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Instructions for Continued Airworthiness 28V Cargo Hook Suspension System

For the

Robinson R44 Series

With ***Talon LC Keeperless Cargo Hook***

Part Numbers
200-288-00, Without Load Weigh
200-289-00, With Load Weigh

STC SR01064SE

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Record of Revisions

Revision	*Date*	*Page(s)*	*Reason for Revision*
4	03/14/06	Section 5	Added suspension inspection information to section 5.2. Updated overhaul criteria in section 5.3 for cargo hook.
5	06/01/07	Section 0 Section 5 25-00-00 Page 1 25-00-00 Page 15 25-00-00 Page 18	Added Section 0.12 to add Warnings, Cautions, and Notes and their explanations. Re-formatted Caution and Note statements. Updated Figure 25-13 and nut tightening instructions. Added additional inspection point (item 6) to annual inspection. Added warning to daily check. Added overhaul information specific to fertilizer spreaders.
6	03/17/10	05-00-00 Page 6 25-00-00 Page 16	Changed cargo hook overhaul frequency criteria. Revised Figure 25-14 to load beam closed and locked and added associated Caution statement.
7	02/28/18	Section 4 Section 5 Page 5, 6	Update Airworthiness Limitations section wording to meet 14 CFR section A27.4. Removed magnetic particle inspection requirement for load cell assembly, inserted instructions to return load cell to factory for inspection/calibration. Updated definition of "hours of external load operations" to match other manuals.

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List of Effective Pages

Title	Pages	Revision	Date
Cover	i, ii Blank	7	02/28/18
Record of Revisions	iii, iv Blank	7	02/28/18
List of Effective Pages	v, vi Blank	7	02/28/18
Contents	vii, viii	5	06/01/07
Section 0 Introduction	1, 2 Blank	5	06/01/07
Section 4 Airworthiness Limitations	1, 2 Blank	7	02/28/18
Section 5 Inspection and Overhaul Schedule	1 through 4	5	06/01/07
Section 5 Inspection and Overhaul Schedule	5, 6	7	02/28/18
Section 11 Placards and Markings	1, 2	2	10/06/04
Section 25 Operation Instructions	1	5	06/01/07
Section 25 Operation Instructions	2	0	04/17/03
Section 25 Operation Instructions	3, 4	2	10/06/04
Section 25 Operation Instructions	5 through 8	0	04/17/03
Section 25 Operation Instructions	9	3	10/21/05
Section 25 Operation Instructions	10 through 14	0	04/17/03
Section 25 Operation Instructions	15	5	06/01/07
Section 25 Operation Instructions	16	6	03/17/10
Section 25 Operation Instructions	17	0	04/17/03
Section 25 Operation Instructions	18	5	06/01/07

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CONTENTS

Figures

Tables

Section 0
Introduction

0.4 Scope

The following information is necessary to carry out the service, maintenance, and inspection of the Cargo Hook Suspension Systems P/N 200-288-00 and P/N 200-289-00.

0.5 Purpose

The purpose of this Instructions for Continued Airworthiness (ICA) manual is to provide the information necessary to service, inspect and maintain the P/N 200-288-00 and P/N 200-289-00 Cargo Hook Suspension Systems in an airworthy condition.

0.6 Arrangement

This manual contains instructions for the installation, maintenance inspection and operation of the Cargo Hook Suspension Systems P/N 200-288-00 and P/N 200-289-00 on Robinson R44 Raven II series helicopters. The manual is arranged in the general order that maintenance personnel would use to maintain and operate the Cargo Hook Suspension System in service.

The arrangement is:

ATA 0 Introduction.
ATA 4 Airworthiness Limitations (None apply to this System.)
ATA 5 Inspection and Overhaul Schedule
ATA 11 Placards and Markings
ATA 25 Equipment and Furnishings

0.7 Applicability

These Instructions for Continued Airworthiness are applicable to Cargo Hook Suspension Systems P/N 200-288-00 and P/N 200-289-00 for the Robinson R44 Raven II series helicopters.

0.9 Abbreviations

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

0.12 Safety Labels

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. Current revision levels of all manuals are available from the factory.

Section 4
Airworthiness Limitations

4.2 No 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 Schedule
5.1 Cargo Hook Suspension System Daily Check

WARNING

Failure to perform a complete daily check of the system, especially when used to transport fertilizer spreaders, may result in sudden failure of the Cargo Suspension System.

Prior to each cargo hook use 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. If the hook does not release or re-latch, do not use the unit until the problem is resolved.

CAUTION

Depressing the electrical release switch continuously in excess of 20 seconds will cause the cargo hook release solenoid to overheat, possibly causing permanent damage.

2. Activate the manual release system by pulling the T-handle in the cockpit. The cargo hook must release. Reset the hook by hand after release. If the hook does not release or re-latch, do not use the unit until the problem is resolved.
3. Swing the cargo hook and the suspension system throughout their full ranges of motion to ensure the manual and electrical release cables have enough slack. The cables must not be the stops that prevent the cargo hook or suspension from swinging freely in all directions.
4. Visually check for presence and security of fasteners and electrical connections.
5. Visually check the suspension system structural components for cracks and damage, paying close attention to the gimbal and load link (items 8 and 11 in figure 5-1).

5.2 Cargo Hook Suspension System Inspection Schedule

The scheduled inspection intervals noted below are maximums and are not to be exceeded. If the cargo hook suspension 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.

Annually or 100 hours of cargo hook use, whichever comes first, inspect the cargo hook and suspension per the following.

1. Visually inspect for corrosion on the exterior of cargo hook and suspension system components (refer to Table 5-2 for limits for suspension components). Corrosion on the cargo hook side plates is cause for immediate overhaul. Additionally, any exfoliation corrosion in the upper attach lug area of the cargo hook is cause for immediate replacement of the side plate. Contact Onboard Systems for the latest revision of the cargo hook service manual.
2. Move the cargo hook and the suspension system throughout their full ranges of motion and observe the manual and electrical release cables to ensure that they have enough slack. The cables must not be the stops that prevent the cargo hook or suspension from moving freely in all directions.
3. Visually inspect for presence and security of fasteners and electrical connections.
4. Visually inspect the electrical wire harnesses for damage and security.
5. Visually inspect the manual release cable for damage and security.
6. Visually inspect the suspension system structural components for cracks and damage, paying close attention to the gimbal and load link (items 8 and 11 in figure 5-1).

5.2 Cargo Hook Suspension System Inspection Schedule continued

WARNING

Specific maintenance restrictions apply to the Cargo Suspension System when used to transport fertilizer spreaders or loads with similar rotating tendency. See this section for specific time-between-overhaul requirements.

Every 1000 hours of external load operations or 5 years**, whichever comes first, remove the suspension system from the helicopter, and disassemble per the following instructions and inspect. Refer to Figure 5-1 for part identification. **Refer to section 5.3 for the overhaul schedule for the cargo hook.**

WARNING

***The overhaul interval shall be no more than 100 hours of operation if the Cargo Suspension System has ever been used with fertilizer spreaders or loads with similar rotating tendency.*

1. Remove cotter pin (item 5).
2. Remove Link Assembly (items 9, 10, and 11) from the Gimbal Assembly by removing hardware (items 3, 4, and 7).
3. Remove the Gimbal Assembly (items 6 and 8) from the Pillow Block (item 1) by removing Roller Pin (item 2).
4. Press out bushings (items 6, 9, and 10).

