

# This TSB supersedes TSB 18-AT-003 to add additional models.

**DESCRIPTION:** If you are servicing any of the vehicles listed below with a harsh and/or delayed shift, use the GDS as shown in the Service Procedure to measure shift engagement time.

### **APPLICABLE VEHICLES:**

2018~19	Sonata (LFa) 2.0T
2020~	Sonata (DN8) 1.6T/2.5L
2019~	Santa Fe (TMa) 2.0T/2.4L
2020~	Palisade (LX2) 3.8L

# WARRANTY INFORMATION: Normal warranty applies

# SERVICE PROCEDURE:

- 1. Attach the GDS and check for Diagnostic Trouble Codes in both the "Engine" and "Automatic Transaxle" menu. If DTCs are found, repair according to the appropriate TSB or shop manual.
- 2. Check the ATF level when the engine is idling in "P" and the ATF is 122°~140°F (50°~60°C) according to the related shop manual. Adjust the ATF level as needed using SP4-M ATF.

- 3. Attach the GDS.
  - From the home screen, select Flight Record. Select the VIN and A/T menu. Select OK.
  - Select the following parameters and select Next.

E Flight Record								
Please choose the items you want to record and press the [Next] button.								
Item List	All	0	Selected Item List	Clear				
Please enter the search word.		*	Sensor Name					
Engine Torque			Engine RPM					
Shift Lever Switch			Current Gear					
Next Gear Position			Shift Control Solenoid					
Torque Converter Clutch Control State			Shift Control Solenoid Valve (46/C)	=				
Sports Mode Select			Shift Control Solenoid Valve (OD&LR)	-				
Sports Mode Switch Up			Shift Control Solenoid Valve (28/B)					
Sports Mode Switch Down			Shift Control Solenoid	-				
Number of DTC			varie (07100)					
Malfunction Indica	ator Lamp On							

- Select 10 minutes recording time and Manual Trigger. Insert the trigger and select VCI Record. Select OK.
  - When the trigger shows steady green, select **Close** and begin the test drive.
  - Accelerate the vehicle in **Manual Mode** through gears 1-2-3-4-5-6-7-8. Hold each gear 3~4 seconds.
  - Press the trigger at the end of the test drive. The trigger will flash green for a few seconds and then show steady green.
  - Remove the trigger.
  - To copy the data from the VCI to the tablet, go to the home screen and select **Recorded Data**. Select the VIN and the GDS data file. Select **Data Copy**.
  - Select **Copy to SD card**, give the file a name and select **Save.** The VCI will copy the data to the SD card.
- 5. After the data has been recorded, you can review the data on the GDS Mobile.
  - Open GDS. Select Recorded Data.
  - Select the vehicle and the GSR file and select File Open.
  - Select Graph. Move all PIDs in the Item List to the Selected Item List. Select OK.
  - The recorded data will display. Select the arrow at the top right of the screen and press the + on the **Time scale** to select 1.0 sec/Div.
  - Select the arrow at the top left. The screen will show cursor **A** and **B**.
  - View the **Current Gear** and select the shift to be measured. Select **A** and place the cursor to the left of the related solenoid PID. Select **B** and place the cursor to the right of the related solenoid PID. Read the elapsed time at the top of the screen.

- 6. To send a GDS file to the Techline Repository using GDS Mobile:
  - From the GDS home page, select **Internet.**
  - Logon to hyundaidealer.com. Enter dealer code, user ID and password.
  - Select the down arrow next to **SERVICE**.
  - Select Tech Info.
  - Select **Technical Training**, select **Techline** and enter your information.
  - Select Choose File. At the bottom of the screen, select Documents.
  - Select SD Card, Android, Data, gitauto.GDSM, files, mcidata and Record.
  - Select your vehicle, VIN and recorded file. Confirm the GSR file is displayed.
  - Select Submit.

**NOTE**: For additional information, see instructions on TSB 19-GI-006H or **Technical Training**, **Techline Procedures** and **GDS/Repository File Upload** (with or without SD card).

#### P-R SHIFT DIAGNOSIS:

- Select the data file on your PC and select the vehicle and A/T menu.
- Select **Data Review** and select the file. Select **Open** to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the 37R/C solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **37R/C** solenoid elapsed time at the top right of the screen. If the P-R shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - > If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.

