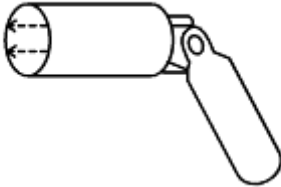




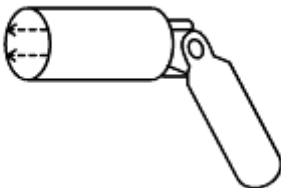
Engine Electrical System

General Information

**SPECIAL SERVICE TOOLS****IGNITION SYSTEM**

Tool (Number and Name)	Illustration	Use
OK552 131 001 Spark plug wrench		Used to remove and install spark plugs.

SPECIAL SERVICE TOOLS**IGNITION SYSTEM**

Tool (Number and Name)	Illustration	Use
OK552 131 001 Spark plug wrench		Used to remove and install spark plugs.



SPECIFICATIONS

IGNITION SYSTEM

Item		GV6 Gasoline
Engine idle speed		750 ± 50
Ignition coil	Type	Double-ended
	Primary coil resistance	0.36~0.44 Ω at 68°F (20°C)
	Secondary coil resistance	10.9~13.3 kΩ at 68°F (20°C)
High-tension lead		16 kΩ per 3.28 feet (1 m)
Spark plug gap		0.039~0.043 in (1.0~1.1 mm)
Spark plug type		PFR6N-11
Firing order		1-6-5-4-3-2

STARTING SYSTEM

Item		GV6 Gasoline	
		M/T	A/T
Starter motor	Type	Pre-engaged drive	
	Output (V-KW)	12-1.2	

CHARGING SYSTEM

Item		GV6 Gasoline	
		M/T	A/T
Battery	Voltage (V)	12V-negative	
	Type	PT56-26FL	
	Capacity (20 hour rate) (AH)	70AH	
Alternator	Type	AC	
	Output (V-A)	12-110	
	Regulator type	Transistorized (Built-in IC regulator)	
	Regulator voltage (V)	14.1-14.7	

Engine Electrical System

Ignition System - Ignition Coil



INSPECTION

VOLTAGE CHECK

1. Disconnect negative battery cable.
2. Disconnect ignition coil connector.
3. Reconnect battery cable.
4. Turn ignition switch to "ON."
5. Measure voltage between PNK wire and GND at ignition coil connector.

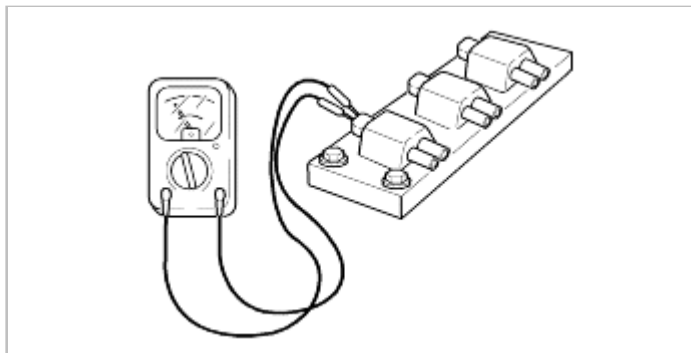
Voltage : approximately 12 volts

6. If no voltage, check main fuse, ignition switch and wire harness.

RESISTANCE CHECK

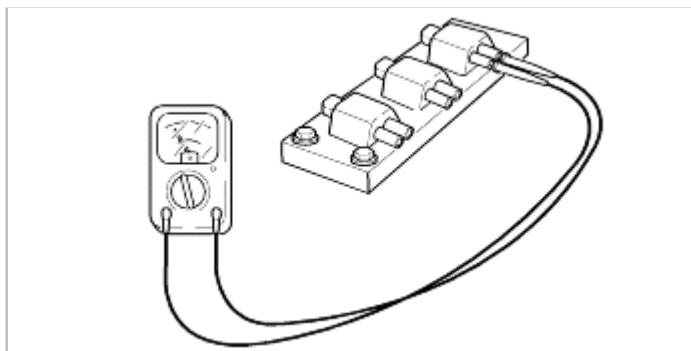
1. Using an ohmmeter, check resistance of primary coil. Connect one lead of ohmmeter to positive (+) terminal and other lead to each negative (-) terminal. If not within specification, replace coil.
Remember that unit has three coil assemblies, so both must be checked.

Primary coil resistance :
0.36~0.44Ω @ 68°F (20°C)



2. Using an ohmmeter, check resistance of the secondary coil. If not within specification, replace coil.

Secondary coil resistance :
10.9~13.3 kΩ @ 68°F (20°C)



REMOVAL

1. Disconnect battery cable.

2. Disconnect high-tension leads.
3. Disconnect ignition coil connectors.
4. Remove five ignition coil mounting bolts.
5. Remove ignition coils.

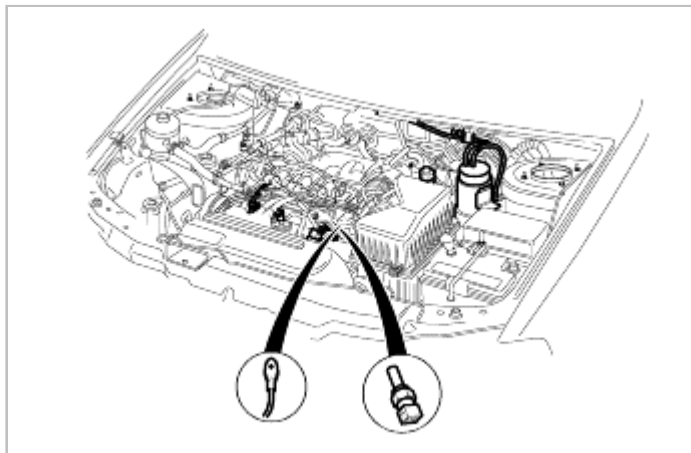
INSTALLATION

1. Insert and tighten five ignition coil mounting bolts.

Tightening torque :

5~7 lb·ft (7~10 N·m, 0.7~1.0 kg·m)

2. Reconnect ignition coil connectors.
3. Reattach high tension leads. Leads are marked for correct connection.
4. Reconnect battery cable.





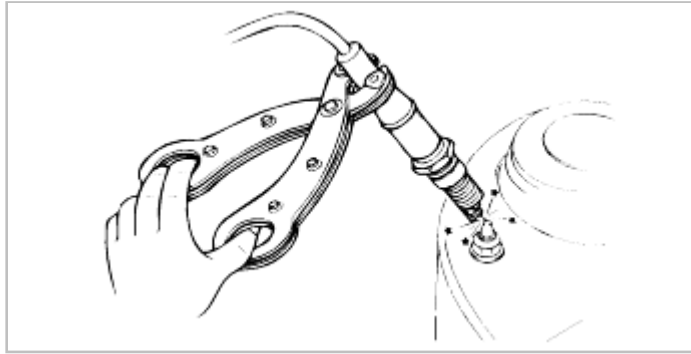
Engine Electrical System

Ignition System - Spark Plug



SPARK TEST

1. Disconnect high-tension code from spark plug.
2. Remove the spark plug.
3. Connect the spark plug to a high tension code.
4. Hold the spark plug with insulated pliers 5~10 mm from a ground.
5. Crank the engine and verify that there is a strong blue spark.
 - A. If there is no spark, inspect the following points.



