SPECIFICATIONS 6.1

NOTE

Service wear limits are given as a guideline for measuring components that are not new. For measurement specifications not given under SERVICE WEAR LIMITS, see NEW COMPONENTS.

Table 6-1. Primary Drive (Engine-to-Transmission)

ITEM	NEW COMPONENTS (XB9R)	NEW COMPONENTS (XB12R)
Engine sprocket – number of teeth	34	38
Clutch sprocket – number of teeth	57	57

Table 6-2. Final Drive (Transmission-to-Rear Wheel)

ITEM	NEW COMPONENTS	SERVICE WEAR LIMITS
Transmission sprocket – number of teeth	27	Inspect at 5,000 mi (8,000 km)
Rear wheel sprocket – number of teeth	65	Inspect at 5,000 mi (8,000 km)
Secondary drive belt – number of teeth	128	Inspect at 5,000 mi (8,000 km)

Table 6-3. Transmission

ITEM	NEW COMPONENTS (XB9R)	NEW COMPONENTS (XB12R)
Primary drive / transmission lubricant capacity (approximately)	Approximately 32 fl. oz. (946 ml)	
Overall gear ratios		
First gear (low)	10.688	9.563
Second gear	7.635	6.831
Third gear	5.678	5.080
Fourth gear	4.706	4.211
Fifth gear (high)	4.036	3.611

Table 6-4. Wet Clutch Multiple Disc-Clutch Plate Thickness

ITEM	NEW COMPONENTS	SERVICE WEAR LIMITS
Friction plate (fiber)	0.0866 + 0.0031 in. (2.200 + 0.079 mm)	N/A
Steel plate	0.0629 + 0.0020 in. (1.598 + 0.051 mm)	N/A
Clutch pack (in.)	N/A	0.661 in. (16.789 mm) (minimum)

Table 6-5. Wet Clutch Multiple Disc-maximum Allowable Warpage

ITEM	NEW COMPONENTS	SERVICE WEAR LIMITS
Friction plate (fiber)	N/A	0.0059 in. (0.150 mm)
Steel plate	N/A	0.0059 in. (0.150 mm)

TORQUE VALUES

ITEM	TORQUE		NOTES
Axle pinch fastener, rear	40-45 ft-lbs	54-61 Nm	page 6-54
Axle, rear			Special procedure, ANTI-SEIZE, page 6-23, 6-24, 6-54
Chin fairing fasteners	36-48 **in-lbs**	4-5 Nm	LOCTITE 272 (red), page 6-24
Clutch inspection cover fasteners	84-108 **in-lbs**	9.5-12.2 Nm	page 6-6
Clutch mainshaft nut	70-80 ft-lbs	94.9-108.5 Nm	Apply onto threads on end of mainshaft, LOCTITE 272 (red) LOCTITE 272 (red), left hand threads, page 6-20
Countershaft retaining screw	33-37 ft-lbs	44.8-50 Nm	LOCTITE 272 (red), page 6-51
Crankcase 5/16 in. fasteners	15-19 ft-lbs	20.3-25 Nm	Apply several drops of LOCTITE 272 (red) to last few threads, page 6-48
Engine sprocket nut	240-260 ft-lbs	325.4-352.5 Nm	Apply LOCTITE 272 (red) onto threads of sprocket shaft, page 6-19
Idler pulley wheel fastener	20-23 ft-lbs	27.1-31.2 Nm	page 6-24
Magnetic drain plug	14-30 ft-lbs	19-40.7 Nm	page 6-5
Negative battery cable at battery terminal	60-84 **in-lbs**	6.7-9.5 Nm	page 6-6
Neutral indicator switch	60-84 **in-lbs**	6.7-9.5 Nm	LOCTITE 242 (blue), page 6-48
Primary cover fasteners	100-120 **in-lbs**	11.3-13.5 Nm	Follow torque sequence, page 6-5
Shift lever pinch screw	48-60 **in-lbs**	5.4-6.8 Nm	LOCTITE 272 (red), Page 6-6
Shift linkage fasteners	36-60 **in-lbs**	4-6.8 Nm	LOCTITE 272 (red), page 6-6
Shift pedal flange head bolt	22-24 ft-lbs	30-32.5 Nm	LOCTITE 272 (red), page 6-6
Transmission sprocket nut			Special procedure, LOCTITE 272 (red), left hand threads, special torque turn method, page 6-53
Transmission sprocket screws	90-110 **in-lbs**	10.2-12.4 Nm	Replace after 3 removals, page 6-53

PRIMARY COVER 6.2

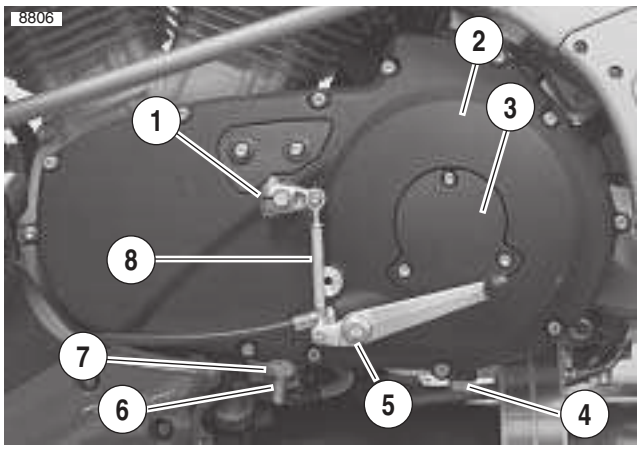
REMOVAL

1. Remove seat. See 2.38 SEAT.

⚠WARNING

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

2. Disconnect negative battery cable from battery.
3. Remove chin fairing. See 2.33 CHIN FAIRING.



1. **Engine shift lever**
2. **Primary cover**
3. **Clutch inspection cover**
4. **Drain plug**
5. **Flange head bolt**
6. **Chain adjuster screw**
7. **Locknut**
8. **Shift linkage assembly**

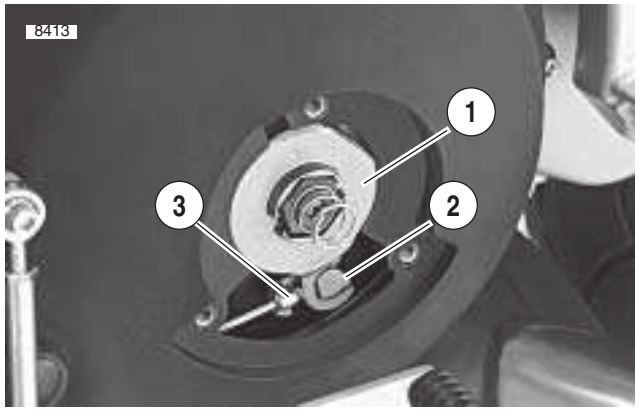
Figure 6-1. Removing Primary Cover

4. See Figure 6-1. Place a drain pan under the engine/primary area. Remove drain plug (4) and drain lubricant from primary drive.
5. Remove engine shift lever assembly (1) and rubber washer. Do not scratch primary cover.
6. Remove flange bolt (5) from primary cover.

NOTE

It is recommended that the shifter shaft seal be replaced whenever the primary cover is removed.

7. Add free play to clutch cable. See ADJUSTMENT under 1.9 CLUTCH.
8. See Figure 6-1. Loosen locknut (6). Turn chain adjuster screw (5) counterclockwise to remove tension on primary chain.
9. Remove three TORX screws with washers and clutch inspection cover.
10. See Figure 6-1. Remove clutch inspection cover (3).



1. **Outer ramp and hook**
2. **Coupling**
3. **Cable end**

Figure 6-2. Clutch Release Mechanism

11. See Figure 6-2. Remove the outer ramp and hook (1) from the cable end (3) and coupling (2). Remove cable end from slot in coupling. See 6.3 CLUTCH RELEASE MECHANISM
12. Remove screws which secure primary cover. Remove cover and gasket.
13. Discard gasket.
14. Remove and discard shifter lever oil seal.
15. Clean all 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)

16. Blow parts dry with low pressure compressed air.

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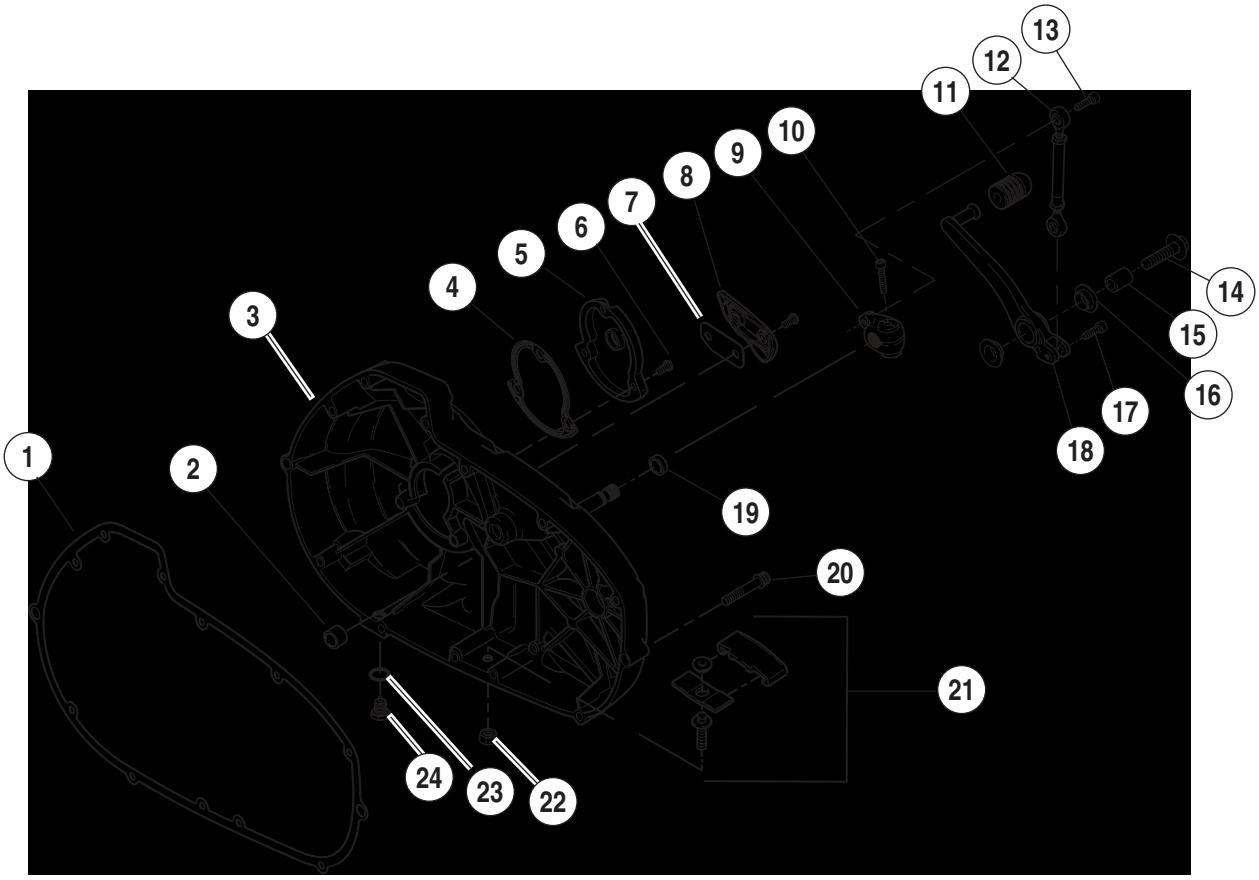
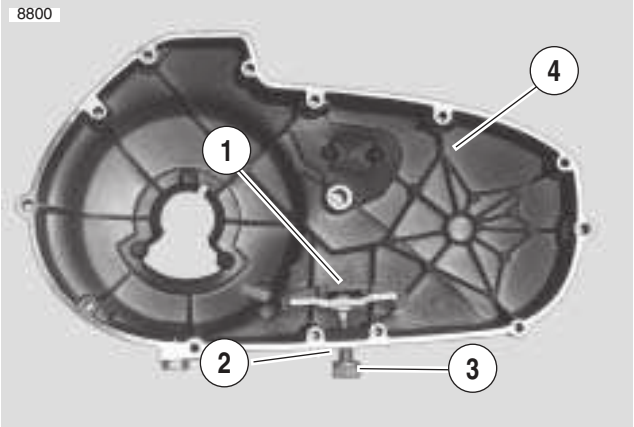


