



TECH TIMES

2016 • VOLUME 19, ISSUE 6

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2016 KIA ELITE CERTIFICATION

Are you certified yet? You have less than a month to complete your certification requirements. You only need to complete your online web-based courses to receive Maintenance- and Professional-Level Elite Certification.

The certification deadline is December 31, 2016. **If you wait until the last minute, you may miss out on your opportunity to be certified for 2017** due to system overload and course availability.

To check your certification progress, log in to KDealer.com and click on the Certification popup message (fig. 1).

Clicking on the Certification progress bar under "My Performance" (fig. 2) will take you to your certification attainment report.

Kia is also sending you frequent email messages about your certification status with instructions to complete your requirements by December 31, 2016.

Don't miss your opportunity to achieve 2016 Elite Certification!

Complete Your Certification Now!

All Professional Level Courses need to be completed by December 31, 2016. If you wait until the last minute, you may miss out on your opportunity to be certified for 2017 due to heavy system overload.



[Click here](#) to visit your certification progress status on Kia University

Fig. 1.

Fig. 2.

TECHLINE FAQs

Q

I have replaced the BCM on a YP Sedona and now the TPMS light is flashing but does not set codes. I have tried relearning the TPMS sensors but still have the same problem. What should I do?

A

The TPMS receiver/module is built into the BCM on the 2015 model year and newer Sedona. When replacing the BCM, all TPMS module replacement steps must also be completed. This includes sensor writing, VIN writing, vehicle name writing and sensor registration.

Q

I have an engine knocking or seized. I have already confirmed proper maintenance has been performed in accordance with the owner's manual and have validated the warranty in WEB DCS. Do I need to open a Techline assistance case, or can I just open the PWA?

A

If you are a DSA Level B dealer (Level A dealers are not required to open PWA cases), you only need to open the PWA case for warranty approval to replace the engine. Be sure to go back into the case after creation and attach the completed and signed core data form to the case.

Q

I replied to the Kia Assistance Center email notification from Techline but have not heard anything back. What should I do?

A

The email notification from the Kia Assistance Center is a one-way server and the Techline agent will not receive responses sent to this address. You need to go into your open Techline assistance cases and add the note to the case. The agent that is assisting you will then be notified via email of your added case note.

Q

I went to add notes to my case, and I got a server error message, can you help me with this?

A

You will need to contact the Web DCS help desk for issues with connectivity at (800) 327-2707.

LATEST TECHNICAL SERVICE BULLETINS, SERVICE ACTIONS AND CAMPAIGNS

SA 248	Delta Garnish and Front Bumper Gap/Noise Adjustment (BOD152)(17MY QL)
SA 241r1	Axle Driveshaft Replacement (TRA060)(16MY JFa)
ENG 160r1	ECU Upgrade for MIL On With DTC(s) P0420/P0171 (12-16MY Multiple Models)
BOD 148r1	Sunroof Buzzing Noise (16MY JFa)
SA 255r1	Auto Lock Mode Change (BOD155r1)(17MY UMa)
SA 254	Rear Doors With High Effort to Open/Close (BOD156)(17MY YDm)
ENG 161	Data Collection: Extract California Emissions Data from ECU (DC16) (16MY Multiple Models)
SA 239r1	Base Audio Upgrade for Bluetooth Pairing Improvement (ELE112r1)(17MY YDm)



CAUTION

Vehicle servicing performed by untrained persons could result in damage to the vehicle.



WARNING

- Vehicle servicing performed by untrained persons could result in injury to those persons or to others.
- Always take proper and necessary safety precautions when performing any type of service on a vehicle.
- The Kia technician newsletter (Tech Times) is intended for use by professional Kia automotive technicians only. It is written to inform technicians of conditions that may occur on some vehicles. Trained Kia technicians have the equipment, tools, safety instructions, publications and expertise to help perform the job correctly.

NOTICE

The topics covered in this newsletter are designed to assist you with the diagnosis and repair of specific vehicle conditions. Just because a condition is described in this newsletter, do not assume that it applies to your vehicle, or that your vehicle will have that condition. In all cases, the procedures in the applicable Service Manual and/or Electrical Troubleshooting Manual or on KGIS should be performed first.

The information and specifications provided in this document were accurate at the time of development. Kia reserves the right to discontinue or change specifications or design at any time without notice and without incurring any obligation.

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TECH LINE 2016-2017 HOLIDAY HOURS

Thanksgiving

Thursday, November 24	Closed
Friday, November 25	6:00 AM - 3:00 PM PST*
Saturday, November 26	7:00 AM - 2:00 PM PST*

Christmas

Friday, December 23	6:00 AM - 3:00 PM PST*
Saturday, December 24	Closed - Christmas Eve
Monday, December 26	Closed - Christmas Day (Observed)
Tuesday, December 27 - Friday, December 30	6:00 AM - 3:00 PM PST*

New Years

Saturday, December 31	Closed - New Year's Eve
Monday, January 2	Closed - New Year's Day (Observed)

* **Note:** Techline staff will be limited during holiday hours. Business hours will resume to normal January 3, 2016. Schedule subject to change without notice.

2017 NIRO NEW MODEL TECHNICAL TRAINING



The 2017 Kia Niro combines the power of an efficient 1.6L GDI 4-cylinder engine, a 43hp electric motor, and a lithium-ion polymer battery to deliver outstanding fuel economy and dynamic driving performance.

2017 Niro Technology Course is a two-day instructor-led course designed to deliver the information Kia Technicians need to properly service and repair this exciting new Hybrid Utility Vehicle.

Classroom time will be devoted to hybrid system operation, the internal combustion engine, engine controls, 6-speed Dual Clutch Transaxle, and driver convenience features. In the workshop, Technicians will use KGIS, KDS, and Special Service Tools while being guided by worksheets and their Kia Instructor. At the end of the course, Technicians will complete a Performance Assessment to prove they are ready to Fix It Right The First Time and provide an exceptional service experience to Kia Niro owners.

After completing this course, technicians will be able to:

- Identify Niro components and features and explain the functions of the 2017 Kia Niro Hybrid Electric Vehicle
- List the Personal Protective Equipment and procedures to safely repair a Hybrid Electric Vehicle
- Explain the operation and powerflow of the HEV system including the 6-speed Dual Clutch Transaxle
- Use KGIS and KDS to diagnose and repair major Niro systems

Stay tuned to **KiaUniversity.com** for more details and to enroll in the 2017 Niro Technology Course.

