Component Procedures: Charging System

Table of Contents

Component Procedures: Charging System

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Alternator	373702E900	Voltage Regulator	188.95	
Alternator > Alternator	373002E821	Korea Built	675.18	
Alternator > Alternator	373002E721	Us Built	719.42	
Alternator > Pulley	3732204630	Korea Built	325.76	
Alternator > Pulley	3732204950	Us Built	325.76	

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Alternator > Alternator, R&R	B	0.8	0.0
Remove & Replace	Alternator > Voltage Regulator, R&R	B	1.1	0.0
Remove & Install	Alternator > Alternator, R&I	B	0.8	0.0
Inspect	Alternator > Charging Circuit, Inspect	B	0.5	0.0

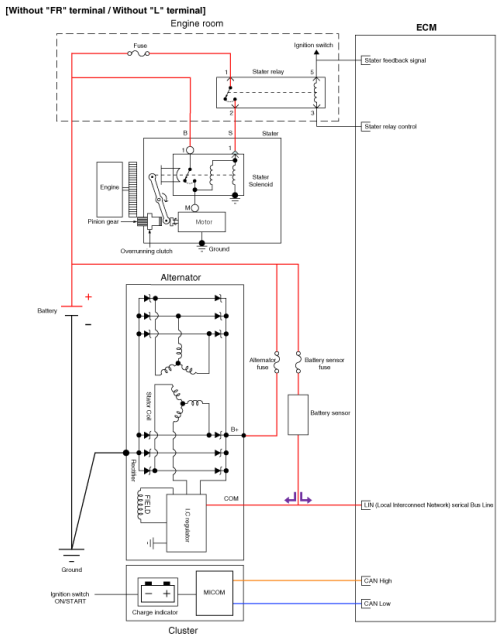
Charging System - Description and Operation (Article 44025)

- Description

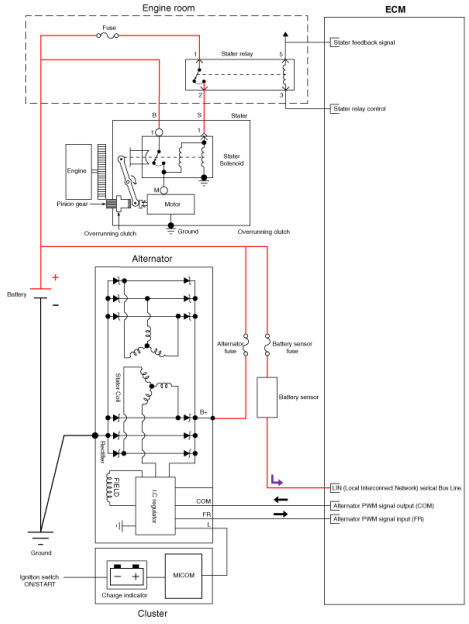
Alternator Management System (AMS)

Charging System - Schematic Diagrams (Article 44027)

- Circuit Diagram



[With "FR" terminal / With "L" terminal]



Charging System - Service Tips (Article 42620)

Circuit Description

An alternator has built-in diodes each of which rectifies AC to DC to generate DC in the alternator B+ terminal. The generated current operates various electric systems via the engine room junction block and recharges the battery. If the ignition switch is switched to the ON position while the engine is turns OFF, IG1 power is applied to the alternator and the charge warning light on the instrument cluster is lighted. However, when the engine is turns ON, the input L terminal of the alternator and the output terminal of the instrument cluster are put in the isopotential state by the voltage generated by the stator coil. Then the charge warning light turns off, and the voltage is also used to magnetize the field coil. The electricity generated by the stator coil (which has to be higher than 12.6V of the battery for recharging) starts recharging the battery via the alternator B+ terminal.

When the power generated by the stator coil and constant power by the FR terminal become higher than the voltage of the Zener voltage inside the IC regulator, the field coil is no longer magnetized to lower the generated voltage. When the powers fall below the Zener voltage, the field coil is magnetized again to continue power generation and thereby maintain a certain level of voltage.

■ Alternator Management System (AMS)

The system improve on fuel economy and maintains the battery in the optimum state of recharge by detecting the vehicle operating condition (accelerating or decelerating), vehicle electric load and battery recharge state so that the ECM(PCM) can control the voltage generated by the alternator. Depending on the battery recharge state and the vehicle operating condition, either recharging control, discharging control or normal control will be performed. During acceleration, the ECM(PCM) performs the battery discharging control to consume the battery's power and lower the alternator-generated voltage to reduce the load of the alternator. During deceleration, it performs recharging control to increase the generated voltage and supplement the voltage of the consumed battery.

■ Battery Sensor

A battery sensor installed on the battery (-) terminal detects the battery fluid temperature, voltage and current, which are needed by the control system, using the internal elements (silicon diode and shunt resistance) and mapping values, and then sends them to the ECM(PCM) using the LIN communication line.

■ Usage

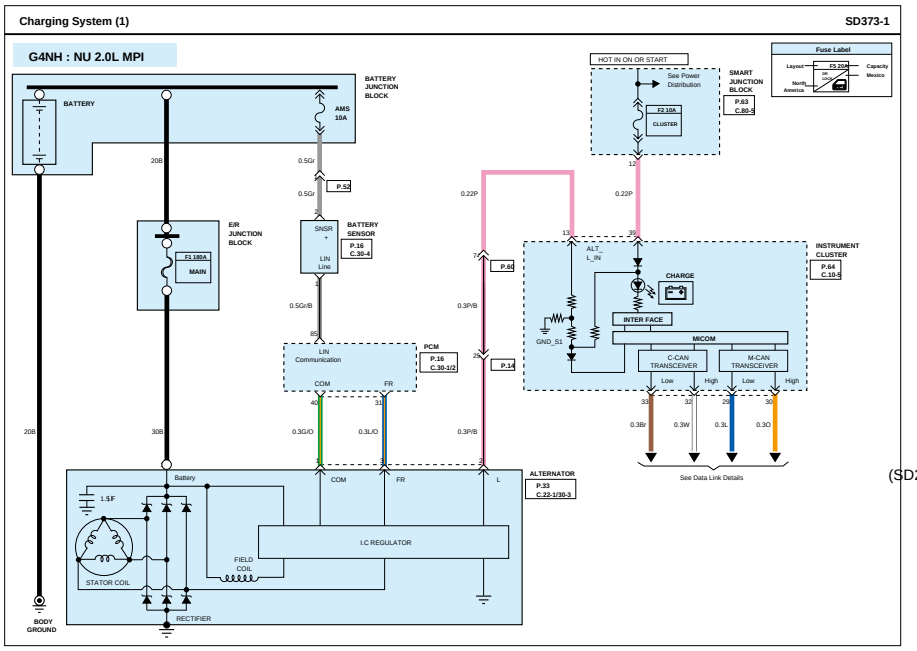
1. B+ Terminal : A battery recharging terminal.
2. L Terminal : A terminal to operate the charge warning light in the instrument cluster.
3. FR Terminal : A terminal to monitor the power generator status by outputting the field coil operating status as the PWM signal
4. C Terminal : A terminal for generating the signal to control the regulating voltage of the generator
5. I.C Regulator : A device for regulating the voltage generated by the generator
6. Field Coil : A circuit that generates the voltage to be regulated by an I.C regulator
7. Stator Coil : A circuit that actually creates the voltage
8. Diode : A circuit that converts (rectifies) AC to DC

