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IMPORT SERVICE MANUAL

FBC Driveability Troubleshooting

**COLT
RAM 50
RAM RAIDER**

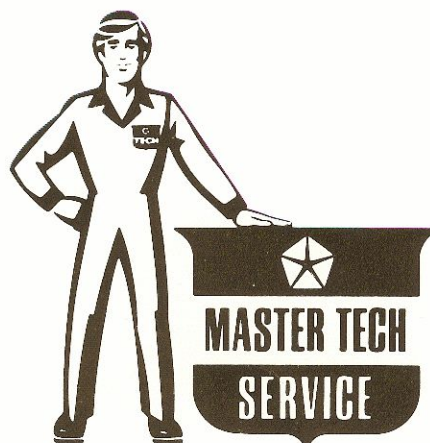
SAFETY NOTICE

CAUTION

ALL SERVICE AND REBUILDING INSTRUCTIONS CONTAINED HERE-IN ARE APPLICABLE TO, AND FOR THE CONVENIENCE OF, THE AUTOMOTIVE TRADE ONLY. All test and repair procedures on components or assemblies in non automotive applications should be repaired in accordance with instructions supplied by the manufacturer of the total product.

Proper service and repair is important to the safe, reliable, operation of all motor vehicles. The service procedures recommended and described in this publication were developed for professional service personnel and are effective methods for performing vehicle repair. Following these procedures will help assure efficient economical vehicle performance and service reliability. Some of these service procedures require the use of special tools designed for specific procedures. These special tools should be used when recommended throughout this publication.

It is important to note that this publication contains various **Cautions** and **Warnings**. These should be carefully read in order to minimize the risk of personal injury, or the possibility that improper service methods may damage the vehicle or render it unsafe. It is important to note these **Cautions** and **Warnings** cover only the situations and procedures Chrysler Motors has encountered and recommended. Chrysler Motors could not possibly know, evaluate, and advise the service trade of all conceivable ways that service may be performed or of the possible hazards of each. Consequently Chrysler Motors has not undertaken any such broad service review. Accordingly, anyone who uses a service procedure or tool that is not recommended in this publication must assure oneself thoroughly that neither personal safety nor vehicle safety be jeopardized by the service methods they select.



FBC

Driveability Test Procedure Manual

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FBC

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FOREWORD

This manual has been prepared to provide information regarding test procedures related to FBC driveability (starting problems, unstable idling, etc.).

Because there are a great many factors related to driveability, such as the electronic-control system, the fuel system, the air-intake system, etc., it is important to be able to precisely pin down the problem and, make the repair correctly the first time.

This manual has been prepared, based upon the concepts noted below, as a more complete version of the troubleshooting information related to driveability already provided in the Service Manual.

1. As a rule, this manual has been planned and prepared so that it is the only reference material needed for FBC driveability troubleshooting.
2. The manual includes the basic points of troubleshooting.
3. The checking order and procedures are arranged as a step-by-step system, and the use of a great many illustrations makes it an easy-to-use manual.

We hope that this manual will be used in such a way so that troubleshooting becomes quicker and with less wasted effort.

Note that this manual was prepared based upon current models as of March, 1987, and for that reason please understand that, due to changes of specifications, etc., it may not be entirely applicable in every respect to subsequent models.

March, 1987

USING THE MANUAL

Descriptive Scope

This manual describes troubleshooting procedures related to FBC driveability problems.

Contents and Order

This manual covers the following points.

1. How to troubleshoot
2. Problems and their symptoms
3. Measuring instruments for troubleshooting
4. FBC structural diagram and system diagram (including sensors and actuators)
5. FBC circuit diagram
6. FBC troubleshooting procedures

Symbols



Indicates component is OK after check and/or adjustment.



Indicates abnormal condition of component after check and/or adjustment.



Indicates check or adjustment for the step in question is to stop here. (Problem is elsewhere.)

Abbreviated Symbols

A/C switch	:	Air Conditioner switch
A/C relay	:	Air Conditioner relay
ECU	:	Electronic Control Unit
HAC	:	High Altitude Compensation System
SV	:	System Voltage
TDC	:	Top Dead Center
TPS	:	Throttle Position Sensor
TWC	:	Three Way Converter

■ Using the Problems Classified By Symptoms Chart

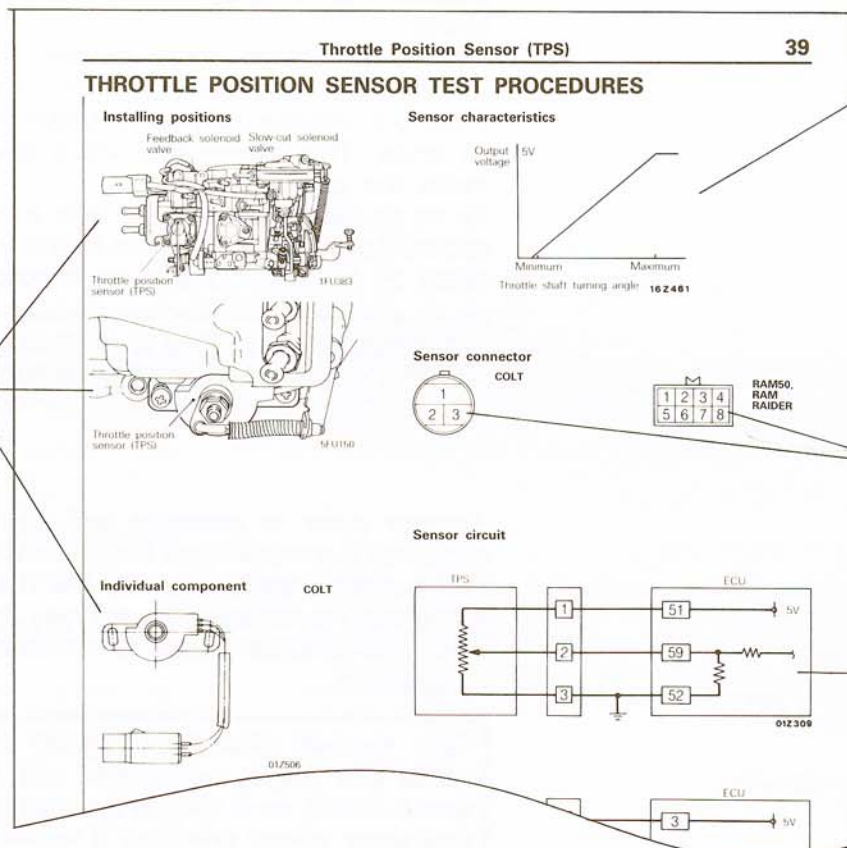
- Column titles Problem symptoms
 - Starting
 - Idling stability
 - Driving
 - Stopping
- Row titles Check points
 - 1. Control
 - 2. Ignition
 - 3. Fuel
 - 4. EGR
 - 5. HAC
 - 6. Combustion chamber
 - 7. Intake
 - 8. Cooling
 - 9. Exhaust
 - 10. Engine mounts

Checking order		Check item	Applicable models			Trouble symptom												
			COLT	RAM50	RAM RAIDER	Starting		Idling stability			Driving						Stop ping	
						Won't start (no initial combustion)	Starting problem (initial combustion, then stall. Starting takes a long time.)	Idling instability (rough idling)	Incorrect idling speed	Improper idling continuity	Hesitating, sag	Poor acceleration	Stumble	Shock	Surge	Knocking		
① Control	Ignition switch	×	×	×														
	TPS	×	×	×			⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗		
	Coolant temperature sensor	×	×	×	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗		
	Oxygen sensor	×	×	×											○			
	Vehicle-speed sensor	×								⊗	⊗	⊗						
	Ignition coil	×	×	×			⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗		
	Vacuum switch	×	×	×	⊗					⊗	⊗	⊗	⊗		⊗			
	Top gear sensing switch	×																
	Power steering oil pressure switch	×					○	○	○									
	Air conditioner switch	×	×	×			○	○	○									
	Feedback solenoid valve	×	×	×	⊗					⊗	⊗	⊗		⊗	⊗			
	Slow cut solenoid valve	×	×	×	⊗	⊗			⊗			⊗					○	

- Checking order: top to bottom of chart ("Control" to "Mounts").
- Check chart row and column intersections marked by ○ or ⊗

■ Using the Checking-Sequence Chart

Example: throttle position sensor (TPS)

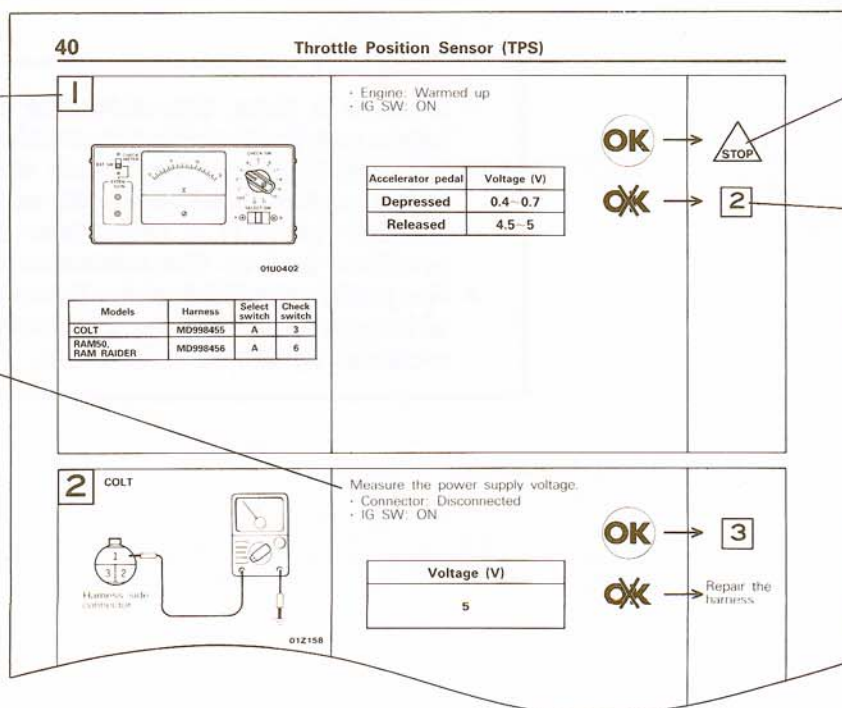


Coincides with minor titles used for check points in the Problems Classified By Symptoms chart.

Individual component illustration, and installation location

Shows shape of connector (at component) and terminal layout.

Circuit diagram (including ECU interface)



Indicates checking sequence.

Describes conditions required for checking.

"Stop checking here." (Component is OK; problem is elsewhere.)

"Proceed to step [2]."

HOW TO TROUBLESHOOT

■ Troubleshooting Steps

(1) Confirming the symptoms

The first step to be taken when troubleshooting is to try and observe the problem correctly, without preconceptions of what it might be or probably is, and to make precise judgments based on what you have seen and/or heard.

This is of course more quickly accomplished if the reported problem exhibits itself while the vehicle is in shop, but unfortunately some problems are not evident at all times. This means that you'll have to take steps to make the problem reoccur.

To do so, first you'll have to take a "verbal diagnosis", a description by the customer of the problem in as much detail as possible. This is an important step.

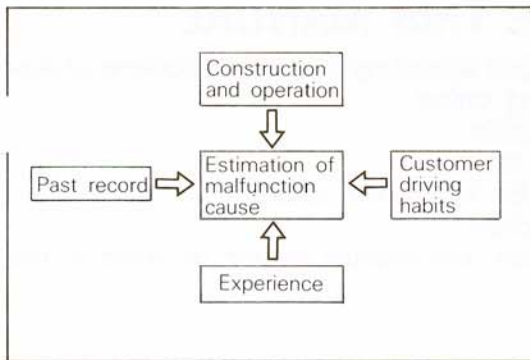
This manual describes such "verbal diagnosis", and should be used whenever possible.

Another point to consider and decide is whether the customer's complaint is about a valid malfunction, or is in fact a natural occurrence for the model in question. To make such a decision means you must know well the usual performance (under normal conditions) of the model in question.

This manual describes typical driveability symptoms you might encounter and explains them in some detail, so it should be used to help you make decisions about whether a reported problem is in fact a malfunction or normal operation.

〈Reference〉

- If there is time, the customer should be present when you try to make the problem reoccur, so that the conditions under which the problem occurs can be reproduced as closely as possible. To put it another way, it is important to experience the problem just as the customer does.
- For problems which occur intermittently, the probable causes are a poor connector contact, foreign material in the fuel line, etc.



(2) Estimation of malfunction cause

More than anything else, a thorough knowledge of the vehicle's construction and operation is basically necessary in order to estimate the cause of a malfunction.

Moreover, for more precise estimation the following points must not be overlooked in order to consider the probable cause from a wider viewpoint and various aspects.

- Can signs of the malfunction be found in the vehicle's past maintenance records?
- Are there any points in common with previous problems, if any?
- Does the customer have certain driving habits which have some effect?
- Is there any cause of past problems which should be considered?

Because the Problems Classified By Symptoms chart in this manual clearly shows the relationship between problem and cause, the chart shows the results of estimation.

Furthermore, by understanding the vehicle construction and operation, the chart can be used as a reference for narrowing down the number of probable causes.

(3) Checking the presumed place and finding the cause

The true cause can be discovered by repeatedly presuming a certain cause (based upon the confirmation procedures mentioned previously) and then checking out that presumption.

This manual should be used to discover the real cause of the problem by following the Checking-Sequence charts for individual components and systems.

(4) Prevention of reoccurrence

A problem cannot be said to have been corrected if it reoccurs soon after repair. Thus the real cause must be discovered, and corrected, so that there is no worry of reoccurrence.

For any problem, there is surely a cause, so it is important to go all the way, and discover just why the problem occurred.

Important points to prevent reoccurrence

- Did the problem originate within the component itself, or did it originate elsewhere?
- Is it a problem which depends on the service life of a component?
- Is it a problem which is caused by imperfect servicing?
- Is the problem caused by improper use of the vehicle or by improper driving?
- Is the problem caused by an external condition, such as the condition of the road, temperature, etc.?

HOW TO USE THIS MANUAL

This manual is arranged according to troubleshooting procedures in the following order:

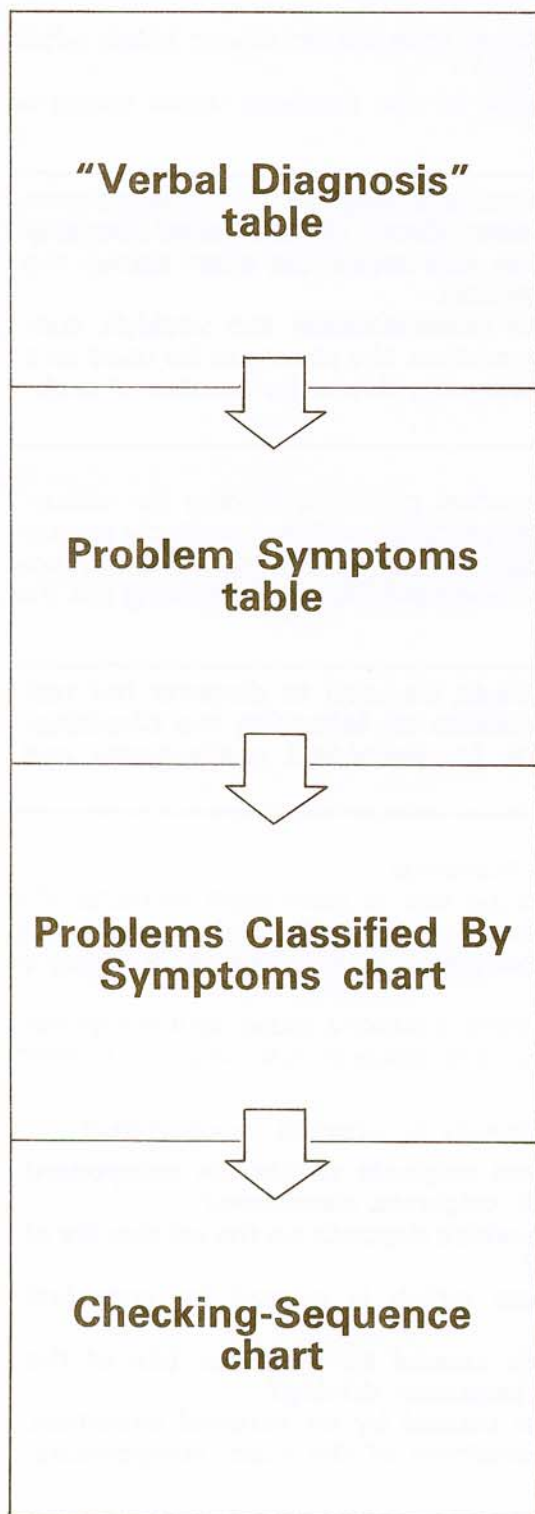
"Verbal Diagnosis" table

Problem Symptoms table

Problems Classified By Symptoms chart

Checking-Sequence chart

For most effective use, the manual should be used in the order described.



(1) "Verbal Diagnosis" table

This table can be effectively used both during verbal diagnosis and when attempting to make the problem reoccur, because it describes the various points for verbal diagnosis and also data for reference for arrangement of the diagnosis results (the conceivable causes, etc.).

(2) Problem Symptoms table

This table of driveability-related problems explains in detail what problems might be encountered, so that symptoms can be confirmed and isolated in order to determine whether or not an actual malfunction exists.

(3) Problems Classified By Symptoms chart

This chart shows the relationship between symptoms and causes (related sensors, actuators, etc.). It is useful for determining which items should be checked.

(4) Checking-Sequence chart

This chart is useful when checking sensors, actuators, etc. It is arranged so as to make it easy to determine checking sequences and procedures.

Note

Refer to page 30 for details regarding checks made by using the ECI checker.

"VERBAL DIAGNOSIS" TABLE

(1) Verbal diagnosisObtain as much detailed information as possible from the customer.

- The date and time the problem occurred _____
- The frequency of occurrence _____
- Road conditions _____
- Running conditions _____
- Driving conditions _____
- Weather conditions _____
- The customer's own "feelings" of the problem _____

(2) Making the problem reoccur (with the customer present if possible)

Reoccurrence results _____

Caution

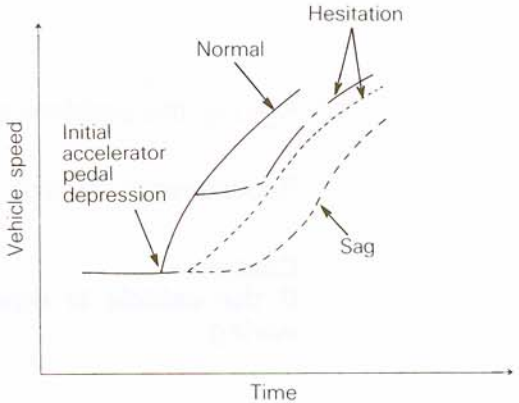
If the vehicle is equipped with ham radio equipment, check its wiring.

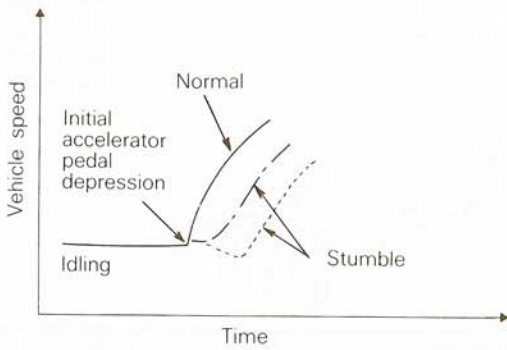
(3) Ascertain the symptoms. _____

(4) Check according to the driveability troubleshooting manual.

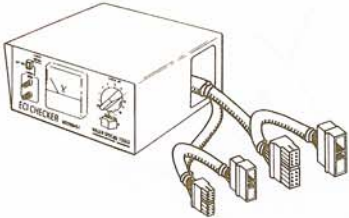
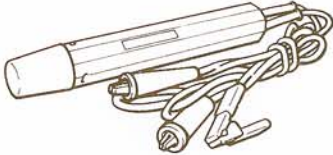
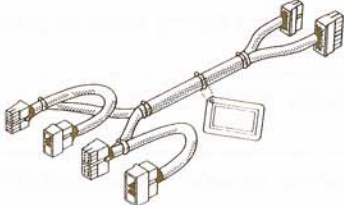
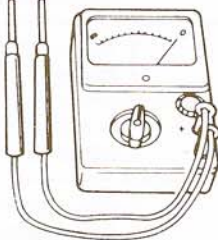
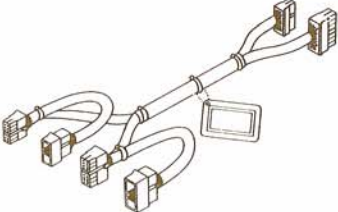

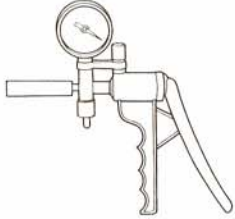
(5) Check to be sure that the problem does not reappear.

PROBLEM SYMPTOMS TABLE

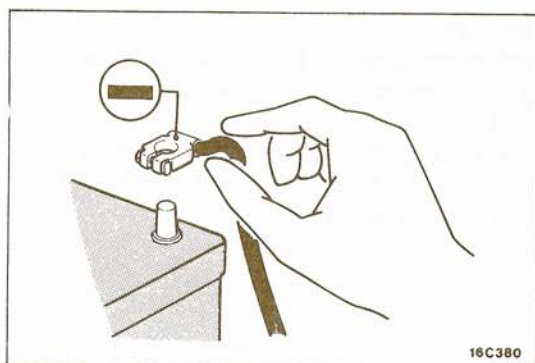
Item		Symptom
Starting	Won't start (no initial combustion)	The starter is used to crank the engine, but there is no combustion within the cylinders, and the engine won't start.
	Starting problem (initial combustion, then stall)	There is combustion within the cylinders, but then the engine soon stalls.
	(Starting takes a long time.)	Engine won't start quickly.
Idling stability	Idling instability (Rough idling)	Engine speed doesn't remain constant; changes during idling. Usually, a judgment can be based upon the movement of the tachometer pointer, and the vibration transmitted to the steering wheel, shift lever, body, etc. This is called rough idling.
	Incorrect idling speed	The engine doesn't idle at the usual correct speed.
	Improper idling continuity Die out Pass out	This non-continuity of idling includes the following elements. (1) Die out The engine stalls when the foot is taken from the accelerator pedal, regardless of whether the vehicle is moving or not. (2) Pass out The engine stalls when the accelerator pedal is depressed or while it is being used.
Driving	Hesitation Sag	<p>"Hesitation" is the delay in response of the vehicle speed (engine rpm) that occurs when the accelerator is depressed in order to accelerate from the speed at which the vehicle is now traveling, or a temporary drop in vehicle speed (engine rpm) during such acceleration.</p> <p>Serious hesitation is called "sag".</p> 
	Poor acceleration	Poor acceleration is inability to obtain an acceleration corresponding to the degree of throttle opening, even though acceleration is smooth, or the inability to reach maximum speed.

Item		Symptom
Driving	Stumble	<p>Engine rpm response is delayed when the accelerator pedal is initially depressed for acceleration from the stopped condition.</p> 
	Shock	The feeling of a comparatively large impact or vibration when the engine is accelerated or decelerated.
	Surge	This is repeated surging ahead during constant speed travel or during variable speed travel.
	Knocking	A sharp sound like a hammer striking the cylinder walls during driving and which adversely affects driving.
Stop-ping	Run-on ("dieseling")	The condition in which the engine continues to run after the ignition is switched OFF. Also called "dieseling".

MEASURING INSTRUMENTS

Instrument (tool) name	Application	Instrument (tool) name	Application
MD998451 ECI checker 	For checking FBC system (use with adaptor harness)	Timing light 	For checking and adjustment of ignition timing
MD998455 Adaptor harness 	For checking FBC system (use with ECI checker) For COLT	Circuit tester (analog type, digital type) 	For checking continuity; for checking and adjustment of output voltage
MD998456 Adaptor harness 	For checking FBC system (use with ECI checker) For RAM50, RAM RAIDER	Compression gauge 	For checking compression pressure
Hand held vacuum pump  01U0445	For checking negative pressure circuit		

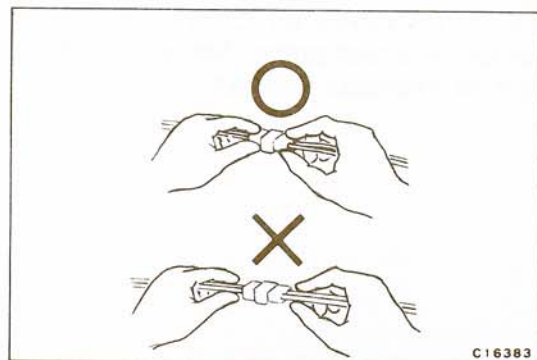
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TROUBLESHOOTING CAUTIONS

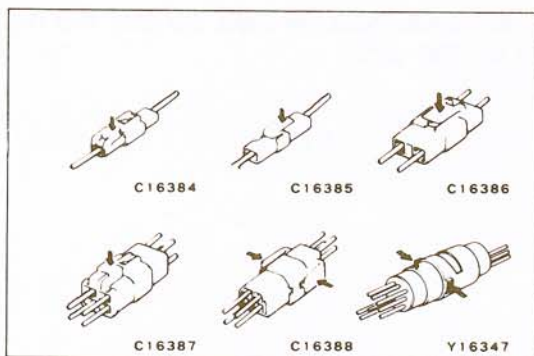
Connection and Disconnection of the Battery Terminal

- (1) When servicing the electrical system, disconnect the negative terminal from the battery to prevent damage by a short-circuit.
- (2) When disconnecting, loosen the nut completely and remove it to prevent damage to the battery terminal. Never try to pry it.

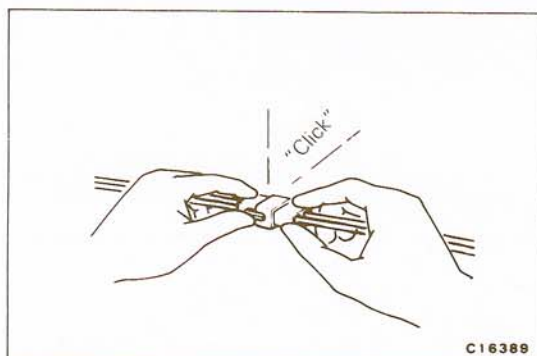


Disconnection/connection and Checking the Connector

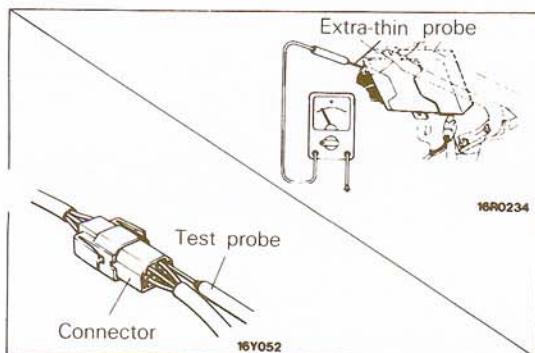
- (1) When disconnecting a connector, be sure to pull only the connector, not the harness.



- (2) Disconnect lock-type connectors by pressing in the direction indicated by the arrows in the illustration.



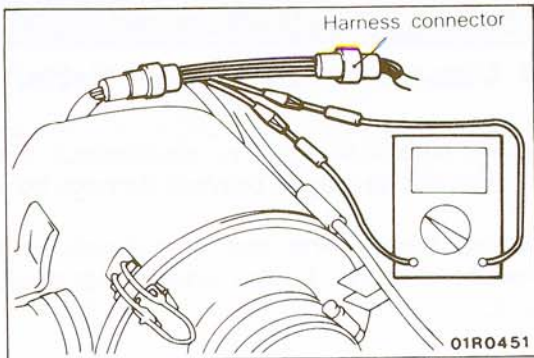
- (3) Connect lock-type connectors by inserting the connectors until they click.



Voltage/continuity Check at Connector

Follow the steps below to avoid causing poor connector contact and/or reduced waterproof performance of connectors when checking continuity and/or voltage at connectors.

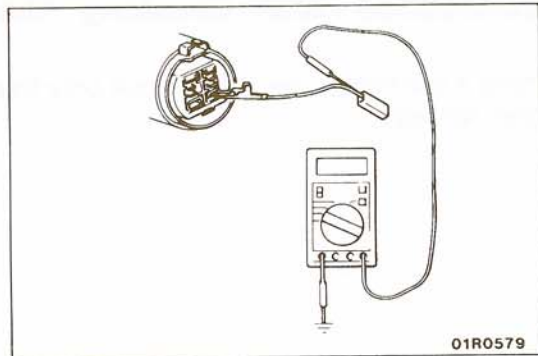
- (1) Ordinary (non-waterproof) connectors
Check by inserting the test probe from the harness side. Note that if the connector (control unit, etc.) is too small to permit insertion of the test probe, it should not be forced; use a special tool (the extra-thin probe in the harness set for checking) for this purpose.



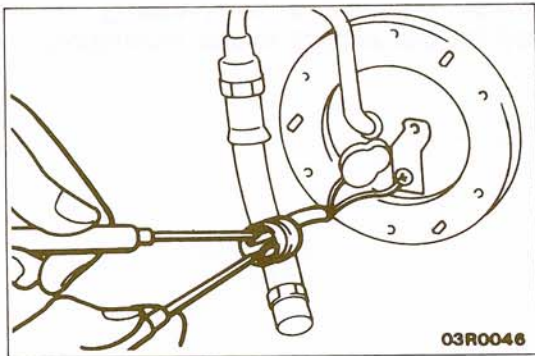
(2) Waterproof connectors

- ① If a waterproof connector is to be checked without disconnecting it, a special tool (harness connector) should be used.

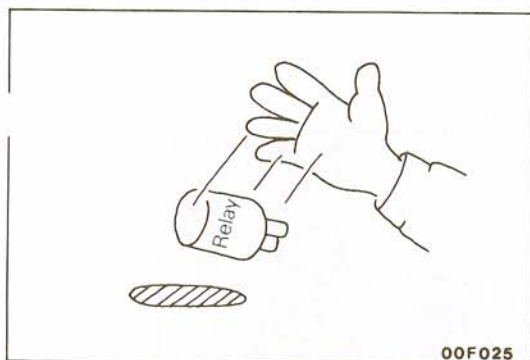
Never insert a test probe from the harness side, because to do so will reduce the waterproof performance and result in corrosion.



- ② If the connector is disconnected for checking, never force the insertion of a test probe, because to do so will cause poor or improper contact.

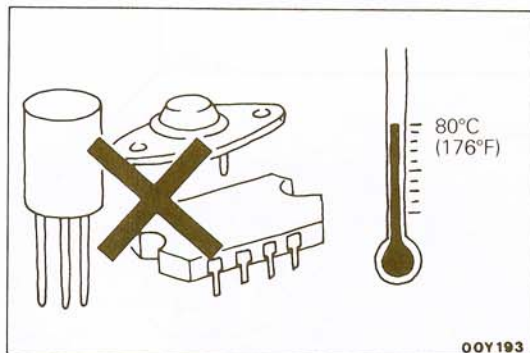


- ③ If the facing part is the male pin side, contact the test probe directly to the pins.

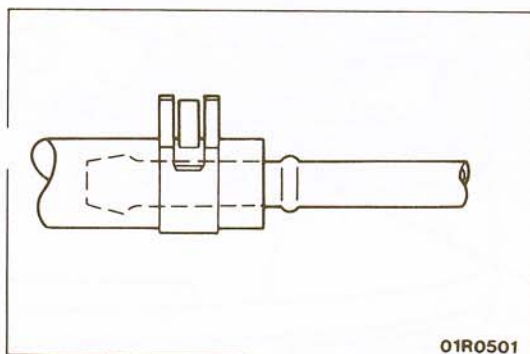


Handling Electronic Parts

- (1) Electronic parts (sensors, relays, etc.) are sensitive to strong impact, and internal circuits are easily damaged. Handle them with care so that they are not dropped or mishandled.



- (2) The electronic parts used for the computer, relays, etc. are sensitive to heat. If any service which results in a temperature of 80°C (176°F) or more is performed, remove the parts.



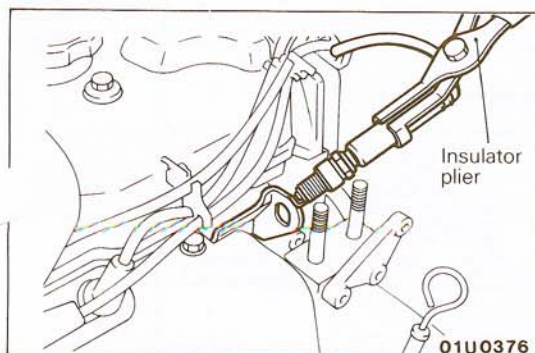
Disconnection/connection of Hose Clip

- (1) If a hose is to be used again, the position of the clip should be the same position as before removing.
- (2) Do not deform the clip. Use a tool suitable for the clip width.

Keep fire sparks away!

Checking the Fuel System

- (1) Keep fire sparks away!
- (2) When disconnecting fuel lines and components, place a cloth or something similar around the appropriate parts to prevent the escaping fuel from spewing out.

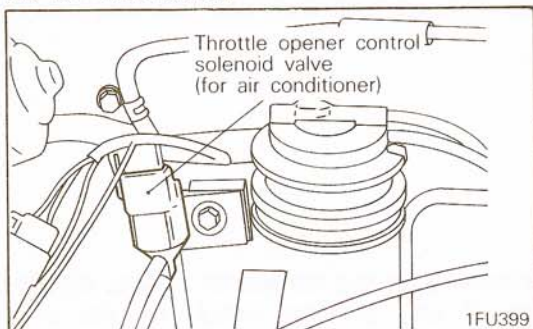


Checking the Spark

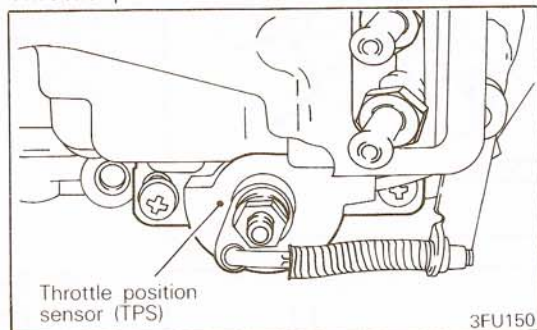
- (1) Use insulated pliers to prevent an electric shock.
- (2) Keep fuel away.

COMPONENTS LAYOUT – COLT

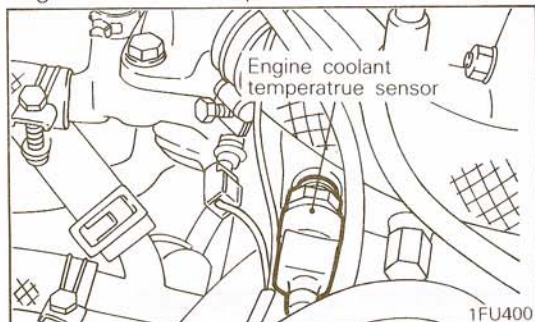
Throttle opener control solenoid valve
(for air conditioner)



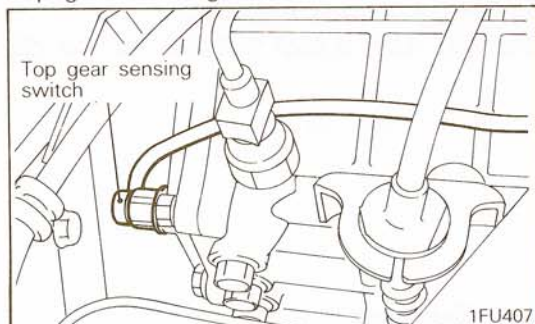
Throttle position sensor



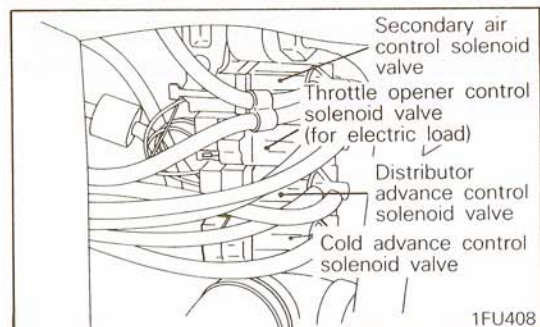
Engine coolant temperature sensor



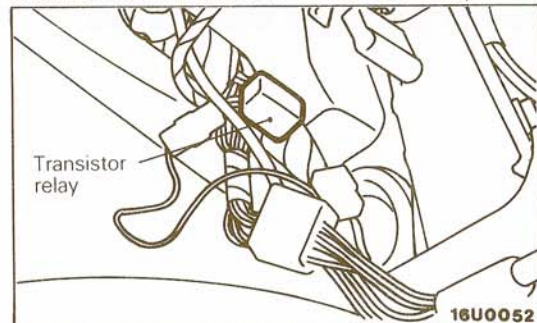
Top gear sensing switch



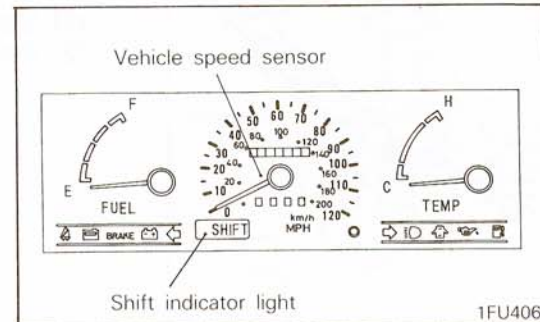
Control solenoid valve



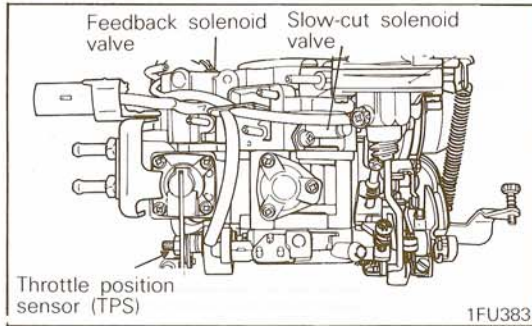
Electric load detection transistor relay



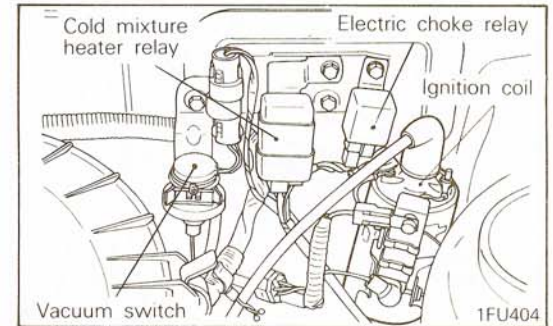
Combination meter



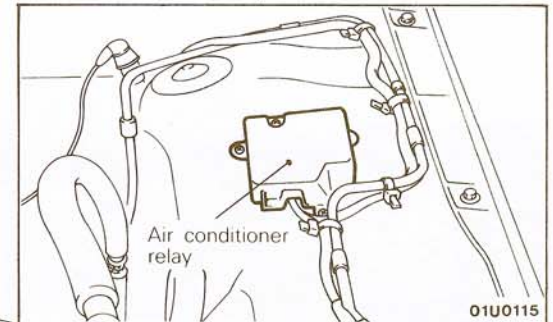
Carburetor



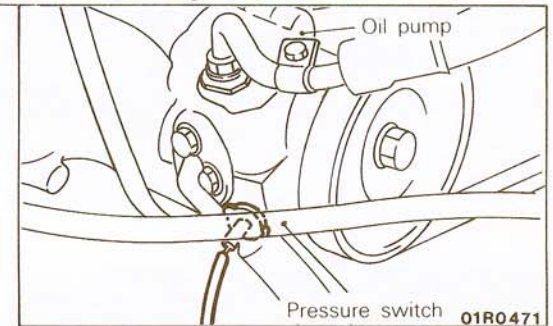
Relay and ignition coil



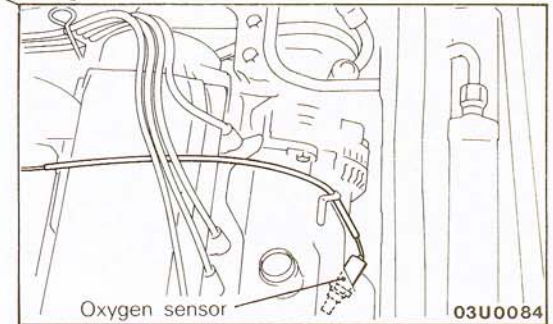
Air conditioner relay



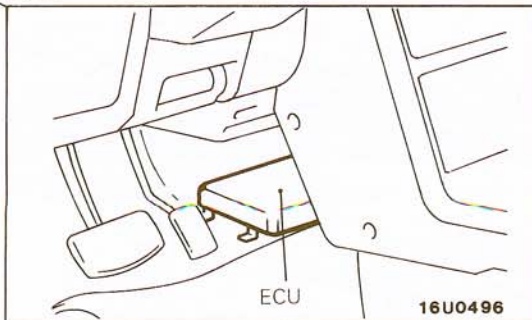
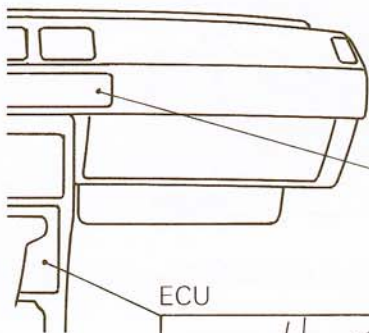
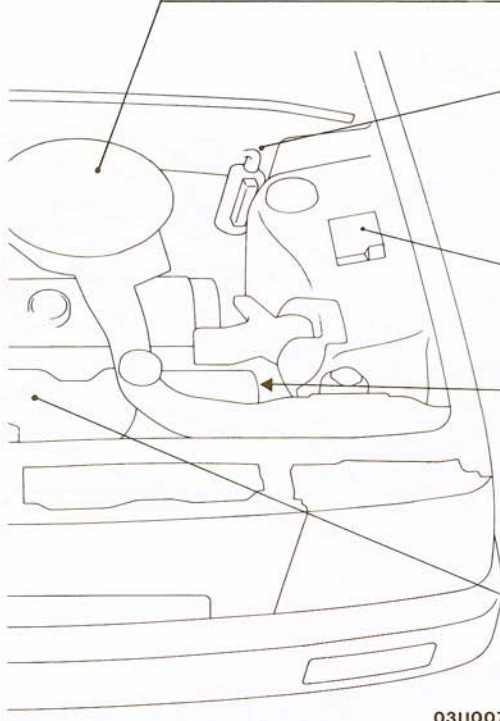
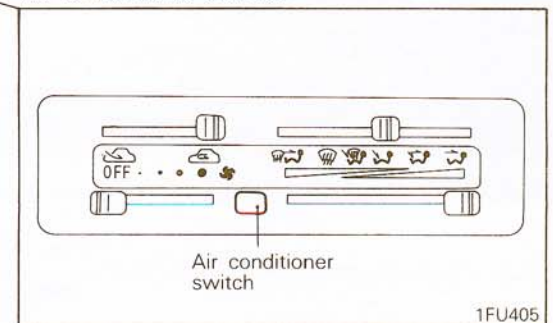
Power steering oil pressure switch



Oxygen sensor

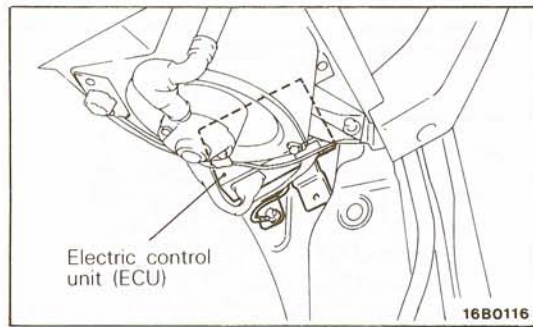


Air conditioner switch

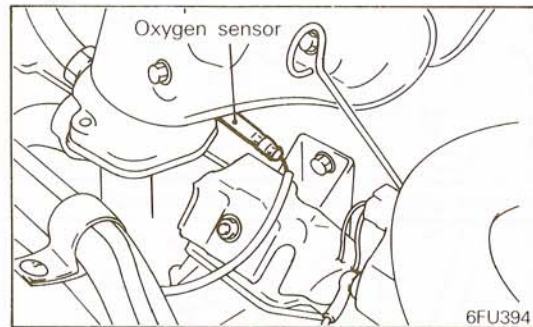


RAM50 [with 2.0 l engine]

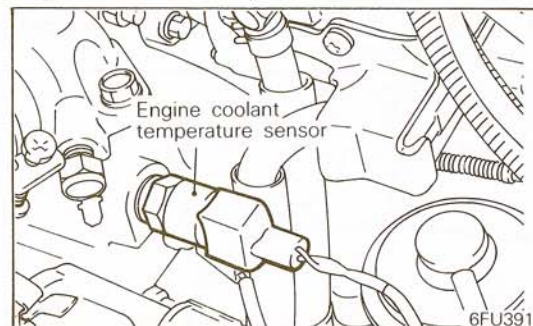
ECU



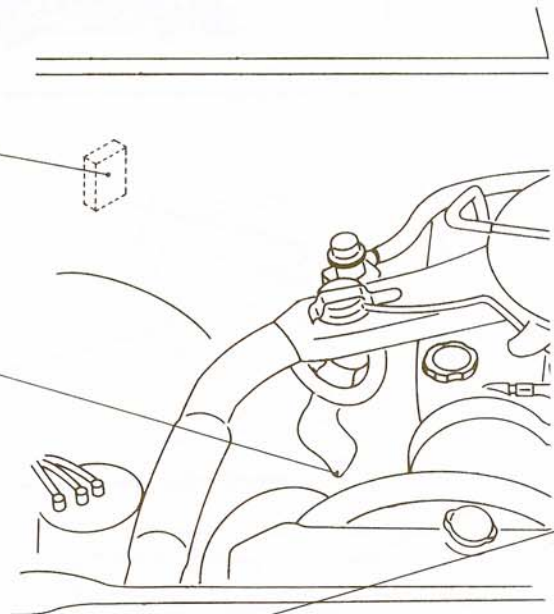
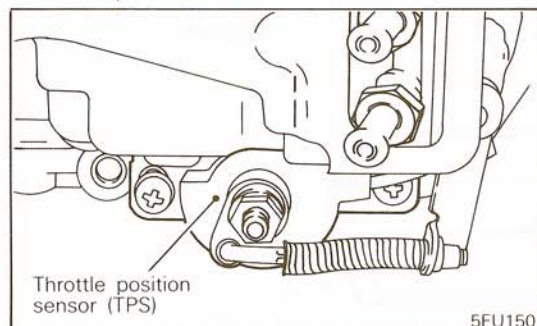
Oxygen sensor



