

SIL 14-TR-18
September, 2018
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SUBJECT: Allison Transmission 5th Generation Controls 2018 BC 181 – New/Updated Diagnostic Trouble Codes (DTCs)

MODELS AFFECTED: 1000, 2000, 3000 and 4000 Series Product Families (Including B and T Models)

Introduction:

Allison Transmission, Inc. released 5th Generation Controls 2018 BC 181 software on, April 19, 2018. For 1000/2000 Series Product Families, this release includes two new Diagnostic Trouble Codes (DTCs), two updated DTCs, and seven DTCs intended for the General Motors Silverado 4500HD, 5500HD and 6500HD models, as well as the NAVISTAR CV model. For 3000/4000 Series Product Families, this release includes four updated DTCs.

1000/2000 DTCs (refer to [Appendix A](#))

The two new DTCs:

- P0600 Internal Serial Peripheral Interface (SPI) Diagnostics
- P07CE Neutral At Stop (NAS) Not Functioning

The two updated DTCs:

- P071A Neutral At Stop (NAS) Input Failed On
- P0703 Brake Switch Circuit

The seven DTCs intended for the General Motors Silverado 4500HD, 5500HD and 6500HD models, as well as the NAVISTAR CV model:

- P060C Main Processor Monitor (MPM)
- P0600 Internal Serial Peripheral Interface (SPI) Diagnostics
- P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit – Performance
- P2534 Ignition Switch Run/Start – Circuit Low
- P2535 Ignition Switch Run/Start – Circuit High
- P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit – Performance
- P2762 Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit - Performance

WBD / SL8163EN

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Please Note: Allison Transmission Service Information Letters are intended for use by professional, trained technicians, not for the “do-it-yourselfer.” They are written to inform those technicians of conditions that may occur on some transmission models (or serial numbers ranges) or to provide information that could assist in the proper servicing of a specific Allison transmission. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, do not assume that the Service Information Letter applies to your transmission, or that your transmission has the condition described. Product evolution and information updates are inevitable. Please see your authorized Allison Transmission service dealer or distributor to understand if your particular transmission may benefit from the information contained within the Service Information Letter.

3000/4000 DTCs (refer to [Appendix B](#))

The four updated DTCs:

- P0600 Internal Serial Peripheral Interface (SPI) Diagnostics
- P07CE Neutral At Stop (NAS) Not Functioning
- P071A Neutral At Stop (NAS) Input Failed On
- P0703 Brake Switch Circuit

Additional Information:

For additional information regarding the Allison Transmission 5th Generation Controls 2018 BC 181 software updates outlined in this document, refer to Allison 5th Generation Controls publications available on the [Allison Hub](#) under the Tech Data link or contact your Allison representative.

Appendix A. 1K2K Troubleshooting

DTC P060C Main Processor Monitor (MPM) Monitor

Circuit Description

This DTC detects when the main processor microprocessor faults as well as the ability for the main processor monitor (MPM) to take action.

Action Taken When the DTC Sets

When DTC P060C is active, the following conditions occur:

- The **MALFUNCTION INDICATOR LAMP** illuminates on first occurrence.
- The **Service Transmission** message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- The DTC is stored in the TCM history.
- Transmission operates in hydraulic default: **R** (Reverse), **N** (Neutral), and **3** (Third Range).



NOTE: When connecting the Allison DOC[®] software to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use the J-48624 NEXIQ[™] USB-Link[™] (Superseded by 124032) Translator and the J-41788 OBD II Connector.

Conditions for Clearing the DTC

Replace the TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

DTC P060C Main Processor Monitor (MPM) Monitor *(cont'd)*

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC[®] software using J-48624 Translator and J-41788 OBD II Connector. 2. Start engine. 3. Using the Allison DOC[®] software, record snapshot showing active or inactive DTC(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC active?		Go to Step 3	Troubleshoot any other active DTCs if present. If no other DTCs are active, go to Step 2
2	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an internal TCM failure. Did DTC P060C return?		Go to Step 3	System OK. Clear inactive DTCs and return vehicle to service
3	1. Turn ignition OFF. 2. Install new TCM and tighten the bolt to 2.0 – 3.2 N·m (18-28 lb in). 3. Install or reconnect OEM components and connectors. 4. Start engine. 5. Using the J-48624 Translator device with the J-41788 OBD II Connector and the Allison DOC[®] software, check for active DTCs. Is DTC P060C active with new TCM?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P0600 Internal Serial Peripheral Interface (SPI) Diagnostics

Circuit Description

This DTC is set when the TCM detects an internal communication fault between the microprocessor and the solenoid control integrated circuits internal to the TCM.

Actions Taken When the DTC Sets

When DTC P0600 is active, the following conditions occur:

- The **MALFUNCTION INDICATOR LAMP** illuminates on first occurrence.
- The **Service Transmission** message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- The DTC is stored in the TCM history.
- Transmission operates in hydraulic default: **R** (Reverse), **N** (Neutral), and **3** (Third Range).



NOTE: When connecting the Allison DOC® software to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use the J-48624 NEXIQ™ USB-Link™ (Superceded by 124032) Translator and the J-41788 OBD II Connector.

Conditions for Clearing the DTC

Replace TCM.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

1. This step tests for an active DTC.
2. Validate the DTC.
3. Replace the TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

DTC P0600 Internal Serial Peripheral Interface (SPI) Diagnostics *(cont'd)*

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC® software. 2. Start engine. 3. Using the Allison DOC® software, record snapshot showing active or inactive DTC(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC P0600 active?		Go to Step 2	Troubleshoot any other active DTCs if present. If no other DTCs are active, go to Step 2
2	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an internal TCM failure. Did DTC P0600 return?		Go to Step 5	System OK. Clear inactive DTCs and return vehicle to service
3	1. Turn ignition OFF. 2. Install new TCM and tighten the bolt to 2.0 – 3.2 N·m (18-28 lb in). 3. Install or reconnect OEM components and connectors. 4. Start the engine. 5. Using the Allison DOC® software, check for active DTCs. Is DTC P0600 active with new TCM?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P07CE Neutral At Stop Not Functioning

Description:

This DTC is set when the Neutral At Stop (NAS) is not functioning. This test monitors the inputs that affect the NAS functionality. This DTC is enabled when the Neutral At Stop: Emissions Credit Vehicle is enabled.

How to Determine “NEUTRAL At Stop: Emission Credit Vehicle” Calibration Setting in the TCM:

The setting for “**Neutral At Stop: Emission Credit Vehicle**” can be found using the Allison DOC® Premium software version 2018.1 or later by choosing “Additional Calibration Information” on the Calibration Information screen.

Additional Calibration Information	
Read-Only Calibration Information/Constants	Value
J1939 SA: EBC1 EBS Brake Switch	254
J1939 SA: EBC1 Engine Retarder Selection	254
J1939 SA: EEC2 Accelerator Pedal Kickdown Switch	254
J1939 SA: EEC2 Accelerator Pedal Position 1	254
J1939 SA: EEC2 Accelerator Pedal Position 2	254
J1939 SA: EEC2 DPF Thermal Management	254
J1939 SA: EEC2 Remote Accelerator Pedal Position	254
J1939 SA: EEC2 SCR Thermal Management	254
J1939 SA: EEC2 Vehicle Acceleration Rate Limit Status	254
J1939 SA: PTOE Enable Switch - Transmission Input Shaft PT...	254
J1939 SA: PTOE Enable Switch - Transmission Input Shaft PT...	254
J1939 SA: PTOE Enable Switch - Transmission Output Shaft P...	254
J1939 SA: TC1 Transmission Mode 2	254
J1939 SA: TC1 Transmission Mode 3	254
J1939 SA: TC1 Transmission Requested Launch Gear	254
J1939 SA: TC1 Transmission Reverse Gear Shift Inhibit Request	254
J1939 SA: TCI Transfer Case Status	254
J1939 SA: B2 Demanded Brake Application Pressure	254
AUTOMATIC NEUTRAL - BRAKE-BASED (BBAN) INPUT	Disabled
RANGE INHIBIT INDICATOR	Disabled
HILL HOLD INTERFACE	Disabled
NEUTRAL AT STOP: Emission Credit Vehicle	No

SEM/LRTP & Engine Torque Information	Value
SEM/LRTP Compatibility	Compatible
SEM Validated	ECM doesn't support SEM
LRTP Validated	ECM doesn't support LRTP
SEM Enabled Status	Enabled
LRTP Enabled Status	Enabled
SEM Torque Reduction Status	Correct Response
LRTP Torque Reduction Status	Correct Response
Unapproved SEM Torque Reducing Device	Information Not Valid
Unapproved LRTP Torque Reducing Device	Information Not Valid
Max Eng. Torq. Allowed during loss of J1939 Com...	894.66 ft-lb
Peak Torque from AETC Message	619.55 ft-lb

J1939 SAs (Source Addresses)

00 - Engine #1	15 - Retarder - Engine	41 - Retarder, Exhaust, Eng #1
03 - Transmission #1	16 - Retarder - Driveline	42 - Headway Controller
04 - Transmission #2	17 - Cruise Control	49 - Cab Controller - Primary
05 - Shift Console, Primary	23 - Instrument Cluster #1	61 - Exhaust Emission Controller
06 - Shift Console, Secondary	33 - Body Controller	232 - Forward Road Image Processor
11 - Brakes - System Controller	39 - Management Computer #1	
254 - Autodetected (To view 'Autodetected' source addresses, connect to Data Bus Viewer and select J1939 as the protocol)		

Close

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The setting for “**Neutral At Stop: Emission Credit Vehicle**” can also be found in the FuelSense® section of Allison Calibration Configuration Tool (ACCT), which can be found in the Engineering section of the <http://hub.allisontransmission.com/>. The ACCT Calibration Summary Report will display this new parameter and calibration setting only if the answer is set to YES in the calibration.

DTC P07CE Neutral At Stop Not Functioning (cont'd)

FuelSense®		
GPIO Wire	Parameter	Setting
	FuelSense [16100]	FuelSense 2.0 Max [60]
	FuelSense 2.0: Coasting NEUTRAL AT STOP [17700]	DISABLED [0]
	DYNAMIC SHIFT SENSING [16000]	DISABLED [0]
	NEUTRAL AT STOP [25270]	PREMIUM - VIA SERVICE BRAKE STATUS INPUT
	NEUTRAL AT STOP: Brake Application Pressure Activation Level [25273]	83
	NEUTRAL AT STOP: Brake Application Pressure Deactivation Level [25274]	69
	A NEUTRAL AT STOP: Emission Credit Vehicle [25275]	YES [1]
	ACCELERATION RATE MANAGEMENT [12000]	ENABLED [1]

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When viewing or editing service calibration requests in ACCT, a green leaf icon  will appear next to the “**Neutral At Stop: Emission Credit Vehicle**” and “Neutral At Stop” parameters if the answer to “Neutral At Stop: Emission Credit Vehicle” parameter is set to YES. In this case, these parameters can only be modified by Allison service personnel upon receipt of OEM authorization.

Action Taken When the DTC Sets

When DTC P07CE is active, the following conditions occur:

- The **CHECK TRANS** indicator is illuminated.
- The DTC is stored in the TCM history.
- TCM inhibits Neutral at Stop operation.

Conditions for Clearing the DTC/CHECK TRANS Light

Use the Allison DOC® software to clear the DTC from TCM history. The TCM automatically clears the DTC from TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

Setting one or more of the following conditions will cause NAS not to function and DTC P07CE to set:

- The Service Brake Input has failed setting DTC(s)
 - U0400 Invalid Communication Link Data Received
 - P0703 Brake Switch Circuit
- Engine Speed
 - P0725 Engine Speed Sensor Circuit
 - P0726 Engine Speed Sensor Circuit - Performance
 - P0727 Engine Speed Sensor Circuit - No Signal
- NAS input fails
 - When NAS is configured as a wired input, will set a P071A in addition to the P07CE
- Transmission Sump Temperature
 - P0711 Transmission Fluid Temperature Sensor Circuit – Performance
 - P0712 Transmission Fluid Temperature Sensor Circuit – Low Input

DTC P07CE Neutral At Stop Not Functioning (cont'd)

- P0713 Transmission Fluid Temperature Sensor Circuit – High Input
- Throttle Input failed when input is over the CAN bus
 - Verify throttle signal is present on the Data Bus using the Data Bus Viewer found in the Allison DOC® software
- Throttle Input failed when input is an analog signal or a Pulse Width Modulation (PWM) signal
 - P0122 Pedal Position Sensor Circuit – Low Voltage
 - P0123 Pedal Position Sensor Circuit – High Voltage
 - P1891 Throttle Position Sensor (TPS) PWM Signal – Low Input
 - P1892 Throttle Position Sensor (TPS) PWM Signal – High Input

Tool Requirements:

- Allison DOC® software

Test Description

Each item number description in this list correlates to the identical number shown in the DTC table "Step" column and is meant to briefly describe the "Action" column procedures for a particular step in the table. The DTC troubleshooting step descriptions examine the following:

1. Check for active DTC.
4. Recalibrate a TCM with updated version of original calibration.
5. Install test a TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

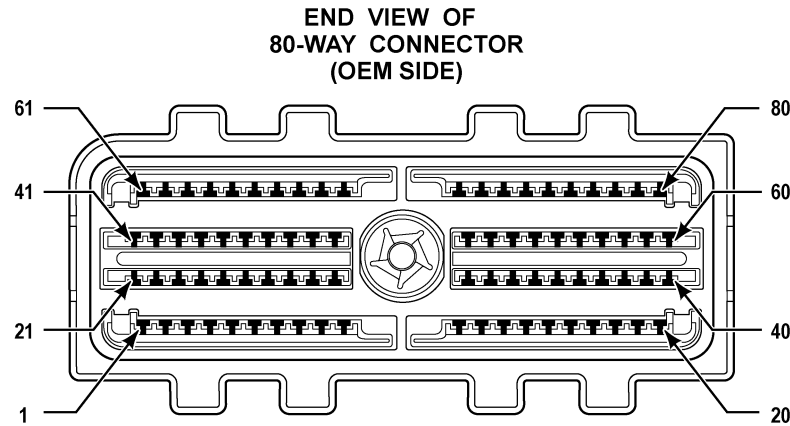
DTC P07CE Neutral At Stop Not Functioning (cont'd)