Step	Inspection		Action
1	Check for good connection of ignition coil	Yes	Go to next step
		No	Repair or replace
2	Check if resistance of high-tension leads are OK Resistance: 16 kΩ/m	Yes	Go to next step
		No	Replace
3	Check if the ignition coil is electrically charged 1. Ignition switch "ON" 2. Check if the ignition coil (+) is electrically charged	Yes	Go to next step
		No	Check the wire harness between ignition switch ignition coil and ECM
4	Check if resistance of ignition coil is OK Resistance Primary : 0.36~0.44Ω (at 68°F (20°C)) Secondary : 10.9~13.3 kΩ (at 68 °F (20 °C))	Yes	Go to next step
		No	Replace
5	Check if ECM is OK	Yes	
		No	Replace

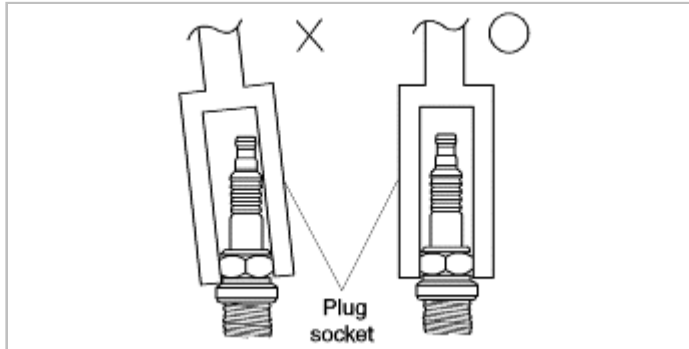


REMOVAL

CAUTION

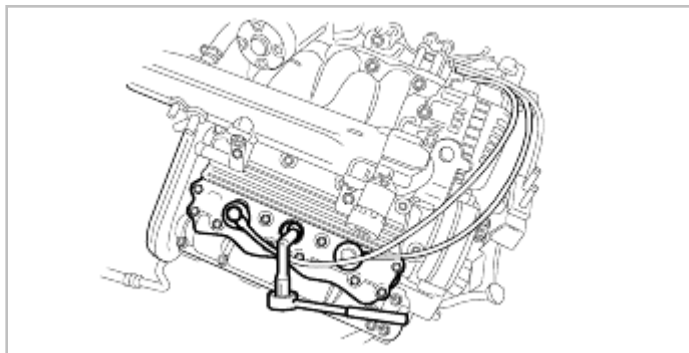
Do not attempt any maintenance on spark plugs if engine is hot.

1. Disconnect negative battery terminal.
2. Carefully remove high-tension leads.
3. Use compressed air to blow any dirt or debris from around spark plug hole.
4. Check that spark plug fits squarely in spark plug socket and remove spark plug.



NOTICE

Raise a vehicle and install SST(0K552 131 001) in order to replace cylinder 2, 4, 6 spark plug.



INSTALLATION

1. Install spark plug into cylinder head.

Tightening torque :

18~22 lb·ft (25~30 N·m, 2.5~3.0 kg·m)

2. Reconnect high-tension leads.
3. Reconnect negative battery cable.

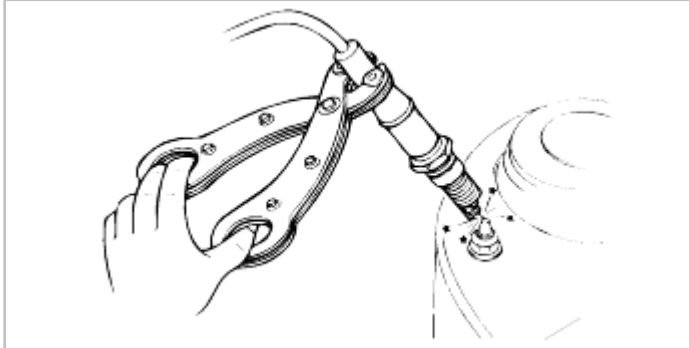
INSPECTION

1. Reconnect negative battery cable.
2. Connect spark plug to high-tension lead.
3. Hold spark plug with insulated pliers 0.2 to 0.39 inch (5~10 mm) from a ground.

WARNING

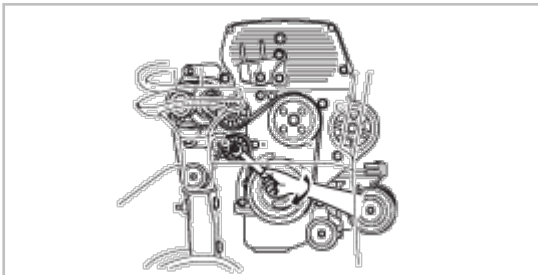
Do not touch vehicle body during following instructions.

4. While holding spark plug, have a second person crank engine. Verify that a strong blue spark jumps from spark plug to ground.



5. If there is no spark or the spark is weak, check for, and implement correction:
- A. Carbon deposits. Clean out or replace plug.
 - B. Oil fouling. Correct oil problem, replace plug.
 - C. Worn or burnt electrode. If present, replace plug.
 - D. Broken or burned ceramic insulator. If present replace plug.
 - E. Damaged spark plug ring. If so, replace ring.
 - F. Improper spark plug gap. Regap if possible, otherwise replace plug.

Gap : 0.039~0.043 in (1.0~1.1 mm)





Engine Electrical System

Ignition System - Spark Plug Cable

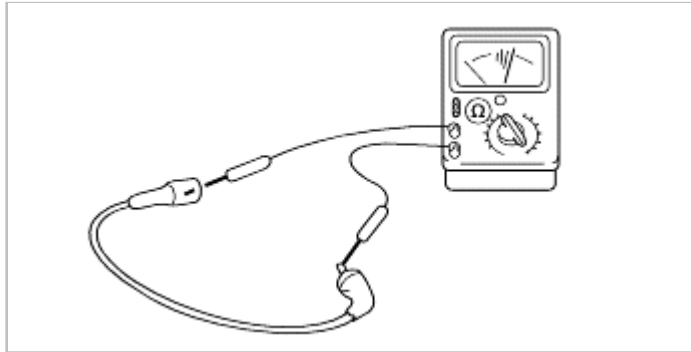


INSPECTION

1. Disconnect from coil and spark plugs.
2. Check for breaks in insulation.
3. Check inside high-tension lead connectors for corrosion or carbon deposits.
4. Connect high-tension lead to an ohmmeter and check resistance.

