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Instructions for Continued Airworthiness

Talon LC Hydraulic
Cargo Hook Kits
For the
MD Helicopters 369 series and 500N

STC SR01778SE

System Part Numbers
200-300-00
200-301-00

13915 NW 3rd Court Vancouver, Washington 98685 USA
Phone: 360-546-3072 Fax: 360-546-3073 Toll Free: 800-275-0883
www.OnboardSystems.com

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Record of Revisions

Revision	*Date*	*Page(s)*	*Reason for Revision*
2	08/06/10	00-00-00, page 2 05-00-00, page 1 and page 4 12-00-00 pages 5 thru 12 25-00-00, pages 15-16, and 19	Replaced P/N 212-014-00 with 212-014-01 and updated hydraulic fluid filling instructions to use new kit. Updated format of safety labels in Precautions section. Updated safety label format throughout document.
3	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.
4	04/12/16	Section 4, Section 5, Section 25 pages 3, 4, 14, and 19	Updated Inspection section including schedule for load cell, updated definition of "hours of external load operations", replaced daily check with annual/100 hour inspection, added references to Cargo Hook CMM. Updated Storage Instructions and Troubleshooting table.
5	09/13/17	Section 12 pages 1, 2, 5, & 7 Section 25 page 14	Replaced fluid MIL-PRF-5606 with MIL-PRF-87257 and bleed kit 212-014-01 with 212-014-02. Added tightening instructions for load cell attaching nut.
6	03/05/18	Section 5 page 3	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 Kit P/N 200-300-00 and P/N 200-301-00.

0.5 Purpose

The purpose of this Instructions for Continued Airworthiness (ICA) manual is to provide the information necessary to inspect, service, and maintain the cargo hook kits in an airworthy condition.

0.6 Arrangement

This manual contains instructions for the service, maintenance, inspection and operation of the cargo hook kits listed above on MD Helicopter models 369 series and 500N. 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 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 Kit P/N 200-300-00 and P/N 200-301-00 (with Cargo Hook P/N 528-028-00) for the MD Helicopter 369 series and 500N helicopters. Refer to the appropriate MD Helicopter ICA 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 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 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 (see section 5.2 for definition), whichever comes first, inspect the cargo hook kit per the following. Refer also to CMM 122-015-00 for the cargo hook for additional procedures.

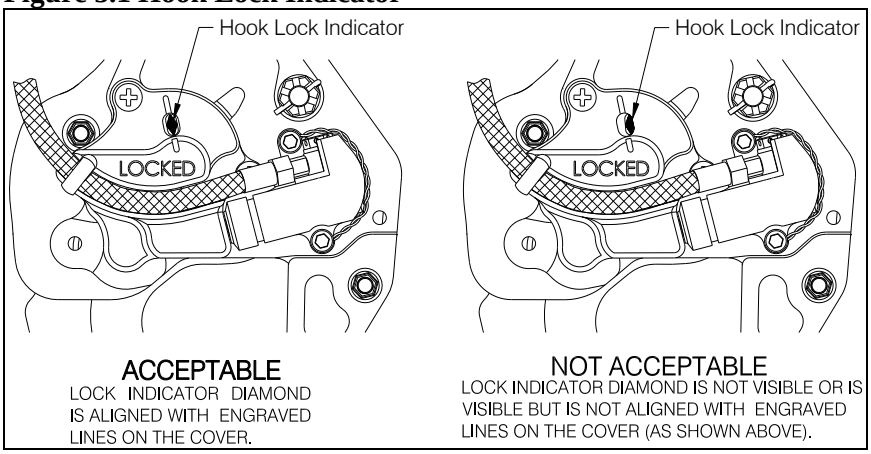
1. Activate the electrical system and press the Cargo Release button to ensure the cargo hook electrical release system is operating correctly. The cargo hook must release. Reset the hook by hand after release. If the hook does not release or re-latch, do not use the unit until the problem is fixed.

CAUTION

Depressing the 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 on the cyclic 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 white lines (see Figure 5.1).

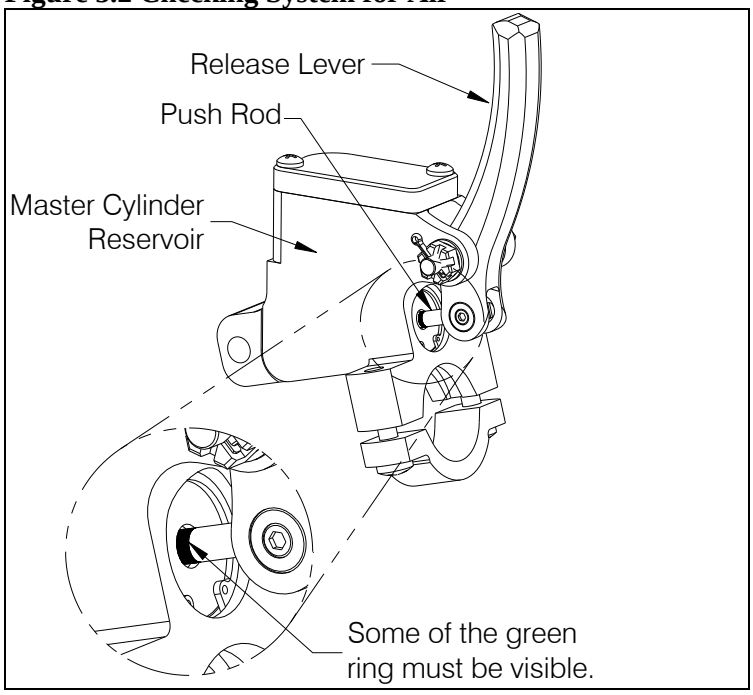
Figure 5.1 Hook Lock Indicator



5.1 Cargo Hook Kit Inspection continued

3. Swing the cargo hook and load cell (if present) throughout their full range of motion to ensure the hydraulic hose and electrical harnesses have enough slack and are not kinked or pinched in any of the possible hook and load cell locations. The hose or harnesses must not be the stops that prevent the cargo hook or load cell from swinging freely in all directions.
4. Visually inspect for presence and security of fasteners and electrical connections.
5. Visually inspect external electrical harnesses for damage and chafing.
6. 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.
7. Check the fluid level in the master cylinder reservoir. The master cylinder features a transparent lid through which the fluid level can be checked. Hydraulic fluid must be visible over the baffle surface (ref. Figure 12.1).
8. 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.

Figure 5.2 Checking System for Air



5.1 Cargo Hook Kit Inspection continued

Every 1000 hours of external load operations or 5 years, whichever comes first, remove the load bearing components from the helicopter, disassemble, and inspect the parts per the following instructions. Refer to Section 5.2 for cargo hook overhaul.

1. Disconnect the electrical release harness connector at the cargo hook, load cell harness (if present) connector at the belly and remove the slave cylinder/plumbing assembly at the cargo hook.
2. Remove spiral wrap from around the harnesses and plumbing at the cargo hook.
3. Remove the cotter pin from the nut and remove nut and washers from the end of the cargo hook's attach bolt.
4. Remove the attach bolt, separating it and the cargo hook from the load cell assembly (if load weigh system is installed) or the existing attach point assembly on the belly of the helicopter (if load cell assembly is not installed).
5. Remove the load cell assembly (if present) by removing cotter pin, nut, and bolt securing it to the existing attach point on the belly of the helicopter (refer to Figure 25.10).

If the Load Cell Assembly (P/N 210-031-01) is present return it 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.

In addition, carefully inspect parts in accordance with the instructions in Table 5.1. Inspect the parts in a clean, well-lit room using standard dimensional measuring tools and visual methods. Repair part(s) found within inspection limits. Replace any part found beyond limits.

Table 5.1 Inspection Criteria

Seq	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement
1.	Attach bolt	Corrosion – 0.006 in. (0.127 mm) deep	Glass bead blast at less than 30 PSI (2.11 KGF/CM^2) to remove corrosion.	Passivate per AMS-QQ-P-35 or ASTM A967	No
		Wear on OD – 0.495 in. (12.57 mm)	None	N/A	No
2.	Electrical connectors	Loose, missing, or mutilated contact pins, cracked case, or worn insulators.	None	N/A	No
3.	Nuts, bolts, cotter pins, washers (ref. Figures 25.10 and 25.11)	Wear, corrosion or deterioration	None	N/A	Yes

5.2 Cargo Hook Overhaul Schedule

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

*Hours of external load operations should be interpreted to be **(1)** anything is attached to the primary cargo hook (whether or not a useful load is being transported) and **(2)** the aircraft is flying. If these conditions are **NOT** met, time does **NOT** need to be tracked.*

Overhaul the cargo hook per CMM 122-015-00. Contact Onboard Systems for guidance locating authorized overhaul facilities.

Section 11
Placards and Markings

11.1 Placards

The 200-301-00 Cargo Hook Kit includes the following placards pertaining to the load weigh system shown in Table 11.1. The 200-300-00 and 200-301-00 kits use the helicopter's existing cargo hook placards. Refer to MD Helicopters' maintenance manuals for their identification and location.

Table 11.1 Cargo Hook Kit Placards

Placard part number and appearance	Location
P/N 215-010-00 ELECTRONIC WEIGHING SYSTEM	When Onboard Systems 200-301-00 system is installed, mounted adjacent to both the power switch and the circuit breaker in full view of the pilot and co-pilot.
P/N 215-012-00 TURN THE WEIGHING SYSTEM OFF WHEN NAVIGATION EQUIPMENT IN USE. NO AIRCRAFT OPERATION SHOULD BE PREDICATED ON THE READING OF THE ONBOARD WEIGHING SYSTEM.	When Onboard Systems 200-301-00 system is installed, mounted adjacent to the load weigh indicator in full view of the pilot and co-pilot.

