SERVICE MANUAL

TACUMA

FOREWORD

This manual includes procedure for maintenance, adjustment, service operation and removal and installation of components.

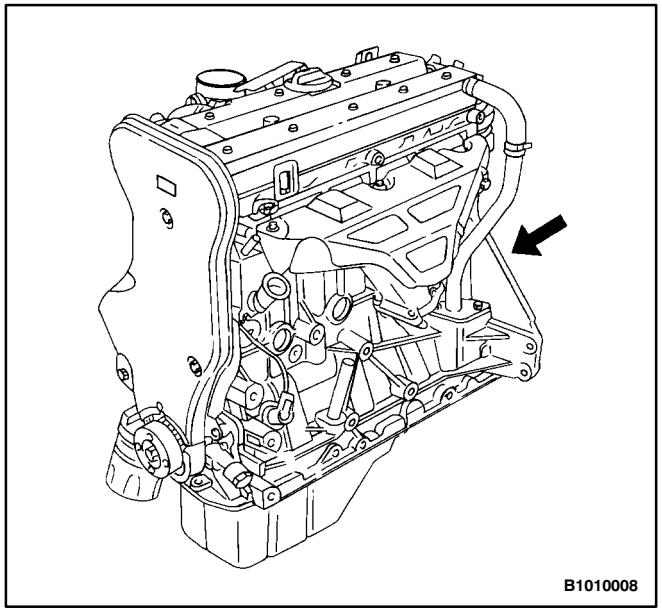
All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of manual approval.

The right is reserved to make changes at any time without notice.

SECTION INDEX

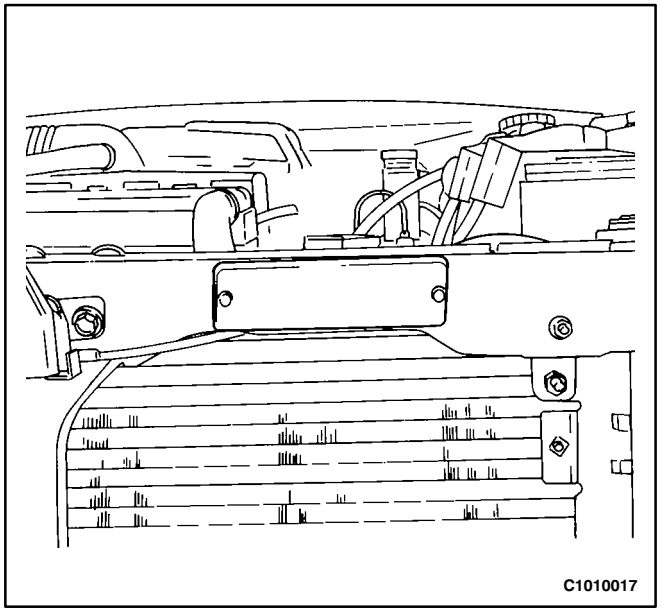
Engraved Engine Number Location

The engraved engine number is located on the engine block beneath the No. 4 exhaust manifold.

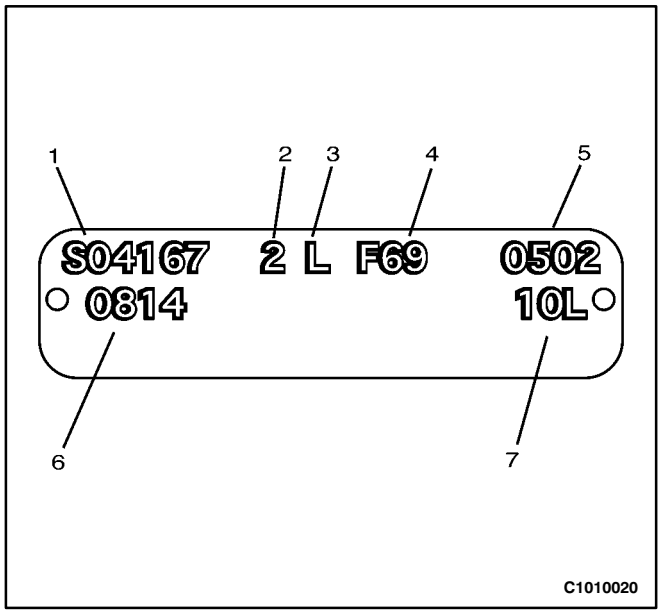


Body Identification Number Plate Location

The body identification number plate is attached to the top left side of the front panel support.

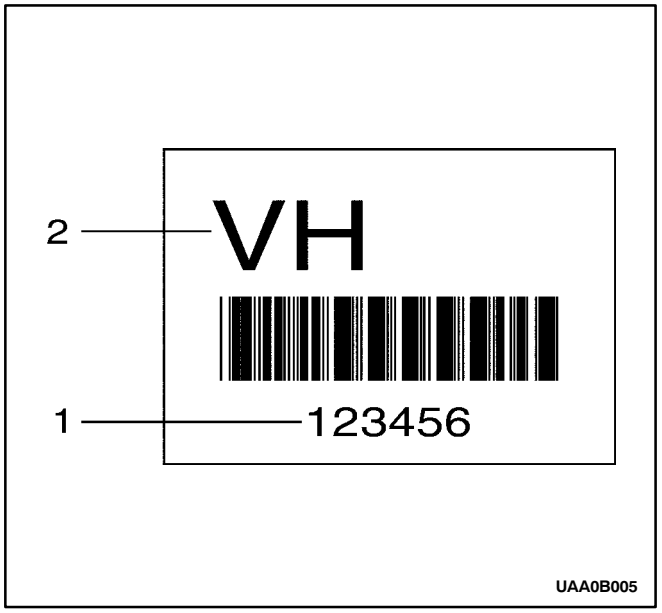


Body Identification Number Plate



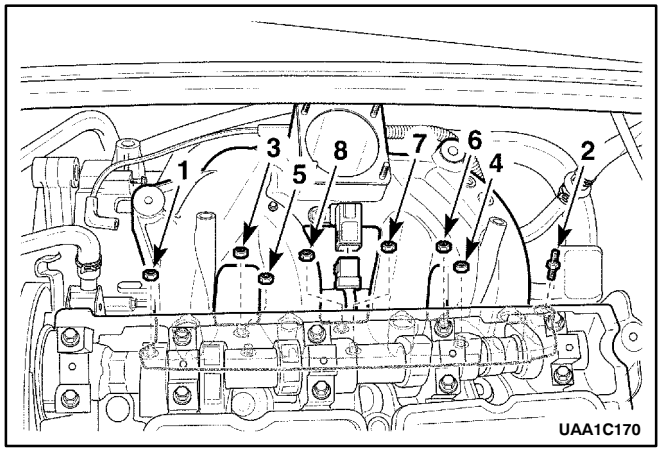
1 P/O Number
2 Check Digit
3 Drive
4 Body Type
5 P/O Date
6 Sequential Number
7 Exterior Color