Resistance : 16 k Ω per 3.28 feet (1 m)

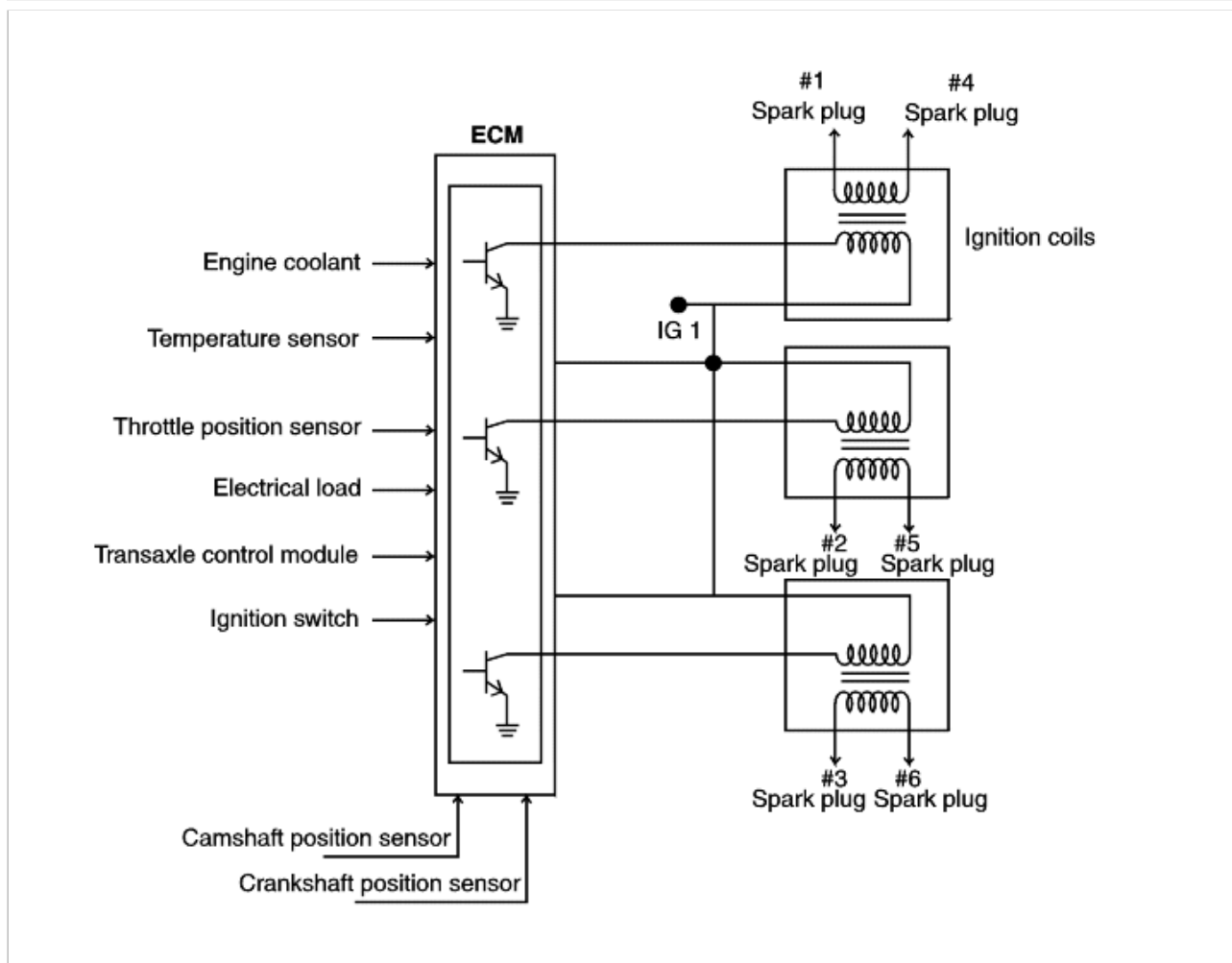
5. Replace if defective.





IGNITION SYSTEM FUNCTION

SYSTEM OPERATION



In a conventional ignition system, the ignition coil produces a high voltage current and the distributor then relays this current, at the required time, to each spark plug. In the distributorless ignition system, two sensors, the camshaft position sensor and the crankshaft position sensor, tell the Engine Control Module (ECM) which cylinder is ready to fire. The ECM then sends an ignition signal to an electronic ignition coil. This ignition coil then produces and sends a high voltage current to the proper spark plug.

Distributorless ignition is a "wasted-spark" system in which two spark plugs fire simultaneously. One cylinder fires at TDC on the compression stroke, while the other fires at TDC of the exhaust stroke.

The cylinders are grouped together by firing order. For example, Carnival firing order is 1-6-5-4-3-2. Cylinders 1 and 4 are the same position, while cylinders 6 and 3 are 180° behind, following cylinders 5 and 2. Plugs 1 and 4 fire together, as do the plugs in cylinder 6 and 3, and also in cylinder 5 and 2.

This means that an ignition spark is fired in one cylinder while at the same time a "waste" spark is fired in the companion cylinder. Because of dual plug firing, if an inductive tachometer is connected to a plug wire, it will indicate an engine RPM that is twice the actual speed (i.e., 1,600 RPM, instead of 800 RPM).

ELECTRONIC SPARK ADVANCE SYSTEM

Ignition Timing is determined and set within the ECM based on signals from various sensors and switches. Optimum performance is gained with this system. The ECM varies ignition timing according to engine speed, intake air amount, coolant temperature and other conditions.

NOTICE

- Timing specification at idle is: $12 \pm 5^\circ$ BTDC
- Timing is not adjustable

IGNITION SYSTEM COMPONENTS

The mechanical, rotating high-voltage distributor mechanism has been replaced by static electronically controlled components. These components are described below.

IGNITION COILS

Three ignition coils are used in this system. The ignition coil is installed on the top of cylinder head cover. One ignition coil fires two spark plug simultaneously one cylinder fires at TDC on the compression stroke, while the other fires at TDC of the exhaust stroke. The coil resistance is identical for these three coils, and there is no maintenance required for them. If determined to be faulty, they must be replaced.

HIGH-TENSION LEADS

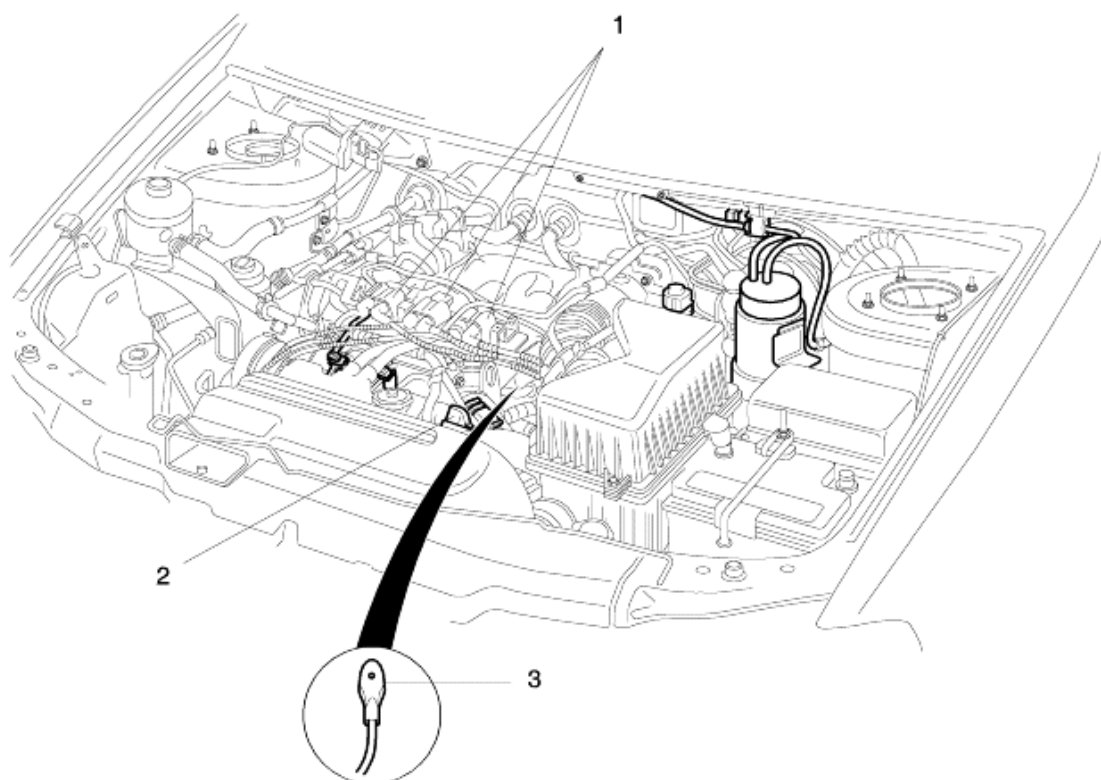
The high-tension leads connect the three ignition coils to the spark plugs. Their function is basically the same as on the previous system. Because of their shorter length, the DLI high-tension leads enhance the ignition systems delivered voltage. In addition, they reduce the wave interference from one high tension wire to another.