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Section 12
Servicing

12.1 Maintenance of the Hydraulic Release System

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

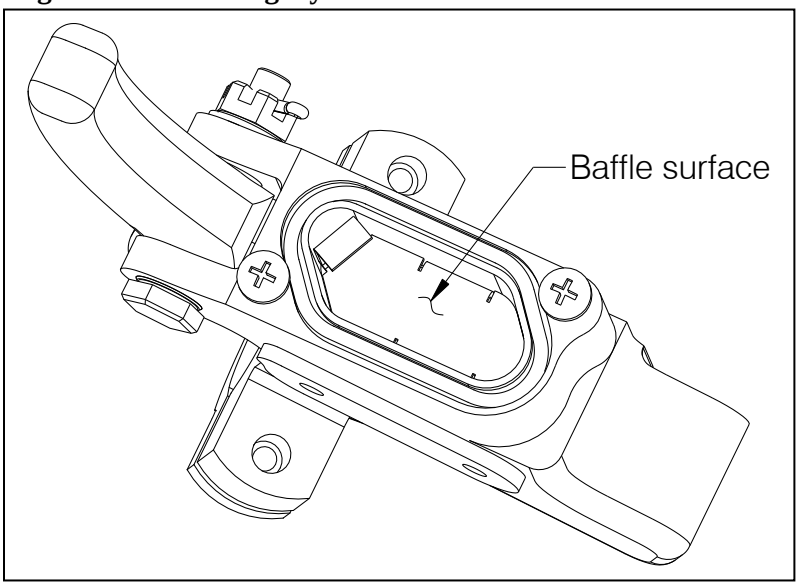
NOTICE

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. If possible, position the cyclic stick such that the reservoir is level.
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. If necessary, remove lid and add hydraulic fluid as required until the fluid level is just over the baffle surface.

Figure 12.1 Checking Hydraulic Fluid Level



If hydraulic fluid 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.

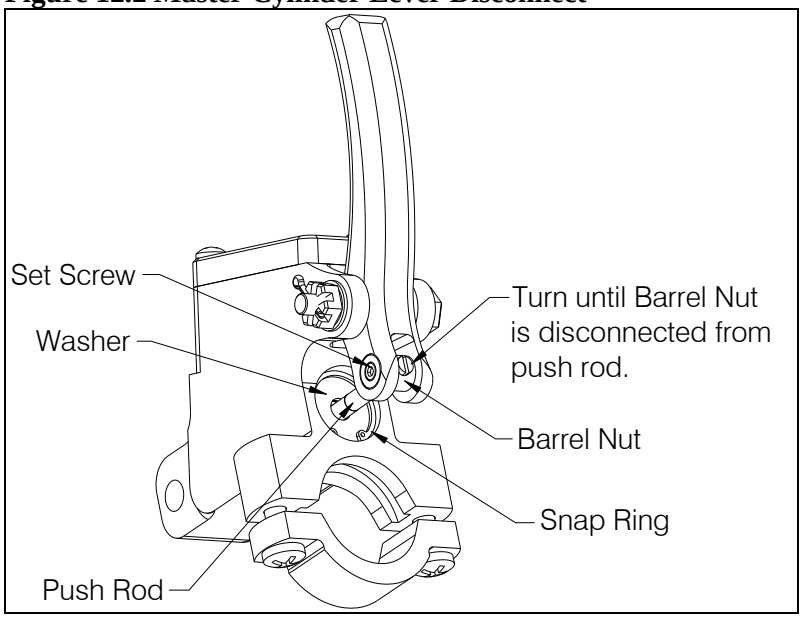
Disassembly:

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

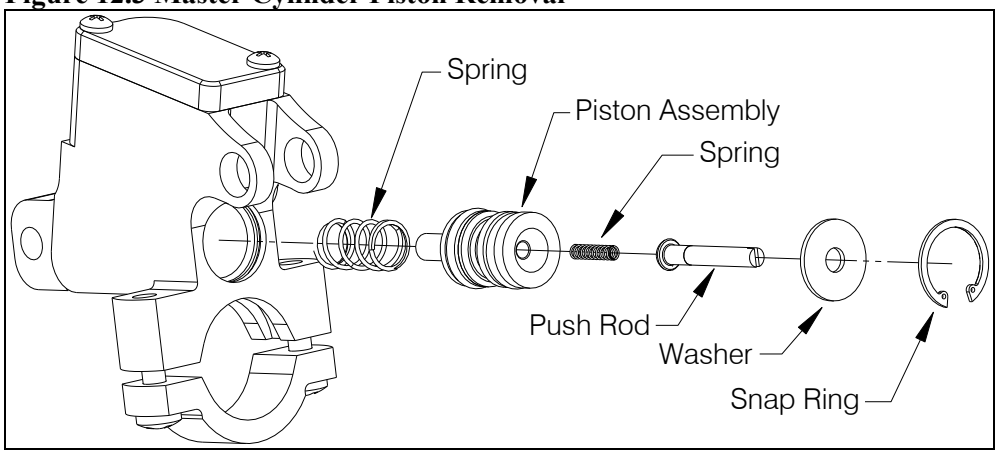
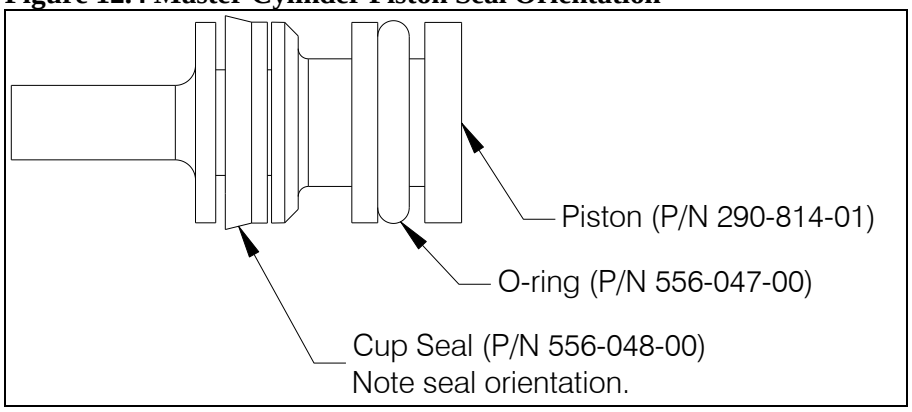


Figure 12.4 Master Cylinder Piston Seal Orientation



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.

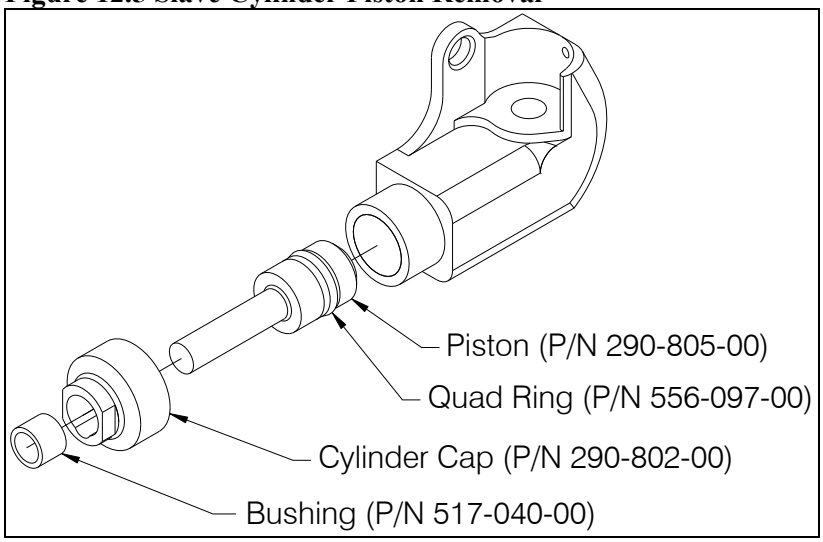
Re-assembly:

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 inch pounds.

12.1 Maintenance of the Hydraulic Release System, continued

Slave Cylinder Repair continued

Figure 12.5 Slave Cylinder Piston Removal



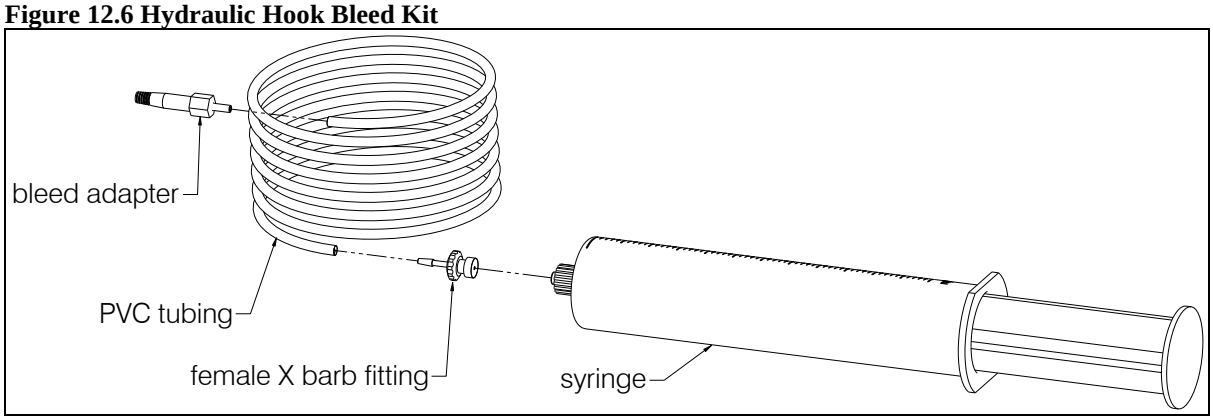
12.2 Bleeding Hydraulic System

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.

