NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
PRESSURE TRANSDUCER, ITEM 215 1V770473-6	2/1R	215/M05: Leakage of pressure sensitive interface. CAUSE: Failure of material.	END ITEM: Leakage path between SOP tanks and strain gauge cavity. GSE INTERFACE: SOP oxygen tank pressurizes the strain gage cavity between pressure sensitive interface and electrical feed through connector. Loss of SOP transducer output. MISSION: None for single failure. CREW/VEHICLE: None for single failure. Possible loss of crewman for second failure (leakage) at electrical feedthrough connector and potential ignition of non metallics in electronic cavity.	A. Design - In the event of diaphragm leakage, the strain gauge cavity is designed to contain the pressure. The minimum calculated factor of safety in the strain gauge cavity is 1.35 against the 3,400 psi pressure and 1.11 against the 9000 psi requirement. The stress of 55,800 psi in the loop occurs in the wall of the four-pin header shell. This analysis has been substantiated by a strain gauge cavity test run to 15,600 psi without failure. For a minimum wall thickness this results in a pressure capability of at least 10,962 psi. The header shell material is 1018 carbon steel, which was selected for its compatibility with the glass seals at the connector pins. One side of the header shell is hermetically sealed and the other is potted, thus the shell wall is (1018 carbon steel) not subject to corrosion. The weld joints, 17-4 PH stainless to 1018 carbon steel and 17-4 PH are also not known to corrode in a dry atmosphere. The gold plated brass connector pins are similarly corrosion resistant. B. Test - Component Acceptance Test - the electrical feedthrough is pressure tested as a detail part at the vendor (Kulite Semiconductor, Inc.). This test consists of pressurizing the feedthrough with 9000 psig water or alcohol and holding it for 3 minutes after which a helium leak test test is done. The maximum helium leakage allowed is 1 x 10-8 sccs/sec at 1 atmosphere. The feedthrough is subsequently welded into the pressure transducer. It is not possible to pressure test this weld. PQA Testing- It is not possible to pressure test the feedthrough connector during the PQA test. Certification Test - The pressure transducer completed the 15 year structured vibration and shock certification requirement during 10/81. Qualification Test - A burst test on the electrical feedthrough was done on 12/11/84. This test unit held a pressure of 15,600 psi, without any signs of leakage (design requirement is 9000 psi). C. Inspection - The pressure sensing diaphragm stainless steel 17-4 PH, is

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verified by vendor inspection of the material certification ticket. The first three welds from the pressure sensing tip are X-ray inspected; the last weld is not. Engineering change 42888-499 required that all four welds be X-ray inspected (presently 3 of the existing 7 flight units meet this requirement). Engineering change 42888-499-4 is in process and will designate the five noncompliant units to nonflight status, after these units are depreserviced.

B. Failure History -
None.

E. Ground Turnaround -
Tested per PERU-E-301, RCP transducer calibration.

F. Operational Use -
Operation Effects - Crew Response -
EVA: Since EVA termination should begin as soon as LSP is sensed, crew response is to continue termination. No further response is necessary unless simple failure is undetectable by crew or ground.
Operational Considerations -
Reference Constellation flight rules define EMU as test for loss of operational LSP.
EVA checklist and IVT procedures verify hardware integrity and systems operational status prior to EVA.
Real Time Data System allows ground monitoring of EMU systems.

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