SPARK PLUGS

The spark plugs provide the air gap necessary to produce an arc from the electrical energy coming in from the ignition coil. This arc then ignites the fuel/air mixture in the cylinder, producing power. The spark plugs are platinum and have a recommended service life of 100,000 km (60,000 miles) for normal driving conditions per maintenance schedule in this manual.



IGNITION SYSTEM OVERVIEW



1. Ignition coil

2. Camshaft position sensor

3. Crankshaft position sensor

The GV6 GASOLINE engine ignition system is now a distributorless ignition system (DLI) type. The key components of this system are:

3 separate coil packs

- A crankshaft position sensor that provides engine RPM information to the ECM
- An ignition control module built into the ECM
- A camshaft position sensor that provides engine firing order information to the ECM
- Spark plug wires and spark plugs



TROUBLESHOOTING GUIDE

IGNITION SYSTEM

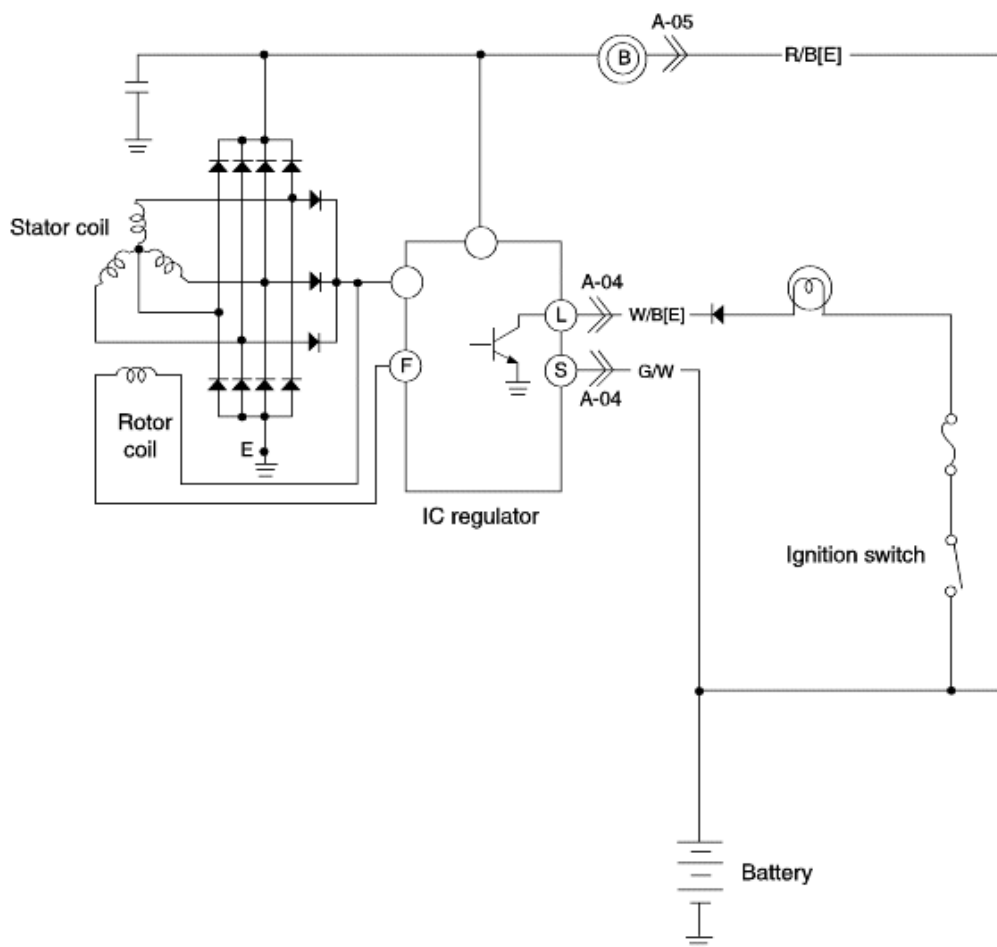
Problem	Possible cause	Action
Start motor turns but engine does not start	Ignition malfunction <ul style="list-style-type: none"> • Ignition coil malfunction • High-tension code malfunction 	Inspect and replace Inspect and replace
	Loose or break ignition wiring or connectors	Inspect and replace
Rough idle	Spark plug malfunction	Inspect and replace
	Damaged ignition wiring	Inspect
	ECM malfunction	Refer to section FL
	Ignition malfunction <ul style="list-style-type: none"> • Ignition coil malfunction • High-tension code malfunction 	Inspect and replace Inspect and replace
Hesitation / Poor acceleration	Spark plug malfunction	Inspect and replace
	Damaged ignition wiring harness	Inspect
	ECM malfunction	Refer to section FL
Back fires	ECM malfunction	Refer to section FL
Over heat	ECM malfunction	Refer to section FL

Engine Electrical System

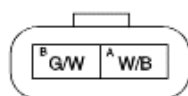
Charging System - Alternator



CIRCUIT DIAGRAM



A-04 Alternator (B)



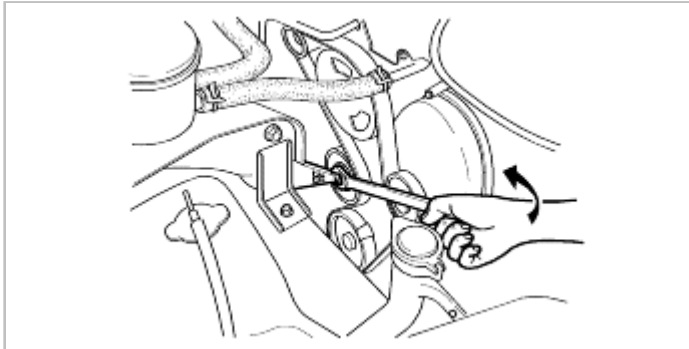
A-05 Alternator (B)