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.

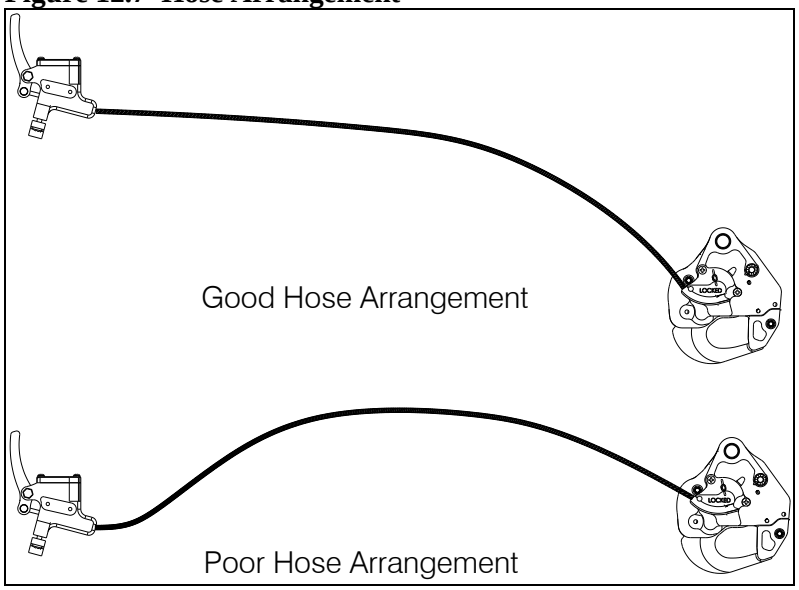
NOTICE

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

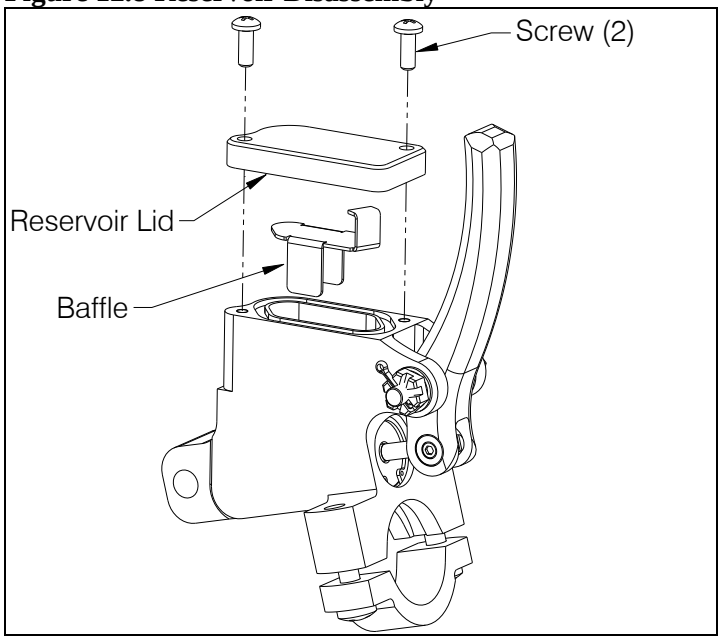
3. Connect the master cylinder assembly to the slave cylinder assembly if not already done. If filling or bleeding on the bench, as much as possible, arrange the hoses uncoiled, straight and running uphill. See Figure 12.7.

Figure 12.7 Hose Arrangement



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

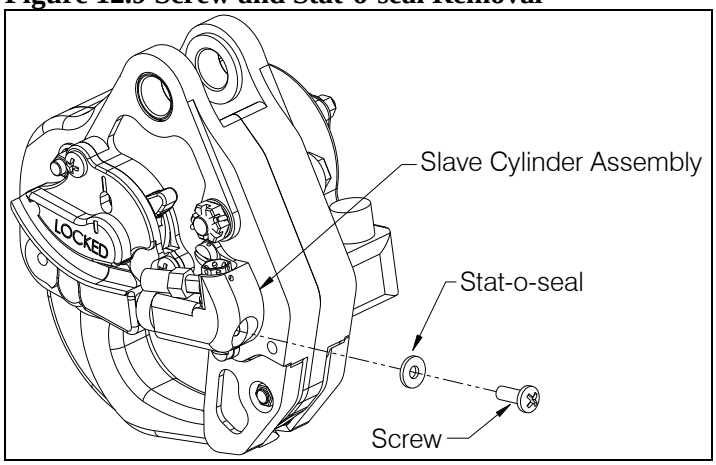
Figure 12.8 Reservoir Disassembly



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



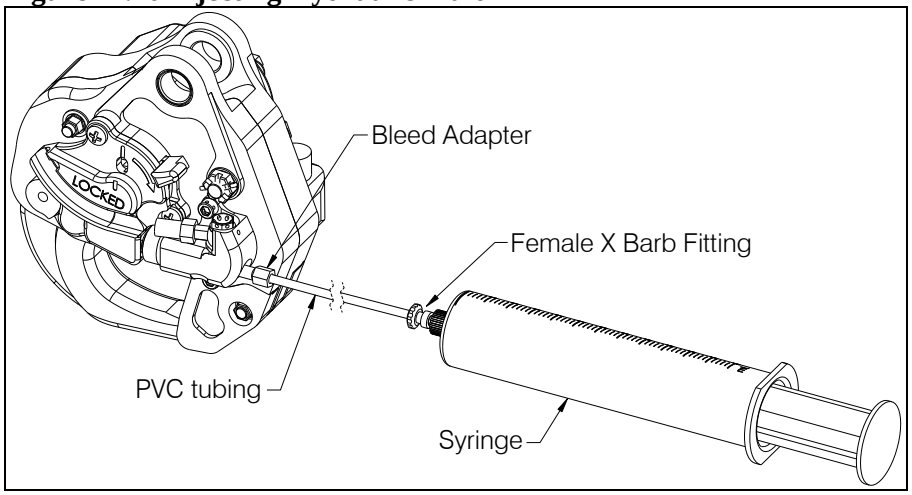
6. Fill the syringe with approximately 35 cc of hydraulic fluid and purge any remaining air in the syringe and tubing. Screw the end of the bleed adapter into the screw hole on the slave cylinder to create a tight seal. See Figure 12.10.

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

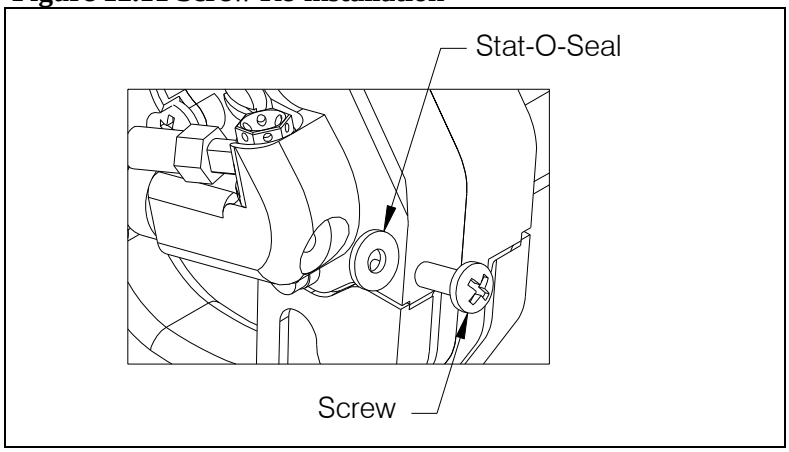
8. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

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 bleed adapter 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.

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.

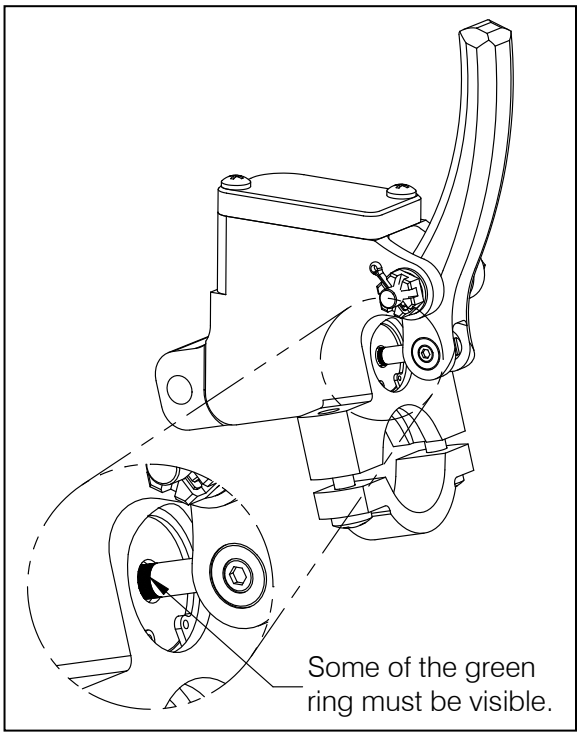
CAUTION

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.

12.2 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 12.12). If some of the green ring on the push rod is visible, proceed to step 13. 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 needs further bleeding. To do this, repeat steps 5 – 11.

