GENERAL

Harley-Davidson spark plugs (Figure 5H-1) have been designed to give maximum life and efficient combustion of fuel. They are available in various "heat ranges," each for a particular service application. Plugs are labeled with numbers 2, 3, 4, or 5 the lowest number indicating the "hottest" plug. Designations 3-4 and 7 are special-purpose plugs.

For normal service, the spark plug as recommended in motorcycle specifications, Section 1-A, should be used on a particular model. However, for special service conditions, a "colder" or "hotter" plug may be desired. If, for instance, the number 4 plug is used on original equipment for normal service, the number 3 plug could be used for slow speed or short run operation while the number 5 plug could be used for the higher speeds of highway travel or maximum throttle operation. It is not uncommon for best results to be obtained with plugs of different heat ranges in front and rear cylinders, with the front usually the colder.

REMOVING SPARK PLUGS

Disconnect wires from plugs, connection is simple snap-on type. Use a deep socket wrench or special spark plug wrench to loosen plugs. Blow away all dirt from plug base with compressed air before removing plug.

CLEANING, INSPECTION AND REPAIR (Figure 5H-2)

Examine plugs as soon as they have been removed. The deposits on the plug base are an indication of the correctness of the plug heat range and efficiency, as well as a guide to the general condition of rings, valves, carburetor and ignition system.

A wet, black and shiny deposit on plug base, electrodes and ceramic insulator tip (A) indicates an oil fouled plug. The condition is caused by worn rings and pistons, loose valves, weak battery, faulty ignition wires, circuit breaker trouble, weak coil or a cold plug.

A dry, flaky or sooty black deposit (B) indicates plug is gas fouling, a result of too rich carburetor air-fuel mixture, long periods of engine idling or a cold plug.

An overheated plug (C) can be identified by a light brown, dry, glassy looking deposit. This condition may be accompanied by cracks in the insulator tip and is caused by too lean an air-fuel mixture, a hot running engine, valves not seating, improper ignition timing or too hot a plug for the service. The oxide deposit on the spark plug is a conductor when hot. It will cause plug to misfire, especially at high speed.

A plug with a rusty brown to tan powdery deposit (D) indicates a balanced ignition and combustion condi-
SECTION 5H
Electrical - Spark Plugs

ion. With leaded gasolines the deposits may be white or yellow. In either case, ignition functions through the deposits if only light, and the deposits should be cleaned off at regular intervals to keep them from building up.

When spark plug electrodes have become eroded away (C) to the point where gap setting is difficult or impossible, the plug should be replaced. Plugs with cracked insulator should also be discarded.

Clean plugs with a sand blast cleaner. Rotate plug top while applying sand blast to clean insulator and electrodes. Cleaning time should be carefully limited to just what is necessary to clean deposits from insulator nose. Prolonged use of abrasive blast will wear away insulator. Normally three to five seconds of sand blasting is sufficient. Never use metal instruments to remove deposits from plugs.

SETTING SPARK GAP

Before setting spark gap on used plugs, pass a thin point file (or nail file) between electrodes to produce flat, parallel surfaces to facilitate accurate gauging.

Use only a wire type gauge. Bend the outside or grounded electrode so only a slight drag on the gauge is felt when passing it between electrodes. Never make adjustments by bending the center electrode. Set gap on all plugs as shown under Engine Specifications Section 3A.

TESTING SPARK PLUGS

Check the sparking ability of a cleaned and regapped plug on a sparking comparator if possible. An inability to withstand rapid firing under cylinder compression conditions can be discovered.

INSTALLING SPARK PLUGS

Before turning spark plugs into cylinder heads, check condition of threads in head and on plug. Soften deposits in cylinder head with penetrating oil and clean out with tap or old plug.

Install new spark plug gasket and turn plug down finger tight. Tighten to 15 pounds with torque wrench or 3/4 of a turn.

Check and adjust engine idle speed and mixture setting after installing new set of plugs if necessary.
REGULATOR

METHOD I employs separate voltmeter, ammeter, fixed resistances of 1/4 ohm and 1-1/2 ohm, and 25 watt variable field resistor. This is the method outlined in detail in the Delco-Remy Service Bulletins.

METHOD II employs single test instrument incorporating the same components as Method I, and in addition has a variable load resistance. The equipment used is a VAT 26 voltage-ampere tester manufactured by the Sun Equipment Corporation.

METHOD I
TESTING DELCO - REMY REGULATORS
GENERATOR-BATTERY SYSTEM (6 or 12 VOLT)
Covers all models except Sportster XLCH

A. TESTING THE GENERATING SYSTEM (SEE FIGURE 51-2)

1. Disconnect battery wire from regulator "BAT" terminal and connect this wire to the negative lead of an ammeter (0-30 amperes). Connect positive ammeter lead to regulator "BAT" terminal.

2. Connect the positive lead of a voltmeter (0-20 volts) to the regulator "GEN" terminal. Connect voltmeter negative lead to ground on motorcycle.

3. Disconnect the wire from the regulator "F" terminal and connect this wire to a lead of a field control variable resistor. Connect other lead of field control variable resistor to ground on motorcycle. Set field control knob to open position.

4. Operate engine at 2000 RPM (approximately 40 MPH).

5. Slowly turn field control knob toward direct position until the ammeter reads:
   15 amperes for 6 volt systems using standard equipment generators (Models 58 and 61 generators)
   20 amperes for heavy duty fan-cooled generators (Models 51 and 58R generators)
   10 amperes for 12 volt generators (Models 64 and 65 generators)

If ammeter reading is as specified, generator is not faulty and difficulty is in regulator. Make regulator tests B, C and D.

6. If there is no ammeter reading or reading is low, observe voltmeter reading. If voltmeter reading is below 6 volts on 6 volt systems, or below 12 volts on 12 volt systems, generator requires service.

Revised: 7-64
7. If voltmeter reading is high, over 7.5 volts on 6 volt systems or over 15 volts on 12 volt systems, the cutout relay is not closing. Make tests B, C and D.

NOTE
Before making adjustments or servicing regulator, identify regulator by number stamped on regulator base, or mounting bracket, then refer to table Fig. 51-1 which contains service information for desired regulator. Delco Remy Bulletins listed in table may be obtained from a Delco Remy service station or the Harley-Davidson Motor Co.

B. TESTING CUTOUT RELAY UNIT CLOSING VOLTAGE (THE SAME CONNECTIONS ARE USED AS IN TEST A (FIG. 51-2.)
1. Turn field control variable resistor to open position.
2. Operate engine at 1500 RPM (approximately 30 MPH).
3. Slowly turn Field Control knob toward direct position to decrease resistance in field circuit. Voltmeter reading will increase slowly until cutout points close. Closing voltage will be highest voltmeter reading before meter pointer "clicks" to read battery voltage. After cutout points close, ammeter will indicate a current flow.

