

# 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.

,	int to re	ecord and press the <mark>[Next]</mark> bu	ltton.
All		Selected Item List	Clear
d,	>>	Sensor Name	
		Engine RPM	=
		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 Valve (37R/C)	
	Control	Control	Control Contro

- 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	SONAT	A(LFA)_AT_18	0319-145634.GSR		Two cursor: 2.4sec	
-	🗆 0.5sec/Div. 🤇	🖲 Record S	Start : 14:46:44	· Cursor Time : 14	4:46:46 🕖 Recor	d End : 14:56:44
	) <b>(</b>	Text 🗘	Reset Min.Max	Go to Trig	File Info	Items List
16383	Eng	jine RPM			MAX: 7	61 RPM 🛛 🔀
						663 RPM 💽
0, , , , ,					MIN: 66	1 RPM
	Cun	rent Gea <mark>r</mark>			MAX: R	X
						P/N
	4			. L	MIN: P/N	
-1275		enoid Valve (		~~~~~	MAX: 11	70 mA 🗙
		V	· · ·			1140 mA 💽
0					MIN: 103	30 mA
1275	Shift Control Se	olenoid Valve (	(46/C)		MAX: 1	10 m.A 🔀
						50 mA 🚺
		~~	~~~~			
1275	Shift Control Se	olenoid Valve (	(28/B)		MAX: 1	
						50 mA 🚺
		·	~ . ~ ~			
<del>0</del>	Shift Control So	lanoid Value (	27P/C)	hada da	MIN: 10	_
12/3	Shint Control So			$\gamma$	meye is	50 mA 💽
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$		$\sim$	~	
-8				· · · · · · ·		
1275	Shift Control Sol	enoid Valve (C	DD&LR)		MAX: 1	
	A					55 mA 💽
		$\sim -\frac{1}{2}$	$\overline{}$			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)_4	AT_180319-145634.(	GSR	Two cursor: 2.0se	ac .
		ord Start : 14:46:	44 🕂 Cursor Tim	e I 14:46:57 💮 Kei	cord End : 14:56:44
	Text	🗘 Reset Mir	n.Max Go to Tri	g File Info	Items List
16383	Engine RPM			MAX	733 RPM 🛛 🔀
					653 RPM 💽
0, , , , ,		<u> </u>		MIN:	653 RPM
	Current Gea			MAX	1 🔀
					P/N
				MIN: I	P/N
-1275	Shift Control Solenoid V	alve (UD/C)		MAX	: 1110 mA 🛛 🗙
					1110 mA 💽
o		~~~~~		~ MIN:	70 mA
1275	Shift Control Solenoid V	alve (46/C)			110 mA
					55 mA 🚺
				~ MIN:	
1275	Shift Control Solenoid V	alve (28/B)			315 mA
					55 mA 🚺
			$- \sim$		15 mA
1275	Shift Control Solenoid V	alve (37R/C)	~ <del>~~~</del> , , ,		110 mA
1210	Shine Control Solehold V			10.02	55 mA 🚺
				~~~~	
~~ <u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~	<u> </u>		15 mA
1275	Shift Control Solenoid Va		~~~~~	~~~~ MAX	115 mA
	A		î		70 mA 臣
~ <del>o,~~,~~,~</del> ~~~		A. A		MIN:	5 mA

### **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_18	0319-145634.GSR		Two cursor: 1.8sec	
	LI 0.5sec/Div.	🕓 Record S	start 1 14:46:44	Cursor Time : 1	4:49:13 🕐 Record E	nd : 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 n	nA 🗙
			/			110 mA 🚺
		~~~~~		~~~~	MIN: 5 mA	
1275	Shift Contro	l Solenoid Valve (	4£/Cho o o o o o	<u> </u>	A MAX: 1165	
		_م_				70 mA 🚺
		~~~~~~				
1275	Shift Contro	l Solenoid Valve (	1 1 1 1949)	<u> </u>	MAX: 110 n	
1213	Shin Contro	i Solenolu Valve (	20/0)		Mox. Hol	110 mA 💽
~ <del>~</del> ,~,~,~,~,		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$		
1275	Shift_Ceptrol	Solenoid Valve (3	7R/C)		MAX: 1130	
						1130 mA 💽
0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	مبمجميم	$\sim$		<b>V</b>
1275	Shift Certrol	Solenoid Valve (G	D&LF2	^ <i>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</i>	MAX: 1170	mA 🗙
		V	v <del>-</del>			1170 mA 🚺
	A				MINE OOD -	
0	<u>[</u> ]				MIN: 895 m/	Δ,

## 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(LFA)_AT_	_180319-145634.GSR	(	Two cursor: 1.7sec	
—	.5sec/Div. 🕔 Record	d Start : 14:48:44 👘	· Cursor Time : 14	:47:34 🕖 Record E	nd : 14:56:44
	C Text	CReset Min.Max	Go to Trig	File Info	Items List
16383	Engine RPM			MAX: 2459 R	RPM 🗙
					2444 RPM 💽
0, , , , , ,				MIN: 2124 RF	M
	Current Gear			MAX: 5	×
					4
				MIN: 4	
1275	Shift Control Solenoid Valv	/e (UD/C)		MAX: 110 m	A 🗙
			ſ		5 mA 🚺
منسبسب	~		البسبيب	MIN: 5 mA	
1275	Shift Control Solenoid Valv	/e (46/C)		MAX: 1170 m	nA 🗙
	l l				1140 mA 💽
0		$\sim$	~~~~·		
1275	Shift Control Solenoid Valv	/e (28/B)		MAX: 110 m	A 🗙
					50 mA 🚺
			~~~	MIN: 10 mA	
1275	Shift Control Solenoid Valve	e (37R/C)		MAX: 110 m	
					55 mA 🚺
			~		
4375	Shift Control Salapaid Value		<u> </u>	MIN: 10 mA MAX: 1170 m	
1275	Shift Control Solenoid Valve	S (ODALK)		MAA. TIYON	
	A	\ B			1115 mA 💽
0, , , , , ,		Y			

#### 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 Reco	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	WALLAG2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	MAX: 1	170 mA 🗙
	~~~		¥ ¥	Ť.	70 mA 💽
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				MIN: 5	5 mA
1275	Shift Control Solenoid Va	alve (46/9	<u> </u>	MAX: 1	170 mA 🗙
	~				70 mA 主
					5 m A
1275	Shift Control Solenoid Va	alve (28/8)	<u> </u>	MAX: 1	
					70 mA 🚺
<del>0</del>			$\sim$	MIN: 1) MAX: 3	
12/5	Shift Control Solenoid Val	WE (STRIC)		MAA. S	
				$\sim$	
~ <del>~</del> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~`~~`~	- <u>`</u> _`	$\sim \sim $	MIN: 1	
1275	Shift Control Solenoid Valv	ve (OD&LR)		MAX: 1	
					70 mA 💽
o, Yranan		~~~~~~	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.

