SPECIFICATIONS 2.1

Table 2-1. Dimensions

DIMENSIONS	IN.	MM
Wheel base (without rider)	54.1	1374
Seat height (with rider)	31.8	808
Ground clearance (without rider)	6.75	171
Trail	4.8	122
Rake (steering angle)	23.5 degrees	
Rake (fork angle)	22 degrees	

Table 2-2. Weight Specifications

WEIGHT	LBS.	KG
Wet weight	498	226
GVWR	950	431
GAWR - front	345	156
GAWR - rear	685	311
Load capacity	452	205
All measurements include a full tank of fuel.		

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 steering head.

Table 2-3. Capacities

CAPACITIES	U.S.	LITERS
Fuel tank (inc. reserve)	4.4 gallons	16.7
Reserve/Low fuel light at	0.83 gallons	3.1
Oil tank (wet - for normal oil change)	2.5 quarts	2.4
Fork oil (each fork)	15.35 ounces	0.45
Transmission	1.0 quart	0.95

Table 2-4. Tire and Positions

TIRE AND POSITION	SOLO RIDING	GVWR
Front Pirelli Scorpion Sync 120/70 R17	34 PSI (234 kPa)	Same as solo
Rear Pirelli Scorpion Sync 180/55 R17	36 PSI (248 kPa)	

Table 2-5. Brake Rotor Runout

RUNOUT	IN.	MM
Front radial	0.0177	0.45
Front lateral	0.0248	0.63
Rear radial	0.0177	0.45
Rear lateral	0.0154	0.39

⚠WARNING

Do not inflate tire beyond maximum pressure as specified on sidewall. Over inflated tires can blow out, which could result in death or serious injury. (00027a)

Table 2-6. Front Fork Service Wear Limits

RUNOUT	IN.	MM
Free length - fork spring	18.77	476.7
Runout - fork tube	0.008	0.2

TORQUE VALUES

ITEM	TORQUE		NOTES
Axle (front)	39-41 ft-lbs	53-56 Nm	ANTI-SEIZE, Left handed thread, page 2-16
Axle (rear)	48-52 ft-lbs	65.1-70.5	ANTI-SEIZE, Tighten to 23-27 ft-lbs (31.2-36.6 Nm) then back off 2 turns and final tighten, page 2-20
Axle pinch fastener, rear	40-45 ft-lbs	54-61 Nm	page 2-20
Axle pinch fasteners, front	20-22 ft-lbs	27-30 Nm	page 2-16
Battery terminal fasteners	72-96 **in-lbs**	8-11 Nm	page 2-66
Brake hand lever housing fasteners	80-90 **in-lbs**	9-10 Nm	page 2-29
Brake lamp switch fastener, front	7-10 **in-lbs**	0.8-1.0 Nm	page 2-29
Brake light switch/master cylinder banjo bolt, rear	16-20 ft-lbs	22-27 Nm	page 2-41
Brake line bracket fasteners	48-72 **in-lbs**	5-8 Nm	page 2-41
Brake line p-clamp fastener, front	36-60 **in-lbs**	4-7 Nm	page 2-32
Brake line P-clamp on inside of lighting module	36-60 **in-lbs**	4-7 Nm	page 2-32
Brake pedal fastener	22-24 ft-lbs	30-33 Nm	LOCTITE 271, page 2-26
Brake pin hanger set, front	11-14 ft-lbs	15-19 Nm	page 2-34
Brake pin hanger set, rear	11-14 ft-lbs	15-20 Nm	page 2-43
Brake pin plug, rear	24 **in-lbs**	2.7 Nm	page 2-43
Caliper banjo bolt, front	16-20 ft-lbs	22-27 Nm	metric, page 2-32
Caliper banjo bolt, rear	16-20 ft-lbs	22-27 Nm	page 2-41
Caliper bleeder valves	36-60 **in-lbs**	4-7 Nm	metric, page 2-27
Caliper carrier, rear	24-26 ft-lbs	32-35 Nm	page 2-20
Caliper fasteners, front	15-19 ft-lbs	20-26 Nm	page 2-34
Caliper mounting fasteners, front	35-37 ft-lbs	47-50 Nm	LOCTITE 271 (red), page 2-34
Caliper mounting large fastener, rear (metric)	18-21 ft-lbs	24-28 Nm	page 2-44
Caliper mounting small fastener, rear (metric)	14-18 ft-lbs	19-24 Nm	page 2-44
Chin fairing fasteners	36-48 **in-lbs**	4-5 Nm	LOCTITE 271 (red), page 2-90
Clutch cable fitting at primary	36-108 **in-lbs**	4-12.2 Nm	page 2-71
Clutch cable wire form retainer	84-92 **in-lbs**	9.5-10.4 Nm	page 2-62
Clutch inspection cover fasteners	84-108 **in-lbs**	9.5-12.2 Nm	Tighten in a crosswise pattern, page 2-72
Deflector fasteners	24-36 **in-lbs**	2.7-4.1 Nm	page 2-68
Deflector jam nuts	39-48 **in-lbs**	4.4-5.4 Nm	page 2-68
Deflector pivot shaft riser	43-49 **in-lbs**	4.8-5.5 Nm	page 2-68

ITEM	TORQUE		NOTES
ECM fasteners	36-60 **in-lbs**	4.0-6.8 Nm	page 2-99
Engine shift lever pinch screw	48-60 **in-lbs**	5.4-6.8 Nm	LOCTITE 271 (red), page 2-71
Engine shroud air scoop	12-36 **in-lbs**	1-4 Nm	page 2-92
Exhaust header mounting nut	72-96 **in-lbs**	8-11 Nm	page 2-83
Footpeg mount	132-144 **in-lbs**	15-16 Nm	page 2-86
Fork cap to damper rod	38-42 ft-lbs	51.5-56.9 Nm	page 2-51
Fork cap to fork tube	22-30 ft-lbs	29.8-40.6 Nm	page 2-51
Fork center bolt	22-30 ft-lbs	30-40 Nm	LOCTITE 271 (red), page 2-50
Fork clamp, lower	20-22 ft-lbs	27-30 Nm	LOCTITE 271 (red), page 2-52
Fork clamp, upper	23-25 ft-lbs	31-34 Nm	LOCTITE 271 (red), page 2-52, page 2-54
Fork damper locknut	22-30 ft-lbs	30-40 Nm	page 2-50
Front fasteners, passenger grab handles	96-120 **in-lbs**	11.0-13.5 Nm	LOCTITE 271 (red), page 2-107
Front lower fender fasteners	36-48 **in-lbs**	4-4.5 Nm	LOCTITE 271 (red), page 2-88
Front isolator bolt	49-51 ft-lbs	66-69 Nm	page 2-62
Front isolator bracket mounting fasteners	49-51 ft-lbs	66-69 Nm	LOCTITE 271 (red), page 2-62
Front isolator snubber, upper	12-36 **in-lbs**	1-4 Nm	page 2-62
Front isolator threaded frame insert	59-61 ft-lbs	80-82.7 Nm	LOCTITE 271, page 2-62
Front muffler mount	16-18 ft-lbs	1.7-24.4 Nm	page 2-84
Hand lever pivot fastener	39-48 **in-lbs**	4.4-5.4 Nm	page 2-29
Handlebar clamp screws	10-12 ft-lbs	14-16 Nm	LOCTITE 271 (red), Tighten front screws first, page 2-79
Headlight support bracket fasteners	48-72 **in-lbs**	5.4-8.1 Nm	LOCTITE 271 (red), page 2-76
Horn	36-60 **in-lbs**	4-6.7 Nm	page 2-76
Intake cover assembly	12-36 **in-lbs**	4-5.4 Nm	page 2-91
Lower belt guard	12-36 **in-lbs**	1-4 Nm	page 2-89
Master cylinder banjo bolt, front	16-20 ft-lbs	22-27 Nm	page 2-32
Master cylinder cover fasteners, front	9-13 **in-lbs**	1.0-1.5 Nm	page 2-30
Master cylinder mounting fasteners, rear	72-84 **in-lbs**	8-9.5 Nm	page 2-39
Muffler mounting block fastener, rear	32-36 ft-lbs	43-49 Nm	LOCTITE 271 (red), page 2-83
Muffler strap fastener, front	108-120 **in-lbs**	12-14 Nm	page 2-84
Muffler strap fastener, rear	48-60 **in-lbs**	5-7 Nm	page 2-84
Negative battery cable at battery terminal	72-96 **in-lbs**	8-11 Nm	page 2-72
Nuts, license plate light	12-36 **in-lbs**	1.4-4 Nm	page 2-107
Oil cooler air scoop	48-72 **in-lbs**	5.4-8.0 Nm	LOCTITE 271 (red), page 2-92

ITEM	TORQUE		NOTES
Oil drain plug	26-29 ft-lbs	35-39 Nm	page 2-60
Oil feed line swingarm p-clamp	48-72 **in-lbs**	5.4-8 Nm	page 2-83
Oil line p-clamps	48-72 **in-lbs**	5.4-8 Nm	page 2-61
P clamp, front tie bar and clutch cable	25-27 ft-lbs	33.9-36.6 Nm	page 2-72
Preload adjuster mounting	36-60 **in-lbs**	4.0-6.7 Nm	page 2-66
Ram air scoop	12-36 **in-lbs**	1-4 Nm	page 2-92
Rear brake line bracket fasteners	48-72 **in-lbs**	5.4-8.1 Nm	page 2-86
Rear fasteners, passenger grab handles	23-25 ft-lbs	31-34 Nm	LOCTITE 271 (red), page 2-107
Rear fender/belt guard	12-36 **in-lbs**	1-4 Nm	page 2-89
Rear remote master cylinder reservoir fastener	48-72 **in-lbs**	11-14 Nm	page 2-39
Rear shock reservoir fastener	80-88 **in-lbs**	9.0-9.9 Nm	page 2-99
Rotor mounting fasteners, front	25-27 ft-lbs	34-37 Nm	Replace with new, page 2-15
Rotor mounting fasteners, rear	25-27 ft-lbs	34-37 Nm	Replace with new, page 2-19
Seat lock	60-96 **in-lbs**	6.7-10.8 Nm	page 2-102
Shift linkage fasteners	36-60 **in-lbs**	4-6.8 Nm	LOCTITE 271 (red), page 2-71
Shift pedal flange head bolt	22-24 ft-lbs	30-32.5 Nm	LOCTITE 271 (red), page 2-71
Shock absorber, lower	15-17 ft-lbs	20.3-23 Nm	page 2-61
Shock mounting fastener, upper	48-52 ft-lbs	65-70.5 Nm	page 2-66
Sidestand bracket fasteners	25-27 ft-lbs	34-37 Nm	LOCTITE 271 (red), page 2-105
Sprocket cover fastener	12-36 **in-lbs**	1-4 Nm	page 2-87
Sprocket fasteners	35-37 ft-lbs	48-50 Nm	Replace with new, page 2-19
Steering stem capnut	38-42 ft-lbs	52-57 Nm	page 2-54
Steering stem pinch fastener	20-22 ft-lbs	27-29.8 Nm	LOCTITE 271 (red), page 2-54, page 2-57
Stone guard	12-36 **in-lbs**	1-4 Nm	page 2-89
Swingarm brace mounting fasteners	25-27 ft-lbs	34-37 Nm	page 2-61
Swingarm pivot shaft pinch bolt	17-19 ft-lbs	23-26 Nm	LOCTITE 271 (red), page 2-61
Swingarm pivot shaft	24-26 ft-lbs	32-35 Nm	page 2-61
Switch housing fasteners, right	25-33 **in-lbs**	3-4 Nm	page 2-67
Tail section to frame/fuel tank	21-23 ft-lbs	28.5-31.2 Nm	LOCTITE 271 (red), page 2-99
Tail sections to tail loop	20-22 ft-lbs	27-30 Nm	page 2-97
Torca clamp	28-30 ft-lbs	38-40.6 Nm	page 2-84
Triple tail plastic collar screw	36-48 **in-lbs**	4.0-5.4 Nm	page 2-107
Upper front fender fasteners	36-48 **in-lbs**	4-5.4 Nm	page 2-88

ITEM	TORQUE		NOTES
Upper module fasteners	36-60 **in-lbs**	4.1-6.8 Nm	page 2-77
Valve stem nut	40-44 **in-lbs**	4.5-4.9 Nm	page 2-23
Windscreen fasteners	10-12 **in-lbs**	1.1-1.4 Nm	page 2-100
Wire cover screws	36-48 **in-lbs**	4.0-5.4 Nm	page 2-107

TIRE SPECIFICATIONS 2.2

GENERAL

⚠WARNING

Tires must be correctly matched to wheel rims. Use only Buell approved tires. See a Buell dealer. Using non-approved tires can adversely affect stability, which could result in death or serious injury. (00133a)

See Figure 2-1. Tire sizes are molded on the sidewall. Rim size and contour are marked on the rim's exterior surface.

Example: **J17 x 3.5 MT DOT**

- **J** designates the tire and rim standard.
- **17** is the normal diameter of the rim in inches, measured at the bead seat diameter.
- **3.5** is the width of the bead seat measured in inches.
- **MT** designates the rim type.
- **DOT** means that the rim meets Department of Transportation Federal Motor Vehicle Safety Standards. Refer to Table 2-7.

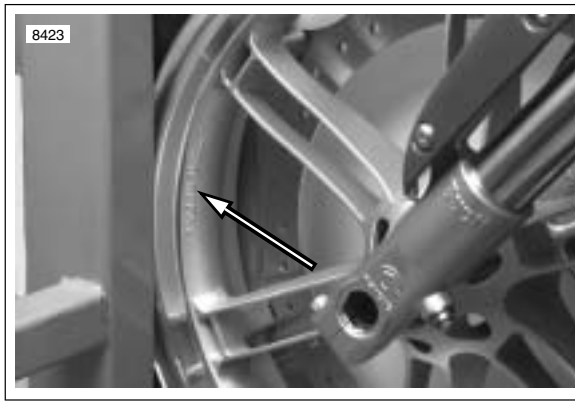


Figure 2-1. Rim Markings

Table 2-7. Tire Fitment-Tubeless Cast Wheels

WHEEL SIZE & POSITION	CONTOUR & RIM SIZE	RIM VALVE HOLE DIAMETER	TIRE SIZE
17 in. – Front	J17 x 3.50 MT DOT	0.33 in.	Pirelli Scorpion Sync 120/70 R17
17 in. – Rear	J17 x 5.50 MT DOT	0.33 in.	Pirelli Scorpion Sync 180/55 R17

VEHICLE IDENTIFICATION NUMBER (V.I.N.)

The full 17 digit serial, or Vehicle Identification Number (V.I.N.) is stamped on the right side of the steering head and on a label located on the left side of the steering head.

A Motor Identification Number is stamped on the left side crankcase at the base between the cylinders.

NOTE

Always give the full Vehicle Identification Number located on the steering head when ordering parts or making any inquiry about your motorcycle.

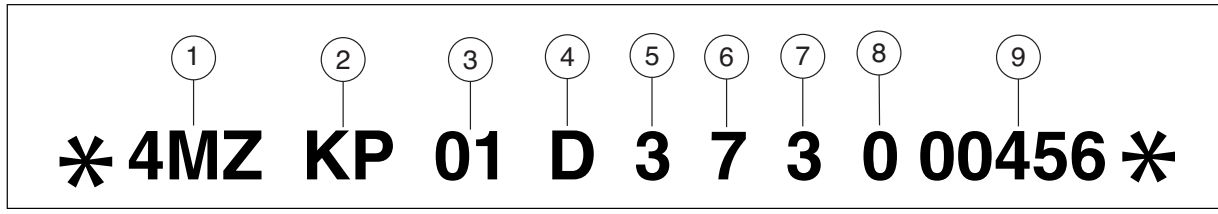


Figure 2-2. Typical Buell Identification Number

Table 2-8. Buell 2007 XB Models V.I.N. Description

ITEM	DESCRIPTION	POSSIBLE VALUES
1	WMI Code	4MZ = Buell vehicles originally manufactured for sale **within** the United States 5MZ = Buell vehicles originally manufactured for sale **outside** the United States
2	Motorcycle type	KP = Blast AX = Firebolt KX = Lightning CityX SX = Lightning WX = Lightning Scg JX = Lightning Long DX = Ulysses
3	Engine type	01 = 492cc (World) 02 = 984cc (World) 03 = 1203cc (World)
4	Market configuration	A = Australia L = California N = Canada D = Domestic E = England R = Europe (HDI) J = Japan
5	VIN check digit	Can be 0-9 or X
6	Model year	7 = 2007
7	Assembly plant	3 = East Troy, WI
8	Model	0 = Blast (07) 1 = XB9R (07) 2 = XB9SX (07) 3 = XB12R (07) 4 = XB12S (07) 5 = XB12Scg (07) 6 = XB12Ss (07) 7 = XB12X (07)
9	Sequential number, by model	varies

GENERAL

Good handling and maximum tire mileage are directly related to the care of wheels and tires. Regularly inspect wheels and tires for damage and wear. If handling problems occur, see 1.21 TROUBLESHOOTING or Table 2-9.

See 1.7 TIRES AND WHEELS for tire pressures. Keep tires inflated to the recommended air pressure. Always balance the wheel after replacing a tire.

⚠WARNING

Do not inflate tire beyond maximum pressure as specified on sidewall. Over inflated tires can blow out, which could result in death or serious injury. (00027a)

TROUBLESHOOTING

See Figure 2-3. Check tire inflation pressure at least once each week. At the same time, inspect tire tread for punctures, cuts, breaks and other damage. Repeat the inspection before long trips.

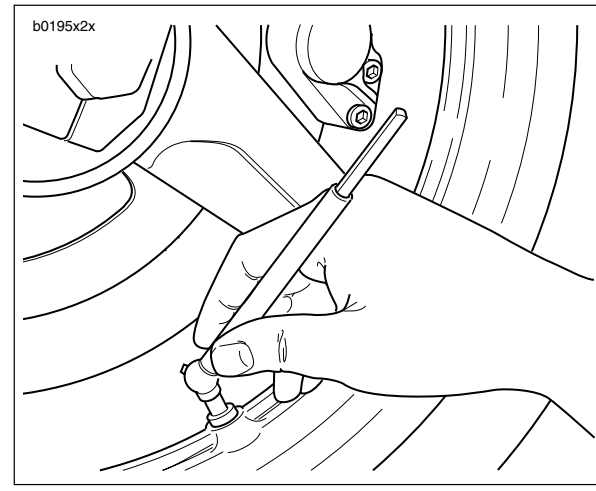


Figure 2-3. Checking Tire Inflation Pressure

Table 2-9. Wheel Service

CHECK FOR	REMEDY
Loose axles.	Tighten front axle. See 2.5 FRONT WHEEL. Tighten rear axle. See 2.6 REAR WHEEL.
Excessive side-play or radial (up-and-down) play in wheel hubs.	Replace wheel bearings.
Rims and tires out-of-true sideways; should not be more than 0.080 in. (2.03 mm).	Replace rims. See 2.7 CHECKING CAST RIM RUNOUT, and 2.8 TIRES.
Rims and tires out-of-round or eccentric with hub; should not be more than 0.090 in. (2.29 mm).	Replace rims. See 2.7 CHECKING CAST RIM RUNOUT, and 2.8 TIRES.
Irregular or peaked front tire wear.	Replace as described under 2.5 FRONT WHEEL, 2.6 REAR WHEEL, 2.8 TIRES and 2.7 CHECKING CAST RIM RUNOUT.
Correct tire inflation.	Inflate tires to correct pressure. See 1.7 TIRES AND WHEELS.
Correct tire and wheel balance.	Static balance may be satisfactory if dynamic balancing facilities are not available. However, dynamic balancing is strongly recommended.
Steering head bearings.	Check for proper torque and replace worn or damaged bearings. See 1.12 STEERING HEAD BEARINGS.
Damper tubes.	Check for leaks. See 2.16 FRONT FORK.
Shock absorbers.	Check damping action and mounts. See 1.11 SUSPENSION DAMPING ADJUSTMENTS.
Swingarm bearings.	Check for proper torque and replace worn or damaged bearings. See 2.19 SWINGARM AND BRACE.

