

ABBREVIATIONS

ABS	Antilock Brake System
A/C	Air Conditioning
ACB	Adaptive Cruise Braking
ACM	Aftertreatment Control Module
AFSS	Automatic Fire Suppression System
ATC	Automatic Traction Control (Bendix)
CECM	Chassis Electronic Control Module
DCDL	Driver Controlled Differential Lock
DDR	Diagnostic Data Reader
DEF	Diesel Exhaust Fluid
DID	Driver Information Display
D-MIC	Driver Microphone
DPF	Diesel Particulate Filter
DTC	Diagnostic Troubleshooting Code
ECM	Electronic Control Module
ECU	Electronic Control Unit
EECU	Engine Electronic Control Unit
EGR	Exhaust Gas Recirculation
ELD	Electronic Logging Device
ESC	Electronic Stability Control
ESC	Escape
ESP	Electronic Stability Program (Bendix)
E+	Eco-Roll
FDA	Following Distance Alert
GAW	Gross Axle Weight
GECU	Gear Selector Electronic Control Unit
G-MIC	Guide Microphone
GVW	Gross Vehicle Weight
HVAC	Heating, Ventilation And Air Conditioning
IA	Impact Alert
IFS	Independent Front Suspension
LED	Light Emitting Diode
LLS	Level Low System
MCM	Master Chassis Module
MPH	Miles Per Hour
PPT	Premium Tech Tool
PRIME	Power Recovery By Intelligent Management Of Energy
PTO	Power Take Off
SCR	Selective Catalytic Reduction
TCM	Transmission Control Module
TCS	Traction Control System
TECU	Transmission Electronic Control Unit
TPMS	Tire Pressure Monitoring System
TWS	Threshold Warning System
ULSD	Ultra Low Sulfur Diesel

10-2 Abbreviations

VCADS	Volvo Computer Assisted Diagnostic Sytem
VEB	Volvo Engine Brake
VECF	Vehicle Electrical Center Front
VECR	Vehicle Electrical Center Rear
VECU	Vehicle Electronic Control Unit
VSS	Video And Sound Selector
WCL	Wheelchair Lift

APPENDIX A

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A-2 Service Literature

SERVICE LITERATURE

Visit our web site at www.prevostcar.com for on-line product information and technical publications!

Additional copies of the following service literature are available on request and at low cost. These can be helpful to mechanics and drivers alike.

- Maintenance Manual
- Operator's Manual
- Parts Manual
- Service Center Directory

To order, call Prevost Parts toll free 1-800-463-8876 or write to:

PREVOST PARTS

2955-A Watt Street
Sainte-Foy, (Quebec)
Canada G1X 3W1

Specify the complete vehicle serial number (VIN). Allow 30 days for delivery

NOTICE

DECLARATION OF THE MANUFACTURING DEFECTS TO THE GOVERNMENT OF THE UNITED STATES

If you believe that your vehicle has defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Prevost.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign.

However, NHTSA cannot become involved in individual problems between you, your dealer, or Prevost.

To contact NHTSA you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 366-0123 in Washington, D.C. area) or write to:

NHTSA
U.S. Department of Transportation
Washington, D.C. 20590

You can also obtain other information about motor vehicle safety from the Hotline.

DECLARATION OF THE MANUFACTURING DEFECTS TO THE CANADIAN GOVERNMENT

If you live in Canada, and if you believe that your vehicle has a safety defect, you should immediately inform Transport Canada and Prevost. You may write to:

**Transport Canada
Box 8880
Ottawa, Ontario, K1G 3J2**

DECLARATION OF THE MANUFACTURING DEFECTS TO PREVOST

In addition to NHTSA (or Transport Canada) notification, please contact Prevost at 1-418-831-2046. Or write to:

**Prevost
After-sales service department
850 ch. Olivier,
Lévis (Quebec)
Canada, G7A 2N1**

APPENDIX B

MULTIPLEX TROUBLESHOOTING GUIDE 2

B-2 Multiplex Troubleshooting

MULTIPLEX TROUBLESHOOTING GUIDE

Problem / Symptom	Probable Causes	Actions
Vehicle does not Start from the dashboard	<p>The Engine Stop pushbutton located on the rear start panel is depressed</p> <p>Main electrical shut-off switch is in the OFF position</p>	<ol style="list-style-type: none"> 1. Twist and pull the Engine Stop pushbutton to place it in normal operating position, check that the main electrical shut-off switch is in the ON position and retry cranking from the ignition switch 2. Start the vehicle from the engine compartment using the rear start button
Vehicle does not Start from the dashboard <i>and</i> from the rear	<p>DL0 (BBUS MUX) network problem (Multiplex)</p> <p>Module AE52 not powered or is defective</p> <p>Engine ECM does not receive the ignition signal</p> <p>Engine ECM is not powered</p>	<ol style="list-style-type: none"> 1. Verify that module AE52 is powered: <ol style="list-style-type: none"> a. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA52, Active”, indicates a power problem on the module or a DL0 (BBUS MUX) network problem. b. Check / reset circuit breaker CB5 c. Check / replace fuse F65 d. Probe gray connector on module to see if it is powered. 2. Verify that the engine ECM is powered and gets the ignition signal <ol style="list-style-type: none"> a. Check / reset circuit breaker CB8 Check / replace fuse F74 b. Check / reset circuit breaker CB2 Check / replace fuse F78

Problem / Symptom	Probable Causes	Actions
<p>None of the Multiplexed functions are operating, including the basic limp-home functions (door opening, flashers, wipers in speed 1)</p> <p>“FLIP REAR BREAKER TO INITIATE I/O MODULES PROGRAMMING” pop-up message appears in the DID</p> <p>Note: The sunshades are still functioning since these are not multiplexed</p>	<p>The program version in the MCM is different than the program in the I/O modules and the MCM is forcing all I/O modules to stay inactive</p>	<ol style="list-style-type: none"> Engage the auto-programming of the I/O modules: Turn the ignition key to the ON position, trip and reset circuit breaker CB6. The DID indicates "MUX AUTOPROGRAMMING I/O MODULE PLEASE WAIT" until the reprogramming is complete.
<p>Many of the non-essential secondary functions are not functioning (interior lighting, driver's area lighting, wiper speed 2 and intermittent). Marker lights and clearance lights are turned ON when setting ignition to the ON position.</p>	<p>The MCM module does not receive 24 V power.</p> <p>The DL0 (BBUS MUX) network is not working. It could be caused by a short on the network, an open circuit, a problem with the MCM or the MCM being disconnected from the network.</p>	<ol style="list-style-type: none"> Check / reset circuit breaker CB6. Check / replace fuse F1 Operate in limp-home mode by starting the vehicle from the engine compartment (REAR START). All functions essential to drive are available <p>To close and lock the door, pull the door manually up to its closed position and it will lock by itself. The door opening button is still functioning</p>
<p>No temperature control in the passenger area</p> <p>Passenger temperature display indicates two dashes "--"</p>	<p>Problem with the temperature sensor located in the evaporator compartment air intake or the sensor wiring</p>	<p>Instruct the driver to manually control the temperature by playing with the passenger set point. Set above 22°C (72°F) to heat and below 22° C (72°F) to cool</p>

