REMOVAL

PART NUMBER	TOOL NAME
HD-47977	PRIMARY DRIVE LOCKING TOOL

NOTES

To remove the primary chain, remove compensating sprocket, clutch assembly and primary chain as an assembly:

1. Remove primary chaincase cover. See 6.2 PRIMARY CHAINCASE COVER, Removal.
2. See Figure 6-4. Remove chain tensioner fasteners (2) then remove chain tensioner (1).
3. Using a colored marker, mark one of the links of the primary chain. Maintaining the original direction of rotation during assembly may prolong service life.

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)

4. See Figure 6-5. Loosen locknut (3).
5. Remove retaining ring (1) and release plate (2).

WARNING

Do not apply heat to remove the clutch hub nut. Fuel vapor and possible fuel mixture in crankcase oil is extremely flammable and highly explosive, which could result in death or serious injury. (00440b)

NOTES

- *See Figure 6-7. When removing the clutch hub mainshaft nut the PRIMARY DRIVE LOCKING TOOL (Part No. HD-47977) must be placed between the teeth of the engine and clutch sprockets.*
- *The mainshaft nut has left handed threads, so turn clockwise to remove.*
- *Do not use PRIMARY DRIVE LOCKING TOOL (Part No. HD-41214) to remove or install components. Damage to components can occur if this tool is used. Use only PRIMARY DRIVE LOCKING TOOL (Part No. HD-47977) to remove and install components.*

6. Using a breaker bar, rotate clutch hub mainshaft nut in direction shown to remove.

NOTE

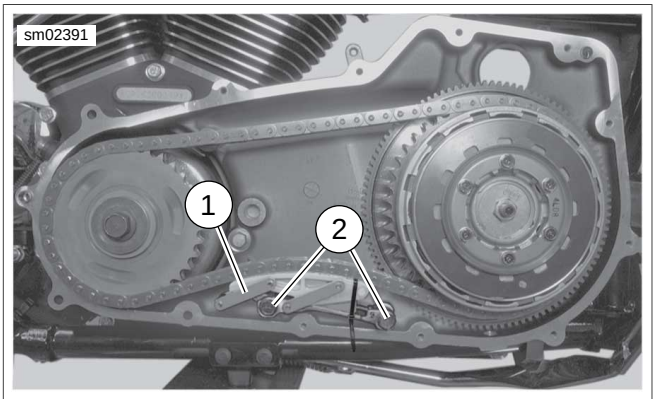
See Figure 6-8. When removing the compensating sprocket bolt, the PRIMARY DRIVE LOCKING TOOL (Part No. HD-47977) must be placed between the teeth of the engine and clutch sprockets.

7. Using a breaker bar, rotate compensating sprocket bolt in direction shown to remove.
8. **All but FXCW/C:** see Figure 6-9. Remove bolt (6) and washer (5).
9. **FXCW/C:** see Figure 6-10. Remove bolt (9), sprocket retainer (8), and thrust washer (7).

NOTE

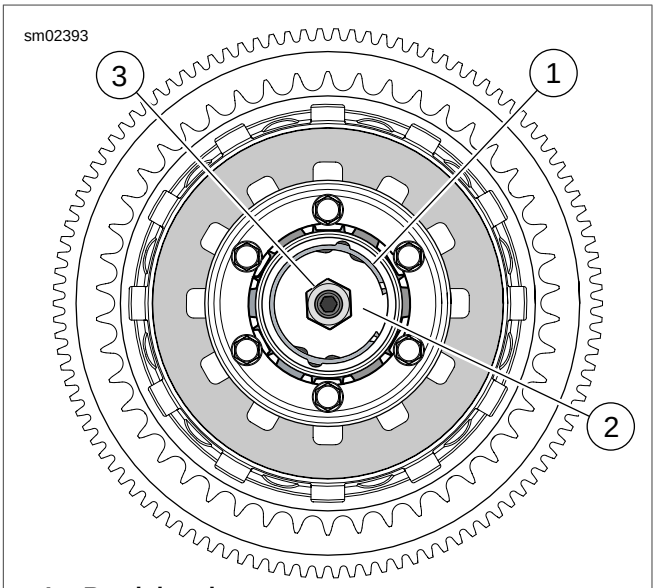
Using a colored marker or paint pen, mark one of the outboard links of the primary chain. Maintaining the original direction of rotation during assembly may prolong service life.

10. See Figure 6-6. Remove clutch assembly, primary chain and compensating sprocket assembly as a single assembly.



1. **Chain tensioner**
2. **Chain tensioner fasteners**

Figure 6-4. Chain Tensioner



1. **Retaining ring**
2. **Release plate**
3. **Locknut**

Figure 6-5. Clutch

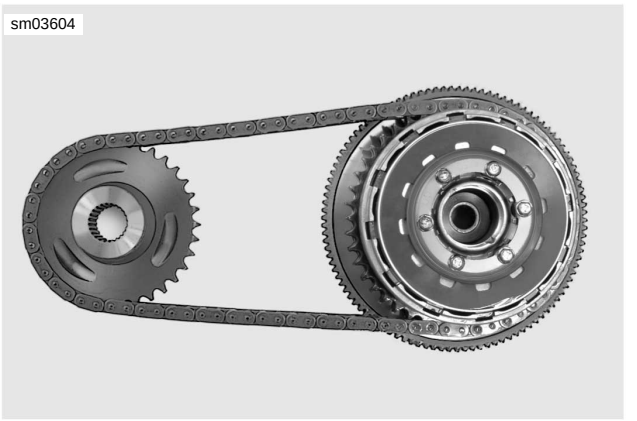
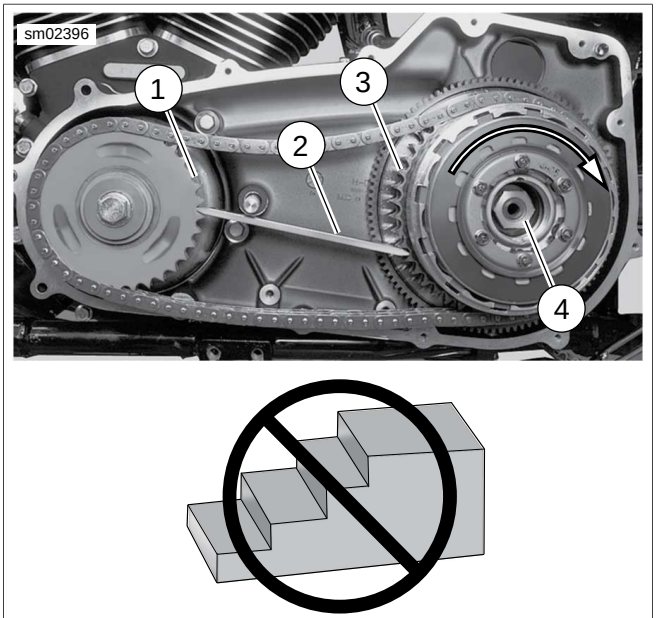
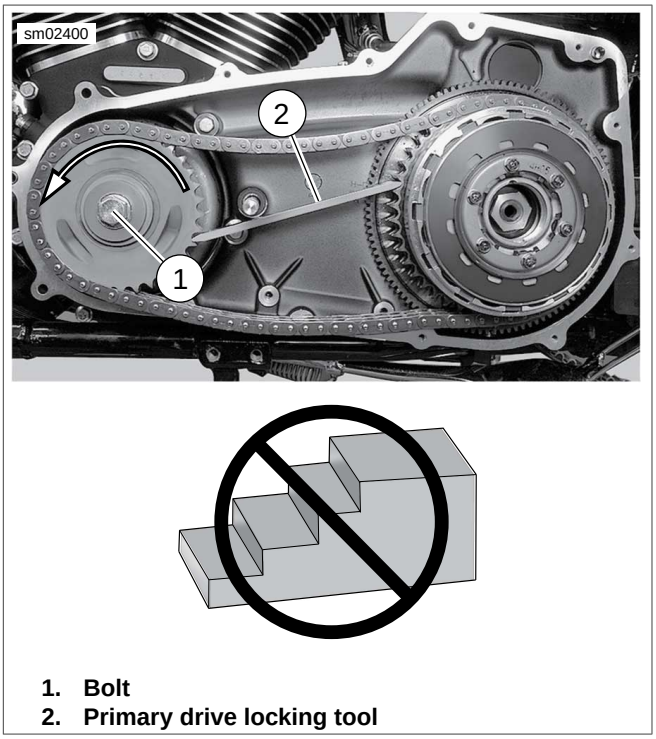


