

19. STARTER SYSTEM



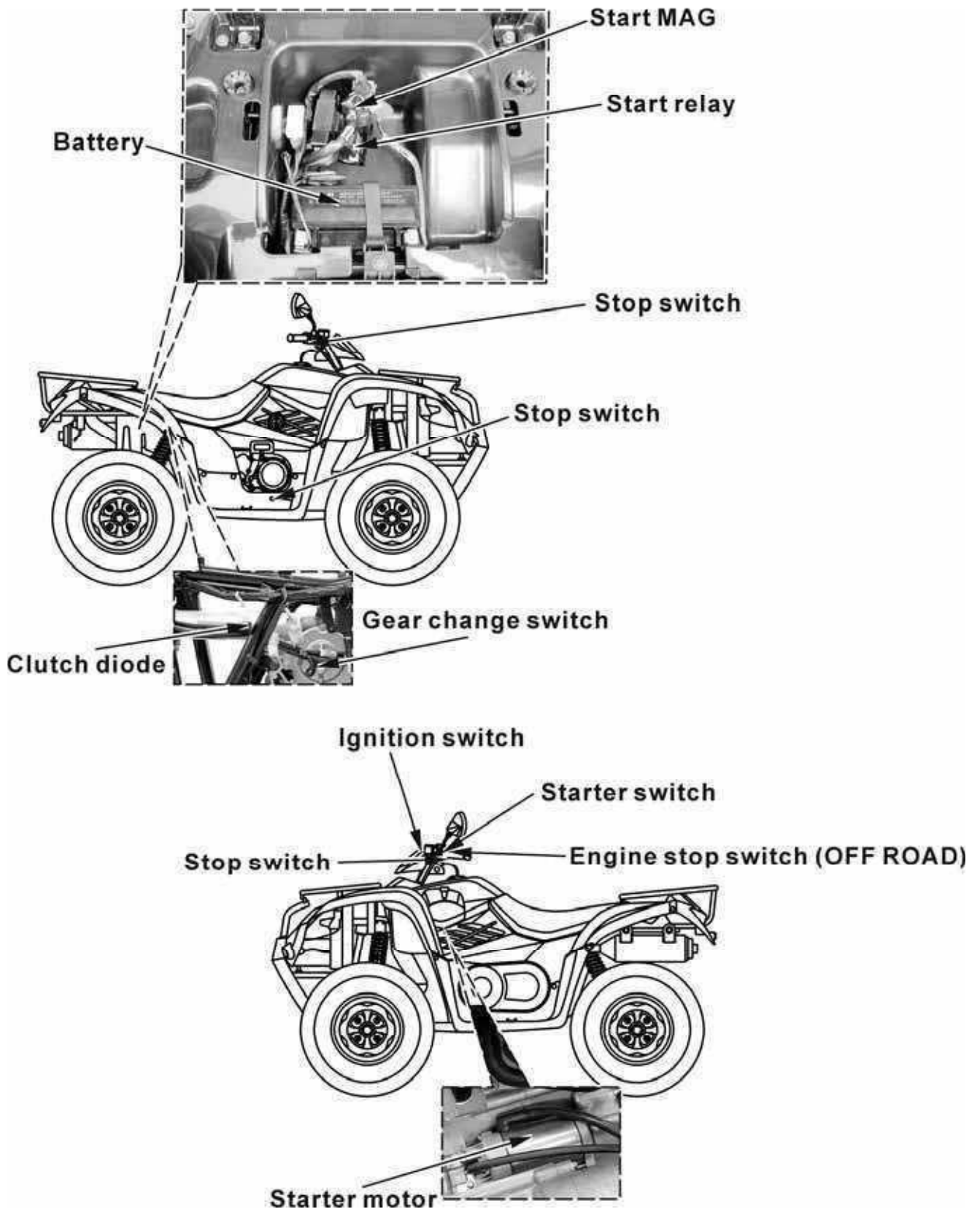
STARTER SYSTEM

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STARTING SYSTEM LAYOUT



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SERVICE INFORMATION

GENERAL

- Always turn the ignition switch to “OFF” before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 20 for following components:
 - ™ Ignition switch
 - ™ Starter switch
 - ™ Brake light switch

SPECIAL TOOL

Flywheel puller A120E00060

TORQUE

Starter pulley nut 5.5 kgf-m (55 N-m, 40 lbf-ft)

TROUBLESHOOTING

- Check for the following before troubleshooting:
 - Blown main fuse (30A) and sub fuse (15 A)
 - Loose battery and starter motor cable
 - Discharged battery
- The starter motor can turn with the following conditions:
 - Ignition switch ON
 - Engine stop switch in RUN (OFF ROAD)
 - Rear brake lever fully squeezed
 - Starter switch pushed

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STARTER MOTOR

INSPECTION

Disconnect the starter motor cable from the starter MAG.
Turn the ignition switch to “ON”.
Connect the starter motor cable directly to the battery positive terminal.
If the starter motor does not turn, the starter motor is faulty.

Starter Motor Cable



REMOVAL

Remove the carburetor (refer to the “CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION” section in the chapter 5).

Turn the ignition switch turned to “OFF”

Remove the two mounting bolts and starter motor.

Release the rubber cap and remove the terminal nut to disconnect the starter motor cable from the starter motor.

Rubber Cap



Bolts

Nut

INSTALLATION

Coat a new O-ring with engine oil and install it into the starter motor groove.

Connect the starter motor cable to motor terminal with the terminal nut and tighten it.

Install the starter motor into the crankcase.

Install the two mounting bolts and tighten them securely.

O-ring



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STARTER RELAY SWITCH/STARTER MAG

INSPECTION

Turn the ignition switch to “ON”.

Squeeze the brake lever or pedal fully.
The coil is normal if the starter relay switch clicks.

Squeeze and hold the brake lever or pedal fully then push the starter switch.
The coil is normal if the starter MAG switch clicks.

If you do not hear the switch click. Inspect the relay switch and starter MAG using the procedure below.

GROUND LINE INSPECTION

Disconnect the starter relay switch connector.
Check for continuity between the Green wire terminal and ground.

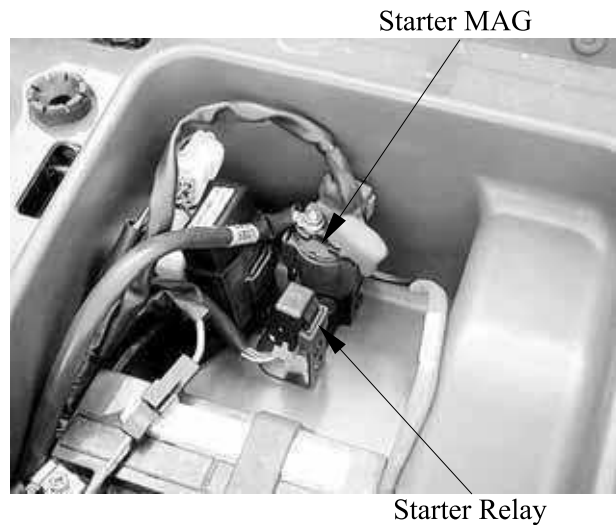
There should be continuity.

