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**Owner's Manual**  
**Dual Cargo Hook System**  
 for the  
**MD Helicopters**  
**369D, 369E, 369F, 369FF, 500N, and**  
**600N models**

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Applicable Equipment Part Numbers

200-448-00  
 200-448-01  
 200-383-00  
 200-383-01  
 200-449-XX

***[Please check our web site www.onboardsystems.com](http://www.onboardsystems.com)***  
***for the latest revision of this manual.***

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## RECORD OF REVISIONS

Revision	Date	Page(s)	Reason for Revision
0	09/25/18	All	Initial Release
1	11/13/18	Section 3.3, Section 4	Updated bill of materials, updated installation instructions based on prototype installation.
2	04/01/19	Section 4.1, page 32	Updated installation instructions for Secondary Hardpoint fittings. Added option to use quick release pin for attaching primary cargo hook.
3	10/02/19	8, 19, 28	Added hydraulic hook bleed kit to BOM. Clarified pillow block as part of assembly P/N 232-800-00. Added step to check orientation of 90 deg. end fittings on master cylinder plumbing at installation and rotate fittings if necessary.
4	11/04/19	9, 15, 19, 20	Clarified the rivets to be removed in Figure 4.1.9. Changed Hi-Lok pin P/N 511-196-00 (-2 length) to P/N 511-220-00 (-3 length) and clarified their installation locations.
5	02/25/20	All	Incorporated optional load weigh system (200-383-00).
6	06/21/21	All	Incorporated kit P/N 200-448-01 and 200-383-01 (for the 600N model) and associated instructions.
7	08/18/21	All	Updated installation instructions based on a 600N prototype installation. Added Limitations Placard P/N 215-418-00 (for the 600N).

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## 1.0 Introduction

### 1.1 Scope

This Owner's Manual contains instructions for installation of the Dual Cargo Hook System on the MD Helicopters 369D, 369E, 369F, 369FF, 500N, and 600N models.

### 1.2 Capability

The instructions contained in this document are provided for the benefit of experienced aircraft maintenance personnel and facilities that are capable of carrying out the procedures.

### 1.3 Safety labels

The following definitions apply to safety labels used in this manual.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.




Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



Draws the reader's attention to important or unusual information not directly related to safety.



Used to address practices not related to personal injury.

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## 2.0 Referenced Documents

120-152-00	Owner's Manual, C-40 Indicator
120-207-00	Owner's Manual, Cargo Hook Kit with Load Weigh
121-069-00	Rotorcraft Flight Manual Supplement
122-015-00	Component Maintenance Manual, Cargo Hook
123-048-00	Instructions for Continued Airworthiness (ICA)

## 3.0 System Overview

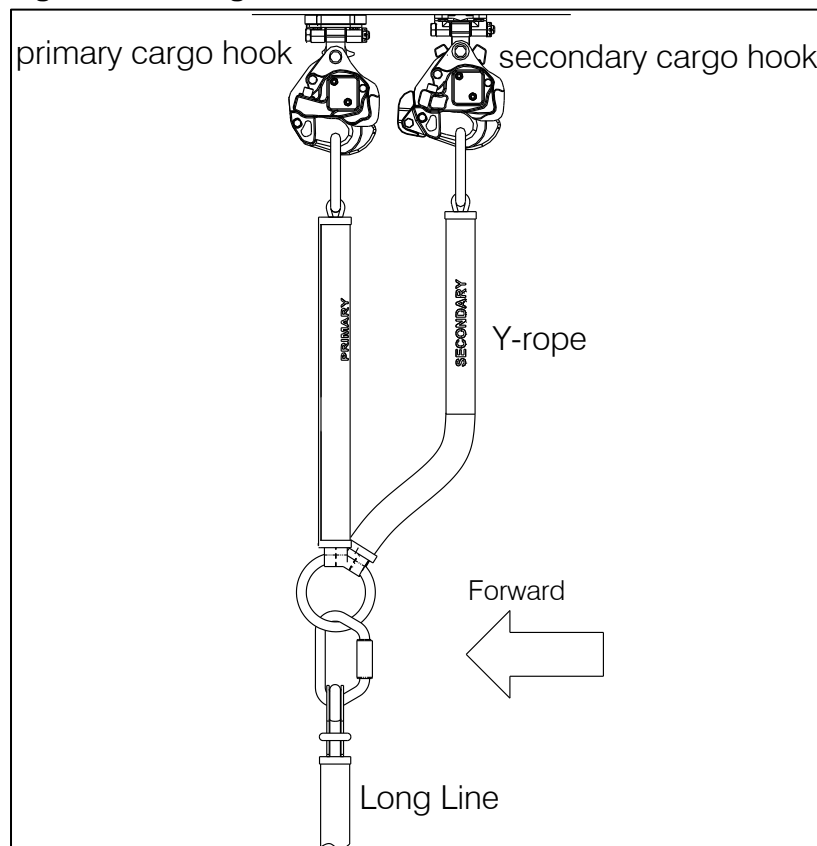
### 3.1 Introduction


The Dual Cargo Hook System is approved for carrying of Human External Cargo (HEC) on the MD Helicopters 369 series, 500N, and 600N model helicopters. The system requires that the helicopter be previously equipped with the MD Helicopters cargo hook kit.

The Dual Cargo Hook System includes:

1. A primary cargo hook and a secondary cargo hook to which a supplied Y-rope is connected to for carrying of HEC. These cargo hooks are Onboard Systems 528-028 series of cargo hooks with hydraulic release.

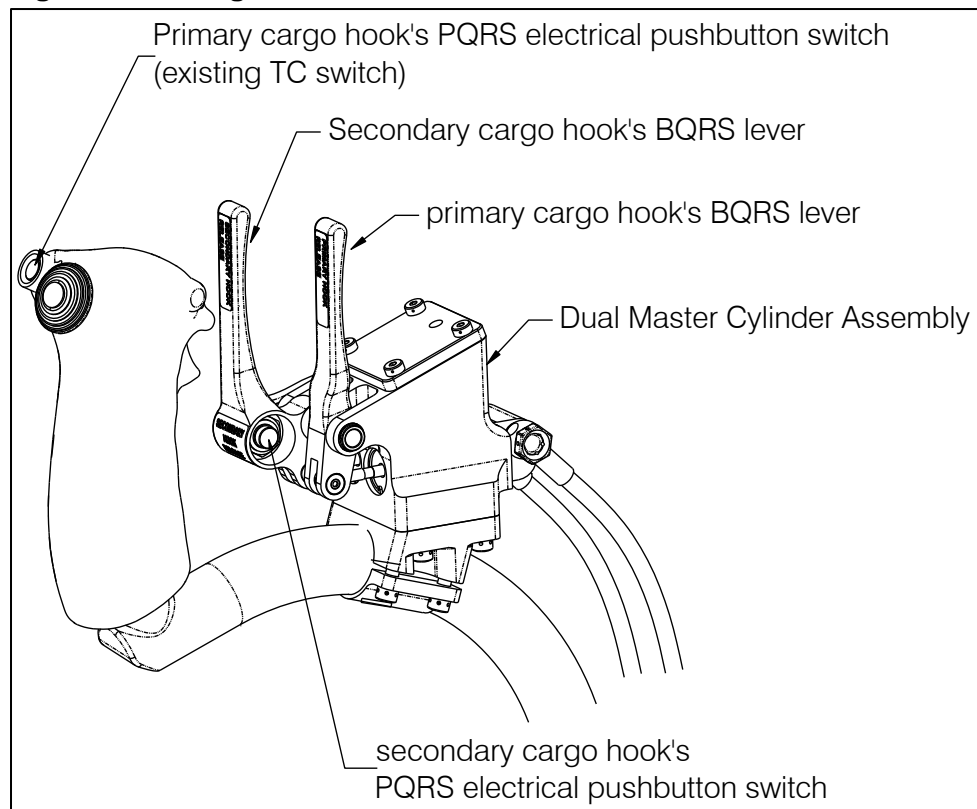
**Figure 3.1.1 Cargo Hook Overview**




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2. Separate backup quick release sub-systems (BQRS) for the primary and secondary cargo hook. These systems are independently actuated by release levers installed on the cyclic (reference Figure 3.1.2)
3. A complete primary quick release sub-system (PQRS) for the secondary cargo hook including a release pushbutton switch integrated into the secondary cargo hook release lever on the cyclic.
4. An external electrical harness to connect the primary cargo hook to the fixed cargo hook electrical system installed under the MD Helicopters' type certificate. This system forms the PQRS for the primary cargo hook.

**Figure 3.1.2 Cargo Hook Controls Overview**



5. Secondary Hardpoint. The secondary hardpoint is the internal structure installed under the fuel tank bladder and above the aircraft skin; it provides the means to attach the secondary cargo hook to the aircraft.
6. Y-rope. The Y-rope is required as it provides a controlled interface between the two cargo hooks and the long line.
7. An optional Long Line Assembly designed to interface with the Y-rope and includes Lanyard Assemblies at the lower end to connect to a personnel harness.


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8. An optional load weigh system. The load weigh system is a compliment to the cargo hook system. Its purpose is to display the weight of the load carried on the cargo hook. It consists of three components: a cockpit mounted load weigh indicator, a pin load cell at the primary cargo hook, and an interconnecting electrical wire harness between them. The wire harness also connects to aircraft power and ground.

The load weigh indicator included with the load weigh system has been updated to Onboard Systems' next generation indicator, the C-40 model. The C-40 Indicator makes several improvements over the C-39 model while preserving classical features and is generally backwards compatible. The C-40 Indicator offers these improvements:

- Full color display
- Load measurement displayed in full, not X 10 (C-39 is X 10)
- Addition of Analog Bar and Maximum Load features
- Simplified user interface
- Addition of Cargo Hook hour meter
- Selectable backlight control voltage, 5 or 28 VDC
- Improved moisture resistance
- Expanded signal input range
- Field-upgradable firmware

Refer to the Owner's Manual 120-152-00 for additional information and detailed operating instructions for the C-40 Indicator.

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### 3.2 Specifications

**Table 3.2.1 P/N 232-800-00 Attach Point (Secondary) Specifications**

Rated Load*	800 lbs (363 kgs)
Design Ultimate Strength	3,000 lbs (1,361 kgs)

\*Use of the secondary (aft) Attach Point is limited to dual cargo hook (HEC) operations with the slack line of the Y-rope attached to it. Do NOT exceed the rated load of 800 lbs. with this configuration.

**Table 3.2.2 P/N 232-449-01 Attach Point (Primary) Specifications**

Rated Load**	2,500 lbs (1134 kgs)
Design Ultimate Strength	9,375 lbs (4,252 kgs)

\*\*P/N 232-449-01 primary (forward) Attach Point is the previously approved configuration for NHEC operations under STC SR01778SE and this rated load remains applicable with the load attached ONLY to this attach point.

**Table 3.2.3 Cargo Hook P/N 528-028-00, 528-028-03 Specifications**


Rated load (P/N 528-028-00)	3,500 lbs. (1,580 kg.)
Rated load (P/N 528-028-03)	800 lbs. (363 kg)***
Design ultimate strength	13,125 lbs. (5,953 kg.)
Electrical release capacity	8,750 lbs. (3,970 kg.)
Mechanical release capacity	8,750 lbs. (3,970 kg.)
Force required for mechanical release at 3,500 lbs.	14 lbs max. @ Master Cylinder
Electrical requirements	22-32 VDC 6.9 – 10 amps
Minimum release load	0 lbs.
Unit weight	3.0 lbs. (1.35 kg.)
Mating electrical connector	PC05A8-2S

\*\*\* Cargo Hook P/N 528-028-03 is the secondary (aft) cargo hook and is a dedicated HEC cargo hook thus is limited to 800 lbs. (363 kg).



*Load ratings given are specific to the equipment described only. Loading limits for the helicopter still apply. Consult the basic flight manual issued by the TC holder and the flight manual supplement provided with the dual cargo hook system for limits.*



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### 3.3 Bill of Materials

The following items are included with the Dual Cargo Hook Systems (P/N 200-448-00 is for the 369 series and 500N and P/N 200-448-01 is for the 600N model). If shortages are found contact the company from whom the system was purchased.

**Table 3.3.1 Bill of Materials – Dual Cargo Hook System**

Part No.	Description	Qty	Qty
		200-448-00	200-448-01
212-014-02	Hydraulic Hook Bleed Kit	1	1
215-379-00	Limitations Decal	1	-
215-381-00	Secondary Hook Breaker Decal	1	1
215-382-00	Decal Sheet	1	1
215-418-00	Limitations Decal	-	1
232-449-01	Attach Point Assembly	1	1
232-456-00	Spacer Assembly	1	1
232-800-00	Secondary Attach Point Assembly	1	1
232-803-00	Secondary Cargo Hook with Slave Cylinder	1	-
232-803-01	Secondary Cargo Hook with Slave Cylinder	-	1
232-806-00	Dual Master Cylinder with Plumbing	1	1
232-809-00	Cargo Hook with Slave Cylinder	1	-
232-809-01	Cargo Hook with Slave Cylinder	-	1
235-284-00	Connector Doubler	1	-
235-286-00	Support Clip	2	2
270-132-00	Electrical Release Harness	1	-
270-132-02	Electrical Release Harness	-	1
270-235-00	Internal Harness	1	1
270-236-00	External Electrical Harness, Secondary	1	-
270-236-01	External Electrical Harness, Secondary	-	1
290-332-00	Attach Bolt	2	2
290-360-01	Bumper, 3.5k Hook	1	1
290-783-00	Relay Bracket	1	1
290-909-00	Modified Loop Clamp	1	1
292-022-00	Hardpoint Fitting, RH	1	1
292-023-00	Hardpoint Fitting, LH	1	1
292-024-00	Web Stiffener	1	1
410-296-00	Ring Terminal	1	1
440-018-00	Circuit Breaker, 15A	1	1
445-005-00	Relay	1	1
505-022-00	Grommet	1	1
505-024-00	Grommet	1	1



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510-095-00	Washer	5	5
510-100-00	Washer	8	8
510-102-00	Nut	7	7
510-170-00	Nut	2	2
510-174-00	Washer	2	2
510-178-00	Cotter Pin	2	2
510-183-00	Washer	4	4
510-277-00	Screw	2	2
510-278-00	Washer	2	2
510-279-00	Nut	2	2
510-282-00	Solid Rivet	6	6
510-308-00	Bolt	4	-
510-481-00	Screw	4	4
510-624-00	Screw	2	2
510-649-00	Solid Rivet	8	8
510-652-00	Screw	3	3
510-712-00	Bolt	2	2
510-979-00	Bolt	-	4
511-034-00	Bolt	4	4
511-191-00	Solid Rivet	10	10
511-193-00	Blind Rivet	2	2
511-194-00	Nut Plate	4	4
511-195-00	Hi-Lok Pin	2	2
511-197-00	Hi-Lok Collar	4	4
511-198-00	Solid Rivet	5	5
511-199-00	Solid Rivet	8	8
511-200-00	Solid Rivet	6	6
511-203-00	Perimeter Nut Plate	1	1
511-204-00	Solid Rivet	8	8
511-220-00	Hi-Lok Pin	2	2
512-026-00	Cushioned Loop Clamp	2	2
512-058-00	Flat Bracket	2	2
512-067-00	Loop Clamp	5	5
512-068-00	Loop Clamp	5	5
540-032-00	2 oz Bottle Hydraulic Fluid	1	1
590-013-00	Spiral Wrap	18"	18"

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The following items are included with the optional load weigh systems (P/N 200-383-00 is for the 369 series/500N and P/N 200-383-01 is for the 600N model).

**Table 3.3.2 Bill of Materials – Load Weigh System**

Part No.	Description	Qty	Qty
		200-383-00	200-383-01
210-293-00	C-40 Indicator	1	1
210-301-03	Pin Load Cell Assembly	1	-
210-301-05	Pin Load Cell Assembly	-	1
215-012-00**	Load Weigh Placard	-	-
215-417-00	Load Weigh Breaker Decal	1	1
270-283-02	Load Weigh Internal Harness	1	1
400-048-00**	Power Switch	-	-
510-028-00	Screw	4	4
510-029-00	Nut	4	4
510-062-00	Washer	4	4
510-170-00	Nut	1	1
510-174-00	Washer	1	1
510-178-00	Cotter Pin	1	1
510-183-00	Washer	1	1
511-211-00	Screw	4	4

\*Indicator P/N 210-293-00 supersedes C-39 Indicator P/N 210-095-00 and is supplied with harness P/N 270-283-02 which supersedes P/N 270-047-01 used with the C-39 Indicator. Indicators are interchangeable with harnesses.

\*\*Items not included with the C-40 Indicator, were included with C-39 Indicator.

## NOTICE

*\*\*\*If the Pin Load Weigh Kit P/N 200-383-00 is installed use ICA 123-048-00 and RFMS 121-069-00 included with the dual cargo hook system in lieu of ICA 123-021-01 and RFMS 121-028-01 (approved under STC SR01778SE) respectively.*

## NOTICE

*The link style load cell (E-51 model, P/N 210-031-00, -01, and -02) is not eligible for installation with the dual cargo hook system.*


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Table 3.3.3 lists the items included with the Long Line Kit P/N 200-449-XX. This kit provides the required Y-rope and all components, including a lanyard, to connect to a human harness.


## NOTICE

*The Y-rope is the only mandatory P/N of the Long Line Kit as it interfaces with the cargo hooks. Locally approved alternate components to connect to the Y-rope may be used.*

The kit P/N is completed by replacing the XX by a two-digit number which is multiplied by 10 to define the length of the included long line, for example – kit P/N 200-449-10 includes a 100 foot long line (P/N 490-015-10), Kit P/N 200-449-15 includes a 150 foot long line (P/N 490-015-15), etc.

