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# *Instructions for Continued Airworthiness*

***Cargo Hook Suspension Kits***
***For the***
***Bell 407 Helicopter***

***System Part Numbers***
***200-328-00, 200-329-00, 200-329-10, 200-330-00***
***200-331-00, 200-331-01, 200-331-02***

***STC SR01943SE***

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# Record of Revisions

| *Revision* | *Date* | *Page(s)* | *Reason for Revision* |
|---|---|---|---|
| 0 | 04/30/08 | All | First Issue |
| 1 | 12/15/08 | Section 25 page 14, 16, and page 17 | Corrected hardware part numbers in Figures 25.17.1, 25.17.3, and 25.17.4. |
| 2 | 03/18/10 | Section 5 Page 13, 14<br>Section 25 Page 19 | Changed overhaul frequency criteria. Revised manual release cable rigging instructions including addition of CAUTION statement. |
| 3 | 11/19/13 | Section 0 page 2,<br>Section 4 page 1,<br>Section 5,<br>Section 12 page 1<br>Section 25 page 16, 21 | Clarified definition of external load operations. Removed daily check section and updated 100 hour/annual inspection. Updated NDT requirements for kit components. Updated tightening instructions for nut on the pin load cell. Updated Section 0.19. Changed applicability of Section 25.18 instructions. Updated statement in Section 4. |
| 4 | 06/04/15 | Section 5 pages 6, 9, 10<br>Section 25 pages 4, 16, 17, 20 | Added load cell P/N 210-282-00. Corrected tightening instructions for nut on the pin load cell (section 25 page 20). |
| 5 | 06/24/16 | Section 0 page 1, Section 5 pages 1, 2, 5-7<br>Section 11 page 2<br>Section 25 pages 2-7, 16, 21 | Added kit P/N 200-329-10 (which includes cargo hook with Surefire release) and associated instructions, added kit P/N 200-331-01. |
| 6 | 02/06/18 | Section 5 page 9 | Removed NDT requirement for pin load cell. |
| 7 | 12/12/18 | Section pages 4, 9, and 10 | Added instruction to return the pin load cell to the factory for inspection and calibration (at 5 year 1000 hour interval), removed requirement for calibration by lifting a known weight from annual/100 inspection. Changed attach bolt diameter limit to .495" in Table 5.1.4. |
| 8 | 02/28/19 | Section 5 | Separated annual/100 hour inspection and 5 year/1000 hour inspection into sections 5.1 and 5.2 for clarity. |
| 9 | 10/13/21 | Section 0 page 1<br>Section 5,<br>Section 11 page 2,<br>Section 25 pages 2, 4, 5, 7, 8, 10 | Added C-40 Indicator and associated kit P/N 200-331-02 and instructions. Added load weigh system schematics. |

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**Figures** ***continued***



**Tables**

# *Section 0*
# Introduction

## 0.4 Scope

The following information is necessary to carry out the service, maintenance, and inspection of the Cargo Hook Kit P/N's 200-328-00, 200-329-00, 200-329-10, and 200-330-00 and Load Weigh Kit P/Ns 200-331-00, 200-331-01, and 200-331-02.

## 0.5 Purpose

The purpose of these Instructions for Continued Airworthiness (ICA) is to provide the information necessary to inspect, service, and maintain in an airworthy condition the Cargo Hook Kits.

## 0.6 Arrangement

This manual contains instructions for the service, maintenance, inspection and operation of the Cargo Hook Kits on Bell 407 helicopters. The manual is arranged in the general order that maintenance personnel would use to install, maintain and operate the Cargo Hook Kits in service.
The arrangement is:

Section 0 Introduction.
Section 4 Airworthiness limitations (None apply to this System.)
Section 5 Inspection and overhaul schedule
Section 11 Placards and Markings
Section 12 Servicing
Section 25 Equipment and Furnishings

## 0.7 Applicability

These Instructions for Continued Airworthiness are applicable to Kit P/N's 200-328-00, 200-329-00, 200-329-10, 200-330-00, 200-331-00, 200-331-01, 200-331-02 for the Bell 407 model.

## 0.9 Abbreviations

FAA Federal Aviation Administration
FAR Federal Aviation Regulation
ICA Instructions for Continued Airworthiness

## 0.12 Precautions

The following definitions apply to the symbols used throughout this manual to draw the reader's attention to safety instructions as well as other important messages.


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.

## 0.19 Distribution of Instructions for Continued Airworthiness

Before performing maintenance ensure that the Instructions for Continued Airworthiness (ICA) in your possession is the most recent revision. Current revision levels of all manuals are posted on Onboard Systems Int'l web site at www.onboardsystems.com.

Onboard Systems offers a free notification service via fax or e-mail for product alerts and documentation updates. By registering Onboard Systems products on the web site, we will be able to contact you if a service bulletin is issued, or if the documentation is updated.

Notices can be chosen to be received on an immediate, weekly, or monthly schedule via fax, email or both methods. There is no charge for this service. Please visit the Onboard Systems web site at www.onboardsystems.com/notify.php to get started.

# *Section 4*
# Airworthiness Limitations

The Airworthiness Limitations section is FAA approved and specifies inspections and other maintenance required under Secs. 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

No airworthiness limitations are associated with this type design change.

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# *Section 5*
# Inspection and Overhaul Schedule

The scheduled inspection intervals noted below are maximums and are not to be exceeded. If the system is subjected to unusual circumstances, extreme environmental conditions, etc., it is the responsibility of the operator to perform the inspections more frequently to ensure proper operation.

There is no maintenance to be performed on the Load Weigh Indicator. Do not open the enclosure, if repair is needed return it to the factory.

## 5.1 Annual/100 Hour Inspection

**Annually or 100 hours of external load operations, whichever comes first, inspect the cargo hook suspension system per the following. Refer also to CMM 122-017-00 for the cargo hook for additional procedures.**

**NOTICE**

*Hours of external load operations should be interpreted to be **(1)** anything is attached to the primary cargo hook (whether or not a useful load is being transported) and **(2)** the aircraft is flying. If these conditions are **NOT** met, time does **NOT** need to be tracked.*

**NOTICE**

*The C-40 Indicator (P/N 210-293-00) records and displays hours of external load operations accumulated. This resettable hour-meter automatically logs time when the external load goes above 50 lbs and stops counting when it goes under 25 lbs. For this method of tracking hours refer to the C-40 Owner's Manual for additional instructions.*

## 5.1 Annual/100 Hour Inspection continued

1. Activate the electrical system and press the Cargo Release button to ensure the cargo hook electrical release system is operating correctly. The cargo hook must release. Reset the hook by hand after release.

**CAUTION**

*Energizing the cargo hook solenoid continuously in excess of 20 seconds will cause it to overheat, possibly causing permanent damage.*

The following instructions are applicable to cargo hook P/N 528-029-02 which is equipped with Surefire release. With no load on the cargo hook perform the following.

- *Very* briefly press the Cargo Release switch, the cargo hook should not actuate and the load beam should remain closed.
- Press and hold the Cargo Release switch for a few seconds, the load beam should fall to the open position and the cargo hook solenoid should continue to cycle repeatedly.
- Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the manual release cover (see Figure 5.1.1).

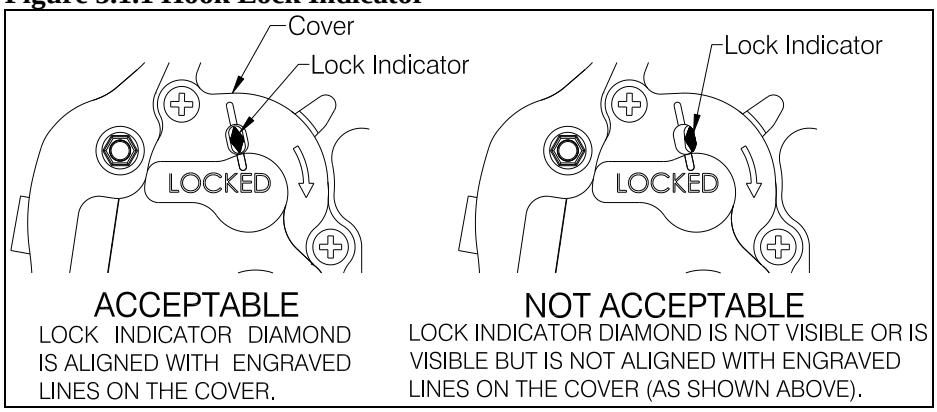
## 5.1 Annual/100 Hour Inspection continued

2. Activate the manual release system by pulling up on the manual release T-handle located adjacent to the collective in the cockpit. The mechanism should operate smoothly and the cargo hook must release. Reset the hook by hand after release. Verify that the hook lock indicator on the side of the hook returns to the fully locked position. If the hook does not release or re-latch, do not use the unit until the problem is resolved.

**⚠ CAUTION**

*In the fully locked position the hook lock indicator must align with the lines on the manual release cover (see Figure 5.1.1).*

**Figure 5.1.1 Hook Lock Indicator**

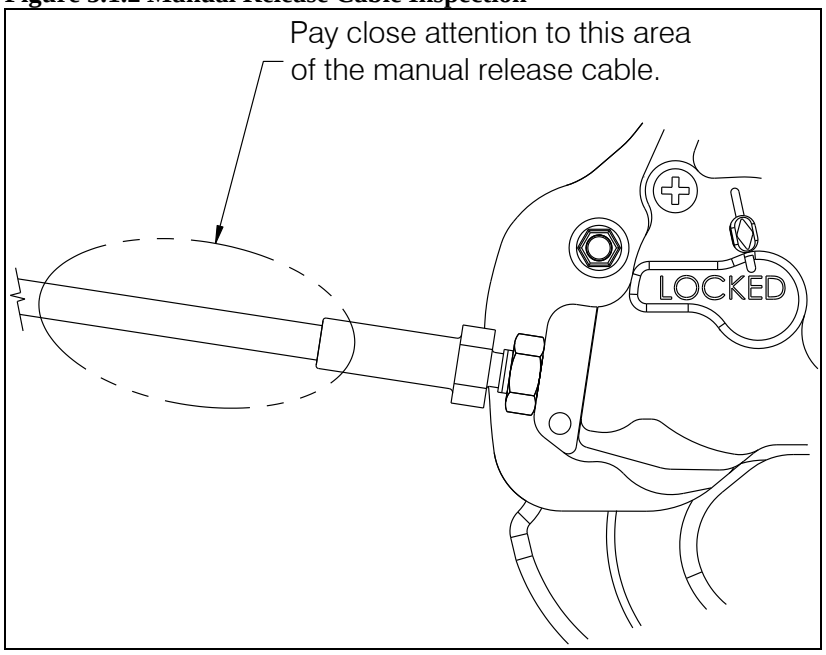



3. Swing the cargo hook and the suspension beam throughout their ranges of motion to ensure the manual release cable and electrical harnesses have enough slack and are not kinked or pinched in any possible cargo hook and beam locations. The manual release cable and harnesses must not be the stops that prevent the cargo hook or suspension beam from pivoting throughout the range provided by their integrated stops.
4. Swing the cargo hook side to side and the suspension beam fore and aft and ensure all pivot points rotate freely without binding.
5. Visually inspect for corrosion on the exterior of cargo hook, load cell and suspension beam components.
6. Visually inspect for presence and security of fasteners and electrical connections.
7. Visually inspect the external electrical wire harnesses for damage, chafing and security.

## 5.1 Annual/100 Hour Inspection continued

8. Visually inspect the manual release cable for damage, paying close attention to the flexible conduit at the area of transition to the cargo hook end fitting (refer to Figure 5.1.2). Inspect for splitting of the outer black conduit in this area and separation of the conduit from the steel end fitting.

**Figure 5.1.2 Manual Release Cable Inspection**

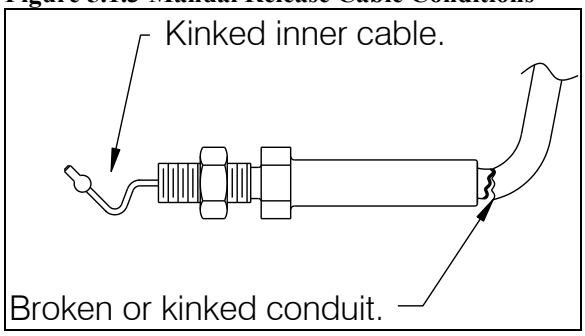



9. Remove the manual release cover from the cargo hook and inspect the visible section of the inner cable for kinks or frays.

