

# ***INSTRUCTIONS FOR INSTALLATION OF THE CH-2 and CH-3 DRIVE UNIT TO AN ENGINE***

## **WARNING**

- ! Never reach hands or other body parts in or near moving parts!**
- ! Maintain a safe distance from any fixed or moving propeller!**
- ! Prior to beginning any work on your project, turn off the main battery switch and/or remove the battery terminals and ignition keys!**
- ! Some parts are heavier. The unit components weigh between 20 lbs. - 60 lbs. on a standard belt drive. Take necessary precautions to avoid injury when preparing to, or when installing the drive unit. Always have a co-worker or assistant available to help.**

**If you have any questions or need technical assistance,  
contact Customer Service at 866-679-4200.**

**Century Drive Systems Inc.  
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Franklin, Pa 16323**

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## 13 STEPS

- Step 1:** Check the top of the engine block bell-housing for an attachment hole. Some blocks have a top center hole drilled. If no hole is drilled, place the main case over the engine dowels and use a 7/16" transfer punch to center at location to drill a hole. Drill 1" deep with a 5/16" drill and tap with a 3/8"-16 tap. It is recommended to clean out the other holes with the tap as well. Some of the newer LS engines do not have a middle top drilled and tapped hole on the right side of the engine block facing from the rear of the motor. There is not a boss to drill and tap to the block. The unit does not need that hole attached to be secure and work properly.
- Step 2A:** Be sure that the end of your crank shaft pilot area is clean and free of rust and burrs for at least 5/8" in depth. This inside diameter should be 1.706".
- Step 2B:** Some engines have a dowel pin in the crankshaft to align the flywheel. This pin must not extend through the flywheel and should be flush or it will interfere with the bolt heads of the Drive Units lower assembly. You may either grind the dowel pin flush, or drive it back toward the engine.
- Step 2C:** Inspect the face of your engine block for a buildup of paint. The block mounting surface must be clean and free of paint.
- Step 2D:** Some engines have excess plates or attached items that can interfere with the drive unit case bolting tight to the engine block. These obstructions must be removed or made to be below the surface of the engine block.
- Step 3:** The CH-2/CH-3 lower drive unit flexplate will have a 6 hole bolt patterns required to mount to your engine flywheel. When all 6 holes match up, mark with a black marker for later when mounting the lower assembly to the flywheel.

***NOTE: When installing lower assembly be sure the shaft is a snug fit inside the crankshaft and that the shaft will not bottom out when spacers are in place.***

- Step 4:** Put a finger full of grease into the pilot area of the crankshaft and then slide the lower assembly stub shaft into the end of the crankshaft. This is a close fit so you may need to lightly tap the end of the shaft with a leather or rubber mallet. **DO NOT USE A STEEL HAMMER OR EXCESSIVE FORCE.** If the fit is too tight, use a piece of emery cloth to polish out the crankshaft. Clean, re-grease and try again. After inserting the stub into the crankshaft, use the six (6) 7/16 fine thread bolts, washers, flange nuts and spacers provided to attach the flexplate to the flywheel. The spacers are placed between the flywheel and the flexplate. Place a washer on the bolt and install the bolt through from the Drive Unit side with the flange nut being on the engine side. Although the nuts are a locking style, it is recommended Loctite material be used on each of the six (6) bolts. Only lightly snug the six (6) bolts at this time making certain you do not bow the two plates together. The plates must not be forced together, pre-loaded or bent in any way when tightening. If the plates are bent or pre-loaded this will cause your flexplate and/or flywheel to crystalize and break around the holes.
- Step 5:** Sprinkle some baby powder on the teeth of the Drive Unit belt, and then place the belt on the lower pulley. The powder will help the upper pulley to slide under the belt for assembly.

**Step 6:** Mount the main case using the (3) 1-1/2" long and (4) 2" long 3/8" - 16 L9 hex head cap screws and lock washers provided in the hardware package. Apply Loctite to the threads and torque to thirty-five (35) pounds.

**WARNING: DO NOT SUBSTITUTE A LESSER QUALITY MOUNTING BOLT THAN THE CAP SCREWS PROVIDED.**

Minimum requirement is a coated Grade 8, however we provide L9 plated fastener.

*NOTE: We also offer metric engine mounting hardware if specified when ordering.*

**Step 7:** Mount the lower bearing (SFC-24 or SFC-24TC) with four (4) each 3/8"-16 - 2" long cap screws and lock washers. Torque to 30 pounds. Do not tighten the bearing set screws or lock ring at this time. It is recommended to use a thin film of rust inhibitor or never seize material on the small end of the shaft prior to installing the lower bearing.

*NOTE: This is a very close bearing fit with only .0002 tenths of a thousand clearance fit. The bearing must not be forced and the shaft must be able to move in the bearing at this time.*

**Step 8:** Roll your engine through by hand or with the starter coil packs are disconnected about four (4) or five (5) revolutions, be sure to protect the belt from being damaged. Then finish tightening the six (6) bolts on the flexplate and flywheel. Torque them to 35 pounds.

