

**ATTENTION:**

- GENERAL MANAGER
- PARTS MANAGER
- CLAIMS PERSONNEL
- SERVICE MANAGER

IMPORTANT - All Service Personnel Should Read and Initial in the boxes provided, right.


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QUALITY DRIVEN® SERVICE

## SERVICE BULLETIN

**APPLICABILITY:** 2018-23MY Legacy and Outback  
 2017-23MY Impreza  
 2018-23MY Crosstrek  
 2019-23MY Forester  
 2019-23MY Ascent

**NUMBER:** 16-132-20R

**DATE:** 12/18/20

**REVISED:** 01/12/23

**SUBJECT:** Diagnostic Information for Alleged Chain Slip Condition on TR580 / TR690 Transmissions

**INTRODUCTION:**

This Service Information Bulletin provides updated diagnostic procedures to follow and a brief questionnaire to complete when diagnosing an alleged Chain Slip condition on the TR580 and TR690 model CVT transmissions used in the models listed above. In some cases, the customer may have had a concern of hearing an abnormal sound and / or felt an unusual vibration while driving. This information is intended to provide Technicians a user-friendly procedure which will help to ensure an accurate diagnosis and reduce the possibility of unnecessary CVT replacements.

**SERVICE PROCEDURE / INFORMATION:**

Customer satisfaction and retention starts with performing quality repairs.

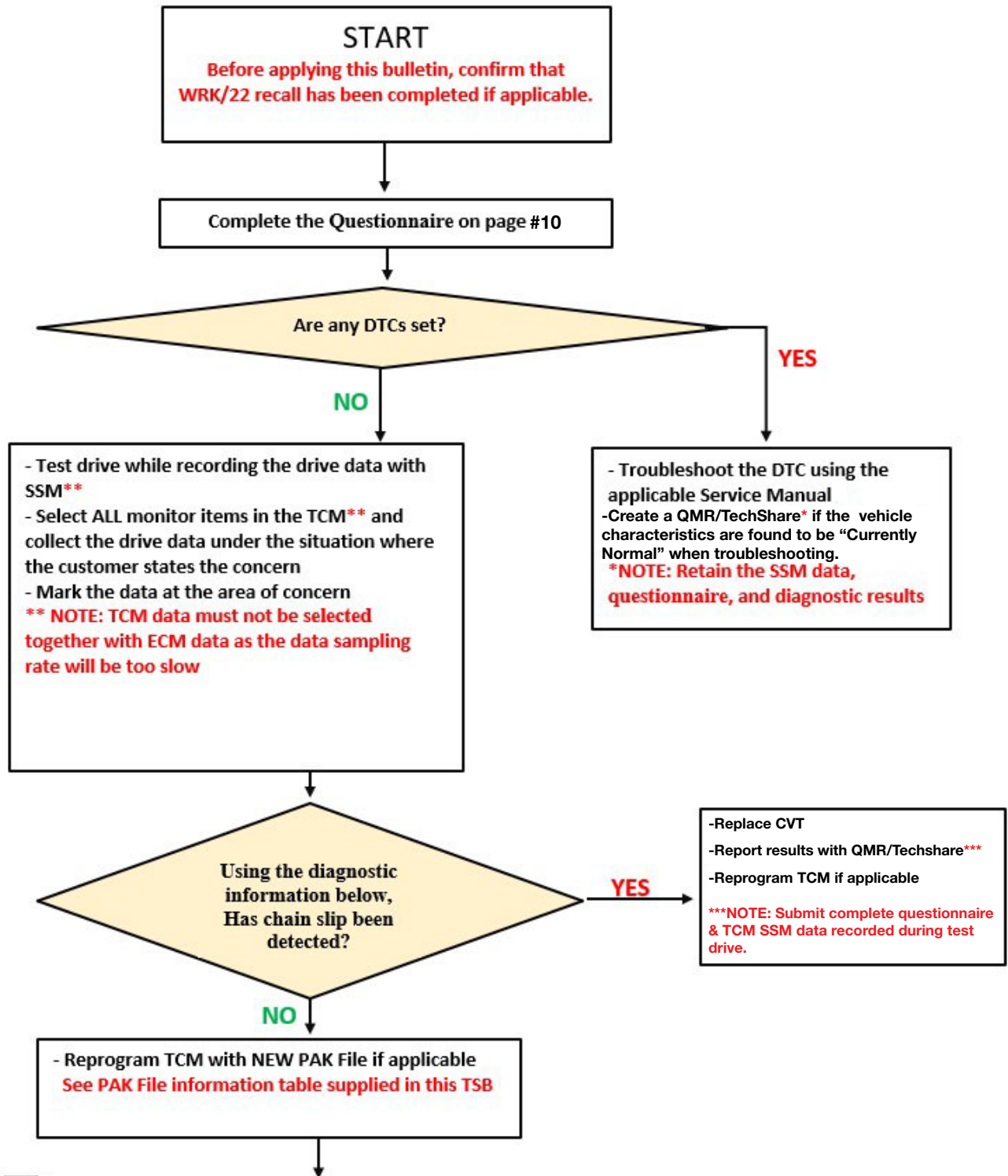
After completing the questionnaire located at the end of the Troubleshooting section, following the diagnostic procedures supplied in this bulletin and when determined necessary, service procedures for CVT and / or TCM replacement remain unchanged. Always refer to the applicable Service Manual and review the full requirements of the repair being performed. The Service Manual procedures contain information critical to performing an effective repair the first time, every time. This includes but is not limited to important SAFETY precautions, proper inspection criteria, necessary special tools, required processes and related one-time-use parts needed for a complete and lasting repair.

