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Instructions for Continued Airworthiness

Talon LC Hydraulic Cargo Hook Kits
For the
Airbus Helicopters' AS350 Series Helicopter

System Part Numbers
200-297-00, 200-297-10
200-298-00, 200-298-10

STC SR01812SE

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Record of Revisions

Rev.	*Date*	*Page(s)*	*Reason for Revision*
4	08/06/10	00-00-00, P2 05-00-00 P1, P3 12-00-00 P5-9 25-00-00, P14, P15, P18	Replaced P/N 212-014-00 with 212-014-01 and updated hydraulic fluid filling instructions to use new kit. Updated warnings, cautions and notes section to safety label section. Updated safety label format throughout document.
5	12/19/11	12-00-00, Page 3, 4	Replaced Cup Seal (P/N 556-038-00) with Quad Ring (P/N 556-097-00) in Slave Cylinder Assembly.
6	06/06/13	Section 5 25-00-00 Page 9, 14	Added Bumper P/N 290-839-01. Moved daily check items to 100 hour/annual inspection. Updated definition of external load operations.
7	10/28/15	Section 5 pages 2-6 Section 12 page 3 Section 25 page 4, 5, 14	Added 5 year/1000 hour inspection, corrected master cylinder o-ring and cup seal P/Ns, updated troubleshooting table and tightening instructions for nut on cargo hook attach bolt.
8	08/29/16	Section 4 Section 5 pages 1, 3 Section 12 page 4 Section 25 pages 1, 3, 4, 17	Updated section 4 per FAA requirement, added CAUTION regarding Load Cell NDT, added references to CMM 122-015-00, corrected Figure 12.5.
9	04/25/17	Section 5, Section 11, Section 25 pages 2-5, 7, 14, 18	Added cargo hook kit P/Ns 200-297-10 and 200-298-10 which include cargo hook P/N 528-028-02 with Surefire release, added associated instructions.
10	09/13/17	Section 12 pages 1, 5	Added MIL-PRF-87257 hydraulic fluid.
11	03/02/18	Section 5 page 4	Removed NDT requirements, added instructions to return load cell to factory for inspection and 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 Kit P/Ns 200-297-00, 200-297-10, 200-298-00 and 200-298-10.

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 Cargo Hook Kits.

0.6 Arrangement

This manual contains instructions for the service, maintenance, inspection and operation of the Cargo Hook Kits on Airbus Helicopters' model AS350B, AS350B1, AS350B2, AS350BA and AS350D helicopters. The manual is arranged in the general order that maintenance personnel would use to install, maintain and operate the Cargo Hook Kits in service.
The arrangement is:

Section 0 Introduction.
Section 4 Airworthiness limitations (None apply to these kits)
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 Kit P/Ns 200-297-00, 200-297-10, 200-298-00, and 200-298-10 for the Airbus Helicopters' AS350B, AS350B1, AS350B2, AS350BA and AS350D helicopters. Refer to the appropriate Airbus Helicopters' maintenance documentation for instructions regarding parts of the aircraft that interface with these kits.

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 revisions of all manuals are also 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 System 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 system per the following. Refer to the cargo hook CMM (manual number 122-015-00) 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 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. 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).

CAUTION

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

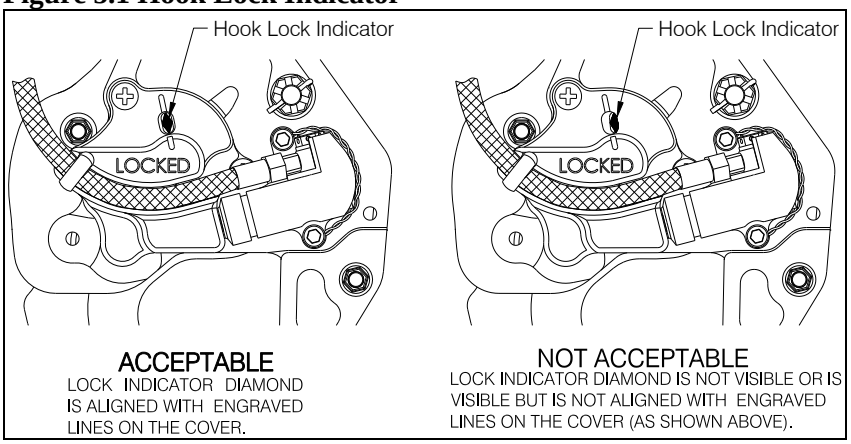
The following instructions are applicable to cargo hook P/N 528-028-02 which is equipped with Surefire electrical release. With no load on the cargo hook perform the following.

- *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).

5.1 Cargo Hook System Inspection continued

2. Activate the hydraulic release system by pulling the release lever 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).

Figure 5.1 Hook Lock Indicator



3. Swing the cargo hook and the suspension system throughout their full ranges of motion to ensure the hydraulic hose and electrical wire harnesses have enough slack and are not kinked or pinched in any of the possible hook and swing frame locations. The hose or harnesses must not be the stops that prevent the cargo hook or suspension from swinging freely in all directions.

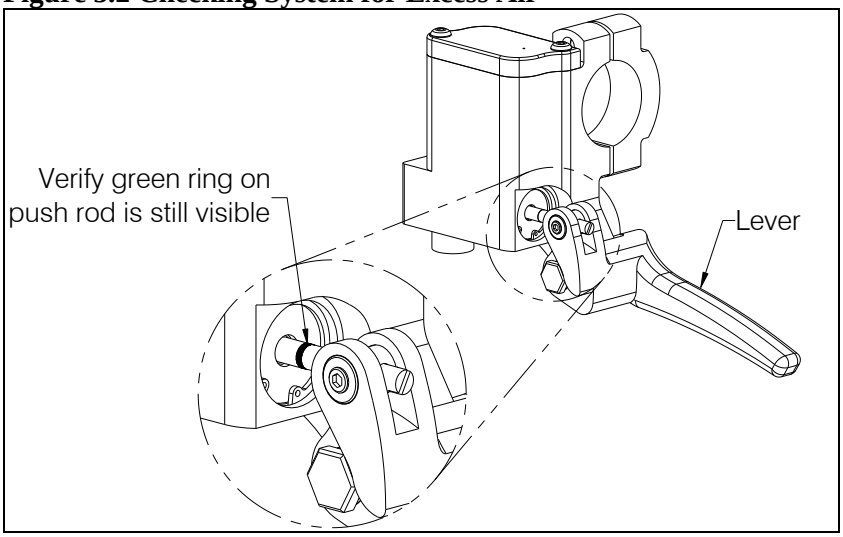
4. Visually inspect for presence and security of fasteners and electrical connections.

5. Visually inspect for fluid leaks in the hydraulic release system. Some seeping or dampness is acceptable, but drips or areas cleaned by leaking fluid indicate that the hook must not be used until the condition is repaired. See troubleshooting section to determine the course of action.

6. Check the hydraulic release system for air by actuating 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.

5.1 Cargo Hook System Inspection continued

Figure 5.2 Checking System for Excess Air



7. Verify calibration of the load cell by lifting a load of known weight.

5.1 Cargo Hook System Inspection continued

Every 5 years or 1000 hours of external load operations, whichever comes first, inspect the system per the following. Refer to Section 5.2 for cargo hook overhaul.

In addition to the items listed for the annual/100 hour inspection, perform the following. The Onboard Systems load weigh system is optional with this installation, thus omit the items pertaining to the load weigh system if it is not installed.

1. Return the Load Cell Assembly (P/N 210-046-01 or 210-046-02) 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.
2. Inspect internal electrical harness from the load weigh indicator to the load cell for general condition, security of attachment, and chafing along the length of wire runs.
3. Inspect the cargo hook bumper for damage (see Table 5.1 for limits).
4. Inspect for security of C-39 load indicator.
5. Inspect the external electrical harnesses and hydraulic hose for damage, chafing, and security of connections at each end.
6. Inspect for security of the Master Cylinder Assembly on the collective.

5.1 Cargo Hook System Inspection continued

Figure 5.3 Load Cell Assembly Components

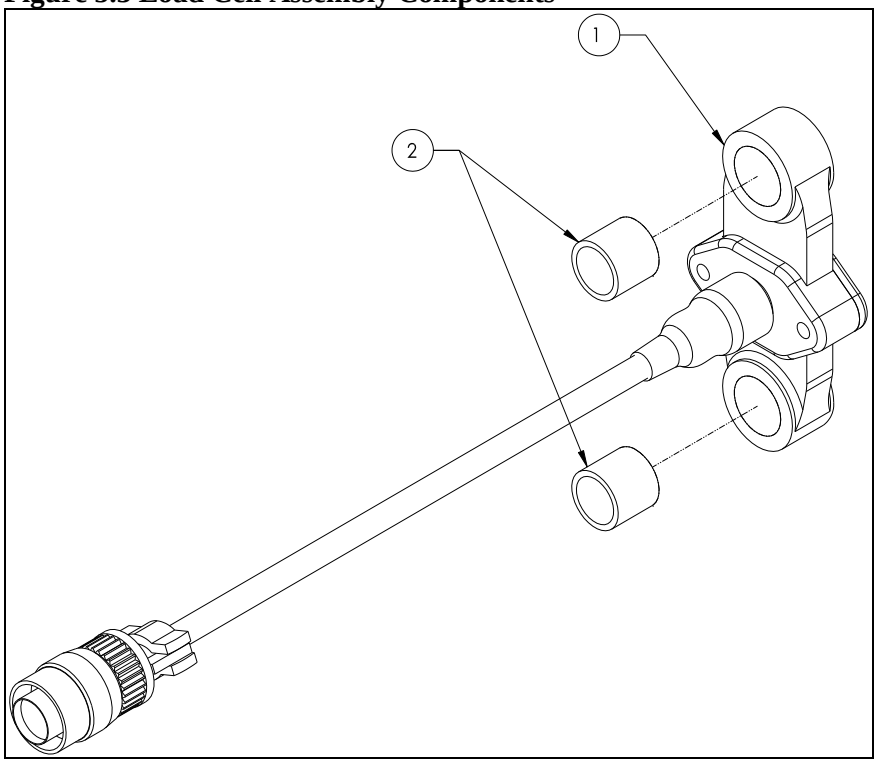


Table 5.1 Inspection Criteria

Item	Part	Inspect for:	Repair
1	Load Cell Assembly P/N 210-046-01 P/N 210-046-02	Dents, nicks, cracks, gouges, corrosion or scratches in the load cell link.	Repair dents, gouges, nicks, scratches and corrosion if less than .020" deep, blend out at a ratio of 20:1, length to depth, replace assembly if otherwise damaged. Load link is 15-5 stainless steel, no finish touch-up required.
		Dents, nicks, gouges, corrosion or scratches in the covers.	Repair dents, gouges, nicks, scratches and corrosion if less than .030" deep, blend out at a ratio of 20:1, length to depth. Touch up with Alodine and zinc chromate primer.
2	Bushing P/N 290-364-00.	Wear on inside diameter.	Replace bushing if inside diameter exceeds 0.520 in. Install bushing with wet zinc chromate primer (TTP1757-1CY or equivalent) applied to the inside diameter of the mating hole.
3*	Cargo Hook Bumper P/N 290-839-02	Nicks, gouges, or scratches.	None. Replace Bumper if nicks, gouges, scratches exceed .060" in depth.

