
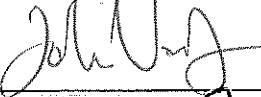



**Field Service Spares Replacement Procedure – Azimuth Stop Kit,  
Complete, 6003A/6004**

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Approval:

Approving Authority	Signature	Date
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Revision History

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

# ***Field Service Procedure – Azimuth Stop Kit, Complete, 6003A/6004***

## **1. Brief Summary:**

Troubleshooting document for inspecting and replacing the end stops, cam plate and base spindle harness on the 6003A and 6004 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)

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### **4. Procedure for Repairing a 6003A/6004 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
- 3/4" Wrench/Spanner or Socket
- Cable Ties/Tie Wraps
- #1 Phillips Screwdriver
- Acetone
- Drill
- 10.2mm Drill Bit
- M12 Tap
- Loctite 242 and 2760


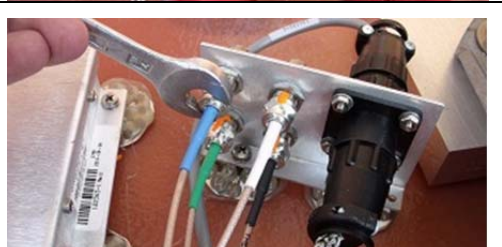

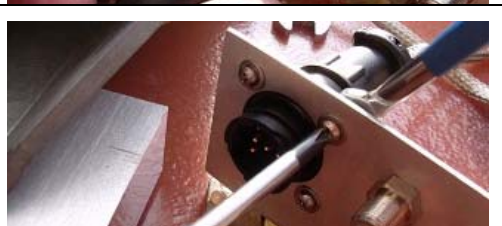


#### **4.2. Procedure.**

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 interface harness assembly.


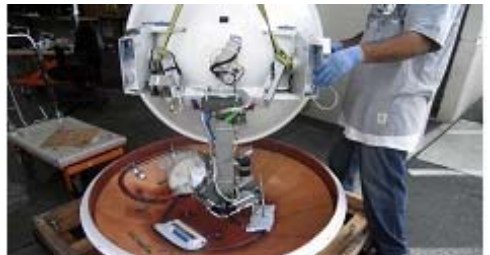




**\*Note:** Some of the images relating to removing the pedestal from the base show the XXo4 series antenna, however the principal is the same.

<p><b>*CAUTION: POWER DOWN THE PEDESTAL BEFORE FOLLOWING THIS PROCEDURE.</b></p> <p><b>*Note:</b> 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.</p>	
<p><b>*Note:</b> There is enough clearance inside the radome to lift the pedestal from the base; however if it's possible to remove the radome top it's recommended you do so for easier access.</p> <p>1. Remove the radome top for access to the system, bolt sizes will either be 7/16" or 10mm (if performing the procedure inside the radome skip to step 2).</p>	
<p>2. Undo the screw securing the P-clip and harness to the radome base. Retain the hardware for future use.</p>	



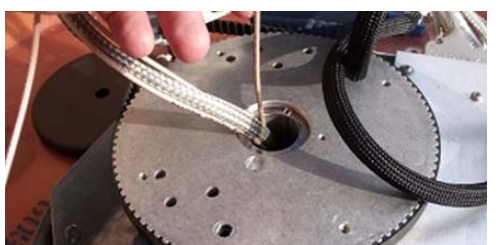
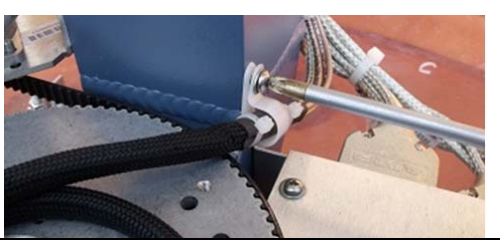


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<p>3. Cut the cable ties securing the harness assembly in the radome base.</p>	
<p>4. Using a 7/16" wrench disconnect the four coax cables from the bracket in the radome base.</p>	
<p>5. Disconnect the female side of the socket connector from the bracket in the radome base.</p>	
<p>6. Remove the male side of the socket connector from the bracket using a 1/4" wrench and #1 Phillips screwdriver.</p>	
<p>7. Remove the socket connector from the harness. (If the old harness is to be discarded this can be cut off to allow clearance through the center of the base spindle).</p>	
<p><b>*Note:</b> The following steps refer to removing the pedestal from the radome, if the procedure is to be carried out inside the radome skip to step: 11.</p> <p>8. Undo the four 3/4" nuts securing the pedestal base plate into the radome base.</p>	

