



SECTION I—MAINTENANCE

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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).

NOTES



SPECIFICATIONS

DIMENSIONS	IN.	MM
Wheel base	55	1397
Overall length	79.5	2019
Overall width	30	762
Road clearance	5.2	132
Seat height	29.5	749

CAPACITIES	U.S.	LITERS
Fuel tank (including reserve)	4.0 gallons	15.14
Reserve	0.6 gallons	2.27
Oil tank	2.0 quarts	1.89
Transmission	1.0 quart	0.95

WEIGHT	LBS.	KG
S1 shipping weight	446	202
GVWR	820	372
GAWR - Front	340	154
GAWR - Rear	480	218

NOTE

Gross Vehicle Weight Rating (GVWR) (maximum allowable loaded vehicle weight) and corresponding Gross Axle Weight Ratings (GAWR) are given on an information decal located on the front frame steering head.

ENGINE		
Number of cylinders	2	
Type	4-Cycle, 45 Degree V-Type	
Bore	3.498 in.	88.849 mm
Stroke	3.8125 in.	96.838 mm
Piston displacement	73.4 cu. in.	1203 cc
Compression ratio	10.0 to 1	
Horsepower @ RPM	91 @ 5800	
Torque ft-lb @ RPM	87 @ 5200	

IGNITION SYSTEM		
Spark plugs	No. 6R12	
Size	12 mm	
Gap	0.038-0.045 in.	0.97-1.14 mm

TRANSMISSION	
Type	Constant Mesh, Foot Shift
Speeds	5 Forward

NUMBER OF SPROCKET TEETH	
Engine	35
Clutch	56
Transmission	27
Rear wheel	61
Belt	128

TRANSMISSION GEAR RATIOS	FINAL*	OVERALL**
First (low) gear	2.69	9.717
Second gear	1.97	7.118
Third gear	1.43	5.180
Fourth gear	1.18	4.269
Fifth (high) gear	1.00	3.615

*Final gear ratios indicate number of mainshaft revolutions required to drive output sprocket one revolution.

**Overall gear ratios indicate number of engine revolutions required to drive rear wheel one revolution.

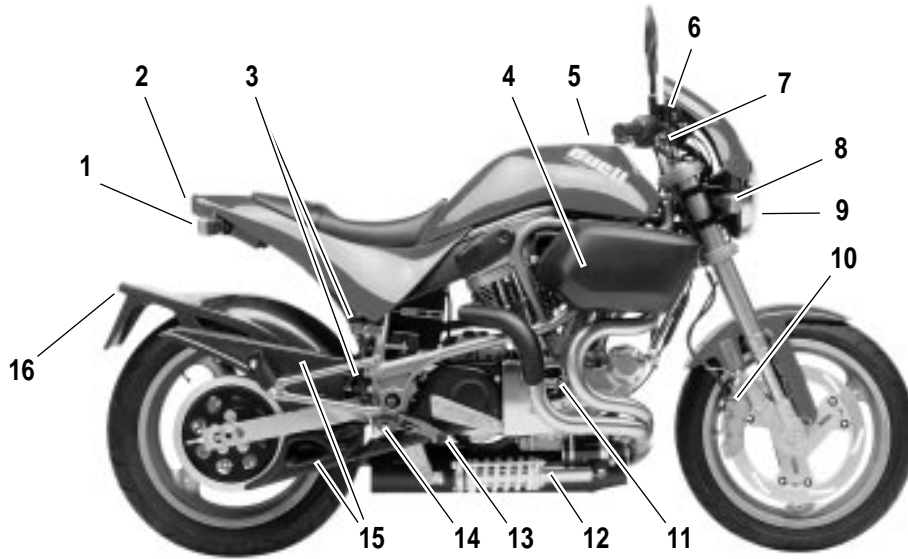
TIRE AND POSITION	PRESSURE FOR SOLO RIDING	PRESSURE AT GVWR
Front-Dunlop Sportmax Radial II 120/70 ZR 17	32 PSI (2.2 bar)	36 PSI (2.5 bar)
Rear-Dunlop Sportmax Radial II 170/60 ZR 17	36 PSI (2.5 bar)	38 PSI (2.8 bar)

WARNING

Do not inflate any tire beyond its maximum inflation pressure as specified on tire sidewall. Overinflation may cause tire to suddenly deflate leading to personal injury.

