

SAA09SY07-007
REV. B
B/L: 3,10,8
SYS: UV FIRE
DETECTORS

JUL 3 0
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ATTACHMEN
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Critical Item: Ultraviolet Fire Detector (18 ea)

Find Number: FD18, FD27, FD29, *FD31, *FD32, *FD36, & *FD37.

*-1 per MLP (12 total)
Others=1 per Pad (6 total)

Criticality Category: 1S

SAA No: 09SY07-007

System/Area: UV Fire Detectors/
Pads A and B

NASA
Part No: 79K12796-2

PMN/ S70-1222
Name: Ultraviolet Fire Detectors

Mfg/ Scientific Instruments
Part No: 72000

Drawing/ 79K40025/79K09203/79K06414/79K40032
Sheet No:

Function: Detects hydrogen fire by sensing ultraviolet light radiation for the purpose of personnel/vehicle safety.

Critical Failure Mode/Failure Mode No:

Alarm output fails "off"/FM No. 09SY07-007.001 thru 09SY07-007.018

Failure Causes: Internal component failure.

Failure Effect: Loss of UV fire detection capability at the affected location. Could result in loss of life during hazardous conditions. Failure may occur undetected.

Acceptance Rationale

Design:

- o The UV fire detectors are designed per 79K08421, specification for UV Fire Detector S70-1222:

Sensitivity and Range - The sensor shall be capable of detecting burning:

- A. Hydrogen flowing at a rate of 5 liters per minute from a 1/16 stainless steel orifice at a distance of up to 24 feet.
- B. Hypergolic fuels (monomethyl hydrazine (MMH), aerazine 50, and hydrazine) pool fire from a 6" square pan (.0235sqm) at a distance up to 60 feet.

UV Fire Detector (Continued)

- C. Spectral Sensitivity - The sensor shall be sensitive to ultra-violet(UV) radiation within the spectrum of 1900 to 2900 angstroms.
- o Fire detector design incorporates a Confidence Indicator which provides a console alarm if input +28VDC to the detector is lost or if internal power supply circuits fail.

Inspection: OMRSD File VI presently requires verification of detector alarm responses to remote (LPS) Test Command and Portable UV source prior to LH2/GH2 operations for each flow and after detector replacement. These requirements are satisfied by sequences in OMI G2297 (Pads MPS LH2), V3541 (FCSS-Pads), and M3020 (GH2).

Test: OMRSD requires functional testing prior to each flow. When beyond field repair, defective detectors are sent via LRU PR to subcontractor for repair, calibration, and testing. Reconditioned detectors are placed back into KSC supply as serviceable spares. All detectors are certified operational by the repair contractor. Functional testing is accomplished when device is placed into use.

Failure History:

- o The PRACA database was queried and 86 failures were identified in the critical failure mode (1985-1989). Failures were detected during pre-op/pre-launch checkout. Defective units removed and replaced with serviceable spares. No failures were reported in which a fire detector failed to detect a known fire. Most failures were caused by internal component failures.
- o The GIDEP failure data interchange system has been researched and no failures of this component were found.

Operational Use:

- o Correcting Action:

Failure may occur undetected. There is no action which can be taken to mitigate the failure effect. However, all UV Fire Detectors are monitored by LPS/CCS function designators. Each detector is monitored continuously for available power input and some types of internal failures by confidence alarm indicator.

The OTV system also may be used to help verify area status if detector(s) fail.

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o Timeframe:

No correcting action is available. Therefore, timeframe does not apply.