**Table 3.3.3 Bill of Materials – Long Line Kit (P/N 200-449-10 listed)**

Part No.	Description	Qty
292-017-00	Rigging Plate	1
490-014-00	Y-Rope	1
490-015-10	Long Line, 100 ft	1
490-017-00	25 LB Long Line Weight Bag	1
490-018-00	Lanyard	1
530-031-00	Carabiner	2

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## 4.0 Installation

These installation instructions are provided for the benefit of experienced aircraft maintenance facilities capable of carrying out the procedures. They must not be attempted by those lacking the necessary expertise.


### 4.1 Secondary Hardpoint Installation

The secondary hardpoint is installed at STA 105, directly aft of the primary cargo hook installation. It provides the aircraft structural attachment means for the secondary cargo hook. If the aircraft is already equipped with the secondary hardpoint installed per STC SR02662LA then skip to section 4.2, otherwise install the secondary hardpoint per this section.

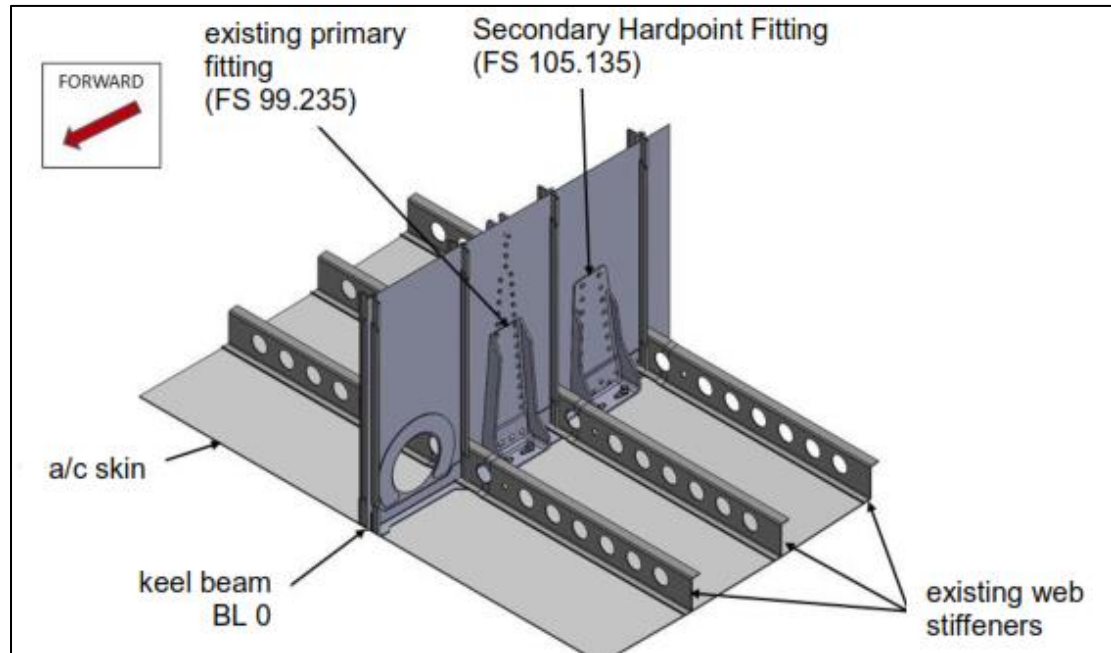
Figure 4.1.1 and Figure 4.1.2 show the precise installation location of the Secondary Hardpoint.

**Figure 4.1.1 Secondary Hardpoint Installation Location (left side shown)**



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**Figure 4.1.2 Fitting Installation Diagram**



1. Before the secondary hardpoint fittings can be installed, the seats, floor, fuel lines and fuel cells must be removed to access the area where the Secondary Hardpoint fittings will be located. Remove these items in accordance with the CSP-HMI-2 Maintenance Manual.
2. Figure 4.1.3 shows the installation area after the seats, floor, access panels, fuel lines, and cells have been removed. The fuel tank liners (shown in Figure 4.1.4) must be cut to gain access and fit the Secondary Hardpoint fittings. The installation area is accessed through the Fuel Tank Access Holes.

**Figure 4.1.3 Interior Access Holes (369 model shown)**




**Figure 4.1.4 Fuel Tank Liners and Sealing Tape**



3. Remove the sealing tape (shown as black tape in Figure 4.1.4) around the installation area. Remove rivets attaching the fuel tank liner to the Keel Beam Web as shown in Figure 4.1.5 (shown in solid oval). If needed, the blind rivets on the frame sections (shown in dashed ovals) can be removed for better access.

**Figure 4.1.5 Rivet Removal for Fuel Tank Liner**



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- To gain access to the area in which the Secondary Hardpoint Fittings will be attached, a section of the fuel tank liner will be removed (and later re-installed). Locate the forward and aft frame sections of the bay being modified. Use a straight edge to scribe the edges of the frame sections. Use a scale to scribe approximately 6 inches out from the keel beam web, as shown in Figure 4.1.6. Repeat process for both sides of the keel beam.

**Figure 4.1.6 Liner Access Cut-out at Installation Area**




- Using the scribe lines as a guide, cut out the section of fuel liner using a knife or small cut-off wheel. Ensure the cut edges are free of burrs and sharp edges. Clean and degrease area to ensure the area is free of debris and contaminants.

**Figure 4.1.7 View of Fuel Tank Liner Removed**



**WARNING**  
DO NOT CUT/SCRATCH  
UNDERLYING STRUCTURE  
WHEN REMOVING LINERS



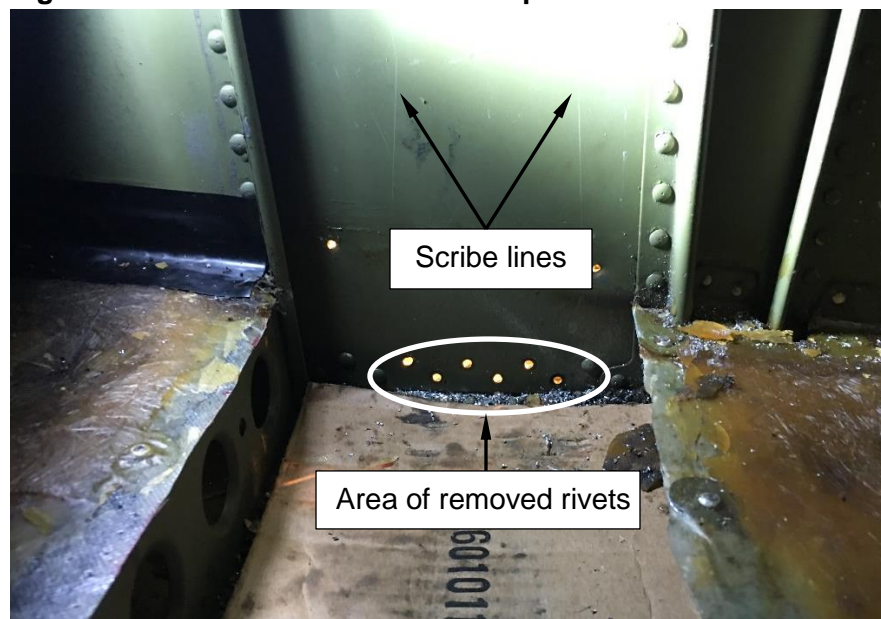
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6. Test fit the Secondary Hardpoint Fittings in the approximate installation location. Scribe the edges of the fittings and determine which rivets are to be removed from the Keel Beam Lower T-Cap. Remove rivets and clean area of all debris. See Figure 4.1.8 and Figure 4.1.9 for approximate layout.

**Figure 4.1.8 Approximate Installation Location (Mock-up)**

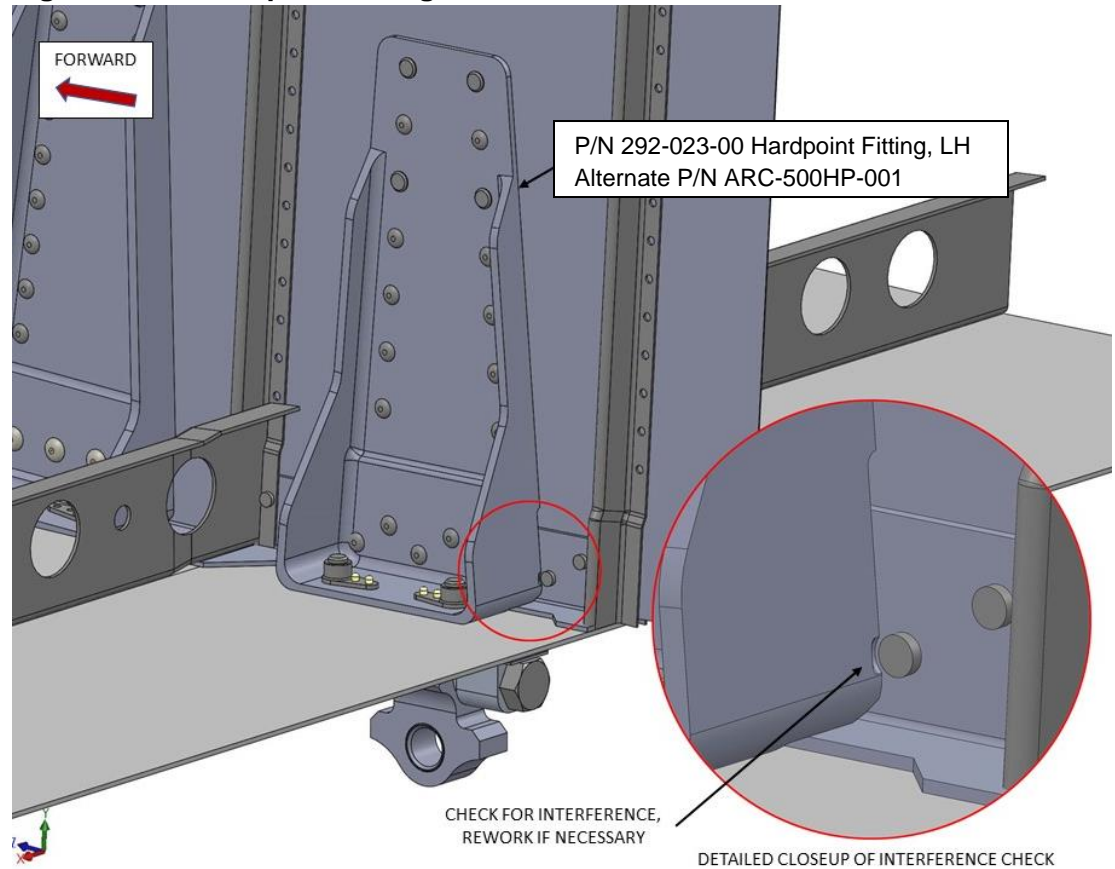



**Figure 4.1.9 Lower Keel Beam – T Cap Rivets Removed**



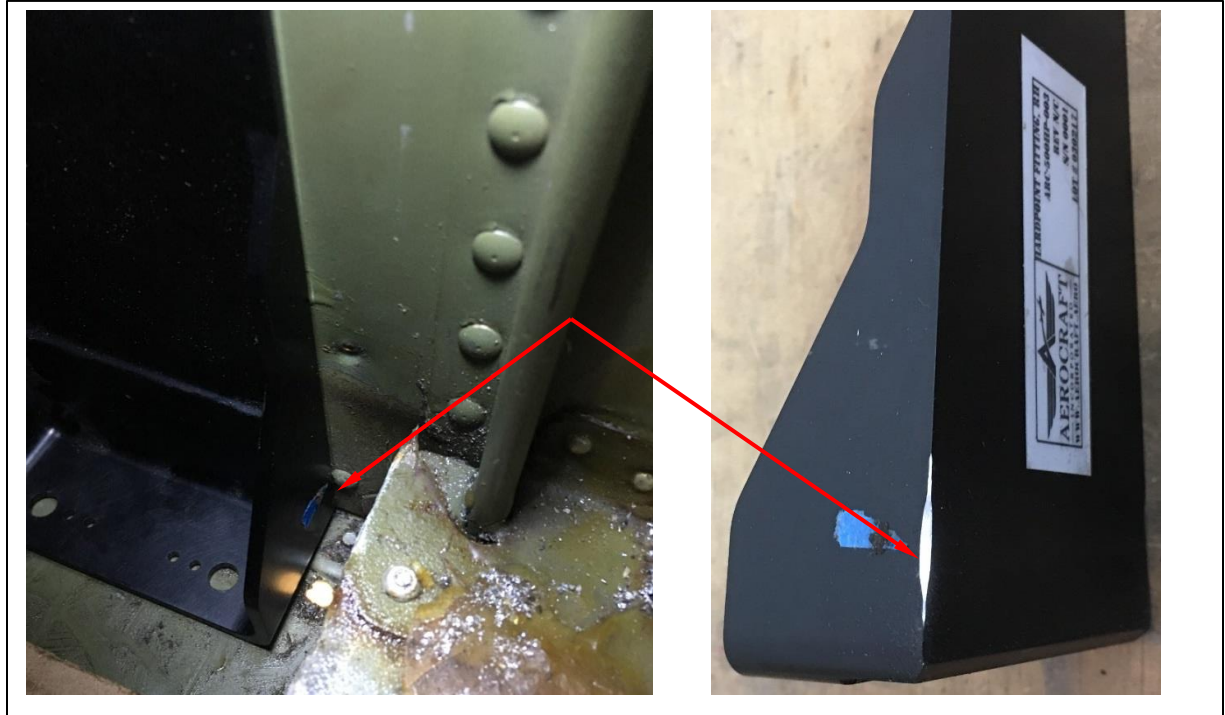
7. Position the P/N 292-023-00 (alternate P/N: ARC-500HP-001) and P/N 292-022-00 (alternate P/N ARC-500HP-003) hardpoint fittings in the area where the rivets from Step 6 were removed. Check for any interference, specifically the areas on either side of the fittings where any existing rivet heads may prevent a flush and proper fit. If any interference occurs, the fittings must be reworked to remove the interference (see Figure 4.1.10 and Figure 4.1.11). Rework involves removing material from the fittings such that they fit flush against the mounting surface. The required minimum clearance between parts is 0.03 inches. Minimum material thickness after reworking on all fittings is 0.125 inches. Deburr, blend and finish all reworked edges.

**Figure 4.1.10 Hardpoint Fitting Interference Check**




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**Figure 4.1.11 Interference and Corresponding Blend-out**

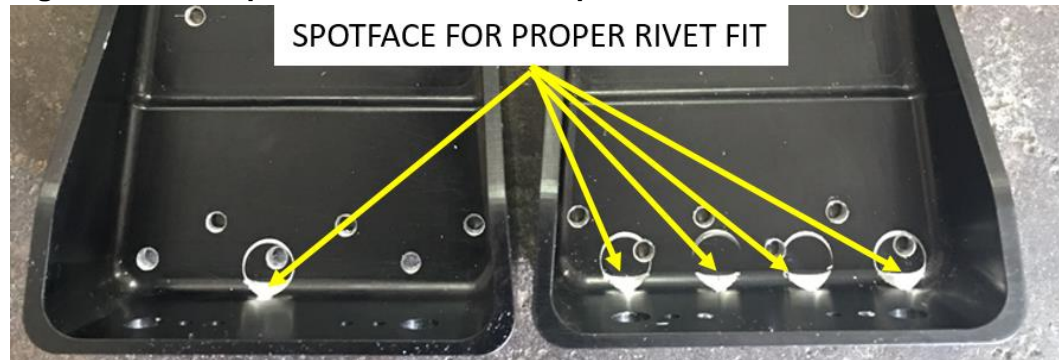


8. With the taller P/N 292-023-00 (alternate P/N: ARC-500HP-001) hardpoint fitting on the bench, use the two spot drilled hole locations that are in the third row from the top of the fitting to drill rivet holes with a #40 drill (.098”).
9. Match drill the two holes from Step 8 to the P/N 292-022-00 (alternate P/N: ARC-500HP-003) fitting by clamping the two hardpoint fittings together on a bench, ensure the lower and outside edges match when clamping together.
10. Position the taller P/N 292-023-00 (alternate P/N: ARC-500HP-001) fitting on the left side of the Keel Beam and match drill the two rivet holes using a #40 drill thru the Keel Beam web.
11. Temporarily secure the taller P/N 292-023-00 hardpoint fitting to the Keel Beam using #40 Cleco fasteners. Match drill this fitting with the six existing fastener holes from the vertical flange of the Keel Beam Cap using a #30 drill (.1285”). An angle head drill is recommended.
12. Match drill the lower nutplate holes through the lower skin using a #40 Drill. Attach Cleco fasteners to secure the lower surface of the hardpoint fitting.
13. Position the shorter P/N 292-023-00 (ARC-500HP-001) fitting on the right side of the Keel Beam and secure in place using Cleco fasteners and the holes from steps 8 and 9.
14. With the fittings fully clamped in place, match drill the remaining spot drilled holes in the taller hardpoint fitting through both fittings using a #40 drill.

