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Section 05

ELECTRICAL

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OVERVIEW

GENERAL OPERATION INFORMATION

The electrical system consist of different sub-systems where some are inter-related:

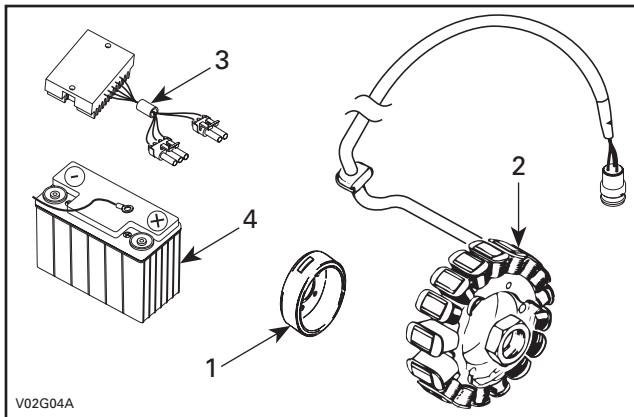
- charging system
- starting system
- ignition system
- accessories.

The following gives an outline of each components.

CHARGING SYSTEM

It is the source of electrical energy to charge the battery and keep it at a full state of charge. The magneto is coupled to the engine and it transforms magnetic field into electric current through a 3 phase, delta wound stator on 18 poles.

The magneto supplies unregulated AC current (alternative current) to the voltage regulator/rectifier.



1. Magneto flywheel
2. Stator
3. Voltage regulator/rectifier
4. Battery

Voltage Regulator/Rectifier

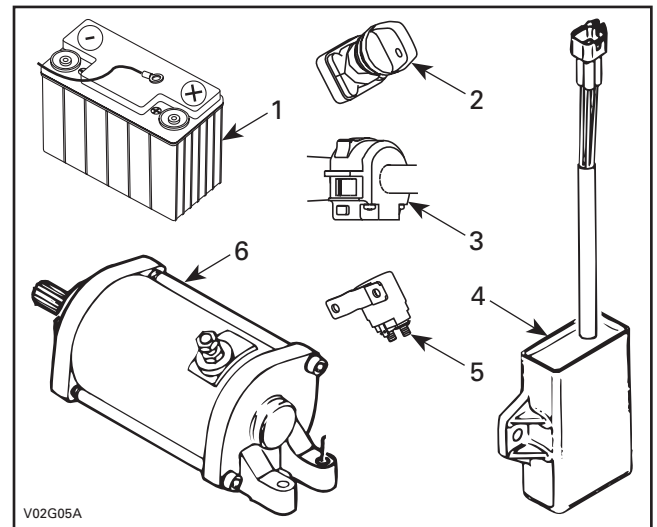
A 3-phase full-wave series-type voltage regulator/rectifier receives the AC voltage and rectifies (converts) it into DC. The voltage is also regulated to a maximum of 14.5 volts (DC).

Battery

The battery supplies the entire vehicle. Therefore, DC current only is used in the entire electrical system.

STARTING SYSTEM

When ignition switch is turned on and start button is pressed, a signal is sent to the starting solenoid. The battery then supply the starter through the starting solenoid to start the engine.



TYPICAL

1. Battery
2. Ignition switch
3. Start button
4. Electronic module
5. Solenoid
6. Electric starter

Engine can be started in any gear (from 1 to 5).

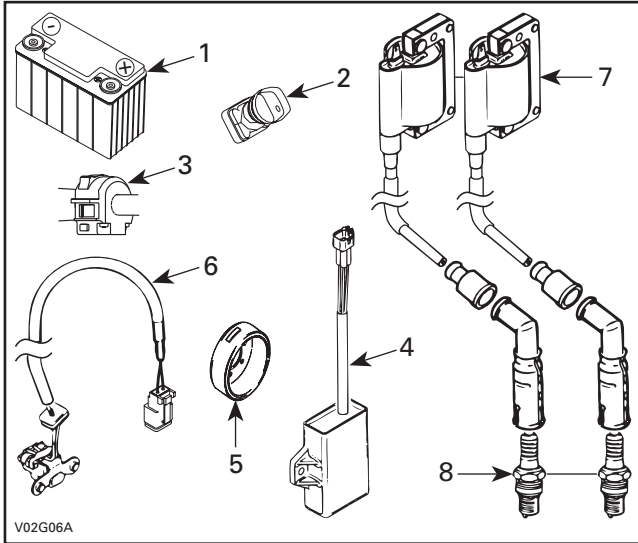
Transmission must be on NEUTRAL or pull in the clutch lever to allow engine starting.

Section 05 ELECTRICAL

Subsection 02 (OVERVIEW)

IGNITION SYSTEM

An CDI (Capacitor Discharge Ignition) system is utilized. The ignition system is made up of the following components:



TYPICAL

1. Battery
2. Ignition switch
3. Start button
4. Electronic module
5. Magneto flywheel
6. Trigger coil
7. Ignition coils
8. Spark plugs

Battery/Ignition Switch

The ignition switch allows battery to supply the electronic module for the ignition system.

Start Button

Besides enabling the starting system, the start button enables/disables the ignition system.

Magneto Flywheel/Trigger Coil

The magneto flywheel features one protrusion that are working with the trigger coil. The trigger coil sends the signals to the electronic module to be processed for the ignition system.

Ignition Coils/Spark Plugs

The ignition coil receives its signal from the electronic module. The ignition coil steps up the input voltage for the CDI system and the end result is firing of the spark plugs. It is two coils that provides a separate spark to each spark plug.

ACCESSORIES

The battery supplies the DC current to all accessories.

GENERAL TESTING/TROUBLESHOOTING INFORMATION

The following gives general electrical-related problems. For specific system-related problems, refer to proper system section.

It is possible that a component seems to operate in static condition but in fact, it is defective. In this case, the best way to solve this problem is to remove the original part and replace it with one which is in good condition.

IMPORTANT: When having to solve an electrical problem, the first thing to do is to check battery condition as well as its cables and connections. Also ensure the ignition switch is turned on. Check related-circuit fuse condition with an ohmmeter — visual inspection could lead to false results — and solidity (close to battery). Also visually examine harness and connections.

CAUTION: It is recommended to always disconnect the battery when replacing any electric or electronic parts.

To perform verifications, a good quality multimeter such as Fluke 73 (P/N 529 022 000) should be used.

Pay particular attention to ensure that pins are not out of their connectors or out of shape. The troubleshooting procedures cover problems not resulting from one of these causes.

WARNING

Ensure all terminals are properly crimped on wires and connector housings are properly fastened.

Before replacing any electric or electronic part(s), always check electrical connections. Make sure that they are very tight and they make good contact and that they are corrosion-free. The voltage and current might be too weak to go through dirty wire pins. Check carefully if posts show signs of moisture, corrosion or if they look dull. Clean pins properly and then coat them with silicon-based dielectric grease or other appropriate lubricant (except if otherwise specified) when reassembling them. See connectors information below.