Manual Transaxle Identification Number Plate

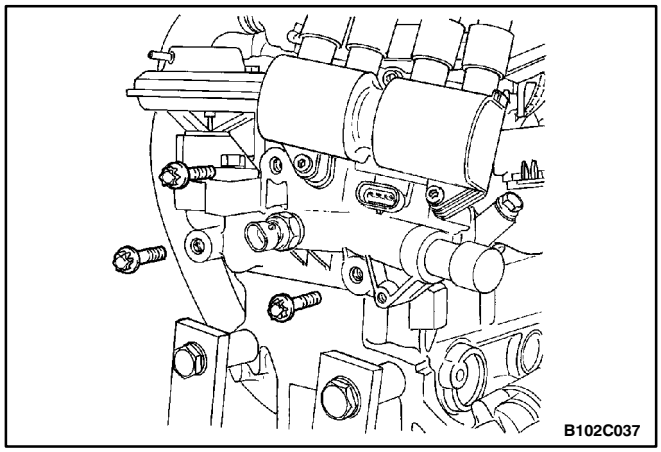


1 Serial Number
2 Part Identification Code (P/Code)

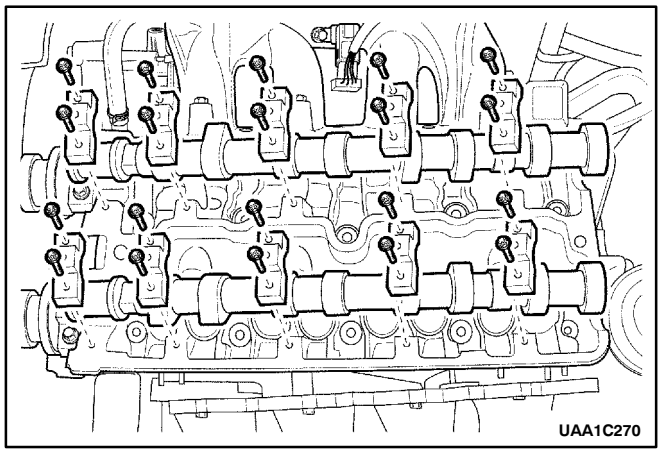
Identification Code	Engine	Gear Ratio
VH	1.6L DOHC	3.944 C/R
FC	2.0L DOHC	3.722 C/R



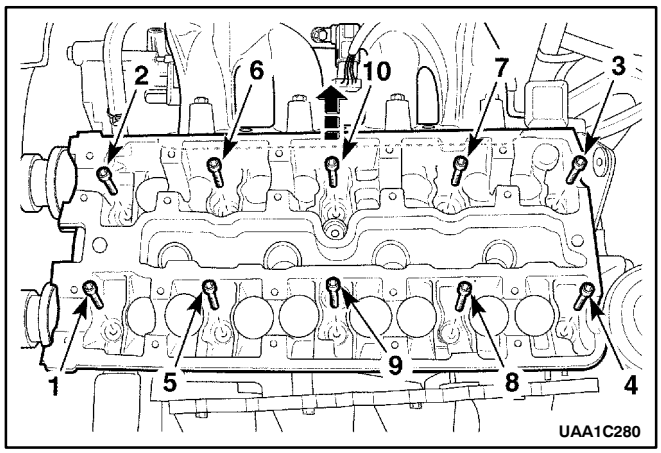
13. Remove the intake manifold retaining nuts and retaining bolt in the sequence shown.
14. Remove the intake manifold.
15. Remove the intake manifold gasket.



16. Remove the direct ignition system (DIS) coil and the exhaust gas recirculation (EGR) mounting bracket bolts.
17. Remove the DIS ignition coil and the EGR mounting bracket and ignition wires.
18. Remove the intake manifold studs.
19. Remove the spark plugs.



20. Remove the camshaft bearing cap bolts gradually and in the sequence shown for each camshaft cap.



21. Remove the intake camshaft caps. Maintain the correct positions for installation.
22. Remove the intake camshaft.
23. Remove the intake valve tappet adjusters.
24. Remove the exhaust camshaft caps. Maintain the correct positions for installation.
25. Remove the exhaust camshaft.
26. Remove the exhaust valve tappet adjusters.

- Run and passed during this ignition cycle.
- Run and passed since DTCs were last cleared.

If the indicated status of the vehicle is "Test Ran and Passed" after a repair verification, the vehicle is ready to be released to the customer.

If the indicated status of the vehicle is "Failed This Ignition" after a repair verification, then the repair is incomplete and further diagnosis is required.

Prior to repairing a vehicle, status information can be used to evaluate the state of the diagnostic test, and to help identify an intermittent problem. The technician can conclude that although the MIL is illuminated, the fault condition that caused the code to set is not present. An intermittent condition must be the cause.

PRIMARY SYSTEM-BASED DIAGNOSTICS

There are primary system-based diagnostics which evaluate the system operation and its effect on vehicle emissions. The primary system-based diagnostics are listed below with a brief description of the diagnostic function:

Oxygen Sensor Diagnosis

The fuel control oxygen sensor (O2S) is diagnosed for the following conditions:

- Few switch count (rich to lean or lean to rich).
- Slow response (average transient time lean to rich or rich to lean).
- Response time ratio (ratio of average transient time rich(lean) to lean(rich)).
- Inactive signal (output steady at bias voltage approximately 450 mV).
- Signal fixed high.
- Signal fixed low.

The catalyst monitor heated oxygen sensor (HO2S) is diagnosed for the following conditions:

- Heater performance (current during IGN on).
- Signal fixed low during steady state conditions or power enrichment (hard acceleration when a rich mixture should be indicated).
- Signal fixed high during steady state conditions or deceleration mode (deceleration when a lean mixture should be indicated).
- Inactive sensor (output steady at approx. 438 mV).

If the O2S pigtail wiring, connector or terminal are damaged, the entire O2S assembly must be replaced. Do not attempt to repair the wiring, connector or terminals. In order for the sensor to function properly, it must have clean reference air provided to it. This clean air reference is obtained by way of the O2S wire(s). Any attempt to repair the wires, connector or terminals could result in the obstruction of the reference air and degrade the O2S performance.

