

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 6-55
Axle, rear	Special procedure		ANTI-SEIZE, page 6-23
Axle, rear	Special procedure		ANTI-SEIZE, page 6-55
Chin fairing fasteners	36-48 in-lbs	4-5 Nm	Apply several drops of LOCTITE 271 (red) to last few threads, page 6-24
Clutch inspection cover fasteners	84-108 in-lbs	9.5-12.2 Nm	Tighten crosswise pattern, page 6-6
Clutch mainshaft nut	70-80 ft-lbs	94.9-108.5 Nm	Apply LOCTITE 271 (red) onto threads on end of mainshaft, left hand threads, page 6-20
Countershaft retaining screw	33-37 ft-lbs	44.8-50 Nm	LOCTITE 271 (red), page 6-52
Crankcase 5/16 in. fasteners	15-19 ft-lbs	20.3-25 Nm	Apply several drops of LOCTITE 271 (red) to last few threads, page 6-49
Engine sprocket nut	240-260 ft-lbs	325.4-352.5 Nm	Apply LOCTITE 271 (red) onto threads of sprocket shaft, page 6-19
Idle pulley nut and washer	33-35 ft-lbs	45-47Nm	page 6-24
Idle 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	72-96 in-lbs	8-11 Nm	page 6-6
Neutral indicator switch	60-84 in-lbs	6.7-9.5 Nm	LOCTITE 242 (blue), page 6-49
Primary cover fasteners	100-120 in-lbs	11.3-13.5 Nm	Follow torque sequence, page 6-5
Rear axle	Special procedure		ANTI-SEIZE, page 6-24
Shift lever pinch screw	48-60 in-lbs	5.4-6.8 Nm	LOCTITE 271 (red), Page 6-6
Shift linkage fasteners	36-60 in-lbs	4-6.8 Nm	LOCTITE 271 (red), page 6-6
Shift pedal flange head bolt	22-24 ft-lbs	30-32.5 Nm	LOCTITE 271 (red), page 6-6
Transmission sprocket nut	Special procedure		LOCTITE 271 (red), left hand threads, special torque turn method, page 6-54
Transmission sprocket screws	90-110 in-lbs	10.2-12.4 Nm	Replace after 3 removals, page 6-54

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](#).

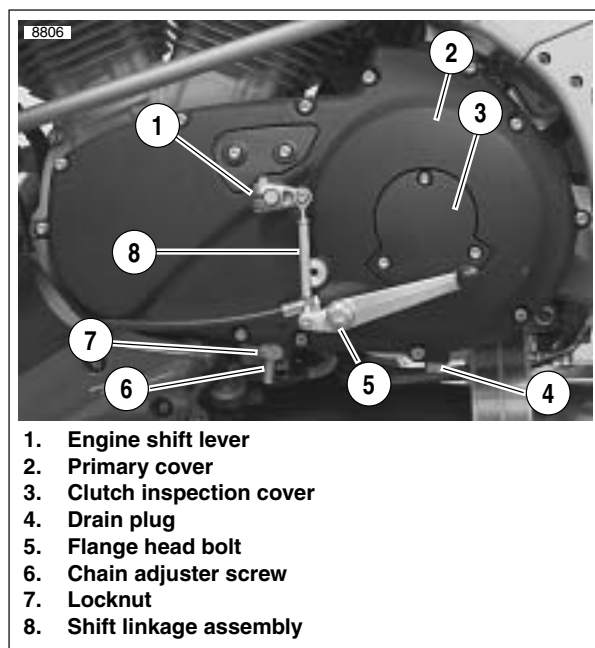


Figure 6-1. Removing Primary Cover

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 (7). Turn chain adjuster screw (6) 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).

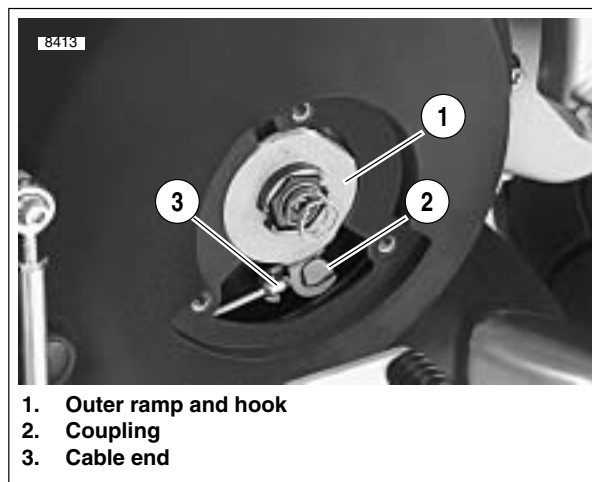


Figure 6-2. Clutch Release Mechanism

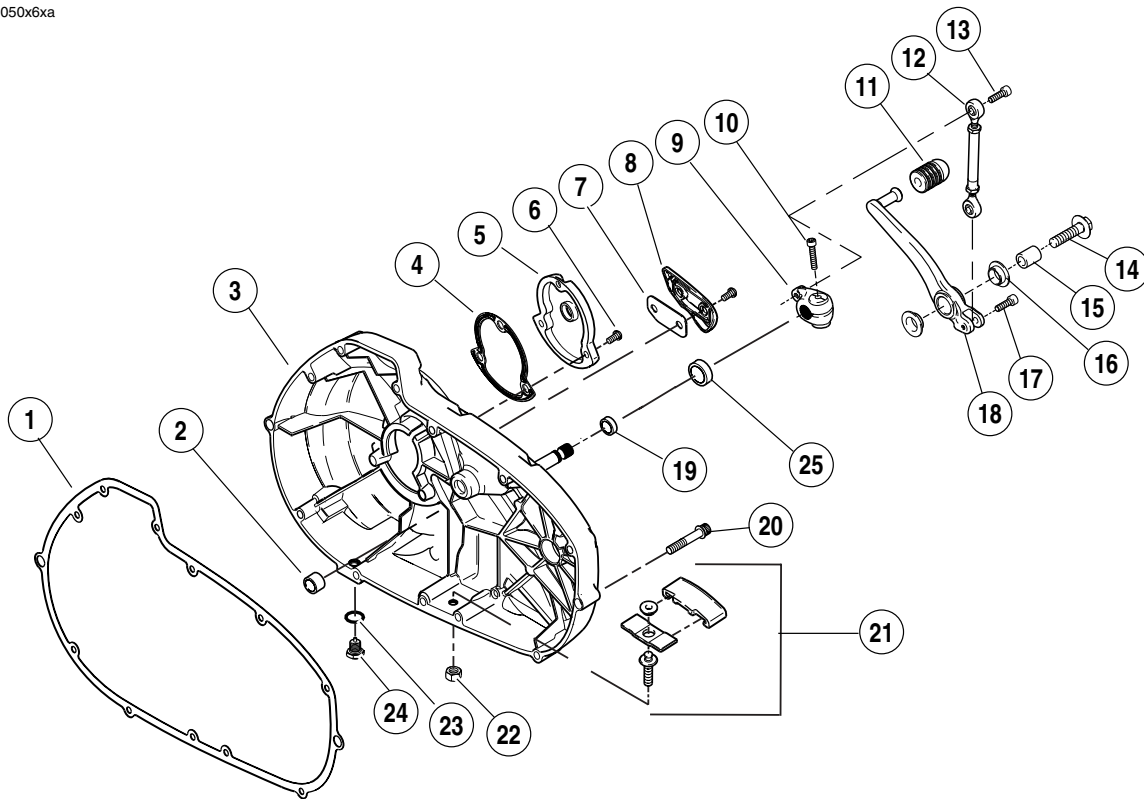
11. See [Figure 6-2](#). Remove the outer ramp and hook (1) from the cable end (3) and coupling (2). Remove cable end from slot in coupling. See [6.3 CLUTCH RELEASE MECHANISM](#)
12. Remove screws which secure primary cover. Remove cover and gasket.
13. Discard gasket.
14. Remove and discard shifter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

b1050x6xa



1. Gasket
2. Shifter bushing
3. Primary cover
4. Gasket
5. Clutch inspection cover
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
25. Rubber washer

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.

