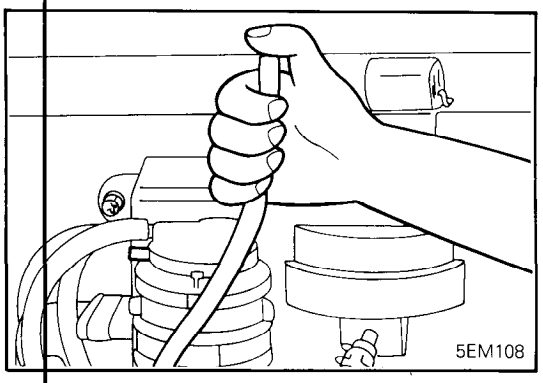
Step	vacuum hose	Normal condition
1	Primary emulsion well (black)	Vacuum holds
2	Secondary emulsion well (red stripe)	
3	Jet air (black)	

STB Revision



(5) Connect the disconnected vacuum hoses to original position.
(6) Run the engine at idle and check ignition timing.

Standard value : 7°BTDC ± 2°



(7) While running the engine at idle, disconnect the vacuum hose (yellow stripe) from the HAC and put a finger at the hose end to check that vacuum is felt.

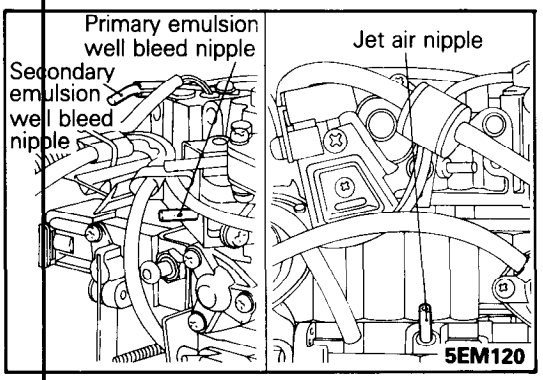
INSPECTION AT ALTITUDE ABOVE 1,200 m (3,900 ft.)

NOTE
When disconnecting the vacuum hose, put a mark on the hose so that is may be reconnected at original position.

Inspection Condition

Engine coolant temperature : 85 - 95°C (185 - 205°F)

(1) Set the timing light.
(2) Remove the air filter.

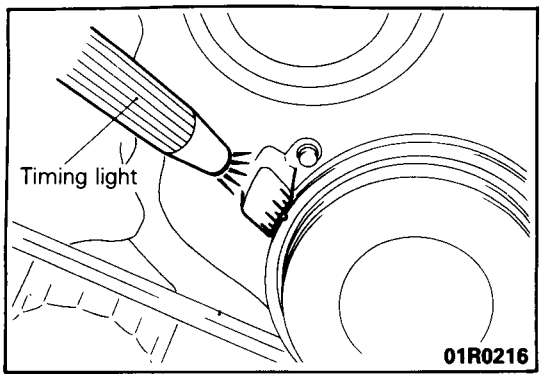


(3) Disconnect the vacuum hoses (black, red stripe, black) from the carburetor primary emulsion well bleed nipple, secondary emulsion well bleed nipple and jet air nipple.

(4) Connect a hand vacuum pump to the vacuum hoses, one hose at a time, and check air tightness while running the engine at idle.

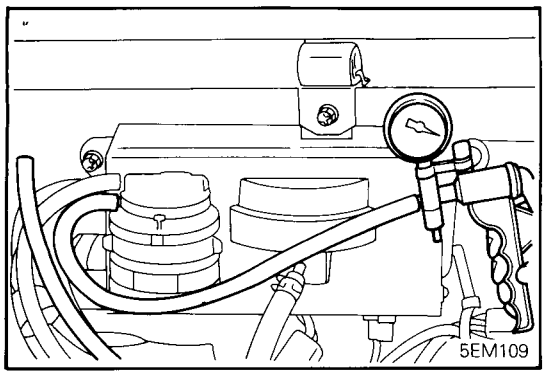
Step	Vacuum hose	Normal condition
1	Primary emulsion well (black)	Vacuum leaks
2	Secondary emulsion well (red stripe)	
3	Jet air (black)	

(5) Connect the disconnected vacuum hoses to original position.



