



Starter Motor & Jackshaft

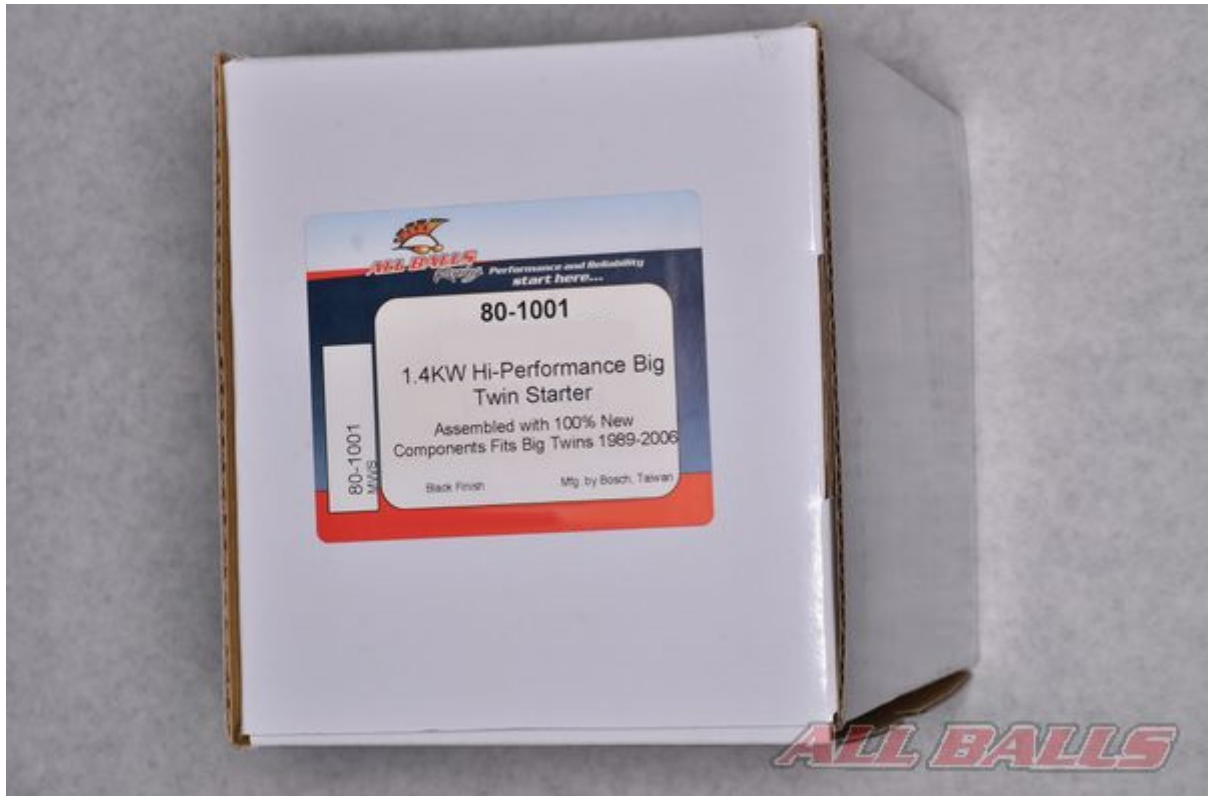
SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Note: The steps here show the installation procedure on a 1998 Harley-Davidson FLT motorcycle, you should have a service manual for your particular vehicle to get a better understanding of your particular setup and have factory recommended torque levels and specifications on hand.

Prep

Thoroughly clean the vehicle to make the job easier and prevent contamination of the new components during installation.





Get your High Performance Starter Motor and Jack Shaft kit from [ALL BALLS RACING](http://www.allballs.com).



Remove the contents of your ALL BALLS RACING starter motor kit.



Remove the contents of your ALL BALLS RACING jack shaft kit.

Arrange the components in an organized manner for easy installation. Note: wait to do this until the old parts are removed and you are ready to begin installing the new components.

Starter Motor Replacement



Remove the seat bolt.



Remove the seat.



Disconnect the ground lead from the battery.



