Field Service Spares Replacement Procedure – Azimuth Stop Kit, Complete, XX04

Approval:

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Revision History

Rev.	ECO	Description of Change	Date
A	9046	Initial release.	10-27-2011

1. Brief Summary:

Troubleshooting document for inspecting and replacing the end stops, cam plate and base spindle harness on the 04 series limited azimuth antennas.

2. Theory of Operation:

Sea Tel limited azimuth antennas use a cam plate and two end stops, one in the pedestals base assembly and one in the azimuth post, to limit the system's rotation. During initialization, the antenna will drive clockwise until it reaches the upper limit of its mechanical rotation; at this point the encoder's relative position will be calibrated.

If the pedestal has been powered down at sea, the azimuth belt has failed or the azimuth rate sensor or encoder have failed the system could make violent contact with its end stops damaging them. Should an end stop break the pedestal is then able to continually rotate twisting the harness and damaging it. Once this has happened its common for the 24VDC on the harness to short and damage the ADE modem.

3. Inspection:

If the end stop has been damaged in either the azimuth post or base plate, but the thread is intact, they can be removed using a short length a 5/32" Allen wrench, with the pedestal in place. Replacement end stops should be secured with Loctite 2760 and set so that the stops "pick-up" the cam plate, but do not drag on the opposite structure.

If the end stop has damaged its thread, the pedestal will need to be removed from the base to allow the hole to be drilled and tapped to fit a Helicoil to allow for a replacement end stop to be installed.

Another potential failure which can happen is when the cam plate warps and binds between the base plate and azimuth post. This will require the azimuth post to be removed from the base and a replacement cam plate to be installed.

Lower End Stop (Base Plate)

Upper End Stop (Azimuth Post)

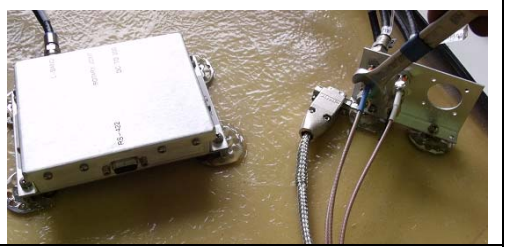
4. Procedure for Repairing an XX04 with Damaged End Stops:

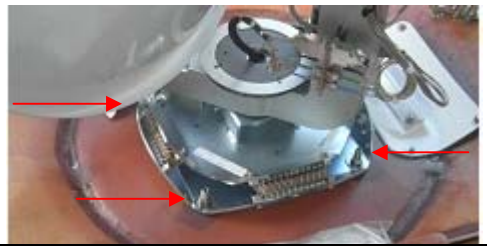
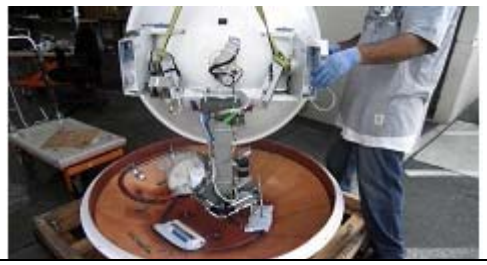
4.1. Tools.

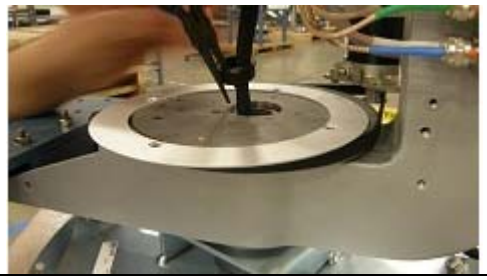
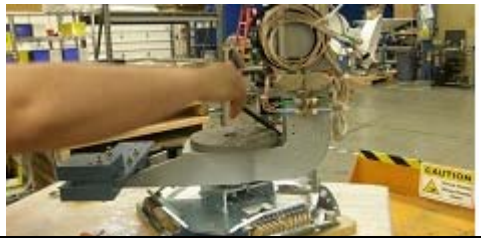
- 10mm Wrench/Spanner or Socket
- 7/16" Wrench/Spanner or Socket
- 2mm Flat Blade (Terminal) Screwdriver
- Snips/Cutters
- ¾" Wrench/Spanner or Socket
- Cable Ties/Tie Wraps
- #1 Phillips Screwdriver
- Acetone
- Drill
- 10.2mm Drill Bit
- M12 Tap
- Loctite 242 and 2760