⚠WARNING

To prevent death or serious injury, use the following guidelines when installing a new tire or repairing a flat:

1. **Always locate and eliminate the cause of the original tire failure.**
2. **Do not patch or vulcanize a tire casing. These procedures weaken the casing and increase the risk of a blowout.**
3. **The use of tires other than those specified can adversely affect handling which could result in death or serious injury.**
4. **Tires and wheels are critical items. Since the servicing of these components requires special tools and skills, Buell recommends that you see your dealer for these services.**

⚠WARNING

Replace punctured or damaged tires. In some cases, small punctures in the tread area may be repaired from within the demounted tire by a Buell dealer. Speed should NOT exceed 50 mph (80 km/h) for the first 24 hours after repair, and the repaired tire should NEVER be used over 80 mph (130 km/h). Failure to follow this warning could result in death or serious injury. (00118a)

⚠WARNING

Buell tires are equipped with wear bars that run horizontally across the tread. When wear bars become visible and only 1/32 in. (0.8 mm) tread depth remains, replace tire immediately. Using a worn tire can adversely affect stability and handling, which could result in death or serious injury.

At regular intervals of 5000 miles (8000 km) or whenever handling irregularities are noted, perform the recommended service checks. Refer to Table 2-9.

If tires must be replaced, same as original equipment tires must be used. Other tires may not fit correctly and may be hazardous to use.

REMOVAL

1. Place a scissor jack under jacking point and raise front wheel off ground. For location of jacking point see 2.32 EXHAUST SYSTEM.

NOTE

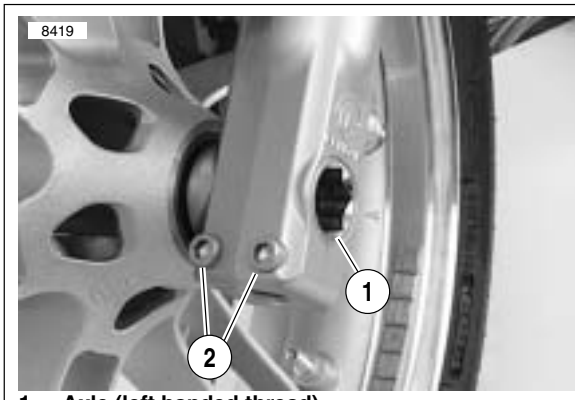
Do not operate front brake lever with front wheel removed or caliper pistons may be forced out. Reseating pistons requires caliper disassembly.

2. Remove the right side lower fender fasteners. See 2.36 FENDERS.
3. See Figure 2-4. Loosen front axle pinch fasteners (2) on front fork.
4. Remove axle (1).

NOTES

- *The front axle is left handed thread.*
- *To prevent cosmetic damage to the wheel, center caliper between spokes before removal.*

5. See Figure 2-5. Raise the wheel up until the rotor clears the caliper and rotate the fork leg counterclockwise allowing wheel clearance for removal.
6. Remove wheel.



1. Axle (left handed thread)
2. Front axle pinch fasteners (2)

Figure 2-4. Front Wheel Mounting

Figure 2-5. Front Wheel Removal

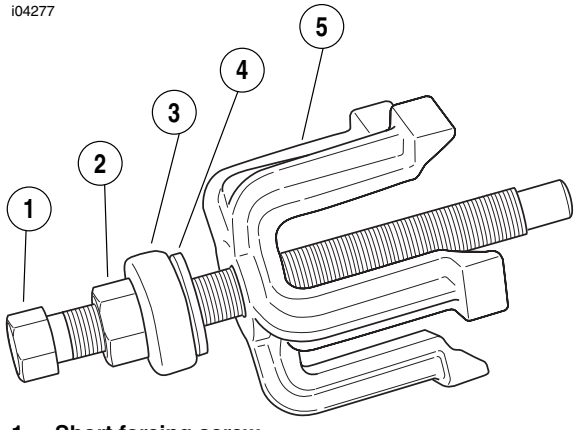
DISASSEMBLY

Bearing Removal

NOTE

On single disc wheels, always remove the brake disc side first.

1. See Figure 2-6. Remove wheel bearings using WHEEL BEARING REMOVER/INSTALLER KIT (Part No. B-43993-50) and WHEEL BEARING REMOVER AND INSTALLER (Part No. HD-44060).
2. Sparingly apply EXTREME PRESSURE LUBRICANT (Part No. J-23444-A) to the threads of the short forcing screw (1) to prolong service life and ensure smooth operation.



1. **Short forcing screw**
2. **Nut**
3. **Nice bearing**
4. **Washer**
5. **Bridge**

Figure 2-6. Assemble Puller

3. Assemble the short forcing screw (1), nut (2), Nice bearing (3), washer (4) and bridge (5) from the WHEEL BEARING INSTALLER/REMOVER (Part No.HD-44060).
4. See Figure 2-7. Insert the FRONT WHEEL BEARING REMOVER COLLET (Part No. B-43993-7, from kit Part No. B-43993-50) into the wheel bearing until it fully seats against the bearing.

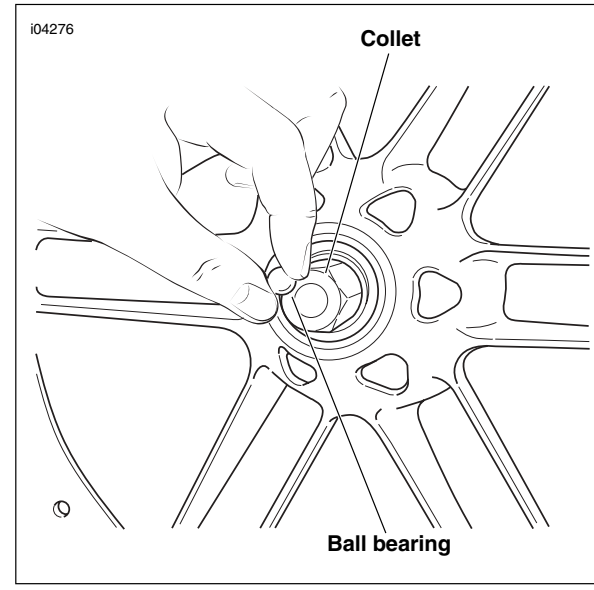
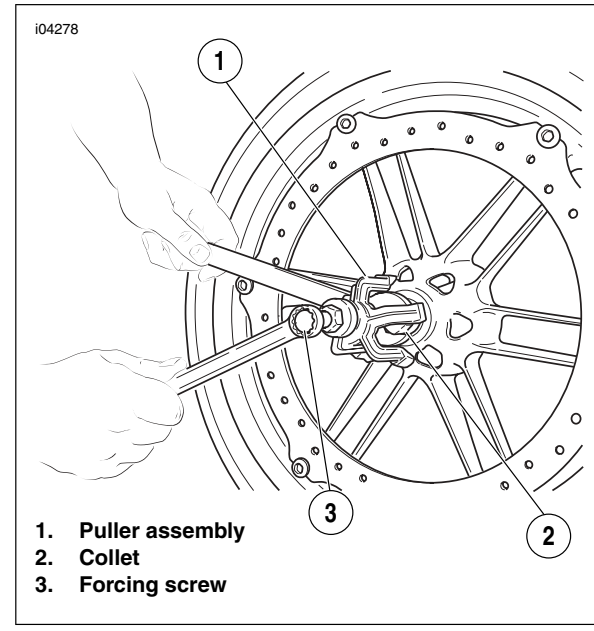


Figure 2-7. Install Collet and Ball Bearing

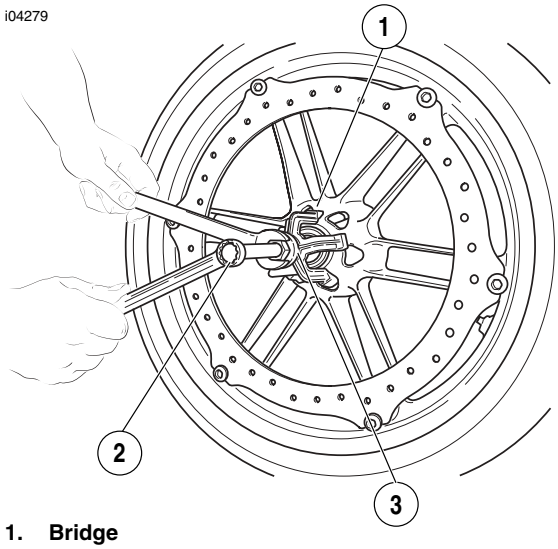
5. Insert the ball bearing into the collet.
6. See Figure 2-8. Thread the puller assembly (1) into the collet (2).
7. Hold the collet (2), and turn the forcing screw (3) to expand the collet.



1. **Puller assembly**
2. **Collet**
3. **Forcing screw**

Figure 2-8. Expand the Collet

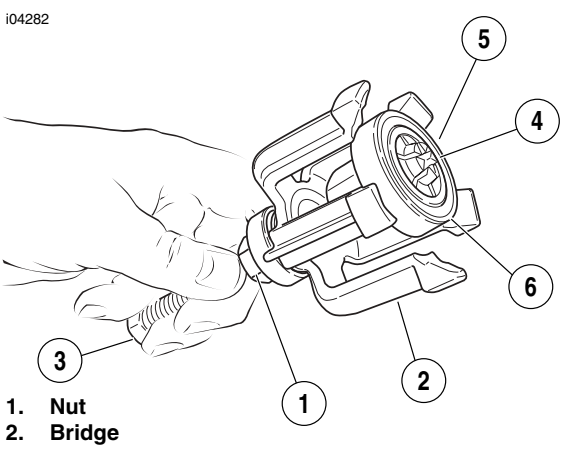
8. See Figure 2-9. Place the bridge (1) against the wheel hub.
9. Hold the forcing screw (2), and turn the nut (3) clockwise until the bearing is free of the hub.



1. **Bridge**
2. **Forcing screw**
3. **Nut**

Figure 2-9. Remove the Bearing

10. See Figure 2-10. Loosen the nut (1), and back off the bridge (2). Hold the forcing screw (3) while holding the collet (4) to remove the forcing screw from the collet.
11. Remove the ball bearing (5) and wheel bearing (6) from the collet (4).



1. **Nut**
2. **Bridge**
3. **Forcing screw**
4. **Collet**
5. **Ball bearing**
6. **Wheel bearing**

Figure 2-10. Removing Bearing from Puller

12. See Figure 2-11. Remove the spacer.

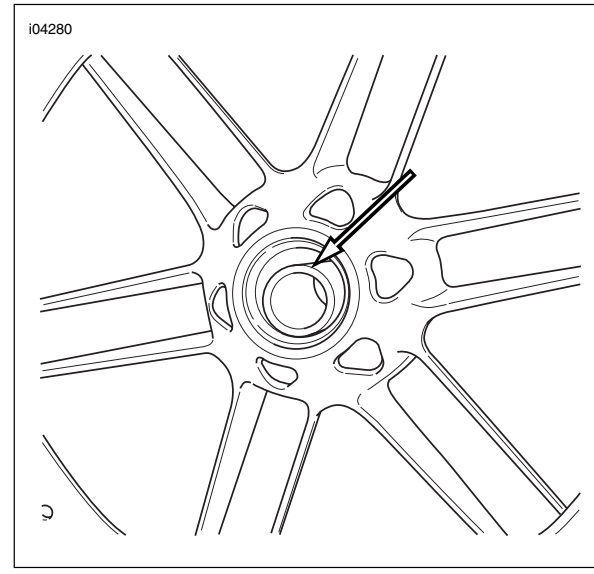


Figure 2-11. Remove the Spacer

13. Repeat Steps 4-12 for the bearing on the other side of the wheel.

Front Rotor Removal

1. See Figure 2-17. Remove and discard rotor mounting fasteners (7).
2. Remove and inspect brake rotor (6) for wear and warping. See 2.12 FRONT BRAKE CALIPER.
3. Remove drive bushings (8) and discard.
4. Remove washers (9) and discard.
5. Remove front brake springs (4) and discard.

CLEANING AND INSPECTION

⚠WARNING

Never use compressed air to “spin-dry” bearings. Very high bearing speeds can damage unlubricated bearings. Spinning bearings with compressed air can also cause a bearing to fly apart, which could result in death or serious injury.

1. Inspect all parts for damage or excessive wear.

NOTE

The wheel bearings are designed as sealed bearings which are not intended to be disassembled, serviced or cleaned with solvents.

⚠WARNING

Always replace brake pads in complete sets for correct and safe brake operation. Improper brake operation could result in death or serious injury. (00111a)

2. Inspect brake rotor and pads. See 1.6 BRAKE SYSTEM MAINTENANCE and 2.12 FRONT BRAKE CALIPER.

ASSEMBLY

1. Install **new** wheel bearings (2) into hub using suitable driver. Press on outer race only.

NOTE

- *Press the rotor side bearing in first ensuring it is seated on the shoulder of the wheel. Followed by pressing the alternate side until it contacts the spacer.*
- *The Wheel Bearing Remover and Installer (B-43993-50) consists of the Front Wheel Bearing Remover Collet (B-43993-7), Rear Wheel Bearing Remover Collet (B-43993-8), Rear Wheel Bearing Installer (B-43993-9), Front Wheel Bearing Installer (B-43993-10) and Backing Plates (B-43993-11 front wheel) and (B-43993-12 rear wheel).*

⚠WARNING

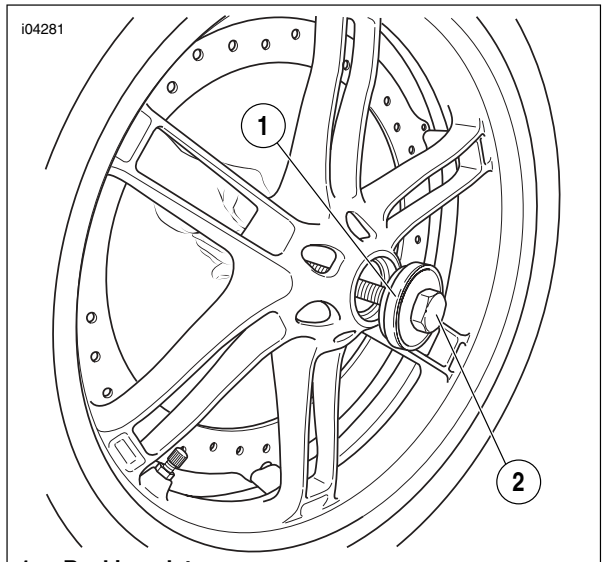
Be sure that brake fluid or other lubricants do not contact brake pads or discs. Such contact can adversely affect braking ability, which could cause loss of control, resulting in death or serious injury. (00290a)

Bearing Installation

NOTES

- *Press the rotor side bearings in first ensuring it is seated on the shoulder of the wheel. Followed by pressing the alternate side until it contacts the spacer.*
- *Always install the brake side bearing first with the lettering facing out from the hub.*

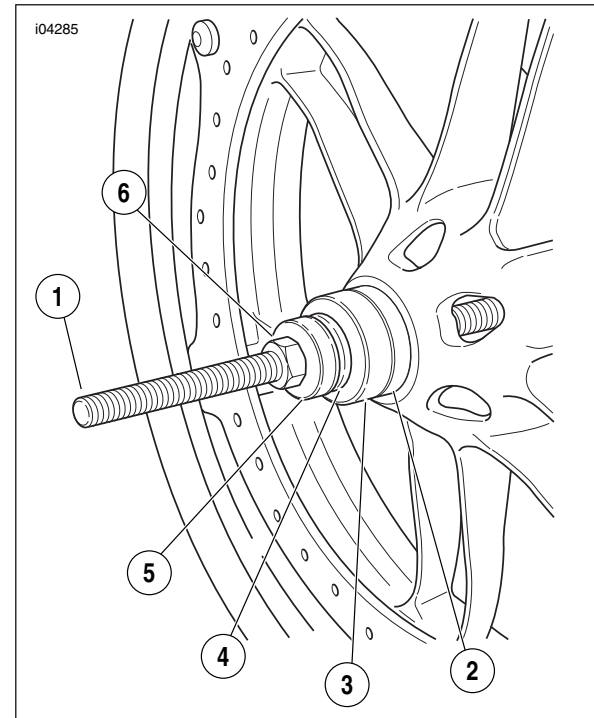
The following procedure describes the bearing installation for the front wheel; the procedure for the rear wheel is the same.



1. **Backing plate**
2. **Forcing screw**

Figure 2-12. Install the Backing Plate (B-43993-12) and Forcing Screw

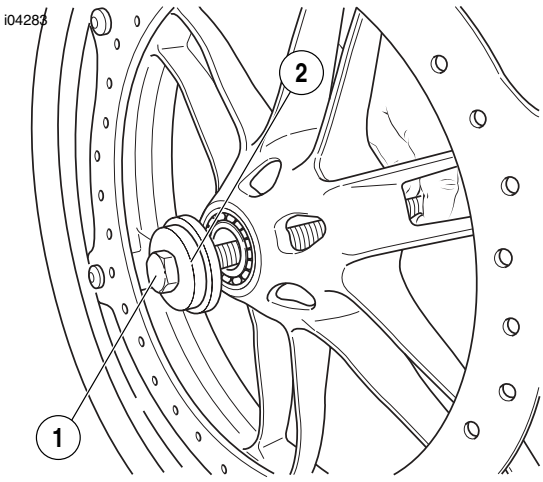
1. See Figure 2-12. Install the Backing Plate (Part No. B-43993-11) onto the long forcing screw from the Wheel Bearing Installer/Remover (Part No. HD-44060), with the smaller diameter toward the wheel hub. Insert the forcing screw and backing plate into the wheel hub.



1. **Long forcing screw**
2. **Wheel bearing**
3. **Front Wheel Bearing Installer (Part No. B-43993-9)**
4. **Washer**
5. **Nice bearing**
6. **Nut**

Figure 2-13. Installing Wheel Bearings

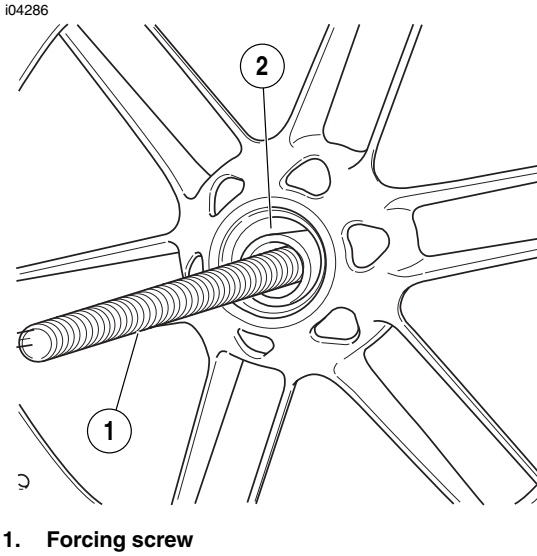
2. See Figure 2-13. Sparingly apply EXTREME PRESSURE LUBRICANT (Part No. J-23444-A) to the threads of the long forcing screw (1) to prolong service life and ensure smooth operation.
3. Insert a **new** wheel bearing (2) squarely into the hub, with the lettered side facing out (away from the wheel).
4. Slide the FRONT BEARING INSTALLER (Part No. B-43993-9, from kit Part No. B-43993-50) (3) onto the forcing screw (1), with the smaller diameter toward the bearing bore.
5. Install a washer (4), Nice bearing (5) and nut (6) onto the forcing screw (1).
6. While holding the forcing screw (1), tighten the nut (6) until the bearing is seated firmly against the shoulder inside the bearing bore in the wheel hub.
7. Remove the nut, bearing, washer, FRONT BEARING INSTALLER (Part No. B-43993-9) and forcing screw.



1. **Forcing screw**
2. **Backing plate**

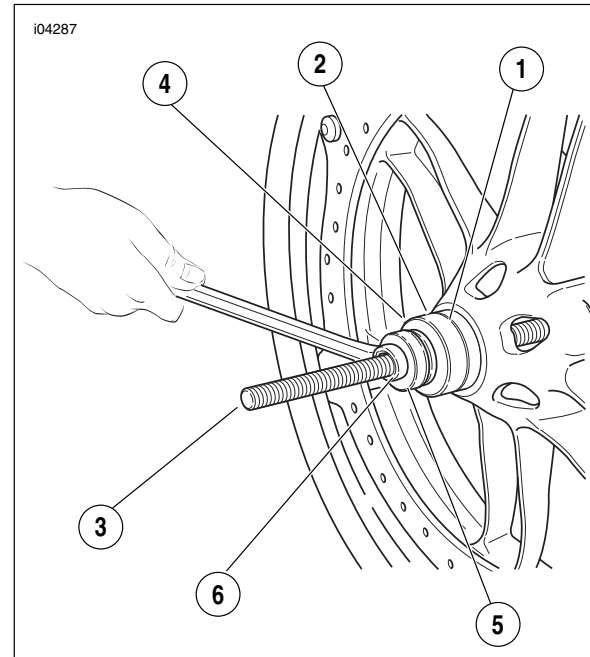
Figure 2-14. Insert Forcing Screw and Backing Plate

8. See Figure 2-14. Remove the BACKING PLATE (Part No. B-43993-11) from the long forcing screw. Reinstall the Backing Plate onto the forcing screw, with the smaller diameter toward the hex-head.
9. Insert the forcing screw through the wheel hub on the opposite side of the wheel.
10. See Figure 2-15. Install the spacer.



