Owner's Manual
Cargo Hook
with Hydraulic Release
For The
MD Helicopters
369 Series and 500N Models

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Applicable Equipment Part Numbers

200-300-00

Please check our web site www.onboardsystems.com for the latest revision of this manual.

RECORD OF REVISIONS

Revision	Date	Page(s)	Reason for Revision
0	01/09/06	All	Initial Release
1	07/13/07	All	Added Warnings, Cautions, and Notes section and updated format of these throughout. Clarified instructions and improved routing of hose and harnesses at the cargo hook. Changed screw p/n from 510-390-00 to 510-624-00 (ref Figure 2.6.1).
2	05/29/08	1-2	Added cotter pin P/N 510-178-00 to parts list.
3	08/03/10	Section 1 through 3	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.
4	12/06/13	2-16, Section 5 & 6	Updated note regarding EMI test for post installation check. Added system part numbers section.
5	03/09/16	2-1, 2-2, 2-7, 3-2, 3-3	Clarified installation requirements if attach point P/N 200-231-02 is present. Updated cargo hook load rigging figure and associated instructions.
6	11/03/17	All	Replaced fluid MIL-PRF-5606 with MIL-PRF-87257 and bleed kit 212-014-01 with 212-014-02. Updated layout and formatting.
7	11/20/17	10	Added optional installation configuration with quick release pin.
8	04/26/22	22, 32, 33	In Table 7.4 changed screw P/N 510-424-00 to Shoulder screw 511-124-00, added note to replace lid and screw together. In Section 4.7 step 14 added safety wire instruction.

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1.0 Introduction

1.1 Scope

This owner's manual contains instructions for installation, operation, and maintenance of the Cargo Hook Kit P/N 200-300-00. The P/N 200-300-00 Cargo Hook Kit is approved for installation on the following MD Helicopter models:

Table 1.1 Approved Model List

369D	369HS
369E	369HM
369F	369HE
369FF	500N

The kit requires that the helicopter be equipped with an MD Helicopter 369H90072 series cargo hook kit (with cargo hook assembly P/N 369H92105-501) or Onboard Systems Cargo Hook Kits 200-187-00, 200-264-00, or 200-264-01.

1.2 Safety labels

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.

2.0 Referenced Documents

121-028-00 RFM Supplement

122-015-00 Component Maintenance Manual

123-021-00 ICA Manual

3.0 System Overview

3.1 Description

The primary elements of the Cargo Hook are the load beam, the internal mechanism, and a solenoid. The load beam supports the load and is latched through the internal mechanism. The solenoid and a hydraulic release system provide the means for unlatching the load beam.

The load is attached to the load beam by passing a cargo sling ring into the throat of the load beam and pushing the ring against the upper portion of the load beam throat, which will initiate the hook to close. In the closed position, a latch engages the load beam and latches it in this position.

To release the load, the latch is disengaged from the load beam. With the latch disengaged, the weight of the load causes the load beam to swing to its open position, and the cargo sling slides off the load beam. The load beam then remains in the open position awaiting the next load.

A load release can be initiated by three different methods. Normal release is achieved by pilot actuation of the push-button switch in the cockpit. When the push-button switch is pressed, it energizes the solenoid in the Cargo Hook, and the solenoid opens the latch in the internal mechanism. In an emergency, release can be achieved by operating a hydraulic release lever. The hydraulic release lever operates the internal mechanism of the Cargo Hook to unlatch the load beam. Ground personnel can release a load by actuating a lever located on the side of the Cargo Hook.

3.2 Specifications

Table 3.1 Cargo Hook Specifications

Design load	3,500 lbs. (1,580 kg.)
Design ultimate strength	13,125 lbs. (7,140 kg.)
Electrical release capacity	8,750 lbs. (3,970 kg.)
Manual release capacity	8,750 lbs. (3,970 kg.)
Force required for manual release at 3,500 lb.	14 lbs max. @ Master Cylinder
Electrical requirements	22-32 VDC 6.9 – 10 amps
Minimum release load	0 pounds
Unit weight	3.0 pounds (1.35 kg.)
Mating electrical connector	PC05A8-2S

3.3 Bill of Materials

The following items are included with the kit, if shortages are found contact the company from whom the system was purchased.

Table 3.2 Bill of Materials

Part No.	Description	Quantity
120-119-00	Owner's Manual	1
121-028-00	RFM Supplement	1
122-015-00	CMM, Cargo Hook	1
123-021-00	ICA Maintenance Manual	1
232-203-00	Cargo Hook/Slave Cylinder Assembly	1
232-197-00	Master Cylinder Assembly	1
270-132-00	Electrical Release Cable Harness	1
270-133-00	Load Cell Extension Cable	1
290-332-00	Attach Bolt	1
290-360-01	Travel Limit Bumper	1
290-361-00	Bumper Pad	2
290-909-00	Modified Adel Clamp	1
505-014-00	Grommet	1
505-015-00	Grommet	1
510-170-00	Nut	1
510-174-00	Washer	1
510-178-00	Cotter Pin	1
510-183-00	Washer	2
512-001-00	Ty-rap	10
512-005-00	Loop Clamp	2
512-026-00	Loop Clamp	2
590-013-00	Spiral Hose Wrap	18"

4.0 Installation

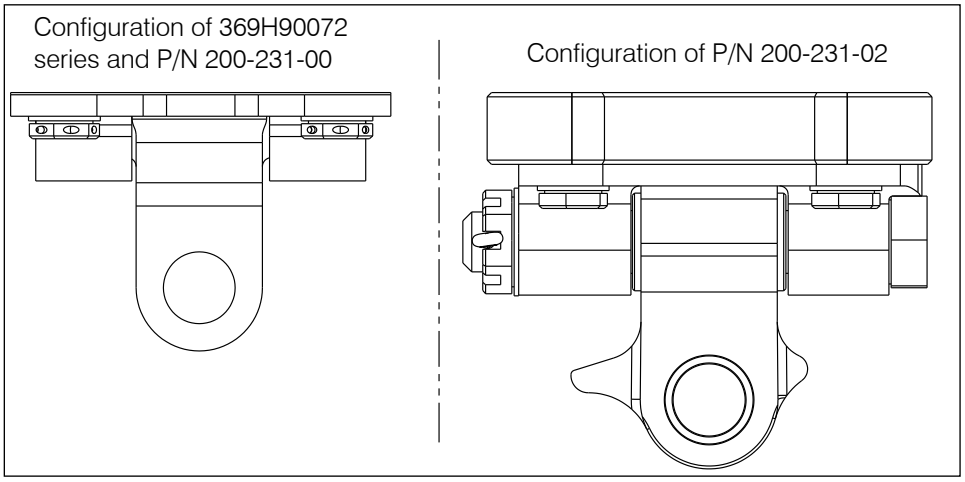
These procedures are provided for the benefit of experienced aircraft maintenance facilities capable of carrying out the procedures. They must not be attempted by those lacking the necessary expertise.

Cargo hook kit P/Ns 200-300-00 is configured to interface with the attach point included with MD cargo hook kit P/N 369H90072 series or the nearly identical Onboard Systems kit P/N 200-231-00. This attach point configuration is shown at left in Figure 4.1.

If P/N 200-231-02 (shown at right in Figure 4.1) is installed the Bumper Pad Installation (see Figure 4.2) and Travel Limit Bumper (see Figure 4.3) are omitted. Follow Owner's Manual 120-207-00 for the cargo hook installation with P/N 200-231-02.

If the E-51 Load Cell Assembly (P/N 210-031 series) is being installed with P/N 200-231-02 follow the instructions in this manual including orientation of the cargo hook.

Figure 4.1 Attach Point Assembly Configurations



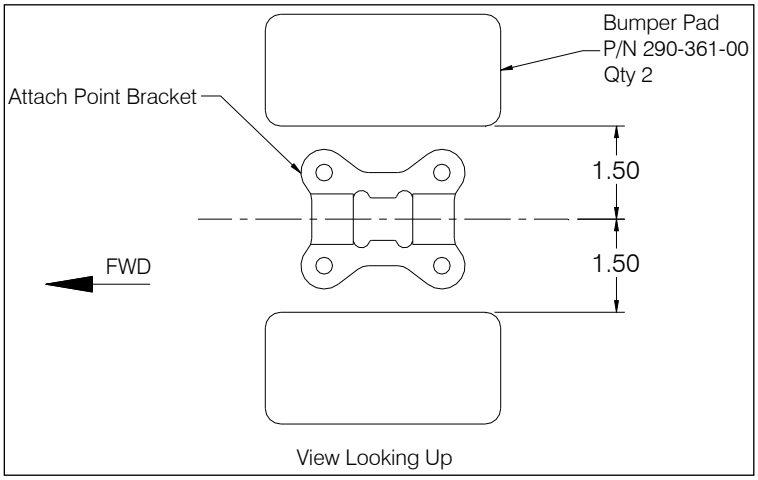
4.1 Cargo Hook Removal

Disconnect the manual release cable from the existing cargo hook and remove the entire release cable including the release lever on the cyclic stick. Disconnect the external electrical release harness at the belly mounted bulkhead connector. Remove the bolt used to attach the Cargo Hook to the airframe-mounting bracket or load cell (if installed) and separate it from the aircraft.

4.2 Bumper Pad Installation

Remove any existing MD hook bumper pads (MD P/N 369H90072-7 and P/N 369H90072-5) that may be attached to the aircraft skin. Install the Bumper Pads (P/N 290-361-00) to the airframe skin in the location illustrated in Figure 4.2 with 3M trim cement.

Figure 4.2 Bumper Pad Installation



4.3 Cargo Hook Pre-installation Assembly

In preparation for installing the cargo hook, assemble the travel limit bumper and the electrical release harness onto the cargo hook (P/N 528-028-00) per the following sections.

NOTICE

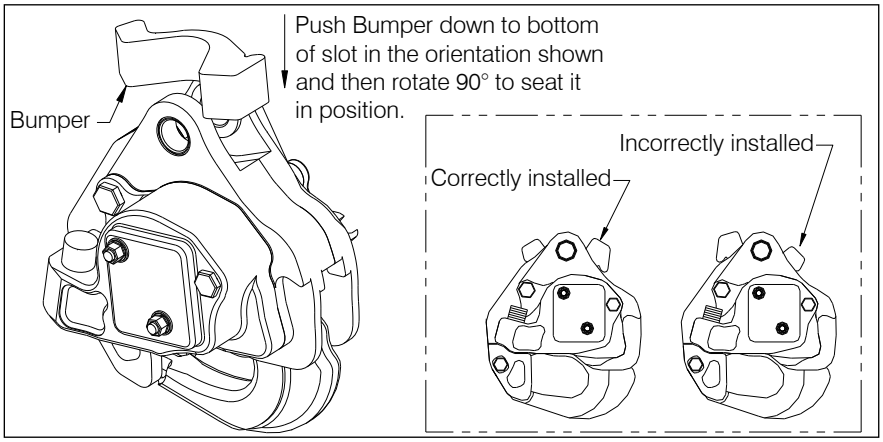
Assemble the travel limit bumper onto the cargo hook if the cargo hook is being installed on an aircraft without the E-51 load cell.