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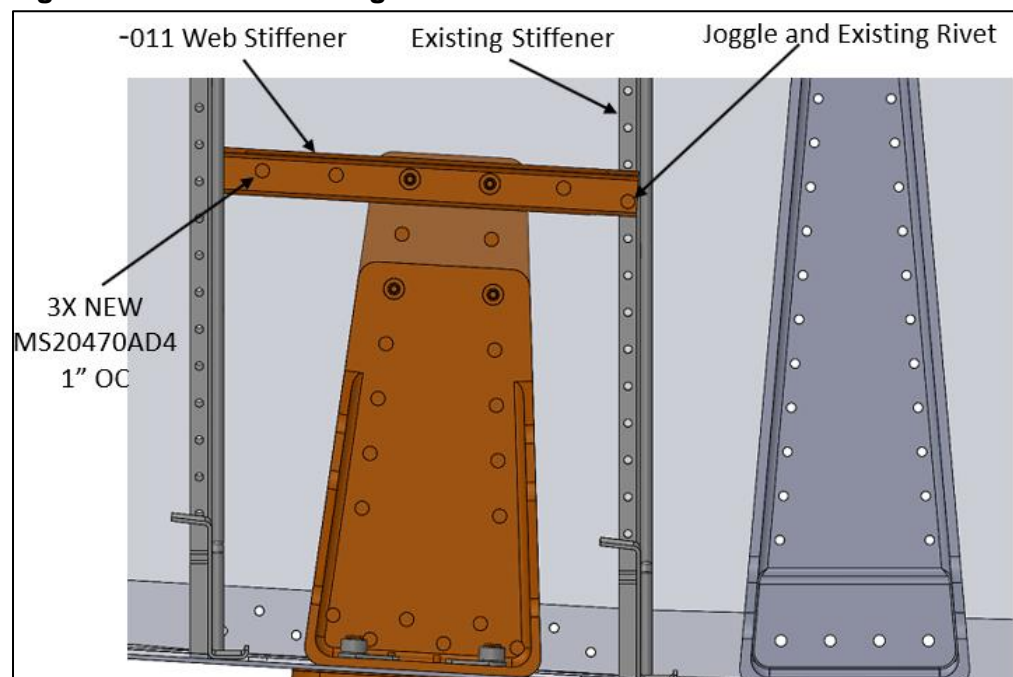
15. From below the aircraft, match drill the Keel Beam Cap flange holes using a #40 Drill. Drill the lower cap holes at a slight outboard angle to ensure drilled hole does not encroach into the upright surface of the Hardpoint Fitting. See Figure 4.1.12 for hole clarification. If required, spotface the holes into the radius to ensure proper rivet installation (see Figure 4.1.12).


**Figure 4.1.12 Proper Drill Location and Spotface for Rivet Fit**



16. On the right side of the keel beam, position P/N 292-024-00 (alternate P/N ARC-500HP-011) Web Stiffener as shown in Figure 4.1.13. There is a joggle on the forward end of the stiffener for the existing vertical stiffener. The top two Hi-Lok holes set the height. Remove the existing rivet from the vertical stiffener. Match drill the upper two holes from the -001 fitting and one hole from existing stiffener using #30 drill. Layout three new fasteners as shown and match drill using #30 drill. Maintain 2D edge distance on all fasteners.

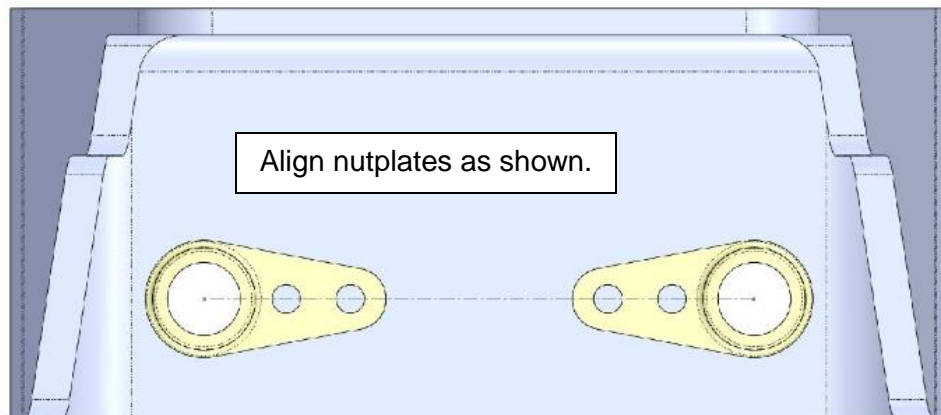
**Figure 4.1.13 View Looking Inboard from Left Side at Web Stiffener**




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17. Using Figure 4.1.15 as a reference, final match drill the vertical web fasteners holes with a #30 drill for MS20470AD3 fasteners. Drill the (HL18-5) Hi-Lok fastener holes using a #21 drill (.159"). Hi-Lok fastener holes should be prepared per NAS618 ( $\phi$ .159-.161).
18. At the taller hardpoint fitting match drill the lower skin for the bolts that will attach the external parts using a .257" diameter ("F" size) drill (2 places).
19. Temporarily secure the external Secondary Pillow Block (part of assembly P/N 232-800-00) in position using the two .257" holes drilled at previous step.
20. Using the Secondary Pillow Block as a template, match drill the other two .257" holes up through the skin and the lower flange of the shorter hardpoint fitting.
21. Position the nutplates (P/N 511-194-00) over the .257" holes, align the nutplates inward and as close to parallel to the centerline of the aircraft as possible (so the rivet heads will be within grooves of the Secondary Pillow Block), and temporarily secure them with the bolts provided. Match drill the four nutplate rivet holes through the hardpoint fitting flange using a #40 drill. Avoid going through the skin and hitting the Secondary Pillow Block.

**Figure 4.1.14 Nutplate Alignment**

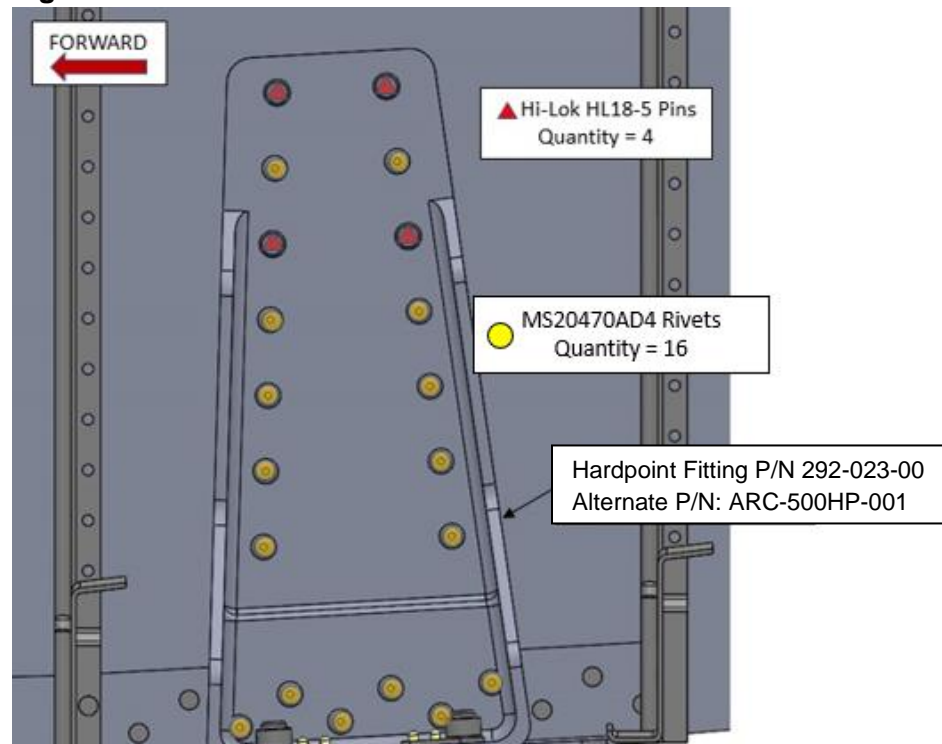


22. Remove the Secondary Pillow Block and finish drilling the nutplate rivet holes through the lower skin.
23. Remove fittings and deburr all holes. Treat all exposed metal surfaces with Alodine (MIL-PRF-5541 Class 1A) prior to final installation.
24. Install the two hardpoint fittings wet with sealant (P/S 890 or equivalent).

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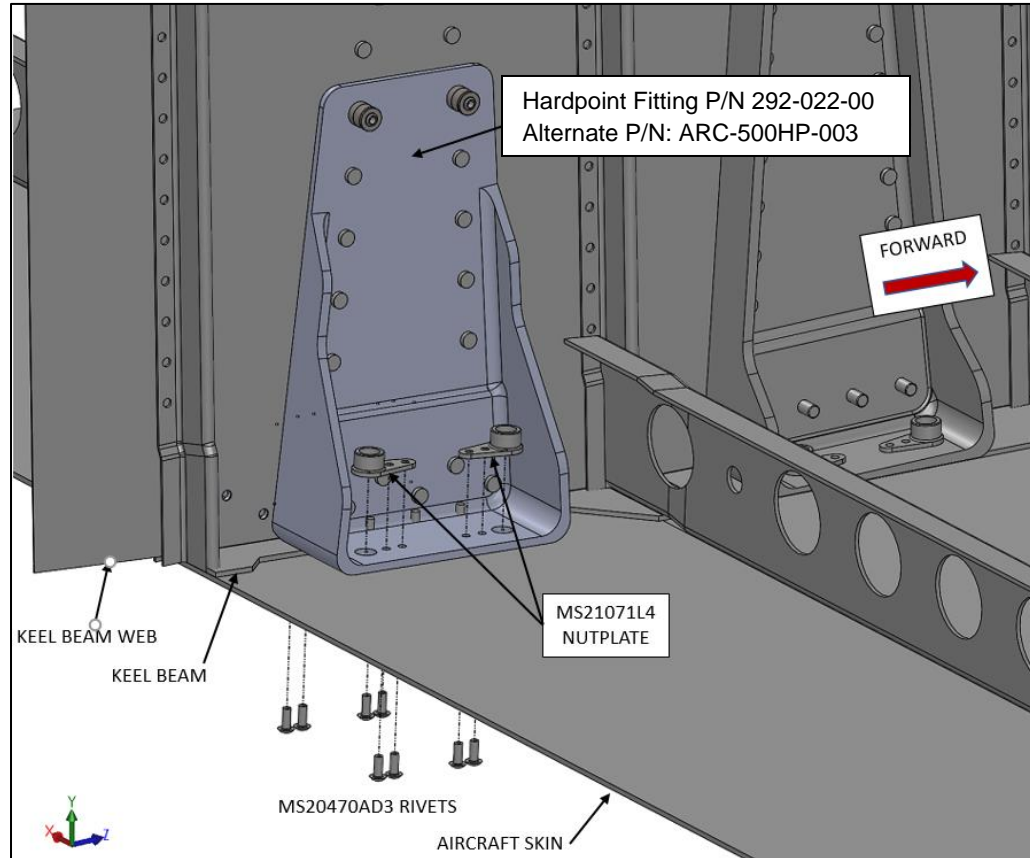
25. Install the MS20470AD4 rivets into the vertical walls of the hardpoint fittings. Install all fasteners per AC 43.13-1B chapter 7, sections 3 and 4.
26. Install total of four (4) Hi-Lok pins and collars (P/N 511-197-00) at locations as shown in Figure 4.1.15 (Hi-Lok Pin P/N 511-220-00 is installed at the top row (through Stiffener) and P/N 511-195-00 at the third row from the top).

**Figure 4.1.15 Fastener Location and Identification**




27. Install the lower skin rivets (MS20470AD3) into the hardpoint fittings as shown in Figure 4.1.16
28. Install the MS21071L4 nutplates (P/N 511-194-00) to the hardpoint fittings using MS20470AD3 rivets as shown in Figure 4.1.16. Install all fasteners per AC 43.13-1B chapter 7, sections 3 and 4.

**Figure 4.1.16 Nutplate Installation**



29. Repair the cut-out fuel tank liners IAW the Structural Repair Manual and applicable sections of FAA AC 43.13-1A and 2A. Replace all removed rivets with original type fasteners. Cover exposed rivet heads and other edges with 10 mil by 1 inch tape (P/N CM711) to prevent chafing on the fuel cell fabric per the CSP-HMI-2 Maintenance Manual.

30. Re-install the fuel lines and cells, floor and seats IAW the CSP-HMI-2 Maintenance Manual.

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## 4.2 Fixed Cargo Hook Electrical Provisions Installation

This section provides the instructions for installing the secondary cargo hook's internal electrical release harness (P/N 270-235-00) and supporting items for this harness (the Relay Bracket and Connector Doubler). Refer to Figure 4.2.6 for electrical schematic.


If installing the load weigh system P/N 200-383-00 with a C-39 Indicator (P/N 210-095-00) refer to Owner's Manual 120-207-00 section 2.2 except use the Connector Doubler (P/N 235-284-00) for installing the load cell connector (reference section below). If load weigh system P/N 200-383-00 with a C-40 Indicator or P/N 200-383-01 (for the 600N model) is being installed, install the load weigh system per this manual including section 4.4 for internal wiring harness and indicator installation instructions.

### 4.2.1 Connector Doubler Installation

The Connector Doubler (P/N 235-284-00) serves as a structural doubler to reinforce the aircraft skin and provides the mounting provisions on the belly of the helicopter for the secondary cargo hook's electrical release connector and hydraulic release connector, the primary cargo hook's hydraulic release connector, and a load weigh system connector (if a load cell is installed).

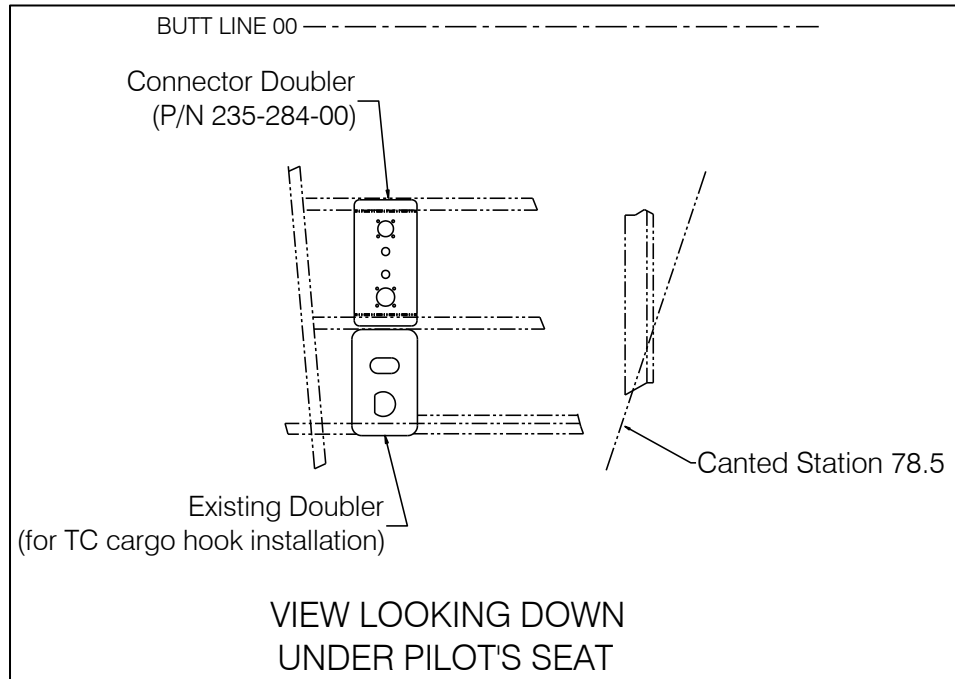
The Connector Doubler is to be mounted on the inside of the aircraft skin and directly inboard of the existing MD Helicopters doubler for the type certificated cargo hook installation's electrical release connector.



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1. Before drilling any holes, verify clearance with surrounding equipment including allowing for several inches above the holes for the connectors.

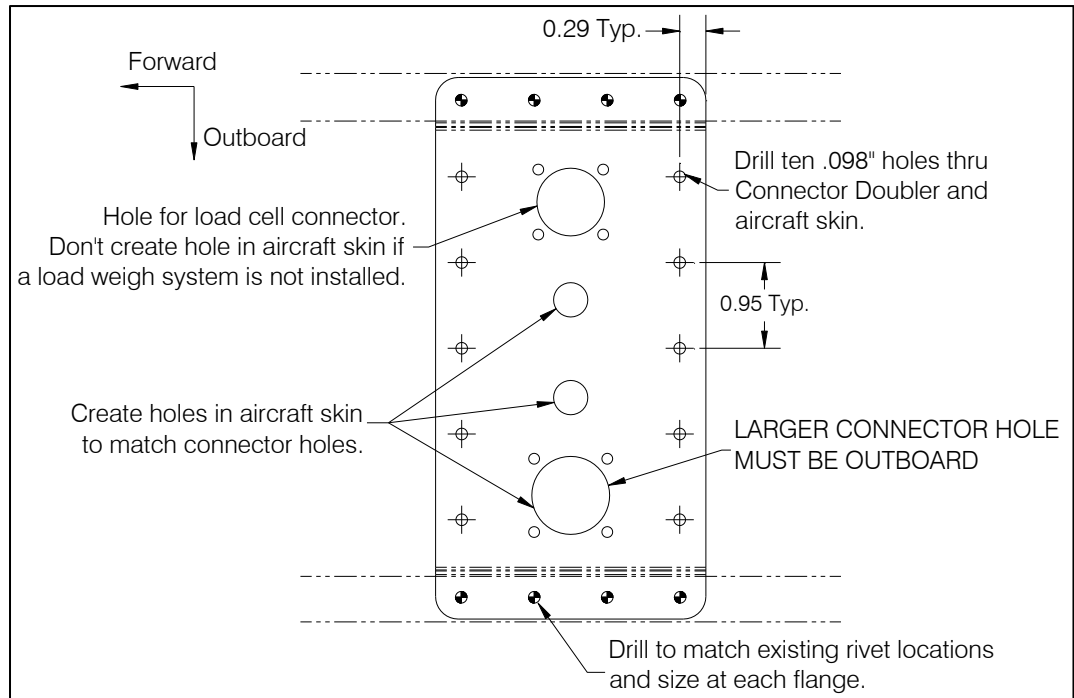
**Figure 4.2.1 Connector Doubler Location**



If this area has an existing hole or hole pattern or a connector installed in a location that is not compatible with the Connector Doubler, optionally fabricate a similar size Connector Doubler from .020" thick 2024-T3 to accommodate. Transfer the supplied Connector Doubler hole pattern for the hydraulic disconnects and electrical release connector to the new Connector Doubler and install it as below.