SIDE VIEWS

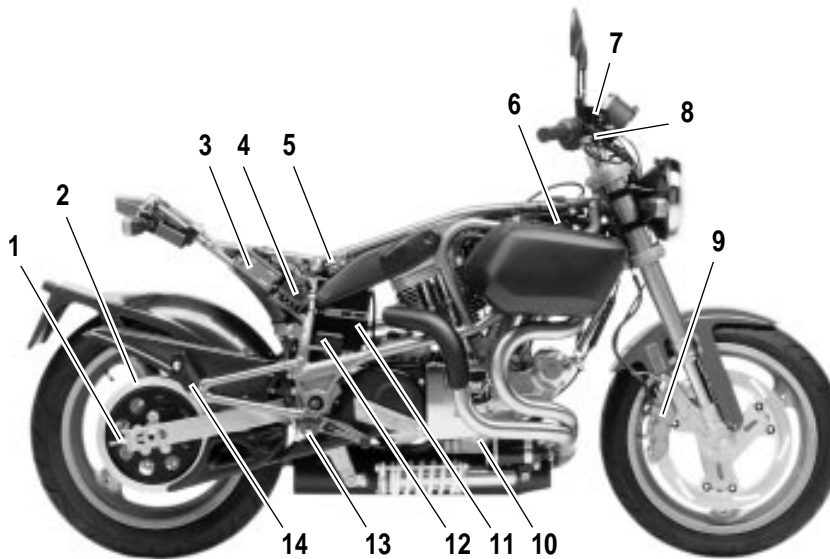
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|---|--------------------------------|-------------------------|
| 1. Right rear turn signal | 6. Front brake master cylinder | 12. Rear shock absorber |
| 2. Tail/stop lamp | 7. Front brake hand lever | 13. Rear brake pedal |
| 3. Rear brake master cylinder/
reservoir | 8. Right front turn signal | 14. Rider footrest |
| 4. Air cleaner cover | 9. Headlamp | 15. Belt guard(s) |
| 5. Fuel filler cap | 10. Front brake caliper | 16. License plate light |
| | 11. Timer cover | |

Figure 1. 1997 S1 Lightning, Right Side View

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|--|--------------------------------|------------------------|
| 1. Rear axle adjuster nut | 5. Turn signal flasher | 10. Oil pump |
| 2. Rear sprocket and secondary
drive belt | 6. Remote idle adjuster | 11. Battery |
| 3. Ignition module | 7. Front brake master cylinder | 12. Voltage regulator |
| 4. Fuse block and spare fuse | 8. Front brake hand lever | 13. Rider footrest |
| | 9. Front brake caliper | 14. Passenger footrest |

Figure 2. 1997 S1 Lightning, Right Side View (Body Removed)

