2001-02 DRIVE AXLES

Variable Torque Management Diagnosis - MDX

APPLICATION

WARNING: Vehicle is equipped with Supplemental Inflatable Restraint (SIR) system. When servicing vehicle, use care to avoid accidental air bag deployment. SIR system-related components are located in various locations throughout interior and exterior of vehicle, depending on application. Do not use electrical test equipment on or near these circuits. If necessary, deactivate SIR system before servicing components. See appropriate AIR BAG DEACTIVATION PROCEDURES article in GENERAL INFORMATION.

VARIABLE TORQUE MANAGEMENT APPLICATION

Application	Model
Acura MDX	VTM-4

IDENTIFICATION

MDX model is equipped with an automatic transaxle, transfer assembly and rear differential with VTM-4 system that distributes driving torque to front and rear wheels.

Transfer assembly is a hypoid-type gear that is connected to final driven gear at transaxle. Power is transmitted to final driven gear by transaxle differential assembly. Drive shaft from rear differential is connected to transfer assembly at companion flange.

DESCRIPTION & OPERATION

VARIABLE TORQUE MANAGEMENT 4WD (VTM-4) REAR DIFFERENTIAL SYSTEM

This vehicle is equipped with a rear differential system called the Variable Torque Management 4WD (VTM-4) system. The VTM-4 control unit controls the currents flowing through electromagnetic coils to engage and disengage the right and left clutches in the rear differential assembly. System components include VTM-4 control unit, rear differential assembly with left and right clutches, VTM-4 lock switch, VTM-4 lock indicator light and VTM-4 indicator light. See **Fig. 1** . The VTM-4 control unit communicates and shares information with the ABS modulator assembly and the Powertrain Control Module (PCM). ABS wheel speed information is sent from the ABS modulator assembly. Fuel injector and RPM information is shared between the VTM-4 control unit and PCM.

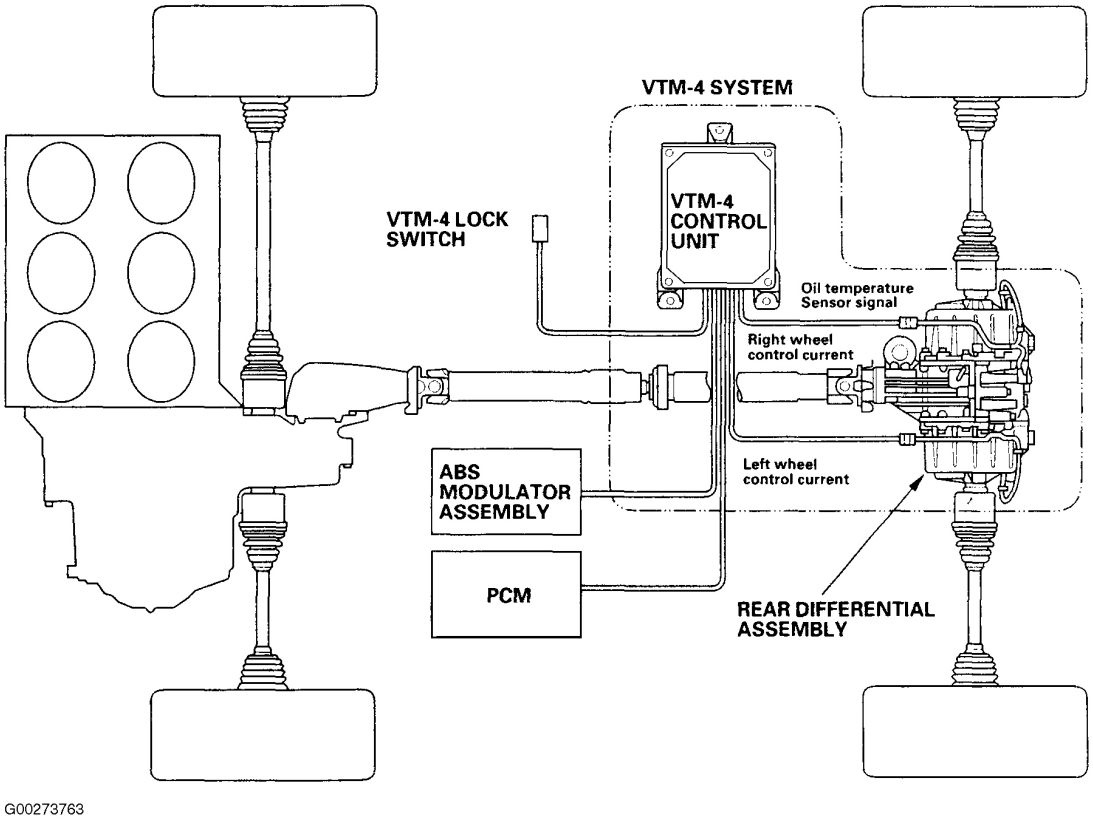


Fig. 1: Identifying VTM-4 Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Using two electronically operated clutches that engage both rear axle shafts, the rear differential transmits torque in equal measure to each rear wheel. The operation of the VTM-4 system consists of the following functions:

- **Vehicle Acceleration Torque Control (VATC)**
- **Limited Slip Differential (LSD)**
- **Lock Control**

See **Fig. 2** . These functions combine to distribute driving torque between the front and rear wheels when the vehicle is being accelerated or when wheels are slipping. Under normal conditions, the vehicle is in Front Wheel Drive (FWD). However, the system will instantly transmit appropriate driving force to the rear wheels, depending on the driving force of the front wheels and the road conditions. The system will lock up the rear differential clutches when the dash-mounted button is selected and the transmission shift lever is in Reverse, 1 and 2 positions. By design, the torque is reduced gradually at speeds above 6 MPH to minimize the load on the 4WD system. The VTM-4 control unit has fail-safe function, a self-diagnosis function, and a provision to communicate with the Honda PGM tester.

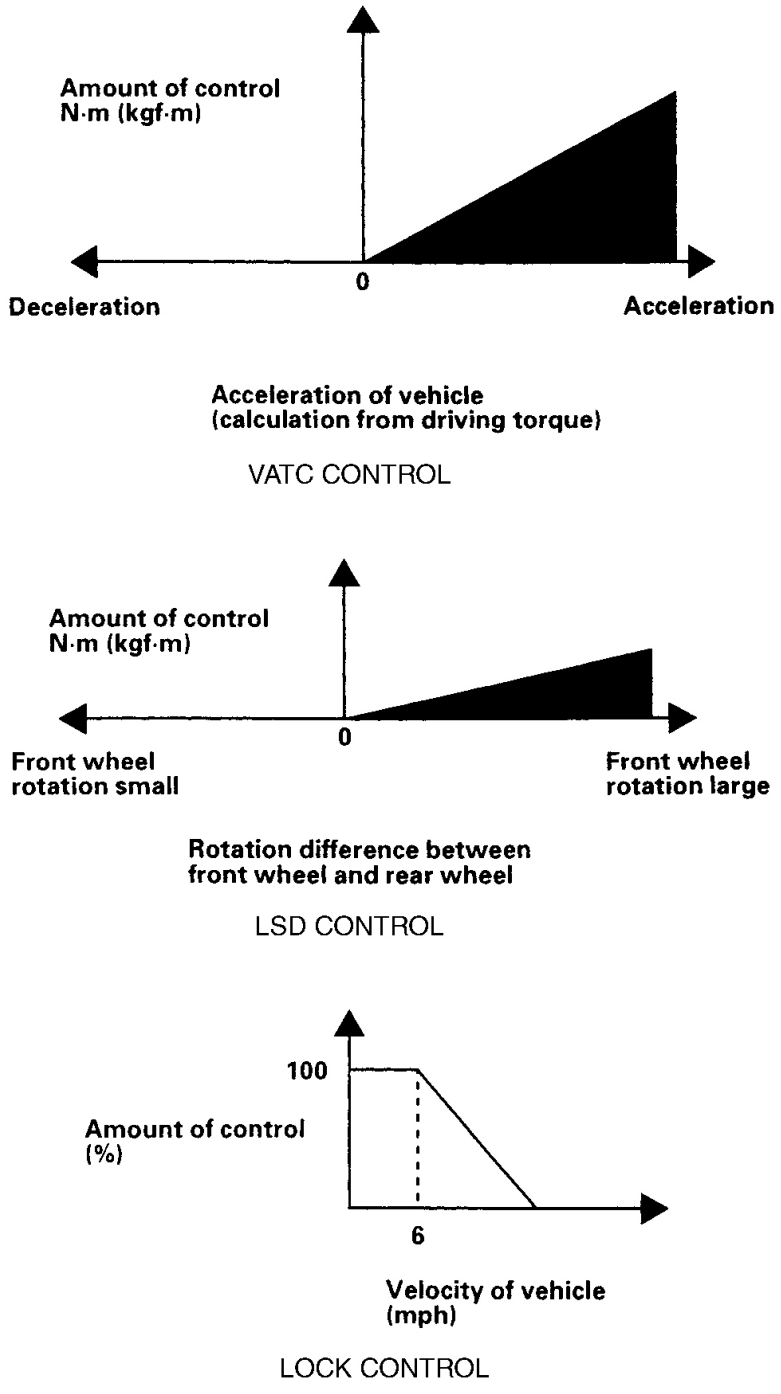


Fig. 2: Identifying VTM-4 Control Functions
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VTM-4 Indicator Light

The VTM-4 indicator light illuminates under certain conditions even if the 4WD system working normally. For example:

- Use of high-powered wireless equipment such as a CB or Ham radio in the vehicle.
- Spinning the rear wheels while the vehicle is stuck in sand, mud, snow, etc.
- Battery voltage is suddenly less than 8 volts or more than 16 volts.

After the VTM-4 indicator light illuminates, it stays on until the ignition switch is turned off.

Vehicle Acceleration Torque Control

The Vehicle Acceleration Torque Control (VATC) mode works in all conditions to distribute driving torque to all four wheels as the vehicle accelerates from a stop to cruising speed. When starting out across a slippery intersection, torque is immediately available at the rear wheels. Torque to the rear wheels increases smoothly to the maximum recommended for a given rate of acceleration. At constant cruising speeds, all driving torque is delivered by the front wheels, for smoothness, quietness and fuel efficiency. By apportioning drive torque to all four wheels when needed, VATC logic also helps improve steering control in corners.

Limited Slip Differential

The Limited Slip Differential (LSD) mode uses wheel slippage control logic. If sensors detect that the front and rear wheels are rotating at different rates because of slippage in front, the ECU sends more torque to the rear wheels, in proportion to the amount of slip and the increase in slip, so rear-wheel torque is always available.

Lock Control

A lock button on the dash engages the lock control mode, locking the rear axle when the transmission is in first, second or reverse gears. Maximum drive torque is applied to the rear wheels up to 6 MPH. Above 6 MPH, the torque applied to the rear wheels gradually diminishes to zero as the vehicle reaches 18 MPH. In normal driving, VTM-4 keeps the vehicle in FWD.

Operation

The Variable Torque Management 4WD System (VTM-4) automatically transfers varying amounts of engine torque to the rear wheels under low traction conditions. VATC and LSD modes are computer-controlled and not selectable. If more traction is needed when the vehicle is stuck or is likely to become stuck, the VTM-4 Lock button can be selected to increase torque to the rear wheels.