VOLTAGE INSPECTION

Connect the starter MAG connector.
Turn the ignition switch ON.

Measure the starter MAG Yellow/Red wire terminal and ground.

If the battery voltage appears only when the rear brake lever is squeezed fully (or the gear change switch in neutral) and starter switch is pushed, the circuit is normal.



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CONTINUTY INSPECTION

Disconnect the starter MAG switch connector and cables.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Yellow/Green wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



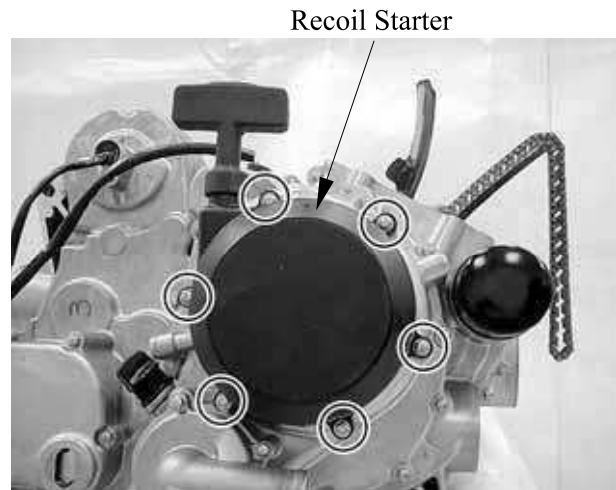
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RECOIL STARTER REMOVAL/INSPECTION/ INSTALLATION

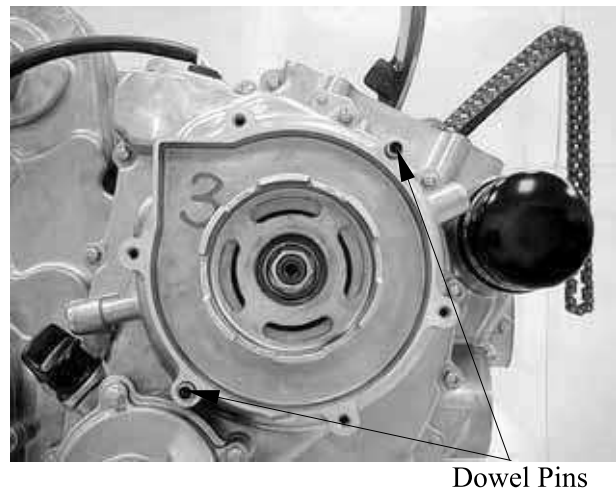
The recoil starter can not start the engine when the battery is removal.

REMOVAL

Remove the six bolts, then remove the recoil starter assembly.

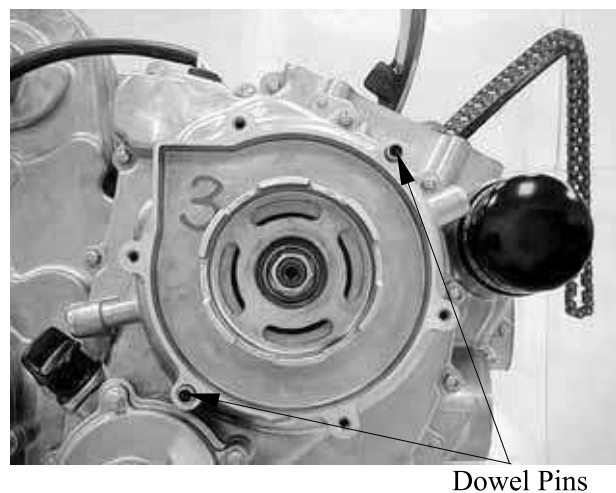


Remove the two dowel pins.



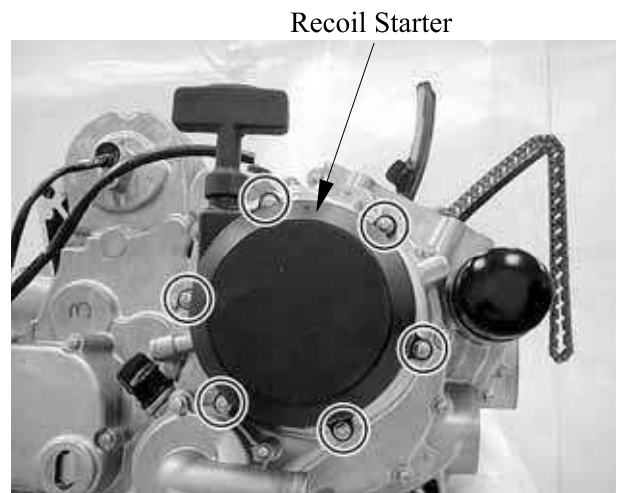
INSTALLATION

Install the dowel pins.



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Install the recoil starter assembly.
Install and tighten the six bolts diagonally.



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RECOIL STARTER HANDLE REPLACE

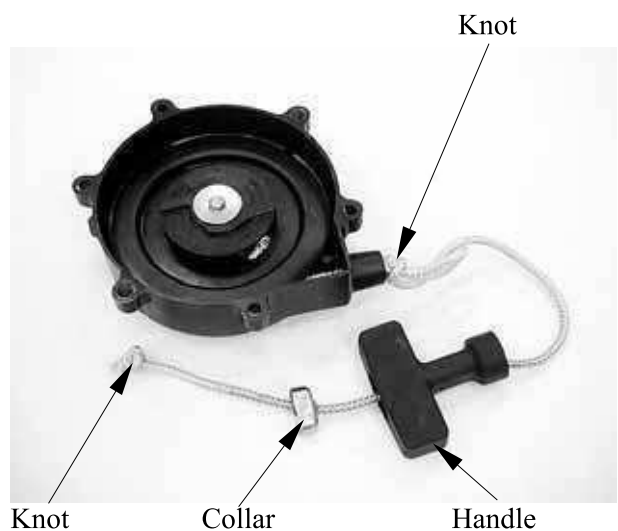
Remove the recoil starter assembly (refer to the “RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION” section in this chapter).

Remove the cap on the handle.



Replace the handle.

Before untying the knot above the starter handle, make a knot in the rope so that the rope is not pulled into the housing.