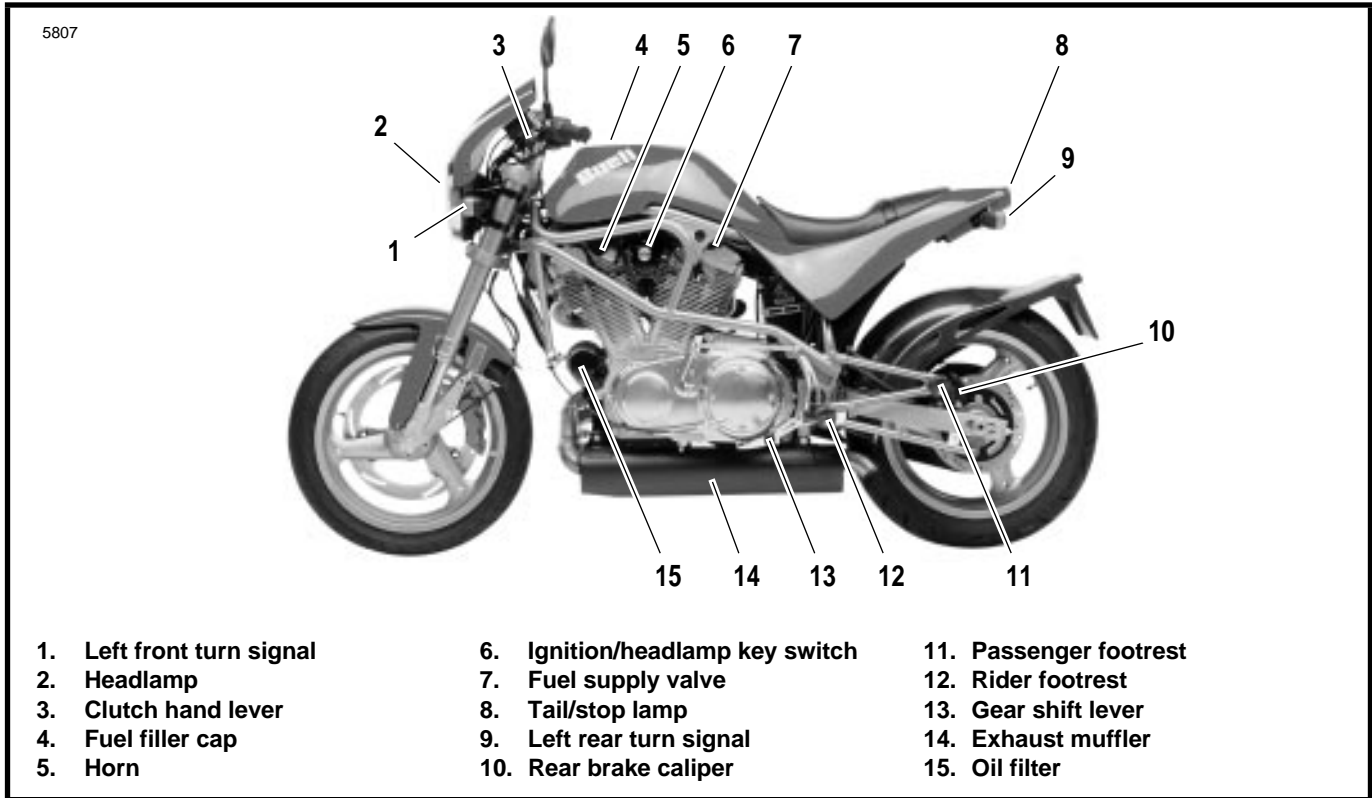


Figure 3. 1997 S1 Lightning, Left Side View

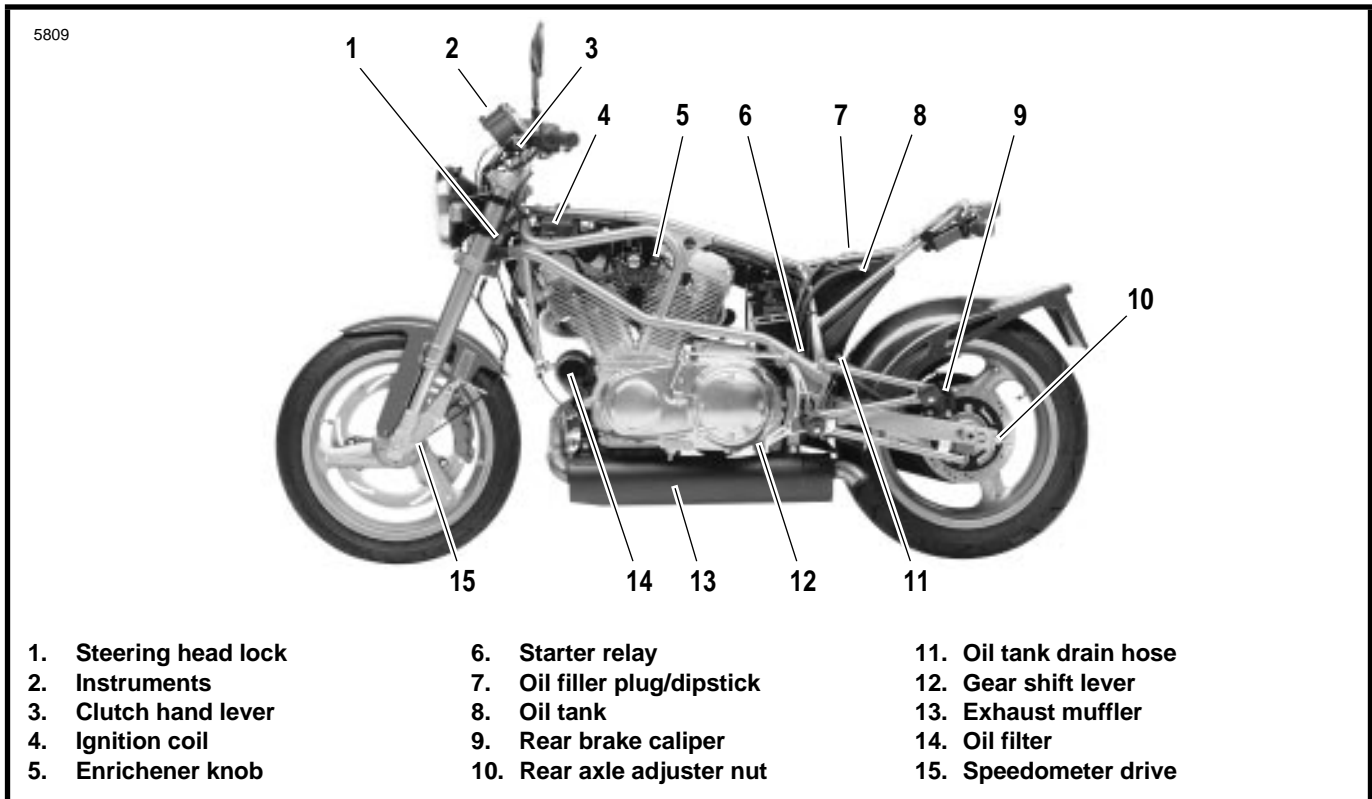


Figure 4. 1997 S1 Lightning, Left Side View (Body Removed)

FLUID REQUIREMENTS

GENERAL

United States System

Unless otherwise specified, **all fluid volume measurements in this Service Manual are expressed in United States (U.S.) units-of-measure.** See below:

- 1 pint (U.S.) = 16 fluid ounces (U.S.)
- 1 quart (U.S.) = 2 pints (U.S.) = 32 fl. oz. (U.S.)
- 1 gallon (U.S.) = 4 quarts (U.S.) = 128 fl. oz. (U.S.)

