 HYUNDAI NEW THINKING. NEW POSSIBILITIES.	GROUP	NUMBER
	AUTOMATIC TRANSMISSION	16-AT-005
Technical Service Bulletin	DATE	MODEL
	MAY 2016	SONATA (YF HEV)
SUBJECT:	EV MOTOR TEMPERATURE SENSOR DTC P0A2B, P0A2C, P0A2D & P0A2F	

This TSB supersedes TSB 14-AT-004 to revise the Service Procedure, steps 8 and 9.

Description: This bulletin provides a supplemental procedure to the Sonata Hybrid Service Shop Manual. If you are servicing a vehicle with the DTCs listed below, follow the Service Procedure on Page 2 of this TSB.

DTC list:

DTC	DESCRIPTION
P0A2B	Drive motor A temperature sensor circuit range/performance
P0A2C	Drive motor A temperature sensor circuit low
P0A2D	Drive motor A temperature sensor circuit high
P0A2F	Drive motor A temperature sensor circuit over temperature

Applicable Vehicles:	2011~ Sonata Hybrid (YF HEV)
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Parts Information:

MODEL	PART	SECTION	PNC	PART NUMBER
2011~ Sonata Hybrid (YF HEV)	Automatic transaxle (includes EV motor)	43-450	45000A	45000-3D*** 00268-3D***
	Control wiring	91-914	91400D	91400-4R***
	Extension motor wire	39-361A	36595	36595-3D000
	HPCU Assembly	28-390A	36601 36600B	36601-3D00* 36600-3D00*

Warranty Information:

MODEL	OP CODE	OPERATION	OP TIME	CAUSAL PART	NATURE CODE	CAUSE CODE
2011~ Sonata Hybrid (YF HEV)	45000R6M	Automatic transaxle	3.7	45000-3D*** (See Parts Catalog)	13A	ZZ3
	45000RH1	Additional	0.9			
	45000RQ0	GDS operation	0.3			
	91401R00	Control wiring assembly	0.8	91400-4R*** (See Parts Catalog)	13A	ZZ3
	91401RQ0	GDS operation	0.3			
	37561R1H	Wiring harness-volt & temp sensor	1.1	36595-3D000	13A	ZZ3
	37561RQ0	GDS operation	0.3			
	36601R1H	HPCU Assy	1.4	36600-3D00* (See Parts Catalog)	13A	ZZ3
	36601RQ0	GDS operation	0.3			

NOTE: The Op Code for GDS operation can be claimed only one time per repair.

SERVICE PROCEDURE:

1. Depress the brake pedal and press the Start button two times to activate “EV Ready” mode. Attach a GDS, check for DTC in the “MCU” menu. **Record the DTC and description.**

Check the Freeze Frame data to check the Drive Motor Temperature when the DTC was set.

Delete the DTC.

- Using GDS, select **Data Analysis**, **MCU** menu and **Drive Motor Temperature**, **MCU Temperature**, **HSG Temperature** and **MCU (GCU)** temperature.
 Confirm the drive motor temperature is within specification according to the chart below.
 Turn "EV ready" off.
 Record the result. Go to Step 3 to continue the diagnosis.

ATF Temperature	Drive motor temperature
Cold (Parked more than 8 hours)	Same as outside temperature
Normal operating temperature: 140~212°F (60~100°C)	<ul style="list-style-type: none"> Less than 365°F (185°C) More than 36°F (20°C) above MCU, HSG and MCU (GCU) temperatures

NOTICE

A Drive Motor Temperature of 417°F indicates a fault in the motor temperature circuit.

The screenshot shows the GDS Data Analysis interface for a SONATA HYBRID 2013/G 2.4 HEV Motor Control System. The interface includes a search bar, navigation buttons (Stop, Graph, Selective Display, Actuation Test), and a table of sensor data.

Sensor Name(52)	Value	Unit	Link Up
Drive Motor Temperature	79	'F	[Link Up Icon]
MCU Temperature	86	'F	[Link Up Icon]
Generator(HSG) Temperature	79	'F	[Link Up Icon]
MCU(GCU) Temperature	82	'F	[Link Up Icon]
Drive Motor U Phase Current Sensor Offset	0	-	[Link Up Icon]
Drive Motor V Phase Current Sensor Offset	1	-	[Link Up Icon]
Drive Motor Resolver Offset	2.277	rad	[Link Up Icon]

- Open the rear trunk and open the cover to the safety switch.