**⚠ CAUTION**

*Manual release cables are wearable items and must be replaced as condition requires. Broken or kinked conduit, inner cable kinks (ref Figure 5.1.3), frays, or sticky operation are each cause for immediate replacement.*

**Figure 5.1.3 Manual Release Cable Conditions**

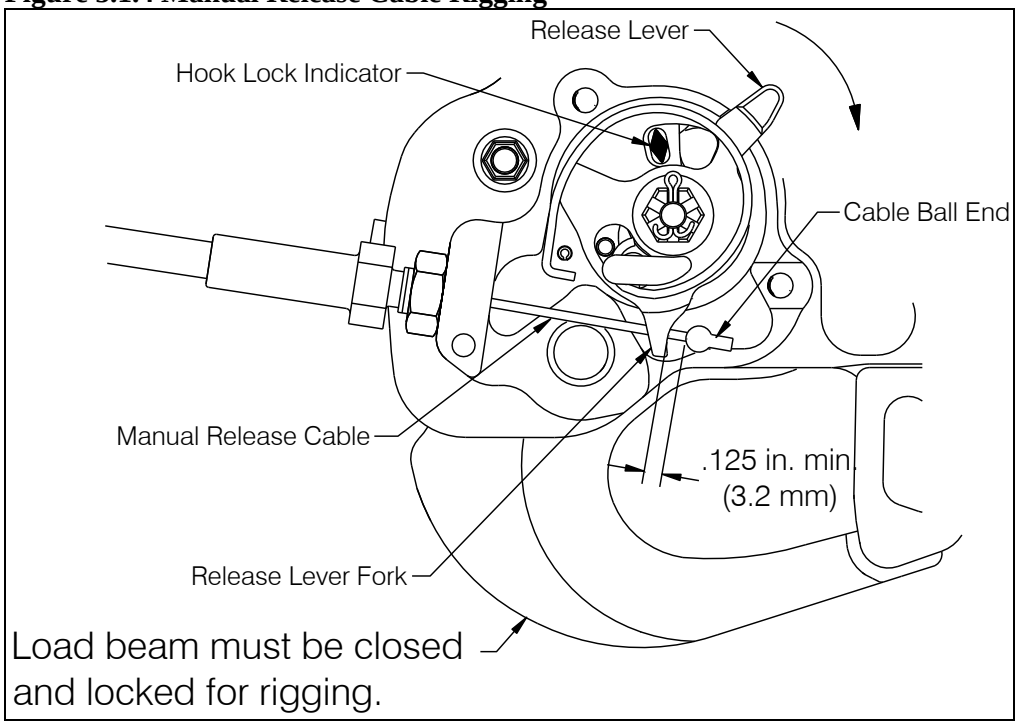


## 5.1 Annual/100 Hour Inspection continued

10. Check the rigging of the manual release cable. With the manual release cover removed from the cargo hook and with the cargo hook closed and locked, rotate the release lever in the clockwise direction to remove free play (this is felt as the lever rotates relatively easily for several degrees as the free play is taken up) and measure the gap between the cable ball end and the release lever fork with the manual release lever in the cockpit in the non-release position. This gap should be a minimum of .125 inches (3.2 mm) as shown in Figure 5.1.4.

    If the gap does not measure at least .125", make adjustments at the cargo hook or at the manual release lever on the collective. Adjustments at the hook are done by disconnecting the manual release cable at the interface with the fixed manual release cable, loosening the jam nut, and rotating the manual release cable in the required direction.

**Figure 5.1.4 Manual Release Cable Rigging**



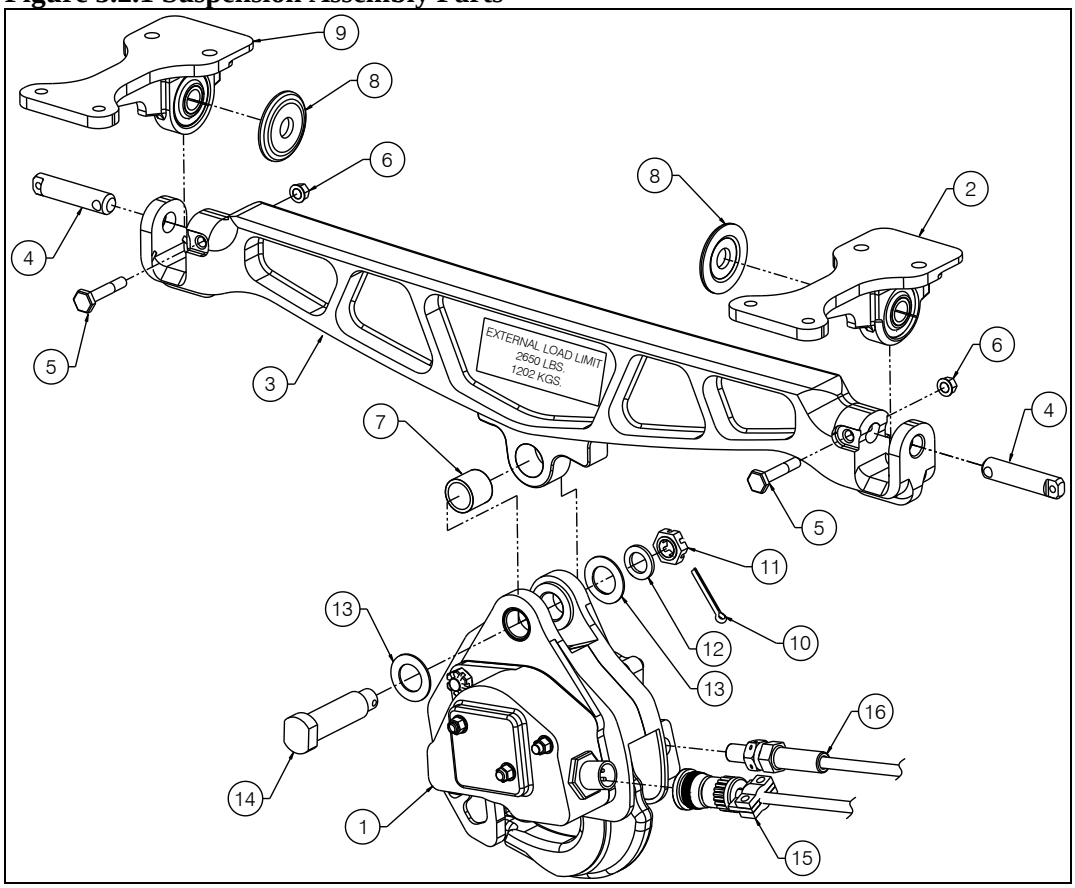

11. Visually inspect the connector bracket on the belly of the helicopter for damage and security.
12. Visually inspect load cell strain relief (if load weigh kit is installed) for damage and security.

## 5.2 5 Year/1000 Hour Inspection

**Every 5 years or 1000 hours of external load operations, whichever comes first, remove the external components from the helicopter and disassemble and inspect per this section.**

- Remove the suspension assembly from the pillow blocks (items 2 and 9) mounted to the belly of the helicopter by removing the nuts (item 6) and bolts (item 5) that retain the trunnion pins (item 4).
- Remove the trunnion pins and drop the suspension assembly from the pillow blocks. Removing the trunnion pins also separates the thrust washers (item 8) from the assembly.
- Remove the cargo hook from the beam assembly by removing the cotter pin (item 10), nut (item 11), washer (item 12), and washer (item 13) from the end of the attach bolt (item 14, or pin load cell if load weigh kit P/N 200-331-00 or 200-331-01 is installed).
- Remove the attach bolt (or pin load cell) and washer (item 13) and separate the cargo hook from the beam.
- Remove the pillow block assemblies (included with kit P/N 200-329-00 and 200-329-10) by removing the four screws (not shown below) that attach them to the helicopter hard points.

**Figure 5.2.1 Suspension Assembly Parts**



## 5.2 5 Year/1000 Hour Inspection continued

**Table 5.2.1 Suspension Assembly Parts List**

| ITEM | PART NO. | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | 528-029-00<br>or<br>528-029-02 | Cargo Hook | 1 |
| 2 | 232-188-01* | Pillow Block Assembly, Left | 1 |
| 3 | 290-852-01 | Main Beam | 1 |
| 4 | 290-854-00 | Trunnion Pin | 2 |
| 5 | 510-523-00 | Bolt | 2 |
| 6 | 510-500-00 | Nut | 2 |
| 7 | 290-364-00 | Bushing | 1 |
| 8 | 290-881-00 | Thrust Washer | 2 |
| 9 | 232-189-01** | Pillow Block Assembly, Right | 1 |
| 10 | 510-178-00 | Cotter Pin | 1 |
| 11 | 510-170-00 | Nut | 1 |
| 12 | 510-174-00 | Washer | 1 |
| 13 | 510-183-00 | Washer | 2 |
| 14*** | 290-332-00 | Attach Bolt | 1 |
| 15 | 270-155-00 | Electrical Release Harness | 1 |
| 16 | 268-031-00 | Manual Release Cable | 1 |

* Refer to Figure 5.2.2 and Table 5.2.2 for assembly parts breakdown.

** Refer to Figure 5.2.3 and Table 5.2.3 for assembly parts breakdown.

*** If load weigh kit (P/N 200-331-00, 200-331-01, or 200-331-02) is installed, the Attach Bolt and washer (P/N 510-183-00) under its head are replaced with the Pin Load Cell Assembly (P/N 210-282-00 or P/N 210-226-00).

**NOTICE**

*The Pillow Block Assemblies (P/N 232-188-01 and P/N 232-189-01) are included with Kit P/Ns 200-329-00 and 200-329-10 only.*

## 5.2 5 Year/1000 Hour Inspection continued

**NOTICE**

*The Pillow Block Assemblies are included with Kit P/Ns 200-329-00 and 200-329-10 only.*

**Figure 5.2.2 LH Pillow Block Assembly**

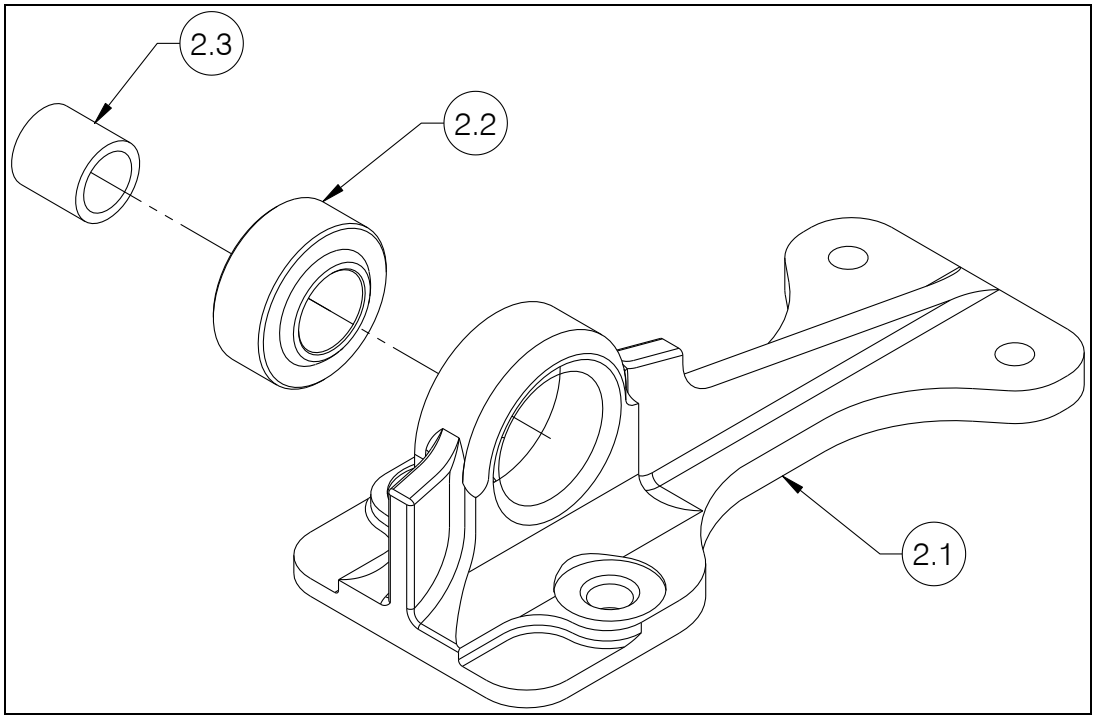



**Table 5.2.2 LH Pillow Block Assembly Parts List**

| ITEM | PART NO. | DESCRIPTION | QTY |
|---|---|---|---|
| 2.1 | 290-853-01 | Pillow Block, Left | 1 |
| 2.2 | 517-012-00 | Spherical Bearing | 1 |
| 2.3 | 290-882-00 | Bushing | 1 |

## 5.2 5 Year/1000 Hour Inspection continued

**Figure 5.2.3 RH Pillow Block Assembly**

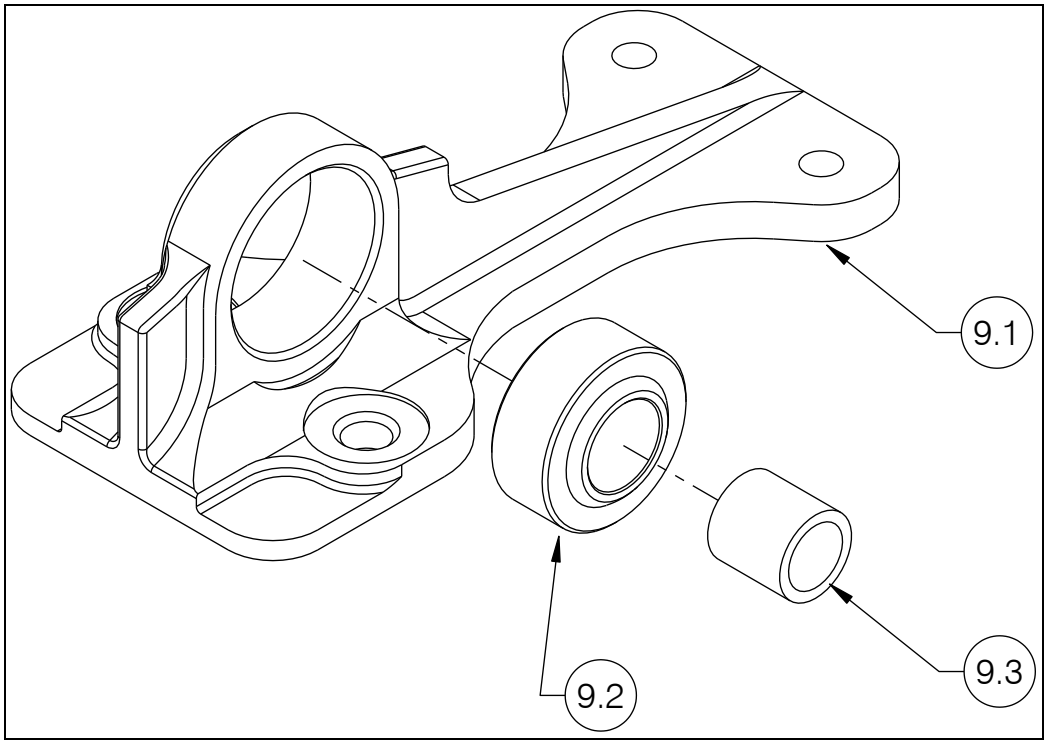



**Table 5.2.3 RH Pillow Block Assembly Parts List**

| ITEM | PART NO. | DESCRIPTION | QTY |
|---|---|---|---|
| 9.1 | 290-883-01 | Pillow Block, Right | 1 |
| 9.2 | 517-012-00 | Spherical Bearing | 1 |
| 9.3 | 290-882-00 | Bushing | 1 |

## 5.2 5 Year/1000 Hour Inspection continued

Return the Pin Load Cell Assembly (P/N 210-282-00 or P/N 210-226-00) to the factory for inspection and calibration. The factory will inspect the condition of the load cell and perform acceptance test procedures including calibration and zero balance, repairing as necessary.