5.2 Cargo Hook Suspension System Inspection Schedule continued

Figure 5-1 Suspension System Parts

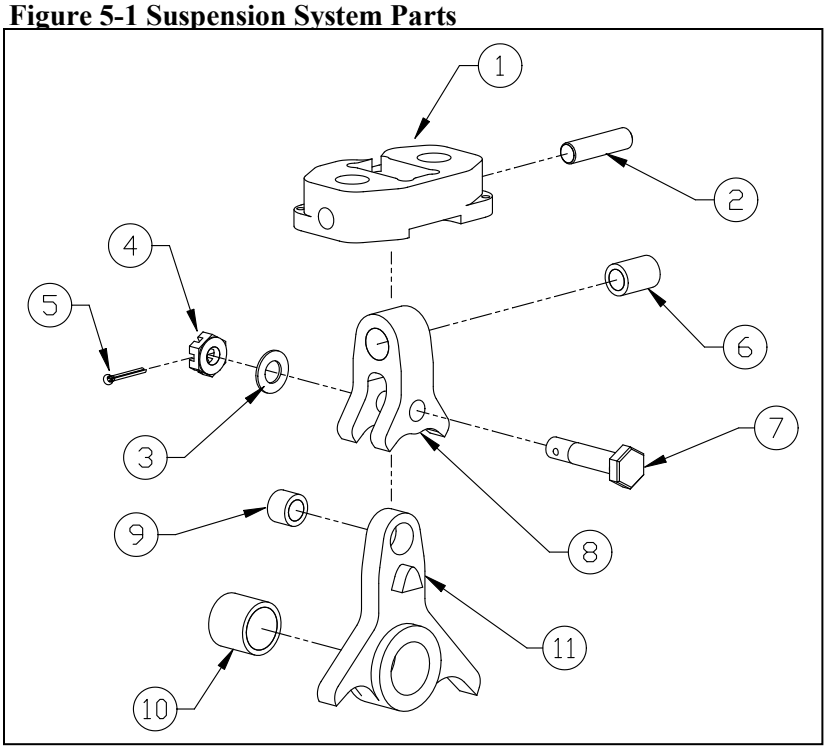


Table 5-1 Suspension System Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	290-492-01	Pillow Block	1
2	290-440-00	Roller Pin	1
3	510-100-00	Washer, AN960-416L	1
4	510-273-00	Nut, BACN10JD104	1
5	510-115-00	Cotter Pin, MS24665-136	1
6	290-462-00	Bushing	1
7	510-528-00	Bolt, NAS6204-12D	1
8	290-455-01	Gimbal	1
9	290-463-00	Bushing	1
10	290-364-00	Bushing	1
11	290-460-00	Load Link	1
	or		
	290-459-00*	Load Cell Link	1

*** With a 200-289-00 kit (with Load Weigh), 290-459-00 is installed rather than 290-460-00.**

5.2 Cargo Hook Suspension System Inspection Schedule continued

Return the Load Cell Assembly (P/N 210-181-00) 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.

Perform magnetic particle inspection in accordance with ASTM-E1444 and MIL-STD-1907, Grade A on the parts listed below. No cracks are permitted in any of these parts.

1. Gimbal (item 8)
2. Pillow Block (item 1)
3. Roller Pin (item 2)

In addition, carefully inspect, and if necessary repair or replace, the detail parts in accordance with the instructions in Table 5-2. Inspect the parts in a clean, well-lit room.

Table 5-2 Suspension System Inspection

Component	Damage	Remedy	Finish
Pillow Block P/N 290-492-01	Dents, nicks, cracks, gouges, corrosion or scratches	Repair dents, gouges, nicks, scratches and corrosion if less than .030" deep, blend out at a ratio of 20:1, length to depth, replace if otherwise damaged.	This part is 15-5PH, passivated. No touch up finish required.
Gimbal P/N 290-455-01	Dents, nicks, cracks, gouges, corrosion or scratches	Repair dents, gouges, nicks, scratches and corrosion if less than .030" deep, blend out at a ratio of 20:1, length to depth, replace if otherwise damaged.	This part is 15-5PH, passivated. No touch up finish required.
Gimbal bushing P/N 290-462-01	Wear on inside diameter.	Maximum permissible bushing ID is .260 inches. Remove and replace if it exceeds .260.	
Load Link P/N 290-460-00 (or Load Cell Assembly P/N 210-181-00).	Dents, nicks, cracks, gouges, corrosion or scratches	Repair dents, gouges, nicks, scratches and corrosion if less than .030" deep, blend out at a ratio of 20:1, length to depth, replace if otherwise damaged.	This part is 15-5PH, passivated. No touch up finish required.
Load Link/ Load Cell Assembly bushing P/N 290-463-00	Wear on inside diameter.	Maximum permissible bushing ID is .260 inches. Remove and replace if it exceeds .260.	
Load Link/ Load Cell Assembly bushing P/N 290-364-00.	Wear on inside diameter.	Maximum permissible bushing ID is .520 inches. Remove and replace if it exceeds .520.	
Threaded fasteners	Wear, deterioration, or corrosion.	Replacement recommend for all threaded fasteners.	

5.3 Cargo Hook Overhaul Schedule

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

*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.*

Section 11
Placards and Markings

11.1 Placards

The 200-288-00 and 200-289-00 Cargo Hook Suspension Systems require that the placards shown in Table 11-1 be installed.

Table 11-1 Cargo Hook Suspension System Placards

Placard part number and appearance	Location
P/N 215-110-00 CARGO RELEASE	Mounted adjacent to the cyclic release switch in clear view of the pilot. Mounted adjacent to the left seat release switch in clear view of the pilot (if optional left seat release switch is installed). Mounted adjacent to the mechanical release T-handle in clear view of the pilot.
P/N 215-111-00 PULL	Mounted adjacent to the mechanical release in clear view of the pilot.
P/N 215-112-00 CARGO	Mounted adjacent to the cargo hook circuit breaker in clear view of the pilot.
P/N 215-114-00 WITH EXTERNAL LOADS, APPROVED FOR CLASS B ROTORCRAFT - LOAD OPERATIONS DAY - VFR ONLY	Mounted on the instrument panel in clear view of the pilot.
P/N 215-119-00 EXTERNAL LOAD LIMIT = 800 LBS (363 KGS)	Mounted on the belly of the aircraft adjacent to the cargo hook attachment point in clear view of the ground support personnel.