It is recommended to always disconnect the battery when replacing the any electric or electronic part(s).

IMPORTANT: In usual electric circuit, the battery supplies a switch which then supplies the electric consumer. Therefore the switch opens and closes the positive side of the circuit. However, in our electrical system, the battery supplies the electric consumer then **the switch completes the circuit to the ground**. So the switch opens and closes the negative side of the circuit. Take this into account when troubleshooting the electrical system.

Pay attention to grounding wires.

Checking for Shorts Between 2 Wires

When checking continuity of a wire in a circuit, wires should be checked for short circuit as follows.

Make sure to isolate circuit wires by unplugging connectors.

Let's suppose that the circuit to be checked has a RED and a BLACK wire. Using an ohmmeter, measure the resistance between the RED and the BLACK wire. The resistance should be infinite (0 L). Otherwise, there is a short circuit between both wires. We must therefore identify and correct the fault.

FUSES LOCATION

If a fuse is damaged, replace it by one of the same rating.

CAUTION: Do not use a higher rated fuse as this can cause severe damage.

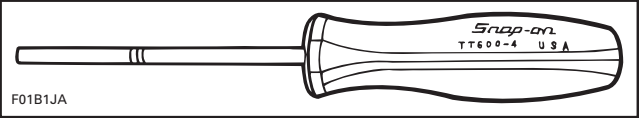
Fuses are located under seat, between engine and air box.



- 1. Fan (15 A)
- 2. Main (25 A)

SERVICING PACKARD CONNECTORS

To remove terminal from Packard connector housing, use Snap-on TT600-4 tool.

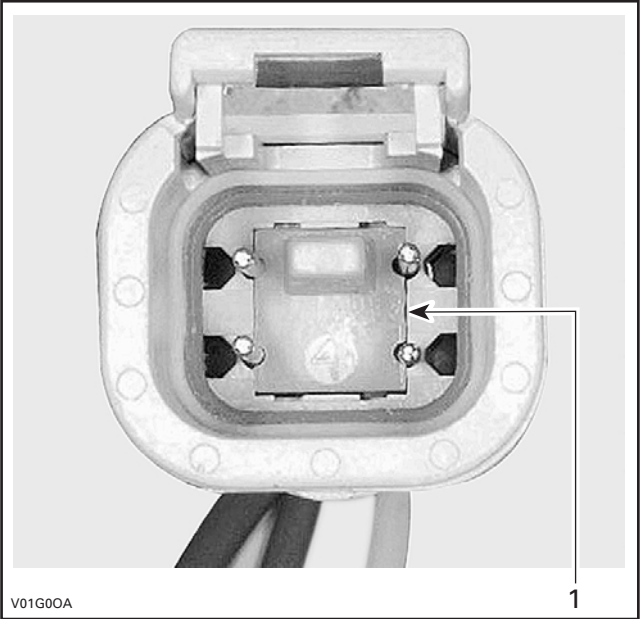


SERVICING DEUTSCH CONNECTORS

Waterproof Connector Housing
Female and Male Connector Housing

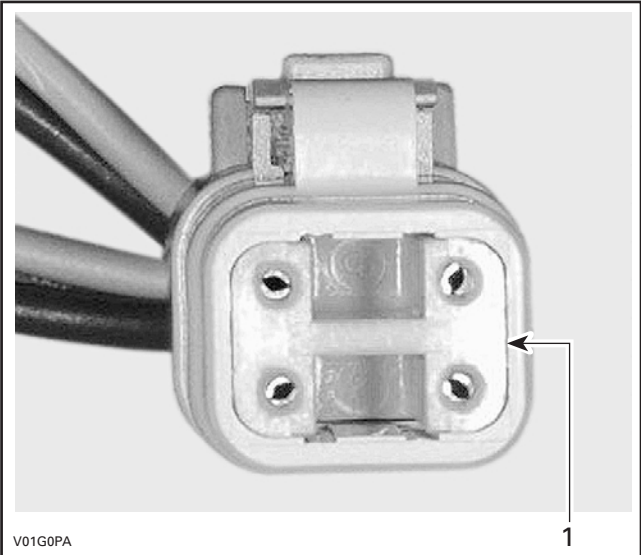
To remove:

- Using a long nose pliers, pull out the lock.



FEMALE HOUSING

- 1. Female lock

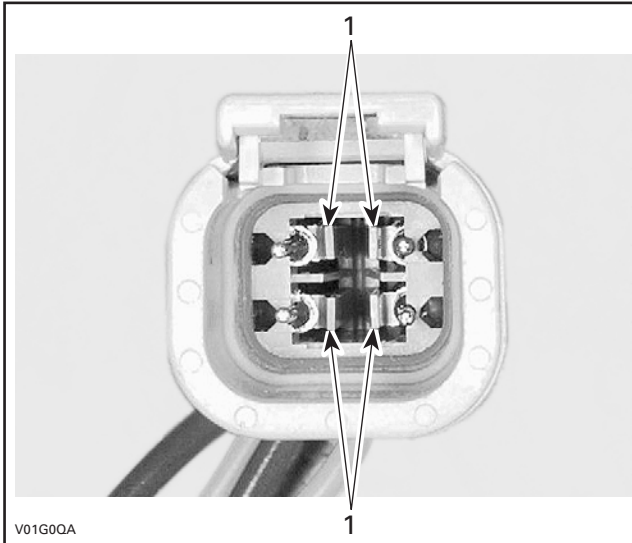


MALE HOUSING

- 1. Male lock

NOTE: Before extraction, push wire forward to relieve pressure on retaining tab.

- Insert a 4.8 mm (0.189 in) wide screwdriver blade inside the front of the contact cavity.
- Pry back the retaining tab while gently pulling wire back until contact is removed.