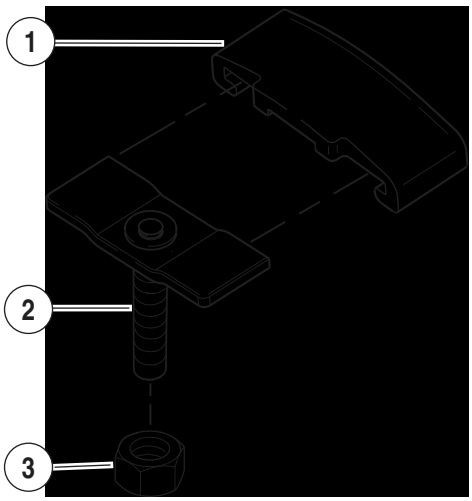
1. Gasket
2. Shifter bushing
3. Primary cover
4. Gasket
5. Clutch dove
6. Sems Screws (5)
7. Inspection cover gasket
8. Cover, inspection
9. Engine lever
10. Screw
11. Rubber shift lever pad
12. Shifter linkage assembly
13. Bolt
14. Flange bolt
15. Sleeve
16. Pedal bearing
17. Bolt
18. Shifter lever
19. Oil seal
20. Sems screw,
21. Adjuster assembly
22. Chain adjustment nut
23. O-ring
24. Drain plug

Figure 6-3. Primary Cover, Primary Chain Adjuster and Shifter Assembly

PRIMARY CHAIN ADJUSTER REPLACEMENT

1. See Figure 6-4. Remove locknut (3) from adjuster screw (2). Turn adjuster screw out of threaded boss in primary cover (4).
2. Remove chain adjuster as an assembly.





1. **Shoe, chain adjuster**
2. **Chain adjuster screw**
3. **Chain adjusting locknut**
4. **Primary cover**

Figure 6-4. Primary Chain Adjuster

3. See Figure 6-4. Inspect primary chain adjuster shoe (1). If badly worn or damaged, it must be replaced.
4. Replace adjuster shoe as an assembly.
5. Position adjuster inside primary cover (4) with closed side of shoe against cover. Thread adjuster screw (2) all the way into tapped boss at bottom of primary cover.
6. At outside of cover, thread locknut (3) onto adjuster screw with nylon sealing surface toward cover. A 1/4-inch allen wrench may be inserted into end of adjuster screw to hold it while threading lock nut.

INSTALLATION

1. Remove foreign material from magnetic drain plug. Apply LOCTITE 565 thread sealant and install plug and tighten to 14-30 ft-lbs (19-40.7 Nm).
2. Wipe gasket surface clean. Install **new** gasket on primary cover.
3. Install primary cover and gasket onto left crankcase half using mounting bolts.

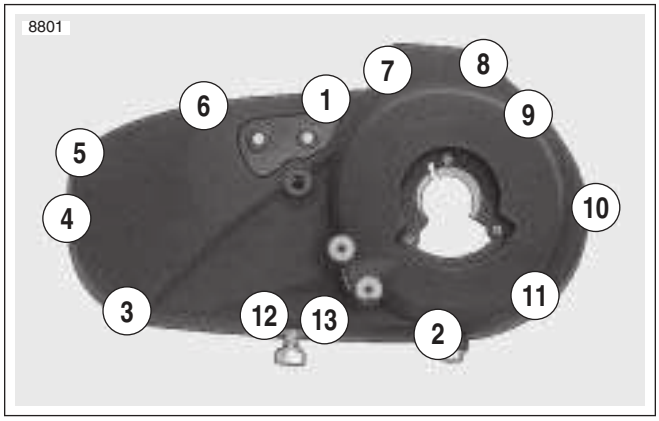
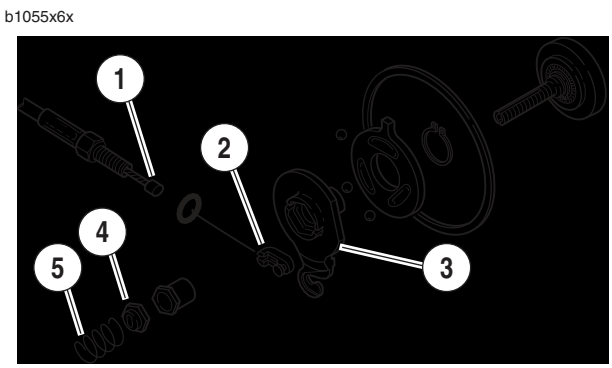


Figure 6-5. Primary Cover Tightening Sequence

4. See Figure 6-5. Tighten fasteners to 100-120 **in-lbs** (11.3-13.5 Nm) in sequence shown.
5. See Figure 6-3. Install **new** shifter lever oil seal.

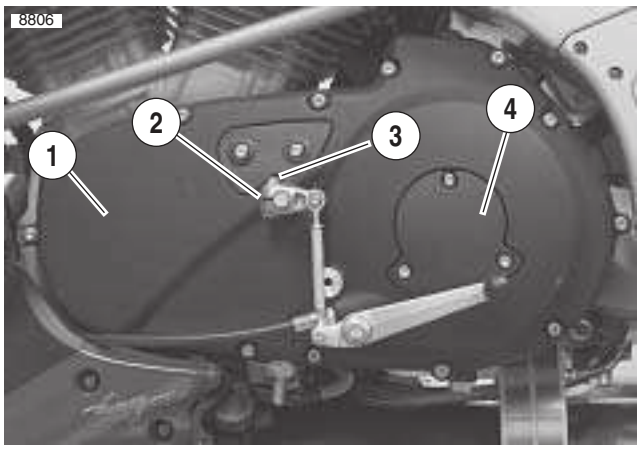


1. **Cable end**
2. **Coupling**
3. **Outer ramp and hook**
4. **Lockplate**
5. **Spring**

Figure 6-6. Clutch Release Mechanism

6. See Figure 6-6. Fit coupling (2) over cable end (1) with rounded side inboard and the ramp connector button outboard. With retaining ring side of ramp assembly facing inward, place hook of ramp (3) around coupling button and rotate assembly counterclockwise until tang on inner ramp fits in slot of primary cover.
7. Thread nut on adjustment screw until slot of screw is accessible with a screwdriver. Fit nut hex into recess of outer ramp and turn adjustment screw counterclockwise.
8. Adjust clutch. See ADJUSTMENT under 1.9 CLUTCH.
9. Adjust primary chain tension. See 1.11 PRIMARY CHAIN.

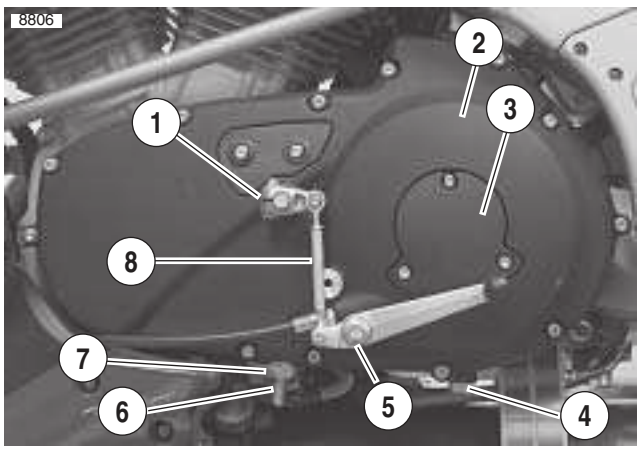
10. Fill transmission to proper level with fresh lubricant. See 1.9 CLUTCH.



1. **Primary cover**
2. **Lever, engine**
3. **Engine lever pinch screw**
4. **Clutch inspection cover**

Figure 6-7. Installing Primary Cover

11. See Figure 6-7. Install clutch inspection cover (4) with **new** gasket and three TORX screws with washers. Tighten screws in a crosswise pattern to 84-108 **in-lbs** (9.5-12.2 Nm).