Metric System

Fluid volume measurements in this Service Manual include the metric system equivalents. In the metric system, 1 liter (L) = 1,000 milliliters (mL). Should you need to convert from U.S. units-of-measure to metric units-of-measure (or vice versa), refer to the following:

- fluid ounces (U.S.) x 29.574 = milliliters
- pints (U.S.) x 0.473 = liters
- quarts (U.S.) x 0.946 = liters
- gallons (U.S.) x 3.785 = liters
- milliliters x 0.0338 = fluid ounces (U.S.)
- liters x 2.114 = pints (U.S.)
- liters x 1.057 = quarts (U.S.)
- liters x 0.264 = gallons (U.S.)

STEERING HEAD BEARING GREASE

Use WHEEL BEARING GREASE (Part No. 99855-89).

BRAKE FLUID

WARNING

D.O.T. 5 SILICONE HYDRAULIC BRAKE FLUID can cause eye irritation. In case of contact with eyes, flush with plenty of water and get medical attention. KEEP BRAKE FLUID OUT OF THE REACH OF CHILDREN!

Use only D.O.T. 5 SILICONE HYDRAULIC BRAKE FLUID (Part No. 99902-77).

FRONT FORK OIL

Use only WP FORK OIL, 5 WEIGHT.

FUEL

Use a good quality leaded or unleaded gasoline (91 pump octane or higher). Pump octane is the octane number usually shown on the gas pump.

ENGINE OIL

Use the proper grade of oil for the lowest temperature expected before the next oil change.

Table 1. Recommended Oil Grades

HARLEY-DAVIDSON TYPE	VISCOSITY	HARLEY-DAVIDSON RATING	LOWEST AMBIENT TEMP.	COLD WEATHER STARTS BELOW 50° F
H.D. Multi-Grade	SAE 10W40	HD 240	Below 40°F (4°C)	Excellent
H.D. Multi-Grade	SAE 20W50	HD 240	Above 40° (4°C)	Good
H.D. Regular Heavy	SAE 50	HD 240	Above 60° (16°C)	Poor
H.D. Extra Heavy	SAE 60	HD 240	Above 80° (27°C)	Poor

PRIMARY DRIVE/TRANSMISSION LUBRICANT

Use only SPORT-TRANS FLUID (Part No. 98854-96 quart size or Part No. 98855-96 gallon size).

CLUTCH

MODEL YEAR CHANGE

See [Figure 5](#). All 1997 model year motorcycles use the new style clutch release ramp introduced on late 1996 vehicles. The clutch adjustment and lever freeplay procedures remain the same. The change was made to provide additional clearance between the coupler and the primary cover.

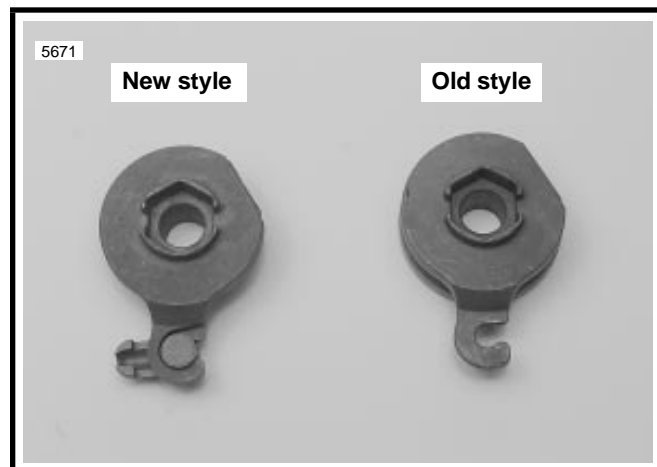


Figure 5. Ramp Change

REAR PRELOAD ADJUSTMENT

GENERAL

Rear suspension spring preload must be adjusted before any other adjustments can be attempted. This adjustment assures that the rear suspension has the proper amount of travel.

Spring preload is the most important suspension adjustment on the S1 Lightning. Improper preload will adversely affect both the handling and motorcycle ride. Correct preload setting will result in motorcycle handling that suits the rider's size and weight.

ADJUSTMENT

You will need three people to carry out this adjustment.