**VERY IMPORTANT:** With any customer concern, it is important to get a complete and detailed description from them so their condition can be duplicated. Duplicating the condition is critical for a proper diagnosis and successful repair. **Whenever using this TSB for alleged CVT Chain Slip diagnosis, Technicians are required to submit a completed QMR which includes all Flow Chart test results, SSM data and a COMPLETED copy of the questionnaire found on pg. 10.** This information will be extremely helpful for SBR Engineers when analyzing what the customer was experiencing as Chain Slip. Cooperation with this special information request is greatly appreciated!

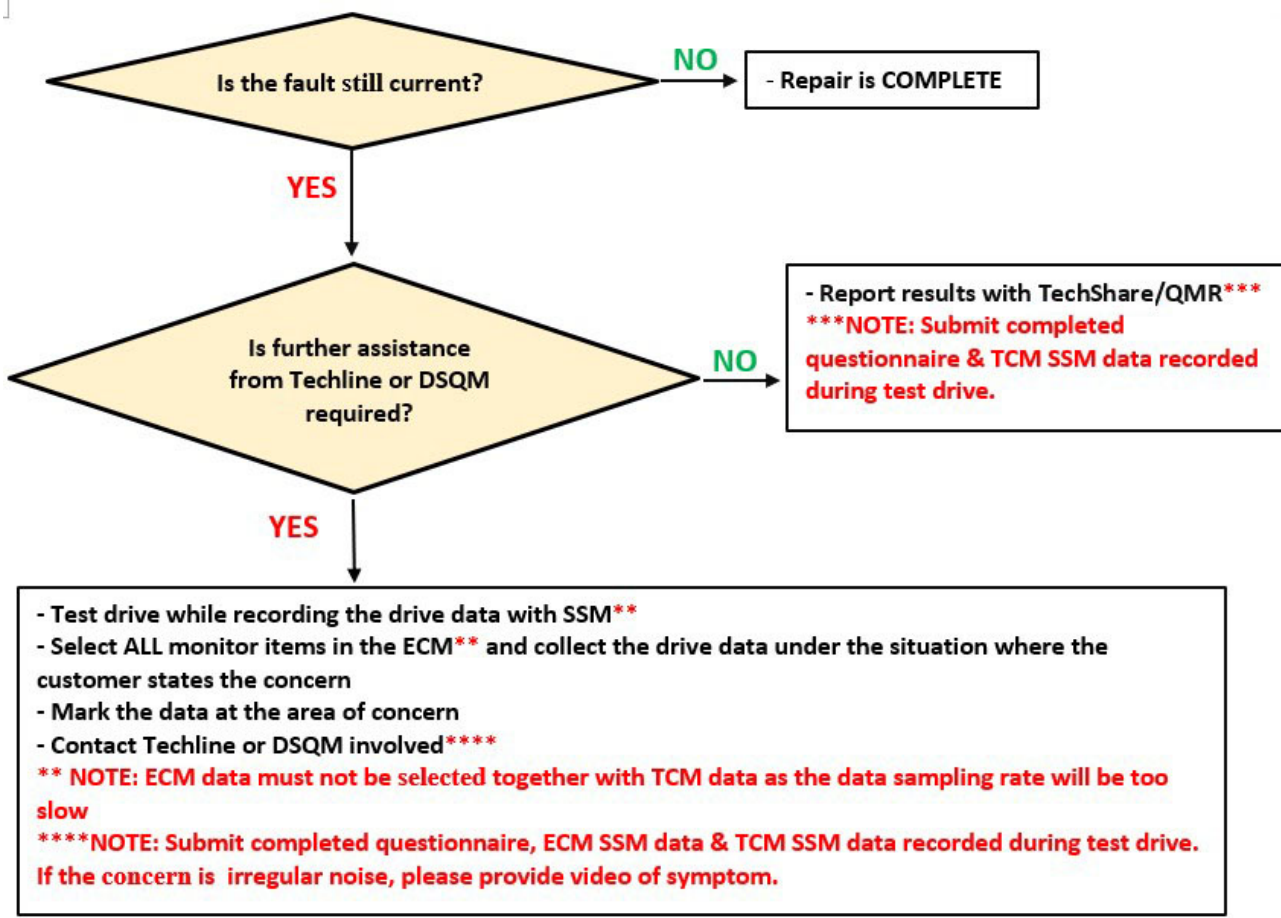
<p><b>CAUTION: VEHICLE SERVICING PERFORMED BY UNTRAINED PERSONS COULD RESULT IN SERIOUS INJURY TO THOSE PERSONS OR TO OTHERS.</b></p> <p>Subaru Service Bulletins are intended for use by professional technicians ONLY. They are written to inform those technicians of conditions that may occur in some vehicles, or to provide information that could assist in the proper servicing of the vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do the job correctly and safely. If a condition is described, DO NOT assume that this Service Bulletin applies to your vehicle, or that your vehicle will have that condition.</p>	<p style="text-align: center;"><b>Subaru of America, Inc. is ISO 14001 Compliant</b></p> <p>ISO 14001 is the international standard for excellence in Environmental Management Systems. Please recycle or dispose of automotive products in a manner that is friendly to our environment and in accordance with all local, state and federal laws and regulations.</p>
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## Troubleshooting Flow Chart for Alleged CVT Chain Slip:



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## PAK FILE INFORMATION:

### IMPORTANT NOTES:

- When performing and CVT replacement or TCU reprogramming, always confirm the fault has been corrected.
- When submitting TechShare/QMR reports, include the TSB number of this document (16-132-20R) as a keyword. This is used to manage cases.

If the vehicle being repaired is not listed in the table below, or if the reprogramming file listed in the table below is already installed, proceed to the next Step in diagnosis procedure. The reprogramming file may be further updated in the future. Always refer to the most current revisions.

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Model	MY	File name	Specification	Old Part Number	Keyword	New CID
ASCENT	19	30919AF98F.pak	2.4L DIT CVT without CVTF cooler (air cool)	30919AF98E	1089258A	R8FEEA00
	19	30919AF99F.pak	2.4L DIT CVT with CVTF cooler (air cool)	30919AF99E	444FBA53	R8FEFA00
	20-21	30919AH13G.pk2	2.4L DIT CVT without CVTF cooler (air cool)	30919AH13F	4194C7F5	Q93EE000
	20-21	30919AH14G.pk2	2.4L DIT CVT with CVTF cooler (air cool)	30919AH14E*	89B6B0EA	Q93EF000
	22	30919AJ53B.pk2	2.4L DIT CVT without CVTF cooler (air cool)	30919AJ53A	D3DF9A7B	N2FEE600
	22	30919AJ54B.pk2	2.4L DIT CVT with CVTF cooler (air cool)	30919AJ54A	CED94BB7	N2FEF600

\* A TCM with software version 30919AH14E as the current software status will require an additional step when reprogramming. Until further revision is announced, the Temporary PAK file used in WRK-21/22 MUST be reprogrammed to the TCM before the 30919AH14G file can be installed.

**NOTE: The temporary reprogramming files used in WRK-21/22 are not to be used for CVT chain slip diagnosis on vehicles currently unaffected by WRK-21/22.**

### CVT Chain Slip Assessment:

There are three main forms of CVT chain slip.

- Continuous Micro-Slip
- Short-Time Slip
- Long-Time Slip

Using Subaru Select Monitor (SSM), check and record data monitors and compare to the three examples listed below. If the recorded data from the vehicle matches the examples below, the CVT will require replacement. The SSM data will be required for claim submission. A QMR containing the same information will also be required.

#### 1. Continuous Micro-Slip:

During a continuous micro-slip, while the Accelerator Opening Angle monitor displays a stable value for more than one second, there are fluctuations in the Actual Gear Ratio monitor:

**Peak to Peak > 0.02**

**Frequency > 3 cycles per 1 second**

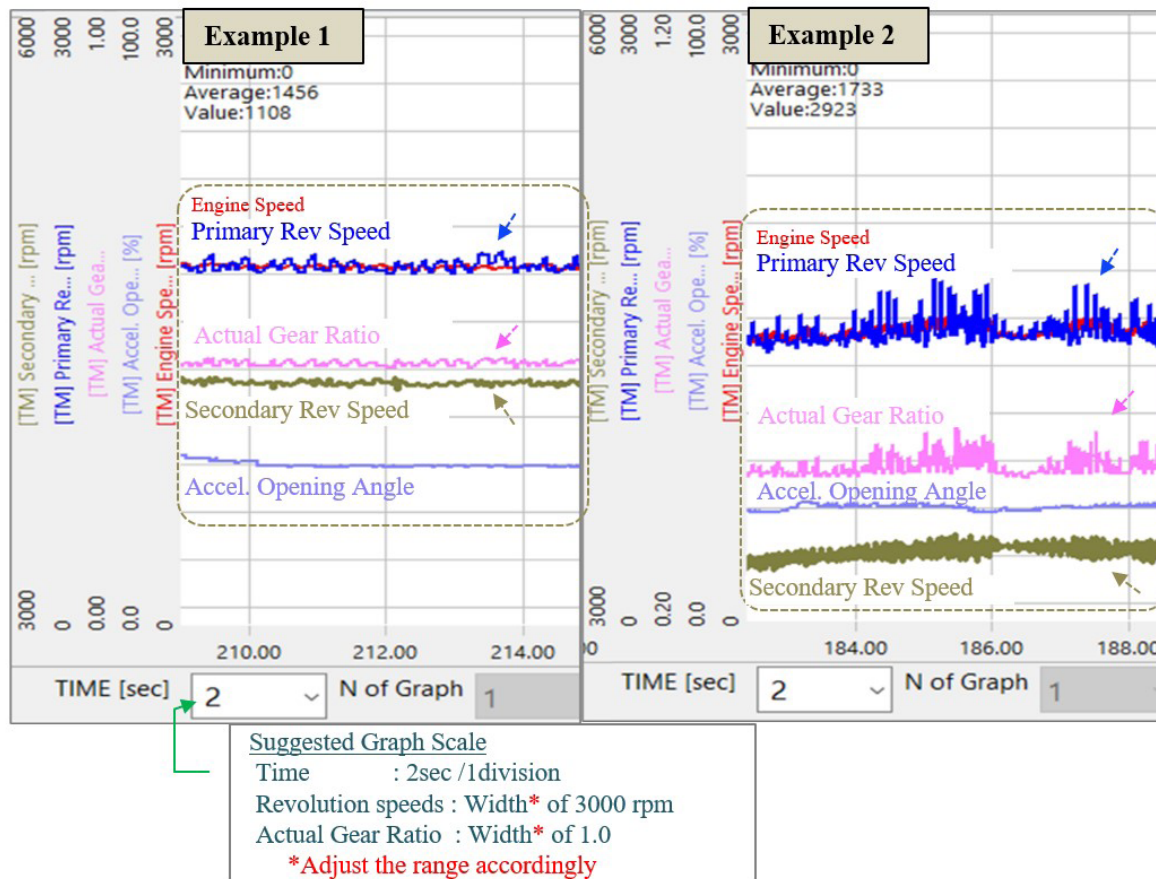
There are fluctuations in the Primary Rev Speed and/or Secondary Rev Speed monitor:

**Peak to Peak > 50 rpm**

**Frequency > 3 cycles per 1 second**

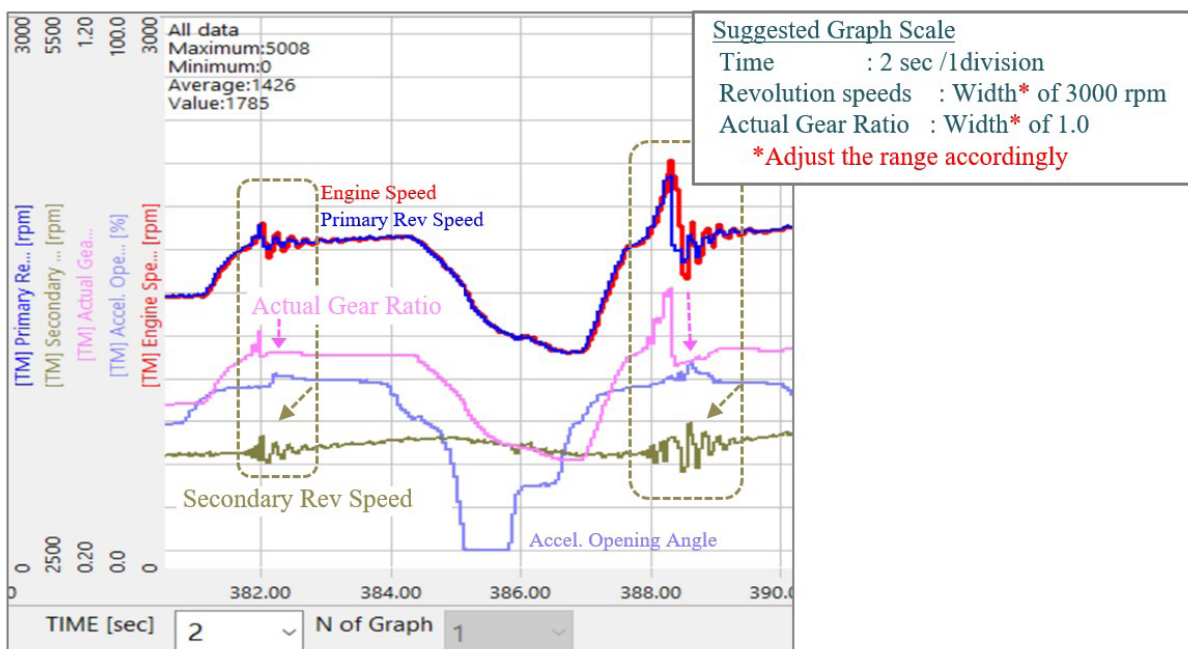
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Below are two examples of the data monitoring during Continuous Micro-Slip