Misfire Monitor Diagnostic Operation

The misfire monitor diagnostic is based on crankshaft rotational velocity (reference period) variations. The Engine Control Module (ECM) determines crankshaft rotational velocity using the Crankshaft Position (CKP) sensor and the Camshaft Position (CMP) sensor. When a cylinder misfires, the crankshaft slows down momentarily. By monitoring the CKP and CMP sensor signals, the ECM can calculate when a misfire occurs.

For a non-catalyst damaging misfire, the diagnostic will be required to monitor a misfire present for between 1000–3200 engine revolutions.

For catalyst-damaging misfire, the diagnostic will respond to misfire within 200 engine revolutions.

Rough roads may cause false misfire detection. A rough road will cause torque to be applied to the drive wheels and drive train. This torque can intermittently decrease the crankshaft rotational velocity. This may be falsely detected as a misfire.

A rough road sensor (VR sensor or G sensor) works together with the misfire detection system. The rough road sensor produces a voltage that varies along with the intensity of road vibrations. When the ECM detects a rough road, the misfire detection system is temporarily disabled.

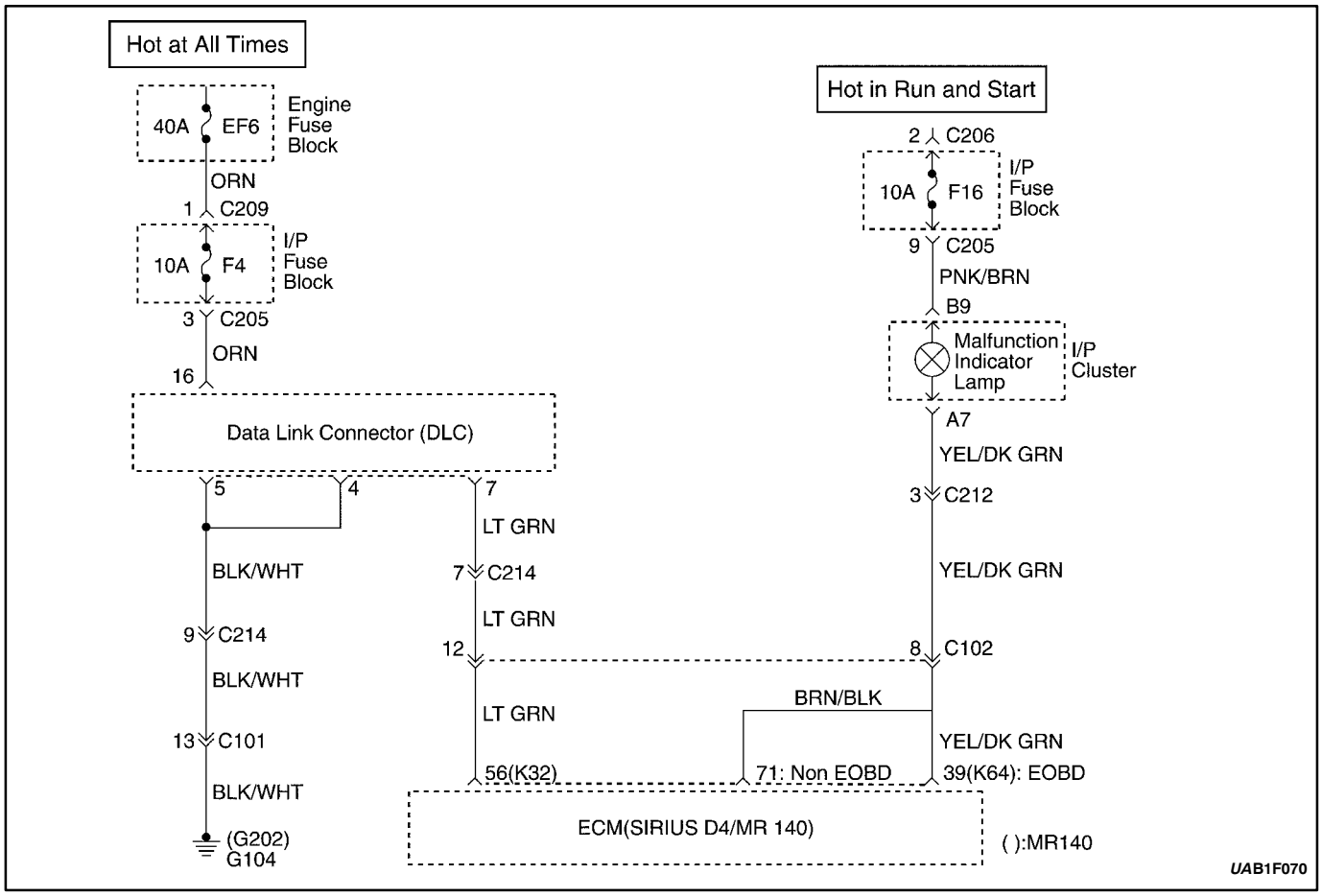
Misfire Counters

Whenever a cylinder misfires, the misfire diagnostic counts the misfire and notes the crankshaft position at the time the misfire occurred. These "misfire counters" are basically a file on each engine cylinder. A current and a history misfire counter are maintained for each cylinder. The misfire current counters (Misfire Current #1–4) indicate the number of firing events out of the last 200 cylinder firing events which were misfires. The misfire current counter will display real time data without a misfire DTC stored. The misfire history counters (Misfire Histtory #1–4) indicate the total number of cylinder firing events which were misfires. The misfire history counters will display 0 until the misfire diagnostic has failed and a DTC P0300 is set. Once the misfire DTC P0300 is set, the misfire history counters will be updated every 200 cylinder firing events. A misfire counter is maintained for each cylinder.

If the misfire diagnostic reports a failure, the diagnostic executive reviews all of the misfire counters before reporting a DTC. This way, the diagnostic executive reports the most current information.

When crankshaft rotation is erratic, a misfire condition will be detected. Because of this erratic condition, the data that is collected by the diagnostic can sometimes incorrectly identify which cylinder is misfiring.