■ Inspection

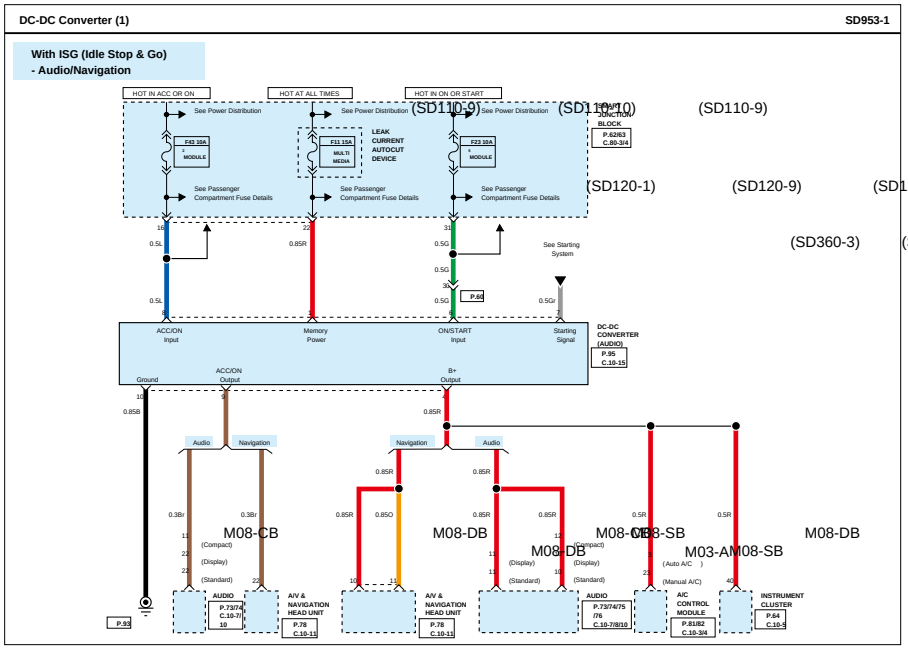
The charge warning light must be turned on when the ignition switch is turned on, and turned off when the ignition switch is turned off. If the charge warning light is not lighted, turn on the ignition switch and connect the L terminal to a jumper cable for grounding.

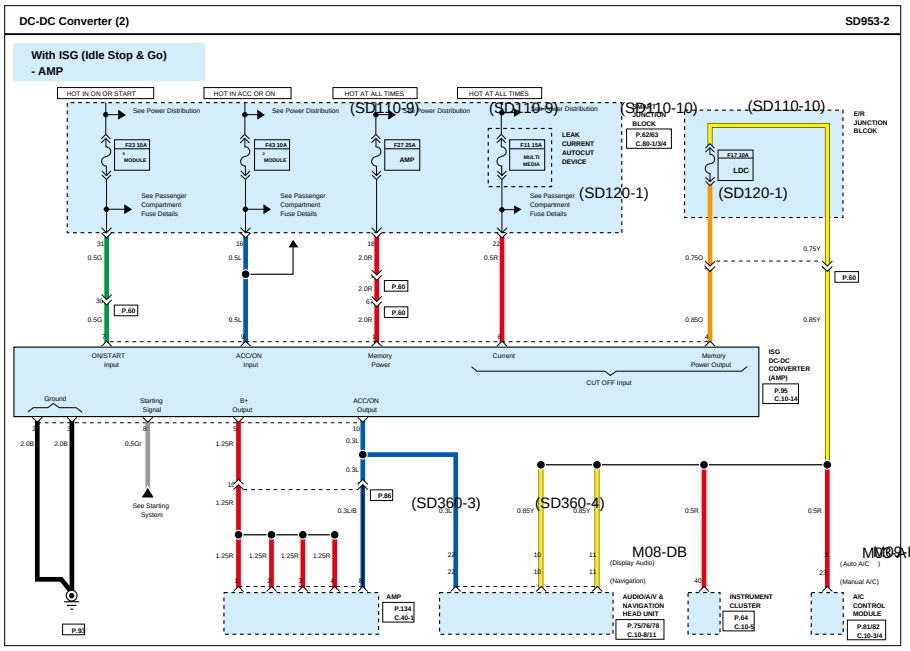
If it is still not lighted, it is mostly likely that the wiring has been cut off or the indicator is malfunctioning. After engine start, If the charge warning light is not turned off, it means that the generator voltage cannot coordinate the battery voltage and is most likely a problem of battery recharging. In that case, check the recharging system for repairs or replacement.

