2008 Sportster Models Service Manual

99484-08

Printed in the U.S.A.

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Hammers

- Never strike a hammer against a hardened object, such as another hammer.
- Always grasp a hammer handle firmly, close to the end.
- Strike the object with the full face of the hammer.
- Never work with a hammer which has a loose head.
- Discard hammer if face is chipped or mushroomed.
- Wear approved eye protection when using striking tools.
- Protect bystanders with approved eye protection.

Punches/Chisels

- Never use a punch or chisel with a chipped or mushroomed end; dress mushroomed chisels and punches with a file.
- Hold a chisel or a punch with a tool holder if possible.
- When using a chisel on a small piece, clamp the piece firmly in a vise and chip toward the stationary jaw.
- Wear approved eye protection when using these tools.
- Protect bystanders with approved eye protection.

Screwdrivers

- Do not use a screwdriver for prying, punching, chiseling, scoring or scraping.
- Use the right type of screwdriver for the job; match the tip to the fastener.
- Do not interchange POZIDRIV, PHILLIPS or REED AND PRINCE screwdrivers.
- Screwdriver handles are not intended to act as insulation. Do not use on live electrical circuits.
- Do not use a screwdriver with rounded edges because it will slip. Redress with a file.

Ratchets and Handles

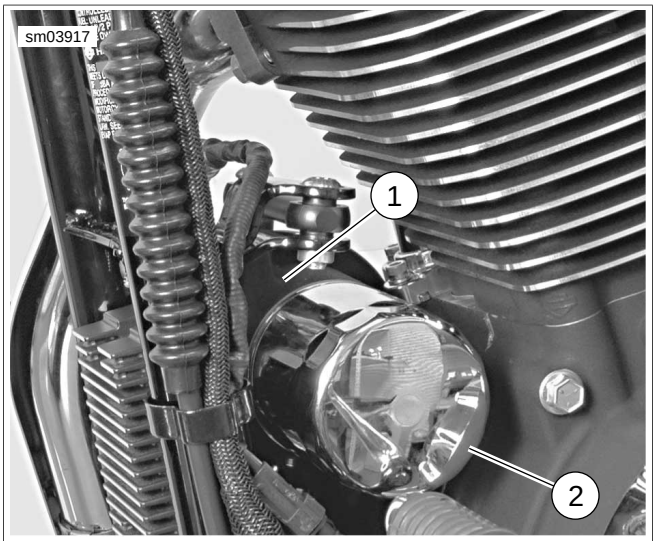
- Periodically clean and lubricate ratchet mechanisms with a light grade oil. Do not replace parts individually; ratchets should be rebuilt with the entire contents of service kit.
- Never hammer or put a pipe extension on a ratchet or handle for added leverage.
- Always support the ratchet head when using socket extensions, but do not put your hand on the head or you may interfere with the action of its reversing mechanism.
- When breaking loose a fastener, apply a small amount of pressure as a test to be sure the ratchet's gear wheel is engaged with the pawl.

Sockets

- Never use hand sockets on power or impact wrenches.
- Select the right size socket for the job.
- Never cock any wrench or socket.
- Select only impact sockets for use with air or electric impact wrenches.
- Replace sockets showing cracks or wear.
- Keep sockets clean.
- Always use approved eye protection when using power or impact sockets.

Storage Units

- Do not open more than one loaded drawer at a time. Close each drawer before opening up another.
- Close lids and lock drawers and doors before moving storage units.
- Do not pull on a tool cabinet; push it in front of you.
- Set the brakes on the locking casters after the cabinet has been rolled to your workspace.



1. **Oil filter mount**
2. **Oil filter**

Figure 1-6. Oil Filter: All Models (XL 1200C Shown)

Installing New Oil Filter

NOTE

Partially fill oil filter before installation to minimize the time required for buildup of oil pressure when engine is first started.

1. Pour about 4 fluid ounces (120 ml) of fresh, clean engine oil into **new** oil filter. Allow time for oil to soak into filter element.
2. Wipe filter gasket contact surface of oil filter mount with a clean cloth.
3. See Figure 1-7. Coat oil filter gasket with clean Harley-Davidson 20W-50 engine oil.

NOTE

Do not use oil filter wrench to install new oil filter.

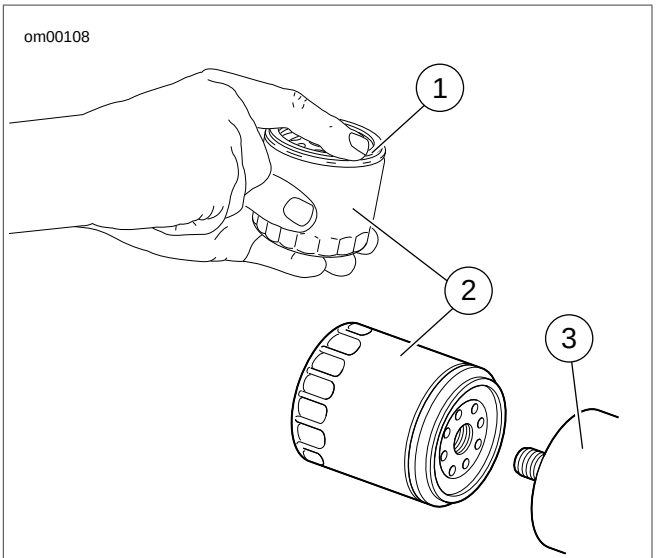
4. Install **new** oil filter. Turn filter clockwise to install. Hand tighten filter 1/2 to 3/4-turn after gasket contacts filter mount surface.

Refilling Oil Tank

CAUTION

Do not overfill oil tank. Doing so can result in oil carryover to the air cleaner leading to equipment damage and/or equipment malfunction. (00190a)

1. Refer to Table 1-2. Always use the proper grade of oil for the lowest expected air temperature before the next regularly scheduled oil change. Pour 2.0 quarts (1.9 liters) of oil into engine oil tank.



1. **Thin oil film ONLY**
2. **Oil filter**
3. **Mounting plate**

Figure 1-7. Applying Thin Oil Film

CAUTION

Loosen clamp and pull plug from end of oil tank drain hose. Allow a small amount of oil to flow from hose before reinstalling drain plug. This removes air from the drain hose and reduces the possibility of oil pump cavitation. (00560b)

2. Install filler cap onto oil tank as described on previous page. Make sure cap is fully seated.
3. Start engine. See Figure 1-8. Verify that oil pressure signal lamp turns off when engine speed is 1000 RPM or above. Turn engine off.
4. Check for oil leaks at oil filter and oil tank drain hose. Check engine oil level. See 1.5 ENGINE OIL AND FILTER, Checking and Adding Oil earlier in this section.

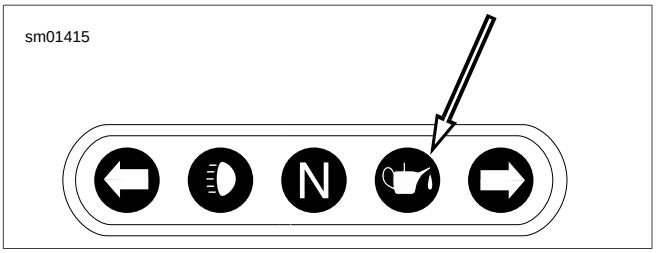


Figure 1-8. Oil Pressure Indicator Lamp

See Figure 1-18. The primary chain can be adjusted without removing the primary cover (2). Proceed as follows:

1. Unplug Maxi-Fuse. See 7.34 MAXI-FUSE.
2. Remove two hex socket screws securing primary chain inspection cover (1).
3. Rotate sprockets to find tightest point on primary chain.

CAUTION

Do not adjust the primary chain tighter than specified. Running chain too tight will result in excessive wear. (00202a)

4. Loosen lock nut (6). Using a 1/4-inch allen wrench, turn chain adjuster screw (5) clockwise (inward) to reduce free play or counterclockwise (outward) to increase free play. Vertical free play must fall within the limits specified in Table 1-11.

NOTE

If vertical free play cannot be set within the limits specified in Table 1-11, then primary chain and/or chain adjuster are worn beyond adjustment limits. Replace parts as necessary. See 6.2 PRIMARY CHAIN ADJUSTER.

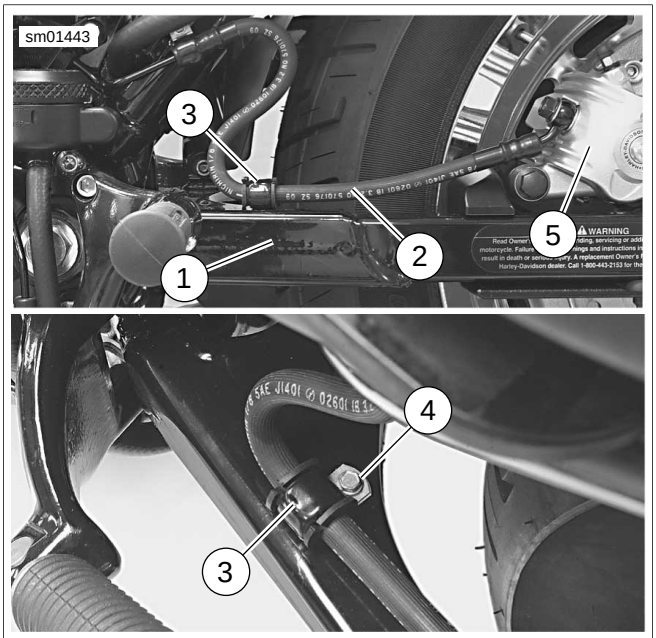
5. See Figure 1-18. When tension is set correctly, hold chain adjusting screw with allen wrench and tighten lock nut (6) to 20-25 ft-lbs (27.1-33.9 Nm).
6. Install primary chain inspection cover (1). Tighten hex socket screws to 84-120 **in-lbs** (9.5-13.6 Nm).
7. Plug in Maxi-Fuse. See 7.34 MAXI-FUSE.

3. Now check rear wheel alignment. Wheel must be centered in rear fork. See 1.14 REAR BELT DEFLECTION, Wheel Alignment.

⚠WARNING

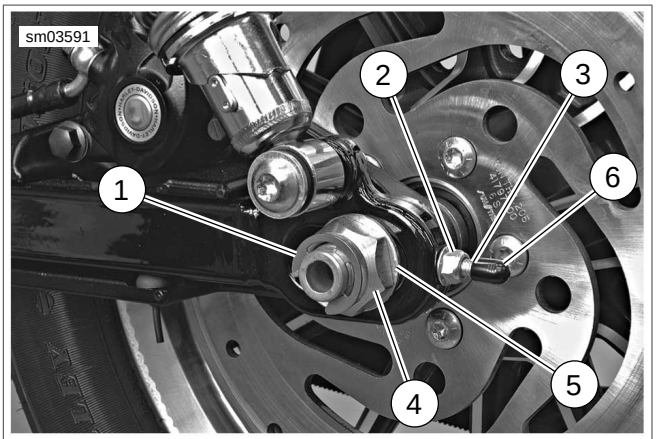
Do not exceed specified torque when tightening axle nut. Exceeding torque can cause wheel bearings to seize during vehicle operation, which could result in death or serious injury. (00408e)

4. After belt deflection and wheel alignment are properly adjusted,
   a. Tighten axle nut (4) to 95-105 ft-lbs (129-142 Nm). Install e-clip (1).
   b. See Figure 1-35. Reposition clamp (3) on rear brake line (2) and secure clamp to rear fork (1) with screw (4). Tighten to 30-40 **in-lbs** (3.4-4.5 Nm).



1. **Rear fork**
2. **Rear brake line**
3. **Clamp**
4. **Screw**
5. **Rear brake caliper**

Figure 1-35. Rear Brake Line



1. **E-clip**
2. **Axle adjuster nut (2)**
3. **Axle adjuster (2)**
4. **Axle nut**
5. **Washer**
6. **Protective cap (2)**

Figure 1-36. Secondary Drive Belt Adjustment

WHEEL ALIGNMENT

PART NUMBER	TOOL NAME
HD-48856	AXLE ALIGNMENT PLUG SET

Checking Wheel Alignment

⚠WARNING

Check vehicle alignment according to following procedures. Incorrect alignment can adversely affect stability and handling, which could result in death or serious injury. (00287a)

1. Obtain AXLE ALIGNMENT PLUG SET (Part No. HD-48856). See Figure 1-37. Insert axle alignment plugs (1, 2) into left and right ends of rear axle.
2. See Figure 1-38. Fabricate an alignment tool (1) using a piece of 1/8-in. (3.175 mm) diameter aluminum welding rod 21.5 in. (546 mm) long. Grind one end down to a blunt point. Use pliers to bend rod at a 90 degree angle, 2.25 in. (57 mm) from the blunt point, as shown. Place a snug-fitting rubber grommet (4) on rod to act as a slide measurement indicator.
3. Insert pointed end of alignment tool in rear fork pivot bolt dimple (2) on right side of rear fork (3). Slide rubber grommet along tool shaft until it aligns with hole in center of alignment plug (8). Measure distance from pointed end of alignment tool to grommet. Repeat measurement for left side of rear fork.
4. If left and right side measurements are not equal, adjust rear wheel alignment.

Table 1-14. Antidotes for Battery Acid

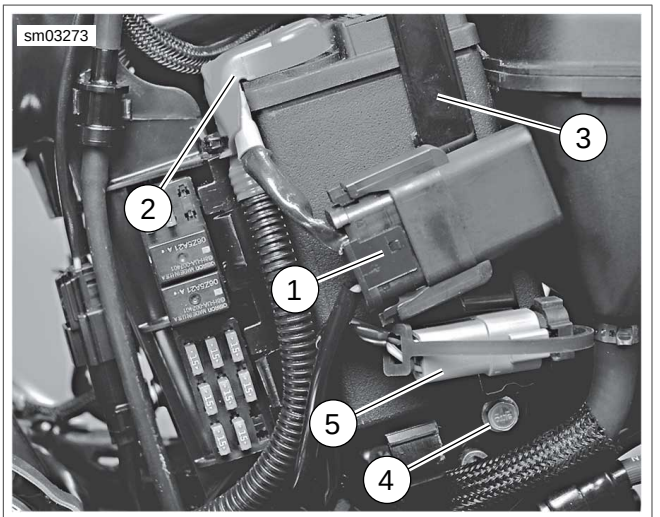
CONTACT	TREATMENT
External	Flush with water.
Internal	Drink large quantities of milk or water, followed by milk of magnesia, vegetable oil or beaten eggs. Get immediate medical attention.
Eyes	Flush with water. Get immediate medical attention.

BATTERY DISCONNECTION AND REMOVAL

⚠WARNING

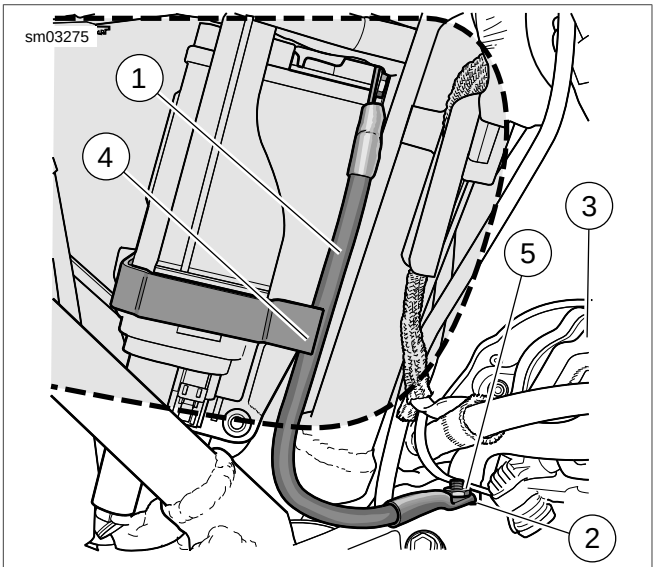
Disconnect negative (-) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00049a)

1. Open left side cover.
2. See Figure 1-54. Press Maxi-Fuse holder (1) toward the rear of the motorcycle until it pops off its mounting pin on battery strap (3). Remove Maxi-Fuse holder from battery strap.
3. Press data link connector (5) toward the rear of the motorcycle until it pops off its mounting pin on battery strap. Remove the connector from battery strap.
4. Remove battery strap screw and flat washer (4). Unhook battery strap from battery tray mount on top of battery and remove strap.
5. See Figure 1-55. Remove nut (2) that secures the negative (-) battery cable (1) connector to ground stud (5) on crankcase boss behind starter motor assembly (3). Remove cable connector from stud.
6. Pull end of negative (-) cable forward gently to free it from cable clip (4).
7. See Figure 1-54. Lift up protective rubber boot covering battery positive (+) terminal (2). Unthread screw from battery positive (+) terminal and remove positive (+) battery cables.
8. See Figure 1-56. Disengage positive (+) battery cable (2) from cable holders (1).
9. Remove battery from battery tray. See Figure 1-55. Note routing of negative (-) battery cable around frame downtube.
10. If battery is to be left out of vehicle (i.e. winter storage), close left side cover.



1. **Maxi-fuse (main fuse) and holder**
2. **Positive (+) battery terminal (under protective rubber boot)**
3. **Battery strap**
4. **Screw and flat washer**
5. **Data link connector**

Figure 1-54. Maxi-Fuse and Battery Location: All Models



1. **Negative (-) battery cable**
2. **Nut**
3. **Starter motor assembly**
4. **Cable clip**
5. **Ground stud**

Figure 1-55. Negative (-) Battery Connection

GENERAL

Replace front fork oil:

- At scheduled service intervals as specified in 1.3 MAINTENANCE SCHEDULE. Refer to Table 1-17.
- Prior to storage.

CHANGING FORK OIL

PART NUMBER	TOOL NAME
HD-59000-B	HARLEY-DAVIDSON PRO-LEVEL OIL GAUGE

1. Have an assistant hold vehicle upright (not resting on jiffy stand), with front fork pointed straight ahead.
2. Place a drain pan under bottom of right fork slider. See Figure 1-62. Remove drain screw and washer (5) from bottom of one slider (4).
3. Drain fork oil by repeatedly compressing front suspension slowly.

NOTE

If fork oil is emulsified, aerated or light brown in color, it has been contaminated by water. Replace fork oil seals (see 2.17 FRONT FORK).

4. Replace drain screw and washer. Tighten to 13-17 **in-lbs** (1.5-2.0 Nm).
5. Repeat previous steps for left side fork.

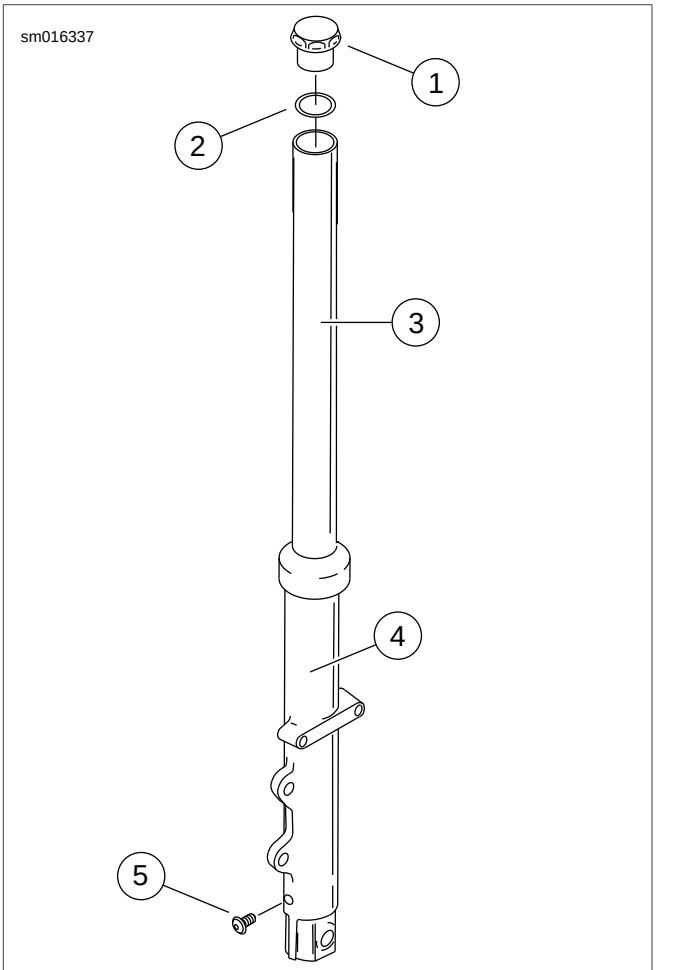
NOTE

Refer to Table 1-17. Fork oil amounts can be measured two ways.

- *Use oz/ml measurement if fork is left in frame.*
- *Use in/mm measurement if fork has been disassembled.*

Table 1-17. Type E Fork Oil Amounts

MODEL	OZ	ML	IN	MM
XL 883L/XL 1200L/XL 1200N	12.3	364	4.80	122
All other XL models	11.6	342	5.75	146



1. **Fork slider tube cap**
2. **O-ring**
3. **Slider tube**
4. **Fork slider**
5. **Fork oil drain screw with washer**

Figure 1-62. Draining Front Fork Oil

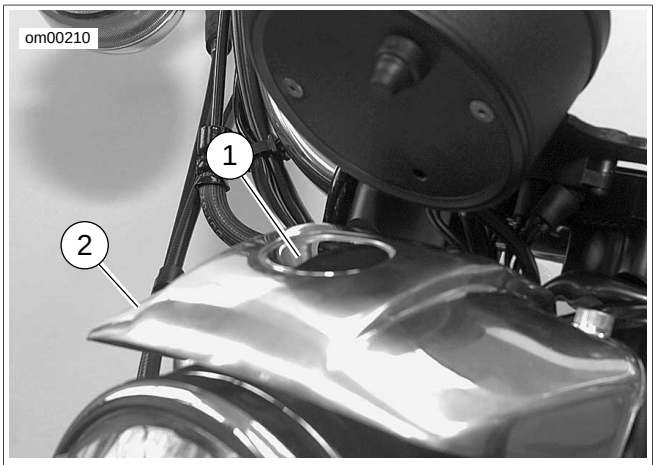
Filling Fork Oil: Forks Assembled, in Frame

1. Block motorcycle under frame so that the front wheel is raised off the ground slightly; this enables front fork to extend fully and allows most of spring preload (compression force) to be relieved.

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)

2. Unscrew fork slider tube cap (1) with o-ring (2) from each slider tube (3). Replace the o-ring if damaged or worn.
3. Fill each slider tube/slider assembly with the amount of TYPE "E" HYDRAULIC FORK OIL specified in Table 1-17.
4. Install each slider tube cap with o-ring. Tighten to 22-58 ft-lbs (29.9-78.7 Nm).



1. Snap plug
2. Headlamp bracket

Figure 1-71. Headlamp Snap Plug: Sportster Models

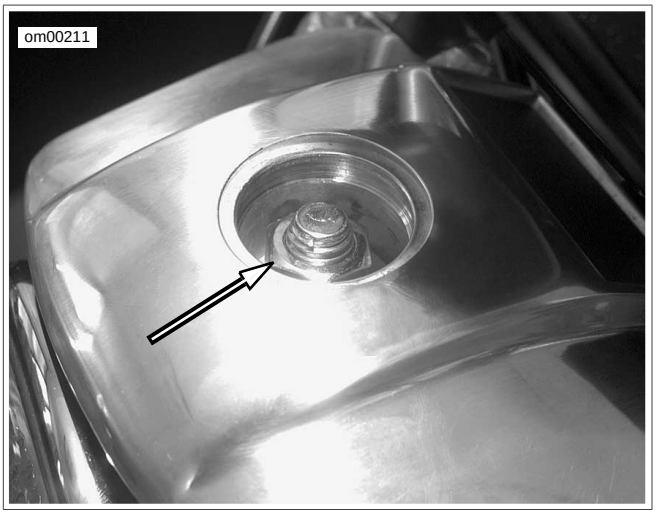
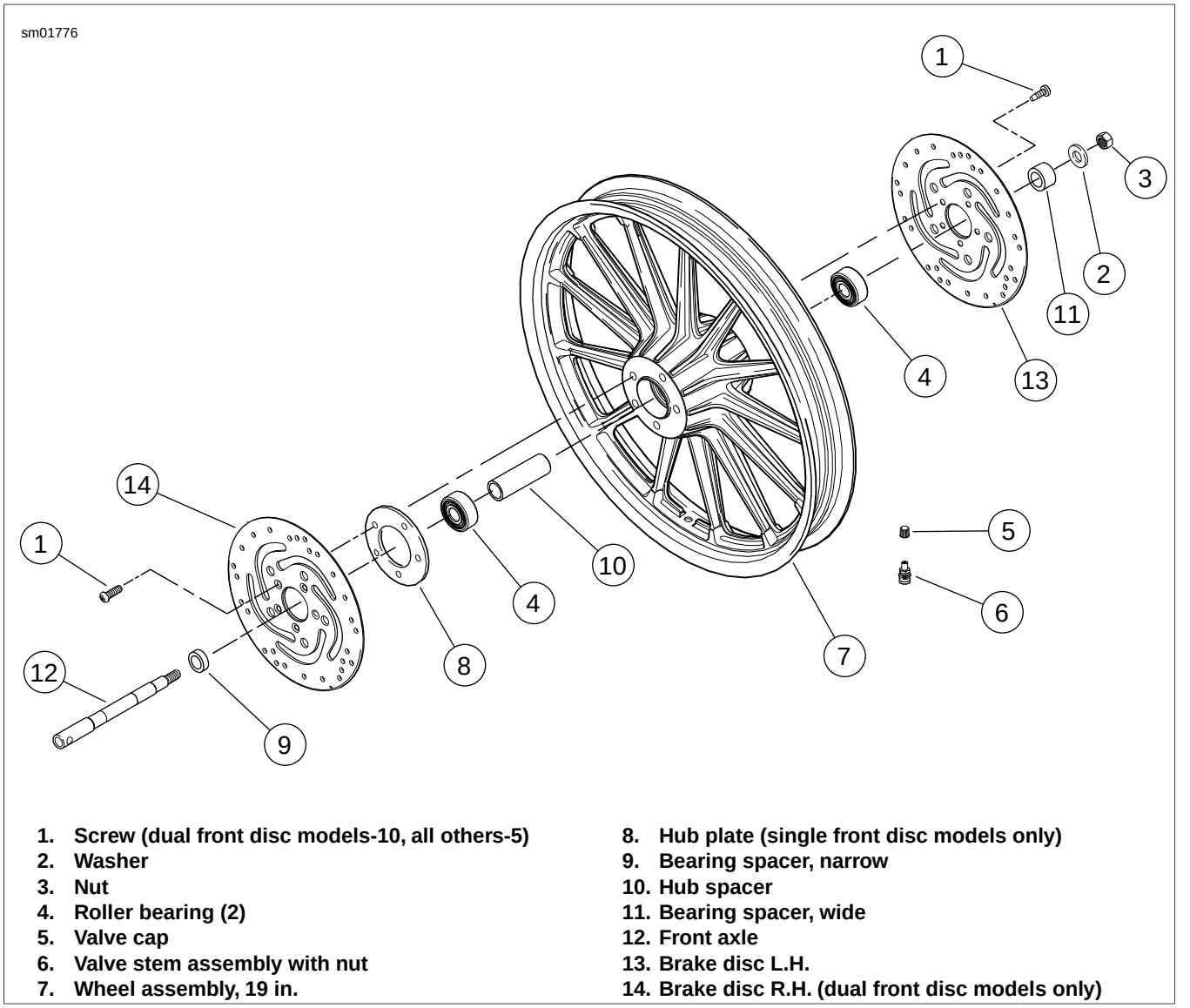


Figure 1-72. Headlamp Clamp Nut: Sportster Models

NOTES



1. **Screw (dual front disc models-10, all others-5)**
2. **Washer**
3. **Nut**
4. **Roller bearing (2)**
5. **Valve cap**
6. **Valve stem assembly with nut**
7. **Wheel assembly, 19 in.**
8. **Hub plate (single front disc models only)**
9. **Bearing spacer, narrow**
10. **Hub spacer**
11. **Bearing spacer, wide**
12. **Front axle**
13. **Brake disc L.H.**
14. **Brake disc R.H. (dual front disc models only)**

Figure 2-7. Cast Wheel Front

GENERAL

NOTES

- *If only rim is to be replaced, tape spokes together to hold position on hub and remove spokes from rim. Install taped hub/spoke assembly to new rim and tighten spokes. Then remove tape and true wheels.*
- *Do not install incorrect spokes or spoke nipples on rim.*

See Figure 2-19. Measure spoke length (distance "A"). To determine correct spoke length for type of rim used, refer to Table 2-16.