1. **Engine shift lever**
2. **Primary cover**
3. **Clutch inspection cover**
4. **Drain plug**
5. **Flange head bolt**
6. **Chain adjuster screw**
7. **Locknut**
8. **Shift linkage assembly**

Figure 6-8. Installing Shift Linkage

12. See Figure 6-8. Install rubber washer and engine shift lever assembly (1).
13. After applying LOCTITE 272, install flange bolt (5) and shift pedal to primary cover, and tighten to 22-24 ft-lbs (30-32.5Nm).
14. After applying LOCTITE 272 (red), tighten engine shift lever pinch screw to 48-60 **in-lbs** (5.4-6.8 Nm).
15. If the shift linkage assembly (8) was removed for any reason, apply Loctite 272 to fasteners and tighten to 36-60 **in-lbs** (4-6.8 Nm). Adjust to rider comfort.
16. Install chin fairing. See 2.33 CHIN FAIRING.

⚠WARNING

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

17. Connect negative battery cable to battery terminal. Tighten fastener to 60-84 **in-lbs** (6.7-9.5 Nm)

⚠WARNING

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

18. Install seat. See 2.38 SEAT.

CLUTCH RELEASE MECHANISM 6.3

DISASSEMBLY

NOTE

For clutch adjustment procedure, See 1.9 CLUTCH.

1. Remove seat. See 2.38 SEAT.

⚠WARNING

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

2. Disconnect negative battery cable.
3. Slide rubber boot on clutch cable adjuster upward to expose adjuster mechanism. Loosen jam nut from adjuster. Turn adjuster to shorten cable housing until there is a large amount of free play at clutch hand lever. See 1.9 CLUTCH.
4. See Figure 6-9. Remove three TORX screws with washers and clutch inspection cover.
5. Slide spring (4) with attached screw lockplate (5) from flats of adjusting screw.
6. Turn adjusting screw clockwise to release ramp and coupling mechanism. As the adjusting screw is turned, ramp assembly moves forward. Unscrew nut (6) from end of adjusting screw.
7. Remove hook of ramp from cable end coupling (10). Remove cable end from slot in coupling.
8. Remove and discard retaining ring from ramp assembly to separate inner and outer halves. Remove three balls from ramp sockets.

CLEANING AND INSPECTION

1. Thoroughly clean all parts in cleaning solvent.
2. See Figure 6-9. Inspect three balls of release mechanism and ball socket surfaces of inner and outer ramps for wear, pitting, surface breakdown and other damage. Replace parts as necessary.
3. Check hub fit of inner and outer ramps. Replace ramps if excessively worn.
4. Check clutch cable for frayed or worn ends. Replace cable if damaged or worn.
5. Change or add transmission fluid if necessary. See 1.9 CLUTCH.

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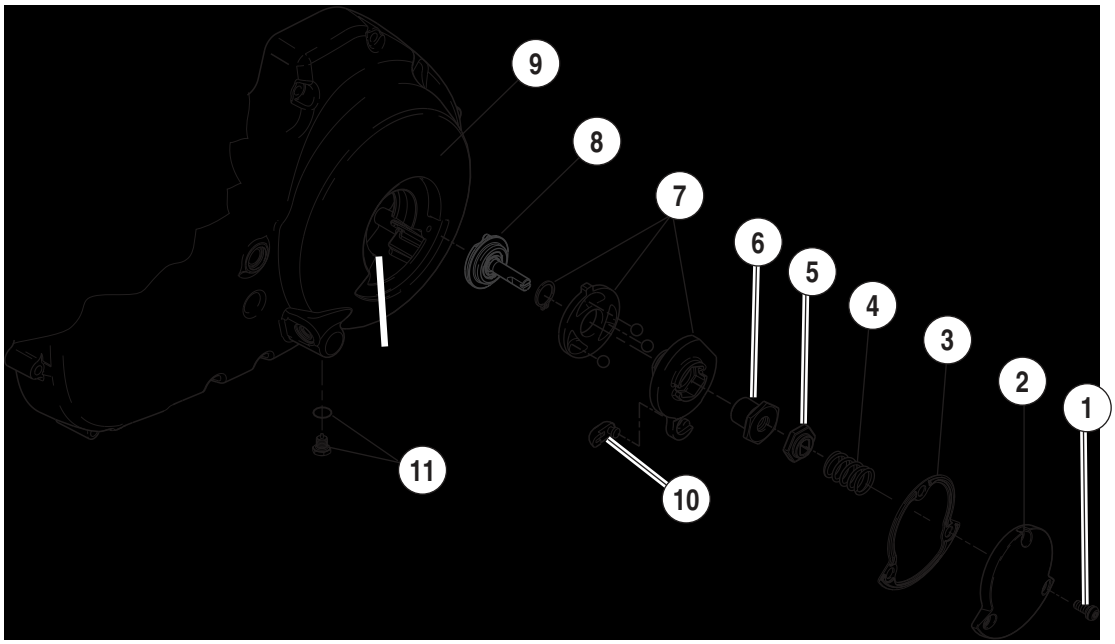


1. **TORX screw with washers (3)**
2. **Clutch inspection cover**
3. **Clutch cover gasket**
4. **Spring**
5. **Lockplate**
6. **Nut**
7. **Ramp assembly**
8. **Adjusting screw assembly**
9. **Primary cover**
10. **Coupling**
11. **Drain plug and o-ring**

Figure 6-9. Clutch Release Mechanism

ASSEMBLY

1. See Figure 6-10. Assemble inner and outer ramps.
   a. Apply multi-purpose grease to balls and ramps.
   b. Insert balls in sockets of outer ramp.
   c. Install inner ramp on hub of outer ramp with tang 180° from hook of outer ramp.
   d. Install **new** retaining ring in groove of outer ramp hub.
2. See Figure 6-11. Install ramp assembly.
   a. Fit coupling over cable end with rounded side inboard, the ramp connector button outboard.
   b. With retaining ring side of ramp assembly facing inward, place hook of ramp around coupling button.
   c. Rotate assembly counterclockwise until tang on inner ramp fits in slot of primary cover.
3. Secure assembly in place.
   a. Thread nut on adjusting screw until slot of screw is accessible with a screwdriver.
   b. Turn adjusting screw counterclockwise until resistance is felt.
   c. Adjust clutch release mechanism. See 1.9 CLUTCH.
   d. Fit nut hex into recess of outer ramp.
   e. Install clutch adjusting lockplate and spring.
4. Install clutch inspection cover and **new** gasket with three TORX screws with washers. Tighten in a crosswise pattern to 84-108 **in-lbs** (9.5-12.2 Nm).
5. Adjust clutch cable. See 1.9 CLUTCH.

⚠WARNING

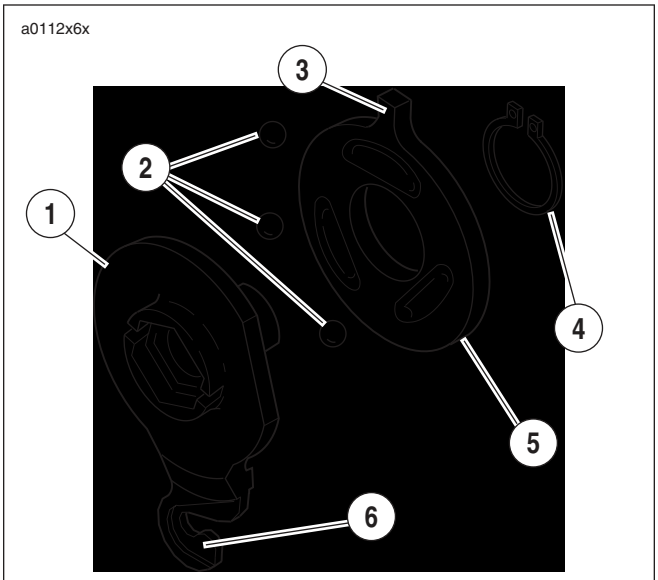
Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

6. Connect negative battery cable to battery terminal. Tighten fastener to 72-96 **in-lbs** (8-11 Nm).

CAUTION

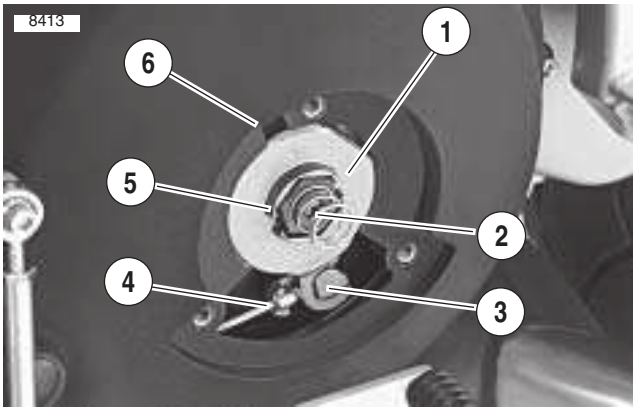
After installing seat, pull upward on front of seat to be sure it is in locked position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070a)

7. Install seat. See 2.38 SEAT.



1. **Outer ramp**
2. **Balls (3)**
3. **Tang**
4. **Retaining ring**
5. **Inner ramp**
6. **Hook**

Figure 6-10. Inner & Outer Ramp



1. **Outer ramp**
2. **Adjusting screw**
3. **Coupling**
4. **Cable end**
5. **Lockplate**
6. **Slot in primary cover**

Figure 6-11. Nut and Outer Ramp

GENERAL

The purpose of the clutch is to smoothly disengage and engage the engine from the rear wheel for starting, stopping and shifting gears.