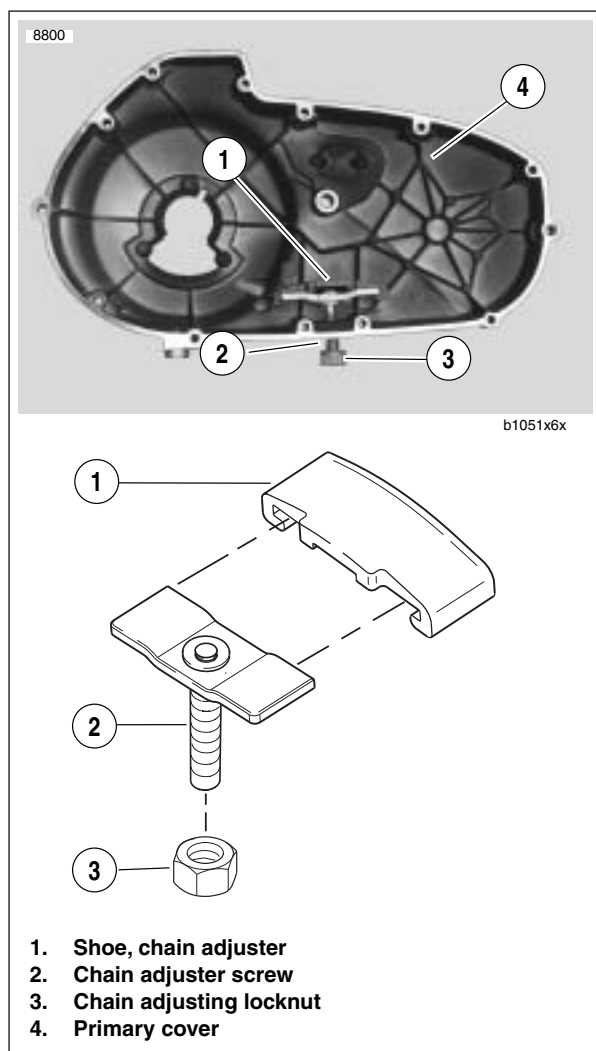


Figure 6-4. Primary Chain Adjuster

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.

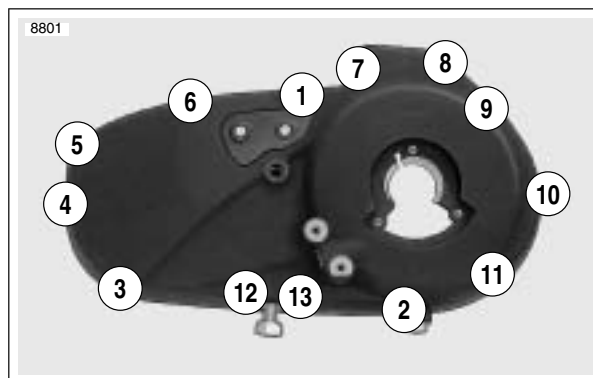


Figure 6-5. Primary Cover Tightening Sequence

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.

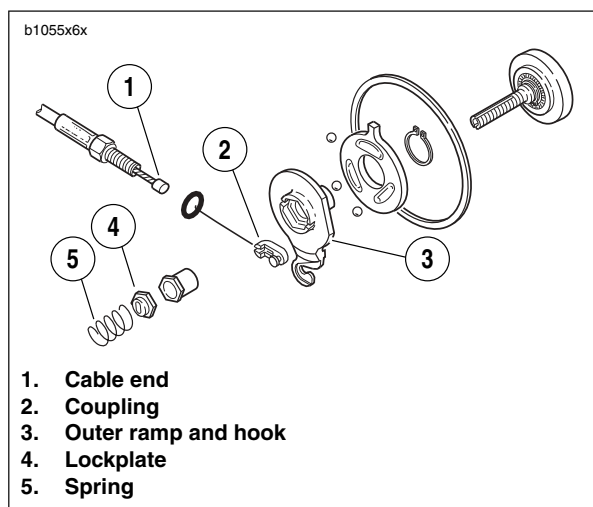


Figure 6-6. Clutch Release Mechanism

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](#).

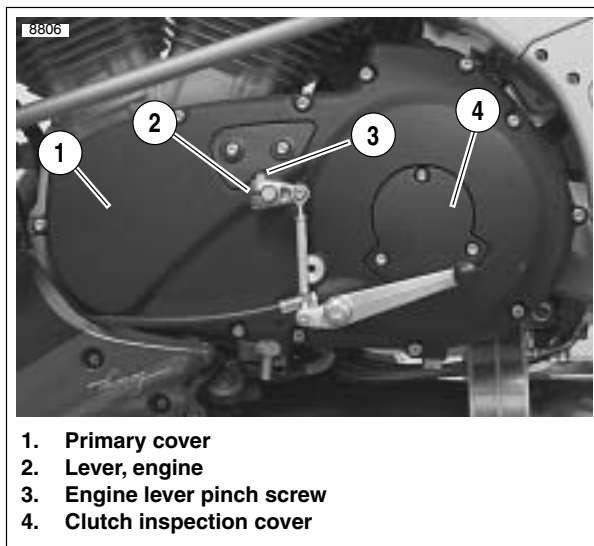


Figure 6-7. Installing Primary Cover

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).

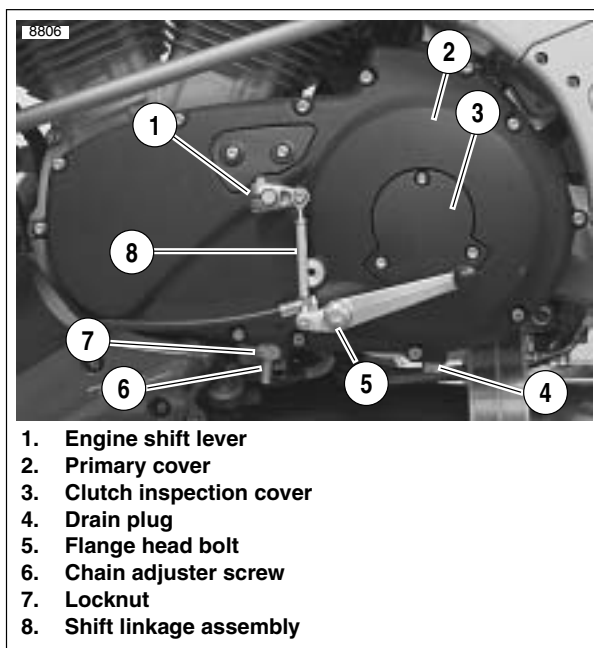


Figure 6-8. Installing Shift Linkage

12. See [Figure 6-8](#). Install rubber washer and engine shift lever assembly (1).
13. After applying LOCTITE 271, install flange bolt (5) and shift pedal to primary cover, and tighten to 22-24 ft-lbs (30-32.5Nm).
14. After applying LOCTITE 271 (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 271 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 72-96 **in-lbs** (8-11 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](#).

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](#).

