

OVERALL GEAR RATIOS

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

Gear	All Models
1	10.11
2	6.96
3	4.95
4	3.86
5	3.15

CHAINS AND BELTS

Primary Chain Adjustments

Free Play	Inches	Millimeters
COLD Engine	5/8-7/8 inch	15.9-22.2 mm
HOT Engine	3/8-5/8 inch	9.5-15.9 mm

Primary Chaincase Lubricant

Amount	Ounces	Milliliters
	32	946
Part Number	Quart	
	99851-05	

Rear Belt Adjustment

Deflection	Inches	Millimeters
On Jiffy Stand Without Rider or Luggage 10 psi (69 kPa) in Rear Shocks	1/4 - 5/16 at 10 lbs force	6.4 - 7.9 at 4.5 kg force
Motorcycle Upright With Rear Wheel in the Air	3/16 - 1/4 at 10 lbs force	4.8 - 6.4 at 4.5 kg force

SPROCKETS

Number of Teeth	
Sprocket	All Models
Engine	25
Clutch	36
Transmission	32
Rear wheel	70

CLUTCH

Clutch	Description
Type	Wet-multiple disc
Clutch lever free play	1/16-1/8 in.
	1.6-3.2 mm
Clutch screw adjustment	loosen 1/2-1 turn after lightly seating

TORQUE VALUES

Item	ft/in-lbs	Nm
Primary chain tensioner shoe nut	21-29 ft-lbs	29-39 Nm
Tensioner shoe adjuster plate screws	12-14 ft-lbs	16-19 Nm
Primary chain inspection cover screws	84-108 in-lbs	10-12 Nm
Clutch adjuster screw locknut	72-120 in-lbs	8-14 Nm
Clutch inspection cover screws	84-108 in-lbs	10-12 Nm
Clutch diaphragm spring retainer to clutch hub bolts	90-110 in-lbs	10-12 Nm
Rear axle cone nut	95-105 ft-lbs	129-142 Nm
Rear swingarm pivot shaft locknut	40-45 ft-lbs	54-61 Nm
Rear swingarm bracket bolts	34-42 ft-lbs	46-57 Nm
Continued ...		

TORQUE VALUES (CONT.'D)

Item		ft/in-lbs	Nm
Transmission mainshaft sprocket nut		60 ft-lbs, then 35° to 45°	81 Nm, then 35° to 45°
Mainshaft sprocket nut lockplate socket head screws		84-108 in-lbs	9-12 Nm
Rear wheel sprocket bolts		55-65 ft-lbs	75-88 Nm
Primary chaincase to crankcase/transmission		15-19 ft-lbs	20.3-25.8 Nm
Starter front and rear mounting screws		14-18 ft-lbs	19-24 Nm
Starter jackshaft bolt		60-80 in-lbs	6.8-9.0 Nm
Engine compensating sprocket nut		75 ft-lbs, then 45° to 50°	101.7 Nm, then 45° to 50°
Clutch hub mainshaft nut		70-80 ft-lbs	95-108 Nm
Primary chaincase cover allen head socket screws		84-108 in-lbs	9-12 Nm
Primary chaincase drain plug		36-60 in-lbs	4.1-6.8 Nm
Passenger footboard socket screws		15-18 ft-lbs	20-24 Nm
Heel-toe shift lever socket screws	5/16"	18-22 ft-lbs	24-30 Nm
Inner shift arm to shift lever shaft socket screw	1/4"	90-110 in-lbs	10.2-12.4 Nm

PRIMARY CHAIN ADJUSTMENT

See Section 1.7 [PRIMARY CHAIN/LUBRICANT](#), [PRIMARY CHAIN ADJUSTMENT](#).

ADJUSTER SHOE REPLACEMENT

If the nylon adjuster shoe is worn or damaged, replace as follows:

1. Remove the primary chaincase cover. See Section 6.5 [PRIMARY CHAINCASE, REMOVAL](#), steps 1-8.
2. Loosen top center nut from captured bolt of chain tensioner assembly. See [Figure 6-1](#).
3. Lower the chain tensioner assembly until the adjuster shoe just contacts the inner primary housing.

⚠ WARNING

Always wear proper eye protection when removing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

4. Remove retaining ring from nub and pull adjuster shoe from chain tensioner. Discard adjuster shoe and retaining ring.
5. Slide **new** adjuster shoe onto chain tensioner. Be sure that the narrow end of the shoe is at the front, the wider end at the rear.

⚠ WARNING

Always wear proper eye protection when installing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

6. Install **new** retaining ring onto nub of chain tensioner to lock position of adjuster shoe. Verify that retaining ring is fully seated in the groove.
7. Raise the chain tensioner assembly and then snug the top center nut.
8. Check the primary chain tension. Push on the upper strand to verify that it has free up and down movement midway between the engine compensating sprocket (front) and the clutch sprocket (rear).
9. Measure the free play to be sure that it falls within the range specified for a hot or cold engine:

Table 6-1. Primary Chain Adjustment

(Free Play)	Inches	Millimeters
COLD ENGINE	5/8-7/8 inch	15.9-22.2 mm
HOT ENGINE	3/8-5/8 inch	9.5-15.9 mm

10. If the chain is too tight or too loose, then adjust as follows:

- a. Loosen the top center nut a maximum of two turns and raise or lower the chain tensioner assembly as necessary to obtain the specified free play. See [Figure 6-1](#).

NOTE

As chains stretch and wear, they run tighter at one spot than another. Always adjust the free play at the tightest spot in the chain. Replace the primary chain if it is worn to the point where it cannot be properly adjusted.

CAUTION

Always keep the primary chain properly adjusted. Allowing the chain to run too tight or too loose will result in excessive chain and sprocket wear.

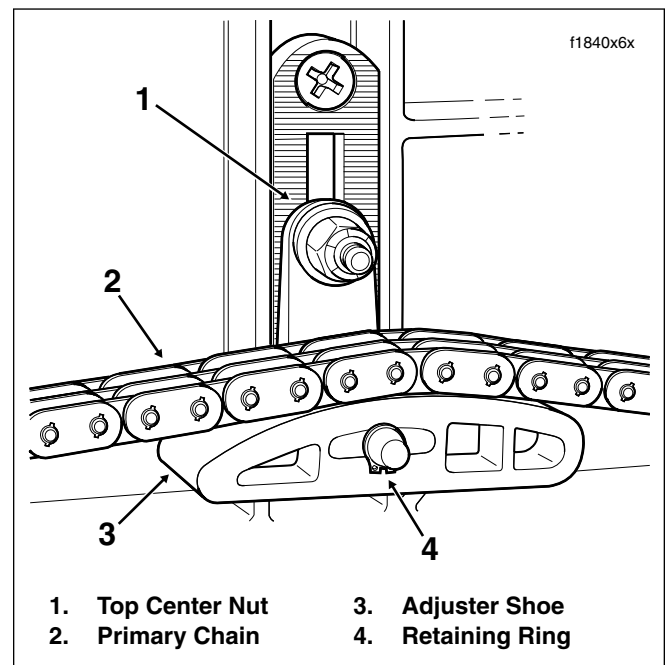


Figure 6-1. Primary Chain Tensioner Assembly

- b. Tighten the top center nut of the chain tensioner assembly to 21-29 ft-lbs (29-39 Nm).

11. Install the primary chaincase cover. See Section [6.5 PRIMARY CHAINCASE, INSTALLATION](#), steps 20-31.

DISASSEMBLY

See Section [6.5 PRIMARY CHAINCASE, REMOVAL](#), steps 1-15.

CLEANING AND INSPECTION

1. Periodically inspect the primary chain for cracked, broken or badly worn links. Replace as necessary.
2. Inspect engine compensating sprocket components for damage or wear. Replace parts as necessary.
3. Inspect clutch sprocket for damage or wear. If broken or damaged teeth are found, the clutch shell and sprocket assembly must be replaced.

ASSEMBLY

See Section [6.5 PRIMARY CHAINCASE, INSTALLATION](#), steps 9-31.

ADJUSTMENT

See Section 1.8 CLUTCH ADJUSTMENT.

REMOVAL/INSTALLATION

To remove the clutch without disassembly, see Section 6.5 PRIMARY CHAINCASE, REMOVAL, steps 1-15.

For installation instructions, see Section 6.5 PRIMARY CHAINCASE, INSTALLATION, steps 9-31.

NOTE

If only the clutch pack is to be disassembled, see PARTIAL DISASSEMBLY below, a procedure that can be performed on the motorcycle without removing the clutch shell or hub.

For complete disassembly of the clutch, which includes clutch pack disassembly and bearing replacement, see COMPLETE DISASSEMBLY.

PARTIAL DISASSEMBLY

CLUTCH PACK ONLY

1. Remove the primary chaincase cover. See Section 6.5 PRIMARY CHAINCASE, REMOVAL, steps 1-8.

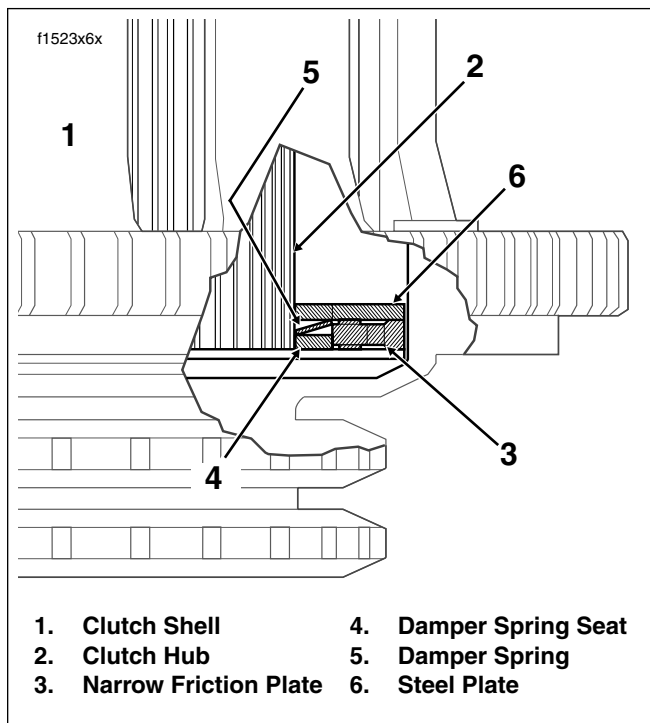


Figure 6-2. Clutch Pack Stack-Up (Cut-Away View)

2. Remove six bolts to release diaphragm spring retainer from clutch hub. See Figure 6-3.
3. Remove diaphragm spring retainer, diaphragm spring and pressure plate from clutch hub.
4. Remove friction plates, steel plates, damper spring and damper spring seat from clutch hub.
5. See CLEANING AND INSPECTION in this section.

