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Instructions for Continued Airworthiness

Talon LC Hydraulic Cargo Hook Suspension Kit
For the
Airbus Helicopters EC120B
Helicopter

Part Number 200-308-00

STC SR01795SE

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Record of Revisions

Rev.	*Date*	*Page(s)*	*Reason for Revision*
0	02/06/07	All	First Issue
1	10/29/08	05-00-00 Page 5 25-00-00 Page 9 25-00-00 Page 16	Changed bumper P/N 290-839-00 to 290-839-01.
2	03/18/10	05-00-00 Page 10	Changed overhaul frequency criteria.
3	06/06/13	Section 0 Page 2 Section 5 Section 12 Pages 6 & 7 Section 25 Pages 9, 16, 17, 19 & 22	Added bumper P/N 290-839-02. Updated precautions to current format. Updated definition of external load operations. Removed daily check and expanded 100 hour inspection to include functional check.
4	08/26/16	Section 4 Section 5 Pages 1, 4, 9 Section 12 page 4 Section 25 pages 2 – 4, 22	Added references to CMM 122-015-00, clarified 1000 hour/5 year inspection requirement for suspension assembly and hard point fittings, updated slave cylinder assembly to reflect change from cup seal to quad ring.
5	10/05/17	Section 5 page 9, Section 12 pages 1 and 5	Removed attach bolt P/N 290-775-00 from NDT list. Added MIL-PRF-87257 hydraulic fluid.
6	03/06/18	Section 5 Page 9	Removed magnetic particle inspection requirement for load cell assembly, inserted instructions to return load cell to factory for inspection/calibration.

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Section 0
Introduction

0.4 Scope

The following information is necessary to carry out the service, maintenance, and inspection of the Cargo Hook Suspension Kit P/N 200-308-00.

0.5 Purpose

The purpose of this Instructions for Continued Airworthiness (ICA) manual is to provide the information necessary to inspect, service, and maintain in an airworthy condition the P/N 200-308-00 Cargo Hook Suspension Kit.

0.6 Arrangement

This manual contains instructions for the service, maintenance, inspection and operation of the Cargo Hook Suspension Kit P/N 200-308-00 on Airbus Helicopters Model EC120B helicopters. The manual is arranged in the general order that maintenance personnel would use to install, maintain and operate the Cargo Hook Suspension Kit in service.
The arrangement is:

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

0.7 Applicability

These Instructions for Continued Airworthiness are applicable to Cargo Hook Suspension Kit P/N 200-308-00 (with Cargo Hook P/N 528-028-00) for the Airbus Helicopters EC120B helicopter. Refer to the appropriate Airbus Helicopters maintenance documentation for instructions regarding parts of the aircraft that interface with the 200-308-00 system.

0.9 Abbreviations

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

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

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

5.1 Cargo Hook Suspension Kit Inspection

The scheduled inspection intervals noted below are maximums and are not to be exceeded. If the cargo hook 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. Refer to the Component Maintenance Manual (manual no. 122-015-00) 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.*

1. Activate the helicopter 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 fixed.

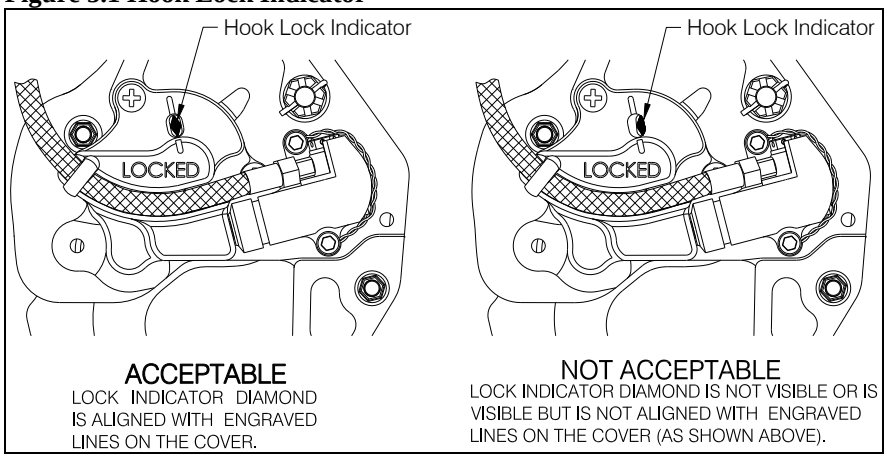
CAUTION

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

2. Activate the hydraulic release system by pulling the release lever located on the collective in the cockpit. The mechanism should operate smoothly and the cargo hook must release. After release, return the load beam to its closed and locked position by hand. Verify that the hook lock indicator on the side of the hook returns to the fully locked position. In the fully locked position the hook lock indicator should align with the lines on the manual release cover (see Figure 5.1). If the hook does not release or re-latch, do not use the unit until the problem is resolved.

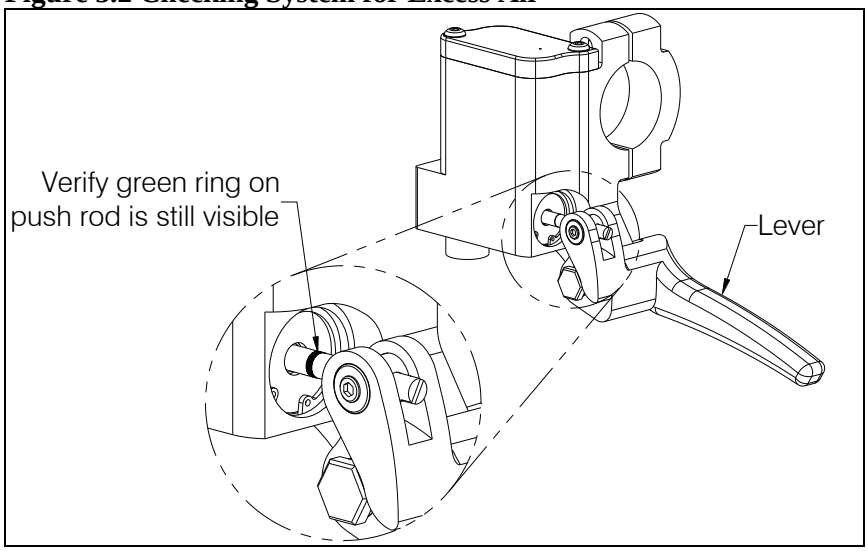
5.1 Cargo Hook Suspension Kit Inspection continued

Figure 5.1 Hook Lock Indicator



3. Check the hydraulic release system for air by pulling the lever firmly until it bottoms out. Check the push rod position (see Figure 5.2). If some of the green ring on the push rod is visible, the system is adequately bled. If some of the green on the push rod is NOT visible with the lever completely pulled, the system has too much air in it and must be bled, see Section 12.2 for bleeding instructions.

Figure 5.2 Checking System for Excess Air



4. Visually inspect for corrosion on the exterior of cargo hook. 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 component maintenance manual.
5. Visually inspect for fluid leaks in the hydraulic release system. Some seeping or dampness is acceptable, but if drips or areas cleaned by fluid leaking are present the hook must not be used until the condition is repaired. See troubleshooting section to determine the course of action.

5.1 Cargo Hook Suspension Kit Inspection continued

6. Move the cargo hook throughout its full range of motion and observe the hydraulic hose and electrical harnesses to ensure that they have enough slack. The hose or harnesses must not be the stops that prevent the cargo hook or suspension from moving freely in all directions.
7. Visually inspect for presence and security of fasteners.
8. Visually inspect the electrical connectors for damage and security.
9. Visually inspect the hydraulic hose and its connection to the cargo hook for damage and security.
10. Visually inspect the cargo hook bumper for damage.
11. Visually inspect the suspension center frame for cracks, corrosion and damage.
12. Inspect suspension cables for broken strands. Pass a cloth over the cables. This will clean the cables for a visual inspection and detect broken wires if the cloth snags on the cable. Ten randomly distributed broken strands in one cable lay (one complete rotation around the wire) or five broken strands in one strand in cable lay is considered unacceptable.
13. Visually inspect the suspension cables for crushing, unstranding, kinking, loss of rope diameter in short lengths, unevenness of outer strands or other damage. Visually inspect for corrosion.
14. Inspect hard point fittings for damage and security.
15. Visually inspect for security of C-39 indicator mounting.

5.1 Cargo Hook Suspension Kit Inspection continued

Every 1000 hours of external load operations or 5 years, whichever comes first, remove the hard point fittings and suspension assembly, disassemble, and inspect the component parts per the following instructions.

1. At the hard point fittings (item 1, Fwd Hard Point Fitting shown below) remove the Quick Release Pins (item 2) that secure the suspension cables to them and remove the Suspension Assembly from the helicopter.
2. Remove the hard point fittings from the helicopter.

Figure 5.3 Suspension Attachment

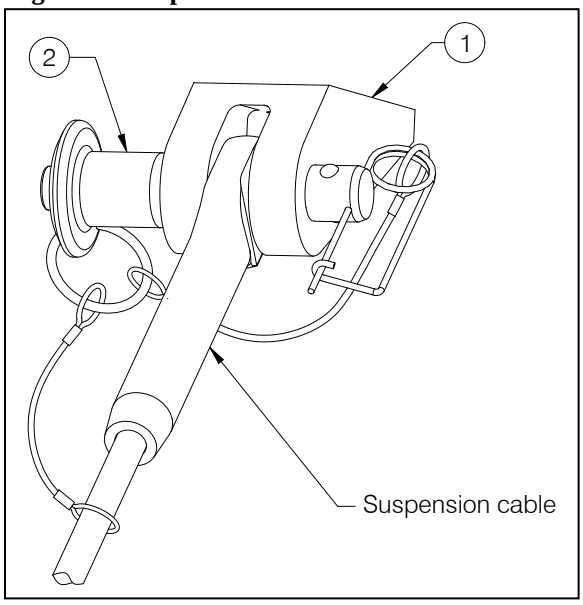


Table 5.1 Suspension Attachment Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	291-067-00	Fwd Hard Point Fitting (shown)	2
	291-066-00	Aft Hard Point Fitting	2
2	291-060-00	Quick Release Pin	1

5.1 Cargo Hook Suspension Kit Inspection continued

3. Remove the cargo hook from the Load Cell Assembly (not shown below) by removing the cotter pin (item 6), nut (item 5), washer (items 2 and 4), washer (item 2) and Attach Bolt (item 1).
4. Remove the Bumper (item 3) from the cargo hook by lifting up and sliding it off.

Figure 5.4 Cargo Hook Bumper/Attach Hardware

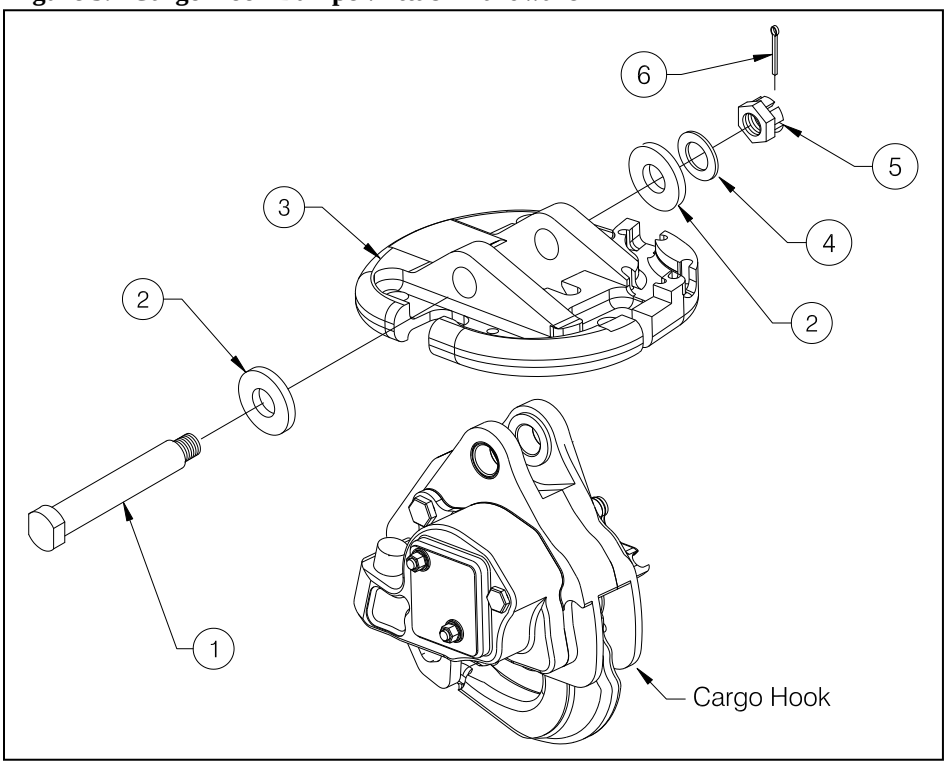


Table 5.2 Cargo Hook Bumper/Attach Hardware

ITEM	PART NO.	DESCRIPTION	QTY
1	290-775-00	Attach Bolt	1
2	510-183-00	Washer	2
3	290-839-02	Bumper	1
4	510-174-00	Washer	1
5	510-170-00	Nut	1
6	510-178-00	Cotter Pin	1

5.1 Cargo Hook Suspension Kit Inspection continued

5. Disassemble the four suspension cables (item 1) from the center frame (item 6) by removing cotter pins (item 5), nut (item 3), washer (item 4) and bolt (item 2).
6. Disassemble the load cell assembly (item 9) from the Gimbal Assembly (item 8) by removing cotter pin (item 14), nut (item 13), washer (item 12), two washers (item 11), and bolt (item 7).
7. Disassemble the Gimbal Assembly from the Center Frame Assembly by removing the cotter pin (item 5), nut (item 3), washer (item 4) and bolt (item 10).