2. Position the Connector Doubler (orient it with the larger connector hole outboard and the primer side down, see Figure 4.2.2) in the fore and aft direction over existing rivets in stringers it overlaps. Ensure 2D edge margins will be present on the doubler with these rivet locations. Remove the Connector Doubler, mark these rivets and drill them out.
3. Re-position the Connector Doubler and drill ten (10) 0.098 inch holes through it and the aircraft skin at the locations shown.
4. Drill the Connector Doubler to match the drilled-out rivet hole pattern in the two stringers.

**Figure 4.2.2 Doubler Installation**



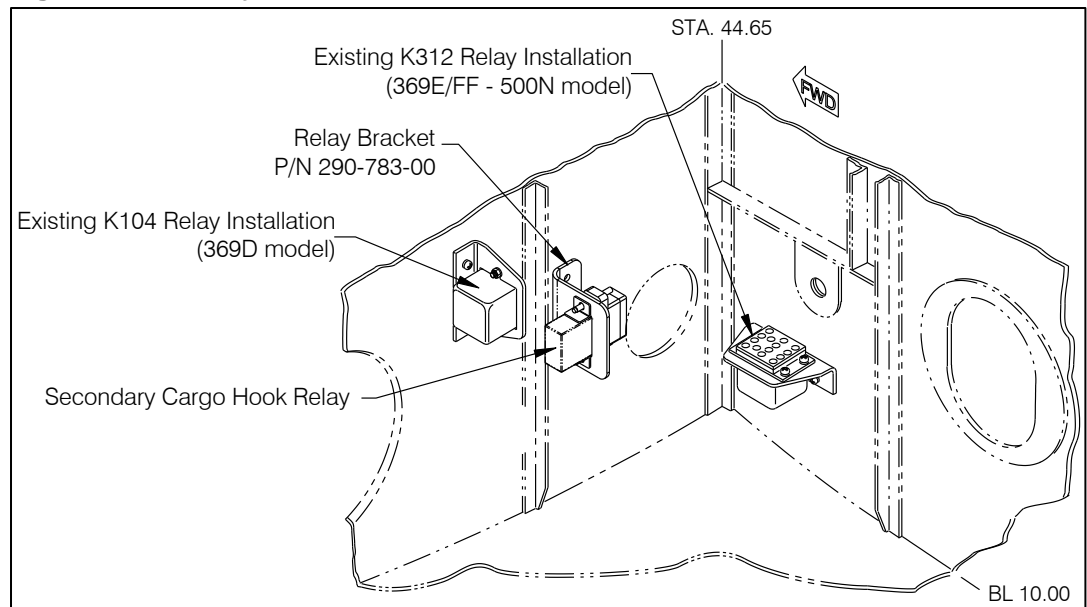
5. Secure the Connector Doubler in position with MS20470AD3-3 rivets (P/N 511-191-00) at the ten new holes and with MS20470AD3-3.5 (P/N 511-204-00) rivets at the holes through the flanges. Or install MS20470AD3 series rivet with dash length as determined on installation.

#### 4.2.2 Relay and Internal Harness Installation


The Relay Bracket (P/N 290-783-00) provides the mounting provisions for the relay for the secondary cargo hook's electrical release system. It is installed forward of the battery under the pilot's compartment floor access door.

1. If present remove the aircraft battery to obtain access to the area of relay mounting and for wire routing from the relay.
2. Position the Relay Bracket in an available location in the approximate area on the forward bulkhead at STA 44.65 shown below and drill 0.169" holes in the forward bulkhead to match the bracket holes.

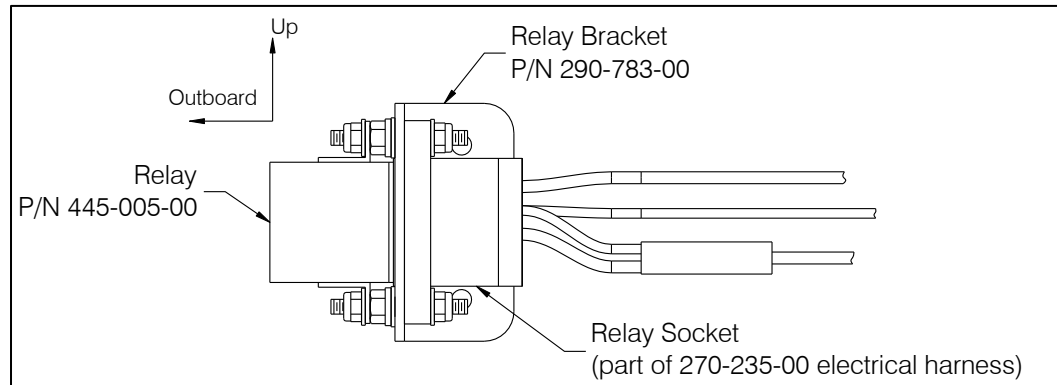
**Figure 4.2.3 Relay Location**



3. Install the Relay Bracket using the supplied screws (P/N 510-277-00), washers (P/N 510-278-00), and nuts (P/N 510-279-00).
4. Position the relay socket of the Internal Harness P/N 270-235-00 in the Relay Bracket and secure with the hardware provided with the harness.
5. Plug the relay (P/N 445-005-00) into the relay socket and secure with the nuts provided.

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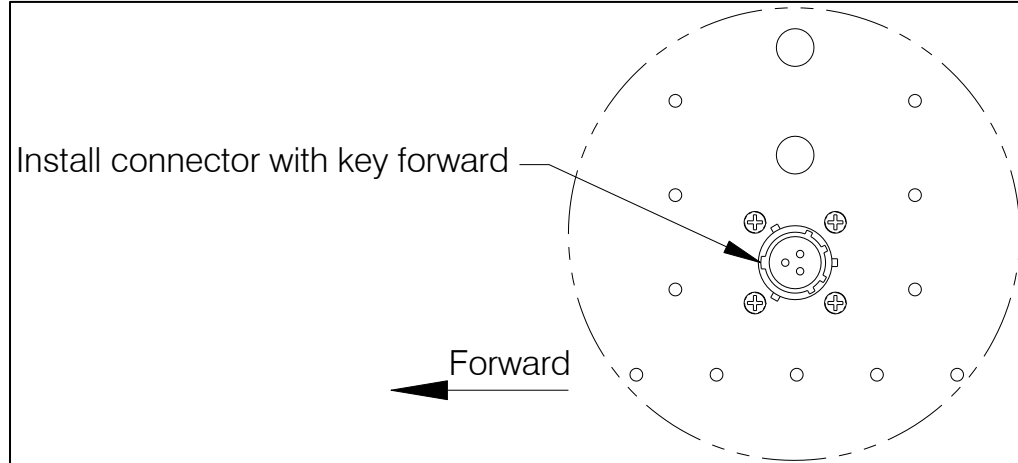
**Figure 4.2.4 Relay Installation**



Route the wires along the existing harnesses per the following guidance. Refer to Figure 4.2.6 for schematic.

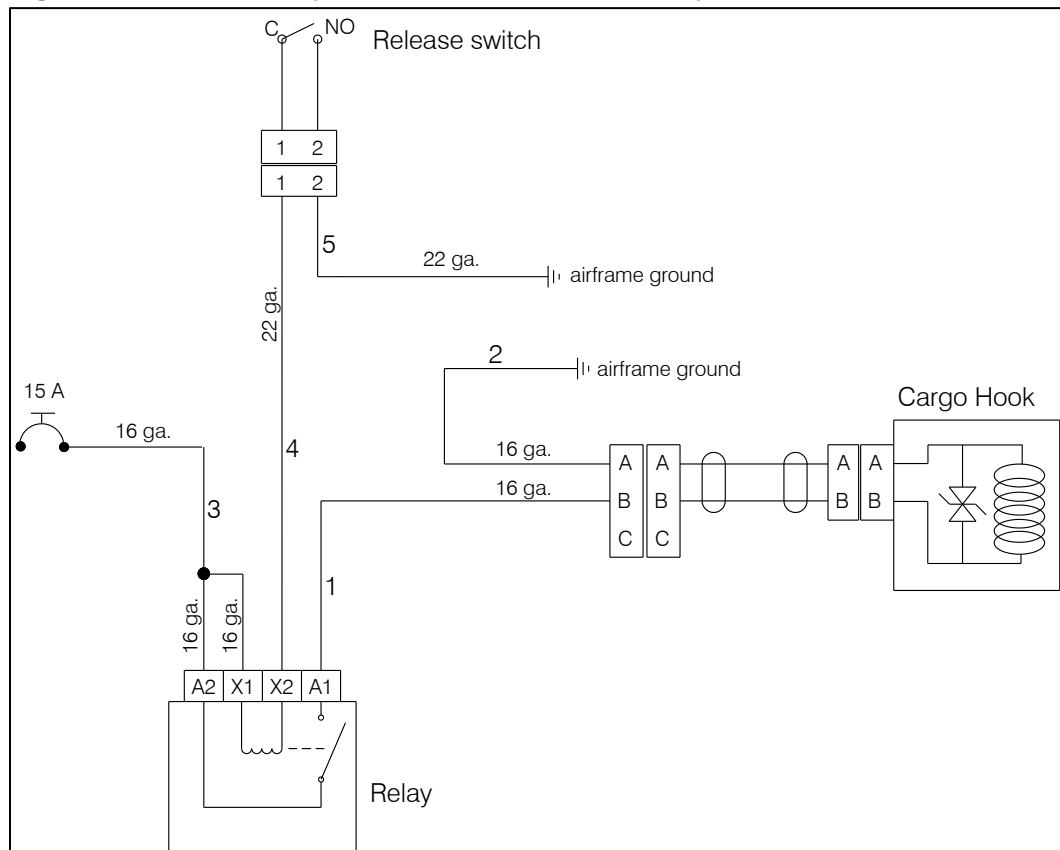
- Pick up existing wire runs by opening existing cable clamps. Nylon ties alone may not be used for primary support.
  - The distance between supports should not exceed 21 inches (53 cm).
  - Bend radius of wire or harness must not be less than 10 times the wire or harness diameter.
  - Inspect and verify that the wire harness may not be manually deflected into a structure with a bend radius of less than 0.13 inches (3.3 mm).
6. Route the wire harness leg (wires 4 and 5) with the small black connector to the base of the cyclic, a new hole will be drilled and this will be routed up the cyclic to connect to the secondary release switch harness in Section 4.3.
  7. Route wire number 3 forward through the hole just inboard of the relay socket and route with existing wire bundles forward of and below the instrument panel to the circuit breaker panel on the right side of the center console.
  8. Install the supplied 15-amp circuit breaker (P/N 440-018-00) and terminate wire 3 using the supplied ring terminal (P/N 410-296-00). Use a 16 AWG M22759 wire as a jumper to connect power from the primary cargo hook circuit breaker to this new circuit breaker.
  9. Route the harness wires (wires 1 and 2) with the MS3470 connector termination to the Connector Doubler. Position the connector with the key FORWARD (see Figure 4.2.5) and secure with the four supplied screws (P/N 510-481-00) and the Perimeter Nut Plate (P/N 511-203-00).


**Figure 4.2.5 Connector Orientation**



- From the connector route wire 2 to an available aircraft ground (E1 or E20) or create an additional ground point per AC43.13 for this wire and the wire from the switch (which will be terminated later). Trim this wire to length as needed.

**Figure 4.2.6 Secondary Hook Electrical Release System Schematic**



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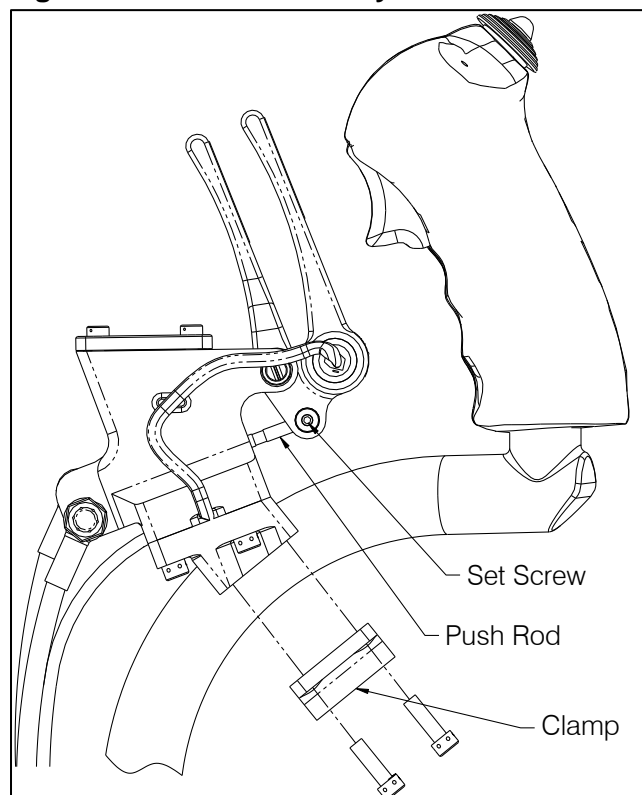
### 4.3 Fixed Hydraulic Release System Installation


The fixed hydraulic release system installation consists of mounting the Dual Master Cylinder (P/N 232-806-00) to the cyclic and routing its hose assemblies to the Connector Doubler installed in the aircraft skin per Section 4.2.1.

Install the Dual Master Cylinder per the following, referring to Figure 4.3.1.

1. Remove the Clamp from the Dual Master Cylinder by removing the four screws that temporarily secured it.
2. Position the Dual Master Cylinder on the cyclic at approximate location shown below and re-install the four screws, tighten the screws just enough to hold the Dual Master Cylinder in position.
3. Check this position by actuating the levers and verifying they do not contact the cyclic grip when fully actuated and that they are comfortably reached from the cyclic grip. Adjust the position of the Dual Master Cylinder on the cyclic tube as necessary and then tighten the four screws to 20-30 in-lbs. and safety wire them together in pairs.
4. Each individual lever can also be adjusted by loosening its set screw and using a small flat screwdriver at the end of the Push Rod to turn it. Maintain full thread engagement on the Push Rod.

**Figure 4.3.1 Dual Master Cylinder Installation**



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For the following steps, refer to Figure 4.2.2.

5. At the base of the cyclic drill a 0.56 inch diameter hole at 2.25 inches inboard of the existing hole and drill another 0.56 inch diameter hole 1.13 inches inboard of the existing hole.
6. Route the electrical harness leg with the small black connector up through the center hole and route this up the cyclic tube to connect to the harness from the switch on the Dual Master Cylinder.
7. Route the hoses down the cyclic tube, securing in three places, re-using the existing loop clamps around the cyclic tube and adding two clamps to secure the second hose and the electrical harness. Longer screws (P/N 510-652-00) are provided to accommodate the additional clamps.
8. Remove the quick disconnect fitting from the ends of each hose assembly and route the ends of the hoses through the holes (if present remove grommet from existing hole).