B-4 Multiplex Troubleshooting

Problem / Symptom	Probable Causes	Actions
<p>Entrance door does not open nor close using the control buttons</p> <p>Defroster fan not functioning</p> <p>Windshield wipers not functioning in speed 1 or intermittent</p>	<p>Module AE47 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA47, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB1 3. Check / replace fuse F45 4. Probe gray connector on module to see if it is powered. 5. Use the air release valves near the entrance door and in the front service compartment to lock / unlock the door
<p>Windshield wipers not functioning in speed 1 or intermittent</p>	<p>No power on R27</p>	<p>Check CB48 (VECF)</p>
<p>HVAC condenser fans not functioning in speed 1</p>	<p>Circuit breaker CB7 tripped</p>	<p>Check / reset circuit breaker CB7</p>
<p>HVAC condenser fans not functioning in speed 2</p>	<p>Circuit breaker CB7 tripped</p>	<p>Check / reset circuit breaker CB7</p> <p>Check / replace fuse F135</p>
<p>Windshield washer not functioning</p> <p>Windshield upper section de-icing system not functioning</p>	<p>Module AE44 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA44, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB1 3. Check / replace fuse F44 4. Probe gray connector on module to see if it is powered.

Multiplex Troubleshooting B-5

Problem / Symptom	Probable Causes	Actions
Defroster fan is functioning but no heat or cooling available in the driver area.	Module AE47 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA47, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB1 3. Check / replace fuse F45 4. Probe gray connector on module to see if it is powered.
<p>Low beam headlamps and front flasher on left side not functioning</p> <p>Electric horn not functioning</p>	Module AE46 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA46, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB10 3. Check / replace fuse F19 4. Probe gray connector on module to see if it is powered.
Low beam headlamps and flasher on right side not functioning	Module AE48 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA48, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB10 3. Check / replace fuse F21 4. Probe gray connector on module to see if it is powered.

B-6 Multiplex Troubleshooting

Problem / Symptom	Probable Causes	Actions
<p>Rear flashers not functioning</p> <p>Stoplights and center stoplights not functioning</p>	<p>Module AE51 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA51, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce this symptom). 2. Check / reset circuit breaker CB8 3. Check / replace fuse F107 4. Probe gray connector on module to see if it is powered.
<p>Engine is overheating and radiator fans do not engage</p>	<p>Module AE52 or AE49 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA52/ ModA49, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce this symptom). 2. Check circuit breaker CB5 3. Check / replace fuse F133, F134 4. CB201-CB208
<p>The A/C compressor clutch does not engage</p>	<p>Module AE54 (or AE52) is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message “No Response ModA54, Active” indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce this symptom). 2. Check / reset circuit breaker CB5 3. Check / replace fuse F135 4. Probe gray connector on module to see if it is powered.

Multiplex Troubleshooting B-7

Problem / Symptom	Probable Causes	Actions
Evaporator fan not functioning	<p>Circuit breaker CB3 tripped</p> <p>Module AE54 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check circuit breaker CB3 2. Check relay R12 3. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message "No Response ModA54, Active" indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce this symptom). 4. Check / reset circuit breaker CB5 5. Check / replace fuse F135 6. Probe gray connector on module to see if it is powered.
HVAC condenser fans not functioning in speed 1	Module AE54 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the DIAGNOSTICS menu of Driver Information Display (DID). Select VIEW ACTIVE FAULTS and ELECTRICAL. The message "No Response ModA54, Active" indicates a power problem on the module. (A DL0 (BBUS MUX) network problem would show the same message but doesn't produce this symptom). 2. Check / reset circuit breaker CB5 3. Check / replace fuse F135 4. Check / replace fuse F141-F144 5. Probe gray connector on module to see if it is powered.
Sound system not functioning	Circuit breaker CB11 tripped	<ol style="list-style-type: none"> 1. Check CB11 2. Check / replace fuse F148, F200
Fire alarm telltale light and audible alarm always ON and there is no fire or high temperature in the engine compartment	Short-circuited fire sensor or defective sensor	Prior to start the vehicle, cycle the ignition key to the ON position, OFF position and then ON position again and then start the vehicle. This will deactivate the fire alarm function. This has to be repeated each time the vehicle is restarted.

B-8 Multiplex Troubleshooting

Problem / Symptom	Probable Causes	Actions
The vehicle is parked and the electrical horn is activated to indicate a fire in the engine compartment but there is no fire	Short-circuited fire sensor or defective sensor	Cycle the ignition key between the ON and OFF position twice within 3 seconds. This will deactivate the fire alarm function. This has to be repeated each time the vehicle is parked
A single light, a group of LED lights or another function of the vehicle is not functioning	The multiplex outputs are protected in current by an internal "soft fuse". When an output is shorted, it turns OFF and stays OFF until the "soft fuse" is reset	turn the ignition key to the OFF position and turn to the ON position again. This resets all "soft fuses"
No backlighting in the instrument cluster	Circuit breaker CB10 is tripped or fuse F10/F29 blown	<p>Check circuit breaker CB2, CB10</p> <p>Check / replace fuse F10, F29</p> <p>Check / replace relay R22, R23</p>
The radiator/CAC electric fans do not function and the engine is overheating		<p>You can manually engage the radiator/CAC fans half-speed (50%) or full speed (100%).</p> <ol style="list-style-type: none"> 1. On the Driver Information Display, select DIAGNOSTICS menu. Select VEHICLE TESTS submenu and then FORCE RADIATOR FAN SPEED 50% or FORCE RADIATOR FAN SPEED 100%. 2. The DID status line will show TEST to confirm the forced activation of the radiator fans. To cancel, turn the ignition switch to the OFF position or press ESCAPE button, select TERMINATE TESTS & FORCED STATES submenu and then press ENTER button twice. TEST will disappear from the DID status line.

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C-2 Allison Transmission Other Features

OIL LEVEL CHECK USING THE PUSHBUTTON SHIFT SELECTOR

The oil level sensor (OLS) is standard in your transmission. With the OLS and Allison 5th generation shift selector, you can get a more accurate electronic fluid level check than with a dipstick.

