

Revisions to this document are noted by a stripe in the left-hand margin

SIL 14-TR-21, Rev. A
September 16, 2021
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SUBJECT: Allison Transmission 6th Generation Controls Release

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

Introduction:

Allison Transmission, Inc. (ATI) has released Allison 6th Generation Controls as of October 15, 2021. The purpose of this release is to add support of functional safety (ISO 26262) compliance, improve cybersecurity, and add CAN-FD capability.

This SIL is organized into the following sections that describe the enhancements included in 6th Generation Controls:

I. New Components:

- Transmission Control Module (TCM) Variants
- Servicing 6th Generation TCMs
- Shift Selectors
- Hall Effect Speed Sensors

II. New or Modified DTCs:

- 1000 and 2000 Series
- 3000 and 4000 Series

III. Cybersecurity Requirements:

- Offline Authentication USB Dongle

Section I – New Components:

TCM Variants:

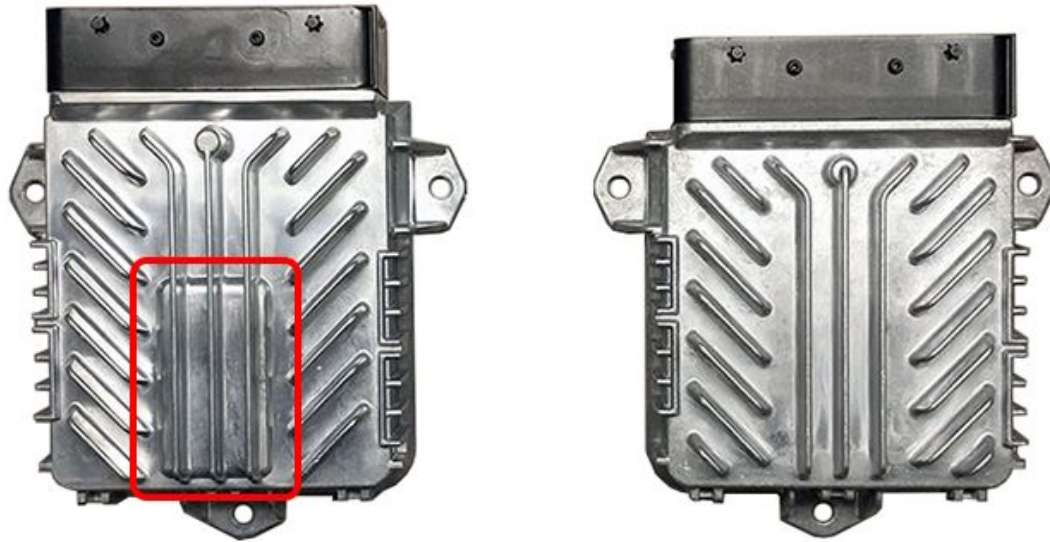
New TCMs are used with 6th Generation Controls. The 6th Generation TCMs look similar and have the same mounting footprint and same electrical connector as the 5th Generation TCMs. The 6th Generation TCM is 10mm longer and can be visually differentiated from the 5th Generation TCM by looking for the raised rectangular section between the cooling fins as shown in [Figure 1](#).

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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.



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Figure 1. 6th Generation and 5th Generation TCMs

Table 1 shows the new TCM variants and a description of each.

Table 1. 6th Generation TCM Model

6th Generation TCM Model	Type	Part Number (Blank)	5th Generation Equivalent
C71M	12 volt, all 6-speed	29562546	29556882 (A61)
C72M	12 volt, all 6-speed and 7-speed, retarder	29562547	29556883 (A62)
C73M	12 volt and 24 volt, all transmissions and features	29562548	29556884 (A63)

Servicing 6th Generation TCMs

5th Generation and 6th Generation TCMs are not compatible. As a result, 5th Generation TCMs will still be serviced by A63 and A6C TCMs. Similar to 5th Generation, only the 12/24 volt C73M will be available as a service replacement. Table 2 shows a table of the service TCM part numbers for 4th Generation, 5th Generation, and 6th Generation Controls.

