## SECTION IV–FUEL SYSTEM

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Idle Adjuster</td>
<td>21</td>
</tr>
<tr>
<td>Air Cleaner</td>
<td>22</td>
</tr>
</tbody>
</table>

This section explains procedures unique to 1997 model S1 Lightnings. Any procedures not found in this supplement are covered in the 1996 S1 Lightning Service Manual (Part No. 99490-96Y).
REMOTE IDLE ADJUSTER

GENERAL
See Figure 16. The remote idle adjuster allows idle adjustments without use of tools. Idle speeds are listed in Table 2.

REMOVAL
1. Remove seat and fuel tank. See FUEL TANK, REMOVAL in Section 4 of the 1996 manual.
2. Remove cable strap holding adjuster to frame.
3. See Figure 17. Unthread adjuster assembly from bracket (4). Remove spring (3) and washer (2).

NOTE
If remote idle adjuster is permanently removed, install idle adjuster screw, spring and two washers. See the 1996 S1 LIGHTNING PARTS CATALOG (Part No. 99571-96Y).

INSTALLATION
1. See Figure 17. Thread remote adjuster (1), spring (3) and washer (2) into bracket (4). Adjuster shaft (5) must touch stop plate (6).
2. See Figure 18. Secure adjuster to frame with a figure-8 cable strap.
   a. Wrap cable strap around inside of frame, then up and through the slot.
   b. Continue cable strap over adjuster.
   c. Run cable strap through the other side of the slot. Strap should be tight enough that the adjuster turns easily.

WARNING
After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control and personal injury.
4. Start vehicle and warm engine to normal operating temperature.
5. See Figure 16. Set idle speed by turning adjuster. See Table 2.
   a. Turn clockwise to increase idle speed.
   b. Turn counterclockwise to decrease idle speed.

Table 2. Engine Idle Speed

<table>
<thead>
<tr>
<th>MODEL</th>
<th>REGULAR IDLE</th>
<th>FAST IDLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Model</td>
<td>950-1050 RPM</td>
<td>2000 RPM</td>
</tr>
<tr>
<td>California</td>
<td>1150-1250 RPM</td>
<td></td>
</tr>
</tbody>
</table>

Figure 16. Idle Speed Adjuster

Figure 17. Removal/Installation

Figure 18. Cable Strap
AIR CLEANER

MODEL YEAR CHANGE

All 1997 model year motorcycles use a modified air cleaner assembly. The new design increases serviceability.

REMOVAL

CAUTION
Do not run engine without filter element in place. Debris could be drawn into the engine causing damage.
1. See Figure 19. Remove screw and nylon washer (1) on top of air cleaner cover.
2. Remove screw and locknut (2) at rear of air cleaner cover.
3. See Figure 20. Remove cover (3) with attached filter box (2) and filter (1).
4. See Figure 21. Remove backplate hoses.
   a. Detach rear breather hose (4) from tee fitting (3).
   b. Detach snorkel breather hose (2) to snorkel (1).
   c. Remove hoses (2, 5) and tee fitting (3) from front breather bolt (6).
   d. On California models, slide fresh air hose from canister through backplate.
5. See Figure 22. Remove two screws and snorkel plate.
6. Remove snorkel.
7. See Figure 23. Remove screw with spacer and gasket.
8. Remove backplate.
   a. See Figure 24. Remove two bolts (1), washers (2) and nuts (3).
   b. Draw rear breather hose through backplate.
   c. Remove front breather bolt. Detach backplate from motorcycle.
9. If necessary, remove air cleaner support ring.
   a. Detach breather hose from rear cylinder head breather bolt.
   b. Loosen rear bolt.
   c. Slide air cleaner support ring upward and remove.

NOTE
Air cleaner support ring fits around breather bolts. Fitting on rear breather bolt may not clear the frame if bolt removal is attempted. Do not remove rear breather bolt unless absolutely necessary.
INSTALLATION

1. Install backplate.
   a. Apply HYLOMAR to threads of breather bolts.
   b. Install air cleaner support ring and backplate using breather bolts. Tighten breather bolts to 10-15 ft-lbs (13.6-20.3 Nm).
   c. Attach rear breather hose to rear breather bolt.
   d. See Figure 24. Install two bolts (1), washers (2) and nuts (3) through backplate into isolator mount.

2. See Figure 21. Install breather hoses.
   a. Slide rear breather hose through backplate.
   b. Attach front breather hose (5, with attached tee and snorkel breather hose) to front breather bolt (6).
   c. Connect rear breather hose (4) to tee fitting (3).
   d. On California models, insert fresh air hose from canister through backplate.