Figure 12.12 Checking System for Air



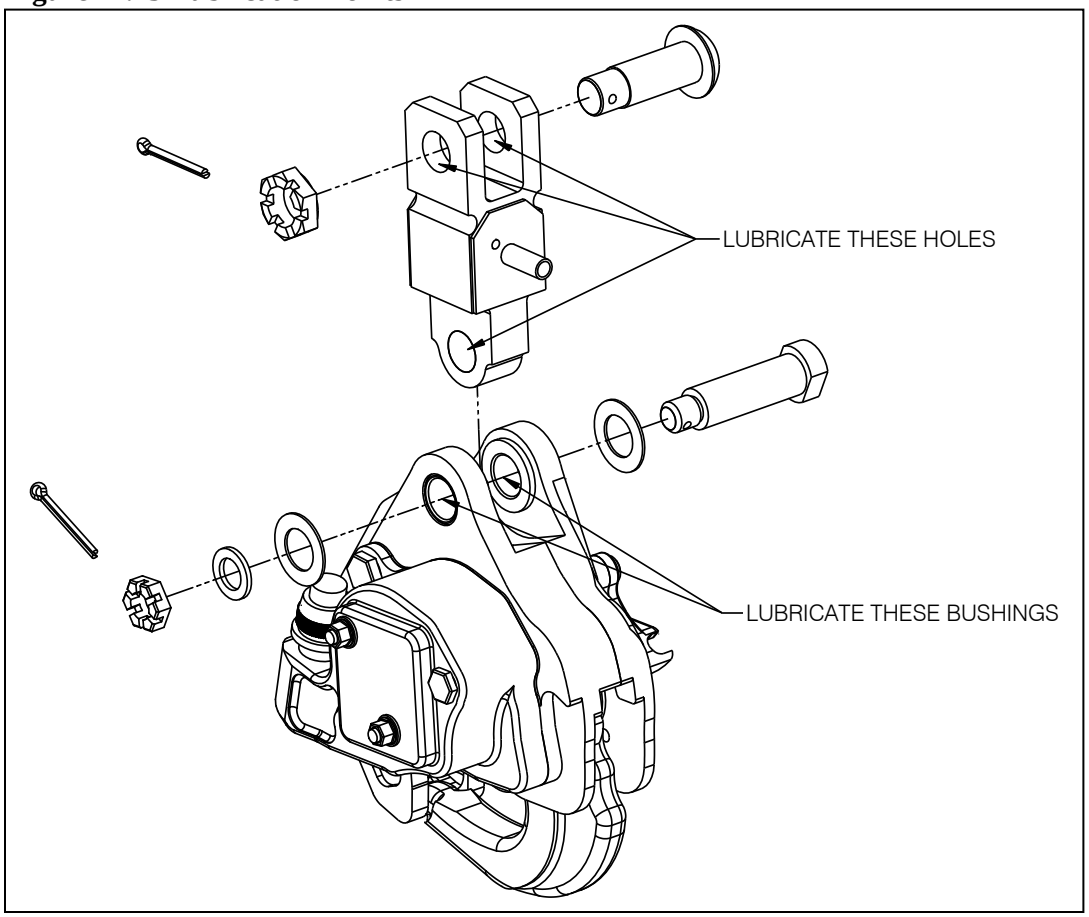
13. After the system is properly bled, verify that the reservoir is approximately half full of hydraulic fluid. Fluid should be visible above the baffle.
14. Re-install the baffle, and the reservoir lid.
15. Check the system for proper operation. Fully actuate the release lever. The hook must open and the lever must have a firm feel.
16. Disassemble and thoroughly clean the 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 Cargo Hook and Load Cell (if installed) pivot points is required every 500 hours of hook operation.

Lubricate the Cargo Hook and Load Cell pivot points illustrated in Figure 12.13. Recommended lubricants are AeroShell 17, MIL-G-21164 or Mobilgrease 28, MIL-G-81322.

Figure 12.13 Lubrication Points



12.3 Lubrication Information, continued

Hook Corrosion Prevention

In marine or other corrosive environments the life of the hook can be increased by periodically treating with a corrosion preventative compound such as ACF-50. Spray exterior of hook with corrosion preventative compound and wipe off excess with a rag.

The amount and frequency of application will vary depending on climate. In dry dusty environments it is not recommended to treat for corrosion since the oily residue on the inside of the cargo hook that cannot be wiped off could attract and retain dust and sand. In addition corrosion is not likely to be a problem in these conditions. For offshore or coastal operations, treatment could be done every two weeks.

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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. The hook is polarity sensitive due to an arc suppressing diode internally mounted.

Table 25-1 Cargo Hook Connector

Pin	*Function*
A	Ground
B	Power

25.2 Description

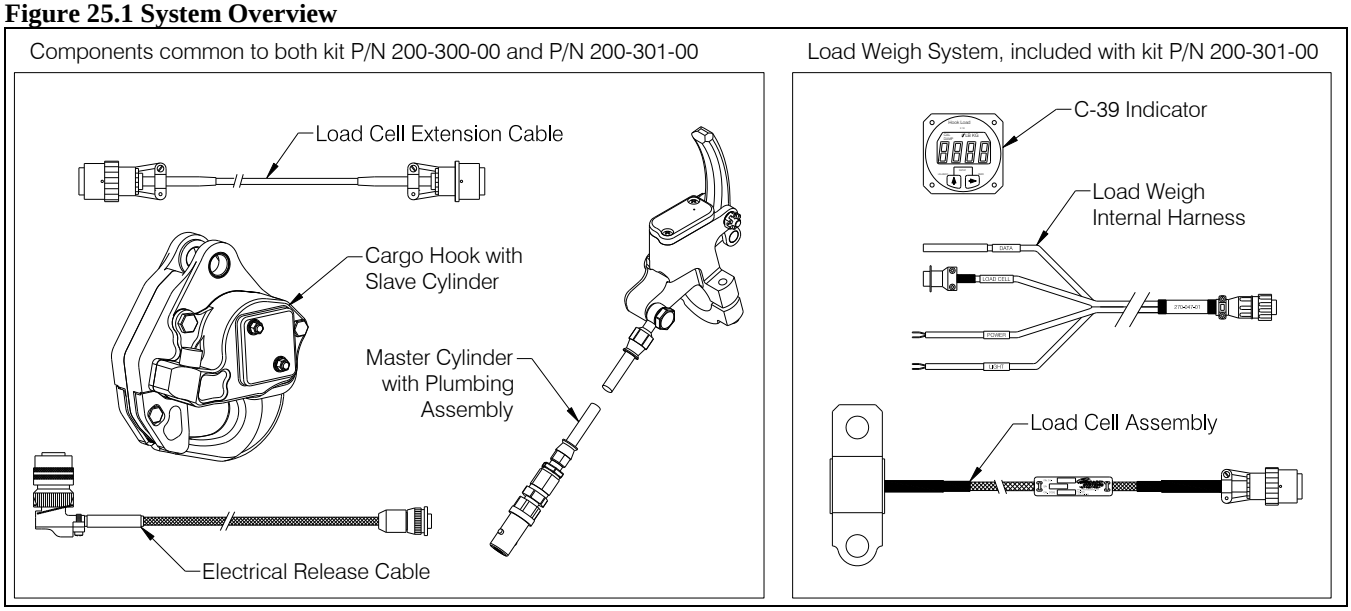
The P/N 200-300-00 kit includes the cargo hook, an external electrical cable that connects to the existing helicopter wiring provisions and a hydraulic release system. The hydraulic release system replaces the existing manual release cable system on the aircraft. It includes a master cylinder assembly with a lever attached to the cyclic in the cockpit, associated plumbing routed to a disconnect point at the belly of the aircraft, and plumbing from this disconnect to a slave cylinder on the cargo hook.

The P/N 200-301-00 kit configuration is identical to the 200-300-00 kit except it includes a load weigh system. The load weigh system includes a load cell mounted between the cargo hook and the helicopter hard point, a load weigh indicator in the cockpit, and associated electrical wiring.

The external electrical release cable in combination with the existing fixed helicopter wiring forms the electrical release system which provides a means to release a cargo hook load through the use of a switch in the cockpit. The hydraulic release system provides a backup means to release a cargo hook load in the event of an electrical system failure.

Figure 25.1 shows the primary components that make up these cargo hook kits. Miscellaneous items, hardware, etc. are not shown.

Figure 25.1 System Overview



25.5 Component Weights

The weights and cgs of the systems are listed in Table 25.2.

Table 25.2 Component Weights and CGs

Item	Weight	Station
Kit P/N 200-300-00		
Removable Provisions*	4.1 lbs (1.9 kgs)	99
Fixed Provisions**	1.2 lbs (.54 kgs)	63
Total	**5.3 lbs (2.4 kgs)**	**91**
Kit P/N 200-301-00		
Removable Provisions*	4.9 lbs (2.2 kgs)	99
Fixed Provisions**	2.2 lbs (.95 kgs)	64
Total	**7.1 lbs (3.2 kgs)**	**88**

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

****** The fixed provisions are those items of the kit that remain on the aircraft. These include the fixed hydraulic release system, internal electrical load weigh harness, and the load weigh indicator. These components would typically be left on the aircraft when configuring the aircraft for non-external load work.

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 place a piece of tape or similar over the air vent to prevent leakage. If draining before storage, 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 Component Maintenance Manual (CMM) 122-015-00 for storage instructions for the cargo hook.

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 MD Helicopter maintenance documentation for guidance on procedures relating to parts that interface with these kits.

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) 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 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.
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).

