DAIHATSU

F300

[HD-ENGINE]

EC

EMISSION CONTROL SYSTEMS

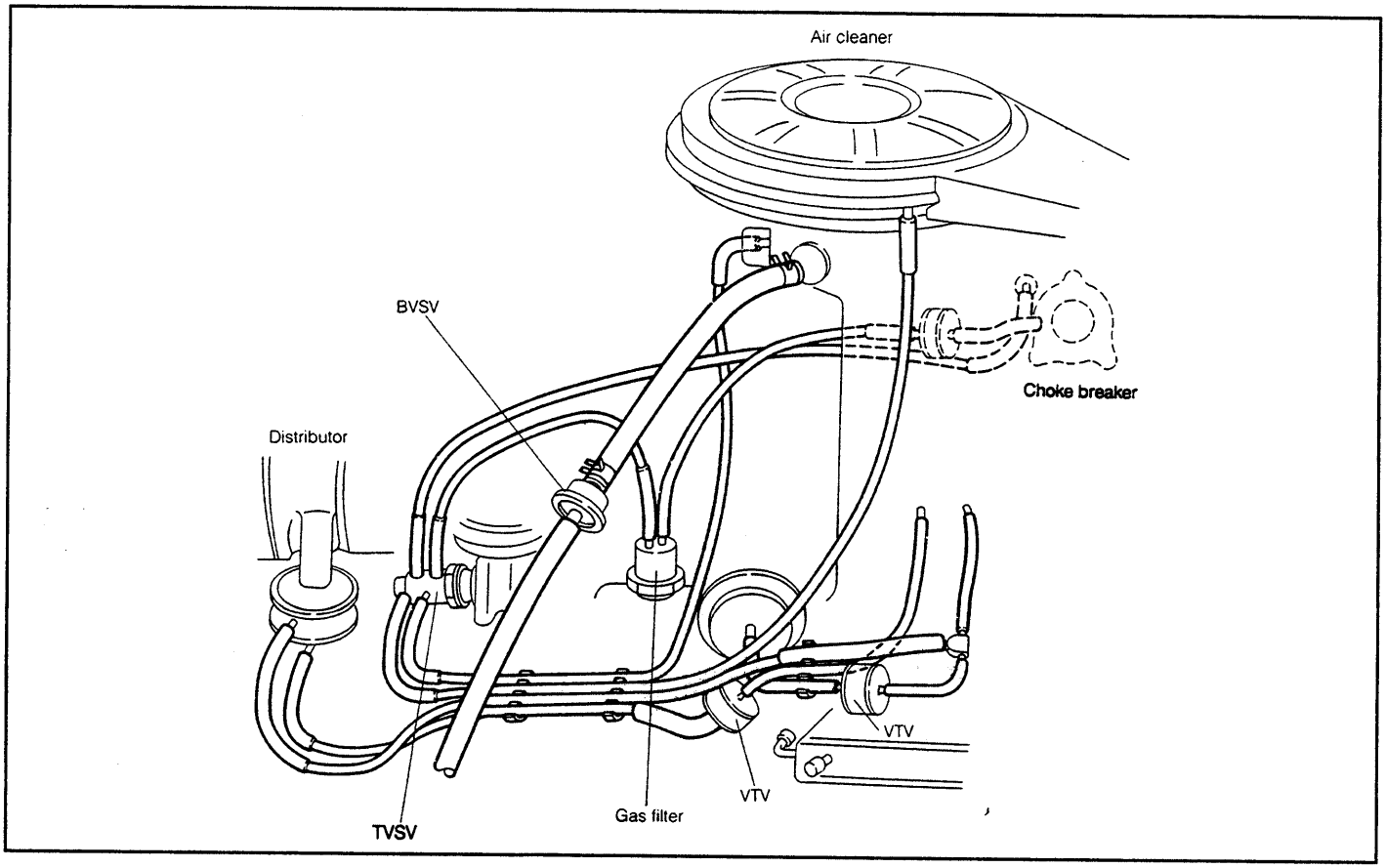
WN88-EC001

[HD-C Engine]
PURPOSE OF SYSTEM

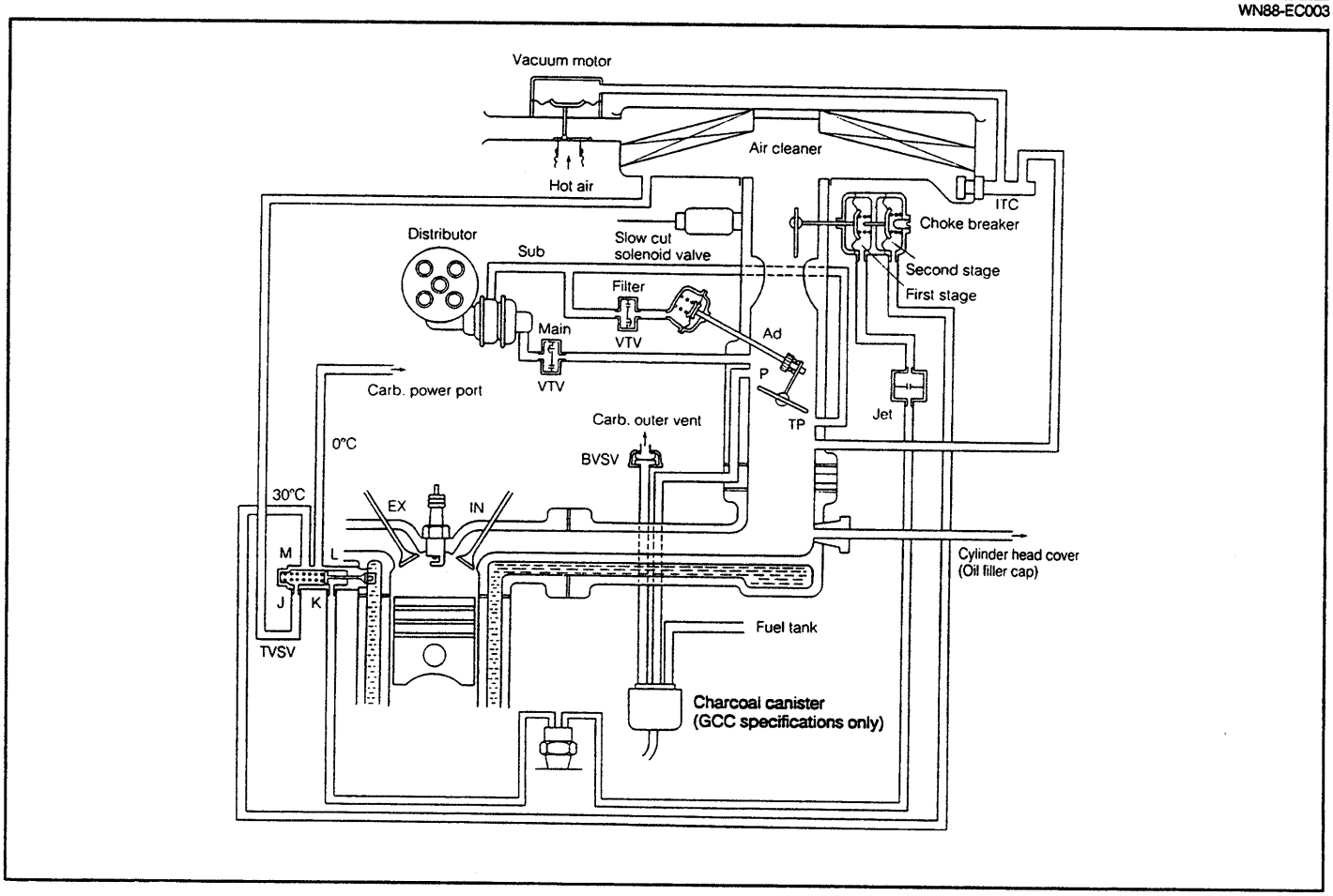
System	Abbreviation	PURPOSE
Positive crank case ventilation	PCV	Prevents blow-by gases from being released to atmosphere (HC)
Spark delay system	SD	Reduces HC and NOx.
Choke breaker system	C/B	Reduces HC and CO.
Throttle positioner system	TP	Reduces HC and CO.
Fuel evaporative emission control system	—	Reduces HC.

WN88-EC002

COMPONENT LAYOUT & SCHEMATIC DIAGRAM



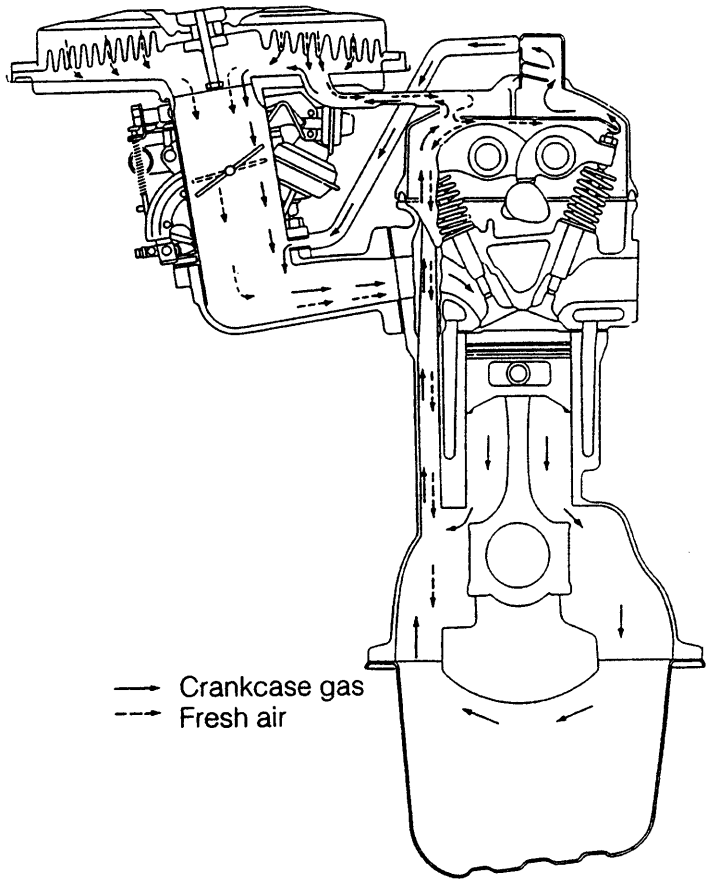
WN88-EC003



WN88-EC004

POSITIVE CRANKCASE VENTILATION (PCV)

To combat with air-pollution problems, the engine is equipped with a sealed type positive crankcase ventilation system in order to prevent blow-by gases generated inside the crankcase from being released into the atmosphere.
The blow-by gases generated inside the crankcase flow into the cylinder head side through the gas passages of the cylinder block.
When the throttle valve opening degree is small, first the oil in the blow-by gas is separated by the oil separator provided at the cylinder head cover. Then, the blow-by gases flow from the carburetor heat insulator section to the intake manifold. Thus, the gases are sucked into the cylinder and burned there again.
At this time, fresh air flows from the upstream of the throttle valve into the cylinder head cover. The air flow rate is restricted by a jet located at the cylinder head cover, thus stabilizing the engine idling.
When the throttle valve opening degree is great and/or a large amount of blow-by gases are generated, the blow-by gases flow through both the upstream and the downstream of the throttle valve and are sucked into the combustion chamber.



