



# INSTRUCTIONS

J04097

2009-06-19



## INVERTED FORK KIT

### GENERAL

#### Kit Number

46321-05B, 48646-06A

#### Models

For model fitment information, see the P&A Retail Catalog or the Parts and Accessories section of [www.harley-davidson.com](http://www.harley-davidson.com) (English only).

#### Additional Parts Required

##### NOTE

If the motorcycle's stock handlebar has been replaced, it may be necessary to use a Braided Brake Line Kit other than the one listed below. See a Harley-Davidson dealer for the appropriate kit.

Proper installation of this kit requires the separate purchase of the following:

- For **2000-2006 models:** 3/4 Inch Front Axle and Set Screw Kit (42134-06) For **2007 and later models:** 25 MM Front Axle and Set Screw Kit (42136-07)
- Braided Brake Line Kit (see Table 1 )
- Upper Dust Shield (48361-80)
- Lower Dust Shield (48365-48A)
- Two Roller Bearings (48300-60)

Proper installation of this kit on FXSTB models also requires the separate purchase of the following:

- Front Directional Mounting Kit (68266-03)
- Two Ball Studs (67822-88)

Table 1. Brake Line Kits

Model	Lower	Upper
FXST	42366-07	42772-07
FXSTB	42366-07	42385-07
FXSTC	42366-07	42752-07

This kit also requires LOCTITE® 243 (blue) (99642-97) and LOCTITE® ANTI-SEIZE LUBRICANT (98960-97) and HARLEY-DAVIDSON® Special Purpose Grease (99857-97) for proper installation.

#### ▲ WARNING

Rider and passenger safety depend upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333b)

##### NOTE

This instruction sheet references service manual information. A service manual for your model motorcycle is required for this installation and is available from a Harley-Davidson Dealer.

Proper assembly/disassembly of the inverted fork tubes for maintenance requires the use of the following tools: FORK TUBE HOLDER (HD-41177), FORK SEAL BUSHING TOOL (B-42571), FLSTS/C HUB CAP REMOVAL TOOL (HD-41494) and FRONT FORK OIL LEVEL GAUGE (HD-59000B).

#### Kit Contents

See Figure 7 and Table 2.

### REMOVAL

##### NOTE

Refer to the appropriate service manual for detailed information on the following generalized steps.

1. Using a lift or blocks, raise the motorcycle so that the motorcycle is level with the front wheel off the ground.
2. Remove front brake caliper, front fender and front wheel. Discard the axle. Save wheel spacers for later installation.
3. Remove the fuel tank.
4. Remove the headlamp assembly.
5. Disconnect turn signal wiring harnesses.
6. Remove screw securing front brake line clip and ground wire to the rear of the upper fork bracket.

##### NOTE

Right side riser bolt also secures a ground wire to the bottom of the upper fork bracket. Save ground wire for later installation.

7. Remove riser bolts and set handlebar assembly aside with controls and attached control cables.
8. Remove the front forks and fork brackets (steering head).