KIA HYBRID TRAINING REQUIREMENTS



Kia is making the Optima Hybrid, Optima Plug-in Hybrid, and Niro Hybrid Utility Vehicle available to all Kia Dealers to sell and service.

This means that if your dealership did not previously sell Optima Hybrid, two Technicians from your dealership must complete hybrid technical training requirements to start performing warranty and customer pay repair and maintenance work on hybrid and plug-in hybrid vehicles.

Kia University offers a number of courses to help Technicians get up to speed:

Web-Based Training (WBT)

- Hybrid Technical Highlights Course & Test (TEC-01-029-1)
- Hybrid Electric Vehicle Safety Course & Test (TEC-01-028-1)
- 2017 Optima Hybrid Tech Highlights Course & Test (TEC-01-057-1)
- 2017 Optima PHEV Tech Highlights Course & Test (TEC-01-058-1)

Instructor-Led Training (ILT)

- Optima Hybrid Technology - 3 days (TEC-03-040-1)

We encourage you to enroll in the Optima Hybrid Technology ILT course as soon as possible. Courses are filling up fast and availability will be limited in early 2017 due to the focus on Niro new model training.

Special Service Tools & Equipment

Hybrid vehicle Special Service Tools will automatically ship to your dealership in November. The Hybrid SST Kit is \$3,231 plus tax and shipping. Dealers that previously purchased any Hybrid SSTs from Snap-on Business Solutions will not receive duplicate SSTs.

SERVICE TECH TRAINING SHOP COATS

As stated in the 2016 Kia Training & Certification Catalog's attire policy, Technicians attending service technical training courses at Kia University Training Centers must wear their Kia dealership uniform and appropriate workshop footwear.

In the near future, if Technicians do not wear their Kia dealership uniform to class, or if their uniforms are soiled or worn, they will be asked to wear a Kia shop coat during training.

Wearing Kia shop coats during technical training is a Kia Motor Corporation (KMC) global standard. This means Technicians in Kia training centers around the world wear Kia shop coats for a professional appearance that reflects positively on the technician profession and the Kia brand.

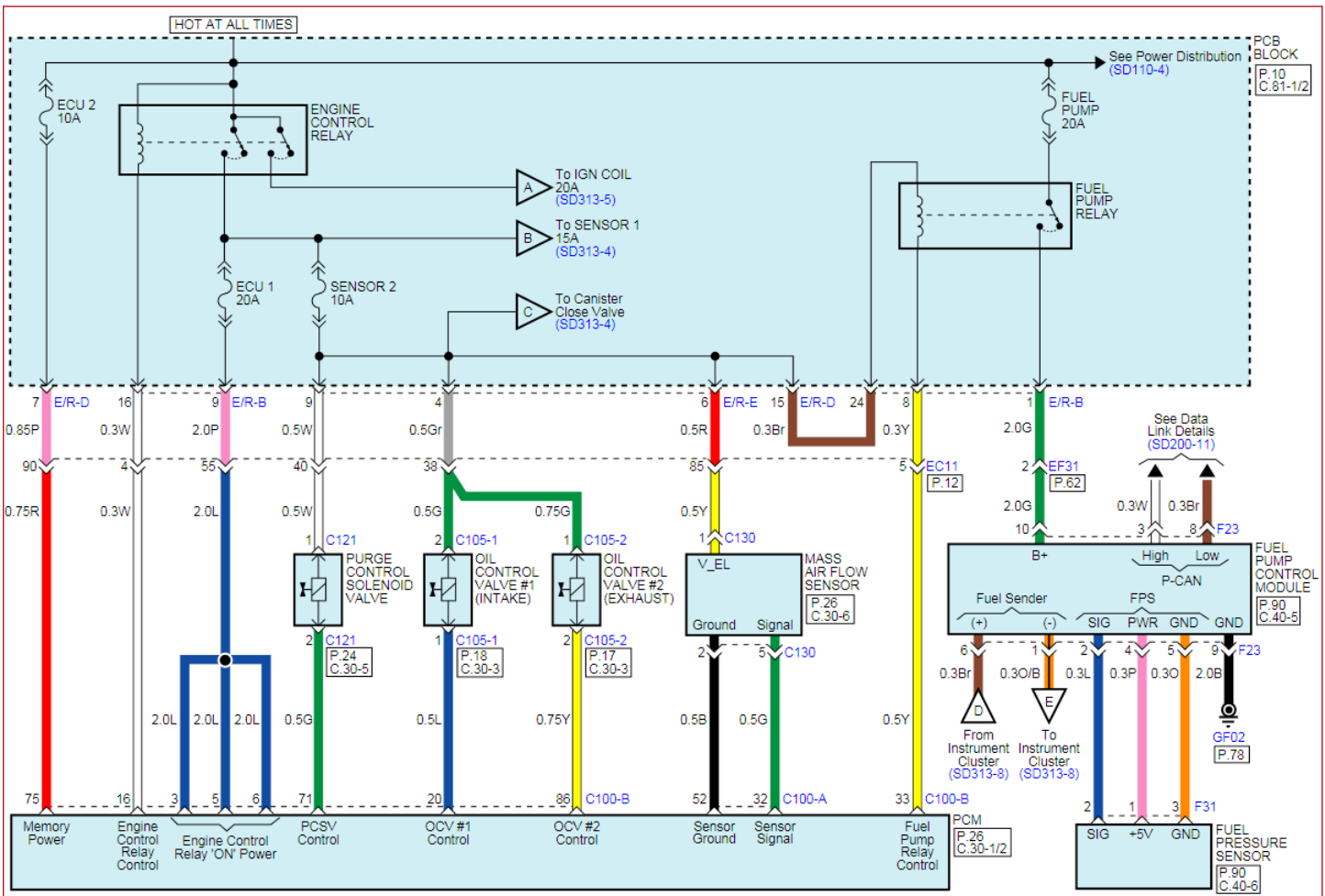
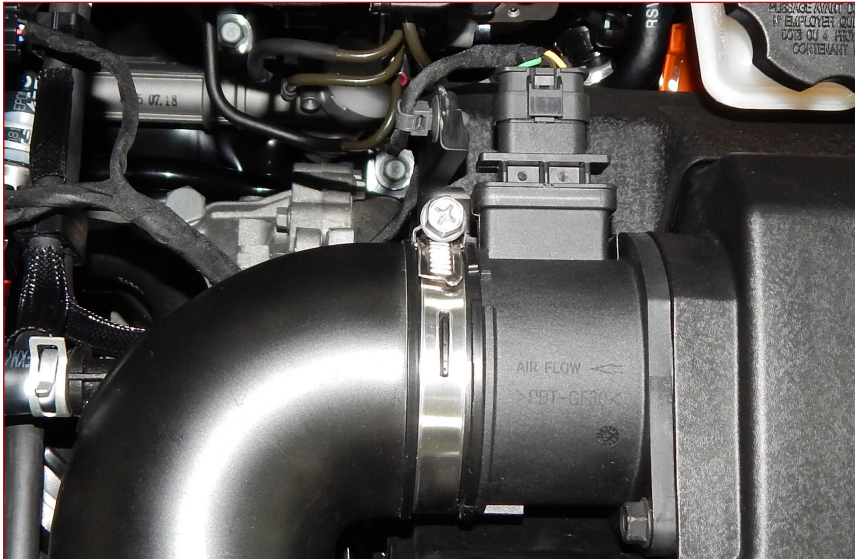