If closing voltage is not within specifications (See Fig. 51-1) adjust setting according to manufacturer's service bulletin. (See Fig. 51-1.)

C. TESTING VOLTAGE CONTROL UNIT SETTING (FIG. 51-3)
1. Remove battery wire from regulator battery "BAT" terminal. Connect a 1/4 ohm resistor (not less than 25 watts) in series with the removed battery wire and the regulator battery "BAT" terminal.
2. Connect the positive lead of a voltmeter (0-15 volts) to the regulator "BAT" terminal, connect the negative lead to ground.

3. Remove wire from regulator field "F" terminal and connect a 25 watt variable resistance. Field Control in series with the removed wire and the regulator field "F" terminal, turn control knob to direct position (no resistance).

6. Volt Regulator - Operate engine at 2000 RPM (approximately 40 MPH). Turn field control resistor knob to "Open" position then to "Direct" position to cycle regulator. Check voltmeter reading. Reading indicated on voltmeter is voltage regulator setting.

12 Volt Double Contact Regulator - Operate engine at 2000 RPM (approximately 40 MPH). Turn field control resistor knob to "Open" position then to "Direct" position to cycle regulator. Check voltmeter reading. Reading indicated on voltmeter is the voltage regulator setting of the upper contacts (shorting contacts). Voltmeter reading should be within manufacturer's specifications (See Fig. 51-1). Maintain engine speed, slowly rotate field control resistor toward "Open" position to increase resistance until voltmeter reading drops slightly and then remains steady. This indicates the voltage setting of the lower contacts (series contacts). The voltage difference between the settings of the two sets of contacts should be within specifications (See Fig. 51-1).

If voltage readings are not within specifications, replace regulator or service and adjust settings (See "Servicing Regulator").

Never ground the 12 volt generator or regulator field terminal while these two units are connected and operating. This will burn up the upper set (shorting set) of contacts of the voltage control unit.

D. TESTING CURRENT CONTROL UNIT SETTING ON 3 UNIT REGULATORS (FIG. 51-4)
1. Remove battery wire from regulator "BAT" terminal and connect to negative lead of ammeter (0-30 amps). Connect positive lead of ammeter to regulator "BAT" terminal.
SECTION 51
Electrical - Regulator

Figure 51-4.

2. Connect positive lead of voltmeter to regulator battery "BAT" terminal and negative voltmeter lead to ground.

3. Turn on light and connect additional load to the battery to drop the voltmeter reading to one volt below voltage regulator setting.

4. Operate engine at 2000 RPM (approximately 40 MPH) and note reading on ammeter. If reading is not within regulator specifications (See Fig. 51-1) replace regulator or adjust according to manufacturer's Service Bulletin.

GENERATOR SYSTEM - WITHOUT BATTERY
(6 Volt)
Covera 1964 and earlier Sportster Model XLCH.

A. TESTING THE GENERATING SYSTEM (FIG. 51-5)

NOTE
Make all tests with light switch in off position to prevent possible light burnout.

1. Connect an ammeter and 1-1/2 ohm resistor in series between regulator terminal marked "GEN" and ground. (Use regulator mounting bolt for ground.) Disconnect "F" terminal lead at the regulator to open the generator field circuit.

2. Start engine and run at slightly faster than normal idle speed. If ammeter shows any current flow, generator field is grounded internally or in wiring harness, and generator repair is necessary. If there is no current flow, proceed to make the following checks.

3. With engine running at idle as before, momentarily ground the disconnected generator field lead by touching it on the regulator mounting bolt. If ammeter does not show any current flow, the generator field circuit is open, or the generator armature circuit is at fault, and generator must be repaired. If ammeter shows sudden jump in output, the generator is functioning normally, and trouble is located elsewhere.

4. Reconnect "F" terminal lead to regulator. Regulator can now be checked to determine if it is functioning properly. Make regulator Tests B, C and D.

NOTE

Before making adjustments or servicing regulator, identify regulator by number stamped on regulator base or mounting bracket, then refer to table Fig. 51-1 which contains service information for desired regulator. Delco-Remy bulletins listed in table may be obtained from Delco Remy service station or the Harley-Davidson Motor Co.

B. TESTING CUTOPT UNIT SETTING AND VOLTAGE CONTROL UNIT SETTING (FIG. 51-6)

1. Remove the red wire from regulator terminal marked "BAT". Connect a 1-1/2 ohm resistor between the regulator terminal marked "BAT" and one of the regulator mounting bolts (ground). Connect a voltmeter to the same terminals with negative lead of voltmeter to the regulator mounting bolt.

2. Run engine at fast idle. A reading of 5 volts or more indicates that the relay is functioning properly.

Figure 51-5.

Figure 51-6.
The cutout relay setting is not critical. The only requirement is that the relay close at a low engine speed.

At a very slow engine idle the voltage may fluctuate between zero and 5 volts. This is a normal condition.

3. With the regulator cover in place and the regulator at operating temperature, increase the engine speed to approximately 2700 RPM (45 MPH road speed) and read the voltmeter. If the voltmeter reading falls within the limits given in Fig. 51-1, it indicates that the voltage regulator is operating properly.

If the voltmeter reading does not fall within the limits given in Fig. 51-1, the voltage regulator must be replaced or adjusted according to manufacturer's Service Bulletin.

METHOD I
TESTING BOSCH REGULATORS

12 VOLT SYSTEM WITH OR WITHOUT BATTERY
Covers 1965 Sportster Models XLH and XLCH

NOTE

This regulator is a sealed unit and no servicing or adjusting is necessary or recommended. When some difficulty arises, checks can be made to determine if the regulator is controlling generator output within specifications. If voltage readings are not within specifications, regulator should be replaced.

A. TESTING GENERATING SYSTEM (FIG. 51-7)

1. Disconnect wire or wires from regulator battery terminal "B+". On XLH models, connect these wires together.

2. Connect one lead from 1-1/2 ohm resistor (not less than 100 watt rating) to the regulator "B+" terminal. Connect the other lead from the resistor to the Positive terminal of an ammeter (0-15 amp). Connect the negative ammeter lead to ground on motorcycle.

3. Connect the Positive lead of a voltmeter (0-15 volts) to regulator "D-" terminal, connect the negative lead to ground on chassis.

4. Disconnect wire from regulator field "DF" terminal and connect this wire to one lead of a field control variable resistor, connect other lead of the field control to ground on motorcycle chassis. Turn field control to "Open" position.

5. Operate engine at 2700 RPM (approximately 45 MPH).

6. Slowly rotate field control resistor knob toward the "Direct" position until ammeter reads 10 amperes, then immediately turn the control knob to "Open" position. If a reading of 10 amperes is obtained, generator is O.K. and any difficulty in the charging circuit is caused by a faulty regulator or defective wiring. Inspect wiring and make regulator tests B and C. If a reading of 10 amperes cannot be obtained and voltmeter reading is below 12 volts, generator is in need of service.