Use diagnostic equipment to monitor misfire counter data on EOBD compliant vehicles. Knowing which specific cylinder(s) misfired can lead to the root cause, even when dealing with a multiple cylinder misfire. Using the



EURO ON-BOARD DIAGNOSTIC (EOBD) SYSTEM CHECK

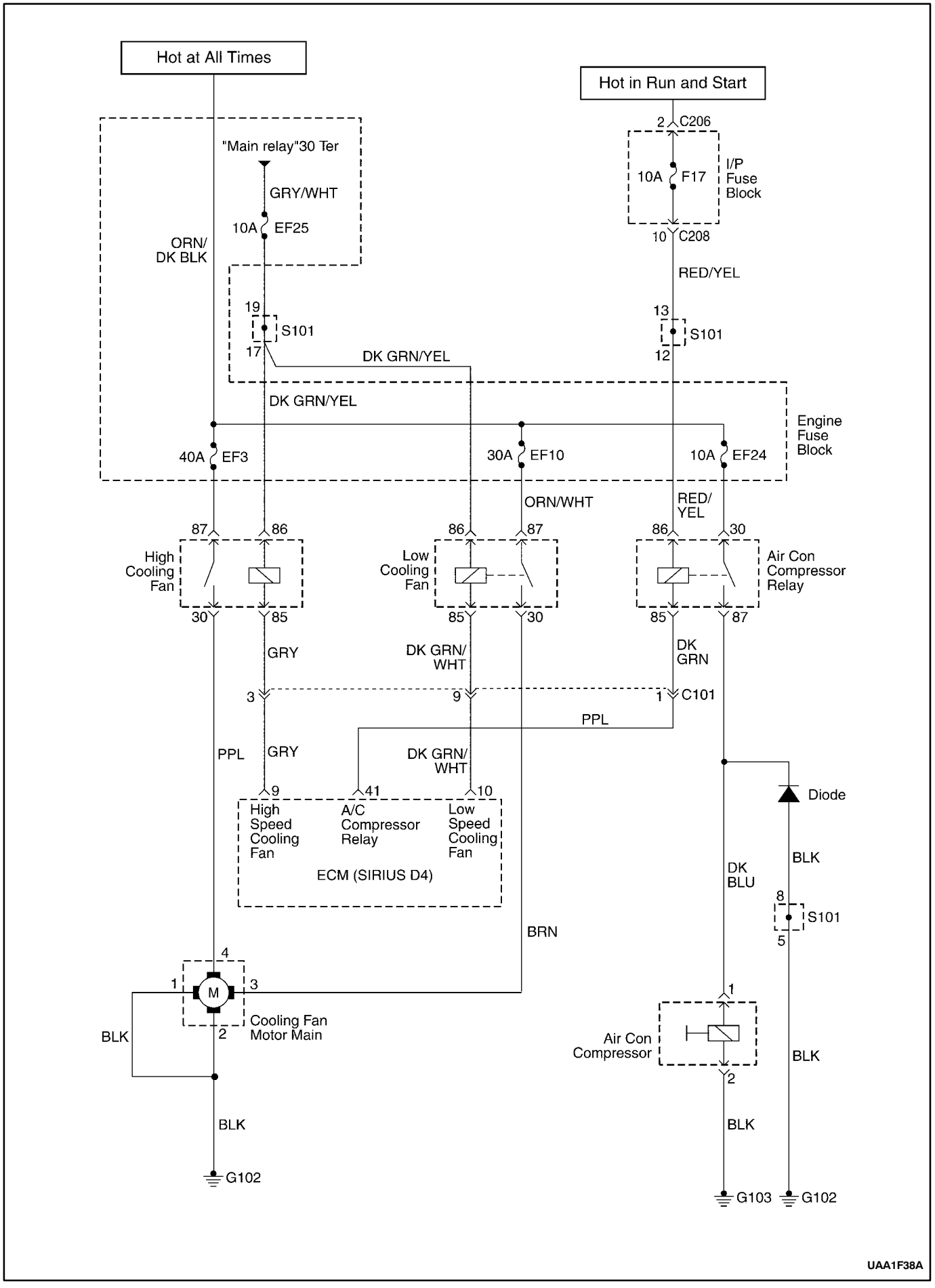
Circuit Description

The Euro On-Board Diagnostic (EOBD) System Check is the starting point for any driveability complaint diagnosis. Before using this procedure, perform a careful visual/physical check of the Engine Control Module (ECM) and the engine grounds for cleanliness and tightness.

The EOBD system check is an organized approach to identifying a problem created by an electronic engine control system malfunction.

Diagnostic Aids

An intermittent may be caused by a poor connection, rubbed-through wire insulation or a wire broken inside the insulation. Check for poor connections or a damaged harness. Inspect the ECM harness and connections for improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connections, and damaged harness.


Hot at All Times
Hot in Run and Start
"Main relay"30 Ter
GRY/WHT
10A EF25
ORN/
DK BLK
2 C206
10A F17
I/P
Fuse
Block
10 C208
RED/YEL
19
S101
17
13
S101
12
DK GRN/YEL
DK GRN/YEL
Engine
Fuse
Block
40A EF3
30A EF10
10A EF24
ORN/WHT
RED/
YEL
87
86
86
87
86
30
High
Cooling
Fan
Low
Cooling
Fan
Air Con
Compressor
Relay
30
85
85
30
85
87
GRY
DK GRN/
WHT
DK
GRN
3
9
1 C101
PPL
PPL
GRY
DK GRN/
WHT
9
41
10
High
Speed
Cooling
Fan
A/C
Compressor
Relay
Low
Speed
Cooling
Fan
ECM (SIRIUS D4)
Diode
BLK
DK
BLU
8
S101
5
BRN
4
1
M
3
2
Cooling Fan
Motor Main
BLK
1
Air Con
Compressor
2
BLK
BLK
G102
BLK
G103
G102
UAA1F38A

DESCRIPTION AND OPERATION

GENERAL DESCRIPTION

The power booster is a single-diaphragm, vacuum-suspended unit. In normal operating mode, with the service brakes in the release position, a vacuum-suspended booster operates with a vacuum on both sides of its diaphragm. When the brakes are applied, air at atmospheric pressure is admitted to one side of the diaphragm to provide the power assist. When the brakes are released, atmospheric air is shut off from that side of the diaphragm.

The air is then drawn from the booster through the vacuum check valve by the vacuum source.

Important: If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system. Refer to ***Section 4F, Antilock Brake System and Traction Control System***.

