NEW THINKING. HYUNDAI **DEW POSSIBILITIES.** Vol. 24, ISSUE OG PUBLISHED BY THE NATIONAL SERVICE TRAINING & SUPPORT DEPARTMENT

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Analysis

Multi Data Analysis

This month welcomes the launch of Hyundai's second-generation Global Diagnostic System. Designers sought to enhance mobility, speed and communication with the latest version. The functionality and information from the original system has been retained.

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GDS INTERNET UPDATE - VERSION 1.17.0

ECU Upgrade

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Introducing GDS-II: "GDS Mobile"

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Samsung Galaxy Note. It is available with either 16 or 32 gigabytes of internal memory. The Samsung Galaxy Note also has a micro SD card slot that will support a 64 gigabyte memory card for additional GDS data storage. The tablet supports Bluetooth and WiFi communication, which are used to communicate with a redesigned Vehicle Communication Interface, called "VCI-2". The WiFi also provides a persistent connection to the Internet; if your shop is so equipped.

Shops that have WiFi available for the GDS-Mobile will easily maintain the latest updates. That means access



- Auto VIN Detection
- Vehicle Specific System Icons Displayed
- Vehicle Warranty History
- Latest Shop Manual Information
- HTSS Mobile Activated
- Latest Campaigns Available
- Latest TSBs Available

to the latest reflashes, TSBs, Campaigns, GDS functionality and other service information. The Hyundai Technical Service Support (HTSS) application requires an internet connection. The WiFi function provides the connection while offering the mobility that is useful for efficient diagnosis and repair. Warranty history and VIN information will be available to you through WiFi as well. Ask your IT guys to make sure your WiFi is operational and ready to interface with the new GDS-Mobile. HMA has suppliers lined up, if your shop needs WiFi help.

The new compact VCI-2 module plugs directly in the diagnostic link connector or DLC and can communicate with a Hyundai vehicle K=line, CAN system, and FlexRay communication protocols if the vehicle is supported. The VCI-2 has two LED lamps that glow blue, green or red depending on the operational status of the communications. The Interface locks directly on to the 16-pin DLC connector. After use, it is necessary to depress the release button to open the connector lock. This lock prevents the unit from being dislodged from the DLC during operation. On the VCI-2, opposite the DLC connector is a cover that opens to allow access to the 20-pin connector for connecting the VCI-2 to the GDS with a USB cable.



GDS Communications

The tablet's internal memory contains the Android operating system, the GDS Mobile application and diagnostic database. This database allows the proper diagnostic routines to be run for each specific vehicle based on engine, transmission types and model year.

If the SD card is installed in the tablet, then additional information can be stored including DTC guides and electronic troubleshooting manuals. This information will be downloaded from a wireless Internet connection or can be downloaded from a computer running the GDS mobile PC Manager software.

The Samsung 10.1 Note runs on the Android Kitkat 4.4.2 operating system. It will look familiar to those already using Android phones or tablets. The GDS-Mobile online training will familiarize you with navigating on the 10.1 Note. Make sure you review the course on TACS. Key settings such as activating Bluetooth and selecting an available wireless network are among the many topics covered in the course.

The GDS Mobile kit comes in two configurations. Hyundai offers a kit that includes the Samsung and VCI- 2 or a "Lite" version that provides just GDS software that can be loaded into Samsung tablets. Installation instructions called "Quick Start" are available at the Hyundai Service Information Website (www.hyndaitechinfo.com), and describe the steps for launching your GDS Mobile device. Both the Full Kit and Lite "Quick Start Guides" are available. Other documents are also contained in the GDS Mobile Info section at the Hyundai Service Information Website. These cover tips for Screen captures, printing, and Wireless connection to the VCI-2.

The flexibility and mobility of the new tablet platform brings the latest technology right to your bays. Remember, a well-functioning wireless network in your shop will unleash the full functionality available in your new Hyundai GDS Mobile tool. Hyundai has lined up potential vendors to help with WiFi installation in your shop. Their contact information is available in the GDS Mobile Info section.

