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Instructions for Continued Airworthiness 12 Volt Cargo Hook Suspension System

For the

Robinson R44 Series

With* *Talon LC Keeperless Cargo Hook

Part Number 200-265-00

STC SR01064SE

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Record of Revisions

Revision	*Date*	*Page(s)*	*Reason for Revision*
5	10/21/05	25-00-00 Page 4	Incorporated new part numbers for Gimbal Assembly (232-049-01 was 232-049-00) and Pillow Block (290-492-01 to 290-492-00) as a result of configuration change (reference Service Bulletin 159-016-00).
6	03/14/06	Section 5 Section 11 25-00-00 Page 2	Added inspection information to section 5.2 and updated cargo hook overhaul criteria. New section (Placards and Markings). Added additional description of cargo hook kits to section 25.2. Added kg equivalents to lbs in Table 25.1.
7	05/31/07	Section 0 Section 5 25-00-00 Page 1-3 25-00-00 Page 5 25-00-00 Page 7	Added Section 0.12 to add Warnings, Cautions, and Notes and their explanations. Re-formatted Caution and Note statements. Updated Figure 25-2 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.
8	03/11/10	05-00-00 Page 6 25-00-00 Page 6	Changed overhaul frequency criteria. Updated Figure 25-3 to show load beam closed and added associated Caution statement.
9	02/15/11	00-00-00 page 1, 05-00-00 pages 1-5, 11-00-00 page 2, 25-00-00 pages 2, 4	Removed load weigh kit P/N 200-266-00 and associated instructions, changed “cargo hook use” to “external load operations”, clarified application of “daily check”.

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ATA 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 200-265-00.

0.5 Purpose

The purpose of this Instructions for Continued Airworthiness (ICA) manual is to provide the information necessary to service, maintain and inspect the P/N 200-265-00 Cargo Hook Suspension System in an airworthy condition.

0.6 Arrangement

This manual contains instructions for the installation, maintenance inspection and operation of the Cargo Hook Suspension System P/N 200-265-00 on Robinson Model R44 series helicopters. The manual is arranged in the general order that maintenance personnel would use to install, 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 System P/N 200-265-00 (with Cargo Hook P/N 528-023-03) for the Robinson R44 Series Helicopters.

0.9 Abbreviations

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

0.12 Precautions

The following definitions apply to Warnings, Cautions and Notes used in this manual.

Means that if this information is not observed, serious injury, death or immediate loss of flight safety could occur.

Means that there is a risk of injury or degradation in performance of equipment if this information is not observed.

Draws the reader's attention to information which may not be directly related to safety, but which is important or unusual.

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.

ATA 4
Airworthiness Limitations

4.2 No airworthiness limitations

No airworthiness limitations associated with this type design change.

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ATA 5
Inspection and Overhaul Schedule
5.1 Cargo Hook Suspension System Daily Check

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

Prior to a flight involving external load operations 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.

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 external load operations, 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

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.**

***The overhaul interval shall be no more then 100 hours of external load 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