Figure 5.5 Suspension Cable/Frame Assembly Parts

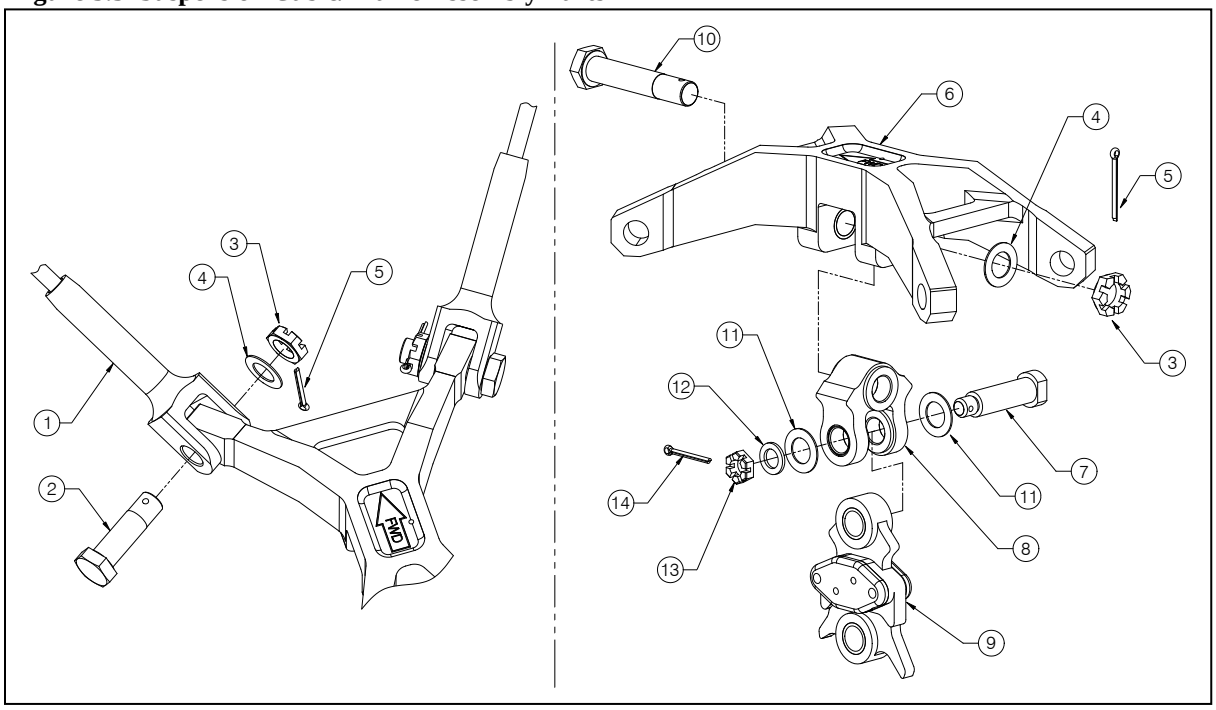


Table 5.3 Suspension Assembly Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	232-223-00	Fwd Suspension Cable (shown)	2
	232-224-00	Aft Suspension Cable	1
	232-284-00	Aft Adjustable Suspension Cable	1
2	510-594-00	Bolt	1
3	510-036-00	Nut	5
4	510-598-00	Washer	5
5	510-113-00	Cotter Pin	5
6	232-260-00	Center Frame Assembly	1
7	290-332-00	Attach Bolt	1
8	232-261-00	Gimbal Assembly	1
9	210-222-00	Load Cell Assembly	1
10	510-595-00	Bolt	1

5.1 Cargo Hook Suspension Kit Inspection continued

Table 5.3 Suspension Assembly Parts continued

11	510-183-00	Washer	2
12	510-174-00	Washer	1
13	510-170-00	Nut	2
14	510-178-00	Cotter Pin	1

8. Disassemble the Gimbal Assembly (P/N 232-261-00) by pressing out bushings as shown in Figure 5.6.

Figure 5.6 Gimbal Assembly

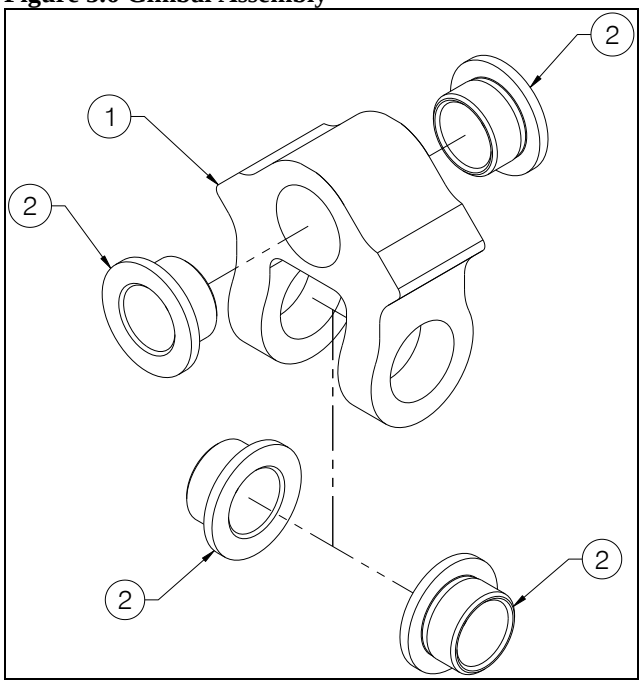


Table 5.4 Gimbal Assembly Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	291-068-00	Gimbal	1
2	290-294-00	Bushing	4

5.1 Cargo Hook Suspension Kit Inspection continued

9. Disassemble the Center Frame Assembly (P/N 232-261-00) by pressing out bushings as shown below.

Figure 5.7 Suspension Assembly Parts

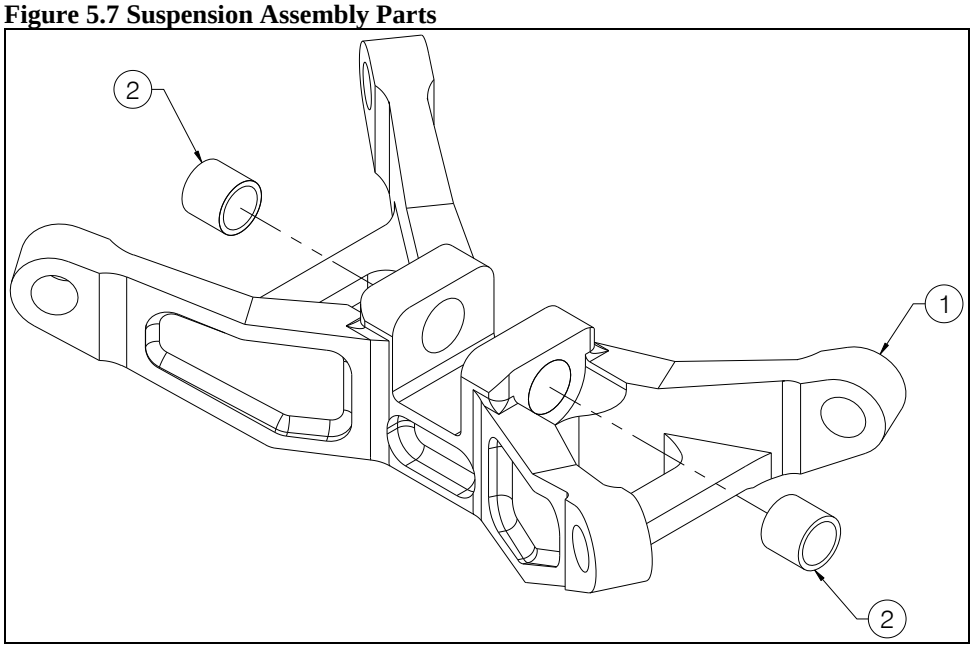


Table 5.5 Center Frame Assembly Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	291-056-00	Center Frame	1
2	290-364-00	Bushing	2

5.1 Cargo Hook Suspension Kit Inspection continued

Return the Load Cell Assembly (P/N 210-222-00) 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. No cracks are permitted in any of these parts.

1. Center Frame (P/N 291-056-00).
2. Gimbal (P/N 291-068-00).
3. Hard Point Fittings (P/N 291-066-00, 291-067-00, 291-127-00).
4. Quick Release Pin (P/N 291-060-00).

In addition carefully inspect, and if necessary repair, the detail parts in accordance with the instructions in Table 5.6.

Table 5.6 Inspection

Component	Damage	Remedy	Finish
Center Frame P/N 291-056-00	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.
Gimbal P/N 291-068-00	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.
Hard Point Fittings P/N 291-066-00 P/N 291-067-00 P/N 291-127-00	Dents, nicks, cracks, gouges, corrosion, or scratches. Wear on inside diameter of hole for quick release pin.	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. Maximum permissible hole diameter is .587 inches (14.9 mm).	This part is 15-5PH, passivated. No touch up finish required.
Attach Bolt P/N 290-775-00	Wear on outside diameter.	.495 min. dia. Remove and replace if smaller.	
Bushings P/N 290-294-00 P/N 290-364-00	Wear on inside diameter.	Max permissible bushing ID is .520 inches (13.2 mm). Remove and replace if exceeds .520.	
Quick Release Pin P/N 291-060-00	Wear on outside diameter	Minimum permissible outside diameter is .550 inches (14.0 mm).	
Fasteners	Wear, corrosion or deterioration.	Recommended to replace all threaded fasteners at overhaul inspection interval.	N/A

5.2 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.

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.*

Section 11
Placards and Markings

11.1 Placards

The 200-308-00 Cargo Hook Suspension Kit includes the following placard.

Table 11-1 Cargo Hook Suspension System Placards

Placard part number and appearance	Location
P/N 215-196-00 **MAX. HOOK LOAD** **1543 LBS. 700 KGS.**	Located on the belly of the helicopter, near the cargo hook suspension, in clear view of ground support personnel.

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Section 12
Servicing

12.1 Maintenance of the Hydraulic Release System

The system is filled with fluid at installation and does not consume fluid unless it leaks out. If any leakage is detected, the fluid level should be immediately checked.

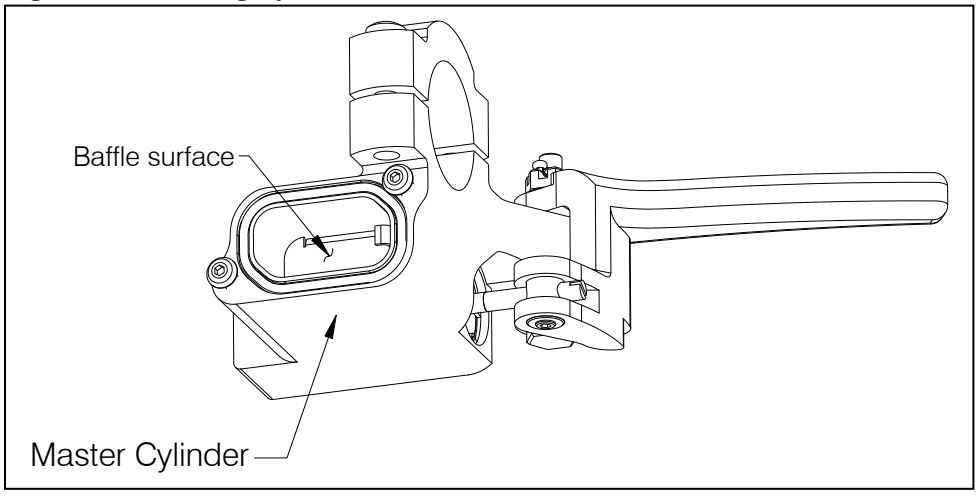
NOTICE

MIL-PRF-5606 and MIL-PRF-87257 fluids are both compatible with the hydraulic system. These fluids are interchangeable and miscible.

To check the fluid level:

1. Position the collective against the lower stop.
2. The Master Cylinder features a transparent lid through which the fluid level can be checked. Hydraulic fluid must be visible over the baffle surface (see Figure 12.1).
3. Remove lid and add hydraulic fluid as required until the baffle surface is submerged (fill so that there is approximately 1/16" of fluid above the baffle surface).

Figure 12.1 Checking Hydraulic Fluid Level



If leakage is noted around any plumbing fittings, the fittings may be tightened until the leakage quits. If leakage is noted around the pistons in either the master or slave cylinders the leaking cylinder must be repaired. See the instructions for repair in this section.

12.1 Maintenance of the Hydraulic Release System, continued

Master Cylinder Repair

If fluid is leaking around the piston, the only repair is to remove and replace the cup seal and O-ring. The master cylinder must be disassembled, inspected and then re-assembled with new seals.