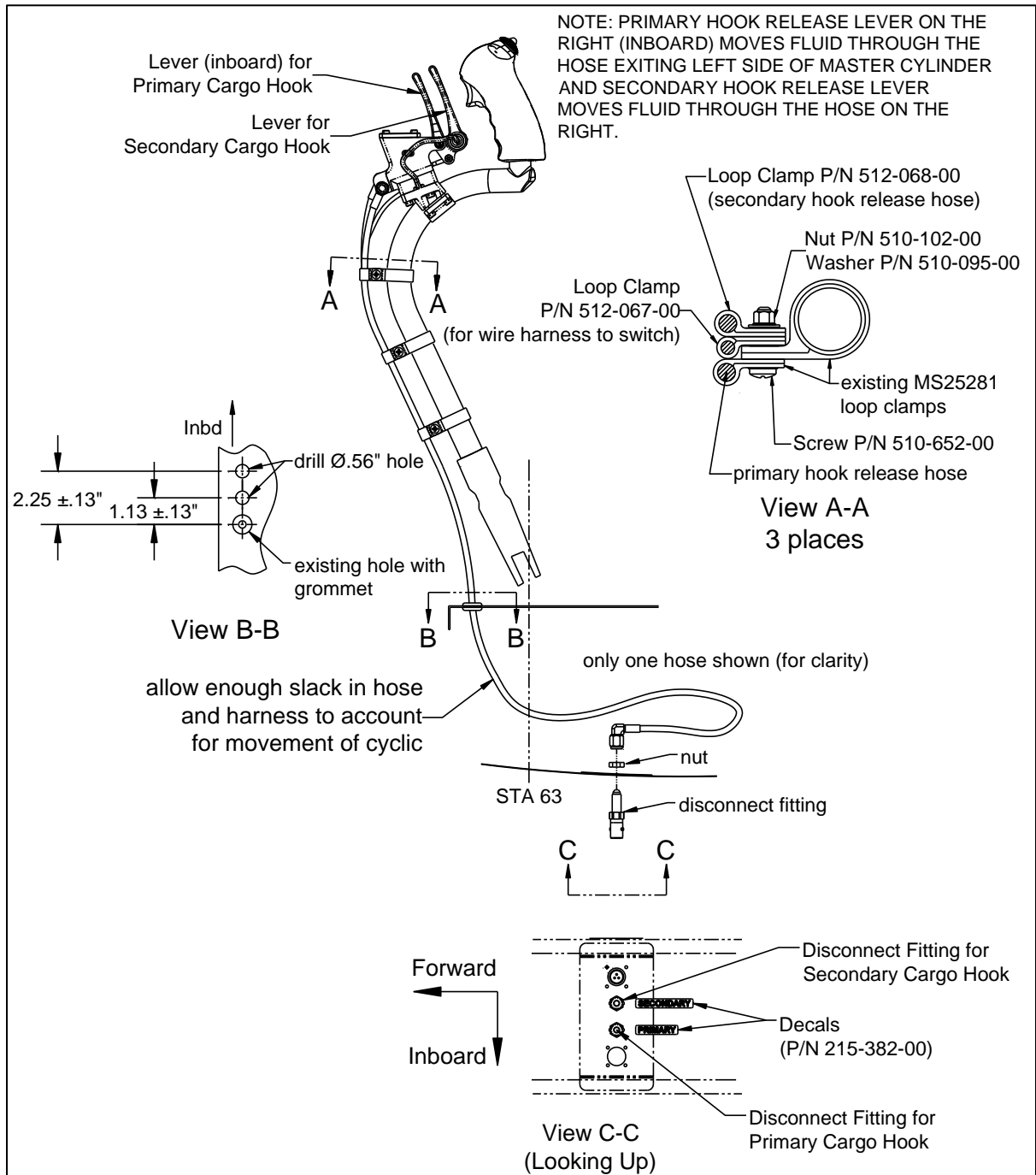
## NOTICE

*Actuation of the primary release lever (on the right) moves fluid through the hydraulic hose that exits the master cylinder on the left and the secondary hook release moves fluid through the hose on the right.*


9. Route the hoses to the Connector Doubler (installed per Section 4.2.1), looping the extra hose length aft of the termination point.
10. Check the orientation of the 90° end fittings with respect to the holes in the Connector Doubler. To facilitate routing of the hoses, the 90° fittings can be rotated as needed by gripping the stainless-steel collar with pliers and rotating the 90° fitting with a 12 mm wrench or pliers.
11. Remove the nuts from the quick disconnect fittings and insert the fittings through the hole from below the aircraft. Thread the nuts back on from inside the aircraft, but do not tighten yet. Thread the fittings into the elbow at the end of the hose assembly and tighten to 70-90 in-lbs.
12. Tighten the nuts to secure the fittings to the Connector Doubler.
13. Apply PRIMARY and SECONDARY decals from the Decal Sheet P/N 215-382-00 to the exterior skin adjacent to the respective disconnect fittings.
14. Split and install the provided grommet (P/N 505-022-00) over the hose and into the inboard hole at the seat base.

- Split and install the other provided grommet (P/N 505-024-00 (MS35489-134)) or an MS35489-2 grommet over the harness and then into the center hole and re-install the removed grommet into the outboard hole.

**Figure 4.3.2 Fixed Hose and Wire Routing from Dual Master Cylinder**





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#### 4.4 Internal Load Weigh System Components Installation

The load weigh system (kit P/N 200-383-00 for the 369/500 or P/N 200-383-01 for the 600N) is optional, if it is not being installed skip to section 4.5.

This section covers installation of the load weigh indicator (C-40 model) and the internal wire harness (P/N 270-283-02). If installing the C-39 Indicator (P/N 210-095-00) and its internal harness (P/N 270-047-01), refer to Owner's Manual 120-207-00.

The C-40 Indicator is directly interchangeable with the C-39 Indicator (without changing the internal harness) except it does not support optional accessory components (e.g. - Analog Meter, C-30 Data Recorder). The functions performed by the C-30 data recorder will be integrated into the C-40 Indicator with a future software update.

The internal harness (P/N 270-283-02) provided with new C-40 Indicator kits is the same as the C-39 internal harness except it does not include the data line to connect to the accessory components.

## NOTICE

*If installing the C-40 indicator as a replacement for the C-39 indicator, the internal harness does not need to be replaced.*

##### 4.4.1 C-40 Indicator Installation


The C-40 Indicator is designed to be mounted in a standard 2¼" instrument hole or optionally a bracket may be fabricated to support it. It should be located in a position that is convenient, accessible and visible to the pilot. Another consideration for its mounting location is access to the USB port on the back, this USB port is intended for the firmware updates.

Secure the C-40 Indicator in its mounting location with the four screws (P/N 511-211-00) provided.

##### 4.4.2 C-40 Internal Harness Installation

Route all wires using the following general guidance.

- Pick up existing wire runs by opening existing cable clamps nylon ties alone may not be used for primary support.
- New wire runs should be supported with MS21919WDG loop clamps.

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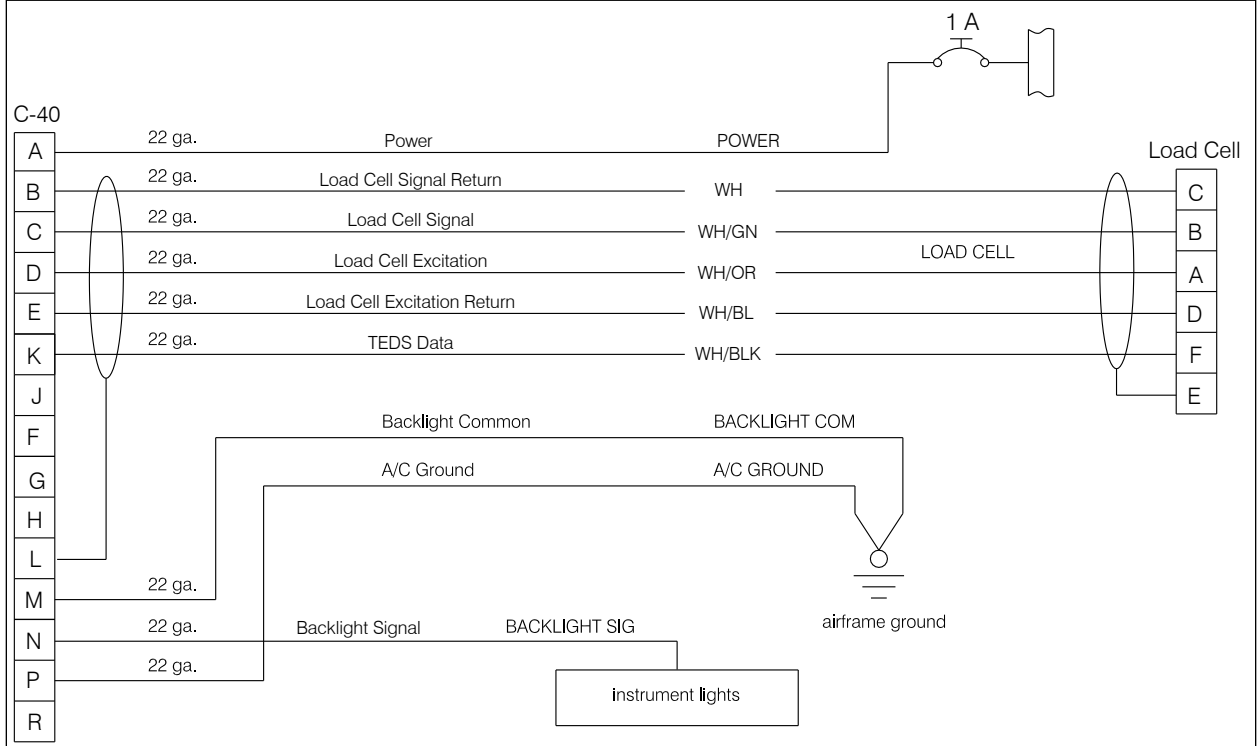
- The distance between supports should not exceed 21 inches.
  - The minimum radius of bends in wire groups or bundles must not be less than 10 times the outside diameter of the largest wire or cable.
  - Inspect and verify that the wire harness may not be manually deflected into a structure with a bend radius less than .125".
1. Connect the larger of the connectors on the load weigh harness (P/N 270-283-02) to the back of the C-40 indicator.
  2. Route the "LOAD CELL" leg of the harness to the Connector Doubler that was installed per Section 4.2.1 and install the connector at the inboard hole with the supplied hardware (screw P/N 510-028-00 (qty 4), nut P/N 510-029-00 (qty 4), and washer P/N 510-062-00 (qty 4)).
  3. If it is necessary to remove the load cell connector to facilitate routing, re-connect the wires referring to the schematic in Figure 4.4.1 .
  4. Route the wire labeled POWER to the circuit breaker panel in the center console and install a 1 or 2-amp circuit breaker (not supplied) and connect this wire to it. Apply the supplied placard P/N 215-010-00 adjacent to the circuit breaker.
  5. Wire numbers BACKLIGHT SIG and BACKLIGHT COM are for the C-40 Indicator's backlight control voltage. Connect wire BACKLIGHT SIG to the instrument panel lighting circuit and wire BACKLIGHT COM to aircraft ground.


## NOTICE

*The Indicator does function normally without the Backlight Control Voltage wired, but will just not dim with other instruments. Full brightness of the Indicator is overridden by the aircraft dimming control voltage (if connected).*

6. Wire A/C GROUND is to be connected to a suitable aircraft ground.

Figure 4.4.1 C-40 Internal Harness Schematic



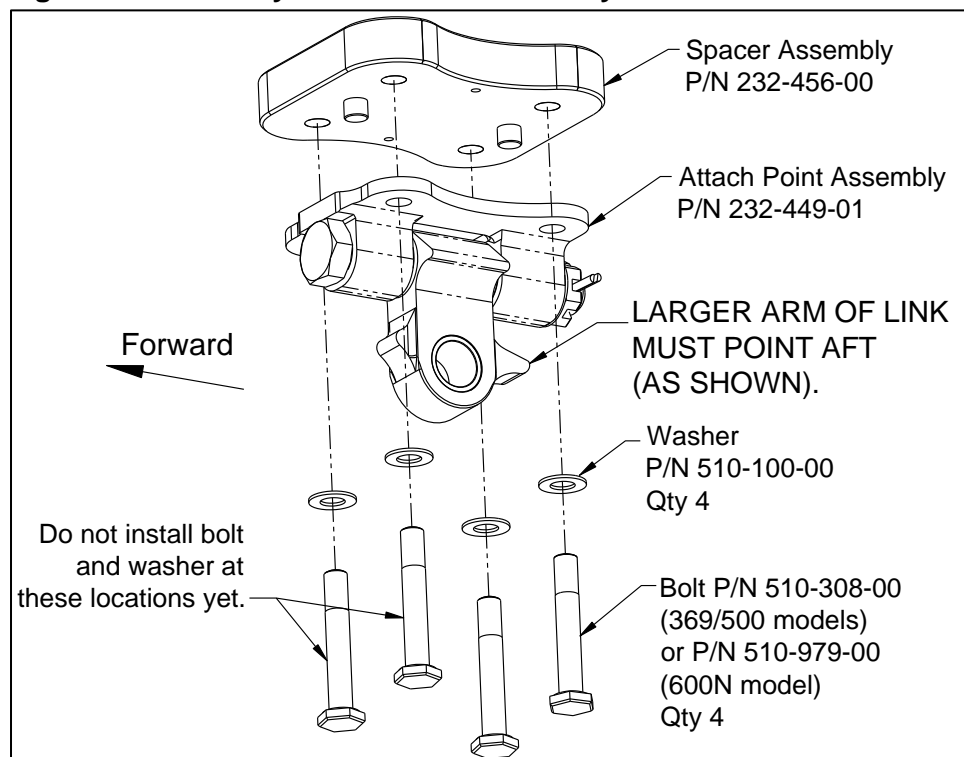
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#### 4.5 Primary Cargo Hook and Attach Point Installation

The primary cargo hook attaches at the original type certificated hardpoint at STA 99.3. It connects to the hardpoint through the supplied Attach Point components. Install these components per the following.

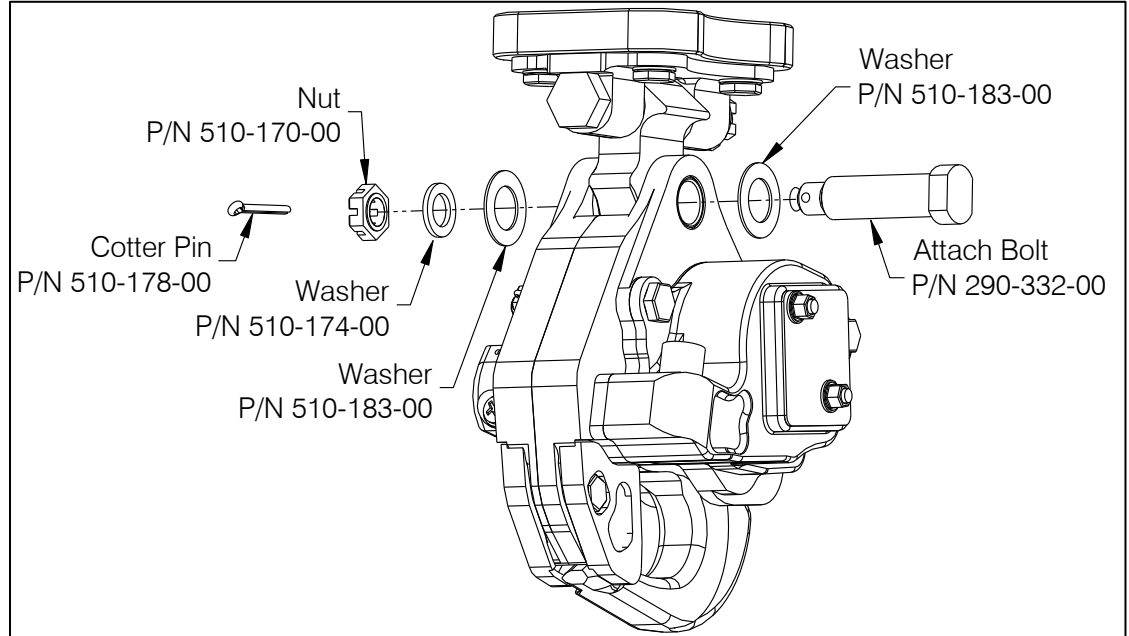
1. Install the Attach Point components (P/N 232-456-00 and P/N 232-449-01) to the hardpoint on the belly of the helicopter using the hardware supplied, as illustrated in Figure 4.5.1, leaving the forward two bolts and washers off until the electrical harnesses and hose can be routed through loop clamps to be installed there.
2. Since the Attach Point Assembly has built in travel limiters, if rubber pads are present on the skin of the aircraft they can be removed at the operator's option. These pads are part of earlier STC and TC configurations.

**Figure 4.5.1 Primary Attach Point Assembly**

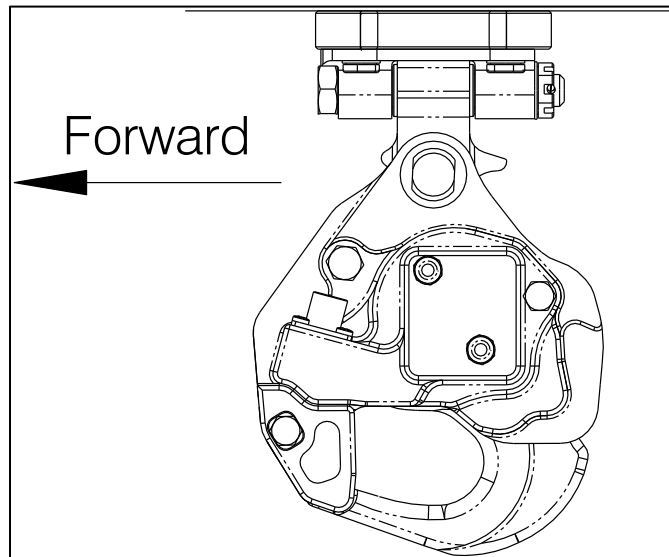


3. Connect the Cargo Hook with Slave Cylinder Assembly (P/N 232-809-00) to the Attach Point Assembly with Attach Bolt and hardware as shown in Figure 4.5.2 or with Pin Load Cell and hardware as shown in Figure 4.5.4. The cargo hook load beam must point forward as shown in Figure 4.5.3.
4. Tighten the nut finger until fully seated, **finger tight only**. Back off nut to previous castellation, if need, when aligning cotter pin for installation. Install and secure cotter pin.

