






Chapter 9

Electrical system

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Degrees of difficulty

Easy, suitable for novice with little experience		Fairly easy, suitable for beginner with some experience		Fairly difficult, suitable for competent DIY mechanic		Difficult, suitable for experienced DIY mechanic		Very difficult, suitable for expert DIY or professional	
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Specifications

Battery

Capacity 12 V, 8 Ah

Alternator

Output 345 W at 5000 rpm
Stator coil resistance 0.1 to 1.0 ohm at 20°C

Regulator/rectifier

Regulated voltage, current 13.5 to 15.5 V, 0.5 A

Starter motor

Brush length
Standard 12.5 mm
Service limit 6.5 mm

Fuel pump

Flow rate 600 cc/min at 10 V

Fusebox fuses

Main fuse	30A
Brake, turn signal, horn	15A
Fan, ignition, headlight, oil and neutral switches	10A

Bulbs

Headlight	60/55W H4 halogen
Sidelight	4.0 W
Brake/tail light	21/5 W
Turn signal lights	21 W

Torque settings

Oil pressure switch	12 Nm
Ignition (main) switch mounting bolts	25 Nm
Neutral switch	12Nm
Alternator rotor bolt	130 Nm

1 General information

All models have a 12-voltelectrical system. The components include a three-phase alternator unit and regulator/rectifier unit.

The regulator maintains the charging system output within the specified range to prevent overcharging, and the rectifier converts the ac (alternating current) output of the alternator to dc (direct current) to power the lights and other components and to charge the battery. The alternator is driven directly off the crankshaft.

The starter motor is mounted on the crankcase behind the cylinders. The starting system includes the motor, the battery, the relay and the various wires and switches. If the engine stop switch and the ignition (main) switch are both in the "Run" or "On" position, the starter relay allows the starter motor to operate only if the transmission is in neutral (neutral switch on) or, if the transmission is in gear, if the clutch lever is pulled into the handlebar (clutch switch on) and the side stand is up.

Note: *Keep in mind that electrical parts, once purchased, cannot be returned. To avoid unnecessary expense, make very sure the faulty component has been positively identified before buying a replacement part.*

2 Electrical troubleshooting

Warning: *To prevent the risk of short circuits, the ignition (main) switch must always be "OFF" and the battery negative (-ve) terminal should be disconnected before any of the bike's other electrical components are disturbed. Don't forget to reconnect the terminal securely once work is finished or if battery power is needed for circuit testing.*

1 A typical electrical circuit consists of an electrical component, the switches, relays, etc. related to that component and the wiring and connectors that hook the component to both the battery and the frame. To aid in locating a problem in any electrical circuit, refer to the wiring diagrams at the end of this Chapter.

2 Before tackling any troublesome electrical circuit, first study the wiring diagram (see end of Chapter) thoroughly to get a complete picture of what makes up that individual circuit. Trouble spots, for instance, can often be narrowed down by noting if other components related to that circuit are operating properly or not. If several components or circuits fail at one time, chances are the fault lies in the fuse or earth connection, as several circuits often are routed through the same fuse and earth connections.

3 Electrical problems often stem from simple causes, such as loose or corroded connections or a blown fuse. Prior to any electrical troubleshooting, always visually check the condition of the fuse, wires and connections in the problem circuit. Intermittent failures can be especially frustrating, since you can't always duplicate the failure when it's convenient to test. In such situations, a good practice is to clean all connections in the affected circuit, whether or not they appear to be good. All of the connections and wires should also be wiggled to check for looseness which can cause intermittent failure.

4 If testing instruments are going to be utilised, use the wiring diagram to plan where you will make the necessary connections in order to accurately pinpoint the trouble spot.

5 The basic tools needed for electrical fault finding include a battery and bulb test circuit, a continuity tester, test light and a jumper wire. For more extensive checks, a multimeter capable of measuring ohms, volts and amps will be required. Full details on the use of this test equipment are given in *Fault Finding Equipment* at the end of this manual.

Battery - removal, installation, inspection and maintenance

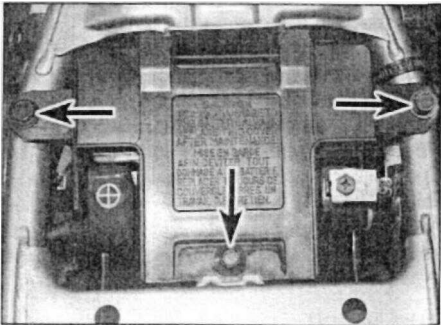
Caution: *Be extremely careful when handling or working around the battery. The electrolyte is very caustic and an explosive gas (hydrogen) is given off when the battery is charging.*

Removal and installation

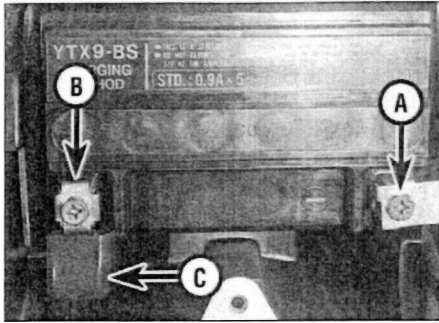
1 Remove the seat (see Chapter 8) then unscrew the bolts securing the battery cover (four on J models, three on all other models) and remove the cover (**see illustration**). Disconnect the leads from the battery, disconnecting the negative (-ve) terminal first, and lift the battery out of its box (**see illustrations**).

2 On installation, clean the battery terminals and lead ends with a wire brush or knife and emery paper. Reconnect the leads, connecting the positive (+ve) terminal first, then fit the insulating cover over the positive (+ve) terminal. Fit the battery cover and install the seat (see Chapter 8).

HINT	Battery corrosion can be kept to a minimum by applying a layer of petroleum jelly to the terminals after the cables have been connected.



3.1a Battery cover bolts (arrow)



3.1b Negative (-ve) terminal (A), positive (+ve) terminal (B), positive terminal cover (C)



3.1c Lift the battery out of its case

Inspection and maintenance

3 The battery fitted to the models covered in this manual is of the maintenance-free (sealed) type and therefore requires no maintenance as such. However the following checks should still be regularly performed.

4 Check the battery terminals and leads for tightness and corrosion. If corrosion is evident, disconnect the leads from the battery, disconnecting the negative (-ve) terminal first, and clean the terminals and lead ends with a wire brush or knife and emery paper. Reconnect the leads, connecting the negative (-ve) terminal last, and apply a thin coat of petroleum jelly to the connections to slow further corrosion.

5 The battery case should be kept clean to prevent current leakage, which can discharge the battery over a period of time (especially when it sits unused). Wash the outside of the case with a solution of baking soda and water. Rinse the battery thoroughly, and then dry it.

6 Look for cracks in the case and replace the battery if any are found. If acid has been spilled, neutralise it with a baking soda and water solution, then dry it thoroughly. Make sure the battery vent tube is routed correctly and is not kinked or pinched.

7 If the motorcycle sits unused for long periods of time, disconnect the cables from the battery terminals, negative (-ve) terminal first. Refer to Section 4 and charge the battery once every month to six weeks. Refer to *Storage* in the Reference section of this Manual.

8 The condition of the battery can be assessed by measuring the voltage present at the battery terminals. Connect the voltmeter positive (+ve) probe to the battery positive (+ve) terminal and the negative (-ve) probe to the battery negative (-ve) terminal. When fully charged there should be approximately 13 volts present. If the voltage falls below 12.3 volts the battery must be removed, disconnecting the negative (-ve) terminal first, and recharged as described below in Section 4.

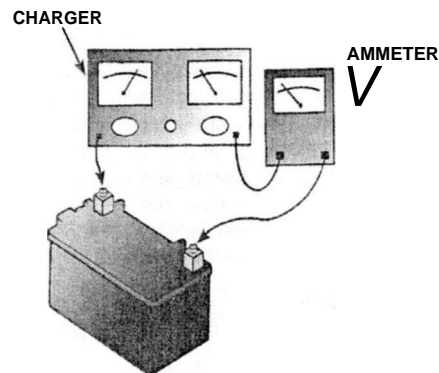
4 Battery - charging

Caution: *Be extremely careful when handling or working around the battery. The electrolyte is very caustic and an explosive gas (hydrogen) is given off when the battery is charging.*

1 Remove the battery (see Section 3).

2 Honda recommend that the battery is charged at a maximum rate of 0.9 amps for 5 hours. Exceeding this figure can cause the battery to overheat, buckling the plates and rendering it useless. Few owners will have access to an expensive current controlled charger, so if a normal domestic charger is used check that after a possible initial peak, the charge rate falls to a safe level (**see illustration**). **Note:** *In emergencies Honda state that the battery can be charged at a higher rate of 4.0 amps for a period of 1 hour. However, this is not recommended and the low amp charge is by far the safer method of charging the battery.*

Caution: *If the battery becomes hot during charging stop - further charging will cause damage.*



4.2 If the charger doesn't have ammeter built in, connect one in series as shown. **DO NOT** connect the ammeter between the battery terminals or it will be ruined

3 If the recharged battery discharges rapidly if left disconnected it is likely that an internal short caused by physical damage or sulphation has occurred. A new battery will be required. A sound item will tend to lose its charge at about 1 % per day.

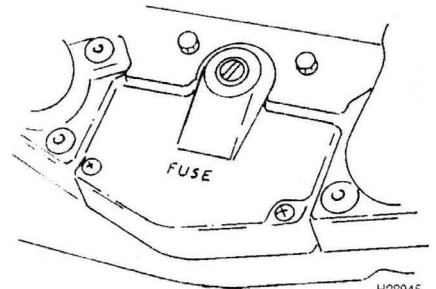
4 Install the battery (see Section 3).

5 If the motorcycle sits unused for long periods of time, charge the battery once every month to six weeks and leave it disconnected. Refer to *Storage* in the Reference section of this Manual.

5 Fuses - check and replacement

1 Most circuits are protected by fuses of different ratings. All fuses except the main fuse are located in the fusebox which is situated in between the handlebars on J, K and M models, and behind the right-hand side panel on P, S and T models (**see illustrations**). On all models the main fuse is located behind the left side of the rear cowl and is incorporated in the starter relay.

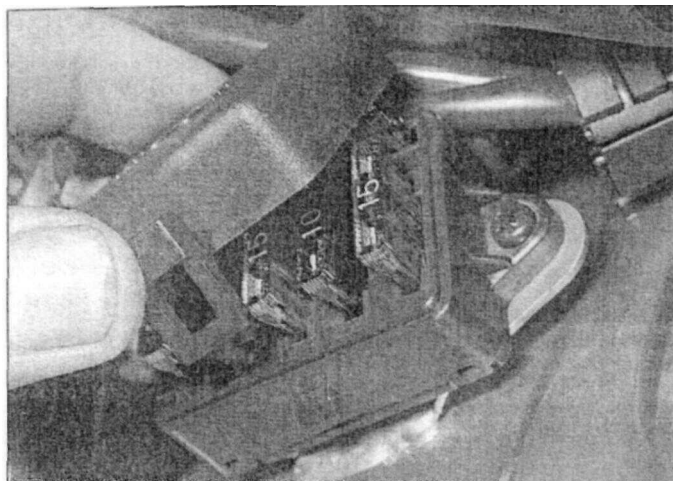
2 To gain access to the fuses, on J, K and M models unscrew the two fusebox cover screws and remove the cover; on P, S and T models remove the right-hand side panel and unclip the fusebox lid (**see illustration**). The fuses are labelled for easy identification. To access the main fuse, remove the rear cowl (see Chapter 8), then unclip the wiring connector on the top of the starter relay (**see illustration**).



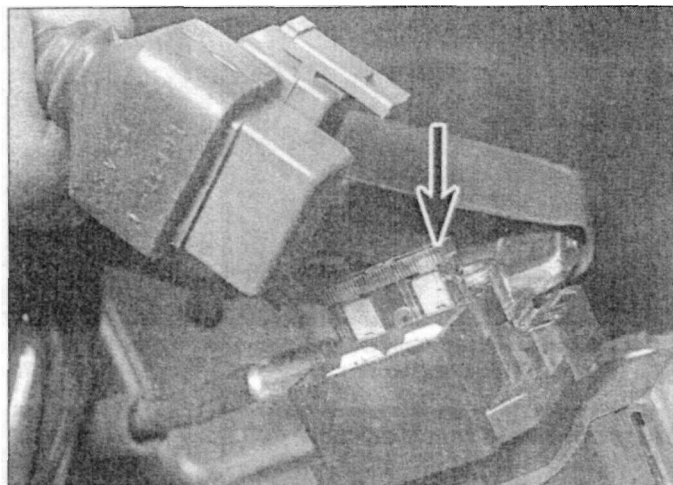
5.1a Fusebox - J, K and M models



5.1b Fusebox - P, S and T models



5.2a On P, S and T models, unclip the lid to access the fuses



5.2b The main fuse (arrow) is under the relay connector

3 The fuses can be removed and checked visually. If you can't pull the fuse out with your fingertips, use a pair of needle-nose pliers. A blown fuse is easily identified by a break in the element (see illustration). Each fuse is clearly marked with its rating and must only be replaced by a fuse of the correct rating.

Caution: *Never put in a fuse of a higher rating or bridge the terminals with any other substitute, however temporary it may be. Serious damage may be done to the circuit, or a fire may start. If the spare fuses are used, always replace them so that a spare fuse of each rating is carried on the bike at all times. A spare main fuse is located in the bottom of the starter relay.*

4 If a fuse blows, be sure to check the wiring circuit very carefully for evidence of a short-circuit. Look for bare wires and chafed, melted or burned insulation. If a fuse is replaced before the cause is located, the new fuse will blow immediately.

5 Occasionally a fuse will blow or cause an open-circuit for no obvious reason. Corrosion of the fuse ends and fusebox terminals may occur and cause poor fuse contact. If this happens, remove the corrosion with a wire brush or emery paper, then spray the fuse end and terminals with electrical contact cleaner.

6 Lighting system - check

1 The battery provides power for operation of the headlight, tail light, brake light and instrument cluster lights. If none of the lights operate, always check battery voltage before proceeding. Low battery voltage indicates either a faulty battery or a defective charging system. Refer to Section 3 for battery checks and Sections 31 and 32 for charging system tests. Also, check the condition of the fuses and replace any blown fuses with new ones.

Headlight

2 If the headlight fails to work, check the fuse first with the key "ON" (see Section 5) and the bulb, then unplug the electrical connector for the headlight (see Section 7) and use jumper wires to connect the bulb directly to the battery terminals. If the light comes on, the problem lies in the wiring or one of the switches in the circuit. Refer to Section 20 for the switch testing procedures, and also the wiring diagram at the end of this Chapter.

Tail light

3 If the taillight fails to work, check the bulbs and the bulb terminals first, then the fuses. Check for battery voltage at the tail light connector. If voltage is present, check the earth circuit for an open or poor connection.

4 If there is no voltage, check the wiring between the light and ignition switch, then check the switch. Also check the light switch.

Brake light

5 See Section 14 for the brake light switch checking procedure.

Neutral indicator light

6 If the neutral light fails to operate when the transmission is in neutral, check the fuses and the bulb (see Sections 5 and 17). If they are in good condition, check for battery voltage at

the connector attached to the neutral switch under the left-hand side of the engine. If battery voltage is present, refer to Section 22 for the neutral switch check and replacement procedures.

7 If no voltage is indicated, check the wiring between the switch and the bulb for open-circuits and poor connections.

Oil pressure warning light

8 See Section 18 for the oil pressure switch check.

7 Headlight bulb and sidelight bulb - replacement

Note: *The headlight bulb is of the quartz-halogen type. Do not touch the bulb glass as skin acids will shorten the bulb's service life. If the bulb is accidentally touched, it should be wiped carefully when cold with a rag soaked in methylated spirit and dried before fitting.*

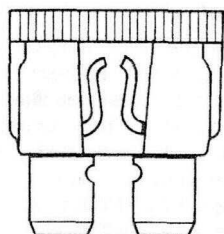
Warning: *Allow the bulb time to cool before removing it if the headlight has just been on.*

Headlight

1 Unscrew the three screws securing the headlight rim to the headlight shell, and ease the rim out of the shell (see illustration).