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC[®] software. 2. Start engine. 3. Record a snapshot using the Allison DOC[®] software showing active or inactive code(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC P07CE active?		<i>Troubleshoot any other active DTCs, if present. If no other DTCs are active, go to Step 6</i>	<i>Go to Step 2</i>
2	1. Clear the DTC. 2. Start the engine and test drive the vehicle. NOTE: This DTC is intended to detect NAS not functioning due to a failed input. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). Did DTC P07CE return?		<i>Go to Step 5</i>	<i>System OK. Clear inactive DTCs and return vehicle to service.</i>
3	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure.		<i>Go to Step 4</i>	
4	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use the Allison DOC[®] software to check for active DTCs. Is DTC P07CE active after recalibrating the TCM?		<i>Go to Step 5</i>	<i>Go to Step 6</i>
5	1. Turn ignition OFF. 2. Install test the TCM and tighten the bolt to 2.0 – 3.2 N·m (18-28 lb in). 3. Install or reconnect OEM components and connectors. 4. Start engine. 5. Using the Allison DOC[®] software, check for active DTCs. 6. If DTC are not active with test the TCM installed, then turn ignition off and reinstall the original TCM. 7. Restart engine and check again for active DTCs. Is DTC P07CE active with original TCM and inactive with test TCM?		<i>Install a new TCM. Go to Step 6 after repairs are made.</i>	<i>If DTC is active with both the test TCM and the original TCM, do not replace the TCM. Review Diagnostic Aids for this DTC. Begin diagnosis again. Go to Step 1</i>

DTC P07CE Neutral At Stop Not Functioning (cont'd)

Step	Action	Value(s)	Yes	No
6	1. Acquire new a Allison DOC [®] snapshot while driving vehicle under same conditions, if possible, noted in failure records from Step 1 . Did DTC P07CE return?		<i>Begin the diagnosis again. Go to Step 1</i>	<i>Repair complete.</i>

DTC P071A Neutral At Stop Input Failed On



301748

Circuit Description

When Neutral at Stop is active, the TCM automatically commands transmission operation at a reduced load state similar to Neutral (N). The purpose of the function is to reduce the load on the engine when the vehicle is stopped which improves fuel economy and also reduces heat load of the transmission in high start/stop duty cycles. To activate Neutral at Stop, the vehicle must be in first range, at a stop, service brakes applied, accelerator pedal approximately at 0%, and the TCM GPI terminal for Neutral at Stop must see V+, V Ign, or V Bat. Neutral at Stop deactivates when the service brake is released. Supplemental controls such as a door switch or a Neutral at Stop enable dash switch may be wired in series with the service brake pressure switch or, alternately, a vehicle Programmable Logic Controller (PLC) output may switch the Neutral at Stop signal as a result of a service brake pressure switch input to the PLC. The signal used to activate Neutral at Stop is W143, depending upon which Input/Output (I/O) package was selected in the TCM calibration. Neutral at Stop typically uses a switch-to-battery input (analog). Refer to the Allison DOC[®] Technician's Library 5th Gen I/O Functions for Neutral at Stop wiring diagrams. This test monitors whether the Neutral at Stop input status is in a stuck "ON" or "OFF" state.

This test counts how many accelerations events occur while the Neutral at Stop input indicates "ON". Failure is when the number of events exceeds 3 acceleration while Neutral at Stop is "ON".

In some applications, this test counts how many deceleration events occur while Neutral At Stop indicates "OFF" and the engine running time while in range. Failure is when the number of event exceeds 20 deceleration events and the engine running time exceeds a calibrated time.

Table 1. Neutral at Stop

GPI#	GPI Type	TCM Pin Number	Wire Number	Wire Color	Termination Point(s)
3	+	43	143	Blue	Service Brake Pressure Switch to V+ or PLC Output

Action Taken When the DTC Sets

When DTC P071A is active, the following conditions occur:

- The DTC is stored in the TCM history.

DTC P071A Neutral At Stop Input Failed On *(cont'd)*

- The TCM does not illuminate the **CHECK TRANS** light.
- TCM inhibits Neutral at Stop operation.

Conditions for Clearing the DTC/CHECK TRANS Light

Allison DOC® software may be used to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

This DTC may be caused by:

- Short to power or short to another wire for the GPI circuit controlling Neutral at Stop feature, i.e., W143.
- For service brake integrations, defective switch or incorrect wiring, e.g., pressure switches are closed when they should be open. If Neutral at Stop enable switch or door switch integrated in series, all switches would need to be stuck closed or wired on wrong side of switches, e.g., normally closed side vs normally open side.
- For PLC Neutral at Stop integrations, a miswired, misprogrammed, or defective circuit from PLC controlling the TCM GPI signal for Neutral at Stop that is maintaining circuit above 3.4 volts with service brakes released.
- Neutral at Stop enabled in TCM programming in error.
- TCM ground is at different voltage potential than the ground of the OEM voltage source responsible for switching GPI circuit controlling Neutral at Stop, e.g. PLC, vehicle ignition, body controller, etc.
- Defective TCM.

Tool Requirements:

- Allison DOC® software
- J-39700 Universal Breakout Box.
- J-47275 TCM Breakout Harness.
- J-47275-1 TCM Magnetic Overlay.
- J-47278 1K2K Transmission Breakout Box Overlay
- J-46708 Digital Multimeter.

Test Description

Each item number description in this list correlates to the identical number shown in the DTC table "Step" column and is meant to briefly describe the "Action" column procedures for a particular step in the table. The DTC troubleshooting step descriptions examine the following:

1. Check for active DTC.
2. Check for Neutral at Stop response.
3. Check for Neutral at Stop response with wire removed from OEM TCM 80-way connector.
5. Check the TCM.
6. Install a test TCM

DTC P071A Neutral At Stop Input Failed On (cont'd)



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or body builder provided components or any external wire harnesses not provided by Allison Transmission, Inc.

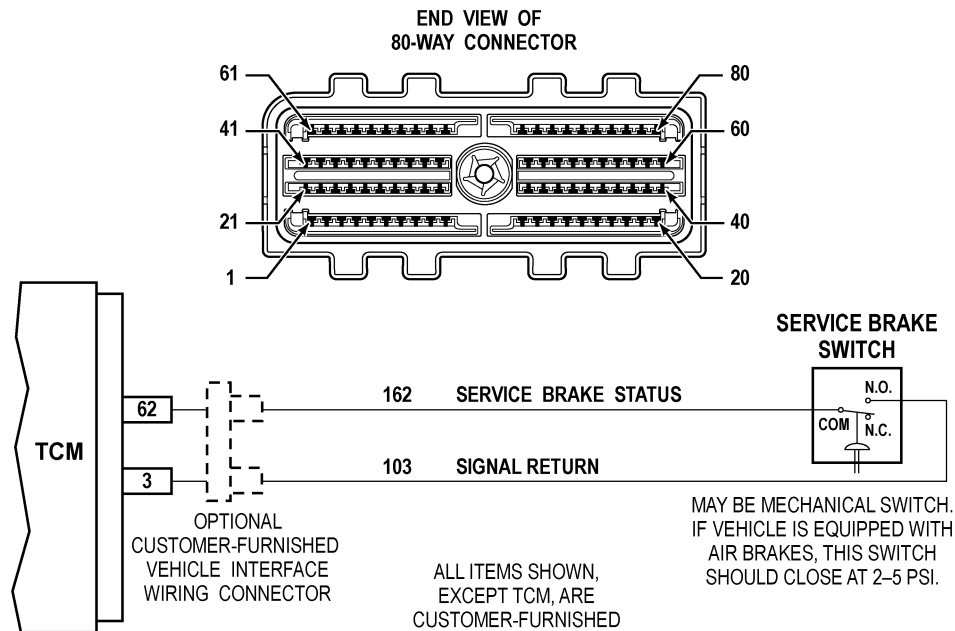
Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC[®] software. 2. Start engine. 3. Record snapshot using the Allison DOC[®] software showing active or inactive code(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC P071A active?		Go to Step 2	Troubleshoot any other active DTCs, if present. If no other DTCs are active, go to Step 7
2	1. Start engine. 2. Select D (Drive) and release the service brake. 3. Start Data Monitor feature in the Allison DOC[®] software. 4. Check status of Neutral at Stop input function and wire state. Are Neutral at Stop function and wire state OFF?		Go to Step 6	Go to Step 3
3	1. Turn ignition ON. 2. Remove Neutral at Stop input wire from OEM side of TCM 80-way. 3. Repeat tasks listed in Step 2. Are Neutral at Stop function and wire state OFF?		Repair condition causing high voltage on Neutral at Stop input wire. Review Diagnostic Aids . Go to Step 7	Go to Step 6
4	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure.		Go to Step 5	

DTC P071A Neutral At Stop Input Failed On *(cont'd)*

Step	Action	Value(s)	Yes	No
5	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use the Allison DOC[®] software to check for active DTCs. Is DTC P071A active after recalibrating the TCM?		Go to Step 6	Go to Step 7
6	1. Turn ignition OFF. 2. Install the test TCM and tighten the bolt in the TCM to 2.0-3.2 N·m (18-28 lb in). 3. Install or reconnect all OEM and transmission components and connectors. 4. Start engine, select D (Drive) and release service brake. 5. Using the Allison DOC[®] software, check for active codes. 6. If codes are not active with test TCM installed, then turn ignition OFF and reinstall original TCM. 7. Repeat tasks 4 and 5. Is DTC P071A active with the original TCM and inactive with a test TCM?		Install a new TCM. Go to Step 7 after repairs are made.	If DTC is active with both the test TCM and the original TCM, do not replace TCM. Review Diagnostic Aids for this DTC. Begin the diagnosis again. Go to Step 1
7	1. Turn ignition OFF. 2. Install or reconnect all OEM and transmission components and connectors, if needed. 3. Acquire a new Allison DOC[®] snapshot while driving vehicle under same conditions, if possible, noted in failure records from Step 1. Did DTC P071A return?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P0703 Brake Switch Circuit



434904



NOTE: If chassis ground is used, omit wire 103.

Circuit Description

This test monitors whether vehicle service brake switch status is in a stuck "ON" or "OFF" state.

Service brake status is relayed to the TCM by a mechanical switch, or over the J1939 datalink indicating the service brake has been applied. Input wire 162 is used to send a positive signal to the TCM. Wire 103 is used in this circuit as the signal return to the TCM.

DTC P0703 is only triggered when input wire 162 is being used for the service brake status signal and when the number of vehicle accelerations with brake switch "ON" exceeds a calibration value. This DTC may also set when the number of vehicle decelerations to a stop with the brake switch "OFF" exceeds a calibration value. This code will not be triggered if the Service Brake Status Input is broadcast on J1939 datalink.

This test counts how many accelerations events occur while the brake switch input indicates "ON". Failure is when the number of events exceeds 3 acceleration while Neutral at Stop is "ON".

In some applications, in addition, this test counts how many deceleration events occur while the brake switch input indicates "OFF" and the engine running time while in range. Failure is reported when the number of events exceeds 20 deceleration events and the engine running time exceeds a calibration.

Action Taken When the DTC Sets

- The TCM does not illuminate the **CHECK TRANS** light.

DTC P0703 Brake Switch Circuit *(cont'd)*

- The **CHECK TRANS** indicator is illuminated on EVS (Emergency Vehicle Series) and SPS (Special Series) only.
- The DTC is stored in TCM history.
- No Grade Braking Allowed.
- The **Service Transmission** message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- Auto Neutral disabled.
- Use the default assumption that the brake is off.
- Neutral At Stop is disabled (if equipped).



NOTE: When connecting the Allison DOC® software to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use the J-48624 Translator and the J-41788 OBD II Connector.

Conditions for Clearing the DTC/CHECK TRANS Light

Use the Allison DOC® software to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

This DTC may be caused by:

- Open or short in wire 103 or wire 162.
- Malfunctioning brake system control components such as:
 - Miswired or defective brake system wiring.
 - Defective brake pressure switches.
- Defective TCM.

Review applicable information in the Allison DOC® Technician's Library, BEGINNING THE TROUBLESHOOTING PROCESS, and other related Appendices.

Tool Requirements:

- Allison DOC® software
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-47275-1 TCM Magnetic Overlay
- J-47278 1K2K Transmission Breakout Box Overlay
- J-46708 Digital Multimeter

DTC P0703 Brake Switch Circuit (cont'd)

DTC Troubleshooting Step Description

Each item number description in this list correlates to the identical number shown in the DTC table "Step" column and is meant to briefly describe the "Action" column procedures for a particular step in the table. The DTC troubleshooting step descriptions examine the following:

1. This step tests for active DTC.
2. This step tests the Service Brake Status.
3. This step tests for voltage on TCM input pin 62 when the service brakes are applied and released.
4. This step checks for open brake fuse.
5. This step tests for open condition in the OEM wire harness, wire 103 and wire 162.
6. The step tests for wire to wire shorts in the OEM wire harness.
7. This step tests for shorts to ground in the OEM wire harness.
9. Repair or replace brake pressure switch.
11. Recalibrate TCM with updated version of original calibration.
12. Install a test TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC[®] software. 2. Start engine. 3. Record snapshot using the Allison DOC[®] software showing active or inactive code(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC P0703 active?		Go to Step 2	Troubleshoot any other active codes, if present. If no DTCs are active, then go to Step 2 .