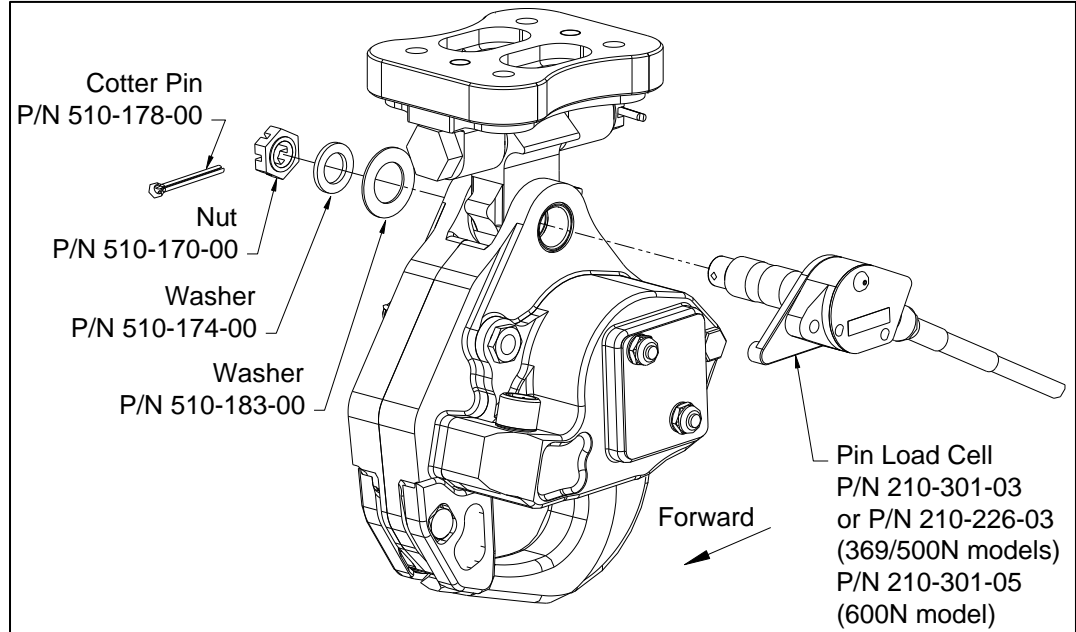
**Figure 4.5.2 Cargo Hook Installation**



**Figure 4.5.3 Cargo Hook Orientation**

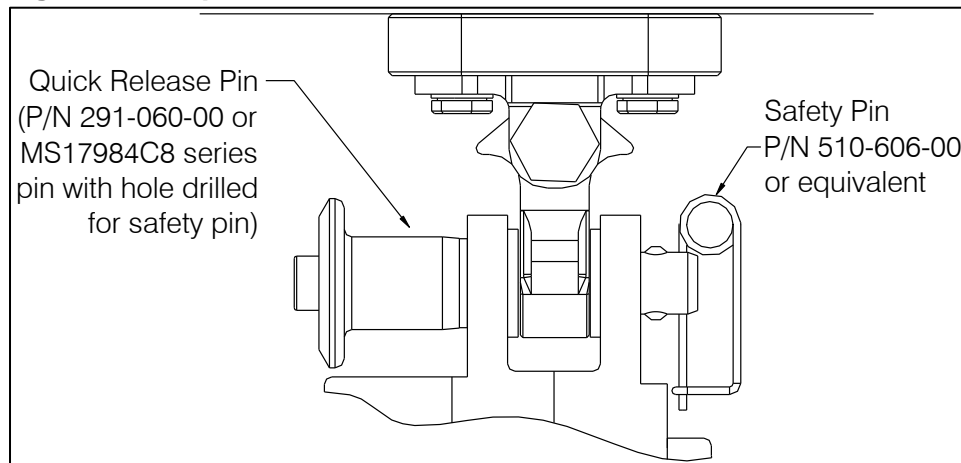



**Figure 4.5.4 Primary Cargo Hook Installation w/ Pin Load Cell**



To facilitate transition of the primary cargo hook between a side puller and the belly installation a quick release pin (P/N 291-060-00 or equivalent MS17984C8 series pin modified with a hole for safety pin) may be used instead of the attach bolt. Grease the pin shank with AeroShell 7 grease or equivalent before installing.

**Figure 4.5.5 Optional Attach Hardware**



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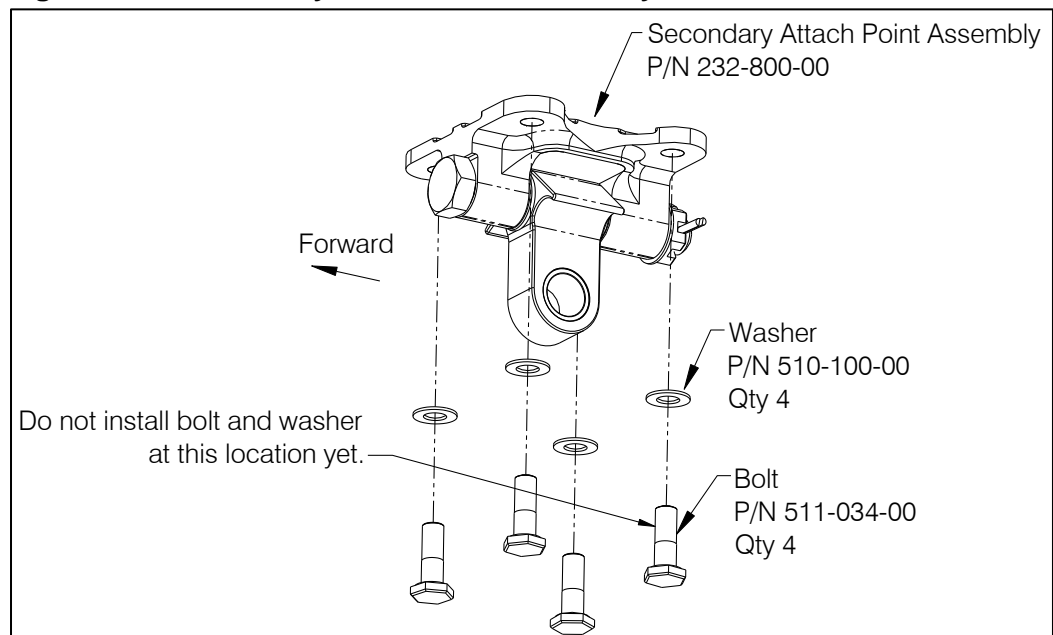
#### 4.6 Secondary Cargo Hook Installation

The secondary cargo hook and the structural linkage to connect it to the aircraft are installed at the secondary hard point installed at STA 105 per Section 4.1.

The Secondary Attach Point Assembly (P/N 232-800-00) serves as the structural linkage to connect the secondary cargo hook to the hard point. Install the Secondary Attach Point Assembly per the following.

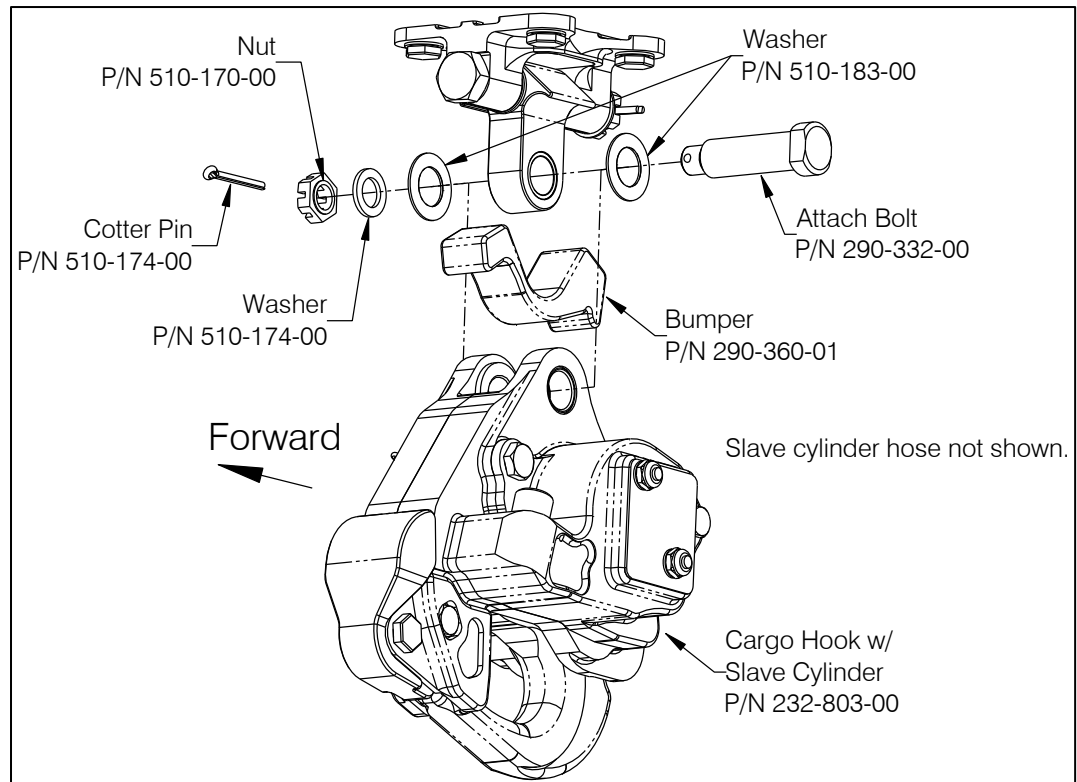
1. If the secondary hardpoint was installed per STC SR02662LA remove the existing external components installed at the hardpoint.
2. Remove the paint from the mating surface of the aircraft skin to create an electrical bond (for lightning/static electricity protection). Apply a MIL-DTL-5541 conversion coating (Alodine 1001 or Alodine 1201 or similar) to the exposed bare metal.
3. Position the Secondary Attach Point Assembly with the bolt head forward and secure it to the aircraft with the hardware shown, leaving the aft left bolt and washer off until the electrical harnesses and hose can be routed through a loop clamp to be installed there.
4. Tighten the three bolts to 50-80 in-lbs.

**Figure 4.6.1 Secondary Attach Point Assembly Installation**



5. Insert the Bumper (P/N 290-360-01), oriented with the larger lobe aft, between the attach lugs of the cargo hook (refer to Figure 4.6.2), align the cargo hook attach hole with the hole in the link of the Secondary Attach Point Assembly and secure with the hardware as shown. **The Bumper is a tight fit within the lugs and will need to be forced into position with a flat screwdriver or similar blunt tool.**
6. Tighten the nut finger until fully seated, finger tight only. Back off nut to previous castellation, if need, when aligning cotter pin for installation. Install and secure cotter pin.

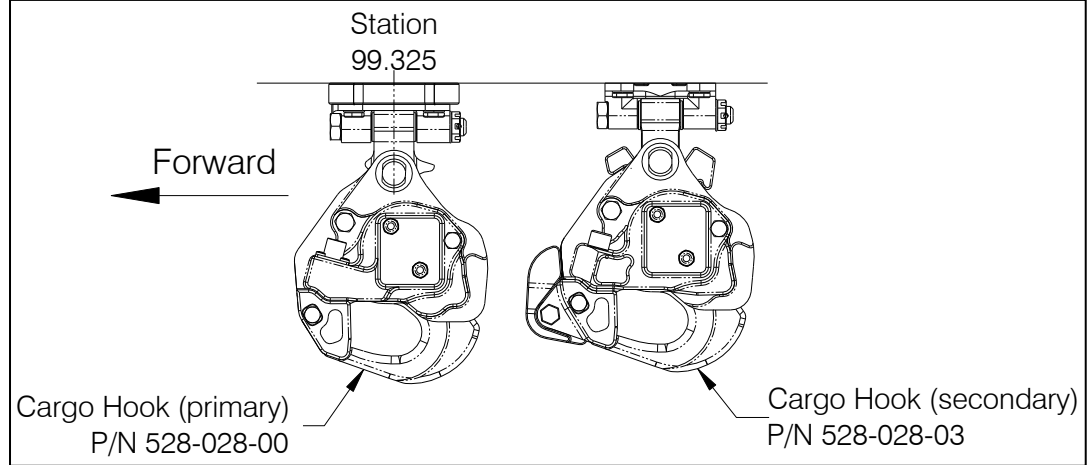
**Figure 4.6.2 Secondary Cargo Hook Installation**




The figure below shows the completed cargo hook installation (slave cylinder hydraulic hoses are not shown) with correct positions and orientation.



**Figure 4.6.3 Overview of Cargo Hook Installation**



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#### 4.7 External Electrical Harness and Hose Routing

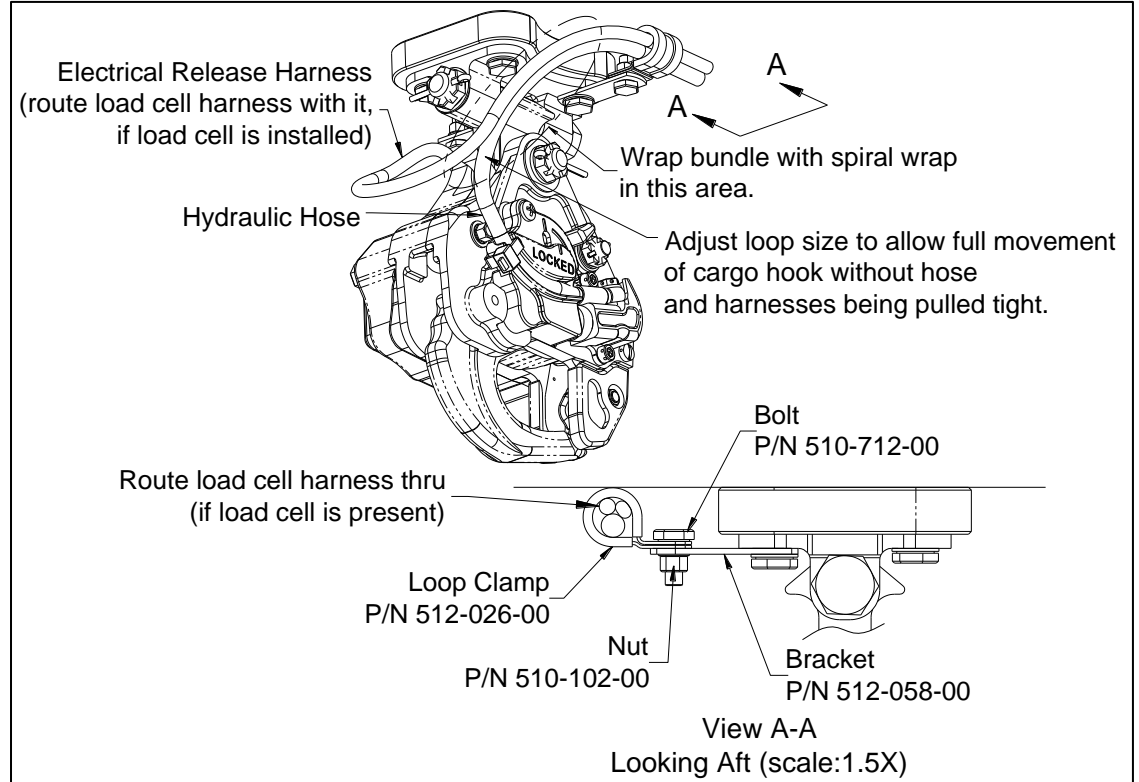
1. Connect the shorter Electrical Harness (P/N 270-132-00 for the 369/500 or P/N 270-132-02 for the 600N) to the connector on the primary cargo hook and the longer Electrical Harness (P/N 270-236-00 for the 369/500 or P/N 270-236-01 for the 600N) to the secondary cargo hook connector.
2. If the Pin Load Cell is installed route its electrical harness with the electrical release harness from the primary cargo hook.



*The Pin Load Cell must be installed at the primary cargo hook.*

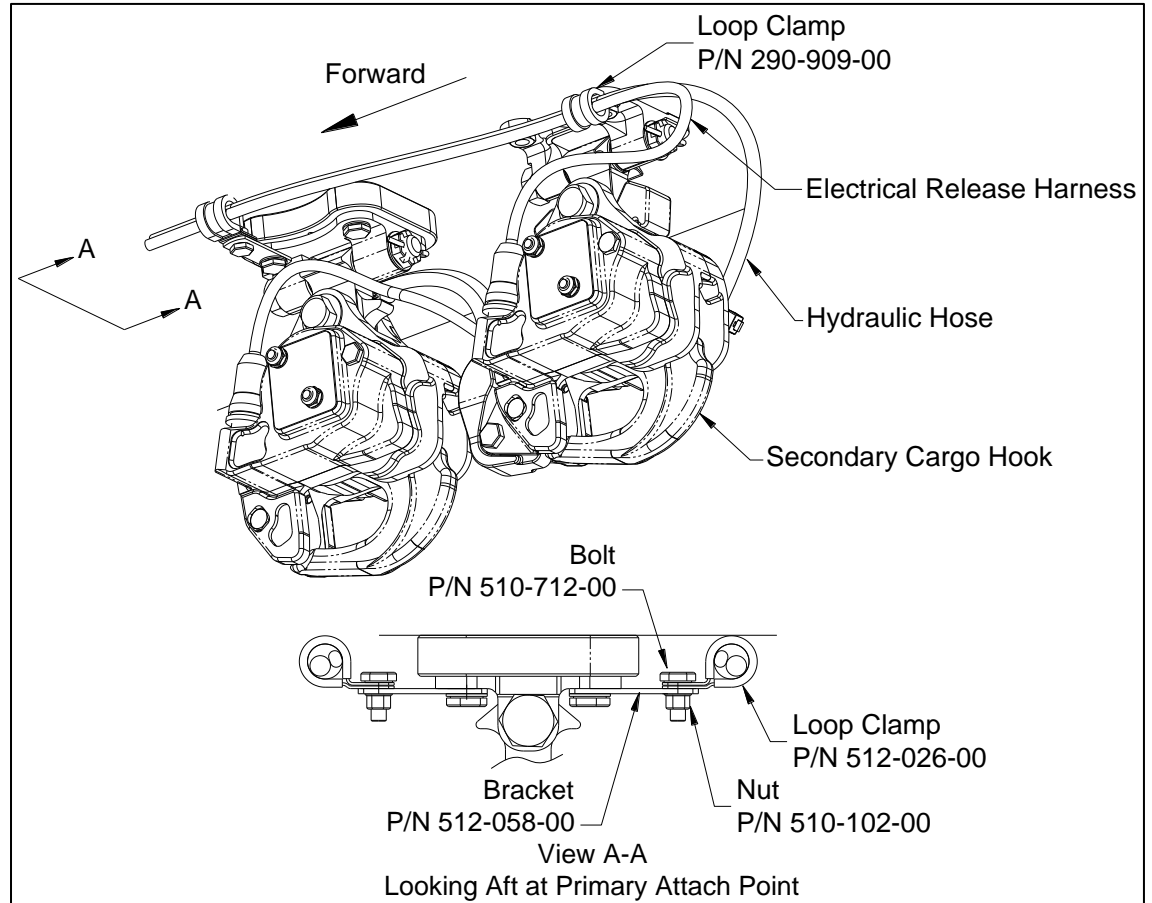
3. Referring to Figure 4.7.1, place a supplied loop clamp (P/N 512-026-00) over the primary cargo hook's release harness, load cell harness (if installed) and hydraulic hose and loosely attach it to the smaller width slot of the supplied Bracket (P/N 512-058-00) with bolt P/N 510-712-00 and nut P/N 510-102-00. Attach the Bracket at the forward right attach point mounting hole with the bolt P/N 510-308-00 and washer P/N 510-095-00. Do not fully tighten the bolt at this point.
4. Route the release harness, load cell harness (if installed) and hose approximately as shown and adjust loop as necessary to allow full swing of the cargo hook without pulling or pinching the hose or harness.
5. When a satisfactory loop is obtained, tighten the P/N 510-102-00 nut to 20-25 in-lbs. and the P/N 510-308-00 bolt to 50-80 in-lbs.
6. Install the supplied spiral wrap (P/N 590-013-00) over the hose and harness(es) (see Figure 4.7.1 for location).

