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Instructions for Continued Airworthiness Cargo Hook Suspension Systems

For the

Robinson R66

STC SR02447SE

Part Numbers
200-380-00, 200-380-10, 200-381-00, 200-381-10, 200-381-01, 200-381-11, 200-382-00, 200-382-01, 200-392-00, 200-417-00

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Record of Revisions

Revision	*Date*	*Page(s)*	*Reason for Revision*
0	03/21/14	All	First Issue
1	04/16/14	All	Updated C-39 indicator, relay and manual release T-handle mounting details.
2	04/01/15	All	Updated placard P/N 215-277-00.
3	07/30/15	5-5, 5-8, 25-9, 25-16	Changed pin load cell to P/N 210-301-01.
4	03/23/17	0-1, 5-1, Section 11, 25-2 thru 25-6, 25-16, 25-25	Added kit P/Ns 200-380-10 and 200-381-10 which include cargo hook P/N 528-029-02 with Surefire release.
5	03/08/18	Pages 5-6 through 5-8	Removed magnetic particle inspection requirement. Changed attach bolt and pin load cell diameter limit to .495".
6	04/23/18	5-7	Added instruction to return pin load cell to the factory at 1000 hour/5 year interval.
7	01/21/20	0-1, Section 5, Section 11, pages 25-2, 25-4, 25-6, 25-8, 25-12, and 25-24.	Added kit P/N's 200-381-01, 200-381-11, and 200-382-01, similar to existing kits except include C-40 Indicator rather than C-39 Indicator. Re-numbered sections of Section 5 and updated inspection table.

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Section 0
Introduction

0.4 Scope

The following information is necessary to carry out the service, maintenance, and inspection of Cargo Hook Suspension System P/N's 200-380-00, 200-380-10, 200-381-00, 200-381-01, 200-381-10, 200-381-11, 200-382-00, 200-382-01, and 200-392-00.

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 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 on Robinson R66 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:

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

0.7 Applicability

These Instructions for Continued Airworthiness are applicable to Cargo Hook Suspension System P/N's 200-380-00, 200-380-10, 200-381-00, 200-381-01, 200-381-10, 200-381-11, 200-382-00, 200-382-01, and 200-392-00 as installed on Robinson R66 model helicopters.

0.9 Abbreviations

FAA Federal Aviation Administration
FAR Federal Aviation Regulation
ICA Instructions for Continued Airworthiness
CMM Component Maintenance Manual

0.12 Precautions

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

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

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

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

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

Used to address practices not related to personal injury.

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. Also a Documentation Update Service is available on the web site. Registering for this service provides an e-mail or fax notification when a manual has been revised. Hard copies of all manuals are available from the factory, contact the factory at 800-275-0883 to request a copy.

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 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.

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 and suspension per the following. Refer also to CMM 122-017-00 for the cargo hook for additional inspection.

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.

1. Activate the electrical system and press the Cargo Release button on the cyclic to ensure the cargo hook electrical release system is operating correctly. The cargo hook must release. Reset the load beam by hand after release and verify that the lock indicator on the side of the hook returns to the fully locked position (see Figure 5.1.1).

5.1 Annual/100 Hour Inspection continued

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.

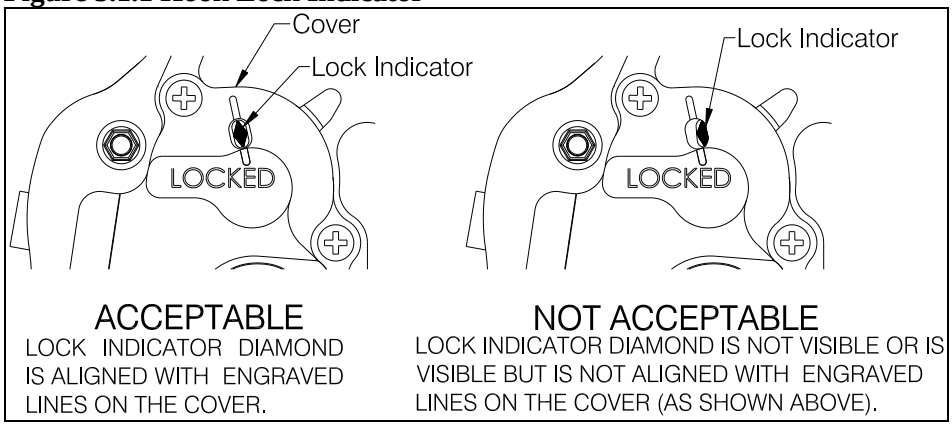
- *Very* briefly press the Cargo Release switch, the cargo hook should not actuate and the load beam should remain closed.
- Press and hold the Cargo Release switch for a few seconds, the load beam should fall to the open position and the cargo hook solenoid should continue to cycle repeatedly.
- Push 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 5.1.1).
- Repeat for the co-pilot release switch if the optional co-pilot release switch kit (P/N 200-417-00) is installed.

2. Activate the manual release system by pulling up on the T-handle located between the co-pilot and pilot seats. The cargo hook must release. Reset the load beam by hand after release and verify that the lock indicator on the side of the hook returns to the fully locked position.

⚠ 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

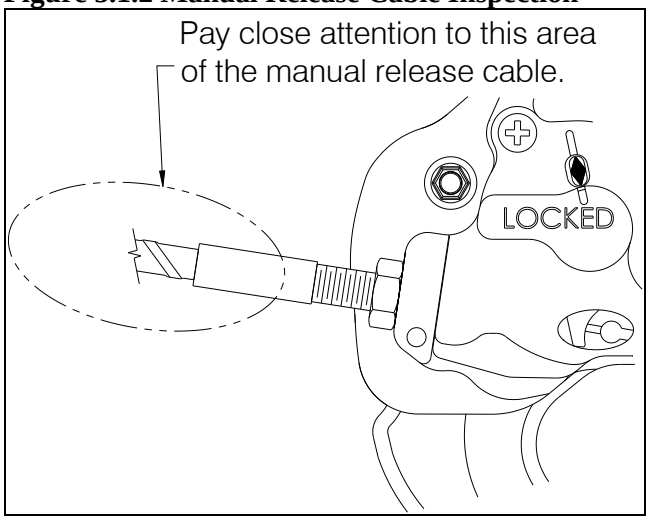


3. Swing the cargo hook and suspension assemblies through their full range of motion to ensure the electrical harnesses and manual release cable have enough slack. The harnesses and cable must not be the stops that prevent the cargo hook or suspension from swinging freely in all directions.

5.1 Annual/100 Hour Inspection continued

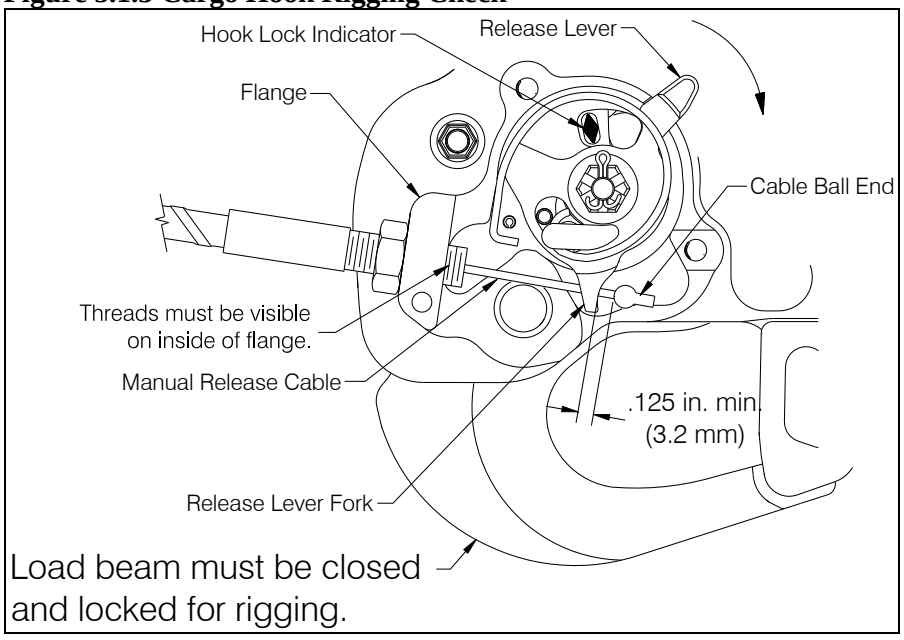
4. Visually inspect the manual release cable for damage and security, paying close attention to the area of transition from the steel fitting at the cargo hook to the flexible cable housing.

Figure 5.1.2 Manual Release Cable Inspection



5. Remove the manual release cover and check the manual release cable rigging per the following. Rotate the manual release lever clockwise to remove the free play (the free play is taken up when the hook lock indicator begins to move, this is also readily felt as the lever rotates relatively easily for several degrees as the free play is taken up) and hold it in this position while checking the gap between the release lever fork and the cable ball end as shown below. Check that there is a minimum gap of .125" (3.2 mm) as shown in Figure 5.1.3. Ensure that the manual release cable threads are visible inside the hook flange.

Figure 5.1.3 Cargo Hook Rigging Check



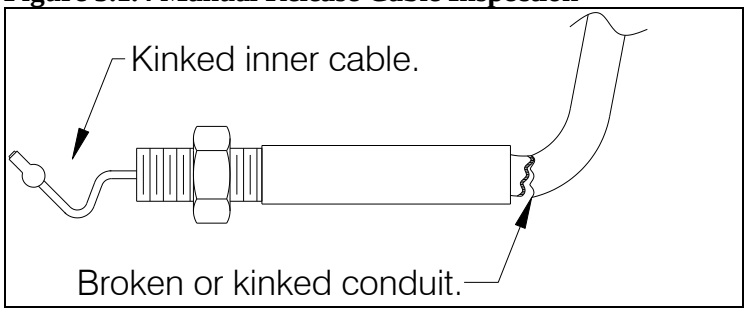
5.1 Annual/100 Hour Inspection continued

6. With the manual release cover removed from the cargo hook, 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 5.1.4), frays, or sticky operation are each cause for immediate replacement.

Figure 5.1.4 Manual Release Cable Inspection



7. Visually inspect for presence and security of fasteners and electrical connections.
8. Visually inspect the external electrical harnesses and their connections for damage and security.
9. Visually inspect the ground strap for damage and security of each end (at the cargo hook and the belly panel).
10. Visually inspect the suspension structural components and the exterior of the cargo hook for cracks and damage.
11. Visually inspect the pin load cell strain relief and harness for damage and security (if load weigh system is installed).
12. Visually inspect the cargo hook release switch(es) on the cyclic for security.
13. Visually inspect for security of the C-39 load weigh indicator (if the load weigh system option is installed).

5.2 5 Year/1000 Hour Inspection

Every 1000 hours of external load operations or 5 years, whichever comes first, remove the suspension assembly from the helicopter, and disassemble per the following instructions and inspect per Table 5.2.2. Refer to Figure 5.2.1 through 5.2.3 for part identification. Refer to section 5.3 for the overhaul schedule for the cargo hook.

1. Remove the cargo hook from the suspension assembly by removing the cotter pin, nut, and washers from the end of the attach bolt and then removing the attach bolt and the washer from under its head (see Figure 5.2.1). If the load weigh system is installed, the attach bolt and one washer are replaced by the pin load cell assembly (as shown in Figure 5.2.2).