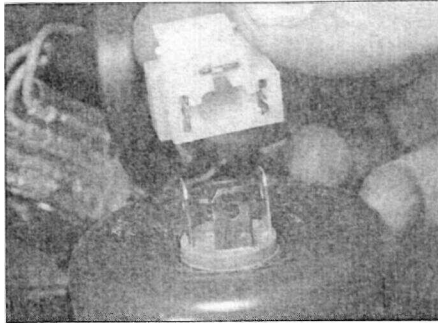


7.1 The headlight rim is secured to the shell by three screws

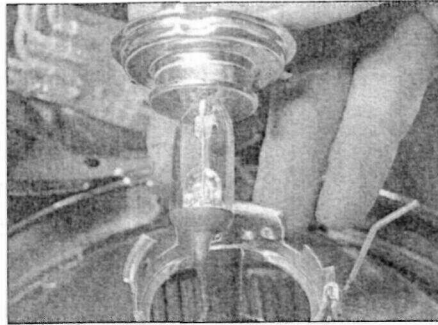


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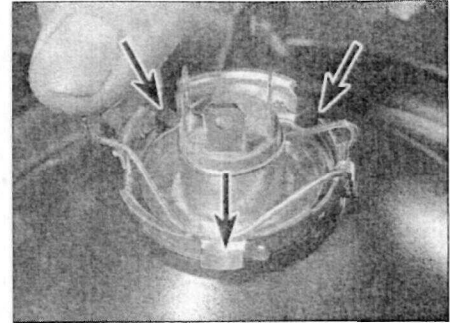
5.3 A blown fuse can be identified by a break in its element



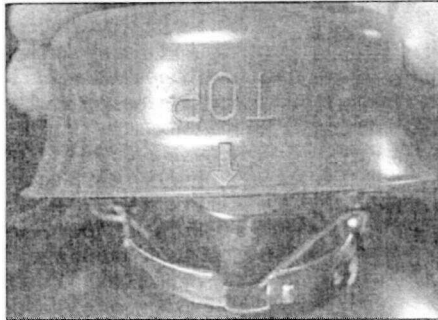
7.2 Disconnect the connector and remove the rubber cover



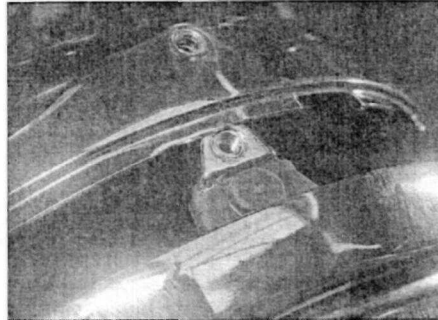
7.3 Release the clip and remove the headlight bulb



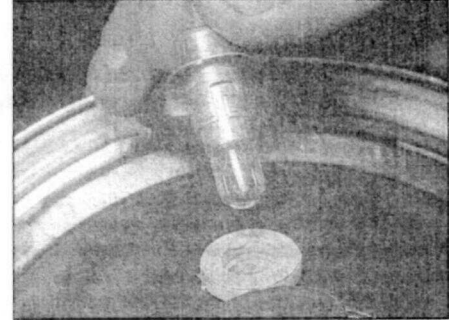
7.4 Make sure the three tabs fit correctly into the slots (arrows)



7.5 Fit the rubber cover with the TOP mark uppermost



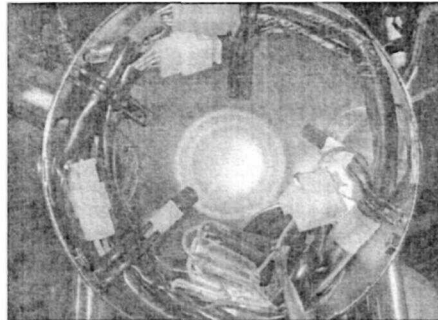
7.6 Make sure the rim is correctly aligned with the shell



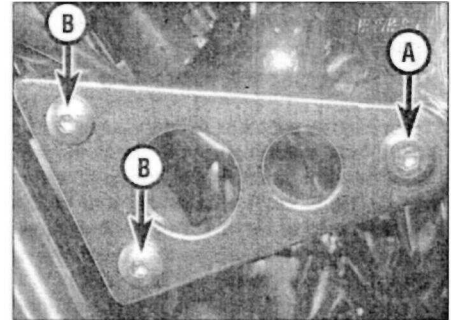
7.8a Remove the sidelight bulbholder from the headlight . . .



7.8b . . . and remove the bulb from the holder



8.3a Free the wiring and pull it through the hole in the back of the shell



8.3b Headlight-to-bracket bolt (A), bracket-to-frame bolts (B)

2 Disconnect the wiring connector and remove the rubber dust cover, noting how it fits (**see illustration**).

3 Release the bulb retaining clip, noting how it fits, then remove the bulb (**see illustration**).
4 Fit the new bulb, bearing in mind the information in the **Note** above. Make sure the tabs on the bulb fit correctly in the slots in the bulb housing, and secure it in position with the retaining clip (**see illustration**).

5 Install the dust cover, making sure it is correctly seated and with the "TOP" mark facing up, and connect the wiring connector (**see illustration**).

6 Check the operation of the headlight, then install the rim into the shell and secure it with the screws (**see illustration**).

Sidelight

7 Unscrew the three screws securing the headlight rim to the headlight shell, and ease the rim out of the shell (**see illustration 7.1**).

8 Pull the bulbholder out from the headlight (**see illustration**). Push the bulb inwards and twist it anti-clockwise to release it from the bulbholder (**see illustration**). If the socket contacts are dirty or corroded, they should be scraped clean and sprayed with electrical contact cleaner before the new bulb is installed.

9 Install the new bulb in the bulbholder by pressing it in and twisting it clockwise. Press the bulbholder back into the headlight.

10 Check the operation of the sidelight, then install the headlight rim into the shell and secure with the screws (**see illustration 7.6**).

Headlight assembly - removal and installation

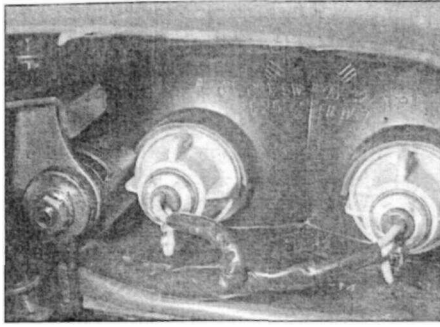


Removal

1 Remove the three screws securing the headlight rim to the headlight shell, and ease the rim out of the shell (**see illustration 7.1**).

2 Disconnect the wiring connector from the headlight bulb and pull the sidelight bulbholder out of the headlight (**see illustrations 7.2 and 7.8a**).

3 To remove the headlight shell, free the wiring inside the shell from any clamps and ease it out the back of the shell, then unscrew the bolts securing the shell to the brackets and remove the shell (**see illustrations**). If necessary,



9.2 Twist the bulbholder anti-clockwise to release it from the tail light

unscrew the bolts securing the brackets to the frame and remove the brackets.



When disconnecting wiring, label the connectors to avoid confusion on reconnection.

Installation

4 Installation is the reverse of removal. Make sure all the wiring is correctly connected and secured. Check the operation of the headlight and sidelight. Check the headlight aim (see Chapter 1).

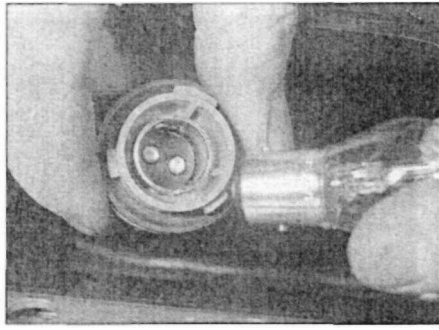
9 Tail light bulbs - replacement

- 1 Remove the seat (see Chapter 8).
- 2 Turn the bulbholder anti-clockwise and withdraw it from the tail light (see illustration).
- 3 Push the bulb into the holder and twist it anti-clockwise to remove it (see illustration). Check the socket terminals for corrosion and clean them if necessary. Line up the pins of the new bulb with the slots in the socket, then push the bulb in and turn it clockwise until it locks into place. **Note:** *The pins on the bulb are offset so it can only be installed one way. It is a good idea to use a paper towel or dry cloth when handling the new bulb to prevent injury if the bulb should break and to increase bulb life.*
- 4 Install the bulbholder into the tail light and turn it clockwise to secure it.
- 5 Install the seat (see Chapter 8).

10 Tail light assembly - removal and installation

Removal

- 1 Remove the seat (see Chapter 8).
- 2 Twist the bulbholders anti-clockwise and withdraw them from the taillight.
- 3 Unscrew the two nuts securing the tail light to the frame and carefully withdraw it from the back of the bike (**see illustration**). Note the



9.3 To release the bulb gently push it in and twist it anti-clockwise. Note that the pins on the bulb are offset

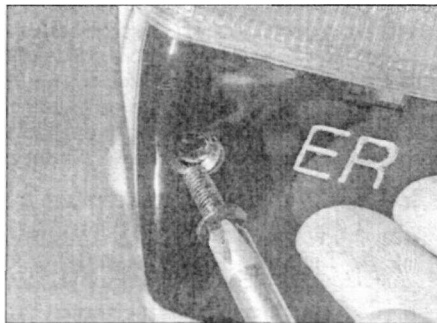
wiring clip secured by the right-hand side nut, and the fitting of the washers and rubber grommets.

Installation

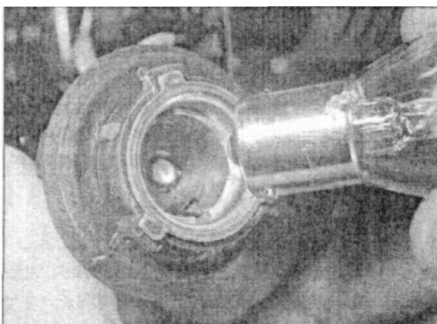
4 Installation is the reverse of removal. Check the operation of the tail and brake lights.

11 Turn signal bulbs - replacement

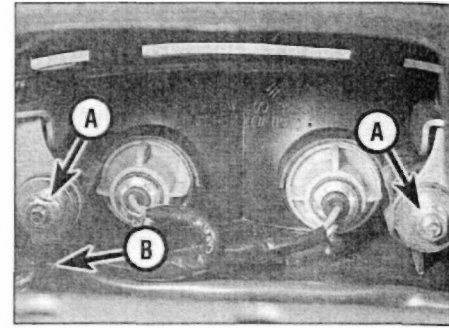
- 1 Unscrew the turn signal lens assembly retaining screw from the bottom of the turn signal cover and remove the lens assembly, noting which way round it fits (**see illustration**).
- 2 Twist the bulbholder anti-clockwise to release it from the lens (**see illustration**).
- 3 Push the bulb into the holder and twist it



11.1 The turn signal lens is secured to the cover by a single screw



11.3 To release the bulb gently push it in and twist it anti-clockwise



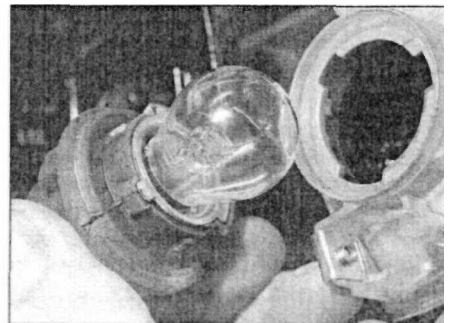
10.3 The tail light assembly is secured by two nuts (A). Note the wiring clamp (B)

anti-clockwise to remove it (**see illustration**). Check the socket terminals for corrosion and clean them if necessary. Line up the pins of the new bulb with the slots in the socket, then push the bulb in and turn it clockwise until it locks into place. **Note:** *It is a good idea to use a paper towel or dry cloth when handling the new bulb to prevent injury if the bulb should break and to increase bulb life.*

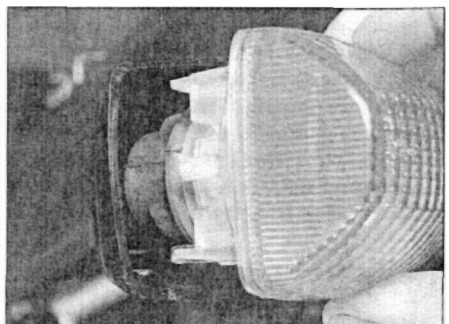
4 Install the bulbholder back into the lens, and the lens assembly back into the cover, and tighten the retaining screw (**see illustration**). Take care not to overtighten the screw as the assembly is easily cracked.



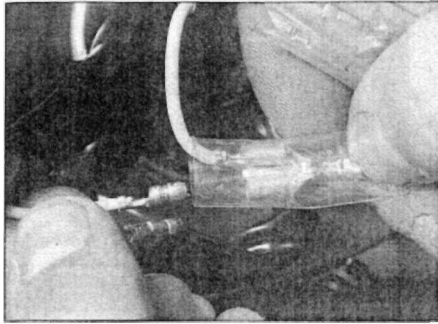
If the socket contacts are dirty or corroded, scrape them clean and spray with electrical contact cleaner before a new bulb is installed.



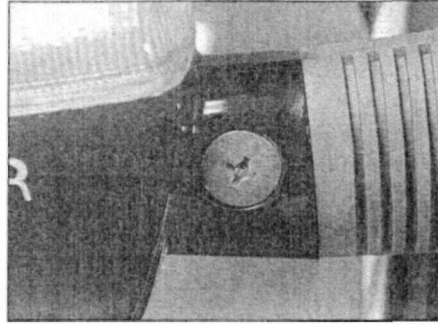
11.2 Twist the bulbholder anti-clockwise to release it from the lens



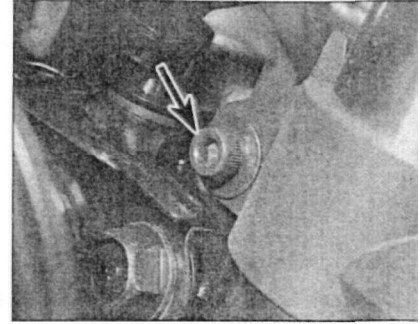
11.4 Install the lens back into the cover



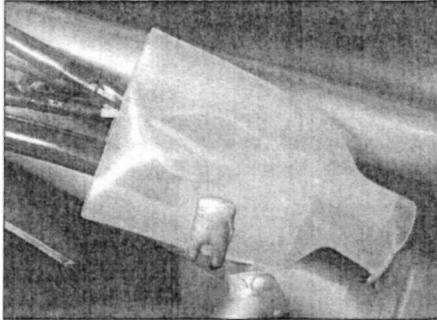
12.2 The front turn signal wiring connectors are inside the headlight shell



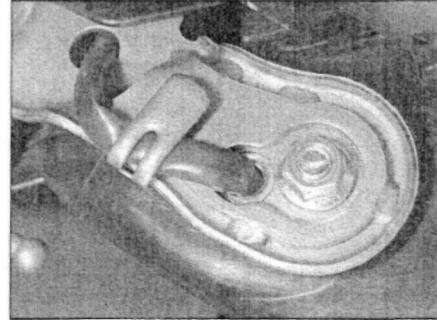
12.3 The lens and cover assembly is secured to the stalk by a single screw



12.4 The stalk fits around the fork and is bolted to the bottom yoke (arrow)



12.6 The rear turn signal wiring connectors are inside the rubber boot



12.8 The rear turn signal assembly is secured to the frame by a single nut

12 Turn signal assemblies removal and installation

Front

Removal

- 1 Unscrew the three screws securing the headlight rim to the headlight shell, and ease the rim out of the shell (**see illustration 7.1**).
- 2 Trace the turn signal wiring back from the turn signal and disconnect it at the connectors inside the headlight shell (**see illustration**). Pull the wiring through to the turn signal mounting, noting its routing.
- 3 To remove the turn signal lens and cover assembly from its stalk, unscrew the screw on the bottom of the stalk and ease the turn signal off, taking care not to snag the wiring as you draw it through (**see illustration**).
- 4 To remove the complete turn signal assembly, unscrew the bolt securing the stalk around the front fork and to its bracket on the bottom yoke, then remove the assembly as a unit (**see illustration**). On P, S and T models, note that the bolt fits into a collar.