3. See Figure 23. Apply LOCTITE THREADLOCKER 242 (blue) to screw. Install ring with screw through backplate. Tighten to 7-9 ft-lbs (9.5-12.2 Nm).

4. See Figure 22. Apply LOCTITE THREADLOCKER 242 (blue) to screws. Fasten snorkel tube with ring and two screws. Tighten to 6-8 ft-lbs (8.1-10.8 Nm).

5. Connect snorkel hose to snorkel tube.

6. See Figure 20. Check air cleaner filter. Place filter inside filter box. Place cover assembly over backplate.

7. See Figure 19. Install screw and washer into top well nut.

8. Install screw and locknut at rear mount. Tighten to 6-8 ft-lbs (8.1-10.8 Nm).
SECTION V–ELECTRIC STARTER

SUBJECT PAGE NO.

1. Starting System Diagnosis .................................................. 27

This section explains procedures unique to 1997 model S1 Lightnings. Any procedures not found in this supplement are covered in the 1996 S1 Lightning Service Manual (Part No. 99490-96Y).
STARTING SYSTEM DIAGNOSIS

— BATTERY TESTS —

• VISUAL
• VOLTAGE
• LOAD

Check Connections at Battery and Starter Components.

INOPERATIVE

Solenoid Clicks.

Relay Clicks.

Nothing Clicks.

Text for Voltage at Solenoid Terminal. Is 12V Present When Starter Button is Pressed?

Test for Voltage at Relay Terminal 87 When Starter Button is Pressed?

Perform Voltage Drop Tests Between Battery and “Relay” Terminal on Solenoid. Less Than 1 Volt?

Perform Voltage Drop Tests from Battery (Pos. +) to Starter “Motor” Terminal. Crank Engine. Is Voltage Greater than 1 Volt?

Perform Voltage Drop Tests from Battery (Pos. +) to Starter Motor “M” (Battery Terminal). Crank Engine. Is Voltage Greater than 1 Volt?

Check for Battery Voltage Between Battery Negative and Starter Studs or Bolts. Is Voltage Greater than 1 Volt?

Perform Voltage Drop Tests Between Battery and “Motor” Terminal. Crank Engine. Is Voltage Greater than 1 Volt?

Test for Voltage to Relay. Is 12V Present on Relay Terminal?

Repair Open on R/BK Wire Feeding Terminal 30 on Starter Relay.

Repair Open on GN Wire Between Relay and Solenoid.

Replace Starter Relay.

Repair Wiring From Starter Button to Relay.

Replace Starter Button.

Check for Battery Voltage to Starter Button BK-W Wire. Battery Voltage Present?

Substitute Good Relay in Test Relay.

Inspect Starter Interlock Circuit or Correct Relay Ground.

Repair Wiring From Starter Button to Relay.

Check for Battery Voltage to Starter Button BK-W Wire. Battery Voltage Present?

Repair Wiring To Starter Button.

Clean Ground Connections.

Repair or Replace Solenoid Contacts.

Repair Connection Between Battery and Starter.

Replace Solenoid.

Test Starter Motor for Opens, Shorts or Grounds.

Replace or Repair Wiring to Starter Button.

Replace Starter Button.

Repair or Replace Starter Relay.

Repair Wiring From Starter Button to Relay.

Substitute Good Relay in Test Relay.

Inspect Starter Interlock Circuit or Correct Relay Ground.

Check for Battery Voltage to Starter Button BK-W Wire. Battery Voltage Present?

Check for Battery Voltage From Starter Button BK-W Wire. Battery Voltage Present With Starter Button Pressed?

Nothing Clicks.

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO

YES

NO
**RUN-ON**

Disconnect Solenoid "Relay" Terminal from Solenoid. Is 12V Present at GN Wire Terminal with Starter Button NOT Pressed?

**YES**

Replace Solenoid.

**NO**

Is 12V present on Starter Relay Terminal 81 with Starter Button NOT Pressed?

**YES**

Replace Starter Relay.

**NO**

Replace Starter Button.

---

**STARTER SPINS, BUT DOES NOT ENGAGE**

Remove Starter. Disassemble Drive Housing Assembly. Inspect for damage to Armature Gear or Idler Gear. Damage Present?

**YES**

Replace Damaged Gear and Armature.

**NO**

Start-Catch Failure. Replace Start-Catch.

---

**STARTER STALLS OR SPINS TOO SLOWLY**

Perform Voltage Drop Tests from Battery (Pos. +) to Starter "Motor" Terminal. Crank Engine. Is Voltage Greater than 1 Volt?