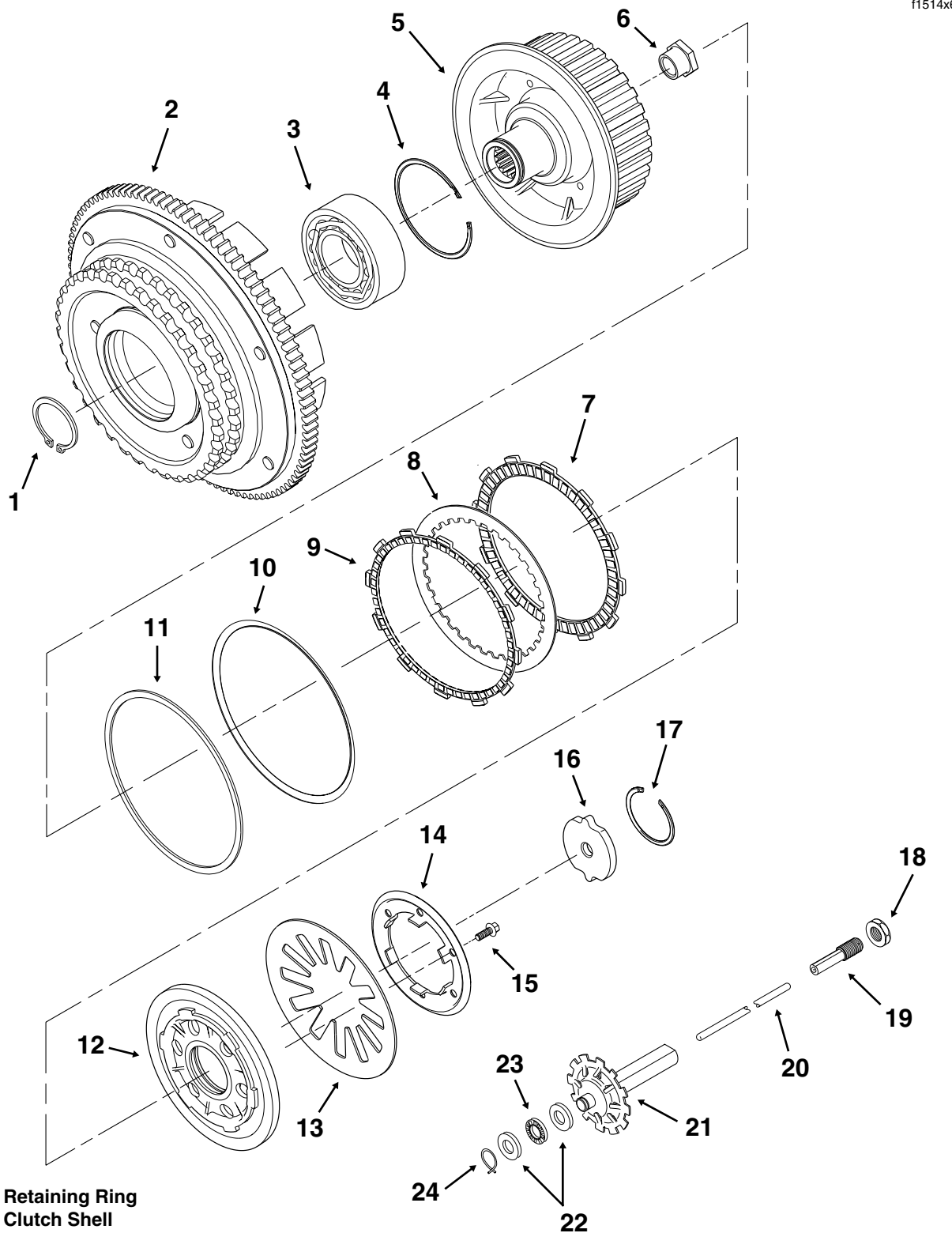
ASSEMBLY

CLUTCH PACK ONLY

1. Submerge and soak all friction and steel plates in PRIMARY CHAINCASE LUBRICANT for at least five minutes.
2. Install the narrow friction plate on the clutch hub engaging tabs on plate with slots in clutch shell.
3. Install damper spring seat on clutch hub so that it seats inboard of narrow friction plate.
4. Install damper spring on clutch hub with the concave side up (facing opposite damper spring seat). See Figure 6-2.
5. Install a steel plate and then a friction plate on the clutch hub. Install seven remaining sets in the same manner, alternating between steel plates and friction plates.
6. Install pressure plate on clutch hub aligning holes in plate with threaded bosses on hub.
7. Seat diaphragm spring in recess of pressure plate with the concave side down.
8. Align holes in diaphragm spring retainer with threaded bosses on clutch hub. Tabs on spring retainer contact flats on inboard side of bosses.
9. Install six bolts to secure diaphragm spring retainer to clutch hub. Alternately tighten bolts to 90-110 in-lbs (10.2-12.4 Nm).
10. Install the primary chaincase cover. See Section 6.5 PRIMARY CHAINCASE, INSTALLATION, steps 20-31.

CLEANING AND INSPECTION

1. Wash all parts in cleaning solvent, except for friction plates and bearing, if removed. Blow dry with compressed air.
2. Check **friction plates** as follows:



- | | | | |
|--------------------------|-------------------------------|--------------------|-----------------------|
| 1. Retaining Ring | 10. Damper Spring | 17. Retaining Ring | 22. Thrust Washer (2) |
| 2. Clutch Shell | 11. Damper Spring Seat | 18. Locknut | 23. Throw Out Bearing |
| 3. Bearing | 12. Pressure Plate | 19. Adjuster Screw | 24. Retaining Ring |
| 4. Retaining Ring | 13. Diaphragm Spring | 20. Push Rod | |
| 5. Clutch Hub | 14. Diaphragm Spring Retainer | 21. Oil Slinger | |
| 6. Mainshaft Nut | 15. Bolt (6) | | |
| 7. Friction Plate (9) | 16. Release Plate | | |
| 8. Steel Plate (8) | | | |
| 9. Narrow Friction Plate | | | |

Figure 6-3. Clutch Assembly

- Wipe all lubricant from the friction plates. Measure the thickness of each plate with a dial caliper or micrometer. If the thickness of any plate is less than 0.143 inch (3.62 mm), discard the friction plates and replace with an entirely new set.
- Look for worn or damaged fiber surface material (both sides).

NOTE

Replace all nine friction plates with an entirely new set if any individual plate shows evidence of wear or damage.

3. Check **steel plates** as follows:

- Discard any plate that is grooved or bluish in color. Blue plates are likely warped or distorted.
 - Check each plate for distortion. Lay the plate on a precision flat surface. Insert a feeler gauge between the plate and the flat surface in several places. Replace any steel plate that is warped more than 0.006 inch (0.15 mm).
4. See [Figure 6-3](#). Holding the clutch hub, rotate the clutch shell to check bearing for smoothness. Replace the bearing if it runs rough or binds.
 5. Check the primary chain sprocket and the starter ring gear on the clutch shell. Replace the clutch shell if either sprocket or ring gear are badly worn or damaged.
 6. Check the slots that mate with the clutch plates on both the clutch shell and hub. Replace shell or hub if slots are worn or damaged.
 7. Check the diaphragm spring and diaphragm spring retainer for cracks or bent tabs. Obtain a new diaphragm spring or diaphragm spring retainer if either condition exists.

COMPLETE DISASSEMBLY**CLUTCH PACK AND BEARING**

1. Remove clutch assembly from the motorcycle. See Section [6.5 PRIMARY CHAINCASE, REMOVAL](#), steps 1-15.
2. Remove six bolts to release diaphragm spring retainer from clutch hub. See [Figure 6-3](#).
3. Remove diaphragm spring retainer, diaphragm spring and pressure plate from clutch hub.
4. Remove friction plates, steel plates, damper spring and damper spring seat from clutch hub.

CAUTION

To avoid possible bearing damage, do not disassemble the clutch shell and hub assembly unless the bearing, hub or shell require replacement. Replace the bearing if disassembled.

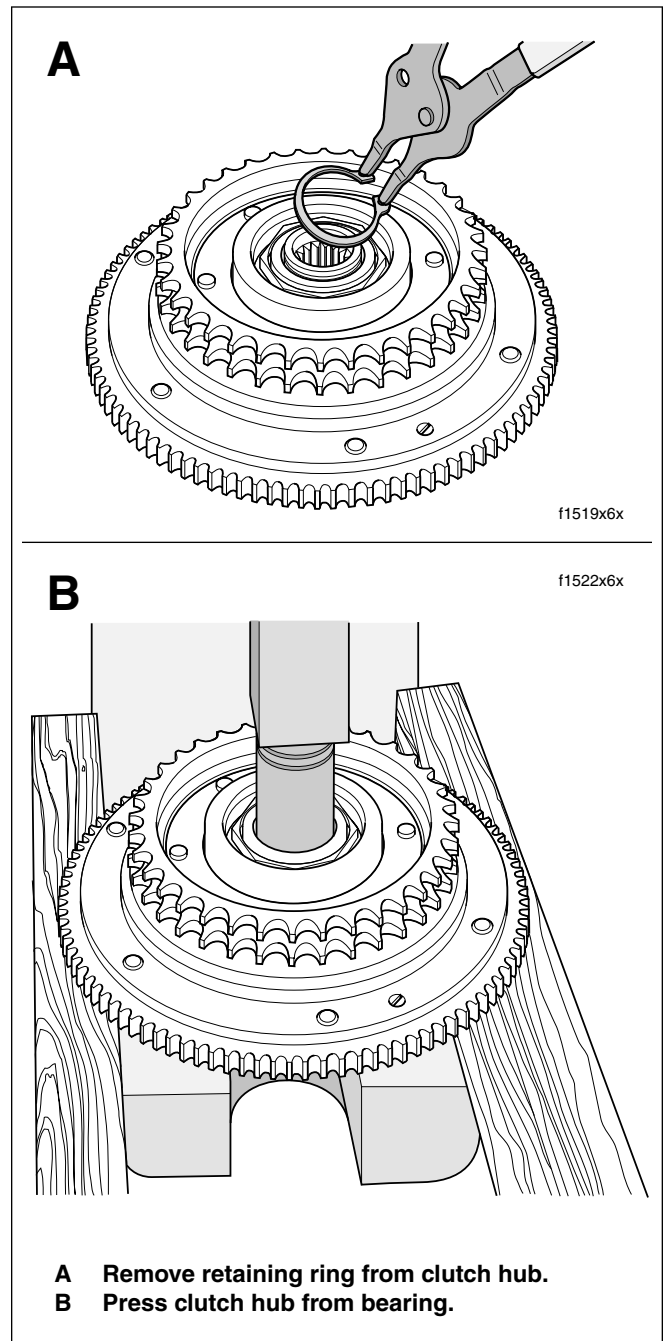


Figure 6-4. Remove Clutch Hub from Clutch Shell

WARNING

Always wear proper eye protection when removing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

5. With the sprocket side up, remove retaining ring from clutch hub groove. See upper frame of [Figure 6-4](#).

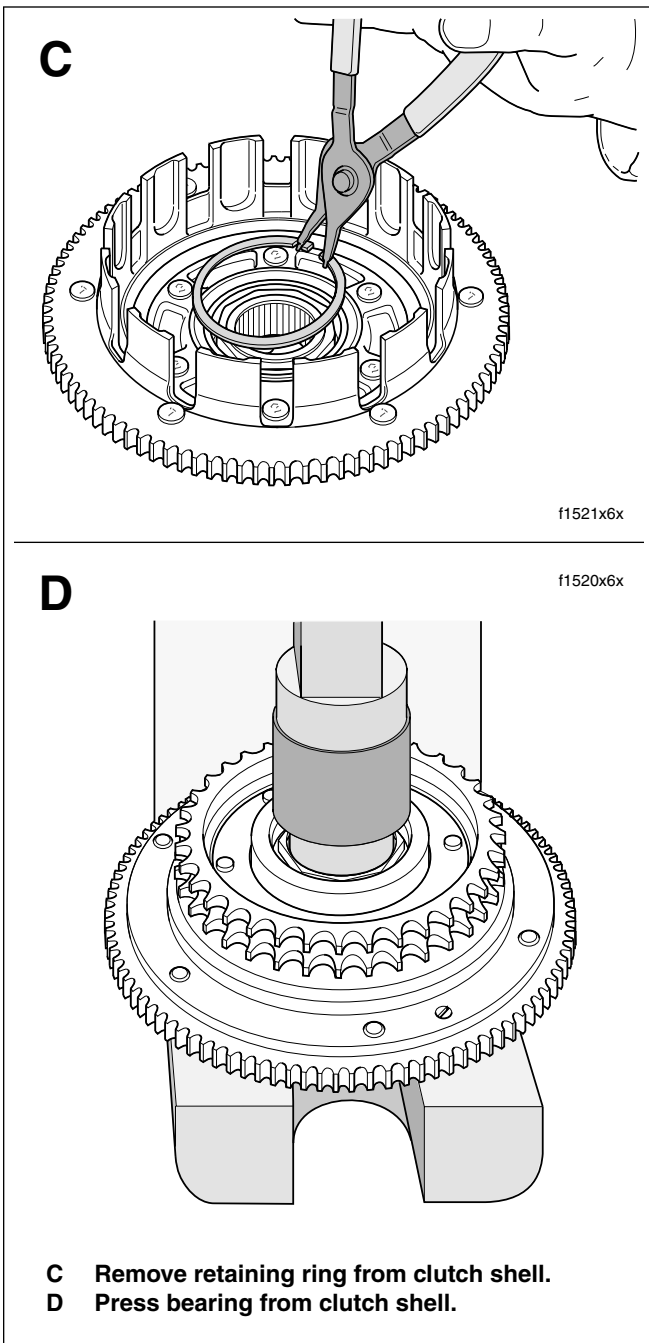


Figure 6-5. Remove Bearing from Clutch Shell

6. Supporting clutch shell in same orientation, use arbor press and a suitable press plug to press hub from bearing in clutch shell. See lower frame of [Figure 6-4](#).
7. Turn clutch shell over so that the sprocket side is down. Remove retaining ring from groove in clutch shell bore. See upper frame of [Figure 6-5](#).
8. Turn clutch shell over so that sprocket side is up. Using arbor press and a suitable press plug, press on inner race to remove bearing from clutch shell bore. See lower frame of [Figure 6-5](#).

9. See [CLEANING AND INSPECTION](#) in this section.

ASSEMBLY

CLUTCH PACK AND BEARING

1. Orient clutch shell in arbor press with sprocket side down. Be sure to support clutch shell bore on sprocket side. Using a suitable press plug, press against outer race until bearing contacts shoulder in clutch shell bore.

WARNING

Always wear proper eye protection when installing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

NOTE

Note that one side of the retaining ring is beveled. Always install the ring with the beveled side opposite the bearing.

2. Install retaining ring in groove of clutch shell bore, so that the flat side of the ring is in towards the bearing, the beveled side out.
3. Center hub in bearing. Be sure that bearing inner race is supported with sleeve on sprocket side. Press hub into bearing until hub shoulder contacts bearing inner race.
4. Turn assembly over so that the sprocket side is up. Install retaining ring in groove of clutch hub.
5. Place clutch assembly on bench oriented with the sprocket side down.
6. Submerge and soak all friction and steel plates in PRIMARY CHAINCASE LUBRICANT for at least five minutes.