Carefully visually inspect, and if necessary repair, the detail parts in accordance with the instructions in Table 5.2.4. Inspect the parts in a clean, well-lit room.

**Table 5.2.4 Suspension System Inspection Criteria**

| Component | Damage Permitted without Repair | Repair | Maximum Damage which Causes Replacement |
|---|---|---|---|
| Main Beam,<br>P/N 290-852-01<br>Item 3 | Dents, gouges, and scratches less than .030" deep outside lug areas of Zones A and B (see Figure 5.2.4).<br><br>Dents, gouges, and scratches less than .010" deep around lugs in Zones A and B (see Figure 5.2.4). | Blend at 20:1 ratio, length to depth, to provide smooth transitions.<br><br>Protect affected surfaces with MIL-PRF-23377 Type 1 epoxy primer or equivalent and MIL-PRF-85285 Type 1 polyurethane coating or equivalent. | Dents, gouges and scratches greater than .060" deep outside lug areas of Zones A and B<br><br>Dents, gouges, and scratches greater than .030" deep around lugs in Zones A and B<br><br>Visual cracks. |
| Pillow Blocks<br>P/N 290-853-01,<br>P/N 290-883-01<br>Items 2.1, 9.1<br>(included with kit P/N 200-329-00) | Dents, gouges, and scratches less than .030" deep outside lug area of Zone A (see Figure 5.2.5). | Blend at 20:1 ratio, length to depth, to provide smooth transitions.<br><br>Protect affected surfaces with MIL-PRF-23377 Type 1 epoxy primer or equivalent and MIL-PRF-85285 Type 1 polyurethane coating or equivalent. | Dents, gouges and scratches greater than .060" deep outside lug area of Zone A<br><br>Dents, gouges, and scratches greater than .030" deep around lug in Zone A<br><br>Visual cracks. |
| Trunnion Pin<br>P/N 290-854-00<br>Item 4 | Wear on outside diameter, diameter of .363" or greater. | None. | Wear on outside diameter, diameter less than .363".<br><br>Visual cracks. |

## 5.2 5 Year/1000 Hour Inspection continued

**Table 5.2.4 Suspension System Inspection Criteria** continued

| Component | Damage Permitted without Repair | Repair | Maximum Damage which Causes Replacement |
|---|---|---|---|
| Bushing<br>P/N 290-364-00<br>Item 7 | Wear on inside diameter, diameter of .510" or less. | None. | Wear on inside diameter, diameter greater than .510". |
| Thrust Washer<br>P/N 290-881-00<br>Item 8 | Wear on ends of bearing, thickness of .125" or greater. | None. | Wear on ends of washer, thickness less than .125" |
| Shaft Bushing<br>P/N 290-882-00<br>Items 2.3, 9.3 | Wear on inside diameter, diameter of .393" or less. | None. | Wear on inside diameter, diameter greater than .393". |
| Attach Bolt,<br>P/N 290-332-00<br>Item 14 | Wear on outside diameter, diameter of .495" or greater. | None. | Wear on outside diameter, diameter less than .495".<br>Visual cracks. |
| Pin Load Cell<br>P/N 210-226-00 or P/N 210-282-00<br>(replaces attach bolt if load weigh is installed) | Wear on outside diameter of pin, diameter of .495" or greater. | None | Wear on outside diameter, diameter less than .495".<br>Visual cracks. |
| Bearing,<br>P/N 517-012-00<br>Items 2.2, 9.2 | None. | None. | Damage to Teflon liner.<br>Binding or seizing. |
| Electrical Release Harness<br>P/N 270-155-00<br>Item 15 | Superficial scratches, nicks, and scrapes on outside of electrical harness sleeving. | None. | Broken or missing pins on connectors. |
| Manual Release Cable<br>P/N 268-031-00<br>Item 16 | Dents, gouges, and scratches less than .020" deep on end fittings.<br>Superficial scratches, nicks, and scrapes on outside of release cable conduit. | Blend at 20:1 ratio, length to depth, to provide smooth transitions. | Dents, gouges, and scratches greater than .040" deep on end fittings.<br>Cracks, scratches, and nicks in the outer conduit, which expose the longitudinal wires underneath. |

## 5.2 5 Year/1000 Hour Inspection continued

**Figure 5.2.4 Main Beam Inspection Zones**

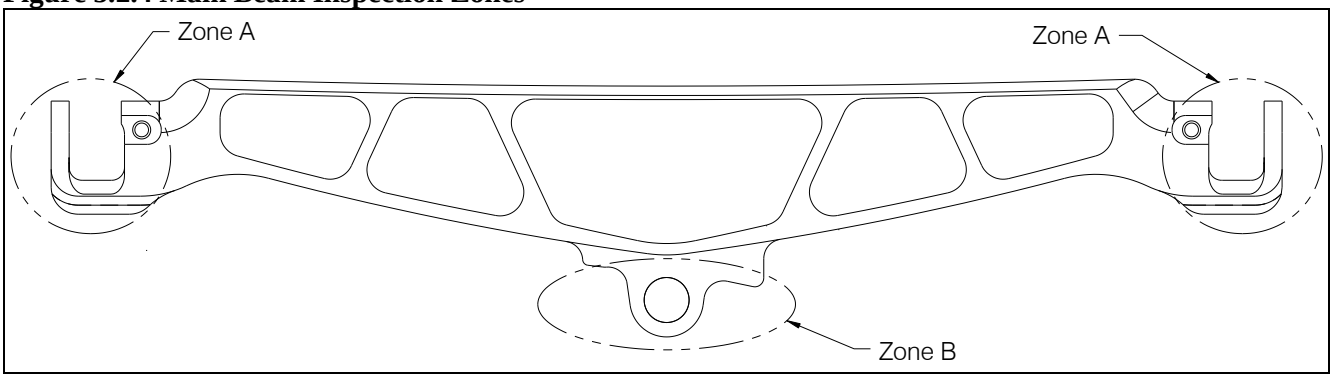
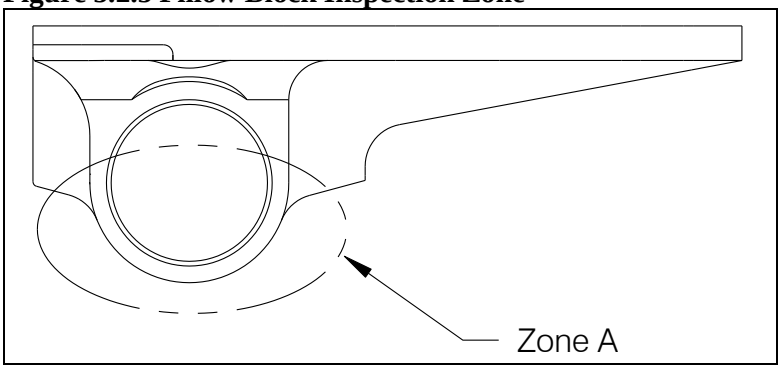



**Figure 5.2.5 Pillow Block Inspection Zone**




### Suspension Re-assembly after Inspection

1. If removed, press Bushing (item 7) into Main Beam (item 3) with zinc chromate primer, TT-P-1757 or equivalent.
2. Install Cargo Hook (item 1) onto Main Beam (item 3) per section 25.17.
3. Install left and right Pillow Block Assemblies (items 2 and 9) onto aircraft hard points per section 25.17.
4. Install suspension assembly onto Pillow Block Assemblies per section 25.17.

## 5.3 Cargo Hook Overhaul Schedule

Time Between Overhaul (TBO) for the cargo hook: 5 years or 1000 hours of external load operations, whichever comes first.

Overhaul instructions for the cargo hook are contained in Component Maintenance Manual 122-017-00. Contact Onboard Systems for guidance to locate authorized overhaul facilities.

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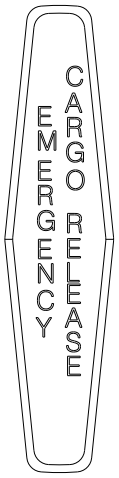
# *Section 11*
# Placards and Markings
## 11.1 Placards

The Cargo Hook Kits includes the following placards shown in Table 11.1.1.

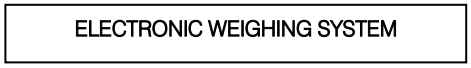
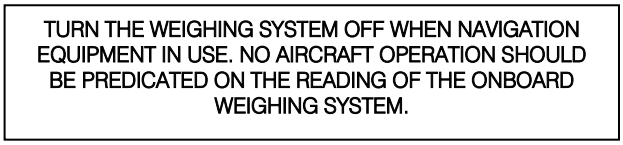
**Table 11.1.1 Cargo Hook Suspension System Placards**

| Placard part number and appearance | Location |
|---|---|
| P/N 215-212-00<br>EXTERNAL LOAD LIMIT<br>2650 LBS.<br>1202 KGS. | When kit P/N 200-329-00 or 200-330-00 is installed, one is located on the forward side and one located on the aft side of the cargo hook suspension beam. |
|  <br>(text is engraved on manual release T-handle as shown) | When kit P/N 200-328-00 is installed, located on the T-handle of the manual release cable. T-handle is located on the center console between the pilot and co-pilot seats. |

continued

## 11.1 Placards continued

**Table 11.1.1 Cargo Hook Suspension System Placards** continued

| Placard part number and appearance | Location |
|---|---|
| P/N 215-336-00   | Mounted on the bottom of solenoid housing of cargo hook P/N 528-029-02 (included with kit P/N 200-329-10 only). |
| P/N 215-343-00   | Located adjacent to the cargo hook release switch on the cyclic (included with kit P/N 200-329-10 only). |
| P/N 215-010-00   | When Onboard Systems 200-331-00 or 200-331-01 system is installed, mounted adjacent to both the power switch (if installed) and the circuit breaker in full view of the pilot and co-pilot. |
| P/N 215-012-00   | When Onboard Systems 200-331-00 or 200-331-01 system is installed, mounted adjacent to the Onboard Systems digital/analog indicator in full view of the pilot and co-pilot. Not applicable to the load weigh system with the C-40 Indicator. |

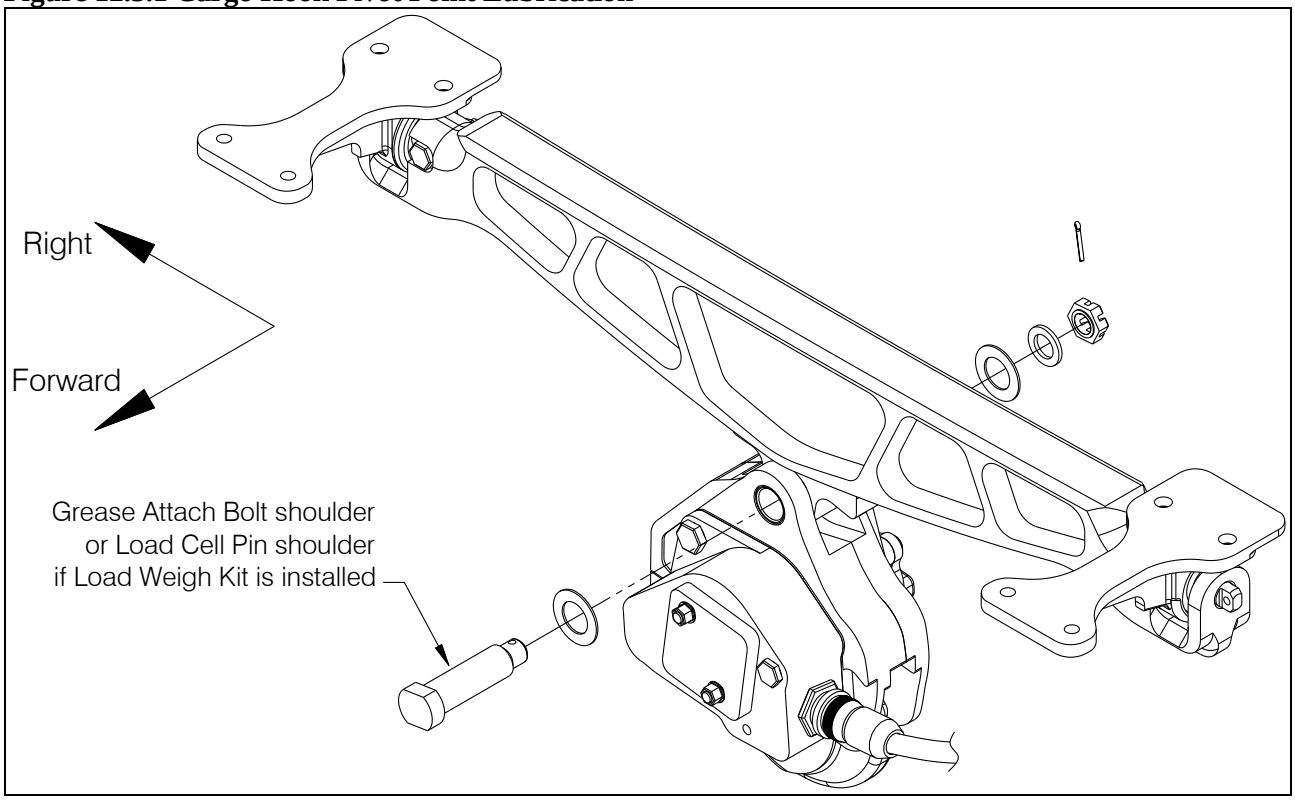
# *Section 12*
# Servicing

## 12.3 Lubrication Information

Lubrication of Cargo Hook Suspension Assembly is required every 500 hours of hook operation. To obtain maximum life under severe duty conditions such as logging or seismic work, it is recommended to lubricate the suspension assembly approximately every 250 hours.