**YES**

Perform Voltage Drop Test Between Battery (Neg. -) and Starter Studs or Bolts. Is Voltage Greater than 1 Volt?

**YES**

Clean Ground Connections.

**NO**

Perform Starter Motor Current Draw Test (on Vehicle).

**YES**

Perform Starter Motor Free Draw Bench Test. Are Test Results in Range?

**YES**

Inspect Engine or Primary Drive.

**NO**

Test Starter Motor for Shorts, Shores or Grounds.

---

**NOTES**

- Remove starter motor and connect jumper wires as described in Free Running Current Draw Test.
- See Troubleshooting/Diagnostics - Voltage drops.
- See Starter Current Draw Test.
- See Free Running Current Draw Test.
- See Starter Interlock Circuit Test.
SECTION VI–DRIVE/TRANSMISSION

All drive/transmission procedures in the 1996 S1 Lightning Service Manual (Part No. 99490-96Y) apply to 1997 models.
SECTION VII–ELECTRICAL

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Handlebar Switches</td>
<td>33</td>
</tr>
<tr>
<td>2. Starter Interlock System</td>
<td>34</td>
</tr>
<tr>
<td>3. Horn</td>
<td>36</td>
</tr>
<tr>
<td>4. Wiring Harness</td>
<td>37</td>
</tr>
</tbody>
</table>

This section explains procedures unique to 1997 model S1 Lightnings. Any procedures not found in this supplement are covered in the 1996 S1 Lightning Service Manual (Part No. 99490-96Y).
MODEL YEAR CHANGE

All 1997 model year motorcycles use new handlebar switches. The switches feature new icons, connectors and a different pin numbering sequence.

NOTE

All HANDLEBAR SWITCHES, REMOVAL and HANDLEBAR SWITCHES, INSTALLATION procedures remain the same. The new switch assemblies are interchangeable between 1996 and 1997 models if the corresponding connector on the wiring harness is changed.

See WIRING HARNESS on page 37 for more information.

Right Handlebar Switch

See Figure 25. The right handlebar switch [P1] contains:
- Engine stop switch (ignition ON or OFF)
- Electric starter switch

Left Handlebar Switch

See Figure 26. The left handlebar switch [P6] contains:
- Passing lamp switch
- Headlamp dimmer switch (headlamp HIGH or LOW beam)
- Turn signal switch
- Horn switch
The starter interlock system is designed to prevent unintended start-up and/or forward motion of the motorcycle with the vehicle's side stand not retracted. Use the following two tests to check the system for proper operation.

**NOTE**

The **STARTER CIRCUIT** and **IGNITION CIRCUIT** tests should be performed in one continuous operation. Conduct both tests one after the other in the sequence given without interruption.

### STARTER CIRCUIT

1. Raise rear wheel off floor using **REAR WHEEL SUPPORT STAND** (Part No. B-41174).
2. Remove GN wire from starter motor.
3. Connect a test light or voltmeter to the vehicle in series.
   - Attach one end to starter wire terminal.
   - Attach the other end to vehicle ground.
4. Set engine stop switch to **RUN**.
5. Turn ignition switch to **IGN**.
6. Place motorcycle in neutral.
7. Press starter button on right handlebar.
   - Is current present? (Current is present if test light illuminates or if voltmeter shows 12 VDC – 1.0 VDC.)

#### YES

- Place motorcycle in first gear.
- Press starter button on right handlebar.
  - Is current present?

#### NO

- Disengage clutch lever by pulling lever in fully.
- Press starter button on right handlebar.
  - Is current present?

#### YES

- Release clutch lever.
- Press starter button on right handlebar.
  - Is current present?

#### NO

- Proceed to **IGNITION CIRCUIT** on page 35.

#### YES

- Check clutch switch. See **STARTER INTERLOCK** in Section 7 of the 1996 manual. Repeat entire interlock circuit test when finished.

#### NO

- Check clutch switch. See **STARTER INTERLOCK** in Section 7 of the 1996 manual. Repeat entire interlock circuit test when finished.

**Start circuit operating properly:**

- a. Turn ignition switch to **LOCK**.
- b. Remove test light or voltmeter.
- c. Reattach starter motor wire.
Ignition Circuit

Remove W/BK wire from ignition coil.

Connect a test light or voltmeter to the vehicle.

a. Attach one end to W/BK wire terminal.
b. Attach the other end to vehicle ground.

Turn ignition switch to IGN.

Set engine stop switch to RUN.

Place motorcycle in neutral. Is current present?