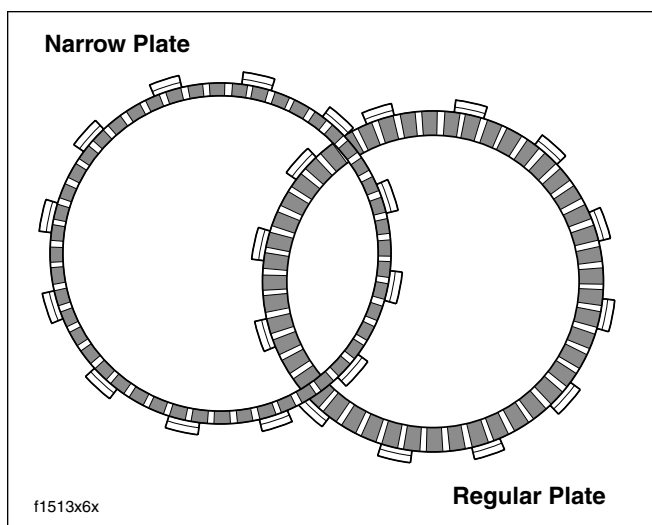


Figure 6-6. Friction Plates

7. Install the narrow friction plate on the clutch hub engaging tabs on plate with slots in clutch shell. See [Figure 6-6](#).
8. Install damper spring seat on clutch hub so that it seats inboard of narrow friction plate.
9. Install damper spring on clutch hub with the concave side up (facing opposite damper spring seat). See [Figure 6-2](#).
10. Install a steel plate and then a friction plate on the clutch hub. Install seven remaining sets in the same manner, alternating between steel plates and friction plates.
11. Install pressure plate on clutch hub aligning holes in plate with threaded bosses on hub.
12. Seat diaphragm spring in recess of pressure plate with the concave side down.
13. Align holes in diaphragm spring retainer with threaded bosses on clutch hub. Tabs on spring retainer contact flats on inboard side of bosses.
14. Install six bolts to secure diaphragm spring retainer to clutch hub. Alternately tighten bolts to 90-110 **in-lbs** (10.2-12.4 Nm).
15. Install clutch assembly on motorcycle. See Section [6.5 PRIMARY CHAINCASE, INSTALLATION](#), steps 9-31.

ADJUSTMENT

See Section 1.10 DRIVE BELT.

CLEANING AND INSPECTION

1. Use a spray solution of soap and water to clean belt. Avoid immersion. Wipe the belt down or blow dry. Although the belt's urethane compound is resistant to most solvents, these should only be used on a limited basis, and then must always be followed by a soap and water wash.
2. Inspect the edges of the belt for cuts or unusual wear patterns. While some beveling of the outside edge is common, and by itself is not usually harmful, it is an indication of sprocket misalignment.
3. Inspect the outside ribbed surface of the belt for signs of stone puncture. Since it is not always easy to observe this type of damage, look closely.
4. On the inside of the belt, inspect the roots of the belt teeth to see if the tensile cords are exposed. See upper frame of Figure 6-7. The tensile cords are covered by a layer of nylon facing and another layer of polyethylene. Once these layers are worn through, the tensile cords become visible. Visible tensile cords are an indication that the transmission sprocket tooth tip diameter is severely worn. Furthermore, belt failure is imminent, since the tooth tips will continue to scratch away at the tensile cords until the belt is completely worn through.

NOTE

During initial operation, the thin coating of polyethylene will wear off as it is burnished into the belt fabric. This is a normal condition and not an indication of belt wear.

5. Look for signs of cracking at the base of the belt teeth where contact may be made with the "corners" of worn transmission sprocket teeth. See upper frame of Figure 6-7. Replace the belt if cracking is evident.

NOTE

If the belt is replaced for reasons other than stone damage, the transmission and/or rear wheel sprockets also should be replaced. Use of worn or damaged sprockets will severely affect belt service life.

6. For common types of belt wear and damage, see lower frame of Figure 6-7.

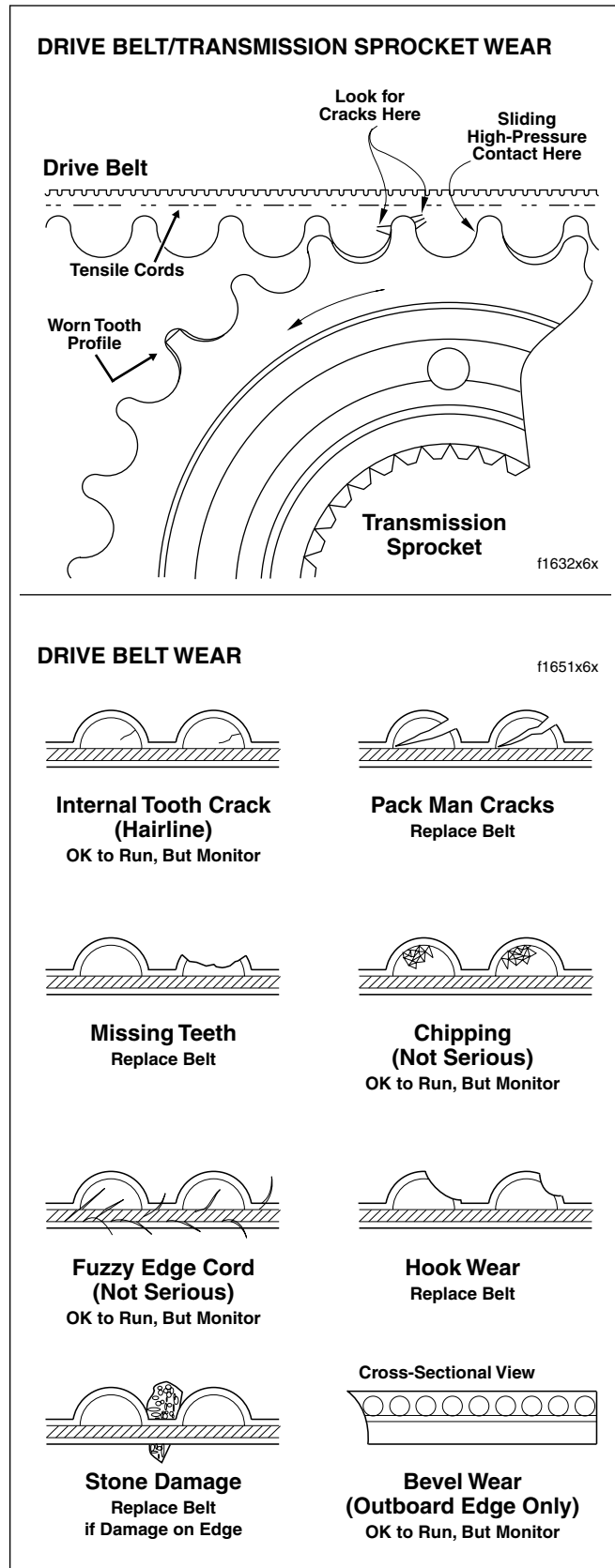


Figure 6-7. Drive Belt/Transmission Sprocket Wear

REPLACEMENT

REMOVAL

1. Remove rear wheel and rear swingarm. See Section [2.20 REAR SWINGARM, REMOVAL](#).
2. Remove the primary chaincase assembly. See Section [6.5 PRIMARY CHAINCASE, REMOVAL](#).
3. Remove the old belt from the transmission sprocket.

INSTALLATION

CAUTION

Handle the drive belt with care. Never bend belt forward into a loop smaller than five inches (127 mm) diameter. Never bend belt into a reverse loop smaller than ten inches (254 mm) diameter. Over bending will weaken belt and result in premature failure. Always install belt in the same direction of rotation as when it was removed. For other handling tips, see [Figure 6-8](#).

1. Install the **new** belt on the transmission sprocket.

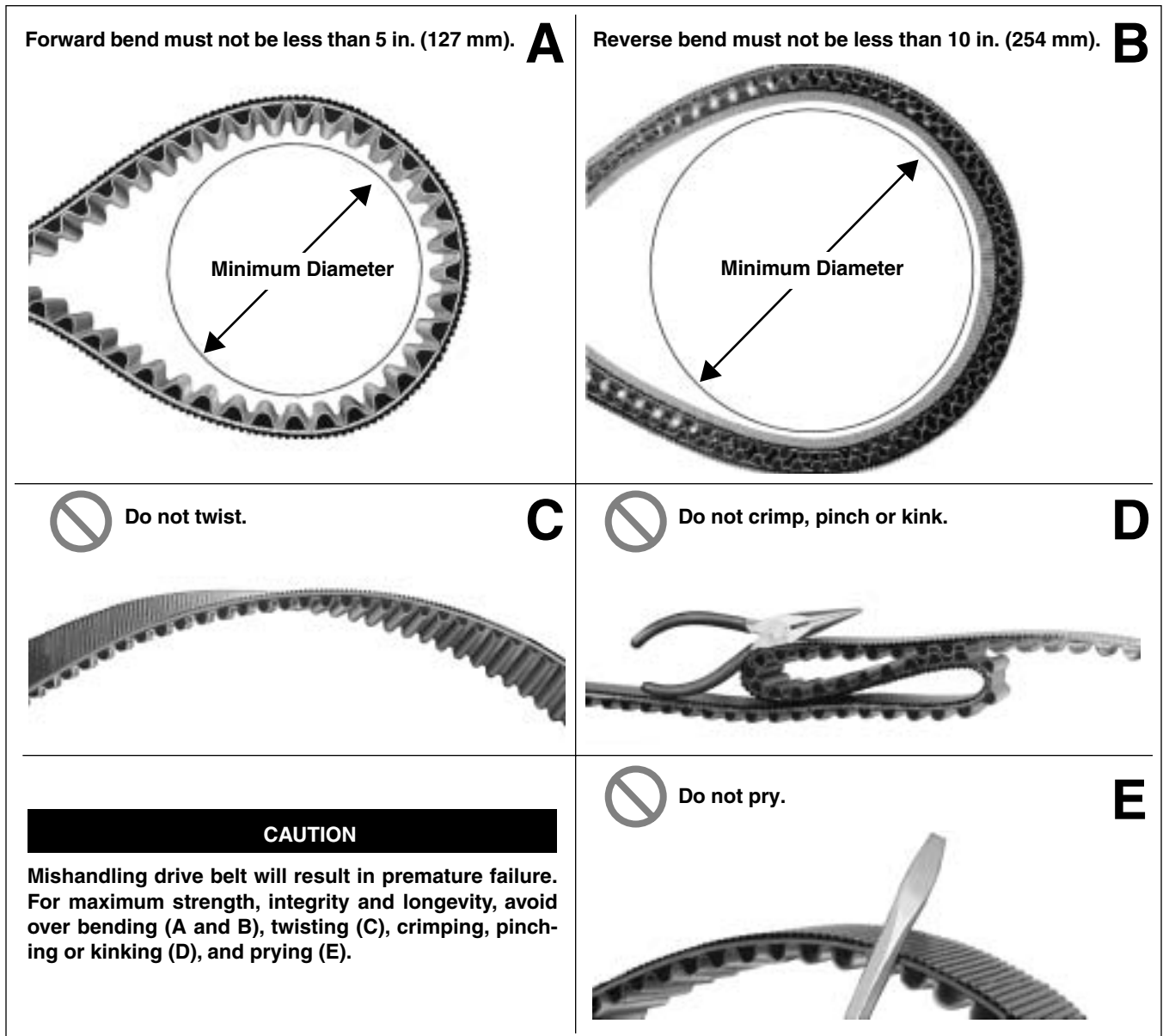


Figure 6-8. Proper Drive Belt Handling

2. Install the primary chaincase assembly. See Section [6.5 PRIMARY CHAINCASE, INSTALLATION](#).
3. Install rear swingarm and rear wheel. Adjust belt deflection. See Section [2.20 REAR SWINGARM, INSTALLATION](#).

TRANSMISSION SPROCKET

REMOVAL

1. Remove rear wheel. See Section [2.4 REAR WHEEL, REMOVAL](#).
2. Remove the primary chaincase assembly. See Section [6.5 PRIMARY CHAINCASE, REMOVAL](#).
3. See [Figure 6-9](#). Remove the two socket screws and lockplate to free the sprocket nut.

NOTE

The transmission sprocket nut has left handed threads. Turn the nut clockwise to remove from the main drive gear.

4. Remove the sprocket nut. Use an air impact wrench for best results.

CLEANING AND INSPECTION

1. Using a non-volatile cleaning solvent, thoroughly clean the transmission sprocket of all grease and dirt.

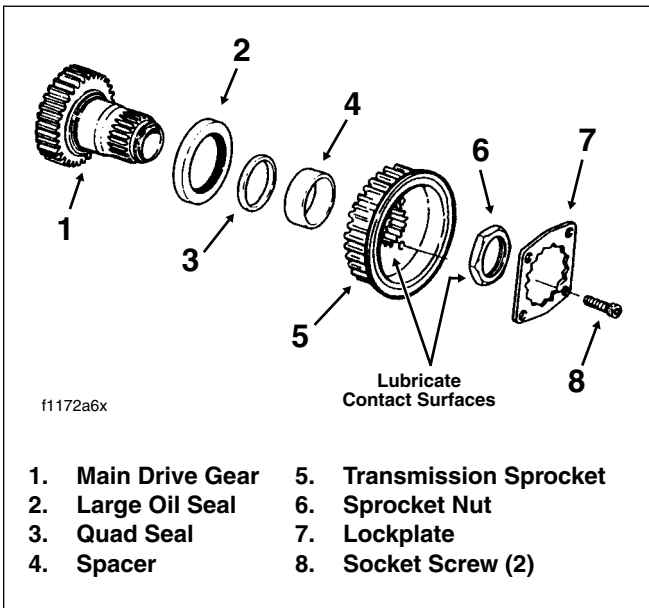


Figure 6-9. Install Transmission Sprocket Components

2. Carefully inspect the sprocket for cracks or other damage.
3. Inspect the sprocket for heavy pitting, which indicates a high degree of abrasive wear.
4. Look for “sharp” corners at the top of each sprocket tooth, particularly where the flank joins the top radius. A smooth transition should exist between the flank and radius. While worn teeth will appear to have an edge across the face width of the tooth, heavily worn teeth will have a flat across the top. If the flat is 1/8 inch (3 mm) wide or more, replace the transmission sprocket and drive belt. See upper frame of [Figure 6-7](#).