FEMALE CONNECTOR HOUSING

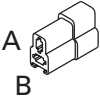
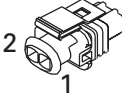
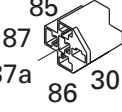
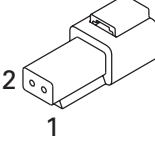
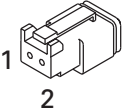
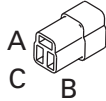
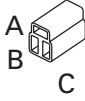
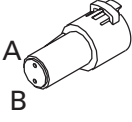
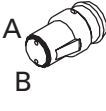
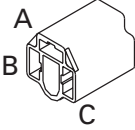
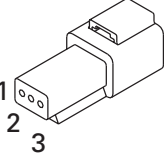
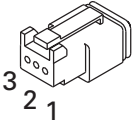
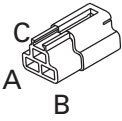
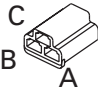
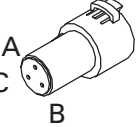
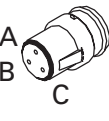
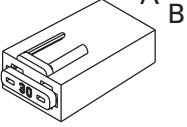
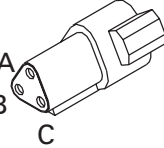
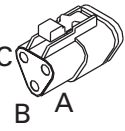
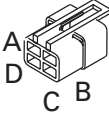
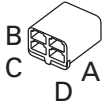
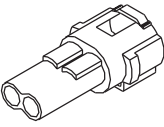
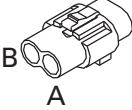
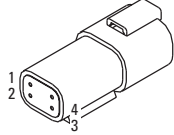
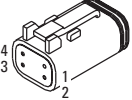
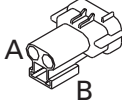
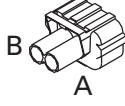
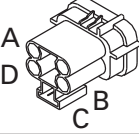
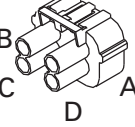
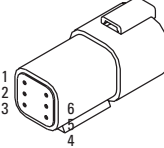
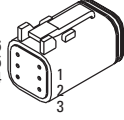
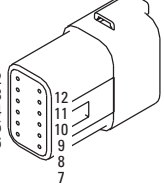
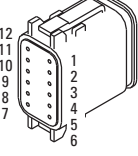
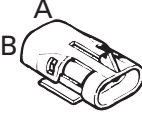
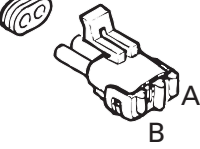
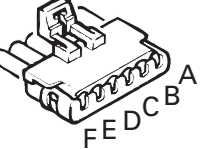
1. Retaining tab

To install:

- For insertion of signal contact, make sure the lock is removed.
- Insert contact into appropriate circuit cavity and push as far as it will go.
- Pull back on the contact wire to be sure the retention fingers are holding the contact.
- After all required contacts have been inserted, the lock must be installed.

CAUTION: Never apply dielectric grease on contacts in plug connector. The use of dielectric grease will make the seal swollen and move out of the connector. Do not lubricate.

IDENTIFICATION OF MAJOR CONNECTOR PINS

					DEUTSCH	
						
						
						
						
						
PACKARD						
						

V01G0ES

CHARGING SYSTEM

TESTING PROCEDURE

NOTE: First, ensure that battery is in good condition prior to performing the following test using a current inductive ammeter such as Snap-on MT 110.

If the battery is regularly discharged, check main (25 amp) fuse condition.

The voltage regulator/rectifier could be the culprit of a blown fuse. To check, simply disconnect the voltage regulator/rectifier from the circuit.

If the fuse still burns, check for a defective wire.

CAUTION: Do not use a higher rated fuse as this can cause severe damage.

Voltage Regulator/Rectifier

STATIC TEST: CONTINUITY

1. Due to internal circuitry, there is no static test available.

DYNAMIC TEST

Current Test

Proceed as follows:

- Start engine.
- Lay an inductive ammeter on positive cable of battery.
- Bring engine to approximately 3500 RPM.

Depending on battery charge, current reading should be approximately **5 amperes**. If not, check magneto output prior to concluding that voltage regulator/rectifier is faulty.

Voltage Test

Proceed as follows:

- Start engine.
- Connect a multimeter to battery posts. Set multimeter to Vdc scale.
- Bring engine to approximately 3500 RPM.

If multimeter reads over 15 volts, voltage regulator/rectifier is defective. Replace it.

NOTE: Whatever the voltmeter type used (peak voltage or RMS), the voltage must not exceed 15 V. A faulty voltage regulator/rectifier will allow voltage to exceed 15 V as engine speed is increased.

NOTE: If the battery will not stay charged, the problem can be any of the charging circuit components. If these all check good, you would be accurate in assuming the problem to be in the voltage regulator/rectifier.

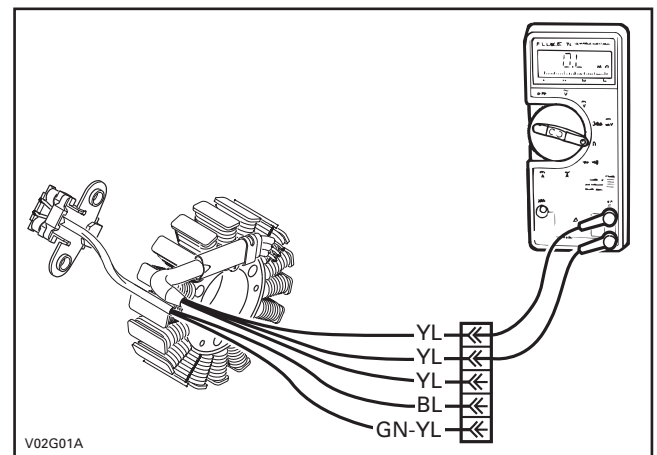
If there is no charging at the battery with the preceding voltage test, the following test can also be performed.

NOTE: If the voltage regulator/rectifier is within the specification, the wiring harness between the voltage regulator/rectifier and battery is defective. If the voltage regulator/rectifier is out of specification and the stator test good, the voltage regulator/rectifier is defective.

Stator

STATIC TEST: CONTINUITY

1. Disconnect the magneto wiring harness connector. With a good multimeter (preferably a digital one), place the 2 meter test probes onto the stator wire leads AC-1 and AC-2 of the stator. The resistance should be $0.3 \Omega \pm 0.2$.

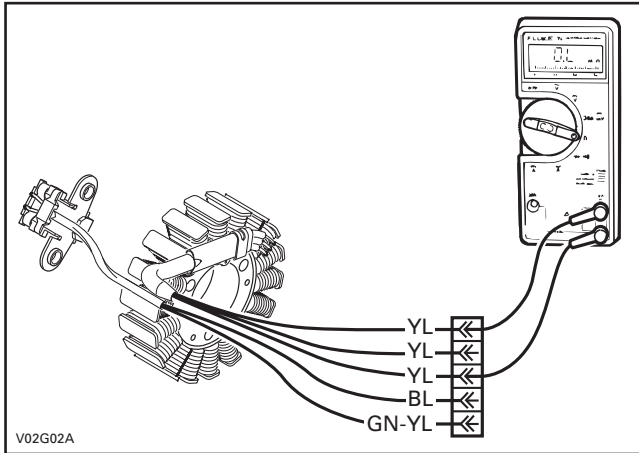


TYPICAL

Section 05 ELECTRICAL

Subsection 03 (CHARGING SYSTEM)

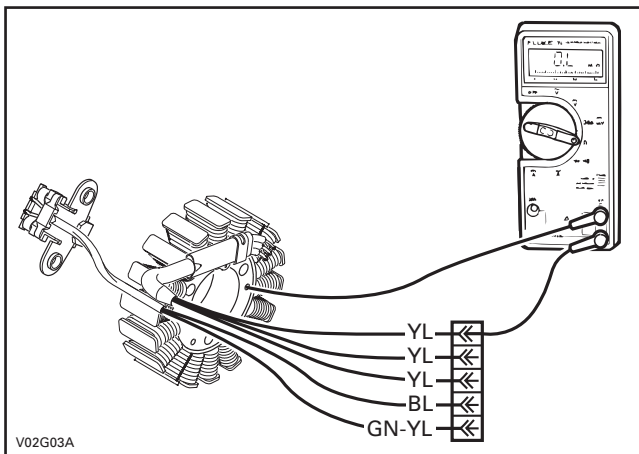
2. Place either meter test probe into the remaining stator lead (AC-3) and note the resistance (same as step no. 1). If the readings are out of specification, the stator will need to be replaced.