Figure 6-6. Remove Drive Components



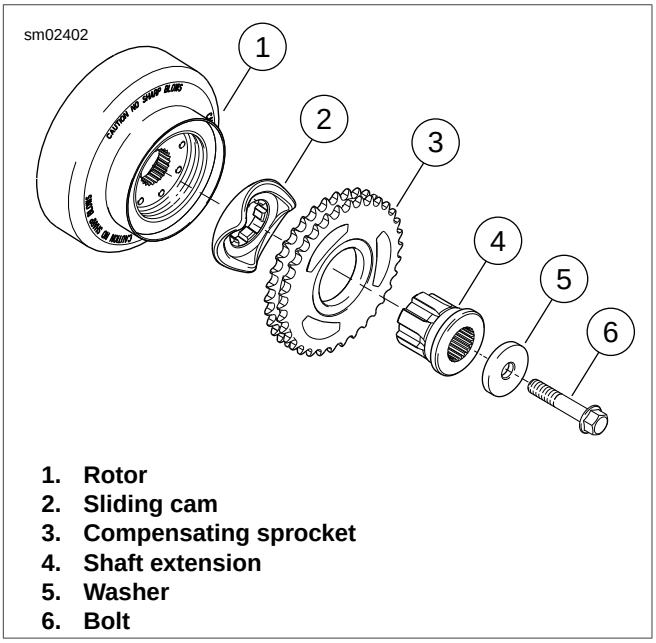
1. **Engine sprocket**
2. **Primary drive locking tool**
3. **Clutch sprocket**
4. **Mainshaft nut**

Figure 6-7. Removing Clutch Hub Mainshaft Nut



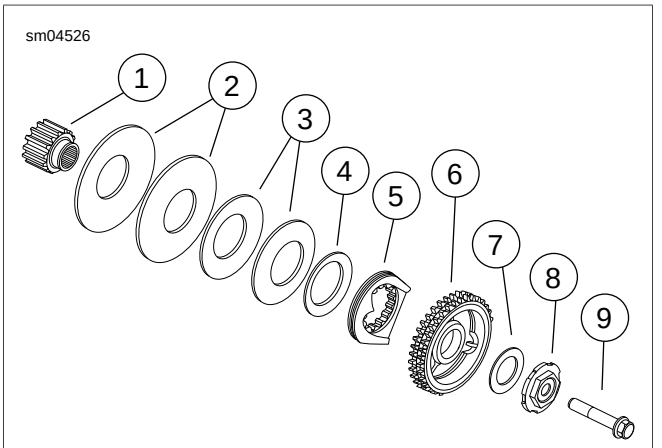
1. **Bolt**
2. **Primary drive locking tool**

Figure 6-8. Removing Compensating Sprocket Bolt



1. **Rotor**
2. **Sliding cam**
3. **Compensating sprocket**
4. **Shaft extension**
5. **Washer**
6. **Bolt**

Figure 6-9. Compensating Sprocket: All But FXCW/C



1. **Shaft extension**
2. **Large spring washer (2)**
3. **Medium spring washer (2)**
4. **Small spring washer**
5. **Sliding cam**
6. **Compensating sprocket**
7. **Thrust washer**
8. **Sprocket retainer**
9. **Bolt**

Figure 6-10. Compensating Sprocket: FXCW/C

INSTALLATION

PART NUMBER	TOOL NAME
HD-47977	PRIMARY DRIVE LOCKING TOOL

NOTE

The primary chain, compensating sprocket and clutch assembly must be installed as an assembly.

1. **All but FXCW/C:** see Figure 6-11. Install compensating sprocket assembly.
   a. Apply a thin layer of primary chaincase oil to the inner diameter of the compensating sprocket (3). and the splines of shaft extension (4). Assemble shaft extension, compensating sprocket and sliding cam (2). Place primary chain over compensating sprocket assembly.
   b. Place drive components (primary chain, compensating sprocket assembly, and clutch assembly) into position. The clutch hub and shaft extension are splined, so a slight rotation of the chain drive will aid installation.
   c. Install **new** bolt (6) and washer (5) hand tight.

   NOTE

   Clutch hub mainshaft nut has left handed threads, so turn counterclockwise to install.

   d. Clean and prime threads of nut. Apply two drops of LOCTITE THREADLOCKER 262 (red) to the threads of the clutch hub mainshaft nut. Start nut onto mainshaft and tighten hand tight.

   NOTE

   See Figure 6-13. When tightening the compensating sprocket bolt, the PRIMARY DRIVE LOCKING TOOL (Part No. HD-47977) must be placed between the teeth of the engine and clutch sprockets.

   e. Tighten compensating sprocket to 65 ft-lbs (88.2 Nm).
   f. Loosen compensating sprocket back 90 degrees.
   g. Re-tighten compensating sprocket to 65 ft-lbs (88.2 Nm).
   h. Using a grease pencil, mark a straight line on the compensating sprocket bolt continuing the line over onto the chaincase housing for reference.
   i. Using the marks as a guide, turn compensating sprocket bolt 62±1 degrees.

