Component Procedures: Battery

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Component Procedures: Battery

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Battery > Negative Cable	91861F2020	Korea Built	52.82	
Battery > Negative Cable	91865F3020	Negative Cable	56.97	
Battery > Negative Cable	91861F3020	Us Built	52.77	
Battery > Positive Cable	91850F3120	Auto Trans	607.84	
Battery > Positive Cable	91850F3110	Manual Trans	482.60	

Labor

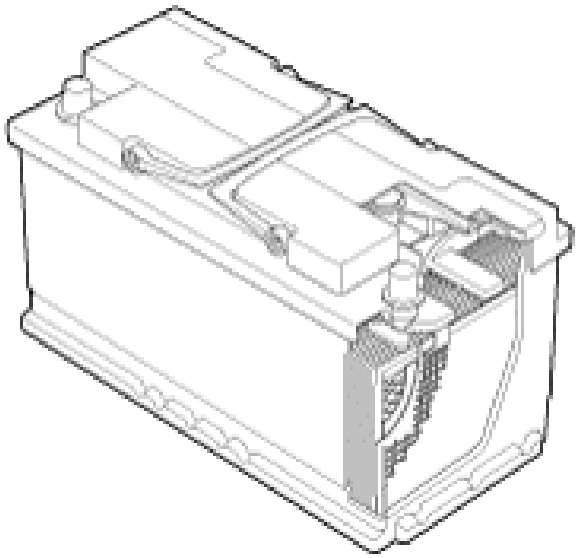
Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Battery > Battery, R&R	C	0.3	0.0
Remove & Replace	Battery > Negative Cable, R&R	B	0.4	0.0
Remove & Replace	Battery > Positive Cable, R&R	B	1.8	0.0
Clean	Battery > Battery Terminals, Clean	C	0.3	0.0
Charge/Test	Battery > Battery, Charge/Test	B	0.4	0.0

Battery - Description and Operation (Article 44037)

- Description

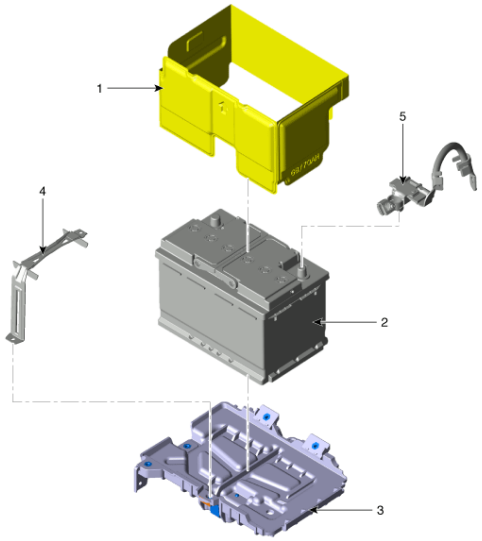
[AGM Battery]

- Significantly longer service life
- Increased starting reliability at low temperatures
- 100 % freedom from maintenance
- Low risk in event of an accident (reduced risk to the environment)



Battery - Components and Components Location (Article 44039)

- Components



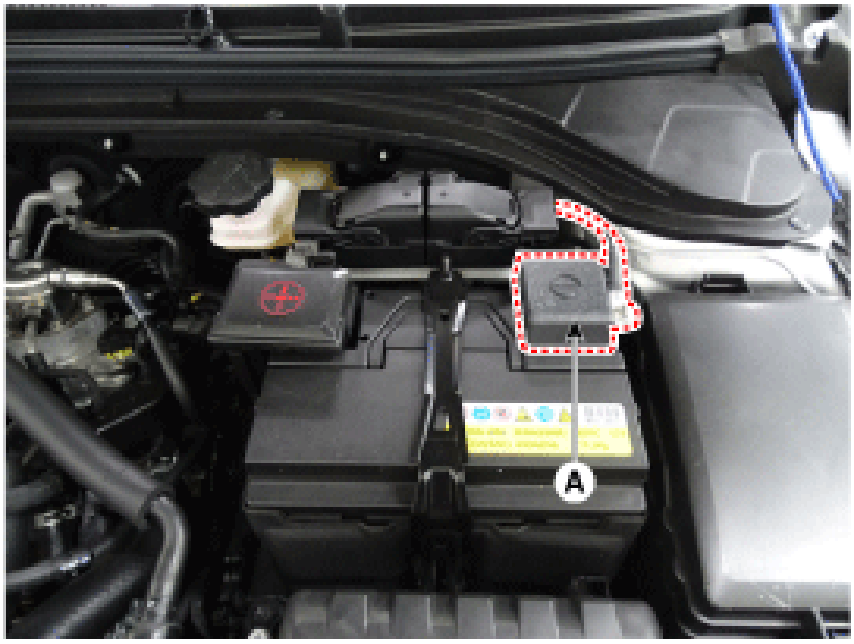
1. Battery insulation pad 2. AMG Battery 3. Battery tray 4. Battery mounting bracket 5. Battery sensor