TYPICAL

STATIC TEST: INSULATION

With the stator leads disconnected, insert either meter test probe onto AC-1 and ground the other meter test probe to the engine or the stator iron core and note the reading. There should be no continuity (infinity) between the stator insulated coils and ground. If there is a reading, the stator coils and/or the wiring from the coils is grounded and needs to be replaced/repaired respectively.



TYPICAL

DYNAMIC TEST

1. Unplug magneto wiring harness connector.
2. On magneto side, connect test probes of the multimeter to two of the YELLOW wires.
3. Set multimeter to Vac scale.
4. Start engine. The obtained value should be between 10 and 12 Vac.
5. Repeat operation 3 times.
6. If the stator is out of specification, replace it.

Trigger Coil

STATIC TEST

NOTE: The trigger coil connector is located on the frame, near rearward of fuel tank.

Unplug the trigger coil connector.

Measure the resistance between BLUE and GREEN/YELLOW wires. The obtained value should be between 190 to 300 Ω .

If the resistance is out of specifications, change the trigger coil.

STARTING SYSTEM

BATTERY

TROUBLESHOOTING

SYMPTOM: DISCHARGED OR WEAK BATTERY	
CAUSE	REMEDY
1. Battery posts and/or cable terminal oxidized.	Clean and coat with dielectric grease.
2. Loose or bad connections.	Check wiring and connector cleanliness, damaged or short circuit.
3. Faulty battery (doesn't keep a full charge loose rectifier).	Replace.
4. Main system fuse burnt or faulty voltage regulator/rectifier.*	First check charging system. If it is in good condition replace fuse or rectifier.
5. Faulty charging system generator coil.*	Replace.

* To test charging system, refer to CHARGING SYSTEM.

BATTERY TESTING

There are 2 types of battery tests: unloaded and loaded. An unloaded test is made on a battery without discharging current. It is the simplest and commonly used. However, be aware that the voltage test can be good while the battery has not enough power to start the engine. A load test gives more accuracy of the battery condition.

Unload Test

Check charge condition using a multimeter.

With a multimeter, voltage readings appear instantly to show the state of charge. Always respect polarity. A fully charged battery will have a reading of 12.6 Vdc.

Load Test

This is the best test of battery condition under a starting load. Use a load testing device that has an adjustable load.

Apply a load of 3 times the ampere-hour rating of the battery. At 14 seconds into the test, check battery voltage; if battery is in good condition, it will have at least 10.5 Vdc.

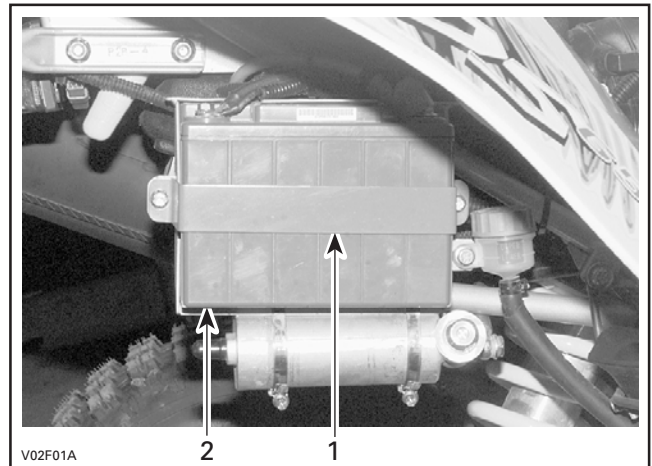
REMOVAL

Disconnect negative BLACK cable first then positive cable.

⚠ WARNING

Always respect this order for disassembly; disconnect BLACK negative cable first. Electrolyte or fuel vapors can be present in engine compartment and a spark may ignite them and possibly cause personal injuries.

Remove bolts retaining battery holder from rack.



1. Battery holder
2. Rack

CLEANING

Clean the battery casing, cables and battery posts using a solution of baking soda and water.

Remove corrosion (if so) from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water and dry well.

Section 05 ELECTRICAL

Subsection 04 (STARTING SYSTEM)

INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casing is damaged, replace battery and thoroughly clean battery rack with water and baking soda.

Inspect battery rack mounting.

Inspect battery posts for security of mounting.

BATTERY STORAGE

Disconnect and remove battery from the vehicle (see above).

The battery must always be stored in fully charged condition.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/N 413 701 700) or petroleum jelly on terminals.

Clean battery casing using a solution of baking soda and water. Rinse battery with clear water and dry well using a clean cloth.

Store battery on a wooden shelf in a cool dry place. Such conditions reduce self-discharging to a minimum.

ACTIVATION OF A NEW BATTERY

WARNING

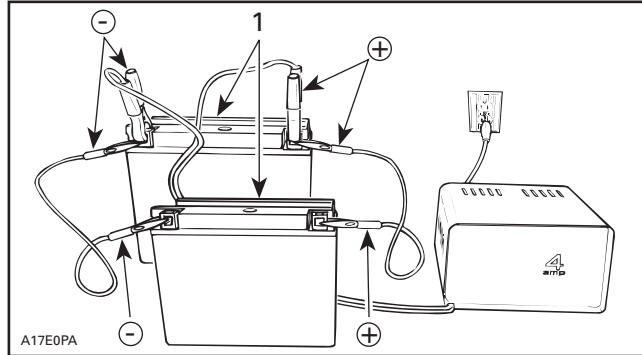
Never charge or boost battery while installed on vehicle.

1. Connect a 10 A battery charger for a few hours.
2. Disconnect battery charger.
3. Test battery state of charge. Use a multimeter.

NOTE: It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

CHARGING 2 OR MORE BATTERIES AT A TIME

Connect all positive battery posts together and use a charger with a capacity (rated) equal to number of batteries to be charged.



TYPICAL

1. Two batteries connected in parallel

INSTALLATION

Reinstall battery in vehicle. Fasten battery holder.

WARNING

Connect positive RED cable first then negative cable. Always connect RED positive cable first.