Charging System - Schematic Diagrams (Article 42619)



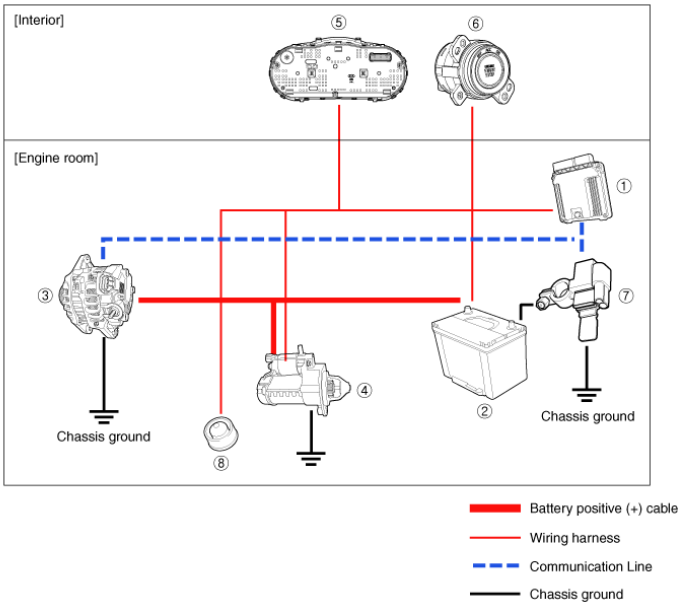
DC-DC Converter - Schematic Diagrams (Article 42623)





Charging System - Components and Components Location (Article 44024)

- Components



Charging System - Repair Procedures (Article 44028)

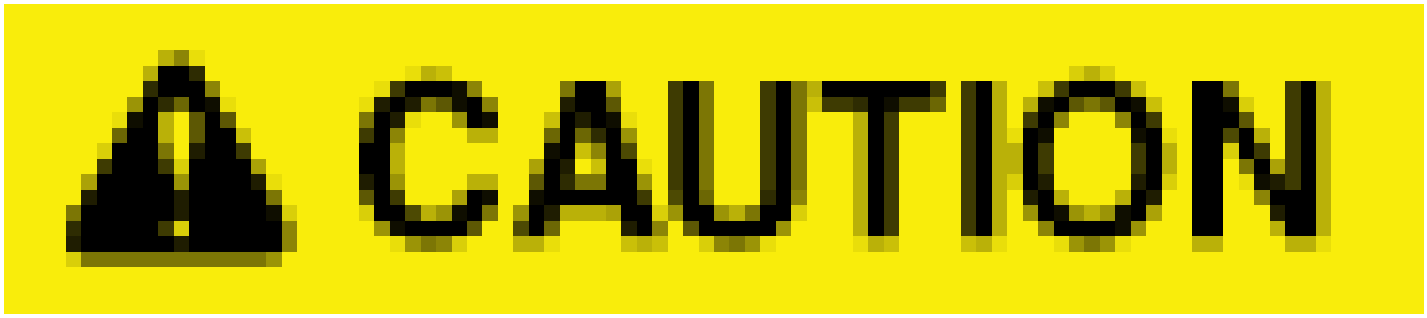
- Inspection

Inspecion Item

- Battery efficiency inspection
- Battery voltage inspection
- Charging voltage insptection
- General inspection
- Terminal tightening state inspection
- Engine/ transaxle ground state inspection
- Wiring hareness ground state inspection
- Electrical Specified Value Inspection
- Vehicle parasitic current inspection
- Inspect the battery capacity

Battery Efficiency Inspection

Check that the battery cable s are connected to the correct terminals. Disconnect the battery cables when the battery is given a quick charge. Never disconnect the battery while the engine is running.



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Inspect the battery test using the load tester and battery tester.

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Battery Voltage Inspection

- After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlamp, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.
- Turn the ignition sw itch OFF and turn off the electrical systems.
- Measure the battery voltage between the negative (-) and positive (+) terminals of the battery. Standard voltage : About 12.5 - 12.9V (20°C) If the voltage is less than specification, charge the battery.

Charging Voltage Insptection

- Starting the engine
- Turn ON the electrical systems.
- While keeping the engine speed at 2,500rpm.
- Measure the battery voltage between the negative (-) and positive (+) terminals of the battery. Standard voltage : About 13.5 - 14.5V (20°C) If the voltage is less than specification, charge the battery.

General Inspection

- Check that the battery terminals are not loose or corroded. (Refer to Charging System - "Battery")
- Check the fuses for continuity. Check the alternator fuse for continuity. Measure the voltage as shown in the image below. Standard value : About 0V If the alternator fuse blown, below replace the alternator fuse. Turn ignition switch OFF and disconnect the battery negative (-) terminal. Remove the battery positive (+) cable mounting nuts. Remove the battery positive (+) cable. Replace the norminal alternator fuse or battery cable. Install in the reverse order of removal. Check the battery sensor fuse for continuity. If the alternator fuse blown, replace the battery sensor fuse. Measure the voltage as shown in the image below. Standard Value : About 0V
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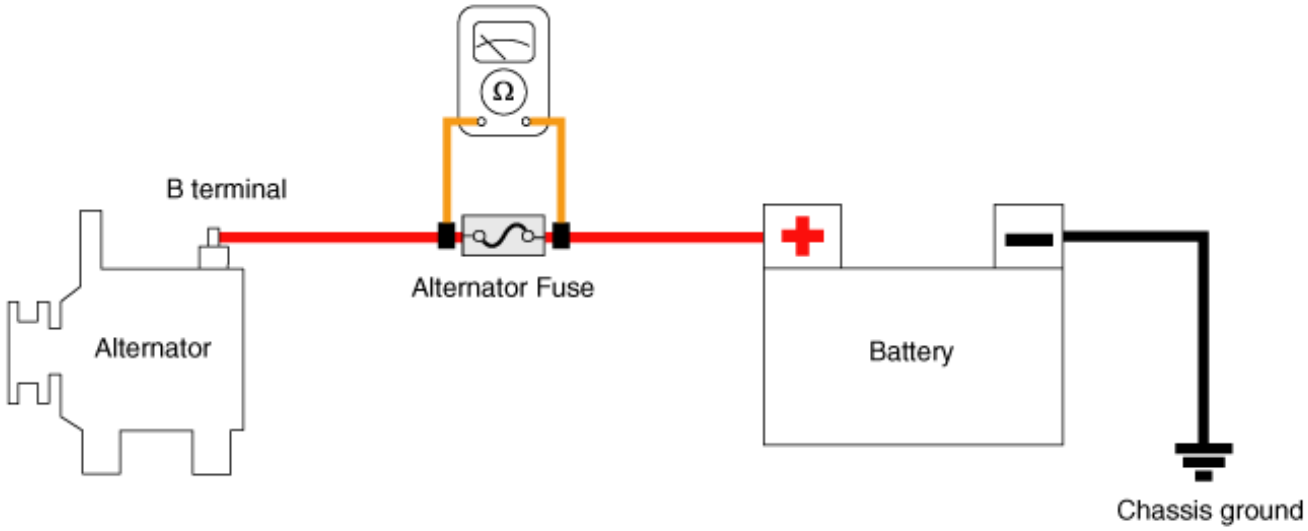

