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1. MANUAL TRANSMISSIONS

1.1. CIRCUIT FUNCTIONS

The manual transmission interfaces with the vehicle electrical system through a vehicle speed sensor, and back-up light switch.

Vehicles with a transmission temperature gauge will also have a temperature sensor on the transmission.

1.2. DIAGNOSTICS

The ESC will set a diagnostic trouble code for a short to ground in the transmission temperature sensor circuits. It is not able to detect an open circuit.

The ESC is not able to detect faults in the back-up light circuits. A fault in the back-up light circuits will be apparent when the transmission is shifted into reverse and the lights don't come on.

The engine controller will monitor the vehicle speed circuits for failures. A fault in the vehicle speed sensor circuits will be apparent when the speedometer is inoperative and the yellow "ENGINE" warning lamp is on.

1.3. BACK-UP LIGHT SWITCH

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

When the transmission is shifted into reverse, the back up light switch should close to provide voltage for the back up lamps.

A fault in the back-up circuits should be suspected if the back-up lights do not come on when the transmission is shifted into reverse. Problems in the back-up light circuits can be caused by open or short circuits, a blown fuse, or failed switch.

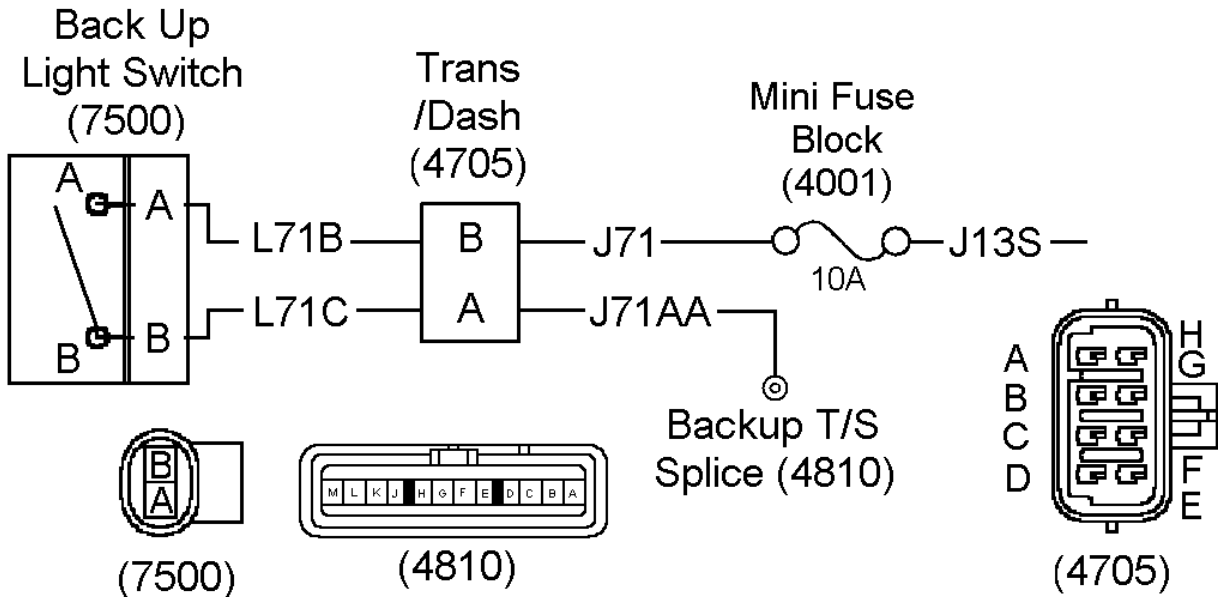


Figure 469 Back Up Switch Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (4810) BACKUP LIGHT TURN SIGNAL SPLICE CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR PDC
- (7500) BACK UP LIGHT SWITCH CONNECTOR
LOCATED ON MANUAL TRANSMISSION

Table 320 Back Up Light Circuit Checks

Back Up Light Switch Connector (7500) Power Checks		
Check with ignition on and (7500) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Back up switch harness connector (7500), cavity A to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit J71B or J71.
Back up switch harness connector (7500), cavity A to cavity B.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L71C or J71AA to back up/turn signal splice (4810). Also check circuits through back up lamps to ground.
If voltages are correct, consider replacing the back up switch.		

Extended Description

Ignition voltage is supplied to the back up light switch connector (7500), terminal A, from the 10 amp back up light fuse in the engine compartment power distribution center (PDC).

When the transmission is shifted into reverse, the switch will close supplying ignition voltage to the lamp circuits.

1.4. VEHICLE SPEED SENSOR

Refer to Speedometer (See SPEEDOMETER, page 249) for procedures to isolate speedometer problems to the sensor circuits.

Refer to the applicable engine manual for troubleshooting circuits from the engine controller to the sensor.

Circuit Function

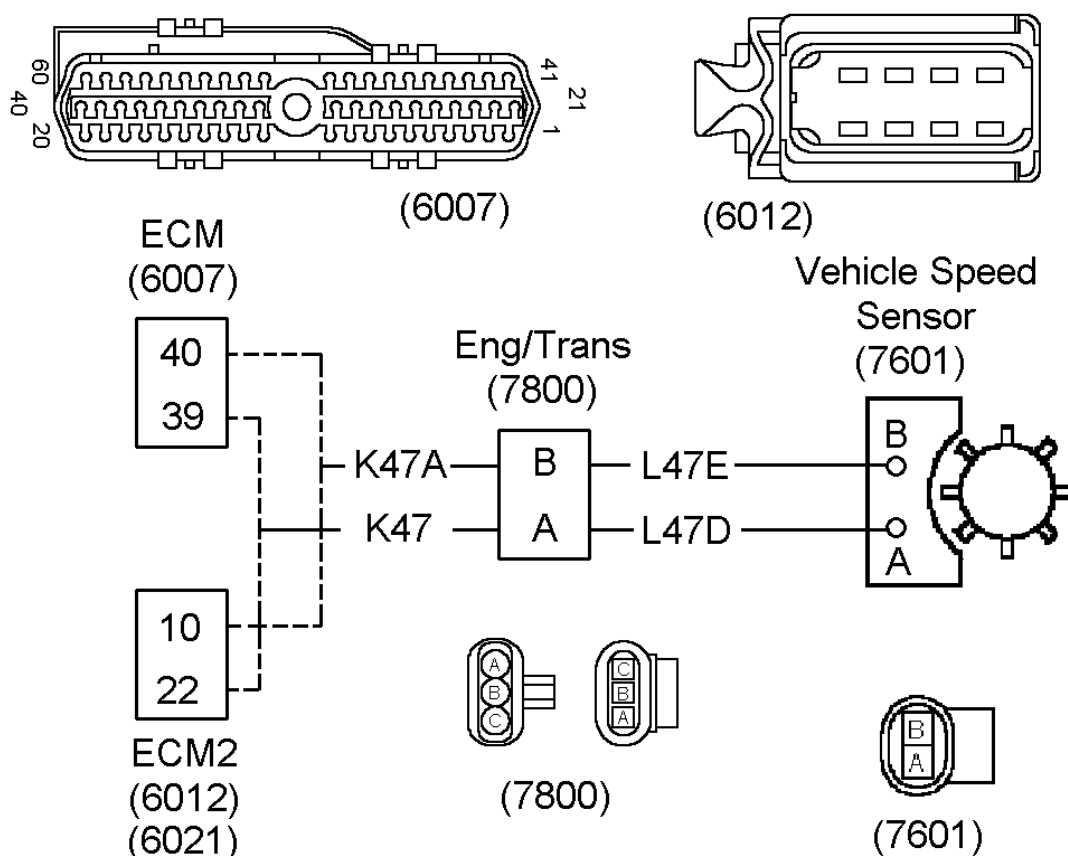


Figure 470 Transmission Vehicle Speed Sensor Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (6007) I6 ENGINE ECM BLACK CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (6012) (6021) V8 ENGINE ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7601) TRANSMISSION SPEED SENSOR
LOCATED ON MANUAL TRANSMISSION
- (7800) ENGINE/TRANSMISSION
LOCATED IN ENGINE COMPARTMENT NEAR ENGINE CONTROLLER

Testing Vehicle Speed Sensor

Construct test leads using terminals (International Part No. 1680205C1), short length of 16 gauge wire and alligator clips.



WARNING – A jack must never be used alone to support vehicle. The jack may lower and serious injury could result. Always support vehicle with floor jacks. Always block wheels to prevent vehicle from moving.



WARNING – EXTREME CAUTION should be used to prevent personal injury resulting from contact with rotating vehicle wheels when connecting test leads.

Table 321 Testing Vehicle Speed Sensor

STEP	KEY	ACTION	TEST POINTS	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	Off	Inspect VSS for damage before performing this test.			Go to next step.	
2.	Off	Disconnect engine harness (7601) from VSS and use test leads to measure resistance between terminal A and B of sensor connector.	VSS, terminal A to B.	600 to 800 ohms.	Go to next step.	Replace the vehicle speed sensor (VSS).
3.	Off	Measure resistance to ground at both sensor terminals.	VSS, term. 1 and 2 to ground.	>100K ohms.	Go to next step.	Replace the vehicle speed sensor (VSS).
4.	Off	Block front wheels and place rear axles on floor stands.			Go to next step.	
5.	Off	Use AC voltmeter with sufficient length leads to avoid personal contact with rotating vehicle wheels during test. Connect meter leads to test leads.			Go to next step.	
6.	Off	Run engine at idle speed, with transmission in high gear. Measure	VSS, across terminals.	>2.0 volts AC	VSS checks good.	Replace the VSS.

Table 321 Testing Vehicle Speed Sensor (cont.)

STEP	KEY	ACTION	TEST POINTS	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
		voltage across the two sensor terminals.				

1.5. TRANSMISSION TEMPERATURE SENSOR

Refer to Transmission Oil Temperature Gauge (See TRANSMISSION OIL TEMPERATURE GAUGE, page 263) for troubleshooting procedures.

1.6. COMPONENT LOCATIONS

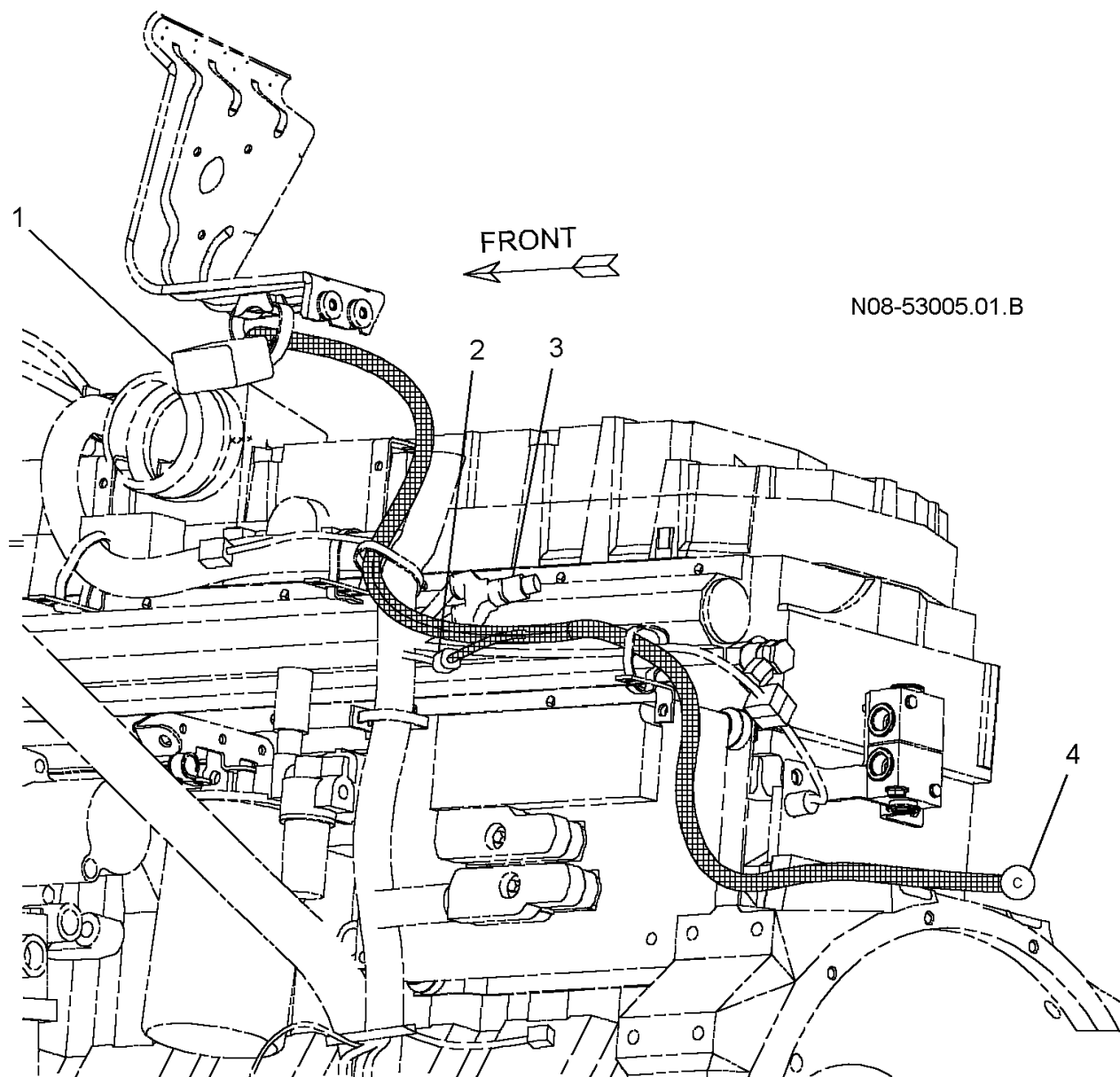


Figure 471 Transmission Harness

1. TRANSMISSION DASH CONNECTOR (4705)
2. ENGINE/TRANSMISSION CONNECTOR (7800)
3. DRIVETRAIN 1939 TERMINATOR
4. TO TRANSMISSION

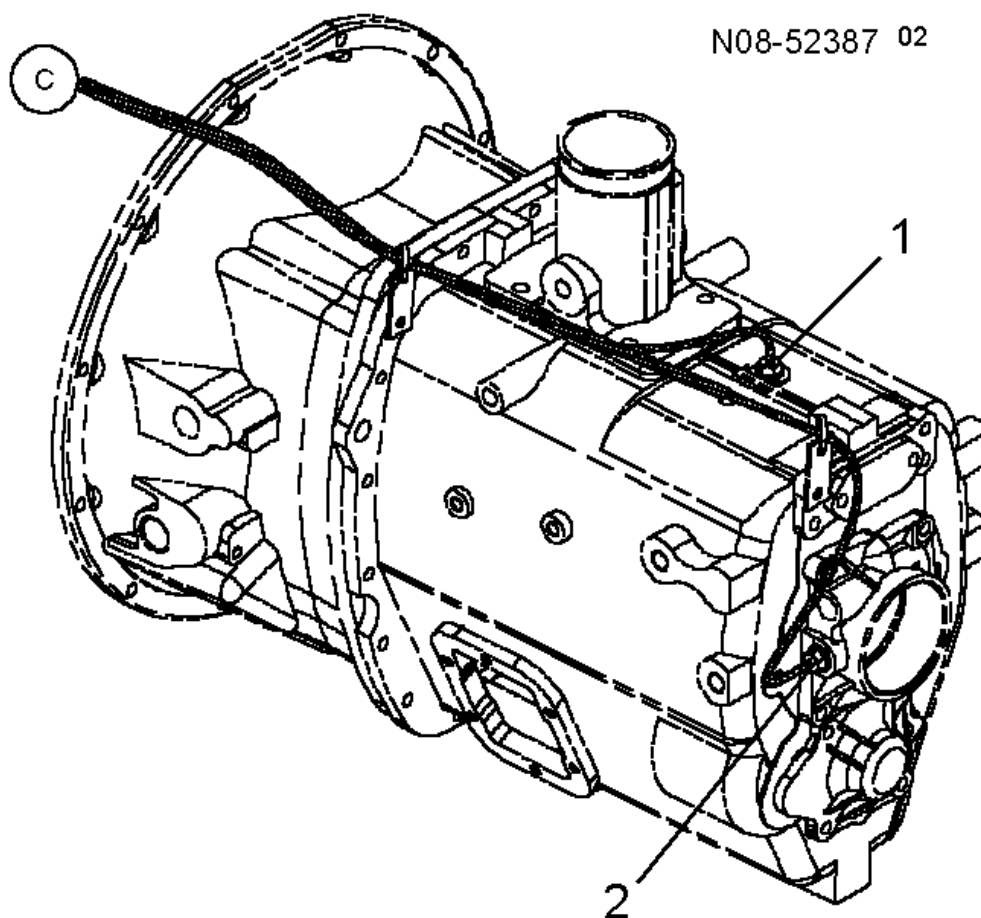


Figure 472 Typical Manual Transmission Wiring

1. (7500) BACK-UP LIGHT SWITCH
2. (7601) VEHICLE SPEED SENSOR

2. ALLISON® MD TRANSMISSION

Discussion of the MD transmission In this section is limited to the transmission electronic control unit (ECU) power circuits and data link connectivity. For detailed information on transmission diagnostics, refer to the Allison service manual.

2.1. CIRCUIT FUNCTIONS

The MD transmission ECU interfaces with the vehicle on the Drive Train 1939 Data Link and several discrete circuits.

A backup lamp relay converts the low backup signal from the ECU to a 12 volt signal and powers the back up lamps.

The ECU receives power from a clean battery feed in the battery box.

A backup lamp relay converts the low backup signal from the ECU to a 12 volt signal and powers the back up lamps.

The neutral signal from the transmission ECU is communicated to the ESC and the engine controller.

The vehicle speed signal is provided by the ECU on circuits to the engine controller.

2.2. DIAGNOSTICS

The ESC will log a DTC and command the “CHECK TRANS” lamp on if communication with the transmission ECU is lost.

The transmission ECU has its own diagnostic system which will turn on the “CHECK TRANS” lamp when there is a detectable fault. Diagnostic codes can be read from the lamps on the transmission shift selector or with the Allison Transmission Diagnostic Tool (ATDT) software. Refer to the applicable troubleshooting manual for details. If the diagnostic software is unable to communicate with the ECU there may be circuit problems in the 1708 data link. Refer to 1708 Data Link. (See 1708 DATA LINK, page 75)

There are no diagnostic trouble codes (DTC's) associated with the back-up light circuits. A fault in the back-up light circuits will be apparent when the transmission is shifted into reverse and the lights don't come on.

Table 322 MD Preliminary Check

STEP	KEY	ACTION	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	On	Does the engine crank when the transmission is in neutral?	Engine cranks when the transmission is in neutral.	Go to next step.	Refer to Engine Cranking. (See ENGINE CRANKING, page 375)
2.	On	Does the “CHECK TRANS” lamp turn off after the vehicle is started.	Lamp turns off after vehicle is started.	Go to next step.	Refer to the applicable transmission service manual.
3.	On	Are there any active DTC's associated with the transmission? Refer to Diagnostic Trouble Codes. (See DIAGNOSTIC TROUBLE CODES (DTC), page 953)	Transmission communication DTC is not active (no codes).	Go to next step.	Go to ECU Power and Data Link Circuits. (See ECU POWER AND DATA LINK CIRCUITS, page 953)
4.	On	Does the Check Transmission Warning Lamp remain illuminated.	Warning lamp remains on after bulb check	Refer to the applicable Allison service manual.	Go to next step.
5.	On	Does the shift selector appear to be malfunctioning?	Check shift selector for correct operation.	Go to next step.	Go to Shift Selector Circuits. (See SHIFT SELECTOR CIRCUITS, page 960)

Table 322 MD Preliminary Check (cont.)

STEP	KEY	ACTION	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
6.	On	Do the back-up lights come on when the transmission is shifted into reverse?	Back-up lights come on when in reverse.	Transmission circuits are functioning. Go to next step.	Go to Neutral Signal Light Circuits. (See NEUTRAL SIGNAL CIRCUITS , page 956) Go to Back-Up Light Circuits. (See BACK-UP LIGHT CIRCUITS , page 958)
If transmission is still not operating correctly, refer to the appropriate Allison service manual.					

2.3. DIAGNOSTIC TROUBLE CODES (DTC)

To display ESC diagnostic codes, put the vehicle in diagnostic mode. Set the parking brake and turn the Ignition key "ON". Then press the Cruise "ON" switch and the Cruise "Resume" switch. If no diagnostic trouble codes are present, the cluster odometer will display "NO FAULT". If diagnostic trouble codes are present, the gauge cluster will display the total number of faults and cycle to the next diagnostic trouble code after 10 seconds. To manually cycle through the diagnostic trouble code list, press the cluster display select/reset button. The last character of the diagnostic trouble code will end in "A" for active diagnostic trouble codes or "P" for previously active diagnostic trouble codes. Turning the ignition key off or releasing the park brake will take the ESC and the gauge cluster out of the diagnostic mode.

The previously active diagnostic trouble codes may be cleared, while in the diagnostic mode, by turning on the left turn signal and pressing the cruise on and set switches simultaneously.

Table 323 Transmission Communication Diagnostic Trouble Codes

DIAGNOSTIC TROUBLE CODE	FAULT DESCRIPTION
639 14 2 240	Electronic transmission controller communication has not been received

2.4. ECU POWER AND DATA LINK CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the power or data link circuits to the ECU will be apparent when the instrument cluster display does not correspond to the shift selector position and the check electrical system lamp is illuminated. Problems in the power and data link circuits can be caused by open or short circuits, a blown fuse, failed switch, a problem in the ESC, a problem in circuits between the ESC and the solenoid module or a problem in the solenoid module.

Table 324 ECU Power and Data Link Checks

ECU Connector (7204) Power Check		
Check with ignition on and (7204) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
TCM harness connector (7204), cavity 4 to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit L13#104, L13M4 or J13M. Also check for short to ground in circuit L13M3 to the NSBU.
ECU Connector (7202) Power Check		
Check with ignition on and (7202) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
ECU harness connector (7202), cavity 16 to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission feed fuse or open or short to ground in circuit N14BB, N92A, L92#136 or L92C136.
ECU harness connector (7202), cavity 1 to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission feed fuse or open or short to ground in circuit N14BB, N92A, L92#136 or L92B136.
ECU harness connector (7202), cavity 1 to cavity 17.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit N14-GA, N92-G, L92-G, L92#143 or L92B143.
ECU harness connector (7202), cavity 1 to cavity 32.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit N14-GA, N92-G, L92-G, L92#143 or L92C143.
If voltages are correct and ECU communication DTC is still active, refer to Drivetrain Data Link. (See DRIVETRAIN 1939 DATA LINK, page 60)		

Extended Description

Ignition voltage is supplied to the black ECU connector (7204), terminal 4, from the 10 amp transmission fuse in the engine compartment PDC.

Battery voltage to the gray ECU connector (7202) cavities 1 and 16, from the 10 amp transmission feed fuse in the battery compartment.

Ground is supplied to the gray ECU connector (7202) cavities 17 and 32 from the battery negative terminal.

The drivetrain data link is connected to the black ECU connector (7204) cavities 29, 12 and 13 from the data link "Y" connector (7208).

The 1708 data link is connected to the black ECU connector (7204) cavities 17 and 1.

2.5. NEUTRAL SIGNAL CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

When the transmission is shifted into neutral, the ECU will apply 12 volts from the gray ECU connector (7202) terminal 6, to ESC connector (4004) and engine controller connector (6007) pin 26 or (6020) pin 8. The voltage will cause the engine controller to enable engine cranking as long as the engine isn't already running.

A fault in the neutral signal circuits should be suspected when the engine will not crank. Problems in the neutral circuits can be caused by open or short circuits, a failure in the engine controller, or a failure in the ECU.

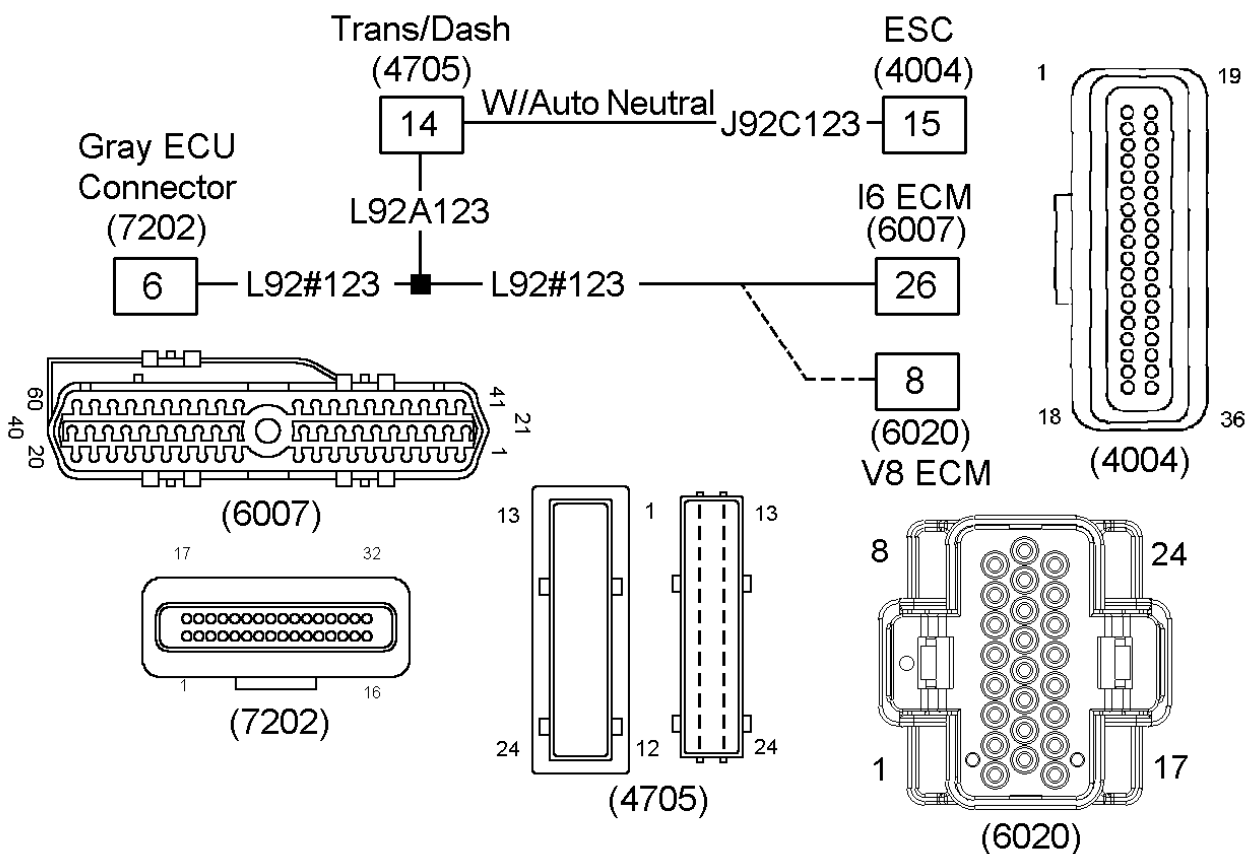


Figure 474 Neutral Signal Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4004) ELECTRICAL SYSTEM CONTROLLER CONNECTOR
LOCATED ON ENGINE SIDE OF ELECTRICAL SYSTEM CONTROLLER
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (6007) I6 ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (6020) V8 ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7202) GRAY ECU "V" CONNECTOR
LOCATED ON TRANSMISSION ECU

Table 325 Neutral Signal Circuit Checks

Neutral Signal Circuit Checks		
Check with ignition on, transmission in neutral and ESC connector (4004) removed.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Remove engine connector (6007) or (6020). Voltage from ESC Connector (4004) cavity 15 to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuit L92#123, L92A123 or J92C123. If circuits check good consider replacing transmission ECU.
Voltage from (6007) pin 26 or (6020) pin 8, to 12 volts.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L92#123 to the engine controller. If circuit checks good, consider replacing engine controller. Refer to the applicable engine troubleshooting manual.

Extended Description

When the transmission is shifted into neutral the ECU will apply a 12 volt signal from the gray ECU connector (7202) terminal 6 to the ESC and the engine controller

This signal will notify the engine controller that the transmission is in neutral. If the engine is not running the engine controller will enable the starter to operate.

2.6. BACK-UP LIGHT CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

When the transmission is shifted into reverse gear, the ECU will apply a ground from the gray ECU connector (7202) terminal 4, to the coil of the back up lamp relay causing it to energize. The energized relay will supply power to the backup lights.

A fault in the back up light relay circuits should be suspected when the back-up lights do not come on when the transmission is shifted into reverse. Problems in the back-up light circuits can be caused by open or short circuits, a blown fuse, or a failure in the ECU.

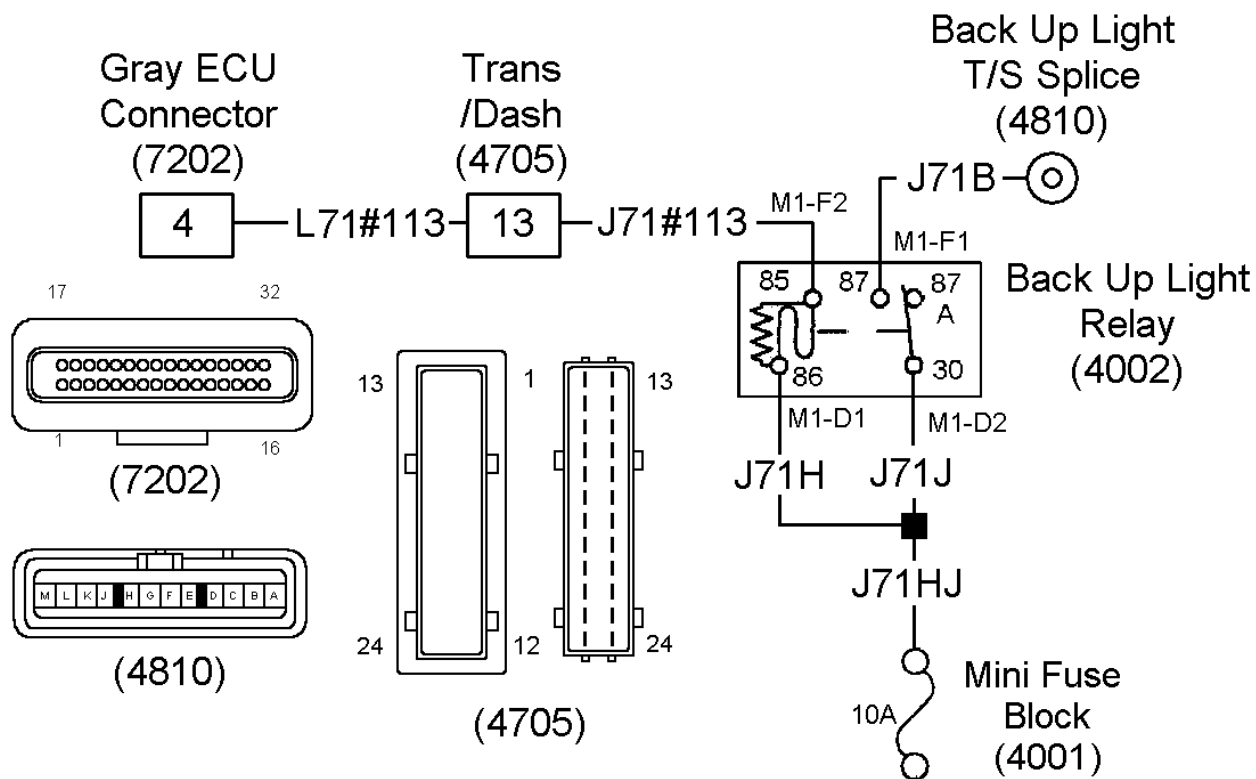


Figure 475 Back Up Light Relay Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4001) MINI FUSE BLOCK 10 AMP TRANSMISSION FUSE
LOCATED IN ENGINE COMPARTMENT PDC
- (4002) BACK UP LIGHT RELAY
LOCATED IN ENGINE COMPARTMENT PDC
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (4810) BACK UP LIGHT TURN / SIGNAL SPLICE
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7202) GRAY ECU "V" CONNECTOR
LOCATED ON TRANSMISSION ECU

Table 326 Back-Up Light Relay Circuit Checks

Back-Up Light Relay Circuit Power Checks		
Check with ignition on and Back Up Light Relay (4002) removed.		
Bench check relay and replace if it has failed. Refer to Bench Checking Relays. (See BENCH TESTING RELAYS, page 29)		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Back Up Light Relay (4002), socket cavity M1–D2 to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit J71HJ, J71H or J71J.
Back Up Light Relay (4002), socket cavity M1–D1 to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit J71HJ, J71H or J71J.
Transmission in neutral. Back Up Light Relay (4002), socket cavity M1–D1 to M1–F2.	0 volts.	If voltage is incorrect, check for short to ground in circuit L71#113. Also check for incorrect signal from ECU.
Transmission in reverse. Back Up Light Relay (4002), socket cavity M1–D1 to M1–F2.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L71#113. Also check for incorrect signal from ECU.

Extended Description

Power to the back up light relay coil and common contact is supply from the 10 amp transmission fuse.

When the transmission is shifted into reverse, the ECU will apply a ground from the gray ECU connector (7202) terminal 4, to the coil of the back up lamp relay causing it to energize. The energized relay will supply power from the normally open contact to the back up lights.

2.7. SHIFT SELECTOR CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

The shift selector contains the microprocessor that communicates driver input to the transmission ECU. The transmission shift selector (420) receives battery power at all times (ignition key on or off) from the transmission ECU (7204) on pin R. The shift selector (420) receives a ground from the transmission ECU (7204) on pin P. A chassis ground is also supplied on (420) pins T and V. Circuits connected to shift selector connector (420) pins A, B, C, D, and E provide signals between the shift selector and the ECU. Panel light voltage is supplied to (420) pin U.

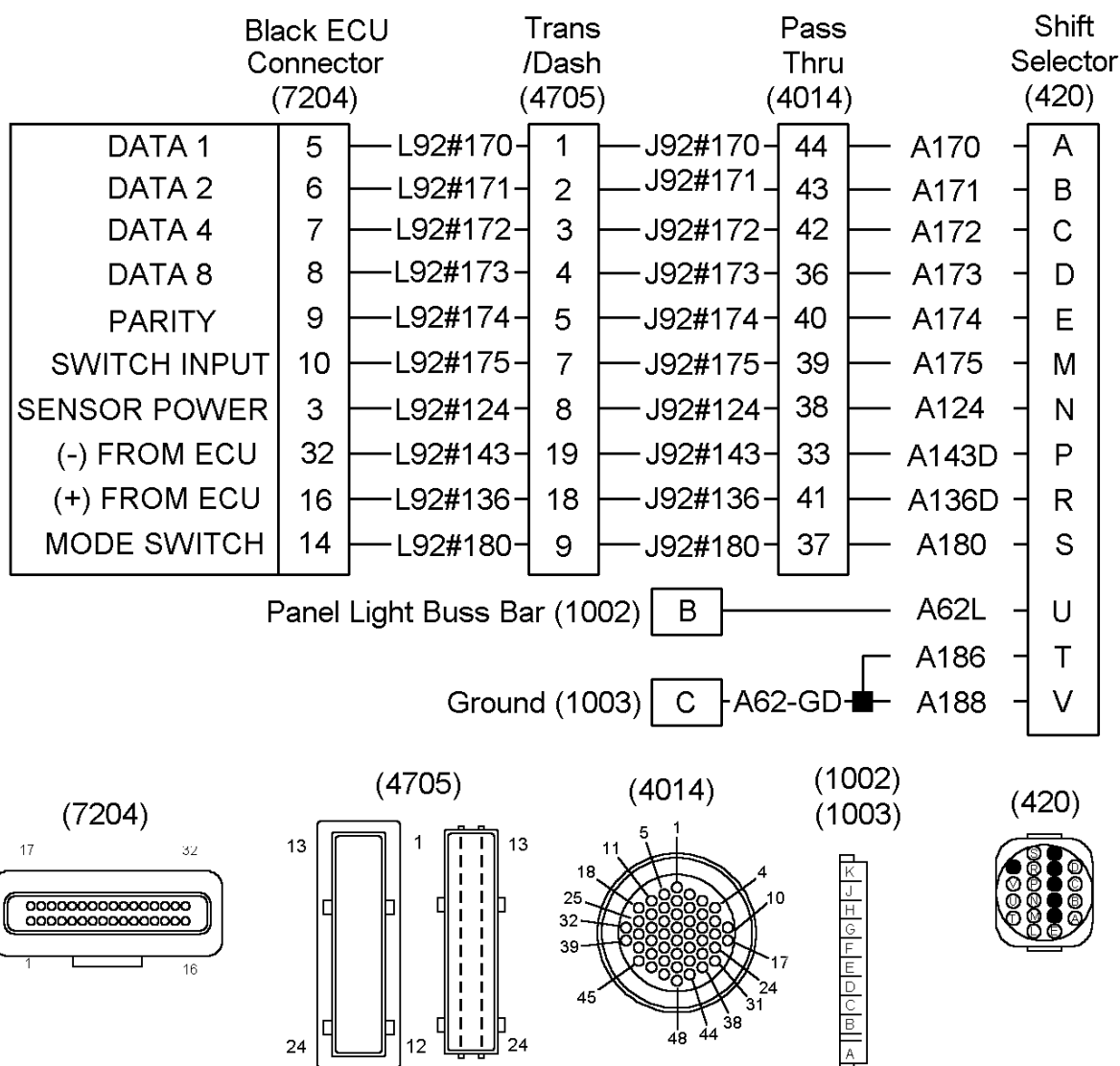


Figure 476 Shift Selector Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (420) SHIFT SELECTOR
- (1002) PANEL LIGHT BUSS BAR
LOCATED BEHIND INSTRUMENT PANEL
- (1003) GROUND BUSS BAR
LOCATED BEHIND INSTRUMENT PANEL
- (4014) PASS THROUGH CONNECTOR
LOCATED ABOVE ESC
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7204) BLACK ECU "S" CONNECTOR
LOCATED ON TRANSMISSION

Table 327 Shift Selector Circuit Checks

Shift Selector Circuit Checks		
Check with ignition on, transmission in neutral and shift selector connector (420) removed.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Harness connector (420) cavity R to ground	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuits between (420) cavity R and black ECU connector (7204) cavity 16. If circuits check good, ECU may be malfunctioning. Refer to the applicable Allison manual.
Harness connector (420) cavity R to P	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuits between (420) cavity P and black ECU connector (7204) cavity 32. If circuits check good, ECU may be malfunctioning. Refer to the applicable Allison manual. If voltages are correct the shift selector may need replaced.