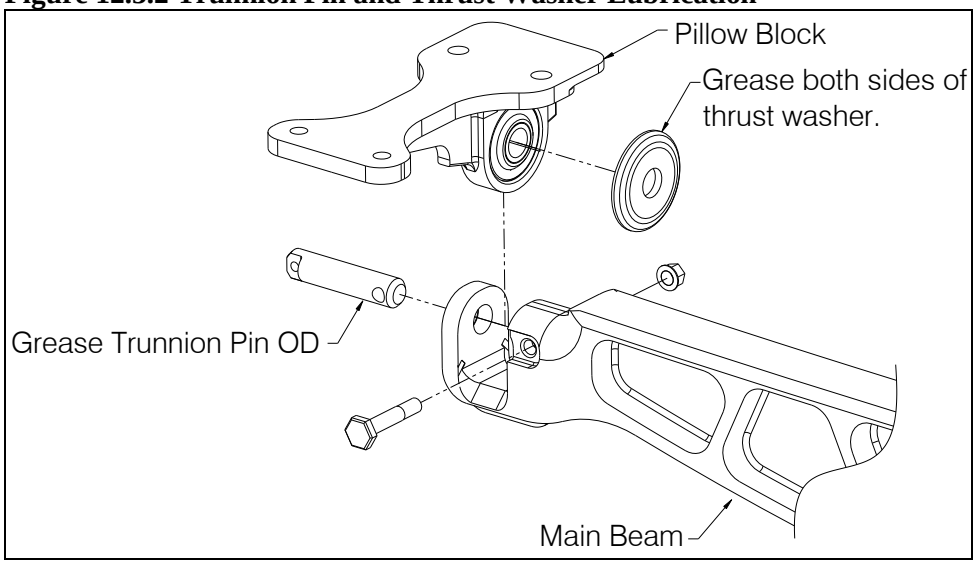
Lubricate the suspension assembly at points noted in Figure 12.3.1 and Figure 12.3.2. Refer to Sections 25.16 and 25.17 for removal and re-installation instructions for the cargo hook and suspension assembly. Recommended lubricants are AeroShell 17, MIL-PRF-21164 or Mobilgrease 28, MIL-PRF-81322.

**Figure 12.3.1 Cargo Hook Pivot Point Lubrication**



## 12.3 Lubrication Information continued

**Figure 12.3.2 Trunnion Pin and Thrust Washer Lubrication**




### Hook Corrosion Prevention

In marine or other corrosive environments, the life of the hook can be increased by periodically treating with a corrosion preventative compound such as ACF-50. Spray exterior of hook with corrosion preventative compound and wipe off excess with a rag.

The amount and frequency of application will vary depending on climate. In dry dusty environments it is not recommended to treat for corrosion since the oily residue on the inside of the hook that cannot be wiped off could attract and retain dust and sand. In addition, corrosion is not likely to be a problem in these conditions. For offshore or coastal operations, treatment should be done every two weeks.

# *Section 25*
# *Equipment and Furnishings*

## 25.1 Cargo Hook Connector

Listed below is the pin out for the cargo hook connector. The hook is polarity sensitive due to an arc suppressing diode internally mounted.

**Table 25.1.1 Cargo Hook Connector**

| *Pin* | *Function* |
|---|---|
| A | Ground |
| B | Power |

# 25.2 Description

This ICA contains maintenance instructions for cargo hook kit P/N's 200-328-00, 200-329-00, 200-329-10, 200-330-00, 200-331-00, 200-331-01, and 200-331-02 on the Bell 407 model helicopters.

Kit P/N 200-328-00 is a fixed provisions kit which includes the internal electrical release wiring harnesses, fixed manual release cable including the T-handle for actuation, bulkhead fittings which support the cargo hook suspension, and miscellaneous brackets and hardware for supporting these items. The primary kit components are shown below.

**Figure 25.2.1 Fixed Provisions Kit Overview**

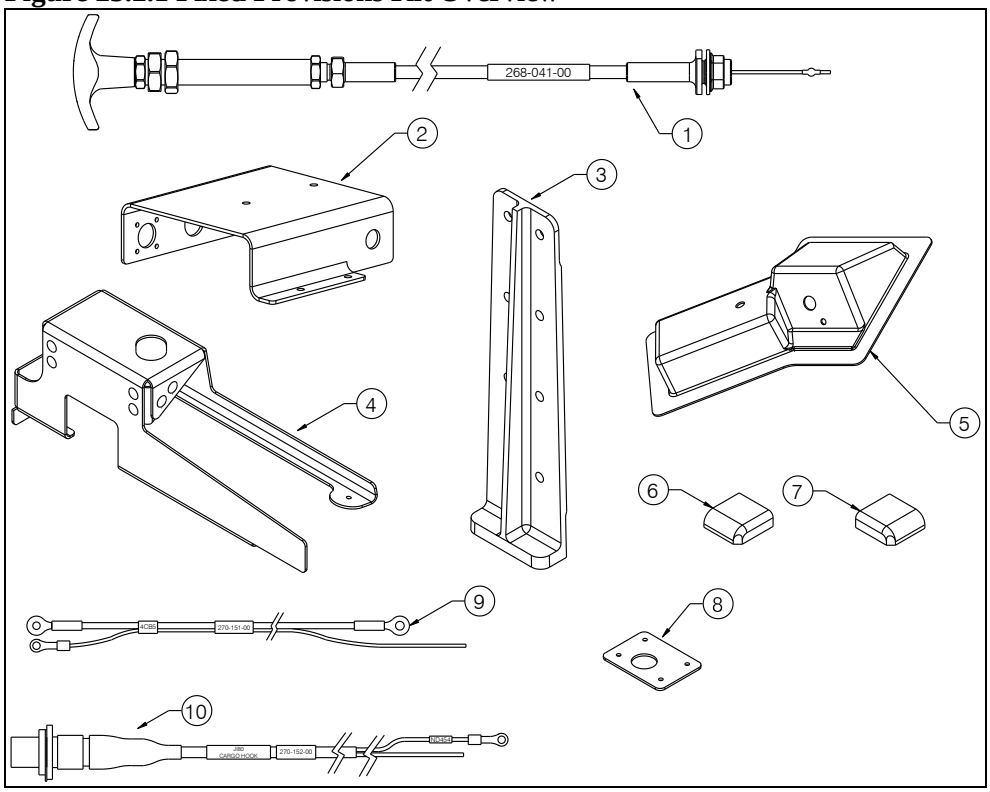



**Table 25.2.1 Fixed Provisions Kit Components**

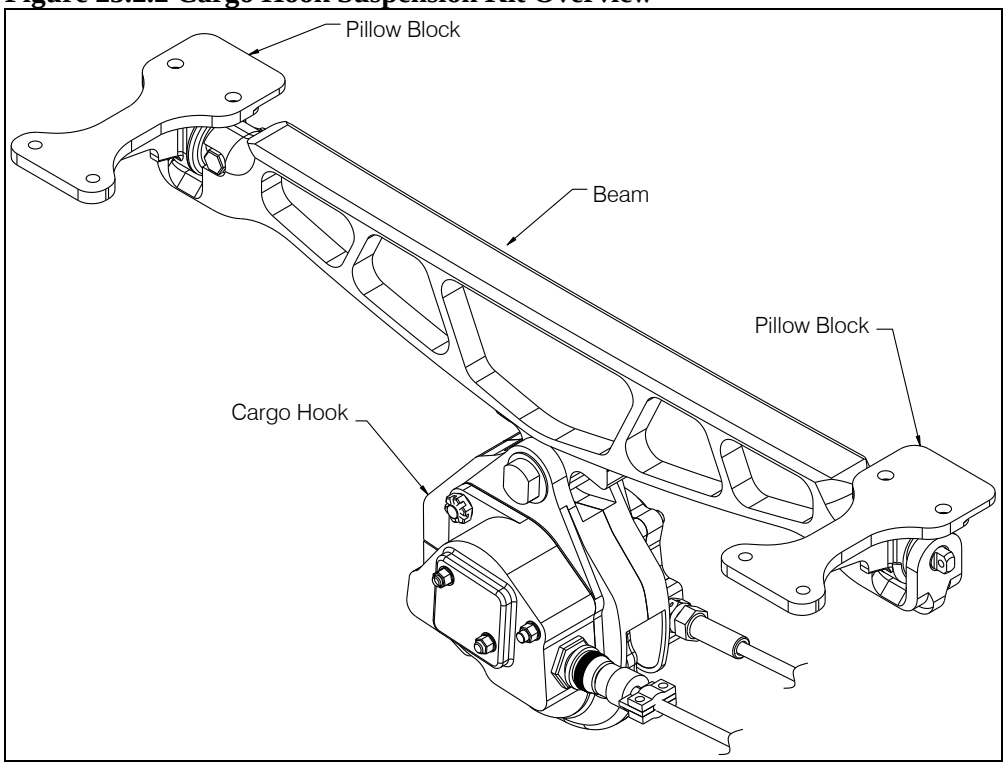
| ITEM | PART NO. | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | 268-041-00 | Manual Release Cable | 1 |
| 2 | 235-164-00 | Connector Bracket | 1 |
| 3 | 291-144-00 | Bulkhead Fitting | 2 |
| 4 | 235-169-00 | T-handle Support Bracket | 1 |
| 5 | 220-042-00 | Cover | 1 |
| 6 | 291-145-00 | Radius Block, Left | 1 |
| 7 | 291-146-00 | Radius Block, Right | 1 |
| 8 | 235-165-00 | Doubler | 1 |
| 9 | 270-151-00 | Electrical Harness | 1 |
| 10 | 270-152-00 | Electrical Harness | 1 |

## 25.2 Description continued

Kit P/N 200-329-00 and 200-329-10 are cargo hook suspension kits and include the cargo hook, a beam which supports the cargo hook and spans the helicopter hard points, and pillow blocks which attach to the hard points. It requires that a helicopter be equipped with Onboard Systems kit P/N 200-328-00 (see above) or with Bell Helicopter P/N 206-706-341-7, -9, -103, -111 or -113 Auxiliary Equipment Kit - Cargo Hook Provisions.

Kit P/N 200-329-10 includes Cargo Hook P/N 528-029-02 with Surefire release as part of its electrical release system. Surefire release is a safety enhancement to protect against inadvertent load release due to accidental contact with the release switch or mistaken actuation of the release switch when another is intended.

**Figure 25.2.2 Cargo Hook Suspension Kit Overview**




Kit P/N 200-330-00 is the same as the P/N 200-329-00 cargo hook suspension kit except it does not include the pillow blocks. It requires that a helicopter be equipped with Bell Helicopter P/N 206-706-341-127 Auxiliary Equipment Kit - Cargo Hook Provisions.

## 25.2 Description continued

Kit P/Ns 200-331-00, 200-331-01, and 200-331-02 are load weigh kits which include a pin load cell, internal electrical harness, and load weigh indicator. When this kit is installed the pin load cell assembly replaces the cargo hook attach bolt within the cargo hook suspension assembly. The primary kit components are shown below.