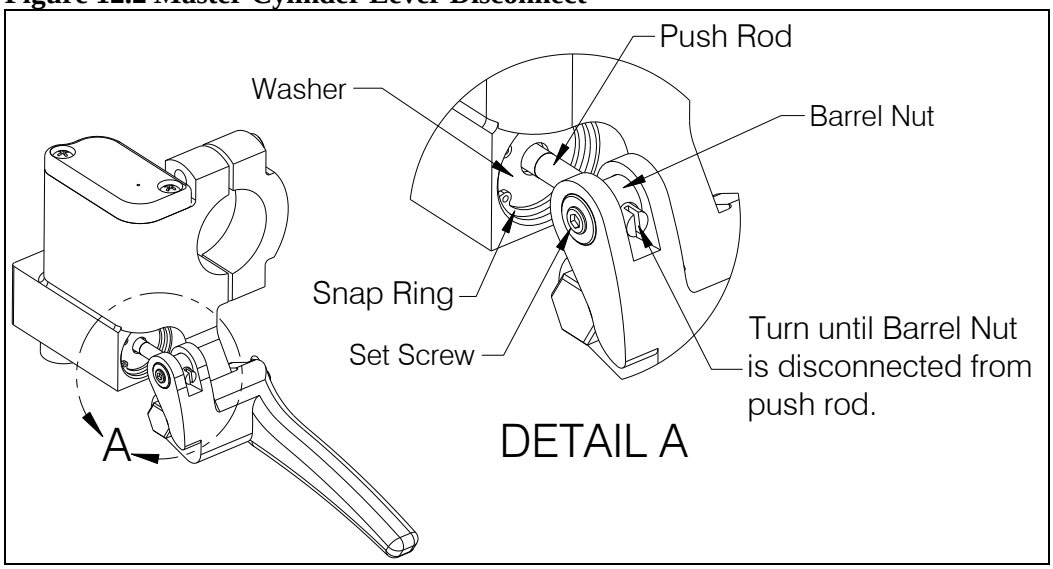
Disassembly:

1. Remove snap ring. Use caution when removing snap ring since the piston is spring loaded against the washer and snap ring. The piston will pop out of the housing when the snap ring is removed. Use the lever to put pressure on the piston while removing snap ring.
2. Loosen the set-screw and disconnect barrel nut on lever from the push rod. See Figure 12.2.
3. Remove the piston and spring. See Figure 12.3 for parts breakdown.
4. Inspect the master cylinder bore for scratches. If any scratches or gouges are visible in the bore, the master cylinder must be replaced.

Re-assembly:

1. If the bore condition is acceptable, replace the lip seal and O-ring on the piston assembly. Maintain orientation as shown in Figure 12.4. Stretch seals over piston into grooves.
2. To assemble the master cylinder, lubricate the piston seals and cylinder bore generously with hydraulic fluid.
3. Place the spring in the cylinder bore.
4. Pass the push rod through the washer.
5. Thread the push rod into the barrel nut until approximately 1/16" of thread is visible through the opposite side of the barrel nut.
6. Insert the small spring into the piston assembly and insert the piston assembly into the master cylinder bore using a firm rocking motion.
7. Use the lever to compress the spring and hold the piston in place.
8. Use snap ring pliers to install the snap ring.
9. Secure push rod threads by tightening set screw.

Figure 12.2 Master Cylinder Lever Disconnect



12.1 Maintenance of the Hydraulic Release System, continued

Master Cylinder Repair continued

Figure 12.3 Master Cylinder Piston Removal

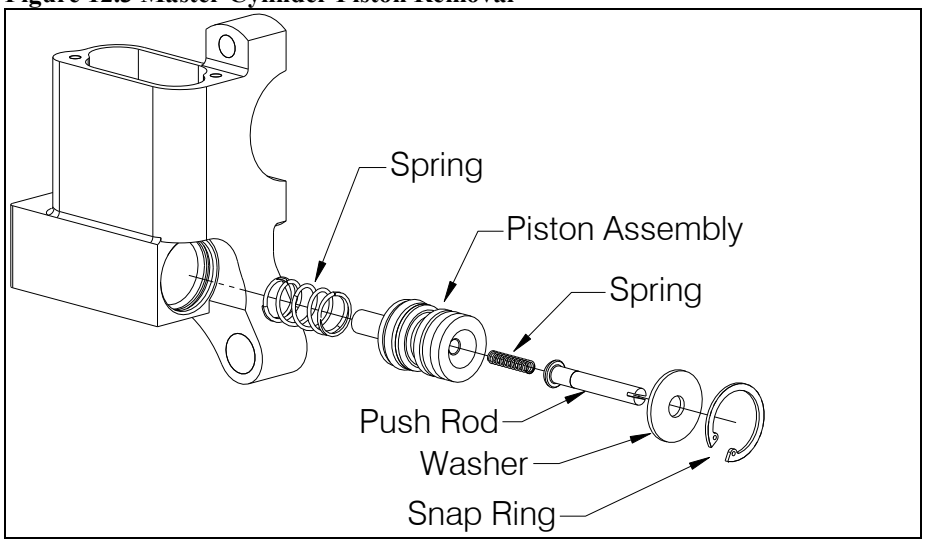
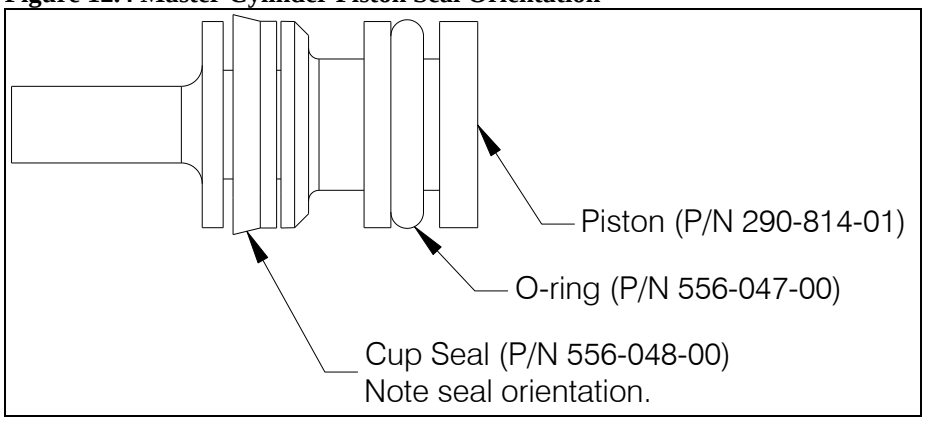


Figure 12.4 Master Cylinder Piston Seal Orientation



12.1 Maintenance of the Hydraulic Release System, continued

Slave Cylinder Repair

If the slave cylinder is leaking fluid around the piston rod, the only repair possible is to remove and replace the cup seal or quad ring (earlier production units of the slave cylinder assembly used a cup seal instead of the quad ring).

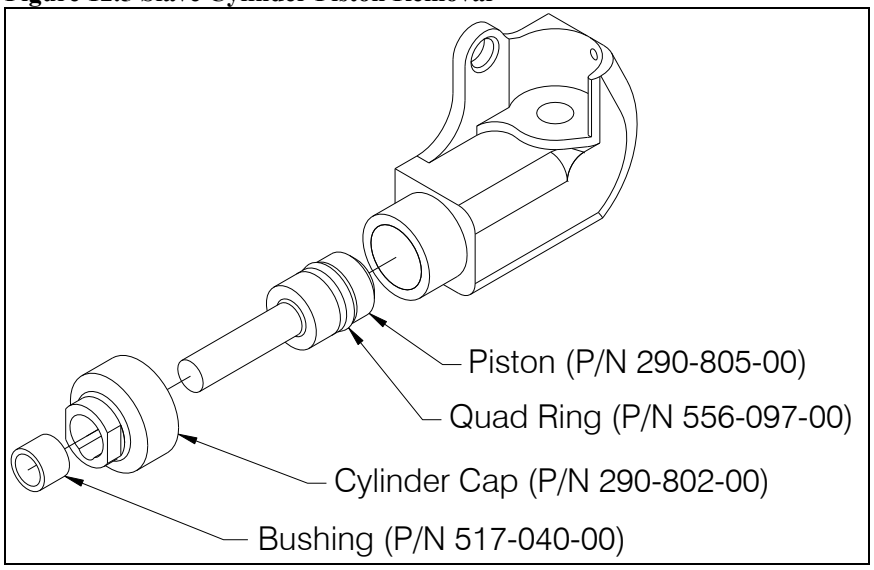
Disassembly:

1. Remove cap, piston, and seal (see Figure 12.5).
2. Inspect bore of slave cylinder for scratches or gouges. If any are present the assembly must be replaced.
3. Remove bushing in cap by pressing it out.
4. Remove quad ring (or cup seal) by stretching it over the piston.

Re-assembly:

1. Press new bushing into cap.
2. Stretch new quad ring over piston into groove.
3. Clean and lubricate cylinder bore and piston seal with hydraulic fluid.
4. Insert piston into cylinder taking care not to damage edges of quad ring.
5. Screw on cap and torque to 50-60 in-lbs.

Figure 12.5 Slave Cylinder Piston Removal



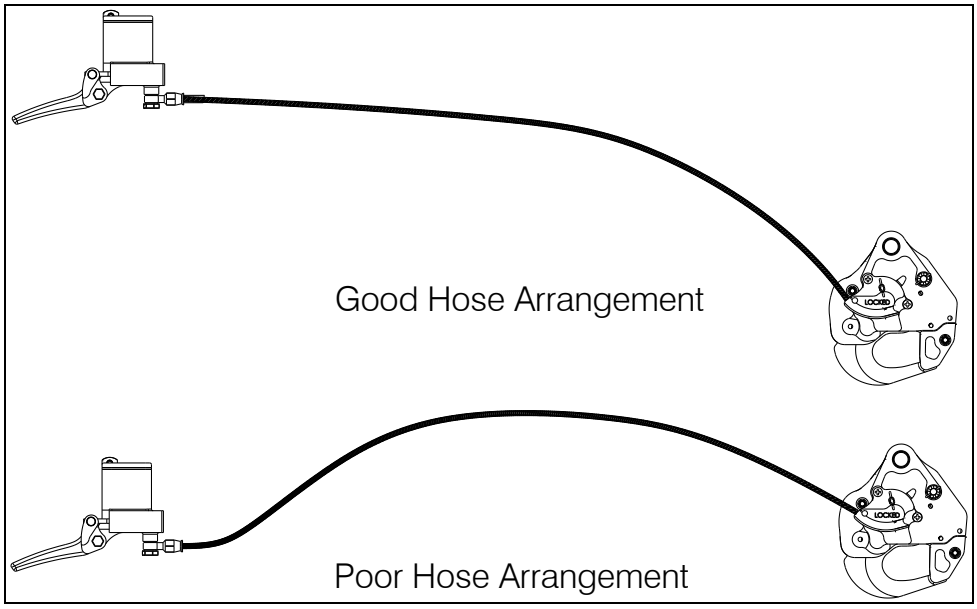
12.2 Bleeding Hydraulic System

Filling and bleeding the hydraulic release system is most easily accomplished on the bench, prior to installation on the aircraft. This process may also be accomplished after the system is installed. Filling and bleeding requires two persons, one to inject hydraulic fluid through the system and the other to observe the reservoir.

Following is the procedure:

1. Obtain bleed kit, 212-014-02. This kit consists of 2 ounces of MIL-PRF-87257 fluid, syringe, a female barb fitting, a length of PVC tubing, and bleed adapter fitting. The bleed kit is included in new cargo hook kits. Assemble the bleed kit by pressing each fitting into the tubing and threading the female barb fitting into the syringe.
2. If the system is already installed on the aircraft, place an absorbent towel under the master cylinder. If the master cylinder is not installed on the aircraft, lightly clamp the master cylinder in a vise to hold it in a vertical position and position the slave cylinder so that its level is below the level of the master cylinder.
3. Connect the master cylinder assembly to the slave cylinder assembly if not already done. If filling or bleeding on the bench, arrange the hoses uncoiled, straight and running uphill as much as possible. See Figure 12.6.

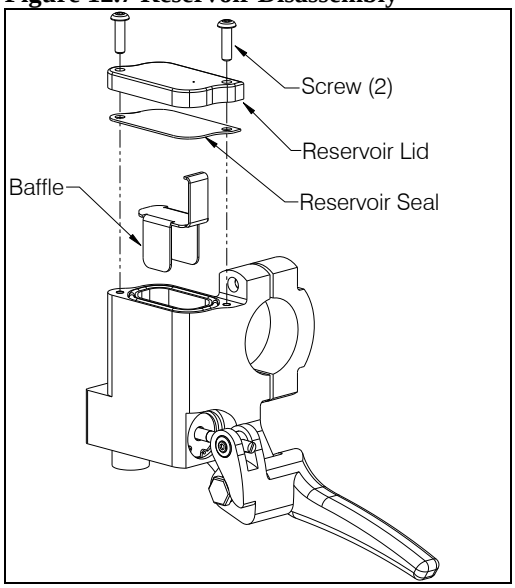
Figure 12.6 Hose Arrangement



4. Remove screws, reservoir lid, reservoir seal, and baffle from the master cylinder reservoir as shown in Figure 12.7 (the reservoir seal is for shipping purposes only, after removal discard or retain for future shipping or storage).