Data Review	SONATA(LFA)_AT	r_180319-145634.GSR		Two cursor: 2.4sec	)
	🗆 0.5sec/Div. 🔣 Recol	rd Start : 14:46:44	Cursor Time : 14	4:46:46 🕖 RECOI	d End : 14:58:44
	Text	CReset Min.Max	Go to Trig	File Info	Items List
16383	Engine RPM			MAX: 7	61 RPM 🛛 🔀
					663 RPM 💽
<del>.</del>				MIN: 66	1 RPM
	Current Gear			MAX: R	×
	Ý .				P/N
	4		<u> </u>	MIN: P/N	
-1275	Shift_Control_Selenoid_V <mark>a</mark> l			~~_^ MAX: 11	170 mA 🛛 🗙
					1140 mA 💽
0, , , , ,				, , MIN: 10	30 mA
1275	Shift Control Solenoid Val	lve (46/C)		MAX: 1	10 mA 🔀
					50 mA 💽
	+	~ <u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u></u>		5 mA
1275	Shift Control Solenoid Val	lve (28/B)		MAX: 1	10 m.A 🔀
					50 mA 💽
~ <del>~</del> ,~,~,~,~,~,~,~,~,~,~,~,~,~,~,~,~,~,~		~~~ <u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u></u>		) mA
1275	Shift Control Solenoid Val	va.(37R/C)		MAX: 1	050 m.A 🛛 🔀
					50 mA 💽
- <del></del>			<u>. ~~~</u>	~ <u>,^</u> MIN: 4	5 mA
1275	Shift Control Solenoid Valv	ve (OD&LR)		MAX: 1	15 m A 🔀
					55 mA 💽
		·		<u>-</u>	i mA

## N-D SHIFT DIAGNOSIS:

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select **Data Review** and select the file. Select **Open** to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the **UD/C** solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **UD/C** solenoid elapsed time at the top right of the screen. If the N-D shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - ➢ If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.