(6) Run the engine at ilde and check ignition timing.

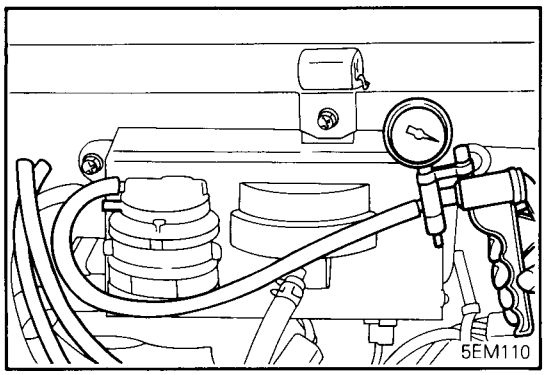
Standard value : Approx. 12°BTDC



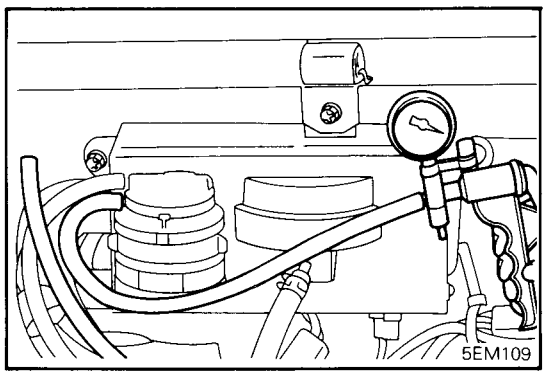
INSPECTION OF HIGH ALTITUDE COMPENSATOR (HAC) – High altitude specifications for the 49 states (excluding California) N25ICPC

INSPECTION AT ALTITUDE BELOW 1,200 m (3,900 ft.)

(1) Disconnect the vacuum hose (yellow stripe) from the HAC and connect a hand vacuum pump to the HAC nipple.
(2) Apply vacuum and check that it leaks and does not hold.

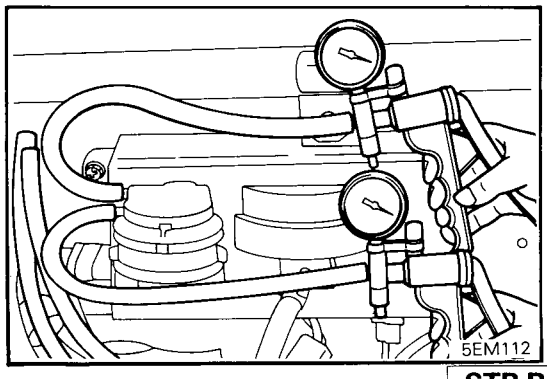


(3) Disconnect the vacuum hose (red stripe) from the HAC and connect a hand vacuum pump to the HAC nipple.
(4) Check that vacuum holds when applied.



INSPECTION AT ALTITUDE ABOVE 1,200 m (3,900 ft.)

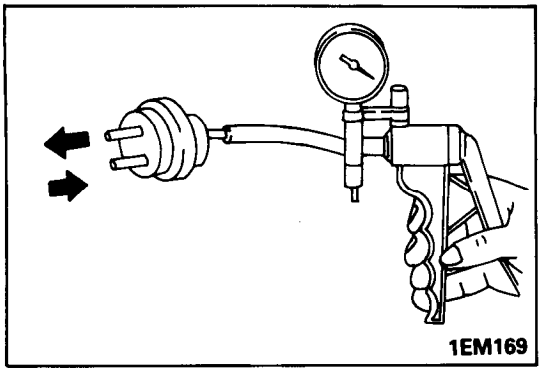
(1) Disconnect the vacuum hose (yellow stripe) from the HAC and connect a hand vacuum pump to the HAC nipple.
(2) Check that vacuum holds when applied.