### INSTALLATION

#### Install the Fork Brackets and Inverted Forks

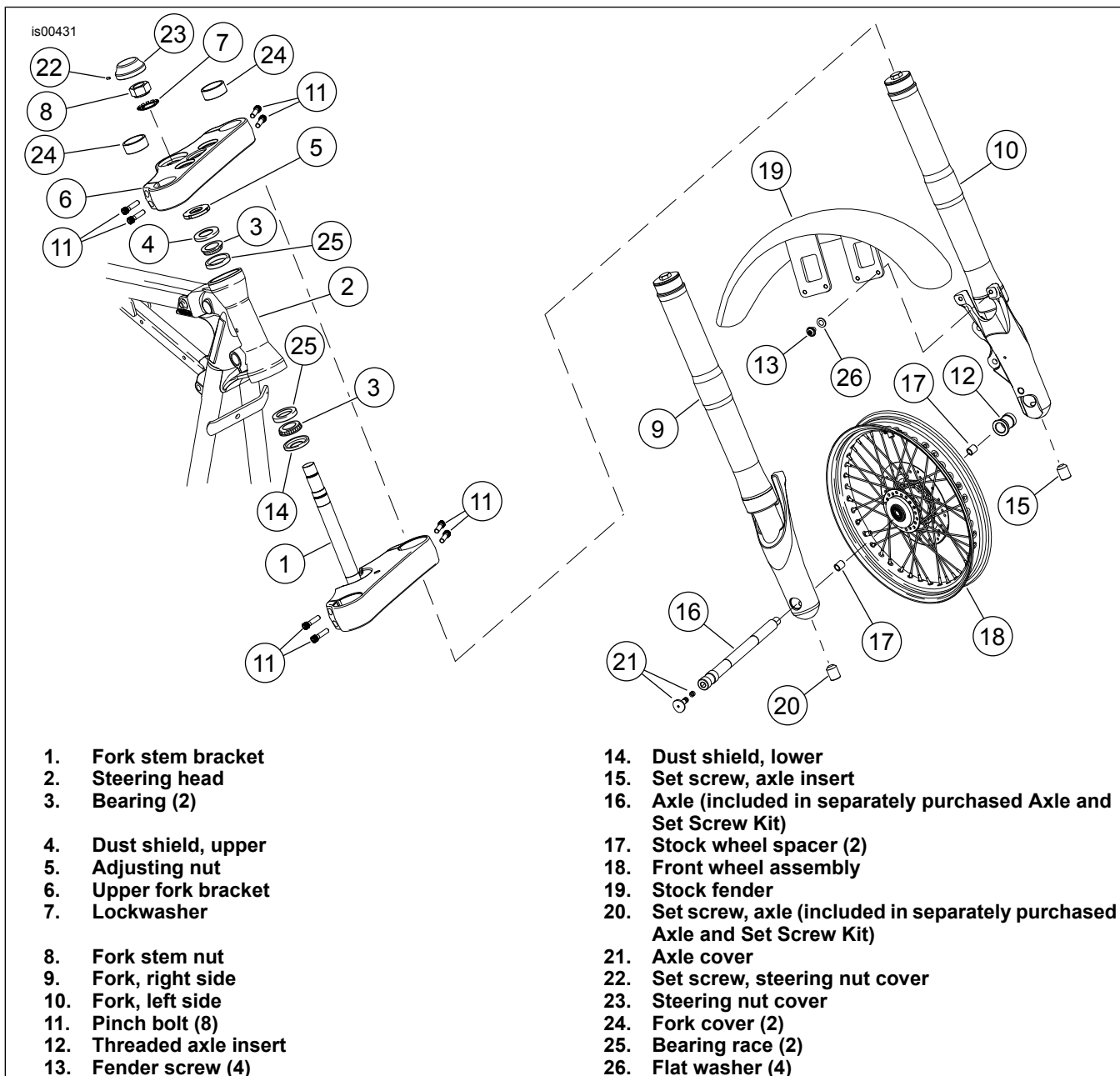
##### NOTE

See Figure 1 for the following procedure.

1. Refer to the appropriate service manual and replace the steering head bearing races (25).
2. Pack the **new** bearings with Harley-Davidson Special Purpose Grease.



3. Install bearing (3) and lower dust shield (14) onto fork stem bracket (1) and insert into the frame steering head (2), then install the bearing (3), and upper dust shield (4). Secure with adjusting nut (5). Tighten the adjusting nut until the bearings do not have any visible free-play, and the fork stem turns from side-to-side with some resistance. The bearing fall-away will be adjusted later in the installation procedure.



**Figure 1. Inverted Fork Installation**

4. Install upper fork bracket (6). Install the new lock washer (7), and fork stem nut (8) loosely. Verify inner tab of lockwasher engages the slot in the upper fork bracket.
5. Loosely install four fork bracket pinch bolts (11) into the upper fork bracket (6).
6. Install right side inverted fork (9) up through the bores in the lower and upper bracket. Bottom out the fork in the bore. Install fork cover (24) and tighten the pinch bolts (11) of the upper fork bracket enough to hold the fork in place. Repeat for left side inverted fork (10).
7. Tighten the fork stem nut (8). Verify the internal tooth on the lockwasher (7) engages in the slot of the upper bracket (6).