1. **Forcing screw**
2. **Spacer**

Figure 2-15. Install the Spacer



1. **Wheel bearing**
2. **Front Wheel Bearing Installer (B-43993-9)**
3. **Forcing screw**
4. **Washer**
5. **Nice bearing**
6. **Nut**

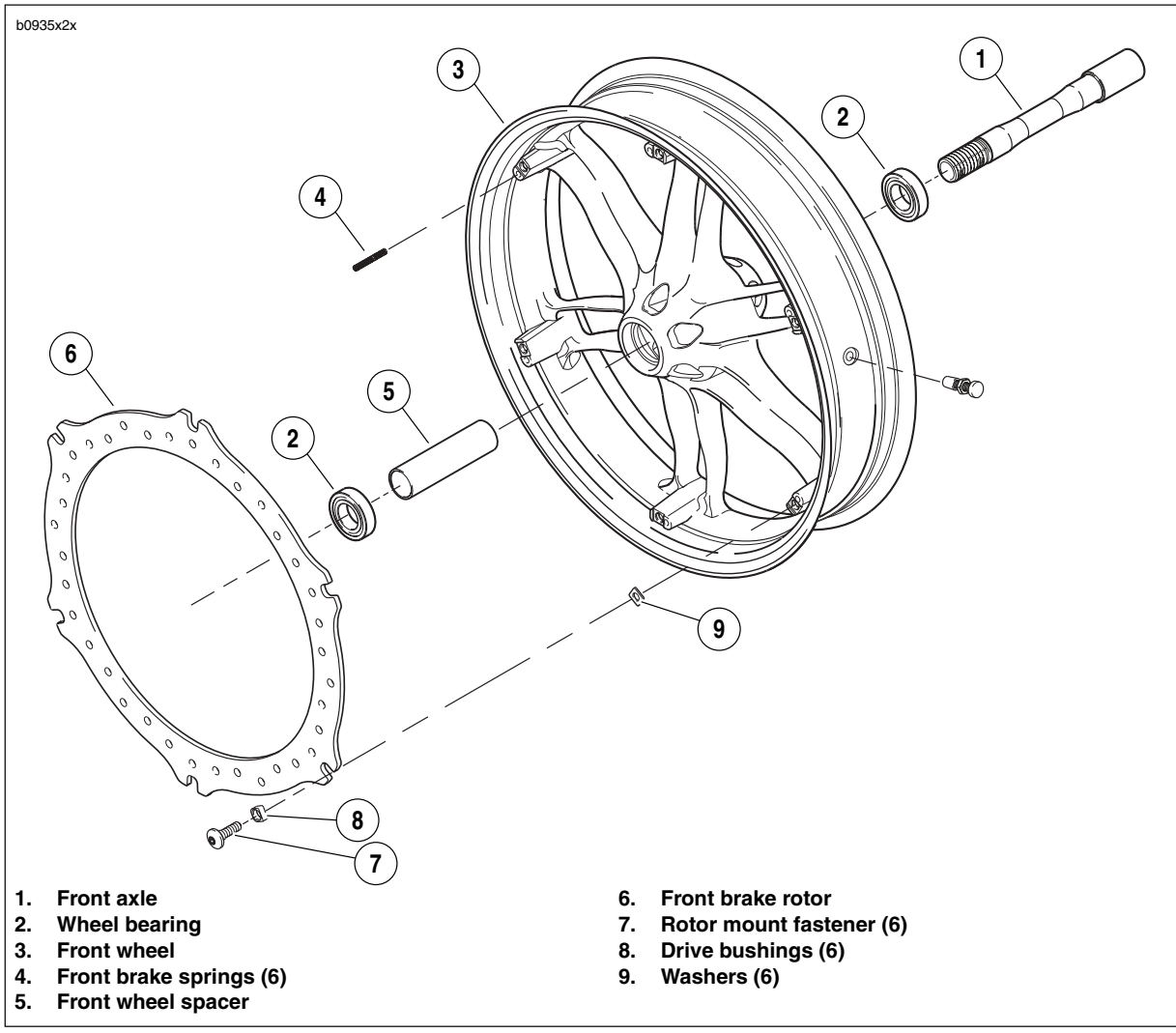
Figure 2-16. Install the Bearing

11. See Figure 2-16. Insert a **new** wheel bearing (1) squarely into the hub, with the lettered side facing out (away from the wheel).
12. Slide the FRONT BEARING INSTALLER (Part No. B-43993-9) (2) onto the forcing screw (3), with the smaller diameter toward the bearing bore.
13. Install a washer (4), Nice bearing (5) and nut (6) onto the forcing screw (3).

NOTE

See Figure 2-15. Center the spacer (2) while installing the wheel bearing. Failure to center the spacer could cause the bearing not to pull in straight.

14. See Figure 2-16. While holding the forcing screw (3), tighten the nut (6) until the bearing contacts the spacer.
15. Remove the nut, bearing, washer, FRONT BEARING INSTALLER (Part No. B-43993-10) and forcing screw.
16. Install the wheel. See INSTALLATION under 2.5 FRONT WHEEL.



1. **Front axle**
2. **Wheel bearing**
3. **Front wheel**
4. **Front brake springs (6)**
5. **Front wheel spacer**
6. **Front brake rotor**
7. **Rotor mount fastener (6)**
8. **Drive bushings (6)**
9. **Washers (6)**

Figure 2-17. Front Wheel Assembly

Front Rotor Installation

1. See Figure 2-17. Install **new** springs (4).
2. Install **new** washers (9).
3. Install **new** drive bushings (8) into rotor.

NOTE

Note the identifying mark of rotor is up and radius end of drive bushing (8) toward center of wheel.

4. Align reference dot on front rotor with the valve stem.

CAUTION

Do not re-use brake disc screws. Re-using disc screws can result in torque loss and damage to rotor and/or brake assembly. (00319b)

5. Install **new** rotor mounting fasteners in a criss-cross pattern around the wheel to insure proper fitting between rotor, fastener and bushing. Tighten to 25-27 ft-lbs (34-37 Nm).

⚠WARNING

Rotor mounting fasteners must be seated into drive bushings and drive bushings must be fitted into rotor properly. Failure to comply can affect braking ability and lead to brake failure which could result in death or serious injury. (00499b)

INSTALLATION

1. Raise front wheel to allow clearance for the caliper to swing under and inside the front rotor.

NOTE

To prevent cosmetic damage to the wheel, center caliper between spokes before installation.

2. See Figure 2-18. Install caliper.
   a. Align wheel so that rotor mounting fasteners straddle caliper.
   b. Rotate right front fork counterclockwise to align caliper with rotor.
   c. Lower front wheel into caliper assembly.

NOTE

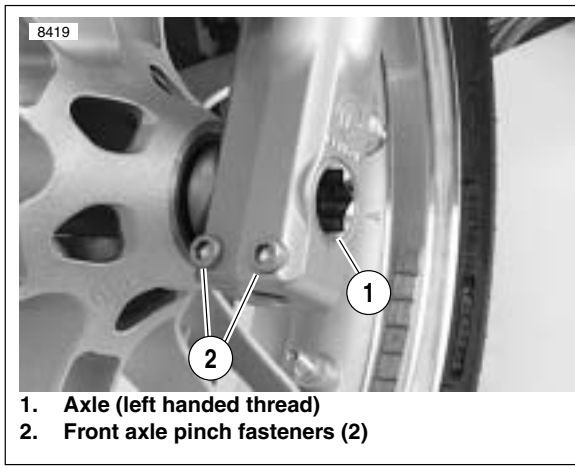
The front axle is left handed thread.

3. Install front axle.
   a. Apply LOCTITE ANTI-SEIZE LUBRICANT to axle.
   b. See Figure 2-19. With pinch fasteners loose, insert threaded end of axle (1) through left side fork, wheel hub and thread into right fork.
   c. Compress the front suspension to make sure it is free and not binding.
   d. Tighten axle (1) (metric) to 39-41 ft-lbs (53-56 Nm).
4. See Figure 2-19.Tighten the front axle pinch fasteners (2) to 20-22 ft-lbs (27-30 Nm).
5. Install right side fender fasteners. See 2.36 FENDERS.

NOTE

Locate and secure the front brake line grommet between the right side and the lower fender.

Figure 2-18. Front Wheel Installation



1. Axle (left handed thread)
2. Front axle pinch fasteners (2)

Figure 2-19. Front Wheel Mounting

REMOVAL

1. Place a scissor jack under jacking point and raise rear wheel off ground. For location of jacking point see 2.32 EXHAUST SYSTEM.

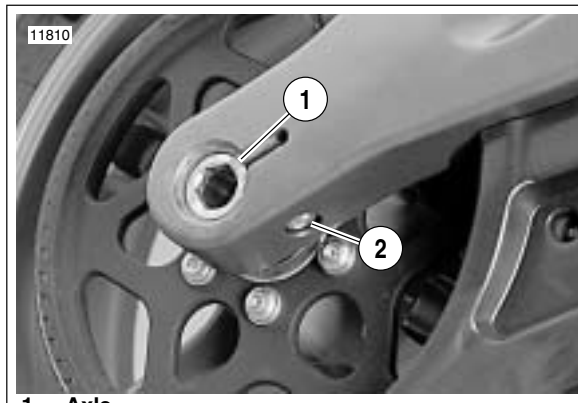
NOTE

Do not operate rear brake pedal with rear wheel removed or caliper piston may be forced out. Reseating piston requires caliper disassembly.

2. See Figure 2-20. Remove caliper carrier from swingarm by removing caliper carrier fasteners. See 2.15 REAR BRAKE CALIPER.
3. See Figure 2-21. Loosen rear axle pinch fastener (2).
4. Loosen rear axle (1) approximately 15 rotations to allow partial tension to be removed from rear drive system.
5. Remove idler pulley assembly by removing nuts and washers. See IDLER PULLEY REMOVAL in 6.6 DRIVE BELT SYSTEM.
6. Remove lower beltguard. See 2.37 BELT GUARDS.
7. Remove rear fender. See 2.36 FENDERS.

Figure 2-20. Rear Brake Caliper Carrier Fasteners

8. Remove rear axle.
9. See 6.6 DRIVE BELT SYSTEM for proper handling. Slide drive belt out of the way and remove rear wheel.



1. **Axle**
2. **Pinch bolt**

Figure 2-21. Rear Wheel Mounting, Right Side

CLEANING AND INSPECTION

⚠WARNING

Never use compressed air to "spin-dry" bearings. Very high bearing speeds can damage unlubricated bearings. Spinning bearings with compressed air can also cause a bearing to fly apart, which could result in death or serious injury.

1. Inspect all parts for damage or excessive wear.
2. Inspect brake rotor. See 2.15 REAR BRAKE CALIPER and 1.6 BRAKE SYSTEM MAINTENANCE.

DISASSEMBLY

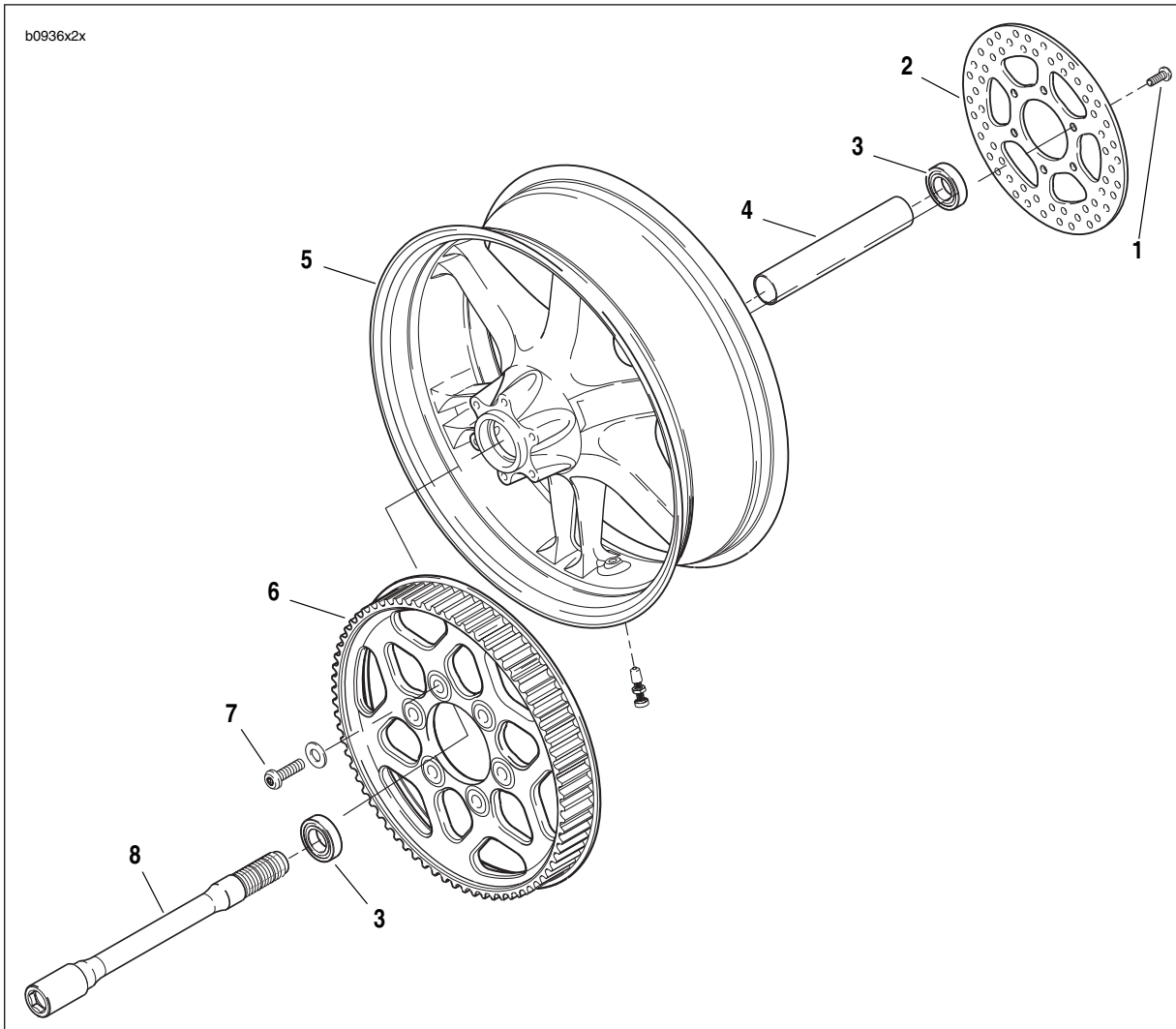
1. Remove sprocket.
   a. Remove sprocket fasteners and washers. Discard fasteners.
   b. Remove sprocket from wheel.
2. Remove rear rotor.
   a. See Figure 2-22. Remove and discard rotor mounting fasteners (1).
   b. Remove and inspect brake rotor for wear and warping. See BRAKE ROTORS in 1.6 BRAKE SYSTEM MAINTENANCE and 2.15 REAR BRAKE CALIPER.

3. Remove rear wheel bearings using BUSHING AND BEARING PULLER (Part No. B43993-8) and WHEEL BEARING REMOVER AND INSTALLER (Part No. HD-44060).

NOTE

The procedure for the rear wheel bearing removal is the same as the front wheel bearing removal. See 2.5 FRONT WHEEL.

4. Remove rear wheel spacer (4).



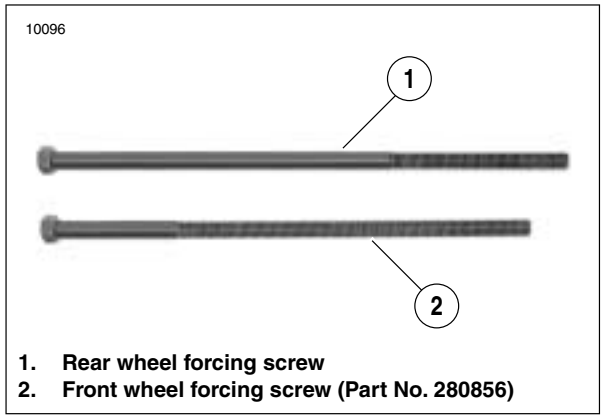
1. **Rotor mounting fastener (6)**
2. **Brake rotor**
3. **Wheel bearing (2)**
4. **Wheel spacer**
5. **Wheel**
6. **Sprocket**
7. **Sprocket fastener (6)**
8. **Axle**

Figure 2-22. Rear Wheel Assembly

ASSEMBLY

⚠WARNING

Be sure that brake fluid or other lubricants do not contact brake pads or discs. Such contact can adversely affect braking ability, which could cause loss of control, resulting in death or serious injury. (00290a)



1. **Rear wheel forcing screw**
2. **Front wheel forcing screw (Part No. 280856)**

Figure 2-23. Forcing Screws Used for Front and Rear Wheel Bearing Installation

NOTES

- *Press the rotor side bearing in first ensuring it is seated on the shoulder of the wheel. Followed by pressing the alternate side bearing until it contacts the spacer.*
- *See Figure 2-23. When installing rear wheel bearings it is necessary to use the FORCING SCREW (1) from the STEERING HEAD BEARING RACE INSTALLER (Part No. HD-39302).*
- *The Wheel Bearing Remover and Installer (B-43993-50) consists of the Front Wheel Bearing Remover Collet (B-43993-7), Rear Wheel Bearing Remover Collet (B-43993-8), Rear Wheel Bearing Installer (B-43993-9), Front Wheel Bearing Installer (B-43993-10) and Backing Plates (B-43993-11 front wheel) and (B-43993-12 rear wheel).*
- *The procedure for the rear wheel bearing installation is the same as front wheel bearing installation. See Bearing Installation in 2.5 FRONT WHEEL.*

1. See Figure 2-22. Install wheel bearing (3) on rotor side of motorcycle.
2. Install rear wheel spacer (4).
3. Install wheel bearing (3) on sprocket side of motorcycle.
4. Install sprocket.
   a. Position sprocket (6) on wheel (5) keeping lip of sprocket facing the inside.
   b. Install **new** sprocket fasteners (7) and washers tightening to 35-37 ft-lbs (48-50 Nm).
5. Install rear rotor (2).
   a. Position rear brake rotor (2) on wheel (5).
   b. Install brake rotor (2) with **new** rotor mounting fasteners (1) and tighten to 25-27 ft-lbs (34-37 Nm).

INSTALLATION

1. Center rear wheel in the swingarm at the same time sliding the drive belt onto the rear sprocket.
2. With wheel centered in swingarm, lower bike to align swingarm and wheel hub.
3. Apply ANTI-SEIZE LUBRICANT to hole in right side of swingarm where rear axle slides through.

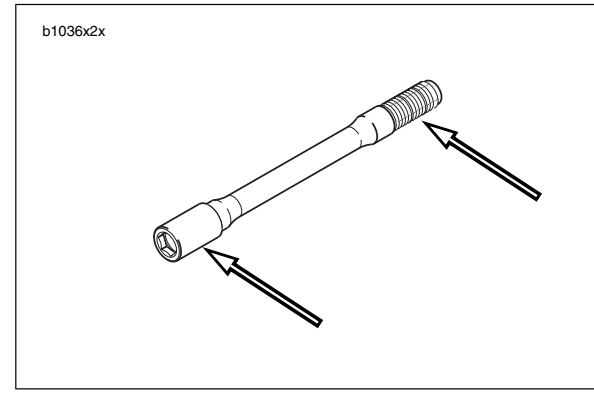


Figure 2-24. Anti-Seize Lubricant Location

4. See Figure 2-24. Coat the axle with ANTI-SEIZE LUBRICANT.
5. Slide axle through right side of swing arm and wheel hub and thread partially into swingarm on left side.
6. Install idler pulley. See 6.6 DRIVE BELT SYSTEM.

NOTE

Never tighten rear axle with swingarm brace removed.