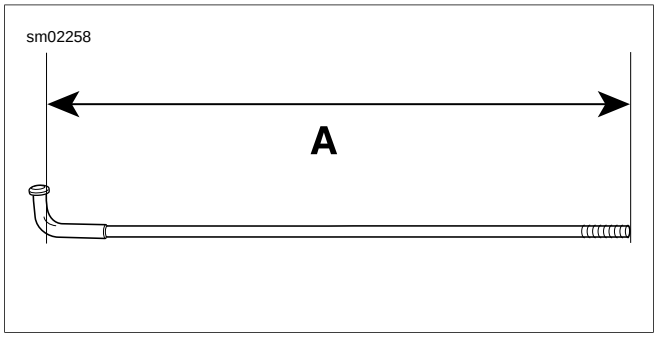
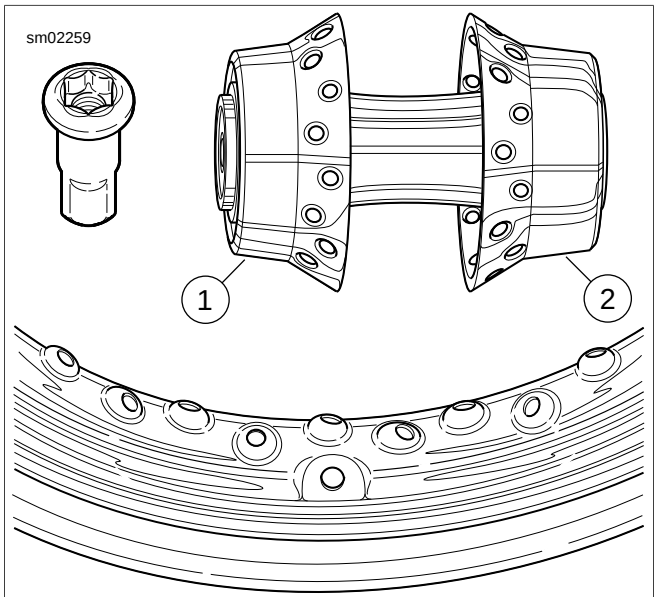


Figure 2-19. Measuring Spoke Length

Table 2-16. Rim Spoke Length

RIM	IN.	MM
Steel laced	6.71-6.75	170.4-171.5
Chrome aluminum profile laced	6.84-6.88	173.7-174.8



1. **Narrow flange (brake side)**
2. **Wide flange (sprocket side)**

Figure 2-20. Rim, Hub and Spoke Nipple

PROCEDURE

NOTE

The primary brake disc side of the hub can be identified by having one or two grooves cut into the disc mounting surface.

1. See Figure 2-21. Place hub on table with primary brake disc side up. Insert a spoke in each hole of **lower** row as shown in the figure. Angle spokes clockwise.

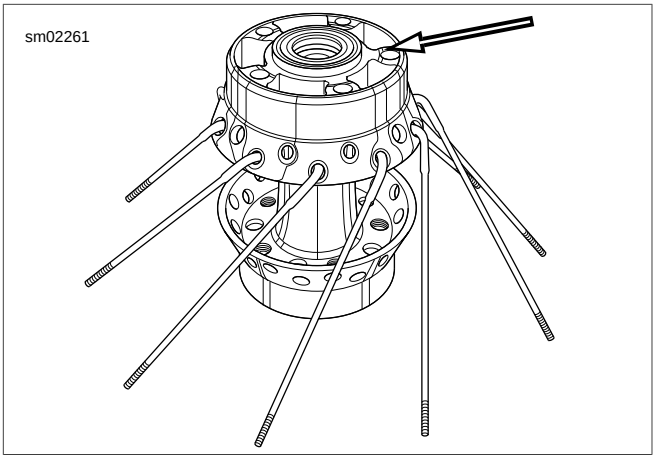


Figure 2-21. Hub: Primary Brake Disc Side Up

2. See Figure 2-22. Center rim over hub assembly with valve stem hole facing upward.
3. Using any **lower** row spoke, place first spoke into rim hole to left of valve stem hole on upper half of rim centerline.

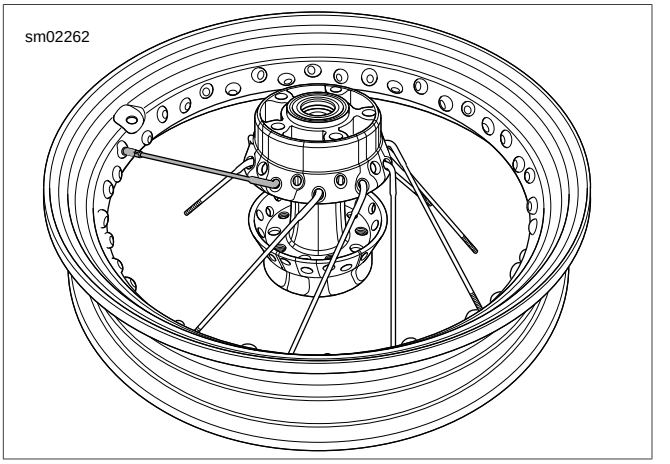


Figure 2-22. Brake Side Up: Start First Spoke of Bottom Row

4. See Figure 2-23. Install remaining lower row spokes, one in every fourth hole.

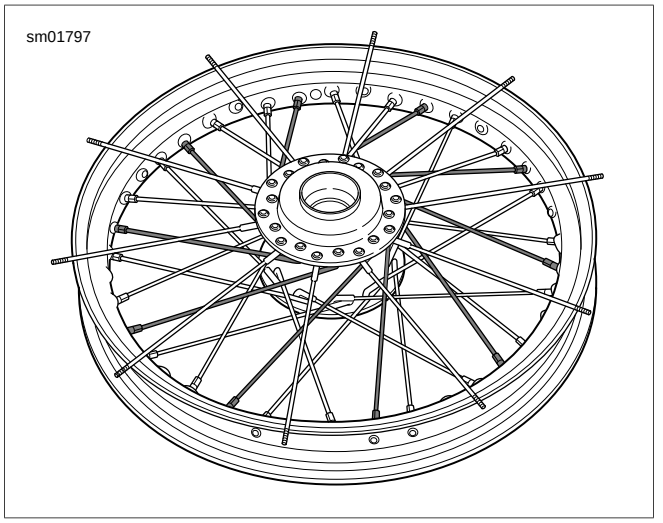


Figure 2-55. Completed Spokes-Top Flange Inner

15. See Figure 2-54. Finish with top flange outer spokes (short-head). Point the top flange outer spokes (short-head) counterclockwise and make sure each one crosses four inner spokes before securing it to the rim.

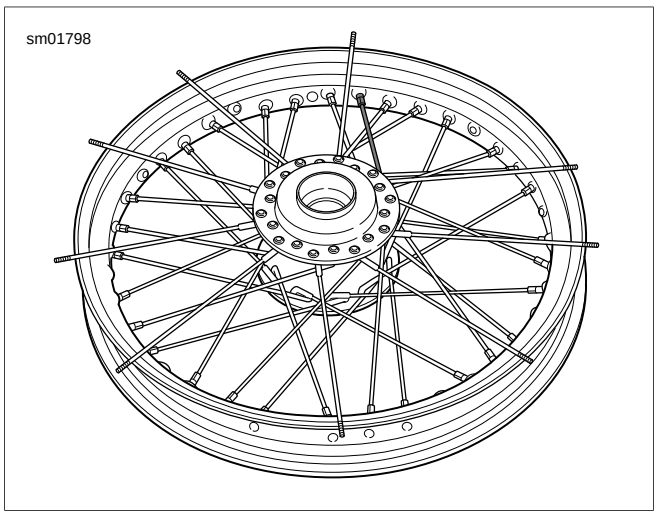


Figure 2-56. Beginning Spoke-Top Flange Outer

16. See Figure 2-57. Verify spoke reaches spoke nipple and secure spoke by hand. Follow pattern to complete top flange outer spokes (short-head).

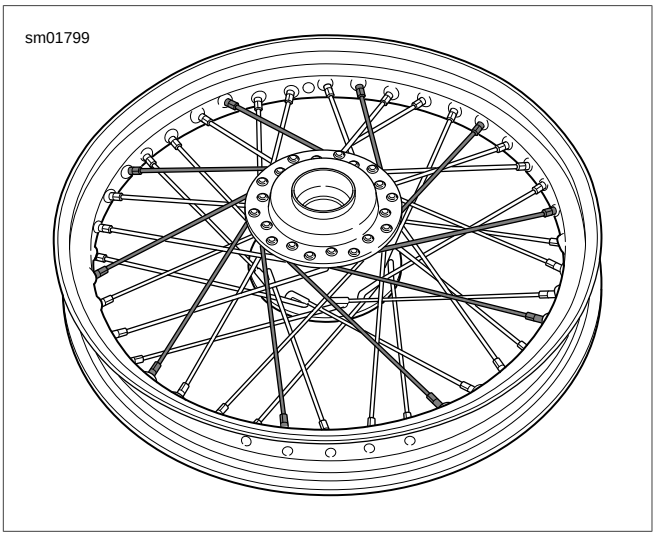


Figure 2-57. Completed Spokes-Top Flange Outer

17. Verify that all outer (short head) spokes on top flange point counterclockwise, and all outer spokes on bottom flange point clockwise. Verify that all inner (long head) spokes on top flange point clockwise, and all inner spokes on bottom flange point counterclockwise.
18. Tighten spoke nipples to specification listed in Table 2-20.
19. True the wheel. See 2.7 TRUING LACED WHEELS.

Table 2-20. Spoke Nipple Torque Specification

RIM TYPE	MINIMUM TORQUE
All	55 **in-lbs** (6.2 Nm)

⚠WARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

NOTE

Use correct retaining ring pliers and correct tips. Verify that tips are not excessively worn or damaged.

4. See Figure 2-70.
   a. **Dual disc master cylinder:** Press down on piston (14) and install **new** retaining ring (15). Verify that retaining ring is fully seated in groove.
   b. **Single disc master cylinder:** Press down on piston (14) and stop plate (22), and install **new** retaining ring (15). Verify that retaining ring is fully seated in groove.
5. Install **new** dust boot (16). Large lip of dust boot fits down inside end of piston bore. Small lip of dust boot fits into groove in end of piston (item 5, Figure 2-72).
6. Apply approximately 0.1 g G40M BRAKE GREASE (from service parts kit) to each of the following two locations:
   a. Pivot hole in brake hand lever (18).
   b. End of piston (14).
7. Align hole in brake hand lever with hole in master cylinder bracket. From top of assembly, slide pivot pin (9) through bracket and hand lever.

⚠WARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

NOTE

Use correct retaining ring pliers and correct tips. Verify that tips are not excessively worn or damaged.

8. Install **new** retaining ring (17) in pivot pin groove. Verify that retaining ring is fully seated in groove.
9. Remove master cylinder assembly from vise. Install cover (2), diaphragm plate (3) and diaphragm (4) on master cylinder reservoir. Install two screws (1) to fasten cover to reservoir, but do not tighten at this time.
10. See Figure 2-73. Squeeze front brake lever and place a 5/32 in. (4 mm) thick cardboard insert between brake lever and lever bracket. Release brake lever.

Figure 2-73. Install 5/32 in. (4 mm) Cardboard Insert Before Installing Master Cylinder Assembly

INSTALLATION

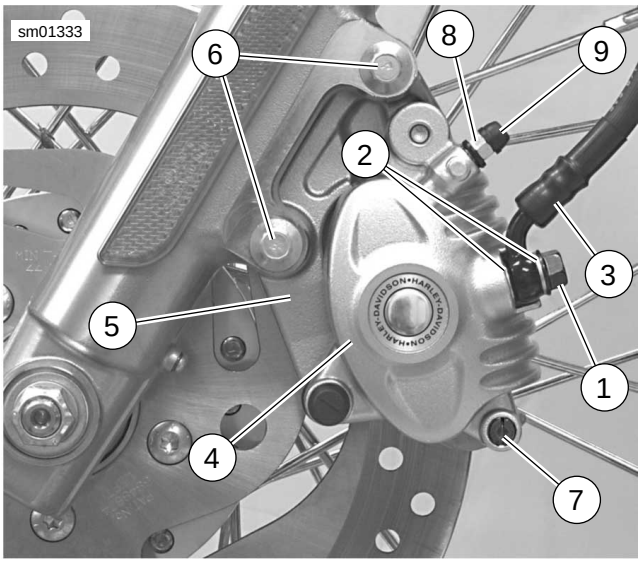
CAUTION

Do not remove or install the master cylinder assembly without first positioning a 5/32-inch (4 mm) thick insert between the brake lever and lever bracket. Removing or installing the master cylinder assembly without the insert in place may result in damage to the rubber boot and plunger on the front stoplight switch. (00324a)

1. See Figure 2-74. Position brake lever/master cylinder assembly inboard of switch housing assembly (1) engaging tab (5) on lower switch housing in slot (4) at top of brake lever bracket (3).
2. See Figure 2-70. Align holes in handlebar clamp (8) with those in master cylinder housing (5) and start two screws (6) with washers (7). Beginning with top screw, tighten screws to 108-132 **in-lbs** (12.2-14.9 Nm) using a T27 TORX drive head.

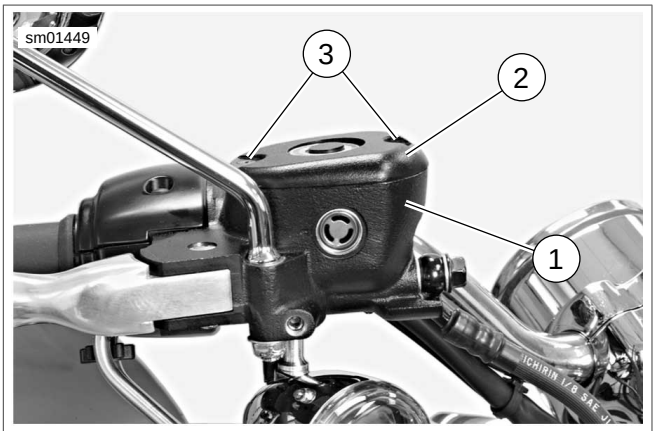
NOTE

Avoid making hard stops for the first 100 miles (160 km). This allows the new pads to become conditioned to the brake discs.



1. **Banjo bolt**
2. **Washer (2)**
3. **Front brake line**
4. **Brake caliper**
5. **Caliper mounting bracket**
6. **Mounting bolt (2) (12 pt/10 mm)**
7. **Pad pin plug**
8. **Bleeder valve**
9. **Bleeder nipple cap**

Figure 2-90. Front Caliper Assembly

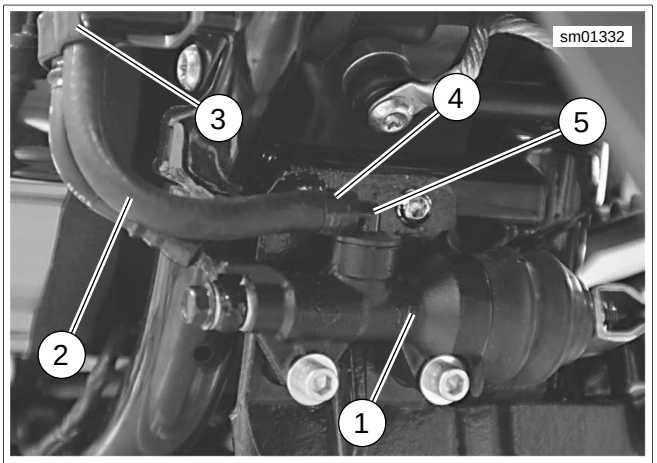


1. **Front brake master cylinder and reservoir**
2. **Top cover**
3. **Cover screw (2)**

Figure 2-91. Removing Master Cylinder Reservoir Cover

1. **Cast-in ridge**
2. **Sight glass**

Figure 2-92. Filling Front Master Cylinder Reservoir



1. **Rear brake master cylinder**
2. **Master cylinder feed hose**
3. **B-clamp**
4. **Hose clamp**
5. **Feed hose port**

Figure 2-101. Master Cylinder Feed Hose

INSTALLATION

⚠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)

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)

NOTE

If D.O.T. 4 brake fluid contacts painted surfaces, IMMEDIATELY flush area with clear water.

1. See Figure 2-101. Slide end of feed hose (2) onto feed hose port (5) on master cylinder (1). Secure feed hose to fitting with hose clamp (4).
2. Slide free end of feed hose up through B-clamp (3).
3. See Figure 2-100. Slide hose clamp (5) onto free end of feed hose (6).
4. Push feed hose onto fitting on reservoir (1) and secure with hose clamp.
5. Install reservoir using screw with captive washer (3). Tighten to 20-25 **in-lbs** (2.3-2.8 Nm).

NOTES

- *Rear brake master cylinder reservoir must be in a level position when filling and checking fluid level.*
- *Use only HARLEY-DAVIDSON D.O.T. 4 BRAKE FLUID from a sealed container.*
- *Do not overfill reservoir. Do not reuse old brake fluid.*

6. Position motorcycle upright (not resting on jiffy stand). Fill master cylinder reservoir with HARLEY-DAVIDSON D.O.T. 4 BRAKE FLUID until the fluid level reaches the UPPER mark on the reservoir.
7. Bleed brake system. See 1.7 BLEEDING HYDRAULIC BRAKE SYSTEM.
8. Install reservoir cover (2).
9. Turn ignition/light switch ON. Test operation of brake lamp with the rear brake applied.

⚠WARNING

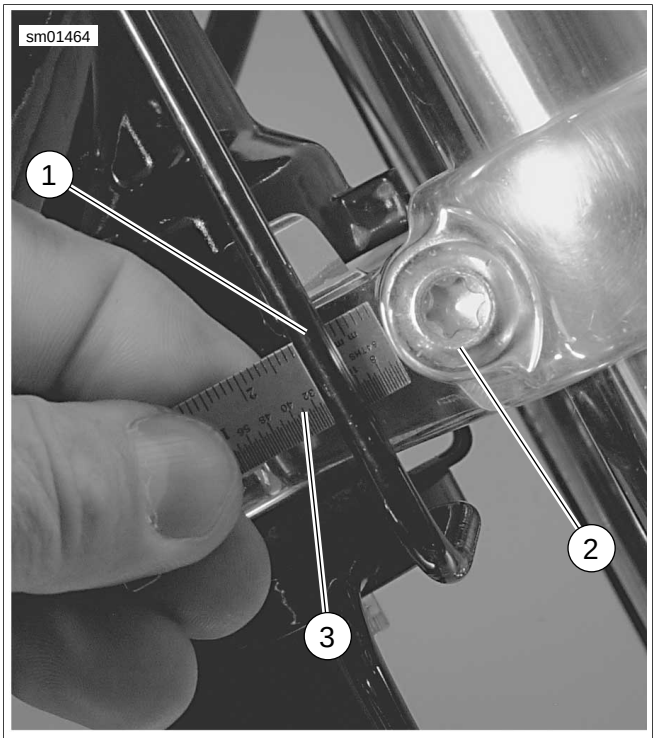
After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

10. Test ride motorcycle. If brake feels spongy, repeat bleeding procedure.

⚠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)

13. Test ride motorcycle. If front brake feels spongy, bleed system again. See 1.7 BLEEDING HYDRAULIC BRAKE SYSTEM.



1. **Front brake line**
2. **Lower fork bracket pinch bolt**
3. **Ruler**

Figure 2-119. Measuring Front Brake Line Clearance

REAR BRAKE LINE

⚠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)

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)

NOTE

If D.O.T. 4 brake fluid contacts painted surfaces, IMMEDIATELY flush area with clear water.

Removal

1. Drain rear brake master cylinder reservoir. See 2.12 REAR BRAKE MASTER CYLINDER RESERVOIR.
2. Remove bleeder nipple cap from bleeder valve on rear brake caliper. Install end of a length of 5/16 in. (7.9 mm) I.D. clear plastic tubing over caliper bleeder valve, while placing free end in a suitable container. Open bleeder valve about 1/2 turn. Pump brake pedal to drain brake fluid. Close bleeder valve.
3. See Figure 2-120. Unplug harness connectors [121] from stop lamp switch (7).
4. Remove banjo bolt (2) and washers (1) to detach rear brake line (3) from master cylinder body and rear brake caliper. Discard washers.
5. Remove screw (5) to detach brake line clamp (4) with bushing (12) from rear fork.
6. Remove screw (10) to detach brake line clamp (9) from battery tray bracket.
7. Remove screw (11) securing brake line/switch tee (6) to battery tray bracket.
8. Feed brake line up through B-clamp (8).
9. Hold hex body of brake line/switch tee with an open-end wrench. Using a 1.0-in. six-point deep socket, unscrew stop lamp switch from brake line/switch tee.

CLEANING, INSPECTION AND REPAIR

1. Thoroughly clean and inspect all parts. Replace any parts that are bent, broken or damaged.
2. See Figure 2-131. Inspect the o-ring (6) for damage, wear or general deterioration; replace as necessary. Replace all other removed seals.
3. **All except XL 883L/XL 1200N:** Inspect damper tube ring(s) (4). Replace ring(s) if damaged or excessively worn.
4. Check dust seal (12) where it contacts slider tube (9). Dust seal should provide continuous contact against slider tube and should not show excessive wear. Check slider tube where it is contacted by seal. Tube surface should be shiny, smooth and free of scoring or abrasions.
5. Inspect small hole in groove of slider tube lower end. Verify that hole is unobstructed.

ASSEMBLY

PART NUMBER	TOOL NAME
HD-36583	FORK SEAL AND BUSHING INSTALLATION TOOL

1. See Figure 2-131. If lower bushing (10) was removed, install **new** lower bushing in groove of slider tube (9). Expand bushing only enough to fit over tube.
2. **All except XL 883L/XL 1200N:** Install damper tube ring(s) (4) into groove(s) of damper tube (3).
3. Place rebound spring (8) over damper tube (3 or 23). Insert damper tube into slider tube.
4. Insert spring (5 or 22) into slider tube with the tapered end down. Push damper tube through opening at bottom of slider tube using spring. Place sleeve (15) over end of damper tube.
5. **XL 883L/XL 1200N:** Install spring washer (21) and spring collar (20) into slider tube.
6. Install slider tube assembly into slider (16). Install screw (18) with washer (17) at bottom of slider. Move slider tube through its full range of travel within slider several times to verify proper component alignment. Then, applying downward force on spring, final tighten screw.
7. Place upper bushing (1), spacer (2) (concave side downward), oil seal (14) (lettering side upward) and FORK SEAL AND BUSHING INSTALLATION TOOL (Part No. HD-36583) over slider tube. Install bushing, spacer and seal into slider bore by tapping components downward with the installation tool. Install internal circle clip (13) into groove in top of slider bore.
8. Install dust seal (12) at top of slider.
9. **All except XL 1200N:** Install cover (11).
10. **XL 1200N:** See Figure 2-133. Slide a fork gaiter (2) down each slider tube. Peal back lower lip (3) and slip over end of fork slider (1), fitting lower lip down over groove in upper end of fork slider. Slide upper end of fork gaiter down as far as possible.
11. See Figure 2-132. Install drain screw and washer (19) into lower end of slider.
12. Pour the proper amount of TYPE "E" HYDRAULIC FORK OIL into top end of slider tube. See 1.20 FRONT FORK OIL.
13. Install slider tube cap (7) with o-ring (6). Screw tube cap all the way into slider tube. Finger-tighten only at this time.

GENERAL

The stabilizer link system allows the engine to "float" on its rubber engine mounts while maintaining engine-to-frame alignment. The stabilizer links provide a fixed alignment, and no adjustment is necessary or possible.

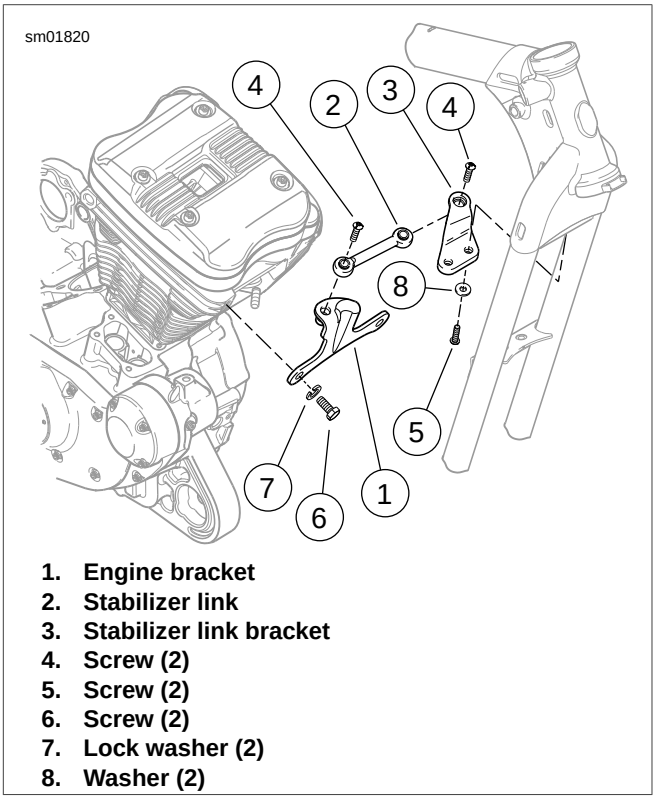
UPPER FRONT STABILIZER LINK

Removal

1. Position motorcycle upright on suitable lift.
2. See Figure 2-140. Remove screws (4) and stabilizer link (2).
3. Remove stabilizer link bracket from frame.
   a. **Models with front mounted horn:** remove screws (5), washers (8), horn bracket, and stabilizer link bracket (3) from frame.
   b. **Models with side mounted horn:** remove screws (5), washers (8) and stabilizer link bracket (3) from frame.
4. Remove screws (6), lock washers (7) and engine bracket (1) from front cylinder head.

Installation

1. See Figure 2-140. Install screws (6), lock washers (7) and engine bracket (1) to front cylinder head. Tighten to 55-65 ft-lbs (74.6-88.2 Nm).
2. Install stabilizer link bracket to frame.
   a. **Models with front mounted horn:** install stabilizer link bracket (3), horn bracket, screws (5) and washers (8).
   b. **Models with side mounted horn:** install stabilizer link bracket (3), screws (5) and washers (8).
   c. Tighten screws to 25-35 ft-lbs (33.9-47.5 Nm).
3. Install stabilizer link (2). Secure with screws (4). Tighten to 25-35 ft-lbs (33.9-47.5 Nm).



1. **Engine bracket**
2. **Stabilizer link**
3. **Stabilizer link bracket**
4. **Screw (2)**
5. **Screw (2)**
6. **Screw (2)**
7. **Lock washer (2)**
8. **Washer (2)**

Figure 2-140. Upper Front Stabilizer Link Assembly

LOWER FRONT STABILIZER LINK

Removal

1. Position motorcycle upright on suitable lift.
2. See Figure 2-141. Remove screws (3) and stabilizer link (1).
3. Remove screws (4), washers (5) and stabilizer link bracket (2) from frame.

Installation

1. See Figure 2-141. Install screws (4), washers (5) and stabilizer link bracket (2) to frame. Tighten to 25-35 ft-lbs (33.9-47.5 Nm).
2. Install stabilizer link (1). Secure with screws (3). Tighten to 25-35 ft-lbs (33.9-47.5 Nm).

GENERAL

For clutch adjustment, see 1.10 CLUTCH.

For clutch replacement, see 6.4 PRIMARY DRIVE AND CLUTCH.

REMOVAL AND DISASSEMBLY

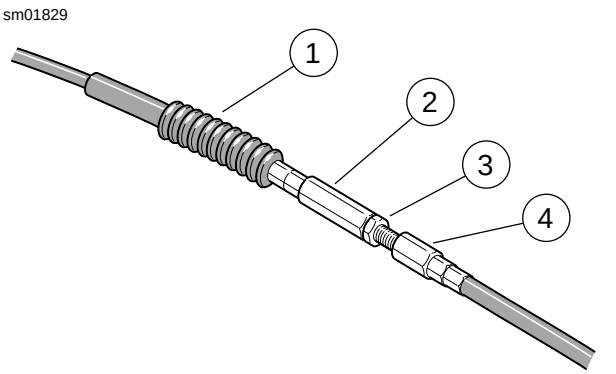
⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove maxi-fuse before proceeding. (00251a)

Unplug Maxi-Fuse. See 7.34 MAXI-FUSE.

