Owner's Manual
Cargo Hook
Suspension System Kits
On the
Bell 407 Helicopter

STC SR01943SE

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Applicable Equipment Part Numbers

200-412-00	200-413-02
200-412-10	200-413-10
200-413-00	200-413-11
200-413-01	200-413-12

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	06/22/12	All	Initial Release
1	10/23/12	Section 2.1.3	Updated installation instructions for hydraulic release system.
2	11/18/13	2-21, 2-25	Changed tightening instructions for nut on pin load cell.
3	08/21/15	1-7, 2-20, 4-3, 4-4, 6-2	Added pin load cell P/N 210-282-01, updated load rigging figure.
4	06/24/16	All	Added kits with cargo hook P/N 528-028-02 (which includes Surefire release) and associated instructions. Added kits which include C-39 with 28V backlight.
5	10/30/17	All	Replaced fluid MIL-PRF-5606 with MIL-PRF-87257 and bleed kit 212-014-01 with 212-014-02. Updated layout and formatting.
6	09/27/21	21	Increased torque for banjo bolt from 60 in-lbs to 10 ft-lbs.
7	10/15/21	All	Added C-40 Indicator and associated kit P/Ns and instructions. Updated left side hydraulic hose routing under seat to remove loop clamp at cyclic base.
8	05/04/22	50, 65	Added safety wire instructions. Changed screw P/N 510-424-00 to shoulder screw P/N 511-124-00.
9	12/08/23	7,13,14,15,38	Replaced C-40 Indicator P/N 210-293-00 with 210-293-01 in new production kits

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1.0 Introduction

1.1 Scope

This Owner's Manual contains installation and operation instructions for cargo hook kit P/Ns 200-412-00, 200-412-10, 200-413-00, 200-413-01, 200-413-10, 200-413-11 on the Bell 407 model helicopter.

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

120-039-00 Owner's Manual C-39 Indicator

121-061-00 Rotorcraft Flight Manual Supplement

122-015-00 Component Maintenance Manual Cargo Hook 528-028-XX

123-040-00 Instructions for Continued Airworthiness

3.0 System Overview

3.1 Description

Kit P/N 200-412 series (also referred to as 200-412-XX) and 200-413 series (also referred to as 200-413-XX) are cargo hook suspension kits and include fixed provisions and removable provisions. The cargo hook fixed provisions kit includes the internal electrical release wiring harness (with the exception of the cargo hook electrical release switch on the cyclic or the wiring through the cyclic), fixed hydraulic release system including the release lever for actuation in the cockpit, and miscellaneous brackets and hardware for supporting these items. The backup release lever included for this kit can be installed on the left hand or right hand side cyclic control. The removable provisions include the cargo hook, a beam which supports the cargo hook and spans the helicopter hard points, and pillow blocks which attach to the hard points.

NOTICE

Installation of the backup release lever on the left side does not constitute approval for left crew seat pilot-in-command operations. There must be provisions made to ensure that equipment originally intended to be operated by the pilot from the right crew seat is equally operable from the left crew seat with similar controls and left crew seat pilot-in-command operation must be approved.

Kit P/N 200-413 series are identical to the 200-412 series except they include a load weigh system. The load weigh system includes a pin load cell installed at the cargo hook, an internal electrical harness, and a load weigh indicator for installation in the cockpit.

Kit P/N's 200-412-10, 200-413-10, and 200-413-11 include a cargo hook with Surefire release as part of the electrical release system. Surefire release is a safety enhancement to protect against inadvertent load release due to accidental contact with the release switch or mistaken actuation of the release switch when another is intended.

The cargo hook suspension kits are comprised of fixed and removable provisions.

The fixed provisions include all cargo hook components internal to the helicopter, the pillow block assemblies, electrical harnesses and hydraulic hose mounted along the belly, and the connector bracket on the belly which provides the means for mounting the connectors between the fixed and removable sections of the release systems and the load weigh system (if installed). These components are typically left on the helicopter when it is configured for an operation other than external load operations.

The removable provisions kit includes the components external to the helicopter which are easily removed when the helicopter is configured for an operation other than external load operations. It includes:

- The cargo hook and beam assembly. The beam assembly spans the pillow block assemblies and supports the cargo hook.
- The external (removable) provisions of the electrical release system. The electrical release system provides means for release by pilot actuation of the push-button switch in the cockpit. When the push-button switch on the cyclic is pressed, it energizes the solenoid in the cargo hook, and the solenoid opens the latch in the internal mechanism of the cargo hook.
- The external (removable) provisions of the manual release system. The manual release system uses a self-contained hydraulic system to provide a means of releasing a cargo hook load in the event of an electrical release system failure. A lever (included with the fixed provisions kit) mounted on the pilot or co-pilot cyclic, provides the means to actuate it.

A load is attached to the cargo hook 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 cause 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 ring slides off the load beam. The load beam then remains in the open position awaiting the next load.

Ground personnel may also release an external load by the actuation of a lever located on the side of the cargo hook.

The optional load weigh system is comprised of an indicator mounted within the instrument panel, a pin load cell at the cargo hook, and the interconnecting wire harness. The indicator displays the weight of the load carried on the cargo hook. It supplies the precision excitation voltage to the pin load cell, conditions the return signal, outputs a proportional analog signal and provides the means of system calibration.

The load weigh indicator included with the P/N 200-464-00 Load Weigh System and P/N 200-415-02 Fixed Provisions Kit is Onboard Systems next generation indicator, the C-40 model (P/N 210-293 series). The C-40 Indicator makes several improvements over its predecessor (the C-39 model, P/N 210-095 series) while preserving classical features and is generally backwards compatible. Among others, the C-40 Indicator offers these improvements:

- Full color display
- Load measurement displayed in full, not X 10 (C-39 is X 10)
- Addition of Analog Bar and Maximum Load features
- Simplified user interface
- Addition of Cargo Hook hour meter
- Selectable backlight control voltage, 5 or 28 VDC
- Improved moisture resistance
- Expanded signal input range
- Field-upgradable firmware

The optional cargo hook with Surefire includes a short time delay circuit built into the cargo hook's electrical release system (cargo hook P/N 528-028-02). This feature is a safety enhancement to protect against inadvertent load release due to accidental contact with the release switch or mistaken actuation of the cargo hook switch when another is intended. The time delay feature requires that the release switch be depressed and held for more than a 1/2 second to open the cargo hook. Surefire makes the electrical release a more deliberate pilot command. If the cargo hook must be released immediately, use the mechanical backup release.

In addition to its P/N, a cargo hook with Surefire can be identified by a gold color solenoid housing (see Figure 3.1). Also, a placard on the underside of the solenoid housing indicates that the electrical release is delayed by ½ second.

NOTICE

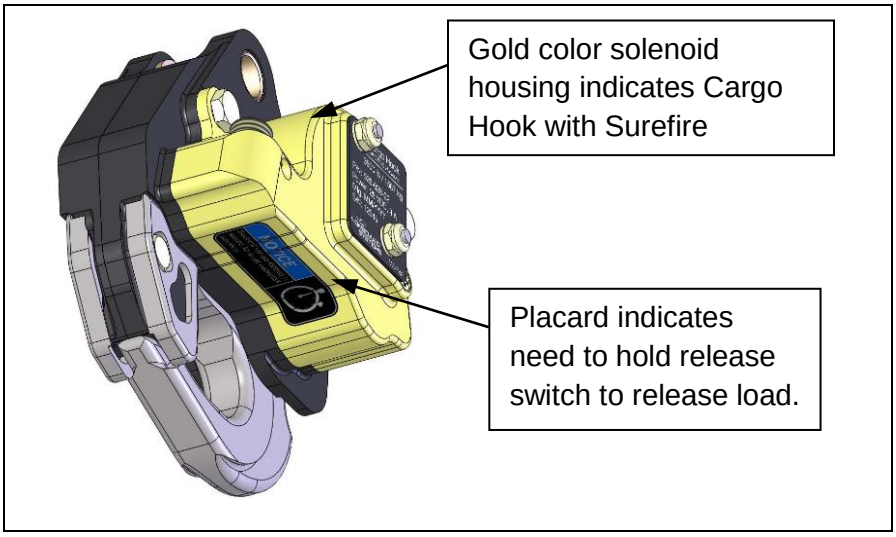
The 528-028-02 cargo hook includes an electronic delay of approximately ½ second. It is necessary to press and hold the cargo hook release button.

⚠ CAUTION

If a Surefire-equipped cargo hook must be released immediately without any delay (such as the case of engine failure or snagged load), use the mechanical backup release.

In addition to the delay feature the circuit includes on-off cycling to limit the duty-cycle on the solenoid. If the release switch is held down, the solenoid will cycle on and off repeatedly in a "machine gun" fashion.