**Figure 25.2.3 Pin Load Weigh Kit Overview**

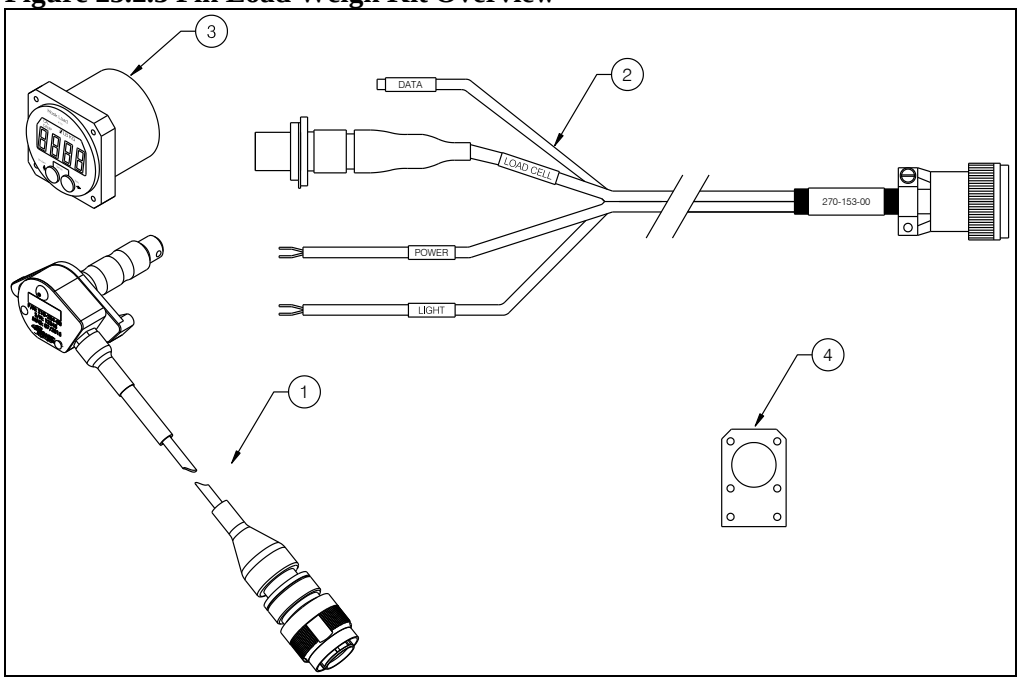



**Table 25.2.2 Pin Load Weigh Kit P/N 200-331-00, -01 Components**

| ITEM | PART NO. | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | 210-282-00* | Pin Load Cell Assembly | 1 |
| 2 | 270-153-00 | Load Weigh Internal Harness | 1 |
| 3 | 210-095-00** | C-39 Indicator, 28V Backlight | 1 |
| 4 | 235-035-01 | QD Bracket | 1 |

*P/N 210-282-00 is shown, 210-282-00 supersedes 210-226-00.
**Replaced by P/N 210-095-02 (has a 5V backlight) in kit P/N 200-331-01.

**Table 25.2.3 Pin Load Weigh Kit P/N 200-331-02 Components**

| ITEM | PART NO. | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | 210-282-00* | Pin Load Cell Assembly | 1 |
| 2 | 270-241-00 | Load Weigh Internal Harness | 1 |
| 3 | 210-293-00 | C-40 Indicator | 1 |
| 4 | 235-035-01 | QD Bracket | 1 |

*P/N 210-282-00 is shown, 210-282-00 supersedes 210-226-00.

# 25.5 Component Weights

The weights and cgs of the systems are listed in Table 25.5.1.

**Table 25.5.1 Component Weights and CGs**

| Item | Weight | Station |
|---|---|---|
| Fixed Provisions Kit<br>P/N 200-328-00 | 5.7 lbs<br>(2.6 kgs) | 106.0 (2692) |
| Cargo Hook Suspension Kit w/o Pillow Blocks<br>P/Ns 200-329-00 and 200-329-10 | 7.5 lbs<br>(3.4 kgs) | 121.0 (3073) |
| Cargo Hook Suspension Kit w/ Pillow Blocks<br>P/N 200-330-00 | 9.2 lbs<br>(4.2 kgs) | 121.0 (3073) |
| Pin Load Weigh Kit<br>P/N 200-331-00, 200-331-01, 200-331-02 | 1.8 lbs<br>(.82 kgs) | 83.0 (2108) |

# 25.12 Storage Instructions

Clean the exterior Cargo Hook and suspension components thoroughly of excess dirt and grease with a rag before packaging. Pack the unit in a heat-sealable package. If the unit is to be stored for long periods in a tropical climate it should be packed in a reliable manner to suit local conditions. Refer to Cargo Hook CMM 122-017-00 for storage instructions for the cargo hook. Refer to MIL-PRF-23199 and MIL-STD-2073-1 for additional guidance.

Package the unit in a suitable fiberboard box and cushion the unit to prevent shifting. Seal the fiberboard box with tape and mark the box with the contents and date of packaging.

# 25.15 Troubleshooting

Table 25.15.1 is provided with the intention of isolating the cause of malfunctions within the system. Sections 25.16 and 25.17 include instructions for removing and replacing defective components.

**Table 25.15.1 Troubleshooting**

| MALFUNCTION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Cargo hook does not operate electrically or manually. | Defective internal mechanism. | Remove and replace cargo hook (see sections 25.16 and 25.17) or repair per 122-017-00. |
| Cargo hook P/N 528-029-00 does not operate electrically, manual release operates normally. | Open electrical circuit, faulty wiring, fuse/circuit breaker, switch or solenoid. | Using multi-meter, check for 3.0 to 4.0 ohms between pins A and B of electrical connector (see note 1 below). If open indication is obtained, remove and replace cargo hook (see sections 25.16 and 25.17) or repair per CMM 122-017-00. Check the aircraft circuit for opens and shorts by using a multi-meter on the hook connector. When the release switch is pressed 28V aircraft voltage should be seen on the connector pins. |
| Cargo hook P/N 528-029-02 (includes Surefire time delay circuit) does not operate electrically, manual release operates normally. | Release switch not held down long enough.<br><br>Open electrical circuit, faulty wiring, circuit breaker, switch or solenoid. | Hold the release switch for a longer time. The time delay circuit incorporates an electronic delay of approximately ½ second after which time the hook solenoid will activate repeatedly. If the release switch is not held down long enough the cargo hook's solenoid will not activate.<br>Check the aircraft circuit for opens and shorts by using a multi-meter on the hook connector. When the release switch is pressed 28V aircraft voltage should be present on the connector pins.<br>Check the aircraft connector polarity. The time delay circuit is polarity sensitive and protected against reverse polarity. +28V should be on pin B and ground on pin A.<br>Check the power pins on the hook itself. A multi-meter set to the kilo-ohms range should read between 2-8Kohms. Some auto-ranging meters will not read properly so be sure to try a manual kilo-ohms range. If the meter reads open or short there is a problem with the solenoid module itself and the hook should be replaced or repaired per CMM 122-017-00. |
| Cargo hook operates electrically, but not manually. | Defective manual release cable. Defective manual release system. | Inspect manual release cable and cable connection to cargo hook. Remove and replace cargo hook (see Sections 25.16 and 25.17) or repair per CMM 122-017-00. |
| Load beam fails to re-latch after being reset. | Defective latch mechanism. | Remove and replace cargo hook (see sections 25.16 and 25.17) or repair per CMM 122-017-00. |
| Force required to release hook with T-handle on center console exceeds 20 lbs. | High cable friction or friction in internal mechanism of hook. | Remove cable from hook and check cable and hook independently to determine cause. Remove and replace defective components per 25.16 and 25.17. |

**Table 25.15.1 Troubleshooting** continued

| MALFUNCTION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| With release cable disconnected at hook, the force required to move T-handle on center console exceeds 6 lbs. | Kinks or wear in cable, frozen water in cable, debris or damage to cable quick disconnect fitting or lever mechanism on cyclic | Inspect individual components to isolate problem. Remove and replace defective parts (see Sections 25.16 and 25.17 for remove and replace instructions for manual release cable). |
| Cargo hook manual release cable pull-off force exceeds 8 lbs (35.6 N) at the hook. | Friction in internal mechanism. | Remove and replace cargo hook (see Section 25.16 and 25.17) or repair per CMM 122-017-00. |
| Circuit breaker opens when cargo hook is energized. | Short in the system, faulty wiring, circuit breaker or solenoid. | Check for shorts to ground along length of wire harness. Check solenoid resistance (see note 1), repair or replace defective parts. |
| Load Weigh Indicator does not light up. | Faulty wiring or circuit breaker. | Check the circuit breaker and wiring (see Note 2). If this doesn't help, remove and replace indicator per sections 25.16 and 25.17. |
| The displayed load on the Load Weigh Indicator is incorrect. | Incorrect calibration code. | Ensure the correct calibration code has been entered (refer to the applicable Owner's Manual for the Indicator) |
| C-39 Indicator displayed load is not stable. | Dampening level is too small. | Adjust the dampening level to a larger number (refer to the Owner's Manual for the C-39 Indicator). |
| C-39 Indicator displayed load takes too long to change the reading when the load is changed. | Dampening level is too large. | Adjust the dampening level to a smaller number (refer to the Owner's Manual for the C-39 Indicator). |
| Indicator displays large negative load | Indicator was zeroed under load. | Un-zero the indicator. Refer to applicable Owner's Manual for instructions. |
| C-40 Indicator analog bar not in sync with displayed load | Indicator is zeroed; analog bar always displays un-zeroed load. | Un-zero the indicator. Refer to the Owner's Manual for the C-40 Indicator. |

## Notes:

1. **Checking resistance at pins A and B.**

   Check for 3.0 to 4.0 ohms between pins A and B of electrical connector located on the cargo hook (see below).

**Figure 25.15.1 Cargo Hook Electrical Connector**

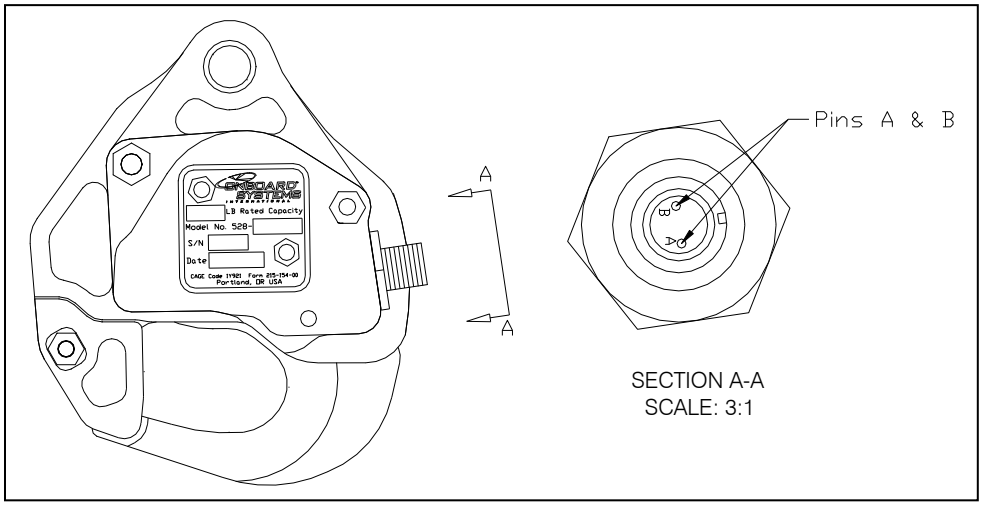


**Table 25.3 Notes** continued:

**2. Checking Wire Harnesses.**

As appropriate, before working on a circuit, e.g. - inspection, removal-installation of components, check that the aircraft system is not energized:

- External power connector is not supplied

- Further precaution: remove the circuit breaker(s) from the corresponding circuits.

The electrical release wire harnesses are routed with and secured to existing wire bundles and are located approximately as shown below. Inspect for general condition and chafing along length of wire runs. See Figure 25.15.3 for electrical schematic for the electrical release system and Figure 25.15.4 and Figure 25.15.5 for load weigh system schematics.