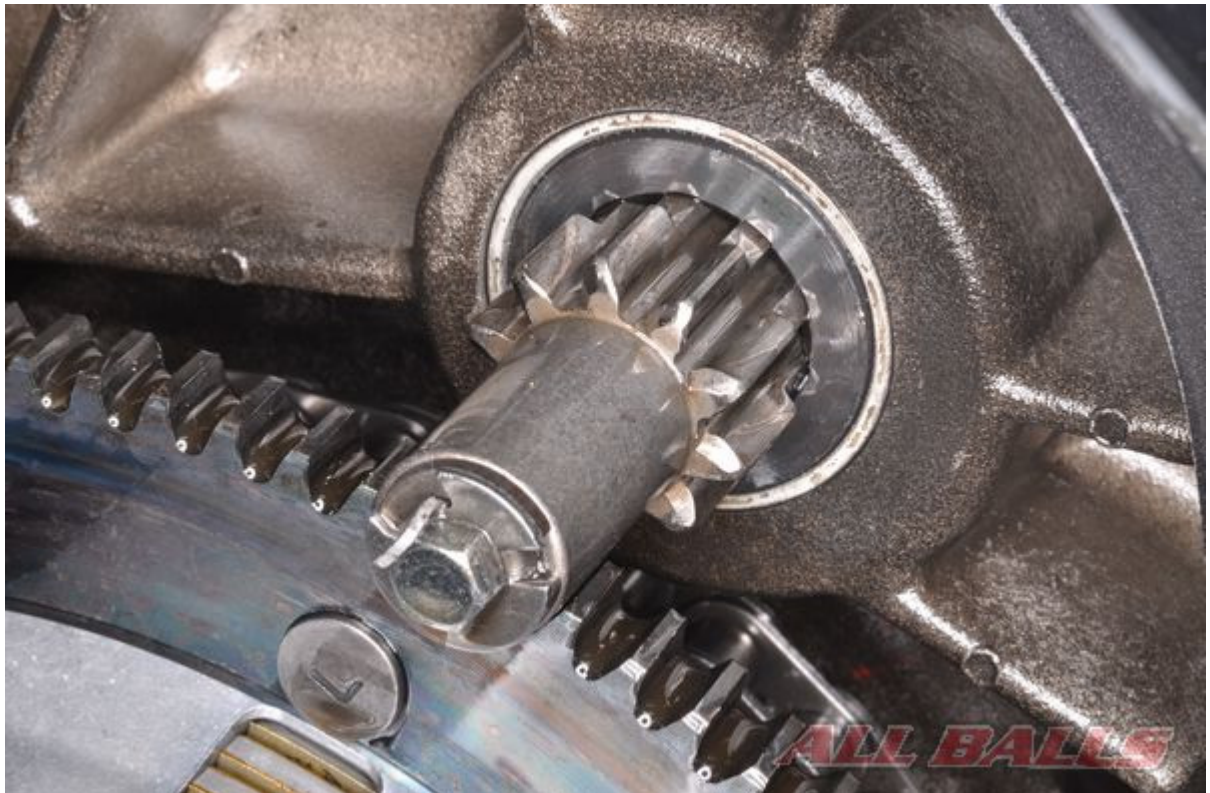
Remove the floorboard, shift lever and passenger foot pegs.



Remove the drain plug and allow the primary oil to drain completely.