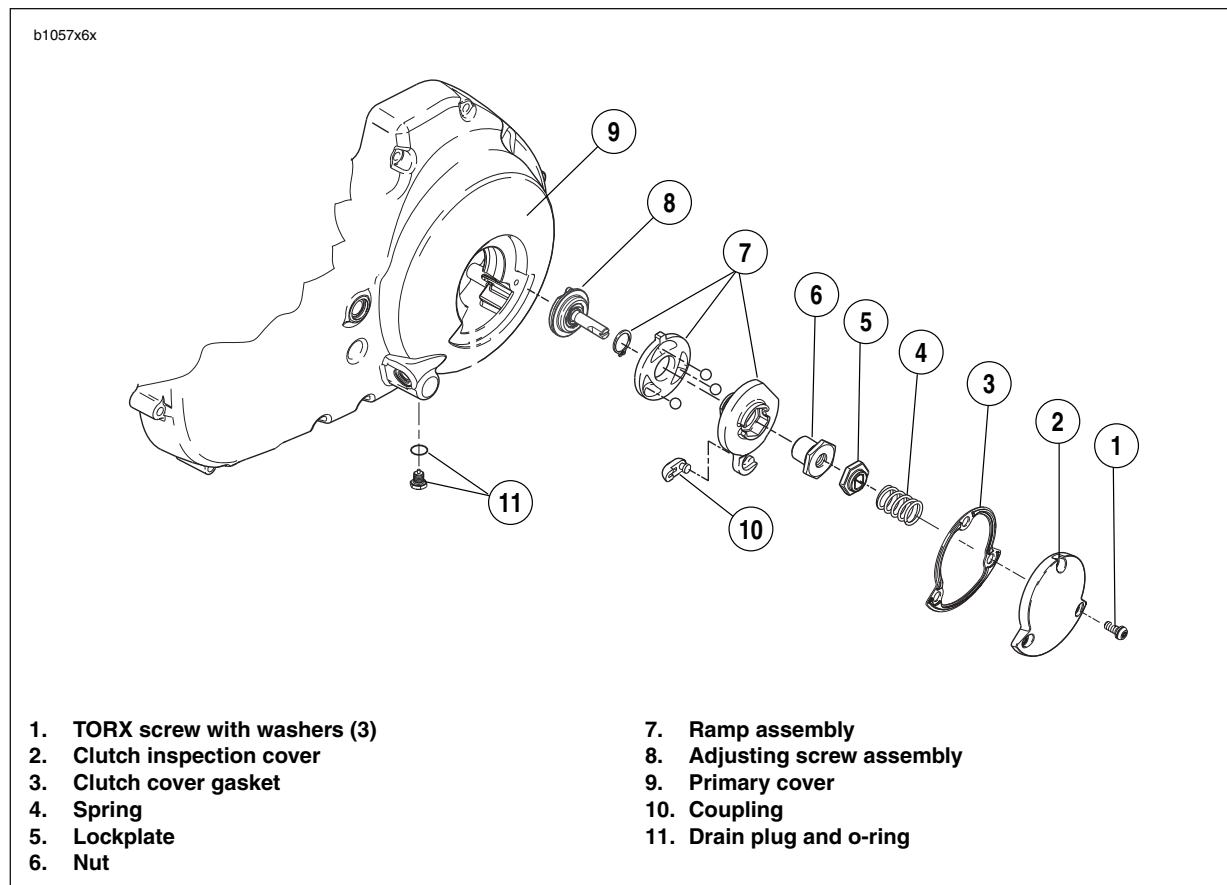


Figure 6-9. Clutch Release Mechanism

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).

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)

7. Install seat. See [2.38 SEAT](#).

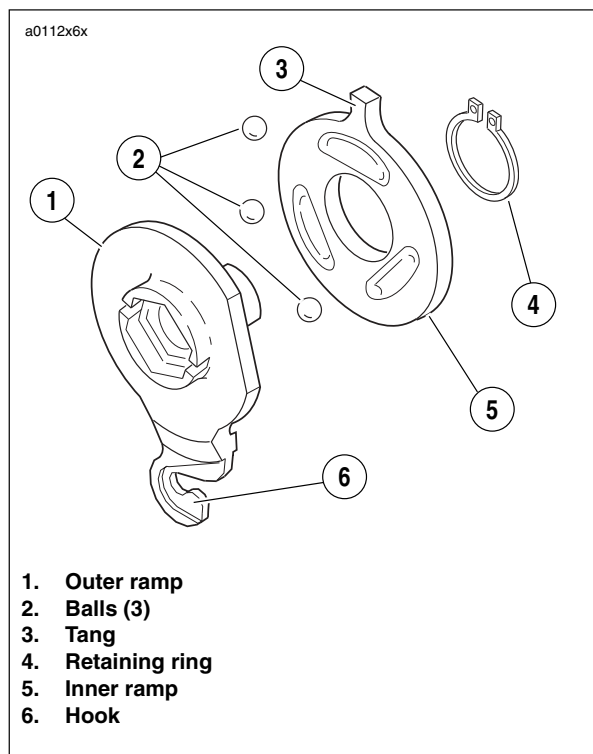


Figure 6-10. Inner & Outer Ramp

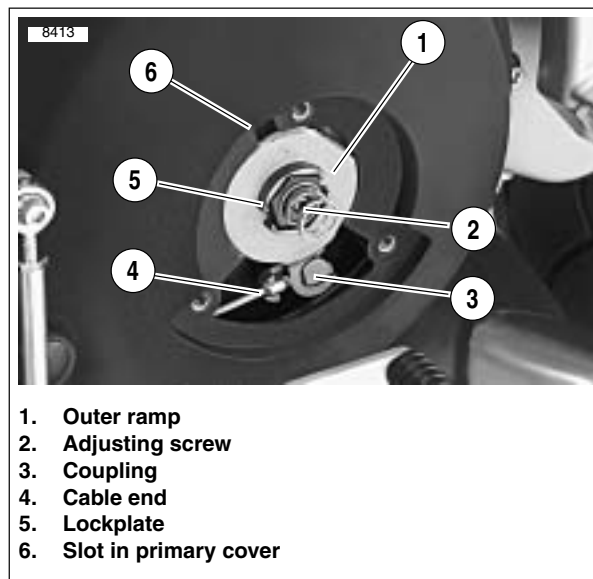


Figure 6-11. Nut and Outer Ramp

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.

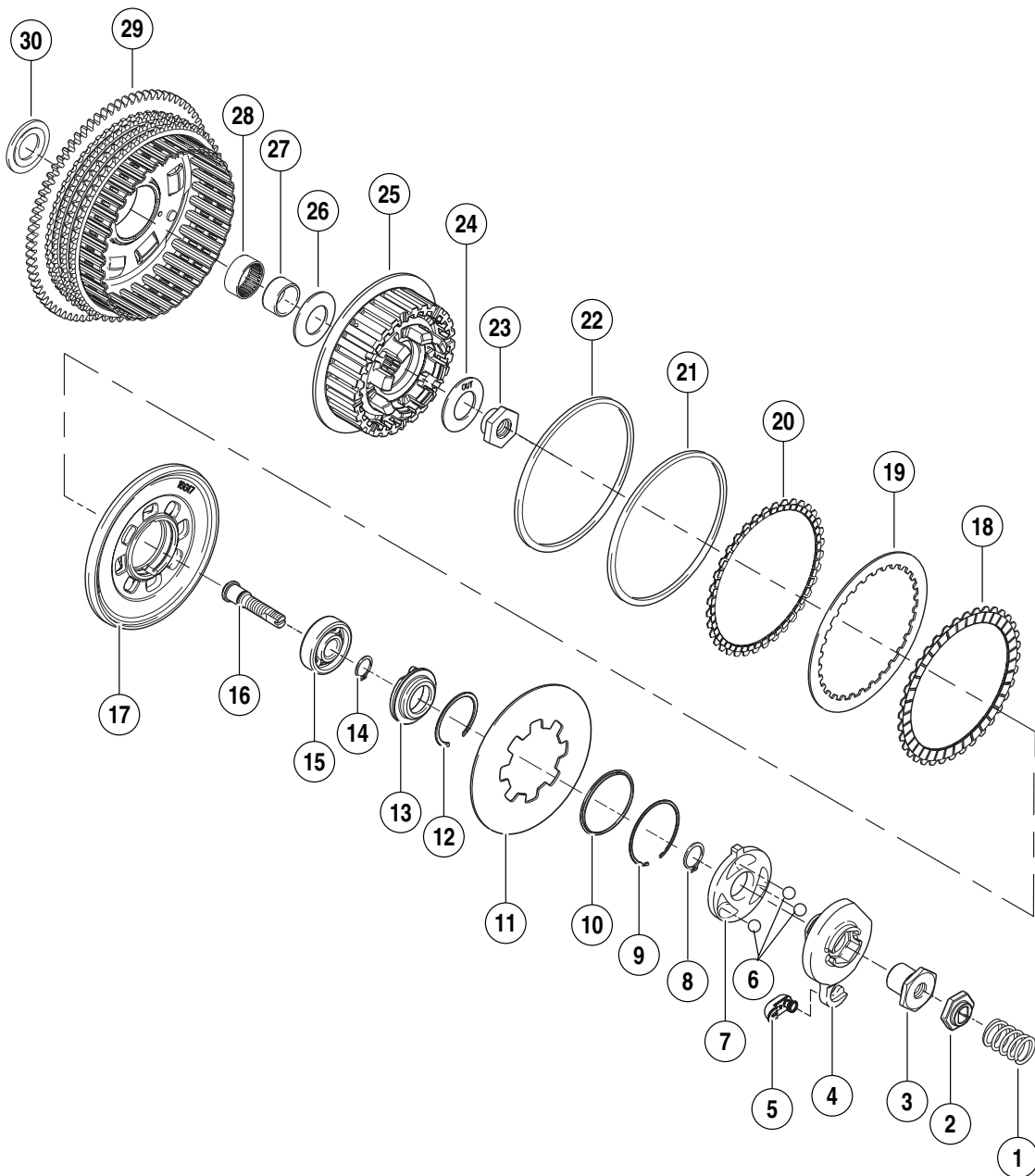
When the clutch is engaged (clutch lever released), the diaphragm spring applies strong force against the pressure plate. The pressure plate then presses the clutch plates

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

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.