To engage the VTM-4 Lock;

1. The vehicle must be stopped.
2. Move the shift lever to first (1), second (2) or reverse (R) position.
3. Press the VTM-4 Lock button. The light in the button will illuminate.

To disengage the VTM-4 Lock, perform one of the following:

1. Press the VTM-4 Lock button.
2. Move the shift lever to D3, D4 or D5 position.
3. Turn the ignition OFF. When vehicle is restarted, the VTM-4 Lock feature will be off.

The VTM-4 Lock will temporarily disengage when the vehicle speed exceeds 18 MPH. It will automatically engage again as the speed slows below 18 MPH. The light in the VTM-4 Lock button will remain on the entire time.

SYSTEM PRECAUTIONS

WARNING: Towing the vehicle with only two wheels on the ground will damage parts of the 4WD system. If vehicle is disabled, it should be towed on a flat-bed truck or trailer. The system does not have a manual switch to disable the 4WD system. Whenever service work requires spinning the front or rear wheels with the engine, always lift up and support the vehicle so all four wheels are off the ground.

Do not continuously spin the vehicle front tires. Continuously spinning the front tires can cause transmission or rear differential damage. Do not use the VTM-4 Lock button on dry, paved roads. Driving on dry, paved roads with VTM-4 Lock ON may damage the rear differential when making a turn. Strange noises and vibration can also result.

COMPONENT LOCATIONS

NOTE: For component locations, see Fig. 3 .

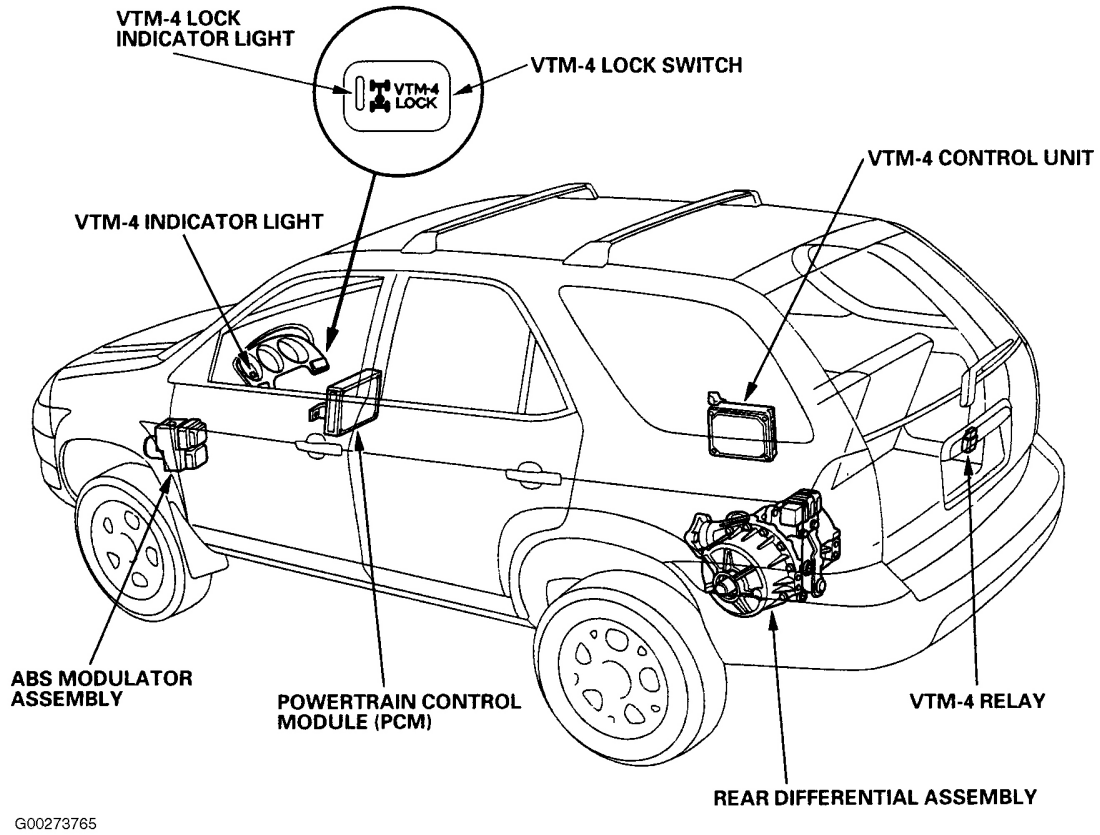


Fig. 3: Locating VTM-4 Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

FLUIDS

Use Honda VTM-4 Differential Fluid. Capacity is 3.0 qt. (2.8 L).

SELF-DIAGNOSTIC SYSTEM

Diagnostic Trouble Code (DTC)

NOTE: Multiple DTCs are displayed in the order they occurred, beginning with the most recent.

The VTM-4 control unit can memorize up to 7 different DTCs. The system displays the DTCs by blinking the VTM-4 indicator light. Multiple DTCs are displayed in the order they occurred, beginning with the most recent. If the same DTC is detected more than once, the most recent DTC is written over the earlier one. Therefore, when the same problem is detected more than once, it is memorized as a single DTC. The DTCs are memorized in the EEPROM (non-volatile memory). Therefore, the memorized DTCs are not cleared when the battery is disconnected or the VTM-4 control unit is disconnected. If there is a problem in the central processing unit (CPU) of the VTM-4 control unit, the VTM-4 indicator light illuminates, but no DTC is memorized.

When a problem is detected by self-diagnosis, the system does the following:

- Turns the VTM-4 indicator light on and memorizes the DTC.
- Stops 4WD control and puts the vehicle back in 2WD (FWD).
- Reduces engine torque to suit the driving conditions when the abnormally was detected.

PROGRAMMING

VTM-4 CONTROL UNIT INITIALIZATION

Whenever the VTM-4 control unit is replaced, it must be initialized to make the 4WD system function. There are two methods used to initialize the VTM-4 control unit. One method is to use the Honda PGM Tester with the appropriate software plugged into the Data link Connector (DLC). The other method is to initialize the VTM-4 control unit manually.

Initialization with Honda PGM Tester

1. With the ignition switch off, connect the Honda PGM Tester to the DLC, located behind the driver's dashboard lower cover. See **Fig. 4** .
2. Turn the ignition switch on, and follow the prompts on the Honda PGM Tester screen.

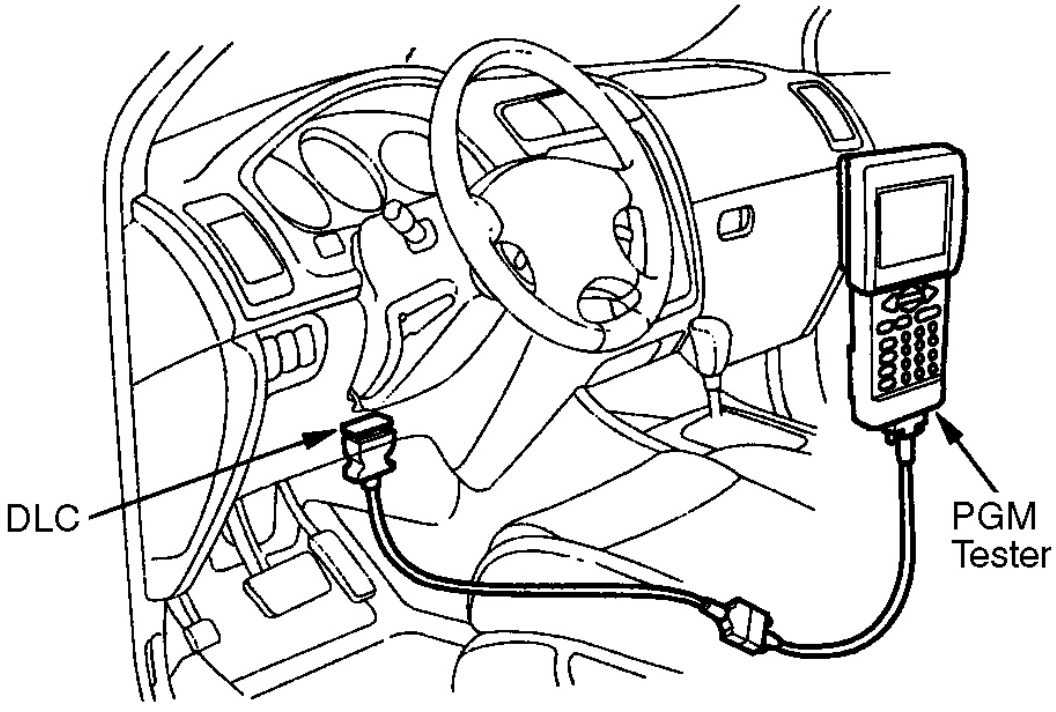


Fig. 4: Locating Data Link Connector (DLC)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Manual Initialization

1. Start the engine. The VTM-4 indicator light should illuminate with the VTM-4 lock switch indicator off.
2. Apply the brakes, and move the shift lever to either the Reverse, 1, or 2 position, then push the VTM-4 lock switch. The VTM-4 indicator light should stay on, and the VTM-4 lock switch indicator should illuminate. The 4WD system is now in lock mode.
3. Turn the ignition switch off.
4. Turn the ignition switch on. The VTM-4 indicator light and the VTM-4 lock indicator light should both illuminate for 4 seconds, then go off. The VTM-4 control unit is initialized.

PERFORMANCE TESTS

DIFFERENTIAL FUNCTION

2WD Mode

1. Raise and support vehicle with all wheels off the ground.

2. Remove the rear wheels.
3. Turn the ignition switch off with the shift lever in the Park position.
4. Release the parking brake.
5. Disconnect the left clutch electromagnetic coil 2-pin connector and the right clutch electromagnetic coil 6-pin connector at rear differential assembly..
6. Using a click-type torque wrench set at 15 ft. lbs. (20 N.m), turn each rear hub clockwise. If both hubs turn without the torque wrench clicking, the differential is okay. If the torque wrench clicks while turning either hub, replace the rear differential. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.

4WD Mode

1. Raise and support vehicle with all wheels off the ground.
2. Remove the rear wheels.
3. Turn the ignition switch off with the shift lever in the Park position.
4. Release the parking brake.
5. Disconnect the left clutch electromagnetic coil 2-pin connector and the right clutch electromagnetic coil 6-pin connector.

WARNING: Connecting battery voltage to the left or right clutch electromagnetic coils for more than 3 minutes will damage the rear differential.

6. To check the left clutch electromagnetic coil, connect battery power to the No. 1 terminal of the left clutch electromagnetic coil 2-pin connector and ground to the No. 2 terminal. See **WIRING DIAGRAMS** .
7. To check the right clutch electromagnetic coil, connect battery power to the No. 6 terminal of the right clutch electromagnetic coil 6-pin connector and ground to the No. 3 terminal.
8. Using a click-type torque wrench set at 148 ft. lbs. (200 N.m), turn each rear hub clockwise. If the torque wrench clicks on both hubs, the differential is okay. If either hub turns, replace the rear differential. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.

BACKLASH INSPECTION

NOTE: No overhaul or disassembly is available from manufacturer. Rear differential is replaced as an assembly.