Battery - Repair Procedures (Article 44040)

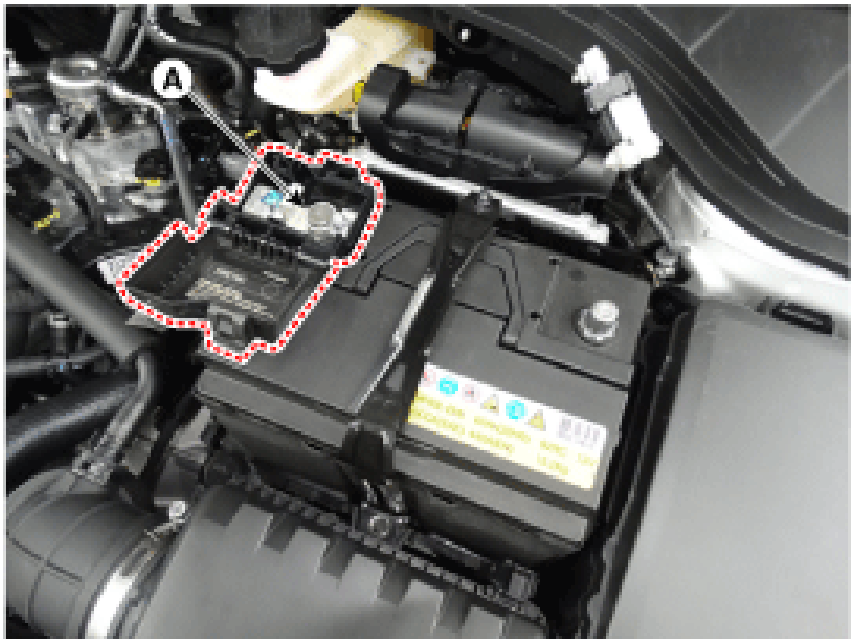
- Removal

Battery

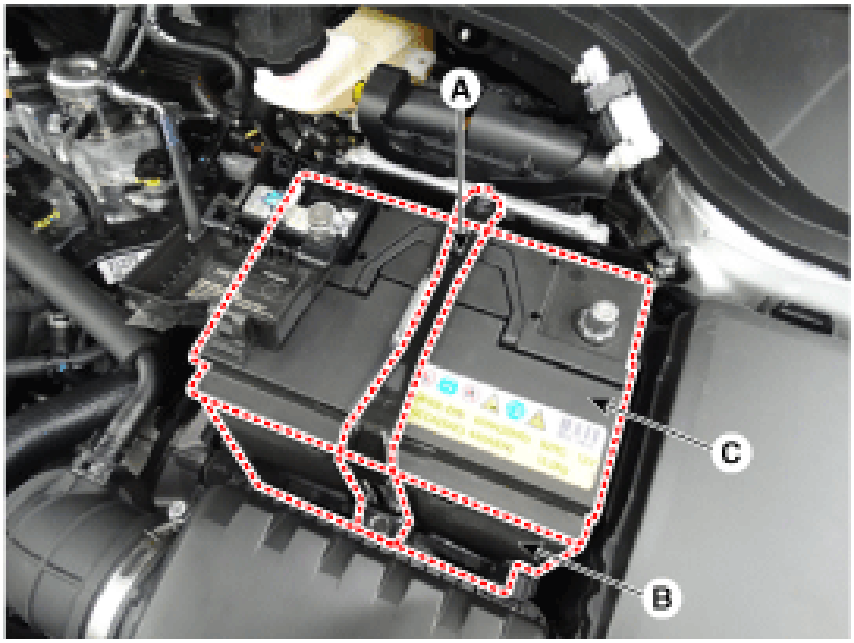
- Turn the ignition switch OFF.
- Disconnect the battery (-) terminal (A).



- Remove the battery (+) terminal (B).