Table 25.3 Troubleshooting continued

Circuit breaker opens when cargo hook is energized.	Short in the system, faulty wiring, circuit breaker or solenoid.	Refer to MD Helicopter maintenance manual for internal cargo hook electrical release wiring. Check for shorts to ground along length of external wire harness (see note 2). Check solenoid resistance (see note 1), repair or replace defective parts.
Load Weigh Indicator does not light up.	Faulty wiring or circuit breaker.	Check the circuit breaker (refer to MD maintenance manual) 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 25.2 Cargo Hook Electrical Connector

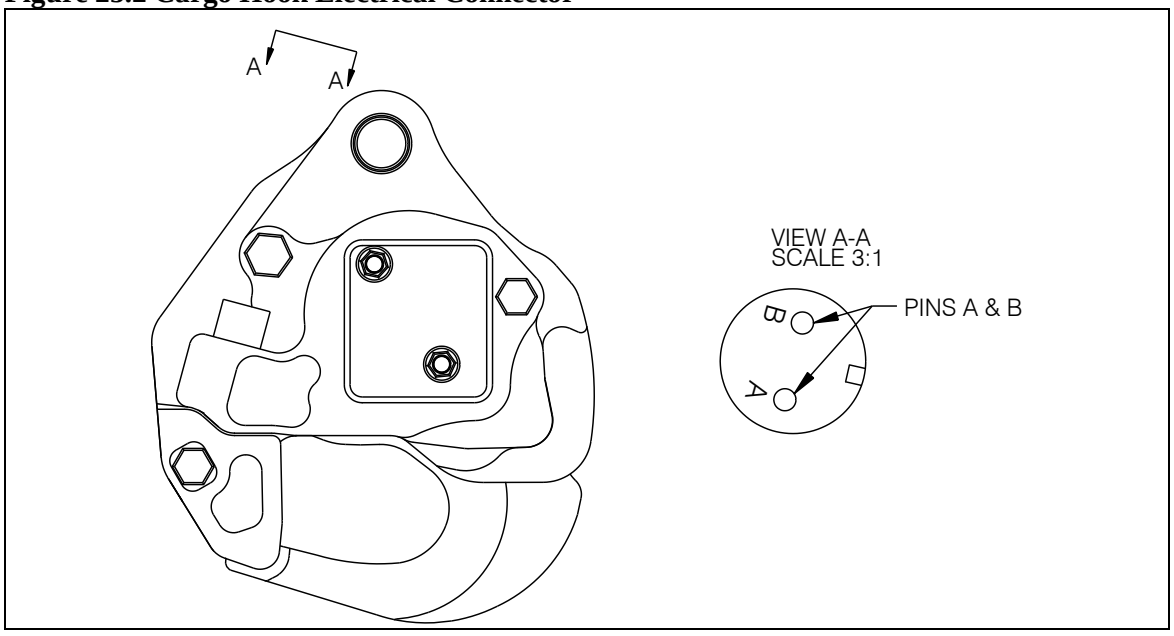


Table 25.3 Notes continued:

2. Checking Wire Harnesses.

As appropriate, before working on a circuit, e.g. - inspection, removal-installation of components, make sure that the BAT-OFF-EXT switch is off.

The external wire harnesses are located as shown below. The electrical release harness from the cargo hook is terminated at the connector located in the doubler in the aircraft belly skin (see below) and interfaces with the existing MD Helicopter cargo hook electrical wiring (refer to MD maintenance manuals for information).

The load cell (if installed) harness is routed with the electrical release harness and is terminated at the connector in the belly skin located approximately as shown below. The load weigh internal harness is routed from the connector shown in the figure below to the C-39 indicator, which has an optional mounting location within the cockpit.

Inspect for general condition and chafing along length of wire runs. See Figure 25.4 for electrical schematic.

Figure 25.3 Wire Harness Routing

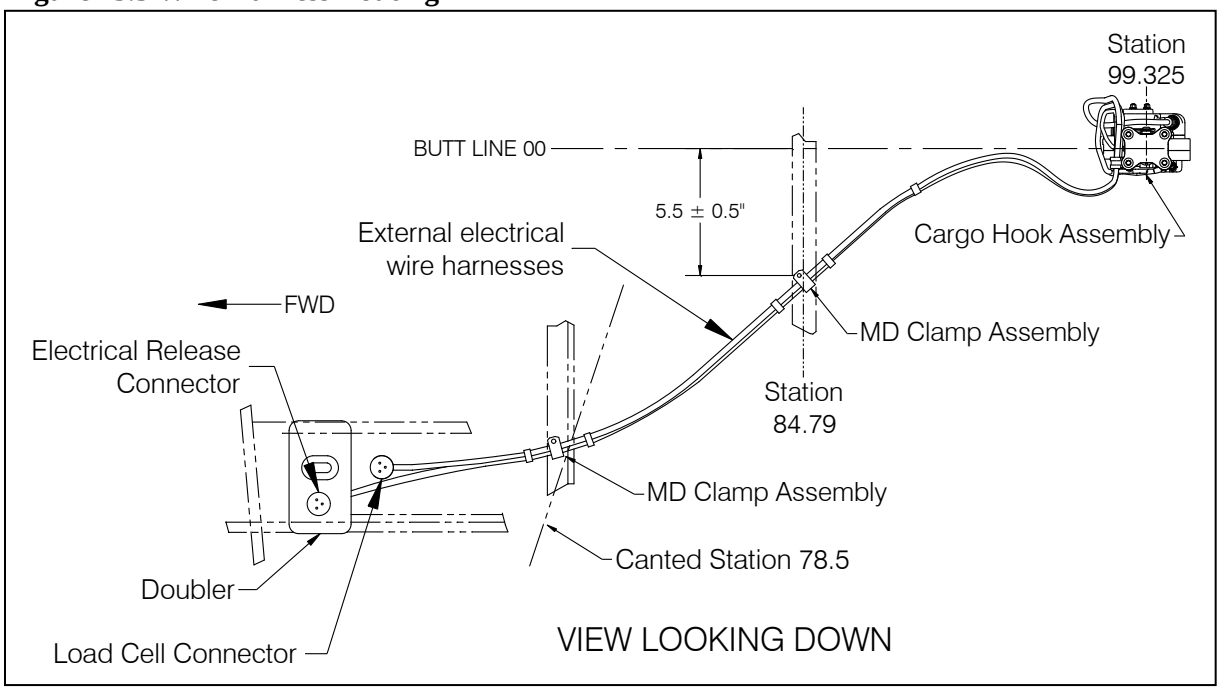


Table 25.3 Notes continued:

2. Checking Wire Harnesses continued

Figure 25.4 Electrical Schematic

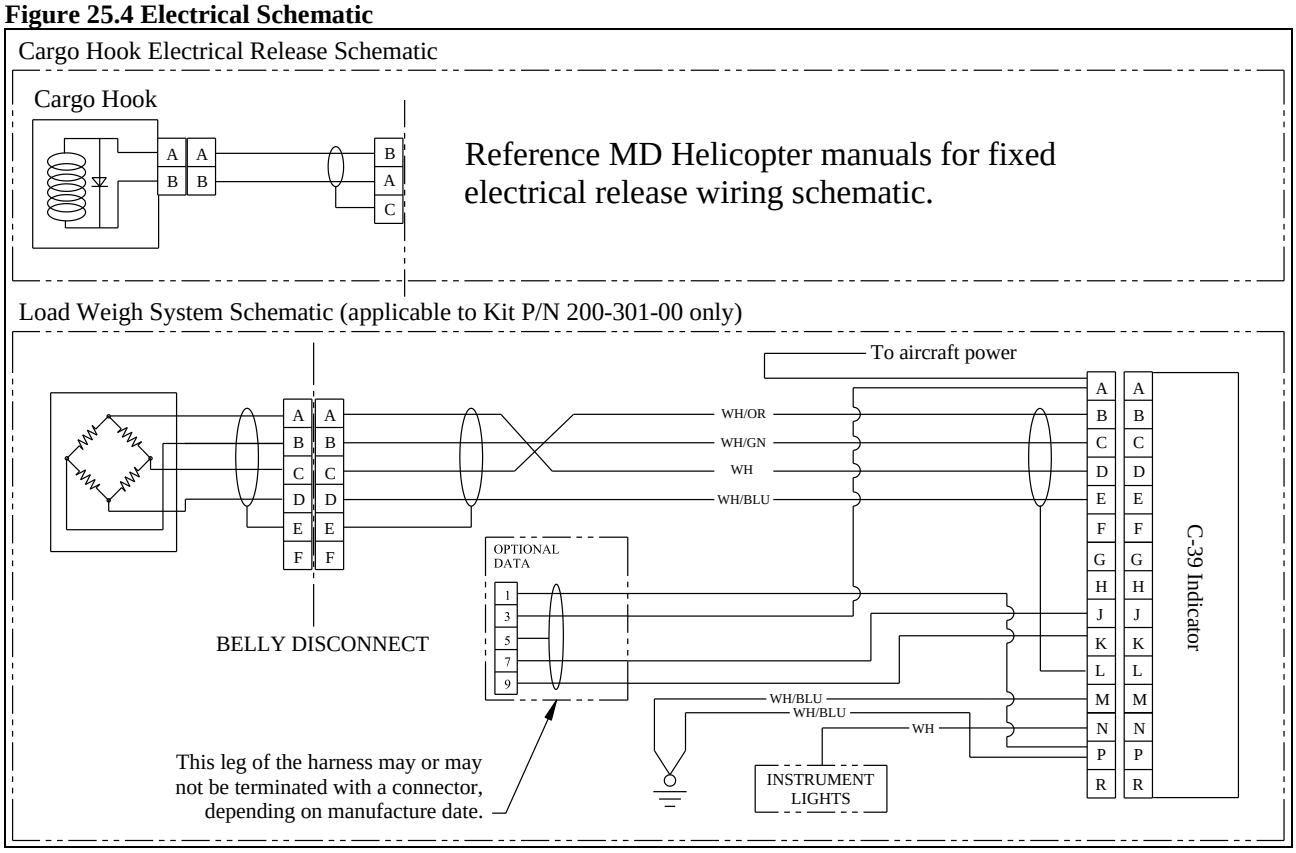
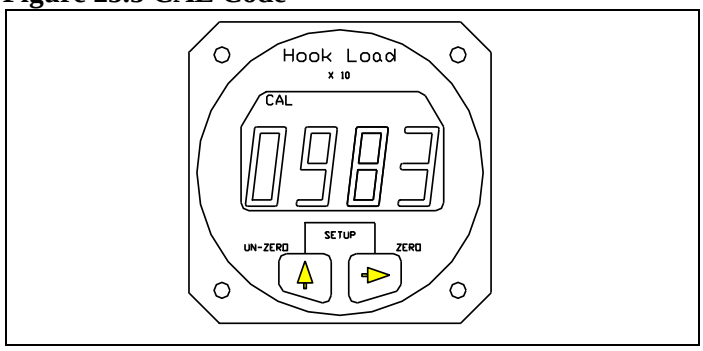