DTC P0703 Brake Switch Circuit (cont'd)

Step	Action	Value(s)	Yes	No
2	1. Turn ignition ON, with the engine off. 2. Record the DTC failure record data. 3. Apply and release the service brake NOTE: This function may be on the J-1939 datalink, use the Allison DOC® software to determine the source of the brake message Does the Allison DOC® software indicate that the brake switch is toggling off and on the input wire 162?		Go to Step 11	Resolve OEM input wiring issue. Go to Step 3
3	1. Turn ignition OFF. 2. Disconnect the 80- way connector at the TCM. 3. Install the J-39700 Universal Breakout Harness and the J-47275 TCM Breakout Box Adaptor between the TCM 80-way connector and the OEM wire harness 80-way connector. 4. Turn on the ignition. 5. Measure the voltage at pin 62 on the J-47275-1 TCM Magnetic Overlay On the J-39700 Universal Breakout Box. 6. Apply and release service brake. Is the voltage within specified value?	Brakes applied 0.0V, Brakes released 5.0V	Go to Step 12	Go to Step 4
4	1. Remove the brake fuse. 2. Inspect the fuse for open condition Did you find and repair the condition?		Go to Step 13	Go to Step 5
5	1. Turn ignition OFF. 2. Leave the 80-way connector disconnected at the TCM. 3. Disconnect the brake pressure switch connector. 4. Using J-39197-A Jumper Wire Kit, install a jumper wire between wires 162 and 103 in the brake pressure switch connector. 5. Measure for continuity between pins 62 and 3 on the J-47275-1 TCM Magnetic Overlay on the J-39700 Universal Breakout Box. Was continuity measured between these pins?		Go to Step 8	Go to Step 6

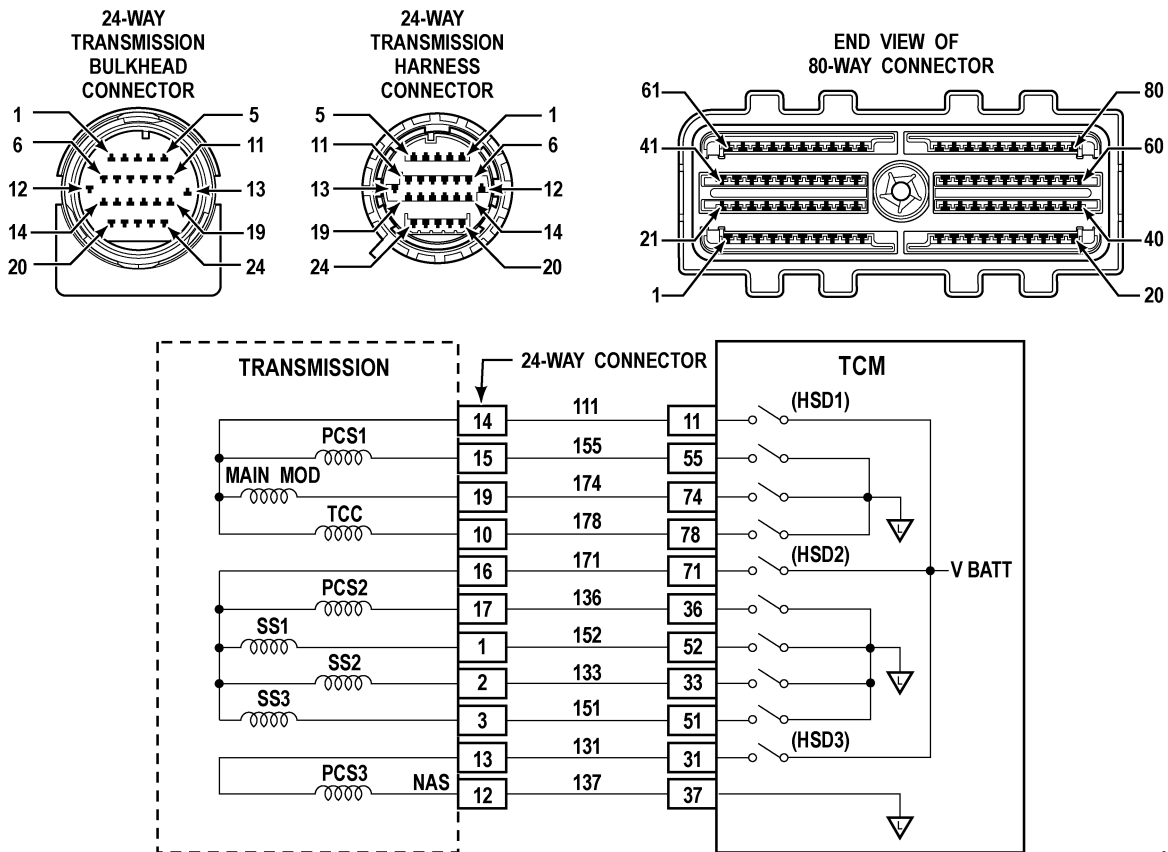
DTC P0703 Brake Switch Circuit *(cont'd)*

Step	Action	Value(s)	Yes	No
6	1. Turn ignition OFF. 2. Leave the 80-way connector disconnected at the TCM. 3. Remove the jumper wire from the brake pressure switch connector and leave connector disconnected. 4. On the J-47275-1 TCM Magnetic Overlay on the J-39700 Universal Breakout Box, measure pins 62 and 3 to all other pins. Was continuity measured between these pins?		Go to Step 8	Go to Step 7
7	1. Turn ignition OFF. 2. Leave the 80-way connector disconnected at the TCM. 3. Leave the connector disconnected. 4. On the J-47275-1 TCM Magnetic Overlay on the J-39700 Universal Breakout Box, measure pins 62 and 3 to chassis ground. Was continuity measured between these pins?		Go to Step 8	Go to Step 13
8	Repair the vehicle wiring harness. NOTE: The vehicle OEM has responsibility for all external wiring. OEM chassis wiring harness repairs performed by Allison Transmission distributors and dealers are not covered under Allison Transmission warranty. Is repair complete?		Go to Step 11	Go to Step 13
9	Repair or replace the brake pressure switch assembly. Is the repair complete?		Go to Step 13	Go to Step 11
10	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure.			
11	If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. Is DTC P071A active after reprogramming the TCM?			

DTC P0703 Brake Switch Circuit *(cont'd)*

Step	Action	Value(s)	Yes	No
12	1. Turn ignition OFF. 2. Install test a TCM and torque bolt in the TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start engine and apply and release service brakes. 4. Using the Allison DOC® software check for active codes and monitor service brake status on TCM input wire 162. 5. If codes are not active with test TCM installed, then turn the ignition OFF and re-install the original TCM. 6. Restart engine and check again for active DTCs. NOTE: In most cases, the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6 TCM DIAGNOSTIC PROCEDURE. Is repair or replacement complete?		Go to Step 13	
13	To verify the repair: 1. Clear the DTC. 2. Using the Allison DOC® software, monitor the status of input wire 162 while applying and releasing the service brake. 3. Drive the vehicle under normal operating conditions. Did the DTC P0703 return?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance



3217237

Circuit Description

PCS2 is a Pressure Proportional to Current (PPC) solenoid used to control oncoming and off-going and holding pressure to any one of five clutches.

The TCM sends control current to PCS2 from High Side Driver 2 (HSD2) via wire 171. HSD2 is continuously on unless the TCM detects a fault condition. The TCM regulates the amount of current to PCS2 by switching the low side driver ON and OFF. Wire 136 completes the circuit between PCS2 and its low side driver. DTC P0965 indicates that the TCM processor has detected an open, short to ground, short to power or wire to wire shorts condition in the electrical circuit.

Actions Taken When the DTC Sets

When DTC P0965 is active, the following conditions occur:

- If the failure occurs while in a forward range, a shift to 1st, 3rd, or 5th range is made.
- While diagnostic response is active, if shift selector is moved to **N** (Neutral), transmission shifts to neutral; if the shift selector is moved to **R** (Reverse), transmission shifts to reverse. If the shift selector is moved to **D** (Drive) range or **R** (Reverse) and transmission is compromised by overspeeding or direction change, transmission shifts to neutral.

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance *(cont'd)*

- The Service Transmission message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- The **Malfunction Indicator Lamp (MIL)** illuminates on first occurrence.
- The DTC is stored in the TCM history.



NOTE: When connecting the Allison DOC® software to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use the J-48624 Translator and the J-41788 OBD II Connector.

Conditions for Clearing the DTC

Use the Allison DOC® software to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

The following procedures are not documented in any Allison procedures or in any Allison Troubleshooting Manual or Service Manual and should not be used as a method to diagnose any transmission DTCs, function, or shift quality concern:

- Back-probing any connections used for transmission features or functions may damage **and/or** unlock terminals from the back-probed connector creating permanent or intermittent shorts **and/or** open circuits. If possible, use the Allison DOC® software, J-48624 Translator and J-41788 OBD II Connector, and J 47275-1 TCM Overlay and J 39700 Universal Breakout Box to troubleshoot the vehicle.
- Load-testing any transmission-related circuits with any other electrical devices such as vehicle lamps or relays, especially with the TCM connected to the harness. Use GM diagnostic tools with Tech 2 Pro Optima to monitor the circuit performance in question unless otherwise specified in the various Troubleshooting Manuals.
- Piercing a wire to check for voltages, shorts-to-grounds or other wires anywhere in the circuit but especially at the TCM. This creates a leak path for moisture and damages the wire and insulation.

An intermittent circuit condition can allow this DTC to set. Make sure you check for the following conditions at the OEM harness first, then at the transmission internal harness:

- DTC P0965 indicates an open, short to ground, short to power or wire to wire shorts in the electrical circuit for PCS2.
- Inspect the wiring for poor electrical connections at the TCM and the transmission main connector. Look for the following conditions:
 - A bent terminal
 - A backed-out terminal
 - A damaged terminal
 - Poor terminal tension
 - A chafed wire
 - A broken wire inside the insulation

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance (cont'd)

- Inspect OEM wiring harness routing. Look for possible contact points where chafing could occur leading to an open circuit condition. Moving parts on the vehicle could be contacting the harness; this includes parking brake drum, suspension components, transmission shift linkage, etc.
- When diagnosing for an intermittent short or open, massage the wiring harness while watching the test equipment for a change. It may be necessary to check continuity at individual wires within a harness to isolate an intermittent open condition.
- You may have to drive the vehicle in order to experience a fault. Use the data obtained from failure records to determine transmission range and/or certain vehicle operating variables such as temperature, run time, etc. This data can be useful in reproducing the failure mode when the DTC was set.

Tool Requirements:

- Allison DOC® software
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-47275-1 TCM Magnetic Overlay
- J-47278-1 Transmission Magnetic Overlay
- J-46708 Digital Multimeter

Test Description

The numbers below refer to the step numbers on the diagnostic table.

1. Beginning the Troubleshooting Process.
2. This step tests for the proper ignition voltage.
3. Verification of DTC after clearing the DTC from the TCM.
4. This step tests the OEM harness for an open condition in either wire 136 or wire 171 of the OEM chassis harness.
5. This step tests the OEM harness for a wire to wire shorts condition in either wire 136 or wire 171 of the OEM chassis harness.
6. This step tests the OEM harness for a short to ground condition in either wire 136 or wire 171 of the OEM chassis harness.
7. This step tests the OEM harness for a short to power condition in either wire 136 or wire 171 of the OEM chassis harness.
8. Repair of the OEM chassis wiring harness.
9. This step tests for wire to wire shorts in the transmission internal wire harness.
10. This step tests for short to ground in the transmission internal wire harness.
11. This step checks the resistance of the PCS2.
15. Recalibrate the TCM with updated version of original calibration.
16. Install a test TCM.

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance *(cont'd)*



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	Was BEGINNING THE TROUBLESHOOTING PROCESS - 5th Gen 1k2k performed?		Go to Step 2	Go to BEGINNING THE TROUBLESHOOTING PROCESS - 5th Gen 1k2k
2	1. Connect the Allison DOC® software. 2. Start the engine. 3. Record the DTC failure record data. 4. Monitor ignition voltage. Is the voltage within the specified values?	9–18V	Go to Step 3	Resolve voltage problem. (Refer to P0562 and P0563)
3	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an open, short to ground, short to power or wire to wire shorts condition in the PCS2 electrical circuit. Did DTC P0965 return?		Go to Step 4	Go to Diagnostic Aids

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
4	1. Turn ignition OFF. 2. Install the J-47275 TCM Breakout Harness Adapter, J-47275-1 TCM Magnetic Overlay and J-39700 Universal Breakout Box on the TCM 80-way vehicle wiring harness connector. Leave TCM disconnected. 3. Remove 24-way connector from the transmission. At the 24-way transmission harness connector install a jumper wire from pin 16 and 17, leave transmission disconnected. 4. At the TCM Breakout Box, measure pins 36 and 71 on the J-47275-1 TCM Magnetic Overlay for continuity. Did the pins have continuity between them?		Go to Step 8	Go to Step 5
5	1. Turn ignition OFF. 2. Disconnect the TCM 80-way connector. 3. Install the OEM side 80-way connector to the Breakout Box. Leave the TCM disconnected. 4. Remove the jumper wire and leave the 24-way transmission connector disconnected. 5. On the J-39700 Universal Breakout Box, measure pins 36 and 71 to all other pins on the J-47275-1 TCM Magnetic Overlay. Wire to wire continuity indicates a short between OEM chassis wiring harness wires. Was continuity measured?		Go to Step 8	Go to Step 6
6	1. Turn ignition OFF. 2. Install the J-47275 TCM Breakout Harness Adapter, J-47275-1 TCM Magnetic Overlay and J-39700 Universal Breakout Box on the TCM 80-way vehicle wiring harness connector. Leave TCM disconnected. 3. Disconnect the 24-way transmission connector. 4. On the J-39700 Universal Breakout Box, measure pins 36 and 71 to chassis ground on the J-47275-1 TCM Magnetic Overlay. Was continuity measured between these pins and to chassis ground?		Go to Step 8	Go to Step 7

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
7	1. Turn ignition OFF. 2. Install the J-47275 TCM Breakout Harness Adapter, J-47275-1 TCM Magnetic Overlay and J-39700 Universal Breakout Box on the TCM 80-way vehicle wiring harness connector. Leave TCM disconnected. 3. Remove 24-way connector from the transmission. 4. Turn ignition ON. 5. On the J-39700 Universal Breakout Box, measure pins 36 and 71 to all other pins on the J-47275-1 TCM Magnetic Overlay. Voltage on either pins indicate a short to power in the OEM chassis wiring harness. Was voltage measured?		Go to Step 8	Go to Step 9
8	Repair the vehicle wiring harness. NOTE: The vehicle OEM has responsibility for all external wiring. Wiring harness repairs performed by Allison Transmission distributors and dealers are not covered under Allison Transmission warranty. Is the repair complete?		Go to Step 17	Go to Step 9
9	1. Turn ignition off. 2. Install the J-47278 Breakout Harness to the transmission 24-way connector. Leave the OEM harness disconnected. 3. Using a Digital volt/ohmmeter (DVOM), measure between pins 16 and 17 and all other pins on the J-39700 Universal Breakout Box and J-47278-1 Transmission 24-way Magnetic Overlay. Continuity would indicate a wire to wire in the internal transmission harness wires. Was continuity observed?		Go to Step 12	Step 10