Oil level codes are obtained as follows:

1. Park vehicle on a level surface, select «N» (neutral) on the pushbutton shift selector and apply parking brake.
2. Wait for at least 2 minutes to allow the oil to settle;
3. Press simultaneously the ▲ (Upshift) and ▼ (Downshift) arrow buttons once.
4. Oil level codes are displayed once the following parameters are met:
 - The vehicle has been stationary for approximately 2 minutes to allow the oil to settle;
 - Engine at idle;
 - Oil at normal operating temperature, between 104°F (40°C) and 220°F (104°C);
 - Transmission in «N» (Neutral);
 - Transmission output shaft stopped;
 - Oil level sensor present and working.

5. *Correct fluid level* is displayed as shown.



6. *Low fluid level* is displayed as shown. The number indicates the number of quarts of fluid the transmission requires.



7. *High fluid level* condition with the number of quarts in excess is displayed as shown.



NOTE

Confirm a low fluid level condition by making a manual fluid level check.

8. To exit the Oil Level Display Mode, press any range button «R», «N» or «D» at any time.

NOTE

Note that the quantities LO 4 and HI 3 are the largest values displayed and that the actual variation in oil level may exceed these numbers.

If the fluid level check cannot be completed, an Invalid for Display fault is reported. Refer to table below to review the codes and conditions.

CODE	CAUSE OF FAULT CODE
SETTLING OK	Settling time too short
ENG RPM TOO LOW	Engine speed (rpm) too low
ENG RPM TOO HIGH	Engine speed (rpm) too high
MUST BE IN NEU	N (Neutral) must be selected
OIL TEMP TOO LOW	Sump fluid temperature too low
OIL TEMP TOO HIGH	Sump fluid temperature too high
VEH SPD TOO HI	Output shaft speed
SENSOR FAILED	Sensor failure

CONTROL SYSTEM PROGNOSTICS

The transmission control system includes the provision for the user to monitor various transmission operating parameters. Transmission operating parameters monitored by the prognostics feature are:

- Oil Life Monitor
- Filter Life Monitor
- Transmission Health Monitor

NOTE


The prognostics package requires the use of **TranSynd™** or an Allison approved **TES295** or **TES389** licensed fluid in the transmission and **Allison High Capacity filters**.



If any other fluids or filters are used, Prognostic mode must be **disabled**.

Prognostic information will not be accurate with any other fluids or filters and could result in missed maintenance activities resulting in transmission damage.




Refer to TES 295 or TES389 Approved Fluids list, found under the Service/Fluids heading on the home page of the Allison Transmission web site.

www.allisontransmission.com

When a specified threshold is detected for any of the serviceable conditions, the TRANSMISSION SERVICE indicator  is illuminated to alert the operator. Failure to attend to the service condition and reset the TRANSMISSION SERVICE indicator within a defined operating period will result in illumination of the CHECK light with associated message in the DID, indicating the increased probability that the service condition will develop into a more serious condition.

To access the Prognostic Mode functions, simultaneously press the  (Upshift) and  (Downshift) arrow buttons repeatedly. See the at the end of this section.

NORMAL PROGNOSTICS INDICATION AT ENGINE START

- A system bulb check illuminates the TRANSMISSION SERVICE indicator  approximately 0.5 seconds.
- If Prognostics features are enabled, the TRANSMISSION SERVICE indicator  illuminates again for 3 seconds after the bulb check. If Prognostics features are disabled, the TRANSMISSION SERVICE indicator  does not illuminate again after the bulb check.


OIL LIFE MONITOR

The display message denotes the calculated remaining life of the transmission fluid. This value is based on the established life for the required baseline fluid, and then is continuously adjusted for

cumulative effects of such operating parameters as operating time, retarder operation, output shaft revolutions and shift frequency.

Display

The display is a two-digit number, denoting percentage of the fluid life which remains. New fluid is displayed as 99%.

The TRANSMISSION SERVICE indicator  will be illuminated, denoting a required change of transmission fluid, when the remaining fluid life reaches approximately 1 %. The indicator will be lit steadily upon each initialization of the TCM, and will remain on steady for approximately 2 minutes after the first selection of "D" (drive) range each time, until service is performed and the indicator is reset.

Failure to perform maintenance and reset the TRANSMISSION SERVICE indicator within a defined period will result in the illumination of the CHECK light with associated message in the DID and diagnostic code P0897 Transmission Fluid Deteriorated.

Reset

The TRANSMISSION SERVICE indicator can be reset by a message over the SAE J1939 communication interface, with the Allison DOC™ for PC diagnostic program, or by depressing and holding the MODE button for ten (10) seconds while the Oil Life Monitor function is displayed. It may also be reset by selecting N-D-N-D-N-R-N on the shift selector, pausing briefly (less than 3 seconds) between each selector movement, with the ignition ON and the engine not running. The TRANSMISSION SERVICE indicator illuminates briefly following a reset to acknowledge the reset was successful.

Setting Fluid Type For Prognostics

The fluid type can be programmed if the specific calibration allows it. The operator can do the following:

With the engine off and the ignition on, perform the following sequence on the selector, N-R-N-D-N-R-N-D-N-R-N-D-N.

The TRANSMISSION SERVICE indicator flashes if TES389 is the current setting and illuminates solidly if TES295 is the current setting. To change the transmission fluid type, wait 5 seconds after entering transmission fluid type mode and perform the following sequences to select the proper transmission type:

C-4 Allison Transmission Other Features

N-R-N to select TES295

N-D-N to select TES389

The selector exits 30 seconds after entering transmission fluid type mode or the ignition may be turned off to exit earlier. Only one transmission fluid type selection may be made after entering transmission fluid type mode. All other attempts will be ignored. Transmission fluid type mode needs to be entered again if the wrong type of fluid is selected.



CAUTION

Verify prognostic fluid type setting matches transmission fluid type. Oil Life Monitor notifications will be inaccurate when mismatched. This could result in transmission damage from running a TES389 fluid too long or cause shortened TES295 fluid changes to occur.



CAUTION


Required calendar-based oil & filter change intervals (based on months) still apply because Oil Life Monitor function cannot measure time while ignition power is OFF.

If the Oil Life Monitor function has not indicated the need for a fluid change before 60 months have passed when using TES295 fluid type or before 24 months have passed when using TES389 fluid type, it will be necessary to change the fluid and filters per calendar requirements and reset the system.


FILTER LIFE MONITOR

This feature provides an alert when the transmission's fluid filters need to be replaced. It helps extend filter change intervals to reduce routine maintenance downtime while providing maximum protection for the transmission.