(3) Disconnect the vacuum hose (red stripe) from the HAC and connect another hand vaccum pump to the HAC nipple.
(4) With vacuum held as in step (2), check that vacuum leaks and dose not hold.

INSPECTION OF VACUUM SWITCHING VALVE (VSV) – High altitude specifications for the 49 states (excluding California) N25ICQB

NOTE
When disconnecting he vacuum hose, put a mark on the hose so that it may be reconnected at original position.


1EM169

(1) Remove the vacuum switching valve (VSV).
(2) Connect a hand vacuum pump to the black vacuum nipple of the VSV.
(3) Apply a vacuum of 53 kPa (7.7 psi) and check air tightness.

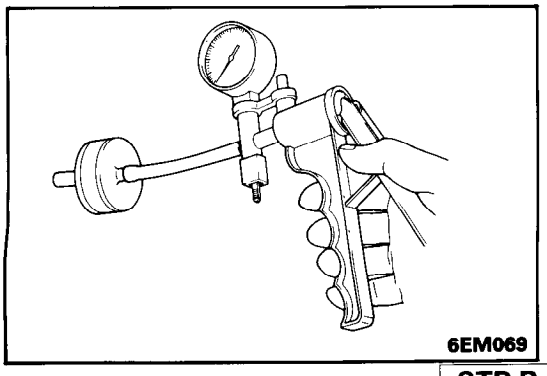
(4) Blow in air lightly from the carburetor air bleed side nipple and check condition as follows.

Hand vacuum pump vacuum	Normal condition
27 kPa (3.9 psi) or less	Air does not blow through
34 kPa (4.8 psi) or more	Air blows through

INSPECTION OF CHECK VALVE – High altitude specifications for the 49 states (excluding California), and vehicles for California N25ICIC

NOTE
When disconnecting the vacuum hose, put a mark on the hose so that it may be reconnected at original position.

(1) Remove the check valve.


6EM069

(2) Connect a hand vacuum pump to the check valve and check air tightness.

Color of nipple to which hand vacuum pump is connected	Normal condition
Dark blue	Vacuum leaks
White	Vacuum holds

INSPECTION OF CARBURETOR BLEED AIR PASSAGE CLOGGING (INSPECTION OF CARBURETOR HIGH ALTITUDE COMPENSATION FUNCTION) N25ICVA

Refer to GROUP 14 FUEL SYSTEM–Service Adjustment Procedures.

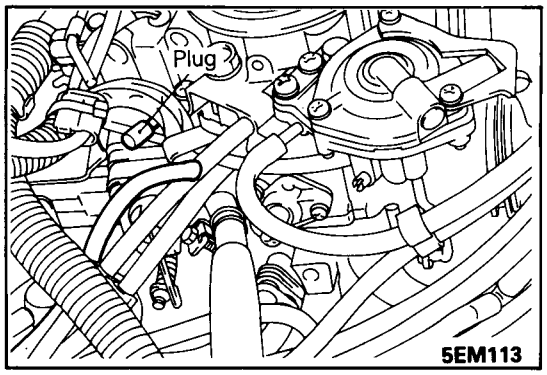
INSPECTION OF HIGH ALTITUDE COMPENSATION SYSTEM – Vehicles for California N25ICOF

INSPECTION AT ALTITUDE BELOW 1,200 m, (3,900 ft.)