2. **FXCW/C:** see Figure 6-12. Install compensating sprocket assembly.
   a. Install shaft extension (1) with bearing journal facing away from vehicle. Apply a thin layer of primary chaincase oil to the splines and bearing journal.
   b. Install large spring washers (2). Outer diameter of spring washers should be contacting each other.
   c. Install medium spring washers (3). Outer diameter of spring washers should be contacting each other.
   d. Install small spring washer (4) so that outer diameter will contact sliding cam (5), once installed.
   e. Install sliding cam with flat face contacting small spring (4). Lubricate sliding cam ramps with primary chaincase oil.
   f. Place drive components [primary chain, compensating sprocket (6) (with text "this side out" facing away from motorcycle), and clutch assembly] into position. The clutch hub and shaft extension are splined, so a slight rotation of the chain drive will aid installation.

   NOTE

   When installing sprocket retainer (8) make sure that thrust washer (7) does not fall off sprocket retainer or that it does not get pinched between the sprocket retainer and extension shaft. A small amount of white lithium grease will help hold the thrust washer to the sprocket retainer.

   g. Install thrust washer (7) and sprocket retainer (8).

   NOTES

   When installing bolt (9), make sure the spring washers are properly aligned and that spring nearest rotor assembly has not slipped between extension and rotor hub.

Make sure the thrust washer has not slipped between the sprocket and sprocket retainer.

h. Install **new** bolt (9) by hand and snug against sprocket retainer. Using a 1 3/4 in. box-end wrench to hold crankshaft, tighten compensating sprocket to 65 ft-lbs (88.2 Nm).

i. Loosen compensating sprocket back 90 degrees.

j. Re-tighten compensating sprocket to 65 ft-lbs (88.2 Nm).

k. Using a grease pencil, mark a straight line on the compensating sprocket bolt continuing the line over onto the chaincase housing for reference.

l. Using the marks as a guide, turn compensating sprocket bolt 62±1 degrees.

m. Rotate compensating sprocket to make sure there is a light pressure on sprocket from the springs, no clearance should be felt. A slight rotation should be possible by hand with transmission in neutral.

NOTE

Clutch hub mainshaft nut has left handed threads, so turn counterclockwise to install.

n. Clean and prime threads of nut. Apply two drops of LOCTITE THREADLOCKER 262 (red) to the threads of the clutch hub mainshaft nut. Start nut onto mainshaft and tighten hand tight.

NOTE

See Figure 6-14. When tightening the clutch hub mainshaft nut the PRIMARY DRIVE LOCKING TOOL must be placed between the teeth of the engine and clutch sprockets.

3. Tighten clutch hub mainshaft nut to 70-80 ft-lbs (94.9-108.5 Nm). Remove primary drive locking tool.

4. See Figure 6-15. Install release plate (5) with locknut (2) and adjuster screw (3) into clutch hub bore. The word "OUT" stamped on the release plate should face outward.

⚠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)

5. Inspect retaining ring (4) and replace if necessary. Install retaining ring in clutch hub bore to lock release plate in position. Verify that the retaining ring is completely seated in the groove.

6. Adjust clutch. See 1.11 CLUTCH, Adjustment.

NOTE

Primary chain tensioner is non-repairable. If tensioner is worn or damaged, assembly must be replaced.

7. See Figure 6-16. Although primary chain tensioner is sold as an assembly, tensioner parts can be disassembled. If primary chain tensioner becomes disassembled, assemble in order shown.

8. See Figure 6-17. Locate end of spring rod (2) on roll pin (3).

9. See Figure 6-18. Slide wedge (2) of primary chain tensioner in direction of arrow until all travel is removed.

10. Push shoe (1) down until it contacts wedge. Keep tension on shoe so wedge stays in place.

11. See Figure 6-19. Insert cable tie (2) as shown to hold wedge in place. Make sure end of cable tie is located below primary chain tensioner. If cable tie is installed this way, it will hang below primary cover gasket surface and serve as a reminder to remove cable tie before installing primary cover.

NOTE

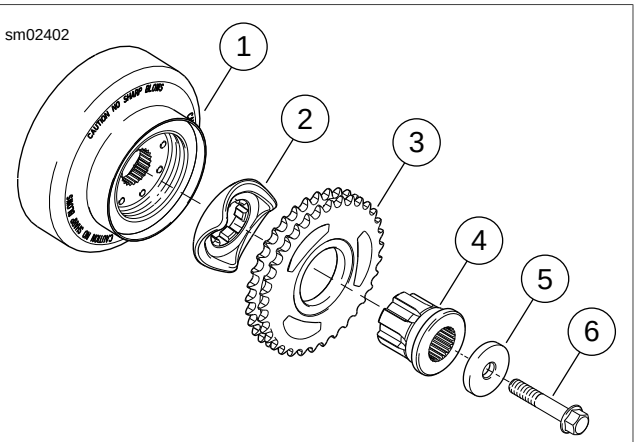
Primary chain tensioner will not complete chain adjustment until vehicle is ridden. Vehicle must be test ridden after tensioner removal/installation to ensure proper adjustment.

12. See Figure 6-20. Install primary chain tensioner (1) into place. Install chain tensioner fasteners (2) and tighten to 15-19 ft-lbs (20.3-25.8 Nm). Remove cable tie.

NOTE

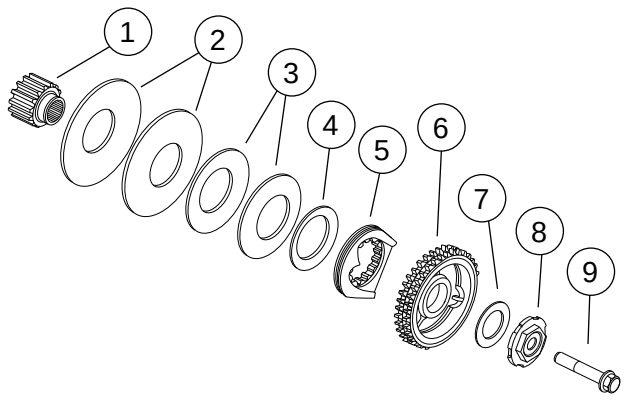
The gasket between the primary chaincase cover and chaincase must be replaced each time the cover is removed. Failure to replace this gasket may cause primary chaincase leaks.