DIAGNOSTIC INFORMATION AND PROCEDURES

POWER BOOSTER FUNCTIONAL CHECK

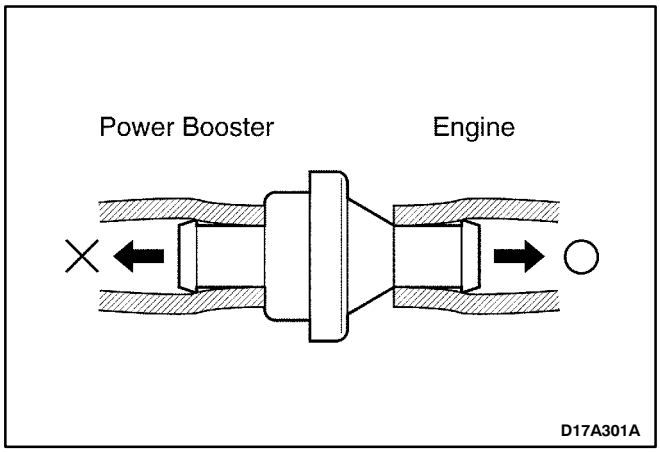
1. With the engine stopped, eliminate vacuum in the booster by pumping the brake pedal several times.
2. Push the pedal down and hold in this position.
3. Start the engine.
4. The booster is OK if the pedal drops further because of extra force produced.

If the brake pedal does not drop, the vacuum system (vacuum hoses, check valve, etc.) is probably defective and should be checked.

If no defect is revealed by checking the vacuum system, the defect is in the booster itself.

CHECK VALVE FUNCTIONAL CHECK

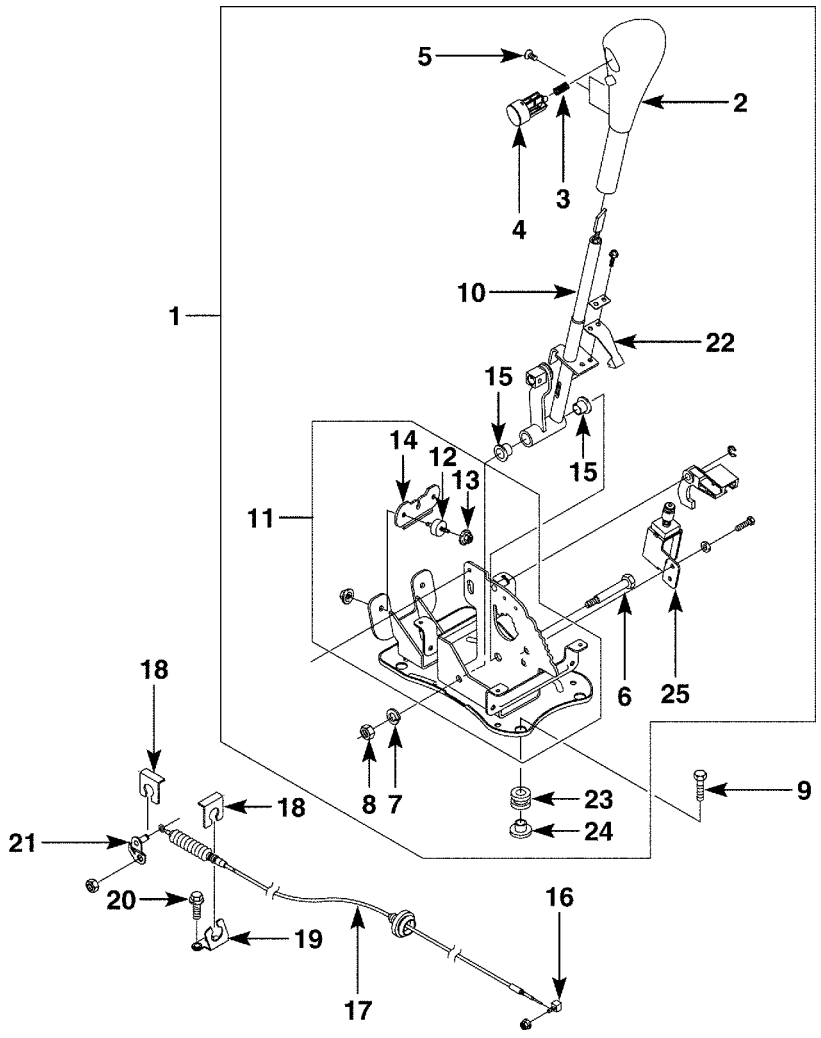
1. Remove the vacuum hose.
2. Suck the vacuum hose to power booster. And also, suck the vacuum hose to engine.
3. If the air pass through the check valve or not, replace the check valve. And if the vacuum hose to engine is only sucked, the check valve OK.



C0025 Left Front Wheel Speed Excessive Variation (Cont'd)

Step	Action	Value	Yes	No
13	1. Speed sensor still disconnected from the jumper harness. 2. Connect a voltmeter to terminals 2 and 1 of the left front speed sensor. 3. Select the AC milli-volt scale. 4. Spin the left front wheel while observing the voltage on the meter. Is the AC voltage within the specified range?	At least 100mV	Go to *Step 14*	Go to *Step 12*
14	1. Disconnect the EBCM harness from the EBCM. 2. Disconnect the left front jumper harness from the ABS body harness. 3. Connect an ohmmeter to EBCM harness terminal A09 and then to ABS body harness terminal 2. Is the resistance within the specified range?	Less than 2 ohms	Go to *Step 16*	Go to *Step 15*
15	Repair the source open or high resistance between terminals A09 and 2.	–	System OK	–
16	1. EBCM harness still disconnected from the EBCM. 2. Jumper harness still disconnected from the body harness. 3. Connect an ohmmeter to EBCM harness terminal A10 and then to ABS body harness terminal 1. Is the resistance within the specified range?	Less than 2 ohms	Go to *Step 18*	Go to *Step 17*
17	Repair the open or high resistance between terminals A10 and 1.	–	System OK	–
18	1. EBCM harness still disconnected from the EBCM. 2. Jumper harness still disconnected from the body harness. 3. Connect an ohmmeter between EBCM harness terminals A09 and A10. Is the resistance within the specified range?	OL (open circuit)	Go to *Step 20*	Go to *Step 19*
19	Repair the short between the 2 wires.	–	System OK	–
20	1. Replace the left front jumper harness. 2. Test-drive the vehicle at various speeds and road surfaces. Did C0025 reset?	–	Go to *Step 21*	System OK
21	Replace the EBCM.	–	System OK	–