## 2. Short-Time Slip:

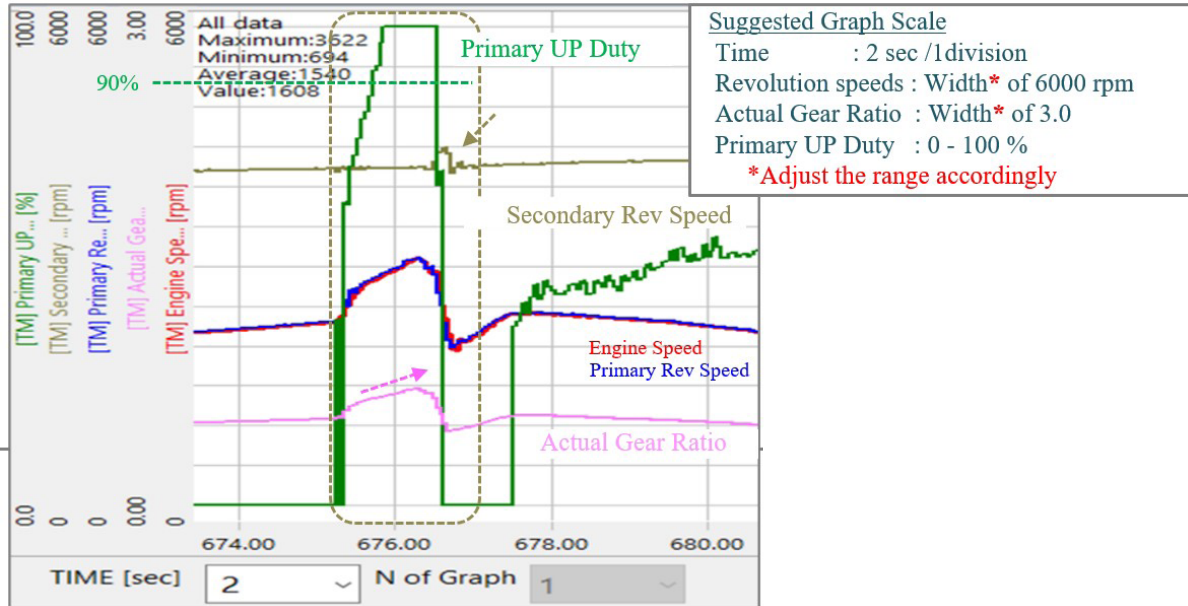
When a short-time slip occurs, the changes in the Actual Gear Ratio monitor will be larger than 0.1 per 0.1 second. After the Actual Gear Ratio monitor resumes to stable conditions, distinct fluctuations in revolution speed continues.



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### 3. Long-Time Slip:

When a long-time slip occurs, the Primary UP Duty monitor will be larger than 90% and the Actual Pulley Ratio monitor lowers for a duration of 0.5 seconds or more. Even after the Actual Gear Ratio monitor resumes to stable conditions, distinct fluctuations in revolution speed continues.



### Reference Material: Similar Symptoms To CVT Chain Slip

In some cases, a customer may report symptoms of chain slip when in fact there is no actual slippage within the CVT. Listed below are examples of situations than can mimic the symptoms of chain slip.

#### 1. Forward Clutch Slip Shock:

This shock can occur when the forward clutch slips. If this situation is reported, reprogram the TCM with new software if it is available.

The rotation speeds for the upstream and downstream sides of the forward clutch do not synchronize when driving.