2.8. COMPONENT LOCATIONS

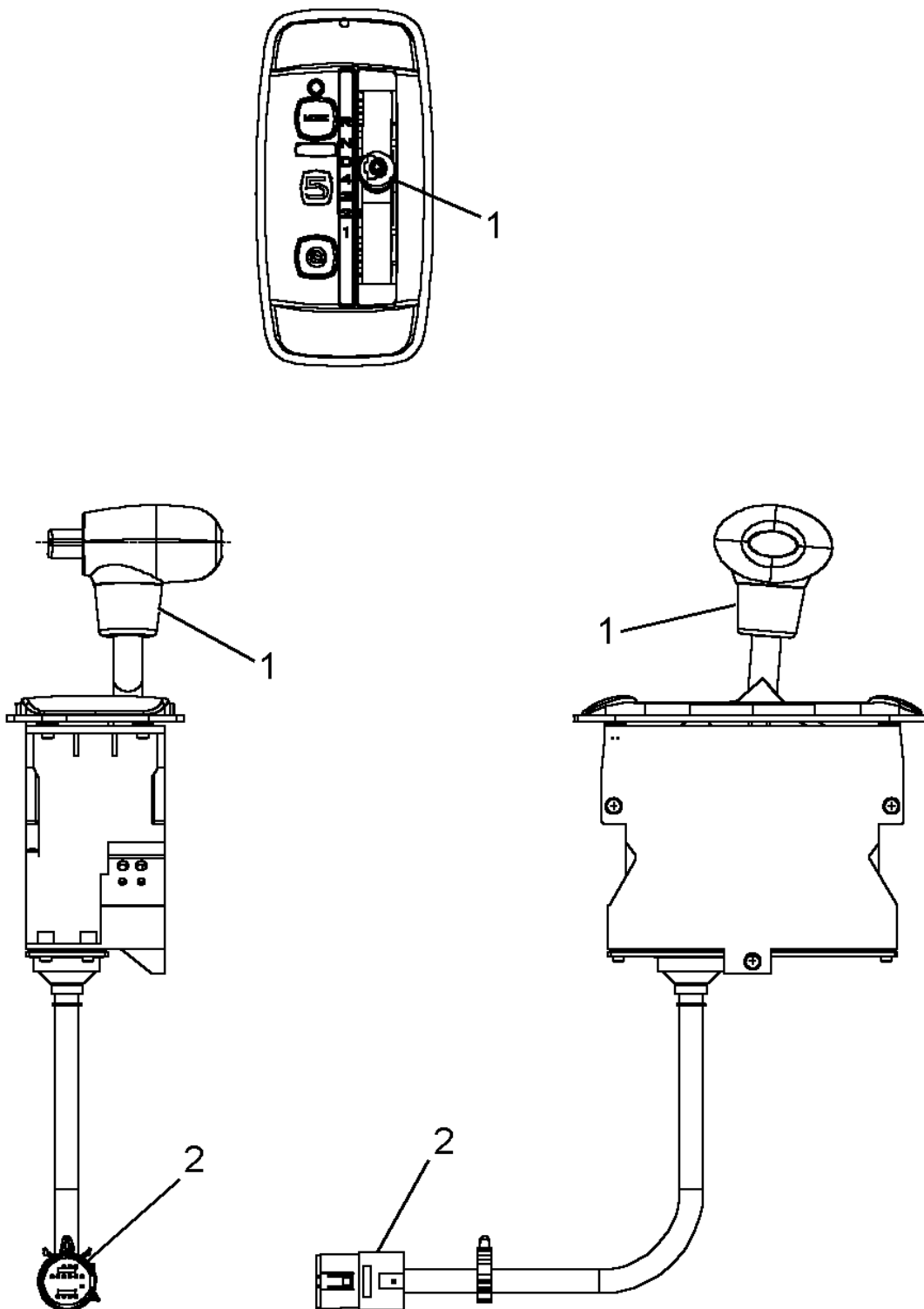


Figure 477 MD T-Bar Shift Control

1. SHIFT CONTROL LEVER
2. (420) SHIFT SELECTOR CONNECTOR

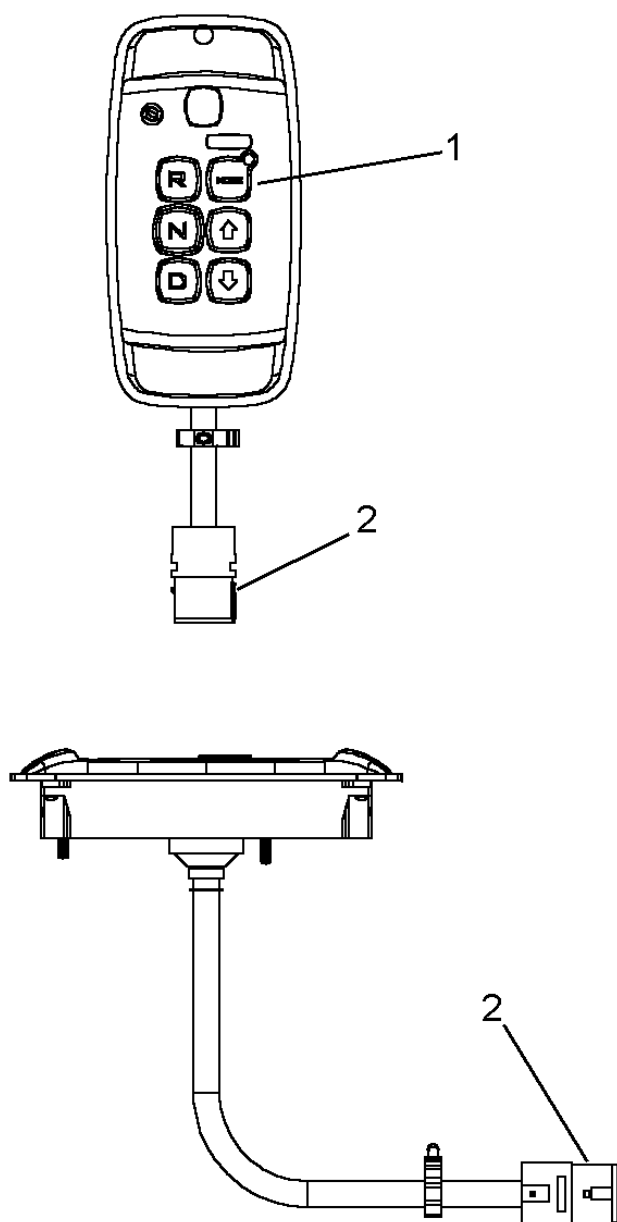


Figure 478 MD Push Button Shift Control

1. SHIFT CONTROL PUSH BUTTONS
2. (420) SHIFT SELECTOR CONNECTOR

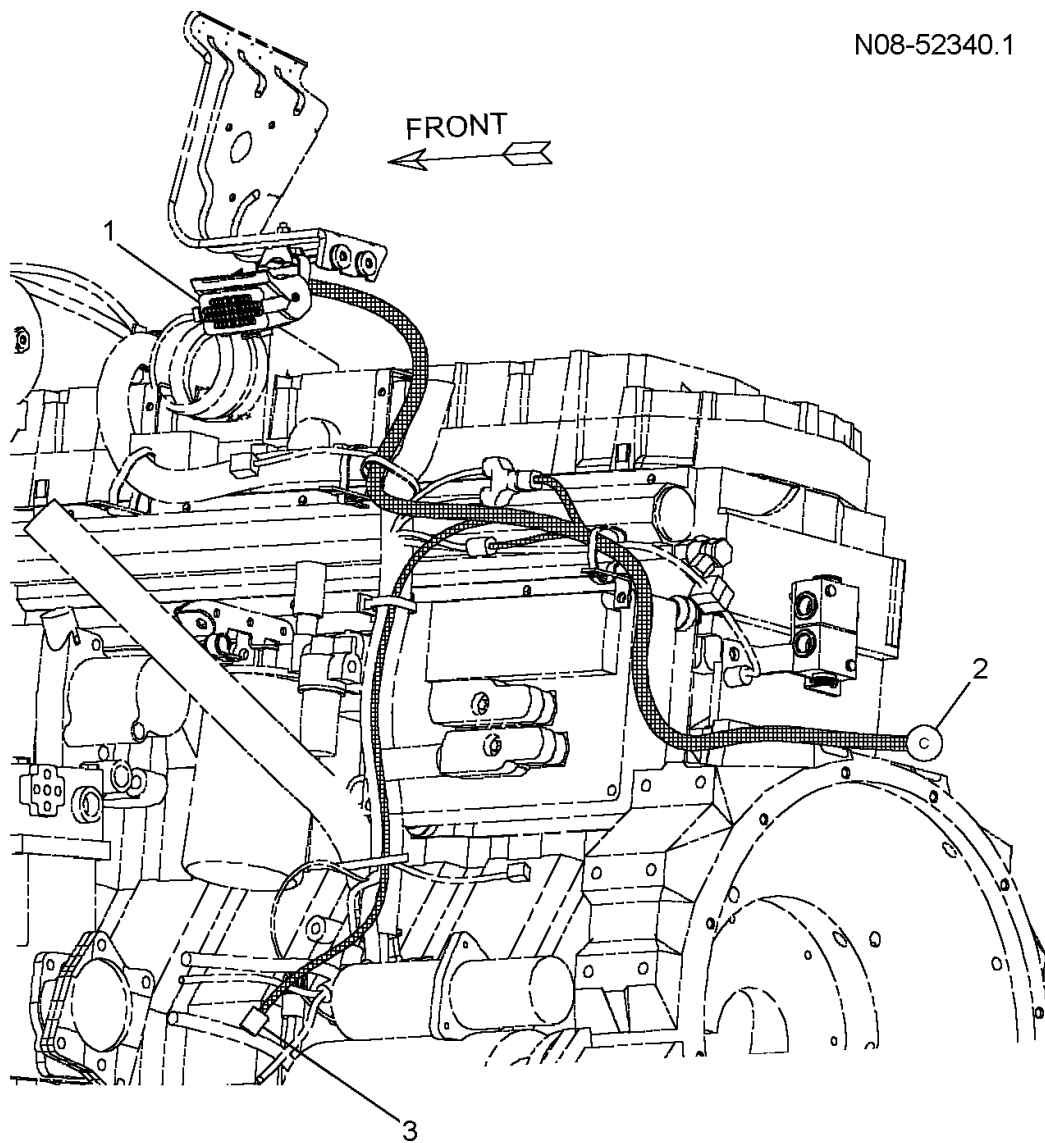


Figure 479 MD Transmission Harness (I6 Engine Shown)

1. TRANSMISSION/DASH HARNESS (4705)
2. TRANSMISSION HARNESS
3. CLEAN BATTERY FEED CONNECTOR (7104)

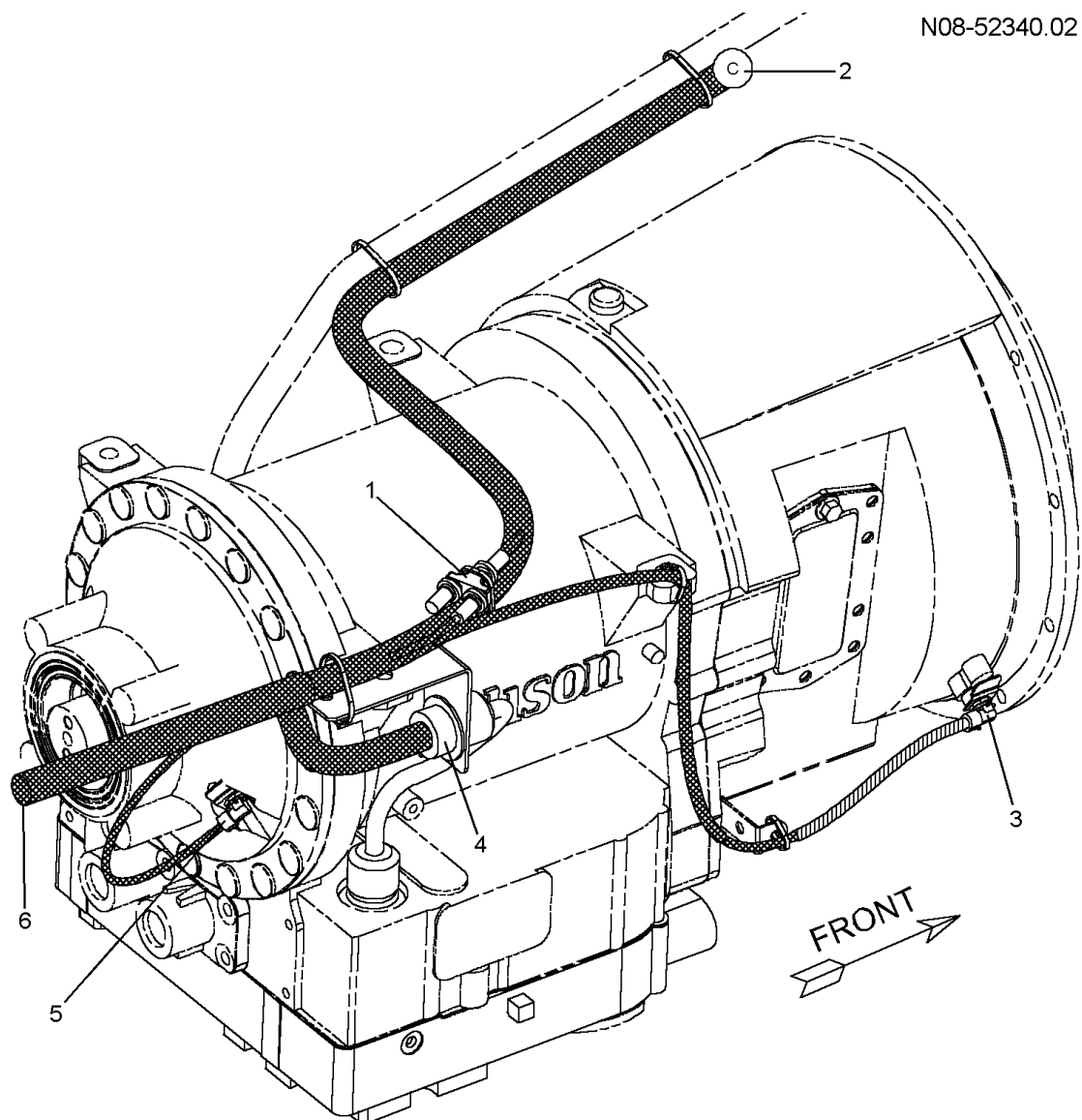


Figure 480 MD Transmission Wiring

1. DRIVETRAIN 1939 "Y" CONNECTOR (7208) AND TERMINATOR
2. TRANSMISSION HARNESS
3. ENGINE SPEED SENSOR (7603)
4. TRANSMISSION BULKHEAD CONNECTOR (7200)
5. OUTPUT SPEED SENSOR (7605)
6. TO ECU

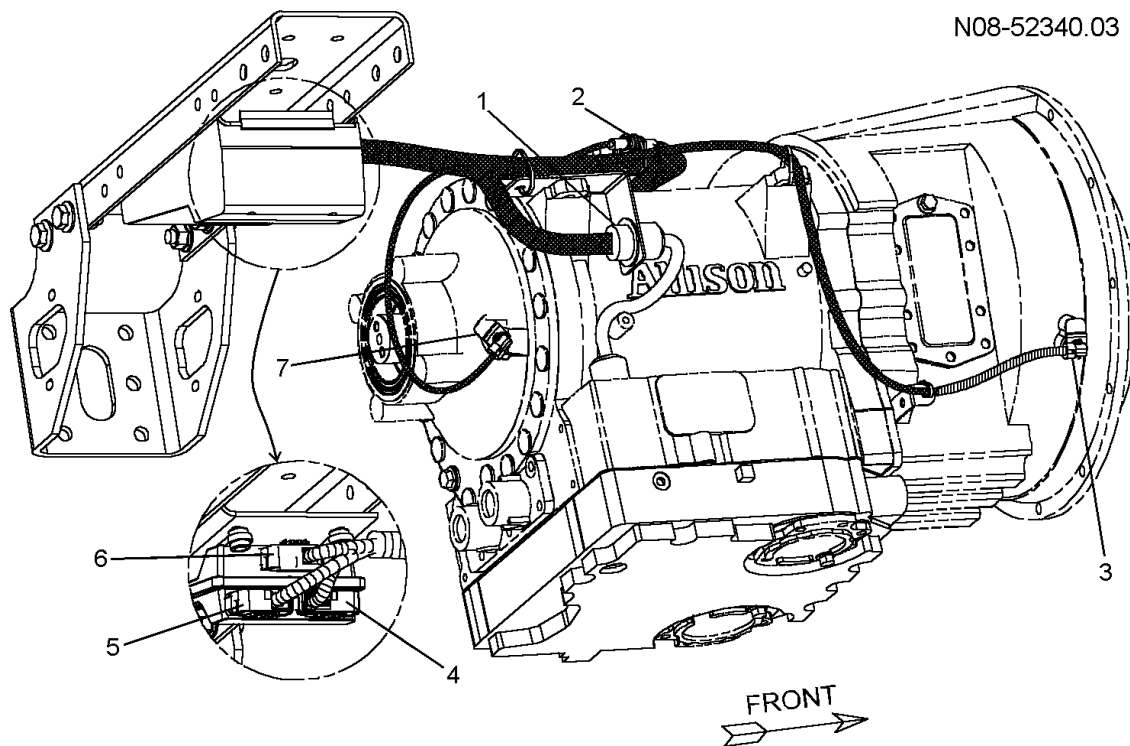


Figure 481 MD Transmission ECU Location

1. TRANSMISSION BULKHEAD CONNECTOR (7200)
2. DRIVETRAIN 1939 "Y" CONNECTOR (7208) AND TERMINATOR
3. ENGINE SPEED SENSOR (7603)
4. ECU "S" CONNECTOR BLACK (7204)
5. ECU "V" CONNECTOR GREY (7202)
6. ECU "T" CONNECTOR BLUE (7203)
7. OUTPUT SPEED SENSOR (7605)

3. AUTO NEUTRAL

3.1. CIRCUIT FUNCTIONS

While the auto neutral feature is activated the transmission will automatically shift into neutral when the park brake is applied. A warning light in the instrument cluster will illuminate when the shift selector is not in neutral but the transmission is in neutral.

The auto neutral feature, from the factory, is only available with the Allison MD transmissions. Auto neutral, using the LCT (Allison 2000 series) transmission, can be installed by body builders. See the Body Builder book for circuits and information.

Auto neutral is selected with a switch in the switch pack. When the switch is on, the ESC will be requested to enable auto neutral. The switch indicator will light when the ESC has received the request and will remain illuminated until the switch is turned off. The switch indicator will flash and auto neutral will be disabled if there is a switch error.

Refer to the Switch Pack Module section of this manual.(See SWITCH PACK MODULES, page 124)

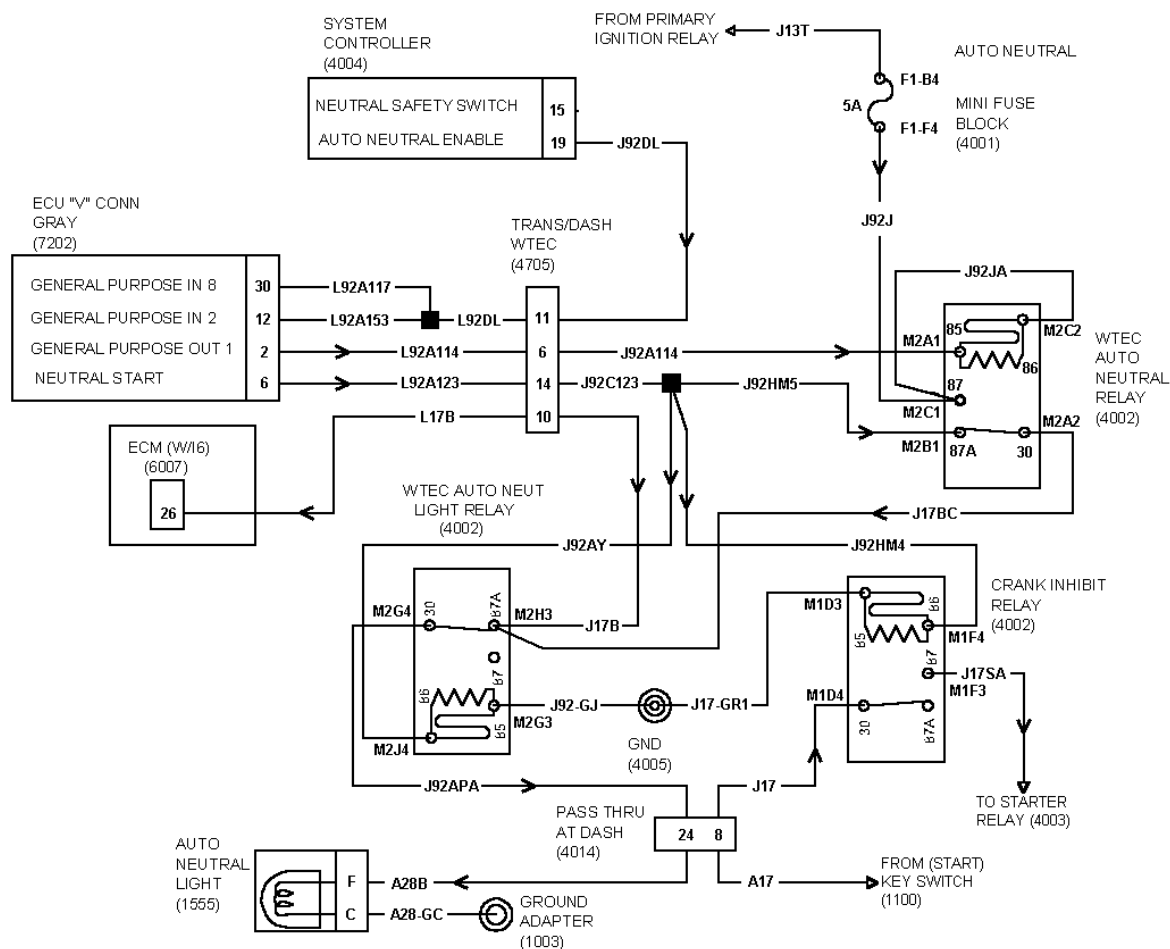


Figure 482 Auto Neutral Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (1555) AUTO NEUTRAL WARNING LIGHT
LOCATED IN CAB INSTRUMENT CLUSTER
- (4001) AUTO NEUTRAL WARNING LIGHT FUSE BLOCK
LOCATED IN ENGINE POWER DISTRIBUTION CENTER
- (4002) WTEC AUTO NEUTRAL RELAY, WTEC AUTO NEUTRAL LIGHT RELAY, CRANK INHIBIT RELAY BLOCK
LOCATED IN ENGINE COMPARTMENT POWER DISTRIBUTION CENTER (PDC)
- (4004) ELECTRICAL SYSTEM CONTROL (ESC) CONNECTOR
LOCATED IN ENGINE COMPARTMENT SIDE OF ESC
- (4014) PASS THROUGH CONNECTOR
LOCATED ON DASH PANEL ABOVE ESC
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (6007) I6 ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7202) ECU "V" GRAY CONNECTOR
LOCATED ON MD TRANSMISSION

3.2. AUTO NEUTRAL ENABLE

Fault Detection Management

Refer to Auto Neutral Circuits (See Figure 482, page 968).

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the auto neutral enable circuits from the ESC to the ECU will be apparent when a DTC is set.

Problems in the auto neutral enable could be the result of open circuits, shorted circuits a failure in the ECU or a failure in the ESC.

The auto enable signal, from ESC connector (4004) pin 19, should be generated when the park brake is on and the auto neutral switch is on.

Table 328 Auto Neutral Enable Circuit Tests

ESC DTC's		
2033 14 7 1	Auto Neutral Enable circuit overloaded. Connector 4004 pin 19 current overload. Too much load attached.	
2033 14 7 2	Auto Neutral Enable circuit open. Connector 4004 pin 19 open.	
2033 14 7 3	Auto Neutral Enable circuit shorted to ground. Connector 4004 pin 19 shorted to ground.	
Auto Neutral Enable Circuit Tests		
Check with Gray ECU connector (7202) removed.		
NOTE – Always check connectors for damage and pushed-out terminals.		
NOTE – Always use breakout box ZTSE 4477 to take measurements on ESC connectors.		
Test Points	Spec.	Comments
Auto neutral switch off and park brake off. Harness connector (7202) cavity 30 to ground.	12 ± 1.5 volts	If voltage is missing, check for open or shorts in circuits J92DL, L92DL, L92A117 to the ESC (4004) cavity 19. Also check for missing signal from ESC.
Auto neutral switch off and park brake off. Harness connector (7202) cavity 12 to ground.	12 ± 1.5 volts	If voltage is missing, check for open or shorts in circuits J92DL, L92DL, L92A153 to the ESC (4004) cavity 19.
Auto neutral switch on and park brake on. Harness connector (7202) cavity 12 to ground.	0 volts	If voltage is incorrect, ESC is not creating enable signal. Check for missing auto neutral command from switch pack or missing park brake signal.
Reconnect (7202). If voltages are correct and DTC is still active consider replacing transmission ECU.		

Extended Description

The auto neutral enable signal will be a ground when auto neutral is on and the park brake is applied. The ESC provides this signal from (4004) pin 19 to ECU “V” Gray connector pins 30 and 12.

3.3. AUTO NEUTRAL RELAY CIRCUITS

Fault Detection Management

Refer to Auto Neutral Circuits (See Figure 482, page 968).

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

The de-energized auto neutral relay completes the circuit path for the transmission ECU neutral start signal to the engine controller DDS input. This signal is 12 volts when the shifter is in neutral and 0 volts when the transmission is in drive. This inhibits engine cranking while the transmission is not in neutral.

The relay is energized, by a signal from the transmission ECU, when the engine is running and the transmission is in neutral. The energized relay applies 12 volts to the engine controller DDS input. This allows engine speed to be changed when the engine is running and the transmission is in neutral (for PTO operations). The output is also applied to the normally closed contact of the neutral light relay and the neutral safety switch input to the ESC.

A fault in the auto neutral relay circuits may be present when the engine will not crank while auto neutral is selected or will crank when transmission is not in neutral. A failure in relay circuits could also prevent the engine from increasing RPM during PTO operations. Problems in the auto neutral relay circuits could be attributed to open or short circuits, a blown fuse, a failure in the transmission ECU or a failure in the engine controller.

Table 329 Auto Neutral Relay Power Checks

Auto Neutral Relay Socket (4002) Power Checks		
Check with ignition on and auto neutral relay (4002) removed.		
Bench check relay and replace if it has failed. Refer to Bench Checking Relays. (See BENCH TESTING RELAYS, page 29)		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Relay socket cavity M2–C1 to ground.	12 ± 1.5 volts	If voltage is missing, check for open or shorts in circuit J92J or open auto neutral fuse.
Relay socket cavity M2–C2 to ground.	12 ± 1.5 volts	If voltage is missing, check for open in circuit J92JA.
Relay socket cavity M2–C2 to M2-A1.	With engine on and transmission in neutral, 12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit J92A114 or L92A114. Also check for missing signal from ECU.

Table 329 Auto Neutral Relay Power Checks (cont.)

Relay socket cavity M2–B1 to ground.	With shifter in neutral and transmission in neutral, 12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit J92HM5, J92C123 or L92A123. Also check for short to ground in circuits J92HM5, J92C123, L92A123, J92HM4 or J92AY. Insure signal from ECU is present.
Relay socket cavity M2–A2 to ground.	With transmission in neutral and, 12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit J17BC. Also check for short to ground in circuits J17BC, J17BD, J17B or L17B. Insure signal from ESC is present.
If voltage is missing from the ESC consider replacing the ESC.		

Extended Description

Power to the auto neutral relay coil and common contact is supply from the 5 amp auto neutral fuse.

The relay is energized by a low signal from ECU “V” gray connector (7202) pin 2. The low signal is generated when the engine is running and the transmission is in neutral.

The de-energized relay provides a circuit path for the neutral start signal from the ECU. This will be 12 volts when the transmission is in neutral or 0 volts when the transmission is in gear. The signal is applied to the engine controller drive line disengagement switch (DDS) input. 12 volts will signal the engine controller that the transmission is in neutral.

The energized relay applies 12 volts to the engine controller DDS input when the engine is on and the transmission is in neutral. This will allow the engine to increase RPM when a power take off is engaged.

3.4. AUTO NEUTRAL LIGHT RELAY CIRCUITS**Fault Detection Management**

Refer to Auto Neutral Circuits (See Figure 482, page 968).

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

The output on the common contact of the auto neutral light relay is 12 volts when the shifter is in not in neutral (auto neutral active) and the transmission is in neutral. The output is 0 volts when the transmission is in drive. The output is applied to the engine controller ECM input to inhibit engine cranking while the transmission is not in neutral. The output is also applied to the normally closed contact of the neutral light relay.

A fault in the auto neutral light relay circuits may be present when the auto neutral warning light does not illuminate when auto neutral is active. Problems in the auto neutral light relay circuits could be attributed to open or short circuits or a failure in the transmission ECU.

Table 330 Auto Neutral Light Relay Power Checks

Auto Neutral Light Relay Socket (4002) Power Checks		
Check with ignition on and auto neutral light relay (4002) removed.		
Bench check relay and replace if it has failed. Refer to Bench Checking Relays. (See BENCH TESTING RELAYS, page 29)		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Relay socket cavity M2–H3 to ground.	With transmission in neutral, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J17BD. Check for shorts in circuit J17BD, J17BC, J17B or L17B.
Relay socket cavity M2–H3 to M2–G3.	With transmission in neutral, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J92–GJ.
Relay socket cavity M2–H3 to M2–G3.	With transmission in neutral, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J92APA, circuit A28B, Auto neutral lamp or circuit A28–GC.
Relay socket cavity M2–H3 to ground.	With shifter in neutral and transmission in neutral, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J92AY, J92C123 or L92A123 Also check for short to ground in circuits J92HM5, J92C123, L92A123, J92HM4 or J92AY. Insure signal from ECU is present.
If signal from ECU is missing, consider replacing the ECU. Refer to the Allison transmission manual.		

Extended Description

The de-energized relay will pass the 12 volt neutral safety switch signal from ESC connector (4004) pin 15 to illuminate the auto neutral light.

Ground for the relay coil is supplied from ground stud (4005).

The relay is energized by the 12 volt neutral start signal from the transmission ECU. This will turn off the auto neutral light. It will only be illuminated when the transmission is in neutral and the shifter is not in neutral.

3.5. CRANK INHIBIT RELAY CIRCUITS**Fault Detection Management**

Refer to Auto Neutral Circuits (See Figure 482, page 968).

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

The crank inhibit relay insures there is no chance of cranking the engine when the transmission shift lever is not in neutral. The relay contacts are installed in series with the starter switch circuits to the coil of the starter relay. The relay is energized by the neutral start signal from the transmission ECU.

A fault in the auto neutral light relay circuits may be present when the auto neutral warning light does not illuminate when auto neutral is active. Problems in the auto neutral light relay circuits could be attributed to open or short circuits or a failure in the transmission ECU.

Table 331 Crank Inhibit Relay Power Checks

Crank Inhibit Relay Socket (4002) Power Checks		
Check with ignition on and crank inhibit relay (4002) removed.		
Bench check relay and replace if it has failed. Refer to Bench Checking Relays. (See BENCH TESTING RELAYS, page 29)		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Relay socket cavity M1–F4 to ground.	With shifter in neutral and transmission in neutral, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J92HM4, J92C123 or L92A123 Also check for short to ground in circuits J92HM5, J92C123, L92A123, J92HM4 or J92AY. Insure signal from ECU is present.
Relay socket cavity M1–F4 to M1–D3.	With transmission in neutral, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J17–GR1 to ground.
Relay socket cavity M1–D4 to ground.	With shifter in neutral, transmission and key in start position, 12 ± 1.5 volts	If voltage is missing, check for open in circuit J17 or A17 to key switch circuits.
Relay socket cavity M1–D4 to M1–F3.	With shifter in neutral, transmission and key in start position, 12 ± 1.5 volts	If voltage is missing, check for open or shorts to ground in circuit J17SA, starter relay coil, circuit J17S or starter circuits.

Extended Description

The relay is installed in between the key switch circuits and the starter relay circuits to insure the engine cannot be cranked when the transmission is in gear.

Ground is supplied to the relay coil from ground stud (4005).

The relay is energized by the 12 volt neutral start signal from the transmission ECU when the shiftier is in neutral and the transmission is in neutral.

The energized relay will connect the key switch start circuits and the starter relay circuits to allow engine cranking.

3.6. COMPONENT LOCATIONS

Refer to MD T-Bar Shift Control (See Figure 477, page 963), MD Push Button Shift Control (See Figure 478, page 964) MD Transmission Harness (I6 Engine Shown) (See Figure 479, page 965), MD Transmission Wiring (See Figure 480, page 966) and MD Transmission ECU Location (See Figure 481, page 967).

4. LCT (ALLISON® 2000 SERIES™) TRANSMISSION

Discussion of the LCT (Allison 2000 Series) transmission In this section is limited to the transmission control module (TCM) power circuits, data link connectivity, signals from the neutral safety back up (NSBU) switch and circuits to the shift selector control. For detailed information on transmission diagnostics, refer to the Allison service manual.

4.1. CIRCUIT FUNCTIONS

The LCT transmission interfaces with the vehicle electrical system via the transmission control module (TCM), the neutral safety back up (NSBU) switch and the shift selector control.

The TCM communicates on the drivetrain 1939 data link to interface with the engine controller, electrical system controller and the air ABS controller.

The NSBU, mounted on the transmission, is controlled by the gear select cable. It interfaces with the vehicle electrical system to provide a neutral signal to the engine controller. It also provides voltage for the back-up lights.

The shift selector has an integral economy switch. The switch will light when economy mode is selected.

4.2. DIAGNOSTICS

The ESC will log a DTC if communication with the TCM is lost.

The transmission control unit has its own diagnostic system which will turn on the "CHECK TRANS" lamp when there is a detectable fault. Diagnostic codes can only be read with the Allison Transmission Diagnostic Tool (ATDT) software. There are no provisions for flash codes. Refer to Allison troubleshooting manual TS3192EN for details.

A problem in the neutral start circuits will prevent the engine from cranking. Refer to Engine Cranking. (See ENGINE CRANKING, page 375)

There are no diagnostic trouble codes (DTC's) associated with the back-up light circuits. A fault in the back-up light circuits will be apparent when the transmission is shifted into reverse and the lights don't come on.

Table 332 LCT Preliminary Check

STEP	KEY	ACTION	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	On	Does the engine crank when the transmission is in neutral?	Engine cranks when the transmission is in neutral.	Go to next step.	Refer to Engine Cranking. (See ENGINE CRANKING, page 375)
2.	On	Are there any active DTC's associated with the transmission? Refer to Diagnostic Trouble Codes. (See DIAGNOSTIC TROUBLE CODES (DTC), page 975)	Transmission communication DTC is active.	Go to next step.	Go to TCM Power and Data Link Circuits. (See TCM POWER AND DATA LINK CIRCUITS, page 975)

Table 332 LCT Preliminary Check (cont.)