Figure 3.1Surefire Configuration Identification



3.2 Specifications

Table 3.1 System Specifications

Design load	2,650 lbs. (1,202 kg)
Design ultimate strength	9,938 lbs. (4,507 kg)
P/N 200-412-00 weight	14.9 lbs (6.76 kg)
P/N 200-413-00 weight	16.4 lbs (7.44 kg)

Table 3.2 Specifications - P/N 528-028-00, 528-028-02 Cargo Hook

Design load	3,500 lb. (1,587 kg.)
Design ultimate strength	13,125 lb. (5,953 kg.)
Electrical release capacity	8,750 lb. (3,968 kg.)
Mechanical release capacity	8,750 lb. (3,968 kg.)
Force required for mechanical release at 3,500 lb.	14 lbs maximum at master cylinder lever
Electrical requirements	22-32 VDC, 6.9 - 10 amps
Minimum release load	0 pounds
Unit weight	3.1 pounds (1.4 kg.)
Mating electrical connector	PC05A8-2S

The weights and CGs of the Cargo Hook Suspension System kits are listed below.

Table 3.3 Weight & CGs – Cargo Hook Suspension System Kits

Item	Weight Lbs (kg)	Station in (mm)
Fixed Provisions Kit P/N 200-394-00	7.2 (3.27)	109.1 (2772)
Removable Provisions Kit P/N 200-395-00, -10	7.7 (3.49)	121.0 (3073)
Total Kit Weight (P/N 200-412-XX)	**14.9 (6.76)**	**115.3 (2929)**
Fixed Provisions Kit w/ Load Weigh P/N 200-415-00	8.5 (3.18)	108.6 (2760)
Removable Provisions Kit w/ Load Weigh P/N 200-416-00, -10	7.9 (4.26)	121.0 (3073)
Total Kit Weight (P/N 200-413-XX)	**16.4 (7.44)**	**114.6 (2911)**

Load capacities given are for the equipment described only. Loading limits for your particular helicopter model still apply. Consult your flight manual.

3.3 Bill of Materials

P/N 200-412-00 and 200-412-10 are complete cargo hook suspension kits (without load weigh systems) and include a fixed provisions kit P/N 200-394-00 and a removable provisions kit (kit P/N 200-395-00 or P/N 200-395-10 which includes cargo hook with Surefire Release).

Table 3.4 Bill of Materials – Cargo Hook Suspension Kit P/N 200-412-00, -10

Part No.	Description	Qty	
		-00	-10
200-394-00	Fixed Provisions Kit	1	1
200-395-00	Removable Provisions Kit	1	-
200-395-10	Removable Provisions Kit	-	1
120-146-00	Owner's Manual	1	1
121-061-00	RFMS	1	1
122-015-00	Component Maintenance Manual, Cargo Hook	1	1
123-040-00	ICA	1	1

The following items are included with the 200-394-00 Fixed Provisions Kit.

Table 3.5 Bill of Materials – Fixed Provisions Kit P/N 200-394-00

Part No.	Description	Qty
215-205-00	Decal	1
232-188-01	Pillow Block Assembly – Left	1
232-189-01	Pillow Block Assembly – Right	1
232-590-00	Master Cylinder Assembly w/ Plumbing	1
232-604-00	Master Cylinder Plumbing	1
235-216-00	Connector Bracket	1
235-221-00	Doubler	2
270-151-00	Electrical Harness	1
270-152-00	Electrical Harness	1
291-144-00	Bulkhead Fitting	2
291-145-00	Radius Block	2
291-146-00	Radius Block	2
291-152-00	Shim	1
291-746-00	Hose Clamp	1
410-243-00	Splice	2
440-007-00	Circuit Breaker	1
510-102-00	Nut	6
510-227-00	Nut	4
510-234-00	Nut	4
510-391-00	Screw	1
510-419-00	Washer	33
510-580-00	Screw	4
510-624-00	Screw	4
510-633-00	Screw	1
510-644-00	Screw	18
510-645-00	Screw	5
510-646-00	Spacer	2
510-647-00	Spacer	5
510-648-00	Washer	4
510-652-00	Screw	1
510-653-00	Screw	4
510-712-00	Bolt	4
510-725-00	Screw	4
510-965-00	Screw	1
511-034-00	Bolt	1
511-035-00	Insert	1
511-048-00	Rivet	16
512-003-00	Tie Wrap	15
512-006-00	Cushioned Loop Clamp	2
512-021-00	Cushioned Loop Clamp	1
512-027-00	Cushioned Loop Clamp	6

Part No.	Description	Qty
512-034-00	Cushioned Loop Clamp	1
512-037-00	Cushioned Loop Clamp	6
512-058-00	Bracket – Flat	1
590-013-00	Spiral Wrap, ¼"	18"
590-017-00	Spiral Wrap, 3/8"	18"

The following items are included with the 200-395-XX Removable Provisions Kit.

Table 3.6 Bill of Materials – Removable Provisions Kit P/N 200-395-00, -10

Part No.	Description	Qty	
		-00	-10
200-395-00	Cargo Hook/Beam Assembly	1	-
200-395-10	Cargo Hook/Beam Assembly with Surefire	-	1
215-343-00	Cockpit Decal	-	1

Kit P/N 200-413 series (also referred to as 200-413-XX) are complete cargo hook suspension kits with a load weigh system and include a fixed provisions kit (P/N 200-415-00, 200-415-01 or 200-415-02) and removable provisions kit (P/N 200-416-00 or 200-416-10).

Table 3.7 Bill of Materials – Cargo Hook Suspension Kit P/N 200-413-XX

Part No.	Description	Qty					
		-00	-01	-02	-10	-11	-12
200-415-00	Fixed Provisions Kit w/ Load Weigh, C-39 w/ 28V Backlight	1	-	-	1	-	-
200-415-01	Fixed Provisions Kit w/ Load Weigh, C-39 w/ 5V Backlight	-	1	-	-	1	-
200-415-02	Fixed Provisions Kit w/ Load Weigh, C-40	-	-	1	-	-	1
200-416-00	Removable Provisions Kit w/ Load Weigh	1	1	1	-	-	-
200-416-10	Removable Provisions Kit w/ Load Weigh and Surefire	-	-	-	1	1	1
120-146-00	Owner's Manual	1	1	1	1	1	1
121-061-00	RFMS	1	1	1	1	1	1
122-015-00	CMM, Cargo Hook	1	1	1	1	1	1
123-040-00	ICA	1	1	1	1	1	1

The following items are included with the 200-415-00 and 200-415-01 Fixed Provisions Kit w/ Load Weigh.

Table 3.8 Bill of Materials – Fixed Provisions Kit P/N 200-415-XX

Part No.	Description	Qty		
		-00	-01	-02
210-095-00	C-39 Indicator w/ 28V Backlight	1	-	-
210-095-02	C-39 Indicator w/ 5V Backlight	-	1	-
210-293-01*	C-40 Indicator	-	-	1
215-205-00	Decal	1	1	1
215-012-00	Placard	1	1	-
215-417-00	Load Weigh Breaker Decal	1	1	1
232-188-01	Pillow Block Assembly – Left	1	1	1
232-189-01	Pillow Block Assembly – Right	1	1	1
232-590-00	Master Cylinder Assy w/ Plumbing	1	1	1
232-604-00	Master Cylinder Plumbing	1	1	1
235-216-00	Bracket	1	1	1
235-221-00	Doubler	2	2	2
270-151-00	Electrical Harness	1	1	1
270-152-00	Electrical Harness	1	1	1
270-153-00	Load Weigh Internal Harness	1	1	-
270-241-00	Load Weigh Internal Harness (C-40)	-	-	1
291-144-00	Bulkhead Fitting	2	2	2
291-145-00	Radius Block	2	2	2
291-146-00	Radius Block	2	2	2
291-152-00	Shim	1	1	1
410-243-00	Splice	2	2	2
410-199-00	Shield Termination	-	-	1
410-255-00	Connector	-	-	1
410-446-00	Strain Relief Clamp	-	-	1
440-007-00	Circuit Breaker	1	1	1
450-005-00	Heat Shrink, 1.5" Long	-	-	1
510-029-00	Nut	4	4	4
510-062-00	Washer	4	4	4
510-102-00	Nut	6	6	6
510-227-00	Nut	4	4	4
510-234-00	Nut	4	4	4
510-391-00	Screw	1	1	1
510-419-00	Washer	33	33	33
510-481-00	Screw	4	4	4
510-580-00	Screw	4	4	4
510-624-00	Screw	4	4	4
510-633-00	Screw	1	1	1
510-644-00	Screw	18	18	18
510-645-00	Screw	5	5	5

Part No.	Description	Qty		
		-00	-01	-02
510-646-00	Spacer	2	2	2
510-647-00	Spacer	5	5	5
510-648-00	Washer	8	8	8
510-652-00	Screw	1	1	1
510-653-00	Screw	4	4	4
510-712-00	Bolt	4	4	4
510-725-00	Screw	4	4	4
510-965-00	Screw	1	1	1
511-035-00	Insert	1	1	1
511-038-00	Rivet	16	16	16
511-211-00	Screw	-	-	4
512-003-00	Tie Wrap	15	15	15
512-006-00	Cushioned Loop Clamp	8	8	8
512-021-00	Cushioned Loop Clamp	1	1	1
512-034-00	Cushioned Loop Clamp	1	1	1
512-037-00	Cushioned Loop Clamp	6	6	6
512-058-00	Bracket – Flat	1	1	1
590-013-00	Spiral Wrap, ¼"	18"	18"	18"
590-017-00	Spiral Wrap, 3/8"	18"	18"	18"

*C-40 Indicator P/N 210-293-01 replaces P/N 210-293-00 in new productions kits as of November 2023, these are interchangeable with the exception of software compatibility. Refer to C-40 Owner's Manual 120-152-00 for specific software versions.