JOE'S CORNER WE'RE BACK! MAF AND EGR REFRESHER

Kia is resurrecting the Mass Air Flow Sensor (MAF) and Exhaust Gas Recirculation (EGR) (starting with 2017MY Optima Hybrid, Plug-In Hybrid and Niro). I thought a little refresher will help you get back up to speed.

The MAF mounts between the air cleaner and throttle body. It measures the mass of intake air entering the engine. A large amount of intake air represents acceleration or high load conditions while a small amount of intake air represents deceleration or idle.

Mass Air Flow Sensor Specifications	
Air Flow (kg/h)	Frequency (kHz)
-40	1.49
-20	1.59
-10	1.68
-8	1.70
-6	1.72
0	1.81
6	1.93
8	1.97
10	2.01
20	2.21
40	2.52
60	2.74
90	3.05
120	3.34
140	3.53
160	3.73
250	4.62
310	5.28
370	6.03
440	7.06
560	9.46
640	11.83



JOE'S CORNER

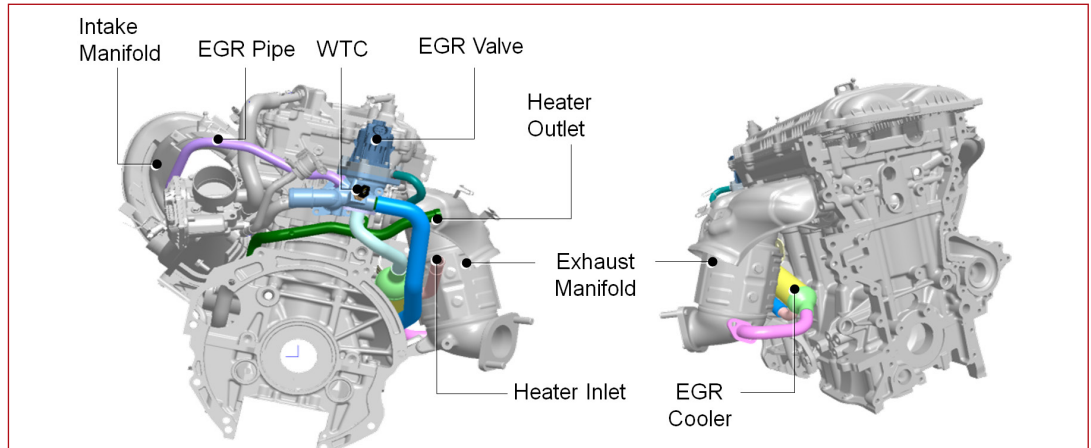
WE'RE BACK! MAF AND EGR REFRESHER (CONT'D)

The Electric EGR Control Valve adds exhaust gas to intake air to reduce the temperature in the combustion chamber.

Hot exhaust gas leaves the catalytic converter, passes through the EGR cooler, EGR Control valve when open, and into the intake manifold.

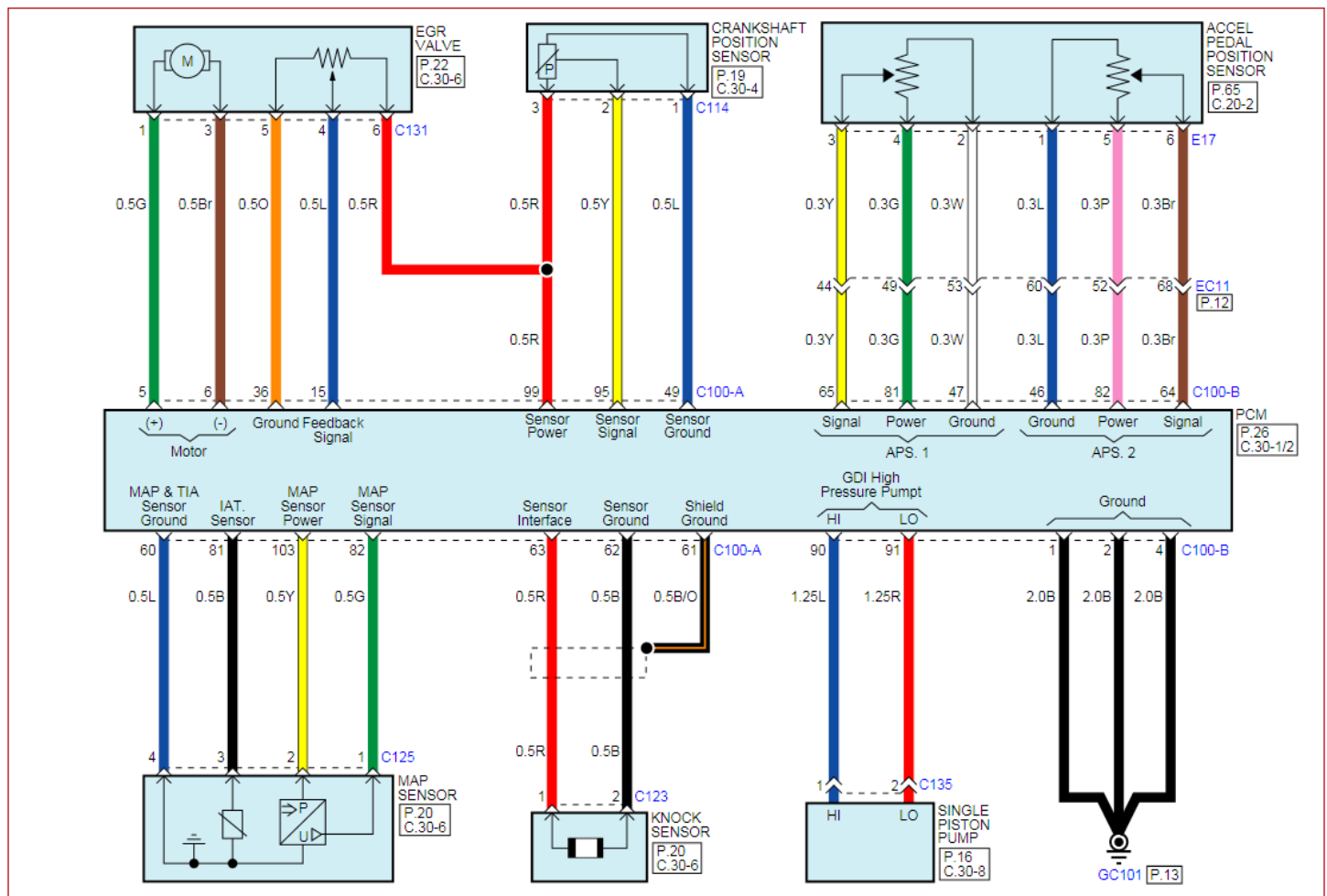
The PCM uses PWM to control the EGR valve.