The filter life indicator pressure switch signals the transmission control module when fluid exiting the main filter drops below a predetermined pressure.

Both the main and lube filters must be changed when the TRANSMISSION SERVICE indicator  shows the main filter should be changed.

Filter Change Notification



The TRANSMISSION SERVICE indicator  will flash for 2 minutes after the first selection of "D"


(drive) range. Once the Filter Monitor mode has been accessed via the shift selector, the "OIL FILTER OK" or "REPLACE FILTERS" message is displayed in the selector display window. An acceptable filter life status is displayed as "OIL FILTER OK". An unacceptable filter life status is displayed as "REPLACE FILTERS".

Once the programmed threshold for maximum filter pressure drop has been observed and verified, the diagnostic code P088A Transmission Filter Maintenance Alert will be recorded to indicate that the filter has reached the end of its designed life. At the next initialization of the TCM, the TRANSMISSION SERVICE indicator  will flash for 2 minutes after the first selection of "D" (drive) range. Thereafter, the indicator will illuminate and flash upon each TCM initialization, continuing to flash for 2 minutes after the first selection of a drive range each time, until service is performed and the indicator is reset.

Failure to perform maintenance and reset the monitor after a calibration-defined number of warnings will result in the illumination of the CHECK light with associated message in the DID and diagnostic code P088B will be recorded to indicate a highly deteriorated filter.

Read And Reset Filter Life Monitor From Selector

To enter the filter life monitor, press simultaneously the  (Upshift) and  (Downshift) arrows three times. An acceptable filter life status is displayed as "OIL FILTER OK". An unacceptable filter life status is displayed as "REPLACE FILTERS".

The feature will reset automatically when the main fluid filter has been changed and the pressure drop across the filter no longer exceeds the threshold value. A manual reset can be performed by depressing and holding the MODE button for ten (10) seconds while the Filter Life Monitor function is displayed. It may also be reset by selecting N-R-N-R-N-D-N on the shift selector, pausing briefly (less than 3 seconds) between each selector movement, with the ignition ON and the engine not running. The TRANSMISSION SERVICE indicator  illuminates briefly following a reset to acknowledge the reset was successful.

TRANSMISSION HEALTH MONITOR

This prognostic feature determines clutch life status of the transmission's clutches and alerts you when

clutch maintenance is required. The clutch life status is determined by monitoring changes and the calculated running clearance of the transmission clutches.

Clutch Maintenance Notification

The transmission health monitor feature determines when clutch maintenance is needed. If any of the clutches (except lockup) reaches a remaining life of approximately 10% or if any of the clutch running clearances exceeds a maximum value, then the TRANSMISSION SERVICE indicator is steadily illuminated from just after ignition on until ignition is turned off. Thereafter, the indicator will be lit upon each initialization of the TCM, and will remain on steady during all vehicle operation until service is performed and the indicator is reset. If the transmission health monitor mode has been accessed via the shift selector, a "TRANS HEALTH OK" or "TRANS HEALTH LO" is displayed. An acceptable clutch life status is displayed as "TRANS HEALTH OK". An unacceptable clutch life status is displayed as "TRANS HEALTH LO".

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Read And Reset Transmission Health Monitor From Selector

To enter the transmission health monitor, press simultaneously the ▲ (Upshift) and ▼ (Downshift) arrows four times. An acceptable clutch life status is displayed as "TRANS HEALTH OK". An unacceptable clutch life status is displayed as "TRANS HEALTH LO".

The feature will reset automatically upon elimination of the clutch clearance condition which initiated it. The indicator can also be manually reset using the Allison DOC™ for PC diagnostics program if necessary.

▲(Upshift) & ▼ (Downshift) arrow buttons pressed simultaneously *	Description	Message	
1 st press	Allison transmission oil level check		
2 nd press	Oil Life Monitor	" O "	" M "
	Oil life remaining will range from 99% down to 00%	Some number from 9 to 0	Some number from 9 to 0
3 rd press	Filter Life Monitor	" F "	" M "
	Present life of filter is acceptable	OIL FILTER OK	
	Present life of filter is unacceptable	REPLACE FILTERS	
4 th press	Transmission Health Monitor	" T "	" M "
	An acceptable clutch life status is displayed as "TRANS HEALTH OK"	TRANS HEALTH OK	
	An unacceptable clutch life status is displayed as "TRANS HEALTH LO"	TRANS HEALTH LO	
5 th press	Display of diagnostic codes		

* With the engine off and ignition on.

DIAGNOSTIC TROUBLESHOOTING CODES (DTC) — ALLISON 5TH GENERATION CONTROLS

Diagnostic features are provided with the transmission control system to assist in troubleshooting of malfunctions and/or the monitoring of specific operating parameters.

DIAGNOSTIC TROUBLESHOOTING CODES (DTC) OVERVIEW

When a control system malfunction is detected, a series of Diagnostic Trouble Codes (DTCs) are used to identify and clarify the nature of the malfunction. These DTCs are each named by a 5 character alphanumeric string that refers to a diagnostic algorithm running pass/fail tests to help identify a malfunction in the transmission or vehicle operation. Most DTCs have some kind of diagnostic response that the operator notices, such as an illuminated CHECK light, selector display change, lock in range, or inhibit shifts condition.

DTCs are logged in the Transmission Control Module (TCM) memory by severity and by their active/inactive status with the most severe and active codes listed first. A maximum of five DTCs (numbered d1- d5) from most recent to oldest may be read from the shift selector. As DTCs are added, the oldest inactive DTC (historic) is dropped from the list. If all DTCs are active, the DTC with the lowest priority is dropped from the list.

An active code is any code that is current in the TCM decision-making process and has failed the DTC test(s) associated with that specific diagnostic algorithm. Historical codes, which are by definition inactive, are codes that are no longer failing their algorithm but are retained in the TCM in order to help the technician analyze possible causes and provide them direction if the vehicle is brought in before they are cleared from the queue.

DTCs can be cleared manually by the operator or they clear automatically from last (d5) to first (d1) in the queue after a number of engine starts, without becoming active again.

USING SHIFT SELECTOR FOR ACCESSING DIAGNOSTIC INFORMATION

DTCs can be displayed on the display portion of the shift selector. A DTC is either active or historic. An active DTC is a DTC that is current in the TCM decision-making process. Historic DTCs are retained in the TCM memory and do not necessarily affect the TCM decision-making process.

Display Sequence

Up to five DTCs may be displayed one at a time from the selector once the diagnostic display mode has been initiated by the operator. Each DTC is 5 characters in length. The DTC status active or inactive is shown below the DTC.



