Field Service Spares Replacement Procedure – Pol Pot Kit, 6003A/6004

Approval:

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Revision History

Rev.	ECO	Description of Change	Date
A	8799	Initial release	08-12-2011
B	9041	Clerical revisions	10-19-2011

1. Brief Summary:

Troubleshooting document for diagnosing a fault with and replacing the pol pot on the 6003A/6004 series antennas.

2. Checklist:

- Verify Range of Motion
- Verify Pot Feedback
- Measure Resistance

3. Theory of Operation:

A polang potentiometer is used to provide a feedback reference for the position of the feed assembly for linear polarization. The pot acts as a potential divider giving an output voltage which varies from 0Vdc to 5Vdc. The PCU converts the voltage output from the pot into the numerical value displayed on the DAC. A failure with the pot causing it to output an incorrect voltage will result in the feed assembly not being aligned correctly causing bad cross pol isolation.

One indication that there is a fault with the feed alignment of the system is that the target light will be permanently illuminated on the DAC and the antenna won't target correctly. It will sit 8 degrees above or below the satellites elevation look angle, as part of the antennas targeting procedure is to target 8 degrees above or below the satellite, calculate the auto threshold setting based on the noise floor level and then align the feed for the correct reception position based on the vessels GPS position and the lookup table in the DAC.

If the system is unable to drive the pol motor to obtain the correct feedback, or if the pot has failed and won't give the correct feedback, the antenna can't complete the target process and the antenna will stay in this position. Setting the pol type to "0009" will make the antenna target by removing the auto pol function from the targeting process; however the mis-alignment of the feed will cause bad cross pol isolation.

4. Verify Range of Motion:

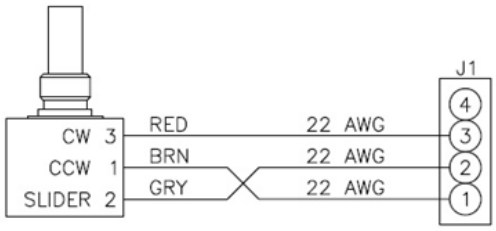
First verify the settings in the DAC are correct; the pol scale should be set to 0090 to give the feed 180 degrees of motion. The default pol offset is 0030 (however these may have been modified slightly to "trim" the pol angle). Ensure tracking is off then drive the elevation to 0 degrees to make it easier to view the feed assembly for diagnostic purposes.

Set the pol type to "0009" to set the mode of the pol assembly from automatic to manual. Now enter the pol window and hold the down arrow to drive the feed assembly into its end stop. At the lower end of the range the pol count should be approximately 28, at which point the LNB should be horizontal with the coax cables pointing towards the left when view facing the feed assembly. At the upper end of the range the count should be approximately 210 and the LNB should have moved 180 degrees, i.e. the coax cables are now pointing to the right.

If no pol motor drive is present verify the pol reading on the DAC isn't out of range (i.e. displaying a value of either 0 or 255). If one of these values are displayed it's possible the pot isn't aligned correctly and that adjusting it may bring it back to with the scale the DAC recognizes. Back the pot off from the main gear and rotate the pot, verifying that the feedback value changes on the DAC. If so, calibrate the pol pot and verify operation as described in the later stages of this document. If the pol count on the DAC doesn't change when the pot is adjusted the pot has failed and is outputting a default value. See Verifying the Resistance of the Pol Pot section below. If this is the case no drive will be issued to the pol motor as the value is out of the range which the system operates in.

5. Verify the Resistance of the Pol Pot:

The polang potentiometer (pol pot) consists of an internal slider as well as a CW and CCW contact. To verify the resistance of the pot a multi meter can be used to measure between the slider and one of the wipers whilst rotating the shaft through its range and verifying the 0 – 5k ohms measured correctly. Disconnect J1 from motor termination PCB assembly.



Looking down onto the shaft of the pot rotate it clockwise until it reaches its end stop.

1. Now measure the resistance between the slider and the CCW contact (grey cable, pin 2 on the IDC connector and the brown cable pin 1 on the IDC connector). The feedback should be approximately 5k ohms.	
2. Now slowly rotate the shaft of the pot counter clockwise, the reading should count down sequentially. After one and a half turns the pot will be in the center of its range giving a resistance of approximately 2.5k ohms.	
3. Continue to rotate the pot until the counter clockwise end stop (it will now have turned through all 3 rotations of its range), the resistance should be approximately 0 ohms.	

