Field Service Spares Replacement Procedure – Pol Pot 6006C, 6009C, 9597B & 9507

Approval:

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Revision History

Rev.	ECO	Description of Change	Date
A	8799	Initial release	07-06-2011
B	9063	Clerical revisions	10-30-2011

Field Service Procedure - Replacement Pol Pot Kit, 6006C, 6009C, 9597B & 9507

1. Brief Summary:

Troubleshooting document for diagnosing a fault with and replacing the pol pot on the 6006C, 6009C, 9597B and 9507series 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 8 degrees below at high elevations) the satellites elevation look angle. As part of the antennas targeting procedure the system will calculate the threshold value 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 miss alignment of the feed will cause bad cross pol isolation.

4. Verify Range of Motion:

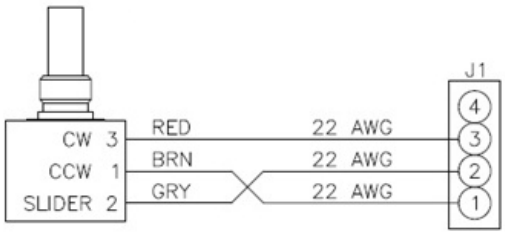
First verify the settings in the DAC are correct, the pol scale should be set to 0090 to give the feed 180 degrees of motion. The default pol offset is 0030 (however these may have been modified slightly to "trim" the pol angle). Turn tracking off (if applicable) and drive the elevation to 0 degrees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

Set the pol type setting in the setup menu of the DAC to "0009" to set the mode of the pol assembly from automatic to manual. Now enter the pol window (after the relative window in the "antenna" screen of the DAC) 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 polang stop plate on the feed should be horizontal facing to the right (when looking face onto the feed).

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 its possible the pot isn't aligned correctly and that adjusting it may bring it back with its range of operation. Back the pot off from the main gear sprocket and rotate its pulley, verify 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 is outputted 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. Now measure the resistance between the slider and the CW contact (red cable, pin 3 on the IDC connector and the grey cable pin 2 on the IDC connector). The feedback should be approximately ok ohms.	
Now slowly rotate the shaft of the pot counter clockwise, the reading should count up sequentially. After five turns the pot will be in the centre of its range giving a resistance of approximately 25k ohms.	
Continue to rotate the pot until the counter clockwise end stop (it will now have turned through all 10 rotations of its range), the resistance should be approximately 5k 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 brown cable pin 1 on the IDC connector) the resistance should be reversed from the previous rotation, reading 0 ohms. Rotating the shaft of the pot clockwise should increase the resistance through its range to 5k ohms. Any error with the pot not giving the correct resistance is an indication the pot is defective and needs replacing.

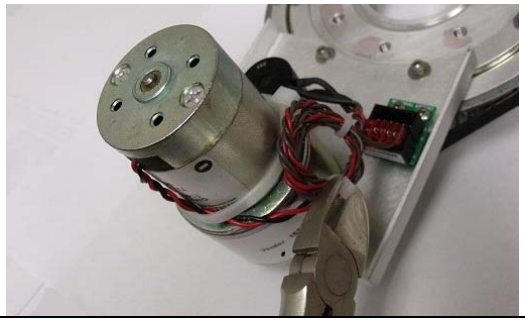
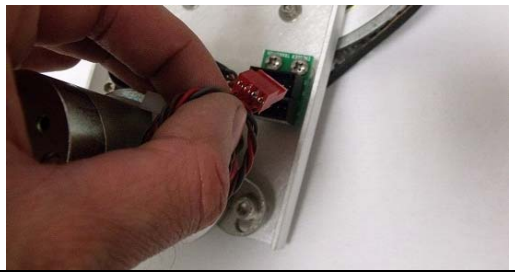
6. Pol Pot Replacement Procedure:

6.1. Tools.

- Snips/Cutters
- 9/64" Allen Wrench/Key
- 3/32" Allen Wrench/Key
- 12mm Wrench/Spanner
- Loctite 222, 242 and 638
- Cable Ties

6.2. Procedure.

Procedure for replacing the Pol Pot on the 6009C, 9597B and 9507 linear C-Band systems, Sea Tel kit part number: 134919 (pot part number: 115425-5).