4.3.1 Travel Limit Bumper

The travel limit bumper helps prevent the cargo hook from damaging the aircraft skin and/or control cables. Follow the steps listed below to install the travel limit bumper.

1. Orient the bumper as shown below and slightly rotate the bumper to hook one edge around the lower lip of one of the bronze bushings on the cargo hook.
2. Continue to rotate the bumper into position. It may be necessary to use a screwdriver or similar tool to push it into the final position.

Figure 4.3 Travel Limit Bumper Installation



4.3.2 Cargo Hook Electrical Release Harness

Connect the external electrical release harness (P/N 270-132-00) to the cargo hook connector. Listed below is the pin out for the cargo hook and the bulkhead connector.

Cargo Hook Connector

Pin	Function
A	Ground
B	Power

Bulkhead Connector

Pin	Function
A	Power
B	Ground
C	Shield

CAUTION

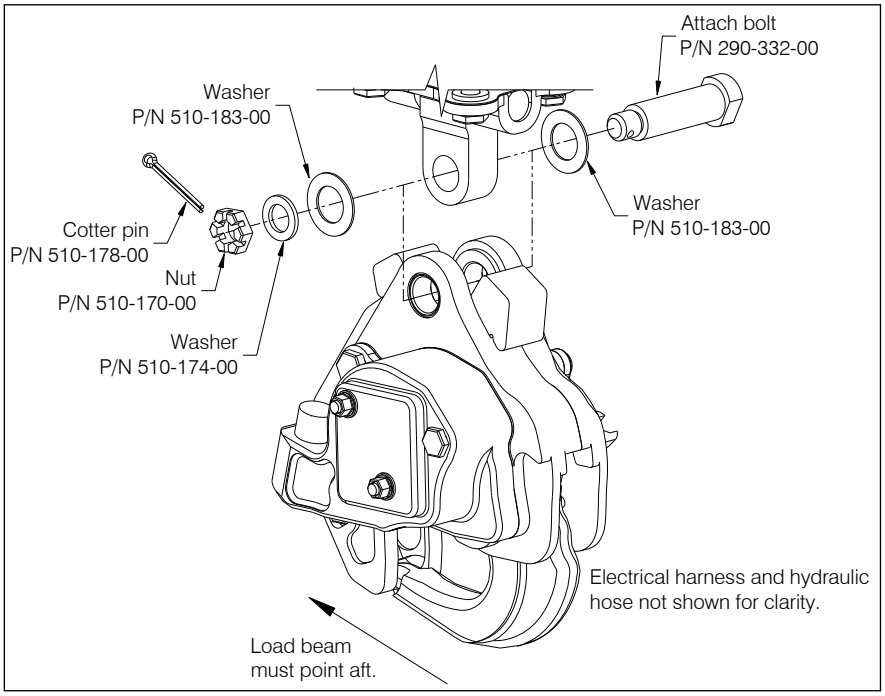
The Cargo Hook is equipped with a suppression diode that will be damaged if the Cargo Hook electrical connections are reversed. Do not attach the electrical connector until the polarity of the aircraft connector is determined to be compatible with the Cargo Hook connector listed.

4.4 Cargo Hook Installation

Install the Cargo Hook onto the existing attach point. Use the supplied hardware as illustrated in Figure 4.4. The cargo hook load beam must point aft.

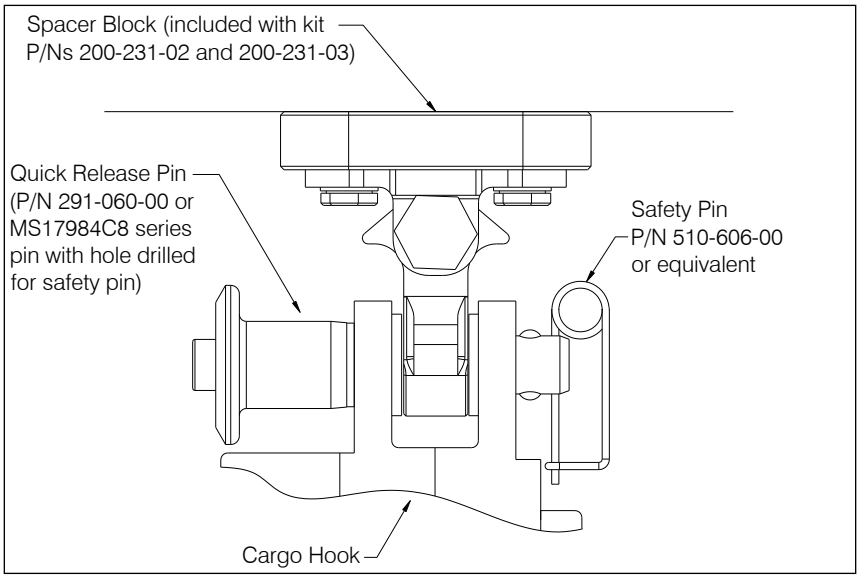
Tighten nut on bolt finger tight until it seats against the shoulder of the bolt, rotate to previous castellation if necessary to align holes for cotter pin insertion, and then install and secure cotter pin (P/N 510-178-00).

Figure 4.4 Cargo Hook Installation (Attach Point 200-231-00 Shown)



To facilitate transition of the cargo hook between a side pull installation and the belly installation a quick release pin (P/N 291-060-00 or equivalent MS17984C8 series pin modified with a hole for safety pin) may be used if the cargo hook is installed with Attach Point Kit P/N's 200-231-02 or 200-231-03 only. Grease the shank of the pin with AeroShell 7 or Mobilgrease 28 grease or equivalent before installing.

Figure 4.5 Optional Attach Hardware Installation

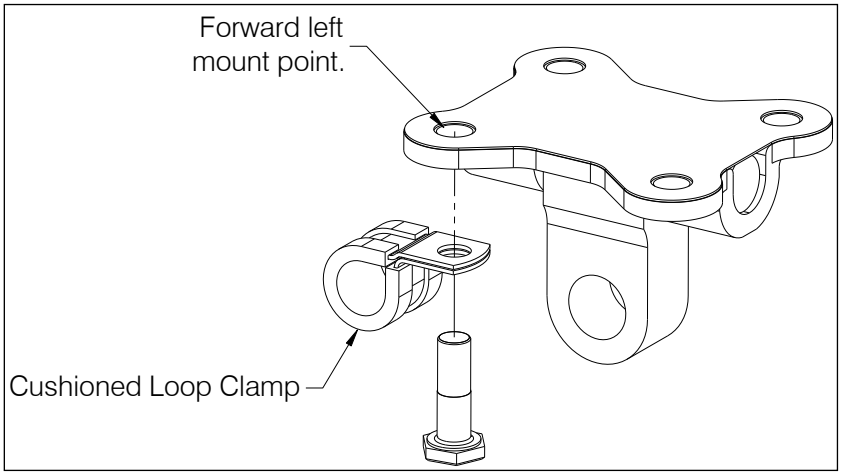


4.5 Hydraulic Hose and Electrical Harness Routing

Place the supplied loop clamp (P/N 290-909-00) over the electrical release harness (and load cell harness if present) and hose.

Remove the existing forward left attach bolt and washer and install the loop clamp re-using the bolt as shown in Figure 4.6. Do NOT fully tighten the bolt at this point.

Figure 4.6 Hose Clamp Installation



Route the harness and hose approximately as shown and install the supplied spiral wrap (P/N 590-013-00) over them as shown in Figure 4.7.

CAUTION

The routing must provide adequate slack in the harness and hose so that any range or direction of cargo hook travel does not create tension in any of these. Swing the cargo hook in all directions and ensure that the harness and hose are not pulled tight or adversely kinked in any position.

Tighten the attach bolt where the loop clamp is installed to 50-70 in-lbs. and ensure that the harness and hose are not loose in the clamp.

NOTICE

If installing the cargo hook on a helicopter equipped with an E-51 load cell (not included with this kit), route as shown in Figure 4.8.