**NOTE: At this time if your unit is a Counter Rotating System please refer to the Counter Rotating Upper Assembly Installation Instructions. If you are installing a standard CH-3 Drive unit continue with Step 9.**

**Step 9:** Hold the belt up so the natural shape has the long direction across from side to side so it helps hold itself open/apart inside the housing. To install the upper assembly we recommend you use 10 pieces of 1/16 diameter aluminum welding rod. Cut them about 6" long with a 1" long right angle bend. Place the 10 rods through the main housing bolt holes evenly spaced from 9 o'clock to the 3 o'clock position. Have the rods on the inside of the belt as they will guide the upper pulley into the belt. When the pulley is under the belt and about half way in, remove all wire rods. It is always good to have a helper available to hold up on the belt and keep it centered on the pulley as it is installed. It may help to angle the pulley end of the assembly downward during installation. Be sure that the short side of the eccentric bearing holder is on the entire upper assembly to get the flange lip up into the main case. Then turn the bearing holder clockwise to tighten the belt. Temporarily put in four (4) 3/8"-16 x 1-1/2" cap screws. Before rotating your engine look in from the bottom of the drive with a flash light to visually inspect that the belt is somewhat centered on the upper pulley. If not centered push the belt by hand to be even on the upper pulley. Then rotate the engine a few revolutions by hand without starting the engine, in order to center the belt. Check the belt tension by feeling the amount of belt deflection. This is done by holding tension on the belt. With a propeller or a long bar on the propeller hub by pushing rotationally against the engine compression. You will then check the belt deflection in the middle of the belt on the slack side. You should be barely able to move the belt. The belt should be snug but not drum tight. If your belt is too tight, you could cause premature bearing wear. If the belt is too loose, you can cause premature belt and pulley wear. Readjust to the proper tension, then put in all nine (9) 3/8"-16 cap screws & lock washers, torque them to 25 pounds then rotate through again and recheck.

*NOTE: Some belt rumble at 500-750 RPM is normal and the belt will tighten a little more as the unit warms up. If you hear the belt whine it is most likely too tight.*

*NOTE: Belts need to be checked when cool after the first hour of operation as belt cords can shrink during storage.*

**Step 10:** Before locking the bearing to the lower shaft we recommend starting your engine for about 15 seconds to

make sure your lower shaft and flexplate are not in a bind.

If you are using the SFC-24TC style bearing, you must tighten the lock ring around the split portion of the inner race of the lower bearing and again re-tighten after a few hours of drive unit operation. If you are using the standard set-screw bearing (SFC-24), take out the set screws and with the bearing in place, reach through the set screw holes with a drill and, drill bit to make two (2) dimples in the shaft for the set screw to lock into. Blow out holes and use a small amount of Loctite on each set screw and lock in place.

**Step 11:** All Drive Units are shipped pre-greases. However, after the first hour of operation, give the upper (2) grease fittings (2) pumps of grease only. Then, give the grease fitting on the lower bearing (2) pumps of grease.

***NOTE: Grease the three (3) bearings with only two (2) pumps of grease every 15-20 hours of operation. Over-greasing at one time can push out dust and grease seals and cause grease to sling out on the boat and propellers.***

**Step 12:** The rear mounts of the Drive Unit main case should be sandwiched between neoprene. This is accomplished with a lock washer and a 9/16" lock nut (or use two (2) nuts to jam nut secure) and a large flat washer and a 3/8" thick neoprene rubber pad being installed from the top. A 1-1/2" thick neoprene pad should be directly under the Drive Unit case between the case and the engine stand. Under the engine stand, use another 1-1/2" thick neoprene pad or the standard coned aircraft neoprene pad, large flat washer and a long 9/16" Grade 8 bolt. You will need a total of three (3) neoprene rubber pads per each bolt for the rear mounts being a total of 6 pads. Century Drive Systems Inc. does not supply this hardware or neoprene pads for the rear mounts since so many different mounting frameworks are used. Remember for proper alignment that the 1 1/2" thick neoprene pad under the drive unit will compress approximately 1/4". This compression will vary depending upon the density of the neoprene pads being used. We suggest using medium to stiff Neoprene pads.

**Step 13:** After 5-10 hours of operation, it is recommended all drive unit bolts be re-torque and verify that the lower bearing set screws or ring clamp are still tight. Re-check belt tension after 15 to 20 hours of operation and adjust as needed.

## Franklin, Pa 16323

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<i>DRIVE UNIT</i>	<i>AVAILABLE RATIOS</i>
<i>CH-2</i>	<i>2 TO 1</i>
<i>CH-3</i>	<i>1.774 TO 1; 2 TO 1; 2.3 TO 1</i>
<i>CH-3 COUNTER ROTATOR - INPUT RATIOS</i>	<i>1.774 TO 1; 2 TO 1; 2.3 TO 1</i>
<i>CH-3 DIESEL</i>	<i>1.5 TO 1</i>
<i>CH-3 LONG BELT DRIVE</i>	<i>2 TO 1 ; 2.3 TO 1</i>
<i>BRIGGS MINI DRIVE</i>	<i>1.65 TO 1 ; 2 TO 1</i>
<i>CH-4</i>	<i>2.52 TO 1 ; 2.67 TO 1</i>
<i>ECO-TEC</i>	<i>2 TO 1</i>