Critical Item: Potentiometer, Trolley (2 Total, 1/Crane)

Find Number: RPOT

Criticality Category: 2

SAA No:	09FY12-005	**System/Area:**	250-Ton Bridge Crane (#1 & #2)/VAB
NASA Part No:	NA	**PMN/ Name:**	K60-0533, K60-0534/ 250-Ton Bridge Crane (#1 & #2)/VAB
Mfg/ Part No:	Ohmite/ RHS750	**Drawing/ Sheet No:**	69-K-L-11388/ 27

Function: Reference potentiometer connected to the master control switch (joystick), 4MC, to regulate the input excitation voltage to the generator field DC input controller, 4FC, and the resulting output to the generator field winding for trolley speed control during operations.

Critical Failure Mode/Failure Mode No: Fails Open/09FY12-005.097

Failure Cause: Corrosion, fatigue.

Failure Effect: If the failure occurs on the resistive element, it would result in a loss of the parallel resistance branch will create a larger input into the DC generator field controller which will cause an increasing speed of the DC motors controlling the trolley. The worst case scenario would be moving a critical load (SRB segment, Orbiter, or ET) in the slow coarse speed mode (maximum coarse speed is 50 ft/min), the failure occurring, causing a sudden increase to full coarse speed and the effect being the critical load striking a VAB wall or work platform resulting in possible damage to a vehicle system. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

Rated Power	Actual Power
25 watts	.18 watts
Rated Voltage	**Actual Voltage**
300 volts	12 volts
Rated Current	**Actual Current**
.176 amps	.015 amps

- Material:
  - Body: Ceramic
  - Windings: High grade resistance alloy
  - Coating: Vitreous enamel
  - Contact Arm: Metal graphite composition
  - Terminals: Solder coated
- Resistance tolerance: +/- 10 %

Test:

- OMRSD file VI requires verification of proper performance of the trolley operational test annually.
- OMI Q3008, Operating Instructions, requires all crane systems to be operated briefly in all speeds to verify satisfactory operation before lifting operations.

Inspection:

- This item is not readily accessible for inspection. OMI Q6003, Maintenance Instructions, instructs that inspections shall not entail any disassembly of equipment.

Failure History:

- The PRACA database was researched and no failure data was found on this component in the critical failure mode.
- The GIDEP failure data interchange system was researched and no failure data was found on this component in the critical failure mode.

Operational Use:

- Correcting Action:
  1) The failure can be recognized via the ammeter (increase in current) and the Selsyn (positions change) that is in view of both operators.
  2) When the failure indication is noticed, the operator can stop all crane operations by pressing the E-Stop button or returning the Master Control Switch to neutral.
  3) When the failure occurs in the fine speed mode of operation, the motor generator set will be shut down by an overvoltage protection relay when the voltage in the DC motor loop reaches 115% of the full fine voltage output.
  4) Operators are trained and certified to operate these cranes and know and understand what to do if a failure indication is present.
  5) During all critical lifts, there is at least one remote Emergency Stop (E-Stop) operator observing the load lift, and can stop the crane if a failure indication is noticed.
  6) Operationally, the crane must be operated in the fine speed mode if a critical load is within 10 feet of any structure in the direction of travel.

- Timeframe:
  - Estimated operator reaction time is 3 to 10 seconds.