The following items are included with the 200-416 series Removable Provisions Kits.

Table 3.9 Bill of Materials – Removable Provisions Kit P/N 200-416-00, -10

Part No.	Description	Qty	
		-00	-10
200-416-00	Cargo Hook/Beam Assembly w/ Pin Load Cell	1	-
200-416-10	Cargo Hook/Beam Assembly w/ Pin Load Cell	-	1
215-343-00	Cockpit Decal	-	1

The following parts (kit P/N 200-464-00) can be purchased to add a load weigh system to the P/N 200-412 series kits (after installation the configuration represents the respective P/N in the 200-413 series).

Table 3.10 Bill of Materials – Load Weigh System P/N 200-464-00 Components

Part No.	Description	Qty
210-282-01*	Pin Load Cell Assembly	1
270-241-00	Load Weigh Internal Harness	1
210-293-01	C-40 Indicator	1
215-417-00	Load Weigh Breaker Decal	1
410-199-00	Shield Termination	1
410-255-00	Connector	1
410-446-00	Strain Relief Clamp	1
450-005-00	Heat Shrink, 1.5" Lg.	1
510-481-00	Screw	4
510-029-00	Nut	4
510-062-00	Washer	4
510-170-00	Nut	1
510-174-00	Washer	1
510-183-00	Washer	1
510-178-00	Cotter Pin	1
512-026-00	Cushioned Loop Clamp	6
400-048-00	Switch	1
512-001-00	Ty-Wrap	10
120-152-00	Owner's Manual, C-40 Indicator	1

*Supersedes P/N 210-226-04, these P/Ns are interchangeable in this installation.
** C-39 indicator P/N 210-095-02 is an optional indicator and is for aircraft with a 5V backlighting system.

The following parts are needed to upgrade an existing installation of P/N 200-328-00 and P/N 200-329-00 which uses cargo hook P/N 528-029-00 to that of the 200-412 or 200-413 series.

Table 3.11 Bill of Materials – Hydraulic Hook Upgrade

Part No.	Description	Qty
232-590-00	Master Cylinder Assy w/ Plumbing	1
232-604-00	Master Cylinder Plumbing	1
232-605-00*	Cargo Hook/Slave Cylinder Assembly	1
235-216-00	Bracket	1
235-221-00	Doubler	2
270-197-00	Electrical Release Harness	1
291-746-00	Hose Clamp	1
510-102-00	Nut	3
510-646-00	Spacer	2
510-712-00	Bolt	4

Part No.	Description	Qty
510-747-00	Bolt	1
511-034-00	Bolt	2
511-035-00	Insert	1
511-048-00	Rivet	16
512-006-00	Cushioned Loop Clamp	2
512-021-00	Cushioned Loop Clamp	1
512-027-00	Cushioned Loop Clamp	6
512-034-00	Cushioned Loop Clamp	1
512-037-00	Cushioned Loop Clamp	6
512-058-00	Bracket	1
590-013-00	Spiral Wrap, ¼"	18"
590-017-00	Spiral Wrap, 3/8"	18"
120-146-00	Owner's Manual	1
121-061-00	RFMS	1
122-015-00	CMM, Cargo Hook	1
123-040-00	ICA	1

*For cargo hook with Surefire Release purchase P/N 232-605-10 in place of 232-605-00.

4.0 Installation

These procedures are provided for the benefit of experienced aircraft maintenance facilities capable of carrying out the procedures. Those lacking the necessary expertise should not attempt them.

This section provides instructions for the installation of the kits outlined in Section 1.0.

4.1 Fixed Provisions Kit Installation

This part of the installation consists of installing the internal cargo hook electrical release wiring, fixed hydraulic release system, bulkhead fittings, and support brackets for the hydraulic release lever and connectors.

4.1.1 Electrical Release Wiring Installation

The electrical release wiring installation consists of installing two wire harnesses (P/N 270-151-00 and P/N 270-152-00) and circuit breaker (P/N 440-007-00). Refer to Figure 4.2 for a wire harness installation overview. Refer to Figure 4.3 for wiring schematic.

NOTICE

If the fixed provisions kit with load weigh is being installed, route the load weigh wiring harness through the structure as the release wiring harness is installed. Refer to section 4.3.3 for load weigh harness installation instructions.

1. Install the circuit breaker in the overhead console (reference Figure 4.2).
2. Connect the ring terminal on the M1A18 wire of harness P/N 270-151-00 to the circuit breaker with hardware provided with the circuit breaker.
3. Route the M1A18 wire with existing harnesses from the circuit breaker down to the underneath the pilot's seat and splice it with wire no. 10 from the cyclic. Splice the wires with the supplied splice (P/N 410-243-00) and secure with ty-wrap P/N 512-003-00.
4. Route wire P14A12 from the circuit breaker to the 28VDC bus and secure as shown in Figure 4.2.

Electrical harness P/N 270-152-00 is routed from the connector bracket (installed per section 4.1.2) on the belly of the helicopter. It is routed and secured with the hydraulic hose along the belly. Temporarily stow this end of the harness until the hydraulic hose is routed.

5. Route the two individual wires (M3B18N and M2B18) forward and up through the hole in belly at STA 62.80.
6. Route and connect wire no. M3B18N to ground point ND454 under the pilot seat.
7. Route wire no. M2B18 to underneath the pilot seat and splice it with wire no. 9 from the cyclic. Splice the wires with the supplied splice (P/N 410-243-00) and secure with ty-wrap P/N 512-003-00.