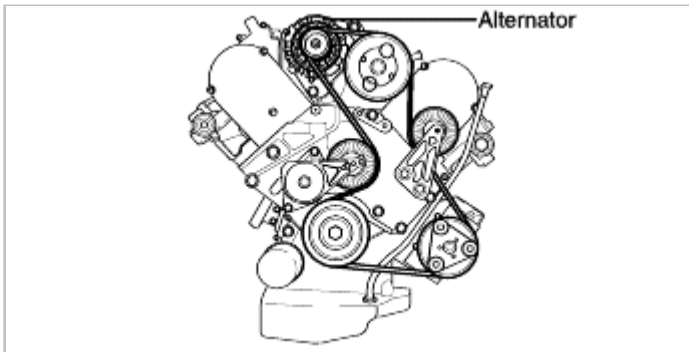


REMOVAL AND REPLACEMENT

1. Disconnect negative battery cable.
2. Raise an auto tensioner with spanner and then remove drive belt.



3. Remove "B" terminal lead and then disconnect alternator "L" and "S" terminal connector.
4. Remove alternator.



5. Install in the reverse order of removal.

Tightening torque :

33.2 lb·ft (45.1 N·m, 4.6 kg·m)

Engine Electrical System

Charging System - Battery



INSPECTION

ELECTROLYTE LEVEL

1. Check whether or not the electrolyte level lines between "upper level" line and "lower level" line.
2. If low, add distilled water to "upper level" line.
Do not overfill.

SPECIFIC GRAVITY OF ELECTROLYTE

1. Measure specific gravity with a hydrometer.

Specific gravity :

1.27~1.29 (at 77°F[25°C])

TERMINAL AND CABLE

1. Check that battery terminal connections are tight to ensure good electrical connections.
2. Check for corroded or frayed battery cables.
3. Check rubber protector on positive terminal for proper coverage.
4. Clean terminals, if necessary, and lightly coat them with grease.

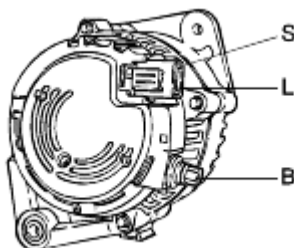


TROUBLESHOOTING GUIDE

DIAGNOSTIC GUIDE

No.	Items
1	Being not charged
2	Discharging of battery

SYMPTOM TROUBLESHOOTING

1	Being not charged														
Step	Inspection		Action												
1	Check the battery voltage.	Yes	Go to next step.												
	Standard: about 12.4V	No	Check the battery.												
2	Start engine and check if alternator warning lamp goes out.	Yes	Go to step 4.												
		No	Go to next step.												
3	Check if voltage at alternator terminals are correct. <table border="1"><thead><tr><th>Terminal</th><th>IG: ON(V)</th><th>Idle(V)</th></tr></thead><tbody><tr><td>B</td><td>Approx. 12V</td><td>14.1-14.7</td></tr><tr><td>L</td><td>Approx. 1V</td><td>14.1-14.7</td></tr><tr><td>S</td><td>Approx. 12V</td><td>14.1-14.7</td></tr></tbody></table> <div></div>	Terminal	IG: ON(V)	Idle(V)	B	Approx. 12V	14.1-14.7	L	Approx. 1V	14.1-14.7	S	Approx. 12V	14.1-14.7	Yes	Check wire harness between battery and terminal "B".
		Terminal	IG: ON(V)	Idle(V)											
B	Approx. 12V	14.1-14.7													
L	Approx. 1V	14.1-14.7													
S	Approx. 12V	14.1-14.7													
No	Check wiring harness. Replace alternator.														
4	1. Connect an ammeter (150A Max: GV6) between terminal "B" and harness. 2. Start engine. 3. Check if engine is 2500~3000 rpm. 4. Check if ampere of load (turn more one of many electrical system on) higher than ampere of unload (Turns blower, head lamp, rear defroster, etc, off).	Yes	Charging system normal.												
		No	Go to next step.												
5	Check if drive belt tension is OK.	Yes	Replace alternator.												
		No	Check drive belt tension.												

2	Discharging of battery	
Step	Inspection	Action

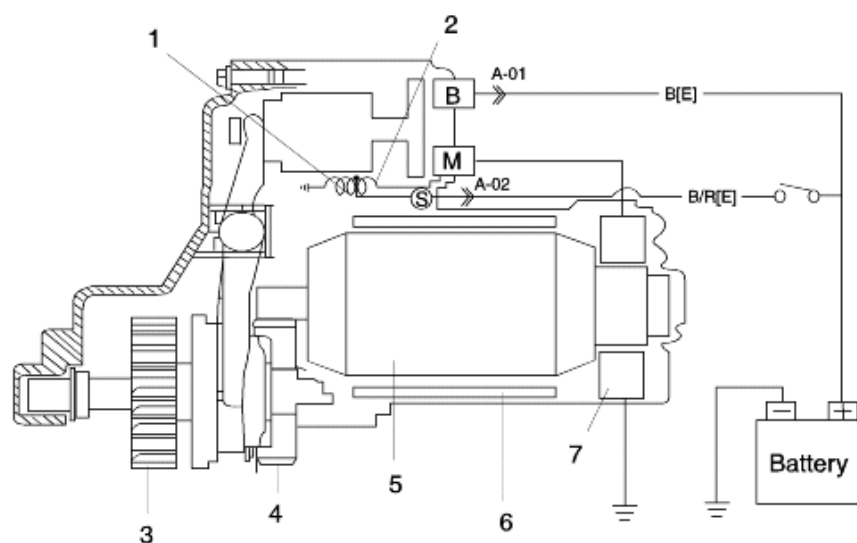
1	Measure open circuit voltage of battery with a digital voltmeter capable of reading 0.01V. Voltage: above 12.4V	Yes	Go to next step.																						
		No	Quick charge for 2 hours and recheck voltage if the voltage is below 12.4V, replace battery.																						
2	Apply load test to the battery by using a battery load tester. Load test <table border="1"><thead><tr><th>Battery</th><th>Load</th></tr></thead><tbody><tr><td>PT56 - 26FL</td><td>300</td></tr></tbody></table> Quick charge and record battery voltage at the end of 15 seconds; is the voltage more than specification? Battery voltage with load <table border="1"><thead><tr><th>Approximate battery temp. (°C)</th><th>Minimum voltage (V)</th></tr></thead><tbody><tr><td>PT56 - 26FL</td><td>9.6</td></tr><tr><td>15</td><td>9.5</td></tr><tr><td>10</td><td>9.4</td></tr><tr><td>4</td><td>9.3</td></tr><tr><td>-1</td><td>9.1</td></tr><tr><td>-7</td><td>8.9</td></tr><tr><td>-12</td><td>8.7</td></tr><tr><td>-18</td><td>8.5</td></tr></tbody></table>	Battery	Load	PT56 - 26FL	300	Approximate battery temp. (°C)	Minimum voltage (V)	PT56 - 26FL	9.6	15	9.5	10	9.4	4	9.3	-1	9.1	-7	8.9	-12	8.7	-18	8.5	Yes	Go to next step.
		Battery	Load																						
PT56 - 26FL	300																								
Approximate battery temp. (°C)	Minimum voltage (V)																								
PT56 - 26FL	9.6																								
15	9.5																								
10	9.4																								
4	9.3																								
-1	9.1																								
-7	8.9																								
-12	8.7																								
-18	8.5																								
No	Replace battery.																								
3	Measure open circuit voltage of battery. Standard: above 12.4V	Yes	Battery is OK.																						
		No	Charge battery.																						