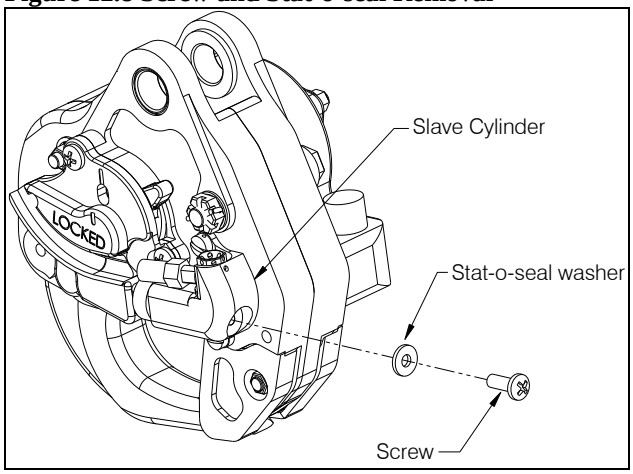
12.2 Bleeding Hydraulic System, continued

Figure 12.7 Reservoir Disassembly



5. Remove the screw and stat-o-seal on the slave cylinder, see Figure 12.8.

Figure 12.8 Screw and Stat-o-seal Removal



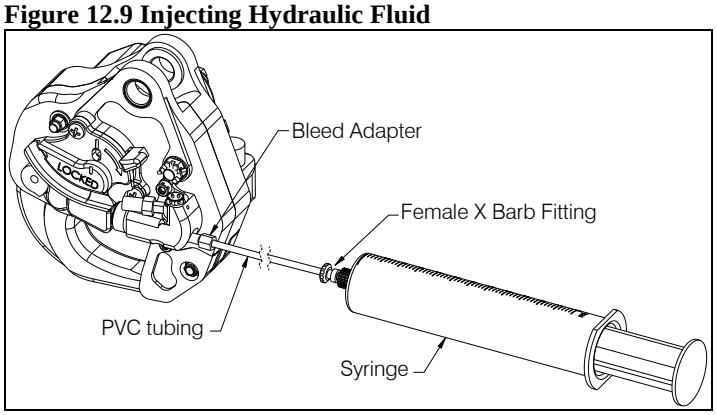
6. Fill a syringe with approximately 35 cc of hydraulic fluid. Screw the end of the syringe into the screw hole on the slave cylinder to create a tight seal. See Figure 12.9.
7. While observing the reservoir, **slowly** push on the syringe plunger to force fluid through the slave cylinder, hydraulic hose, and up to the master cylinder reservoir. There will be some resistance during filling—this is normal.

CAUTION

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

12.2 Bleeding Hydraulic System, continued

Figure 12.9 Injecting Hydraulic Fluid



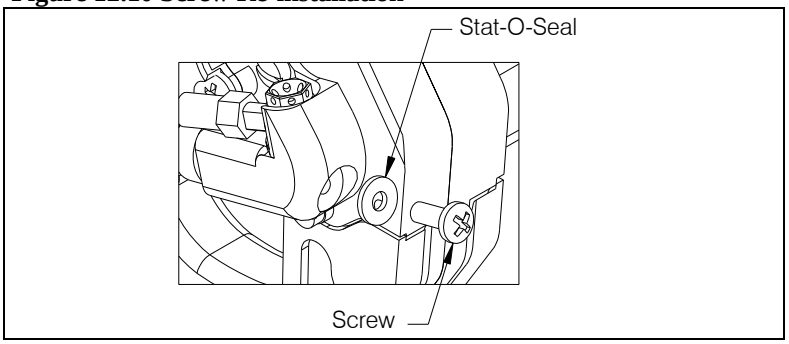
8. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

NOTICE

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

9. Remove the syringe from the screw hole. Re-install the Stat-O-Seal (P/N 510-496-00) and screw (P/N 510-493-00), see Figure 12.10.

Figure 12.10 Screw Re-installation



10. Allow the system to rest for several minutes. This will allow any air to rise through the system.

11. Very **slowly** pull the release lever on the master cylinder and watch for bubbles. If bubbles are observed rising within the reservoir, continue to slowly cycle the lever until there are no more.

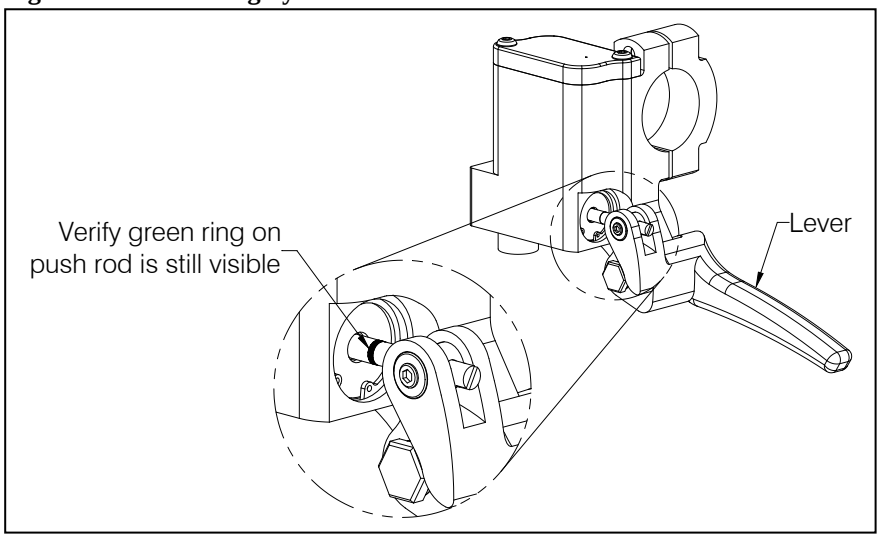
⚠ CAUTION

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

12.2 Bleeding Hydraulic System, continued

12. Check the system for air by actuating the lever firmly until it bottoms out. Check the push rod position (see Figure 12.11). If the green area on the push rod is visible, proceed to step 13. If the green on the push rod is not visible with the lever completely pulled, the system has too much air in it and needs further bleeding. To do this, repeat steps 5 – 11.

Figure 12.11 Checking System for Air



13. After the system is properly bled, verify that the reservoir is approximately half full of hydraulic fluid. Fluid should be visible above the baffle.
14. Re-install the baffle and the reservoir lid.
15. Check the system for proper operation. Fully actuate the release lever. The hook must open and the lever must have a firm feel.
16. Disassemble and thoroughly clean the syringe with isopropyl alcohol. Allow it to dry. Not cleaning the syringe will render it unusable. Reassemble and store for next use.

12.3 Lubrication Information

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

Lubricate the Cargo Hook Suspension at points noted in Figure 12.12 and 12.13. Recommended lubricants are AeroShell 17, MIL-G-21164 or Mobilgrease 28, MIL-G-81322.

Figure 12.12 Load Cell and Gimbal Lubrication Points

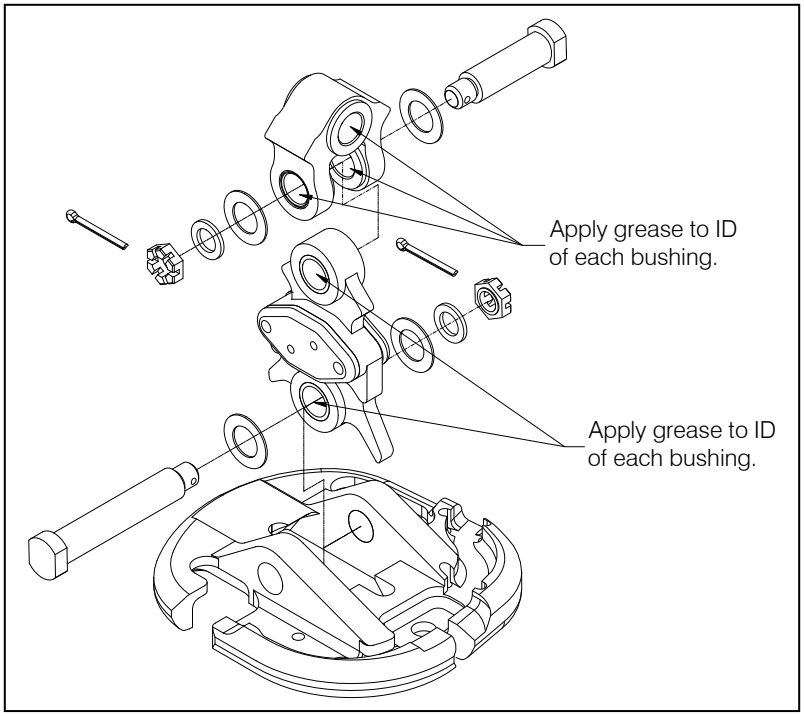
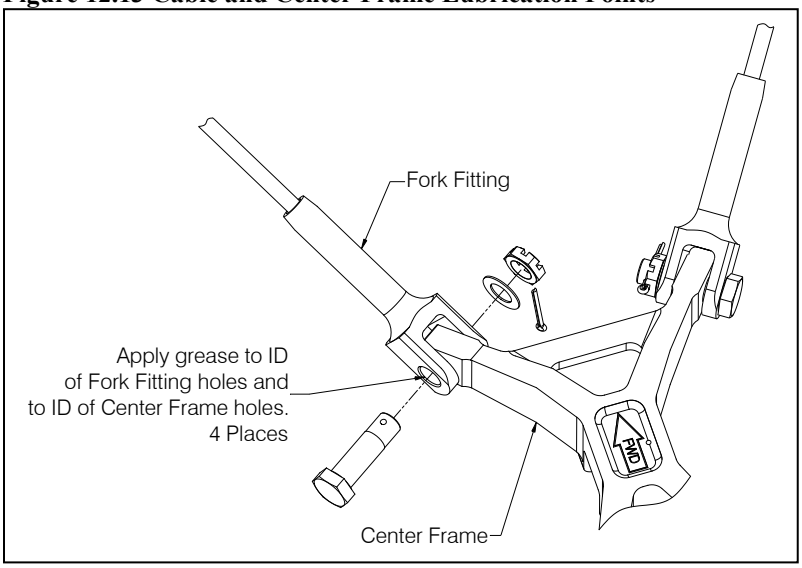


Figure 12.13 Cable and Center Frame Lubrication Points



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Section 25
Equipment and Furnishings

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 Cargo Hook Suspension System consists of four primary subsystems, these are the Suspension Assembly, Hydraulic Release System, Electrical Release System, and Load Weighing System.

The Suspension Assembly is attached to hard points and suspended below the helicopter by its four cable assemblies. The cable assemblies are attached to a frame assembly, which supports the cargo hook and a load cell through a gimbal (ref. Figure 25.1).

The Electrical Release System provides a means to release a cargo hook load through the use of a switch in the cockpit. The Electrical Release System interfaces with the existing release switch on the cyclic.

The Hydraulic Release System provides an additional means to release a cargo hook load and consists of a release lever mounted to the collective, a hose routed from the release lever to the hook, and a piston at the hook that actuates the internal release mechanism when the lever is pulled.

The Load Weighing System consists of an indicator mounted within the cockpit, the load cell on the suspension, and associated wiring.

25.5 Component Weights

The weight of the system is listed in Table 25.2. Refer to Airbus Helicopters manual for location of cargo hook.

The weights of the Cargo Hook Suspension System components are listed below.

Table 2.9.2 Component Weights

Item	Weight
Removable Provisions*	15.5 lbs (7.03 kg)
Fixed Provisions**	6.5 lbs (2.95 kg)
Total	22.0 lbs (10.0 kg)

***** The removable provisions include the suspension with cargo hook and load cell, external hydraulic, and external electrical release harness. These items are easily removed if they are not needed on the helicopter's mission.

****** The fixed provisions are those items of the kit that remain on the aircraft. These include the fixed hydraulic hose, internal electrical wire harnesses, the load weigh indicator, hard point fittings, and the miscellaneous brackets that support these items.

25.12 Storage Instructions

For temporary storage the master cylinder must be stored with the reservoir lid up. The lid contains an air vent that will allow hydraulic fluid to drain out if left inverted. If long term storage or shipping must be done where the orientation of the master cylinder cannot be controlled, either drain the reservoir or apply a piece of tape over the breather hole on the reservoir lid. If draining the reservoir, remove the hose attached to the master cylinder and drain it as well. Seal the hydraulic parts in a plastic bag for shipping or storage to prevent dirt contamination. The slave cylinder end needs no special handling.

Clean the exterior Cargo Hook suspension components thoroughly of excess dirt and grease with a rag before packaging. Pack the unit in a heat-sealable package. If the unit is to be stored for long periods in a tropical climate it should be packed in a reliable manner to suit local conditions. Refer to MIL-PRF-23199 and MIL-STD-2073-1 for additional guidance. Refer to CMM 122-015-00 for storage instructions specific to the Cargo Hook.

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

25.15 Troubleshooting

Table 25.3 is provided with the intention of isolating the cause of malfunctions within the system. Sections 25.16 and 25.17 include instructions for removing and replacing defective components. Refer to the appropriate Airbus Helicopters maintenance instructions for guidance on procedures relating to Airbus Helicopters parts that interface with this suspension system.

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 hydraulic release operates normally.	Open electrical circuit, faulty wiring, fuse, switch or solenoid.	Disconnect cable from electrical connector on cargo hook. Using multi-meter, check for 3.0 to 4.0 ohms between pins A and B of electrical connector (see note 1 below). If open indication is obtained, remove and replace cargo hook (see sections 25.16 and 25.17) or repair per CMM 122-015-00.
Cargo hook operates electrically, but not manually.	Leaks in hydraulic hose system. Air in hydraulic hose system. Jammed slave cylinder.	Check for leaks in hydraulic hose system and correct defects if found. Bleed hydraulic system per this manual. Remove slave cylinder from hook and check for proper operation while actuating manual release lever. Repair as required.
Load beam fails to re-latch after being reset.	Defective latch mechanism.	Remove and replace cargo hook (see sections 25.16 and 25.17) or repair per CMM 122-015-00.
Force required to release hook with lever on collective exceeds 14 lbs.	Friction in internal mechanism or defective hydraulic system.	Remove slave cylinder from hook and manually operate master cylinder. If operation feels free and force is less than 5 lbs. Remove and replace cargo hook (see Section 25.16 and 25.17) or repair per CMM 122-015-00.
Hydraulic fluid leaks at hose fittings.	Loose fittings	Tighten fittings. Check fluid level in reservoir. Bleed hydraulic system per Section 12.2.
Hydraulic fluid leaks around master or slave cylinder pistons.	Leaking seals	Replace master or slave cylinder assembly.
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 (see note 2). Check solenoid resistance (see note 1), repair or replace defective parts.