Figure 4.7 Hose and Harness Routing

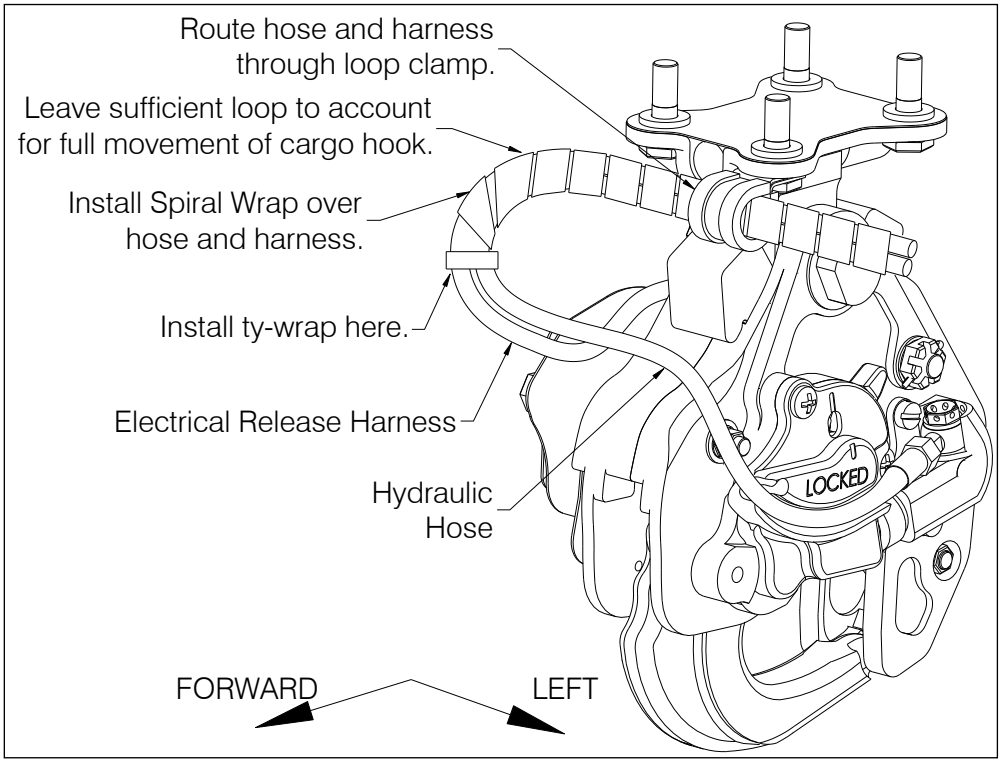
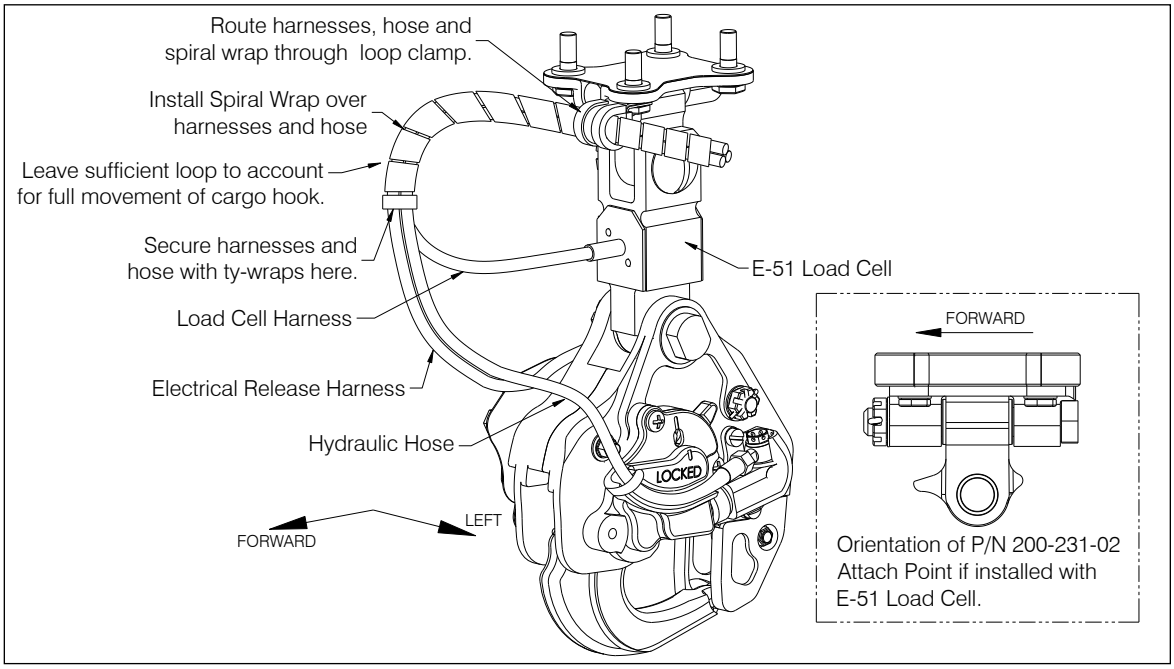


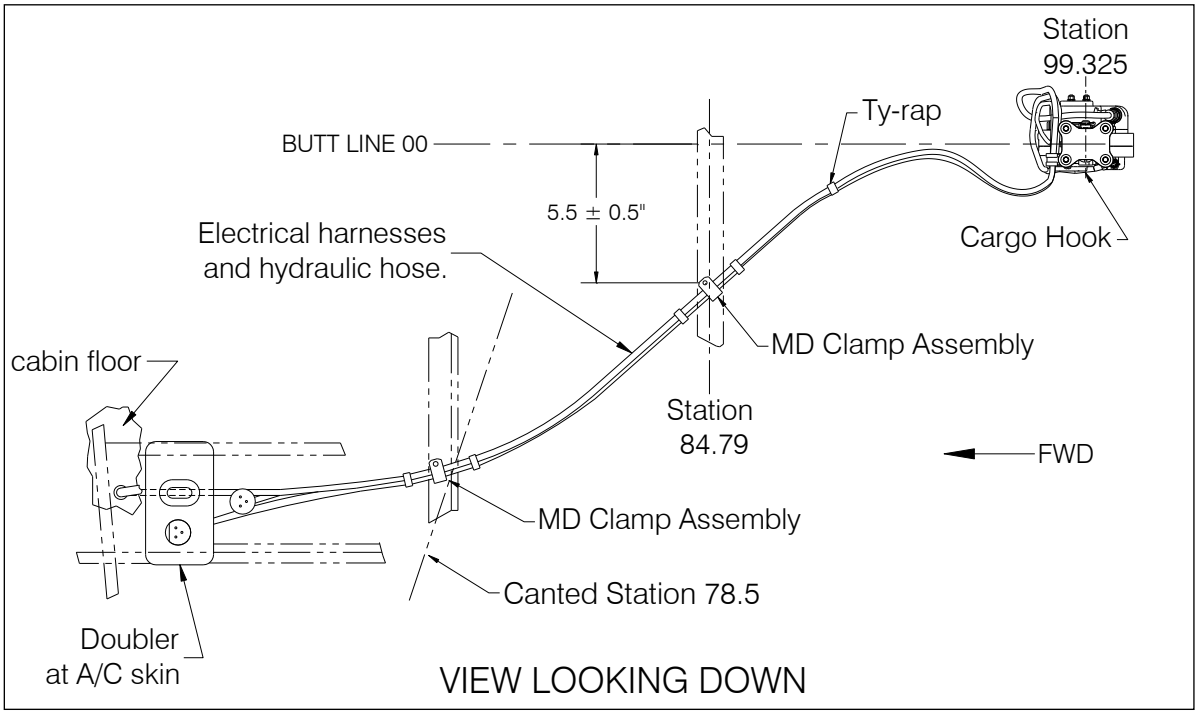
Figure 4.8 Hose and Harness Routing with Load Cell



Route the hose and harness forward through the existing MD clamp assemblies located at Station 84.79 and forward of Canted Station 78.5 as shown in Figure 4.9.

Secure them to the clamp assemblies (MD P/N 369H90017-29) using the loop clamps provided (P/N 512-005-00 or 512-026-00). Re-use the bolt and nut that came off the clamp assemblies to secure the loop clamps.

Figure 4.9 External Hose and Harness Routing



After securing them at the clamp assemblies, route the harness and hydraulic hose forward to the doubler (as shown in Figure 4.9).

Connect the cargo hook electrical release connector to the existing bulkhead connector at the doubler on the aircraft skin and safety wire the connector onto the bulkhead mount point.

NOTICE

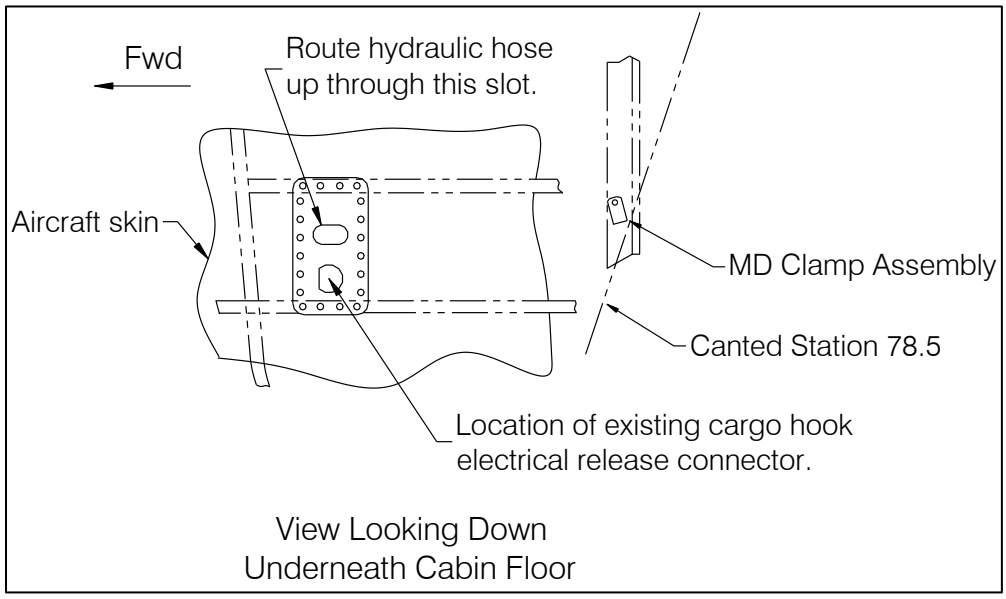
If retrofitting a helicopter with an existing E-51 load cell assembly and if necessary to obtain length disconnect the load cell harness connector at the belly skin and install the load cell extension harness (P/N 270-133-00) in between it and the fixed load weigh connector.

Remove existing grommet (if present) from the slot (see Figure 4.10) in the doubler at the lower skin that previously housed the manual release cable.

Route the quick disconnect end of the external hydraulic hose through the new grommet (P/N 505-015-00) provided and then through the slot.

Install the grommet in the slot (if necessary split the grommet).

Figure 4.10 Hydraulic Hose Routing at Aircraft Skin



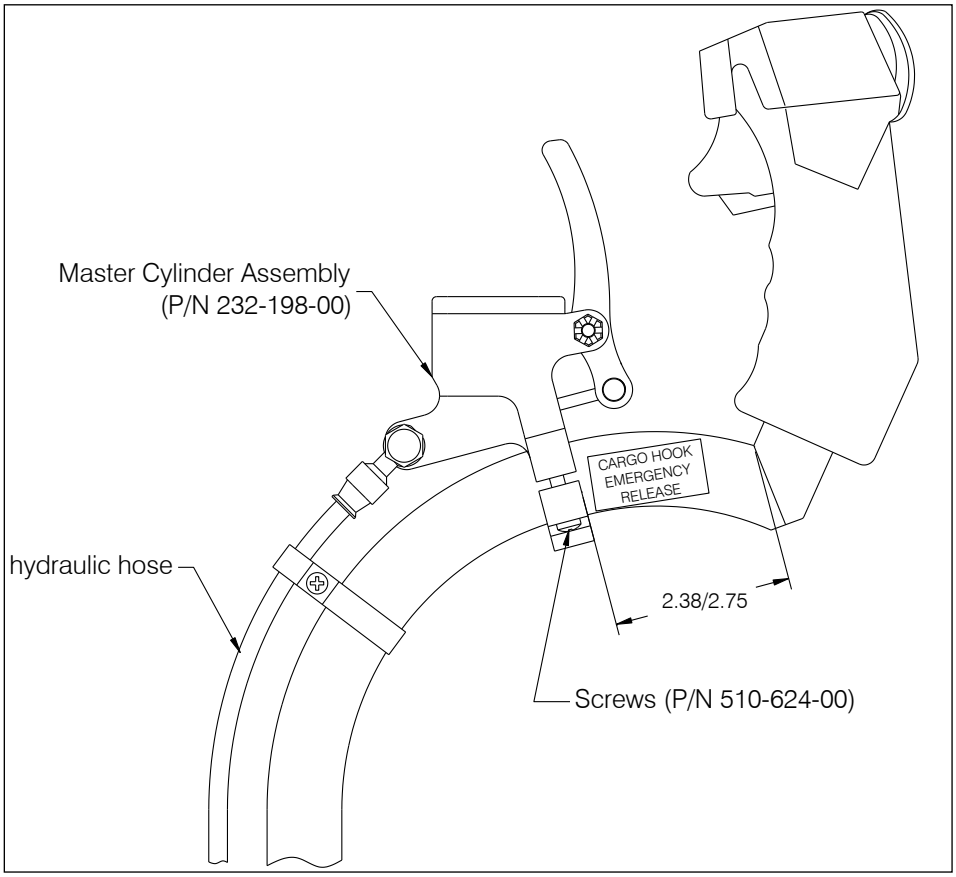
4.6 Master Cylinder Installation

The hydraulic release system is supplied dry. It is recommended that the system be filled and bled on the bench before installing on the helicopter. Refer to section 4.7 for filling and bleeding instructions.