1. Install the left rear driveshaft. Connect battery power to the No. 1 terminal of the left clutch electromagnetic coil 2-pin connector and ground to the No. 2 terminal.
2. Check backlash at the driveshaft companion flange with a dial indicator. Standard backlash is .048-.094 in. (1.23-2.38 mm).
3. If backlash is out of standard, replace the rear differential. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.

SELF-DIAGNOSTIC SYSTEM

RETRIEVING DIAGNOSTIC TROUBLE CODES

When the VTM-4 control unit senses an abnormality in the input or output systems, the VTM-4 indicator light in the gauge assembly will usually illuminate, and the Malfunction Indicator Lamp (MIL), the D5 indicator light and/or the ABS indicator light may also illuminate.

There are two methods used to check for DTCs. One method is to use the Honda PGM Tester with the appropriate software plugged into the DLC. The other method is to connect the Service Check Signal (SCS) circuit with the Honda PGM Tester. When the DLC is connected to the Honda PGM Tester, the VTM-4 indicator light will indicate the DTC when the ignition switch is turned on and the SCS circuit is connected to body ground.

Honda PGM Tester Method

NOTE: See the Honda PGM Tester user's manual for specific instructions.

1. With the ignition switch off, connect the Honda PGM Tester to the DLC, located behind the driver's dashboard lower cover. See **Fig. 4** .
2. Turn the ignition switch on, and follow the prompts on the Honda PGM Tester to display the DTC(s) on the screen. To determine the meaning of the DTC(s), see **DIAGNOSTIC TROUBLE CODE DEFINITIONS** .
3. If there are fuel and emissions DTCs, A/T DTCs, and/or ABS DTC's at the same time, trouble shoot the fuel and emission DTC's first.
4. After recording the DTCs, clear all DTCs.
5. Test drive the vehicle for several minutes in 4WD mode, and check for DTCs. If the DTC returns, refer to the **DIAGNOSTIC TROUBLE CODE DEFINITIONS** . If the DTC does not return, there was an intermittent problem within the circuit. Ensure all connectors and terminals in the circuit are tight.

Service Check Signal Circuit (SCS) Method

1. Park the vehicle on level ground. Shift to the Park position, then turn off the engine.
2. Release the parking brake pedal.
3. With the ignition switch off, connect the Honda PGM Tester to the DLC, located behind the driver's dashboard lower cover. See **Fig. 4** .
4. Connect the SCS circuit to body ground using the Honda PGM Tester.
5. Turn the ignition switch on, and observe the VTM-4 indicator light. Codes are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code.
6. Record the all DTCs. To determine the meaning of the DTC, see **DIAGNOSTIC TROUBLE CODE DEFINITIONS** .
7. After recording the DTCs, clear all DTCs.
8. If there are fuel and emissions DTCs, A/T DTCs, and/or ABS DTC's at the same time, trouble shoot the

fuel and emission DTC's first.

9. Test drive the vehicle for several minutes in 4WD mode, and check for DTCs. If the DTC returns, refer to **DIAGNOSTIC TROUBLE CODE DEFINITIONS** . If the DTC does not return, there was an intermittent problem within the circuit. Make sure all connectors and terminals in the circuit are tight.

DIAGNOSTIC TROUBLE CODE DEFINITIONS

DIAGNOSTIC TROUBLE CODE IDENTIFICATION

DTC	Description
21	Left Front Wheel Sensor
22	Right Front Wheel Sensor
23	Left Rear Wheel Sensor
24	Right Rear Wheel Sensor
26	ABS Modulator Unit Or Harness
37	Engine RPM Signal Circuit
38	Engine RPM Signal Circuit
41	PCM Communication
42	Differential Oil Temperature Sensor
43	Differential Oil Temperature Sensor
44	VTM-4 Relay
45	ABS Modulator Unit Power Supply
51	Left Clutch Coil
52	Left Clutch Coil
53	Left Clutch Coil
54	Left Clutch Coil
55	Right Clutch Coil
56	Right Clutch Coil
57	Right Clutch Coil
58	Right Clutch Coil
59	Left Or Right Clutch Coil Power Supply
73	MAP Sensor, TP Sensor Or PCM
77	PCM
78	VTM-4 Control Unit

CLEARING DIAGNOSTIC TROUBLE CODES

There are two methods used to clear DTCs. One method is to use the Honda PGM Tester with the appropriate software plugged into the DLC. The other method is to connect the SCS circuit with the Honda PGM Tester and manually clear the memory.

Honda PGM Tester Method

NOTE: See the Honda PGM Tester user's manual for specific instructions.

1. With the ignition switch off, connect the Honda PGM Tester to the DLC, located behind the driver's dashboard lower cover. See **Fig. 4** .
2. Turn the ignition switch on, and follow the prompts on the Honda PGM Tester to clear the DTC(s).

Service Check Signal Circuit Method

1. Park the vehicle on level ground. Shift to the Park position, then turn off the engine.
2. Release the parking brake pedal.
3. With the ignition switch off, connect the Honda PGM Tester to the DLC, located behind the driver's dashboard lower cover. See **Fig. 4** .
4. Connect the SCS circuit to body ground using the Honda PGM Tester.
5. Turn the ignition switch on. See **Fig. 5** .
6. The VTM-4 indicator light should illuminate and stay on for 4 seconds. While the VTM-4 indicator light is on, press and hold the VTM-4 lock switch in.
7. When the VTM-4 indicator light goes off, release the VTM-4 lock switch.
8. The VTM-4 indicator light should illuminate again and stay on for 4 seconds. While the VTM-4 indicator light is on, press and hold the VTM-4 lock switch in.
9. When the VTM-4 indicator light goes off, release the VTM-4 lock switch. The VTM-4 indicator light will blink twice quickly to confirm that the DTCs have been cleared from the VTM-4 control unit memory.
10. If the VTM-4 indicator light does not blink twice quickly, the memory has not been cleared. Turn the ignition switch off, then repeat steps 5 -9 again.
11. Turn the ignition switch off, then disconnect the Honda PGM Tester from the DLC.

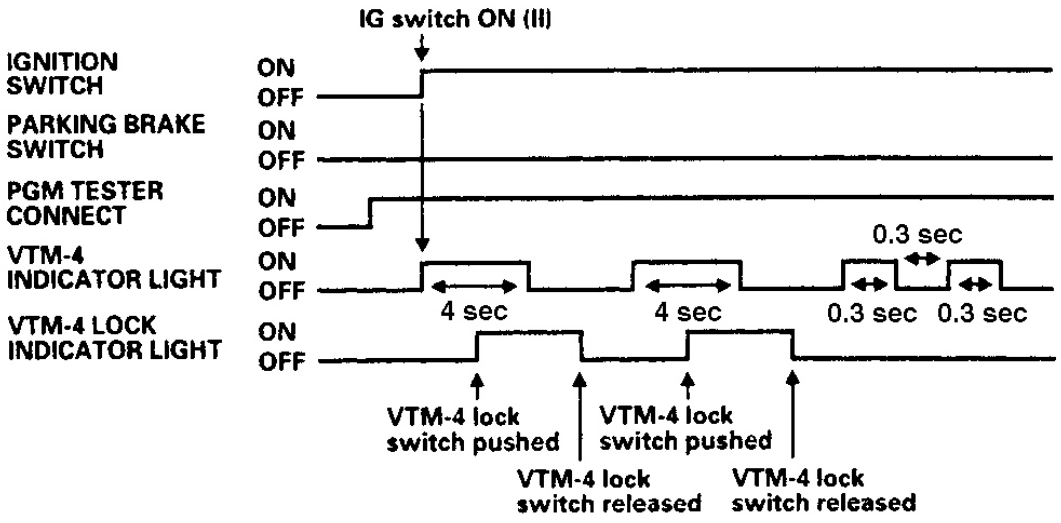


Fig. 5: Clearing Codes (SCS Method)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

AFTER-REPAIR VERIFICATION

After any repairs, perform this procedure to verify proper operation.

1. Turn the ignition switch off.
2. Clear the DTCs from the VTM-4 control unit memory.
3. Disconnect the Honda PGM Tester from the DLC.
4. Verify that the problem has been repaired by test driving the vehicle for several minutes in 4WD mode.

DIAGNOSTIC TESTS

DTC 21, 22, 23 &24: WHEEL SENSOR

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Watch the ABS indicator light. Does the ABS indicator light illuminate? If yes, inspect the ABS system. See **ANTI-LOCK/TRACTION CONTROL** article in BRAKES. If no, go to next step.
4. Raise the vehicle, and make sure it is securely supported.

5. Spin the rear wheels by hand, and check for rear brake drag. Are the rear brakes dragging? If yes, repair cause of rear brake drag and retest. If no, go to next step.
6. Turn the ignition switch on.
7. Measure the voltage between the appropriate terminal of the VTM-4 control unit and body ground while rotating the appropriate wheel one rotation a second. See **VTM-4 WHEEL SENSOR CIRCUIT IDENTIFICATION** table. Is there 2-3 volts? If yes, go to step 13 . If no, go to next step.

VTM-4 WHEEL SENSOR CIRCUIT IDENTIFICATION

DTC (Wheel Sensor)	VTM-4 Terminal No.	ABS Modulator Terminal No.
21 (Left Front)	A8	25
22 (Right Front)	A6	26
23 (Left Rear)	A4	23
24 (Right Rear)	A2	24

8. Turn the ignition switch off.
9. Disconnect the VTM-4 control unit and the ABS control unit connectors.
10. Check the appropriate terminal of the VTM-4 control unit "A" (22-pin) connector for continuity to body ground. See **VTM-4 WHEEL SENSOR CIRCUIT IDENTIFICATION** table. Is there continuity? If yes, repair short to ground in the wire between the appropriate terminal of the VTM-4 control unit and the ABS control unit. If no, go to next step.
11. Connect the appropriate terminal of the VTM-4 control unit "A" (22-pin) connector to body ground with a jumper wire.
12. Check for continuity between the ABS control unit connector terminals and body ground. See **VTM-4 WHEEL SENSOR CIRCUIT IDENTIFICATION** table. Is there continuity? If yes, go to next step. If no, repair open in the wire between the VTM-4 control unit and the ABS control unit.
13. Check for loose terminal fit in the VTM-4 control unit and the ABS control unit connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. Test drive vehicle and monitor the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, replace the ABS modulator assembly. See **ANTI-LOCK/TRACTION CONTROL** article in BRAKES. If no, the system is okay at this time.

DTC 26: ABS MODULATOR UNIT OR HARNESS

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Watch the ABS indicator light. Does the ABS indicator light illuminate? If yes, inspect the ABS system. See **ANTI-LOCK/TRACTION CONTROL** article in BRAKES. If no, go to next step.
4. Raise the vehicle, and make sure it is securely supported.

5. Turn the ignition switch on.
6. Measure the voltage between the all appropriate terminals of the VTM-4 control unit and body ground while rotating the each wheel one rotation a second. See **VTM-4 WHEEL SENSOR CIRCUIT IDENTIFICATION** table. Is there 2-3 volts at all appropriate terminals? If yes, check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, check for loose wires or poor connections between the VTM-4 control unit and the ABS control unit. If it is normal, replace the ABS modulator assembly. See **ANTI-LOCK/TRACTION CONTROL** article in BRAKES.

