




**Field Service Spares Replacement Procedure – Pol Pot Kit, XX04,
XX06, 4003A, XX09 & XX10**

Approval:

| Approving Authority | Signature | Date |
|-----------------------------------|---|----------|
| Doc Control: | Ron Chaffee / Signature on file.  | 11-2-11 |
| Assistant Service Manager, Global | John VanderJagt / Signature on file.  | 11-2 |
| Author: | Stuart Broadfield / Signature on file.  | 11-02-11 |
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Field Service Procedure – Replacement Pol Pot Kit, XX04, 4003A, XX06, XX09 & XX10

1. Brief Summary:

Troubleshooting document for diagnosing a fault with and replacing the pol pot on a XX04, 4003A, XX06, XX09 or XX10 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 8 degrees below at high elevation look angles) the satellites elevation look angle. As part of the antennas targeting procedure the system will target 8 degrees above (or 8 degrees below at high elevation look angles) 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 miss alignment of the feed will cause bad cross pol isolation.

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4. Verify Range of Motion:

Firstly 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 setting for an xx04 series antenna is 0030 and for the xx06, xx09 and xx10 it's 0040 (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 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 to its lower limit. At the lower end of the range the feedback from the pot should be approximately 28 counts (depending on the antenna model). On the 04 series antennas the LNB should be horizontal with the coax cables pointing towards the right, on the xx06, xx09 or xx10 antennas the LNB should be to the left of the OMT with the coax cable pointing upwards (when looking at the feed from the back of the reflector).

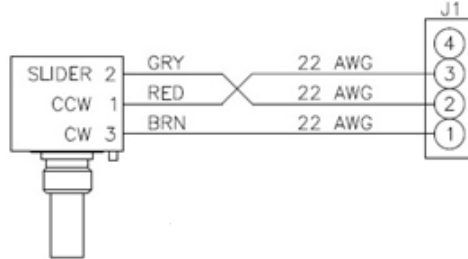
If no pol motor drive is present verify the pol reading on the DAC, isn't out of range (i.e. displaying a value of either 0 or 255). If one of these values are displayed it's possible the pot isn't aligned correctly and that adjusting it may bring it back to within the scale the DAC recognizes. Back the pot off from the main gear sprocket and rotate its pulley, verifying if the feedback changes on the DAC once the pot has been realigned. If so calibrate the pol pot and verify its 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.

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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 – 5 ohms is outputted correctly. Disconnect J1 from motor termination PCB assembly.



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| <p>Looking down onto the shaft of the pot rotate it clockwise until it reaches its end stop.</p> <p>Now measure the resistance between the slider and the CCW contact (grey cable, pin 2 on the IDC connector and the red cable pin 3 on the IDC connector).</p> <p>The feedback should be approximately 5k ohms.</p> | |
| <p>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.</p> | |
| <p>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.</p> | |

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 5 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.

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6. Replacing the Polang Potentiometer Assembly:

6.1. Tools.

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

6.2. Procedure.

Procedure for replacing the pol pot assembly, Sea Tel kit part number: 124109-2 (pol pot part number: 115425-2).

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| <p>*CAUTION: Power down the pedestal before following this procedure.</p> <p>1. Using a pair of snips, cut the tie wrap which secures the pol pot harness to the pol motor assembly and disconnect the pol pot IDC connector from the motor termination PCB.</p> <p>2. Using a 3/32" Allen wrench remove the two screws attaching pol pot bracket to the feed and remove the pol pot assembly. Take care not to lose the installing hardware.</p> |  |
| <p>3. Using the components from the replacement kit install the replacement bracket onto the pot with the wires in the same orientation as on the defective pot assembly. Secure it in place using the nut and lock washer, tighten with a 12mm wrench.</p> |  |
| <p>4. Apply Loctite 638 to the inside of the sprocket and fit it to the shaft in the same position as on the defective pot. Secure the sprocket using Loctite 222 on the set screw and tighten with a 3/32" Allen wrench.</p> <p>*Note: For further information refer to the Loctite Procedure 121730 provided with this kit.</p> |  |
| <p>5. Install the pol pot into the feed assembly using the hardware removed earlier; apply Loctite 242 to the threads.</p> <p>6. Do not engage the sprocket onto the main gear at this time; refer to the following calibration procedure of the pot, to set its range.</p> <p>*Note: Damage may occur if the feed is allowed to drive without the pot being engaged. Ensure the Pol Type is set to "ooog".</p> |  |

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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' 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 "0015" for a 4003A antenna, "0030" for an xx04 series antenna or "0040" for an xx06, xx09 or xx10 series antenna. (If necessary use arrow keys to select the 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 "105" for the 4003A antenna, "120" for the XX04 series or "130" for the XX06, XX09 and XX10 series 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 or the reflector harness is coiled around the feed.

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7. Observe the physical alignment of the LNB:

For the 4003A antenna the LNB should be aligned vertically with the coax pointing upwards, the LNB of the xx04 series antennas should be aligned vertically, for the xx06, xx09 and xx10 series antennas the LNB should be aligned horizontally with the coax pointing to the right (as shown below). If not continue on to step 8, otherwise skip ahead to step 12.



4003A







xx04



xx06, xx09 & xx10

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

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

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 for the xx04 series antennas or horizontally for the xx06, xx09 and xx10 series antennas. Now press the  button to de-activate the window.

9. Locate the pol potentiometer on the feed and loosen the screw that secures the slotted mounting plate (fig. 1.1) with a 3/32 Allen wrench and then carefully move the pol pot gear out of alignment with the main 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  button (Fig 1.3) (failure to do this will result in display not changing). Now rotate the pot manually until a count of 105 is achieved for the 4003A antenna, 120 is achieved for the xx04 series antennas or 130 for the xx06, xx09 and xx10 series antennas. 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 118-122 for an XX04 series antenna and 128-132 for an XX06, XX09 or XX10 series antenna.

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(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 cursor underneath the pol value and then press and hold the  arrow key to drive the feed to its upper end stop. Verify the xx04 series LNB is horizontal with the coax cable towards the left or if using an xx06, xx09 or xx10 series the LNB should be vertical, to the right of the OMT with the coax pointing downwards (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 xx04 series LNB is horizontal with the coax cables towards the right or if using an xx06, xx09 or xx10 series the LNB should be vertical, to the left of the OMT with the coax pointing upwards (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  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).

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

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.