If you choose to install the GDS Mobile program onto your own Samsung, remember the program currently performs with Samsung's Kitkat 4.4.2 Android operating system. Make sure you update your unit to that system.



Car Care Express Technician Course Now on TACS

The New Car Care Express Technician web course has been placed on the TACS dashboard. The course offers an introduction to the Car Care Express maintenance process, and makes a great place for "Quick Service" Techs and "C level" technicians to familiarize themselves with the Multi-Point Inspection (MPI) process. Other basic topics are covered including oil and filter replacement and tire checking and rotation. The course runs about 25 minutes and makes a good refresher for anyone using the MPI form during their workday.

Assurance CAR CARE EXPRESS

Hyundai's 11th World Skills Team Selected

It takes a blend of technical knowledge, diagnostic skill, written communication and a little bit of luck to survive the rigors of Hyundai's National Skills Competition. The event brings 15 of Hyundai Motor America's best technicians together in a head to head competition at the Hyundai Motor Manufacturing Alabama plant in Montgomery. This year's field did not disappoint!

Various diagnostic conditions were "created" by a team of Hyundai Technical Instructors, Field Engineers and former World Skills Participants. To invent the challenges for these technicians, you need to be curiously deceptive and willing to watch technicians struggle a little. It's all for the good cause of setting a high bar for automotive repair excellence which has contributed to Hyundai leading the automotive industry in customer loyalty for five years running.

This team has some big expectations placed on it. In 2011 and 2013, Hyundai Motor America Technicians brought home the overall gold medal from the world competition. Jasen Nowacki from Florida earned the honor in the 9th edition; and two years later in the 10th, California's

Jason Emerson won it all. Emerson is not too worried for this team: "I think we have a real good chance [of winning]. All these guys are good. With a little coaching over the next year, I would predict a 'three-peat!'"





Meet the 2014 Hyundai Motor America National Skills Challenge winners: Rick Byrne, Jefte Caldera, Matt Schmitt, and Aronn Walters.





ECV Type A/C Compressor Diagnosis Procedure

This article provides additional service procedures to assist the diagnosis of vehicles equipped with externally controlled variable displacement (ECV Type) A/C compressors. Refer to the applicable Shop Manual HVAC section of the vehicle, and then follow the procedures outlined in this article whenever a vehicle with the following symptom(s) are being diagnosed: A/C does not get cold enough; the high and/or low sides are showing abnormal system pressure on the manifold gauge or GDS; high side pressure should be greater than 130 PSI (896kpa, 9.1kg/cm2) during MAX A/C use.

NOTE: The A/C Compressor Diagnosis Kit (P/N 00305 ACKIT TOOL) applies only for vehicles equipped with ECV type compressors. See the list of applicable models and connection configuration later in this article.



Main Connection Harness Component Parts:

- 1. Battery Terminal Connection Leads
- 2. Protection Fuse (10A)
- 3. On/Off toggle switch
- 2-pin connector (female) for direct connection to the compressor or to Extension Harness 1 or 2 (as necessary)

Applicable Vehicles



Extension Harnesses Extension Harness 1 for 2 Pin (small) Extension Harness 2 for 3 Pin

Diagnosis Procedure

For the A/C Performance Test, start the engine, set the blower speed to level 2, and select MAX A/C. Set MAX A/C with A/C ON, coldest temperature setting, and recirculated air. Next, check system status related to the HVAC system and A/C compressor using the GDS. The system status of all related components should be indicating ON. If the GDS is showing the compressor status as OFF, then check the various wiring harness and connection points from the A/C Heater Control Unit to the A/C compressor.

Then, Check the A/C pressure using the GDS. If the pressure is more than 130 PSI, then the A/C system is operating normally. The proper specification is 130 PSI (896kpa, 9.1kg/cm2) If the pressure is out of spec, continue the diagnosis by using the A/C Compressor Diagnosis Kit.