8. Install four pinch bolts (11) in the fork stem bracket (1).
9. Verify the threaded axle insert (12) is installed in the axle holder of the left fork (10).
10. Apply Loctite 243 (blue) to the threads of the axle insert set screw (15) and install into the bottom of the left side fork (10). Tighten the set screw to 68–75 N·m (50–55 ft-lbs).
11. Apply Loctite 243 (blue) to the four fender screws (13), and install the stock fender (19) to the front forks using the screws and four flat washers (26). Tighten the screws to 20.3–24.4 N·m (15–18 ft-lbs).
12. Obtain axle (16) from Axle and Set Screw Kit (42134-06 or 42136-07). Apply a coat of Loctite Anti-Seize Lubricant to the threads and bearing area of the axle.
19. Remove front brake line and install Braided Brake Line Kit (purchased separately) according to the instructions included with the kit.
20. Refer to the appropriate service manual and install the headlamp assembly.
21. See Figure 7. Install left side (26) and right side (27) reflectors to fork tubes, just below the fork stem bracket.
22. Fill the neck with Harley-Davidson Special Purpose Grease through the grease fitting located in the steering head.
23. **See the Steering Head Bearing Fall-Away Adjustment section of this Instruction Sheet and adjust steering head bearing fall-away.**

**NOTE**

*Install stock wheel spacers (17) into place before installing the front wheel assembly (18). Install the thicker spacer on the left (rotor) side of the wheel.*

13. Install the front wheel assembly (18) and spacers (17) with the new axle (16) from the kit, threading the axle into the left front fork slider. Tighten the axle to 88–95 N·m (65–70 ft-lbs).
14. Compress the front forks several times to prevent binding and center the right fork on the axle.
15. Obtain axle set screw (20) from Axle and Set Screw Kit (42134-06 or 42136-07). Apply Loctite 243 (blue) to the threads of the axle set screw and install into the bottom of the right side fork (9). Tighten the set screw to 68–75 N·m (50–55 ft-lbs).
16. Install the axle cover (21) to the end of the axle.

**NOTE**

*Secure the ground wire, that was previously removed, to the upper fork bracket, when installing the right side riser bolt.*

17. Refer to the appropriate service manual and install the handlebar risers, handlebar and controls. Route wiring through the hole in the upper fork bracket, between the handlebar risers.
18. Refer to the appropriate service manual and install the front brake caliper.

**NOTE**

*See the motorcycle owner's manual for the appropriate brake fluid to be used when replacing the front brake line.*

*Secure the ground wire attached to the bottom of the upper fork bracket between the screw head and the brake line clip.*

*When installing brake line clip to the upper fork bracket, position the clip so that the brake line is secured on the outboard side of the mounting screw.*

24. Apply Loctite to pinch bolts:
  - a. Remove pinch bolts from fork stem bracket.
  - b. Apply a small amount of Loctite 243 (blue) to the threads of the pinch bolts and install.
  - c. Remove pinch bolts from upper fork bracket, apply a small amount of Loctite 243 (blue) to the threads and install.
  - d. Tighten pinch bolts to 25–27 N·m (18–20 ft-lbs). Tighten upper pinch bolt, then the lower pinch bolt of each side of the upper fork bracket. Tighten upper pinch bolt, then the lower pinch bolt of each side of the fork stem bracket. Repeat the tightening sequence.
25. See Figure 1. Apply a small amount of Loctite 243 (blue) to the steering nut cover set screw (22). Install the steering nut cover (23) and set screw to the fork stem nut.

## Steering Head Bearing Fall-Away Adjustment

1. Verify that the motorcycle is supported upright and level with the front end suspended off the ground.
2. Check that no wiring, clutch or throttle cables influence the swing of the front end.
3. Place a suitable marking material, such as masking tape, over the fender tip.
4. Install a pointer so the base is stationary on the floor and the pointer indicates the center of the fender. The front end should be straight ahead, however the balance point may be slightly off center.
5. Check the steering head bearing tension:
  - a. Tap the fender on one side until the front end begins to "fall-away" by itself. Label this point on the marking material.
  - b. Repeat the previous step in the opposite direction.
  - c. Measure the distance between the two marks.