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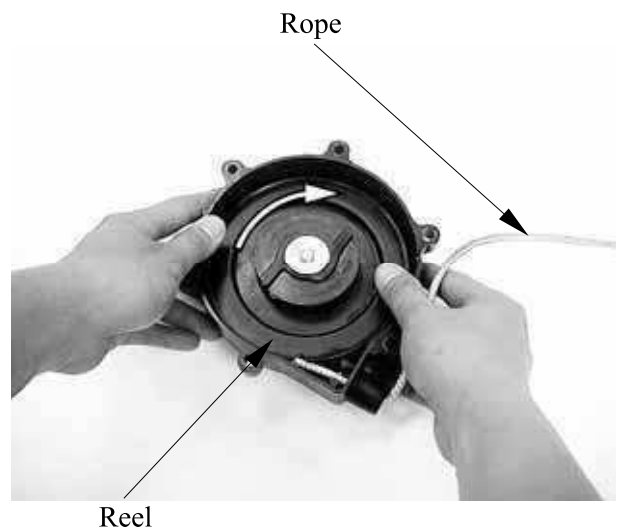
RECOIL STARTER DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

Remove the recoil starter assembly (refer to the “**RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the handle (refer to the “**RECOIL STARTER HANDLE REPLACE**” section in this chapter).

Untying the knot, then turn the reel clockwise with the rope slowly.



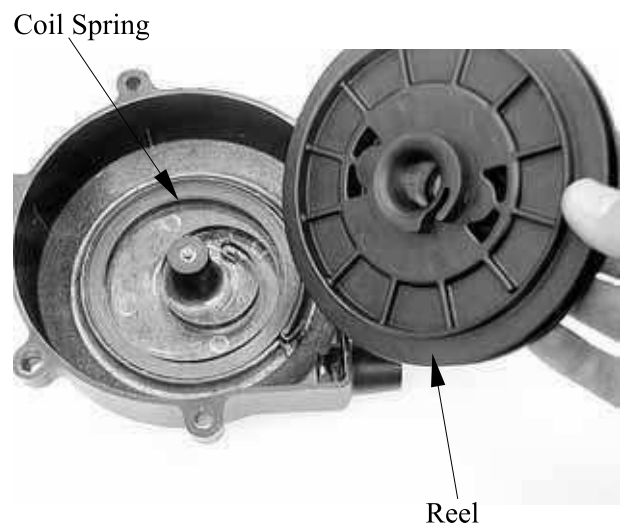
Remove the bolt and then remove the washer, friction plate and pawl spring.



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Remove the reel, then remove the coil spring.

Wear hand and eye protection when removing the reel, since the spring may quickly unwind and cause an injury.



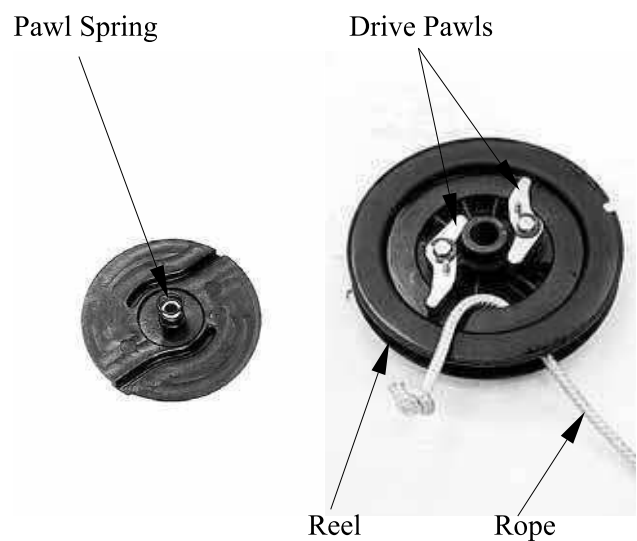
INSPECTION

Pull the rope and check that the ratchet is pushed out.



Inspect the rope, reel and drive pawl for wear or damage.

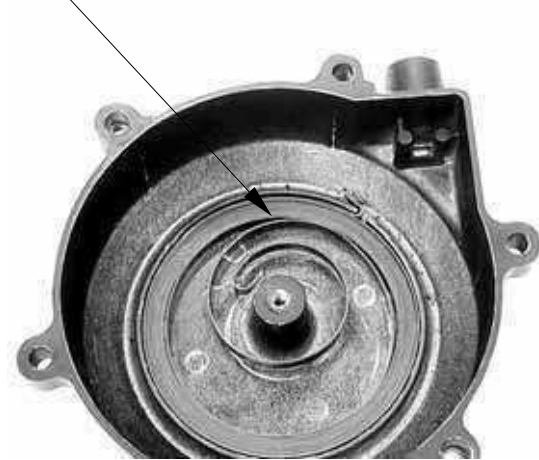
Inspect the pawl spring for fatigue.



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Inspect the coil spring for fatigue.

Coil Spring

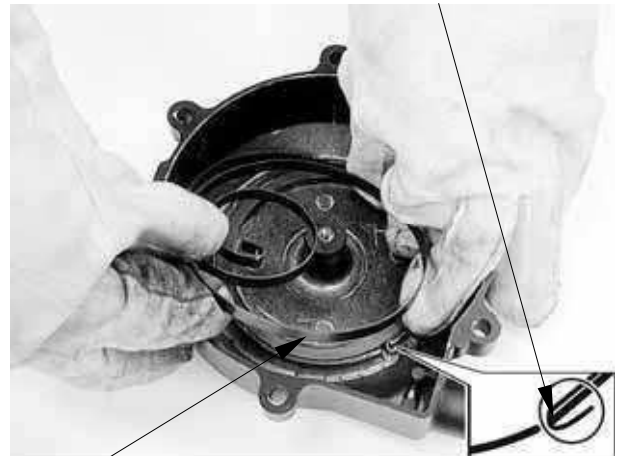


ASSEMBLY

Apply molybdenum disulfide grease to the coil spring, then install the coil spring.

- Wear hand and eye protection when installing the spring, since the spring may quickly unwind and cause an injury.
- Mesh the spring hook with the housing slit, then wind the housing to make the diameter of the spring smaller and the spring will be into the housing.

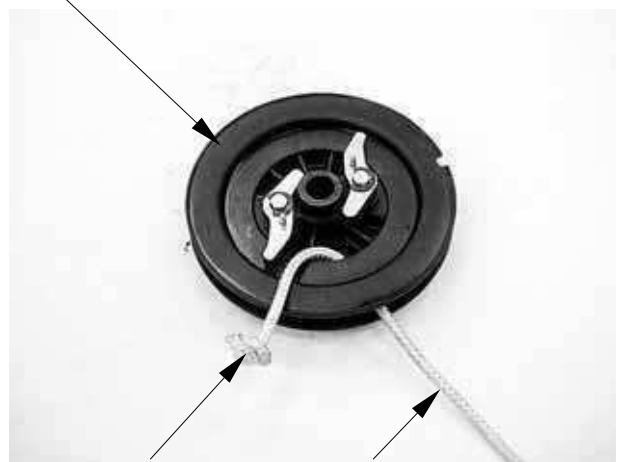
Hook



Coil Spring

Pass the rope through the reel and make a knot above the reel.