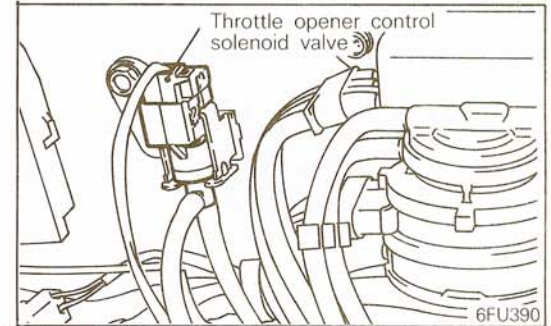
Engine coolant temperature sensor



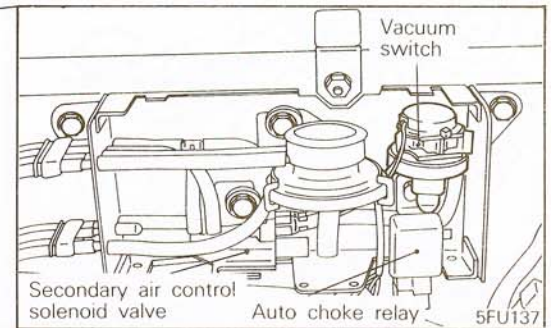
Throttle position sensor



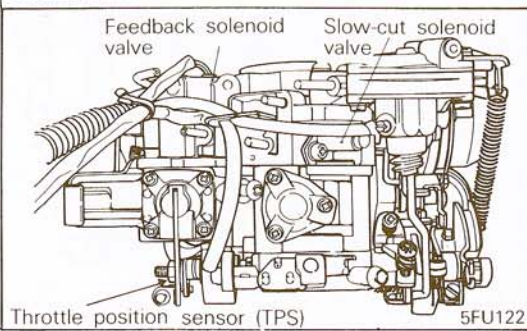
Throttle opener control solenoid valve



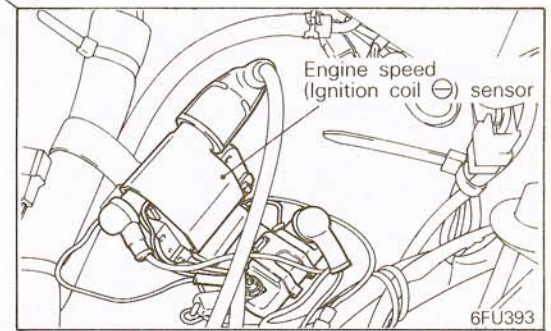
Vacuum switch
Secondary air control solenoid valve
Auto choke relay



Carburetor

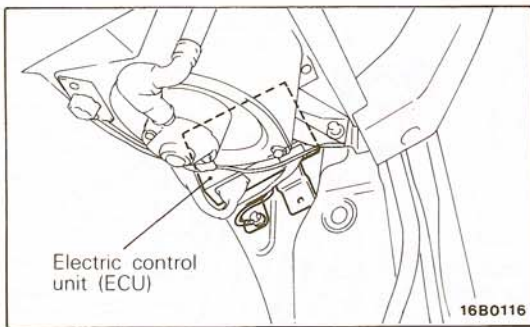


Ignition coil

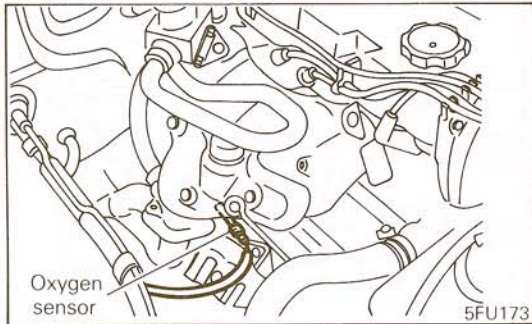


RAM50 [with 2.6 l engine]

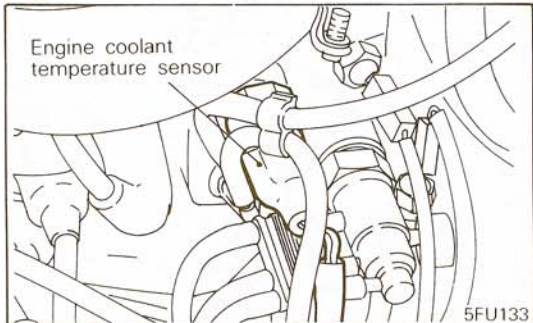
ECU



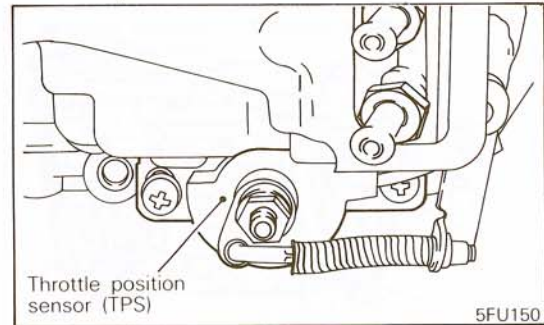
Oxygen sensor

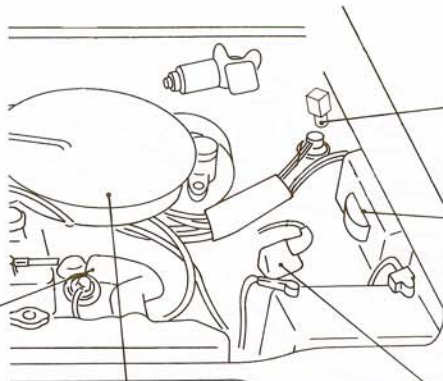


Engine coolant temperature sensor

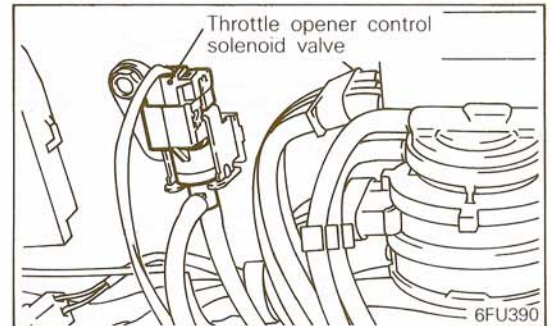


Throttle position sensor

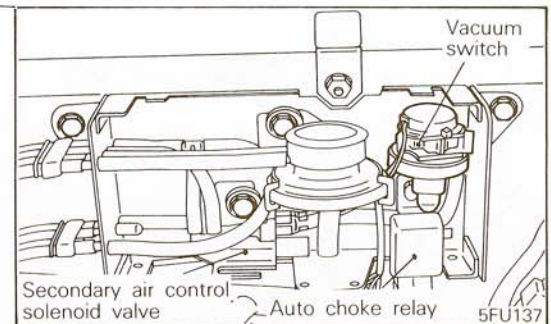




Throttle opener control solenoid valve

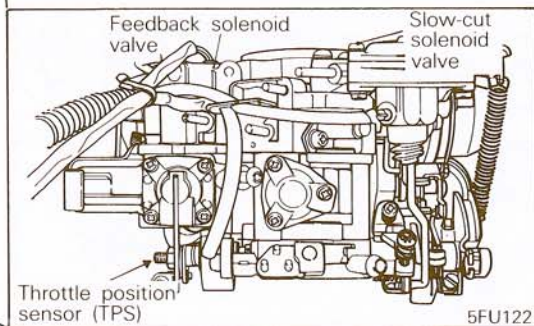


Vacuum switch
Secondary air control solenoid valve
Auto choke relay

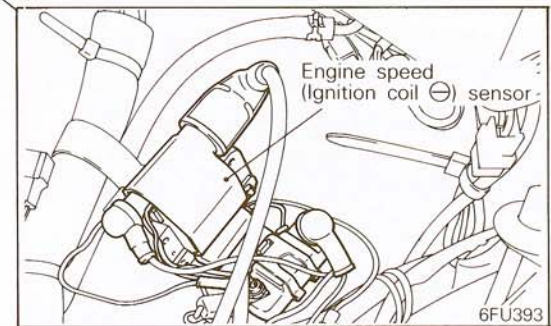


5FU168

Carburetor

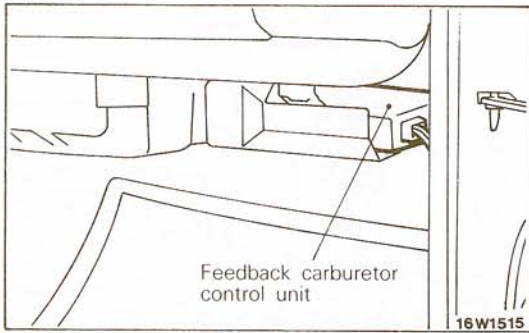


Ignition coil

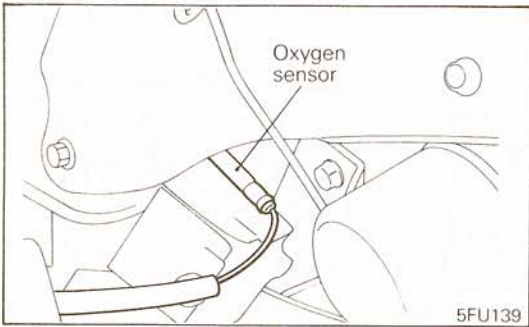


RAM RAIDER

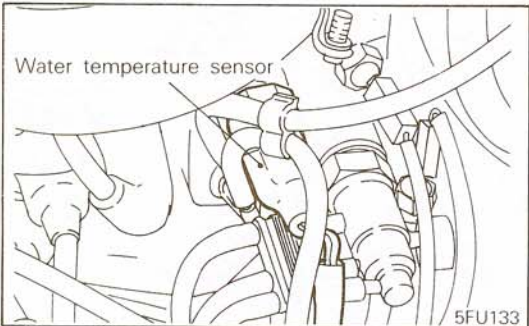
ECU



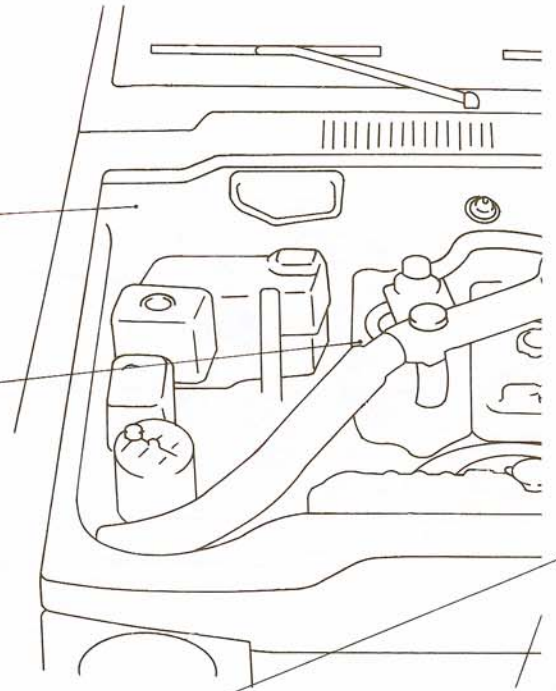
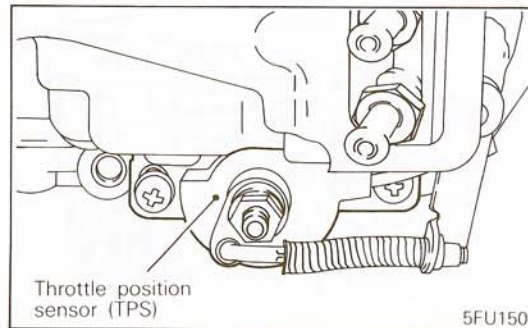
Oxygen sensor

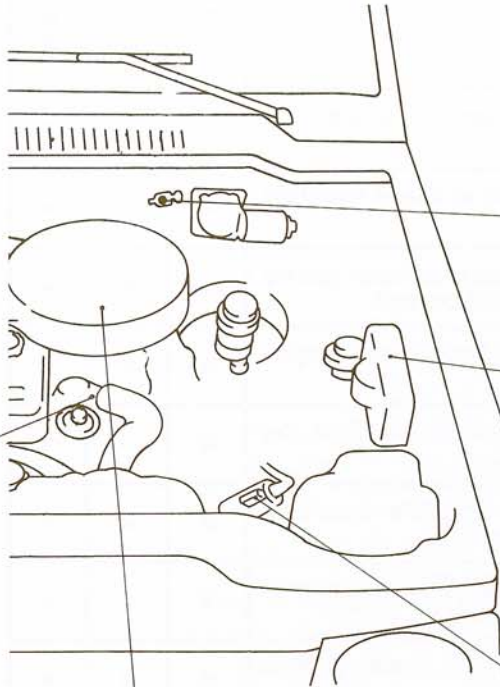


Water temperature sensor



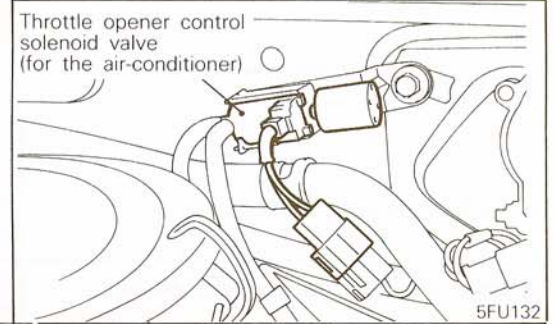
Throttle position sensor



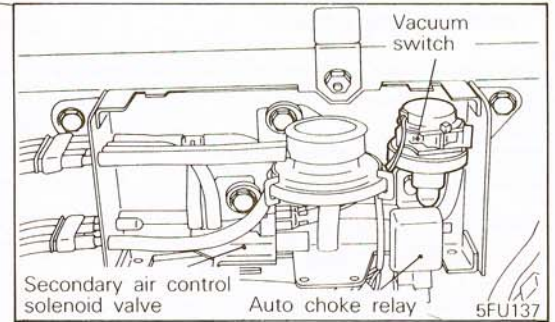


5FU131

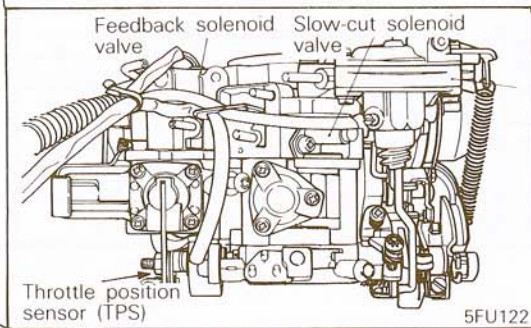
Throttle opener control solenoid valve
(for the air-conditioner)



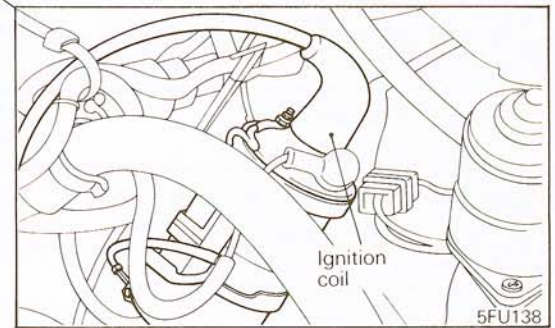
Vacuum switch
Secondary air control solenoid valve
Auto choke relay



Carburetor



Ignition coil

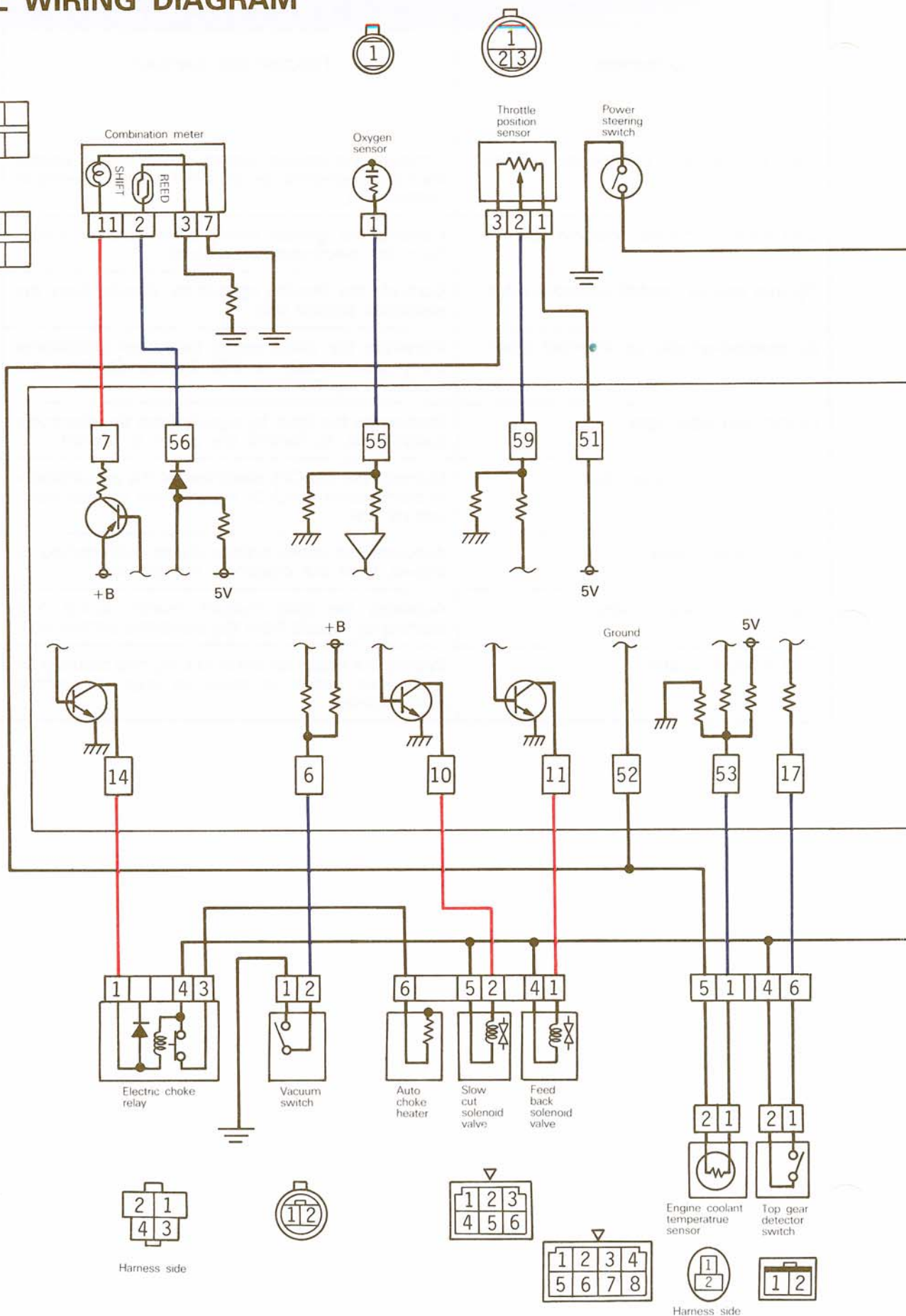


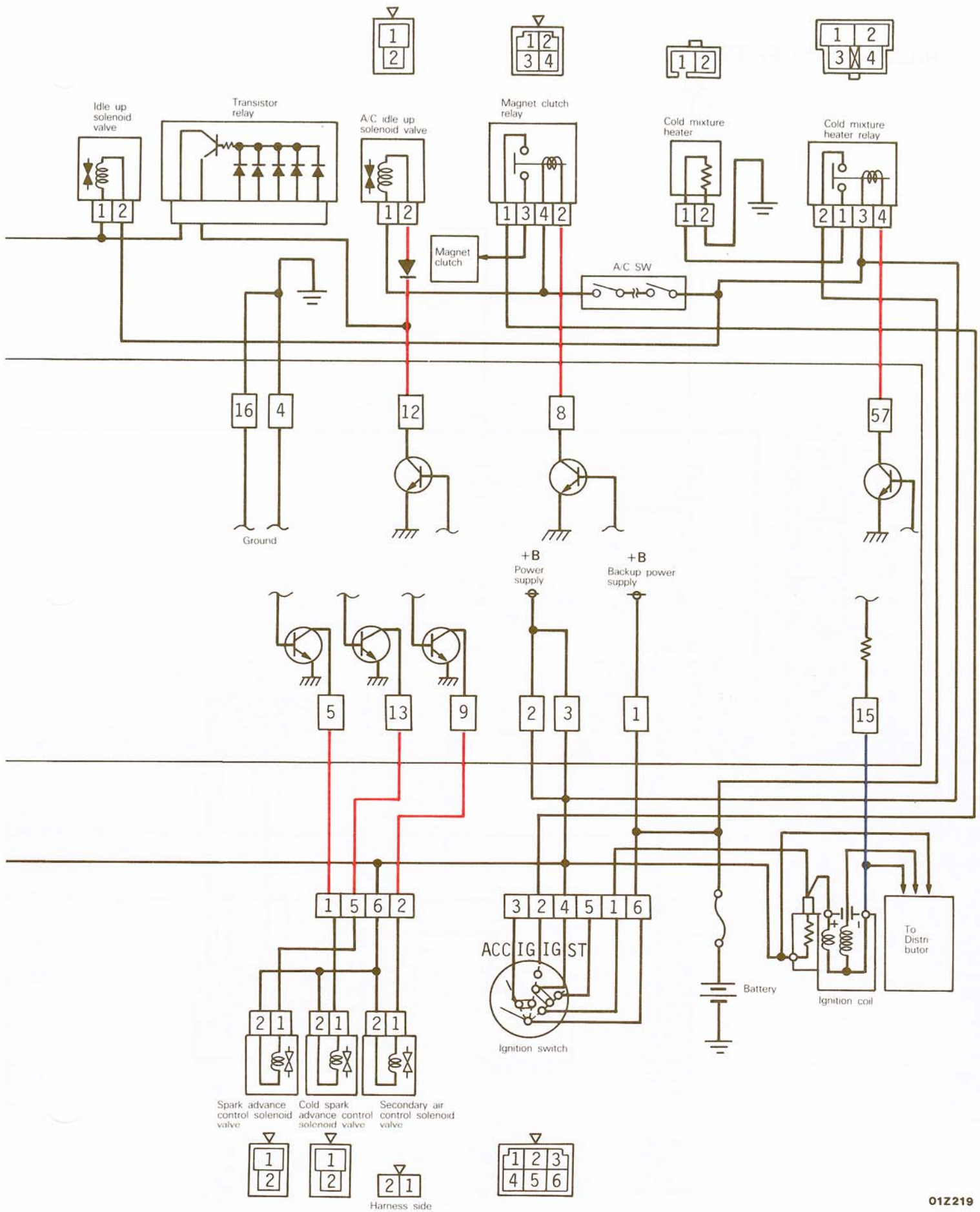
SENSORS AND ACTUATORS

Component	Function and operation	COLT	RAM50	RAM RAIDER
Throttle position sensor	Detects the throttle valve opening degree by potentiometer.	×	×	×
Engine coolant temperature sensor	Detects the coolant temperature at intake manifold by a thermistor.	×	×	×
Oxygen sensor	Detects the oxygen concentration in exhaust gas by the use of an oxygen-concentration cell.	×	×	×
Engine speed sensor (Ignition coil)	Detects the engine rpm by the ignition coil output voltage.	×	×	×
Vehicle speed sensor	Detects the vehicle speed by a reed switch in the speedometer.	×	—	—
Vacuum switch	Detects the intake manifold negative pressure (vacuum) by a contact-type switch.	×	×	×
Top gear sensing switch	Detects whether or not the manual transaxle is in top gear by a contact-type switch.	×	—	—
Air conditioner switch	Detects the air conditioner ON-OFF positions by a contact-type switch.	×	×	×
Power steering switch	Detects the power steering hydraulic pressure by a contact-type switch.	×	—	—
Transistor relay (Electric load switch)	Detects the electrical load by a transistor switch.	×	—	—
Ignition switch	Switches the engine power supply ON and OFF by a contact-type switch.	×	×	×
Feedback solenoid valve	Controls the air/fuel ratio by signals from the electronic control unit.	×	×	×
Slow-cut solenoid valve	Stops the fuel supply (when accelerator OFF) by signals from the electronic control unit.	×	×	×
Secondary air control solenoid valve	Controls the inflow of secondary air by signals from the electronic control unit.	×	×	×

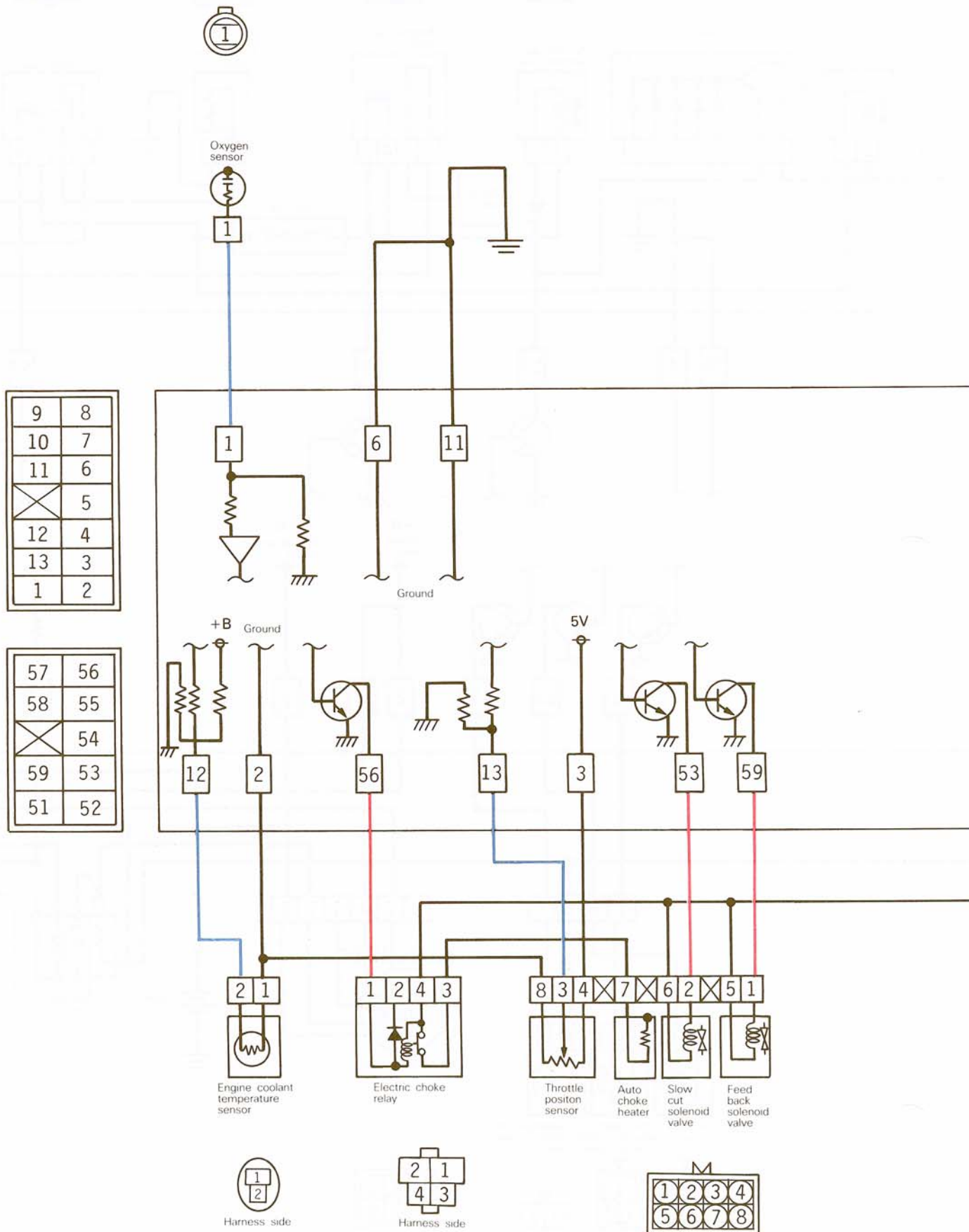
Component	Function and operation	COLT	RAM50	RAM RAIDER
Distributor advance control solenoid valve	Controls the ignition timing during heavy engine load or acceleration by signals from the electronic control unit.	×	—	—
Cold advance control solenoid valve	Controls the ignition timing when cold by signals from the electronic control unit.	×	—	—
Throttle opener control solenoid valve	Controls the throttle opener by signals from the electronic control unit.	×	—	—
Air conditioner idle up solenoid valve	Increases the idling speed (when air conditioner compressor clutch is ON) by signals from the electronic control unit.	×	×	×
Upshift reminder light	Illuminates the light, by signals from the electronic control unit, to remind the driver to upshift.	×	—	—
Air conditioner power relay	Controls the ON/OFF switching of the air conditioner compressor clutch by signals from the electronic control unit.	×	×	×
Electric choke relay	Activates the choke system during cold starting by signals from the electronic control unit.	×	×	×
Cold mixture heater relay	Activates the cold mixture heater during cold starting by signals from the electronic control unit.	×	—	—
Cold mixture heater	Warms the intake air mixer (during cold starting) by a ceramic heater in order to improve starting performance.	×	—	—

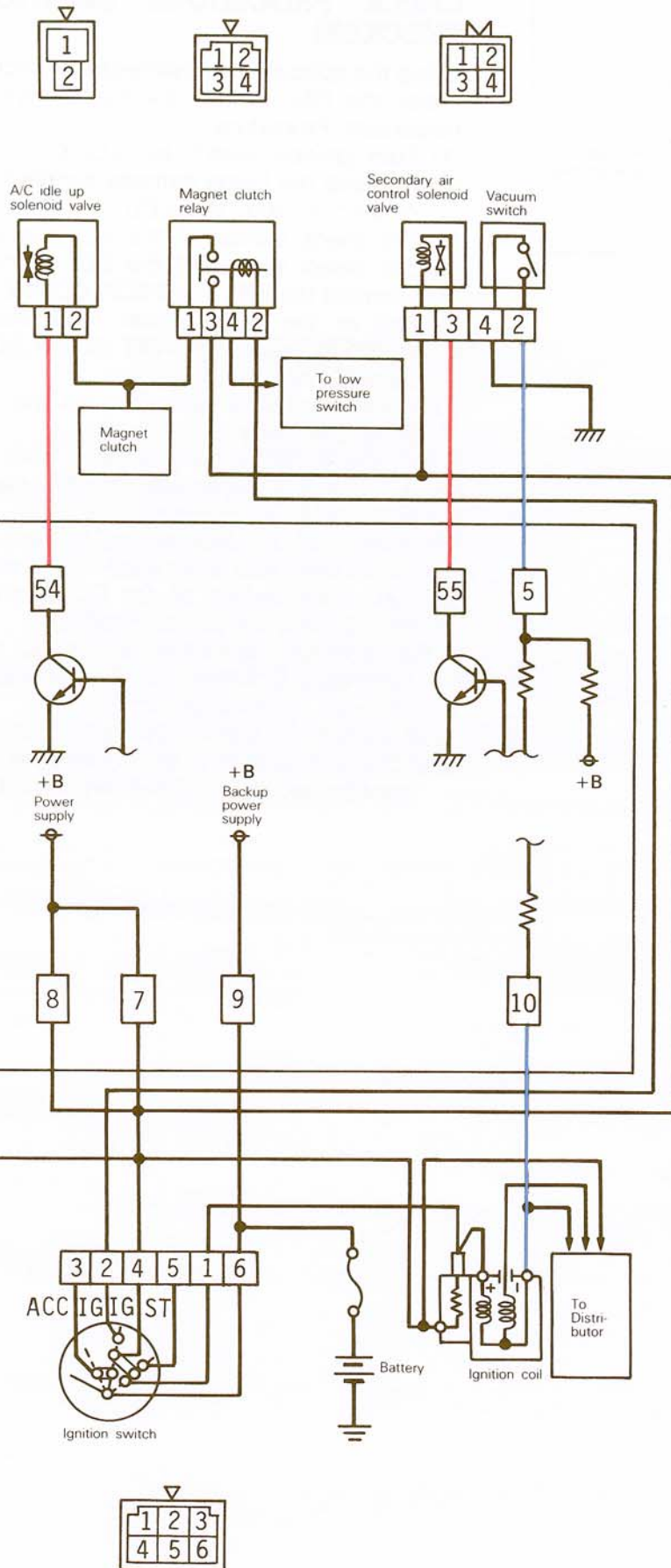
COLT

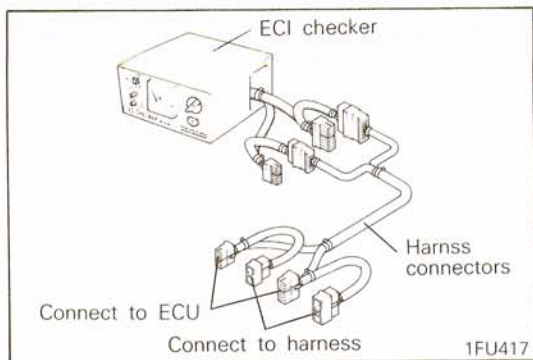




RAM50, RAM RAIDER







TROUBLESHOOTING

CHECK PROCEDURE (METHOD USING ECI CHECKER)

Using the special tools (Harness Connector and ECI Checker), check the FBC system by the following procedure.

Inspection Procedure:

- (1) Turn ignition switch to "LOCK".
- (2) Remove the Large harness connector and Small harness connector from the ECU.
- (3) Set check switch of the ECI checker to OFF.
- (4) Set select switch of the ECI checker to A.
- (5) Connect the FBC HARNESS CONNECTOR to the connectors of the ECI checker, and then connect the FBC HARNESS CONNECTOR to the ECU and the harness connectors.
- (6) Perform checks according to the FBC System Check Procedure chart.
- (7) If checker shows any variance from specifications, check the corresponding sensor and related electrical wiring then repair or replace.
- (8) After repair or replacement, recheck with the ECI checker to confirm that the repair has corrected the problem.
- (9) Set check switch of the ECI checker to OFF.
- (10) Set ignition switch to "LOCK".
- (11) Disconnect connectors of the ECI checker and the FBC HARNESS CONNECTOR from the ECU and the body side harness connectors.
- (12) Connect the body side harness connectors to the ECU.
- (13) After completion of the above test make certain that the trouble has been eliminated on the road test.

FOR COLT

ECI checker operation		Check item	Conditions and operation at vehicle		Judgement table (check meter indication if normal)		ECU check terminal No.
Select switch	Check switch						
Set to "A"	1	Power supply	Ignition switch "LOCK→ON"		11 – 13V		2
	2	Spark advance control solenoid valve	Idling (warm engine)		0 – 0.6V		13
			Start engine. Drive vehicle for some seconds at a speed higher than 8 km/h (5 mph), then hold 2,000 rpm (warm engine)		13 – 15V		
	3	Throttle position sensor (TPS)	Ignition switch "LOCK→ON" (warm engine)	Accelerator fully closed	0.4 – 0.7V		59
				Accelerator fully opened	4.5 – 5.5V		
	4	Engine coolant temperature sensor	Ignition switch "LOCK→ON"	0°C (32°F)	3.4 – 3.6V		53
				20°C (68°F)	2.4 – 2.7V		
				40°C (104°F)	1.5 – 1.8V		
				80°C (176°F)	0.5 – 0.7V		
	5	—	—				—
	6	Vacuum switch for idle position	Ignition switch "LOCK→ON"		9 – 13V		6
			Idling (warm engine)		0 – 0.6V		
	7	Throttle opener control solenoid valve	Idling	Air conditioner switch ON *1 or lighting switch ON	0 – 0.6V		12
			2,000 rpm		9 – 15V		
	8	Electric choke relay	Ignition switch "LOCK→ON"		0 – 0.6V		14
			Idling		13 – 15V		
	9	Air conditioner cut-off relay	Ignition switch "LOCK→ON" and air conditioner switch "ON"*1	Accelerator fully closed	0 – 0.6V		8
				Accelerator fully opened	M/T	0 – 0.6V	
					A/T	13 – 15V	
	10	Power supply for sensor	Ignition switch "LOCK→ON"		4.5 – 5.5V		51
	11	Vehicle speed sensor reed switch	Start engine, and drive vehicle slowly with transaxle in first gear or drive range.		0 – 0.6V ↑ (pulsates) ↓ Over 2V		56
	12	Secondary air control solenoid valve	Idling, 70 seconds after start of warm engine		0 – 0.6V then 13 – 15V		9
			Quick deceleration from above 2,000 rpm to idling with gear in "N" position		Momentarily drop		

NOTE *1: ON means compressor clutch engaged.

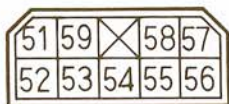
FOR COLT

ECI checker operation		Check item	Conditions and operation at vehicle		Judgement table (check meter indication if normal)	ECU check terminal No.
Select switch	Check switch					
Set to "B"	1	Shift select lever 4th or 5th switch	Ignition switch "LOCK→ON"	Transaxle in 1st	0 – 0.6V	17
				Transaxle in 4th or 5th	11 – 13V	
	2	Feed back solenoid valve (FBS)	Ignition switch "LOCK→ON"		11 – 13V	11
			Idling (warm engine)		2 – 12V	
	3	–	–	–	–	–
	4	Ignition pulse	Ignition switch "LOCK→START"		2 – 8V	15
	5					
	6					
	7	Slow cut solenoid valve	Idling		0 – 0.6V	10
			Quick deceleration from above 4,000 rpm to idling with gear at "N" position		Momentarily 13 – 15V	
	8	Oxygen sensor	Hold speed constant above 1,300 rpm, 70 seconds after start of warm engine		0 – 1V *2 ↑ (pulsates) ↓ 2 – 3V	55
	9					
	10					
	11					
	12					

NOTE

*2: Failure of parts other than the oxygen sensor can also cause deviation from the specifications. Also check other parts related to air-fuel ratio control.

ECU terminal



1FU455

View from front as installed in ECU

FOR RAM50, RAM RAIDER

ECI checker operation		Check item	Conditions and operation at vehicle		Judgement table (check meter indication if normal)	ECU check terminal No.
Select switch	Check switch					
Set to "A"	1	Power supply	Ignition switch "LOCK→ON"		11 – 13V	7
	2	Ignition pulse	Idling		2 – 8V	10
	3	—	—		—	—
	4	Coolant temperature sensor	Ignition switch "LOCK→ON"	0°C (32°F)	3.4 – 3.6V	12
				20°C (68°F)	2.4 – 2.7V	
				40°C (104°F)	1.5 – 1.8V	
				80°C (176°F)	0.5 – 0.7V	
	5	Power supply for sensor	Ignition switch "LOCK→ON"		4.5 – 5.5V	3
	6	Throttle position sensor (TPS)	Ignition switch "LOCK→ON" (warm engine)	Accelerator fully closed	0.4 – 0.7V	13
				Accelerator fully opened	4.5 – 5V	
	7	Vacuum switch for idle position	Ignition switch "LOCK→ON"		9 – 13V	5
			Idling (warm engine)		0 – 0.6V	
	8	—	—		—	—
	9	Feed back solenoid valve (FBS)	Ignition switch "LOCK→ON"		11 – 13V	59
			Idling (warm engine)		2 – 5V	
	10	Slow cut solenoid valve (SCS)	Idling		0 – 0.6V	53
			Quick deceleration from above 4,000 rpm to idling with "N" position		Momentarily 13 – 15V	
	11	—	—		—	—
	12	—	—		—	—

NOTE

SV: System Voltage

FOR RAM50, RAM RAIDER

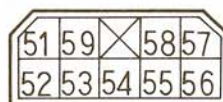
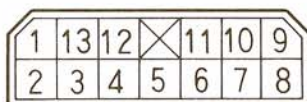
ECI checker operation		Check item	Conditions and operation at vehicle		Judgement table (check meter indication if normal)	ECU check terminal No.
Select switch	Check switch					
Set to "B"	1	Idle up control solenoid valve	Idling	Air conditioner switch ON * ¹ or lighting switch ON	0 – 0.6V	54
			2,000 rpm		9 – 15V	
	2	A/C cutoff relay	Ignition switch "LOCK→ON" and A/C switch "ON" * ¹	Accelerator fully closed	0 – 0.6V	57
				Accelerator fully opened	0 – 0.6V	
	3	–	–	–	–	–
	4	Secondary air control solenoid valve	Idling, after 70 seconds from start of warm engine		13 – 15V	55
			Quick deceleration from above 2,000 rpm to idling with "N"		Momentarily drop	
	5	–	–	–	–	–
	6	–	–	–	–	–
	7	–	–	–	–	–
	8	Oxygen sensor * ²	Hold rpm constant above 1,300 rpm, after 70 seconds from start of warm engine		0 – 1V ↑ (pulsates) ↓ 2 – 3V	1
	9	–	–	–	–	–
	10	–	–	–	–	–
	11	–	–	–	–	–
	12	–	–	–	–	–

NOTE

*1: ON means compressor clutch engaged.

*2: Because there are sometimes malfunctions and differences from the specifications in parts other than oxygen sensor, take care to inspect the parts connecting the other air-fuel ratio controls.

ECU terminal



5FU143

View from front as installed in ECU

PROBLEMS CLASSIFIED BY SYMPTOMS CHART

Checking order		Check item	Applicable models			Trouble symptom												
			COLT	RAM50	RAM RAIDER	Starting		Idling stability			Driving						Stop-ping	
						Won't start (no initial combustion)	Starting problem (initial combustion, then stall Starting takes a long time.)	Idling instability (rough idling)	Incorrect idling speed	Improper idling continuity	Hesitating, sag	Poor acceleration	Stumble	Shock	Surge	Knocking	Run-on ("dieseling")	
①	Control	Ignition switch	×	×	×													
		TPS	×	×	×			⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗		
		Coolant temperature sensor	×	×	×		⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗		
		Oxygen sensor	×	×	×										○			
		Vehicle-speed sensor	×								⊗	⊗	⊗					
		Ignition coil	×	×	×			⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗		
		Vacuum switch	×	×	×		⊗				⊗	⊗	⊗	⊗	⊗			
		Top gear sensing switch	×															
		Power steering oil pressure switch	×					○	○	○								
		Air conditioner switch	×	×	×			○	○	○								
		Feedback solenoid valve	×	×	×		⊗				⊗	⊗	⊗		⊗	⊗		
		Slow cut solenoid valve	×	×	×		⊗	⊗		⊗			⊗					○
		Secondary air control solenoid valve	×	×	×			⊗										
		Distributor spark advance control solenoid valve	×					⊗	⊗	⊗	⊗	⊗	⊗			⊗		
		Distributor cold spark advance control solenoid valve	×					⊗			⊗	⊗	⊗				○	
		Throttle opener control solenoid valve (electrical load)	×					○	○									
		Throttle opener control solenoid valve (air conditioner)	×	×	×			○	○									
		Shift indicator light	×															

○ Warm

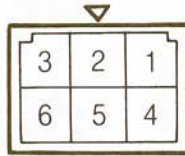
⊗ Cold

PROBLEMS CLASSIFIED BY SYMPTOMS CHART

Checking order			Check item	Applicable models			Trouble symptom										
				COLT	RAM50	RAM RAIDER	Starting		Idling stability			Driving					Stop-ping
							Won't start (no initial combustion)	Starting problem (initial combustion, then stall (Starting takes a long time.))	Idling instability (rough idling)	Incorrect idling speed	Improper idling continuity	Hesitating, sag	Poor acceleration	Stumble	Shock	Surge	Knocking
①	Control	Air conditioner relay	×	×	×			○	○	○		⊗					
		Cold mixture heater relay	×									⊗	⊗		○ Warm		
		Cold mixture heater	×									⊗	⊗		⊗ Cold		
		Electric choke relay	×	×	×		⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗	○	
		Transistor relay (electrical load)	×					○	○								
②	Ignition		×	×	×	⊗	⊗	⊗		⊗	⊗	⊗	⊗	⊗	⊗		
③	Fuel		×	×	×	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
④	EGR		×	×	×		⊗	⊗		⊗	⊗	⊗		⊗			
⑤	HAC		×	×	×			⊗	⊗	⊗	⊗	⊗	⊗		⊗		
⑥	Combustion chamber		×	×	×	⊗	⊗	⊗		⊗	⊗	⊗			⊗		
⑦	Intake		×	×	×	⊗	⊗	⊗		⊗	⊗			⊗			
⑧	Cooling		×	×	×						○	○	○			○	
⑨	Exhaust		×	×	×						⊗	⊗	⊗				
⑩	Engine mounts		×	×	×									⊗	⊗		

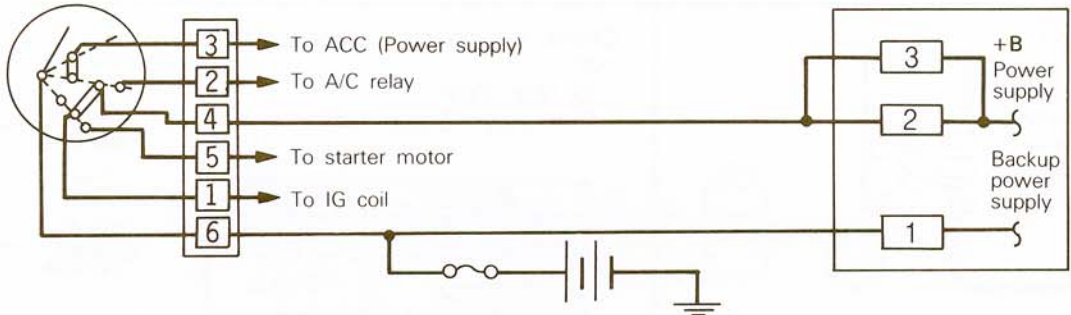
IGNITION SWITCH TEST PROCEDURES

Sensor connector



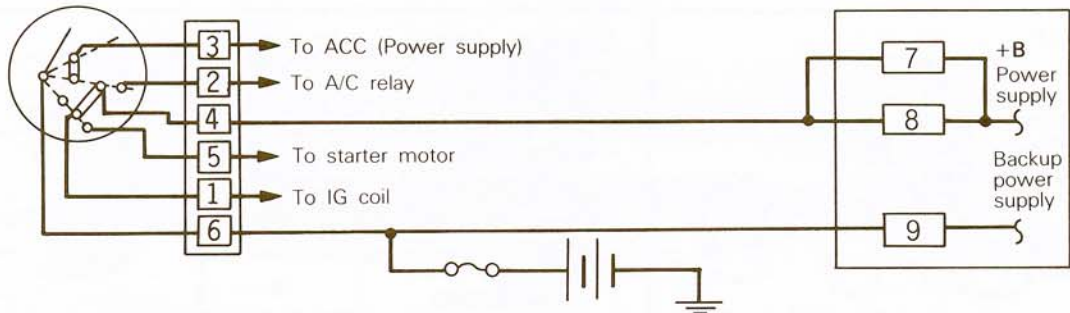
Sensor circuit

COLT



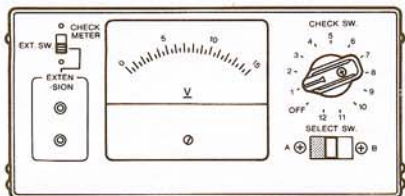
01Z312

RAM50,
RAM RAIDER



01Z312

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01U0400

Models	Harness	Select switch	Check switch
COLT	MD998455	A	1
RAM50, RAM RAIDER	MD998456	A	1

• IG SW: ON

Voltage (V)
SV

OK



OK

2

2

Harness side connector

01Z137

Measure the power supply voltage.

- IG SW: ON

Voltage (V)
SV

OK → **3**

~~OK~~ → Repair the harness.

3 COLT

Harness side connector

01Z138

Check the power supply output circuit.