STARTING SYSTEM TROUBLESHOOTING

SYMPTOM	CAUSE	REMEDY
Starter does not turn.	Ignition switch is in the OFF position.	Turn switch in the ON position.
	Engine stop switch is in the OFF position.	Place the engine stop switch to run position.
	Burnt fuse.	Check main fuse and wiring condition.
	Transmission is not set on Neutral.	Set transmission in Neutral or squeeze the clutch lever.
	Poor contact of battery terminal(s) or ground cable connections.	Clean and tighten terminal(s).
	Weak battery.	Recharge battery.
	Poor contact or open circuit of: start button, engine stop switch, ignition switch or starting solenoid.	Check and replace defective part.
	Neutral switch is defective.	Check neutral switch and wiring condition.
	Clutch switch is defective.	Check clutch switch and wiring condition.
	Electronic module is defective.	Check wiring. Change electronic module.
	Engine mechanical problem (ensure that other electric components are good).	Check and replace defective part.
Starter turns; but does not crank the engine.	Poor contact of battery terminal(s).	Clean and tighten terminal(s).
	Poor battery ground cable connection.	Clean and tighten.
	Burnt or poor contact of solenoid switch contact disc.	Replace starting solenoid.
	Poor contact of brush.	Straighten commutator and brush or replace electric starter.
	Burnt commutator.	Turn commutator in a lathe or replace electric starter.
	Worn commutator segments.	Undercut mica or replace electric starter.
	Shorted armature.	Replace electric starter.
	Weak brush spring tension.	Replace electric starter.
	Weak magnet.	Replace electric starter.
	Worn bushings.	Replace electric starter.
	Weak battery.	Recharge or replace battery.
Starter turns, but overrunning clutch pinion does not mesh with ring gear.	Worn clutch pinion gear.	Replace electric starter.
	Defective clutch.	Replace electric starter.
	Poor movement of clutch on splines.	Replace electric starter.
	Worn clutch bushing.	Replace electric starter.
	Worn ring gear.	Recharge ring gear.
Starter motor keeps running.	Shorted starting solenoid switch winding.	Replace starter solenoid.
	Melted solenoid contacts.	Replace starter solenoid.
	Sticking or defective starter clutch.	Lubricate or replace electric starter.

STARTING SYSTEM TESTS

GENERAL

First ensure the problem is not related to engine mechanical components. Otherwise, test the starting system.

Causes of troubles are not necessarily related to starter but may be due to a burnt fuse faulty battery, start button, ignition switch, engine stop switch, starting solenoid, electrical cables or connections or the electronic module.

Check these components before removing starter. Consult also the **Starting System Troubleshooting** table above for a general view of possible problems.



WARNING

Short circuiting electric starter is always a danger, therefore disconnect the battery ground cable before carrying out any kind of maintenance on starting system. Do not place tools on battery.

Fuses

Make sure the main fuse is in good condition. If the fuse tests good, continue the other tests.

Battery

To check battery condition, refer to **Battery** above. If it tests good, continue the other tests.

Ignition Switch

A quick test to validate it is working. Turn the ignition switch ON then place the headlight switch in ON position. If the lights turn on, the ignition switch is good. Otherwise, refer to IGNITION SYSTEM for testing procedure. If it tests good, continue the other tests.

Engine Stop Switch

If engine does not turn when placing engine stop switch to RUN and pressing the start button, test the engine stop switch as follows.

Remove the front facia and unplug the multi-function switch connector.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch to OFF	BLACK and BLACK/WHITE	1 Ω max.
Switch to RUN		Infinite (0.L)

Replace multi-function switch if defective.

If switch tests good, check wiring. If it tests good, continue the other tests.

Start Button

If engine does not turn when pressing the start button, test the switch as follows.

Remove the front facia and unplug the multi-function switch connector.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch released	RED/VIOLET and YELLOW/RED	Infinite (0.L)
Switch depressed and held		0.6 Ω max.

Replace multi-function switch if defective.

If switch tests good, check wiring going to electronic module. If it tests good, continue the other tests.

Starting Solenoid

NOTE: Solenoid is located on frame, behind battery rack.

Ensure the solenoid receives electric current as follows. Using a multimeter, measure the voltage between the following wires when pressing the start button with the ignition key turned ON and the engine stop switch to RUN.

WIRE COLOR	CONNECTOR		VOLTAGE
BLACK	Position B	On wiring connecting to solenoid	12 Vdc
	—	Battery ground post (-)	

If solenoid does not properly receive current, the electronic module can be suspected. See **Electronic Module** section below.

If solenoid receives current, test the solenoid as follows.

Disconnect large cables from solenoid.

Inspect connections and clean as necessary. Solenoid condition can be checked with an ohmmeter. Install test probes on large connectors of solenoid. Measure resistance when current is applied to small connectors; if it is more than a few ohms, replace solenoid.

If solenoid test good, check the electric starter. If starter test good, the electronic module can be suspected. See **Electronic Module** below.

Electrical Cables or Connections

Check all connections, cables and wires. Tighten any loose cables. Replace any chafe wires/cables.

If wiring and connectors are good, check the electric starter. See below.

Electric Starter

Using boosting cables, carefully supply current from the battery directly to the starter. Connect the BLACK negative cable first. Then connect the remaining jump cable from the battery then to the starter.

If starter now turns ensure the cables/connections from battery to solenoid and to starter are in good condition. If they test good, the electronic module can be suspected. See **Electronic Module** below.

If starter does not turn, check for mechanical problems in the starter.

Electronic Module

When other components have been tested above and are good, the electronic module can be suspected. Ensure wiring and connectors are in good condition prior to replacing the electronic module.

ELECTRIC STARTER

REMOVAL

Turn OFF ignition switch.

Disconnect BLACK cable ground connection from battery.

WARNING

Always disconnect ground cable first and reconnect last.

Disconnect RED cable connection from battery.

Clean starter area.

Remove starter mount screws.

Pull starter out.

INSTALLATION

Installation is essentially the reverse of removal procedure. However, pay particular attention to the following.

Make sure that starter and engine mating surfaces are free of debris. Serious trouble may arise if starter is not properly aligned.

Torque starter screws to 10 N•m (89 lbf•in).

Connect the RED battery cable to the starter and torque nut to 6 N•m (53 lbf•in). Apply dielectric grease on terminal and nut.

First connect RED cable to battery then connect the BLACK cable.

WARNING

Always connect RED positive cable first then BLACK negative cable last. Whenever connecting the RED positive cable to the starter motor make sure the battery cables are disconnected to prevent electric shock.

Test starter operation.

IGNITION SYSTEM

IGNITION SYSTEM TESTING PROCEDURE

GENERAL

Ignition Problems

When dealing with ignition problems, the following items should be checked in this order. After one item has been checked and it is found not to be the problem, continue with the next item:

1. main fuse condition
2. spark occurrence
3. battery condition
4. ignition switch
5. trigger coil
6. ignition coil
7. electronic module.

Intermittent Ignition Problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

In most cases of temperature and/or vibration failure, only parts replacement might solve the problem as most of these failures return to normal when engine is not running.

Multiple Problems

There is always the possibility of more than one faulty part. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other faulty part.

IGNITION SYSTEM TEST

Safety Precautions

WARNING

To prevent powerful electric shocks while cranking engine, neither touch any electronic ignition components (ignition coil, high tension wire, wire harness, etc.) nor tester lead clips. Also make sure that tester leads do not touch any metallic object.