STEP	KEY	ACTION	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
3.	On	Does the "CHECK TRANS" lamp turn off after the vehicle is started.	Lamp turns off after vehicle is started.	Go to next step.	Refer to the applicable transmission service manual.
4.	On	Do the back-up lights come on when the transmission is shifted into reverse?	Back-up lights come on when in reverse.	Go to next step.	Go to Neutral And Back-Up Light Circuits. (See NEUTRAL AND BACK-UP LIGHT CIRCUITS , page 978)
5.	On	Is the economy mode indicator in the economy switch illuminating when economy is selected.	Economy mode indicator illuminates when economy mode is selected.	Transmission circuits are functioning.	Go to Shift Selector Circuits. (See SHIFT SELECTOR CIRCUITS , page 980)

4.3. DIAGNOSTIC TROUBLE CODES (DTC)

To display diagnostic codes, put the vehicle in diagnostic mode. Set the parking brake and turn the Ignition key "ON". Then press the Cruise "ON" switch and the Cruise "Resume" switch. If no diagnostic trouble codes are present, the cluster odometer will display "NO FAULT". If diagnostic trouble codes are present, the gauge cluster will display the total number of faults and cycle to the next diagnostic trouble code after 10 seconds. To manually cycle through the diagnostic trouble code list, press the cluster display select/reset button. The last character of the diagnostic trouble code will end in "A" for active diagnostic trouble codes or "P" for previously active diagnostic trouble codes. Turning the ignition key off or releasing the park brake will take the ESC and the gauge cluster out of the diagnostic mode.

The previously active diagnostic trouble codes may be cleared, while in the diagnostic mode, by turning on the left turn signal and pressing the cruise on and set switches simultaneously.

Table 333 Transmission Communication Diagnostic Trouble Codes

DIAGNOSTIC TROUBLE CODE	FAULT DESCRIPTION
639 14 2 240	Electronic transmission controller communication has not been received

4.4. TCM POWER AND DATA LINK CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the power or data link circuits to the TCM will be apparent when the instrument cluster display does not correspond to the shift selector position and the check electrical system lamp is illuminated. Problems in the

power and data link circuits can be caused by open or short circuits, a blown fuse, failed switch, a problem in the ESC, a problem in circuits between the ESC and the solenoid module or a problem in the solenoid module.

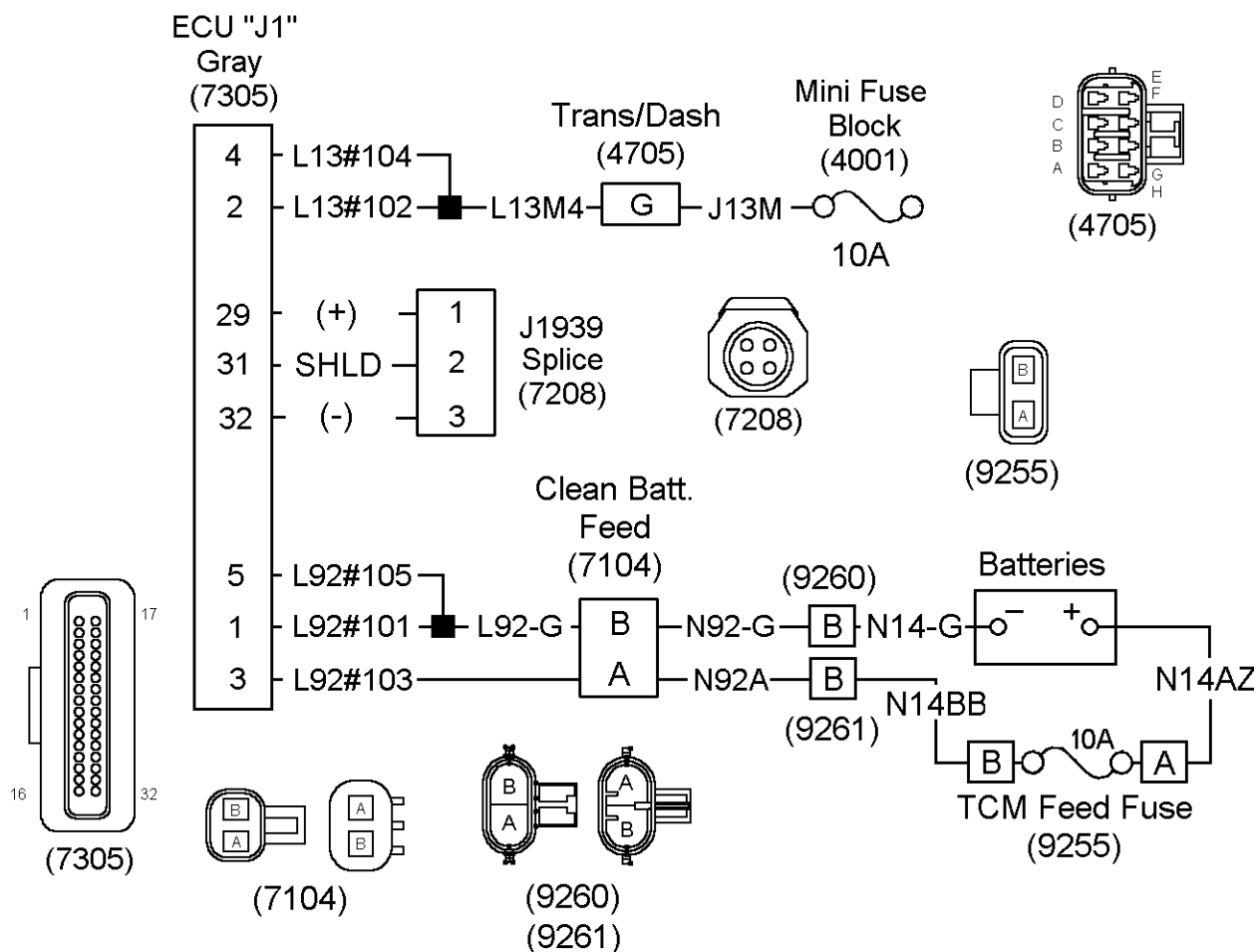


Figure 483 TCM Power and Data Link Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4001) MINI FUSE BLOCK 10 AMP TRANSMISSION FUSE
LOCATED IN ENGINE COMPARTMENT PDC
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7104) CLEAN BATTERY FEED
LOCATED IN BATTERY HARNESS
- (7208) J1939 DATA LINK SPLICE CONNECTOR
LOCATED IN ENGINE HARNESS
- (7305) GRAY ECU "J1" CONNECTOR
LOCATED ON ALLISON LCT TRANSMISSION CONTROL MODULE
- (9255) TRANSMISSION ECU FEED FUSE CONNECTOR
LOCATED IN BATTERY COMPARTMENT
- (9260) BATTERY ECM NEGATIVE CONNECTOR
LOCATED IN BATTERY COMPARTMENT
- (9261) BATTERY ECM POSITIVE CONNECTOR
LOCATED IN BATTERY COMPARTMENT

Table 334 TCM Power and Data Link Checks

TCM Connector (7305) Power Checks		
Check with ignition on and (7305) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
TCM harness connector (7305), cavity 4 to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit L13#104, L13M4 or J13M. Also check for short to ground in circuit L13M3 to the NSBU.
TCM harness connector (7305), cavity 2 to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit L13#102, L13M4 or J13M. Also check for short to ground in circuit L13M3 to the NSBU switch.
TCM harness connector (7305), cavity 3 to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission feed fuse or open or short to ground in circuit N14BB, N92A or L92#103.
TCM harness connector (7305), cavity 3 to cavity 5.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit N14-GA, N92-G, L92-G or L92#105.
TCM harness connector (7305), cavity 3 to cavity 1.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit N14-GA, N92-G, L92-G or L92#101.
TCM Connector (7305) Data Link Checks		
Check with ignition on and (7305) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
TCM harness connector (7305), cavity 29 to ground.	Approximately 2.5 volts.	If voltage is missing check for open or short to ground in (+) data link circuits between harness connector and J1939 splice (7208).
TCM harness connector (7305), cavity 32 to ground.	Approximately 2.5 volts.	If voltage is missing check for open or short to ground between harness connector and J1939 splice (7208).
If voltages are correct and TCM is not operating correctly, refer to the Allison 2000 service manual .		

Extended Description

Ignition voltage to TCM connector (7305) cavity 4 and 2 from the 10 amp transmission fuse in the engine compartment PDC.

Battery voltage to TCM connector (7305) cavity 3 from the 10 amp transmission feed fuse in the battery compartment.

Ground for the TCM is supplied to TCM connector (7305) cavities 1 and 5 from the battery negative terminal.

The drivetrain data link is connected to TCM connector (7305) cavities 29, 31 and 32.

4.5. NEUTRAL AND BACK-UP LIGHT CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A shift cable connects the shift selector to the transmission gear select shaft. The NSBU is mounted on the shaft. When the shaft is in the neutral position the neutral contacts off the NSBU switch should close. When the shaft is in the reverse position, the back up light contacts of the NSBU should close.

A fault in the back-up circuits should be suspected when the back-up lights do not come on when the transmission is shifted into reverse. Problems in the back-up light circuits can be caused by open or short circuits, a blown fuse, or failed NSBU.

A fault in the neutral circuits should be suspected when the engine will not start. Problems in the neutral circuits can be caused by open or short circuits, a blown fuse, a failed NSBU, or a problem in the engine controller.

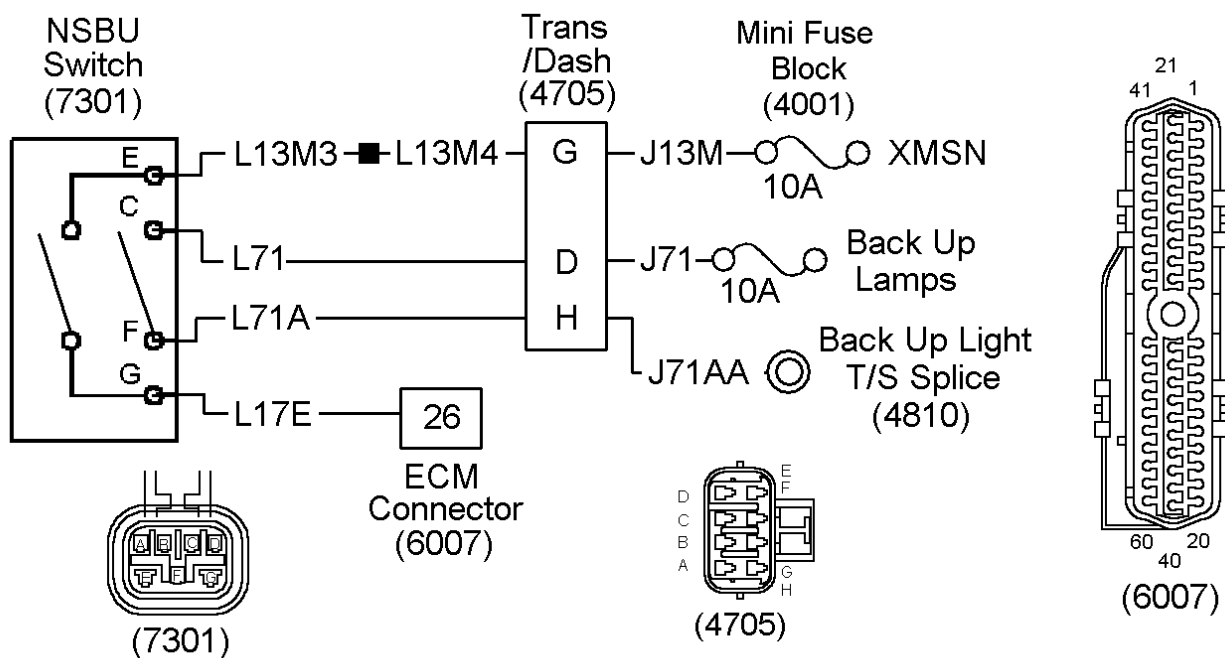


Figure 484 Neutral Safety Back Up (NSBU) Switch Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4001) MINI FUSE BLOCK 10 AMP XMSN FUSE
LOCATED IN ENGINE COMPARTMENT PDC
- (4001) MINI FUSE BLOCK 10 AMP BACKUP LAMPS FUSE
LOCATED IN ENGINE COMPARTMENT PDC
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (4810) BACK UP LIGHT TURN / SIGNAL SPLICE CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (6007) ECM CONNECTOR (I6 ENGINE)
LOCATED ON I6 ENGINE
- (7301) NEUTRAL SAFETY BACK UP (NSBU) SWITCH
LOCATED ON TRANSMISSION

Table 335 Neutral And Back-Up Light Circuit Checks

NSBU Connector (7301) Power Checks		
Check with ignition on and (7301) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
NSBU harness connector (7301), cavity E to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit J13M, L13M4 or L13M3.
NSBU harness connector (7301), cavity E to G.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L17E to the engine controller.
NSBU harness connector (7301), cavity C to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A back up light fuse or open or short to ground in circuit L71 or J71.
NSBU harness connector (7301), cavity C to F.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L71A or J71AA to the back up light and turn signal splice 4810.
If voltages are correct, consider replacing NSBU switch. Refer to the Allison 2000 Service manual		

Extended Description

Ignition voltage is supplied to the NSBU switch connector (7301), terminal E, neutral contacts from the 10 amp transmission fuse in the engine compartment PDC.

When the transmission is shifted into neutral, the neutral switch will close supplying ignition voltage to the engine controller. The engine controller will use this signal to enable the engine to crank.

Ignition voltage is supplied to the NSBU switch connector (7301), terminal C, back up light contacts from the 10 amp back up light fuse in the engine compartment PDC.

When the transmission is shifted into reverse, the back up light switch will close supplying ignition voltage to power the back up lights.

4.6. SHIFT SELECTOR CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

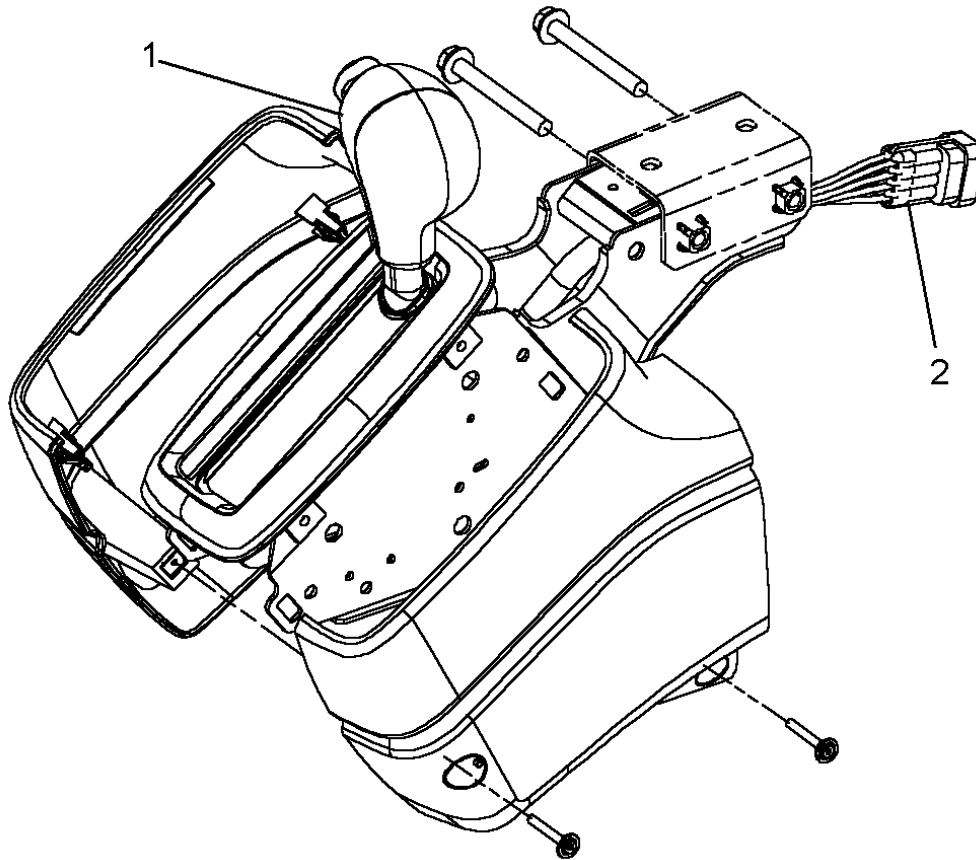


Figure 485 LCT Dash Mounted Shift Selector

1. SHIFT CONTROL LEVER
2. (1828) SHIFT SELECTOR CONNECTOR

A shift cable connects the shift selector to the transmission gear select shaft.

The shift selector contains an economy switch used to enable the economy mode of the transmission. The selector also contains a lock out solenoid used for some models that will prevent the selector from being moved out of park unless the foot brake is applied.

When the economy switch in the shift selector is closed the signal ground from the TCM will be applied to the economy mode enable input to the TCM. The switch will also illuminate the indicator in the switch.

A fault in the economy mode switch circuits should be suspected when the economy mode indicator does not illuminate when economy mode is selected.

Problems in the economy mode circuits can be caused by open or short circuits, a blown fuse, or failure in the TCM.

The Interlock for Shifter with Park Position feature will be controlled by the presence of the ignition signal, service brake applied signal, and transmission in park signal.

When the ignition signal is present, the transmission is in the 'Park' position, and the service brake is depressed, the relay driver, which sinks current through the shifter interlock solenoid, will be activated and the

shifter interlock solenoid will unlock. When the shifter interlock solenoid unlocks, the transmission can be shifted out of the 'Park' position.

If the ignition signal is present and a loss of J1939 data occurs from the transmission to the ESC, then the relay driver that controls the shifter interlock solenoid will become active.

If the ignition signal is present and the service brake switch is defective or stuck, then the relay driver that controls the shifter interlock solenoid will become active.

A fault in the selector circuits should be suspected when the economy switch doesn't illuminate when it is selected. Problems in the selector circuits can be caused by open or short circuits, a blown fuse, or failure in the selector assembly.

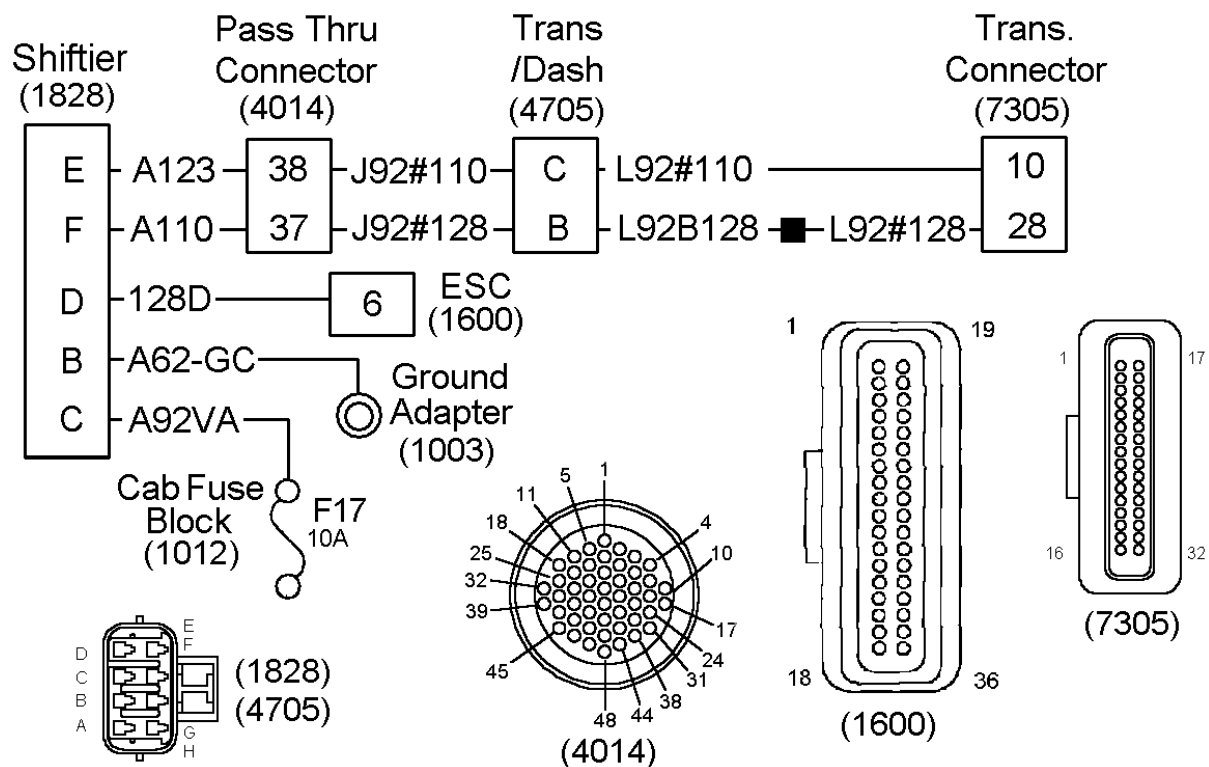


Figure 486 Shift Selector Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (1003) GROUND ADAPTER
LOCATED IN INSTRUMENT PANEL
- (1012) CAB FUSE BLOCK F17 10 AMP FUSE
LOCATED IN CAB PDC
- (1600) ELECTRICAL SYSTEM CONTROLLER
LOCATED ON CAB SIDE OF ELECTRICAL SYSTEM CONTROLLER
- (1828) LCT TRANSMISSION SHIFTER SELECTOR CONNECTOR
LOCATED ON BACK OF LCT SHIFT SELECTOR
- (4014) PASS THROUGH CONNECTOR
LOCATED ABOVE ELECTRICAL SYSTEM CONTROLLER
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7305) TRANSMISSION CONNECTOR
LOCATED ON TRANSMISSION

Table 336 Shift Selector Circuit Checks

Shift Selector Connector (1828) Power Checks		
Check with ignition on and (1828) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments

Table 336 Shift Selector Circuit Checks (cont.)

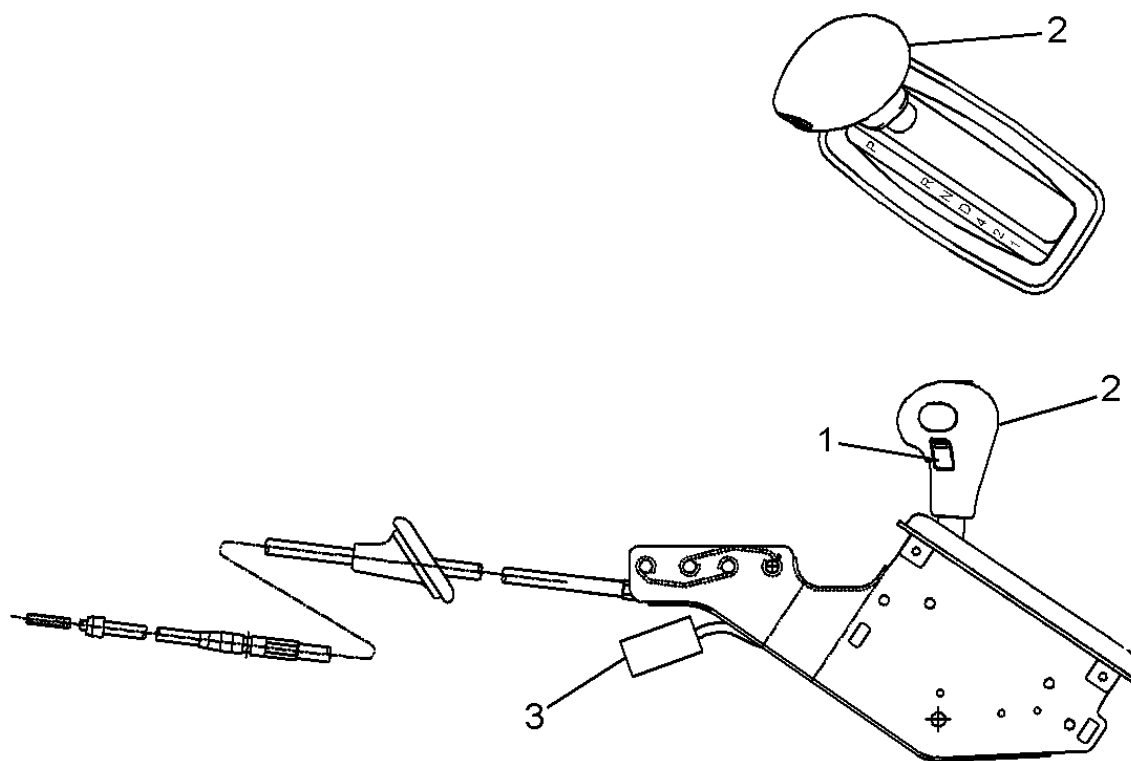
Shift selector harness connector (1828), cavity C to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown fuse F17 or open or short to ground in circuit A92VA.
Shift selector harness connector (1828), cavity C to B.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit A62–GC to ground splice (1003).
If voltages are correct and shift selector is not powered, consider replacing shift selector.		

Extended Description

Power to the shift selector is provided to (1828) terminal C from cab fuse F17.

Ground for the shift selector is provided to (1828) terminal B from ground adapter (1003).

Ground from the ESC (1600) terminal 6 is provided to shift selector (1828) terminal D, when the ignition key is on, the service brake pedal is depressed, and the transmission in park signal.

4.7. COMPONENT LOCATIONS**Figure 487 LCT Shift Control**

1. ECONOMY MODE SWITCH
2. SHIFT CONTROL LEVER
3. (1828) SHIFT SELECTOR CONNECTOR

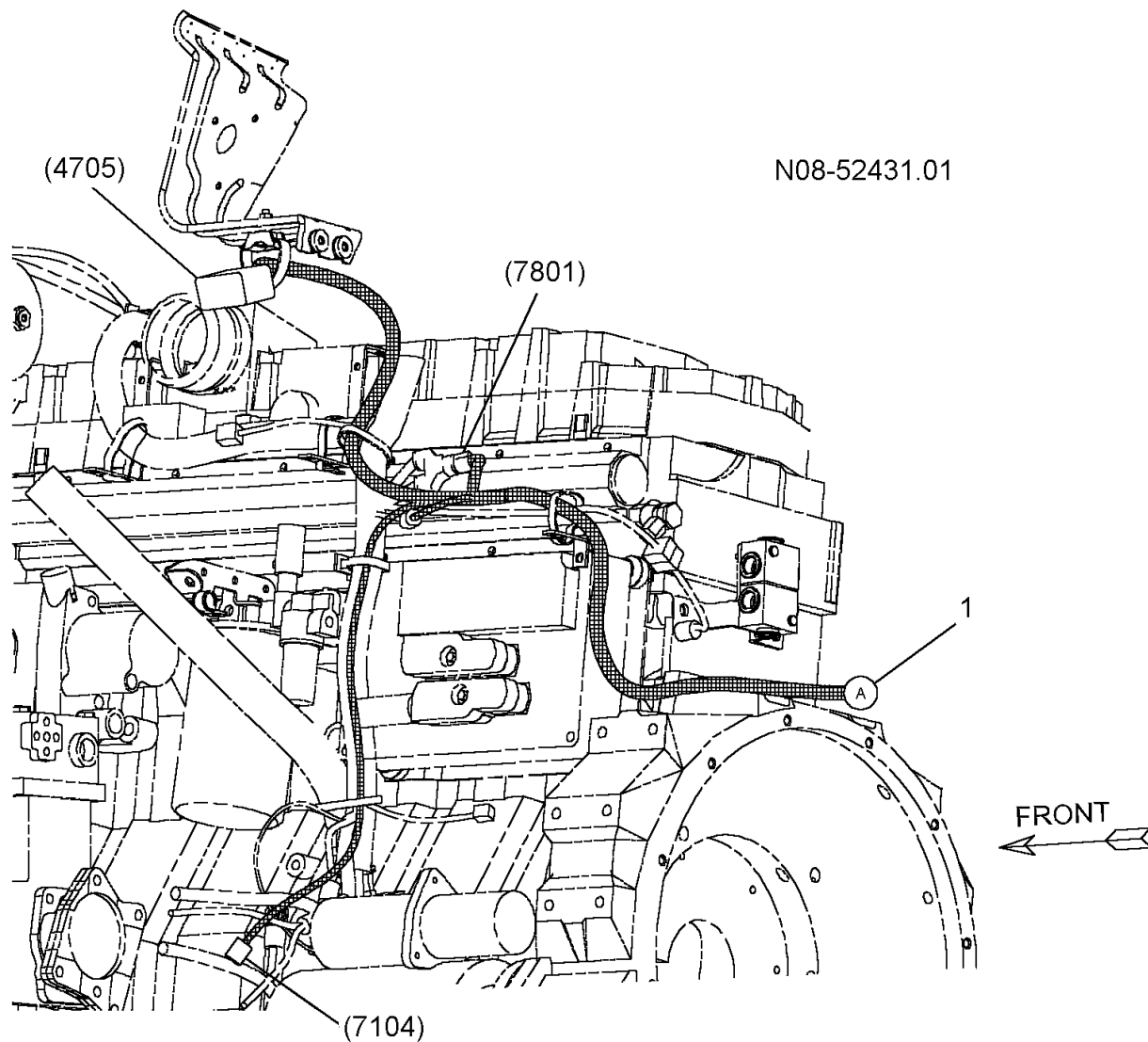


Figure 488 LCT Transmission Harness

- 1. HARNESS TO TRANSMISSION
- (4705) TRANSMISSION / DASH CONNECTOR
- (7104) CLEAN BATTERY FEED
- (7801) DRIVE TRAIN DATA LINK "Y" TO TRANSMISSION "Y"

N08-52431.02

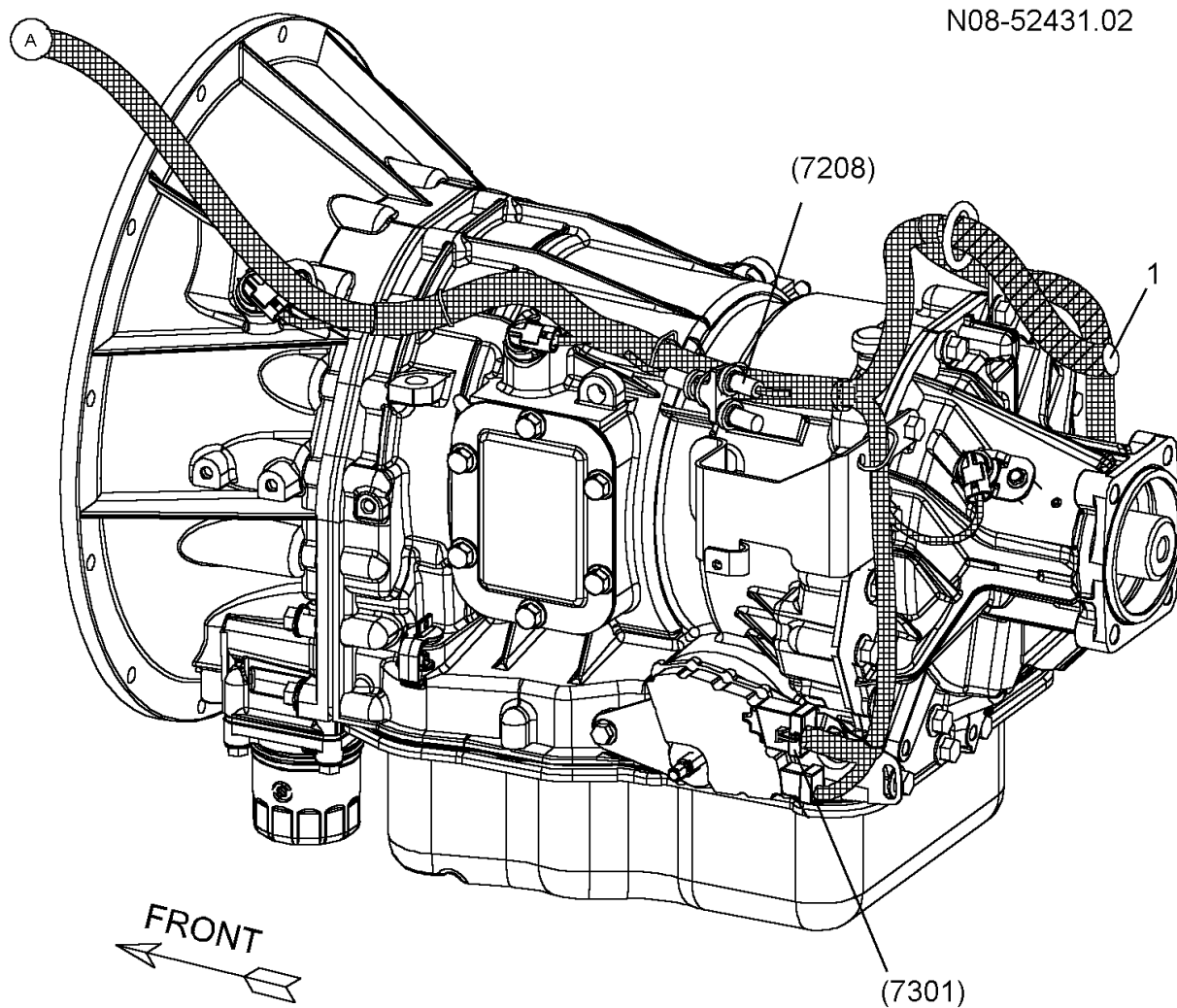


Figure 489 LCT Transmission Wiring

1. HARNESS TO TCM

(7208) TRANSMISSION DATA LINK CONNECTOR AND TERMINATOR

(7301) NSBU CONNECTOR

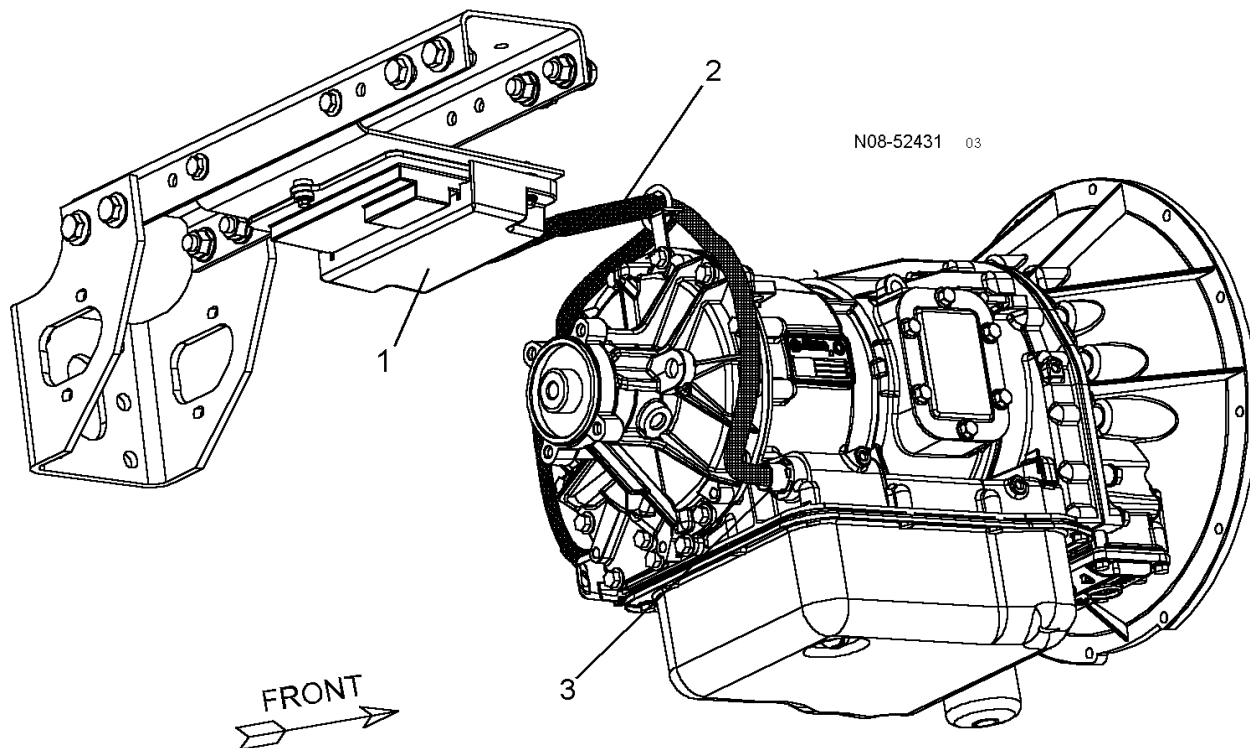


Figure 490 LCT Transmission TCM Location

1. LCT TRANSMISSION CONTROL MODULE (TCM)
2. HARNESS TO TCM (7305)
3. HARNESS TO OUTPUT SPEED SENSOR (7600)

5. EATON® AUTOSHIFT™ TRANSMISSION

Discussion of the EATON AUTOSHIFT transmission In this section is limited to the transmission ECU power circuits, power circuits to the shift selector control and drive train 1939 data link connectivity. For detailed information on transmission diagnostics, refer to the appropriate EATON service manual.

5.1. CIRCUIT FUNCTIONS

The autoshift transmission interfaces with the vehicle electrical system via the ECU, the shift selector control, back up light switch and an Eaton Autoshift relay.

The transmission communicates on the drivetrain 1939 data link to interface with the engine controller, electrical system controller and the air ABS controller. The drivetrain 1939 data link is connected to the shift control in the cab.

5.2. DIAGNOSTICS

The ESC will log a DTC if data link communication with the transmission shifter is lost.