Figure 4.1 Wire Harness Installation Overview

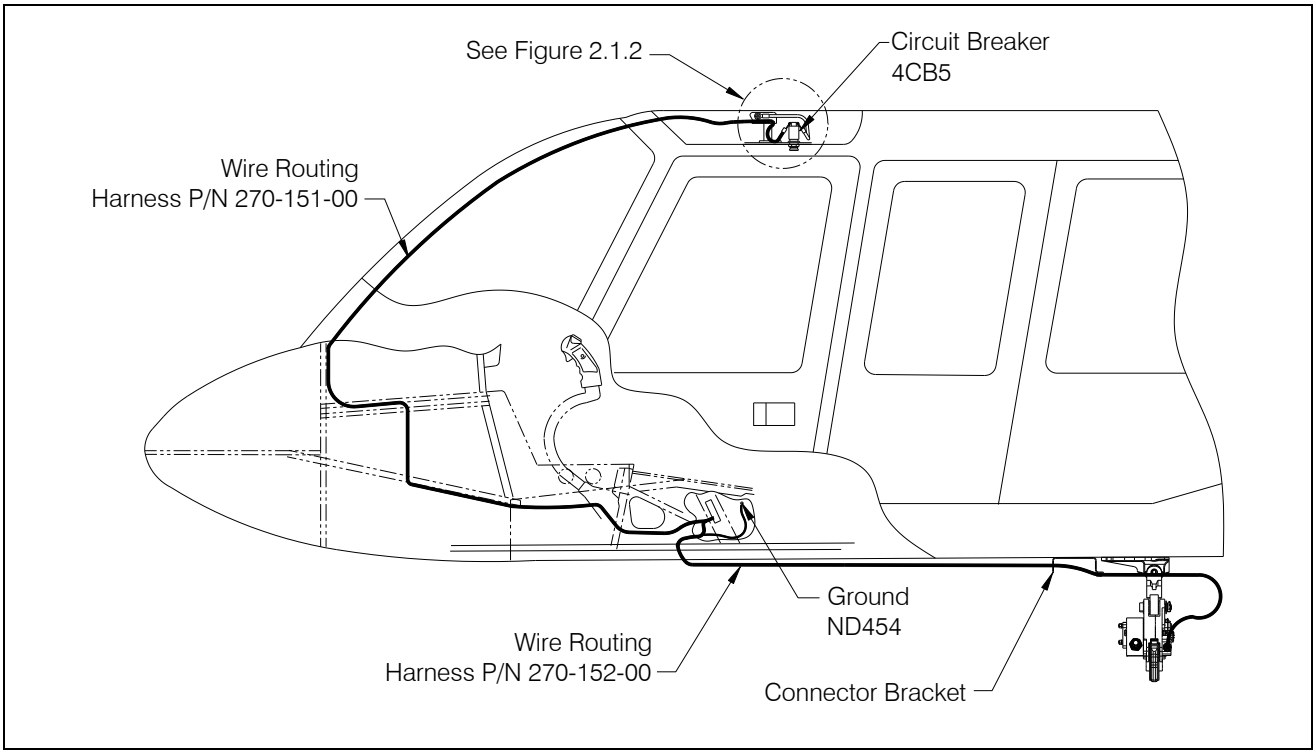


Figure 4.2 Circuit Breaker Installation

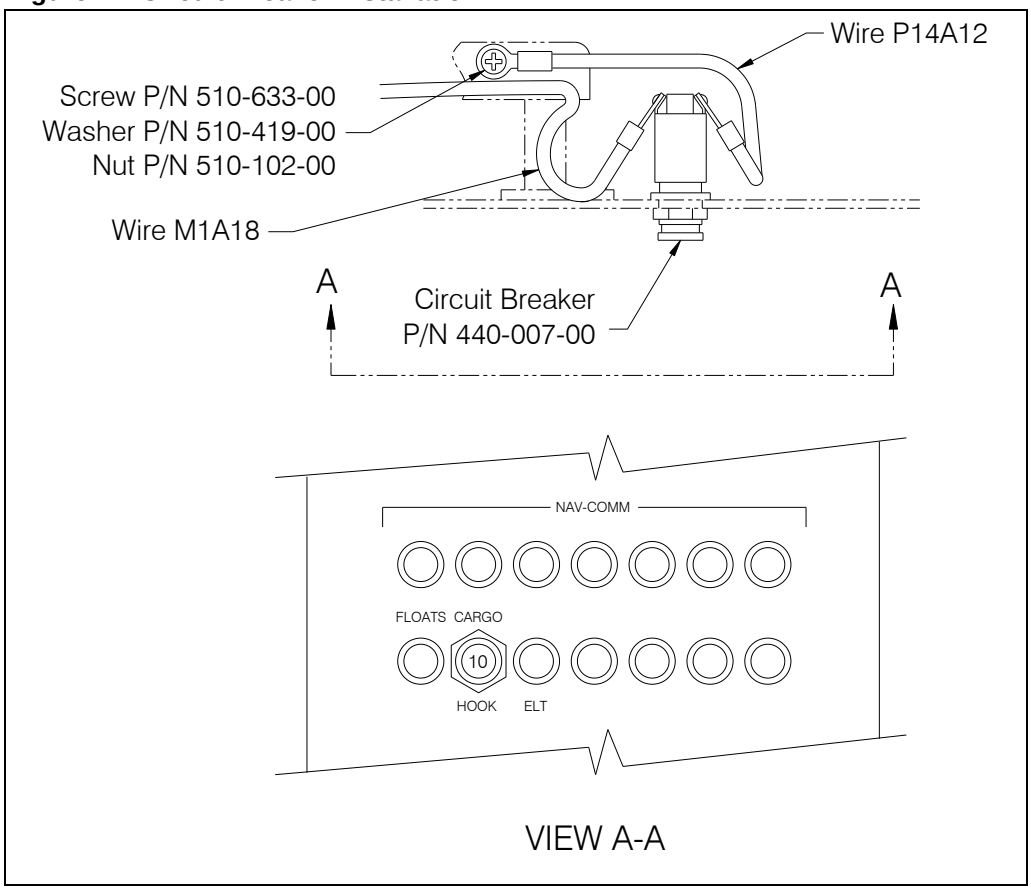
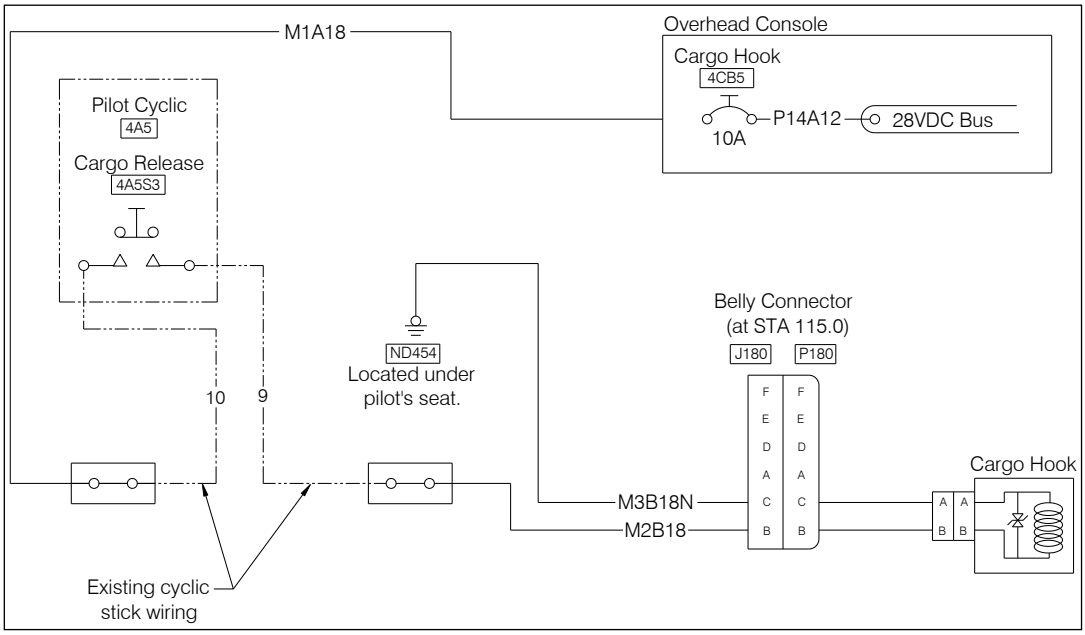


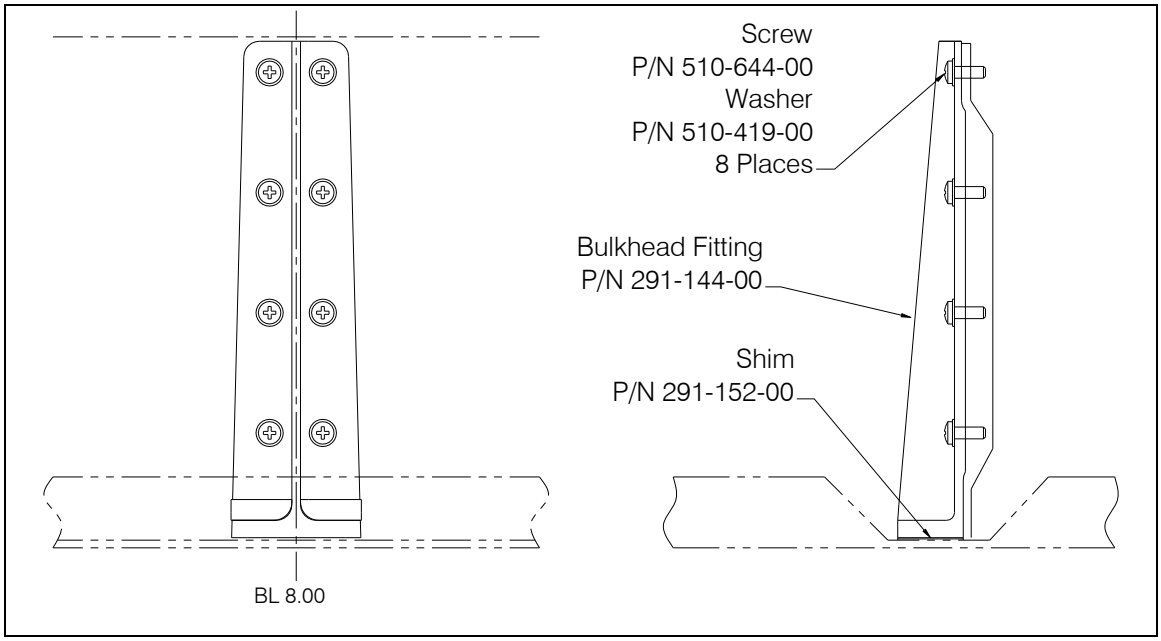
Figure 4.3 Wiring Schematic



The two bulkhead fittings (P/N 291-144-00) are installed on the passenger seat bulkhead (FS 121.44). Install them per the following instructions.

8. Remove 16 screws at RBL 8.00 and LBL 8.00 from the passenger seat bulkhead.
9. At these locations remove the four screws and nuts and eight washers from the floor panel.
10. Place the bulkhead fittings at these locations and temporarily attach each to the bulkhead with eight screws (P/N 510-644-00) and washers (P/N 510-419-00).
11. Peel shims (P/N 291-152-00) and insert between the bottom of the bulkhead fittings and inside of floor panel to establish a gap of 0.000/0.003 inches (0.00/0.07 mm).
12. Temporarily remove the shims.

Figure 4.4 Bulkhead Fitting Fasteners



13. Working from underneath the helicopter, transfer the four hole locations in the floor to the bulkhead fittings (two at each bulkhead fitting).