Installation

- 5 Installation is the reverse of removal. Make sure the wiring is correctly routed and securely connected. Check the operation of the turn signals.

Rear

Removal

- 6 Remove the seat (see Chapter 8). Trace the turn signal wiring back from the turn signal and disconnect it at the connectors inside the rubber boot behind the right-hand side of the rear cowl (**see illustration**). Remove the rear cowl if access to the boot is too restricted (see Chapter 8) Pull the wiring through to the turn signal mounting, releasing it from any clips and noting its routing.
- 7 To remove the turn signal lens and cover assembly from its stalk, unscrew the screw on the bottom of the stalk and ease the turn signal off, taking care not to snag the wiring as you draw it through (**see illustration 12.3**).
- 8 To remove the complete turn signal assembly, unscrew the nut under the rear mudguard securing the stalk to the frame, then remove the assembly, noting how the mounting plate and its rubber fit (**see illustration**).

Installation

- 9 Installation is the reverse of removal. Make sure the wiring is correctly routed and securely connected. Check the operation of the turn signals.

13 Turn signal circuit - check

- 1 The battery provides power for operation of the turn signal lights, so if they do not operate,

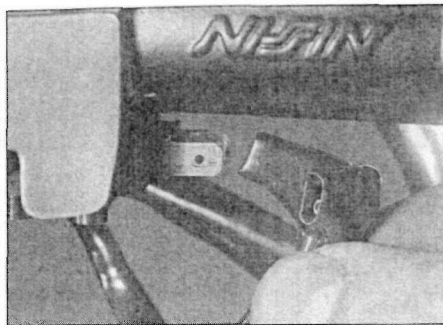
always check the battery voltage first. Low battery voltage indicates either a faulty battery or a defective charging system. Refer to Section 3 for battery checks and Sections 31 and 32 for charging system tests. Also, check the fuses (see Section 5) and the switch (see Section 21).

2 Most turn signal problems are the result of a burned out bulb or corroded socket. This is especially true when the turn signals function properly in one direction, but fail to flash in the other direction. Check the bulbs and the sockets (see Section 11).

3 If the bulbs and sockets are good, check for power at the turn signal relay white/green wire (J and K models) or black/brown wire (all other models) with the ignition "ON". The relay is mounted behind the toolkit case behind the right-hand side panel (**see illustration**). Turn the ignition OFF when the check is complete.



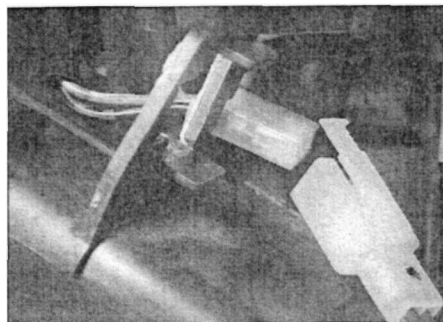
13.3 Turn signal relay location



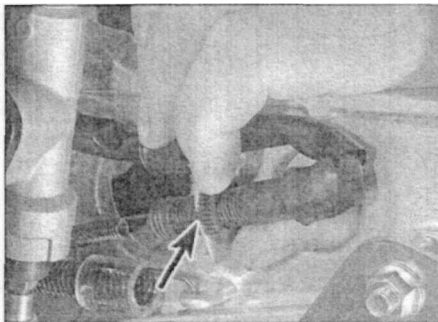
14.5 Disconnect the front brake light switch wiring connectors



14.6 The brake light switch is secured by a single screw



14.8 Disconnect the rear brake light switch wiring connector



14.10 The retainer prongs are on the underside of the adjuster nut (arrow)

4 If no power was present at the relay, check the wiring from the relay to the ignition (main) switch for continuity.

5 If power was present at the relay, using the wiring diagram at the end of this Chapter, check the wiring between the relay, turn signal switch and turn signal lights for continuity. If the wiring and switch are sound, replace the relay with a new one.

14 Brake light switches - check and replacement

Circuit check

1 Before checking any electrical circuit, check the bulb (see Section 9) and fuses (see Section 5).

2 Using a test light connected to a good earth, check for voltage at the power wire of the brake light switch wiring connector (see illustration 14.5 or 14.8). The wiring connector should be connected to the switch for this test. If there's no voltage present, check the wire between the switch and the fusebox (see the wiring diagram at the end of this Chapter).

3 If voltage is available, touch the probe of the test light to the other terminal of the switch, then pull the brake lever in or depress the brake pedal. If the test light doesn't light up, replace the switch.

4 If the test light does light, check the wiring between the switch and the brake lights (see the wiring diagrams at the end of this Chapter).

Switch replacement

Front brake lever switch

5 Unplug the electrical connectors from the switch (see illustration).

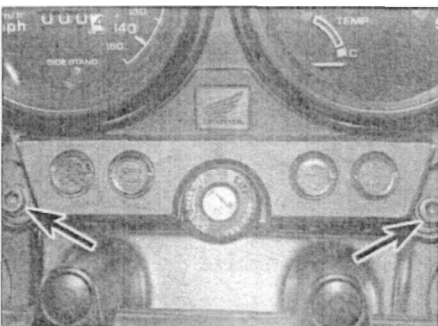
6 Unscrew the single screw and detach the switch from the bottom of the front brake master cylinder (see illustration).

7 Installation is the reverse of removal. The switch isn't adjustable.

Rear brake pedal switch

8 The switch is mounted to the back of the right-hand footrest bracket. Trace the wiring and disconnect it at the connector which is mounted on top of the toolkit casing behind the right-hand side panel (see illustration).

9 Detach the lower end of the switch spring from the brake pedal.



15.4 The instrument cluster is secured to the top yoke by two bolts (arrows) - P, S and T models shown

10 Compress the switch adjuster nut retainer prongs and withdraw the complete switch from its bracket (see illustration).

11 Installation is the reverse of removal. Make sure the brake light is activated just before the rear brake pedal takes effect. If adjustment is necessary, hold the switch and turn the adjusting nut on the switch body until the brake light is activated when required.

15 Instrument cluster and speedometer cable - removal and installation



Instrument cluster

Removal

1 Unscrew the three screws securing the headlight rim to the headlight shell, and ease the rim out of the shell (see illustration 7.1).

2 Trace the wiring back from the instrument cluster, then disconnect it at the connectors inside the shell and release it from any ties.

3 Unscrew the speedometer cable retaining ring from the rear of the instrument cluster and detach the cable (see illustration 15.6).

4 Remove the two bolts securing the instrument cluster to the top yoke and carefully lift the assembly off the yoke, taking care not to snag the wiring and noting its routing (see illustration).

Installation

5 Installation is the reverse of removal. Make sure that the speedometer cable and wiring are correctly routed and secured.

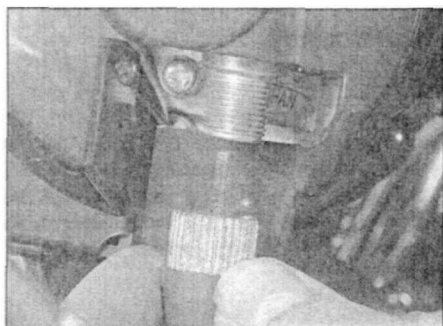
Speedometer cable

Removal

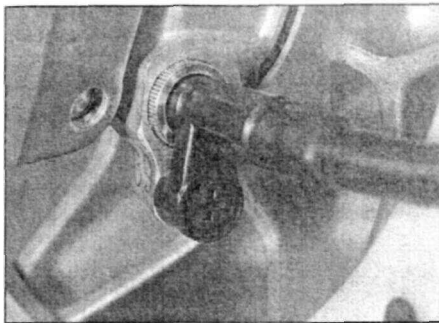
6 Unscrew the speedometer cable retaining ring from the rear of the instrument cluster and detach the cable (see illustration).

7 Remove the screw securing the lower end of the cable to the drive housing on the left-hand side of the front wheel (see illustration).

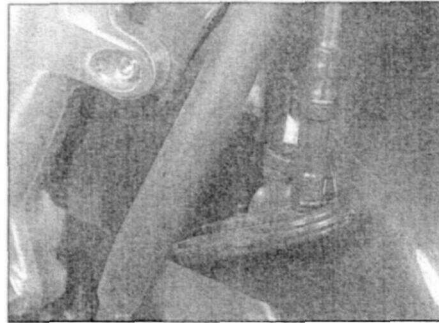
8 Withdraw the cable from the guides on the brake caliper and front mudguard and remove it from the bike, noting its correct routing.



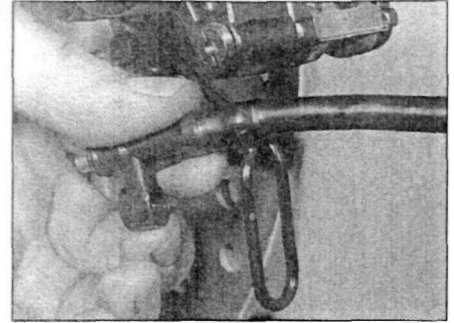
15.6 Unscrew the knurled ring to release the speedometer cable



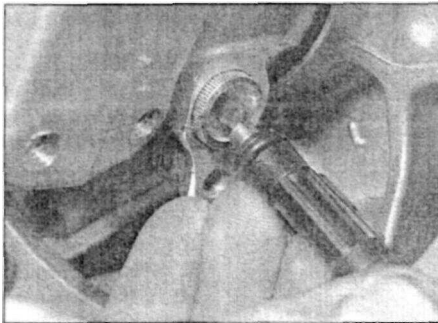
15.7 The speedometer cable is secured to the drive housing by a single screw (arrow)



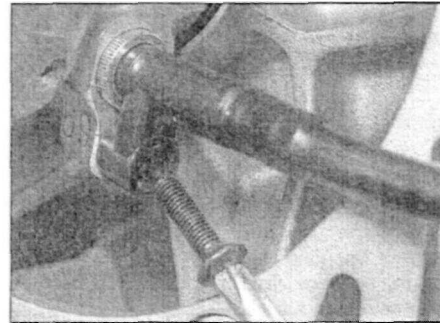
15.9a Pass the cable through its guide on the mudguard . . .



15.9b . . . and on the brake caliper



15.11a Align the slot in the cable with the drive tab . . .



15.11b . . . and secure the cable with its screw

Installation

9 Route the cable correctly and install it in its retaining guides on the front mudguard and the brake caliper (**see illustrations**).

10 Connect the cable upper end to the instrument cluster and tighten the retaining ring securely (**see illustration 15.6**).

11 Connect the cable lower end to the drive housing, aligning the slot in the cable end with the drive tab, and secure it with its screw (**see illustrations**).

12 Check that the cable doesn't restrict steering movement or interfere with any other components.

16 Instruments - check and replacement

15/16/17

Tachometer

Check

1 No test procedure is provided for the tachometer. If it is believed to be faulty, take the motorcycle to a Honda dealer for assessment. Prior to condemning the tachometer, check the yellow/blue wire from the tachometer to its take-off point on the ignition HT coil for continuity.

Replacement

2 On J, K and M models, remove the three screws and the four nuts on the back of the cluster which secure the rear cover, noting the

order of the washers and rubber grommets. Note the correct fitted position of the tachometer wires, then remove the wire retaining screws and detach the wires. Remove the bulbholders, then remove the rear cover and detach the tachometer from the front panel.

3 On P, S and T models, remove the screws securing the rear cover and remove the cover (**see illustration**). Note the correct fitted position of the tachometer wires, then remove the wire retaining screws and detach the wires (**see illustration**). Remove the bulbholders from their sockets. Unscrew the nuts securing the instrument bracket, the screws securing the tachometer, and the screws securing the front cover. Lift off the front cover and withdraw the tachometer from the cluster.

4 Install the tachometer by reversing the removal sequence. Make sure the wires are correctly and securely connected.

Speedometer

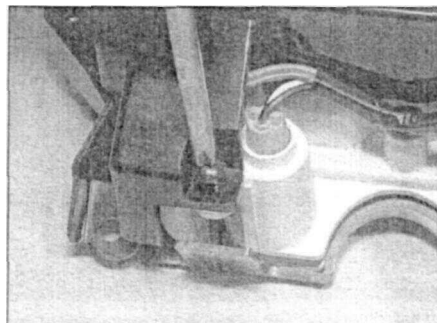
Check

5 Special instruments are required to properly check the operation of this meter. If it is believed to be faulty, take the motorcycle to a Honda dealer for assessment.

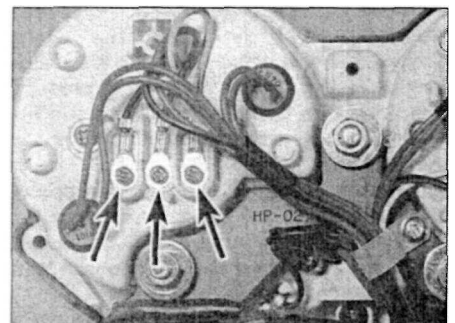
Replacement

6 On J, K and M models, unscrew the three screws and the four nuts on the back of the cluster which secure the rear cover, noting the order of the washers and rubber grommets. Unscrew the retaining screw from the centre of the odometer trip knob and remove the knob. Remove the bulbholders, then remove the rear cover and detach the speedometer from the front panel.

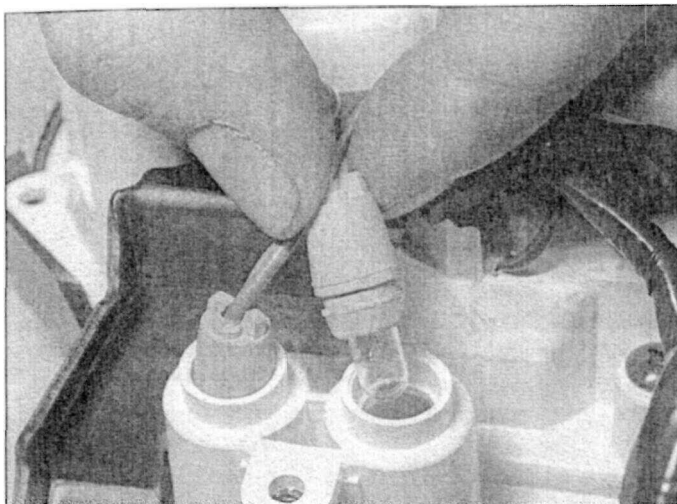
7 On P, S and T models, remove the screws securing the rear cover and remove the cover (**see illustration 16.3a**). Remove the bulbholders



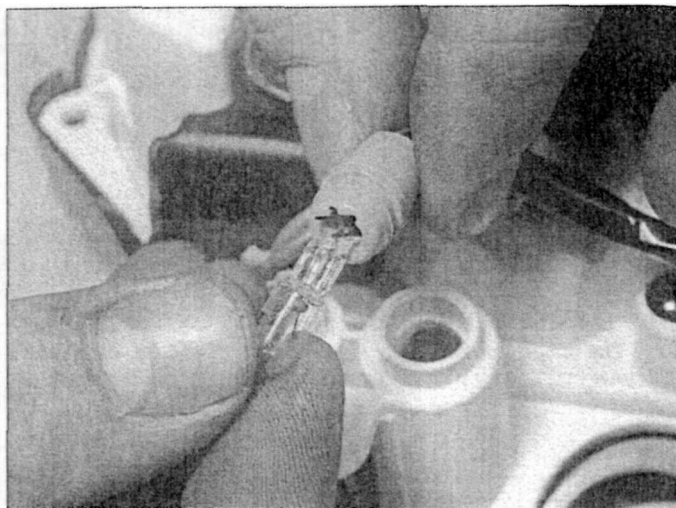
16.3a Remove the rear cover screws



16.3b Note the position of the tachometer wires before removing them (arrows)



17.4a Pull the bulbholder out of the instrument cluster , ,



17.4b . and the bulb out of the holder

from their sockets. Unscrew the retaining screw from the centre of the odometer trip knob and remove the knob. Unscrew the nuts securing the instrument bracket, the screws securing the speedometer drive box and the speedometer, and the screws securing the front cover. Lift off the front cover and withdraw the tachometer from the cluster.