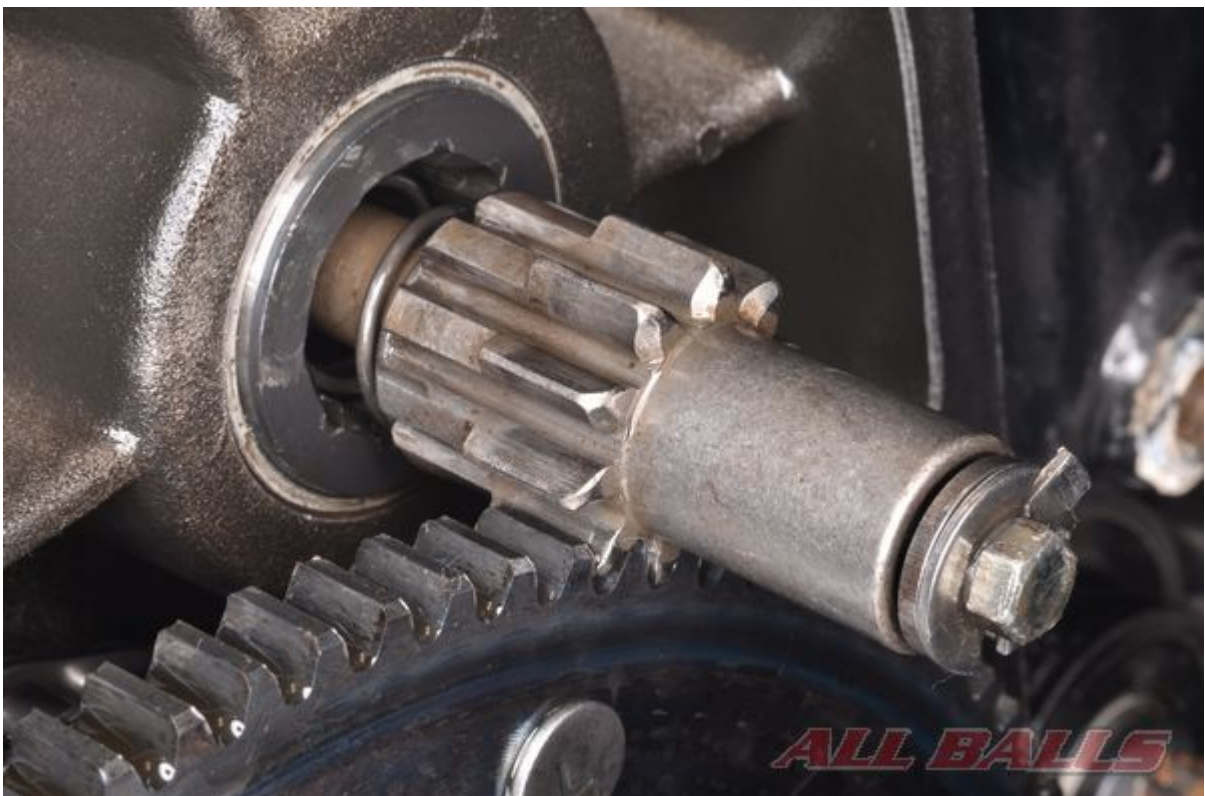


Remove the mounting bolts and the primary chain case cover.