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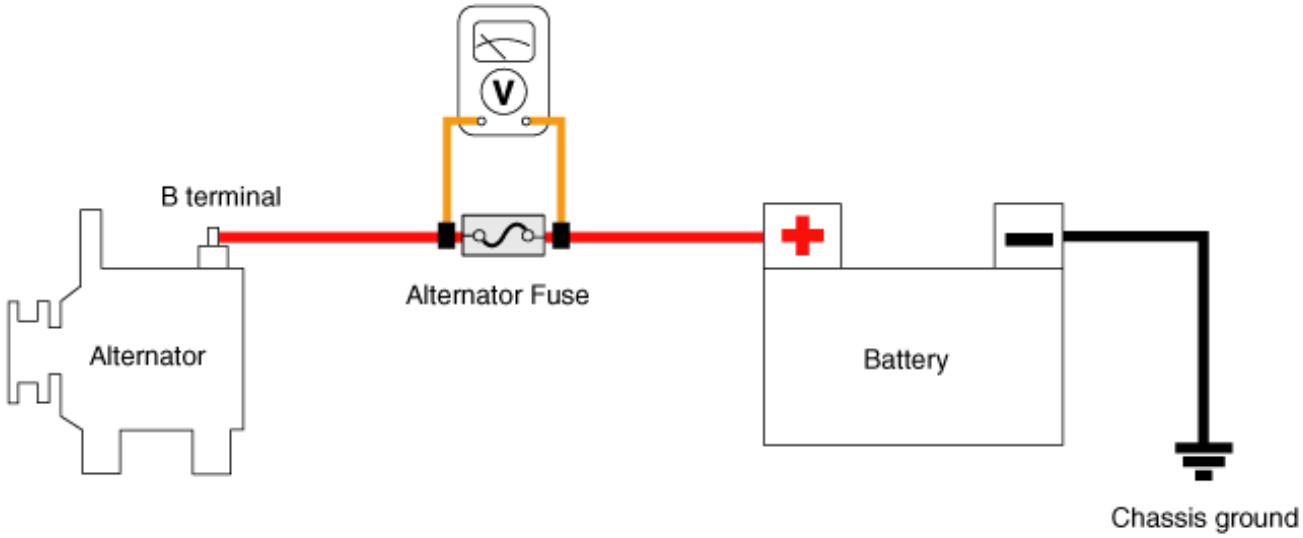

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- Remove the battery positive (+) cable mounting nuts.
- Remove the battery positive (+) cable.
- Replace the norminal alternator fuse or battery cable.
- Install in the reverse order of removal.
- Check the battery sensor fuse for continuity.
- If the alternator fuse blown, replace the battery sensor fuse.
- Measure the voltage as shown in the image below. Standard Value : About 0V
- Inspect Drive Belt Visually check the belt for excessive wear, frayed cords etc. If any defect has been found, replace the drive belt. Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.
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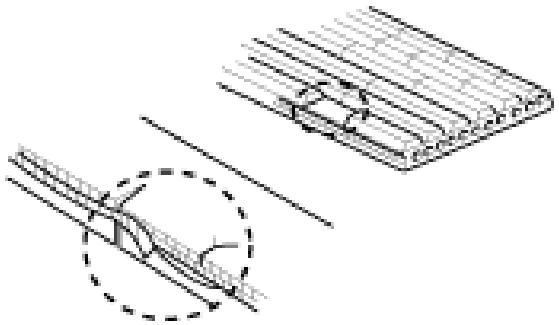

- Drive belt tension measurement and adjustment. (Refer to Engine Mechanical System - "Drive Belt")
- Visually Check Alternator Wiring And Listen For Abnormal Noises Check that the wiring is in good condition. Check that there is no abnormal noise from the alternator while the engine is running.
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- Check that there is no abnormal noise from the alternator while the engine is running.
- Check Discharge Warning Light Circuit Warm up the engine and then turn it off. Turn off all accessories Turn the ignition switch "ON". Check that the discharge warning light is lit. Start the engine. Check that the light is lit.. If the light does not go off as specified, troubleshoot the discharge light circuit.
- Warm up the engine and then turn it off.
- Turn off all accessories
- Turn the ignition switch "ON". Check that the discharge warning light is lit.
- Start the engine. Check that the light is lit.. If the light does not go off as specified, troubleshoot the discharge light circuit.