If no reading is obtained on ammeter but voltmeter reading is 15 volts or higher, cutout relay is defective and regulator should be replaced.

B. TESTING CUTOUT RELAY UNIT CLOSING VOLTAGE - SAME CONNECTIONS ARE USED AS IN TEST A (FIG. 51-7)

1. Turn field control resistor knob to "Open" position.

2. Operate engine at 2000 RPM (approximately 35 MPH).

3. Slowly turn field control toward "Direct" position. As the resistance is decreased, the voltmeter reading will increase. Note the highest reading on the voltmeter before the pointer "kicks". This will be the relay closing voltage. Repeat operation a few times, each time returning the field control resistor to "Open" position. If the closing voltage is not within specifications, (see Fig. 51-1) replace regulator.

C. TESTING VOLTAGE CONTROL UNIT SETTING.
(FIG. 51-8)

Two tests are required:

1. Testing regulator voltage setting under load.

Revised: 7-64

Figure 51-7.
SECTION 51
Electrical - Regulator

2. Testing regulator voltage setting under no load.

Testing Voltage Setting Under Load

1. Make same connections as used to make previous Test B, except move positive voltmeter lead to regulator "B" terminal. See Fig. 51-8.

2. Turn field control resistor to "Direct" position (no resistance in field circuit).

3. Operate engine at 2700 RPM (approximately 45 MPH) and note reading on voltmeter. This reading will be the voltage under load.

Testing Voltage Setting Under No Load

1. Remove 1-1/2 ohm resistor used in previous load test from circuit by disconnecting grounded ammeter lead. Place field control resistor in Direct position (no resistance).

2. With engine running at 2700 RPM, note voltmeter reading. This reading will be the voltage at no load.

Readings taken in Load and No Load tests must be within specifications or regulator should be replaced. See Fig. 51-1 for specifications.

METHOD II
TESTING DELCO - REMY REGULATORS
(VAT 26 TESTER)

GENERATOR-BATTERY SYSTEM (6 OR 12 VOLT)
Covers all models except Sporster XLCH

A. TESTER CONTROLS
Turn ground polarity selector to negative; Load Control knob to Direct; Ammeter selector to 100A position; and voltage selector to 16V position for 12 volt system, or 8V position for 6 volt system.

B. TESTER CONNECTIONS (See Fig. 51-9)
1. Remove "BAT" lead from voltage regulator.

2. Connect Regulator lead "R" of tester to "BAT" terminal of regulator.

3. Connect Battery lead "B" of tester to battery wire removed from regulator.

4. Connect Ground lead "G" of tester to ground of motorcycle.

5. Connect Positive voltmeter lead to "GEN" terminal of regulator.

6. Connect Negative voltmeter lead to ground of motorcycle.

7. Remove wire connected to regulator field "F" terminal and connect this wire to a lead of the field control variable resistor, the other lead of the field control resistor is connected to ground on motorcycle. Turn field control to "Open" position.

C. TESTING GENERATING SYSTEM.

2. Slowly turn field control resistor knob to "Direct" position until ammeter reads:

   15 amperes for 6 volt systems using standard equipment generators.

   20 amperes for heavy duty fan-cooled generators (6 volt)

   10 amperes for 12 volt generators.

If ammeter reading is as specified, generator is not at fault and difficulty is in voltage regulator or wiring. Make regulator Tests D, E, and F.
3. If there is no ammeter reading or reading is low, observe voltmeter reading. If voltmeter reading is below 6 volts on 6 volt systems or below 12 volts on 12 volt systems, generator requires service.

4. If voltmeter reading is over 7.5 volts on 6 volt systems or over 15 volts on 12 volt systems, the cutout relay is not closing. Make following Test D.

NOTE

Before making adjustment or servicing regulator, identify regulator by Delco Remy number stamped on regulator base or mounting bracket. Then, see table, Fig. 51-I, which contains service information for the desired regulator. Delco Remy Bulletins listed in table may be obtained from a Delco Remy service station or the Harley-Davidson Motor Co.

D. TESTING CUTOUT RELAY UNIT CLOSING VOLTAGE

Use same tester connections as previous Test C. (Fig. 51-9)

1. Turn field control variable resistor to "Open" position.

2. Turn load control knob to "Direct" position.

3. Operate engine at 1500 RPM (approximately 30 MPH).

4. Slowly turn field control resistor knob toward "Direct" position observing voltmeter.

As resistance is decreased in field circuit, voltage will rise. Note highest reading before meter pointer "kicks" to read battery voltage. Repeat operation several times, each time turning field control to "Open" position. Highest reading observed is the cutout relay closing voltage.

If closing voltage is not within specifications (see Fig. 51-I), replace regulator or adjust according to manufacturer's Service Bulletin.

E. TESTING VOLTAGE CONTROL UNIT SETTING (Fig. 51-10)

Same connections are used as in previous Test D except move Positive voltmeter lead to regulator battery "BAT" terminal and remove grounded lead of the field control variable resistor and connect to regulator field "F" terminal. (See Fig. 51-10)

1. Turn field control knob to "Direct" position.

2. Turn load control to the 1/4 ohm position.

6 Volt Regulator - Operate engine at 2000 RPM (approximately 40 MPH). Turn field control resistor knob to "Open" position then to "Direct" position to cycle regulator. Check voltmeter reading. Reading indicated on voltmeter is voltage regulator setting.

F. TESTING CURRENT CONTROL UNIT SETTING ON 3 UNIT REGULATORS

Use same connections as previous Test E, Voltage Control Test. (See Fig. 51-10).

1. Turn field control to "Direct" position.

2. Operate engine at 2000 RPM.

3. Turn load control clockwise until maximum reading is obtained on ammeter.

This reading will be equal to the current limiter setting. If not within specifications (see Fig. 51-I), replace or adjust according to manufacturer's Service Bulletin and retest. Take final reading with regulator cover in place.

Figure 51-10.

12 Volt Double Contact Regulator - Operate engine at 2000 RPM (approximately 40 MPH). Turn field control resistor knob to "Open" position then to "Direct" position to cycle regulator. Check voltmeter reading. Reading indicated on voltmeter is the voltage regulator setting of the upper contacts (shorting contacts). Voltmeter reading should be within manufacturer’s specifications. (See Fig. 51-I). Maintain engine speed, slowly rotate field control resistor toward "Open" position to increase resistance until voltmeter reading drops slightly and then remains steady. This indicates the voltage setting of the lower contacts (series contacts). The voltage difference between the settings of the two sets of contacts should be within specifications. (See Fig. 51-I).

