

D400
Stealth Gen



Eclectic Energy Limited

D400 Drive Shaft and bearing replacement

Parts required: Alternator shaft
Alternator bearings
Shaft Seal
Shaft Circlip
Shims
Threadlock
Split pin



1. Remove tail and blades. Place alternator on workbench.
2. Remove 3 screws retaining the back with a hex key. The back can be separated from the front of the housing, and 'hinged' back. (The cables on the inside will act as a hinge.) NOTE HOW THE 2 BUNDLES OF CABLES RUN THROUGH THE P-CLIPS.
3. Remove the 2 screws holding the 2 p-clips which retain the cables to the inside of the back. Disconnect the cables from the 2 square rectifiers (will slide off) and place the back to one side. If the 'monoblock' type rectifier is fitted, remove screws and stator ring terminals.
4. Remove the p-clips from the cables on the main body.
5. Remove and discard the slit pin retaining the castle nut on the inside end of the alternator shaft. Remove the castle nut and any shim underneath.
6. Remove the 3 posidrive or hex-socket head screws around the main shaft.
7. The rear magnet may now be removed. This is normally done using a hub puller, with threadheads of 3 M8 hex head screws slotted through the tadpole shaped holes in the magnet steel backing plate. Note there is a small steel key between the steel backing plate and the shaft during disassembly it will fall out or be retained on the steel backing plate. Exercise great care not to trap fingers etc.. between the magnet and other objects.
8. When the stator has been revealed, remove the six posidrive headed screws retaining it, noting their positions and the position of the stator output cables in relation to the housing.
9. The stator can now be lifted out. This can be done by holding the cables with one hand and pulling on a screw wedged in one of the holes opposite the cable. It may be necessary to first rotate the stator, so that an area of the edge where resin is missing lines up with the black and red cables exiting the housing. This will give more clearance to remove the stator.
10. With the stator removed, the inner magnet rotor and magnet spacer are clearly visible. Lift the inner magnet and spacer off the alternator shaft. If the parts will not move, invert the alternator and tap the whole assembly on a solid surface such that the end of the alternator shaft contacts the surface. This will jar the inner magnet and spacer loose.
11. If the magnet spacer is made from nylon, it can be replaced with the current aluminium part. If you are undertaking this change, remove the three screws in the inner magnet rotor and the nylon spacer. Fit the aluminium spacer to the inner magnet rotor with the screws provided.
12. Note that both the magnet rotors have a notch in the rim. These should be aligned when the alternator is rebuilt, and it is prudent to mark one of the magnet spacer screw holes to aid this alignment on re-assembly.
13. Remove any shims and spacing washers which were between the inner magnet rotor and the shaft circlip. Then remove the shaft circlip, together with any shim fitted beneath it.
14. With the circlip removed, support the alternator housing, nose downwards, and tap the shaft at its threaded end with a hammer. It is recommended that you protect the end of the shaft with a piece of wood, or use a soft faced hammer.
15. Tapping the shaft should drift out the outer bearing, together with the shaft seal and the bearing spacer, enabling you to remove the alternator shaft from the housing.

Please note: Steps 16 and 22. Some alternators have a spring washer next to the bearing spacer (between the bearings). Ensure that this spring washer is replaced in its original position.

16. Remove the seal, its spacer ring and the bearing spacer from the shaft.
17. Using a suitable punch inserted from the 'nose' end of the alternator housing, drift out the inner bearing.
18. To remove the outer bearing from the shaft, support the bearing across vice jaws, or similar, and tap the threaded end of the shaft, again taking care to avoid damaging the threads. As an alternative to the above, a hollow punch (convenient piece of tube) could be used.
19. Thoroughly clean the alternator shaft and bearing seatings.
20. To reassemble, begin by fitting the new outer bearing to the alternator shaft. This is the reverse of the removal procedure, accomplished either over a vice jaw or with a hollow punch.