Terminal Tightening State Inspection

Alternator B+ terminal state Alternator B+ termina tightening nut Battery positive (+) terminal state Battery positive (+) terminal tightening nut state Battery negative (-) terminal state Battery negative (-) terminal tightening nut state Battery negative (-) terminal mounting bolt tightening state (Chassis ground) Battery sensor negative (-) terminal state (With battery sensor) Battery sensor negative (-) terminal tightening nut state (With battery sensor) Battery sensor negative (-) terminal mounting bolt tightening state (Chassis ground) [With battery sensor] Engine room fuse & relay box positive (+) harness state Engine room fuse & relay box positive (+) harness tightening nut state Check the status of ground fault by chassis paint
- Alternator B+ terminal state
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- Battery positive (+) terminal tightening nut state
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- Battery negative (-) terminal mounting bolt tightening state (Chassis ground)
- Battery sensor negative (-) terminal state (With battery sensor)
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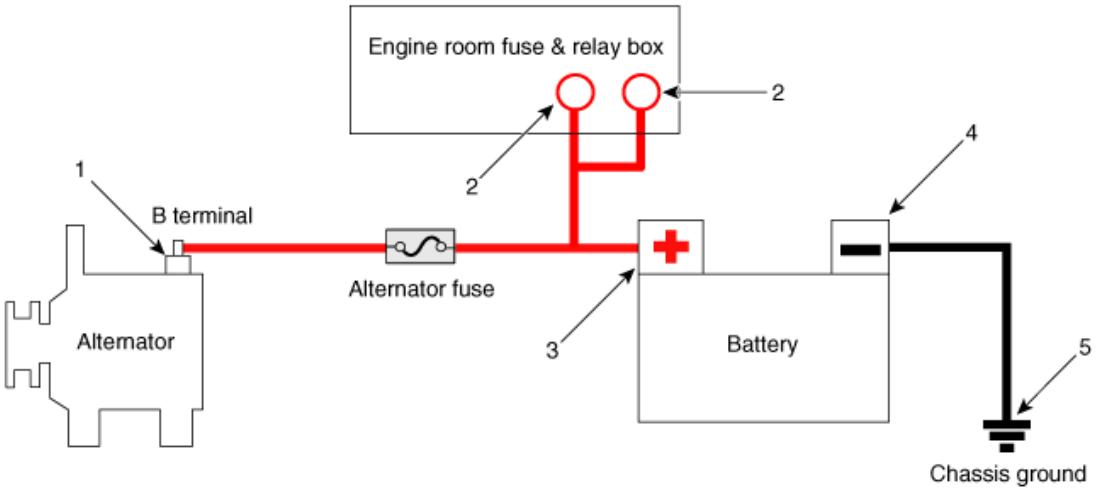
- Engine room fuse & relay box positive (+) harness state
- Engine room fuse & relay box positive (+) harness tightening nut state
- Check the status of ground fault by chassis paint

Inspection Component Location



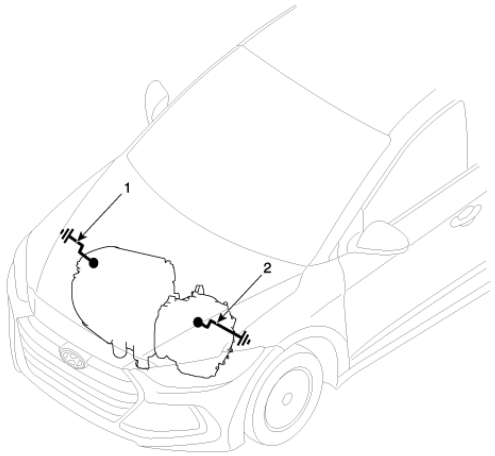
1. Alternator B+ terminal 2. Engine room fuse & relay box positive (+) terminal 3. Battery negative (+) terminal 4. Battery negative (-) terminal 5. Chassis ground

Engine/ Transaxle Ground State Inspection

Ground state Mounting bolt tightening state (Chassis) Mounting bolt tightening state (Engine) Check the status of ground fault by chassis paint

- Ground state
- Mounting bolt tightening state (Chassis)
- Mounting bolt tightening state (Engine)

Wiring Hareness Ground State Inspection



1. Engine ground (Engine ↔ Chassis) 2. Transaxle ground (Transaxle ↔ Chassis)

Check the ground point. (Refer to ETM Harness Layout - "Ground Point")

- Check the ground point. (Refer to ETM Harness Layout - "Ground Point")

Electrical Specified Value Inspection (Using the Voltmeter and Ammeter)

- Voltage Drop Test Of Alternator Output Wire This test determines whether or not the wiring between the alternator "B" terminal and the battery (+) terminal is good by the voltage drop method. Preparation Turn the ignition switch to "OFF". Disconnect the output wire from the alternator "B" terminal. Connect the (+) lead wire of ammeter to the "B" terminal of alternator and the (-) lead wire of ammeter to the output wire. Connect the (+) lead wire of voltmeter to the "B" terminal of alternator and the (-) lead wire of voltmeter to the (+)

terminal of battery. Test Start the engine. Turn on the headlamps and blower motor, and set the engine speed until the ammeter indicates 20A.And then, read the voltmeter at this time. Result The voltmeter may indicate the standard value. Standard value : 0.2V max If the value of the voltmeter is higher than expected (above 0.2V max.), poor wiring is suspected. In this case check the wiring from the alternator "B" terminal to the battery (+) terminal. Check for loose connections, color change due to an over-heated harness, etc. Correct them before testing again. Upon completion of the test, set the engine speed at idle.Turn off the headlamps, blower motor and the ignition switch.
- Preparation Turn the ignition switch to "OFF". Disconnect the output wire from the alternator "B" terminal. Connect the (+) lead wire of ammeter to the "B" terminal of alternator and the (-) lead wire of ammeter to the output wire. Connect the (+) lead wire of voltmeter to the "B" terminal of alternator and the (-) lead wire of voltmeter to the (+) terminal of battery.
- Turn the ignition switch to "OFF".
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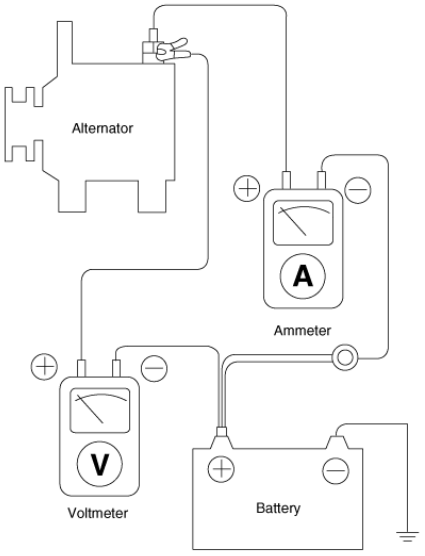