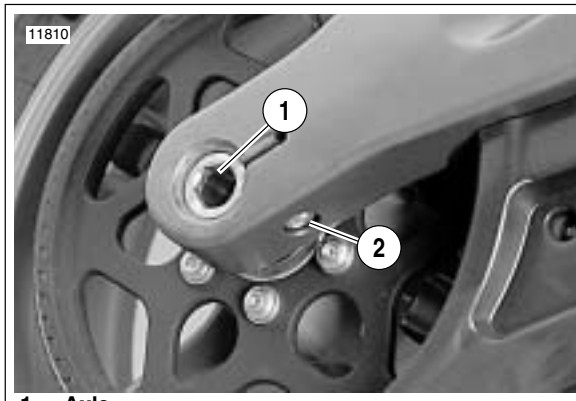
7. See Figure 2-25. Tighten rear axle (1) to 23-27 ft-lbs (31.2-36.6 Nm), back off two full turns and then retighten to 48-52 ft-lbs (65.1-70.5 Nm).
8. Tighten pinch fastener (2) on right side of swingarm to 40-45 ft-lbs (54-61 Nm).
9. Install lower belt guard. See 2.37 BELT GUARDS.
10. Install rear fender. See 2.36 FENDERS.
11. See Figure 2-26. Install caliper carrier and tighten fastener to 24-26 ft-lbs (32-35 Nm).

NOTE

The brake pads may become cocked and will not allow the rotor to slide into the caliper. Press on the brake pad from the outside of the caliper to straighten out the pad.

⚠WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)



1. Axle
2. Pinch bolt

Figure 2-25. Rear Wheel Mounting, Right Side

Figure 2-26. Rear Brake Caliper Carrier Fasteners

CHECKING CAST RIM RUNOUT 2.7

GENERAL

Check wheels for lateral and radial runout before installing a **new** tire.

Rim Lateral Runout

1. See Figure 2-27. Install truing arbor in wheel hub and place wheel in WHEEL TRUING AND BALANCING STAND (Part No. HD-99500-80).
2. Tighten arbor nuts so hub will turn on its bearings.
3. Check rim lateral runout by placing a gauge rod or dial indicator near the rim bead. Replace wheel if lateral runout exceeds specification shown in Table 2-10.

Rim Radial Runout

1. See Figure 2-28. Install truing arbor in wheel hub and place wheel in WHEEL TRUING AND BALANCING STAND (Part No. HD-99500-80).
2. Tighten arbor nuts so hub will turn on its bearings.
3. Check radial runout as shown. Replace wheel if runout exceeds specification shown in Table 2-10.

Table 2-10. Wheel Rim Runout

RUNOUT	IN	MM
Maximum lateral	0.040	1.02
Maximum radial	0.030	0.76

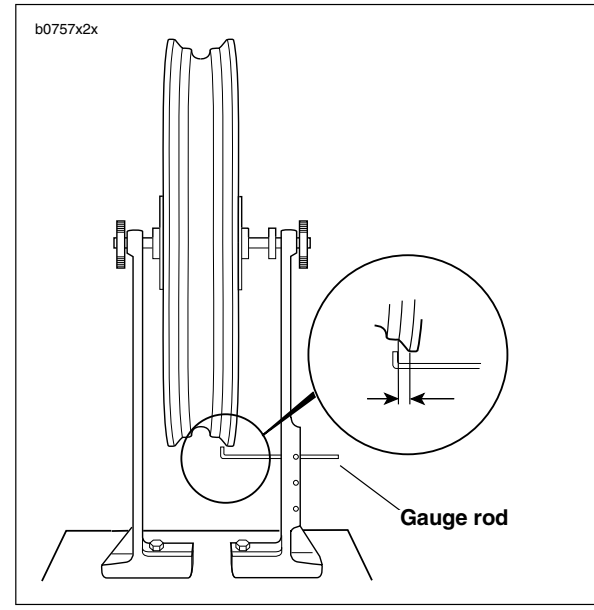


Figure 2-27. Checking Cast Rim Lateral Runout Using Wheel Truing and Balancing Stand (HD-99500-80)

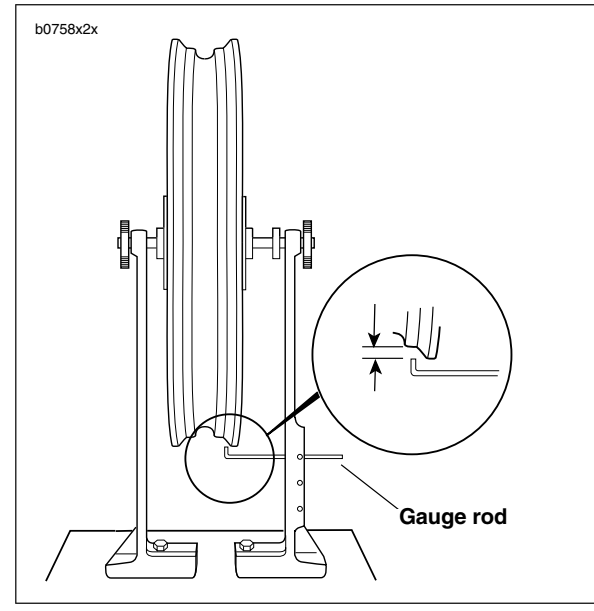


Figure 2-28. Checking Cast Rim Radial Runout Using Wheel Truing and Balancing Stand (HD-99500-80)

GENERAL

Tires should be inspected for punctures, cuts, breaks and wear at least weekly.

New tires should be stored in a horizontal tire rack. Avoid stacking new tires in a vertical stack. The weight of the stack compresses the tires and closes down the beads.

⚠WARNING

Replace punctured or damaged tires. In some cases, small punctures in the tread area may be repaired from within the demounted tire by your Harley-Davidson dealer. Speed should NOT exceed 50 mph (80 km/h) for the first 24 hours after repair, and the repaired tire should NEVER be used over 80 mph (130 km/h). Failure to follow this warning could result in death or serious injury. (00015a).

Tubeless tires may be repaired in the tread area only if the puncture is 1/4 in. (6.4 mm) or smaller. All repairs must be made from inside the tire.

Acceptable repair methods include a patch and plug combination, chemical or hot vulcanizing patches or head-type plugs. When repairing tubeless tires, use TIRE SPREADER (Part No. HD-21000) to spread the tire sidewalls.

⚠WARNING

- **Never repair a tire with less than 1/16 in. (1.6 mm) tread depth. Inadequate tread depth can cause an accident which could result in death or serious injury.**
- **Buell front and rear tires are not the same. Interchanging front and rear tires can cause tire failure, which could result in death or serious injury. (00026b)**

REMOVAL

1. Remove wheel from motorcycle. See 2.5 FRONT WHEEL or 2.6 REAR WHEEL.
2. Deflate tire.
3. See Figure 2-29. Loosen both tire beads from rim flange.

⚠WARNING

Do not use excessive force when starting bead over rim. Excessive force may damage tire or rim and adversely affect handling which could result in death or serious injury.

4. If a bead breaker machine is not available, attach RIM PROTECTORS (Part No. HD-01289) to the rim. Using tire tools (not sharp instruments), start upper bead over edge of rim at valve. Repeat all around rim until first bead is over rim.
5. See Figure 2-30. Push lower bead into rim well on one side and insert tire tool underneath bead from opposite side. Pry bead over rim edge. Remove tire from rim.
6. Remove valve stem if it is damaged or leaks.
7. Mount tire on TIRE SPREADER (Part No. HD-21000) for inspection and repair procedures.

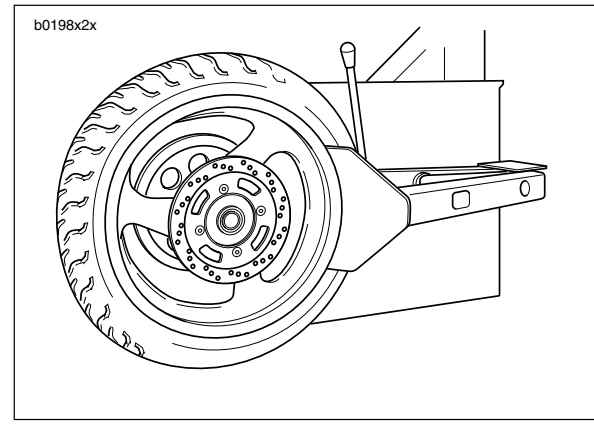


Figure 2-29. Loosening Beads from Rim Flange

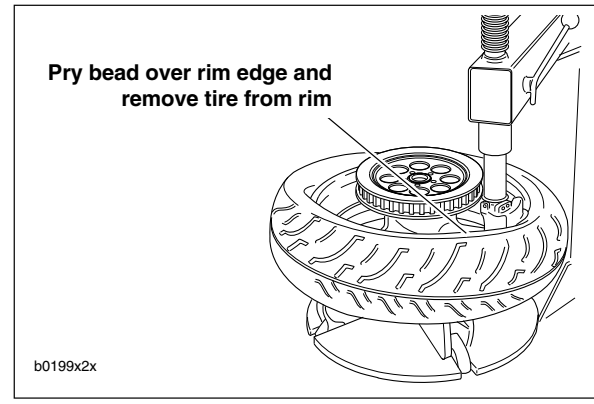


Figure 2-30. Starting Tire Off Rim

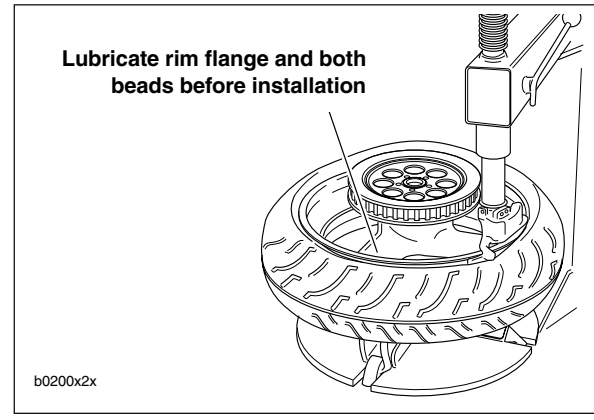


Figure 2-31. Starting Bead on Rim

CLEANING AND INSPECTION

1. Clean inside of tire with dry rag.
2. If rim is dirty or corroded, clean with a stiff wire brush.
3. Inspect tire for wear and damage. Replace worn or damaged tires. See 1.7 TIRES AND WHEELS.

INSTALLATION

⚠WARNING

Only install original equipment tire valves and valve caps. A valve, or valve and cap combination, that is too long or too heavy can strike adjacent components and damage the valve, causing rapid tire deflation. Rapid tire deflation can cause loss of vehicle control, which could result in death or serious injury. (00281a)

⚠WARNING

- **Always check both tire sidewalls for arrows indicating forward rotation. Some tires require different tire rotation depending on whether tire is used on front or rear wheel. Installing a tire with the wrong rotation could result in death or serious injury.**
- **Buell front and rear tires are not the same. Interchanging front and rear tires can cause tire failure, which could result in death or serious injury. (00026a)**

1. Damaged or leaking valve stems must be replaced.
2. Install and tighten fastener to 40-44 **in-lbs** (4.5-4.9 Nm).
3. Thoroughly lubricate rim flanges and both beads of tire with tire lubricant.

NOTE

The red dot on the sidewall is a balance mark and should be aligned 180 degrees from the balance mark (blue dot) on inside of rim.

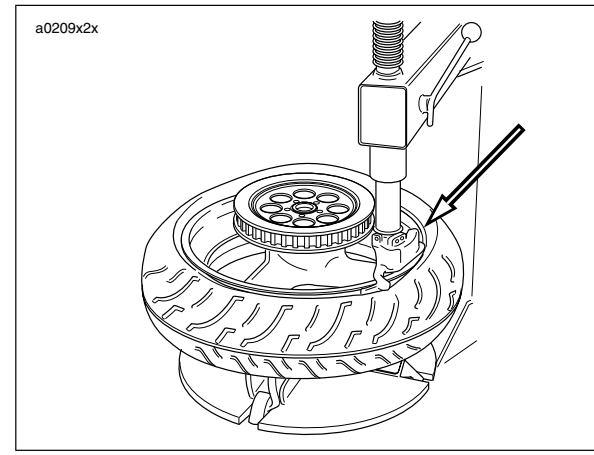


Figure 2-32. Starting Bead on Rim (Typical)

4. See Figure 2-32. Starting at the valve stem, start first bead into the rim well using a bead breaker machine. If no machine is available, work bead on as far as possible by hand. Use a tire tool to pry the remaining bead over rim flange.
5. Start 180 degrees from valve stem hole and place second bead on rim. Work bead onto rim with tire tools, working toward valve in both directions.

⚠WARNING

Do not inflate tire beyond maximum pressure as specified on sidewall. Over inflated tires can blow out, which could result in death or serious injury. (00027a)

6. Apply air to stem to seat beads on rim. It may be necessary to use a TIRE BEAD EXPANDER (Part No. HD-28700) on the tire until beads seal on rim.

Checking Tire Lateral Runout

1. See Figure 2-33. Turn wheel on axle and measure amount of displacement from a fixed point to tire sidewall.
2. Check tire tread for tire lateral runout. Refer to Table 2-11. If tire lateral runout is more than specification, remove tire from rim.
3. Check rim bead side runout. See 2.7 CHECKING CAST RIM RUNOUT. Replace rims not meeting specifications.
4. Install tire and again check tire lateral runout.

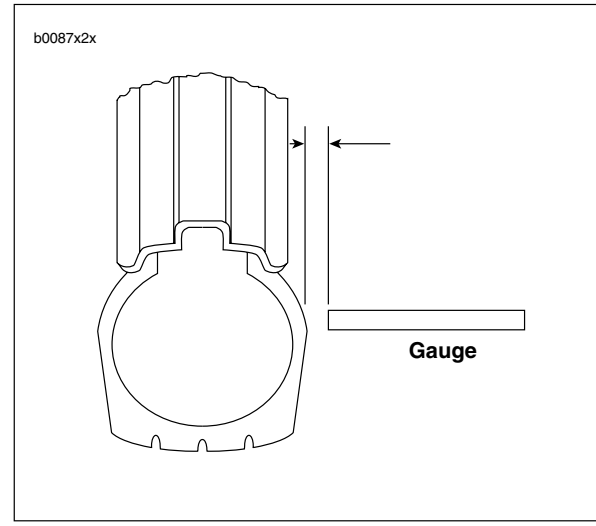


Figure 2-33. Checking Tire Lateral Runout

Checking Tire Radial Runout

1. See Figure 2-34. Turn wheel on axle and measure tire radial runout.
2. Refer to Table 2-11. If tire radial runout is more then specification, remove tire from rim.
3. Check rim bead runout. See 2.7 CHECKING CAST RIM RUNOUT. Replace rims not meeting specifications.
4. Install tire and again check tire radial runout.

Table 2-11. Tire Runout

RUNOUT	IN.	MM
Tire radial	0.060	1.52
Tire lateral	0.080	2.03

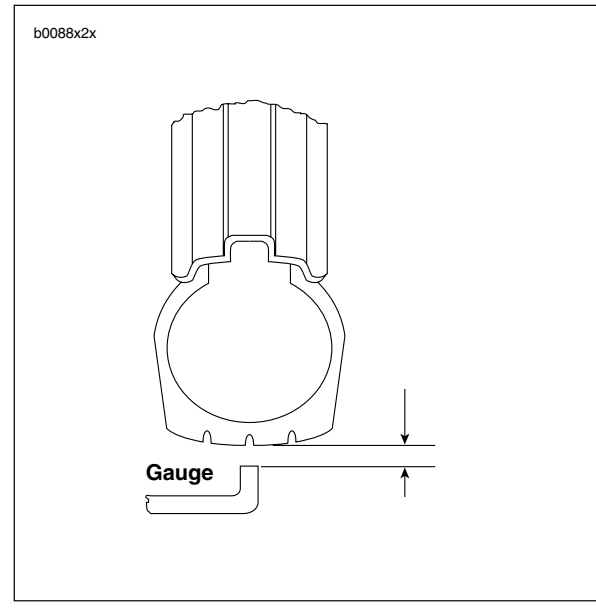


Figure 2-34. Checking Tire Radial Runout

ADJUSTMENT

Wheel Balancing

Wheel balancing is recommended to improve handling and reduce vibration, especially at high road speeds.

In most cases, static balancing using WHEEL TRUING AND BALANCING STAND (Part No. HD-99500-80) will produce satisfactory results. However, dynamic balancing, utilizing a wheel spinner, can be used to produce finer tolerances for better high-speed handling characteristics. Follow the instructions supplied with the balance machine you are using.

NOTE

If the rear wheel will not fit on a stock dynamic spin balance shaft, use the Carlson wheel balance shaft (Part No. AF15).

WEIGHTS FOR CAST WHEELS

The maximum weight permissible to accomplish balance is:

- 1.0 oz. (28 g) total weight applied to the front wheel.
- 2.0 oz. (56 g) total weight applied to the rear wheel.

Wheels should be balanced to within 1/4 oz. (7 g) at 60 MPH (97 KM/H).

See Figure 2-35. Use only WHEEL WEIGHTS (Part No. 43692-94Y) which have special self-adhesive backings. Apply WHEEL WEIGHTS to the flat surface of the wheel rim.

1. Make sure that area of application is completely clean, dry and free of oil and grease.
2. Remove paper backing from weight. For additional adhesive strength, apply three drops of LOCTITE SUPER-BONDER 420 to adhesive side of weight.

⚠WARNING

Do not install balancing weights under the stand offs for the front brake rotor. Contact could push rotor out of round. Braking could result in brake failure resulting in death or serious injury.

3. On the front wheel, locate a flat surface on the **right side** of the wheel rim. On the rear wheel locate a flat surface. Press weight firmly in place, holding for ten seconds.
4. Allow eight hours for adhesive to cure completely before using wheel.

NOTE

If wheel assembly is out of specification (1 oz. front, 2 oz. rear) rotate tire on rim and rebalance until wheel is within specification.

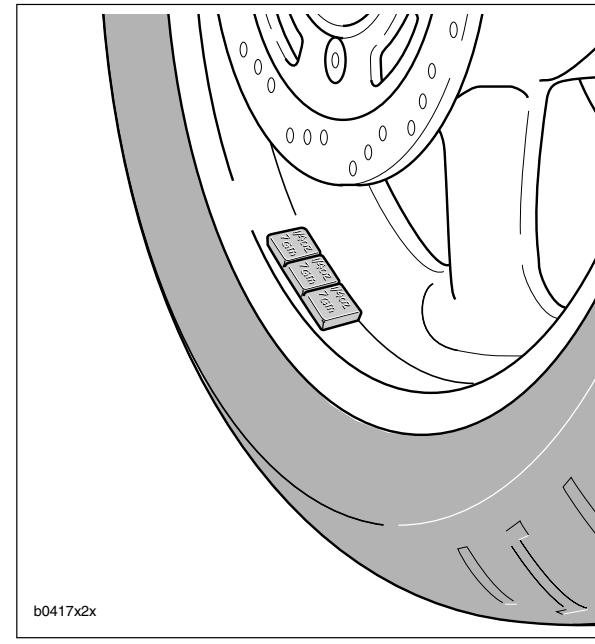


Figure 2-35. Wheel Weights

BRAKE PEDAL 2.9

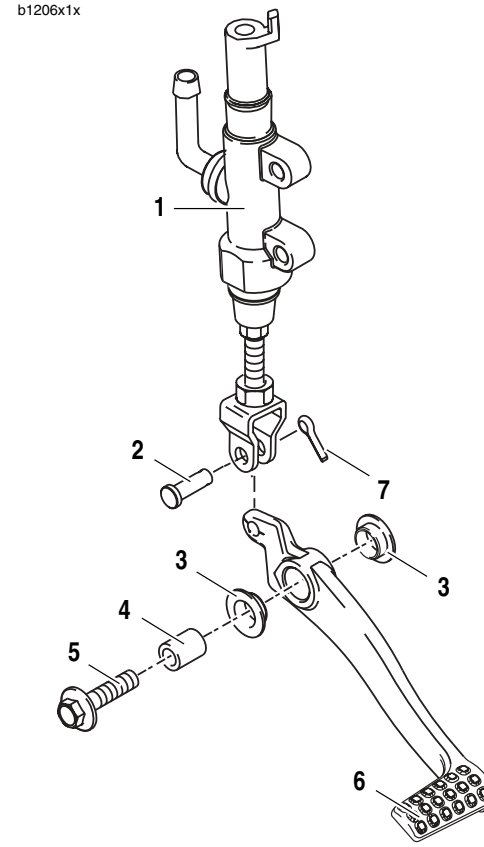
REMOVAL

1. See Figure 2-37. Remove cotter pin (7) and discard.
2. Remove clevis pin (2).
3. Remove pedal fastener (5).
4. Remove shift brake pedal sleeve (4).
5. Remove pedal bushings (3).
6. Remove brake pedal (6).

INSTALLATION

1. See Figure 2-37. Install pedal bushings (3).
2. Install shift brake pedal sleeve (4).
3. Install brake pedal (6) using LOCTITE 271 (red) and tighten fastener (5) to 22-24 ft-lbs (30-33 Nm).
4. Install clevis pin (2).
5. Install **new** cotter pin (7).