- IG SW: OFF
- Connector: Disconnected

Models	ECU terminal
COLT	2 or 3
RAM50, RAM RAIDER	7 or 8

OK → **4**

~~OK~~ → Repair the harness.

4 COLT

Harness side connector

01Z139

Check the backup power supply output circuit.

- IG SW: OFF
- Connector: Disconnected
- Battery: Removal

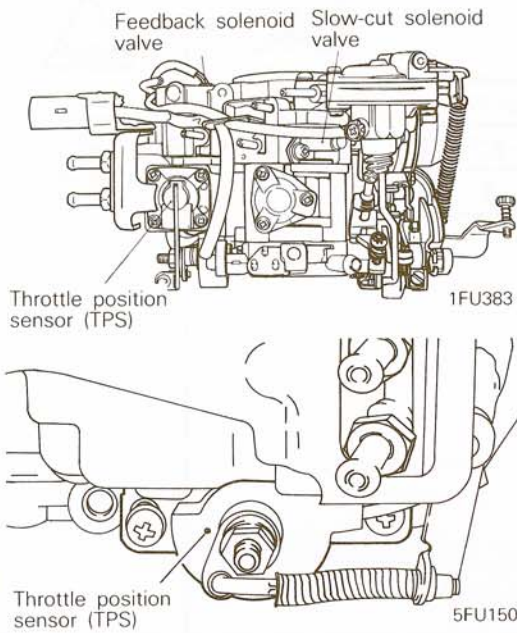
Models	ECU terminal
COLT	1
RAM50, RAM RAIDER	9

OK → Replace the ignition switch.

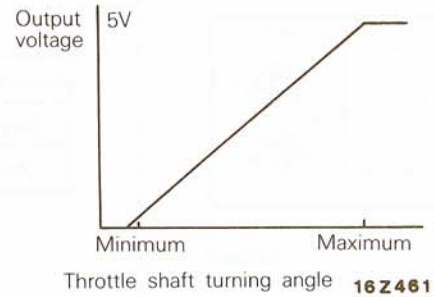
~~OK~~ → Repair the harness.

THROTTLE POSITION SENSOR TEST PROCEDURES

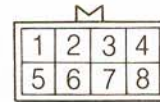
Installing positions



Sensor characteristics



Sensor connector

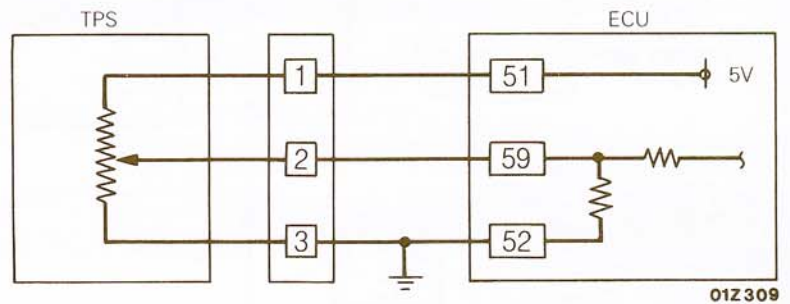
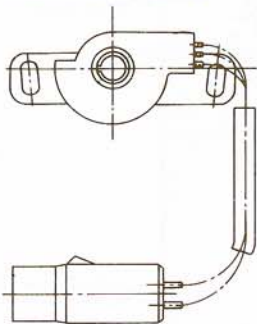


RAM50,
RAM
RAIDER

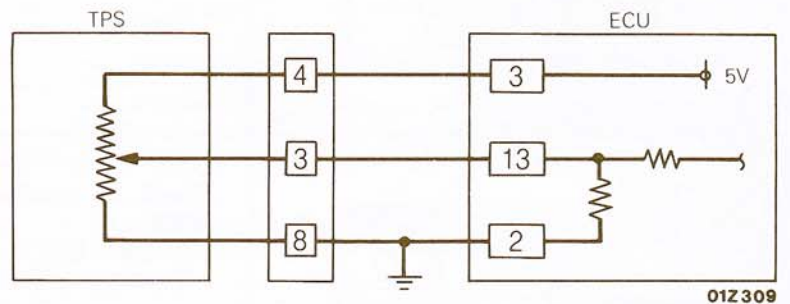
Sensor circuit

Individual component

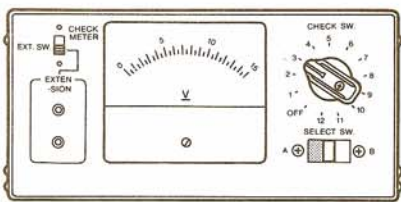
COLT



RAM50,
RAM RAIDER



I



01U0402

Models	Harness	Select switch	Check switch
COLT	MD998455	A	3
RAM50, RAM RAIDER	MD998456	A	6

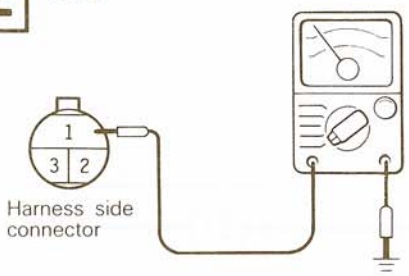
- Engine: Warmed up
- IG SW: ON

Accelerator pedal	Voltage (V)
Depressed	0.4~0.7
Released	4.5~5

OK → STOP

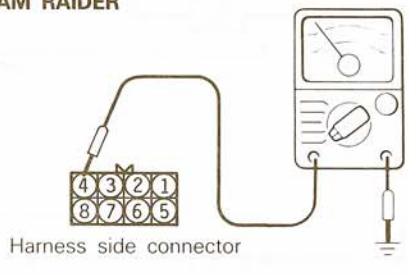
OK → 2

2 COLT



01Z158

RAM50,
RAM RAIDER



01Z155

Measure the power supply voltage.

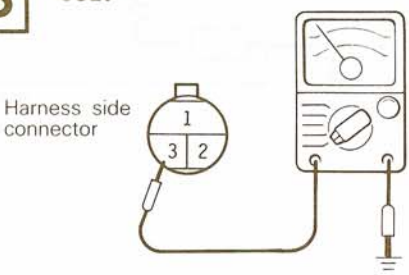
- Connector: Disconnected
- IG SW: ON

Voltage (V)
5

OK → 3

OK → Repair the harness.

3 COLT



01Z159

Check for continuity of the ground circuit.

- IG SW: OFF
- Connector: Disconnected

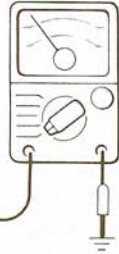
OK → 4

OK → Repair the harness.

3

RAM50,
RAM RAIDER

Harness
side
connector



01Z152

Check for continuity of the ground circuit.

- IG SW: OFF
- Connector: Disconnected



4



Repair the harness.

4

COLT

TPS side
connector



01Z156

Measure the resistance.

- IG SW: OFF
- Connector: Disconnected

Accelerator pedal	Resistance (Ω)
Depressed	4~6
Released	0



5



Replace the TPS.

RAM50,
RAM RAIDER

TPS side
connector

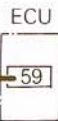
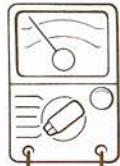


01Z153

5

COLT

Harness
side
connector



01Z157

Check for wiring damage or disconnection, or short-circuit, between electronic control unit and throttle-position sensor.



Repair the harness.

RAM50,
RAM RAIDER

Harness side connector

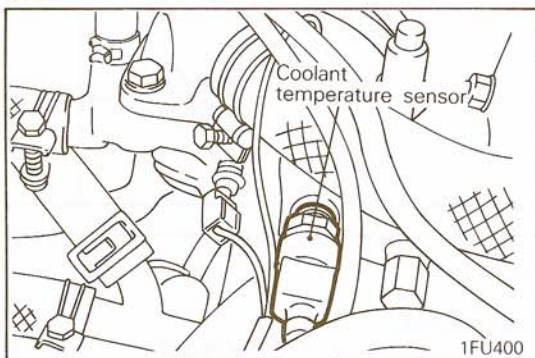


01Z154

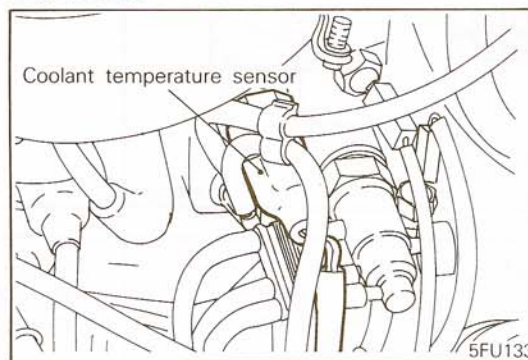
COOLANT TEMPERATURE SENSOR TEST PROCEDURES

Installing positions

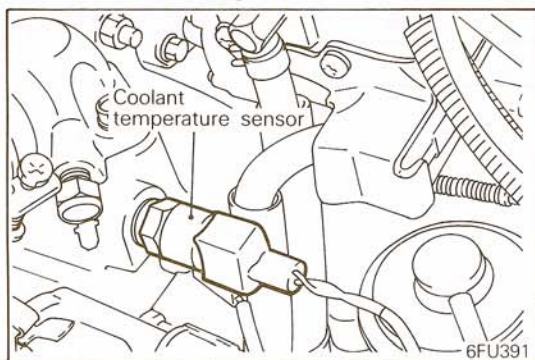
COLT



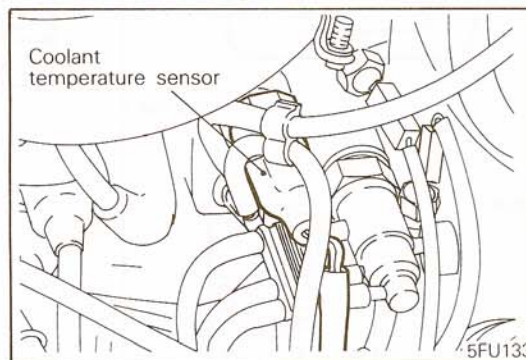
RAM RAIDER



RAM50 (with 2.0 l engine)



RAM50 (with 2.6 l engine)

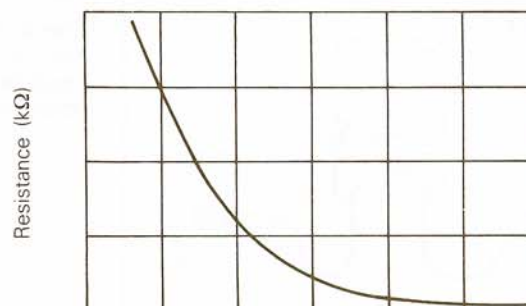


Individual component



20Z031

Sensor characteristics



01L0382

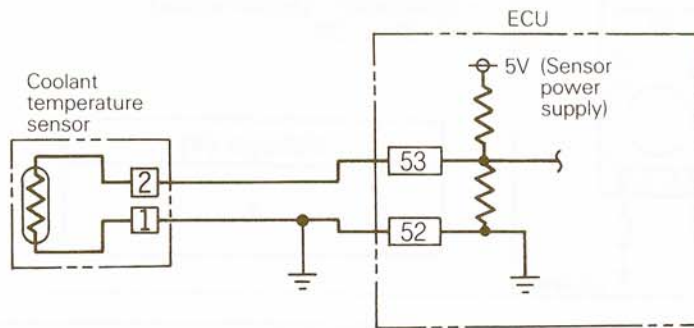
Coolant temperature

Sensor connector

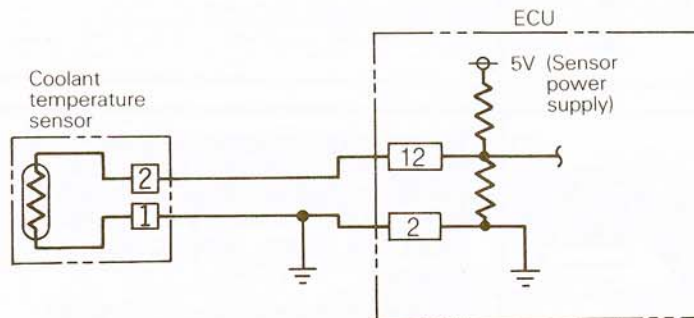


Sensor circuit

COLT

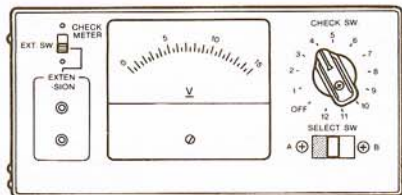


01L0382

RAM50,
RAM RAIDER

01L0382

I



01U0403

Models	Harness	Select switch	Check switch
COLT	MD998455	A	4
RAM50, RAM RAIDER	MD998456	A	4

· IG SW: ON

Temperature [°C (°F)]	Voltage (V)
0 (32)	3.4~3.6
20 (68)	2.5~2.7
40 (104)	1.5~1.7
80 (176)	0.5~0.7

OK



STOP

OK



2

2

Harness side connector

01L0461

Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

Voltage (V)
5

OK → **3**

✗ → Repair the harness.

3

Harness side connector

01L0463

Check for continuity of the ground circuit.

- Connector: Disconnected

OK → **4**

✗ → Repair the harness.

4

3 mm (.12 in.)

Hot water surface

16E861

Remove the coolant temperature sensor from the engine and place its temperature-sensing part in water, and then measure the resistance while the water temperature is increased.

Temperature [°C (°F)]	Resistance (kΩ)
0 (32)	6.0
20 (68)	2.5
40 (104)	1.1
80 (176)	0.3

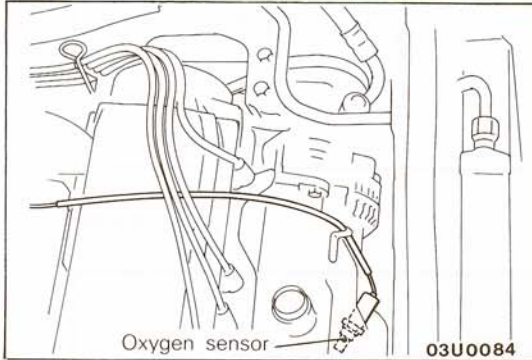
OK → **STOP**

✗ → Replace the sensor.

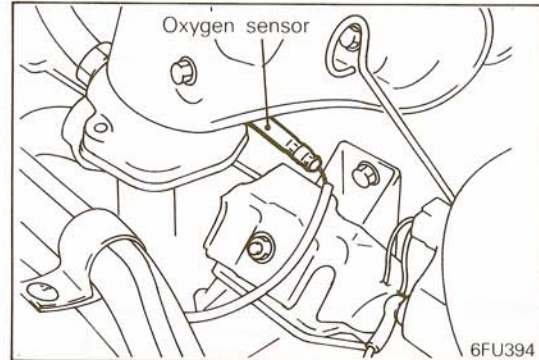
OXYGEN SENSOR TEST PROCEDURES

Installing positions

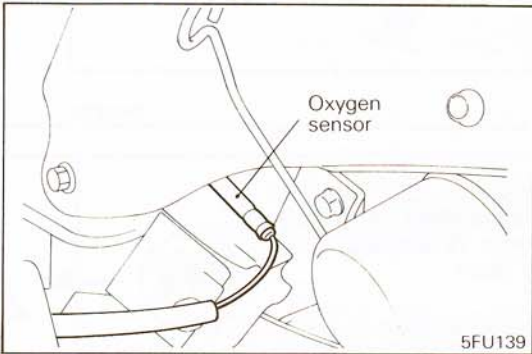
COLT



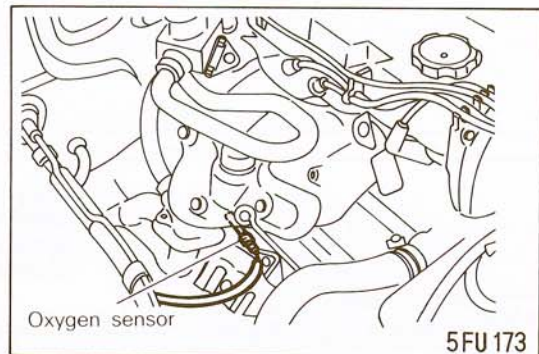
RAM RAIDER



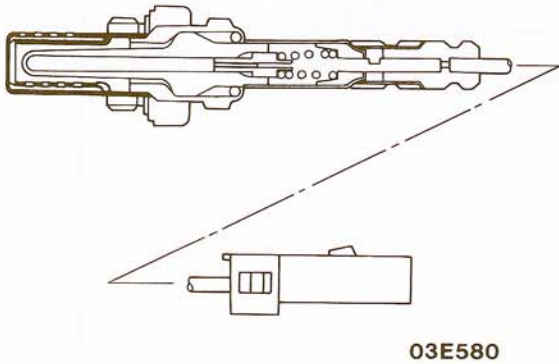
RAM50 (with 2.0 l engine)



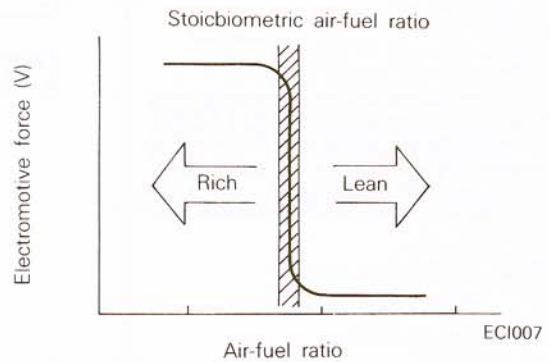
RAM50 (with 2.6 l engine)



Individual component



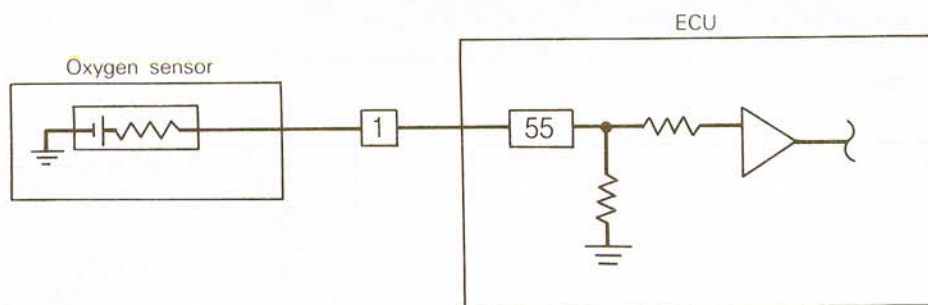
Sensor characteristics



Sensor connector

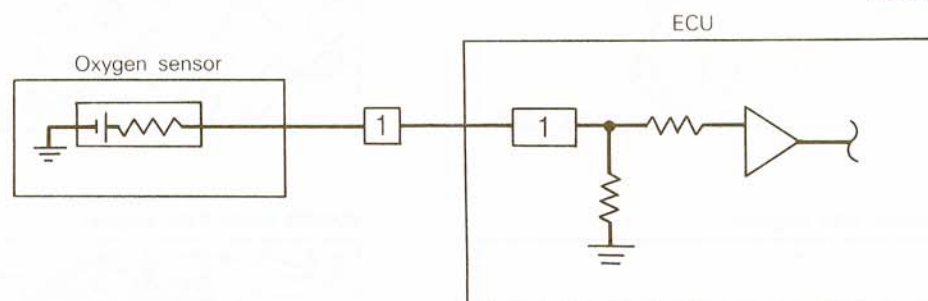


Sensor circuit COLT



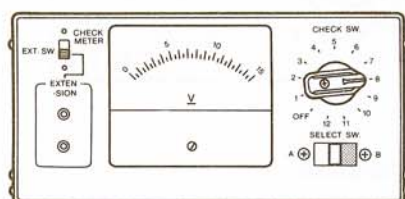
01Z305

RAM50, RAM RAIDER



01Z305

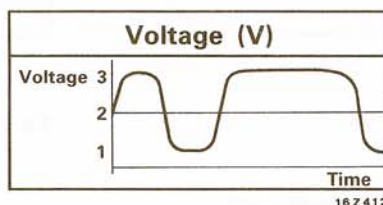
I



01U0407

Models	Harness	Select switch	Check switch
COLT	MD998455	B	8
RAM50, RAM RAIDER	MD998456	B	8

- Engine: Warmed up
- Engine rpm: Maintained at 1,300 rpm or higher with 70 seconds and thereafter after start



Fluctuates between 0~1V and 2~3V.

OK

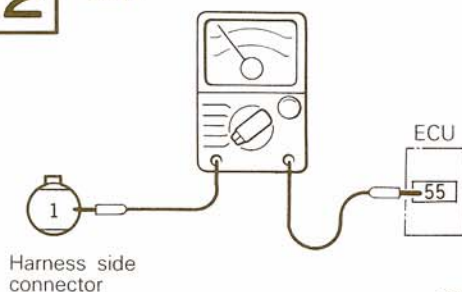
OK

STOP

2

2

COLT



01Z160

Check for continuity of the output circuit.

- Connector: Disconnected

Other models are basically the same as the COLT; only the electronic control unit terminal numbers are different.

RAM50,
RAM RAIDER) ... 1

OK

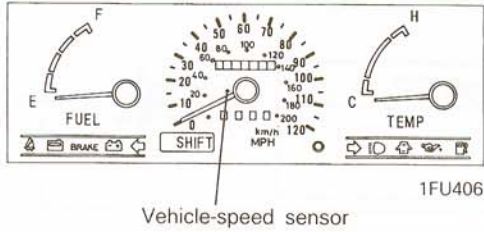
OK

Replace the
oxygen
sensor.

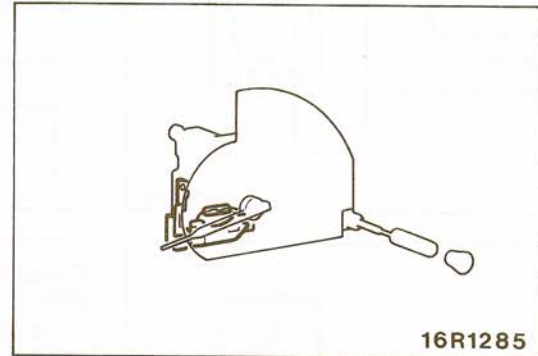
Repair the
harness.

VEHICLE-SPEED SENSOR TEST PROCEDURES

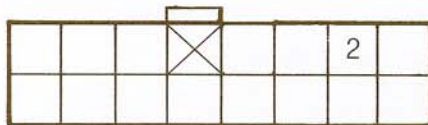
Installing position



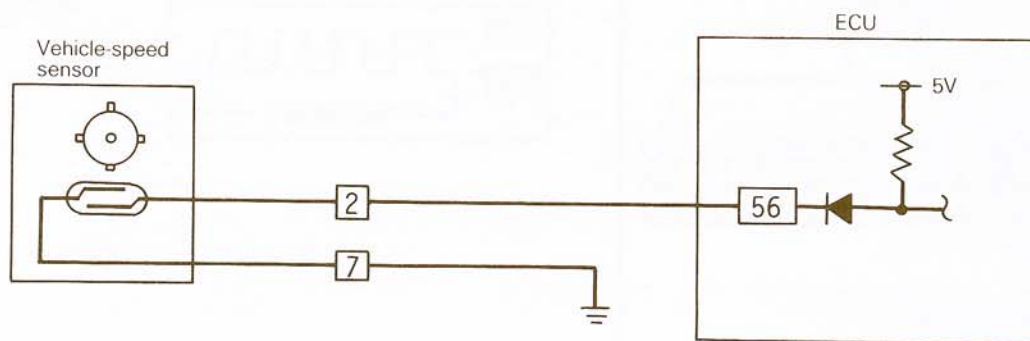
Individual component



Harness side connector



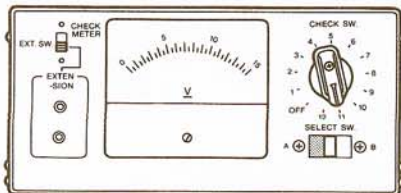
Sensor circuit



012308

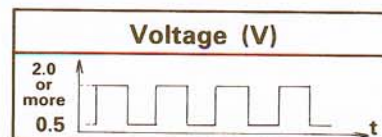
I

ECI checker (use MD998455)
Select switch: A
Check switch: 11



01U0410

- IG SW: ON
- Slowly move the vehicle about one meter.



OK



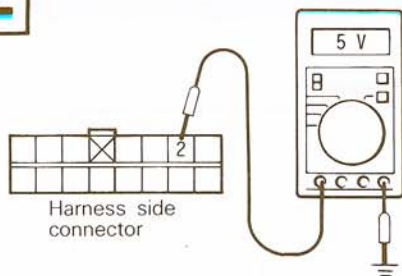
STOP

OK



2

2



01Z173

Measure the sensor power supply **voltage**.

- Combination meter: Removal
- IG SW: ON
- Sensor connector: Disconnected

Voltage (V)
5

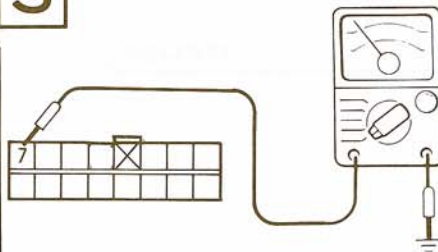


3



Repair the harness.

3



01Z174

Check for the continuity of the ground circuit.

- Combination meter: Removal
- Sensor connector: Disconnected

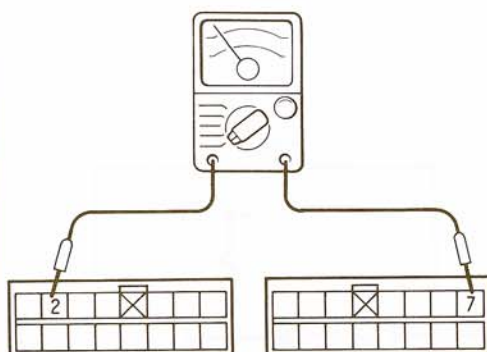


4



Repair the harness.

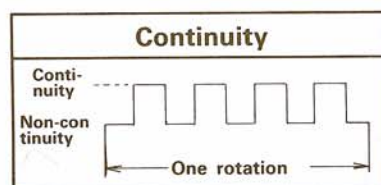
4



01Z175

Check the sensor for continuity.

- Combination meter: Removal
- Sensor connector: Disconnected
- Use a thin rod or similar tool to slowly turn the speedometer cable shaft.

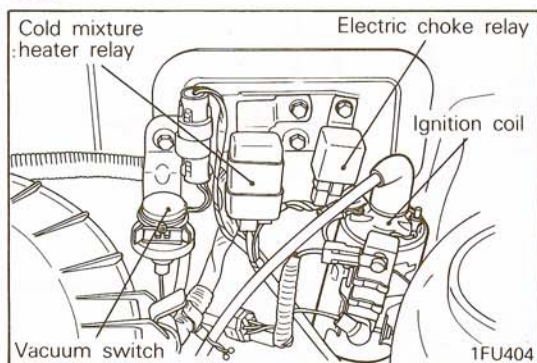


Replace the oxygen sensor.

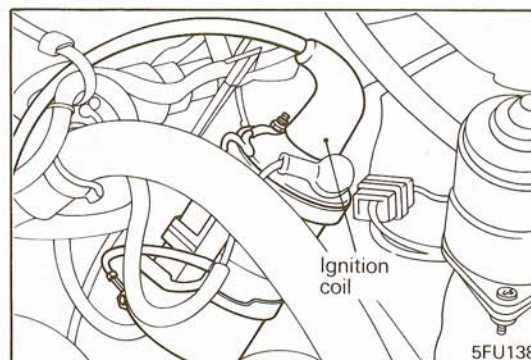
ENGINE SPEED SENSOR TEST PROCEDURES

Installing positions

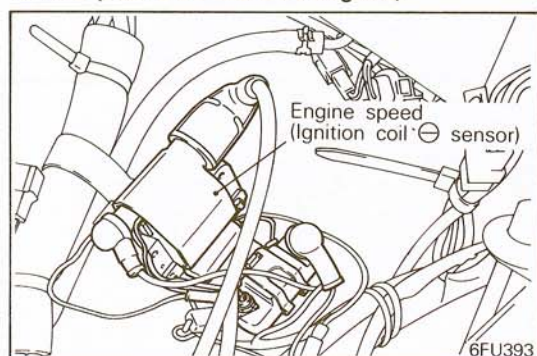
COLT



RAM RAIDER

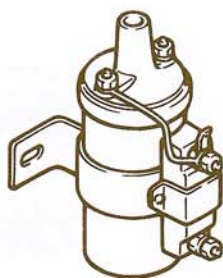


RAM50 (with 2.0 l and 2.6 l engines)



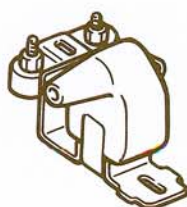
Individual component

COLT, RAM RAIDER



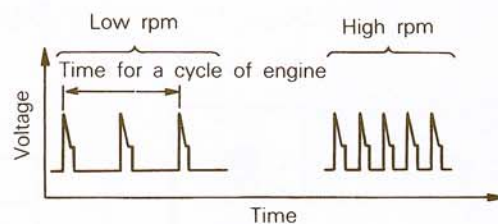
01Z249

RAM50 (with 2.0 l and 2.6 l engines)



01Z250

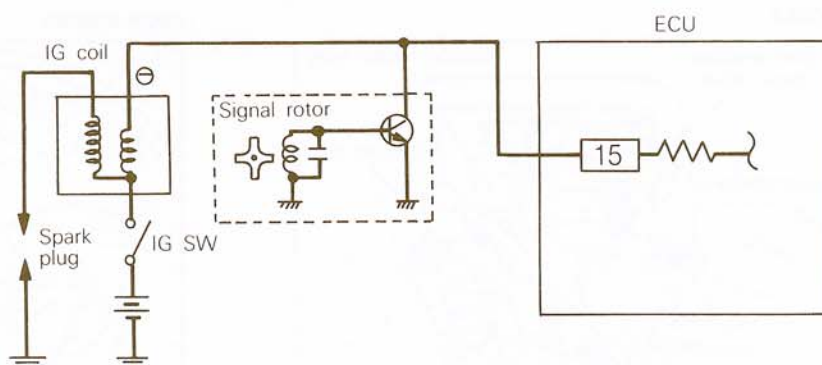
Sensor characteristics



01Z511

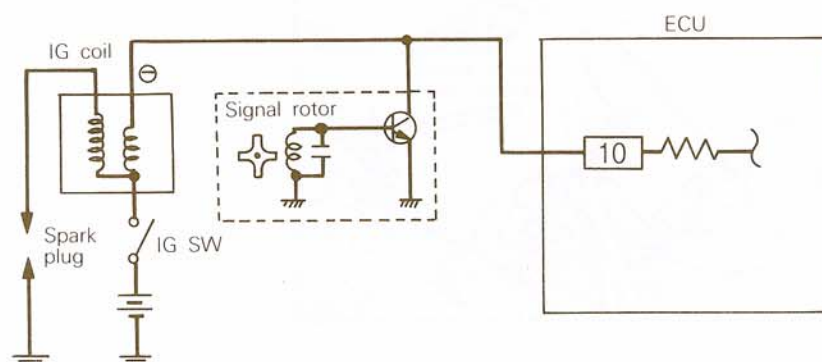
Sensor circuit

COLT



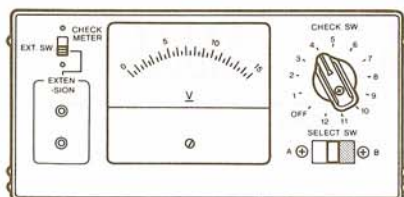
01Z327

RAM50,
RAM RAIDER



01Z327

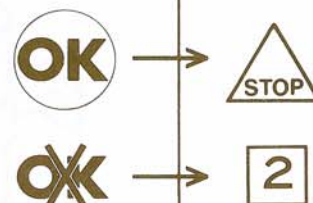
I



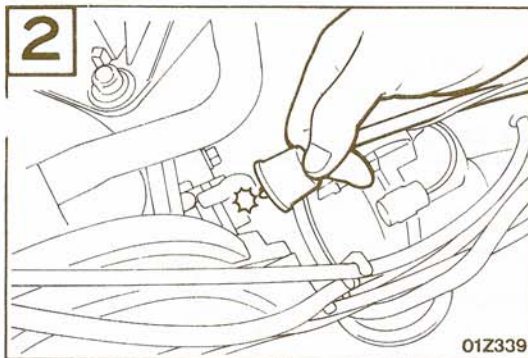
01U0403

• Engine: Idling

Models	Voltage
COLT, RAM50, RAM RAIDER	2 to 8V pulses



Models	Harness	Select switch	Check switch
COLT	MD998455	B	4
RAM50, RAM RAIDER	MD998456	A	2



Disconnect the high-tension cable between the ignition coil and the distributor and check to be sure that sparks fly.

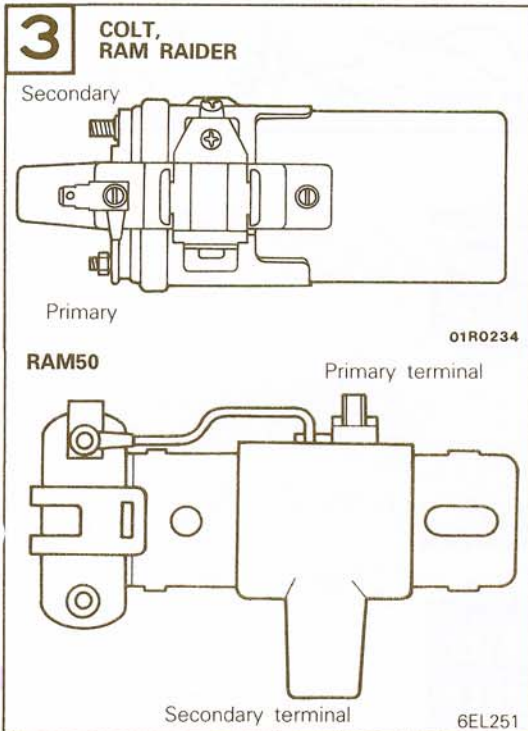
• Engine: Cranking

OK →

3

OK →

4



• IG coil: Removal

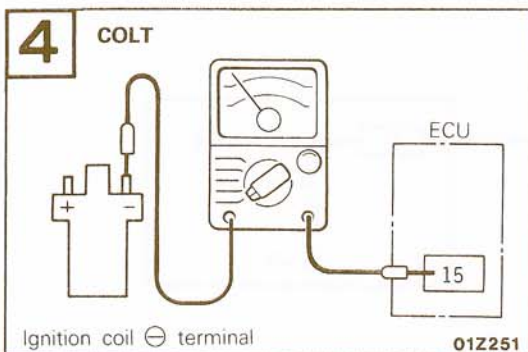
	Resistance at 20°C (68°F)	
	TRUCK	Other
Primary	1.1~1.3Ω	1.1~1.3Ω
Secondary	22.1~22.9 kΩ	11.6~15.8 kΩ
External resistor	1.2~1.5Ω	1.2~1.5Ω

OK →

Replace the distributor.

OK →

Replace the ignition coil.



Check for the continuity between the ignition coil ⊖ terminal and the ECU

• Connector: Disconnected

Other models are basically the same as the COLT; only the electronic control unit terminal numbers are different.

RAM50, RAM RAIDER) ... 10

OK →

STOP

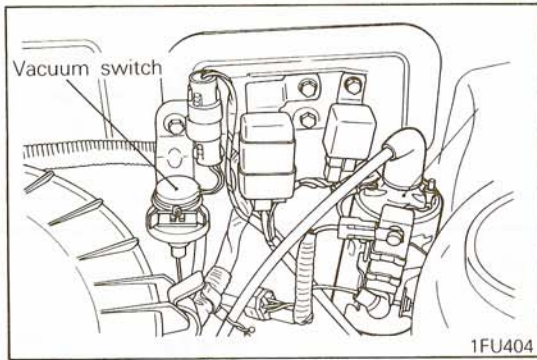
OK →

Repair the harness.

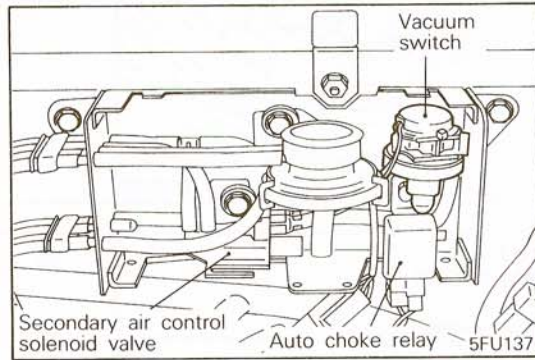
VACUUM SWITCH TEST PROCEDURES

Installing positions

COLT



RAM50, RAM RAIDER



Individual component

COLT



01Z252

RAM50, RAM RAIDER



01Z254

Sensor connector

COLT

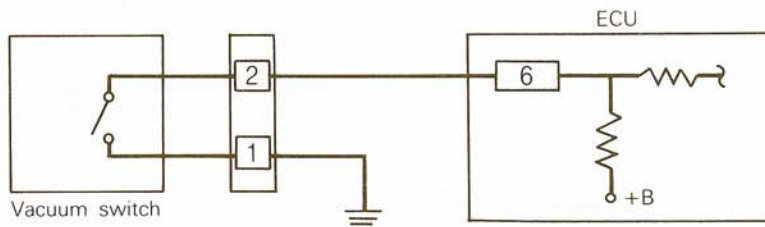


RAM50, RAM RAIDER



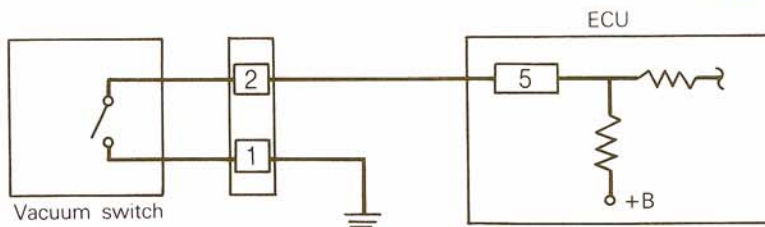
Sensor circuit

COLT



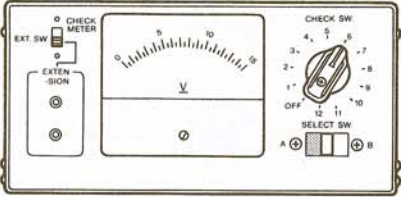
01Z306

RAM50, RAM RAIDER



01Z306


I



01U0405

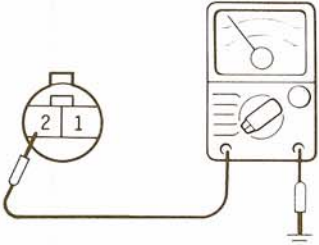
Models	Harness	Select switch	Check switch
COLT	MD998455	A	6
RAM50, RAM RAIDER	MD998456	A	7

Engine	Voltage (V)
Ignition SW ON (Cold Engine)	SV
Idling (Warm Engine)	0.6 or less

OK → 

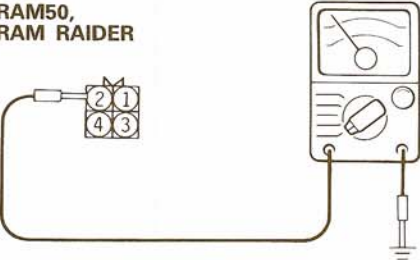
OK → **2**

2 COLT



01Z161

RAM50,
RAM RAIDER



01L0373

Measure the power supply voltage.

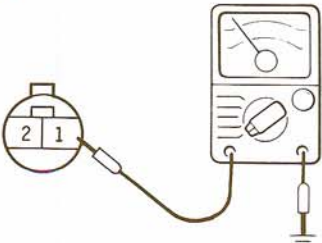
- Connector: Disconnected
- IG SW: ON

Voltage (V)
SV

OK → **3**

OK → Repair the harness.

3 COLT



01Z162

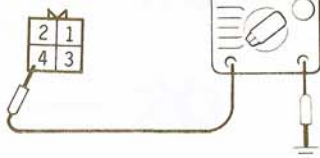
Check for the continuity of the ground circuit.

- Connector: Disconnected
- IG SW: OFF

OK → **4**

OK → Repair the harness.

3

RAM50,
RAM RAIDER

01Z163

Check for the continuity of the ground circuit.

- Connector: Disconnected
- IG SW: OFF

OK

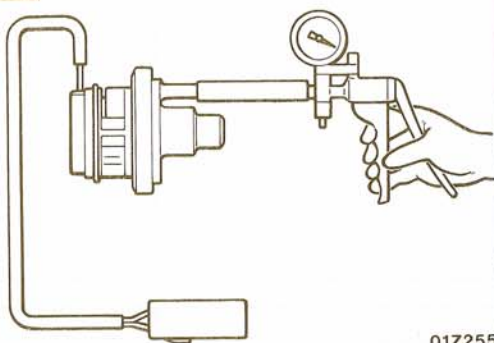
4

OK

Repair the harness.

4

COLT



01Z255

Check for the continuity of the vacuum switch.

- Vacuum switch: Removal
- Connector: Disconnected
- Connect a hand held vacuum pump to the vacuum switch nipple and apply negative pressure (vacuum).

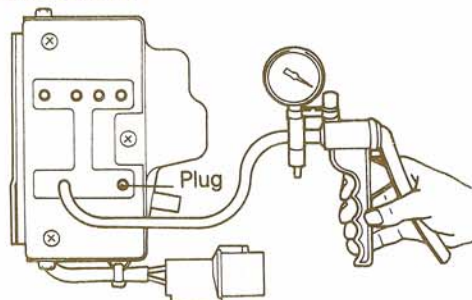
OK

STOP

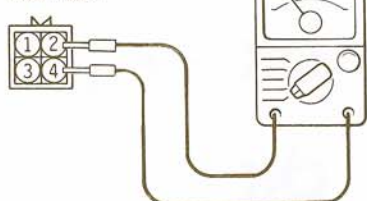
OK

Replace the vacuum switch.

Negative pressure	Terminal	Continuity
26 kPa (3.9 psi) or less	COLT 1-2	No
	RAM50, RAM RAIDER 2-4	
40 kPa (5.8 psi) or more	COLT 1-2	Yes
	RAM50, RAM RAIDER 2-4	

RAM50,
RAM RAIDER

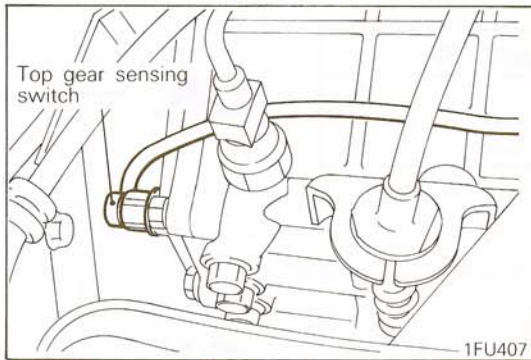
5FU146

Sensor
side
connector

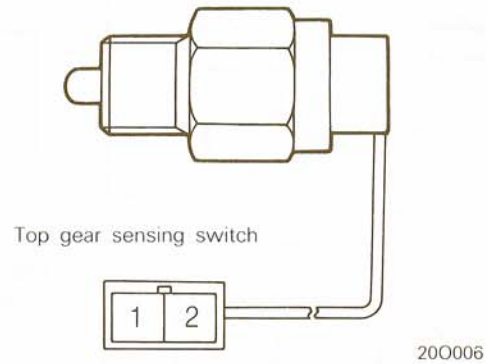
01L0375

TOP GEAR SENSING SWITCH TEST PROCEDURES

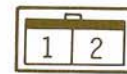
Installing position



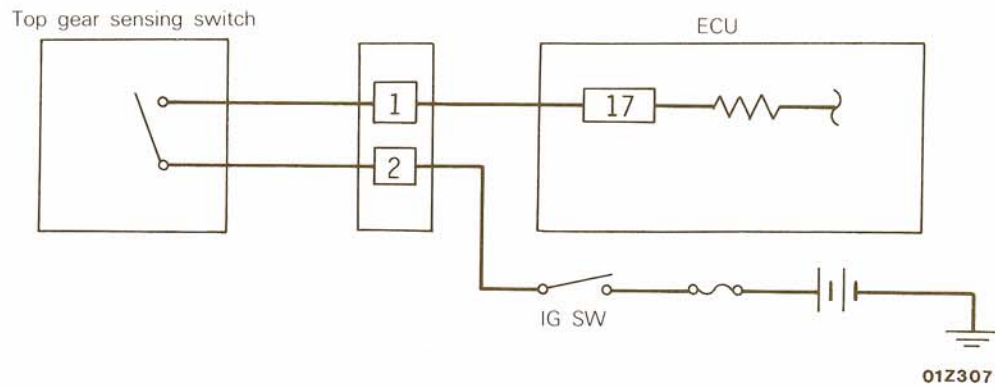
Individual component



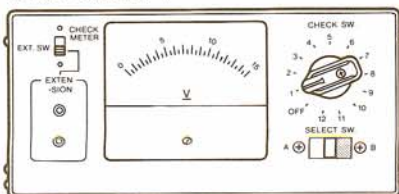
Sensor connector



Sensor circuit



ECI checker (use MD998455)
Select switch: B
Check switch: 1



• IG SW: ON

Transaxle	Voltage (V)
1st	0~0.6
4th or 5th	SV

OK

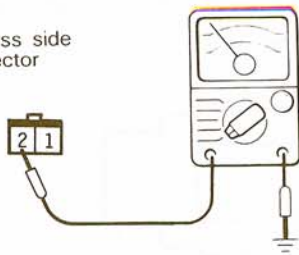
OK



2

2

Harness side connector



01Z179

Measure the sensor power supply voltage.

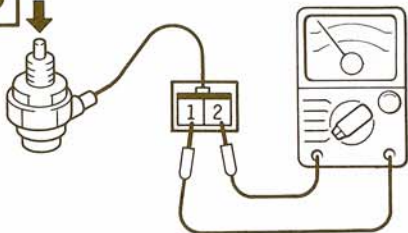
- IG SW: ON

Voltage (V)
SV

OK → **3**

OK → Repair the harness.

3



01Z181

Check for the continuity of the sensor.

- Sensor: Removal

Sensor	Continuity
Normal	No
Push	Yes

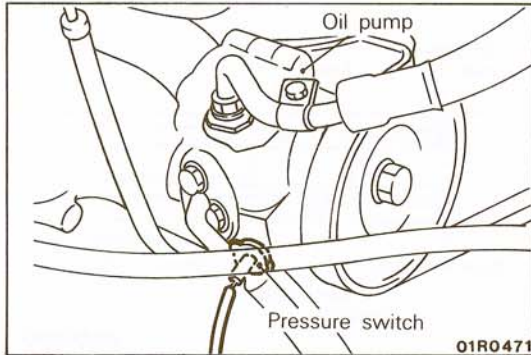
OK → **STOP**

OK → Replace the sensor.