Figure 5.2.1 Cargo Hook Attachment Hardware

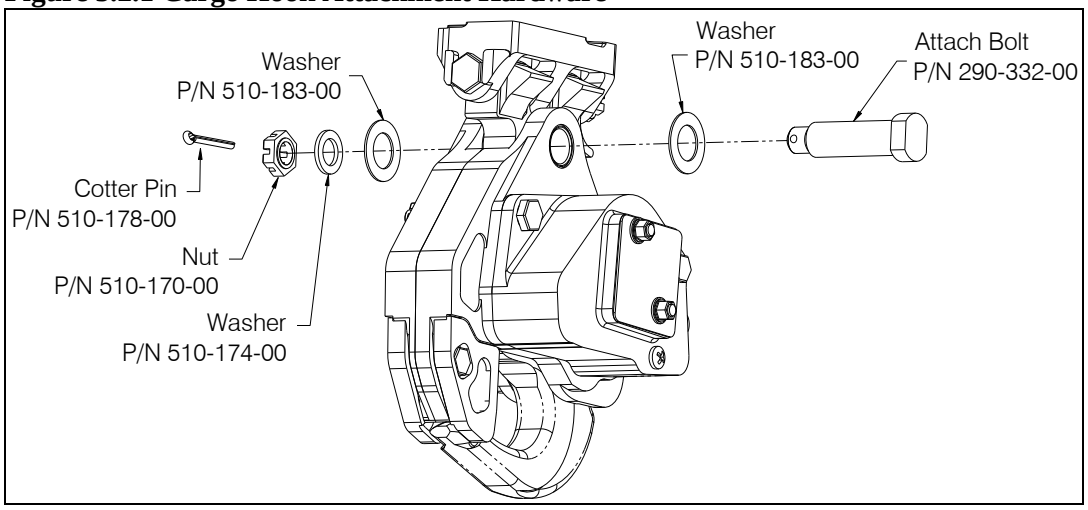
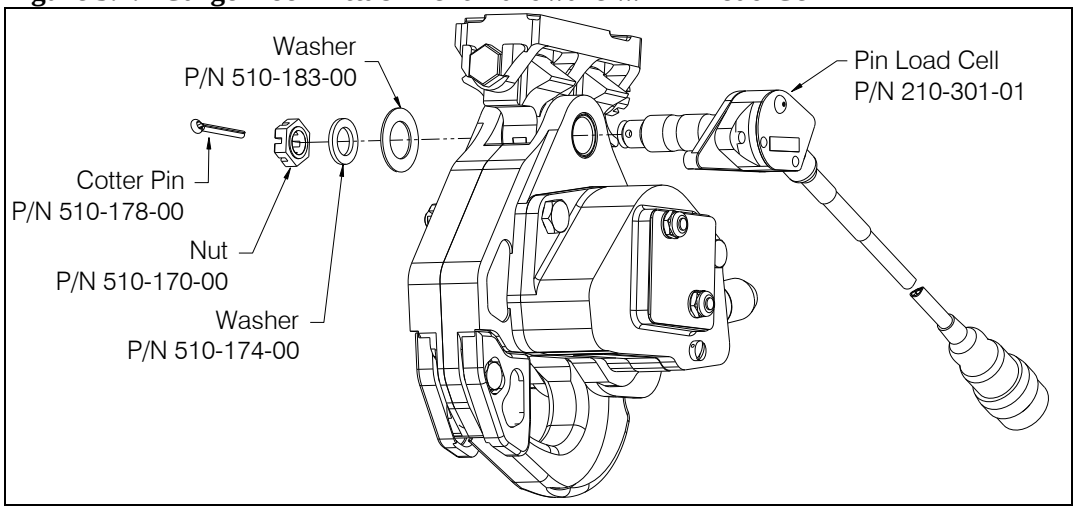


Figure 5.2.2 Cargo Hook Attachment Hardware w/ Pin Load Cell



5.2 5 Year/1000 Hour Inspection continued

Remove and disassemble the Suspension Assembly.

1. Remove cotter pin (item 11, Figure 5.2.3), nut (item 10), and washer (item 9) from bolt (item 8) and remove the bolt to separate the Gimbal Assembly (items 2, 3, 4, and 5) from the Pillow Block (item 1).
2. Cut safety wire securing the bolts (item 6) to the Pillow Block and remove the bolts and washers (item 7) thus removing the Pillow Block from the helicopter.

It is not necessary to remove the bushings from the Gimbal Assembly unless they need to be replaced (refer to Table 5.2.2).

Figure 5.2.3 Suspension Assembly Parts

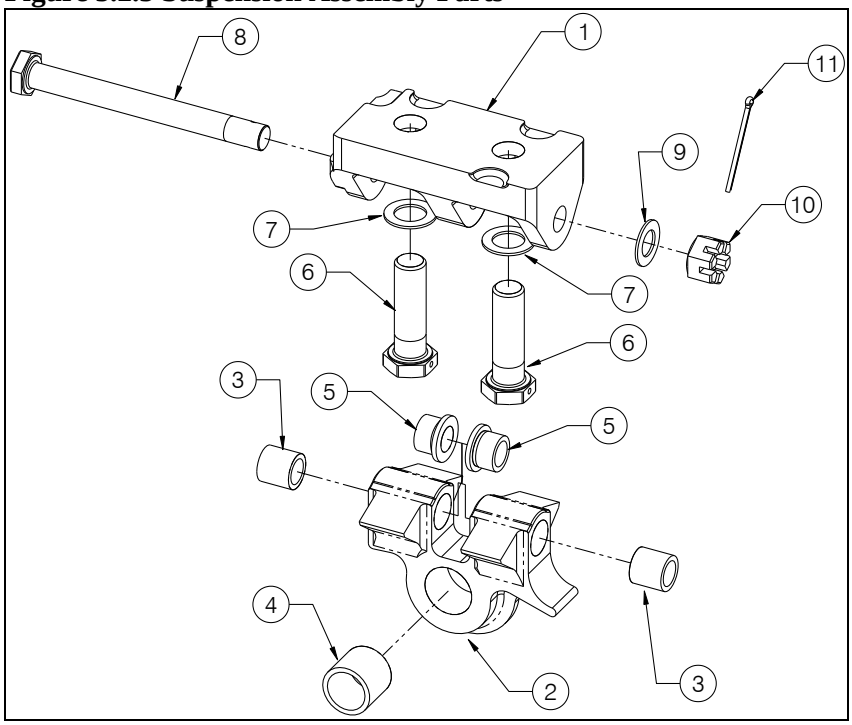


Table 5.2.1 Suspension Assembly Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	291-638-00	Pillow Block	1
2	291-639-00	Gimbal	1
3	291-640-00	Bushing	2
4	290-364-00	Bushing	1
5	291-749-00	Flange Bushing	2
6	291-669-00	Bolt	2
7	510-238-00	Washer	2
8	510-982-00	Bolt	1
9	510-239-00	Nut	1
10	510-719-00	Washer	1
11	510-081-00	Cotter Pin	1

5.2 5 Year/1000 Hour Inspection continued

Return the Pin Load Cell Assembly (P/N 210-301-01) 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 inspect and repair (as needed) the suspension system detail parts in accordance with the instructions in Table 5.2.2. Inspect the parts in a clean, well-lit room. Refer to Figures 5.2.1 through 5.2.3 and Table 5.2.1 for part identification.

Table 5.2.2 Suspension System Inspection

Component	Inspection Criteria and Limit	Repair	Finish
Attach Bolt P/N 290-332-00	Wear on outside diameter – 0.495 in. (12.57 mm)	None.	N/A
Pin Load Cell Assembly P/N 210-301-01	Wear on outside diameter – 0.495 in. (12.57 mm)	None.	N/A
Pillow Block P/N 291-638-00	Dents, nicks, cracks, gouges, scratches and corrosion – 0.010 in. (0.25 mm) deep.	Blend at 10:1 ratio, length to depth, to provide smooth transitions.	Passivate per AMS-QQ-P-35 or ASTM A967.
Gimbal P/N 291-639-00	Dents, nicks, cracks, gouges, scratches and corrosion – 0.010 in. (0.25 mm) deep.	Blend at 10:1 ratio, length to depth, to provide smooth transitions.	Passivate per AMS-QQ-P-35 or ASTM A967.
Bushing P/N 291-640-00	Wear on inside diameter – 0.331 in. (8.41 mm).	None.	N/A
Bushing P/N 290-364-00	Wear on inside diameter – 0.520 in. (13.21 mm).	None.	N/A
Flange Bushing P/N 291-749-00	Wear on inside diameter – 0.331 in. (8.41 mm).	None.	N/A
Bolt, nuts, washers, cotter pin, etc.	Wear, corrosion, or deterioration	None*.	N/A

*It is recommended to replace hardware at 5 year/1000 hour inspection interval.

5.3 Cargo Hook Overhaul Schedule

Time Between Overhaul (TBO) for the cargo hook: 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.*

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

Section 11
Placards and Markings
11.1 Placards

The P/N 200-380-00, 200-380-10, 200-381-00, 200-381-01, 200-381-10, 200-381-11, 200-382-00, 200-382-01, and 200-392-00 kits 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 215-281-00 CARGO RELEASE	Mounted adjacent to the cyclic release switch in clear view of the pilot. Mounted adjacent to the co-pilot cyclic release switch in clear view of the pilot (if optional co-pilot release switch is installed). Mounted adjacent to the mechanical release T-handle in clear view of the pilot.
P/N 215-281-00 PULL	Mounted adjacent to the mechanical release in clear view of the pilot.
P/N 215-281-00 CARGO HOOK	Mounted adjacent to the cargo hook circuit breaker in clear view of the pilot.
P/N 215-277-00 ⚠ WARNING EXTERNAL LOAD LIMIT 1015 LB (460 KG) 215-277-00	Mounted on the belly of the aircraft adjacent to the cargo hook attachment point in clear view of the ground support personnel.
P/N 215-272-00 ⚠ WARNING ◦ Route to avoid strain ◦ Rig with proper free play ◦ Replace as condition requires (See reverse) ◦ See manual for complete instructions One Side ⚠ WARNING Causes for replacement: ◦ Kinked inner cable ◦ Kinked or broken conduit Opposite Side	Located on the manual release cable, near the cargo hook.
REMOTE HOOK	Mounted adjacent to the remote hook release circuit breaker in clear view of the pilot (if remote hook release kit P/N 200-392-00 installed) and next to the relay for the remote hook (under the panel between the pilot and co-pilot seats).