Leaving the pot at its counter clockwise end stop measure between the clockwise contact and the slider (grey cable, pin 2 on the IDC connector and the red cable pin 3 on the IDC connector), the resistance should be reversed from the previous rotation, reading 5k ohms. Rotating the shaft of the pot clockwise should reduce the resistance through its range to 0 ohms. Any error with the pot not giving the correct resistance is an indication the pot is defective and needs replacing.

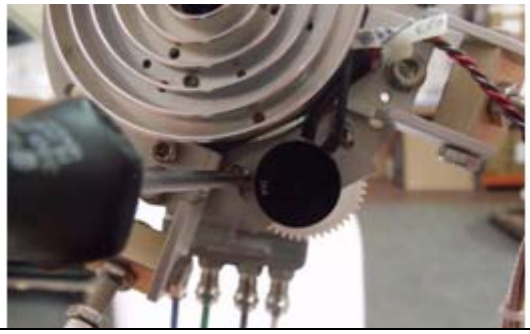
6. Replacing the Pol Pot Assembly:

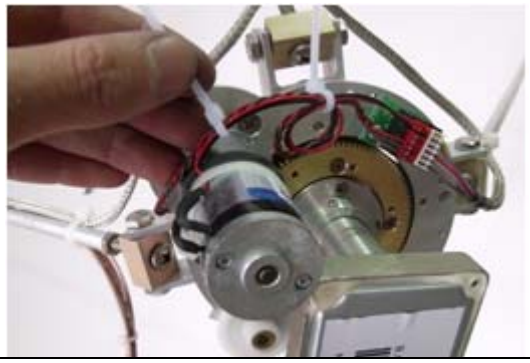
6.1. Tools.

- Snips/Cutters
- #1 Phillips Screwdriver
- 1/16" Allen Wrench/Key
- Tie Wraps/cable Ties

6.2. Procedure.

Procedure for replacing the pol pot assembly, Sea Tel kit part number: 124109-1 (pol pot part number: 115425-3).

***CAUTION:** Power down the pedestal before following this procedure. 1. Using a pair of snips, cut the tie wraps which secure the pol pot harness and disconnect the pol pot IDC connector from the motor termination PCB.	
2. Using a #1 Phillips screwdriver remove the two screws attaching the pol pot bracket to the feed and remove the pol pot assembly.	
3. Install the replacement pol pot onto the bracket with the wires exiting to the upper right side of bracket as on the defective pol pot assembly and secure it in place using the nut and lock washer. 4. Install the new pulley on the replacement pot in the same position as on the defective pot (it may be advisable to trial fit the pot assembly to the feed to verify the correct position of the pulley and pot harness). Once satisfied apply Loctite 638 to the pot pulley and install the set screw with Loctite 222 and tighten using a 1/16" Allen wrench. ***Note:** For further information refer to the Loctite Procedure 121730 provided with this kit.	

5. Apply Loctite 242 to the threads on the feed and install the pol pot assembly loosely as shown here, do not engage the pulley onto the main gear at this time. 7. Follow the calibration procedure of the pot overleaf, to set its range.	
8. Once calibrated engage the pol pot pulley with the main sprocket, verify the pol reading on the DAC is correct and tighten the mounting screws.	
9. Connect the IDC connection to the termination block and secure the harness with cable ties.	

7. Pol Pot Alignment and Verification:

1. Drive the reflector to zero degrees of elevation to view the orientation of the LNB:

   Press the TRACK button to turn the tracking function off (if applicable) to prevent the antenna from going into a search. Push the NEXT button until the 'Antenna' window is displayed (the screen will show the AZ, EL and REL values). Press the ENTER button twice to isolate the 'EL' window and then press the ◄ arrow to activate it (a cursor will be displayed). Now use the ◄ and ► arrow keys to scroll the cursor along and use the ▲ and ▼ arrow keys to change the elevation value to "00.0" and press the ENTER button.

