

B/L: 389.00

SYS: 250-TON

BRIDGE

CRANE, VAB

**Critical Item:** Resistor, Fixed, Main Hoist (4 Total, 2/Crane)  
**Find Number:** 1RR4A, 1RR4B (1ea/Crane)  
**Criticality Category:** 2

<b>SAA No:</b> 09FY12-005	<b>System/Area:</b> 250-Ton Bridge Crane (#1 & #2)/VAB
<b>NASA Part No:</b> NA	<b>PMN/Name:</b> K60-0533, K60-0534/ 250-Ton Bridge Crane (#1 & #2)/VAB
<b>Mfg/Part No:</b> DIGI-KEY/ P 1.6KW-2	<b>Drawing/Sheet No:</b> 69-K-L-11388/ 15

**Function:** Provides a voltage divider for the +/- 6VDC power source to the potentiometer, R-POT, in the master controller (joystick), 1MC, for input to the generator field DC input controller, 1FC, to allow for main hoist operation in the fine speed mode.

**Critical Failure Mode/Failure Mode No:** Fails open/09FY12-005.072

**Failure Cause:** Contamination, corrosion, fatigue

**Failure Effect:** No generator field DC input controller excitation voltage in the fine speed mode of operation. No generator field winding voltage. No output from the generator. No hoist motor torque when the command is given, via the master control switch, to raise or lower the load while the brakes are released. The load will descend with regenerative braking at 0.25 ft/min (0.05 in/sec) max (based on maximum load capacity of the hoist, in reality this would descend slower). The worst case would be attempting to lift a critical load (SRB segment, Orbiter, or ET) from the stop position, releasing the brakes, the failure occurring, and the effect being the critical load descending and striking the VAB floor, transporter, work platforms, MLP, or Shuttle Stack resulting in possible damage to a vehicle system. Time to effect: seconds.

#### ACCEPTANCE RATIONALE

##### Design:

- 1600 Ohm Resistor
- 5% Metal Oxide Film Resistor
- Resistance tolerance: +/- 5%.
- Meets overload tests in accordance with MIL (Underwriters Laboratories) specification #1412 without producing a fire hazard.

- Withstands solvents in accordance with Mil-Std-202E without producing mechanical or electrical damage.
- Temperature coefficient: +/- 100 PPM/°C typ., +/- 200 PPM/°C max.
- Maximum working voltage: 350 volts
- Actual working voltage: 6 volts
- Rated power: 2 watts
- Actual power: 0.0082 watts

**Test:**

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

**Inspection:**

- OMI Q6003, Maintenance Instructions, requires annual inspection of resistors for deterioration/discoloration caused by corrosion or overheating.

**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 (lack of 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) Operators are trained and certified to operate these cranes and know and understand what to do if a failure indication is present.
- 4) 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.
- 5) Operationally, the crane must be operated in the fine or float speed mode if a critical load is within 10 feet of any structure in the direction of travel.
- 6) During final SRB mate, all crane operations are ceased and final mate is accomplished by use of the 250-Ton Hydra-Set.

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• **Timeframe:**

- Estimated operator reaction time is 3 to 10 seconds.