Data Review	SONATA(LFA)_AT	_180319-145634.GSR	(	Two cursor: 2.0sec	
	).5sec/Div. 🛛 🕚 Recor	rd Start : 14:46:44	Cursor Time : 14	:46:57 💮 Record	d End : 14:56:44
	Text	CRESET Min.Max	Go to Trig	File Info	Items List
16383	Engine RPM			MAX: 73	IS RPM 🛛 🗙
					653 RPM 💽
<del>, , , , , , , , , , , , , , , , , , , </del>		<u> </u>		, , MIN: 653	RPM
	Current Gear			MAX: 1	×
					P/N
				MIN: P/N	
-1275	Shift Control Solenoid Valv	ve (UD/C)		MAX: 11	10 m.A 🔀
					1110 mA 💽
0	\.			MIN: 70	mA
1275	Shift Control Solenoid Val	lve (46/C)		MAX: 11	0 mA 🗙
					55 mA 💽
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	^	ليمجمج	لبمجلمجم	~ MIN: 15	mA
1275	Shift Control Solenoid Val	ve (28/B)		MAX: 31	5 mA 🗙
					55 mA 🚺
~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim\sim\sim\sim$	~~~ MIN: 15	mA
1275	Shift Control Solenoid Valv	ve (37R/C)		MAX: 11	0 mA 🗙
					55 mA 💽
~~~~~			^	~	mA
1275	Shift Control Solenoid Valv	e (OD&LR)	· · · · ·	MAX: 11	5 m.A 🔽
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		70 mA
	A			1.055 Z	

### **1-2 UPSHIFT DIAGNOSIS:**

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select Data Review and select the file. Select Open to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the 28/B solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **28/B** solenoid elapsed time at the top right of the screen. If the 1-2 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.



### 2-3 UPSHIFT DIAGNOSIS:

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select **Data Review** and select the file. Select **Open** to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the **37R/C** solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **37R/C** solenoid elapsed time at the top right of the screen. If the 2-3 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - > If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.



#### **3-4 UPSHIFT DIAGNOSIS:**

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select Data Review and select the file. Select Open to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the 46/C solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the <u>46/C</u> solenoid elapsed time at the top right of the screen. If the 3-4 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.

Data Review	SON	ATA(LFA)_AT_180	0319-145634.GSR		Two cursor: 1.8sec	
	L 0.5sec/Div.	🕓 Record S	tart : 14:46:44	Cursor Time : 1	4:49:13 🕐 Record E	End : 14:56:44
	00	Text 🗘	Reset Min.Max	Go to Trig	File Info	Items List
16383		Engine RPM			MAX: 3071	RPM 🔀
						3029 RPM 💽
0, , , ,					MIN: 2370 R	PM
	C	Current Gear			MAX: 4	×
						3
					MIN: 3	
1275	Shift Contro	l Solenoid Valve (I	JD/C)		MAX: 110 r	mA 🗙
						110 mA 🚺
	<u></u> +	~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~ <u>~</u> ~~~	MIN: 5 mA	N
1275	Shift Contro	l Solenoid Valve 🕻	18C)~~~~~	~~~~~	AAX: 1165	mA 🗙
		~~~				70 mA 💽
		~~~~				Δ,
1275	Shift Contro	l Solenoid Valve (	28/8)		MAX: 110+	nA 🗙
		Ì				110 mA 💽
- <del></del>				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~ MIN: 10 m/	4 m 0
140		Solenoid Valve (3	i/RiC)		WAA. 1130	
						1130 mA 🔛
0, , , , ,		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim \sim $	$\sim \sim $	~	А.
_1275	Shift_Cer <mark>t</mark> rol	Solenoid Valve (S	D&LRI	~~~~	A MAX: 1170	mA 🗙
		v	·			1170 mA 💽
0	A				MIN: 895 m	A

## 4-5 UPSHIFT DIAGNOSIS:

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select **Data Review** and select the file. Select **Open** to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the **OD&LR** solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **OD&LR** solenoid elapsed time at the top right of the screen. If the 4-5 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - > If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.

Data Review	SONATA(LF/	<pre>\)_AT_1803</pre>	319-145634.GSR	(	Two cursor: 1.7sec	
	🗆 0.5sec/Div. 🛞 R	ecord St	art : 14:48:44 🕠	• Cursor Time : 1	4:47:34 🕖 RECO	rd End 1 14:56:44
	🔁 🗖 👘 Tex	t 🗘	Reset Min.Max	Go to Trig	File Info	Items List
16383	Engine F	PM			MAX: 2	459 RPM 🛛 🗙
						2444 RPM 💽
0, , , , ,					MIN: 21	24 RPM
	Current C	ear			MAX: 5	×
						4
					MIN: 4	
1275	Shift Control Solenoi	d Valve (UI	D/C)		MAX: 1	10 mA 🗙
				,		5 mA 💽
	~~~~	~	~~~~~	~~~~	MINE 4	5 m A
	<ul> <li>Shift Control Soleno</li> </ul>	d Valve (4f	6/C)	<u></u>	MAX: 1	170 mA
	~~~		,			1140 mA
	$\sim$	$\sim$		,	$\sim\sim$	
0, , , , ,	<u> </u>	<u>.~ `~</u>	~~~~~~	$\sim$	MIN: 2	0 mA
1275	Shift Control Soleno	d Valve (28	8/B)		MAX: 1	
						50 mA 💽
∽⇔∽∽∽∽∽⊷⊷⊷	~~~~	<u>~</u>	$\sim \sim $	~~~ <u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		0 mA
1275	Shift Control Solenoi	l Valve (37	'R/C)		MAX: 1	110 m.A 🔀
						55 mA 💽
	~	<u> </u>	لمجلمهم	<u> </u>		0 mA
1275	Shift Control Solenoic	Valve OD	ALR)		MAX: 1	170 m.A 🗙
						1115 mA 💽
0	A	∎	~~~~~	~~~-		5 m A
0		· · ·	$\sim \sim $	$\sim$	MIN: 6	5 mA

#### 5-6 UPSHIFT DIAGNOSIS:

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select **Data Review** and select the file. Select **Open** to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the 46/C solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **46/C** solenoid elapsed time at the top right of the screen. If the 5-6 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - > If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.

Data Review	SONATA(LFA)_AT	T_180319-145634.GSR	(	Two cursor: 2.0sec	
	🗆 0.5sec/Div. 🛞 Reco	rd Start : 14:48:44	Cursor Time : 14	1:49:24 Ret 01	rd End : 14:56:44
	🕂 🗖 🛛 Text	CRESET Min.Max	Go to Trig	File Info	Items List
16383	Engine RPM			MAX: 2	321 RPM 🛛 🗙
					2316 RPM 💽
0, , , , ,	<u> </u>				99 RPM
	Current Gear			MAX: 6	×
					5
				, , MIN: 5	
1275	Shift Control Sciencid Va	WALL RG2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	MAX: 1	170 mA 🗙
	~~~		۷V	Ť.	70 mA 💽
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				MIN: 5	5 mA
1275	Shift Control Solenoid Va	alve (46/9	<u> </u>	MAX: 1	170 mA 🗙
	~				70 mA 主
				MIN: 4	5 m A
1275	Shift Control Solenoid Va	alve (28/8)	<u> </u>	MAX: 1	10 mA
					70 mA
					· · ·
~ <del>0</del> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			$\sim$	MIN: 11	UmA
12/5	Shint Control Solehold Var	WE (STRIC)		MAA. S	
				$\sim$	55 MA 💽
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- <u>`</u> -``-	$\sim \sim $	MIN: 1	5 mA
1275	Shift Control Solenoid Valv	ve (OD&LR)		MAX: 1	10 mA 🔀
					70 mA 💽
o. Yrry		~~~~~~	م. مىلىمى		i mA

## 6-7 UPSHIFT DIAGNOSIS:

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select Data Review and select the file. Select Open to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the 37R/C solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **37R/C** solenoid elapsed time at the top right of the screen. If the 6-7 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - ➢ If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.



### 7-8 UPSHIFT DIAGNOSIS:

- Select the data file on your PC. Select the vehicle and A/T menu.
- Select **Data Review** and select the file. Select **Open** to view the file.
- Click the "+" or "-" buttons to choose 0.9 sec/Div or less.
- View the **28/B** solenoid graph and locate the shift.
- Move the cursor to the start of the shift and "Left click".
- Move the cursor to the end of the shift and "Right click".
- Read the **28/B** solenoid elapsed time at the top right of the screen. If the 7-8 shift requires more than 2.8 seconds, refer to TSB 16-AT-001-2, "Reset and Relearn Adaptive Values":
  - > If the shift is less than 0.5 seconds, exchange a PCM from another vehicle and retest.
  - If the shift time is more than 2.8 seconds, compare to a similar model and year vehicle. Replace the transmission if the shift time is longer than a comparison vehicle.