Figure 2-36. Brake Pedal



1. **Rear master cylinder body**
2. **Clevis pin**
3. **Pedal bushings (2)**
4. **Shift brake pedal sleeve**
5. **Brake pedal fastener**
6. **Brake pedal**
7. **Cotter pin**

Figure 2-37. Brake Pedal Assembly

FRONT BRAKE MASTER CYLINDER AND HAND LEVER 2.10

REMOVAL

1. Remove the right deflector, see 2.25 DEFLECTORS/ HANDLEBARS.

CAUTION

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

CAUTION

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN. (00240a)

NOTES

Steps 2 is not required for removing the master cylinder assembly from the handlebars. Do not disassemble master cylinder unless problems are experienced.

2. Drain brake fluid into a suitable container. Discard used fluid according to local laws.
   a. Install a length of plastic tubing over caliper bleeder valve. Place free end in a suitable container.
   b. Open bleeder valve (metric) about 1/2-turn.
   c. Pump brake hand lever to drain brake fluid.
   d. Tighten bleeder valve to 36-60 **in-lbs** (4-7 Nm).

NOTE

Damaged banjo bolt seating surfaces will leak when reassembled. Prevent damage to seating surfaces by carefully removing brake line components.

3. See Figure 2-38. Remove the banjo bolt (13) (metric) and two copper washers (15) to disconnect brake line (14) from master cylinder (4). Discard copper washers.
4. Unplug terminal (12) to detach brake lamp switch (11).

NOTE

The individual parts of the brake lamp switch are not serviceable. Replace switch upon failure.

5. Remove mounting clamp fasteners (5) (metric) to detach master cylinder reservoir (4) from handlebar.

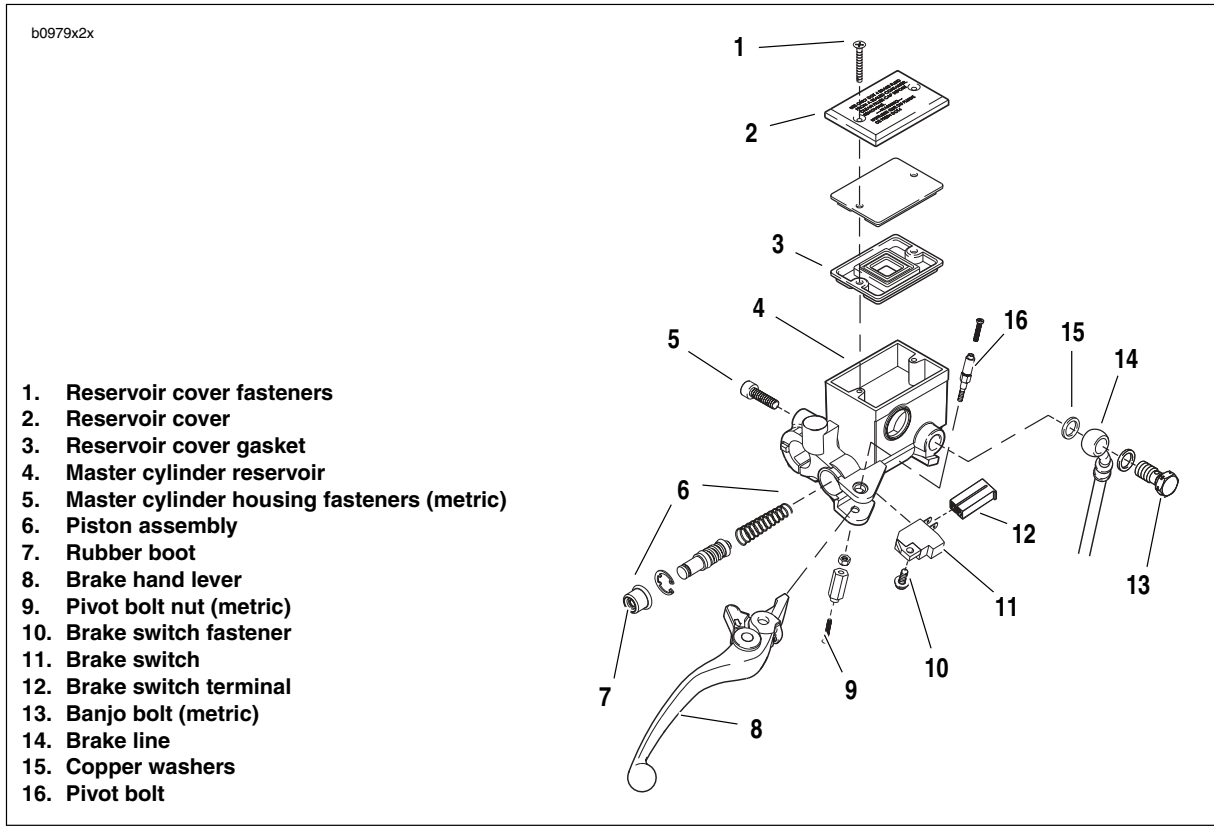


Figure 2-38. Front Brake Hand Lever Assembly

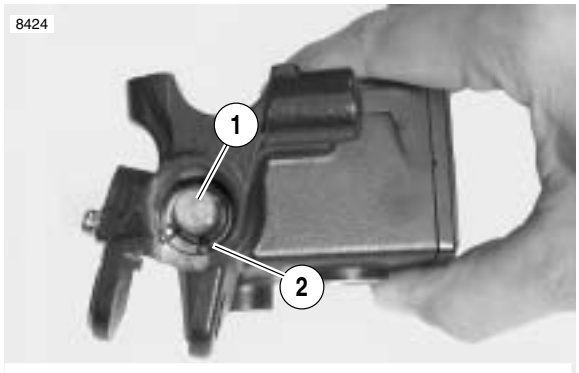
DISASSEMBLY

Brake Hand Lever

1. See Figure 2-38. Remove pivot bolt nut (9) (metric) and pivot bolt (16) from hand lever pivot.
2. Detach front brake hand lever assembly (8) from hand lever pivot.
3. Detach front brake lamp switch (11) by removing the switch fastener (10).

Front Master Cylinder

1. See Figure 2-42. Remove reservoir cover by removing cover fasteners.
2. Drain and discard excess brake fluid.
3. Remove rubber boot and discard.
4. See Figure 2-39. Depress piston assembly (1) and remove internal circlip (2) and discard.
5. See Figure 2-38. Remove piston assembly (6) from front master cylinder reservoir (4) and discard.



1. Piston assembly
2. Circlip

Figure 2-39. Piston Assembly in Master Cylinder

CLEANING AND INSPECTION

⚠WARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

1. Clean all parts with denatured alcohol or **D.O.T. 4 BRAKE FLUID**. Do not contaminate with mineral oil or other solvents. Wipe dry with a clean, lint free cloth. Blow out drilled passages and bore with a clean air supply. Do not use a wire or similar instrument to clean drilled passages in bottom of reservoir.
2. Inspect piston bore in master cylinder housing for scoring, pitting or corrosion. Replace housing if any of these conditions are found.
3. Inspect outlet port that mates with brake line fitting. As a critical sealing surface, replace housing if any scratches, dents or other damage is noted.

ASSEMBLY

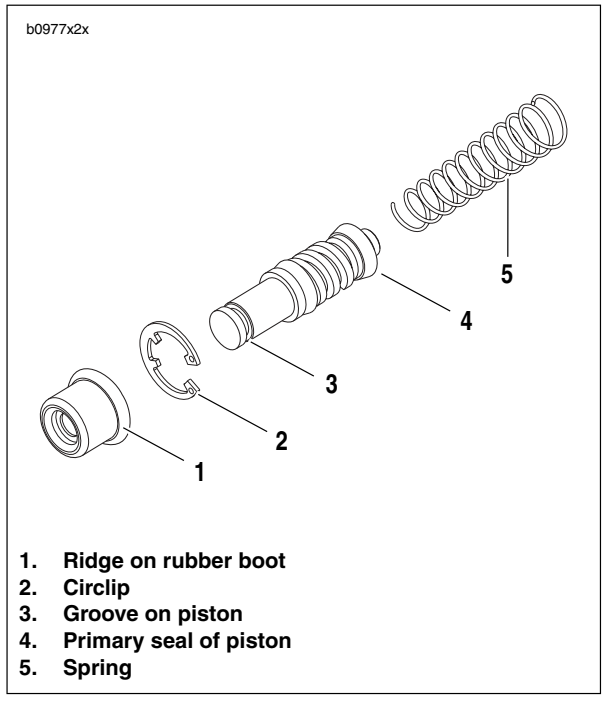
Front Master Cylinder

1. Obtain PISTON ASSEMBLY KIT.
2. See Figure 2-40. Assemble **new** piston components placing small end of spring (5) behind primary seal of piston (4).
3. Lubricate master cylinder body and piston seals with special lubricant found in the service parts kit.

⚠WARNING

When installing circlip to secure master cylinder, be sure the circlip snaps into place. Failure to do so can result in improper brake operation which could result in death or serious injury.

4. See Figure 2-38. Insert piston assembly (6), spring first, into master cylinder reservoir (4).
5. See Figure 2-39. Secure piston assembly (1) with a **new** circlip (2).
6. See Figure 2-40. Install ridge on boot (1) into groove on piston (3).



1. **Ridge on rubber boot**
2. **Circlip**
3. **Groove on piston**
4. **Primary seal of piston**
5. **Spring**

Figure 2-40. Front Master Cylinder Piston Assembly

Brake Hand Lever

1. See Figure 2-38. Lubricate pivot bolt (16) with LOCTITE ANTI-SEIZE.
2. Align hole in hand lever (8) with hole in hand lever pivot and install pivot bolt (16) through top of hand lever pivot and tighten nut to 39-48 **in-lbs** (4.4-5.4 Nm).

INSTALLATION

1. See Figure 2-38. Install front brake lamp switch (11).
   a. Install brake lamp switch (11) with switch fastener (10) and tighten to 7-10 **in-lbs** (0.8-1.0 Nm).
   b. Connect brake switch terminal (12) to brake lamp switch (11).
   c. Test switch action. Tang on switch must release when hand lever is moved.
2. Install master cylinder to handlebar by fastening clamp with fasteners. Position for rider posture and tighten to 80-90 **in-lbs** (9-10 Nm).

⚠WARNING

Use only new copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

⚠WARNING

To avoid leakage, verify that banjo washers, banjo bolt, hydraulic brake line and master cylinder bore are completely clean.

3. See Figure 2-38. Connect brake line to master cylinder using two **new** copper washers (15) and banjo bolt (13) (metric) and tighten to 16-20 ft-lbs (22-27 Nm).

4. See Figure 2-41. Verify brake lamp switch wires are tight.
5. Remove two master cylinder cover screws, cover and cover gasket.

CAUTION

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

6. Protect body work from brake fluid.
7. See Figure 2-43. With the master cylinder in a level position, add **D.O.T. 4 BRAKE FLUID**. Bring fluid level to within 1/8 in. (3.2 mm) of molded boss inside front master cylinder reservoir.

⚠WARNING

A plugged or covered relief port can cause brake drag or lock-up, which could lead to loss of control, resulting in death or serious injury. (00288a)

8. Verify proper operation of the master cylinder relief port. Actuate the brake lever with the reservoir cover removed. A slight spurt of fluid will break the surface if all internal components are working properly.
9. Bleed brake system. See 1.6 BRAKE SYSTEM MAINTENANCE.
10. See Figure 2-38. Attach master cylinder cover (2) and cover gasket (3). Tighten two cover fasteners (1) to 9-13 **in-lbs** (1.0-1.5 Nm).

⚠WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

11. Turn ignition key switch to ON. Apply brake hand lever to test brake lamp operation. Turn ignition key switch to OFF.
12. Install right deflector. See 2.25 DEFLECTORS/HANDLEBARS.

Figure 2-41. Front Brake Light Switch Connector

Figure 2-42. Front Brake Reservoir Cover

Figure 2-43. Reservoir Brake Fluid Level

FRONT BRAKE LINE 2.11

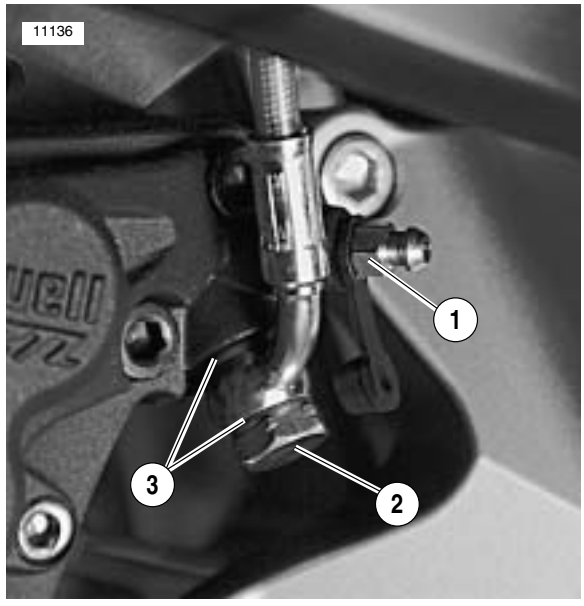
REMOVAL

1. Drain brake fluid into a suitable container. Discard of used fluid according to local laws.
   a. See Figure 2-44. Remove front caliper bleeder valve cap and install a length of plastic tubing over valve (1). Place free end in a suitable container.
   b. Open bleeder valve (metric) about 1/2-turn.
   c. Pump brake hand lever to drain brake fluid.
   d. Tighten bleeder valve to 36-60 **in-lbs** (4-7 Nm).
2. See Figure 2-45. Remove p-clamp (1) attaching brake line to rear of right front module. See 2.44 WINDSHIELD AND WINDSCREEN and 2.29 FRONT MODULES.
3. Remove p-clamp (2) detaching brake line (3) from right side of lower fork clamp.
4. Remove fasteners (4) on right lower fender.

NOTE

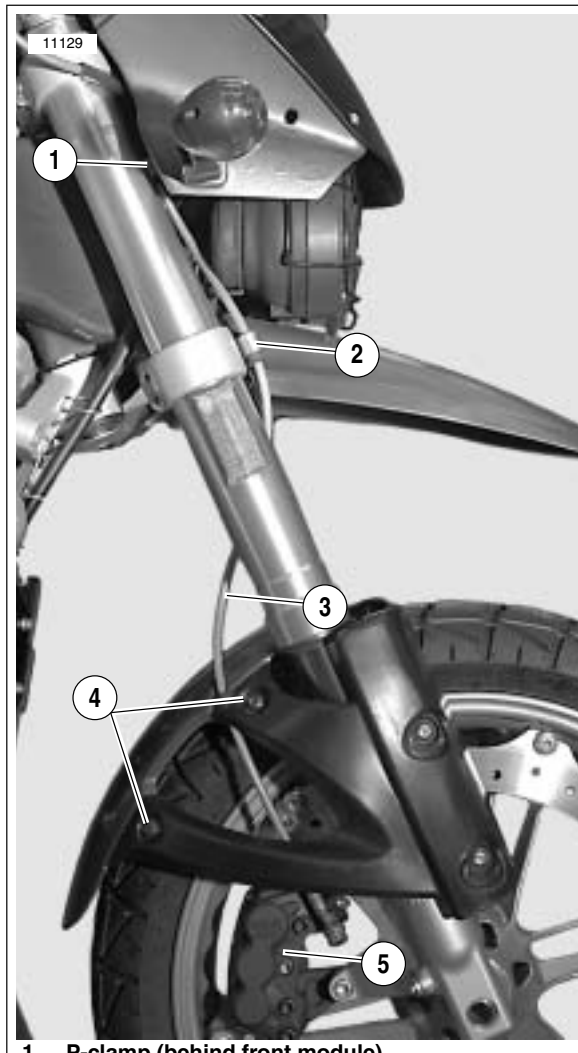
Damaged banjo bolt seating surfaces will leak when reassembled. Prevent damage to seating surfaces by carefully removing brake line components.

5. Remove master cylinder banjo bolt (metric) and two copper washers to disconnect brake line from master cylinder. Discard copper washers.
6. See Figure 2-44. Remove caliper banjo bolt (metric) (2), two copper washers (3) to disconnect brake line from caliper. Discard copper washers.
7. Carefully inspect the brake line for dents, cuts, chaffing or other defects. Replace damaged brake lines.



1. **Bleeder valve**
2. **Banjo bolt**
3. **Copper washers**

Figure 2-44. Bleeder Valve and Banjo Bolt (Caliper)



1. **P-clamp (behind front module)**
2. **P-clamp on fork tube**
3. **Brake line**
4. **Right lower fender fasteners**
5. **Front brake caliper**

Figure 2-45. Front Brake Line

INSTALLATION

NOTE

To avoid leakage, verify that gaskets, banjo bolt, hydraulic brake line and master cylinder bore are completely clean.

1. See Figure 2-38. Connect brake line (14) to master cylinder (4) using two **new** copper washers (15) and a banjo bolt (13) (metric). Loosely install bolt into master cylinder.
2. Route the brake line from the master cylinder to the caliper. See D.1 HOSE AND WIRE ROUTING for front brake line routing.
3. Install and tighten P-clamp on inside of front module. Tighten to 36-60 in-lbs (4-7 Nm). See 2.44 WINDSHIELD AND WINDSCREEN and 2.29 FRONT MODULES.

⚠WARNING

Use only new copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

CAUTION

To avoid leakage, verify that gaskets, banjo bolt, hydraulic brake line and caliper bore are completely clean.

4. Install brake line to caliper.
   a. See Figure 2-44. Install **new** copper washer (3), brake line, **new** copper washer (3) onto banjo bolt (2).
   b. Finger tighten banjo bolt onto front caliper and position brake line as show in figure.
5. Install and tighten p-clamp with fastener (1) on lower triple clamp to 36-60 **in-lbs** (4-7 Nm).
6. See Figure 2-38. Tighten master cylinder banjo bolt (13) (metric) to 16-20 ft-lbs (22-27 Nm).
7. See Figure 2-44. Tighten brake caliper banjo bolt (metric) to 16-20 ft-lbs (22-27 Nm).

⚠WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

8. Install bleeder valve if removed. Refill master cylinder and bleed brakes. See 1.6 BRAKE SYSTEM MAINTENANCE.

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

9. See Figure 2-45. Install lower right fender. See 2.36 FENDERS.

NOTE

Verify that the brake line grommet is captured between the center front fender and the lower right front fender.

10. Turn ignition key switch to ON. Apply brake hand lever to test brake lamp operation. Turn ignition key switch to OFF.

FRONT BRAKE CALIPER 2.12

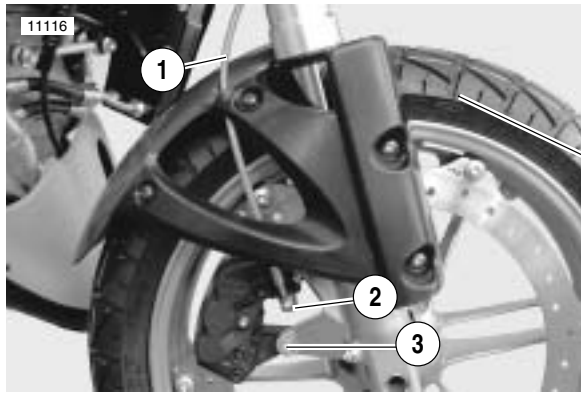
REMOVAL

1. Drain brake fluid into a suitable container. Discard used fluid according to local laws.
   a. Install a length of plastic tubing over caliper bleeder valve. Place free end in a suitable container.
   b. Open bleeder valve (metric) about 1/2-turn.
   c. Pump brake hand lever to drain brake fluid.
   d. Tighten bleeder valve to 36-60 **in-lbs** (4-7 Nm).

NOTE

Damaged banjo bolt seating surfaces will leak when reassembled. Prevent damage to seating surfaces by carefully removing brake line components.

2. Remove fasteners on lower right fender. See 2.36 FENDERS.
3. See Figure 2-46. Disconnect brake line at caliper. See 2.11 FRONT BRAKE LINE.
4. Remove caliper mounting fasteners (3).
5. Slide caliper down the rotor to clear fork lower and then remove off rotor.

