

**Champion Reverse Gear**  
Harley-Davidson Six Speed Transmissions  
for  
FLH 2007 to 2008  
and  
Softail 2007 up

(Cable or Hydraulic Clutch)

**Installation Instructions**

**Revision 11**

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## 1 Part Listing

Check your reverse gear packaging to ensure you have received the following parts.

Note: You will need to purchase a Champion Oil Tube Feeder Line if installing on a 6 speed Harley Davidson Softail, part #RG-101-087.

Qty	Part Number	Description	Specification
1	RG-101-005	Housing Assembly	6 Sp. Reverse Gear Housing Assm.
2	RG-100-002	Housing Gasket	
1	RG-100-030	Large Gear	27 Tooth
1	RG-100-035	Small Gear	15 Tooth
1	RG-100-060	Special Tool (Small Gear Installation)	
1	RG-100-070	Clutch Push Rod	
1	RG-100-075	Carbide Drill	
4	HW-250-031	Socket Head Cap Screw (Replaces OEM cover screws)	1/4-20x2-1/4
2	HW-250-032	Socket Head Cap Screw (Replaces OEM cover screws)	1/4-20x1-3/4
2	HW-312-054	Socket Head Cap Screw (Replaces OEM exhaust bracket screws)	5/16-18x1-3/4
1	CH-F00-051	Exhaust Bracket Spacer	1/4" Thk
1	RG-100-083	Sealing Washer, Stainless Steel/Neoprene	1/4" ID x 1/2" OD
2	RG-100-084	Nylon Set Screw	1/4"-20 3/8" L
2	RG-100-071	Lock Pin, Round Nose	pin, lock, 5/16-24x7/8, machined to 1/4", round nose
2	RG-100-072	Dowel Pin	3/16" OD. x 3/4" Long, Alloy Steel,
1	RG-100-085	Plug (Ear Plug)	
1	HW-375-042	Hex Head Bolt	3/8-24 x 1" Long
1	HW-375-011	NyLoc Nut	3/8-24
2	HW-375-016	Flat Washer	3/8 SAE
2	HW-312-017	Flat Washer	5/16 SAE
6	HW-250-014	Lock Washer	1/4"
1	RG-101-020	Thread Locking Compound	ND No: 54125 (Equiv. to Loctite 680)

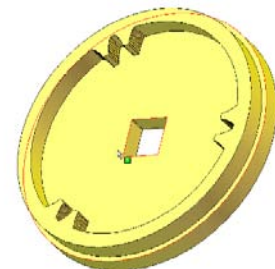
## 2 Preparation

Remove Original Parts From Vehicle.

- 2.1 Purchase a small tube of Loctite #262 (red) for use later.
- 2.2 To torque the large gear:
  - 2.2.1 Purchase Snap-On (or equivalent) filter tool. Part #: FWA62121. **OR**
  - 2.2.2 Purchase Champion special tool – Part # RG-100-100
- 2.3 Drain the transmission oil.
- 2.4 Remove front and rear exhaust header pipe.
- 2.5 Remove the exhaust pipe support bracket.
- 2.6 Remove the clutch release cover (right side).
- 2.7 Remove throw out bearing assembly. (To be reinstalled later without modification)
- 2.8 Remove the two nuts from the main and counter transmission shafts.



Snap-On Part No: FWA62121



Champion Part No: RG-100-100

**WARNING! : Do not attempt to push shafts into gearbox or remove the trap door – This can cause spacers inside the gearbox to be miss-aligned and lock up the gearbox when gears are installed and tightened.**

- 2.9 Remove clutch push rod (to be replaced w/ Champion supplied rod) **Note:** For hydraulic clutch bikes, obtain Champion Part # RG-100-082, a longer push rod)

### 3 Installation

- 3.1 Reinstall exhaust pipe support bracket with the **supplied** two 5/16-18 x 1 3/4" long hex head bolts and the 1/4" thick spacer between engine and bracket. Figure 1



Figure 1

- 3.2 *Thoroughly* clean threads of main and counter shafts using a silicon remover.

- 3.3 Apply the green thread locking compound (supplied) to main shaft threads and screw the small gear onto the main shaft. Figure 2

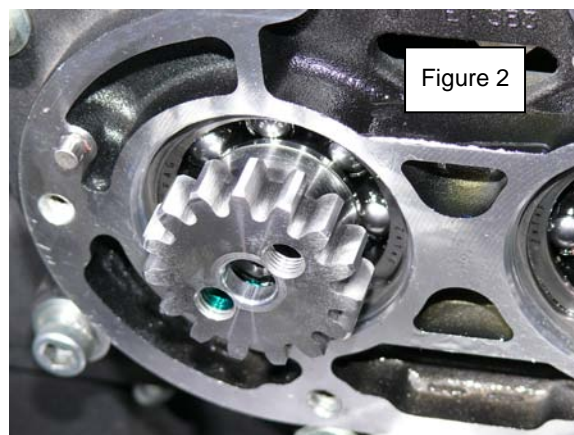


Figure 2

- 3.4 Install the supplied plug into the main shaft hole. To be removed later.