It controls the amount of valve opening depending on engine load.



Stay tuned for my next issue: "What You See Is What You Get," How to Read Kia ETM Schematics.

EGR (Exhaust Gas Recirculation) Current Data		
Sensor Name	Sensor Value	Unit
EGR Valve Sensor Voltage	4.242	V
EGR Valve Opening Angle	-7.477	%
EGR Valve Actuator PWM	-20.002	%
EGR Valve Closed Position Learning Value (Maximum)	4.016	V
EGR Valve Closed Position Learning Value (Minimum)	0.000	V
EGR Valve Closed Position Learning Value	4.106	V
EGR Valve Flow Rate Learning Value	1.000	—
EGR Valve Dead Zone Learning Value	0.000	Cm ²



HEAD UNIT IDENTIFICATION

HEAD UNIT IDENTIFICATION CHART

Vehicle	Audio 4.0A • No touchscreen • Monochrome display • 1-6 Preset buttons below display • 5.0" TFT Display	Audio 4.0B • 5.0" TFT Display • No Navigation/SD card • Large v-Seek/Track-^ buttons below display	UVO 3.0 • 7.0" TFT Display • Monochrome icons • No Navigation/SD card • CarPlay®/Android Auto™	AVN 4.0 • 8.0" TFT Display • Color icons • Navigation/Has SD card • CarPlay®/Android Auto™	Premium 2.0 • 9.2" TFT Display • Only available on K900 • Navigation/Has SD card
					
Cadenza	N/A	N/A	17MY	17MY	N/A
Forte	N/A	N/A	17MY	17MY	N/A
K900	N/A	N/A	N/A	N/A	16-17MY
Niro	N/A	N/A	17MY	17MY	N/A
Optima	N/A	N/A	17MY	15-17MY	N/A
Rio	N/A	N/A	N/A	N/A	N/A
Sedona	17MY	17MY	17MY	15-17MY	N/A
Sorento	N/A	N/A	17MY	16-17MY	N/A
Soul	17MY	17MY	17MY	14-17MY	N/A
Sportage	N/A	N/A	17MY	17MY	N/A

See chart above for current generation head units and on which model they are available.

This article provides information to aid in identifying the head unit installed in any current Kia vehicle.

Identifying Features

Premium 1.0 and 2.0:

- All K900 vehicles come exclusively with the Premium 1.0 (14-15MY) or Premium 2.0 (16-17MY) platforms.
- Premium 2.0 includes touchscreen capabilities

AVN 4.0:

- Navigation unit that has an 8" touchscreen as well as a SD card port.
- Unit is compatible with CarPlay and Android Auto and has a "RADIO" hard key.

AVN 3.0 (Not shown):

- Navigation unit looks similar to the AVN 4.0 but can be identified by the { icon} hard key.
- 7" touchscreen, SD card port, and is not compatible with CarPlay or Android Auto.

UVO 3.0:

- Resembles AVN 4.0 and 3.0 with a 7" touchscreen. Has monochrome (black and white) softkeys.

- Does not have SD card port. No "MAP VOICE" or "NAVI" keys, is replaced with "APPS" hardkey.
- Unit is compatible with CarPlay and Android Auto.

UVO 2.0 (Not shown):

- 4.3" touchscreen with "eServices" hardkey.

Audio 4.0B:

- 5.0" touchscreen with monochrome display.
- Has "DISP" hardkey.

Audio 4.0A:

- Resembles Audio 4.0B with monochrome display.
- No touchscreen and no backup camera.
- Has 1-6 preset hardkeys below display.

Audio 3.0B (Not shown):

- 4.3" touchscreen resembles UVO 2.0, but does not have "eServices" hardkey.
- Has "DISP" and "CLOCK" hardkeys.

Audio 3.0A (Not shown):

- Red display with 1-6 preset hardkeys below display.
- No touchscreen, no backup camera, and no "eServices" hardkey.

Additional information can be found in TSB ELE091.

TEST YOUR TECH TIMES KNOWLEDGE WORDSEARCH

Test your knowledge of the articles in this issue of Tech Times!

Locate the words listed below. Words can be located horizontally, vertically, and diagonally (in all directions). Answers on page 13.