13. Install primary chaincase cover and fill with lubricant. See 6.2 PRIMARY CHAINCASE COVER, Installation.



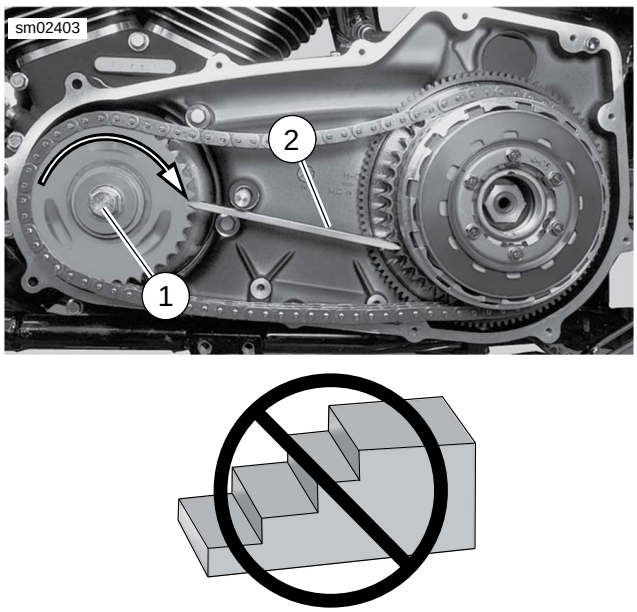
1. **Rotor**
2. **Sliding cam**
3. **Compensating sprocket**
4. **Shaft extension**
5. **Washer**
6. **Bolt**

Figure 6-11. Compensating Sprocket: All But FXCW/C



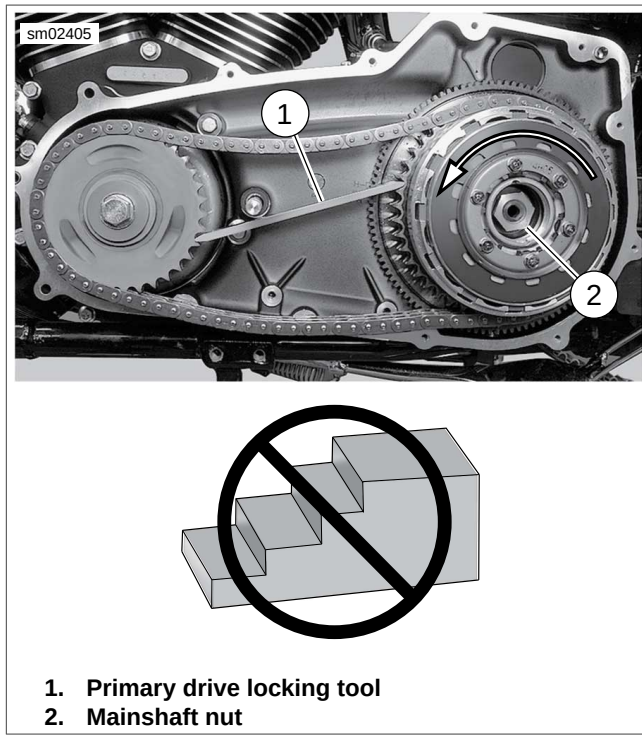
1. Shaft extension
2. Large spring washer (2)
3. Medium spring washer (2)
4. Small spring washer
5. Sliding cam
6. Compensating sprocket
7. Thrust washer
8. Sprocket retainer
9. Bolt

Figure 6-12. Compensating Sprocket: FXCW/C



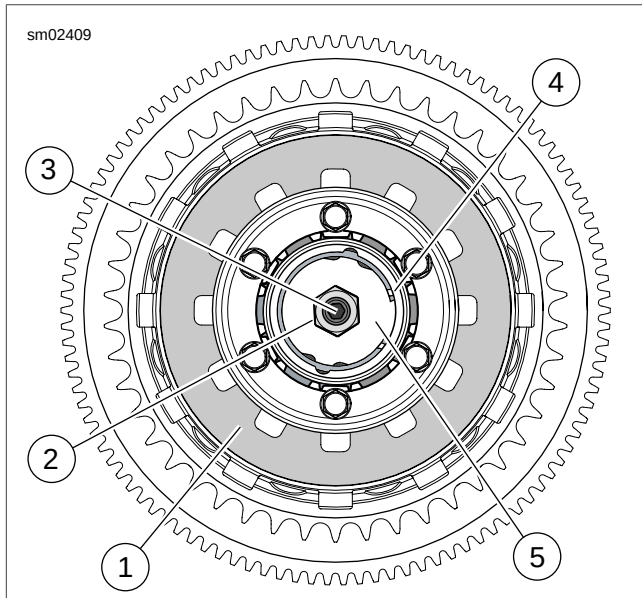
1. Bolt
2. Primary drive locking tool

Figure 6-13. Installing Compensating Sprocket Bolt



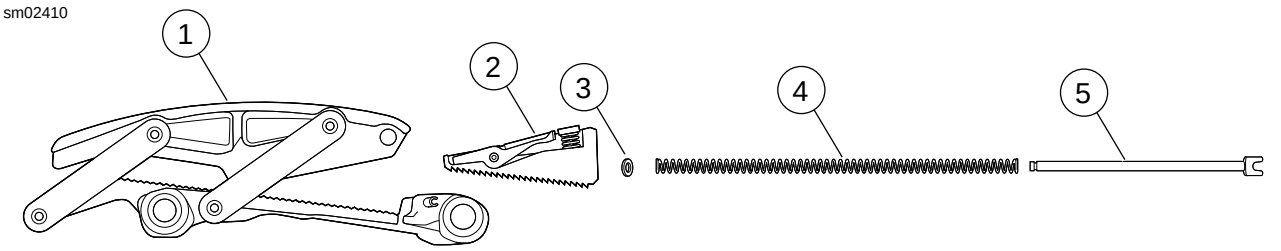
1. Primary drive locking tool
2. Mainshaft nut

Figure 6-14. Installing Clutch Hub Mainshaft Nut



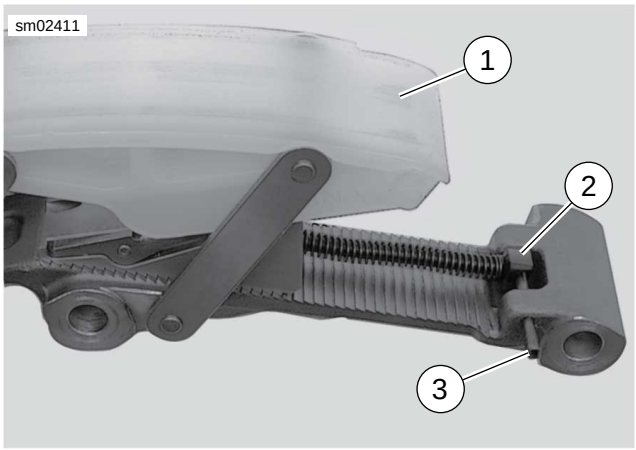
1. Diaphragm spring
2. Locknut
3. Adjuster screw
4. Retaining ring
5. Release plate

Figure 6-15. Clutch



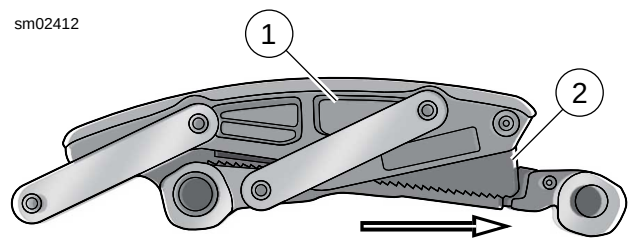
1. Shoe assembly
2. Wedge
3. Washer
4. Spring
5. Spring rod