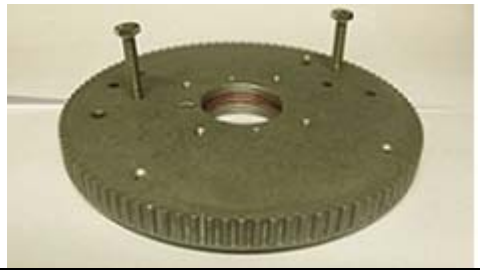
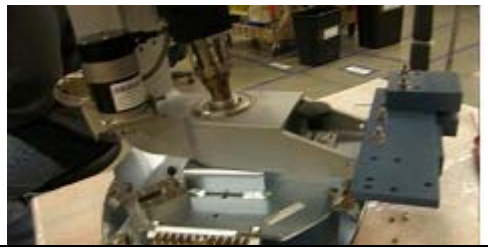
4.2. Procedure.

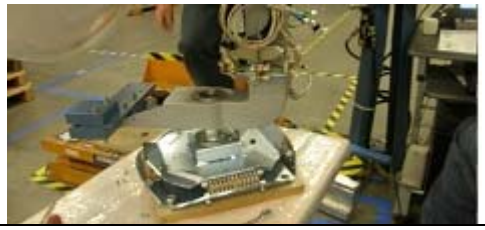
The following procedure is for removing the pedestal from the base plate to allow repair of the end stop threads, replacement of the cam plate and replacement of the base spindle harness assembly.

***CAUTION:** Power down the pedestal before following this procedure. ***Note:** The replacement harness assembly will come without the connector installed. Do not install the connector at this time as it needs the clearance to be fed through the center of the base spindle.	
1. Remove the radome top for access to the system, bolt sizes will either be 7/16" or 10mm.	
2. Remove the 9-pin D-Sub connector from the ADE Modem using a 2mm flat blade screw driver. 3. Remove the 4 coax connections from the bracket (it's advisable to note their orientation).	

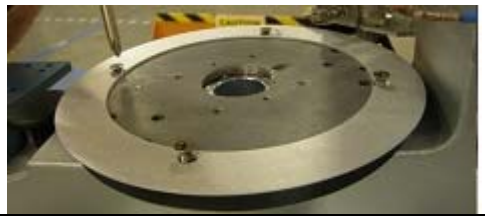
4. Using a #1 Phillips screwdriver remove the screw and P-clip securing the harness into the radome base.	
5. Remove the clamp securing the harness to the base plate using a 10mm wrench (if applicable).	
6. Remove the cable tie securing the harness to the base plate.	
7. Undo the four ¾" nuts securing the pedestal base plate into the radome base.	
8. Secure the system around the cross level beam for lifting, taking care to allow clearance for any belts or cables.	
9. Lift the pedestal from the radome, place it in a secure place to enable an easier working environment.	

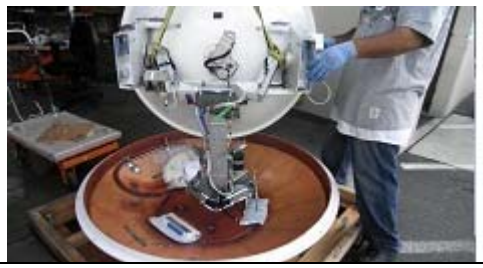
10. Using a 3/32" Allen wrench remove the back shells from the 9-pin D-sub connector, to allow the harness to be removed through the center of the base assembly. ***Note:** The harness can be cut to allow easy removal from the pedestal.	
11. Feed the base spindle harness up through the center of the azimuth post.	
12. Remove the snap bushing and save for future use.	
13. Remove the 15-pin harness D-sub connector from the azimuth post using a 2mm flat blade screwdriver. 14. Now remove the four coax connections from the azimuth post using a 7/16" wrench. Discard the damaged harness as a replacement is provided with this kit.	
15. Using a #1 Phillips screwdriver, remove the azimuth belt retaining plate (if applicable).	
16. Remove the azimuth belt.	