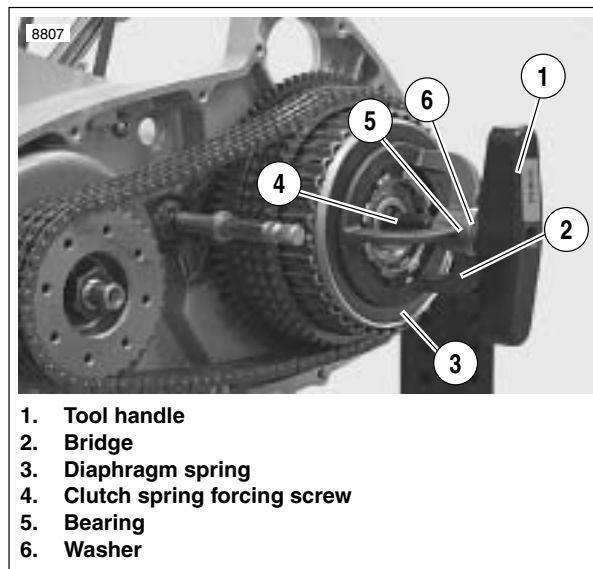


Figure 6-13. Compressing Clutch Diagram Spring

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.



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).

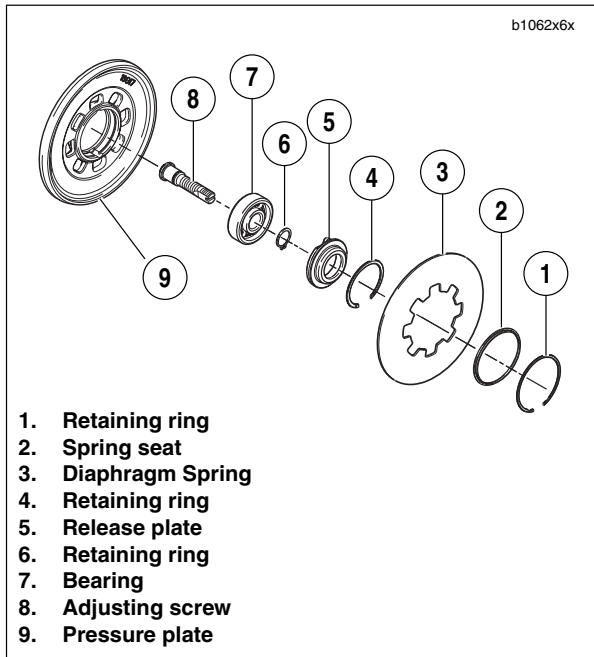


Figure 6-15. Adjusting Screw Assembly

3. Replace components as required and reassemble adjusting screw assembly in reverse order.
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.

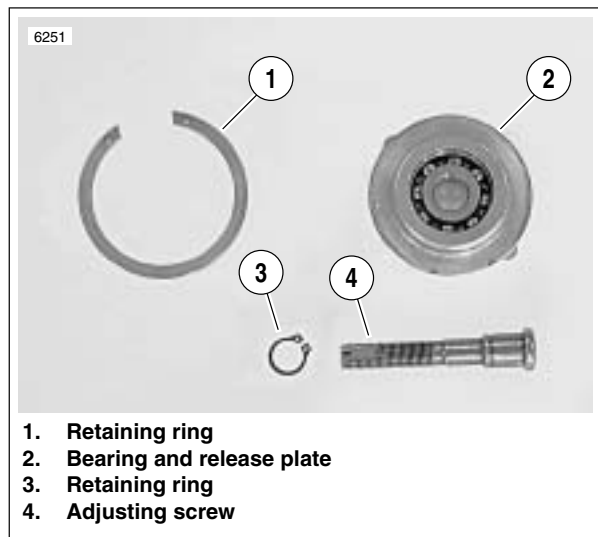


Figure 6-16. Adjusting Screw Assembly

CLUTCH PACK CLEANING AND INSPECTION

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

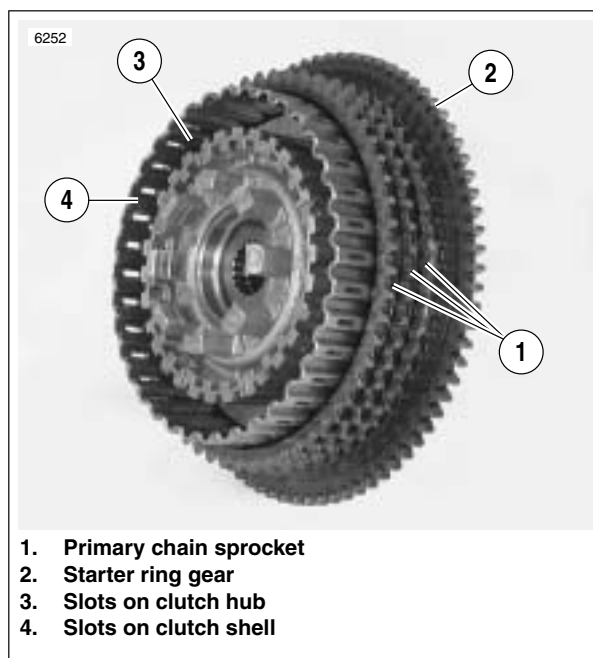
⚠ WARNING

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)

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



**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.

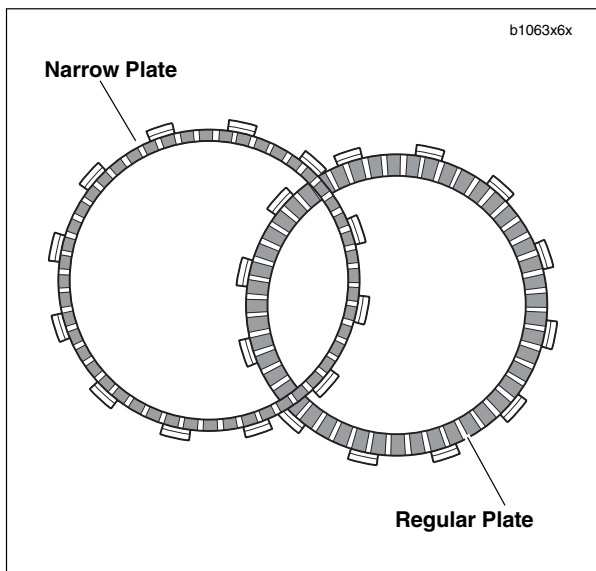


Figure 6-19. Friction Plates

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.

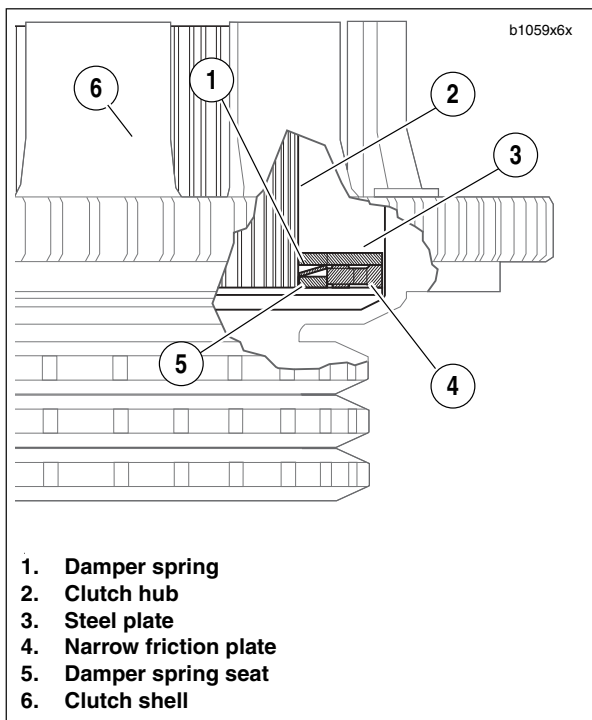


Figure 6-20. Clutch Pack Stack-Up (Cut-Away View)