GEAR SHIFT CONTROL



UAA5A270

1 Selector control
2 Selector control handle
3 Spring
4 Selector control button
5 Screw
6 Selector lever shaft
7 Spring washer
8 Nut
9 Bolt
10 Intermediate lever
11 Base plate
12 Selector control isolator
13 Nut
14 Fastener plate
15 Bush
16 Selector control clamp piece
17 Selector control cable
18 E-ring
19 Cable fastener
20 Bolt
21 Transaxle lever
22 Positioning spring
23 Grommet
24 Bush
25 BTSI Solenoid

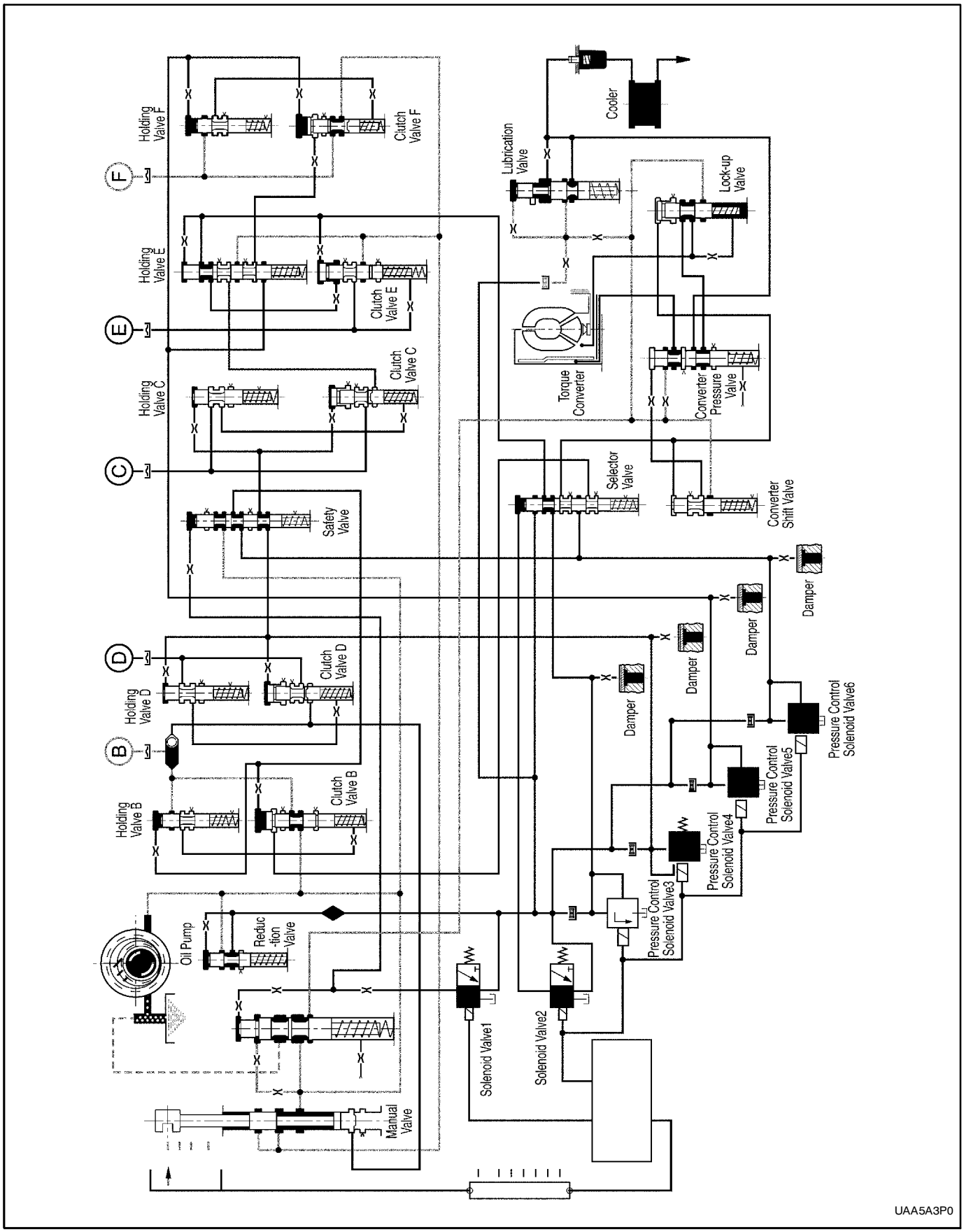
DTC P0715 – Input Speed Sensor(ISS) Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the check performed?	–	Go to Step 2	Go to "On-Board Diagnostic System Check"
2	1. Install the scan tool. 2. Turn the ignition ON(at 3,100rpm). 3. Observe the turbine speed on the scan tool. Is the speed within the values shown?	Engine speed 0–7,000rpm increasing rate : less than 25,000 rpm/sec	Go to "Diagnostic Aids"	Go to Step 3
3	1. Turn the ignition LOCK. 2. Disconnect the trasaxle wiring connector. 3. Measure the resistance between terminals 15 and 16 of the transaxle wiring connector. Is the resistance within the values shown?	830±5Ω	Go to Step 9	Go to Step 4
4	1. Remove the oil pan. 2. Disconnect the input speed sensor wiring connector. 3. Measure the resistance between terminal 1 of the input speed sensor wiring connector and terminal 15 of the transaxle wiring connector. 4. Measure the resistance between terminal 2 of the input speed sensor wiring connector and terminal 16 of the transaxle wiring connector. Is the resistance within the values shown?	0Ω	Go to Step 6	Go to Step 5
5	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
6	1. Turn the ignition ON. 2. Measure the voltage of terminal 1. 3. Measure the voltage of terminal 2. Is the resistance within the values shown?	11–14V	Go to Step 7	Go to Step 8
7	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
8	Replace the input speed sensor. Is the action complete?	–	System OK	–
9	1. Disconnect the transaxle wiring connector and TCM connector. 2. Measure the resistance between terminal 15 of the transaxle wiring connector and terminal B4 of the TCM wiring connector. 3. Measure the resistance between terminal 16 of the transaxle wiring connector and terminal B7 of the TCM wiring connector. Is the resistance within the values shown?	0Ω	Go to Step 11	Go to Step 10
10	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–