***CAUTION:** Power down the pedestal before following this procedure. 1. Cut the cable ties securing the pol pot harness.	
2. Disconnect the pol pot IDC connector from the termination block.	
3. Using a 9/64" Allen wrench, remove the pot assembly from the feed.	

4. Install the mounting bracket onto the pol pot using a 12mm wrench. 5. Apply Loctite 638 to the shaft of the pot and install the pulley, apply Loctite 222 to the set screw and install using a 3/32" Allen wrench.	
6. Apply Loctite 242 to the mounting screw and install the replacement pol pot assembly. Do not fully engage at this time.	
7. Secure the pol pot harness with cable ties and reconnect the IDC connector. 8. Follow the below procedure for calibrating the pot.	

7. Pol Pot Alignment and Verification:

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

   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 Polang Type to manual mode:

   Enter the 'Setup Menu' mode 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" for a 9597B or 9507 or "0040" for a 6006C or 6009C. (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.

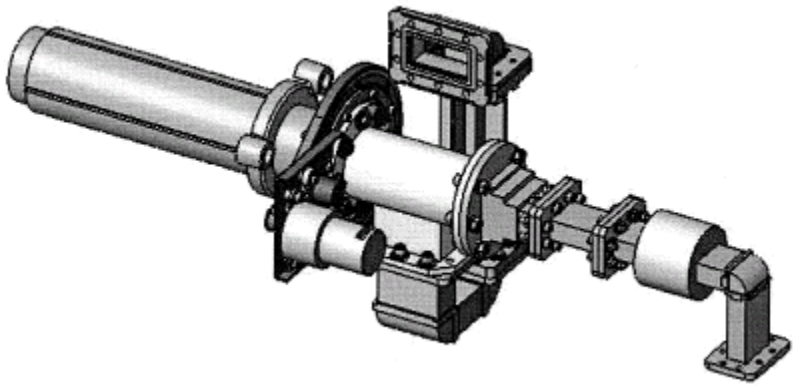
6. Now hold either the ▲ or ▼ arrow key to drive the pol until a count of either "130" for the 6006C or6009C, or "120" is displayed for the 9597B and 9507 pedestals.

   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 or the reflector harness is coiled around the feed.

7. Observe the physical alignment of the feed:

   The RX waveguide should be facing downwards with the TX reject filter to the right, vertically with the LNB horizontally above the assembly with the coax exiting to the left. Later revisions of this system use an additional length of waveguide with the filter above the assembly horizontally, and the LNB facing downwards on the left side (as shown on the below image).

Note: LNB not shown for clarity.



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

8. Using the DAC-2202 drive the feed so the RX waveguide exits vertically.

   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 RX wave guide is facing downwards. Now press the ENTER button to de-activate the window.

9. Locate the pol potentiometer on the feed and loosen the screw that secures the slotted mounting plate with a 9/64" Allen wrench and carefully move the pol pot gear out of alignment with the belt (fig. 1.1).

(Fig. 1.1)

10. Align the potentiometer:

    On the DAC verify the cursor is not displayed on the pol window, if it is press the ENTER button (failure to do this will result in display not changing). Now rotate the pot sprocket manually until a count of either 120 for the 9597B and 9507 or 130 for the 6006C and 6009C is achieved, depending on your antenna model. Now reinstall the pot on the main sprocket.

    Note: *W*hen re-installing the pot onto the belt, it is common for the reading to change as the teeth are engaged. Once the pot had been installed recheck the pol value and adjust if necessary. Due to the belt/sprocket alignment of the pot the tolerance is +/- 2 degrees so 118-122 counts for the 9597B and 9507 and 128-132 for the 6009C.

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 cursor underneath the pol value and then press and hold the  arrow key to drive the feed to its upper end stop. Verify the assembly drives 90 degrees so the exit of the RX wave guide is horizontal, facing the left with the LNB now vertical with the coax facing upwards (provided the LNB was horizontal in the previous step, depending on the configuration of the antenna). 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 feed rotates 180 degrees, with the exit of the RX waveguide horizontally facing the right, and the LNB now vertical with the coax facing downwards (depending on the configuration of the antenna). The pol reading 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 'Pol 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  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  button, "Parameters Saved" will be displayed and the pol type and pol offset will be stored in the DAC.

    ***Note:** If making adjustments to the polarization alignment of a VSAT antenna contacting the NOC to run through a cross-pol isolation test and calibrating the Pol Offset will be necessary.*