6. The distance between the two "fall-away" marks must be between 1.0-2.0 in. (25.4-50.8 mm). Tighten or loosen the fork adjuster nut until the measurement is within specification:
  - a. Loosen the upper fork bracket pinch bolts.
  - b. Remove fork stem nut cover, fork stem nut and lockwasher.
  - c. Lift upper fork bracket with attached handlebar and controls enough to access the adjusting nut.
  - d. If the measurement is more than 2.0 in. (50.8 mm), loosen the adjuster nut. If the measurement is less than 1.0 in. (25.4 mm), tighten the adjuster nut.
  - e. Place a suitable support under the front wheel to prevent it from falling.
  - f. Loosen the pinch bolts in the lower fork stem bracket.
  - g. Verify the upper fork bracket is properly seated on steering head, then ensure that the forks properly seat in the upper fork bracket bores. Snug pinch bolts for upper bracket.
  - h. Install fork stem nut and lockwasher. Tighten the fork stem nut to 48–54 N·m (35–40 ft-lbs). Check that the internal tooth on the lockwasher engages in the slot of the upper bracket.
  - i. Bend one tab of the lockwasher up against a flat of the fork stem nut.
  - j. Remove pinch bolts from fork stem bracket.
  - k. Apply a small amount of Loctite 243 (blue) to the threads of the pinch bolts and install.
  - l. Remove pinch bolts from upper fork bracket, apply a small amount of Loctite 243 (blue) to the threads and install.
  - m. Tighten pinch bolts to 25–27 N·m (18–20 ft-lbs). Tighten upper pinch bolt, then the lower pinch bolt of each side of the upper fork bracket. Tighten upper pinch bolt, then the lower pinch bolt of each side of the fork stem bracket. Repeat the tightening sequence.
  - n. See Figure 1. Apply a small amount of Loctite 243 (blue) to the fork stem nut cover set screw (22). Install the fork stem nut cover (23) and set screw to the fork stem nut.
7. Repeat Step 6 as necessary.

## Return Motorcycle to Service

### ⚠ 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

**Whenever a wheel is installed and before moving the motorcycle, pump brakes to build brake system pressure. Insufficient pressure can adversely affect brake performance, which could result in death or serious injury. (00284a)**

### ⚠ 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. Refer to the appropriate service manual and bleed the front brake caliper.

### ⚠ 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)**

2. Test all lights, turn signals and controls for proper operation.
3. Refer to the owner's manual and align the headlamp.

## Service Schedule

After the Inverted Fork Kit has been installed, make a note of the mileage on the motorcycle and perform the following after the stated mileage has been achieved: Lubricate the steering head bearings every 10,000 miles. Replace the fork oil every 20,000 miles.

## CARE AND MAINTENANCE

### Remove Inverted Forks

#### NOTE

See Figure 1 for the following procedure.

1. Block the motorcycle under the frame so the front wheel is raised off the ground.
2. Refer to the appropriate service manual, and remove front brake caliper and front fender.
3. Remove axle cover (21) by threading a #6-32 screw into the axle cover. Pull screw to remove the axle cover.
4. Remove axle set screw (20).
5. Remove axle (16), spacers (17) and front wheel assembly (18).

#### NOTE

*The fork cover (24) may fall through the upper fork bracket (6) bore when the pinch bolts are loosened or removed. Carefully catch it to prevent scratches or nicks.*

*When fork bracket pinch bolts are removed for service, use new pinch bolts during installation.*

6. While holding fork to prevent it from sliding, remove pinch bolts from one side of upper and lower fork brackets and remove fork. Repeat for opposite side.

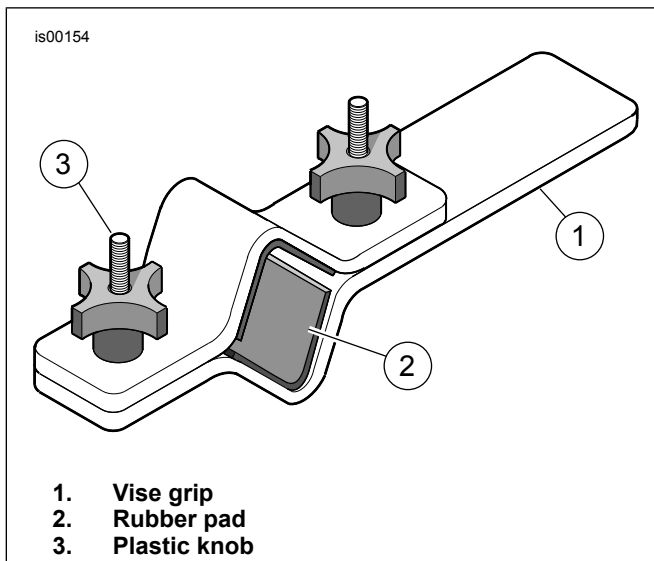


Figure 2. Fork Tube Holder (HD-41177)

## Disassemble Inverted Fork

1. See Figure 2. Obtain FORK TUBE HOLDER (HD-41177).
  - a. Clamp end of tool in vise in a horizontal position with plastic knobs facing toward you.
  - b. See Figure 3. With the fork tube at the bottom, clamp outer fork tube between rubber pads on inboard side of tool. Tighten knobs until fork tube is securely held.

### NOTE

See Figure 3 for Steps 2 through 10.