A	S	J	C	A	Y	E	S	E	D	S	Q	N	D	W	Q	P	P	S	D
A	C	C	G	O	X	A	L	T	R	E	O	F	E	P	D	O	E	J	E
K	C	E	I	H	N	X	L	O	A	I	T	T	C	N	G	L	L	R	T
W	N	C	A	M	A	V	T	P	T	E	R	A	E	A	P	Y	T	D	A
T	O	U	E	S	A	C	E	A	R	A	S	N	L	P	M	M	I	A	R
M	S	R	N	L	E	N	C	R	N	A	Y	O	E	I	V	E	E	E	G
T	A	A	K	N	E	I	Y	S	T	R	C	I	R	G	T	R	R	H	E
E	R	J	N	S	F	R	M	D	C	E	S	T	A	N	I	N	H	A	T
T	K	O	O	I	H	I	A	O	O	E	R	A	T	E	N	P	E	T	N
P	C	A	T	R	S	E	M	T	N	C	P	U	I	E	S	A	A	V	I
U	D	R	T	S	I	P	E	S	I	R	E	T	O	R	T	R	T	K	X
K	E	M	I	N	O	T	O	T	B	O	C	C	N	C	R	A	E	R	Y
C	R	O	K	N	I	R	Y	J	S	C	N	A	O	S	U	S	D	X	R
A	N	D	E	G	R	A	H	C	O	B	R	U	T	H	C	I	I	C	E
B	U	N	C	A	T	A	L	Y	T	I	C	H	V	C	T	T	O	K	V
C	T	N	O	I	T	C	U	D	N	I	T	X	S	U	O	I	R	O	M
S	E	M	O	R	H	C	O	N	O	M	P	F	K	O	R	C	D	Z	J
V	O	L	T	A	G	E	Q	U	I	P	P	E	D	T	G	K	N	X	E
E	L	C	I	H	E	V	L	I	T	H	I	U	M	I	O	N	A	O	Q
B	G	Z	E	L	E	C	T	R	O	S	T	A	T	I	C	V	K	Q	Y

- You have less than a month to complete your _____ requirements (p1)
- The _____ will be notified of your added case note (p2)
- Replacement Wire Repair _____ (p2)
- Niro has a a _____ - _____ battery (p3)
- You'll be guided by _____ and Kia _____ (p3)
- You'll be able to Identify Niro _____ (p3)
- Explain the 6-speed Dual Clutch _____ (p3)
- Expanding the Kia _____ Brand (p4)
- Kia is resurrecting the Mass Air Flow _____ (p5)
- A large amount of _____ air represents _____ (p5)
- A small amount of intake air represents _____ (p5)
- Hot _____ gas leaves the _____ (p6)
- Identify the _____ unit for any Kia _____ (p7)
- Premium 2.0 includes _____ capabilities (p7)
- Touchscreen with _____ display (p7)
- Some units do not have a _____ (p7)
- Unit is compatible with _____ and _____ Auto (p7)
- A battery's charge drops due to _____ draw (p9)
- _____ stays very stable from 5% to 95% (p9)
- Some vehicles are _____ with a Dual Clutch _____ (p10)
- A _____ of Kia vehicles are fitted with _____ and _____ (p11)
- _____ introduced _____ (p11)
- Replacing the _____ brake _____ unit (p12)
- Some Kia vehicles have _____ engines (p13)

2017 KIA NIRO 12-VOLT BATTERY OVERVIEW

No Lead Acid Battery?

The 2017 Kia Niro is not equipped with a traditional 12 Volt Lead Acid Battery. Because the engine is started using the high voltage Starter/Generator, a traditional high amp 12 Volt battery is not needed.

12 Volt Battery

The 12 Volt Lead Acid battery is replaced by a 12 Volt Lithium Ion Polymer battery. This battery is smaller, lighter, lasts longer, and fits into the high voltage battery case.

The auxiliary 12 Volt battery is charged by the Low Voltage DC-DC Converter (LDC). The system is designed with safeguards to protect against the battery being drained down too far.

If the battery's State of Charge drops to 10%, a latch relay will open to separate the battery from the electrical system. With normal parasitic draw, this would take about 45 days of sitting/parked. As shown in the graph (Fig. 1), the voltage stays very stable from 5% to 95%.

Latch Relay

The Latch relay has 2 coils. One coil to open and one coil to close the contacts. The relay will stay in the open or closed position without being energized.

Starting the System

To start the vehicle after the relay has opened, press the "12V BATT RESET" button located on the dash to the left of the steering wheel. The switch supplies voltage to the BMS to close the relay contacts. Now the vehicle can be started, by pressing the start button. If the vehicle is not started within one minute, the relay will open.

Continued next page.

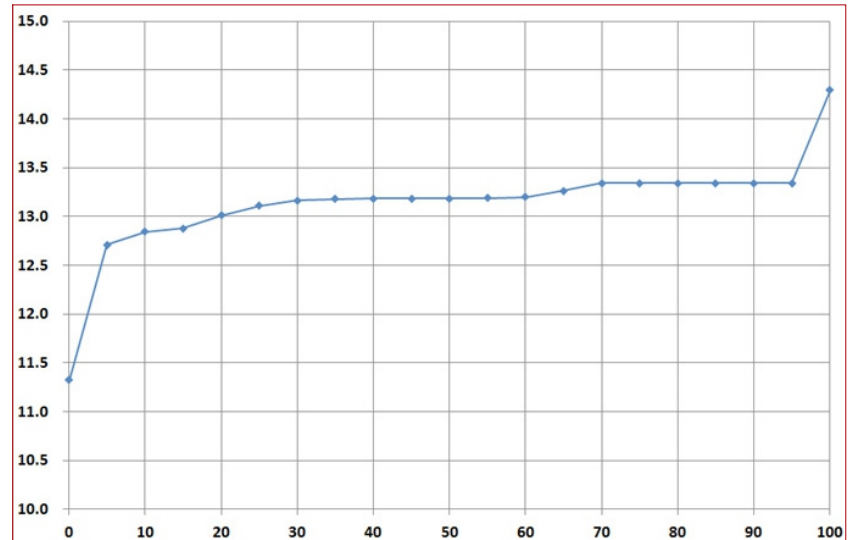
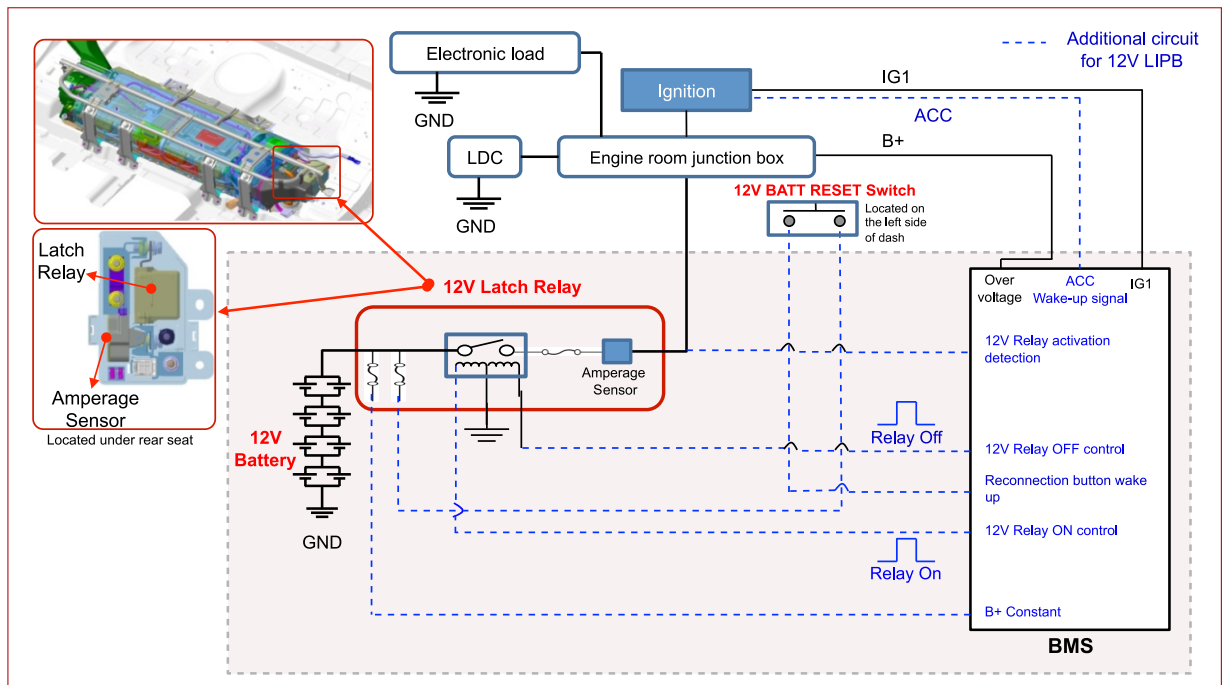