Put on safety gloves and pull up on the black tab and pull out the safety switch.

Go to Step 4.



WARNING

Failure to perform this procedure may result in accidental injury or death.



- Without depressing the brake pedal, push the Start-Stop button 2 times to power the cluster.

Attach a GDS and select **BMS** menu, **Current Data** and **Inverter Capacitor Voltage**. Confirm the **Inverter Capacitor Voltage** is less than 30V.

- If less than 30V, the system voltage is safe for the technician. Turn off the ignition and disconnect the negative battery cable. Go to Step 5.
- If more than 30V, wait until the voltage is within specification before performing any repairs.

GDS		KMHEC4A42DA087627		03/18/16 10:27	
HOME		Online		SONATA HYBRI../2013/G 2.4 HEV	
		Battery Management System		VCI	
Data Analysis					
Stop		Graph		Selective Display	
Actuation Test					
Sensor Name(116)	Value	Unit	Link Up		
Inverter Capacitor Voltage	4	V			
Accumulative Discharge Power	81.0	KWH			
Accumulative Operating Time	249848	Sec			
MCU Ready	YES	-			
MCU Main Relay Off Request	NO	-			
MCU Controllable	NO	-			
MCU(GCU) Ready	YES	-			

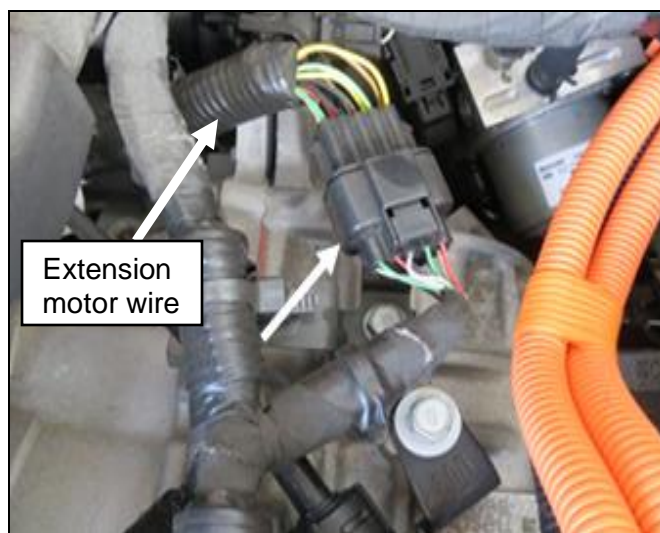
5. Remove the air intake duct.



6. Remove the air intake hose and air cleaner assembly.



7. Disconnect the connector to the extension motor wire.



8. Use a DVOM to measure the resistance between the two pins shown. Resistance specification.

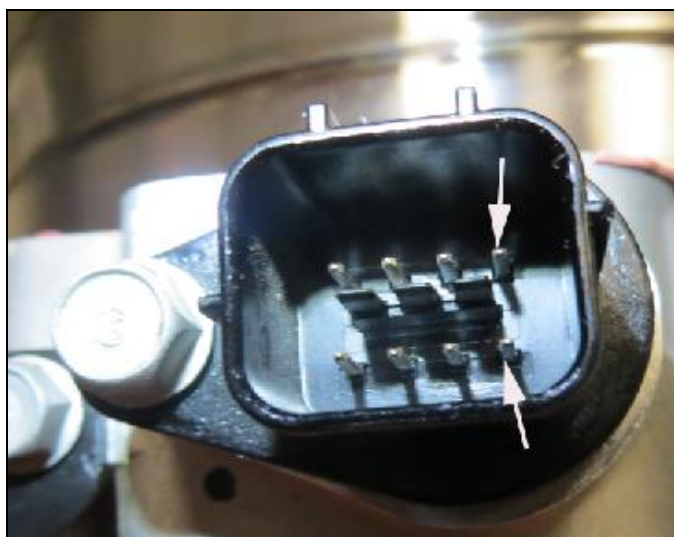
Model Year	EV Motor Temperature	
	68°F (20°C)	140~212°F (60~100°C)
2010~13	112~143 kΩ	5.2~24.5 kΩ
2014~15	10.9~13.4 kΩ	0.9~3.3 kΩ