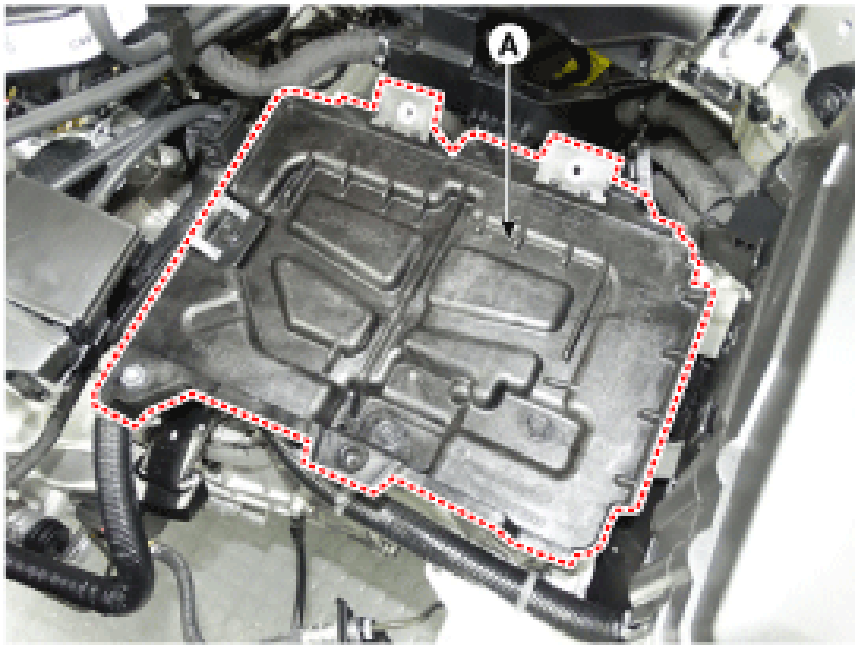


- Remove the battery mouting bracket (A).
- Remove the battery insulation pad after removing the battery (B).



Battery tray

- Remove the battery. (Refer to "Removal")
- Remove the air cleaner assembly. (Refer to Engine Mechanical System - "Air Cleaner")
- Remove the ECM. (Refer to Engine Control / Fuel System - "Engine Control Module (ECM)")
- Remove the battery tray (A) after loosening the bolts.



- Installation

- Install in the reverse order of removal. Battery (-) terminal installation : 7.8 - 9.8 N.m (0.8 - 1.0 kgf.m, 5.8 - 7.2 lb-ft) Battery (+) terminal installation : 7.8 - 9.8 N.m (0.8 - 1.0 kgf.m, 5.8 - 7.2 lb-ft) Battery mounting bracket and the insulation pad installation : 19.6 - 29.4 N.m (2.0 - 3.0 kgf.m, 14.5 - 30.4 lb-ft)
When installing the battery, fix the mounting bracket on the tray correctly.
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NOTICE

- When installing the battery, fix the mounting bracket on the tray correctly.

[AGM battery charging]

Do not charge with more than 14.8V or quick charge mode.
- Do not charge with more than 14.8V or quick charge mode.

[Constant voltage charge conditions]

Battery temperature should be maintained at about 68°F-86°F (20°C-30°C) during charging of the battery.

Information

- Battery temperature should be maintained at about 68°F-86°F (20°C-30°C) during charging of the battery.
If the battery is charged directly at the battery terminals on vehicles with battery sensor , misinterpretations of battery condition and under certain circumstances also unwanted Check Control messages or fault memory entire can occur. After recharging finished, let the battery stand for over 10 hours with normal temperature for battery stabilization.

CAUTION

- If the battery is charged directly at the battery terminals on vehicles with battery sensor , misinterpretations of battery condition and under certain circumstances also unwanted Check Control messages or fault memory entire can occur. After recharging finished, let the battery stand for over 10 hours with normal temperature for battery stabilization.
- Cleaning
- Make sure the ignition sw itch and all accessories are in the OFF position.
- Disconnect the battery negative cables (A).
- Remove the battery from the vehicle. (Refer to Charging System - "Battery") Care should be taken in the event the battery case is cracked or leaking, to protect your skin from the electrolyte. Heavy rubber gloves (not the household type) should be worn when removing the battery.