1. Verify correct front and rear tire pressure. See [SPECIFICATIONS](#) on [page 3](#).
2. Remove all accessories from motorcycle including tank bag and/or saddlebags.
3. Take the motorcycle off the side stand and bounce the rear up and down a few times to be sure the suspension is free and not binding.
4. See [Figure 6](#). Measure the distance from the center of the rear axle nut to the rear turn signal mounting bolt **without** rider/passenger/cargo/accessories on the motorcycle.
5. Install items removed in Step 2. Load all cargo.
6. Bounce a few times on the seat to be sure the suspension is free and not binding.
7. With the help of an assistant, take the same measurement with the vehicle fully loaded (rider/passenger/luggage/cargo). The assistant should help balance the motorcycle so the rider can keep both feet on the footrests.
8. Subtract the second measurement from the first. The difference, which is the squat, should be 0.25-0.75 in. (6.4-19.1 mm). If it is not, you will have to adjust the spring preload.

⚠ CAUTION

- Be sure to apply the same number of turns to each preload adjusting nut to ensure that the drawing rings do not become misaligned. Misaligned drawing rings will cause the shock absorber spring to bind against the adjustment rods
 - Be sure the drawing rings are parallel within 1/64 in. (0.4 mm). Misaligned drawing rings will cause the shock absorber spring to bind against the adjustment rods.
9. See [Figure 7](#). Change the spring preload by adjusting both preload adjusting nuts (1) (metric) behind the rear drawing ring (2).
 - a. Increase the preload by tightening the nuts.
 - b. Decrease the preload by loosening the nuts.

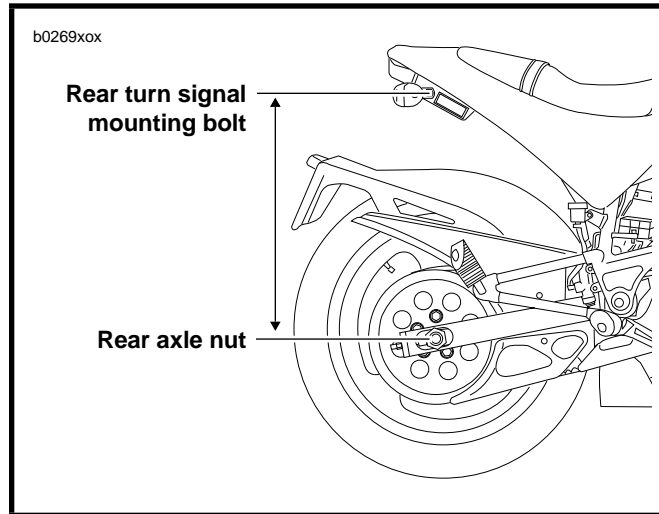


Figure 6. Checking Rear Preload

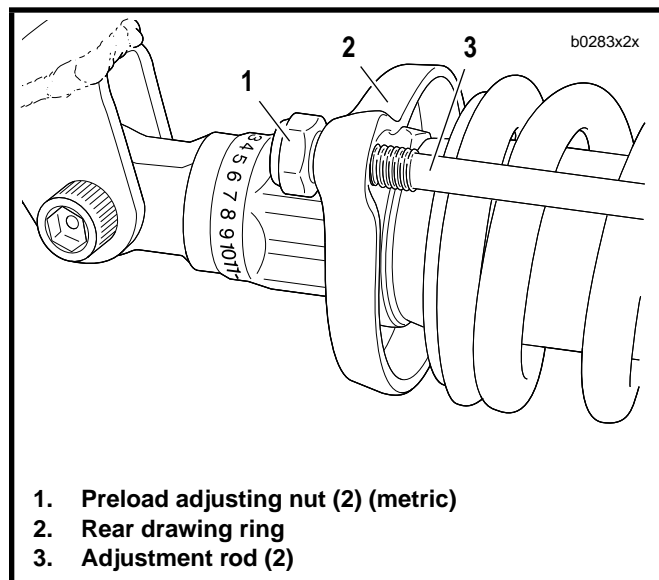


Figure 7. Adjusting Rear Preload

IGNITION TIMING

MODEL YEAR CHANGE

See [Figure 8](#). All 1997 model year motorcycles have the remote idle adjuster introduced on late 1996 vehicles. Using this adjuster, it is no longer necessary to use the [CARBURETOR IDLE ADJUSTMENT TOOL \(Part No. HD-33413\)](#) and TIP (SNAP-ON Part No. TMP23A) to adjust engine idle speed.

NOTE

The new idle adjuster changes [Step 4 of IGNITION TIMING, INSPECTION](#) in [Section 1](#) the 1996 manual.

See [REMOTE IDLE ADJUSTER](#) on [page 21](#) for more information.



Figure 8. Remote Idle Adjuster

NOTES





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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).