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Example for  
2.4L Turbo or 3.6L NA equipped vehicles

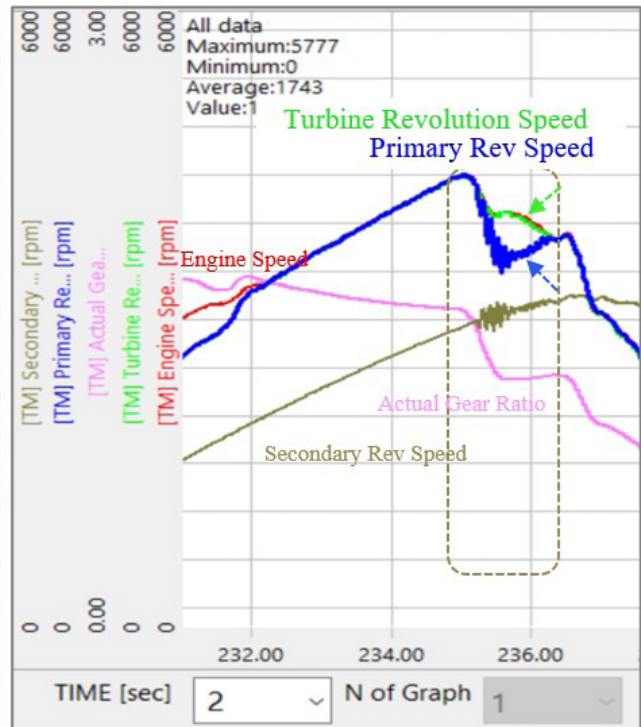
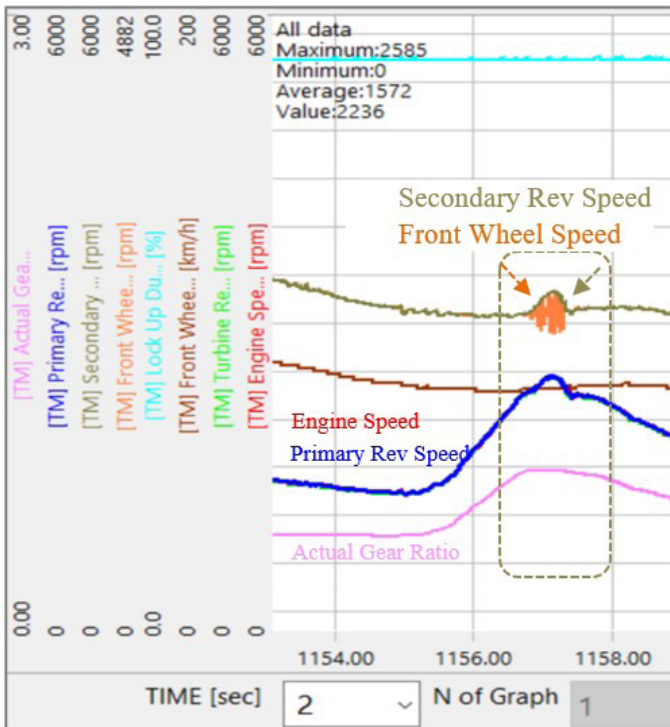
Upstream side of the forward clutch-  
Secondary Rev Speed

Downstream side of the forward clutch-  
Front Wheel Speed

Example for vehicles **WITHOUT**  
2.4L Turbo or 3.6L NA

Upstream side of the forward clutch-  
Turbine Revolution Speed

Downstream side of the forward clutch-  
Primary Rev Speed



Suggested Graph Scale

- Time : 2sec /1division
- Engine Speed : 0 - 6000 rpm
- Primary Rev Speed : 0 - 6000 rpm
- Secondary Rev Speed : 0 - 6000 rpm
- Front Wheel Speed : 0 - 4882\*\*\*\* rpm
- Actual Gear Ratio : 0.0 - 3.0
- Lock Up Duty Ratio : 0 - 100 %