Table 11-1 Cargo Hook Suspension System Placards, continued

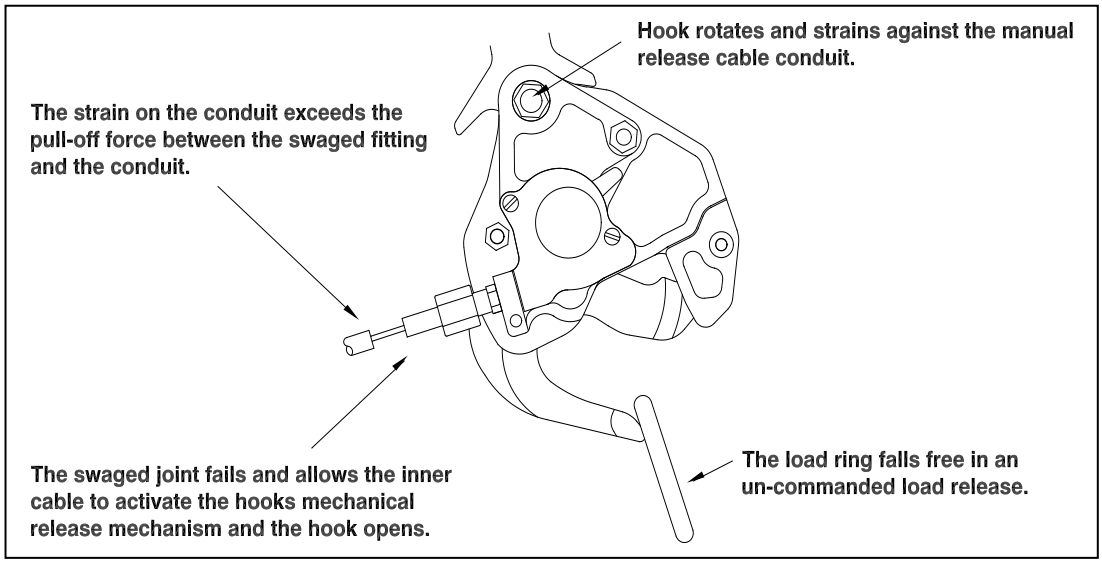
Placard part number and appearance	Location
P/N 215-115-00 FOR FAR PART 133.35(A) OPERATIONS: NO PERSON MAY BE CARRIED UNLESS HE IS: (1) A FLIGHT CREW MEMBER OR TRAINEE; (2) PERFORMS AN ESSENTIAL FUNCTION IN CONNECTION WITH THE EXTERNAL LOAD OPERATION; OR (3) IS NECESSARY TO ACCOMPLISH THE WORK ACTIVITY DIRECTLY ASSOCIATED WITH THAT OPERATION.	Mounted on the instrument panel in clear view of the pilot.
P/N 215-010-00 ELECTRONIC WEIGHING SYSTEM	When Onboard Systems 200-289-00 system is installed, mounted adjacent to both the power switch and the circuit breaker in full view of the pilot and co-pilot.
P/N 215-012-00 TURN THE WEIGHING SYSTEM OFF WHEN NAVIGATION EQUIPMENT IN USE. NO AIRCRAFT OPERATION SHOULD BE PREDICATED ON THE READING OF THE ONBOARD WEIGHING SYSTEM.	When Onboard Systems 200-289-00 system is installed, mounted adjacent to the Onboard Systems digital/analog indicator in full view of the pilot and co-pilot.

Section 25
Equipment and Furnishings

⚠ CAUTION

Un-commanded cargo hook release will happen if the manual release cable is improperly restrained. The cables must not be the stops that prevent the Cargo Hook from swinging freely in all directions. If the Cargo Hook loads cause the hook to strain against the manual release cable the swaged end of the cable may separate allowing the inner cable to activate the cargo hook manual release mechanism. The result is an un-commanded release. Ensure that no combination of suspension and Cargo Hook position is restrained by the manual or electrical release cables.

Figure 25-1 Un-commanded cargo hook release



25.1 Cargo hook connector

Listed below is the pin out for the cargo hook connector.

Table 25-1 Cargo Hook Connector

Pin	*Function*
A	Ground
B	Positive

25.2 Description

The 200-288-00 and 200-289-00 Cargo Hook Suspension Systems are composed of:

- The cargo hook, which is mounted to the belly of the helicopter through a gimbaled suspension utilizing an existing hard point. The 200-289-00 system incorporates a load cell as part of the suspension above the hook.
- An electrical release system that provides a means for releasing a load by pilot actuation of a push-button switch installed on the end of the cyclic grip assembly or an optional switch on the side of the co-pilot's seat. The electrical release system is powered from the bus through a 10 amp circuit breaker to a relay in the center tunnel. The switches control the relay and energize the DC solenoid in the Cargo Hook, opening the hook and releasing the cargo. A schematic for the electrical system is shown below in Figure 25-3.
- A manual release system, which provides a means of releasing a cargo hook load in the event of an electrical release system failure. A T-handle mounted to the cyclic control cover actuates it.
- Ground personnel may also release a load by the actuation of a lever located on the side of the cargo hook.
- The 200-289-00 system includes a load indicator, mounted within the cockpit and connected to the load cell above the cargo hook.

25.5 Component Weights

The weight and cg of the systems are listed in Table 25-2.

Table 25-2 System Weights and CGs

Item	Weight lbs (kgs)	STA in (mm)	BL in (mm)
P/N 200-288-00	5.0 (2.27)	86.1 (2187)	-4.1 (-104)
P/N 200-288-00 w/ cargo hook and suspension removed (see section 25.16 for removal instructions).	1.5 (0.68)	63.3 (1608)	-4.1 (-104)
P/N 200-289-00	6.3 (2.86)	80.0 (2032)	-4.1 (-104)
P/N 200-289 w/ cargo hook and suspension removed (see section 25.16 for removal instructions).	2.8 (1.27)	69.3 (1760)	-4.1 (-104)

25.12 Storage Instructions

Clean the exterior Cargo Hook 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.

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 Trouble Shooting

Table 25-3 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).
Cargo hook does not operate electrically, manual cable release operates normally.	Open electrical circuit, faulty wiring, 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). If switch is faulty, remove and replace per Sections 25.16 and 25.17.
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).
Load beam fails to re-latch after being reset.	Defective latch mechanism.	Remove and replace cargo hook (see sections 25.16 and 25.17).
Force required to release hook with lever on collective exceeds 14 lbs (62.3 N).	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.
With release cable disconnected at hook, the force required to move manual release lever on collective exceeds 6 lbs (26.7 N).	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)
Visibly loose fasteners or missing locking pins on suspension.	Visibly loose fasteners or missing locking pins.	Re-torque and re-install locking pins per installation instructions.
Visibly loose electrical connector.	Visibly loose electrical connector.	Re-tighten connector
Visible cracks or corrosion on hook.	Visible cracks or corrosion.	Remove and replace cargo hook (see Sections 25.16 and 25.17).
Gouges or wear deeper than .090 inches (2.3 mm) on the cargo hook load beam.	Gouges or wear deeper than .090 inches (2.3 mm).	Remove and replace cargo hook (see Sections 25.16 and 25.17).
Cargo hook fails to open or re-lock properly.	Failure to open or re-lock properly.	Remove and replace cargo hook (see Sections 25.16 and 25.17).
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.

