

JUN 10 1997

Critical Item: Relay K1
Find Number: 78K00205 1 ea.
Criticality Category: 1S

SYSTEM	AREA	CRIT	TOTAL LRU'S
Hypergol Vapor Detection Sys	LOA	1S	1

SAA No: 09IT09-001 **System/Area:** LPS/CCMS/FR1/FR2/CR3/CR4
NASA **PMN/** L72-0400-03
Part No: 78K00205 **Name:** HIM
Mfg/ **Drawing/**
Part No: 78K00205 **Sheet No:** MCR7656 VOL. III 4.2 (REV CY)

Function: This HIM Critical Item is used in support of a critical user system. It provides power supply protection during a power up sequence of a HIM.

Critical Failure Mode/Failure Mode No: * Failure Mode - Fails to Remain Closed/09IT09-001.482

* Relay K1 failures could result in loss of power to HIM DC power supply causing the HIM to fail resulting in loss of the data path for the critical system being monitored/controlled.

Failure Cause: Electrical/Electronic failure of LRU piece part

Failure Effect:

SYSTEM	FAILURE EFFECT	CRIT
Hypergol Vapor Detection System (LOA)	Loss of output signal will fail to provide the console operator with an input that would indicate a leak in the hypergol propellant servicing system. Loss of the capability to detect a leak during hazardous operations could result in loss of life and/or vehicle. Time to effect: Immediate. Detection method: Software detects loss of HIM functions.	1S

Relay K1 (Continued)

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ACCEPTANCE RATIONALE

Design: The Relay K1 was designed per the requirements of the following documents.

1. CP09IT0910: General design requirements specification for LPS/CCMS.
2. CP09IT0916: Contract end item assembly specifications for HIM for LPS/CCMS.

Test: Rigorous sets of acceptance tests were performed to verify performance and design requirements of the LPS/CCMS. This process occurred on each end item from "In Process Assembly" phase to "Site Acceptance". Master control procedures (MCPs) 78K-M401 and 78K-M701 were utilized for acceptance testing by MMC. Following this acceptance testing IBM performed integrated testing of each set. Test procedures KSC-LPS-IB-086, Book 3 and KSC-LPS-IB-105, Book 5 were utilized.

Hypergol Vapor Detection Sys

- OMRSD File VI Volume 1 requires a sensor functional test prior to each flow. OMI V3542 "Hypergol Vapor Detection System Operations Support (LPS)" provides this end-to-end verification of the system (LPS/HVDS).
- During loading operations, personnel are stationed on the RSS to provide visual monitor.

Inspection: LPS system integrity is continuously monitored by on-line software programs. These programs provide health and status to system operators. OMRSD, File VI requires verification of backup power to be performed every 360 days on the hardware interface module which contains this LRU. OMI C6040 "HIM Preventive Maintenance" satisfies this requirement. Proper HIM operation is verified by each user system as part of the end-to-end verification of their integrated system.

Failure History:

The PRACA Data Base was used for this analyses (timeframe APR. 88 to Sep. 90). There were no Problem Reports initiated on Relay K1 that relate to failure modes depicted on this CIL sheet. There is a total population of 197 Relay K1's installed in various CCMS Station Sets. In the basic SAA the timeframe of Jan. 84 to Mar. 88 was used with 0 Problem Reports identified from a total population of 171 relays installed. Operation use varies from 7 days a week, 24 hours a day to as required.

Operational Use:

- Correcting Action:
Troubleshooting required to isolate and replace failed unit.
- Timeframe:
Varies, troubleshooting required.