Position the Master Cylinder Assembly (P/N 232-197-00) on the pilot's cyclic stick as shown below. Adjust the location if necessary so that the lever is accessible and comfortably reached by hand from the cyclic stick grip but not be able to contact or interfere with operation of any cyclic grip control when it is fully actuated. This will be verified at installation check out (when the release system is operational).

Secure the Master Cylinder Assembly using two screws (P/N 510-624-00) as shown in Figure 4.11 (these screws are provided pre-assembled onto the P/N 232-197-00 assembly).

Figure 4.11 Master Cylinder Installation



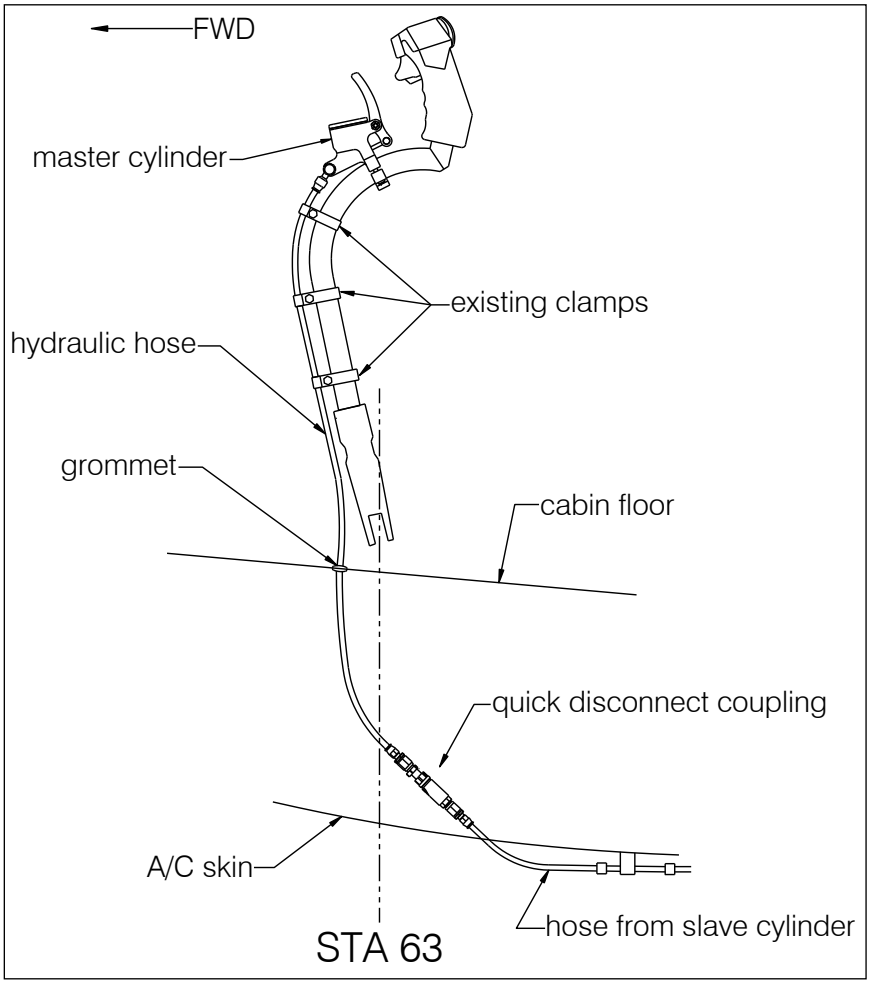
The hydraulic hose should follow the same path as the manual release cable that is shown in MDHC Publication CSP-005.

Secure the hydraulic hose to the cyclic using the same clamps that were used with the manual release cable.

The quick disconnect end of the hose is to be routed to underneath the cabin floor using the same hole at the base of the pilot seat that the manual release cable used. Open up the hole to 0.69 inches to accommodate the quick disconnect and grommet P/N 505-014-00. If necessary, split the grommet to facilitate installation.

Feed the hose down through the hole and connect it to the hose routed from the cargo hook slave cylinder. Secure to prevent free movement or chafing during flight.

Figure 4.12 Master Cylinder Hose Routing



4.7 Hydraulic System Bleed Procedure

If there is a need to fill and/or bleed the system, follow the procedures listed below. Proper bleeding is critical to the operation of the hydraulic release system. An improperly bled system will not release the cargo hook mechanism. If you need to remove and repair any items in the hydraulic system, refer to 123-021-00, Instruction for Continued Airworthiness

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.

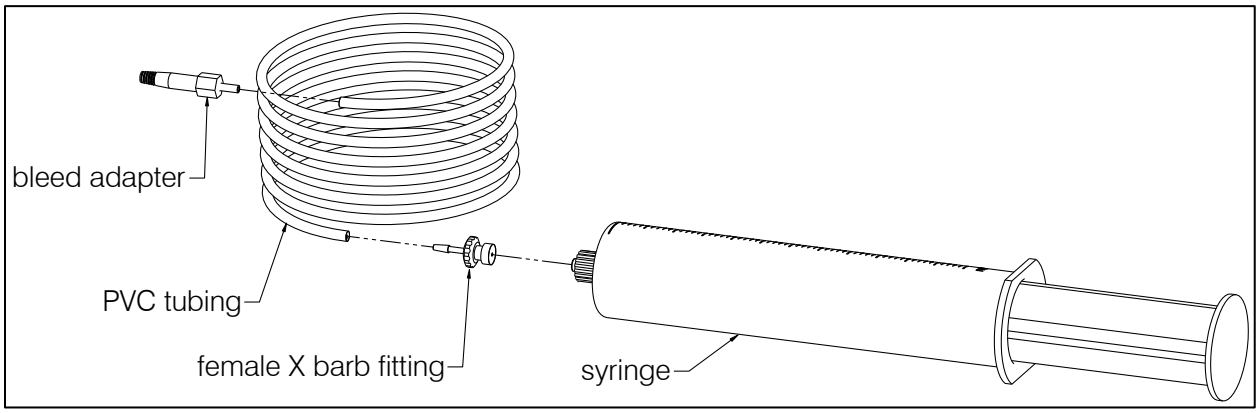
NOTICE

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

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 hook kits. Assemble the bleed kit by press fitting each component as shown.

Figure 4.13 Hydraulic Hook Bleed Kit



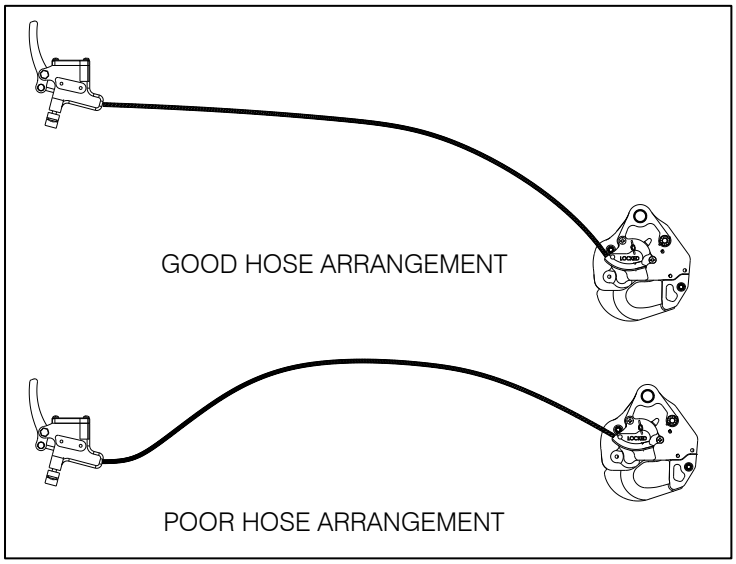
2. If the system is already installed on the aircraft, place an absorbent towel under the master cylinder. If the master cylinder is not installed on the aircraft, lightly clamp the master cylinder in a vise to hold it in a vertical position and position the slave cylinder so that its level is below that 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.

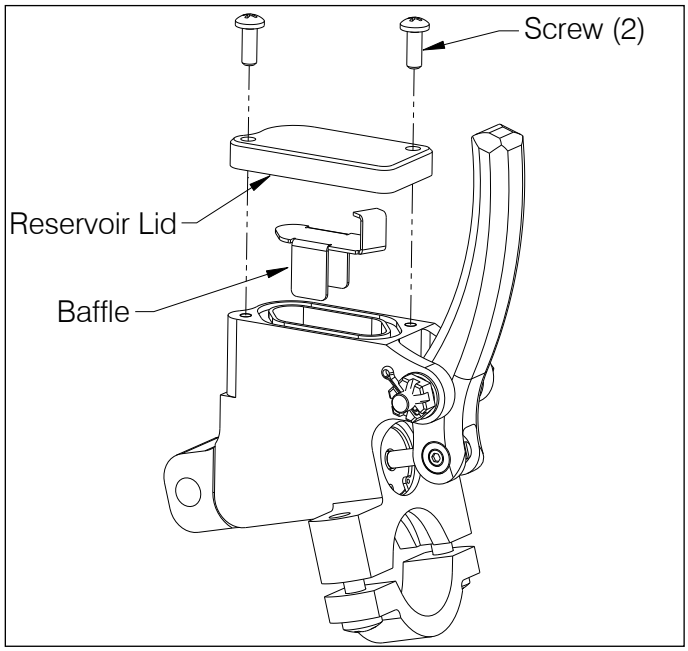
3. Connect the master cylinder assembly to the slave cylinder assembly if not already done. If filling or bleeding on the bench, as much as possible, arrange the hoses uncoiled, straight and running uphill. See Figure 4.14.