Figure 6-16. Primary Chain Tensioner Assembly



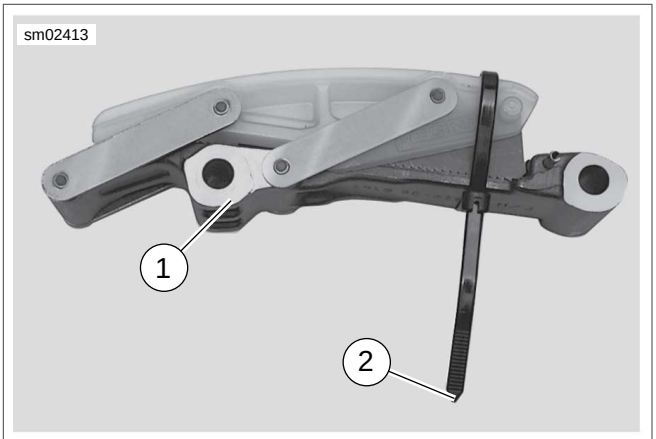
1. Shoe
2. Spring rod
3. Roll pin

Figure 6-17. Spring Rod Location



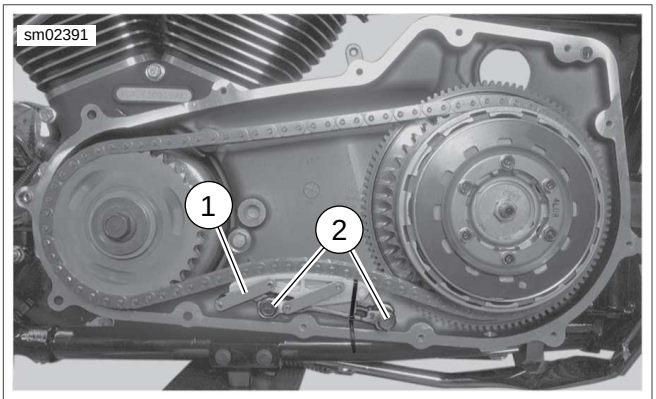
1. Shoe
2. Wedge

Figure 6-18. Primary Chain Tensioner



1. Primary chain tensioner
2. Cable tie

Figure 6-19. Securing Primary Chain Tensioner



1. Chain tensioner
2. Chain tensioner fasteners

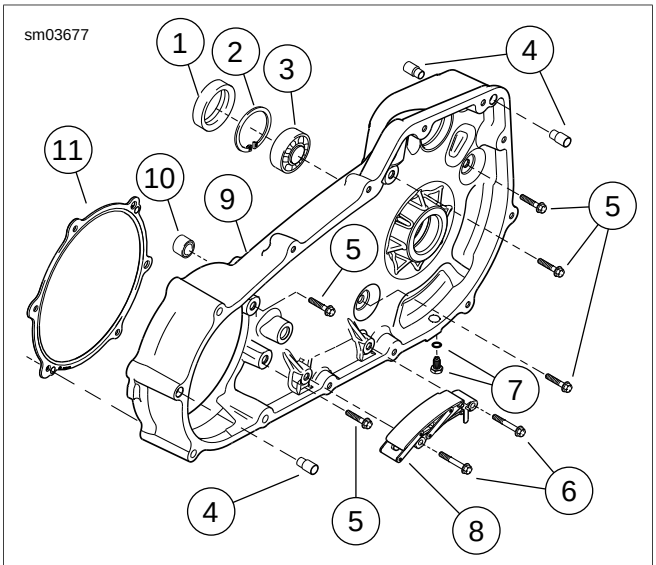
Figure 6-20. Chain Tensioner

REMOVAL

WARNING

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

1. Disconnect negative battery cable.
2. Remove primary chaincase cover. See 6.2 PRIMARY CHAINCASE COVER, Removal.
3. Remove starter. See 5.2 STARTER, Removal.
4. Remove primary chain, clutch, and compensating sprocket. See 6.3 DRIVE COMPONENTS, Removal.
5. See Figure 6-21. Remove sealing fasteners (5) securing primary chaincase housing (9) to crankcase and transmission. Discard the crankcase gasket (11) and sealing fasteners (5).



1. **Seal**
2. **Lock ring**
3. **Bearing**
4. **Dowel pin**
5. **Sealing fastener**
6. **Chain tensioner fasteners**
7. **Drain plug and o-ring**
8. **Chain tensioner**
9. **Primary chaincase housing**
10. **Shifter shaft bushing**
11. **Crankcase gasket**

Figure 6-21. Primary Chaincase Housing

INSPECTION

1. Inspect primary chaincase for cracks or damaged gasket surface.
2. Check the mainshaft bearing. Replace if bearing does not rotate freely. Replace the lip seal. See 6.4 PRIMARY CHAINCASE HOUSING, Mainshaft Bearing and Lip Seal in this section.

MAINSHAFT BEARING AND LIP SEAL

Removal

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)

1. Pull lip seal from bearing bore on transmission side of primary chaincase. Use a seal remover or rolling head pry bar for best results.
2. Remove retaining ring from groove on transmission side of bearing.
3. Support inner primary chaincase on transmission side of bearing.

NOTE

Support inner primary chain case area on transmission side while pressing bearing out of primary chaincase. The force needed to remove bearing may cause damage to primary chain case.

4. Place primary chaincase in arbor press. Press out bearing from clutch side applying pressure to the outer race.

Installation

1. Inspect the bearing bore to verify that it is clean and smooth. Install retaining ring in groove on pulley side of primary chaincase.
2. Place primary chaincase in arbor press with the transmission side up.
3. Support the bearing support area on the clutch side of the primary chaincase.

NOTE

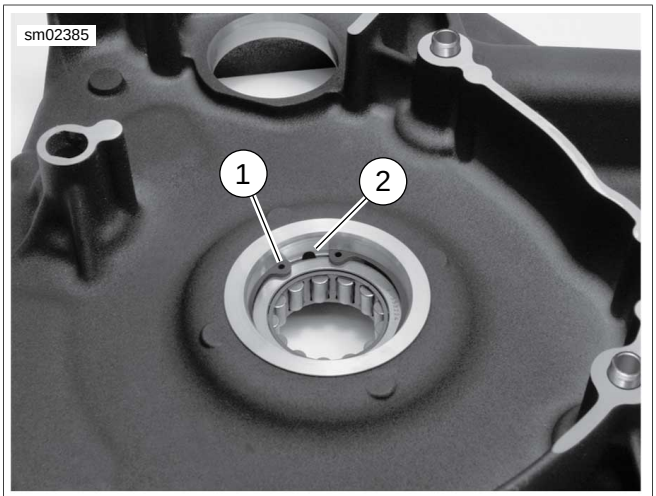
Support the bearing support area on clutch side while pressing bearing into bore. The force needed to press bearing into position may force and unsupported primary chain case to become damaged.

4. Apply a thin film of oil to outer diameter of bearing
5. Applying pressure to the outer race, press **new** bearing letter side up, into bore until it makes solid contact with the bearing support area.
6. See Figure 6-22. Retaining ring (1) must be oriented as shown to prevent blocking of oil passage (2). Install retaining ring to lock position of bearing in bore. Verify that the ring is fully seated in the groove and is in proper orientation.