Clutch Cable: Lower

1. **Models equipped with mid-mount foot controls:** remove left side rider footrest and mounting bracket assembly. See 2.33 RIDER FOOT CONTROLS: ALL MODELS EQUIPPED WITH MID-MOUNT CONTROLS for removal procedure.
2. See Figure 2-150. Slide rubber boot (1) on clutch cable adjuster (2) upward to expose adjuster mechanism. Loosen jam nut (3) from adjuster. Turn adjuster to shorten cable housing until there is a large amount of freeplay at clutch hand lever. See 1.10 CLUTCH.
3. See Figure 2-151. Remove six screws (1) and clutch inspection cover (2). Exercise caution to avoid damaging or dislodging quad ring (7) from groove in primary cover (9).
4. Slide hex lockplate with attached spring (3) from flats of adjusting screw assembly (8).
5. Turn adjusting screw assembly clockwise to release ramp assembly (5) and coupling (6). As the adjusting screw is turned, ramp assembly moves forward. Unscrew nut (4) from end of adjusting screw.
6. Remove hook of ramp from cable coupling. Remove clutch cable end (11) from slot in coupling. Remove coupling and ramp assembly.
7. Unscrew cable end fitting (12) and remove clutch cable (13) lower section from primary cover. Remove o-ring (10) from cable end fitting. Discard o-ring.
8. Clean all metal parts in a non-volatile cleaning solution or solvent.



1. **Rubber boot**
2. **Cable adjuster**
3. **Jam nut**
4. **Cable end**

Figure 2-150. Clutch Cable Adjuster Mechanism

XL MODELS

NOTE

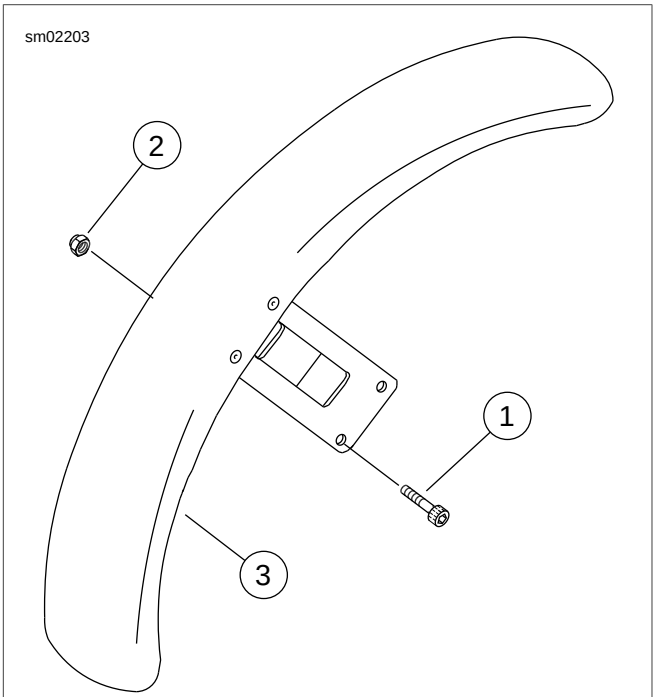
Be careful when removing or installing fender assembly, to avoid scratching the paint. If necessary, cover the fender with a clean shop towel to prevent damage.

Removal

1. See Figure 2-160. Remove four screws (1) and lock nuts (2) to detach front fender (3) from front fork sliders.
2. Carefully remove fender from between front fork sliders.

Installation

1. See Figure 2-160. Carefully position front fender (3) between right and left front fork sliders.
2. Secure fender using four screws (1) and lock nuts (2). Tighten to 96-156 **in-lbs** (10.9-17.6 Nm).



1. **Screw (4)**
2. **Lock nuts (4)**
3. **Front fender**

Figure 2-160. Front Fender

GENERAL

See Figure 2-175. The vehicle is equipped with a jiffy stand (or side stand) that locks when placed in the full forward position (down) with the full weight of the vehicle resting on it.

WARNING

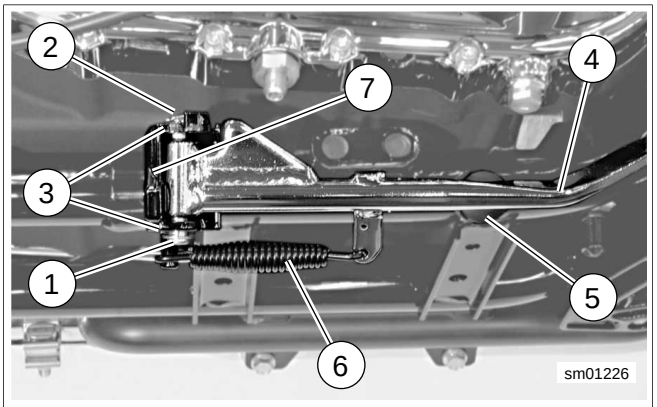
The jiffy stand locks when placed in the full forward (down) position with vehicle weight on it. If the jiffy stand is not in the full forward (down) position with vehicle weight on it, the vehicle can fall over which could result in death or serious injury. (00006a)

WARNING

Always park motorcycle on a level, firm surface. An unbalanced motorcycle can fall over, which could result in death or serious injury. (00039a)

WARNING

Be sure jiffy stand is fully retracted before riding. If jiffy stand is not fully retracted, it can contact the road surface causing a loss of vehicle control, which could result in death or serious injury. (00007a)



1. **Clevis pin**
2. **Pretzel clip**
3. **Bushing (2)**
4. **Jiffy stand leg**
5. **Rubber bumper**
6. **Spring**
7. **Jiffy stand yoke**

Figure 2-175. Jiffy Stand (Retracted Position) (Typical)

JIFFY STAND INTERLOCK: INTERNATIONAL MODELS

Some international models are equipped with a jiffy stand interlock feature.

If the rider attempts to start the engine or pushes the starter button while the transmission is in gear and the jiffy stand is down, then the jiffy stand interlock system will not permit the engine to run. The message "SidE StAnd" will scroll across the odometer to indicate this to the rider. Raising the jiffy stand (or putting the transmission in neutral) will permit the engine to run and clear the message.

If the jiffy stand falls out of the fully retracted position while riding at speeds greater than 10 mph (15 km/h), then the jiffy stand interlock system will maintain engine operation and alert the rider about this by illuminating the indicators (flash twice) and scroll the message "SidE StAnd" across the odometer. The message will remain until the system detects the jiffy stand in the fully retracted position again. The rider may continue to operate the vehicle while in this mode.

The rider may clear the text messages at any time by pressing the function switch once while the vehicle is powered up.

NOTE

If the operation of raising the jiffy stand and putting the transmission in gear is rapidly executed, the jiffy stand bouncing off the frame could cause the jiffy stand interlock system to activate and stop the engine.

REMOVAL

1. Block motorcycle under frame so that motorcycle is securely resting upright and jiffy stand may be moved through its full range of travel.
2. See Figure 2-175. Remove rubber bumper (5) from frame to permit further retraction of jiffy stand leg (4). Additional spring tension relief allows for easier spring removal.
3. See Figure 2-176. Place jiffy stand leg in retracted position. Remove and discard pretzel clip (3).

WARNING

Wear safety glasses or goggles when removing or installing spring. Spring tension can cause spring, attached components and/or hand tools to fly out which could result in death or serious injury. (00477c)

4. While firmly holding jiffy stand leg (5) in fully retracted position, withdraw clevis pin (1) until it disengages from upper pivot hole of jiffy stand yoke (4).
5. Detach spring (6) from anchor pin (7) using pliers. Unhook other end of spring from jiffy stand leg.
6. Remove clevis pin from lower pivot hole of jiffy stand yoke. Remove jiffy stand leg. Remove upper and lower bushings (2).

CLEANING AND LUBRICATION

Clean and lubricate jiffy stand assembly every 5000 miles (8000 km). Proceed as follows:

1. See Figure 2-176. See 2.31 JIFFY STAND, Removal above to remove jiffy stand from motorcycle frame.
2. Thoroughly clean all jiffy stand components, including frame-mounted anchor pin and jiffy stand yoke (4).
3. Apply a small amount of wheel bearing grease to pivot holes of jiffy stand leg (5) and yoke, groove of anchor pin and O.D. of clevis pin (1).
4. See 2.31 JIFFY STAND, Installation to install jiffy stand to motorcycle frame.

GENERAL

Passenger footrest assemblies are standard equipment on certain models only.

XL MODELS

Removal

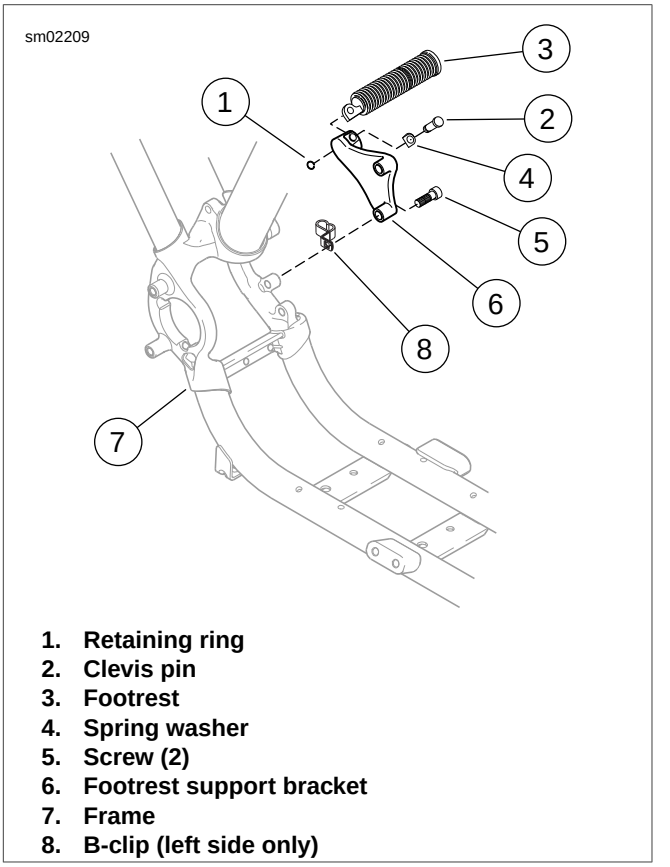
1. See Figure 2-185. Remove retaining ring (1), clevis pin (2), footrest (3) and spring washer (4). Discard retaining ring.
2. Remove two screws (5) and footrest support bracket (6) from frame (7).

Installation

NOTE

See Figure 2-185. On left side of vehicle, a B-clip (8) is positioned between footrest support bracket (6) and lower support bracket hole on frame (7). Make sure this clip is positioned between footrest support bracket and frame when attaching support bracket in the next step.

1. See Figure 2-185. Attach footrest support bracket (6) to frame (7) with two screws (5). Tighten to 45-50 ft-lbs (61-68 Nm).
2. Install footrest (3) on footrest support bracket with spring washer (4). Make sure spring washer is positioned inside support bracket mounting boss with the square edge toward the inside.
3. Align holes and push clevis pin (2) from top down through hole in support bracket. Secure with **new** retaining ring (1).



1. **Retaining ring**
2. **Clevis pin**
3. **Footrest**
4. **Spring washer**
5. **Screw (2)**
6. **Footrest support bracket**
7. **Frame**
8. **B-clip (left side only)**

Figure 2-185. Passenger Footrest Assembly (Not Standard Equipment on Some Models)

GENERAL

The engine is a two-cylinder, four-cycle, air-cooled, overhead-valve V-twin. It has three major component assemblies: **cylinder, crankcase,** and **gear case.**

The **cylinder** assembly includes cylinder head, valves, rocker arm cover, rocker arms, and piston. Cylinders mount on the crankcase in a 45 degree "V", with both connecting rods connected to a single crank pin.

The up-and-down motion of the piston in the cylinder is converted to circular motion in the **crankcase.** The multi-piece crankshaft consists of a crank pin mounted between two counterweighted flywheels, which rotate on two end shaft bearings. The lower end of the rear cylinder connecting rod is forked to fit around the single-end front cylinder connecting rod, allowing a single connecting rod crank pin connection to the flywheel.

The **gear case** is located on the right side of the crankcase. The gear case houses the gear train which operates and times the valves and ignition. The cam gear train, consisting of four cam shafts with one cam lobe on each shaft, is gear driven. The engine valves are opened and closed through the mechanical linkage of tappets, push rods, and rocker arms. Hydraulic lifters, located in the tappets, automatically compensate for heat expansion to maintain the no-lash fit of valve train components. Tappets serve to transmit the cam action to the valve linkage. Valve timing is obtained by aligning timing marks when installing cam gears.

Ignition spark is produced by the operation of a microprocessor-controlled Electronic Control Module (ECM), ignition coil, and spark plugs. Spark timing is determined primarily by crankshaft rotation, triggering a magnetic sensing unit.

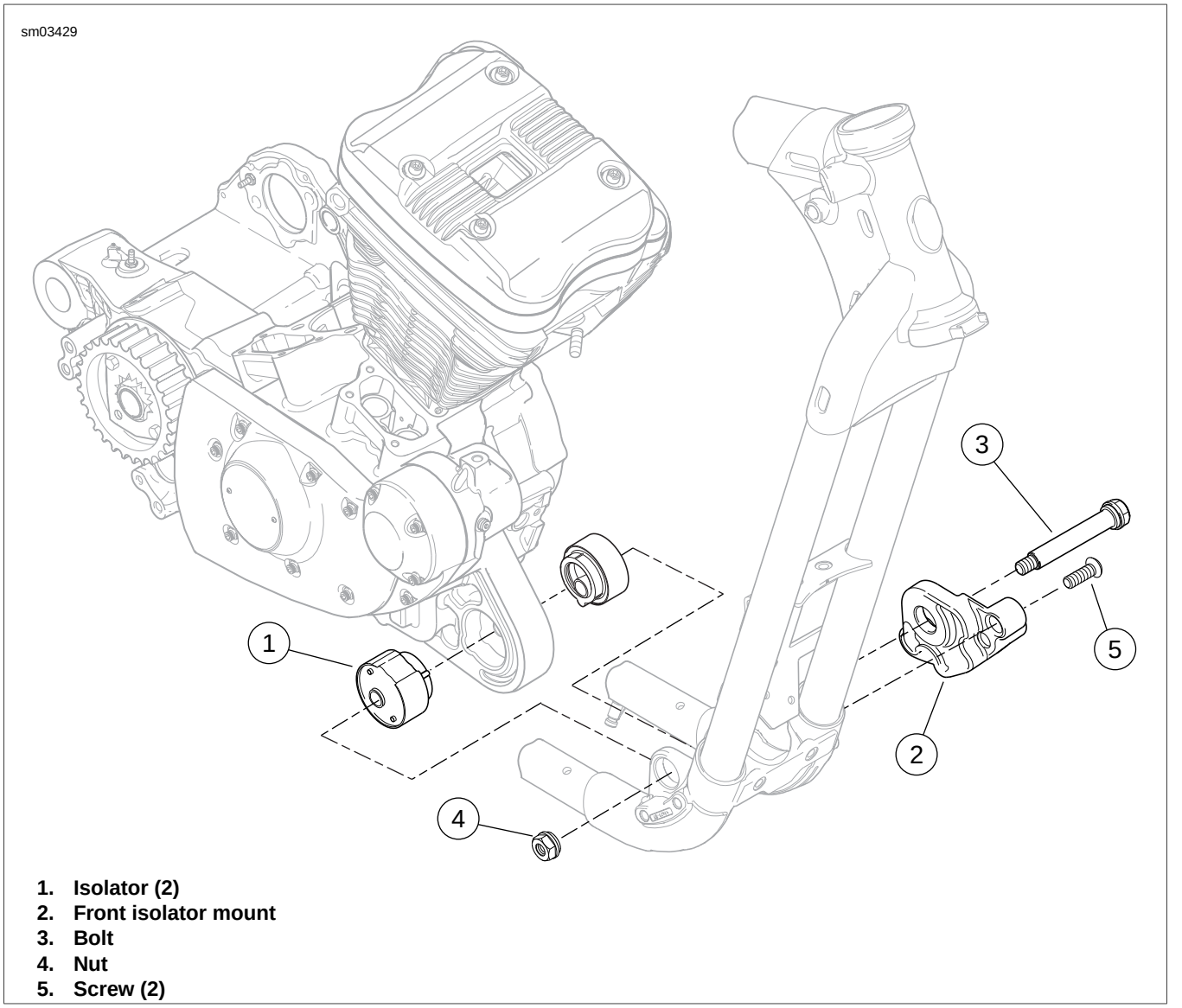
Each spark plug fires independently at the end of that cylinder's compression stroke, igniting the air/fuel mixture in the cylinder.

The engine has a force-feed (pressure) type oiling system, incorporating oil feed and return pumps in one pump body, with one check valve on the oil feed side. The feed pump forces oil to the engine, lubricating lower connecting rod bearings, rocker arm bushings, valve stems, valve springs, push rods, and tappets. Cylinder walls, pistons, piston pins, timing gears and bushings, and main bearings are lubricated by oil spray thrown off connecting rods and crankshaft, and by oil draining from each rocker box through an internal drain passage in each cylinder and each tappet guide. Piston jets spray oil on the underside of the pistons to cool the piston crown and skirt area.

A small amount of oil is sprayed through an oil galley jet onto the rear intake cam gear in the gear case; oil is transferred to the teeth of all the cam gears by way of the gear meshing action. The oil-scavenging section of the pump returns oil to the tank from the engine. See 3.6 ENGINE LUBRICATION SYSTEM later in this section for further information.

Figure 3-7.
Lubrication Diagram (Red=Feed Oil, Blue=Return Oil)

Figure 3-7.
Lubrication Diagram (Red=Feed Oil, Blue=Return Oil)



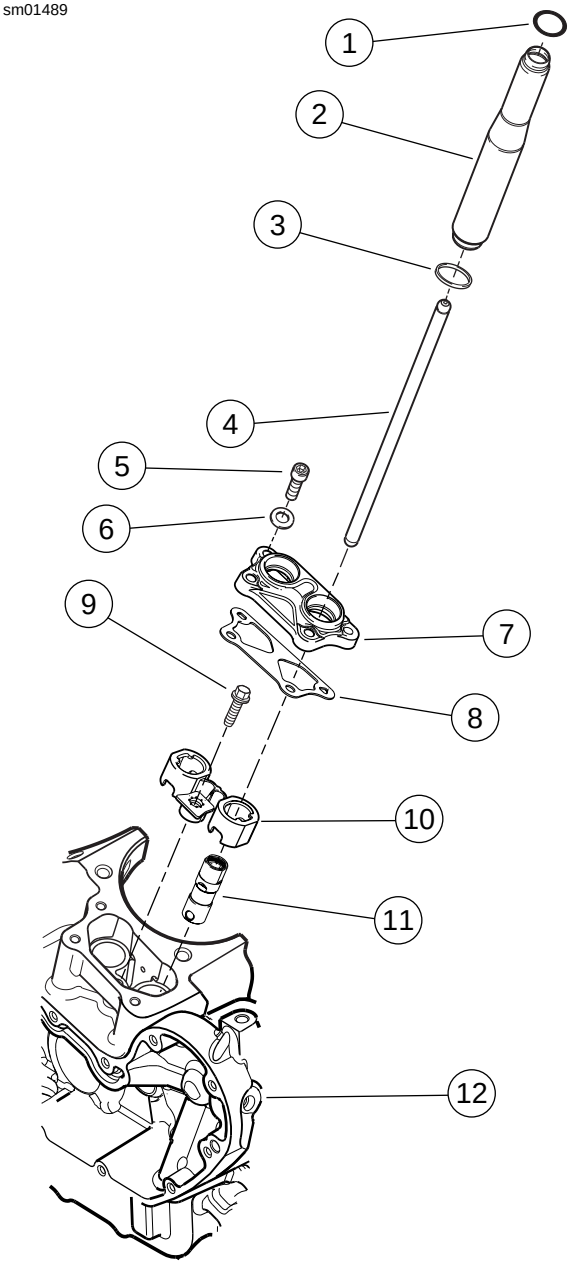
1. **Isolator (2)**
2. **Front isolator mount**
3. **Bolt**
4. **Nut**
5. **Screw (2)**

Figure 3-13. Front Engine Mount/Isolator Assembly

36. See Figure 3-14. Loosen, but do not remove, two rear isolator mounting bracket screws (7) on left side of engine.
37. Attach ENGINE HOOK (Part No. HD-46284) and engine hoist. Carefully raise engine enough to relieve pressure from mounting bolts.
38. See Figure 3-13. Remove front engine mount bolt (3) and nut (4).
39. Remove two screws (5) and front isolator mount (2).
40. See Figure 3-14. Remove two rear engine mount/rear fork pivot bolts (1). Pull rear fork back until fork pivot bosses clear the frame.
41. Remove oil tank vent hose from oil tank. See 3.23 OIL TANK.
42. Remove two screws (7) and rear isolator mounting bracket (2) from frame.
43. Lift engine as necessary and swing assembly out from chassis toward the left side. Swing rear of engine out first. Then remove engine from chassis.

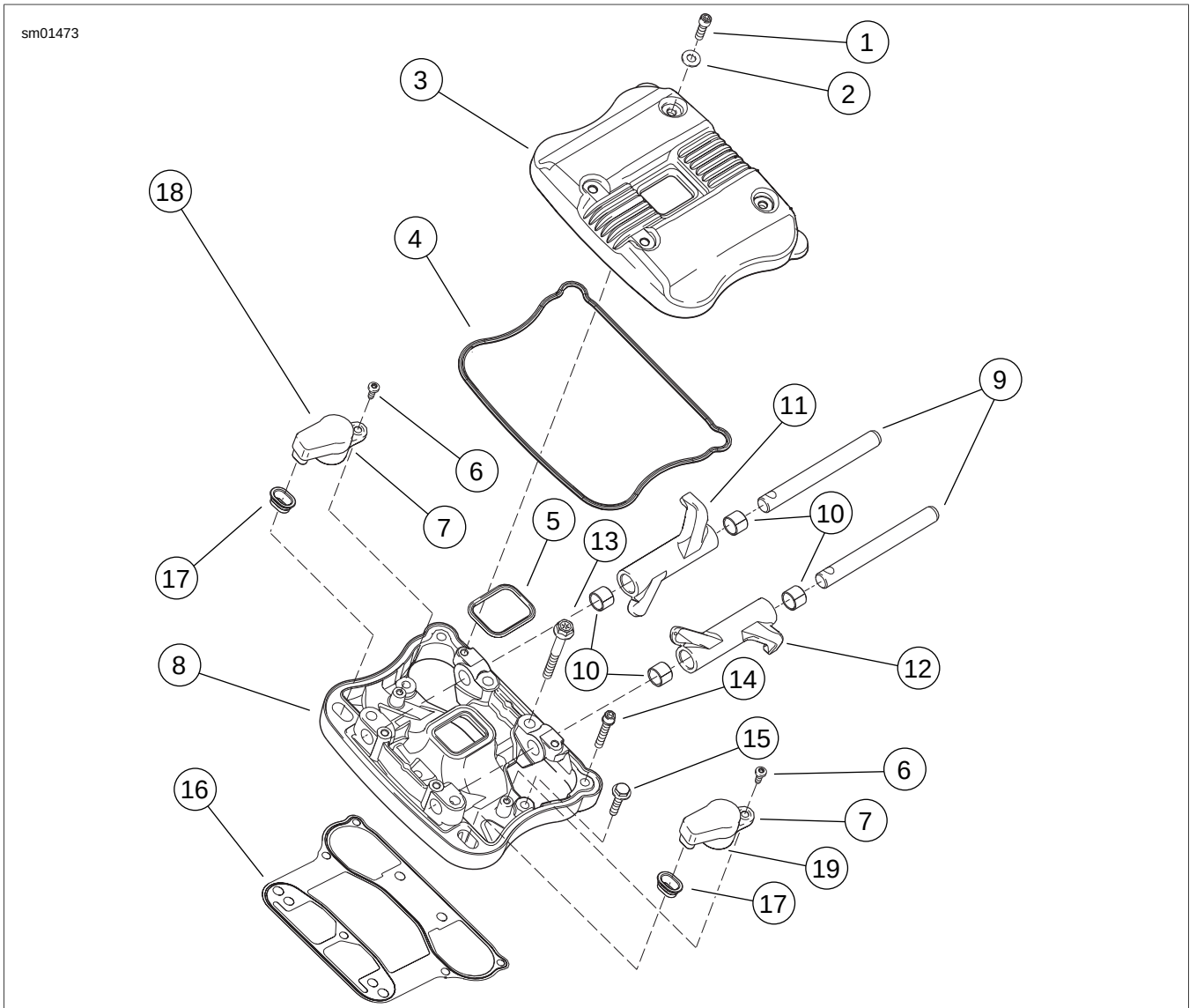
Disassembling Push Rods and Covers

1. See Figure 3-23. Remove push rod covers (2), o-rings (1, 3) and push rods (4). Mark the location and orientation (top and bottom) of each push rod. Discard o-rings.
2. Remove socket screws (5) and washers (6). Remove retainer (7) and gasket (8). Discard gasket.
3. Repeat above steps for other cylinder.



1. **O-ring (4)**
2. **Push rod cover (4)**
3. **O-ring (4)**
4. **Push rod (4)**
5. **Screw (8)**
6. **Washer (8)**
7. **Retainer (2)**
8. **Gasket (2)**
9. **Screw (2)**
10. **Anti-rotation device (2)**
11. **Tappet (4)**
12. **Right crankcase**

Figure 3-23. Middle Valve Train Components



1. Screw w/ captive washer (4)
2. Fiber seal (4)
3. Outer rocker cover
4. Gasket
5. Gasket
6. Screw
7. Breather assembly
8. Inner rocker cover
9. Rocker arm shaft (2)
10. Rocker arm bushing (4)
11. Rocker arm
12. Rocker arm
13. Bolt (4)
14. Screw (2)
15. Bolt (3)
16. Gasket
17. Breather seal
18. Breather location: Front Cylinder
19. Breather location: Rear Cylinder

Figure 3-38. Rocker Cover Assembly

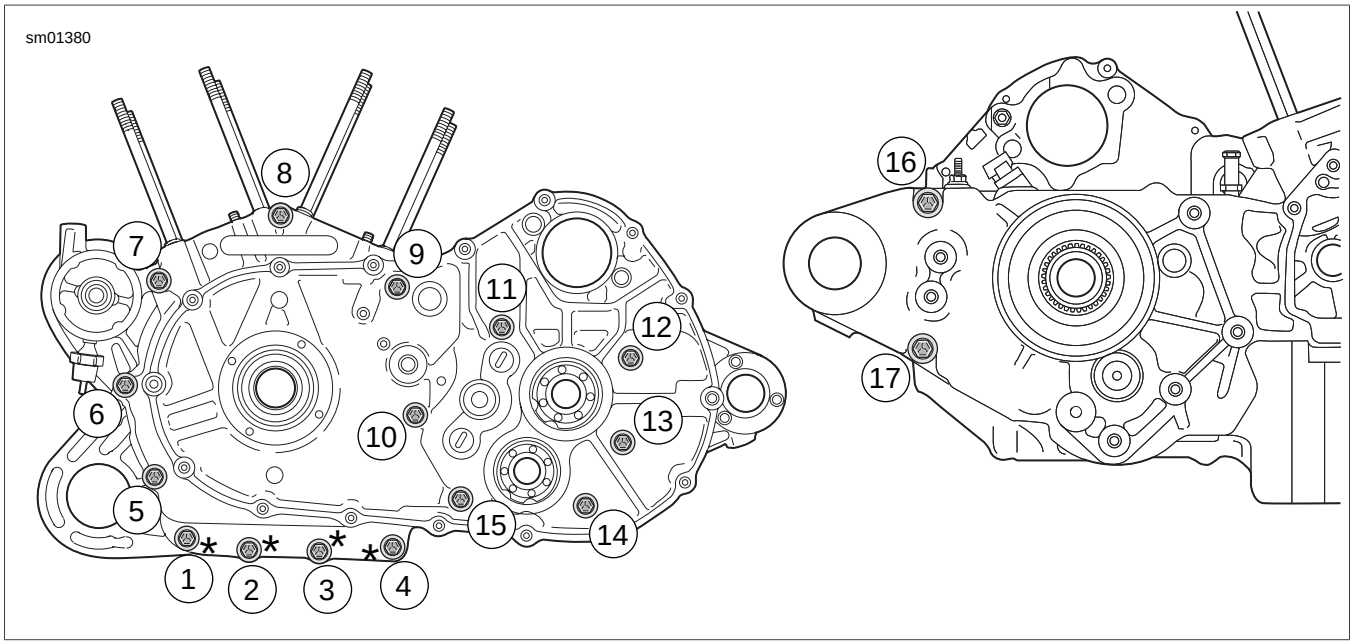


Figure 3-56. Crankcase Fastener Torque Sequence (* - Short Fasteners)

7. See Figure 3-57. See Figure 3-58. Install spacer in I.D. of **new** seal. With the open (lipped) side of seal facing outward, center seal/spacer assembly over bearing bore.