If voltmeter readings are not within specifications, replace regulator or service and adjust settings. (See "Servicing Regulator").

CAUTION

Never ground the 12 volt generator or regulator field terminal while these two units are connected and operating. This will burn up the upper set (shorting set) of contacts of the voltage control unit.

Issued: 7-64
SECTION 51:
Electrical - Regulator

Figure 51-11.

GENERATOR SYSTEM WITHOUT BATTERY (6 VOLT)

Covers 1964 and earlier Sportster Model XLCH

A. TESTER CONTROLS

Turn ground polarity selector to Negative; load control knob to Direct; ammeter selector to 100A position; and voltage selector to 6 volt position.

B. TESTER CONNECTIONS (See Fig. 51-11)

1. Remove wires from regulator "BAT" terminal.
2. Connect Regulator lead "R" of tester to regular "BAT" terminal.
3. Connect Ground lead "G" of tester to ground on motorcycle.
4. Connect Positive lead of voltmeter to regulator "GEN" terminal.
5. Connect Negative lead of voltmeter to ground on motorcycle.
6. Remove wire connected to regulator "F" terminal and connect this wire to a lead of the field control variable resistor. Connect other lead of field control to ground on motorcycle. Turn field control variable resistor to "Direct" position.

Battery lead "B" of tester is not connected.

C. TESTING GENERATING SYSTEM

1. Operate engine at 2700 RPM (approximately 45 MPH).
2. Turn load control clockwise until a 15 ampere reading is observed.

If reading is 15 amperes or more, generator is satisfactory.
Make Tests D, E and F.

If no ammeter reading is obtained or reading is low, observe voltmeter reading. If reading is below 6 volts, generator requires service. If voltmeter reading is high (over 7.5 volts), the cutout relay is not closing. Make Test D following.

D. TESTING CUTOUT RELAY UNIT CLOSING VOLTAGE (Fig. 51-11)

1. Connect battery lead "B" of tester to 1-1/2 ohm connection on side of tester.
2. Turn field control variable resistor to "Open" position.
3. Turn load control knob to "Direct" position.
5. Slowly turn field control knob toward the "Direct" position to decrease resistance in generator field circuit. As the resistance is decreased, voltmeter reading will increase until a kickback of the voltmeter needle is observed. The highest voltage noted will be the cutout relay closing voltage. Repeat operation several times, each time turning the field control to "Open" position. If the closing voltage is not within specifications (see Fig. 51-1), adjust according to manufacturer's Service Bulletin and retet.

E. TESTING VOLTAGE CONTROL UNIT SETTING (FIG. 51-12)

1. Move positive voltmeter lead to regulator "BAT" terminal.
2. Move field control lead from ground on motorcycle to regulator field terminal.
3. Turn field control variable resistor to "Direct" position.
4. Operate engine at 2700 RPM, (approximately 45 MPH).
5. Turn field control variable resistor to "Open" position, then to "Direct" to cycle regulator. Observe voltmeter reading.
6. If voltmeter reading is not within specifications (see 51-1), replace or adjust regulator according to manufacturer's Service Bulletin.

51-6B

Issued: 7-64
I2 VOLT SYSTEM WITH OR WITHOUT BATTERY
Covers 1963 Sportster Models XLH and XLC

A. TESTER CONTROLS

Turn ground polarity selector to Negative; load control knob to Direct; ammeter selector to 100A position; and voltage selector to 12 volt position.

B. TESTER CONNECTIONS (SEE FIG. 5I-13)

1. Remove wires from regulator "B" terminal. On XLH models, connect these wires together.

2. Connect Regulator lead "R" of tester to regulator terminal "B".

3. Connect Ground lead "G" of tester to ground on motorcycle.

4. Connect Positive voltmeter lead to regulator terminal "D" and connect Negative lead to ground on motorcycle.

5. Remove wire from regulator terminal "DF" and connect this wire to a lead of the field control variable resistor. Connect the other lead of the field control to ground on motorcycle. Turn field control to "Direct" position. Turn load control to "Direct" position.

Battery lead "B" of tester is not connected for this test.

C. TESTING GENERATING SYSTEM

1. Operate engine at 2700 RPM (approximately 45 MPH).

2. Slowly rotate load control clockwise until a reading of 10 amperes is observed.

3. If a reading of 10 amperes is obtained, generator is not at fault and difficulty is due to a faulty regulator or defective wiring. Inspect wiring and make Tests D and E.

4. If a reading of 10 amperes cannot be obtained and voltmeter reading is below 12 volts, generator is defective.

5. If no reading is obtained on ammeter but voltmeter reading is 15 volts or higher, cutout relay is defective. Regulator should be replaced and circuit retested.

D. TESTING CUTOUT RELAY UNIT CLOSING VOLTAGE

Make same connections as in previous Test C, except connect battery lead "B" of tester to 1-1/2 ohm connection on side of tester.

1. Turn load control to "Direct" position.

2. Turn field control variable resistor to "Open" position.


4. Slowly turn field control variable resistor toward "Direct" position while observing the voltmeter. As resistance is decreased in field circuit, voltage will rise.

Observe highest voltmeter reading before voltmeter pointer kicks back. Repeat operation several times, each time returning field control to "Open" position. Highest reading observed is the cutout relay closing voltage.

If closing voltage is not within specifications (see 5I-1), replace regulator.
SECTION 51
Electrical - Regulator

E. TESTING VOLTAGE CONTROL UNIT SETTING.
(Fig. 51-14)

Two tests are required:
1. Testing regulator voltage setting under load.
2. Testing regulator voltage setting under no load.

Testing Voltage Setting Under Load
1. Make connections as in previous Test D, except
   switch positive voltmeter lead to regulator “B+”
   terminal, disconnect tester battery lead “B” from
   1-1/2 ohm connector on tester, disconnect field con-
   trol lead from ground connection on motorcycle
   and connect this lead to regulator “DF” terminal.
2. Turn field control resistor to “Direct” position
   (no resistance in field circuit).
3. Operate engine at 2700 RPM (approximately 45
   MPH).
4. Turn load control knob clockwise to load circuit
   until ammeter reads 10 amperes.
5. Voltmeter reading will be voltage setting under
   load.

Testing Voltage Setting Under No Load
1. Return load control knob to “Direct” position.
2. Turn field control resistor to “Direct” position.
3. Operate engine at 2700 RPM.
4. Voltmeter reading will be voltage setting at no
   load.

Both load and no-load voltage readings must be within
specifications or regulator should be replaced. (See
Fig. 51-1)

CAUTION
It is advisable to “Flash” field coils whenever
wires have been removed from regulator; or
after generator or battery has been removed
and is reinstalled. This is done to make sure
generator has correct polarity. If polarity of
generator is reversed, relay points will vi-
brate and burn. On battery systems, “Flash”
field coils by momentarily touching a jumper
wire between “BAT” terminal and “GEN” ter-

minal on regulator, after all wires have been
properly connected and before starting en-
gen.