The transmission has its own diagnostic system which will turn on the "SERVICE" lamp on the autoshift display when there is a detectable fault. Diagnostic codes can be read with flash codes on the display. Refer to the appropriate EATON service manual for details.

There are no diagnostic trouble codes (DTC's) associated with the back-up light circuits. A fault in the back-up light circuits will be apparent when the transmission is shifted into reverse and the lights don't come on.

Table 337 Autoshift Preliminary Check

STEP	KEY	ACTION	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	On	Does the engine crank when the transmission is in neutral?	Engine cranks when the transmission is in neutral.	Go to next step.	Refer to Engine Cranking. (See ENGINE CRANKING, page 375)
2.	On	Does the autoshift display appear to have power?	Autoshift display has power.	Go to next step.	Refer to Autoshift selector Power Circuits. (See AUTOSHIFT SELECTOR POWER CIRCUITS, page 989)
3.	Off	Are there any active DTC's associated with the transmission? Refer to Diagnostic Trouble Codes. (See DIAGNOSTIC TROUBLE CODES (DTC), page 988)	Transmission communication DTC is not active.	Go to next step.	Go to Autoshift selector data link circuits. (See AUTOSHIFT SELECTOR DATA LINK CIRCUITS, page 992) Go to Autoshift ECU Power Circuits. (See AUTOSHIFT ECU POWER CIRCUITS, page 993) Go to Autoshift Relay Circuits. (See AUTOSHIFT RELAY CIRCUITS, page 995)
4.	Off	Is the transmission warning light in the EGC illuminated?	Transmission warning lamp is not illuminated.	Go to next step.	Refer to the Eaton Autoshift service manual.
5.	On	Do the back-up lights come on when the transmission is shifted into reverse?	Back-up lights come on when in reverse.	Transmission circuits are functioning. Go to next step.	Go to Back-Up Autoshift Light Circuits. (See Autoshift BACK-UP LIGHT CIRCUITS, page 997)

5.3. DIAGNOSTIC TROUBLE CODES (DTC)

To display diagnostic codes, put the vehicle in diagnostic mode. Set the parking brake and turn the Ignition key "ON". Then press the Cruise "ON" switch and the Cruise "Resume" switch. If no diagnostic trouble codes are present, the cluster odometer will display "NO FAULT". If diagnostic trouble codes are present, the gauge cluster will display the total number of faults and cycle to the next diagnostic trouble code after 10 seconds. To manually cycle through the diagnostic trouble code list, press the cluster display select/reset

button. The last character of the diagnostic trouble code will end in “A” for active diagnostic trouble codes or “P” for previously active diagnostic trouble codes. Turning the ignition key off or releasing the park brake will take the ESC and the gauge cluster out of the diagnostic mode.

The previously active diagnostic trouble codes may be cleared, while in the diagnostic mode, by turning on the left turn signal and pressing the cruise on and set switches simultaneously.

Table 338 Transmission Communication Diagnostic Trouble Codes

DIAGNOSTIC TROUBLE CODE	FAULT DESCRIPTION
639 14 2 240	Electronic transmission controller communication has not been received.

5.4. AUTOSHIFT SELECTOR POWER CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the power circuits to the Autoshift selector will be apparent when the autoshift display does not respond to shift selections. Problems in the selector circuits could be attributed to open or short circuits, a blown fuse, a failed EATON Autoshift relay or a failure in the selector assembly.

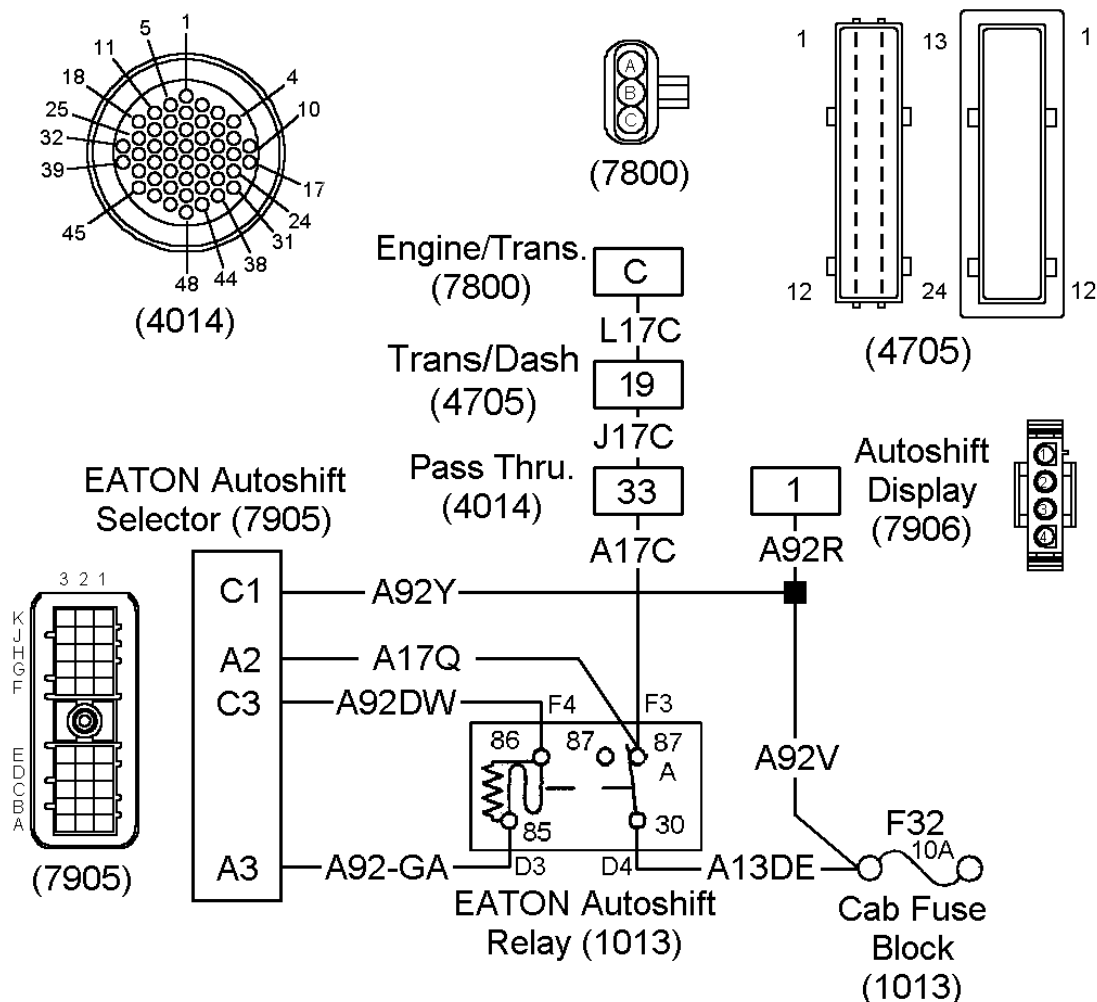


Figure 491 Autoshift Selector Power Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (1012) CAB FUSE BLOCK (EATON AUTOSHIFT RELAY)
LOCATED IN CAB POWER DISTRIBUTION CENTER
- (1013) CAB FUSE BLOCK #3, F29, 5 AMP FUSE
LOCATED IN CAB POWER DISTRIBUTION CENTER
- (4014) PASS THROUGH CONNECTOR
LOCATED ON DASH PANEL ABOVE ESC
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7800) ENGINE/TRANSMISSION
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7905) EATON AUTOSHIFT SELECTOR CONNECTOR
LOCATED ON AUTOSHIFT SELECTOR
- (7906) EATON AUTOSHIFT DISPLAY CONNECTOR
LOCATED ON AUTOSHIFT DISPLAY

Table 339 Autoshift Selector Power Checks

Autoshift Selector Power Connector (7905) Power Checks		
Check with ignition on and (7905) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Selector harness connector (7905), cavity C1 to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown 5A transmission fuse F29 or open or short to ground in circuit A49E or A92Y. Also check for short to ground in circuit A49C or A92R.
EATON Autoshift Relay Checks		
Check with ignition on and EATON Autoshift relay removed.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Bench check relay and replace if it has failed. Refer to Bench Checking Relays. (See BENCH TESTING RELAYS, page 29)		
Test Points	Spec.	Comments
Relay socket cavity A4 (relay 30) to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for open or short in circuit A49C to fuse F29.
Relay socket cavity C4 (relay 86) to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit A92DW to Autoshift selector (7905) cavity C3.
Relay socket cavity A4 (relay 30) to A3 (relay 85).	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit A92-GA to Autoshift selector (7905) cavity A3.
Relay socket cavity A4 (relay 30) to C3 (relay 87).	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit A17Q to Autoshift selector (7905) cavity A2.
If voltages or circuits are correct and Autoshift selector is not powering up, refer to the EATON Autoshift manual.		

Extended Description

Autoshift display connector (7906) cavity 1 is supplied ignition voltage from fuse F29 in the cab PDC.

Autoshift selector connector (7905) cavity C1 is supplied ignition voltage from fuse F29 in the cab PDC.

EATON Autoshift relay, common terminal 30, is supplied Ignition voltage from fuse F29 in the cab PDC.

The autoshift relay is energized by signals from the selector. When the relay energizes it supplies ignition voltage to the selector and to the clutch switch.

5.5. AUTOSHIFT SELECTOR DATA LINK CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the data link circuits to the Autoshift selector will be apparent when communication DTC is active. Problems in the data link circuits could be attributed to open or short circuits, or a failure in the selector assembly.

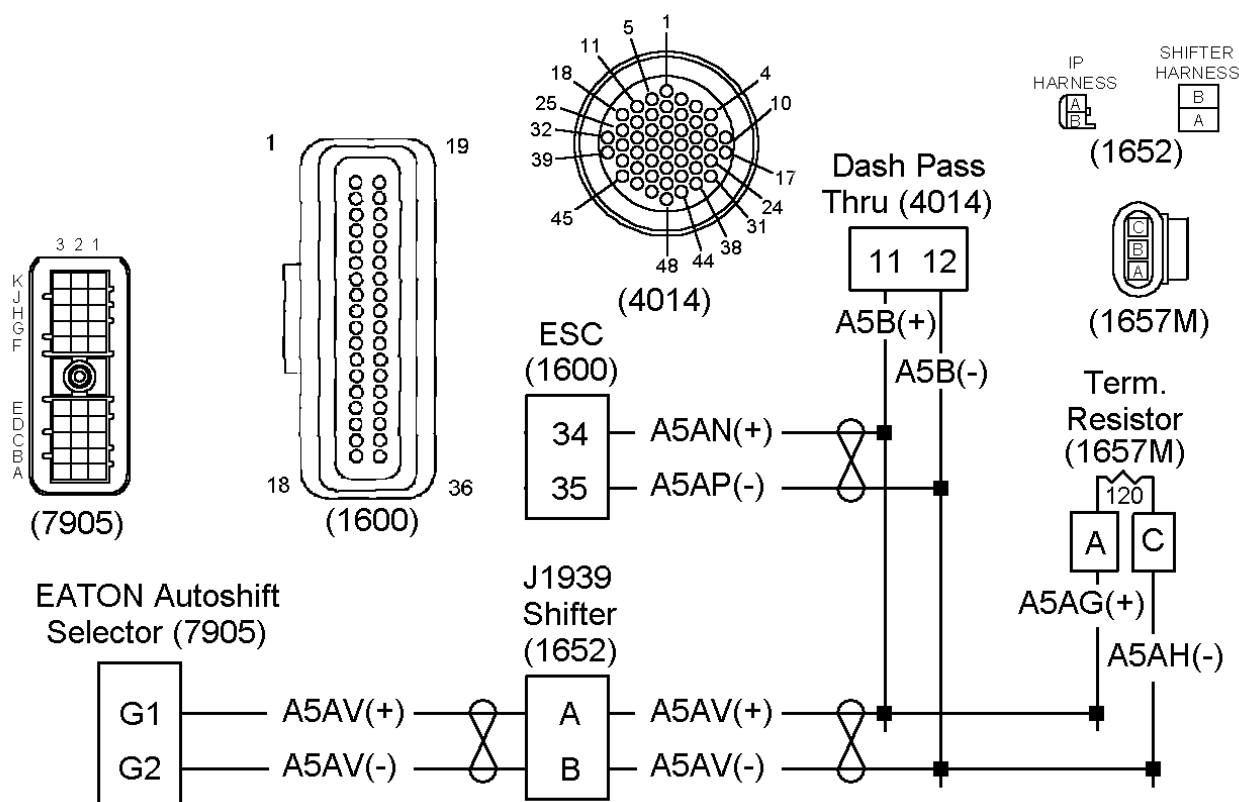


Figure 492 Autoshift Selector Data Link Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (1600) ELECTRICAL SYSTEM CONTROLLER (ESC) CONNECTOR
LOCATED ON CAB SIDE OF ELECTRICAL SYSTEM CONTROLLER
- (1652) DRIVETRAIN J1939 EATON AUTOSHIFT SHIFTER CONNECTOR
LOCATED ON EATON AUTOSHIFT
- (1657M) DRIVETRAIN J1939 TERM. RESISTOR CONNECTOR
LOCATED ON DASH PANEL
- (4014) PASS THROUGH CONNECTOR
LOCATED ON DASH PANEL ABOVE ESC
- (7905) EATON AUTOSHIFT SELECTOR CONNECTOR
LOCATED ON AUTOSHIFT SELECTOR

Table 340 Autoshift Selector Data Link Checks

Autoshift Selector Data Link Connector (7905) Voltage Checks		
Check with ignition on and (7905) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Selector harness connector (7905), cavity G1 to ground	Approximately 3 volts.	If voltage is missing, check for open or short to ground in circuit A5AV(+).
Selector harness connector (7905), cavity G2 to ground	Approximately 3 volts.	If voltage is missing, check for open or short to ground in circuit A5AV(-).
If voltages are correct and EATON Autoshift ECU communication DTC is still active, refer to Drivetrain Data Link. (See DRIVETRAIN 1939 DATA LINK, page 60)		

Extended Description

The drivetrain data link is connected to the EATON Autoshift selector connector (7905) cavities G1 and G2 from the J1939 EATON Autoshift shifter connector (1652).

5.6. AUTOSHIFT ECU POWER CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the power circuits to the autoshift ECU might be present when the autoshift display “SERVICE” warning lamp illuminates. Problems in the ECU power circuits could be attributed to open or short circuits, a blown fuse, or a failed ECU.

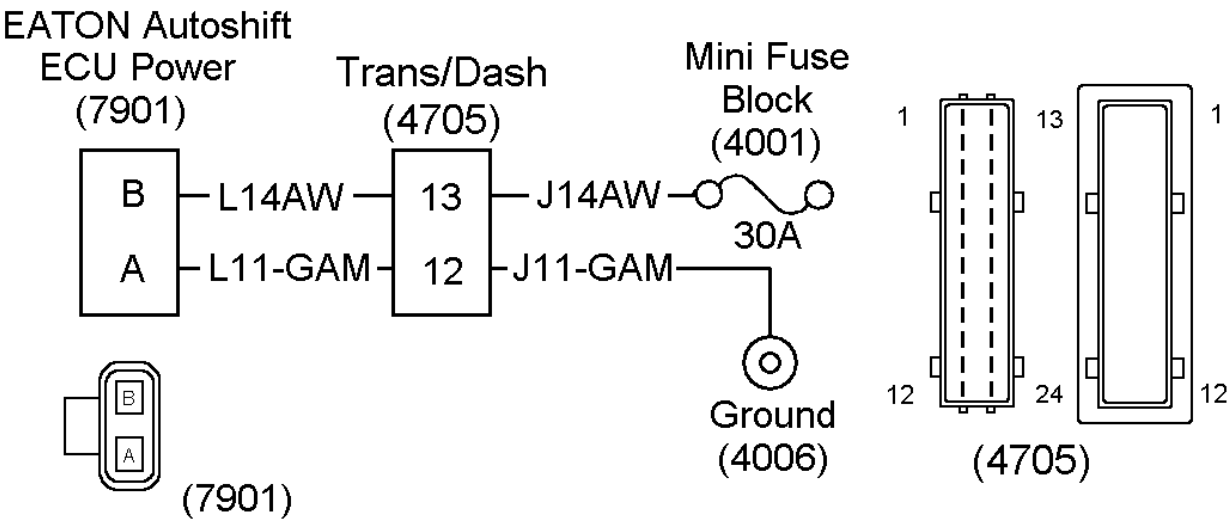


Figure 493 Autoshift ECU Power Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4001) MINI FUSE BLOCK 30 AMP EATON AUTOSHIFT FUSE
LOCATED IN ENGINE POWER DISTRIBUTION CENTER
- (4006) GROUND STUD
LOCATED ON ENGINE
- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7901) AUTOSHIFT ECU POWER
LOCATED ON TRANSMISSION ECU

Table 341 ECU Power Checks

ECU Power Connector (7901) Power Checks		
Check with ignition on and (7901) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
ECU power harness connector (7901), cavity B to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown 30A EATON autoshift fuse or open or short to ground in circuit L14AW or J14AW.
ECU power harness connector (7901), cavity B to A	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L11-GAM or J11-GAM.
If voltages are correct and ECU is not operating correctly, refer to the EATON Autoshift service manual .		

Extended Description

Battery voltage is supplied to ECU power connector (7901) cavity B from the 30 amp EATON Autoshift fuse in the engine compartment PDC.

Ground for the ECU is supplied to ECU power connector (7901) cavity A from the engine ground stud.

5.7. AUTOSHIFT RELAY CIRCUITS

Fault Detection Management

The EATON Autoshift relay provides an input to the engine controller signalling that the transmission is in neutral. The Autoshift selector will energize the relay when the transmission is in neutral. The energized relay supplies 12 volts to the drive line disengagement signal (DDS) input to the engine controller. This signals the engine controller that the transmission is not in gear causing the engine controller to provide a ground to the starter relay coil.

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A problem in the EATON Autoshift relay circuit could be attributed to open or short circuits, a blown fuse, or a failed ECM.

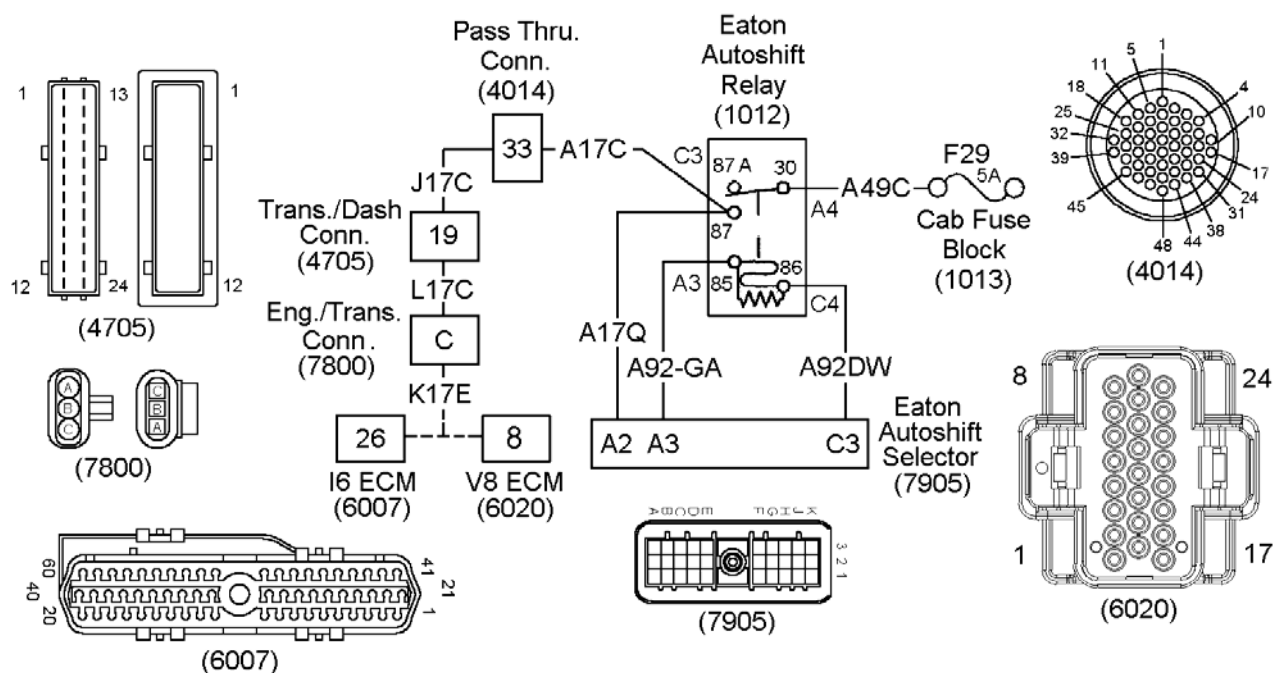


Figure 494 Eaton Autoshift Relay Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (1012) CAB FUSE BLOCK (EATON AUTOSHIFT RELAY)
LOCATED IN CAB POWER DISTRIBUTION CENTER
- (1013) CAB FUSE BLOCK #3, F29, 5 AMP FUSE
LOCATED IN CAB POWER DISTRIBUTION CENTER
- (4014) PASS THROUGH CONNECTOR
LOCATED ABOVE ELECTRICAL SYSTEM CONTROLLER IN DASH PANEL
- (4705) TRANSMISSION DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (6007) I6 ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (6020) V8 ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7800) ENGINE/TRANSMISSION CONNECTOR
LOCATED NEAR ENGINE CONTROLLER
- (7905) AUTOSHIFT SELECTOR CONNECTOR
LOCATED BEHIND AUTOSHIFT SELECTOR

Table 342 Autoshift Relay Circuit Voltage Check Chart

Autoshift Relay Circuit Voltage Checks	
Check with ignition key on and autoshift relay removed.	
NOTE – Always check connectors for damage and pushed-out terminals.	

Table 342 Autoshift Relay Circuit Voltage Check Chart (cont.)

Bench check relay and replace if it has failed. Refer to Bench Checking Relays. (See BENCH TESTING RELAYS, page 29)		
Relay socket cavity A4 (relay 30) to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown fuse F29, short to ground or open in circuit A49C to fuse F29.
Transmission in gear, relay socket cavity C4 (relay 86) to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuit A92DW or missing voltage from Autoshift selector.
Transmission in gear, relay socket cavity C4 (relay 86) to cavity A3 (relay 85).	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit A92-GA or missing ground signal from Autoshift selector.
Relay socket cavity C3 (relay 87) to cavity A3 (relay 85).	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuit A17C, A17Q, J17C, L17C, or K17E to engine controller. Also check for missing voltage from engine controller.

Extended Description

Refer to the Eaton Autoshift Relay Circuits.

When the key switch is in the ignition position and the transmission is in neutral, battery voltage will be applied to the relay common contact 30 and normally closed contact 87 to the ECM DDS circuit.

The autoshift selector provides ground to the relay coil contact 85.

When the transmission is shifted out of neutral, the autoshift selector will apply 12 volts from connector (7905) terminal C3 to relay coil contact 86. This will energize the relay.

The energized relay will remove voltage from the ECM DDS circuits. This will cause the ECM to disable engine cranking.

5.8. AUTOSHIFT BACK-UP LIGHT CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

When the transmission is shifted into reverse, the back up light switch should close to provide voltage for the back up lamps.

A fault in the back-up circuits should be suspected if the back-up lights do not come on when the transmission is shifted into reverse. Problems in the back-up light circuits can be caused by open or short circuits, a blown fuse, or failed switch.

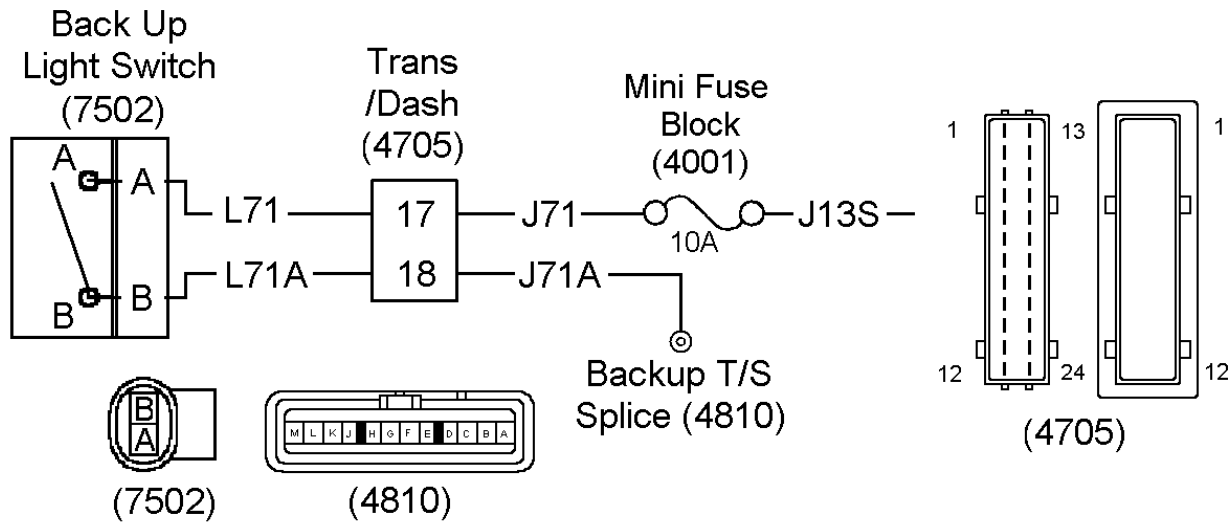


Figure 495 Back Up Switch Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4705) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (4810) BACKUP LIGHT TURN SIGNAL SPLICE CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR PDC
- (7502) BACK UP LIGHT SWITCH CONNECTOR
LOCATED ON AUTOSHIFT TRANSMISSION

Table 343 Back Up Light Circuit Checks

Back Up Light Switch Connector (7502) Power Checks		
Check with ignition on and (7502) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Back up switch harness connector (7502), cavity A to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit J71 or L71.
Back up switch harness connector (7502), cavity A to cavity B.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L71A or J71A to back up/turn signal splice (4810). Also check circuits through back up lamps to ground.
If voltages are correct, consider replacing the back up switch.		

Extended Description

Ignition voltage is supplied to the back up light switch connector (7502), terminal A, from the 10 amp back up light fuse in the engine compartment power distribution center (PDC).

When the transmission is shifted into reverse, the switch will close supplying ignition voltage to the lamp circuits.

5.9. VEHICLE SPEED SENSOR

Refer to Speedometer (See SPEEDOMETER, page 249) for procedures to isolate speedometer problems to the sensor circuits.

Refer to the applicable engine manual for troubleshooting circuits from the engine controller to the sensor

Circuit Function

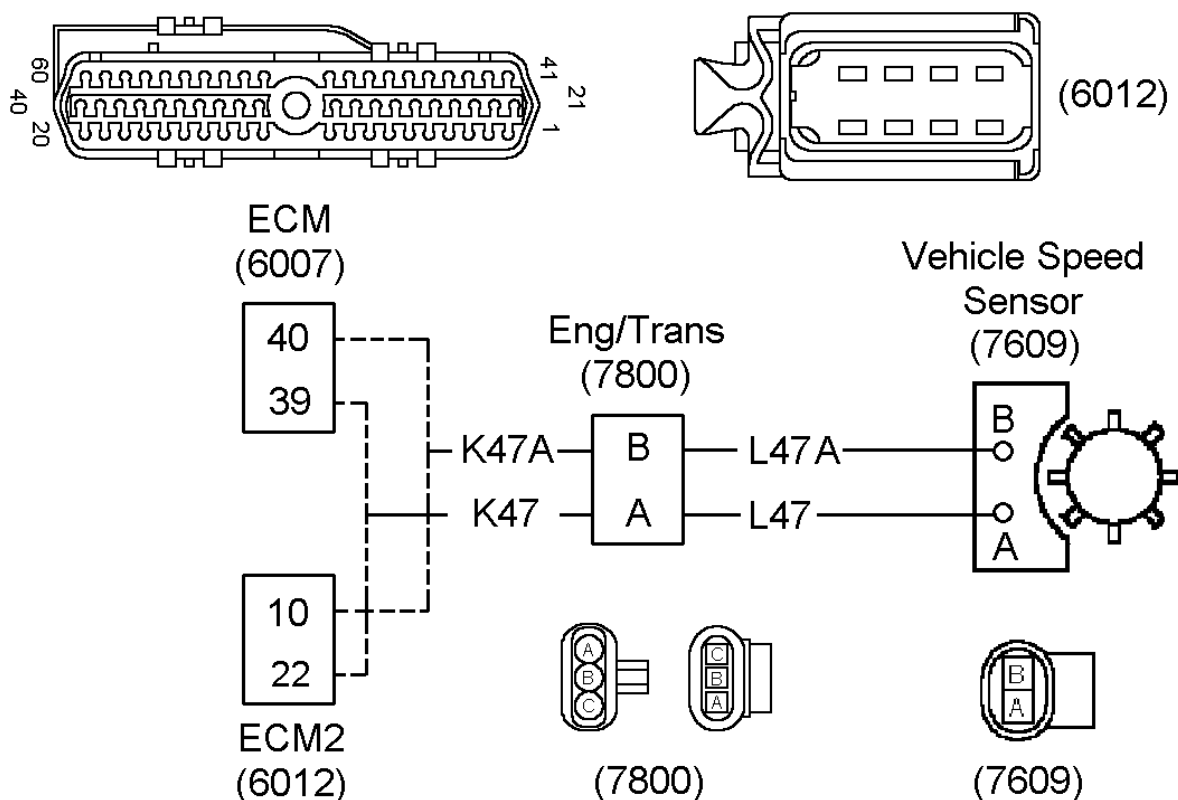


Figure 496 Transmission Vehicle Speed Sensor Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (6007) I6 ENGINE ECM BLACK CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (6012), (6021) V8 ENGINE ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7609) TRANSMISSION SPEED SENSOR
LOCATED ON TRANSMISSION
- (7800) ENGINE/TRANSMISSION
LOCATED IN ENGINE COMPARTMENT NEAR ENGINE CONTROLLER

Testing Vehicle Speed Sensor

Construct test leads using terminals (International Part No. 1680205C1), short length of 16 gauge wire and alligator clips.



WARNING – A jack must never be used alone to support vehicle. The jack may lower and serious injury could result. Always support vehicle with floor jacks. Always block wheels to prevent vehicle from moving.



WARNING – EXTREME CAUTION should be used to prevent personal injury resulting from contact with rotating vehicle wheels when connecting test leads.

Table 344 Testing Vehicle Speed Sensor

STEP	KEY	ACTION	TEST POINTS	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	Off	Inspect VSS for damage before performing this test.			Go to next step.	
2.	Off	Disconnect engine harness (7609) from VSS and use test leads to measure resistance between terminal A and B of sensor connector.	VSS, terminal A to B.	600 to 800 ohms.	Go to next step.	Replace the vehicle speed sensor (VSS).
3.	Off	Measure resistance to ground at both sensor terminals.	VSS, term. 1 and 2 to ground.	>100K ohms.	Go to next step.	Replace the vehicle speed sensor (VSS).
4.	Off	Block front wheels and place rear axles on floor stands.			Go to next step.	
5.	Off	Use AC voltmeter with sufficient length leads to avoid personal contact with rotating vehicle wheels during test. Connect meter leads to test leads.			Go to next step.	
6.	Off	Run engine at idle speed, with transmission in high gear. Measure voltage across the two sensor terminals.	VSS, across terminals.	>2.0 volts AC	VSS checks good.	Replace the VSS.

5.10. COMPONENT LOCATIONS

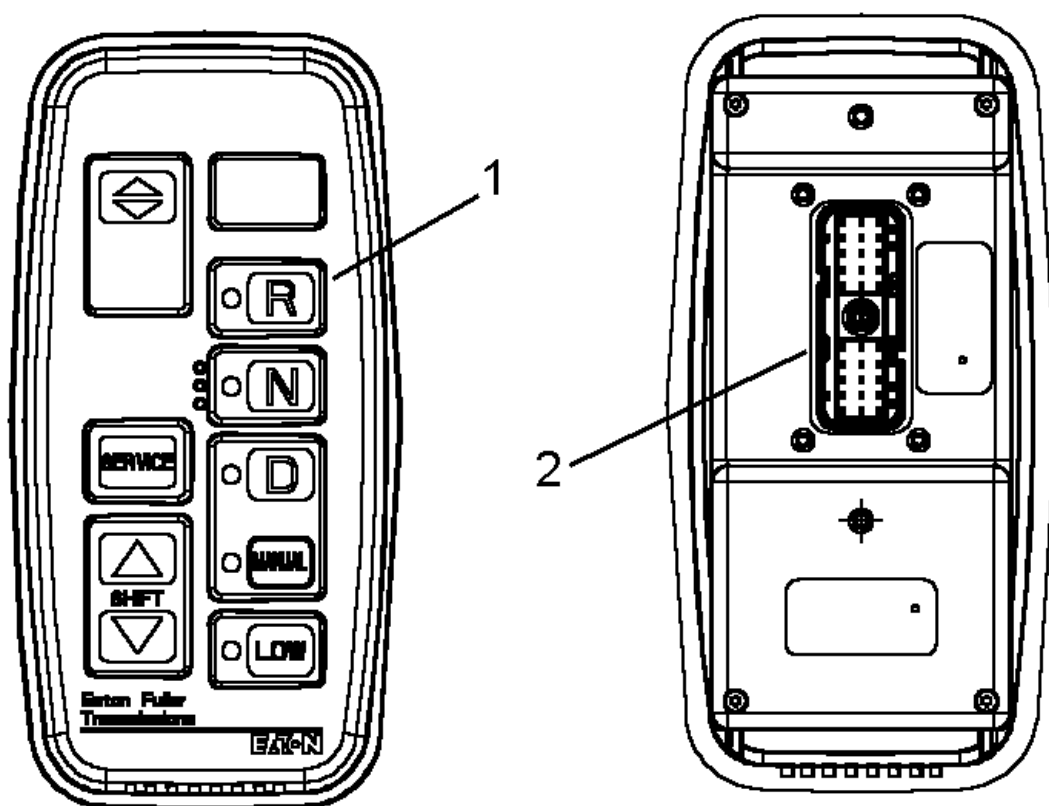


Figure 497 Eaton Autoshift Shift Selector

1. SHIFT CONTROL BUTTONS
2. (420) SHIFT SELECTOR CONNECTOR

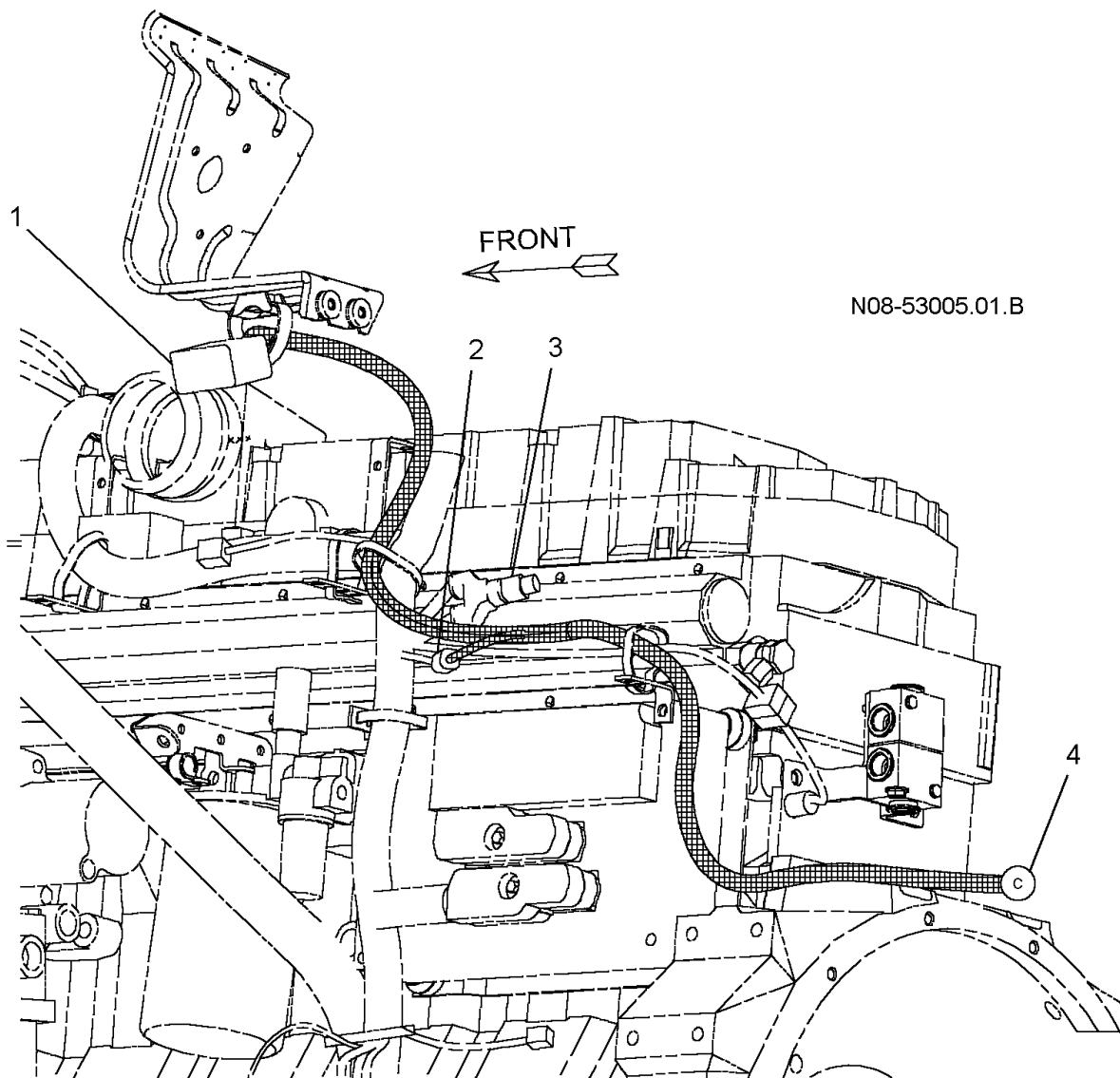


Figure 498 Eaton Autoshift Transmission Harness

1. TRANSMISSION/DASH CONNECTOR (4705)
2. ENGINE/TRANSMISSION CONNECTOR (7800)
3. DRIVETRAIN 1939 DATA LINK TERMINATING RESISTOR (DATA LINK CONNECTION FOR TRANSMISSION IS AT SELECTOR)
4. TO TRANSMISSION HARNESS