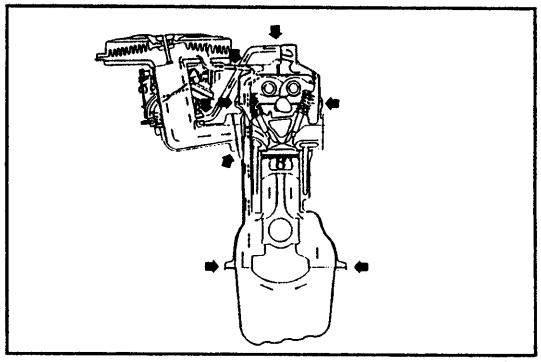
HD-C engine

WN88-EC005

INSPECTION OF PCV HOSE & CONNECTION

Visual inspection of hoses and connection

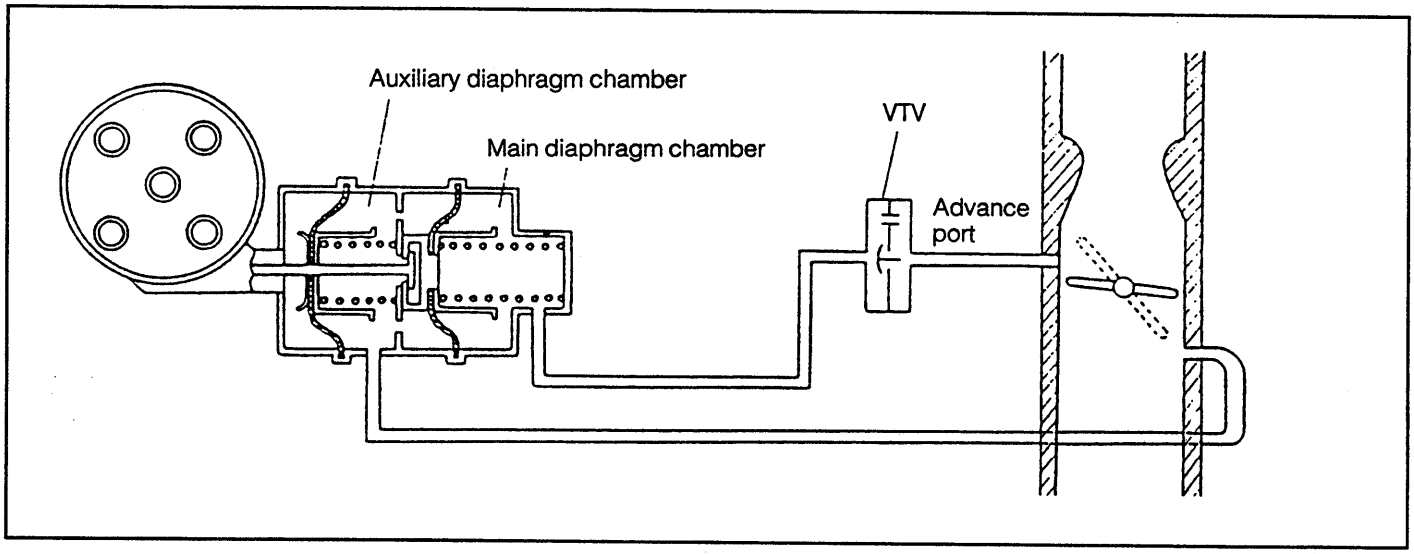
Check the hoses for improper connections, cracks, leak or damage.
Replace or repair any part which exhibits defects.



WN88-EC006

SPARK DELAY SYSTEM

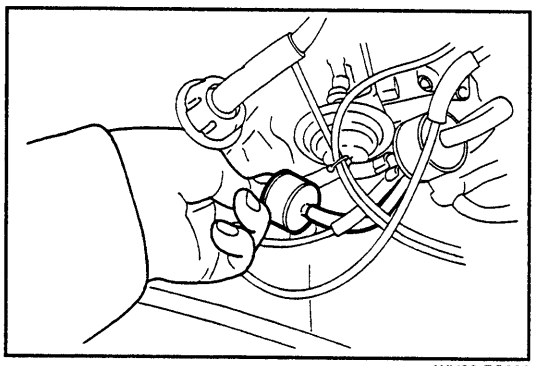
During an acceleration period, this system reduces the HC and NOx emissions generated during the transient period by retarding the ignition advance timing temporarily. This is accomplished by means of the VTV which retards the application of a negative pressure being applied to the main diaphragm of the distributor vacuum advancer through the carburetor advance port.



WN88-EC007

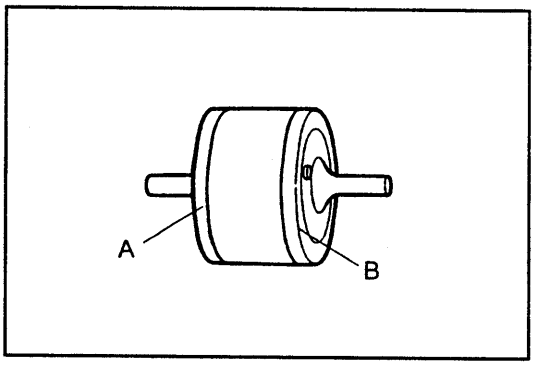
Check of Ignition Timing

1. Warm up the engine thoroughly.
   Stop the engine. Remove the VTV.



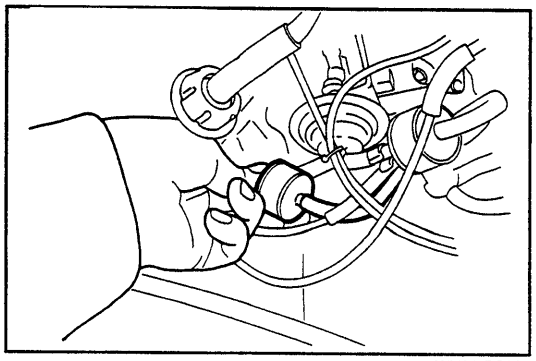
WN88-EC008

2. Inspection of VTV
   (1) Blow your breath into the VTV carburetor side (side B).
   Ensure that the air passes through without restriction.
   If significant restriction exists, replace the VTV.
   (2) Blow your breath into the VTV distributor side (side A).
   Ensure that there is restriction.
   If no restriction exists, replace the VTV.



WR88-EC023

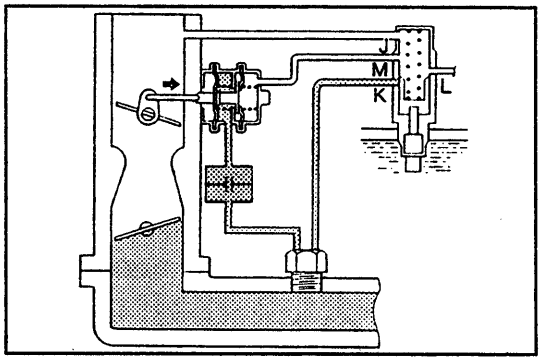
3. Install the VTV to the engine.



WN88-EC009

CHOKE BREAKER SYSTEM

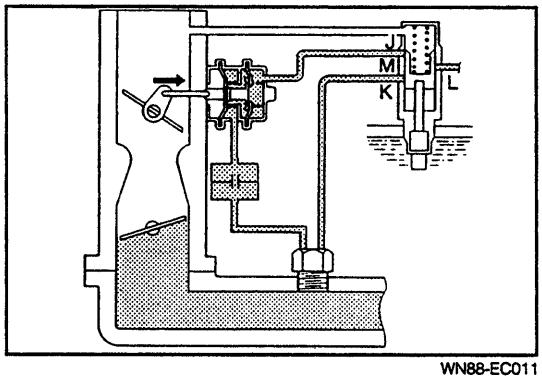
This system opens the choke valve during a period immediately after starting so as to reduce the HC and CO emissions.