*not shown

5.2 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 122-015-00. Contact Onboard Systems for guidance to locate authorized overhaul facilities.

Section 11
Placards and Markings

11.1 Placards

The 200-297-00 and 200-298-00 cargo hook kits include the following placard(s). Refer to the appropriate Airbus Helicopters' documentation for additional placards relating to the cargo hook suspension system.

Table 11.1 Cargo Hook System Placards

Placard part number and appearance	Location
 (text is engraved on manual release lever shown)	Located on the release lever of the hydraulic release master cylinder assembly. Master cylinder assembly is located on the collective.
P/N 215-010-00 ELECTRONIC WEIGHING SYSTEM	When a 200-298-00 or 200-298-10 system is installed, mounted adjacent to both the power switch and the circuit breaker in full view of the pilot and co-pilot.
P/N 215-012-00 TURN THE WEIGHING SYSTEM OFF WHEN NAVIGATION EQUIPMENT IN USE. NO AIRCRAFT OPERATION SHOULD BE PREDICATED ON THE READING OF THE ONBOARD WEIGHING SYSTEM.	When a 200-298-00 or 200-298-10 system is installed, mounted adjacent to the Onboard Systems load indicator in full view of the pilot and co-pilot.
P/N 215-336-00 	Mounted on the bottom of solenoid housing of cargo hook P/N 528-028-02 (included with kit P/N 200-297-10 and 200-298-10 only).

Table 11.1 Cargo Hook System Placards continued

Placard part number and appearance	Location
P/N 215-343-00 	Located adjacent to the cargo hook release switch on the cyclic (included with kit P/N 200-297-10 and 200-298-10 only).

Section 12
Servicing

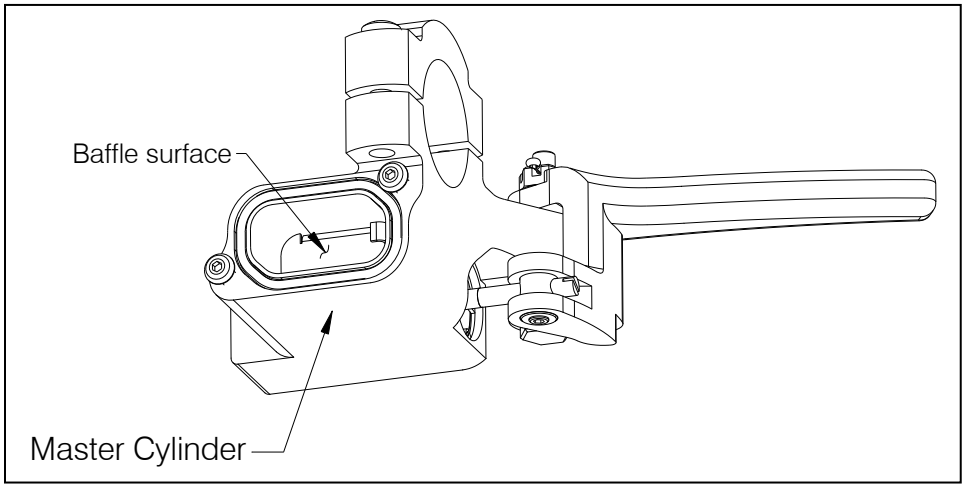
12.1 Maintenance of the Hydraulic Release System

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.

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 MIL-PRF-87257 (optional: MIL-PRF-5606) hydraulic fluid as required until the baffle surface is partially or fully submerged.

Figure 12.1 Checking Hydraulic Fluid Level



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 lip seal and o-ring. The Master Cylinder must be disassembled, inspected and then re-assembled with new seals.

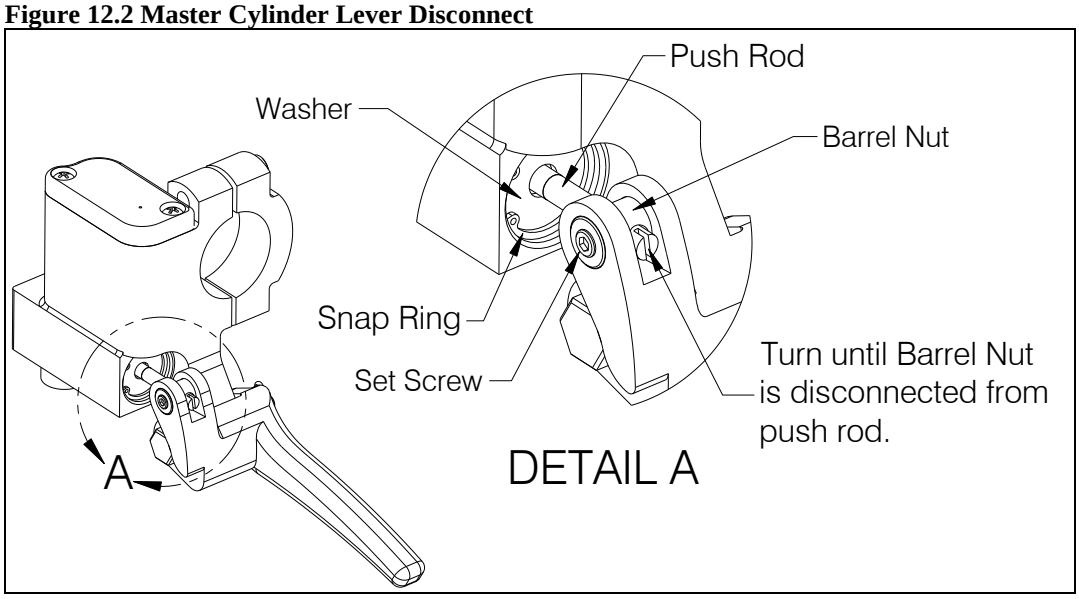
Disassembly:

1. Disconnect barrel nut on lever from the push rod. See Figure 12.2.
2. Remove retaining ring. Use caution when removing retaining ring since the piston is spring loaded against the washer and retaining ring and the piston will pop out of the housing when the retaining ring is removed. Hold the washer down with a screwdriver while removing retaining ring.
3. Remove the piston and spring
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 looks good, replace the cup seal and O-ring on the piston assembly. Maintain orientation as shown in Figure 12.4. Stretch seals over piston into grooves.
2. Re-assemble piston assembly, washer, spring and retaining ring as shown in Figure 12.3. Hold piston and washer down in bore with a screwdriver while you install the retaining ring.
3. Position the Barrel Nut in line with the push rod and with a small screwdriver, thread the push rod into the Barrel Nut.

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

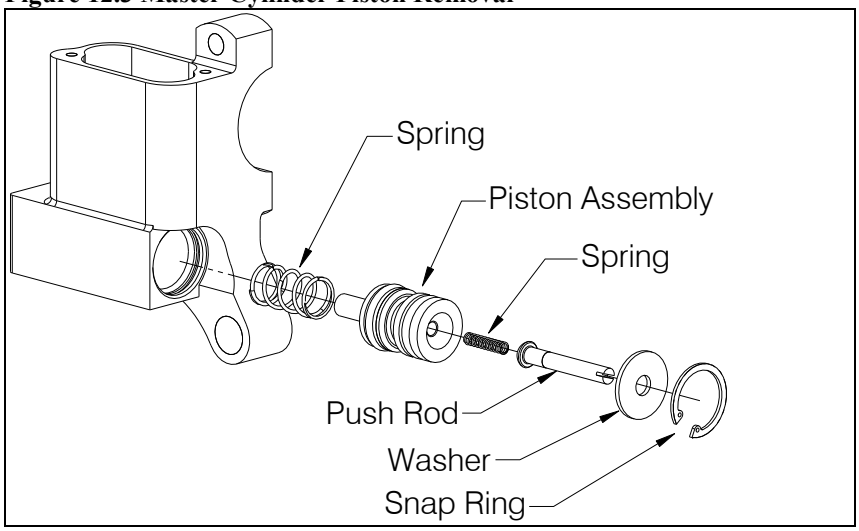
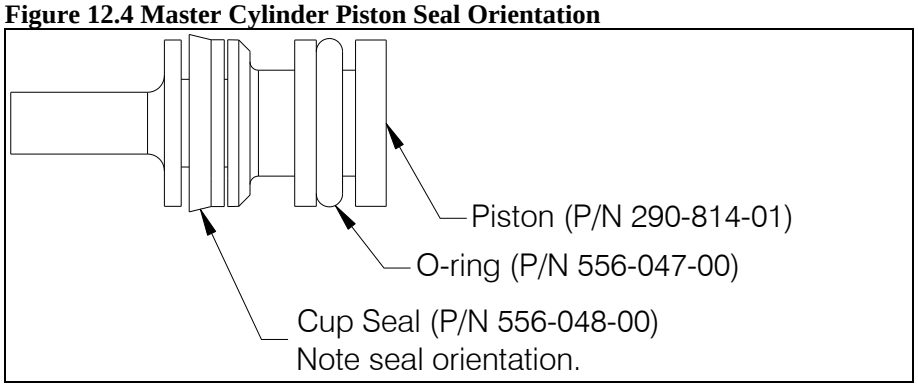


Figure 12.4 Master Cylinder Piston Seal Orientation



Slave Cylinder Repair

If the slave cylinder is leaking fluid around the piston rod, the only repair possible is to remove and replace the quad ring or cup seal (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.