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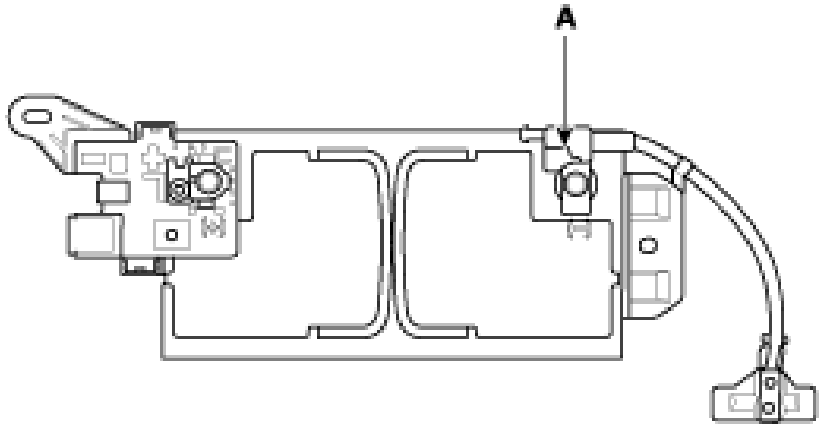

- Inspect the battery tray for damage caused by the loss of electrolyte. If acid damage is present, it will be necessary to clean the area with a solution of clean warm water and baking soda. Scrub the area with a stiff brush and wipe off with a cloth moistened with baking soda and water.
- Clean the top of the battery with the same solution as described above.
- Inspect the battery case and cover for cracks. If cracks are present, the battery must be replaced.
- Clean the battery posts with a suitable battery post tool.
- Clean the inside surface of the terminal clamps with a suitable battery cleaning tool. Replace damaged or frayed cables and broken terminal clamps.
- Install the battery in the vehicle.
- Connect the cable terminals to the battery post, making sure tops of the terminals are flush with the tops of the posts.
- Tighten the terminal nuts securely.
- Coat all connections with light mineral grease after tightening. When batteries are being charged, an explosive gas forms beneath the cover of each cell. Do not smoke near batteries being charged or which have

recently been charged. Do not break live circuit at the terminals of batteries being charged. A spark will occur when the circuit is broken. Keep open flames away from battery.
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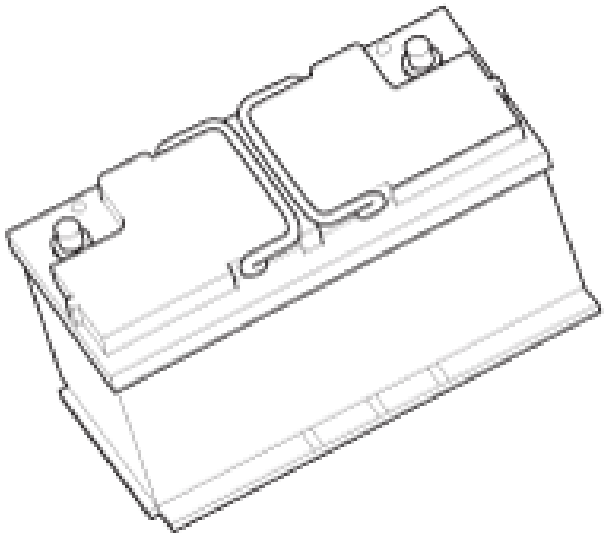