WN88-EC010

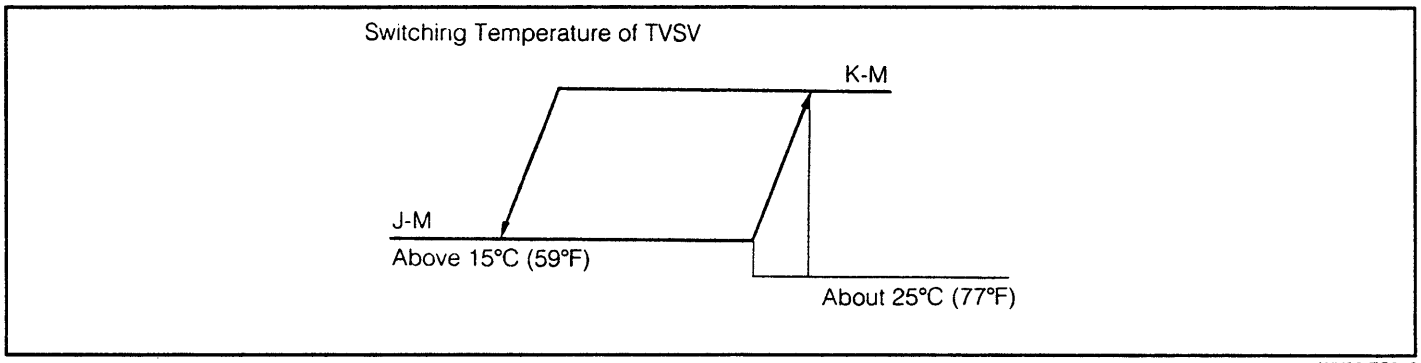
Operation

During a period immediately after starting, negative pressure is applied gradually to the first stage of the choke breaker diaphragm. Consequently, the choke valve is opened slightly. When the water temperature is low, the atmosphere is applied to the second stage of the choke breaker diaphragm via the TVSV. Thus, the second diaphragm remains inoperative.



WN88-EC011

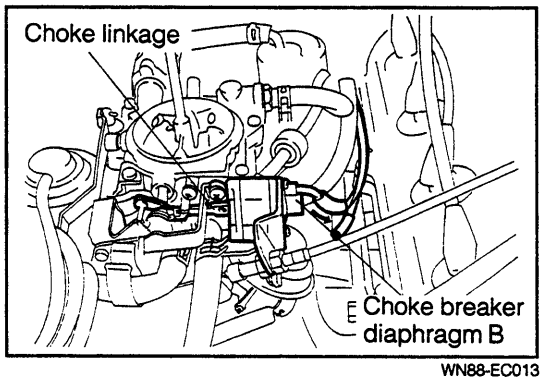
When the temperature reaches a certain level as the cooling water temperature rises, the negative pressure of the intake manifold starts to be applied to the second stage of the choke breaker diaphragm via the TVSV.
As a result, the choke valve opens further, thereby preventing the air-to- fuel ratio from becoming too rich.



WN88-EC012

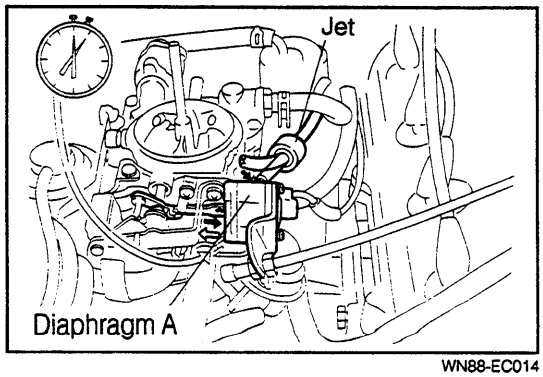
Inspection of choke breaker system

1. Inspection of TVSV with cold engine
   (1) Start the engine.
   (2) With the coolant temperature below 15°C (59°F), disconnect the vacuum hose from choke breaker diaphragm B and check that the choke linkage does not move.
   (3) Reconnect the vacuum hose to diaphragm B.



WN88-EC013

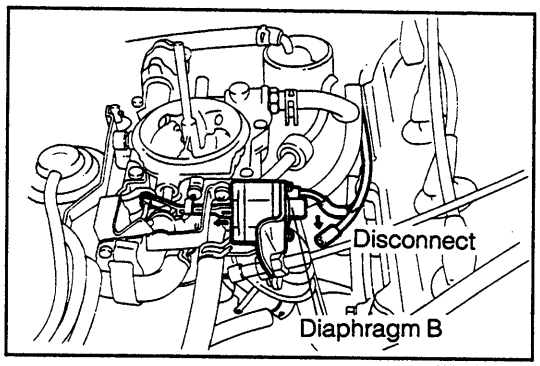
2. Inspection of jet and diaphragm A
   (1) Disconnect the vacuum hose from the choke breaker diaphragm A and check linkage moves.
   (2) Reconnect the vacuum hose to diaphragm A and check that the choke linkage moves within the specified time after reconnecting the hose.
   Specified Time: 1 - 5 seconds



WN88-EC014

3. Inspection of TVSV and diaphragm B with warm engine
   (1) After warming up the engine, disconnect the vacuum hose from diaphragm B and check that the choke linkage returns.
   (2) Reconnect the vacuum hose to diaphragm B.

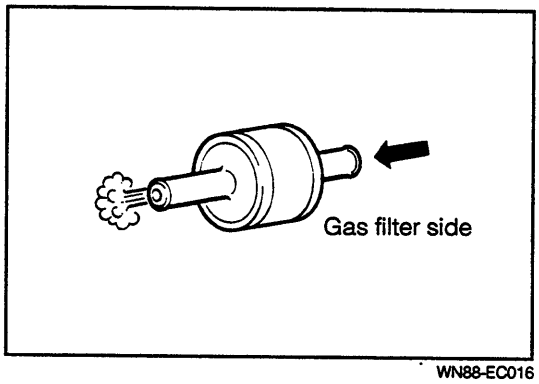
   If no problem is found with this inspection, the system is okay; otherwise inspect each part.



WN88-EC015

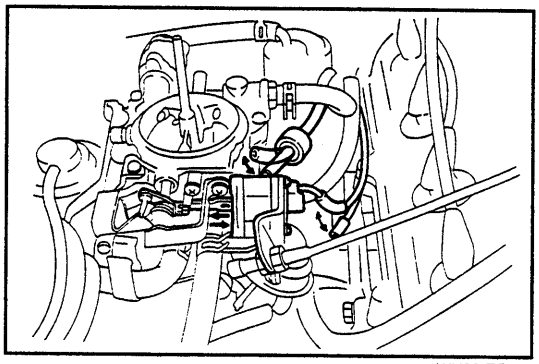
Unit inspection of choke breaker

1. Inspection of jet
   (1) Check the jet by blowing air from each side.
   (2) Ensure that there is no restriction if the air blows form the gas filter side.



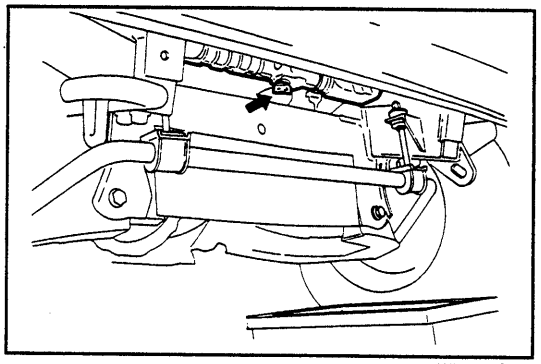
WN88-EC016

2. Inspection of choke breaker diaphragms
   (1) Check that choke linkage moves in accordance with applied vacuum.

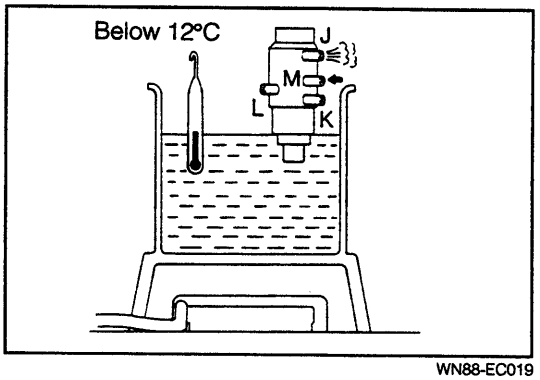

WN88-EC017

3. Inspection of TVSV
   (1) Drain the cooling water from radiator into a suitable container.
   (2) Disconnect the vacuum hose from the TVSV, and remove the TVSV.

   NOTE:
   Be very careful not to damage the TVSV by hitting it to the by-pass pipe.

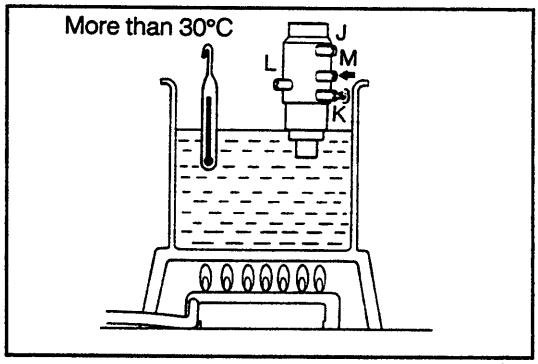

WN88-EC018

   (3) Cool the TVSV thermo sensing section to below 12°C (54°F), and check that air flows from pipe M to pipe J.



WN88-EC019

(4) Heat the TVSV more than 30°C (86°F), and check that air flows from pipe M to pipe K.

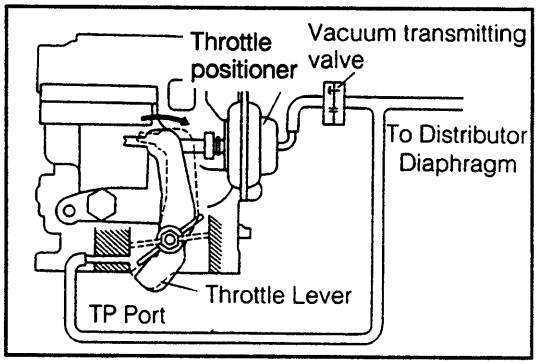


WN88-EC020

THROTTLE POSITIONER (TP) SYSTEM

Operation

For the purpose of reducing the CO and HC emissions, the throttle positioner prevents the throttle valve from being closed suddenly during the engine braking period, utilizing a negative pressure generated in the intake manifold.