**Note\*\*\*\* : Due to the secondary reduction gear ratio 1.229**

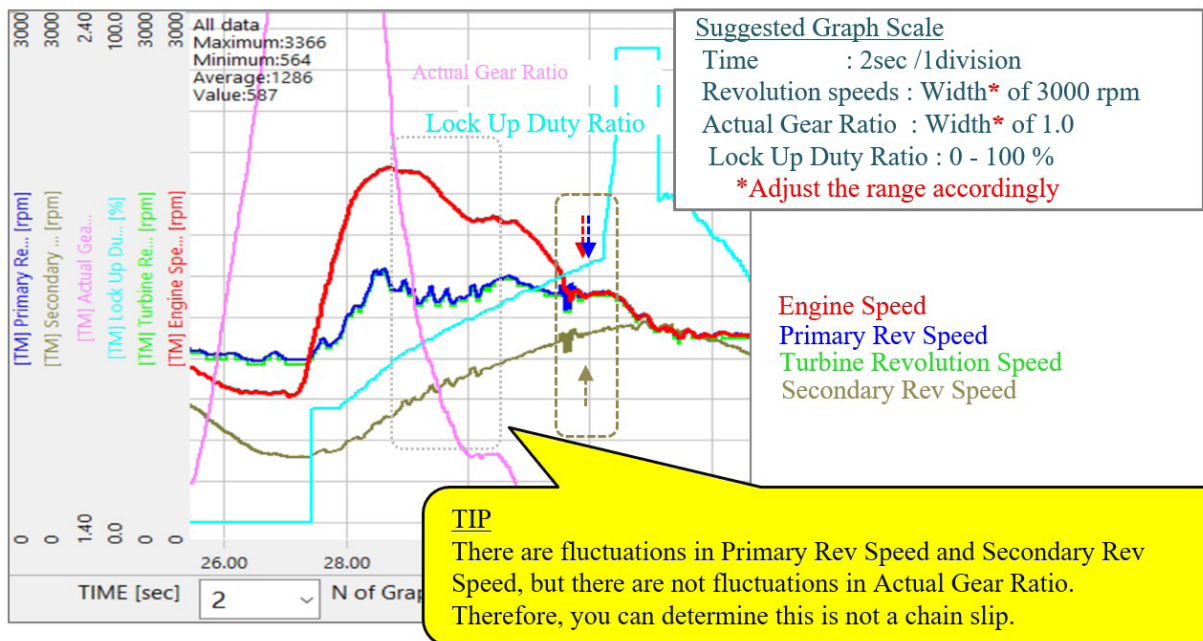
Suggested Graph Scale

- Time : 2sec /1division
- Engine Speed : 0 - 6000 rpm
- Turbine Revolution Speed : 0 - 6000 rpm
- Primary Rev Speed : 0 - 6000 rpm
- Secondary Rev Speed : 0 - 6000 rpm
- Front Wheel Speed : 0 - 6000 rpm
- Actual Gear Ratio : 0.0 - 3.0
- Lock Up Duty Ratio : 0 - 100 %

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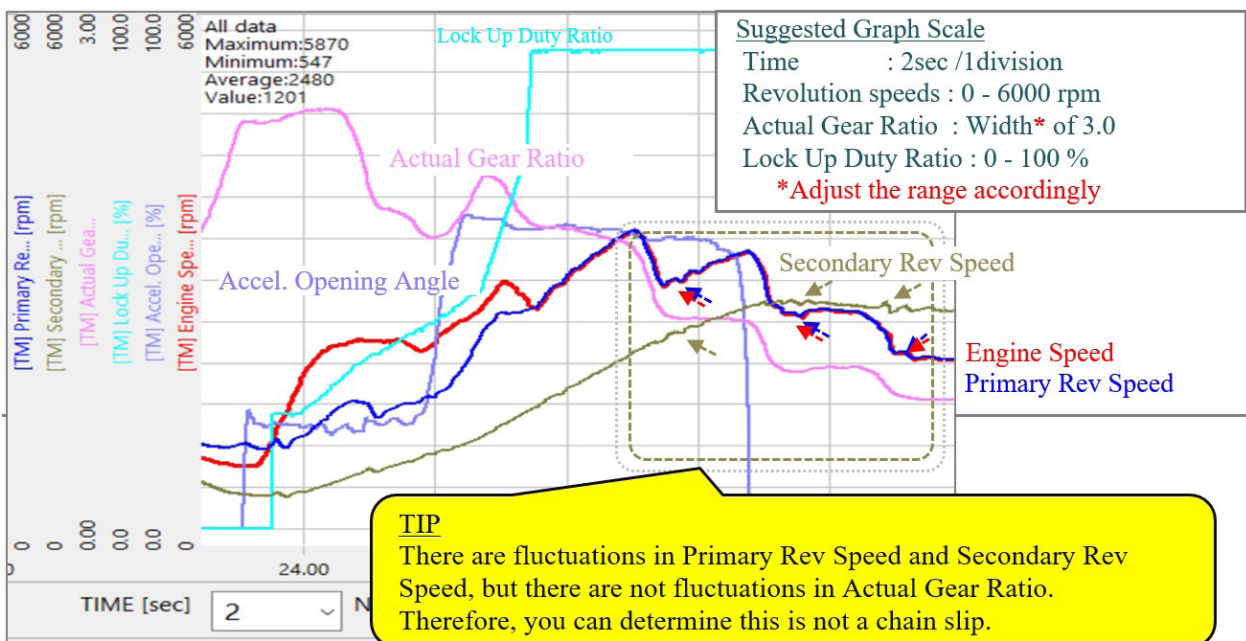
## 2. Lock Up Clutch Engagement Shock:

This shock can occur when the lock up clutch engages rapidly. If this situation is reported, reprogram the TCM with new software if it is available.