11.1 Placards continued

Table 11.1 Cargo Hook Suspension System Placards, continued

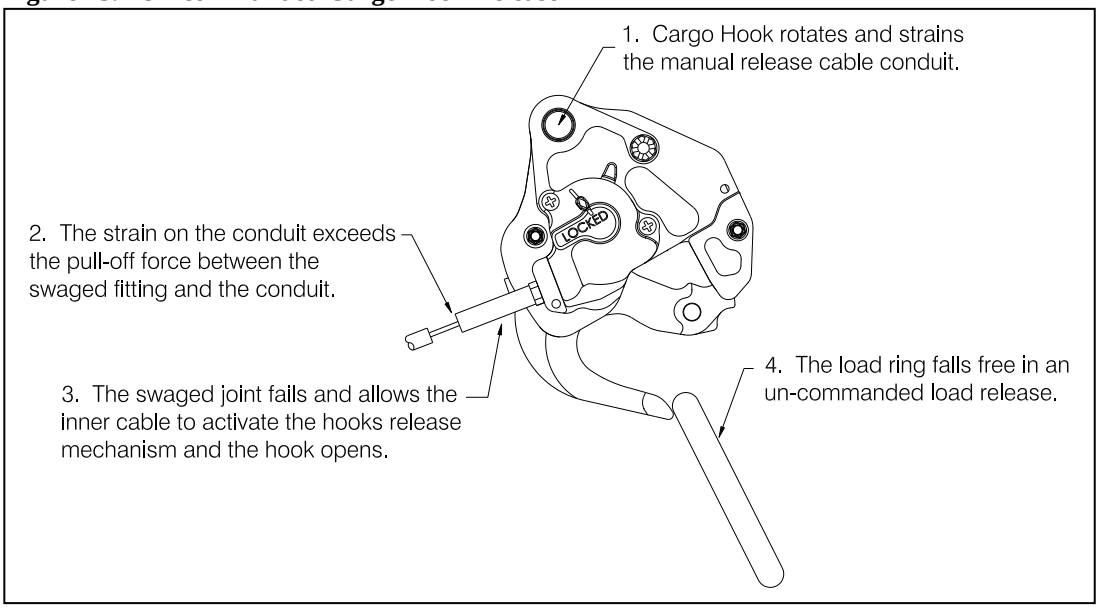
Placard part number and appearance	Location
	Mounted on the remote hook release switch housing in clear view of the pilot (if remote hook release kit P/N 200-392-00 installed).
P/N 215-281-00 FOR FAR PART 133.35(A) OPERATIONS: NO PERSON MAY BE CARRIED UNLESS HE IS: (1) A FLIGHT CREW MEMBER OR TRAINEE; (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 the load weigh system is installed, mounted adjacent to 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 a C-39 Indicator (included with kit P/Ns 200-381-00 and 200-381-10) is installed, mounted adjacent to the Onboard Systems load indicator in full view of the pilot and co-pilot. This placard is not applicable to the C-40 Indicator model
P/N 215-336-00 	Mounted on the bottom of solenoid housing of cargo hook P/N 528-029-02.
P/N 215-343-00 	Located adjacent to the cargo hook release switch on the cyclic (included with kit P/N 200-380-10 and 200-381-10 only).

Section 25
Equipment and Furnishings

WARNING

Un-commanded cargo hook release will happen if the manual release cable is improperly restrained. The cable 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's internal mechanism. The result is an un-commanded release. Ensure that no combination of suspension and Cargo Hook position is restrained by the manual release cable.

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 25.1.1 Cargo Hook Connector

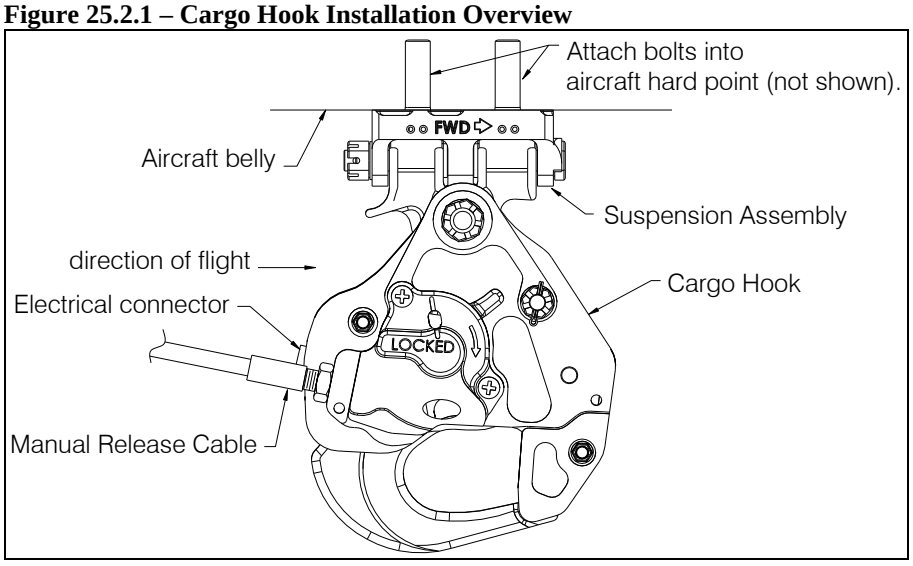
Pin	*Function*
A	Ground
B	Positive

25.2 Description

The Cargo Hook Suspension System kits are comprised of:

- The cargo hook, which is mounted to the belly of the helicopter through a pivoting structural linkage (referred to as a suspension assembly) utilizing an existing hard point (see overview below).

Figure 25.2.1 – Cargo Hook Installation Overview



- A load weigh system provides a reading of the weight of the load being lifted to the pilot (the load weigh system is included with kit P/Ns 200-381-00, 200-381-01, 200-381-10, 200-381-11). It includes a pin load cell at the cargo hook which also serves as the cargo hook attach bolt, a load indicator in the cockpit located adjacent to and to the right of the pilot's seat, and the interconnecting electrical wire harness.
- 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. The electrical release system is powered from the bus through a 10 amp circuit breaker to a mil-spec. relay in the center tunnel. The switch controls the relay and energizes a rotary solenoid in the Cargo Hook, opening the hook and releasing the cargo. A schematic for the electrical system is shown in Figure 25.15.1.

  Kit P/Ns 200-380-10 and 200-381-10 include Cargo Hook P/N 528-029-02 with Surefire release as part of the electrical release system. Surefire release is a safety enhancement which requires the release switch to be held for approximately ½ second. This protects against inadvertent load release due to accidental contact with the release switch or mistaken actuation of the release switch when another is intended.
- A manual release cable system, which provides a means of releasing a cargo hook load in the event of an electrical release system failure. A T-handle mounted between the pilot and co-pilot seats provides the means for actuation.
- Ground personnel may also release a load by the actuation of a lever located on the side of the cargo hook.

25.2 Description continued

In addition to the cargo hook suspension system kits, two optional kits are available:

1) A remote hook electrical release kit (P/N 200-392-00). This kit provides the fixed electrical provisions for the operation of a remote cargo hook at the end of a long line. The kit includes a cyclic mounted electrical release switch, circuit breaker, relay, an internal wire harness, and a short external harness terminated with a connector which is located next to the belly mounted cargo hook for connection of an electrical cord from a remote cargo hook (the cord and remote cargo hook are not included and are not certified equipment). See Figure 25.15.2 for the electrical schematic for the remote hook electrical release system.

2) A co-pilot electrical release switch kit (P/N 200-417-00). This kit provides for a second primary cargo hook release switch located on the co-pilots side of the cyclic.

25.5 Component Weights

The weight and cg of the systems are listed in Table 25.5.1.

Table 25.5.1 System Weights and CGs

Item	Weight lbs (kgs)	STA in (mm)	BL in (mm)
P/N 200-380 series Cargo Hook Suspension System	6.2 (2.8)	95.0 (2413)	-4.0 (-102)
P/N 200-381 series Cargo Hook Suspension System with Load Weigh	7.6 (3.5)	87.0 (2210)	-4.0 (-102)
P/N 200-392-00 Remote Hook Electrical Release Kit	1.2 (.54)	77.3 (1964)	-1.0 (-25.4)
P/N 200-417-00 Co-pilot Release Switch Kit	.15 (.07)	32.0 (813)	-8.0 (203)

25.12 Storage Instructions

Refer to the Component Maintenance Manual (CMM) 122-017-00 for storage instructions for the cargo hook.

Clean the exterior suspension components thoroughly of excess dirt and grease with a rag before packaging. Store the components in a heat-sealable package with a desiccant and label with the date of storage. Refer to MIL-PRF-23199 and MIL-STD-2073-1 for additional guidance.

25.15 Troubleshooting

Table 25.15.1 Troubleshooting

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Cargo hook does not operate electrically or manually.	Defective internal mechanism or corroded and seized mechanism pivot bushings/bearings.	Remove and replace cargo hook (see sections 25.16 and 25.17) or repair per Cargo Hook Component Maintenance Manual (CMM) no. 122-017-00.
Cargo hook does not operate electrically, manual cable release operates normally.	Open electrical circuit, faulty wiring, circuit breaker, switch or solenoid. Connector Panel Assembly is not grounded to airframe.	Using multi-meter, check the resistance 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. Check resistance between pin A of the hook connector of the external electrical harness and airframe ground.
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. 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. 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. 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. 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 the CMM.
Cargo hook operates electrically, but not manually.	Kinks in manual release cable or broken conduit.	Inspect manual release cable and cable connection to Cargo Hook. Remove manual release cover on cargo hook and inspect inner cable connection to cargo hook. Remove and replace cargo hook or manual release cable (see Sections 25.16 and 25.17) or repair Cargo Hook per its CMM.
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 Cargo Hook per its CMM.
Force required to release hook with T-handle in the cockpit 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.

25.15 Troubleshooting continued

Table 25.15.2 Troubleshooting continued

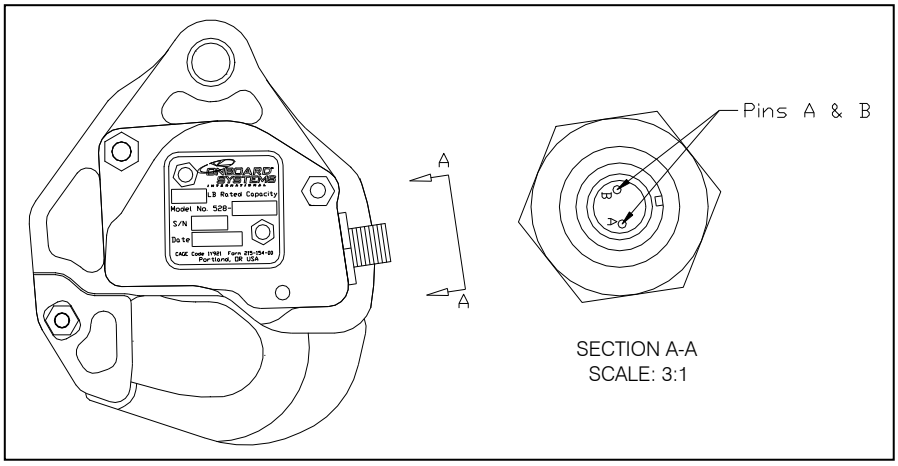
MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
With release cable disconnected at hook, the force required to move T-handle in the cockpit exceeds 8 lbs.	Kinks or wear in cable, frozen water in cable, debris or damage to cable quick disconnect fitting or lever mechanism on cyclic	Inspect individual components to isolate problem. Remove and replace defective parts (see Sections 25.16 and 25.17 for removal 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).
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.