- Vehicle parasitic current inspection
- Turn the all electric devices OFF, and then turn the ignition switch OFF.
- Close all doors except the engine hood, and then lock all doors. Disconnect the hood switch connector. Close the trunk lid. Close the doors or remove the door switches.
- Disconnect the hood switch connector.
- Close the trunk lid.
- Close the doors or remove the door switches.
- Wait a few minutes until the vehicle's electrical systems go to sleep mode. For an accurate measurement of a vehicle parasitic current, all electriacl systems should go to sleep mode. (It takes at least one hour or at most one day.) However, an approximate vehicle parasitic current can be measured after 10-20 minutes.
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- Connect an ammeter in series between the battery (-) terminal and the ground cable , and then disconnect the clamp from the battery (-) terminal slowly. Be careful that the lead wires of an ammeter do not come off from the battery (-) terminal and the ground cable to prevent the battery from being reset. In case the battery is reset, connect the battery cable again, and then start the engine or turn the ignition switch ON for more than 10 sec. Repeat the procedure from No. 1. To prevent the battery from being reset during the inspection, Connect a jump cable between the battery (-) terminal and the ground cable. Disconnect the ground cable from the battery (-) terminal. Connect an ammeter between the battery (-) terminal and the ground cable. After disconnecting the jump cable, read the current value of the ammeter.
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value of the ammeter.
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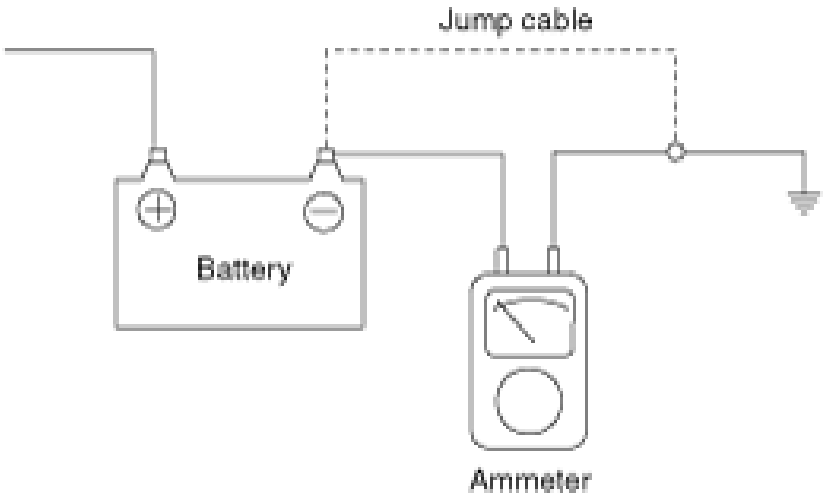
- Connect a jump cable between the battery (-) terminal and the ground cable.
- Disconnect the ground cable from the battery (-) terminal.
- Connect an ammeter between the battery (-) terminal and the ground cable.
- After disconnecting the jump cable, read the current value of the ammeter.



- Read the current value of the ammeter. If the parasitic current is over the limit value, search for abnormal circuit by removing a fuse one by one and checking the parasitic current. Reconnect the suspected parasitic current draw circuit fuse only and search for suspected unit by removing a compoconnected with the circuit one by one until the parasitic draw drops below limit value. Limit value (after 10 - 20 min.) : Below 50 mA
- If the parasitic current is over the limit value, search for abnormal circuit by removing a fuse one by one and checking the parasitic current.
- Reconnect the suspected parasitic current draw circuit fuse only and search for suspected unit by removing a compoconnected with the circuit one by one until the parasitic draw drops below limit value.

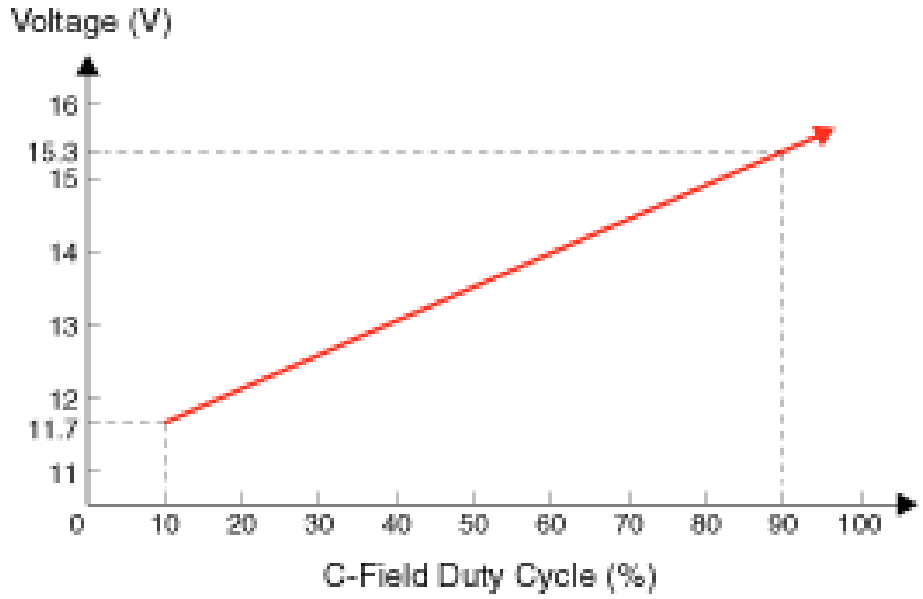
Battery - Specifications (Article 44038)

- Specifications
Item Specification
Model type AGM60L-DIN
Capacity [20HR/5HR] (AH) 60 / 48
Cold Cranking Amperage (A) 640 (SAE) / 512 (EN)
Reserve Capacity (Min) 100

Engine Electrical System - Specifications (Article 44008)