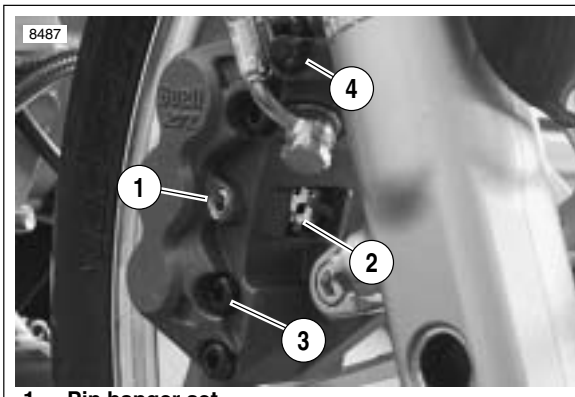


1. **Brake line**
2. **Banjo bolt (metric)**
3. **Mounting fasteners (2)**

Figure 2-46. Front Brake Caliper

DISASSEMBLY

1. See Figure 2-47. Remove pin hanger set (1), brake pads and caliper pad spring (2).
2. Split caliper by removing caliper fasteners (3).
3. See Figure 2-49. Remove and discard o-rings (8).
4. See Figure 2-48. Remove pistons using a BRAKE PISTON REMOVER (Part No. B-42887).
5. See Figure 2-49. Remove and discard piston o-rings (6).



1. **Pin hanger set**
2. **Caliper pad spring**
3. **Caliper fasteners**
4. **Bleeder valve**

Figure 2-47. Pad Spring (Typical)

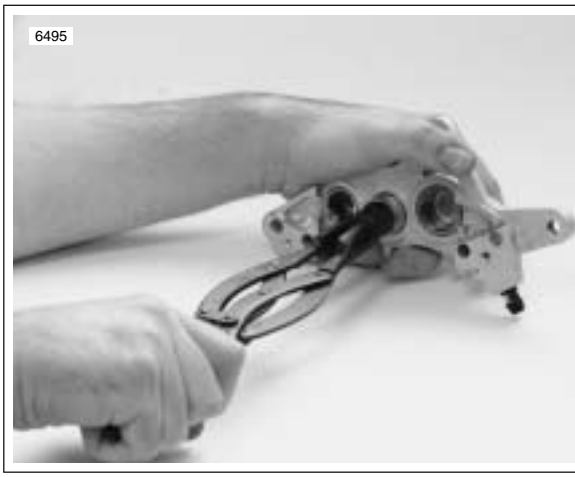


Figure 2-48. Removing Pistons (B-42887)

CLEANING AND INSPECTION

⚠WARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a).

1. Clean all parts with denatured alcohol or **D.O.T. 4 BRAKE FLUID**. Do not contaminate with mineral oil or other solvents. Wipe dry with a clean, lint free cloth. Blow out drilled passages and bore with a clean air supply. Do not use a wire or similar instrument to clean drilled passages.

2. Carefully inspect all components. Replace any parts that appear damaged or worn. Do not hone caliper piston bore.

⚠WARNING

Always replace brake pads in complete sets for correct and safe brake operation. Improper brake operation could result in death or serious injury. (00111a)

3. Inspect brake rotor and pads. See 1.6 BRAKE SYSTEM MAINTENANCE.

4. Check rotor surface. Replace if warped or badly scored. See Table 2-12.

Table 2-12. Front Rotor Runout

RUNOUT	IN.	MM
Rotor radial	0.0177	0.45
Rotor lateral	0.0248	0.63

ASSEMBLY

1. See Figure 2-49. Install pistons and o-rings.
   a. Lubricate **new** o-rings (6), pistons (5), and caliper piston bores with **D.O.T. 4 BRAKE FLUID**.
   b. Install two **new** o-rings (6) in grooves of each piston bore.
   c. Install pistons (5) in each piston bore.
2. Install **new** o-rings (8) between caliper halves.
3. Clamp caliper together with caliper fasteners (11) and tighten to 15-19 ft-lbs (20-26 Nm).

INSTALLATION

1. See Figure 2-49. Install pad spring (7) brake pads (10).
2. Install pin hanger set (1) and tighten to 11-14 ft-lbs (15-19 Nm).
3. Slide the caliper over the rotor up to the mount and install caliper on caliper mount. Using LOCTITE 271 (red). Tighten fasteners (9) to 35-37 ft-lbs (47-50 Nm).

⚠WARNING

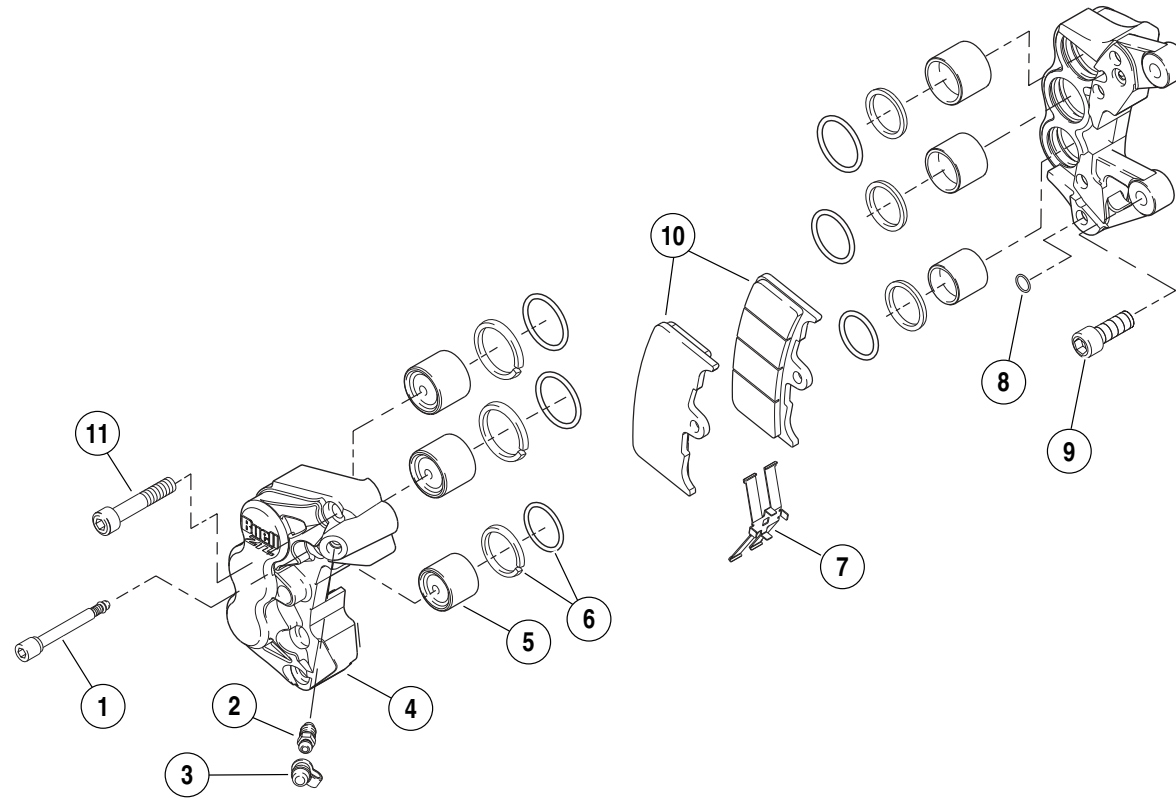
Use only new copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

4. Install brake line to caliper. See 2.11 FRONT BRAKE LINE.
5. Bleed front brakes. See BLEEDING BRAKES in 1.6 BRAKE SYSTEM MAINTENANCE.
6. Install lower right fender. See 2.36 FENDERS.

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

7. Turn ignition key switch to ON. Apply brake hand lever to test brake lamp operation.



1. Pin hanger set
2. Brake bleeder
3. Bleeder cap
4. Caliper
5. Piston
6. Piston o-rings
7. Pad spring
8. Small o-ring
9. Caliper mounting fasteners
10. Brake pads
11. Caliper fasteners

Figure 2-49. Front Caliper Assembly

REAR BRAKE MASTER CYLINDER 2.13

REMOVAL

1. See Figure 2-50. Drain brake fluid into a suitable container. Discard used fluid according to local laws.
   a. Install a length of plastic tubing over caliper bleeder valve. Place free end in a suitable container.
   b. Open bleeder valve (metric) about 1/2-turn.
   c. Pump brake foot pedal to drain brake fluid.
   d. Tighten bleeder valve to 36-60 **in-lbs** (4-7 Nm).
2. Remove right side footpeg mount. See 2.34 HEEL GUARD AND FOOTPEG MOUNTS.

NOTE

Damaged banjo bolt seating surfaces will leak when reassembled. Prevent damage to seating surfaces by carefully removing brake line components.

3. See Figure 2-51. Remove brake reservoir hose (1) at master cylinder.
4. Remove cotter pin from brake pedal. See 2.9 BRAKE PEDAL.
5. Remove seat. See 2.45 SEAT.
6. See Figure 2-52. Disconnect brake light connector located under the seat.

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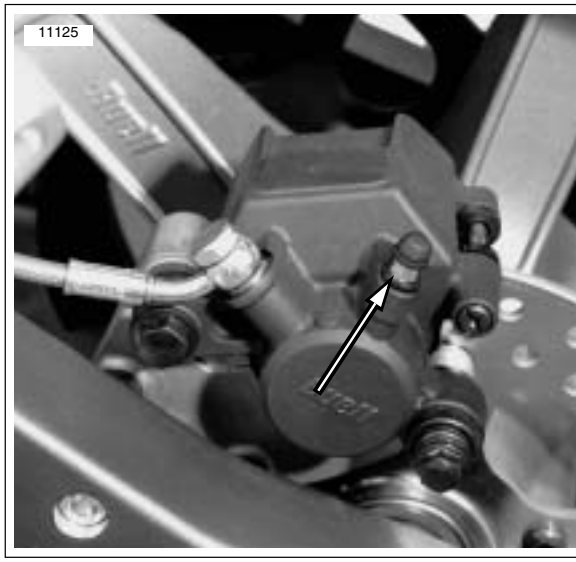
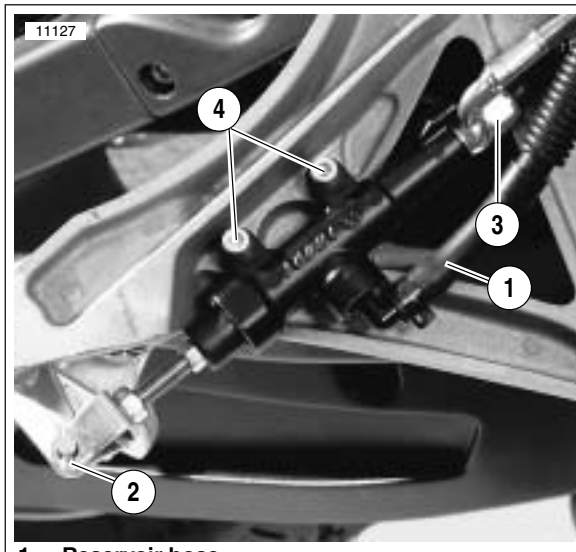


Figure 2-50. Brake Bleeder Valve, Rear Caliper



1. **Reservoir hose**
2. **Cotter pin**
3. **Banjo bolt (metric)**
4. **Fasteners (2)**

Figure 2-51. Rear Master Cylinder

7. See Figure 2-54. Remove rear brake light switch (1) (metric) and two copper crush washers (3) to detach brake line (2) from master cylinder (4). Discard copper crush washers.

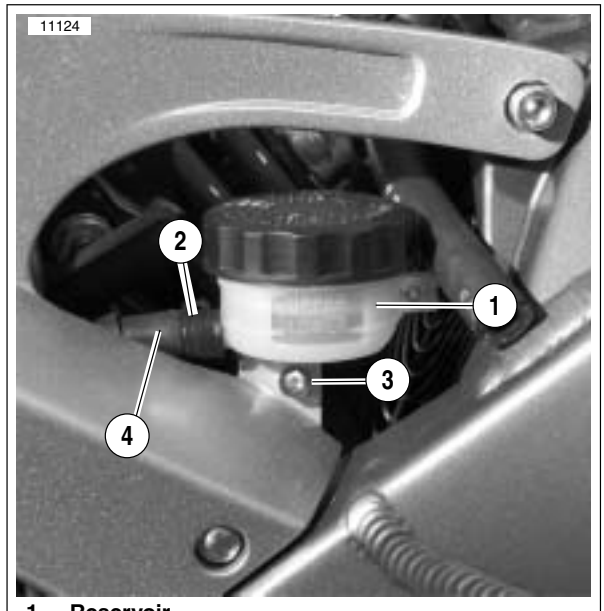
8. See Figure 2-54. Remove fasteners (11) to detach master cylinder (4) from rider footpeg mount.

9. See Figure 2-53. Detach remote reservoir.

   a. Remove top clamp (2) on hose connected to master cylinder.

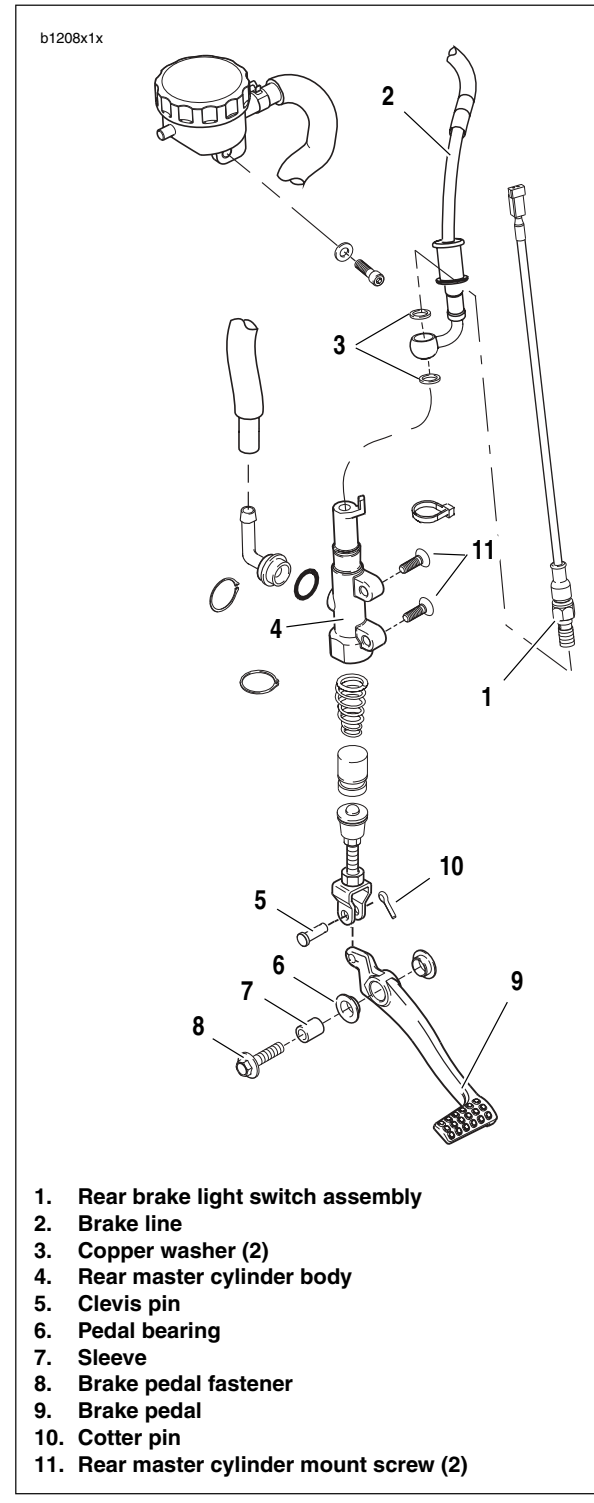
   b. Remove fastener and washer (3) to detach reservoir (1) from frame if necessary.

Figure 2-52. Brake Line Switch Connector



1. **Reservoir**
2. **Clamp**
3. **Fastener and washer**
4. **Remote reservoir hose**

Figure 2-53. Remote Reservoir



1. **Rear brake light switch assembly**
2. **Brake line**
3. **Copper washer (2)**
4. **Rear master cylinder body**
5. **Clevis pin**
6. **Pedal bearing**
7. **Sleeve**
8. **Brake pedal fastener**
9. **Brake pedal**
10. **Cotter pin**
11. **Rear master cylinder mount screw (2)**

Figure 2-54. Rear Master Cylinder Assembly

DISASSEMBLY

1. See Figure 2-55. Slide rubber boot on rod assembly (3) away from master cylinder body (1).
2. Depress rod assembly (3) and remove internal snap ring (2). Discard circlip.
3. Remove piston assembly (4) from master cylinder body (1).
4. Loosen adjuster locknut on the rod assembly (3).
5. Remove the clevis from the rod assembly (3).

NOTE

Do not disassemble master cylinder unless problems are experienced. Discard all seals during the disassembly procedure. Install a complete rebuild kit upon assembly.

CLEANING AND INSPECTION

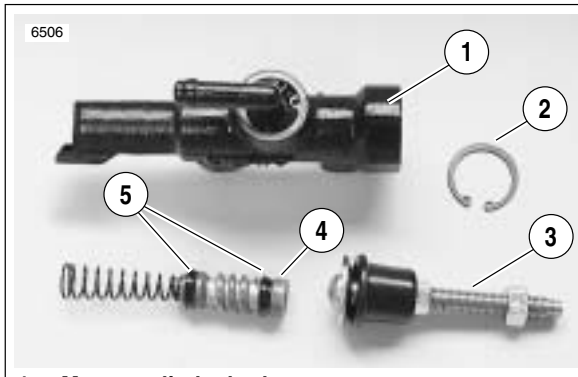
⚠WARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

1. Thoroughly clean master cylinder and all brake system components. Stand master cylinder on wooden block or towel to protect seating surfaces.
   a. Examine walls of master cylinder reservoir for scratches and grooves. Replace if damaged.
   b. Verify that vent holes on master cylinder are completely open and free of dirt or debris.
2. Inspect boot on front of master cylinder for cuts, tears or general deterioration. Replace if necessary.

ASSEMBLY

1. Obtain PISTON ASSEMBLY KIT.



1. **Master cylinder body**
2. **Snap ring**
3. **Rod assembly**
4. **Piston assembly**
5. **Seals**

Figure 2-55. Master Cylinder Internal

2. See Figure 2-55. Assemble **new** piston components placing small end of spring behind primary seal of piston (4).
3. Lubricate master cylinder body (1) and piston seals (5) with **D.O.T. 4 BRAKE FLUID**.
4. Place round side of rod assembly (3) over piston. Depress piston (4) into master cylinder body (1) and secure with a **new** snap ring (2).

⚠WARNING

Circlip must be snapped into the groove of the master cylinder body. If the circlip is not properly installed, improper brake operation could result in death or serious injury.

5. Tuck rubber boot on rod assembly (3) into master cylinder body (1).

INSTALLATION

1. See Figure 2-54. Install master cylinder (4) onto footpeg mount with fasteners (11). Tighten to 72-84 **in-lbs** (8-9.5 Nm).
2. Install rear brake switch (1), brake line (2) and **new** copper crush washers (3). Tighten to 16-20 ft-lbs (22-27 Nm).
3. Install footpeg mount to frame. See 2.34 HEEL GUARD AND FOOTPEG MOUNTS.

⚠WARNING

Use only new copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

NOTE

To avoid leakage after assembly, verify that banjo washers, banjo bolt, hydraulic brake line and bore of master cylinder are completely clean.

4. See Figure 2-53. Connect remote reservoir.
   a. If removed, attach remote reservoir (1) to frame using fastener and washer (3). Tighten to 48-72 **in-lbs** (5.4-8.1 Nm).
   b. Attach hose (3) to rear brake reservoir using clamp.
5. See Figure 2-52. Connect brake line switch connector under seat.
6. Install master cylinder to brake pedal. See 2.9 BRAKE PEDAL.

⚠WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

7. Add brake fluid and bleed brake system. See 1.6 BRAKE SYSTEM MAINTENANCE.

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

⚠WARNING

After servicing brakes and before moving motorcycle, pump brakes to build brake system pressure. Insufficient pressure can adversely affect brake performance, which could result in death or serious injury. (00279a)

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is in locked position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070a)

8. Install seat. See 2.45 SEAT.

REMOVAL

1. Remove seat. See 2.45 SEAT.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

2. Disconnect battery by unthreading fastener removing negative cable (black) from battery first. See 1.4 BATTERY MAINTENANCE.