DTC 37 & 38: ENGINE RPM SIGNAL CIRCUIT

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Watch the MIL indicator light. Does the MIL indicator light illuminate? If yes, inspect the engine performance system. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If no, go to next step.
4. Disconnect the VTM-4 control unit "B" (26-pin) connector.
5. Measure the voltage between the B10 terminal and body ground with the ignition on and with the engine running. Voltage should be more than 10 volts with ignition on, and 5-8 volts with engine running. If voltage is correct, go to step 13 . If voltage is not correct, go to next step.
6. Turn the ignition switch off.
7. Disconnect PCM connector "A" (32-pin).
8. Turn the ignition switch on.
9. Measure the voltage between the B10 terminal of the VTM-4 control unit and body ground. Is there voltage? If yes, repair short to power in the wire between the B10 terminal of the VTM-4 control unit and the A19 terminal of the PCM. If no, go to next step.
10. Turn the ignition switch off.
11. Check for continuity between the B10 terminal of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the B10 terminal of the VTM-4 control unit and the A19 terminal of the PCM. If no, go to next step.
12. Connect the B10 terminal of the VTM-4 control unit to body ground with a jumper wire. Check for continuity between the A19 terminal of the PCM and body ground. Is there continuity? If yes, go to next step. If no, repair open circuit in the wire between the B10 terminal of the VTM-4 control unit and the A19 terminal of the PCM.
13. Check for loose terminal fit in the VTM-4 control unit and PCM connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. Test drive vehicle and monitor the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, replace the PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. If no, the system is okay at this time.

DTC 41: PCM COMMUNICATION (A/T CONTROL SYSTEM)

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Connect the Honda PGM Tester to the Data link Connector (DLC). Check for an A/T system DTC. Is there a DTC? If yes, diagnose the DTC. See **DIAGNOSIS - MGHA** article in AUTOMATIC TRANSMISSIONS. If no, go to next step.
4. Disconnect the "A" (22-pin) connector from the VTM-4 control unit, and the "A" (32-pin) connector from the PCM.
5. Turn the ignition switch on.
6. Measure the voltage between the A5 terminal of the VTM-4 control unit and body ground. Is there more than one volt? If yes, repair short to power in the wire between the A5 terminal of the VTM-4 control unit and the A7 terminal of the PCM. If no, go to next step.
7. Turn the ignition switch off.
8. Check for continuity between the A5 terminal of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the A5 terminal of the VTM-4 control unit and the A7 terminal of the PCM. If no, go to next step.
9. Connect the A5 terminal of the VTM-4 control unit to body ground with a jumper wire. Check for continuity between the A7 terminal of the PCM and body ground. Is there continuity? If yes, go to next step. If no, repair open circuit in the wire between the A5 terminal of the VTM-4 control unit and the A7 terminal of the PCM.
10. Check for loose terminal fit in the VTM-4 control unit and PCM connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. Test drive vehicle and monitor the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, replace the PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. If no, the system is okay at this time.

DTC 42 & 43: DIFFERENTIAL OIL TEMPERATURE SENSOR

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Turn the ignition switch off.
4. Remove the wire harness cover from the rear differential.
5. Disconnect the 2-pin connector from the differential oil temperature sensor. Measure the resistance of the differential oil temperature sensor. See **DIFFERENTIAL OIL TEMPERATURE SENSOR**

RESISTANCE table. Is the resistance correct? If yes, go to next step. If no, replace differential oil temperature sensor. See **DIFFERENTIAL OIL TEMPERATURE SENSOR** under REMOVAL & INSTALLATION.

DIFFERENTIAL OIL TEMPERATURE SENSOR RESISTANCE

Oil Temperature	Resistance (Ohms)
32°F (0°C)	5820-7260
86°F (30°C)	1530-1830
212°F (100°C)	148-162
284°F (140°C)	52-61

6. Disconnect the "B" (26-pin) connector from the VTM-4 control unit.
7. Turn the ignition switch on.
8. Measure the voltage between the B21 and B23 terminals of the VTM-4 control unit and body ground. Is there voltage? If yes, repair short to power in the wire between the B21 or B23 terminal of the VTM-4 control unit and the differential oil temperature sensor. If no, go to next step.
9. Turn the ignition switch off.
10. Check for continuity between the B21 and B23 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the B21 or B23 terminal of the VTM-4 control unit and the differential oil temperature sensor. If no, go to next step.
11. Connect the differential oil temperature sensor connector terminals to body ground with jumper wires. Check for continuity between the B21 and B23 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, check for loose terminal fit in the VTM-4 control unit and differential oil temperature sensor connector. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, repair open in the wire between the B21 or B23 terminal of the VTM-4 control unit and the differential oil temperature sensor.

DTC 44: VTM-4 RELAY

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Turn the ignition switch off. With the VTM-4 control unit still connected, measure the voltage between the B1 and B7 terminals of the VTM-4 control unit and body ground with the ignition switch on, and again after the engine starts. See **VTM-4 RELAY VOLTAGE** table. Is the voltage correct? If yes, go to step 15 . If no, go to next step.

VTM-4 RELAY VOLTAGE

Condition	Terminal B1	Terminal B7
Ignition Switch On	Less than 3 Volts	Battery Voltage

Engine Running	Battery Voltage	Less than 3 Volts

4. Turn the ignition switch off.
5. Remove and check VTM-4 relay. See **VTM-4 RELAY** under COMPONENT TESTS. Is the VTM-4 relay okay? If yes, go to next step. If no, replace the VTM-4 relay.
6. Turn the ignition switch on, with VTM-4 relay removed.
7. Measure the voltage between the No. 1 and No. 5 terminals of the VTM-4 relay 5-pin connector and body ground. Is there battery voltage? If yes, go to next step. If no, check for blown No. 60 (20-amp) fuse in the auxiliary fuse box and/or No. 6 (15-amp) fuse in the driver's under-dash fuse/relay box. If the fuses are okay, repair open in the wire between fuse/relay box and the VTM-4 relay. See **WIRING DIAGRAMS** .
8. Turn the ignition switch off.
9. Disconnect the "B" (26-pin) connector from the VTM-4 control unit.
10. Turn the ignition switch on.
11. Measure the voltage between the B1 and B7 terminals of the VTM-4 control unit and body ground. Is there voltage? If yes, repair short to power in the wire between the B1 or B7 terminals of the VTM-4 control unit and the VTM-4 relay. If no, go to next step.
12. Turn the ignition switch off.
13. Check for continuity between the B1 and B7 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the B1 or B7 terminals of the VTM-4 control unit and the VTM-4 relay. If no, go to next step.
14. Check for continuity of the circuits between the terminals of the VTM-4 control unit and VTM-4 relay 5-pin connector. See **VTM-4 RELAY CIRCUIT IDENTIFICATION** table. If yes, go to next step. If no, repair open in the circuit(s) between the VTM-4 control unit and the VTM-4 relay.

VTM-4 RELAY CIRCUIT IDENTIFICATION

VTM-4 Control Unit Terminal	VTM-4 Relay 5-Pin Connector Terminal No.
B1	2
B7	3

15. Check for loose terminal fit in the VTM-4 control unit and VTM-4 relay 5-pin connectors. If it is normal, test drive vehicle and monitor the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, the system is okay at this time.

DTC 45: ABS MODULATOR UNIT POWER SUPPLY

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light

illuminate? If yes, go to next step. If no, system is okay at this time.

3. Watch the ABS indicator light. Does the ABS indicator light illuminate? If yes, inspect the ABS system. See **ANTI-LOCK/TRACTION CONTROL** article in BRAKES. If no, go to next step.
4. Measure the voltage between the A11 terminal of the VTM-4 control unit and body ground with the ignition switch on, and when the engine is cranking. Battery voltage should exist when ignition is on, no voltage should exist when engine is cranked. Is voltage as specified? If yes, check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, repair open in the wire between the No. 11 terminal of the VTM-4 control unit and the driver's under-dash fuse/relay box.

DTC 51, 52, 53 & 54: LEFT CLUTCH COIL

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Turn the ignition switch off.
4. Disconnect the left clutch electromagnetic coil 2-pin connector on the differential. Measure the resistance between the No. 1 terminal and No. 2 terminal of the left clutch electromagnetic coil connector. Is resistance 1-3 ohms? If yes, go to next step. If no, replace the rear differential assembly. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.
5. Measure the resistance between the No. 1 terminal and differential carrier assembly. Is resistance 50 megohms or more? If yes, go to next step. If no, replace the rear differential assembly. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.
6. Disconnect the "B" (26-pin) connector from the VTM-4 control unit.
7. Turn the ignition switch on.
8. Measure the voltage between the B2 and B15 terminals of the VTM-4 control unit and body ground. Is there voltage? If yes, repair short to power in the wire between the B2 or B15 terminals of the VTM-4 control unit and the left clutch electromagnetic coil. If no, go to next step.
9. Turn the ignition switch off.
10. Measure the resistance between the B2 and B15 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the B2 or B15 terminals of the VTM-4 control unit and the left clutch electromagnetic coil. If no, go to next step.
11. Connect a jumper wire between No. 1 terminal and No. 2 terminal of the 2-pin connector of the left clutch electromagnetic coil. Check for continuity between the B2 terminal and B15 terminal of the VTM-4 control unit. Is there continuity? If yes, check the right clutch coil. See **DTC 55, 56, 57 & 58: RIGHT CLUTCH COIL** . If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, repair open circuit in the wire between the B2 or B15 terminals of the VTM-4 control unit and the left clutch electromagnetic coil.

DTC 55, 56, 57 & 58: RIGHT CLUTCH COIL

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Turn the ignition switch off.
4. Disconnect the right clutch electromagnetic coil 6-pin connector on the differential. Measure the resistance between the No. 3 terminal and No. 6 terminal of the right clutch electromagnetic coil connector. Is resistance 1-3 ohms? If yes, go to next step. If no, replace the rear differential assembly. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.
5. Measure the resistance between the No. 3 terminal and differential carrier assembly. Is resistance 50 megohms or more? If yes, go to next step. If no, replace the rear differential assembly. See **REAR DIFFERENTIAL ASSEMBLY** under REMOVAL & INSTALLATION.
6. Disconnect the "B" (26-pin) connector from the VTM-4 control unit.
7. Turn the ignition switch on.
8. Measure the voltage between the B3 and B16 terminals of the VTM-4 control unit and body ground. Is there voltage? If yes, repair short to power in the wire between the B3 and B16 terminals of the VTM-4 control unit and the right clutch electromagnetic coil. If no, go to next step.
9. Turn the ignition switch off.
10. Measure the resistance between the B3 and B16 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the B3 and B16 terminals of the VTM-4 control unit and the right clutch electromagnetic coil. If no, go to next step.
11. Connect a jumper wire between No. 3 terminal and No. 6 terminal of the 6-pin connector of the right clutch electromagnetic coil. Check for continuity between the B3 terminal and B16 terminal of the VTM-4 control unit. Is there continuity? If yes, check the left clutch coil. See **DTC 51, 52, 53 & 54: LEFT CLUTCH COIL** . If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, repair open circuit in the wire between the B3 and B16 terminals of the VTM-4 control unit and the right clutch electromagnetic coil.