NOTES

- *The lip garter spring side of the oil seal is also identified by the words "OIL SIDE".*
- *Install oil seal with a seal driver that will press only against outer rim of oil seal, NOT against the inner area.*
- *The minimum allowable depth of the seal is reached when the outer edge of the seal carrier is flush with the machined surface of the primary housing. The maximum allowable depth of the seal is reached when the seal carrier contacts the mainshaft bearing snap ring.*

7. Install mainshaft oil seal:
   a. Lubricate the O.D. of the new seal with clean engine oil.
   b. See Figure 6-23. With the lip garter spring side (stamped "oil side") facing toward the bearing, press squarely on the outer edge of a **new** oil seal until outer edge of seal is flush with machined surface of inner primary housing.
8. Lubricate the bearing and seal lip with multi-purpose grease or clean engine oil.



1. Retaining ring
2. Oil passage

Figure 6-22. Retaining Ring Orientation

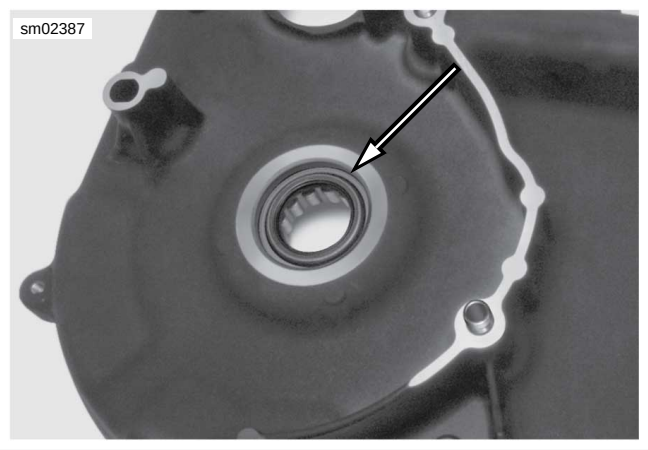


Figure 6-23. Oil Seal

MAINSHAFT BEARING INNER RACE

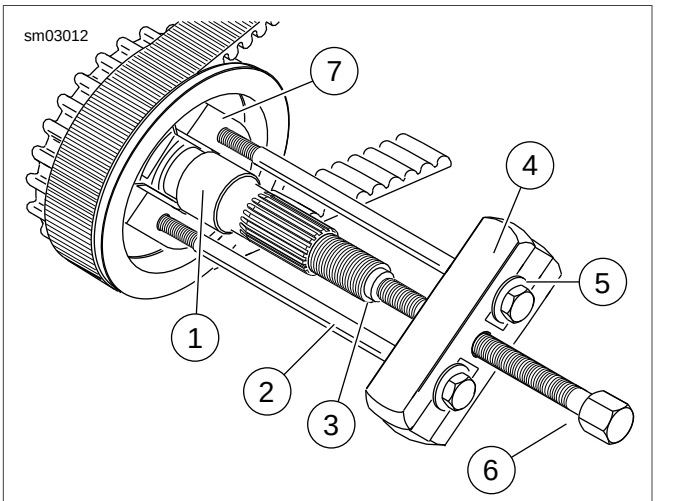
PART NUMBER	TOOL NAME
HD-34902-B	MAINSHAFT BEARING INNER RACE REMOVER/INSTALLER

Removal

NOTE

The bearing inner race must be positioned on the shaft a precise distance to properly 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-34902-B).

1. See Figure 6-24. Install washers (5) on bolts (2). Slide one bolt into channel on each side of bridge (4) so that washer is between bridge and bolt head.
2. Thread bolts into stamped side of puller plate (7) an equal number of turns.
3. Apply graphite lubricant to threads of forcing screw (6). Thread forcing screw into bridge.
4. Position puller plate between inner race (1) and sprocket nut.
5. Install end cap into end of mainshaft. Thread forcing screw into bridge until the forcing screw seats in the end cap. Continue turning forcing screw until the bearing inner race is free of the mainshaft.



1. Bearing inner race
2. Bolt (2)
3. End cap
4. Bridge
5. Washer (2)
6. Forcing screw
7. Puller plate

Figure 6-24. Pulling Mainshaft Inner Bearing Race

Installation

1. See Figure 6-26. Slide bearing inner race (1), chamfer edge first, onto mainshaft.

NOTE

Extension shaft has left-hand threads.

2. Thread extension shaft (2) onto end of mainshaft .
3. Position installer sleeve (4) over extension shaft and against bearing inner race. Apply graphite lubricant to threads of extension shaft.
4. Place two washers (5) over threaded portion of extension shaft and install nut.
5. Tighten nut (6) while holding extension shaft stationary with wrench on flats (3) at end of screw threads. Press race onto shaft so inside edge is 0.100-0.125 in. (2.540-3.180 mm) from main drive gear.
6. Lubricate race with primary chaincase lubricant.

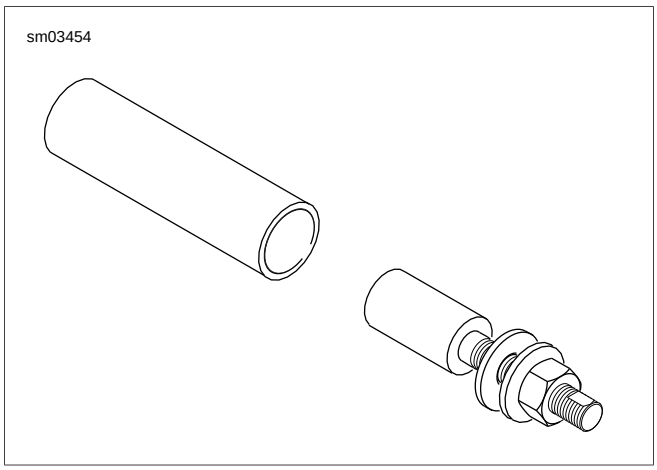
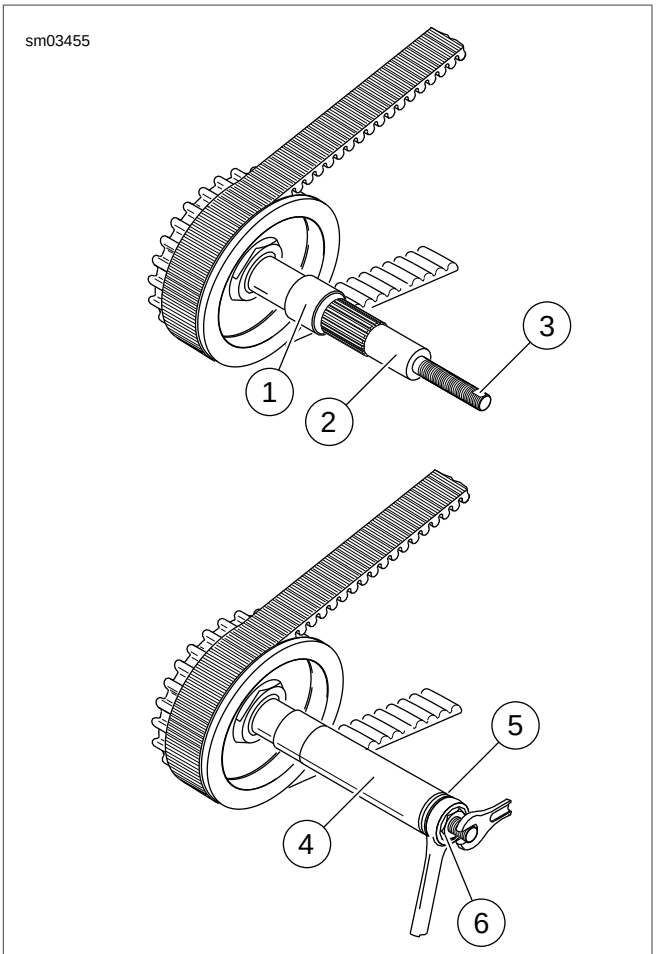