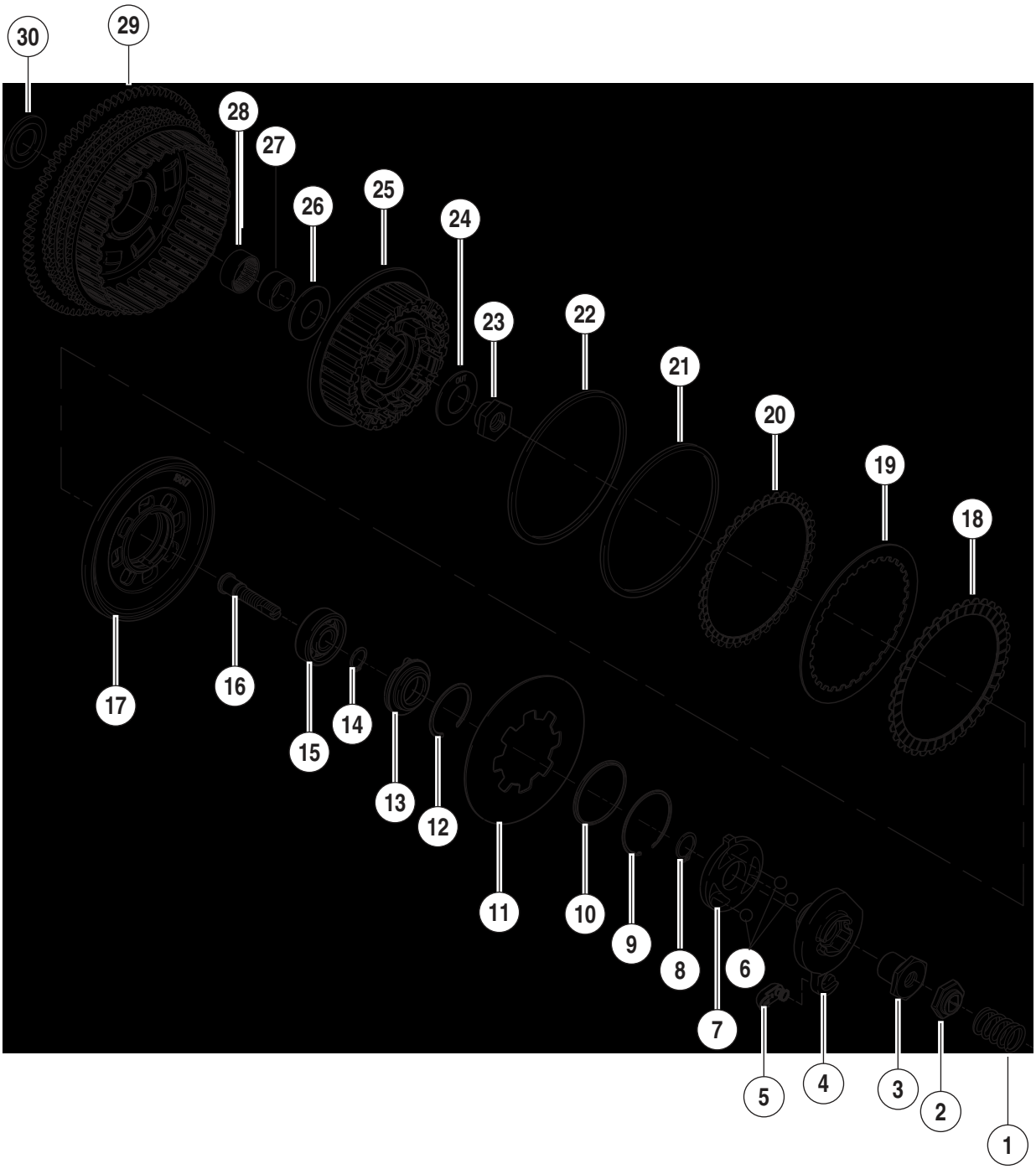
See Figure 6-12. The clutch is a wet, multiple-disc clutch with steel plates and fiber (friction) plates stacked alternately in the clutch shell. The pack consists of seven fiber plates, seven steel plates, one narrow fiber plate, one damper spring and one damper spring seat. The fiber plates (clutch driving plates) are keyed to the clutch shell, which is driven by the engine through the primary chain. The steel plates (clutch driven plates) are keyed to the clutch hub, which drives the rear wheel through the transmission and secondary drive belt.

When the clutch is engaged (clutch lever released), the diaphragm spring applies strong force against the pressure plate. The pressure plate then presses the clutch plates together causing the plates to turn as a single unit. The result is that the rotational force of the clutch shell is transmitted through the clutch plates to the clutch hub. As long as the transmission is set in a forward gear, power from the engine will be transmitted to the rear wheel.

When the clutch is disengaged (clutch lever pulled to left handlebar grip), the pressure plate is pulled outward (by clutch cable action) against the diaphragm spring, thereby compressing the diaphragm spring. With the pressure plate retracted, strong inward force no longer squeezes the clutch plates together. The fiber plates are now free to rotate at a different relative speed than that of the steel plates (i.e. Slippage between the clutch plates occurs). The result is that the rotational force of the clutch shell is no longer fully transmitted through the “unlocked” clutch plates to the clutch hub. The engine is free to rotate at a different speed than the rear wheel.

Table 6-6. Troubleshooting

SYMPTOM	CHECK ORDER	CAUSE	REMEDY
Clutch slips.	1	Incorrect clutch release adjustment.	Check and adjust clutch release mechanism.
	2	Worn clutch plates.	Check service wear limits. Replace plates.
Clutch drags.	1	Incorrect clutch release adjustment.	Check and adjust clutch release mechanism.
	2	Worn clutch release ramps or balls	Replace release ramps and/or balls.
	3	Warped clutch steel plates.	Replace clutch steel plates.
	4	Blade worn or damaged clutch gear splines.	Replace clutch gear or hub as required.
	5	Overfilled primary.	Drain lubricant to correct level.



1. Spring
2. Lockplate
3. Nut
4. Outer ramp
5. Coupling
6. Ball (3)
7. Inner ramp
8. Retaining ring
9. Retaining ring
10. Spring seat
11. Diaphragm spring
12. Retaining ring
13. Release plate
14. Retaining ring
15. Bearing
16. Adjusting screw
17. Pressure plate
18. Friction plate, paper (7)
19. Steel plate (7)
20. Friction plate, narrow
21. Damper spring
22. Damper spring seat
23. Mainshaft nut
24. Washer
25. Clutch hub
26. Inner thrust washer
27. Needle bearing Inner race
28. Needle bearing
29. Clutch shell and sprocket
30. Outer thrust washer

Figure 6-12. Clutch Assembly

REMOVAL

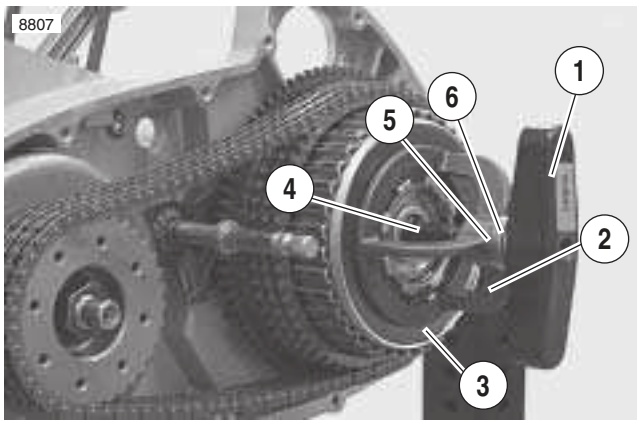
⚠WARNING

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

1. Remove negative battery cable from battery.
2. Drain the transmission fluid. See TRANSMISSION FLUID under 1.9 CLUTCH.
3. Remove primary cover. See 6.2 PRIMARY COVER.

⚠WARNING

Do not attempt to disassemble the clutch without SPRING COMPRESSING TOOL (Part No. HD-38515-A), CLUTCH SPRING FORCING SCREW (Part No. HD-38515-91) and proper eye protection. Otherwise, the highly compressed diaphragm spring could fly out with great force which could result in death or serious injury.



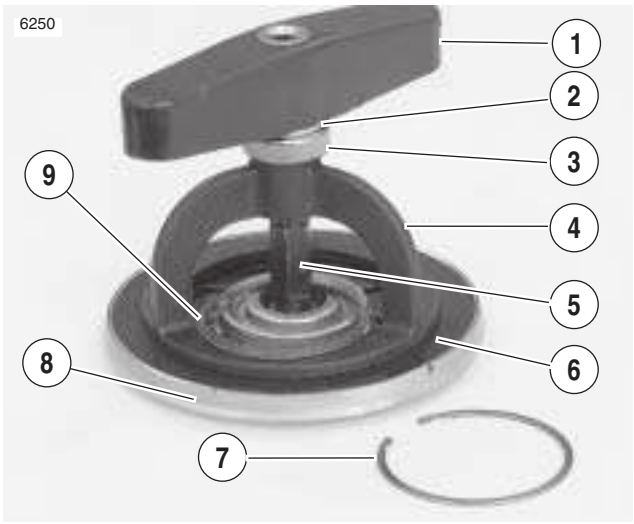
1. **Tool handle**
2. **Bridge**
3. **Diaphragm spring**
4. **Clutch spring forcing screw**
5. **Bearing**
6. **Washer**

Figure 6-13. Compressing Clutch Diagram Spring

4. See Figure 6-13. Attach tools to compress clutch diaphragm spring.
   a. Thread the CLUTCH SPRING FORCING SCREW (Part No. HD-38515-91) onto the clutch adjusting screw.
   b. Place the bridge of SPRING COMPRESSING TOOL (Part No. HD-38515-A) against diaphragm spring.
   c. Install bearing and washer.
   d. Thread the tool handle onto end of forcing screw.

NOTE

See Figure 6-14. Turn compressing tool handle only the amount required to release spring seat and remove snap ring. Excessive compression of diaphragm spring could damage clutch pressure plate.



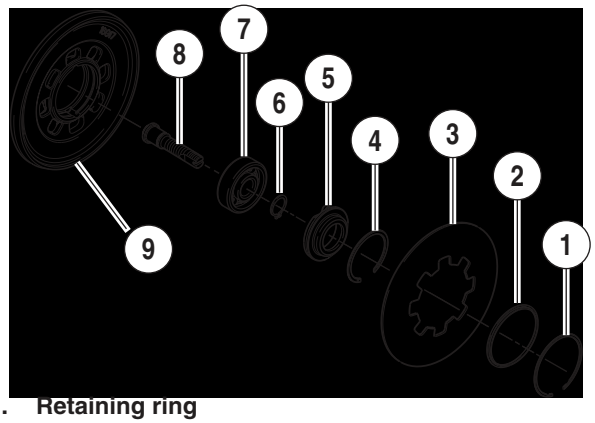
1. **Tool handle**
2. **Washer**
3. **Bearing**
4. **Bridge**
5. **Forcing screw**
6. **Diaphragm spring**
7. **Snap ring**
8. **Pressure plate**
9. **Spring seat**

Figure 6-14. Pressure Plate Assembly

5. See Figure 6-14. Remove pressure plate assembly.
   a. Place a wrench on the clutch spring forcing screw flats to prevent the forcing screw from turning.
   b. Turn compressing tool handle clockwise until tool relieves pressure on retaining ring and spring seat. Remove and discard retaining ring.
   c. Unseat spring seat from the groove in clutch hub prongs.
   d. Remove pressure plate assembly.
6. Remove the clutch pack from the shell/hub assembly.