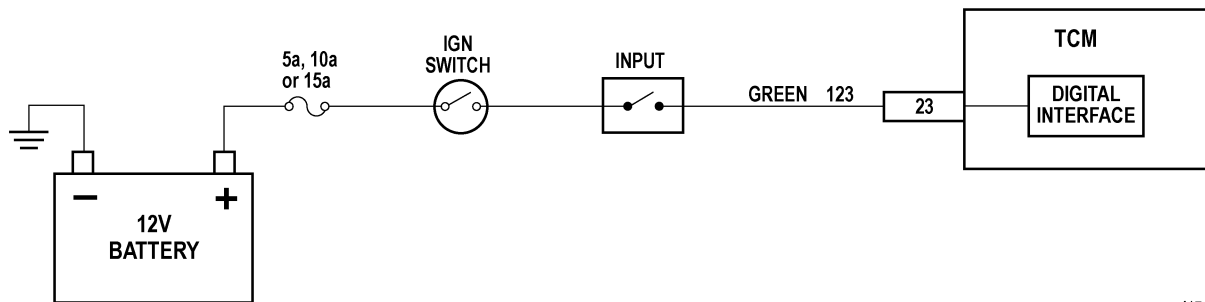
DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
10	- Turn ignition off. - Install the J-47278 Breakout Harness to the transmission 24-way connector. Leave the OEM harness disconnected. - Using a Digital volt/ohmmeter (DVOM), measure between chassis ground pins 16 and 17 on the J-39700 Universal Breakout Box and the J-47278-1 Transmission 24-way Magnetic Overlay and chassis ground. Continuity would indicate a wire to wire in the internal transmission harness wires. Was continuity observed?		Go to Step 12	Go to Step 11
11	- Turn ignition off. - Remove the transmission oil pan (refer to the Service Manual or the In-Chassis Maintenance). - Disconnect the internal transmission wire harness connectors on the PCS2. - Using a Digital Volt/Ohmmeter (DVOM), test measure the PCS2 resistance between pins A and B. Is the resistance within specified values?	Refer to Table 6-8	Go to Step 13	Go to Step 12
12	Replace the internal transmission wire harness (refer to the Service Manual or In-Chassis Maintenance). Is the replacement complete?	Refer to Table 6-8	Go to Step 17	
13	Replace PCS2 (refer to Service Manual or the In-Chassis Maintenance). Is the replacement complete?		Go to Step 17	
14	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure. Is the replacement complete?		Go to Step 17	
15	- If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. - Once the TCM recalibration is complete, use the Allison DOC® software to check for active DTCs. Is DTC P0965 active after reprogramming the TCM?		Begin diagnosis again. Go to Step 1	Go to Step 16

DTC P0965 Pressure Control Solenoid 2 (PCS2) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
16	1. Turn ignition OFF. 2. Install test a TCM and torque bolt in TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start engine and apply and release service brakes. 4. Using the Allison DOC[®] software check for active codes and monitor service brake status on TCM input wire 162. 5. If codes are not active with test TCM installed, then turn ignition OFF and re-install the original TCM. 6. Restart engine and check again for active DTCs. NOTE: In most cases, the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6 TCM DIAGNOSTIC PROCEDURE. Is repair or replacement complete?		Go to Step 17	
17	To verify the repair: 1. Clear the DTC 2. Drive the vehicle under circumstances shown in the failure records. Did DTC P0965 return?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P2534 Ignition Switch Run/Start—Circuit Low



Circuit Description

This DTC is set when the TCM detects if the Run/Start wired input to the TCM is low when it is expected to be high.

DTC P2534 indicates that the TCM processor has detected low and open conditions in the ignition switch run/start electrical circuit. Open, short to ground or wire to wire short conditions may exist in the ignition switch run/start circuit (wire 123).

Action Taken When the DTC Sets

When DTC P2534 is active, the following conditions occur:

- The **Malfunction Indicator** Lamp illuminates on first occurrence.
- The Service Transmission message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- DTC is stored in the TCM history.



NOTE: When connecting the Allison DOC[®] software to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use the J-48624 Translator and the J-41788 OBD II Connector.

Conditions for Clearing the DTC/CHECK TRANS Light

Use the Allison DOC[®] software to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the failure.

Diagnostic Aids

The following procedures are not documented in any Allison procedures or in any Allison Troubleshooting Manual or Service Manual and should not be used as a method to diagnose any transmission DTCs, function, or shift quality concern:

- Back probing any connections used for transmission features or functions may damage and/or unlock terminals from the back probed connector creating permanent or intermittent shorts and/or open circuits. If possible, use the Use J-39700 Universal Breakout Box, the appropriate harness adapters, and appropriate magnetic overlays to troubleshoot the vehicle.
- Load testing any transmission related circuits with any other electrical devices such as vehicle lamps or relays, especially with the TCM connected to the harness. Use J-39700 Universal Breakout Box and J-48624

DTC P2534 Ignition Switch Run/Start—Circuit Low *(cont'd)*

Translator and J-41788 OBD II Connector with the Allison DOC® software to monitor the circuit performance in question unless otherwise specified in the various Troubleshooting Manuals.

- Piercing a wire to check for voltages, shorts to grounds or other wires anywhere in the circuit but especially at the TCM. This creates a leak path for moisture and damages the wire and insulation.
- You may have to drive the vehicle in order to experience a fault.
- This DTC indicates a variation in ignition voltage. Common ignition circuit problems for this DTC are a fault in the feed wires to the TCM, a defective ignition switch, or a large vehicle accessory load on the ignition circuit.
- A vehicle charging system failure may cause this DTC to set under certain circumstances.
- This DTC may indicate that an internal voltage problem has occurred inside the TCM. The use of a substitute TCM would be a good way to diagnose this problem.
- A defective vehicle battery may induce this DTC.
- Inspect the wiring for poor electrical connections at the TCM. Look for the following conditions:
 - A bent terminal
 - A backed-out terminal
 - A damaged terminal
 - Poor terminal tension
 - A chafed wire
 - A broken wire inside the insulation
- When diagnosing for an intermittent short or open circuit condition, massage the wiring harness while watching the test equipment for a change.

Tool Requirements:

- Allison DOC® software
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-47278-1 Transmission Magnetic Overlay
- J-46708 Digital Multimeter

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2. This step tests for an active DTC.
3. This step tests for voltage at pin 23.
5. This step test for open condition in OEM wire harness.
6. This step test for wire to wire shorts in the OEM wire harness.
7. This step test for shorts to ground in the OEM wire harness.
10. Recalibrate TCM with updated version of original calibration.
11. Install test TCM.

DTC P2534 Ignition Switch Run/Start—Circuit Low *(cont'd)*



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC[®] software. 2. Start engine. 3. Using the Allison DOC[®] software, record snapshot showing active or inactive code(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is the DTC active?		Go to Step 2	Troubleshoot any other active DTCs if present. If no other DTCs are active, go to Step 2
2	1. Clear the DTC. 2. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an open condition, short to ground or wire to wire shorts in the Ignition Switch Run/Crank Circuit Low electrical circuit. Did the DTC return?		Go to Step 3	System OK. Clear inactive DTCs and return vehicle to service.

DTC P2534 Ignition Switch Run/Start—Circuit Low *(cont'd)*

Step	Action	Value(s)	Yes	No
3	1. Turn ignition OFF. 2. Connect the TCM Breakout Harness Adapter to the J-39700 Universal Breakout Box. 3. Connect the OEM TCM wire harness 80-way connector to the TCM Breakout Harness. 4. Leave TCM disconnected. Do not connect the TCM side of the Breakout Harness to the TCM. 5. On the J-39700 Universal Breakout Box, measure ignition voltage pin 23 on the J-47275-1 TCM Overlay while cranking the engine. Was voltage measured at pin 23?	9-18V (12V TCM)	Go to Step 5	Go to Step 4
4	Check the Transmission Ignition Fuse in the OEM fuse panel. Was fuse open?		Check and replace fuse 47 in the OEM Underhood Electrical Center and repeat Step 4 . Go to Step 5 if fuse is OK	Go to Step 5
5	1. Turn ignition OFF. 2. Connect the J-47275 TCM Breakout Harness Adapter to the J-39700 Universal Breakout Box. 3. Connect the OEM TCM wire harness 80-way connector to the J-47275 TCM Breakout Harness Adapter. 4. Leave the TCM disconnected. Do not connect the TCM side of the Breakout Harness to the TCM. 5. Disconnect the 24-way connector at transmission. 6. Using a DVOM, measure between pin 23 on the J-39700 Universal Breakout Box and the J-47278-1 Transmission 24-way Magnetic Overlay and pin X103 in the OEM in-line connector A2. Was continuity measured?		Go to Step 6	Go to Step 8

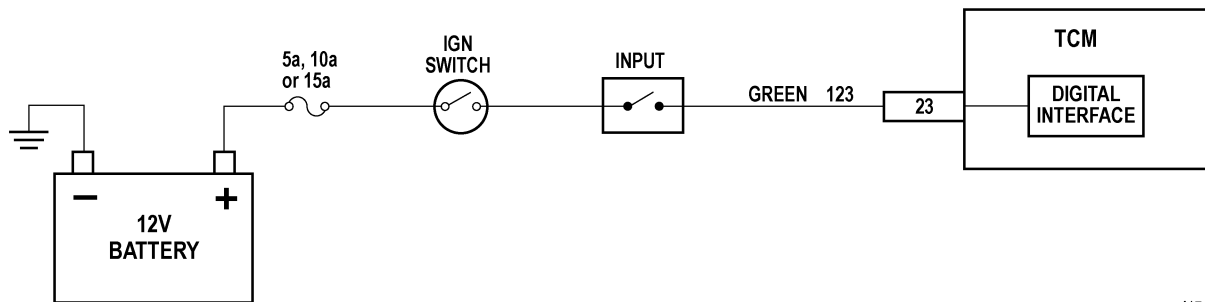
DTC P2534 Ignition Switch Run/Start—Circuit Low *(cont'd)*

Step	Action	Value(s)	Yes	No
6	1. Turn ignition OFF. 2. Connect the J-47275 TCM Breakout Harness Adapter TCM to the Breakout Box. 3. Connect the OEM TCM wire harness 80-way connector to the J-47275 TCM Breakout Harness Adapter. 4. Leave the TCM disconnected. Do not connect the TCM side of the Breakout Harness to the TCM. 5. Disconnect the 24-way connector at transmission. 6. Using a Digital volt/ohmmeter (DVOM), test for short to ground between pin 23 and all other pins on the J-47275-1 TCM Overlay. Was continuity measured?		Go to Step 7	Go to Step 8
7	1. Turn ignition OFF. 2. Disconnect the 80-way TCM connector and install the Breakout Box to the 80-way connector. 3. Disconnect the 24-way transmission connector and leave disconnected. 4. On the J-39700 Universal Breakout Box, measure pin 23 to chassis ground on the J-47275-1 TCM Overlay. Was continuity measured between this pin and to chassis ground?		Go to Step 8	Go to Step 12
8	Repair the vehicle wiring harness. NOTE: The vehicle OEM has responsibility for all external wiring. The OEM should perform. Is the repair complete?		Go to Step 12	Go to Step 9
9	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure.			
10	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use the Allison DOC® software to check for active DTCs. Is DTC P2543 active after reprogramming the TCM?		Go to Step 11	Go to Step 12

DTC P2534 Ignition Switch Run/Start—Circuit Low *(cont'd)*

Step	Action	Value(s)	Yes	No
11	1. Turn ignition OFF. 2. Install test a TCM and torque bolt in TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start the engine and apply and release service brakes. 4. Using the Allison DOC® software check for active codes and monitor service brake status on TCM input wire 162. 5. If codes are not active with the test TCM installed, then turn ignition OFF and re-install the original TCM. 6. Restart engine and check again for active DTCs. NOTE: In most cases, the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6 TCM DIAGNOSTIC PROCEDURE. Is repair or replacement complete?		Go to Step 12	
12	To verify the repair: 1. Clear the DTC. 2. Drive the vehicle under normal operating conditions. 3. Using the Allison DOC® software, monitor the ignition voltage. 4. Drive the vehicle under normal operating conditions. Did DTC P2534 return?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P2535 Ignition Switch Run/Start—Circuit High



Circuit Description

This DTC is set when the TCM detects if the Run/Start wired input to the TCM is high when it is expected to be low.

DTC P2535 indicates that the TCM processor has detected high condition in the ignition switch run/start electrical circuit. The short to power or wire to wire short conditions may exist in the ignition switch run/start circuit (wire 123).

Action Taken When the DTC Sets

When DTC P2535 is active, the following conditions occur:

- DTC is stored in the TCM history.
- The Service Transmission message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.

Conditions for Clearing the DTC

Use the Allison DOC® to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warmup cycles without failure.



NOTE: When connecting Allison DOC® to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use J-48624 Translator and J-41788 OBD II Connector.

Diagnostic Aids

The following procedures are not documented in any Allison procedures or in any Allison Troubleshooting Manual or Service Manual and therefore should not be used as a method to diagnose any transmission DTCs, function, or shift quality concern:

- Back probing any connections used for transmission features or functions may damage and/or unlock terminals from the back probed connector creating permanent or intermittent shorts and/or open circuits. If possible, use the J-39700 Universal Breakout Box, the appropriate harness adapters, and appropriate magnetic overlays to troubleshoot the vehicle
- Load testing any transmission related circuits with any other electrical devices such as vehicle lamps or relays, especially with the TCM connected to the harness. Use J-39700 Universal Breakout Box and J-48624 Translator and J-41788 OBD II Connector with Allison DOC® to monitor the circuit performance in question unless otherwise specified in the various Troubleshooting Manuals.

DTC P2535 Ignition Switch Run/Start—Circuit High *(cont'd)*

- Piercing a wire to check for voltages, shorts to grounds or other wires anywhere in the circuit but especially at the TCM. This creates a leak path for moisture and damages the wire and insulation.
- You may have to drive the vehicle in order to experience a fault.
- This DTC indicates a variation in ignition voltage. Common ignition circuit problems for this DTC are a fault in the feed wires to the TCM, a defective ignition switch, or a large vehicle accessory load on the ignition circuit.
- A vehicle charging system failure may cause this DTC under certain circumstances.
- This DTC may indicate that an internal voltage problem has occurred inside the TCM. The use of a substitute TCM would be a good way to diagnose this problem.
- A defective vehicle battery may induce this DTC.
- Inspect the wiring for poor electrical connections at the TCM. Look for the following conditions:
 - A bent terminal
 - A backed out terminal
 - A damaged terminal
 - Poor terminal tension
 - A chafed wire
 - A broken wire inside the insulation
- When diagnosing for an intermittent short or open circuit condition, massage the wiring harness while watching the test equipment for a change.