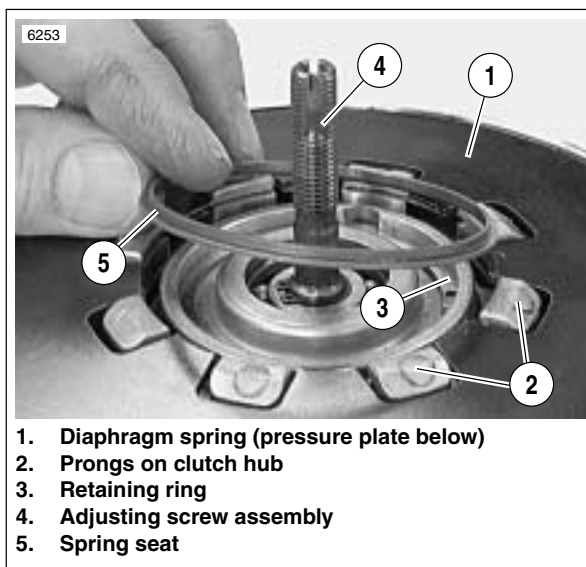


Figure 6-21. Spring Seat Installation

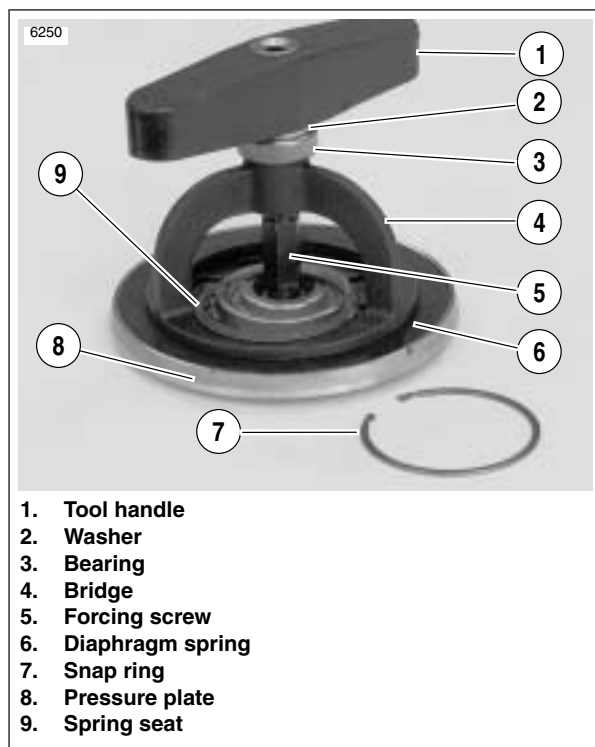


Figure 6-22. Pressure Plate Assembly

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 (Part No. 99851-05). 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](#).

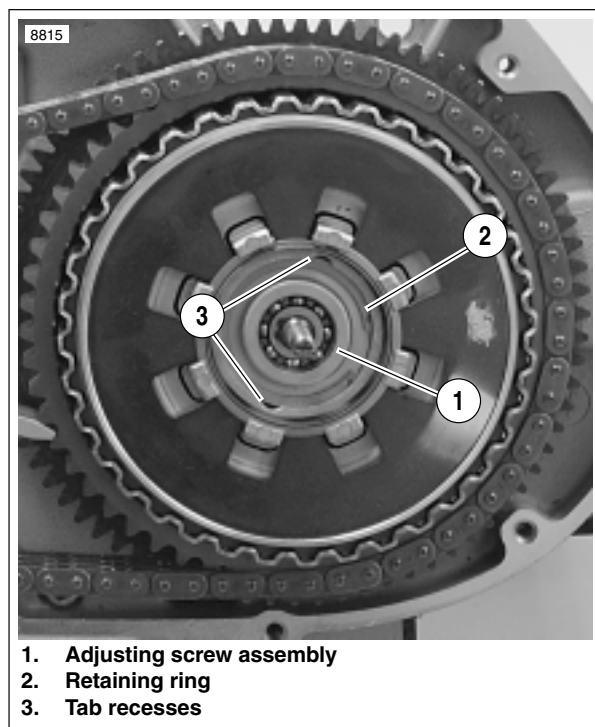


Figure 6-23. Clutch Adjusting Screw Assembly and Retaining Ring

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](#).

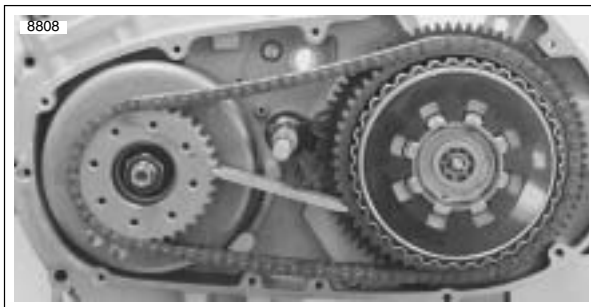


Figure 6-24. Sprocket Locking Link Tool
(Part No. HD-38362) for XB9R models and
(Part No. HD-46283) for XB12R models.

4. Loosen engine sprocket.
 - a. See [Figure 6-24](#). Install SPROCKET LOCKING LINK (Part No. HD-46283).
 - 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.

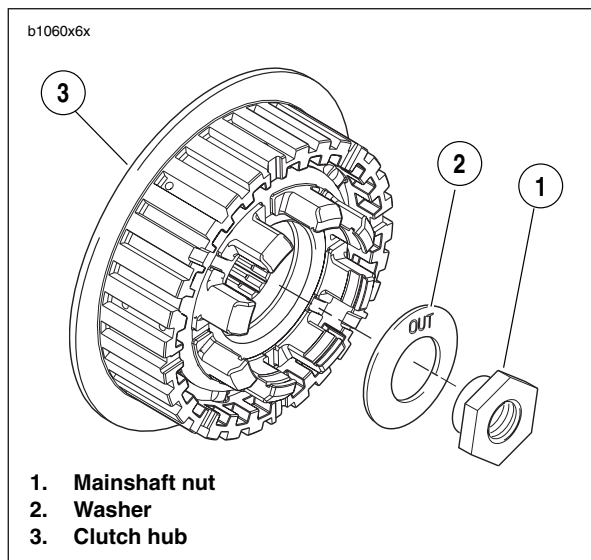


Figure 6-25. Mainshaft Nut and Washer

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.

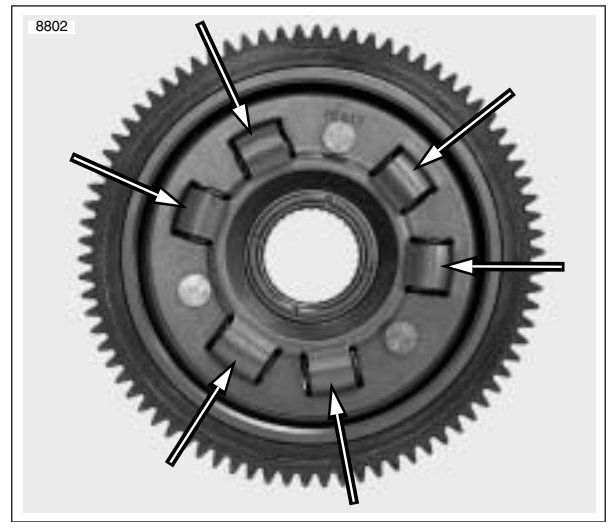


Figure 6-26. Compensating Spring Set

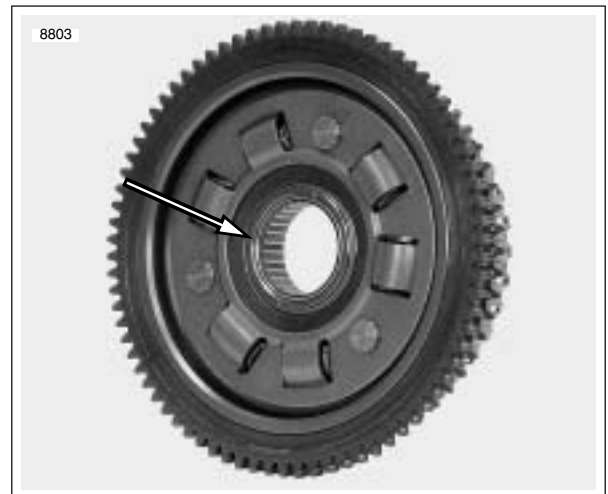


Figure 6-27. Needle Bearing in Clutch Shell



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).