POWER STEERING SWITCH TEST PROCEDURES

Installing position

COLT



Individual component



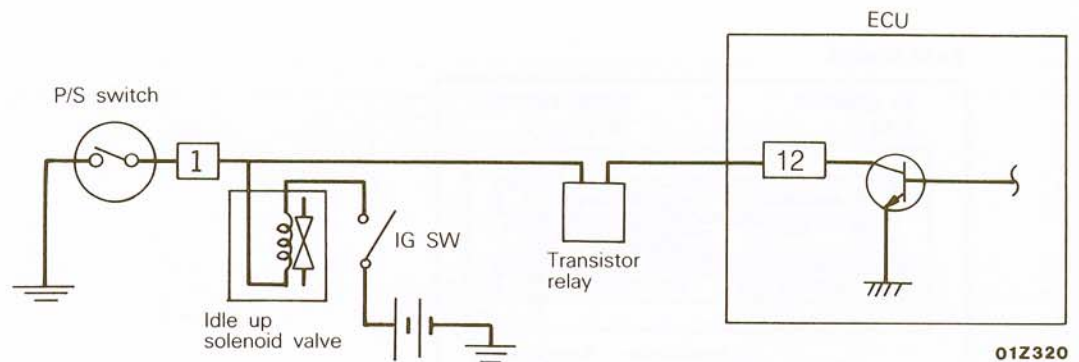
01Z256

Harness side connector

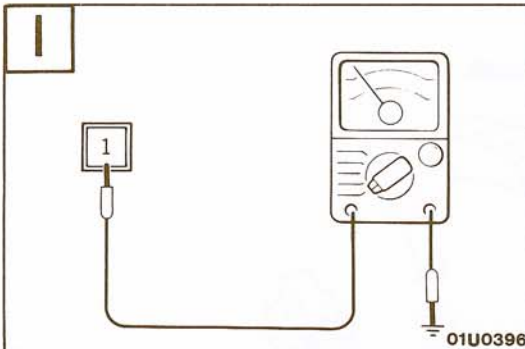


Sensor circuit

COLT



01Z320



Measure the power supply voltage.

- IG SW: ON
- Connector: Disconnected

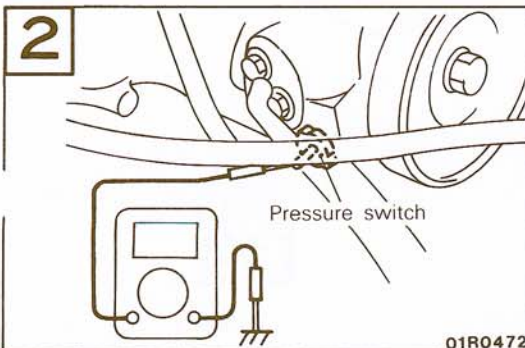
Voltage (V)
SV

OK

2

OK

Repair the harness.



Check for the continuity of the sensor.

- Engine: Idling
- Connector: Disconnected

Steering wheel position	Continuity (Resistance)
Straight	No (∞)
Turned until stops	Yes (30Ω or less)

OK



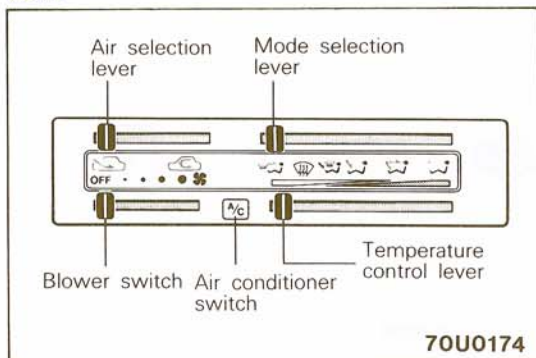
OK

Check the oil pump or replace the power steering switch.

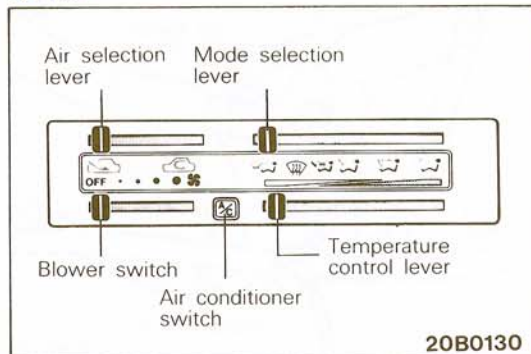
AIR CONDITIONER SWITCH TEST PROCEDURES

Installing positions

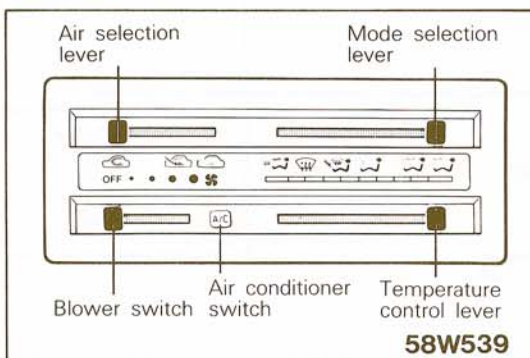
COLT



RAM50

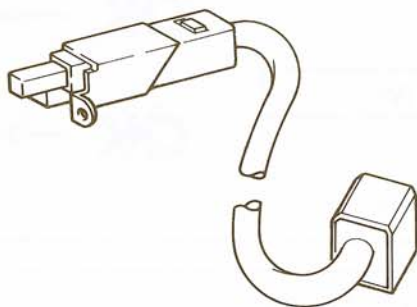


RAM RAIDER

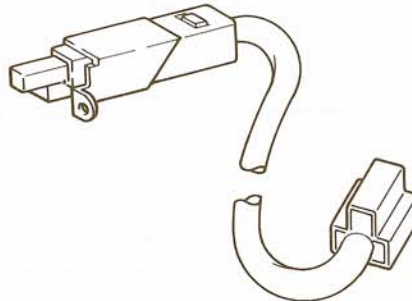


Individual component

COLT, RAM50



RAM RAIDER

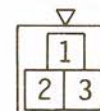


Sensor connector

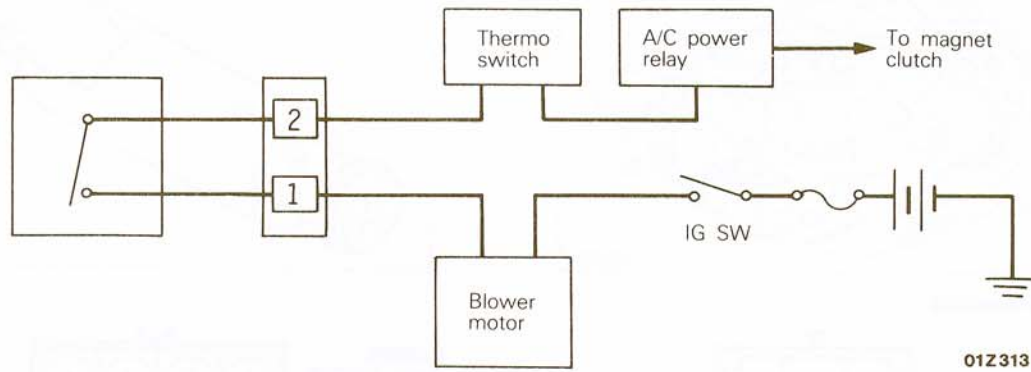
COLT, RAM50



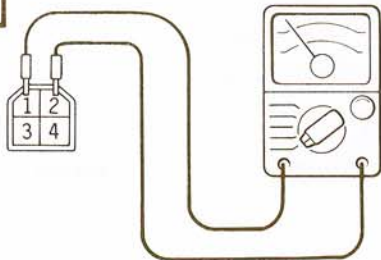
RAM RAIDER



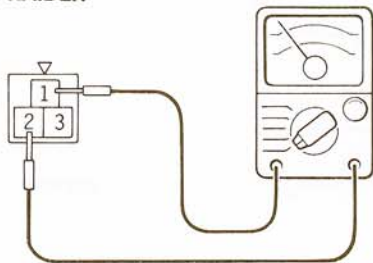
Sensor circuit



COLT, RAM50



RAM RAIDER



Check for the continuity of the air conditioner switch.

- Connector: Disconnected

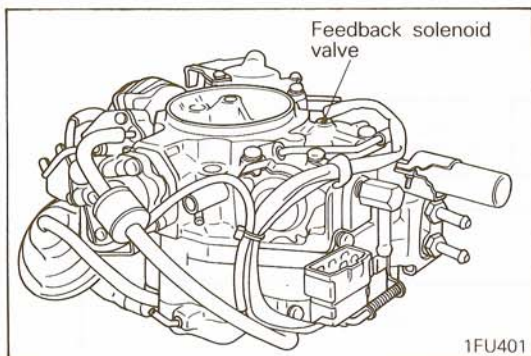
Sensor switch	Continuity
ON	Yes
OFF	No



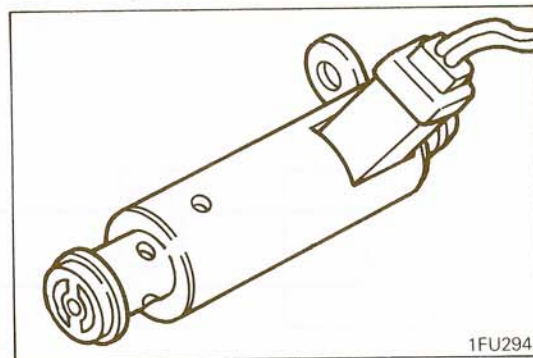
Check the air conditioner system separately.

FEEDBACK SOLENOID VALVE TEST PROCEDURES

Installing position

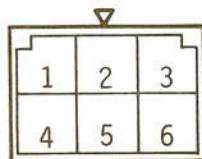
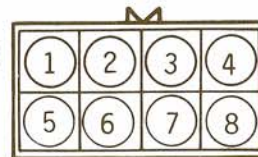


Individual component



Sensor connector

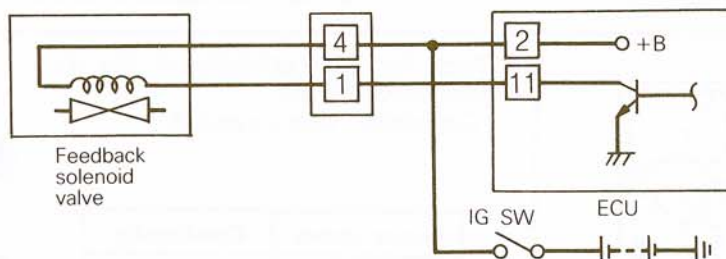
COLT

RAM50,
RAM RAIDER

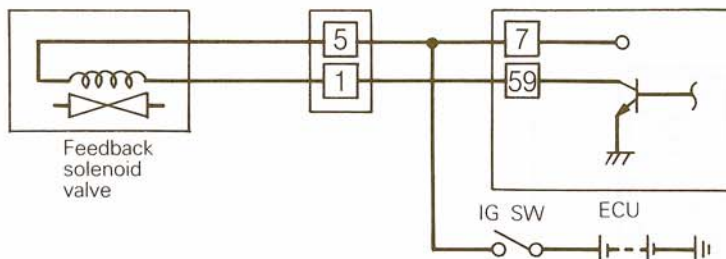
01Z302

Sensor circuit

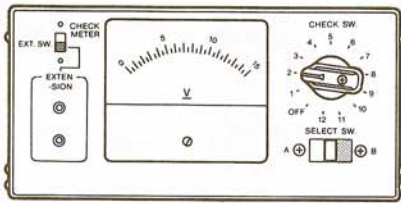
COLT



01Z303

RAM50,
RAM RAIDER

01Z303

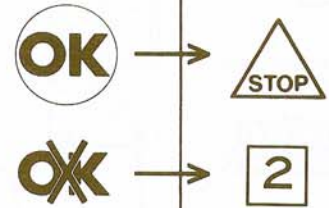
1

01U0401

Models	Harness	Select switch	Check switch
COLT	MD998455	B	2
RAM50, RAM RAIDER	MD998456	A	9

- IG SW: ON

Voltage (V)
SV

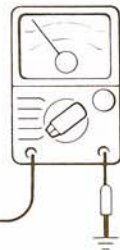
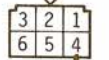


- Engine: Warmed up

Engine rpm	Voltage (V)
Idle	2~SV

2 COLT

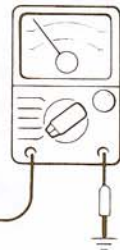
Harness side connector



01Z144

RAM50, RAM RAIDER

Harness side connector

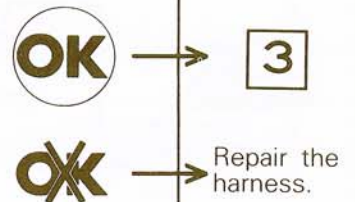


01Z151

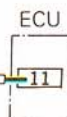
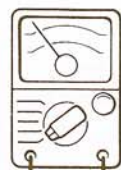
Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

Voltage (V)
SV

**3** COLT

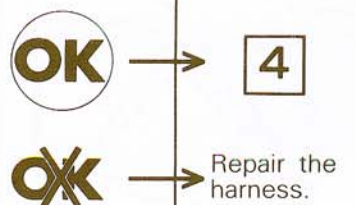
Harness side connector

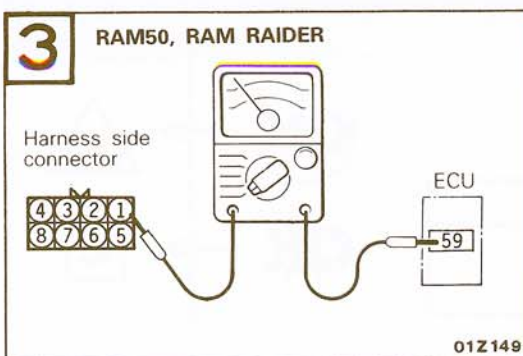


01Z145

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the FBSV.

- Connector: Disconnected





Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the FBSV.

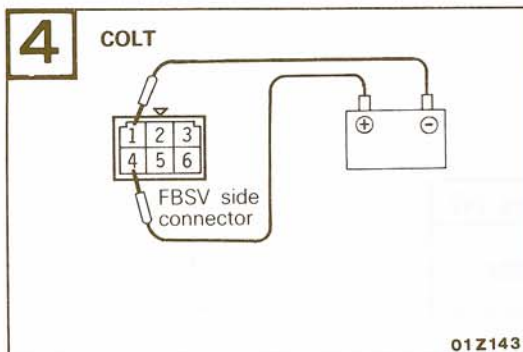
- Connector: Disconnected



4



Repair the harness.

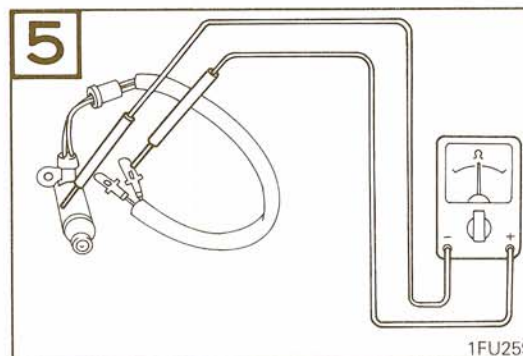
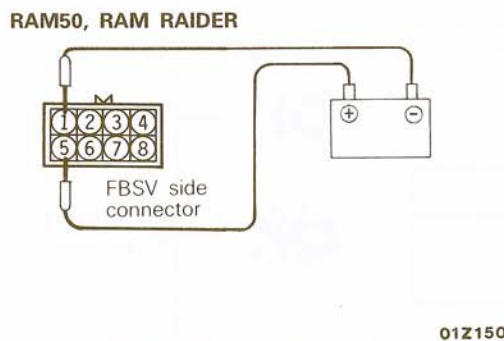


Check the operation sound of the FBSV.

- Connector: Disconnected
- Apply the system voltage.



5



Check the insulation between the solenoid valve body and the terminals.

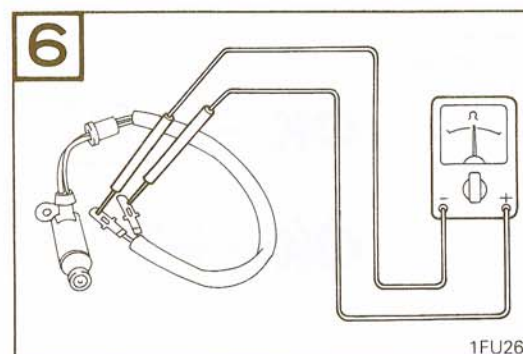
- FBSV: Removal



6



Replace the FBSV.



Measure the resistance.

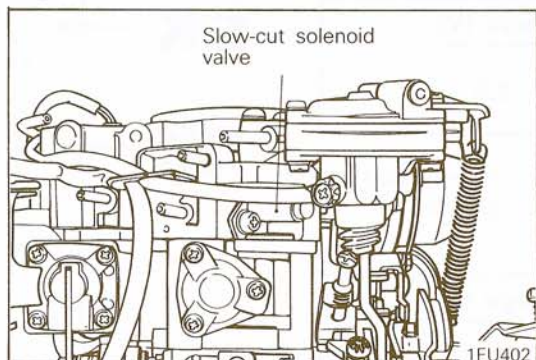
Resistance (Ω)
54~66 [at 20°~30°C (68°~86°F)]



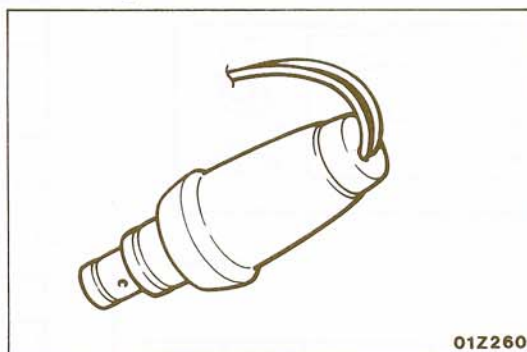
Replace the FBSV.

SLOW-CUT SOLENOID VALVE TEST PROCEDURES

Installing position

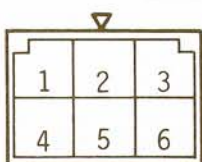


Individual component

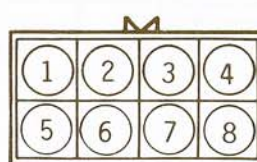


Sensor connector

COLT



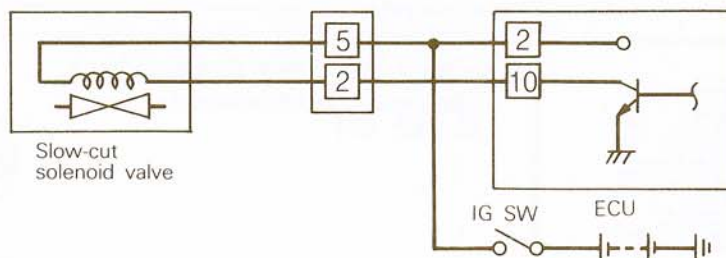
RAM50,
RAM RAIDER



01Z302

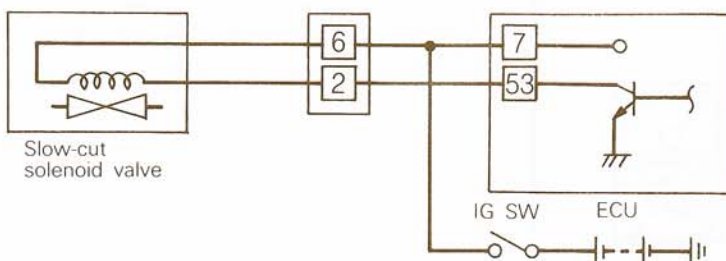
Sensor circuit

COLT



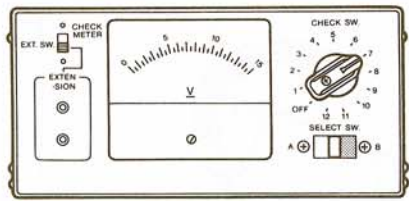
01Z303

RAM50,
RAM RAIDER



01Z303

1



01U0406

Models	Harness	Select switch	Check switch
COLT	MD998455	B	7
RAM50, RAM RAIDER	MD998456	A	10

• Engine: Idling

Voltage (V)

0~0.6

Quick deceleration from above 4,000 rpm to idling with gear at "N" position.

Voltage (V)

Momentarily SV

OK →

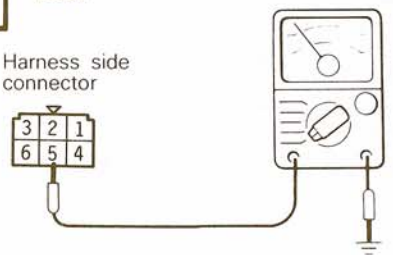
STOP

OK →

2

2 COLT

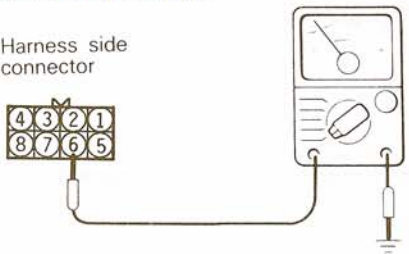
Harness side connector



01Z141

RAM50, RAM RAIDER

Harness side connector



01Z148

Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

OK →

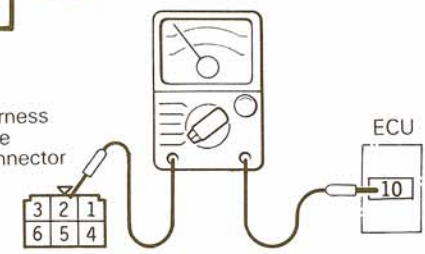
3

OK →

Repair the harness.

3 COLT

Harness side connector



01Z142

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the SCSV.

- Connector: Disconnected

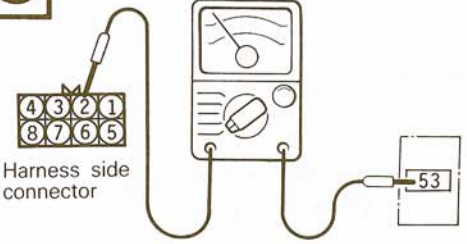
OK →

4

OK →

Repair the harness.

3 RAM50, RAM RAIDER



Harness side connector

01Z146

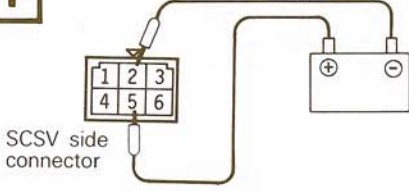
Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the SCSV.

- Connector: Disconnected

OK → **4**

✗ → Repair the harness.

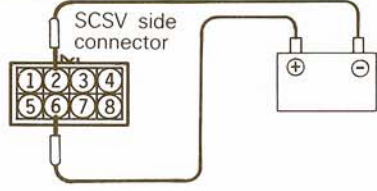
4 COLT



SCSV side connector

01Z140

RAM50, RAM RAIDER



SCSV side connector

01Z147

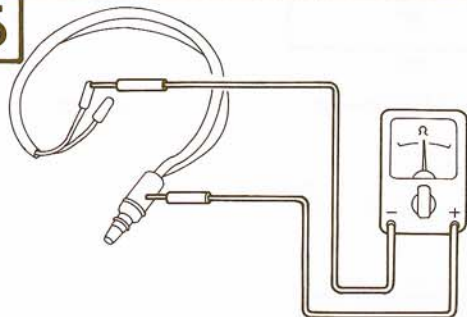
Check the operation sound of the SCSV.

- Connector: Disconnected
- Apply the system voltage.

OK → **STOP**

✗ → **5**

5



1FU256

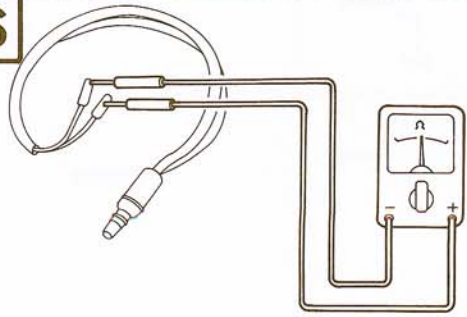
Check the insulation between the solenoid valve body and the terminals.

- SCSV: Removal

OK → **6**

✗ → Replace the SCSV.

6



1FU257

Measure the resistance.

Resistance (Ω)
48~60 [at 20°~30°C (68°~86°F)]

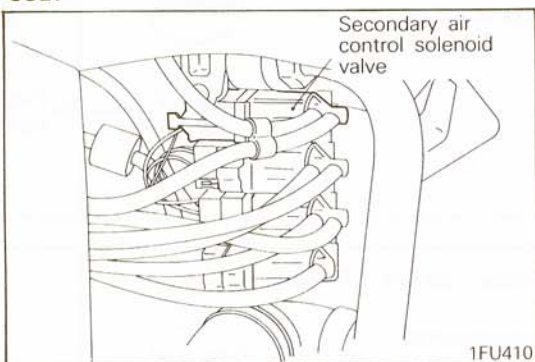
OK → **STOP**

✗ → Replace the SCSV.

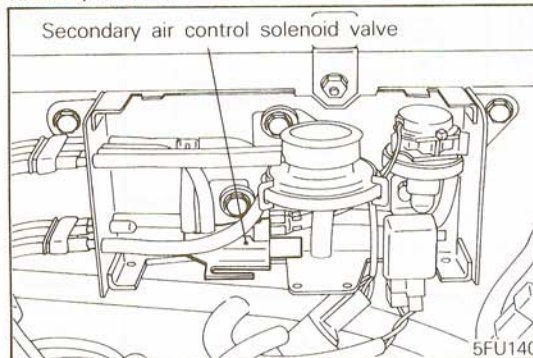
SECONDARY AIR CONTROL SOLENOID VALVE TEST PROCEDURES

Installing positions

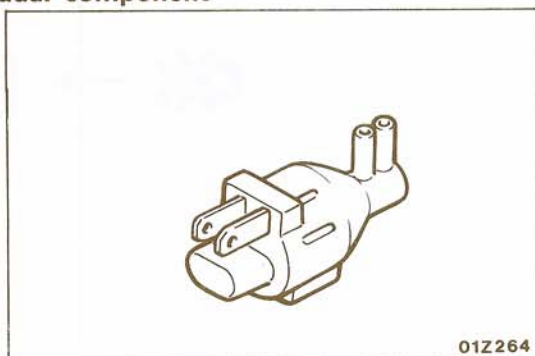
COLT



RAM50, RAM RAIDER



Individual component



Sensor connector

COLT

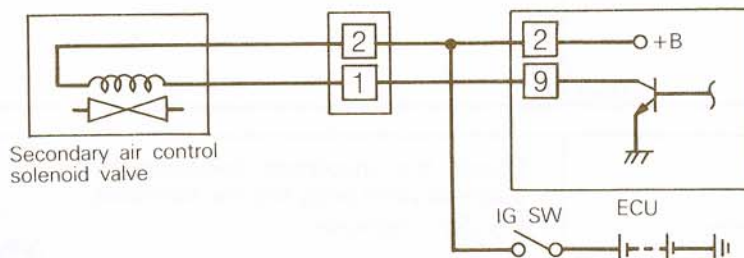


RAM50, RAM RAIDER



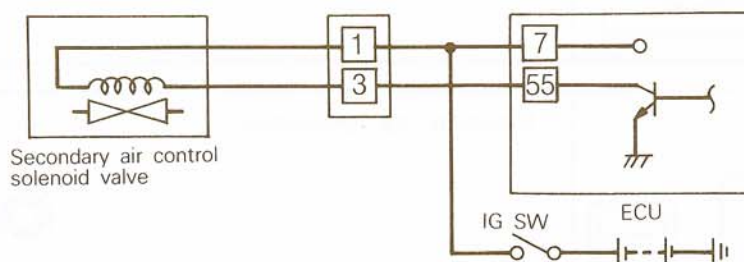
Sensor circuit

COLT



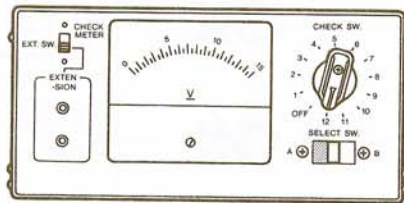
01Z303

RAM50, RAM RAIDER



01Z303

1



01U0411

Models	Harness	Select switch	Check switch
COLT	MD998455	A	12
RAM50, RAM RAIDER	MD998456	B	4

- Start the warmed up engine and keep it running at idling for more than 70 seconds.

Voltage (V)
0~0.6 then SV

- Quick deceleration from above 2,000 rpm to idling with "N" position.

Voltage (V)
Momentarily drop

OK

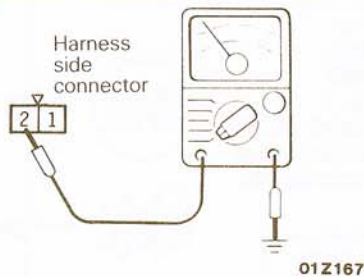


OK

2

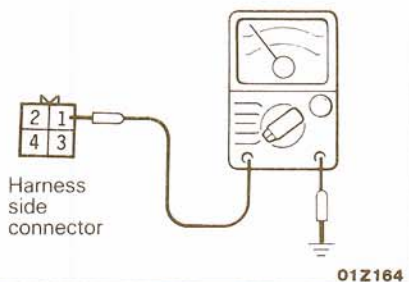
2

COLT



01Z167

RAM50,
RAM RAIDER



01Z164

Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

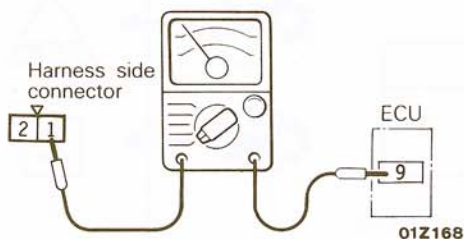
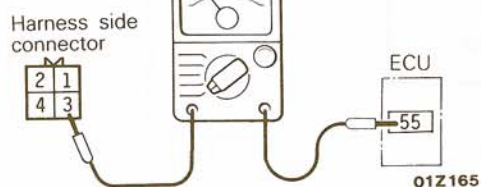
Voltage (V)
SV

OK

3

OK

Repair the harness.

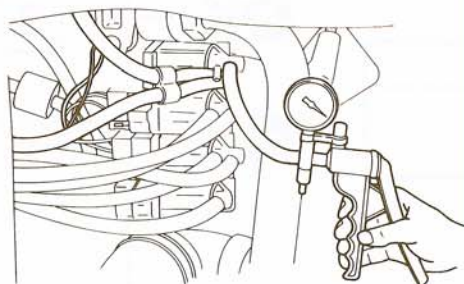
3 COLT**RAM50,
RAM RAIDER**

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the solenoid valve.

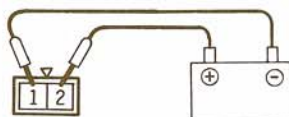
- Connector: Disconnected

OK**4****OK**

Repair the harness.

4 COLT

1EM228



01Z169

Check the solenoid valve.

- Vacuum hoses: Disengage (white stripe, green stripe)
- Connector: Disconnected
- Connect a hand held vacuum pump to the nipple to which white stripe vacuum hose has been connected.

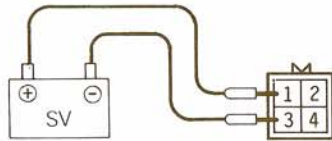
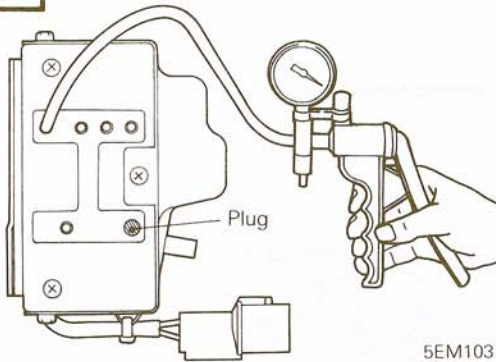
System voltage	Other nipple of solenoid valve	Normal Condition
When applied	Open	Vacuum leaks
	Closed with finger	Vacuum holds
When not applied	Open	Vacuum holds

OK**5****OK**

Replace the solenoid valve.

4

RAM50,
RAM RAIDER



5EM103

01Z166

Check the solenoid valve.

- Vacuum hoses: Disengage (red stripe, green stripe)
- Connector: Disconnected
- Connect a hand held vacuum pump to the nipple to which red stripe vacuum hose has been connected.

System voltage	Other nipple of solenoid valve	Normal Condition
When applied	Open	Vacuum leaks
	Closed with finger	Vacuum holds
When not applied	Open	Vacuum holds

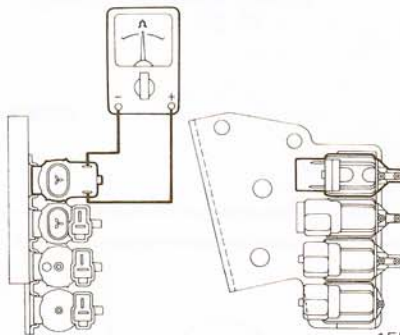


5

Replace the solenoid valve.

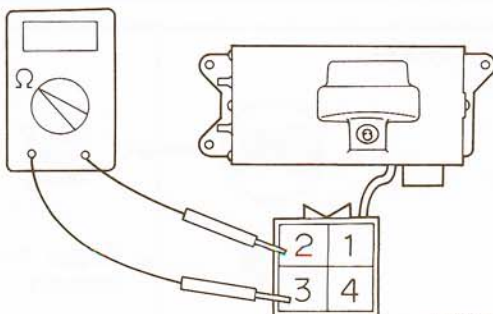
5

COLT



1EM230

RAM50, RAM RAIDER



5EM105

Measure the resistance.

- Connector: Disconnected

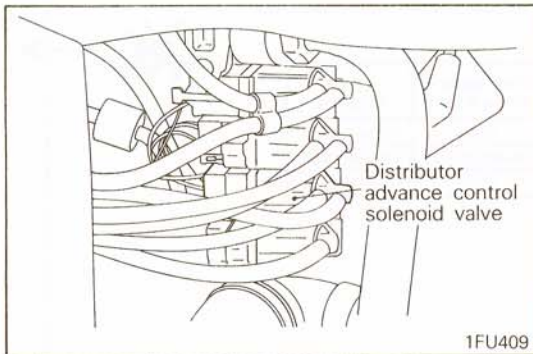
Resistance (Ω)
38~44 [at 20°C (68°F)]



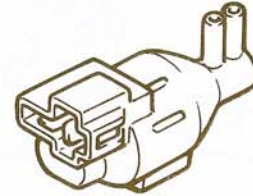
Replace the solenoid valve.

DISTRIBUTOR SPARK ADVANCE CONTROL SOLENOID VALVE TEST PROCEDURES

Installing position

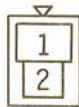


Individual component

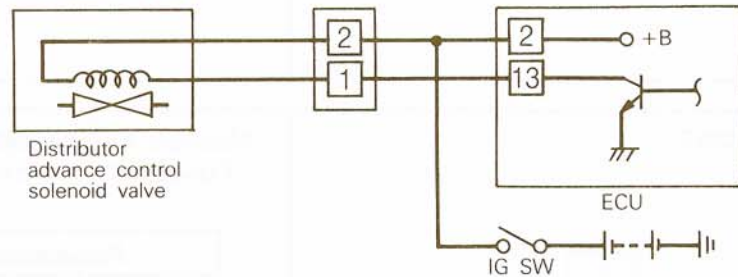


01Z261

Sensor connector



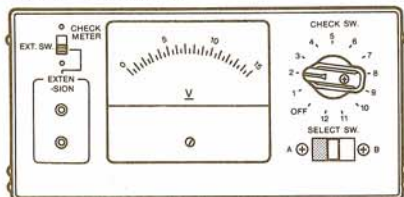
Sensor circuit



01Z303

1

ECI checker (use MD998455)
Select switch: A
Check switch: 2



01U0401

Engine rpm	Voltage (V)
Idle	0~0.6
2,000	SV

OK

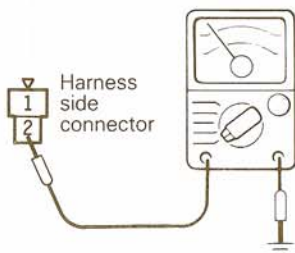


OK



2

2



01Z182

Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

OK



3

OK



Repair the harness.

3

Harness side connector

ECU

01Z187

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the solenoid valve.

- Connector: Disconnected

OK → **4**

✗ → Repair the harness.

4

1FU428

01Z184

Check the air tightness.

- Vacuum hoses: Disengage (black, red, blue stripe)
- Connector: Disconnected
- Connect a hand held vacuum pump to the nipple to which the black vacuum hose has been connected.

System voltage	Normal state
Applied	Vacuum leaks
Not applied	Vacuum holds

OK → **5**

✗ → Replace the solenoid valve.

5

1FU430

01Z184

Check the air tightness.

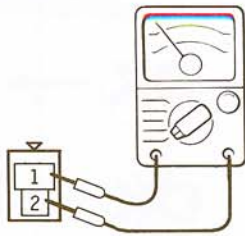
- Connect a hand held vacuum pump to the nipple to which the blue stripe vacuum hose has been connected.

System voltage	Normal state
Applied	Vacuum holds
Not applied	Vacuum leaks

OK → **6**

✗ → Replace the solenoid valve.

6



01Z189

Measure the resistance.
• Connector: Disconnected

Resistance (Ω)
38~44 [at 20°C (68°F)]

OK



STOP

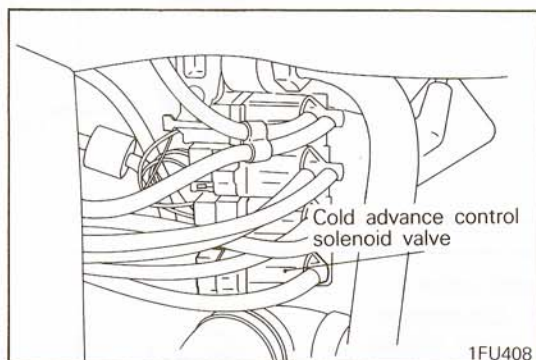
OK



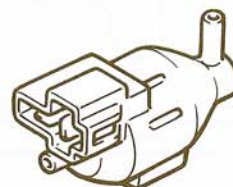
Replace the
solenoid
valve.

DISTRIBUTOR COLD SPARK ADVANCE CONTROL SOLENOID VALVE TEST PROCEDURES

Installing position

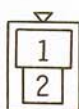


Individual component

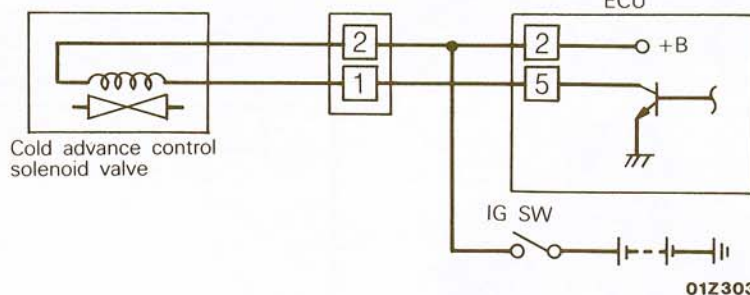


01Z263

Sensor connector

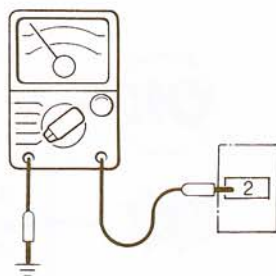


Sensor circuit



01Z303

1



01Z157

- Measure the output voltage.
- Drive the vehicle for some seconds at a speed higher than 8 km/h (5 mph) then hold engine idling.

Engine coolant temp.	Voltage (V)
50°C (122°F) or lower	0~0.6
50°C (122°F) or higher	SV

OK

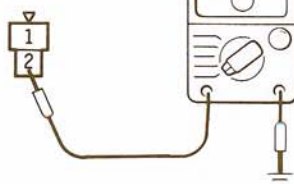


OK

2

2

Harness side connector



01Z182

Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

Voltage (V)
SV

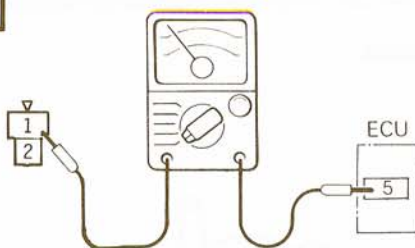
OK

3

OK

Repair the harness.

3



01Z187

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the solenoid valve.

- Connector: Disconnected

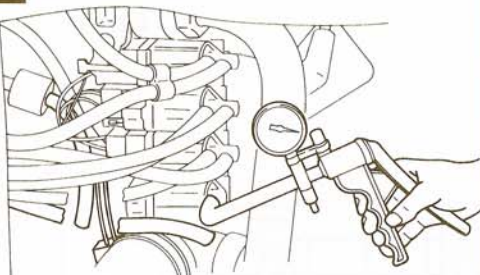


4

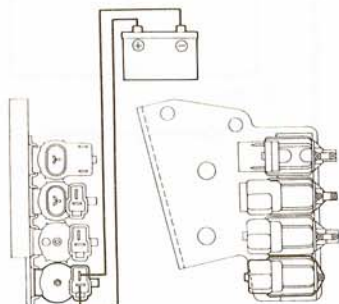


Repair the harness.

4



1FU433



1FU434

Check the solenoid valve.

- Vacuum hoses: Disengage (yellow stripe, green stripe)
- Connector: Disconnected
- Connect a hand held vacuum pump to the nipple to which the yellow stripe vacuum hose has been connected.



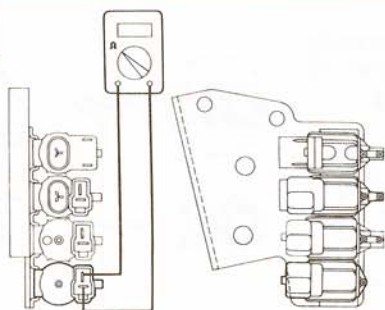
5



Replace the solenoid valve.

System voltage	Normal state
Applied	Vacuum holds
Not applied	Vacuum leaks

5



1FU435

Measure the resistance.

- Connector: Disconnected

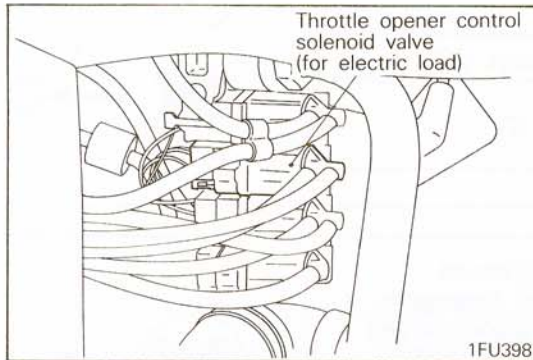
Resistance (Ω)
38~44 [at 20°C (68°F)]



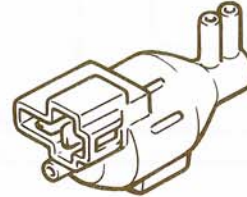
Replace the solenoid valve.

THROTTLE OPENER CONTROL SOLENOID VALVE TEST PROCEDURES

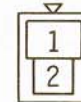
Installing position



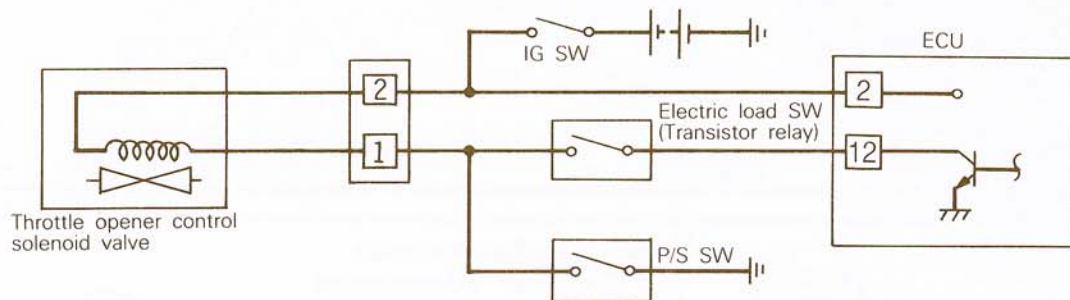
Individual component



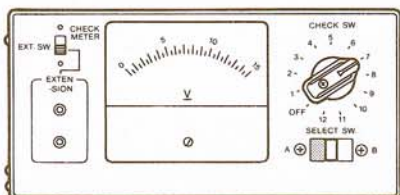
Sensor connector



Sensor circuit


I

ECI checker (use MD998455)
Select switch: A
Check switch: 7



- Air conditioner switch: ON
(Compressor clutch engaged)
- or lighting switch: ON

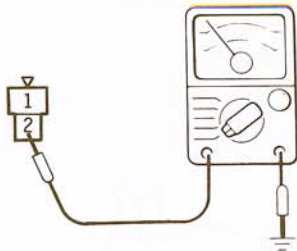
Engine rpm	Voltage (V)
Idle	0~0.6
2,000	9~15

OK

OK

2

2



01Z182

Measure the power supply voltage.

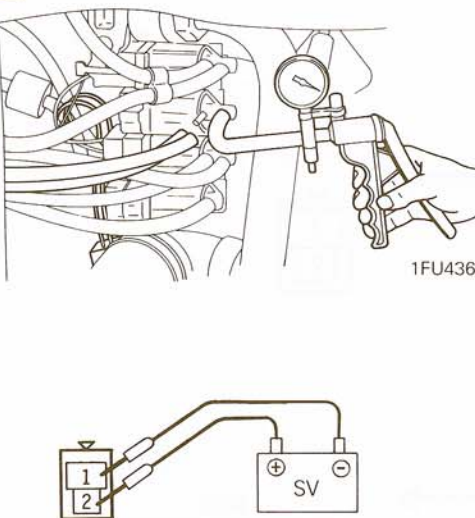
- Connector: Disconnected
- IG SW: ON

Voltage (V)
SV

OK → **3**

✗ → Repair the harness.

3



01Z184

Check the air tightness.

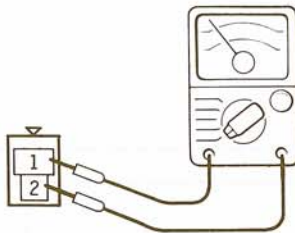
- Vacuum hoses: Disengage (white stripe, yellow stripe)
- Connector: Disconnected
- Connect a hand held vacuum pump to the nipple to which white stripe vacuum hose has been connected.

System voltage	Other nipple of solenoid valve	Normal Condition
When applied	Open	Vacuum leaks
	Closed with finger	Vacuum holds
When not applied	Open	Vacuum holds

OK → **4**

✗ → Replace the solenoid valve.

4



01Z189

Measure the resistance.

- Connector: Disconnected

Resistance (Ω)
38~44 [at 20°C (68°F)]

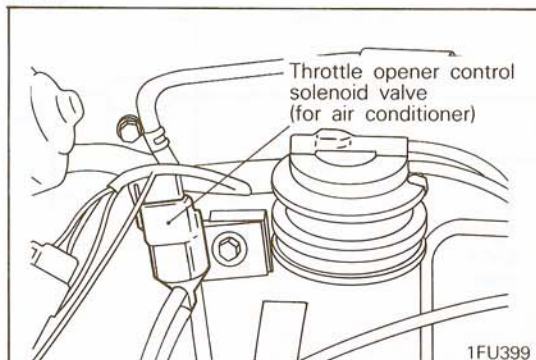
OK → Check the transistor relay system.

✗ → Replace the solenoid valve.

