

#16-NA-019: Information on Transmission Adaptive Functions and Correcting Low Mileage Harsh Shifts, Slips, or Flares - (Aug 19, 2016)

Subject: Information on Transmission Adaptive Functions and Correcting Low Mileage Harsh Shifts, Slips, or Flares



Brand:	Model:	Model Year:		VIN:		Engine:	Transmission:
		from	to	from	to		
Buick Cadillac Chevrolet GMC	All GM Passenger Cars and Trucks	2016	2017			All	Equipped with 8L90 and 8L45 Automatic Transmission (RPOs M5U, M5T, M5N, M5X)

Involved Region or Country	North America and N.A. Export Regions
Condition	Some customers may comment on low mileage vehicles with an automatic transmissions that the shifting may feel too firm (harsh), slips, or flares. Customers should be advised that the transmission makes use of an adaptive function that will help to refine the shift feel while driving and improve shift quality.

Correction

Important: Using Tis2Web please check the ECM/TCM Software/Calibrations against what's currently in the vehicle and if the description of the update is relevant to the customer concern please perform the update prior to proceeding with the learns below. By completing the software/calibration update, the clutch adapts will clear and thus a Service Fast Learn followed by Adaptive Learning may be needed to further learn specific clutches if shift concern exists.

The following should be used to determine what steps should be followed within this document. The 8-Speed transmission utilizes a total of 5 clutches to obtain all the ratios. Utilize the chart within this document to determine which clutch may require additional adaptive learning.

- If a transmission replacement was required, reset the adapts using Service Fast Learn. Evaluate the shifts and further learn pressures and volumes if required.
- If a customer has a specific shift concern, the Service Fast Learn should be skipped. Complete the driving learn procedure to further learn pressures and volumes for the complaint shift.

Transmission Adaptive Functions

The Hydra-Matic® 8-Speed RWD transmission utilizes a line pressure and volume control system during upshifts to compensate for new transmission build variation as well as the normal wear of transmission components. The variation from new and normal wear of the apply components within the transmission over time can cause shift time (the time required to apply a clutch) to be longer or shorter than desired.

In order to compensate for these changes, the transmission control module (TCM) adjusts the pressure commands to the various pressure control (PC) solenoids to maintain the originally calibrated shift timing. The automatic adjusting process is referred to as "adaptive learning" and it is used to ensure consistent shift feel plus increase transmission durability.

The TCM monitors the A/T input speed sensor (ISS) and the A/T output speed sensor (OSS) during commanded shifts to determine if a shift is occurring too fast (harsh) or too slow (soft) and adjusts the corresponding PC solenoid signal to maintain the set shift feel. The purpose of the adapt function is to automatically compensate the shift quality for the various vehicle shift control systems. The adapt function is a continuous process that will help to maintain optimal shift quality throughout the life of the vehicle.

How to Adapt Your Transmission

Transmission adapts can be reset and relearned on most vehicles through GDS 2 by using the Transmission Service Fast Learn procedure. This procedure is completed in the service stall and no vehicle driving is required.

To complete the Transmission Service Fast Learn procedure, enter GDS 2 Diagnosis and navigate to:

- Module diagnostics
- Transmission Control Module
- Configuration / Reset Function
- Transmission Service Fast Learn

Transmission Service Fast Learn is the recommended method to reset and relearn adapts. This procedure is available on all 2016-2017 MY Trucks, Cars and SUVs with 8L45 and 8L90 Automatic Transmissions (RPOs: M5U, M5T, M5N, M5X).

When the Service Fast Learn is complete, perform a test drive and note any soft or harsh shifts.

To improve these complaint shifts further, locate the clutches that need to be learned in the following table below, and perform the required learning procedure for each clutch listed in the chart. Execute the steps below with the vehicle warmed up on a smooth level road. The driver may observe a brief pulse behavior or firm shift feel while the transmission is optimizing the clutch learn characteristics.

Note: The transmission fluid temperature must be between 35°C (95°F) and 95°C (203°F). Drive vehicle under normal conditions until this temperature range is achieved. If temperature is outside this range, the clutches will not be learned.

To Correct The Shift Feel	Learn These Clutches	
	Applying Clutch	Releasing Clutch
1-2	C4	C3
2-3	C3	C1
3-4	C5	C3
4-5	C3	C4
5-6	C4	C2
6-7	C1	C4
7-8	C4	C3
3-1	C1	C4
2-1	C3	C4
N-D	C3 - Perform garage shift adaptive learning	
N-R	C5 - Perform garage shift adaptive learning	
Power Downshifts	Just perform the shifts and they will adapt	

Note: If the harsh shift is noted when the vehicle is coming to a stop and shifting into 1st gear, this downshift is most likely a 3-1 shift.

Note: This sequence is MY 2016-2017 specific and varies from MY 2015. The following adaptive learning procedure was developed to further learn clutch pressures and volumes required for specific shifts. To expedite the learning process, it is recommended to utilize a road with minimal traffic volume that has as smooth and level surface as possible.