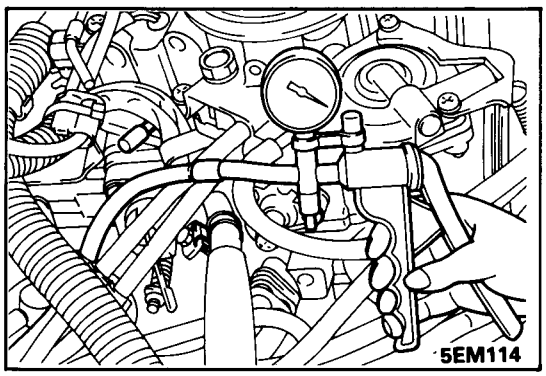
NOTE
When disconnecting the vacuum hose, put a mark on the hose so that it may be reconnected at original position.

Inspection Condition

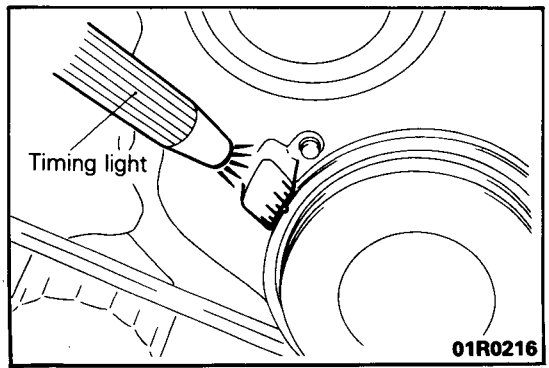
Engine coolant temperature : 85 – 95°C (185 – 205°F)



(1) Set the timing light.
(2) Remove the air filter.
(3) Disconnect the vacuum hose (black) from the carburetor primary emulsion well bleed nipple and plug the nipple.

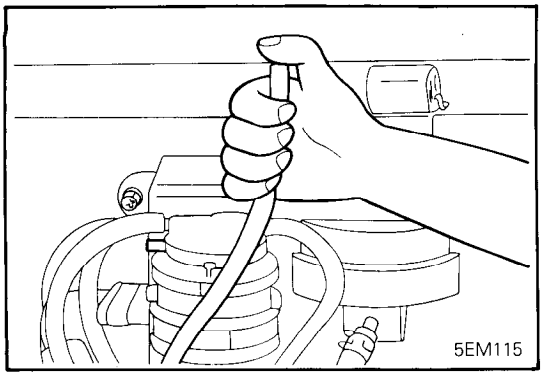


(4) Connect a hand vacuum pump to the vacuum hose and check that vacuum is held when applied while running the engine at idle.



(5) Connect the disconnected vacuum hose to original position.
(6) Run the engine at idle and check ignition timing.

Standard value : 7°BTDC ± 2°



(7) While running the engine at idle, disconnect the vacuum hose (white stripe, two nipples side) from the HAC and hold a finger at the hose end to check that vacuum is felt.

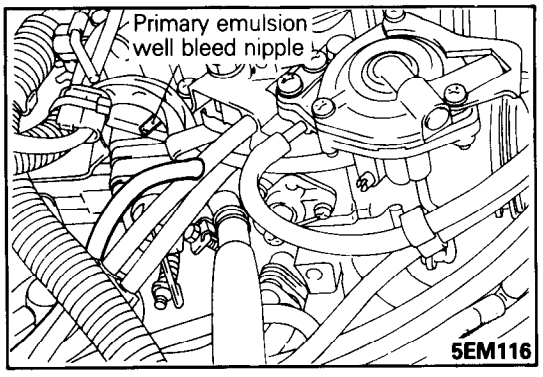
INSPECTION AT ALTITUDE ABOVE 1,200 m (3,900 ft.)

NOTE
When disconnecting the vacuum hose, put a mark on the hose so that it may be reconnected at original position.

