B/L: 389.00
SYS: 250-TON
BRIDGE
CRANE, VAB

Critical Item: Meter Relay, Main Hoist (2 Total, 1/Crane)

Find Number: M1

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:	Larson Instrument Co./ CMC 3.5 4-L	**Drawing/ Sheet No:**	69-K-L-11388/ 15

Function: Controls relay K10 to scale current reading on console ammeter by a factor of 10 when the hoist motors cufrent reaches 60 amps. Also controls PL34 to indicate to operator when current reading is scaled.

Critical Failure Mode/Failure Mode No:
High/Low limit No. 2 N.C. contact fails open/09FY12-005.029

Failure Cause: Corrosion, binding mechanism

Failure Effect: Relay K10 will not be energized and the current reading on the console ammeter will be scaled without indication from console light PL34. This could lead to an operator giving an erroneous input during float operations resulting in an inadvertent movement of the load causing possible damage to vehicle system. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

Rating	Actual
115 volts	120 volts

- This relay was off-the-shelf hardware selected by the crane manufacturer for this application.

Test:

- OMRSD file VI requires verification of proper performance of hoist operational test annually.

- OMRSD File VI requires verification of proper performance of console ammeter switch-over point (main hoist-60A, aux. hoist-20A) annually.
- OMI Q3008, Operating Instructions, requires all crane systems be operated briefly in all speeds to verify satisfactory operation before lifting operations.

Inspection:

- This is a self-contained unit with contacts that are 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 failure data was found on this component in the critical failure mode.
  - The failures occurred on 7/23/91, 8/14/91, and 10/3/91.
  - The failure cause was binding mechanism.
  - The correcting action was remove and replace the relay.

  NOTE: The failures did not necessarily occur on these crane drive systems. The failure may have occurred on either the main or auxiliary hoist drive systems of one of these two cranes or the VAB 175-Ton Bridge Crane.
- 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 (inadvertent movement) 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 releasing the brake switch.
  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.
- Timeframe:
  - Estimated operator reaction time is 3 to 10 seconds.