Shows active DTC P0730

The operator presses the MODE button to read the next OTC in the queue (if any) or requests to exit diagnostics mode. The diagnostic mode times out and returns the selector to normal operating mode after approximately 10 minutes of operator inactivity.

C-8 Allison Transmission Other Features

DIAGNOSTIC CODE DISPLAY AND CLEARING PROCEDURE

Diagnostic codes can be read and cleared by two methods:

- Using an Allison DOC™ diagnostic tool. For specific instructions on how to use an Allison DOC™ diagnostic tool, refer to the User Guide.
- Using the pushbutton shift selector.

To begin the diagnostic process:

1. Bring the vehicle to a stop at a safe location.
2. Apply the parking brake.

To display stored codes:

1. Simultaneously press the ▲ (Upshift) and ▼ (Downshift) arrow buttons five times (Prognostics enabled) to access the Diagnostic Display Mode. With Prognostics disabled, press the ▲ (Upshift) and ▼ (Downshift) arrow buttons twice.
2. Press the MODE button to read the next code in the queue, if any.

To clear all active stored codes:

While in Diagnostic Mode, clear all active codes by pressing and holding the MODE button for approximately three seconds until the MODE message flashes. Release the MODE button. The MODE message should not remain illuminated if the active DTC shown in the display has cleared.

While in Diagnostic Mode, press and hold the MODE button for 10 seconds to clear both active codes and inactive codes. The MODE message flashes a second time indicating all codes are cleared from the queue.

EXITING DIAGNOSTIC MODE

Exit the diagnostic mode by one of the following methods:

1. Press simultaneously the ▲ (Upshift) and ▼ (Downshift) arrow buttons at the same time on the push button shift selector.
2. Press any range button «D», «N» or «R» on the push button shift selector.
3. After approximately 10 minutes of inactivity at the push button shift selector, the diagnostic mode automatically exits and returns to normal operating mode.
4. Turn off power to the TCM (shut off the engine using the ignition key).

NOTE
<i>Be sure to record all codes displayed before they are cleared. This is essential for troubleshooting.</i>

NOTE
<i>If clearing a code while locked in a «D» (Drive) or «R» (Reverse) position (fail-to-range), the transmission will still be in «D» (Drive) or «R» (Reverse) when the clearing procedure is completed. «N» (Neutral) must be manually selected.</i>

DIAGNOSTIC TROUBLE CODE RESPONSE

The electronic control system is programmed to inform the operator of a problem with the transmission system via the CHECK light and shift selector display while it automatically takes action to protect the operator, vehicle, and transmission. When the Transmission Control Module (TCM) flags a Diagnostic Trouble Code (DTC) as active, the TCM may take a combination of diagnostic responses as listed in the table below.

RESPONSE CATEGORY	ACTIONS TAKEN
DNS - Do Not Shift	Release lock up (LU) clutch and inhibit lock up operation. Inhibit shifts from the current attained range. Turn on the CHECK light. Display the current attained range in the MONITOR window of the shift selector. Blank the SELECT window of the shift selector. Ignore any range selection inputs from the shift selector.
SOL OFF - Solenoid OFF	All solenoids are commanded off, resulting in hydraulic default operation of the transmission – PCS1 & PCS2 are on hydraulically when off electrically.
RPR - Return to Previous Range	When the speed sensor ratio or PS1 tests do not pass, the TCM commands the same range as commanded before the shift.
NNC - Neutral No Clutches	When certain speed sensor ratio or PS1 tests do not pass, the TCM commands a neutral condition with no clutches applied.
DNA - Do Not Adapt	The TCM stops adaptive shift control while the code is active.

C-10 Allison Transmission Other Features

DIAGNOSTIC TROUBLESHOOTING CODES (DTC) LIST - ALLISON 5TH GENERATION CONTROLS

DTC	Description	CHECK Light	Inhibited Operation Description
C1312	Retarder Request Sensor Failed Low	No	May inhibit retarder operation if not using J1939 datalink
C1313	Retarder Request Sensor Failed High	No	May inhibit retarder operation if not using J1939 datalink
P0122	Pedal Position Sensor Circuit Low Voltage	No	Use default throttle values. Freezes shift adapts.
P0123	Pedal Position Sensor Circuit High Voltage	No	Use default throttle values. Freezes shift adapts.
P0218	Transmission Fluid Over Temperature	Yes	Use default sump temp
P0562	System Voltage Low	No	Inhibit TCC Operation, DNA
P0602	TCM Not Programmed	Yes	Lock in Neutral
P0604	Control module random access memory (RAM)	Yes	Lock in Neutral
P0614	Torque Control Data Mismatch ECM/TCM	Yes	Allows operation only in reverse and second range.
P0634	TCM Internal Temperature Too High	Yes	SOL OFF (hydraulic default)
P0642	Sensor Reference Voltage "A" Circuit Low	Yes	Default sensor data used
P0643	Sensor Reference Voltage "A" Circuit High	Yes	Default sensor data used
P0657	Actuator Supply Circuit Voltage 1 Open (HSD 1)	Yes	SOL OFF, DNA, Inhibit TCC operation, Inhibit main modulation
P0658	Actuator Supply Voltage 1 (HSD1) Low	Yes	DNS, SOL OFF (hydraulic default)
P0659	Actuator Supply Voltage 1 (HSD1) High	Yes	DNS, SOL OFF (hydraulic default)
P0703	Brake Switch Circuit Malfunction	No	No Neutral to Drive shifts for refuse packer. TCM inhibits retarder operation if a TPS code is also active.
P0708	Transmission Range Sensor Circuit High Input	Yes	Ignore defective strip selector inputs
P070C	Transmission Fluid Level Sensor Circuit – Low Input	No	None
P070D	Transmission Fluid Level Sensor Circuit – High Input	No	None
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	Yes	Use default sump temp
P0713	Transmission Fluid Temperature Sensor Circuit High Input	Yes	Use default sump temp