Main Fuse Condition

Check main fuse condition. Replace burnt fuse as necessary.

Spark Occurrence

Remove one spark plug and connect to its cable. While holding the spark plug against a metallic part of the engine, start the engine. Look for a spark at the spark plug tip. Proceed the same with the other spark plug. Replace defective spark plug.

NOTE: If a spark plug is found defective, replace both spark plugs at the same time.

Both spark plugs must be checked individually. If one works and the other isn't, try another spark plug.

Keep in mind that a spark plug might test good this way while not being able to work properly under combustion chamber mixture and pressure.

If known good spark plug(s) do(does) not work, continue the other tests.

NOTE: Spark occurrence can be checked with a tester such as Superex Canada Ltd P/N 15-785 or the equivalent.

Battery Condition

A battery must be present in the vehicle to allow the ignition system to work. Also, at least 8 V is required for proper operation. Check battery voltage.

Ignition switch

A quick test to validate it is working. Turn the ignition switch ON then place the headlight switch in ON position. If the headlight turn on, the ignition switch is good.

Test

Disconnect ignition switch.

Measure voltage between RED supply wire and the battery ground. If voltage is lower than battery voltage, test the wiring. If voltage is good, test switch.

Use a multimeter and measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
OFF	WHITE and BROWN	Infinite (0.L)
ON	WHITE and BROWN	0.6 Ω max.

Replace switch if defective.

If switch is good, continue the other tests.

Trigger Coil Voltage Testing

NOTE: The trigger coil is not adjustable.

STATIC TEST: CONTINUITY

Check resistance with a high-sensitivity ohmmeter.

1. Disconnect the Deutsch 2-pin connector.
2. Connect multimeter probes to the GREEN/YELLOW wire and to the BLUE wire.
3. Measure resistance; it should be between 190 - 300 ohms.

DYNAMIC TEST

1. Disconnect the Deutsch 2-pin connector.
2. Connect one of the multimeter probes to the GREEN/YELLOW wire and the other to the engine, then bring selector switch to **V** and scale to 00.0^{Vac}.
3. Press START button, note result. The obtained value should be between 0.4 and 0.7 Vac. Repeat operation 3 times.
4. If the trigger coil is out of specification, replace it. If it tests good continue the other tests.

Ignition Coil

NOTE: An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter. Replacing the ignition coil may be necessary as a test.

Primary Winding

Disconnect the wire connector on the primary side of the ignition coil.

Using a multimeter, check the resistance between the terminal and the ignition coil body ground.

The resistance should be between 0.2 and 0.5 Ω at 20°C (68°F).

If not within specification, replace the ignition coil.

If the ignition coil test good, check the power supply on the electronic module.

There should be 12 Vdc between the RED/VIOLET and BLACK/WHITE wires while starting the engine.

If there is no voltage, either the electronic module or the wiring harness is defective.

Secondary Winding

Due to the integrated diode, it is not possible to take any resistance measurement.

The output voltage should not be less than 12 kV (12 000 V).

The ignition coil outlet caps and the spark plug caps include a resistance. They should be checked prior to replacing a suspected ignition coil.

Measure resistance between ignition coil terminals and spark plug caps. The obtained value should be between 6 and 13 KΩ. If resistance is good, continue check. If not, change spark plug wires.

DYNAMIC TEST

An ignition coil tester available from after-market tool/equipment suppliers can be used.

CAUTION: Do NOT use coil tester on metal work bench. Follow manufacturer instructions.

If the ignition coil is out of specification, replace it. If it tests good ensure the wiring and connectors are in good condition then continue the other tests.

Electronic Module

When every other components above have been tested and are good, the electronic module can be suspected. Ensure wiring and connectors are in good condition prior to replacing the electronic module.

TEST

NOTE: On the multimeter, set measuring range from 1 K Ω – 10 K Ω . Make sure that positive and negative tester probes are installed on the appropriate wires.

	COLORS	NEGATIVE (-) TESTER LINE				
		BL	WH	OR	RD	BK
POSITIVE (+) TESTER LINE	BL		O	O	O	O
	WH	O		O	O	O
	OR	X	Δ		Δ	X
	RD	O	O	O		O
	BK	O	O	O	O	

SYMBOLS:

O: Open circuit, value/pointer change continuously

X: No open circuit, value/pointer do not register any change

Δ : Value/pointer changer and move to ∞

If a fault is detected, the electronic module must be replaced.

IGNITION TIMING

It is impossible to check the ignition timing with a timing lamp because there is no access window or mark.

Section 05 ELECTRICAL

Subsection 05 (IGNITION SYSTEM)

SPARK PLUG

DISASSEMBLY

First unscrew the spark plug one turn.

Clean the spark plug and cylinder head with pressurized air then completely unscrew.

HEAT RANGE

The proper heat range of the spark plugs is determined by the spark plugs ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be and inversely, the shorter the heat path, the colder the operating temperature will be.

A "cold" type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The "hot" type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.

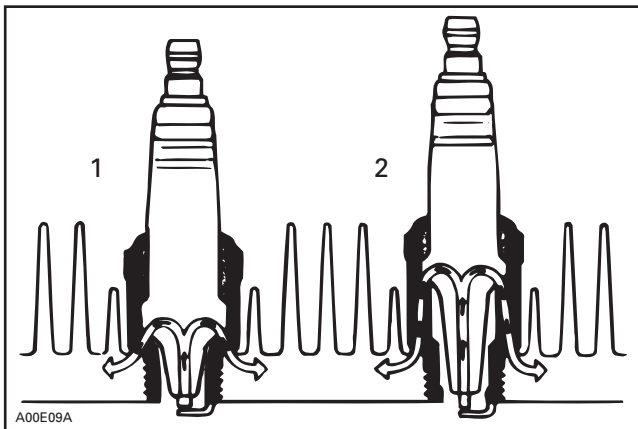
A too "hot" plug will result in overheating pre-ignition, etc.

A too "cold" plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling or low-speed riding, or running on a too rich mixture due to abuse of choke, a clogged air filter, a faulty carburetor adjustment, incorrect fuel, defective ignition system, incorrect ignition timing, incorrect spark plug gap, lubricating oil entering the combustion chamber, or too cold spark plug. The plug face of a fouled spark plug has either a wet black deposit or a black carbon fouling. Such coatings form a conductive connection between the center electrode and ground.

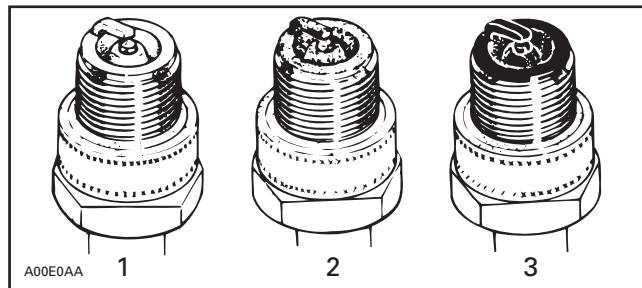
SPARK PLUG ANALYSIS



TYPICAL

1. Cold
2. Hot

CAUTION: Severe engine damage might occur or major plastic parts might melt if a wrong heat range plug is used.