Table 25.15.2 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



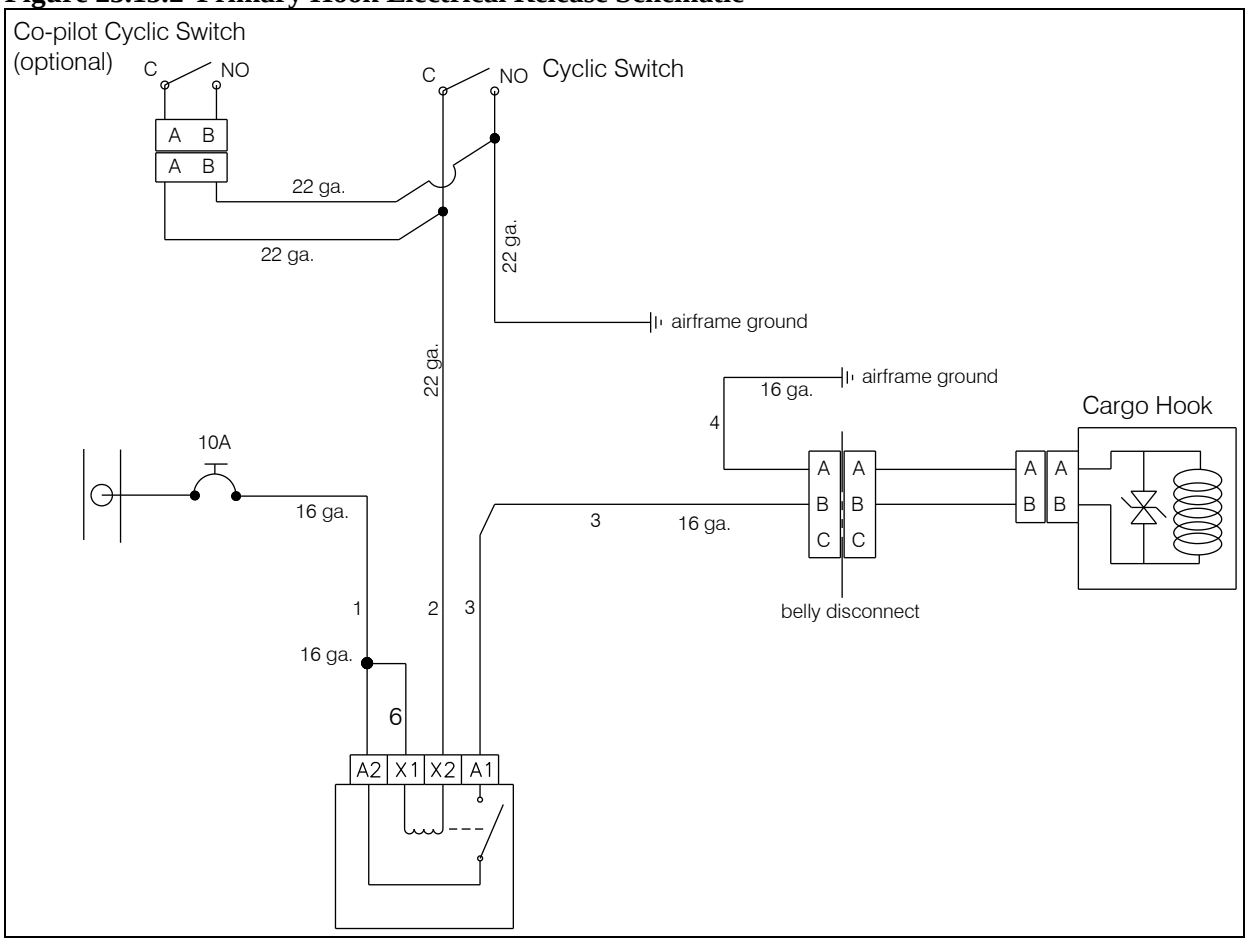
25.15 Trouble Shooting continued

Table 25.15.2 Notes continued:

2. Electrical Wiring

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

Figure 25.15.2 Primary Hook Electrical Release Schematic



25.15 Trouble Shooting continued

Figure 25.15.3 Remote Electrical Release Schematic

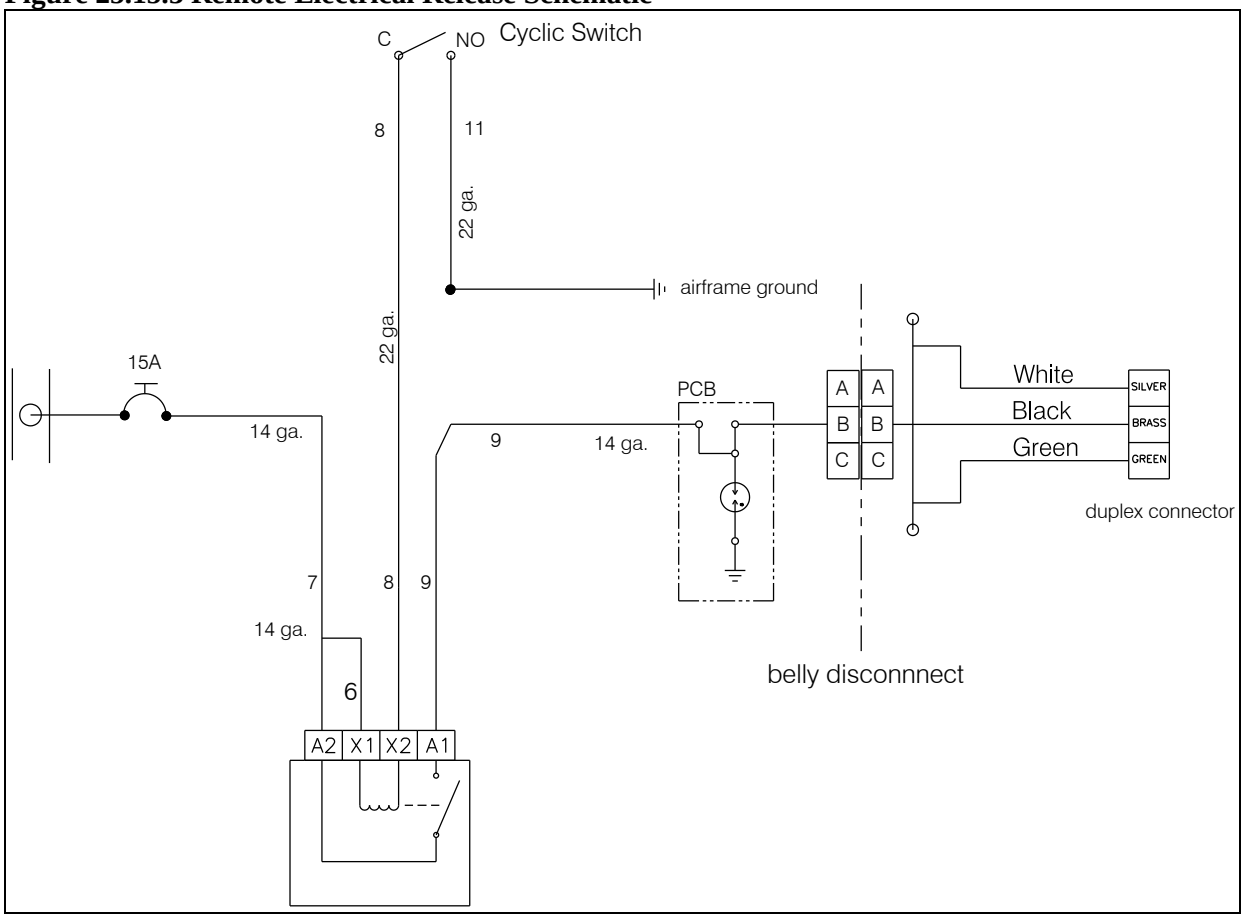
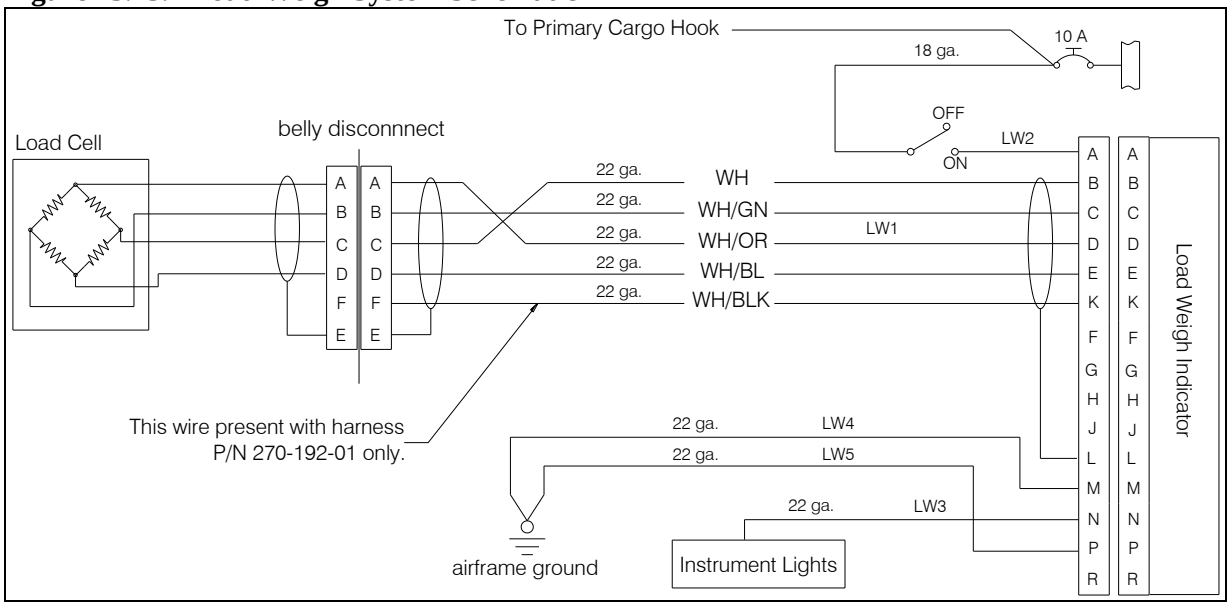


Figure 25.15.4 Load Weigh System Schematic



25.16 Component Removal

Cargo Hook and Pin Load Cell Assembly Removal

1. Disconnect the electrical connector from the cargo hook.
2. Remove the ground strap from the cargo hook by removing its mounting screw.
3. Remove the cotter pin P/N 510-178-00 from the Attach Bolt P/N 290-332-00 or Pin Load Cell Assembly P/N 210-301-01 if a kit P/N 200-381 series is installed.
4. Remove the castellated nut P/N 510-170-00 from the Attach Bolt.
5. Remove attach bolt (or Pin Load Cell Assembly) and all washers.
6. Remove manual release cover by removing two screws.
7. Remove the manual release cable from the cargo hook by loosening the jam nut and rotating the cargo hook about the manual release cable.

Suspension Removal

To remove the Suspension Assembly:

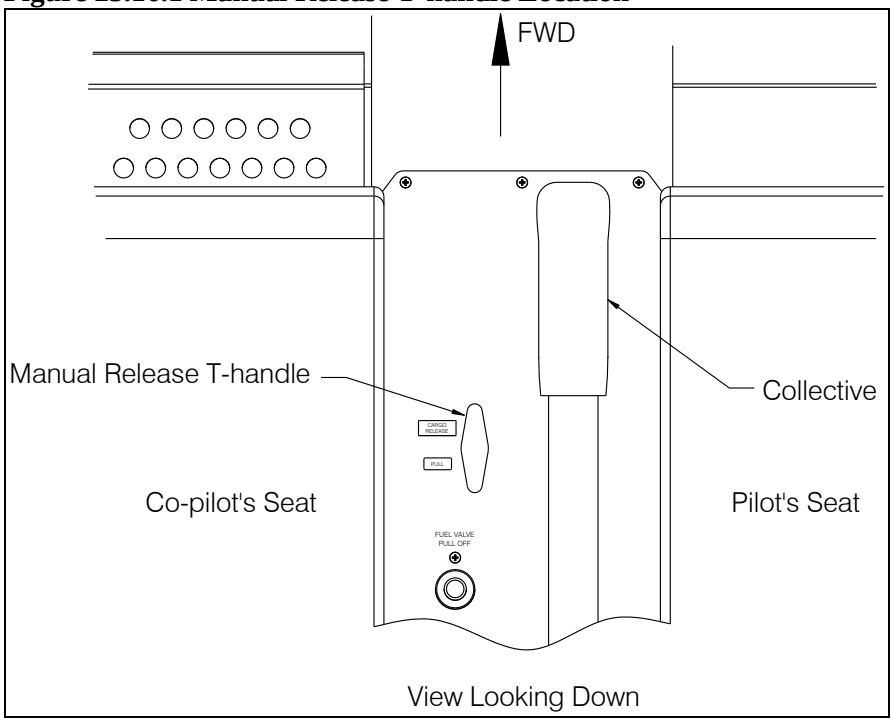
1. In order to access the bolts into the airframe hard point, separate the Gimbal Assembly from the Pillow Block by removing the cotter pin and nut from the pivot bolt and removing the pivot bolt.
2. Cut the safety wire between the bolts and the adjacent pairs of holes in the Pillow Block and remove the bolts.