NOTES



VEHICLE IDENTIFICATION NUMBER

MODEL YEAR CHANGE

See [Figure 9](#). A 17-digit serial number, or Vehicle Identification Number (V.I.N.), is stamped on the right side of the steering head (ex., 4MZSS11J1V3200001). Also affixed to the steering head at this location is an information decal bearing the V.I.N. code.

An abbreviated V.I.N. is stamped on the front left side of the crankcase.

NOTE

Always give the V.I.N. or abbreviated V.I.N. when ordering parts or making inquiries about your Buell motorcycle.

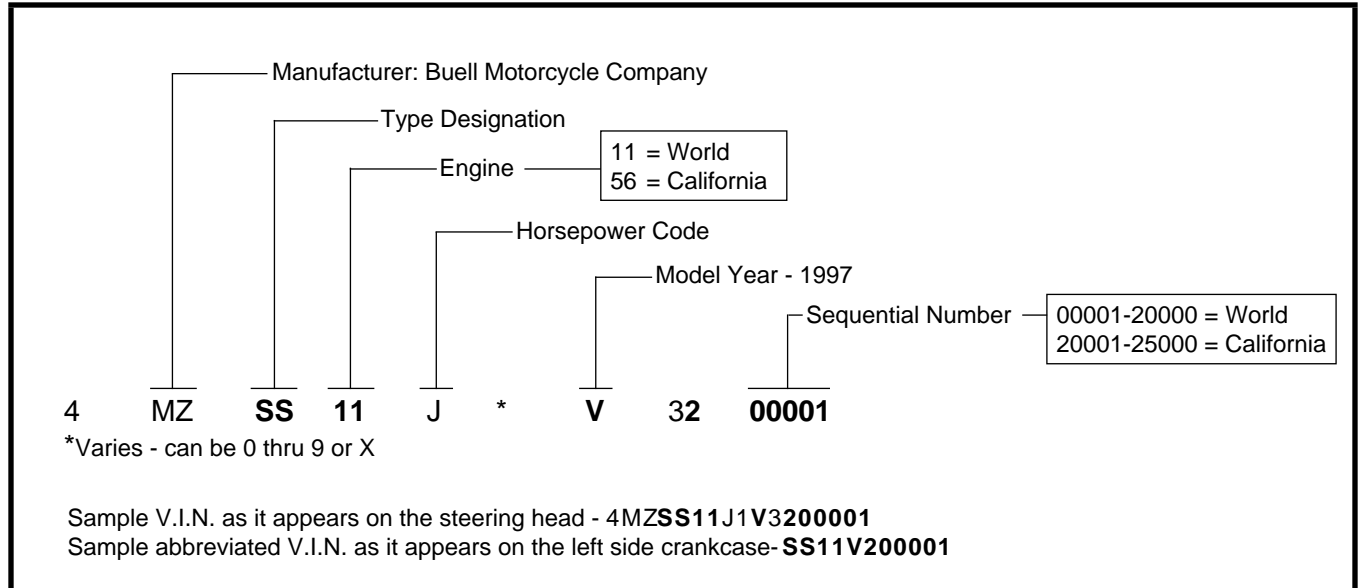


Figure 9. Vehicle Identification Number (V.I.N.)

FRONT WHEEL

MODEL YEAR CHANGE

See [Figure 10](#). All 1997 model year motorcycles have new fasteners on the front brake rotor/carrier assembly.

Separate the carrier from the rotor only when necessary. Use **new** clips when reassembling.

NOTE

The new rotor/carrier assembly changes Step 4 of [FRONT WHEEL, REMOVAL](#) and Step 2 of [FRONT WHEEL, ASSEMBLY](#) in the 1996 manual.

REMOVAL/INSTALLATION

1. See [Figure 10](#). Remove and discard the clip (2).
2. Remove the wave washer (3).
3. Remove the drive pin (1). Repeat this procedure for the other five fasteners to separate the carrier (4) from the rotor (5).
4. Assemble in reverse order. Use **new** clips upon assembly.