On systems without battery, connect negative
lead of outside battery to generator frame and
flash positive lead to generator “A” terminal.
The momentary surge of current from battery
to generator will correctly polarize genera-
tor.

SERVICING REGULATORS

Delco Remy Regulator
Faulty operation of Delco Remy regulators may be
due to one or more of the following conditions:
1. Contact points dirty, oxidized or pitted — To
clean contacts, refer to manufacturer’s Service Bul-
etin, (See Fig. 51-1)

After cleaning contacts, the air gaps and contact
spacing must be adjusted. See Fig. 51-1 for infor-
mation on the voltage regulator and cutout relay
air gap and contact opening setting.
2. Ground wire broken (short braided wire between
   regulator base and mounting bracket).
3. Defective fuse (in holder near regulator).
4. Corrosion contamination on regulator internal
   parts.

After any faults have been corrected, regulating
units must be adjusted according to manufacturer’s
Service Bulletin. (See Fig. 51-1).

Bosch regulator

Service or adjustment to internal parts of Bosch
regulators is not recommended since contact spac-
ing and air gaps are factory set. If tests indicate
that the regulator is defective, it should be replaced.

NOTE
If a new regulator is installed, it should be
checked out in operation of the vehicle.
GENERAL
The battery serves as a storage place for current used in starting the motorcycle; to operate accessories when the engine is not running and to provide additional current, when necessary, over the amount being generated. For a battery to remain in good condition, the current draw must be balanced by a current input. All Harley-Davidson batteries have lead plates and sulphuric acid electrolyte units of capacities suitable for load requirements under intended use.

BATTERY CARE
Prompt and correct battery care determines the life span of the unit. Therefore, for a longer useful life, the battery solution level must be checked at weekly intervals. Add only pure distilled or approved water to recommended level above plates and separators. Be careful not to overfill. Overfilling will result in some of the electrolyte being forced out through cap vent holes, diluting or weakening the solution strength. An overflow of battery solution will cause cables to corrode and motorcycle parts near the battery to be damaged.

Clean battery and terminals when necessary with a baking soda-water solution. Be careful to avoid getting any of the solution into the cap vent holes. When solution stops bubbling, flush off battery with clean water.

Coat terminals with grease or oil felt terminal post washers after wires have been attached to retard corroding.

CHARGING BATTERY
Never allow a battery to stand in a discharged condition. Start charging it at once at the recommended continuous charge rate.

To determine the amount or condition of a battery charge, check solution in each cell with a battery hydrometer. When hydrometer reading is 1.200 or less, battery is considered discharged and should be removed from motorcycle and charged at the following maximum continuous charge rate; using appropriate 6 or 12 volt charger.

- 12 volt 53 Ampere hour battery - 10 amperes
- 12 volt 32 Ampere hour battery - 4 amperes
- 6 volt 51 Ampere hour battery - 3 1/2 amperes
- 6 volt 22 Ampere hour battery - 1 1/2 amperes
- 6 volt 10 Ampere hour battery - 1/2 amperes
- 2-6 volt 8 Ampere hour batteries
  (Series connected - 12 volts ) - 1/2 Ampere

A higher battery charge rate will heat and damage the battery. For this reason, do not allow the small motorcycle battery to be charged in the same line with large batteries. Hydrometer reading of a fully charged battery in good condition, with full strength electrolyte will be 1.270 or higher.

WARNING
Hydrogen gas, formed when charging, is explosive. Avoid open flame or electrical spark near battery.

Allowing a battery to remain in a discharged condition will shorten its life. It is important that a battery be kept well charged during below freezing weather.

RECLAIMING SULPHATED BATTERY
If a battery has been allowed to stand in a discharged condition for a period of time, the lead sulphate in the plates will crystallize and not take a charge at normal rates. Such batteries should be charged at half the specified continuous rate for twice the computed time. A longer charging time at a slower rate will many times break down the crystalline structure into active materials and restore the battery.

CHANGING ELECTROLYTE
In normal service with average care, it is never necessary to change electrolyte for the lifetime of the battery. However, if the battery solution is spilled, diluted as a result of careless water addition, or neutralized by the addition of an alkaline substance, the battery solution may be changed and in some cases near full capacity restored.

A weak acid solution may be detected by charging the battery until all cells gas freely and the gravity has not shown a rise for three successive readings taken at hourly intervals. "Gassing" is evidenced by a bubbling action in the electrolyte that may be detected by sight or sound. Do not change electrolyte in a battery with one or more cells that fail to gas. Such a condition indicates a structural failure.

Pour solution out of charged battery and fill with water. Charge battery again until maximum specific gravity is reached. Pour out this solution and add prepared battery electrolyte to specified level and charge again for a short length of time for full capacity.

Check specific gravity and add a little water if necessary to bring solution down to desired maximum limits.

The value of changing electrolyte in a fairly old battery is questionable. By tipping over such a battery to drain the solution, the sloughed-off waste materials accumulated by repeated charging and discharging actions might be dislodged from the sediment chambers in the bottom of the battery and deposited in the separators. This material is an electrical conductor and thus may "tree" or catch in the separators and cause a short circuit.

Revised: 9-66

S5J-1
TRUMPET HORN - 1964 AND EARLIER
DUO-GLIDE AND SPORTSTER

If the horn does not blow satisfactorily, the trouble may be caused by a constricted diaphragm, loose terminal wires, or a discharged battery. Before attempting to correct horn performance by moving the adjusting screw, it is recommended procedure to trouble shoot as follows: (Fig. 5K-1 and 5K-2).

1. Check the battery for adequate current. Examine the horn trumpet (10 or 11), depending on model being worked on) and power pack (6) for misalignment with each other causing constriction of power pack diaphragm. To correct horn misalignment, loosen horn power pack support bracket (16) or (17) and horn support bracket nut (7), and correctly align (10 or 11) and (6) with each other. Be sure the horn trumpet does not contact any part of the engine. If horn trumpet and power pack cannot be realigned, check the power pack support bracket (16) or (17) for bent condition.

2. Check to make sure horn power pack has not been tightened more than 2 to 2-1/2 turns on trumpet stem. If tightened further, trumpet stem end will obstruct operation of pack diaphragm.

3. Inspect horn wiring for damage or loose connections at the terminal points. Loose or damaged horn wires will result in inadequate voltage at the

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Figure following name of part indicates quantity necessary for one complete assembly.

Figure 5K-1. Horn - Exploded View - Duo-Glide (1964 & Earlier)

Revised: 9-66
Figure following name of part indicates quantity necessary for one complete assembly.