TYPICAL

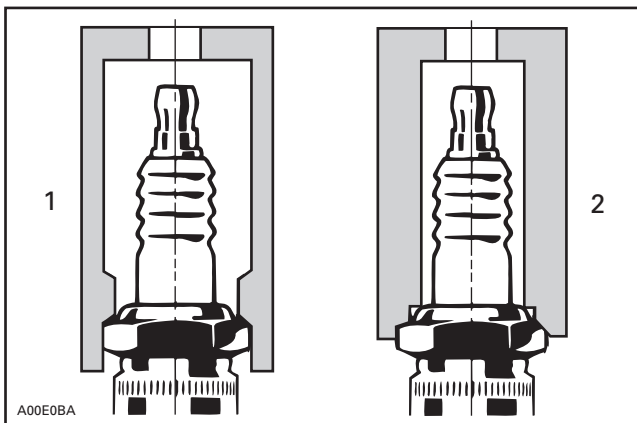
1. Overheated (light grey, white)
2. Normal (light brown, brown)
3. Fouled (black, wet or dry, dark deposits, grey, melted coating)

The plug face reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber).

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

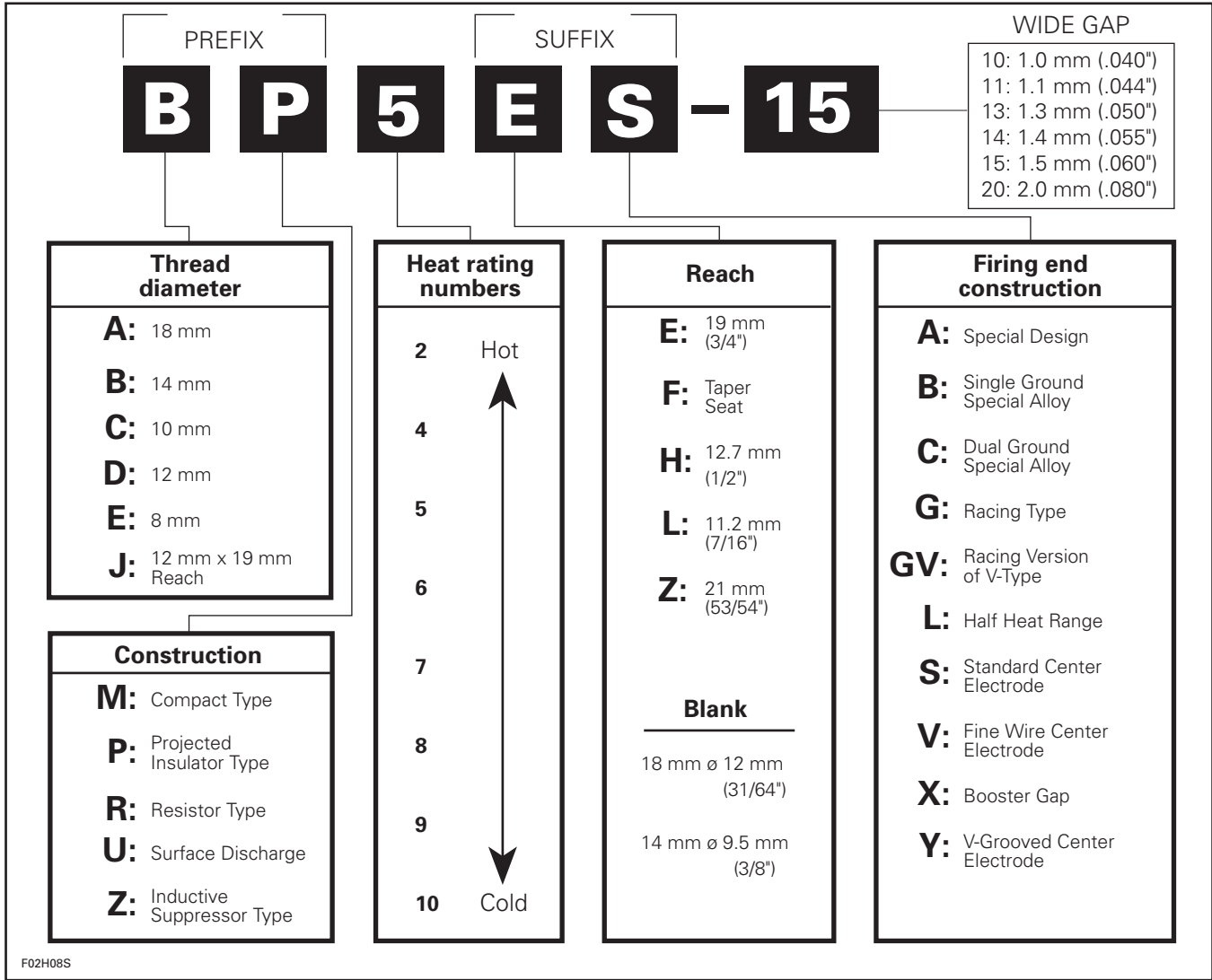
1. Using a wire feeler gauge, set electrode gap according to the following chart.
2. Apply anti-seize lubricant over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. *Proper socket*
2. *Improper socket*

4. Torque spark plug to 20 N•m (15 lbf•ft).

NGK SPARK PLUG SYMBOL EXPLANATION



ACCESSORIES

REMOVAL AND INSTALLATION

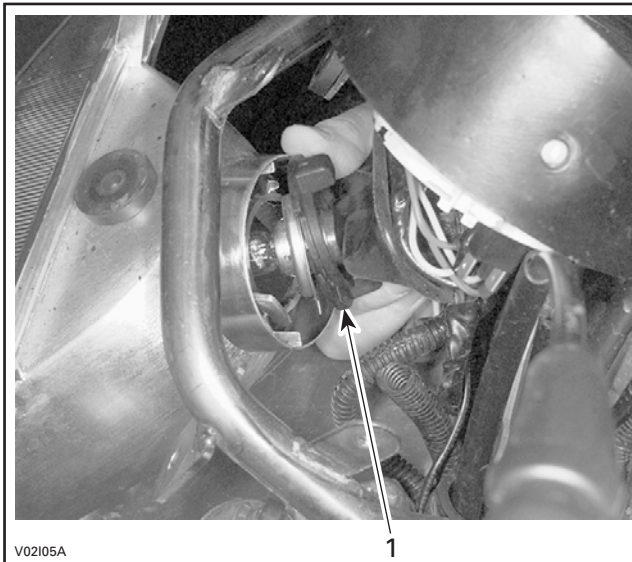
CAUTION: It is recommended to always disconnect the battery when replacing any electric or electronic parts.