- 3.5 Install the supplied special tool to the small gear. Ensure the holes of the special tool align with the holes in the small gear. Figure 3



Figure 3

- 3.6 Install torque wrench to special tool and torque the small gear to 80 lb. ft.

**Note:** To prevent gears from rotating during torque procedures, engage transmission into 1<sup>st</sup> gear and apply brakes.

- 3.7 Remove torque wrench from special tool. Do not remove special tool from small gear.



- 3.8 Using the supplied boring tool and the special tool as a guide, drill the main shaft through two holes of the special tool as shown. Stop when cutter contacts bearing race. Figure 4



Boring tool

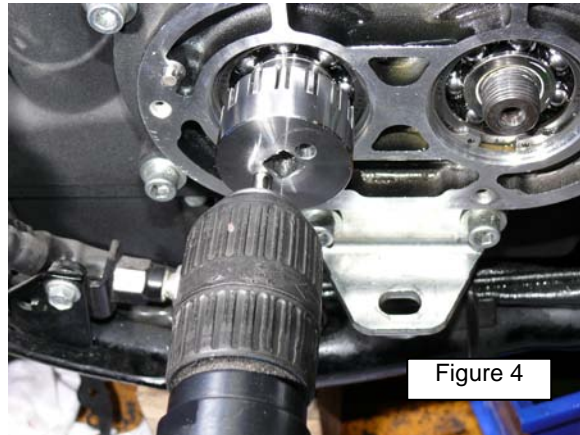


Figure 4

**Note:** Cutting bit will push outward, away from shaft. Carefully apply pressure to counter this effect and keep cutter parallel with the shaft.

**Note:** Frequently stop cutting and remove bit from hole to clean bit and vacuum debris from hole.

- 3.9 Remove special tool, leaving main shaft plug in place, and thoroughly clean out the holes. Use care to ensure debris does not enter transmission.

- 3.10 Remove plug from main shaft hole.

- 3.11 Apply red Loctite to the threads of the stainless steel locking screws and install into the small gear. Figure 5

**Note:** Apply locking compound to threads only. Do not apply to unthreaded portion on set screw.

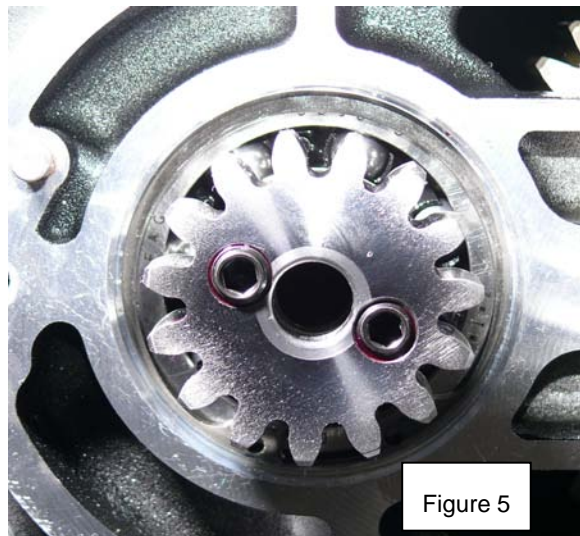


Figure 5

- 3.12 Torque set screws to 8 lb. ft. (94 lb. in.)

- 3.13 Install two nylon set screws into large gear. End of set screw should be flush with the I.D. of the internal threads of the gear. These will aid in locking of the threads.

- 3.14 Apply the green thread locking compound (supplied) to counter shaft threads and screw the large gear onto the counter shaft. Figure 6

- 3.15 Install Snap-On filter tool or Champion tool to large gear.

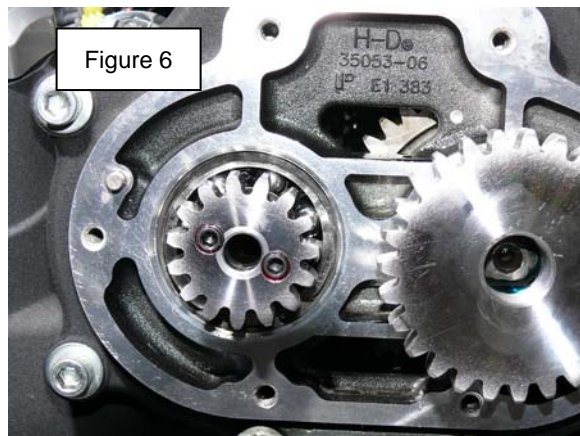
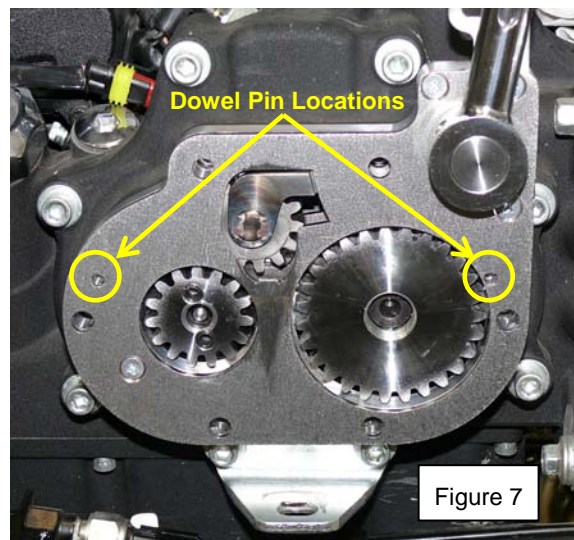