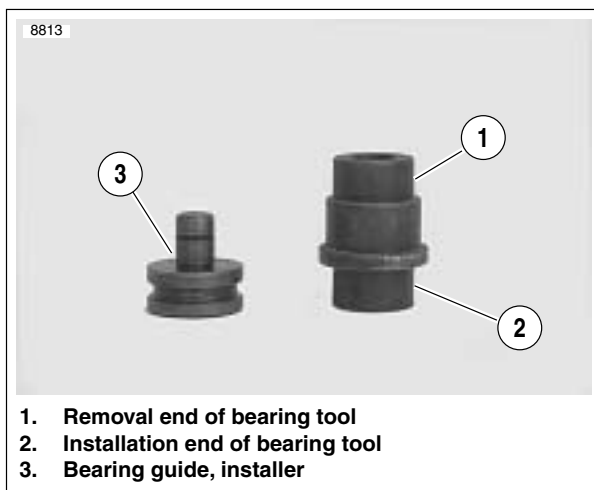


Figure 6-29. Clutch Shell Bearing Remover/Installer B-45926



Figure 6-30. Removing Clutch Shell Needle Bearing

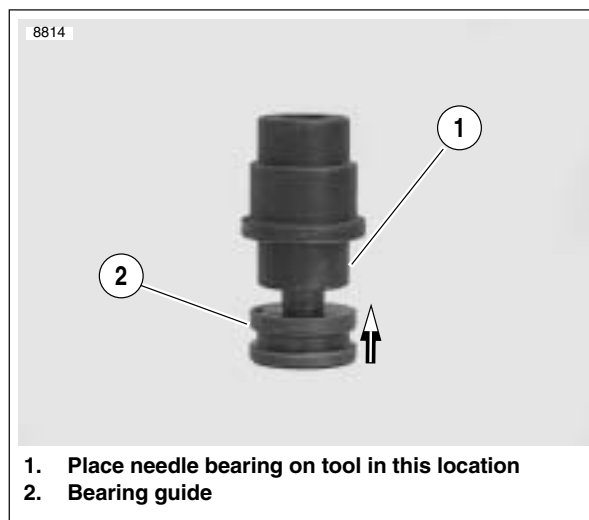


Figure 6-31. Bearing Installer

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.

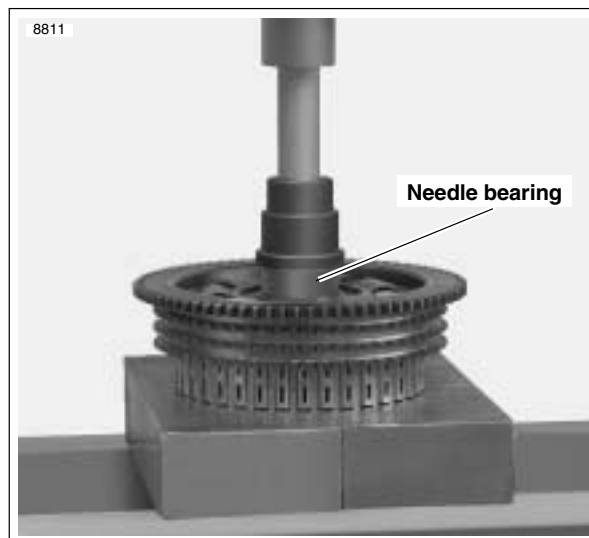


Figure 6-32. Installing Clutch Shell Needle Bearing Clutch Shell Bearing Remover/Installer B-45926

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. Verify 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 for XB9R models and Part No. HD-46283 for XB12R models).
 - b. Apply two or three drops of LOCTITE 271 (red) onto threads of sprocket shaft.
 - c. Install engine sprocket nut. Tighten to 240-260 ft-lbs (325.4-352.5 Nm).

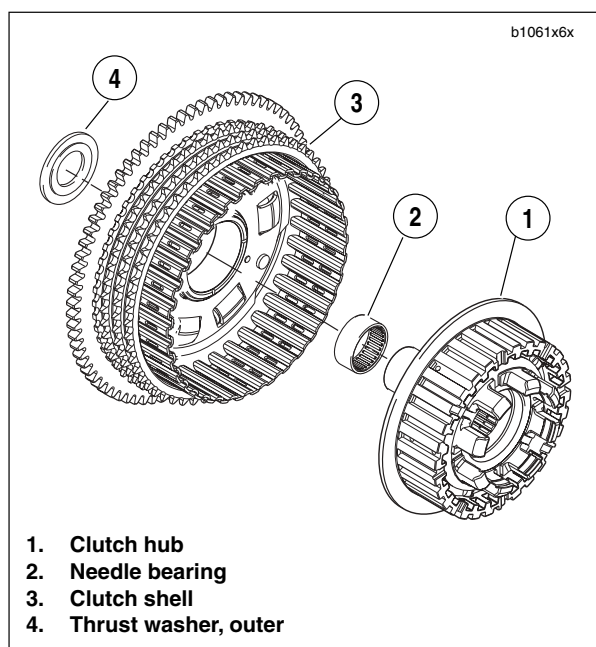


Figure 6-33. Clutch Hub and Shell Assembly

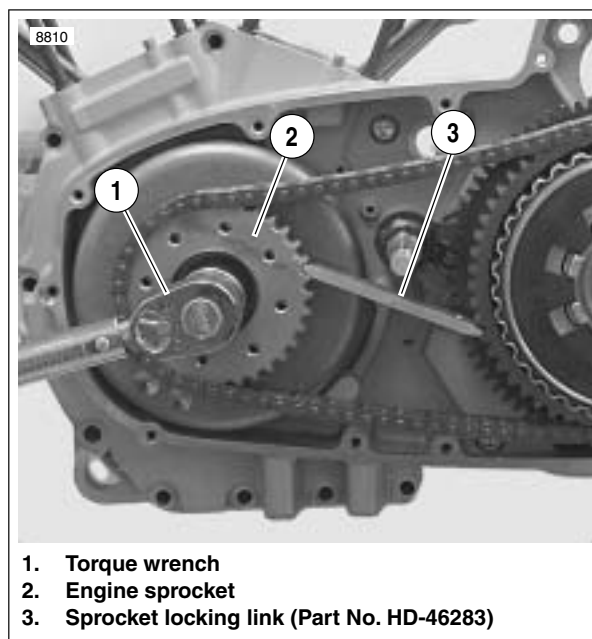


Figure 6-34. Sprocket Locking Link Tool
(Part No. HD-38362 for XB9R models and
Part No. HD-46283 for XB12R models)

NOTE

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

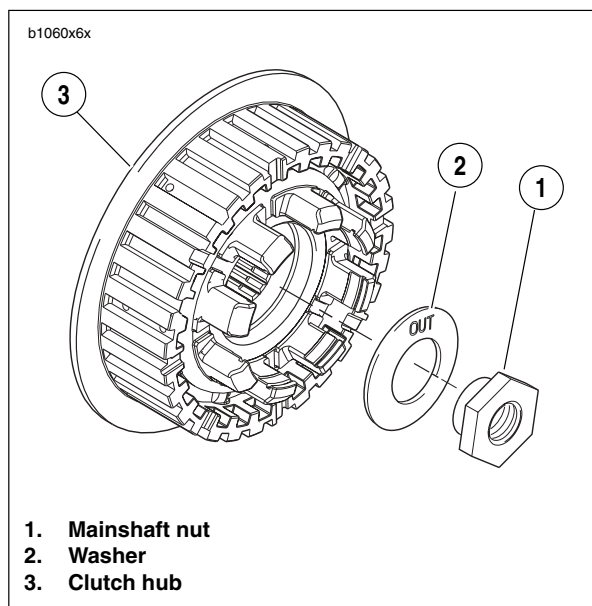


Figure 6-35. Mainshaft Nut and Washer

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 271 (red) onto threads on end of mainshaft.
 - b. Place washer (2) on mainshaft with the word "out" facing away from clutch hub.
7. Install nut (left-hand threads) (1). Tighten to 70-80 ft-lbs (94.9-108.5 Nm). 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 (Part No. 99851-05). 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](#).

