

SAA09FY12-006
REV. BB/L: 389 00
SYS: 175-TON
BRIDGE
CRANE, VABCritical Item: Potentiometer, Trolley
Find Number: RPOT
Criticality Category: 2

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SAA No:	09FY12-006	System/Area:	175-Ton Bridge Crane/VAB
NASA		PMN/	K60-0528/
Part No:	NA	Name:	175-Ton Bridge Crane/VAB
Mfg/	Ohmite/	Drawing/	67-K-L-11348/
Part No:	RHS750	Sheet No:	27

Function: Reference potentiometer connected to the master control switch, 4MC, (joystick) to control 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: Fail open/09FY12-006.116

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 which will create a larger input into the generator field DC input controller which will cause an increasing speed of the DC motors controlling the trolley. The worst case would be attempting to move an External Tank (ET) or the aft end of the orbiter while in the coarse mode of operation, the failure occurring, causing a sudden increase to full coarse speed and the effect being the ET or the aft end of the orbiter striking the VAB wall or platform, resulting in possible damage to a vehicle system. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

<u>Rated Power</u>	<u>Actual Power</u>
25 watts	.18 watts
<u>Rated Voltage</u>	<u>Actual Voltage</u>
300 volts	12 volts
<u>Rated Current</u>	<u>Actual Current</u>
.176 amps	.015 amps

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- 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 be operated briefly in all speeds to verify satisfactory operation before lifting operations.
- OMI Q3008, Pre-Operation Setup Instructions, requires current limit checks prior to all major lifts of flight hardware (verifies motor, generator, generator field DC input controller, float control loop and DC power loop components are operational).

Inspection:

- This item is not readily accessible for inspection. OMI Q6003, Maintenance Instructions, instructs that inspections shall not entail 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 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 returning the Master Control Switch to neutral or pressing the E-Stop button.
 - 3) If the speed increase 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 full fine voltage.
 - 4) Operationally, the crane must be operated in the fine speed mode if a critical load is within 10 feet of any structure.
 - 5) Operators are trained and certified to operate these cranes and know and understand what to do if a failure indication is present.

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6) 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.

• Timeframe:

- Estimated operator reaction time is 3 to 10 seconds.