Table 2. 4th Generation, 5th Generation, and 6th Generation Service TCMs

TCM Model	Description	Part Number (Blank)	TCMs Serviced
C73M	6th Generation Service TCM	29562548	C71M, C72M, C73M
A63	5th Generation Service TCM	29556884	A61, A62, A63
A6C	5th Generation Service TCM	29558100	A6A, A6B, A6C
A59	4th Generation Service TCM	29551869	A41, A42, A43, A51, A52, A53, A59

Shift Selectors:

6th Generation push button shift selectors (PBSS) are offered in Standard, Common, and Compact. The 6th Generation PBSS have the same mounting footprint and electrical connector as their 5th Generation counterparts. The 6th Generation PBSS cannot be visually differentiated from 5th Generation unless looking at the part label. The 6th Generation label shows a prominent “G6” on the right-hand side of the label, as is shown in [Figure 2](#). Additionally, when installed and powered, all 6th Generation models have a software feature that when pushing the up and down arrows, the last menu (after oil level display, DTCs, etc.) will display the selector type as “6th Gen”, as is shown in [Figure 4](#). 6th Generation push button shift selectors are not backward compatible with 5th Generation TCMs. 5th Generation bump-lever and strip (3-button and 6-button) selectors are forward compatible with 6th Generation TCMs. The installed shift selector must match the selector specified in the TCM calibration.



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Figure 2. 6th Generation PBSS Label



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Figure 3. 5th Generation PBSS Label



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Figure 4. 6th Generation PBSS Display showing “6th Gen” Text

Table 3. Service Shift Selectors

6th Generation Shift Selector Model	Type	Part Number
Push Button (PBSS)	Compact	29563388
	Compact, Alternate Mount	29563389
	Common	29563384 29563383 w/ kit
	Standard	29563387 29563386 w/ kit

Hall Effect Speed Sensors:

6th Generation Controls require the use of a new Hall Effect (HE) Output Speed Sensor, which is needed to meet Functional Safety Requirements. Engine and Turbine Speed Sensors remain of the Variable Reluctance (VR) type and are unchanged from 5th Generation Controls. The HE Sensor uses the same access bore as the VR Sensor, but the clamp configuration and connector are different to prevent installation of an incorrect sensor. The HE sensor orientation with respect to the target (tone wheel) and the wire polarity are both critical, unlike with the 5th Generation VR sensors.

The HE Output Speed Sensor is not backward compatible with 5th Generation Controls. The VR Output Speed Sensor is not forward compatible with 6th Generation Controls.

Table 4. Output Speed Sensor Part Numbers

Transmission Model	Rear Cover Part Numbers	VR Speed Sensor Part Numbers	HE Speed Sensor Part Numbers
3000 Series™ Non-Retarder	29540393, 29541001, 29546599	29544139	29566163
3000 Series™ Retarder	29546672	29543434	29566225
3000 Series™ Universal	29540394, 29506122	29543432	29566221
4000 Series™ Retarder	29551547, 29551653	29544139	29566223
4000 Series™	29540134, 29542565, 29540139, 29548961	29544139	29566224
4000 Series™ w/ Dropbox Provision	29542550	29543432	29566222
1000 and 2000 Series	29537009, 29551580, 29559870	29536408	29562542

Section II – New or Modified DTCs:

6th Generation Controls include new DTCs and modifications to existing DTCs. The following tables show the affected DTCs.