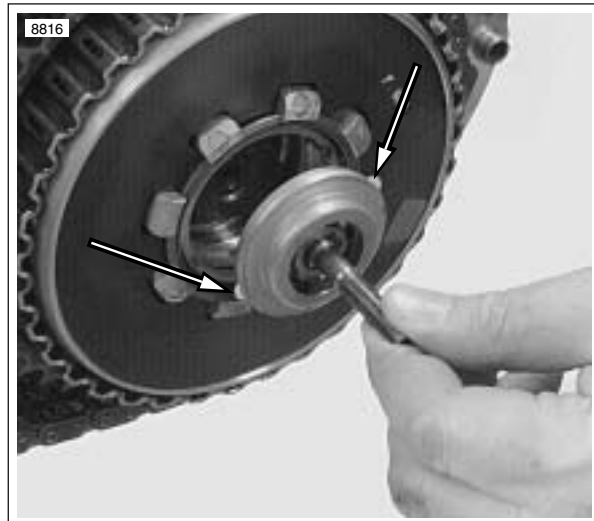
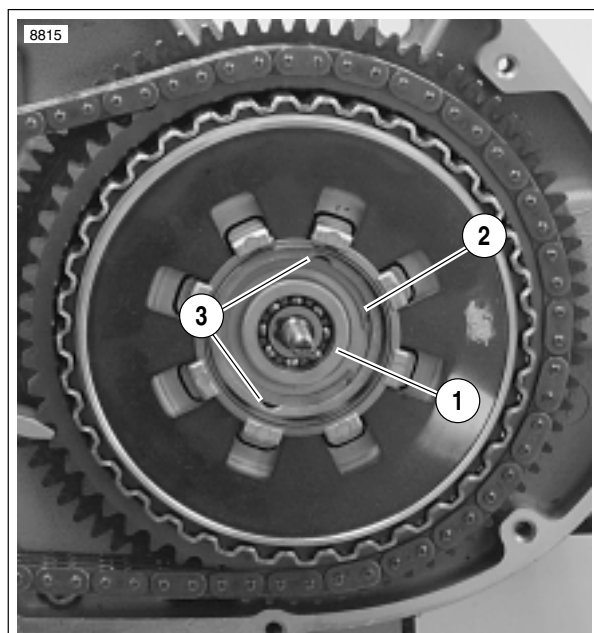


Figure 6-36. Adjusting Screw Assembly Aligning Tabs



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

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

GENERAL

There is no drive belt adjustment required for the Buell Fire-bolt. The system utilizes a fixed idler pulley that maintains the desired tension throughout suspension travel and life of the belt.

INSPECTION & CLEANING

See 1.10 DRIVE BELT.

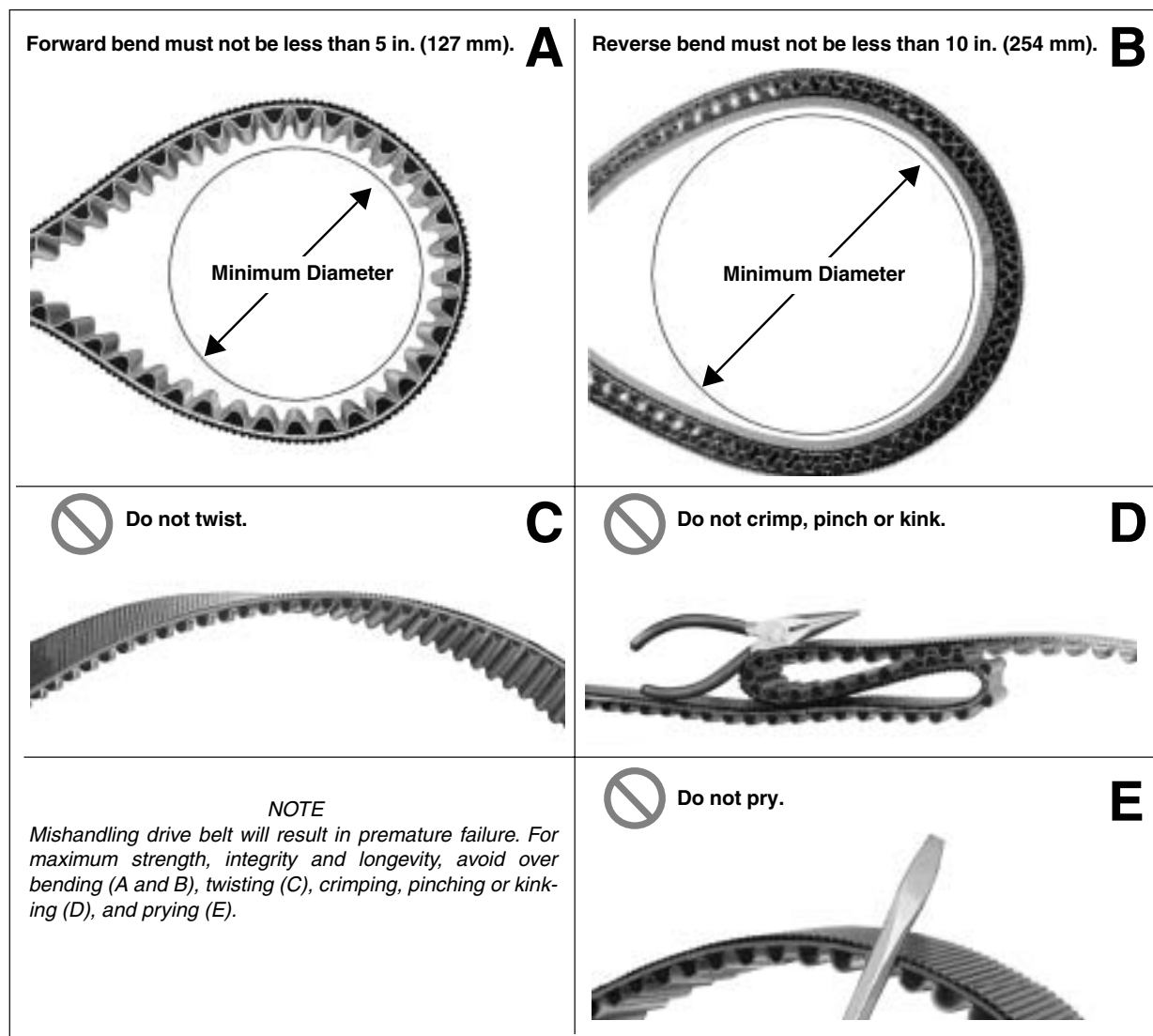


Figure 6-38. Proper Drive Belt Handling

DRIVE BELT REMOVAL

1. Place a scissor jack under jacking point and raise rear wheel off ground. For location of jacking point see [2.28 EXHAUST SYSTEM](#).
2. Remove right side rider footpeg support bracket. See [2.29 FOOTPEG, HEEL GUARD AND MOUNT](#).

NOTE

The right rear chin fairing fasteners must be removed to access the front sprocket cover.