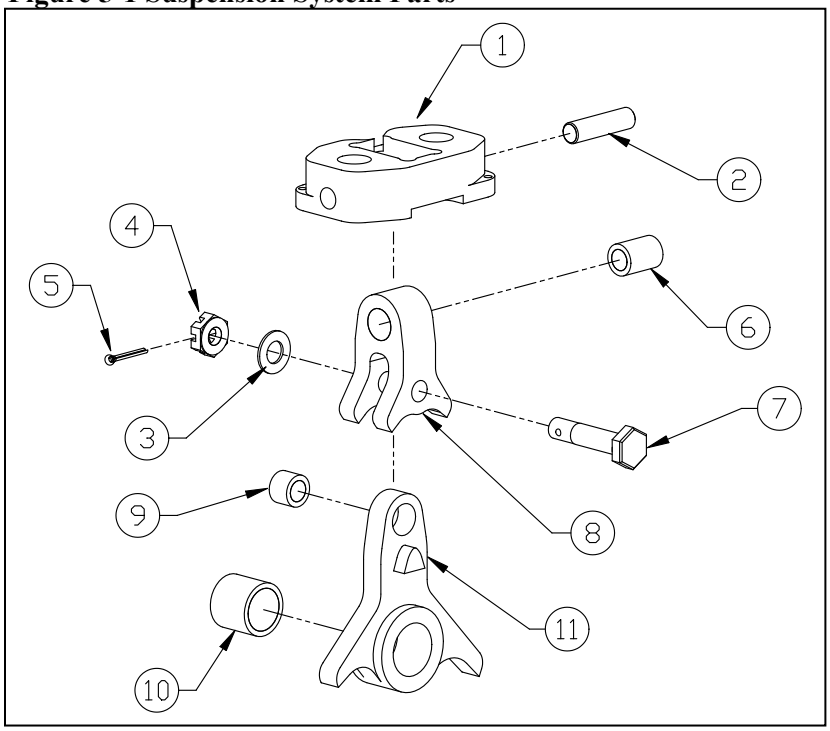


Table 5-1 Suspension System Parts

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	290-462-01	Bushing	1
7	510-275-00	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

5.2 Cargo Hook Suspension System Inspection Schedule continued

Carefully inspect and repair the suspension system detail parts in accordance with the instructions in Table 5-2. Inspect the parts in a clean, well-lit room.

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. Load Link (item 11)
3. Pillow Block (item 1)
4. Roller Pin (item 2)

Table 5-2 Suspension System Inspection

Component	Inspect for:	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	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 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 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	N/A	Replace all threaded fasteners.	

5.3 Cargo Hook Overhaul Schedule

The overhaul of the cargo hook shall be in accordance with the guidelines below. Contact Onboard Systems for the latest revision of overhaul instructions and guidance to locate authorized overhaul facilities.

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

NOTE

(*) Hours of external load operations is defined as the time in which a helicopter is engaged in external load operations. This includes time between loads on the hook.

ATA 11
Placards and Markings

11.1 Placards

The 200-265-00 Cargo Hook Suspension System requires 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

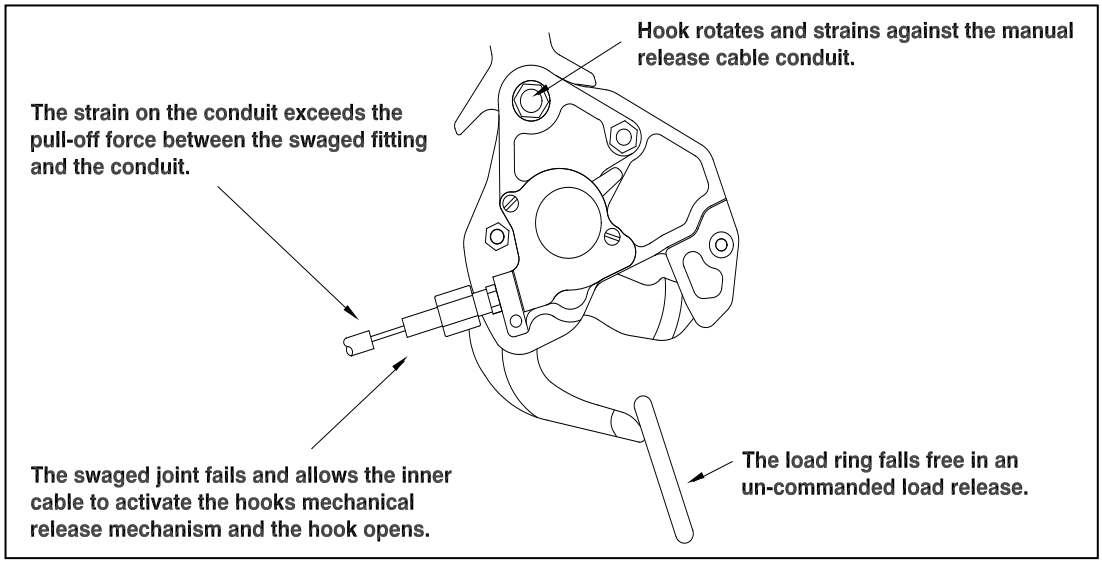
Placard part number and appearance	Location
P/N 215-115-00 FOR FAR PART 133.35(A) OPERATIONS: NO PERSON MAY BE CARRIED UNLESS HE IS: (1) A FLIGHT CREW MEMBER OR TRAINEE; (2) PERFORMS AN ESSENTIAL FUNCTION IN CONNECTION WITH THE EXTERNAL LOAD OPERATION; OR (3) IS NECESSARY TO ACCOMPLISH THE WORK ACTIVITY DIRECTLY ASSOCIATED WITH THAT OPERATION.	Mounted on the instrument panel in clear view of the pilot.