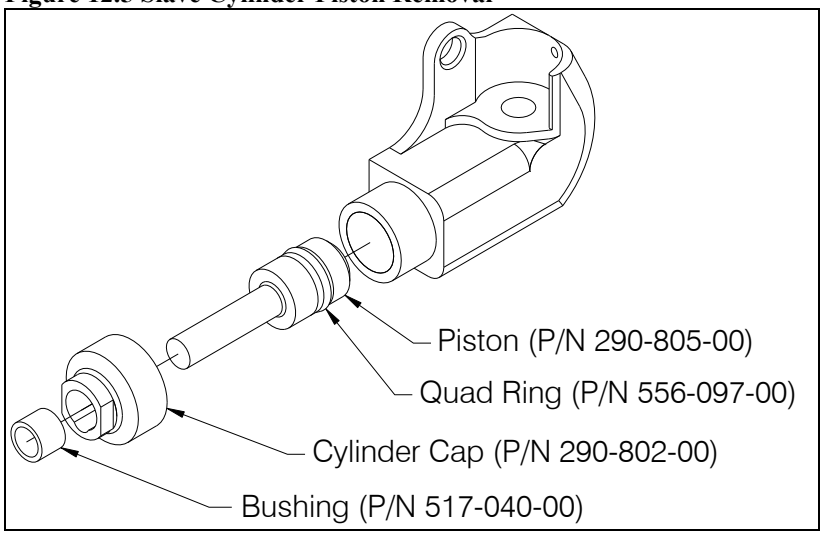
Re-assembly:

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.

12.1 Maintenance of the Hydraulic Release System, continued

Slave Cylinder Repair continued

Figure 12.5 Slave Cylinder Piston Removal



12.2 Bleeding Hydraulic System

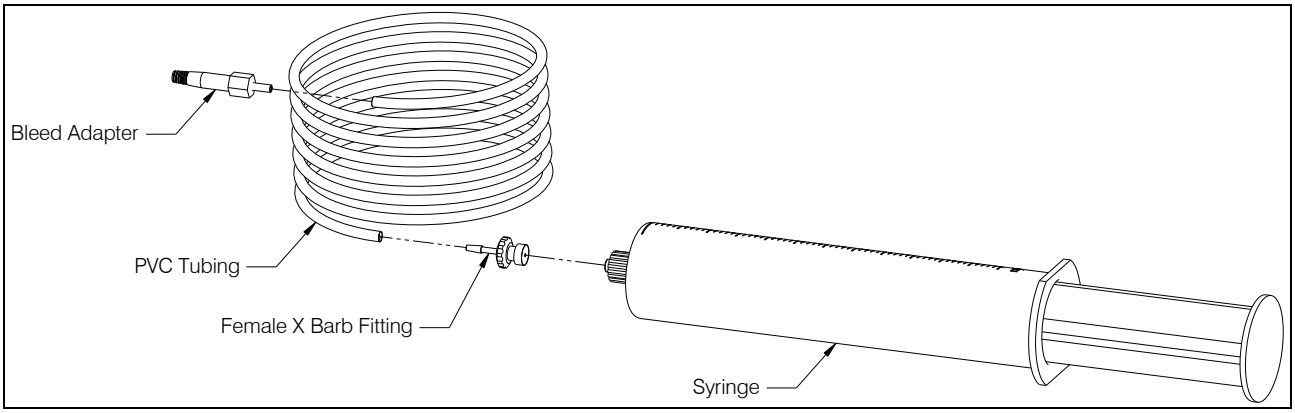
Filling and bleeding the hydraulic release system is most easily accomplished on the bench, prior to installation on the aircraft. This process may also be accomplished after the system is installed. Filling and bleeding requires two persons, one to inject hydraulic fluid through the system and the other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

1. Obtain the hydraulic hook bleed kit, 212-014-02. This kit consists of 2 ounces of MIL-PRF-87257 fluid, a syringe, a female barb fitting, a length of PVC tubing, and a bleed adapter fitting. The bleed kit is included in new Hydraulic Hook kits. Assemble the bleed kit by press fitting each component as shown.

NOTICE

MIL-PRF-5606 fluid is also compatible with the hydraulic system and was formerly included with new cargo hook kits. It is interchangeable and miscible with MIL-PRF-87257 fluid.

Figure 12.6 Hydraulic Hook Bleed Kit



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.

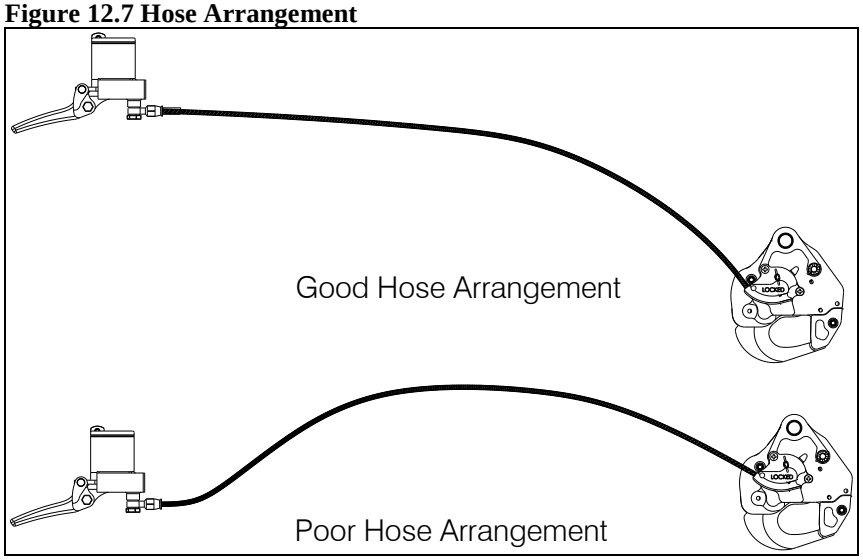
NOTICE

Use best shop practices to keep foreign material out of the hydraulic system. FOD will plug orifices, damage seals and/or scratch sealing surfaces necessitating system rebuild. Use only clean hydraulic fluid from sealed containers.

12.2 Bleeding Hydraulic System, continued

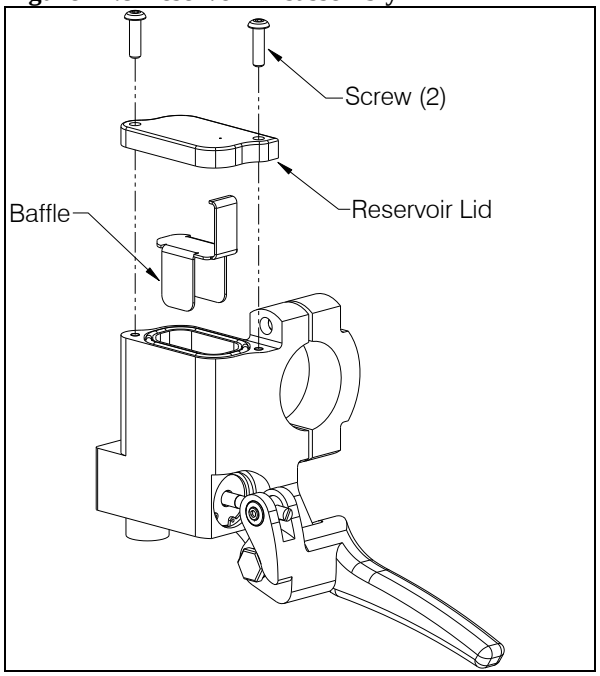
3. Connect the master cylinder assembly to the slave cylinder assembly if not already done. If filling or bleeding on the bench, as much as possible, arrange the hoses uncoiled, straight and running uphill. See Figure 12.7

Figure 12.7 Hose Arrangement



4. Remove screws, reservoir lid, and baffle from the master cylinder reservoir as shown in Figure 12.8.

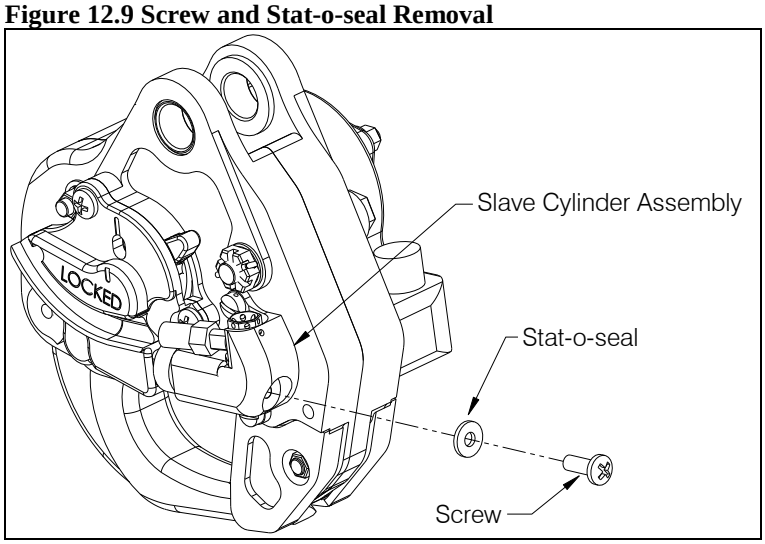
Figure 12.8 Reservoir Disassembly



12.2 Bleeding Hydraulic System, continued

5. Remove the screw and stat-o-seal on the slave cylinder, see Figure 12.9.

Figure 12.9 Screw and Stat-o-seal Removal



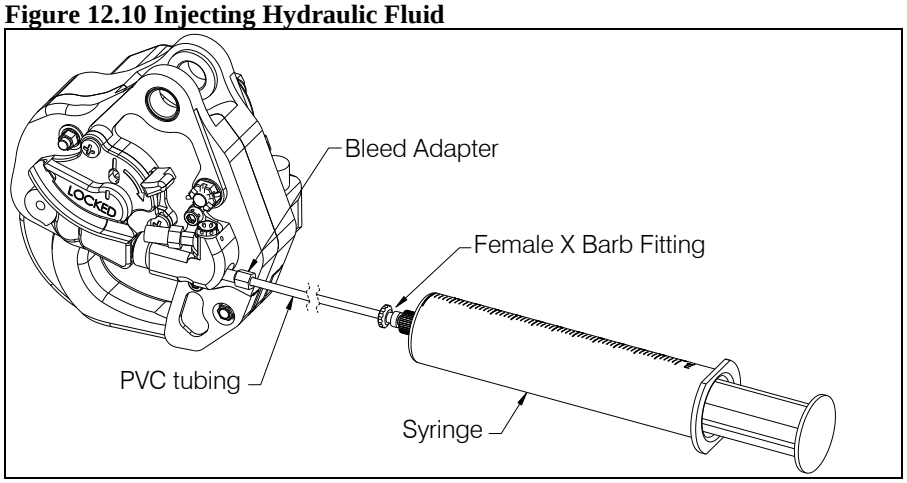
6. Fill the syringe with approximately 35 cc of hydraulic fluid and purge any remaining air in the syringe and tubing. Screw the end of the bleed adapter into the screw hole on the slave cylinder to create a tight seal. See Figure 12.10.