### ▲ WARNING

Wear safety glasses or goggles when servicing fork assembly. Do not remove slider tube caps without relieving spring preload or caps and springs can fly out, which could result in death or serious injury. (00297a)

2. Remove fork plug (6). The fork plug is threaded to the outer fork tube (5) and cartridge assembly (1).
3. Loosen nut (17) and remove fork plug (6).
4. Pull down on fork spring and remove spring end plate (11).
5. Place a drain pan under the fork. Turn the fork over and allow fork oil to drain from the fork. Turn fork back to the upright position.
6. Remove screw and washer (14).
7. Remove cartridge assembly (1) and preload spacer (16).
8. Use FLSTS/C HUB CAP REMOVAL TOOL (HD-41494) and disengage dust cover (13) and dust seal (4). Slide them down towards the bottom of the fork tube assembly.
9. Compress retaining ring (3) and remove the clip from the internal groove of the outer fork tube (5).

**NOTE**  
To overcome any resistance, use the fork tube assembly as a slide hammer: push fork tube into the outer fork tube and then pull it with a moderate amount of force. Repeat this sequence until fork tube separates from the outer fork tube.

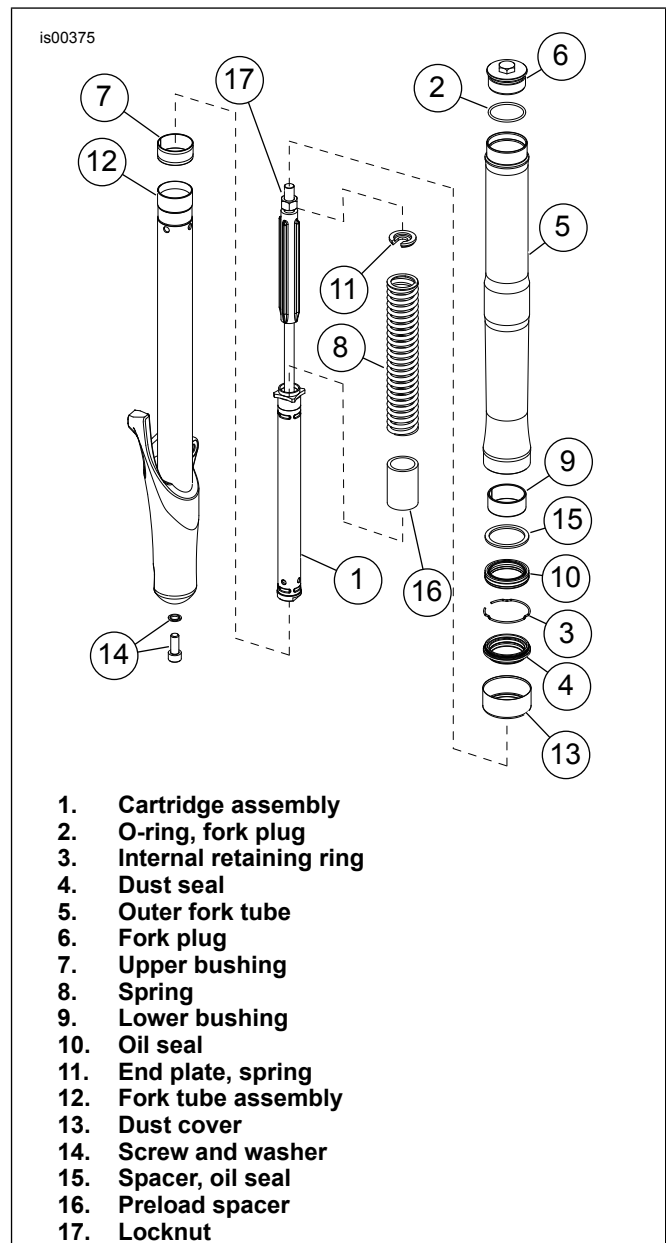


Figure 3. Inverted Fork (left side shown)

10. Withdraw fork tube (12) from outer fork tube (5) until upper bushing (7) on fork tube contacts lower bushing (9) in the outer fork tube. Use upper bushing in a slide hammer motion to gently tap out oil seal (10), spacer (15) and lower bushing (9) from slider bore.

## Inspect Inverted Fork

Inspect inverted fork for worn or damaged parts. If the fork tubes, spring, preload spacer or cartridge assembly are worn or damaged, replace the entire fork. When reassembling the

fork, replace oil seal, bushings and dust seal using Fork Rebuild Kit (46662-05).