Reel



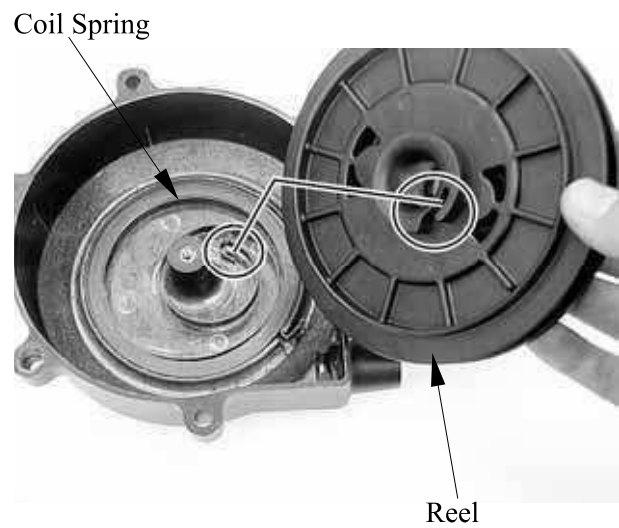
Knot

Rope

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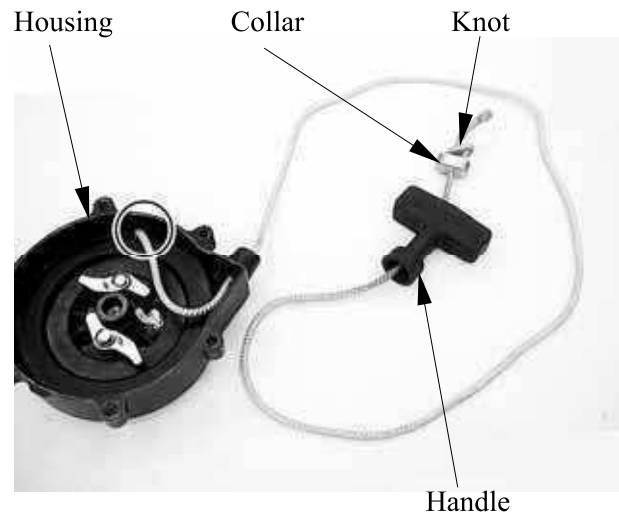
Install the reel.

- Wear hand and eye protection when installing the reel, since the spring may quickly unwind and cause an injury.
- Engage the part of the reel with coil spring end.



Hook the rope onto the hook part of the reel, then pass the rope through the recoil starter housing, handle and collar.

Make a knot above the collar.



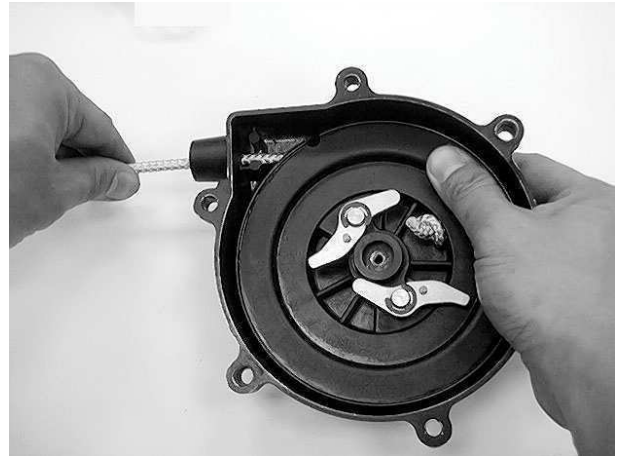
Hook the rope onto the hook part of the reel, turn the reel counterclockwise three or four times with the rope.

Wear hand and eye protection when assembling the recoil starter, since the spring may quickly unwind and cause an injury.



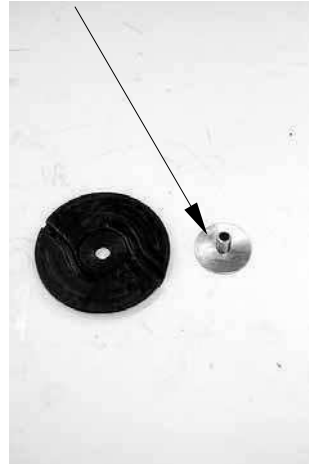
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Unhook the rope, then turn the reel clockwise with the rope slowly.

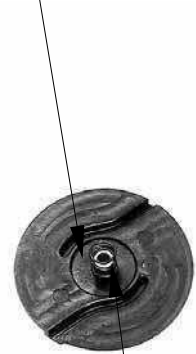


Apply molybdenum disulfide grease to the washer and friction plate.

Apply Grease



Apply Grease



Spring

Install the pawl spring, friction plate/washer.
Install and tighten the new bolt securely.

Bolt/Washer/Plate/Spring



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Pull the rope and check that the ratchet is pushed out.



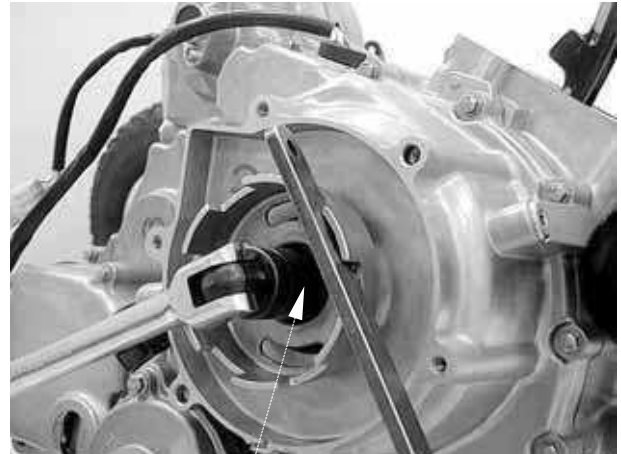
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STARTER PULLEY REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the recoil starter assembly (refer to the “**RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

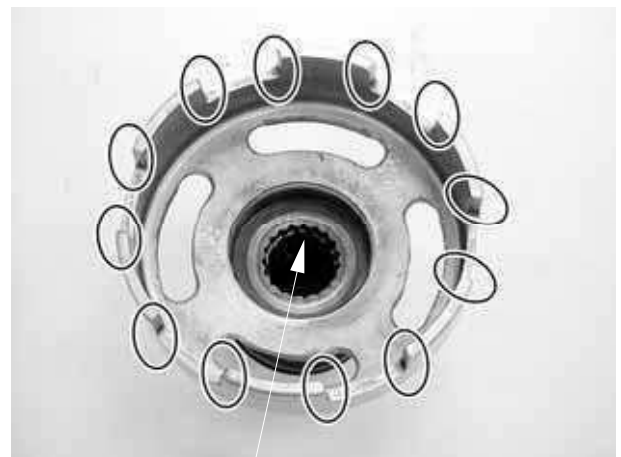
Remove the starter pulley nut by using a suitable bar.



