NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		103FM20		
WRIST DISCONNECT, ITEM 103 (1) LEFT (1) RIGHT --- A/L 9813-05/9814-05 (2)	2/2	Physical jamming in mated position. Contamination or foreign matter trapped in latch, defective lock spring, latch spring, or O-ring. Bent or broken latch pin, defective material, impact.	END ITEM: Unable to unlock disconnect. GFE INTERFACE: Unable to remove glove. MISSION: Terminate EVA prep. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Minutes. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The disconnect operates by direct mechanical actuation of the locking latches through the external lock assembly. The design specifies tight clearances at the glove wrist disconnect interface to reduce the possibility of foreign material getting into the mated interface. The arm-side disconnect is stowed in the orbiter mated to the glove-side disconnect the following preflight inspections reducing contamination of foreign material prior to EVA. The design of the wrist disconnect requires simultaneous manual actuation in three planes in order to effect a separation of the arm and glove; rotation of the locking ring, withdrawal of two independant primary locks and depression of one secondary lock (lock/lock). Since the primary locks require independent actuation, each of the three locks (primary and secondary) is provided with double redundancy by the other two. Proper separation of the disconnect with the failure of the lock/lock is therefore virtually precluded by design. Actuation of the secondary lock button depresses a spring-loaded retainer into its slot in the wrist disconnect housing; clearing the locking ring for rotary motion. The design of the secondary lock is such that the spring is totally encapsulated by the housing. The spring is commerical, industrial standard stainless steel spring material. The wrist disconnect housing is machined from 7075-T73 Aluminum. The latch and latch pin are machined from 17-4 Ph stainless steel, heat treated to the 1050 condition. High strength material and heat treated condition of the latch and latch pin preclude wear and breakage. Lubrication with Krytox grease and a dry film lubricant (Dow Corning 321) assure smooth operation and prevent jamming. B. Test - Acceptance: The wrist disconnect is subjected to engagement/disengagement testing per Airlock ATP 9813-02/9814-02 prior to acceptance by ILC. PDA: The following tests are conducted at the arm assembly level in accordance with ILC Document 0111-70028J: Five wrist disconnect/test plug engagement cycles to actuate and release the primary and secondary locks. A functional test to ensure that the secondary lock is not capable of being bypassed by actuation of the primary locks only. Certification: The Wrist Disconnect was successfully tested (manned) during SSA certification to duplicate operational life. The following usage reflecting requirement of significance to the arm assembly, was documented during certification (Reference ILC document EM 83-1083). Requirement / S/AD / Actual Pressure Hours: 458 / 1190 Pressure Cycles: 300 / 1080 Disconnect Cycles: 300 / 1080

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Wrist disconnect has successfully passed shock, vibration, and acceleration testing (ref. HSD Test Reports TER 3067, TER 3048, TER 3043, and TER 3076).

C. Inspection -
Components and material manufactured to ILC requirements at an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the hardware received is as identified in the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provide traceability information.
The following MIP's are performed during the Wrist Disconnect manufacturing process to assure that the failure causes are precluded from the fabricated item:
1. Verification of compliance to the Wrist Disconnect. Component Drawings.
2. Verification of lock function.
3. Inspection for cleanliness to VC level.
During PDA, the following inspection points are performed at the Arm Assembly level in accordance with ILC Document 0111-70028J:

Inspection for cleanliness to VC level.
Inspection for damage wear or material degradation.
Verification of engagement/disengagement force.
Verification of smooth engagement and proper operation of locking dogs.

D. Failure History -
None.

E. Ground Turnaround -
Tested for non-EET processing per FEMU-R-001, Pre-Flight Inspections and Final Structural and Leakage, SSA Connector Verification. None for EET processing. Additionally, every 4 years or 229 hours of manned pressurized time the disconnect is disassembled inspected, cleaned, lubricated and reassembled. Following reassembly and installation the disconnect is subjected to structural and leakage tests, engagement evaluation and primary and secondary lock operational tests.

F. Operational Use -
Crew Response -
Pre EVA/Post EVA: Trouble shoot problem. If no success, consider use of third EMU if available. Otherwise, continue EVA prep. If able to move hand safely and effectively and suit passes leak check, EMU is go for EVA.
Training -
No training specifically covers this failure mode.
Operational Considerations -
EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Donning and doffing can be performed with glove attached to EMU.

EXTRAVEHICULAR MOBILITY UNIT

SYSTEMS SAFETY REVIEW PANEL REVIEW

FOR THE

I-103 ARM ASSEMBLY

CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

Prepared by: _____ 5/27/02
HS - Project Engineering

Approved by: _____
NASA - SSA/SSM

_____
HS - Reliability

_____ 5/14/02
NASA - EMU/SSM

_____
HS - Engineering Manager

_____ 6/17/02
NASA - S&MA

_____ 5/23/02
NASA - MOD

_____ 6/04/02
NASA - Crew

_____ 6/04/02
NASA - Program Manager