DTC 59: LEFT OR RIGHT CLUTCH COIL POWER SUPPLY

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Check the battery. Is the specified battery installed, and is it fully charged? If yes, go to next step. If no, charge or replace the battery.
4. Watch the charging system indicator. Does the charging system indicator illuminate with ignition switch on, and after the engine starts, does the indicator go off? If yes, check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under

REMOVAL & INSTALLATION. If no, check the charging system. See appropriate GENERATORS & REGULATORS - MDX article in ELECTRICAL.

DTC 73: MAP SENSOR, TP SENSOR OR PCM

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Watch the MIL. Does the MIL illuminate? If yes, check engine control system. See appropriate SELF-DIAGNOSIS article in ENGINE PERFORMANCE. If no, check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION.

DTC 77: PCM

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Replace the PCM, and test-drive the vehicle again, watching for the VTM-4 indicator light. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. Does the VTM-4 indicator light illuminate? If yes, check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, system is okay at this time.

DTC 78: VTM-4 CONTROL UNIT

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

1. Clear the DTC.
2. Test drive the vehicle, and watch for the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, go to next step. If no, system is okay at this time.
3. Check the battery. Is the specified battery installed, and is it fully charged? If yes, go to next step. If no, charge or replace the battery.
4. Watch the charging system indicator. Does the charging system indicator illuminate with ignition switch on, and after the engine starts, does the indicator go off? If yes, go to next step. If no, check the charging system. See appropriate GENERATORS & REGULATORS - MDX article in ELECTRICAL.
5. Check for installation of any aftermarket CB or Ham radios which may cause a RF signal interference. Is

there an aftermarket radio installed? If yes, disconnect the aftermarket radio and retest. If no, check for loose terminal fit in the VTM-4 control unit. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION.

SYMPTOM TESTS

SYMPTOM TEST DIRECTORY

Symptom	Go To Test
VTM-4 Indicator Light Comes On, But No DTC Is Stored	**A**
Indicator Light Does Not Come On	**B**
The VTM-4 Lock Indicator Light Does Not Come On When The VTM-4 Lock Switch Is Pushed	**C**
The VTM-4 Lock Indicator Light Comes On With Ignition Switch On, Does Not Go Off	**D**
The VTM-4 Lock Indicator Light Does Not Come On For About 4 Seconds When Ignition Switch Is Turned On.	**E**

VTM-4 INDICATOR LIGHT

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

TEST A: VTM-4 Indicator Light Comes On, But No DTC Is Stored

1. Check the No. 6 (15-amp) fuse in the driver's underdash fuse/relay box. Is the fuse okay? If yes, go to next step. If no, replace the fuse and recheck.
2. Reinitialize the VTM-4 control unit, and watch the VTM-4 indicator. Does the VTM-4 indicator light illuminate and stay on? If yes, go to next step. If no, the system is okay at this time.
3. Turn the ignition switch off.
4. Measure the voltage between the A12 and A10 terminals of the VTM-4 control unit, and between the B26 and B12 terminal of the VTM-4 control unit. Is there battery voltage? If yes, go to next step. If no, repair open in the wire between A12 or B26 terminals of the VTM-4 control unit and the driver's under-dash fuse/relay box, or repair open in the wire between A10 or B12 terminals of the VTM-4 control unit and body ground.
5. Turn the ignition switch off.
6. Disconnect the VTM-4 control unit and the gauge assembly connectors. See **Fig. 6** .
7. Check for continuity between the A14 and B20 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the A14 or B20 terminals of the VTM-4 control unit and the gauge assembly. If no, go to next step.
8. Reconnect the gauge assembly connectors only, then turn the ignition switch on. Does the VTM-4 indicator light illuminate? If yes, replace the gauge assembly. See **INSTRUMENT PANELS** article in ACCESSORIES & EQUIPMENT. If no, check for loose terminal fit in VTM-4 connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION.

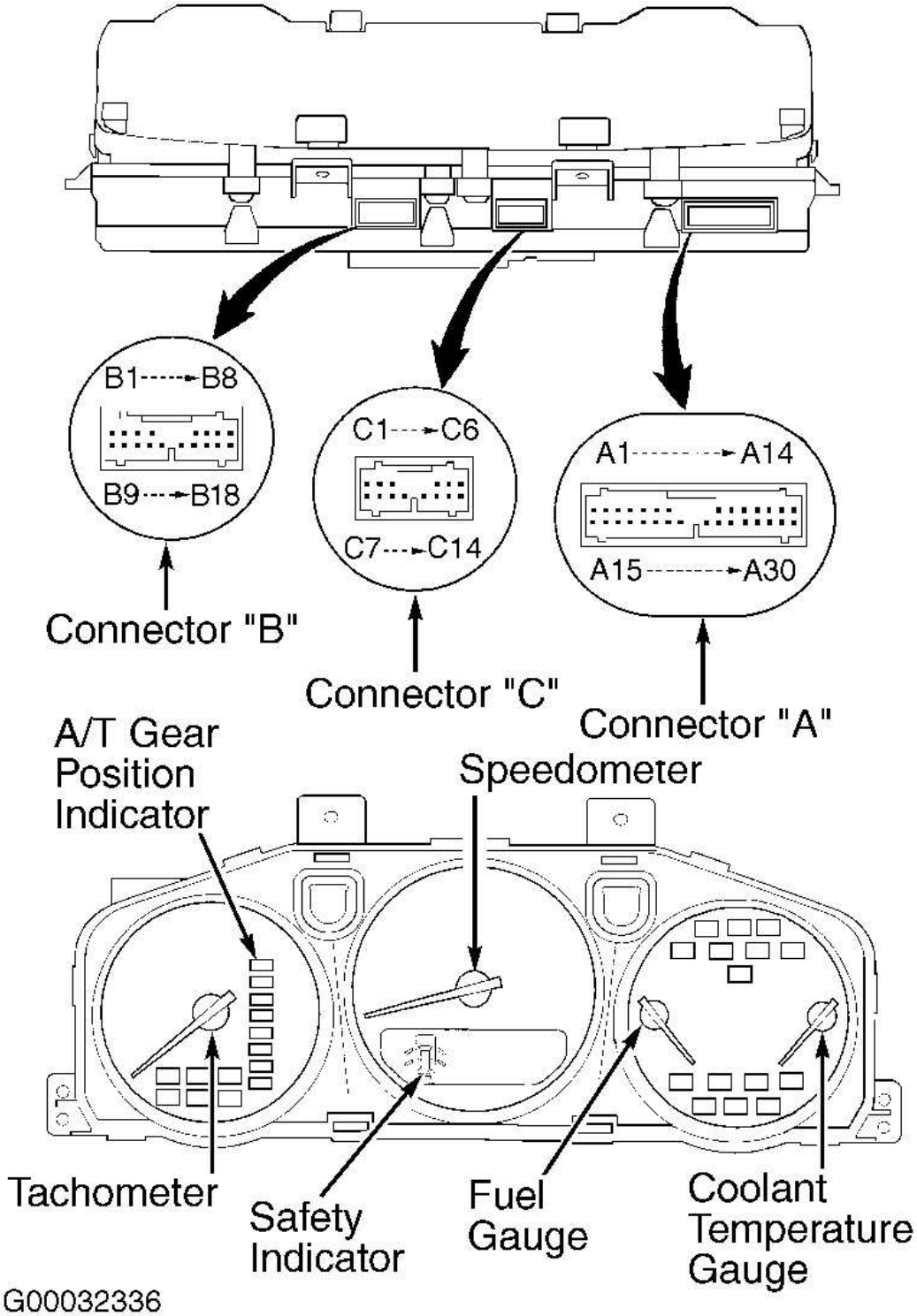

B1
B8
B9
B18
C1
C6
C7
C14
A1
A14
A15
A30
Connector "B"
Connector "C"
Connector "A"
A/T Gear Position Indicator
Speedometer
Tachometer
Safety Indicator
Fuel Gauge
Coolant Temperature Gauge
G00032336

Fig. 6: Exploded View Of Gauge Assembly & Connectors
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TEST B: VTM-4 Indicator Light Does Not Come On

1. Turn the ignition switch on and check operation of all gauge assembly indicator lights. Do all the indicator lights illuminate? If yes, go to next step. If no, check for open or short in the power and ground circuits in the gauge assembly.
2. Disconnect the "A" (22-pin) and "B" (26-pin) connectors from the VTM-4 control unit.
3. Turn the ignition switch on.
4. Connect the A14 or B20 terminals of the VTM-4 control unit to body ground with a jumper wire, and watch the VTM-4 indicator light. Does the VTM-4 indicator light illuminate? If yes, check for loose terminal fit in the VTM-4 control unit connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, go to next step.
5. Turn the ignition switch off.
6. Disconnect the "A" (22-pin) and "B" (30-pin) connectors from the gauge assembly. See **Fig. 6** .
7. Connect the B20 terminal of the gauge assembly to body ground with a jumper wire, then check for continuity between the A14 and B20 terminals of the VTM-4 control unit and body ground. Is there continuity? If yes, check for a blown bulb in the VTM-4 indicator light or a problem in gauge assembly. If no, repair open in the wire between the A7 terminal of the gauge assembly and driver's underdash fuse/relay box.

VTM-4 LOCK INDICATOR LIGHT

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

TEST C: The VTM-4 Lock Indicator Light Does Not Come On When The VTM-4 Lock Switch Is Pushed

NOTE: The VTM-4 LOCK indicator will only illuminate when the engine is running and the transmission is in R, 1 or 2 before the switch is pressed.

1. Check the No. 9 (10-amp) fuse in the driver's underdash fuse/relay box. Is the fuse okay? If yes, go to next step. If no, replace the fuse and recheck.
2. Turn the ignition switch on and watch the VTM-4 LOCK indicator light. Does the VTM-4 LOCK indicator light illuminate with the ignition switch on, and does the light go off 4 seconds later? If yes, go to next step. If no, go to step 10 .
3. Start the engine, and move the shift lever to the Reverse, 1, and 2 positions, then watch the VTM-4 LOCK indicator light. Does the VTM-4 LOCK indicator light illuminate when the VTM-4 lock switch is pushed? If yes, the system is okay at this time. If no, go to next step.
4. Check for A/T system DTC. Is there a DTC? If yes, troubleshoot the A/T system for the cause of the DTC. If no, go to next step.
5. Turn the ignition switch off.
6. Disconnect the "A" (22-pin) and "B" (26-pin) connectors from the VTM-4 control unit.

7. Turn the ignition switch on.
8. Connect a voltmeter between the B11 terminal of the VTM-4 control unit and body ground. Is there battery voltage when the VTM-4 lock switch is pushed? If yes, check for loose terminal fit in the VTM-4 control unit connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, go to next step.
9. Test the VTM-4 lock switch. See **VTM-4 LOCK SWITCH** under COMPONENT TESTS. Is the VTM-4 lock switch okay? If yes, repair open in the wire between the VTM-4 lock switch and the VTM-4 control unit. If no, replace the VTM-4 lock switch. See **VTM-4 LOCK SWITCH** under REMOVAL & INSTALLATION.
10. Connect the B9 terminal of the VTM-4 control unit to body ground with a jumper wire, and watch the VTM-4 LOCK indicator light. Does the VTM-4 LOCK indicator light illuminate? If yes, check for loose terminal fit in the VTM-4 control unit connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, go to next step.
11. Turn the ignition switch off.
12. Remove the VTM-4 lock switch. See **VTM-4 LOCK SWITCH** under REMOVAL & INSTALLATION.
13. Connect the No. 1 terminal of the VTM-4 lock switch 6-pin connector to body ground with a jumper wire. Check the continuity between the B9 terminal and body ground. Is there continuity? If yes, go to next step. If no, repair open in the wire between the B9 terminal and the VTM-4 lock switch.
14. Turn the ignition switch on.
15. Measure the voltage between the No. 2 terminal of the VTM-4 lock switch 6-pin connector and body ground. Is there battery voltage? If yes, replace the VTM-4 LOCK indicator light bulb. If no, repair open in the wire between the No. 2 terminal of the VTM-4 lock switch 6-pin connector and the driver's under-dash fuse/relay box.