Tool Requirements:

- Allison DOC®
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-47278-1 Transmission Magnetic Overlay
- J-46708 Digital Multimeter

Test Description

The numbers below refer to the step numbers on the diagnostic table:

2. This step checks for active DTCs.
3. This step tests for proper ignition voltage.
4. This step tests for wire to wire shorts in the OEM wiring harness.
7. Recalibrate TCM with updated version of original calibration.
8. Install test TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.

DTC P2535 Ignition Switch Run/Start—Circuit High *(cont'd)*



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	1. Connect using the Allison DOC [®] software with the J-48624 Translator and the J-41788 OBD II Connector 2. Start engine. 3. Using the Allison DOC [®] software, record snapshot showing active or inactive code(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is the DTC active?		Go to Step 2	Troubleshoot any other active DTCs if present. If no other DTCs are active, go to Step 2
2	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an open condition in the Ignition Switch Run/Start electrical circuit. Did the DTC return?		Go to Step 3	System OK. Clear inactive DTCs and return vehicle to service.
3	1. Turn OFF the ignition. 2. Connect J-47275 TCM Breakout Harness Adapter. 3. Connect the OEM TCM wire harness 80-way connector to the J-39700 Universal Breakout Box. 4. Leave the TCM disconnected. Do not connect the TCM side of the Breakout Harness to the TCM. 5. On the J-39700 Universal Breakout Box, measure ignition voltage pin 23 on the J-47275-1 TCM Magnetic Overlay while cranking the engine Was voltage measured at pin 23?	9-18V (12V TCM)	Go to Step 4	Check and replace fuse 47 in the OEM Underhood Electrical Center and repeat Step 3 . Go to Step 4 if fuse is OK

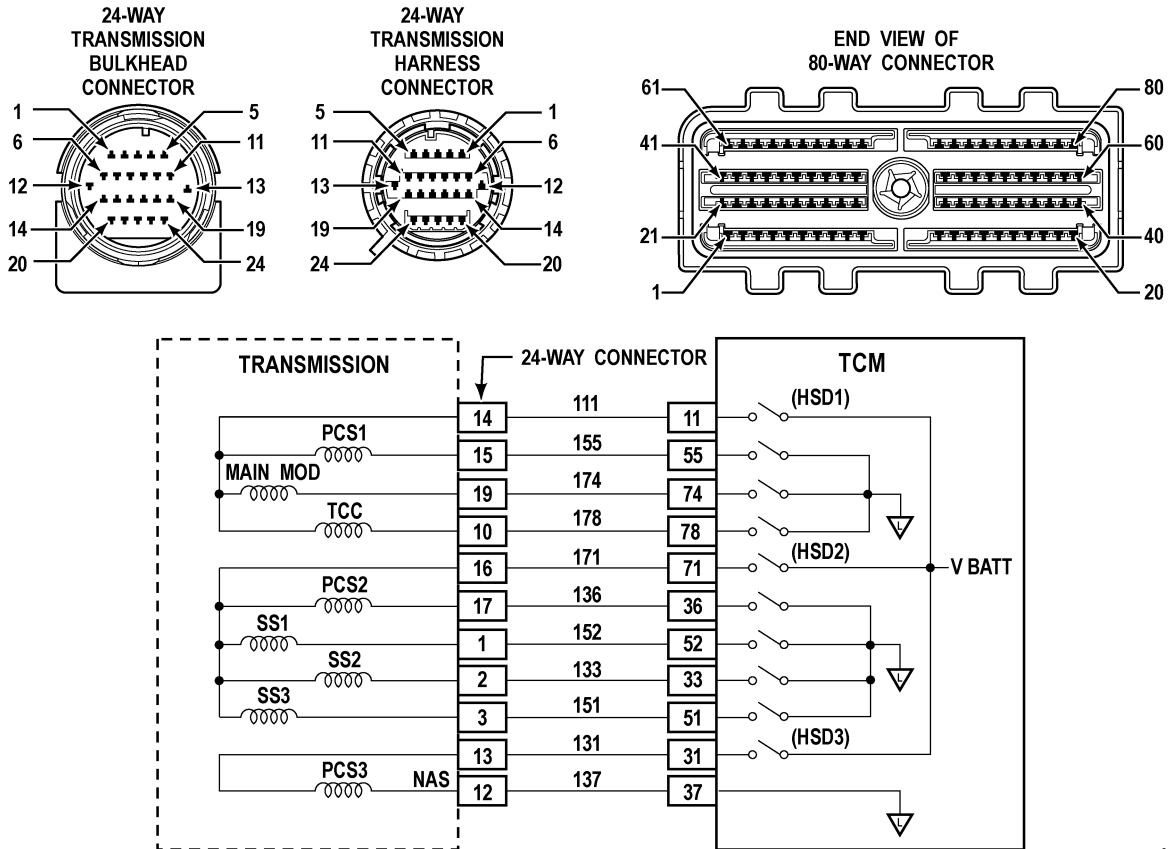
DTC P2535 Ignition Switch Run/Start—Circuit High *(cont'd)*

Step	Action	Value(s)	Yes	No
4	1. Turn OFF the ignition. 2. Disconnect the 80-way TCM connector and install the J-39700 Universal Breakout Box to the 80-way connector. 3. Disconnect the 24-way transmission connector and leave disconnected. 4. On the J-39700 Universal Breakout Box, measure ignition voltage pin 23 to all other pins on the J-47275-1 TCM Magnetic Overlay. Was continuity measured between pin 23 and any other pin on the Breakout Box?		Go to Step 5	Go to Step 9
5	Repair the vehicle wiring harness. NOTE: The vehicle OEM has responsibility for all external wiring. The OEM should perform vehicle harness repairs. Is the repair complete?		Go to Step 9	Go to Step 6
6	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure. Is the replacement complete?		Go to Step 9	Replace TCM
7	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use the Allison DOC® software to check for active DTCs. Is DTC P2535 active after reprogramming the TCM?		Go to Step 8	Go to Step 9

DTC P2535 Ignition Switch Run/Start—Circuit High *(cont'd)*

Step	Action	Value(s)	Yes	No
8	1. Turn ignition OFF. 2. Install a test TCM and torque bolt in the TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start engine and apply and release service brakes. 4. Using the Allison DOC[®] software check for active codes and monitor service brake status on the TCM input wire 123. 5. If codes are not active with test the TCM installed, then turn ignition OFF and re-install original the TCM. 6. Restart the engine and check again for active DTCs. NOTE: In most cases, the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6 TCM DIAGNOSTIC PROCEDURE. Is repair or replacement complete?		Go to Step 9	
9	To verify the repair: 1. Clear the DTC. 2. Drive the vehicle under normal operating conditions. 3. Using the J-48624 Translator device with the J-41788 OBD II Connector, monitor the ignition voltage with the Allison DOC[®] software. 4. Drive the vehicle under normal operating conditions. Did DTC P2535 return?		Begin Diagnostic again. Go to Step 1	Repair complete.

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance



3217237

Circuit Description

PCS1 is a Pressure Proportional to Current (PPC) solenoid used to control oncoming and off-going and holding pressure to any one of five clutches.

The TCM sends control current to PCS1 from High Side Driver 1 (HSD1) via wire 111. HSD1 is continuously on unless the TCM detects a fault condition. The TCM regulates the amount of current to PCS1 by switching the low side driver on and off. Wire 155 completes the circuit between PCS1 and its low side driver. DTC P2728 indicates that the TCM processor has detected an open, short to ground, short to power or wire to wire shorts condition in the electrical circuit. The open condition may exist in the high side (wire 111) or low side (wire 155).

This test detects the performance of the solenoid by comparing desired current to current as measured by the control integrated circuit.

Actions Taken When the DTC Sets

When DTC P2728 is active, the following conditions occur:

- If the failure occurs while in a forward range, a shift to 1st, 3rd, or 5th range is made.
- While diagnostic response is active, if shift selector is moved to **N** (Neutral), transmission shifts to neutral; if the shift selector is moved to **R** (Reverse), transmission shifts to reverse. If the shift selector is moved

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance *(cont'd)*

to **D** (Drive) or **R** (Reverse) from the range failed in, the transmission will shift to the requested range if transmission operating conditions allow. If the shift selector is moved to **N** (Neutral), the transmission will shift to neutral.

- The Service Transmission message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- The **Malfunction Indicator Lamp (MIL)** illuminates on first occurrence.
- The TCM forces Variable Modulated Main off.
- The DTC is stored in the TCM history.



NOTE: When connecting Allison DOC® to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use J-48624 Translator and J-41788 OBD II Connector.

Conditions for Clearing the DTC

Use Allison DOC® to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

The following procedures are not documented in any Allison procedures or in any Allison Troubleshooting Manual or Service Manual and should not be used as a method to diagnose any transmission DTCs, function, or shift quality concern:

- Back-probing any connections used for transmission features or functions may damage and/or unlock terminals from the back-probed connector creating permanent or intermittent shorts and/or open circuits. If possible, use J-39700 Universal Breakout Box, J-48624 Translator and J-41788 OBD II Connector, and appropriate magnetic overlays to troubleshoot the vehicle.
- Load-testing any transmission-related circuits with any other electrical devices such as vehicle lamps or relays, especially with the TCM connected to the harness. Use J-39700 Universal Breakout Box, J-48624 Translator and J-41788 OBD II Connector with Allison DOC® to monitor the circuit performance in question unless otherwise specified in the various Troubleshooting Manuals.
- Piercing a wire to check for voltages, shorts-to-grounds or other wires anywhere in the circuit but especially at the TCM. This creates a leak path for moisture and damages the wire and insulation.

An intermittent circuit condition can allow this DTC to set. Make sure you check for the following conditions at the OEM harness first, then at the transmission internal harness:

- DTC P2728 indicates an open, short to ground, short to power or wire to wire shorts in the electrical circuit for the PCS1.
- Inspect the wiring for poor electrical connections at the TCM and the transmission main connector. Look for the following conditions:
 - A bent terminal.
 - A backed-out terminal.
 - A damaged terminal.

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance (cont'd)

- Poor terminal tension.
- A chafed wire.
- A broken wire inside the insulation.
- Inspect OEM wiring harness routing. Look for possible contact points where chafing could occur leading to an open circuit condition. Moving parts on the vehicle could be contacting the harness; this includes parking brake drum, suspension components, transmission shift linkage, etc.
- When diagnosing for an intermittent open condition, massage the wiring harness while watching the test equipment for a change. It may be necessary to check continuity at individual wires within a harness to isolate an intermittent circuit ground condition.
- You may have to drive the vehicle in order to experience a fault. Use the data obtained from failure records to determine transmission range and/or certain vehicle operating variables such as temperature, run time, etc. This data can be useful in reproducing the failure mode when the DTC was set.

Tool Requirements:

- Allison DOC®
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-47275-1 TCM Magnetic Overlay
- J-47278-1 Transmission Magnetic Overlay
- J-46708 Digital Multimeter

Test Description

The numbers below refer to the step numbers on the diagnostic table.

1. This step tests for the proper ignition voltage.
- 4 This step tests the OEM harness for an open condition in either wire 111 or wire 155 of the OEM chassis harness.
- 5 This step tests the OEM harness for a wire to wire shorts condition in either wire 111 or wire 155 of the OEM chassis harness.
- 6 This step tests the OEM harness for a short to ground condition in either wire 111 or wire 155 of the OEM chassis harness.
- 7 This step tests the OEM harness for a short to power condition in either wire 111 or wire 155 of the OEM chassis harness.
8. Repair of the OEM chassis wiring harness
- 9 This step tests for wire to wire shorts in the transmission internal wire harness.
- 10 This step tests for short to ground in the transmission internal wire harness.
- 11 This step checks the resistance of PCS1.
15. Recalibrate TCM with updated version of original calibration.
16. Install a test TCM.

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance *(cont'd)*



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	Was BEGINNING THE TROUBLESHOOTING PROCESS performed?		Go to Step 2	Go to BEGINNING THE TROUBLE SHOOTING PROCESS
2	1. Connect using the Allison DOC® software with the J-48624 Translator and the J-41788 OBD II Connector. 2. Start the engine. 3. Record the DTC failure record data. 4. Monitor the ignition voltage. Is the voltage within the specified values?	9–18V	Go to Step 3	Resolve voltage problem. (Refer to System Voltage Low and System Voltage High)
3	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an open, short to ground, short to power or wire to wire shorts condition in the PCS1 electrical circuit. Did DTC return?		Go to Step 5	Go to Diagnostic Aids

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
4	1. Turn OFF the ignition. 2. Install the J-47275 TCM Connector Breakout Harness and the J-39700 Universal Breakout Box on the TCM 80-way vehicle wiring harness connector. Leave TCM disconnected. 3. Remove the 24-way connector from the transmission. At the 24-way transmission harness connector install a jumper wire from pin 14 and 15, leave transmission disconnected. 4. At the TCM J-39700 Universal Breakout Box, measure pins 11 and 55 for continuity. Did the pins have continuity between them?		Go to Step 8	Go to Step 5
5	NOTE: Review TROUBLESHOOTING OF PERFORMANCE COMPLAINTS PROCEDURES, before performing steps. 1. Turn OFF the ignition. 2. Disconnect the TCM 80-way connector. 3. Install the OEM side 80-way connector to the J-39700 Universal Breakout Box. Leave the TCM disconnected. 4. Remove the jumper wire and leave the 24-way transmission connector disconnected. 5. At the J-39700 Universal Breakout Box, test for wire to wire continuity between pins 11 and 55 to all other pins in the 80-way connector. Wire to wire continuity indicates a short between OEM chassis wiring harness wires. Was continuity measured?		Go to Step 8	Go to Step 6
6	1. Turn ignition OFF. 2. Install the J-47275 TCM Breakout Harness Adapter and J-39700 Universal Breakout Box on the 80-way OEM connector. Leave TCM disconnected. 3. Disconnect the 24-way transmission connector. 4. On the J-39700 Universal Breakout Box measure continuity between pins 11 and 55 to chassis ground. Was continuity measured between these pins and chassis ground?		Go to Step 8	Go to Step 7