## Assemble Inverted Fork

### NOTE

See Figure 3 for Steps 1 through 17, unless otherwise stated.

### NOTE

Lubricate the oil seal with new Harley-Davidson Type E Fork Oil before installing.

1. Slide dust cover (13), dust seal (4), oil seal (10) (lettering side down), oil seal spacer (15) (concave side up) and lower bushing (9) over the tube of the fork tube assembly (12) for later installation.
2. Install upper bushing (7) in the groove of fork tube assembly (12). Expand bushing only wide enough to fit over the tube.
3. Install the fork tube assembly (12) into the outer fork tube (5).
4. See Figure 4. Install bushing, spacer and seal into slider bore by tapping components upward with the FORK SEAL BUSHING TOOL (B-42571).
5. Install internal retaining ring (3) into groove in bottom of the outer fork tube.
6. Install dust seal (4) and dust cover (13).
7. Insert cartridge assembly (1) into fork tube bore.
8. Install the screw and washer (14) into the bottom of the fork tube assembly (12). Move the slider tube through its full range of travel within the slider several times to verify proper component alignment. Then, apply downward force on the cartridge assembly and tighten the screw. Tighten screw to 15–25 N·m (12–18 ft-lbs).
9. Insert preload spacer (16) over cartridge in the fork tube bore.

### NOTE

The new fork does not have a oil drain screw. If it becomes necessary to drain the oil from the front fork assembly, it is necessary to turn the front fork over. Drain the oil into an appropriate container.

10. Pour 525 ml of Harley-Davidson Type E Fork Oil into fork tube.

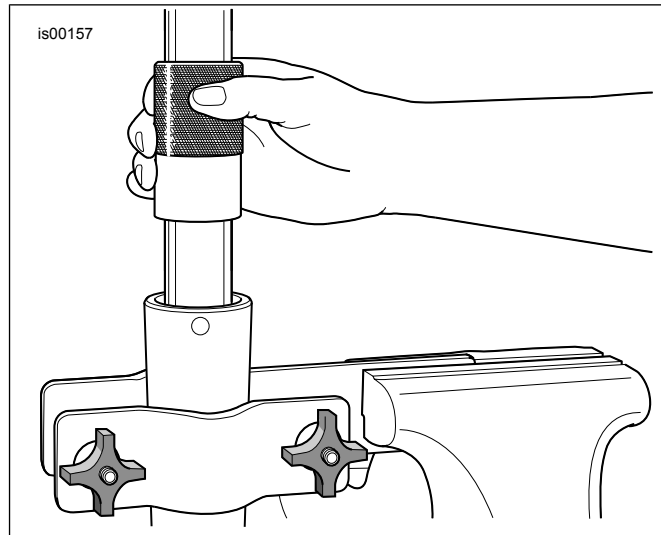


Figure 4. Install Fork Oil Seal

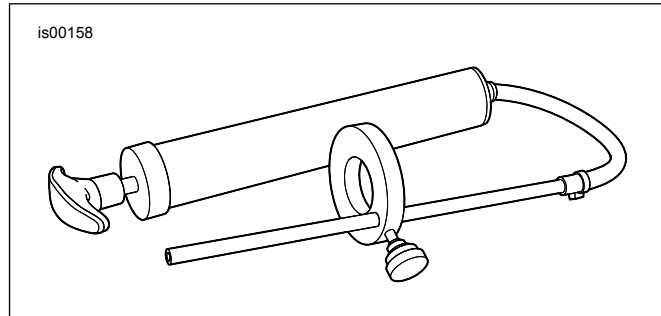


Figure 5. Front Fork Oil Level Gauge (HD-59000B)

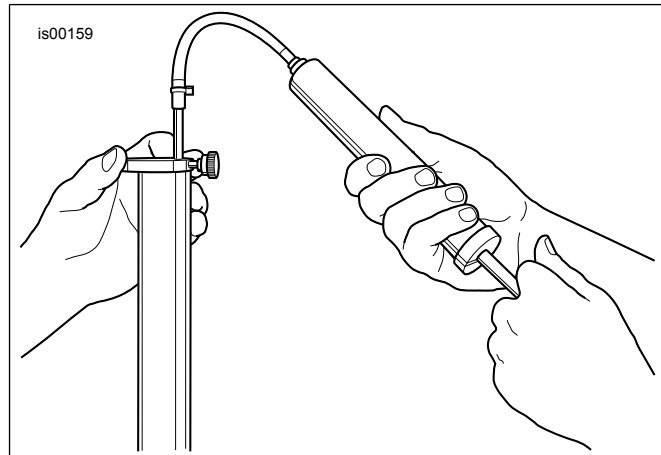


Figure 6. Remove Excess Fork Oil

### ▲ WARNING

Incorrect amount of fork oil can adversely affect handling and lead to loss of vehicle control, which could result in death or serious injury. (00298a)