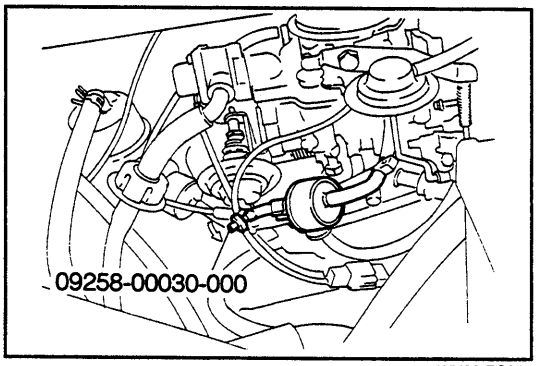


WN88-EC021

Inspection of throttle positioner system

1. Warm up the engine.
2. Disconnect the vacuum hose from the throttle positioner. Plug the hole, using the following SST.
   SST: 09258-00030-000

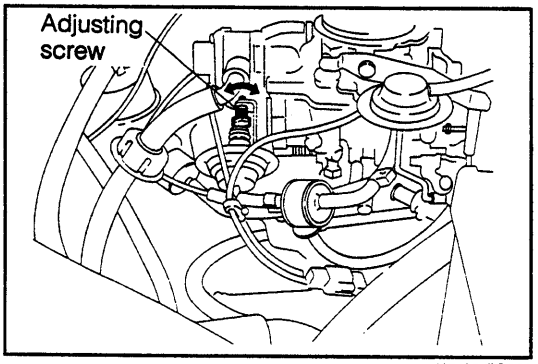
   NOTE:
   At this time, be sure that the throttle positioner shaft is stretched fully.



WN88-EC022

3. Check that touch revolution speed is set.
   Touch Revolution Speed: 1500 ± 50 rpm

4. It not at specified speed adjust with throttle positioner adjusting screw.



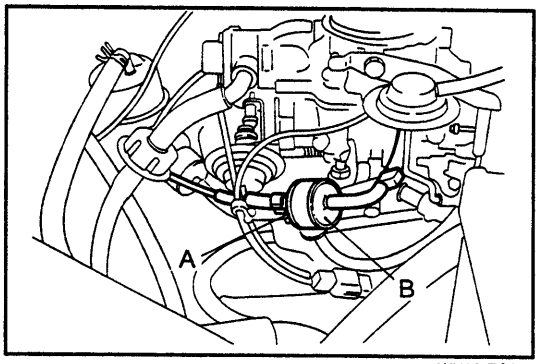
WN88-EC023

5. Hold the engine revolution speed at about 2500 rpm at least five seconds by opening the throttle valve. Then, release the throttle lever. Check that the time required for the engine revolution speed to drop from 1500 rpm to 1200 rpm conforms to the specified value.
   Specified Time: 0.5 - 5 seconds
   If the time will not conform to the specification, check the direction of the VTV. Then, proceed to check the VTV.

WN88-EC024

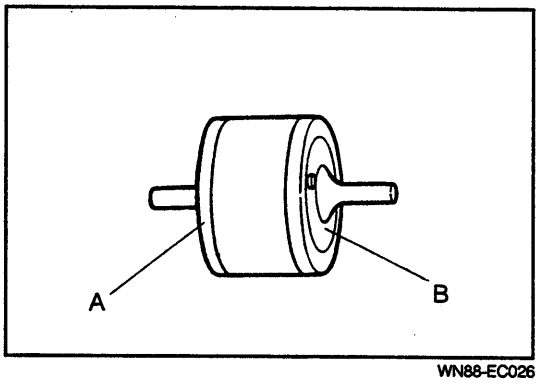
Inspection of VTV

1. Remove the VTV. Blow your breath into the VTV from the carburetor side (side B). Ensure that the air passes through without restriction.
   If significant restriction exists, replace the VTV.



WN88-EC025

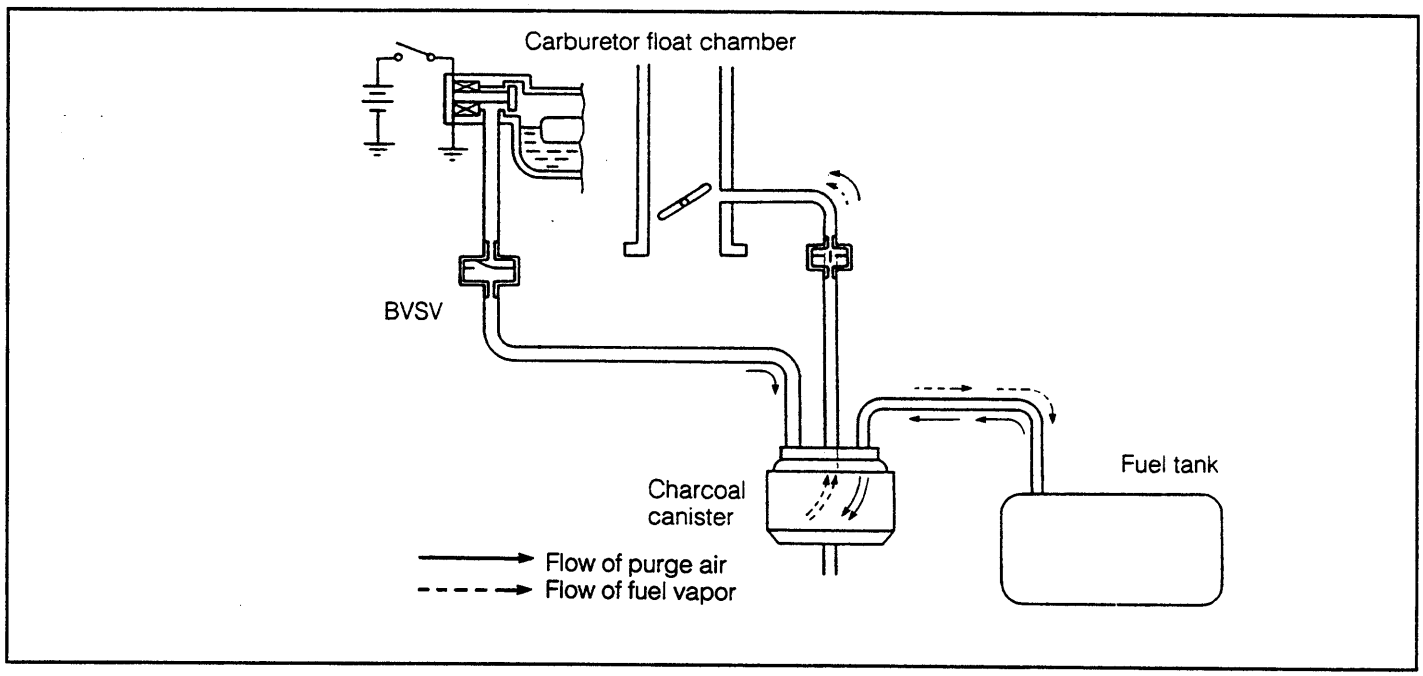
2. Blow your breath into the VTV from the throttle positioner side (side A). Ensure that there is restriction.
   If no restriction exists, replace the VTV.



WN88-EC026

FUEL EVAPORATIVE EMISSION CONTROL SYSTEM (GCC specifications only)

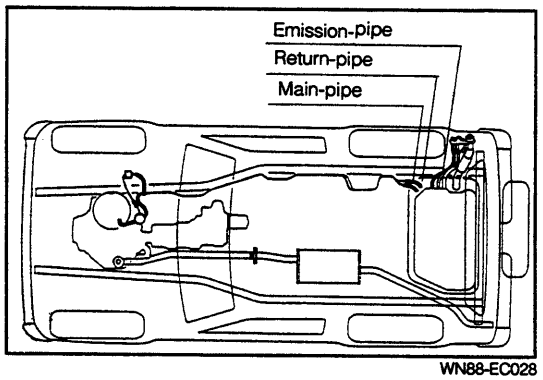
The fuel evaporative emission control system prevents the fuel evaporative emission generated inside the fuel tank or the float chamber of the carburetor from being discharged to the atmosphere.
As the temperature rises, the pressure of the fuel evaporative emission generated in the fuel tank increases while the engine is stopped. When this pressure rise exceeds a certain level, the check valve at the positive pressure side is raised and the evaporative emission is absorbed into the activated carbon in a charcoal canister.
When the engine starts running, the check valve at the negative pressure side opens so that any evaporative emission stored in the canister may be sent to the combustion chamber to be reburnt there.
On the other hand, the fuel evaporative emission generated in the float chamber of the carburetor is sent into the charcoal canister when the BVSV exceeds the set temperature (65°C, 149°F).



WN88-EC027

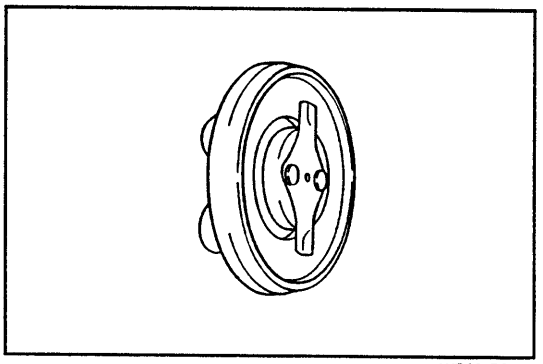
Inspection of fuel vapor lines, fuel tank & filler cap

1. Visual inspection of fuel vapor line and connections
   Check the line and connections for loose connections, kinks or damage.
2. Visual inspection of fuel tank
   Check the fuel tank for deformation, cracks or fuel leakage.



WN88-EC028

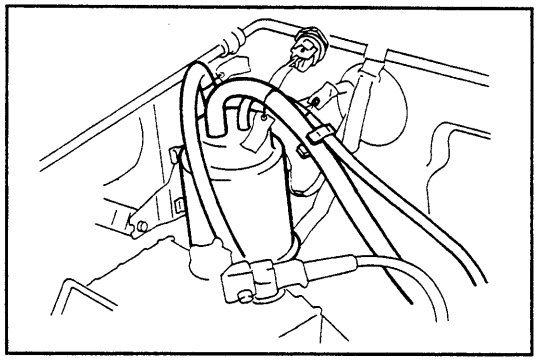
3. Visual inspection of fuel filler cap
   Check the cap and gasket for damage or deformation.
   Replace the cap, if necessary.