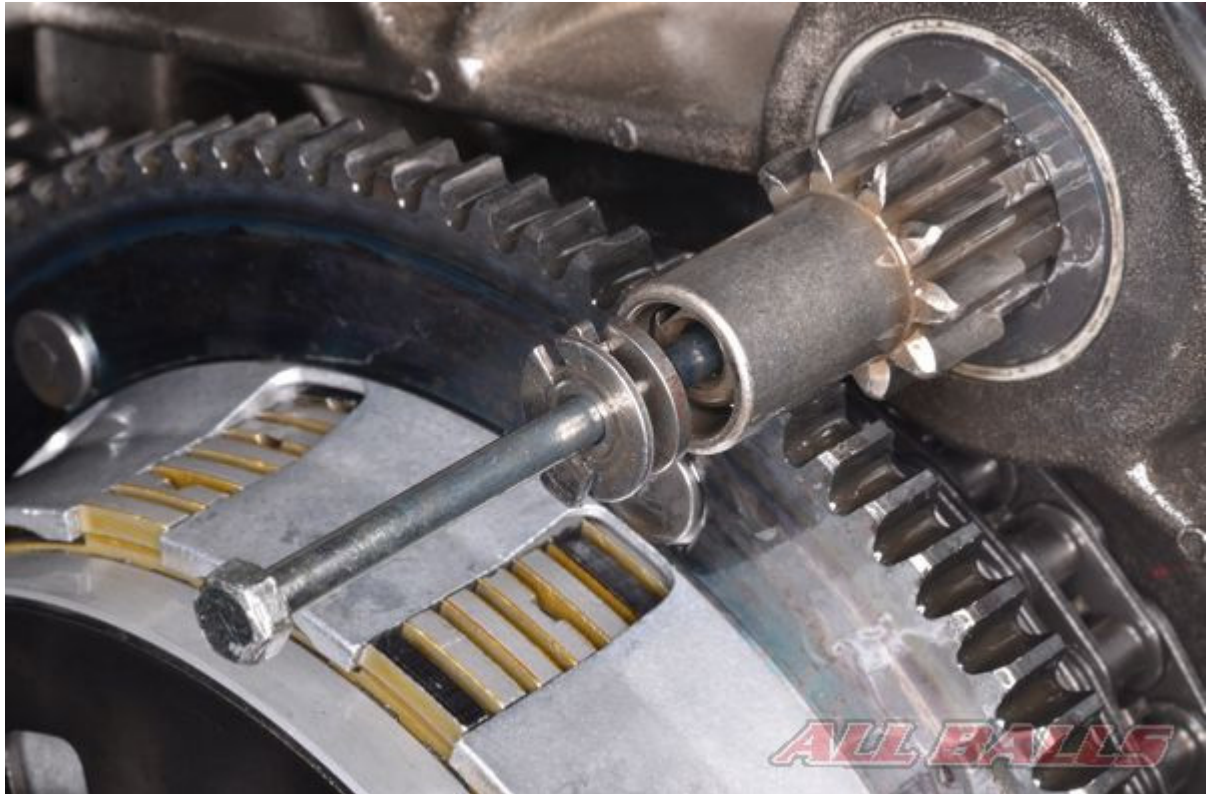




Bend the tab on the lock washer.



Extend the pinion gear so it can be held by the clutch driven gear and loosen the jack shaft bolt. Wrap the pinion gear with a rag and hold it with pliers if needed to keep it from turning when the bolt is loosened.



Remove the jack shaft bolt and washers.



Remove the pinion gear and spring, and check for any damaged teeth on the starter driven gear on the clutch basket. Replace the components as necessary.



Follow the manufacturers instructions and remove the clutch and primary chain as an assembly.

Note: On some models the clutch hub main shaft nut has reverse or left hand threads.



Remove the coupling and the old jack shaft.



Locate the starter motor on the right side of the machine.



Pull back the rubber boot, remove the lock nut and free the starter motor cables.



Disconnect the solenoid connector.



Remove the 2 starter motor mounting bolts. Some models may require the removal of an exhaust bracket.



Remove the starter motor.





Drive out the old jack shaft oil seal and note the direction of the seal for installation.



Apply a thin coat of grease to the new oil seal lips.



Install the new jack shaft oil seal into the left case half until it is fully seated.



Note the direction and order of your new jack shaft and parts.





Install the the splined washer onto the new starter motor, a small dab of grease will help hold it in place. Apply a thin coat of grease to the starter motor splines.



Install the new starter motor onto the engine. Tighten the bolts to specification with a torque wrench.



Using a suitable holding tool, carefully place the spring onto the starter motor shaft. Avoid damaging the oil seal or dropping the spring.



Install the new jack shaft onto the starter motor shaft, carefully guide it through the oil seal. Make sure it fits correctly- you will feel it press against the spring.



Install the clutch and primary assembly, follow the manufacturers instructions for proper reassembly.



Install the plain washer onto the jack shaft bolt.



Apply non-permanent thread locking agent to the bolt threads.





Install the bolt into the jack shaft, hold the jack shaft with a suitable tool and tighten the bolt to 5 ft. lbs.



Install the primary cover and fill with oil following the manufacturers instructions.



Install the floorboard, shift lever and passenger foot pegs following the manufacturer's instructions.



Connect the solenoid lead and battery cables, pull the rubber boot over the cables.



Connect the negative battery lead.



Install the seat and tighten the bolt securely to the manufacturers specification.



INSTALL ALL BALLS RACING STICKER!

Instruction Sheet

80-1005 & 80-1006

For Harley Davidson 1988 and Earlier Bikes

IMPORTANT! Do not discard the wafer supplied in the hardware bag. You may need it!