17. Two M6 bolts can be set into any of the spare holes in the azimuth sprocket to allow leverage.	
18. Using a heat gun, heat the center of the azimuth spindle to soften the Loctite retaining the azimuth sprocket.	
19. Using the leverage points from the previous step, place a pry bar across the sprocket onto the azimuth post and rotate the pedestal counter clockwise to undo the azimuth sprocket. ***Note:** Apply more heat if required.	
20. Once loose, remove the sprocket by hand and discard as a replacement is provided with this kit. ***CAUTION:** It may be hot!	
21. Prepare to lift the pedestal from the base plate. Secure the system around the cross level beam for lifting, taking care to allow clearance for any belts or cables.	
22. Heat the center of the azimuth spindle to loosen the spindle from the bearings.	

23. While prying the system from the base, apply even force on both sides to prevent damage to the azimuth bearings. ***Note:** Do not pry on the bearings surface or seat.	
24. Raise the pedestal from the base and set aside safely.	
25. Discard the cam plate and nylon washers from the pedestal as replacements are provided with this kit.	
26. If the thread in the base plate or azimuth post is too damaged to reuse, remove the end stop and drill the hole out using a 10.2mm drill bit 27. Tap a 12mm thread into the 10.2mm hole using an M12 tap. ***Note:** Drill the 10.2mm hole to tap an M12 thread; do not drill a 12mm hole.	
28. Install the Helicoil using Loctite 2760 so it sits flush with the upper edge of the base plate, or flush with the lower edge of the azimuth post. 29. Once the Loctite 2760 on the Helicoil has set, install the end stop into the Helicoil using Loctite 2760 and a 5/32" Allen wrench.	
30. Use a guide to make sure the top of the end stop and the cam plate are flush. The same principal applies for the end stop in the azimuth post.	

31. Install one of the replacement nylon washers from this kit over the azimuth spindle.	
32. Then, install the replacement cam plate followed by the other replacement nylon washer.	
33. Lower the pedestal over the azimuth assembly, taking care to keep it straight to avoid stressing the azimuth bearings. ***Note:** Make sure the end stops are on either side of the cam plate before lowering the pedestal to avoid contact when fitting.	
34. Rotate the pedestal and verify the end stops are positioned correctly and that the system has 680 degrees of rotation.	
35. Apply Loctite 2760 to the lower threads of the replacement azimuth sprocket.	
36. Install the azimuth sprocket and tighten it down slowly, making sure the Loctite 2760 works its way through the threads, then tighten the sprocket. 37. Rotate the pedestal verifying it doesn't bind; if it does, back the azimuth sprocket off slightly and re-check.	
38. Clean any excess Loctite from the center of the azimuth sprocket.	

39. Reinstall the azimuth belt.	
40. Reinstall the azimuth belt retainer applying Loctite 242 to the screws (if applicable).	
41. Install the 15 pin D-sub connector of the replacement harness to the connector on the azimuth post, tightening the screws with a 2mm flat blade screwdriver. 42. Connect the 4 coax cables using a 7/16" wrench, ensuring the connectors are color matched.	
43. Locate the snap busing in the center of the azimuth spindle. 444. Feed the harness through the center of the base spindle and out the front of the base (feeding the coax cables and 9-pin D-sub connector through one at a time).	
45. Rotate the pedestal so it's facing in the same direction as the harness exits from the base. 46. Work the harness up and down in the base spindle to straighten it. Then secure it to the mounting point of the base with a cable tie. (This is the center of the pedestals range of motion, meaning the harness will wrap and un-wrap an equal amount).	
47. Secure the harness using the cable clamp, applying Loctite 2760 to the bolt and tighten with a 10mm wrench (if applicable).	

48. Insert the pins into the numbered connections of the 9 pin D-sub connector in the following order: 9 - Blue 2 – White/Brown 5 - Brown 8 – Violet 1 - Black 3 – White/Violet	
49. Install the back shells to the 9-pin D-sub connector, using the fully threaded screws and nuts to join them. Install the split washers on the screws to attach the connector to the ADE modem.	
50. Secure the system around the cross level beam for lifting, taking care to allow clearance for any belts or cables.	
51. Lower the system into the radome base with the base harness facing towards the bow of the vessel, (which is typically with the harness exiting away from the hatch depending on the orientation the radome has been installed on the vessel).	
52. Install the system into the radome base using the ¾" hardware removed earlier using Loctite 2760.	
53. Reattach the 9-Pin D-Sub connector to the ADE modem using a 2mm flat blade screwdriver. 54. Reconnect the four coax cables in their original orientation using a 7/16" wrench. 55. Install the P-clip on the harness and secure to the radome base using Loctite 242, secure the coax and harness cables together using cable ties.