1. Horn trumpet nut
2. Horn cover screw
3. Horn cover
4. Horn wire terminals (2)
5. Bracket mounting bolt, washers and nut (2 each)
6. Horn power pack
7. Horn trumpet mounting nut
8. Horn trumpet lock washer
9. Horn trumpet plain washer
10. Horn trumpet mounting rubber washer
11. Horn trumpet rubber washer
12. Horn trumpet mounting rubber washer
13. Horn trumpet rubber mounting bushing
14. Circuit breaker cable bracket
15. Horn trumpet mounting bolt
16. Horn mounting bracket
17. Horn power pack support bracket
18. Horn adjusting screw and nut
19. Horn trumpet screen

Figure 5K-2. Horn - Exploded View - Sportster (1964 & Earlier)

4. Horn performance will be affected if dirt or water accumulates in the trumpet or horn pack diaphragm compartment. This condition will dampen action of the horn diaphragm affecting volume and tonal quality of the horn. Remove trumpet and power pack and clean out all scale and dirt. Shake out any accumulated debris from the power pack and reassemble.

DISASSEMBLY AND REASSEMBLY (Fig. 5K-1 and 5K-2)

To disassemble the horn, simply follow the order of disassembly as illustrated. When installing the horn power pack to the trumpet, tighten the power pack 2 - 2-1/2 turns on the trumpet stem before tightening nut (1). Be careful to correctly position all parts as shown to insure correct alignment of trumpet and pack.

ADJUSTMENT

Loosen the center core jam nut with a wrench, and turn the slotted center core screw 1/2 turn counterclockwise with a screwdriver. Then adjust the Phillips head tone adjusting screw until the horn blows. Turn the center core screw clockwise until the horn rattles, and then back off screw (counterclockwise) 1/4 turn. While holding core screw in this position, tighten core screw lock nut with wrench. Readjust the Phillips head tone adjusting screw for desired tone.

1961 AND EARLIER SERV-CAR (Fig. 5K-3)

The horn operating (ground) button is on the handlebar.

Revised: 9-61
possible disorders have been eliminated (includes cleaning of contact points), the air gap adjusting screw can be turned to correct tone and output of horn.

**ASSEMBLY**

Assembly is the reverse order of disassembly. Be sure to correctly align the diaphragm assembly on the horn back and to readjust the contact points after the horn is assembled.

**1962 AND LATER SERVİ-CAR, SPORTSTER CH**

Horns are shown in Figures 5K-4, 5K-5, and 5K-6. If the horn fails to blow or does not blow satisfactorily, check for loose, frayed or damaged wiring leading to horn terminals, discharged battery, etc. If these steps do not correct the trouble, turn in contact point adjusting screw, located back of horn, until horn just gives a single click - then retard screw until best tone is obtained. If horn fails to operate after moving adjusting screw, entire horn must be replaced because it is permanently riveted together. Mounting parts are replaceable.

**DISASSEMBLY (Fig. 5K-3)**

Disconnect horn wires and remove horn from motorcycle. Remove three horn front bolts, lock washers and nuts (1) and remove horn front (2). Remove three horn diaphragm bolts, lock washers and nuts (3), loosen retainer (4) and horn diaphragm (5) from horn back (6).

**INSPECTION AND REPAIR**

Brush all scale, rust and dirt from horn parts and blow clean with compressed air. Examine interior of horn for damaged or broken wires and cracked or damaged terminal screw bushing. Make sure contact points are clean.

Air gap adjusting screw (6) should be left as originally set by the manufacturer. However, in the event horn does not appear to operate correctly after all other
Figure 5K-6. Horn 1965 Electra-Glide, Sportster & Servi-Car
STARTER MOTOR

The starter motor is a 12-volt, series field 2-pole or 4-pole drive motor which engages the clutch ring gear through a Bendix type drive and a reduction gear unit. The two pole 2-brush type was used on early Servi-cars. The four pole 4-brush type is used on the Electra-Glide, Servi-car and Sportster models. A solenoid relay provides battery current directly to the motor. The solenoid is controlled by a button switch on the handle bar. On some models, control circuit has a cut-out switch in the transmission cover. Switch plunger contacts a nub on the shifter can only when transmission is in neutral to complete the starting circuit. This prevents starter operation when transmission is in gear.

NOTE
Starter motor should never be operated continuously for more than 30 seconds without pausing to let it cool for at least two minutes. The motor is not designed for continuous operation and serious damage may result.

LOCATING TROUVLES

The starter motor is designed to be corrosion resistant and requires very little maintenance. However, to ensure satisfactory operation, periodic inspection of brushes and commutator should be made. In the event starter motor fails to operate satisfactorily, the following checks should be made before removing motor for inspection:

1. Wiring
Make sure the mounting and wiring connections are tight and in good condition. The solenoid switch should be firmly mounted and all wiring connections should be clean and tight. Also inspect the connections to the battery and return circuit, as loose or dirty connections anywhere in the circuit will cause high resistance and reduced motor efficiency.

2. Battery
If the connections and wiring are found to be satisfactory, the battery should be checked to determine its state of charge (See Section 6J, "Charging Battery"). If the battery is charged and battery voltage is reaching the motor without any excessive losses in wiring or connections, the trouble may be attributed to either the engine or the starter motor itself.

3. Switches
If the battery is charged but there is no current flow to motor at all, trouble is probably in handlebar button switch, transmission cutout switch or the solenoid switch. This can be determined by bypassing each switch with a heavy jumper (Refer to wiring diagram, Section 5B).

4. Engine
Excessive friction in the engine from tight bearings or pistons or from heavy oil obviously makes engine harder to crank. However, if engine is known to be in normal condition and the rest of the starting system is satisfactory, the starter motor should be removed for further checking.

NOTE: Electrical tests to locate cause of starting system failures can be made using the Sun VAT-26 Tester and applicable Service Bulletins.

REMOVING STARTER MOTOR AND DRIVE

SERVI-CAR (Fig. 5L-6)
Disconnect solenoid and battery cables from starter motor. On 1964-65 model, remove motor thru bolt nuts and lockwashers (1), securing motor (2), until it can be removed as an assembly from starter shaft housing and transmission top cover flange (3). Remove starter motor end support bracket (not shown). On 1966 and later models, unscrew motor thru bolts (4) from transmission cover (3A).

NOTE: Late 1966 mounting flange has 2 sets of holes for Delco Remy or Prestolite motor.

ELECTRA-GLIDE (Fig. 5L-6)
Disconnect solenoid cable from starter motor terminal. Remove attaching nuts and lockwashers (1) which fasten starter motor housing (3) to studs on chain housing. Remove starter motor end support plate (not shown) from transmission. It may be necessary to loosen and raise battery carrier to provide clearance. Remove starter motor (2) and starter shaft housing (3) from motorcycle as an assembly.