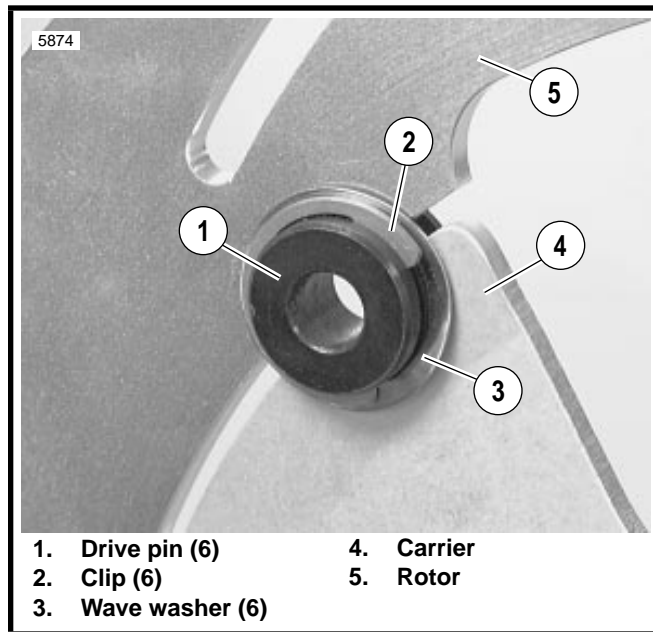


Figure 10. 1997 Rotor to Carrier Fastener

FRONT BRAKE CALIPER

TOOL INFORMATION

Use the [BRAKE CALIPER PISTON REMOVER](#) (Part No. B-42079) to simplify front caliper piston removal.

NOTE

The following instructions expand upon Step 9 of [FRONT BRAKE CALIPER, REMOVAL/DISASSEMBLY](#) in the 1996 manual.

1. Attach caliper half to tool.
 - a. See [Figure 11](#). Attach outside caliper half using two screws.
 - b. See [Figure 12](#). Attach inside caliper half using two screws and two nuts.

⚠WARNING

When using air pressure to remove pistons from caliper, pistons may be ejected with considerable force. Wear safety glasses and heavy gloves to prevent personal injury.

⚠CAUTION

Exercise care to avoid dropping piston on hard surface. Any damage requires piston replacement.

2. If removing pistons from outside caliper half, place a gloved finger over the banjo bolt hole.
3. See [Figure 13](#). Apply low pressure air to force the pistons from the caliper bores.

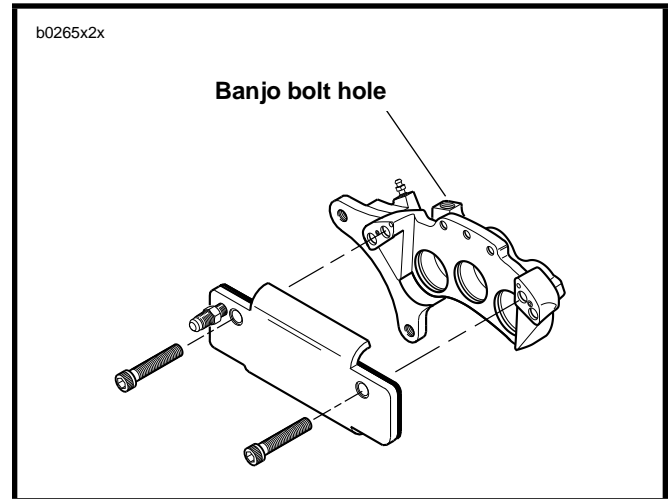


Figure 11. Outside Caliper Half

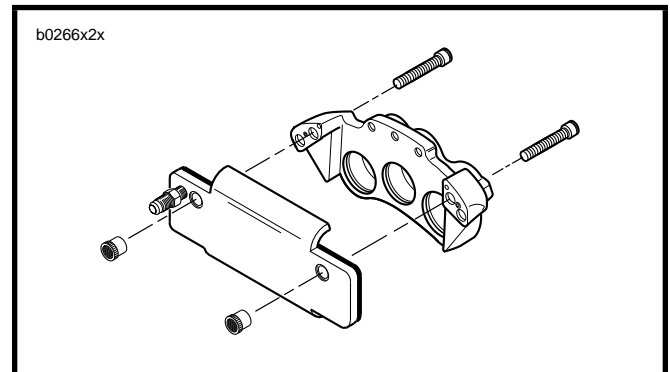


Figure 12. Inside Caliper Half

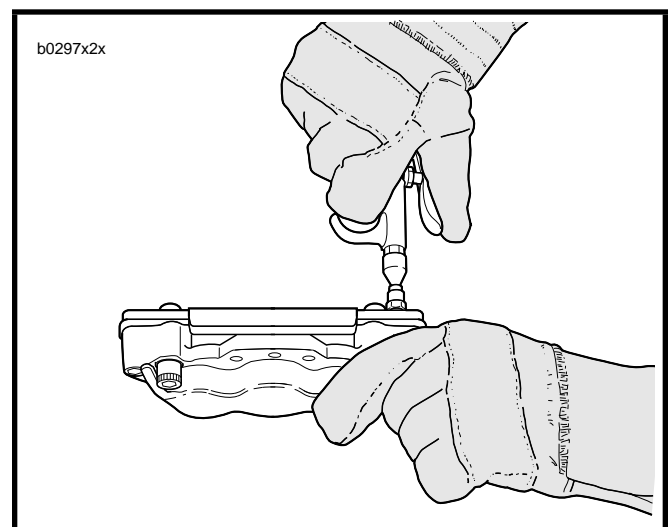


Figure 13. Using Air Pressure to Remove Pistons

SWINGARM

MODEL YEAR CHANGE

All 1997 model year motorcycles use a revised swingarm pivot assembly. The modifications allow preload to be adjusted without using the **PIVOT SHAFT BEARING ADJUSTER** (Part No. B-41175).