DTC P1866 – EDS 5 Output Open

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the check performed?	–	Go to Step 2	Go to "On-Board Diagnostic System Check"
2	1. Install the scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Select "Actuating" on the scan tool. 4. Actuate EDS 5 is ON/OFF. Does the EDS 5 change ON/OFF?	ON/OFF	Go to "Diagnostic Aids"	Go to Step 3
3	1. Turn the ignition LOCK. 2. Disconnect the transaxle wiring connector. 3. Measure the resistance between terminal 5 and 10 the transaxle wiring connector. Is the resistance within the values shown?	TFT 25**b**C 6Ω	Go to Step 7	Go to Step 4
4	1. Remove the oil pan. 2. Disconnect the wiring connector of the EDS 5. 3. Measure the resistance between terminal 2 of the EDS 5 and terminal 5 of the transaxle connector. 4. Measure the resistance between terminal 1 of the EDS 5 and terminal 10 of the transaxle connector. Is the resistance within the values shown?	0Ω	Go to Step 6	Go to Step 5
5	1. Repair the circuit(between terminal 2 and terminal 5) for open. 2. Repair the circuit(between terminal 1 and terminal 10) for open. Is the action complete?	–	System OK	–
6	Replace the EDS 5. Is the action complete?	–	System OK	–
7	1. Disconnect the transaxle wiring connector and TCM connector. 2. Measure the resistance between terminal 5 of the transaxle wiring connector and terminal C7 of the TCM wiring connector. 3. Measure the resistance between terminal 10 of the transaxle wiring connector and terminal A10 of the TCM wiring connector. Is the resistance within the values shown?	0Ω	Go to Step 9	Go to Step 8
8	Repair the transaxle wiring harness for open. Is the action complete?	–	System OK	–
9	Replace the TCM. Is the action complete?	–	Go to Step 10	–
10	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified exit DTC chart

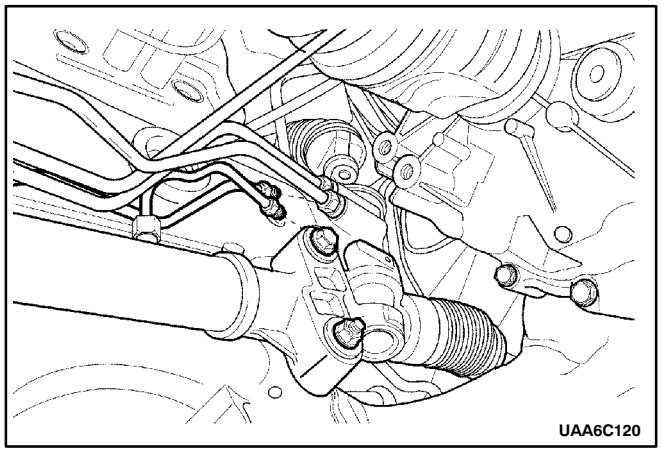
Drive range–First gear



Installation Notice

Tightening Torque	Dash Seal Nut	6 N·m (4 lb–ft)
Tightening Torque	Intermediate Shaft Lower Pinch Bolt	25 N·m (18 lb–ft)

- When attaching the lower universal joint, the marks on the intermediate shaft and on the stub shaft should line up.
- When attaching the lower and the upper universal joint, the steering wheel must be placed in the straight-ahead position with the spokes pointing down.


UAA6C120

HYDRAULIC CYLINDER LINES

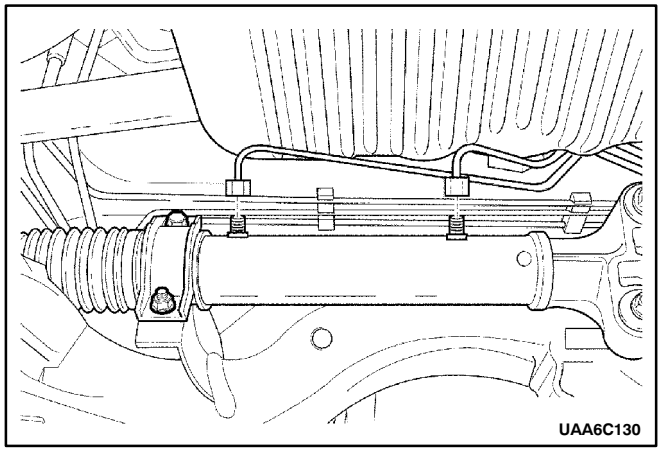
(Left–Hand Drive Shown, Right–Hand Drive Similar)

Removal and Installation Procedure

1. Siphon the power steering fluid from the power steering fluid reservoir.
2. Raise and suitably support the vehicle.
3. Disconnect the power steering gear hydraulic cylinder pipes from the power steering gear at the valve end. Replace the O-ring seals as needed.

Installation Notice

Tightening Torque	18 N·m (13 lb–ft)


UAA6C130

4. Disconnect the power steering gear hydraulic cylinder pipes from the power steering gear at the cylinder end.
5. Remove the steering gear hydraulic cylinder pipes from the vehicle.

Installation Notice

Tightening Torque	27 N·m (20 lb–ft)

DESCRIPTION AND OPERATION

THE V5 FULL AUTOMATIC TEMPERATURE CONTROL (FATC) SYSTEM

The full automatic temperature control (FATC) uses the integrated control panel as the driver's interface to the system. The FATC receives driver's input signal and various input signal from sensors and controls the actuators to maintain driver's desired room temperature.

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System* for general Information details for the following:

- System Components – Functional.
- The V5 A/C System.
- V5 Compressor – Operation.
- V5 Compressor – General Description.

SYSTEM COMPONENTS–CONTROL

Controller

The operation of the A/C system is controlled by the switched on the control head. This console-mounted controller consist of control knobs and a vacuum fluorescent display (VFD) indicating the status of the control settings selected.

Temperature Control Switch

- Raise the temperature of the air entering the vehicle by pressing upper part of the switch, with the red arrow pointing upward.
- Lower the temperature of the air entering the vehicle by pressing lower part of the switch, with the blue arrow pointing downward.
- Actuate the air mix door by an electrical motor.
- Varies the mix of the air passing through the heater core with the air bypassing the core.
- Each press of the switch changes the set temperature by increments of 0.5°C(1°F) this is shown in the temperature window on the function display.

AUTO Switch

Maintains the set temperature automatically. In this mode, the full automatic temperature control (FATC) system controls the following:

- The air mix door motor.
- The mode door motor.
- The blower motor speed.
- The intake air door motor.
- A/C ON/OFF.

OFF Switch

Turns the automatic air conditioning and fan control off.

MODE Switch

Allows manual selection of the airflow direction.

- Selection is shown on the function display.
- Each time the MODE switch is pressed, the next function is displayed.