8 Install the speedometer by reversing the removal sequence.

Temperature gauge

Check

9 See Chapter 3.

Replacement

10 The temperature gauge is integral with the tachometer. See above for the tachometer replacement procedure,

17 Instrument and warning light bulbs - replacement

- 1 Remove the instrument cluster (Section 15).
- 2 On J, K and M models, remove the three screws and the four nuts on the back of the cluster which secure the rear cover, noting the order of the washers and rubber *grommets*.
- 3 On P, S and T models, remove the screws securing the rear cover and remove the cover (see illustration 16.3a).
- 4 Pull the relevant bulbholder out of the back of the cluster (see illustration). Gently pull the bulb out of the bulbholder (see illustration). If the socket contacts are dirty or corroded, scrape them clean and spray with electrical contact cleaner before a new bulb is installed.
- 5 Push the new bulb into position; push the bulbholder back into the rear of the cluster.
- 6 Install the rear cover and the instrument cluster (see Section 15).

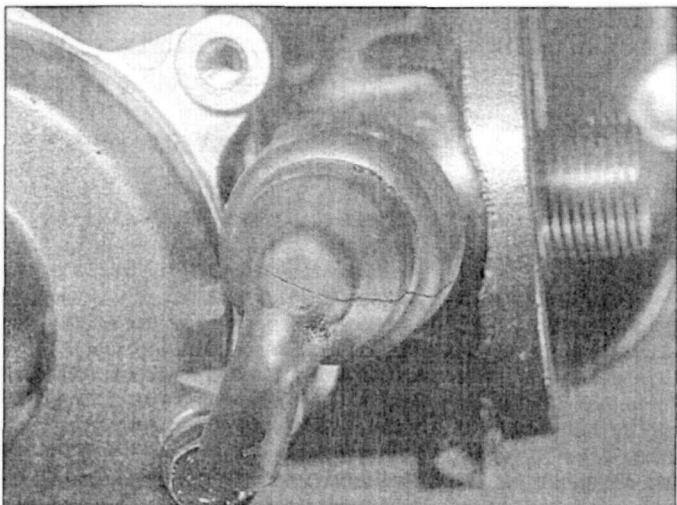
18 Oil pressure switch - check, removal and installation

Check

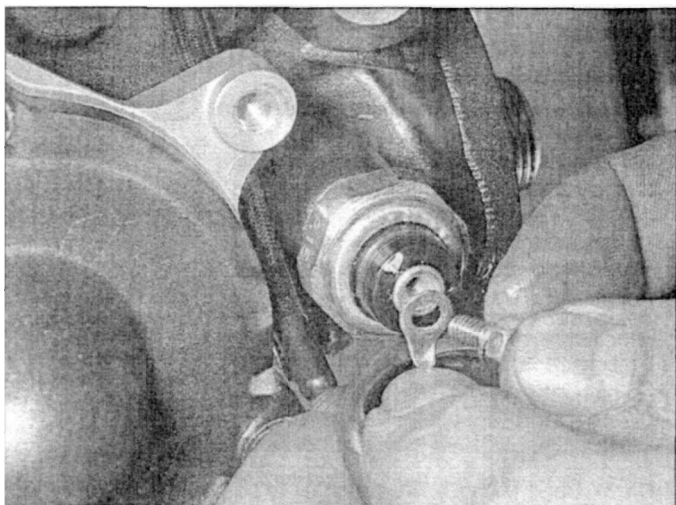
1 The oil pressure warning light should come on when the ignition (main) switch is turned ON and extinguish a few seconds after the engine is started. If the oil pressure light comes on whilst the engine is running, stop the engine immediately and carry out an oil pressure check as described in Chapter 2.

2 If the oil pressure warning light does not come on when the ignition is turned on, check the bulb (see Section 17) and fuses (see Section 5).

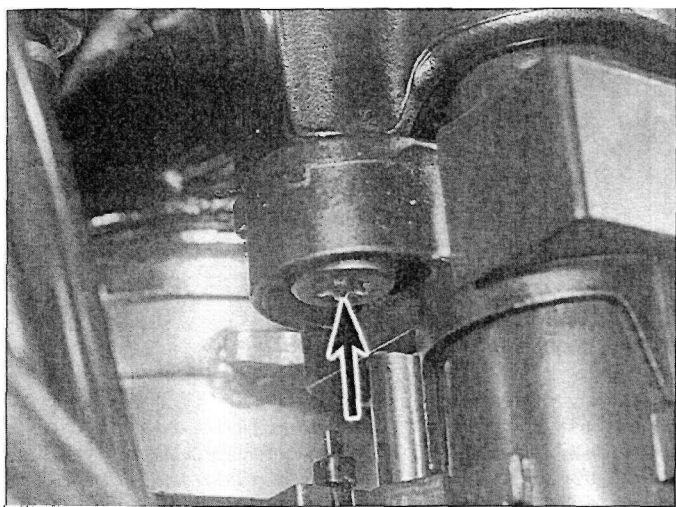
3 The oil pressure switch is screwed into the left-hand side of the crankcase just ahead of the oil filter (see illustration). Pull back the rubber cover and detach the wiring connector from the switch. With the ignition ON, earth



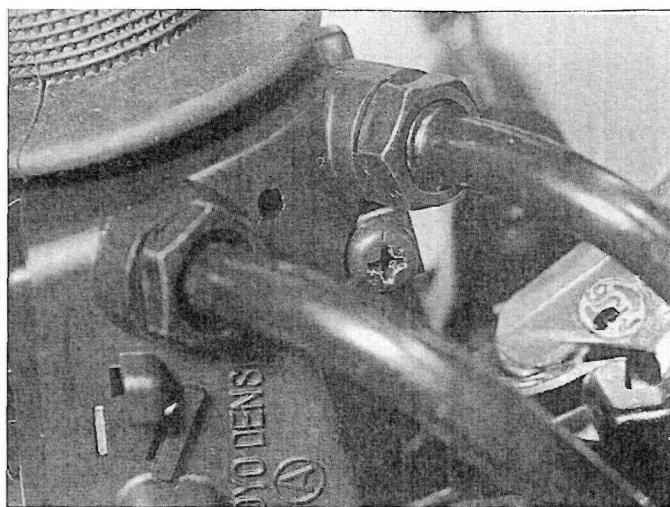
18.3 The oil pressure switch is located just ahead of the oil filter



18.7 The connector is secured to the oil pressure switch by a bolt



19.4 The ignition (main) switch is secured to the top yoke by two Torx bolts (arrow)



21.2 The right-hand handlebar switch is secured by two screws

the wire on the crankcase and check that the warning light comes on. If the light comes on, the switch is defective and must be replaced.

4 If the light still does not come on, check for voltage at the wire terminal using a test light. If there is no voltage present, check the wire between the switch, the instrument cluster and fusebox for continuity (see the *wiring diagram* at the end of this Chapter).

5 If the warning light comes on whilst the engine is running, yet the oil pressure is satisfactory, remove the wire from the oil pressure switch. With the wire detached and the ignition switched ON the light should be out. If it is illuminated, the wire between the switch and instrument cluster must be earthed at some point. If the wiring is good, the switch must be assumed faulty and replaced.

Removal

6 Drain the engine oil (see Chapter 1).

7 Unscrew the bolt securing the wiring connector to the bolt (see illustration). Unscrew the switch and withdraw it from the crankcase.

Installation

8 Apply a suitable sealant (3-Bond or equivalent) to the threads of the switch and install the switch; tighten it to the specified torque setting.

9 Refill the engine with oil (see Chapter 1).

10 Connect the wiring to the switch and check the operation of the switch (see Steps 1 to 5 above).

19 Ignition (main) switch - check, removal and installation

Note: To prevent the risk of short-circuits, disconnect the battery negative (-ve) lead before making ignition (main) switch checks.

Check

1 Remove the three screws securing the headlight rim to the headlight shell, and ease the rim out of the shell (see illustration 7.1). Trace the ignition (main) switch wiring back from the base of the switch and disconnect it at the connector in the headlight shell.

2 Using an ohmmeter or a continuity tester, check the continuity of the terminal pairs (see the *wiring diagram* at the end of this Chapter). Continuity should exist between the terminals connected by a solid line on the diagram when the switch is in the indicated position.

3 If the switch fails any of the tests, replace it.

Removal and installation

4 Remove the instrument cluster (Section 15). Unscrew the two Torx bolts securing the switch to the underside of the top yoke and remove the switch (see illustration). If access to the bolts is too restricted, also remove the top yoke (see Chapter 6, Section 8).

5 If the switch is being replaced, release the wiring from its clamp on the base of the switch, then unscrew the three screws and remove the contact plate from the base of the switch.

6 Installation is the reverse of removal. Tighten the switch mounting bolts to the specified torque setting.

20 Handlebar switches - check

1 Generally speaking, the switches are reliable and trouble-free. Most troubles, when they do occur, are caused by dirty or corroded contacts, but wear and breakage of internal parts is a possibility that should not be overlooked. If breakage does occur, the entire switch and related wiring harness will have to be replaced with a new one, since individual parts are not available.

2 The switches can be checked for continuity using an ohmmeter or a continuity test light. Always disconnect the battery negative (-ve) lead, which will prevent the possibility of a short-circuit, before making the checks.

3 Trace the wiring harness of the switch in question back to its connector(s) and disconnect it.

4 Using the ohmmeter or test light, check for continuity between the terminals of the switch harness with the switch in the various positions (ie switch off - no continuity, switch on - continuity) (see the *wiring diagram* at the end of this Chapter).

5 If the continuity check indicates a problem exists, refer to Section 21, remove the switch and spray the switch contacts with electrical contact cleaner. If they are accessible, the contacts can be scraped clean with a knife or polished with crocus cloth. If switch components are damaged or broken, it will be obvious when the switch is disassembled.

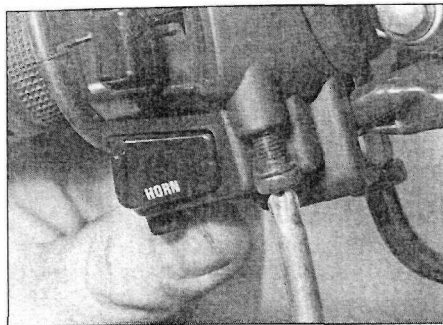
21 Handlebar switches - removal and installation

Right-hand handlebar switch

Removal

1 If the switch is to be removed from the bike, locate the switch wiring connector (either inside the headlight shell or under the fuel tank) and disconnect it. Work back along the harness, freeing it from all the relevant clips and ties, whilst noting its correct routing.

2 Disconnect the two wires from the brake light switch. Unscrew the switch retaining screw on its underside and remove the switch from the handlebar, noting how it fits (see illustration). Remove the throttle cables and cable elbows from the switch (see Chapter 4 if necessary).



21.5 The left-hand handlebar switch is secured by two screws

Installation

3 Installation is the reverse of removal. Make sure the locating pin in the lower half of the switch fits into the hole in the underside of the handlebar (see illustration 21.6). If necessary, refer to Chapter 4 for installation of the throttle cables,

Left-hand handlebar switch

Removal

4 If the switch is to be removed from the bike, locate the switch wiring connector (either inside the headlight shell or under the fuel tank) and disconnect it. Work back along the harness, freeing it from all the relevant clips and ties, whilst noting its correct routing.

5 Disconnect the two wires from the clutch switch. Unscrew the two switch retaining screws on the underside of the switch and remove the switch from the handlebar, noting how it fits (see illustration). Remove the choke cable (see Chapter 4 if necessary).

Installation

6 Installation is the reverse of removal. Make sure the locating pin in the lower half of the switch fits into the hole in the underside of the handlebar (see illustration). If necessary, refer to Chapter 4 for installation of the choke cable.

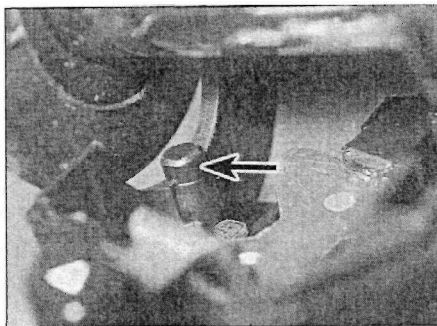
22 Neutral switch - check and replacement

Check

1 Before checking the electrical circuit, check the bulb (see Section 17) and fuse (see Section 5).

2 The switch is located on the left-hand side of the crankcase above the water pump (see illustration). Disconnect the wiring connector from the switch. Make sure the transmission is in neutral.

3 With the wire detached and the ignition switched ON, the neutral light should be out. If not, the wire between the switch and instrument cluster must be earthed at some point.



21.6 The pin (arrow) locates in the hole in the handlebar

4 Earth the wire on the crankcase (using a jumper wire if necessary) and check that the neutral light comes on. If the light comes on, but doesn't when connected to the switch, the switch is confirmed defective.

5 If the light does not come on when the wire is earthed, check for voltage at the wire terminal using a test light. If there's no voltage present, check the wire between the switch, the instrument cluster and fusebox (see the *wiring diagram* at the end of this Chapter).

Replacement

6 Drain the engine oil (see Chapter 1).

7 Disconnect the wiring connector from the switch (see illustration 22.2).

8 Unscrew the switch from the crankcase and remove it along with its sealing washer. Discard the washer as a new one must be used.

9 Clean the threads of the switch and fit a new sealing washer to it.

10 Install the switch and tighten it to the torque setting specified at the beginning of the Chapter, then reconnect the wiring connector.

11 Check the operation of the neutral light.

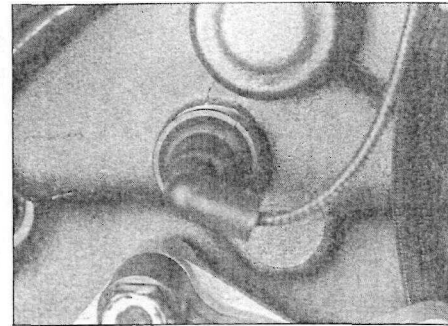
12 Fill the engine with oil (see Chapter 1).

23 Side stand switch - check and replacement

Check

1 The side stand switch is mounted on the frame just behind the side stand (**see illustration 23.6**). The switch is part of the safety circuit which prevents or stops the engine running if the transmission is in gear whilst the side stand is down, and prevents the engine from starting if the transmission is in gear unless the side stand is up and the clutch is pulled in. A warning light on the instrument cluster indicates when the side stand is down. Before checking the electrical circuit, check the bulb (see Section 17) and fuse (see Section 5).

2 Trace the wiring back from the switch to its connector behind the left-hand side panel and disconnect it.



22.2 The neutral switch is located above the water pump

3 Check the operation of the switch using an ohmmeter or continuity test light. Connect the meter to the yellow/black and green wires on the switch side of the connector. With the side stand down there should be continuity (zero resistance) between the terminals, and with the stand up there should be no continuity (infinite resistance). Connect the meter to the green/white and green wires on the switch side of the connector. With the side stand up there should be continuity (zero resistance) between the terminals, and with the stand down there should be no continuity (infinite resistance).