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
7	1. Turn ignition OFF. 2. Install the J-47275 TCM Breakout Harness Adapter and the J-39700 Universal Breakout Box on the 80-way OEM connector. Leave TCM disconnected. 3. Remove the 24-way connector from the transmission. 4. Turn ignition ON. 5. Using a DVOM, measure for voltage between pins 11 and 55 on the 80-way connector. Voltage on either pins indicates a short to power in the wire harness. Was voltage measured?		Go to Step 8	Go to Step 9
8	Repair the OEM chassis wiring harness. NOTE: The vehicle OEM has responsibility for all external wiring. OEM chassis wire harness repairs performed by Allison Transmission distributors and dealers are not covered under Allison Transmission warranty. Is the repair complete?		Go to Step 17	
9	1. Turn ignition OFF. 2. Install the J-47278 Breakout Harness to the transmission 24-way connector. Leave the OEM harness disconnected. 3. Using a Digital volt/ohmmeter (DVOM), measure between pins 14 and 15 and all other pins on the J-39700 Universal Breakout Box and J-47278-1 Transmission 24-way Magnetic Overlay and chassis ground. Continuity would indicate a wire to wire in the internal transmission harness wires. Was continuity observed?		Go to Step 12	Go to Step 10

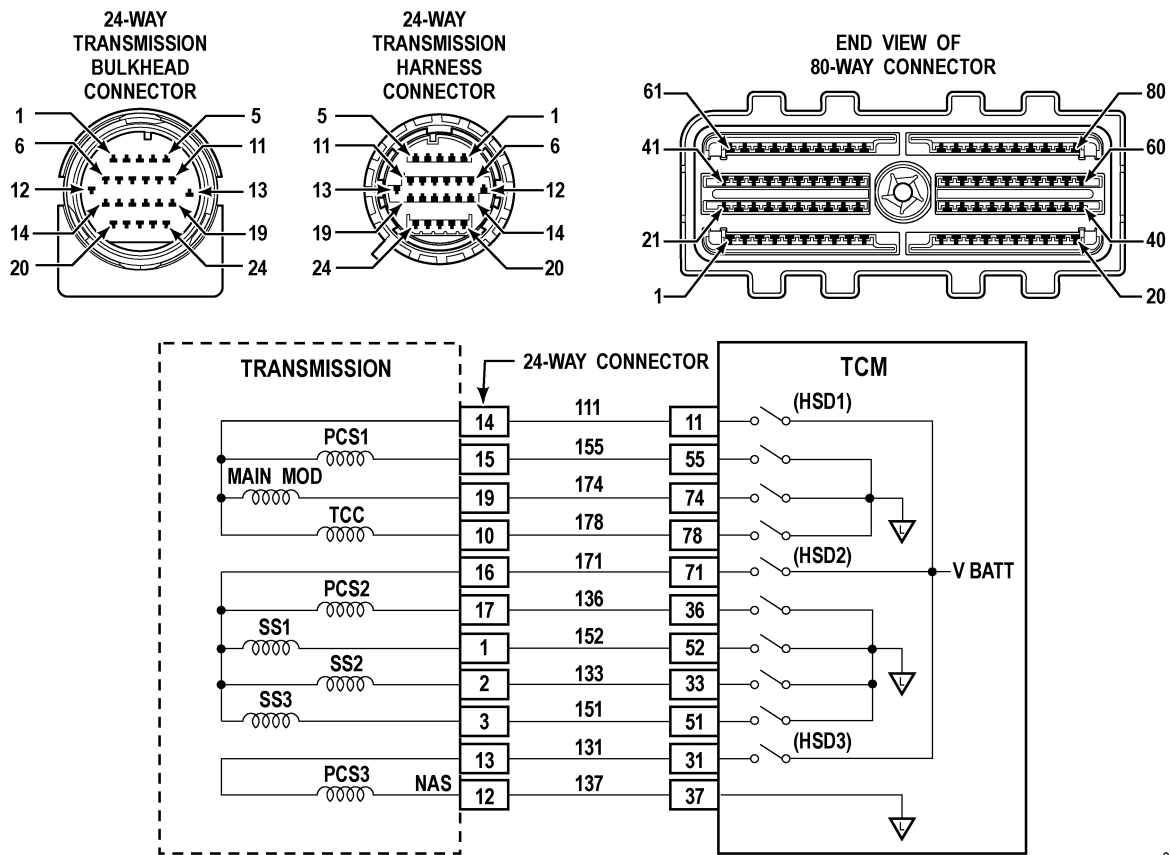
DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
10	1. Turn ignition OFF. 2. Install the J-47278 Breakout Harness to the transmission 24-way connector. Leave the OEM harness disconnected. 3. Using a Digital volt/ohmmeter (DVOM), test for short to ground between pins 14 and 15 on the J-39700 Universal Breakout Box and the J-47278-1 Transmission 24-way Magnetic Overlay and chassis ground. Continuity would indicate a short to ground in the internal transmission harness wires. Was continuity observed?		Go to Step 12	Go to Step 11
11	1. Turn ignition OFF. 2. Remove the transmission oil pan (refer to the Service Manual or the In-Chassis Maintenance). 3. Disconnect internal transmission wire harness connectors on the PCS1 solenoid 4. Using a Digital Volt/Ohmmeter (DVOM), test measure the PCS1 solenoid resistance between pins A and B. Is the resistance within specified values?	Refer to Table 6-8	Go to Step 14	Go to Step 13
12	Replace the internal transmission wire harness (refer to the Service Manual or In-Chassis Maintenance).		Go to Step 17	
13	Replace the PCS1 solenoid (refer to the Service Manual or the In-Chassis Maintenance).		Go to Step 17	
14	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure.		Go to Step 17	
15	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use Allison DOC® to check for active DTCs. Is DTC P2728 active after reprogramming the TCM?		Go to Step 16	

DTC P2728 Pressure Control Solenoid 1 (PCS1) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
16	1. Turn ignition OFF. 2. Install test a TCM and torque bolt in the TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start engine and apply and release service brakes. 4. Using the Allison DOC[®] software check for active codes and monitor PCS1 status on TCM input wire 155. 5. If codes are not active with the test TCM installed, then turn ignition OFF and re-install the original TCM. 6. Restart engine and check again for active DTCs. NOTE: In most cases, the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6 TCM DIAGNOSTIC PROCEDURE. Is repair or replacement complete?		Go to Step 17	
17	To verify the repair: 1. Clear the DTC. 2. Drive the vehicle under conditions shown in failure records. Did DTC P2728 return?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P2762 TCC (PCS) Control Circuit—Performance



3217237

Circuit Description

The TCC PCS is a Pressure Proportional to Current (PPC) solenoid used to control the TCC apply and release.

The TCM sends control current to solenoid TCC from High Side Driver 1 (HSD1) via wire 111. HSD1 is continuously on unless the TCM detects a fault condition. The TCM regulates the amount of current to the TCC by switching the low side driver on and off. Wire 178 completes the circuit between the TCC and its low side driver. DTC P2762 indicates that the TCM processor has detected an open condition in the electrical circuit. The open condition may exist in the high side (wire 111) or low side (wire 178).

Actions Taken When the DTC Sets

When DTC P2762 is active, the following conditions occur:

- The Service Transmission message is displayed in the vehicle message center on the Silverado 4500HD, 5500HD, 6500 HD and the Navistar CV models.
- The **Malfunction Indicator Lamp (MIL)** illuminates on second consecutive occurrence.
- The DTC is stored in the TCM history.
- TCM inhibits Torque Converter Clutch (TCC) engagement.

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*



NOTE: When connecting Allison DOC® to a General Motors Silverado 4500HD, 5500HD and 6500HD models or a NAVISTAR CV model use J-48624 Translator and J-41788 OBD II Connector.

Conditions for Clearing the DTC

Use the Allison DOC® to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

The following procedures are not documented in any Allison procedures or in any Allison Troubleshooting Manual or Service Manual and should not be used as a method to diagnose any transmission DTCs, function, or shift quality concern:

- Back-probing any connections used for transmission features or functions may damage and/or unlock terminals from the back-probed connector creating permanent or intermittent shorts and/or open circuits. If possible, use J-39700 Universal Breakout, the J-48624 Translator and J-41788 OBD II Connector, and appropriate magnetic overlays to troubleshoot the vehicle.
- Load-testing any transmission-related circuits with any other electrical devices such as vehicle lamps or relays, especially with the TCM connected to the harness. Use the J-39700 Universal Breakout, the J-48624 Translator and the J-41788 OBD II Connector with the Allison DOC® software to monitor the circuit performance in question unless otherwise specified in the various Troubleshooting Manuals.
- Piercing a wire to check for voltages, shorts-to-grounds or other wires anywhere in the circuit but especially at the TCM. This creates a leak path for moisture and damages the wire and insulation.

An intermittent circuit condition can allow this DTC to set. Make sure you check for the following conditions at the OEM harness first, then at the transmission internal harness:

- DTC P2762 indicates an open, short to ground, short to power or wire to wire shorts in the electrical circuit for the TCC solenoid.
- When this DTC sets there can be a noticeable reduction of engine performance.
- Inspect the wiring for poor electrical connections at the TCM and the transmission main connector. Look for the following conditions:
 - A bent terminal
 - A backed-out terminal
 - A damaged terminal
 - Poor terminal tension
 - A chafed wire
 - A broken wire inside the insulation
- Inspect OEM wiring harness routing. Look for possible contact points where chafing could occur leading to an open circuit condition. Moving parts on the vehicle could be contacting the harness; this includes parking brake drum, suspension components, transmission shift linkage, etc.
- When diagnosing for an intermittent open condition, massage the wiring harness while watching the test equipment for a change. It may be necessary to check continuity at individual wires within a harness to isolate an intermittent circuit ground condition.

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*

- You may have to drive the vehicle in order to experience a fault. Use the data obtained from failure records to determine transmission range and/or certain vehicle operating variables such as temperature, run time, etc. This data can be useful in reproducing the failure mode when the DTC was set.

Tool Requirements:

- Allison DOC® software
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-47275-1 TCM Magnetic Overlay
- J-47278-1 Transmission Magnetic Overlay
- J-46708 Digital Multimeter

Test Description

The numbers below refer to the step numbers on the diagnostic table.

1. This step tests for the proper ignition voltage.
4. This step tests the OEM harness for an open condition in either wire 111 or wire 178 of the OEM chassis harness.
5. This step tests the OEM harness for a wire to wire shorts condition in either wire 111 or wire 178 of the OEM chassis harness.
6. This step tests the OEM harness for a short to ground condition in either wire 111 or wire 178 of the OEM chassis harness.
7. This step tests the OEM harness for a short to power condition in either wire 111 or wire 178 of the OEM chassis harness.
9. This step tests for wire to wire shorts in the transmission internal wire harness.
10. This step tests for short to ground in the transmission internal wire harness.
11. This step checks the resistance of TCC solenoid.
15. Recalibrate TCM with updated version of original calibration.
16. Install a test TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	Was BEGINNING THE TROUBLESHOOTING PROCESS performed?		Go to Step 2	Go to BEGINNING THE TROUBLE SHOOTING PROCESS
2	1. Connect the Allison DOC® software with the J-48624 Translator and the J-41788 OBD II Connector. 2. Start the engine. 3. Record the DTC failure record data. 4. Using the Allison DOC® software monitor ignition voltage. Is the voltage within the specified values?	9–18V	Go to Step 3	Resolve voltage problem. (Refer to System Voltage Low and System Voltage High)
3	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an open, short to ground, short to power or wire to wire shorts condition in the TCC solenoid electrical circuit. Did DTC return?		Go to Step 5	Go to Diagnostic Aids

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
4	NOTE: Review WIRE CHECK PROCEDURES before performing steps. 1. Turn ignition OFF. 2. Install the J-47275 TCM Breakout Harness Adapter and the J-39700 Universal Breakout Box on the TCM 80-way vehicle wiring harness connector. Leave TCM disconnected. 3. Remove the 24-way connector from the transmission. At the 24-way transmission harness connector install jumper wire from pin 10 and 14, leave the transmission disconnected. 4. On the J-39700 Universal Breakout Box, measure pins 11 and 78 for continuity on the J-47275-1 TCM Overlay. Did the pins have continuity between them?		Go to Step 5	Go to Step 7
5	1. Turn ignition OFF. 2. Disconnect the TCM 80-way connector. 3. Install the OEM side 80-way connector to the Install the J-47275 TCM Breakout Harness Adapter and the J-39700 Universal Breakout Box Leave the TCM disconnected. 4. Remove the jumper wire and leave the 24-way transmission connector disconnected. 5. On the J-39700 Universal Breakout Box, measure pins 11 and 78 and all other pins on the J-47275-1 TCM Overlay. Wire to wire continuity indicates a short between OEM chassis wire harness wires. Was continuity measured?		Go to Step 8	Go to Step 6
6	1. Turn ignition OFF. 2. Install J-47275 TCM Breakout Harness Adapter and J-47275-1 TCM Overlay and J-39700 Universal Breakout Box on the 80-way OEM connector. Leave TCM disconnected. 3. Disconnect the 24-way transmission connector. 4. On the J-39700 Universal Breakout Box, measure pins 11 and 78 to ground on the J-47275-1 TCM Overlay. Was continuity measured between these pins and chassis ground?		Go to Step 8	Go to Step 7

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
7	1. Turn ignition OFF. 2. Install J-47275 the TCM Breakout Harness Adapter and the J-47275-1 TCM Overlay and the J-39700 Universal Breakout Box on the 80-way OEM connector. Leave TCM disconnected. 3. Remove the 24-way connector from the transmission. 4. Turn ignition ON. 5. On the J-39700 Universal Breakout Box, measure pins 11 and 78 to ground on the J-47275-1 TCM Overlay. Voltage on either pin indicates a short to power in the wire harness. Was voltage measured?		Go to Step 8	Go to Step 8
8	Repair the vehicle wiring harness. NOTE: The vehicle OEM has responsibility for all external wiring. Harness repairs performed by Allison Transmission distributors and dealers are not covered under Allison Transmission warranty. Is the repair complete?		Go to Step 9	Go to Step 10
9	1. Turn ignition OFF. 2. Install the J-47278 Breakout Harness to the transmission 24-way connector. Leave the OEM harness disconnected. 3. Using a Digital volt/ohmmeter (DVOM), measure between pins 10 and 14 and all other pins on the J-39700 Universal Breakout Box and J-47278-1 Transmission 24-way Magnetic Overlay and chassis ground. Continuity would indicate a wire to wire in the internal transmission harness wires. Was continuity observed?		Go to Step 12	Go to Step 10
10	1. Turn ignition OFF. 2. Install the J-47278 Breakout Harness to the transmission 24-way connector. Leave the OEM harness disconnected. 3. Using a Digital volt/ohmmeter (DVOM), test for short to ground between pins 10 and 14 on the J-39700 Universal Breakout Box and the J-47278-1 Transmission 24-way Magnetic Overlay and chassis ground. Continuity would indicate a short to ground in the internal transmission harness wires, Was continuity observed?		Go to Step 12	Go to Step 11