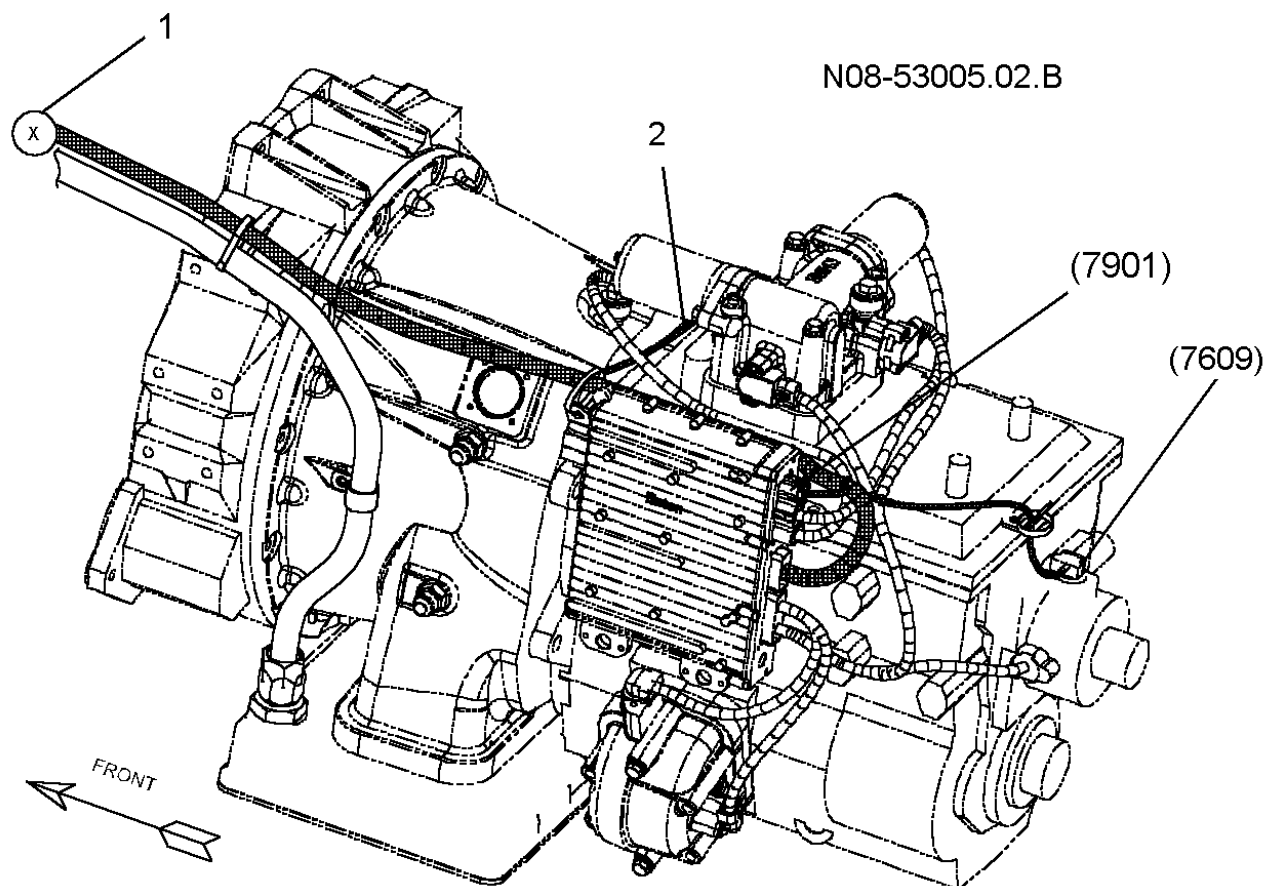


Figure 499 Eaton Autoshift Manual Transmission Wiring

- 1. FROM ENGINE HARNESS
- 2. HARNESS TO BACK UP SWITCH (7502)
- (7609) TRANSMISSION SPEEDOMETER SENSOR
- (7901) ECU POWER CONNECTOR

6. EATON® LIGHTNING™ TRANSMISSION

Discussion of the EATON LIGHTNING transmission In this section is limited to the transmission ECU power circuits, power circuits to the shift Lightning ECM and drive train 1939 data link connectivity. For detailed information on transmission diagnostics, refer to the appropriate EATON service manual.

6.1. CIRCUIT FUNCTIONS

The lightning transmission interfaces with the vehicle electrical system via the Eaton Lightning ECM, the shift control lever, back up light switch and the engine ECU.

The transmission communicates on the drivetrain 1939 data link to interface with the engine controller, electrical system controller and the air ABS controller. The drivetrain 1939 data link is connected to the shift control in the cab.

6.2. DIAGNOSTICS

The ESC will log a DTC if data link communication with the transmission shifter is lost.

The transmission has its own diagnostic system which will turn on the “SERVICE” lamp on the lightning display when there is a detectable fault. Diagnostic codes can be read with flash codes on the display. Refer to the appropriate EATON service manual for details.

There are no diagnostic trouble codes (DTC's) associated with the back-up light circuits. A fault in the back-up light circuits will be apparent when the transmission is shifted into reverse and the lights don't come on.

Table 345 Lightning Preliminary Check

STEP	KEY	ACTION	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	On	Does the engine crank when the transmission is in neutral?	Engine cranks when the transmission is in neutral.	Go to next step.	Refer to Engine Cranking. (See ENGINE CRANKING, page 375)
2.	On	Does the lightning display appear to have power?	Lightning display has power.	Go to next step.	Refer to Lightning Shifter Power Circuits. (See Lightning Shifter POWER CIRCUITS, page 1005)
3.	Off	Are there any active DTC's associated with the transmission? Refer to Diagnostic Trouble Codes. (See DIAGNOSTIC TROUBLE CODES (DTC), page 1004)	Transmission communication DTC is not active.	Go to next step.	Go to Lightning data link circuits. (See Lightning DATA LINK CIRCUITS, page 1007) Go to Lightning ECU Power Circuits. (See Lightning ECU POWER CIRCUITS, page 1009)
4.	Off	Is the transmission warning light in the EGC illuminated?	Transmission warning lamp is not illuminated.	Go to next step.	Refer to the Eaton Lightning service manual.
5.	On	Do the back-up lights come on when the transmission is shifted into reverse?	Back-up lights come on when in reverse.	Transmission circuits are functioning. Go to next step.	Go to Lightning Back-Up Light Circuits. (See LIGHTNING BACK-UP LIGHT CIRCUITS, page 1010)

6.3. DIAGNOSTIC TROUBLE CODES (DTC)

To display diagnostic codes, put the vehicle in diagnostic mode. Set the parking brake and turn the Ignition key “ON”. Then press the Cruise “ON” switch and the Cruise “Resume” switch. If no diagnostic trouble codes are present, the cluster odometer will display “NO FAULT”. If diagnostic trouble codes are present, the gauge cluster will display the total number of faults and cycle to the next diagnostic trouble code after 10

seconds. To manually cycle through the diagnostic trouble code list, press the cluster display select/reset button. The last character of the diagnostic trouble code will end in "A" for active diagnostic trouble codes or "P" for previously active diagnostic trouble codes. Turning the ignition key off or releasing the park brake will take the ESC and the gauge cluster out of the diagnostic mode.

The previously active diagnostic trouble codes may be cleared, while in the diagnostic mode, by turning on the left turn signal and pressing the cruise on and set switches simultaneously.

Table 346 Transmission Communication Diagnostic Trouble Codes

DIAGNOSTIC TROUBLE CODE	FAULT DESCRIPTION
639 14 2 240	Electronic transmission controller communication has not been received.

6.4. LIGHTNING SHIFTER POWER CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the power circuits to the Lightning shifter will be apparent when the lightning display does not respond to shift selections. Problems in the shifter circuits could be attributed to open or short circuits, a blown fuse, a failed EATON Lightning jumper or a failure in the shifter assembly.

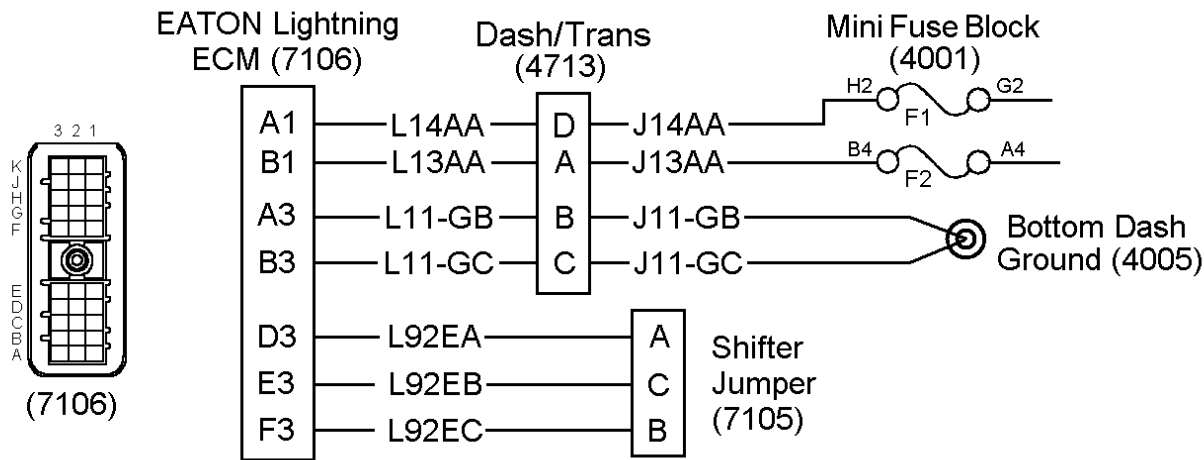


Figure 500 Lightning Shifter/ECM Power Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4001) MINI FUSE BLOCK, F1 & F2, EATON LIGHTNING FUSES
LOCATED IN ENGINE POWER DISTRIBUTION CENTER
- (4005) BOTTOM DASH GROUND
LOCATED IN CAB DASH
- (4713) DASH/TRANSMISSION CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7105) EATON LIGHTNING SHIFTER JUMPER CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION
- (7106) EATON LIGHTNING ECM POWER CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION

Table 347 Lightning Shifter Power Checks

Lightning Shifter Jumper Connector (7105) Power Checks		
Check with ignition on and (7105) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Shifter Jumper harness connector (7105), cavity A to ground	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuit L92EA.
Shifter Jumper harness connector (7105), cavity C to ground	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuit L92EB.
Shifter Jumper harness connector (7105), cavity B to ground	12 ± 1.5 volts.	If voltage is incorrect, check for open or short to ground in circuit L92EC.
If voltages or circuits are correct and Lightning Shifter is not powering up, refer to the EATON Lightning service manual.		

Extended Description

Lightning Shifter jumper connector (7105) cavity A is supplied voltage from Lightning ECM power connector (7106) cavity D3.

Lightning Shifter jumper connector (7105) cavity C is supplied voltage from Lightning ECM power connector (7106) cavity E3.

Lightning Shifter jumper connector (7105) cavity B is supplied voltage from Lightning ECM power connector (7106) cavity F3.

6.5. LIGHTNING DATA LINK CIRCUITS

Fault Detection Management

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the data link circuits to the Lightning ECM will be apparent when communication DTC is active. Problems in the data link circuits could be attributed to open or short circuits, or a failure in the shifter assembly.

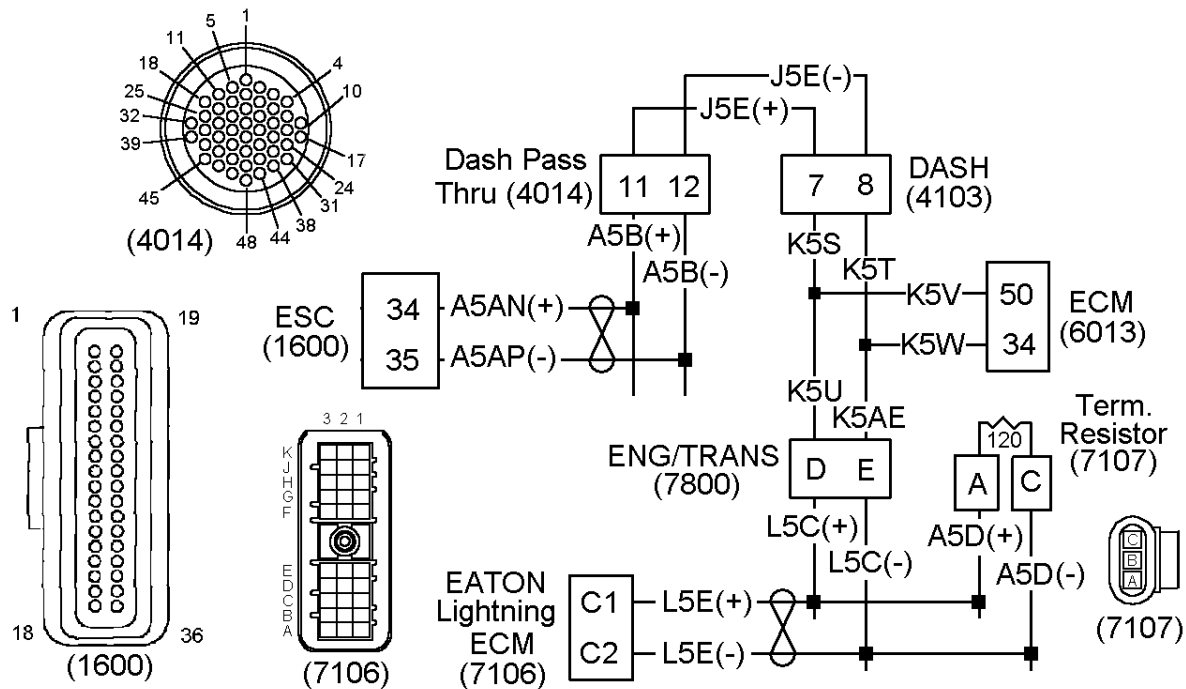


Figure 501 Lightning Data Link Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (1600) ELECTRICAL SYSTEM CONTROLLER (ESC) CONNECTOR
LOCATED ON CAB SIDE OF ELECTRICAL SYSTEM CONTROLLER
- (4014) PASS THROUGH CONNECTOR
LOCATED ON DASH PANEL ABOVE ESC
- (4103) DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT ABOVE ESC
- (6013) CAT ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7106) EATON LIGHTNING ECM CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION
- (7107) DRIVETRAIN J1939 TERM. RESISTOR CONNECTOR
LOCATED ON DASH PANEL
- (7800) ENGINE/TRANSMISSION CONNECTOR
LOCATED NEAR ENGINE CONTROLLER

Table 348 Lightning Data Link Checks

Lightning ECM Data Link Connector (7106) Voltage Checks		
Check with ignition on and (7106) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments

Table 348 Lightning Data Link Checks (cont.)

Lightning ECM harness connector (7106), cavity C1 to ground	Approximately 3 volts.	If voltage is missing, check for open or short to ground in circuit L5E(+).
Lightning ECM harness connector (7106), cavity C2 to ground	Approximately 3 volts.	If voltage is missing, check for open or short to ground in circuit L5E(-).
If voltages are correct and EATON Lightning ECU communication DTC is still active, refer to Drivetrain Data Link. (See DRIVETRAIN 1939 DATA LINK, page 60)		

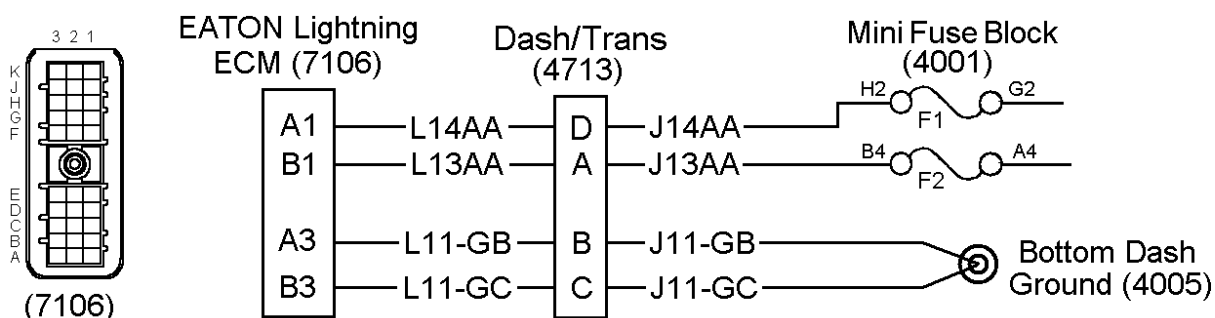
Extended Description

The drivetrain data link is connected to the EATON Lightning ECM connector (7106) cavities C1 and C2 from the J1939 EATON Lightning shifter jumper connector (7105).

6.6. LIGHTNING ECU POWER CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

A fault in the power circuits to the lightning ECU might be present when the lightning display “SERVICE” warning lamp illuminates. Problems in the ECU power circuits could be attributed to open or short circuits, a blown fuse, or a failed ECU.

**Figure 502 Lightning ECU Power Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information**

- (4001) MINI FUSE BLOCK, F1 & F2, EATON LIGHTNING FUSES
LOCATED IN ENGINE POWER DISTRIBUTION CENTER
- (4005) BOTTOM DASH GROUND
LOCATED IN CAB DASH
- (4713) DASH/TRANSMISSION CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (7106) EATON LIGHTNING ECU POWER CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION

Table 349 ECU Power Checks

ECU Power Connector (7106) Power Checks		
Check with ignition on and (7106) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
ECU power harness connector (7106), cavity A1 to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown transmission fuse F1 or open or short to ground in circuit L14AA or J14AA. Also check for short to ground in circuit L14AA or J14AA.
ECU power harness connector (7106), cavity B1 to ground	12 ± 1.5 volts.	If voltage is incorrect, check for blown transmission fuse F2 or open or short to ground in circuit L13AA or J13AA. Also check for short to ground in circuit L13AA or J13AA.
ECU power harness connector (7106), cavity A1 to A3	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L11–GB or J11–GB.
ECU power harness connector (7106), cavity B1 to B3	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L11–GC or J11–GC.
If voltages are correct and ECU is not operating correctly, refer to the EATON Lightning service manual .		

Extended Description

Battery voltage is supplied to ECU power connector (7106) cavity B1 from the EATON Lightning fuse F2 in the engine compartment PDC.

Battery voltage is supplied to ECU power connector (7106) cavity A1 from the EATON Lightning fuse F1 in the engine compartment PDC.

Ground for the ECU is supplied to ECU power connector (7106) cavity A3 from the engine ground stud.

Ground for the ECU is supplied to ECU power connector (7106) cavity B3 from the engine ground stud.

6.7. LIGHTNING BACK-UP LIGHT CIRCUITS**Fault Detection Management**

NOTE – The testing method for troubleshooting the electrical systems portrayed in this manual is a basic voltage test. An alternative method of checking for voltage drops within a given circuit may be a quicker method of identifying an exact problem.

When the transmission is shifted into reverse, the back up light switch should close to provide voltage for the back up lamps.

A fault in the back-up circuits should be suspected if the back-up lights do not come on when the transmission is shifted into reverse. Problems in the back-up light circuits can be caused by open or short circuits, a blown fuse, or failed switch.

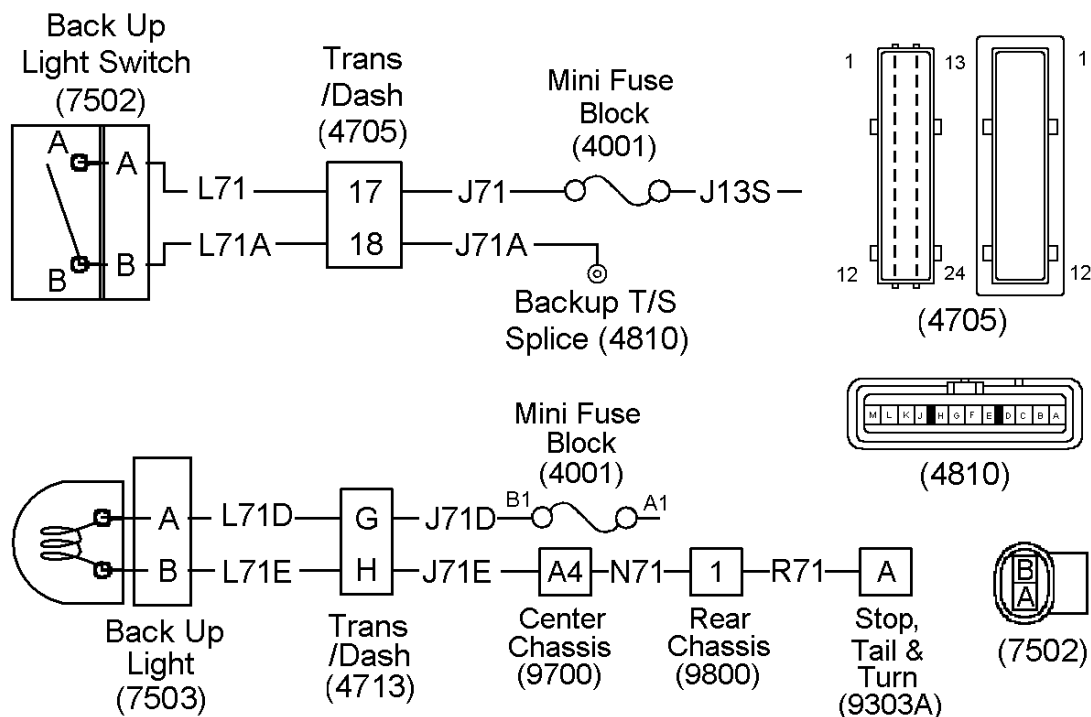


Figure 503 Lightning Back Up Switch Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (4713) TRANSMISSION/DASH CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR WIPER MOTOR BRACKET
- (4810) BACKUP LIGHT TURN SIGNAL SPLICE CONNECTOR
LOCATED IN ENGINE COMPARTMENT NEAR PDC
- (7502) BACK UP LIGHT SWITCH CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION
- (7503) BACK UP LIGHT CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION

Table 350 Back Up Light Circuit Checks

Back Up Light Switch Connector (7502) Power Checks		
Check with ignition on and (7502) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Back up switch harness connector (7502), cavity A to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown 10A transmission fuse or open or short to ground in circuit J71 or L71.

Table 350 Back Up Light Circuit Checks (cont.)

Back up switch harness connector (7502), cavity A to cavity B.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L71A or J71A to back up/turn signal splice (4810). Also check circuits through back up lamps to ground.
If voltages are correct, consider replacing the back up switch.		
Back Up Light Connector (7503) Power Checks Check with ignition on and (7503) disconnected.		
NOTE – Always check connectors for damage and pushed-out terminals.		
Test Points	Spec.	Comments
Back up light harness connector (7503), cavity A to ground.	12 ± 1.5 volts.	If voltage is incorrect, check for blown transmission fuse or open or short to ground in circuit J71D or L71D.
Back up light harness connector (7503), cavity A to cavity B.	12 ± 1.5 volts.	If voltage is incorrect, check for open in circuit L71E, J71E, N71 or R71 to stop, tail & turn signal (9303A). Also check circuits through back up lamps to ground.
If voltages are correct, consider replacing the back up switch.		

Extended Description

Ignition voltage is supplied to the back up light switch connector (7502), terminal A, from the 10 amp back up light fuse in the engine compartment power distribution center (PDC).

Ignition voltage is supplied to the back up light connector (7503), terminal A, from the back up light fuse in the engine compartment power distribution center (PDC).

When the transmission is shifted into reverse, the switch will close supplying ignition voltage to the lamp circuits.

6.8. VEHICLE SPEED SENSOR

Refer to Speedometer (See SPEEDOMETER, page 249) for procedures to isolate speedometer problems to the sensor circuits.

Refer to the applicable engine manual for troubleshooting circuits from the engine controller to the sensor

Circuit Function

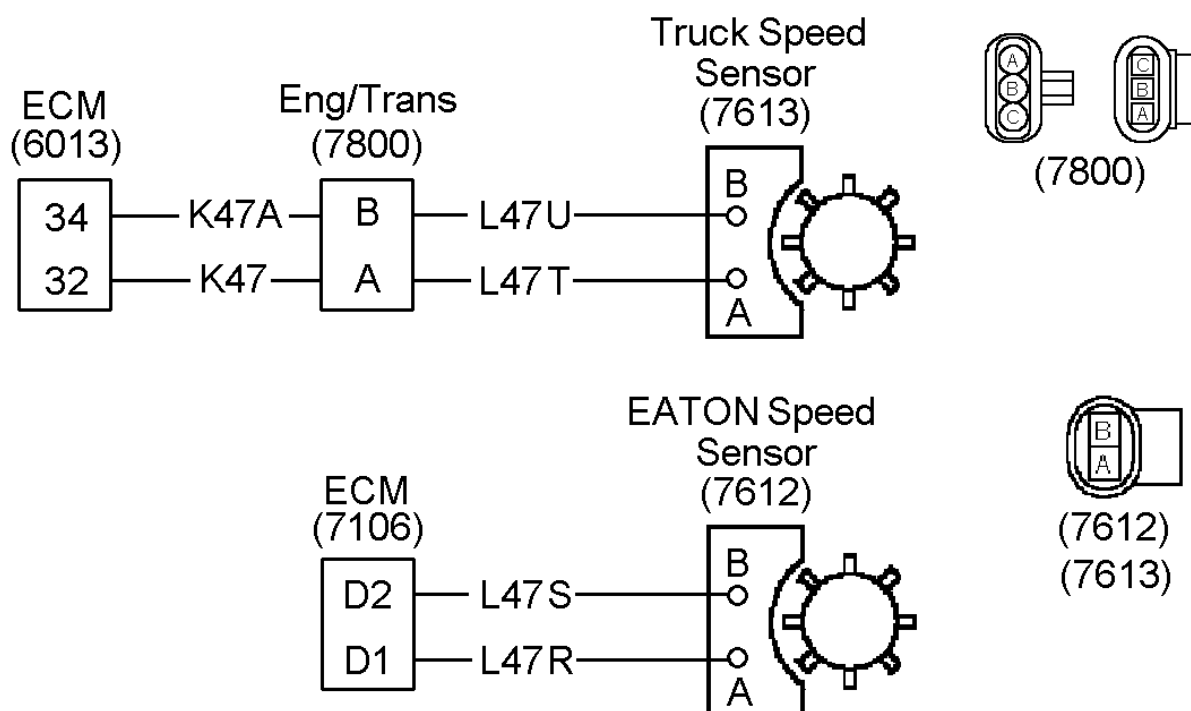


Figure 504 Lightning Transmission Vehicle Speed Sensor Circuits—Always Refer to Circuit Diagram Book for Latest Circuit Information

- (6013) ENGINE ECM CONNECTOR
LOCATED ON ENGINE CONTROLLER
- (7106) EATON LIGHTNING ECM POWER CONNECTOR
LOCATED ON LIGHTNING TRANSMISSION
- (7612) EATON SPEED SENSOR
LOCATED ON TRANSMISSION
- (7613) TRUCK SPEED SENSOR
LOCATED ON TRANSMISSION
- (7800) ENGINE/TRANSMISSION
LOCATED IN ENGINE COMPARTMENT NEAR ENGINE CONTROLLER

Testing Vehicle Speed Sensor

Construct test leads using terminals (International Part No. 1680205C1), short length of 16 gauge wire and alligator clips.



WARNING – A jack must never be used alone to support vehicle. The jack may lower and serious injury could result. Always support vehicle with floor jacks. Always block wheels to prevent vehicle from moving.



WARNING – EXTREME CAUTION should be used to prevent personal injury resulting from contact with rotating vehicle wheels when connecting test leads.

Table 351 Testing Vehicle Speed Sensor

STEP	KEY	ACTION	TEST POINTS	SPEC.	YES-IN SPEC.	NO-OUT OF SPEC.
1.	Off	Inspect VSS for damage before performing this test.			Go to next step.	
2.	Off	Disconnect engine harness (7613) from VSS and use test leads to measure resistance between terminal A and B of sensor connector.	VSS, terminal A to B.	600 to 800 ohms.	Go to next step.	Replace the vehicle speed sensor (VSS).
3.	Off	Measure resistance to ground at both sensor terminals.	VSS, term. 1 and 2 to ground.	>100K ohms.	Go to next step.	Replace the vehicle speed sensor (VSS).
4.	Off	Block front wheels and place rear axles on floor stands.			Go to next step.	
5.	Off	Use AC voltmeter with sufficient length leads to avoid personal contact with rotating vehicle wheels during test. Connect meter leads to test leads.			Go to next step.	
6.	Off	Run engine at idle speed, with transmission in high gear. Measure voltage across the two sensor terminals.	VSS, across terminals.	>2.0 volts AC	VSS checks good.	Replace the VSS.

6.9. TRANSMISSION OIL TEMPERATURE SENSOR

Refer to Transmission Oil Temperature Gauge (See TRANSMISSION OIL TEMPERATURE GAUGE, page 263) for troubleshooting procedures.

6.10. COMPONENT LOCATIONS

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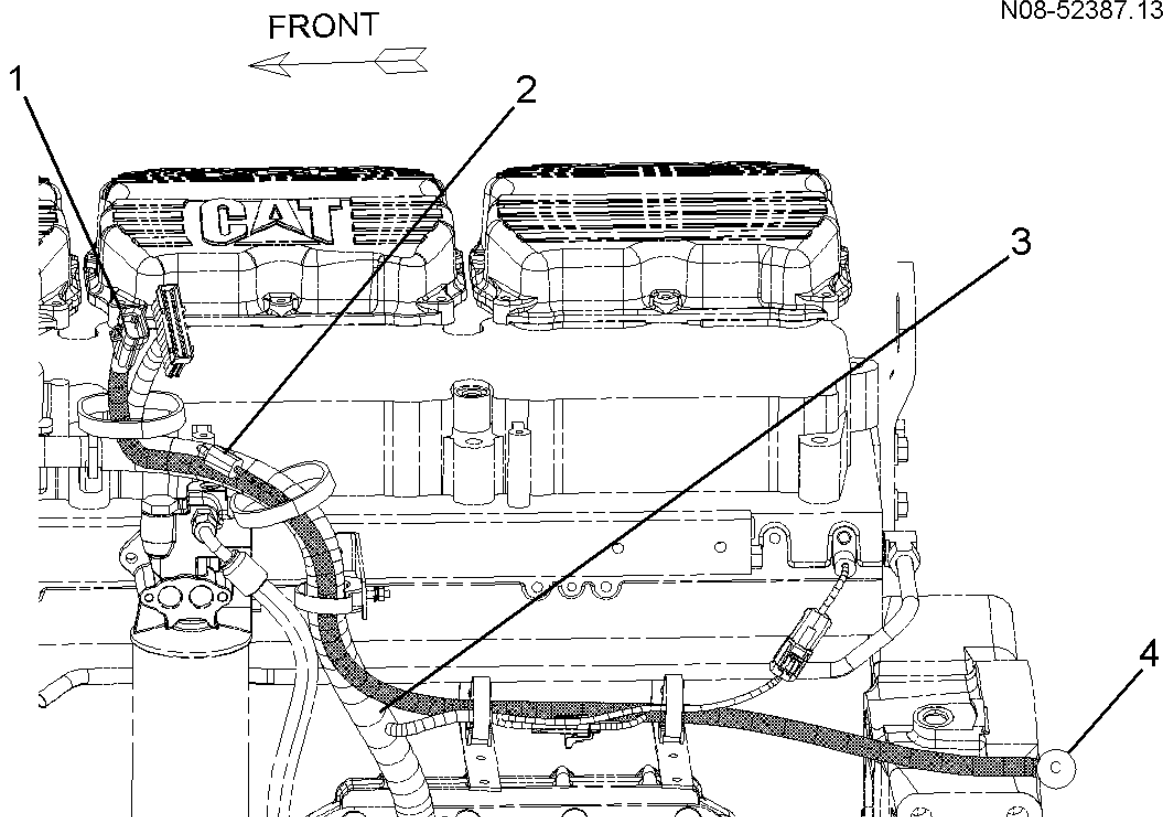


Figure 505 Eaton Lightning Transmission Harness

1. TRANSMISSION/DASH CONNECTOR (4713)
2. ENGINE/TRANSMISSION CONNECTOR (7800)
3. DRIVETRAIN 1939 DATA LINK TERMINATING RESISTOR
4. TO TRANSMISSION HARNESS

N08-52387.10.E

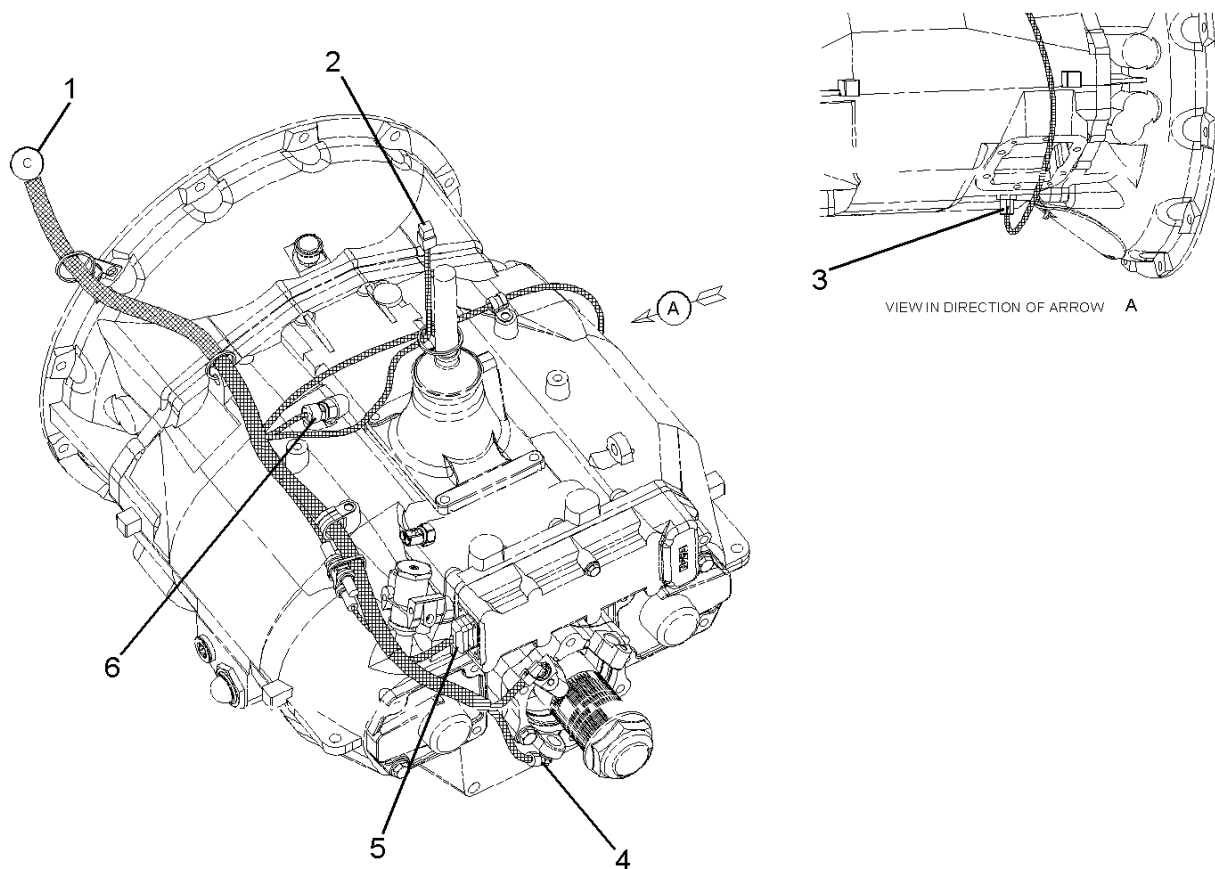


Figure 506 Eaton Lightning Manual Transmission Wiring

1. FROM ENGINE HARNESS
2. (7105) EATON LIGHTNING SHIFTER JUMPER
3. (7703) TRANSMISSION OIL TEMP SENSOR
4. (7612) EATON SPEED SENSOR
5. (7106) EATON LIGHTNING ECM
6. (7502) BACK UP LIGHT SWITCH

Table of Contents

Refer to the HVAC service manual section S16025 for information on the HVAC electrical system.