Allison Transmission Other Features C-11

DTC	Description	CHECK Light	Inhibited Operation Description
P0715	Turbine Shaft Speed Sensor Circuit	Yes	DNS, Lock in current range
P0716	Turbine Shaft Speed Sensor Circuit Performance	Yes	DNS, Lock in current range
P0717	Turbine Shaft Speed Sensor Circuit No Signal	Yes	DNS, Lock in current range
P071A	RELS Input Failed On	Yes	Inhibit RELS operation
P071D	General Purpose Input Fault	Yes	None
P0720	Output Shaft Speed Sensor Circuit	Yes	DNS, Lock in current range
P0721	Output Shaft Speed Sensor Circuit Performance	Yes	DNS, Lock in current range
P0722	Output Speed Sensor Circuit No Signal	Yes	DNS, Lock in current range
P0725	Engine Speed Sensor Circuit	No	Default to turbine speed
P0726	Engine Speed Sensor Circuit Performance	No	Default to turbine speed
P0727	Engine Speed Sensor Circuit No Signal	No	Default to turbine speed
P0729	Incorrect 6 th Gear Ratio	Yes	DNS, Attempt 5 th , then 3 rd
P0731	Incorrect 1 st Gear ratio	Yes	DNS, Attempt 2 nd , then 5 th
P0732	Incorrect 2 nd Gear ratio	Yes	DNS, Attempt 3 rd , then 5 th
P0733	Incorrect 3 rd Gear ratio	Yes	DNS, Attempt 4 th , then 6 th
P0734	Incorrect 4 th Gear ratio	Yes	DNS, Attempt 5 th , then 3 rd
P0735	Incorrect 5 th Gear ratio	Yes	DNS, Attempt 6 th , then 3 rd , then 2 nd
P0736	Incorrect Reverse Gear ratio	Yes	DNS, Lock in Neutral
P0741	Torque Converter Clutch System Stuck Off	Yes	None
P0752	Shift Solenoid 1 Valve Performance-Stuck On	Yes	DNS
P0776	Pressure Control Solenoid (PCS) 2 Stuck Off	Yes	DNS, RPR
P0777	Pressure Control Solenoid 2 Stuck On	Yes	DNS, RPR
P0796	Pressure Control Solenoid 3 Stuck Off	Yes	DNS, RPR
P0797	Pressure Control Solenoid 3 Stuck On	Yes	DNS, RPR
P0842	Transmission Fluid Pressure Switch 1 Circuit Low	Yes	DNS, Lock in current range
P0843	Transmission Fluid Pressure Switch 1 Circuit High	Yes	DNS, Lock in current range
P0847	Transmission Fluid Pressure Switch 2 Circuit Low	Yes	None
P0848	Transmission Fluid Pressure Switch 2 Circuit High	Yes	None
P088A	Transmission Fluid Filter Maintenance Alert	No	None

C-12 Allison Transmission Other Features

DTC	Description	CHECK Light	Inhibited Operation Description
P088B	Transmission Fluid Filter Maintenance Required	No	None
P0880	TCM Power Input Signal	No	None
P0881	TCM Power Input Signal Performance	No	None
P0882	TCM Power Input Signal Low	Yes	DNS, SOL OFF (hydraulic default)
P0883	TCM Power Input Signal High	No	None
P0894	Unexpected Mechanical Gear Disengagement	Yes	DNS, Lock in first
P0897	Transmission Fluid Deteriorated	No	None
P0960	Main Pressure Modulator Solenoid Control Circuit Open	Yes	None
P0962	Main Pressure Modulator Solenoid Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0963	Main Pressure Modulator Solenoid Control Circuit High	Yes	None
P0964	Pressure Control Solenoid 2 (PCS2) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P0966	Pressure Control Solenoid 2 (PCS2) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0967	Pressure Control Solenoid 2 (PCS2) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P0968	Pressure Control Solenoid 3 (PCS3) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P0970	Pressure Control Solenoid 3 (PCS3) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0971	Pressure Control Solenoid 3 (PCS3) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P0973	Shift Solenoid 1 (SS1) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0974	Shift Solenoid 1 (SS1) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P0976	Shift Solenoid 2 (SS2) Control Circuit Low	Yes	7-speed: Allow 2 through 6, N, R Inhibit TCC operation
P0977	Shift Solenoid 2 (SS2) Control Circuit High	Yes	7-speed: Allow 2 through 6, N, R
P097A	Shift Solenoid 1 (SS1) Control Circuit Open	Yes	Lock in range
P097B	Shift Solenoid 2 (SS2) Control Circuit Open	Yes	7-speed: Allow 2 through 6, N, R

Allison Transmission Other Features C-13

DTC	Description	CHECK Light	Inhibited Operation Description
P0989	Retarder Pressure Sensor Circuit Low	No	None
P0990	Retarder Pressure Sensor Circuit High	No	None
P1739	Incorrect Low Gear Ratio	Yes	Command 2 nd and allow shifts 2 through 6, N, R
P1790	Gear Shift Module 1 Calibrated Invalid	Yes	Shift selector language or units incorrect
P1791	Gear Shift Module 2 Calibrated Invalid	Yes	Shift selector language or units incorrect
P1891	Throttle Position Sensor PWM Signal Low	No	Use default throttle values
P1892	Throttle Position Sensor PWM Signal High	No	Use default throttle values
P2184	Engine Coolant Temperature Sensor 2 Circuit Low Input	No	Use default engine coolant values
P2185	Engine Coolant Temperature Sensor 2 Circuit High Input	No	Use default engine coolant values
P2637	Torque Management Feedback Signal (A)	Yes	Inhibit SEM
P2641	Torque Management Feedback Signal (B)	Yes	Inhibit LRTP
P2669	Actuator Supply Circuit Voltage 2 Open (HSD2)	Yes	SOL OFF, Inhibit TCC operation, Inhibit Main modulation, ONA
P2670	Actuator Supply Voltage 2 (HSD2) Low	Yes	DNS, SOL OFF (hydraulic default)
P2671	Actuator Supply Voltage 2 (HSD2) High	Yes	DNS, SOL OFF (hydraulic default)
P2684	Actuator Supply Circuit Voltage 3 Open (HSD3)	Yes	SOL OFF, Inhibit TCC operation, Inhibit Main modulation, ONA
P2685	Actuator Supply Voltage 3 (HSD3) Low	Yes	DNS, SOL OFF (hydraulic default)
P2686	Actuator Supply Voltage 3 (HSD3) High	Yes	DNS, SOL OFF (hydraulic default)
P2714	Pressure Control Solenoid 4 (PCS4) Stuck Off	Yes	DNS, RPR
P2715	Pressure Control Solenoid 4 (PCS4) Stuck On	Yes	DNS, SOL OFF (hydraulic default)
P2718	Pressure Control Solenoid 4 (PCS4) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2720	Pressure Control Solenoid 4 (PCS4) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)