Table 25.3 Troubleshooting continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Load Weigh Indicator does not light up.	Faulty wiring or circuit breaker.	Check the circuit breaker (refer to Airbus Helicopters maintenance documentation) 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 low.	Adjust the dampening level to a higher number (see Note 4).
Indicator displayed load takes too long to change the reading when the load is changed.	Dampening level is too high.	Adjust the dampening level to a lower 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 25.15.1 Cargo Hook Electrical Connector

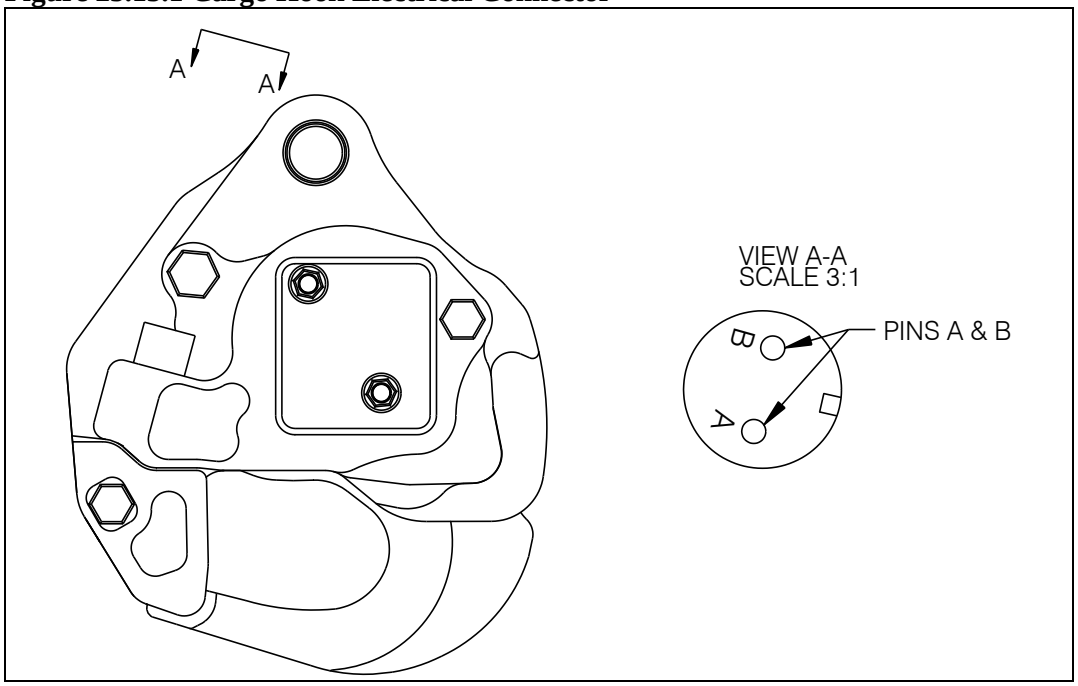


Table 25.3 Notes continued

2. Checking Wire Harnesses.

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

The wire harnesses are routed with and secured to existing wire bundles and are located approximately as shown below. Remove lower fairings to inspect wiring underneath the cabin floor. Inspect for general condition and chafing along length of wire runs. See Figure 25.15.4 and Figure 25.15.5 for electrical schematics.