Nut/Washer

INSPECTION

Inspect the starter pulley for cracks or pitting.
Inspect the O-ring for wear or damage.



O-ring

Inspect the oil stop ring for crack or damage.



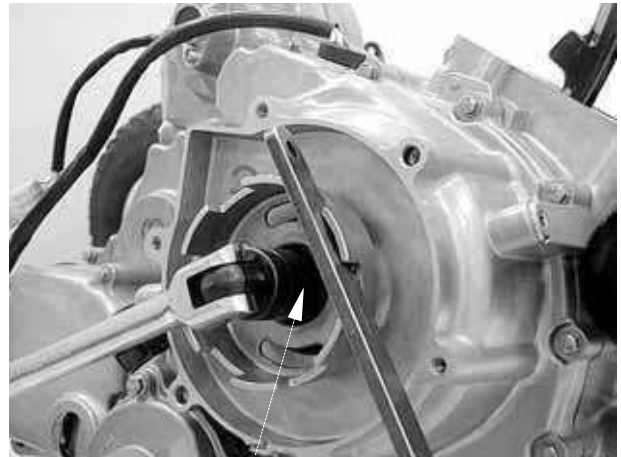
Oil Stop Ring

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INSTALLATION

Install the starter pulley and washer.
Install and tighten the nut to the specified torque by using suitable bar.

Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)



Nut/Washer

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STARTER CLUTCH REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the right crankcase cover (refer to the “**ALTERNATOR STATOR REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 17).

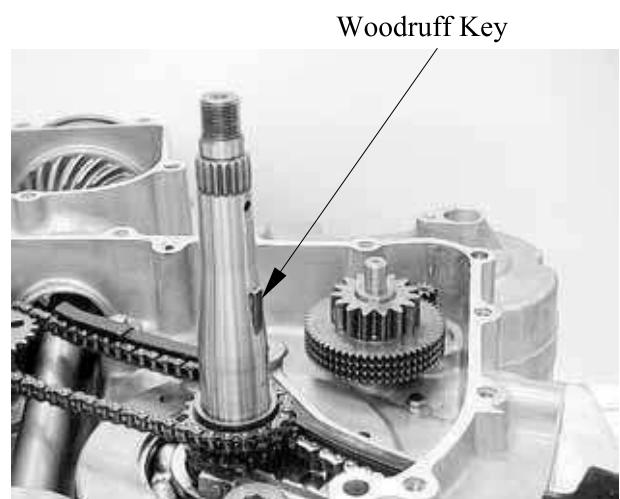
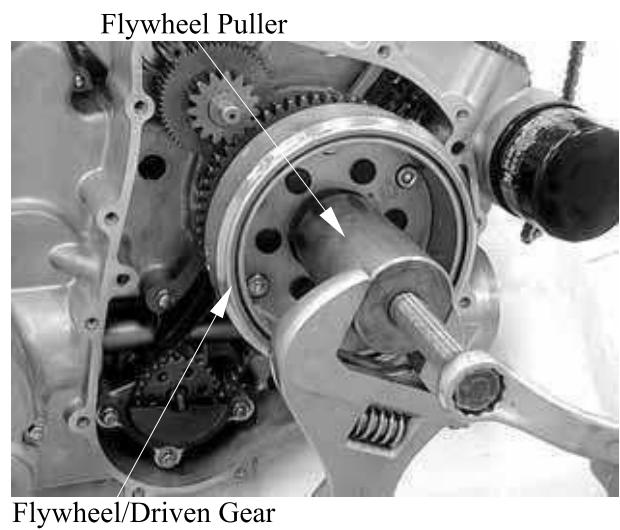
Remove the flywheel/driven gear by using the special tool.

Special tool:

Flywheel puller A120E00060

Remove the woodruff key.

Remove the reduction gear.



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INSPECTION

Check the operation of the sprag clutch by turning the driven gear. You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear by turning the driven gear.



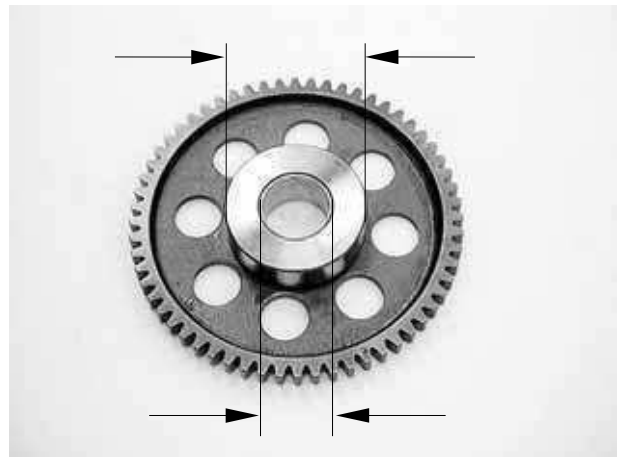
Check the starter driven gear teeth for wear or damage.

Measure the starter driven gear boss O.D..

Service limit: 57.7 mm (2.272 in)

Measure the starter driven gear bushing I.D..

Service limit: 27.1 mm (1.084 in)



Check the starter reduction gear teeth and shaft for wear or damage.



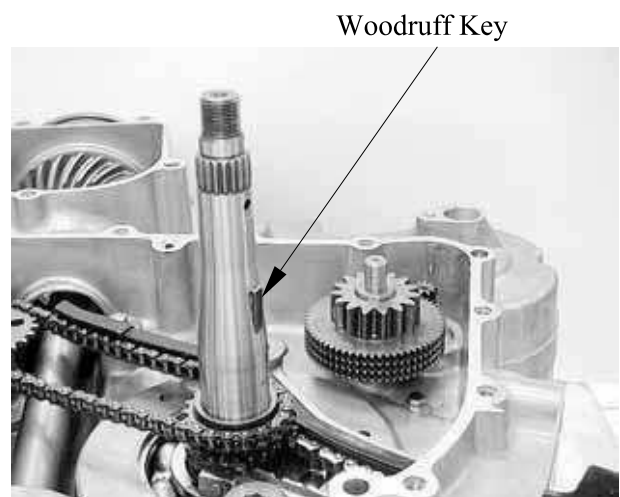
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INSTALLATION

Apply oil to the starter reduction gear.
Install the starter reduction gear to the right crankcase.