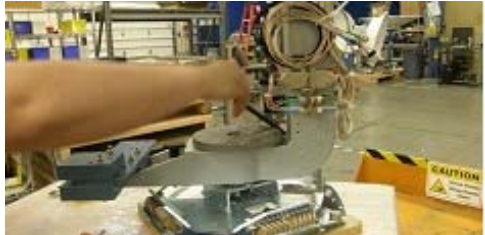





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<p>9. Secure the system around the cross level beam for lifting, taking care to allow clearance for any belts or cables.</p>	
<p>10. Lift the pedestal from the radome, place it in a secure place to enable an easier working environment.</p>	
<p>11. Using an 8mm wrench remove the tensioning screw from the azimuth motor assembly (if applicable).</p>	
<p>12. Cut the cable tie securing the harness the cover.</p>	
<p>13. Using a #1 Phillips screwdriver remove the screw securing the harness cover.</p> <p>14. Remove the cover taking care not to lose the installing hardware and save for future use.</p>	
<p>15. Cut the cable ties securing the interface harness to the bracket.</p>	






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<p>16. Using a #1 Phillips screwdriver remove the bracket and standoffs, take care not to lose the installing hardware and save for future use.</p>	
<p>17. Cut the cable tie securing the harness to the base plate.</p>	
<p>18. Feed the defective harness up through the center of the base spindle, this is easiest to do by removing the harness and coax cables one at a time.</p>	
<p>19. Using a #2 Phillips screwdriver remove the P-Clip securing the harness to the azimuth post. Retain the hardware for future use.</p>	
<p>20. Using a 2mm flat blade screwdriver disconnect the interface harness D-sub connector from the PCU (lower right connector).</p>	
<p>21. Snip the cable ties securing the interface harness and coax connections to allow the defective harness assembly to be completely removed from the pedestal.</p> <p><b>*Note:</b> The harness runs up the pedestal with two IDC connectors terminating on the pol aux relay PCB, with the four coax connections running directly to the LNB and the pol harness IDC connector terminating on the feed assembly.</p>	

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<p>22. Remove the azimuth belt.</p>	
<p>23. Two M6 bolts can be set into any of the spare holes in the azimuth sprocket to allow leverage.</p>	
<p>24. Using a heat gun, heat the center of the azimuth spindle to soften the Loctite retaining the azimuth sprocket.</p>	
<p>25. 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.</p> <p><b>*Note:</b> Apply more heat if required.</p>	
<p>26. Once loose, remove the sprocket by hand and discard as a replacement is provided with this kit.</p> <p><b>*CAUTION:</b> It may be hot!</p>	
<p>27. 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.</p>	

## Field Service Procedure – Azimuth Stop Kit, Complete, 6003A/6004




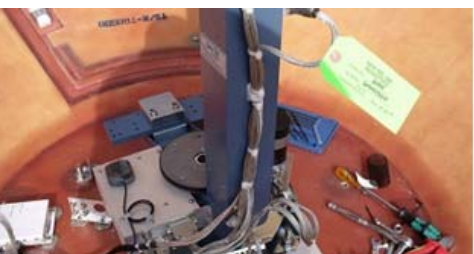


<p>28. Heat the center of the azimuth spindle to loosen the spindle from the bearings.</p>	
<p>29. Whilst prying the system from the base, apply even force on both sides to prevent damage to the azimuth bearings.</p> <p><b>*Note:</b> Do not pry on the bearings surface or seat.</p>	
<p>30. Raise the pedestal from the base and set aside safely.</p>	
<p>31. Discard the cam plate and nylon washers from the pedestal as replacements are provided with this kit.</p> <p><b>*Note:</b> The 6003A/6004 cam plate has a larger tab on it than the XX04 one shown here.</p>	
<p>32. 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</p> <p>33. Tap a 12mm thread into the 10.2mm hole using an M12 tap.</p> <p><b>*Note:</b> Drill the 10.2mm hole to tap an M12 thread; do not drill a 12mm hole.</p>	
<p>34. 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.</p> <p>35. 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.</p>	






