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. 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.
1884 Allegheny Blvd. Bldg. 16
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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.

Step 2: Be sure that the end of your crank shaft pilot area is clean and free of rust and burrs. Also, some engines have a dowel pin in the crankshaft to align the flywheel. This pin must not extend through the flywheel more than 1/16" or it will interfere with the bolt heads of the Drive Unit's lower assembly. You may either grind the dowel pin flush, or drive it back toward the engine.

Step 3: In most cases the Generation 5 Flex Plate on a 2:1 or 2.3:1 ratio Drive Unit will bolt directly to your flywheel without drilling new holes. However, when you use other unit ratios or engines, you may have to drill the new pattern into your flywheel. In such cases, contact your dealer or manufacturer and a pattern and centering hub will be supplied for your use to drill the flywheel as needed. If you are installing your drive unit onto a LS engine that has a dished flywheel or uses a spacer behind the straight flywheel, you will need to use our LS style lower assembly which has the stub shaft increased in length by 7/16" for a total boss length of 15/16 of an inch. It is extremely important that the stub shaft end of our lower assembly go into the actual engine crank shaft by 3/8". **NOTE: The following is very important as we have found two manufactures of the flywheel spacers that have been marketing poorly designed and faulty spacers. If you are using a spacer behind your flywheel you must use the extended lower shaft assembly to reach through the spacer and into the engine crankshaft. As a manufacturer we cannot trust the integrity of the spacers being manufactured and marketed, further we need to be sure the lower assembly is guided in the end of the crankshaft. If you did not order the correct lower assembly, stop now and contact the dealer where you purchased your drive unit.**

Step 4: Make sure the bellhousing face of the engine block is free of paint down to bare metal. Check for any obstructions that would keep the case from seating tight to the engine block. Next put a thin film of grease into the pilot area of the crankshaft 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 pilot area of the crankshaft. Clean, re-grease and try again. After inserting the stub into the crankshaft, use the six (6) 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 don't bow the two plates together. The plates must not be forced together, pre-loaded or bent in any way when tightening. To check the trueness of the lower assembly, use a dial indicator to check the end of the lower assembly shaft for run-out by rotating the engine through. This will require removing the spark plugs and using a ratched and socket to rotate the engine with the bolt head on the harmonic balancer. You may bump the shaft in place with a rubber or dead blow hammer. .

NOTE: Remember on LS Style engines using a spacer the longer stub shaft will go through the spacer and into the counter bore of the actual crank shaft just as it does on the NON-LS style engines. If you choose to use the dished flywheel without a spacer our LS style stub shaft will still engage into the crankshaft 3/8" of an inch as required.

Step 5: Sprinkle some baby powder on the teeth of the Drive Unit belt, 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.

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.

Step 8: Roll your engine through by hand about 4 or 5 revolutions, be sure to protect the belt from being damaged, and then finish tightening the six (6) bolts on the flexplate and flywheel. Torque them to 40 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: With a helper, hold the unit belt up so that you can slide the upper assembly pulley under the belt. To do this, you should be sure that the bearing flange has the short side down as it is on an eccentric to give you slack on the belt to assemble. After the pulley is under the belt, you must pick up on the entire upper assembly to get the flange lip up into the main case, and then turn the bearing holder clockwise to tighten the belt. Temporarily put in (4) 3/8"-16 x 1 1/2" cap screws. Before rotating look in from the bottom with a flash light to visually inspect that the belt is somewhat centered on the upper pulley. Then rotate the engine a few revolutions by hand without starting the engine, 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 bar across the propeller dowels or with the propeller 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 middle of the belt. The belt should be snug but not drum tight. If your belt is too tight, you could cause premature pulley or bearing wear. Readjust to the proper tension, then put in all (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.

Step 10: 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 (2) dimples for the set screws to lock into.

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 hours of operation. Over-greasing at one time can push out dust and grease seals.

Step 12: The rear mounts of the Drive Unit main case should be sandwiched between neoprene. This is accomplished with a long 9/16" Grade 8 bolt, 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, lock washer and a 9/16" lock nut (or use two (2) nuts to jam nut secure). 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 1-½" thick neoprene pad under the drive unit will compress approximately 1/4" to 1/2". 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.

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

Century Drive Systems Inc.,

INSTRUCTIONS FOR INSTALLATION OF THE CH-3 COUNTER ROTATING UPPER ASSEMBLY - TAPERED SHAFT UNITS ONLY

WARNING

- Never reach hands or other body parts in or near moving parts!
- Unit upper assembly is shipped without oil in the gear case. Be sure to fill with the proper type and amount of lubricant. This assembly weighs 120 lbs. Be careful when handling to avoid injury or damage. Always have a co-worker or assistant available to help.
- Maintain a safe distance from any fixed or moving propeller!

Note: Be sure to disconnect batteries prior to beginning maintenance on your drive unit. Also remove all tools and loose objects from engine area prior to testing.

WARNING: IT IS VERY IMPORTANT THAT YOU CAREFULLY FOLLOW ALL DETAILS OF THESE INSTRUCTIONS

DEATH OR SERIOUS INJURY MAY OCCUR WHEN WORKING ON OR AROUND MOVING PARTS.

1. With the aid of (2) assistance, hold the belt up so that you can slide the upper assembly pulley under the belt. To do this, you should be sure that the bearing flange has the short side down as it is on an eccentric to give you slack on the belt to assemble. After the pulley is under the belt, you must pick up on the entire upper assembly to get the flange up into the main case, and then turn the bearing holder clockwise to tighten the belt.
   Be sure to center the belt by hand before tightening.

Note: That the oil sight glass should be on the right hand side of the upper assembly when facing the rear of the boat.

2. Temporarily put in (4) 3/8" - 16 x 2 1/4" cap screws. Before rotating look in from the bottom of the unit with a flash light to visually inspect that the belt is somewhat centered on the pulleys, so that the belt will not hit the flexplate bolt heads when you first rotate the unit through. If the belt is somewhat centered, turn (2) revolutions by hand without starting the engine, to finish centering the belt. Check the belt tension by feeling the amount of belt deflection. The belt should be snug but not drum tight. If your belt is too tight, you could cause premature pulley or bearing wear. Readjust to the proper tension, then put in all (9) 3/8" - 16 cap screws and lock washers, 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. Running with a loose belt can also cause premature pulley wear and damage to the belt.

3. If you are using the (SFC-24TC) lock 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 screw and with the bearing in place, reach through the set screw hole with a drill and, drill bit to make (2) dimples for the set screws to lock into.

4. Place front propeller over the 2 1/4" dia. shaft, adjust propellers to the manufacturers maximum effective pitch setting so that most of the load is on the front right hand rotation shaft as it is a 1.5 to 1 reduction to the rear propeller. The bore thru your hub should be at least 2 3/8" diameter.

9. The first oil change should be done after 20 hours of breaking time and then we recommend changing your unit oil every 6 months or 100 hours of use.

Note: The bottom plug is magnetic and will attract fine metallic materials as your unit breaks in or as it wears over its lifetime.

10. Please remember your lower bearing still needs 2 pumps of high temp bearing grease every 16-20 hours of operation. **DO NOT OVER GREASE!**

11. Propellers must maintain a 1 ½" minimum clearance between the trailing edge of the front prop and the leading edge of the rear propeller.

12. If you must take your unit off of the boat, first drain your counter rotating upper assembly oil. **Also note: that the vent in the front of the center shaft could leak remaining residual oil if stood up on the pulley.**

13. During handling or assembly of the boat, be sure to set the unit on foam pad (or like material) to protect the aluminum pulley teeth.

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