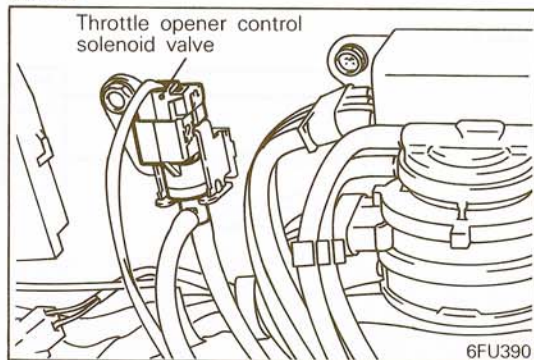
THROTTLE OPENER CONTROL SOLENOID VALVE TEST PROCEDURES

Installing positions

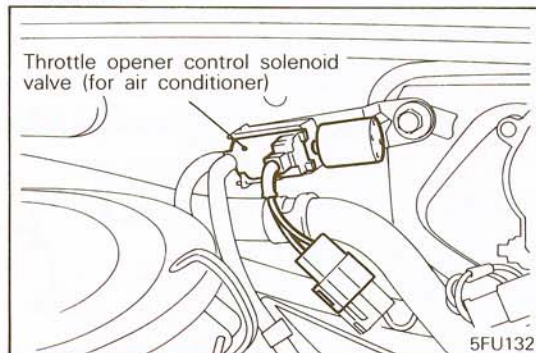
COLT



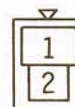
RAM50



RAM RAIDER

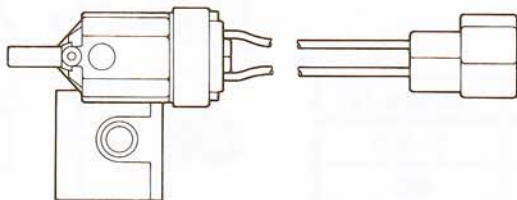


Sensor connector

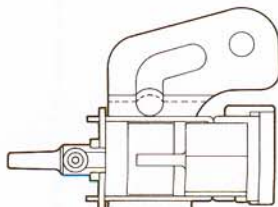


Individual component

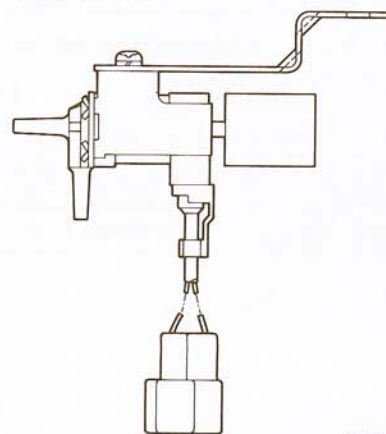
COLT



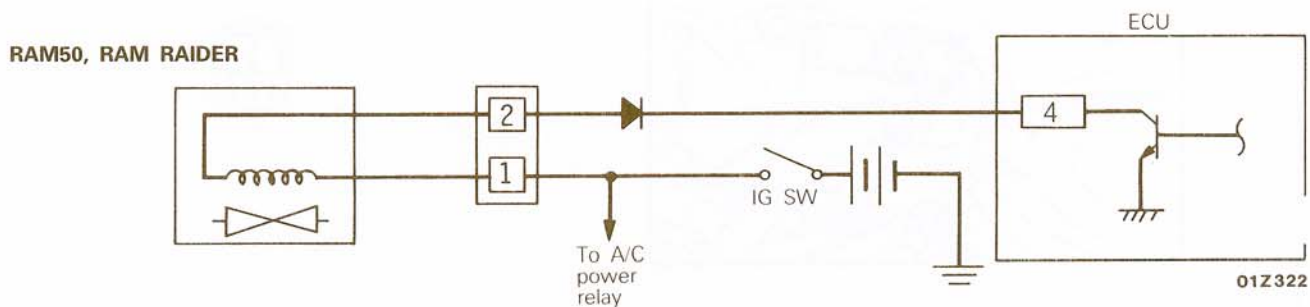
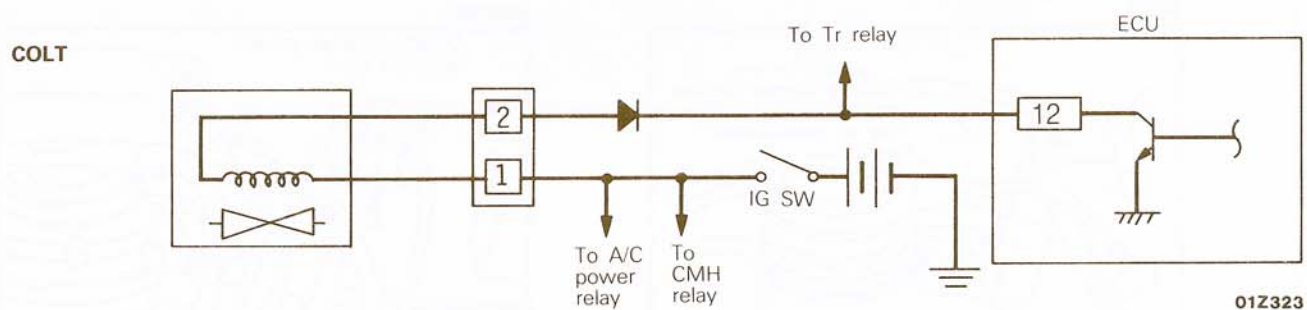
RAM50



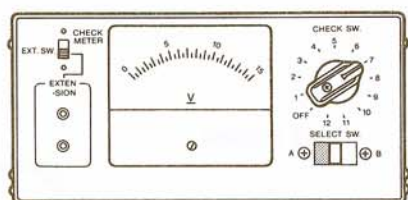
RAM RAIDER



Sensor circuit



I



01U0406

Models	Harness	Select switch	Check switch
COLT	MD998455	A	7
RAM50, RAM RAIDER	MD998456	B	1

• A/C SW: ON

Engine	Voltage (V)
Idle	0~0.6
2,000 rpm	SV

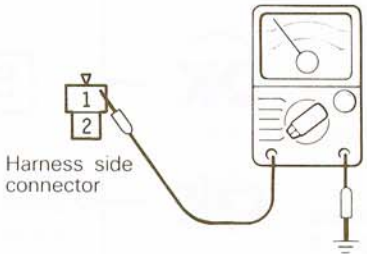
OK



OK



2



Harness side connector

01Z191

Measure the power supply voltage.

- IG SW: ON
- Connector: Disconnected

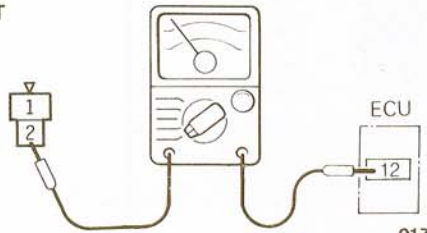
Voltage (V)
SV

OK → **3**

✗ → Repair the harness.

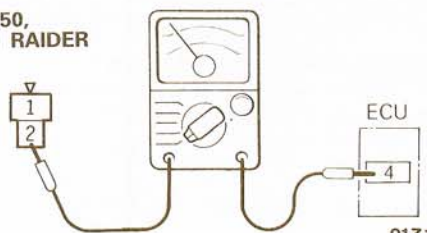
3

COLT



01Z187

RAM50, RAM RAIDER



01Z187

Check for continuity of the output circuit.

- Connector: Disconnected

* Continuity must be so that the sensor connector is (+) positive.

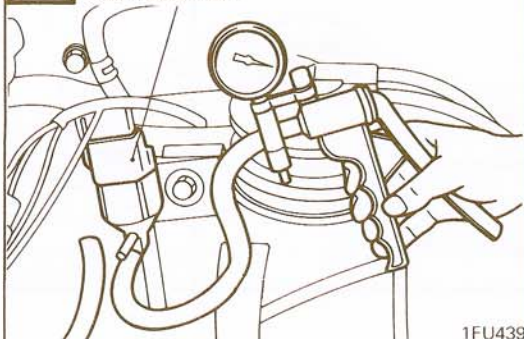
OK → **4**

✗ → Repair the harness.

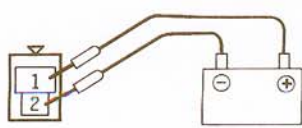
4

COLT

Solenoid valve



1FU439



01Z186

Check the solenoid valve.

- Vacuum hose: Disengage (white stripe, yellow stripe)
- Connector: Disconnected

Connect a hand held vacuum pump to the nipple to which the white stripe vacuum hose is connected.

Apply vacuum and check air tightness for both when system voltage is directly applied to the solenoid valve terminal and when no voltage is applied.

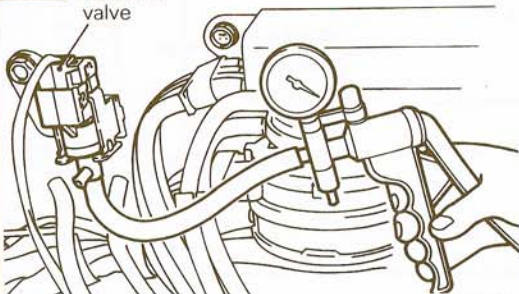
System voltage	Other nipple of solenoid valve	Normal Condition
Applied	Open	Vacuum leaks
	Closed with finger	Vacuum is held
Not applied	Open	Vacuum is held

OK → **5**

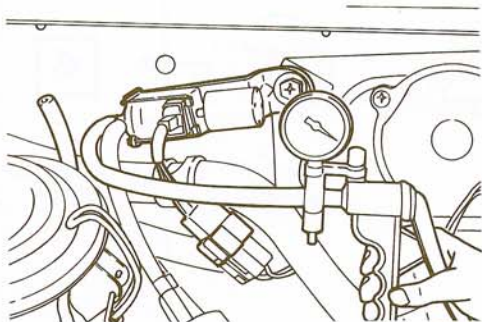
✗ → Replace the solenoid valve.

4**RAM50**

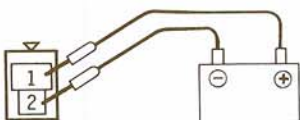
Solenoid valve



5FU177

RAM RAIDER

5FU149



01Z186

Check the solenoid valve.

- Vacuum hose: Disengage (white stripe, yellow stripe)
- Connector: Disconnected

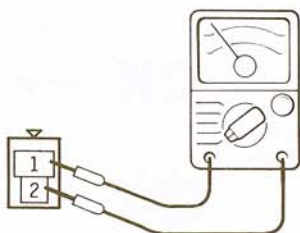
Connect a hand held vacuum pump to the nipple to which the white stripe vacuum hose is connected.

Apply vacuum and check air tightness for both when system voltage is directly applied to the solenoid valve terminal and when no voltage is applied.

System voltage	Other nipple of solenoid valve	Normal Condition
Applied	Open	Vacuum leaks
	Closed with finger	Vacuum is held
Not applied	Open	Vacuum is held

**5**

Replace the solenoid valve.

5

01Z189

Measure the resistance of the sensor.

- Connector: Disconnected

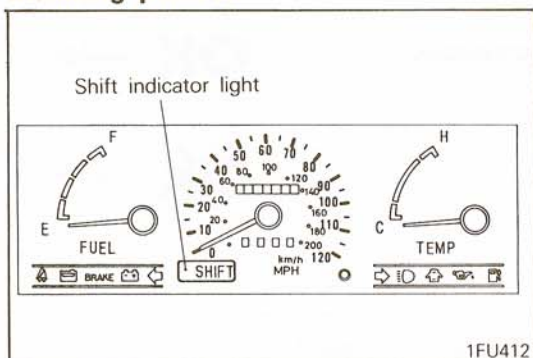
Resistance (Ω)
38~44



Replace the solenoid valve.

UPSHIFT REMINDER LIGHT TEST PROCEDURES

Installing position

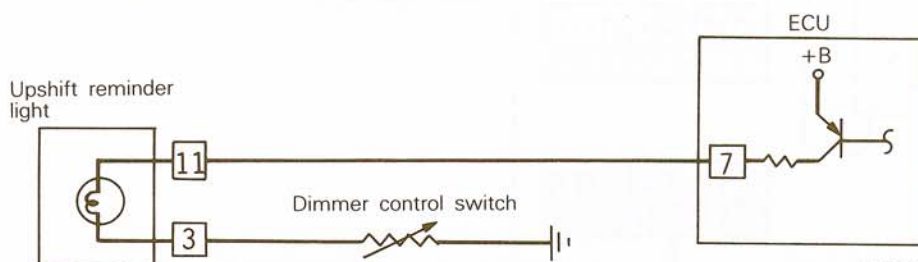


Sensor connector

1	2	3	4	5	6	7	
8	9	10	11	12	13	14	15

1	2	3	4	<div></div>	5	6	7
8	9	10	11	12	13	14	15

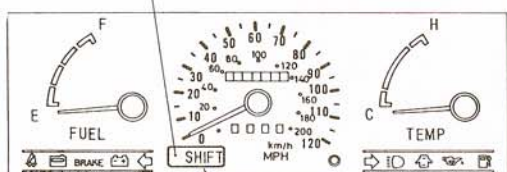
Sensor circuit



01Z321

1

Shift indicator light



1FU406

Check for illumination of the upshift reminder light.

- Engine coolant temperature: 85~95°C (185~205°F)
- Drive the vehicle on flat road at a gear other than top gear.

Engine rpm	Light
Idle	OFF
1,600~1,800	ON after 1 second
1,800~2,500	ON

- Check that the upshift reminder light dose not come on during driving in top gear.

OK



STOP

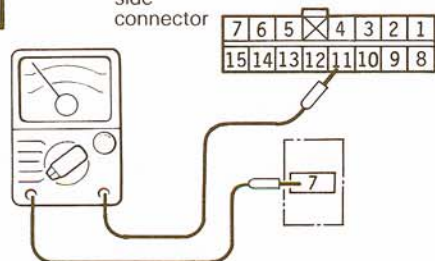
OK



2

2

Harness side connector



01Z176

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the upshift reminder light.

- Combination meter: Removal
- Connector: Disconnected

OK



3

OK



Repair the harness.

3Harness side
connector

7	6	5	4	3	2	1	
15	14	13	12	11	10	9	8



01Z177


Check for the continuity of the ground circuit.

- IG SW: OFF
- Connector: Disconnected

**4**

Repair the harness.

4

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15

1	2	3	4	<div></div>	5	6	7
8	9	10	11	12	13	14	15

01Z178

Check for the continuity of the upshift reminder light.

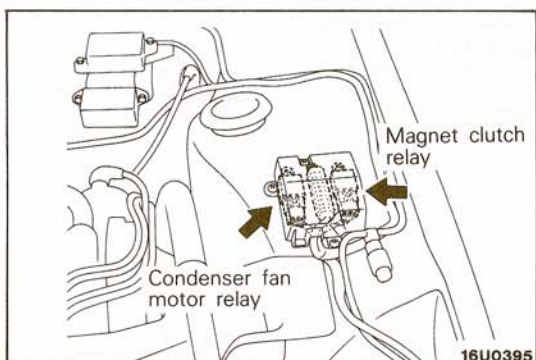


Replace the bulb.

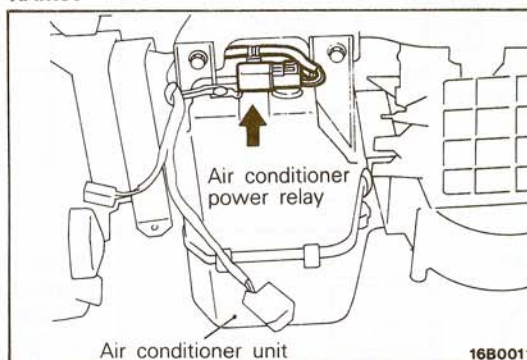
AIR CONDITIONER POWER RELAY TEST PROCEDURES

Installing positions

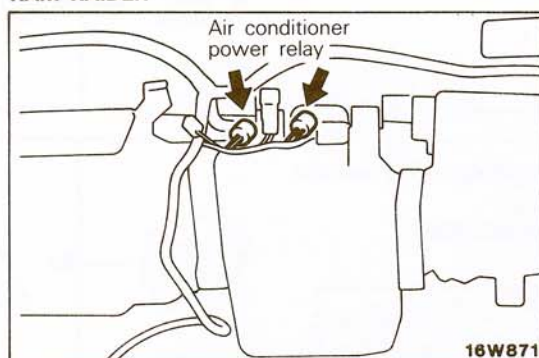
COLT



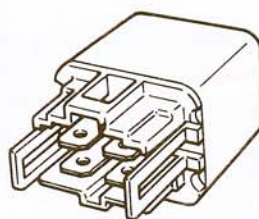
RAM50



RAM RAIDER

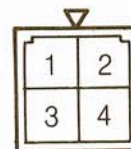


Individual component



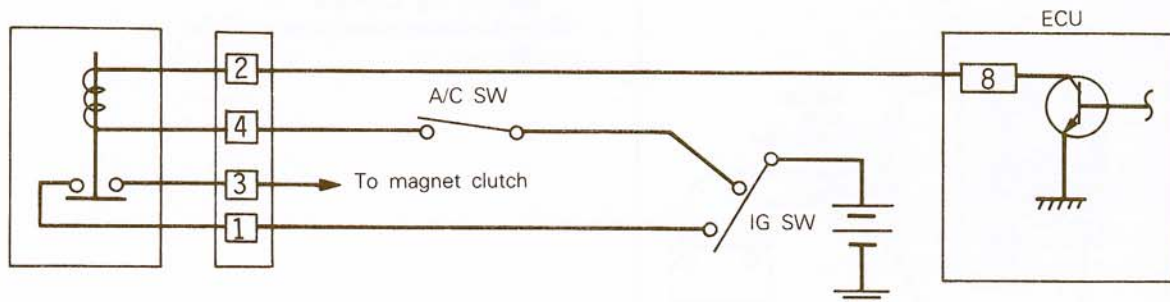
16L0301

Sensor connector

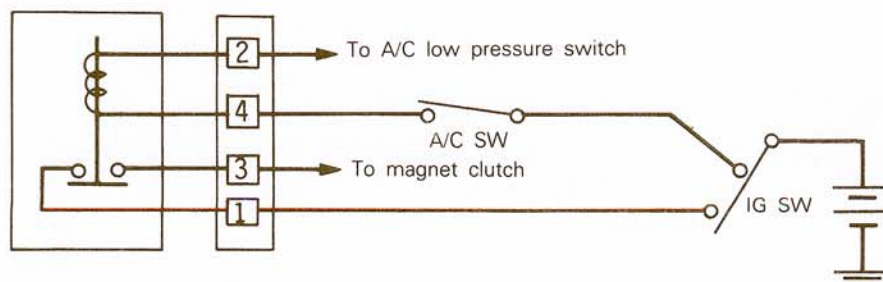


Sensor circuit

COLT



RAM50, RAM RAIDER



1 COLT

Harness side connector

01Z215

Measure the power supply voltage.

- IG SW: ON
- Connector: Disconnected

Voltage (V)
SV

OK → **2**

✗ → Repair the harness.

2 COLT

Harness side connector

01Z216

Check for the continuity of the output circuit.
(except RAM50, RAM RAIDER)

- Connector: Disconnected

OK → **3**

✗ → Repair the harness.

3

Sensor side connector

01Z217

Sensor side connector

01Z218

Check for the continuity of the sensor.

- Sensor: Removal
- Connector: Disconnected

Terminal	1	2	3	4
Condition				
When de-energized		○	○	○
When energized	○	⊕	○	⊖

NOTE

(1) ○—○ indicates that there is continuity between the terminals.

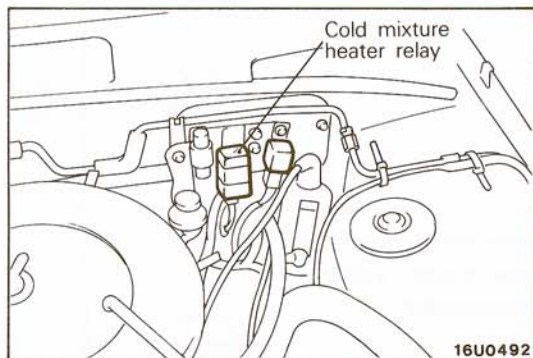
(2) ⊕—⊖ indicates power supply connection.

OK → **STOP**

✗ → Replace the relay.

COLD MIXTURE HEATER RELAY TEST PROCEDURES

Installing position

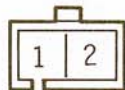
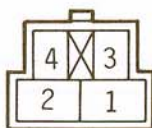


Individual component

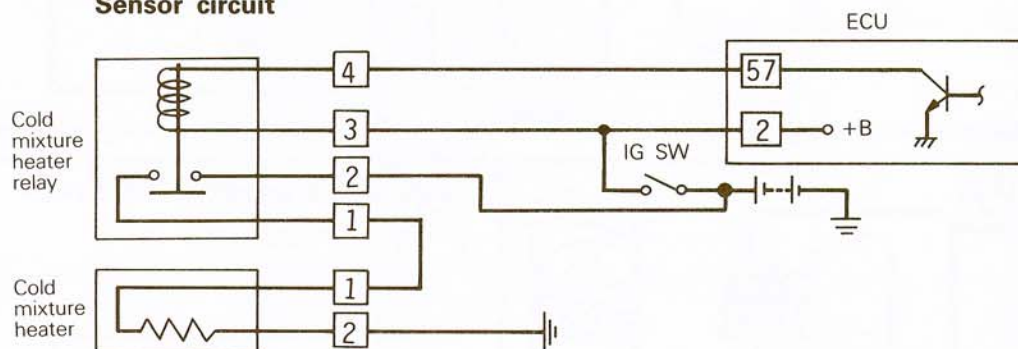


01Z270

Sensor connector

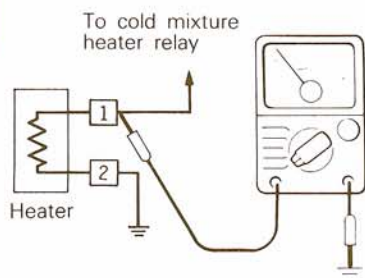


Sensor circuit



01Z311

1



01Z210

Check the output voltage.

- Insert the probe from behind the connector. Do not disconnect the connector.

Coolant temp.	Engine	Voltage
50°C (122°F) or lower	Stopped	0
	Idle	SV
70°C (158°F) or higher		0

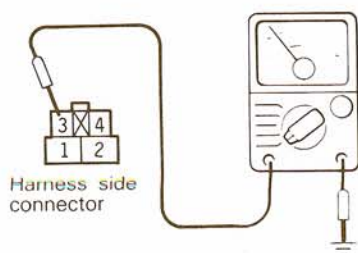
OK



OK

2

2



01Z212

Measure the power supply voltage.

- Connector: Disconnected
- IG SW: ON

Voltage (V)
SV

OK

3

OK

Repair the harness.

3

Harness side connector

ECU

01Z214

Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the cold mixture heater relay.

- Connector: Disconnected

OK → **4**

✗ → Repair the harness.

4

Harness side connector

01Z206

Measure the power supply voltage.

- Connector: Disconnected

Voltage (V)
SV

OK → **5**

✗ → Repair the harness.

5

SV

01Z208

Check for the operation of the relay.

- Relay: Removal

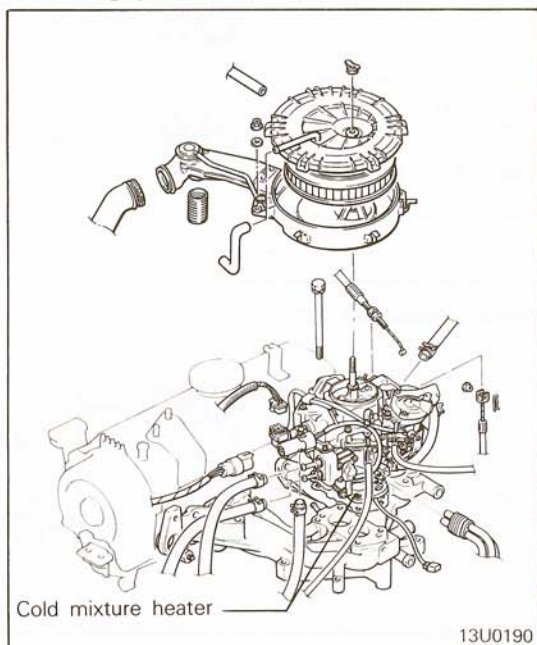
System voltage	Resistance (Ω)
Not applied	∞
Applied	0

OK → **STOP**

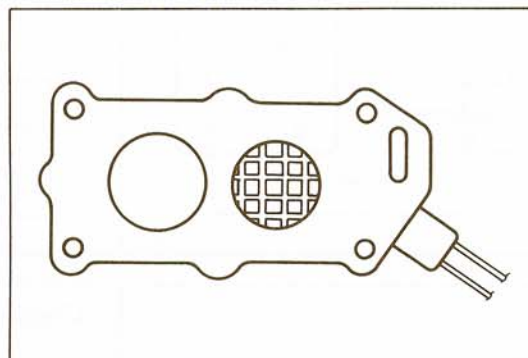
✗ → Replace the relay.

COLD MIXTURE HEATER TEST PROCEDURES

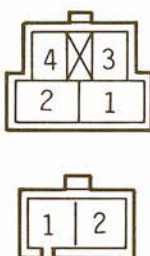
Installing position



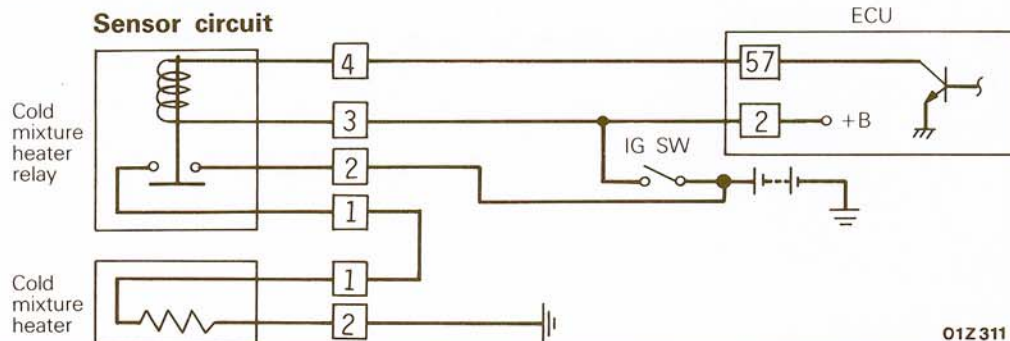
Individual component



Sensor connector



Sensor circuit



Measure the power supply voltage.
 • Cold mixture heater relay ①. (Refer to P.85.)

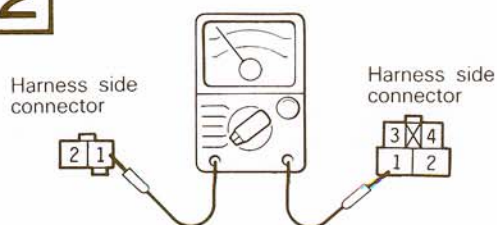
OK

→ 3

OK

→ 2

2



Check for damage, disconnection or short-circuit of the output circuit between the electronic control unit and the heater.
 • Connector: Disconnected

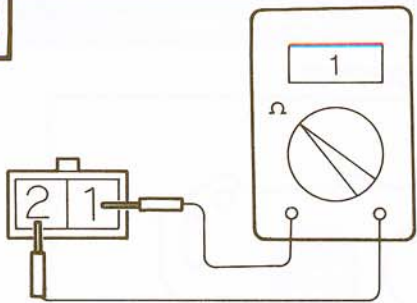
OK

→ Check the relay. (Refer to P.85.)

OK

→ Repair the harness.

3



1FU422

Measure the resistance.

- Connector: Disconnected
- Heater: Removal

Resistance (Ω)

Approx. 1 at 20°C (68°F)

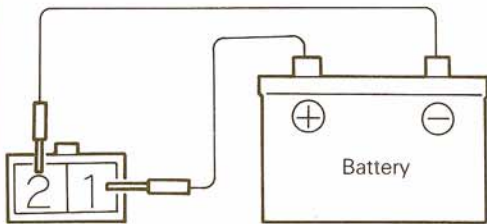
OK →

4

✗ →

Replace the heater.

4



1FU443

Check that the heater becomes hot.

OK →



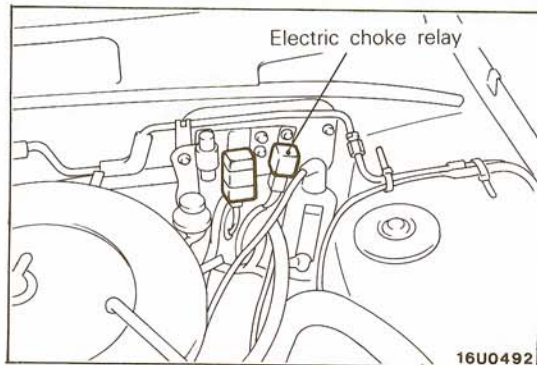
✗ →

Replace the heater.

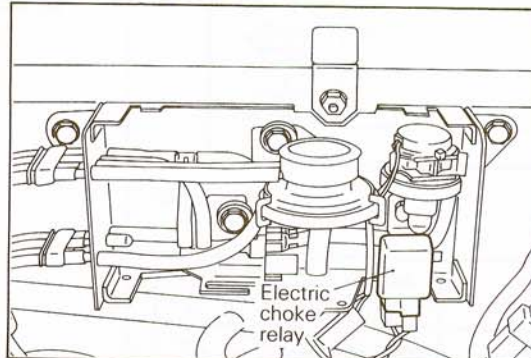
ELECTRIC CHOKE RELAY TEST PROCEDURES

Installing positions

COLT



RAM50, RAM RAIDER

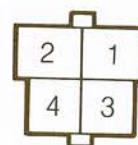


Individual component



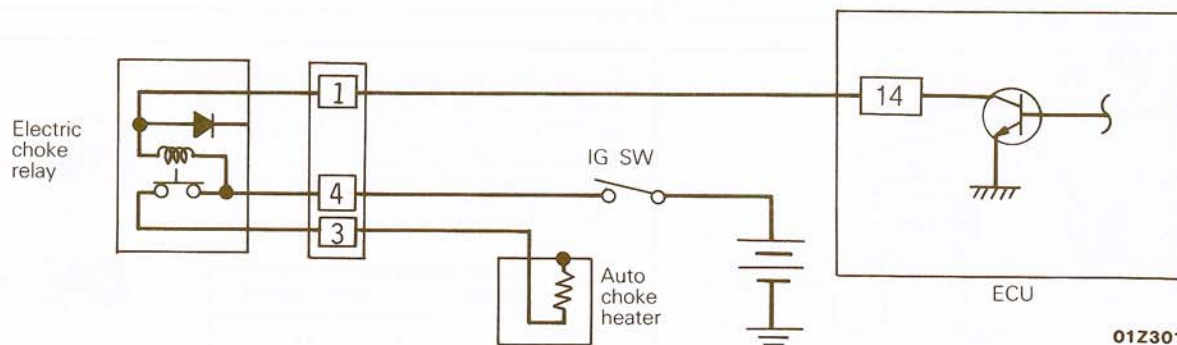
01Z271

Harness side connector



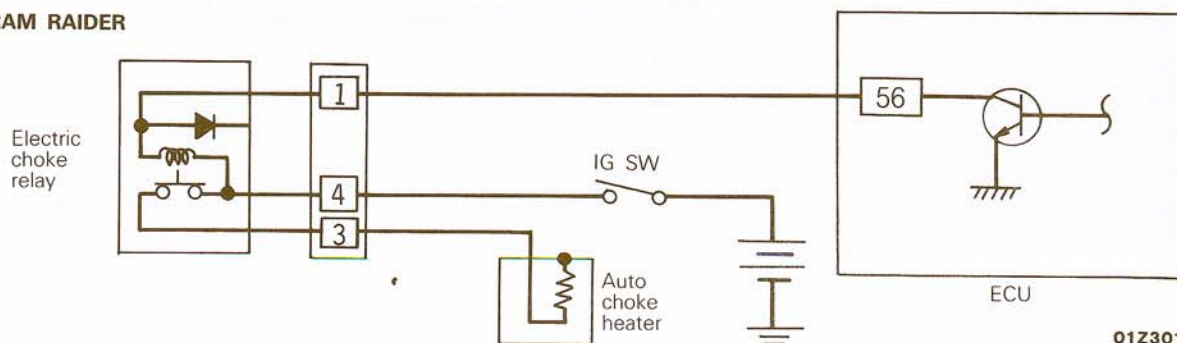
Sensor circuit

COLT



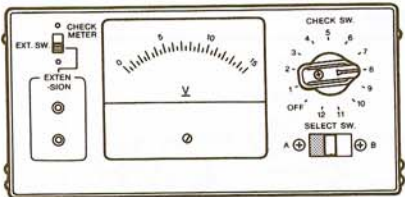
01Z301

RAM50, RAM RAIDER



01Z301

I



01U0407

Models	Harness	Select switch	Check switch
COLT	MD998455	A	8
RAM50, RAM RAIDER	MD998456		

Condition	Voltage (V)
IG SW: ON	0~0.6
Engine: Idle	SV

OK

→

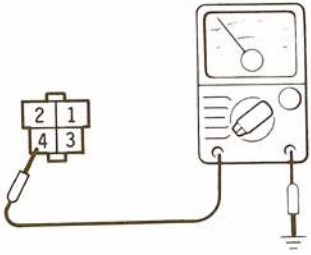
2

OK

→

2

2



01Z211

Measure the power supply voltage.

- IG SW: ON
- Connector: Disconnected

Voltage (V)
SV

OK

→

3

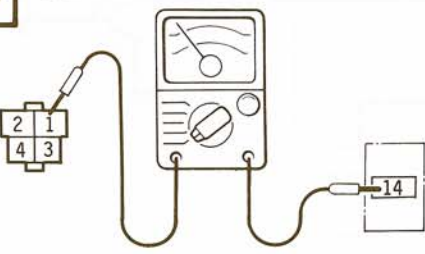
OK

→

3

3

COLT



01Z205

Check for damage, disconnection or short-circuit of the output circuit between the electric choke relay and the electronic control unit.

- Connector: Disconnected
- IG SW: OFF

Models	ECU terminal
COLT	14
RAM50, RAM RAIDER	56

OK

→

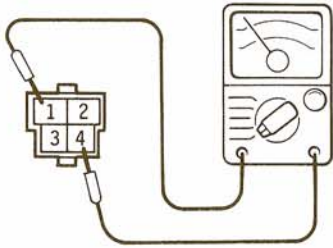
4

OK

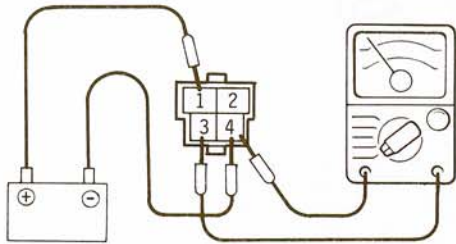
→

4

4



01Z207



01Z209

Check for the continuity of the electric choke relay.

- Electric choke relay: Removal
- Connector: Disconnected

Terminal	1	3	4
Condition			
When de-energized	○	—	○
When energized	⊖	⋯	⊕

NOTE

- (1) ○—○ indicates that there is continuity between the terminals.
 (2) ⊕—⊖ indicates power supply connection.

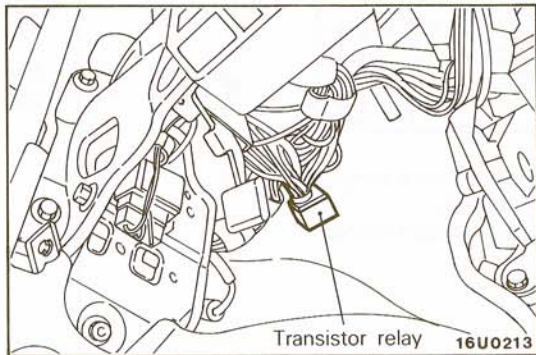


Replace the relay.

TRANSISTOR RELAY TEST PROCEDURES

Installing position

COLT



Individual component

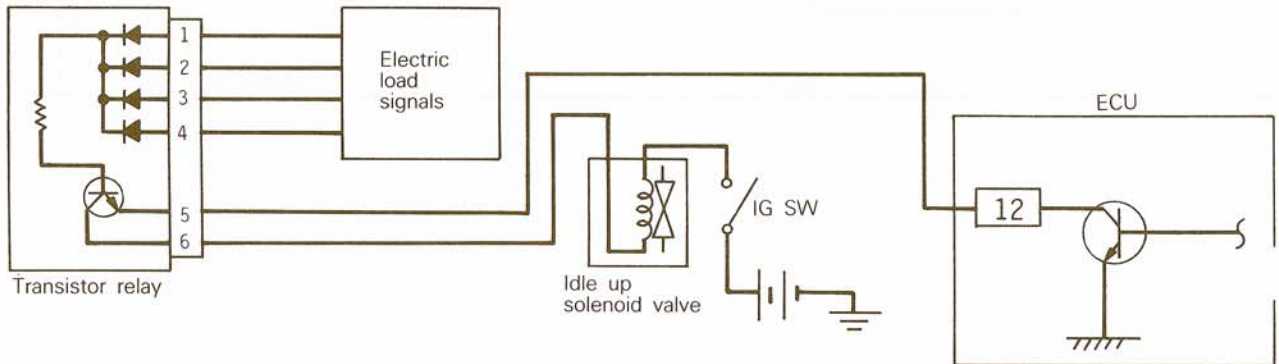
COLT



01Z266

Sensor circuit

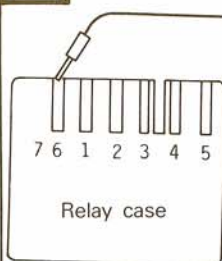
COLT



01Z324

I

COLT



01Z284

Measure the power supply voltage.

- IG SW: ON
- Transistor relay: Removal

Voltage (V)
SV

OK



2

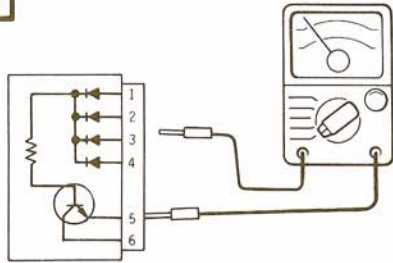
OK



Repair the harness or check the idle up solenoid valve.

2

COLT



01Z288

Check the sensor circuit.
 • Transistor relay: Removal

Check for continuity between the terminals noted below by using a tester with built-in 3V battery.

COLT

Ohmmeter connection	Continuity
①, ②, ③, ④→⑤	Conductive
①, ②, ③, ④←⑤	Non-conductive ($\infty\Omega$)
⑥→⑤	Non-conductive ($\infty\Omega$)
⑥→⑤*	Conductive
⑥←⑤	Non-conductive ($\infty\Omega$)

* When voltage is applied between ①, ②, ③, ④→⑤.

OK

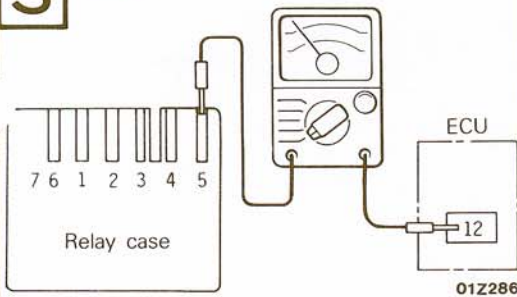
3

OK

Replace transistor relay.

3

COLT



01Z286

Check for the continuity of the output circuit.

• IG SW: OFF
 • Transistor relay: Removal

OK

STOP

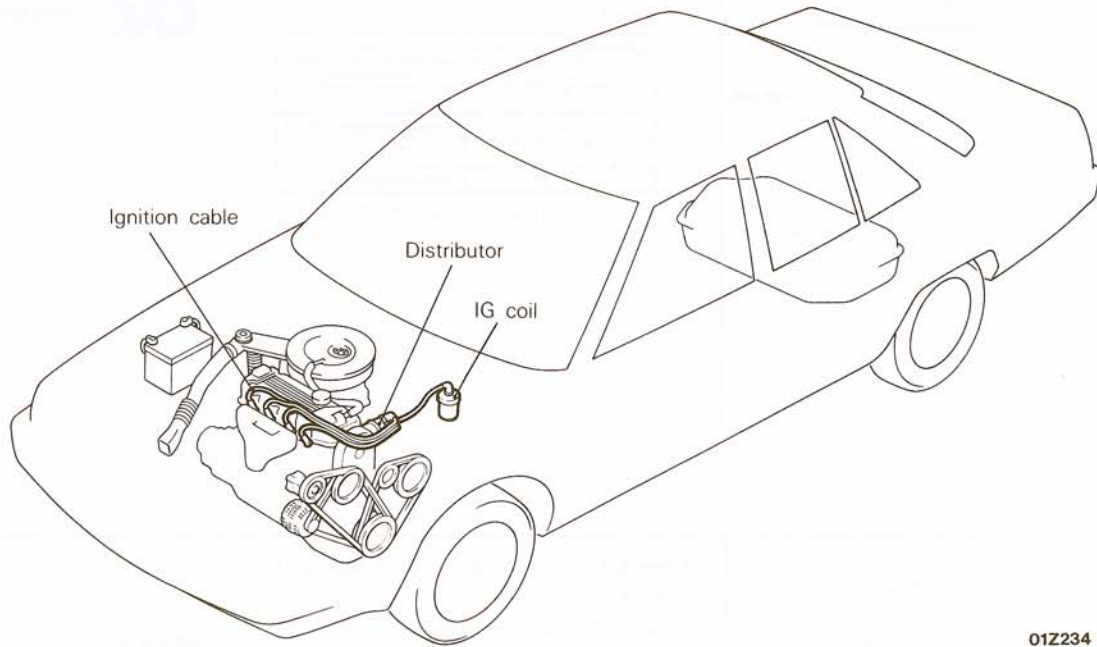
OK

Repair the harness.

IGNITION SYSTEM TEST PROCEDURES

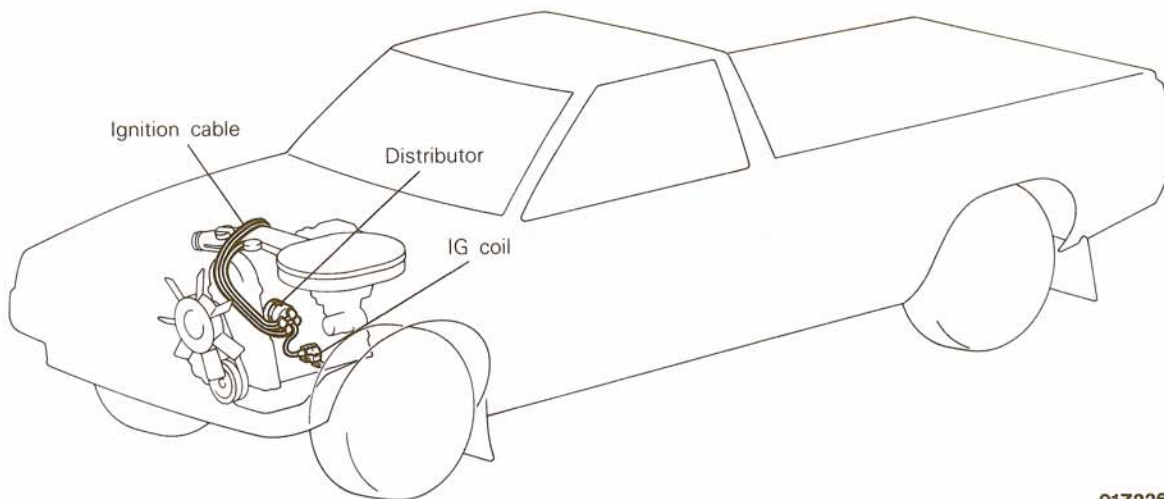
Installing positions

COLT



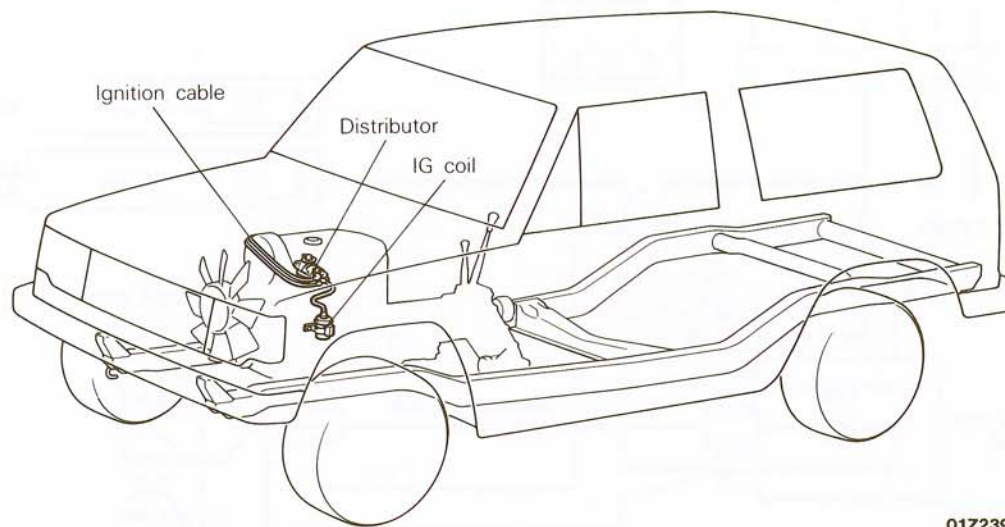
01Z234

RAM50

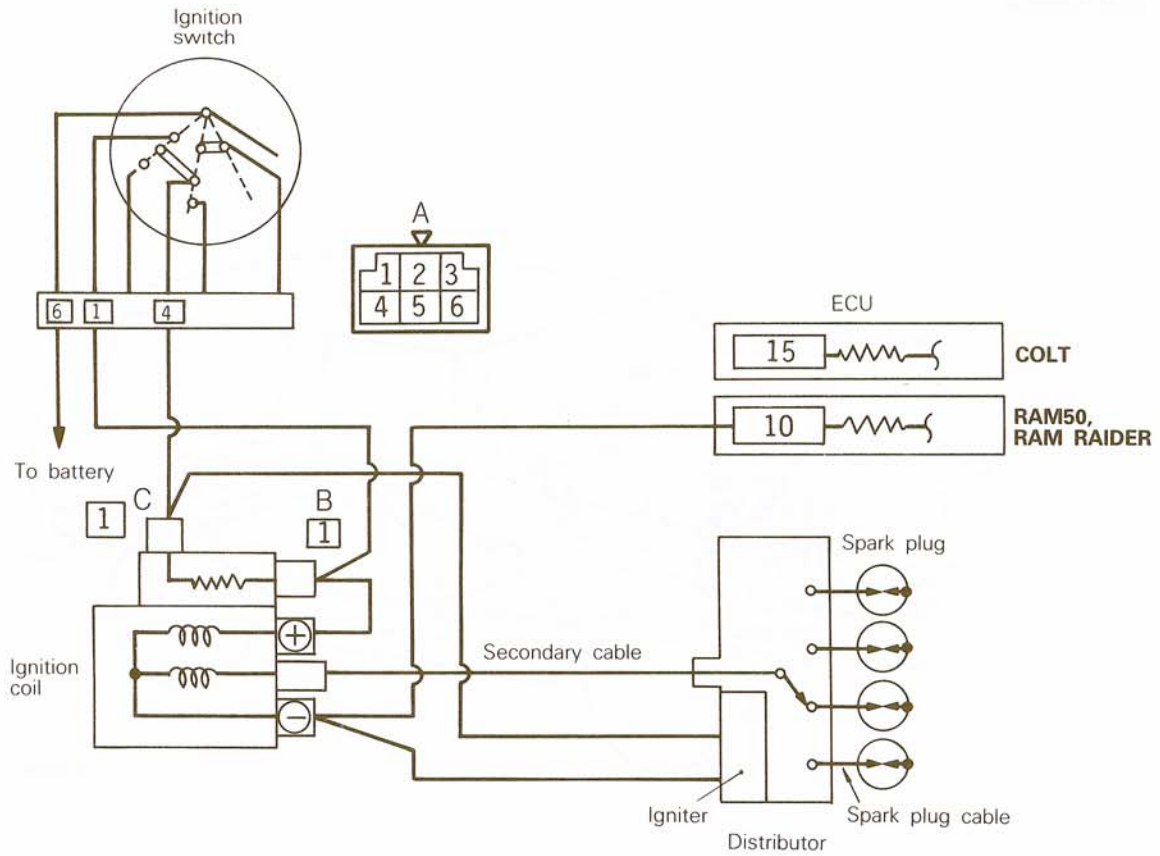


01Z226

RAM RAIDER



01Z239



01Z315

Engine condition

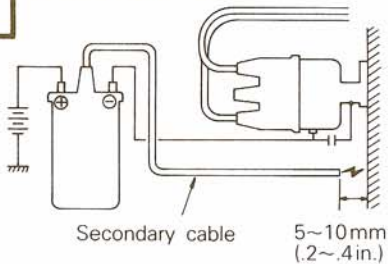
Engine won't start

→ 1

Driveability trouble

→ 6

1 COLT, RAM RAIDER



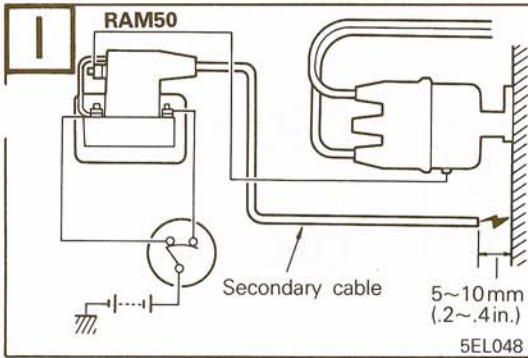
1EL038

Make a sparking test of the secondary cable.