- Test Start the engine. Turn on the headlamps and blower motor, and set the engine speed until the ammeter indicates 20A.And then, read the voltmeter at this time.
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- Upon completion of the test, set the engine speed at idle.Turn off the headlamps, blower motor and the ignition switch.
- Output Current Test This test determines whether or not the alternator gives an output current that is equivalent to the normal output. Preparation Prior to the test, check the following items and correct as necessary. Check the battery installed in the vehicle to ensure that it is good condition. The battery checking method is described in the section "Battery". The battery that is used to test the output current should be one that has been partially discharged. With a fully charged battery, the test may not be conducted correctly due to an insufficient load. Check the tension of the alternator drive belt. The belt tension check method is described in the section "Inspect drive belt". Turn off the ignition switch. Disconnect the battery ground cable. Disconnect the alternator output wire from the alternator "B" terminal. Connect a DC ammeter (0

to 150A) in series between the "B" terminal and the disconnected output wire. Be sure to connect the (-) lead wire of the ammeter to the disconnected output wire. Tighten each connection securely, as a heavy current will flow. Do not rely on clips. Connect a voltmeter (0 to 20V) between the "B" terminal and ground. Connect the (+) lead wire to the alternator "B" terminal and (-) lead wire to a good ground. Connect the battery ground cable . Leave the engine hood open. Test Check to see that the voltmeter reads as the same value as the battery voltage. If the voltmeter reads 0V, and the open circuit in the wire between alternator "B" terminal and battery (+) terminal or poor grounding is suspected. Start the engine and turn on the headlamps. Set the headlamps to high beam and the heater blower switch to HIGH, quickly increase the engine speed to 2,500rpm and read the maximum output current value indicated by the ammeter. After the engine start up, the charging current quickly drops. Therefore, the above operation must be done quickly to read the maximum current value correctly. Result The ammeter reading must be higher than the limit value. If it is lower but the alternator output wire is in good condition, remove the alternator from the vehicle and test it. Limit value : Rated current 60% The nominal output current value is shown on the nameplate affixed to the alternator body. The output current value changes with the electrical load and the temperature of the alternator itself. Therefore, the nominal output current may not be obtained. If such is the case, keep the headlamps on the cause discharge of the battery, or use the lights of another vehicle to increase the electrical load. The nominal output current may not be obtained if the temperature of the alternator itself or ambient temperature is too high. In such a case, reduce the temperature before testing again. Upon completion of the output current test, lower the engine speed to idle and turn off the ignition switch Disconnect the battery negative (-) terminal. Remove the ammeter and voltmeter and the engine tachometer. Connect the alternator output wire to the alternator "B" terminal. Connect the battery negative (-) terminal.

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- Turn off the ignition switch.
- Disconnect the battery ground cable.
- Disconnect the alternator output wire from the alternator "B" terminal.
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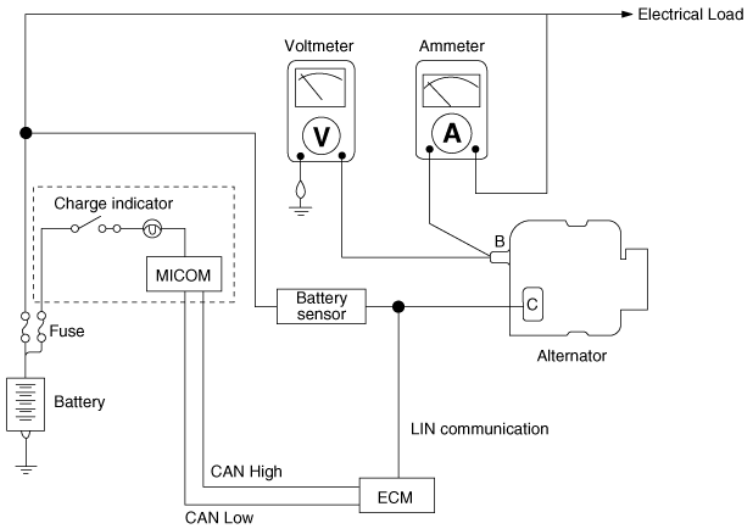
- Connect the battery ground cable .
- Leave the engine hood open.

[Without "FR" terminal / Without "L" terminal]



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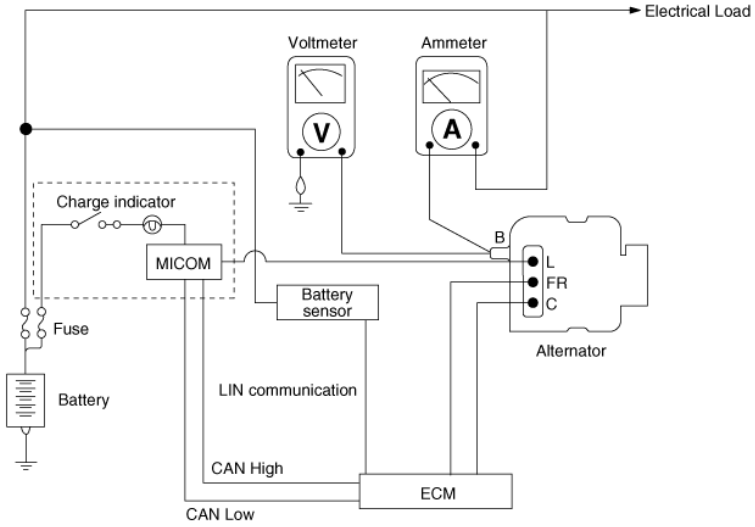

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- Connect the alternator output wire to the alternator "B" terminal.
- Connect the battery negative (-) terminal.
- Regulated Voltage Test The purpose of this test is to check that the electronic voltage regulator controls voltage correctly. Preparation Prior to the test, check the following items and correct if necessary. Check that the battery installed on the vehicle is fully charged. The battery checking method is described in the section "Battery". Check the alternator drive belt tension. The belt tension check method is described in the section "Inspect drive belt". Turn ignition switch to "OFF". Disconnect the battery negative (-) terminal. Connect a digital voltmeter between the "B" terminal of the alternator and ground. Connect the (+) lead of the voltmeter to the "B" terminal of the alternator. Connect the (-) lead to good ground or the battery (-) terminal. Disconnect the alternator output wire from the alternator "B" terminal. Connect a DC ammeter (0 to 150A) in series between the "B" terminal and the disconnected output wire.Connect the (-) lead wire of the ammeter to the disconnected output wire. Connect the battery negative (-) terminal. Test Turn on the ignition switch and check to see that the voltmeter indicates the following value. Voltage : Battery voltage If it reads 0V, there is an open circuit in the wire between the alternator "B" terminal and the battery and the battery (-) terminal. Start the engine. Keep all lights and accessories off. Run the engine at a speed of

about 2,500 rpm and read the voltmeter when the alternator output current drops to 10A or less Result If the voltmeter reading doesn't agree with thestandard value, the voltage regulator or thealternator is faulty. Regulated Voltage : 11.7 - 15.3V If the voltmeter reading doesn't agree with thestandard value, the voltage regulator or thealternator is faulty. Disconnect the battery negative (-) terminal. Remove the voltmeter and ammeter. Connect the alternator output wire to the alternator "B" terminal. Connect the battery negative (-) terminal.