ATA 25
Equipment and Furnishings

CAUTION

Un-commanded cargo hook release will happen if the manual and electrical release cables are 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 cyclic stick or 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 200-265-00 Cargo Hook Swing 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 200-266-00 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 manual release system, which provides a means of releasing a cargo hook load in the event of an electrical release system failure. Pulling the 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.

25.5 Component Weights

The weight of the systems is listed in Table 25-2.

Table 25-2 Component Weights

Kit	**Weight lbs (kgs)**
P/N 200-265-00	5.0 (2.3)

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 Trouble Shooting

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Cargo hook does not operate electrically, manual cable release operates normally.	Open electrical circuit, faulty wiring, circuit breaker, switch or solenoid	Disconnect cable from electrical connector on Cargo Hook. Using multimeter, check for 1.2 to 1.6 ohms between pins A and B of electrical connector. If open indication is obtained, overhaul solenoid.
Cargo hook does not operate electrically or manually.	Defective internal mechanism	Overhaul internal mechanism.
Cargo hook operates electrically, but not manually.	Defective manual release cable Defective manual release system	Check manual release cable and cable connection to Cargo Hook. Correct any defects. Overhaul internal mechanism.
Load beam fails to relatch after being reset.	Defective latch mechanism	Overhaul internal mechanism.
Cargo hook manual release cable pull-off force exceeds 8 Lbs. (at the hook).	Friction in internal mechanism.	Check operation of unit using manual release lever. Overhaul internal mechanism.
Visibly loose fasteners or missing locking pins	Visibly loose fasteners or missing locking pins	Re-torque and reinstall locking pins per installation instructions
Visibly loose electrical connector	Visibly loose electrical connector	Retighten connector
Visible cracks or corrosion.	Visible cracks or corrosion.	Remove Hook from service and replace discrepant parts.
Visible cracks. Gouges or wear deeper than .090 in.	Visible cracks. Gouges or wear deeper than .090 in.	Remove Hook from service and replace discrepant parts.
Failure to open or relock properly	Failure to open or relock properly	Remove hook from service.
Circuit breaker opens when Cargo Hook is energized.	Short in the system, faulty wiring, circuit breaker or solenoid	Check for shorts to ground. Check solenoid resistance, repair or replace defective parts.

25.16 Cargo Hook Removal

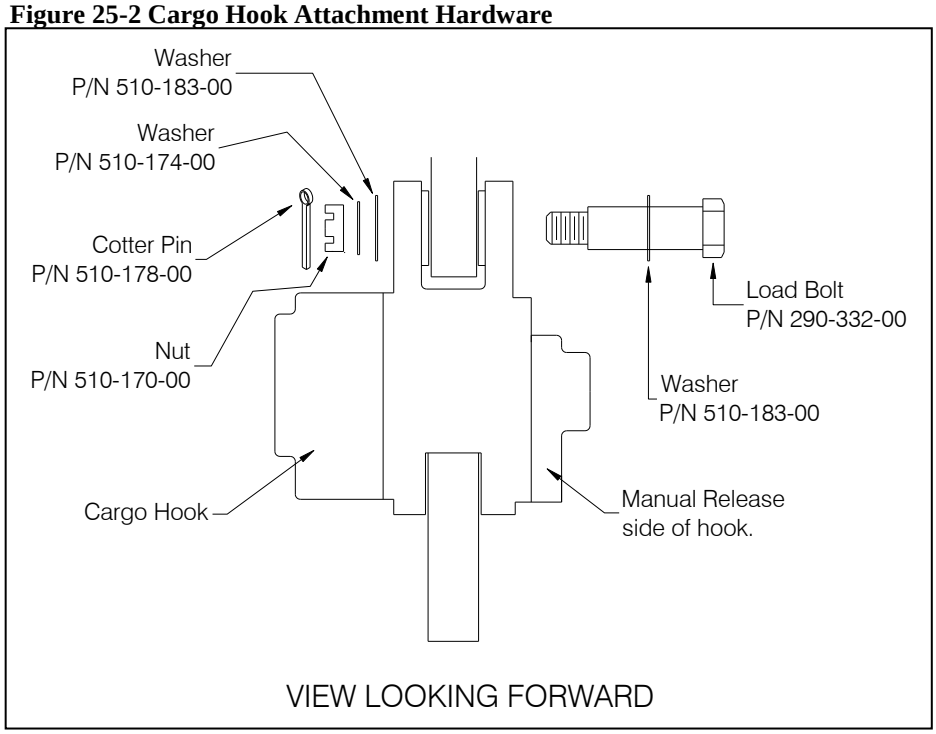
1. Cut and remove all lockwire.
2. Remove manual release cover by removing 2 screws.
3. Remove the manual and electrical release cables from the Cargo Hook.
4. Remove the cotter pin P/N 510-178-00 from the attach bolt P/N 290-332-00.
5. Remove the castellated nut P/N 510-170-00 from the attach bolt.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