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.

Figure 12.10 Injecting Hydraulic Fluid



12.2 Bleeding Hydraulic System, continued

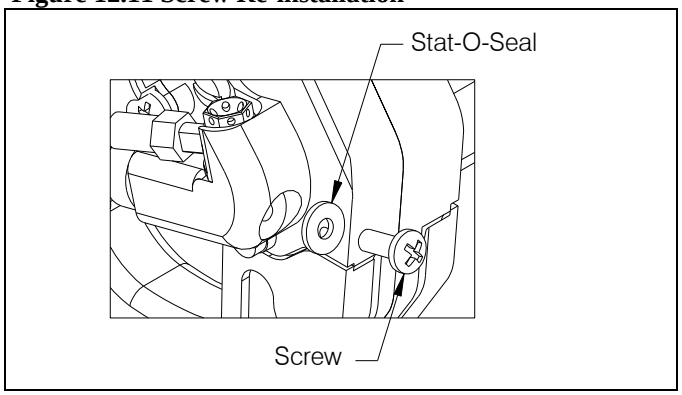
8. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

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 12.11.

Figure 12.11 Screw Re-installation



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

12.2 Bleeding Hydraulic System, continued

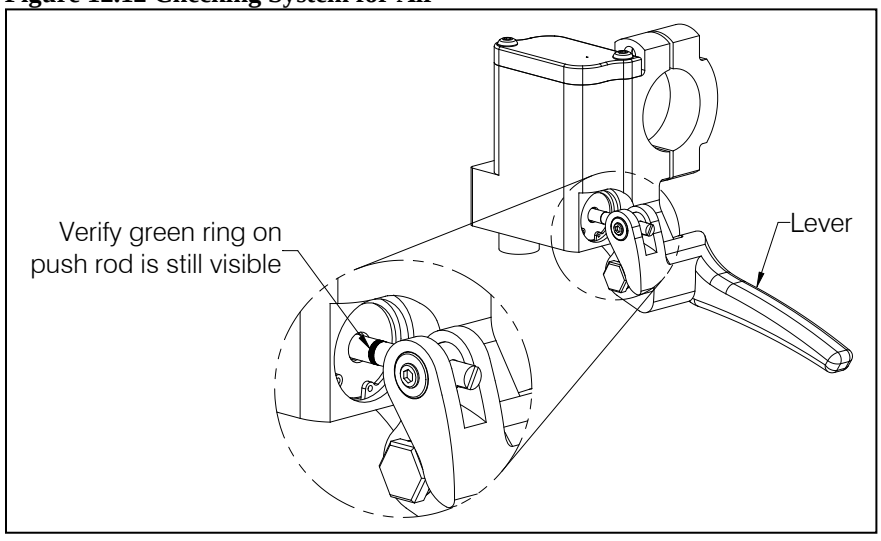
11. Very **slowly** pull the release lever on the master cylinder and watch for bubbles. If bubbles are observed rising within the reservoir, continue to slowly cycle the lever until there are no more. Actuating the lever releases air trapped within the master cylinder.

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. Check the system for air by actuating the lever firmly until it bottoms out. Check the push rod position (see Figure 12.12). 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 12.12 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 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 bleed kit 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

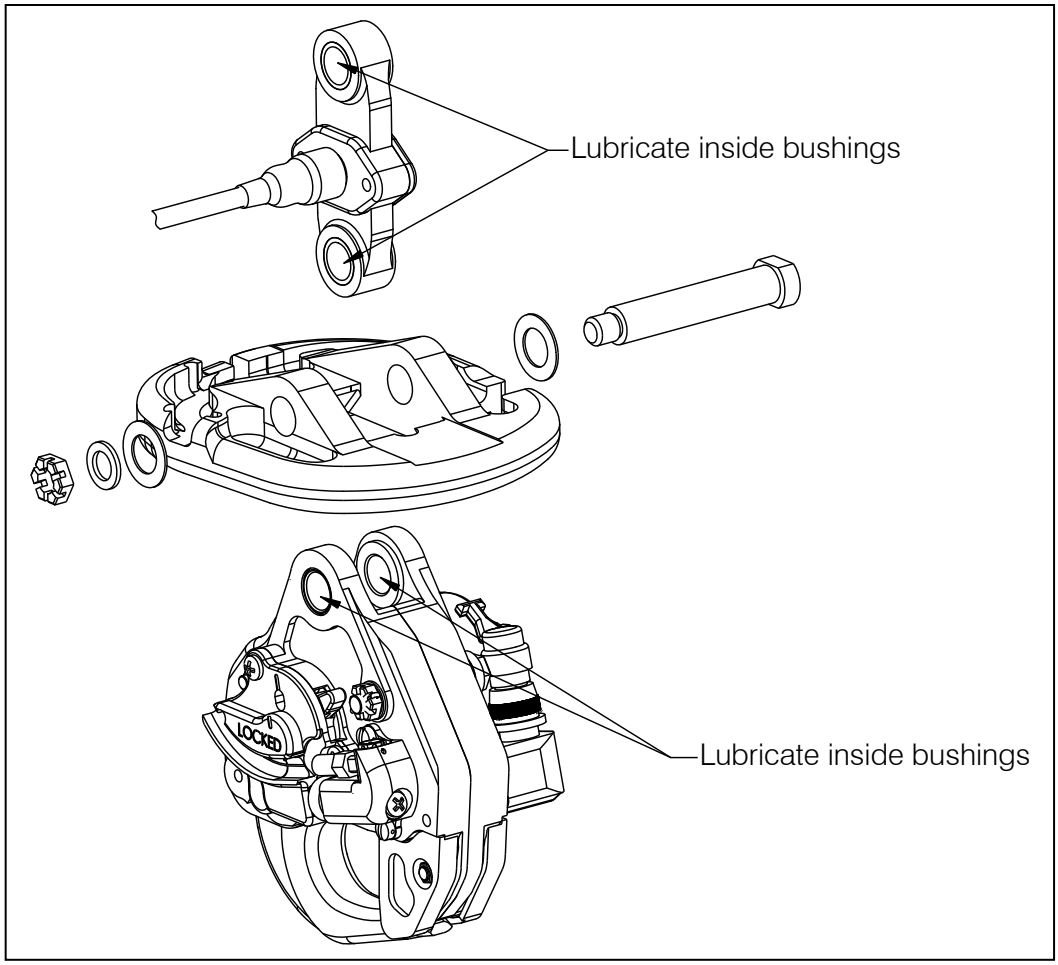
Lubrication of the Cargo Hook and Load Cell bushings is required every 500 hours of hook operation. To obtain maximum life under severe duty conditions such as logging or seismic work, it is recommended to lubricate approximately every 250 hours.

Hook and Load Cell Lubrication

Lubricate the Hook and Load Cell bushings shown in Figure 12.13. Some parts are not shown in Figure 12.13 to improve clarity. Recommended lubricants are AeroShell 17, MIL-G-21164 or Mobilgrease 28, MIL-G-81322.

For re-assembly after lubrication, tighten castellated nut on cargo hook pivot bolt to finger tight, then rotate nut to previous castellation if necessary to install and secure cotter pin. Refer to Airbus Helicopters' documentation for load cell attachment hardware information.

Figure 12.13, Hook and Load Cell Lubrication



Section 25
Equipment and Furnishings

25.1 Cargo Hook Connector

Listed below is the pin out for the cargo hook connector. Early production units of the cargo hook were polarity sensitive due to the arc suppressing diode internally mounted.