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1. DIAGNOSTICS

1.1. ON-LINE DIAGNOSTICS

On-line Diagnostics are automatically performed while the key is in the accessory or ignition position. Any faults encountered will be entered in the active diagnostic trouble code list.

Check Electrical System Light

The check electrical system light will turn on for 5 seconds after the gauge sweep, on power up. If there is an active fault the light will stay on for an extra minute. If a fault occurs during operation of the vehicle the light will come on for 1 minute. This will alert the driver that an active fault exists.

If the check electrical system light comes on and stays on after the gauge sweep is completed there is an active diagnostic trouble code (DTC) or there is no communication between the EGC and ESC.

If the EGC loses communication with the ESC or engine controller the check electrical system light will turn on and stay on. The light will be accompanied by 10 short beeps from the EGC alarm.

Gauges

Gauge warning lamps will illuminate and be accompanied by the appropriate alarm when gauge readings exceed preset limits. Gauges will also respond when the ESC is not receiving input from sensors.

Flashing Switch Lamps

Several features activated by switches in the switch packs are programmed to flash the indicator lamp in the switch when there is a switch malfunction or a malfunctioning feature.

Not all switches will respond the same. Generally a malfunctioning switch will cause the indicator to flash at a slow rate. A problem with the feature will cause the indicator to flash at a fast rate. Refer to the section on the particular feature for details on how the switch indicator responds to failures.

1.2. OFF- LINE DIAGNOSTICS

NOTE – Diagnostic messages from the engine controller, antilock brake system or transmission are not displayed on the electronic gauge cluster (EGC) digital display.

Placing the electronic gauge cluster (EGC) in diagnostic mode will allow the EGC to display active and previously active diagnostic messages from the electrical system controller (ESC) or from the EGC itself.

To engage the diagnostic mode turn the Ignition key ON (or in accessory), then press the Cruise ON switch and the Cruise RESUME switch simultaneously. If no faults are present, the gauge cluster display will read NO FAULTS. If faults are present, the gauge cluster will display a message with the number of faults, followed by the diagnostic codes. Refer to Diagnostic Trouble Code Display. This procedure will also initiate the diagnostic flash codes for the engine controller and the hydraulic ABS controller. The display will show each DTC for 10 seconds, then automatically scroll to the next entry and continue to cycle through the faults. To manually cycle through the fault list, press the cluster SELECT/RESET button.

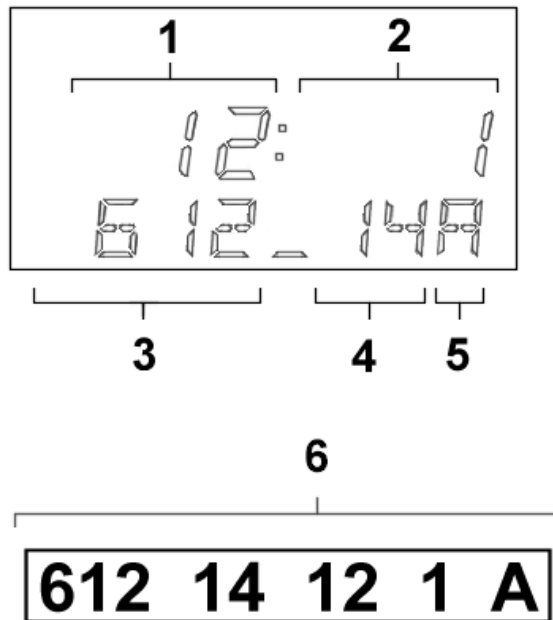


Figure 507 Diagnostic Trouble Code Display

1. BYTE 7 FIELD
2. BYTE 8 FIELD
3. SPN FIELD
4. FMI FIELD
5. ACTIVE/PREVIOUSLY ACTIVE STATUS INDICATOR
6. COMPILED FORMAT OF DIAGNOSTIC TROUBLE CODE

Diagnostic trouble codes (DTC) will end with an “A” while the code is active. The code will remain active as long as the feature affected is active and the fault is present. If the feature is turned off or the fault is removed, the trouble code will be moved to the “previously active” list and the code will end with a “P”. For example: when the work light is turned on and there is an open an active circuit fault code (611 14 11 1 A) will be logged. When the light is turned off the code will become previously active. The fault still exists, but the code will not go active until the light is turned on.

While in the diagnostic mode, previously active diagnostic trouble codes may be cleared by turning the left turn signal ON and pressing the Cruise ON switch and the Cruise SET switch simultaneously.

Diagnostic codes for the engine controller and hydraulic ABS controller will not be cleared with this procedure.

To exit the diagnostic mode, cycle the key switch or release the parking brake.

1.3. OFF-BOARD DIAGNOSTICS

The diagnostic service tool, running the INTUNE software, can be used to view and clear ESC diagnostic trouble codes (DTC). Other diagnostic software can be used to view and clear engine controller, ABS and transmission diagnostic trouble codes. Refer to the applicable supplier service manual for information on their diagnostic software and tools.

1.4. DIAGNOSTIC TROUBLE CODE (DTC) LIST

Table 352 Diagnostic Trouble Code (DTC) List

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
70	14	1	0	1600/ 4004/ Bus 1602 32/16	<p>Air Powered Park Brake is stuck.</p> <p>Occurs when the park brake switch does not match the spring apply air release (SAAR) chamber travel sensor. This indicates the park brake cannot be applied or cannot be released.</p> <p>Refer to Air Powered Park Brake warning lamp (See PARK BRAKE WARNING LAMP, page 212)in the Electronic Gauge Cluster section of this manual.</p> <p>Refer to Air Actuated Park Brake (See Diagnostic Trouble Codes, page 801)in the Chassis Accessories section of this manual.</p>
70	14	1	1	1600/ 4004/ Bus 1602 32/16	<p>The auto apply portion with the Air Powered Park Brake is not operating.</p> <p>Occurs when the park brake switch is not set within 5 seconds of the receipt of the Park as the requested gear. This failure would indicate a failure in the auto apply relay or in the air lines between the auto apply relay and the Park Brake switch.</p> <p>Refer to Air Powered Park Brake warning lamp (See PARK BRAKE WARNING LAMP, page 212)in the Electronic Gauge Cluster section of this manual.</p> <p>Refer to Air Actuated Park Brake (See Diagnostic Trouble Codes, page 801)in the Chassis Accessories section of this manual.</p>
597	14	1	0	Hyd or Air n/4091 – 1600/33 or Air w/4091 — 4004/Bus 1602 33	<p>Brake switch is stuck in the open or closed position</p> <p>Occurs if the wheel based vehicle speed increases from 0 kph to 72 kph two times without the brake switch opening or decreases from 72 kph to 0 kph two times without the brake switch closing.</p> <p>Defective brake switch</p> <p>Refer to hydraulic brake switch (See HYDRAULIC BRAKE SWITCH INPUTS TO ESC, page 892) or air brake switch (See AIR BRAKE SWITCH INPUTS TO ESC, page 895) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
597	14	2	0	Hyd or Air n/4091 – 1600/33 or Air w/4091 — 4004/Bus 1602 33	<p>Brake switch inputs do not match</p> <p>Occurs if the comparison of the inputs indicates a mismatch in the analog and digital signals.</p> <p>Occurs if there is a high resistance in the wire harness, defective brake switch or a defective Electronic System Controller (ESC).</p> <p>Refer to hydraulic brake switch (See HYDRAULIC BRAKE SWITCH INPUTS TO ESC, page 892) or air brake switch (See AIR BRAKE SWITCH INPUTS TO ESC, page 895) in the Light Systems section of this manual.</p>
598	14	1	0	1600/17	<p>Upper Clutch Switch stuck in the open or closed position</p> <p>Occurs if the vehicle speed increases from 0 kph to 72 kph without a change in state of the clutch switch.</p> <p>Defective upper clutch switch</p> <p>Refer to Clutch Switch(See CLUTCH SWITCH, page 551) in the Cab Features section of this manual.</p>
610	14	1	0	1600/12	<p>Ignition feed error.</p> <p>Loss of Ignition feed for 10 seconds while the engine is running</p> <p>Refer to ESC Power and Ground. (See ESC POWER AND GROUND, page 91)</p>
610	14	2	0	1600/2	<p>Accessory feed error.</p> <p>Loss of Accessory feed for 10 seconds while the engine is running</p> <p>Refer to ESC Power and Ground. (See ESC POWER AND GROUND, page 91)</p>
611	14	1	1	1601/G	<p>Connector #1601 Pin #G Mirror heat under current</p> <p>Not used on Buses</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to Heated Mirrors in the Cab Features section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	1	2	1601/G	Connector #1601 Pin #G Mirror heat over current Not used on Buses The output behaves like a 20 amp type III circuit breaker. Short to ground or overload Refer to Heated Mirrors in the Cab Features section of this manual.
611	14	1	3	1601/G	Connector #1601 Pin #G Mirror heat less than normal low current but more than open circuit Not used on Buses Refer to Heated Mirrors in the Cab Features section of this manual.
611	14	1	4	1601/G	Connector #1601 Pin #G Mirror heat greater than normal high current and less than fusing current Not used on Buses Refer to Heated Mirrors in the Cab Features section of this manual.
611	14	1	6	1601/G	Connector #1601 Pin #G Mirror heat has current flow when output commanded off Not used on Buses Refer to Heated Mirrors in the Cab Features section of this manual.
611	14	2	1	4008/ Bus 1604 A	Connector #4008 Pin #A Solenoid power under current The current from this output is below 0.5 A Open circuit Refer to Air Solenoid Modules(See ESC– SOLENOID POWER CIRCUIT, page 723) in the Chassis Features section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	2	2	4008/ Bus 1604 A	<p>Connector #4008 Pin #A Solenoid power over current</p> <p>The output behaves like a 20 amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to ESC-Solenoid Power Circuit(See ESC– SOLENOID POWER CIRCUIT, page 723) in the Chassis Features section of this manual.</p>
611	14	2	3	4008/ Bus 1604 A	<p>Connector #4008 Pin #A Solenoid power less than normal low current but more than open circuit</p> <p>Refer to ESC-Solenoid Power Circuit(See ESC– SOLENOID POWER CIRCUIT, page 723) in the Chassis Features section of this manual.</p>
611	14	2	4	4008/ Bus 1604 A	<p>Connector #4008 Pin #A Solenoid power greater than normal high current and less than fusing current</p> <p>Refer to ESC-Solenoid Power Circuit(See ESC– SOLENOID POWER CIRCUIT, page 723) in the Chassis Features section of this manual.</p>
611	14	2	6	4008/ Bus 1604 A	<p>Connector #4008 Pin #A Solenoid power has current flow when output commanded off</p> <p>Refer to ESC-Solenoid Power Circuit(See ESC– SOLENOID POWER CIRCUIT, page 723) in the Chassis Features section of this manual.</p>
611	14	3	1	4007/ Bus 1603 A	<p>Connector #4007 Pin #A Fog light / Spare 1 under current</p> <p>Not used on Buses</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to Fog Lights(See FOG LIGHT SYSTEM, page 850) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	3	2	4007/ Bus 1603 A	<p>Connector #4007 Pin #A Fog light / Spare 1 over current</p> <p>Not used on Buses</p> <p>The output behaves like a 20 amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to Fog Lights(See FOG LIGHT SYSTEM, page 850) in the Light Systems section of this manual.</p>
611	14	3	3	4007/ Bus 1603 A	<p>Connector #4007 Pin #A Fog light / Spare 1 less than normal low current but more than open circuit</p> <p>Not used on Buses</p> <p>Refer to Fog Lights(See FOG LIGHT SYSTEM, page 850) in the Light Systems section of this manual.</p>
611	14	3	4	4007/ Bus 1603 A	<p>Connector #4007 Pin #A Fog light / Spare 1 greater than normal high current and less than fusing current</p> <p>Not used on Buses</p> <p>Refer to Fog Lights(See FOG LIGHT SYSTEM, page 850) in the Light Systems section of this manual.</p>
611	14	3	6	4007/ Bus 1603 A	<p>Connector #4007 Pin #A Fog light / Spare 1 has current flow when output commanded off</p> <p>Not used on Buses</p> <p>Refer to Fog Lights(See FOG LIGHT SYSTEM, page 850) in the Light Systems section of this manual.</p>
611	14	4	1	4007/ Bus 1603 H	<p>Connector #4007 Pin #H Park light under current</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to Marker, Park and Tail Lamps(See MARKER, PARK AND TAIL LAMPS, page 824) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	4	2	4007/ Bus 1603 H	Connector #4007 Pin #H Park light over current The output behaves like a 20 amp type III circuit breaker. Short to ground or overload Refer to Marker, Park and Tail Lamps(See MARKER, PARK AND TAIL LAMPS, page 824) in the Light Systems section of this manual.
611	14	4	3	4007/ Bus 1603 H	Connector #4007 Pin #H Park light less than normal low current but more than open circuit Refer to Marker, Park and Tail Lamps(See MARKER, PARK AND TAIL LAMPS, page 824) in the Light Systems section of this manual.
611	14	4	4	4007/ Bus 1603 H	Connector #4007 Pin #H Park light greater than normal high current and less than fusing current Refer to Marker, Park and Tail Lamps(See MARKER, PARK AND TAIL LAMPS, page 824) in the Light Systems section of this manual.
611	14	4	6	4007/ Bus 1603 H	Connector #4007 Pin #H Park light has current flow when output commanded off Refer to Marker, Park and Tail Lamps(See MARKER, PARK AND TAIL LAMPS, page 824) in the Light Systems section of this manual.
611	14	5	1	4007/ Bus 1603 D	Connector #4007 Pin #D Low beam under current The current from this output is below 0.5 A Open circuit Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	5	2	4007/ Bus 1603 D	Connector #4007 Pin #D Low beam over current The output behaves like a 20 amp type I circuit breaker Short to ground or overload Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	5	3	4007/ Bus 1603 D	Connector #4007 Pin #D Low beam less than normal low current but more than open circuit Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	5	4	4007/ Bus 1603 D	Connector #4007 Pin #D Low beam greater than normal high current and less than fusing current Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	5	6	4007/ Bus 1603 D	Connector #4007 Pin #D Low beam has current flow when output commanded off Refer to Headlight System in the Light Systems section of this manual. (See HEADLIGHT SYSTEM, page 858)
611	14	6	1	4008/ Bus 1604 F	Connector #4008 Pin #F Wiper power under current Connector #1604 Pin #F Bus - not Used The Current from this output is below 0.5 A Open circuit Refer to Wiper Motor Circuits (See WIPER MOTOR CIRCUITS, page 538) in the Cab Feature section of this manual.
611	14	6	2	4008/ Bus 1604 F	Connector #4008 Pin #F Wiper power over current Connector #1604 Pin #F Bus - not Used The output behaves like a 20 amp type I circuit breaker Short to ground or overload Refer to Wiper Motor Circuits (See WIPER MOTOR CIRCUITS, page 538) in the Cab Feature section of this manual.
611	14	6	3	4008/ Bus 1604 F	Connector #4008 Pin #F Wiper power less than normal low current but more than open circuit Connector #1604 Pin #F Bus - not Used Refer to Wiper Motor Circuits (See WIPER MOTOR CIRCUITS, page 538) in the Cab Feature section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	6	4	4008/ Bus 1604 F	Connector #4008 Pin #F Wiper power greater than normal high current and less than fusing current Connector #1604 Pin #F Bus - not Used Refer to Wiper Motor Circuits (See WIPER MOTOR CIRCUITS, page 538) in the Cab Feature section of this manual.
611	14	6	6	4008/ Bus 1604 F	Connector #4008 Pin #F Wiper power has current flow when output commanded off Connector #1604 Pin #F Bus - not Used Refer to Wiper Motor Circuits (See WIPER MOTOR CIRCUITS, page 538) in the Cab Feature section of this manual.
611	14	7	1	4007/ Bus 1603 G	Connector #4007 Pin #G High beam under current The Current from this output is below 0.5 A Open circuit Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	7	2	4007/ Bus 1603 G	Connector #4007 Pin #G High beam over current The output behaves like a 20 amp type I circuit breaker Short to ground or overload Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	7	3	4007/ Bus 1603 G	Connector #4007 Pin #G High beam less than normal low current but more than open circuit Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	7	4	4007/ Bus 1603 G	Connector #4007 Pin #G High beam greater than normal high current and less than fusing current Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.
611	14	7	6	4007/ Bus 1603 G	Connector #4007 Pin #G High beam has current flow when output commanded off Refer to Headlight System(See HEADLIGHT SYSTEM, page 858) in the Light Systems section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	9	1	4008/ Bus 1604 G	<p>Connector #4008 Pin #G A/C Clutch under current</p> <p>Connector #1604 Pin #G (Right Front and Rear Amber Flashers) under current</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to AC Compressor Circuits in the HVAC service manual section S16025.</p>
611	14	9	2	4008/ Bus 1604 G	<p>Connector #4008 Pin #G A/C Clutch over current</p> <p>Connector #1604 Pin #G (Right Front and Rear Amber Flashers) over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to AC Compressor Circuits in the HVAC service manual section S16025.</p>
611	14	9	3	4008/ Bus 1604 G	<p>Connector #4008 Pin #G A/C Clutch less than normal low current but more than open circuit</p> <p>Connector #1604 Pin #G (Right Front and Rear Amber Flashers) less than normal low current but more than open circuit</p> <p>Refer to AC Compressor Circuits in the HVAC service manual section S16025.</p>
611	14	9	4	4008/ Bus 1604 G	<p>Connector #4008 Pin #G A/C Clutch greater than normal high current and less than fusing current</p> <p>Connector #1604 Pin #G (Right Front and Rear Amber Flashers) greater than normal high current and less than fusing current</p> <p>Refer to AC Compressor Circuits in the HVAC service manual section S16025.</p>
611	14	9	6	4008/ Bus 1604 G	<p>Connector #4008 Pin #G A/C Clutch has current flow when output commanded off</p> <p>Connector #1604 Pin #G (Right Front and Rear Amber Flashers) has current flow when output commanded off</p> <p>Refer to AC Compressor Circuits in the HVAC service manual section S16025.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	10	1	1601/C	<p>Connector #1601 Pin #C Dome light under current</p> <p>Connector #1601 Pin #C (BUS - Wheelchair interior lights) under current</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to dome light circuits (See DOME LIGHT CIRCUITS, page 844) in the Light Systems section of this manual.</p>
611	14	10	2	1601/C	<p>Connector #1601 Pin #C Dome light over current</p> <p>Connector #1601 Pin #C (BUS - Wheelchair interior lights) over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to dome light circuits (See DOME LIGHT CIRCUITS, page 844) in the Light Systems section of this manual.</p>
611	14	10	3	1601/C	<p>Connector #1601 Pin #C Dome light less than normal low current but more than open circuit</p> <p>Connector #1601 Pin #C (BUS - Wheelchair interior lights) less than normal low current but more than open circuit</p> <p>Refer to dome light circuits (See DOME LIGHT CIRCUITS, page 844) in the Light Systems section of this manual.</p>
611	14	10	4	1601/C	<p>Connector #1601 Pin #C Dome light greater than normal high current and less than fusing current</p> <p>Connector #1601 Pin #C (BUS - Wheelchair interior lights) greater than normal high current and less than fusing current</p> <p>Refer to dome light circuits (See DOME LIGHT CIRCUITS, page 844) in the Light Systems section of this manual.</p>
611	14	10	6	1601/C	<p>Connector #1601 Pin #C Dome light has current flow when output commanded off</p> <p>Connector #1601 Pin #C (BUS - Wheelchair interior lights) has current flow when output commanded off</p> <p>Refer to dome light circuits (See DOME LIGHT CIRCUITS, page 844) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	11	1	4007/Bus 1603 F	<p>Connector #4007 Pin #F Work light under current</p> <p>Connector #1603 Pin #F (Left front and rear Red flashers) under current</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to Work Lights (See WORK LIGHT CIRCUIT OUTPUTS FROM ESC, page 924) in the Light Systems section of this manual.</p>
611	14	11	2	4007/Bus 1603 F	<p>Connector #4007 Pin #F Work light over current</p> <p>Connector #1603 Pin #F (Left front and rear Red flashers) over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to Work Lights (See WORK LIGHT CIRCUIT OUTPUTS FROM ESC, page 924) in the Light Systems section of this manual.</p>
611	14	11	3	4007/Bus 1603 F	<p>Connector #4007 Pin #F Work light less than normal low current but more than open circuit</p> <p>Connector #1603 Pin #F (Left front and rear Red flashers) less than normal low current but more than open circuit</p> <p>Refer to Work Lights (See WORK LIGHT CIRCUIT OUTPUTS FROM ESC, page 924) in the Light Systems section of this manual.</p>
611	14	11	4	4007/Bus 1603 F	<p>Connector #4007 Pin #F Work light greater than normal high current and less than fusing current</p> <p>Connector #1603 Pin #F (Left front and rear Red flashers) greater than normal high current and less than fusing current</p> <p>Refer to Work Lights (See WORK LIGHT CIRCUIT OUTPUTS FROM ESC, page 924) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	11	6	4007/Bus 1603 F	<p>Connector #4007 Pin #F Work light has current flow when output commanded off</p> <p>Connector #1603 Pin #F (Left front and rear Red flashers) has current flow when output commanded off</p> <p>Refer to Work Lights (See WORK LIGHT CIRCUIT OUTPUTS FROM ESC, page 924) in the Light Systems section of this manual.</p>
611	14	12	1	4007/Bus 1603 E	<p>Connector #4007 Pin #E Electric horn under current</p> <p>The Current from this output is below 0.5 A</p> <p>Open circuit</p> <p>Refer to Electric Horn (See ELECTRIC HORN CIRCUIT OUTPUTS FROM ESC, page 488) in the Cab Feature section of this manual.</p>
611	14	12	2	4007/Bus 1603 E	<p>Connector #4007 Pin #E Electric horn over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to Electric Horn (See ELECTRIC HORN CIRCUIT OUTPUTS FROM ESC, page 488) in the Cab Feature section of this manual.</p>
611	14	12	3	4007/Bus 1603 E	<p>Connector #4007 Pin #E Electric horn less than normal low current but more than open circuit</p> <p>Refer to Electric Horn (See ELECTRIC HORN CIRCUIT OUTPUTS FROM ESC, page 488) in the Cab Feature section of this manual.</p>
611	14	12	4	4007/Bus 1603 E	<p>Connector #4007 Pin #E Electric horn greater than normal high current and less than fusing current</p> <p>Refer to Electric Horn (See ELECTRIC HORN CIRCUIT OUTPUTS FROM ESC, page 488) in the Cab Feature section of this manual.</p>
611	14	12	6	4007/Bus 1603 E	<p>Connector #4007 Pin #E Electric horn has current flow when output commanded off</p> <p>Refer to Electric Horn (See ELECTRIC HORN CIRCUIT OUTPUTS FROM ESC, page 488) in the Cab Feature section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	13	1	4008/Bus 1604 C	<p>Connector #4008 Pin #C Left rear turn lamp under current</p> <p>Connector #1604 Pin #C (Left front and rear Amber flashers) under current</p> <p>The Current from this output is below 0.5 A</p> <p>Blown bulb or open circuit</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC (See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	13	2	4008/Bus 1604 C	<p>Connector #4008 Pin #C Left rear turn lamp over current</p> <p>Connector #1604 Pin #C (Left front and rear Amber flashers) over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	13	3	4008/Bus 1604 C	<p>Connector #4008 Pin #C Left rear turn lamp less than normal low current but more than open circuit</p> <p>Connector #1604 Pin #C (Left front and rear Amber flashers) less than normal low current but more than open circuit</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	13	4	4008/Bus 1604 C	<p>Connector #4008 Pin #C Left rear turn lamp greater than normal high current and less than fusing current</p> <p>Connector #1604 Pin #C (Left front and rear Amber flashers) greater than normal high current and less than fusing current</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	13	6	4008/Bus 1604 C	<p>Connector #4008 Pin #C Left rear turn lamp has current flow when output commanded off</p> <p>Connector #1604 Pin #C (Left front and rear Amber flashers) has current flow when output commanded off</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	14	1	4008/Bus 1604 B	<p>Connector #4008 Pin #B Right rear turn lamp under current</p> <p>Connector #1604 Pin #B (Right front and rear red flashers) under current</p> <p>The Current from this output is below 0.5 A</p> <p>Blown bulb or open circuit</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	14	2	4008/Bus 1604 B	<p>Connector #4008 Pin #B Right rear turn lamp over current</p> <p>Connector #1604 Pin #B (Right front and rear red flashers) over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	14	3	4008/Bus 1604 B	<p>Connector #4008 Pin #B Right rear turn lamp less than normal low current but more than open circuit</p> <p>Connector #1604 Pin #B (Right front and rear red flashers) less than normal low current but more than open circuit</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	14	4	4008/Bus 1604 B	<p>Connector #4008 Pin #B Right rear turn lamp greater than normal high current and less than fusing current</p> <p>Connector #1604 Pin #B (Right front and rear red flashers) greater than normal high current and less than fusing current</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	14	6	4008/Bus 1604 B	<p>Connector #4008 Pin #B Right rear turn lamp has current flow when output commanded off</p> <p>Connector #1604 Pin #B (Right front and rear red flashers) has current flow when output commanded off</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See REAR STOP/TURN SIGNAL/HAZARD LIGHT OUTPUTS FROM ESC, page 903) in the Light Systems section of this manual.</p>
611	14	15	1	4007/Bus 1603 C	<p>Connector #4007 Pin #C Left front turn lamp under current</p> <p>The Current from this output is below 0.5 A</p> <p>Blown bulbs or open circuit</p> <p>Refer to Rear Stop/Turn Signal/Hazard Light Outputs From ESC(See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.</p>
611	14	15	2	4007/Bus 1603 C	<p>Connector #4007 Pin #C Left front turn lamp over current</p> <p>The output behaves like a 10 Amp type III circuit breaker.</p> <p>Short to ground or overload</p> <p>Refer to left front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.</p>
611	14	15	3	4007/Bus 1603 C	<p>Connector #4007 Pin #C Left front turn lamp less than normal low current but more than open circuit</p> <p>Refer to left front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	15	4	4007/Bus 1603 C	Connector #4007 Pin #C Left front turn lamp greater than normal high current and less than fusing current Refer to left front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.
611	14	15	6	4007/Bus 1603 C	Connector #4007 Pin #C Left front turn lamp has current flow when output commanded off Refer to left front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.
611	14	16	1	4007/Bus 1603 B	Connector #4007 Pin #B Right front turn lamp under current The Current from this output is below 0.5 A Blown bulb or open circuit Refer to right front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.
611	14	16	2	4007/Bus 1603 B	Connector #4007 Pin #B Right front turn lamp over current The output behaves like a 10 Amp type III circuit breaker. Short to ground or overload Refer to right front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.
611	14	16	3	4007/Bus 1603 B	Connector #4007 Pin #B Right front turn lamp less than normal low current but more than open circuit Refer to right front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.
611	14	16	4	4007/Bus 1603 B	Connector #4007 Pin #B Right front turn lamp greater than normal high current and less than fusing current Refer to right front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
611	14	16	6	4007/Bus 1603 B	Connector #4007 Pin #B Right front turn lamp has current flow when output commanded off Refer to right front circuits (See FRONT TURN SIGNAL/HAZARD AND SEPARATE TURN SIGNAL LIGHT OUTPUTS FROM ESC, page 899) in the Light Systems section of this manual.
612	14	0	1	1600/2	Connector #1600 Pin #2 Ignition out of range low Shorted to ground or open Refer to ESC Power and Ground.(See ESC POWER AND GROUND, page 91)
612	14	0	2	1600/2	Connector #1600 Pin #2 Ignition out of range high Shorted high Refer to ESC Power and Ground.(See ESC POWER AND GROUND, page 91)
612	14	1	1	1600/33	Connector #1600 Pin #33 Brake switch out of range low Shorted to ground. Refer to hydraulic brake switch (See HYDRAULIC BRAKE SWITCH INPUTS TO ESC, page 892) or air brake switch (See AIR BRAKE SWITCH INPUTS TO ESC, page 895) in the Light Systems section of this manual.
612	14	1	2	1600/33	Connector #1600 Pin #33 Brake switch out of range high Shorted high or open circuit Refer to hydraulic brake switch (See HYDRAULIC BRAKE SWITCH INPUTS TO ESC, page 892) or air brake switch (See AIR BRAKE SWITCH INPUTS TO ESC, page 895) in the Light Systems section of this manual.
612	14	2	1	1600/17	Connector #1600 Pin #17 Upper Clutch Switch out of range low Shorted to ground. Refer to Clutch Switch (See CLUTCH SWITCH, page 551) in the Cab Features section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
612	14	2	2	1600/17	Connector #1600 Pin #17 Upper Clutch Switch out of range high Shorted high or open circuit Refer to Clutch Switch (See CLUTCH SWITCH, page 551) in the Cab Features section of this manual.
612	14	3	1	1600/16	Connector #1600 Pin #16 Secondary Air Sensor / Spare out of range low Short to ground, open circuit Secondary Air Pressure Gauge (See SECONDARY AIR PRESSURE GAUGE, page 288)
612	14	3	2	1600/16	Connector #1600 Pin #16 Secondary Air Sensor / Spare out of range high Shorted high Secondary Air Pressure Gauge (See SECONDARY AIR PRESSURE GAUGE, page 288)
612	14	4	1	1600/15	Connector #1600 Pin #15 Primary Air Sensor / Auxiliary Air Sensor out of range low Short to ground, open circuit For vehicles with air brakes, refer to Primary Air Pressure Gauge (See PRIMARY AIR PRESSURE GAUGE, page 280). For vehicles with hydraulic brakes, refer to Auxiliary Air Pressure Gauge (See AUXILIARY AIR PRESSURE GAUGE, page 295).
612	14	4	2	1600/15	Connector #1600 Pin #15 Primary Air Sensor / Auxiliary Air Sensor out of range high Shorted high For vehicles with air brakes, refer to Primary Air Pressure Gauge (See PRIMARY AIR PRESSURE GAUGE, page 280). For vehicles with hydraulic brakes, refer to Auxiliary Air Pressure Gauge (See AUXILIARY AIR PRESSURE GAUGE, page 295).