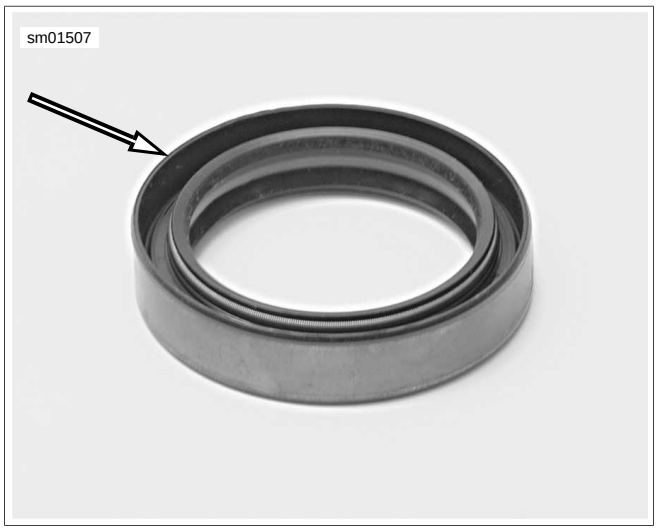


Figure 3-57. Open (Lipped) Side of Seal Faces Out

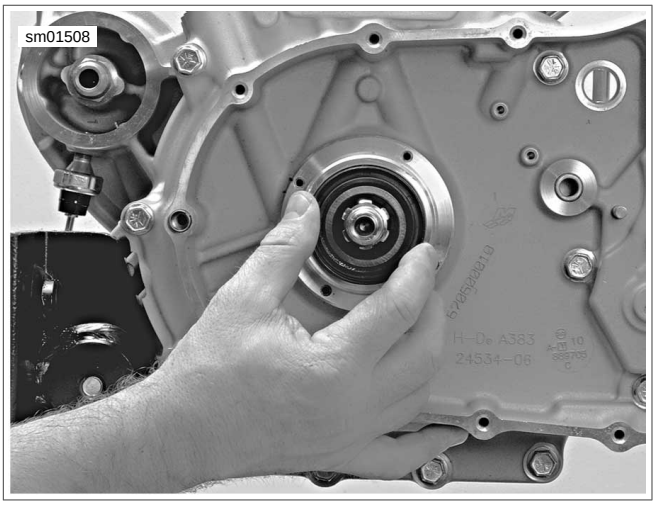


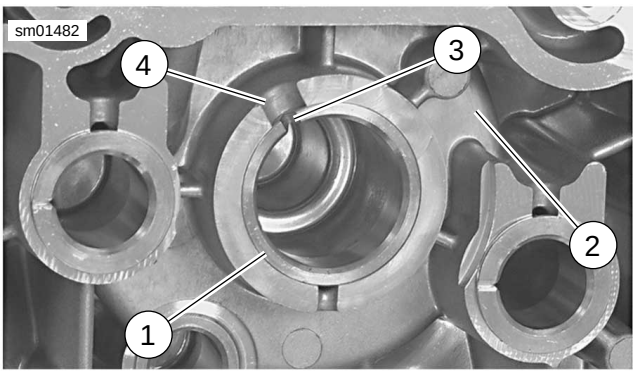
Figure 3-58. Install Spacer and Seal

NOTE

Do not remove the spacer after installation or the new seal will have to be discarded and the procedure repeated.

8. See Figure 3-59. Install bearing seal and spacer.
   a. Center seal/spacer driver (2) over seal, so that the sleeve (smaller O.D.) seats between seal wall and garter spring.
   b. Assemble SPROCKET SHAFT BEARING/SEAL INSTALLATION TOOL (Part No. HD-42579) (1) and SPROCKET SHAFT SEAL/SPACER INSTALLER (Part No. B-45676) onto sprocket shaft.
   c. Rotate handle clockwise until the spacer makes contact with the bearing. Remove tool from sprocket shaft.

2. See Figure 3-74. Although the original pinion shaft bushing is not "pinned," the replacement bushing must be secured from possible rotation within the cover bore, by installation of a dowel pin. Drill a No. 31 hole, 0.281 in. (7.14 mm) deep, at top side of boss (side toward top of gearcase cover), centering the drill bit on the cover bore circle (hole is drilled half in bushing O.D. and half in cover bore I.D.).
3. Drive a **new** dowel pin no more than 0.20 in. (5.1 mm) below the bushing face. Carefully peen edges of hole to lock the pin in place.
4. After you install a **new** bushing in gearcase cover, line-ream the bushing to the correct size. See 3.17 GEAR-CASE COVER AND CAM GEARS, Bushing Reaming.



1. **Rear intake cam gear bushing**
2. **Gearcase cover**
3. **Cam bushing slot**
4. **Gearcase cover slot**

Figure 3-73. Rear Intake Cam Gear Bushing Installed in Gearcase Cover

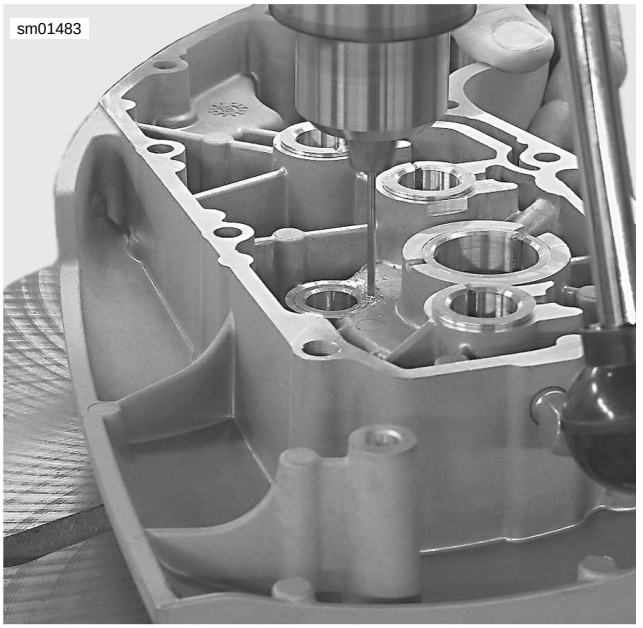


Figure 3-74. Drilling Pinion Bushing Dowel Pin Hole in Gearcase Cover

BUSHING REAMING

PART NUMBER	TOOL NAME
HD-38871	CAMSHAFT BUSHING REAMER PILOT
HD-94803-67	REAR INTAKE CAM GEAR BUSHING REAMER
HD-94812-1	PINION SHAFT BUSHING REAMER
HD-94812-87	PINION SHAFT BUSHING REAMER

NOTES

- *Installing and reaming crankcase and gearcase cover bushings may alter the center distances between mating gears and may result in an increase in gear noise. For quiet-running gears, the gears should be matched to the center distances.*
- *Bushings in right crankcase serve as pilots for reaming gearcase cover bushings and must, therefore, be reamed to size first.*
- *After reaming any bushing, check shaft fit in the bushing. It may be necessary to make a second pass with reamer to attain proper fit.*

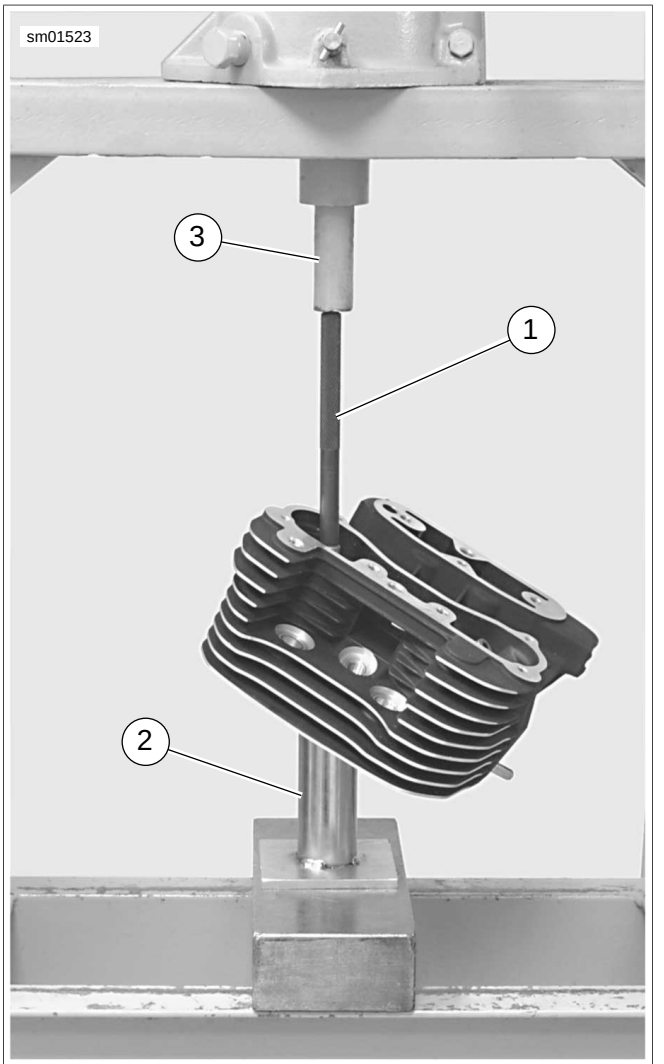
Cam Gear Bushings in Right Crankcase

1. Separate two halves of crankcase, if not already done. Place right crankcase on flat surface with gearcase side up.
2. See Figure 3-75. Position CAMSHAFT BUSHING REAMER PILOT (Part No. HD-38871) onto gearcase side of crankcase; upper right and lower left indexing holes in pilot must be placed over dowels in crankcase. Insert two bolts (supplied with pilot) through two remaining holes in pilot, and into threaded holes of crankcase. Tighten bolts securely.
3. Insert a standard 11/16-in. diameter reamer through pilot hole and into bushing while turning reamer clockwise. Continue turning reamer clockwise through bushing until smooth shank of reamer passes through hole in pilot.
4. Detach reamer from handle. Pull reamer out opposite side of crankcase.

⚠WARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

5. Thoroughly clean right crankcase, removing all metal chips/shavings. Blow out all bushing bores and oil passages using low pressure compressed air.



1. **Valve guide remover/installer**
2. **Cylinder head support stand**
3. **Ram**

Figure 3-88. Removing Shoulderless Valve Guide

Installation

NOTE

Only a single replacement oversize valve guide is available. The O.D. of the replacement valve guide must be machined to the correct size and proper interference fit.

1. Check valve guide to valve guide bore clearance.
   a. Measure outer diameter of a new standard valve guide.
   b. Measure the cylinder head valve guide bore. The valve guide diameter should be 0.0020-0.0033 in. (0.0508-0.0838 mm) larger than cylinder head valve guide bore.
   c. If interference fit is within specification, a replacement standard valve guide will be used. If interference fit is not within specification, obtain oversize valve guide and machine valve guide O.D. as needed.

NOTE

Since some material is typically removed from the cylinder head valve guide bore when the valve guide is pressed out, it is common to go to the larger size for the proper interference fit.

2. Measure cylinder head bore and outside diameter of replacement valve guide to verify correct interference fit.

NOTE

Cylinder head support stand ensures that valve guide and valve seat are perpendicular. If perpendicularity is not achieved, cylinder head valve guide bore will be damaged during the press procedure.

3. Prepare cylinder head for valve guide replacement.
   a. See Figure 3-87. Insert sleeve of intake (4 or 6) or exhaust (5 or 7) seat adapter into tube at top of cylinder head support stand (3). Position cylinder head so that valve seat is centered on seat adapter.
   b. Apply Vaseline to lightly lubricate external surfaces of valve guide. Spread lubricant so that thin film covers entire surface area.
   c. At top of cylinder head, start valve guide into bore.
   d. Place installer sleeve (2) over valve guide and then insert VALVE GUIDE REMOVER/INSTALLER (1) into installer sleeve.
   e. See Figure 3-89. Center VALVE GUIDE REMOVER/INSTALLER (1) under ram of press and apply pressure only until valve guide is started in bore and then back off ram slightly to allow valve guide to center itself.

NOTE

Always back off ram to allow the valve guide to find center. Pressing valve guide into cylinder head in one stroke can bend remover/installer, break valve guide, distort cylinder head casting and/or damage cylinder head valve guide bore.

   f. Verify that cylinder head support stand (3) and VALVE GUIDE REMOVER/INSTALLER are square. Center VALVE GUIDE REMOVER/INSTALLER under ram and press valve guide further into bore, then back off ram again to allow valve guide to find center.
   g. Repeat previous step and then apply pressure to VALVE GUIDE REMOVER/INSTALLER until installer sleeve (2) contacts machined area of cylinder head surrounding valve guide.

2. Measure the piston skirt at the oval openings and then transfer that measurement to a dial bore gauge.
3. Using a grease pencil, mark the top, middle and bottom of the piston ring travel zone in the cylinder bore. Measure at markings in cylinder parallel and perpendicular to crankshaft.
4. Replace piston and/or cylinder if running clearance exceeds 0.003 in. (0.076 mm).

Boring and Honing Cylinder

1. The cylinder must be bored with gaskets and torque plates attached. Bore the cylinder to 0.003 in. (0.08 mm) under the desired finished size.
2. Hone the cylinder to its finished size using a 280 grit rigid hone followed by a 240 grit flexible ball hone. Honing must be done with the torque plates attached. All honing must be done from the bottom (crankcase) end of the cylinder. Work for a 60° crosshatch pattern.

Final cylinder bore sizes, after honing are as follows:

Table 3-32. Cylinder Final Bore Sizes

BORE SIZE	883 CC		1200 CC	
	IN.	MM	IN.	MM
Standard bore*	3.0005 in.	76.213 mm	3.4978 in.	88.844 mm
0.005 in. (0.13 mm) OS bore	3.0048 in.	76.323 mm	3.502 in.	88.95 mm
0.010 in. (0.25 mm) OS bore	3.0098 in.	76.449 mm	3.507 in.	89.08 mm
* All bore sizes + 0.0002 in. (0.00508 mm)				

NOTES

- *When cylinder requires oversize re-boring to beyond 0.010 in. (0.25 mm), the oversize limit has been exceeded and cylinder must be replaced.*
- *The same piston may be used if cylinder bore was not changed, unless it is scuffed or grooved. However, replace rings and hone the cylinder walls with a No. 240 grit flexible ball hone.*

CAUTION

Failure to remove all abrasive particles may result in premature cylinder, piston and ring wear and engine failure. (00537b) .

3. Thoroughly wash the cylinder bore with liquid dishwashing soap and warm water to remove all abrasive particles and residual grit. Continue cleaning until a clean cloth shows no remaining dirt or debris.

⚠WARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

4. Hot rinse the cylinder and dry with moisture free low pressure compressed air.
5. Immediately apply a thin film of clean engine oil to a clean white paper towel and thoroughly wipe the inside of the cylinder.

NOTE

After wiping the cylinder with a clean, oiled paper towel, the towel will be dark with contamination. Repeat this process using a new lightly oiled paper towel each time until the towel remains white. The cylinder is now clean.

6. With the cylinder at room temperature, check the piston clearance in the cylinder in which the piston will run.

Fitting Piston Rings

See Figure 3-104. Piston rings are of two types: compression and oil control. The two compression rings are positioned in the two upper piston ring grooves. The dot on the second compression ring must face upward. Ring sets are available to fit standard and oversize pistons.

Piston ring sets must be properly fitted to piston and cylinder:

1. See Figure 3-105. Place piston in cylinder about 1/2 in. (13 mm) from top. Set ring to be checked inside cylinder, squarely against piston. Remove piston and check ring end gap with thickness gauge. See 3.1 SPECIFICATIONS for tolerance.

NOTE

See piston ring gap Service Wear Limits in 3.1 SPECIFICATIONS for end gap dimensions. Do not file rings to obtain proper gap.

Table 3-33. Paint Dot Specifications

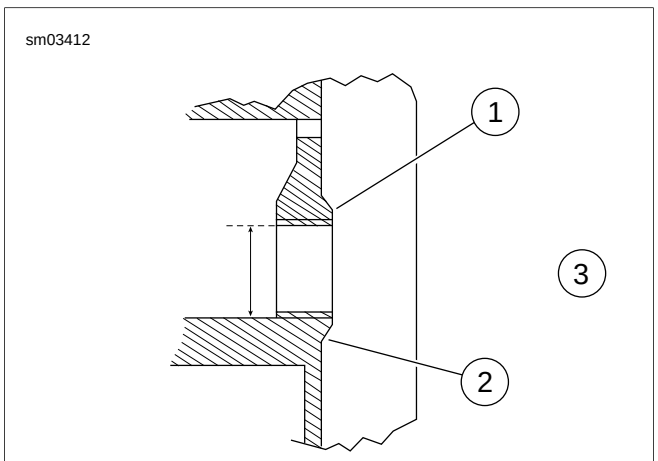
RACE O.D.		CLASS	IDENTIFICATION*
IN.	MM		
1.2498-1.2500	31.745-31.750	A	White
1.2496-1.2498	31.740-31.745	B	Green
* Paint dot on end of spline.			

Table 3-34. Roller Specifications

ROLLER O.D. (A)	IDENTIFICATION (PACKAGE COLOR)
Largest	Red
	Blue
	White (Grey)
Smallest	Green

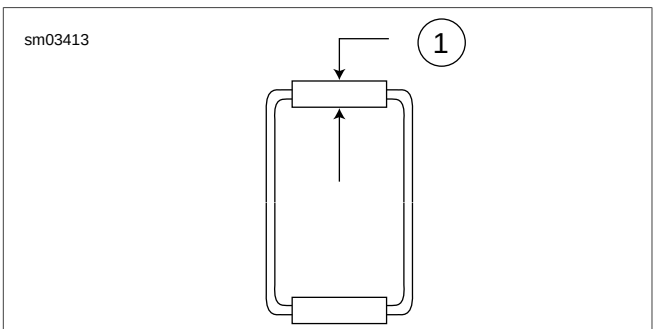
Table 3-35. Stamp Specifications

RACE I.D.		CLASS NO.	STAMPED IDENTIFICATION*
IN.	MM		
1.5646-1.5648	39.741-39-746	1	1
1.5648-1.5650	39.746-39.751	2	2
1.5650-1.5652	39.751-39.756	3	3
* Stamped number inside crankcase near race.			



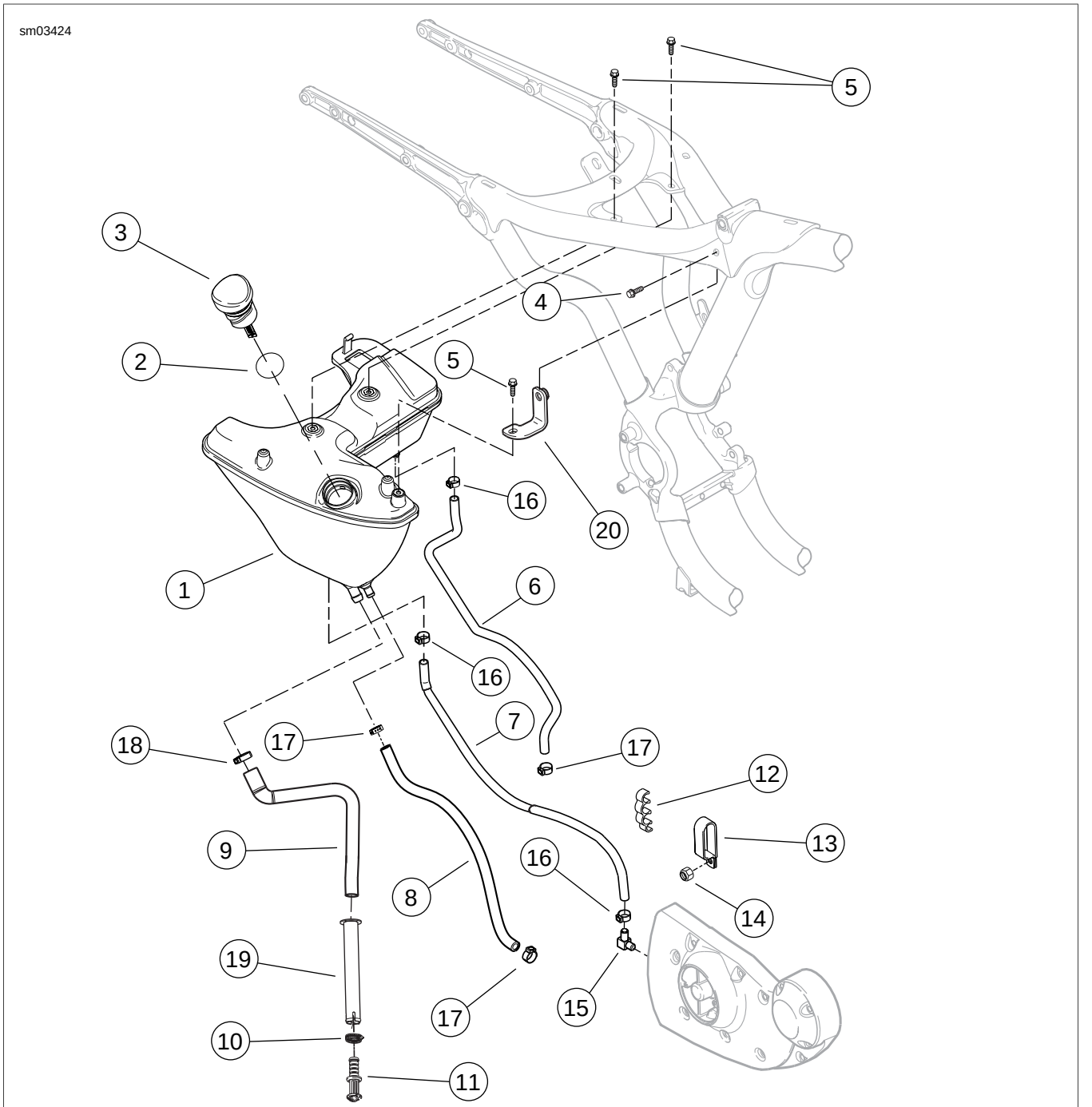
1. **Outer race**
2. **Stamped class no.**
3. **Right crankcase**

Figure 3-123. Factory Outer Race Sizes (Service wear limit: 1.5672 in. (39.807 mm))



1. **A - Roller O.D. cannot be measured to required accuracy with micrometer**

Figure 3-124. Bearing Identification



1. Oil tank
2. O-ring
3. Filler cap/dipstick
4. Screw
5. Oil tank mounting screw (3)
6. Return oil hose
7. Vent oil hose
8. Feed oil hose
9. Drain oil hose
10. Worm drive clamp
11. Drain plug
12. Hose clip
13. Clamp
14. Lock nut
15. Elbow fitting
16. Clamp (3)
17. Clamp (3)
18. Clamp
19. Oil drain hose sleeve
20. Bracket

Figure 3-136. Engine Oil Tank Assembly

PURGING AND DISCONNECTING FUEL SUPPLY HOSE

⚠WARNING

When servicing the fuel system, do not smoke or allow open flame or sparks in the vicinity. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00330a)

⚠WARNING

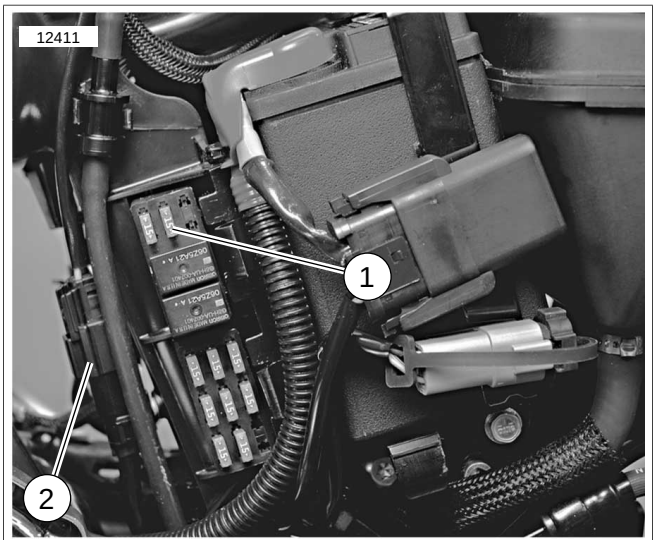
To prevent spray of fuel, purge system of high-pressure fuel before supply line is disconnected. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00275a)

1. Purge the fuel supply line of high pressure gasoline.
   a. Open left side cover. See 2.16 LEFT SIDE COVER.
   b. See Figure 4-3. Remove fuel pump fuse (1) located in fuse panel in front of battery.
   c. Start engine and allow vehicle to run.
   d. When engine stalls, operate starter for 3 seconds to remove any remaining fuel from fuel hose.
   e. Shut off ignition and reinstall fuel pump fuse.

⚠WARNING

Do not thread hex nut onto valve more than two turns to prevent "bottoming" nut on valve, which can cause a fuel leak. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00276a)

2. See Figure 4-4. Push up on release sleeve (1) on fuel pump quick-connect fitting and pull down on fuel supply hose fitting (2) to disconnect fuel supply hose (3) from fuel pump module (4). Immediately clean up any fuel spills.



1. Fuel pump fuse
2. Fuel pump connector [141]

Figure 4-3. Fuel Pump Fuse and Connector

1. Reslease sleeve (quick-connect fitting)
2. Fuel supply hose fitting
3. Fuel supply hose
4. Fuel pump module

Figure 4-4. Fuel Tank Quick-Connect Fitting

REMOVING FUEL TANK

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove maxi-fuse before proceeding. (00251a)

1. Remove Maxi-Fuse. See 7.34 MAXI-FUSE.
2. Remove seat.
3. Drain fuel tank:
   a. Obtain a suitable fuel transfer pump with a long, flexible nozzle.
   b. Position vehicle upright. Unscrew and remove fuel tank filler cap.
   c. Insert fuel transfer pump nozzle into fuel tank filler spout. Aim nozzle toward right side of fuel tank to avoid contacting and damaging fuel pump assembly.
   d. Direct the pump output into a suitable container.
   e. Pump fuel until fuel tank is empty.
   f. Immediately wipe up any spilled fuel.
4. See Figure 4-5. Remove vent hose from fuel tank vent nipple. Remove cable clip (3) securing fuel pump wiring harness (2) to mounting boss on H-bracket.
5. See Figure 4-3. Unplug fuel pump connector (2) [141].
6. See Figure 4-2. Remove protective caps (8), lock nuts (7), screws (4, 5) and washers (6) from front and rear of fuel tank.
7. Place a clean, soft cloth over front of fuel tank to keep tank from contacting top fork clamp and damaging paint. Lift up rear of fuel tank. Remove fuel pump harness from clip on wire harness caddy latch clip on frame backbone.
8. Lift fuel tank off motorcycle.
9. Remove fuel pump assembly. See 4.13 FUEL PUMP.

GENERAL

The XL model induction module is a side-draft unit with a separate intake manifold. The induction module includes the throttle body, fuel injectors, TMAP sensor, TP sensor and IAC.