HEADLIGHT

If the Headlight Bulb is Burnt

Remove front facia and dashboard.

Remove rubber boot and turn counterclockwise bulb retaining ring.



1. Retaining ring

Detach bulb and replace.

Properly reinstall removed parts in the reverse order of their removal.

CAUTION: On applicable models, never touch glass portion of an halogen bulb with bare fingers, it shortens its operating life. If glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

Removal

Remove front facia and dashboard. Refer to BODY. Unscrew the bolts retaining headlight then unplug the connector.

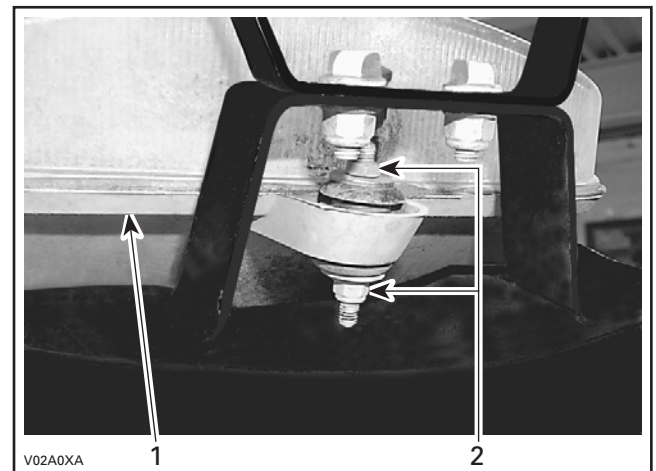
Installation

Properly reinstall removed parts in the reverse order of their removal.

Adjustment

Adjust beam aiming as follows:

Turn nuts to adjust beam height orientation as explained below.



1. Headlight
2. Beam height adjustment

HEADLIGHT BEAM AIMING

Select **high** intensity.

Beam aiming is correct when center of high beam is 131 mm (5 in) below the headlight horizontal center line, scribed on a test surface, 5 m (17 ft) away.

NOTE: Sit down the driver or place the same weight on the vehicle.

Measure headlight center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 131 mm (5 in) below scribed line.

Section 05 ELECTRICAL

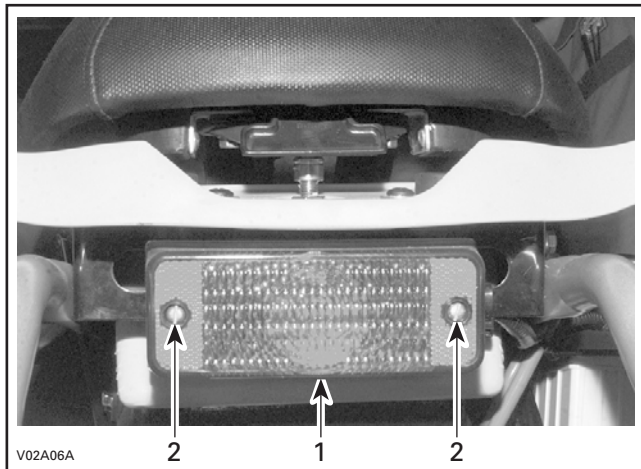
Subsection 06 (ACCESSORIES)

Taillight Bulb Replacement

Unscrew lens screws to expose bulb.

Push bulb in and hold while turning counterclockwise to release.

Install the new bulb by first pushing in while turning clockwise.



- 1. Lens
- 2. Screws

IGNITION SWITCH

Test

Refer to IGNITION SYSTEM.

Removal

Lift the dashboard and unscrew the ignition switch nut.

Unplug the switch connectors.

Installation

For the installation, reverse the removal procedure.

INDICATOR LIGHTS

Test

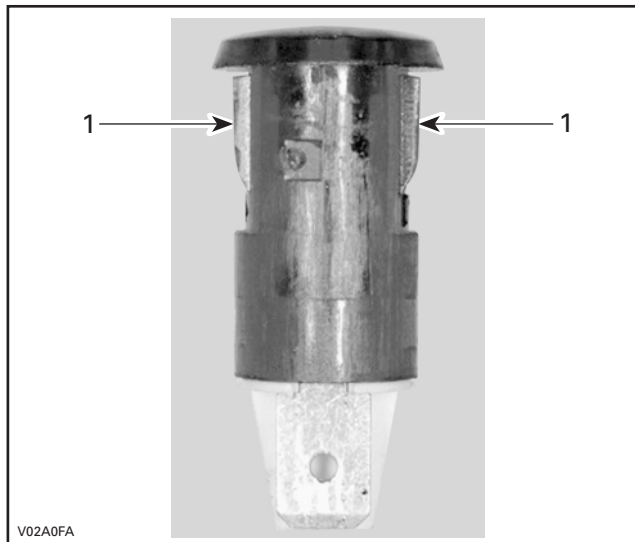
Refer to TESTS section.

Removal

Remove dashboard.

Unplug wires on indicator lamp.

Press both tabs then push indicator lamp out of hole.



- 1. Tabs

Installation

For the installation, reverse the removal procedure.

NOTE: The LED have polarity. Make sure to reconnect the RED/VIOLET wire on the positive (+) tab.

TESTS

COOLING FAN OPERATION TEST

Unplug the temperature sender connectors.
Install a jumper wire end in each connector. Turn key ON. Replace the fan if it does not work.

HEADLIGHT

Using a multimeter, measure the voltage between GREEN and BLACK wires at LOW beam and between BLUE and BLACK wires at HI beam.

Start the engine. The obtained value should be between 12 and 14.5 Vdc.

- No voltage:
 - Check wiring condition and HI-LO switch.
- Voltage is good:
 - Change headlight.

MULTI-FUNCTION SWITCH

Unplug connector located near oil tank, under front facia.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch OFF	RED/VIOLET and GREEN	Infinite (0.L)
Switch OFF	RED/VIOLET and BLUE	Infinite (0.L)
Switch to LO	RED/VIOLET and GREEN	0.4 Ω max.
Switch to HI	RED/VIOLET and BLUE	0.4 Ω max.

Replace switch if defective.

INDICATOR LIGHTS

Remove steering cover.

Neutral Indicator Light (GREEN)

Unplug the neutral indicator light connectors.
With the RED probe of the multimeter to the positive (+) connector on the LED and the black probe to the other connector.

Select the testing diodes/continuity function on the multimeter.



NOTE: Do not use Ω function to check LED.
The measure should be between 1.6 and 2.0.

- LED is good:
 - Check wiring condition.
 - Check neutral switch. Refer to TRANSMISSION.
- LED is burned:
 - Change indicator light.

Engine Indicator Light (RED)

Unplug the neutral indicator light connectors.
Test LED with a multimeter.

- LED is good:
 - Check wiring condition.
 - Check oil sensor. Refer to LUBRICATION SYSTEM.
 - Check temperature sensor. Refer to COOLING SYSTEM.
- LED is burned:
 - Change indicator light.