ADJUSTING SCREW DISASSEMBLY/ASSEMBLY

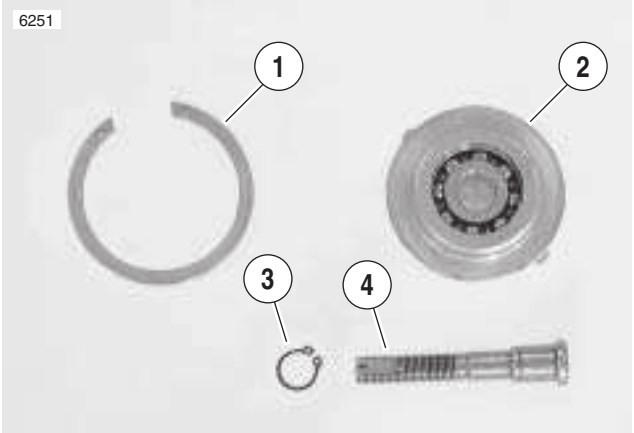
1. See Figure 6-15. Remove adjusting screw assembly.
   a. Remove large retaining ring.
   b. Remove adjusting screw assembly from pressure plate.
2. If necessary, disassemble adjusting screw assembly.
   a. Remove and discard small retaining ring (6).
   b. Separate the adjusting screw (8) from the bearing (7) and release plate (5).
   c. Remove bearing (7) from release plate (5).



1. **Retaining ring**
2. **Spring seat**
3. **Diaphragm Spring**
4. **Retaining ring**
5. **Release plate**
6. **Retaining ring**
7. **Bearing**
8. **Adjusting screw**
9. **Pressure plate**

Figure 6-15. Adjusting Screw Assembly

3. Replace components as required and reassemble adjusting screw assembly in reverse order.s
4. Install adjusting screw assembly into pressure plate.
   a. See Figure 6-37. Align two tabs on perimeter of release plate with corresponding recesses (3) in pressure plate.
   b. Secure the adjusting screw assembly with **new** retaining ring.



1. **Retaining ring**
2. **Bearing and release plate**
3. **Retaining ring**
4. **Adjusting screw**

Figure 6-16. Adjusting Screw Assembly

CLUTCH PACK 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. Separate the pack in to the following components:
   a. Seven fiber plates.
   b. Seven steel plates.
   c. One narrow fiber plate.
   d. One damper spring.
   e. One damper spring seat
2. Wash all parts, except fiber (friction) plates and bearing in the clutch hub/shell, in cleaning solvent. Blow dry with compressed air.
3. Examine the clutch components as follows:
   a. Check all clutch plates for wear and discoloration.
   b. Inspect each steel (drive) plate for grooves.
   c. Place each steel plate on a flat surface. Using a feeler gauge, check for flatness in several places. Replace any plates that are damaged or are warped more than 0.006 in. (0.15 mm).
4. Inspect the damper spring for cracks or distortion. Install a **new** spring if either condition exists.
5. See Figure 6-17. Check fiber plates for thickness.
   a. Wipe the lubricant from the eight fiber plates (7 regular and 1 narrow) and stack them on top of each other.
   b. Measure the thickness of the eight stacked fiber plates with a dial caliper or micrometer. The minimum thickness must be 0.661 in. (16.789 mm).
   c. If the thickness is less than specified, discard the fiber plates and steel plates. Install a **new** set of both friction and steel plates.

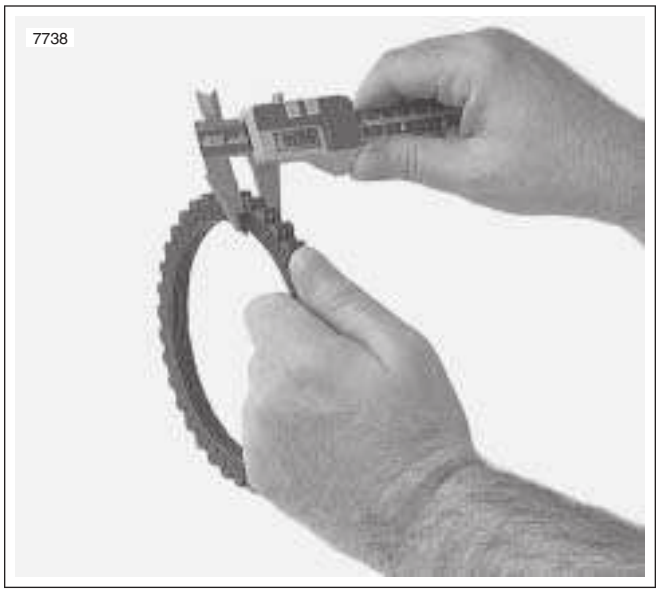
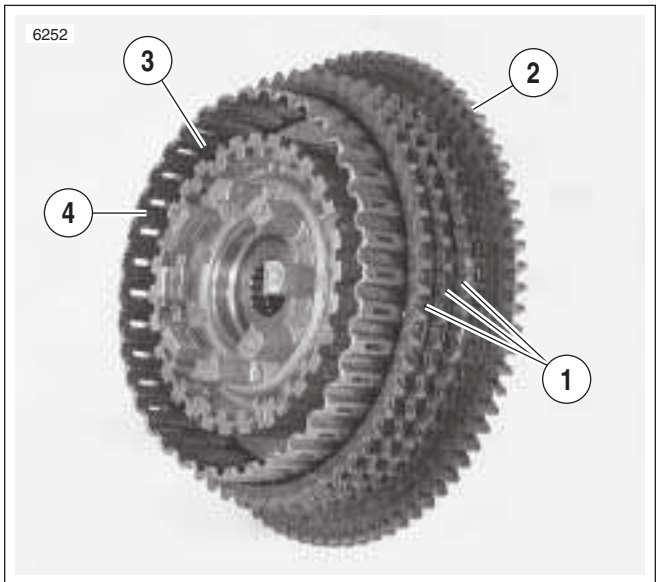


Figure 6-17. Measuring Friction Plates



1. **Primary chain sprocket**
2. **Starter ring gear**
3. **Slots on clutch hub**
4. **Slots on clutch shell**

Figure 6-18. Checking Clutch Shell (Shell Removed from Primary Shaft)

6. See Figure 6-18. Inspect primary chain sprocket and the starter ring gear on the clutch shell. If either sprocket or ring gear are badly worn or damaged, replace the clutch shell. See 6.5 PRIMARY CHAIN.
7. Inspect slots that mate with the clutch plates on both clutch shell and hub. If slots are worn or damaged, replace shell and/or hub. See 6.5 PRIMARY CHAIN.

ASSEMBLY AND INSTALLATION

1. Submerge and soak all friction and steel plates in GENUINE HARLEY-DAVIDSON FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT for at least five minutes.
2. See Figure 6-19. Install narrow friction plate on the clutch hub engaging tabs on plate with slots in clutch shell.
3. See Figure 6-20. Install damper spring seat (5) on clutch hub so that it seats inboard of narrow friction plate (4).
4. Install damper spring (1) on clutch hub with the concave side up (facing opposite damper spring seat).
5. Install a steel plate and then a friction plate on the clutch hub. Install six remaining sets in the same manner, alternating between steel plates and friction plates.

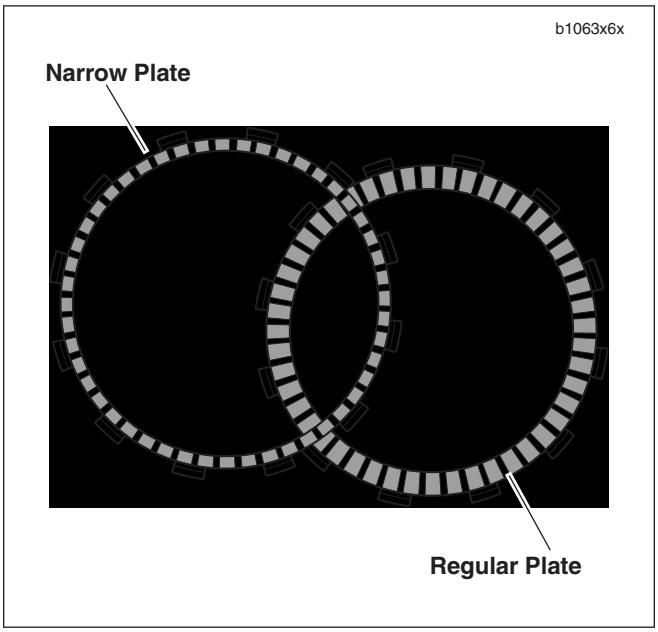


Figure 6-19. Friction Plates

6. Place pressure plate, diaphragm spring, adjusting screw assembly with **new** retaining ring and spring seat onto clutch pack.
   a. See Figure 6-21. Align square openings of pressure plate and diaphragm spring so that the assembly can be installed over prongs on clutch hub.
   b. Position spring seat with its larger outer diameter side toward diaphragm spring.

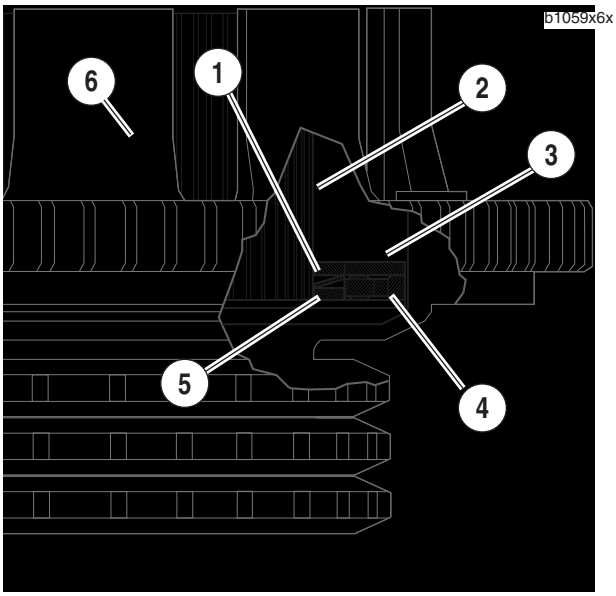
NOTE

See Figure 6-22. Turn compressing tool handle only the amount required to install spring seat and snap ring. Excessive compression of diaphragm spring could damage clutch pressure plate.

   c. See Figure 6-22. Install SPRING COMPRESSING TOOL (Part No. HD-38515-A) onto clutch hub against diaphragm spring.
   d. Place a wrench on the clutch spring forcing screw flats to prevent the forcing screw from turning.
   e. Turn compressing tool handle clockwise until diaphragm spring compresses just enough to install **new** retaining ring into the groove in clutch hub prongs.
   f. With retaining ring fully seated in groove of clutch hub, carefully loosen and remove compression tool.