Table 25-3 Troubleshooting continued

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 (see Note 3).
Indicator displayed load is not stable.	Dampening level is too small.	Adjust the dampening level to a larger number (see Note 4).
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 (see Note 4).
Indicator does not change with changing hook loads.	Defective load cell, indicator failure or damaged wire harness.	Check for damaged wire harness (see note 2), remove and replace wire harness assembly or load cell (see sections 25.16 and 25.17).

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 25-2 Cargo Hook Electrical Connector

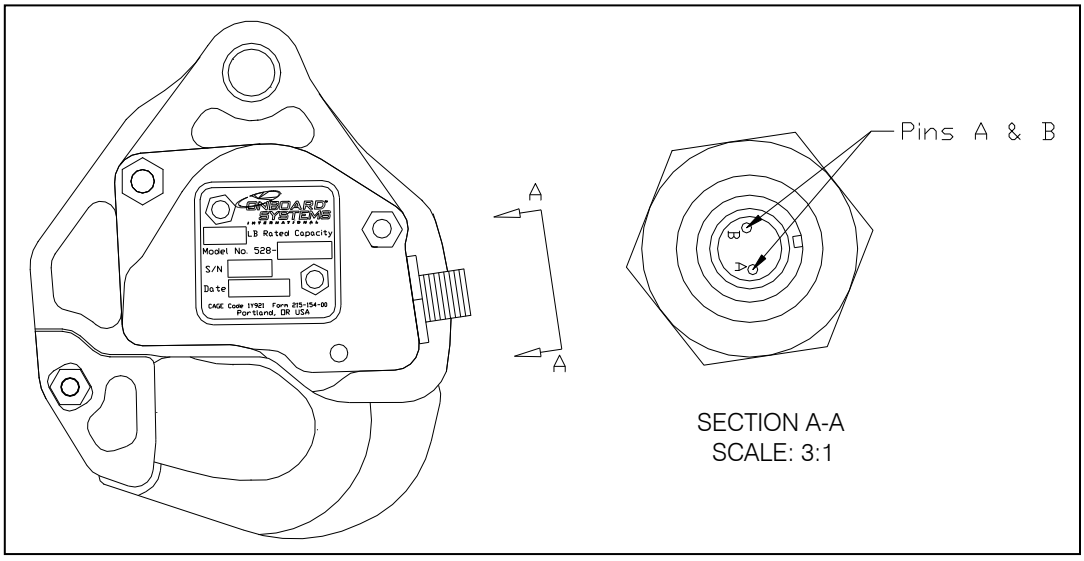
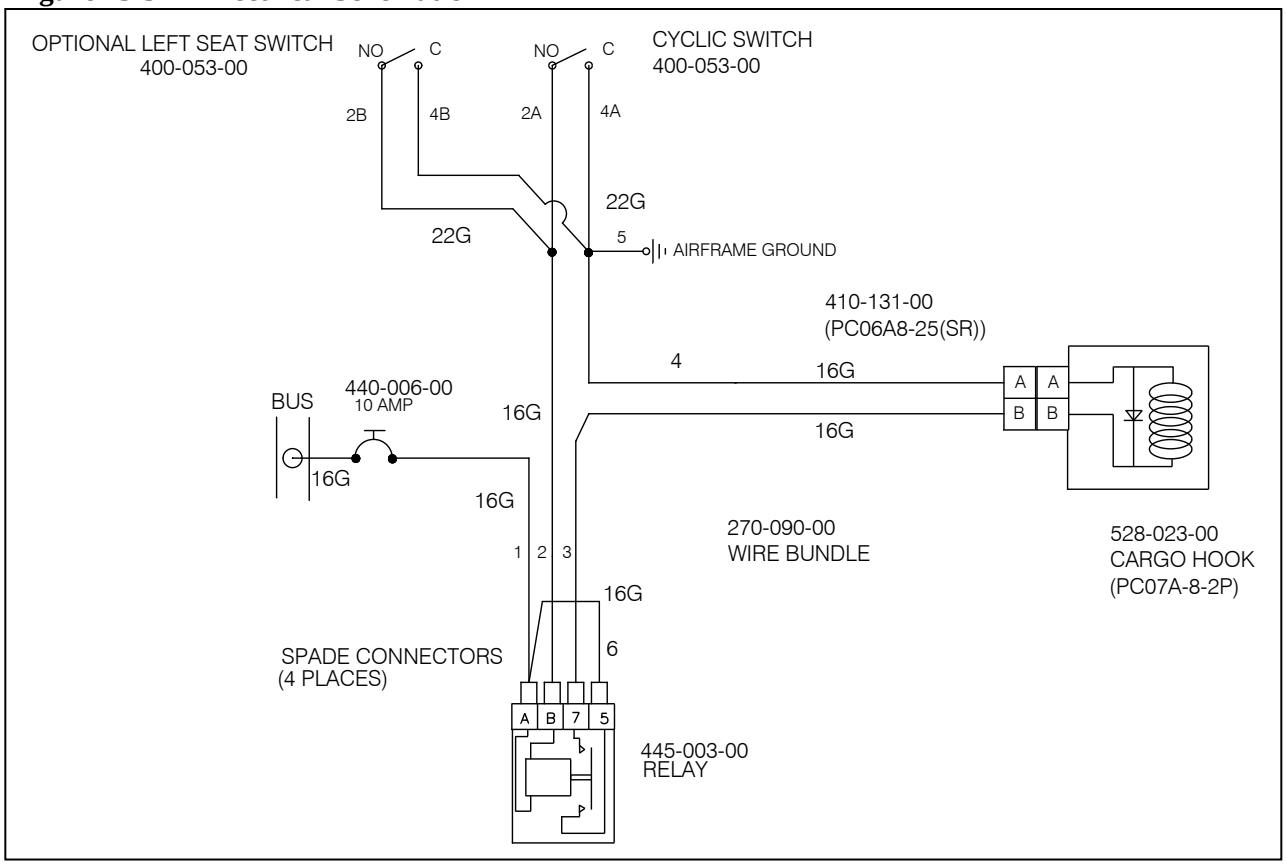


Table 25-3 Notes continued:

2. Electrical Wiring

Inspect wire harness for general condition and chafing along length of wire runs.

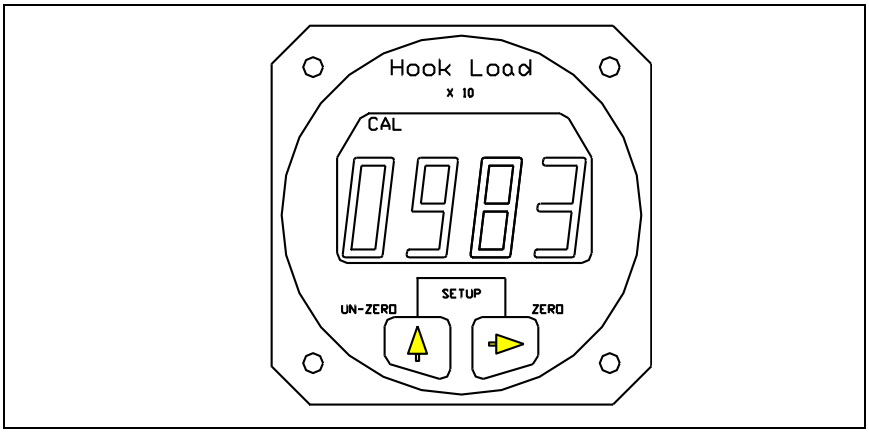
Figure 25-3 Electrical Schematic



3. Checking Load Weigh Indicator calibration code:

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word CODE is displayed, then press the Right button. The display should look like this:

Figure 25-4 CAL Code



This code should match the code printed on the tag attached to the load cell cable.