C-14 Allison Transmission Other Features

DTC	Description	CHECK Light	Inhibited Operation Description
P2721	Pressure Control Solenoid 4 (PCS4) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P2723	Pressure Control Solenoid 1 (PCS1) Stuck Off	Yes	DNS, RPR
P2724	Pressure Control Solenoid 1 (PCS1) Stuck On	Yes	DNS, RPR
P2727	Pressure Control Solenoid 1 (PCS1) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2729	Pressure Control Solenoid 1 (PCS1) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2730	Pressure Control Solenoid 1 (PCS1) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P2736	Pressure Control Solenoid 5 (PCS5) Control Circuit Open	Yes	Inhibit retarder operation
P2738	Pressure Control Solenoid 5 (PCS5) Control Circuit Low	Yes	Allow 2 through 6, N, R. Inhibit retarder and TCC operation
P2739	Pressure Control Solenoid 5 (PCS5) Control Circuit High	Yes	Inhibit retarder operation
P273F	Retarder Oil Temperature Sensor Over Temperature Condition	No	None
P2742	Retarder Oil Temperature Sensor Circuit – Low	No	Use default retarder temp values
P2743	Retarder Oil Temperature Sensor Circuit – High	No	Use default retarder temp values
P2761	TCC PCS Control Circuit Open	Yes	Inhibit TCC operation
P2763	TCC PCS Control Circuit High	Yes	Inhibit TCC operation
P2764	TCC PCS Control Circuit Low	Yes	7-speed: Allow 2 through 6, N, R. Inhibit TCC operation
P2789	Transmission Clutch Life Expired (Clutch Adaptive Learning at Limit)	No	None
P2793	Gear Shift Direction Circuit	Yes	Ignores PWM input from shift selector
P2808	Pressure Control Solenoid 6 (PCS6) Stuck Off	Yes	DNS, RPR
P2809	Pressure Control Solenoid 6 (PCS6) Stuck On	Yes	DNS, RPR
P2812	Pressure Control Solenoid 6 (PCS6) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2814	Pressure Control Solenoid 6 (PCS6) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)

Allison Transmission Other Features C-15

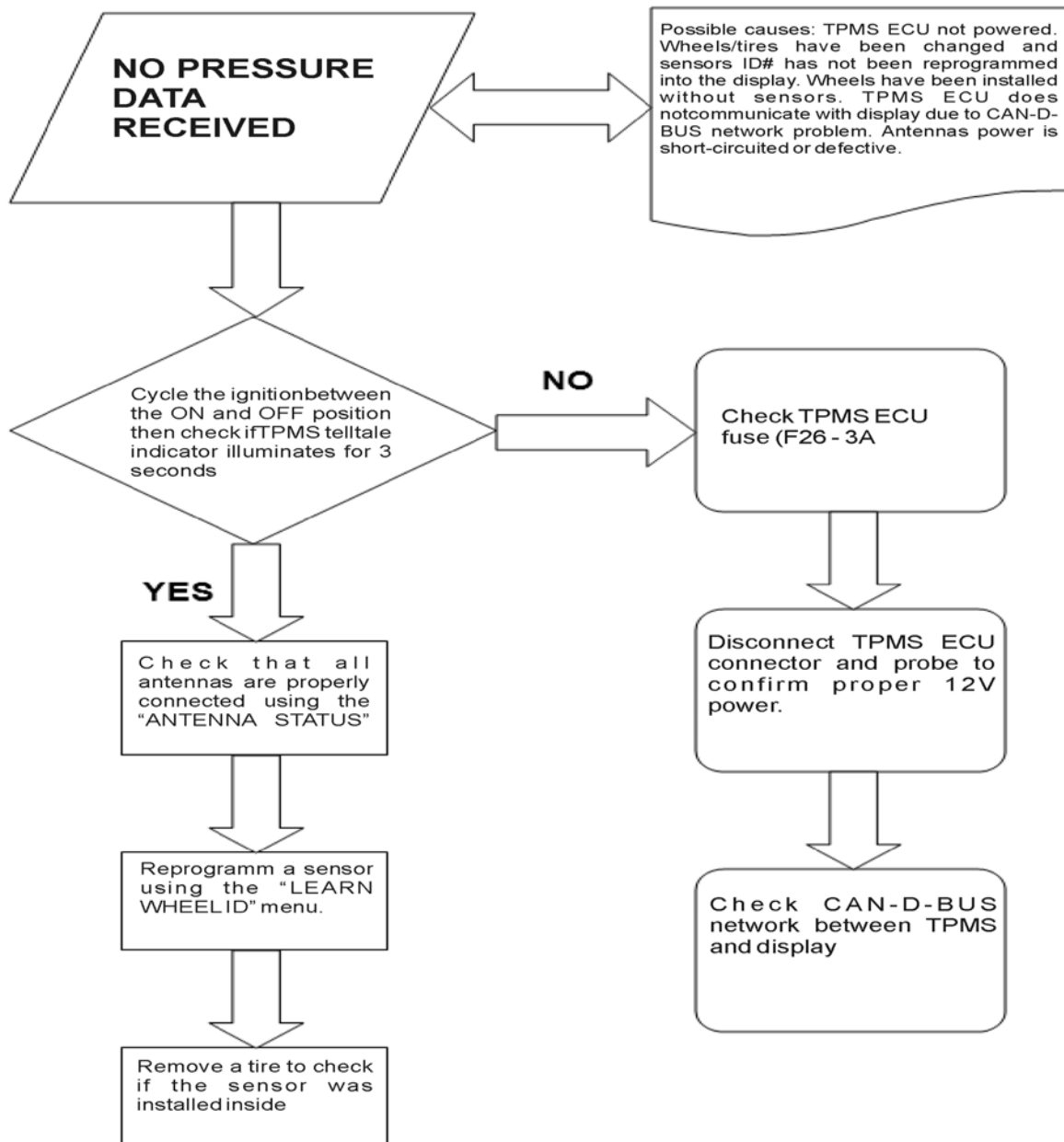
DTC	Description	CHECK Light	Inhibited Operation Description
P2815	Pressure Control Solenoid 6 (PCS6) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
U0073	CAN Communication Bus 1 Off	No	Use default values
U0074	CAN Communication Bus 2 Off	No	Use default values
U0100	Lost Communications with ECM A	Yes	Use default values
U0103	Lost Communication with Gear Shift Module (Shift Selector) 1	Yes	Maintain range selected, observe gear shift direction circuit
U0291	Lost Communication with Gear Shift Module (Shift Selector) 2	Yes	Maintain range selected, observe gear shift direction circuit
U0304	Incompatible Gear Shift Module 1 (Shift Selector)	Yes	Ignore shift selector inputs
U0333	Incompatible Gear Shift Module 2 (Shift Selector)	Yes	Ignore shift selector inputs
U0404	Invalid Data Received From Gear Shift Module (Shift Selector) 1	Yes	Maintain range selected, observe gear shift direction circuit
U0592	Invalid Data Received From Gear Shift Module (Shift Selector) 2	Yes	Maintain range selected, observe gear shift direction circuit