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- Turn ignition switch to "OFF".
- Connect a digital voltmeter between the "B" terminal of the alternator and ground. Connect the (+) lead of the voltmeter to the "B" terminal of the alternator. Connect the (-) lead to good ground or the battery (-) terminal.
- Connect a DC ammeter (0 to 150A) in series between the "B" terminal and the disconnected output wire.Connect the (-) lead wire of the ammeter to the disconnected output wire.
- Test Turn on the ignition switch and check to see that the voltmeter indicates the following value. Voltage : Battery voltage If it reads 0V, there is an open circuit in the wire between the alternator "B" terminal and the battery and the battery (-) terminal. Start the engine. Keep all lights and accessories off. Run the engine at a speed of about 2,500 rpm and read the voltmeter when the alternator output current drops to 10A or less
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- Start the engine. Keep all lights and accessories off.
- Run the engine at a speed of about 2,500 rpm and read the voltmeter when the alternator output current drops to 10A or less
- Result If the voltmeter reading doesn't agree with thestandard value, the voltage regulator or thealternator is faulty. Regulated Voltage : 11.7 - 15.3V If the voltmeter reading doesn't agree with thestandard value, the voltage regulator or thealternator is faulty. Disconnect the battery negative (-) terminal. Remove the voltmeter and ammeter. Connect the alternator output wire to the alternator "B" terminal. Connect the battery negative (-) terminal.
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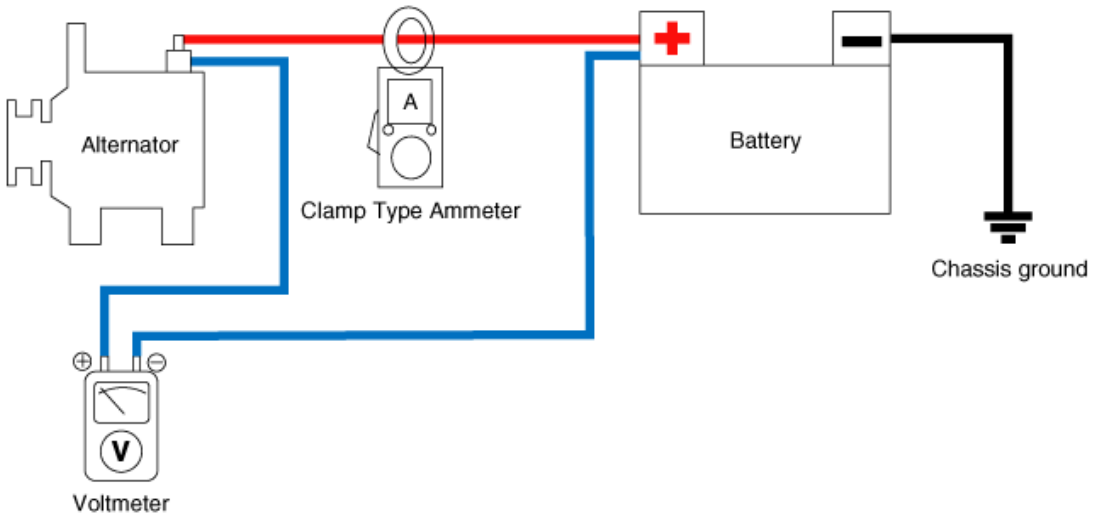
- If the voltmeter reading doesn't agree with thestandard value, the voltage regulator or thealternator is faulty.
- Remove the voltmeter and ammeter.

Electrical Specified Value Inspection (Using the Voltmeter and Clamp type Ammeter)

- Voltage Drop Test Of Alternator Output Wire This test determines whether or not the wiring between the alternator "B" terminal and the battery (+) terminal is good by the voltage drop method. Preparation Turn the ignition switch to "OFF". Install the clamp type ammeter between battery positive (+) and alternator "B" terminal. Connect the (+) lead wire of voltmeter to the "B" terminal of alternator and the (-) lead wire of voltmeter to the (+) terminal of battery. Test Start the engine. Turn on the headlamps and blower motor, and set the engine speed until the ammeter indicates 20A.And then, read the voltmeter at this time. Result The voltmeter may indicate the standard value. Standard value : 0.2V max If the value of the voltmeter is higher than expected (above 0.2V max.), poor wiring is suspected. In this case check the wiring from the alternator "B" terminal to the battery (+) terminal. Check for loose connections, color change due to an over-heated harness, etc. Correct them before testing again. Upon completion of the test, set the engine speed at idle.Turn off the headlamps, blower motor and the ignition switch.
- Preparation Turn the ignition switch to "OFF". Install the clamp type ammeter between battery positive (+) and alternator "B" terminal. Connect the (+) lead wire of voltmeter to the "B" terminal of alternator and the (-) lead wire of voltmeter to the (+) terminal of battery.

- Install the clamp type ammeter between battery positive (+) and alternator "B" terminal.
- Connect the (+) lead wire of voltmeter to the "B" terminal of alternator and the (-) lead wire of voltmeter to the (+) terminal of battery.