**Figure 4.7.1 Harness and Hose Routing at Primary Cargo Hook**



7. Route the secondary cargo hook's electrical harness and hydraulic hose in a loop aft and then to the left of the cargo hook (see Figure 4.7.2). At its aft left attach point mounting hole place a loop clamp (P/N 290-909-00) over the electrical harness and hose and loosely attach it at the mounting hole with the bolt P/N 511-034-00 and washer P/N 510-100-00.
8. At the primary attach point, place loop clamp P/N 512-026-00 over the hose and harness and loosely attach the loop clamp to the smaller width slot of the bracket with bolt and nut as shown in View-A-A. Orient the loop clamp up as shown.
9. Attach the bracket with the bolt P/N 510-308-00 and washer P/N 510-100-00 at the forward left hole.

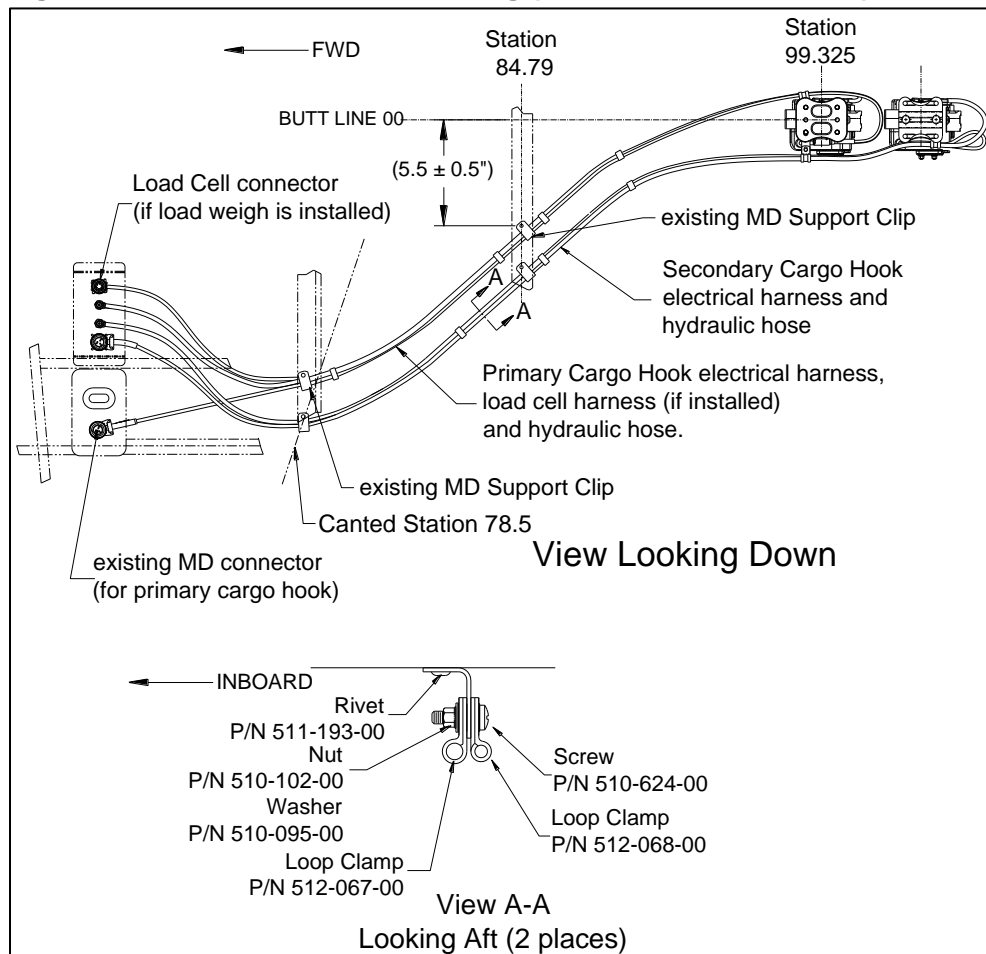
**Figure 4.7.2 Hose and Harness Routing From Secondary Cargo Hook**




10. Move each cargo hook throughout its range of motion and ensure the hoses and harnesses have slack and are not pinched or kinked in any position.
11. Tighten the P/N 510-102-00 nut to 20-25 in-lbs. and tighten the bolts securing the bracket to the primary attach point and the loop clamp to the secondary attach point to 50-80 in-lbs.
12. Install safety wire between the pairs of bolts on each side at the primary attach point.
13. Route the hoses and electrical harness forward along the belly, following the path of the type certificated harness routing (see Figure 4.7.3).
14. Route the primary cargo hook's hose and electrical harness and the load cell harness (if installed) at the existing MD support clip locations along the belly. Route the load cell harness with the cargo hook electrical harness, using a larger MS21919 or MS25281 loop clamp as needed to accommodate the load cell harness.

15. Add an additional mounting point outboard of each of these MD support clips by removing an existing rivet (3<sup>rd</sup> rivet over from the existing support clip rivet) and drilling hole out to Ø.143/.146".
16. Install the two (2) provided Support Clips (P/N 235-286-00) using rivets (P/N 511-193-00) and place loop clamp P/N 512-068-00 over the hose and loop clamp P/N 512-067-00 over the harness and secure to Support Clips with hardware shown in View A-A.

**Figure 4.7.3 Hose & Harness Routing (369 series/500N shown)**



17. Connect the primary cargo hook's electrical harness to the existing MD electrical connector and the primary cargo hook's hydraulic hose to the inboard hydraulic connector. Connect the load cell connector.
18. Connect the secondary cargo hook's electrical harness connector and hydraulic hose to the other connectors.

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#### 4.8 Hydraulic System Fill and Bleed Procedure

If there is a need to fill and/or bleed the system, follow the procedures listed below. Proper bleeding is critical to the operation of the hydraulic release system. An improperly bled system will not release the cargo hook mechanism.

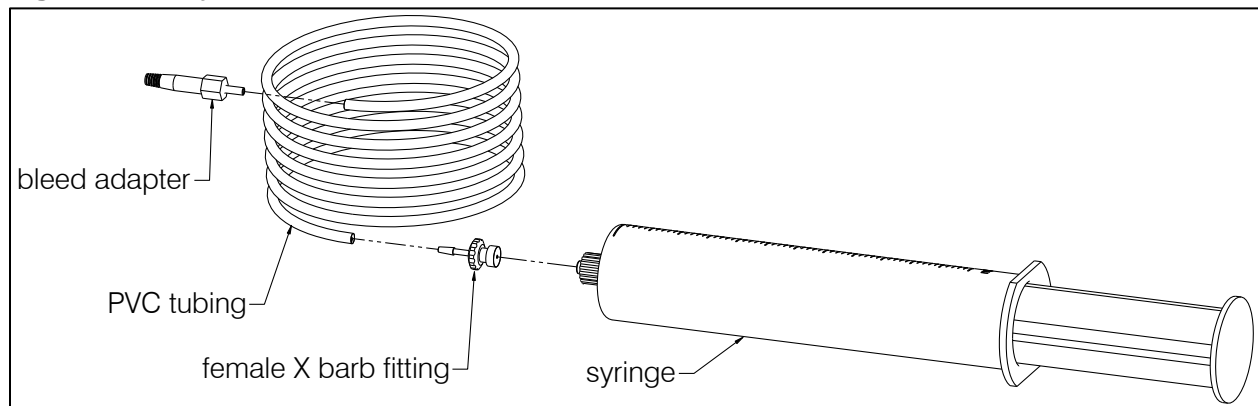
Filling and bleeding requires two persons, one to inject hydraulic fluid through the system and the other to observe the master cylinder reservoir.

A hydraulic hook bleed kit, P/N 212-014-02, is provided. This kit consists of 2 fl. oz. of MIL-PRF-87257 hydraulic fluid, a syringe, a female barb fitting, a length of PVC tubing, and a bleed adapter fitting. An additional 2 oz bottle of hydraulic fluid (P/N 540-032-00) is also included.

Bleeding procedure:

1. Assemble the bleed kit by press fitting each component as shown.

**Figure 4.8.1 Hydraulic Hook Bleed Kit**



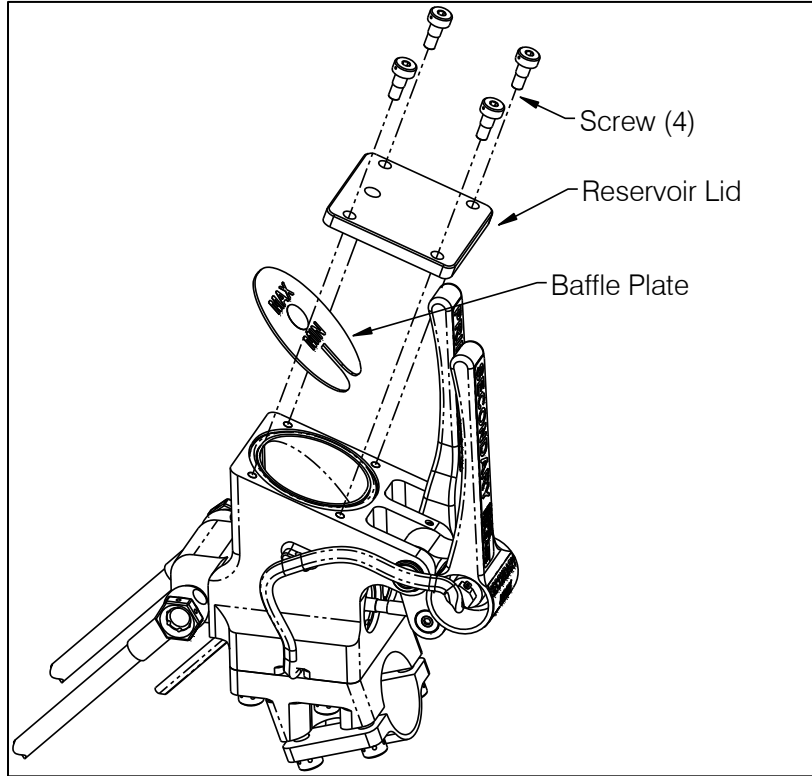
2. Place an absorbent towel under the master cylinder.

## NOTICE

*Use best shop practices to keep foreign material out of the hydraulic system. FOD will plug orifices, damage seals and/or scratch sealing surfaces necessitating system rebuild. Use only clean hydraulic fluid from sealed containers.*

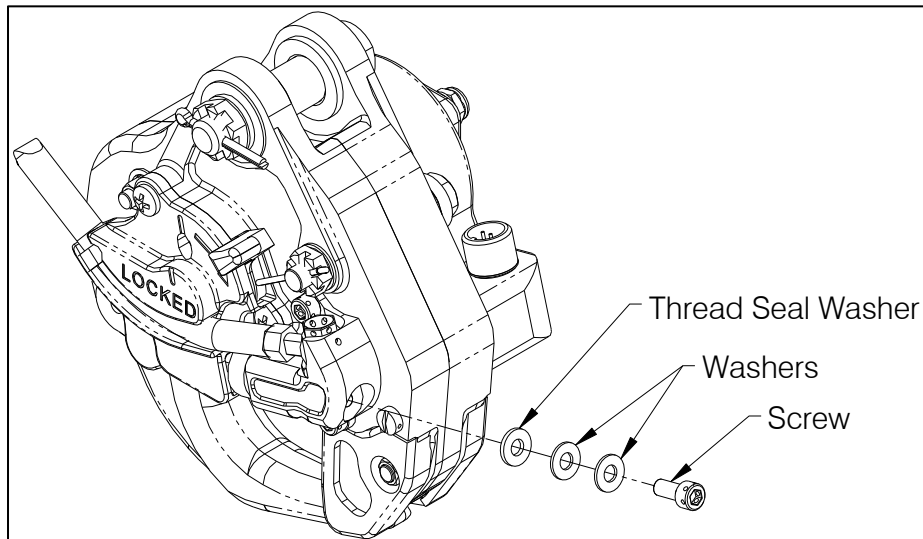
3. Remove screws, reservoir lid, and baffle plate from the master cylinder reservoir as shown in Figure 4.8.2.

**Figure 4.8.2 Reservoir Lid Removal**



4. Remove the bleed screw, thread seal washer, and washers from the slave cylinder, see Figure 4.8.3.

**Figure 4.8.3 Bleed Screw Removal**

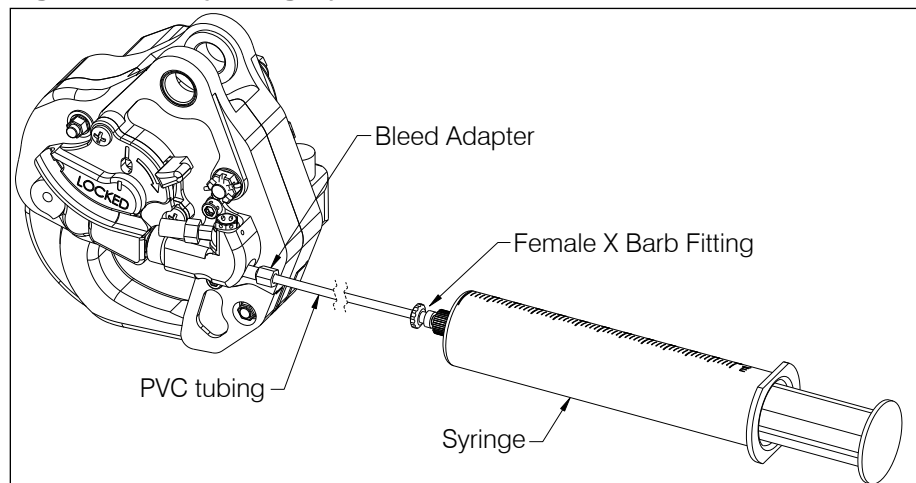


5. Fill the syringe with approximately 35 cc of hydraulic fluid and purge any remaining air in the syringe and tubing. Screw the end of the bleed adapter into the screw hole on the slave cylinder to create a tight seal. See Figure 4.8.4.
6. While observing the reservoir, **slowly** push on the syringe plunger to force fluid through the slave cylinder, hydraulic hose, and up to the master cylinder reservoir. There will be some resistance during filling—this is normal.

## CAUTION

*Injecting the fluid into the system too rapidly may cause the fluid to spray up and out of the master cylinder reservoir. Wear safety glasses when observing fluid reservoir while filling.*

**Figure 4.8.4 Injecting Hydraulic Fluid**




7. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

## NOTICE

*If bleeding an already filled system, you may need to draw fluid from the master cylinder reservoir during this step to prevent overflow.*



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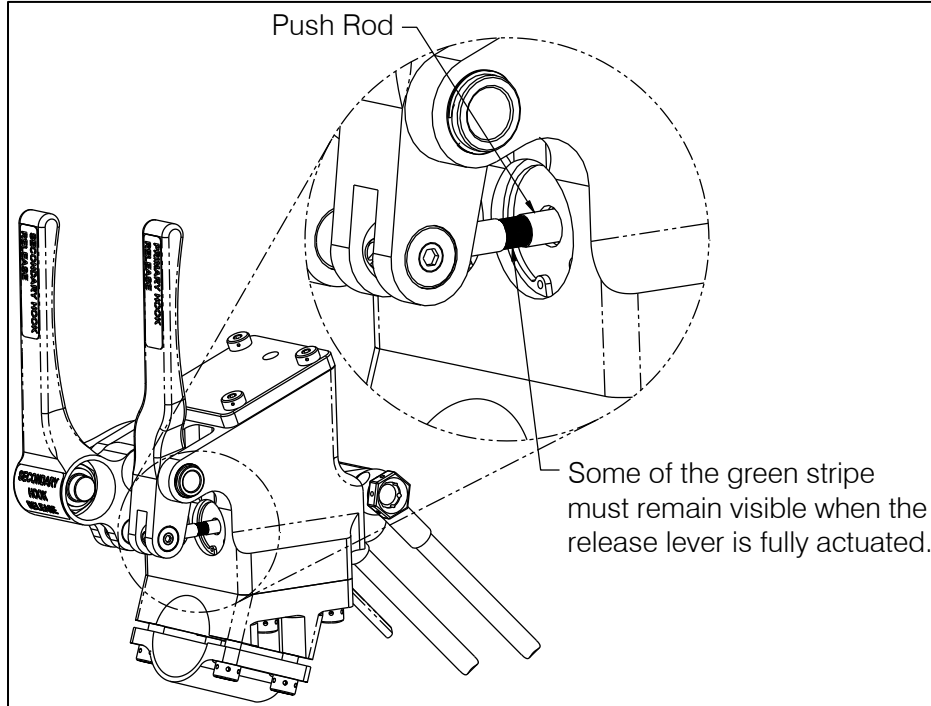
8. Prepare the thread seal washer, washer and screw for quick assembly into the bleed screw hole when the adapter is removed as fluid will began to drain from the system.
9. Remove the bleed adapter from the screw hole. Re-install the Thread Seal Washer, washers, and screw.
10. Repeat steps 4 through 9 with the other cargo hook.
11. Allow the system to rest for several minutes. This will allow any air to rise through the system
12. Very **slowly** pull each release lever on the master cylinder and watch for bubbles. If bubbles are observed rising within the reservoir, continue to slowly cycle the lever until there are no more. Actuating the lever releases air trapped within the master cylinder.