INSTALLATION

1. Install the transmission sprocket (with belt) on the main drive gear.
2. Install the sprocket nut. The following procedure is based on whether a new or used nut is being installed.

CAUTION

Exercise caution to avoid getting oil on the threads of the sprocket nut or the integrity of the lock patch may be compromised.

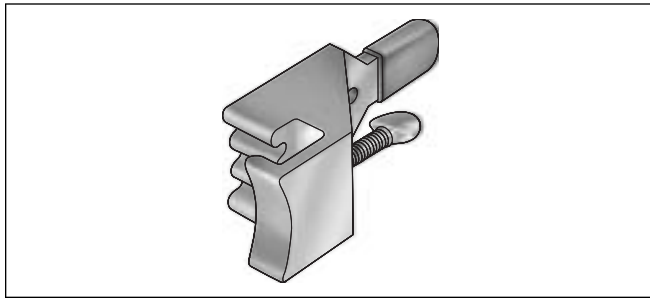
New sprocket nut: smear a small quantity of clean engine oil on the inside face of the sprocket nut and the outside face of the sprocket. Limit the application to where the surfaces of the two parts contact each other. Install the sprocket nut until finger tight.

NOTE

The transmission sprocket nut has left handed threads. Turn the nut counterclockwise to install on the main drive gear.

Used sprocket nut: apply Loctite High Strength Threadlocker 262 (red) to the threads of the sprocket nut. Also smear a small quantity of Loctite or clean engine oil on the inside face of the sprocket nut and the outside face of the sprocket. Limit the application to where the surfaces of the two parts contact each other. See [Figure 6-9](#). Install the sprocket nut until finger tight.

3. Obtain FINAL DRIVE SPROCKET LOCKING TOOL (HD-41184) to lock transmission sprocket. See [Figure 6-10](#). Proceed as follows:
 - a. Insert handle of tool below pivot shaft inboard of bottom frame tube and attach to sprocket. See upper frame of [Figure 6-11](#).
 - b. Snug thumbscrew to lock position of tool on sprocket. See lower frame of [Figure 6-11](#).



**Figure 6-10. Final Drive Sprocket Locking Tool
(Part No. HD-41184)**

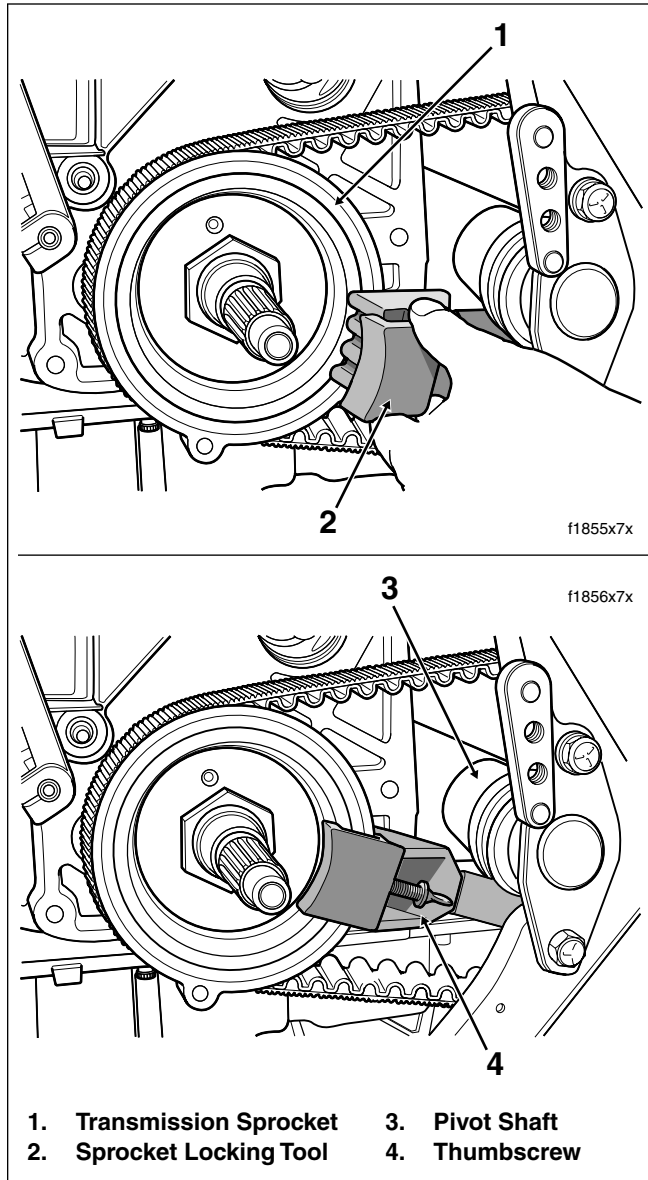


Figure 6-11. Install Final Drive Sprocket Locking Tool

4. Obtain MAINSHAFT LOCKNUT WRENCH/PILOT (HD-94660-37B). See [Figure 6-12](#). Proceed as follows:

- a. Install pilot on threaded end of mainshaft. See upper frame of [Figure 6-13](#).
- b. Slide sleeve of locknut wrench over pilot and onto sprocket nut.
- c. Tighten sprocket nut to 60 ft-lbs (81 Nm). See lower frame of [Figure 6-13](#). As the nut is tightened the handle of the sprocket locking tool rises to contact the pivot shaft, thereby preventing sprocket/mainshaft rotation.

5. Scribe a straight line on the transmission sprocket nut continuing the line over onto the transmission sprocket as shown in [Figure 6-14](#). Tighten the transmission sprocket nut an additional 35° to 40°.
6. Install lockplate over nut so that two diagonally opposite holes align with two tapped holes in sprocket. To find the best fit, lockplate can be rotated to a number of positions and can be placed with either side facing sprocket.
7. If holes in lockplate do not align with those in sprocket, tighten sprocket nut as necessary (up to the 45° maximum) until sprocket and lockplate holes are in alignment. See [Figure 6-14](#).

CAUTION

Maximum allowable tightening of sprocket nut is 45° of counterclockwise rotation after a torque of 60 ft-lbs (81 Nm). Do not loosen sprocket nut to align holes or nut will be under tightened.

8. Insert two socket head screws through lockplate into sprocket holes. Tighten screws to 84-108 in-lbs (9.5-12.2 Nm).

NOTE

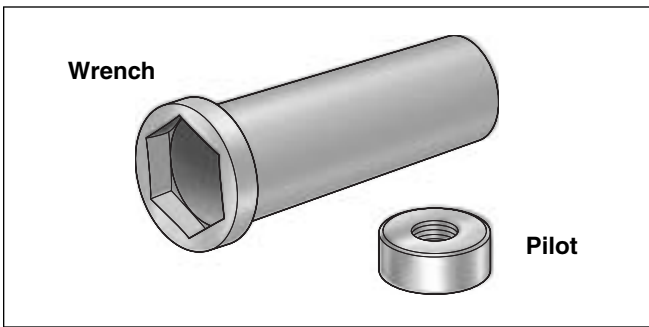
*The socket head screws have a thread locking compound that allows them to be reused up to three times. The fourth time the screws are removed, replace with **new** screws (H-D Part No. 3594).*

9. Install primary chaincase assembly. See Section [6.5 PRIMARY CHAINCASE, INSTALLATION](#).
10. Install rear wheel and adjust belt deflection. See Section [2.4 REAR WHEEL, INSTALLATION](#).

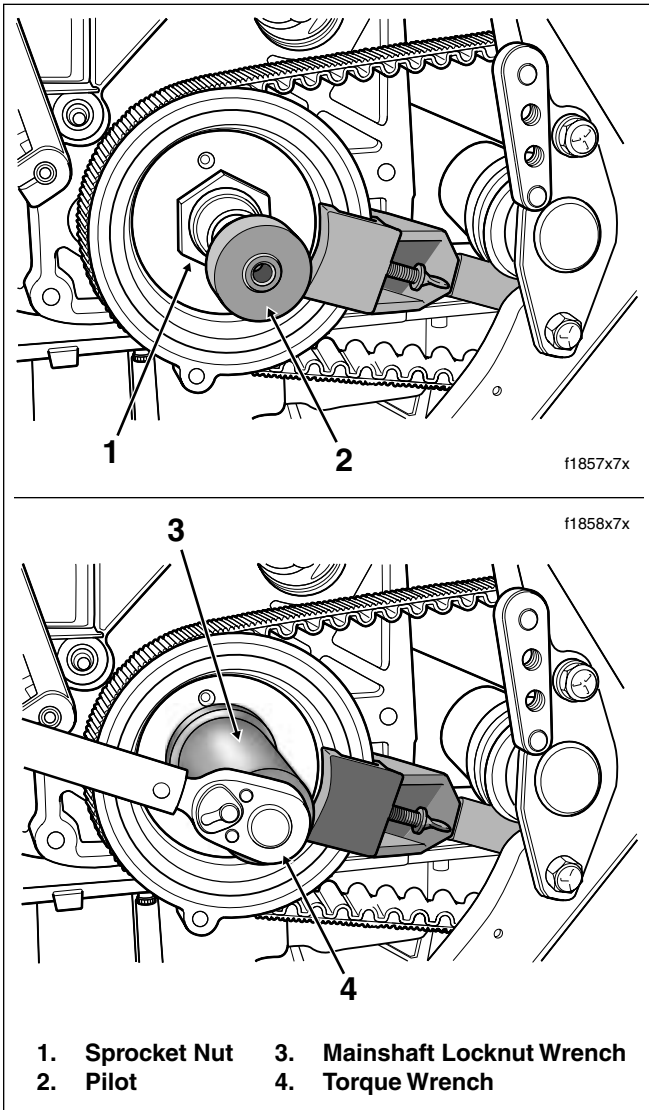
REAR WHEEL SPROCKET

REMOVAL

1. Remove rear wheel. See Section [2.4 REAR WHEEL, REMOVAL](#).
2. Remove five bolts with flat washers securing sprocket to hub.



**Figure 6-12. Mainshaft Locknut Wrench/Pilot
(Part No. HD-94660-37B)**



**Figure 6-13. Install Mainshaft Locknut Pilot/Wrench
and Torque Sprocket Nut**

CLEANING AND INSPECTION

1. Using a non-volatile cleaning solvent, thoroughly clean the rear wheel sprocket of all grease and dirt.

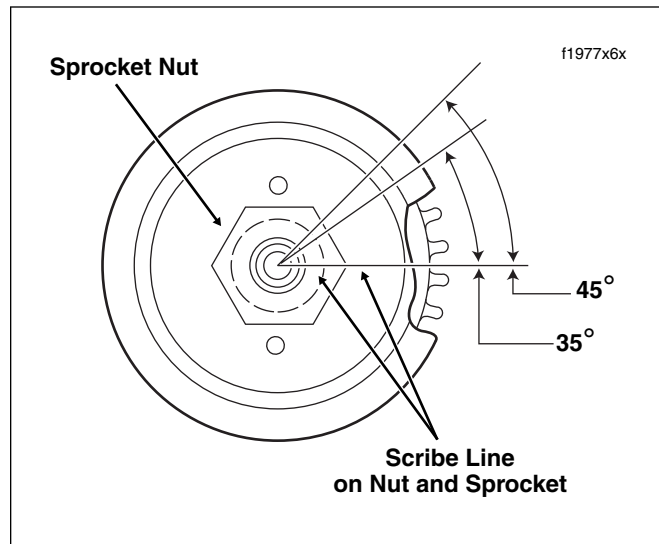


Figure 6-14. Tighten/Secure Sprocket Nut

2. Carefully inspect the sprocket for cracks or other damage.
3. Inspect each sprocket tooth for large chrome chips having sharp edges. Look for gouges caused by contact with a hard object. If large enough, both of these conditions will leave a corresponding pattern in the belt face and are cause for rear sprocket replacement.
4. Without obvious damage, rear wheel sprocket replacement may be a subjective decision based on general appearance. Using medium pressure, drag a scribe or the sharp point of a knife blade across the root of a groove. Even though the plating is lightest in the root area, a knife point should not penetrate the chrome. If the blade slides across the chrome plating without digging in, then the chrome is still good. On the other hand, if you can feel the scribe digging in and it leaves a visible mark, then the chrome plating has worn off and the bare aluminum is being cut. Loss of chrome is cause for rear sprocket replacement.