1000 and 2000 Series

Table 5. 1000 and 2000 Series Modified and Added DTCs

DTC	Description
P0600	Solenoid Controller Serial Peripheral Interface Communication Bus Off
P0604	Control Module Random Access Memory (RAM)
P060C	Internal Control Module Main Processor Performance
P0652	Sensor Reference Voltage B Circuit Fault
P0720	Output Shaft Speed Sensor Circuit
P0721	Output Shaft Speed Sensor Circuit - Performance
P0722	Output Shaft Speed Sensor Circuit - No Signal
P0965	Pressure Control Solenoid (PCS) 2 System Performance
P0969	Pressure Control Solenoid (PCS) 3 System Performance
P2728	Pressure Control Solenoid (PCS) 1 System Performance
P2762	Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit Range/Performance
P27B2	Internal Control Module Transmission Range Control Performance
P27B4	Internal Control Module Transmission Gear Direction Control Performance
P27B6	Internal Control Module Transmission Speed Sensor Performance
U0103	Lost Communication with Gear Shift Module 1
U0304	Gear Shift Module 1 Incompatible
U0404	Gear Shift Module 1 Invalid Data
U1401	J1939 TSC1 Engine Message Impostor Detected
U1402	J1939 TSC1 Compression Brake Message Impostor Detected
U1403	J1939 TSC1 Exhaust Brake Message Impostor Detected

3000 and 4000 Series

Table 6. 3000 and 4000 Series Modified and Added DTCs

DTC	Description
P0600	Solenoid Controller Serial Peripheral Interface Communication Bus Off
P0604	Control Module Random Access Memory (RAM)
P060C	Internal Control Module Main Processor Performance
P0652	Sensor Reference Voltage B Circuit Fault
P0720	Output Shaft Speed Sensor Circuit
P0721	Output Shaft Speed Sensor Circuit - Performance
P0722	Output Shaft Speed Sensor Circuit - No Signal
P085D	Gear Shift Module 1 Performance
P085E	Gear Shift Module 2 Performance
P0965	Pressure Control Solenoid (PCS) 2 System Performance
P0969	Pressure Control Solenoid (PCS) 3 System Performance
P2719	Pressure Control Solenoid (PCS) 4 System Performance
P2728	Pressure Control Solenoid (PCS) 1 System Performance
P2762	Torque Converter Clutch (TCC) Pressure Control Solenoid (PCS) Control Circuit Range/Performance
P27B2	Internal Control Module Transmission Range Control Performance
P27B4	Internal Control Module Transmission Gear Direction Control Performance
P27B6	Internal Control Module Transmission Speed Sensor Performance
P2813	Pressure Control Solenoid (PCS) 6 System Performance
U0103	Lost Communication with Gear Shift Module 1
U0291	Lost Communication with Gear Shift Module 2
U0304	Gear Shift Module 1 Incompatible
U0333	Gear Shift Module 2 Incompatible
U0404	Gear Shift Module 1 Invalid Data
U0592	Gear Shift Module 2 Invalid Data
U1401	J1939 TSC1 Engine Message Imposter Detected
U1402	J1939 TSC1 Compression Brake Message Imposter Detected
U1403	J1939 TSC1 Exhaust Brake Message Imposter Detected

Section III – Cybersecurity Requirements:

6th Generation Controls provide improved cyber security to:

- Prevent unauthorized software from operating on Allison hardware
- Prevent unauthorized tools from programming Allison hardware
- Prevent unauthorized on-vehicle messaging from impacting vehicle operation
- Protect Allison intellectual property

Offline Authentication USB Dongle

Allison's 6th Generation TCMs require TCM Reflash and Allison DOC[®] software to “authenticate” with the TCM in order to perform reflashing events, reprogramming, and certain action requests. Authentication can be achieved in two ways: 1) online with an active internet connection to Allison Product Cybersecurity System (PCS) or 2) offline with a USB dongle. The offline authentication USB dongle requires Allison HUB[™] user ID or Allison TCM Reflash user ID to activate and is good for set number of signing tokens (signs). During reflashing, reprogramming, and performing action requests, the sign count is decremented. Once the signs are depleted or near depletion, the USB dongle must be refreshed/recharged using a computer that has an active internet connection.

USB dongles are considered an essential tool and can be purchased from Noregon Systems' Allison Web Store (<https://allisonstore.noregon.com/collections/cybersecurity-e-tools>).

More information relating to the USB dongle will be included in future Allison DOC[®] and TCM Reflash SILs.