- Specification
Ignition System
Item Specification
Primary Coil Resistance (Ω) 0.61 ± 15% [20°C (68°F)]
Secondary Coil Resistance (kΩ) 7.5 ± 15% [20°C (68°F)]
Type ELR9IQP9+
Gap 0.8 - 0.9 mm (0.0314 - 0.0354 in.)
Charging System
Rated voltage 13.5V, 150A
Speed in use 1,000 - 18,000 rpm
Voltage regulator IC Regulator built-in type
Regulator Setting Voltage External mode Refer to below graph

Internal mode 14.55 ± 0.3V
Temperature Gradient External mode 0 ± 3 mV / °C
Internal mode -3.5 ± 2mV / °C



Model type AGM60L-DIN
Capacity [20HR/5HR] (AH) 60 / 48
Cold Cranking Amperage (A) 640 (SAE) / 512 (EN)
Reserve Capacity (Min) 100
Model type description Cold Cranking Ampere (CCA) : Cold Cranking Amps is a rating used in the battery industry to define a battery's ability to start an engine in cold temperatures. The rating is the number of amps a new, fully charged battery can deliver at -18°C (-0.4°F) for 30 seconds, while maintaining a voltage of at least 7.2 volts for a 12 volt battery. The higher the CCA rating, the greater the starting power of the battery. RESERVE CAPACITY (RC) : Reserve Capacity is a battery industry rating, defining a battery's ability to power a vehicle with an inoperative alternator or fan belt. The rating is the number of minutes a battery at 26.7°C (80°F) can be discharged at 25 amps and maintain a voltage of 10.5 volts for a 12 volt battery. The higher the reserve rating, the longer your vehicle can operate should your alternator or fan belt fail.

- Model type description

- Battery type notation : □□□ □□ □ - □□□
  ① ② ③ ④

① : Battery specification
- CMF : Closed Maintenance Free
- MF : Maintenance Free
- AGM : Absorbent Glass Mat

② : Battery capacity (20HR)
- 68 : 68AH

③ : Terminal location
- L : Positive terminal is left
- R : Positive terminal is right

④ : Battery type
- DIN: Deutsche Industric Normen
- BCI: Battery Council International

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Starting System
Rated voltage 12V, 1.2 kW
The number of pinion teeth 13
Performance [No-load, 11.5V] Ampere 105A
Speed Min. 2,950 rpm

- Tightening Torques

Item N.m kgf.m lb-ft
Ignition coil installation bolt 9.8 - 11.8 1.0 - 1.2 7.2 - 8.7
Spark plug installation 14.7 - 24.5 1.5 - 2.5 10.9 - 18.1
Alternator B-terminal cable nut 9.8 - 11.8 1.0 - 1.2 7.2 - 8.7
Alternator installation bolt [12 mm (0.47 in.)] 19.6 - 26.5 2.0 - 2.7 14.5 - 19.5
Alternator installation bolt [14 mm (0.55 in.)] 29.4 - 41.2 3.0 - 4.2 21.7 - 30.4
Battery (+) terminal tightening nut 7.8 - 9.8 0.8 - 1.0 5.2- 8.7
Battery (-) terminal tightening nut 3.9 - 5.9 0.4 - 0.6 2.9 - 4.3
Battery mounting bracket bolt 19.6 - 29.4 2.0 - 3.0 14.5 - 30.4
Battery tray installation bolt 19.6 - 29.4 2.0 - 3.0 14.5 - 30.4
Battery sensor cable installation bolt 10.8 -13.7 1.1 - 1.4 8.0 -10.1
Starter installation bolt 49.0 - 63.7 5.0 - 6.5 36.2 - 47.0

Engine Electrical System - Specifications (Article 44009)

- Specification

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Primary Coil Resistance (Ω) 0.61 ± 15% [20°C (68°F)]
Secondary Coil Resistance (kΩ) 7.5 ± 15% [20°C (68°F)]
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Gap 0.8 - 0.9 mm (0.0314 - 0.0354 in.)