INSTALLATION

1. Apply two drops of Loctite High Strength Threadlocker 271 (red) to threads of each of five sprocket bolts. Secure sprocket to hub using bolts with flat washers (and locknuts on laced wheels). Tighten bolts to 55-65 ft-lbs (75-88 Nm).
2. Install rear wheel and adjust belt deflection. See Section [2.4 REAR WHEEL, INSTALLATION](#).

GENERAL

The primary chaincase is a sealed housing containing the primary chain, clutch, engine compensating sprocket, chain tensioner assembly, alternator and starter drive mechanism.

LUBRICATION

See Section 1.7 PRIMARY CHAIN/LUBRICANT, PRIMARY CHAIN LUBRICANT.

REMOVAL

1. Remove seat. See Section 2.25 SEAT, REMOVAL.

WARNING

To protect against shock and accidental start-up of vehicle, disconnect the negative battery cable before proceeding. Inadequate safety precautions could result in death or serious injury.

2. Unthread bolt and remove battery negative cable (black) from battery negative (-) terminal.
3. Standing on left side of motorcycle, remove magnetic drain plug at bottom of primary chaincase cover. Drain lubricant into suitable container.

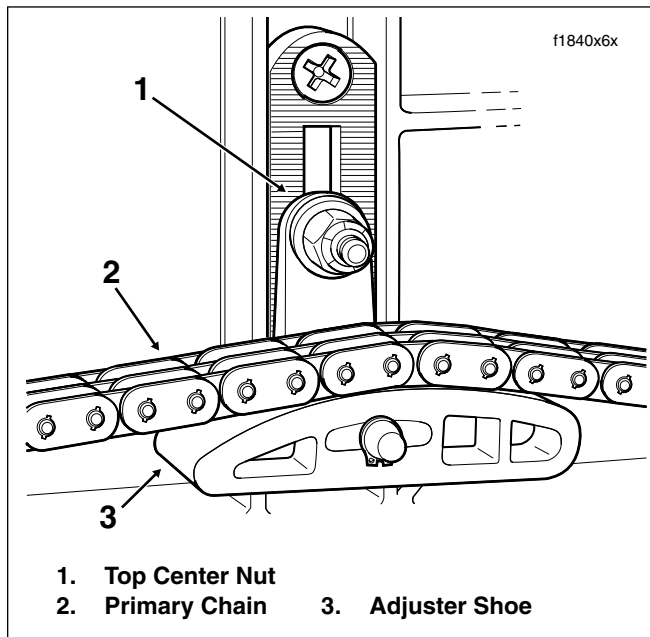


Figure 6-15. Primary Chain Tensioner Assembly

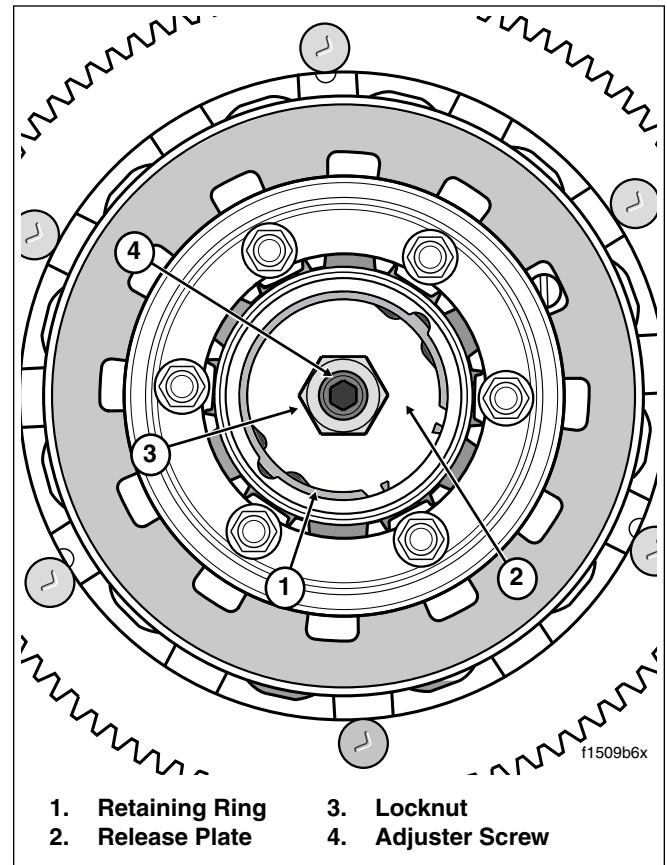


Figure 6-16. Clutch Hub Release Plate Assembly

NOTE

If drain plug has accumulated a lot of debris, inspect the condition of chaincase components.

4. Remove socket screw with lockwasher to remove passenger footboard from rear swingarm bracket.
5. Remove socket screw (with lockwasher and flat washer) to release front footboard forward bracket from frame weldment. For best results, approach from opposite side using a 3/8 inch ball allen with extension. To free front footboard rear bracket from frame weldment and jiffy stand bracket, remove lower hex bolt (with lockwasher) and upper hex bolt (with lockwasher and locknut).
6. Remove locknut, lockwasher and flat washer to free shift rod from inner shift arm.
7. Remove socket head screws and pull both heel and toe shift levers from shift lever shaft. Remove rubber spacer. If preferable, remove socket head screw to release inner shift arm instead, and then pull shift lever shaft and heel-toe shift lever assembly from primary chaincase bore. When pulling any lever from splined shaft, always mark splines on both shaft and lever to assist in assembly.

8. Remove ten allen head socket screws (with captive washers) from primary chaincase cover. Remove primary chaincase cover from motorcycle.
9. Loosen top center nut from captured bolt of chain tensioner assembly. See [Figure 6-15](#). Lower the chain tensioner assembly as required, so that the adjuster shoe rests flat on casting of primary chaincase.

⚠ WARNING

Always wear proper eye protection when removing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

10. Remove retaining ring and pull release plate (with lock-nut and adjuster screw) from clutch hub. See [Figure 6-16](#).
11. See [Figure 6-17](#). Obtain the PRIMARY DRIVE LOCKING TOOL (HD-41214) and proceed as follows:

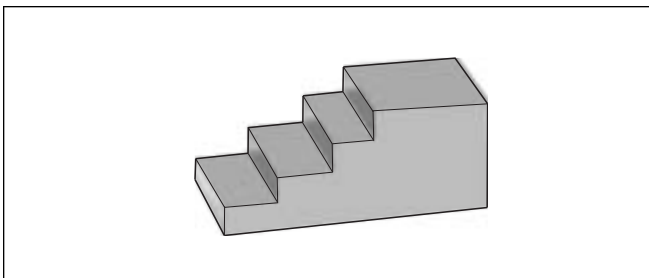


Figure 6-17. Primary Drive Locking Tool (Part No. HD-41214)

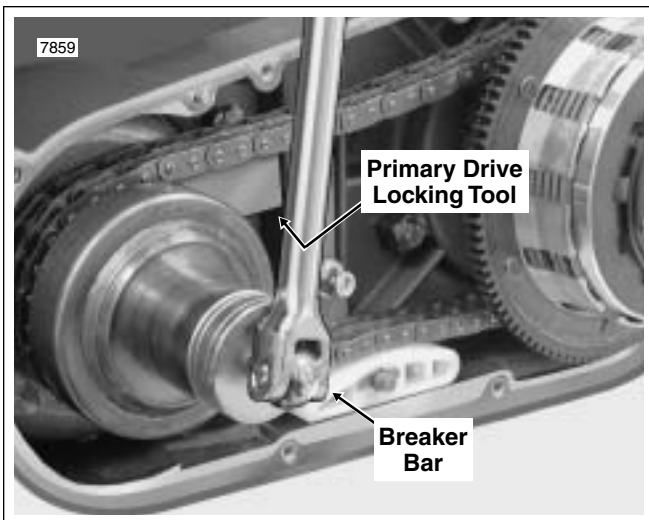


Figure 6-18. Place Primary Drive Locking Tool and Loosen Engine Compensating Sprocket Nut

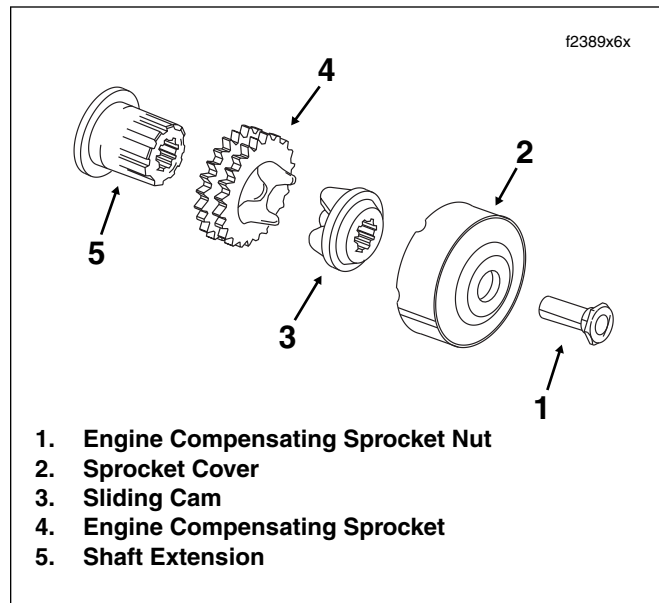


Figure 6-19. Engine Compensating Sprocket Assembly

CAUTION

Do not place the tool on the lower strand of the primary chain. Rotation of either the engine compensating sprocket nut or clutch hub mainshaft nut causes tool to exert enough force to break or shatter the nylon adjuster shoe.

With the flat side against the upper strand of the primary chain, insert stepped side of tool into teeth of engine compensating sprocket. Using a breaker bar and 1-1/2 inch socket, turn the sprocket nut in a counterclockwise direction. Once the stepped area of the tool is drawn into

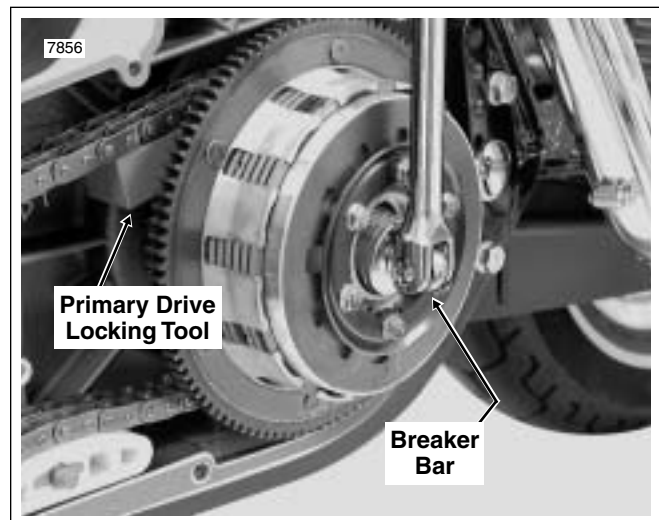


Figure 6-20. Place Primary Drive Locking Tool and Loosen Clutch Hub Mainshaft Nut

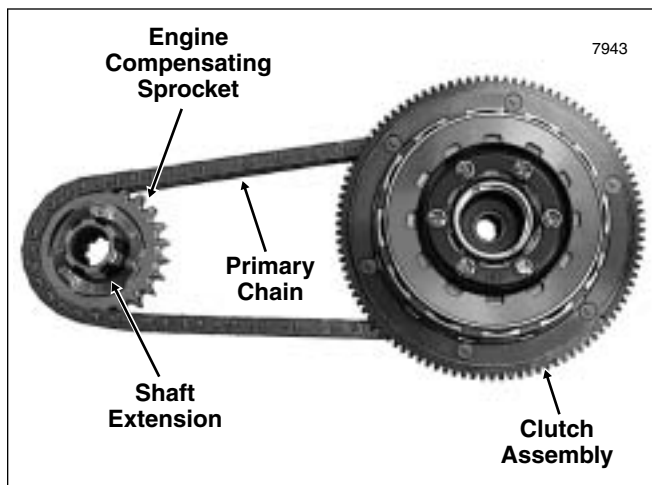


Figure 6-21. Remove Clutch Assembly, Primary Chain, Engine Compensating Sprocket and Shaft Extension

the sprocket, rotation of the primary drive is stopped. Continue turning compensating sprocket nut until loose. See [Figure 6-18](#).

NOTE

If too much loctite, or perhaps the wrong loctite, was used to install the engine compensating sprocket nut, it may be very difficult to remove. In these cases, break down loctite using heat from a small propane torch. Apply heat evenly around nut head in a circular motion, but not for so long as to turn nut blue. Do not direct heat at chain tensioner assembly and other components or damage will result. If unable to loosen sprocket nut with breaker bar after applying heat, use air impact wrench as the last alternative.

WARNING

Use extreme caution when operating propane torch. Read the manufacturers instructions carefully before use. Do not direct open flame or heat toward any fuel system component. Extreme heat can cause fuel ignition and explosion. Inadequate safety precautions could result in death or serious injury.

12. Reverse the position of the primary drive locking tool. With the flat side against the upper strand of the primary chain, insert stepped side of tool into teeth of clutch sprocket. Using a breaker bar and 1-3/16 inch socket, turn the clutch hub mainshaft nut in a clockwise direction until loose. See [Figure 6-20](#).

NOTE

Clutch hub mainshaft nut has left handed threads.