Install the woodruff key in the crankshaft key groove.



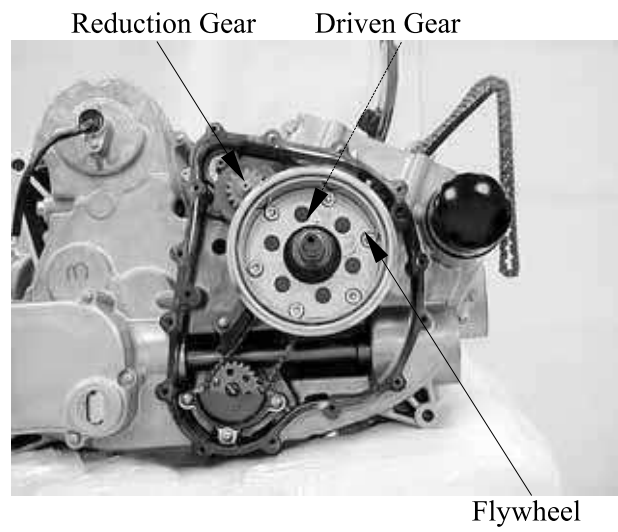
Apply molybdenum oil solution to the starter driven gear bushing.
Install the starter driven gear by turning the driven gear clockwise.



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Clean any oil from the tapered portion of the flywheel I.D.

Install the flywheel/driven gear onto the crankshaft, aligning the key way with woodruff key.



20. LIGHTS/SWITCHES

LIGHTS/SWITCHES

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20. LIGHTS/SWITCHES

SERVICE INFORMATION

- A continuity test can be made with the switches installed on the vehicle.
- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the vehicle. Simply disconnect the connectors and connect a continuity tester to the terminals or connections.

20. LIGHTS/SWITCHES

BULBS REMOVAL

HEADLIGHT

Disconnect the headlight wire connector.
Remove the rubber boot from the headlight case.

Headlight Connector



Rubber Boot

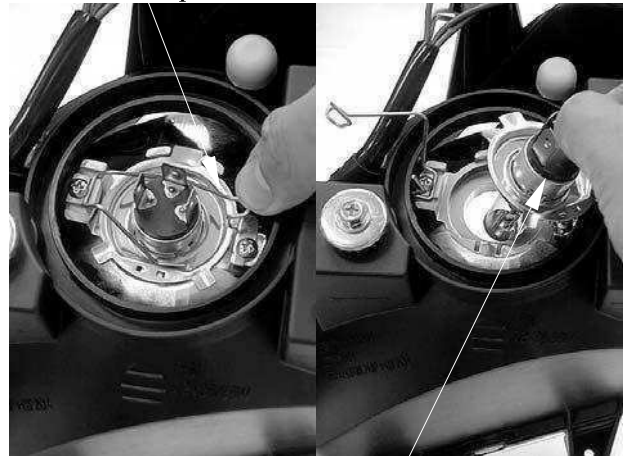
Relax the lock clip to remove the bulb and replace with a new one.

Install the bulb, aligning the bulb socket groove with the bulb tab and set the lock clip.

Connect headlight wire connector.
Install the rubber boot.

Install the front fender in the reverse order of removal.

Lock Clip

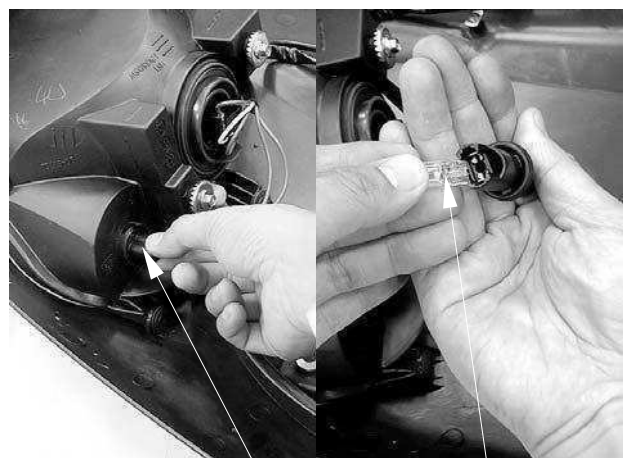


Bulb

POSITION LIGHT

Remove the bulb socket by pulling it out.
Remove the bulb.

Install the bulb in the reverse order of removal



Bulb Socket

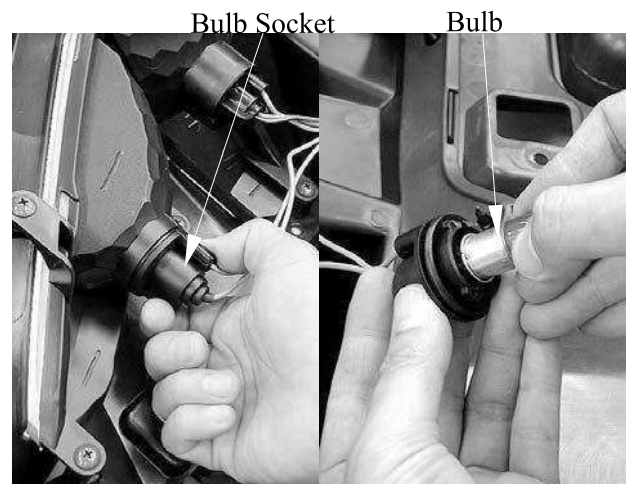
Bulb

20. LIGHTS/SWITCHES

TAIL/BRAKE LIGHT

Remove the bulb socket by turning it counterclockwise.
Remove the bulb.

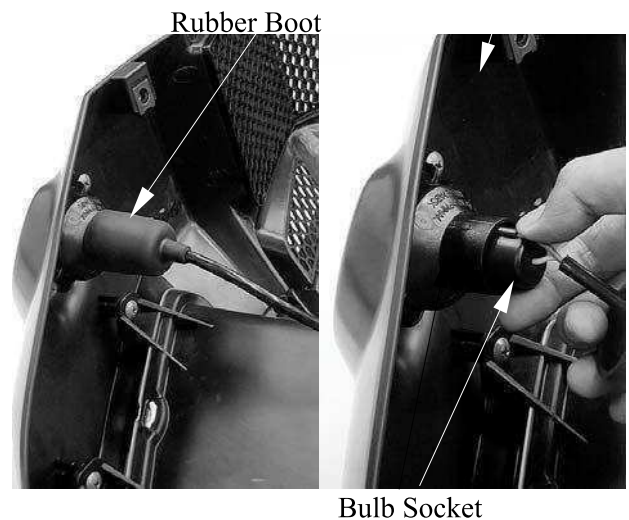
Install the bulb in the reverse order of removal.