Connecting the Diagnosis Kit

NOTE: Turn the engine OFF before disconnecting and connecting the A/C Compressor Diagnosis Kit. Once the engine is off, disconnect the main vehicle wiring harness from the A/C compressor. Connect the A/C Compressor Diagnosis Kit to the A/C compressor. For compressors equipped with a pigtail harness from the ECV, connect to the ECV pigtail harness using the Main Connection Harness of the kit. For compressors not equipped with a pigtail harness from the ECV, connect to ECV pigtail harness to connect directly to the ECV. **NOTE:** Refer to the Applicable Vehicles chart for the connector configuration and type. Connection configuration and type listed in the chart may be subject to change.

Model	Production Range	Compressor Part Number	ECV Connector	Diagnosis Kit Connection Configuration				
RB	14MY~	977011R000						
BK	13MY~	977012M500 • 977012M600						
AN	ALL	977011U500]					
NC	ALL	977011U600 • 977011U650]					
BH	ALL	977013M102 • 977013M000	2 PIN	Main Connection Harness				
DH	ALL	97701B1000 • 97701B1200]					
VI	ALL	977013M100]					
GD/JK	ALL	07701 45000	1					
MD/UD	14MY~	97701A5800						
YF 2.0/2.4	ALL	977013R000	1					
YF 2.0/2.4	ALL	977013V110	e Dibi	Main Connection Hamon				
LF 1.6/2.0/2.4	ALL	97701C2000 • 97701C2100		+ Extension Harness 1				
HG	ALL	977013R200 • 977013V410						
MD/UD	~13MY	977013X601		Main Connection Harness				
LM ALL		977012S500		+ Extension Harness 2				

NOTE: Connection configuration and type listed in the chart may be subject to change.

ECV Resistance Test

Connect the B+ Red and negative Black power lead clips of the diagnosis kit to a DVOM set to Ω .



Multimeter Probe Connection





Switch ON

Switch OFF

After connecting the clips, turn the diagnosis kit switch to the ON position and check the ECV resistance using the DVOM. Normal resistance is $10.1 \sim 11.1\Omega$ when AMB temperature is 77°F.

Resistance may vary according to the engine compartment temperature. The acceptable normal resistance range is $8 \Omega \le \text{ECV}$ Resistance $\le 14 \Omega$. Replace the ECV if the resistance is either less than 8Ω or greater than 14Ω . Refer to the applicable parts catalog for the latest service part number. After replacing the ECV, repeat the A/C Performance Test.

A/C Pressure Test

NOTE: Before connecting to the battery, turn the engine OFF and confirm that the diagnosis kit switch is in the OFF position. Then connect the diagnosis kit to the vehicle battery terminals, the red clip to the + terminal and the black clip to the – terminal. Next, start the engine, set the blower speed to level 2, and select MAX A/C. Remember, MAX A/C is with A/C ON, coldest temperature setting, and recirculated air. Note: Do not run the A/C with the diagnosis kit switch in the ON position beyond 30 seconds. The evaporator core or expansion valve may freeze and alter pressure gauge readings.

If the pressure is normal using the diagnosis kit, even though it did not pass the initial A/C Performance Test outlined above, check the various wiring harness and connection points from the A/C Heater Control Unit to the A/C compressor. Repair any damaged wiring or connections along the wiring harness.

If out of specification or erratic pressures are showing on the manifold gauge or the GDS, recharge the refrigerant and perform leak testing if refrigerant level is out of specification. Then, check A/C line for blockage if there are no leaks found. Next, check the radiator cooling fan for proper operation. Lastly, repeat A/C Pressure Test to verify the repair.

If the test results lead to out of spec compressor, **check the ECV pin for bent or poor contact** condition (see photos) before replacing the compressor. Replace the compressor if no other faults are found and the compressor is not operational.



Bent EVC Pin

Record Results and Finalize Repair

Record the diagnosis results on the repair order. Document the measured ECV resistance, pressures, and the recovered refrigerant amount. If a new A/C compressor is being installed, then perform a visual check of the ECV connections.ECV connection and ECV pin contact condition.Repeat "A/C Performance Test" to verify system performance.