13. Remove the primary drive locking tool. Remove the clutch hub mainshaft nut and engine compensating sprocket nut.

14. Remove sprocket cover and sliding cam. See [Figure 6-19](#).
15. Remove clutch, primary chain, compensating sprocket and shaft extension as a single assembly. See [Figure 6-21](#).
16. Bend tab on lockplate away from head of jackshaft bolt. Holding pinion gear to prevent rotation, remove the jackshaft bolt with lockplate and thrust washer. Carefully pull jackshaft assembly from primary chaincase bore.
17. From right side of motorcycle, remove starter front mounting screw with lockwasher. Remove rear mounting screw with lockwasher, but do not disconnect chassis ground cable ring terminal.
18. Returning to left side of motorcycle, remove two bolts (with captive washers) from outside edge of primary chaincase.
19. Remove five inside bolts (with captive washers) to free primary chaincase from crankcase and transmission housings. Remove primary chaincase from motorcycle.
20. Remove O-ring from crankcase lip and discard.

INSPECTION AND REPAIR

1. Inspect the primary chaincase for cracks or other damage. Replace as necessary.
2. Check the mainshaft bearing. Bearing must rotate freely without drag. Replace the bearing if necessary. Replace the lip seal. See [MAINSHAFT BEARING AND LIP SEAL](#) on this page.

NOTE

Also check the bearing inner race on the mainshaft. Replace the race if scored or excessively worn. See [MAINSHAFT BEARING INNER RACE](#) in this section.

3. Check the starter jackshaft bushing in the primary chaincase. Check the jackshaft bushing in the primary chaincase cover. Replace the bushings if they are damaged or excessively worn (i.e., through the teflon and copper coatings into the steel backing). Replace the lip seal. See [STARTER JACKSHAFT LIP SEAL AND BUSHING - PRIMARY CHAINCASE](#) in this section.
4. Check the shifter bushings in the primary chaincase. Replace the bushings if necessary. See [SHIFTER BUSHINGS](#) in this section.

DISASSEMBLY

MAINSHAFT BEARING AND LIP SEAL

REMOVAL

⚠ WARNING

Always wear proper eye protection when removing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

1. Remove retaining ring from groove on clutch side of primary chaincase. Turn the chaincase over to transmission side.
2. Pull lip seal from bearing bore on transmission side of primary chaincase. Use a seal remover or rolling head pry bar for best results. Remove retaining ring from groove on same side of chaincase.

CAUTION

Failure to provide proper support will cause the casting to crack or break around the outside diameter of the boss. Any damage to the casting requires replacement of the primary chaincase.

3. Place primary chaincase in arbor press with the transmission side up. Be sure to properly support boss on clutch side to avoid damage to casting.
4. Center bearing under ram, and using a suitable driver, carefully press out bearing applying pressure to the outer race.

INSTALLATION

1. Inspect the bearing bore to verify that it is clean and smooth.

⚠ WARNING

Always wear proper eye protection when installing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

2. Install retaining ring in groove on transmission side of primary chaincase. Verify that the retaining ring is fully seated in the groove.
3. Apply a thin film of clean H-D 20W50 engine oil to bearing bore and O.D. of new bearing.

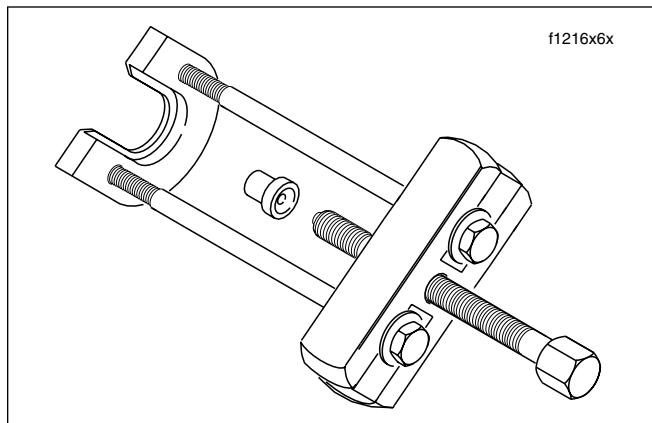


Figure 6-22. Mainshaft Bearing Inner Race Remover (Part No. HD-34902B)

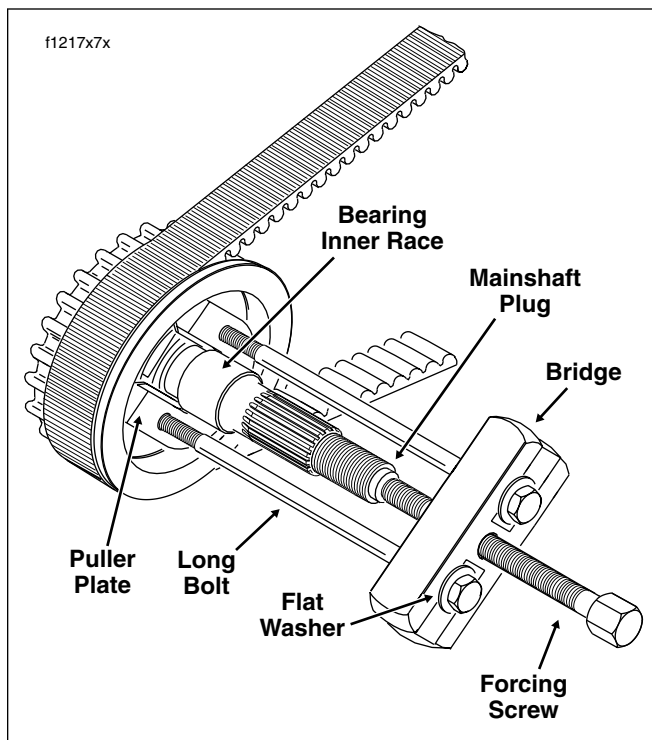


Figure 6-23. Pull Mainshaft Bearing Inner Race

CAUTION

Failure to provide proper support will cause the casting to crack or break around the outside diameter of the boss. Any damage to the casting requires replacement of the primary chaincase.

4. Place primary chaincase in arbor press with the clutch side up. Be sure to properly support boss on transmission side to avoid damage to casting.
5. Place bearing over bore with the lettered side up. Center bearing under ram, and using a suitable driver, apply pressure to the outer race until bearing makes contact with the installed retaining ring.

6. Install second retaining ring to lock position of bearing in bore on clutch side of chaincase. Verify that retaining ring is fully seated in the groove.
7. Turn chaincase over, so that the transmission side is up.
8. Lubricate O.D. of **new** lip seal with clean H-D 20W50 engine oil. With the lip garter spring side (also stamped "OIL SIDE") facing the bearing, press lip seal into bore until outer edge is flush with machined surface of the casting. To avoid seal damage, be sure to use a suitable driver that presses squarely on the outer edge of the seal carrier.
9. Verify that lip seal is square in the bore and completely seated around its circumference.
10. Lubricate the bearing and lip seal with multi-purpose grease or clean H-D 20W50 engine oil.

MAINSHAFT BEARING INNER RACE

NOTE

The bearing inner race must be properly positioned on the mainshaft to align with the bearing outer race in the primary chaincase. To remove and install the bearing inner race, use the combination MAINSHAFT BEARING INNER RACE REMOVER/INSTALLER, Part No. HD-34902B. See Figure 6-22 and [Figure 6-24](#).

REMOVAL

1. Install small flat washers on two long bolts of puller tool. Slide one bolt into channel on each side of bridge so that washer is between bridge and bolt head. Thread bolts into stamped side of U-shaped puller plate an equal number of turns.
2. Sparingly apply graphite lubricant to threads of forcing screw to ensure smooth operation. Thread forcing screw into center hole of bridge.
3. Position U-shaped puller plate between bearing inner race and sprocket nut. See [Figure 6-23](#).
4. Install mainshaft plug into end of transmission mainshaft. Thread the forcing screw into the bridge until the steel ball at the end of the screw seats in the cavity of the mainshaft plug. Verify that the tool assembly is square so that the bearing is not cocked during removal.
5. Continue turning the forcing screw until the bearing inner race is pulled free of the mainshaft.

INSTALLATION

1. Chamfered edge first, slide the bearing inner race onto the transmission mainshaft.
2. Thread extension shaft onto end of mainshaft. See upper frame of [Figure 6-25](#).

NOTE

Extension shaft has left handed threads, so turn counter-clockwise to install.

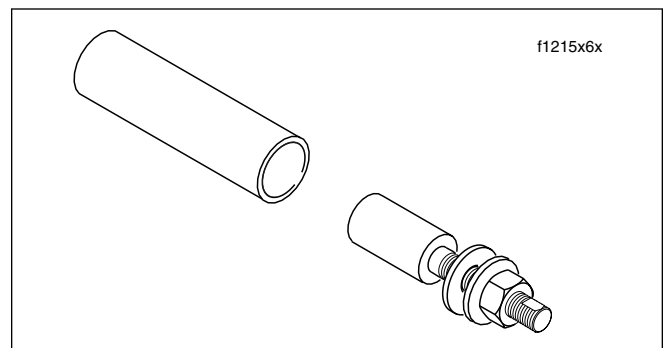


Figure 6-24. Mainshaft Bearing Inner Race Installer (Part No. HD-34902B)

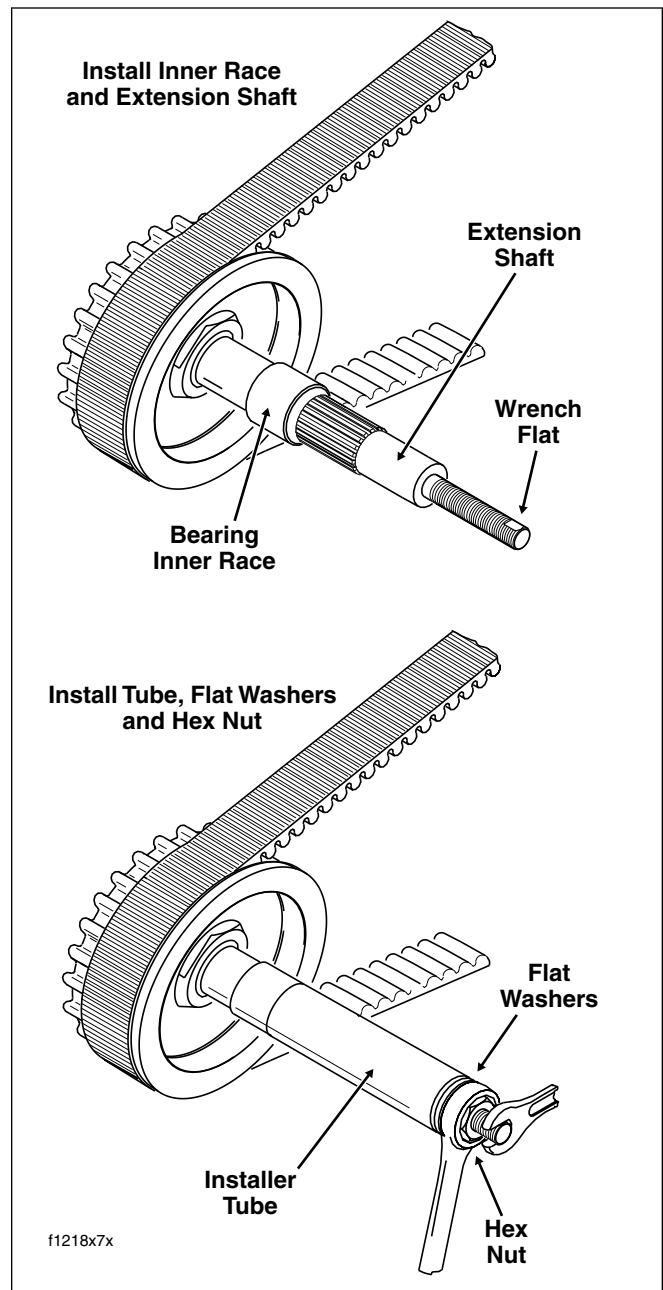


Figure 6-25. Press Bearing Inner Race onto Mainshaft

3. Slide installer tube over extension shaft until it contacts bearing inner race. Sparingly apply graphite lubricant to threads of extension shaft to ensure smooth operation.
4. Place both large flat washers over threaded portion of extension shaft until they contact installer tube. Install large hex nut onto extension shaft. See lower frame of [Figure 6-25](#).
5. With a wrench on flats at threaded end of extension shaft, hold shaft stationary while turning hex nut in a clockwise direction. In this manner, press race onto shaft so inside edge is 0.100 in. (2.54 mm) from main drive gear.
6. Lubricate the race with multi-purpose grease or clean engine oil.



Figure 6-26. Install Jackshaft Lip Seal with Open Side of Seal Carrier on the Clutch Side

STARTER JACKSHAFT LIP SEAL AND BUSHING - PRIMARY CHAINCASE

REMOVAL

1. Remove lip seal and bushing from jackshaft bore of primary chaincase. Approach from the transmission side using a suitable seal or bushing driver.
2. Inspect the jackshaft bore to verify that it is clean and smooth.