SPORTSTER (Fig. 5L-7)
Disconnect solenoid cable from starter motor terminal. Remove starter motor clamp bolt and lockwasher (1) from crankcase. Unscrew motor thru bolts (4) from starter shaft housing (3). Remove starter motor and clamp (2) as an assembly.

DELCO-REMY STARTER MOTOR SERVICE

DISASSEMBLING STARTER MOTOR
Delco-Remy 2-pole and 4-pole (Fig. 5L-8 and 5L-9)
Remove thru-bolts (1). Note that the bolt which passes near field coil connection has insulating sleeve (2). Remove commutator end frame (3) and drive end frame (4). Remove armature (5) from drive end of frame and field assembly (6).

Revised: 3-69

5L-5
SECTION 5L
Electrical Starter Motor

CHECKING FRAME AND FIELD ASSEMBLY

The frame, field and brush assembly can be checked for open or grounded circuit using a test lamp. To test for open circuit, place one prod of test lamp on terminal screw (9) and other prod on insulated brush (20). If test lamp fails to light, an open circuit is indicated. A grounded field circuit is located by placing one test prod on each insulated brush (20) or on the terminal (9) and the other test prod on the frame (6), making certain contact is made with the metal surface. The lamp will light if the circuit is grounded. Each insulated brush holder should be checked with the test lamp to make certain it is insulated from the frame.

There is no satisfactory field test for shorted field coils, and if this condition is suspected, the field coil assembly should be replaced and the motor retested to see if performance improves.

REPLACING FIELD COILS AND BRUSHES

Remove pole shoe screws (7), terminals nuts, lockwashers and insulating washers (8) and terminal screw (9). Remove set of field coils with brush (10) and pole shoes (11). It is unnecessary to remove brush holders (12) except when defective or when replacing grounded brushes (13). Remove by cutting off or drilling out rivets. Replacement brushes are complete with screws (14), washers, and nuts (15) for attaching to frame. To remove brush springs (16), compress one side of spring with a small screw driver until it flips out of its seat. Then turn spring clockwise until it comes out of holder.

Replacement insulated brush holder set (17) is available with insulator (18) and attaching hardware. Grounded replacement brush holder set (19) includes grounded brushes (13) and insulated brushes (20) with necessary attaching hardware.

INSULATED BRUSH

To replace insulated brush (20), first cut off old brush lead where it is attached to field coil wire. Lead should be soldered to back side of coils so that excessive solder will not rub on armature. Thoroughly clean coil lead end by filing or grinding off old connection. Varnish should be removed only as far back as necessary to make new solder connection. Using rosin flux, solder brush lead to field coil lead, making certain brush is in the right position to reach brush holders (See Figure 5L-10).

Do not over-heat brush lead or solder will run on wire strands and lead will no longer be flexible.

GROUNDED BRUSH

To replace grounded brush, remove brush holder as described in 'Disassembling Starter Motor'. Attach new brush holder and brush assembly (Items 12 & 13, Fig. 5L-8 or 5L-9), with hardware included in package.

After tightening nuts on both brush holders, peer the screws with a hammer so nuts cannot vibrate loose.

5L-6

ELECTRA-GLIDE, SPORTSTER, SERVI-CAR

REPAIRING ARMATURE

If armature commutator is worn, dirty, out of round or has high mica insulation between segments, commutator can be turned down in a lathe. Mica should then be undercut 1/32 in. deep with an undercutting machine and slots cleaned out to remove dirt or copper dust. If undercutting machine is not available, undercutting can be accomplished satisfactorily using a hacksaw blade. (See Fig. 5E-6, page 5E-5 for recessing mica separators.) Commutator should then be sanded lightly with No. 00 sandpaper to remove any burrs left from undercutting procedure.

Armature test procedure is described in Section 5E, or see Delco-Remy service bulletin No. 1M-152.

Inspect bushings (Item 21, Fig. 5L-8 and 5L-9) is drive end and commutator end frames, and commutator end thrust washer (22). Replace any excessively worn parts. Inspect bearing (23) in 4-pole type and replace if worn to excessive looseness.

For additional service and testing procedures, see Delco-Remy service bulletin No. 1M-152.

Figure 5L-5. Removing Starter Motor - Servi-car

1. Thru-bolt nuts and lockwashers
   (1964-65) (2)
2. Starter motor
3. Transmission cover (1964-65 Servi-car)
3A. Transmission cover (1966 Servi-car)
4. Thru-bolt (2)

Revised: 9-66
SECTION 5L
Electrical Starter Motor

REASSEMBLING STARTER MOTOR (Fig. 5L-6 and 5L-9)

Reassembly is essentially the reverse of the disassembly procedure. The frame and field assembly should be completed first and checked with test lamp to make sure no grounds or open circuits have been caused by disassembly. Note that pole shoes (11) are notched on one end to accommodate connections at field coils. It is important that notched ends be placed at the lead ends of the coils so the pole shoes can be tightened properly and not drag on the armature.

Reassemble remaining parts in reverse order of assembly. Note that end frames (3 and 4) are notched to fit field frame ends. Also note correct location of thru-bolt insulator sleeve (2) next to field coil connection. Reconnect cables to solenoid switch and battery.

PRESTOLITE STARTER MOTOR SERVICE

DISASSEMBLING STARTER MOTOR (Fig. 5L-11)

Remove thru bolts (1) with washers and lockwashers (2). Remove commutator end cover (3) holding brush plate (4) in place if necessary.

NOTE: End cover is marked with a double line next to the motor terminal. Also brush holder has a positioning notch which registers on the motor terminal insulator. See Figure 5L-12. Parts must be located correctly when reassembled.

Armature (5) and drive end cover (6) with bearing (7) are removed as an assembly. Bearing (7) is a light press fit on armature shaft and is staked in end cover (6).

NOTE: To prevent brushes from escaping holders, insert a spool of slightly larger diameter than the commutator underneath brushes when brushes are half exposed as armature is withdrawn from frame. In this way armature can be reinstalled without removing brushes from holders.