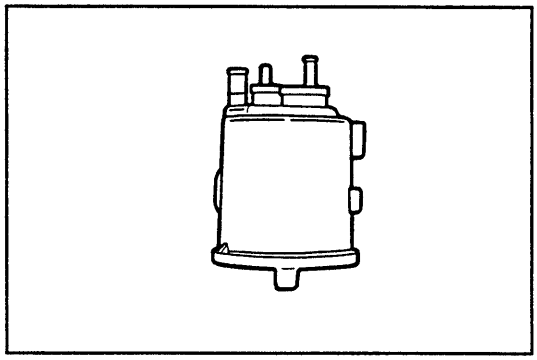
WR88-EC059

Inspection of Charcoal Canister

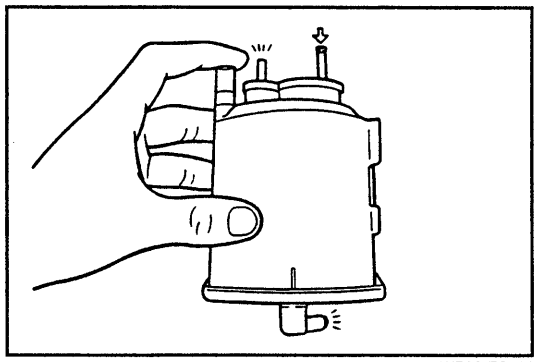
1. Disconnect the rubber hoses and remove the charcoal canister.
   NOTE:
   Put a tag on each of the rubber hoses so that they may be reconnected correctly to the original positions.


WN88-EC029

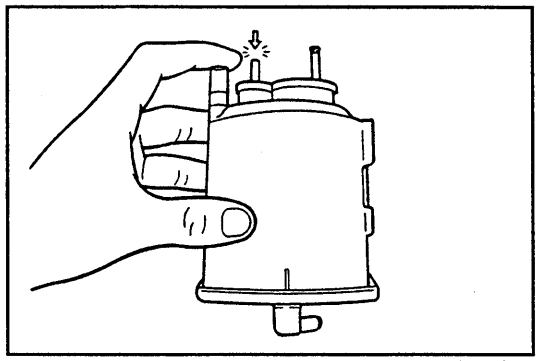
2. Visual inspection of charcoal canister case
   Visually inspect the charcoal canister case for cracks or damage.


WR88-EC061

3. Check of canister for restriction
   (1) With the pipe at the BVSV side plugged with your finger, apply compressed air from the pipe at the fuel tank side. Ensure that air leaks from the other pipe.

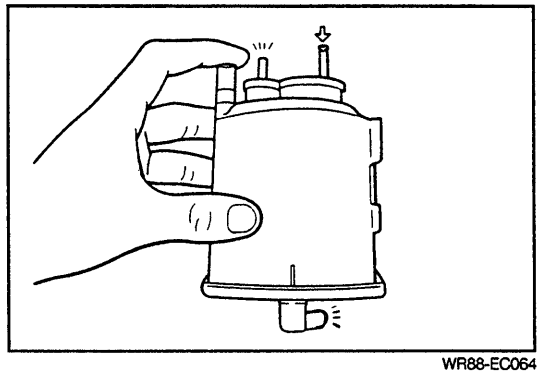

WR88-EC062

   (2) Apply compressed air from the purge side. Ensure that no air continuity exists.
   If the check results are unsatisfactory, replace the charcoal canister.


WR88-EC063

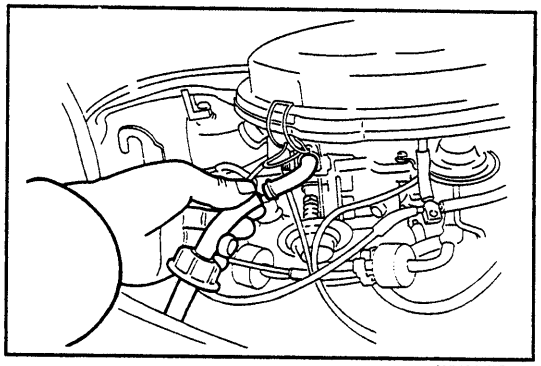
4. Cleaning of filter in canister
   Clean the filter by blowing compressed air of 3 kg/cm^2 (43 psi) into the tank pipe while holding the other upper canister pipe closed.
   NOTE:
   - **Do not attempt to wash the canister.**
   - **No activated carbon should come out during the test.**

5. Install the charcoal canister and reconnect the rubber hose.


WR88-EC064

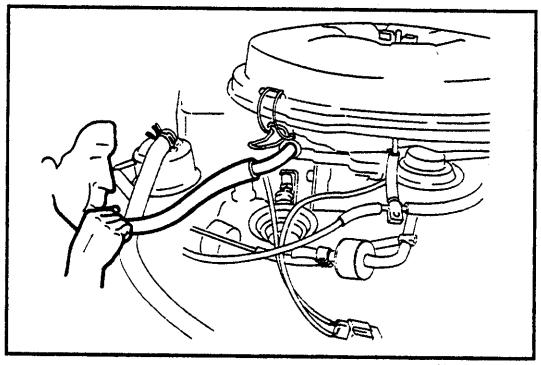
Inspection of Outer Vent Valve

1. Disconnect the rubber hose at the BVSV side.



WN88-EC030

2. With the ignition key switch turned ON, blow air into the outer vent valve. Ensure that no air continuity exists.
   If air continuity exists, check to see if any abnormality is present in the electric circuit of the outer vent valve. Then, replace the outer vent valve, as required.
   CAUTION:
   Never inhale the air during the continuity inspection.



WN88-EC031

3. With the ignition key switch turned OFF, blow air into the outer vent valve. Ensure that air continuity exists.
   If no air continuity exists, check to see if any abnormality is present in the electric circuit of the outer vent valve. Then, replace the outer vent valve, as required.
   CAUTION:
   Never inhale the air during the continuity inspection.

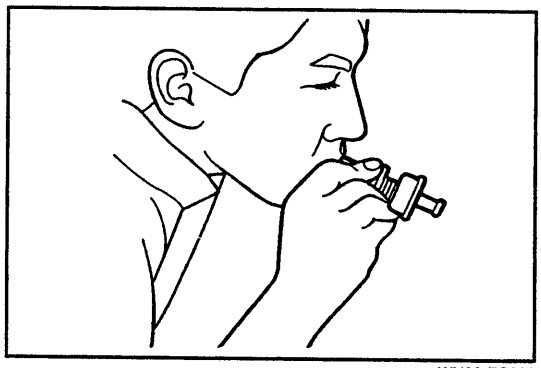
4. Connect the rubber hose to the BVSV. Attach the hose bands.

Inspection of BVSV

1. Remove the BVSV.
2. Check the air continuity of the BVSV under the following ambient air temperature conditions.
   Below 50 °C (122 °F) ....
   No air continuity exists.
   Above 65 °C (149 °F) ....
   Air continuity exists.

3. Install the BVSV on the carburetor.

WN88-EC032



WN88-EC033

[HD-E Engine]
PURPOSE OF SYSTEMS

System	Abbreviation	Purpose
Positive crankcase ventilation	PCV	Reduction of blow-by gas (HC emission)
Fuel evaporative emission control	EVAP	Reduction of evaporative HC emission
Throttle positioner	TP	Reduction of HC and CO emissions
Three-way catalyst	TWC	Reduction of HC, CO and NOx emissions
Electronic fuel injection*	EFI	Regulation of all engine conditions for reduction of exhaust emissions

*For inspection and repairs of the EFI system, refer to the EFI section.

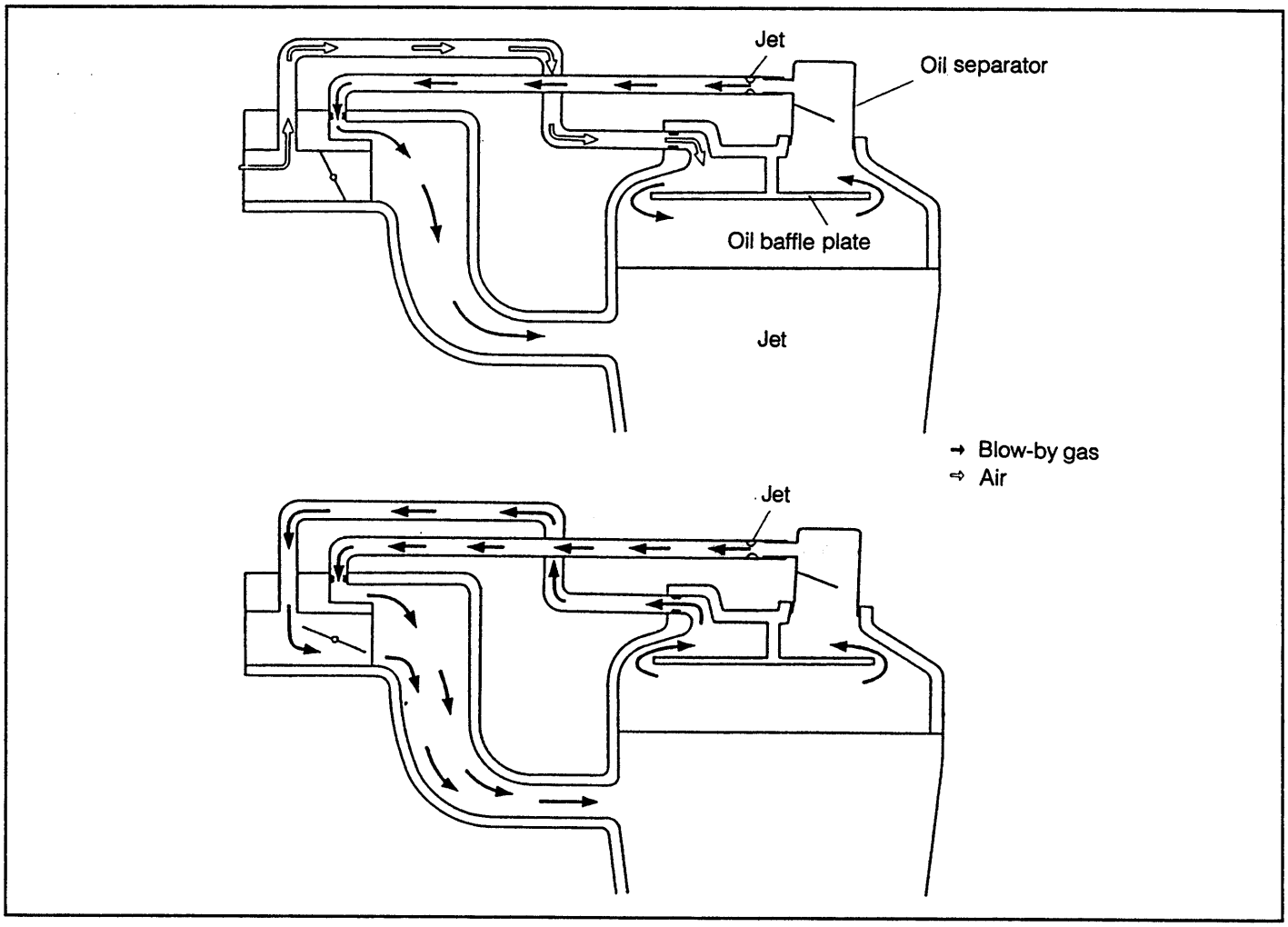
WN88-EC034

POSITIVE CRANKCASE VENTILATION SYSTEM (PCV)

To combat with air-pollution problems, the engine is equipped with a sealed type positive crankcase ventilation system in order to prevent blow-by gases generated inside the crankcase from being released into the atmosphere.