Bent pin check

Control valve check



2011-2013 ELANTRA (MD/UD) ECM UPDATE – P2096 AND/OR MISFIRE DTC(S)

DESCRIPTION: This article provides an ECM update to revise the diagnostic logic for the following DTC(s):

2011-2012MY

- P2096: Post Catalyst Fuel Trim System too Lean (Bank1)
- P0301/2/3/4: Cylinder-1/2/3/4 Misfire detected

2013MY

• P2096: Post Catalyst Fuel Trim System too Lean (Bank1)

APPLICABLE VEHICLES: 2011-2013 ELANTRA (MD/UD)

NOTE: Use the applicable ECM P/N listed in the ECM **ROM ID Information Table from the following** pages.

GDS Information:

EVENT #	DESCRIPTION
330	330. UD/MD 1.8MPI ENGINE DTC P2096 IMPROVEMENT

Warranty Information:

MODEL	PART	OPERATION	OP TIME	CAUSAL PART #
ELANTRA (MD/UD)	39101F17	ECM UPGRADE	0.3 M/H	(See NOTE)

ECM ROM ID INFORMATION TABLE:

Verify the ECM ROM ID before updating the vehicle's software. Refer to the table below.

MV	Emission	FCM P/N	T/M	IMMO	ROM	ID	MY	Emission	FCM P/N	T/M	IMMO	ROM ID		MY	Emission	FCM P/N	T/M	IMMO	ROM I	D
NI I	LIIII001011	CONTIN	1/101	INNING	Previous	New		Linosion	Lonnin	12.111	mino	Previous	New		Linioron	Louitin		interio	Previous	New
		39101-2EMA0		YES (Start-Stop	/ES MD1SP1MS294B MD1SP1MS294C MD1SP1MS294D MD1SP1MS294D	MD1SP1MF2EAA			39101-2EMN2 (MD)	-	YES (Start-Stop Button)	MD2SP1MS2B7A MD2SP1MF2E3A				39101-2EMA3 (UD)		YES	MD3SP1MS2D2A MD3SP1MS2D2B MD3SP1MS2D8A MD3SP1MS2B8A	
	SULEV	(100/00)	AT	Button)	MD1SP1MS296A MD1SP1MS296A MD1SP1MF2E3A			SULEV	39103-2EMA2 (MD/UD)	AT	NO (Kay Start)	MD2SP1NS2B0A MD2SP1NS2B4A MD2SP1NS2B4B MD2SP1NS2B4C MD2SP1NS2B7A	MD2SP1NF2EAA			39101-2EMN3 (MD)	-	(Start - Stop Button)	MD3SP1MS2D2A MD3SP1MS2D2B MD3SP1MS2D8A MD3SP1MS2D8A MD3SP1MS2E3A	MD3SP1MF2EAA
	39103-2EMA0 (MD/UD)		NO (Key Start)	MD ISP INS294B MD ISP INS294C MD ISP INS294D MD ISP INS294E MD ISP INS296A MD ISP INS296A	MD1SP1NF2EAA					(Rey Start)	MD2SP1NF2E3A			SULEV		- AT	NO	MD3SP1NS2D2A		
								39103-2EMN2 (MD)			MD2SP1NS2B7A MD2SP1NF2E3A				39103-2EMA3 (UD)			MD3SP1NS2D2B MD3SP1NS2D8A MD3SP1NS2E3A		
11MY		39101-2EMB0	AT	YES (Start-Stop	MD1UP1MS294B MD1UP1MS294C MD1UP1MS294D MD1UP1MS294D	MD1UP1MF2EAA		ULEV	39101-2EMB2 (MD/UD)	AT	YES (Start-Stop	MD2UP1MS2B0A MD2UP1MS2B4A MD2UP1MS2B4B MD2UP1MS2B4C MD2UP1MS2B4C				39103-2EMN3 (MD)		(Key Start)	MD3SP1NS2D2A MD3SP1NS2D2B MD3SP1NS2D8A MD3SP1NS2E3A	MUSSPINFZEAA
		(MD/OD)		Button)	MD1UP1MS296A MD1UP1MF2E3A		12MY				Button)	MD2UP1MF2E3A	MUZUPIMFZEAA	13MY		39101-2EMB3		YES (Start-Stop	MD3UP1MS2D2A MD3UP1MS2D2B	- MD3UP1MF2FAA
	ULEV 39103-2 EMB0 (MD/UD)				MD1UP1NS294B MD1UP1NS294C				39101-2EMP2 (MD)	AT	YES (Start_Stop Button)	MD2UP1MS2B7A MD2UP1MF2E3A				(0D)	AT		MD3UP1MS2D8A MD3UP1MS2E3A	
		AT	10	MD1UP1NS294D MD1UP1NS294E MD1UP1NS296A MD1UP1NF2E3A				39103-2EMB2	AT	building	MD2UP1NS2B0A MD2UP1NS2B4A MD2UP1NS2B4B				39101-2EMP3 (MD)		Button)	MD3UP1MS2D2A MD3UP1MS2D2B MD3UP1MS2D8A MD3UP1MS2E3A		
		39107-2EMB0	MT	(Key Start)	MD1UP1NS294B MD1UP1NS294C MD1UP1NS294D	MD1UP1NF2EAA		ULEV	(MD/UD)	AI		MD2UP1NS2B4C MD2UP1NS2B7A MD2UP1NF2E3A			ULEV	39103-2EMB3 (UD)			MD3UP1NS2D2A MD3UP1NS2D2B MD3UP1NS2D8A MD3UP1NS2E3A	
	(MD/UD)	100		MD1UP1NS294E MD1UP1NS296A MD1UP1NF2E3A				39103-2EMP2 (MD)		NO (Key Start)	t) MD2UP1NS2B7A MD2UP1NF2E3A	MD2UP1NF2EAA			39103-2EMP3	AT	NO	MD3UP1NS2D2A MD3UP1NS2D2B	MD0LID1NE2EAA	
				VEC	MD2SP1MS2B0A MD2SP1MS2B4A						k.	MD2UP1NS2B0A MD2UP1NS2B4A				(MD)		(Key Start)	MD3UP1NS2D8A MD3UP1NS2E3A	moour mizervi
12MY	SULEV	39101-2EMA2 (MD/UD)		(Start-Stop Button)	MD2 SP1MS2B4B MD2 SP1MS2B4C MD2 SP1MS2B7A MD2SP1MF2E3A	MD2SP1MF2EAA			39107-2EMB2 (MD/UD)	MT		MD2UP1NS2B4B MD2UP1NS2B4C MD2UP1NS2B7A MD2UP1NF2E3A				39107-2EMB3 (MD/UD)	MT		MD3UP1NS2D2A MD3UP1NS2D2B MD3UP1NS2D8A MD3UP1NS2E3A	