REMOVAL

⚠WARNING

Stop the engine when refueling or servicing the fuel system. Do not smoke or allow open flame or sparks near gasoline. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00002a)

⚠WARNING

To prevent spray of fuel, purge system of high-pressure fuel before supply line is disconnected. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00275a)

⚠WARNING

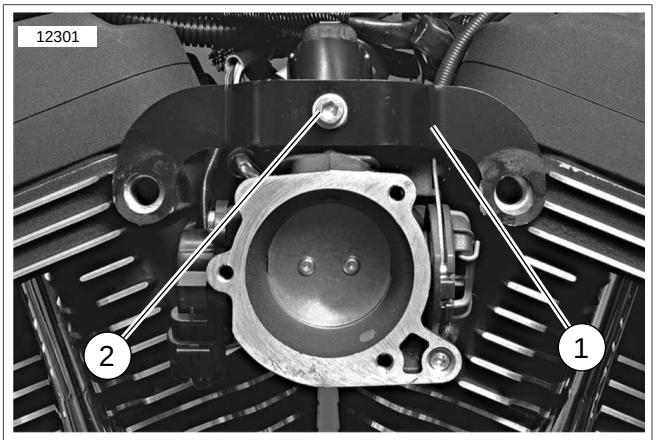
Gasoline can drain from quick-connect fitting when removing fuel line. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. Wipe up spilled fuel immediately and dispose of rags in a suitable manner. (00267a)

1. Purge the fuel supply hose of high pressure gasoline. Disconnect fuel supply hose from fuel pump module. See 4.4 FUEL TANK.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove maxi-fuse before proceeding. (00251a)

2. Unplug Maxi-Fuse. See 7.34 MAXI-FUSE.
3. Remove air cleaner cover, air filter and backing plate assembly. See 4.3 AIR CLEANER.
4. Remove seat.
5. Loosen (but do not remove) front fuel tank mounting screw. Remove rear fuel tank mounting screw, washers and nut. Carefully pivot rear of fuel tank upward and prop in position. See 4.4 FUEL TANK.
6. See Figure 4-24. Remove screw (2) and mounting bracket (1).



1. Mounting bracket
2. Screw

Figure 4-24. Induction Module Mounting Bracket

7. See Figure 4-25. Unplug the following connectors:
   a. front fuel injector (4) connector [84],
   b. rear fuel injector (5) connector [85],
   c. TMAP sensor (6) connector [80],
   d. IAC (7) connector [87],
   e. TP sensor (8) connector [88].
8. **California models only:** remove purge hose from fitting (9) on induction module (1).

GENERAL

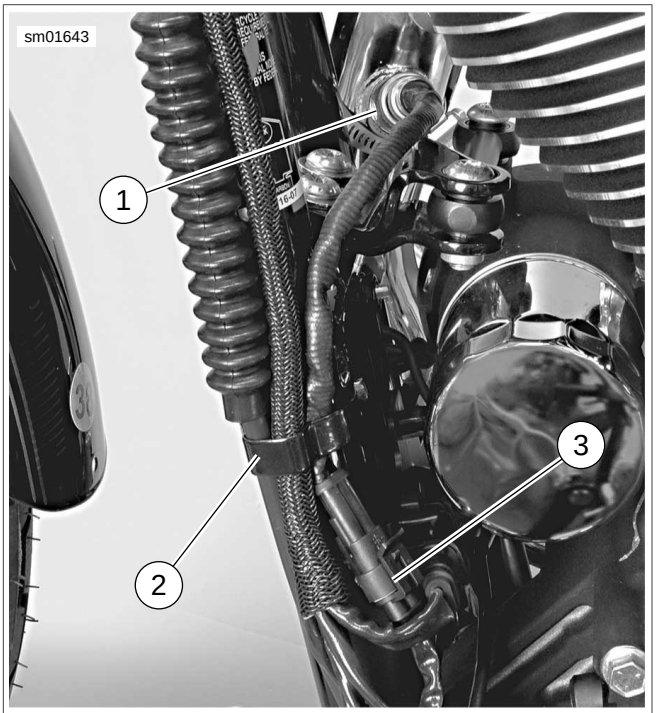
See Figure 4-43. The oxygen (O2) sensors are installed in threaded bosses on the inboard side of front and rear exhaust pipes.

NOTE

Both Oxygen sensors are identical. However, if they will be reused, it is best to mark them FRONT or REAR and return each to the exhaust pipe in which it was originally mounted.

Refer to the ELECTRICAL DIAGNOSTIC MANUAL for information on the function and testing of the O2 sensors.

Figure 4-43. Oxygen Sensor Location



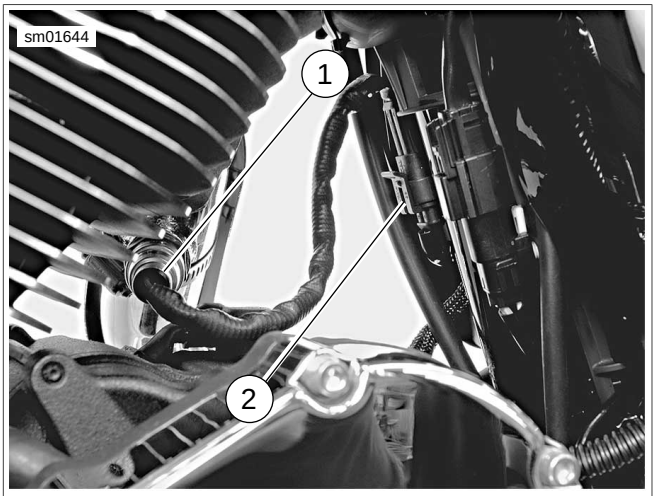
1. **Front oxygen sensor**
2. **Frame clip**
3. **Sensor connector [138]**

Figure 4-44. Front Oxygen Sensor and Connector

REMOVAL

PART NUMBER	TOOL NAME
HD-48262	OXYGEN SENSOR SOCKET

1. Unplug sensor connector:
   a. **Front O2 sensor:** see Figure 4-44. Remove frame clip (2). Unplug sensor connector [138A] (3) from wiring harness connector [138B].
   b. **Rear O2 sensor:** see Figure 4-45. Disengage connector [137] (2) from mounting tab on right side of H-bracket. Unplug connector [137A] from wiring harness connector [137B].
2. Using OXYGEN SENSOR SOCKET (Part No. HD-48262), unscrew sensor from mounting boss on exhaust pipe. If reusing sensor, be careful not to damage sensor harness.



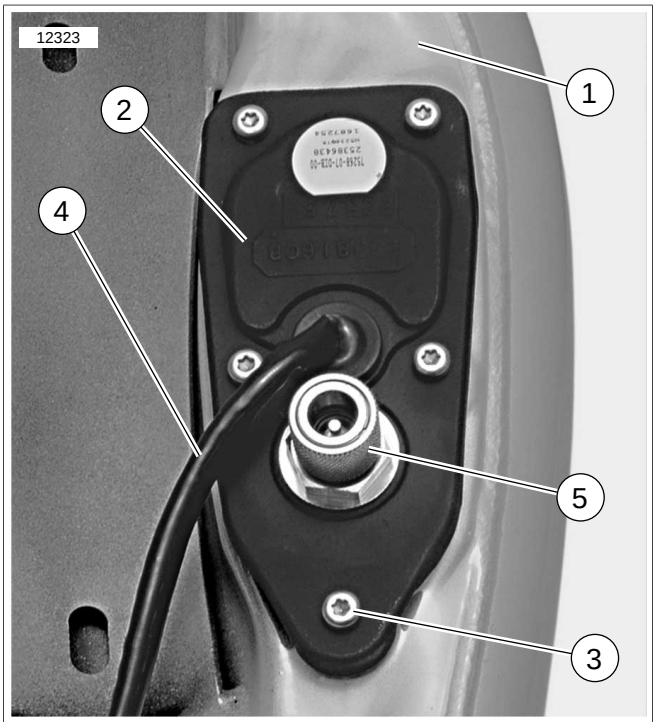
1. **Rear oxygen sensor**
2. **Sensor connector [137]**

Figure 4-45. Rear Oxygen Sensor and Connector

INSTALLATION

NOTES

- *Do not install sensors that have been dropped or impacted by other components. Damage to the sensor element may*



1. **Fuel tank**
2. **Fuel pump module**
3. **Screw (5)**
4. **Fuel pump harness**
5. **Quick-connect fitting**

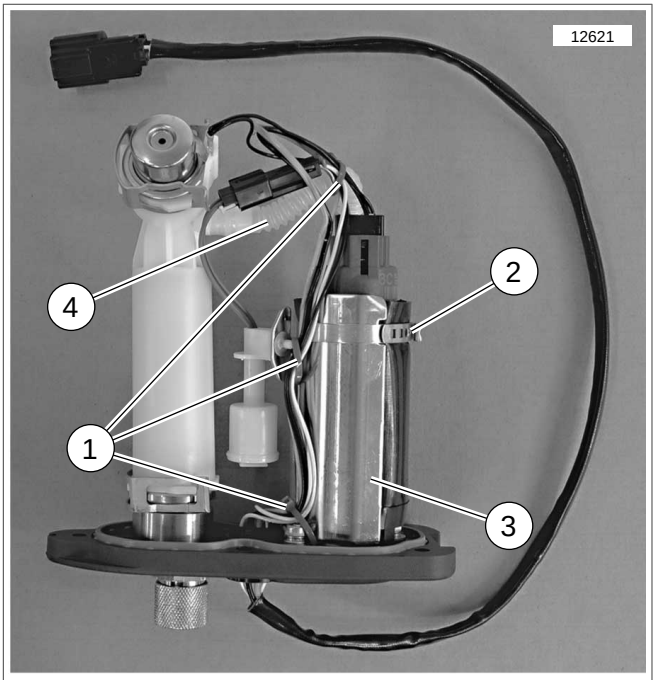
Figure 4-55. Fuel Pump Module

Figure 4-56. Removing/Installing Fuel Pump Module

DISASSEMBLY

The disassembly procedure is broken down into the following groups:

- Pressure regulator and filter housing.
- Fuel pump assembly and pump bracket.
- Low fuel level sensor assembly.
- Fuel pump/sender harness.



1. **Cable strap (3)**
2. **Pump assembly clamp**
3. **Pump bracket**
4. **Filter housing hose**

Figure 4-57. Fuel Pump Assembly: Location of Cable Straps and Pump Clamp

NOTE

See Figure 4-57. When disassembling or assembling the fuel pump and sender assembly, refer to this figure for the relative positions of the wiring harness cable straps (1) and pump assembly clamp (2).

Pressure Regulator and Filter Housing

1. See Figure 4-57. Cut and discard cable strap (1) securing wiring harness to the filter housing hose (4).
2. See Figure 4-58. Remove ground clip (12) from top of filter housing (23).
3. Remove and discard clamp (1). Remove filter housing hose from top of fuel pump (2).
4. Remove retaining clip (24) from top of filter housing and remove pressure regulator (22).
5. Remove second retaining clip (24) from bottom of filter housing and remove filter housing. Remove fuel filter element (25) from housing.
6. Remove o-ring (26) from filter housing mount (19).

⚠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)

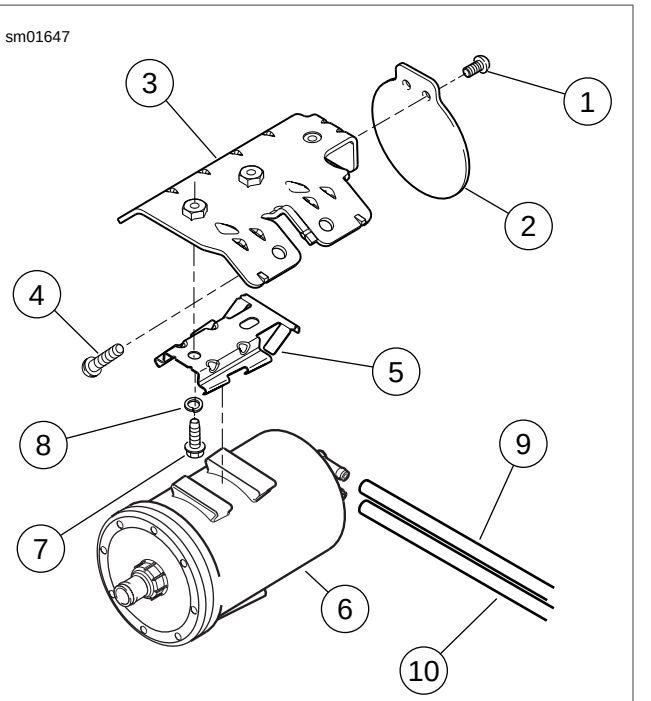
CAUTION

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)

NOTE

If D.O.T. 4 brake fluid contacts painted surfaces, IMMEDIATELY flush area with clear water.

5. If canister mounting bracket requires repair/replacement, proceed as follows:
   a. Drain rear master cylinder reservoir and detach reservoir hose from rear master cylinder. See 2.12 REAR BRAKE MASTER CYLINDER RESERVOIR.
   b. Remove two screws (4) to detach canister mounting bracket from rear master cylinder mounting bracket.



1. **Screw (2)**
2. **Canister guard**
3. **Canister mounting bracket**
4. **Screw (2)**
5. **Canister clip**
6. **Charcoal canister**
7. **Screw (2)**
8. **Washer (2)**
9. **Purge hose from induction module**
10. **Vent hose from vapor valve**

Figure 4-66. Charcoal Canister Mounting

Installation

⚠CAUTION

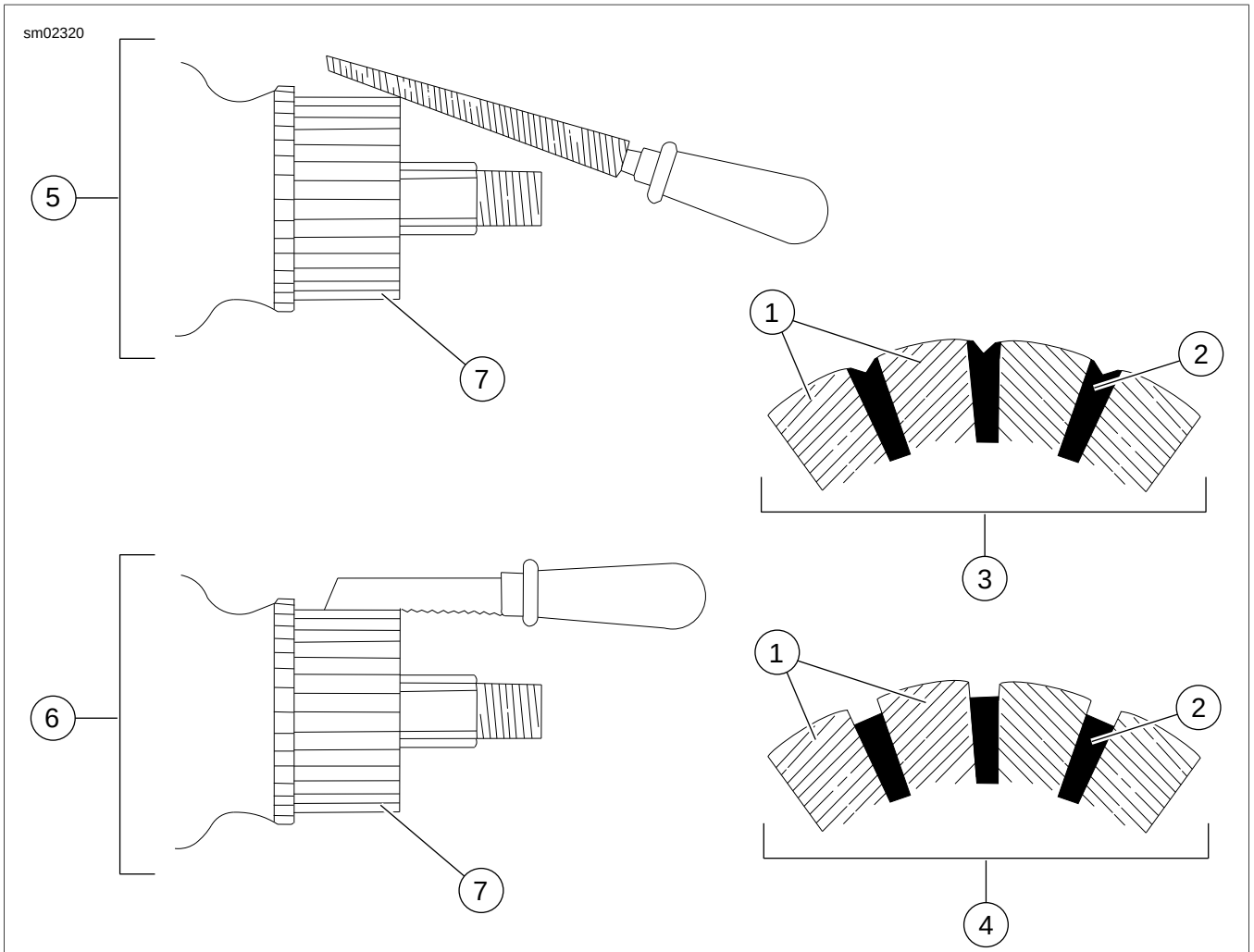
Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in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

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)

NOTE

If D.O.T. 4 brake fluid contacts painted surfaces, IMMEDIATELY flush area with clear water.



1. **Segments**
2. **Mica**
3. **Incorrect (Mica must not be left with a thin edge next to segments)**
4. **Correct (Mica must be cut away clean between segments)**
5. **Starting groove in mica with 3 cornered file**
6. **Undercutting mica with piece of hacksaw blade**
7. **Commutator**

Figure 5-2. Undercutting Mica Separators

GENERAL

The primary chain adjuster mechanism maintains proper tension on the primary chain.

An opening between the primary drive and transmission compartments allows the same lubricant supply to lubricate moving parts in both areas. Since the primary chain runs in lubricant, little service will be required other than checking lubricant level and chain tension. If, through hard usage, the primary chain does become worn, it must be replaced. Remove and install the chain following the procedure under 6.4 PRIMARY DRIVE AND CLUTCH.

REMOVAL

Primary Cover

WARNING

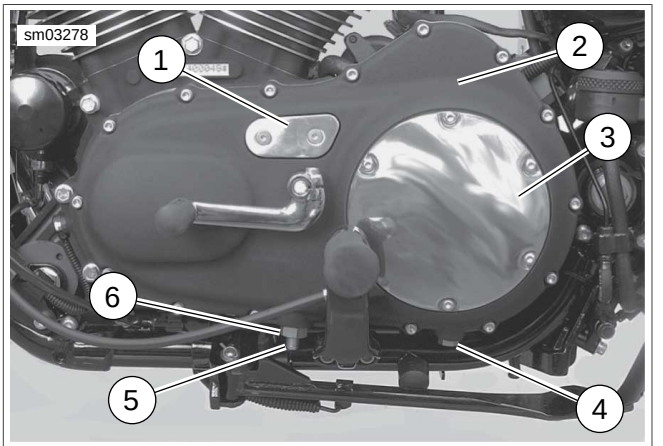
To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect battery cables (negative (-) cable first) before proceeding. (00307a)

1. Disconnect negative (-) battery cable from stud on engine crankcase behind starter motor assembly. See 1.16 BATTERY MAINTENANCE.
2. Open left side cover. See 2.16 LEFT SIDE COVER.
3. Remove positive (+) battery cable from battery positive (+) terminal. See 1.16 BATTERY MAINTENANCE.
4. Close left side cover.
5. Remove left side rider footrest and mounting bracket assembly.
   a. **Models equipped with mid-mount foot controls:** see 2.33 RIDER FOOT CONTROLS: ALL MODELS EQUIPPED WITH MID-MOUNT CONTROLS for removal procedure.
   b. **Models equipped with forward foot controls:** see 2.34 RIDER FOOT CONTROLS: ALL MODELS EQUIPPED WITH FORWARD CONTROLS for removal procedure.
6. See Figure 6-1. Place a drain pan under the engine. Remove drain plug (4) and drain lubricant from primary drive housing.
7. Loosen lock nut (6). Turn chain adjuster screw (5) counterclockwise to relax primary chain tension.
8. Remove gear shifter lever and rubber washer from transmission shifter shaft.
9. See Figure 6-2. Slide rubber boot (1) on clutch cable adjuster (2) upward to expose adjuster mechanism. Loosen jam nut (3) from adjuster. Turn adjuster to shorten cable housing until there is a large amount of freeplay at clutch hand lever. See 1.10 CLUTCH, Adjustment.
10. See Figure 6-3. Remove six screws (1) and clutch inspection cover (2). Remove quad ring (7) from groove in primary cover (8). Discard quad ring.
11. Slide hex lockplate and attached spring (3) from flats of adjusting screw (9).
12. Turn adjusting screw clockwise to release ramp assembly (5) and coupling mechanism (6). As the adjusting screw is turned, ramp assembly moves forward. Unscrew nut (4) from end of adjusting screw.
13. Remove hook of ramp from cable coupling. Remove clutch cable end from slot in coupling. Remove coupling and ramp assembly.
14. Turn cable end fitting (14) counterclockwise to remove clutch cable lower section from primary cover. Remove and discard o-ring (12) from cable end fitting.
15. Remove sixteen screws with captive washers (11) securing primary cover to engine crankcase. Remove cover and gasket (10). Discard gasket.
16. See Figure 6-4. Remove and discard shifter shaft oil seal (4).
17. Clean all metal parts in a non-volatile cleaning solution or solvent.

WARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

18. Blow parts dry with low pressure compressed air.



1. **Primary chain inspection cover**
2. **Primary cover**
3. **Clutch inspection cover**
4. **Drain plug**
5. **Primary chain adjuster screw**
6. **Lock nut**

Figure 6-1. Primary Cover: All Models

REMOVAL

PART NUMBER	TOOL NAME
HD-38362	SPROCKET LOCKING LINK (883 CC)
HD-46283	SPROCKET LOCKING LINK (1200 CC)

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect battery cables (negative (-) cable first) before proceeding. (00307a)

NOTE

See Figure 6-11. If replacement of clutch pack (28) is the only service work required, perform REMOVAL Steps 1 and 4 only, and then proceed to the NOTES under DISASSEMBLY.

1. Disconnect negative (-) battery cable from stud on engine crankcase behind starter motor assembly. See 1.16 BATTERY MAINTENANCE.
2. Open left side cover. See 2.16 LEFT SIDE COVER.
3. Remove positive (+) battery cable from battery positive (+) terminal. See 1.16 BATTERY MAINTENANCE.
4. Remove primary cover, as described under 6.2 PRIMARY CHAIN ADJUSTER. Discard primary cover gasket.

NOTES

- *See Figure 6-12. In the next step, you will be positioning the SPROCKET LOCKING LINK (1) on the engine and clutch sprockets. Make sure you do not position the sprocket locking link too close to the shifter shaft (2). If the sprocket locking link contacts the shifter shaft while you are exerting force to loosen the engine sprocket nut, the sprocket locking link may damage the shifter shaft and/or the engine crankcase.*
- *To determine the correct sprocket locking link for your application, refer to tool table.*

5. See Figure 6-12. Install SPROCKET LOCKING LINK (883 CC) (Part No. HD-38362) or SPROCKET LOCKING LINK (1200 CC) (Part No. HD-46283). Remove the engine sprocket nut. Do not remove engine sprocket at this time.
6. See Figure 6-11. Remove large retaining ring (16). Remove adjusting screw assembly (12, 13, 14 and 15) from pressure plate (11).

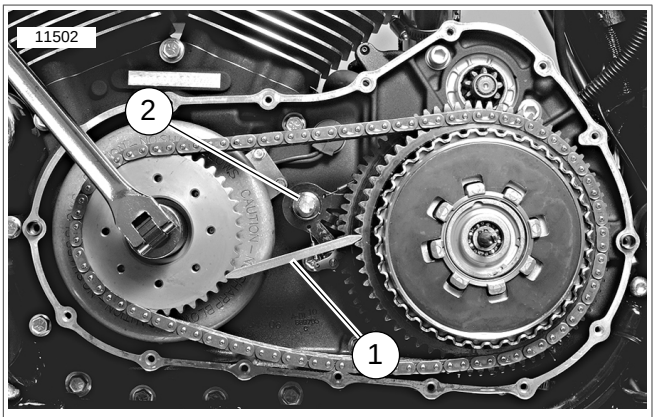
NOTE

Transmission mainshaft nut (7) has left-hand threads. Turn nut clockwise to loosen and remove from mainshaft.

7. Remove nut (7) and spring washer (6). Remove the clutch assembly, primary chain and engine sprocket as an assembly from the vehicle.
8. Inspect primary chain. If damaged or excessively worn, remove it from engine sprocket and clutch assembly; replace original primary chain with a **new** one.
9. Inspect stator and rotor. See 7.25 ALTERNATOR. Replace damaged parts as necessary.

NOTE

If replacement of primary chain is the only service work required, proceed directly to 6.4 PRIMARY DRIVE AND CLUTCH, Installation. Skip Step 1 and begin with the NOTE preceding Step 2.



1. **Sprocket locking link**
2. **Shifter shaft**

Figure 6-12. Using Sprocket Locking Link (Part No. HD-46283 or HD-38362) to Loosen Engine Sprocket Nut

DISASSEMBLY

NOTES

- *See Figure 6-11. If replacement of clutch pack (28) is the only service work required, perform DISASSEMBLY Steps 2 - 5 and 7 only, and then proceed to the NOTE under INSPECTION AND REPAIR.*
- ***Observe all WARNING and CAUTION statements which apply to the steps specified.***

1. See Figure 6-11. With clutch assembly removed from primary chaincase, reinstall adjusting screw assembly (12, 13, 14 and 15) into pressure plate (11), noting that two tabs on perimeter of release plate (15) must be inserted into corresponding recesses in pressure plate. Secure the adjusting screw assembly with retaining ring (16).

⚠WARNING

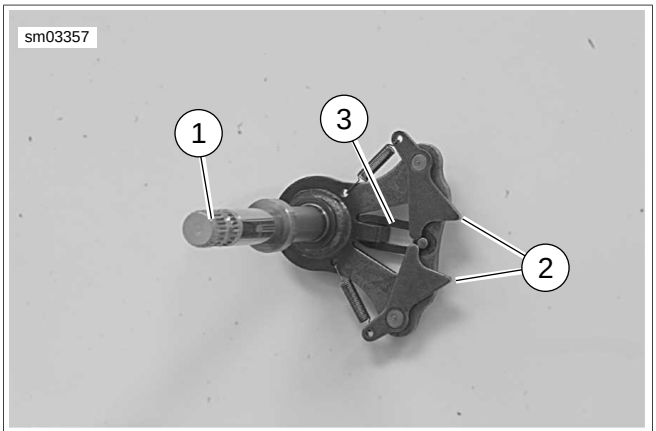
Disassemble clutch using a spring compressing tool. The diaphragm spring is compressed and, if removed without proper tools can fly out, which could result in death or serious injury. (00292a)

2. Thread the CLUTCH SPRING FORCING SCREW (1, Figure 6-13) onto the clutch adjusting screw (12, Figure 6-11). Place the bridge (2, Figure 6-13) of SPRING COMPRESSING TOOL against diaphragm spring (17, Figure 6-11). Thread the tool handle (3, Figure 6-13) onto end of forcing screw.

NOTE

Figure 6-11. Turn compressing tool handle only enough to remove retaining ring (19) and spring seat (18). Excessive compression of diaphragm spring could damage clutch pressure plate.

3. See Figure 6-11. With a wrench on the clutch spring forcing screw flats to prevent the forcing screw from turning, turn handle clockwise until tool relieves pressure on retaining ring (19) and spring seat (18).