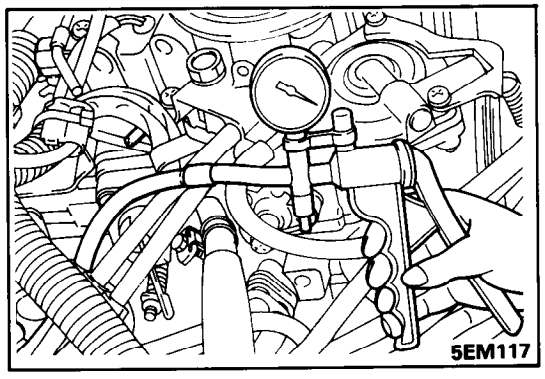
Inspection Condition

Engine coolant temperature : 85–95°C(185 –205°F)

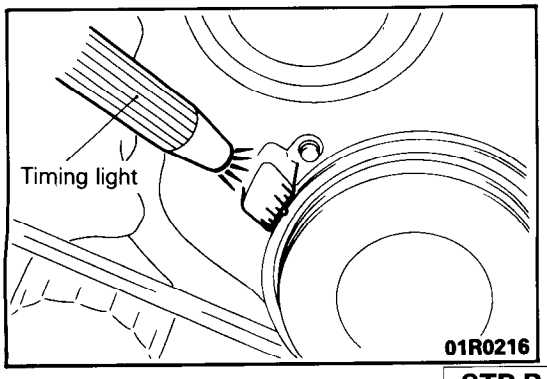
(1) Set the timing light.
(2) Remove the air filter.



(3) Disconnect the vacuum hose (black) from the carburetor primary emulsion well bleed nipple.



(4) Connect a hand vacuum pump to the vacuum hose and while running the engine at idle, apply vacuum to check the pressure leaks and does not build up.

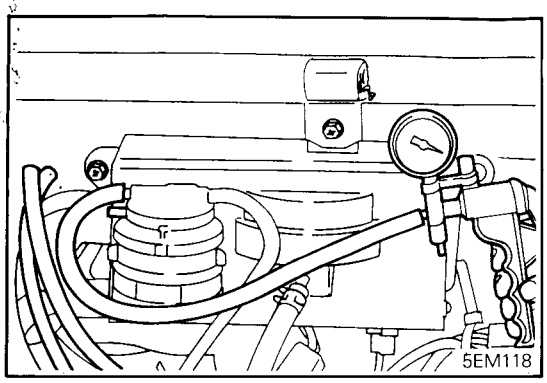


(5) Connect the disconnected vacuum hose to original position.
(6) Run the engine at idle and check ignition timing.

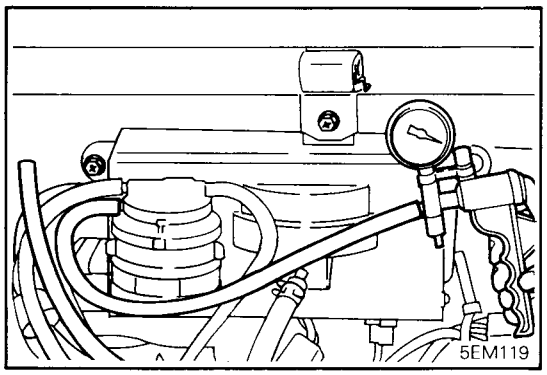
Standard value : Approx. 12°BTDC

INSPECTION OF HIGH ALTITUDE COMPENSATOR (HAC) – Vehicles for California N25ICPD

INSPECTION AT ALTITUDE BELOW 1,200 m (3,900 ft.)

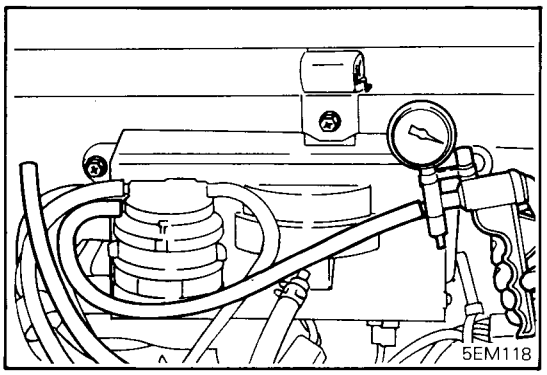


(1) Disconnect the vacuum hose (white stripe, two nipples side) from the HAC and connect a hand vacuum pump to the HAC nipple.
(2) Apply vacuum and check that it leaks and does not hold.