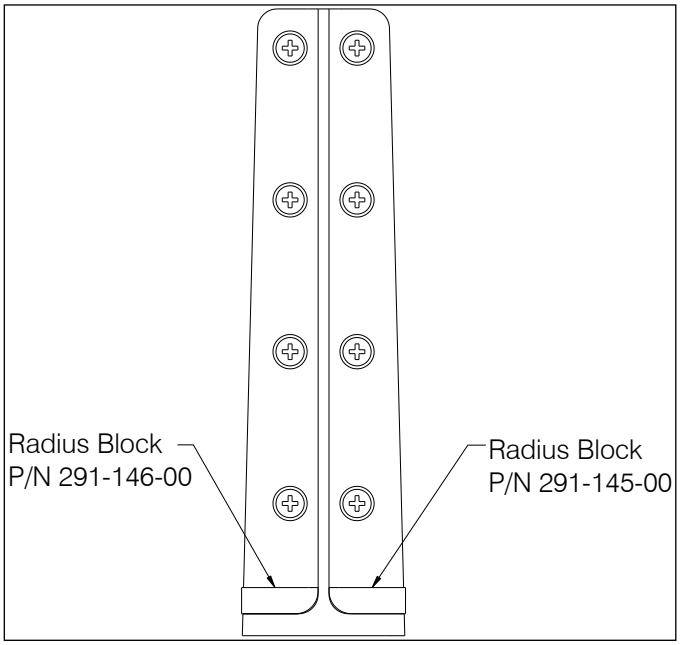
14. Remove the bulkhead fittings and drill a Ø0.250/0.255 inch hole through the flanges at the marked locations.

NOTICE

The bulkhead fittings are heat-treated steel thus it is recommended that they be clamped securely in a vise and that a drill press and new drill bits be used.

15. Place the four radius blocks in position on the lower flanges of the bulkhead fittings.

Figure 4.5 Radius Blocks



16. Mark the four radius blocks with locations to match the holes in the flanges of the bulkhead fittings.
17. Drill .250/.255 inch holes in the radius blocks at these locations.
18. Check the radius blocks for fit by inserting bolts through them and the bulkhead fittings. Minor filing may be necessary to obtain proper fit and alignment.
19. Align the shims with the bottom of the bulkhead fittings and transfer the hole locations to them and drill through the shims.
20. In preparation for bonding, remove primer and clean the mating surfaces of the radius blocks, bulkhead fittings, shims, and the floor panel using MEK or similar cleaner.

21. Align the holes and bond the shims to the floor panel with Magnobond 6398 adhesive (Bell P/N 299-947-100 Type II, Class 2).
22. Install the bulkhead fittings onto the seat bulkhead with the sixteen screws and washers.
23. Apply the Magnobond 6398 adhesive and position the four radius blocks onto the flanges of the bulkhead fittings. Temporarily install pillow blocks (or work aid) until adhesive cures.

Instructions for installing the pillow blocks are in section 4.1.6.

If the pillow blocks are not to be installed at this time, plug the holes in the belly with the supplied fasteners. At the forward pairs of holes (#10 size), use screw P/N 510-580-00 and washer P/N 510-419-00. At the two aft pairs of holes (1/4") install screw P/N 510-653-00, washer P/N 510-648-00 and nut P/N 510-227-00.

4.1.2 Hydraulic Release System Installation

The hydraulic release system is supplied dry. It is recommended that the system be filled and bled on the bench before installing it on the helicopter. Refer to section 4.5 for filling and bleeding instructions.

The supplied Release Lever Assembly with Plumbing (P/N 232-590-00) is for installation on the cyclic on the left-hand side of the aircraft.

NOTICE

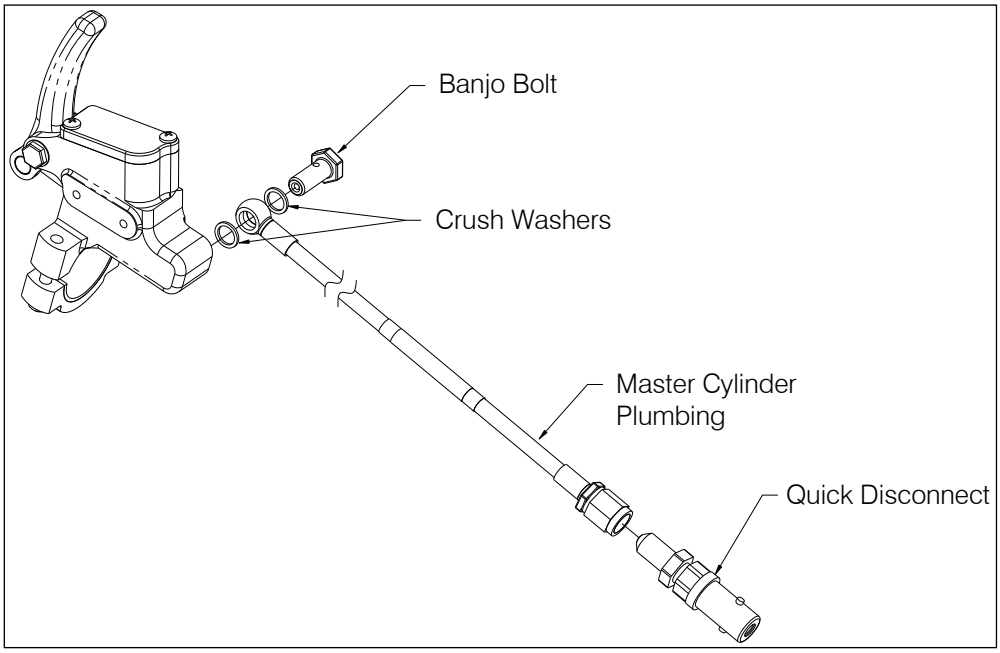
Installation of the backup release lever on the left side does not constitute approval for solo left seat operations.

If installation on the cyclic on the right-hand side is desired, a longer plumbing assembly (P/N 232-604-00) is provided for this option. Disassemble the plumbing from the release lever assembly and assemble the longer plumbing assembly onto the release lever assembly referring to Figure 4.6. Torque the banjo bolt to 10 ft-lbs.

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.

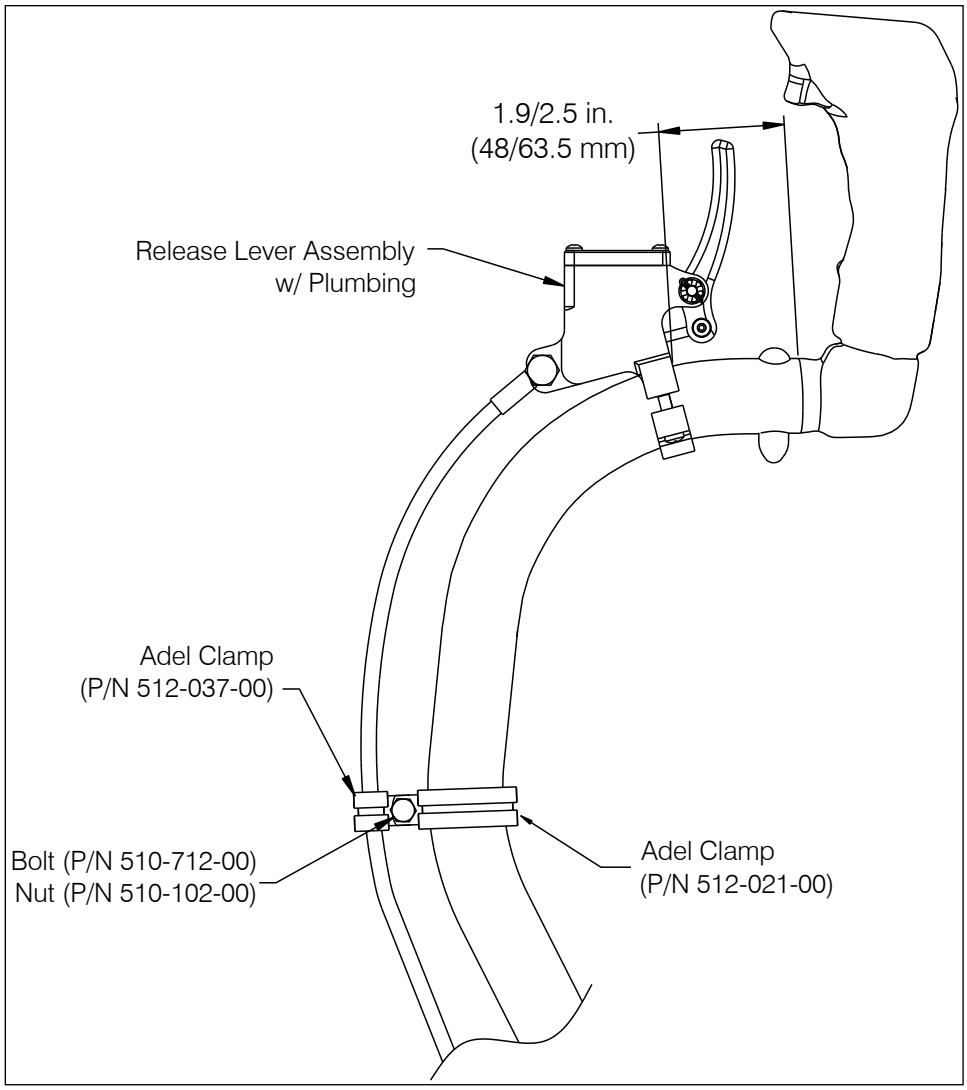
Figure 4.6 Release Lever with Plumbing Assembly



1. Mount the Release Lever Assembly to the cyclic as shown below with the two screws provided pre-assembled onto the assembly. Adjust the location if necessary so that the lever is accessible and comfortably reached by hand from the cyclic grip but will not contact or interfere with operation of any cyclic grip control when it is actuated. Operation will be verified at installation check out (when the release system is operational).

