

Idiots Guide to Duo Gen Tower Removal and Refitting to replace bearings and Seals.

Duo Gens instructions for bearing replacement are excellent but the tower which has to be removed to get to the bearings can be a swine of a job to do whilst on board with limited tools and lack of work shop conditions. After using a Duo Gen mark 1 for 10 years, I replaced it with the Mark 3 in 2013, A vast improvement, and generally a good bit of kit on board for distance cruising. The mark one needed a fair bit of attention, so I have dismantled the Duo Gen quite a few times. When I needed to replace bearings in my later unit, I thought I may not be the only one who has struggled with this job whilst on board.

One of the problems we all have is lack of a workshop or even a bench and no degree in engineering, but a certain practical knowledge and know how. So this is my "how" to in regard to Duo Gen Tower removal for replacing bearings and seals. I also used a felt tip marker when taking the alternator apart to mark where wires go, the position of the stator and the keyway etc.

To be used in conjunction with Duo Gen's general instructions.

1. Getting tower back inside the cockpit, You do need a helper if possible and ideally calm conditions.
When undoing the electrical connection inside the boat, tie a feeder line to the end of the wire so on removal you have a line to retrieve the wire back through what may be a difficult access route through the back of the boat. Tie a line to the yaw arm in case of a splash. (make this line just long enough to be able to get the unit back in the cockpit) Even a light line to the clevis pin that holds it all into the rail mounted bracket. When you remove the split pin at the base of the clevis pin there is also a stainless washer that will drop down or fall off....avoid 1st splash!
2. Having got the unit on board, make some space on a fairly solid surface. The cockpit is safer than the side deck, as some things may just jump out over the side.
3. You may as well get all your tools, spare blocks of wood and stuff out ready. Depending on how tight the tower is attached to the alternator unit, you may need them all. Ingenuity is the name of the game here. A couple of small containers to put parts in is essential.
4. Beware, the tower is alloy and anodised, so very soft, but also can mark easily. Try to keep the work area clean and clear of any tools you are not using. An old canvas sheet, or old towels are good to lay the unit on.
5. After removing the two Allen bolts at the base of the shaft, (mark which side of the alternator nose they came from so reassembly is the correct way around and holes will line up) If the tower does not move with either a twist, or help from an oil filter wrench (cover anodising first), you will need to start levering very carefully the tower away from the alternator top. Place a block on the alternator housing and lever using a fairly wide good quality flat bladed screwdriver between where the water drain channel (there are four of these), and start to lever the tower away from the alternator top. It may be useful to rotate the whole unit so as to give equal leverage around the tower base, and not just on one point. This is a long and arduous task, but (slowly slowly catchy monkey). Keep increasing the size of the block to lever against as the tower leaves the base. There is about a 30 mm flange to get the tower away from the bottom flange.
6. Then just when you think phew, there is still a nylon spacer about 40mm inside the tube which is bonded to the alternator nose. You have to keep levering away to get the tube over the spacer. So the blocks are getting bigger and more unwieldy. I found a large adjustable spanner (wrench) was useful. By placing the handle on its side against a block on the alternator casing, I could open the jaws to act as a fulcrum to lever the tower a couple of mm at a time, then open the jaws a bit more to re-establish the best leverage position. Eventually you will see the nylon spacer slowly come past the two holes where the allen bolts secure it to the alternator top.
7. Now when the bottom of the nylon spacer comes to the base of the pole, there are four drainage gaps on the spacer. Carefully, use these gaps to place your lever against and so as to continue levering the tower away. And hey presto. The tower should come free. You can then resume following the manufacturer's instructions. To continue disassembly.

For reassembly:

If the nylon spacer was extremely tight (yes they can absorb water and swell). And this is the case use emery paper on a block to take a little bit off the edge to ease reassembly and future removal.

Thoroughly clean the alternator nose and inside the tower tube of any debris where surfaces meet.

Ensure you draw a line from the alternator head where the allen bolts holes are along the unit onto the nylon spacer. When putting the tower back, this will help as a guide to keep the holes in line for the final part of the reassembly, as the tolerances are very small.

Once you have reconnected the drive shaft, offer the end of the tower to the alternator.

Ensure you are using a level surface, and everything is on the same plane. Put a large block at the base of the alternator and wedge that against a solid object (side of cockpit maybe).

You will need to tap the top of the tower with a rubber mallet or similar, protecting the top of the tower with a block of wood to slowly move the tower back onto its mounting.

You can lubricate the inside of the tower and nylon spacer with some soap to ease it into situ. Once past the nylon spacer, clean out the inside of the tube before it reaches the alternator head. Ensure you give this flange a liberal coating of Tef Gel to stop any build up of corrosion that will stop any future removal of the tower.

During this last part of moving the tower down to the flange keep checking that the top bearing is coming through the head of the tower. It is vital that you check this all the time otherwise you may damage the female part of the top bearing. Wiggling the top sliding drive shaft may help. Remember also to check that the two Allen bolt holes line up with the marks you have previously made.

When the tower is snugly against the alternator, fasten the two Allen bolts but ensure you use plenty of Tef Gel on the threads.

Ensure that the shaft is rotating smoothly.

Re mount the unit on its mounting bracket remember to use a safety line again. Use the feeder line to pull the wire through to the connector which leads to the control box.

Manufacturers Removal Instructions:

- a) Remove the two allen headed set screws at the base of the tower. Then remove the tower by pulling it off the alternator nose. Using a twisting action as you pull may help if the tower is stiff.
- b) Once the tower is clear of the alternator nose, the drive shaft coupler will be visible. Remove the lower M6 bolt and washer securing the drive shaft coupler and lift away the old tower, drive shaft and yaw arm assemblies. Remove the yaw arm from the old tower by sliding it off the tower's lower (alternator) end.
- c) Spin the alternator shaft by hand. It should spin fairly freely without any undue noise or friction. If it does not, contact your Dealer or Eclectic Energy Ltd.
- d) Clean alternator nose with scotchbright pad or fine wet and dry. Pay particular attention to clearing the four drainage channels.

To Refit

- e) Fit the yaw arm by sliding it on from the bottom of the tower tube. Ensure that the spring plunger is in its retracted position.
- f) Push the shaft coupler onto the alternator shaft. Align the holes in the coupler with the through-hole in the alternator shaft, and secure using the 6mm bolt, washer and nyloc nut. Note that the washer should be fitted under the bolt head.

g) Do not over-tighten the 6mm bolt securing the coupler to the drive shaft. When correctly fitted, the end of the bolt should be level with the end of the nut.

*Should the drive shaft bind or wobble when the tower is replaced, check for the correct placement of this bolt.

h) Using the Tef-Gel (supplied in the small plastic bag) lightly smear the aluminium nose of the alternator. The Tef-Gel prevents corrosion and makes subsequent disassembly easier.

i) Slide the tower onto the alternator nose. Take care to ensure that the bearing sleeve at the top of the drive shaft passes through the bearing at the top of the tower.

j) If the tower won't slide all the way onto the alternator nose, check the alignment and 'wobble' the upper drive shaft to get it to enter the top tower bearing. Do not force it!

k) Finally, refit the allen head tower securing bolts, ensuring that the threads are liberally coated with Tef-Gel to ease future disassembly.

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