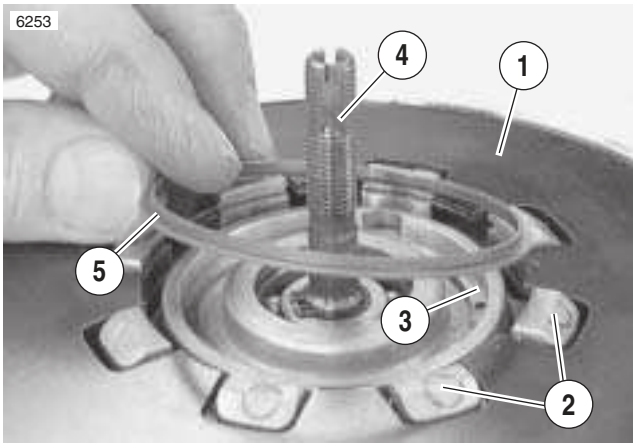
NOTE

When the compressing tool is removed, the diaphragm spring will move outward forcing the spring seat up into the inside of the retaining ring. The spring seat provides an operating surface for the diaphragm spring at the same time preventing the retaining ring from coming out during operation.



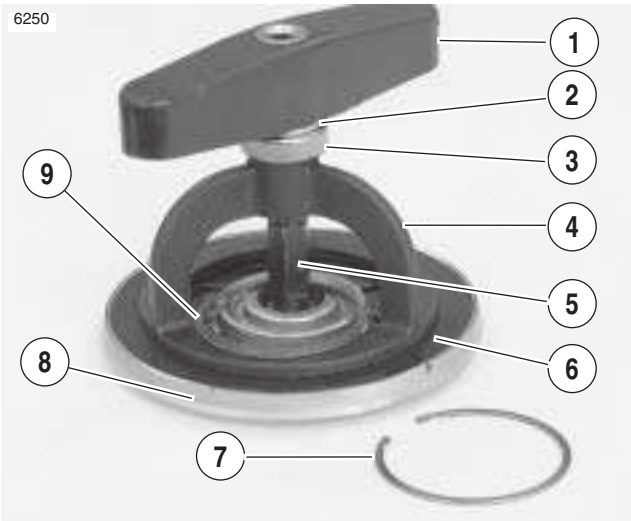
1. **Damper spring**
2. **Clutch hub**
3. **Steel plate**
4. **Narrow friction plate**
5. **Damper spring seat**
6. **Clutch shell**

Figure 6-20. Clutch Pack Stack-Up (Cut-Away View)



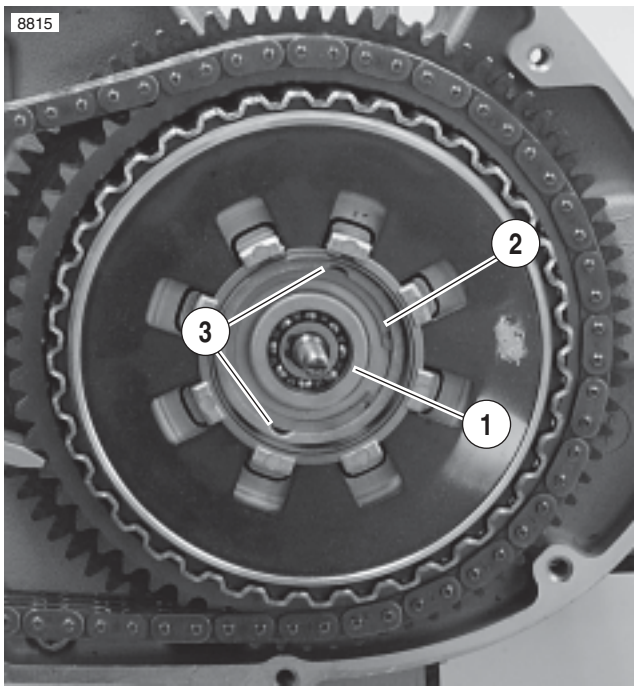
1. **Diaphragm spring (pressure plate below)**
2. **Prongs on clutch hub**
3. **Retaining ring**
4. **Adjusting screw assembly**
5. **Spring seat**

Figure 6-21. Spring Seat Installation



1. Tool handle
2. Washer
3. Bearing
4. Bridge
5. Forcing screw
6. Diaphragm spring
7. Snap ring
8. Pressure plate
9. Spring seat

Figure 6-22. Pressure Plate Assembly



1. Adjusting screw assembly
2. Retaining ring
3. Tab recesses

Figure 6-23. Clutch Adjusting Screw Assembly and Retaining Ring

7. Install primary cover. See 6.2 PRIMARY COVER.
8. Adjust Clutch. See 1.9 CLUTCH.
9. Fill with GENUINE HARLEY-DAVIDSON FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT. See 1.9 CLUTCH.

⚠WARNING

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

10. Connect negative battery cable to battery terminal. Tighten fastener to 72-96 **in-lbs** (8.6-10.9 Nm).

⚠WARNING

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

11. Install seat. See 2.38 SEAT.

PRIMARY CHAIN 6.5

GENERAL

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 and cannot be adjusted to within specifications, it must be replaced. See 1.11 PRIMARY CHAIN.

An opening between the primary drive and transmission compartments allows the same lubricant supply to lubricate moving parts in both areas.

REMOVAL

⚠WARNING

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

1. Remove negative battery cable from battery.
2. Drain the transmission fluid. See TRANSMISSION FLUID under 1.9 CLUTCH.
3. Remove primary cover. See 6.2 PRIMARY COVER.

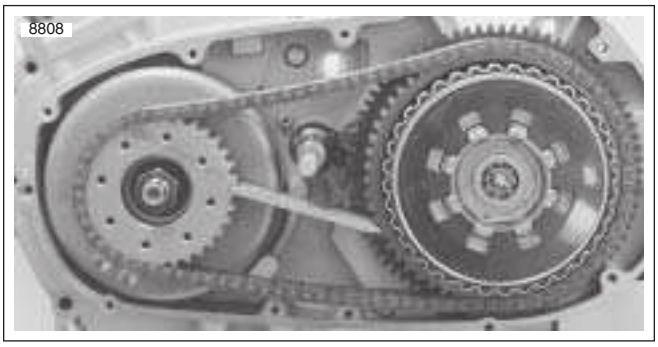


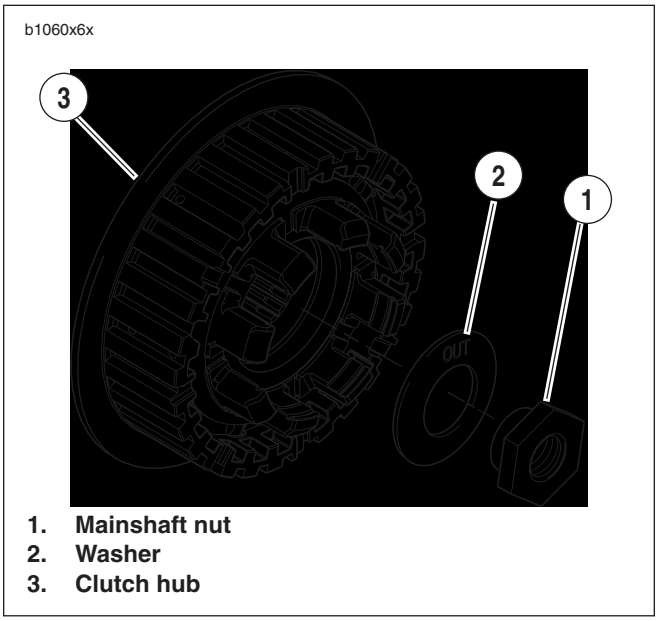
Figure 6-24. Sprocket Locking Link Tool (Part No. HD-38362) for XB9R models and (Part No. HD-46283) for XB12R models.

4. Loosen engine sprocket.
   a. See Figure 6-24. Install SPROCKET LOCKING LINK (Part No. HD-38362).
   b. Remove the engine sprocket nut.
   c. Loosen but do not remove engine sprocket. If necessary, use the slotted portion of TWO CLAW PULLER (Part No. HD-97292-61) and two bolts to loosen the engine sprocket.
5. See Figure 6-16. Remove adjusting screw assembly.
   a. Remove large retaining ring.
   b. Remove adjusting screw assembly from pressure plate.

NOTE

See Figure 6-25. Mainshaft nut has left-hand threads. To prevent damage, turn nut clockwise to loosen and remove from mainshaft.

6. See Figure 6-25. Remove mainshaft nut and washer.
7. Remove the clutch, clutch shell/hub, primary chain and engine sprocket as a unit.



1. **Mainshaft nut**
2. **Washer**
3. **Clutch hub**

Figure 6-25. Mainshaft Nut and Washer

CLUTCH SHELL/HUB INSPECTION

1. Separate primary chain, engine sprocket and clutch shell/hub assembly.

2. Inspect engine sprocket for damage or excessive wear. Replace as required.

3. Attach tools to compress clutch diaphragm spring and remove pressure plate assembly. See 6.4 CLUTCH.

NOTE

The clutch hub and clutch shell are no longer pressed together. There are no retaining rings securing the clutch hub to the clutch shell. Once the pressure plate assembly has been removed the clutch hub will slide out of the clutch shell.

4. Remove clutch pack. Disassemble, clean and inspect clutch pack. See CLUTCH PACK CLEANING and INSPECTION under 6.4 CLUTCH.

5. Disassemble adjusting screw assembly and inspect bearing, release plate, and adjusting screw. See ADJUSTING SCREW DISASSEMBLY/ASSEMBLY under 6.4 CLUTCH.