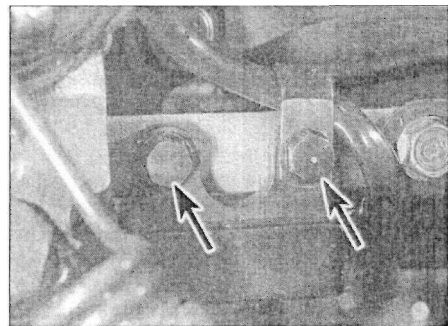
4 If the switch does not perform as expected, it is defective and must be replaced. Check first that the fault is not caused by a sticking switch plunger due to the ingress of road dirt; spray the switch with a water dispersant aerosol.

5 If the switch is good, check the other components in the starter circuit as described in the relevant sections of this Chapter. If all components are good, check the wiring between the various components (see the *wiring diagram* at the end of this chapter).

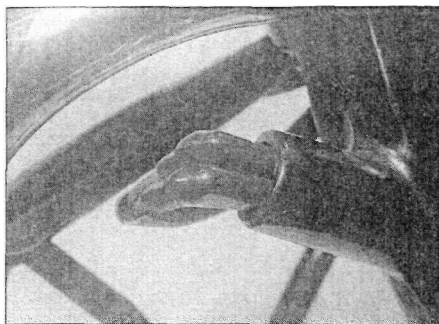
Replacement

6 The side stand switch is mounted on the frame just behind the side stand (see illustration). Trace the wiring back from the switch to its connector behind the left-hand side panel and disconnect it.

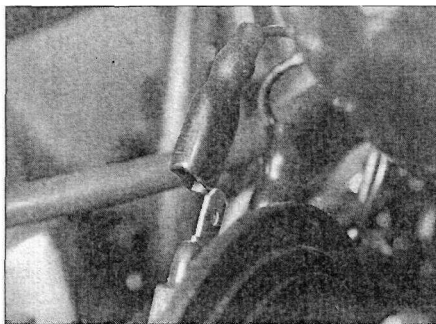
7 Work back along the switch wiring, freeing it from any relevant retaining clips and ties, noting its correct routing.



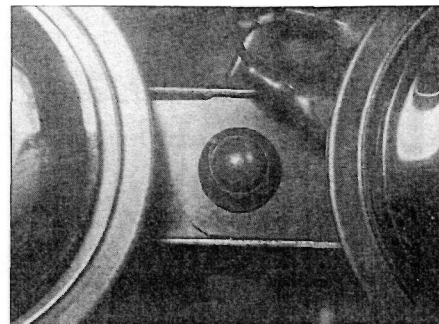
23.6 The side stand switch is secured by two bolts (arrows). Note the wiring clip on the right-hand bolt



24.4 The clutch switch is a push fit into the lever bracket



26.2 Disconnect the horn wiring connectors



26.4 The horns are secured to the bracket by a single nut

8 Unscrew the two bolts securing the switch to the frame.

9 Fit the new switch to the frame and install the retaining bolts, tightening them securely.

10 Make sure the wiring is correctly routed up to the connector and retained by all the necessary clips and ties.

11 Reconnect the wiring connector and check the operation of the side stand switch.

24 Clutch switch - check and replacement



Check

1 The clutch switch is situated on the base of the clutch lever bracket. The switch is part of the safety circuit which prevents or stops the engine running if the transmission is in gear whilst the side stand is down, and prevents the engine from starting if the transmission is in gear unless the side stand is up and the clutch is pulled in.

2 To check the switch, disconnect the wiring connectors from the switch (**see illustration 24.4**). Connect the probes of an ohmmeter or a continuity test light to the two switch terminals. With the clutch lever pulled in, continuity should be indicated. With the clutch lever out, no continuity (infinite resistance) should be indicated.

3 If the switch is good, check the other components in the starter circuit as described in the relevant sections of this Chapter. If all components are good, check the wiring between the various components (see the *wiring diagram* at the end of this chapter).

Replacement

4 Disconnect the wiring connector from the clutch switch (**see illustration**). Adjust the clutch lever freeplay adjuster to provide as much freeplay in the lever as possible (see Chapter 1), then unscrew the lever locknut and pivot bolt and displace the lever with the cable still attached. The clutch switch is a push fit into the bracket. Push the switch from its connector end and withdraw it from the bracket.

5 Install the new switch and the lever in a reverse of the removal procedure, then connect the wiring connector. Adjust the clutch lever freeplay (see Chapter 1).

25 Clutch diode - check and replacement



Check

1 Remove the seat (see Chapter 8).

2 The diode is a small block that plugs into a connector in the main wiring harness. Disconnect the diode from the harness.

3 On J and K models, using an ohmmeter or continuity tester, connect its probes across the two terminals of the diode and note the reading. Reverse the meter probes and note the reading. The diode should only allow electricity to flow in one direction - if it indicates continuity in both directions or high resistance in both directions, the diode is faulty.

4 The diode block on M, P, S and T models contains two diodes. Using an ohmmeter or continuity tester, connect one of its probes to the single positive (+) terminal on the diode and the other probe to one of the two negative terminals on the diode. Note the reading and then reverse the probes. The diode should only allow electricity to flow in one direction - if it indicates continuity in both directions or high resistance in both directions, the diode is faulty. Now check the other diode, by making the same test across the single positive terminal and the other negative terminal.

5 If the diode is good, check the other components in the starter circuit as described in the relevant sections of this Chapter. If all components are good, check the wiring between the various components (see the *wiring diagrams* at the end of this chapter).

Replacement

6 Remove the seat (see Chapter 8).

7 The diode is a small block that plugs into a connector in the main wiring harness. Disconnect the diode and connect the new one.

26 Horns - check and replacement

Check

1 The horns are mounted to a bracket on the bottom yoke (**see illustration 26.4**).

2 Unplug the wiring connectors from the horn being tested (**see illustration**). Using two jumper wires, apply battery voltage directly to the terminals on the horn. If the horn sounds, check the switch (see Section 20) and the wiring between the switch and the horn (see the *wiring diagrams* at the end of this Chapter).

3 If the horn doesn't sound, replace it.

Replacement

4 The horns are mounted to a bracket on the bottom yoke (**see illustration**).

5 Unplug the wiring connectors from the horns (**see illustration 26.2**), then unscrew the nut securing the horns to their mounting bracket and remove them from the bike.

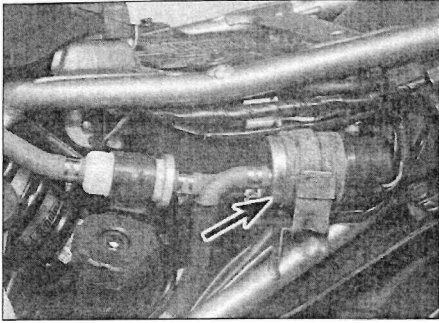
6 Install the horns and securely tighten the nut. Connect the wiring connectors to the horns.

27 Fuel pump - check, removal and installation

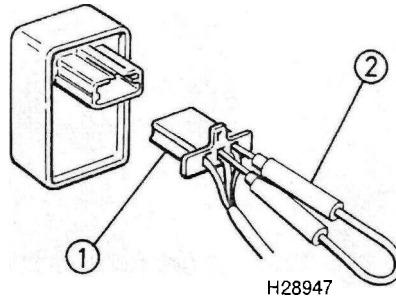
Warning: Petrol is extremely flammable, so be sure to take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance is present. If you spill any fuel on your skin, rinse it off immediately with soap and water. When you perform any kind of work on the fuel system, wear safety glasses and have a fire extinguisher suitable for a class B type fire (flammable liquids) on hand.

Check

1 The fuel pump is located behind the left-hand side panel (**see illustration**). The fuel



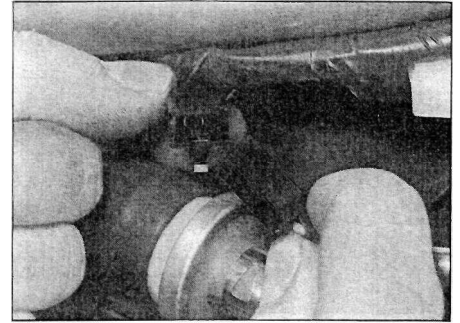
27.1 Fuel pump (arrow)



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27.4 Disconnect the fuel pump relay wiring connector and connect across the terminals using a jumper wire

1 Relay wiring connector 2 Jumper wire



27.8 Disconnect the fuel pump wiring connector

pump relay is located behind the right-hand side panel. Remove the side panels for access (see Chapter 8).

2 The fuel pump is controlled through the fuel cut-off relay so that it runs whenever the ignition is switched "ON" and the ignition is operative (ie, only when the engine is turning over). As soon as the ignition is killed, the relay will cut off the fuel pump's electrical supply (so that there is no risk of fuel being sprayed out under pressure in the event of an accident).

3 It should be possible to hear or feel the fuel pump running whenever the engine is turning over - either place your ear close beside the pump or feel it with your fingertips. If you can't hear or feel anything, check the circuit fuse (see Section 5). If the fuse is good, check the pump and relay for loose or corroded connections or physical damage and rectify as necessary.

4 If the circuit is fine so far, switch the ignition "OFF", unplug the relay's wiring connector and connect across the black and black/blue terminals of the connector with a short length of insulated jumper wire (see illustration). Switch the ignition "ON"; the pump should operate.

5 If the pump now works, either the relay or its wiring is at fault. Test the wiring as follows.

6 Check for full battery voltage at the relay's black terminal with the ignition switch "ON". If there is no battery voltage, there is a fault in the circuit between the relay and the fuse - trace and rectify the fault as outlined in Section 2; refer to the wiring diagram at the end of this Chapter. Switch the ignition OFF. Next check for continuity on the blue/yellow wire between the relay and the ignition control unit, and on the black/blue wire between the relay and the pump. If there is no continuity on any of these wires, trace and rectify the fault as described in Section 2.

7 If these wiring checks reveal no faults, reconnect the relay and try the circuit again.

8 If the pump still does not work, trace the wiring from the pump and disconnect it at the black 2-pin wiring connector (see illustration). Using a fully-charged 12 volt battery and two

insulated jumper wires, connect the positive (+ve) terminal of the battery to the pump's black/blue terminal, and the negative (-ve) terminal of the battery to the pump's green terminal. The pump should operate. If the pump does not operate it must be replaced.

9 If the pump works and all the relevant wiring and connectors are good, then the relay is at fault. The only definitive test of the relay is to substitute it with one that is known to be good. If substitution does not cure the problem, bear in mind that the ignition control unit could be faulty.

10 If the pump operates but is thought to be delivering an insufficient amount of fuel, first check the fuel tank breather and the condition and routing of the pipes between the tank, the pump and the filter (see Chapter 4). Check carefully for signs of kinked, trapped, pinched or blocked pipes.

11 The fuel pump's output can be checked as follows: make sure the ignition switch is "OFF", then remove the side panels (see Chapter 8).

12 Disconnect the fuel output hose (the inlet hose comes from the filter, the outlet hose goes to the carburettors) from the pump and connect a spare length of fuel hose from the

outlet and into a graduated beaker capable of holding about a litre (see illustration).

13 Disconnect the fuel cut-off relay's wiring connector. Using a short length of insulated jumper wire, connect across the black and the black/blue wire terminals of the connector (see illustration 27.4).

14 Turn the ignition switch "ON" and let fuel flow from the pump into the beaker for 5 seconds, then switch the ignition "OFF".

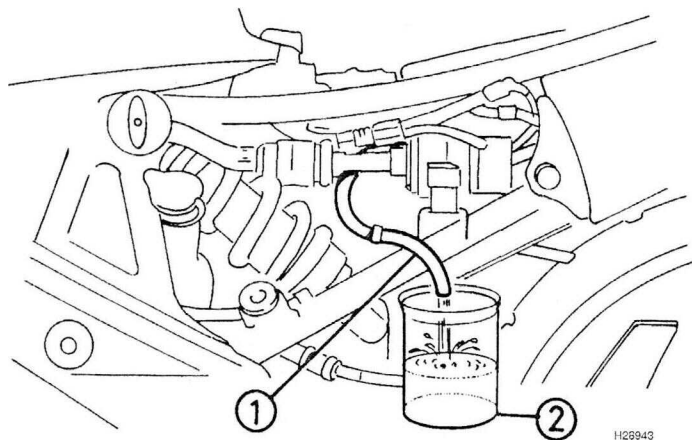
15 Record the amount of fuel that has flowed into the beaker, then multiply that amount by 12 to determine the fuel pump flow rate per minute. The minimum flow rate required is 600 cc per minute. If the flow rate recorded is below the minimum required, then the fuel pump must be replaced.

Removal

16 Make sure both the ignition and the fuel tap are switched "OFF". Remove the left-hand side panel (see Chapter 8).

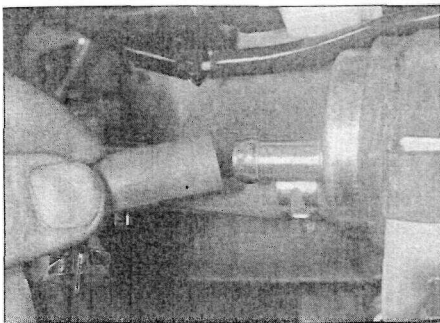
17 Trace the wiring from the fuel pump and disconnect it at the black 2 pin connector (see illustration 27.8).

18 Using a rag to mop up any spilled fuel, disconnect the two fuel hoses from the fuel pump, noting which hose fits on which

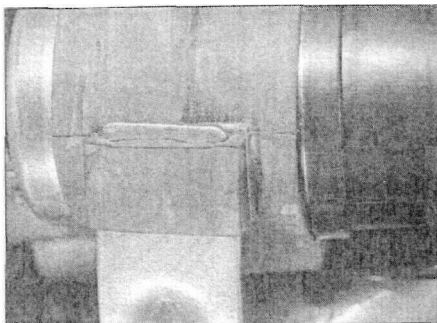


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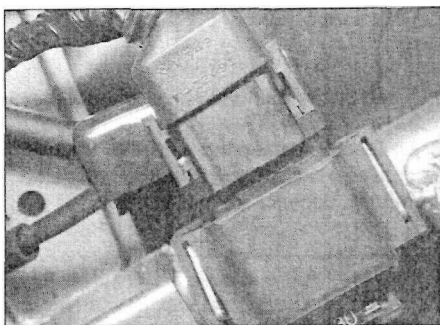
27.12 Connect a length of fuel hose (1) from the pump outlet and into a graduated beaker (2)



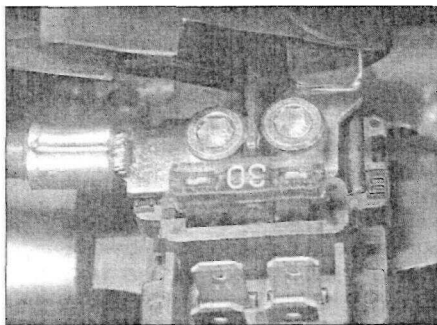
27.18a Disconnect the fuel hoses from the pump . . .



27.18b . . . and remove the pump rubber mounting from its tab



28.2 Starter relay is secured to the frame behind the left-hand side of the rear cowl



28.8 Starter relay terminals

nozzle. Remove the pump with its rubber mounting sleeve from the mounting bracket tab, taking care not to snag the wiring (see illustrations).

19 To remove the fuel cut-off relay, disconnect its wiring connector and remove it from its mounting lug.

Installation

20 Installation is a reverse of the removal procedure. Make sure the fuel hoses are correctly and securely fitted to the pump. Start the engine and look carefully for any signs of leaks at the pipe connections.