NOTE

See [Figure 14](#). The threaded rod (1) replaces a pivot shaft used on 1996 models. This new part changes the **SWINGARM, ASSEMBLY** and **SWINGARM, INSTALLATION** procedures in the 1996 manual.

ASSEMBLY

1. See [Figure 14](#). If necessary, draw **new** roller bearing cups (5) into swingarm using **BEARING INSTALLATION BOLT** (Part No. B-35316-5) and **STEERING HEAD BEARING RACE INSTALLER** (Part No. HD-39302).

NOTE

Timkin roller bearing assemblies should be replaced as a unit. Do not intermix components. Mark all components so they may be correctly installed.

2. Coat bearing components with **WHEEL BEARING GREASE** (Part No. HD-99855-89) and assemble.
3. Install a **new** swingarm seal (3) flush to the swingarm.
4. Slide swingarm assembly into position.

NOTE

See [Figure 14](#). The left side bearing adjustment bolt (6) has additional internal threads.

5. Install both bearing adjustment bolts (2, 6) and the threaded rod (1). Insert the rod from the air cleaner side of the motorcycle.
6. Tighten the left pinch screw on the swingarm mount block. Do not tighten the right side pinch screw at this time.

INSTALLATION

1. See [Figure 15](#). Adjust swingarm preload by tightening the threaded rod. Preload should measure 3.5-5.5 lbs (1.6-2.5 kg).
2. Follow the remaining installation instructions in the 1996 manual.

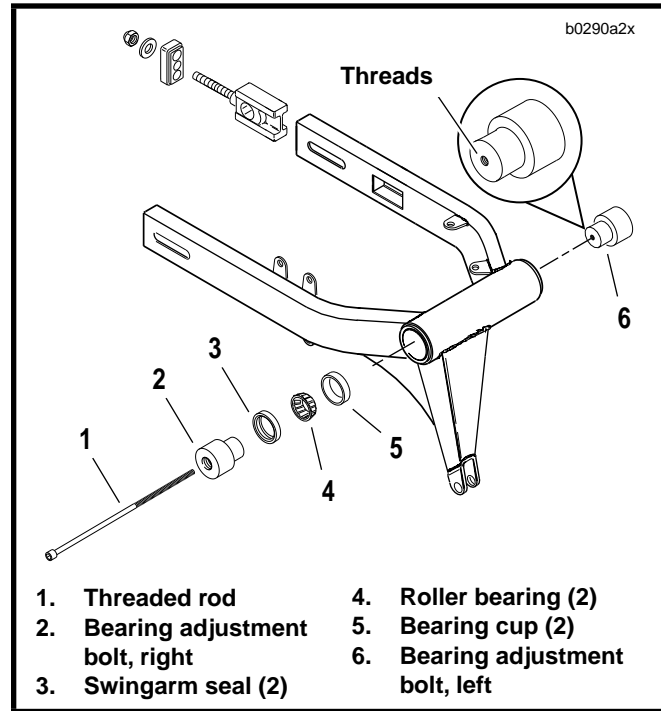


Figure 14. Swingarm

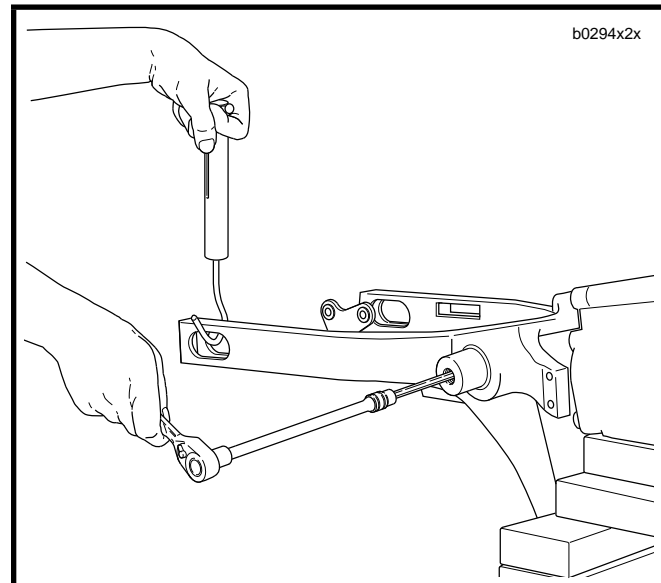


Figure 15. Adjusting Preload



SECTION III-ENGINE

All engine procedures in the [1996 S1 Lightning Service Manual](#) (Part No. 99490-96Y) apply to 1997 models.

NOTES