Table 25.1 Cargo Hook Connector

Pin	*Function*
A	Ground
B	Power

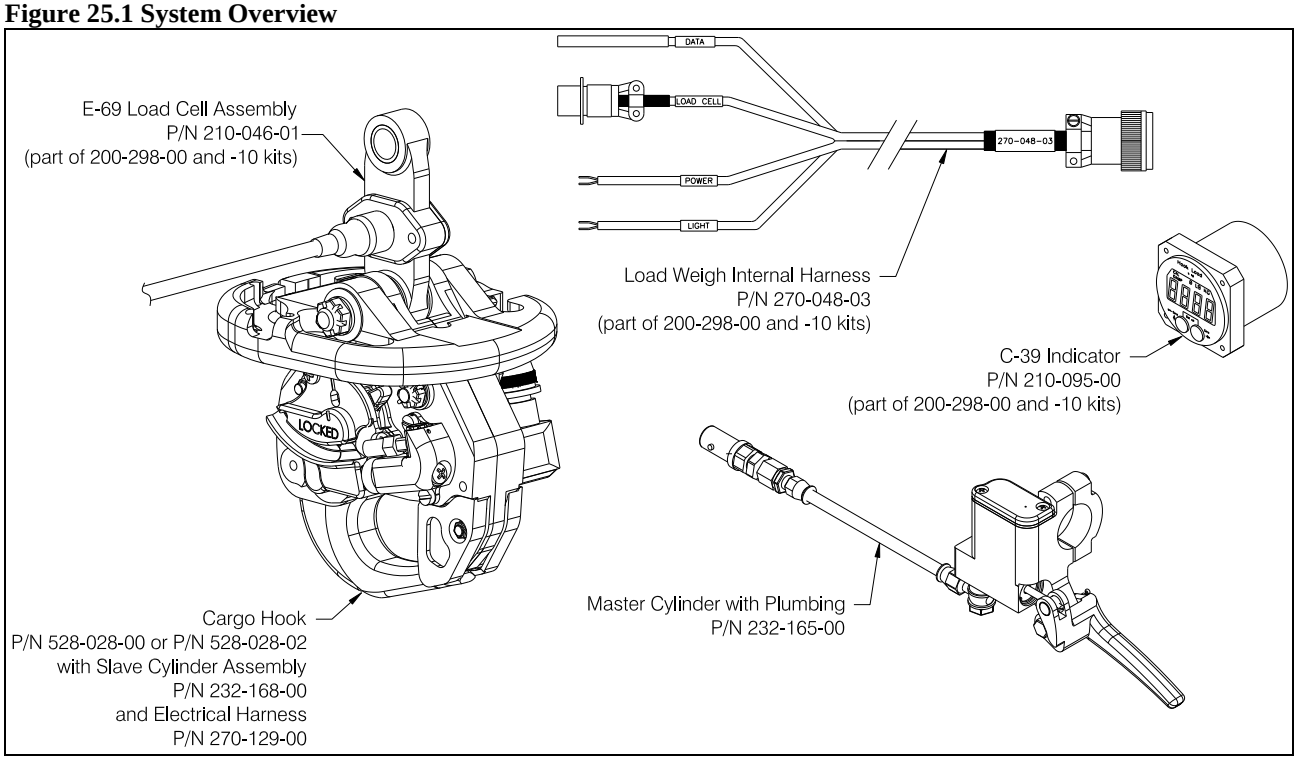
25.2 Description

The 200-297-00, 200-297-10, 200-298-00, and 200-298-10 Cargo Hook Kits are designed for use on an Airbus Helicopters' AS350B, AS350B1, AS350B2, AS350BA and AS350D swing suspension frame. They interface with the helicopter's existing electrical release wiring to provide means for release of a cargo hook load by pilot actuation of the push-button switch in the cockpit. When the push-button switch is pressed, it energizes the DC solenoid in the cargo hook, and the solenoid opens the latch in the internal mechanism. An alternative means of releasing a cargo hook load is provided by a hydraulic release system. When the release lever mounted to the collective is actuated, a piston integrated into the hook extends and releases the internal mechanism causing the load beam to open. Ground personnel may also release a load by the actuation of a lever located on the side of the cargo hook.

The P/N 200-298-00 and 200-298-10 kits include a load weigh system, which is comprised of an indicator mounted within the cockpit connected by a wiring harness to a load cell between the cargo hook and frame.

Kit P/Ns 200-297-10 and 200-298-10 include Cargo Hook P/N 528-028-02 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.

Figure 25.1 System Overview



25.5 Component Weights

The weights and cgs of the kits are listed in Table 25.2 and 25.3. These weights are for the parts supplied in the kits only. For complete weight and balance calculations the removed equipment will need to be weighed and subtracted from the aircraft weight.

Table 25.2 Weights and CGs for Kit P/N 200-297-00, 200-297-10

Item	Weight	Station
Removable Provisions*	3.5 lbs (1.6 kg)	133 in (3375 mm)
Fixed Provisions**	1.4 lbs (0.6 kg)	110 in (2794 mm)
Total	4.9 lbs (2.2 kg)	126.4 in (3211 mm)

Table 25.3 Weights and CGs for Kit P/N 200-298-00, 200-298-10

Item	Weight	Station
Removable Provisions*	4.6 lbs (2.1 kg)	133 in (3375 mm)
Fixed Provisions**	2.6 lbs (1.2 kg)	110 in (2794 mm)
Total	7.2 lbs (3.3 kg)	124.7 in (3167 mm)

***** The removable provisions include the hook, external hydraulic release hose, external electrical release cable, and load cell. These items are easily removed if they are not needed on the helicopter's mission. Refer to Suspension System Removal in Section 25.16 for removal instructions.

****** The fixed provisions are those items of the kit that remain on the aircraft. Examples of these items include the Master Cylinder with hydraulic hose, internal load weigh harness, the load weigh indicator, and 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 stored inverted. If long term storage or shipping must be done where the orientation of the master cylinder cannot be controlled, the reservoir must be drained. 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.

Refer to Cargo Hook Component Maintenance Manual 122-015-00 for storage instructions for the cargo hook. Clean the remaining kit components thoroughly of excess dirt and grease with a rag before packaging. Pack the components in a heat-sealable package. If the components are 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.

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

25.15 Troubleshooting

Table 25.4 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 documentation for guidance on procedures relating to parts that interface with this suspension system.

Table 25.4 Troubleshooting

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Cargo hook does not operate electrically or manually.	Defective internal mechanism.	Remove and replace cargo hook (see sections 25.16 and 25.17) or repair per CMM 122-015-00.
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 P/N 528-028-02 (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.	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.

Table 25.4 Troubleshooting continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Fluid leaks at hose fittings.	Loose fittings.	Tighten fittings. Check fluid level in reservoir. Bleed hydraulic system per Section 12.2.
Fluid leaks around master or slave cylinder pistons.	Leaking seals.	Replace master or slave cylinder assembly or repair per Section 12.
Cargo hook fails to open or re-lock properly.	Failure to open or re-lock properly.	Remove and replace cargo hook (see Sections 25.16 and 25.17) or repair per CMM 122-015-00.
Fuse or circuit breaker opens when cargo hook is energized.	Short in the system, faulty wiring, fuse/circuit breaker or solenoid.	Check wiring (refer to Airbus maintenance documentation). Check solenoid resistance (see note 1), repair or replace defective parts.
Load Weigh Indicator does not light up.	Faulty wiring or fuse/circuit breaker.	Check the fuse/circuit breaker (refer to Airbus 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 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 for remove and replace instructions).

Notes:

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

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

Figure 25.2 Cargo Hook Electrical Connector

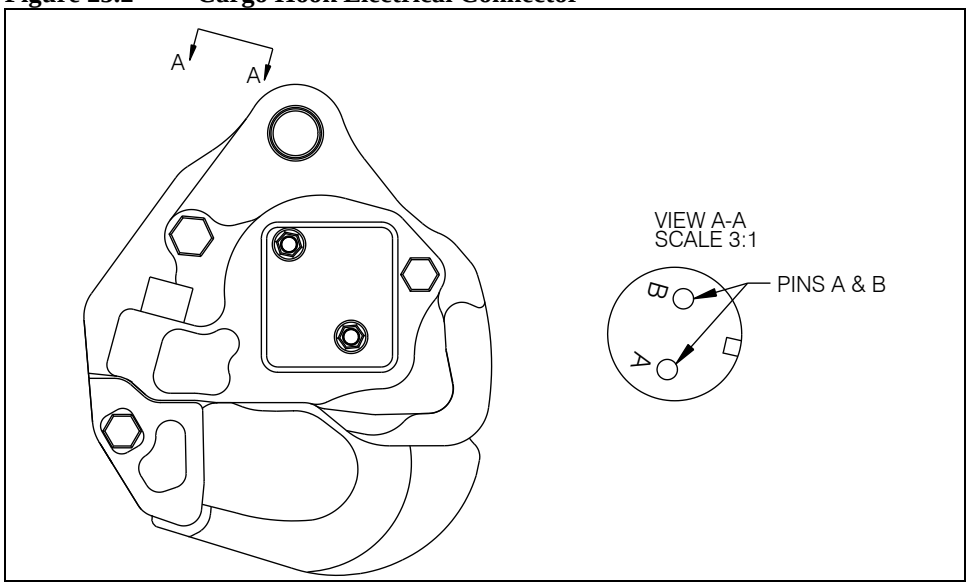


Table 25.3 Notes continued:

2. 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:

- "EXT. PWR. BAT." push-button is released.
- External power connector is not supplied
- Further precaution: remove the fuse(s) from the corresponding circuits.

The load weigh electrical harnesses is routed with and secured to existing wire bundles located 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 25.4 for electrical schematic.

Figure 25.3 Load Weigh Wire Harness Routing

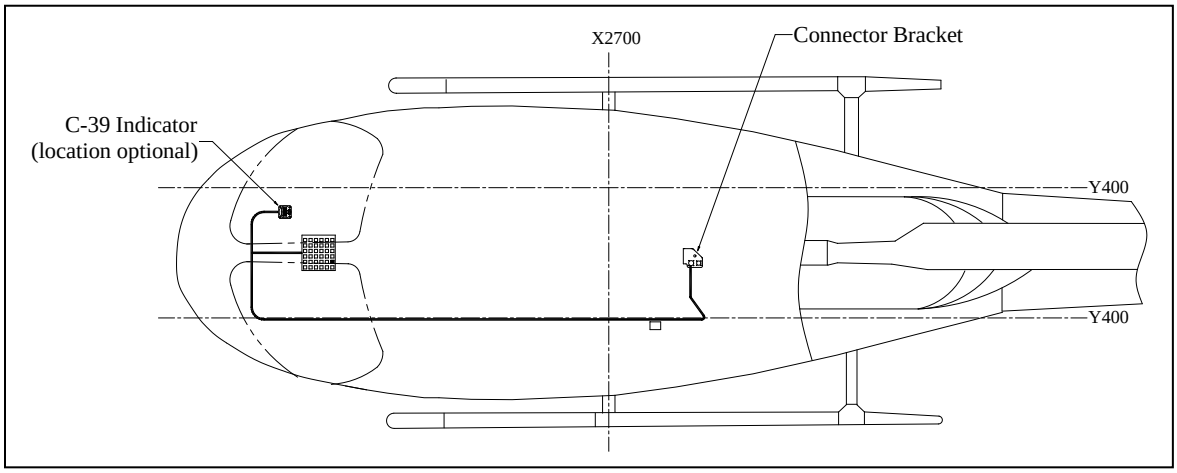


Table 25.3 Notes continued:

2. Checking Wire Harnesses continued

Figure 25.4 Load Weigh Electrical Schematic

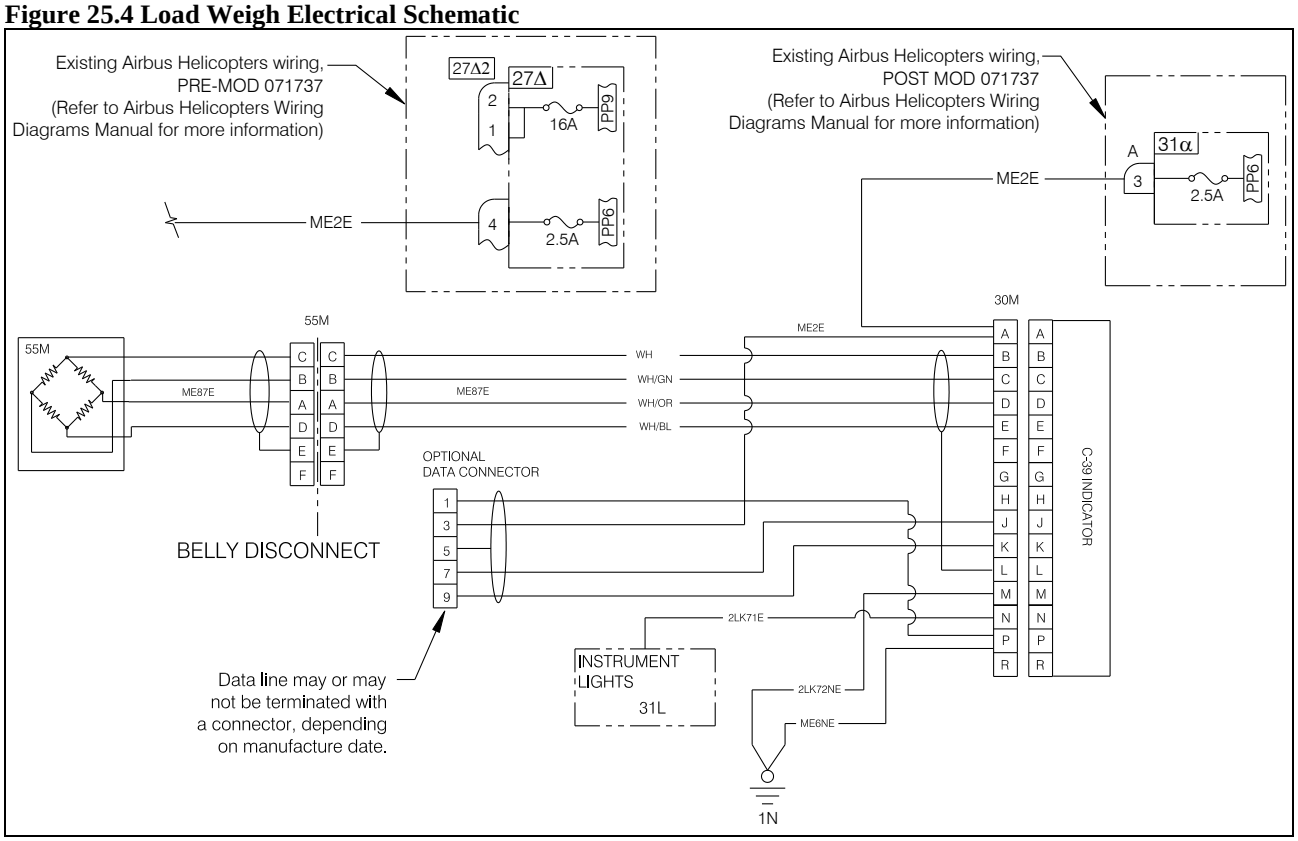
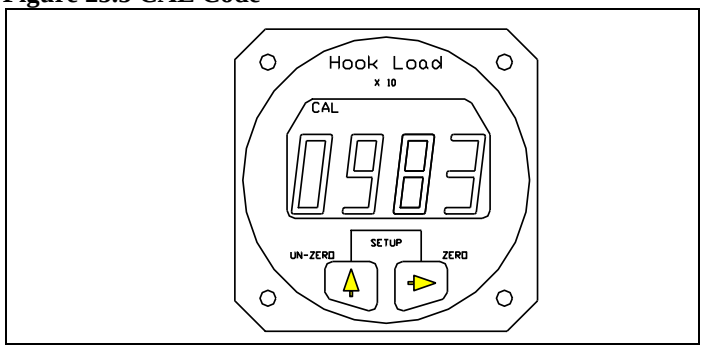


Table 25.3 Notes continued:

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 25.5 CAL Code

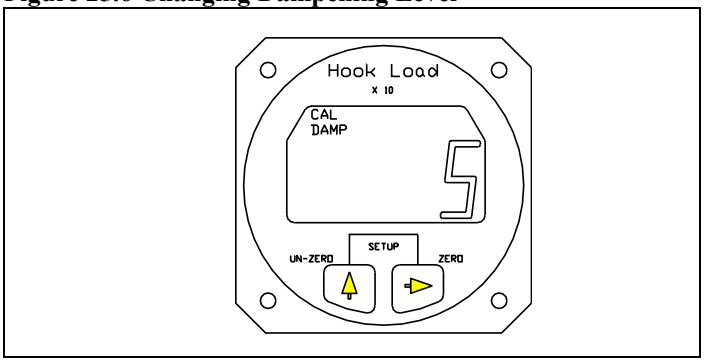


This code should match the code printed on the tag attached to the load cell cable. If this code does not match, contact Onboard Systems for further guidance.

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 25.6 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

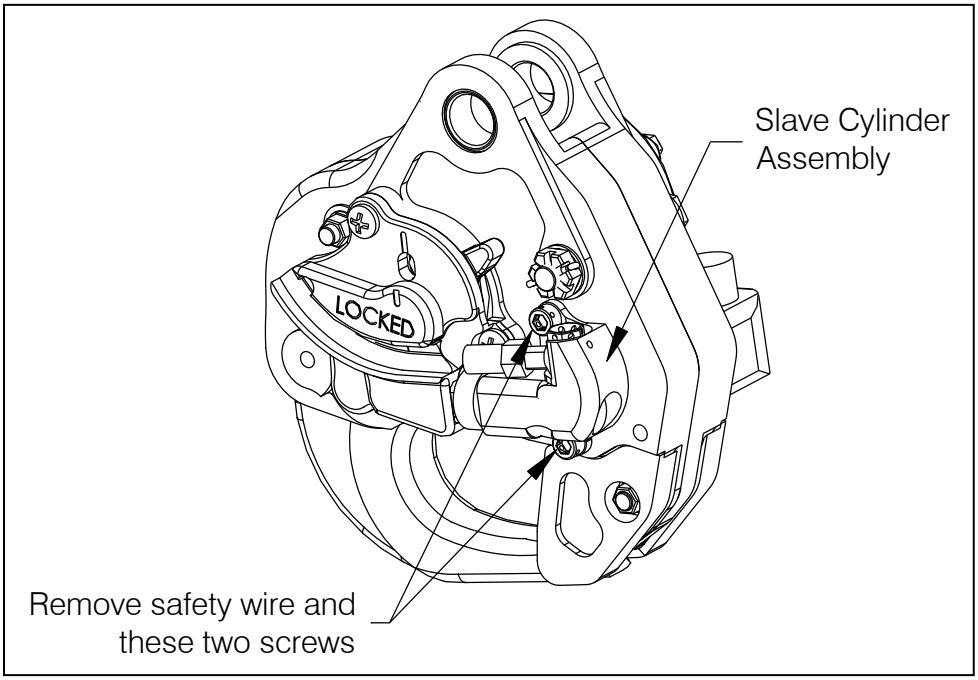
1. Remove the slave cylinder assembly by removing two screws (refer to Figure 25.7) and associated ty-wraps.
2. Remove the electrical release harness from the Cargo Hook and associated ty-wraps at the bumper.
3. Remove the cotter pin (P/N 510-178-00) from attach bolt (P/N 290-775-00).
4. Remove the castellated nut (P/N 510-170-00) from the attach bolt.
5. Remove attach bolt and all washers.
6. Remove the Cargo Hook from suspension system.
7. Remove the Hook Bumper (P/N 290-839-02) from the cargo hook.

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 25.7 Slave Cylinder Assembly Removal