Engine Electrical System

Starting System - Starter



STRUCTURAL VIEW

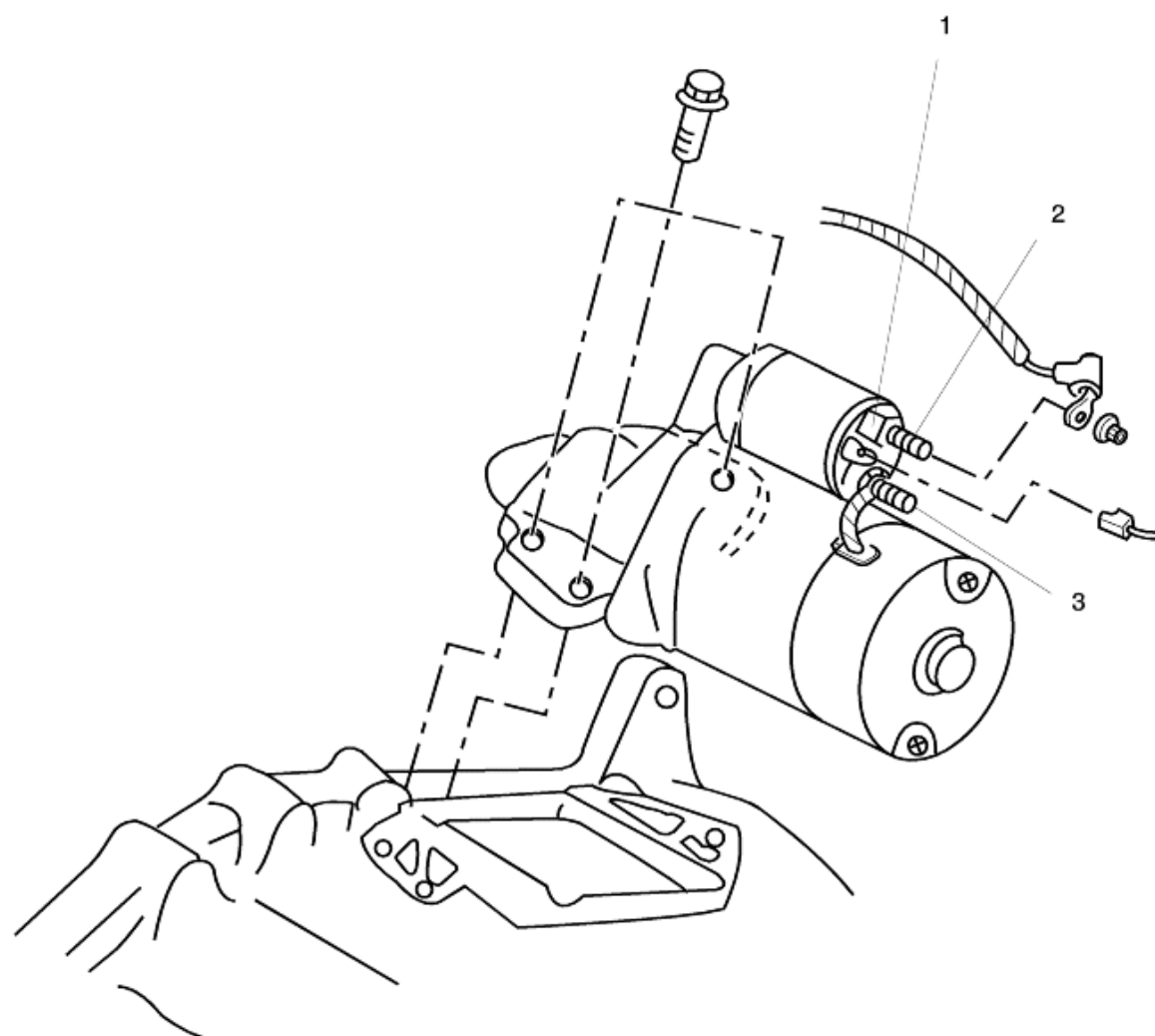


- 1. Hold-in coil
- 2. Pull-in coil
- 3. Drive pinion
- 4. Reduction gear

- 5. Armature
- 6. Magnetic
- 7. Brush



COMPONENT



1. S terminal
2. B terminal

3. M terminal



INSPECTION

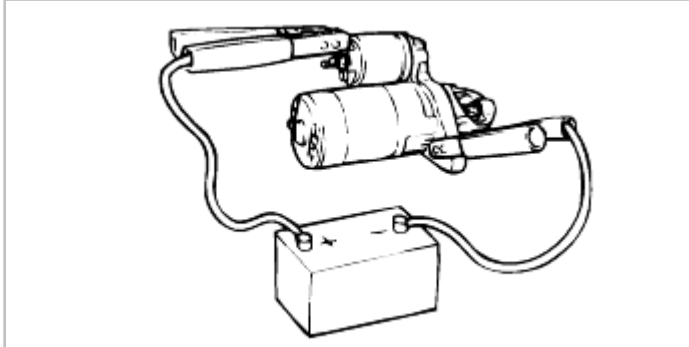
SOLENOID

PULL-OUT TEST

NOTICE

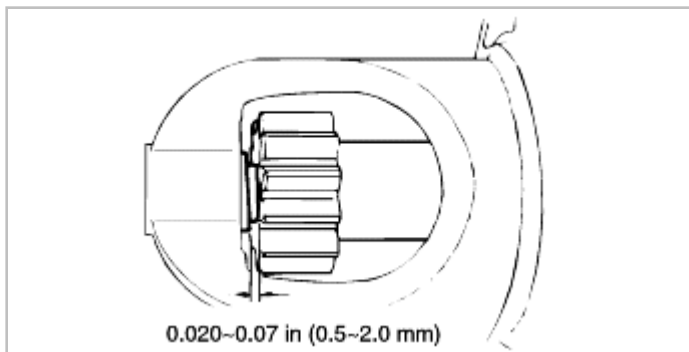
Be careful not to let electricity flow continuously for more than 10 seconds.

1. Apply battery power to the "S" terminal and ground starter motor body. Pinion will eject outward and the stop.



2. Measure clearance (pinion gap) between pinion and stopper.

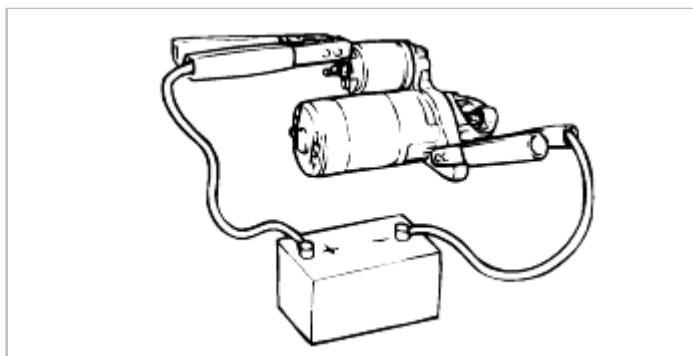
Pinion : 0.020~0.079 in (0.5~2.0 mm)



3. If pinion gap is not within specified range, adjust it by increasing or decreasing the number of washers used between solenoid and drive housing.
The gap will become smaller if the number of washers is increased.