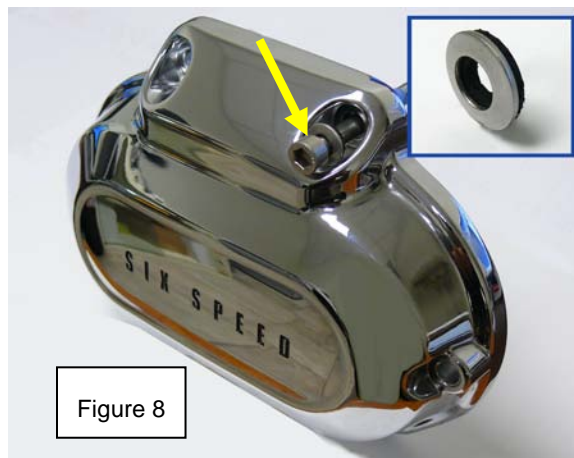
Figure 6

- 3.16 Install torque wrench to filter tool or Champion tool and torque gear to 80 lb. ft.

- 3.17 Remove OE clutch push rod (use magnet or similar) and install supplied clutch push rod. **Note:** For hydraulic clutch bikes, obtain Champion Part # RG-100-082, a longer push rod)
- 3.18 Position reverse gear housing and new gasket (supplied) to transmission as shown. Figure 7
- 3.19 Install OEM throw out bearing assembly (unmodified). Do not remove the oil slinger.
- 3.20 Install the two 3/16" x 3/4" long dowel pins to the reverse gear housing. Figure 7
- 3.21 Ensure mating surfaces are clean and free of debris. Position new gasket (supplied) and clutch release cover onto reverse gear housing.



- 3.22 Install supplied hardware to secure assembly to transmission. Install sealing washer to one bolt. Note location of the sealing washer bolt. Torque bolts to 9 lb. ft. (108 lb. in.) Figure 8
- (2) 1/4-20x1-3/4 Socket Head Cap Screw (top of cover)
  - (4) 1/4-20x2-1/4 Socket Head Cap Screw



- 3.23 Replace header pipes to engine. Use supplied hardware to secure pipe to bracket.
- (1) 3/8-24 x 1" long Hex Head Bolt
  - (2) 3/8 SAE Flat Washer
  - (1) 3/8-24 NyLoc Nut

- 3.24 Refill transmission with OEM recommended oil.

- 3.25 Adjust clutch (See OEM manual).
- Shorten outer cable to ensure maximum free play.
  - Loosen push rod adjustment lock nut (left side) and screw in push rod adjustment screw until clutch plates open approx. 1/16" – 1/8".
  - Pull clutch lever (to ensure zero positioning) and release.
  - Back out push rod adjustment screw and screw in until tension is created. Now loosen 1/2-3/4 turn and tighten jam nut.
  - Adjust outer cable to ensure desired clutch play.



## 4 Instructions for Use

**WARNING! USE IN NEUTRAL. CLUTCH MUST BE ENGAGED AND TRANSMISSION IN NEUTRAL WHEN ENGAGING AND DISENGAGING REVERSE.**

**CAUTION! Reverse gear is intended for light duty use only. Do not drive for long periods in reverse.**

### To engage reverse:

- Start Motorcycle.
- Engage clutch.
- Place bike in neutral. **(See Note A below)**
- Shift reverse handle down and backward to select reverse.
- Feather clutch and throttle to reverse motorcycle. **(See Note B below)**

### To disengage:

- Engage clutch
- Shift handle down and forward to deselect reverse.

### NOTE:

- A. It is good practice to first engage first gear to stop the gearbox from spinning (This will prevent the “grinding” noise when reverse gear is engaged) and then place the bike in neutral and immediately engage reverse.**
- B. Do not let the bike “free wheel” backwards while in reverse gear and the clutch disengaged (i.e. when rolling down a slope when in reverse) – The reverse gear will automatically try to disengage and will result in a “grinding” sound. To prevent this – Always engage the clutch immediately after the reverse action is completed.**

**CAUTION! Disengage reverse before engaging forward gears. Failure to do so may cause serious damage to reverse gear assembly.**

**WARNING! ANY ATTEMPT TO MODIFY THIS PRODUCT WITHOUT WRITTEN PERMISSION FROM THE MANUFACTURER WILL VOID THE WARRANTY AND MAY CAUSE DAMAGE TO VEHICLE AND INJURY TO PERSONS. DO NOT ATTEMPT TO ENGAGE REVERSE WHILE MOTORCYCLE IS UP ON LIFT STAND.**

## 5 Warranty

One year on reverse gear parts only.  
15% restocking fee on all returned orders.