28 Starter relay - check and replacement

Check

- 1 If the starter circuit is faulty, first check the fuses (see Section 5).
- 2 The starter relay is located behind the left-hand side of the rear cowl (see illustration). Remove the cowl for access to the relay (see Chapter 8). With the ignition switch ON, the engine kill switch in RUN and the transmission in neutral, press the starter switch. The relay should be heard to click.
- 3 If the relay doesn't click, switch off the ignition. Remove the relay from the motorcycle as described below and test it as follows.
- 4 Set a multimeter to the ohms x 1 scale and connect it across the relay's starter motor and battery lead terminals. Using a fully-

charged 12 volt battery and two insulated jumper wires, connect the positive (+ve) terminal of the battery to the yellow/red wire terminal of the relay, and the negative (-ve) terminal to the green/red wire terminal of the relay. At this point the relay should be heard to click and the multimeter read 0 ohms (continuity). If this is the case the relay is proved good. If the relay does not click when battery voltage is applied and indicates no continuity (infinite resistance) across its terminals, it is faulty and must be replaced.

5 If the relay is good, check for battery voltage between the yellow/red wire and the green/red wire when the starter button is pressed. Check the other components in the starter circuit as described in the relevant sections of this Chapter. If all components are good, check the wiring between the various components (see the *wiring diagram* at the end of this chapter).

Replacement

- 6 Remove the rear cowl (see Chapter 8).
- 7 Disconnect the battery terminals, remembering to disconnect the negative (-ve) terminal first.
- 8 Disconnect the relay wiring connector, then unscrew the two bolts securing the starter motor and battery leads to the relay and detach the leads (see illustration). Remove the relay with its rubber sleeve from its mounting lugs on the frame.
- 9 Installation is the reverse of removal ensuring that the terminal screws are securely tightened. Connect the negative (-ve) lead last when reconnecting the battery.

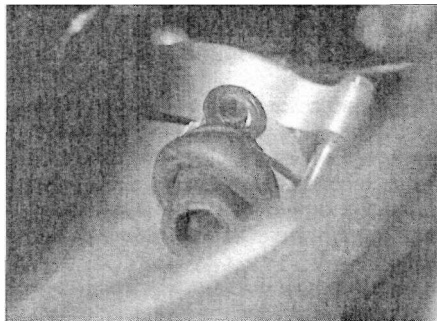
29 Starter motor - removal and installation

Removal

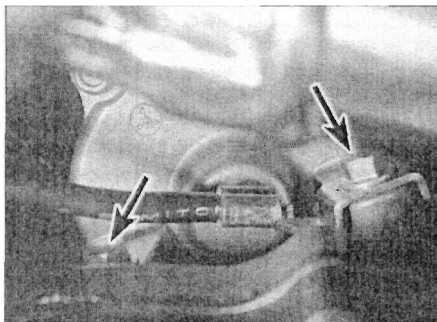
- 1 Remove the seat and the side panels (see Chapter 8). Disconnect the battery negative (-ve) lead.
- 2 Peel back the rubber cover and unscrew the nut securing the starter cable to the motor (see illustration).
- 3 Unscrew the two bolts securing the starter motor to the crankcase (see illustration). Note the earth cable secured by the front mounting bolt.
- 4 Slide the starter motor out from the crankcase and remove it from the left-hand side of the machine.
- 5 Remove the O-ring on the end of the starter motor and discard it as a new one must be used.

Installation

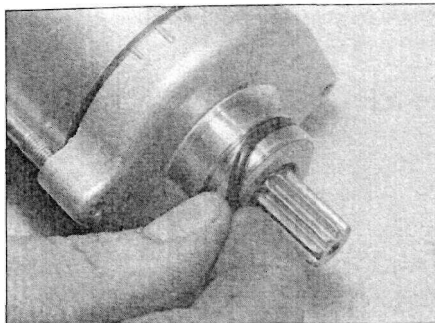
- 6 Install a new O-ring on the end of the starter motor and ensure it is seated in its groove (see illustration). Apply a smear of engine oil to the O-ring to aid installation.
- 7 Manoeuvre the motor into position and slide it into the crankcase (see illustration). Ensure that the starter motor teeth mesh correctly with those of the starter idler gear.
- 8 Install the retaining bolts and tighten them securely, not forgetting the earth cable on the front bolt (see illustration 29.3).



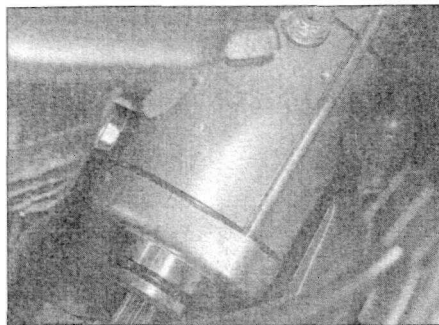
29.2 Pull back the rubber cover and unscrew the terminal nut



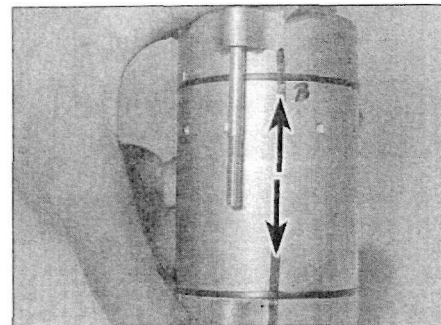
29.3 The starter motor is secured by two bolts (arrows). Note the earth cable secured by the front bolt



29.6 Fit a new O-ring to the starter motor



29.7 Manoeuvre the starter motor into position



30.2 Make alignment marks between the main housing and the covers (arrows)

9 Connect the cable and spring washer, and secure them with the retaining nut (**see illustration 29.2**). Make sure the rubber cover is correctly seated over the terminal.

10 Connect the battery negative (-ve) lead and install the seat.

30 Starter motor - disassembly, inspection and reassembly



Disassembly

- 1 Remove the starter motor (see Section 29).
- 2 Make alignment marks between the main housing and the two covers (**see illustration**).

3 Unscrew the two long bolts then remove the rear cover from the motor along with its sealing ring (**see illustration**). Discard the sealing ring as a new one must be used for reassembly. Remove the shim(s) from the rear end of the armature noting their correct fitted positions.

4 Remove the front cover from the motor along with its sealing ring. Discard the sealing ring as a new one must be used for reassembly. Recover the toothed washer from the cover and slide off the insulating washer and shim(s) from the front end of the armature, noting their correct fitted locations.

5 Withdraw the armature from the main housing.

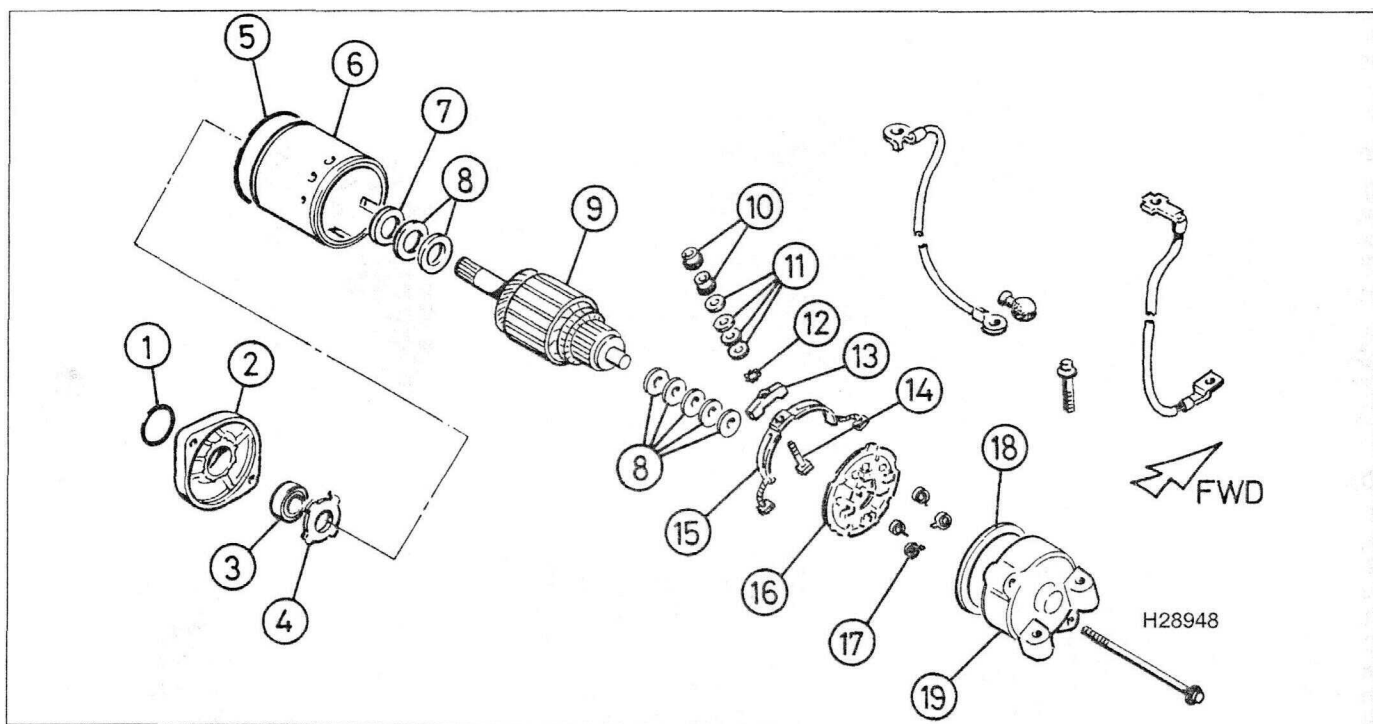
6 Noting the correct fitted location of each washer, unscrew the nut from the terminal

bolt and remove the plain washer, the various insulating washers and the rubber O-ring. Withdraw the terminal bolt and brushplate assembly from the main housing and recover the insulator.

7 Lift each brush spring end onto the top of each brush holder and slide the brushes out from their holders (**see illustration**).

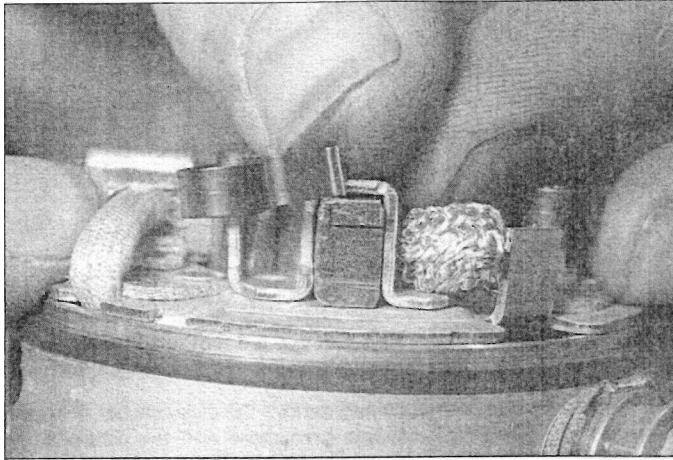
HAYNES HINT

Lifting the end of the brush spring so that it is against the top of the brush holder and not pressing the brush inwards makes it much easier to install the armature on reassembly.

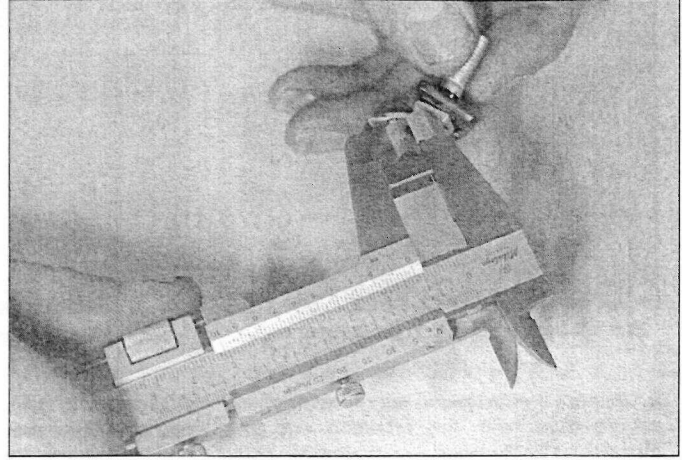


30.3 Starter motor components

- | | | | | |
|------------------|---------------------|-----------------------|-------------------|------------------|
| 7 O-ring | 5 Sealing ring | 9 Armature | 13 Insulator | 17 Brush springs |
| 2 Front cover | 6 Main housing | 10 Nuts | 14 Terminal bolt | 18 Sealing ring |
| 3 Oil seal | 7 Insulating washer | 11 Insulating washers | 15 Brush assembly | 19 Rear cover |
| 4 Toothed washer | 8 Shims | 12 O-ring | 16 Brush plate | |



30.7 Lift the spring end off the brush and secure it against the top of the brush holder, then remove the brush



30.8 Measure the brush length

Inspection

8 The parts of the starter motor that are most likely to require attention are the brushes. Measure the length of the brushes and compare the results to the brush length listed in this Chapter's Specifications (**see illustration**). If any of the brushes are worn beyond the service limit, replace the brush assembly with a new one. If the brushes are not worn excessively, nor cracked, chipped, or otherwise damaged, they may be re-used.

9 Inspect the commutator bars on the armature for scoring, scratches and discoloration. The commutator can be cleaned and polished with crocus cloth, but do not use

sandpaper or emery paper. After cleaning, wipe away any residue with a cloth soaked in electrical system cleaner or denatured alcohol.

10 Using an ohmmeter or a continuity test light, check for continuity between the commutator bars (**see illustration**). Continuity should exist between each bar and all of the others. Also, check for continuity between the commutator bars and the armature shaft (**see illustration**). There should be no continuity (infinite resistance) between the commutator and the shaft. If the checks indicate otherwise, the armature is defective.

11 Check for continuity between each brush and the terminal bolt. There should be

continuity (zero resistance). Check for continuity between the terminal bolt and the housing (when assembled). There should be no continuity (infinite resistance).

12 Check the starter pinion gear for worn, cracked, chipped and broken teeth. If the gear is damaged or worn, replace the starter motor.

13 Inspect the end cover for signs of cracks or wear. Inspect the magnets in the main housing and the housing itself for cracks.

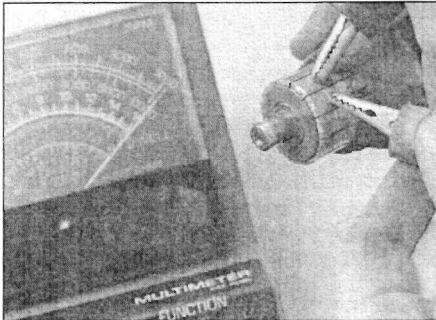
14 Inspect the insulating washers, O-ring and front cover oil seal for signs of damage and replace if necessary.

Reassembly

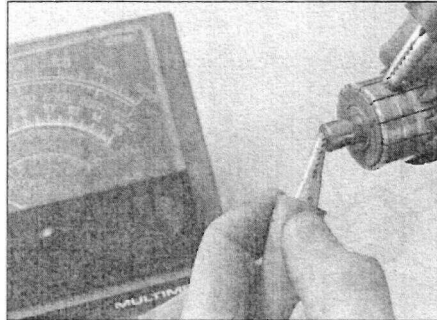
15 Check that each brush spring is retained against the top of its brush holder so that it will not exert any pressure on the brush, then slide all the brushes back into position in their holders (**see illustration 30.7**).

16 Fit the insulator to the main housing, then insert the terminal bolt through the brushplate and housing and install the brushplate assembly, making sure its tab is correctly located in the housing slot (**see illustrations**).

17 Slide the rubber O-ring and small insulating washer(s) onto the terminal bolt, followed by the large insulating washer(s) and the plain washer. Fit the nut to the terminal bolt and tighten it securely (**see illustration**).



