

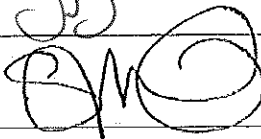


Field Service Spares Replacement Procedure – Pol Motor Kit, 2406

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Revision History

Rev.	ECO	Description of Change	Date
X1	8878	Initial release	08-18-2011
A	9059	Clerical revisions	10-30-2011

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Field Service Procedure – Pol Motor Kit, 2406

1. Brief Summary:

Troubleshooting document for diagnosing a fault with and replacing the pol motor on the 2406 series antenna.

2. Checklist:

- Verify Range of Motion
- Verify Pot Range
- Measure Motor Voltage
- Verify Harness

3. Theory of Operation:

The antennas feed assembly is driven through its 180 degree range of motion by a 12VDC stepper motor for the correct orientation of the linear signal. Based on the vessels GPS position and the look angle to the desired satellite the DAC will calculate the numerical value for the position of the pol assembly, the PCU will then send the command to the POL Aux relay to issue voltage to drive the pol motor until the pol pot outputs the correct value at which point the feed will be aligned to the polarity of the satellite signal (provided s been calibrated correctly). Then as the vessel sails and the GPS position changes the look angle to the satellite will also change and adjustments will be made to maintain good cross pol isolation (alignment to the satellites linear signal).

An indication that there is a fault with the feed alignment of the system is the target light will be permanently illuminated on the DAC and the antenna won't target correctly, sitting 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 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 before targeting the satellite.

If the system is unable to drive the pol motor so the correct feedback is received from the pot or the pot has failed and won't give the correct feedback the system can't complete the targeting 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:

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 "0040" for the xx06, xx09 and xx10 it's "0040", however these may have been modified slightly to "trim" the pol angle.

Set the pol type setting in the setup menu of the DAC to "0009" to change the mode of the pol assembly from automatic (pol type "0072") to manual. This removes the automatic calculation based on the vessels GPS position and allows the feed assembly to be manually driven for diagnostic purposes. Now enter the pol window and drive the pol assembly down into its end stop, observe the position of the feed. Now drive the pol assembly up, the feed should move 180 degrees under normal operation.

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5. Verify Pot Range:

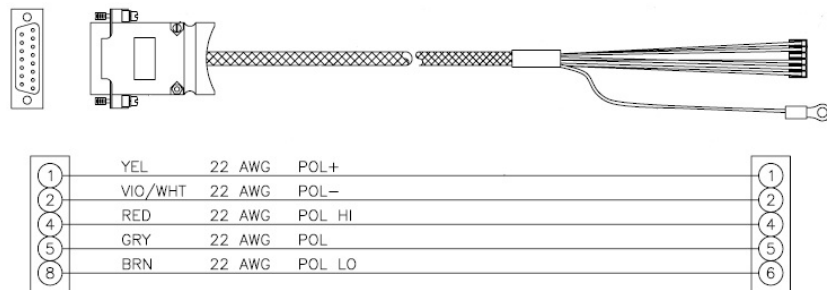
If no feed drive is present verify the pol reading on the DAC isn't out of range (i.e. displaying a value of either 0 or 255). If one of these values are displayed its possible the pot isn't aligned correctly and that adjusting it may bring within its range. Back the pot off from the main gear sprocket 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 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, no drive will be issued to the pol motor as the value is out of the range which the system operates in. Then the pol pot must be changed.

6. Measure Motor Voltage:

Leaving the pol type in manual mode, apply drive to the feed assembly and measure the voltage to the motor on the IDC connector, 12VDC should be present. If voltage is present but the motor isn't driving the motor is defective and need replacing.

If no voltage is present verify the connections of the reflector harness by measuring pin to pin as per the below diagram for the relevant model of antenna.



If the harness connections are good, then the pol aux isn't outputting the voltage to drive the motor and needs replacing.

As long as the pol range is within the pot limits the DAC will issue the pol drive command to the PCU motherboard, based on the antenna targeting, a change in the vessels GPS position or operator inputs. The PCU motherboard will then issue the command to switch the pol aux relay to drive the pol motor. The motor will then drive the feed until the correct output from the pot has been received, at which point the feed will be in the correct reception position (providing the system is functioning and calibrated correctly). Therefore there is also the possibility for a pol drive fault to be caused by the PCU motherboard.