11. Pump the cartridge rod 10 times to remove air from system.
12. With the outer fork tube slid all the way down, adjust the fork oil level, so that it is 2.75 in. (70 mm) from the top of the fork tube, with spring spacer installed.
  - a. See Figure 5. Obtain the FRONT FORK OIL LEVEL GAUGE (HD-59000B).

- b. Loosen thumbscrew on metal ring and move it up or down until the bottom of the ring is 2.75 in. (70 mm) from the bottom of the rod. Tighten thumbscrew.
  - c. Push the handle on the cylinder all the way in.
  - d. See Figure 6. Insert rod into top of fork tube until metal ring rests flat on top of fork tube, and the outer fork tube is pushed all the way down.
  - e. Pull out handle to suck oil from fork tube. Observe fork oil through tube as it is drawn into cylinder.
  - f. Remove rod from fork tube. Push handle into cylinder to eject excess fork oil into suitable container.
  - g. If necessary, repeat Steps 12c through 12f. The level is correct when no fork oil is being drawn through transparent tube.
13. See Figure 3. Thread locknut (17) down the cartridge until it bottoms out.
  14. Install spring (8) into fork tube.
  15. Install new O-ring from rebuild kit onto fork plug (6).
  16. Press down on spring (8) and install spring end plate (11) between spring and locknut (17) with the concave side up.
  17. Install fork plug (6) onto cartridge assembly (1). Thread plug all the way down until it bottoms out, then thread locknut (17) up to the plug and tighten.
  18. Press down on fork plug and pull up on the outer fork tube until it can be threaded into the outer fork tube. Thread fork plug into outer fork tube until plug bottoms out, then tighten.
  19. Repeat Steps 1 through 18 for the opposite fork assembly.
  20. Refer to the Installation section of this Instruction Sheet to install the front forks.