1. **Shifter shaft**
2. **Ratchet arms**
3. **Return spring**

Figure 6-29. Shifter Shaft Assembly

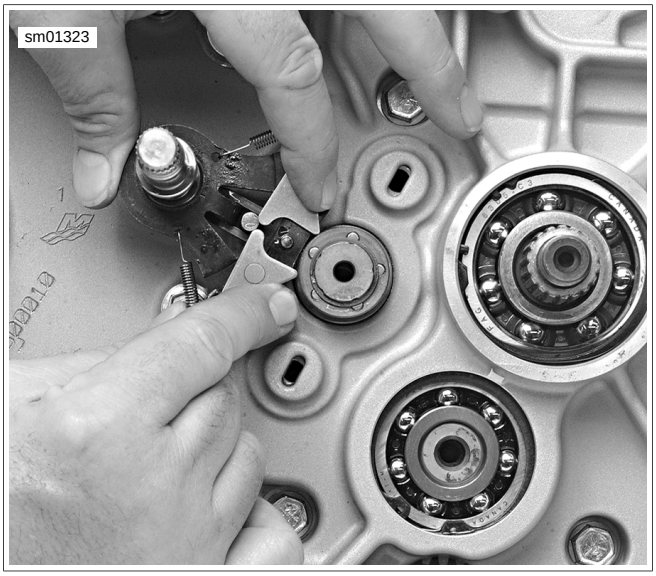


Figure 6-30. Removing Shifter Shaft Assembly

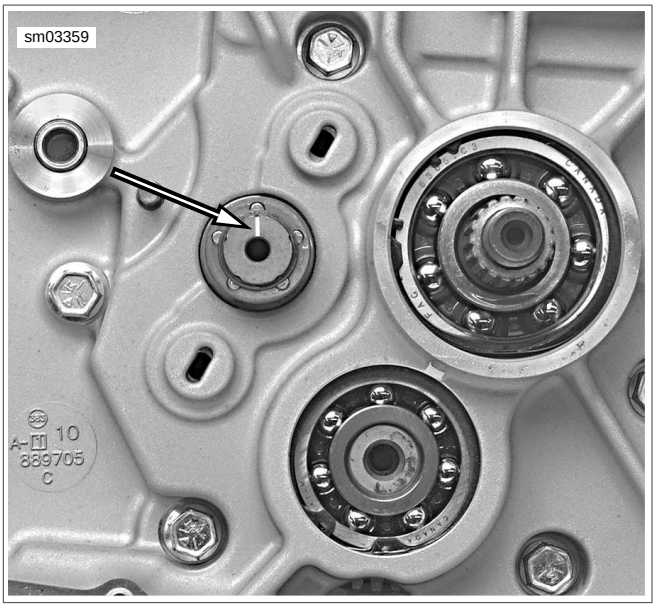


Figure 6-31. Scribed Line on Shifter Drum at 12 o'clock

MAINSHAFT ASSEMBLY

PART NUMBER	TOOL NAME
J-5586-A	RETAINING RING PLIERS

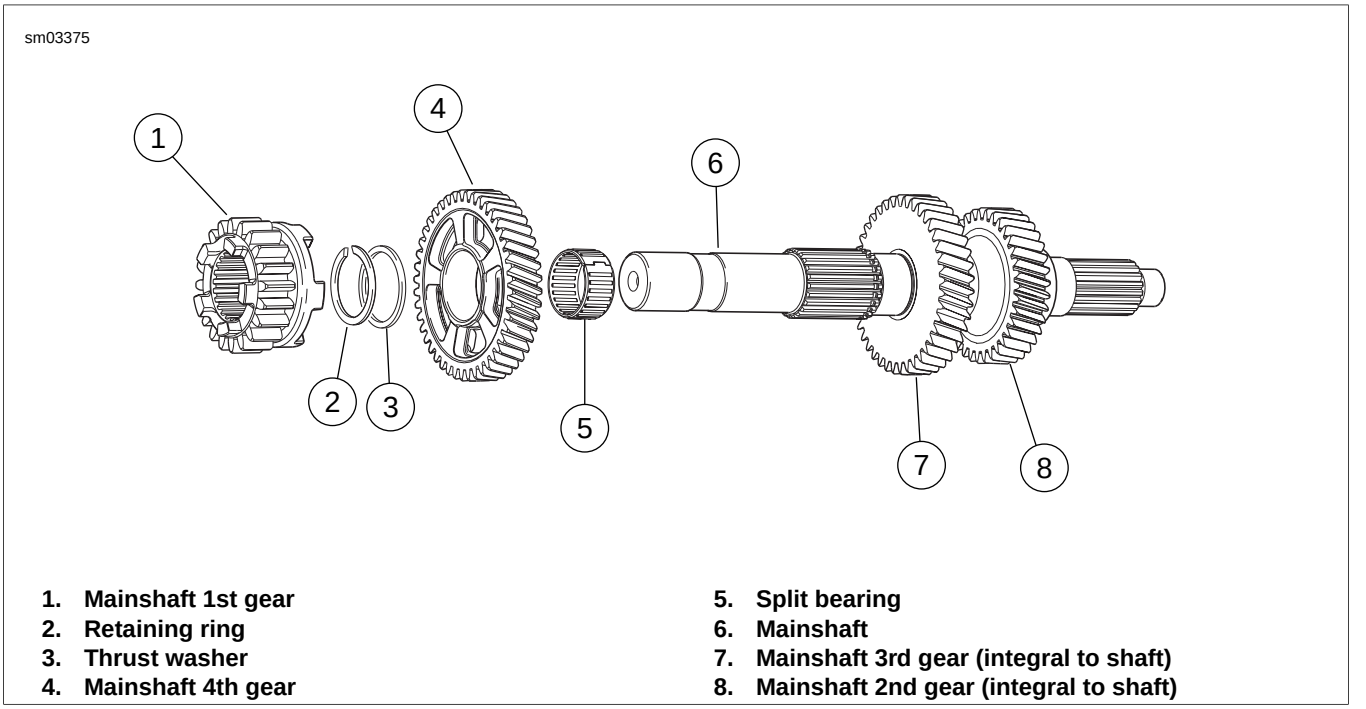
WARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

NOTES

- *Use correct retaining ring pliers and correct tips. Verify that tips are not excessively worn or damaged.*
- *During assembly, the split bearings and the internal bores of the gears must be lubricated with Harley-Davidson FORMULA+ TRANSMISSION AND PRIMARY CHAIN-CASE LUBRICANT prior to assembly. Leaving these parts dry could accelerate wear at start-up.*

1. See Figure 6-45. Install **new** split bearing (5) in 4th gear position on mainshaft.
2. Install 4th gear (4) and thrust washer (3).
3. Using RETAINING RING PLIERS (Part No. J-5586-A), expand and install new retaining ring (2).
4. Install 1st gear (1).



1. **Mainshaft 1st gear**
2. **Retaining ring**
3. **Thrust washer**
4. **Mainshaft 4th gear**
5. **Split bearing**
6. **Mainshaft**
7. **Mainshaft 3rd gear (integral to shaft)**
8. **Mainshaft 2nd gear (integral to shaft)**

Figure 6-45. Transmission Mainshaft Assembly Once Removed from Left Crankcase/Disassembly

COUNTERSHAFT ASSEMBLY

PART NUMBER	TOOL NAME
J-5586-A	RETAINING RING PLIERS

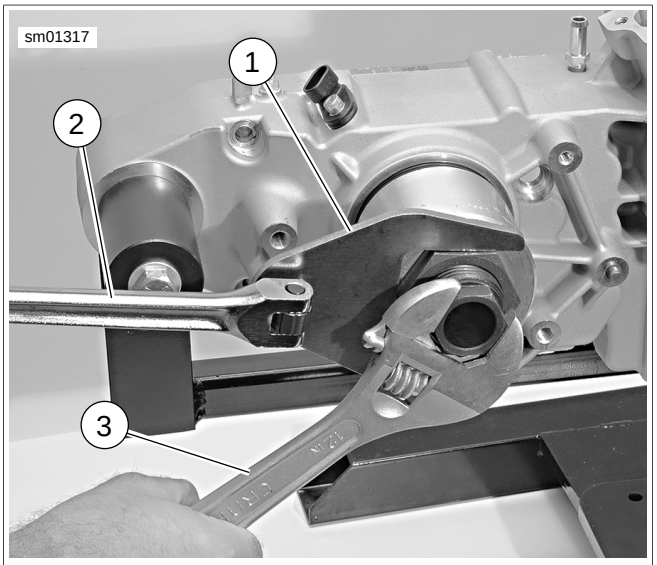
WARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

NOTES

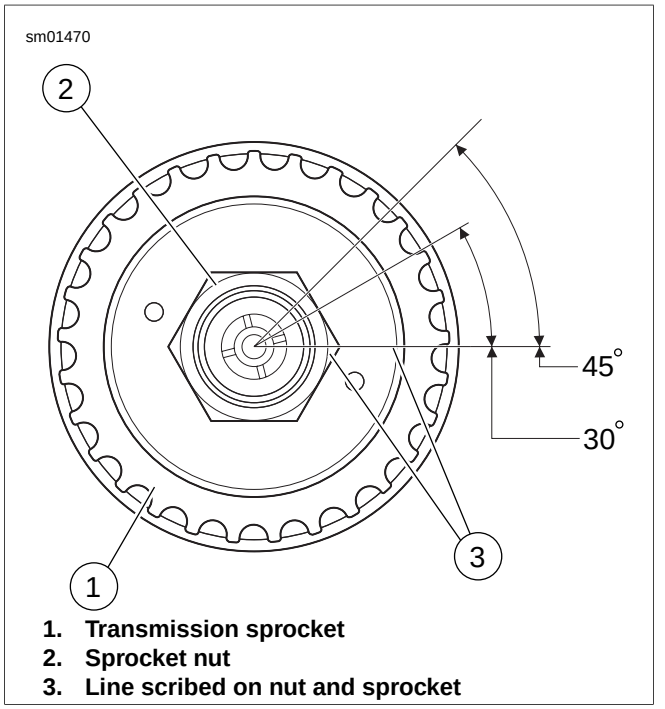
- *Use correct retaining ring pliers and correct tips. Verify that tips are not excessively worn or damaged.*
- *During assembly, the split bearings and the internal bores of the gears must be lubricated with Harley-Davidson FORMULA+ TRANSMISSION AND PRIMARY CHAIN-CASE LUBRICANT prior to assembly. Leaving these parts dry could accelerate wear at start-up.*

1. See Figure 6-46. Install **new** split bearing (3) in 1st gear position on mainshaft.
2. Install 1st gear (4) and thrust washer (5).
3. Using RETAINING RING PLIERS (Part No. J-5586-A), expand and install **new** retaining ring (6).



1. **Crowfoot wrench**
2. **1/2 inch breaker bar**
3. **Adjustable wrench**

Figure 6-65. Press Seal Into Crankcase



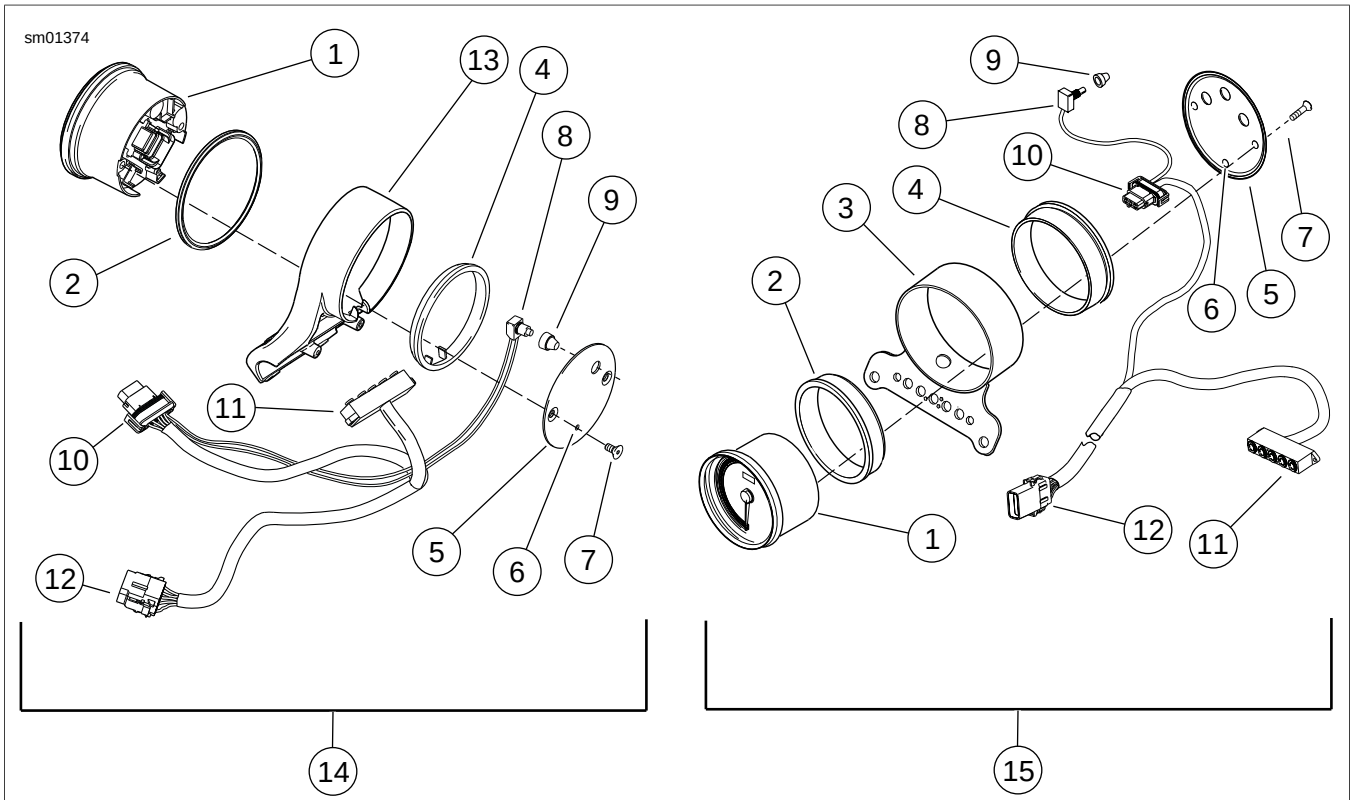
1. **Transmission sprocket**
2. **Sprocket nut**
3. **Line scribed on nut and sprocket**

Figure 6-85. Transmission Sprocket Nut Final Tightening Procedure

NOTES

- *Maximum allowable tightening of sprocket nut is 45° of counterclockwise rotation, after initially tightening to 50 ft-lbs. Do not loosen sprocket nut while attempting to align the screw holes. If you cannot align lockplate and sprocket screw holes, nut may be additionally tightened until screw holes line up, but do not exceed 45° as specified above. Tightening too much or little may cause the nut to come loose during vehicle operation.*
- *To ensure the lockplate's security, you must use BOTH screws when you install the lockplate.*

3. Tighten socket head screws (5) to 90-110 **in-lbs** (10.2-12.4 Nm).
4. **XL models without passenger footrests:** remove SPROCKET HOLDING TOOL ADAPTER (Part No. HD-46282-1).
5. See Figure 6-82. Install screw and washer (6) to secure muffler interconnect bracket to engine crankcase. Tighten to 30-33 ft-lbs (40.7-44.8 Nm) .
6. Install rear drive belt onto transmission sprocket. See 6.5 SECONDARY DRIVE BELT.
7. Adjust rear belt deflection and rear wheel alignment. See 1.14 REAR BELT DEFLECTION.
8. Install belt guard. See 2.19 BELT GUARD AND DEBRIS DEFLECTOR.
9. See Figure 6-81. Install sprocket cover (1). Secure with two screws (2, 3). Note that long screw goes in top hole, short screw in bottom hole. Do not tighten screws at this time.
10. Install exhaust pipe clamp bracket (4), washer (5) and screw (6). Tighten to 30-33 ft-lbs (40.7-44.8 Nm) . Now tighten screws (2, 3) to 80-120 **in-lbs** (9.0-13.6 Nm).
11. Install rear exhaust pipe and rear muffler. See 4.11 EXHAUST SYSTEM.
12. Plug in Maxi-Fuse. See 7.34 MAXI-FUSE.



1. **Speedometer**
2. **Front gasket**
3. **Instrument housing/bracket**
4. **Back gasket**
5. **Back plate**
6. **Vent hole**
7. **Screw (2)**
8. **Trip odometer reset switch**
9. **Reset switch boot**
10. **Speedometer harness connector [39B]**
11. **Indicator lamp module**
12. **Instrument harness connector [20A]**
13. **XL 1200L/XL 1200N**
14. **All other single gauge models except XL 883C/XL 1200C**

Figure 7-11. Speedometer Components Single Gauge Models Except XL 883C/XL 1200C

GENERAL

See Figure 7-24. The battery tray is located behind the vehicle's left side cover. The battery tray is a light-weight, sturdy plastic assembly which supports the battery, TSM/TSSM/HFSM, and rear brake lamp switch assembly.

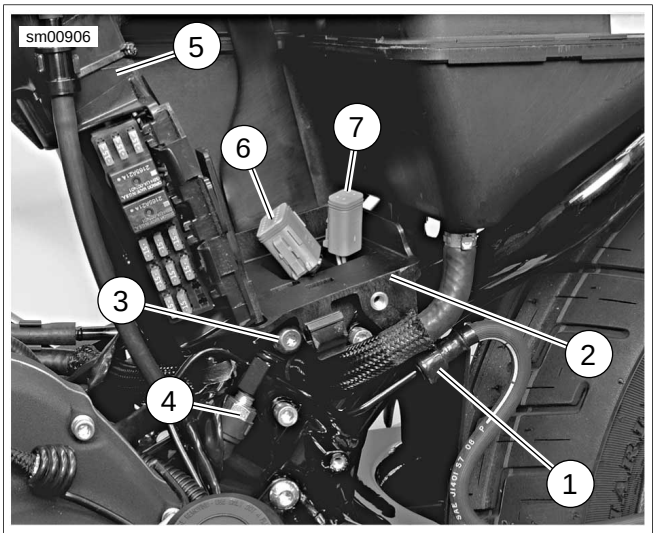
REMOVAL

1. Remove left side cover. See 2.16 LEFT SIDE COVER.

WARNING

Prevent accidental vehicle start-up, which could cause death or serious injury. First disconnect negative (-) battery cable at engine and then positive (+) cable from battery. (00280b)

2. Disconnect battery cables, negative cable first, and remove battery. See 1.16 BATTERY MAINTENANCE.
3. Reach under battery tray and push TSM/TSSM/HFSM up from cavity in bottom of tray. Unplug and remove TSM/TSSM/HFSM. See 7.8 TURN SIGNAL AND SECURITY MODULE (TSM/TSSM/HFSM).
4. Remove rear brake master cylinder reservoir cover by grasping cover and gently pull straight out from reservoir. Unbolt reservoir and secure out of the way with an elastic tiedown cord, mechanic's wire or cable strap. See 2.12 REAR BRAKE MASTER CYLINDER RESERVOIR.
5. See Figure 7-24. Remove screw securing rear brake hose clamp (1) to battery tray (2).



1. **Rear brake hose clamp**
2. **Battery tray**
3. **TORX screw**
4. **Rear brake lamp switch assembly**
5. **H-bracket**
6. **TSM/TSSM/HFSM 12-pin connector [30B]**
7. **4-pin connector [208B] (HFSM only)**

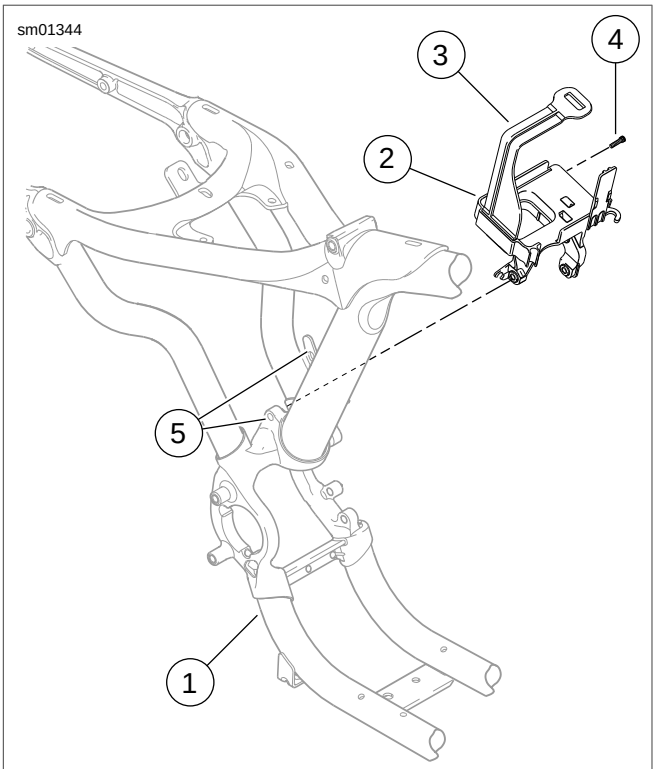
Figure 7-24. Battery Tray Assembly

6. Remove TORX screw (3) securing rear brake lamp switch assembly (4) to battery tray. Gently pull brake lamp switch assembly back out of the way. Do not bend or stress metal brake lines.
7. See Figure 7-25. Remove three screws (4) securing battery tray to mounting tabs (5) on frame.
8. See Figure 7-26. Slide H-bracket (1) up frame tube as far as possible and disengage battery tray upright support (3) from tabs (2) on H-bracket.

WARNING

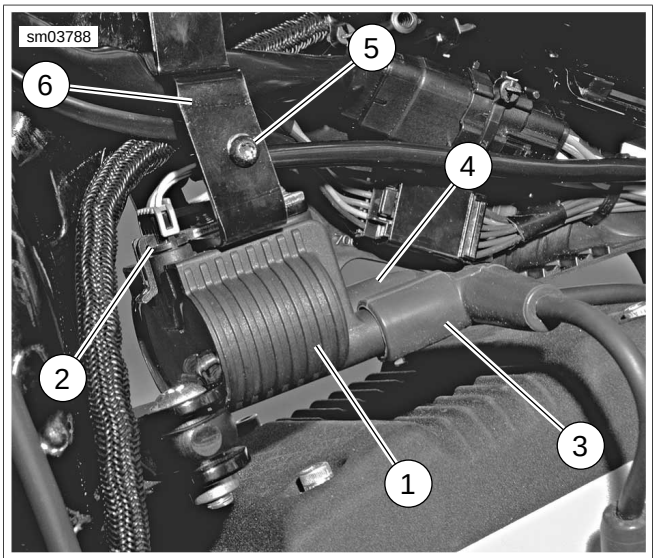
Prevent accidental vehicle start-up, which could cause death or serious injury. First disconnect negative (-) battery cable at engine and then positive (+) cable from battery. (00280b)

9. Lift up battery tray slightly so that mounting tabs will clear mounts on frame. See Figure 7-25. As you lift up on tray, pull down gently on end of battery strap support (3) to clear frame and wiring harnesses above battery tray.
10. Slide battery tray out and remove from left side of vehicle.



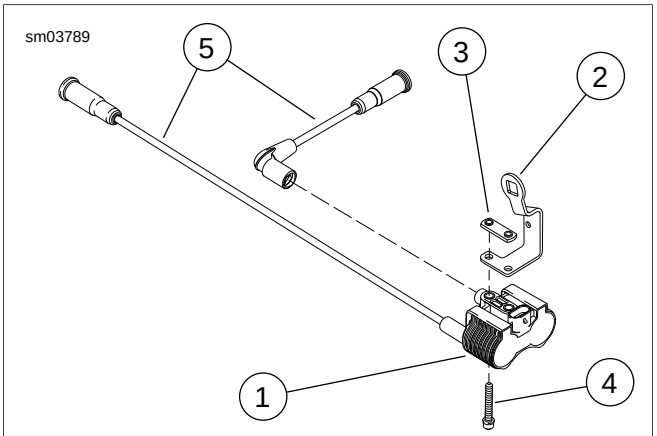
1. **Frame**
2. **Battery tray**
3. **Battery strap support**
4. **Screw (3)**
5. **Tray mounting tabs on frame (3)**

Figure 7-25. Battery Tray Mounting Screws



1. **Ignition coil**
2. **Coil harness connector [83B]**
3. **Front spark plug boot and cable**
4. **Rear spark plug boot and cable**
5. **Screw**
6. **Mounting bracket**

Figure 7-36. Ignition Coil Mounting and Connections



1. **Ignition coil**
2. **Mounting bracket**
3. **Nut plate**
4. **Screw (2)**
5. **Spark plug cables (2)**

Figure 7-37. Ignition Coil Mounting

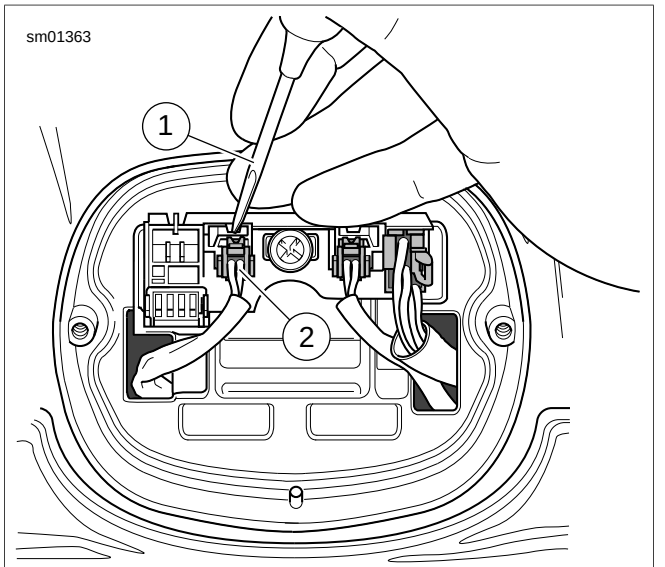
INSTALLATION

1. See Figure 7-37. Position **new** ignition coil (1) on underside of mounting bracket (2). Fasten coil to mounting bracket with two screws (4) and nut plate (3). Tighten screws to 24-72 **in-lbs** (2.7-8.1 Nm).
2. See Figure 7-36. Slide coil (1) with mounting bracket (6) into position. Make sure all wiring harnesses from front end of vehicle are positioned between coil bracket upright and vehicle frame. Secure bracket with screw (5) and tighten to 35-45 **in-lbs** (4.0-5.1 Nm).
3. Plug spark plug cables into ignition coil towers; front spark plug cable (3) to left side of coil, rear spark plug cable (4) to right side of coil.
4. See Figure 7-35. Mate left wire harness caddy (2) to right wire harness caddy. Secure with screw (1) and tighten. See 7.29 ELECTRICAL CADDIES.
5. Install fuel tank. See 4.4 FUEL TANK.