Fig. 1. Do not Charge Above 14.8V when using an external battery charger.



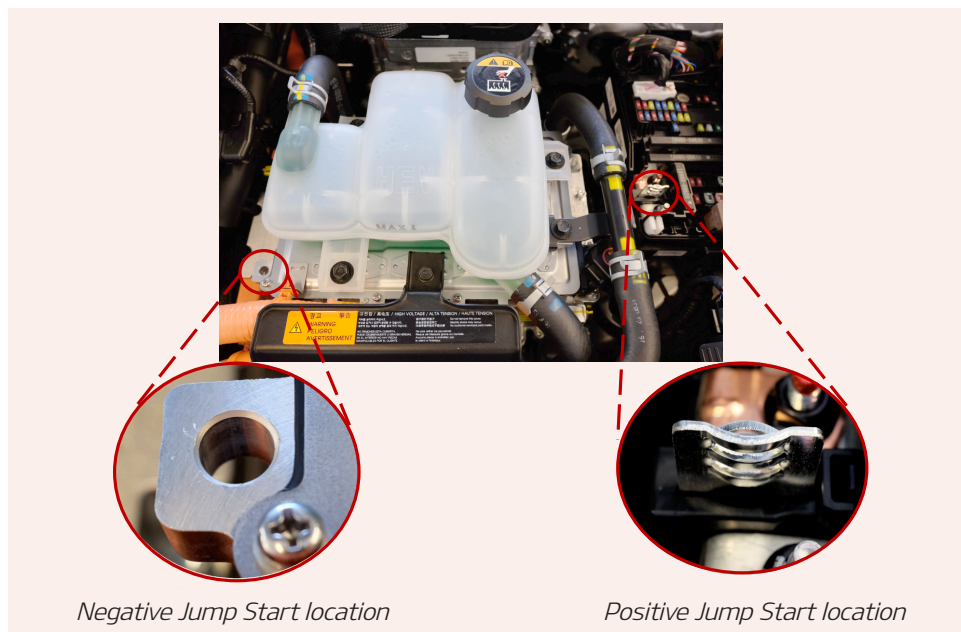
12V Latch Relay and 12V BATT RESET circuit

2017 KIA NIRO 12-VOLT BATTERY OVERVIEW (CONT'D)

Jumping the Battery

If the 12V BATT RESET button does not work and the 12 Volt Lithium Ion Polymer battery is completely drained, the system can be jump started using a conventional jump box. There is a post (+) in the under-hood fuse box that is used for jump starting. Attach the positive clamp to this (+) post and clamp the negative post to a good ground (-) (see image at right). Once a jump box is attached to the vehicle the system will start using the Start Button. When jump starting the system, there is no need to push the 12V BATT RESET button.

Start and run the engine for 30 minutes to charge the 12 Volt Lithium Ion Polymer auxiliary battery.



Negative Jump Start location

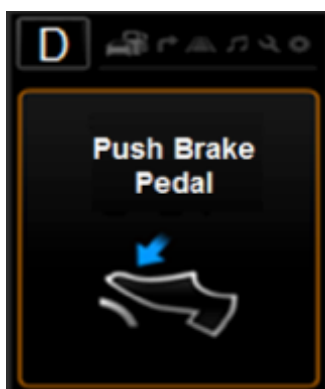
Positive Jump Start location

DUAL CLUTCH TRANSMISSION (DCT) WARNING MESSAGES

On vehicles equipped with a Dual Clutch Transmission (DCT) mated with a 1.6L Turbo, such as the new 2016 - 2017MY Optima (JFa), 2017MY Soul (PS) and Forte (YDm), specific DCT related warning messages may appear on the instrument cluster under set conditions. It is important to understand these warning messages in order to address potential customer concerns with this type of transmission.

Push brake pedal warning

This warning message may occur while attempting to keep the vehicle stationary uphill utilizing the accelerator pedal, which will cause excess clutch slippage. When this message appears, the TCM will also actuate the clutches to create a vibration feeling to warn the driver. In order to prevent this message, customers should utilize the brake pedal when stopping uphill.



Clutch high temperature warning

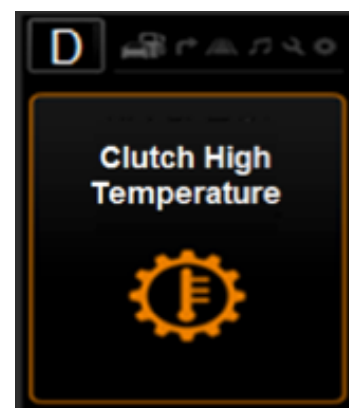
This message will likely occur while driving in stop and go conditions uphill. Stop and go driving conditions uphill will lead to excessive clutch slippage, increasing clutch temperature. To prevent damage, the "Clutch High Temperature" warning message will be displayed on the instrument cluster.