**Figure 25.15.2 Wire Harness Routing**

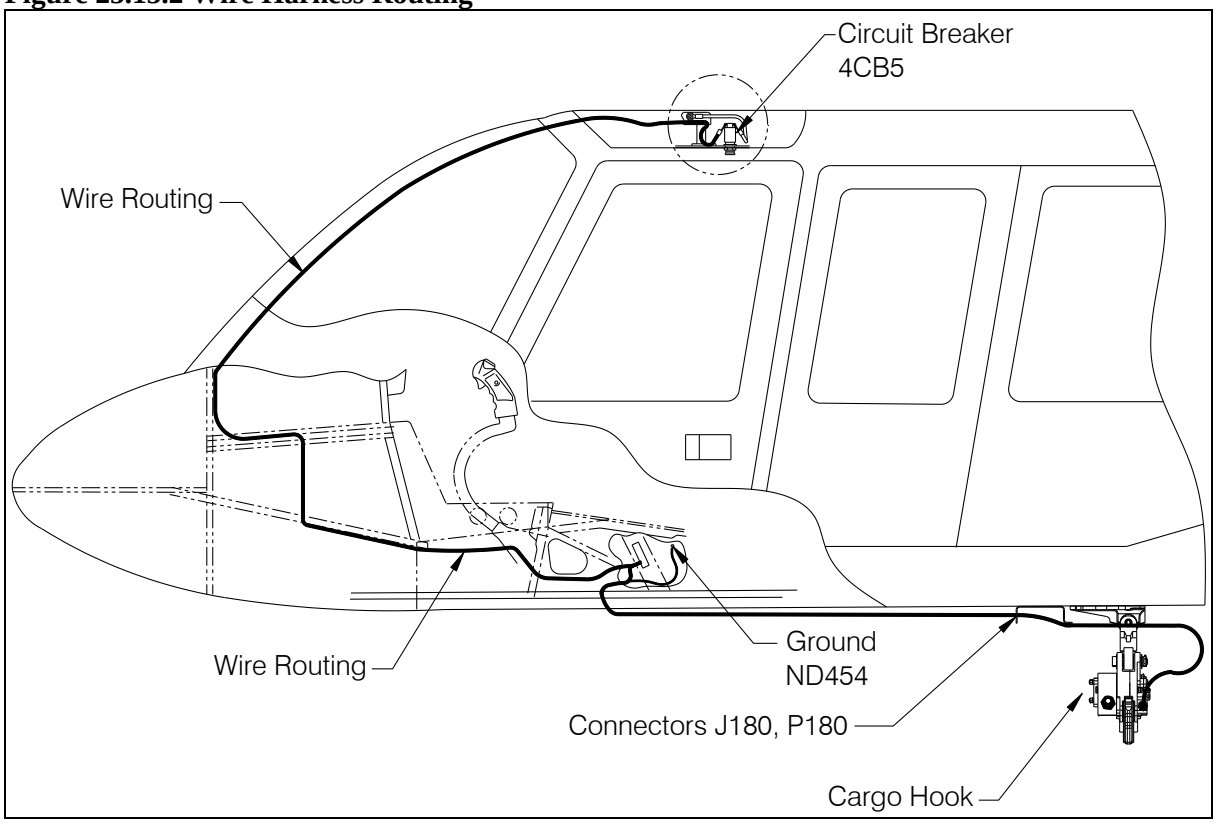


**Table 25.3 Notes** continued:

**2. Checking Wire Harnesses** continued

**Figure 25.15.3 Electrical Schematic – Electrical Release Wiring**

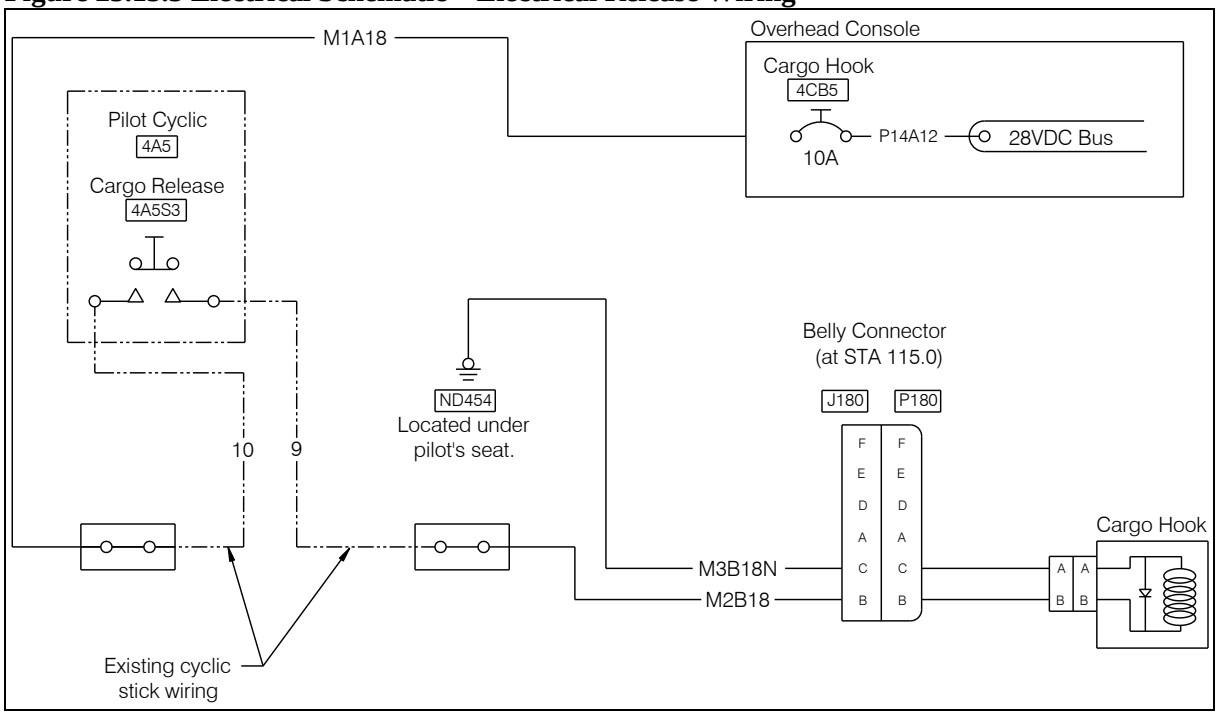


**Table 25.3 Notes** continued:

**Figure 25.15.4 Load Weigh System Wiring Schematic (C-40)**

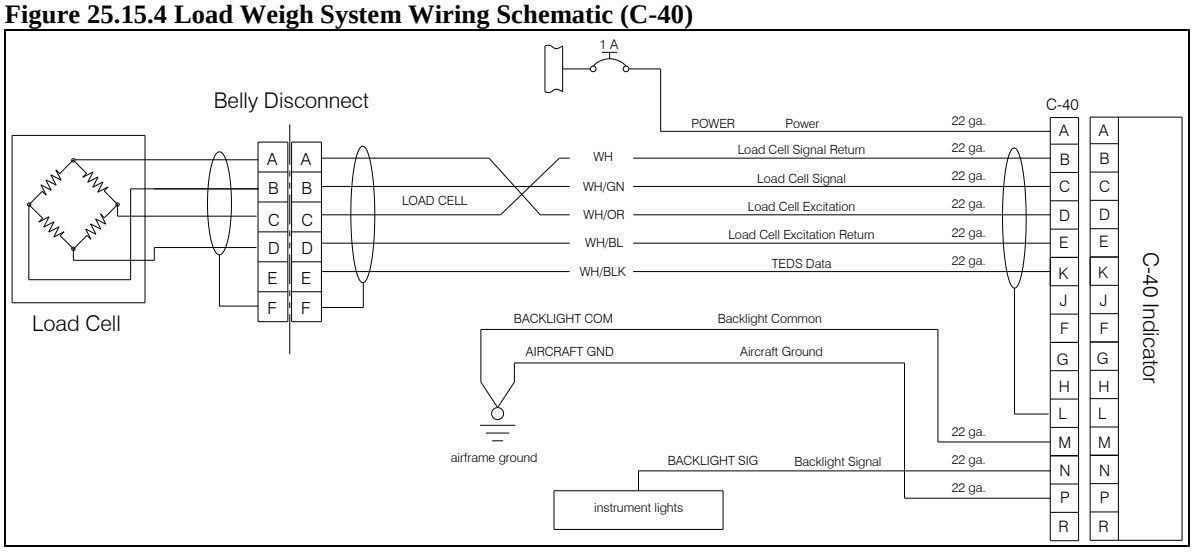
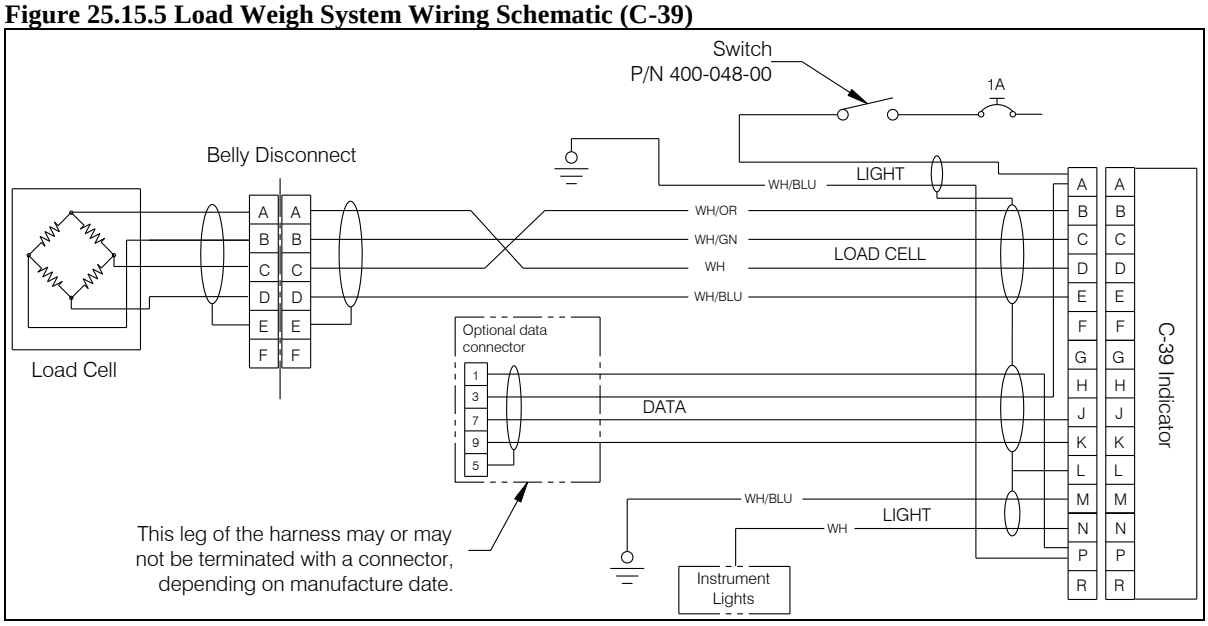



**Figure 25.15.5 Load Weigh System Wiring Schematic (C-39)**



# 25.16 Component Removal

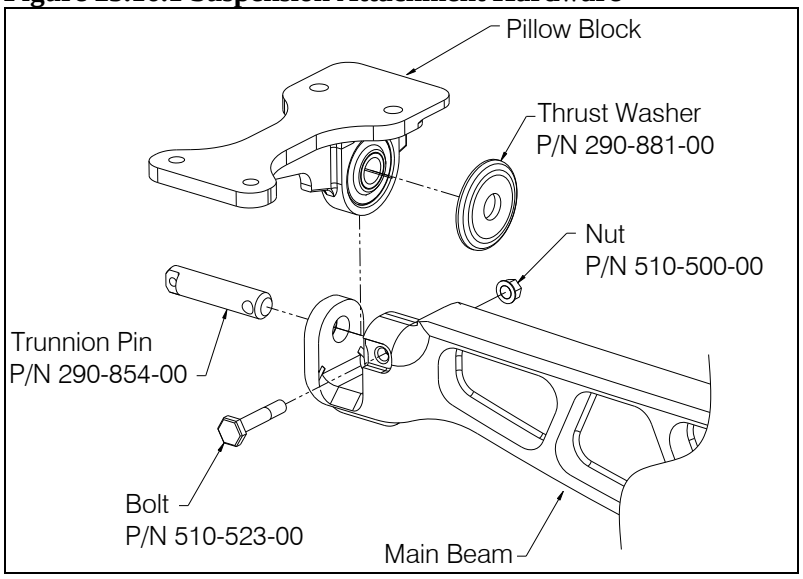
### Cargo Hook Removal

1. Remove manual release cover by removing two screws (ref. Figure 25.16.2).
2. Remove the manual release cable from the cargo hook.
3. Disconnect the electrical connector from the cargo hook.
4. Remove the cotter pin P/N 510-178-00 from the Attach Bolt P/N 290-332-00 (or Pin Load Cell if Load Weigh System) is installed.
5. Remove the castellated nut P/N 510-170-00 from the Attach Bolt (or Pin Load Cell).
6. Remove Attach Bolt (or Pin Load Cell) and all washers.
7. Remove cargo hook from suspension beam assembly.

### Suspension Beam Assembly Removal

1. Disconnect the load cell harness connector, electrical release harness connector, and manual release cable at their respective connections at the bracket on the belly of the helicopter.
2. At each end of the Main Beam remove the nut and bolt that retain the Trunnion Pins (refer to Figure 25.16.1).
3. Remove the Trunnion Pins and separate the Main Beam and Thrust Washers from the Pillow Blocks.

**Figure 25.16.1 Suspension Attachment Hardware**



# 25.16 Component Removal continued

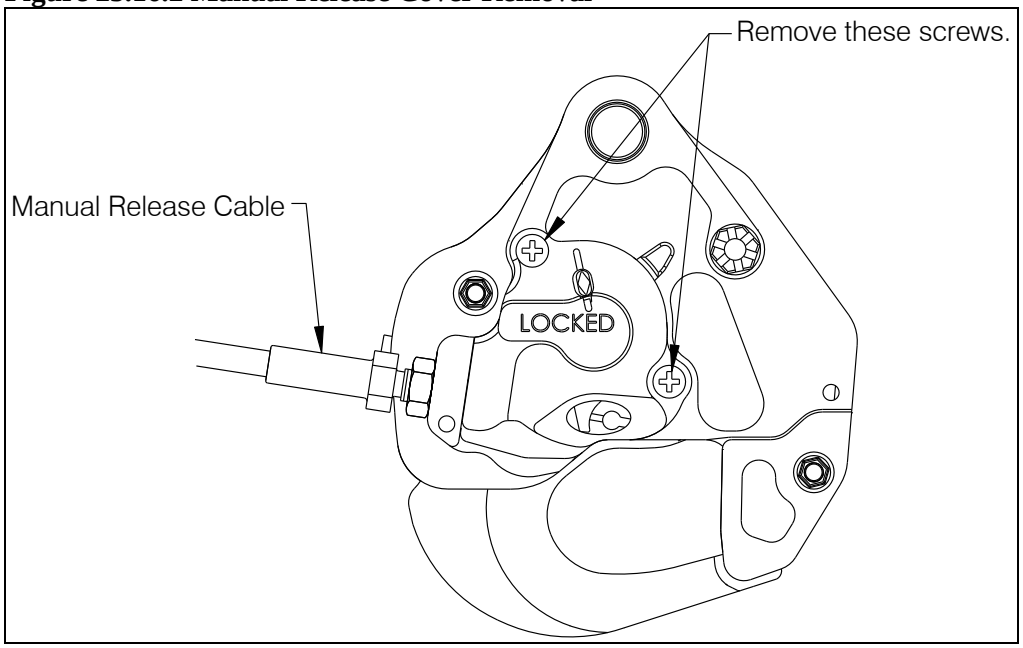
### Pillow Block Assembly Removal

1. Remove the four screws that secure the Pillow Block Assemblies to the aircraft. The aft pairs of screws are secured with nuts that must be accessed from inside the helicopter. They are located just forward of the bottom of the passenger seat bulkhead.

### Manual Release Cable Removal

1. Disconnect the manual release cable from the fixed manual release cable at the belly of the helicopter and remove it from the bracket by removing the nut.
2. At the cargo hook remove the manual release cover by removing two screws (see Figure 25.16.2).
3. Unhook the cable ball end from the fork fitting (located underneath the manual release cover).

**Figure 25.16.2 Manual Release Cover Removal**




4. Loosen the jam nut that secures the manual release cable to the cargo hook.
5. Unthread the manual release cable from the cargo hook.