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
612	14	5	1	1600/10	<p>Connector #1600 Pin #10 Analog cruise switch input out of range low</p> <p>Connector #1600 Pin #10 (Bus - Diags/flashers/Entrance Door Input) out of range low</p> <p>Shorted to ground or open circuit</p> <p>Refer to Cruise Control .</p> <p>The EGC cannot be put in diagnostic mode when there is a fault in these circuits. The INTUNE software must be used to view this DTC.</p>
612	14	5	2	1600/10	<p>Connector #1600 Pin #10 Analog cruise switch input out of range high</p> <p>Connector #1600 Pin #10 (Bus - Diags/flashers/Entrance Door Input) out of range high</p> <p>Shorted high</p> <p>Refer to Cruise Control .</p> <p>The EGC cannot be put in diagnostic mode when there is a fault in these circuits. The INTUNE software must be used to view this DTC.</p>
612	14	23	1	4004/Bus 1602 4	<p>Connector #4004 Pin #4 Fuel level sensor out of range low</p> <p>This code is associated with a short to ground on the fuel level sensor on the draw tank for both single tank and dual tank vehicles.</p> <p>Shorted to ground.</p> <p>Refer to Fuel Level Gauge (See FUEL LEVEL GAUGE, page 255) in the Electronic Gauge Cluster section of this manual.</p>
612	14	23	2	4004/Bus 1602 4	<p>Connector #4004 Pin #4 Fuel level sensor out of range high</p> <p>This code is associated with a short to accessory or open circuit on the fuel level sensor on the draw tank for both single tank and dual tank vehicles.</p> <p>Shorted high or open circuit</p> <p>Refer to Fuel Level Gauge (See FUEL LEVEL GAUGE, page 255) in the Electronic Gauge Cluster section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
612	14	24	1	4004/Bus 1602 23	Connector #4004 Pin #23 Hydraulic ABS warning lamp input out of range low Open circuit Refer to ABS indicator (See ABS WARNING LAMP, page 223) in the Electronic Gauge Cluster section of this manual.
612	14	24	2	4004/Bus 1602 23	Connector #4004 Pin #23 Hydraulic ABS warning lamp input out of range high Shorted high Refer to ABS indicator (See ABS WARNING LAMP, page 223) in the Electronic Gauge Cluster section of this manual.
612	14	25	1	4004/Bus 1602 5	Connector #4004 Pin #5 Fuel level sensor out of range low This code is associated with a short to ground on the fuel level sensor on the storage tank for dual tank vehicles. Shorted to ground. Refer to Fuel Transfer System (See FUEL TRANSFER PUMP SYSTEM, page 675) in the Chassis Features section of this manual.
612	14	25	2	4004/Bus 1602 5	Connector #4004 Pin #5 Fuel level sensor out of range high This code is associated with a short to accessory or open circuit on the fuel level sensor on the storage tank for dual tank vehicles. Shorted high or open circuit Refer to Fuel Transfer System (See FUEL TRANSFER PUMP SYSTEM, page 675) in the Chassis Features section of this manual.
612	14	27	1	4004/Bus 1602 6	Connector #4004 Pin #6 Outlet HVAC thermistor out of range low Shorted to ground. Refer to AC Refrigerant Thermistors in the HVAC Troubleshooting in S16025.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
612	14	27	2	4004/Bus 1602 6	Connector #4004 Pin #6 Outlet HVAC thermistor out of range high Thermistor open circuit. Refer to AC Refrigerant Thermistors in the HVAC Troubleshooting in S16025.
612	14	29	1	4004/Bus 1602 7	Connector #4004 Pin #7 Inlet HVAC thermistor out of range low Shorted to ground. Refer to AC Refrigerant Thermistors in the HVAC Troubleshooting in S16025.
612	14	29	2	4004/Bus 1602 7	Connector #4004 Pin #7 Inlet HVAC thermistor out of range high Thermistor open circuit. Refer to AC Refrigerant Thermistors in the HVAC Troubleshooting in S16025.
612	14	30	1	4004/Bus 1602 27	Connector #4004 Pin #27 Switched 5 volt sensor supply out of range low Shorted to ground or open circuit All air gauges and air brake switches will be inoperative. Refer to ESC Switched 5 Volt Sensor Supply. (See ESC SWITCHED 5 VOLT SENSOR SUPPLY, page 93)
612	14	30	2	4004/Bus 1602 27	Connector #4004 Pin #27 Switched 5 volt sensor supply out of range high Shorted high All air gauges and air brake switches will be inoperative. Refer to ESC Switched 5 Volt Sensor Supply. (See ESC SWITCHED 5 VOLT SENSOR SUPPLY, page 93)
612	14	31	1	4004/Bus 1602 8	Connector #4004 / Bus #1602 Pin #8 HVAC high side pressure sensor out of range low Short to ground or open circuit Refer to AC Pressure Transducer in the HVAC Troubleshooting in S16025.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
612	14	31	2	4004/Bus 1602 8	Connector #4004 / Bus #1602 Pin #8 HVAC high side pressure sensor out of range high Shorted high Refer to AC Pressure Transducer in the HVAC Troubleshooting in S16025.
612	14	32	1	4004/Bus 1602 1	Connector #4004 / Bus #1602 Pin #1 Rear Axle Oil Temperature out of range low Shorted to ground or open circuit. Refer to Rear-Rear Axle Temperature Gauge(See REAR-REAR AXLE OIL TEMPERATURE GAUGE, page 269).
612	14	32	2	4004/Bus 1602 1	Connector #4004 / Bus #1602 Pin #1 Rear Axle Oil Temperature out of range high Shorted high. Refer to Rear-Rear Axle Temperature Gauge(See REAR-REAR AXLE OIL TEMPERATURE GAUGE, page 269) .
612	14	33	1	4004/Bus 1602 10	Connector #4004 / Bus #1602 Pin #10 Engine Oil Temperature Power Park Brake out of range low Short to ground or open circuit Refer to Engine Oil Temperature Gauge(See ENGINE OIL TEMPERATURE GAUGE, page 246) in the Electronic Gauge Cluster section of this manual. Refer to Air Application Gauge(See AIR APPLICATION GAUGE, page 311) in the Electronic Gauge Cluster section of this manual.
612	14	33	2	4004/Bus 1602 10	Connector #4004 / Bus #1602 Pin #10 Engine Oil Temperature Power Park Brake out of range high Shorted high Refer to Engine Oil Temperature Gauge(See ENGINE OIL TEMPERATURE GAUGE, page 246) in the Electronic Gauge Cluster section of this manual. Refer to Air Application Gauge(See AIR APPLICATION GAUGE, page 311) in the Electronic Gauge Cluster section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
612	14	34	1	4004/Bus 1602 2	Connector #4004 Pin #2 Forward Rear Axle Temperature out of range low Shorted to ground. Refer to Forward-rear axle temperature gauge (See FORWARD-REAR AXLE OIL TEMPERATURE GAUGE, page 274)
612	14	35	1	4004/Bus 1602 13	Connector #4004 Pin #13 Brake Application Air out of range low Connector #1602 Pin #13 (Crossing gate disable switch) out of range low Short to ground or open circuit Refer to Air Application Gauge(See AIR APPLICATION GAUGE, page 311) in the Electronic Gauge Cluster section of this manual.
612	14	35	2	4004/Bus 1602 13	Connector #4004 Pin #13 Brake Application Air out of range high Connector #1602 Pin #13 (Crossing gate disable switch) out of range high Shorted high Refer to Air Application Gauge(See AIR APPLICATION GAUGE, page 311) in the Electronic Gauge Cluster section of this manual.
612	14	36	1	4004/Bus 1602 3	Connector #4004 Pin #3 Transmission Oil Temp/Spare out of range low Shorted to ground. Refer to Transmission Oil Temperature Gauge (See TRANSMISSION OIL TEMPERATURE GAUGE, page 263)
613	14	1	1	N/A	HVAC Control Head air inlet fault This is a motor fault in the evaporator module. This motor controls the door in the evaporator module duct. Motor in the wrong position or jammed. Refer to Recirculation Motor in the HVAC service manual section S16025.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
613	14	1	2	N/A	<p>HVAC Control Head hot/cold temp. mix control fault</p> <p>This is a motor fault in the heater module. This motor controls the door in the heater module/blower scroll.</p> <p>Motor in the wrong position or jammed.</p> <p>Refer to Temperature Actuator in the HVAC service manual section S16025.</p>
613	14	1	3	N/A	<p>HVAC Control Head mode control fault.</p> <p>This is a motor fault in the kinematic network. This motor controls the doors in the kinematic network of the heater module.</p> <p>Motor in the wrong position or jammed.</p> <p>Refer to Mode Actuator in the HVAC service manual section S16025.</p>
613	14	1	4	N/A	<p>HVAC Control Head multiple motor faults.</p> <p>2 or more motor faults.</p> <p>Motor in the wrong position or jammed.</p> <p>Refer to HVAC Control Head in the HVAC service manual section S16025.</p>
613	14	1	5	N/A	<p>HVAC Control Head diagnostic circuit loss of communication with the ESC.</p> <p>Open circuit, short to ground or shorted high.</p> <p>Refer to HVAC Control Head in the HVAC service manual section S16025.</p>
613	14	1	6	N/A	<p>AC service soon</p> <p>At the current operating ambient temperature the system has lost enough charge that service should be performed to insure continued AC performance.</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
613	14	1	7	N/A	<p>AC service now - low charge</p> <p>At the current operating ambient temperature the system has lost so much charge that the compressor must be shut off to prevent damage to it or other system components.</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>
613	14	1	8	N/A	<p>AC service now - very low charge</p> <p>At the current operating ambient temperature the system has lost so much charge that the compressor must be shut off to prevent damage to it or other system components.</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>
613	14	1	9	N/A	<p>AC service now - burst pipe</p> <p>An almost complete loss of charge has occurred due to pipe or other component rupture. The compressor is shut off so that no damage will occur.</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>
613	14	1	10	N/A	<p>AC service now - fan problem/clogged pipe</p> <p>At the current operating ambient temperature the engine fan isn't working, one of the AC lines has become plugged or the system is over-charged. The compressor is shut off to prevent damage.</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>
613	14	1	11	N/A	<p>AC service now - compressor failure</p> <p>The compressor is not functioning</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>
613	14	1	12	N/A	<p>AC service now - rapid cycling</p> <p>The compressor clutch is cycling faster than once every 15 seconds. The compressor is not allowed to operate.</p> <p>Refer to HVAC Diagnostics in the HVAC service manual section S16025.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
614	14	1	1	1600/ 34,35,36	Electronic Gauge Cluster #1 checksum error fixed by reteach. The configuration checksum in the cluster did not match the teach/reteach checksum in the ESC. This situation was corrected by the teach/reteach operation. Refer to EGC section.
614	14	1	2	1600/ 34,35,36	Electronic Gauge Cluster #1 checksum error could not be fixed. The configuration checksum in the cluster did not match the teach/reteach checksum in the ESC. This situation could not be corrected by the teach/reteach operation. Defective cluster Refer to EGC section.
614	14	23	1	1600/ 34,35,36	Electronic Gauge Cluster #1 checksum error fixed by reteach. The configuration checksum in the cluster did not match the teach/reteach checksum in the ESC. This situation was corrected by the teach/reteach operation. Refer to EGC section.
614	14	23	2	1600/ 34,35,36	Electronic Gauge Cluster #1 checksum error could not be fixed. The configuration checksum in the cluster did not match the teach/reteach checksum in the ESC. This situation could not be corrected by the teach/reteach operation. Defective cluster Refer to EGC section.
614	14	40	1	1600/ 34,35,36	Auxiliary Gauge Switchpack #1 checksum error fixed by reteach. The configuration checksum in the AGSP did not match the teach/reteach checksum in the ESC. This situation was corrected by the teach/reteach operation. Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
614	14	40	2	1600/ 34,35,36	<p>Auxiliary Gauge Switchpack #1 checksum error could not be fixed.</p> <p>The configuration checksum in the AGSP did not match the teach/reteach checksum in the ESC. This situation could not be corrected by the teach/reteach operation.</p> <p>Defective AGSP</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
625	14	5	0	1600/ 29,30	<p>Switch Pack #4 not communicating with the ESC (Lower half of 12 pack)</p> <p>The ESC sets the status of the switches in switch pack #4 to there default values.</p> <p>Switch data link fault.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	17	1600/ 29,30	<p>Switch Pack #4 Switch #1, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #4 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	18	1600/ 29,30	<p>Switch Pack #4 Switch #1, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #4 switch #1 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	19	1600/ 29,30	<p>Switch Pack #4 Switch #1, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #4 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	20	1600/ 29,30	<p>Switch Pack #4 Switch #1, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #4 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	21	1600/ 29,30	<p>Switch Pack #4 Switch #1. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #1 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	33	1600/ 29,30	<p>Switch Pack #4 Switch #2, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #4 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	34	1600/ 29,30	<p>Switch Pack #4 Switch #2, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #4 switch #2 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	35	1600/ 29,30	<p>Switch Pack #4 Switch #2, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #4 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	36	1600/ 29,30	<p>Switch Pack #4 Switch #2, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #4 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	37	1600/ 29,30	<p>Switch Pack #4 Switch #2. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #2 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	49	1600/ 29,30	<p>Switch Pack #4 Switch #3, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	50	1600/ 29,30	<p>Switch Pack #4 Switch #3, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #3 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	51	1600/ 29,30	<p>Switch Pack #4 Switch #3, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #4 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	52	1600/ 29,30	<p>Switch Pack #4 Switch #3, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	53	1600/ 29,30	<p>Switch Pack #4 Switch #3. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #3 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	65	1600/ 29,30	<p>Switch Pack #4 Switch #4, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	66	1600/ 29,30	<p>Switch Pack #4 Switch #4, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #4 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	67	1600/ 29,30	<p>Switch Pack #4 Switch #4, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	68	1600/ 29,30	<p>Switch Pack #4 Switch #4, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #4 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	69	1600/ 29,30	<p>Switch Pack #4 Switch #4. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #4 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	81	1600/ 29,30	<p>Switch Pack #4 Switch #5, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	82	1600/ 29,30	<p>Switch Pack #4 Switch #5, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #5 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	83	1600/ 29,30	<p>Switch Pack #4 Switch #5, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	84	1600/ 29,30	<p>Switch Pack #4 Switch #5, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	85	1600/ 29,30	<p>Switch Pack #4 Switch #5. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #5 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	97	1600/ 29,30	<p>Switch Pack #4 Switch #6, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	5	98	1600/ 29,30	<p>Switch Pack #4 Switch #6, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #6 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	99	1600/ 29,30	<p>Switch Pack #4 Switch #6, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	100	1600/ 29,30	<p>Switch Pack #4 Switch #6, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of Switch Pack #4 Switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	5	101	1600/ 29,30	<p>Switch Pack #4 Switch #6. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #4 switch #6 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	0	1600/ 29,30	<p>Switch Pack #3 not communicating with the ESC (Upper half of 12 pack)</p> <p>The ESC sets the status of the switches in switch pack #3 to there default values</p> <p>Switch data link fault</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	17	1600/ 29,30	<p>Switch Pack #3 Switch #1, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	18	1600/ 29,30	<p>Switch Pack #3 Switch #1, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #3 switch #1 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	19	1600/ 29,30	<p>Switch Pack #3 Switch #1, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	20	1600/ 29,30	<p>Switch Pack #3 Switch #1, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #3 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	21	1600/ 29,30	<p>Switch Pack #3 Switch #1. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #3 switch #1 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	33	1600/ 29,30	<p>Switch Pack #3 Switch #2, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	34	1600/ 29,30	<p>Switch Pack #3 Switch #2, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #3 switch #2 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	35	1600/ 29,30	<p>Switch Pack #3 Switch #2, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	36	1600/ 29,30	<p>Switch Pack #3 Switch #2, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	37	1600/ 29,30	<p>Switch Pack #3 Switch #2. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #3 switch #2 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	49	1600/ 29,30	<p>Switch Pack #3 Switch #3, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	50	1600/ 29,30	<p>Switch Pack #3 Switch #3, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #3 switch #3 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	51	1600/ 29,30	<p>Switch Pack #3 Switch #3, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	52	1600/ 29,30	<p>Switch Pack #3 Switch #3, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #3 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	53	1600/ 29,30	<p>Switch Pack #3 Switch #3. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #3 switch #3 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	65	1600/ 29,30	<p>Switch Pack #3 Switch #4, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	66	1600/ 29,30	<p>Switch Pack #3 Switch #4, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #3 switch #4 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	67	1600/ 29,30	<p>Switch Pack #3 Switch #4, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	68	1600/ 29,30	<p>Switch Pack #3 Switch #4, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #3 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	69	1600/ 29,30	<p>Switch Pack #3 Switch #4. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #3 switch #4 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	81	1600/ 29,30	<p>Switch Pack #3 Switch #5, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	82	1600/ 29,30	<p>Switch Pack #3 Switch #5, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #3 switch #5 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	83	1600/ 29,30	<p>Switch Pack #3 Switch #5, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	84	1600/ 29,30	<p>Switch Pack #3 Switch #5, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #3 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	85	1600/ 29,30	<p>Switch Pack #3 Switch #5. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #3 switch #5 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	97	1600/ 29,30	<p>Switch Pack #3 Switch #6, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	98	1600/ 29,30	<p>Switch Pack #3 Switch #6, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #3 switch #6 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	99	1600/ 29,30	<p>Switch Pack #3 Switch #6, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #3 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	6	100	1600/ 29,30	<p>Switch Pack #3 Switch #6, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #3 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	6	101	1600/ 29,30	<p>Switch Pack #3 Switch #6. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #3 switch #6 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	0	1600/ 29,30	<p>Switch pack #2 not communicating with the ESC</p> <p>The ESC sets the status of the switches in switch pack #2 to there default values</p> <p>Switch data link fault</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	17	1600/ 29,30	<p>Switch Pack #2 Switch #1, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	18	1600/ 29,30	<p>Switch Pack #2 Switch #1, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #2 switch #1 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	19	1600/ 29,30	<p>Switch Pack #2 Switch #1, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #1 to its default value.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	20	1600/ 29,30	<p>Switch Pack #2 Switch #1, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #2 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	21	1600/ 29,30	<p>Switch Pack #2 Switch #1. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #2 switch #1 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	33	1600/ 29,30	<p>Switch Pack #2 Switch #2, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	34	1600/ 29,30	<p>Switch Pack #2 Switch #2, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #2 switch #2 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	35	1600/ 29,30	<p>Switch Pack #2 Switch #2, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	36	1600/ 29,30	<p>Switch Pack #2 Switch #2, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #2 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	37	1600/ 29,30	<p>Switch Pack #2 Switch #2. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #2 switch #2 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	49	1600/ 29,30	<p>Switch Pack #2 Switch #3, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	50	1600/ 29,30	<p>Switch Pack #2 Switch #3, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #2 switch #3 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	51	1600/ 29,30	<p>Switch Pack #2 Switch #3, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	52	1600/ 29,30	<p>Switch Pack #2 Switch #3, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #2 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	53	1600/ 29,30	<p>Switch Pack #2 Switch #3. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #2 switch #3 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	65	1600/ 29,30	<p>Switch Pack #2 Switch #4, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	66	1600/ 29,30	<p>Switch Pack #2 Switch #4, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #2 switch #4 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	67	1600/ 29,30	<p>Switch Pack #2 Switch #4, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	68	1600/ 29,30	<p>Switch Pack #2 Switch #4, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #2 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	69	1600/ 29,30	<p>Switch Pack #2 Switch #4. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #2 switch #4 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	81	1600/ 29,30	<p>Switch Pack #2 Switch #5, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	82	1600/ 29,30	<p>Switch Pack #2 Switch #5, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #2 switch #5 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	83	1600/ 29,30	<p>Switch Pack #2 Switch #5, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	84	1600/ 29,30	<p>Switch Pack #2 Switch #5, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #2 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	85	1600/ 29,30	<p>Switch Pack #2 Switch #5. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #2 switch #5 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	97	1600/ 29,30	<p>Switch Pack #2 Switch #6, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	98	1600/ 29,30	<p>Switch Pack #2 Switch #6, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #2 switch #6 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	99	1600/ 29,30	<p>Switch Pack #2 Switch #6, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #2 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	7	100	1600/ 29,30	<p>Switch Pack #2 Switch #6, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #2 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	7	101	1600/ 29,30	<p>Switch Pack #2 Switch #6. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #2 switch #6 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	0	1600/ 29,30	<p>Switch pack #1 not communicating with the ESC</p> <p>The ESC sets the status of the switches in switch pack #1 to there default values</p> <p>Switch data link fault</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	17	1600/ 29,30	<p>Switch Pack #1 Switch #1, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	18	1600/ 29,30	<p>Switch Pack #1 Switch #1, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #1 switch #1 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	19	1600/ 29,30	<p>Switch Pack #1 Switch #1, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	20	1600/ 29,30	<p>Switch Pack #1 Switch #1, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #1 switch #1 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	21	1600/ 29,30	<p>Switch Pack #1 Switch #1. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #1 switch #1 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	33	1600/ 29,30	<p>Switch Pack #1 Switch #2, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	34	1600/ 29,30	<p>Switch Pack #1 Switch #2, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #1 switch #2 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	35	1600/ 29,30	<p>Switch Pack #1 Switch #2, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	36	1600/ 29,30	<p>Switch Pack #1 Switch #2, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #1 switch #2 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	37	1600/ 29,30	<p>Switch Pack #1 Switch #2. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #1 switch #2 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	49	1600/ 29,30	<p>Switch Pack #1 Switch #3, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	50	1600/ 29,30	<p>Switch Pack #1 Switch #3, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #1 switch #3 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	51	1600/ 29,30	<p>Switch Pack #1 Switch #3, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	52	1600/ 29,30	<p>Switch Pack #1 Switch #3, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #1 switch #3 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	53	1600/ 29,30	<p>Switch Pack #1 Switch #3. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #1 switch #3 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	65	1600/ 29,30	<p>Switch Pack #1 Switch #4, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	66	1600/ 29,30	<p>Switch Pack #1 Switch #4, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #1 switch #4 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	67	1600/ 29,30	<p>Switch Pack #1 Switch #4, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	68	1600/ 29,30	<p>Switch Pack #1 Switch #4, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #1 switch #4 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	69	1600/ 29,30	<p>Switch Pack #1 Switch #4. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #1 switch #4 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	81	1600/ 29,30	<p>Switch Pack #1 Switch #5, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	82	1600/ 29,30	<p>Switch Pack #1 Switch #5, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #1 switch #5 to its default value.</p> <p>Faulty microswitch</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	83	1600/ 29,30	<p>Switch Pack #1 Switch #5, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	84	1600/ 29,30	<p>Switch Pack #1 Switch #5, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #1 switch #5 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	85	1600/ 29,30	<p>Switch Pack #1 Switch #5. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #1 switch #5 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	97	1600/ 29,30	<p>Switch Pack #1 Switch #6, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	15	98	1600/ 29,30	<p>Switch Pack #1 Switch #6, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of switch pack #1 switch #6 to its default value.</p> <p>Faulty microswitch</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	99	1600/ 29,30	<p>Switch Pack #1 Switch #6, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of switch pack #1 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	100	1600/ 29,30	<p>Switch Pack #1 Switch #6, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of switch pack #1 switch #6 to its default value.</p> <p>Switch actuator</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>
625	14	15	101	1600/ 29,30	<p>Switch Pack #1 Switch #6. The switch should be empty but one or both microswitches is pressed.</p> <p>The ESC sets the status of switch pack #1 switch #6 to its default value.</p> <p>Switch actuator or faulty microswitch.</p> <p>Refer to the Switch Pack Module section of this manual. (See SWITCH PACK MODULES, page 124)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	64	0	1600/ 29,30	<p>Front passenger side Door Pod not communicating with the ESC</p> <p>The status message from the door pod has not been received by the ESC</p> <p>Switch data link fault</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
625	14	64	7	1600/ 29,30	<p>Front passenger side Door Pod window motor failure</p> <p>The window motor drive circuit is not functioning</p> <p>This could be a short in the window motor, an open in the window motor or a jammed window.</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
625	14	64	8	1600/ 29,30	<p>Front passenger side Door Pod door lock motor failure</p> <p>The Door Lock Actuation Solenoid is not functioning</p> <p>This could be a short in the solenoid, open in the solenoid, or a jammed solenoid.</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
625	14	64	9	1600/ 29,30	<p>Front passenger side Door Pod module failure</p> <p>A failure has occurred in the Door Pod module circuitry.</p> <p>Defective door pod.</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
625	14	65	0	1600/ 29,30	<p>Rear passenger side Door Pod not communicating with the ESC</p> <p>The status message from the door pod has not been received by the ESC</p> <p>Switch data link fault</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	65	7	1600/ 29,30	<p>Rear passenger side Door Pod window motor failure</p> <p>The window motor drive circuit is not functioning</p> <p>This could be a short in the window motor, an open in the window motor or a jammed window.</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>
625	14	65	8	1600/ 29,30	<p>Rear passenger side Door Pod door lock motor failure</p> <p>The Door Lock Actuation Solenoid is not functioning</p> <p>This could be a short in the solenoid, open in the solenoid, or a jammed solenoid.</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>
625	14	65	9	1600/ 29,30	<p>Rear passenger side Door Pod module failure</p> <p>A failure has occurred in the Door Pod module circuitry.</p> <p>Defective door pod.</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>
625	14	66	0	1600/ 29,30	<p>Rear driver side Door Pod not communicating with the ESC</p> <p>The status message from the door pod has not been received by the ESC</p> <p>Switch data link fault</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>
625	14	66	7	1600/ 29,30	<p>Rear drivers side Door Pod window motor failure</p> <p>The window motor drive circuit is not functioning</p> <p>This could be a short in the window motor, an open in the window motor or a jammed window.</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	66	8	1600/ 29,30	<p>Rear drivers side Door Pod door lock motor failure</p> <p>The Door Lock Actuation Solenoid is not functioning</p> <p>This could be a short in the solenoid, open in the solenoid, or a jammed solenoid.</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>
625	14	66	9	1600/ 29,30	<p>Rear drivers side Door Pod module failure</p> <p>A failure has occurred in the Door Pod module circuitry.</p> <p>Defective door pod</p> <p>Refer to the Crew Cab Rear Power Windows And Locks section of this manual.</p>
625	14	130	0	1600/ 29,30	<p>Front drivers side Door Pod not communicating with the ESC</p> <p>The status message from the door pod has not been received by the ESC</p> <p>Switch data link fault</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
625	14	130	7	1600/ 29,30	<p>Front drivers side Door Pod window motor failure</p> <p>The window motor drive circuit is not functioning</p> <p>This could be a short in the window motor, an open in the window motor or a jammed window.</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
625	14	130	8	1600/ 29,30	<p>Front drivers side Door Pod door lock motor failure</p> <p>The Door Lock Actuation Solenoid is not functioning</p> <p>This could be a short in the solenoid, open in the solenoid, or a jammed solenoid.</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
625	14	130	9	1600/ 29,30	<p>Front drivers side Door Pod module failure</p> <p>A failure has occurred in the Door Pod module circuitry.</p> <p>Defective door pod</p> <p>Refer to the Front Power Windows and Locks section of this manual.</p>
627	14	1	1	4010/ A	<p>ESC power supply #1 open circuit</p> <p>Open Circuit</p> <p>Refer to the ESC Power and Ground(See ESC POWER AND GROUND, page 91) section of this manual.</p>
639	14	0	240	1600/ 34,35,36	<p>Engine retarder torque not being communicated from the ECM or transmission retarder torque not being communicated from Allison WTEC transmission</p> <p>PGN 61440–SA 15 or 16</p> <p>Refer to the appropriate Allison manual or engine diagnostic manual.</p> <p>Refer to the Transmission section of this manual.</p>
639	14	1	240	1600/ 34,35,36	<p>ABS controller not communicating with the ESC</p> <p>No power to ABS controller or no communication from controller on data link.</p> <p>PGN 61441–SA 11</p> <p>Refer to the Air ABS Power and Data Link section of this manual. (See AIR ABS POWER AND DATA LINK CIRCUITS, page 625)</p>
639	14	2	240	1600/ 34,35,36	<p>Electronic transmission controller communication has not been received</p> <p>No power to transmission controller or no communication from controller on data link.</p> <p>PGN 61442–SA 3</p> <p>Refer to the Transmission section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
639	14	4	240	1600/ 34,35,36	Engine speed not communicated to the ESC PGN 61444–SA 0 Refer to information for engine in this vehicle in Engine section of this manual.
639	14	5	240	1600/ 34,35,36	Current gear, range inhibit and check transmission lamps not communicated to the ESC. PGN 61445–SA 3 Refer to the applicable transmission manual for this vehicle. Refer to the Transmission section of this manual.
639	14	8	240	1600/ 34,35,36	Electronic pressure mode indicator not communicated to the ESC PGN 61448–SA 0 Refer to information for engine in this vehicle in Engine section of this manual.
639	14	33	239	1600/ 34, 35, 36	EGC not communicating with the ESC No power to EGC or no communication from EGC on data link. PGN 61148–DA 33 —SA 23 Refer to EGC Power and Data Link Troubleshooting. (See EGC POWER AND DATA LINK CIRCUITS, page 163)
639	14	202	254	1600/ 34,35,36	Engine Lamp information not communicated to the ESC PGN 65226–SA 0 Refer to information for engine in this vehicle in Engine section of this manual.
639	14	228	254	1600/ 34,35,36	Wait to start lamp information not communicated to the ESC PGN 65252–SA 0 Refer to information for engine in this vehicle in Engine section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
639	14	241	254	1600/ 34,35,36	Cruise control enable, active, state and vehicle speed not communicated to the ESC PGN 65265–SA 0 Refer to information for engine in this vehicle in Engine section of this manual.
639	14	251	254	1600/ 34,35,36	Retarder overheat lamp information not communicated to the ESC PGN 65275–SA 3 Refer to the applicable manual for the transmission on this vehicle. Refer to the Transmission section of this manual.
1231	14	0–255	3	4004/Bus 1602 34, 35,36	Unconfigured Source Address Something with the source address in Byte 7 is broadcasting on the data link and the ESC is not configured to expect it. Unexpected or incorrectly addressed module is on the data link. Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	34	1	4004/Bus 1602 34, 35,36	RASM #1 not communicating with the ESC Failed Source Address/Message Time-out PGN 65441–SA 34 Drivetrain J1939 data link, an improperly addressed RASM module, or a missing RASM module that the ESC is expecting Refer to the Air Solenoid (7–Pack)(See REMOTE AIR SOLENOID MODULE (7–PACK), page 742) section of this manual.
1231	14	34	2	4004/Bus 1602 34, 35,36	More than one RASM responds back as RASM #1 Multiple Source Address PGN 65441–SA 234 Refer to the Air Solenoid (7–Pack)(See REMOTE AIR SOLENOID MODULE (7–PACK), page 742) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1231	14	209	1	4004/Bus 1602 34, 35,36	Remote engine speed control module is not communicating with the ESC Failed Source Address/Message Time-out PGN 65441–SA 234 Drivetrain J1939 data link, an improperly addressed RESCM module, or a missing RESCM module that the ESC is expecting Refer to Remote Engine Speed Control Module(See REMOTE AIR SOLENOID MODULE (7–PACK), page 742).
1231	14	209	2	4004/Bus 1602 34, 35,36	More than one Remote engine speed control module with the same source address is responding to the ESC. Multiple Source Address PGN 65441–SA 234 Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
1231	14	225	1	4004/Bus 1602 34, 35,36	RPM #1 not communicating with the ESC Failed Source Address/Message Time-out PGN 65313–SA 225 Drivetrain J1939 data link, an improperly addressed RPM module, or a missing RPM module that the ESC is expecting Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	225	2	4004/Bus 1602 34, 35,36	More than one RPM responds back as RPM #1 Multiple Source Address PGN 65313–SA 225 Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1231	14	226	1	4004/Bus 1602 34, 35,36	RPM #2 not communicating with the ESC Failed Source Address/Message Time-out PGN 65313–SA 226 Drivetrain J1939 data link, an improperly addressed RPM module, or a missing RPM module that the ESC is expecting Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	226	2	4004/Bus 1602 34, 35,36	More than one RPM responds back as RPM #2 Multiple Source Address PGN 65313–SA 226 Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	228	1	4004/Bus 1602 34, 35,36	RPM #4 not communicating with the ESC Failed Source Address/Message Time-out PGN 65313–SA 228 Drivetrain J1939 data link, an improperly addressed RPM module, or a missing RPM module that the ESC is expecting Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	228	2	4004/Bus 1602 34, 35,36	More than one RPM responds back as RPM #4 Multiple Source Address PGN 65313–SA 228 Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1231	14	231	1	4004/Bus 1602 34, 35,36	RPM #7 not communicating with the ESC Failed Source Address/Message Time-out PGN 65313–SA 231 Drivetrain J1939 data link, an improperly addressed RPM module, or a missing RPM module that the ESC is expecting Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	231	2	4004/Bus 1602 34, 35,36	More than one RPM responds back as RPM #7 Multiple Source Address PGN 65313–SA 231 Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
1231	14	234	1	4004/Bus 1602 34, 35,36	RASM #2 not communicating with the ESC Failed Source Address/Message Time-out PGN 65441–SA 234 Drivetrain J1939 data link, an improperly addressed RASM module, or a missing RASM module that the ESC is expecting Refer to the Air Solenoid (7–Pack)(See REMOTE AIR SOLENOID MODULE (7–PACK), page 742) section of this manual.
1231	14	234	2	4004/Bus 1602 34, 35,36	More than one RASM responds back as RASM #2 Multiple Source Address PGN 65441–SA 234 Refer to the Air Solenoid (7–Pack)(See REMOTE AIR SOLENOID MODULE (7–PACK), page 742) section of this manual.
1542	14	1	1	4009/ A	ESC power supply #2 open circuit Open Circuit Refer to the ESC Power and Ground(See ESC POWER AND GROUND, page 91) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1557	0	1	1	N/A	<p>ESC internal fault software main loop time exceeded.</p> <p>There are too many features and the main loop is exceeding its maximum execution time. Truck may work partially or not at all. This indicates ESC is incapable of handling this configuration.</p> <p>Software configuration too big.</p> <p>Refer to the Electrical System Controller(See ELECTRICAL SYSTEM CONTROLLER, page 85) section of this manual.</p>
1705	14	101	3	N/A	<p>EGC gauge location 1 (tachometer) out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	101	4	N/A	<p>EGC gauge location 1 (tachometer) out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to Tachometer (See TACHOMETER, page 252)</p>
1705	14	101	5	N/A	<p>EGC gauge location 1 (tachometer) sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Tachometer (See TACHOMETER, page 252)</p>
1705	14	101	6	N/A	<p>EGC gauge location 1 (tachometer) data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Tachometer (See TACHOMETER, page 252)</p>
1705	14	102	3	N/A	<p>EGC gauge location 2 (speedometer) out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to Speedometer (See SPEEDOMETER, page 249)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	102	4	N/A	<p>EGC gauge location 2 (speedometer) out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to Speedometer (See SPEEDOMETER, page 249)</p>
1705	14	102	5	N/A	<p>EGC gauge location 2 (speedometer) sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Speedometer (See SPEEDOMETER, page 249)</p>
1705	14	102	6	N/A	<p>EGC gauge location 2 (speedometer) data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Speedometer (See SPEEDOMETER, page 249)</p>
1705	14	103	3	N/A	<p>EGC gauge location 3 (engine coolant temperature) out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)</p>
1705	14	103	4	N/A	<p>EGC gauge location 3 (engine coolant temperature) out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)</p>
1705	14	103	5	N/A	<p>EGC gauge location 3 (engine coolant temperature) sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	103	6	N/A	<p>EGC gauge location 3 (engine coolant temperature) data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)</p>
1705	14	104	3	N/A	<p>EGC gauge location 4 out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	104	4	N/A	<p>EGC gauge location 4 out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>The gauge in this location can be any optional gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	104	5	N/A	<p>EGC gauge location 4 sensor fault</p> <p>The gauge in this location can be any optional gauge.</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	104	6	N/A	<p>EGC gauge location 4 data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>The gauge in this location can be any optional gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	105	3	N/A	<p>EGC gauge location 5 (oil pressure) out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>
1705	14	105	4	N/A	<p>EGC gauge location 5 (oil pressure) out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>
1705	14	105	5	N/A	<p>EGC gauge location 5 (oil pressure) sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>
1705	14	105	6	N/A	<p>EGC gauge location 5 (oil pressure) data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>
1705	14	106	3	N/A	<p>EGC gauge location 6 out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	106	4	N/A	<p>EGC gauge location 6 out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	106	5	N/A	<p>EGC gauge location 6 sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	106	6	N/A	<p>EGC gauge location 6 data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	107	3	N/A	<p>EGC gauge location 7 (fuel level) out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>
1705	14	107	4	N/A	<p>EGC gauge location 7 (fuel level) out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	107	5	N/A	<p>EGC gauge location 7 (fuel level) sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>
1705	14	107	6	N/A	<p>EGC gauge location 7 (fuel level) data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>
1705	14	108	3	N/A	<p>EGC gauge location 8 out of range high</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	108	4	N/A	<p>EGC gauge location 8 out of range low</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	108	5	N/A	<p>EGC gauge location 8 sensor fault</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	108	6	N/A	<p>EGC gauge location 8 data unavailable</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	109	3	N/A	<p>EGC gauge location 9 (volts) out of range high</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>
1705	14	109	4	N/A	<p>EGC gauge location 9 (volts) out of range low</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>
1705	14	109	5	N/A	<p>EGC gauge location 9 (volts) sensor fault</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	109	6	N/A	<p>EGC gauge location 9 (volts) data unavailable</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>
1705	14	110	3	N/A	<p>EGC gauge location 10 out of range high</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>Data for this gauge is above the value that the gauge can display. For example: a value exceeding the gauge maximum scale value.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	110	4	N/A	<p>EGC gauge location 10 out of range low</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>Data for this gauge is below the minimum value the gauge can display. For example: the lowest scale value on the gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	110	5	N/A	<p>EGC gauge location 10 sensor fault</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
1705	14	110	6	N/A	<p>EGC gauge location 10 data unavailable</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
1705	14	150	1	N/A	<p>ESC not communicating with the EGC.</p> <p>Loss of communication in excess of 10 seconds.</p> <p>Drivetrain J1939 data link.</p> <p>Refer to the Electrical System Controller(See ELECTRICAL SYSTEM CONTROLLER, page 85) section of this manual.</p>
1705	14	150	2	N/A	<p>Engine Controller not communicating with the EGC.</p> <p>Loss of communication in excess of 10 seconds.</p> <p>Drivetrain J1939 data link.</p> <p>Refer to the Electronic Engine Controls section of this manual.</p>
2023	14	101 or 201	5	N/A	<p>EGC gauge location 1 (tachometer) sensor fault to primary EGC (101) or secondary EGC (201)</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Tachometer (See TACHOMETER, page 252)</p>
2023	14	101 or 201	6	N/A	<p>EGC gauge location 1 (tachometer) data unavailable to primary EGC (101) or secondary EGC (201)</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Tachometer (See TACHOMETER, page 252)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	101 or 201	7	N/A	EGC gauge location 1 (tachometer) data missing to primary EGC (101) or secondary EGC (201) The data for this gauge is not being transmitted on the datalink. Refer to Tachometer (See TACHOMETER, page 252)
2023	14	102 or 202	5	N/A	EGC gauge location 2 (speedometer) sensor fault to primary EGC (102) or secondary EGC (202) There is a problem with the sensor that provides the data for this gauge. Refer to Speedometer (See SPEEDOMETER, page 249)
2023	14	102 or 202	6	N/A	EGC gauge location 2 (speedometer) data unavailable to primary EGC (102) or secondary EGC (202) The data that this gauge displays should be, but is not available at this time. Refer to Speedometer (See SPEEDOMETER, page 249)
2023	14	102 or 202	7	N/A	EGC gauge location 2 (speedometer) data missing to primary EGC (102) or secondary EGC (202) The data for this gauge is not being transmitted on the datalink. Refer to Speedometer (See SPEEDOMETER, page 249)
2023	14	103 or 203	5	N/A	EGC gauge location 3 (engine coolant temperature) sensor fault to primary EGC (103) or secondary EGC (203) There is a problem with the sensor that provides the data for this gauge. Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)
2023	14	103 or 203	6	N/A	EGC gauge location 3 (engine coolant temperature) data unavailable to primary EGC (103) or secondary EGC (203) The data that this gauge displays should be, but is not available at this time. Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	103 or 203	7	N/A	<p>EGC gauge location 3 (engine coolant temperature) data missing to primary EGC (103) or secondary EGC (203)</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to Engine Coolant Temperature Gauge. (See ENGINE COOLANT TEMPERATURE GAUGE, page 240)</p>
2023	14	104 or 204	5	N/A	<p>EGC gauge location 4 sensor fault to primary EGC (104) or secondary EGC (204)</p> <p>The gauge in this location can be any optional gauge.</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	104 or 204	6	N/A	<p>EGC gauge location 4 data unavailable to primary EGC (104) or secondary EGC (204)</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>The gauge in this location can be any optional gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	104 or 204	7	N/A	<p>EGC gauge location 4 data missing to primary EGC (104) or secondary EGC (204)</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>The gauge in this location can be any optional gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	105 or 205	5	N/A	<p>EGC gauge location 5 (oil pressure) sensor fault to primary EGC (105) or secondary EGC (205)</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	105 or 205	6	N/A	<p>EGC gauge location 5 (oil pressure) data unavailable to primary EGC (105) or secondary EGC (205)</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>
2023	14	105 or 205	7	N/A	<p>EGC gauge location 5 (oil pressure) data missing to primary EGC (105) or secondary EGC (205)</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to Engine Oil Pressure Gauge. (See ENGINE OIL PRESSURE GAUGE, page 243)</p>
2023	14	106 or 206	5	N/A	<p>EGC gauge location 6 sensor fault to primary EGC (106) or secondary EGC (206)</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	106 or 206	6	N/A	<p>EGC gauge location 6 data unavailable to primary EGC (106) or secondary EGC (206)</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	106 or 206	7	N/A	<p>EGC gauge location 6 data missing to primary EGC (106) or secondary EGC (206)</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>The gauge in this location is optional.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	107 or 207	5	N/A	<p>EGC gauge location 7 (fuel level) sensor fault to primary EGC (107) or secondary EGC (207)</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>
2023	14	107 or 207	6	N/A	<p>EGC gauge location 7 (fuel level) data unavailable to primary EGC (107) or secondary EGC (207)</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>
2023	14	107 or 207	7	N/A	<p>EGC gauge location 7 (fuel level) data missing to primary EGC (107) or secondary EGC (207)</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to Fuel Level Gauge. (See FUEL LEVEL GAUGE, page 255)</p>
2023	14	108 or 208	5	N/A	<p>EGC gauge location 8 sensor fault to primary EGC (108) or secondary EGC (208)</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	108 or 208	6	N/A	<p>EGC gauge location 8 data unavailable to primary EGC (108) or secondary EGC (208)</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	108 or 208	7	N/A	<p>EGC gauge location 8 data missing to primary EGC (108) or secondary EGC (208)</p> <p>On vehicles with air brakes this is the primary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	109 or 209	5	N/A	<p>EGC gauge location 9 (volts) sensor fault to primary EGC (109) or secondary EGC (209)</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>
2023	14	109 or 209	6	N/A	<p>EGC gauge location 9 (volts) data unavailable to primary EGC (109) or secondary EGC (209)</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>
2023	14	109 or 209	7	N/A	<p>EGC gauge location 9 (volts) data missing to primary EGC (109) or secondary EGC (209)</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to Voltmeter. (See VOLTMETER, page 237)</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	110 or 210	5	N/A	<p>EGC gauge location 10 sensor fault to primary EGC (110) or secondary EGC (210)</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	110 or 210	6	N/A	<p>EGC gauge location 10 data unavailable to primary EGC (110) or secondary EGC (210)</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	110 or 210	7	N/A	<p>EGC gauge location 10 data missing to primary EGC (110) or secondary EGC (210)</p> <p>On vehicles with air brakes this is the secondary air gauge.</p> <p>On vehicles with hydraulic brakes this can be any optional gauge</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to the Electronic Gauge Cluster(See Table 23, page 146) section of this manual.</p>
2023	14	150 or 250	1	N/A	<p>Loss of data link from ESC to primary EGC (150) or secondary EGC (250)</p> <p>Loss of communication in excess of 10 seconds.</p> <p>Drivetrain J1939 data link.</p> <p>Refer to the Electrical System Controller(See ELECTRICAL SYSTEM CONTROLLER, page 85) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	150 or 250	2	N/A	<p>Engine Controller not communicating with the primary EGC (150) or secondary EGC (250)</p> <p>Loss of communication in excess of 10 seconds.</p> <p>Drivetrain J1939 data link.</p> <p>Refer to the Electronic Engine Controls section of this manual.</p>
2023	14	150 or 250	8	N/A	<p>ABS warning light malfunction on primary EGC (150) or secondary EGC (250)</p> <p>Refer to the ABS warning light(See ABS WARNING LAMP, page 223) section of this manual.</p>
2023	14	150 or 250	9	N/A	<p>Trailer ABS warning light malfunction on primary EGC (150) or secondary EGC (250)</p> <p>Refer to the Trailer ABS Lamp (See TRAILER ABS LAMP, page 199) section of this manual.</p>
2023	14	50, 40, 30, or 20	1	N/A	<p>ESC not communicating with AGSP 1 (50), AGSP 2 (20), AGSP 3 (30), or AGSP 4 (40).</p> <p>Loss of communication in excess of 10 seconds.</p> <p>Drivetrain J1939 data link.</p> <p>Refer to the Electrical System Controller(See ELECTRICAL SYSTEM CONTROLLER, page 85) section of this manual.</p>
2023	14	50, 40, 30, or 20	10	N/A	<p>Ignition signal from datalink from ESC does not match hardwired ignition signal on AGSP 1 (50), AGSP 2 (20), AGSP 3 (30), or AGSP 4 (40).</p> <p>Ignition Circuit to ESC/AGSP.</p> <p>Refer to the Electronic Engine Controls section of this manual.</p>
2023	14	1, 11, 21, 31	5	N/A	<p>Gauge location 1 sensor fault on AGSP 1 (1), AGSP 2 (11), AGSP 3 (21), or AGSP 4 (31).</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	1, 11, 21, 31	6	N/A	<p>Gauge location 1 data unavailable on AGSP 1 (1), AGSP 2 (11), AGSP 3 (21), or AGSP 4 (31).</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2023	14	1, 11, 21, 31	7	N/A	<p>Gauge location 1 data missing on AGSP 1 (1), AGSP 2 (11), AGSP 3 (21), or AGSP 4 (31).</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2023	14	2, 12, 22, 32	5	N/A	<p>Gauge location 2 sensor fault on AGSP 1 (2), AGSP 2 (12), AGSP 3 (22), or AGSP 4 (32).</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2023	14	2, 12, 22, 32	6	N/A	<p>Gauge location 2 data unavailable on AGSP 1 (2), AGSP 2 (12), AGSP 3 (22), or AGSP 4 (32).</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2023	14	2, 12, 22, 32	7	N/A	<p>Gauge location 2 data missing on AGSP 1 (2), AGSP 2 (12), AGSP 3 (22), or AGSP 4 (32).</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2023	14	3, 13, 23, 33	5	N/A	<p>Gauge location 3 sensor fault on AGSP 1 (3), AGSP 2 (13), AGSP 3 (23), or AGSP 4 (33).</p> <p>There is a problem with the sensor that provides the data for this gauge.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2023	14	3, 13, 23, 33	6	N/A	<p>Gauge location 3 data unavailable on AGSP 1 (3), AGSP 2 (13), AGSP 3 (23), or AGSP 4 (33).</p> <p>The data that this gauge displays should be, but is not available at this time.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2023	14	3, 13, 23, 33	7	N/A	<p>Gauge location 3 data missing on AGSP 1 (3), AGSP 2 (13), AGSP 3 (23), or AGSP 4 (33).</p> <p>The data for this gauge is not being transmitted on the datalink.</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2033	14	1	0	1601/A	<p>Connector 1601 pin A. There is a load on this pin that has been configured as Unused.</p> <p>Connector 1601 pin A is drawing current and it is configured as Unused.</p> <p>An unexpected load is attached to this pin.</p>
2033	14	1	1	1601/A	<p>Connector 1601 pin A. Output overloaded</p> <p>Connector 1601 pin A current overload.</p> <p>Too much load attached.</p>
2033	14	1	2	1601/A	<p>Connector 1601 pin A. Output open circuit.</p> <p>Connector 1601 Pin A open</p> <p>Open circuit.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	1	3	1601/A	Connector 1601 pin A. Output shorted to ground. Connector 1601 Pin A shorted to ground. Shorted to ground.
2033	14	2	0	1601/E	Connector 1601 pin E. There is a load on this pin that has been configured as Unused. Connector 1601 pin E is drawing current and it is configured as Unused. An unexpected load is attached to this pin.
2033	14	2	1	1601/E	Connector 1601 pin E. Output overloaded Connector 1601 pin E current overload. Too much load attached.
2033	14	2	2	1601/E	Connector 1601 pin E. Output open circuit. Connector 1601 Pin E open. Open circuit.
2033	14	2	3	1601/E	Connector 1601 pin E. Output shorted to ground. Connector 1601 Pin E shorted to ground. Shorted to ground.
2033	14	3	0	1600/11	Connector 1600 pin 11. There is a load on this pin that has been configured as Unused. Connector 1600 Pin #11. Bus - Electric Door Control Open Command, there is a load on this pin that has been configured as Unused Connector 1600 pin 11 is drawing current and it is configured as Unused. Connector 1600 Pin #11. Bus - Electric Door Control Open Command, is drawing current and it is configured as unused An unexpected load is attached to this pin.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	3	1	1600/11	<p>Connector 1600 pin 11. Output overloaded</p> <p>Connector 1600 Pin #11. BUS - Electric Door Open Output overloaded</p> <p>Connector 1600 pin 11 current overload.</p> <p>Connector 1600 Pin #11. BUS - Electric Door Open current overloaded</p> <p>Too much load attached.</p>
2033	14	3	2	1600/11	<p>Connector 1600 pin 11. Output open circuit.</p> <p>Connector 1600 Pin #11. BUS - Electric Door Open Output open circuit</p> <p>Connector 1600 Pin 11 open.</p> <p>Connector 1600 Pin #11. BUS - Electric Door Open circuit open</p> <p>Open circuit.</p>
2033	14	3	3	1600/11	<p>Connector 1600 pin 11. Output shorted to ground.</p> <p>Connector 1600 Pin #11. BUS - Electric Door Open Output shorted to ground</p> <p>Connector 1600 Pin 11 shorted to ground.</p> <p>Connector 1600 Pin #11. BUS - Electric Door Open shorted to ground</p> <p>Shorted to ground.</p>
2033	14	4	0	1600/6	<p>Connector 1600 pin 6. There is a load on this pin that has been configured as Unused.</p> <p>Connector 1600 Pin #6. BUS - Fog Light Command</p> <p>Connector 1600 pin 6 is drawing current and it is configured as Unused.</p> <p>Connector 1600 Pin #6. BUS - Fog Light Command is drawing current and it is configured as unused</p> <p>An unexpected load is attached to this pin.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	4	1	1600/6	<p>Connector 1600 pin 6. Output overloaded</p> <p>Connector 1600 Pin #6. BUS - Fog Light Command Output overloaded</p> <p>Connector 1600 pin 6 current overload</p> <p>Connector 1600 Pin #6, BUS - Fog Light Command Output, current overload</p> <p>Too much load attached.</p>
2033	14	4	2	1600/6	<p>Connector 1600 pin 6. Output open circuit.</p> <p>Connector 1600 Pin #6. BUS - Fog Light Command Output open circuit</p> <p>Connector 1600 Pin 6 open.</p> <p>Connector 1600 Pin #6, BUS - Fog Light Command Output, open</p> <p>Open circuit.</p>
2033	14	4	3	1600/6	<p>Connector 1600 pin 6. Output shorted to ground.</p> <p>Connector 1600 Pin #6. BUS - Fog Light Command Output shorted to ground</p> <p>Connector 1600 Pin 6 shorted to ground.</p> <p>Connector 1600 Pin #6, BUS - Fog Light Command Output, shorted to ground</p> <p>Shorted to ground.</p>
2033	14	5	0	1600/4	<p>Connector 1600 pin 4. There is a load on this pin that has been configured as Unused.</p> <p>Connector 1600 pin 4 is drawing current and it is configured as Unused.</p> <p>An unexpected load is attached to this pin.</p>
2033	14	5	1	1600/4	<p>Connector 1600 pin 4. Output overloaded</p> <p>Connector 1600 pin 4 current overload</p> <p>Too much load attached.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	5	2	1600/4	Connector 1600 pin 4. Output open circuit. Connector 1600 Pin 4 open. Open circuit.
2033	14	5	3	1600/4	Connector 1600 pin 4. Shorted to ground. Connector 1600 Pin 4 shorted to ground. Shorted to ground.
2033	14	6	0	4004/Bus 1602 17	Connector 4004 pin 17. There is a load on this pin that has been configured as Unused. BUS Connector 1602 Pin #17. Electric Door Control Closed, there is a load on this pin that has been configured as Unused Connector 4004 pin 17 is drawing current and it is configured as Unused. Bus Connector 1602 pin 17, Bus Electric Door Control, is drawing current and it is configured as unused An unexpected load is attached to this pin.
2033	14	6	1	4004/Bus 1602 17	Connector 4004 pin 17. Output overloaded Bus Connector 1602 pin 17, Bus Electric Door Control, is Output overloaded Connector 4004 pin 17 current overload Bus Connector 1602 pin 17, Bus Electric Door Control, current overload Too much load attached.
2033	14	6	2	4004/Bus 1602 17	Connector 4004 pin 17. Output open circuit. Bus Connector 1602 pin 17. Bus Electric Door Control, Output open circuit Connector 4004 Pin 17 open. Bus Connector 1602 pin 17. Bus Electric Door Control, open Open circuit.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	6	3	4004/Bus 1602 17	Connector 4004 pin 17. Output shorted to ground. Bus Connector 1602 pin 17. Bus Electric Door Control, Output shorted to ground. Connector 4004 Pin 17 shorted to ground. Bus Connector 1602 pin 17. Bus Electric Door Control, shorted to ground Shorted to ground.
2033	14	7	0	4004/Bus 1602 19	Connector 4004 pin 19. There is a load on this pin that has been configured as Unused. Connector 4004 pin 19 is drawing current and it is configured as Unused. An unexpected load is attached to this pin.
2033	14	7	1	4004/Bus 1602 19	Connector 4004 pin 19. Output overloaded. Connector 4004 pin 19 current overload. Too much load attached.
2033	14	7	2	4004/Bus 1602 19	Connector 4004 pin 19. Output open circuit. Connector 4004 Pin 19 open. Open circuit.
2033	14	7	3	4004/Bus 1602 19	Connector 4004 pin 19. Output shorted to ground. Connector 4004 Pin 19 shorted to ground. Shorted to ground.
2033	14	8	0	4004/Bus 1602 20	Connector 4004 pin 20. There is a load on this pin that has been configured as Unused. Bus Connector 1602 Pin #20. Wiper high speed relay, there is a load on this pin that has been configured as Unused Connector 4004 pin 20 is drawing current and it is configured as Unused. Bus Connector 1602 Pin #20. Wiper high speed relay, is drawing current and it is configured as unused