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
11	1. Turn ignition OFF. 2. Remove transmission oil pan (refer to the Service Manual or the In-Chassis Maintenance). 3. Disconnect the internal transmission wire harness connectors on the TCC solenoid. 4. Using a Digital Volt/Ohmmeter (DVOM), test measure the TCC solenoid resistance between pins A and B. Is the resistance within specified values?	Refer to Table 6-8	Go to Step 14	Go to Step 13
12	Replace the internal transmission wire harness (refer to the Service Manual or the In-Chassis Maintenance).		Go to Step 17	
13	Replace the TCC solenoid (refer to the Service Manual or the In-Chassis Maintenance).		Go to Step 17	
14	NOTE: In most cases the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6. TCM Diagnostic Procedure.		Go to Step 17	
15	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use the Allison DOC[®] software to check for active DTCs. Is DTC P2762 active after reprogramming the TCM?		Go to Step 16	Go to Step 17
16	1. Turn ignition OFF. 2. Install a test TCM and torque bolt in the TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start the engine and apply and release service brakes. 4. Using the Allison DOC[®] software check for active codes and monitor the TCC status on the TCM input wire 178. 5. If codes are not active with the test TCM installed, then turn ignition OFF and re-install the original TCM. 6. Restart engine and check again for active DTCs. NOTE: In most cases, the TCM is not at fault. Investigate thoroughly before replacing the TCM. Refer to 4-6 TCM DIAGNOSTIC PROCEDURE. Is repair or replacement complete?		Go to Step 17	

DTC P2762 TCC (PCS) Control Circuit—Performance *(cont'd)*

Step	Action	Value(s)	Yes	No
17	To verify the repair: 1. Clear the DTC. 2. Drive the vehicle under conditions shown in failure records. Did DTC P2762 return?		<i>Begin the diagnosis again.</i> <i>Go to Step 1</i>	<i>Repair complete.</i>

Appendix B. 3K4K Troubleshooting

DTC P0600 Internal Serial Peripheral Interface (SPI) Diagnostics

Circuit Description

This DTC is set when the TCM detects an internal communication fault between the microprocessor and the solenoid control integrated circuits internal to the TCM.

Actions Taken When the DTC Sets

When DTC P0600 is active, the following conditions occur:

- The **MALFUNCTION INDICATOR LAMP** illuminates on first occurrence.
- The DTC is stored in the TCM history.
- Transmission operates in hydraulic default: **R** (Reverse), **N** (Neutral), and **3** (Third Range).

Conditions for Clearing the DTC

Replace the TCM.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

1. This step tests for an active DTC.
2. Validate the DTC.
3. Replace the TCM.

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC® software. 2. Start engine. 3. Using the Allison DOC® software, record snapshot showing active or inactive DTC(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC P0600 active?		Go to Step 3	Troubleshoot any other active DTCs if present. If no other DTCs are active, go to Step 2
2	1. Clear the DTC. 2. Start the engine and test drive the vehicle. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). NOTE: This DTC is intended to detect an internal TCM failure. Did DTC P0600 return?		Go to Step 3	System OK. Clear inactive DTCs and return vehicle to service

DTC P0600 Internal Serial Peripheral Interface (SPI) Diagnostics *(cont'd)*

Step	Action	Value(s)	Yes	No
3	1. Turn ignition OFF. 2. Install a new TCM and tighten the bolt to 2.0 – 3.2 N·m (18-28 lb in). 3. Install or reconnect OEM components and connectors. 4. Start engine. 5. Using the Allison DOC® software, check for active DTCs. Is DTC P0600 active with the new TCM?		<i>Begin the diagnosis again. Go to Step 1</i>	<i>Repair complete.</i>

DTC P07CE Neutral At Stop Not Functioning

Description:

This DTC is set when the Neutral At Stop (NAS) is not functioning. This test monitors the inputs that affect the NAS functionality. This DTC is enabled when the Neutral At Stop: Emissions Credit Vehicle is enabled.

How to Determine “NEUTRAL At Stop: Emission Credit Vehicle” Calibration Setting in the TCM:

The setting for “NEUTRAL At Stop: Emission Credit Vehicle” can be found using Allison DOC® Premium version 2018.1 or later by choosing “Additional Calibration Information” on the Calibration Information screen.

Additional Calibration Information			
Read-Only Calibration Information/Constants		Value	
J1939 SA: EBC1 EBS Brake Switch		254	
J1939 SA: EBC1 Engine Retarder Selection		254	
J1939 SA: EEC2 Accelerator Pedal Kickdown Switch		254	
J1939 SA: EEC2 Accelerator Pedal Position 1		254	
J1939 SA: EEC2 Accelerator Pedal Position 2		254	
J1939 SA: EEC2 DPF Thermal Management		254	
J1939 SA: EEC2 Remote Accelerator Pedal Position		254	
J1939 SA: EEC2 SCR Thermal Management		254	
J1939 SA: EEC2 Vehicle Acceleration Rate Limit Status		254	
J1939 SA: PTOE Enable Switch - Transmission Input Shaft PT...		254	
J1939 SA: PTOE Enable Switch - Transmission Input Shaft PT...		254	
J1939 SA: PTOE Enable Switch - Transmission Output Shaft P...		254	
J1939 SA: TC1 Transmission Mode 2		254	
J1939 SA: TC1 Transmission Mode 3		254	
J1939 SA: TC1 Transmission Requested Launch Gear		254	
J1939 SA: TC1 Transmission Reverse Gear Shift Inhibit Request		254	
J1939 SA: TCI Transfer Case Status		254	
J1939 SA: B2 Demanded Brake Application Pressure		254	
AUTOMATIC NEUTRAL - BRAKE-BASED (BBAN) INPUT		Disabled	
RANGE INHIBIT INDICATOR		Disabled	
HILL HOLD INTERFACE		Disabled	
NEUTRAL AT STOP: Emission Credit Vehicle		No	
SEM/LRTP & Engine Torque Information		Value	
SEM/LRTP Compatibility		Compatible	
SEM Validated		ECM doesn't support SEM	
LRTP Validated		ECM doesn't support LRTP	
SEM Enabled Status		Enabled	
LRTP Enabled Status		Enabled	
SEM Torque Reduction Status		Correct Response	
LRTP Torque Reduction Status		Correct Response	
Unapproved SEM Torque Reducing Device		Information Not Valid	
Unapproved LRTP Torque Reducing Device		Information Not Valid	
Max Eng. Torq. Allowed during loss of J1939 Com...		894.66 ft-lb	
Peak Torque from AETC Message		619.55 ft-lb	

J1939 SAs (Source Addresses)		
00 - Engine #1	15 - Retarder - Engine	41 - Retarder, Exhaust, Eng #1
03 - Transmission #1	16 - Retarder - Driveline	42 - Headway Controller
04 - Transmission #2	17 - Cruise Control	49 - Cab Controller - Primary
05 - Shift Console, Primary	23 - Instrument Cluster #1	61 - Exhaust Emission Controller
06 - Shift Console, Secondary	33 - Body Controller	232 - Forward Road Image Processor
11 - Brakes - System Controller	39 - Management Computer #1	
254 - Autodetected (To view 'Autodetected' source addresses, connect to Data Bus Viewer and select J1939 as the protocol)		

4175527

Figure 1. Calibration Information Screen

The setting for “NEUTRAL At Stop: Emission Credit Vehicle” can also be found in the FuelSense® section of Allison Calibration Configuration Tool (ACCT), which can be found in the Engineering section of the <http://hub.allisontransmission.com/>. The ACCT Calibration Summary Report will display this new parameter and calibration setting only if the answer is set to YES in the calibration.

DTC P07CE Neutral At Stop Not Functioning (cont'd)

FuelSense®		
GPIO Wire	Parameter	Setting
	FuelSense [16100]	FuelSense 2.0 Max [60]
	FuelSense 2.0: Coasting NEUTRAL AT STOP [17700]	DISABLED [0]
	DYNAMIC SHIFT SENSING [16000]	DISABLED [0]
	NEUTRAL AT STOP [25270]	PREMIUM - VIA SERVICE BRAKE STATUS INPUT
	NEUTRAL AT STOP: Brake Application Pressure Activation Level [25273]	83
	NEUTRAL AT STOP: Brake Application Pressure Deactivation Level [25274]	69
	A NEUTRAL AT STOP: Emission Credit Vehicle [25275]	YES [1]
	ACCELERATION RATE MANAGEMENT [12000]	ENABLED [1]

4156709

When viewing or editing service calibration requests in ACCT, a green leaf icon  will appear next to the “NEUTRAL At Stop: Emission Credit Vehicle” and “NEUTRAL AT STOP” parameters if the answer to “NEUTRAL At Stop: Emission Credit Vehicle” parameter is set to YES. In this case, these parameters can only be modified by Allison service personnel upon receipt of OEM authorization.

Action Taken When the DTC Sets

When DTC P07CE is active, the following conditions occur:

- The **CHECK TRANS** indicator is illuminated.
- The DTC is stored in the TCM history.
- TCM inhibits Neutral at Stop operation.

Conditions for Clearing the DTC/CHECK TRANS Light

Use Allison DOC® Premium to clear the DTC from TCM history. The TCM automatically clears the DTC from TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

Setting one or more of the following conditions will cause NAS not to function and DTC P07CE to set:

- The Service Brake Input has failed setting DTC(s)
 - U0400 Invalid Communication Link Data Received
 - P0703 Brake Switch Circuit
- Engine Speed
 - P0725 Engine Speed Sensor Circuit
 - P0726 Engine Speed Sensor Circuit - Performance
 - P0727 Engine Speed Sensor Circuit - No Signal
- NAS input fails
 - When NAS is configured as a wired input, will set a P071A in addition to the P07CE
- Transmission Sump Temperature
 - P0711 Transmission Fluid Temperature Sensor Circuit – Performance
 - P0712 Transmission Fluid Temperature Sensor Circuit – Low Input

DTC P07CE Neutral At Stop Not Functioning (cont'd)

- P0713 Transmission Fluid Temperature Sensor Circuit – High Input
- Throttle Input failed when input is over the CAN bus
 - Verify throttle signal is present on the Data Bus using the Data Bus Viewer
- Throttle Input failed when input is an analog signal or a Pulse Width Modulation (PWM) signal
 - P0122 Pedal Positon Sensor Circuit – Low Voltage
 - P0123 Pedal Positon Sensor Circuit – High Voltage
 - P1891 Throttle Position Sensor (TPS) PWM Signal – Low Input
 - P1892 Throttle Position Sensor (TPS) PWM Signal – High Input

Test Description

Each item number description in this list correlates to the identical number shown in the DTC table "Step" column and is meant to briefly describe the "Action" column procedures for a particular step in the table. The DTC troubleshooting step descriptions examine the following:

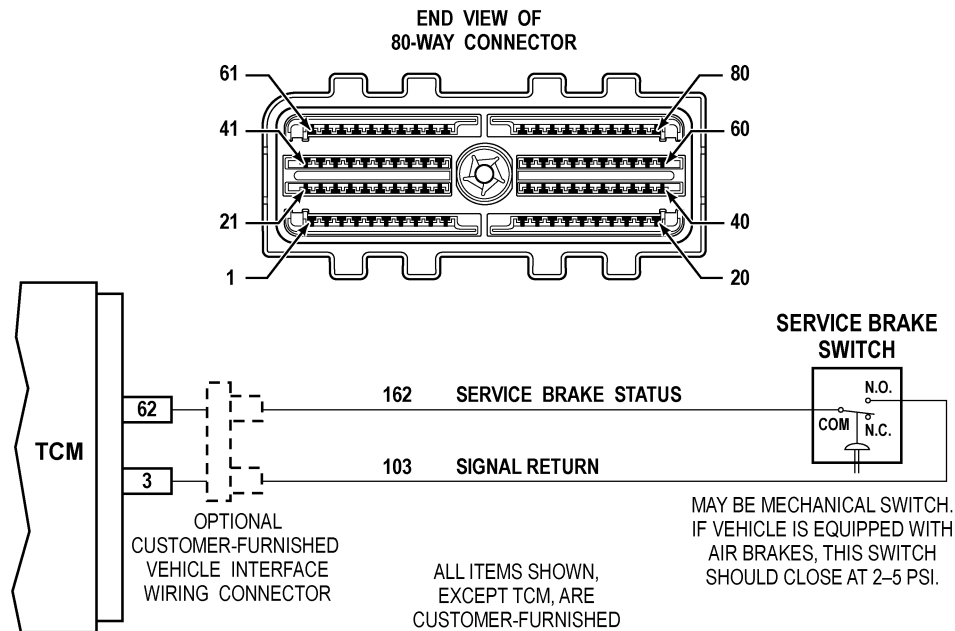
1. Check for active DTC.
2. Check for NAS not functioning.
3. Recalibrate TCM with updated version of original calibration.
4. Install a test TCM.

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC® software. 2. Start engine. 3. Record snapshot using the Allison DOC® software showing active or inactive code(s). 4. Review the failure records report from snapshot to determine conditions when the DTC occurs. Is DTC P07CE active?		<i>Troubleshoot any other active DTCs, if present. If no other DTCs are active, go to Step 5</i>	Go to Step 2
2	1. Clear the DTC. 2. Start the engine and test drive the vehicle. NOTE: This DTC is intended to detect NAS not functioning due to a failed input. 3. Attempt to duplicate the same conditions observed in the failure records (range attained, temperature, etc.). Did DTC P07CE return?		Go to Step 4	System OK. Clear inactive DTCs and return vehicle to service.

DTC P07CE Neutral At Stop Not Functioning (cont'd)

Step	Action	Value(s)	Yes	No
3	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software. 2. Once the TCM recalibration is complete, use Allison DOC® to check for active DTCs. Is DTC P07CE active after reprogramming the TCM?		Go to Step 4	Go to Step 5
4	1. Turn ignition OFF. 2. Install a test TCM and tighten the bolt to 2.0–3.2 N·m (8-28 lb in). 3. Install or reconnect OEM components and connectors. 4. Start engine. 5. Using the Allison DOC® software, check for active DTCs. 6. If DTC are not active with a test TCM installed, then turn ignition off and reinstall the original TCM. 7. Restart engine and check again for active DTCs. Is DTC P07CE active with original TCM and inactive with test TCM?		Install a new TCM. Go to Step 5 after repairs are made.	If DTC is active with both the test TCM and the original TCM, do not replace the TCM. Review Diagnostic Aids for this DTC. Begin diagnosis again. Go to Step 1
5	Acquire new Allison DOC® snapshot while driving vehicle under same conditions, if possible, noted in failure records from Step 1. Did DTC P07CE return?		Begin the diagnosis again. Go to Step 1	Repair complete.