Intake Air Control Switch

Switches between fresh air intake, the default, and recirculating air. Airflow arrows on the display indicate the mode in effect.

A/C Switch

Allows manual selection and control of the air conditioning function.

Rear Window and Side Rear View Mirror Defroster Switch

Defrost rear window and side rear view mirror. When pressed, it operates for 8 to 12 minutes by the timer in the controller.

Defrost Switch

Cause the mode motor to direct all air to the windshield and aide window outlets for maximum defrosting.

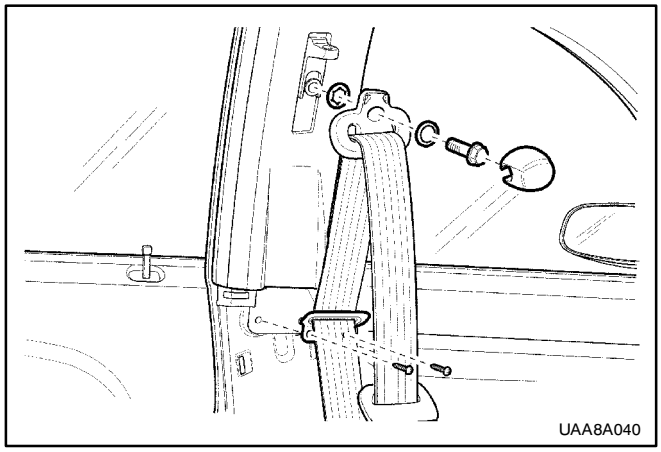
- Mode: Defroster
- Intake Air: Fresh
- A/C: ON (If the outside temperature is below than 1.5°C, the A/C would not operate.)

Fan Control Switch

Allow manual selection among six–fan speeds.

Vacuum Fluorescent Display (VFD)

- Temperature setting – Indicates the temperature set with temperature control knob.
- Auto status – Indicates whether the system is operating in the full automatic mode or manual mode.
- A/C – A snowflake icon indicating whether the A/C is On or OFF.
- Intake Air – Indicates whether the intake air is fresh (from outside) or recircurating.
- Mode – Indicated by icon, the mode chosen by the system is shown by illumination of arrow indicating the air path.
- Defrost – Indicates whether the defroster is ON or not.
- Fan speed – Indicates the fan speed by illuminating a bar based segment from low to high speed by adding additional segments.

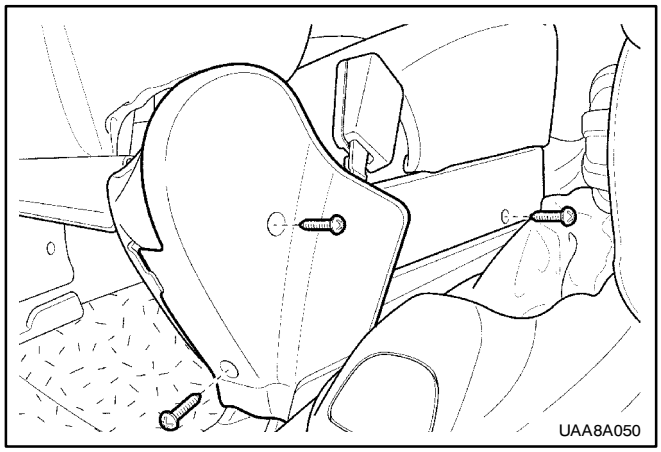


7. Remove screws and seat belt guide.
8. Remove the plastic cap to reveal the upper B-pillar seat belt anchor.
9. Remove the bolt, washers and B-pillar seat belt anchor.

Installation Notice

Tightening Torque	38 N·m(28 lb–ft)

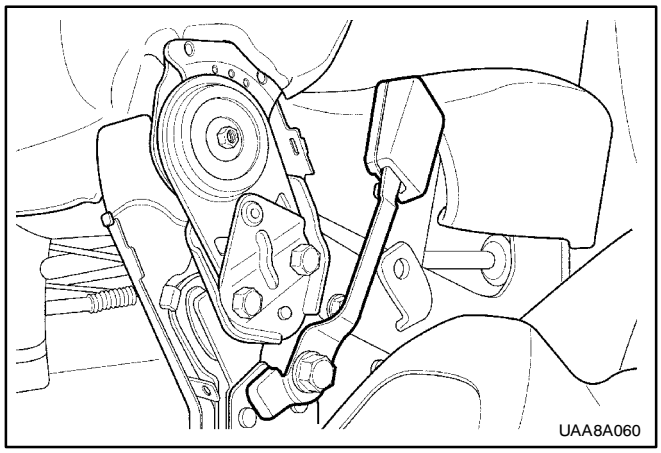
10. Installation should follow the removal procedure in the reverse order.



FRONT SEAT BELT BUCKLE

Removal and Installation Procedure

1. Remove the plastic caps and three screws.
2. Remove the seat belt buckle cover.

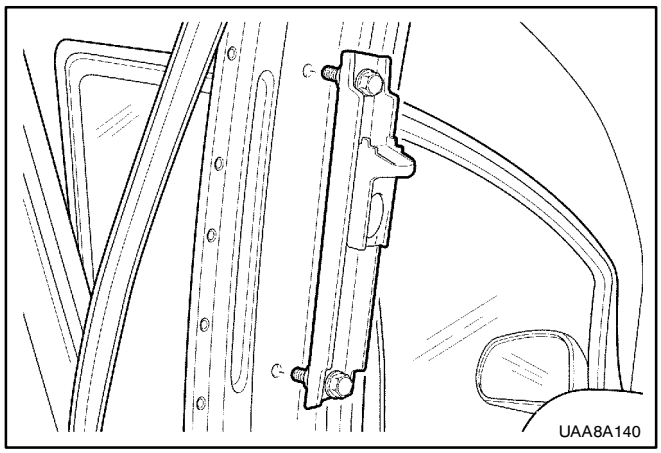


3. Disconnect the seat belt warning lamp connector, for driver seat.
4. Remove the bolt, washer and buckle.

Installation Notice

Tightening Torque	38 N·m(28 lb–ft)

5. Installation should follow the removal procedure in the reverse order.



FRONT SEAT BELT HEIGHT ADJUSTER

Removal and Installation Procedure

1. Disconnect negative battery cable.
2. Remove the lower B-pillar trim. Refer to *Section 9G, Interior trim*.
3. Remove screws and seat belt guide.
4. Remove the front seat belt upper B-pillar anchor bolt.

Installation Notice

Tightening Torque	38 N·m(28 lb–ft)