# SERVICE PARTS

is00362

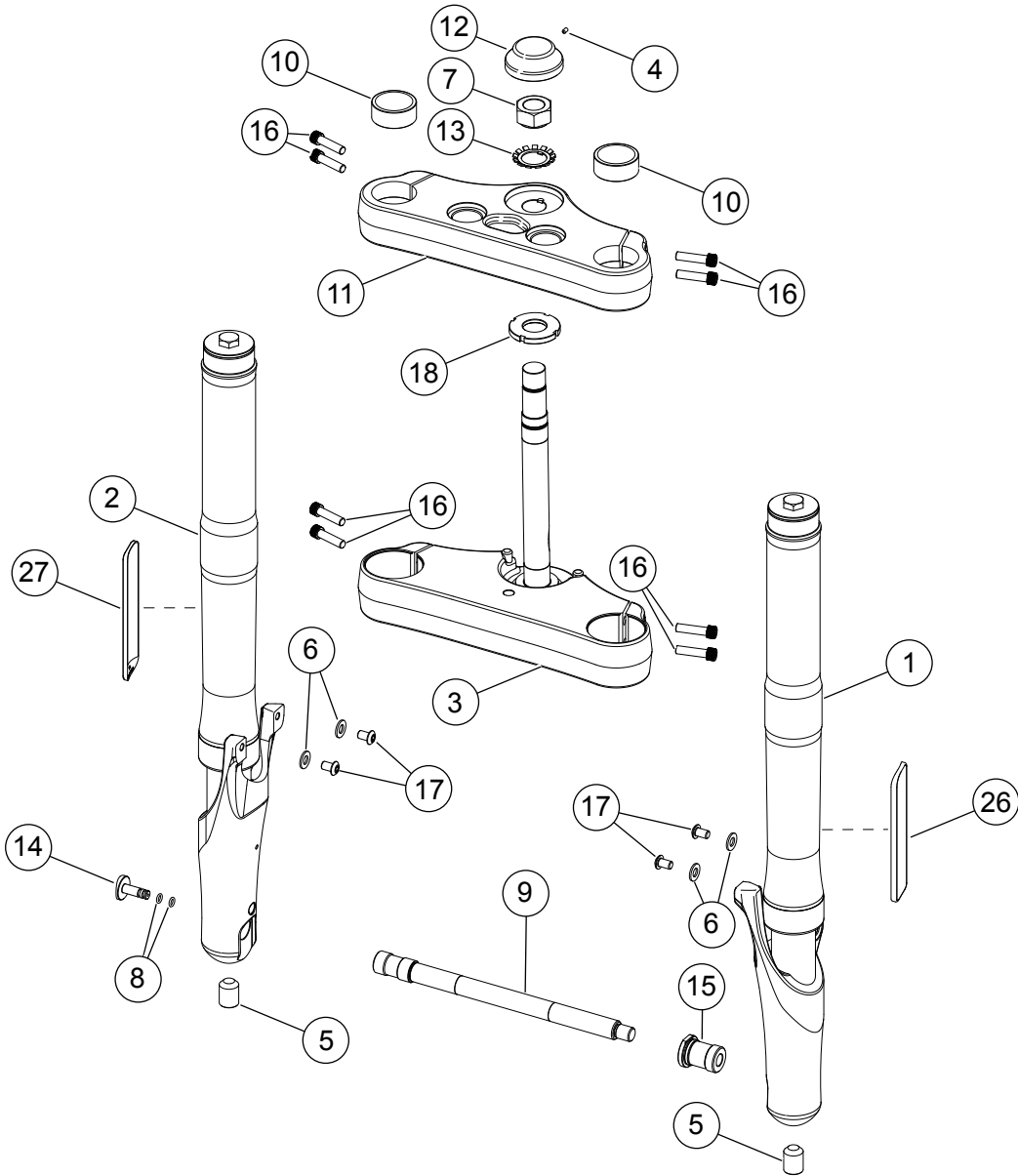


Figure 7. Service Parts for Inverted Fork Kit

Table 2. Service Parts Table

Item	Description (Quantity)	Part Number
1	Fork assembly, left side (Chrome)	46603-05B
	Fork assembly, left side (Black)	48647-06A
2	Fork assembly, right side (Chrome)	46604-05A
	Fork assembly, right side (Black)	48651-06
3	Fork bracket, lower (Chrome)	46831-05
	Fork bracket, lower (Black)	42131-06
4	Set screw, #6-32 x 1/4 in.	Not Sold Separately
5	Set screw, cup point - Insert Set Screw included in Inverted Fork Kit or replace with Kit #20. <b>Axle Set Screw not included, purchase Kit #21</b>	Not Sold Separately
6	Washer, flat, stainless steel (4) - included in Kit #23	Not Sold Separately
7	Nut, steering stem - included in Kit #22	Not Sold Separately
8	O-ring (2) - included in Kit #20	Not Sold Separately
9	Axle, front - <b>Not included in Inverted Fork Kit, purchase Kit #21</b>	Not Sold Separately
10	Cover, fork (2) - included in Kit #19	Not Sold Separately
11	Fork bracket, upper (Chrome)	46837-05
	Fork bracket, upper (Black)	42130-06



**Table 2. Service Parts Table**

<b>Item</b>	<b>Description (Quantity)</b>	<b>Part Number</b>
12	Cover, steering stem - included in Kit #19	Not Sold Separately
13	Lock washer - included in Kit #22	Not Sold Separately
14	Cover, axle - included in Kit #20	Not Sold Separately
15	Insert, axle - included in Kit #20	Not Sold Separately
16	Screw, socket head (8) - included in Kit #24	94335-91T
17	Screw, button head (4) - included in Kit #23	94392-92T
18	Nut, adjusting - included in Kit #22	Not Sold Separately
19	Kit, cover - includes steering stem cover (#12) and two fork covers (#10)	46842-05
20	Kit, axle accessories - includes axle insert (#15), axle cover (#14), two O-rings (#8), and set screw (#5)	42133-06
21	Kit, axle, 3/4 inch - includes front axle (#9) and set screw (#5)	42134-06
	Kit, axle, 25 mm - includes front axle (#9) and set screw (#5)	42136-07
22	Kit, steering adjustment - includes adjusting nut (#18), lock washer (#13), and steering stem nut (#7)	46845-05
23	Kit, fender hardware - includes four button head screws (#17) and four washers (#6)	95501-05
24	Kit, fork bracket pinch screw - includes eight socket head screws (#16)	46846-05
25	Kit, fork rebuild - includes two of each oil seal, lower bushing, upper bushing, dust seal and O-ring	46662-05
26	Reflector, left side	59482-00
27	Reflector, right side	59481-00