- Output Current Test This test determines whether or not the alternator gives an output current that is equivalent to the normal output. Preparation Prior to the test, check the following items and correct as necessary. Check the battery installed in the vehicle to ensure that it is good condition. The battery checking method is described in the section "Battery". The battery that is used to test the output current should be one that has been partially discharged. With a fully charged battery, the test may not be conducted correctly due to an insufficient load. Check the tension of the alternator drive belt. The belt tension check method is described in the section "Inspect drive belt". Turn off the ignition switch. Disconnect the battery negative (-) terminal. Install the clamp type ammeter between battery positive (+) and alternator "B" terminal. Connect a DC ammeter (0 to 150A) in series between the "B" terminal and the disconnected output wire. Be sure to connect the (-) lead wire of the ammeter to the disconnected output wire. Tighten each connection securely, as a heavy current will flow. Do not rely on clips. Connect a voltmeter (0 to 20V) between the "B" terminal and ground. Connect the (+) lead wire to the alternator "B" terminal and (-) lead wire to a good ground. Connect the battery negative (-) terminal. Leave the engine hood open. Test Check to see that the voltmeter reads as the same value as the battery voltage. If the voltmeter reads 0V, and the open circuit in the wire between alternator "B" terminal and battery (+) terminal or poor grounding is suspected. Start the engine and turn on the headlamps. Set the headlamps to high beam and the heater blower switch to HIGH, quickly increase the engine speed to 2,500 rpm and read the maximum output current value indicated by the ammeter. After the engine start up, the charging current quickly drops. Therefore, the above operation must be done quickly to read the maximum current value correctly. Result The ammeter reading must be higher than the limit value. If it is lower but the alternator output wire is in good condition, remove the alternator from the vehicle and test it. Limit value : Rated current 60% The nominal output current value is shown on the nameplate affixed to the alternator body. The output current value changes with the electrical load and the temperature of the alternator itself.Therefore, the nominal output current may not be obtained. If such is the case, keep the headlamps on the cause discharge of the battery, or use the lights of another vehicle to increase the electrical load. The nominal output current may not be obtained if the temperature of the alternator itself or ambient temperature is too high. In such a case, reduce the temperature before testing again. Upon completion of the output current test, lower the engine speed to idle and turn off the ignition switch Disconnect the battery negative (-) terminal. Remove the ammeter and voltmeter and the engine tachometer. Connect the alternator output wire to the alternator "B" terminal. Connect the battery negative (-) terminal.
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clamp type ammeter between battery positive (+) and alternator "B" terminal. Connect a DC ammeter (0 to 150A) in series between the "B" terminal and the disconnected output wire. Be sure to connect the (-) lead wire of the ammeter to the disconnected output wire. Tighten each connection securely, as a heavy current will flow. Do not rely on clips. Connect a voltmeter (0 to 20V) between the "B" terminal and ground. Connect the (+) lead wire to the alternator "B" terminal and (-) lead wire to a good ground. Connect the battery negative (-) terminal. Leave the engine hood open.
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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 electrical 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. For an accurate measurement of a vehicle parasitic current, all electrical 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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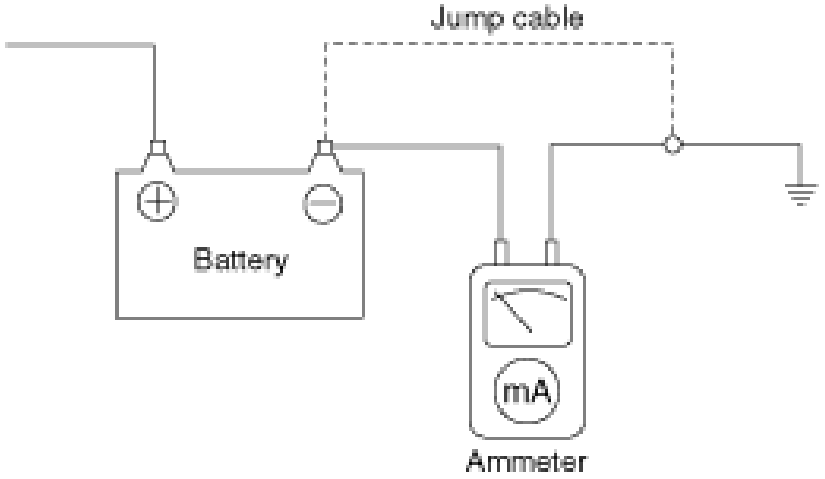
- Connect an ammeter in series between the battery (-) terminal and the ground cable, and then disconnect the clamp from the battery (-) terminal slowly. Be careful that the lead wires of an ammeter do not come off from the battery (-) terminal and the ground cable to prevent the battery from being reset. 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.
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.
- 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.



- 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 currentdraw circuit fuse only and search for suspectedunit by removing the component connected with thecircuit one by one until the parasitic draw dropsbelow limit value. Limit value (after 10 - 20 min.) : Below 50 mA
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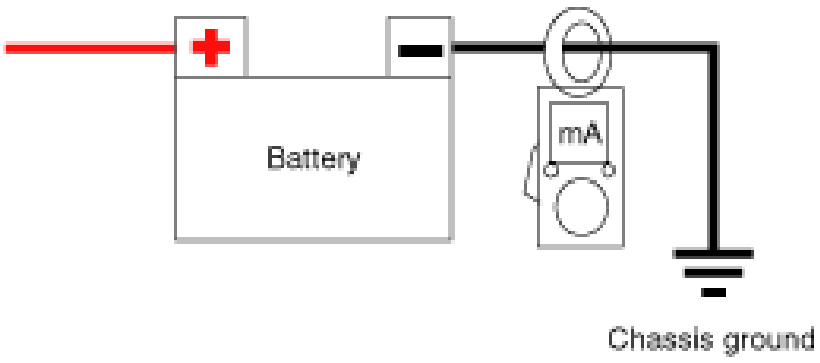
- Install the clamp type ammerter on battery negative (-) terminal.



Charging System - Troubleshooting (Article 44029)

- Troubleshooting

Symptom Suspect area Remedy

Charging warning indicator does not light with ignition switch "ON" and engine off. Fuse blown Check fuses

Light burned out Replace light

Wiring connection loose Tighten loose connection
Electronic voltage regulator Disconnect the voltage regulator to see if light turns off. If light turns off, replace voltage regulator.
Charging warning indicator does not go out with engine running. (Battery requires frequent recharging) Drive belt loose or worn Adjust belt tension or replace belt
Battery cable loose, corroded or worn Inspect cable connection, repair or replace cable
Electronic voltage regulator or alternator Disconnect the voltage regulator or alternator to see if light turns off. If light turns off, replace voltage regulator.
Wiring Repair or replace wiring
Overcharge Electronic voltage regulator Disconnect the voltage regulator to see if light turns off. If light turns off, replace voltage regulator.
Voltage sensing wire Repair or replace wiring
Discharge Drive belt loose or worn Adjust belt tension or replace belt
Wiring connection loose or short circuit Inspect wiring connection, repair or replace wiring
Poor grounding Inspect ground or repair
Worn battery Replace battery