Figure 25.15.2 Electrical Release Wire Harness Routing

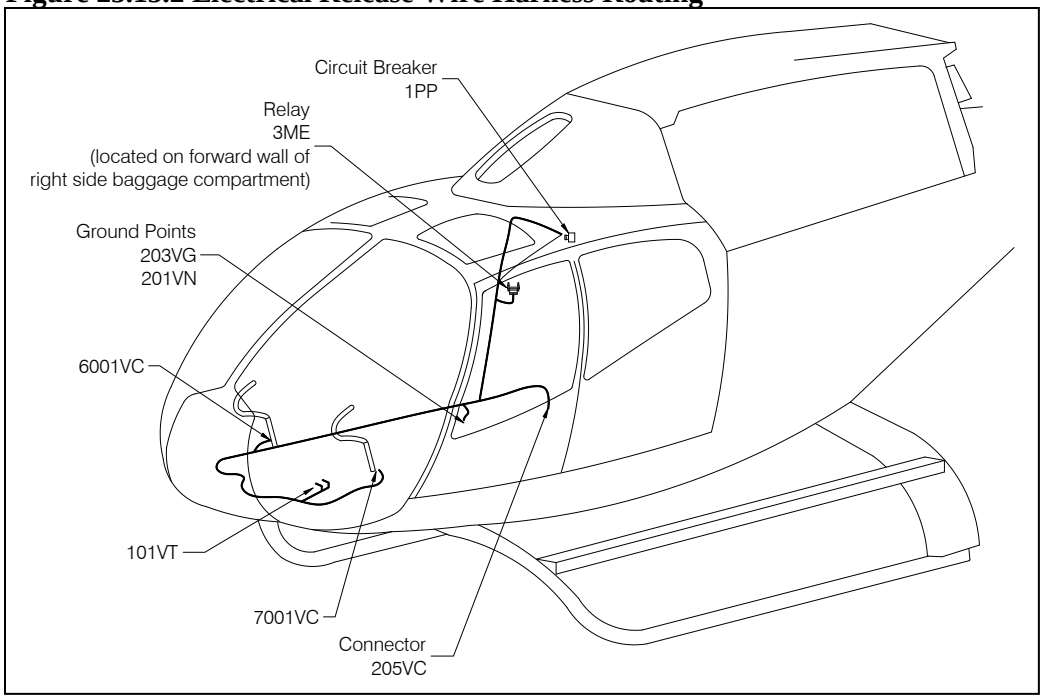


Figure 25.15.3 Load Weigh Harness Routing

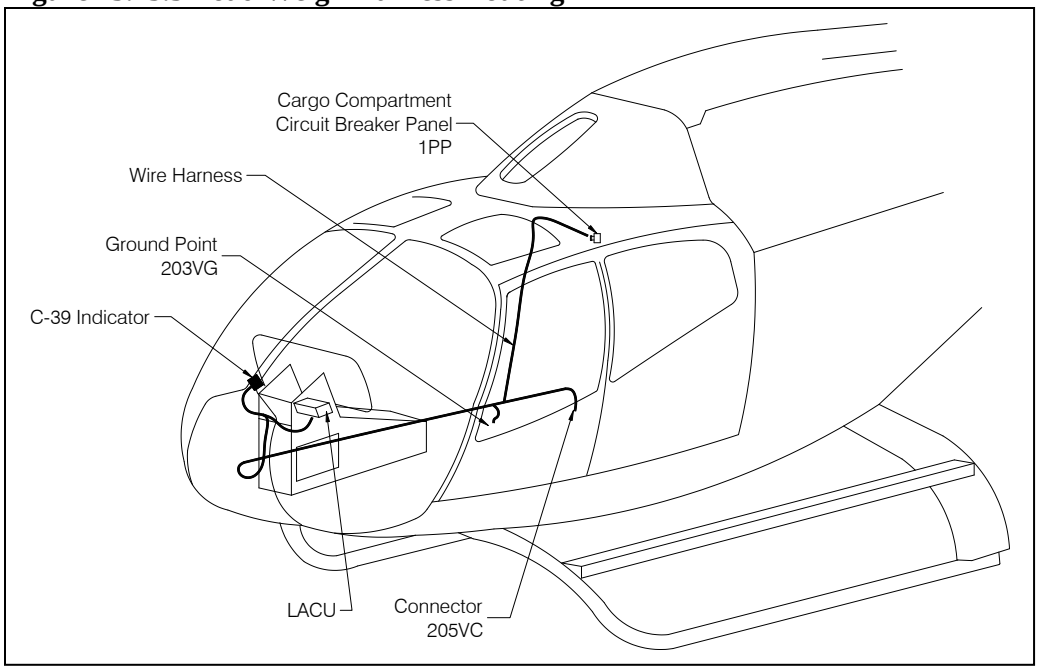


Table 25.3 Notes continued

2. Checking Wire Harnesses continued

Figure 25.15.4 Electrical Schematic – Cargo Hook Electrical Release

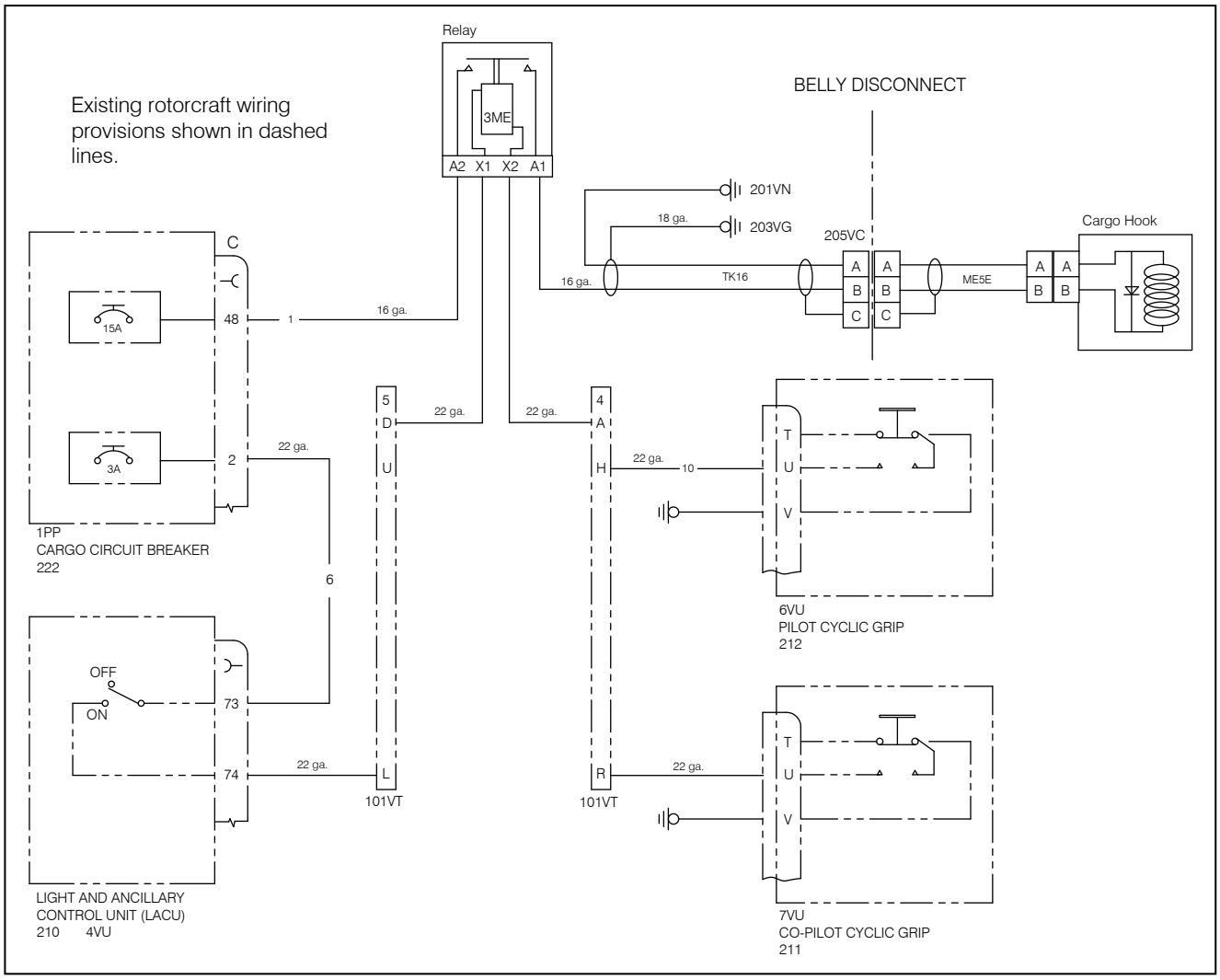


Table 25.3 Notes continued

Figure 25.15.5 Electrical Schematic – Load Weigh System

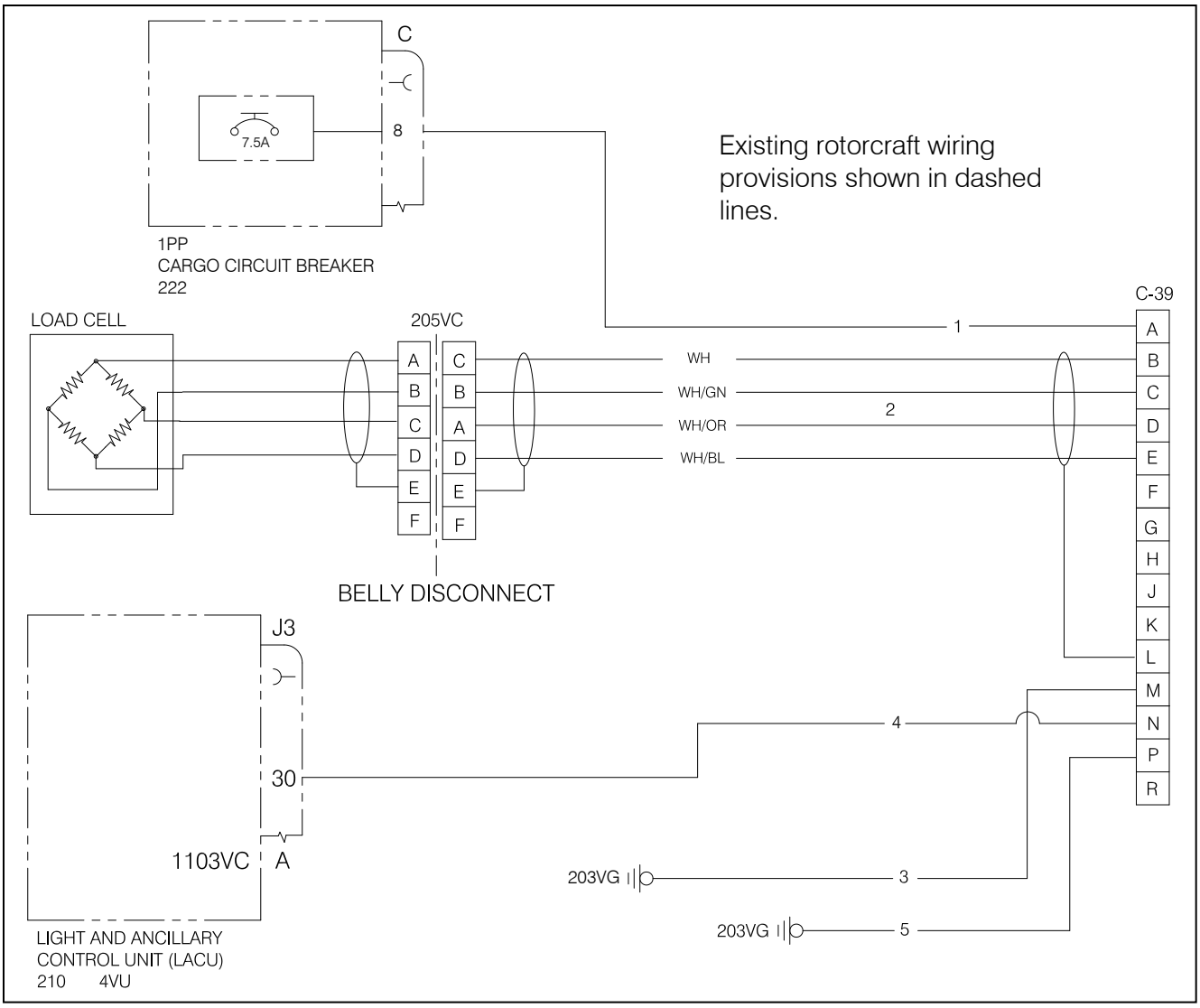
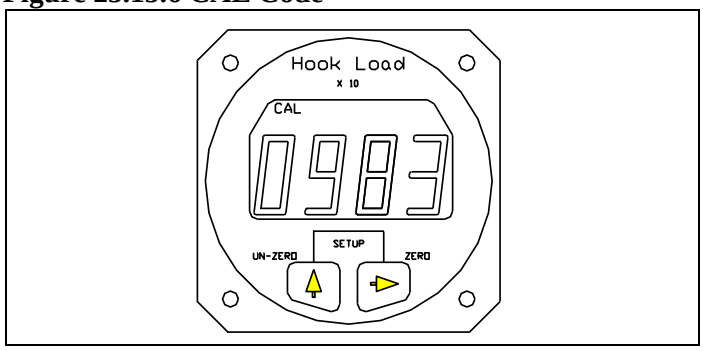


Table 25.3 Notes continued

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 25.15.6 CAL Code

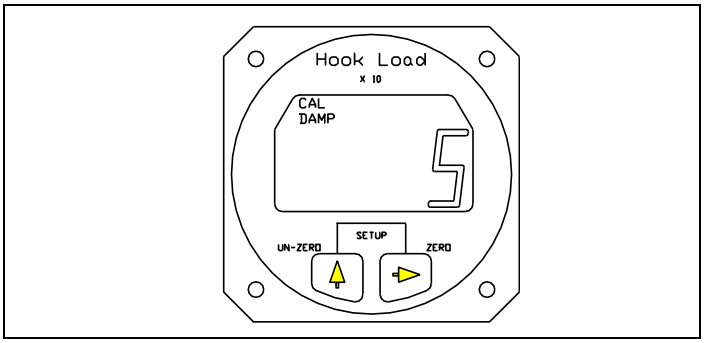


This code should match the code printed on the tag attached to the load cell cable. If this code does not match, contact Onboard Systems for further guidance.

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 25.15.7 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. Remove the slave cylinder assembly by removing safety wire and two screws (refer to Figure 25.16.1) and associated ty-wraps.
2. Disconnect the electrical release connector from the cargo hook and remove the associated ty-wraps that secure the harness to the bumper.
3. Remove the cotter pin (P/N 510-178-00) from the attach bolt (P/N 290-775-00) (refer to Figure 25.17.2).
4. Remove the castellated nut (P/N 510-170-00) from the attach bolt.
5. Remove the attach bolt and all washers.
6. Remove the Cargo Hook from suspension system.
7. Remove the Bumper (P/N 290-839-02) from the cargo hook.

Suspension System Removal

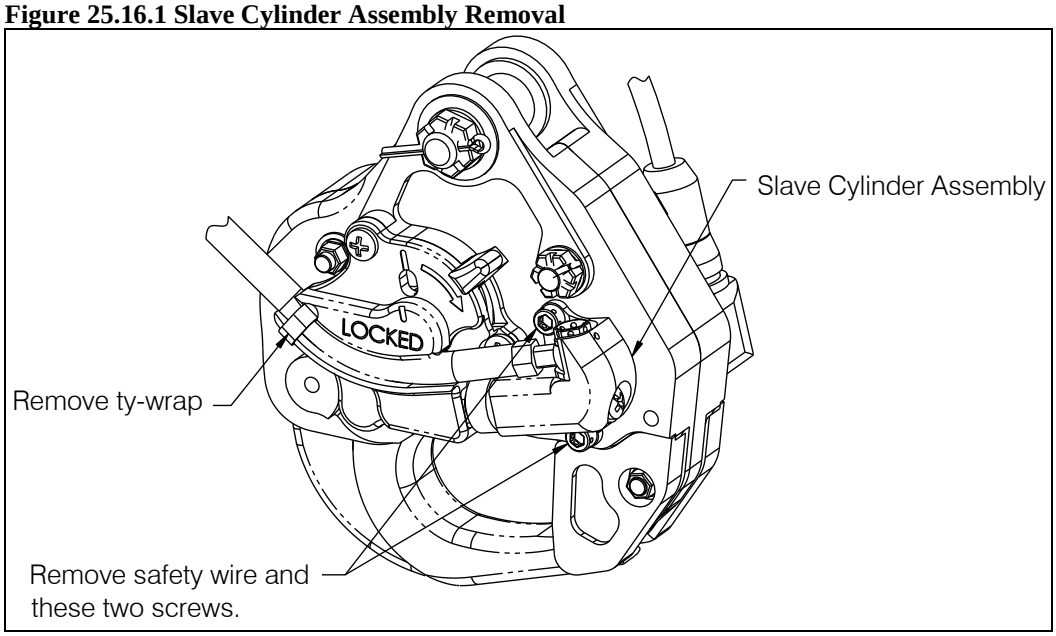
1. Disconnect the load cell connector from the bulkhead connector on the belly of the helicopter.
2. Disconnect the electrical release connector at the bulkhead connector on the belly of the helicopter.
3. Disconnect the hydraulic hose at the quick release fitting at the belly of the helicopter.
4. Remove the Safety Pins (P/N 510-565-00) and Quick Release Pins (P/N 291-060-00) at the 4 joints where the suspension cable ends mate with the hard point fittings at the belly of the helicopter.

25.16 Component Removal continued

Slave Cylinder Assembly Removal

1. Disconnect the hose at the quick disconnect coupling at the belly of the helicopter.
2. Remove the two screws that hold the slave cylinder assembly to the cargo hook. Remove all ty-wraps that hold the hydraulic hose to the cargo hook and the bumper.

Figure 25.16.1 Slave Cylinder Assembly Removal

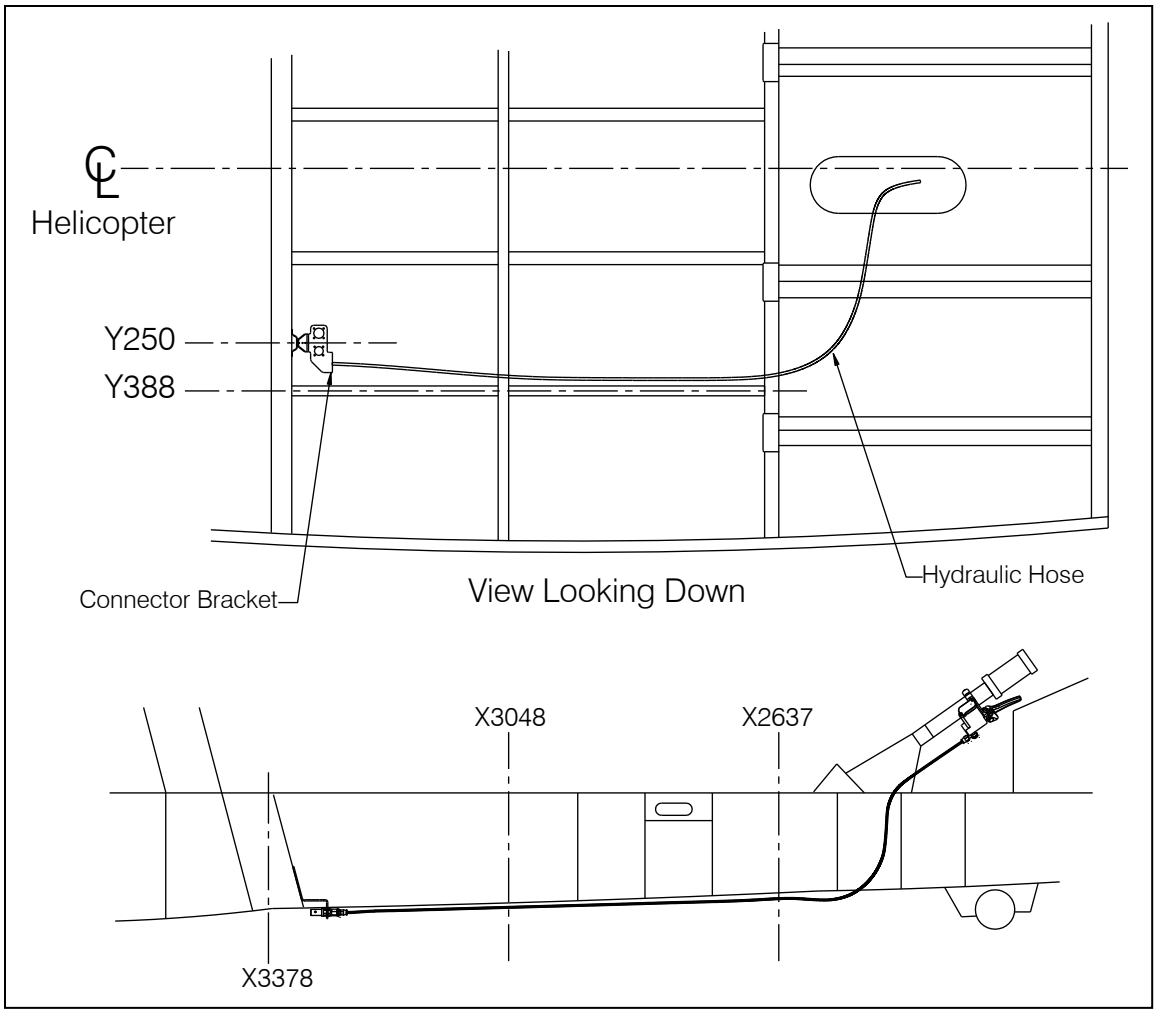


25.16 Component Removal continued

Fixed Hydraulic Release Hose Assembly Removal

The fixed hydraulic release hose is routed from the release lever mounted to the collective stick to the connector bracket mounted on the frame just forward of X3378 and at Y250 where it is mated with the removable section of the hydraulic release system.

Figure 25.16.2 Fixed Hydraulic Release Hose Routing

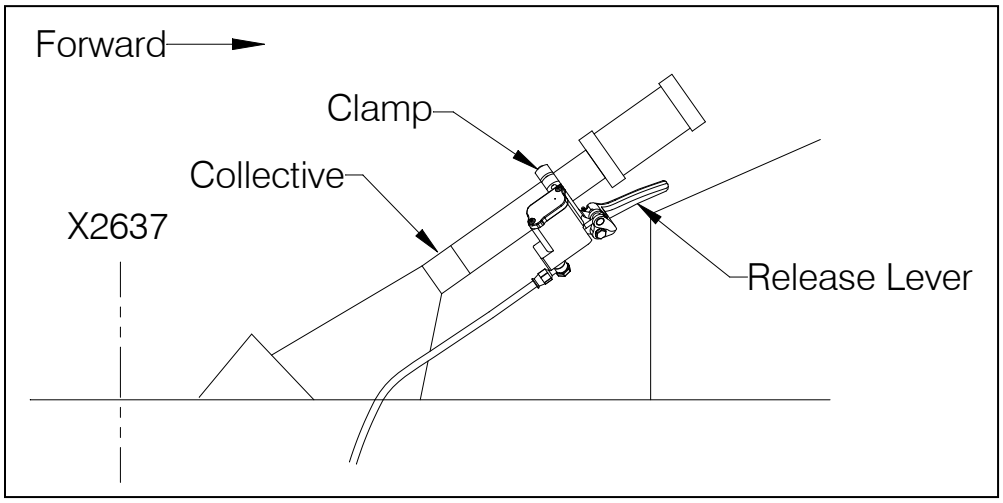


25.16 Component Removal continued

Fixed Hydraulic Release Hose Assembly Removal continued

1. Loosen the jam nut and remove the quick disconnect fitting from the connector bracket.
2. Moving forward, remove the loop clamps from the hydraulic hose at the frames at X3048 and X2637.
3. Feed the hose up through the cabin floor and through the velcro seam of the collective pitch lever boot.
4. Remove the master cylinder and lever from the collective by removing the two clamp screws.