GENERAL PRECAUTIONS:

- Connect the USB cable between the GDS and the VCI.
- Connect the 16-pin DLC connector from the VCI into the DLC located under the driver's side dash.



NOTICE Make sure the battery icon at the bottom right of the GDS laptop shows at least 50%; if not, charge the GDS or attach a battery charger.

- Turn off all lights (Do not leave the headlight switch in auto mode) and all accessories (including heater/air conditioner/fan, audio, heated seats, rear defroster, etc) to ensure the battery will not be discharged during the update.
- Perform the update with the ignition key in the ON position. (Turn the ignition key to ON position or press the Start-Stop Button two times without depressing the brake pedal).
- Do not disconnect any cables connected to the vehicle or the GDS during the update.
- Do not start the engine or turn the ignition switch OFF during the update.
- NOTICE Confirm your GDS has the most recent version. If not, connect the GDS to an Internet port, open the GDS home page and select "Update". Refer to instructions on hmaservice.com if necessary.
- If you encounter GDS related problems, call the GIT Helpline at 888-437-0308.

SERVICE PROCEDURE: GDS AUTO MODE ECM UPDATE PROCEDURE

- **1.** From the GDS home page, select ECU Upgrade. If necessary, select the VIN.
- 2. Select Engine as the system and then select OK.
- **3.** Select Auto Mode and then select Next.
- **4.** From the System tab, select Engine and then select OK. The GDS will read the ROM ID. Confirm the ROM is applicable as shown on Page 2-3, "ECM ROM ID Information".

NOTE: Record the ECM ROM ID in case the auto update fails and a manual update is needed.



