



## STAR ONLINE PUBLICATION



**Case Number:** S2221000004

**Release Date:** October 2022

**Symptom/Vehicle Issue:** Harsh Shift During Transition From Electric Vehicle (EV) To Hybrid Engine Mode.

**Discussion:** Some customers may experience a transmission harsh shift during the transition from EV to hybrid engine mode. This condition typically happens on vehicles with less than 500 miles. There will not be any Diagnostic Trouble Codes (DTCs) set when the condition is present. If a technician receives a vehicle with the above condition, please perform the following repair procedure.

**NOTE: For vehicles experiencing the concern that have not yet been delivered to the customer, skip to the Transmission Adaptation Procedure:**

### Repair Procedure:

1. Print out the Customer Questionnaire form below and gather additional information from the customer regarding the concern.
2. Using the information gathered from the customer on when the condition happens, attempt to duplicate the concern. Was the condition duplicated?
  - a. Yes>>> Proceed to **(Step 3)**.
  - b. No>>> The document no longer applies. The transmission may have adapted, and no repairs are necessary.
3. Using wiTECH, obtain a Vehicle Scan Report and save for your records.
4. Perform the Transmission Adaptation Procedure.

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### Transmission Adaptation Procedure:

**NOTE:** The transmission oil temperature must be above 122°F (50°C) before performing the adaptation procedure.

**NOTE:** The High Voltage (HV) battery state of charge (SOC) must be above 20% before performing this procedure. If the HV battery is below 20%, charge the battery before continuing.

1. Using wiTECH, navigate to the Transmission Control Module (TCM) Data Tab and verify the Transmission Oil Temperature is above 122°F (50°C). Please see (Figure 1) If the temperature is too low, drive the vehicle until transmission reaches the proper temperature before proceeding.

NAME	VALUE	UNIT	TYPE		
TerrainModeStat_ECM	---		Sensors	...	<input type="checkbox"/>
AWD Sys Stat	---		Sensors	...	<input type="checkbox"/>
TCM Drive Program Act	---		Sensors	...	<input type="checkbox"/>
Check Drive Mode Switch	---		Sensors	...	<input type="checkbox"/>
Odometer	---	miles	Bussed Inputs	...	<input type="checkbox"/>
Transmission Oil Temperature	---	°F	Sensors	...	<input type="checkbox"/>
Torque Converter Slip	---	rpm	Sensors	...	<input type="checkbox"/>
Limp in Status	---		Sensors	...	<input type="checkbox"/>

Figure 1

2. Using wiTECH, navigate to the K0- Adaptives group in the TCM Data Tab. Click on the “+” symbol to expand that group. Please see (Figures 2 & 3)

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Figure 2.

NAME	VALUE	UNIT	TYPE
Clutch- K0 - filling pressure	4	PSI	Sensors
Clutch- K0 - filling counter	12	Counts	Sensors
Clutch- K0 - filling time	2	ms	Sensors
Clutch- K0 - fast filling counter	12	Counts	Sensors

  

NAME	VALUE	UNIT	TYPE
TerrainModeStat_ECM	Auto		Sensors
AWD Sys Stat	4-6		Sensors
TCM Drive Program Act	Standard		Sensors
Check Drive Mode Switch	Normal Mode		Sensors
Odometer	4872	miles	Busse Inputs
Transmission Oil Temperature	68	°F	Sensors
Torque Converter Slip	0	rpm	Sensors

Figure 3.

3. Record the values for the following:
  - a. K0- Filling Counter
  - b. K0- Fast Filling Counter
4. Are the K0 Filling and Fast Filling counters greater than **5**
  - a. Yes>>> Perform the TCM Adaptation Drive Learn Routine. For detailed instructions, please refer to Service Library Service Information Section 28 – DTC Based Diagnostics > Module, Transmission Control (TCM), 8P75PH > Standard Procedure > Transmission Control Module (TCM) Adaptation. **If the concern is still present after performing the Drive Learn Routine, please contact STAR.**
  - b. No>>> Proceed to Step 5.
5. Start the vehicle.
6. Place the vehicle in EV mode by pressing the Electric mode button on the left side switch bank. Please see (Figure 4)

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Figure 4

**NOTE: Keep firm pressure on the brake pedal through the next steps.**

7. Press and hold the brake pedal.
8. Place the shifter in Park, Drive, or Neutral.
9. Keeping pressure applied on the brake pedal, monitor the K0 Fill and Fast Fill counters in the TCM data. The counters should start incrementing within 30 seconds. Did the counter start to increment in 30 seconds?
  - a. Yes>>> Proceed to (**Step 10**).
  - b. No>>> Drive the vehicle to perform an engine on event and repeat steps 6-9
10. Keep pressure applied on the brake pedal until the K0 Fill and Fast Fill counter reaches **5** or more. Proceed to (**Step 11**).
11. Perform the TCM Adaptation Drive Learn Routine. For detailed instructions, please refer to Service Library Service Information Section 28 – DTC Based Diagnostics > Module, Transmission Control (TCM), 8P75PH > Standard Procedure > Transmission Control Module (TCM) Adaptation.
12. Test drive the vehicle under the operating conditions that the concern was present, to verify the repair. Proceed to (**Step 13**).

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13. Is the vehicle a customer owned vehicle that was brought in for the concern or was this procedure performed as part of a Pre-Delivery Inspection (PDI)?
- PDI vehicle>>> No further actions are necessary. Repair complete
  - Customer vehicle brought in for the concern>>> Start a STAR case and report all results. Be sure to include the Vehicle Scan Report and Customer Questionnaire results in the case. This information will be used for additional root cause analysis.

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### Customer Questionnaire:

1. Do you experience any harsh shifts while driving in Electric Vehicle (EV) Mode? If so, at what speeds does the concern typically happen?
2. Do you experience any harsh shifts while driving in Hybrid mode? If so, at what speeds does the concern typically happen?
3. Do you experience a harsh shift/engagement when the vehicle transitions from EV mode to Hybrid mode at idle, while driving, or both?
4. If the concern happens when the vehicle is transitioning from EV mode to hybrid mode while driving, do you experience:
  - a. Harsh shift when in EV mode prior to transitioning to Hybrid mode?
  - b. Harsh shift in Hybrid mode after transitioning from EV mode?
  - c. Harsh shift only when the vehicle transitions from EV to Hybrid mode?

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