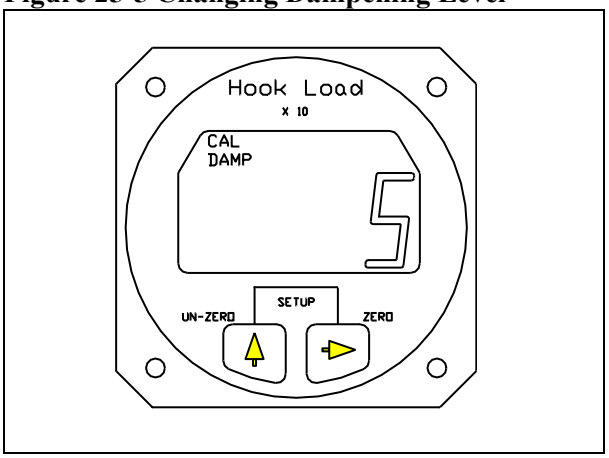
If this code does not match, contact Onboard Systems for further guidance.

Table 25-3 Notes continued:

4. Adjusting dampening level:

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu, using the Left button, until the word DAMP is displayed. To look at or change the Dampening Level press the Right button. The display should look like this:

Figure 25-5 Changing Dampening Level



The CAL and the DAMP legend is turned on and the previously set dampening level is displayed. To return to Run without changing the current dampening level press both the Right and Left buttons at the same time. To change the dampening number, use the Left button to scroll the blinking digit to the desired number. Ten dampening levels are available, from 0 through 9. At level 0 the display responds to the slightest change in weight. However, if the load bounced even slightly, the display digits would respond instantly, making the display look unstable. With a dampening level of 9, the display would be stable under the most turbulent conditions, however, it would take several seconds for the display to respond to a change in weight. The ideal dampening level will depend on the flying conditions. A mid range setting of 5 or 6 is usually adequate. After the selection has been made press both the Right and Left buttons at the same time to return to Run.

25.16 Component Removal

Cargo Hook Removal

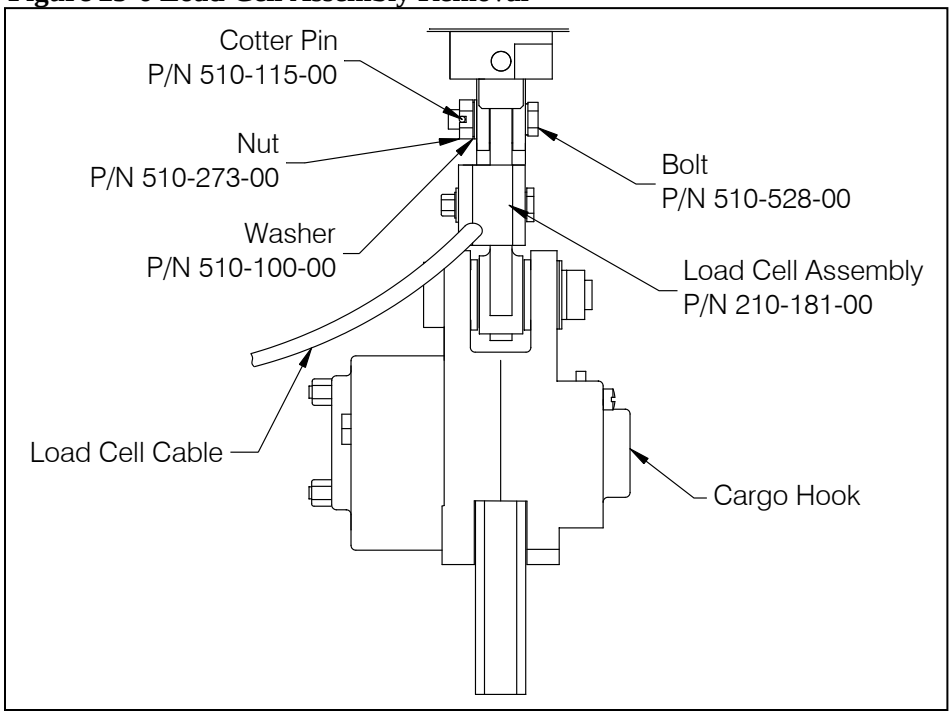
1. Cut and remove all lock wire.
2. Remove manual release cover by removing 2 screws (ref. Figure 25-9).
3. Remove the manual and electrical release cables from the Cargo Hook.
4. Remove the cotter pin P/N 510-178-00 from the Attach bolt P/N 290-332-00 (ref. Figure 25-13).
5. Remove the castellated nut P/N 510-170-00 from the attach bolt.
6. Remove attach bolt and all washers.
7. Remove cargo hook from suspension system.

The aircraft can be operated with the Cargo Hook and suspension assembly removed. The may be accomplished by removing the Cargo Hook from the 210-181-00 Load Cell Assembly or 232-050-00 Link Assembly if no load weigh system is installed. Then remove the 232-049-01 Gimbal Assembly and 290-492-01 Pillow Block together by removing the two Pillow Block mounting fasteners 290-505-00. Secure the manual release cable and electrical wire bundle to any convenient location on the frame structure using tie wraps.

Load Cell Removal

1. Remove Cargo Hook as described above.
2. Remove the cotter pin from bolt.
3. Remove the castellated nut, washer, and bolt.
4. Disconnect the load cell cable connector.