Charging System
Rated voltage 13.5V, 150A

Speed in use 1,000 - 18,000 rpm
Voltage regulator IC Regulator built-in type
Regulator Setting Voltage External mode Refer to below graph
Internal mode 14.55 ± 0.3V
Temperature Gradient External mode 0 ± 3 mV / °C
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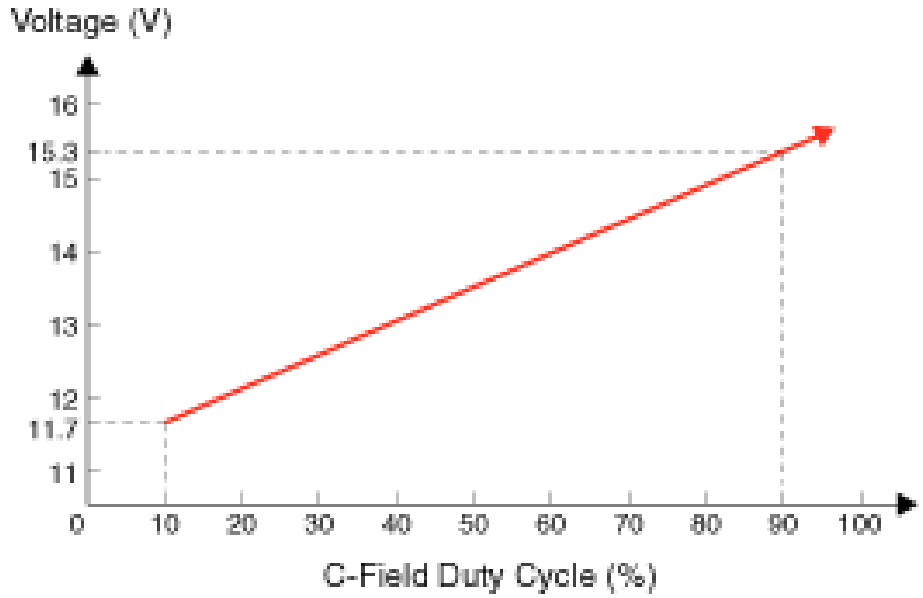

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Cold Cranking Amperage (A) 640 (SAE) / 512 (EN)
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- 68 : 68AH

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- L : Positive terminal is left
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Starting System
Rated voltage 12V, 1.2 kW
The number of pinion teeth 13
Performance [No-load, 11.5V] Ampere 105A
Speed Min. 2,950 rpm

- Tightening Torques

Item	N.m	kgf.m	lb-ft
Ignition coil installation bolt	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Spark plug installation	14.7 - 24.5	1.5 - 2.5	10.9 - 18.1
Alternator B-terminal cable nut	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Alternator installation bolt [12 mm (0.47 in.)]	19.6 - 26.5	2.0 - 2.7	14.5 - 19.5
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Battery (+) terminal tightening nut	7.8 - 9.8	0.8 - 1.0	5.2- 8.7
Battery (-) terminal tightening nut	3.9 - 5.9	0.4 - 0.6	2.9 - 4.3
Battery mounting bracket bolt	19.6 - 29.4	2.0 - 3.0	14.5 - 30.4
Battery tray installation bolt	19.6 - 29.4	2.0 - 3.0	14.5 - 30.4
Battery sensor cable installation bolt	10.8 -13.7	1.1 - 1.4	8.0 -10.1
Starter installation bolt	49.0 - 63.7	5.0 - 6.5	36.2 - 47.0

All New Technical Service Bulletins (itype_432)

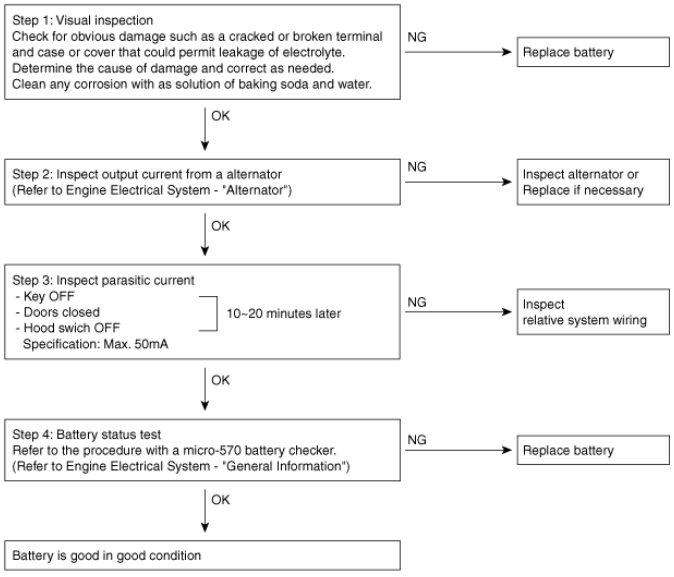
Tsbs
- DCA-8000 BATTERY TESTER/DIAGNOSTIC CHARGER TOOL & BATTERY WARRANTY POLICY (25-EE-006H, 2025/09/29)
- WARRANTY POLICY TO HOLD 12-VOLT BATTERY FOR WTC PART RETURN (24-EE-009H, 2024/07/15)
- SERVICE AND MAINTENANCE INFORMATION FOR 12V INTEGRATED LITHIUM-ION POLYMER BATTERY SYSTEMS (25-EE-007H, 2025/10/31)
- 12V BATTERY MAINTENANCE FOR INVENTORY & PRE-DELIVERY INSPECTION (PDI) (26-EE-002H, 2026/02/03)
- CADEX SPECTRO MODULAR 12V BATTERY TESTER TOOL (25-EE-005H, 2025/09/29)
- LEGACY CADEX 12V BATTERY TESTER (24-EE-011H, 2024/08/07)
- GUIDE TO BATTERY DIAGNOSTIC SERVICE BULLETINS (25-EE-003H, 2025/09/29)