The blow-by gases generated inside the crankcase flow into the cylinder side through the gas path of the cylinder block. When the opening degree of the throttle valve is small, oil in the blow-by gases is separated by the oil separator provided at the cylinder head cover. Then, the blow-by gases are sucked into the cylinders from the throttle body to be burnt there again.

Fresh air enters the cylinder head cover from the upstream path of the throttle valve. At this time, the air flow rate is regulated by a jet provided at the cylinder head cover, thus stabilizing the engine idling. When the opening degree of the throttle valve is large and/or when a large amount of blow-by gases are generated, the blow-by gases are sucked into the combustion chambers both through the upstream path and the downstream path of the throttle valve.

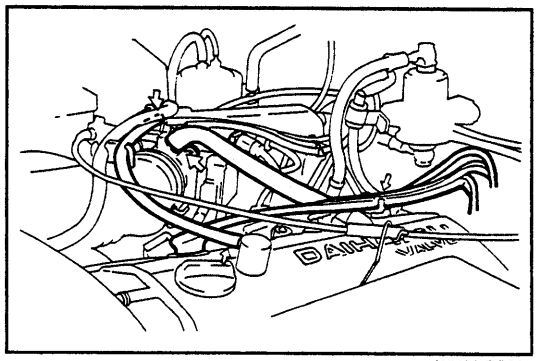


WR88-EC074

INSPECTION OF PCV HOSE & CONNECTION

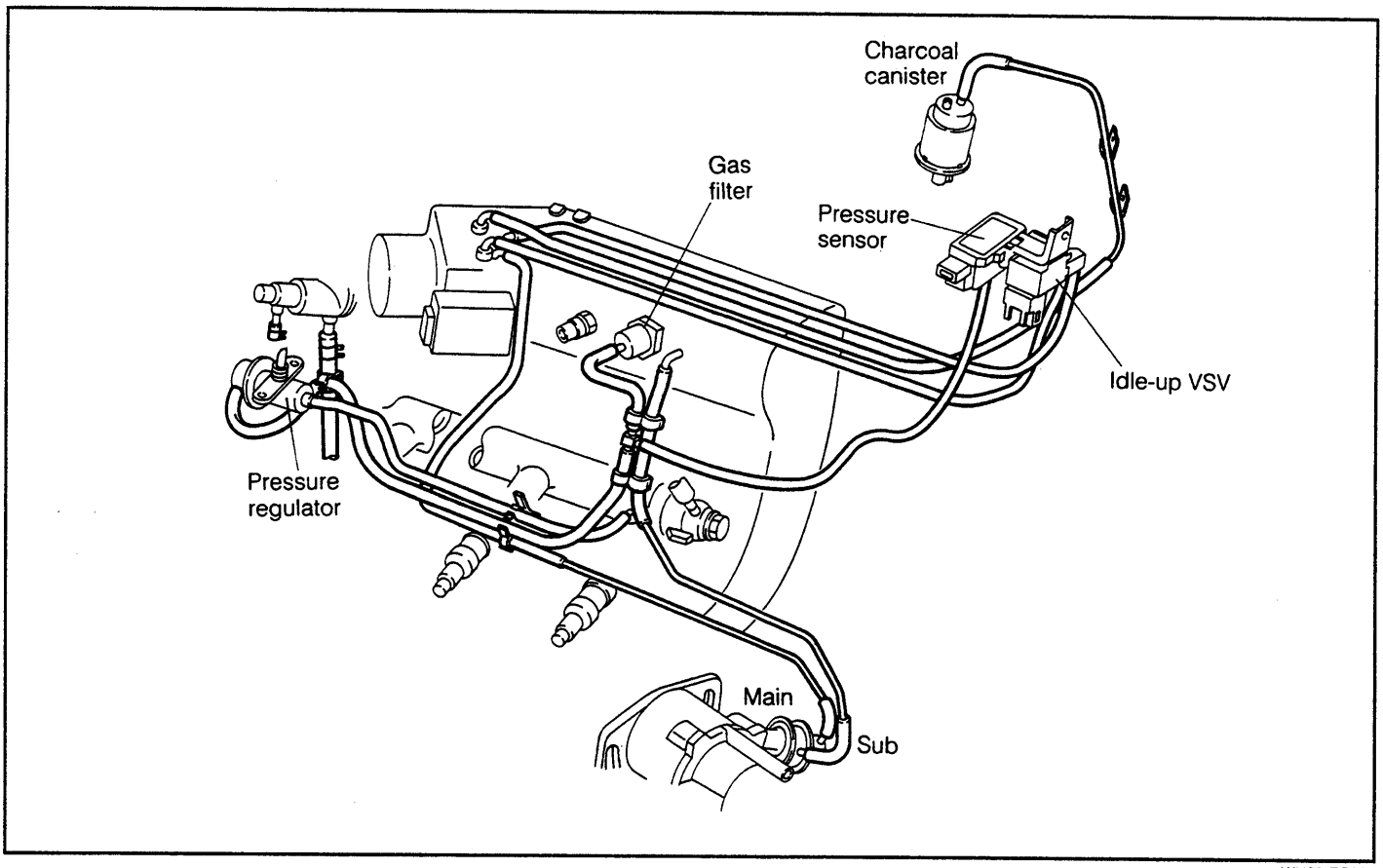
Visual inspection of hoses and connections check the hoses and connections for cracks, leakage or damage.

If any parts exhibit fault, replace or repair them, as required.