Figure 4.14 Hose Arrangement



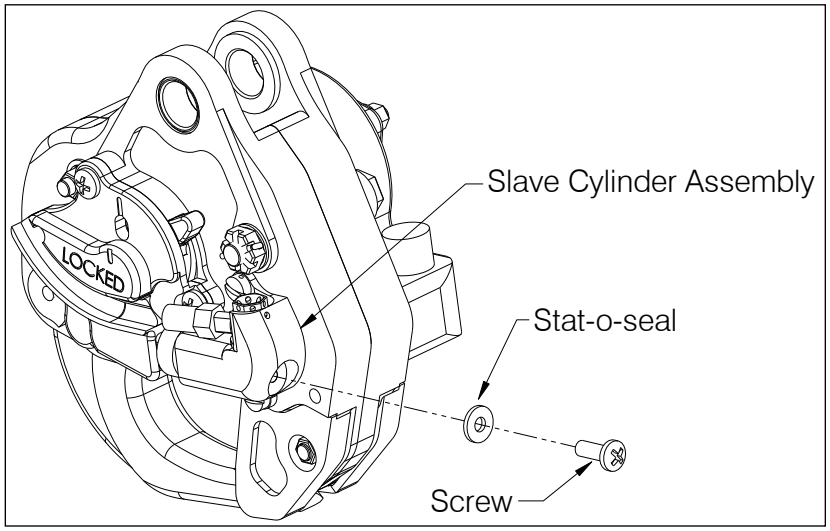
4. Remove screws, reservoir lid, and baffle from the master cylinder reservoir as shown in Figure 4.15.

Figure 4.15 Reservoir Disassembly



5. Remove the screw and stat-o-seal on the slave cylinder, see Figure 4.16.

Figure 4.16 Screw and Stat-o-seal Removal



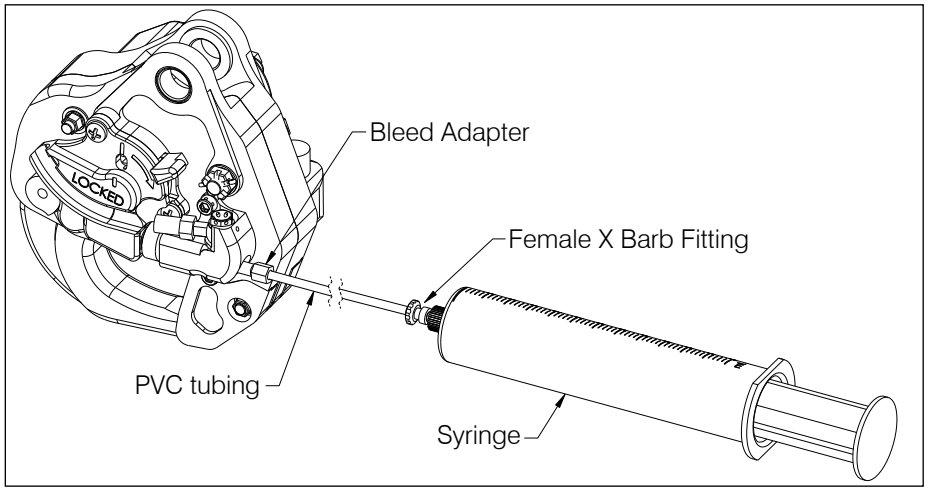
6. Fill the syringe with approximately 35 cc of hydraulic fluid and purge any remaining air in the syringe and tubing. Screw the end of the bleed adapter into the screw hole on the slave cylinder to create a tight seal. See Figure 4.17.

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 4.17 Injecting Hydraulic Fluid



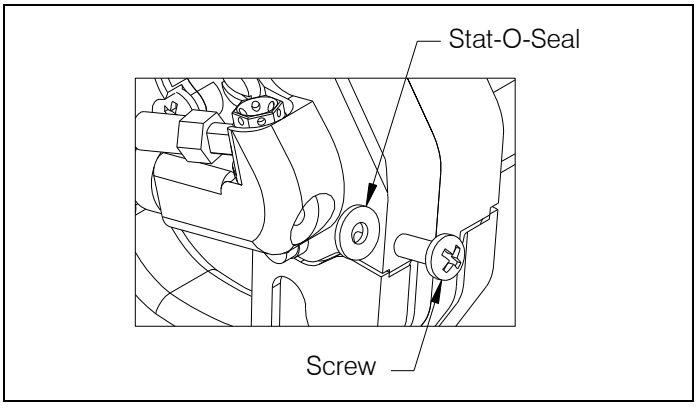
8. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

NOTICE

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

9. Remove the bleed adapter from the screw hole. Re-install the Thread-Seal (P/N 510-740-00), washers (P/N 510-209-00) and screw (P/N 510-694-00), see Figure 4.18.

Figure 4.18 Screw Re-installation



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

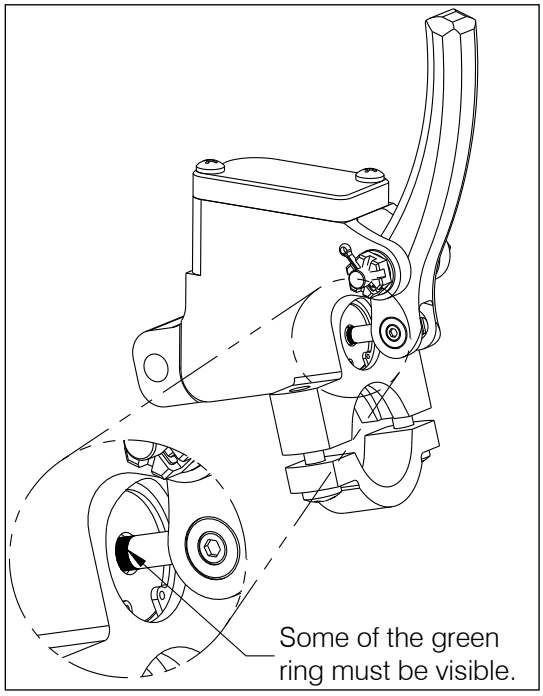
11. Very **slowly** pull the release lever on the master cylinder and watch for bubbles. If bubbles are observed rising within the reservoir, continue to slowly cycle the lever until there are no more. Actuating the lever releases air trapped within the master cylinder.

⚠ 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. Check the system for air by actuating the lever firmly until it bottoms out. Check the push rod position (see Figure 4.19). If some of the green area 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 4.19 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. Depending on the configuration - if the heads on the reservoir lid screws are drilled, install safety wire.

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. Re-assemble and store for next use.

4.8 Installation Check-out

After installation of the Cargo Hook Kit, activate the circuit breaker to turn the system on. Perform the following functional checks.

1. Swing the installed Cargo Hook to ensure that the hydraulic hose and the load cell (if installed) and electrical release harnesses have enough slack to allow full swing of the cargo hook. The harnesses and hose must NOT be the stops that prevent the Cargo Hook from swinging freely in all directions.
2. Pull and fully actuate the hydraulic release lever on the pilot's cyclic stick and verify it does not contact or interfere with operation any cyclic control.
3. With no load on the cargo hook, pull the lever-operated cargo hook hydraulic release. The Cargo Hook should release. Reset the cargo hook load beam. Check the hydraulic system for any signs of leaking hydraulic fluid. If leakage is found, do not use the system until the leak has been fixed.
4. With no load on the cargo hook load beam, depress the cargo hook electrical release button. The Cargo Hook should release.
5. Ensure that the hydraulic hose and wire harnesses are secured clear of flight control rods and hydraulic lines.
6. Perform an EMI ground test per AC 43.13-1b section 11-107. For equipment that can only be checked in flight an EMI flight test may be required.

NOTICE

The cargo hook is of a class of equipment not known to have a high potential for interference. This class of equipment does not require special EMI installation testing (i.e. FADEC) as required in paragraphs 7 and 8 of FAA policy memorandum ASW-2001-01.

7. In the US, fill in FAA form 337 for the initial installation. This procedure may vary in different countries. Make the appropriate aircraft log book entry. Insert the Rotorcraft Flight Manual Supplement 121-028-00 into the Rotorcraft Flight Manual.

4.9 Component Weights

The weights of the Cargo Hook Kit components are listed below.

Table 4.1 Kit P/N 200-300-00 Component Weights

Item	Weight lbs (kgs)
Cargo Hook	3.0 (1.36)
Master Cylinder Assembly	0.5 (.23)
Hydraulic Release Cable	1.0 (.45)
Electrical Release Cable	0.5 (.23)
Bumper Pads	0.2 (.09)
Travel Limit Bumper	0.1 (.05)
Total	**5.3 (2.4)**

4.10 Cargo Hook Location

Table 4.2 Cargo Hook Location

Station	99.3

5.0 Operation Instructions

5.1 Operating Procedures

Prior to a flight involving external load operations perform the following:

1. Be completely familiar with this manual, particularly the Cargo Hook rigging section.
2. Be completely familiar with all MD Helicopter cargo hook operating instructions.
3. Activate the electrical system and press the release button to ensure the cargo hook electrical release is operating correctly. With no load on it, the cargo hook must release. Reset the cargo hook load beam by hand after release. If the load beam does not release or re-latch do not use the unit until the difficulty is resolved.

CAUTION

The release solenoid in the cargo hook is intended to be energized only intermittently. Depressing the electrical release button continuously in excess of 20 seconds will cause the release solenoid to overheat, possibly causing permanent damage.