When this message is displayed, customers may notice a deterioration in shift quality such as increased vibration or

roughness. Initially, an audible warning and blinking of the gear indicator will also occur 3 times. A sequential warning may follow shortly after which an audible warning and gear indicator blinking will occur continuously. Should this condition occur, the customer should safely pull over to the side of the road. Place the vehicle in park and idle the engine until the message goes away.

Clutch overheat warning

If customer disregards the previous warning and clutch temperatures continue to increase, the "Clutch Over Heat" warning will appear. In this condition, the system will disengage the clutches, preventing operation of the vehicle in order to protect the system from further damage. A timer of approximately 20 minutes will then appear. Once timer reaches 0, clutch operation will be reestablished.



K900 CLIMATE CONTROL SEATS

A large majority of KIA models are fitted with heated and ventilated seats. In the cooling mode, the blower motor fan is moving air around the cabin that is pushed through the seat(s). When the seat heaters are selected the seat cushion and backrest are heated using an electrical grid (for more information refer to Pit Stop PS224).

The K900 seats differ from the rest of the KIA model range in that they actually heat and cool the air (see Fig. 1) using an assembly known as the Thermal Efficiency Device (TED).

The TED is based on the Peltier effect principle named after its inventor Jean Charles Athanase Peltier. Peltier introduced the concept of electrostatic induction, based on the modification of the distribution of electric charge in a material under the influence of a second object closest to it and its own electrical charge. Today, the Peltier effect is achieved using a solid-state active heat pump which transfers heat from one side of the device to the other, with consumption of electrical energy, depending on the direction of the current (see Fig. 2 & 3).

The K900 Climate control seats are not connected to any of the vehicle's CAN communication networks. The most important factor to consider when diagnosing a K900 climate seat operation concerns is that there are no climate seat-related Diagnostic Trouble codes (DTC). In addition, GDS/KDS do not provide any climate seat operation Current Data parameters (a.k.a. Data Analysis) or Actuation Tests to monitor and/or test climate seat operation.

The only indicator that the climate seat system is malfunctioning is by activating the affected seat switch and monitoring the Orange and Blue colored LED indicators (see Fig. 4). Depending on the type of concern, the LED indicators will blink 10 times to indicate a fault in the system.

NOTE: The heated/cooled seats only operate when the engine is operating (running).

The table at right shows which LED indicator will blink depending on the fault.

NOTE: After the LED indicator(s) blinks 10 times, the vehicle will have to be shut off and restarted in order to get the system to repeat flashing the LED sequence.



Fig. 1. K900 Climate Control Seats

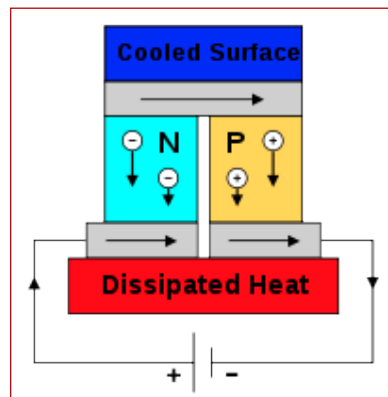


Fig. 2. Basic diagram of the Peltier cell.



Fig. 3. K900 Climate Control Seat components: 1. TED; 2. Blower motor

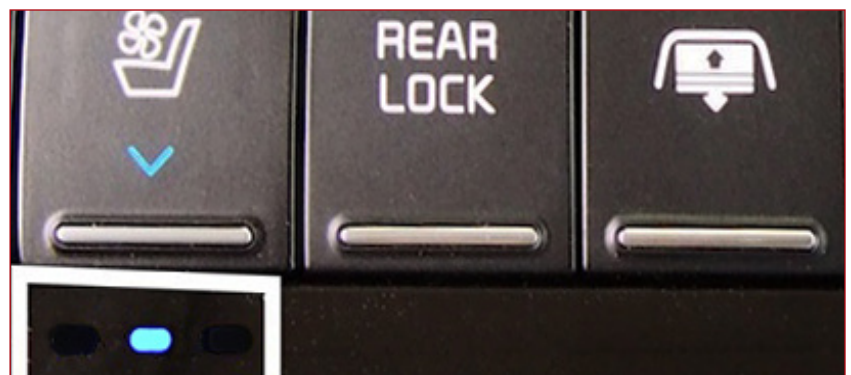


Fig. 4. Heated/Cooled seats LED fault indicator (open circuit fault shown).

Type of Fault	Switch LED
Open circuit	Medium-Temp Blue LED blinks 10 times
Shorted temperature sensor signal wire	Medium-Temp Orange/Blue LED blinks 10 times
Shorted Peltier cell circuit or faulty climate control seat module circuitry	Medium-Temp Orange LED blinks 10 times

VARIANT CODING INTEGRATED BRAKE ACTUATION UNITS (IBAU)

When replacing the integrated brake actuation unit, it is necessary to perform variant coding of the new module. For additional information related to variant coding, click the Variant Codes link on the KGIS home page. (See below for sample screen shot.)

Go to the Software Management tab on the GDS/KDS and select the ABS/ESC system.

The following Part Numbers and Variant Codes apply:

2014 - 2016 Optima (TFH)	
Part Number	Variant Code
58500 4UD600	2202
58500 4UD700	
58500 4UD701	

2017 Optima (JFH)		
Part Number	Type	Variant Code
58500 A8450	HEV	2202
	PHEV	2C02
58500 A8470	HEV	2802
	PHEV	2C02

The screenshot shows the Kia Global Information System (KGIS) interface. On the left sidebar, under 'Quick Links', the 'Variant Codes' link is highlighted with a red box and a red arrow. The main content area features an 'Enhanced Search' section with a VIN input field, a 'Go' button, and various filters for year (2017), model (OPTIMA HYBRID (JF HEV)), and engine. Below the search section are 'News Center' and 'New Items' sections, each with a list of updates and a 'more' link.

HVAC VENTILATION LOGIC OPERATION

Starting with 14MY Soul (PS) (with the exception of PSEV) and complete new models such as K900 (KH), Sedona (YP), Sorento (UMa), Optima (JFa), Sportage (QL), and 17MY Forte (YD, YDm), etc., equipped with a sunroof, a ventilation logic has been applied in order to prevent exhaust gases flowing into the vehicle due to the pressure difference (inside vs outside) that is generated when driving with the sunroof open. This logic allows the system to automatically switch from RECIRCULATION to FRESH mode when the sunroof is open.



