

SAA09PPA813-003
B/L: 12.00 & 13.00
SYS: HVDS, PADS A
& B

ED40254U
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Critical Item: HVDS Monitor Unit (6 units/Pad)

Find Number: A129915, A129916, A129919, A129920, A129923,
A129926

Criticality Category: 15

SAA No: 09PPA813-003

System/Area: Hypergol Vapor Detection
Subsystem/LOA

NASA
Part No: 80K51753
(79K08420-H1)

PMN/
Name: S70-1221-01/Hypergol Vapor
Detection Unit, Fuel/
Oxidizer

Mfg/
Part No: Energetics Science Div.,
Becton-Dickinson Co./
Ecolyzer Model 7630
(MMH/NO2, 8 ea.)

Drawing/
Sheet No: 79K08420/(Pad A and B)
1-15

Function: Detect the presence of hypergol fuel and oxidizer vapors.

Critical Failure Mode/Failure Mode No: Erroneous output signal during
hazardous conditions/09PPA813-003.002

Failure Causes: HVDS monitor unit component failure (sensor cell, sample
pump, clogged filter, flow control devices or electronic) allowing hypergol
leaks to go undetected.

Failure Effect: If a hypergol spill is encountered, the sensor units will not
transmit the appropriate signal indicating presence of hypergol vapor to CCMS
control console. There is a potential for fire and/or explosion if hypergol
leaks occur leading to potential loss of life and/or vehicle during a
hazardous condition. Failure of the sample pump diaphragm or loss of flow
would go undetected.

Time to Effect: Immediate

Method of Detection: LPS monitors HVDS

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HVDS Monitor Unit (6 units/Pad) (Cont)

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Acceptance Rationale

Design: Procured item built for NASA.

- o Capabilities and characteristics

Minimum detectable sensitivity	2% of full scale*
Zero drift	±10%
Span drift	±10%
Accuracy	5% of full scale
Noise	1% of full scale maximum
Operating temperature range	0°C to 35°C
Operating relative humidity	10% to 95%

* Note: Range vs. PPM for 2% of Full Scale

<u>PMH</u>		<u>NO2</u>	
<u>Range</u>	<u>PPM</u>	<u>Range</u>	<u>PPM</u>
0-2	0.04	0-5	0.10
0-20	0.40	0-50	1.00
0-200	4.00	0-500	10.00

Test:

- o The OMRSD File VI, Vol 1 requires that the sample flow rate will be verified prior to each use.
- o The OMRSD File VI, Vol 1 requires that the zero setting in air and the analog response to surrogate gas will be verified prior to each use.
- o The OMRSD File VI, Vol 1 requires that the sample line ID is verified prior to each use.
- o The OMRSD File VI, Vol 1 requires that the sample line's integrity be verified through a leak check prior to each use.

Inspection: (Per OMRSD File VI, Vol 1):

- o The sensor certification is verified to be current prior to each flow and the certification date recorded to avoid operation beyond certification period.
- o The sample lines are cleaned and dried prior to each sensor installation.

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HVDS Monitor Unit (6 units/Pad) (Cont)

Failure History:

- o KSC PRACA failure history (May 29, 1984 thru June 30, 1991) indicated one hundred and one (101) HVDS Monitor Unit failures. Of those failures, 25 were insufficient or no flow (pump or cell), 53 were cell failure (actual fluid visible in flowmeter), and 23 were general failure (electronic).
- o The GIDEP failure data interchange system has been researched and no failures of this component were found.

Operational Use:

- o The OMI requires that personnel be stationed on the RSS during loading operations; those personnel provide a visual monitoring of the operation.
- o During the break between loading operations of oxidizer (N2O4) and fuel (MH), a survey will be taken of the units to assess the operational status of each and make repairs if needed prior to continuing.
- o Correcting Action:
There is no action which can be taken to mitigate the failure effect.
- o Timeframe:
Since no correcting action is available, timeframe does not apply.

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