⚠WARNING

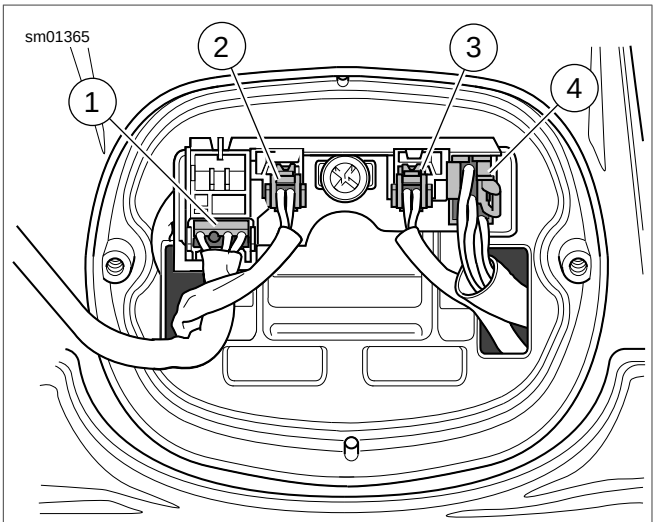
After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

6. Install seat. See 2.32 SEAT.
7. Plug in Maxi-Fuse. See 7.34 MAXI-FUSE.



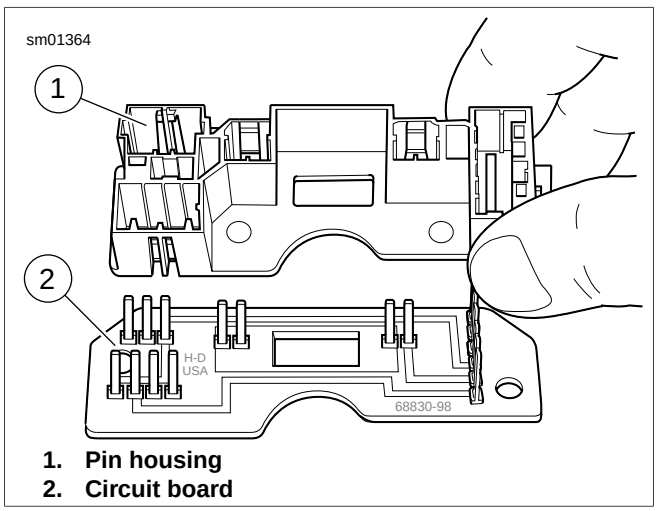
1. **Terminal pick**
2. **2-pin connector**

Figure 7-49. Removing 2-Pin Connectors



1. **Tail lamp [93]**
2. **Left turn signal [18]**
3. **Right turn signal [19]**
4. **Power in [94]**

Figure 7-51. Tail Lamp Base Connectors

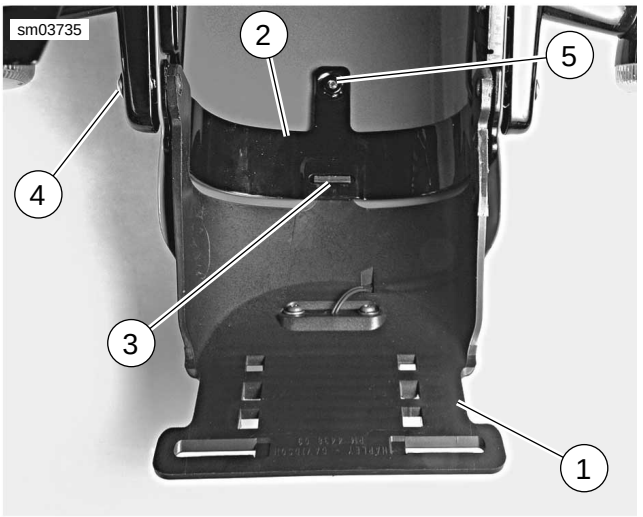


1. **Pin housing**
2. **Circuit board**

Figure 7-50. Pin Housing and Circuit Board

Table 7-8. Connector Specifications

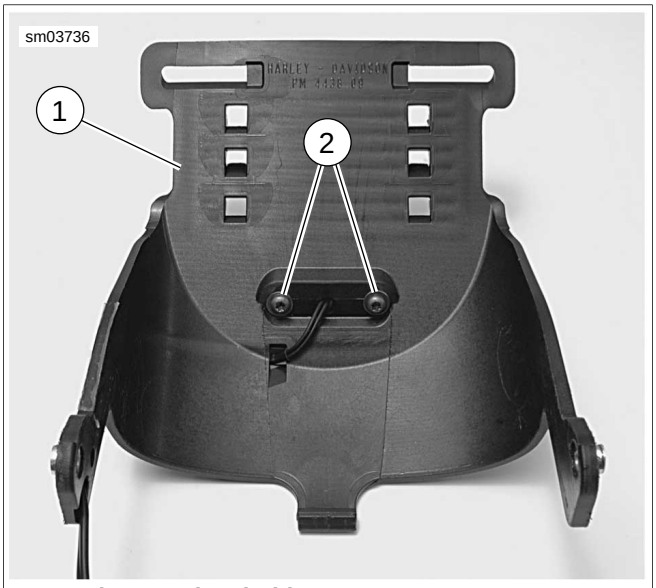
FUNCTION	TYPE	NUMBER	WIRE COLOR	CAVITY
Right turn signal	2-pin Mulitlock	19	V	1
			BK	2
Left turn signal	2-pin Multilock	18	V	1
			BK	2
Tail lamp	4-pin Mulitlock	93	BE	1
			O/W*	2
			R/Y	3
			BK	4



1. **License plate holder**
2. **Rear fender brace**
3. **Tab**
4. **Fender support screw with washer (2)**
5. **Screw with washer**

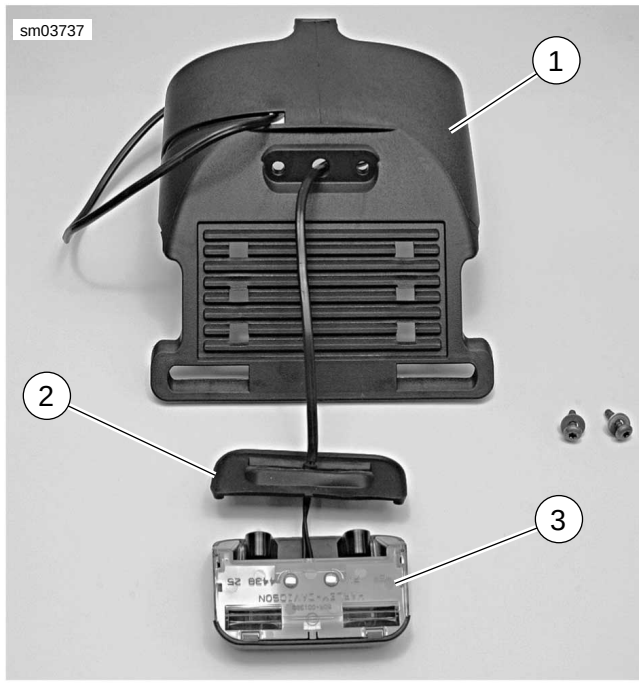
Figure 7-70. License Plate Holder: XL 1200N (HDI)

7. See Figure 7-71. Remove two screws with washers (2) securing license plate lamp housing to license plate holder (1). See Figure 7-72. Separate lamp housing (3) and gasket (2) from license plate holder (1).



1. **License plate holder**
2. **Screw with washer (2)**

Figure 7-71. License Plate Holder and Lamp Mounting Screws: XL 1200N (HDI)



1. **License plate holder**
2. **Gasket**
3. **Lamp housing**

Figure 7-72. Lamp Housing Separated from License Plate Holder: XL 1200N (HDI)

8. See Figure 7-73. Insert the tip of a small flat bladed screwdriver (3) into each slot (2) in lamp housing. Gently tilt screwdriver handle outward (away from lamp housing) just enough to disengage housing from cover. Separate housing from cover and slide housing away from tabs (4) in cover.
9. See Figure 7-74. If replacing a light bulb (2), gently pull bulb straight out of socket assembly (3). Push **new** light bulb into socket.

GENERAL

The vehicle speed sensor (VSS) is powered and monitored by the Electronic Control Module (ECM). The ECM processes the vehicle speed signal and transmits this signal to the turn signal module/turn signal security module (TSM/TSSM) and speedometer through serial data.

NOTE

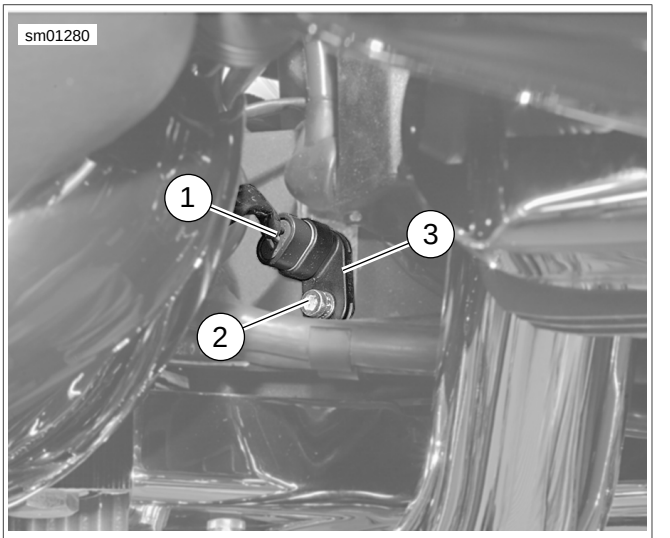
The vehicle speed sensor cannot be repaired. Replace the unit if it fails.

REMOVAL

WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove maxi-fuse before proceeding. (00251a)

1. Unplug Maxi-Fuse. See 7.34 MAXI-FUSE.
2. See Figure 7-87. Disconnect VSS harness connector [65A] (1) from VSS (3) mounted on rear of engine case below starter motor assembly.
3. Remove screw (2). Carefully remove VSS and o-ring from engine crankcase.



1. **VSS connector [65]**
2. **Screw**
3. **Vehicle speed sensor (VSS)**

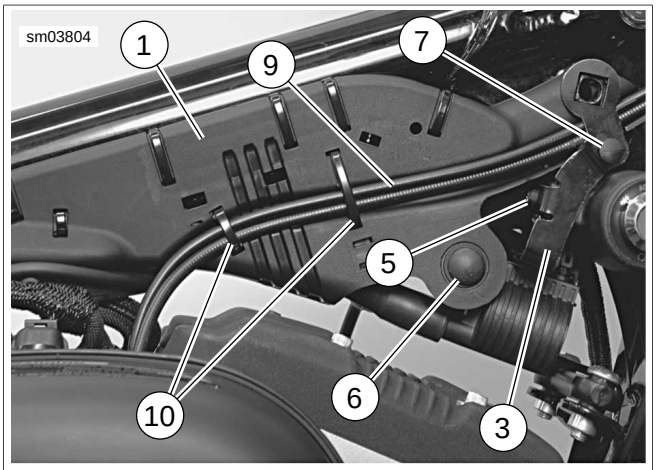
Figure 7-87. Vehicle Speed Sensor: All Models (XL Shown)

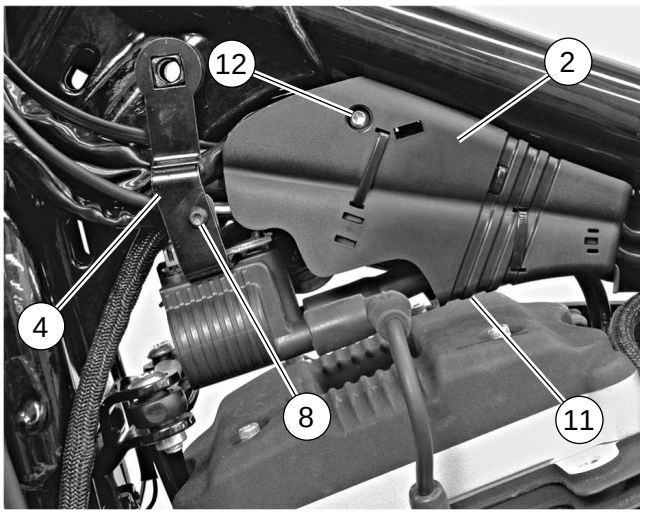
INSTALLATION

NOTE

*The **new** VSS o-ring has a teflon coating that provides lubrication during installation. It is not necessary to coat the o-ring with engine oil or other lubricant to install it.*

1. See Figure 7-87. Carefully install VSS (3) and o-ring into engine crankcase with screw (2). Tighten to 80-100 **in-lbs** (9.0-11.3 Nm).
2. Attach VSS harness connector [65A] (1) to VSS.
3. Plug in Maxi-Fuse. See 7.34 MAXI-FUSE.
4. Start engine and test ride motorcycle to verify proper operation.





1. **Right wire harness caddy**
2. **Left wire harness caddy**
3. **Ignition switch bracket**
4. **Coil bracket**
5. **Screw w/lockwasher (lockwasher between bracket and switch housing)**
6. **Push-in fastener, large**
7. **Push-in fastener, small**
8. **Screw**
9. **Throttle cable (2)**
10. **Cable strap (2)**
11. **Tab (3) (engage left and right caddies)**
12. **Screw**

Figure 7-101. Wire Harness Caddy Assembly

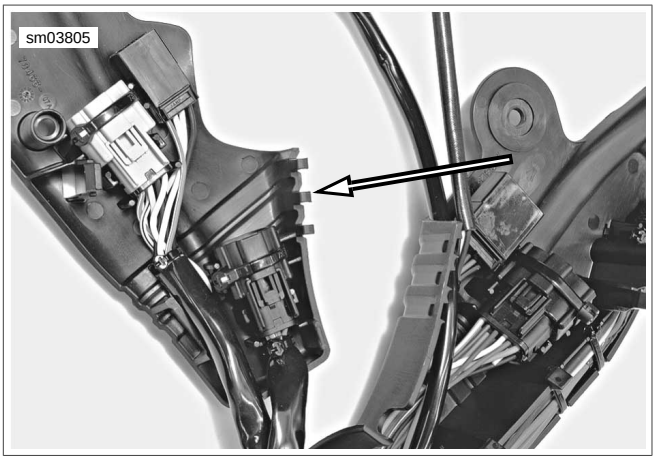


Figure 7-102. Wire Harness Caddy: Locking Tabs

Removal

WARNING

To prevent spray of fuel, purge system of high-pressure fuel before supply line is disconnected. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00275a)

1. Purge the fuel supply hose of high pressure gasoline. Disconnect fuel supply hose from fuel pump module. See 4.4 FUEL TANK.

WARNING

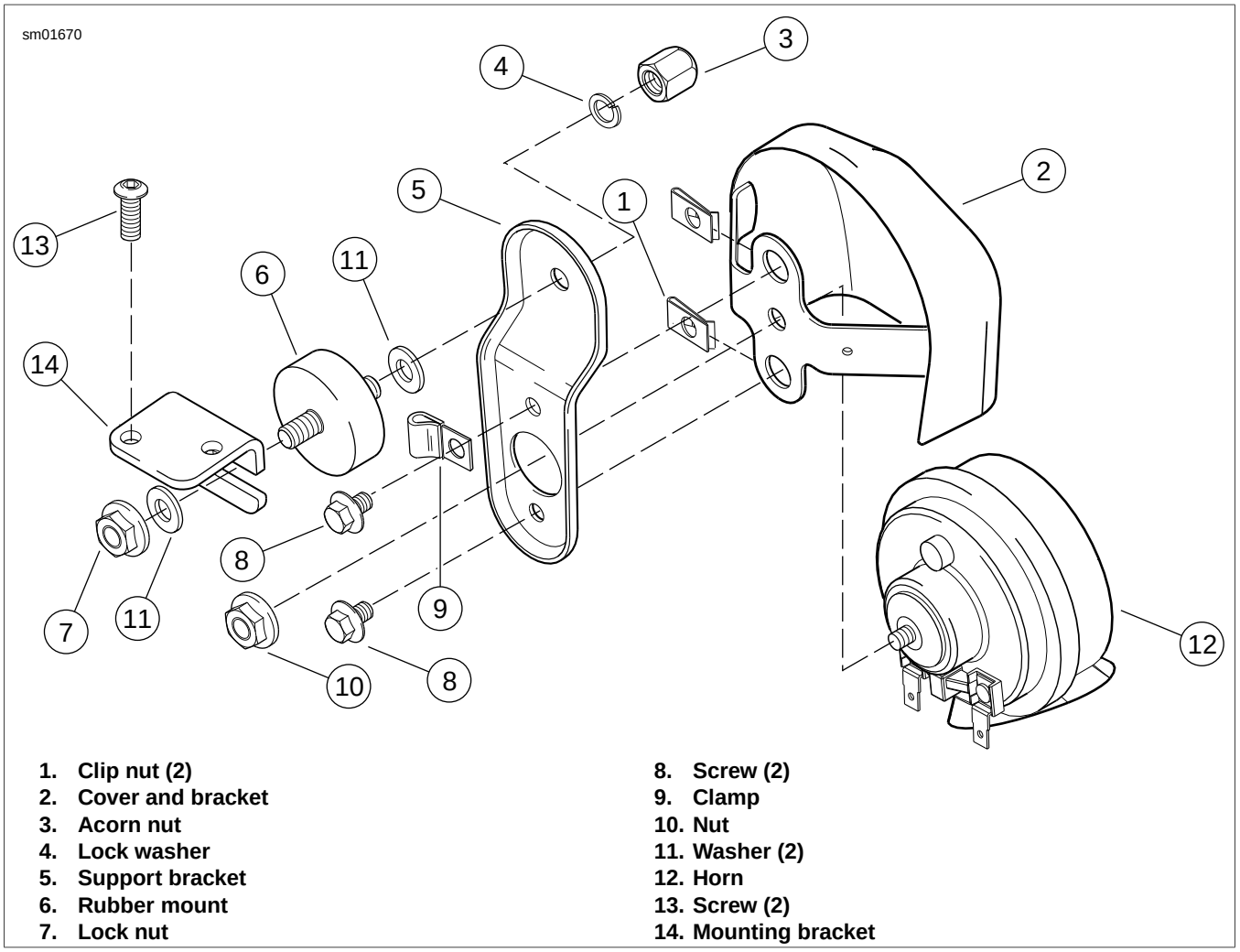
To prevent accidental vehicle start-up, which could cause death or serious injury, remove maxi-fuse before proceeding. (00251a)

2. Unplug Maxi-Fuse. See 7.34 MAXI-FUSE.
3. Remove seat.
4. Remove fuel tank. See 4.4 FUEL TANK.
5. See Figure 7-101. Remove screw (8) and disengage coil bracket (4) from mounting boss on frame.
6. See Figure 7-103. Unhook caddy latch clip (2) from right wire harness caddy (1).

NOTE

It is not necessary to remove rear spark plug cable from wire harness caddy latch clip, unless latch clip is being replaced.

7. If necessary, cut cable strap securing rear spark plug cable to caddy latch clip.
8. Remove engine sub-harness from loop in caddy latch clip.
9. See Figure 7-101. Remove screw (12) and carefully disengage left wire harness caddy (2) from right wire harness caddy (1).
10. Cut two cable straps (10) securing throttle cables (9) to right wire harness caddy.
11. See Figure 7-104. Disengage rear spark plug cable (2) from trough in right wire harness caddy (1). Cut barbed cable strap securing engine sub-harness (3) to right wire harness caddy.



1. **Clip nut (2)**
2. **Cover and bracket**
3. **Acorn nut**
4. **Lock washer**
5. **Support bracket**
6. **Rubber mount**
7. **Lock nut**
8. **Screw (2)**
9. **Clamp**
10. **Nut**
11. **Washer (2)**
12. **Horn**
13. **Screw (2)**
14. **Mounting bracket**

Figure 7-120. Horn Components (Models with Side Mounted Horn)

REMOVAL

NOTE

The removal and installation steps listed apply when replacing the entire switch assembly, switch housing or handlebars.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove maxi-fuse before proceeding. (00251a)

1. Remove maxi-fuse. See 7.3 FUSES AND RELAYS.
2. Using a T27 TORX drive head, remove the two screws with flat washers securing the handlebar clamp to the clutch lever bracket. Remove the clutch hand lever assembly and clamp from the handlebar.
3. Using a T25 TORX drive head, remove the upper and lower switch housing screws.
4. Remove the grip sleeve from the end of the handlebar if damaged.

DISASSEMBLY

1. Using a T25 TORX drive head, remove the upper and lower switch housing screws.
2. If replacing lower housing switches, perform next step before continuing to repair section. If replacing upper housing switches, proceed directly to repair section.
3. Using a T27 TORX drive head, loosen the upper screw securing the handlebar clamp to the clutch lever bracket. Remove the lower clamp screw with flat washer.

SWITCH REPAIR/REPLACEMENT

Upper Housing Repair

NOTE

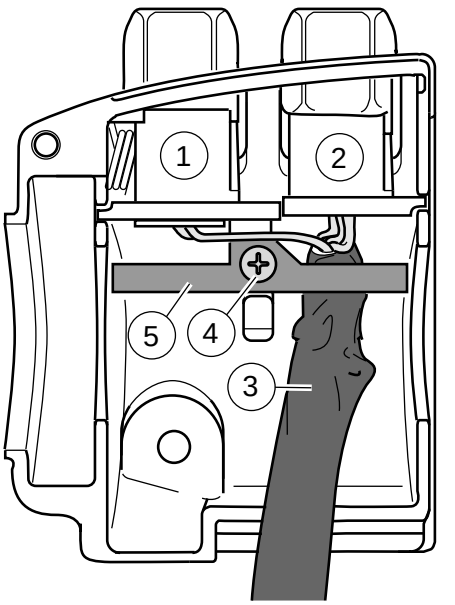
Replace the horn switch and high/low beam switch as a single assembly even if only one switch is determined to be faulty.

1. See Figure 7-135. From inside the switch housing, remove the screw with lockwasher (4) to release the bracket (5). Remove bracket and switch assembly from the housing.
2. Move cable conduit (3) from beneath wing of bracket. Cut wires 0.25 in. (6.4 mm) from old switches (1, 2). Discard old switch and bracket assembly.
3. Slide conduit forward over cut ends of switch wires and cut off 0.5 in. (12.7 mm) of conduit (3) material. Push conduit back to access switch wires.
4. Separate the **new** horn switch (1) and high/low beam switch (2) wires into two bundles.

NOTE

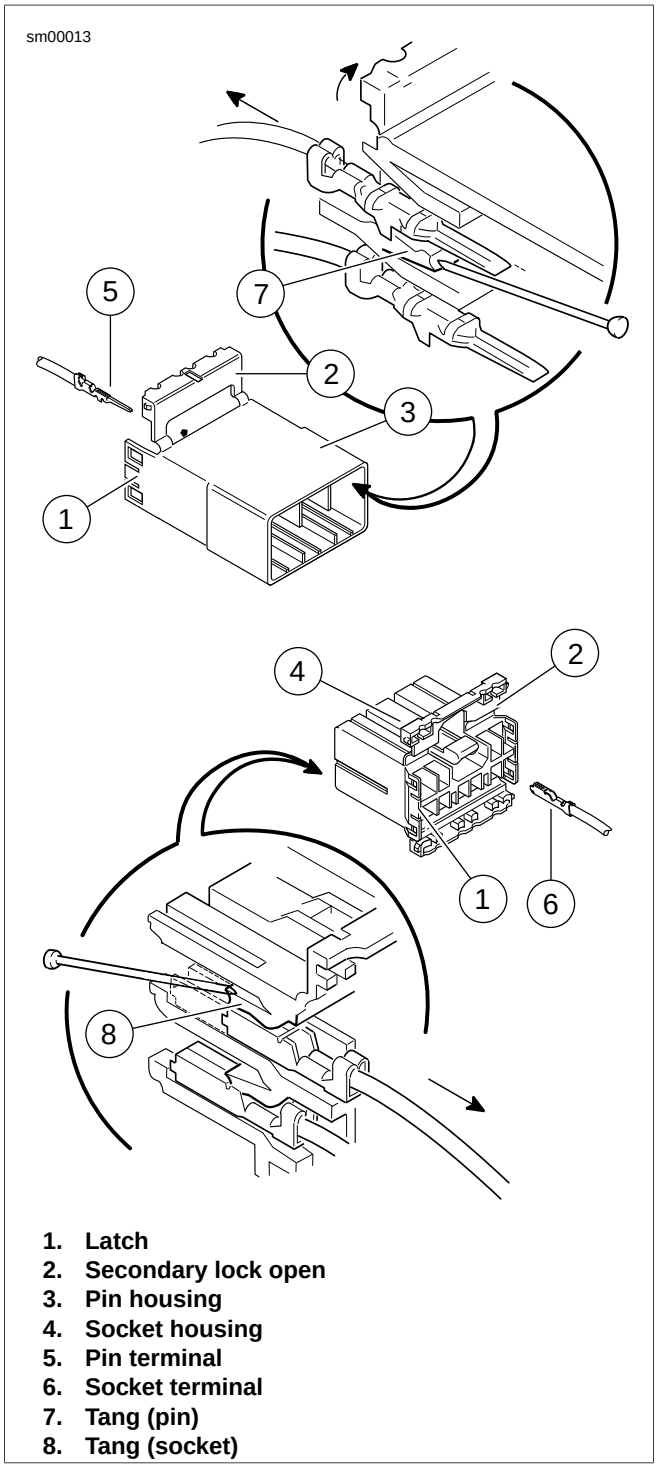
Replacement high/low beam switch and horn switch wires are cut to length of 2.5 in. (63.5 mm) and 2.0 in. (50.8 mm) respectively, and partially stripped.

5. See 7.35 HANDLEBAR SWITCH ASSEMBLIES for information on splicing and general repair practices.
6. Loop switch wires so that spliced lengths are positioned as shown in Figure 7-136. Route wires downstream of splices beneath wing on high/low beam switch side of bracket as shown in Figure 7-135.
7. See Figure 7-136. Install a **new** 7.0 in. (177.8 mm) cable strap (5) beneath wing on horn switch side (1) of bracket and capture wire splices (4).
8. Place switch assembly into upper housing aligning hole in bracket with threaded hole in boss. Be sure that bracket is fully seated. The step at the edge of the boss captures the bottom edge of the bracket, while tabs on each side of the bracket fit in slots cast into the housing.
9. See Figure 7-135. Install screw and lockwasher (4) to secure bracket (5) inside housing. Verify that wing on high/low switch (2) side of bracket captures edge of conduit (3) as shown.
10. Securely tighten cable strap to draw splices to bracket. Remove any excess cable strap material.
11. Continue with 7.37 LEFT HANDLEBAR SWITCHES, Assembly.



1. **Horn switch**
2. **High/low beam switch**
3. **Conduit**
4. **Screw with lockwasher**
5. **Bracket**

Figure 7-135. Upper Housing Without Splices



1. **Latch**
2. **Secondary lock open**
3. **Pin housing**
4. **Socket housing**
5. **Pin terminal**
6. **Socket terminal**
7. **Tang (pin)**
8. **Tang (socket)**

Figure A-4. AMP Multilock Connector: Socket and Pin Housings

Inserting Terminals into Housing

NOTE

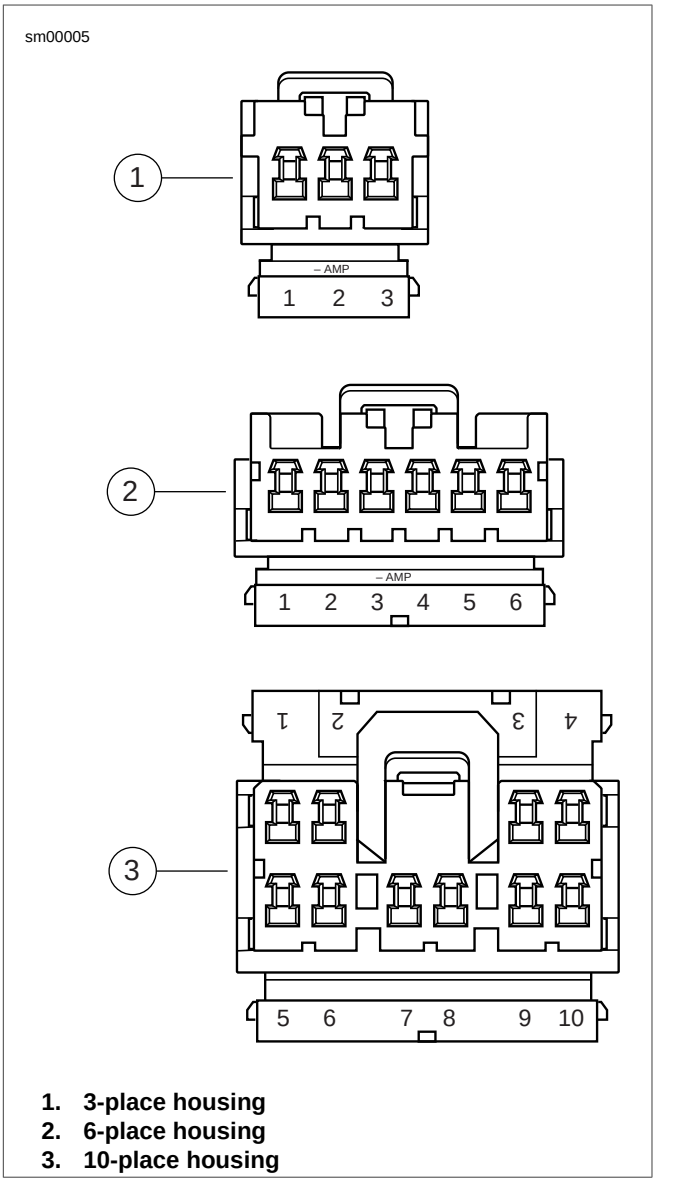
See Figure A-5. Cavity numbers are stamped into the secondary locks of both the socket and pin housings. Match the wire color to the cavity number found on the wiring diagram.

1. Hold the terminal so the catch faces the tang in the chamber. Insert the terminal into its numbered cavity until it snaps in place.

NOTES

- *Up and down can be determined by the position of the release button, the button is the top of the connector.*
- *On the pin side of the connector, tangs are positioned at the bottom of each cavity, so the slot in the pin terminal (on the side opposite the crimp tails) must face downward.*
- *On the socket side, tangs are at the top of each cavity, so the socket terminal slot (on the same side as the crimp tails) must face upward.*

2. Gently tug on wire end to verify that the terminal is locked in place.
3. Rotate the hinged secondary lock inward until tabs fully engage latches on both sides of connector.