## 3. Shift Up Shock:

This shock can occur when the CVT upshifts. If this situation is reported, reprogram the TCM with new software if it is available. If there is no new software available or the reprogramming does not remedy the issue, report the situation to Techline.

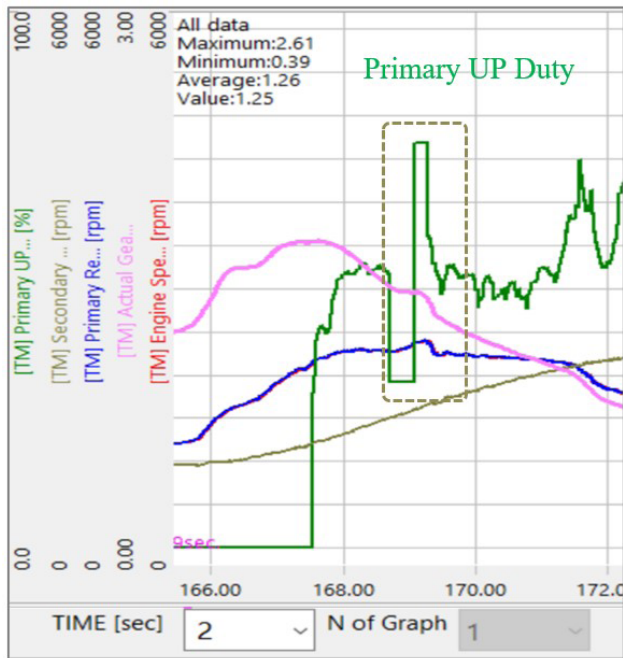


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#### 4. Primary Up Duty Square Control (Ascent Models up to 2021MY):

A harsh shift can be felt while driving. If this situation is reported, reprogram the TCM with new software if it is available. If there is no new software available or the reprogramming does not remedy the issue, report the situation to Techline.



Suggested Graph Scale  
Time : 2sec /1division  
Revolution speeds : 0 - 6000 rpm  
Actual Gear Ratio : Width\* of 3.0  
Primary UP Duty : 0 - 100 %  
*\*Adjust the range accordingly*

Engine Speed  
Primary Rev Speed  
Actual Gear Ratio

#### IMPORTANT REMINDERS:

- SOA strongly discourages the printing and/or local storage of service information as previously released information and electronic publications may be updated at any time.
- Always check for any open recalls or campaigns anytime a vehicle is in for servicing.
- Always refer to STIS for the latest service information before performing any repairs.

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## Questionnaire for Alleged CVT Chain Slip Condition

Please use all applicable check boxes.

Please enter a number value in  vehicle speed box.

Please attach SSM data files for both before and after pre- and post-repair.

No.	Item	Answer
1	<b>CVT Temperature</b>	<input type="checkbox"/> Immediately after starting the engine <input type="checkbox"/> Warming-up <input type="checkbox"/> After warming-up
2	<b>Location</b>	<input type="checkbox"/> Highway <input type="checkbox"/> Paved-road <input type="checkbox"/> Rough-road
3	<b>Vehicle Speed</b>	<input style="width: 80px; height: 20px; border: 1px solid black;" type="text"/> mph
4	<b>Condition:</b>	<input type="checkbox"/> While accelerating <input type="checkbox"/> While decelerating <input type="checkbox"/> While cruising <input type="checkbox"/> While turning
5		<b>Vehicle Used for Towing?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No
6		<b>Frequency of Slip Condition</b> <input type="checkbox"/> Only once <input type="checkbox"/> A few times <input type="checkbox"/> Intermittent <input type="checkbox"/> Always
7		<b>How Long Has Condition Been Occurring?</b> <input type="checkbox"/> It just started <input type="checkbox"/> Within the last month <input type="checkbox"/> From new
8		<b>Symptoms:</b>
9	<b>Repair(s):</b>	<input type="checkbox"/> T/M assy replacement <input type="checkbox"/> T/M part(s) replacement <input type="checkbox"/> TCM Re-programing <input type="checkbox"/> AT relearn / torque converter relearn <input type="checkbox"/> No repair made (inspection only) <input type="checkbox"/> Other (please describe:)  
10	<b>Customer Comments Post-Repair:</b>	Example: Satisfaction / dissatisfaction level, further improvement requirements.