Bearing compound is an adhesive. Take care to avoid getting bearing lock onto the face of the bearings. This can result

21. Apply a smear of bearing compound to the outer bearing housing, and insert the shaft and bearing assembly down through the alternator nose. Tap the end of the alternator shaft gently with a hammer to fully seat the bearing.
22. Invert the alternator housing and note the position of the shaft. If the shaft is not central the outer bearing is not squarely seated. Remove and reseat the outer bearing if necessary to correct this. Once the outer bearing is squarely seated and the shaft is centrally positioned, slide the bearing spacer down the shaft. Apply a smear of bearing lock to the inner bearing seat. Slide the second new bearing down the shaft and gently tap into position. This is best done with a hollow punch (ie. piece of tube). If this is not available, take care to keep the bearing square as it is tapped in.
23. If fitted originally, refit the shim and secure with the new circlip.
24. Refit the spacer washer and shims. Note, if you are fitting the new aluminium spacer the clearance between the inner magnet rotor and shaft circlip should be reduced by 0.5 mm. This can be achieved by removing shims from the original build, or new spacer washers can be fitted.
25. Slide the inner magnet rotor and spacer assembly onto the alternator shaft. Check the height difference from the face of the inner magnet to the machined stator shaft in the alternator housing. The magnet face should be 2.3 mm below the stator shelf. A 2 mm drill bit could be used as a gauge. Adjust the shims/ washers beneath the magnet rotor until this dimension is correct.
26. Fit the stator following the reverse of the procedure above. Refit the 6 screws in the same holes, leaving the same 3 holes free for the screws which retain the backplate. Use some blue threadlock on these 6 screws.
27. Check the magnet for anything sticking to it and remove as necessary. Refit the magnet taking care not to trap finger etc. between the magnet and the stator. This is normally done by fitting the heads of three long M8 screws through the tadpole shaped holes, and holding all the screws in one hand. The housing may then be steadied with the other hand ensuring that fingers are clear. As the magnet approaches within 20-30 mm of the stator, the other magnet on the other side of the stator will attract the magnet being inserted suddenly – take care. Also make sure that fingers are clear of the end of the shaft which will suddenly emerge from the central hole in the steel pole piece plate.

28. Rotate the shaft to align the keyway in the shaft with the cut out in the steel backing plate. Insert the key with some bearing fit liquid (if available).
29. Refit the three posidrive or hex-socket head screws around the shaft in the original holes.
30. Refit the shim (if fitted) and castle nut. Tighten the castle nut to about 10 mm and retain with the (new) split pin.
31. Fit the p-clips to the red and black cables, if necessary.
32. The three stator cables may now be attached to the three terminals on the bridge rectifier, again using countersink screws and blue threadlock or spade terminals, depending on rectifier type. These white leads may be connected in any order, but the longest lead connected to the outer terminal adjacent to the red cable makes for the neatest installation. The red and black leads will pass between the white cables.
33. Now fit the p-clips. Use new ones if the originals are badly distorted. The larger p-clip (marked "4") secures the red and black cables and is fitted closest to the rim of the back. The smaller p-clip (marked "3") secures the stator cables which are bundled together within transparent sleeving. Arrange the p-clips so that they hold the cables as far apart as possible, one bundle on either side of the fixing screws – refer to note made previously. Check that the p-clips are squarely aligned so that when the back is offered up the cables can slide easily through the p-clips.
34. Check if the sealing black o-ring is still in place all around the lip on the rim of the back. If it has come away remove it entirely for refitting later.
35. Offer up the back to the main body, ensuring that the cables to the bridge rectifier are pressed down away from the magnet steel backing plate, and that the cables slide through the p-clips rather than kinking and contacting the edge of the magnet.
36. Secure the back with the 3 hex key headed screws, new red washers and blue threadlock. Rotate each screw a little in turn to ensure the back sits squarely and evenly. If the black o-ring needs to be refitted at this stage it can be stretched over the back to fit in the groove created by the lip on the edge of the back. If the o-ring breaks it can be rejoined with "Super Glue". Tighten the screws down evenly to seal the alternator.
37. Refit tail and blades