- Pull the secondary cable to disconnect it from the distributor.
- Engine: Cranking

OK → 9

✗ → 2



Make a sparking test of the secondary cable.

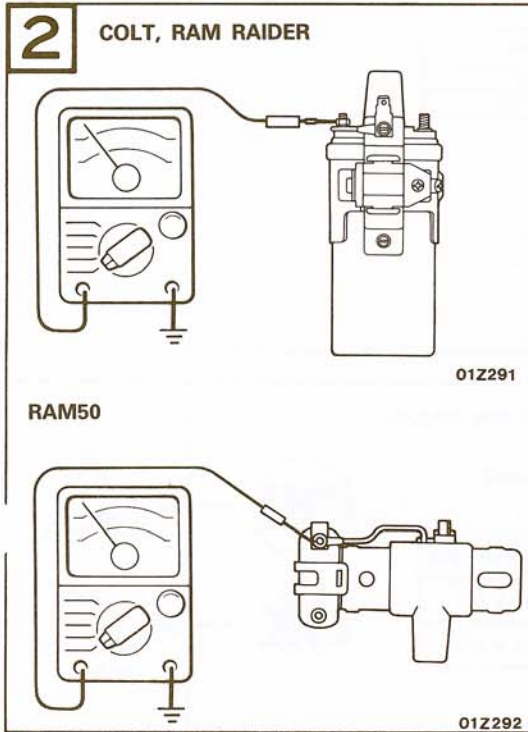
- Pull the secondary cable to disconnect it from the distributor.
- Engine: Cranking

OK

9

✗

2



Measure the power supply voltage of the ignition coil.

- Secondary cable: Removal
- IG SW: START

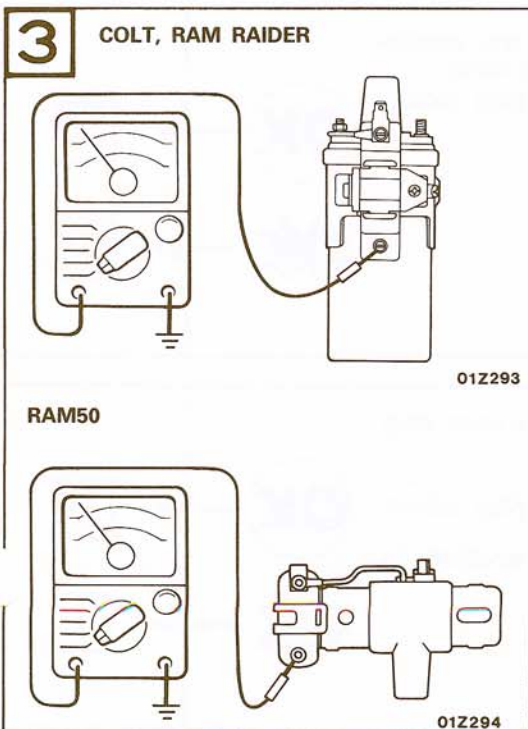
Voltage (V)
SV

OK

3

✗

Repair the harness.
(A 1 - B 1)



Measure the power supply voltage of the ignition coil.

- IG SW: ON

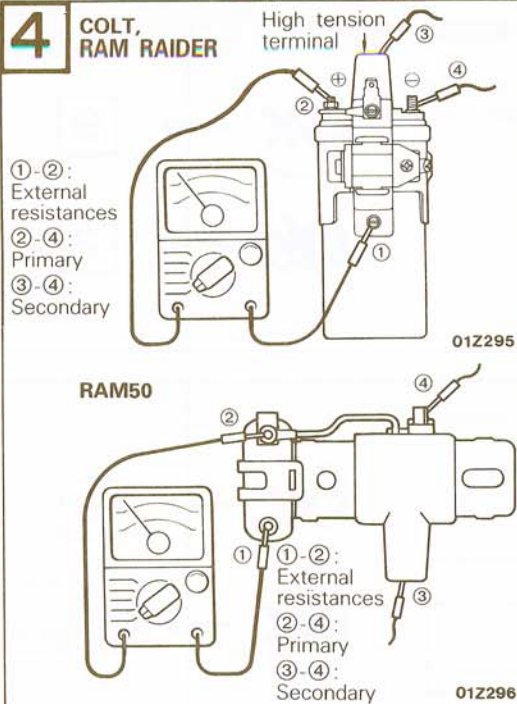
Voltage (V)
SV

OK

4

✗

Repair the harness.
(A 4 - C 1)



Measure the resistance of the ignition coil.

	Resistance at 20°C (68°F)	
	COLT	RAM RAIDER
External resistances	1.2~1.49Ω	1.2~1.4Ω
Primary	1.1~1.3Ω	1.1~1.3Ω
Secondary	11.6~15.8 kΩ	14.5~19.5 kΩ

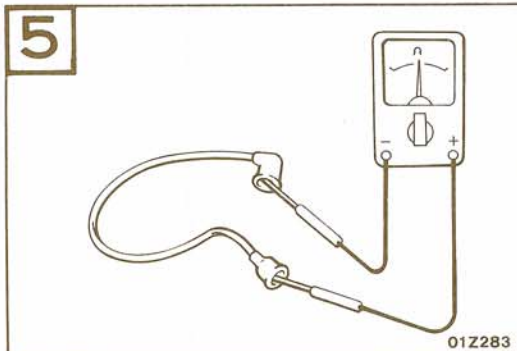
	Resistance at 20°C (68°F)	
	RAM50	
External resistances	1.22~1.48Ω	
Primary	1.1~1.3Ω	
Secondary	22.1~22.9 kΩ	



5



Replace the ignition coil.



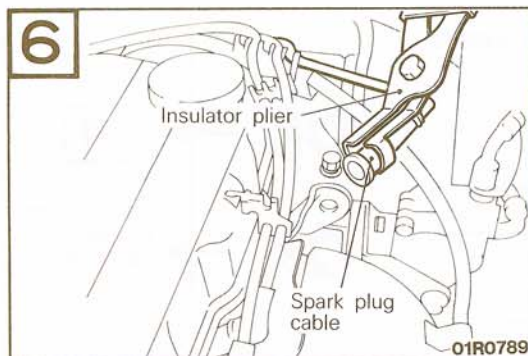
Measure the resistance of the secondary cable.

- Secondary cable: Removal

Models	Resistance at 20°C (68°F)
COLT	Approx. 6 kΩ
RAM50, RAM RAIDER	Approx. 7 kΩ



Replace the secondary cable.



Check to be sure that the engine condition changes during idling.

- Disconnect the spark plug cables one by one.

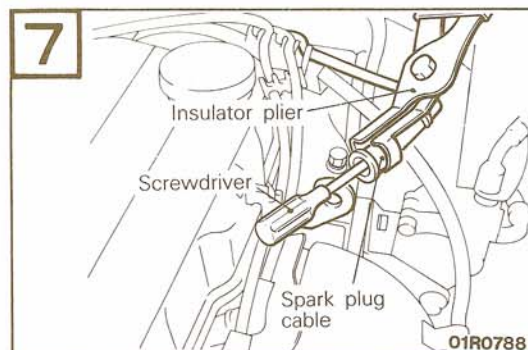
Caution
Use the insulator plier.



14



7



Make a sparking test of the spark plug cables.

- Engine: Cranking
- Disconnect the spark plug cables one by one.
- Insert an insulated screwdriver in terminal.

Caution
Use the insulator plier.

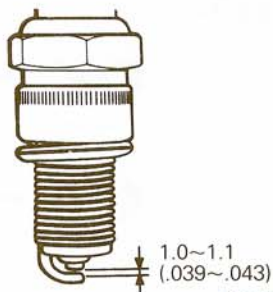


8



1

8



mm (in.)

60D519

Clean the spark plugs and check the plug gaps.

Plug gap mm (in.)

1.0~1.1 (.039~.043)

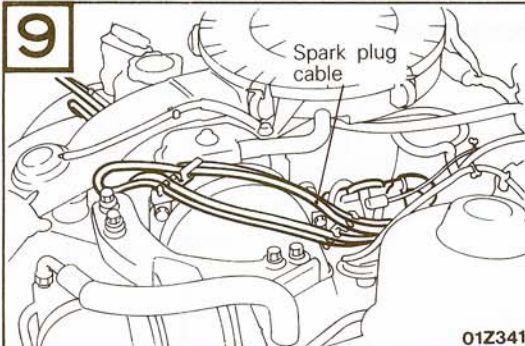


14



Repair or replace

9



01Z341

Check the placement of the spark plug cables.

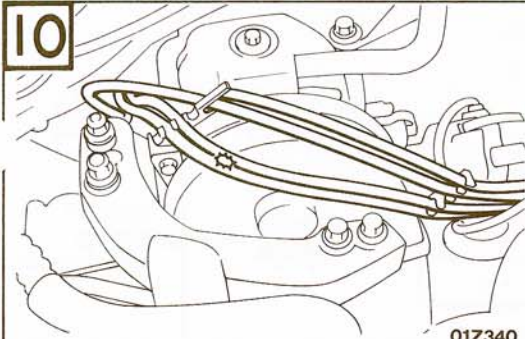


10



Correct the placement of the spark plug cables.

10



01Z340

Check for leakage.
• Engine: Cranking

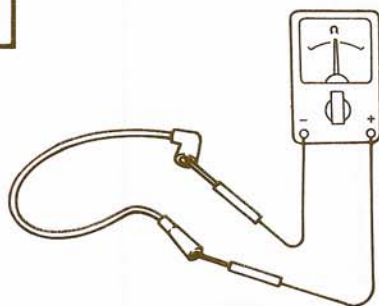


11



Replace the cable.

11



1EL105

Measure the spark plug cable resistance.

• Spark plug cables: Removal

	Resistance at 20°C (68°F)			
	No. 1 (kΩ)	No. 2 (kΩ)	No. 3 (kΩ)	No. 4 (kΩ)
COLT	Approx. 10	Approx. 12	Approx. 12	Approx. 13
RAM50 2.0 l engine	Approx. 10	Approx. 11	Approx. 12	Approx. 14
RAM50 2.6 l engine	Approx. 9	Approx. 11	Approx. 13	Approx. 14
RAM RAIDER	Approx. 9	Approx. 11	Approx. 13	Approx. 14

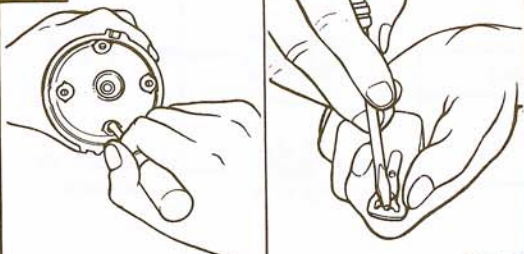


12



Replace the plug cable.

12



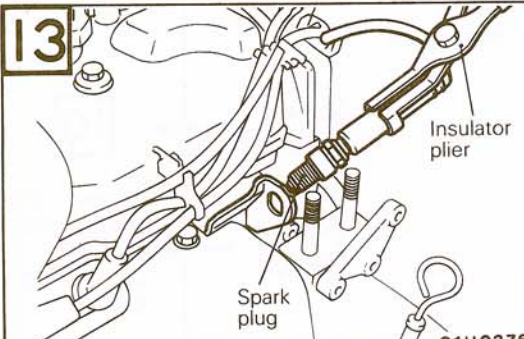
00E539

Check for poor contact or cracking of the contact carbon, rotor and distributor cap.

OK → **13**

✗ → Replace.

13



01U0376

Check the spark plug sparking condition.

- Spark plug: Removal
- Engine: Cranking

Caution
Use the insulator plier.


OK → **14**

✗ → Replace the spark plug or the cable.

14

COLT, RAM50, RAM RAIDER

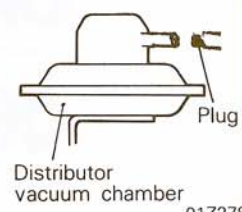
—Federal/California and high-altitude vehicles for Federal



Distributor vacuum chamber 01Z277

RAM50, RAM RAIDER

—Federal except high-altitude vehicles



Distributor vacuum chamber 01Z278

Check the ignition timing.

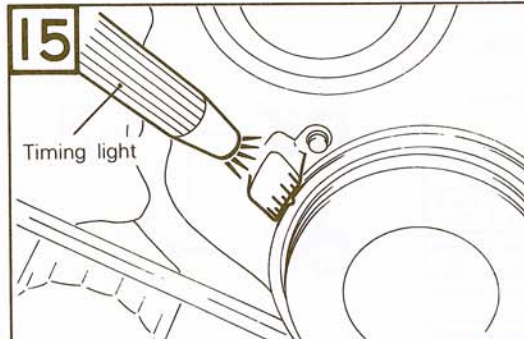
- Vacuum hose: Disconnect and plug.
- Engine: Idling

	Engine: rpm	Ignition timing (BTDC)
COLT	550~850	5°±2°
RAM50 —2.0 l engine	550~850	8°±2°
RAM50 —2.6 l engine RAM RAIDER	625~900	7°±2°

OK → **15**

✗ → Ignition timing adjustment

15



01R0216

Check the centrifugal ignition spark advance.

- Vacuum hose: Disconnect and plug.

Engine rpm	Ignition timing
Increase	Advance

COLT, RAM50, RAM RAIDER
—Federal/California and high-altitude vehicles for Federal

RAM50, RAM RAIDER
—Federal except high-altitude vehicles

OK → **16**

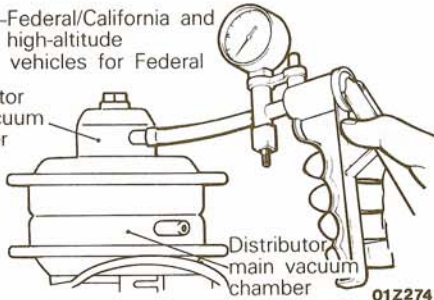
OK → **17**

✗ → Check and replace the centrifugal ignition timing spark advance.

16 COLT, RAM50, RAM RAIDER

—Federal/California and high-altitude vehicles for Federal

Distributor sub vacuum chamber



Distributor main vacuum chamber

01Z274

Check the vacuum ignition spark advance.

- Hand held vacuum pump: Connect to the sub vacuum chamber.
- Engine: Idling

Negative pressure	Ignition timing
Increase	Advance approx. 5°



17

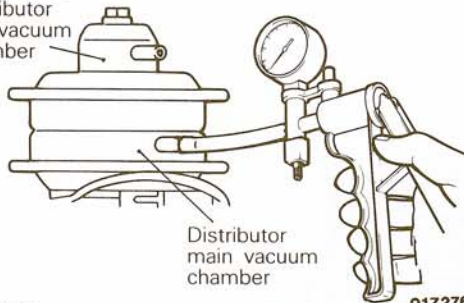


Replace the vacuum ignition spark advance device.

17 COLT, RAM50, RAM RAIDER

—Federal/California and high-altitude vehicles for Federal

Distributor sub vacuum chamber

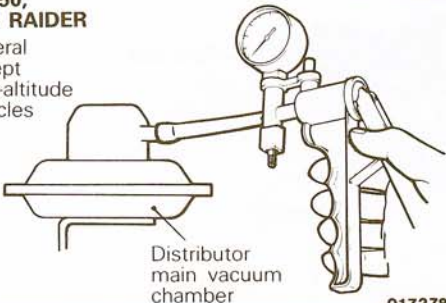


Distributor main vacuum chamber

01Z276

RAM50, RAM RAIDER

—Federal except high-altitude vehicles



Distributor main vacuum chamber

01Z278

Check the vacuum ignition spark advance.

- Hand held vacuum pump: Connect to the main vacuum chamber.
- Engine: Idling

Negative pressure	Ignition timing
Increase	Advance

COLT

RAM50, RAM RAIDER



18



Replace the vacuum ignition spark advance device.

18



01R0360

Check the distributor spark advance control solenoid valve. (Refer to P.70.)



19

19



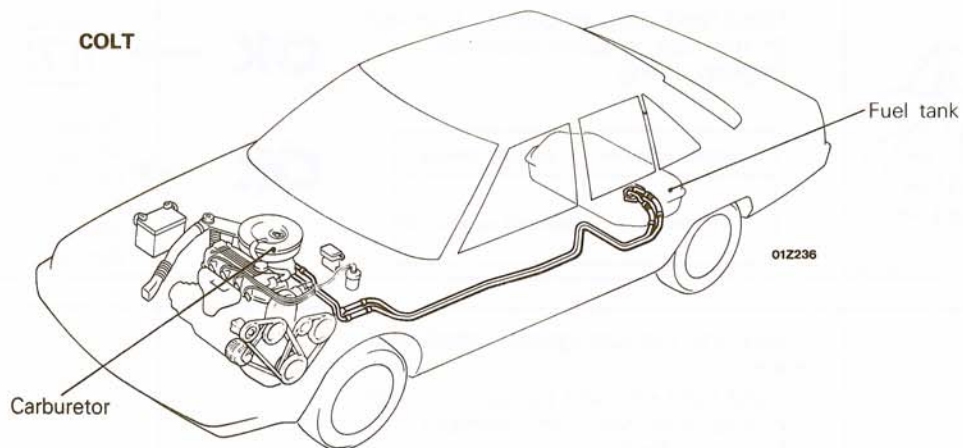
01R0360

Check the distributor cold spark advance control solenoid valve. (Refer to P.73.)

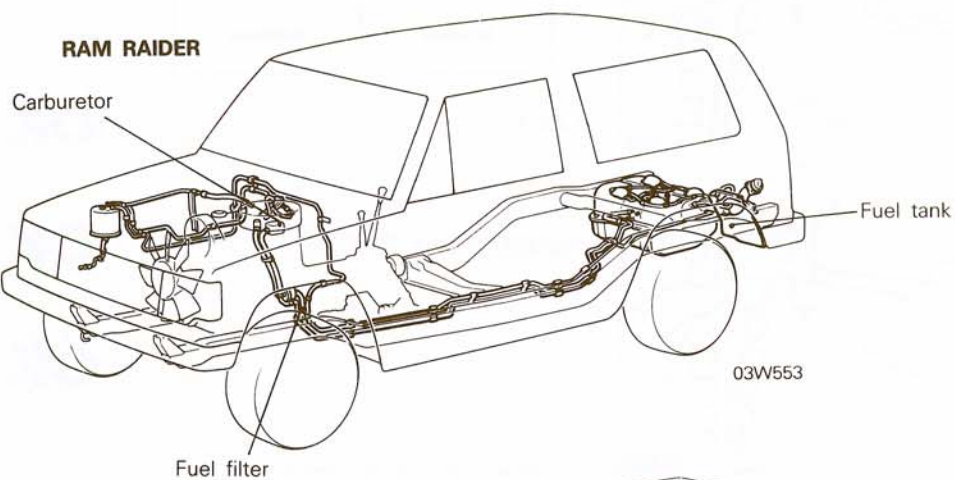


FUEL SYSTEM TEST PROCEDURES

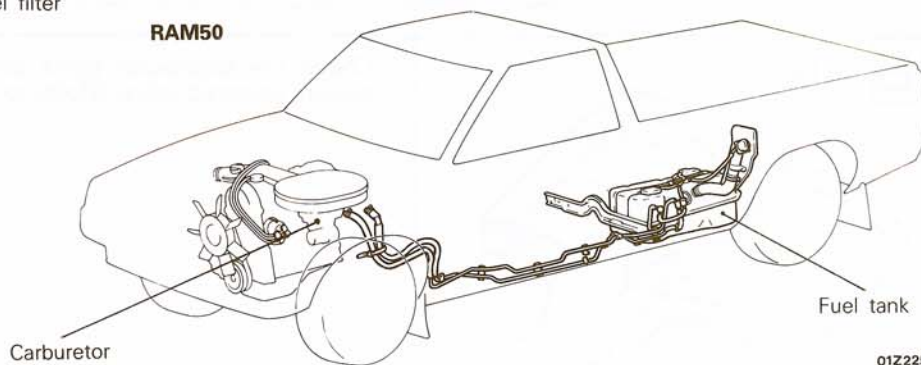
COLT



RAM RAIDER



RAM50



I



Check to be sure that the engine can be started.

OK



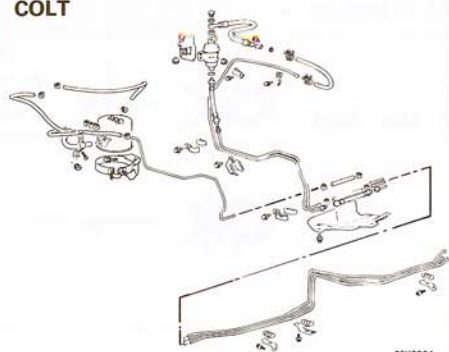
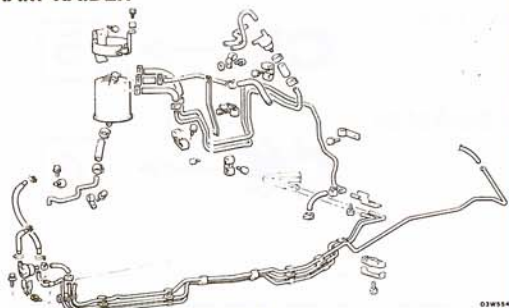
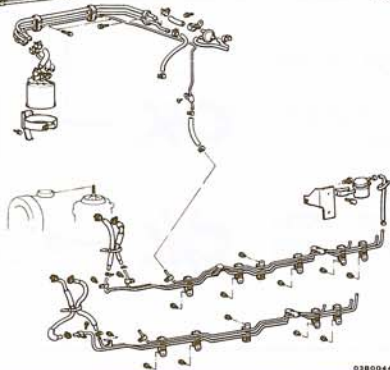
4

OK



2

<div data-bbox="131 157 203 241">2</div> <div data-bbox="316 262 462 409"> </div> <div data-bbox="576 472 649 504">01Z281</div>	<p>Check to be sure that there is fuel in the tank.</p> <ul style="list-style-type: none"> IG SW: ON <p>Caution Check to be sure that the fuel gauge is normal.</p>	<div data-bbox="1169 231 1274 336">OK</div> <div data-bbox="1404 252 1469 315">3</div> <div data-bbox="1169 367 1274 441">✗</div> <div data-bbox="1372 378 1494 420">Add fuel.</div>
<div data-bbox="131 535 203 619">3</div> <div data-bbox="316 556 462 882"> </div> <div data-bbox="584 861 657 892">01Z335</div>	<p>Check to be sure that fuel flows out from the fuel pump discharge port.</p> <ul style="list-style-type: none"> Fuel pump discharge port pipe: Removal Engine: Cranking <p>Caution Catch the fuel in a plastic bucket or similar container.</p>	<div data-bbox="1169 619 1274 724">OK</div> <div data-bbox="1404 640 1469 703">5</div> <div data-bbox="1169 745 1274 819">✗</div> <div data-bbox="1404 756 1469 819">4</div>
<div data-bbox="131 913 203 997">4</div> <div data-bbox="170 924 576 1260"> </div> <div data-bbox="584 1228 657 1260">01Z336</div>	<p>Check the fuel pump.</p> <ul style="list-style-type: none"> Inlet side pipe: Submerge in the fuel. Outlet side pipe: Place in a plastic bucket or similar container. Engine: Idling <p>Caution This operation should be done quickly, because the fuel in the float turns the engine.</p>	<div data-bbox="1169 997 1274 1102">OK</div> <div data-bbox="1404 1018 1469 1081">5</div> <div data-bbox="1169 1123 1274 1197">✗</div> <div data-bbox="1372 1134 1526 1186">Replace the fuel pump.</div>
<div data-bbox="131 1291 203 1375">5</div> <div data-bbox="235 1291 641 1638"> <div data-bbox="235 1291 308 1333">COLT</div> <div data-bbox="430 1291 511 1333">RAM50</div> <div data-bbox="284 1333 397 1480"> </div> <div data-bbox="511 1333 625 1438"> </div> <div data-bbox="284 1480 430 1522">RAM RAIDER</div> <div data-bbox="349 1522 495 1627"> </div> <div data-bbox="373 1459 438 1480">01Z245</div> <div data-bbox="584 1459 649 1480">01Z246</div> <div data-bbox="462 1606 527 1627">01Z247</div> </div>	<p>Check the fuel filter.</p> <ul style="list-style-type: none"> Clogging Dirt Deformation <p>Caution The tank, carburetor, etc. should also be checked if the condition is very bad.</p>	<div data-bbox="1169 1375 1274 1480">OK</div> <div data-bbox="1404 1396 1469 1459">6</div> <div data-bbox="1169 1501 1274 1575">✗</div> <div data-bbox="1372 1501 1526 1564">Replace the fuel filter.</div>
<div data-bbox="131 1669 203 1753">6</div> <div data-bbox="154 1701 641 1995"> </div> <div data-bbox="592 1984 657 2005">03U0060</div>	<p>Check the fuel tank.</p> <ul style="list-style-type: none"> Foreign material in the tank Cap air passage Clogging of pipe inside the tank 	<div data-bbox="1169 1753 1274 1858">OK</div> <div data-bbox="1404 1774 1469 1837">7</div> <div data-bbox="1169 1879 1274 1953">✗</div> <div data-bbox="1372 1879 1485 1942">Clean or replace.</div>

7 COLT**RAM RAIDER****RAM50**

Check the fuel line.

- Clogging
- Air in the line
- Vapor lock



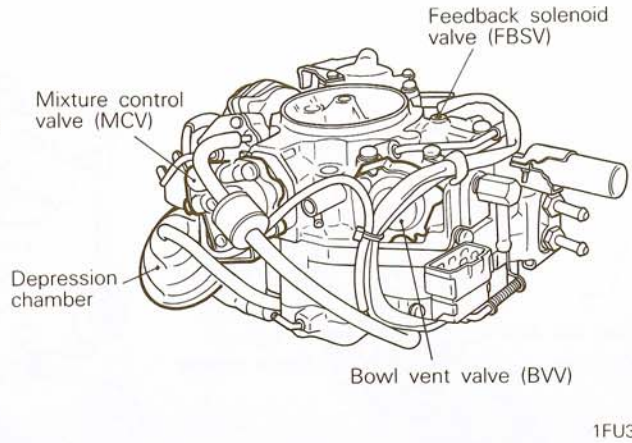
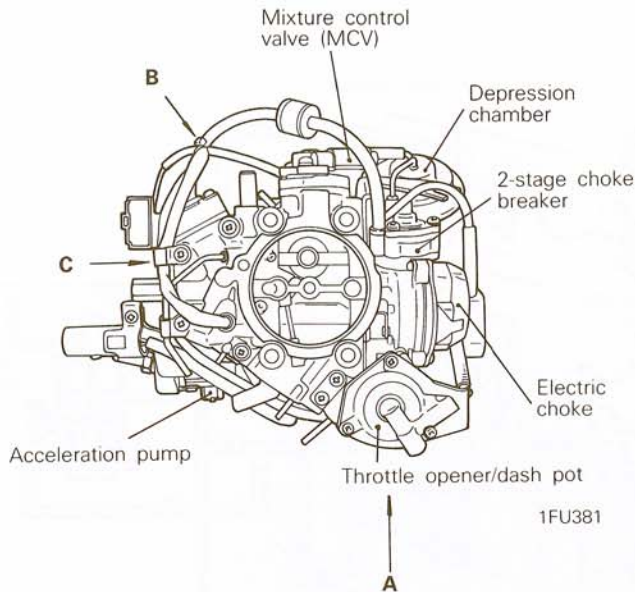
→ Check the carburetor.



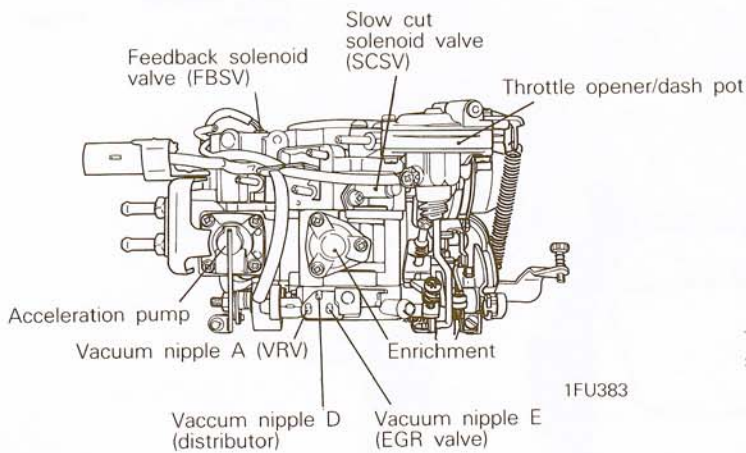
→ Clean or replace the fuel line.

CARBURETOR TEST PROCEDURES

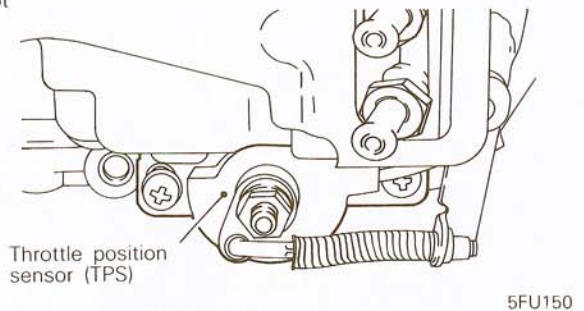
COLT



View B

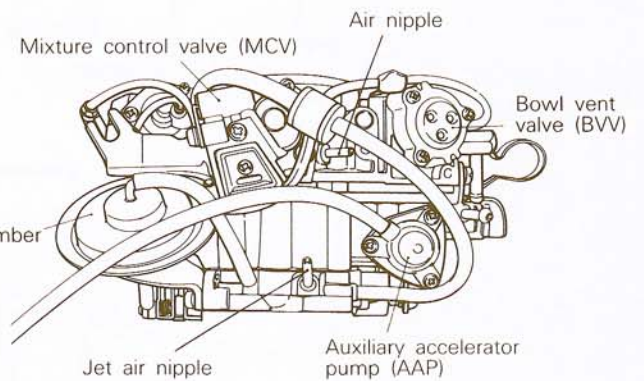
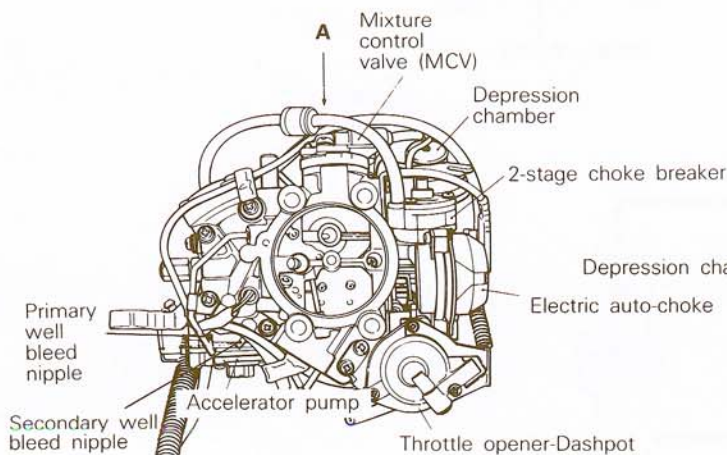


View A



View C

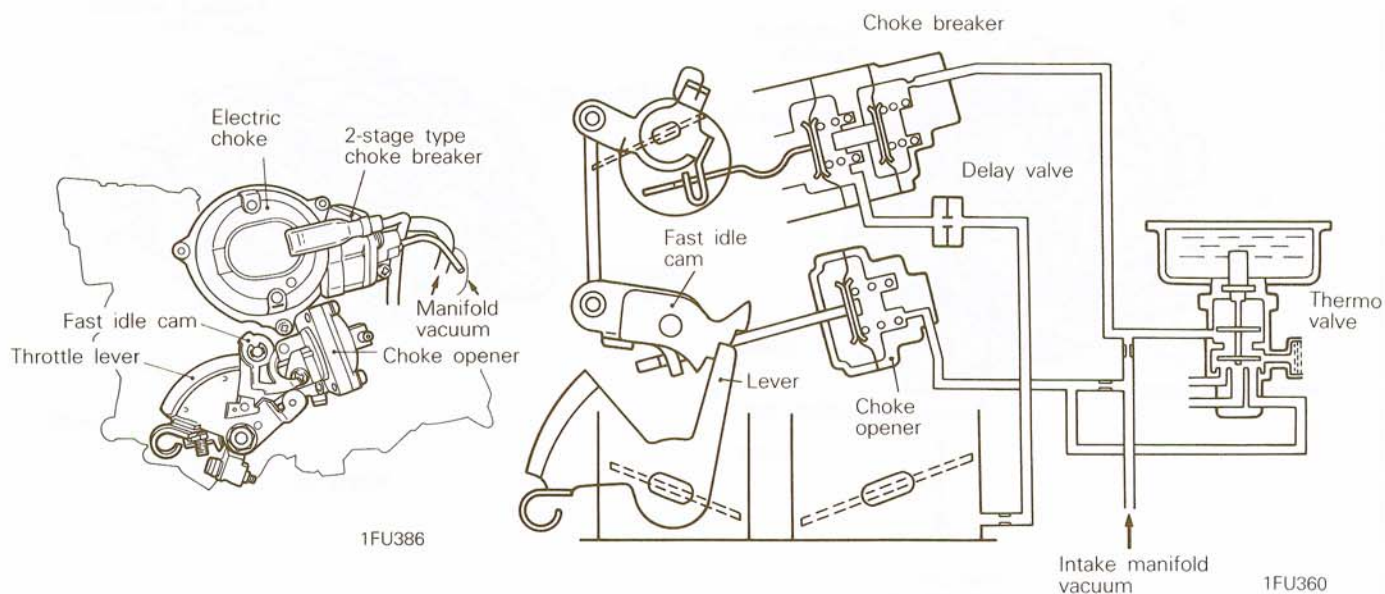
RAM50, RAM RAIDER



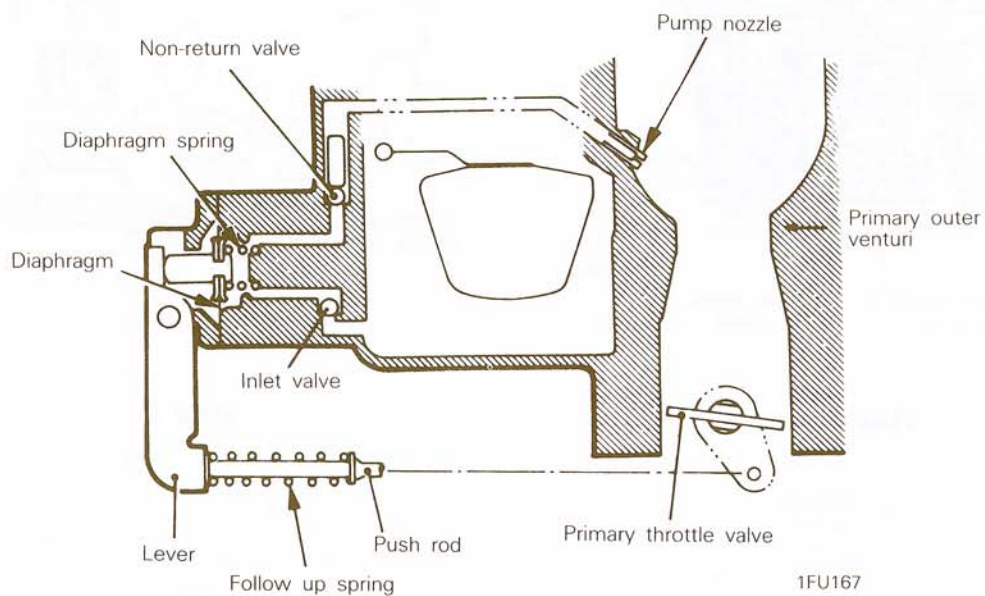
View A

5FU121

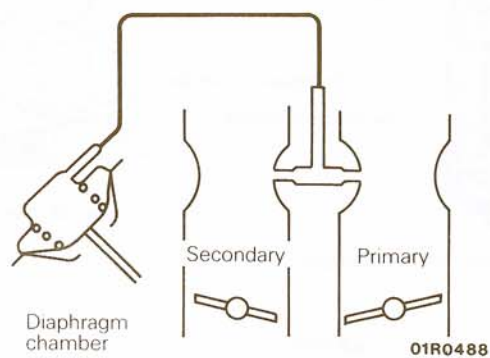
Carburetor electric choke system



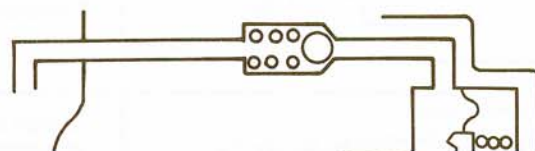
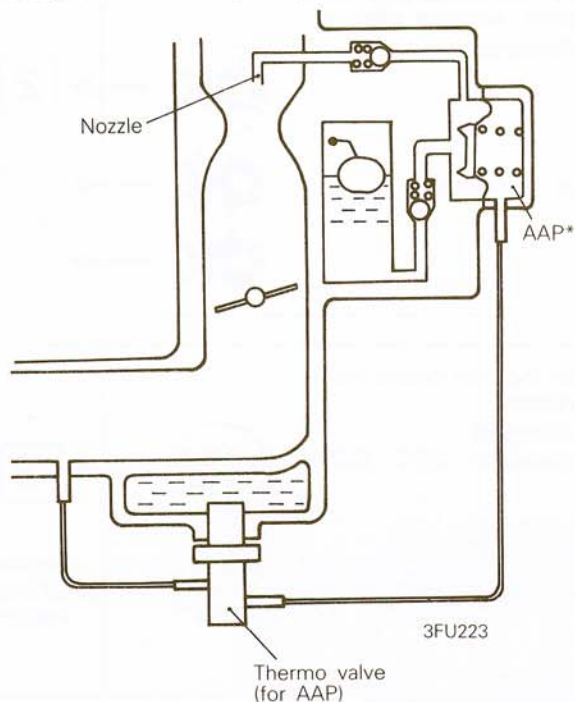
Accelerator pump



Secondary valve



Auxiliary accelerator pump

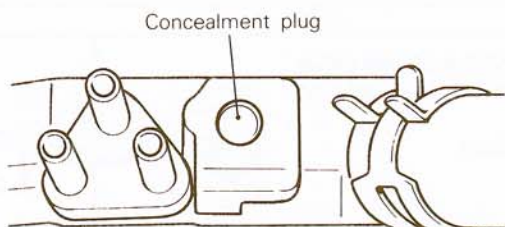


*AAP: (Auxiliary Accelerator Pump)

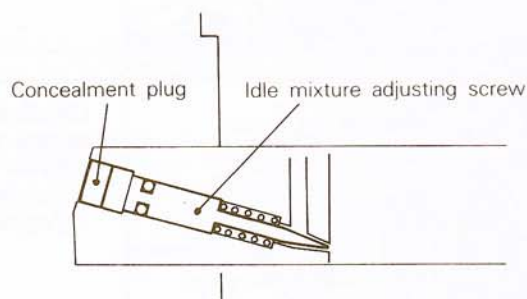
3FU224

Caution

1. All carburetors have a tamper-proof choke. The choke-related parts are factory adjusted. The choke adjustment is not required during service, except when major carburetor overhaul, choke calibration related parts adjustments are needed by state or local inspections.
2. All carburetors also have a tamper-resistant idle mixture adjusting screw. The CO setting has been done as a factory adjustment. Neither removal of the plug nor adjustment of the mixture screw is required during service unless a major carburetor overhaul, throttle body replacement, or high-idle CO adjustments are needed by state or local inspections.



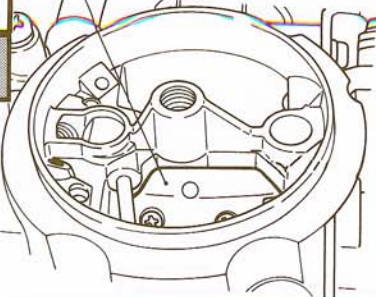
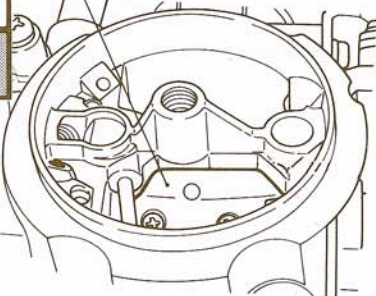
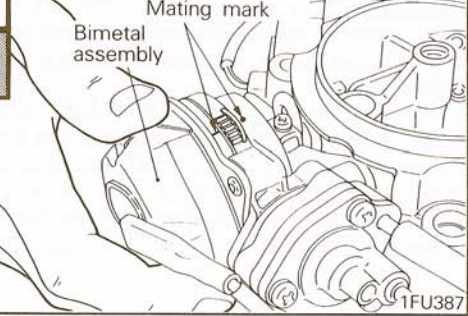
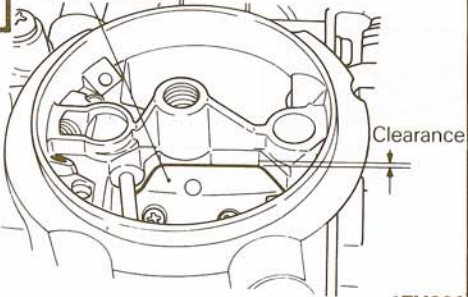
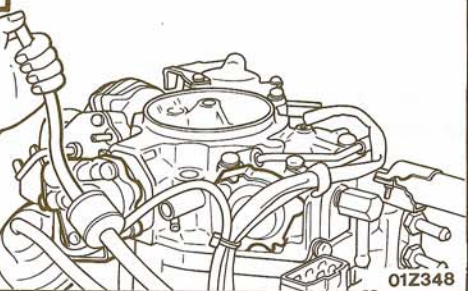
1FU345



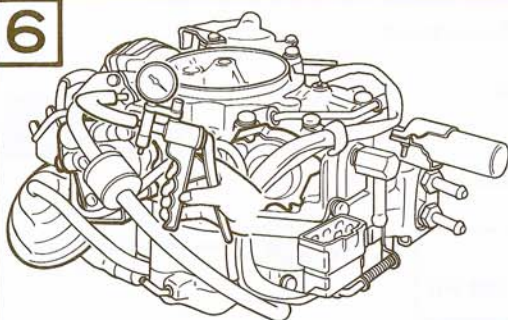
1FU346

Tamper Prevention

- If the symptom of trouble is related to starting, idling stability, etc., check in the □ numbered order.
- If the symptom of trouble is related to driveability, check in the ■ numbered order.

<div data-bbox="105 121 154 262">1</div> 	<p>Check whether or not the choke valve operates smoothly, without play.</p> <ul style="list-style-type: none"> • Air cleaner: Removal <p>Doesn't operate smoothly.</p> <p>Excessive play.</p> <div data-bbox="1128 199 1242 294">OK</div> → <div data-bbox="1339 210 1469 283">2 2</div> <div data-bbox="1128 304 1242 378">✗</div> → <div data-bbox="1339 283 1485 462">Clean around the choke valve. Replace the float chamber cover.</div> <div data-bbox="1128 388 1242 462">✗</div> → <div data-bbox="1339 388 1485 462"></div>
<div data-bbox="105 499 154 640">2</div> 	<p>Check to be sure that the choke valve is completely closed.</p> <ul style="list-style-type: none"> • Air cleaner: Removal • Coolant temperature: 10°C (90°F) or lower <div data-bbox="1128 577 1242 672">OK</div> → <div data-bbox="1339 588 1469 661">3 3</div> <div data-bbox="1128 703 1242 777">✗</div> → <div data-bbox="1339 703 1485 787">Replace the bimetal assembly.</div>
<div data-bbox="105 877 154 1018">3</div> 	<p>Check to be sure that the mating marks of the bimetal assembly and the electric choke body are in alignment.</p> <ul style="list-style-type: none"> • Air cleaner: Removal <div data-bbox="1128 955 1242 1050">OK</div> → <div data-bbox="1339 966 1469 1039">4 4</div> <div data-bbox="1128 1081 1242 1155">✗</div> → <div data-bbox="1339 1081 1485 1165">Align the mating marks.</div>
<div data-bbox="105 1255 154 1312">4</div> 	<p>Check whether or not the choke valve opens slightly immediately after the engine starts.</p> <ul style="list-style-type: none"> • Air cleaner: Removal • Engine: Start <div data-bbox="1128 1333 1242 1428">OK</div> → <div data-bbox="1364 1354 1429 1417">7</div> <div data-bbox="1128 1459 1242 1533">✗</div> → <div data-bbox="1364 1480 1429 1543">5</div>
<div data-bbox="105 1633 154 1690">5</div> 	<p>Check the negative pressure at the end of the vacuum hose (black) connected to the choke breaker.</p> <ul style="list-style-type: none"> • Air cleaner: Removal • Engine: Idling <div data-bbox="682 1837 1063 1963"> <p>Negative pressure</p> <p>Can be felt by a finger.</p> </div> <div data-bbox="1128 1711 1242 1806">OK</div> → <div data-bbox="1364 1732 1429 1795">6</div> <div data-bbox="1128 1837 1242 1911">✗</div> → <div data-bbox="1339 1837 1485 1911">Replace the delay valve.</div>

6



01Z346

Check whether or not there is a slight opening when negative pressure is applied to the choke breaker.