Figure 6-25. Mainshaft Bearing Inner Race Installer



1. **Bearing inner race**
2. **Extension shaft**
3. **Wrench flat**
4. **Installer sleeve**
5. **Washers**
6. **Nut**

Figure 6-26. Installing Bearing Race

INSTALLATION

NOTES

- *Cover mainshaft clutch hub splines with tape to prevent the splines damaging the inner primary cover oil seal.*
- *See Figure 6-27. In next step, be sure dowels (1) in crankcase gasket (2) engage holes in crankcase.*

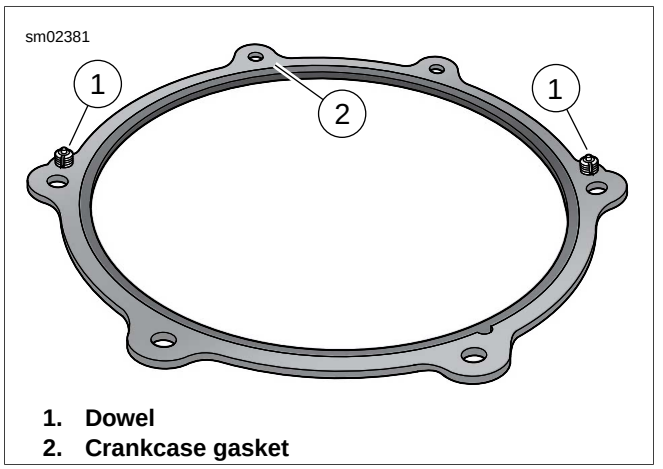
1. See Figure 6-28. Place crankcase gasket in place on gasket surface (2). Be sure dowels in gasket engage dowel holes (3).
2. Spread a thin film of oil on mainshaft oil seal lip and rubber portion of crankcase gasket. Be careful not to damage mainshaft seal when installing chaincase over the primary bearing inner race on the mainshaft.
3. See Figure 6-29. Insert **new** sealing fasteners.
4. See Figure 6-30. Tighten fasteners in sequence shown to 26-28 ft-lbs (35.3-38.0 Nm).
5. Install the primary chain, clutch, and compensating sprocket as an assembly. See 6.3 DRIVE COMPONENTS, Installation.

6. Install chain tensioner assembly.
7. Install starter. See 5.2 STARTER, Installation.

NOTE

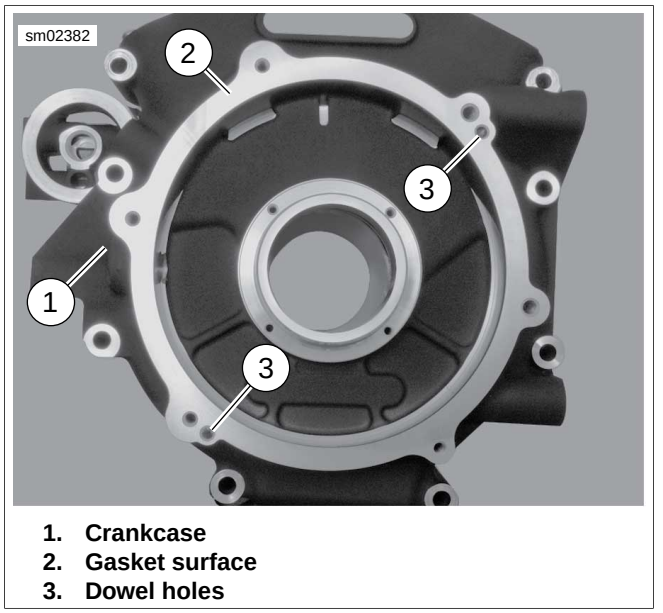
The gasket between the primary chaincase cover and chaincase must be replaced each time the cover is removed. Failure to replace this gasket may cause primary chaincase leaks .

8. Install primary chaincase cover. See 6.2 PRIMARY CHAINCASE COVER, Installation.
9. Fill primary chaincase with lubricant. See 1.9 PRIMARY CHAIN, Changing Primary Chaincase Lubricant.
10. Adjust rear belt tension.
11. Connect negative battery cable.



1. **Dowel**
2. **Crankcase gasket**

Figure 6-27. Crankcase Gasket



1. **Crankcase**
2. **Gasket surface**
3. **Dowel holes**

Figure 6-28. Crankcase

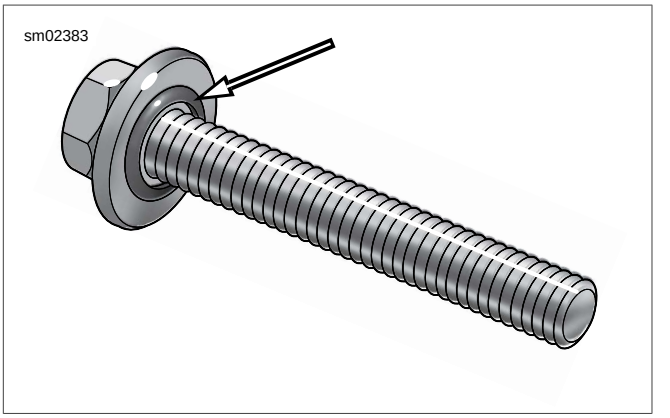


Figure 6-29. Sealing Fastener

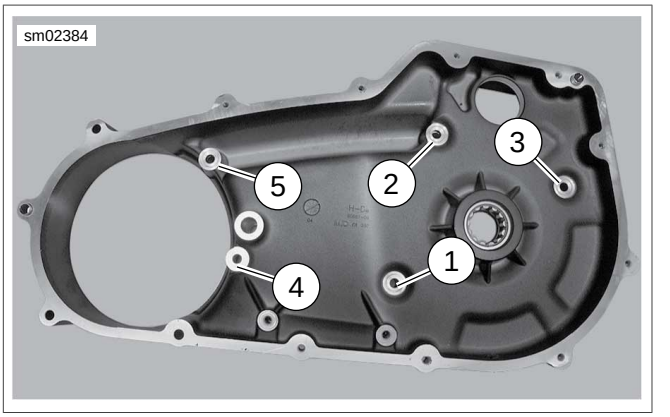


Figure 6-30. Sealing Fastener Torque Sequence

REMOVAL AND INSTALLATION

To remove the clutch without disassembly or for installation instructions, see 6.3 DRIVE COMPONENTS, Removal.