TEST D: The VTM-4 Lock Indicator Light Comes On With Ignition Switch On, Does Not Go Off

1. Disconnect the "B" (26-pin) connector from the VTM-4 control unit.
2. Turn the ignition switch on and watch the VTM-4 LOCK indicator light. Does the VTM-4 LOCK indicator light illuminate with ignition switch on? If yes, go to next step. If no, check for loose terminal fit in the VTM-4 control unit connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION.
3. Turn the ignition switch off.
4. Disconnect the VTM-4 lock switch connector.
5. Check for continuity between the B9 terminal of the VTM-4 control unit and body ground. Is there continuity? If yes, repair short to ground in the wire between the B9 terminal of the VTM-4 control unit and the VTM-4 lock switch. If no, replace the VTM-4 lock switch. See **VTM-4 LOCK SWITCH** under REMOVAL & INSTALLATION.

TEST E: The VTM-4 Lock Indicator Light Does Not Come On For About 4 Seconds When Ignition Switch Is Turned On.

1. Disconnect the "B" (26-pin) connector from the VTM-4 control unit.
2. Turn the ignition switch on.
3. Connect the B9 terminal of the VTM-4 control unit to body ground with a jumper wire, and watch the

VTM-4 lock indicator light. Does the VTM-4 lock indicator light illuminate? If yes, check for loose terminal fit in the VTM-4 control unit connectors. If it is normal, replace the VTM-4 control unit. See **VTM-4 CONTROL UNIT** under REMOVAL & INSTALLATION. If no, go to next step.

4. Turn the ignition switch off.
5. Remove the VTM-4 lock switch.
6. Connect the No. 1 terminal of the VTM-4 lock switch 6-pin connector to the body ground with a jumper wire. Check for continuity between the B9 terminal and body ground. Is there continuity? If yes, go to next step. If no, repair open in the wire between the B9 terminal of the VTM-4 control unit and VTM-4 lock switch.
7. Turn the ignition switch on.
8. Measure the voltage between the No. 2 terminal of the VTM-4 lock switch 6-pin connector and ground. Is there battery voltage? If yes, replace VTM-4 LOCK indicator light bulb. If no, repair open in the wire between the No. 2 terminal of the VTM-4 lock switch 6-pin connector and the driver's under-dash fuse/relay box.

COMPONENT TESTS

VTM-4 LOCK SWITCH

NOTE: For circuit reference, see WIRING DIAGRAMS .

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

Remove the VTM-4 lock switch. See **VTM-4 LOCK SWITCH** under REMOVAL & INSTALLATION. Check for continuity between the terminals in each switch position. See **VTM-4 LOCK SWITCH CONTINUITY** table. See **Fig. 7** . If the switch fails any continuity check, replace the switch.

VTM-4 LOCK SWITCH CONTINUITY

Switch Position	Continuity Between Terminals No.
Released	1 & 2, 3 & 5
Pressed	1 & 2, 2 & 4, 3 & 5

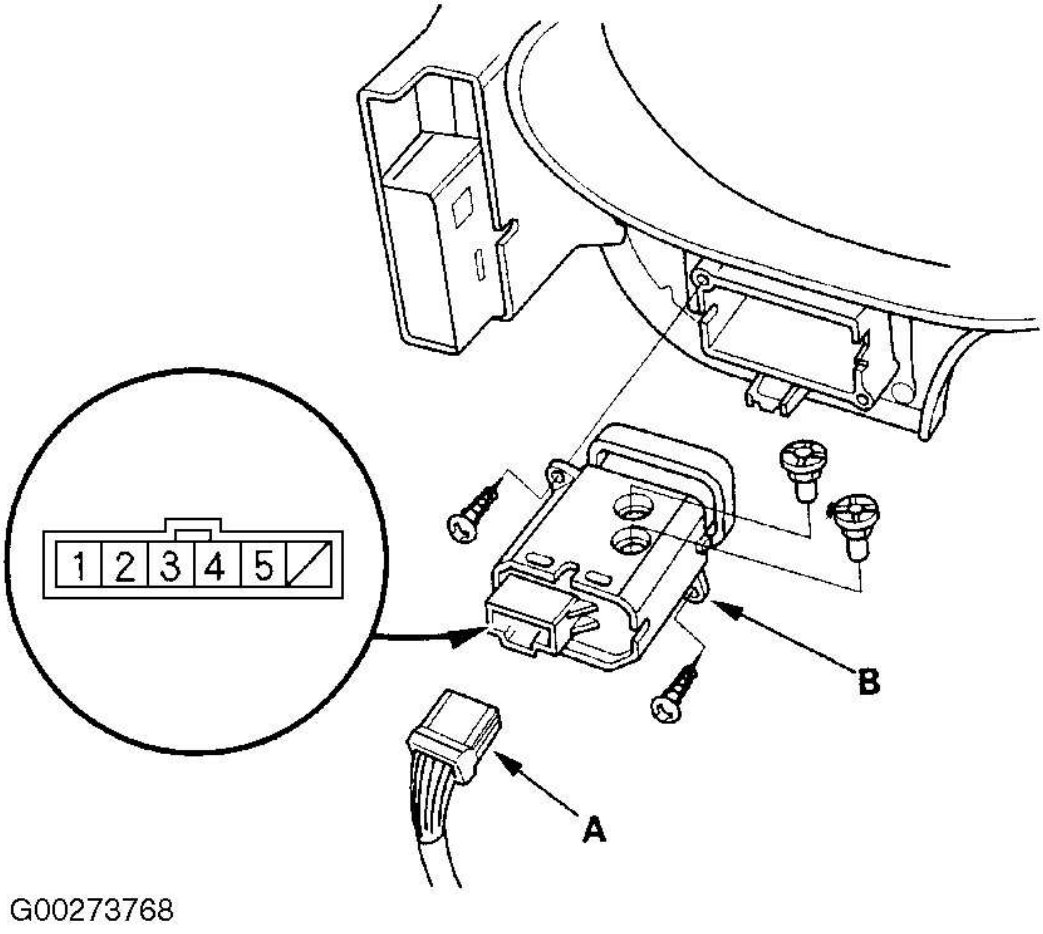


Fig. 7: Identifying VTM-4 Lock Switch & Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VTM-4 RELAY

NOTE: After repairs, perform AFTER-REPAIR VERIFICATION under SELF-DIAGNOSTIC SYSTEM.

NOTE: VTM-4 relay does not have 5 terminals. This application is missing the No. 4 terminal in illustration.

Remove VTM-4 relay . Check for continuity between the terminals. See **Fig. 8** . There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 5 terminals. There should be no continuity between the No. 1 and No. 2 terminals when power is disconnected.

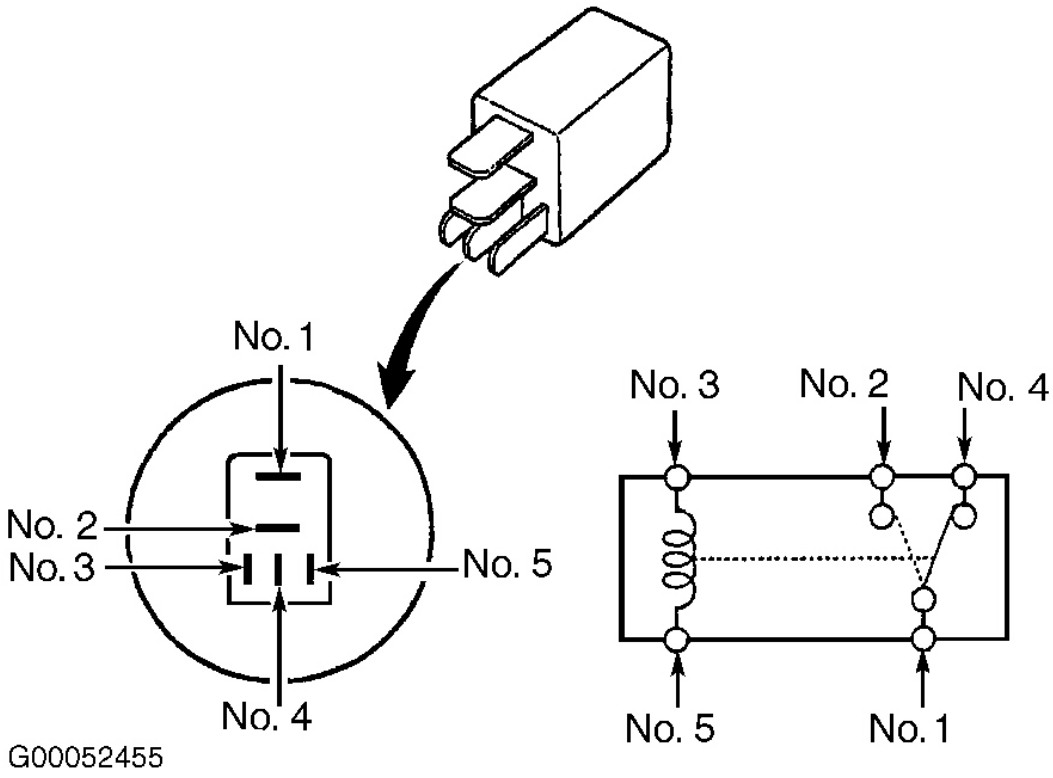


Fig. 8: Testing VTM-4 Relay
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REMOVAL & INSTALLATION

WARNING: Vehicle is equipped with Supplemental Inflatable Restraint (SIR) system. When servicing vehicle, use care to avoid accidental air bag deployment. SIR system-related components are located in various locations throughout interior and exterior of vehicle, depending on application. Do not use electrical test equipment on or near these circuits. If necessary, deactivate SIR system before servicing components. See appropriate AIR BAG DEACTIVATION PROCEDURES article in GENERAL INFORMATION.

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

DIFFERENTIAL OIL TEMPERATURE SENSOR

Removal & Installation

Raise and support vehicle. Remove the wire harness cover, then disconnect the differential oil temperature sensor 2-pin connector. See **Fig. 9** . Remove the differential oil temperature sensor. Install the differential oil temperature sensor in the reverse order of removal, with a NEW "O" ring. Tighten to specification. See **TORQUE SPECIFICATIONS** .