RETURN TEST

1. Disconnect the wire from the "S" terminal, and then connect the battery between the "M" terminal and the body.



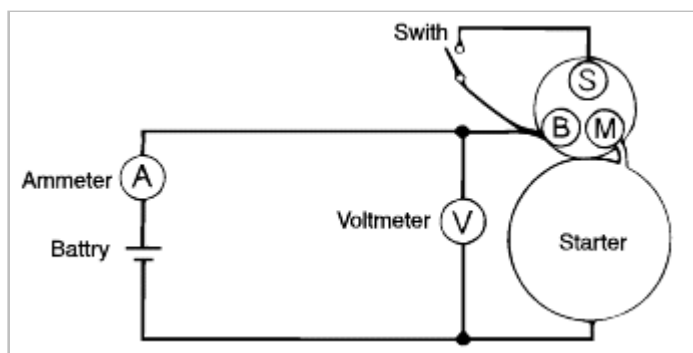
2. Pull out the over-running clutch with a flat-tip screwdriver, and then check that the over-running clutch returns to its original position when released.

NO-LOAD TEST

1. Form a test circuit with a volt meter and an ammeter.

NOTICE

Use wires as thick as possible and tighten each terminal fully.



2. Close switch to run the starter.
3. Check the following.

		GV6 GASOLINE
Voltage	(V)	11.0
Current	(A)	Below 100
Gear shaft speed	(rpm)	Above 2200

4. If any abnormality is noted, check it according to "INSPECTION".

REMOVAL AND REPLACEMENT

1. Remove the battery negative cable.
2. Inspect the parts, replace and repair as necessary.
3. Install in the reverse order of removal.

INSPECTION

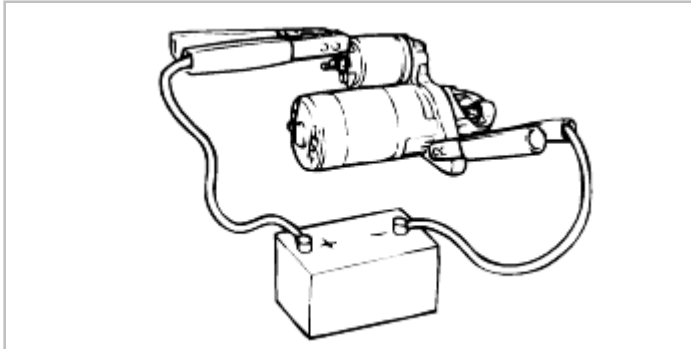
SOLENOID

PULL-OUT TEST

NOTICE

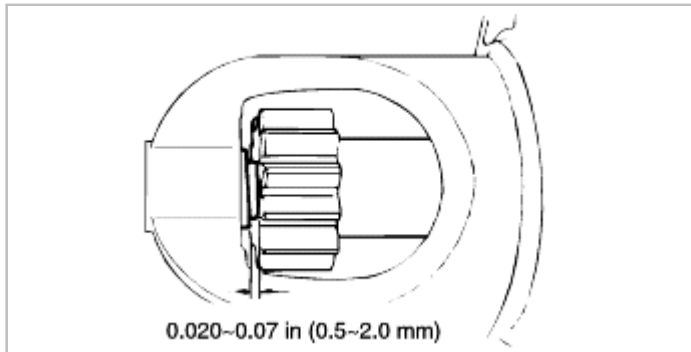
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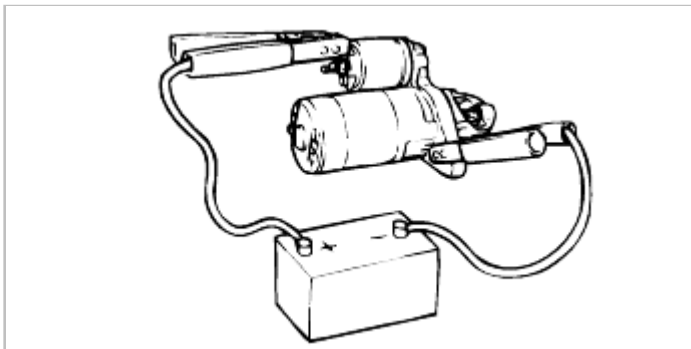
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3. If pinion gap is not within specified range, adjust it by increasing or decreasing the number of washers used between solenoid and drive housing.
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RETURN TEST

1. Disconnect the wire from the "S" terminal, and then connect the battery between the "M" terminal and the body.



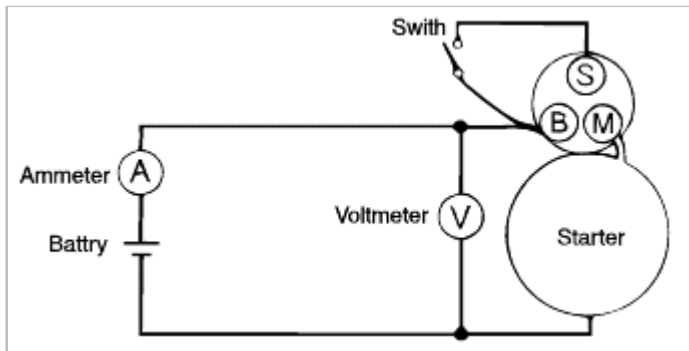
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GV6 GASOLINE		
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Gear shaft speed	(rpm)	Above 2200

4. If any abnormality is noted, check it according to "INSPECTION".

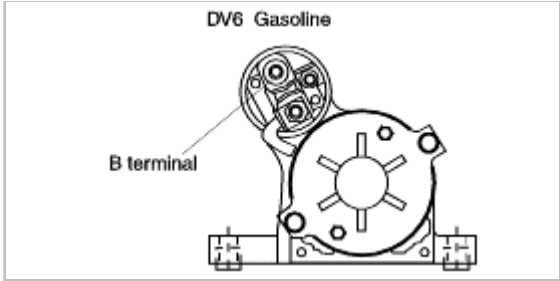
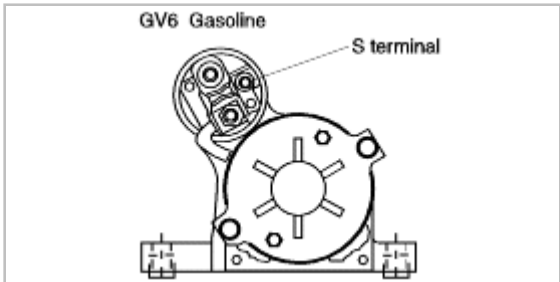


TROUBLESHOOTING GUIDE

SYMPTOM GUIDE

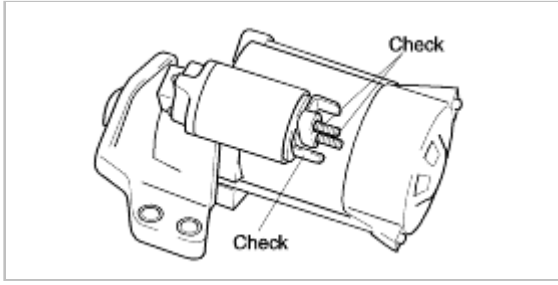
NO.	Items
1	Will not crank-starter motor does not operate
2	Will not crank-starter motor spins
3	Cranks slowly
4	Generator warning light illuminates with engine running
5	Discharged battery
6	Misfire

SYMPTOM TROUBLESHOOTING

1	Will not crank-starter motor does not operate		
Step	Inspection		Action
1	Check if engine cranks with fully charged battery.	Yes	Check charging system.
		No	Go to next step.
2	Check if battery voltage is supplied at B terminal. 	Yes	Go to next step.
		No	Check wiring harness.
3	Check if battery voltage is supplied at S terminal with clutch pedal depressed (M/T), car in park (A/T), and ignition switch in START position. 	Yes	Replace starter unit.
		No	<ul style="list-style-type: none"> • Check transaxle range switch (A/T) (Refer to Automatic transaxle system) • Check ignition switch • Check wiring harness

2	Will not crank-starter motor spins		
Step	Inspection		Action
1	Check if drive pinion is pulled out while cranking.	Yes	Remove starter and check flywheel ring gear teeth and starter drive pinion teeth.