30.10a Continuity should exist between the commutator bars



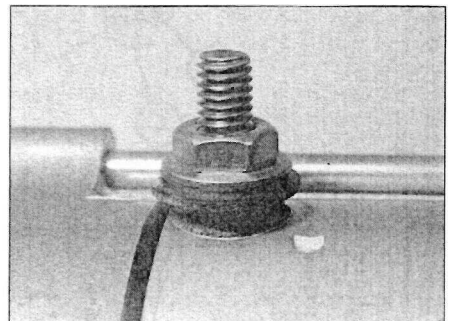
30.10b There should be no continuity between the commutator bars and the armature shaft



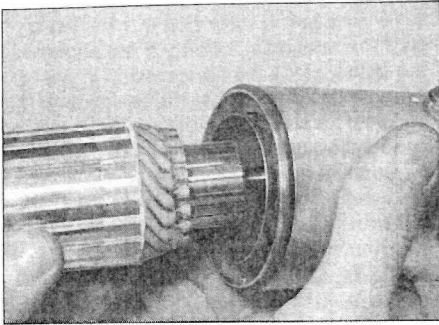
30.16a Locate the insulator in the housing . . .



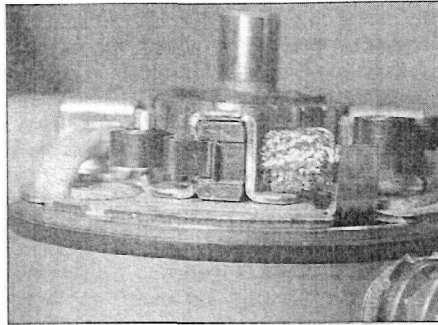
30.16b . . . and install the brushplate assembly and terminal bolt



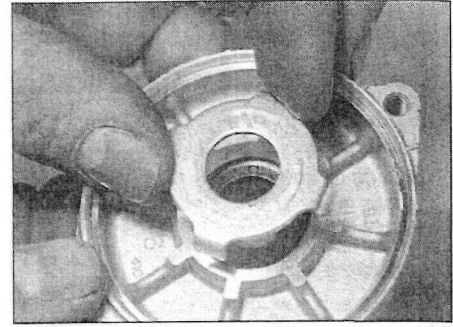
30.17 Terminal assembly



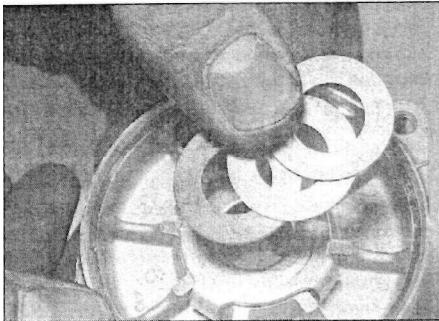
30.18a Install the armature into the housing



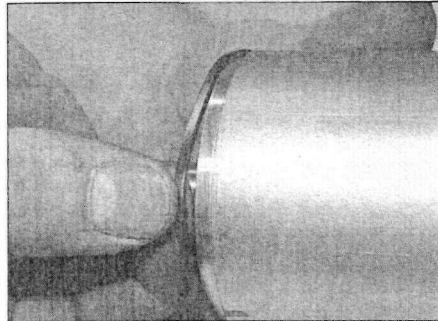
30.18b Fit the brush spring ends onto the brushes



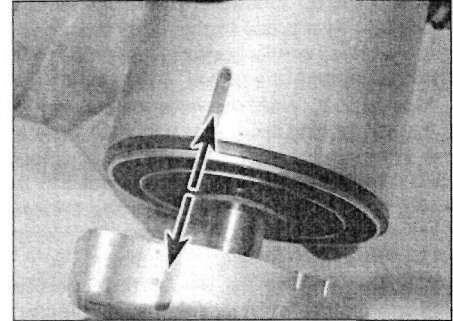
30.19 Fit the toothed washer to the front cover



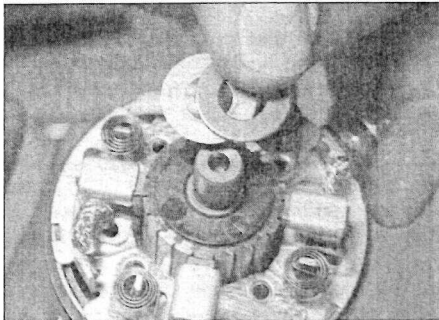
30.20a The insulating washer fits against the front cover, with the shims behind it



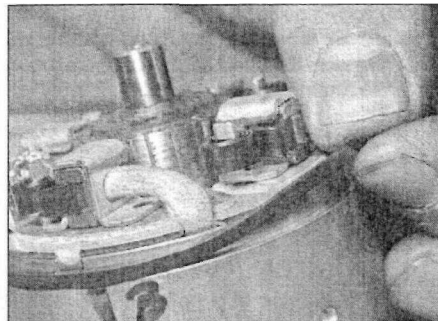
30.20b Fit a new sealing ring to the housing . . .



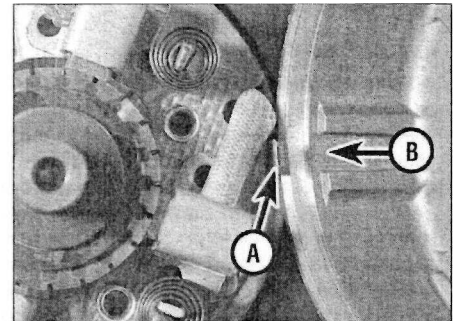
30.20c . . . then install the front cover, aligning the marks (arrows)



30.21 Fit the shims onto the end of the shaft



30.22a Fit a new sealing ring to the housing . . .



30.22b . . . then install the rear cover, aligning the tab on the brushplate (A) with the groove (B)

18 Insert the armature in the front of the housing and locate the brushes on the commutator bars. Slip each brush spring end on the top of the brush housing and onto the brush end (**see illustration**). Check that each brush is securely pressed against the commutator by its spring and is free to move easily in its holder.

19 Fit the toothed washer to the front cover so that its teeth are correctly located with the cover ribs (**see illustration**). Apply a smear of grease to the cover oil seal lip.

20 Slide the shim(s) onto the front end of the armature shaft, then fit the insulating washer (**see illustration**). Fit a new sealing ring to the housing and carefully slide the front cover into position, aligning the marks made on removal (**see illustrations**).

21 Fit the shims to the rear of the armature shaft (**see illustration**).

22 Fit a new sealing ring to the housing (**see illustration**). Align the rear cover groove with the brushplate outer tab and install the cover (**see illustration**).

23 Check the marks made on removal are correctly aligned then fit the long bolts and tighten them securely (**see illustration 30.2**).

24 Install the starter motor (see Section 29).

31 Charging system testing - general information and precautions

1 If the performance of the charging system is suspect, the system as a whole should be

checked first, followed by testing of the individual components. **Note:** Before beginning the checks, make sure the battery is fully charged and that all system connections are clean and tight.

2 Checking the output of the charging system and the performance of the various components within the charging system requires the use of a multimeter (with voltage, current and resistance checking facilities).

3 When making the checks, follow the procedures carefully to prevent incorrect connections or short circuits, as irreparable damage to electrical system components may result if short circuits occur.

4 If a multimeter is not available, the job of checking the charging system should be left to a Honda dealer.

32 Charging system - leakage and output test

1 If the charging system of the machine is thought to be faulty, remove the seat (see Chapter 8) for access to the battery. Perform the following checks.

Leakage test

2 Make sure the ignition (main) switch is OFF and disconnect the lead from the battery negative (-ve) terminal.

3 Set the ammeter or multimeter to the mA (milli Amps) function, then connect its negative (-ve) probe to the battery negative (-ve) terminal, and its positive (+ve) probe to the disconnected negative (-ve) lead (**see illustration**). With the meter connected like this the reading should not exceed 0.1 mA.

4 If the reading exceeds the specified amount it is likely that there is a short-circuit in the wiring. Thoroughly check the wiring between the various components (see the *wiring diagram* at the end of this chapter).

5 If the reading is below the specified amount, the leakage rate is satisfactory. Disconnect the meter and connect the negative (-ve) lead to the battery, tightening it securely. Check the alternator output as described below.

Output test

6 Start the engine and warm it up to normal operating temperature.

7 Allow the engine to idle and connect a voltmeter or multimeter set to the 0-20 volts dc scale across the terminals of the battery (positive (+ve) lead to battery positive (+ve) terminal, negative (-ve) lead to battery negative (-ve) terminal). Slowly increase the engine speed to 3000 rpm and note the reading obtained. At this speed the voltage should be 13.5 to 15.5 volts. If the voltage is below this it will be necessary to check the alternator and regulator as described in the

following Sections. **Note:** Occasionally the condition may arise where the charging voltage is excessive. This condition is almost certainly due to a faulty regulator/rectifier which should be tested as described in Section 35. Stop the engine and disconnect the meter.

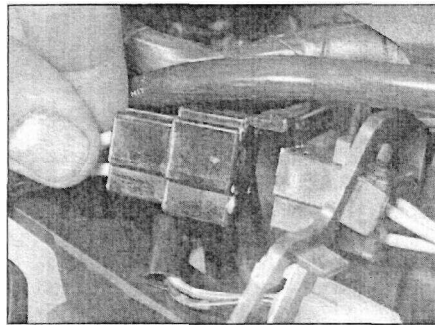
HINT	Clues to a faulty regulator are constantly blowing bulbs, with brightness varying considerably with engine speed, and battery overheating.
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33 Alternator - removal and installation

Removal

1 Remove the right-hand side panel (see Chapter 8). Trace the wiring back from the alternator and disconnect it at the connector (**see illustration**). Release the wiring from any clips or ties.

2 Working in a criss-cross pattern, evenly slacken the left-hand side crankcase front cover retaining bolts. Lift the cover away from the engine, being prepared to catch any residual oil which may be released as the cover is removed. Remove the gasket and discard it. Note the positions of the two locating dowels fitted to the crankcase and remove them for safe-keeping if they are loose.



33.1 Disconnect the alternator wiring connector

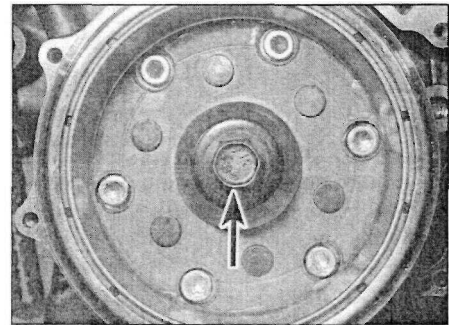
3 To remove the rotor bolt it is necessary to stop the rotor from turning. If the engine is in the frame, place the transmission in gear and have an assistant apply the rear brake, then unscrew the bolt - note that the bolt has a left-hand thread and so must be turned clockwise for removal (**see illustration**). If the engine is removed from the frame, a strap wrench can be used to hold the rotor or it can be locked with the Honda service tool (Pt. No. 07725-0040000).

4 Remove the idle/reduction gear along with its shaft (**see illustration**). To remove the rotor from the shaft it is necessary to use a rotor puller to release the rotor from the crankshaft taper. Use only the specified service tool (Pt. No. 07733-0020001) or a commercially available equivalent - the rotor might be damaged by other removal methods. Thread the rotor puller into the rotor threads and turn it clockwise until the rotor is displaced from the shaft (**see illustration**). Note how the Woodruff key in the crankshaft locates in the slot in the rotor.

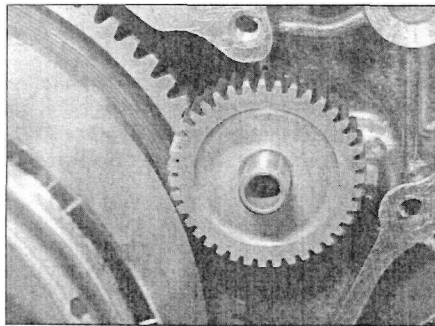
5 To remove the stator from the crankcase cover, unscrew the four bolts securing the stator, and the bolt securing the wiring clip, then remove the assembly from the cover, noting how the rubber wiring grommet fits (**see illustrations**).

Installation

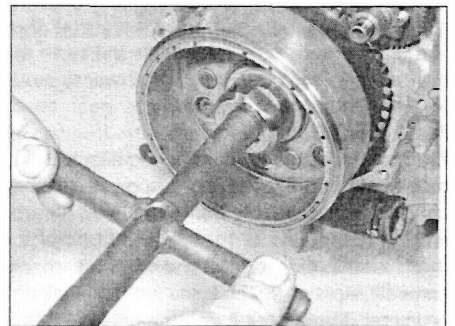
6 Make sure that no metal objects have attached themselves to the magnet on the inside of the rotor and that the Woodruff key is in its slot in the crankshaft, then align the slot



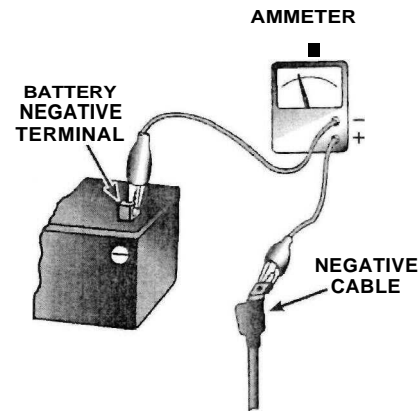
33.3 Alternator rotor bolt (arrow)



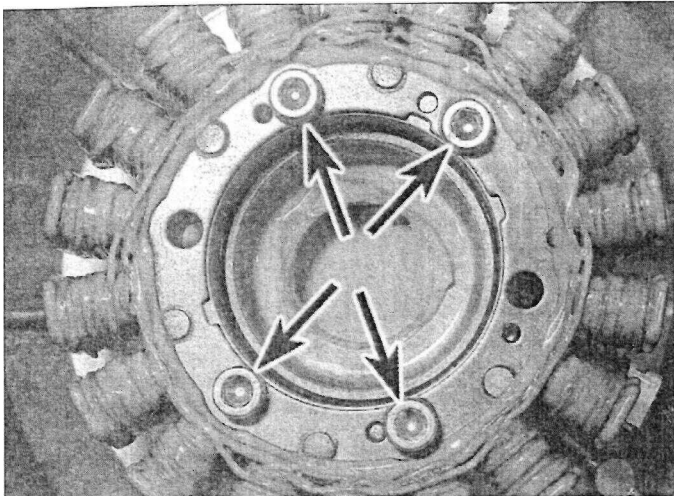
33.4a Remove the idle/reduction gear and its shaft



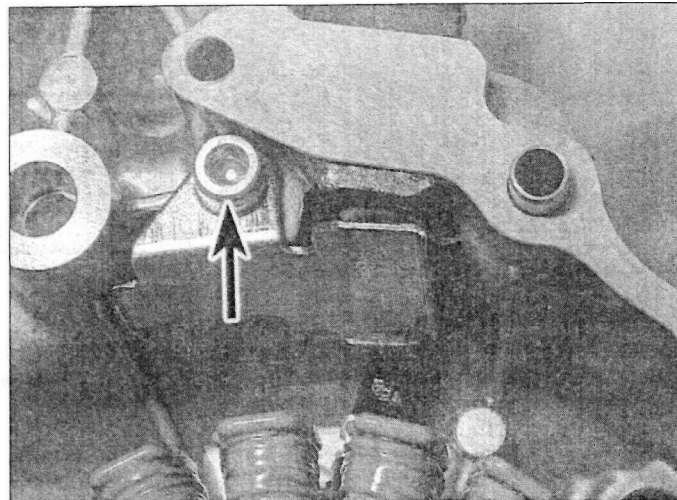
33.4b Use only the specified tool to extract the alternator rotor