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7. Replacing the 2406 Polang Motor:

7.1. Tools.

- 5/16" Wrench/Spanner
- 7/16" Wrench/Spanner
- 1/4" Wrench/Spanner
- 5/32" Allen Wrench/Key
- Snips/Cutters
- Loctite 222, 242 & 638
- Cable ties/Tie wraps

7.2. Procedure.

Procedure for replacing the 2406 polang motor, using Sea Tel kit part number: 134924 (Pol motor part number: 124069-2).

***CAUTION:** Power down the pedestal before following this procedure.

1. Disconnect the IDC connector of the reflector harness from the termination block and remove the ground cable using a 5/64" wrench.
2. Undo the coax cable from the LNB using a 7/16" wrench and undo the TX SMA cable from the waveguide rotary joint with a 5/16" wrench.

***Note:** The orientation of the feed assembly for when it comes to re-fitting it.







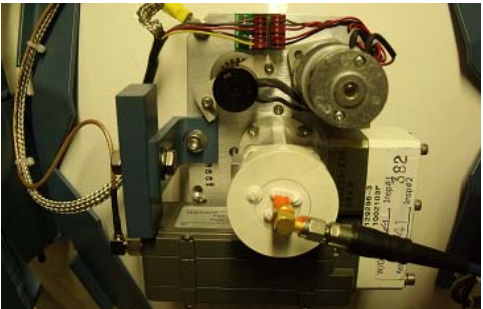
3. Using a 1/4" wrench, remove the four hex nuts and washers and remove the vertex feed tube and set aside. Save all hardware for future use.



4. Now using a 1/4" wrench or socket remove the four nuts and washers securing the feed assembly to the reflector. Support the weight of the feed whilst undoing the nuts and remove it from the reflector.








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<p>5. Remove the cable ties securing the pol pot and motor harnesses and disconnect the IDC connectors from the termination block.</p>	
<p>6. Using a 5/32" Allen wrench, remove the two bolts securing the 12VDC polang motor to the feed assembly.</p>	
<p>7. Fit the pulley to the replacement polang motor in the same position as on the defective motor, applying Loctite 638 to the motor shaft and Loctite 222 to the set screws.</p> <p>*Note: For further information refer to the Loctite Procedure 121730 provided with this kit.</p> <p>8. Install the replacement motor to the feed assembly, applying Loctite 242 to the hardware.</p> <p>9. Connect the pol motor IDC connector and secure the excess harness with cable ties.</p>	
<p>10. Install the feed assembly onto the reflector in the same orientation it was removed in at the beginning of this procedure. Install the 4 washers, split washers and nuts to the outer set of threads with Loctite 242.</p> <p>11. Then install the feed horn using the smaller sets of washers, split washers and nuts using Loctite 242.</p>	
<p>12. Reconnect the reflector harness IDC connector and the ground connection.</p> <p>13. Reconnect the coax cable to the LNB and the SMA cable to the waveguide rotary joint.</p>	









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8. 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' 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 pol 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 "0040". (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.

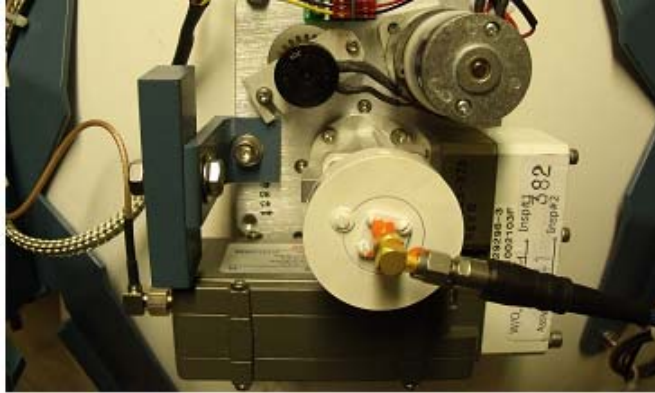
6. Now hold either the  or  arrow key to drive the pol until a count of "130" is displayed.

***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.

7. Observe the physical alignment of the LNB:





The LNB should be horizontal (as shown below). If not continue on to step 8, otherwise skip ahead to step 12.

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(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 horizontally. 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 key 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 130 is displayed. 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 128-132 counts.






(Fig 1.3)












(Fig 1.4)

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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 LNB is vertical, to the left of the OMT with the coax cable pointing upwards (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 should be vertical, to the right of the OMT with the coax pointing downwards (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 '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).

***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.

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.