2. Route the hydraulic hose along the cyclic and secure it using the cushioned loop clamps and hardware as shown in Figure 4.7.

Figure 4.7 Release Lever Assembly Installation



Depending on which cyclic (left or right side) the release lever is installed, refer to the appropriate section below for routing to underneath the belly, refer to section 4.1.3 for routing on the left side and 4.1.4 for routing on the right side.

4.1.3 Hydraulic Hose Routing – Left Side

1. Remove the seat and the panel underneath it for access.
2. At the base of the cyclic, route the quick disconnect end of the hydraulic hose through the lower right corner of the boot and into the bay underneath the seat.

3. After verifying clearance for the Doublers inside and outside of the belly panel (see Caution note below), create a Ø.64/.68" (16.3/17.3 mm) hole in the honeycomb panel in a location shown in Figure 4.8 while observing the restrictions in BHT-ALL-SRM Section 3-9-3 to account for optional equipment and any other aircraft modifications.

⚠ CAUTION

Before creating the hole in the belly panel verify that the Doubler will fit on the inside and the outside of the belly panel in the location shown. Check for inserts, antennae, optional equipment, etc on the outside.

4. Install a supplied Doubler P/N 235-221-00* around the hole on the inside and on the outside using the supplied rivets (P/N 511-048-00). The eight holes in the Doubler are pilot holes and are to be drilled out to Ø.143/.146 at installation during match drilling of the panel skins. Follow instructions in BHT-ALL-SRM section 3-9-3 for modifying the panel and installing the Doublers and rivets.

   * Optionally fabricate and install Doublers per BHT-ALL-SRM section 3-9-3.

5. At 1.63/1.75" (41.4/44.5 mm) outboard and .63/.75" (16.0/19.0 mm) forward of the hole created above add a 10-32 insert (supplied P/N 511-035-00 or Bell P/N as allowed in the BHT-ALL-SRM) in the panel. Follow the instructions in the BHT-ALL-SRM for modifying the panel.

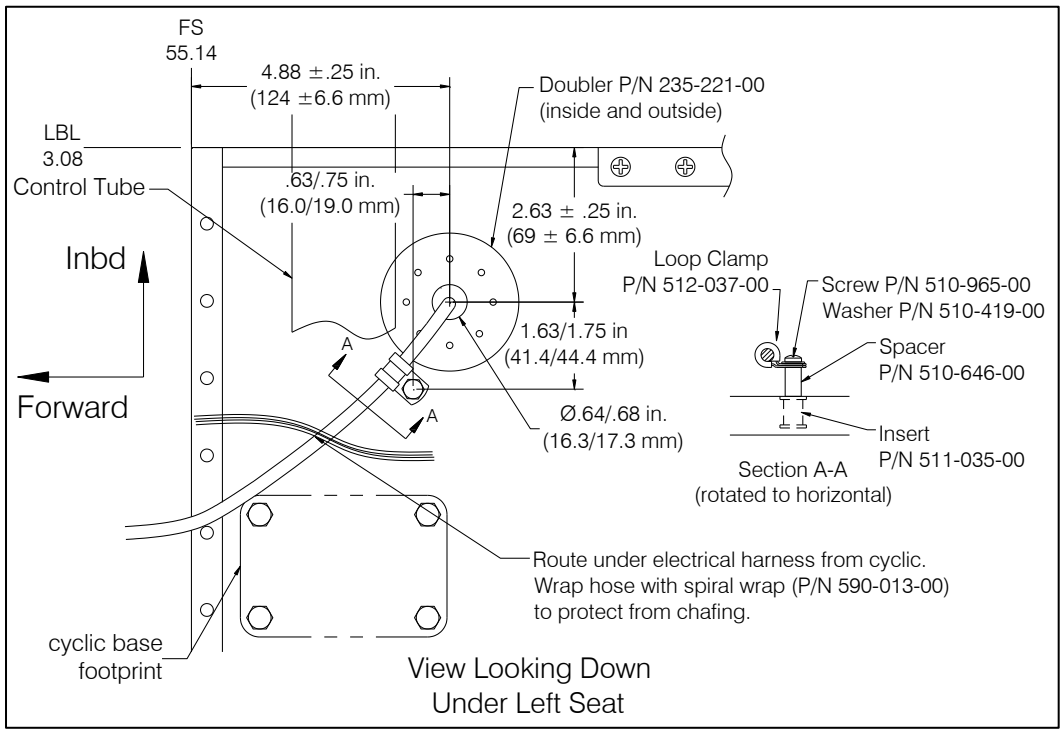
6. Route the hose through the hole in the panel to underneath the helicopter.

⚠ CAUTION

Provide enough slack up to the loop clamp on the cyclic to allow full movement of the cyclic and ensure the slack is not in excess to where it has potential to impede or interfere with flight control movement.

7. Place a cushioned loop clamp (P/N 512-037-00) over the hose and secure it and a spacer (P/N 510-646-00) to the panel insert with screw (P/N 510-965-00) and washer (P/N 510-419-00).

Figure 4.8 Hose Routing Under Seat



8. After exiting the hole, the hose is secured along the belly on its path to the connector bracket with cushioned loop clamps and spacers installed at existing inserts that are used for routing of the type certificated manual release cable. Proceed to Section 4.1.5 for installation of the connector bracket and routing along the belly.

4.1.4 Hydraulic Release Routing – Right Side

For the following steps refer to Figure 4.9.

1. Remove the seat and panel underneath it for access.
2. At the base of the cyclic, route the quick disconnect end through the lower right corner of the boot and into the bay underneath the seat.
3. At the forward right corner of the cyclic base remove the existing NAS6604-4 bolt which secures the Bell bracket that supports the throttle control cable.
4. Pre-assemble a cushioned loop clamp (P/N 512-037-00) over the hose and onto the supplied flat bracket (P/N 512-058-00) with bolt (P/N 510-712-00) and nut (P/N 510-102-00). Refer to View A-A in Figure 4.9.
5. Install the pre-assembled bracket and loop clamp over the Bell bracket on the cyclic base and secure with the longer bolt provided (P/N 511-034-00). Refer to View A-A.

⚠ CAUTION

Provide enough slack up to the loop clamp on the cyclic to allow full movement of the cyclic and ensure the slack is not in excess to where it has potential to impede or interfere with flight control movement.

6. Route the hose along the throttle control cable and secure it to the cable with a pair of loop clamps (P/N 512-037-00 around the hose and P/N 512-007-00 around the throttle control cable) and bolt (P/N 510-712-00) and nut (P/N 510-102-00) in two locations. Secure in two locations with combination of hardware, refer to Figure 4.9 including Section B-B.
7. On the back wall of the compartment underneath the seat, remove the lower MS27039 screw at the existing L bracket which support the throttle control cable assembly and secure the hose with a loop clamp (P/N 512-037-00) at this location using the longer screw (P/N 510-391-00) provided. Refer to Section C-C in Figure 4.9.
8. From this location the hose is to be routed through the belly panel. Create a Ø.64/.68" (16.3/17.3 mm) hole in the honeycomb panel in a location shown in Figure 4.9 while observing the restrictions in BHT-ALL-SRM Section 3-9-3 to account for optional equipment and any other aircraft modifications.
9. Install a Doubler P/N 235-221-00* around the hole on the inside and the outside of the aircraft using the supplied rivets (P/N 511-048-00). The eight holes in the Doubler are pilot holes and are to be drilled out to Ø.143/.146 at installation during match drilling of the panel skin. Follow instructions in BHT-ALL-SRM section 3-9-3 for modifying the panel and installing the Doublers and rivets.