Figure 25.16.3 Hydraulic Release Lever



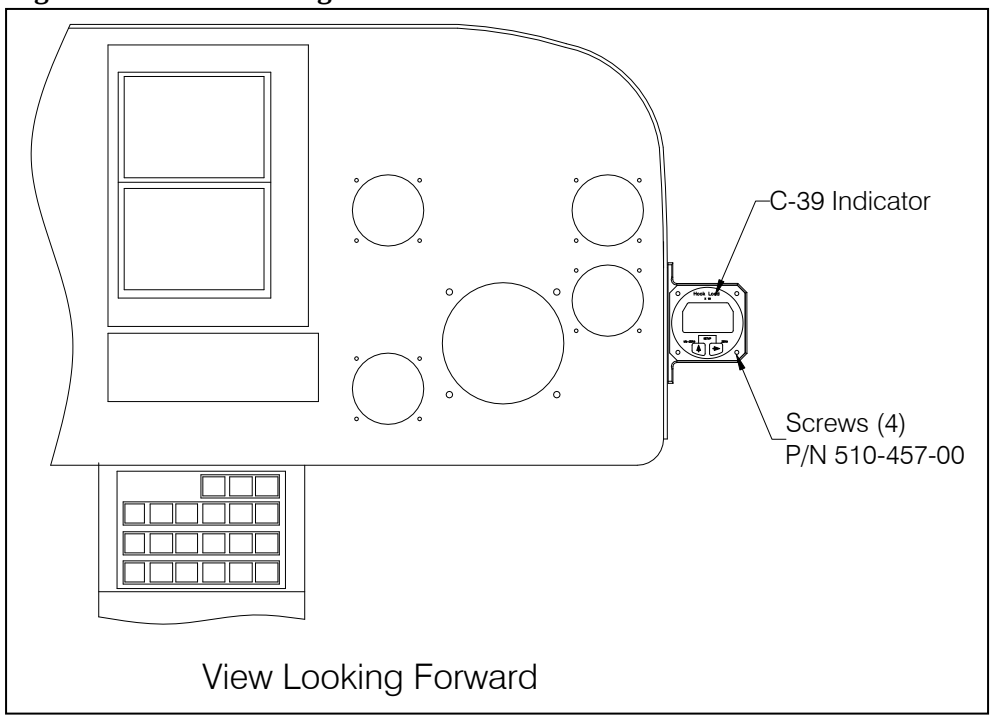
25.16 Component Removal continued

Load Weigh Indicator Removal

The load weigh indicator is located on the right side of the instrument panel shroud.

1. Disconnect electrical connector from the back of indicator.
2. Remove the four screws (P/N 510-457-00) that secure the indicator to the mounting bracket and remove the indicator.

Figure 25.16.4 Load Weigh Indicator



25.16 Component Removal continued

Load Cell Removal

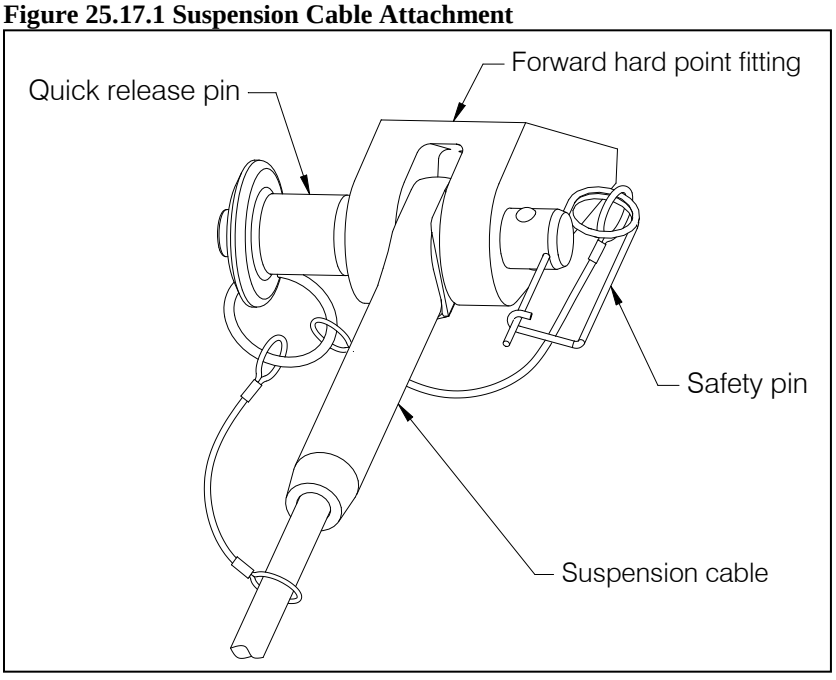
1. Remove the Cargo Hook per the above instructions.
2. Disconnect the load cell electrical connector at the belly of the helicopter.
3. Remove the Load Cell Assembly from the gimbal on the suspension frame by removing the cotter pin from the nut, and then removing nut, washers, and attach bolt.

25.17 Component Re-installation

Suspension Re-installation

1. Inspect the Suspension Assembly for evidence of damage, corrosion, cable fraying, freedom of rotation at all pivot points, and security of fasteners. If damage is evident, do not use the items until they are repaired.
2. Install the Suspension Assembly by securing the shorter suspension cables to the forward hard point fittings (shown below) and the longer suspension cables to the aft hard point fittings with the quick release pins. Secure quick release pins with the attached safety pins. The cargo hook load beam must point forward.
3. Connect the load cell harness connector to the bulkhead connector at the belly of the helicopter.
4. Connect the electrical release harness connector to the bulkhead connector at the belly of the helicopter.
5. Connect the hydraulic release hose to the quick disconnect coupling at the belly of the helicopter.
6. Attach an approximate load of 25 pounds to the cargo hook. Look for slack in the suspension cables. If there is visible slack in any of the suspension cables, adjust the LH aft suspension cable as necessary to remove slack from the system. Adjust the cable length by loosening the jam nut and rotating the rod end fitting in the required direction. Re-tighten jam nut.

Figure 25.17.1 Suspension Cable Attachment

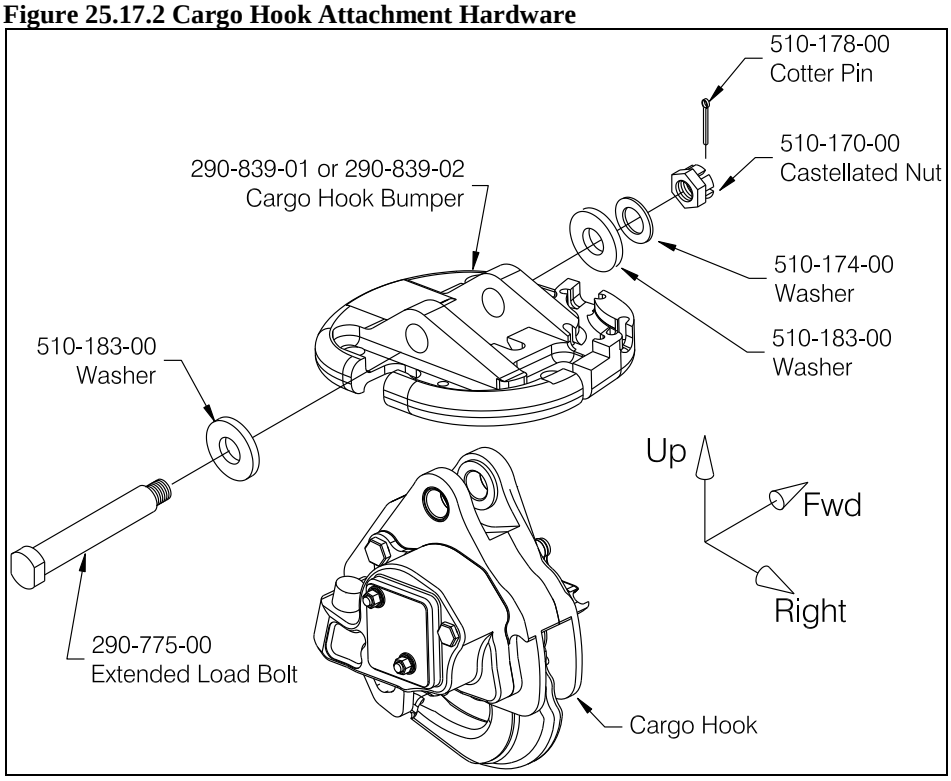


25.17 Component Re-installation continued

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. Attach the Cargo Hook (P/N 528-028-00) to the load cell on the suspension system by placing the Bumper (P/N 290-839-02) over the Cargo Hook and installing the attach bolt (P/N 290-775-00) through the cargo hook and load cell (not shown below) with washer (P/N 510-183-00). Refer to Figure 25.17.2.
3. Install washer (P/N 510-183-00), washer (P/N 510-174-00) and nut (510-170-00) over bolt end.
4. Tighten nut finger tight, then rotate nut to next castellation to install and secure cotter pin (P/N 510-178-00).
5. Install slave cylinder assembly (P/N 232-262-00) per this section.
6. Install external electrical release harness (P/N 270-144-00) per this section.
7. Route electrical harnesses and hydraulic hose through channel in bumper and secure with ty-wraps. See Figure 25.17.4.

Figure 25.17.2 Cargo Hook Attachment Hardware



NOTICE

The Cargo Hook load beam must point forward.

25.17 Component Re-installation continued

Slave Cylinder Assembly Re-installation

Connect the slave cylinder assembly to the cargo hook first, per the following instructions:

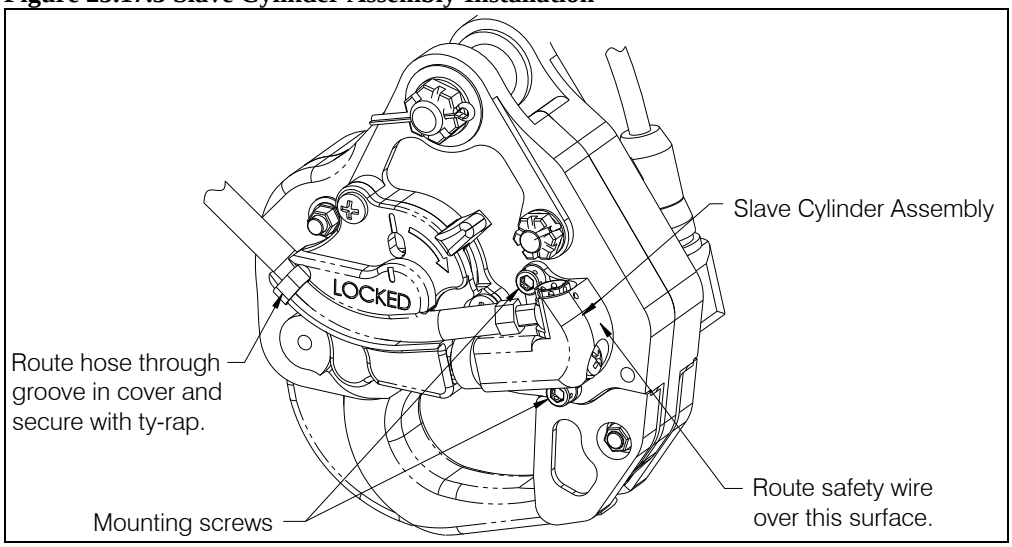
1. Ensure that the piston is in the retracted position. If the piston needs to be retracted connect the quick disconnect coupling and push the piston in.

NOTICE

The piston will not be able to be retracted if the hydraulic hose is not connected at the quick disconnect.

2. Insert the nose of the slave cylinder assembly into the side of the cargo hook as shown below and install the mounting screws (P/N 510-531-00).
3. Install safety wire between these screws around the backside of the slave cylinder. See Figure 25.17.3.
4. Route the hydraulic hose along the manual release cover and up through the hook bumper, along with the electrical harnesses, as shown in Figure 25.17.4. Secure components to bumper with ty-wraps as shown.
5. Connect the quick disconnect coupling at the belly of the helicopter.