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
					An unexpected load is attached to this pin.
2033	14	8	1	4004/Bus 1602 20	Connector 4004 pin 20. Output overloaded. Bus Connector 1602 Pin #20. Wiper high speed relay, Output overloaded Connector 4004 pin 20 current overload. Bus Connector 1602 Pin #20 Wiper high speed relay current overloaded Too much load attached.
2033	14	8	2	4004/Bus 1602 20	Connector 4004 pin 20. Output open circuit. Bus Connector 1602 Pin #20. Wiper high speed relay Output open circuit Connector 4004 Pin 20 open. Bus Connector 1602 Pin #20. Wiper high speed relay Output open circuit Open circuit.
2033	14	8	3	4004/Bus 1602 20	Connector 4004 pin 20. Output shorted to ground. Bus Connector 1602 Pin #20. Wiper high speed relay Output, Output shorted to ground Connector 4004 Pin 20 shorted to ground. Bus Connector 1602 Pin #20. Wiper high speed relay Output, Output shorted to ground Shorted to ground.
2033	14	9	0	4004/Bus 1602 21	Connector 4004 pin 21. There is a load on this pin that has been configured as Unused. Connector 4004 pin 21 is drawing current and it is configured as Unused. An unexpected load is attached to this pin.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	9	1	4004/Bus 1602 21	Connector 4004 pin 21. Output overloaded. Connector 4004 pin 21 current overload. Too much load attached.
2033	14	9	2	4004/Bus 1602 21	Connector 4004 pin 21. Output open circuit. Connector 4004 Pin 21 open. Open circuit.
2033	14	9	3	4004/Bus 1602 21	Connector 4004 pin 21. Output shorted to ground. Connector 4004 Pin 21 shorted to ground. Shorted to ground.
2033	14	10	0	4004/Bus 1602 22	Connector 4004 pin 22. There is a load on this pin that has been configured as Unused. (4 Pack Air Solenoid Channel 3) Connector 4004 pin 22 is drawing current and it is configured as Unused. An unexpected load is attached to this pin. Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.
2033	14	10	1	4004/Bus 1602 22	Connector 4004 pin 22. Output overloaded. (4 Pack Air Solenoid Channel 3) Connector 4004 pin 22 current overload. Too much load attached, defective relay or 4 pack air solenoid module. Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.
2033	14	10	2	4004/Bus 1602 22	Connector 4004 pin 22. Output open circuit. (4 Pack Air Solenoid Channel 3) Connector 4004 Pin 22 open Open circuit, defective relay or 4 pack air solenoid module. Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	10	3	4004/Bus 1602 22	<p>Connector 4004 pin 22. Output shorted to ground. (4 Pack Air Solenoid Channel 3)</p> <p>Connector 4004 Pin 22 shorted to ground.</p> <p>Shorted to ground, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	10	4	4004/Bus 1602 22	<p>Connector 4004 Pin 22. Power to solenoid pack has been disabled due to this solenoid being shorted to ground. This condition causes all solenoids in the solenoid pack to report as being shorted to ground. This fault indicates the true cause of the solenoid pack shut-down.</p> <p>Connector 4004 Pin 22 shorted to ground.</p> <p>Power to the solenoid pack has been turned off due to a short in solenoid 3.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	11	0	4004/Bus 1602 23	<p>Connector 4004 pin 23. There is a load on this pin that has been configured as Unused.</p> <p>Bus connector 1602 pin #23. Wheelchair Lift solenoid, there is a load on this pin that has been configured as Unused</p> <p>Connector 4004 pin 23 is drawing current and it is configured as Unused.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, is drawing current and it is configured as unused</p> <p>An unexpected load is attached to this pin.</p>
2033	14	11	1	4004/Bus 1602 23	<p>Connector 4004 pin 23. Output overloaded.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, Output Overloaded</p> <p>Connector 4004 pin 23 current overload.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, current Overloaded</p> <p>Too much load attached.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	11	2	4004/Bus 1602 23	<p>Connector 4004 pin 23. Output open circuit.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, Out put open circuit</p> <p>Connector 4004 Pin 23 open.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, open</p> <p>Open circuit.</p>
2033	14	11	3	4004/Bus 1602 23	<p>Connector 4004 pin 23. Output shorted to ground.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, Output shorted to ground</p> <p>Connector 4004 Pin 23 shorted to ground.</p> <p>Bus connector 1602 pin #23, Wheelchair Lift solenoid, shorted to ground</p> <p>Shorted to ground.</p>
2033	14	12	0	4004/Bus 1602 24	<p>Connector 4004 pin 24. There is a load on this pin that has been configured as Unused. (4 Pack Air Solenoid Channel 2)</p> <p>Connector 4004 pin 24 is drawing current and it is configured as Unused.</p> <p>An unexpected load is attached to this pin.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	12	1	4004/Bus 1602 24	<p>Connector 4004 pin 24. Output overloaded. (4 Pack Air Solenoid Channel 2)</p> <p>Connector 4004 pin 24 current overload.</p> <p>Too much load attached, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	12	2	4004/Bus 1602 24	<p>Connector 4004 pin 24. Output open circuit. (4 Pack Air Solenoid Channel 2)</p> <p>Connector 4004 Pin 24 open</p> <p>Open circuit, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	12	3	4004/Bus 1602 24	<p>Connector 4004 pin 24. Output shorted to ground. (4 Pack Air Solenoid Channel 2)</p> <p>Connector 4004 Pin 24 shorted to ground.</p> <p>Shorted to ground. Defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module (See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	12	4	4004/Bus 1602 24	<p>Connector 4004 Pin 24. Power to solenoid pack has been disabled due to this solenoid being shorted to ground. This condition causes all solenoids in the solenoid pack to report as being shorted to ground. This fault indicates the true cause of the solenoid pack shut-down.</p> <p>Connector 4004 Pin 24 shorted to ground.</p> <p>Power to the solenoid pack has been turned off due to a short in solenoid 2.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	13	0	4004/Bus 1602 25	<p>Connector 4004 pin 25. There is a load on this pin that has been configured as Unused.</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, there is a load on this pin that has been configured as Unused</p> <p>Connector 4004 pin 25 is drawing current and it is configured as Unused.</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, is drawing current and it is configured as unused</p> <p>An unexpected load is attached to this pin.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	13	1	4004/Bus 1602 25	<p>Connector 4004 pin 25. Output overloaded.</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, Output overloaded</p> <p>Connector 4004 pin 25 current overload</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid current overload</p> <p>Too much load attached.</p>
2033	14	13	2	4004/Bus 1602 25	<p>Connector 4004 pin 25. Output open circuit</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, Output open circuit</p> <p>Connector 4004 Pin 25 open.</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, open</p> <p>Open circuit.</p>
2033	14	13	3	4004/Bus 1602 25	<p>Connector 4004 pin 25. Output shorted to ground.</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, Output Shorted to ground</p> <p>Connector 4004 Pin 25 shorted to ground.</p> <p>Bus connector 1602 pin #25, Park Position Unlock solenoid, Shorted to ground</p> <p>Shorted to ground.</p>
2033	14	14	0	4004/Bus 1602 29	<p>Connector 4004 pin 29. There is a load on this pin that has been configured as Unused.</p> <p>Connector 4004 pin 29 is drawing current and it is configured as Unused.</p> <p>An unexpected load is attached to this pin.</p>
2033	14	14	1	4004/Bus 1602 29	<p>Connector 4004 pin 29. Output overloaded.</p> <p>Connector 4004 pin 29 current overload.</p> <p>Too much load attached.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	14	2	4004/Bus 1602 29	Connector 4004 pin 29. Output open circuit. Connector 4004 Pin 29 open. Open circuit.
2033	14	14	3	4004/Bus 1602 29	Connector 4004 pin 29. Output shorted to ground Connector 4004 Pin 29 shorted to ground. Shorted to ground.
2033	14	15	0	4004/Bus 1602 30	Connector 4004 pin 30. There is a load on this pin that has been configured as Unused. (4 Pack Air Solenoid Channel 4) Connector 4004 pin 30 is drawing current and it is configured as Unused. An unexpected load is attached to this pin. Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.
2033	14	15	1	4004/Bus 1602 30	Connector 4004 pin 30. Output overloaded. (4 Pack Air Solenoid Channel 4) Connector 4004 pin 30 current overload. Too much load attached, defective relay or 4 pack air solenoid module. Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.
2033	14	15	2	4004/Bus 1602 30	Connector 4004 pin 30. Output open circuit. (4 Pack Air Solenoid Channel 4) Connector 4004 Pin 30 open Open circuit, defective relay or 4 pack air solenoid module. Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	15	3	4004/Bus 1602 30	<p>Connector 4004 pin 30. Output shorted to ground. (4 Pack Air Solenoid Channel 4)</p> <p>Connector 4004 Pin 30 shorted to ground.</p> <p>Shorted to ground, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	15	4	4004/Bus 1602 30	<p>Connector 4004 Pin 30. Power to solenoid pack has been disabled due to this solenoid being shorted to ground. This condition causes all solenoids in the solenoid pack to report as being shorted to ground. This fault indicates the true cause of the solenoid pack shut-down.</p> <p>Connector 4004 Pin 30 shorted to ground.</p> <p>Power to the solenoid pack has been turned off due to a short in solenoid 4.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	16	0	4004/Bus 1602 31	<p>Connector 4004 pin 31. There is a load on this pin that has been configured as Unused. (4 Pack Air Solenoid Channel 1)</p> <p>Connector 4004 pin 31 is drawing current and it is configured as Unused.</p> <p>An unexpected load is attached to this pin.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	16	1	4004/Bus 1602 31	<p>Connector 4004 pin 31. Output overloaded. (4 Pack Air Solenoid Channel 1)</p> <p>Connector 4004 pin 31 current overload.</p> <p>Too much load attached, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2033	14	16	2	4004/Bus 1602 31	<p>Connector 4004 pin 31. Output open circuit. (4 Pack Air Solenoid Channel 1)</p> <p>Connector 4004 Pin 31 open.</p> <p>Open circuit, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	16	3	4004/Bus 1602 31	<p>Connector 4004 pin 31. Output shorted to ground. (4 Pack Air Solenoid Channel 1)</p> <p>Connector 4004 Pin 31 shorted to ground.</p> <p>Shorted to ground, defective relay or 4 pack air solenoid module.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2033	14	16	4	4004/Bus 1602 31	<p>Connector 4004 Pin 31. Power to solenoid pack has been disabled due to this solenoid being shorted to ground. This condition causes all solenoids in the solenoid pack to report as being shorted to ground. This fault indicates the true cause of the solenoid pack shut-down.</p> <p>Connector 4004 Pin 31 shorted to ground.</p> <p>Power to the solenoid pack has been turned off due to a short in solenoid 1.</p> <p>Refer to the 4– pack air solenoid module(See AIR SOLENOID MODULE (4–PACK), page 729) section of this manual.</p>
2034	14	1	1	N/A	<p>Remote Air Solenoid Module #1 - Output #1 - Valve ON when commanded OFF.</p> <p>Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.</p>
2034	14	1	2	N/A	<p>Remote Air Solenoid Module #1 - Output #1 - Valve OFF when commanded ON.</p> <p>Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2034	14	1	3	N/A	Remote Air Solenoid Module #1 - Output #1 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	1	4	N/A	Remote Air Solenoid Module #1 - Output #1 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Remove solenoid or reprogram ESC to recognize the solenoid. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2034	14	2	1	N/A	Remote Air Solenoid Module #1 - Output #2 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	2	2	N/A	Remote Air Solenoid Module #1 - Output #2 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	2	3	N/A	Remote Air Solenoid Module #1 - Output #2 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	2	4	N/A	Remote Air Solenoid Module #1 - Output #2 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Remove solenoid or reprogram ESC to recognize the solenoid. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2034	14	3	1	N/A	Remote Air Solenoid Module #1 - Output #3 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	3	2	N/A	Remote Air Solenoid Module #1 - Output #3 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	3	3	N/A	Remote Air Solenoid Module #1 - Output #3 - Open Circuit coil or valve not installed. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	3	4	N/A	Remote Air Solenoid Module #1 - Output #3 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Remove solenoid or reprogram ESC to recognize the solenoid. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2034	14	4	1	N/A	Remote Air Solenoid Module #1 - Output #4 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	4	2	N/A	Remote Air Solenoid Module #1 - Output #4 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	4	3	N/A	Remote Air Solenoid Module #1 - Output #4 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2034	14	4	4	N/A	<p>Remote Air Solenoid Module #1 - Output #4 - Unknown remote air solenoid.</p> <p>An air Solenoid is installed in this position but is not configured.</p> <p>Remove solenoid or reprogram ESC to recognize the solenoid.</p> <p>Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.</p>
2034	14	5	1	N/A	<p>Remote Air Solenoid Module #1 - Output #5 - Valve ON when commanded OFF.</p> <p>Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.</p>
2034	14	5	2	N/A	<p>Remote Air Solenoid Module #1 - Output #5 - Valve OFF when commanded ON.</p> <p>Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.</p>
2034	14	5	3	N/A	<p>Remote Air Solenoid Module #1 - Output #5 - Open Circuit coil or valve not installed.</p> <p>Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.</p>
2034	14	5	4	N/A	<p>Remote Air Solenoid Module #1 - Output #5 - Unknown remote air solenoid.</p> <p>An air Solenoid is installed in this position but is not configured.</p> <p>Remove solenoid or reprogram ESC to recognize the solenoid.</p> <p>Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.</p>
2034	14	6	1	N/A	<p>Remote Air Solenoid Module #1 - Output #6 - Valve ON when commanded OFF.</p> <p>Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2034	14	6	2	N/A	Remote Air Solenoid Module #1 - Output #6 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	6	3	N/A	Remote Air Solenoid Module #1 - Output #6 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	6	4	N/A	Remote Air Solenoid Module #1 - Output #6 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Remove solenoid or reprogram ESC to recognize the solenoid. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2034	14	7	1	N/A	Remote Air Solenoid Module #1 - Output #7 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	7	2	N/A	Remote Air Solenoid Module #1 - Output #7 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2034	14	7	3	N/A	Remote Air Solenoid Module #1 - Output #7 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2034	14	7	4	N/A	<p>Remote Air Solenoid Module #1 - Output #7 - Unknown remote air solenoid.</p> <p>An air Solenoid is installed in this position but is not configured.</p> <p>Remove solenoid or reprogram ESC to recognize the solenoid.</p> <p>Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.</p>
2040	14	1	1	N/A	<p>AGSP #1 Switch #1, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #1 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	1	2	N/A	<p>AGSP #1 Switch #1, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #1 to the default value.</p> <p>Replace faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	1	3	N/A	<p>AGSP #1 Switch #1, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #1 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	1	4	N/A	<p>AGSP #1 Switch #1, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #1 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	1	5	N/A	<p>AGSP #1 Switch #1, This switch should be empty but one or both of the microswitches is pressed.</p> <p>The ESC sets the status of AGSP #1 Switch #1 to the default value.</p> <p>Replace switch actuator or faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	2	1	N/A	<p>AGSP #1 Switch #2, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #2 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	2	2	N/A	<p>AGSP #1 Switch #2, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #2 to the default value.</p> <p>Replace faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	2	3	N/A	<p>AGSP #1 Switch #2, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #2 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	2	4	N/A	<p>AGSP #1 Switch #2, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #2 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	2	5	N/A	<p>AGSP #1 Switch #2, This switch should be empty but one or both of the microswitches is pressed.</p> <p>The ESC sets the status of AGSP #1 Switch #2 to the default value.</p> <p>Replace switch actuator or faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	3	1	N/A	<p>AGSP #1 Switch #3, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #3 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	3	2	N/A	<p>AGSP #1 Switch #3, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #3 to the default value.</p> <p>Replace faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	3	3	N/A	<p>AGSP #1 Switch #3, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #3 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	3	4	N/A	<p>AGSP #1 Switch #3, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #3 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	3	5	N/A	<p>AGSP #1 Switch #3, This switch should be empty but one or both of the microswitches is pressed.</p> <p>The ESC sets the status of AGSP #1 Switch #3 to the default value.</p> <p>Replace switch actuator or faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	4	1	N/A	<p>AGSP #1 Switch #4, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #4 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	4	2	N/A	<p>AGSP #1 Switch #4, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #4 to the default value.</p> <p>Replace faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	4	3	N/A	<p>AGSP #1 Switch #4, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #4 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	4	4	N/A	<p>AGSP #1 Switch #4, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #4 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	4	5	N/A	<p>AGSP #1 Switch #4, This switch should be empty but one or both of the microswitches is pressed.</p> <p>The ESC sets the status of AGSP #1 Switch #4 to the default value.</p> <p>Replace switch actuator or faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	5	1	N/A	<p>AGSP #1 Switch #5, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #5 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	5	2	N/A	<p>AGSP #1 Switch #5, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #5 to the default value.</p> <p>Replace faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	5	3	N/A	<p>AGSP #1 Switch #5, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #5 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	5	4	N/A	<p>AGSP #1 Switch #5, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #5 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	5	5	N/A	<p>AGSP #1 Switch #5, This switch should be empty but one or both of the microswitches is pressed.</p> <p>The ESC sets the status of AGSP #1 Switch #5 to the default value.</p> <p>Replace switch actuator or faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	6	1	N/A	<p>AGSP #1 Switch #6, microswitch inputs are in an invalid state. Both microswitches are not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #6 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	6	2	N/A	<p>AGSP #1 Switch #6, microswitch inputs are in an invalid state. Both microswitches are depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #6 to the default value.</p> <p>Replace faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2040	14	6	3	N/A	<p>AGSP #1 Switch #6, microswitch inputs are in an invalid state. Top microswitch depressed, bottom microswitch not depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #6 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	6	4	N/A	<p>AGSP #1 Switch #6, microswitch inputs are in an invalid state. Top microswitch not depressed, bottom microswitch depressed.</p> <p>The ESC sets the status of AGSP #1 Switch #6 to the default value.</p> <p>Replace switch actuator</p> <p>Refer to the AGSP Preliminary System Check (See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2040	14	6	5	N/A	<p>AGSP #1 Switch #6, This switch should be empty but one or both of the microswitches is pressed.</p> <p>The ESC sets the status of AGSP #1 Switch #6 to the default value.</p> <p>Replace switch actuator or faulty microswitch</p> <p>Refer to the AGSP Preliminary System Check(See AGSP PRELIMINARY SYSTEM CHECK, page 162) section of this manual.</p>
2209	14	1	1	N/A	<p>Remote Engine Speed Control Module Digital Output #1 - Output failure</p> <p>Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).</p>
2209	14	1	4	N/A	<p>Remote Engine Speed Control Module Digital Output #1 - Data mismatch</p> <p>Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2209	14	2	1	N/A	Remote Engine Speed Control Module Digital Output #2 - Output failure Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	2	4	N/A	Remote Engine Speed Control Module Digital Output #2 - Data mismatch Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	3	1	N/A	Remote Engine Speed Control Module Digital Output #3 - Output failure Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	3	4	N/A	Remote Engine Speed Control Module Digital Output #3 - Data mismatch Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	4	2	N/A	Remote Engine Speed Control Module Analog Input #1 - Shorted to Battery Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	4	3	N/A	Remote Engine Speed Control Module Analog Input #1 - shorted to ground. Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	5	2	N/A	Remote Engine Speed Control Module Analog Input #2 - Shorted to Battery Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	5	3	N/A	Remote Engine Speed Control Module Analog Input #2 - shorted to ground. Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2209	14	5	4	N/A	Remote Engine Speed Control Module Analog Input #2 - Data mismatch Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2209	14	6	1	N/A	Remote Engine Speed Control Module Vbat Supply-Output Failure Refer to Remote Engine Speed Control Module(See REMOTE ENGINE SPEED CONTROL MODULE (RESCM), page 407).
2225	14	1	1	N/A	RPM #1 output pin A over current The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - connected to zero volt reference) Short to ground or overload Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
2225	14	2	1	N/A	RPM #1 output pin B over current The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - connected to zero volt reference) Short to ground or overload Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.
2225	14	3	1	N/A	RPM #1 output pin C over current The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - connected to zero volt reference) Short to ground or overload Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2225	14	4	1	N/A	<p>RPM #1 output pin D over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - connected to zero volt reference)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2225	14	5	1	N/A	<p>RPM #1 output pin E over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - connected to zero volt reference)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2225	14	6	1	N/A	<p>RPM #1 output pin H over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - connected to zero volt reference)</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2226	14	1	1	N/A	<p>RPM #2 output pin A over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - connected to zero volt reference, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2226	14	2	1	N/A	<p>RPM #2 output pin B over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - connected to zero volt reference, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2226	14	3	1	N/A	<p>RPM #2 output pin C over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - connected to zero volt reference, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2226	14	4	1	N/A	<p>RPM #2 output pin D over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - connected to zero volt reference, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2226	14	5	1	N/A	<p>RPM #2 output pin E over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - connected to zero volt reference, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2226	14	6	1	N/A	<p>RPM #2 output pin H over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - connected to zero volt reference, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2228	14	1	1	N/A	<p>RPM #4 output pin A over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - connected to zero volt reference, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2228	14	2	1	N/A	<p>RPM #4 output pin B over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - connected to zero volt reference, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2228	14	3	1	N/A	<p>RPM #4 output pin C over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - connected to zero volt reference, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2228	14	4	1	N/A	<p>RPM #4 output pin D over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - connected to zero volt reference, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2228	14	5	1	N/A	<p>RPM #4 output pin E over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - connected to zero volt reference, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2228	14	6	1	N/A	<p>RPM #4 output pin H over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - connected to zero volt reference, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2231	14	1	1	N/A	<p>RPM #7 output pin A over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2231	14	2	1	N/A	<p>RPM #7 output pin B over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2231	14	3	1	N/A	<p>RPM #7 output pin C over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2231	14	4	1	N/A	<p>RPM #7 output pin D over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2231	14	5	1	N/A	<p>RPM #7 output pin E over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>
2231	14	6	1	N/A	<p>RPM #7 output pin H over current</p> <p>The output behaves like a 20 amp type III circuit breaker. (MS3 - open circuit, MS2 - open circuit, MS1 - open circuit)</p> <p>Short to ground or overload</p> <p>Refer to the Remote Power Module(See REMOTE POWER MODULE, page 753) section of this manual.</p>

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2234	14	1	1	N/A	Remote Air Solenoid Module #2 - Output #1 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	1	2	N/A	Remote Air Solenoid Module #2 - Output #1 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	1	3	N/A	Remote Air Solenoid Module #2 - Output #1 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	1	4	N/A	Remote Air Solenoid Module #2 - Output #1 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2234	14	2	1	N/A	Remote Air Solenoid Module #2 - Output #2 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	2	2	N/A	Remote Air Solenoid Module #2 - Output #2 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	2	3	N/A	Remote Air Solenoid Module #2 - Output #2 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2234	14	2	4	N/A	Remote Air Solenoid Module #2 - Output #2 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2234	14	3	1	N/A	Remote Air Solenoid Module #2 - Output #3 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	3	2	N/A	Remote Air Solenoid Module #2 - Output #3 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	3	3	N/A	Remote Air Solenoid Module #2 - Output #3 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	3	4	N/A	Remote Air Solenoid Module #2 - Output #3 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2234	14	4	1	N/A	Remote Air Solenoid Module #2 - Output #4 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	4	2	N/A	Remote Air Solenoid Module #2 - Output #4 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2234	14	4	3	N/A	Remote Air Solenoid Module #2 - Output #4 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	4	4	N/A	Remote Air Solenoid Module #2 - Output #4 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2234	14	5	1	N/A	Remote Air Solenoid Module #2 - Output #5 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	5	2	N/A	Remote Air Solenoid Module #2 - Output #5 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	5	3	N/A	Remote Air Solenoid Module #2 - Output #5 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	5	4	N/A	Remote Air Solenoid Module #2 - Output #5 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2234	14	6	1	N/A	Remote Air Solenoid Module #2 - Output #6 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.

Table 352 Diagnostic Trouble Code (DTC) List (cont.)

SPN	FMI	Byte 7	Byte 8	ESC Connector and Pin #	Condition Description/Comments/Probable Cause(s)
2234	14	6	2	N/A	Remote Air Solenoid Module #2 - Output #6 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	6	3	N/A	Remote Air Solenoid Module #2 - Output #6 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	6	4	N/A	Remote Air Solenoid Module #2 - Output #6 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.
2234	14	7	1	N/A	Remote Air Solenoid Module #2 - Output #7 - Valve ON when commanded OFF. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	7	2	N/A	Remote Air Solenoid Module #2 - Output #7 - Valve OFF when commanded ON. Refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	7	3	N/A	Remote Air Solenoid Module #2 - Output #7 - Open Circuit coil or valve not installed. Install solenoid or refer to the Testing Individual Solenoids(See TESTING INDIVIDUAL SOLENOIDS, page 746) section of this manual.
2234	14	7	4	N/A	Remote Air Solenoid Module #2 - Output #7 - Unknown remote air solenoid. An air Solenoid is installed in this position but is not configured. Refer to the Air Solenoid (7-Pack)(See REMOTE AIR SOLENOID MODULE (7-PACK), page 742) section of this manual.

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