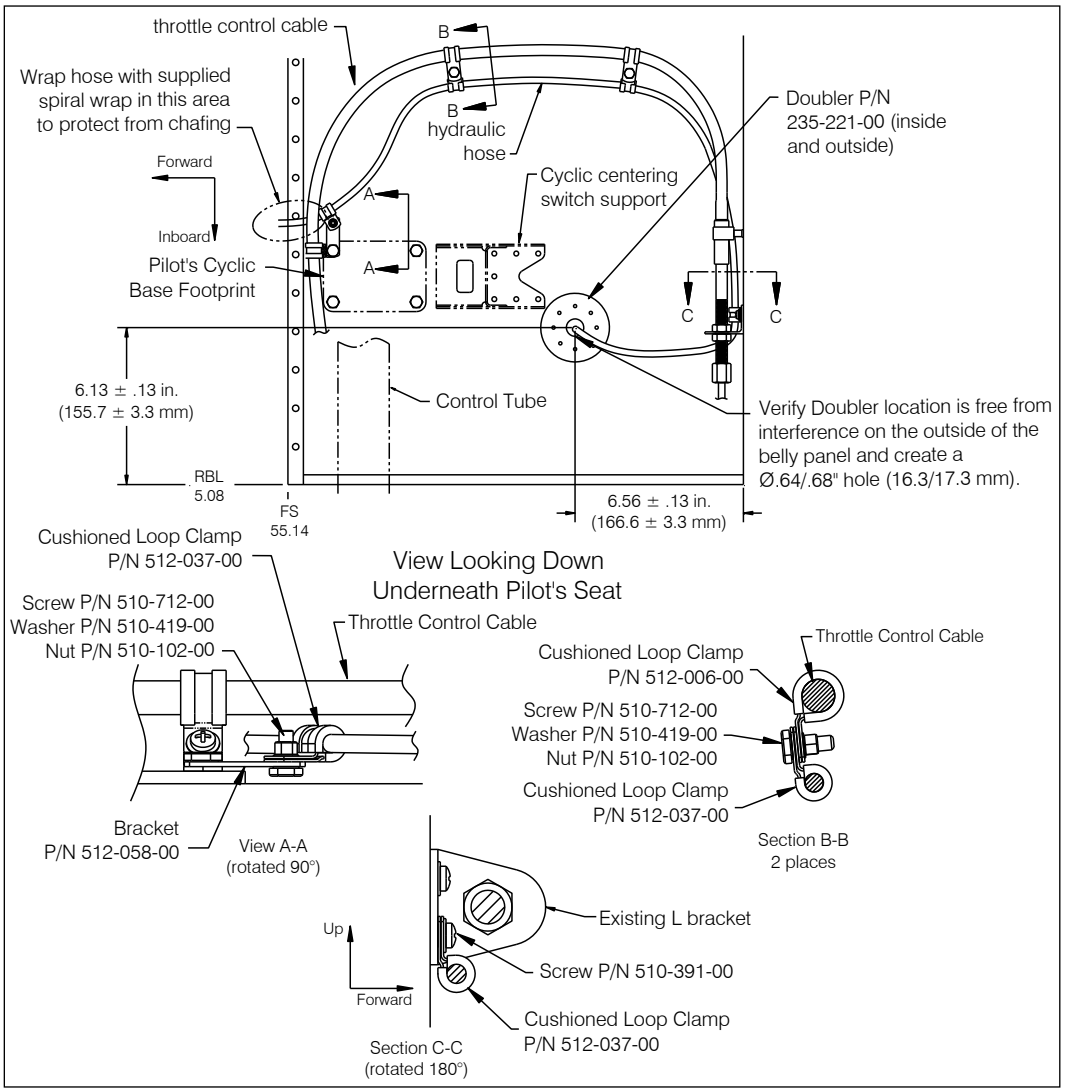
   *Optionally fabricate and install Doublers per BHT-ALL-SRM section 3-9-3.

CAUTION

Before creating the hole in the belly panel verify that the Doubler will fit on the inside and the outside of the belly panel in the location shown. Check for inserts, antennae, any optional equipment, etc. on the outside.

10. After exiting the hole, the hose is secured along the belly on its path to the connector bracket with loop clamps and spacers installed at existing inserts that are used for routing of the type certificated manual release cable. Proceed to Section 4.1.5 for installation of the connector bracket and routing along the belly.

Figure 4.9 Hose Routing Under Pilot's Seat



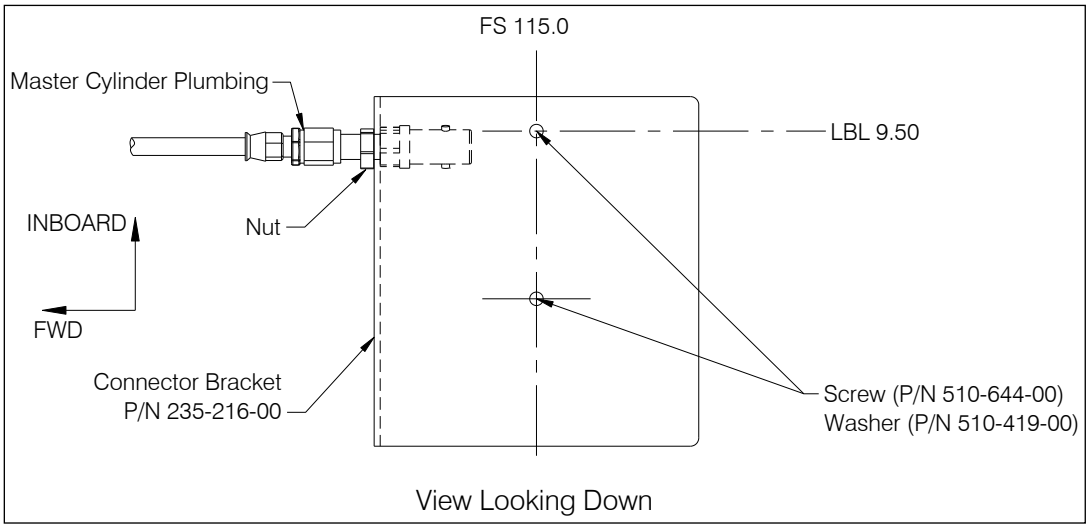
4.1.5 Hydraulic Release Routing – Underneath Belly

NOTICE

Secure the plumbing at the Connector Bracket first and move forward along the belly, securing it to the existing inserts in the belly as indicated below.

1. Install the Connector Bracket (P/N 235-216-00) on the belly of the helicopter using two existing inserts located left of the centerline at FS 115.00 (refer to Figure 4.10). The inboard insert is located at LBL 9.50. Attach the bracket with screws (P/N 510-644-00) and washers (P/N 510-419-00).
2. Insert the quick disconnect fitting at the end of the master cylinder plumbing through the keyhole slot and slide inboard and secure in this position by tightening the nut against the bracket flange.

Figure 4.10 Bracket Installation

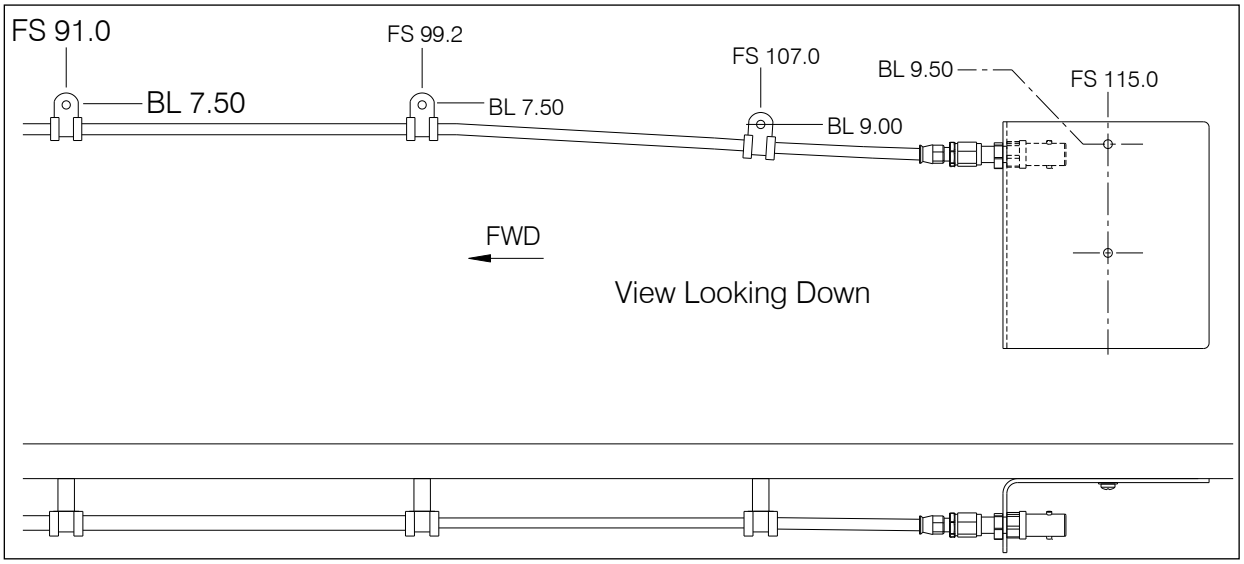


3. Install the electrical release harness (P/N 270-152-00) connector at the center hole in the forward flange of the bracket.
4. Apply decal P/N 215-205-00 (J180) next to the electrical connector.
5. At existing belly panel inserts at FS 107.0, 99.2, 91.0, and 83.0 (refer to Figure 4.11 and Figure 4.12) secure the hydraulic hose along with the electrical harness with spacer (P/N 510-647-00), loop clamp (P/N 512-027-00), screw (P/N 510-645-00), and washer (P/N 510-419-00).