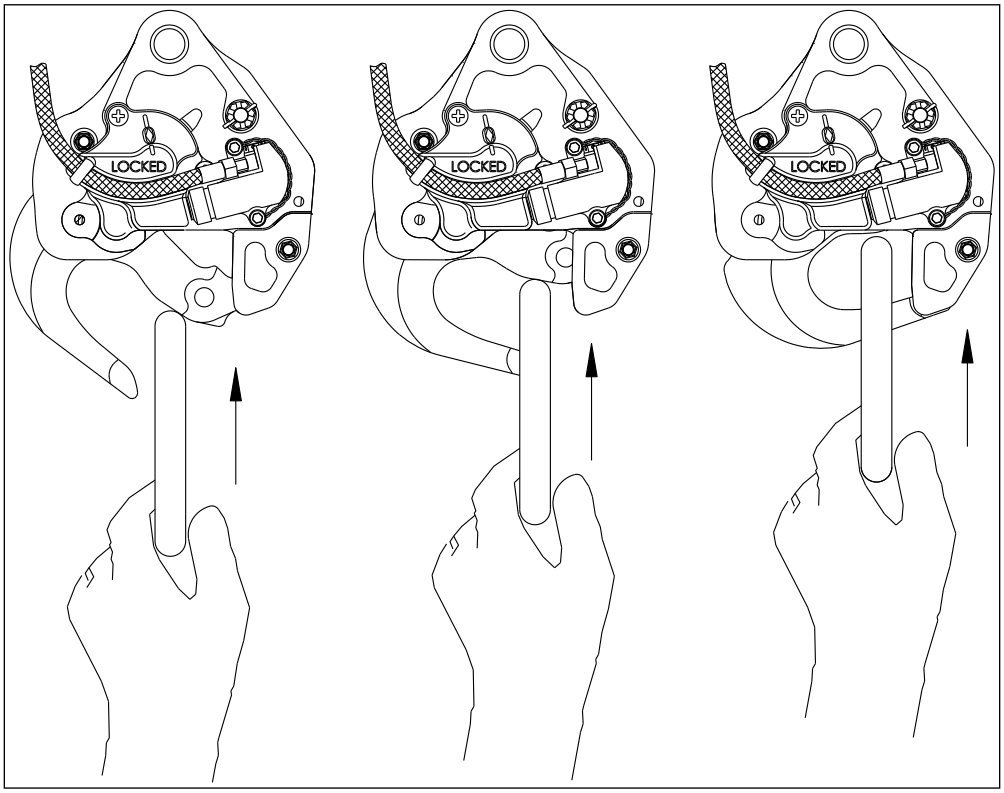
4. Activate the release lever assembly located on the cyclic to test the cargo hook hydraulic release mechanism. With no load on it, the cargo hook must release. Reset the cargo hook load beam by hand after release and ensure the hook lock indicator is aligned with the lines on the cover. If the load beam does not re-latch or the lock indicator is not aligned do not use the unit until the problem is resolved.

See the MD Helicopter service instructions that cover the original Cargo Hook installation for additional instructions.

5.2 Cargo Hook Loading

The cargo hook can easily be loaded with one hand. A load is attached to the hook by pushing the ring upward against the upper portion of the load beam throat, as illustrated in Figure 5.1, until an internal latch engages the load beam and latches it in the closed position.

Figure 5.1 Cargo Hook Loading



5.3 Cargo Hook Rigging

Extreme care must be exercised when rigging a load to the Cargo Hook. Steel load rings are recommended to provide consistent release performance and resistance to fouling. The following illustration shows the recommended rigging and rigging to avoid, but is not intended to represent all rigging possibilities.

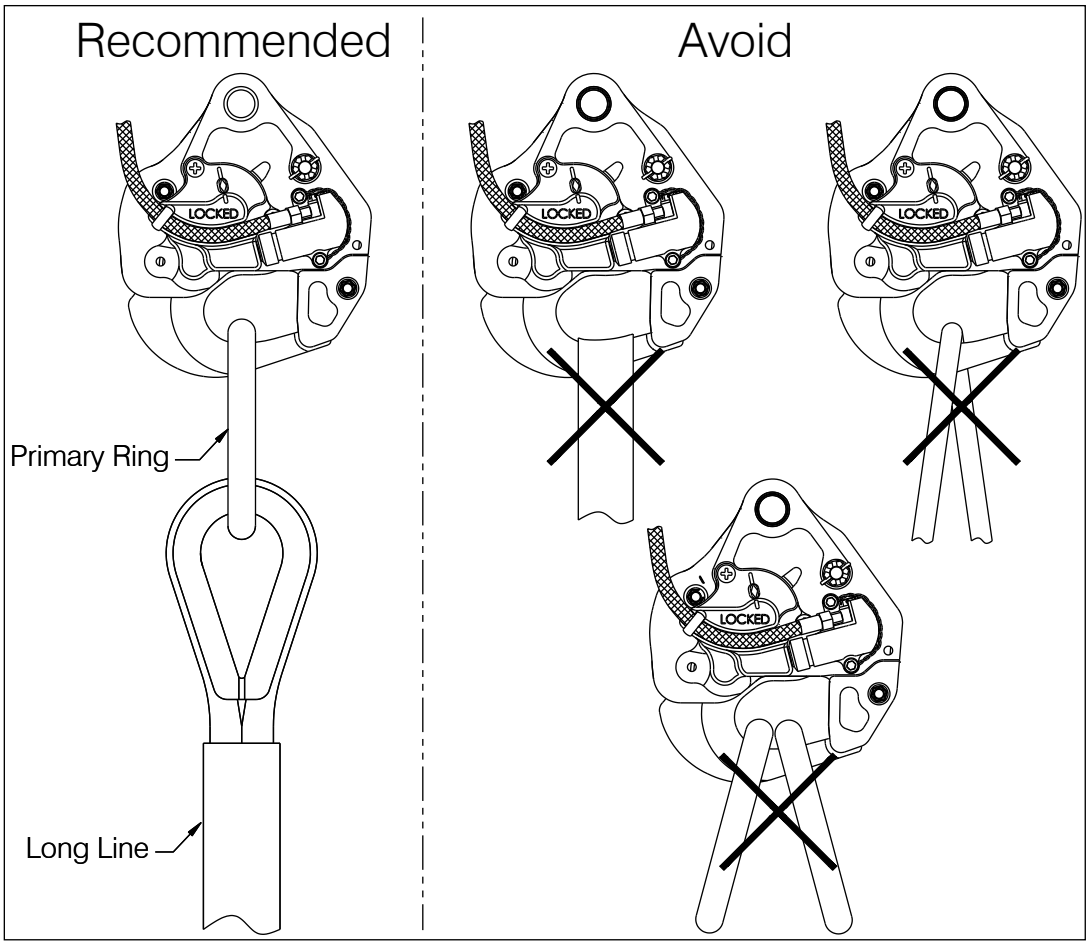
WARNING

Some combinations of small primary rings and large secondary rings could cause fouling during release. It is the responsibility of the operator to assure the cargo hook will function properly with each rigging.

WARNING

Nylon type straps (or similar material) or rope must not be used directly on the cargo hook load beam. If nylon straps or rope must be used they should be first attached to a steel primary ring. Verify that the ring will freely slide off the load beam when it is opened. Only the primary ring should be in contact with the cargo hook load beam.

Figure 5.2 Examples of Cargo Hook Rigging



6.0 Maintenance

Refer to Cargo Hook Component Maintenance Manual 122-015-00 and Instructions for Continued Airworthiness 123-021-00 for detailed maintenance information.

6.1 Instructions for Returning Equipment to the Factory

If an Onboard Systems product must be returned to the factory for any reason (including returns, service, repairs, overhaul, etc.) obtain an RMA number before shipping your return.

NOTICE

An RMA number is required for all equipment returns.

To obtain an RMA, please use one of the listed methods.

- Contact Technical Support by phone or e-mail (Techhelp@OnboardSystems.com).
- Generate an RMA number at our website: http://www.onboardsystems.com/rma.php

After you have obtained the RMA number, please be sure to:

- Package the component carefully to ensure safe transit.
- Write the RMA number on the outside of the box or on the mailing label.
- Include the RMA number and reason for the return on your purchase or work order.
- Include your name, address, phone and fax number and email (as applicable).
- Return the components freight, cartage, insurance and customs prepaid to:

  Onboard Systems
  13915 NW 3rd Court
  Vancouver, Washington 98685
  USA
  Phone: 360-546-3072

7.0 System Part Numbers

Figure 7.1 232-203-00, Cargo Hook/Slave Cylinder Assembly Parts

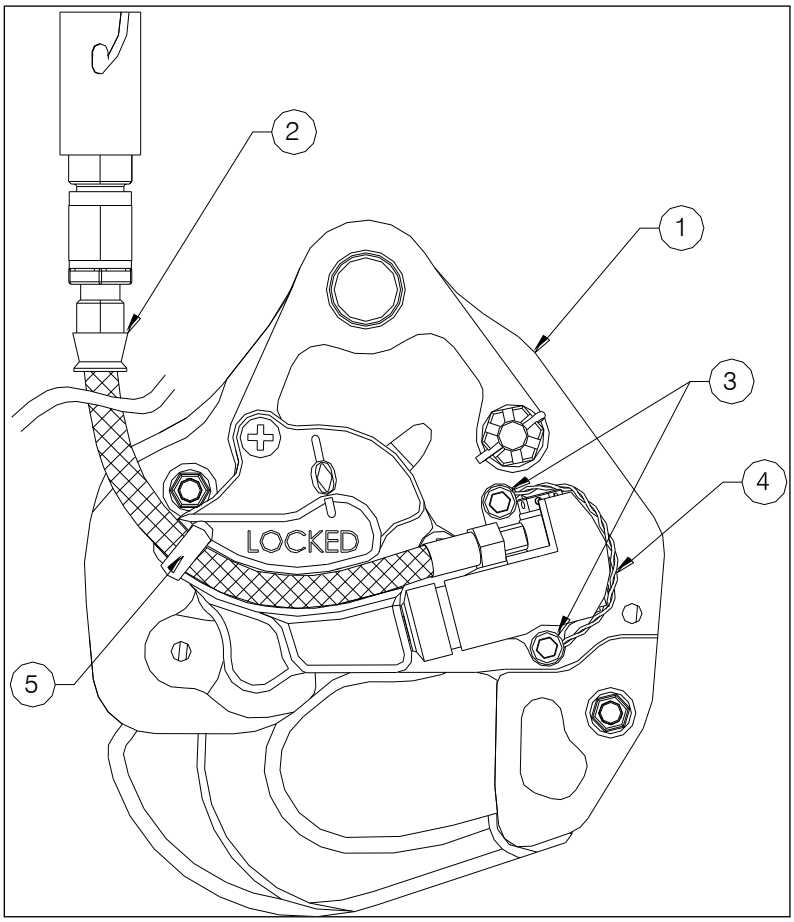


Table 7.1 232-203-00, Cargo Hook/Slave Cylinder Assembly Parts

Item	P/N	Description	Qty
1	528-028-00	Cargo Hook	1
2	232-200-00	Slave Cylinder Assembly with Plumbing	1
3	510-531-00	Screw	2
4	420-033-00	Safety Wire	AR
5	512-003-00	Ty-Wrap	1

