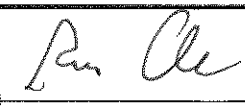
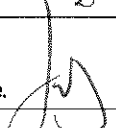
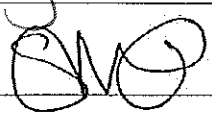


Field Service Spares Replacement Procedure – EL Motor Kit, ST24

Approval:

Approving Authority	Signature	Date
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Revision History

Rev.	ECO	Description of Change	Date
A	9145	Initial release	03-07-2012

Field Service Procedure – Replacement EL Motor Kit, ST24

1. Brief Summary:

Troubleshooting document for diagnosing a fault with and replacing the elevation motor and encoder on the ST24 antenna.

2. Checklist:

- Verify Initialization
- Run the Built-In Test

3. Theory of Operation:

The elevation motor on the ST24 antenna features an integrated encoder for feedback into the PCU of the elevation look angle of the system. During the initialization process the system drives down in elevation until the reflector comes into contact with the end stop, at this point the elevation position is calibrated and the encoder will count elevation increments/decrements accordingly.

After initialization the system will target the elevation look angle for the desired satellite based on the vessels GPS location. Once the satellite has been acquired elevation drive will be issued to counteract the vessels movement & maintain stabilization based on feedback from the rate and tilt sensors on the PCU motherboard. Once the tracking function of the antenna is enabled elevation drive will also be issued to optimize the receive signal level, based on feedback from each dishscan revolution.

4. Initialization:

To reinitialize the pedestal, cycle the Power to the antenna by toggling the power switch to the GACP control panel. During the initialization process the antenna will calibrate the encoders on the elevation and pol motors as well as verifying the motor drive and acquiring GPS lock. The initialization process is as follows:

1. EL drive – The elevation axis drives down into its end stop to calibrate the encoder and then up to a zero degree look angle.
2. Pol Drive – The feed drives counter clockwise into its end stop to calibrate the encoder and then drives clockwise until the LNB is vertical.
3. EL Drive 45 – The elevation axis then drives the reflector to a 45 degree look angle

Once the initialization process is complete the system will then target the last preset satellite in the GACP.

5. Run the ST24 Built-In Test:

To run the internal system test on the ST24 antenna access the home page of the control panel. If there is a locked padlocked displayed in the lower right corner of the screen, press this to access the options.

Select the antenna option from the home page and then select the advanced options, you'll now see the option to run "system test". Select the system test option to display the different tests available. You'll now have the following options:

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5.1. Power on Self Test Results PCU:

Displays the PCUs test results for the elevation motor and encoder, pol motor and encoder, azimuth motor, tilt sensor, rate sensors, GPS, and some internal communication tests which were recorded when the antenna was last initialized. Possible Failure results are:

1. EL Motor and Encoder – Loose connection, a winding is down in the motor, encoder failure. Verify connection, replace the motor.
2. Pol Motor and Encoder – Loose connection, a winding is down in the motor, encoder failure. Verify connection, replace the motor.
3. AZ Motor – Loose connection, a winding is down in the motor. Verify the connection, replace the motor. This test is not currently active at time of print contact your local Sea Tel service department to verify if it's supported by your PCU software (version 1.11 or higher).
4. Tilt (MEM) Sensor – Failure of the solid state accelerometer or the pedestal is tilted more than 15 degrees, rerun test with pedestal level, or replace the PCU.
5. Rate Sensor – Failure of one of the rate sensors, replace the PCU. This test is not currently active at time of print contact your local Sea Tel service department to verify if it's supported by your PCU software (version 1.11 or higher).
6. GPS – The GPS is only tested during the in service test due to the amount of time required for the GPS antenna to acquire lock.
7. Processor – Failure of the main PCU processor to communicate properly with onboard devices, replace the PCU.
8. Tuner Communication – Failure of the DVB tuner, replace the PCU.

5.2. In Service Test PCU:

Tests the internal components on the PCU PCB including the tilt (MEM) sensor, rate sensor, GPS, processor and tuner communication. Possible Failure results are:

1. Tilt (MEM) Sensor – Failure of the solid state accelerometer or the pedestal is tilted more than 15 degrees, rerun test with pedestal level, or replace the PCU.
2. Rate Sensor – Failure of one of the rate sensors, replace the PCU.
3. GPS - No active GPS update, verify connection, replace GPS antenna, or replace PCU.
4. Processor – Failure of the main PCU processor to communicate properly with onboard devices, replace the PCU.
5. Tuner Communication – Failure of the DVB tuner, replace the PCU.

5.3. Out of Service Test PCU:

This will take the antenna off satellite by doing a software reset of the PCU, reinitializing the system. In doing this it re-runs the PCU's power on self test which include the elevation motor and encoder, pol motor and encoder, azimuth motor, tilt sensor, rate sensors, GPS, and some internal communication tests. Possible Failure results are:

1. EL Motor and Encoder – Loose connection, a winding is down in the motor or encoder failure. Verify the connection, replace the motor.
2. Pol Motor and Encoder – Loose connection, a winding is down in the motor or encoder failure. Verify the connection, replace the motor.

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3. AZ Motor – Loose connection, a winding is down in the motor. Verify the connection, replace the motor. This test is not currently active at time of print contact your local Sea Tel service department to verify if it's supported by your PCU software (version 1.11 or higher).
4. Tilt (MEM) Sensor – Failure of the solid state accelerometer or the pedestal is tilted more than 15 degrees, rerun test with pedestal level, or replace the PCU.
5. Rate Sensor – Failure of one of the rate sensors, replace the PCU. This test is not currently active at time of print contact your local Sea Tel service department to verify if it's supported by your PCU software (version 1.11 or higher).
6. GPS – The GPS is only tested during the in service test due to the amount of time required for the GPS antenna to acquire lock.
7. Processor – Failure of the main PCU processor to communicate properly with onboard devices, replace the PCU.
8. Tuner Communication – Failure of the DVB tuner, replace the PCU.