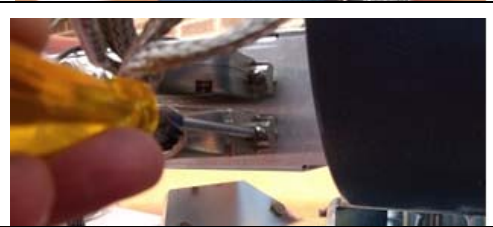

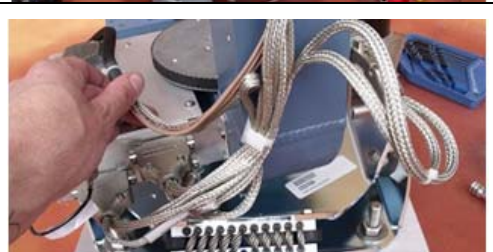
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<p>36. Use a guide to make sure the top of the end stop and the cam plate are flush. The same principal applies for the end stop in the azimuth post.</p>	
<p>37. Install one of the replacement nylon washers from this kit over the azimuth spindle.</p>	
<p>38. Then, install the replacement cam plate followed by the other replacement nylon washer.</p>	
<p>39. Lower the pedestal over the azimuth assembly, taking care to keep it straight to avoid stressing the azimuth bearings.</p> <p><b>*Note:</b> Make sure the end stops are either side of the cam plate before lowering the pedestal to avoid contact when fitting.</p>	
<p>40. Rotate the pedestal and verify the end stops are positioned correctly and that the system has 540 degrees of rotation.</p>	
<p>41. Apply Loctite 2760 to the lower threads of the replacement azimuth sprocket.</p>	

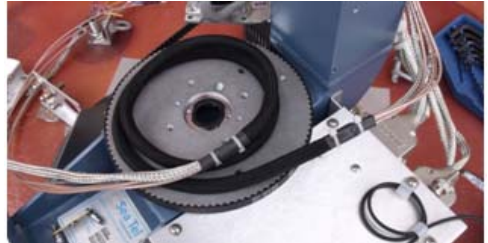





## Field Service Procedure – Azimuth Stop Kit, Complete, 6003A/6004

<p>42. Install the azimuth sprocket and tighten it down slowly, making sure the Loctite 2760 works its way through the threads, then tighten the sprocket.</p> <p>43. Rotate the pedestal verifying it doesn't bind; if it does, back the azimuth sprocket off slightly and re-check.</p>	
<p>44. Clean any excess Loctite from the center of the azimuth sprocket.</p>	
<p>45. Reinstall the azimuth belt.</p>	
<p><b>*Note:</b> It's advisable to loosely install the harness up the azimuth post, onto the mount on the cross level sprocket and under the elevation pan to the feed at first so adjustments can be made during the process.</p>	
<p>46. Feed the coax connections through the hole in the reflector and connect them to the LNB in the following combination:</p> <p>Horizontal Low = White Horizontal High = Black Vertical High = Green Vertical Low = Blue</p>	
<p>47. Connect the pol motor IDC connector to the termination block on the feed assembly.</p> <p>48. Secure the harness to the feed struts using cable ties, ensure there is enough free play to enable full rotation of the LNB.</p>	


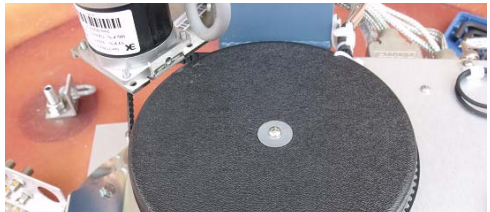

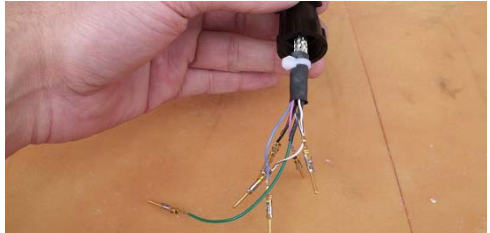
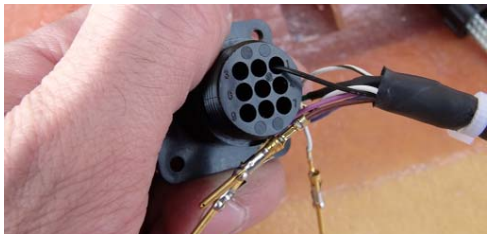