Table 25.3 Notes continued:

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

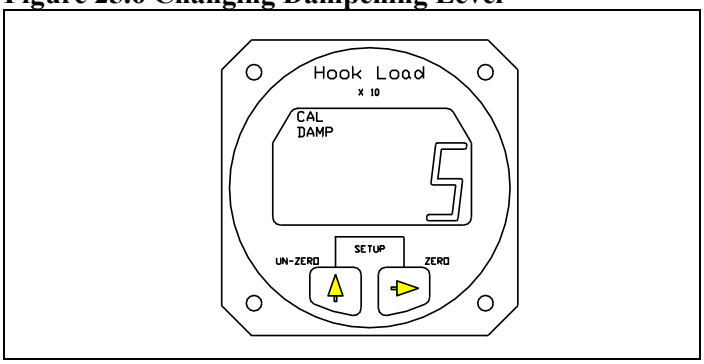


This code should match the code printed on the tag attached to the load cell cable. If this code does not match, contact Onboard Systems for further guidance.

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

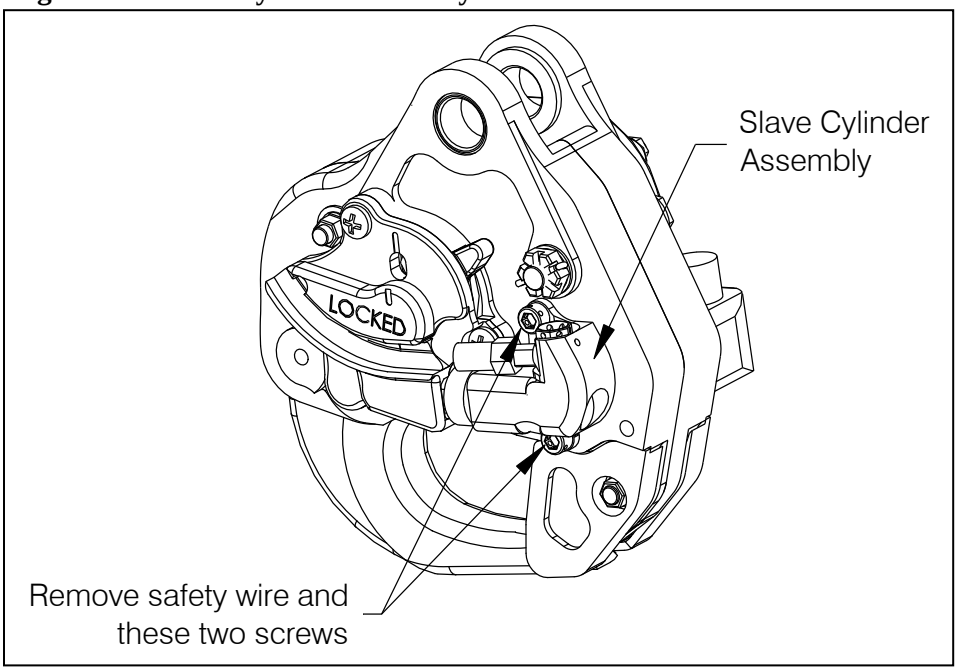
1. Cut and remove all lockwire.
2. Remove the slave cylinder assembly by removing two screws (refer to Figure 25.7) and associated ty-wraps.
3. Remove the electrical release cable connector from the Cargo Hook.
4. Remove the cotter pin (P/N 510-178-00) from the attach bolt (P/N 290-332-00) (refer to Figure 25.11).
5. Remove the castellated nut (P/N 510-170-00) from the attach bolt.
6. Remove attach bolt and all washers.
7. Remove the Cargo Hook.

25.16 Component Removal continued

Slave Cylinder and Plumbing Assembly Removal

1. Disconnect the hose at the quick disconnect coupling and remove the hose from its supporting brackets along the belly of the helicopter.
2. Remove the two screws that hold the slave cylinder assembly to the cargo hook. Remove the ty-wrap that holds the hydraulic hose to the cargo hook.

Figure 25.7 Slave Cylinder Assembly Removal

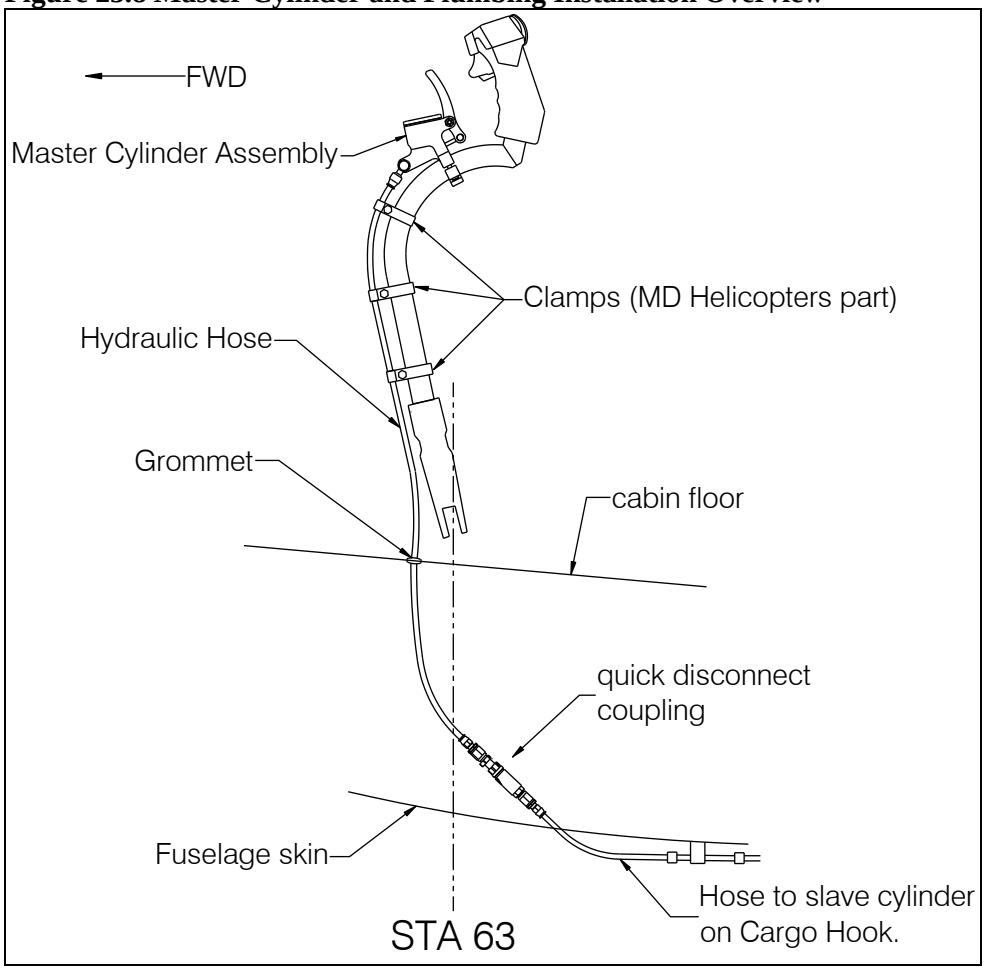


25.16 Component Removal continued

Fixed Hydraulic Release Plumbing Assembly Removal

The fixed hydraulic release hose is routed from the master cylinder release lever mounted to the pilot's cyclic stick to underneath the cabin floor where it is mated via a quick disconnect coupling with the slave cylinder plumbing from the cargo hook.

Figure 25.8 Master Cylinder and Plumbing Installation Overview



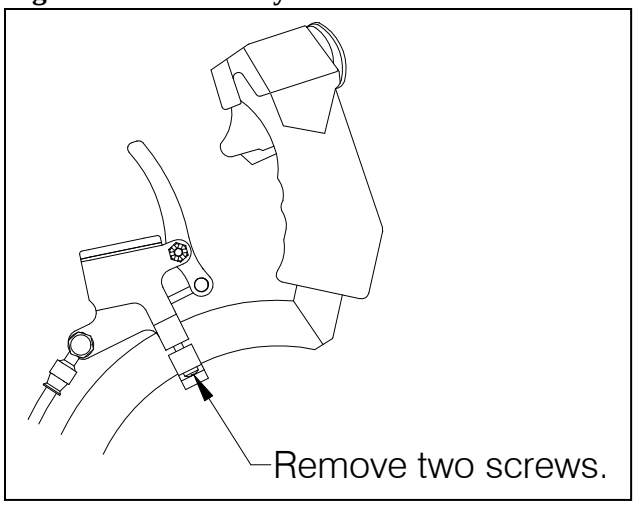
25.16 Component Removal continued

Fixed Hydraulic Release Hose Assembly Removal continued

1. Disconnect the master cylinder plumbing from the slave cylinder plumbing by separating the quick disconnect coupling.
2. Remove the hose from the three clamps on the pilot cyclic stick.