INSTALLATION

1. Place primary chaincase in arbor press with the clutch side up. Support forward part of case so that it lies flat on transmission mounting flanges.
2. Lightly apply clean engine oil to O.D. of **new** lip seal.
3. With the open side of the seal carrier facing up, place lip seal in the jackshaft bore. See [Figure 6-26](#).
4. Using a suitable seal or bushing driver, press squarely on the outer edge of the seal carrier until it makes solid contact with the shoulder on the transmission side.
5. Verify that seal is square in the bore and completely seated around its circumference.
6. Press **new** bushing into bore. Bushing must be flush with boss or at a depth not exceeding 0.010 in. (0.25 mm).
7. Lubricate the bushing and lip seal with clean engine oil.

STARTER JACKSHAFT BUSHING - PRIMARY CHAINCASE COVER

REMOVAL

1. Remove bushing from jackshaft bore of primary chaincase cover. For best results, use a suitable bushing/bearing puller.
2. Inspect the bushing bore to verify that it is clean and smooth.

INSTALLATION

1. Remove five T27 TORX screws (with captive washers) to free clutch inspection cover from primary chaincase cover.
2. Place primary chaincase cover in arbor press. Support forward part of case so that it lies flat around the clutch inspection cover bore.
3. Press **new** bushing into bore using a suitable bushing driver. Bushing must be flush with boss or at a depth not exceeding 0.010 in. (0.25 mm).
4. Lubricate the bushing with clean engine oil.

SHIFTER BUSHINGS

REMOVAL

1. Using an arbor press, press bushings from bore. Inspect the bushing bore to verify that it is clean and smooth.

INSTALLATION

1. Place primary chaincase in arbor press.
2. Press **new** bushing into each end of bore. Installed bushings must be flush to 0.010 inch (0.76 mm) **above outer edge** of bore.
3. Assemble primary chaincase. See Section [6.5 PRIMARY CHAINCASE, INSTALLATION](#), on the next page.

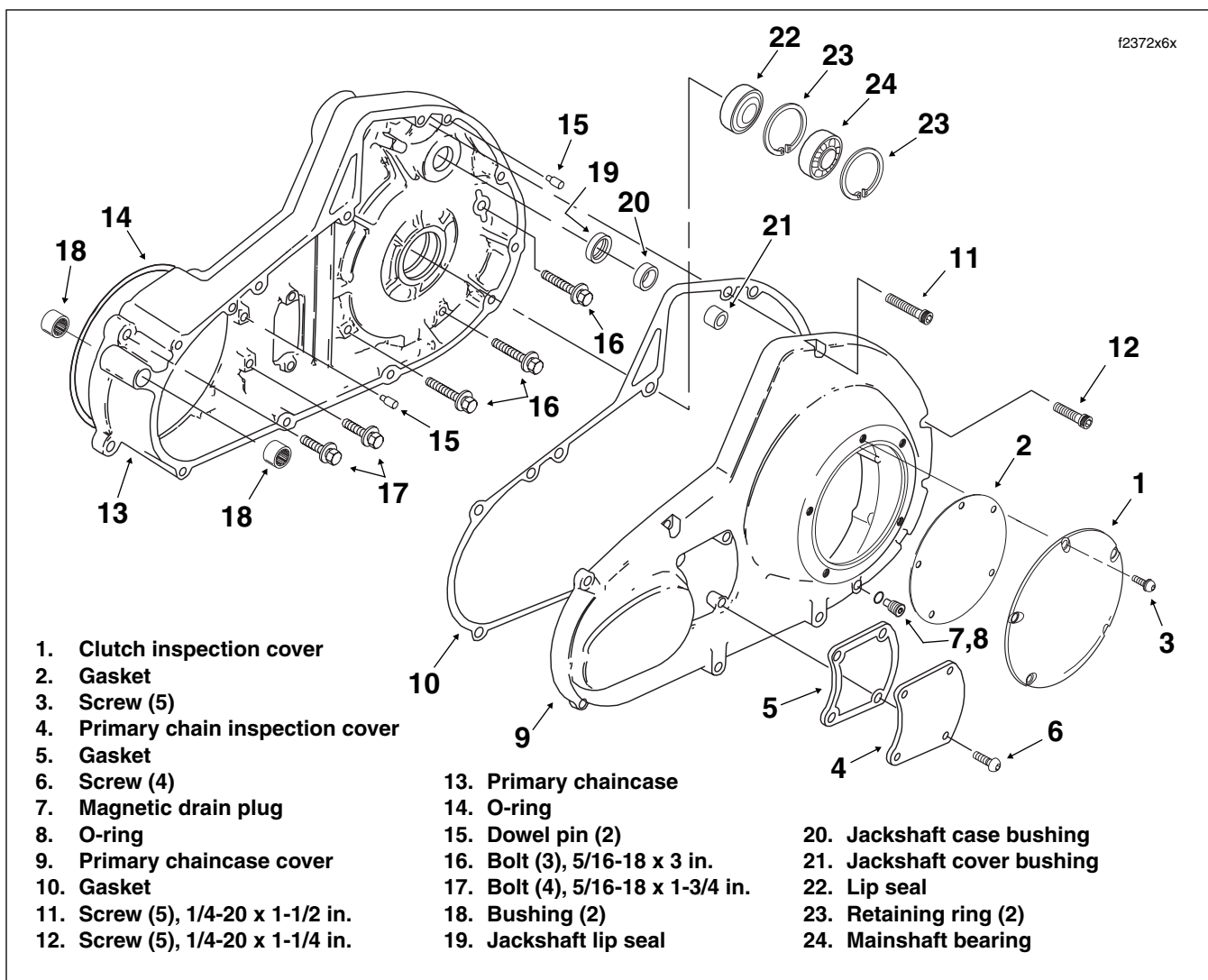


Figure 6-27. Primary Chaincase Assembly

INSTALLATION

1. Install **new** O-ring on lip of crankcase.

CAUTION

Avoid the use of sealant where the primary chaincase mates with the crankcase/transmission interface. Use of sealant can interfere with the mating of these parts.

NOTE

If the use of sealant is absolutely necessary to eliminate oil wicking past the primary chaincase bolts, use only a light film around the bolt holes on the mating surfaces. With one exception, remember that all bolts go into blind holes. The only open hole is located at the bottom of the transmission case. See right frame of [Figure 6-28](#).

2. Verify that the mating surfaces of the primary chaincase and crankcase/transmission interface are clean.

CAUTION

The presence of sealant, residual loctite, dirt, water or oil in the blind holes of the crankcase or transmission can cause the castings to crack or break.

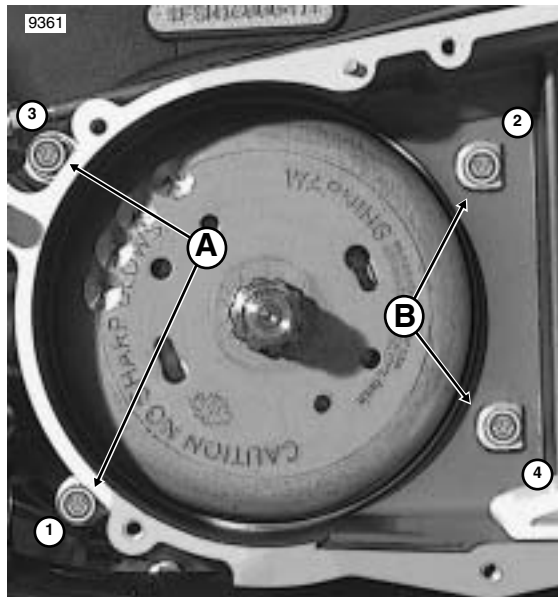
3. Verify cleanliness of all blind holes in both the crankcase and transmission.

CAUTION

The mainshaft splines may damage the sealing surface of the lip seal if the protector sleeve is not used.

4. Place the seal protector sleeve (from the MAIN DRIVE GEAR SEAL INSTALLER, HD-41405) over the mainshaft splines. Lightly lubricate the sleeve with clean engine oil.

Start four 1-3/4 inch bolts to engine.



Start three 3 inch bolts to transmission.

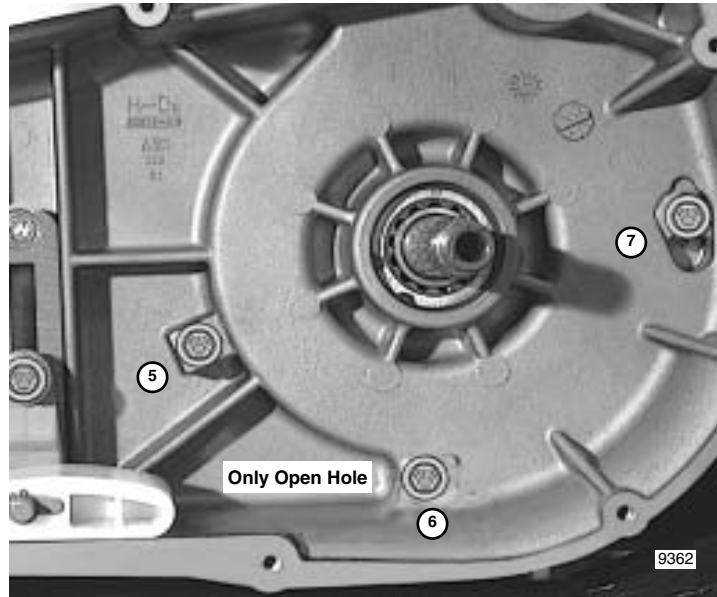


Figure 6-28. Primary Chaincase Screw Size and Torque Sequence

5. Place the primary chaincase into position against the crankcase and transmission housings. Remove the seal protector sleeve from the mainshaft.
6. Install primary chaincase bolts as follows:

NOTE

Wherever the primary chaincase bolts are to be reused, clean threads and apply two drops of Loctite Medium Strength Threadlocker 243 (blue) before installation.

- a. See A in left frame of Figure 6-28. Start two bolts (1-3/4 inches with captive washers) to fasten outside edge of primary chaincase to front of crankcase.
 - b. See B in left frame of Figure 6-28. From within the primary chaincase, start two bolts (1-3/4 inches with captive washers) to fasten primary chaincase to rear of crankcase.
 - c. See right frame of Figure 6-28. From within the primary chaincase, start three bolts (3 inches with captive washers) to fasten primary chaincase to front and rear of transmission.
 - d. Tighten the seven bolts to 15-19 ft-lbs (20.3-25.8 Nm) in the numerical sequence shown in Figure 6-28.
7. On right side of motorcycle, install the front starter mounting screw with lockwasher. Install rear mounting screw and lockwasher (with chassis ground cable ring terminal). Alternately tighten front and rear starter mounting screws to 14-18 ft-lbs (19-24 Nm).
 8. Returning to left side of motorcycle, gently insert jackshaft assembly into primary chaincase so that splined end of shaft engages coupling on starter output shaft. Insert key on lockplate through slot in thrust washer and into keyway on jackshaft. Thread the jackshaft bolt into the starter shaft making sure that the lockplate key remains in the keyway. Holding pinion gear to prevent rotation, tighten jackshaft bolt to 60-80 in-lbs (6.8-9.0 Nm). Bend tab on lockplate against flat of bolt head to secure.
 9. Install the clutch, primary chain, compensating sprocket and shaft extension as a single assembly. See Figure 6-21. Start clutch assembly on the mainshaft, while placing the shaft extension on the engine sprocket shaft. The clutch hub and shaft extension are splined, so a slight rotation of the chain drive will aid in lining up the splines.
 10. Place sliding cam over shaft extension. Slide sprocket cover over sliding cam. See Figure 6-19.
 11. Install the engine compensating sprocket nut. The following procedure is based on whether a new or used nut is being installed.

CAUTION

Exercise caution to avoid getting oil on the threads of the sprocket nut or the integrity of the lock patch (new nut) or Loctite (used nut) may be compromised.

New sprocket nut: smear a small quantity of clean engine oil on the inside face of the sprocket nut and the outside face of the sprocket cover. Limit the application to where the surfaces of the two parts contact each other. Install nut and hand tighten in a clockwise direction.

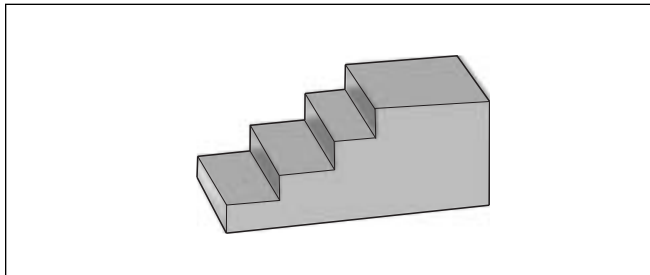
Used sprocket nut: apply two drops of Loctite High Strength Threadlocker 262 (red) to the threads of the engine compensating sprocket nut. Also smear a small quantity of clean engine oil on the inside face of the sprocket nut and the outside face of the sprocket cover. Limit the application to where the surfaces of the two parts contact each other. Install nut and hand tighten in a clockwise direction.

12. Apply two drops of Loctite High Strength Threadlocker 262 (red) to the threads of the clutch hub mainshaft nut. Install nut and hand tighten in a **counterclockwise** direction.