	(Click heard when pulled out.)	No	Check solenoid. Repair or replace as necessary.
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3	Crank slowly		
Step	Inspection		Action
1	Check if engine cranks normally when fully charged.	Yes	Check charging system.
		No	Go to next step.
2	Check starter cable connection for looseness and corrosion. 	Yes	Repair or replace connection.
		No	Check for seized motor armature. Repair or replace as necessary.

4	Alternator warning lamp illuminates with engine running		
Step	Inspection		Action
1	Check for correct battery voltage at idle. Specification: 14.1~14.7V	Yes	Check wiring harness between Alternator L terminal and generator warning lamp.
		No	Check charging system.

5	Discharged battery		
Step	Inspection		Action
1	Check charging system.	Yes	Turn ignition switch ON and check dark current as shown. Dark current: Below 20mA
		No	Repair or replace parts as necessary .

6	Misfire		
Step	Inspection		Action
1	Disconnect spark plug wire from each spark plug and check for strong blue spark while cranking.	Yes	Check spark plug. If OK, engine electrical system is normal. If not OK, clean or replace spark plug.
		No	Check ignition system.



Random misfire detected

Diagnostic trouble code No. P0300	Random misfire detected
Diagnostic trouble code No. P0301	Cylinder 1 misfire detected
Diagnostic trouble code No. P0302	Cylinder 2 misfire detected
Diagnostic trouble code No. P0303	Cylinder 3 misfire detected
Diagnostic trouble code No. P0304	Cylinder 4 misfire detected
Diagnostic trouble code No. P0305	Cylinder 5 misfire detected
Diagnostic trouble code No. P0306	Cylinder 6 misfire detected
Related items	<ul style="list-style-type: none"> • Vacuum leak in air intake system • CKPS circuit malfunction • Ignition circuit malfunction • Faulty ignition coil or plug wire • Spark plug malfunction • Low compression due to blown head gasket, leaking valve or piston ring • Low/high fuel pressure due to faulty pressure regulator, restricted fuel lines, plugged fuel filter or faulty fuel pump • Fuel injector circuit malfunction • Faulty fuel injector <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>NOTICE</p> <p>If any injectors, HO2S, ECTS, and MAFS codes are present, do all repairs associated with those codes before proceeding this troubleshooting guide.</p> </div>

Step	Inspection	Action
1	Connect SCAN TOOL to data link connector or OBD-II check connector. Turn ignition to ON and monitor DTCs. Are any other codes set?	Yes Do all repairs associated with those codes before proceeding this procedure.
		No Go to step 2.
2	Check for any split, disconnected or perforated vacuum hoses. Also, check PCV valve for proper operation. Are vacuum hoses and PCV okay?	Yes Go to step 3.
		No Replace faulty vacuum hoses or PCV.
3	Turn ignition to OFF and disconnect ignition coil connector. Turn ignition to ON and measure voltage of ignition coil battery voltage between ignition coil harness connector and chassis ground.	Yes Go to step 4.
		No Open circuit or short circuit to chassis ground between ignition coil harness connector and

	<ul style="list-style-type: none"> • Specification: approximately B+ <p>Is battery voltage within specifications?</p>		<p>main relay. Repair as necessary.</p>
4	<p>Turn ignition to OFF and check ignition coils and plug wires for cracks or carbon tracing. Check resistance of primary coils (0.36~0.55kΩ at 20°C) and secondary coils (10.9~13.3 kΩ at 20°C). Check for resistance of plug wires (16 kΩ per 1m). Are ignition coils and plug wires OK?</p>	Yes	Go to step 5.
		No	Repair or replace as necessary.
5	<p>Disconnect CKP connector and measure resistance between CKP terminal 2 and terminal 3 (800~900Ω at 20°C). Remove CKPS and calculate air gap between sensor and flywheel/torque converter (0.3~1.7 mm <0.012~0.067 in>) {measure distance from hosing to teeth on flywheel/torque converter (measurement "A") and from mounting surface on sensor to sensor tip (measurement "B") subtract "B" from "A" = air gap}. Are air gap and resistance measurements within specifications?</p>	Yes	<p>Thoroughly check for loose, bent or corroded terminals between CKPS and ECM. Measure resistance between CKPS terminal 3 and chassis ground (<1Ω). Repair as necessary.</p>
		No	Repair as necessary.
6	<p>Release fuel pressure and attach fuel pressure gauge to service port on fuel rail. Start an engine and warm up to operating temperature. Check for fuel pressure at idle.</p> <ul style="list-style-type: none"> • Fuel pressure at idle: 43~46 psi (296~317kPa, 3.02~3.23kg/cm²) <p>Is fuel pressure within specification?</p>	Yes	Go to step 7.
		No	Check fuel delivery system.
7	<p>Remove spark plugs and check gap (1.0~1.1 mm [0.027~0.031 in]) and plug condition. Are spark plugs gapped properly and in good condition?</p>	Yes	Go to step 8.
		No	Repair as necessary.
8	<p>Perform compression test [approximately (193 psi, 1360kPa, 13.6kg/cm²) at 300rpm (no more than 10% between highest and lowest cylinder)]. Is compression OK?</p>	Yes	Go to step 9.
		No	Perform leak down test to determine source of low compression and repair as necessary.
9	<p>Return vehicle to original condition. Clear all diagnostic trouble codes. Verify by driving vehicle with SCAN TOOL connected and monitor for pending codes.</p>		



Battery backup line malfunction

Diagnostic trouble code No. P0560	Battery backup line malfunction
Diagnostic trouble code No. P0562	Battery backup line low input
Diagnostic trouble code No. P0563	Battery backup line high input
Related items	<ul style="list-style-type: none"> • Open or short between ECM and battery • ECM internal faulty

Step	Inspection		Action
1	Turn ignition to OFF and disconnect ECM connector. Measure voltage of backup circuit between battery and chassis ground. • Specification: approximately B+ Is voltage within specification?	Yes	Thoroughly check for poor connection, misplaced, corroded terminals at ECM connector. Repair as necessary.
		No	Open circuit or short circuit to chassis ground between ECM harness connector and battery. Repair as necessary.
2	<ul style="list-style-type: none"> • Temporarily install a known good ECM and check for proper operation. If problem is corrected replace ECM. • Return vehicle to original condition. Clear all diagnostic trouble codes. Verify by driving vehicle with SCAN TOOL connected and monitor for pending codes. 		