Note: Within GDS2 a Transmission Service Fast Learn Data page has been created to aid in performing adaptive learn by showing throttle percentage, engine speed, transmission fluid temperature, and gear command.

To Learn C1 (For 6-7 or 3-1 Shift)

1. Pressure Learns:

Note: It is recommended to utilize a road with a speed limit between of 30-45 mph (48-72 km/h) for this procedure.

- Shift the transmission into 6th gear with the PRNDM in the M position. Obtain an engine speed between 1000 and 1600 engine rpm. Maintain this condition for a total of about 5 miles (8 km). Cruise control may be used and has been found to result in faster learning of the clutch values.

2. Volume Learns:

- Complete 15 light throttle 6-7 upshifts at approximately 15% throttle to further learn C1.

To Learn C2 (For 6-5 Shift)

1. Pressure Learns:

Note: It is recommended to utilize a road with a speed limit 40-45 mph (64-72 km/h) for this procedure.

- Perform 10 normal mode 6-5 coast down shifts (zero/light brake) to learn the C2 Return Spring pressure.

2. Volume Learns:

- Shift the transmission into 8th gear with the PRNDM in the M position. Obtain an engine speed between 1000 and 1750 rpm. Maintain this condition for a total of about 5 miles (8 km). Cruise control may be used and has been found to result in faster learning of the clutch values.

To Learn C3 (For 2-3, 4-5, or N-D Shift)

Important: Application Specific Silverado & Sierra e-Assist (RPO M5X) Trucks: To enable Adaptive Learn on 8-7 Coast downs a power on (~15% throttle thru the upshift) 7-8 upshift must be performed prior to each downshift. This action enables TCC controlled slip on downshift to occur vs. TCC unlocked which occurs on normal downshifts and disables Adaptive Learn. As a supplement if the previous procedure is unsuccessful using GDS TCC Control Functions, TCC can be left enabled during 8-7 Coast downs to aid in learning C3 pressure.

1. Pressure Learns:

- Perform 10 normal mode 8-7 coast down shifts (zero/light brake) to learn the C3 Return Spring.

2. Volume Learns:

- Complete 15 light throttle 2-3 upshifts at approximately 15% throttle to further learn C3.

To Learn C4 (For 1-2, 5-6, or 7-8 Shift)

1. Pressure Learns:

Note: It is recommended to utilize a road with a speed limit between of 40-45 mph (64-72 km/h) for this procedure.

- Shift the transmission into 7th gear with the PRNDM in the M position. Obtain an engine speed between 1000 and 1750 rpm. Maintain this condition for a total of about 5 miles (8 km). Cruise control may be used and has been found to result in faster learning of the clutch values.

Important: Application Specific Express & Savana Vans Pressure Learns: Perform 10 normal mode 7-6 coast down shifts (zero/light brake) to learn the C4 Return Spring.

2. Volume Learns:

- Complete 15 light throttle 1-2 upshifts at approximately 15% throttle to further learn C4.

To Learn C5 (For 3-4 or N-R Shift)

1. Pressure Learns:

Note: It is recommended to utilize a road within a Business Park or similar area, where it is safe to drive at very slow speeds of approximately 5-25 mph (8-40 km/h).

- Shift the transmission into 3rd gear with the PRNDM in the M position. Start a very slow acceleration, starting at about 1000 rpm. Maintain the slow acceleration until you reach about 2500 rpm. Once you reach 2500 rpm, slow back down to 1000 rpm and repeat the slow acceleration up to 2500 rpm. Repeat this 10 times.

2. Volume Learns:

- Complete 15 light throttle 3-4 upshifts at approximately 15% throttle to further learn C5.

Power Downshift Adaptive Learning

Starting with the vehicle operation in 8th gear, slowly apply pressure to the accelerator pedal until downshift occurs. Repeat as necessary in each gear (8, 7, 6, 5, 4, 3 and 2).

Note: This procedure will learn the off-going clutch adapts for desired power downshift control.

Garage Shift Adaptive Learning (For N-D or N-R Shift)

1. After above clutches are learned C3 –Drive and C5 – Reverse. With the vehicle at a stop, hold foot on brake pedal and move the shifter from Neutral to Drive and release the brake once in gear allowing the vehicle to roll 5-10 feet or Neutral to Reverse and release the brake once in gear allowing the vehicle to roll 5-10 feet. Repeat as necessary until desired shift quality is achieved.

Note: This procedure will learn the C13567 (C3-Drive) and C45678R (C5 – Reverse) oncoming clutch adapts.

Warranty Information

Labor Operation	Description	Labor Time
8480318*	Transmission Service Fast Learn	Use Actual Clock Time
*This is a unique Labor Operation for Bulletin use only.		

Version	2
Modified	August 19, 2016 – Added 2017 Model Year and updated information.

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