Figure 25-6 Load Cell Assembly Removal

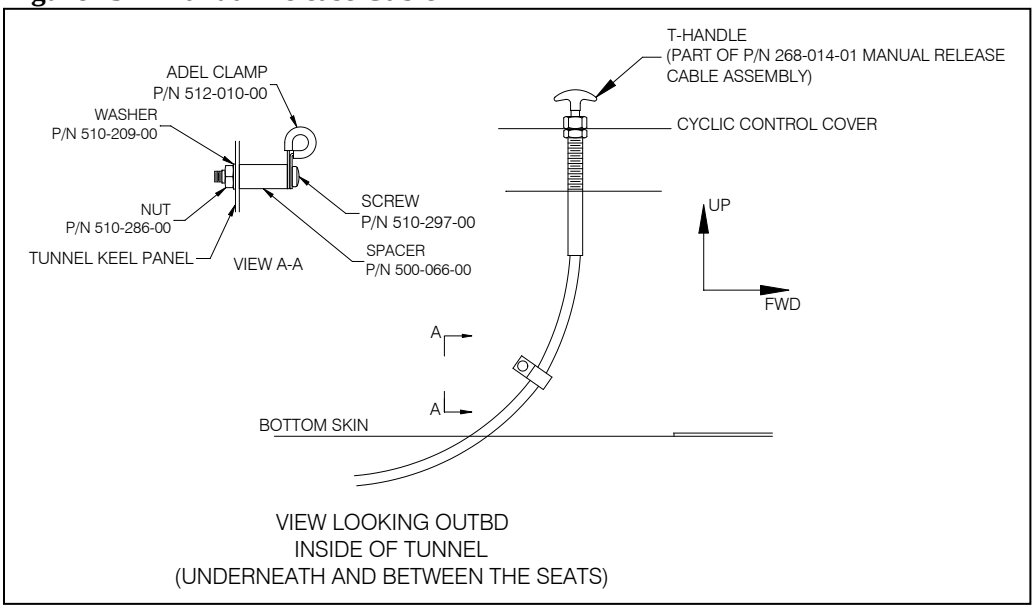


25.16 Component Removal, continued

Manual Release Cable Removal

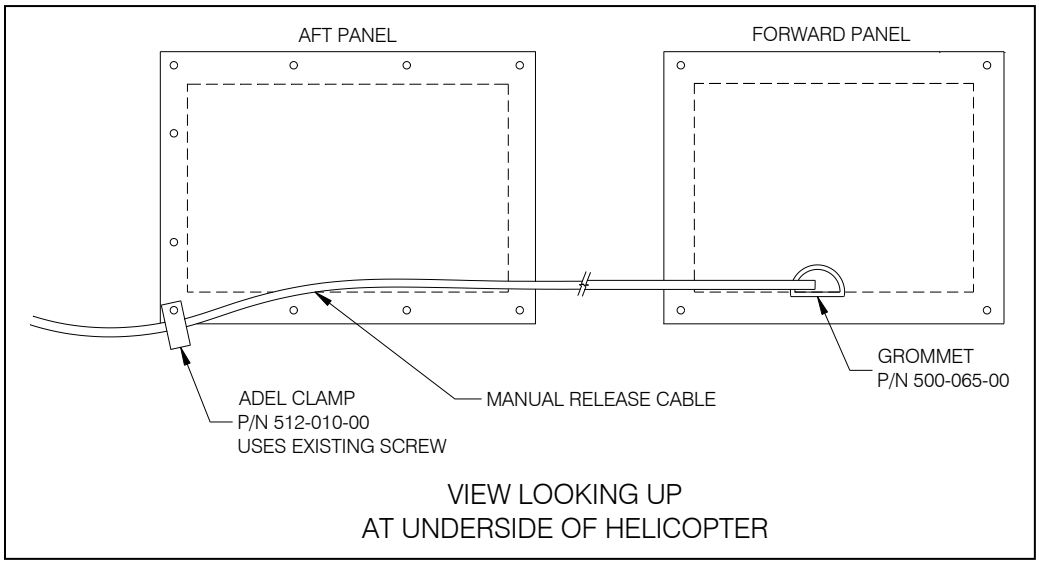
1. In the cockpit unthread the T-handle and nut from the end of the release cable located on the cyclic control cover (ref. Figure 25-7).
2. Underneath the cyclic control cover and located on the tunnel keel panel remove the Adel clamp (ref. Figure 25-7).

Figure 25-7 Manual Release Cable



3. Pull the cable down through the cyclic control cover and through the grommet in the forward panel in the bottom skin (ref Figure 25-8) and remove the Adel clamp at the aft panel.

Figure 25-8 Manual Release Cable Exterior Routing

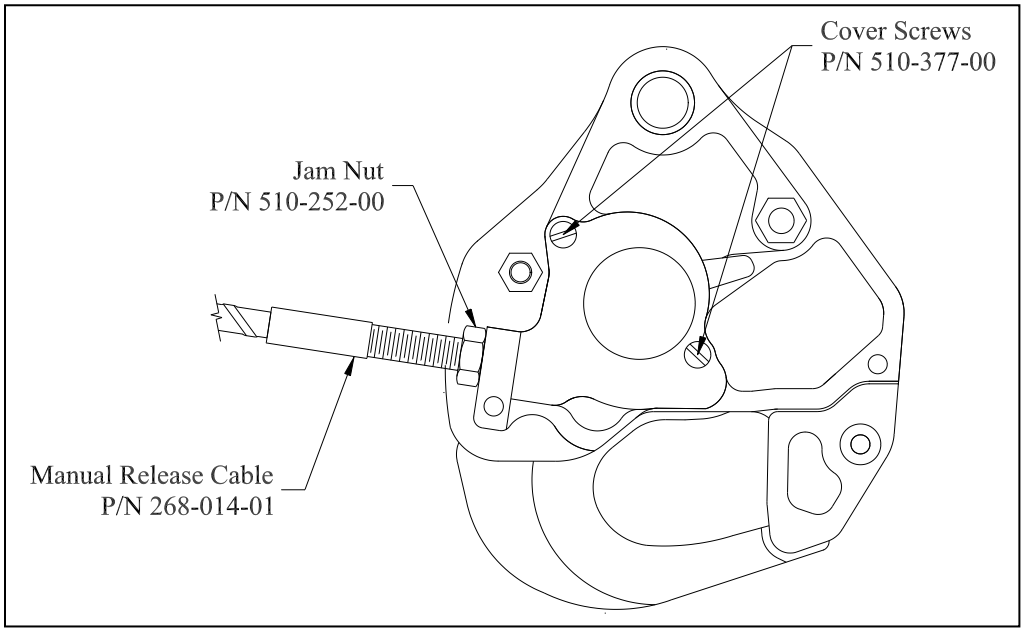


25.16 Component Removal, continued

Manual Release Cable Removal, continued

4. At the cargo hook remove safety wire and the two screws that secure the manual release cover to the hook (see below) and unhook the cable ball end from the fork fitting.