   Note: These clamps are part of the original equipment installation that these kits are a replacement for. Refer to MD maintenance manuals for part numbers.
3. Remove the grommet (P/N 505-016-00) from the hole in the cabin floor.
4. Pull the hose up through the hole through the hole in the floor.
5. Remove the master cylinder from the pilot's cyclic stick by removing two screws (see below).

Figure 25.9 Master Cylinder Removal



25.16 Component Removal continued

Load Weigh Indicator Removal

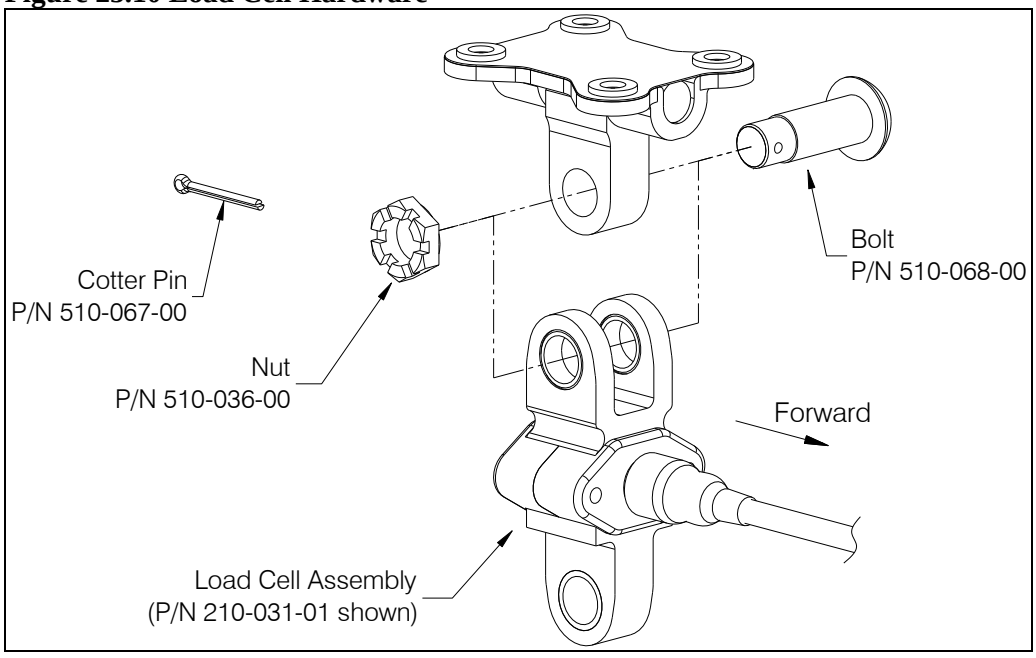
The load weigh indicator location is optional within the cockpit.

1. Remove the four screws that secure the indicator in its position and remove the indicator.
2. Disconnect electrical connector from the back of 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 helicopter hard point by removing the hardware as illustrated in Figure 25.10.

Figure 25.10 Load Cell Hardware



25.17 Component Re-installation

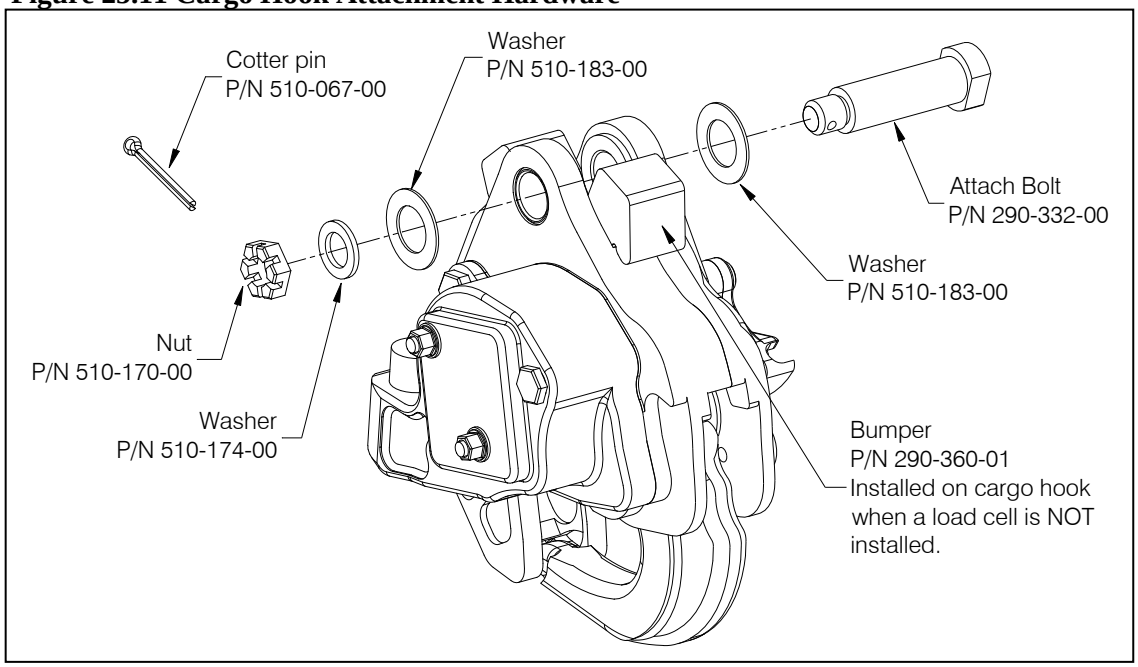
Load Cell Re-installation

1. Attach the load cell assembly to the helicopter hard point fitting with hardware as illustrated in Figure 25.10.
2. Tighten nut to finger tight and rotate to previous castellation if necessary to insert cotter pin.

Cargo Hook Re-installation

1. Insert the Cargo Hook (P/N 528-028-00) over the end of the load cell and install the attach bolt (P/N 290-332-00) through the load cell (not shown below) with washer (P/N 510-183-00).
2. Install washer (P/N 510-183-00), washer (P/N 510-174-00) and nut (510-170-00) over bolt end.
3. Tighten nut (P/N 510-170-00) on bolt (P/N 290-332-00) finger tight until it seats against the shoulder of the attach bolt and then install and secure cotter pin (P/N 510-178-00). If necessary rotate the nut to previous castellation to allow the cotter pin to pass through the bolt.
4. Install slave cylinder with plumbing assembly (P/N 232-196-00 or P/N 232-196-01) per this section.
5. Install electrical release cable connector onto hook connector.
6. Route electrical cables and hydraulic hose per Figure 25.13 and 25.14.

Figure 25.11 Cargo Hook Attachment Hardware



25.17 Component Re-installation continued

Slave Cylinder Assembly Re-installation

Connect the slave cylinder assembly (P/N 232-196-00) to the cargo hook first, per the following instructions:

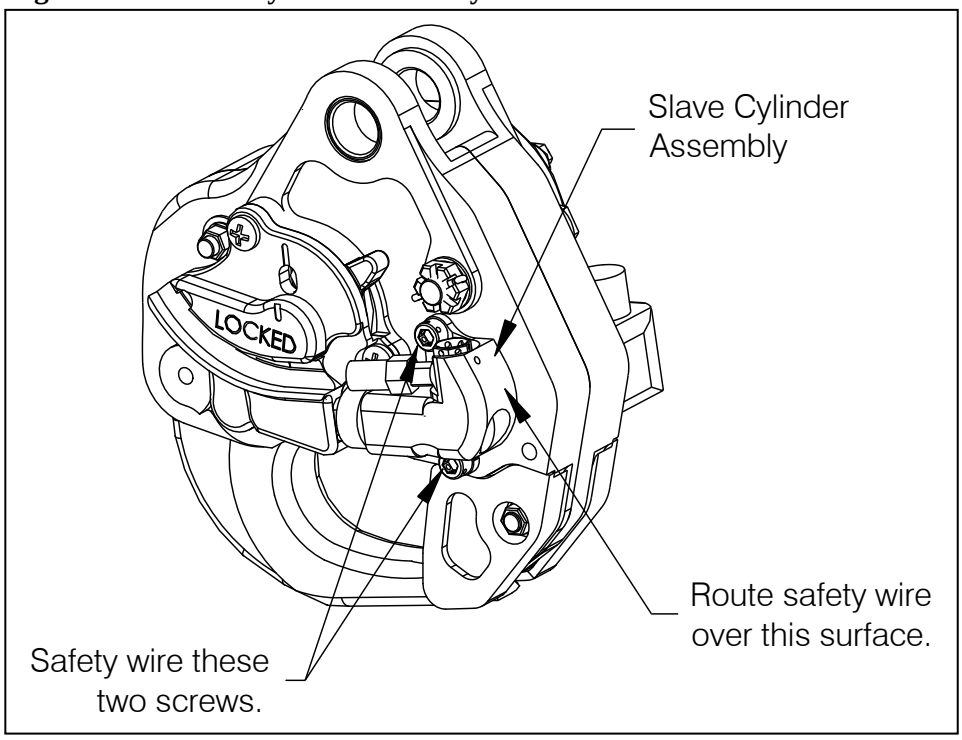
1. Ensure that the piston is in the retracted position. If the piston needs to be retracted connect the quick disconnect coupling and push the piston in.

