



# Aqua-Cycle International, Inc.

*Ride a Tricycle on Water*

## AC3 REAR AXLE REPLACEMENT KIT for AC3 and most prior models

This replacement kit is for one AC3 Aqua-Cycle rear axle and contains:

- 1 - AC3 Rear Axle
- 1 - Rear Gear (4 pieces)
- 4 - 3/8 x 1¼ Stainless Bolts
- 4 - 3/8 Stainless Locking Nuts
- 4 - 3/8 Stainless Washers

It is very important that you replace all rear axle and pedal crank bearings when the axle is replaced. If you do not have new bearings, you should order an AC3 Bearing Replacement Kit before proceeding to assemble this axle onto the Aqua-Cycle.

Please read these instructions completely before attempting to replace the rear axle.

Replacement of all AC3 bearings every 100 hours of use will help protect the rear axle and pedal crank from fatigue, reverse stress, and eventual breakage. Wear beyond 100 hours of use will cause accumulative damage to the rear axle and pedal crank which cannot be detected by physical inspection. If you fail to replace these bearings as suggested, the damage will eventually cause the pedal crank and rear axle to break in half.

Installation: The Aqua-Cycle must be flipped over (upside down) and supported on the fork handlebar and the top of the seat back.

Remove the plastic belt guard, noting how it comes off to make replacement easier when you are done. Never allow the Aqua-Cycle to be used with the belt guard removed for the safety of your riders.

Remove both rear wheels from the old axle and loosen the pedal crank locking collars. Remove the axle bearing bolts, nuts, and washers, the old axle, and the old bearings. It is not necessary to remove the wheel hubs from inside the wheels.

Carefully inspect the belt for frays, missing or worn teeth, or broken places in the rubber. The belt takes all the strain of pedaling and must be in good condition to keep your Aqua-Cycle operating properly.

Inspect the pedal crank for excessive wear at the locations where it rotates within the bearings. Wear to the pedal crank can cause the belt to “jump” when pedaling and harm the belt.

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To attach the gear to the axle you must first find the axle's center point. Either measure the axle to find the center, or pick up the axle with one hand, putting your hand at the assumed center point. Move your hand until the axle balances in your hand. That is the center.

With your hand at the center of the axle, the center gear plate is now to one side of your hand. Stand the axle up, leaning it against your shoulder with the center plate below your hand (your hand still in the center). The gear now attaches to the side of the center plate, which is upward toward your face.

The gear consists of four parts: two gear halves and two plate halves.

The gear halves lock together to make one unit. Unlock them and re-lock them a few times to be sure you understand how they lock together.

Attach the two halves of the gear **AROUND THE AXLE** with the flat side toward the center plate and the hollow part of the gear toward your face. Be sure that the halves are hooked together properly and that the gear is now one solid unit.

Slip the two plate halves between the gear and the axle center plate with the square portion of the plate halves matching the center plate. Turn the gear so that the split in the gear halves is perpendicular to the split in the plate halves and all holes match those in the axle center plate.

Put each bolt in from the bottom, with the bolt head against the center plate. Put the washer on the threaded end, against the gear, and put on the locking nut. Repeat this for all four bolts before tightening any of them.

Tighten one bolt at a time, keeping the gear halves from pulling apart during the tightening. Be sure that the plate halves are together as much as possible with little or no gap between halves.

Two tests need to be performed on the rear axle mounts (points where the rear axle bearings mount to the frame). First, use a string, pipe or any other reference that is or can be pulled straight. Stretch the string or lay the pipe across the two side mounting plates and inspect the center bracket. If the center is lower than the sides, you will need to use a shim of some type under the center bearing to raise it up to match the sides. If the center is higher than the sides, shim up the side points to match the center. A shim can be a strip of aluminum of proper thickness, several stainless steel washers or most anything that will not rust to make all bearings the same height. Even a single washer thickness of shim is necessary to keep the rear axle from being bowed down (in the center or on the sides) when the bearings are bolted in place.

Put a new bearing half (without grease fitting) on each bearing mount. Set the axle onto the bearing halves.

Be sure that an equal amount of axle extends beyond each side of the Aqua-Cycle frame. Reversing the axle or installing the gear on the wrong side of the center plate will cause one wheel mounting plate to be closer to the frame than the other.

Now that you know the position and orientation of the axle, remove it from the bearing halves, slip it through the belt, and place it again on the bearing halves.

Put the top bearing halves (with grease fittings toward the back of the Aqua-Cycle) on the axle. Install the bolts, washers, and nuts in the center bearings only and do not tighten yet. Slide the rear axle and bearings away from the pedal crank as far as possible. When the belt is tight, tighten the bearing nuts and bolts. Once tightened, carefully align the axle to be parallel with the pedal crank, install the bolts, nuts and washers in the side bearings and tighten.

Proper alignment of the rear axle, pedal crank and frame are important just like proper alignment of the wheels on a car. If the axle is at a slight angle to the frame, the rear wheels will be aimed slightly to the side. More importantly, the rear axle gear will not be aimed exactly at the pedal crank gear, causing the belt to have a slight twist as it enters and leaves the gear.

After you go through the above process and if the belt is still not tight then the frame has become damaged or bent. To permit further adjustment, the bolt holes in the rear axle bearing mounts (or pedal crank bearing mounts) will need to be elongated. This will permit the rear axle to be adjusted farther away from the pedal crank.

If you are uncertain about making changes to the bearing mounts please call our office and we will talk you through the steps necessary.

Once the belt is tight, the bearing bolts are tight and you are confident that the rear axle and pedal crank are parallel to each other, carefully adjust the side to side positioning of the pedal crank gear and rear axle gear. The gears must be in an exact line with each other. The belt must move freely from front to back without being twisted slightly to one side or the other.

The two gears are held in proper alignment by lock collars on each side of the pedal crank and rear axle. Each lock collar should be positioned against the outside of the bearings and should be tightened when both gears are properly aligned.

Now you can re-mount the rear wheels being careful to not over-tighten the wheel bolts and nuts. Only tighten them until one or two threads protrude beyond the end of the nuts. Over-tightening will cause damage or cracks in the wheels and therefore leaks.

Once all of the above is completed, grease the bearings with a high quality marine grease.

Reinstall the belt guard and continue to enjoy your Aqua-Cycle. Never allow the Aqua-Cycle to be used with the belt guard removed for the safety of your riders.

If you have any questions about this installation, please call our office.