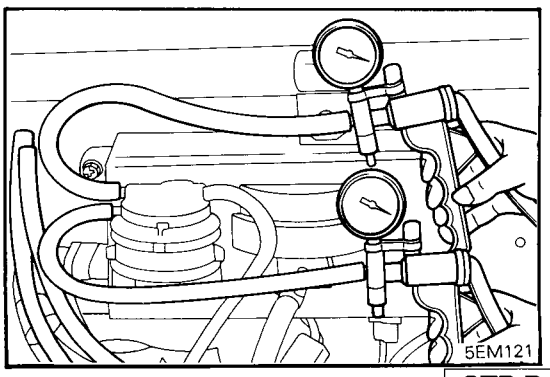


(3) Disconnect the vacuum hose (black) from the HAC and connect a hand vacuum pump to the HAC nipple.
(4) Check that vacuum holds when applied.

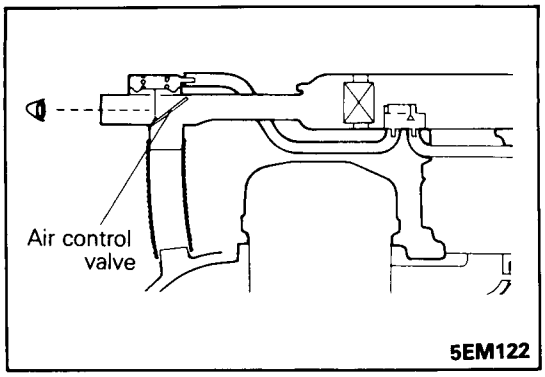
INSPECTION AT ALTITUDE ABOVE 1,200 m (3,900 ft.)



(1) Disconnect the vacuum hose (white stripe, two nipples side) from the HAC and connect a hand vacuum pump to the HAC nipple.
(2) Check that vacuum holds when applied.



(3) Disconnect the vacuum hose (black) from the HAC and connect another hand vacuum pump to the HAC nipple.
(4) Holding the vacuum applied in procedure 2, apply vacuum and check that it leaks and does not hold.

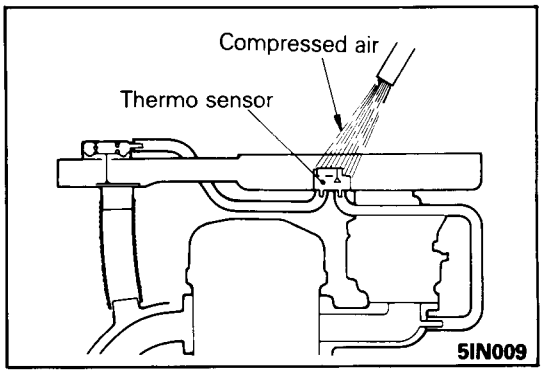


INSPECTION OF INTAKE AIR TEMPERATURE CONTROL SYSTEM

N25ICSA

(1) Remove the air filter cover and air duct.
(2) Run the engine at idle and check air control valve condition.

Thermo sensor temperature	Normal condition
30°C (86°F) or less	Cold air side inlet closes
45°C (113°F) or more	Cold air side inlet opens



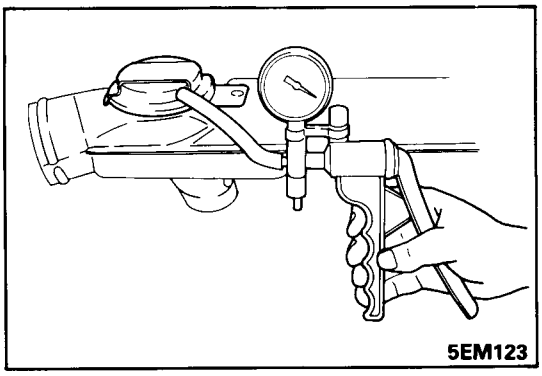
NOTE
If necessary, apply compressed air to cool or apply hot air using a hair dryer, etc. to heat.