CLUTCH PACK ONLY

Partial Disassembly

This procedure can be performed on the motorcycle without removing the clutch shell or hub.

1. Remove primary chaincase cover. See 6.2 PRIMARY CHAINCASE COVER, Removal.
2. See Figure 6-31. Remove six bolts (1) (metric) to release diaphragm spring retainer (2) from clutch hub. Loosen each bolt gradually and in a star sequence around the hub.
3. Remove diaphragm spring retainer, diaphragm spring (3) and pressure plate (4) from clutch hub.
4. Remove friction plates (5, 7), steel plates (6), damper spring (8) and damper spring seat (9) from clutch hub (11). Continue with Cleaning And Inspection.

Cleaning And Inspection

⚠WARNING

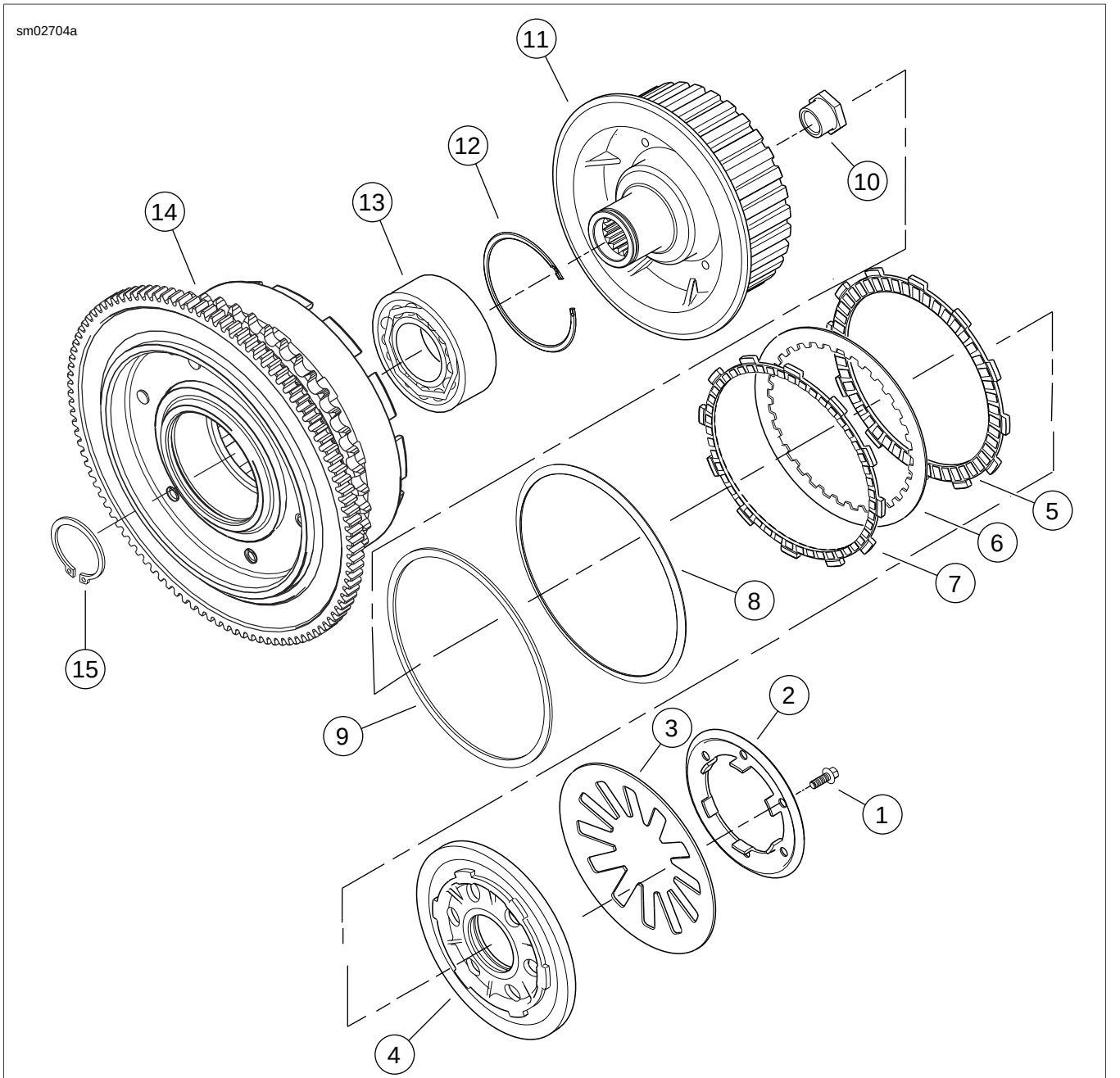
Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

1. Wash all parts in cleaning solvent, except for friction plates and bearing, if removed. Blow parts dry with low pressure compressed air.
2. Check **friction plates** as follows:
   a. Blow off all lubricant from the friction plates. Do not wipe off with a rag.
   b. Measure the thickness of each plate with a dial caliper or micrometer.
   c. If the thickness of any plate is less than 0.143 in. (3.62 mm), discard all friction plates and replace with an entirely **new** set.
   d. 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. Submerge and soak all friction plates in FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT (Part No. 99851-05, qt.) for at least five minutes.

3. Check the **steel plates** as follows:
   a. Discard any plate that is grooved or bluish in color. Blue plates are likely warped or distorted.
   b. 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 in. (0.15 mm).
4. Holding the clutch hub, rotate the clutch shell to check bearing for smoothness. Replace the bearing if it runs rough, binds or has any end play.
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.



1. **Bolt (6) (metric)**
2. **Diaphragm spring retainer**
3. **Diaphragm spring**
4. **Pressure plate**
5. **Friction plate (9)**
6. **Steel plate (8)**
7. **Narrow friction plate**
8. **Damper spring**
9. **Damper spring seat**
10. **Mainshaft nut (metric)**
11. **Clutch hub**
12. **Retaining ring**
13. **Bearing**
14. **Clucth shell**
15. **Retaining ring**

Figure 6-31. Clutch Shell Assembly

Assembly

NOTE

Submerge and soak all friction plates in FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT (Part No. 99851-05, qt.) for at least five minutes.

1. See Figure 6-32. Install the narrow friction plate on the clutch hub. Engage tabs on plate with slots in clutch shell.
2. See Figure 6-31. Install damper spring seat (9) on clutch hub (11). It must sit inboard of narrow friction plate (7).