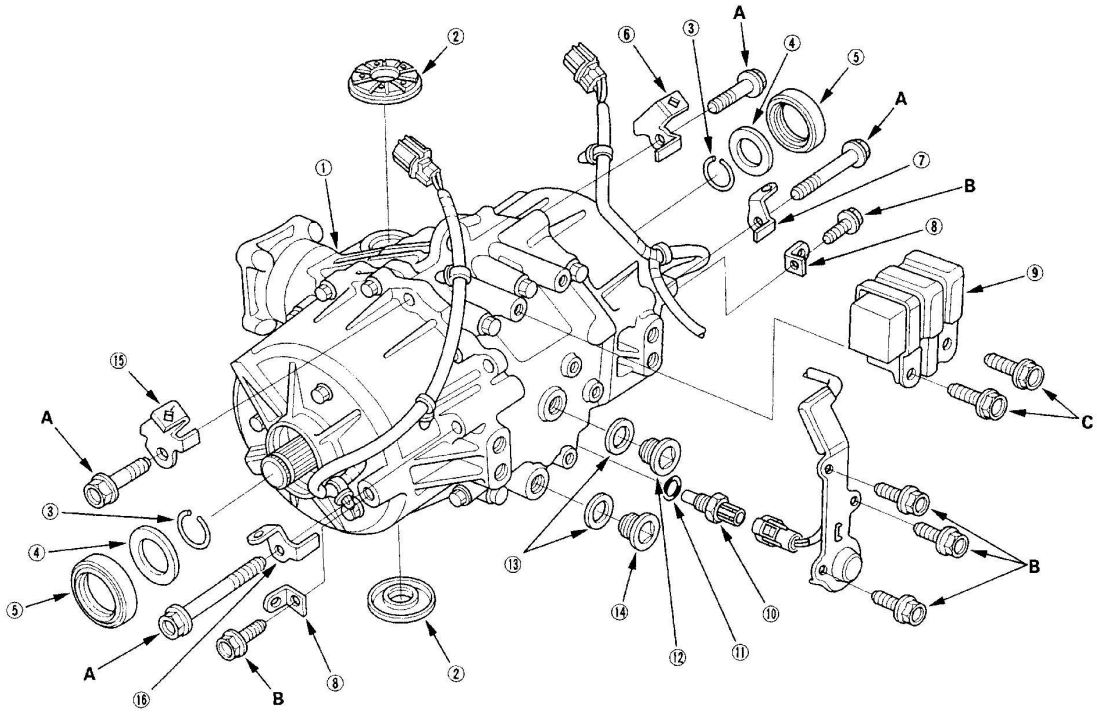


Fig. 9: Exploded View Of Rear Differential
Courtesy of AMERICAN HONDA MOTOR CO., INC.

REAR DIFFERENTIAL ASSEMBLY

NOTE: No overhaul or disassembly is available from manufacturer. Rear differential is replaced as an assembly. See Fig. 9 .

Removal & Installation

1. Drain the differential fluid. Make a reference mark across the propeller shaft, the transfer assembly and the rear differential. Remove the propeller shaft. See DRIVESHAFT under **REMOVAL & INSTALLATION** in DRIVE SHAFTS - MDX article in DRIVELINE/AXLES.
2. Remove the left upper arm bolt, then remove the upper arm from the vehicle. See **UPPER & LOWER CONTROL ARMS** under REMOVAL & INSTALLATION in REAR - MDX, RSX, 3.2CL, 3.2TL & 3.5RL article in SUSPENSION.
3. Remove the left rear damper. Remove both inboard joints using Special Tool (07AAD-S3VA00). See REMOVAL & INSTALLATION in AXLE SHAFTS - REAR MDX article in DRIVELINE/AXLES.
4. Place a transmission jack under the rear differential. Disconnect the 6-pin and 2-pin harness connectors. Remove the mounting bolts and washer.
5. Lower the rear differential slightly, then remove axle shafts from differential. Disconnect the breather tube and lower the rear differential with the transmission jack.
6. To install, reverse removal procedure. Apply grease to axle shaft splines before connecting to differential. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** . Fill with proper differential fluid. See **FLUIDS** under DESCRIPTION & OPERATION.

VTM-4 CONTROL UNIT

NOTE: The VTM-4 control unit must be programmed after replacement for the 4WD system to function. See PROGRAMMING .

Removal & Installation

1. Remove the front mounting bolts from the right third row seat, and fold the seat cushion back.
2. Remove the cover from the right rear side trim panel to gain access to the VTM-4 control unit.
3. Remove the 3 bolts from the VTM-4 control unit. Disconnect the VTM-4 control unit connectors. Remove the VTM-4 control unit.
4. To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .

VTM-4 LOCK SWITCH

Removal & Installation

Remove instrument cluster. See appropriate INSTRUMENT PANELS article in ACCESSORIES & EQUIPMENT. Disconnect the 6-pin connector from the VTM-4 lock switch. See **Fig. 7** . Remove two screws and the switch. To install, reverse removal procedure.

VTM-4 RELAY

Removal & Installation

Remove the right rear side trim panel. See **RIGHT REAR SIDE TRIM PANEL** . Remove the VTM-4 relay.

To install, reverse removal procedure.

RIGHT REAR SIDE TRIM PANEL

Removal & Installation

Remove third row seat belt upper anchor bolt. Remove "D" pillar trim. See **Fig. 10** . Remove cargo lid. Remove rear trim panel Remove right rear side trim panel. See **Fig. 11** . To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .

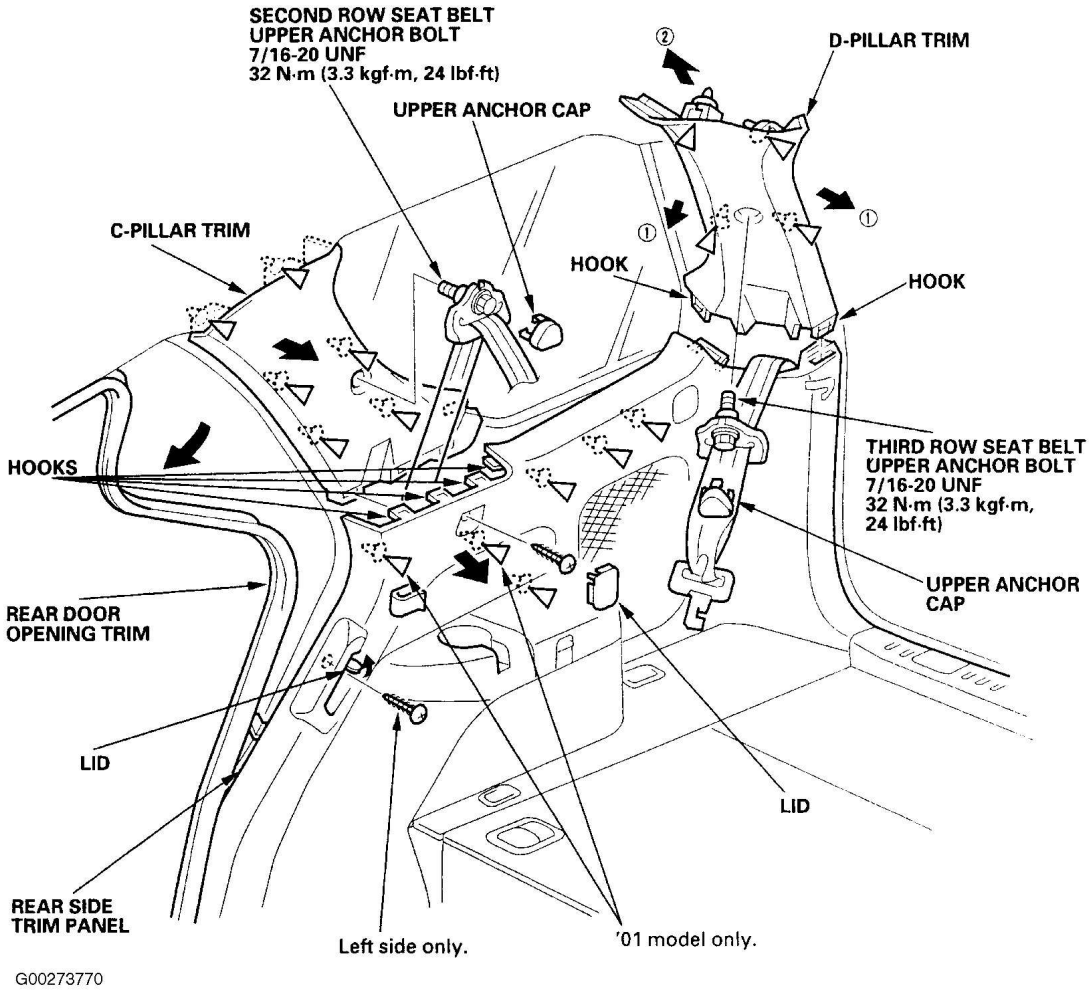


Fig. 10: Removing "D" Pillar Trim
Courtesy of AMERICAN HONDA MOTOR CO., INC.

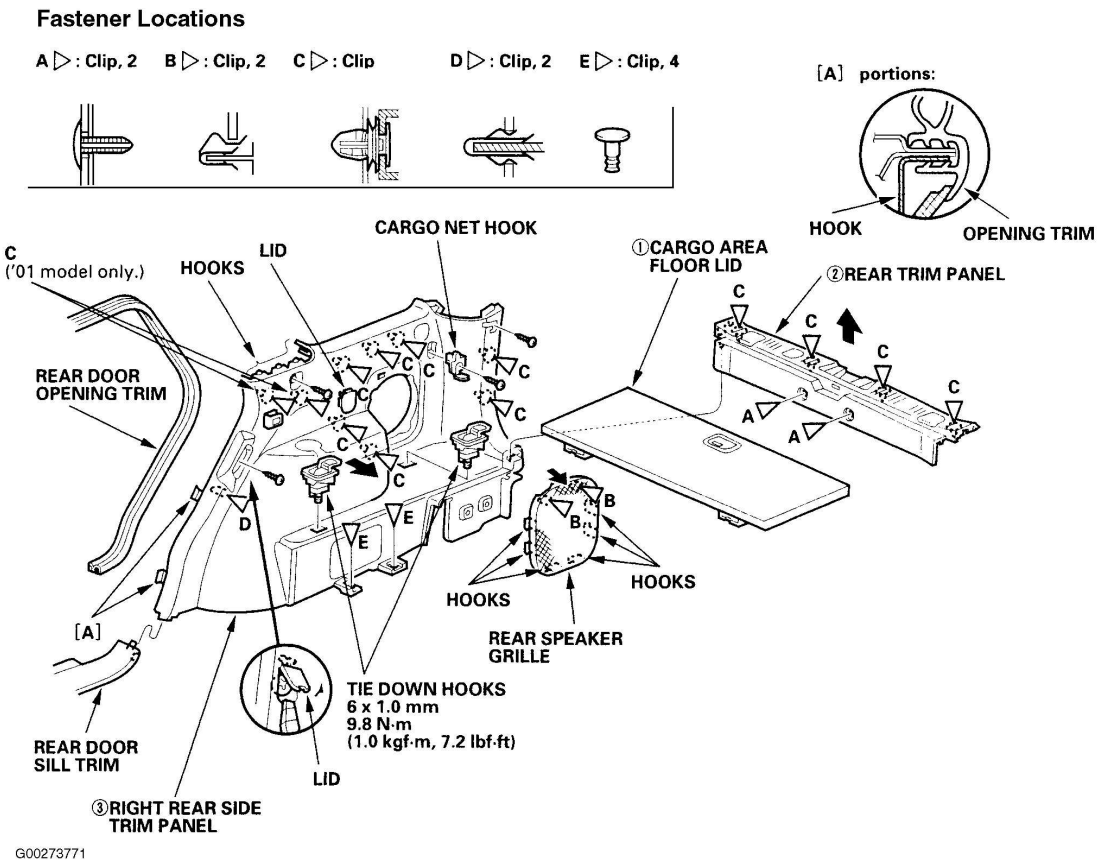


Fig. 11: Removing Left Rear Side Panel
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Differential Drain Plug	35 (47)
Differential Filler Plug	35 (47)
Differential Oil Temperature Sensor	13 (18)
Differential Mounting Bolt (Horizontal)	63 (85)
Differential Mounting Bolt (Vertical)	41 (55)
Differential Damper Bolt	16 (22)
Third Row Seat Front Mounting Bolt	35 (47)
Third Row Seat Belt Anchor Bolt	24 (32)
Wheel Lug Nut	80 (108)
	INCH Lbs. (N.m)
Differential Wire Harness Bracket Bolt	9 (12)