Figure 25-9 Manual Release Cover Removal



5. Loosen the jam nut and unthread the release cable from the hook.

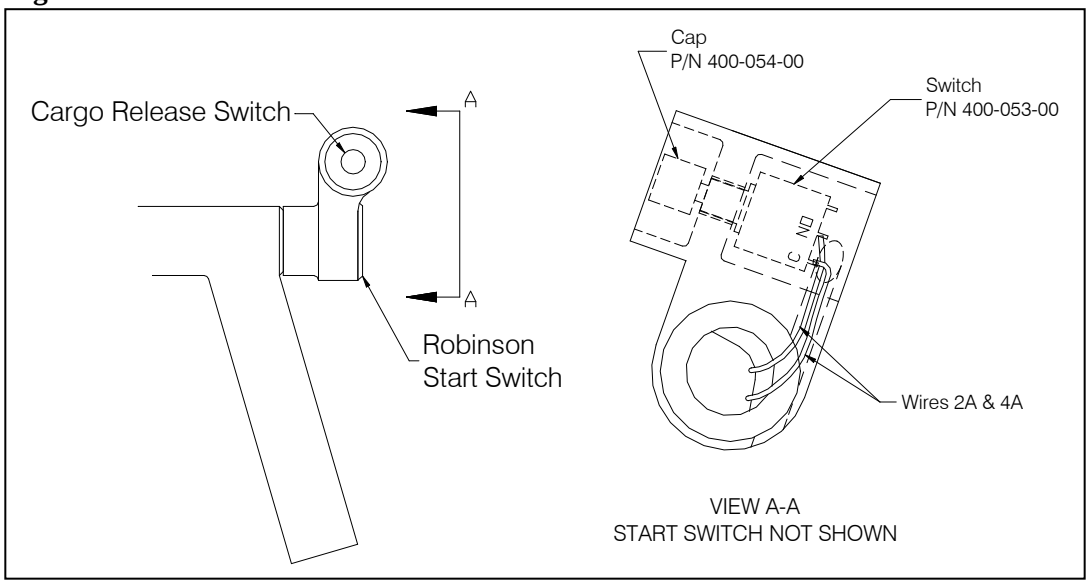
25.16 Component Removal, continued

Release Switch Removal

The release switch is located on the cyclic grip assembly. To remove the release switch:

1. Disconnect the battery.
2. De-solder wires 2A and 4A from the back of the switch (see Figure 25-10).
3. Remove the cap and unthread and remove the switch from the rear of the housing.

Figure 25-10 Release Switch



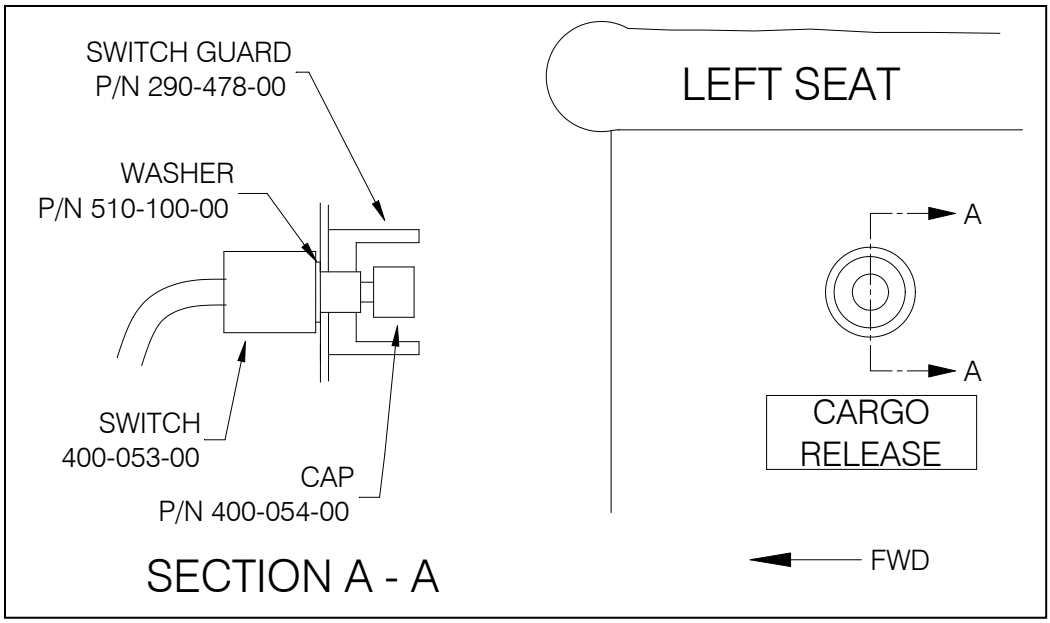
25.16 Component Removal, continued

Left Seat Switch Removal

This is an optional installation; thus it may not be present on all helicopters with these cargo hook kits.

1. Disconnect the battery.
2. Remove the cap from the switch button.
3. Reach under the seat and hold the switch and unthread the switch guard from the switch.
4. De-solder the wires from the back of the switch.

Figure 25-11 Left Seat Switch



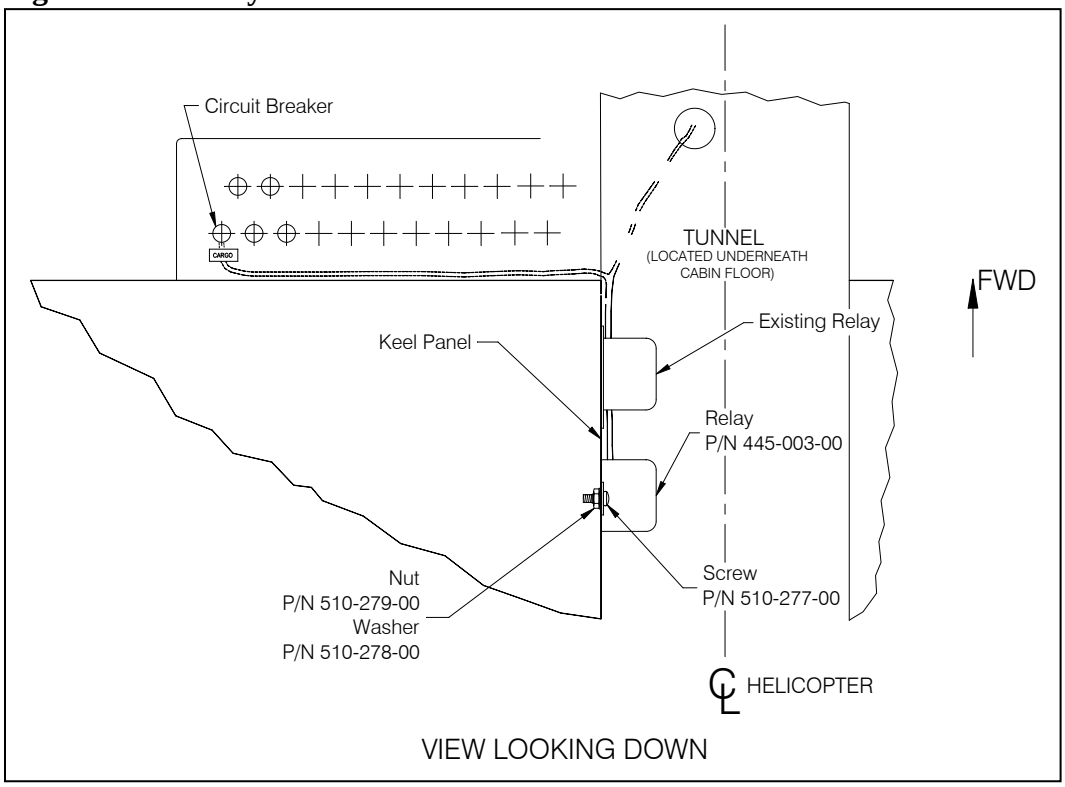
25.16 Component Removal, continued

Relay Removal

The relay (P/N 445-003-00) is located on the keel panel in the tunnel between the seats and below the floor (see below). To remove the relay:

1. Disconnect the battery.
2. Remove the 4 spade connectors at the relay.
3. Remove the two nuts, screws and washers.

Figure 25-12 Relay Location

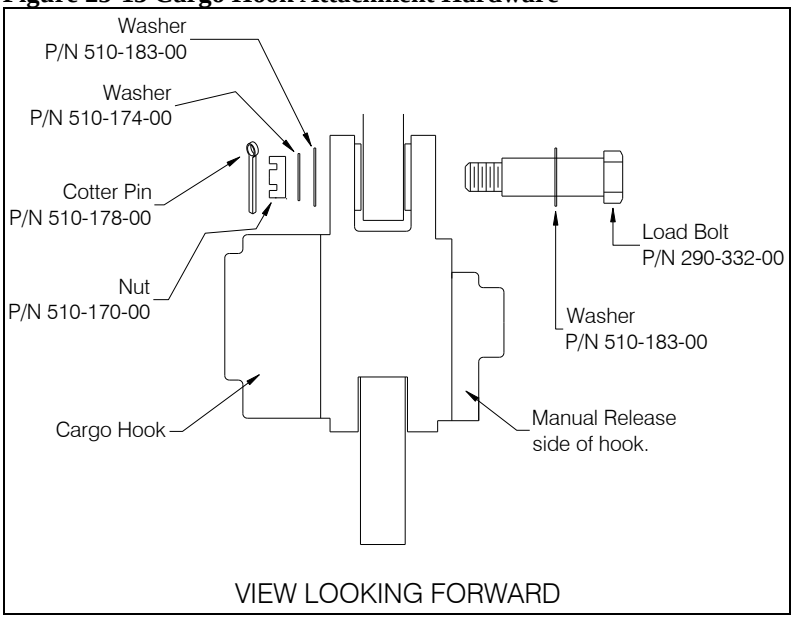


25.17 Component Re-installation

Cargo Hook Re-installation

1. Inspect the Cargo Hook for evidence of damage, corrosion and security of lock wire and fasteners. If damage is evident, do not use the items until they are repaired.
2. Verify that the part number of the cargo hook removed matches one of the numbers on the list in the Applicability section of this manual. If it does not, do not attempt to use the cargo hook, contact the factory for clarification.
3. Inspect the suspension system to ensure that all components are in serviceable condition before re-installing the cargo hook to the suspension system.
4. Attach the Cargo Hook, P/N 528-023-01 to the suspension system by installing the bolt P/N 290-332-00 and washer P/N 510-183-00 as illustrated in Figure 25-13.
5. Install washer P/N 510-183-00 and washer P/N 510-174-00 over bolt end.
6. Tighten nut P/N 510-170-00 on bolt P/N 290-332-00 finger tight, then rotate nut to next castellation to install and secure cotter pin P/N 510-178-00.

Figure 25-13 Cargo Hook Attachment Hardware



NOTICE

The cargo hook load beam must point forward.

25.17 Component Re-installation, continued

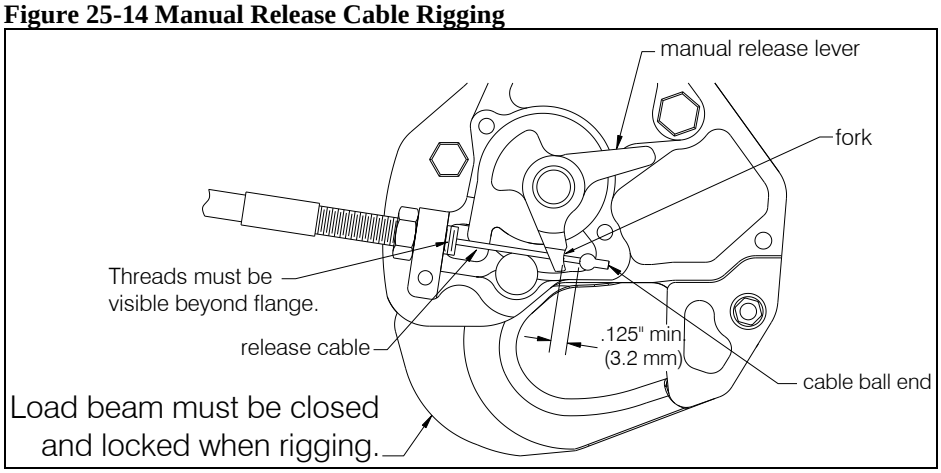
Manual Release Cable Re-installation

CAUTION

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

1. Remove the manual release cover from the Cargo Hook.
2. Screw the manual release cable into the hook by holding the cable and turning the hook assembly or vice versa.
3. Place the cable ball end fitting into the hook manual release fork fitting as illustrated. Move the manual release lever in the clockwise direction until it is against the cam stop. Measure the cable ball end free play with the manual release handle in the cockpit in the non-release position. Adjust the manual release cable system to allow .125 inches (3.2 mm) of free play at the fork fitting as shown.
4. Re-install the manual release cover with the two screws. Tighten the jam nut against the hook and safety wire the jam nut to the nearest cover screw. Safety wire the remaining cover screw.

Figure 25-14 Manual Release Cable Rigging



5. Route the cable forward through the Adel clamp and grommet as shown in Figure 25-8.
6. Route the cable up through the Adel clamp on the tunnel keel panel and to the 0.38 inch (9.7 mm) dia. hole in the cyclic control cover and secure with nut. Install T-handle (Ref. Figure 25-7).

25.17 Component Re-installation, continued

Release Switch Re-installation

1. Thread release switch into housing on the end of the cyclic grip assembly (see Figure 25-10) from the backside.
2. Press on cap.
3. Solder wires 2A and 2B onto pins C and NO. Refer to Figure 25-3 for electrical schematic.

Left Seat Release Switch Re-installation

1. Solder wires onto switch (refer to Figure 25-3 for electrical schematic).
2. Insert switch with washer into hole in side of left seat.
3. Hold switch and thread on switch guard.
4. Press on cap.

Relay Re-installation

1. Secure relay to keel panel in tunnel with two screws (P/N 510-277-00), washers (P/N 510-278-00), and nuts (P/N 510-279-00).
2. Connect the four spade connectors to relay. Refer to electrical schematic (Figure 25-3) for pin out information.

25.18 General Procedural Instructions-Testing

Daily, prior to each cargo hook use, and after re-installation, perform the following:

1. Activate the electrical system and press the Cargo Hook release button to ensure the cargo hook electrical release is operating correctly. The mechanism should operate smoothly and the Cargo Hook must release. Reset the hook by hand after the release. If the hook does not release or re-latch, do not use the unit until the difficulty is resolved.

The release solenoid is intended to be energized only intermittently. Depressing the electrical release button continuously in excess of 20 sec. will cause the release solenoid to overheat, possibly causing permanent damage.

2. Activate the release handle located between the seats to test the cargo hook manual release mechanism. The mechanism should operate smoothly and the Cargo Hook must release. Reset the hook by hand after release. If the hook does not release or re-latch, do not use the unit until the difficulty is resolved.

3. Swing the installed Cargo Hook to ensure that the manual release cable assembly and the electrical release cable have enough slack to allow full swing of the suspension assembly without straining or damaging the cables. The cables must not be the stops that prevent the Cargo Hook from swinging freely in all directions.