25.16 Component Removal continued

Manual Release Cable Removal

1. Remove the two inspection panels from the belly of the helicopter.
2. In the cockpit unthread the T-handle and nut from the end of the release cable located in the center console to the left of the collective (ref. Figure 25.16.1).
3. From underneath the helicopter pull the manual release cable threaded end down through the hole in the center console panel and remove the ring terminal of the ground strap from over its threaded end.
4. Remove the hardware securing the three cushioned loop clamps to the keel panel along the length of the manual release cable.
5. External to the helicopter, remove the two loop clamps around the manual release cable at the angle bracket on the connector belly panel and unwrap the spiral wrap around the release cable and harnesses.
6. At the cargo hook, remove the screws that secure the manual release cover to the hook and unhook the cable ball end from the fork fitting.
7. At the cargo hook, loosen the jam nut, and unthread the manual release cable assembly or separate the cargo hook from the suspension assembly and rotate it about the manual release cable.

Figure 25.16.1 Manual Release T-handle Location



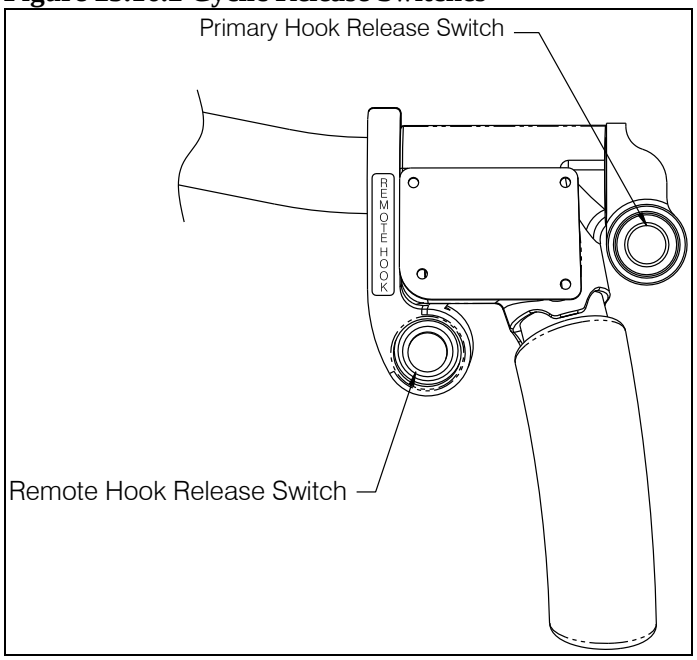
25.16 Component Removal continued

Primary Hook Release Switch Removal

The primary electrical release switch is located on the pilot's cyclic grip assembly along with the optional remote hook release switch.

1. Disconnect the battery.
2. Remove the screw that secures the Switch Housing Assembly to the cyclic grip and pull the switch housing out of the cyclic far enough to access the solder joint on the wires.
3. Remove the heat shrink over the solder joints and de-solder the joints.
4. Unthread the release switch (P/N 400-059-00) from the housing and pull the wires through.

Figure 25.16.2 Cyclic Release Switches



Remote Hook Release Switch Removal

The remote hook electrical release switch is located on the cyclic grip assembly (see Figure 25.16.2) if optional kit P/N 200-392-00 is installed.

1. Disconnect the battery.
2. Remove the screws that secure the Remote Hook Switch Housing Assembly (P/N 232-513-00) to the cyclic grip.
3. Remove the four screws that secure the face plate (Robinson P/N C214-10) to the cyclic housing to access the wiring for the remote release switch.
4. Remove the heat shrink over the solder joints and de-solder the joints.
5. Remove sealant and unthread the release switch (P/N 400-071-00) from the housing and pull the wires through.

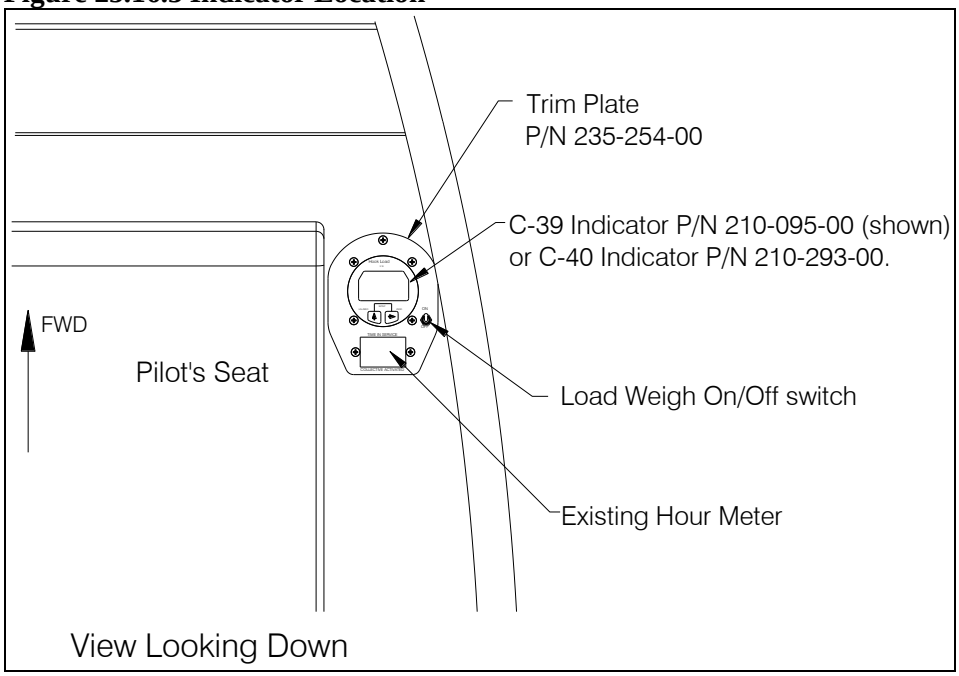
25.16 Component Removal continued

Load Weigh Indicator Removal

The load weigh Indicator (C-39 or C-40 model) is located between the pilot's seat and the door, just forward of the hour meter (see figure below).

1. Disconnect the battery.
2. Remove the nut and washer from the on/off switch.
3. Hinge up the pilot's seat bottom to gain access to the back of the load weigh indicator and disconnect the electrical connector.
4. Remove the four mounting screws from the top of the load weigh indicator and pull the load weigh indicator out from under the seat.

Figure 25.16.3 Indicator Location



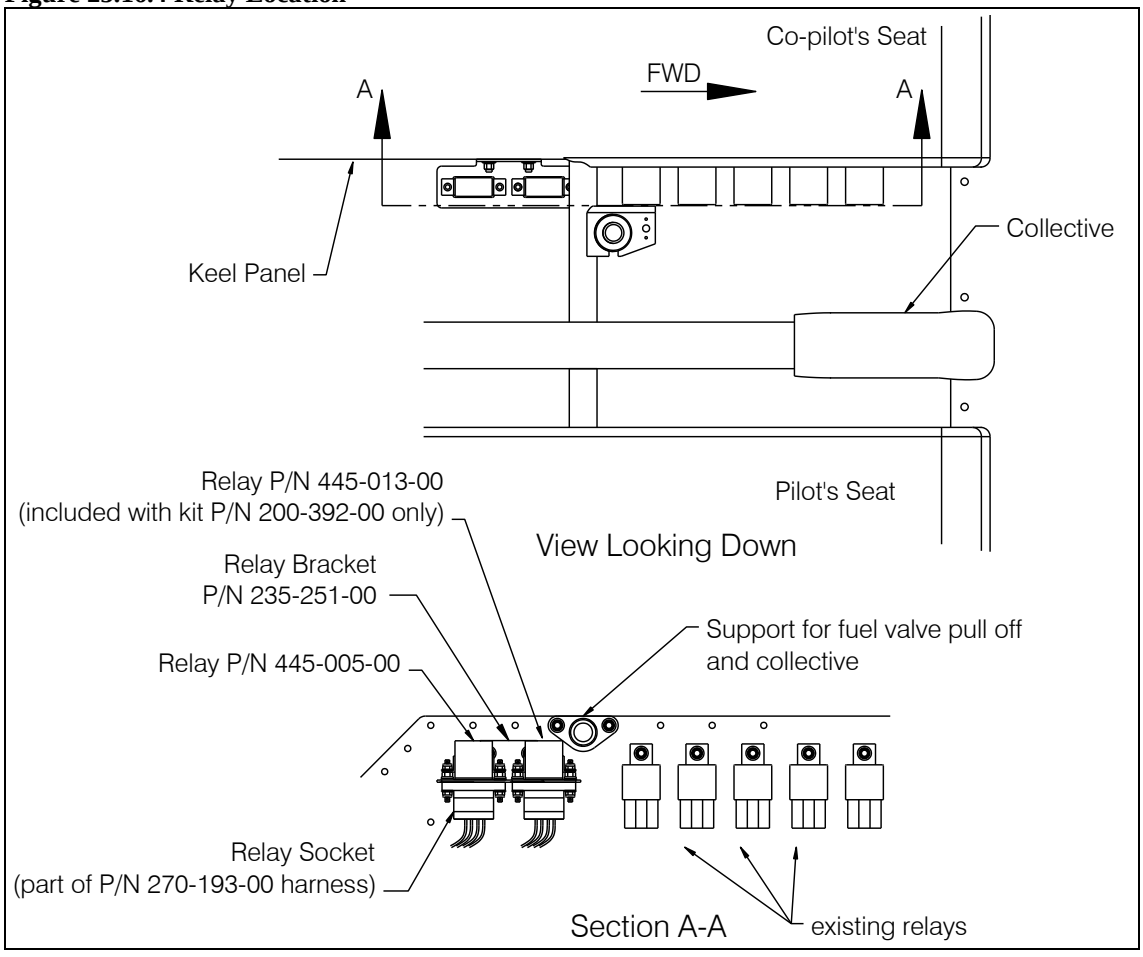
25.16 Component Removal continued

Relay Removal

The primary hook relay (P/N 445-005-00) and the remote hook relay (P/N 445-013-00) are located on the Relay Bracket (P/N 235-251-00) located on the left keel panel between the pilot and co-pilot seats and just aft of the support weldment for the fuel valve pull off and collective.

1. Remove the T-handle from the manual release cable by unthreading it.
2. Remove the hardware securing the center console Cover Assembly to the seat bases and lift the center console panel enough to access the relay. It is not necessary to remove the Cover Assembly from around the collective hinge attachment.
3. Remove the hardware securing the relay to the relay socket of the electrical release harness and "unplug" the relay.

Figure 25.16.4 Relay Location



25.17 Component Re-installation

Suspension Re-installation

The pillow block is secured to the helicopter's existing hard point block (Robinson P/N G134-1). Ensure the area of the Doubler below the block that mates with the Pillow Block has no primer or paint present, for grounding purposes.

1. Orient the Pillow Block (P/N 291-638-00) as shown in Figure 25.17.1 and secure it to the helicopter with the two P/N 291-669-00 bolts.

NOTICE

The Pillow Block has an engraved FWD indication on one side, install accordingly.