 Update event "330. UD/MD 1.8MPI ENGINE DTC P2096 IMPROVEMENT" will display. Select Upgrade.



- **6.** If the screen indicates **"Voltage is OK"** (voltage > 12volts), select **OK**. If not, select **CANCEL** and charge the vehicle battery by running the engine for 10 minutes.
- **7.** Updating will occur until 100% is reached on the bar graph. At the prompt, turn the ignition key OFF for 10 seconds, then turn it **ON** and select **OK**.
- **8.** The GDS will confirm that ECM reprogramming is successfully finished. Select **OK**.
- **9.** If the ECM update was not successful, go to GDS MANUAL MODE ECM UPDATE PROCEDURE.
- **10.** Check for DTC in all systems and Erase All DTC that stored due to loss of CAN communication during the ECM Update.
- **11.** Turn **OFF ignition for 10 seconds** then turns **ON** before going to engine start.
- **12.** Start the engine to confirm proper operation.

NOTICE In the event of AUTO MODE update failure:

- You must attempt MANUAL MODE. Use the ECM P/N from the vehicle's ECM label if it is not clear from the ROM ID Table as to the correct ECM P/N to use for your vehicle.
- Replacing an ECM without carefully documenting that a MANUAL MODE update attempt was made may result in claims charged back.

NOTICE

- GDS Manual Mode is intended for recovery of an ECM Update should it begin but then later fail in process in the Auto Mode.
- The ECM connectors must be disconnected for 15 minutes to reset its contents then perform this Manual Mode Update.
- Do not force Manual Mode if you get an error in Auto Mode that the vehicle's current ROM ID did not apply.
- It is critical to identify the correct ECM Part Number in the PASSWORD table or the ECM may be permanently damaged. It is recommended to remove ECM and read the part number from the label to confirm.
- **1.** From the GDS home page, select **ECU Upgrade**. If necessary, select the VIN.

continued on page 12

Fix-It-Right

continued from page 11

- **2.** Select **Engine** as the system and then select OK.
- 3. Select Manual Mode and then select Next.
- **4.** From the **System** tab, select **Engine** and then select **OK**.
- 5. Select update event 330. UD/MD 1.8MPI ENGINE DTC P2096 IMPROVEMENT, then select Next.
- **6.** Be certain to select the exact appropriate ECU of the vehicle, select Upgrade, enter corresponding password from the table below and select OK.

MENU	KEY TYPE	PASSWORD
UD/MD 1.8 AT IMMO : 39101-2EMA0	Start-Stop Button	0120
UD/MD 1.8 AT IMMO : 39101-2EMB0	Start-Stop Button	0121
UD/MD 1.8 AT NON IMMO : 39103-2EMA0	Key Start	0122
UD/MD 1.8 AT/MT NON IMMO : 39103/39107-2EMB0	Key Start	0123
UD/MD 1.8 AT IMMO : 39101-2EMA2/2EMN2	Start-Stop Button	0124
UD/MD 1.8 AT,MT IMMO : 39101-2EMB2/2EMP2	Start-Stop Button	0125
UD/MD 1.8 AT NON IMMO : 39103-2EMA2/2EMN2	Key Start	0126
UD/MD 1.8 AT,MT NON IMMO : 39103-2EMB2/2EMP2, 39107-2EMB2	Key Start	0127
UD/MD 1.8 AT IMMO : 39101-2EMA3/2EMN3	Start-Stop Button	0128
UD/MD 1.8 AT,MT IMMO : 39101-2EMB3/2EMP3	Start-Stop Button	0129
UD/MD 1.8 AT NON IMMO 39103-2EMA3/2EMN3	Key Start	0130
UD/MD 1.8 AT,MT NON IMMO : 39103-2EMB3/2EMP3, 39107-2EMB3	Key Start	0131

7. The remaining steps are the same as Steps $6 \sim 12$ of the Auto Procedure.

TECHNET TIDBIT

The Audio Update Module tool was developed to eliminate the need of storing multiple USB flash drives at the dealership. This module only replaces the usage of USB flash drives for updates. This Essential Service Tool has initially been designed for use with the **PC-based** GDS tool.

TechNet Times

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