*Pull the lever very slowly! When the reservoir is not baffled and capped, a hard pull will cause fluid to erupt over the edge of the reservoir.*

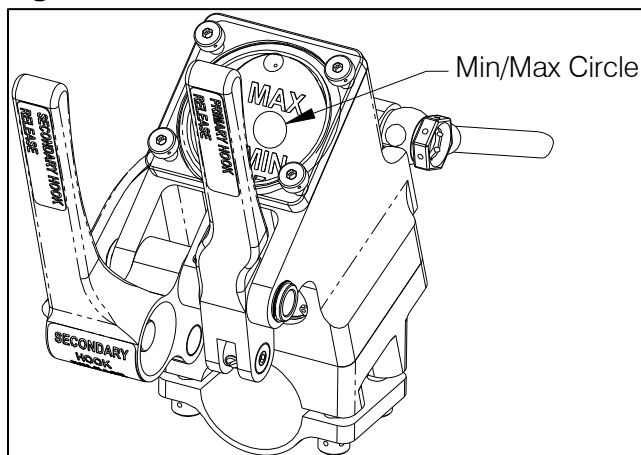
13. Check the system for air by actuating the lever firmly until it bottoms out. Check the push rod position (see Figure 4.8.5). If some of the green area on the push rod is visible, proceed to step 13. If some of the green on the push rod is not visible with the lever completely pulled, the system has too much air in it and needs further bleeding. To do this, repeat steps 5 – 11.

**Figure 4.8.5 Checking System for Air**




14. After the system is properly bled, re-install the baffle plate and verify that the reservoir is adequately filled with hydraulic fluid. Fluid level should be within the Min/Max circle on the baffle. Add or draw off fluid as necessary.

**Figure 4.8.6 Fluid Level**



15. Check the system for proper operation. Fully actuate the release lever. The hook must open and the lever must have a firm feel.
16. Re-install the reservoir lid with the four screws and safety-wire them together.

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17. Disassemble and thoroughly clean the bleed kit with isopropyl alcohol. Allow it to dry. Not cleaning the syringe will render it unusable. Re-assemble and store for next use.

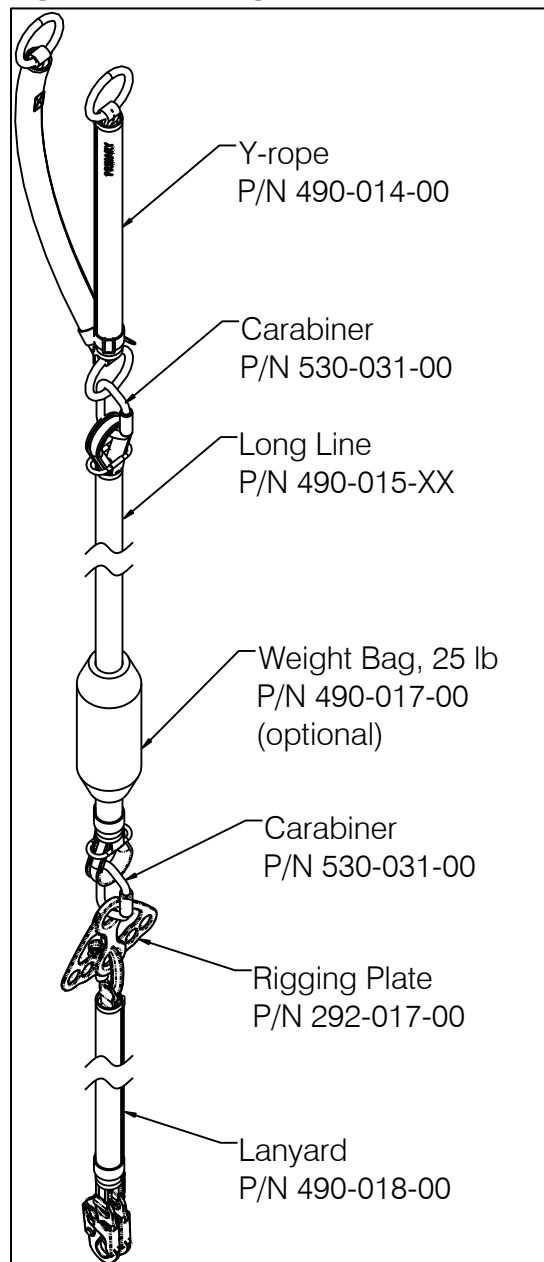
#### **4.9 Placard Installation**


1. Install the Limitations Placard P/N 215-379-00 (for the 369 series and 500N) or P/N 215-418-00 (for the 600N) on the belly of the helicopter, adjacent to the primary cargo hook.
2. Install the "SECONDARY HOOK" decal adjacent to the circuit breaker (P/N 440-018-00) installed for the secondary cargo hook.

#### 4.10 Long Line Kit

The Long Line Kit (P/N 200-449-xx) includes the components shown in the figure below. The Y-rope is the only component of the long line kit that is required to be used with the dual cargo hook system as it is designed to provide a controlled interface with the cargo hooks. For the components below the Y-rope (carabiner to lanyard), an alternative configuration or components approved by the local Aviation Authority may be used.

**Figure 4.10.1 Long Line Kit**



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Connect one end of the long line to the load ring that joins the two legs of the Y-rope with carabiner P/N 530-031-00 (shown in Figure 4.10.1).



*With this configuration use only the supplied carabiners, P/N 530-031-00. Do not substitute.*

Connect the single lug end of the Rigging Plate (P/N 292-017-00) to the long line through the other carabiner P/N 530-031-00 provided with the kit.

The lanyard provides a single carabiner at one end to connect to one of the lower Rigging Plate holes and two snap hooks at the other end to connect to a human harness. The lanyard is rated for 310 lbs. Multiple lanyards may be connected to the Rigging Plate (see section 4.10.1 below for Rigging Plate loading limitations).

Attach the 25 lb weight bag to the lower end of the long line, this specific weight bag is optional with the 200-449-XX kit configuration but a minimum of 10 lbs is required at the lower end of the long line to minimize risk of an unloaded long line trailing into tail rotor (refer to RFMS for limitation and operational procedures).



*Refer to the Long Line User's Manual provided for additional information regarding the ropes and instructions for use.*

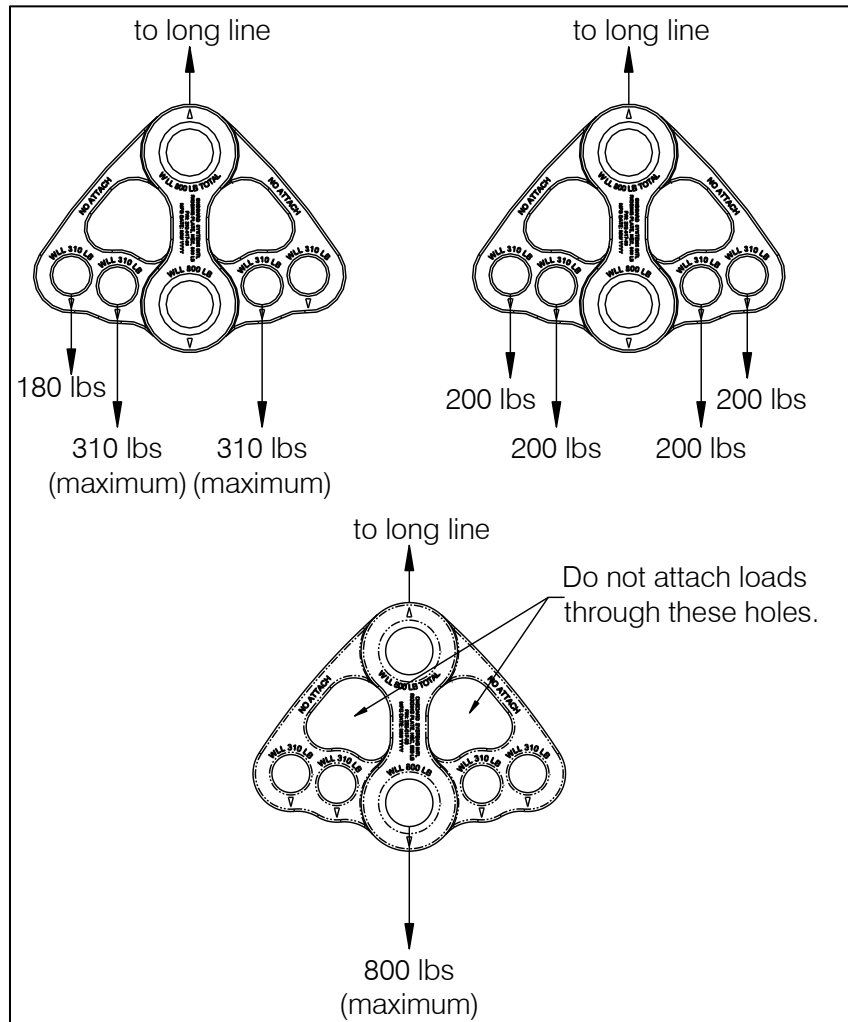
#### **4.10.1 Rigging Plate**


The Rigging Plate (P/N 292-017-00) provides an upper 1.25 inch diameter hole to connect to the long line through the carabiner, a lower 1.25 inch hole with a working load limit (WLL) of 800 lbs and four lower 1.00 inch diameter holes each rated for a WLL of 310 lbs (800 lbs remains the overall limit) for connecting a lanyard or multiple lanyards for carrying more than one person. Figure 4.10.2 provides some examples of Rigging Plate loading with each example representing the 800 lbs maximum that can be carried. Distribute the loads about the center of the Rigging Plate as much as possible. If a single load is attached to the Rigging Plate use the center lug (as shown).

# NOTICE

*Any combination of loads may be applied through the lower five holes as long as the 310 lb load is not exceeded at the 1.00 inch holes and the 800 lb overall limit is not exceeded.*

**Figure 4.10.2 Rigging Plate Loading Examples (800 lb maximum shown)**

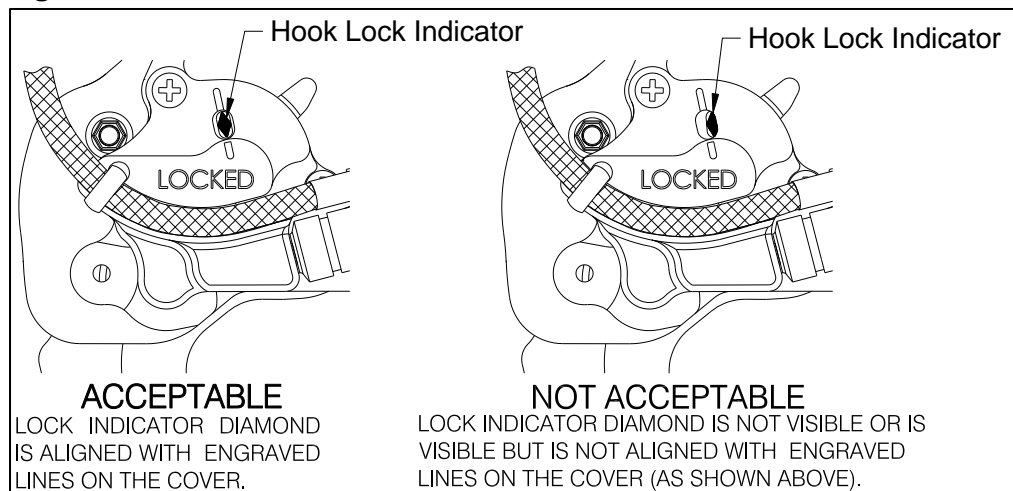


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#### 4.11 Installation Check-out

1. Swing the cargo hooks throughout their ranges of motion to ensure that the hose and harnesses have enough slack to allow full swing of the cargo hooks without being pulled tight or otherwise damaged. The hoses and harnesses must not be the stops that prevent the cargo hooks from swinging freely in all directions throughout the range of motions as provided by the physical stops of the attach point assemblies.
2. Power up the aircraft electrical system, press the release switch for the primary cargo hook, and verify that the primary (forward) cargo hook opens with no load on it.
3. Press the release switch for the secondary (aft) cargo hook and verify the secondary cargo hook opens with no load on it.
4. Return each cargo hook to the closed position and verify that each cargo hook's lock indicator aligns with the lines on the manual release cover.

**Figure 4.11.1 Hook Lock Indicator**



5. Pull the primary release lever and verify the primary cargo hook opens with no load on it.
6. Pull the secondary release lever and verify the secondary cargo hook opens with no load on it.

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7. Refer to the documentation provided for the long line kit components for initial inspection and familiarization with the care, handling, and recurring inspection of the rope materials.
8. If the long line kit's Y-rope, long line, and/or lanyard are being placed into service at this time, record the Service Entry Date on the ID tag of each component and record in log book.

If these components are not to be placed into service at this time, store the components in a protected environment free from mechanical, environmental, ultraviolet, and temperature damage (refer to rope manufacturer's instructions provided).

## NOTICE

*The Y-rope (P/N 490-014-00), Long Line (P/N 490-015-XX), and Lanyard (P/N 490-018-00) must be retired at four (4) years after entry into service. Refer to ICA 123-048-00. Enter the service entry date on the applicable ID tag on the component.*



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#### 4.12 Component Weights

The weights and CGs of the major components of Dual Cargo Hook System are listed below. When performing weight and balance calculations remember to deduct the weight of any components removed.

**Table 4.12.1 Dual Cargo Hook System P/N 200-448-00 Weight and CGs**

Item	Weight (Lbs.)	Long. Arm (in.)	Lat. Arm (in.)
Primary Cargo Hook Installation*	4.7	99.3	0.0
Secondary Cargo Hook Installation*	4.3	105.1	0.0
Secondary Hardpoint Fittings	2.0	105.1	0.0
Dual Master Cylinder w/ Plumbing	1.7	60.0	14.0
Miscellaneous kit components (slave cylinder plumbing, electrical harnesses, clips, brackets, etc.)	1.5	77.0**	5.6**
<b>Total</b>	<b>14.2 lbs (6.4 kg)</b>	<b>94.8</b>	<b>2.3</b>

\*Includes cargo hook, attach point assembly, and hardware.


\*\*Estimated.

**Table 4.12.2 Long Line Kit P/N 200-449-10 Weights**

Item	Weight Lbs. (kg)
Y-rope (P/N 490-014-00)	3.6 (1.63)
Carabiner (P/N 530-031-00) Qty 2	0.7 (0.32)
Rigging Plate (P/N 292-017-00)	1.75 (0.79)
Long Line, 100 ft (P/N 490-015-10)	16.05 (7.28)
Weight Bag (P/N 490-017-00)	27.10 (12.30)
Lanyard (P/N 490-018-00)	3.25 (1.47)
<b>Total Kit Weight</b>	<b>52.5 (23.8)</b>

#### 4.13 Paperwork

In the US, fill in FAA form 337 for the initial installation. This procedure may vary in different countries. Make the appropriate aircraft log book entry. Insert the Rotorcraft Flight Manual Supplement P/N 121-069-00 into the Rotorcraft Flight Manual.

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## 5.0 Maintenance

Refer to the Instructions for Continued Airworthiness (ICA) manual 123-048-00 for maintenance of the dual cargo hook system and Component Maintenance Manual 122-015-00 for maintenance specific to the cargo hook.

## 6.0 Instructions for Returning Equipment to the Factory

If an Onboard Systems product must be returned to the factory for any reason (including returns, service, repairs, overhaul, etc.) obtain a Return Merchandise Authorization (RMA) number before shipping your return.



*An RMA number is required for all equipment returns.*

To obtain an RMA, please use one of the listed methods.

- Contact Technical Support by phone or e-mail ([Techhelp@OnboardSystems.com](mailto:Techhelp@OnboardSystems.com)).
- Generate an RMA number at our website: <http://www.onboardsystems.com/rma.php>

After you have obtained the RMA number, please be sure to:

- Package the component carefully to ensure safe transit.
- Write the RMA number on the outside of the box or on the mailing label.
- Include the RMA number and reason for the return on your purchase or work order.
- Include your name, address, phone and fax number and email (as applicable).
- Return the components freight, cartage, insurance and customs prepaid to:

Onboard Systems International  
13915 NW 3rd Court  
Vancouver, Washington 98685  
USA  
Phone: 360-546-3072