2. Torque bolts to 26 ft-lbs.
3. Safety-wire each bolt through the adjacent pair of holes in the pillow block.
4. Grease the pivot bolt (P/N 510-982-00) with Mobilgrease 28 or equivalent before assembly.
5. Hold the Gimbal Assembly in the orientation shown in Figure 25.17.2, position it within the slots of the Pillow Block, and slide the bolt through the Gimbal Assembly and pillow block.

25.17 Component Re-installation continued

Suspension Re-installation continued

Figure 25.17.1 Pillow Block Installation

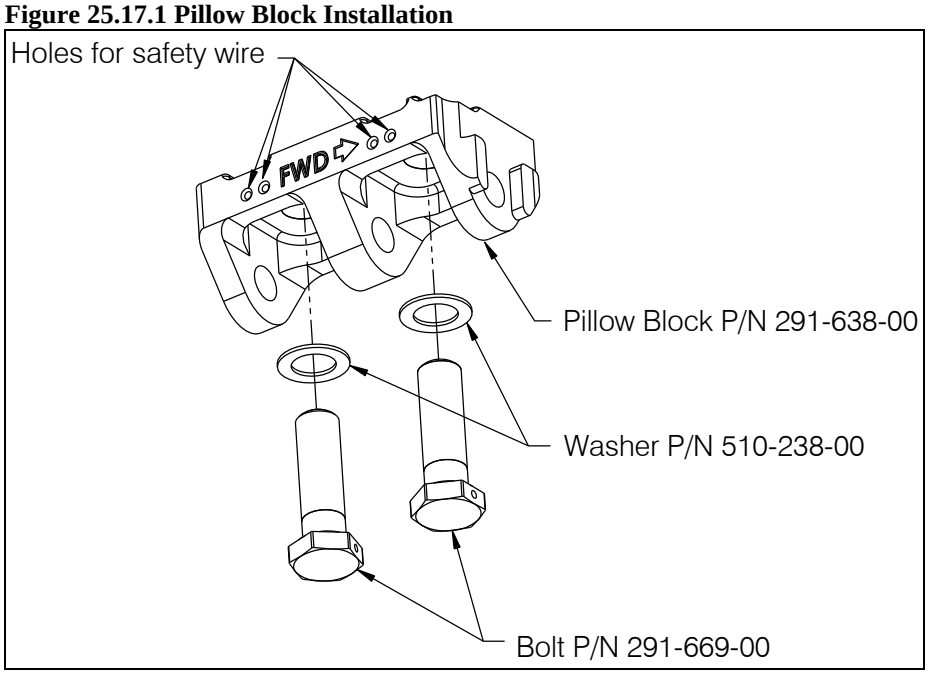
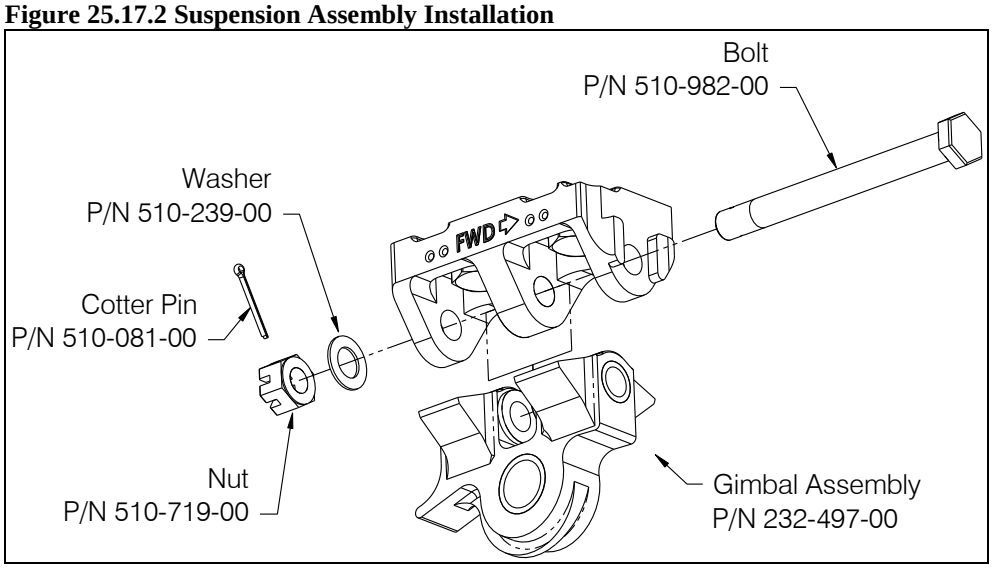


Figure 25.17.2 Suspension Assembly Installation



25.17 Component Re-installation continued

Cargo Hook Re-installation

1. Attach the Cargo Hook to the suspension system by installing the Attach Bolt P/N 290-332-00 and washer P/N 510-183-00 as illustrated in Figure 25.17.3. If in possession of kit P/N 200-381 series (with load weigh system), the Pin Load Cell Assembly is installed rather than the Attach Bolt and washer as shown in Figure 25.17.4.
2. Install washers and nut over bolt (or pin 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. Over-tightening will damage load cell.

Figure 25.17.3 Cargo Hook Attachment Hardware

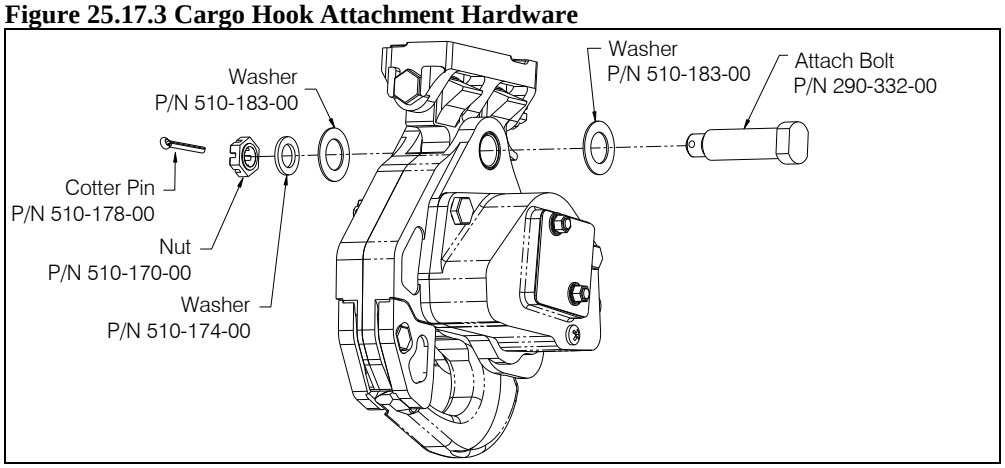
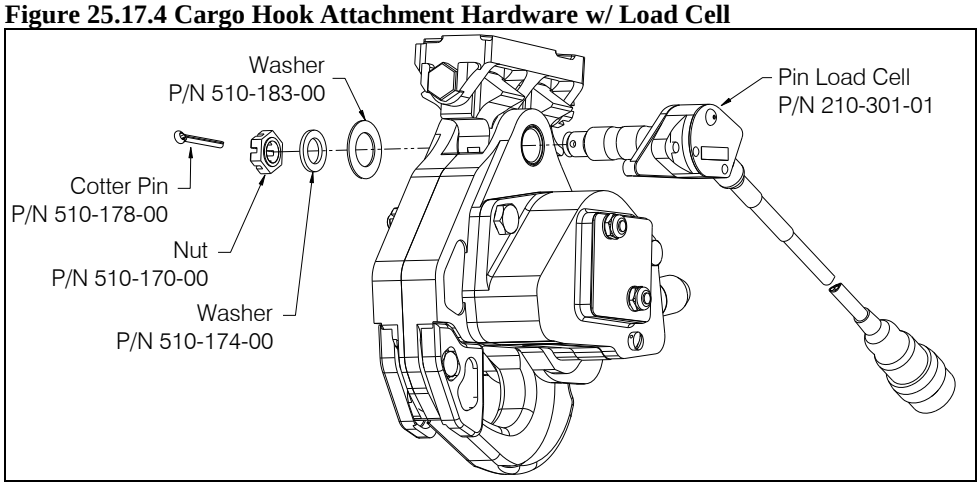


Figure 25.17.4 Cargo Hook Attachment Hardware w/ Load Cell

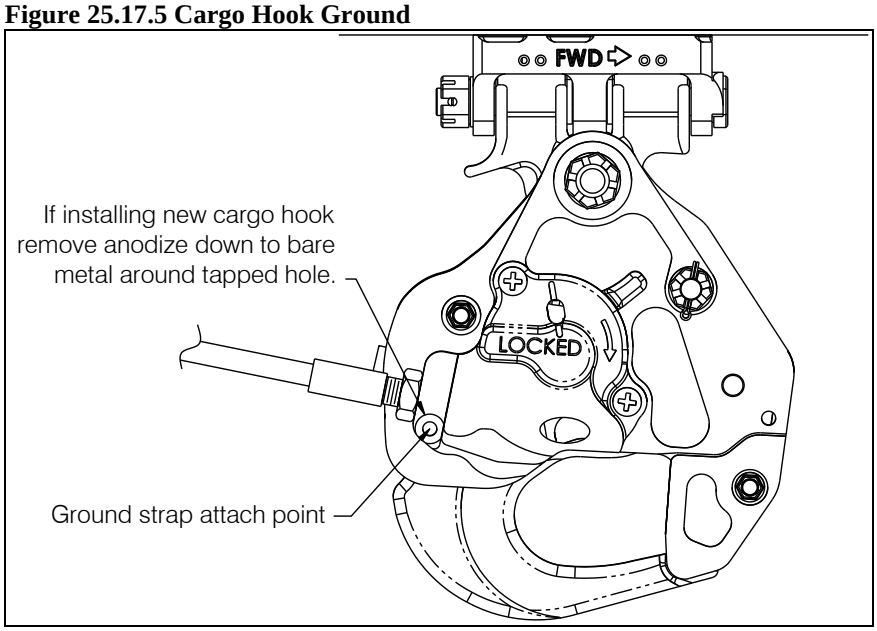


25.17 Component Re-installation continued

Cargo Hook Re-installation continued

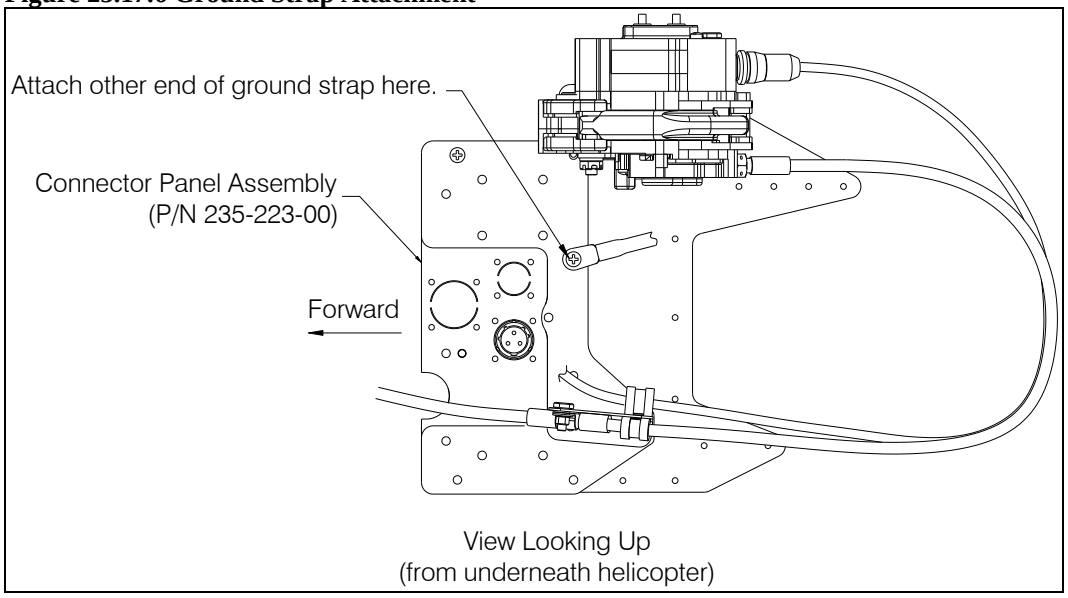
4. Ensure the anodize finish is removed around the tapped hole on the side plate and attach the ground strap (P/N 270-211-00) with screw (P/N 510-391-00). If a new cargo hook is being installed, lightly remove the anodize layer around the hole.