## 25.16 Component Removal continued

### Pin Load Cell Removal

1. Disconnect the electrical connector at the bracket on the belly of the helicopter.
2. Remove the electrical harness from the cushioned loop clamp at the bracket.
3. Remove the cotter pin (P/N 510-178-00), nut (P/N 510-170-00), washer (P/N 510-174-00), and washer (P/N 510-183-00) from the load cell and remove the load cell from the cargo hook.

### Load Weigh Indicator Removal

The load weigh indicator location is optional within the cockpit. It is designed to fit within a standard instrument panel hole.

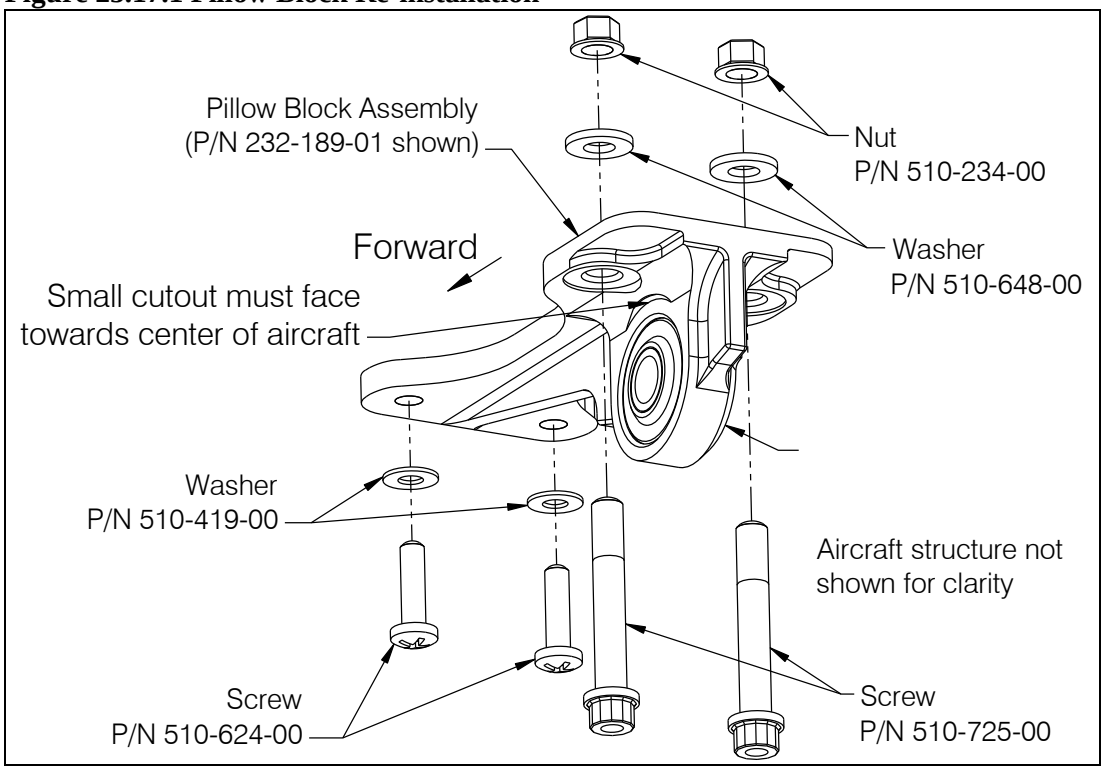
1. Remove the four screws that secure it to its mounting location.
2. Disconnect the electrical connector from the back of the indicator.

# 25.17 Component Re-installation

**Pillow Block Assembly Re-installation**

1. Position the Pillow Block Assemblies (P/N 232-188-01 and P/N 232-189-01) at their respective hard points on the belly of the helicopter. P/N 232-189-01 is installed on the right side (see figure below for identifying features).
2. Secure the Pillow Blocks to the aircraft with hardware as shown in Figure 25.17.1.

**Figure 25.17.1 Pillow Block Re-installation**

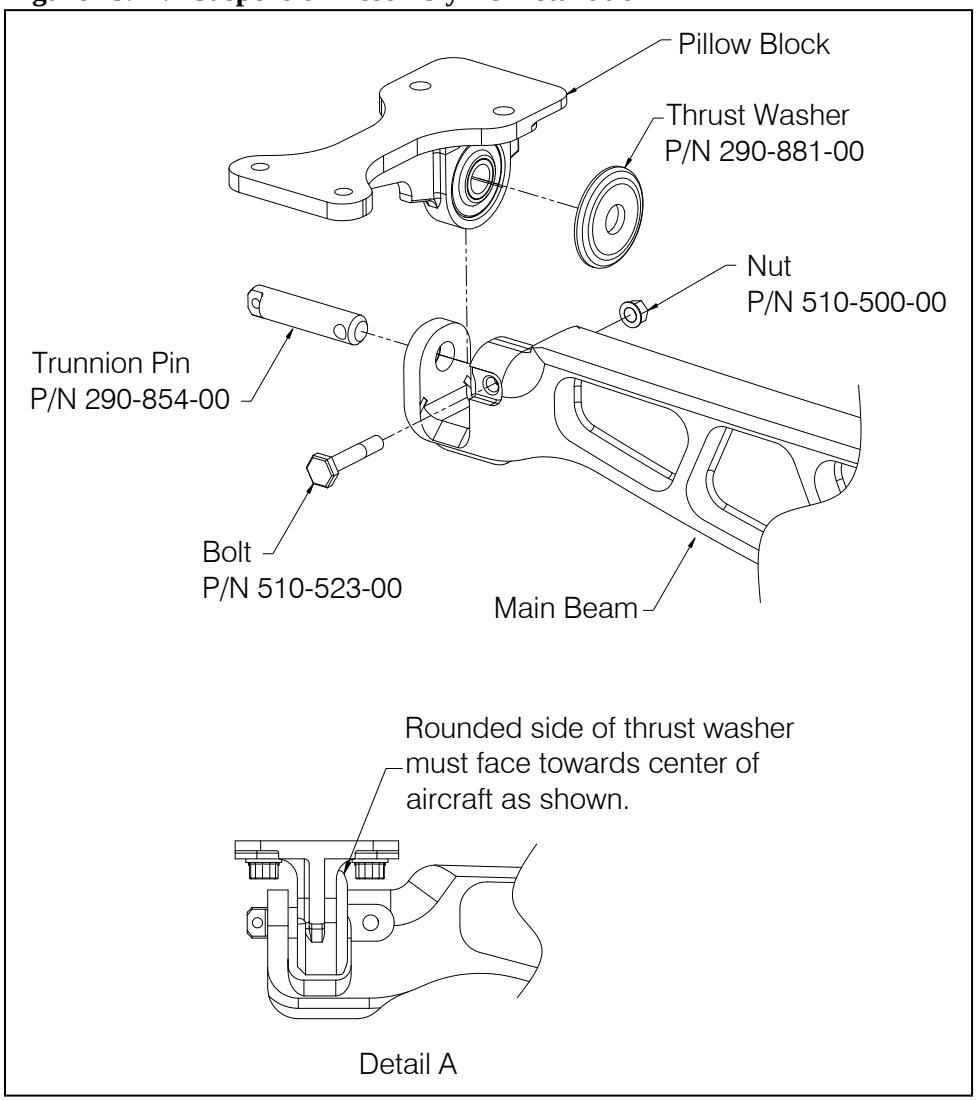


# 25.17 Component Re-installation continued

### Suspension Assembly Re-installation

1. Orient the Thrust Washers (P/N 290-881-00) as shown in Detail A of Figure 25.17.2 and align them with the holes at each end of the Main Beam and hold in place by hand.
2. Position the Main Beam over the Pillow Blocks and align the holes at each end with the Pillow Block bearings and Thrust Washers and insert the Trunnion Pins through.
3. Rotate the Trunnion Pins as required to insert the bolt (P/N 510-523-00) through.
4. Install nut (P/N 510-500-00) over bolt and torque to 30-40 in-lbs.

**Figure 25.17.2 Suspension Assembly Re-installation**



# 25.17 Component Re-installation continued

### Cargo Hook Re-installation

1. Attach the Cargo Hook (P/N 528-029-00 or P/N 528-029-02) to the beam by aligning its holes with the hole in the beam and inserting the Attach Bolt (P/N 290-332-00) with washer (P/N 510-183-00). Refer to Figure 25.17.3.

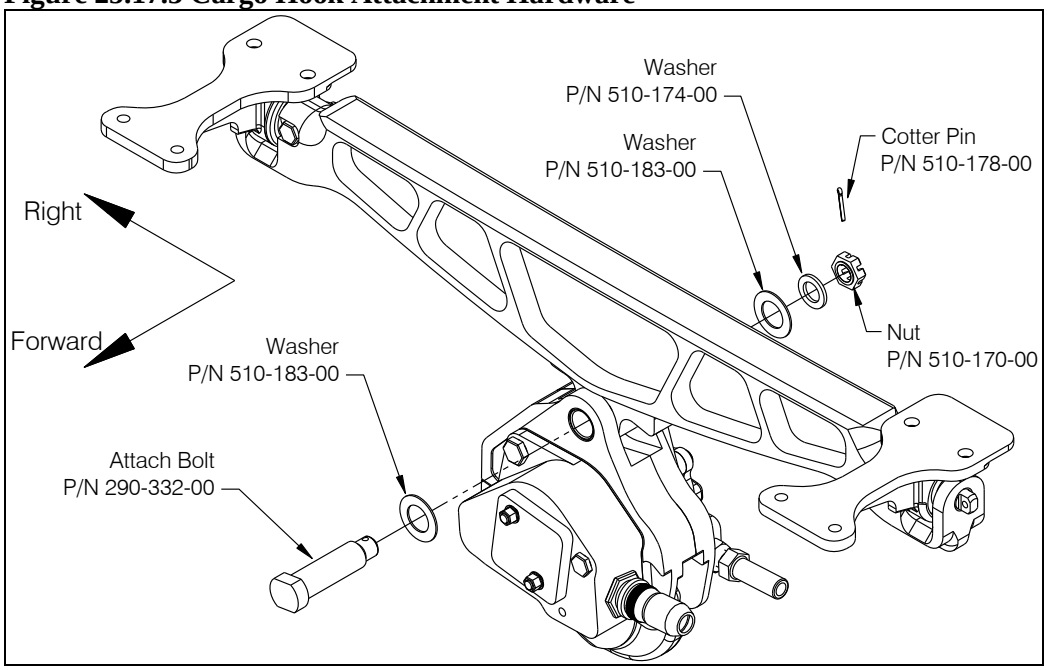
   If the load weigh system is installed the Pin Load Cell is installed at this step rather than the Attach Bolt and washer (see Figure 25.17.4).
2. Install washer (P/N 510-183-00), washer (P/N 510-174-00) and nut (510-170-00) over bolt (or load cell) end.
3. Tighten nut on attach bolt or pin load cell until fully seated, finger tight only. Back off nut to previous castellation, if needed, when aligning cotter pin for installation. Install and secure cotter pin (P/N 510-178-00).

**CAUTION**

*Do not tighten nut on pin load cell more than finger tight. Overtightening will damage load cell.*

4. Connect electrical release harness to the cargo hook connector.
5. Re-install manual release cable onto the cargo hook.