TURN SIGNAL LIGHT (ON ROAD)

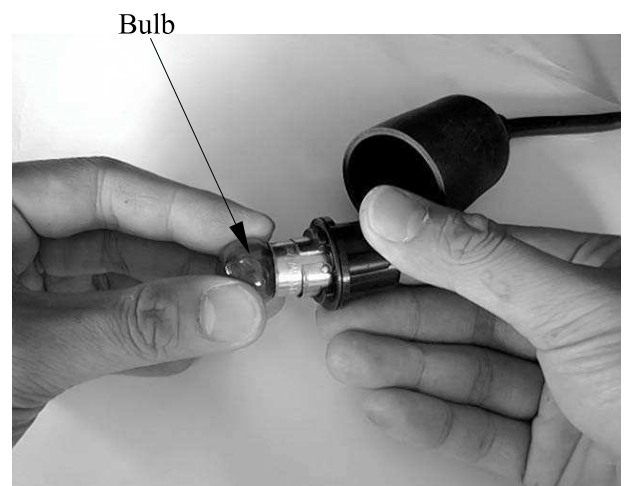
FRONT

Remove the rubber boot from the turn signal light case.
Remove the bulb socket by turning it counterclockwise.



Remove the bulb.

Install the bulb in the reverse order of removal.



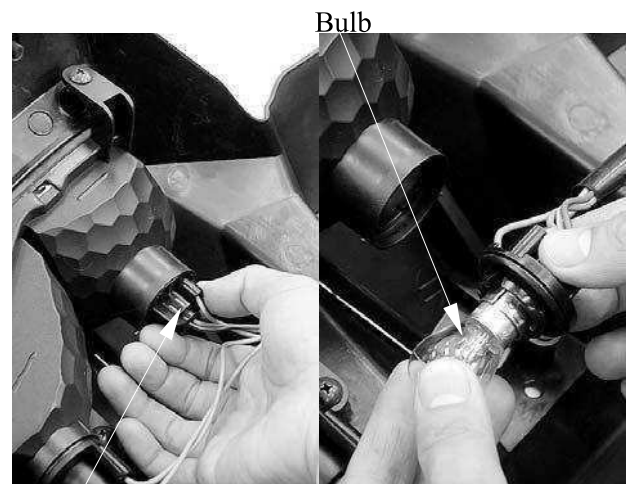
20. LIGHTS/SWITCHES

REAR

Remove the bulb socket by turning it counterclockwise.

Remove the bulb.

Install the bulb in the reverse order of removal.



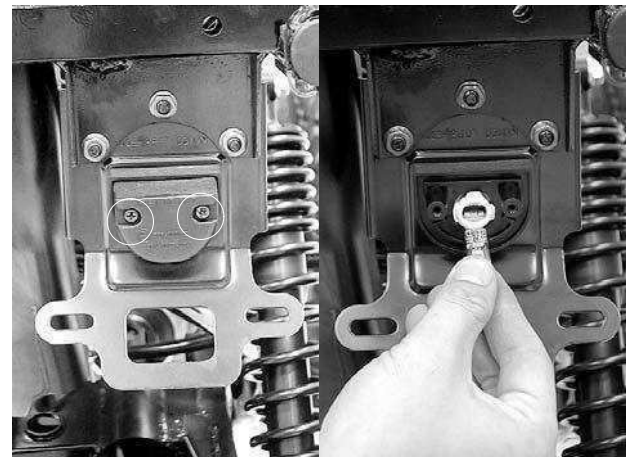
Bulb Socket

LICENCE LIGHT BULB (ON ROAD)

Remove the two screws and licence light cover.

Remove the bulb.

Install the bulb in the reverse order of removal



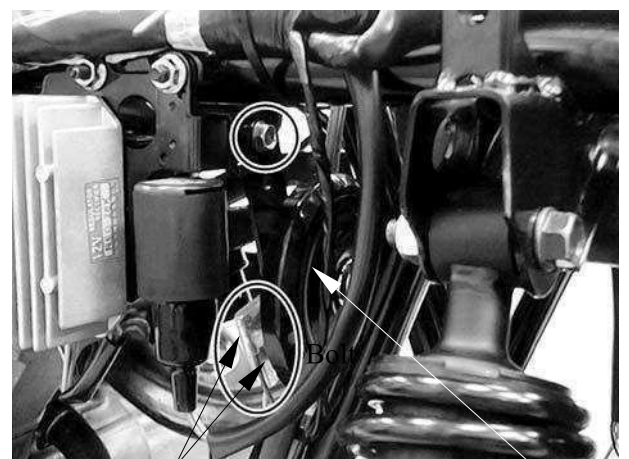
HORN (ON ROAD)

REMOVAL

Disconnect the horn wire leads.
Remove the bolt and remove horn.

INSTALLATION

The installation sequence is the reverse of removal.



Horn Wire Leads

Horn

20. LIGHTS/SWITCHES

IGNITION SWITCH

INSPECTION

Disconnect the ignition switch connectors.
 (Refer to the “**FRAME COVER**” section in the chapter 2.)

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as right:

	IG	E	BAT1	BAT2	PO
OFF	○	○			
ON			○	○	
PO			○	○	○
COLOR	B/W	G	R	B	BR

REPLACEMENT

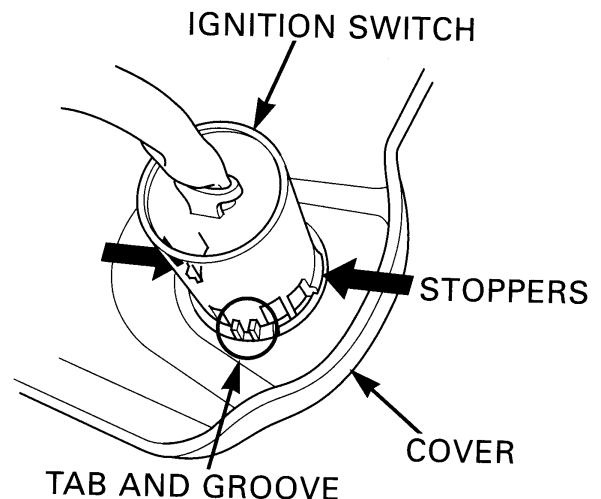
Release the switch wire from the wire clips on the steering shaft holder frame pipe.

Remove the meter cover (refer to the “**FRAME COVER**” section in the chapter 2).

Remove the ignition switch from the cover while pushing in the two stoppers.

Install a new ignition switch by aligning the locating tab with the groove in the cover.