5.4. Power on Self Test Results Panel:

Displays the control panels test results for the GACPs processor, touch screen, modem board and PCU communications which were recorded when the antenna was initialized. Possible Failure results are:

1. Processor - Failure of the GACP processor, replace the GACP.
2. Touch Screen - Failure of the GACP touch screen, replace the GACP.
3. Modem Board - Failure of the GACP modem board, replace the GACP.
4. PCU (communications) – Failure of communication with the PCU verify cable, verify voltage to the PCU/antenna powered, replace the GACP.

5.5. In Service Test Panel:

Tests the internal components on the control panel including the GACP processor, touch screen, modem board and PCU communications. Possible Failure results are:

1. Processor - Failure of the GACP processor, replace the GACP.
2. Touch Screen - Failure of the GACP touch screen, replace the GACP.
3. Modem Board - Failure of the GACP modem board, replace the GACP.
4. PCU (communications) – Failure of communication with the PCU verify cable, verify voltage to the PCU/antenna powered, replace the GACP.

5.6. Out of Service Test Panel:

Runs the panels power on tests which include the GACP processor and touch screen. Possible Failure results are:

1. Processor - Failure of the GACP processor, replace the GACP.
2. Touch Screen - Failure of the GACP touch screen, replace the GACP.

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6. Replacing the Elevation Motor:

6.1. Tools.

- #1 Phillips Screwdriver
- Snips/Cutters
- 3mm Allen Wrench/Key
- 10mm Wrench/Spanner
- Cable Ties/Tie Wraps
- Loctite 242

6.2. Procedure.

Procedure for replacing the elevation motor assembly, Sea Tel kit part number: 135918 (motor assembly part number: 133094-1).

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

1. Using a #1 Phillips screwdriver remove the 4 screws securing the PCU PCB cover to the yoke. Save the hardware for future use.



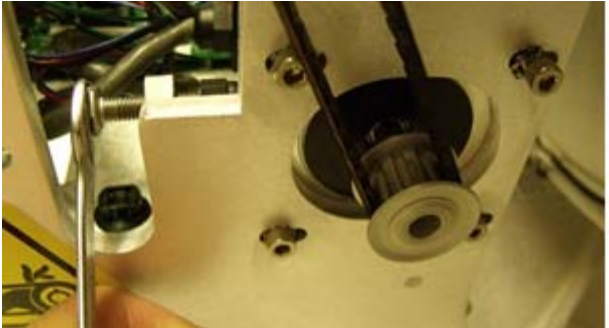

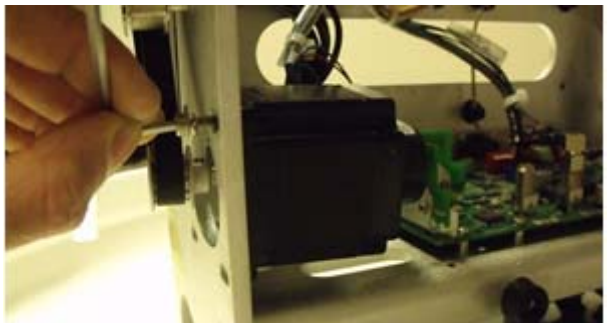

2. Disconnect the elevation motor and encoder IDC connectors from the PCU PCB.





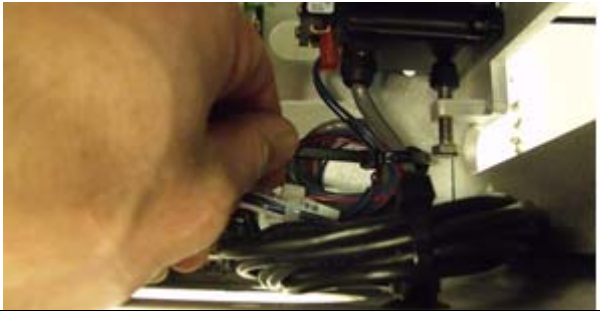
3. Cut the cable ties securing the elevation motor and encoder harnesses to the yoke using a pair of snips.



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<p>4. Back off the tensioning bolt using a 10mm wrench.</p>	
<p>5. Remove the 4 screws securing the motor assembly to the yoke and remove the defective motor. Save the hardware for future use.</p>	
<p>6. Install the replacement motor assembly with the harness pointing to the rear or the pedestal. Apply Loctite 242 to the threads of the hardware removed in the previous step. Do not fully tighten them at this time.</p>	
<p>7. Apply Loctite 242 to the thread of the tensioning screw and tighten it, checking the belt tension periodically as per the following step.</p>	

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<p>8. Verify the belt tension by rotating the belt at the central point between the main drive sprocket and motor pulley. The belt should be easily rotated through to 90 degrees at which point it should become tight.</p> <p>If the belt can easily be rotated past 90 degrees the tension is too loose, if it can't be rotated to 90 degrees the tension is too tight.</p> <p>9. Once complete tighten the 4 motor mounting screws and re-check the belt tension. Adjust if necessary.</p>	
<p>10. Connect the elevation motor and encoder IDC connectors to the PCU PCB.</p>	
<p>11. Secure the elevation motor and encoder harnesses to the yoke using a cable tie.</p>	
<p>12. Refit the PCU PCB cover to the yoke using the hardware removed in step 1, applying Loctite 242 to the threads.</p>	