6. Remove clutch hub from clutch shell. Inspect primary chain sprocket and the starter ring gear on the clutch shell.

7. Inspect slots that mate with the clutch plates on both clutch shell and hub.

8. See Figure 6-26. Inspect the clutch shell compensating spring set.

NOTE

As you proceed around the back of the clutch shell, the compensating springs go from being loaded to unloaded so it is possible for the clutch springs to float and move during inspection. This condition is normal.

9. See Figure 6-27. Inspect clutch shell needle bearing for smoothness. Rotate the clutch shell while holding the clutch hub. If bearing is rough or binds, it must be replaced. See CLUTCH SHELL BEARING REPLACEMENT.

10. See Figure 6-28. Inspect clutch shell bearing inner race on the back side of the clutch hub for pitting and wear. If the inner race shows any of these signs the complete hub assembly must be replaced.

11. Replace damaged parts as necessary.

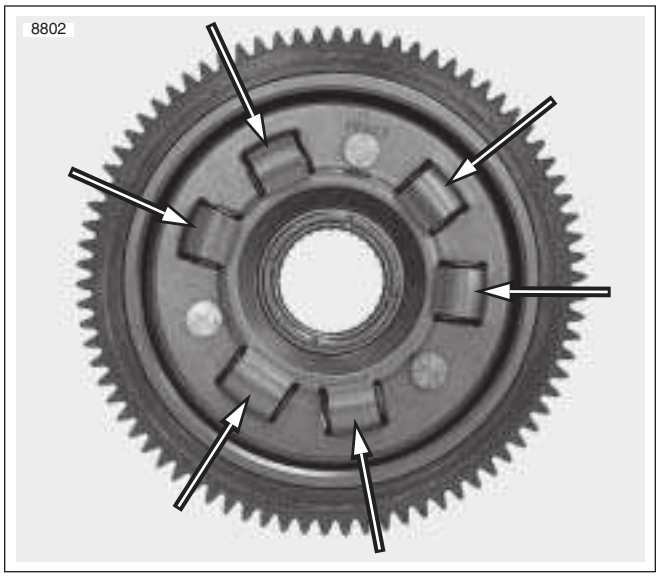


Figure 6-26. Compensating Spring Set

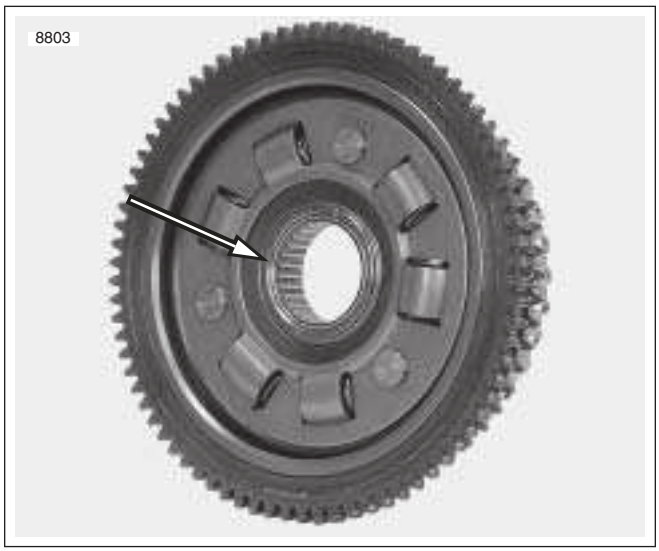


Figure 6-27. Needle Bearing in Clutch Shell

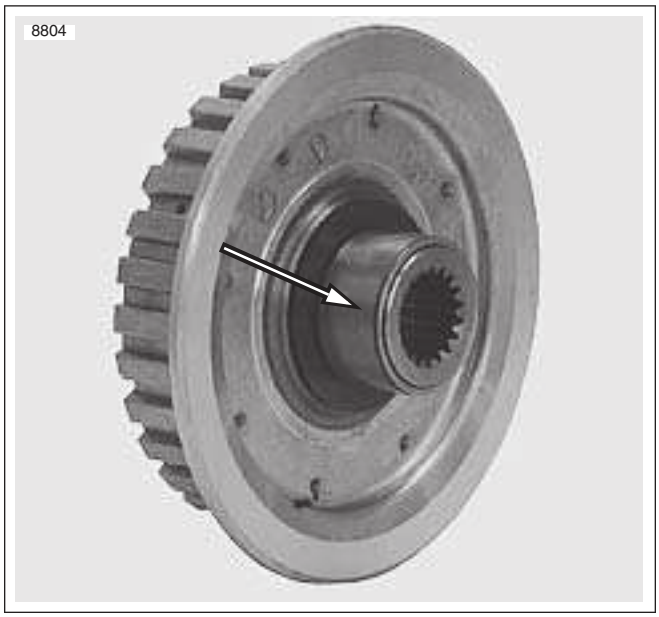


Figure 6-28. Clutch Hub Bearing Race

CLUTCH SHELL BEARING REPLACEMENT

NOTE

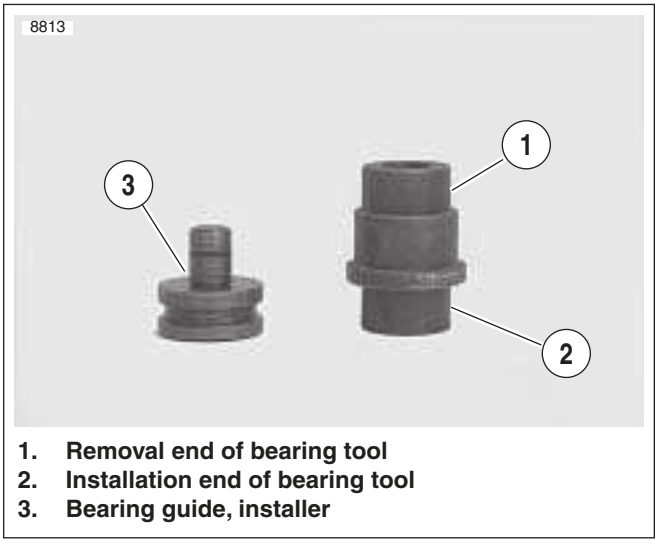
The clutch shell uses a caged needle bearing that corresponds to an inner race installed on the clutch hub.

1. See Figure 6-30. Place clutch shell on support blocks with sprocket side facing up.

NOTE

The CLUTCH SHELL BEARING REMOVER/INSTALLER (Part No. B-45926) is clearly marked for removal and installation purposes.

2. See Figure 6-30. Insert removal end of tool into bearing assembly and remove bearing from clutch shell.
3. See Figure 6-31. Remove bearing guide from end of CLUTCH SHELL BEARING REMOVER/INSTALLER (Part No. B-45926).



1. Removal end of bearing tool
2. Installation end of bearing tool
3. Bearing guide, installer

Figure 6-29. Clutch Shell Bearing Remover/Installer B-45926

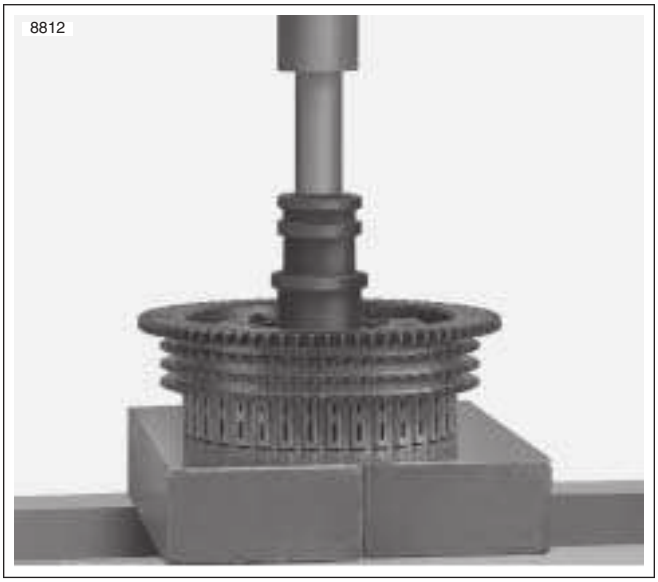
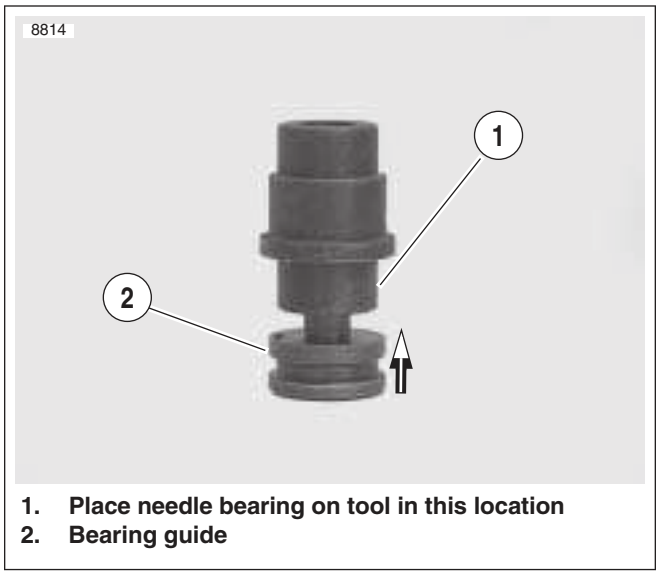


Figure 6-30. Removing Clutch Shell Needle Bearing



1. Place needle bearing on tool in this location
2. Bearing guide

Figure 6-31. Bearing Installer

4. Place **new** needle bearing onto installer end of tool and insert the bearing guide to prevent the bearing from falling off during installation and to align bearing with clutch shell.
5. See Figure 6-32. Place clutch shell on support blocks with sprocket side facing up.
6. Press bearing into clutch shell until tool bottoms on the shell. This will be the correct installed height.

