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B/L: 287.00

SYS: Orbiter Main Access
Platforms, OPF-3**Critical Item:** Worm Gear Winch Assembly (1 Item Total)**Find Number:** MK3W1**Criticality Category:** 2**SAA No:** 09FY093-012**System/Area:** Orbiter Main Access Platforms
/ OPF-3**NASA****Part No:** None**PMN/** A70-0668-03**Name:** Orbiter Main Access Platforms**Mfg/** Thern**Part No:** 484-76P**Drawing/** 80K52693**Sheet No:** 5**Function:** Provide a means to Raise and Lower the four extending sections on platform [13-1] that have been modified to flip up/down.**Critical Failure Mode/Failure Mode No:** Worm Gear Disengages / 09FY093-012.002**Failure Cause:** Structural Failure**Failure Effect:** The platform free falls, rotates under its own weight down to the horizontal extended position against hard stops. The hinges could fail, allowing the platform to fall onto the Orbiter. The failure would be visually detected and the time to effect would be immediate.

ACCEPTANCE RATIONALE

Design:

- The winch is an off-the-shelf design manufactured by Thern Winch Inc. , and its design complies with the American Gear Manufacturers Association (AGMA) standards.
- The winch is made with a steel frame, with a fully enclosed gear housing.
- The gearing consist of a precision machine cut steel worm which interfaces with a bronze worm gear.
- The manufactured safety factor at rated load is 5 to 1 minimum.
- The winch will only be used approximately 30 times per year, given 5 shuttle flows through OPF-3 per year, and 6 lifts per flow including maintenance. This is an extremely low duty cycle when compared to a commercial duty cycle of 5 -10 lifts per day at 50% rated load.
- The winch will not be required to support/hold the platform in position. Its only operational use is to raise and lower the modified extension platforms on the payload bay platform [13-1].



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Test:

- OMRS File VI requires the annual performance of an operational test.
- An acceptance test at 125% rated load is required at initial installation.
- Preventive maintenance on the platforms including hinges and associated winch mechanisms will be performed per OMI V6H59.

Inspection:

- A visual and operational check of functional alignment and/or overall condition of the winch and platforms are performed annually to detect worn, cracked, or distorted parts.
- Inspections are performed in accordance with NSS/GO-1740.9 requirements.
- Inspections are performed per the preventive maintenance OMI V6H59.

Failure History:

- The PRACA database was researched and no failure data was found on this component in the critical failure mode.
- The GIDEP failure data interchange system was researched and no failure data was found on this component in the critical failure mode.

Operational Use:

- Correcting Action:
There is no action which can be taken to mitigate the failure effect.
- Timeframe:
Since no correcting action is available, timeframe does not apply.