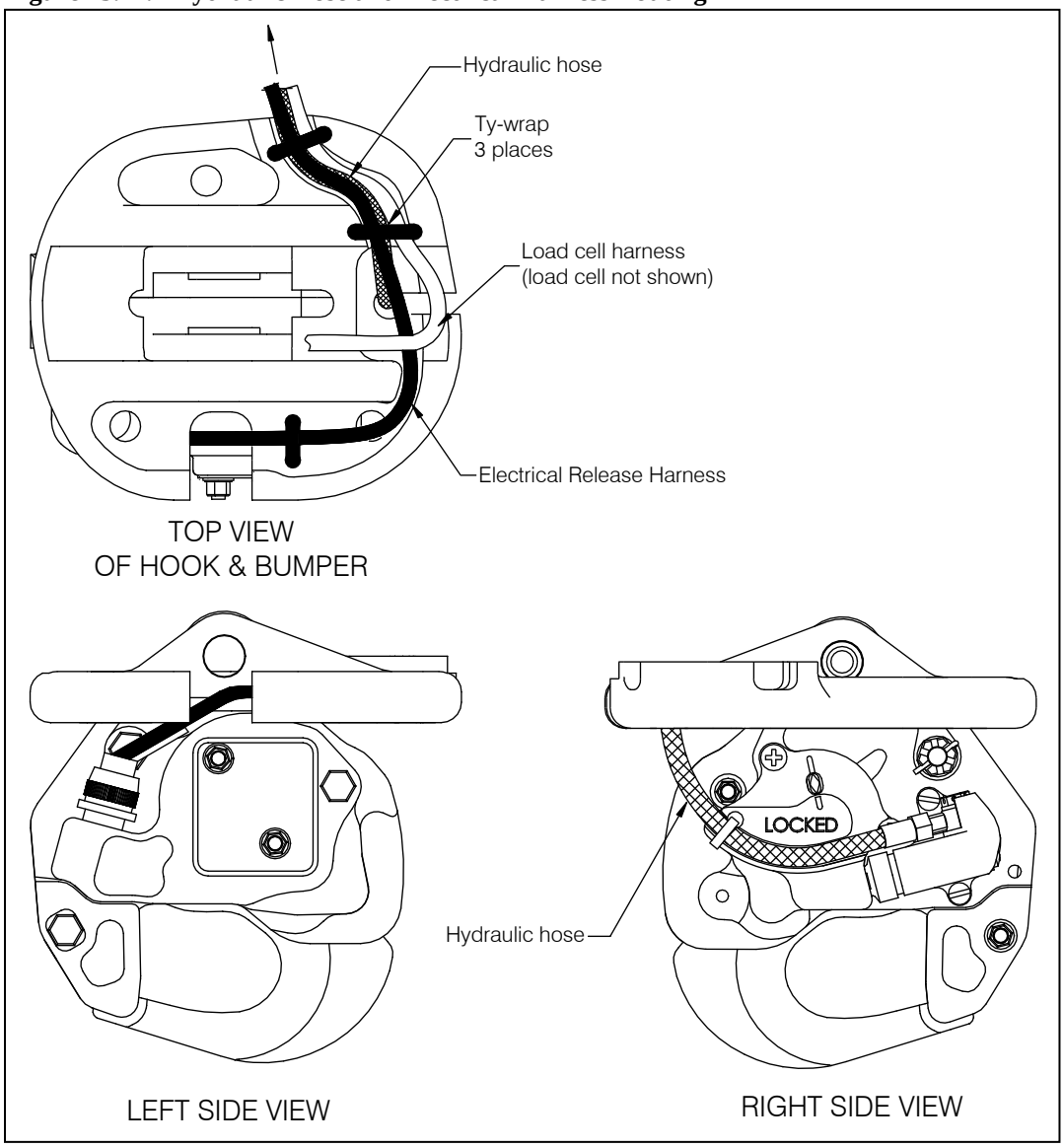
Figure 25.17.3 Slave Cylinder Assembly Installation



25.17 Component Re-installation continued

Slave Cylinder Assembly Re-installation continued

Figure 25.17.4 Hydraulic Hose and Electrical Harness Routing



25.17 Component Re-installation continued

Fixed Hydraulic Release Hose Re-installation

1. Install the release lever assembly onto the collective. Tighten the release lever assembly clamp until contact with the collective shaft is made, then tighten each screw approximately half a turn. Check that the Release Lever Assembly does not rotate on the shaft and that the collective pitch lever twist grip operates correctly.

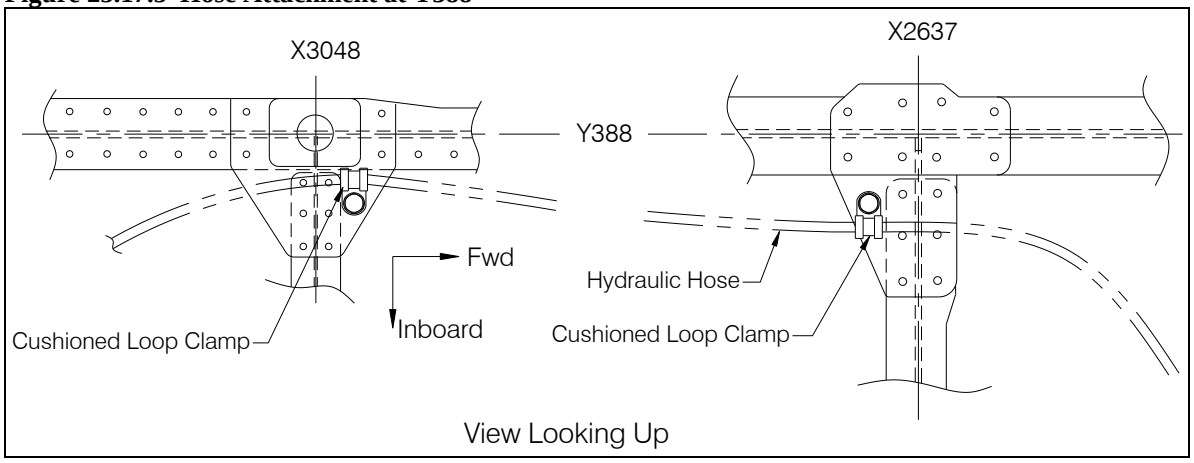
⚠ CAUTION

Do not over-tighten the two screws that secure the release lever assembly to the collective shaft. The shaft can be deformed and interfere with twist grip operation.

2. Aft of the collective, route the hose underneath the cabin floor through the velcro seam of the collective pitch lever boot.

3. Route the hose down and to the right side of the aircraft to the beam at Y388 and secure near frame at X2637 and X3048 with cushioned loop clamp (P/N 512-005-00). Secure loop clamp with bolt (P/N 510-453-00), washer (P/N 510-042-00), and nut (P/N 510-102-00).

Figure 25.17.5 Hose Attachment at Y388



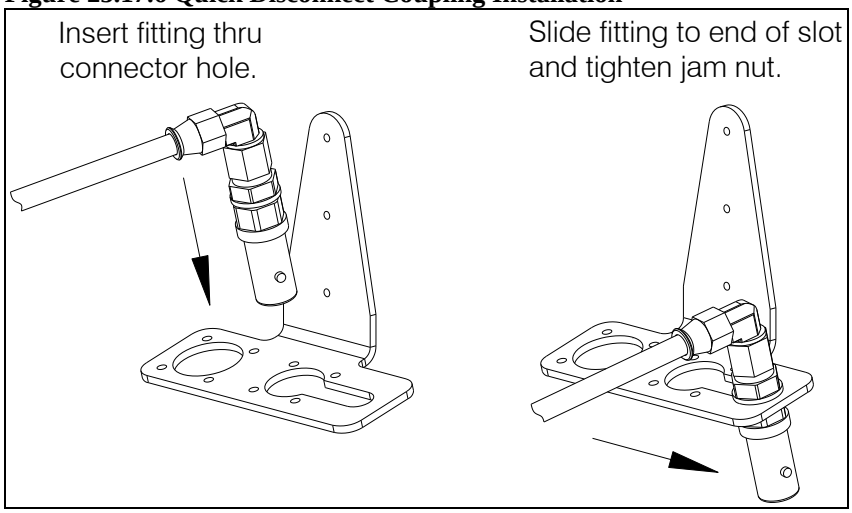
4. Aft of the cushioned loop clamp at X3048 route the hose directly to the connector bracket at Y250.

25.17 Component Re-installation continued

Fixed Hydraulic Release Hose Re-installation continued

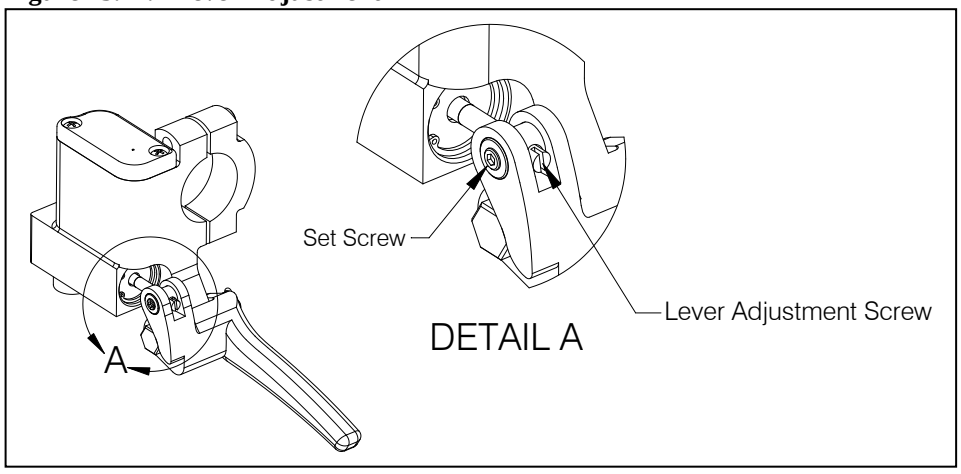
5. Pass the hydraulic quick disconnect coupling through the slotted hole. Slide the coupling outboard to the end of the slot and tighten the jam nut securely against the Connector Bracket.

Figure 25.17.6 Quick Disconnect Coupling Installation



6. After completing installation of the hydraulic system (both fixed and removable) bleed the system per section 12.2. If the hoses have not been disassembled, the system may not need to be bled. Check function per section 5.1.
7. If necessary, adjust position of lever (see below) on master cylinder to give full stroke of lever. Secure lever adjustment screw with set screw. Ensure there is no interference in any combination of control movements.

Figure 25.17.7 Lever Adjustment



25.17 Component Re-installation continued

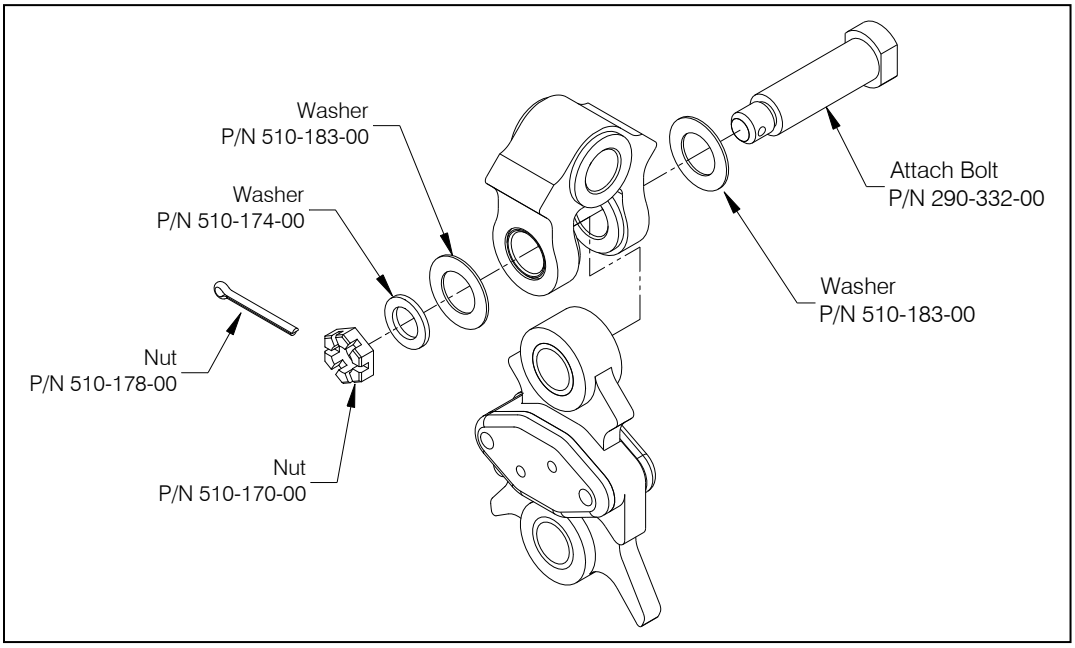
Load Weigh Indicator Re-installation

1. Place the Load Weigh Indicator into the mounting bracket on the RH door pillar and secure with four screws (P/N 510-457-00).
2. Connect the electrical connector on the wiring harness to the connector on the back of the indicator.

Load Cell Re-installation

1. Attach the load cell assembly to the gimbal fitting on the suspension frame (suspension frame not shown below) with hardware as illustrated in Figure 25.17.8.
2. Connect the load cell electrical cable connector on the load cell harness to the connector on the belly of the helicopter.
3. Secure electrical harness to bumper with ty-wraps (ref. Figure 25.17.4). Ensure harness does not get pulled tight or pinched throughout the full range of motion of the cargo hook.

Figure 25.17.8 Load Cell Hardware



25.18 General Procedural Instructions-Testing

After re-installation of the cargo hook or release system components 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 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.

CAUTION

The cargo hook 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 hydraulic release system by pulling the release lever on the collective in the cockpit. The mechanism should operate smoothly and the cargo hook must release. Return the load beam to its closed and locked position by hand after release. Verify that the hook lock indicator on the side of the hook returns to the fully locked position. In the fully locked position the hook lock indicator should align with the lines on the manual release cover (see Figure 5.1). If the hook does not release or re-latch, do not use the unit until the problem is resolved.

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