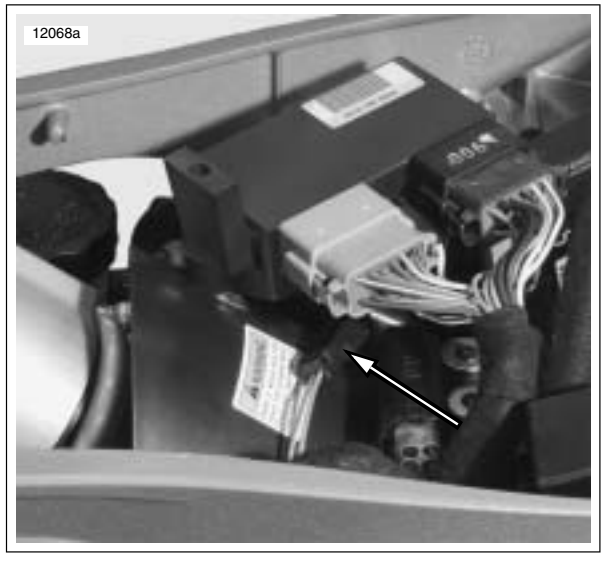


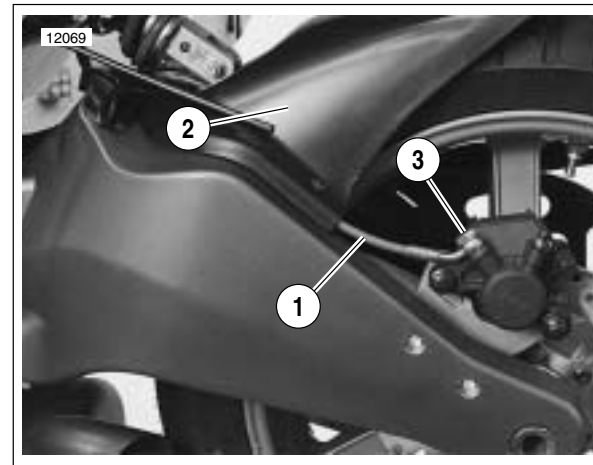
Figure 2-56. Brake Light Switch Connector

3. See Figure 2-56. Disconnect brake light connector from under seat in the front of the battery.
4. Drain brake fluid into a suitable container. Discard used fluid according to local laws.
   a. Install a length of plastic tubing over caliper bleeder valve. Place free end in a suitable container.
   b. Open bleeder valve (metric) about 1/2-turn.
   c. Pump brake foot pedal to drain brake fluid.
   d. Tighten bleeder valve to 36-60 **in-lbs** (4-7 Nm).
5. See Figure 2-57. Remove the rear wheel fender. See 2.36 FENDERS.

NOTE

Damaged banjo bolt seating surfaces will leak when reassembled. Prevent damage to seating surfaces by carefully removing brake line components.

6. Remove banjo bolt (3) from rear caliper. Discard copper washers.



1. **Brake line**
2. **Rear fender**
3. **Banjo bolt**

Figure 2-57. Rear Brake Line

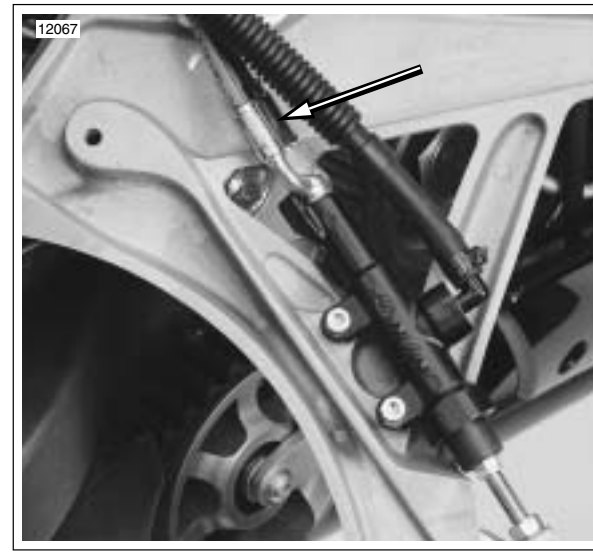


Figure 2-58. Rear Brake Light Switch/Banjo Bolt

7. Remove right side rider/passenger peg mount. See 2.34 HEEL GUARD AND FOOTPEG MOUNTS.
8. See Figure 2-58. Remove brake line switch/banjo bolt from rear master cylinder. Discard copper washers.
9. Remove brake line bracket fasteners.
10. Remove brake line from motorcycle.

INSTALLATION

1. Route the brake line. See D.1 HOSE AND WIRE ROUTING for brake line routing.
2. See Figure 2-58. Install brake line switch/banjo bolt with **new** copper washers to the master cylinder. Tighten to 16-20 ft-lbs (22-27 Nm).

⚠WARNING

Use only new copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

3. Install brake line bracket and tighten fasteners to 48-72 **in-lbs** (5-8 Nm).
4. Install the rider/passenger peg mount to the motorcycle. See 2.34 HEEL GUARD AND FOOTPEG MOUNTS.
5. See Figure 2-56. Connect brake line switch connector beneath seat.
6. Install brake line switch/banjo bolt and **new** copper washers to rear caliper. Tighten to 16-20 ft-lbs (22-27 Nm).
7. Bleed brakes. See BLEEDING BRAKES in 1.6 BRAKE SYSTEM MAINTENANCE.

⚠WARNING

Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

8. Install negative battery cable and tighten to 72-96 **in-lbs** (8-11 Nm). See 1.4 BATTERY MAINTENANCE.

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is in locked position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070a)

9. Install seat. See 2.45 SEAT.

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

10. Turn ignition key ON, depress rear brake pedal and check for proper brake light operation.

⚠WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

11. Test ride motorcycle and check for proper brake operation.

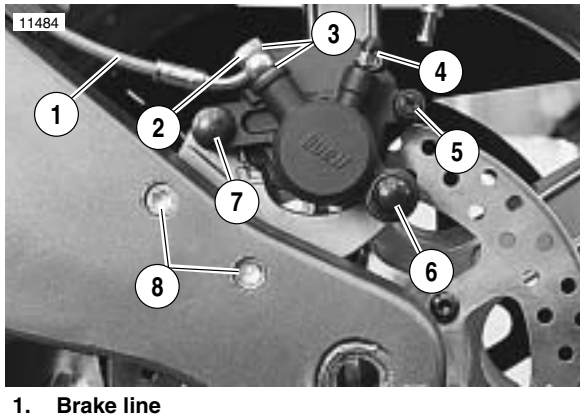
REAR BRAKE CALIPER 2.15

REMOVAL

NOTES

- *Steps 1 and 2 are not required for detaching caliper from rotor. Drain fluid only when disassembling caliper.*
- *Damaged banjo bolt seating surfaces will leak when reassembled. Prevent damage to seating surfaces by carefully removing brake line components.*

1. Drain brake fluid into a suitable container. Discard used fluid according to local laws.
   a. Install a length of plastic tubing over caliper bleeder valve. Place free end in a suitable container.
   b. Open bleeder valve (metric) about 1/2-turn.
   c. Pump brake foot pedal to drain brake fluid.
   d. Tighten bleeder valve to 36-60 **in-lbs** (4-7 Nm).
2. Remove banjo bolt connecting brake line to rear caliper. See 2.14 REAR BRAKE LINE.
3. See Figure 2-59. Remove caliper mounting fasteners (6, 7) (metric).

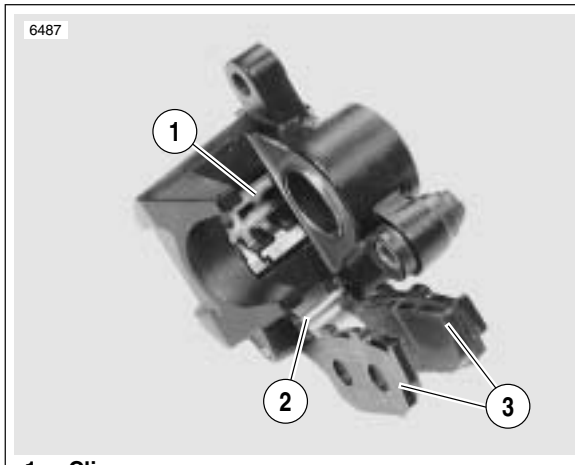


1. **Brake line**
2. **Banjo bolt (metric)**
3. **Copper washers (2)**
4. **Bleeder valve (metric)**
5. **Pin plug**
6. **Small caliper fastener (metric)**
7. **Larger caliper fastener (metric)**
8. **Caliper mounting fasteners**

Figure 2-59. Rear Brake Caliper

DISASSEMBLY

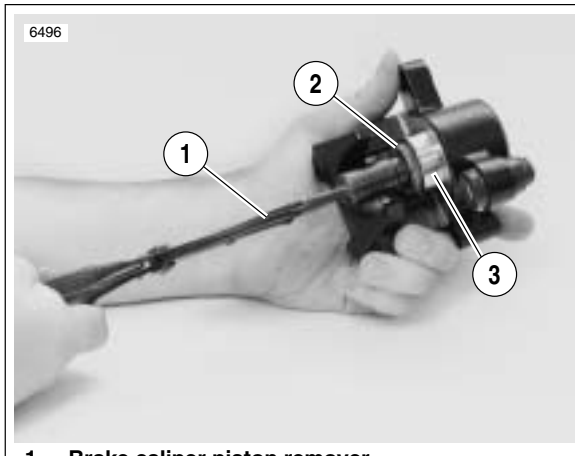
1. See Figure 2-59. Remove pin plug (5) and pad hanger (metric) to free brake pads.



1. **Clip**
2. **Pin plug and pad hanger (metric)**
3. **Brake pads (2)**

Figure 2-60. Brake Pads

2. See Figure 2-60. Remove spring clip (1).



1. **Brake caliper piston remover**
2. **Adaptor**
3. **Piston**

Figure 2-61. Removing Rear Brake Caliper Piston

3. See Figure 2-61. Remove piston (3) using BRAKE CALIPER PISTON REMOVER (1) (Part No. B-42887) with adaptor (2).
4. Remove two o-rings from groove in caliper bore and discard.

CLEANING AND INSPECTION

⚠WARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

1. Clean all parts with denatured alcohol or **D.O.T. 4 BRAKE FLUID**. Do not contaminate with mineral oil or other solvents. Wipe dry with a clean, lint free cloth. Blow out drilled passages and bore with a clean air supply. Do not use a wire or similar instrument to clean drilled passages.
2. Carefully inspect all components. Replace any parts that appear damaged or worn. Do not hone caliper piston bore.
3. Inspect brake rotor.
   a. Measure rotor thickness. Replace if minimum thickness is less than 0.18 in. (4.5 mm).
   b. Check rotor surface. Replace if warped or badly scored. Refer to Table 2-13.

Table 2-13. Rear Rotor Runout

RUNOUT	IN.	MM
Rotor radial	0.0177	0.45
Rotor lateral	0.0154	0.39

⚠WARNING

Always replace brake pads in complete sets for correct and safe brake operation. Improper brake operation could result in death or serious injury. (00111a)

4. Inspect brake pads for damage or excessive wear. Replace both pads as a set if the friction material of either pad is worn to 0.04 in. (1.0 mm) or less.

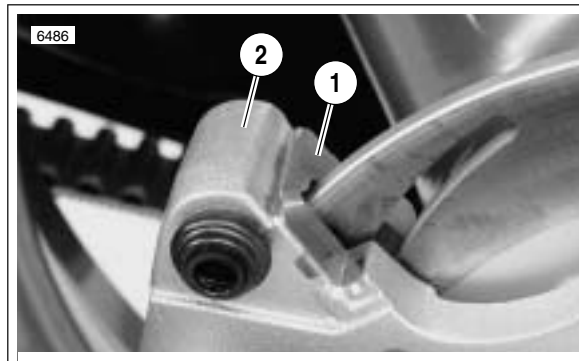
ASSEMBLY

1. See Figure 2-60. Place clip (1) inside caliper body as shown.

NOTE

*To ensure proper brake pad-to-brake rotor clearance when the caliper is installed, piston must be pressed all the way into the bore whenever **new** brake pads are used.*

2. Install pistons and o-rings.
   a. Apply a light coat of **D.O.T. 4 BRAKE FLUID** to o-rings, piston and caliper piston bore.
   b. Place two **new** o-rings inside grooves of piston bore.
   c. Install piston inside caliper body.



1. Retainer, brake pads
2. Rear caliper mount

Figure 2-62. Retainer, Brake Pads

NOTE

See Figure 2-62. Always make sure brake pad retainer is in place on caliper mount before installing pads and caliper.

3. See Figure 2-60. Install brake pads (3) using pad hanger and pin plug (2).
   a. Install pad hanger pin (metric). Tighten to 11-14 ft-lbs (15-19 Nm).
   b. Install pin plug. Tighten to 24 **in-lbs** (2.7 Nm).
4. Install a **new** bleeder valve (metric) if necessary and tighten to 36-60 **in-lbs** (4-7 Nm).

INSTALLATION

1. See Figure 2-62. Install brake pad retainer (1) if removed.
2. See Figure 2-59. Install caliper assembly on caliper mount. Brake pad surfaces must face rear brake rotor.
   a. Install large caliper screw (7) (metric) tightening to 18-21 ft-lbs (24-28 Nm).
   b. Install small caliper screw (6) (metric) tightening to 14-18 ft-lbs (19-24 Nm).

⚠WARNING

Use only new copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

NOTE

To avoid leakage, verify that gaskets, banjo bolt, hydraulic brake line and caliper bore are completely clean.

3. See Figure 2-59. Connect brake line (1) to caliper using two **new** copper washers (3) and banjo bolt (2) (metric). Tighten to 16-20 ft-lbs (22-27).
4. Depress rear brake pedal several times to set brake pads to proper position within caliper. See Bleeding brakes in 1.6 BRAKE SYSTEM MAINTENANCE.

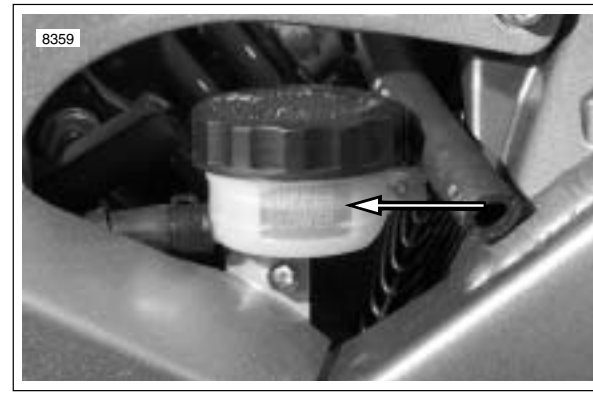


Figure 2-63. Rear Reservoir

5. See Figure 2-63. Verify proper fluid level in reservoir.

⚠WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

6. Turn ignition key switch to ON. Apply brake pedal to test brake lamp operation. Turn ignition key switch to LOCK.

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

NOTE

*Avoid making hard stops for the first 100 miles (160 km) to allow **new** brake pads to "wear in" properly with the brake rotor.*

FRONT FORK 2.16

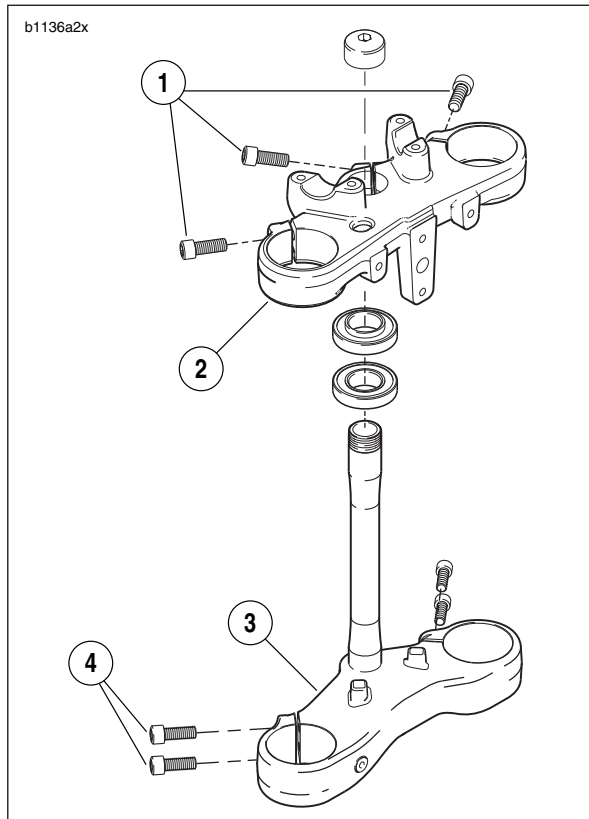
GENERAL

The XB12X model utilizes a 43mm fork assembly. The front fork consists of two telescoping outer tube/inner slider assemblies. Each assembly has an internal compression spring which supports the forward weight of the vehicle and rider. The compression spring extends and retracts to cushion the ride over rough or irregular road surfaces. An oil filled damping mechanism controls the telescoping action of each tube/slider assembly.

See 1.11 SUSPENSION DAMPING ADJUSTMENTS for more information.

REMOVAL

1. Remove front fender. See 2.36 FENDERS.
2. Remove front wheel. See 2.5 FRONT WHEEL.
3. Remove caliper mounting fasteners. See 2.12 FRONT BRAKE CALIPER.
4. See Figure 2-64. Loosen upper and lower fork clamp pinch fasteners (1, 4).
5. See Figure 2-65. Remove fork from upper fork clamp and slide the stopper ring up and over the top of the fork.
6. See Figure 2-64. Remove fork from lower fork clamp (3).
7. Repeat 4 through 6 on opposite side.



1. **Screw, pinch fastener**
2. **Triple clamp, upper**
3. **Triple clamp assembly, lower**
4. **Screw, pinch fastener**

Figure 2-64. Upper and Lower Fork Clamp Assembly

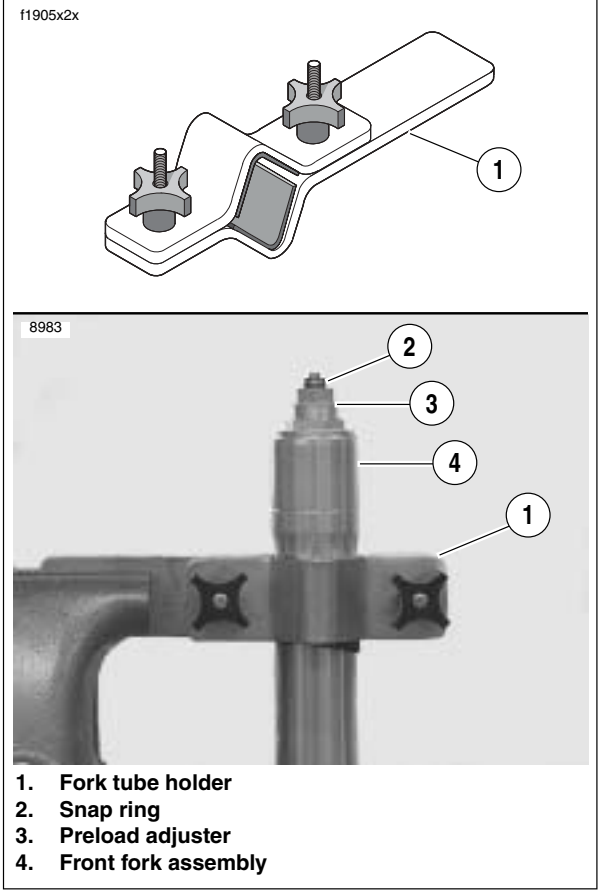
Figure 2-65. Stopper Ring

DISASSEMBLY

NOTE

Record rider suspension settings before disassembly.

1. Remove front fork. See REMOVAL in 2.16 FRONT FORK.



1. **Fork tube holder**
2. **Snap ring**
3. **Preload adjuster**
4. **Front fork assembly**

Figure 2-66. Fork Tube Holder (HD-41177)

2. See Figure 2-66. Clamp the FORK TUBE HOLDER TOOL (1) (Part No. HD-41177) in a vise and install the upper part of the front fork in the holding tool.
3. Remove snap ring (2).

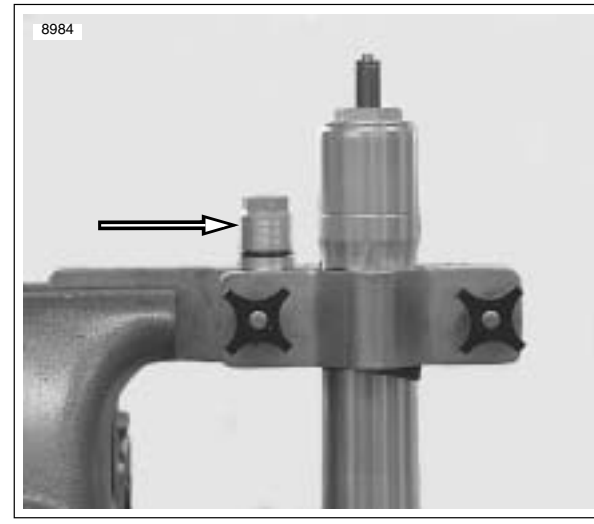


Figure 2-67. Removing Preload Adjuster

4. See Figure 2-67. Remove preload adjuster by turning counterclockwise.

NOTE

After fully unthreading preload adjuster, gently pull on adjuster.