**Figure 25.17.3 Cargo Hook Attachment Hardware**



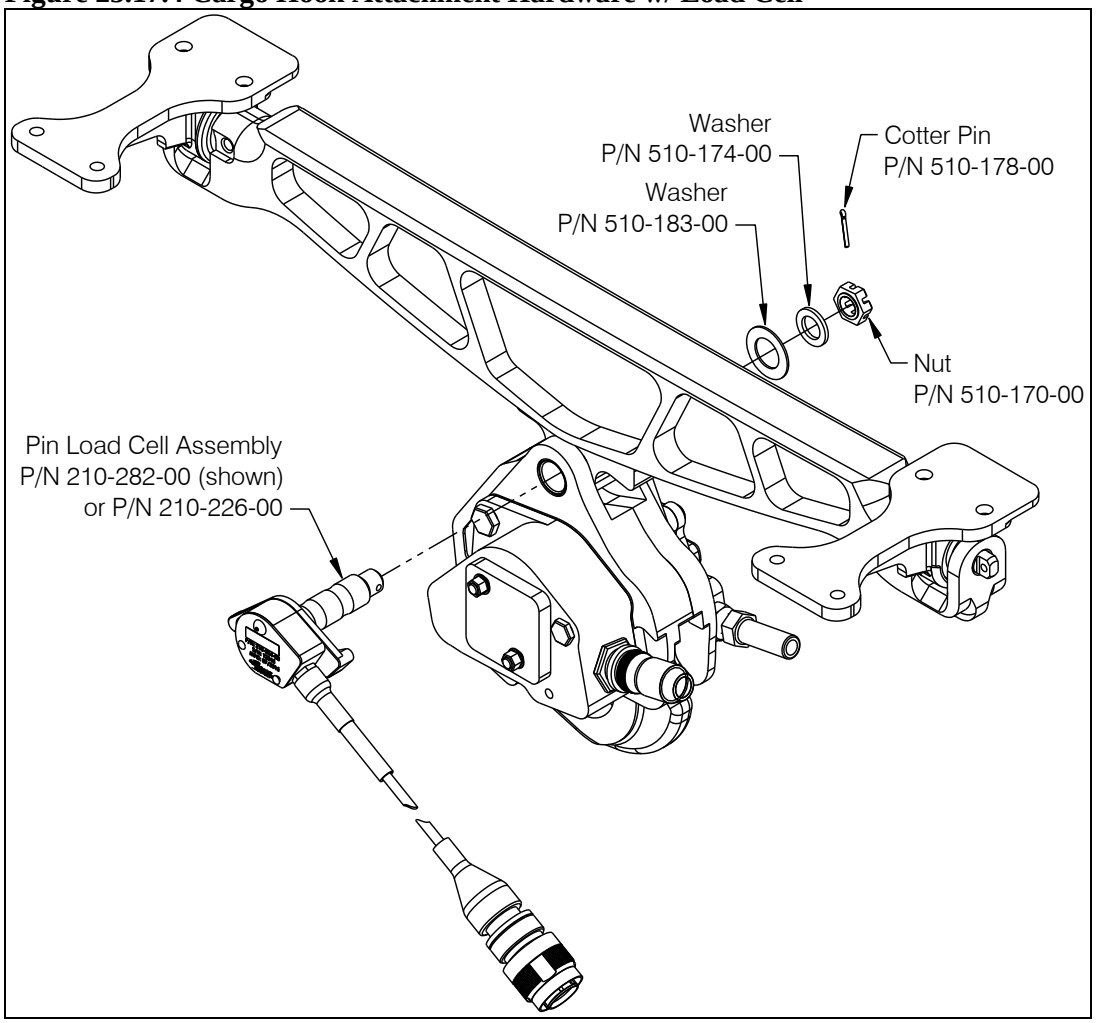

**NOTICE**

*The Cargo Hook load beam must point to the right when looking from the rear.*

# 25.17 Component Re-installation continued

## Cargo Hook Re-installation continued

**Figure 25.17.4 Cargo Hook Attachment Hardware w/ Load Cell**



# 25.17 Component Re-installation continued

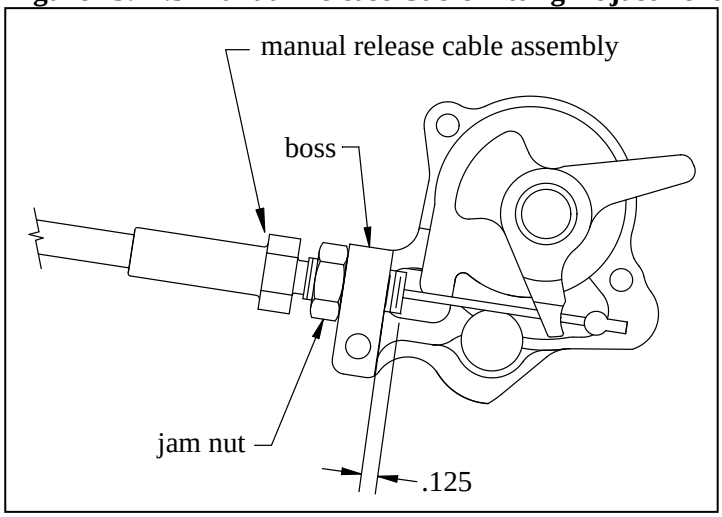
## Manual Release Cable Re-installation

Connect the manual release cable (P/N 268-031-00) to the cargo hook first, per the following instructions:

Remove the manual release cover from the cargo hook (see Figure 25.16.2). Thread the fitting at the end of the manual release cable into the manual release boss on the hook side plate until the threads protrude approximately .125" inch beyond the boss and secure with jam nut (as shown in Figure 25.17.5).

Leave the manual release cover off of the cargo hook until the other end of the release cable is connected, in order to verify proper setting.

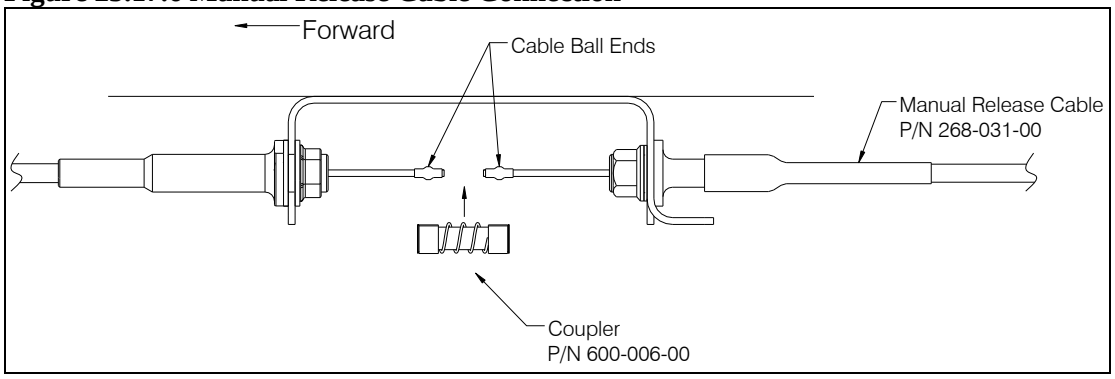
**Figure 25.17.5 Manual Release Cable Fitting Adjustment**




Secure the other end of the manual release cable to the bracket at the belly of the helicopter.

Connect the inner cable to the inner cable from the fixed manual release cable using the coupler (P/N 600-006-00). Retract the spring-loaded sleeve at each end (of the Coupler) and insert the Cable Ball Ends.

**Figure 25.17.6 Manual Release Cable Connection**



# 25.17 Component Re-installation continued

## Manual Release Cable Re-installation continued

**Verify proper setting at the hook:**

**CAUTION**

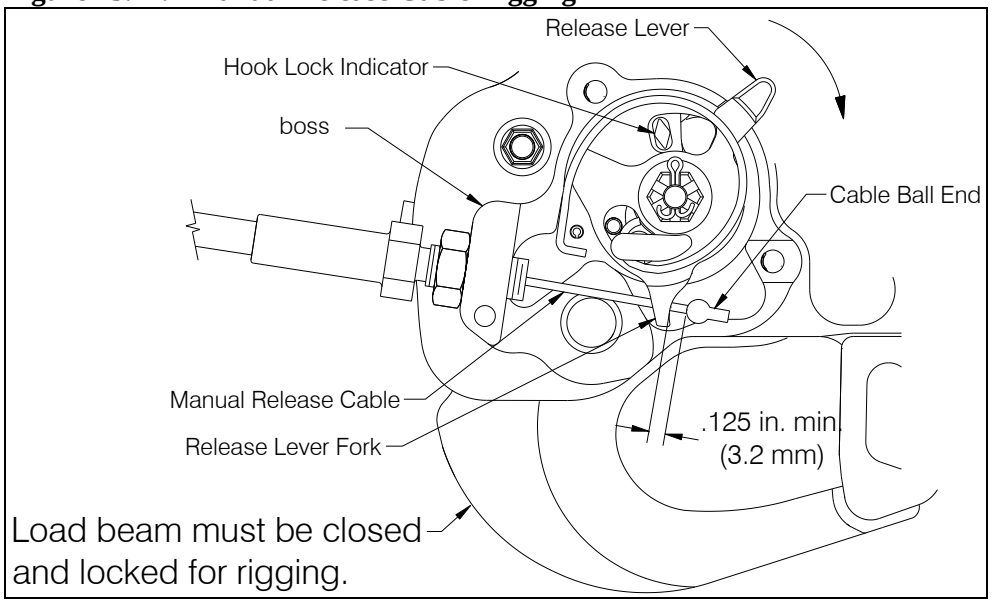
*The cargo hook load beam must be closed and locked when verifying and adjusting the manual release cable rigging.*

Place the cable ball end fitting into the cargo hook release lever fork as illustrated in Figure 25.17.7.

Rotate the release lever in the clockwise direction to remove free play and hold (the free play is taken up when the hook lock indicator begins to move).

Measure the cable ball end gap with the T-handle in the cockpit in the non-release position. The gap should measure a minimum of .125" (see below).

**Figure 25.17.7 Manual Release Cable Rigging**




If necessary adjust the manual release cable system to obtain the minimum 0.125" (3.2 mm). Some adjustment can be made at the cargo hook by loosening the jam nut and turning the manual release cable or cargo hook in the required direction and re-tightening the jam nut. Ensure the manual release cable fitting threads maintain full thread engagement with the cargo hook side plate boss (i.e. - the end of the threads should not be recessed within the boss).

When proper setting is achieved tighten the manual release cable jam nut and re-install the manual release cover with the two screws.

# 25.17 Component Re-installation continued

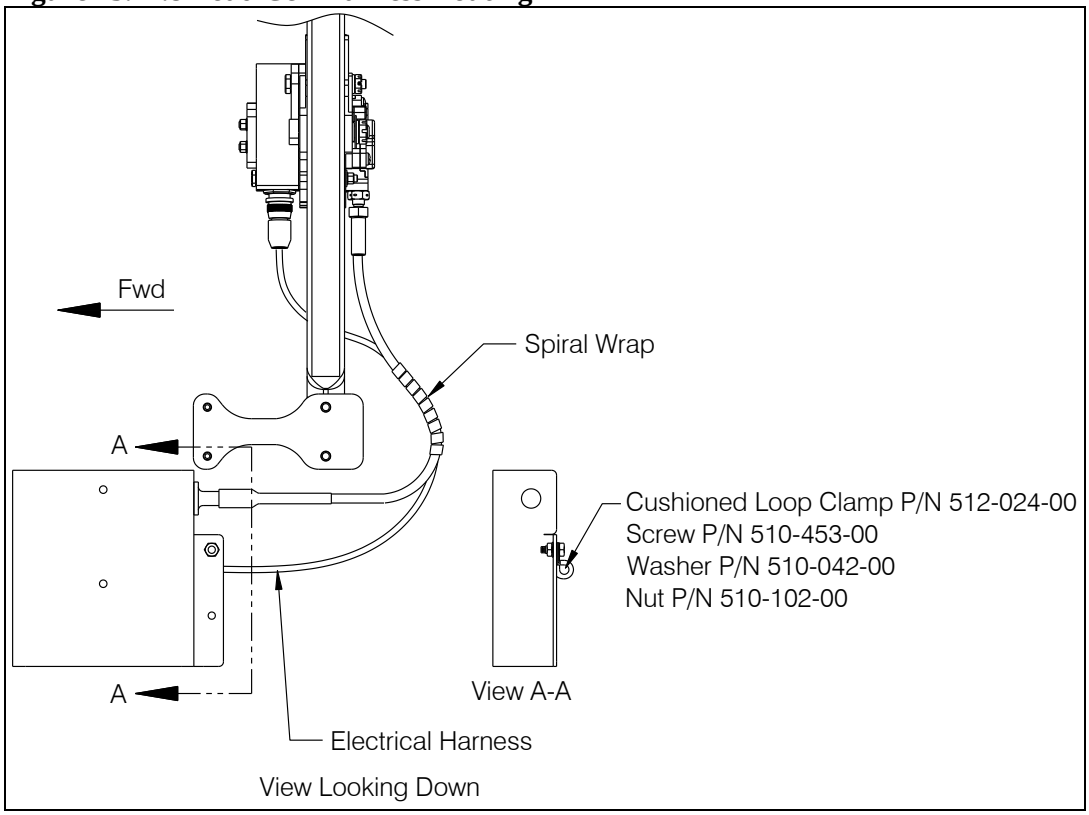
### Load Weigh Indicator Re-installation

1. Place the Load Weigh Indicator into its mounting location and secure with four screws.
2. Connect the electrical connector on the wiring harness to the connector on the back of the indicator.

### Pin Load Cell Re-installation

1. Insert the pin load cell through the cargo hook and main beam pivot point (reference Figure 25.17.4). The load cell cover and harness must be on the forward side of the main beam when installed on the helicopter.
2. Secure with washer (P/N 510-183-00), washer (P/N 510-174-00), and nut (P/N 510-170-00). Tighten nut finger tight until fully seated then rotate to previous castellation if necessary to insert cotter pin. Install and secure cotter pin (P/N 510-178-00).
3. Route the harness up to and connect its connector to the outboard connector on the connector bracket.
4. If Onboard Systems Fixed Provisions Kit P/N 200-328-00 is installed the connector bracket features a horizontal flange with which to secure the harness. Secure the harness at this point with hardware as shown below.
5. Secure the harnesses and manual release cable together at their midpoints using spiral wrap.

**Figure 25.17.8 Load Cell Harness Routing**



## 25.18 General Procedural Instructions-Testing

After re-installation of the cargo hook, manual release cable, or any electrical release system component, perform the following:

1. Activate the electrical system and press the Cargo Release button to ensure the cargo hook electrical release system is operating correctly. The cargo hook must release. Reset the hook by hand after release.

**CAUTION**

*Energizing the cargo hook release solenoid continuously in excess of 20 seconds will cause it to overheat, possibly causing permanent damage.*

The following instructions are applicable to cargo hook P/N 528-029-02 which is equipped with Surefire electrical release. With no load on the cargo hook perform the following.

- *Very* briefly press the Cargo Release switch, the cargo hook should not actuate and the load beam should remain closed.
- Press and hold the Cargo Release switch for a few seconds, the load beam should fall to the open position and the cargo hook solenoid should continue to cycle repeatedly.
- Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the manual release cover (see Figure 5.1).

2. Activate the manual release system by pulling the T-handle next to the collective in the cockpit. The mechanism should operate smoothly and the cargo hook must release. Return the load beam to its closed and locked position by hand after release. Verify that the hook lock indicator on the side of the hook returns to the fully locked position. In the fully locked position the hook lock indicator should align with the lines on the manual release cover (see Figure 5.1.1). If the hook does not release or re-latch, do not use the unit until the problem is resolved.
3. Swing the installed Cargo Hook and the suspension to ensure that the manual release cable and the electrical harnesses have enough slack to allow full swing of each component without straining or damaging the cables. The cable and harnesses must not be the stops that prevent the Cargo Hook or the suspension from swinging freely in all directions.