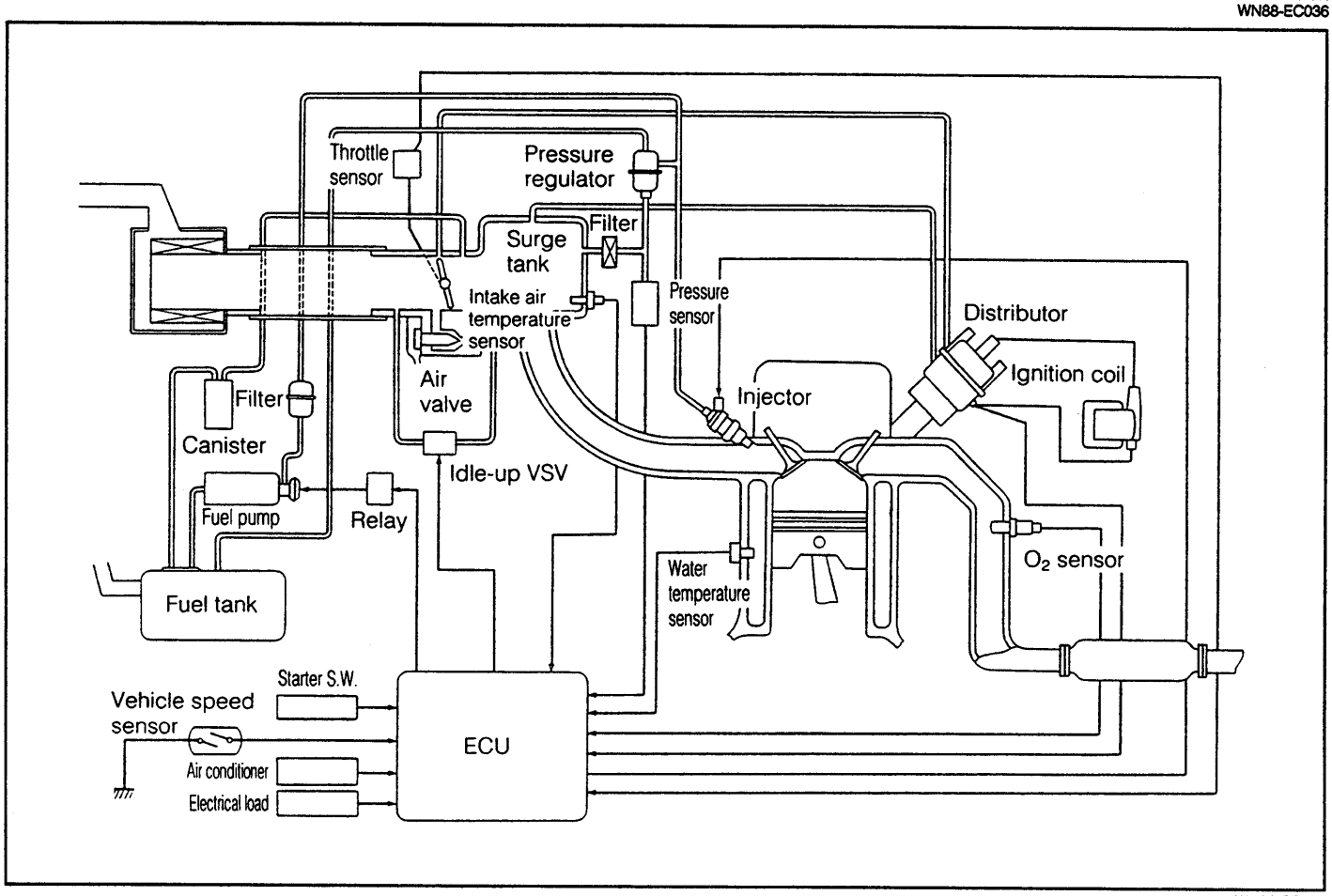


WN88-EC035

COMPONENT LAYOUT & SCHEMATIC DIAGRAM



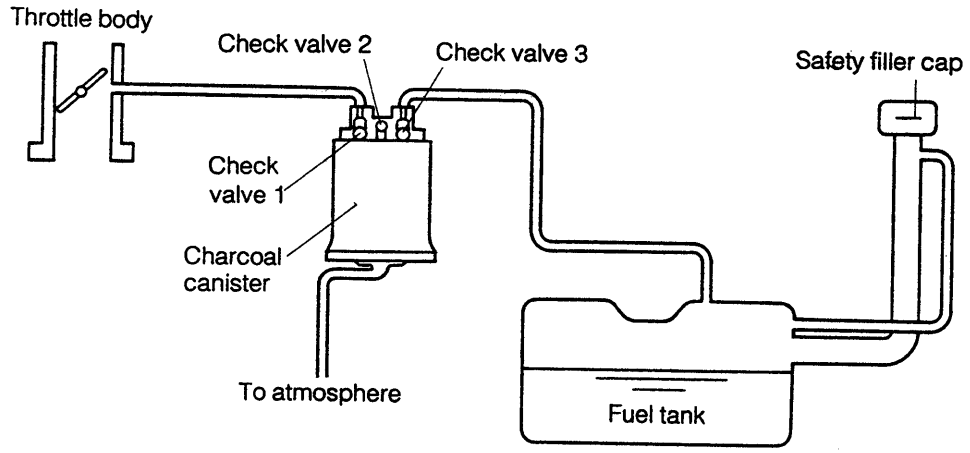
WN88-EC036



WN88-EC037

FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM

The fuel evaporative emission control system employs the charcoal canister type. The charcoal canister type leads the fuel vapor into the charcoal canister which uses activated carbon to absorb HC emission. The separated HC emission is drawn into the throttle body to be burnt together with mixture in the combustion chamber.



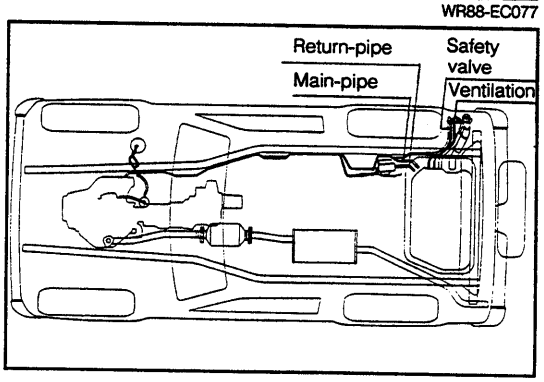
WN88-EC038

Pressure condition in tank	Engine condition	Canister check valve			Check valve in safety filler cap	Evaporated Fuel (HC)
		1	2	3		
High pressure in tank	When engine is rotating:	open	open	closed	closed	HC emission is sucked into engine through charcoal canister
High vacuum in tank	When engine is rotating:	open	closed	open	open	HC engine absorbed by charcoal canister is sucked into engine
High pressure in tank	When engine is stopped:	closed	open	closed	closed	HC emission is absorbed by charcoal canister
High vacuum in tank	When engine is stopped:	closed	closed	open	open	HC emission remains absorbed by charcoal canister. However, a part of HC emission is returned to fuel tank when negative pressure in fuel tank becomes great

WR88-EC077

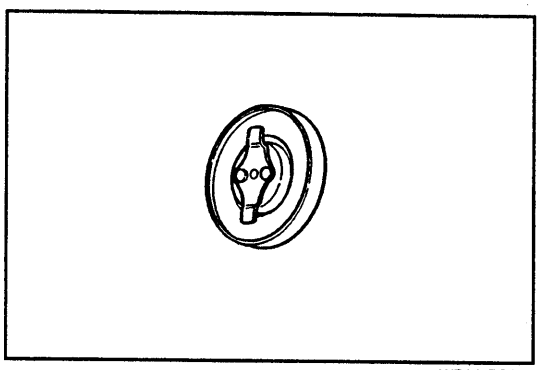
Inspection of fuel vapor lines, fuel tank & filler cap

1. Visual inspection of fuel vapor lines and connections
   Check the lines and connections for loose connections, kinks or damage.
2. Visual inspection of fuel tank
   Check the fuel tank for deformation, cracks or fuel leakage.



WN88-EC039

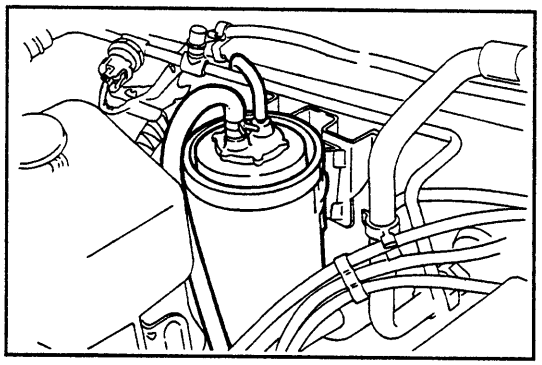
3. Visual inspection of fuel filler cap
   Check the cap and gasket for damage or deformation.
   Replace the cap, if necessary.



WR88-EC079

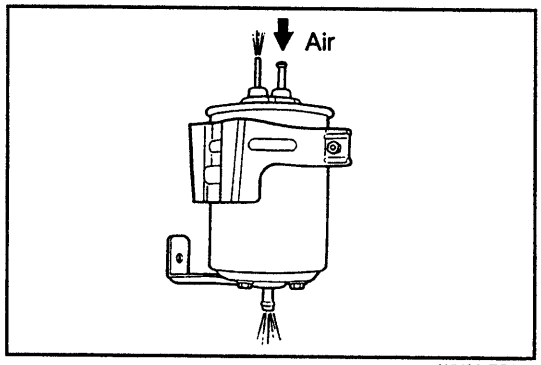
Inspection of charcoal canister

1. Disconnect the rubber hose and remove the charcoal canister.
   NOTE:
   Prior to disconnection of the rubber hose, put a tag on the hose so that the original installation position may be known easily.



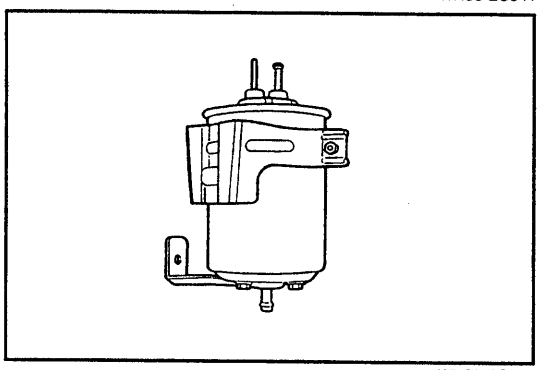
WN88-EC040

2. Visual inspection of charcoal canister
   Visually inspect the charcoal canister case for cracks or damage.



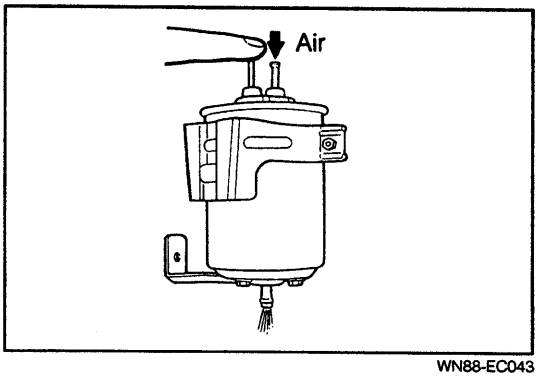
WN88-EC041

3. Check of filter for restriction
   (1) Blow low pressure compressed air into the tank pipe. Ensure that air flows without resistance from the other pipe.
   (2) Blow air into the purge pipe. Ensure that no air flows from the other pipe.
   Replace the charcoal canister, if it exhibits any defect.



WN88-EC042

4. Cleaning of filter in canister
   Clean the filter by blowing compressed air of 3 kg/cm^2 (43 psi) into the tank pipe while holding the other upper canister pipe closed.
   NOTE:
   - **Do not attempt to wash the canister.**
   - **No activated carbon should come out during the test.**

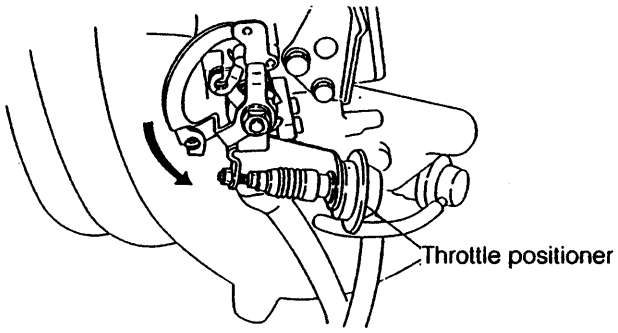


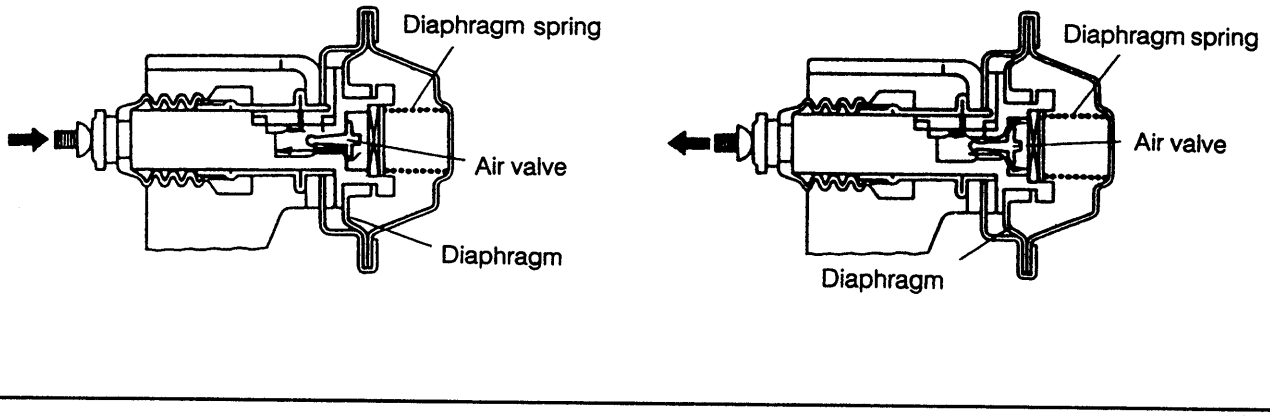
WN88-EC043

5. Install the charcoal canister and reconnect the rubber hose.

THROTTLE POSITIONER (TP) SYSTEM

This system prevents the throttle valve from suddenly closing, thus reducing the CO and HC emissions.