Important information before getting started

1. This starter is only as strong as the battery powering it. We recommend a 300 CCA rated battery as a minimum.
2. It is often necessary to place the included metal wafer into the solenoid plunger. This assures correct contact pressure and good current flow through the solenoid. This shim should be used when the starter has insufficient cranking torque and the solenoid terminals are becoming warm during cranking. Read trouble shooting guide for important information.

Removal of the old starter

1. Remove the battery negative cable.
2. Remove the cable from the starter. Note: You may need to remove the rear exhaust pipe in order to gain access to the starter.
3. Remove the two bolts on the back of the starter.
4. Remove the starter from the motorcycle.
 - a. Note 1: We strongly recommend replacing your old battery cables if they are #6 wire or are in poor condition. If your existing battery cables are #4 and are in good condition, we recommend that you clean all the terminals well. A starter can only produce its rated output if enough current is coming into it. Bad cables or too small a cable will result in poor starter performance.
 - b. Note 2: Inspect your starter solenoid. If it is old or in poor condition, we recommend either replacing it or rebuilding it.

Installation of High Torque Starter

1. Remove the drive end housing from the starter.
2. Remove the two thru bolts from the starter. *See figure 1.*
3. Hold the drive-end housing and gently tap on the gear. *See Figure 2.*
 - a. Caution: Handle the motor portion carefully so that the armature does not fall out of the starter. *See Figure 3.*
4. Once the drive-end housing has been removed from the starter, bolt the drive-end housing onto the primary housing with the two socket cap screws supplied. Torque these two socket cap screws to 45-60 inch pounds. *See Figure 4.* The drive end housing has 3 sets of mounting holes. Select the set that positions the battery cable stud in the best position.
5. Grease the starter gear.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

6. Take the starter and place it into the drive-end housing. *See Figure 5.*
 - a. Note: The motorcycle should be in a warm garage for this operation. If the motorcycle is in a cold environment, it will be difficult to slip the starter into the drive end due to a tight bearing bore fit at low temperatures. It may be necessary to slightly heat the bearing bore for a slip fit.
7. Install the two thru-bolts and torque them to 50-65 inch pounds. *See Figure 6.*
8. Attach the cable to the starter post. *See Figure 7.*
9. Reattach the exhaust pipe and or other parts that had to be removed from the motorcycle to access the starter.
10. Reattach the ground cable to the battery.

Removal of the High-Torque Starter

1. Remove the battery negative cable.
2. Remove the two thru-bolts.
3. Pull the motor from the drive-end housing by pulling and wiggling the starter out of the drive-end housing.
 - a. Note: The starter armature may stay in the drive end housing. If this occurs, you will need to pull the armature out of the drive end housing and reload it into the motor.

Installing the Armature back into the Motor

1. Remove the two small phillip screws in the rear starter casting.
2. Remove the rear starter casting.
3. Place the armature into the motor and work the four brushes onto the armature commutator.
4. Reassemble the motor.

Trouble shooting

Starter cranks slowly/ has difficulty getting over first compression cycle.

Possible causes:

1. Insufficient solenoid contact pressure. **(This is the most common cause)** The easiest way to diagnose this is by checking if the solenoid contact studs are becoming hot during cranking. If they are becoming hot add the metal wafer supplied into the solenoid plunger bore (the solenoid plunger is the metal plunger that attaches to the drive shift fork and goes inside the solenoid bore.) Before installing the metal wafer it is recommended to remove the negative battery cable and vice clamp it to the battery post. This will act as a quick release in the event that the solenoid stays engaged. If the solenoid stays engaged after the wafer is installed it may be necessary to reduce the thickness of the wafer until the solenoid releases on its own yet still has the proper contact pressure for optimal cranking.
2. Bad battery or battery with insufficient rating (should be 300CCA minimum.) The easiest way to determine if the battery is the problem is by jumping another battery to the existing battery. If this solves the problem, replacing the battery is a good bet.
3. Bad battery cables/ battery cables with insufficient size/ bad battery cable contacts. The battery cables should be 4 gauge. Check the battery cables at the terminals for frayed wires or corroded/loose connections.
4. Damaged relay wire or bad relay.