Yes

No

Check neutral switch and circuit. See NEUTRAL INDICATOR SWITCH in Section 7 of the 1996 manual. Repeat entire ignition portion of interlock circuit test when finished.

Place motorcycle in first gear. Is current present?

Yes

Check neutral switch. See NEUTRAL INDICATOR SWITCH in Section 7 of the 1996 manual. Repeat entire ignition portion of interlock circuit test when finished.

No

Retract side stand. Is current present?

Yes

Extend side stand.

Pull-in clutch lever. Is current present?

Yes

No

Check side stand switch. See STARTER INTERLOCK in Section 7 of the 1996 manual. Repeat entire ignition portion of interlock circuit test when finished.

Ignition circuit operating properly.

a. Turn ignition switch to LOCK.
b. Set engine stop switch to OFF.
c. Remove test light or voltmeter.
d. Reconnect W/BK wire to ignition coil.
e. Remove REAR WHEEL SUPPORT STAND.
MODEL YEAR CHANGE
See Figure 27. All 1997 model year motorcycles have a new horn in a new location.

NOTE
For troubleshooting information, see HORN, TROUBLE-SHOOTING in Section 7 in the 1996 manual.

REMOVAL
1. Remove seat and fuel tank. See FUEL TANK, REMOVAL in Section 4 of the 1996 manual.
2. See Figure 28. Detach horn wires.
   a. Disconnect Y/BK power wire (5).
   b. Disconnect BK ground wire (6).
3. Remove bolt (1), lockwasher (2) and washer (3) to detach horn and bracket from frame.

INSTALLATION
1. See Figure 28. Attach horn assembly to frame using bolt (1), lockwasher (2) and washer (3).
2. Connect horn wires.
   a. Attach Y/BK power wire (5).
   b. Attach BK ground wire (6).

WARNING
After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control and personal injury.
WIRING HARNESS

MODEL YEAR CHANGE

The following changes were made to the wiring harness for 1997 model year motorcycles.

- New connectors and a different pin numbering sequence for the right handlebar switch [P1] and the left handlebar switch [P6]. See HANDLEBAR SWITCHES on page 33.
- Longer wires leading to the horn to accommodate the new mounting position.

Table 3. Electrical Connectors

<table>
<thead>
<tr>
<th>CONNECTOR NUMBER</th>
<th>DESCRIPTION</th>
<th>COMPONENT(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[P1]</td>
<td>4-place connector</td>
<td>right handlebar switch housing-ignition power, module and starter</td>
</tr>
<tr>
<td>[P2]</td>
<td>2-place Amp.Multilock</td>
<td>front brake switch</td>
</tr>
<tr>
<td>[P3]</td>
<td>12-place Amp Multilock</td>
<td>instruments and indicator lamps</td>
</tr>
<tr>
<td>[P4]</td>
<td>4-place Amp Multilock</td>
<td>headlamp</td>
</tr>
<tr>
<td>[P5]</td>
<td>2-place Amp Multilock</td>
<td>clutch switch</td>
</tr>
<tr>
<td>[P6]</td>
<td>8-place connector</td>
<td>left handlebar switch housing-horn, turn signals, lights</td>
</tr>
<tr>
<td>[P7]</td>
<td>2-place Deutsch</td>
<td>vacuum-operated electric switch</td>
</tr>
<tr>
<td>[P8]</td>
<td>4-place PED</td>
<td>ignition/headlamp switch</td>
</tr>
<tr>
<td>[P9]</td>
<td>4-slot fuse block</td>
<td>four 15 amp fuses-ignition, instruments, lights and accessories</td>
</tr>
<tr>
<td>[P10]</td>
<td>8-place Deutsch</td>
<td>ignition module</td>
</tr>
<tr>
<td>[P11]</td>
<td>8-place Amp Multilock</td>
<td>tail lamp and rear turn signals</td>
</tr>
<tr>
<td>[P12]</td>
<td>4-place relay</td>
<td>ignition relay</td>
</tr>
<tr>
<td>[P13]</td>
<td>4-place relay</td>
<td>starter relay</td>
</tr>
<tr>
<td>[P14]</td>
<td>2-place Amp Multilock</td>
<td>side stand switch</td>
</tr>
<tr>
<td>[P15]</td>
<td>2-place Amp Multilock</td>
<td>license plate light</td>
</tr>
<tr>
<td>[P16]</td>
<td>3-place Deutsch</td>
<td>timer and pickup</td>
</tr>
<tr>
<td>[P17]</td>
<td>2-place plug</td>
<td>voltage regulator</td>
</tr>
</tbody>
</table>
Figure 29. 1997 Wiring Diagram