2. Set the Pol Type to manual mode:

   Enter the 'Setup Menu' by pressing and holding the ◄ ► arrow keys together until the "EL Trim' or 'Auto Trim' window is displayed. Push the ▼ arrow key until the 'Polang Type' window is displayed. Press the ◄ arrow key to activate the window. Now use the ◄ and ► arrow keys to scroll the cursor along and use the ▲ and ▼ arrow keys to change the characters. Set the 'Polang Type' to "0009" which is manual mode and press the ENTER button.

3. Press the ENTER button to go to the 'Pol Offset' window and verify the default setting is "0030". (If necessary use arrow keys to select appropriate digits and change accordingly).

4. Now keep pressing the NEXT button until the 'Antenna' window is displayed (the screen will show the AZ, EL and REL values).

5. Press the ENTER button 4 times until 'Pol xxx' is displayed and then press the ◄ arrow key to activate the window.

6. Now hold either the ▲ or ▼ arrow key to drive the pol until a count of "115" is displayed.

   ***Note:** It's advisable to have someone watching the feed while it's being driven as if the pot isn't correctly calibrated there is the possibility to damage the assembly if the LNB hits the pol motor.*

7. Observe the physical alignment of the LNB:

   The LNB should be aligned vertically with the coax cables pointing downwards, as shown below (use the lower feed strut as a guide). If not continue on to step 8, otherwise skip ahead to step 13.

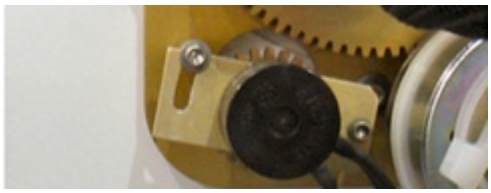
(***Steps 8-12 requires assistance to observe and operate antenna simultaneously***)

8. Using the DAC-2202 drive the feed assembly to vertical:

   Press the ▶ arrow key to activate the cursor on the pol window. Now hold either the ▲ or ▼ arrow key to drive the pol motor until the LNB is aligned vertically with the coax cables pointing downwards (use the lower feed strut as guide). Now press the ENTER button to de-activate the window.

9. Locate the pol pot on the feed and loosen the screw that secures the slotted mounting plate (fig. 1.1) and carefully move the pol pot gear out of alignment with the main drive sprocket (Fig. 1.2).

(Fig. 1.1)



(Fig. 1.2)

10. Align the potentiometer:

    On the DAC verify the cursor is not displayed on the pol window, if it is press the ENTER button (Fig 1.3) failure to do this will result in the display not changing. Now rotate the pot manually until a count of 115 is achieved. Now reinstall the pot on the main sprocket (Fig 1.4).

    Note: When re-installing the pot onto the main sprocket its common for the reading to change as the teeth of the sprockets are engaged. Because of this the tolerance is +/- 2 degrees so 113-117 counts.

(Fig 1.3)

(Fig 1.4)

11. Drive the pol motor to its upper and lower electrical limits and verify the assembly drives in the correct direction and that the feed assembly has 180 degrees of rotation:

    On the DAC press the ▶ arrow key to display the cursor underneath the pol value and then press and hold the ▲ arrow key to drive the feed to its upper end stop and verify the LNB is horizontal with the coax cables towards the right (the pol reading should be approximately 211 counts). Now press and hold the ▼ arrow key to drive the feed to its lower end stop and verify the LNB is horizontal with the coax cables towards the left (the pol count should be approximately 28 counts).

12. Set the Pol Type to Automatic (auto pol):

    Press and hold the ◀ ▶ arrow keys together until the 'EL Trim' or 'Auto Trim' window is displayed. Push the ▼ arrow key to scroll through the settings until the 'Polang Type' window is displayed and press the ◀ arrow key to activate the window. Now use the ◀ and ▶ arrow keys to scroll the cursor along and use the ▲ and ▼ arrow keys to change the value from "0009" to "0072" and then press the ENTER button to put the system back into automatic polang (auto pol) mode.

    Watch the LNB and verify it returns to the correct reception position (while the pol motor is driving the target light will be illuminated on the DAC).

13. Save the settings in the DAC-2202:

    Press and hold the ◀ ▶ arrow keys together briefly, "Save New Parameters" will be displayed. Press the ▶ arrow key to activate the window and then press the ENTER button, "Parameters Saved" will be displayed and the pol type will be stored in the DAC.