Figure 25.17.5 Cargo Hook Ground



5. Attach the other end of the ground strap to the connector panel assembly on the belly of the aircraft.

Figure 25.17.6 Ground Strap Attachment

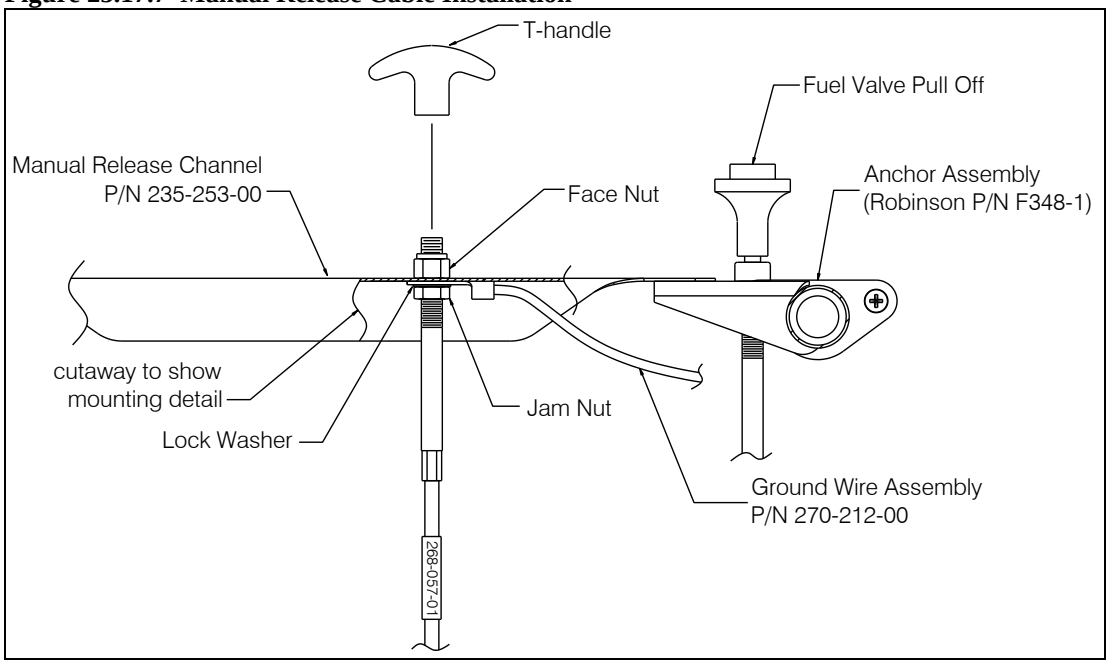


25.17 Component Re-installation continued

Manual Release Cable Re-installation

1. Remove the T-handle and face nut from the end of the manual release cable.
2. Insert it up through manual release channel between the pilot and co-pilot seats while placing the ring terminal of the ground wire assembly (P/N 270-212-00) over its threads before inserting it through its mounting hole in the manual release channel.
3. Thread the face nut over the protruding threads to set the height, tighten the jam nut from underneath to secure it, and then thread on the T-handle.

Figure 25.17.7 Manual Release Cable Installation

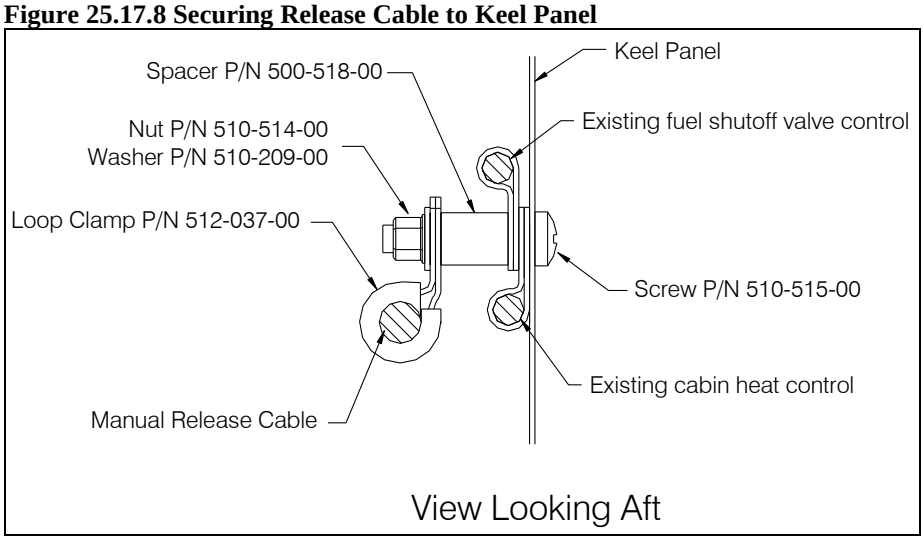


25.17 Component Re-installation continued

Manual Release Cable Re-installation continued

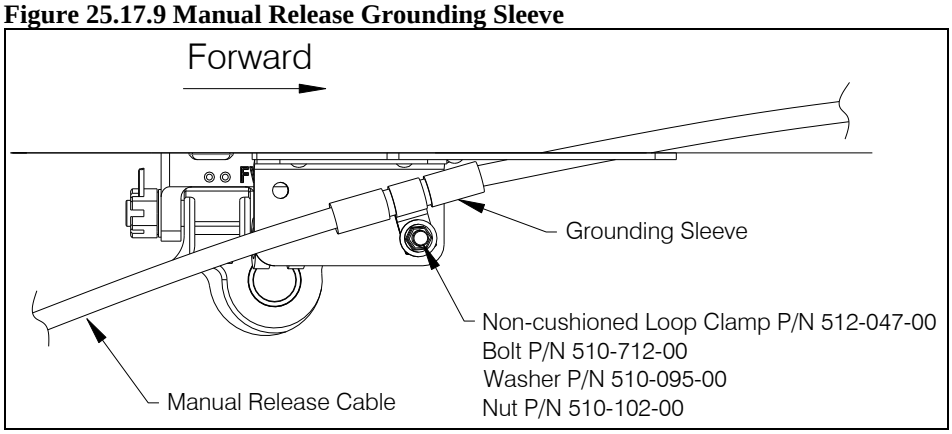
4. Route the manual release cable aft through the tunnel and secure it with cushioned loop clamps at points above the forward inspection panel where the fuel shutoff valve and cabin heat control are simultaneously secured (see Figure 25.17.6)

Figure 25.17.8 Securing Release Cable to Keel Panel



5. Route it external to the aircraft at the connector panel assembly in the aft end of the aft inspection opening in the belly and secure it to the L bracket on the connector panel assembly with the non-cushioned loop clamp at the forward hole which provides the ground for the manual release cable grounding sleeve.

Figure 25.17.9 Manual Release Grounding Sleeve



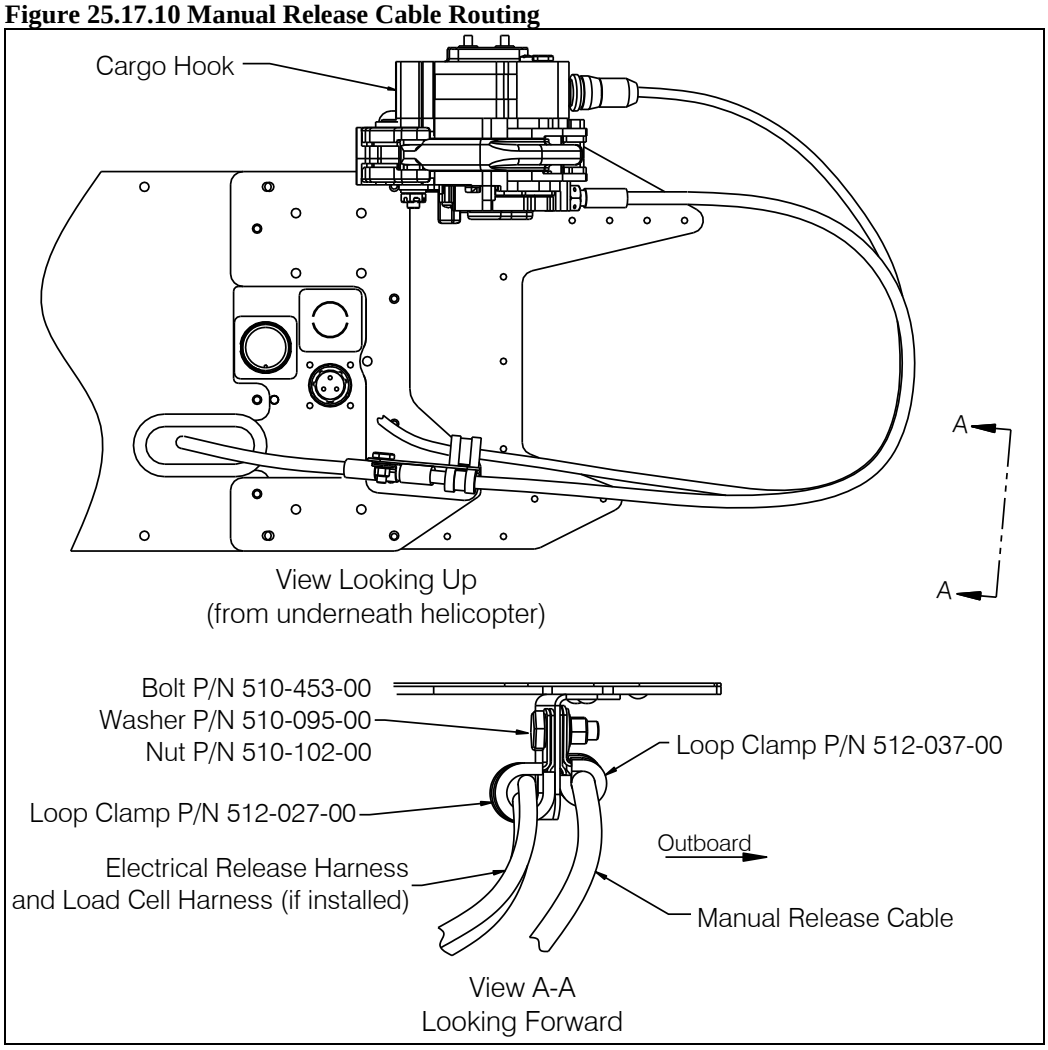
6. Screw the end fitting of the manual release cable into the cargo hook by holding the cable and turning the cargo hook.

25.17 Component Re-installation continued

Manual Release Cable Re-installation continued

7. Temporarily install the cargo hook onto the suspension and route the manual release cable in a loop as shown and secure to aft hole of L bracket on the Connector Panel Assembly with the cushioned loop clamp and hardware as shown (secure at the same time as the cushioned loop clamp for the electrical harnesses).