CHECKING FRAME AND FIELD ASSEMBLY

Due to the internal wiring and connections of the frame and field assembly, there is no satisfactory field test to determine grounded or shorted field coils. If field coils are required, it is necessary, due to the method of installing field coils in this assembly, to replace the frame and field assembly. To test for open field coils, using a test lamp, place one probe of test light against the frame. Place the other probe against each of the brushes attached to the field coils. If test lamp fails to light on one or both of the brushes, an open circuit is indicated.
Figure 5L-8. Delco-Remy 2 Pole Starter Motor - Exploded View

1. Thru-bolt (2)
2. Insulating sleeve
3. Commutator end frame
4. Drive end frame
5. Armature
6. Frame and field assembly
7. Pole shoe screw (2)
8. Terminal nuts, lockwashers and insulating washers
9. Terminal screw
10. Set of field coils with insulated brush
11. Pole shoe (2)
12. Brush holder (2)
13. Grounded brush
14. Brush holder mounting screw (2)
15. Brush holder mounting nut and lockwasher (4)
16. Brush spring (2)
17. Insulated brush holder set
18. Insulator
19. Grounded brush holder set
20. Insulated brush
21. Bushing
22. Thrust washer
1. Thru bolt (2)
2. Insulating sleeve
3. Commutator end frame
4. Drive end frame
5. Armature
6. Frame and field assembly
7. Pole shoe screw (2 or 4)
8. Terminal nuts, lockwashers and insulating washers
9. Terminal screw
10. Set of field coils
11. Pole shoe (2 or 4)
12. Brush holder (2 or 4)
13. Grounded brush and holder (1 or 2)
14. Brush holder mounting screw (2 or 4)
15. Brush holder mounting nut and lockwasher (2 or 4)
16. Brush spring (2 or 4)
17. Insulated brush holder set
18. Insulator
19. Grounded brush holder set
20. Insulated brush (1 or 2)
21. Bushing
22. Thrust washer
23. Ball bearing
24. Bearing retainer

Figure 5L-9. Delco Remy 4 Pole Starter Motor - Exploded View
SECTION 5L
Electrical Starter Motor

Figure 5L-10. Brush Position on Field Coil
(2-Pole Delco-Remy Starter Motor Shown)

REPLACING BRUSHES

To replace the insulated brushes (9), remove the terminal and brush assembly from slot in frame and install new terminal and brush assembly. To replace ground brushes (10) attached to the field coils, first cut off old brush lead wire where it is attached to the field coil lead. Thoroughly clean coil lead by filing off old connection. Insulation on field coil lead should be removed only as far back as necessary to make new solder connection. Using rosin flux, solder brush lead to field coil lead, making certain brush lead is in the same position as the original brush lead. Do not overheat brush lead or solder will run on wire strands and brush lead will no longer be flexible. Before reassembling motor, check brush connections for sufficient clearance from frame and from armature.

REPAIRING ARMATURE

If armature commutator is worn, dirty, out of round or has high mica insulation between segments, commutator can be turned down in a lathe. Mica should then be undercut 1/32 in. deep with an undercutting machine and slots cleaned out to remove dirt or copper dust. If undercutting machine is not available, undercutting can be accomplished satisfactorily using a hacksaw blade. See Figure 5E-6, page 5E-5 for recessing mica separators.) Commutator should then be sanded lightly with No. 00 sandpaper to remove any burrs left from undercutting procedure. Armature test procedure is described in Section 3E. Inspect commutator end cover bushing. If bushing is worn, replace complete commutator end cover assembly. Inspect drive end cover and bearing and replace bearing if worn to excessive looseness.

REASSEMBLING STARTER MOTOR

Reassembly is essentially the reverse of the disassembly procedure. If brushes (9 and 10) and springs (8) have been released from holder, use clips or clamps as shown in Figure 5L-13 to hold them in place while installing armature. Note that drive end of frame is notched to fit drive end cover. Line up positioning notch in the brush holder assembly with terminal insulator. Line up positioning mark on commutator end head with motor terminal. Install thru bolts and replace unit on engine. Reconnect cables to solenoid switch and battery.

Figure 5L-11. Prestolite 4-Pole Starter Motor - Exploded View
Figure 5L-12. Positioning Prestolite Starter Motor Cover

Figure 5L-13. Using Clamps to Hold Brushes in Place
SUN POWER TIMING LIGHT MODEL PTL-45

Order from Sun Electric Corp., Chicago, Ill.

94501-56 CIRCUIT BREAKER WRENCH
Used to tighten circuit breaker attaching bolts.

94575-58A SPARK PLUG WRENCH
Fits 14 mm spark plugs.

95715-19A GEAR PULLER
Removes generator drive gear.

96305-65 TIMING MARK VIEW PLUG
Clear plastic plug threads into crankcase timing hole for accurate ignition timing with strobe timing light.

96802-63 BATTERY HYDROMETER — WITH TEMPERATURE CORRECTION FEATURE
For testing state of charge of storage batteries. Specific gravity of electrolyte can be corrected for temperature extremes by means of built-in thermometer.
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruments</td>
<td>6D-1</td>
</tr>
</tbody>
</table>
INSTRUMENTS

SERVICING SPEEDOMETER

GENERAL

Lubricate cable core every 5,000 miles with graphite grease.

To lubricate the speedometer drive core or replace a damaged or broken core, proceed as follows:

DUO-GLIDE AND SERVI-CAR MODEL

Remove instrument panel cover. Remove two screws that secure speedometer head to instrument panel base. Lift speedometer head as far as casing will permit, and with pliers, loosen case coupling nut from speedometer head. Withdraw core from casing. To free a broken core from casing, disconnect lower case coupling nut from speedometer drive unit located at transmission on Duo-Glide and right axle on Servi-Car Model. Withdraw core from lower case end.

SPORTSTER MODEL

Remove headlamp housing (if necessary). With a pliers remove speedometer case coupling nut from speedometer head and withdraw core from casing. To free a broken core from casing, disconnect lower case coupling nut from speedometer drive unit located under transmission sprocket cover. Withdraw core from lower case end.

To free the speedometer head, remove headlamp housing from fork (if necessary), disconnect speedometer cable casing as described above. Disconnect trip odometer adjuster knob from its stem and remove nut securing odometer adjuster to panel. Remove two nuts securing speedometer head, and lift head from its mounting bracket.

To install a speedometer head and drive case, reverse the order of disassembly.

Install core in upper end of casing, applying a light coat of graphite grease to the core as it is inserted into position. Engage squared lower end of core in speedometer drive shaft. Connect case coupling upper end to the speedometer head, engaging squared end of core in speedometer shaft. Be sure to tighten both case coupling nuts securely.

SERVICING TACHOMETER

GENERAL

Lubricate cable core every 5,000 miles with graphite grease.

To lubricate the tachometer drive core or replace a damaged or broken core proceed as follows:

ELECTRA GLIDE AND SPORTSTER

With a pliers remove case coupling nut from tachometer and withdraw core from casing. To free a broken core from casing, disconnect lower case coupling nut from drive unit located on circuit breaker cover or magneto. Withdraw core from lower case end.

To free tachometer head, disconnect tachometer cable casing as described above. Remove two nuts securing tachometer head, and lift head from its mounting bracket.

To install a tachometer head and drive case, reverse the order of disassembly.

Install core in upper end of casing, applying a light coat of graphite grease to the core as it is inserted into position. Engage squared lower end of core in drive shaft. Connect case coupling upper end to the head, engaging squared end of core in shaft. Be sure to tighten both case coupling nuts securely.
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