INSPECTION OF AIR CONTROL VALVE AND THERMO SENSOR

N25ICTA

INSPECTION OF AIR CONTROL VALVE

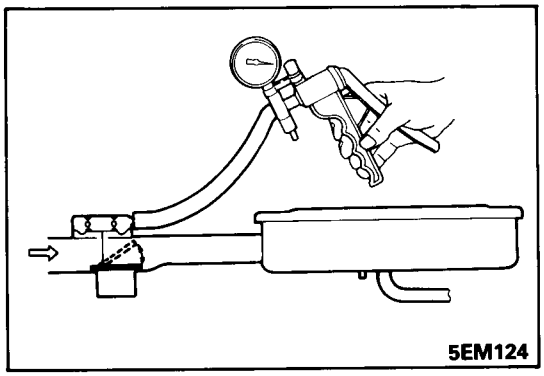
(1) Remove the air filter.
(2) Disconnect the vacuum hose from the air control valve and connect a hand vacuum pump to the valve nipple.
(3) Apply a vacuum of 67 kPa (9.7 psi) and check air tightness.



(4) Check air control valve operation.

Vacuum	Normal condition
9 kPa (1.4 psi) or less	Cold air side inlet opens
25 kPa (3.7 psi) or more	Cold air side inlet closes

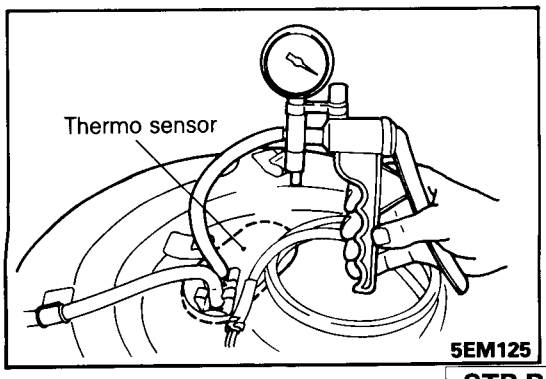
(5) Connect the disconnected vacuum hose to the original position.



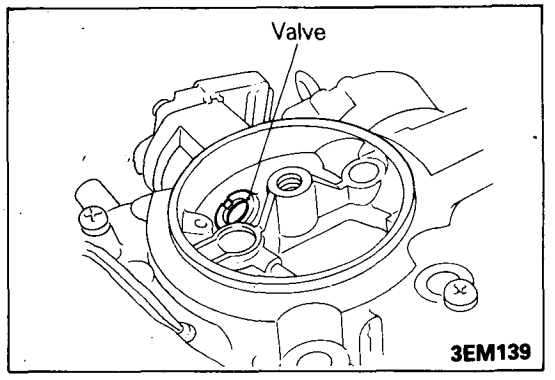
INSPECTION OF THERMO SENSOR

(1) Connect a hand vacuum pump to the thermo sensor nipple and check air tightness.

Thermo sensor temperature	Normal condition
30°C (86°F) or less	Vacuum holds
45°C (113°F) or more	Vacuum leaks



(2) If any fault is found in above checks, replace the air filter body.



INSPECTION OF MIXTURE CONTROL VALVE (MCV) – Vehicles with a manual transmission N25ICUB

Caution
Check the valve after warming up the engine.

(1) Remove the air filter.
(2) Start the engine and open and close the throttle valve quickly to check MCV operation and air suction noise.

Engine speed	Normal condition	
	MCV valve operation	Air suction noise
Throttle lever in operation	Pops out once and quickly closes	Heard
Idling	Remains closed	Not heard