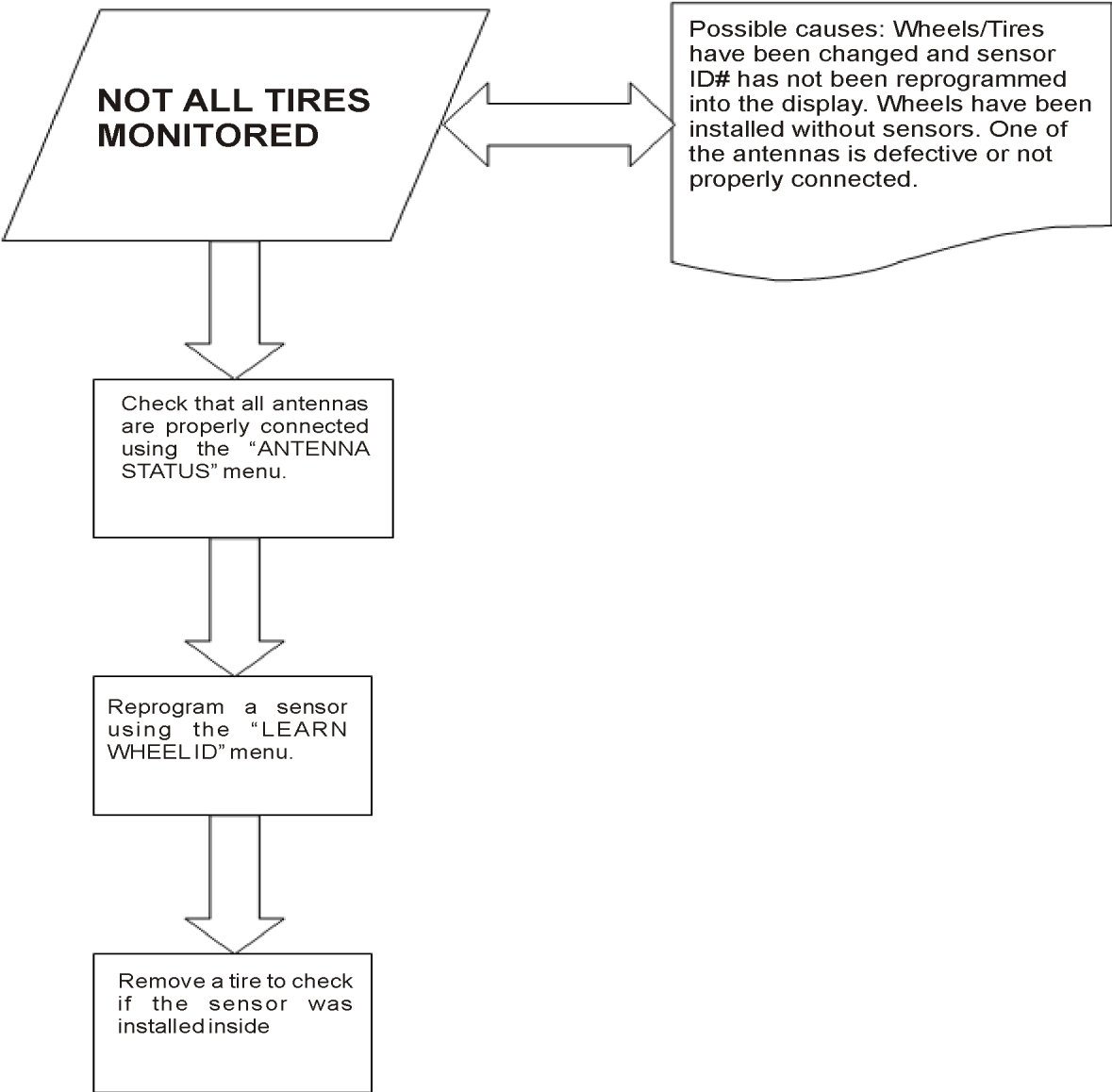
APPENDIX D

ON-SCREEN TPMS 2
TPMS-LITE 4

D-2 TPMS Troubleshooting Guide

ON-SCREEN TPMS

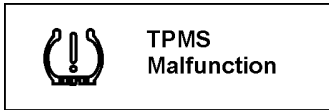




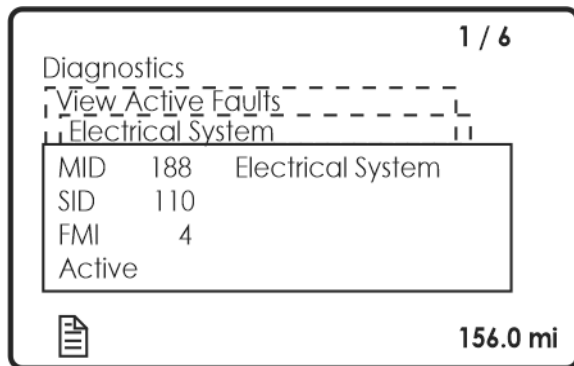
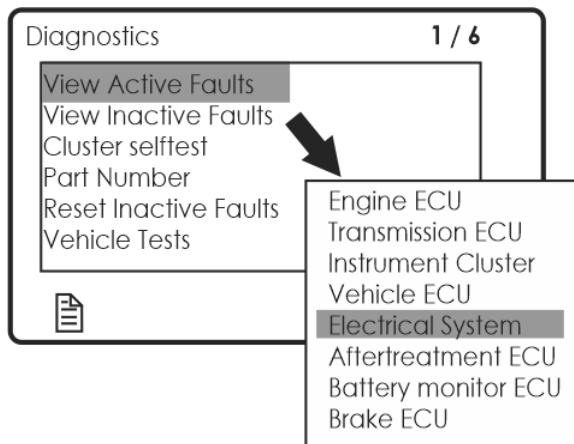
D-4 TPMS Troubleshooting Guide

TPMS-LITE

In case of TPMS malfunction, the following warning pop-up message will show on the DID to warn the driver that the TPMS might be disabled or unreliable. To determine the possible cause of the anomaly, check the diagnostic codes on the DID display.



In the DIAGNOSTICS menu, select VIEW ACTIVE FAULTS sub-menu or VIEW INACTIVE FAULTS and then select ELECTRICAL SYSTEM. See the list of diagnostic codes listed for the MID 188 Electrical System. Identify the SID and FMI digital codes and see the description in the following table below.



TPMS-LITE DIAGNOSTIC CODES

SID	FMI	DESCRIPTION
55	1	Tire pressure too low
106	0	Tire temperature too high
106	13	Tire temperature critically high
107	2	Tire sensor not responding
110	4	Sensor low battery power
111	2	LIN Bus power fault
112	2	Front antenna fault
113	2	Rear left antenna fault
114	2	Rear right antenna fault
115	1	Low sensor counts