9. Disconnect the extension motor wire connector from the temperature sensor at the transaxle.

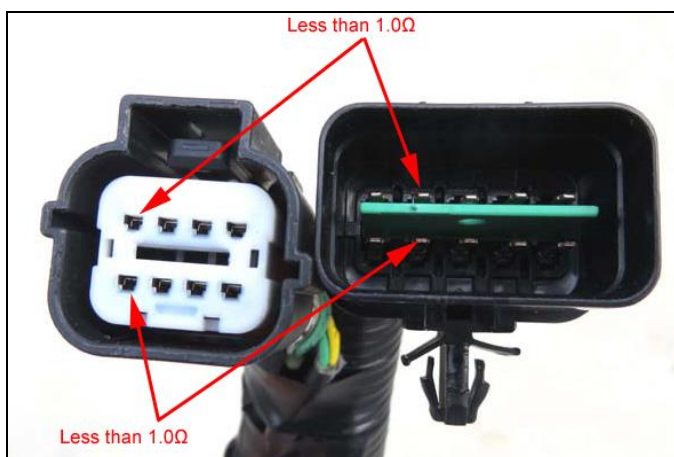
Measure the resistance between the two pins shown. Resistance specification:

Model Year	EV Motor Temperature	
	68°F (20°C)	140~212°F (60~100°C)
2010~13	112~143 kΩ	5.2~24.5 kΩ
2014~15	10.9~13.4 kΩ	0.9~3.3 kΩ



If the resistance is:

- Different than the value found in Step 8, go to Step 10 and retest the extension wire.
 - Not within specification, replace the automatic transaxle and go to Step 11.
 - Within specification, replace the HPCU.
10. If Steps 8 and 9 showed different values, use a DVOM to measure the resistance between the pins as shown. If the resistance is:
- Less than 1 ohm, the harness is ok. Go to Step 9 and retest.
 - More than 1 ohm, replace the extension motor wire.

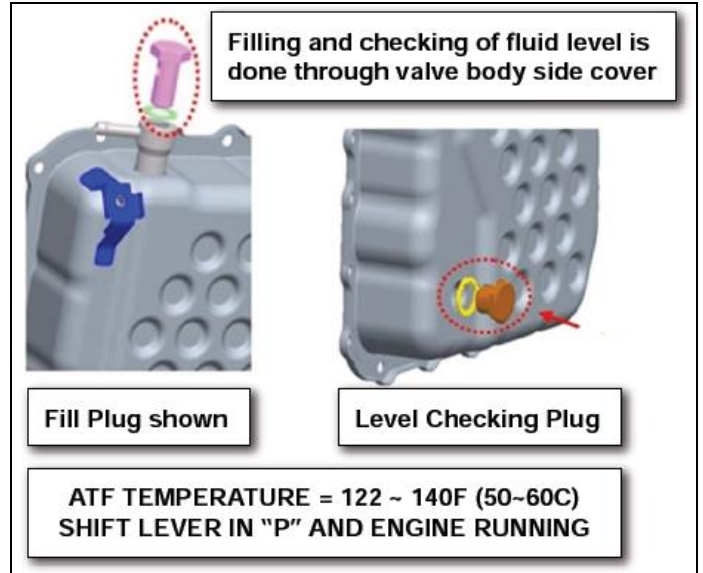


11. If transaxle was replaced, remove the fill plug.

Use a funnel to add approximately 5~6 quarts of SP-4-M ATF through the fill plug opening. Reinstall the fill plug.

Attach the GDS to the DLC and select vehicle, **Data Analysis, A/T** menu and **Oil Temperature Sensor**.

Start the engine and shift to Park. When the ATF is 122°F~140°F (50~60°C), remove the level checking plug. The level is correct when oil flows from the level checking plug in a thin steady stream.



Collect and dispose of any excess fluid in accordance with local regulations.

12. Clear the DTC in the BlueLink system according to instructions in TSB 12-BE-005-2.
13. Drive the vehicle for two key-on/key-off cycles to confirm the DTC do not return. If the DTC return, repair or replace the control wiring harness.