The aircraft can be operated with the Cargo Hook and gimbal assembly removed. This may be accomplished by removing the Cargo Hook from the 232-050-00 Link Assembly. 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.

25.17 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 reinstalling the cargo hook to the suspension system.
4. Attach the Cargo Hook, P/N 528-023-03 to the suspension system by installing the bolt P/N 290-332-00 and washer P/N 510-183-00 as illustrated in Figure 25-2.
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 to finger tight, then rotate to next castellation to install and secure cotter pin P/N 510-178-00.

Figure 25-2 Cargo Hook Attachment Hardware



NOTE

The Cargo Hook Load Beam must point forward.

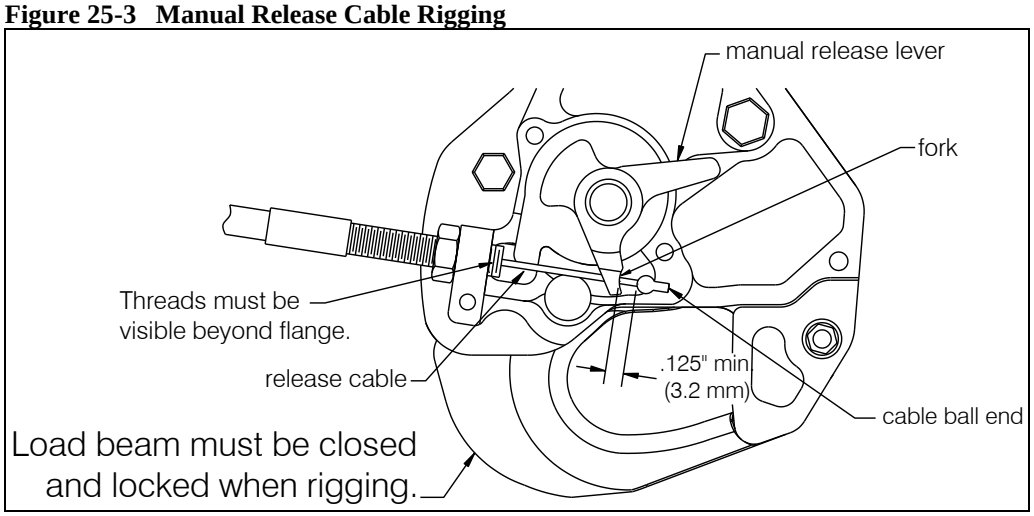
25.17 Cargo Hook Re-installation, continued

Connection of Manual release cable

Cargo hook must be closed and locked when rigging and adjusting 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.
3. Place the cable ball end fitting into the hook manual release fork fitting as illustrated in Figure 25-3. 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 provide minimum of .125" of freeplay at the fork fitting as shown in Figure 25-3.
4. Reinstall 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 25-3 Manual Release Cable Rigging



Reconnect the cargo hook electrical release cable connector to the Cargo Hook.

25.18 General Procedural Instructions-Testing

Daily, prior to each cargo hook use, and after 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 relatch, 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 seconds 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 relatch 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.

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