Figure 7.2 232-200-00, Slave Cylinder Assembly with Plumbing

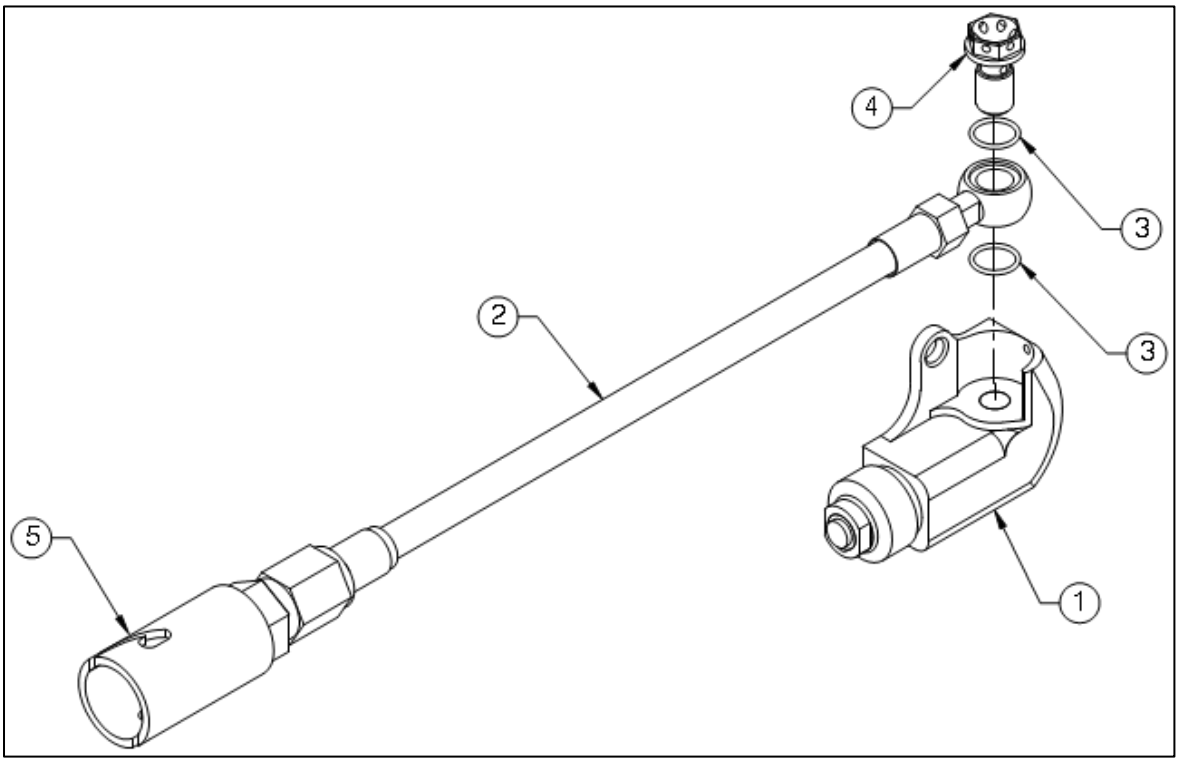


Table 7.2 232-200-00, Slave Cylinder Assembly with Plumbing

Item	Part Number	Description	Qty
1	232-169-00	Slave Cylinder Assembly	1
2	232-196-01	Slave Cylinder Plumbing Assembly	1
3	556-041-00	O-Ring	2
4	558-031-00	Banjo Bolt	1
5	560-006-00	Quick Disconnect	1

Figure 7.3 232-197-00, Master Cylinder Assembly with Plumbing

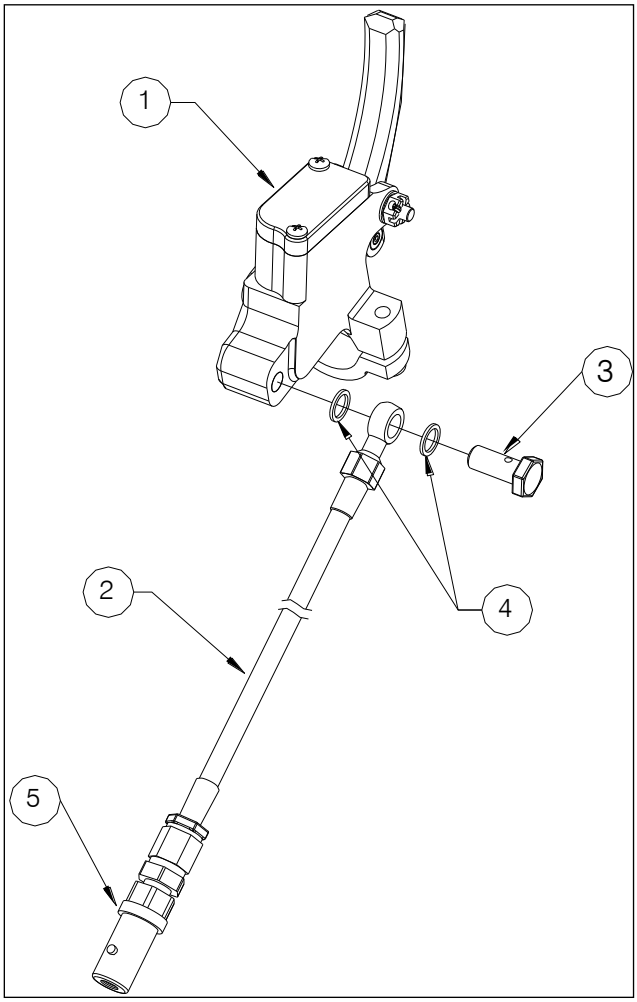


Table 7.3 232-197-00, Master Cylinder Assembly with Plumbing

Item	Part Number	Description	Qty
1	232-198-00	Master Cylinder Assembly	1
2	232-199-01	Master Cylinder Plumbing Assembly	1
3	558-021-00	Banjo Bolt	1
4	556-040-00	Crush Washer	2
5	560-005-00	Quick Disconnect	1

Figure 7.4 232-198-00, Master Cylinder Assembly

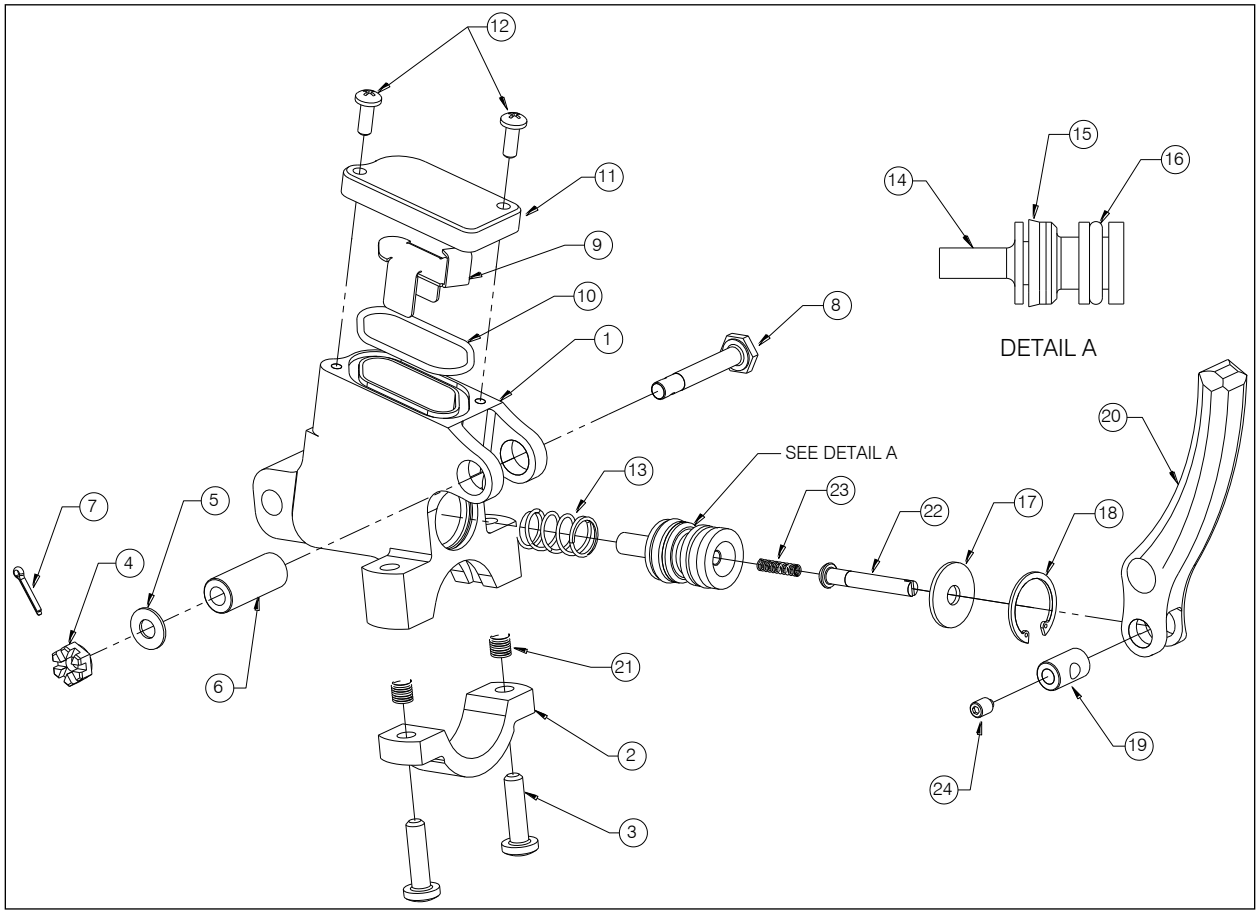


Table 7.4 232-198-00, Master Cylinder Assembly

Item	Part Number	Description	Qty
1	290-905-00	Master Cylinder	1
2	290-907-00	Clamp Half	1
3	510-624-00	Screw	2
4	510-082-00	Nut	1
5	510-986-00	Washer	1
6	290-908-00	Shaft	1
7	510-125-00	Cotter Pin	1
8	510-450-00	Bolt	1
9	235-124-00	Baffle	1
10	556-044-00	O-Ring	1
11	290-922-00*	Reservoir Lid	1
12	511-124-00*	Shoulder Screw	2
13	514-055-00	Compression Spring	1
14	290-814-01	Piston	1

Item	Part Number	Description	Qty
15	556-048-00	Cup Seal	1
16	556-047-00	O-Ring	1
17	510-532-00	Washer	1
18	515-008-00	Snap Ring	1
19	290-812-00	Barrel Nut	1
20	290-906-00	Lever	1
21	510-248-00	Helicoil	2
22	290-813-00	Push Rod	1
23	514-060-00	Spring	1
24	510-530-00	Screw	1

* For improved performance, use shoulder screw P/N 511-124-00 if replacing reservoir lid P/N 290-922-00. P/N 511-124-00 supersedes P/N 510-424-00.