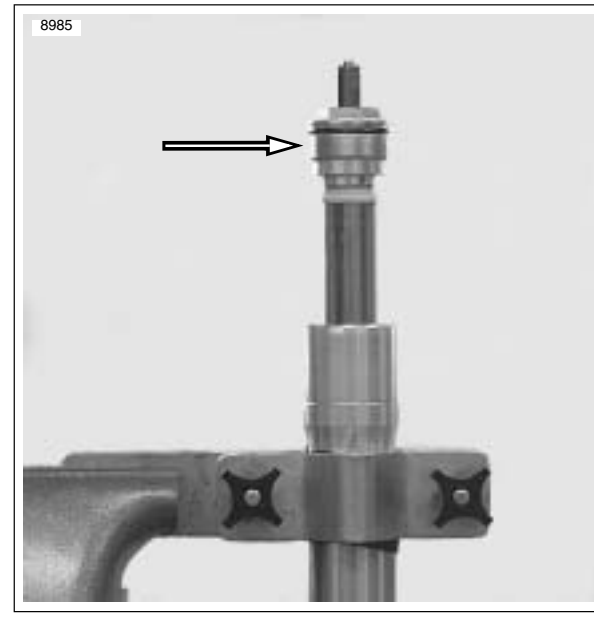


Figure 2-68. Removing Fork Cap From Outer Tube

5. See Figure 2-68. Remove fork cap from outer tube.

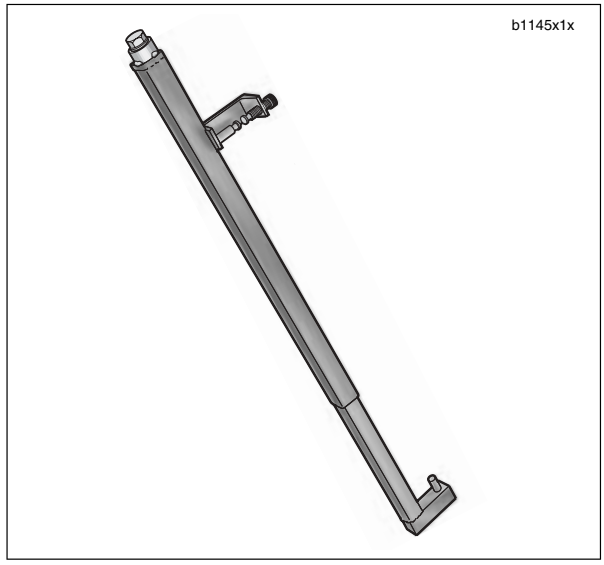
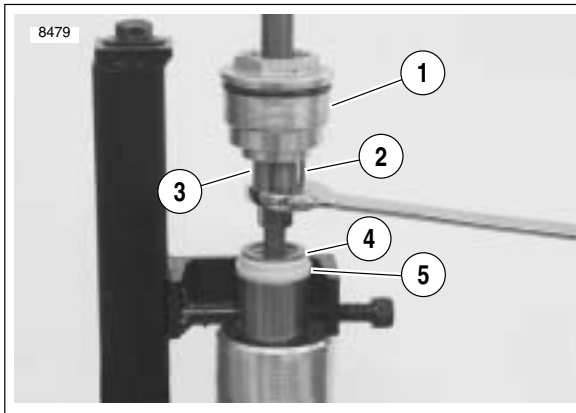


Figure 2-69. Fork Spring Compressing Tool (HD-45966)

6. See Figure 2-69. Move the fork assembly from the holding tool and compress fork in the FORK SPRING COMPRESSION TOOL.

NOTES

- *FORK SPRING COMPRESSING TOOL (HD-45966) comes with a cup and screw that are for FLT models only and not to be used with Buell.*
- *When using the FORK SPRING COMPRESSING TOOL be sure not to bind the outer fork tube on the tool.*



1. **Fork cap**
2. **Preload pins**
3. **Damper rod assembly**
4. **Preload washer**
5. **Slider piston**

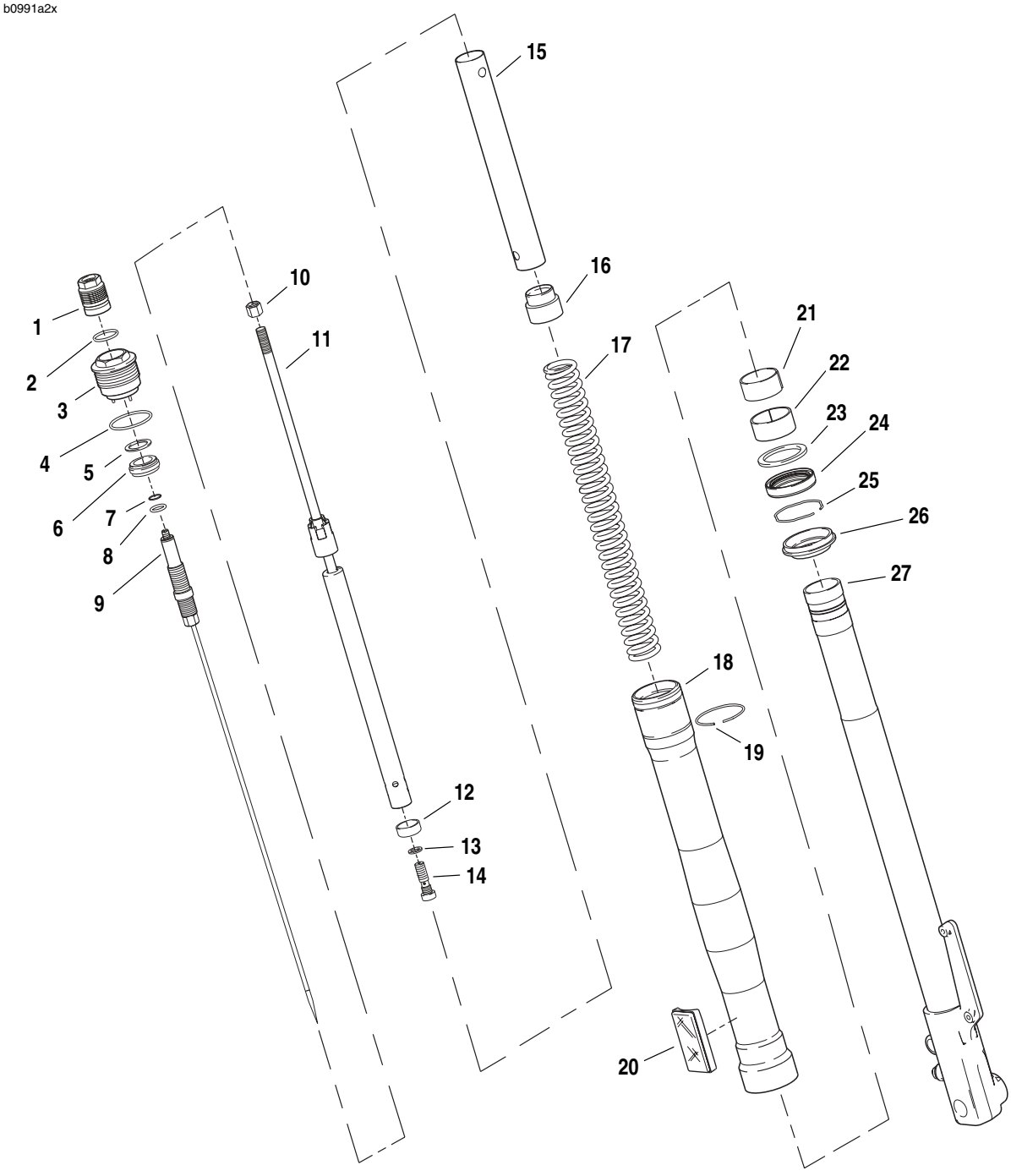
Figure 2-70. Holding Damper Rod Assembly

7. See Figure 2-70. Hold damper rod assembly (3) and remove fork cap (1).

NOTE

Careful not to damage preload pins while holding damper rod assembly.

8. Remove preload washer (4) and slider piston (5).
9. See Figure 2-69. Expand fork and remove from FORK SPRING COMPRESSION TOOL.



1. Preload adjuster
2. Preload adjuster o-rings
3. Fork cap
4. Fork cap o-ring
5. Preload washer
6. Slider piston
7. Inner slider piston o-ring
8. Snap ring
9. Rebound adjuster assembly
10. Damper locknut
11. Damper rod assembly
12. Centering plate
13. Sealing washer
14. Center bolt
15. Collar
16. Spring joint
17. Spring
18. Outer tube
19. Stopper ring
20. Reflector assembly
21. Slide bushing
22. Guide bushing
23. Seal spacer
24. Oil seal
25. Oil seal stopper ring
26. Dust seal
27. Slider fork

Figure 2-71. Front Fork Assembly

10. See Figure 2-71. Over drain pan, remove spring collar (15), spring (16) and drain fork oil.
11. Drain remaining fork oil by pumping the damping rod (11) approximately 8 to 10 times or until damping rod moves freely.
12. Clamp fork upside down in the FORK TUBE HOLDER TOOL (Part No. HD-41177) over drain pan allowing fork oil to drain.

NOTE

- *If performing fork oil change only, proceed to Fork Assembly Step 12.*
- *Be careful not to drop damping rod assembly into oil pan when removing center bolt.*

13. Remove center bolt (14) to release damping rod assembly (11).
14. Remove centering plate (12) from dampening rod (11).

⚠WARNING

Be careful not to scratch the slider fork or the outer tube. Improperly operating forks may lead to a loss of control which could result in death or serious injury.

15. Remove dust seal (26) to access oil seal stopper ring (25).
16. Release the oil seal stopper ring (25) out from the outer tube with a small pry tool.
17. Using a slide hammer action, remove the slider fork (27) from the outer tube (18).
18. Remove the slide bushing (21) from slider fork by prying the slide bushing at the split.

NOTE

Careful not to over expand slide bushing.

19. Remove guide bushing (22), seal spacer (23), oil seal (24), stopper ring (25) and dust seal (26).

Damper Rod Disassembly

NOTES

- *See Figure 2-71. Disassembly of damper rod is not required unless damper locknut (10) has been moved. If damper rod needs servicing refer to the Parts Catalog for kit information.*
- *If damper locknut has been moved, proceed with the following disassembly and assembly procedures for setting the correct range of motion.*

1. See Figure 2-71. Lightly turn the rebound adjuster screw on top of the rebound adjuster assembly (9) counter clockwise till it stops.
2. Holding the damper locknut (10), unscrew the rebound adjuster assembly (9) and remove from damper rod assembly (11).
3. Remove damper locknut (10) from damper rod assembly (11).

CLEANING AND INSPECTION

1. Thoroughly clean and inspect all parts. Replace any parts that are bent, broken or damaged.
2. See Figure 2-71. Check the slider fork (27) and outer tube (18) for score marks, scratches and excessive or abnormal wear. Replace if worn or damaged.
3. Check the slide bushing (21) and the guide bushing (22) for excessive wear or scratches. Replace if damaged or worn.
4. Replace the stopper ring (19) if distorted.
5. Measure spring (16) free length. Replace springs shorter than the service wear limit of 18.77 in. (476.7 mm).
6. See Figure 2-72. Measure slider fork runout. Replace pipe if runout exceeds the service wear limit of 0.008 in. (0.2 mm).

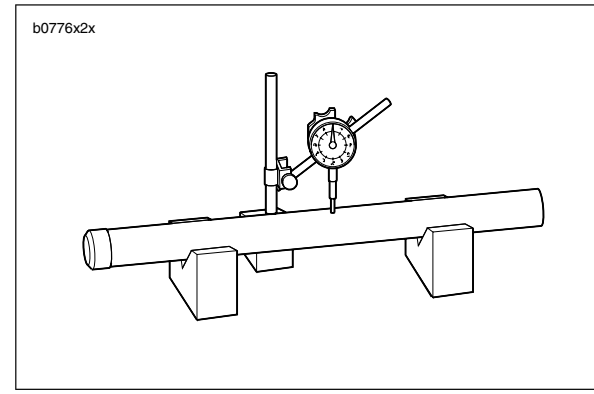


Figure 2-72. Slider fork Runout

ASSEMBLY

Damper Rod Assembly

Note

Skip to fork assembly if damper rod assembly was not disassembled.

1. See Figure 2-71. Fully thread the damper rod locknut (10) on to damper rod (11) clockwise till it lightly bottoms.

NOTE

Set both forks to the exact same suspension settings.

2. Adjust rebound assembly for proper range of motion.
   a. Lightly turn the rebound adjuster screw on top of the rebound adjuster assembly (9) counter clockwise till it stops.
   b. Turn the rebound adjuster screw three full turns clockwise.
3. Fully thread rebound adjuster assembly (9) onto the damper rod assembly (11) until it lightly bottoms. Do not tighten.
4. Thread the damper locknut (10) until bottoms lightly on the rebound adjuster assembly. Do not tighten
5. Turning the rebound adjuster screw (9) counter clockwise three full turns or until stops.

Figure 2-73. Rebound and Fork Cap Assembly

6. See Figure 2-73. Tighten the damper locknut to 22-30 ft-lbs (30-40 Nm).
7. Repeat for other fork assembly.

Fork Assembly

1. See Figure 2-71. Wrap the end of the slider fork (27) and the slide bushing channel with tape to avoid damaging the oil seal lip when installing.
2. Install a **new** dust seal (26) and stopper ring (25) onto the slider fork (27).
3. Coat the sealing lips of the **new** oil seal (24) with fork oil or sealing grease and install onto the slider fork with its marked side facing the dust seal (26).
4. Remove the tape from the slider fork end.
5. Install the seal spacer (23), the guide bushing (22) and the slide bushing (21) onto the slider fork (27).
6. Coat the slide bushing (21) and the guide bushing (22) with fork oil.

NOTE

The outer tube can move freely up and down on the slider fork. Always hold both the slider fork and outer tube to prevent damage to bushings and seals.

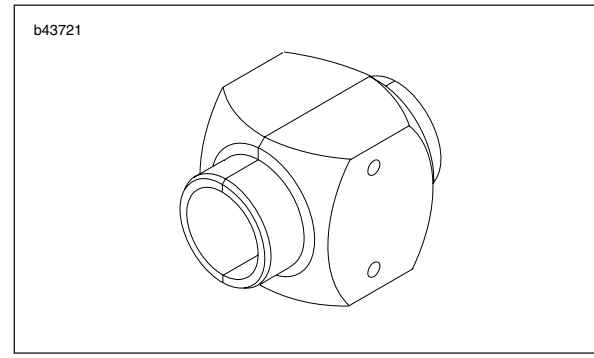


Figure 2-74. Fork Seal Driver (B-42571) 43mm

7. See Figure 2-71. Drive the guide bushing (22) with the seal spacer (23) and oil seal (24) into position in the outer tube using a FORK SEAL DRIVER (Part No. B-42571/43mm). See Figure 2-74.
8. Install the oil seal stopper ring (25) and a **new** dust seal (26).
9. Place the fork in the FORK TUBE HOLDER TOOL (Part No. HD-41177) and clamp into vise horizontally.
10. See Figure 2-71. Install the centering plate (12) onto the damper assembly (11) and insert the damper assembly into the slider fork (27).
11. See Figure 2-71. Replace the sealing washer (13) and center bolt (14) (metric). Install the center bolt and tighten to 22-30 ft-lbs (30-40 Nm).

12. Move the front fork and the FORK TUBE HOLDER TOOL in the vise from the horizontal position to the vertical.

NOTES

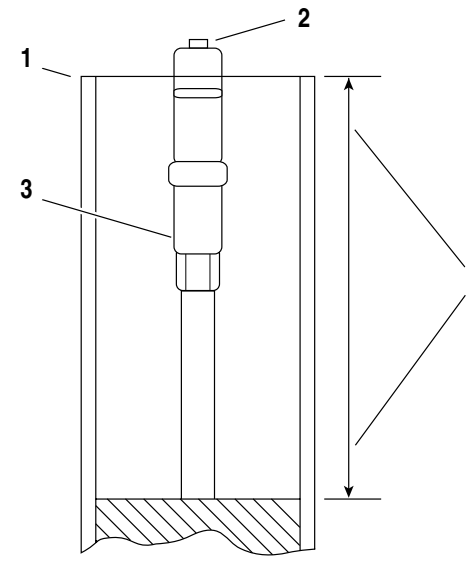
Use only TYPE E FORK OIL (Part No. HD-99884-80).

13. Pour 8 oz. (237 cc) into the fork pipe.
14. Pump the damper rod approximately 12 to 15 times or until resistance is felt.
15. Place the damper rod in the fully bottomed position and compress fork completely.
16. Pour 8 oz. (266 cc) more fork oil into the slider fork.
17. See Figure 2-75. Adjust fork oil level with FRONT FORK OIL LEVEL GAUGE (Part No. B-59000A) so that it is 7.56 in. (192 mm) from the top of the fork tube.
18. See Figure 2-71. Install spring (16) and collar (15).
19. Move fork assembly from holding tool to the FORK SPRING COMPRESSION TOOL.
20. See Figure 2-70. Install preload washer (4) and slider piston (5).
21. See Figure 2-73. Hold damper rod assembly (3) and install fork cap (1) on damper rod assembly tightening to 38-42 ft-lbs (51.5-56.9 Nm).

NOTE

See Figure 2-70. Careful not to damage preload pins (2) while holding damper rod assembly (3).

22. Remove the fork assembly from the FORK SPRING COMPRESSION TOOL and install in the FORK TUBE HOLDER and install in vise.
23. See Figure 2-71. Thread fork cap (3) into fork tube (18) and tighten to 22-30 ft-lbs (29.8-40.6 Nm).
24. Apply fork oil or light grease to o-rings on preload adjuster and install preload adjuster (1).
25. Install snap ring (8).



1. **Outer tube**
2. **Adjuster**
3. **Damper assembly**
4. **Fork oil level**

Figure 2-75. Measuring Fork Oil Level

INSTALLATION

1. Install one front fork assembly into lower fork clamp.
2. Slide the stopper ring over top of fork assembly and into groove.

⚠WARNING

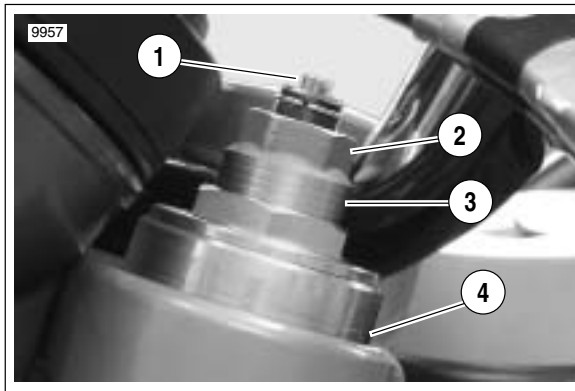
Carefully install the fork into the upper fork clamp. Forcing the fork into the upper fork clamp could move the stopper ring out of the groove which will not allow the correct upper fork clamp load resulting in possible loss of control of the motorcycle and could result in death or serious injury.

3. Install fork assembly into upper fork clamp.

⚠WARNING

Both forks should display the same number of alignment lines. Forks that are not properly aligned can lead to loss of control, which could result in death or serious injury. (00124a)

4. See Figure 2-76. Position fork with alignment lines (4) visible and reflector facing to the side and tighten the lower fork clamp.
5. Repeat step 1 through 4 on second front fork.
6. Temporarily install front axle to the fork assemblies to verify correct alignment.
7. Use LOCTITE 271 (red) on upper fork clamp fasteners and tighten to 23-25 ft-lbs (31-34 Nm).
8. Use LOCTITE 271 (red) on lower fork clamp fasteners and tighten to 20-22 ft-lbs (27-30 Nm).
9. Repeat torque sequence in steps 7 and 8.
10. Install front brake caliper onto caliper mount. See 2.12 FRONT BRAKE CALIPER.
11. Install front wheel. See 2.5 FRONT WHEEL.
12. Install front fender. See 2.36 FENDERS.
13. Check headlight alignment. See 1.18 HEADLIGHTS.
14. Adjust front forks suspension to rider preferences. See 1.11 SUSPENSION DAMPING ADJUSTMENTS.



1. **Rebound adjuster screw**
2. **Preload adjuster nut**
3. **Preload alignment lines**
4. **Alignment lines**

Figure 2-76. Front Fork Preload And Rebound Adjuster