Figure 25.17.10 Manual Release Cable Routing



25.17 Component Re-installation continued

Manual Release Cable Re-installation continued

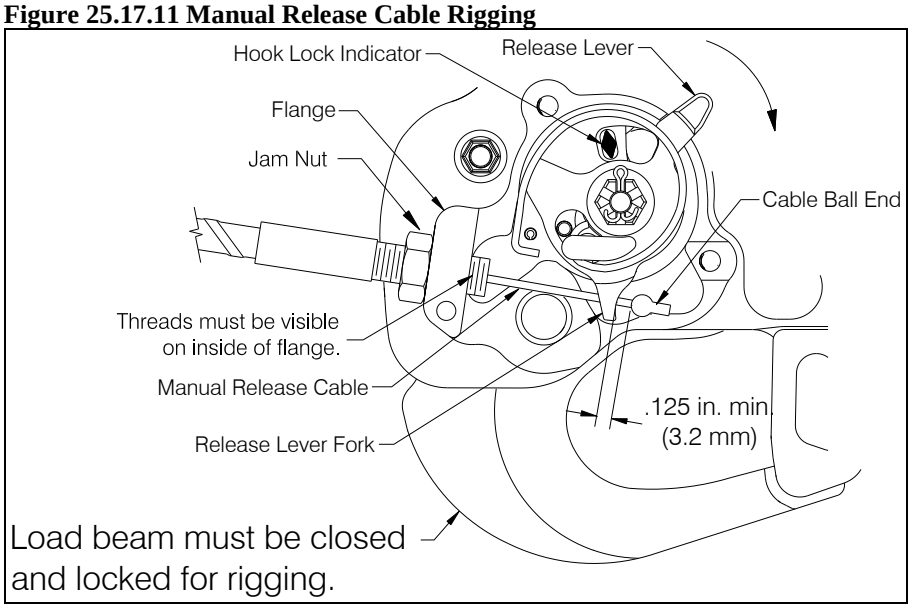
8. Rotate the release lever in the clockwise direction to remove free play and hold (the free play is removed when the hook lock indicator begins to move). This is also readily felt as the lever rotates relatively easily for several degrees as the free play is removed.
9. Measure the gap between the release lever fork and the cable ball end with the T-handle in the cockpit in the non-release position. The gap should measure a minimum of .125" (see below).

⚠ CAUTION

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

10. If the gap does not measure at least .125", make adjustments at the cargo hook by removing the cargo hook from the suspension and rotating the cargo hook in the required direction.
11. When correct setting is achieved, tighten the jam nut securely against the cargo hook and re-install the manual release cover.

Figure 25.17.11 Manual Release Cable Rigging



25.17 Component Re-installation continued

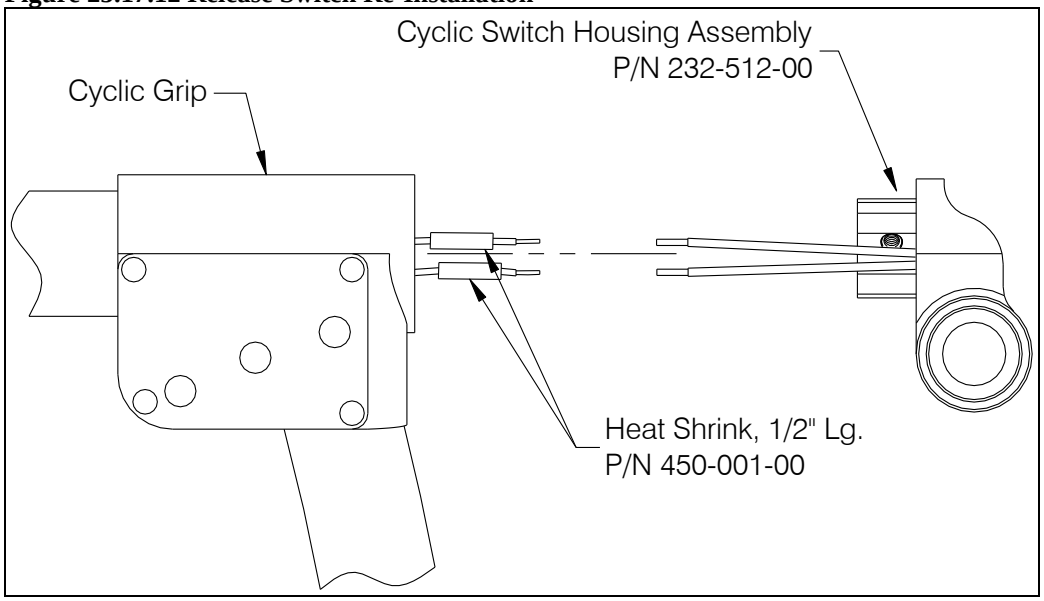
Relay Re-installation

1. Plug relay into relay socket mounted to the relay bracket on the left keel panel between the pilot and co-pilot seats (reference Figure 25.16.3).
2. Secure relay with the two washers and lock nuts removed previously.

Release Switch Re-installation

1. Solder two 5" lengths of 22 ga. M22759/34 wire onto the switch terminals and cover terminals with heat shrink
2. Feed the wires through the switch housing and thread the switch into the housing.
3. Slide 1/2" long piece of heat shrink over each wire and solder wires from the cyclic onto the switch wires. Position heat shrink over solder joints and shrink in place with heat gun.

Figure 25.17.12 Release Switch Re-Installation



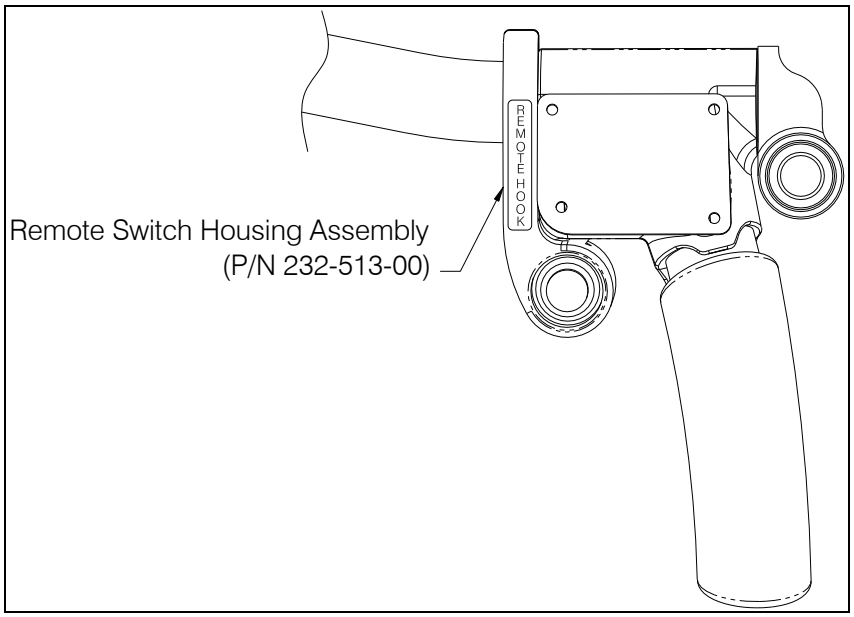
4. Insert switch housing into end of cyclic.
5. Secure switch housing into cyclic with screw removed previously.

25.17 Component Re-installation continued

Remote Hook Release Switch Re-installation

1. The remote hook release switch (included with the optional kit 200-392-00) is located on the pilot's cyclic, to the left of the control grip (ref Figure 25.17.13).
2. Solder two 5" long 22 ga. M22759/34 wires to the terminals on the back of the switch, slide 1" long pieces of 1/8" heat shrink over each wire and shrink in place.
3. Thread the release switch into the housing and feed the wires through the slot in the housing at the backside of the switch. Secure the wires in center of the slot by filling the slot with RTV silicone.
4. Clamp the release switch housing assembly onto the cyclic with the two screws (P/N 511-011-00) and torque to 12-15 in-lbs.
5. Remove the cyclic control grip cover to access the wiring.
6. Feed the wiring from the switch through the hole in the cyclic housing, slide a piece of 1/8" heat shrink over each wire and solder to the wires from the internal harness. Slide heat shrink over solder joints and shrink into place.
7. Re-install cyclic cover (refer to Robinson Helicopter documentation).

Figure 25.17.13 Remote Hook Release Switch Re-installation



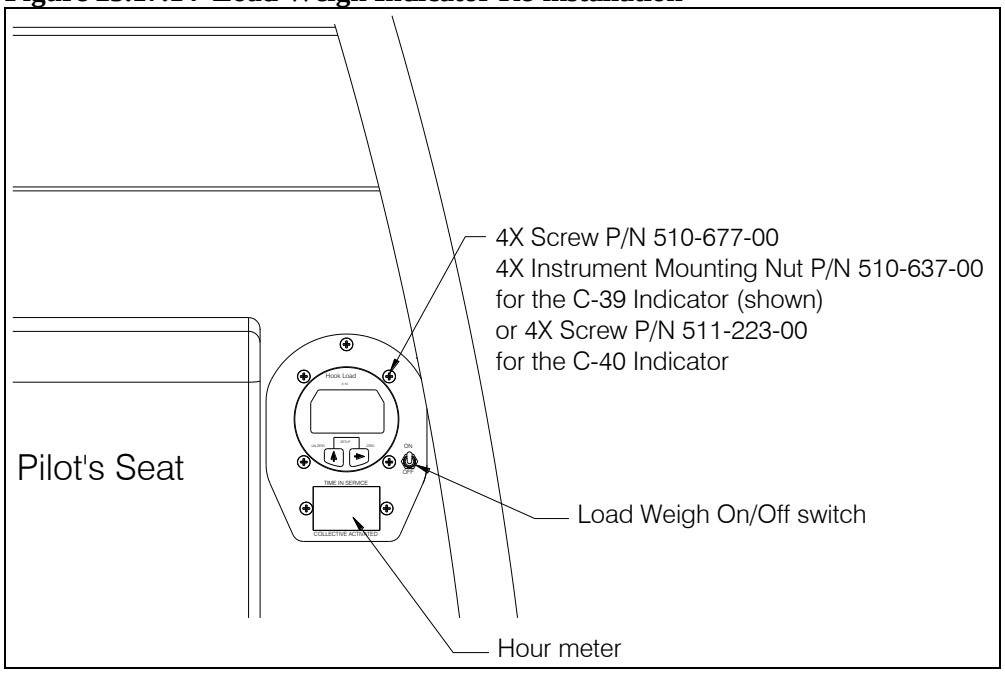
25.17 Component Re-installation continued

Load Weigh Indicator Re-installation

The load weigh indicator is installed between the pilot's seat and the door.

1. Hinge the pilot's seat forward to access the area underneath.
2. For the C-39 Indicator (P/N 210-095-00) ensure the instrument mounting nuts (P/N 510-637-00) are in place on the indicator and insert the indicator up into position from under the seat.
3. Position the Trim Plate (P/N 235-254-00) over the indicator from above, align the holes and secure the C-39 indicator with four screws (P/N 510-677-00). The C-40 Indicator has integrated thread inserts, use four P/N 511-223-00 screws to secure it.
4. Connect the electrical harness connector to the back of it and insert the switch (wired to the connector) up through the hole to the right of the indicator and secure it with its washer and nut.

Figure 25.17.14 Load Weigh Indicator Re-installation



25.18 General Procedural Instructions-Testing

After re-installation of the cargo hook, manual release cable, or an electrical 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 5.1.1).

2. Pull up on the manual release cable's T-handle in the cockpit 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 cargo 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 harnesses have enough slack to allow full swing of the suspension assembly without straining or damaging them. The manual release cable and electrical harnesses must not be the stops that prevent the Cargo Hook from swinging freely in all directions.