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 510-531-00). See Figure 25.12.
3. Install safety wire between these screws around the backside of the slave cylinder.
4. Route the hydraulic hose along the manual release cover and secure with a ty-wrap as shown in Figure 25.13.

Figure 25.12 Slave Cylinder Assembly Installation



25.17 Component Re-installation continued

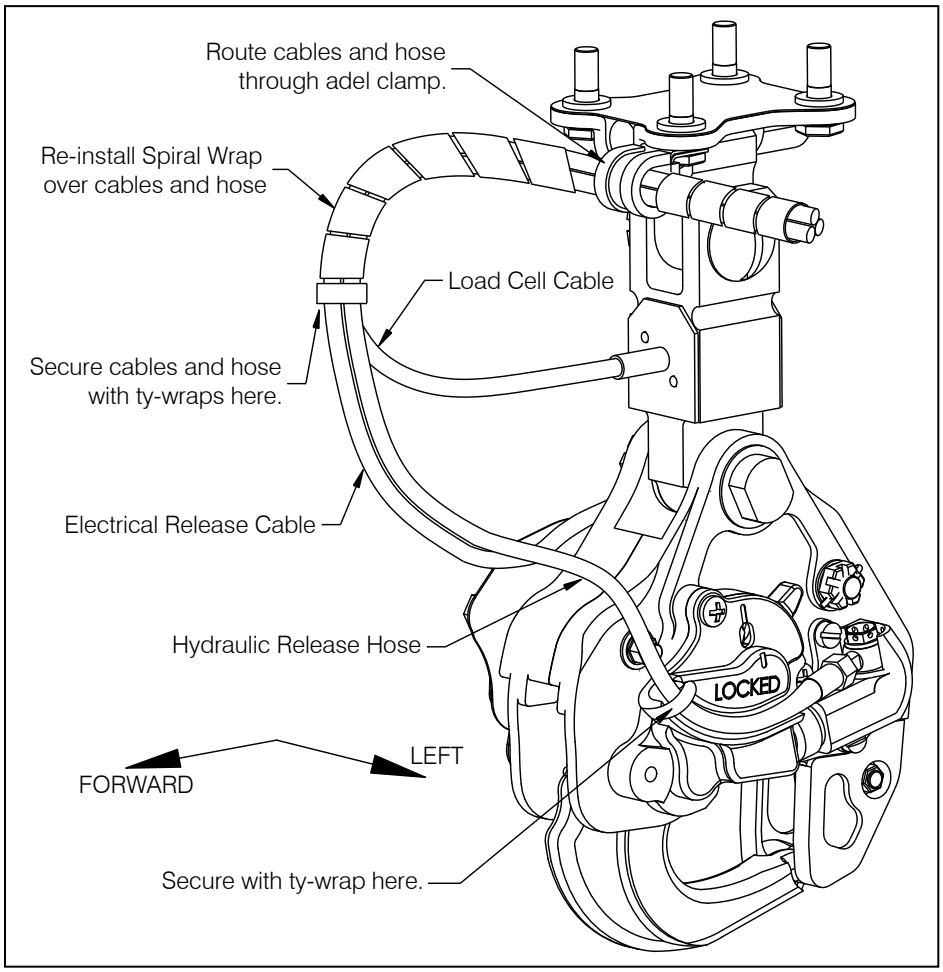
External Electrical Cable and Hose Routing

NOTICE

The instructions below reflect an installation with a load cell (kit P/N 200-301-00). These instructions are also applicable to an installation without load cell.

1. Route the electrical cables and hydraulic hose as shown in Figure 25.13. Before tightening adel clamp, ensure that there is sufficient slack in the cables and hose to allow for full movement of the cargo hook.
2. Re-install spiral wrap (P/N 590-013-00) over cables and hose.
3. Route the bundle forward through the two MD Clamp Assemblies (as shown in Figure 25.14).

Figure 25.13 Hydraulic Hose and Electrical Cable Routing

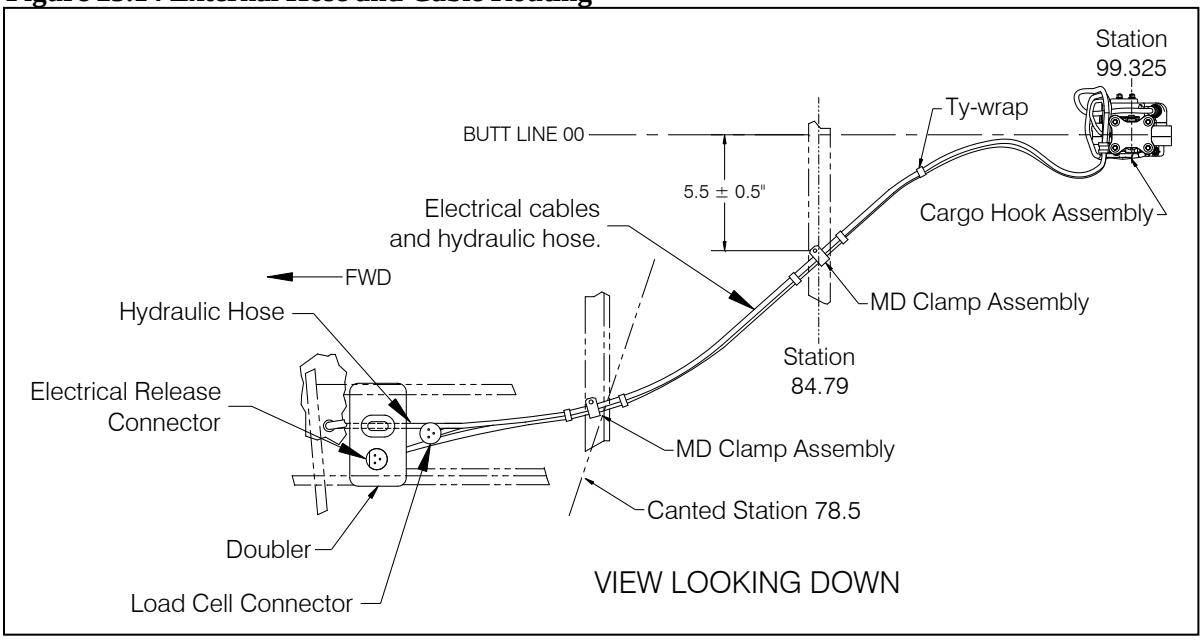


25.17 Component Re-installation continued

External Electrical Cable and Hose Routing continued

4. Connect the electrical connectors to the fixed connector at the doubler.
5. Insert the quick disconnect end of the hydraulic hose through the slot at the doubler at the aircraft skin to mate up with the plumbing from the master cylinder and re-install grommet in the slot.

Figure 25.14 External Hose and Cable Routing

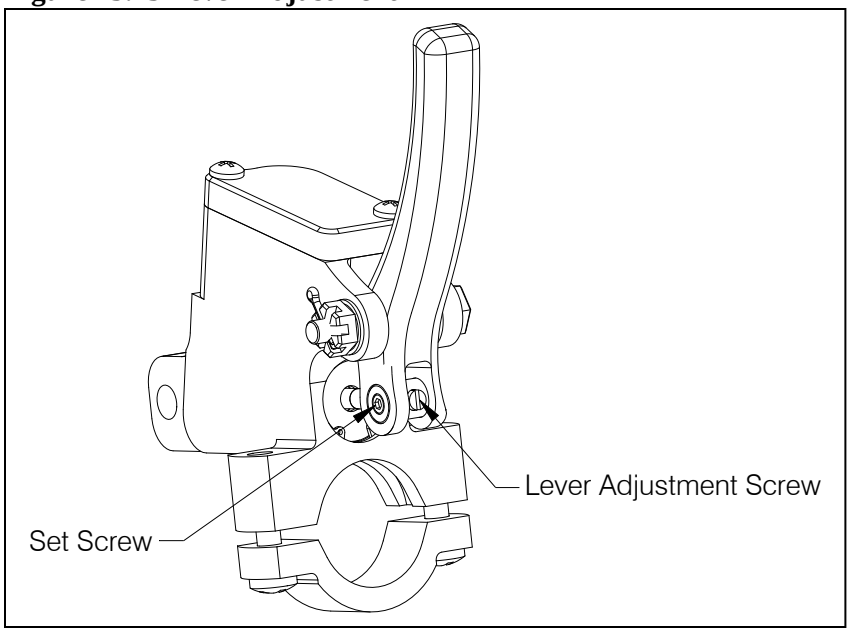


25.17 Component Re-installation continued

Fixed Hydraulic Release Hose Re-installation

1. Install the master cylinder and release lever onto the cyclic with the two screws (P/N 510-390-00).
2. Attach the hose to the three clamps on the pilot's cyclic stick (see Figure 25.9).
3. Feed the quick disconnect fitting at the end of the hydraulic hose through the hole in the floor. Re-install the grommet.
4. Underneath the floor connect the quick disconnect coupling to the mating fitting on the slave cylinder hose.
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 daily check section.
6. If desired, adjust the position of the lever (see below) on master cylinder. Secure lever adjustment screw with set screw. Ensure there is no interference in any combination of lever movements.

Figure 25.15 Lever Adjustment



Load Weigh Indicator Re-installation

1. Place the Load Weigh Indicator into the mounting location and secure with four screws.
2. Connect the electrical connector on the wiring harness to the connector on the back of the indicator.

25.18 General Procedural Instructions-Testing

After re-installation of any parts, 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 sec. 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 white lines (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 to ensure that the hydraulic release hose and the electrical harnesses have enough slack to allow full swing without straining or damaging the hose and harnesses. The hose and harnesses must not be the stops that prevent the Cargo Hook from swinging freely in all directions.