- Air cleaner: Removal
- Coolant temperature: 10°C (50°F) or lower
- Hand held vacuum pump: Connect to the choke breaker.

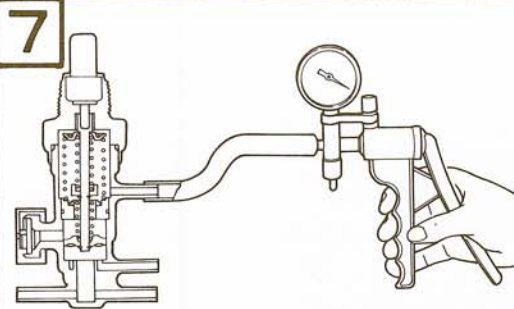


→ 7



→ Replace the choke breaker.

7



01Z344

Check whether there is air-tightness when negative pressure is applied to the thermo valve.

- Hand held vacuum pump: Connect to the thermo valve.
- Coolant temperature: 10°C (90°F) or lower

Negative pressure

Negative pressure leaks.

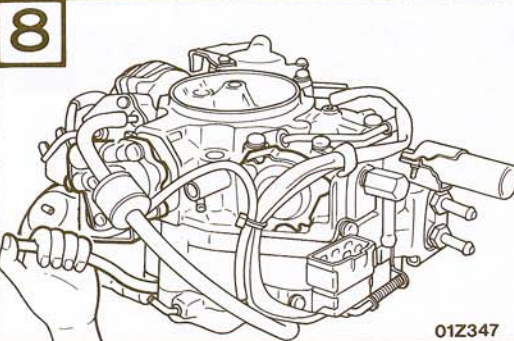


→ 8



→ Replace the thermo valve.

8



01Z347

Check the negative pressure at the end of the vacuum hose (yellow stripe) connected to the choke breaker.

- Air cleaner: Removal
- Coolant temperature: 10°C (90°F) or lower
- Engine: Idling

Negative pressure

Cannot be felt by a finger.

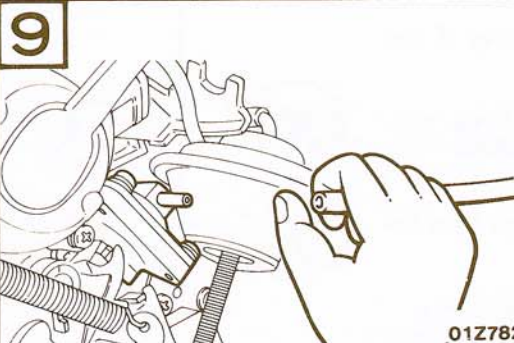


→ 9



→ Replace the vacuum hose.

9



01Z782

Check the negative pressure at the end of the vacuum hose (white stripe) connected to the choke opener.

- Air cleaner: Removal
- Coolant temperature: 10°C (90°F) or lower
- Engine: Idling

Negative pressure

Cannot be felt by a finger.

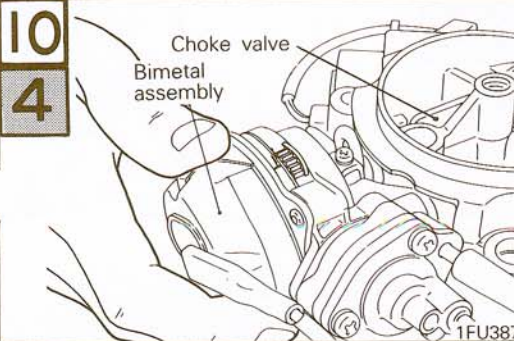


→ 10



→ Replace the vacuum hose.

10



1FU387

Choke valve
Bimetal
assembly

Check the operation of the choke valve while a finger is placed against the bimetal assembly.

- Engine: Warm up from the 10°C (50°F) or lower coolant temperature condition.

Bimetal assembly	Choke valve
---------------------	-------------

Gradually becomes hot.	Opens in accordance with bimetal tempera- ture increase.
---------------------------	---

Bimetal assembly	Choke valve
---------------------	-------------

Gradually becomes hot.	Opens in accordance with bimetal tempera- ture increase.
---------------------------	---



→ 13 7

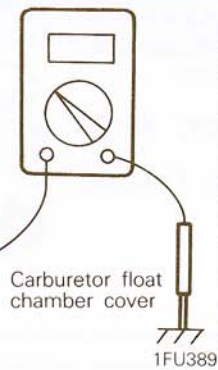
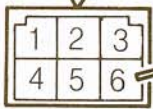


→ 11 5

11
5

COLT

Heater side connector



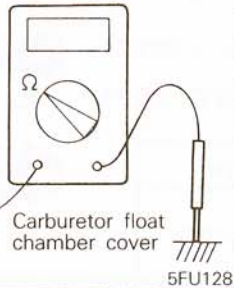
Carburetor float chamber cover

1FU389

RAM50, RAM RAIDER



Heater side connector



Carburetor float chamber cover

5FU128

Check for continuity of the Auto choke heater.

- Connector: Disconnected

Continuity
Yes [Approx. 6Ω at 20°C (68°F)]

OK →

12
6

✗

Replace the bimetal assembly.

12
6



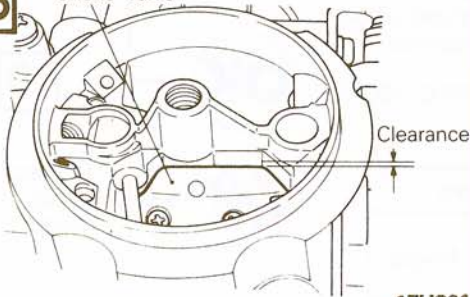
01R0360

Check the electric choke relay. (Refer to P.89.)

→ **13**
7

13

Choke valve



1FU301

Check the degree of opening of the choke breaker.

- Air cleaner: Removal
- Yellow-striped vacuum hose connected to the choke breaker: Removal
- Engine: Idling
- Choke valve: Lightly close by a finger until it stops.

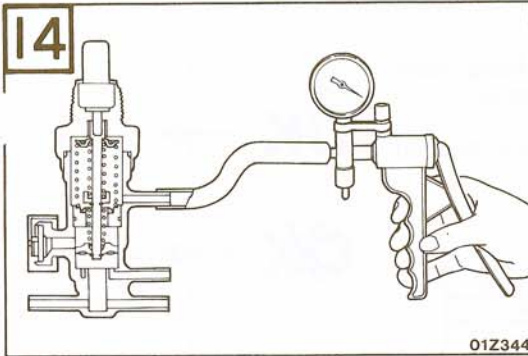
OK →

14

✗

Adjust the degree of opening of the breaker.

	Clearance between choke valve and bore mm (in.)
COLT	1.4 (.056)~1.6 (.064)
RAM50 ~2.0ℓ engine	2.2 (.088)~2.4 (.096)
RAM50 ~2.6ℓ engine RAM RAIDER	2.5 (.1)~2.7 (.108)



Check whether there is air-tightness when negative pressure is applied to the thermo valve.

- Hand held vacuum pump: Connect to the thermo valve.
- Coolant temperature: 25°C (87°F) or more

Negative pressure

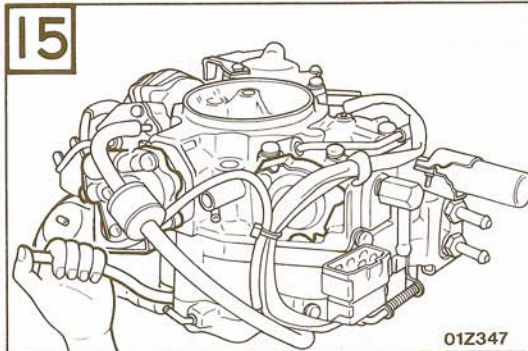
Negative pressure is maintained.



15



Replace the thermo valve.



Check the negative pressure at the end of the vacuum hose (yellow stripe) connected to the choke breaker.

- Air cleaner: Removal
- Engine: Idling

Negative pressure

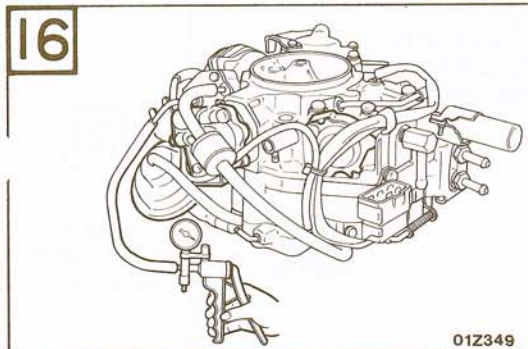
Can be felt by a finger.



16



Replace the vacuum hose.



Check whether there is air-tightness when negative pressure is applied to the choke breaker.

- Air cleaner: Removal
- Hand held vacuum pump: Connect to the choke breaker.

Negative pressure

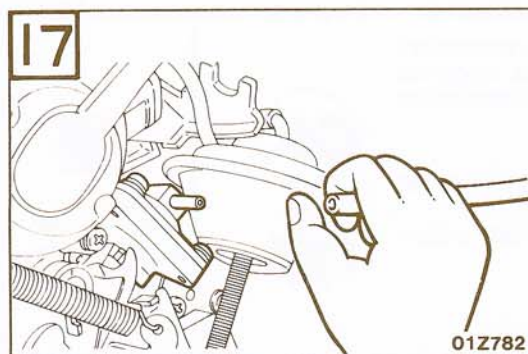
Negative pressure is maintained.



17



Replace the choke breaker.



Check the negative pressure at the end of the vacuum hose (white stripe) connected to the choke opener.

- Air cleaner: Removal
- Engine: Idling

Negative pressure

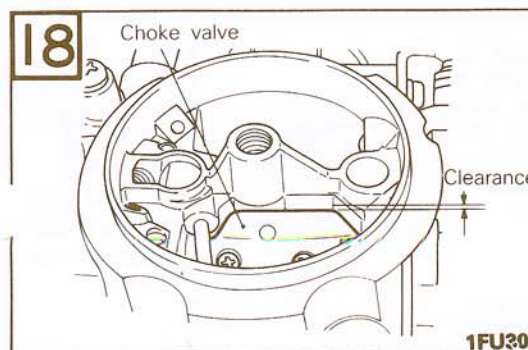
Can be felt by a finger.



18



Replace the vacuum hose.



Check the degree of opening of the choke breaker.

- Air cleaner: Removal
- Engine: Idling
- Choke valve: Lightly close by a finger until it stops.

	Clearance between choke valve and bore mm (in.)
COLT, RAM50 ~2.0 l engine	2.9 (.116) ~ 3.1 (.124)
RAM50 ~2.6 l engine RAM RAIDER	3.2 (.128) ~ 3.4 (.136)



19



Check the degree of opening of the breaker.

19



1FU395

Check the fast idle rpm.

- White-striped vacuum hose connected to the choke opener: Disconnect and plug
- Fast idle cam: Set to the second step.
- Engine: Idling

	Fast idle rpm
COLT	2,800
RAM50 -2.0 l engine	2,500
RAM50 -2.6 l engine RAM RAIDER	2,350

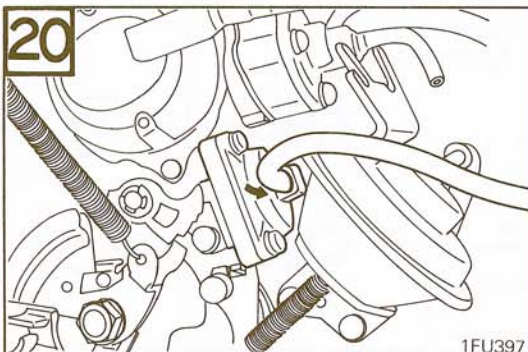


20



Adjust the fast idle rpm.

20



1FU397

Check to be sure that the fast idle is cancelled when the white-striped vacuum hose is connected to the choke opener (returned to the original condition).

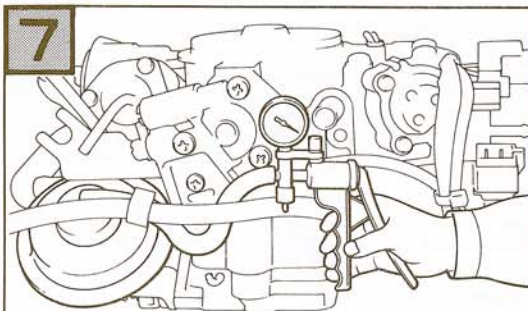


21



Replace the choke opener.

7



01R0576

Check to be sure that the secondary throttle valve opens when negative pressure is applied to the depression chamber.

- Air cleaner: Removal
- Depression chamber: Connect to the hand held vacuum pump.
- Primary throttle valve: Fully open

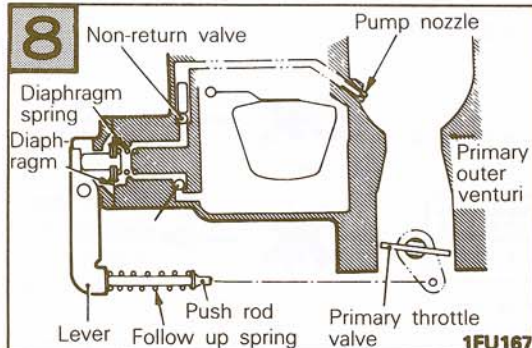


8



Repair the secondary mechanism.

8



1FU167

Check whether or not fuel is discharged from the accelerator pump nozzle when the throttle valve is changed from fully closed to fully open.

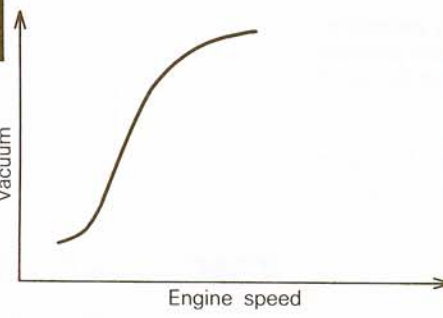
- Air cleaner cover: Removal
- Choke valve: Fully open

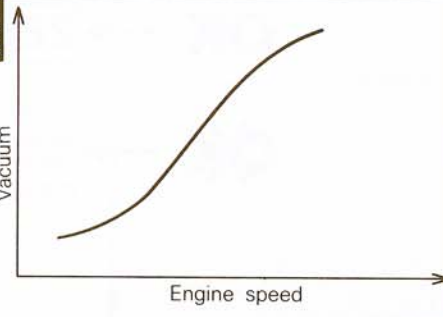


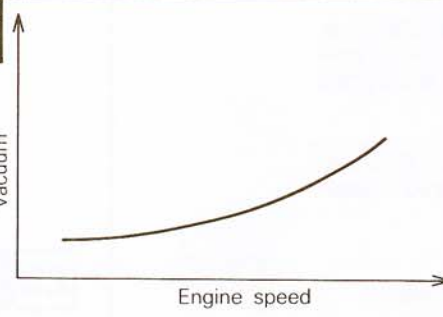
9

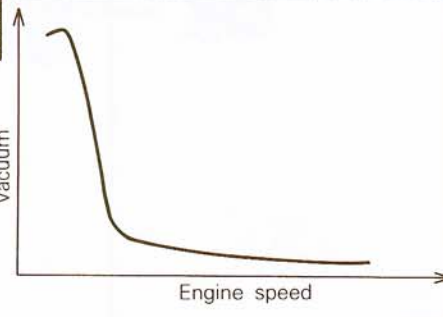


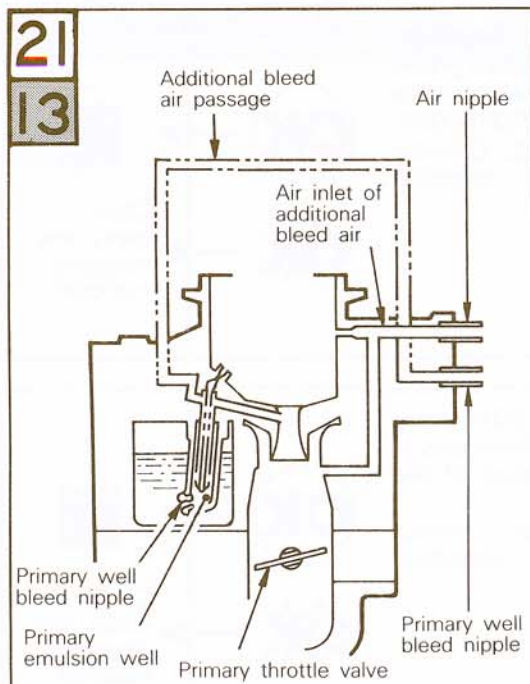
Repair the accelerator pump.

<div data-bbox="120 153 194 231">9</div>  <p>Vacuum</p> <p>Engine speed</p> <p>1FU445</p>	<p>Check whether or not the distributor spark advance control negative pressure (vacuum) increases in accordance with the increase of the engine rpm.</p> <ul style="list-style-type: none"> • Hand held vacuum pump: Connect to the carburetor D negative-pressure nipple. • Engine rpm: Increase 	<div data-bbox="1153 231 1266 336">OK</div> <div data-bbox="1153 357 1266 441">OK</div> <div data-bbox="1396 252 1461 315">10</div> <p>Clean away any clogging material.</p>
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<div data-bbox="120 533 194 609">10</div>  <p>Vacuum</p> <p>Engine speed</p> <p>1FU446</p>	<p>Check whether or not EGR valve control negative pressure increases in accordance with the increase of the engine rpm.</p> <ul style="list-style-type: none"> • Hand held vacuum pump: Connect to the carburetor E negative-pressure nipple. • Engine rpm: Increase 	<div data-bbox="1153 609 1266 714">OK</div> <div data-bbox="1153 735 1266 819">OK</div> <div data-bbox="1396 630 1461 693">11</div> <p>Clean away any clogging material.</p>
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<div data-bbox="120 911 194 987">11</div>  <p>Vacuum</p> <p>Engine speed</p> <p>1FU447</p>	<p>Check whether or not vacuum regulator valve control negative pressure gradually increases in accordance with the increase of the engine rpm.</p> <ul style="list-style-type: none"> • Hand held vacuum pump: Connect to the carburetor A negative-pressure nipple. • Engine rpm: Increase 	<div data-bbox="1153 987 1266 1092">OK</div> <div data-bbox="1153 1113 1266 1197">OK</div> <div data-bbox="1396 1008 1461 1071">12</div> <p>Clean away any clogging material.</p>
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<div data-bbox="120 1287 194 1362">12</div>  <p>Vacuum</p> <p>Engine speed</p> <p>1FU448</p>	<p>Check whether or not the vacuum switch control negative pressure decreases suddenly relative to the increase of the engine rpm.</p> <ul style="list-style-type: none"> • Hand held vacuum pump: Connect to the carburetor F negative-pressure nipple. • Engine rpm: Increase 	<div data-bbox="1153 1659 1266 1764">OK</div> <div data-bbox="1153 1785 1266 1890">OK</div> <div data-bbox="1153 1911 1266 1995">OK</div> <div data-bbox="1396 1680 1461 1743">16</div> <div data-bbox="1396 1806 1461 1869">13</div> <p>Clean away any clogging material.</p>
<p>RAM50, RAM RAIDER Federal except high-altitude vehicles</p> <p>COLT, RAM50, RAM RAIDER Federal/California and high-altitude vehicles for Federal</p>		



1FU376

Check, by applying negative pressure, whether or not the carburetor primary well bleed air passage is clogged with foreign material.

- Air cleaner: Removal
- Hand held vacuum pump: Connect to the primary well bleed nipple.

COLT—
California
RAM50, RAM RAIDER—
Federal/California

COLT—
Federal
RAM50, RAM RAIDER—
High-altitude vehicles for Federal

OK

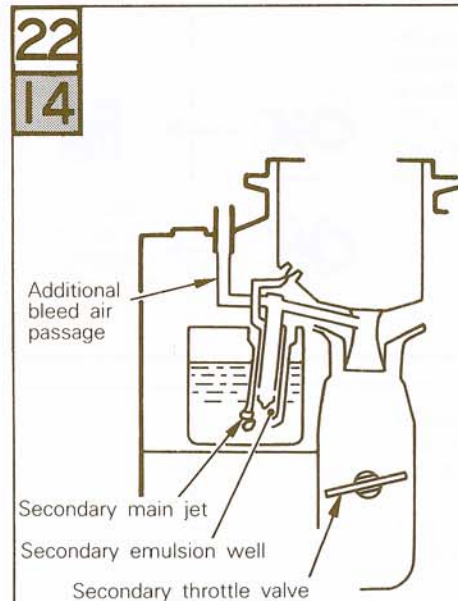
**16**

OK

22**14**

OK

Clean
away any
clogging
material.



Check, by applying negative pressure, whether or not the carburetor secondary well bleed air passage is clogged with foreign material.

- Air cleaner: Removal
- Hand held vacuum pump: Connect to the secondary well bleed nipple.

COLT—Federal
RAM50, RAM RAIDER—
High-altitude vehicles for Federal

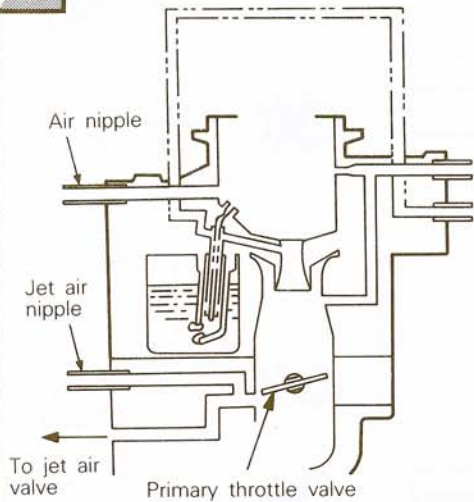
OK

23**5**

OK

Clean
away any
clogging
material.

23
15



1FU378

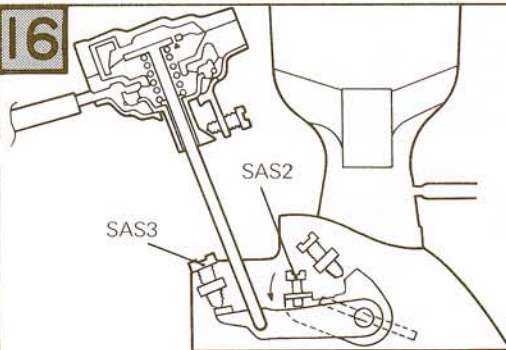
Check, by applying negative pressure, whether or not the carburetor jet air nipple is clogged with foreign material.

- Air cleaner: Removal
- Hand held vacuum pump: Connect to the jet air nipple.



Clean away any clogging material.

16



1EM175

Check the dash pot contact rpm.

- Engine: Idling
- Throttle valve: Secure at the position where the SAS2 contacts the free lever.

	Dash pot contact rpm
COLT	1,800
RAM50, RAM RAIDER	2,000

COLT

RAM50, RAM RAIDER

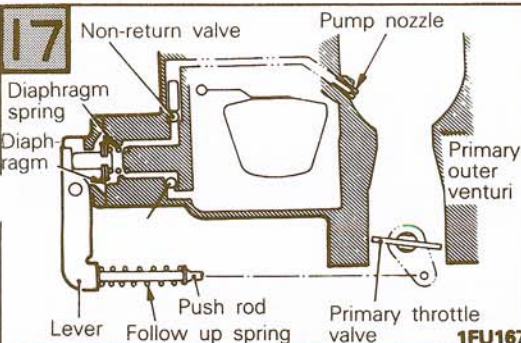


17



Adjust the contact rpm.

17



1FU167

Check to be sure that fuel is discharged from the pump nozzle when the vacuum hose (black) is disconnected from the auxiliary accelerator pump body.

- Air cleaner: Removal
- Engine: Idling
- Coolant temperature: 30°C (86°F) or lower
- Choke valve: Fully open

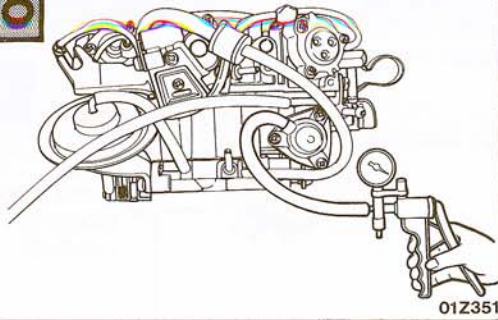


19



18

18



01Z351

Check the discharge of fuel from the nozzle of the auxiliary accelerator pump.

- Air cleaner: Removal
- Hand held vacuum pump: Connect to the auxiliary accelerator pump.

Negative pressure	Fuel
53 kPa (7.7 psi) → 0 kPa (0 psi)	Discharge

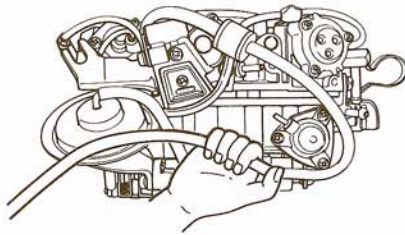
OK →

19

✗ →

Repair the auxiliary accelerator pump.

19



01Z350

Check the negative pressure at the end of the vacuum hose (black) connected to the auxiliary accelerator pump.

- Air cleaner: Removal
- Engine: Idling

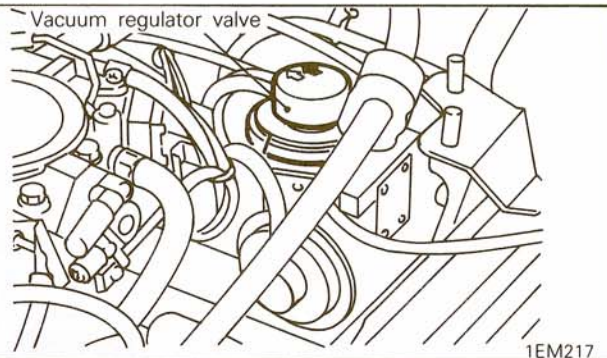
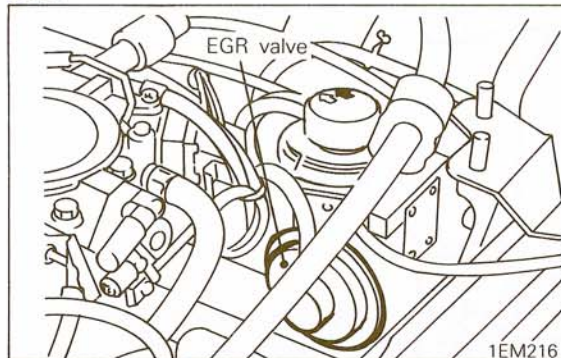
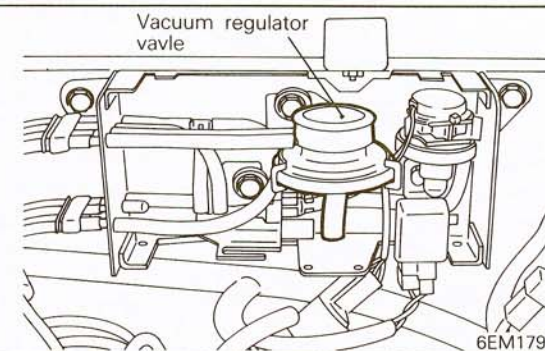
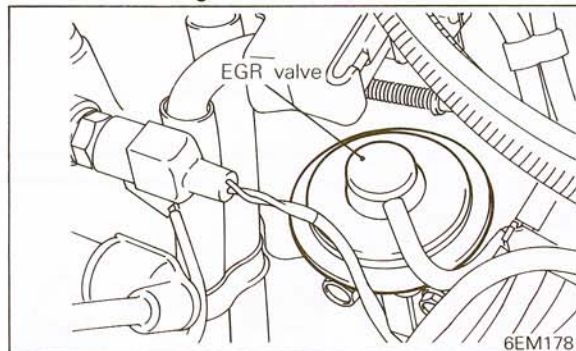
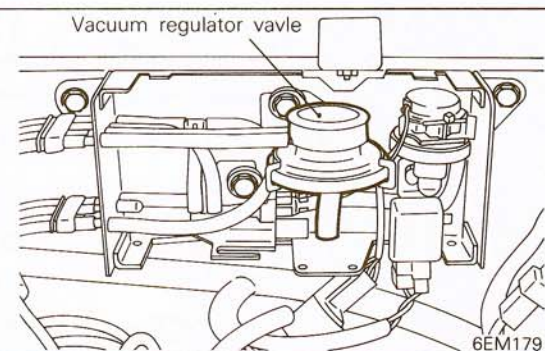
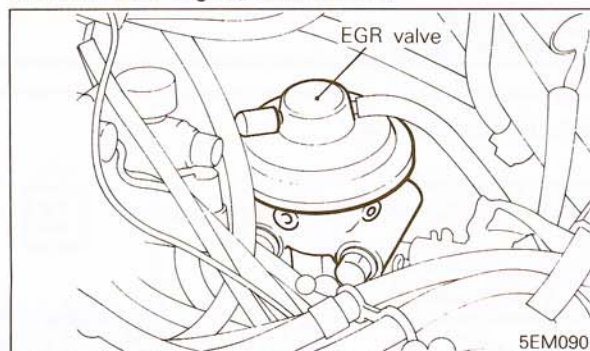
Coolant temperature	Negative pressure
30°C (86°F) or lower	Can be felt by a finger.
50°C (122°F) or higher	Cannot be felt by a finger.

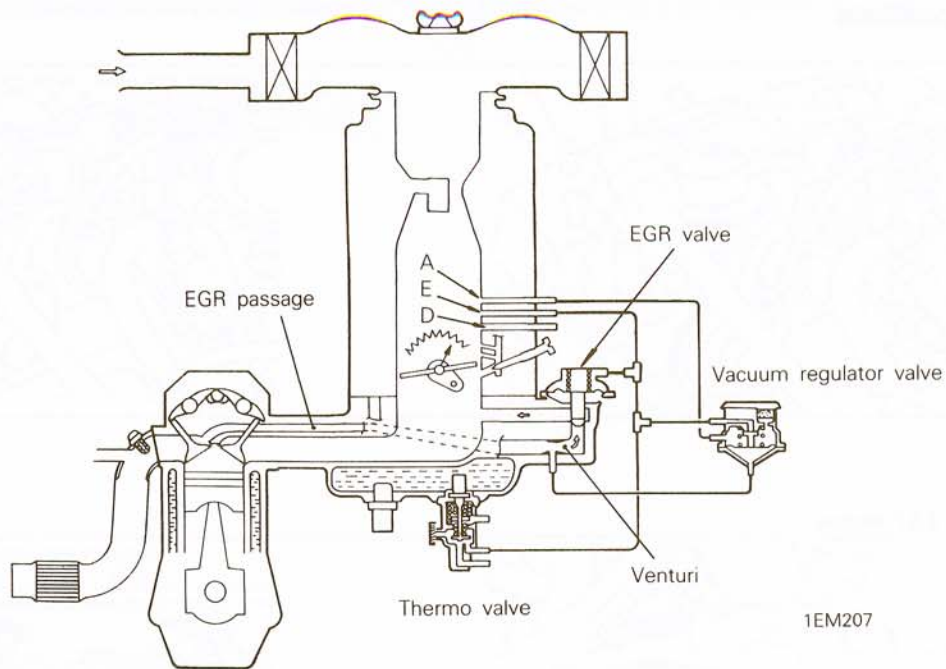
OK →



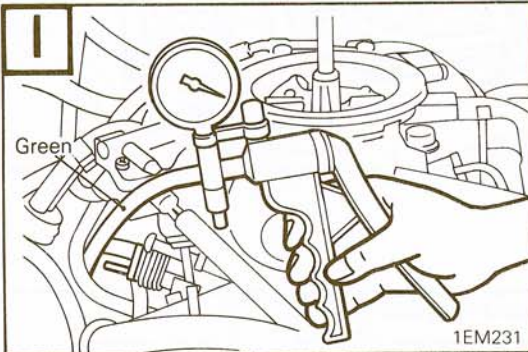
✗ →

Replace the thermo valve for the auxiliary accelerator pump.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM TEST PROCEDURES**Installing positions****COLT****RAM50 – 2.0 l engine****RAM50 – 2.6 l engine, RAM RAIDER**



1EM207



1EM231

Check for air-tightness when negative pressure is applied to the EGR negative pressure (vacuum) hose.

- Hand held vacuum pump: Connect to the carburetor EGR negative pressure (vacuum) hose.

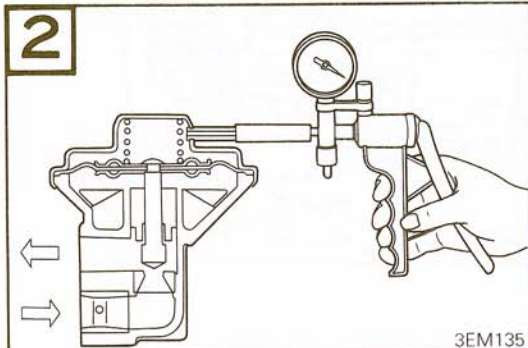
Coolant temp.	Engine	Negative pressure kPa (psi)
45°C (113°) or lower	3,500 rpm	Negative pressure leaks.
80°C (176°F) or higher	Idle	Leaks until approximately 10.6 kPa (1.55 psi).

OK



OK

2



3EM135

Check the passage of air through the EGR valve.

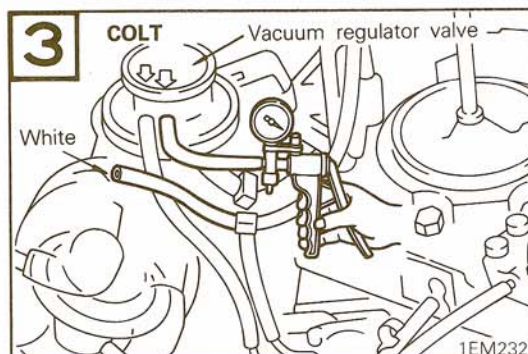
- EGR valve: Remove and clean
- Hand held vacuum pump: Connect to the EGR valve.

Negative pressure kPa (psi)	Air passes
8.0 (1.2) or less	No
22.7 (3.3) or more	Yes

OK

3

OK

Replace the
EGR valve.

1EM232

Check for air-tightness when negative pressure is applied to the vacuum regulator valve.

- Hand held vacuum pump: Connect to the vacuum regulator valve nipple to which the white-striped vacuum hose was connected.

Engine	Negative pressure
Stop	Negative pressure leaks.
3,500 rpm	Negative pressure is maintained.

OK

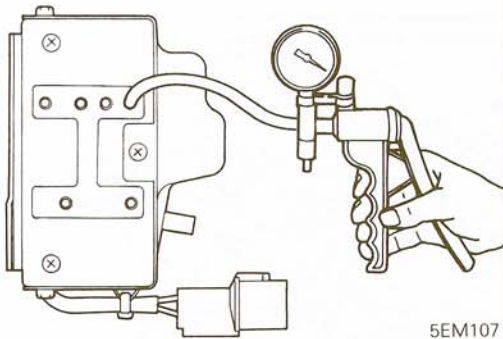
4

OK

Replace the
vacuum
regulator
valve,
vacuum
regulator
valve hoses.

3

RAM50, RAM RAIDER



Check for air-tightness when negative pressure is applied to the vacuum regulator valve.

- Hand held vacuum pump: Connect to the vacuum regulator valve nipple to which the white-striped vacuum hose was connected.

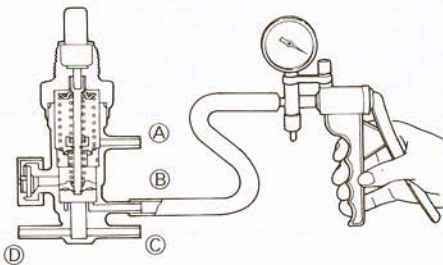
Engine	Negative pressure
Stop	Negative pressure leaks.
3,500 rpm	Negative pressure is maintained.

OK →

4

✗

Replace the vacuum regulator valve, vacuum regulator valve hoses.

4

Check for air-tightness when negative pressure is applied to the thermo valve.

- Hand held vacuum pump: Connect to nipples (B), (C) and (D) in that order.

Coolant temp.	Negative pressure
45°C (113°F) or less	Negative pressure leaks.
80°C (176°F) or more	Negative pressure is maintained.

OK →

5

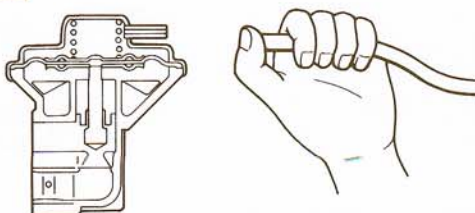
✗

Replace the thermo valve.

5

Check the carburetor EGR negative pressure. (Refer to P.105.)

→

6**6**

Check the negative pressure at the end of the vacuum hose connected to the EGR valve.

- Vacuum hose end: Cover with a finger
- Engine: 3,500 rpm

E negative pressure

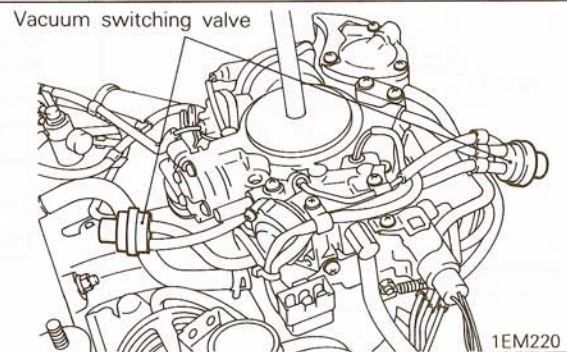
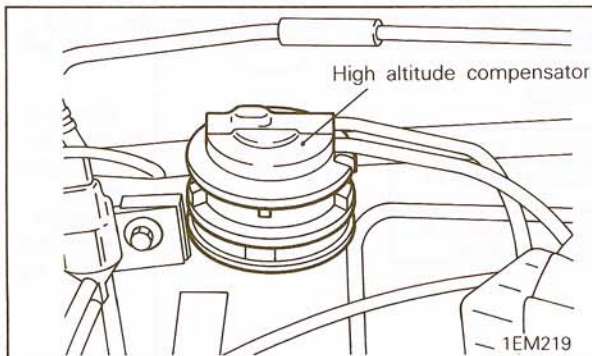
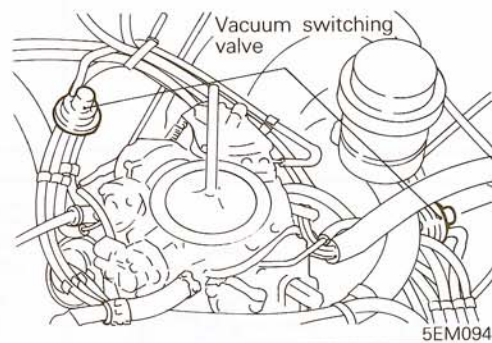
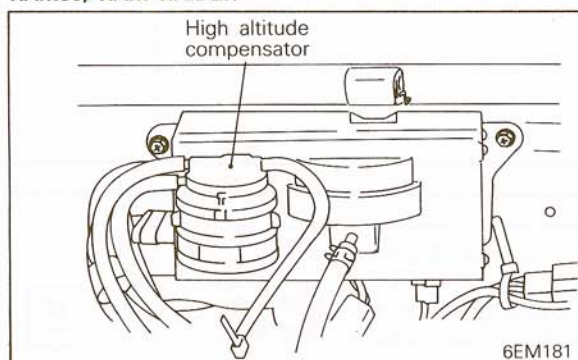
Can be felt by a finger.

OK →

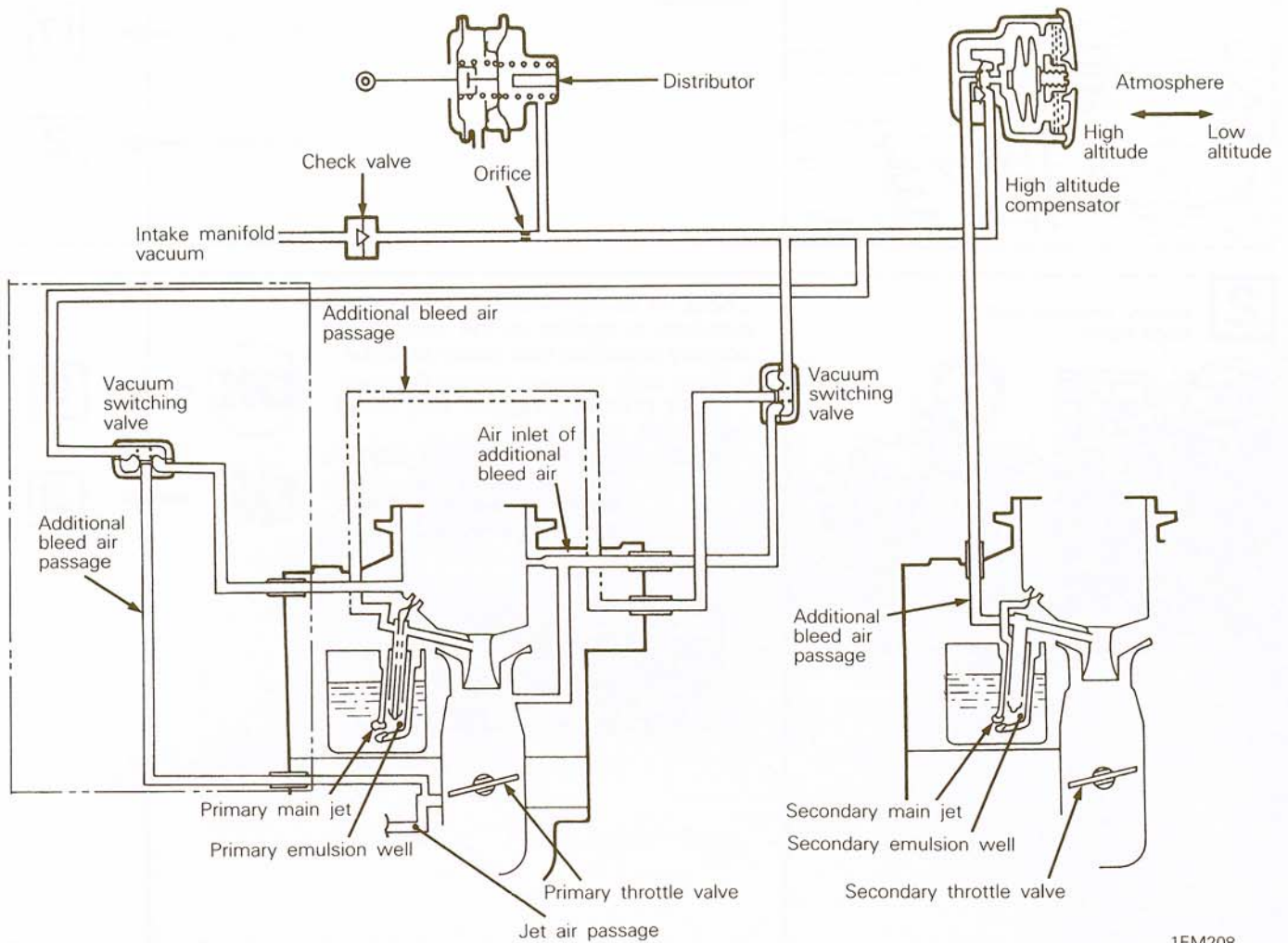


✗

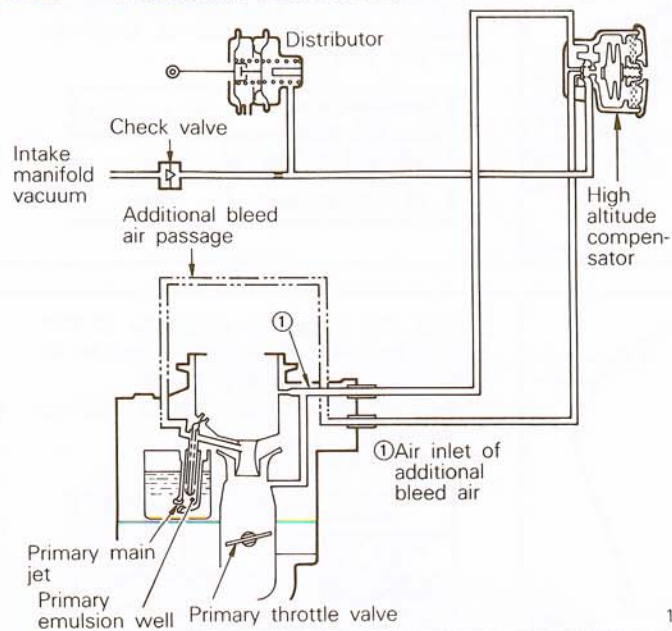
Repair the vacuum hose.

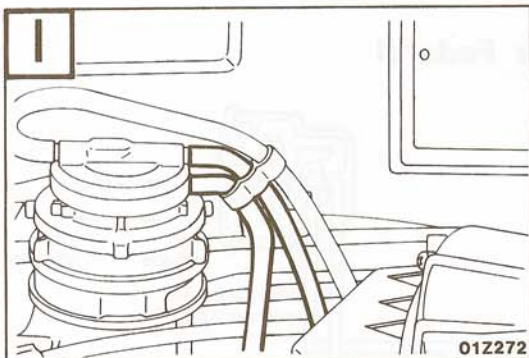
HIGH ALTITUDE COMPENSATION SYSTEM TEST PROCEDURES**COLT****RAM50, RAM RAIDER**

**COLT – Federal
RAM50, RAM RAIDER – High altitude vehicles for Federal**



**COLT – California
RAM50, RAM RAIDER – Federal/California**

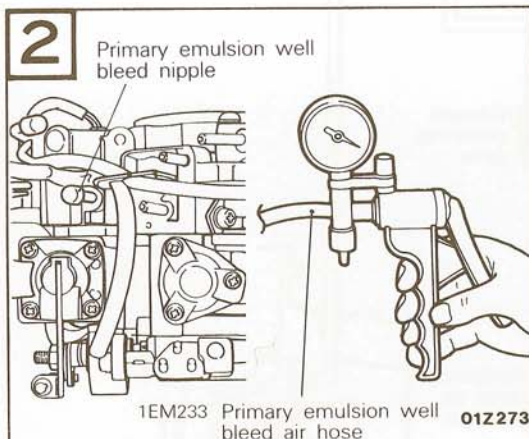




Check the number of vacuum hoses connected to the high-altitude compensator.

3 hoses → **17**

2 hoses → **2**



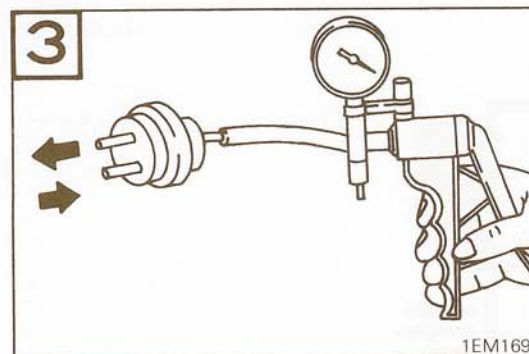
Check for air-tightness when negative pressure is applied to the carburetor primary emulsion well bleed air hose.