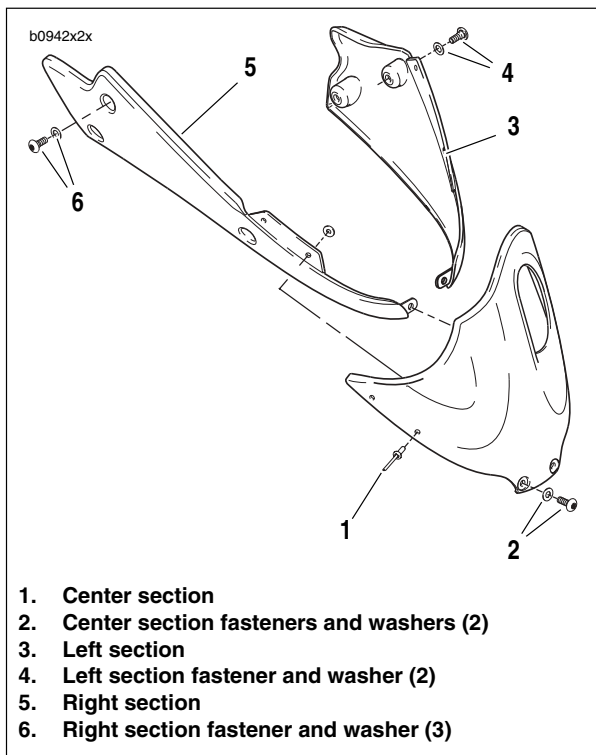


Figure 6-39. Chin Fairing Assembly

3. Remove right rear chin fairing fasteners. See [2.33 CHIN FAIRING](#).

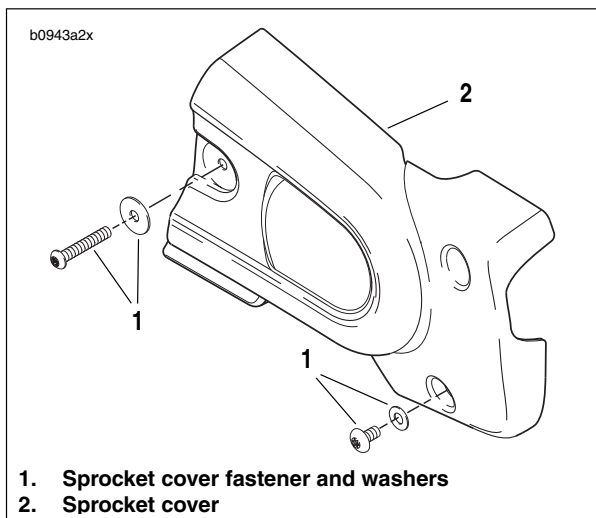


Figure 6-40. Sprocket Cover

4. See Figure 6-40. Remove sprocket cover. See [2.30](#).

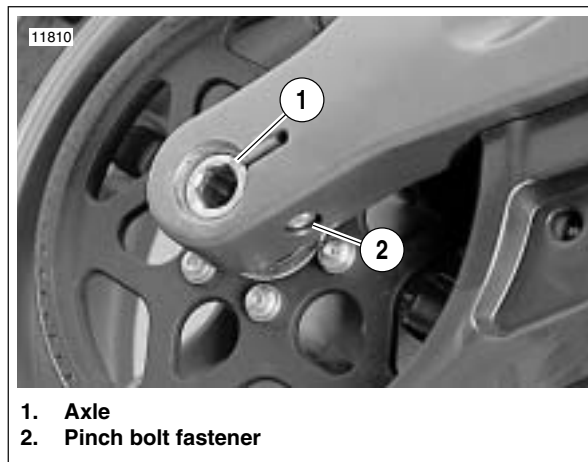


Figure 6-41. Rear Wheel Mounting, Right Side

5. See [Figure 6-41](#). Loosen rear axle pinch fastener (2).
6. Loosen rear axle (1) approximately 15 rotations to allow partial tension to be removed from rear drive system.
7. Remove idler pulley assembly by removing nuts and washers. See [IDLER PULLEY REMOVAL](#) in [6.6 DRIVE BELT SYSTEM](#).
8. Remove swingarm brace. See [2.19 SWINGARM AND BRACE](#).
9. Remove lower belt guard. See [2.32 BELT GUARDS](#).

NOTE

When removing or installing belt, do not bend or twist belt, partially slide belt onto sprocket and "roll" wheel or belt damage will occur.

10. Slide belt from sprocket and remove.

DRIVE BELT INSTALLATION

NOTE

- When removing or installing belt, do not bend or twist belt, partially slide belt onto sprocket and "roll" wheel or belt damage will occur.
- Never tighten rear axle with swingarm brace removed.

1. Slide belt onto sprocket.
2. Install swingarm brace and tighten fasteners to 25-27 ft-lbs (34-37 Nm). See [2.19 SWINGARM AND BRACE](#).

NOTE

See [Figure 6-42](#). Occasionally the drive belt is not fully seated in rear sprocket making it difficult to install the idler pulley. It will be necessary to follow the outlined procedure in order to easily install idler pulley.

3. See [Figure 6-42](#). Grasp top and bottom of drive belt and squeeze together until belt teeth are fully seated in rear sprocket.
4. While keeping tension on lower belt, install idler pulley assembly tightening washers and nuts to 33-35 ft-lbs (45-47 Nm).
5. See [Figure 6-41](#). Tighten rear axle (1) to 23-27 ft-lbs (31.2-36.6 Nm), back off two full turns and then retighten to 48-52 ft-lbs (65.1-70.5 Nm).
6. Tighten rear axle pinch fastener (2) to 40-45 ft-lbs (54-61 Nm).
7. See [Figure 6-40](#). Install front sprocket cover. See [2.30 SPROCKET COVER](#).
8. Install chin fairing. See [2.33 CHIN FAIRING](#).
9. Install right side rider footpeg mount. See [2.29 FOOTPEG, HEEL GUARD AND MOUNT](#).
10. Install lower belt guard. See [2.32 BELT GUARDS](#).
11. Remove scissor jack from motorcycle.



Figure 6-42. Seating Drive Belt Into Pulley Teeth

IDLER PULLEY REMOVAL

1. See [Figure 6-43](#). Loosen rear axle pinch fastener (2).
2. Unthread axle approximately 15 rotations to release tension from drive belt.
3. Remove chin fairing fasteners. See [2.33 CHIN FAIRING](#).
4. Remove front sprocket cover. See [2.30 SPROCKET COVER](#).
5. See [Figure 6-44](#). Remove idler pulley bracket nuts and washers (5) from studs (3).
6. Slide idler pulley bracket (4) off studs (3).
7. See [Figure 6-44](#). Inspect pulley by spinning wheel (1) and checking for wheel bearing wear. See [INSPECTION](#) under [1.10 DRIVE BELT](#).
8. If pulley wheel needs replacement, remove fastener (6), washer and nut (2) from idler pulley bracket (4) and discard wheel. Replace with **new** pulley wheel (1).

NOTE

The pulley wheel bearings can not be replaced separately.

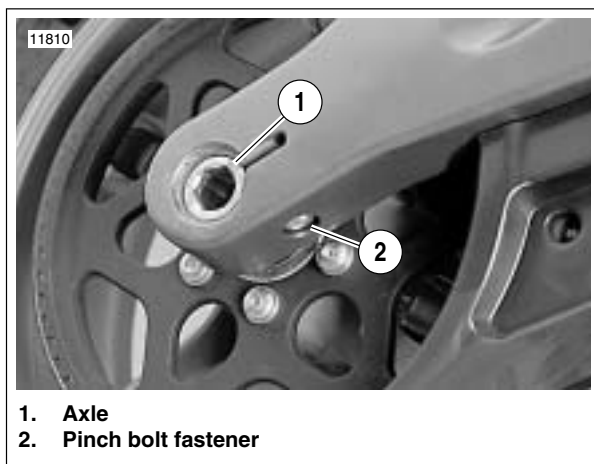


Figure 6-43. Rear Wheel Mounting, Right Side

IDLER PULLEY INSTALLATION

1. See [Figure 6-44](#). Install new or existing pulley wheel (1), if removed, and tighten washer and nut (2) wheel fastener (6) to 20-23 ft-lbs (27.1-31.2 Nm).
2. Slide idler pulley bracket (4), washer and nuts (5) on to studs (3) and tighten to 33-35 ft-lbs (45-47 Nm). See [DRIVE BELT INSTALLATION](#).
3. Install front sprocket cover. See [2.30 SPROCKET COVER](#).
4. Install chin fairing fasteners and tighten to 36-48 **in-lbs** (4-5 Nm). See [2.33 CHIN FAIRING](#).

NOTE

Never tighten rear axle with swingarm brace removed.

5. See [Figure 6-43](#). Install and tighten rear axle (1) to 23-27 ft-lbs (31.2-36.6 Nm), back off two full turns and then retighten to 48-52 ft-lbs (65.1-70.5 Nm). See [6.6 DRIVE BELT SYSTEM](#).
6. Tighten rear axle pinch fastener (2) to 40-45 ft-lbs (54-61 Nm).

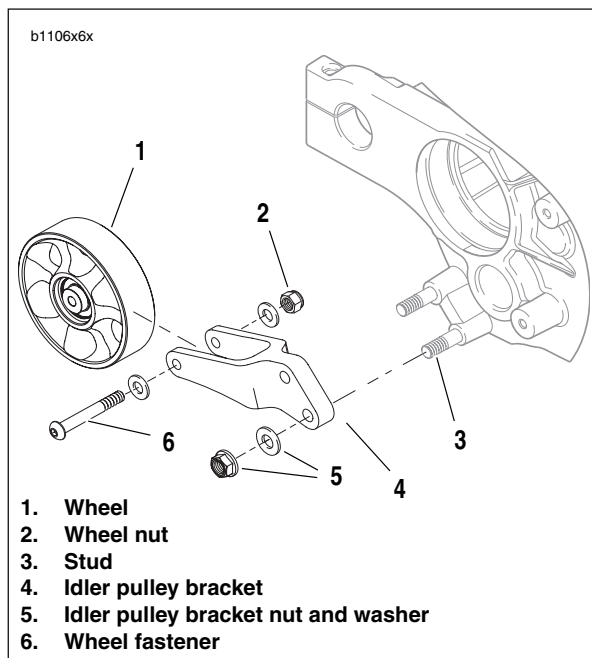


Figure 6-44. Idler Pulley Assembly