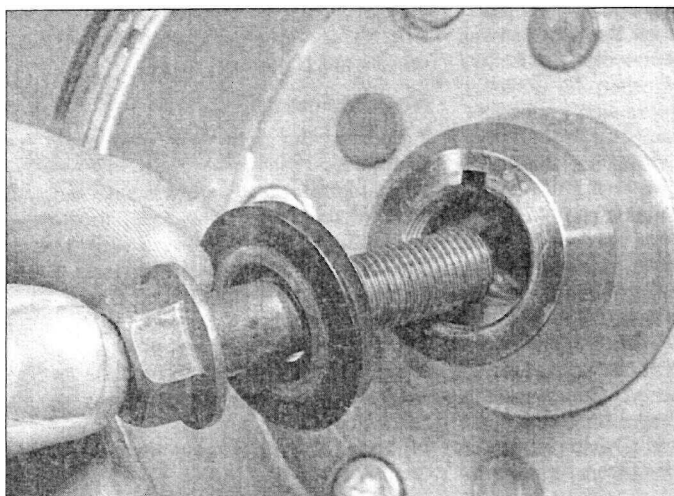
32.3 Checking the charging system leakage rate. Connect the meter as shown



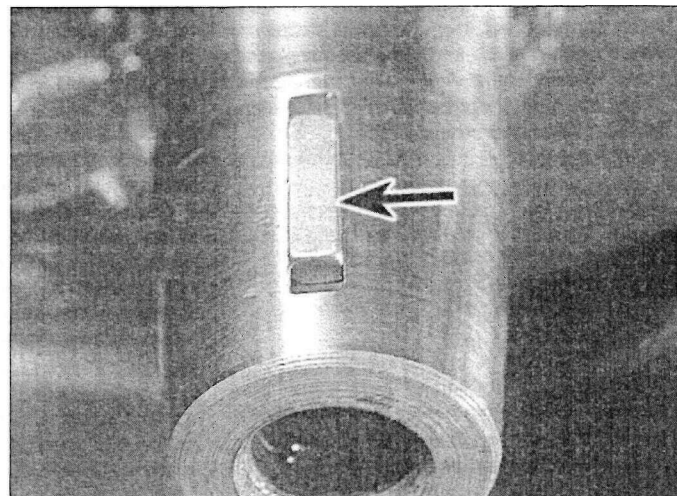
33.5a The stator is secured to the cover by four bolts (arrows)



33.5b Unscrew the bolt securing the wiring clamp (arrow)



33.6b Install the rotor bolt and its washer and tighten in an anti-clockwise direction

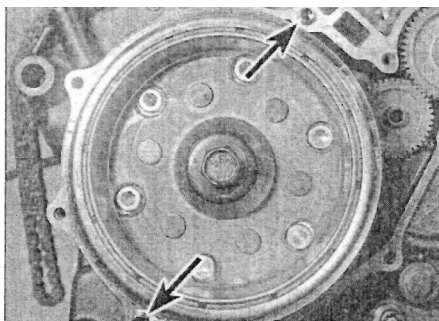


33.6a Check that the Woodruff key is in its slot (arrow)

in the rotor with the Woodruff key and install the rotor onto the shaft (**see illustration**). Install the rotor bolt and tighten it to the torque setting specified at the beginning of the Chapter (**see illustration**). To stop the rotor from rotating use a strap wrench, or place the transmission in gear and have an assistant apply the rear brake. Do not forget that the rotor has a left-hand thread and so must be tightened anti-clockwise. Install the idle/reduction gear, making sure the teeth of the smaller inner pinion face inwards and engage with the starter driven gear (**see illustration 33.4**)

7 Install the stator into the cover, aligning the rubber wiring grommet with the groove in the cover. Apply a suitable non-permanent thread locking compound to the stator bolt threads, then install the bolts and tighten them securely. Apply a suitable sealant to the wiring grommet, then install it into the cut-out in the cover. Secure the wiring with its clamp (**see illustration 33.5b**).

8 If removed, insert the dowels in the crankcase. Install the crankcase cover using a new gasket, making sure it locates correctly onto the dowels (**see illustration**). Apply a suitable thread-locking compound to the top right-hand cover bolt, then tighten the cover bolts evenly in a criss-cross sequence.



33.8 Place a new gasket over the dowels (arrows) before installing the crankcase cover

9 Reconnect the wiring at the connector and secure it with any clips or ties.

10 Check the engine oil level and top up if necessary (*see Daily (pre-ride) checks*).

34 Alternator stator coils - check

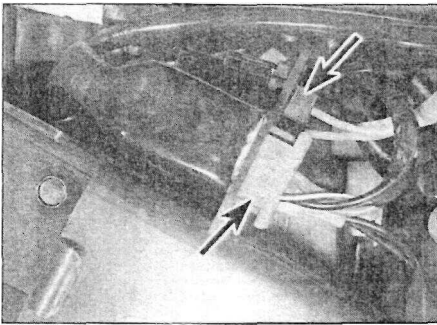


1 Remove the right-hand side panel (*see Chapter 8*).

2 Trace the wiring back from the alternator and disconnect it at the 3-pin connector (**see illustration 33.1**).

3 Using a multimeter set to the ohms x 1 scale, measure the resistance between each of the yellow wires on the alternator side of the connector, taking a total of three readings. These readings must be within the range shown in the Specifications at the beginning of this Chapter.

4 Next check for continuity between each yellow wire terminal and earth. If the stator



35.1 Disconnect the two regulator/rectifier unit wiring connectors (arrows)

coil windings are in good condition there should be no continuity (infinite resistance) between any of the terminals and earth.

5 If the stator coil tests do not produce the correct results and charging problems have been experienced, the alternator stator coil assembly is at fault and should be replaced.

Note: Before condemning the stator coils, check the fault is not due to damaged wiring between the connector and coils.

35 Regulator/rectifier unit - check and replacement

Check

1 Remove the right-hand side panel (see Chapter 8) and disconnect the 4-pin white and 3-pin black regulator/rectifier unit wiring connectors (**see illustration**).

	RED/ WHITE	YELLOW 1	YELLOW 2
RED/WHITE		∞	∞
YELLOW 1	1-20		∞
YELLOW 2	1-20	∞	
YELLOW 3	1-20	∞	∞
GREEN	5-30	1-20	1-20

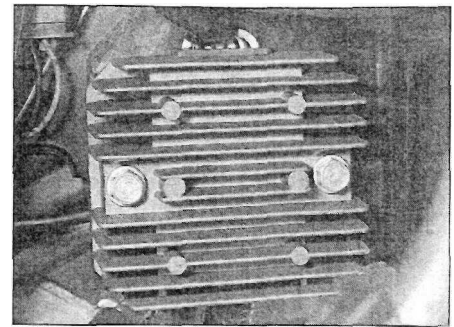
(2070-9-32 6 HAYNES)

35.4 Regulator/rectifier unit resistance readings

2 Use a voltmeter or multimeter set to the 0-20 dc volts range to check the power supply to the regulator/rectifier. Connect the meter's positive (+ve) probe to either red/white terminal and its negative (-ve) probe to either green terminal on the wire harness side of the white wiring connector. Full battery voltage should be shown when the ignition is switched ON. Switch the ignition switch OFF and disconnect the meter.

3 Check the alternator stator coil resistance as described in Section 34.

4 Use an ohmmeter or multimeter set to the ohms scale to check the internal circuitry of the regulator/rectifier unit. Refer to the test table, noting that the checks are made on the regulator/rectifier side of the wire connectors, with the ignition OFF (**see illustration**). **Note:** The use of certain multimeters could lead to false readings being obtained. Therefore, if the above check shows the regulator/rectifier unit to be faulty take the unit to a Honda dealer for confirmation of its condition before replacing it.



35.8 The regulator/rectifier unit is mounted to a plate behind the toolkit and is secured by two bolts

5 If the above checks do not provide the expected results check the wiring between the battery, regulator/rectifier and alternator (see the *wiring diagrams* at the end of this chapter).

6 If the wiring checks out, the regulator/rectifier unit is probably faulty.

Replacement

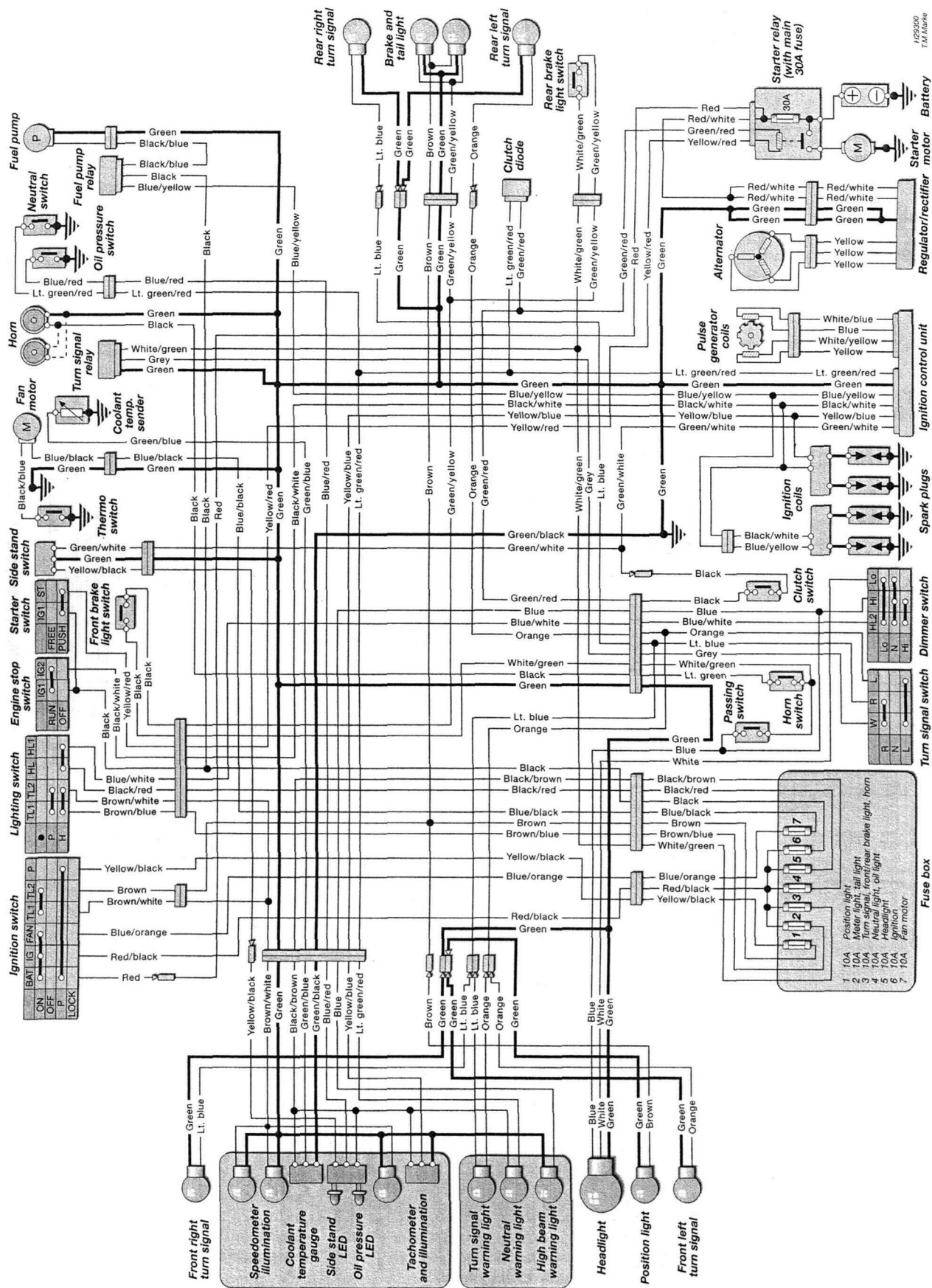
7 Remove the right-hand side panel (see Chapter 8).

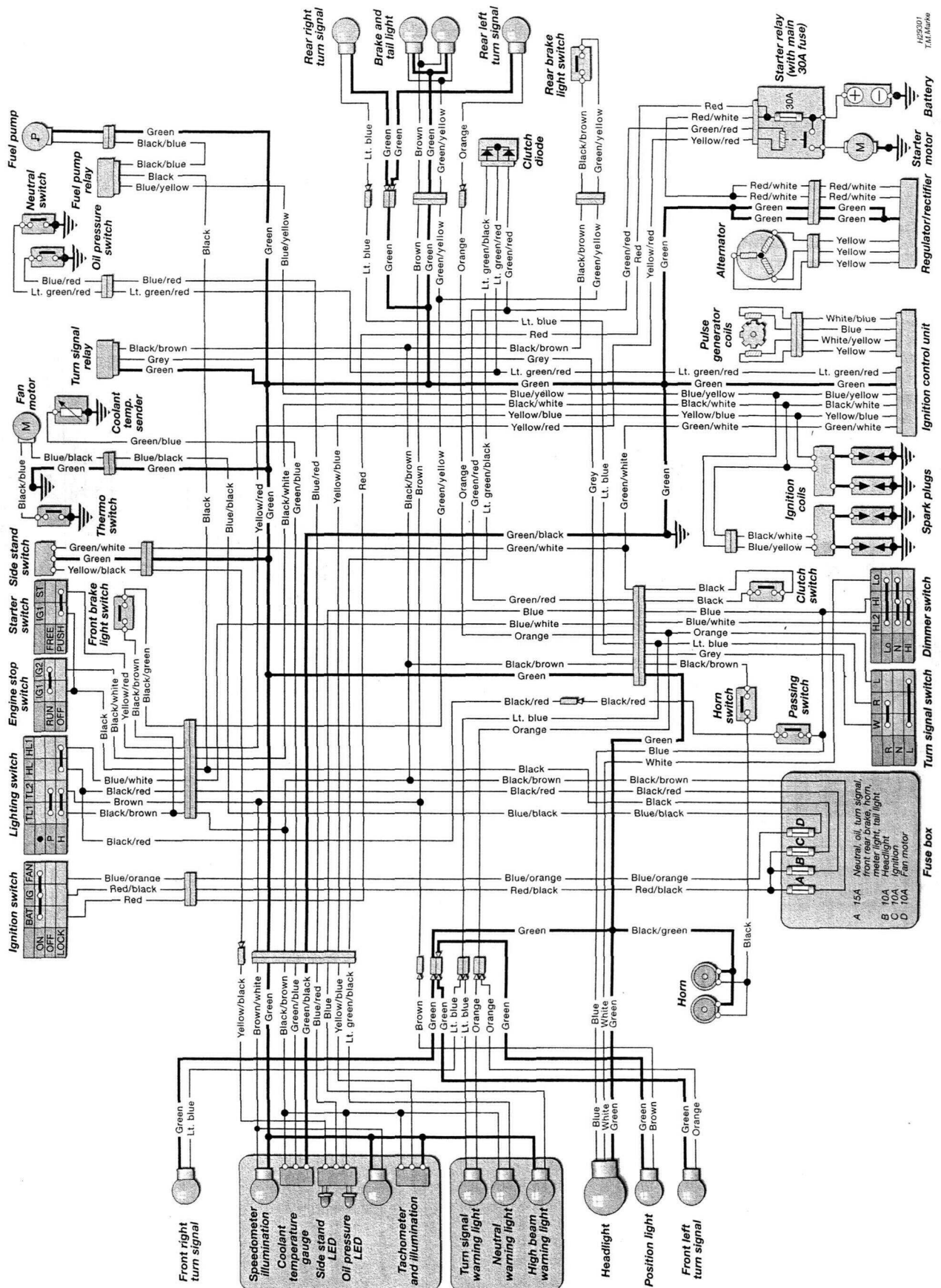
8 The regulator/rectifier unit is mounted to the back of the plate behind the toolkit (**see illustration**). Trace the wiring back from the regulator/rectifier unit and disconnect it at the connectors (**see illustration 35.1**).

9 Unscrew the two bolts securing the unit to its mounting plate and remove it.

10 Install the new unit and tighten its bolts securely. Connect the wiring at the connectors

11 Install the right-hand side panel (see Chapter 8).





Wiring diagram - NTV600M, NTV650P, S and T models