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<p>49. Secure excess harness behind the reflector and secure it under the elevation pan with a P-clip, applying Loctite 242 to the screw (as shown on the right).</p>	
<p>50. Route the harness from the underside of the EL pan, over the cross level beam, securing it in the cable clamp installed.</p> <p>51. Secure the harness to the cross level pulley using the P-clip, apply Loctite 242 to the screw.</p> <p>52. Verify the system can freely move in elevation without stressing the harness and secure with cable ties.</p>	
<p>53. Connect the two IDC connectors from the replacement harness to the pol aux relay PCB.</p>	
<p>54. Connect the interface harness D-sub connector to the PCU.</p>	
<p>55. Run the harness down the azimuth post loosely installing cable ties until the complete harness is secured. Once complete tighten and snip the cable ties and secure to the azimuth post using the cable clamp installed.</p>	
<p>56. Secure the lower of the harness with cable ties allowing free movement of the base section (as shown on the right).</p>	


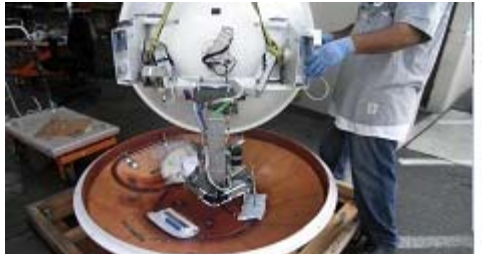
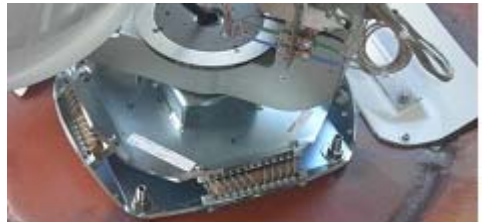
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<p>57. Align the azimuth post so it's facing in the same orientation as where the harness will exit the base.</p> <p>58. Take the lower harness section and lay it across the azimuth sprocket. Coil the harness freely so not to stress any of the internal cabling (as shown on the right).</p>	
<p>59. Insert the harness through the center of the base spindle ensuring the plastic retainer is installed (as shown in the right).</p>	
<p>60. Gently work the harness through the base with the antenna facing parallel to the angle the harness exits the base to remove any twists (this centralizes the position of the harness in the center of the antennas range of movement).</p> <p>61. Once the harness has been fed through the base secure the lower heat shrunk section of the harness to the base using a cable tie (shown on the right).</p>	
<p>62. Apply Loctite 242 to the screw and install the P-clip retaining the upper heat shrunk section of the harness to the azimuth post.</p>	
<p>63. Apply Loctite 242 to the two screws and install the standoffs and retainer plate the top of the azimuth spindle assembly.</p>	
<p>64. Keeping the harness coiled freely install a cable tie to secure the harness to the retaining plate.</p>	

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<p>65. Place the azimuth cover over the harness and install a cable tie around the harness to secure it in place.</p>							
<p>66. Apply Loctite 242 to the thread and install the spacer, washer and screw securing the cover over the harness assembly</p>							
<p>67. Reinstall the belt tensioning screw to the azimuth motor assembly using Loctite 242 (if applicable).</p>							
<p>68. Slide the rear section of the harness socket connector over the harness.</p>							
<p>69. Insert the harness pins into the socket connector in the following order:</p> <table data-bbox="240 1266 618 1392"><tr><td>1 – Black</td><td>5 – Brown</td></tr><tr><td>2 – White/Brown</td><td>7 - Green</td></tr><tr><td>3 – White/Violet</td><td>9 - Blue</td></tr></table>	1 – Black	5 – Brown	2 – White/Brown	7 - Green	3 – White/Violet	9 - Blue	
1 – Black	5 – Brown						
2 – White/Brown	7 - Green						
3 – White/Violet	9 - Blue						
<p>70. Screw the rear part of the socket connector to main section and install the cable clamp and two securing screws using a #1 Phillips screwdriver.</p>							

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<p>71. Secure the system around the cross level beam for lifting, taking care to allow clearance for any belts or cables.</p>	
<p>72. 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).</p>	
<p>73. Install the system into the radome base using the 3/4" hardware (removed earlier) using Loctite 2760.</p>	
<p>74. Install the socket connector and coax cables to the bracket in the radome base. 75. Connect the cable from the modem (if applicable). 76. Secure the harness with cable ties.</p>	