Install the removed parts in the reverse order of removal.



HANDLEBAR SWITCH

INSPECTION

Remove front center cover (refer to the “**FRAME COVER**” section in the chapter 2).

Disconnect the connectors.

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as next page:

20. LIGHTS/SWITCHES

(ON ROAD)

HORN SW

	HO	BAT
FREE		
PUSH	○	○
COLOR	LG	B

WINKER SW

	R	L	WR
L		○	○
R	○		○
COLOR	SB	O	GR



START SW

	ST	C
FREE		
PUSH	○	○
COLOR	Y/R	Y/BR

LIGHT SW

	PO	LO	HI
☰	○		
☹	○	○	
☹	○		○
COLOR	BR/B	W	L



HAZARD SW

	BAT	HA
△	○	○
●		
COLOR	R/W	Y/B

2WD/4WD SW

	2WD	4WD	
4WD LOCK	○	○	○
4WD	○	○	
2WD	○		
COLOR	G	W/L	W/O



20. LIGHTS/SWITCHES

(OFF ROAD)

ENGINE STOP SW

	E	IG
COLOR	BR/L	B/W

START SW

	ST	C
FREE		
PUSH		
COLOR	Y/R	B/W

DIMMER SW

	HL	LO	HI
COLOR	BR/B	W	L

PASSING SW

	ST	C
FREE		
PUSH		
COLOR	BR/L	L

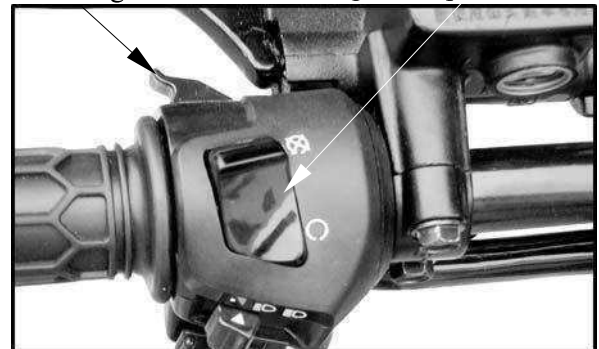
Dimmer Switch



Start Switch

Passing Switch

Engine Stop Switch



2WD/4WD SW

	2WD	4WD	
4WD LOCK			
4WD			
2WD			
COLOR	G	W/L	W/O



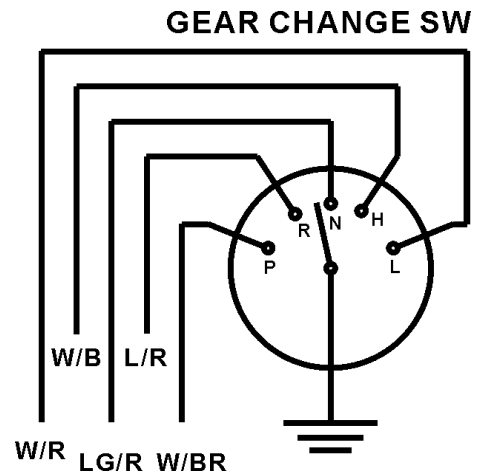
20. LIGHTS/SWITCHES

GEAR INDICATOR LIGHT SWITCHES

INSPECTION

Disconnect the gear indicator light switch wire connector.

Check for continuity between the switch side connector terminal and engine ground.

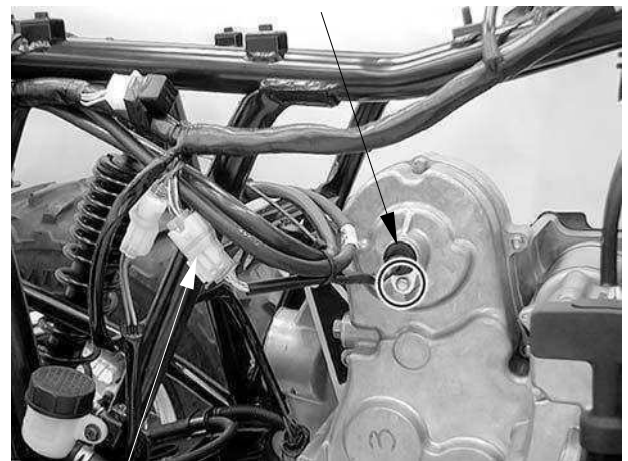


REPLACEMENT

Disconnect the gear indicator light switch connector.

Remove the bolt, then remove the gear indicator light switch and washer.

Gear Indicator Light Switch

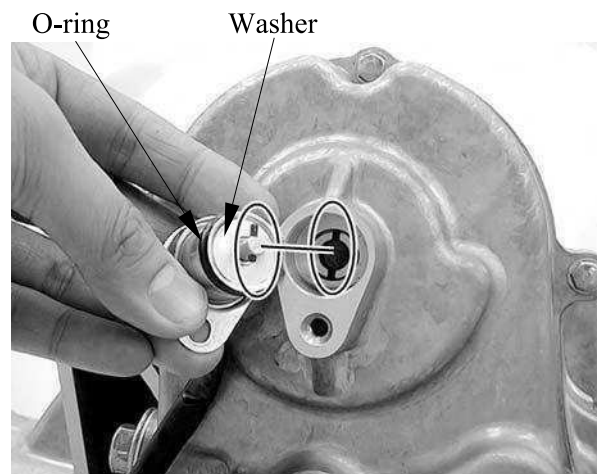


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Install the washer and a new switch with a new O-ring (apply engine oil to O-ring).

* Make sure that the lever on the gear indicator light switch correctly engages with the locating slot on the shift shaft.

Shift the drive select lever to check if the gear indicator light is correct.



20. LIGHTS/SWITCHES

SPEED SENSOR

Disconnect the connector.

Remove the bolt then remove the speed sensor.

If the speedometer, odometer or trip meter does not function properly. Inspect the connection of speed sensor connector.

If the connection is all right, replace the speedometer with a new one.

If the speedometer, odometer or trip meter still does not function properly, replace the speed sensor.



Speed Sensor

20. LIGHTS/SWITCHES

FUEL UNIT

REMOVAL

Remove the fuel tank cover (refer to the “**FRAME COVERS**” section in the chapter 2).

Remove the fuel unit connectors.
Remove the four bolts, then remove the fuel unit from fuel tank.

INSPECTION

Measure the resistance between the Yellow/White and Blue/White terminals of the fuel unit connector.

Standard (at 20°C/68°F):

Float at full position	$1100 \pm 33 \Omega$
Float at empty position	$100 \pm 3 \Omega$

INSTALLATION

Fuel unit installation is in the reverse order of removal.

* Align the tab on the fuel unit with the mark on the fuel tank.

Fuel Unit Connectors