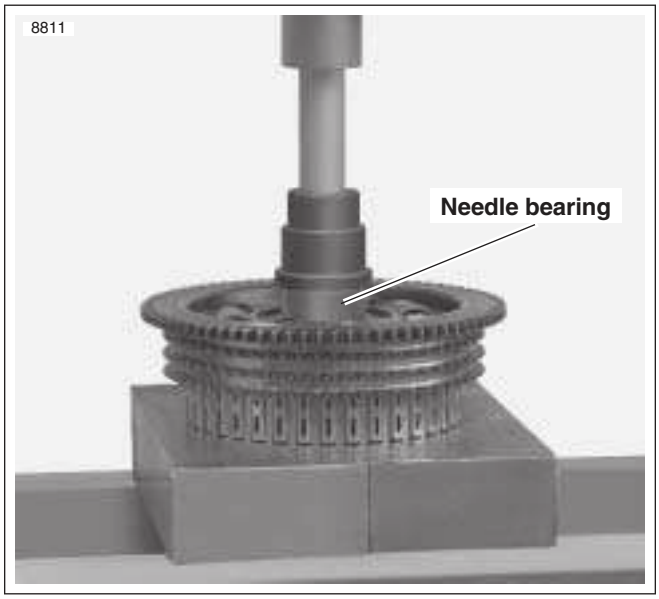


Figure 6-32. Installing Clutch Shell Needle Bearing Clutch Shell Bearing Remover/Installer B-45926

INSTALLATION

NOTE

Prior to installing engine sprocket nut and the clutch hub nut, the threads on the sprocket shaft, sprocket nut, mainshaft and clutch hub nut must be thoroughly cleaned to remove any oil that might contaminate and interfere with the locking agent.

1. See Figure 6-33. Assemble clutch hub (1) and shell (3) by sliding inboard end of clutch hub into shell bearing(2) by hand. No tools are required.

2. Submerge and soak all friction and steel plates in FORMULA+ Primary/Transmission Lubricant for at least five minutes and assemble clutch pack in sequence in the clutch hub. See ASSEMBLY and INSTALLATION under 6.4 CLUTCH.

3. Verity that outer thrust washer (4) is installed on transmission shaft.

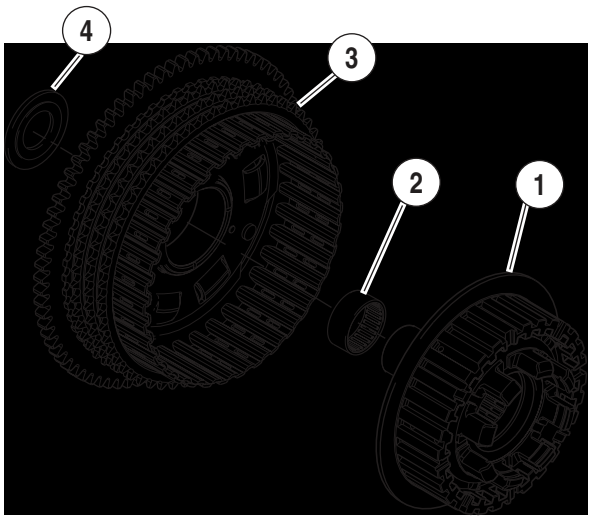
4. Install the engine sprocket, clutch assembly and primary chain as a unit into primary chaincase.

5. See Figure 6-34. Install the engine sprocket nut.

   a. Install SPROCKET LOCKING LINK (Part No. HD-38362).

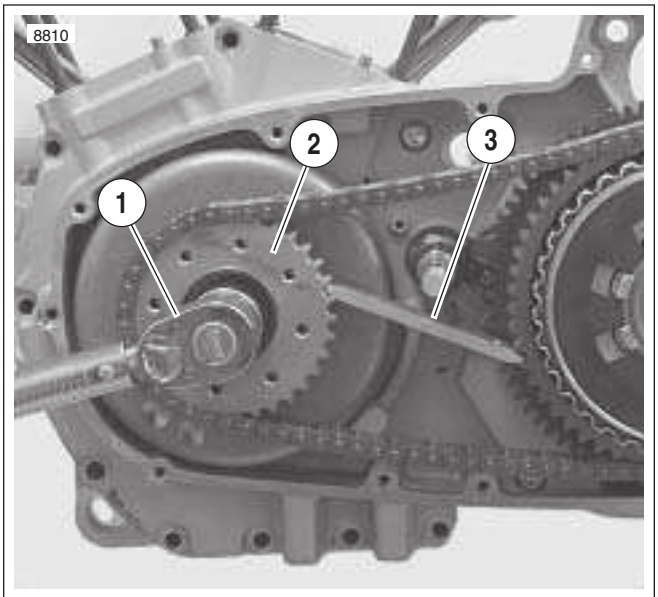
   b. Apply two or three drops of LOCTITE 272 (red) onto threads of sprocket shaft.

   c. Install engine sprocket nut. Tighten to 240-260 ft-lbs (325.4-352.5 Nm).



1. **Clutch hub**
2. **Needle bearing**
3. **Clutch shell**
4. **Thrust washer, outer**

Figure 6-33. Clutch Hub and Shell Assembly

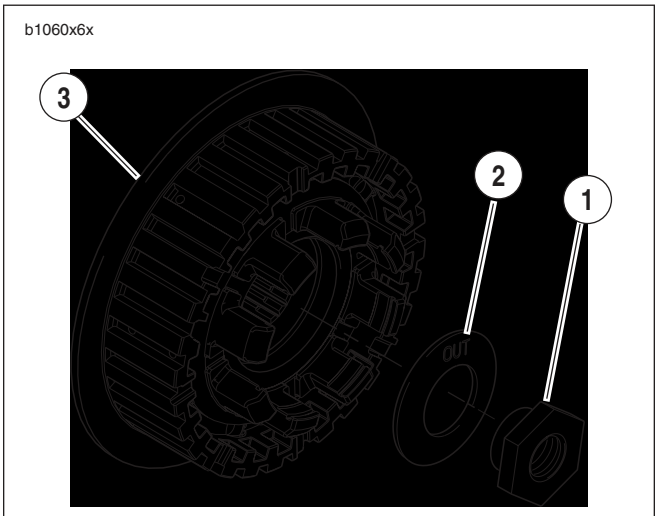


1. **Torque wrench**
2. **Engine sprocket**
3. **Sprocket locking link (Part No. HD-38362)**

Figure 6-34. Sprocket Locking Link Tool (Part No. HD-38362) for XB9R models and (Part No. HD-46283) for XB12R models.

NOTE

See Figure 6-35. Washer must be installed with the word "out" facing the mainshaft nut or transmission may be damaged.



1. **Mainshaft nut**
2. **Washer**
3. **Clutch hub**

Figure 6-35. Mainshaft Nut and Washer

NOTE

New mainshaft nut comes with a chemical lock patch making it unnecessary to use Loctite with new fastener.

6. See Figure 6-35. Install mainshaft washer (2) and nut (1).
   a. If using original mainshaft nut apply two or three drops of LOCTITE 272 (red) onto threads on end of mainshaft.
   b. Place washer (2) on mainshaft with the word “out” facing away from clutch hub.
   c. Install nut (left-hand threads) (1). Tighten to 70-80 ft-lbs (94.9-108.5 Nm).
7. Remove SPROCKET LOCKING LINK.
8. Install the pressure plate assembly. See 6.4 CLUTCH.
9. Install adjusting screw assembly into pressure plate.
   a. See Figure 6-37. Align two tabs on perimeter of release plate with corresponding recesses (3) in pressure plate.
   b. Secure the adjusting screw assembly with **new** retaining ring.
10. Install primary cover. See 6.2 PRIMARY COVER.
11. Adjust Clutch. See 1.9 CLUTCH.
12. Add GENUINE HARLEY-DAVIDSON FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT. See TRANSMISSION FLUID under 1.9 CLUTCH.

⚠WARNING

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

13. Connect negative battery cable to battery terminal. Tighten fastener to 72-96 **in-lbs** (8.1-10.9 Nm).

⚠WARNING

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

14. Install seat. See 2.38 SEAT.

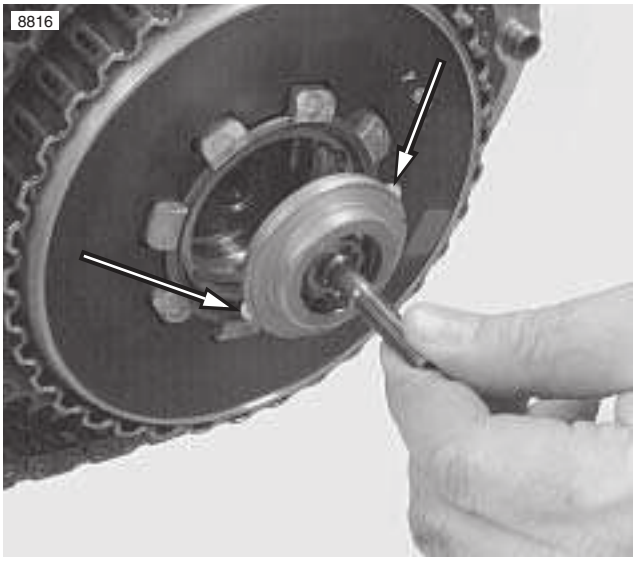
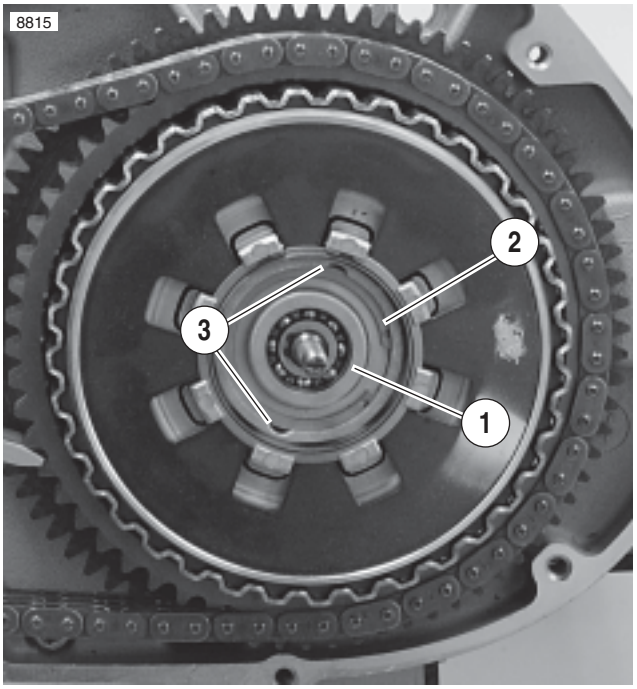


Figure 6-36. Adjusting Screw Assembly Aligning Tabs



1. **Adjusting screw assembly**
2. **Retaining ring**
3. **Tab recesses**

Figure 6-37. Clutch Adjusting Screw Assembly and Retaining Ring