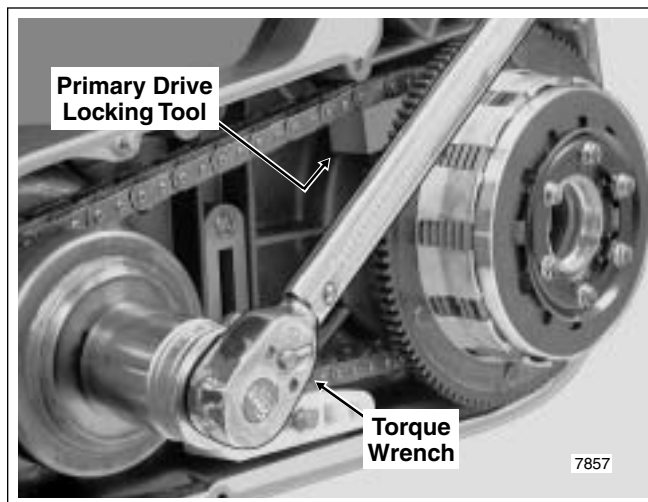
NOTE

Clutch hub mainshaft nut has left handed threads.

13. See [Figure 6-29](#). Obtain the PRIMARY DRIVE LOCK-ING TOOL (HD-41214) and proceed as follows:



**Figure 6-29. Primary Drive Locking Tool
(Part No. HD-41214)**



**Figure 6-30. Place Primary Drive Locking Tool
and Torque Engine Compensating Sprocket Nut**

CAUTION

Do not place the tool on the lower strand of the primary chain. Rotation of either the engine compensating sprocket nut or clutch hub mainshaft nut causes tool to exert enough force to break or shatter the nylon adjuster shoe.

- a. With the flat side against the upper strand of the primary chain, insert stepped side of tool into teeth of clutch sprocket. Verify that adjuster shoe of chain tensioner assembly rests flat on casting of primary chaincase, and then using torque wrench and 1-1/2 inch socket, tighten engine compensating sprocket nut to 75 ft-lbs (101.7 Nm). See [Figure 6-30](#).

NOTE

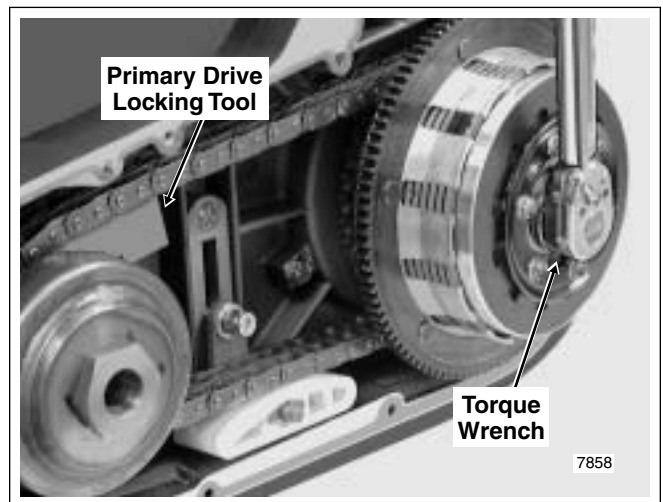
Once the stepped area of the tool is drawn into the sprocket, rotation of the primary drive is stopped.

- b. Mark a straight line on the engine compensating sprocket nut continuing the line over onto the sprocket cover. Tighten the engine compensating sprocket nut an additional 45° to 50°.

14. Reverse the position of the primary drive locking tool. With the flat side against the upper strand of the primary chain, insert stepped side of tool into teeth of engine compensating sprocket. Using torque wrench and 1-3/16 inch socket, tighten clutch hub mainshaft nut to 70-80 ft-lbs (95-108 Nm). See [Figure 6-31](#).

15. Remove the primary drive locking tool.

16. Install release plate (with locknut and adjuster screw) into clutch hub bore. The word "OUT" is stamped on the release plate to indicate the outboard side.



**Figure 6-31. Place Primary Drive Locking Tool
and Torque Clutch Hub Mainshaft Nut**

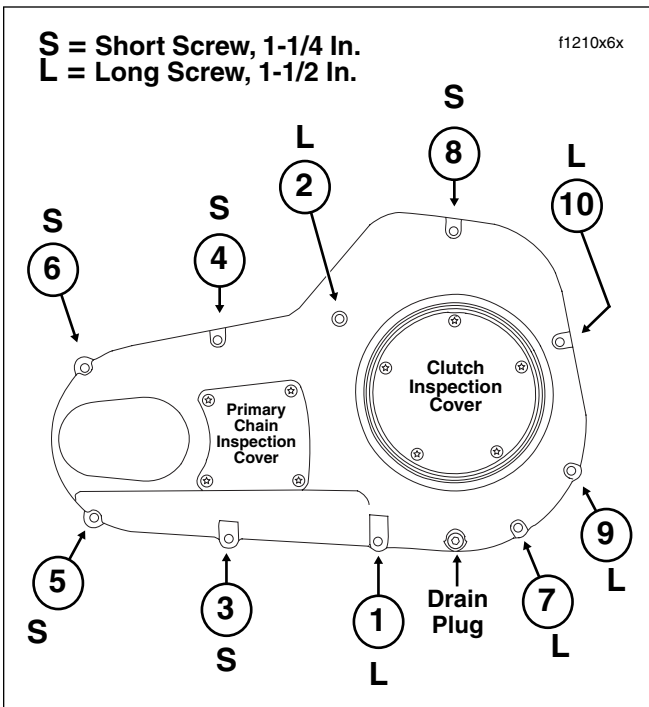


Figure 6-32. Primary Chaincase Cover Torque Sequence and Screw Size

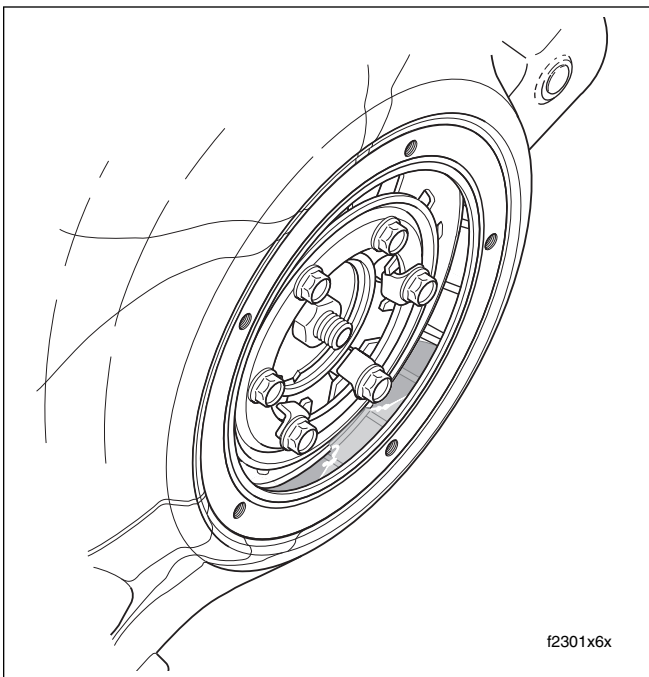


Figure 6-33. Add Primary Chaincase Lubricant

⚠ WARNING

Always wear proper eye protection when installing retaining rings. Use the correct retaining ring pliers. Verify that the tips of the pliers are not damaged or excessively worn. Slippage may propel the ring with enough force to cause eye injury.

17. Install retaining ring in clutch hub bore to lock release plate in position. Verify that the retaining ring is completely seated in the groove.
18. Adjust clutch. See Section 1.8 [CLUTCH ADJUSTMENT](#), steps 3-8.
19. Adjust primary chain tension. See Section 1.7 [PRIMARY CHAIN/LUBRICANT](#), [PRIMARY CHAIN ADJUSTMENT](#), steps 4-6.
20. Remove old gasket from flange of primary chaincase and discard. Thoroughly clean gasket surface. Hang **new** gasket on dowels.
21. Start ten allen head socket screws (five long, five short) with flat washers to install primary chaincase cover. Tighten screws to 84-108 **in-lbs** (10-12 Nm) in the numerical sequence shown in [Figure 6-32](#).
22. Clean magnetic drain plug and inspect O-ring for cuts, tears or signs of deterioration. Replace O-ring as necessary. Install drain plug back into primary chaincase cover and tighten to 36-60 **in-lbs** (4.1-6.8 Nm).
23. Remove five T27 TORX screws (with captive washers) to free clutch inspection cover from primary chaincase cover, if installed.

CAUTION

Do not overfill the primary chaincase with lubricant. Overfilling may cause rough clutch engagement, incomplete disengagement, clutch drag and/or difficulty in finding neutral at engine idle.

⚠ WARNING

Be sure that lubricant does not contact rear wheel, tire and brake components. Such contact can adversely affect traction and may lead to loss of vehicle control, which could result in death or serious injury.

24. Pour 32 ounces (946 ml) of Harley-Davidson [FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT](#) through the clutch inspection cover opening, Part No. 99851-05 (quart). See [Figure 6-33](#).
25. To avoid punching holes in the clutch inspection cover gasket or enlarging existing holes, install clutch inspection cover and **new** gasket as follows:
 - a. Align the triangular shaped hole in the gasket with the top hole in the clutch inspection cover. Be sure the rubber molding and the words "towards clutch" face the motorcycle.
 - b. Insert screw (with captive washer) through clutch inspection cover and carefully thread it all the way through triangular shaped hole in gasket. Do not push screw through hole.
 - c. Hang the clutch inspection cover on the primary chaincase cover flange by starting the top cover screw.

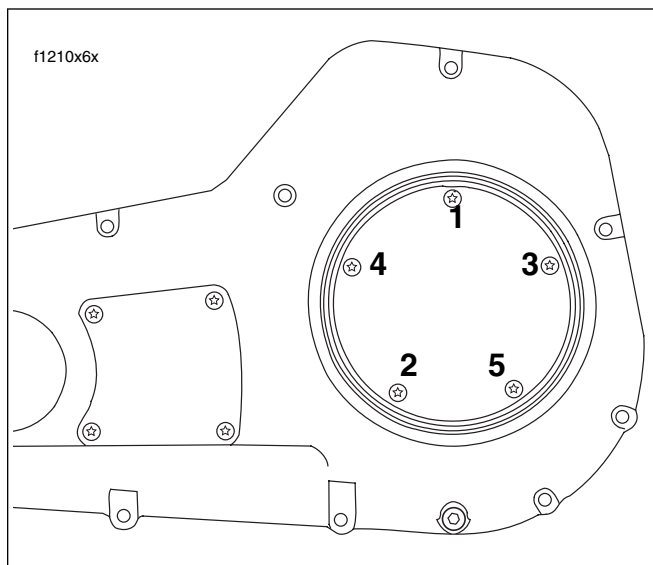


Figure 6-34. Clutch Inspection Cover Torque Sequence

- d. Start the remaining four screws (with captive washers).
 - e. Using a T27 TORX drive head, alternately tighten screws to 84-108 **in-lbs** (10-12 Nm) in the pattern shown in [Figure 6-34](#).
26. If installing heel-toe shift levers onto shift lever shaft, perform steps 26(a) thru 26(d). If just installing inner shift arm onto shift lever shaft, perform steps 26(d) thru 26(f).
 - a. Set the heel-toe shift levers down, so that the Harley-Davidson script on the rubber peg is topside. Now look at the socket head screw hole. If the hole is countersunk at the bottom, then it is the inboard shift lever (toe). If the hole is countersunk at the top, it is the outboard shift lever (heel).
 - b. Install heel-toe shift levers onto splines of shift lever shaft taking note to align marks placed on splines during disassembly.
 - c. Install socket head screws to fasten heel-toe shift levers to shift lever shaft. Tighten 5/16 inch screws to 18-22 ft-lbs (24-30 Nm).
 - d. Install rubber spacer onto shift lever shaft. Install shift lever shaft into primary chaincase bore.
 - e. Install inner shift arm onto splines of shift lever shaft taking note to align marks placed on splines during disassembly.
 - f. Install socket head screw to fasten inner shift arm to shift lever shaft. Tighten 1/4 inch screw to 90-110 **in-lbs** (10.2-12.4 Nm)
 27. Install flat washer, lockwasher and locknut to fasten shift rod to inner shift arm.
 28. Install socket screw with lockwasher to fasten passenger footboard to rear swingarm bracket. Tighten screw to 15-18 ft-lbs (20-24 Nm). Repeat step on opposite side of motorcycle.
 29. Install left side footboard and bracket assembly as follows:
 - a. Insert socket screw (with lockwasher and flat washer) through frame weldment into front footboard forward bracket. For best results, approach from opposite side of motorcycle using a 3/8 inch ball allen with extension.
 - b. At front footboard rear bracket, slide upper hex bolt through frame weldment, jiffy stand bracket and footboard bracket thru hole. Install lockwasher and locknut. Slide lower hex bolt through frame weldment and jiffy stand bracket into threaded hole of footboard bracket.
 - c. Tighten front bracket socket screw to 30-35 ft-lbs (41-48 Nm).
 - d. Alternately tighten rear bracket hex bolts to 15-20 ft-lbs (20-27 Nm).
 30. Insert bolt through battery negative cable (black) into threaded hole of battery negative (-) terminal. Tighten bolt to 60-96 **in-lbs** (6.8-10.9 Nm).
 31. Install seat. See [Section 2.25 SEAT, INSTALLATION](#).

NOTES