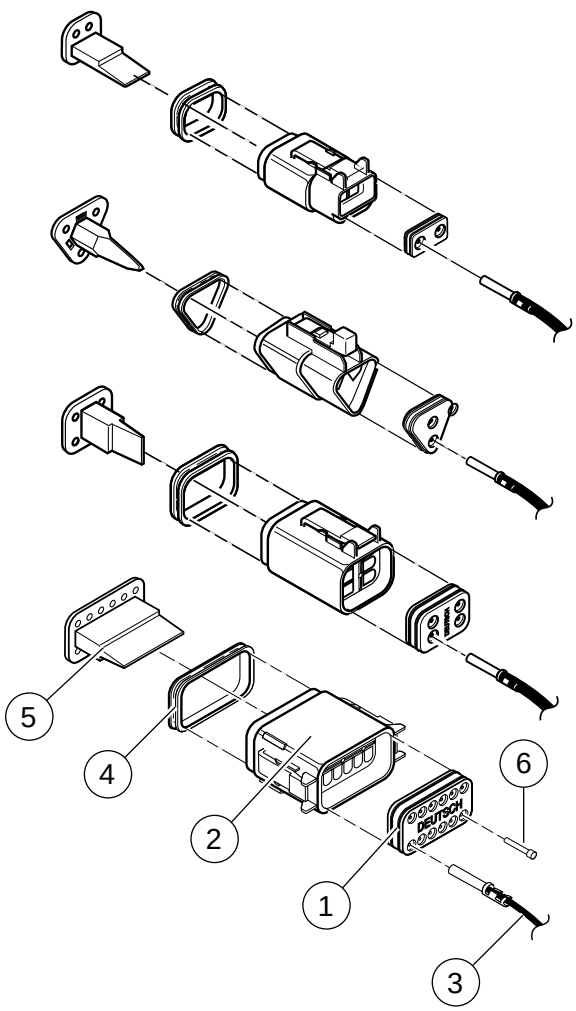


1. **3-place housing**
2. **6-place housing**
3. **10-place housing**

Figure A-5. AMP Multilock Connector: Cavity Numbers on Secondary Locks (Socket Housings Shown)

Preparing Wire Leads for Crimping

1. Strip 5/32 in. (4.0 mm) of insulation from the wire lead.



1. **Wire seal**
2. **Socket housing**
3. **Wire lead**
4. **Internal seal**
5. **Secondary locking wedge**
6. **Seal plug**

Figure A-20. Deutsch Connector: 2, 3, 4 and 12-Place Socket Housings

Removing Pin Terminals

1. Use the hooked end of a stiff piece of mechanics wire, a needle nose pliers or the FLAT BLADE L-HOOK (Part No. HD-41475-100) to remove the secondary locking wedge.
2. Gently depress terminal latches inside pin housing and back out pins through holes in wire seal.

NOTES

- *If wire leads require **new** terminals, see the instructions for crimping terminals.*
- *If it should become necessary to replace a pin or socket housing, please note that the 8-place and 12-place gray and black connectors are not interchangeable. Since location of the alignment tabs differ between the black and gray connectors, plugs or receptacles must be replaced by those of the same color.*
- *When replacing both socket and pin housings, then the black may be substituted for the gray, and vice versa. The socket and pin housings of all other connectors are interchangeable, that is, the black may be mated with the gray, since the alignment tabs are absent and the orientation of the external latch is the same.*

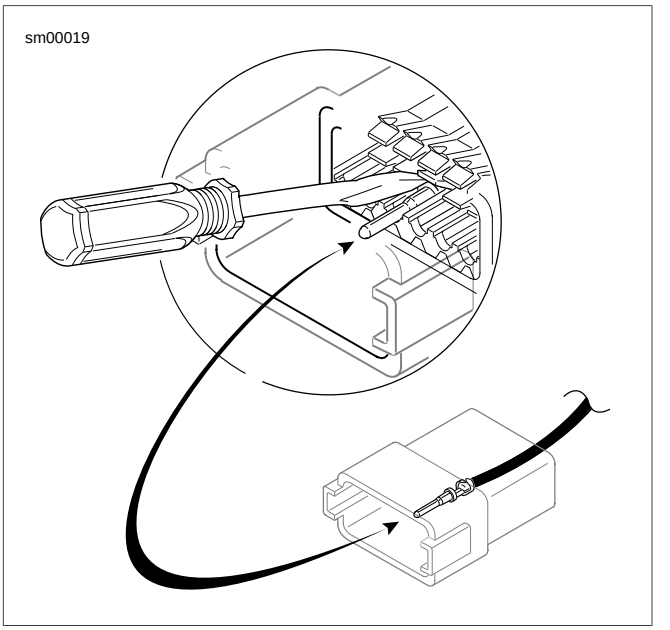


Figure A-21. Deutsch Connector: Depress Terminal Latch and Back Out Pin

Installing Pin Terminals

1. See Figure A-22. Fit wire seal (1) into back of pin housing (2).
2. Grasp wire lead approximately 1.0 in. (25.4 mm) behind the pin terminal (3). Gently push pin through holes in wire seal into its respective numbered chamber until it "clicks" in place.

NOTE

A tug on the wire lead will confirm that a pin is locked in place.

3. Insert tapered end of secondary locking wedge (4) into pin housing and press down until it snaps in place.

NOTES

- *The wedge fits in the center groove of the pin housing and holds the terminal latches tightly closed.*
- *See Figure A-19. While rectangular wedges do not require a special orientation, the conical secondary locking wedge of the 3-place connector must be installed with the arrow (2) pointing toward the external latch.*
- *If the secondary locking wedge does not slide into the installed position easily, verify that all terminals are fully installed in the pin housing. The lock indicates when terminals are not properly installed by not entering its fully installed position.*

150 METRI-PACK CONNECTOR REPAIR

General

Metri-Pack connectors are embossed with the initials (P.E.D.).

There are two types of connectors in this series:

- Pull-to-Seat
- Push-to-Seat

Separating Pin and Socket Housings

Bend back the external latch slightly and separate the pin and socket halves of the connector.

Mating Pin and Socket Housings

Align the wire colors and push the pin and socket halves of the connector together.

Removing Socket Terminal

1. See Figure A-39 for pull-to-seat connector or Figure A-40 for push to seat connector. Remove wire lock (1) from wire end of socket housing on push-to-seat type connectors.

NOTE

For best results, free one side of wire lock first and then release the other side.

2. Find the locking tang in the mating end of the connector.

NOTE

The tangs are always positioned in the middle of the chamber and are on the same side as the external latch.

3. Gently insert a safety pin into the chamber about 1/8 in. (3.2 mm).
   a. **For pull-to-seat:** Stay between the terminal and the chamber wall and pivot the end of the pin toward the terminal body.
   b. **For push-to-seat:** There is a small opening for the pin.
4. When a click is heard, remove the pin and repeat the procedure.

NOTE

The click is the sound of the tang returning to the locked position as it slips from the point of the pin.

5. Pick at the tang until the clicking stops and the pin seems to slide in deeper than it had previously. This is an indication that the tang has been depressed.

NOTE

On those terminals that have been extracted on multiple occasions, the click may not be heard, but pivot the pin as if the click was heard at least 3 times.

6. Remove the pin.
   a. **For pull-to-seat:** Push on the lead to extract the terminal from the mating end of the connector.
   b. **For push-to-seat:** Pull on the lead to draw the terminal out the wire end.

Inserting Socket Terminal

NOTE

For wire location purposes, alpha characters are stamped into the socket housings.

1. See Figure A-39 for pull-to-seat connector or Figure A-40 for push to seat connector. Using a thin flat blade, like that on a hobby knife, carefully bend the tang outward away from the terminal body.
2. Gently pull or push on the lead to install the terminal back into the chamber. A click is heard when the terminal is properly seated.
3. Gently pull or push on the lead to verify that the terminal is locked in place.

   For push-to-seat: See Figure A-40. Seat wires in separate channels of wire lock and then push channels **inside** chambers at wire end of socket housing. Fully installed, slot on each side of wire lock engages ear on socket housing.

4. With the center ear on the head of the secondary lockpin facing the mating end of the connector, push secondary lock in until head is flush with the connector housing.

Preparing Wire Leads for Crimping

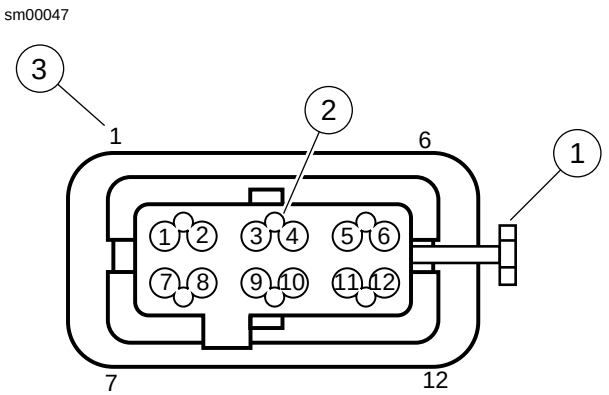
Strip lead removing 1/8 in. (3.0 mm) of insulation.

Crimping Terminals

1. Inspect **new** socket terminal for bent or deformed contact and crimp tails. Replace as necessary.
2. See Figure A-53. Squeeze the handles of the PACKARD MICRO-64 TERMINAL CRIMPER (Part No. HD-45929) to cycle the tool to the fully open position (1).
3. Raise locking bar and barrel holder by pushing up on bottom tab with index finger (2).
4. With the crimp tails facing upward, insert terminal through locking bar into front hole in barrel holder (20-22 gauge wire) (3).
5. Release locking bar to lock position of contact. When correctly positioned, the locking bar fits snugly in the space at the front of the core crimp tails and the closed side of the terminal rests on the outer nest of the crimp tool.
6. Insert wires between crimp tails until ends make contact with locking bar. Verify that wire is positioned so that wide pair of crimp tails squeeze bare wire strands, while the narrow pair folds over the insulation material.
7. Squeeze handle of crimp tool until tightly closed (4). Tool automatically opens when the crimping sequence is complete.
8. Raise locking bar and barrel holder to remove contact.

Inspecting Crimps

Inspect the quality of the core and insulation crimps. Distortion should be minimal.



1. **Secondary lock**
2. **Pin hole**
3. **Stamped number**

Figure A-51. Packard Micro 64 Connector: Housing

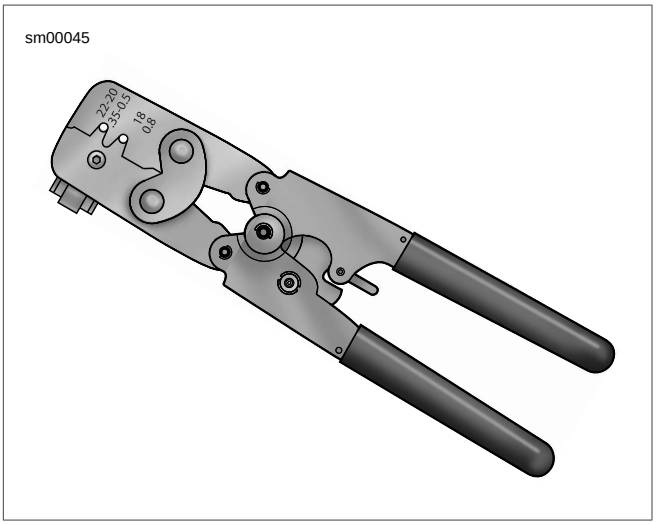


Figure A-52. Packard Micro 64 Terminal Crimper (HD-45929)

Wiring Diagram List

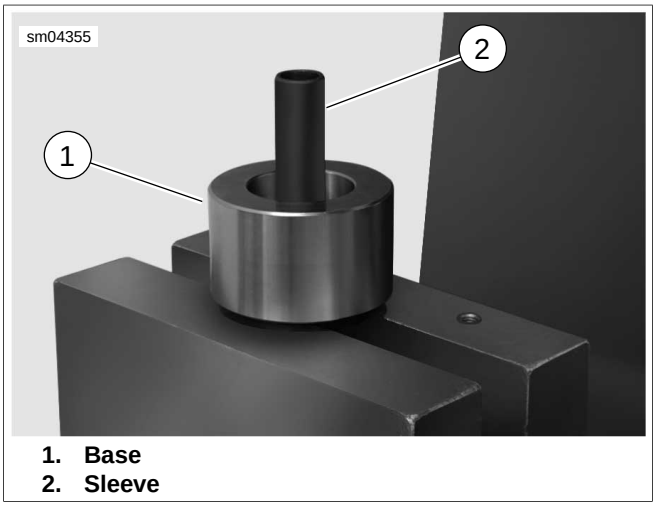
DIAGRAM	LOCATION
2008 SPORTSTER DOM. and INT. MODELS, MAIN HARNESS	Figure B-2
2008 SPORTSTER DOM. and INT. MODELS, INDICATOR LAMPS AND CONTROLS	Figure B-3
2008 SPORTSTER DOM. and INT. MODELS, STARTING AND CHARGING	Figure B-4
2008 SPORTSTER DOM. and INT. MODELS, ENGINE MANAGEMENT (1 of 2)	Figure B-5
2008 SPORTSTER DOM. and INT. MODELS, ENGINE MANAGEMENT (2 of 2)	Figure B-6
2008 SPORTSTER DOM. and INT. MODELS, LIGHTS (1 of 2)	Figure B-7
2008 SPORTSTER DOM. and INT. MODELS, LIGHTS (2 of 2)	Figure B-8
2008 SPORTSTER DOM. and INT. MODELS, HORN AND INSTRUMENTS	Figure B-9
2008 SPORTSTER DOM. and INT. MODELS, SECURITY (1 of 2)	Figure B-10
2008 SPORTSTER DOM. and INT. MODELS, SECURITY (2 of 2)	Figure B-11

Figure B-6.
2008 SPORTSTER DOM. and INT. MODELS, ENGINE MANAGEMENT (2 of 2)

Figure B-6.
2008 SPORTSTER DOM. and INT. MODELS, ENGINE MANAGEMENT (2 of 2)

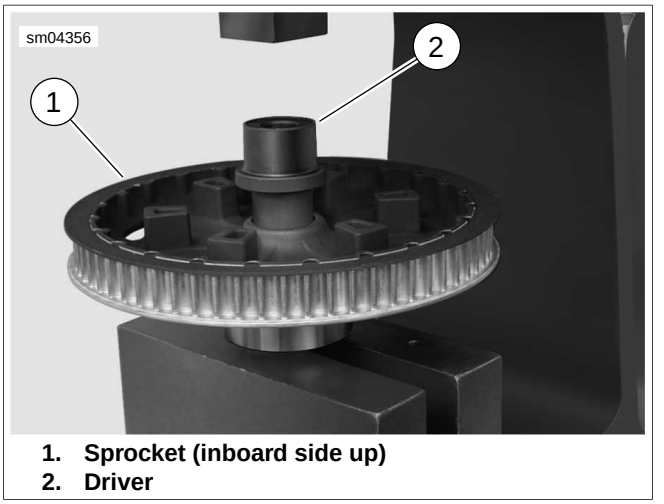
Figure B-11.
2008 SPORTSTER DOM. and INT. MODELS, SECURITY (2 of 2)

Figure B-11.
2008 SPORTSTER DOM. and INT. MODELS, SECURITY (2 of 2)



1. **Base**
2. **Sleeve**

Figure D-3. Position Tool for Bearing Removal

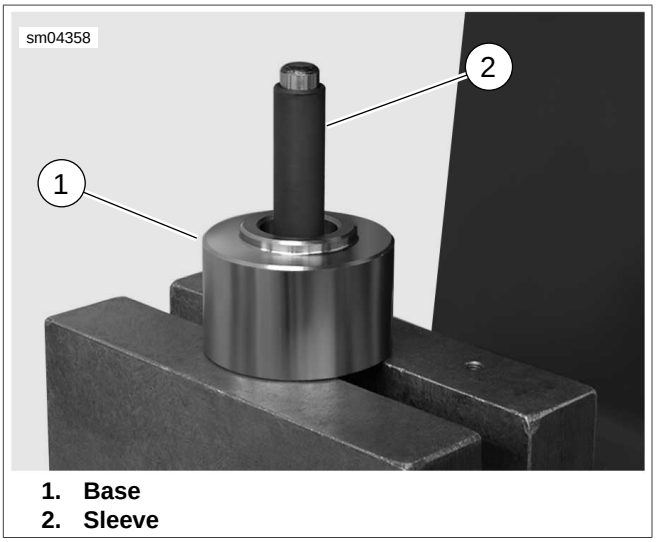


1. **Sprocket (inboard side up)**
2. **Driver**

Figure D-4. Remove Compensator Sprocket Bearing

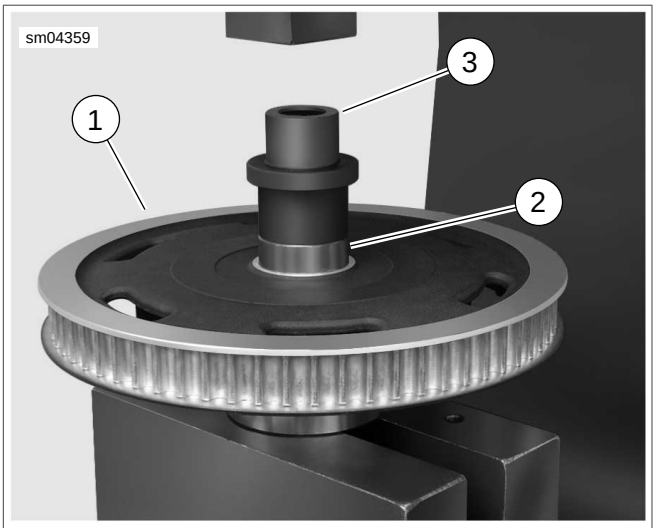
Installation

1. See Figure D-2. Obtain the REAR WHEEL COMPENSATOR SPROCKET BEARING REMOVER/INSTALLER (Part No. HD-48921).
2. See Figure D-5. Position base (1) on deck of arbor press with the small OD topside.
3. Slide sleeve (2) over base pin.
4. Verify that sprocket bearing bore is clean and dry.
5. See Figure D-6. With the outboard side facing up, slide sprocket (1) over sleeve until it rests on base.
6. Slide bearing (2) over sleeve.
7. Slide large OD of driver (3) over sleeve until contact is made with outer race of bearing.
8. Center driver under ram and apply pressure until bearing makes firm contact with counterbore in sprocket.
9. Turn sprocket over and verify that bearing is fully seated.



1. **Base**
2. **Sleeve**

Figure D-5. Position Tool for Bearing Installation



1. **Sprocket (outboard side up)**
2. **Bearing outer race**
3. **Driver**

Figure D-6. Install Compensator Sprocket Bearing

ASSEMBLY AND INSTALLATION

NOTES

- *See Figure D-1. Only remove compensator bowl (7) from rear wheel (8) if necessary. Bolts (3) are one-time usage only. If removed, they must be discarded and replaced with **new** bolts.*
- ***New** compensator bowl bolts are equipped with a LOCTITE patch on the threads. Do not apply any additional LOCTITE.*

1. See Figure D-1. If compensator bowl (7) was removed, install bowl onto rear wheel with **new** bolts with captive washers (3). Tighten bolts to 55-65 ft-lbs (74.6-88.2 Nm) in a star pattern (tighten every other bolt until all five have been tightened).

Tools Used in This Manual

PART NUMBER	TOOL NAME	NOTES
HD-43984	CRANKSHAFT LOCKING TOOL	3.15 BOTTOM END OVERHAUL: ASSEMBLY, Cam Gears and Gearcase Cover
HD-44060-B	WHEEL BEARING INSTALLER/REMOVER	2.3 WHEELS, Sealed Wheel Bearings
HD-44061	FUEL PRESSURE GAUGE ADAPTER	4.14 FUEL PRESSURE TEST, Testing
HD-44358	FLYWHEEL SUPPORT FIXTURE	3.20 CRANKCASE, Disassembly
HD-44750	DIGITAL TECHNICIAN	1.24 IDLE SPEED AND IGNITION TIMING, Idle Speed
HD-44750	DIGITAL TECHNICIAN	7.11 IGNITION SYSTEM, General
HD-45928	PACKARD MICRO-64 TERMINAL REMOVER	A.17 PACKARD MICRO-64 CONNECTORS, Packard Micro-64 Connector Repair
HD-45929	CRIMPING TOOL	7.5 SPEEDOMETER: ALL SINGLE GAUGE MODELS EXCEPT XL 883C/XL 1200C, Installation
HD-45929	PACKARD MICRO-64 TERMINAL CRIMPER	A.17 PACKARD MICRO-64 CONNECTORS, Packard Micro-64 Connector Repair
HD-45967	SHOP DOLLY	2.24 REAR ENGINE MOUNT/ISOLATOR, Removal
HD-45967	SHOP DOLLY	3.10 REMOVING ENGINE FROM CHASSIS, Procedure
HD-45967	SHOP DOLLY	3.11 INSTALLING ENGINE IN CHASSIS, Procedure
HD-45968	FAT JACK	2.3 WHEELS, Rear Wheel
HD-45968	FAT JACK	2.23 FRONT ENGINE MOUNT/ISOLATOR, Removal
HD-45968	FAT JACK	2.24 REAR ENGINE MOUNT/ISOLATOR, Installation
HD-45968	FAT JACK	3.10 REMOVING ENGINE FROM CHASSIS, Procedure
HD-45968	FAT JACK	3.11 INSTALLING ENGINE IN CHASSIS, Procedure
HD-46281	BEARING REMOVER/INSTALLER TOOL	2.20 REAR FORK, Disassembly
HD-46282	TRANSMISSION SPROCKET HOLDING TOOL SET	6.14 TRANSMISSION SPROCKET, Removal
HD-46282-1	SPROCKET HOLDING TOOL ADAPTER	6.14 TRANSMISSION SPROCKET, Removal
HD-46282-1	SPROCKET HOLDING TOOL ADAPTER	6.14 TRANSMISSION SPROCKET, Installation
HD-46283	SPROCKET LOCKING LINK (1200 CC)	6.4 PRIMARY DRIVE AND CLUTCH, Removal
HD-46283 OR HD-38362	SPROCKET LOCKING LINK	6.4 PRIMARY DRIVE AND CLUTCH, Installation
HD-46284	ENGINE HOOK	3.10 REMOVING ENGINE FROM CHASSIS, Procedure
HD-46285	TRANSMISSION ASSEMBLY FIXTURE	6.13 TRANSMISSION INSTALLATION, Installation
HD-46287	LAPPING TOOL ADAPTER	3.20 CRANKCASE, Lapping Engine Main Bearing Races
HD-46288	MAINSHAFT LOCK NUT WRENCH	6.14 TRANSMISSION SPROCKET, Removal
HD-47114	CONSOLE ALIGNMENT RING	4.4 FUEL TANK, Console Replacement
HD-47855	INNER/OUTER MAIN DRIVE GEAR NEEDLE BEARING INSTALLATION TOOL	6.10 MAIN DRIVE GEAR AND BEARING, Assembly
HD-47856	MAIN DRIVE GEAR SEAL INSTALLER KIT	6.10 MAIN DRIVE GEAR AND BEARING, Installation
HD-47856-1	INSTALLER	6.10 MAIN DRIVE GEAR AND BEARING, Installation
HD-47856-2	PILOT	6.10 MAIN DRIVE GEAR AND BEARING, Installation
HD-47856-4	ADAPTER	6.10 MAIN DRIVE GEAR AND BEARING, Installation
HD-47856-5	LARGE NUT	6.10 MAIN DRIVE GEAR AND BEARING, Installation
HD-48114	MOLEX ELECTRICAL CONNECTOR TERMINAL REMOVER	A.10 MOLEX CONNECTORS, Molex Connector Repair
HD-48116-A	TEMPERATURE SENSOR SOCKET	4.6 ENGINE TEMPERATURE SENSOR (ET), Removal
HD-48119	ELECTRICAL CRIMP TOOL	A.10 MOLEX CONNECTORS, Crimp Terminal to Lead

FASTENER	TORQUE VALUE		NOTES
Induction module-to-intake manifold screw	35 **in-lbs**	4.0 Nm	4.7 INDUCTION MODULE, Assembly
Induction module-to-intake manifold screw	35 **in-lbs**	4.0 Nm	4.7 INDUCTION MODULE, Assembly
Inner rocker cover bolt, large	18-22 ft-lbs	24.4-29.8 Nm	3.13 TOP END OVERHAUL: ASSEMBLY, Rocker Covers
Inner rocker cover bolt, small	135-155 **in-lbs**	15.3-17.5 Nm	3.13 TOP END OVERHAUL: ASSEMBLY, Rocker Covers
Inner rocker cover screw	135-155 **in-lbs**	15.3-17.5 Nm	3.13 TOP END OVERHAUL: ASSEMBLY, Rocker Covers
Intake manifold mounting screw	96-120 **in-lbs**	10.9-13.6 Nm	4.7 INDUCTION MODULE, Installation
Isolator (front) mounting bracket screw	25-35 ft-lbs	33.9-47.5 Nm	2.23 FRONT ENGINE MOUNT/ISOLATOR, Installation
Isolator (front) mounting bracket screw	25-35 ft-lbs	33.9-47.5 Nm	2.24 REAR ENGINE MOUNT/ISOLATOR, Installation
Isolator (front) mounting bracket screw	25-35 ft-lbs	33.9-47.5 Nm	3.11 INSTALLING ENGINE IN CHASSIS, Procedure
Isolator (rear) mounting bracket screw	25-35 ft-lbs	33.9-47.5 Nm	3.11 INSTALLING ENGINE IN CHASSIS, Procedure
Jiffy stand switch screw	96-120 **in-lbs**	10.9-13.6 Nm	7.30 JIFFY STAND SWITCH: INTERNATIONAL MODELS, Installation
License plate bracket mounting screw	20-25 **in-lbs**	2.3-2.8 Nm	2.29 REAR FENDER: ALL MODELS EXCEPT XL 1200N, Installation
License plate lamp housing screw	14-16 **in-lbs**	1.2-1.3 Nm	7.21 LICENSE PLATE LAMP MODULE: XL 1200N, Installation (HDI Only)
Light switch bracket screw	35-45 **in-lbs**	4.0-5.1 Nm	7.29 ELECTRICAL CADDIES, Wire Harness Caddy
Long post jam nut	65-80 **in-lbs**	7.3-9.0 Nm	5.3 STARTER SOLENOID, Solenoid Contacts
Lower fork bracket pinch screw	30-35 ft-lbs	40.7-47.5 Nm	2.18 FORK STEM AND BRACKET ASSEMBLY, Assembly and Installation
Lower handlebar clamp bolts	30-40 ft-lbs	40.7-54.3 Nm	2.27 HANDLEBARS, Installation
Lower shock absorber screw	45-50 ft-lbs	61-68 Nm	6.5 SECONDARY DRIVE BELT, Installation
Mirror stem lock nut	96-144 **in-lbs**	10.9-16.3 Nm	2.9 FRONT BRAKE MASTER CYLINDER , Installation
Mirror stem lock nut	96-144 **in-lbs**	10.9-16.3 Nm	2.26 CLUTCH CONTROL, Assembly and Installation
Muffler interconnect bracket mounting screw	30-33 ft-lbs	40.7-44.8 Nm	4.11 EXHAUST SYSTEM, Installation
Muffler interconnect bracket mounting screw	30-33 ft-lbs	40.7-44.8 Nm	6.14 TRANSMISSION SPROCKET, Installation
Muffler torca clamp nut	45-65 ft-lbs	61.1-88.2 Nm	4.11 EXHAUST SYSTEM, Installation
Mufler-to-interconnect bracket screw	15-19 ft-lbs	20.4-25.8 Nm	4.11 EXHAUST SYSTEM, Installation
Neutral indicator switch	60-84 **in-lbs**	6.8-9.5 Nm	6.13 TRANSMISSION INSTALLATION, Assembling Crankcases
Neutral indicator switch	60-84 **in-lbs**	6.8-9.5 Nm	7.27 NEUTRAL SWITCH, Replacement
O2 sensor	29-44 ft-lbs	39.3-59.7 Nm	4.11 EXHAUST SYSTEM, Installation
Oil filter adapter	96-144 **in-lbs**	10.9-16.3 Nm	3.22 OIL FILTER MOUNT, Assembly