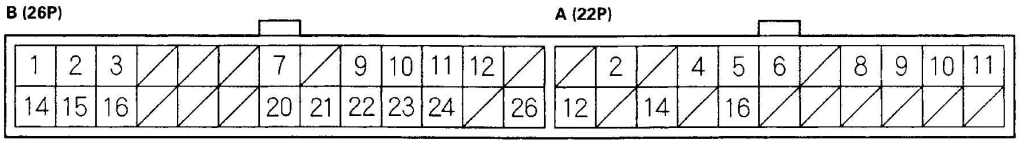
Differential Wire Harness Cover Bolt	9 (12)
Tie Down Hook	6 (9.8)
VTM-4 Control Unit Bolt	9 (12)

CONNECTOR IDENTIFICATION

For VTM-4 control unit terminal identification, see **Fig. 12** .

PIN VOLTAGE TESTS

VTM-4 Control Unit Connector Terminal Locations



Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement	
				Conditions	Voltage
A2	GRY/RED	RRP (Rear right pulse)	Detects right-rear wheel sensor signal	Turn wheel at 1 turn/ second	2 V – 3 V
A4	GRY/YEL	RLP (Rear left pulse)	Detects left-rear wheel sensor signal		
A5	BLK	FIRX (Fuel injection receiver)	Reception signal from PCM	Ignition switch ON (II)	Above 5 V
A6	LT GRN	FRP (Front right pulse)	Detects right-front wheel sensor signal	Turn wheel at 1 turn/ second	2 V – 3 V
A8	WHT/RED	FLP (Front left pulse)	Detects left-front wheel sensor signal		
A9	WHT	FITX (Fuel injection transmitter)	Sending signal to PCM	Ignition switch ON (II)	Above 5 V
A10	BRN/BLK	LG (Logic ground)	Ground		Below 1 V
A11	ORN	IG 2 (Ignition 2)	Power supply for activating the system	Ignition switch ON (II)	Battery Voltage
A12	BLK/YEL	IG 1 (Ignition 1)	Power supply for activating the system	Ignition switch ON (II)	Battery Voltage
A14	RED/WHT	WARN 1 (Warning 1)	Drives VTM-4 indicator light	VTM-4 indicator light on	Below 4 V
				VTM-4 indicator light off	Battery Voltage
A16	LT BLU	LET (Line end tester)	Communication signal to Honda PGM Tester	Ignition switch ON (II) (Not connected to PGM Tester)	About 5 V

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Fig. 12: VTM-4 Pin Voltage Chart (1 Of 3)
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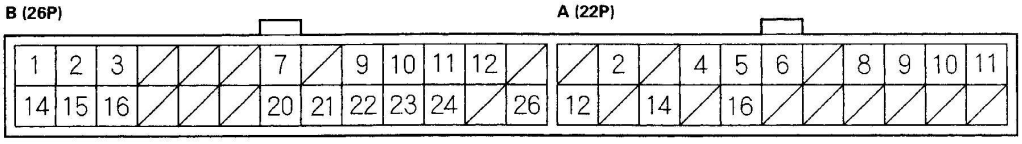
VTM-4 Control Unit Connector Terminal Locations



Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement	
				Conditions	Voltage
B1	RED/BLU	PWR (Power)	Power supply for VTM-4 control unit	10 seconds after Ignition switch ON (II)	Below 3 V
				Engine running	Battery Voltage
				VTM-4 lock mode	Above 8 V
B2	BLK/RED	LCOH (Left coil high)	Drives left clutch electromagnetic coil (Positive)	Ignition switch ON (II)	Below 1 V
				Engine running	Below 1 V
				VTM-4 lock mode	Above 3 V
B3	BRN	RCOH (Right coil high)	Drives right clutch electromagnetic coil (Positive)	Ignition switch ON (II)	Below 1 V
				Engine running	Below 1 V
				VTM-4 lock mode	Above 3 V
B7	ORN/GRN	FSR (Fail-safe relay)	Drives VTM-4 relay	Ignition switch ON (II)	Battery Voltage
				Engine running	Below 1 V
B9	YEL/BLK	LCOKH (Lock lamp)	Drives VTM-4 LOCK indicator light	VTM-4 LOCK indicator light on	Below 4 V
				VTM-4 LOCK indicator light off	Battery Voltage
B10	GRN/BLU	NE (Engine revolution)	Detects engine revolution signal	Ignition switch ON (II)	Above 8 V
				Engine running at 1,000 rpm	5 V – 8 V
B11	BRN/WHT	LOCKSW (Lock switch)	Detects VTM-4 lock switch signal	Ignition switch ON (II)	Below 1 V
				VTM-4 lock mode	Battery Voltage
B12	BRN/BLK	LG (Logic ground)	Ground		Below 1 V
B14	BLK	PG (Power ground)	Ground		Below 0.5 V
B15	BLK/WHT	LCOL (Left coil low)	Drives left clutch electromagnetic coil (Negative)	Ignition switch ON (II)	Below 1 V
				Engine running	Below 1 V
				VTM-4 lock mode	Below 1 V

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Fig. 13: VTM-4 Pin Voltage Chart (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

B16	GRN	RCOL (Right coil low)	Drives right clutch electromagnetic coil (Negative)	Ignition switch ON (II)	Below 1 V
				Engine running	Below 1 V
				VTM-4 lock mode	Below 1 V
B20	RED/WHT	WARN 2 (Warning 2)	Drives VTM-4 indicator light	VTM-4 indicator light on	Below 4 V
				VTM-4 indicator light off	Battery Voltage
B21	WHT	TCH (Temperature coil high)	Power supply for differential oil temperature sensor	Check at normal temperature with the ignition switch ON (II)	4 V – 5 V
B22	BRN	SCS (Service check signal)	Detects service check connector signal	SCS circuit shorted	Below 2 V
				SCS circuit opened	About 5 V
B23	BLK	TCL (Temperature coil low)	Detects differential oil temperature sensor signal	Check at normal temperature with the ignition switch ON (II)	3 V – 4.2 V
B24	GRN/RED	PARBRK (Parking brake)	Detects parking brake signal	Parking brake on	Below 2 V
				Parking brake off	Battery Voltage
B26	BLK/YEL	IG 1 (Ignition 1)	Power supply for activating the system	Ignition switch ON (II)	Battery Voltage

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Fig. 14: VTM-4 Pin Voltage Chart (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

WIRING DIAGRAMS

2002 Acura MDX

2001-02 DRIVE AXLES Variable Torque Management Diagnosis - MDX

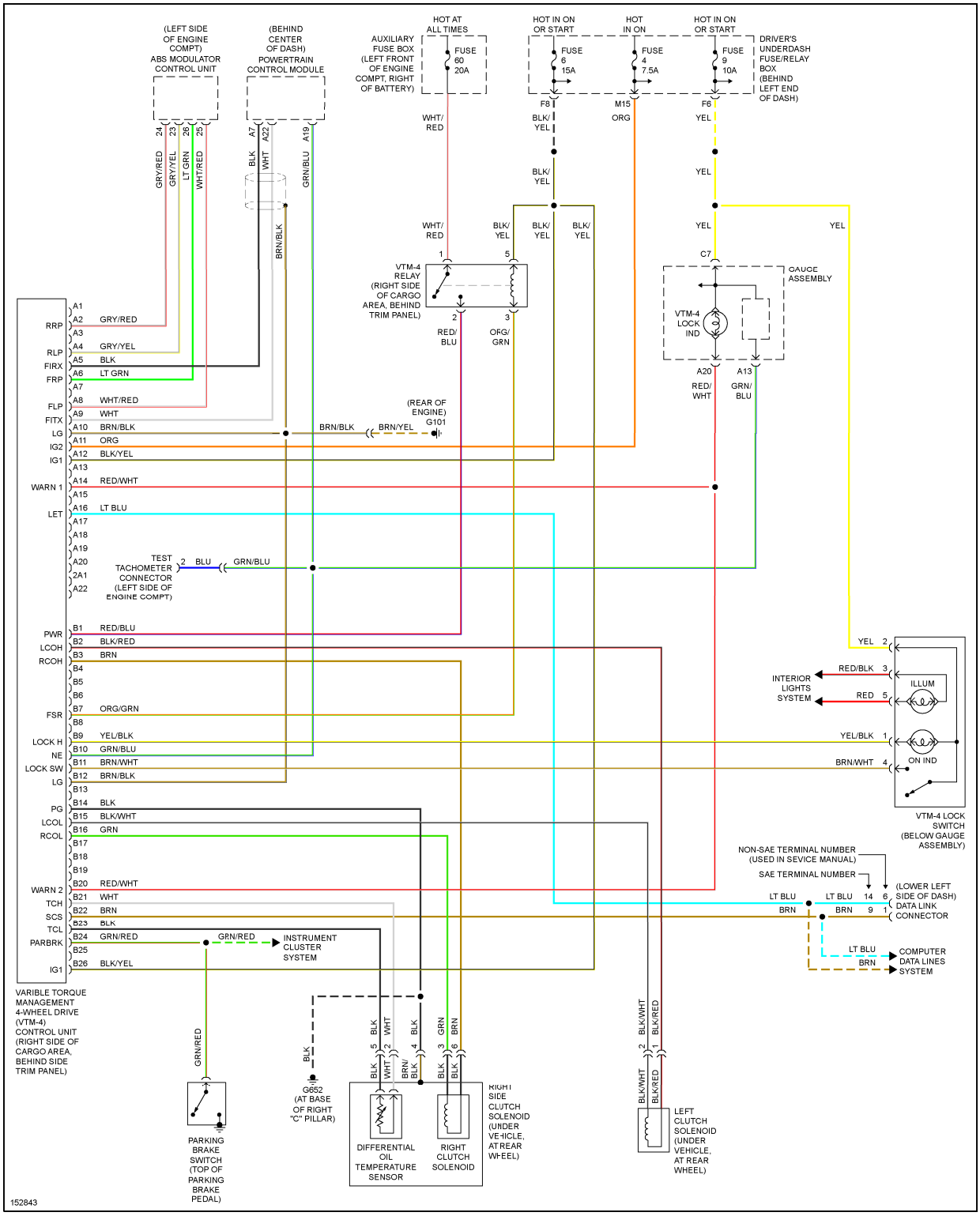

Fig. 15: Variable Torque Management Circuit Wiring Diagram (2001-2002)