- Hand held vacuum pump: Connect to the primary emulsion well bleed air hose.
- Nipple: Plugged [Altitudes below 1,200 m (3,900 ft.)]
Open [Altitudes above 1,200 m (3,900 ft.)]
- Engine: Idling

OK → **9**

OK → **3**

Altitude	Negative pressure
Below 1,200 m (3,900 ft.)	Negative pressure is maintained.
Above 1,200 m (3,900 ft.)	Negative pressure leaks.



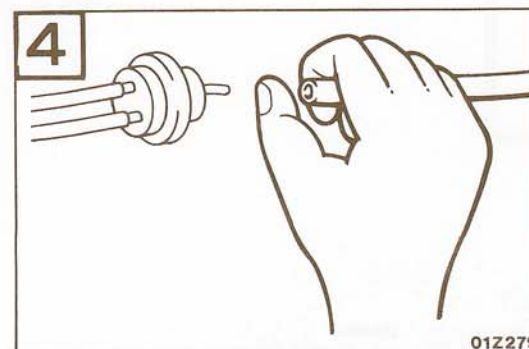
Check the vacuum switching valve (VSV).

- Vacuum switching valve: Removal
- Hand held vacuum pump: Connect to the black nipple.

Negative pressure kPa (psi)	Air passage
20 (3.0) or less	No
33 (4.8) or more	Yes

OK → **4**

OK → Replace the VSV.



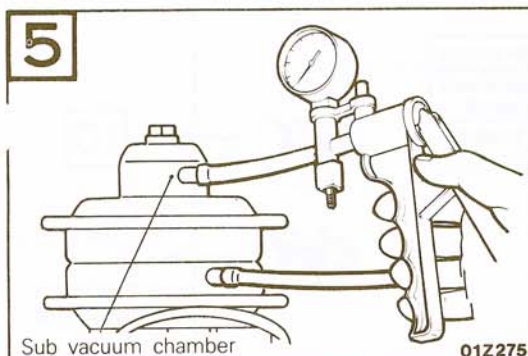
Check the negative pressure at the end of the vacuum hose connected to the vacuum switching valve.

- Vacuum hose end: Cover with a finger.
- Engine: Idling

OK → **9**

OK → **5**

Altitude	Intake manifold negative pressure
Below 1,200 m (3,900 ft.)	Can not be felt by a finger.
Above 1,200 m (3,900 ft.)	Can be felt by a finger.



5

Check for air-tightness when negative pressure is applied to the distributor sub vacuum chamber.

- Hand held vacuum pump: Connect to the sub vacuum chamber.

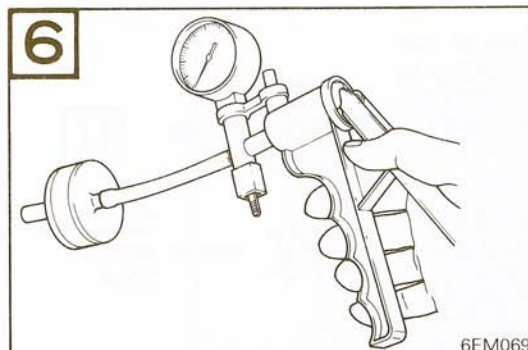
Negative pressure

Negative pressure is maintained.



6

Replace the distributor vacuum spark-advance device.



6

Check for air-tightness when negative pressure is applied to the check valve.

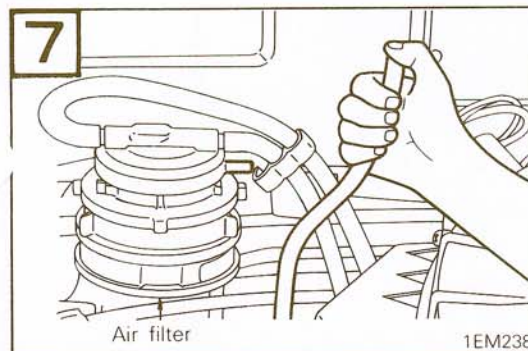
- Check valve: Removal

Hand held vacuum pump connection nipple color	Negative pressure
Dark blue	Negative pressure leaks.
White	Negative pressure is maintained.



7

Replace the check valve.



7

Check the negative pressure at the end of the vacuum hose connected to the air filter side of the high-altitude compensator.

- Vacuum hose end: Cover with a finger
- Engine: Idling

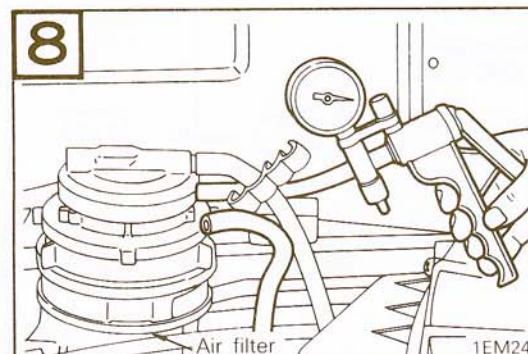
Negative pressure

Can be felt by a finger.



8

Repair the vacuum hose.



8

Check for air-tightness when negative pressure is applied to the high-altitude compensator.

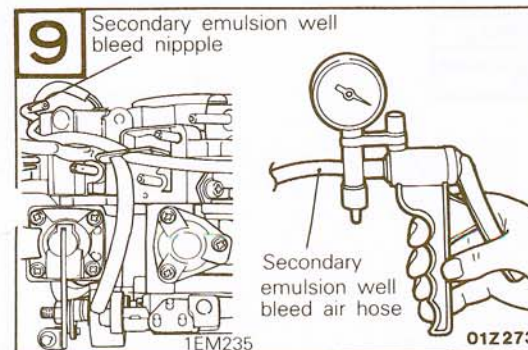
- Hand held vacuum pump: Connect to the nipple of the air filter side.

Altitude	Negative pressure
Below 1,200 m (3,900 ft.)	Negative pressure is leaks.
Above 1,200 m (3,900 ft.)	Negative pressure is maintained.



9

Replace the high-altitude compensator.



9

Check for air-tightness when negative pressure is applied to the carburetor secondary emulsion well bleed air hose.

- Hand held vacuum pump: Connect to the secondary emulsion well bleed air hose.
- Nipple: Plugged [Altitudes below 1,200 m (3,900 ft.)]
Open [Altitudes above 1,200 m (3,900 ft.)]
- Engine: Idling

9

Altitude	Negative pressure
Below 1,200 m (3,900 ft.)	Negative pressure is maintained.
Above 1,200 m (3,900 ft.)	Negative pressure leaks.

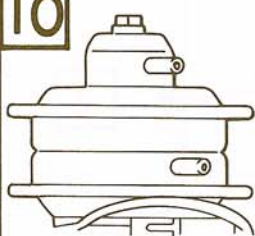
OK →

10

✗ →

Replace the high-altitude compensator.

10



01Z277

Check the negative pressure at the end of the vacuum hose connected to the distributor sub vacuum chamber.

- Vacuum hose end: Cover with a finger.
- Engine: Idling

Altitude	Intake manifold negative pressure
Below 1,200 m (3,900 ft.)	Can not be felt by a finger.
Above 1,200 m (3,900 ft.)	Can be felt by a finger.

OK →

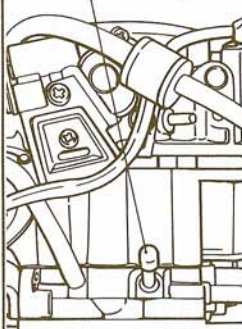
11

✗ →

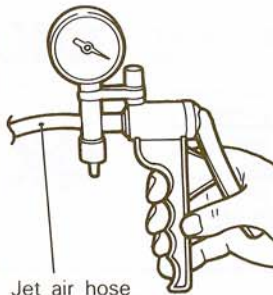
Repair the vacuum hose.

11

Jet air nipple



1EM233



Jet air hose

01Z273

Check for air-tightness when negative pressure is applied to the carburetor jet air hose.

- Air hose: Connect to the hand held vacuum pump.
- Nipple: Plugged [Altitudes below 1,200 m (3,900 ft.)]
Open [Altitudes above 1,200 m (3,900 ft.)]
- Engine: Idling

Altitude	Negative pressure
Below 1,200 m (3,900 ft.)	Negative pressure is maintained.
Above 1,200 m (3,900 ft.)	Negative pressure leaks.

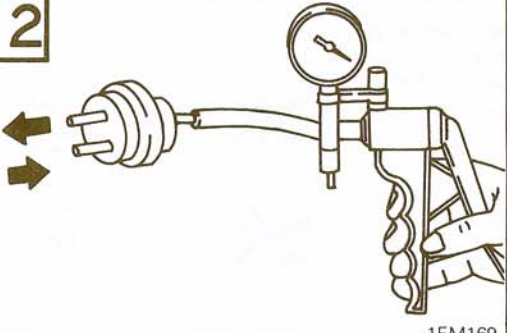
OK →

14

✗ →

12

12



1EM169

Check the vacuum switching valve (VSV).

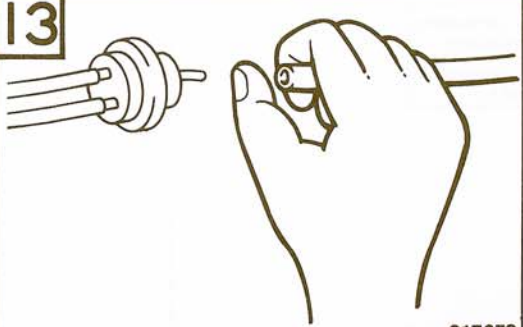
- Vacuum switching valve: Removal
- Hand held vacuum pump: Connect to the black nipple.

Negative pressure kPa (psi)	Air passage
20 (3.0) or less	No
33 (4.8) or more	Yes

OK → **13**

✗ → Replace the VSV.

13



01Z279

Check the negative pressure at the end of the vacuum hose connected to the vacuum switching valve.


- Vacuum hose end: Cover with a finger.
- Engine: Idling

Altitude	Intake manifold negative pressure
Below 1,200 m (3,900 ft.)	Can not be felt by a finger.
Above 1,200 m (3,900 ft.)	Can be felt by a finger.

OK → **14**

✗ → Repair the vacuum hose.

14




01R0360

Check for clogging of the carburetor primary well bleed air nipple. (Refer to P. 105.)

→ **15**

15




01R0360

Check for clogging of the carburetor secondary well bleed air nipple. (Refer to P. 105.)


→ **16**

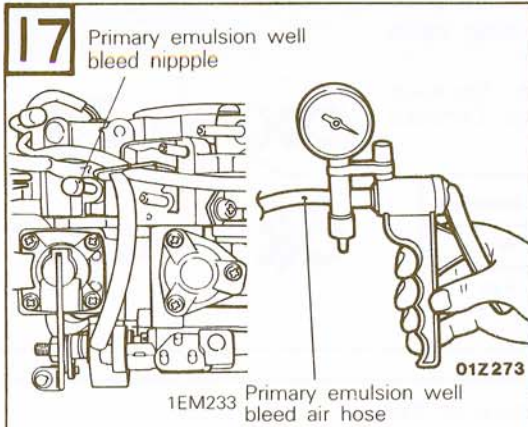
16



01R0360

Check for clogging of the carburetor jet air nipple. (Refer to P. 105.)

→ 



Check for air-tightness when negative pressure is applied to the carburetor primary emulsion well bleed air hose.

- Hand held vacuum pump: Connect to the primary emulsion well bleed air hose.
- Nipple: Plugged [Altitudes below 1,200 m (3,900 ft.)]
Open [Altitudes above 1,200 m (3,900 ft.)]
- Engine: Idling

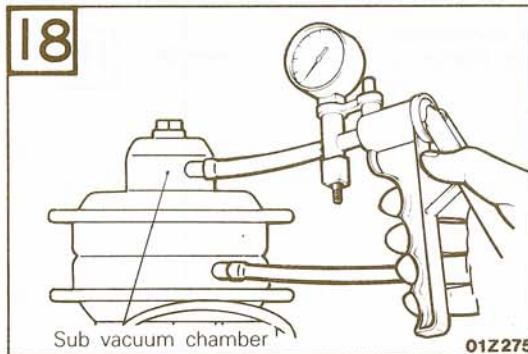
Altitude	Negative pressure
Below 1,200 m (3,900 ft.)	Negative pressure is maintained.
Above 1,200 m (3,900 ft.)	Negative pressure leaks.



→ **22**



→ **18**



Check for air-tightness when negative pressure is applied to the distributor sub vacuum chamber.

- Hand held vacuum pump: Connect to the sub vacuum chamber.

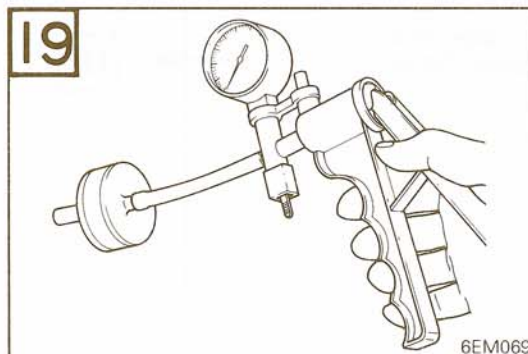
Negative pressure
Negative pressure is maintained.



→ **19**



→ Replace the distributor vacuum spark-advance device.



Check for air-tightness when negative pressure is applied to the check valve.

- Check valve: Removal

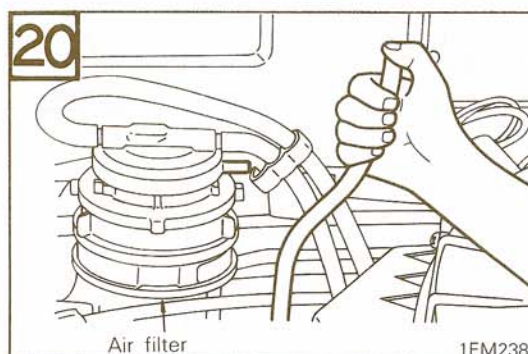
Hand held vacuum pump connection nipple color	Negative pressure
Dark blue	Negative pressure leaks.
White	Negative pressure is maintained.



→ **20**



→ Replace the check valve.



Check the negative pressure at the end of the vacuum hose connected to the air filter side of the high-altitude compensator.

- Vacuum hose end: Cover with a finger
- Engine: Idling

Negative pressure
Can be felt by a finger.

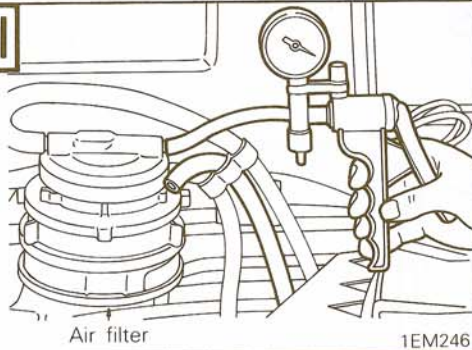


→ **21**



→ Repair the vacuum hose.

21



Check for air-tightness when negative pressure is applied to the high-altitude compensator.

- Engine: Idling
- Hand held vacuum pump: Connect to the nipple farther from the air filter.

Altitude	Negative pressure
Below 1,200 m (3,900 ft.)	Negative pressure is maintained.
Above 1,200 m (3,900 ft.)	Negative pressure leaks.



22



Replace the high-altitude compensator.

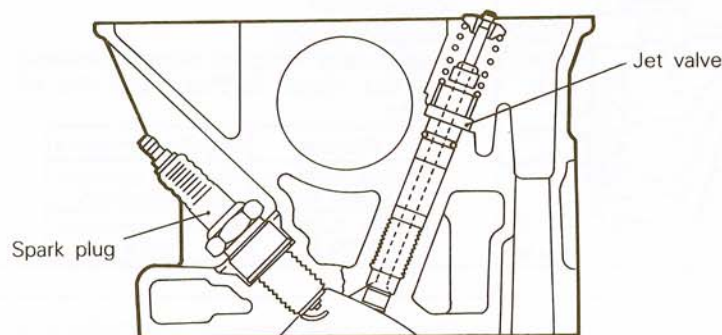
22



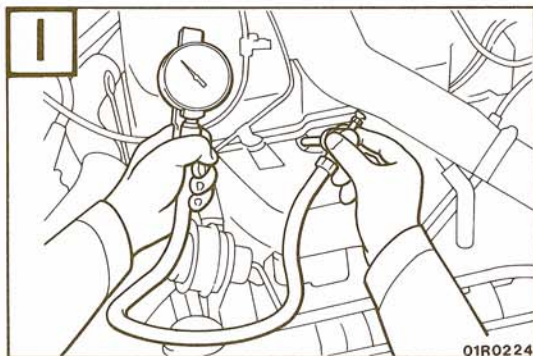
Check for clogging of the carburetor primary well bleed air nipple. (Refer to P. 105.)



ENGINE MECHANICAL TEST PROCEDURES



1EN309



01R0224

Measure the compression pressure.

• Engine: Warmd up

	Engine rpm	Pressure kPa (psi)	Pressure difference of each cylinder kPa (psi)
COLT	300	Limit 1,200 (174)	Within 98 (14.2)
RAM50, RAM RAIDER		Limit 1,050 (152)	

OK

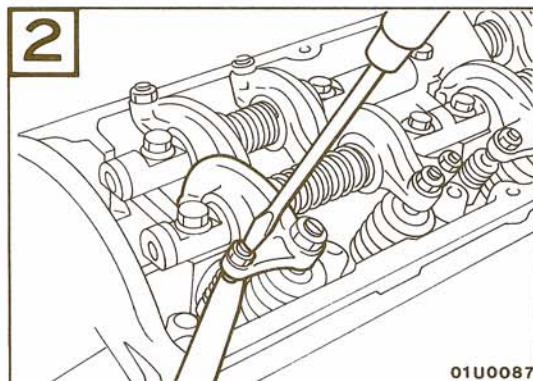


STOP

OK



2



01U0087

Check the valve clearances.

• Engine: Warmd up

	Clearance mm (in.)		
	Intake	Jet	Exhaust
COLT	0.15 (.006)	0.25 (.01)	0.25 (.01)
RAM50, RAM RAIDER	-	0.25 (.01)	-

COLT

OK



4

RAM50, RAM RAIDER

OK

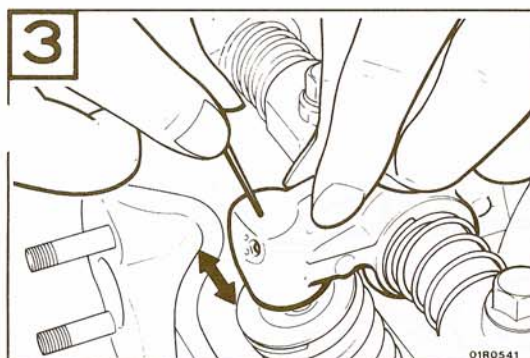


3

OK



Re-adjust.

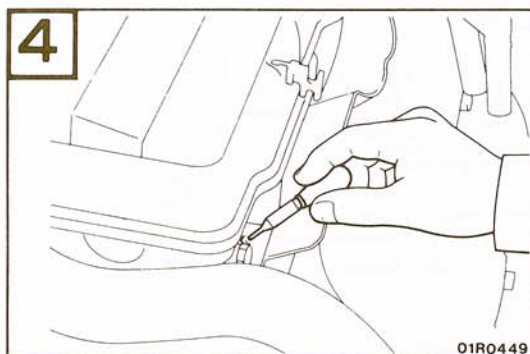


- ① Insert the air-bleed wire and drain the oil.
- ② There should be play when the rocker arm is moved in the direction of the arrow.



4

Inspect or replace the lash adjuster.

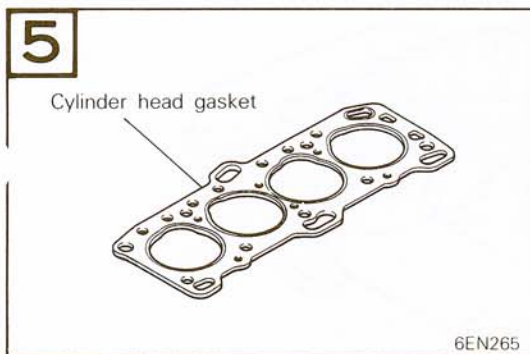


Add a small amount of engine oil through the spark plug hole, and then measure the compression pressure.

Pressure	Higher than ①
	Same as ①

6

5

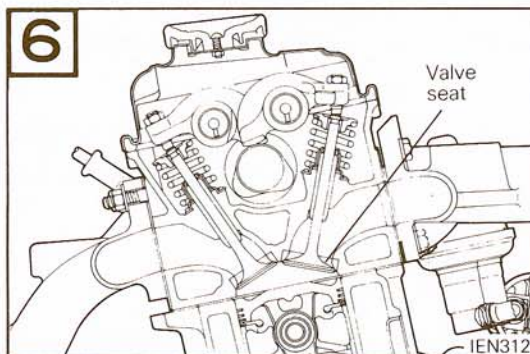


Check the blow-by of the cylinder head gasket.



6

Replace the gasket.

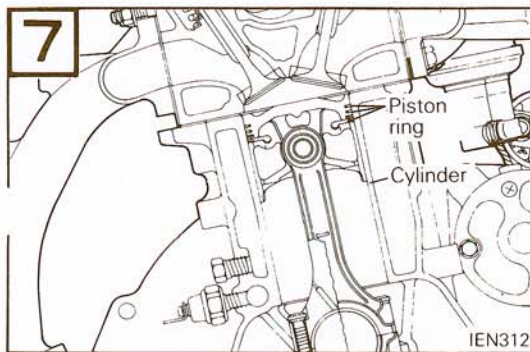


Check for a valve face or seat malfunction or for heat damage.



7

Repair or replace.



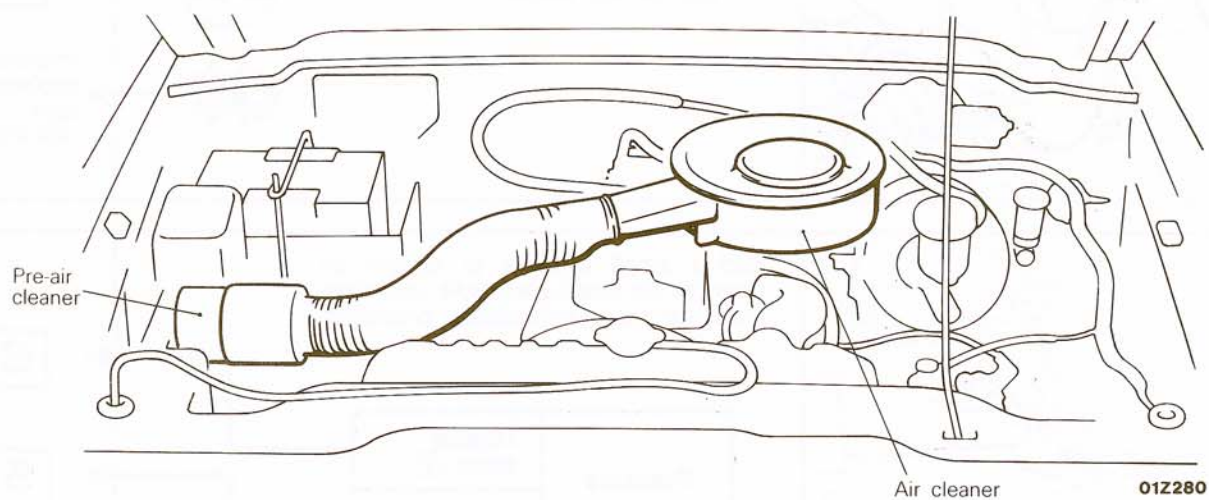
Check the piston rings and cylinders.



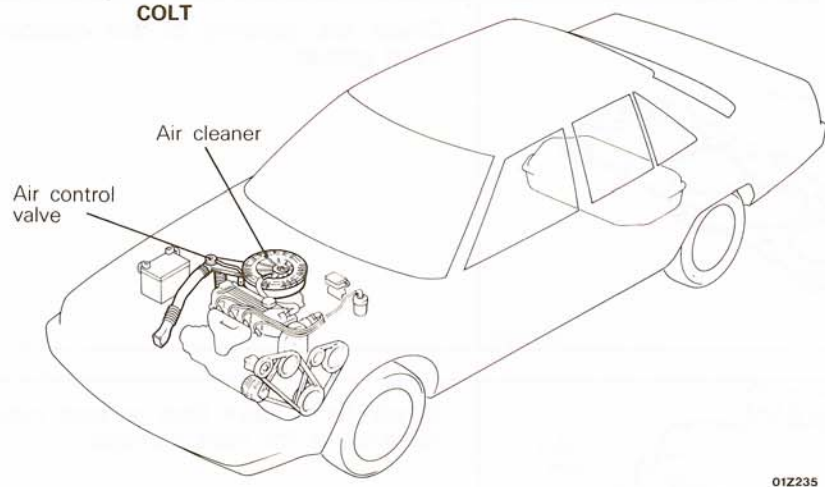
Repair or replace.

INTAKE SYSTEM TEST PROCEDURES

RAM RAIDER

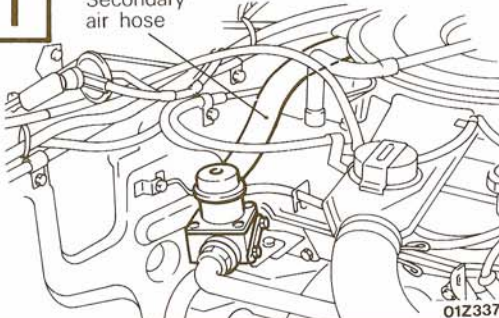


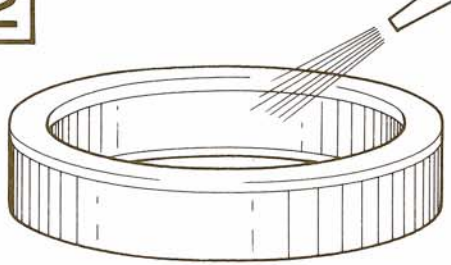
COLT

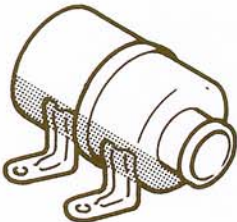


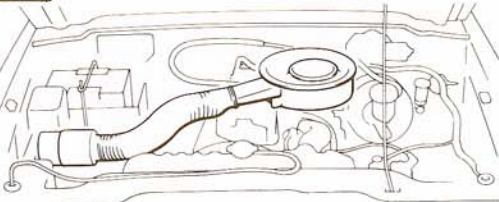
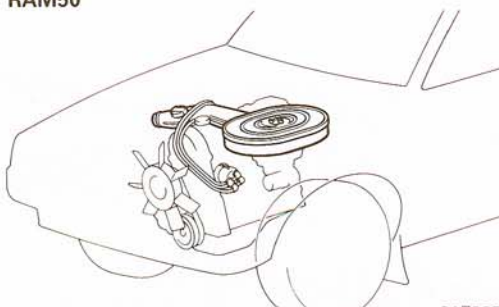
RAM50



<p>1 Secondary air hose</p>  <p>01Z337</p>	<p>Check for the connection or damage of the secondary air hose.</p>	<p>OK → 2</p> <p>✗ → Repair or replace.</p>
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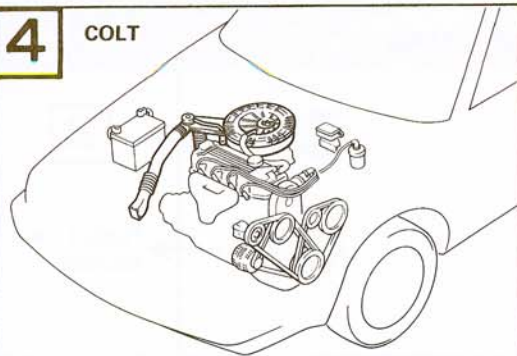
<p>2</p>  <p>11N006</p>	<p>Check for clogging of the air cleaner element.</p>	<p>OK → 3</p> <p>✗ → Clean or replace.</p>
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<p>3 RAM RAIDER, RAM50 only</p>  <p>01Z290</p>	<p>Check the pre-air cleaner. (visually)</p>	<p>OK → 4</p> <p>✗ → Clean.</p>
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<p>4 RAM RAIDER</p>  <p>01Z280</p> <p>RAM50</p>  <p>01Z227</p>	<p>Check the air hose connection and clamp condition.</p>	<p>OK → STOP</p> <p>✗ → Repair.</p>
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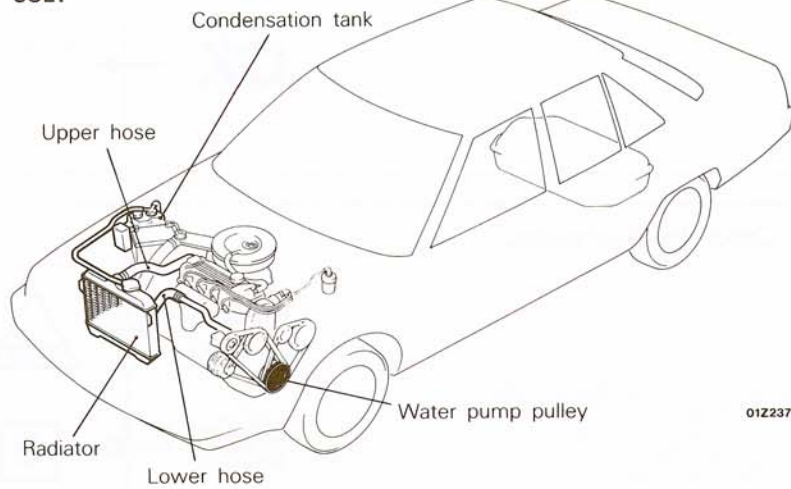
4

COLT

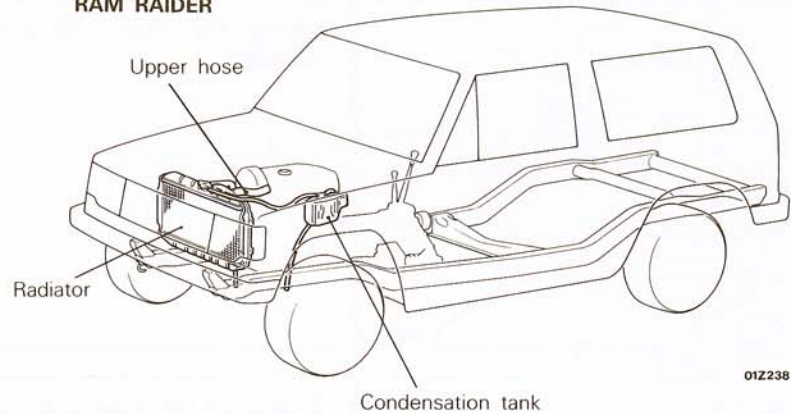


COOLING SYSTEM TEST PROCEDURES

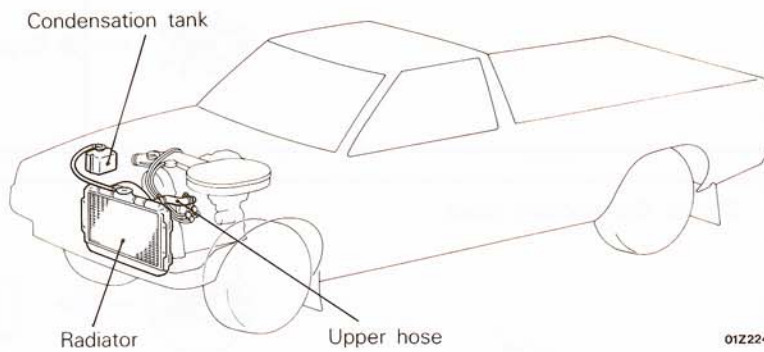
COLT



RAM RAIDER

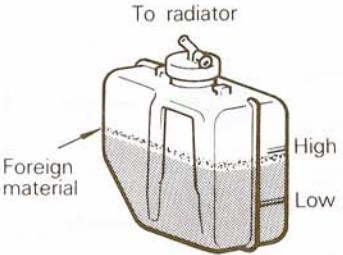


RAM50



<div data-bbox="99 115 167 184" data-label="Text">1</div> <div data-bbox="289 201 461 373" data-label="Image"> </div> <div data-bbox="532 436 613 457" data-label="Text">01K653</div>	<p>Check for excessive cooling.</p> <ul style="list-style-type: none"> The fuel gauge circuit must be normal. 	<div data-bbox="1133 191 1235 289" data-label="Text">OK → <div data-bbox="1365 212 1430 275" data-label="Text">2</div></div> <div data-bbox="1133 317 1235 386" data-label="Text">✗ → Replace the thermostat.</div>
<div data-bbox="99 495 167 564" data-label="Text">2</div> <div data-bbox="289 590 461 762" data-label="Image"> </div> <div data-bbox="526 816 607 837" data-label="Text">01K654</div>	<p>Check for overheating.</p>	<div data-bbox="1133 569 1235 667" data-label="Text">OK → <div data-bbox="1344 575 1446 659" data-label="Image"> </div></div> <div data-bbox="1133 695 1235 764" data-label="Text">✗ → <div data-bbox="1365 716 1430 779" data-label="Text">3</div></div>
<div data-bbox="99 877 167 947" data-label="Text">3</div> <div data-bbox="233 915 428 940" data-label="Text">Belt tension gauge</div> <div data-bbox="110 953 607 1205" data-label="Image"> </div> <div data-bbox="532 1199 613 1220" data-label="Text">01R0423</div>	<p>Check for drive belt looseness or damage.</p>	<div data-bbox="1133 951 1235 1050" data-label="Text">OK → <div data-bbox="1365 972 1430 1035" data-label="Text">4</div></div> <div data-bbox="1133 1077 1235 1146" data-label="Text">✗ → Adjust the tension or replace the belt.</div>
<div data-bbox="99 1257 167 1327" data-label="Text">4</div> <div data-bbox="185 1472 315 1518" data-label="Text">Radiator cap tester</div> <div data-bbox="126 1257 607 1593" data-label="Image"> </div> <div data-bbox="526 1577 607 1598" data-label="Text">04R0016</div>	<p>Check to be sure that there is no leakage from the cooling system.</p>	<div data-bbox="1133 1333 1235 1432" data-label="Text">OK → <div data-bbox="1365 1354 1430 1417" data-label="Text">5</div></div> <div data-bbox="1133 1459 1235 1528" data-label="Text">✗ → Repair.</div>
<div data-bbox="99 1638 167 1707" data-label="Text">5</div> <div data-bbox="256 1661 370 1686" data-label="Text">To radiator</div> <div data-bbox="266 1692 574 1923" data-label="Image"> </div> <div data-bbox="542 1948 613 1969" data-label="Text">01K675</div>	<p>Check the coolant level.</p>	<div data-bbox="1133 1711 1235 1810" data-label="Text">OK → <div data-bbox="1365 1732 1430 1795" data-label="Text">6</div></div> <div data-bbox="1133 1837 1235 1906" data-label="Text">✗ → Add coolant.</div>

6



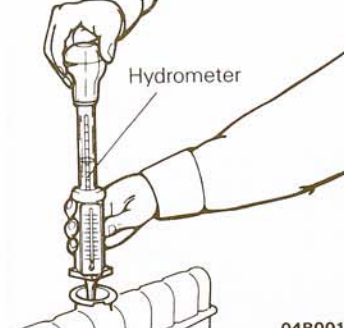
01K676

Check for foreign material floating in the coolant.

OK → **7**

✗ → Replace the coolant.

7



04R0017

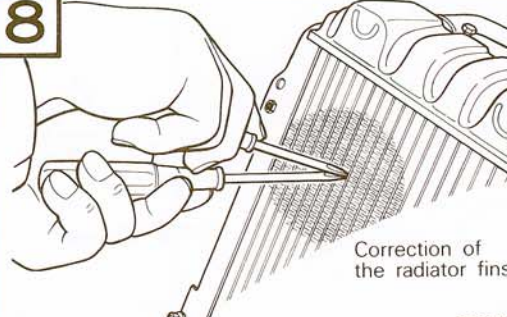
Measure the specific gravity of the coolant.

Coolant temperature °C (°F)	Specific gravity
20 (68)	1.058

OK → **8**

✗ → Replace the coolant.

8




04E513

Check for clogging of the radiator fins.

OK → **9**

✗ → Repair.

9



01G0018

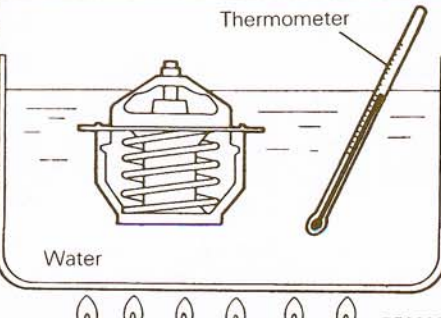
Check the air-tightness of the radiator cap.

	Pressure kPa (psi)
Standard	75~105 (11~15)
Limit	5 (0.7) or less

OK → **10**

✗ → Replace the cap.

10



5C0009

Check whether the thermostat operates normally.

- Thermostat: Removal

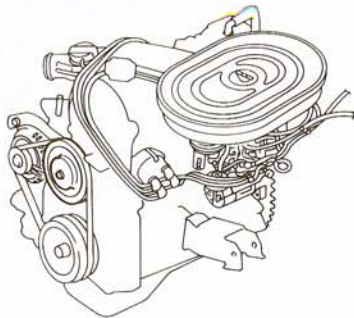
Valve-opening temperature °C (°F)
88±1.5 (190±2.7)
Full valve-opening temperature 100 (212)

OK → **11**

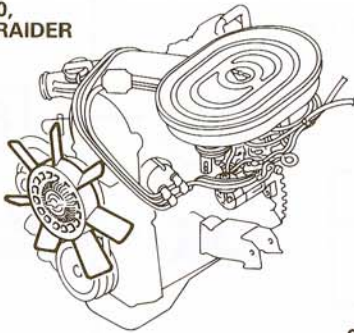
✗ → Replace the thermostat.

11

COLT



01Z248

RAM50,
RAM RAIDER

01Z328

Check the water pump.

- Check for leakage.
- Check the impeller and shaft rotation. (abnormal noise, or foreign material adhered)
- Check the pump body for cracks.
- Check the pipe and hose for cracking or damage.
- Check the cooling fan for damage.

OK



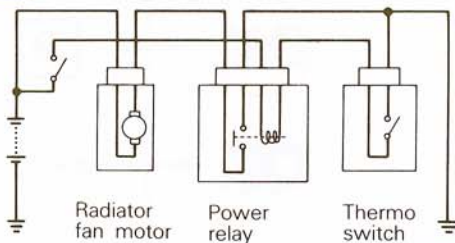
12

OK

Repair or
replace.

12

COLT only



01R0108

Check the radiator fan motor circuit.

OK

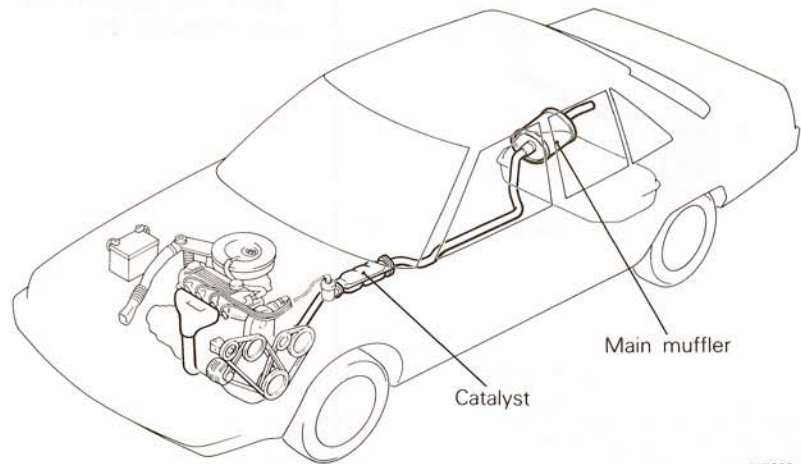
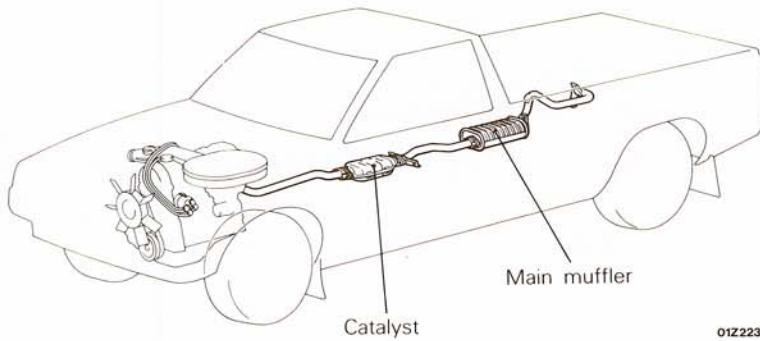
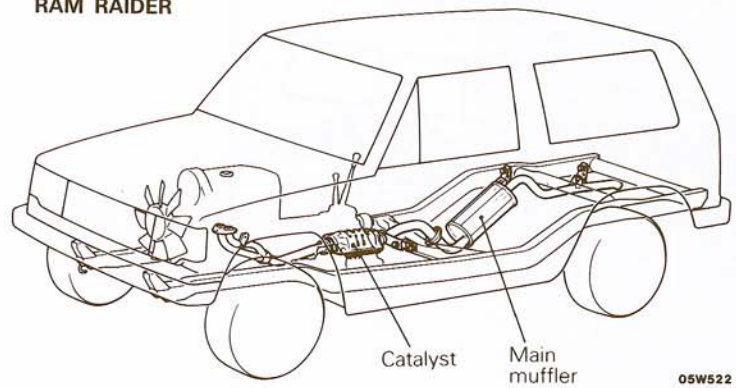


STOP

OK

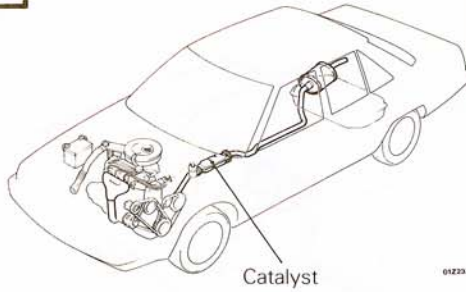


Repair.

EXHAUST SYSTEM TEST PROCEDURES**COLT****RAM50****RAM RAIDER**

1

COLT



Check for clogging of the catalyst.

- Catalyst: Removal

Check the catalyst for damage, foreign material, etc.

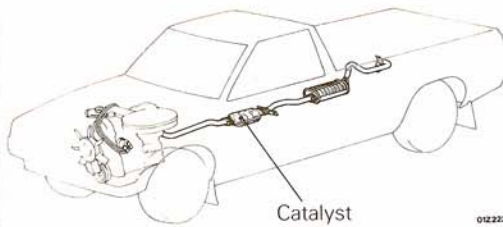


2

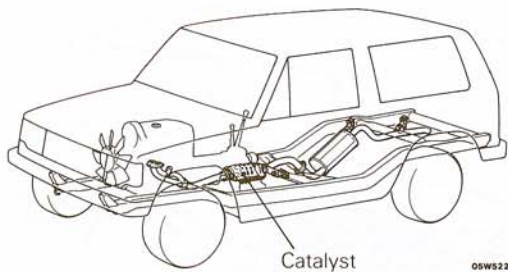


Replace the catalyst.

RAM50

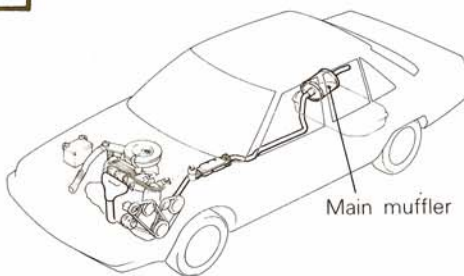


RAM RAIDER



2

COLT

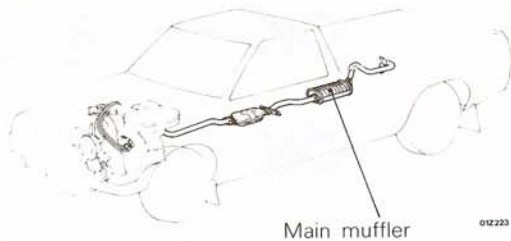
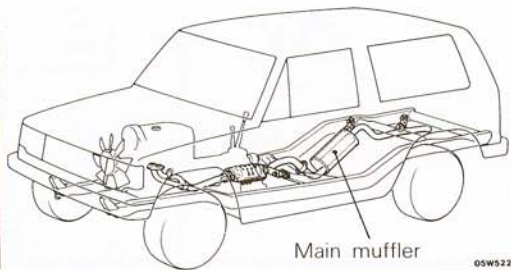


Check for clogging of the main muffler.

- Main muffler: Removal
- Also look for main muffler corrosion, splits, etc.



Replace the main muffler.

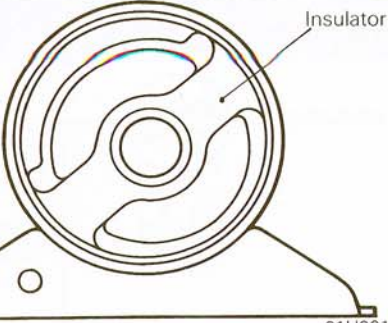
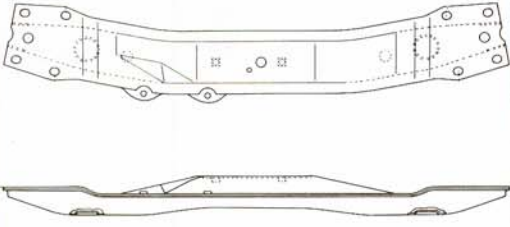
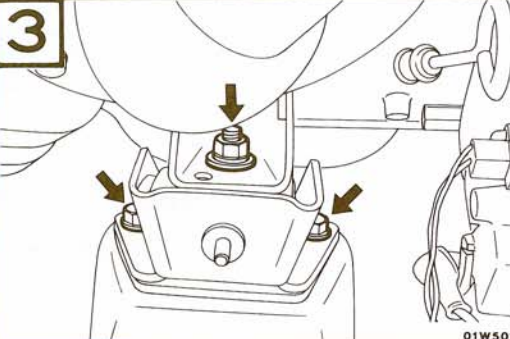
2**RAM50****RAM RAIDER**

Check for clogging of the main muffler.

- Main muffler: Removal
Also look for main muffler corrosion, splits, etc.



Replace the main muffler.

<div data-bbox="99 107 170 184">1</div>  <p>01U0014</p>	<p>Check each insulator for cracking damage or peeling/flaking.</p>	<div data-bbox="1144 184 1242 283">OK</div> → <div data-bbox="1377 199 1442 262">2</div> <div data-bbox="1144 310 1242 388">OK</div> → Replace the part.
<div data-bbox="99 485 170 562">2</div>  <p>01W504</p>	<p>Check each bracket for deformation or damage.</p>	<div data-bbox="1144 562 1242 661">OK</div> → <div data-bbox="1377 577 1442 640">3</div> <div data-bbox="1144 688 1242 766">OK</div> → Repair or replace the part.
<div data-bbox="99 863 170 940">3</div>  <p>01W501</p>	<p>Check the each installing bolt for looseness.</p>	<div data-bbox="1144 940 1242 1039">OK</div> → <div data-bbox="1356 955 1453 1039">STOP</div> <div data-bbox="1144 1066 1242 1144">OK</div> → Retighten.