DTC P0703 Brake Switch Circuit



434904

Circuit Description

This test monitors whether vehicle service brake switch status is in a stuck "ON" or "OFF" state.

Service brake status is relayed to the TCM by a mechanical switch, or over the J1939 datalink indicating the service brake has been applied. Input wire 162 is used to send a positive signal to the TCM. Wire 103 is used in this circuit as the signal return to the TCM.

DTC P0703 is only triggered when input wire 162 is being used for the service brake status signal and when the number of vehicle accelerations with brake switch "ON" exceeds a calibration value. This DTC may also set when the number of vehicle decelerations to a stop with the brake switch "OFF" exceeds a calibration value. This code will not be triggered if the Service Brake Status Input is broadcast on J1939 datalink.

This test counts how many acceleration events occur while the brake switch input indicates "ON". Failure is reported when the number of events exceeds 3 acceleration while Neutral at Stop is "ON".

In some applications, this test counts how many deceleration events occur while the brake switch input indicates "OFF" and the engine running time while in range. Failure is reported when the number of events exceeds 20 deceleration events and the engine running time exceeds a calibration.

Action Taken When the DTC Sets

- The TCM does not illuminate the **CHECK TRANS** light.
- The **CHECK TRANS** indicator is illuminated on Emergency Vehicle Series (EVS) and Specialty Series (SPS) only.
- DTC is stored in TCM history.

DTC P0703 Brake Switch Circuit *(cont'd)*

- Some feature ranges may be inhibited when a valid Service Brake Status (SBS) state is not detected by the TCM. The range inhibit light will illuminate when range is inhibited.

Conditions for Clearing the DTC/CHECK TRANS Light

Use the Allison DOC® software to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Diagnostic Aids

This DTC may be caused by:

- Open or short in wire 103 or wire 162.
- Malfunctioning brake system control components such as:
 - miswired or defective brake system wiring.
 - defective brake pressure switches.
- Defective TCM.

Review applicable information in the Allison DOC® Technician's Library, , and other related Appendices.

Tool Requirements:

- Allison DOC® software
- J-39700 Universal Breakout Box
- J-47275 TCM Breakout Harness
- J-46708 Digital Multimeter
- J-47275-1 Magnetic Overlay

DTC Troubleshooting Step Description

Each item number description in this list correlates to the identical number shown in the DTC table "Step" column and is meant to briefly describe the "Action" column procedures for a particular step in the table. The DTC troubleshooting step descriptions examine the following:

1. Check for active DTC.
 2. Check for short to ground or another wire in input wire.
 3. Check for high resistance or open in input wire.
 5. Recalibrate TCM with updated version of original calibration.
- Install a test TCM.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to for the procedure to determine the tool resistance that is added to a test circuit.

DTC P0703 Brake Switch Circuit (cont'd)



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or bodybuilder-provided components or any external wire harnesses not provided by Allison Transmission, Inc.

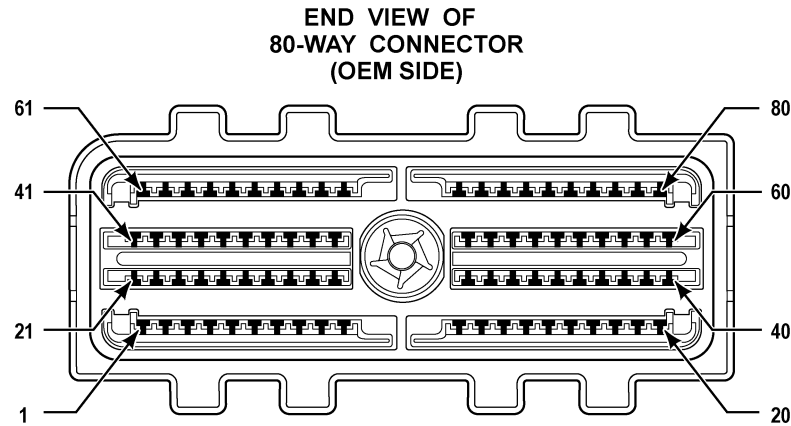
Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC[®] software. 2. Start the engine. 3. Record snapshot using the Allison DOC[®] software showing active or inactive code(s). 4. Review the failure records report from the snapshot to determine conditions when DTC occurs. Is DTC P0703 active?		Go to Step 2	Troubleshoot any other active codes, if present. If no DTCs are active, then go to Step 6 .
2	1. Turn ignition OFF. 2. Connect the J-47275 TCM Breakout Harness to J-39700 Universal Breakout Box. 3. Connect the OEM chassis harness 80-way connected to the J-47275 TCM Breakout Harness OEM side. 4. Leave the TCM side of the J-47275 TCM Breakout Harness disconnected from TCM. 5. Disconnect input wire at SBS signal source end of circuit. Leave SBS wire installed in the OEM TCM 80-way. 6. Using the J-46708 Digital Multimeter, measure the resistance from the terminal for the Service Brake Status (SBS) analog input (e.g., terminal 62 for most calibrations) on the J-47275-1 Magnetic Overlay to all other labeled terminals on the J-47275-1 Magnetic Overlay and to chassis ground. Does circuit resistance measure 20 kΩ or more to all other terminals and chassis ground?	20 kΩ or more	Go to Step 3	Resolve OEM input wiring issue. Go to Step 6

DTC P0703 Brake Switch Circuit (cont'd)

Step	Action	Value(s)	Yes	No
3	1. Turn ignition OFF. 2. Remove the J-39700 Universal Breakout Box. 3. Using the J-46708 Digital Multimeter, check for high resistance or open circuit in W162. Does circuit resistance measure 2 Ω or less through W162?	2 Ω or less	Go to Step 5	Resolve OEM input wiring issue. Go to Step 6
4	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software 2. Once the TCM recalibration is complete, use Allison DOC® to check for active DTCs. Is DTC P0703 active after reprogramming the TCM?		Go to Step 5	Go to Step 6
5	1. Turn ignition OFF. 2. Install test a TCM and torque bolt in the TCM to 2.0-3.2 N·m (18-28 lb in). 3. Start engine. 4. Using the Allison DOC® software and the snap shot feature, check for active codes. 5. If codes are not active with the test TCM installed, then turn ignition OFF and re-install the original TCM. 6. Restart engine and check again for active DTCs. NOTE: Vehicle must be road tested in order for this code to go active. Is DTC active with the original TCM and inactive with a test TCM?		Install a new TCM. Go to Step 6 after repair	If DTC is active with both test TCM and original TCM, then reinstall the original TCM. Resolve OEM integration issue, e.g., defective brake switch, multiplex signal source, etc. Go to Step 6
6	To verify the repair: 1. Turn ignition OFF. 2. Install or reconnect all OEM and transmission components and connectors, if needed. 3. Use the Allison DOC® software to clear inactive DTCs from history. 4. Acquire new Allison DOC® snapshot while driving vehicle under same conditions, if possible, noted in failure records. Did DTC P0703 return?		Begin the diagnosis again. Go to Step 1 .	Repair complete.

DTC P071A Neutral at Stop Input Failed On



301748

Circuit Description

When Function AS: Neutral at Stop is active, the Transmission Control Module (TCM) automatically commands transmission operation at a reduced load state similar to Neutral (N). The purpose of the function is to reduce the load on the engine when the vehicle is stopped which improves fuel economy and also reduces heat load of the transmission in high start/stop duty cycles. To activate Neutral at Stop, the vehicle must be in first range, at a stop, service brakes applied, accelerator pedal approximately at 0%, and the TCM GPI terminal for Neutral at Stop must see V+, V Ign, or V Bat. Neutral at Stop deactivates when the service brake is released. Supplemental controls such as a door switch or a Neutral at Stop enable dash switch may be wired in series with the service brake pressure switch; alternately, a vehicle Programmable Logic Controller (PLC) output may switch the Neutral at Stop signal as a result of a service brake pressure switch input to the PLC. The signal used to activate Neutral at Stop may be on W102, W123 or W143, depending upon which Input/Output (I/O) package was selected in the TCM calibration. Neutral at Stop typically uses a switch-to-battery input (analog). Refer to the Allison DOC[®] Technician's Library 5th Gen I/O Functions for Neutral at Stop wiring diagrams. This test monitors whether the Neutral at Stop input status is in a stuck "ON" or "OFF" state.

In some applications, in addition, this test counts how many deceleration events occur while Neutral At Stop indicates "OFF" and the engine running time while in range. Failure is when the number of event exceeds a calibration and the engine running time exceeds a calibrated time.

Table 2. Neutral at Stop

GPI#	GPI Type	TCM Pin Number	Wire Number	Wire Color	Termination Point(s)
1	+	23	123	Green	Service Brake Pressure Switch to V+ or PLC Output
2	+	2	102	Yellow	Service Brake Pressure Switch to V+ or PLC Output
3	+	43	143	Blue	Service Brake Pressure Switch to V+ or PLC Output

Action Taken When the DTC Sets

When DTC P071A is active, the following conditions occur:

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DTC P071A Neutral at Stop Input Failed On *(cont'd)*

- The DTC is stored in the TCM history.
- The TCM does not illuminate the **CHECK TRANS** light.
- TCM inhibits Neutral at Stop operation.

Conditions for Clearing the DTC/CHECK TRANS Light

The Allison DOC[®] software may be used to clear the DTC from the TCM history. The TCM automatically clears the DTC from the TCM history if the vehicle completes 40 warm-up cycles without the DTC recurring.

Tool Requirements

- Allison DOC[®]

Diagnostic Aids

This DTC may be caused by:

- Short to power or short to another wire for the GPI circuit controlling Neutral at Stop feature; i.e., W102, W123, or W143.
- Service brake integrations: defective switch or incorrect wiring; e.g., pressure switches are closed when they should be open. If Neutral at Stop enable switch or door switch is integrated in series, all switches would need to be stuck closed or wired on the wrong side of switches; e.g., normally closed side versus normally open side.
- PLC Neutral at Stop integrations: a miswired, misprogrammed, or defective circuit from PLC controlling the TCM GPI signal for Neutral at Stop that is maintaining circuit above 3.4 volts with service brakes released.
- Neutral at Stop enabled in TCM programming error.
- TCM ground is at different voltage potential than the ground of the OEM voltage source responsible for switching GPI circuit controlling Neutral at Stop; e.g., PLC, vehicle ignition, body controller, etc.
- Defective TCM.

DTC Troubleshooting Test Descriptions

Each item number description in this list correlates to the identical number shown in the DTC table "Step" column and is meant to briefly describe the "Action" column procedures for a particular step in the table. The DTC troubleshooting step descriptions examine the following:

1. Check for active DTC.
2. Check for Neutral at Stop response.
3. Check Neutral at Stop response with wire removed from OEM TCM 80-way connector.
4. Check the TCM.
5. If DTC is still active, review diagnostic aids, and applicable information in the Universal Allison DOC[®] Technician's Library.



NOTE: The J-39700 Universal Breakout Box, adapter harnesses, jumpers, and the J-46708 Digital Multimeter leads add a few ohms of resistance to a circuit. Refer to BEGINNING THE TROUBLESHOOTING PROCESS for the procedure to determine the tool resistance that is added to a test circuit.

DTC P071A Neutral at Stop Input Failed On (cont'd)



NOTE: The Allison Transmission warranty, or the extended coverage for parts and labor, does not cover the repair or replacement of OEM or body builder provided components or any external wire harnesses not provided by Allison Transmission, Inc.

Before repairing or replacing these components or circuits that caused a transmission issue, always contact the vehicle OEM call center and/or the vehicle OEM or bodybuilder service representative to verify the warranty coverage and proper payment arrangements, arrange an alternate sublet or repair plan (if needed), and get troubleshooting assistance for the repair (such as vehicle schematics, DTC trees, parts assistance, etc.).

Step	Action	Value(s)	Yes	No
1	1. Connect the Allison DOC® software. 2. Start engine. 3. Record snapshot using the Allison DOC® software showing active or inactive code(s). 4. Review failure records report from snapshot to determine conditions when DTC occurs. Is DTC P071A active?		Go to Step 2	Troubleshoot any other active DTCs, if present. If no other DTCs are active, go to Step 6
2	1. Start engine. 2. Select D (Drive) and release the service brake. 3. Start Data Monitor feature in Allison DOC®. 4. Check status of Neutral at Stop input function and wire state. Are Neutral at Stop function and wire state OFF?		Go to Step 5	Go to Step 3
3	1. Turn ignition ON. 2. Remove Neutral at Stop input wire from OEM side of TCM 80-way. 3. Repeat tasks listed in Step 2. Are Neutral at Stop function and wire state OFF?		Repair condition causing high voltage on Neutral at Stop input wire. Review Diagnostic Aids . Go to Step 6	Go to Step 5
4	1. If the service outlet is authorized to use the TCM Reflash software, recalibrate the original TCM with the latest calibration and software 2. Once the TCM recalibration is complete, use the Allison DOC® software to check for active DTCs. Is DTC P071A active after reprogramming the TCM?		Go to Step 5	Go to Step 6

DTC P071A Neutral at Stop Input Failed On *(cont'd)*

Step	Action	Value(s)	Yes	No
5	1. Turn ignition OFF. 2. Install the test TCM and tighten the bolt to 2.0-3.2 N·m (18-28 lb in). 3. Install or reconnect all OEM and transmission components and connectors. 4. Start engine, select D (Drive) and release service brake. 5. Using the Allison DOC® software, check for active codes. 6. If codes are not active with test TCM installed, then turn ignition OFF and reinstall original TCM. 7. Repeat tasks 4 and 5. Is DTC P071A active with the original TCM and inactive with a test TCM?		<i>Install a new TCM. Go to Step 6 after repairs are made.</i>	<i>If DTC is active with both the test TCM and the original TCM, do not replace TCM. Review Diagnostic Aids for this DTC. Begin the diagnosis again. Go to Step 1</i>
6	1. Turn ignition OFF. 2. Install or reconnect all OEM and transmission components and connectors, if needed. 3. Acquire new Allison DOC® snapshot while driving vehicle under same conditions, if possible, noted in failure records from Step 1. Did DTC P071A return?		<i>Begin the diagnosis again. Go to Step 1</i>	<i>Repair complete.</i>