Logic of Operation:

- A/C control unit receives the sunroof open/close data via CAN communication line.
- **Activation:** Sunroof is opened → System changes from RECIRCULATION to FRESH mode.
- **Deactivation:**
 - Close the sunroof (the system will automatically switch back to the previous mode).
 - Manually push the RECIRCULATION mode button (if the sunroof is still open, the system will automatically switch back to FRESH mode after 3 minutes).

NOTICE

There is no permanent deactivation. The system will always activate FRESH mode when the sunroof is opened due to having a different logic than in previous model years.

Please refer to PitStop PS 472.

TURBOCHARGED ENGINES VACUUM PUMP

Kia vehicles with turbocharged engines such as the 1.6 Liter and 2.0 Liter fitted to the Optima, Sportage and Forte models are fitted with an electrically operated vacuum pump.

The main function of the vacuum pump is to evacuate the air from the brake booster (thus creating a vacuum), which is used for brake pedal assist application.

An electrically driven vacuum pump system is required due to the fact that under certain engine operating conditions, turbocharged engines cannot generate enough vacuum.

The vacuum pump is located between the engine and transmission for all turbo engines (See Fig. 1). The vacuum pump electrical operation is controlled by a vacuum switch located in the brake booster (see Fig. 2).

The vacuum switch (see Fig. 2) closes when vacuum levels in the booster drop to a point where more vacuum is required for the brake booster to provide the necessary assist. Once the switch closes, the vacuum pump runs for a short amount of time to replenish vacuum levels in the brake booster.

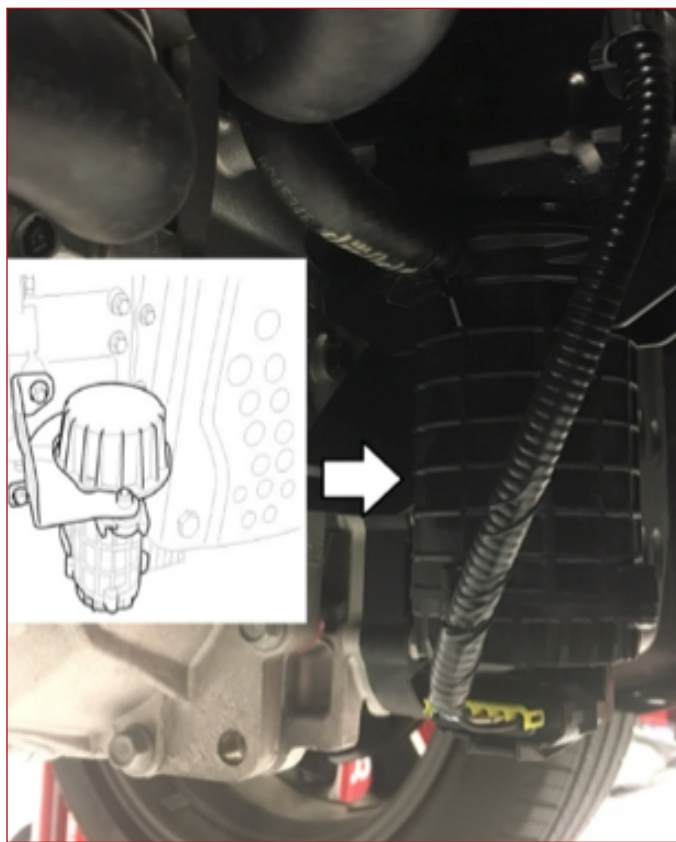


Fig. 1. Electric Vacuum Pump (2016 Optima 2.0T shown)

The vacuum pump is connected to the vehicle's C-CAN communication network (see Fig. 3), but it does not output any vacuum pump-system-specific C-CAN Diagnostic Trouble Codes (DTC). Any C-CAN network related codes will be set by other vehicle modules in the C-CAN network. For example; CAN ERROR set by the Instrument Cluster (IC), if communication between the vacuum pump and IC fails for more than 2 seconds.

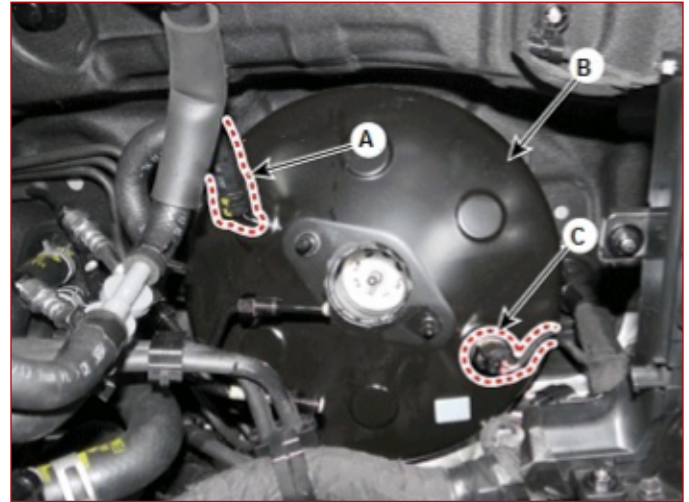


Fig. 2. Brake Booster (2016 Optima 2.0T shown). A. Vacuum Hose. B. Brake Booster assembly. C. Vacuum Switch

WORD FIND ANSWERS

Answers to the puzzle on page 8.

- 1. CERTIFICATION
- 2. AGENT
- 3. CONNECTORS
- 4. LITHIUM ION, POLYMER
- 5. WORKSHEETS,
- INSTRUCTOR
- 6. COMPONENTS
- 7. TRANSAXLE
- 8. ECODYNAMICS
- 9. SENSOR
- 10. INTAKE, ACCELERATION
- 22. PELTIER, ELECTROSTATIC,
- SEATS
- 21. HEATED, VENTILATED,
- TRANSMISSION
- 20. EQUIPPED,
- 19. VOLTAGE
- 18. PARASITIC
- 17. CARPLAY, ANDROID
- 16. BACKUP, CAMERA
- 15. MONOCHROME
- 14. TOUCHSCREEN
- 13. HEAD, VEHICLE
- 12. CATALYTIC, CONVERTOR
- 23. INTEGRATED, ACTUATION
- 24. TURBOCHARGED