All Technical Service Bulletins (itype_100)

Tsbs
- DCA-8000 BATTERY TESTER/DIAGNOSTIC CHARGER TOOL & BATTERY WARRANTY POLICY (25-EE-006H, 2025/09/29)
- WARRANTY POLICY TO HOLD 12-VOLT BATTERY FOR WTC PART RETURN (24-EE-009H, 2024/07/15)
- SERVICE AND MAINTENANCE INFORMATION FOR 12V INTEGRATED LITHIUM-ION POLYMER BATTERY SYSTEMS (25-EE-007H, 2025/10/31)
- 12V BATTERY MAINTENANCE FOR INVENTORY & PRE-DELIVERY INSPECTION (PDI) (26-EE-002H, 2026/02/03)
- CADEX SPECTRO MODULAR 12V BATTERY TESTER TOOL (25-EE-005H, 2025/09/29)
- GDS CADEX TESTER BATTERY CLAIM APP (20-EE-002H, 2020/03/18)
- LEGACY CADEX 12V BATTERY TESTER (24-EE-011H, 2024/08/07)
- J-51807 CADEX BATTERY TESTER SOFTWARE UPDATE (VERSION HMA3.00) (20-EE-004H, 2020/03/30)
- GUIDE TO BATTERY DIAGNOSTIC SERVICE BULLETINS (25-EE-003H, 2025/09/29)
- J-51807 CADEX BATTERY TESTER SOFTWARE UPDATE (VERSION HMA2.21) (18-EE-005, 2018/12/17)

Battery - Troubleshooting (Article 44041)

- Troubleshooting



OEM Policies and Procedures (itype_120)

Tsbs
- SERVICE AND MAINTENANCE INFORMATION FOR 12V INTEGRATED LITHIUM-ION POLYMER BATTERY SYSTEMS (25-EE-007H, 2025/10/31)
- LEGACY CADEX 12V BATTERY TESTER (24-EE-011H, 2024/08/07)

Pre-Delivery Inspection (itype_121)

Tsbs
- 12V BATTERY MAINTENANCE FOR INVENTORY & PRE-DELIVERY INSPECTION (PDI) (26-EE-002H, 2026/02/03)

Tools and Equipment (itype_113)

Tsbs
- DCA-8000 BATTERY TESTER/DIAGNOSTIC CHARGER TOOL & BATTERY WARRANTY POLICY (25-EE-006H, 2025/09/29)
- CADEX SPECTRO MODULAR 12V BATTERY TESTER TOOL (25-EE-005H, 2025/09/29)
- LEGACY CADEX 12V BATTERY TESTER (24-EE-011H, 2024/08/07)
- J-51807 CADEX BATTERY TESTER SOFTWARE UPDATE (VERSION HMA3.00) (20-EE-004H, 2020/03/30)
- GUIDE TO BATTERY DIAGNOSTIC SERVICE BULLETINS (25-EE-003H, 2025/09/29)
- J-51807 CADEX BATTERY TESTER SOFTWARE UPDATE (VERSION HMA2.21) (18-EE-005, 2018/12/17)

Warranty Information (itype_119)

Tsbs

- WARRANTY POLICY TO HOLD 12-VOLT BATTERY FOR WTC PART RETURN (24-EE-009H, 2024/07/15)
- GDS CADEX TESTER BATTERY CLAIM APP (20-EE-002H, 2020/03/18)

Service Campaigns (itype_108)

Tsbs

- J-51807 CADEX BATTERY TESTER SOFTWARE UPDATE (VERSION HMA2.21) (18-EE-005, 2018/12/17)