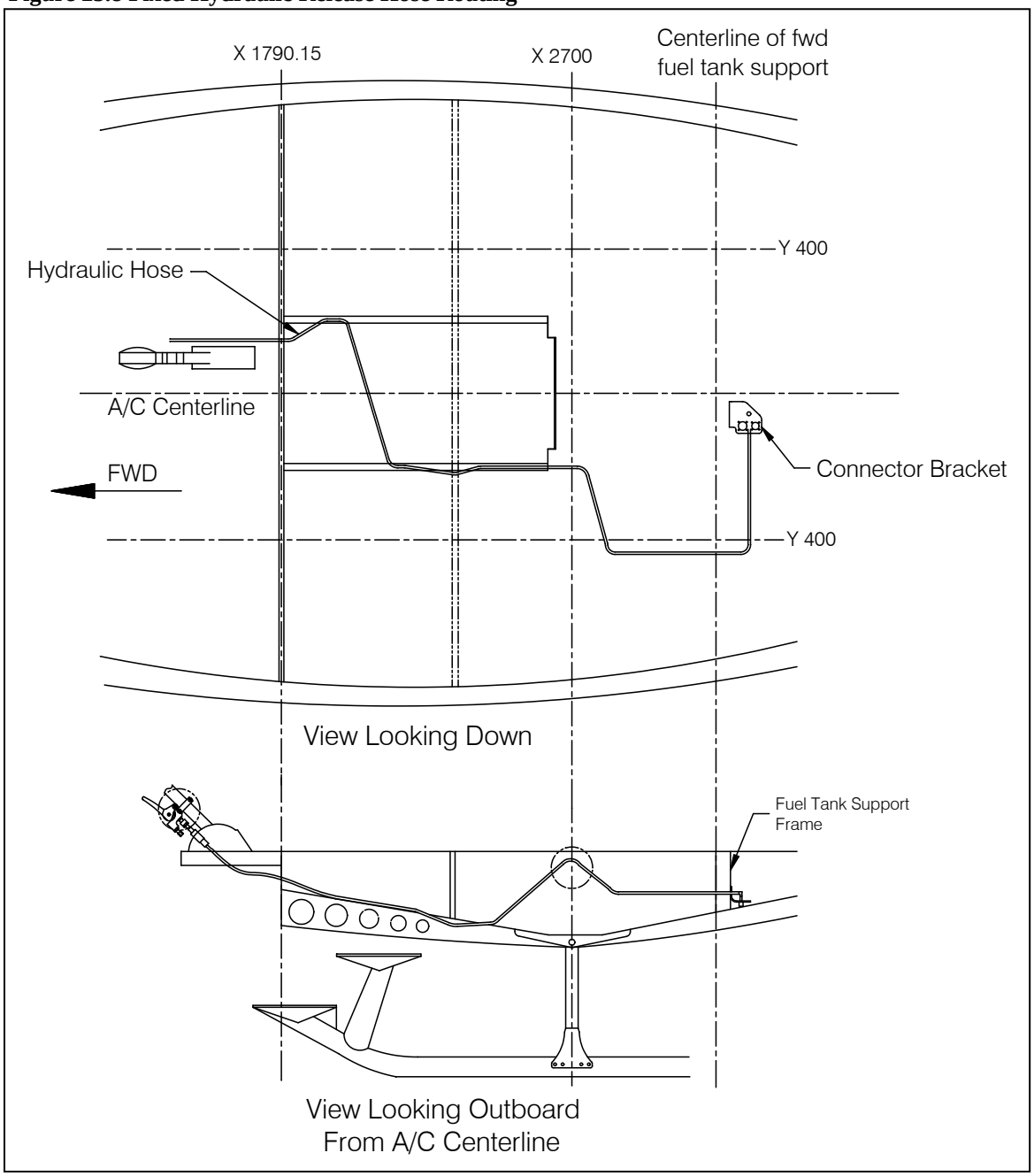


25.16 Component Removal continued

Fixed Hydraulic Release Hose Assembly Removal

The fixed hydraulic release hose is routed from the release lever mounted to the collective to the connector bracket on the forward fuel tank support of the helicopter where it is mated with the removable section of the hydraulic release system.

Figure 25.8 Fixed Hydraulic Release Hose Routing

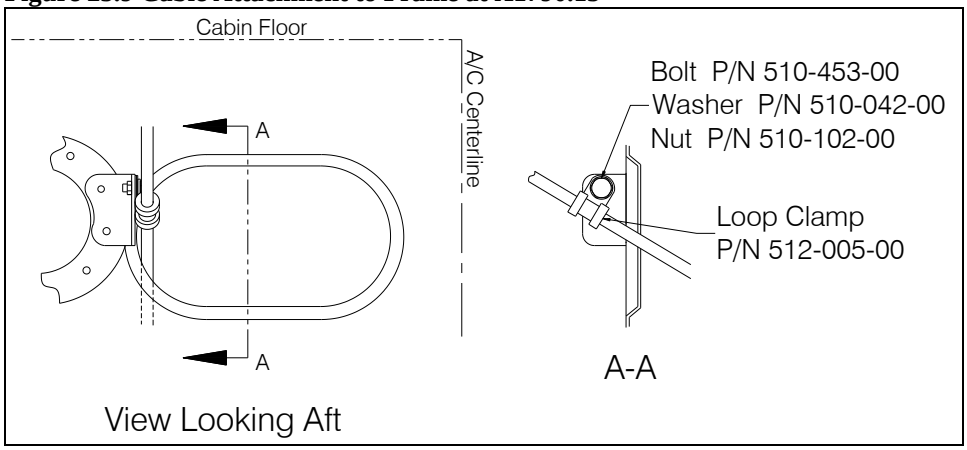


25.16 Component Removal continued

Fixed Hydraulic Release Hose Assembly Removal continued

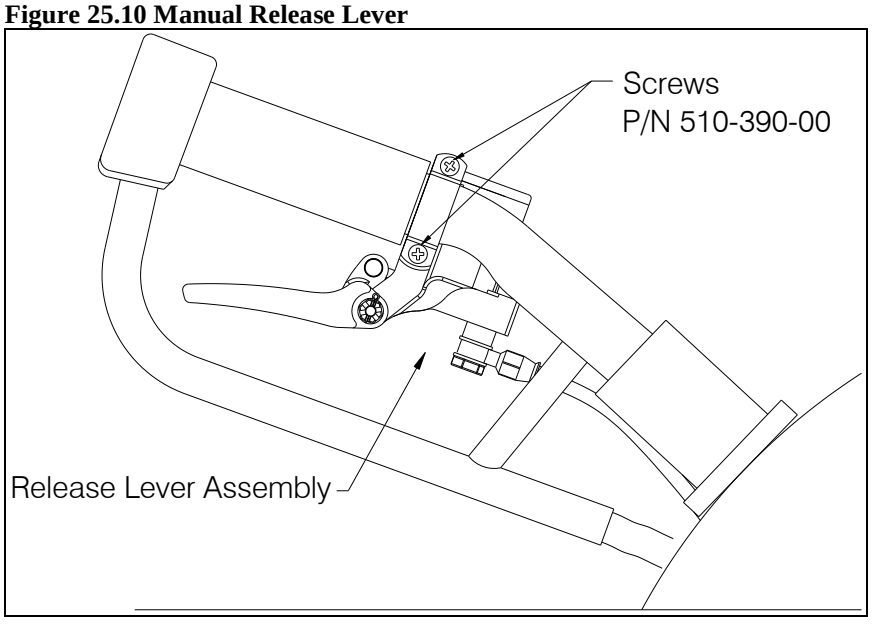
1. Remove the quick disconnect coupling from the connector bracket that is attached to the fuel tank support frame.
2. Moving farther forward, remove all ty-raps on the hose and the loop clamp at the bracket at frame at STA 1790.15 and remove it from the hose.

Figure 25.9 Cable Attachment to Frame at X1790.15



3. Feed the hose forward and then up through the slot in the floor.
4. Above the floor and on the collective stick remove the release lever by removing two screws (see below).

Figure 25.10 Manual Release Lever



25.16 Component Removal **continued**

Load Weigh Indicator Removal

The mounting location of the load weigh indicator is optional.

1. Disconnect electrical connector from the back of indicator.
2. Remove the four screws that secure the indicator to its mounting bracket and remove the indicator.

Load Cell Removal

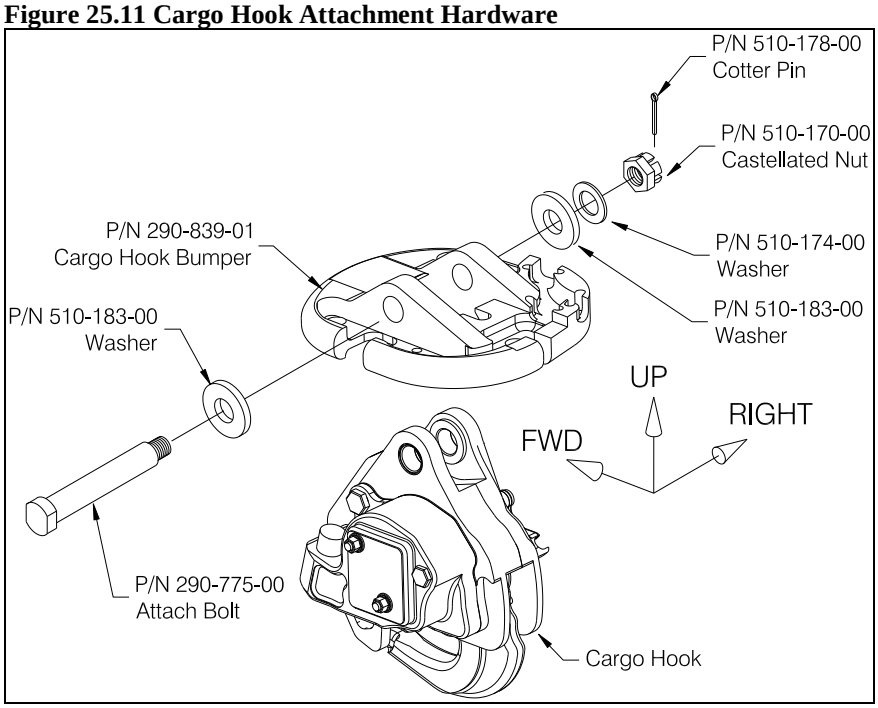
1. Remove the Cargo Hook per the above instructions.
2. Disconnect the electrical connector at the belly of the helicopter.
3. Remove the Load Cell Assembly from the suspension by removing the hardware. Note: The load cell is secured to the suspension utilizing existing Airbus Helicopters' hardware, refer to Airbus Helicopters' manuals for part numbers.

25.17 Component Re-installation

Cargo Hook Re-installation

1. Inspect the Cargo Hook for evidence of damage, corrosion and security of lock wire and fasteners. If damage is evident, do not use the items until they are repaired.
2. Install slave cylinder assembly (P/N 232-168-00) per this section.
3. Install electrical release harness (P/N 270-129-00) per this section.
4. Attach the Cargo Hook (P/N 528-028-00 or P/N 528-028-02) 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 load cell (not shown below) with washer (P/N 510-183-00). Refer to Figure 25.11
5. Install washer (P/N 510-183-00), washer (P/N 510-174-00) and nut (510-170-00) over bolt end.
6. Tighten nut to finger tight until seated, and then rotate to previous castellation if necessary to insert cotter pin. Install and secure cotter pin (P/N 510-178-00).
7. Route electrical harnesses and hydraulic hose through channel in bumper and secure with ty-wraps. See Figure 25.13.

Figure 25.11 Cargo Hook Attachment Hardware



NOTICE

The Cargo Hook load beam must point forward when installed on the cargo swing (as shown above).