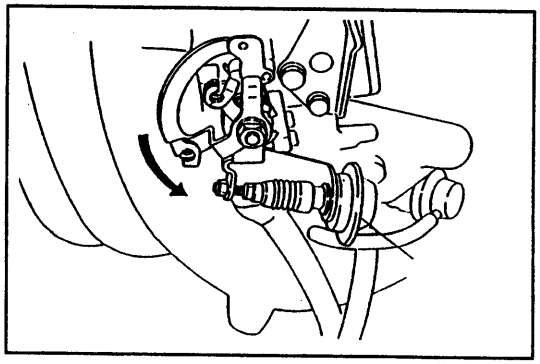
WR88-EC084

Conditions	TP diaphragm	Throttle valve
Idling	Pushed in by return force of throttle valve	Idle speed position
Normal driving	Pushed out by diaphragm spring	Opened position
Deceleration	Pushed in by return force of throttle valve*	Slightly opens and then slowly closes to the idle position.

*At this point, the function of the air valve provided inside the TP diaphragm prevents the throttle valve from being closed suddenly.

WR88-EC085

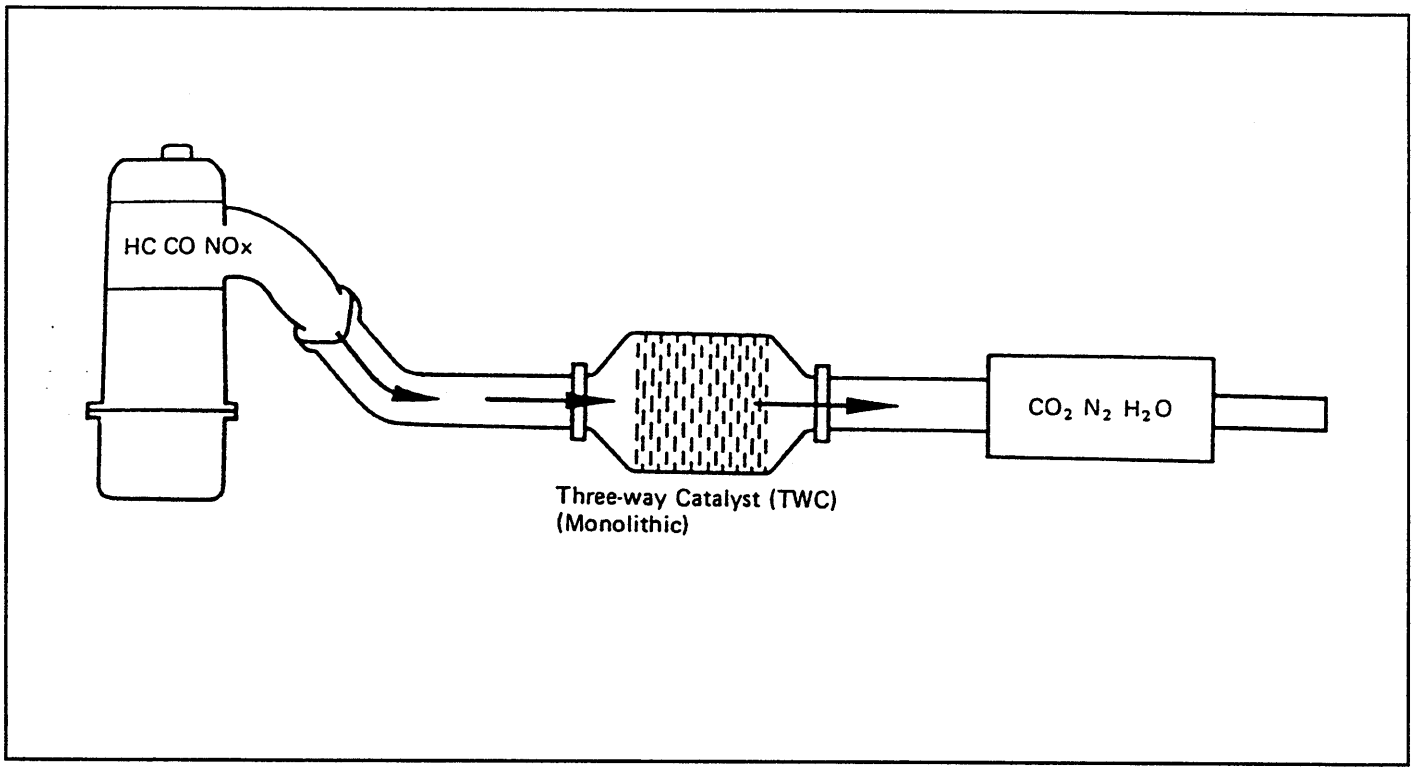
Inspection of throttle positioner (TP) system
(See page MA–10)



WN88-EC044

THREE-WAY CATALYST (TWC) SYSTEM

If this three-way catalyst, the oxidation of carbon monoxide (CO) and the reduction of nitrogen oxides (NOx) contained in exhaust gas can take place simultaneously. Thus, the three-way catalyst purifies the exhaust gas by converting its harmful components gas into harmless carbon dioxide (CO_2), water vapor (H_2O) and nitrogen (N_2).



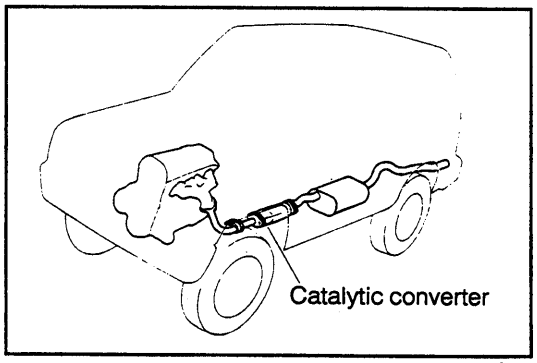
WN88-EC045

Exhaust gas component		TWC		Exhaust gas
HC, CO and NOx	⇒	Oxidation and reduction	⇒	CO_2, H_2O and N_2

WR88-EC088

Inspection of exhaust pipe assembly

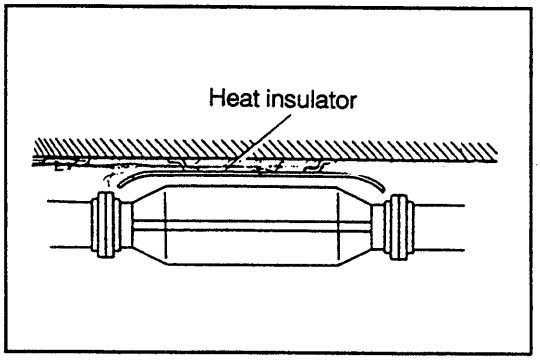
1. Check the connections for looseness or damage.
2. Check the clamps for weakness, bend or damage.



WN88-EC046

Inspection of heat insulator

1. Check heat insulator for damage.
2. Check for adequate clearance between catalytic converter and heat insulator.

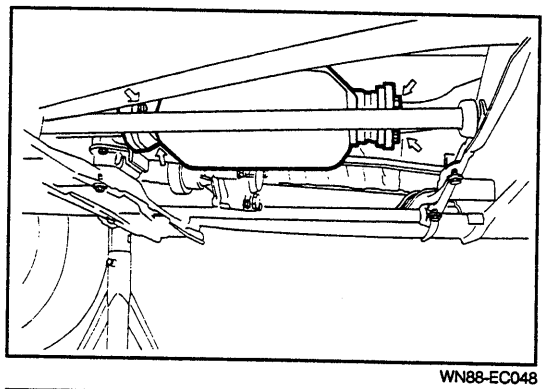


WN88-EC047

Replacement of catalytic converter

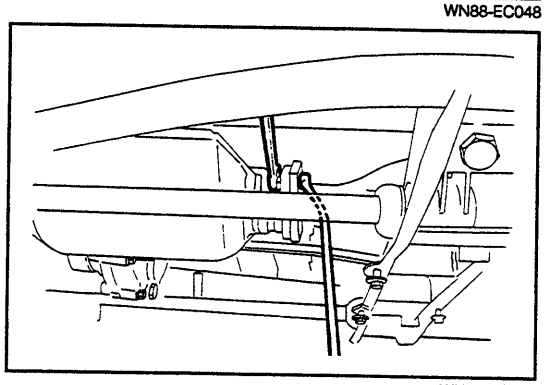
CAUTION:
Do not perform any operation while the exhaust pipe is still hot.

1. Jack up the vehicle and support it with safety stands. (See page GI–9)
2. Remove the bolts at the front and rear of the converter.
3. Remove the converter and gaskets.



WN88-EC048

4. Place new gaskets on the converter front and rear pipes, and connect the converter to the exhaust pipes.
5. Tighten the bolts.
   Tightening Torque: 3.7 - 5.2 kg-m (26.7 - 37.6 ft-lb)



WN88-EC049