Figure 7.5 232-169-00, Slave Cylinder Assembly

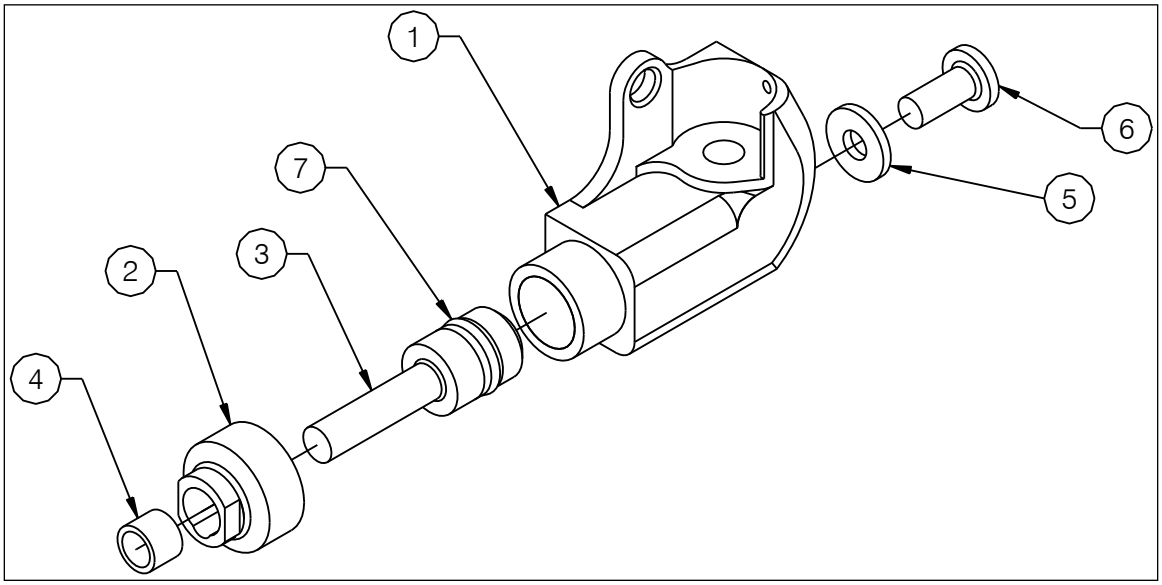


Table 7.5 232-169-00, Slave Cylinder Assembly

Item	Part No.	Description	Qty
1	290-803-00	Slave Cylinder	1
2	290-802-00	Cylinder Cap	1
3	290-805-00	Piston	1
4	517-040-00	Bushing	1
5	510-496-00	Stat-O-Seal	1
6	510-493-00	Screw	1
7	556-097-00	Quad Seal	1

8.0 Certification

8.1 STC

United States of America
Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number **SR01778SE**

This certificate, issued to **Onboard Systems**
13915 NW 3rd Court
Vancouver, WA 98685

certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 27 *of the* Federal Aviation Regulations.

Original Product—Type Certificate Number: H3WE
Make: MD Helicopters, Inc.
Model: 369D, 369E, 369F, 369FF, 369HE, 369HM, 369HS and 500N

Description of the Type Design Change: Fabrication of Onboard Systems Model 200-300-00 Talon LC Hydraulic Cargo Hook Kit without Load Weigh, Model 200-301-00 Talon LC Hydraulic Cargo Hook Kit with Load Weigh in accordance with FAA approved Onboard Systems Master Drawing List No. 155-112-00, revision 1, dated July 13, 2007, or later FAA approved revision; and Installation of the 200-300-00 cargo hook kit in accordance with FAA approved Onboard Systems Owner's Manual No. 120-119-00, revision 1, dated July 13, 2007, or later FAA approved revision and installation of the 200-301-00 cargo hook kit in accordance with FAA approved Onboard Systems Owner's Manual No. 120-121-00, revision 1, dated July 13, 2007, or later FAA approved revision. This modification must be inspected and maintained in accordance with Section ATA 5 of the FAA approved Onboard Systems Instructions for Continued Airworthiness document no. 123-021-00, revision 0, dated January 6, 2006 or later FAA approved revision and Onboard Systems Cargo Hook Service Manual No. 122-015-00, revision 2, dated November 9, 2005 or later FAA approved revision.

Limitations and Conditions: Approval of this change in type design applies to only those MD Helicopter model rotorcraft listed above, which were previously equipped with a FAA approved installation of the MD Helicopter cargo hook suspension systems or Onboard Systems Model 200-187-00 or 200-264-00 cargo hook kits.

(See Continuation Page 3 of 3)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: January 06, 2006 *Date reissued:*
Date of issuance: August 3, 2007 *Date amended:*

FEDERAL AVIATION ADMINISTRATION

By direction of the Administrator

(Signature)

Acting Manager, Seattle Aircraft Certification Office
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2(10-68) PAGE 1 OF 3

United States of America
Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate
Continuation Sheet

Number **SR01778SE**

Onboard Systems
Date of Issuance: August 3, 2007

Limitations and Conditions continued:

This approval should not be extended to other rotorcraft of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that helicopter. Rotorcraft modified in accordance with this STC must be operated in accordance with an FAA approved copy of Onboard Systems Rotorcraft Flight Manual Supplement (RFMS) 121-028-00 dated July 24, 2007, or later FAA approved revision.

A copy of this Certificate, FAA approved RFMS, ICA and Cargo Hook Service Manual must be maintained as part of the permanent records of the modified rotorcraft. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

-END-

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.
This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2(10-68) PAGE 3 OF 3

8.2 Canadian Approval

Transport Canada / Transports Canada
Civil Aviation / Aviation Civile

Suite 620
800 Burrard Street
Vancouver, B.C.
V6Z 2J8

Your file / Votre référence
130S-GA-07-99
Our file / Notre référence
P-07-0520
RDIMS 3789419

December 20, 2007

Mr. Mark Hanson
Onboard Systems International
13915 NW 3rd Court
Vancouver, WA
98685 USA

Dear Mr. Hanson

Subject: Acceptance of FAA STC SR01778SE

This is in response to the FAA Seattle ACO letter dated October 4, 2007, requesting Transport Canada approval of the subject STC.

In accordance with our current policy associated with the review of foreign STCs, some STCs applicable to certain categories of aircraft may be accepted solely on the basis of their foreign certification, and do not require the issue of a corresponding certificate by Transport Canada. The subject STC falls within these criteria.

This STC will be entered in the national index of STCs that have been reviewed and accepted by Transport Canada for installation on Canadian registered aeronautical products.

This letter confirms formal acceptance of the referenced STC by Transport Canada.

Yours truly,

John Nehera
Regional Manager
Aircraft Certification

Encl. (1)

c.c. Mr. Jeffrey E. Duven, Manager Seattle Aircraft Certification Office

Canada

1/1

8.3 EASA STC

European Aviation Safety Agency

SUPPLEMENTAL TYPE CERTIFICATE

EASA.IM.R.S.01409

This Supplemental Type Certificate is issued by EASA, acting in accordance with Regulation (EC) No. 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation and in accordance with Commission Regulation (EC) No. 1702/2003 to

Onboard Systems International
13915 NW 3rd Court
Vancouver, WA 98685
United States

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and environmental protection requirements when operated within the conditions and limitations specified below:

Original Product Type Certificate Number:	FAA H3WE
Type Certificate Holder:	MDHI
Model:	369D, 369E, 369FF, 369HE, 369HM, 369HM, 369HS 500N
Original STC Number:	FAA STC SR01778SE

Description of Design Change:
Onboard Systems Model 200-300-00 talon LC Hydraulic Cargo Hook Kit without load weight, Model 200-301-00 talon LC Hydraulic Cargo Hook Kit with load weight on helicopters 369D, 369E, 369FF. 369HE, 369HM, 369HS, 500N.

Associated Technical Documentation:
1. Onboard Systems Master Drawing List No. 155-112-00, Revision 2, dated 4 March 2008, or later approved revision;
2. Onboard Systems Owner's Manual (for 200-300-00 Cargo Hook Kit) No. 120-119-00, Revision 1, dated 13 July 2007, or later approved revisions;
3. Onboard Systems Owner's Manual (for 200-301-00 Cargo Hook Kit) No. 120-121-00, Revision 1, dated 13 July 2007, or later approved revisions;
4. Instruction for Continued Airworthiness Onboard System document No. 123-121-00, Revision 0, dated 6 January 2006, or later approved revision;
5. Cargo Hook Service Manual No 122-015-00 rev 2, dated 9 November 2005, or later approved revision;
6. Onboard Rotorcraft Flight Manual Supplement (RFMS) No. 121-028-00, , dated July 24, 2007, or later approved revision.

Limitations and Conditions:
1. This cargo hook is not approved for human external load;
2. Approval of this change in type design applies to only those McDonnell Douglas model rotorcraft listed above, which were previously equipped with:

   - Onboard system model 200-187-00 cargo hook (approvals FAA STC SR00407SE and EASA.IM.R.S01396), or
   - Onboard system model 200-264-00 cargo hook (approvals FAA STC SR00892SE and EASA.IM.R.S.01167),or
   - an approved McDonnell Douglas cargo hook 369H92105-0501 and cargo hook kits shown in the following table:

EASA Form 91, Issue 1

European Aviation Safety Agency

Cargo Hook Kit	Rotorcraft Model	Cargo Hook
369H90072-501, -505, -507 & -515	369D	369H92105-501
369H90072-505 & -517	369E	Same
369H90072-505 & -511	369FF	Same
369H90072-519 & -523	500N	Same
369H90072-501	369HE	Same
369H90072-501	369HM	Same
369H90072-501	369HS	Same

3. Prior of installation of this modification the installer must determine that the interrelationship between this modification and any other previously installed modification will introduce no adverse effect upon the airworthiness of the product

This Certificate shall remain valid unless otherwise surrendered or revoked.

For the European Aviation Safety Agency,

Date of issue: 08 July 2008

Massimo MAZZOLETTI
Certification Manager

STC – EASA.IM.R.S.01409 – Onboard Systems International