25.17 Component Re-installation continued

Slave Cylinder Assembly Re-installation

Connect the slave cylinder assembly (P/N 232-168-00) to the cargo hook first, per the following instructions:

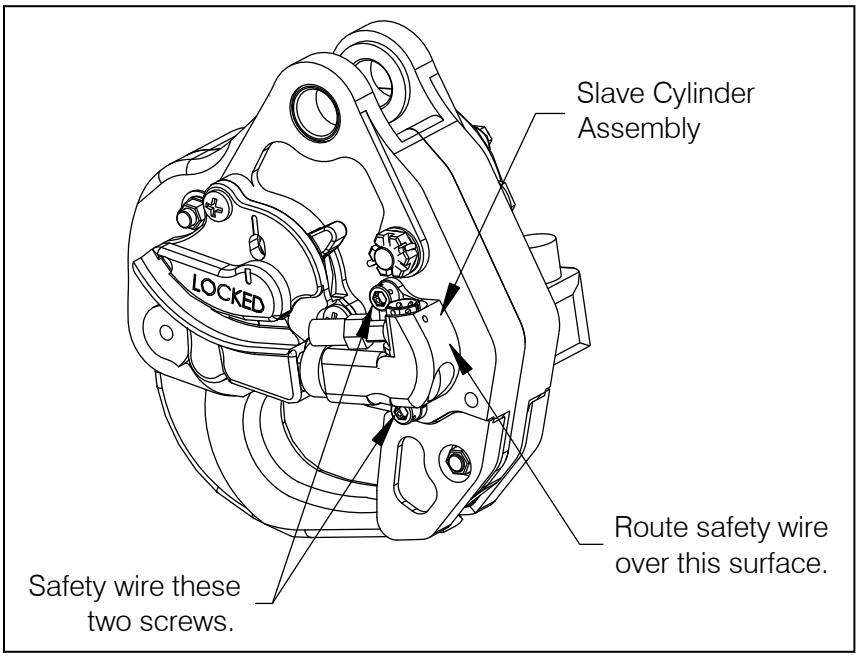
1. Ensure that the piston is in the retracted position. If the piston needs to be retracted connect the quick disconnect coupling and push the piston in.

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 510-251-00). See Figure 25.12.
3. Install safety wire between these screws around the backside of the slave cylinder. See Figure 25.12
4. Route the hydraulic hose along the manual release cover and up through the hook bumper, along with the electrical harness, as shown in Figure 25.13. Secure components to bumper with ty-wraps as shown.
5. Connect the quick disconnect coupling at the belly of the helicopter.

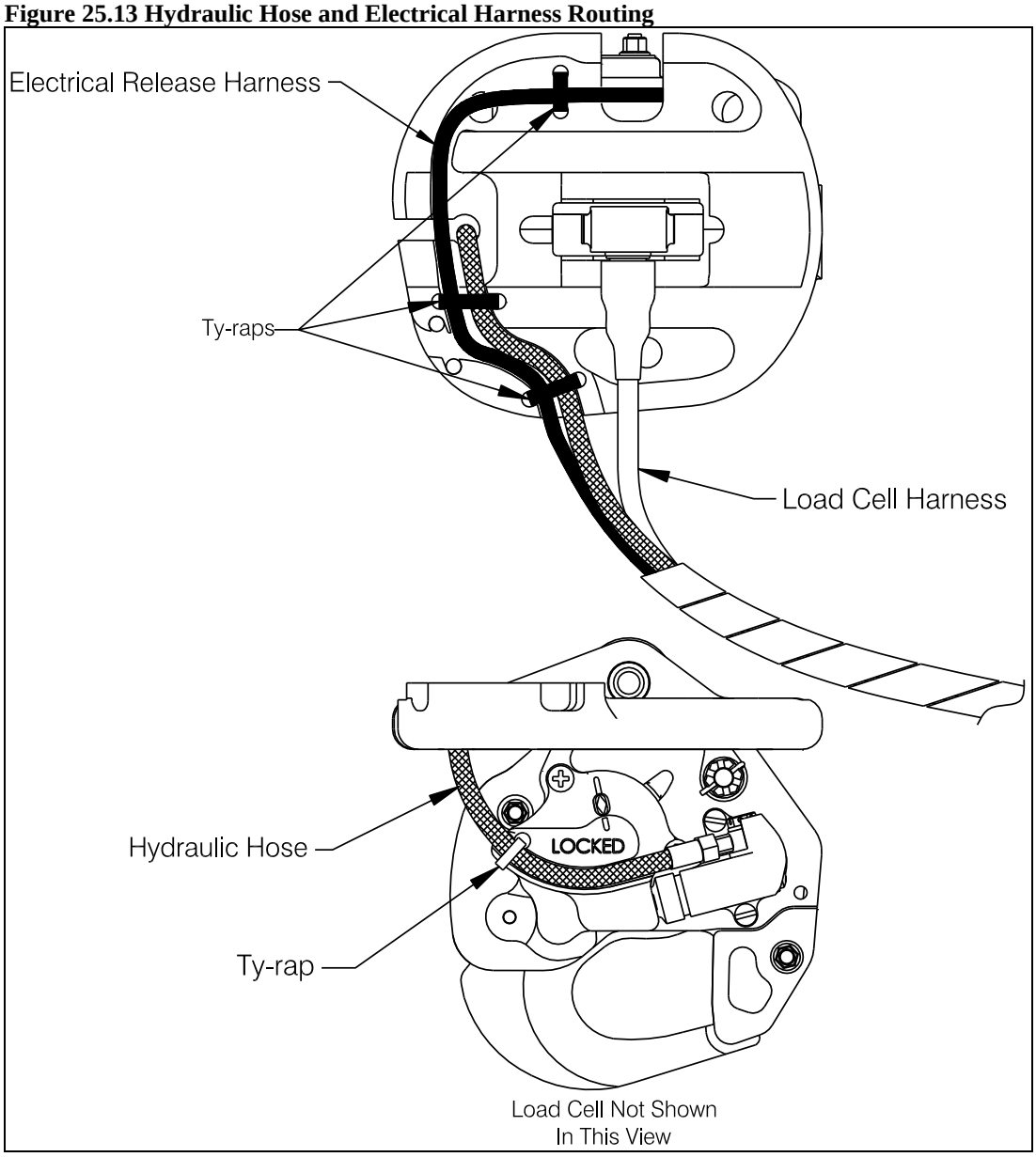
Figure 25.12 Slave Cylinder Assembly Installation



25.17 Component Re-installation continued

Slave Cylinder Assembly Re-installation continued

Figure 25.13 Hydraulic Hose and Electrical Harness Routing

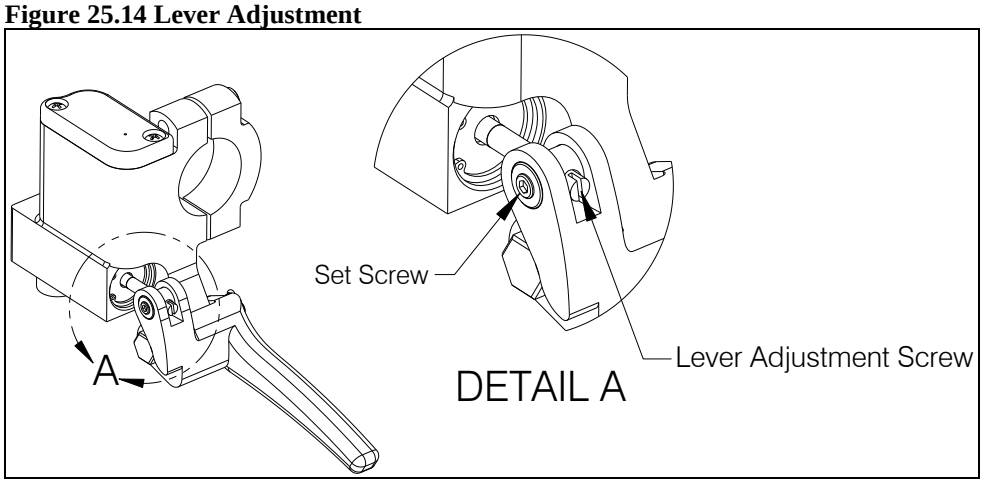


25.17 Component Re-installation continued

Fixed Hydraulic Release Hose Re-installation

1. Install the master cylinder and release lever onto the collective with the two screws (P/N 510-390-00).
2. Feed the end of the hydraulic hose through the slot in the floor. The grommet may have to be temporarily removed to allow the fitting to pass through.
3. Install the loop clamp around the release cable at the bracket at frame at 1790.15 with hardware as shown in Figure 25.9.
4. Route the hose as shown in Figure 25.8 and install the quick disconnect coupling to the connector bracket attached to the fuel tank support.
5. 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 the instructions in the 100 hour/annual inspection.
6. 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 25.14 Lever Adjustment



Load Weigh Indicator Re-installation

1. Place the Load Weigh Indicator into its mounting position 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 (P/N 210-046-01 or P/N 210-046-02) to the gimbal fitting on the suspension frame.
2. Connect the load cell electrical cable connector on the load cell cable to the connector on the belly of the helicopter.
3. Ensure cable does not pull or get pinched at full range of motion of hook and swing.

25.18 General Procedural Instructions-Testing

After re-installation of the cargo hook, hydraulic release system component, 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. 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).

   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 528-028-02 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. Activate the release lever located on the collective to test the cargo hook hydraulic release mechanism. The mechanism should operate smoothly and the Cargo Hook must release. Reset the hook by hand after release. If the hook does not release or re-latch, do not use the unit until the difficulty is resolved.
3. Swing the installed Cargo Hook and the suspension to ensure that the hydraulic hose and the electrical wire harnesses have enough slack to allow full swing of each component without straining or damaging the hose or harnesses. The hydraulic hose and harnesses must not be the stops that prevent the Cargo Hook or the suspension from swinging freely in all directions.
4. Visually check for presence and security of fasteners.
5. Swing the Cargo Hook and Load Cell in fore and aft and side to side directions to check for freedom of rotation at all joints.