NOTICE

If the load weigh system is being installed, route its wiring harness through the loop clamps as the release wiring harness and hydraulic hose are routed through using the larger loop clamps (P/N 512-026-00) provided with the load weigh kit. Refer to section 4.3.3 for load weigh harness installation instructions.

Figure 4.11 Hose Routing



6. Place loop clamp P/N 512-034-00 over the forward cross tube and attach loop clamp P/N 512-027-00 to it with screw P/N 510-652-00, washer P/N 510-419-00, nut P/N 510-102-00, and spacer P/N 510-646-00 to secure the hydraulic hose and electrical harness.
7. For the left side installation (see Figure 4.12) extend any excess hose into a loop past it and at the first insert (FS 69.5) aft of the point where it exits the skin, secure the hydraulic hose (and electrical harness) with a loop clamp (P/N 512-027-00), spacer (P/N 510-647-00), screw (P/N 510-645-00) and washer (P/N 510-419-00).
8. For the right-side installation (see Figure 4.13), in addition to the clamp point at FS69.5 attach a loop clamp (P/N 512-037-00) and spacer (P/N 510-646-00) with screw (P/N 510-965-00) and washer (P/N 510-419-00) at the existing insert adjacent to the Doubler installed previously (see section A-A).
9. Install ty-wraps (P/N 512-003-00) over the hydraulic hose and wiring harness bundle at locations 3.0 inches from and on both sides of each loop clamp.
10. When hose and electrical harness routing is set, seal holes in belly panel with MIL-S-81733 sealant. When adding sealant to the hole for the hydraulic hose, center the hose within the hole and seal around it to prevent it from chafing on the edges of the hole.

Figure 4.12 Hose Routing – Left Side, Underneath

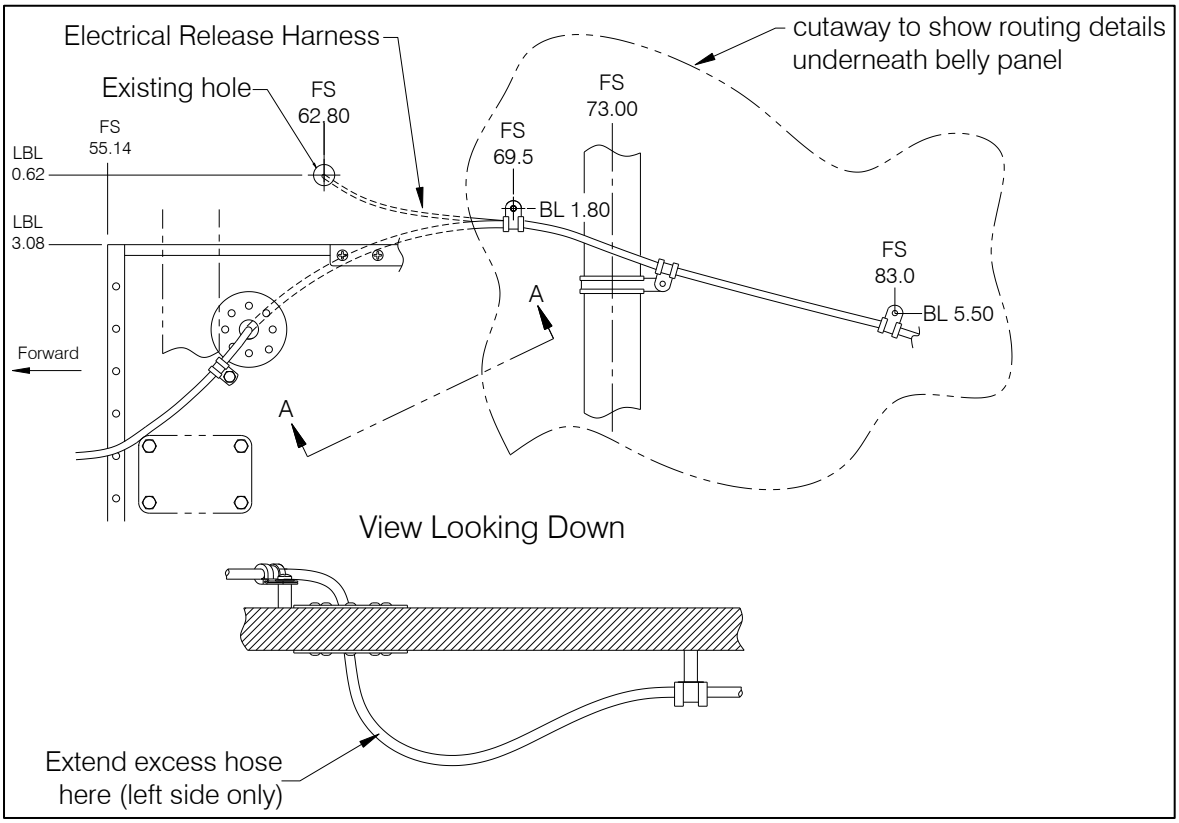
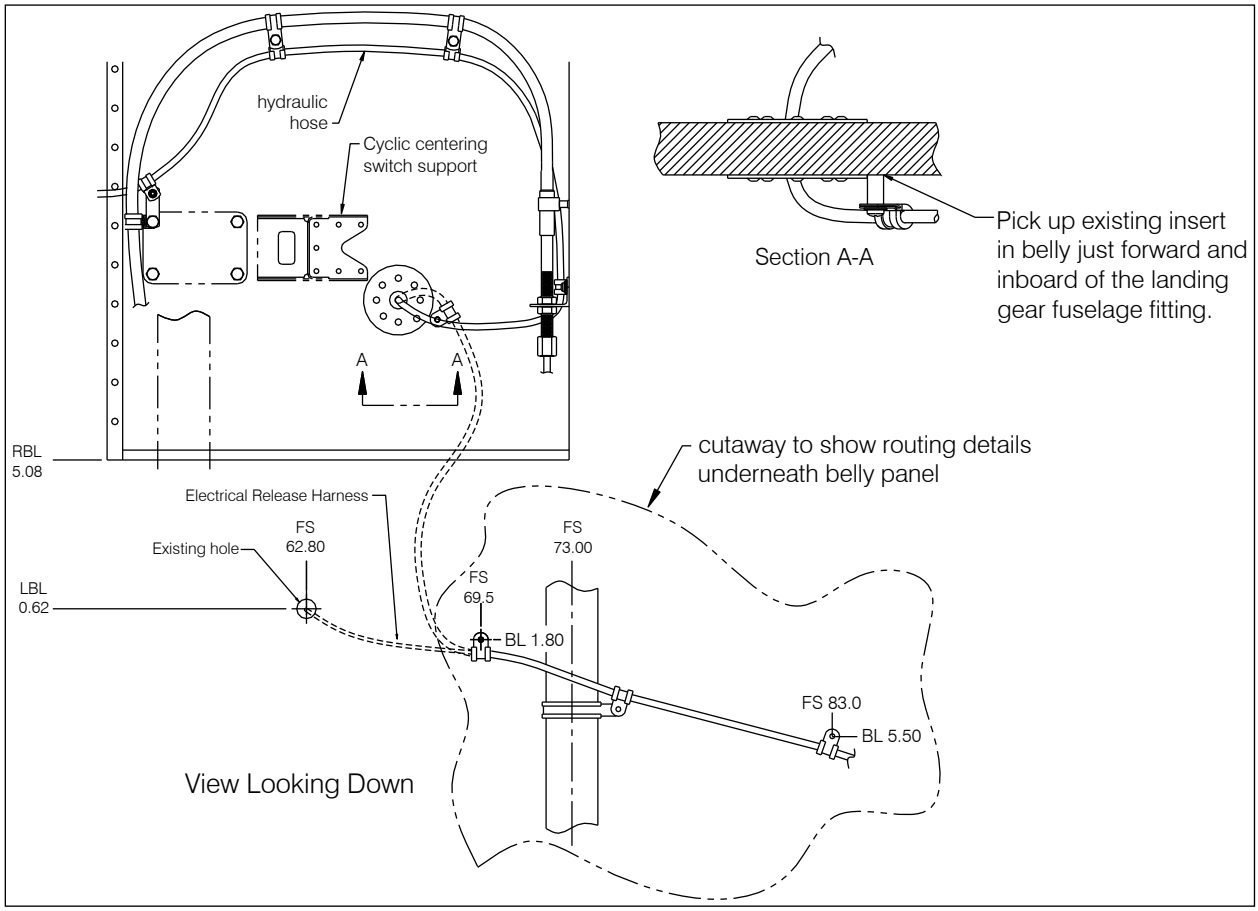


Figure 4.13 Hose Routing – Right Side, Underneath

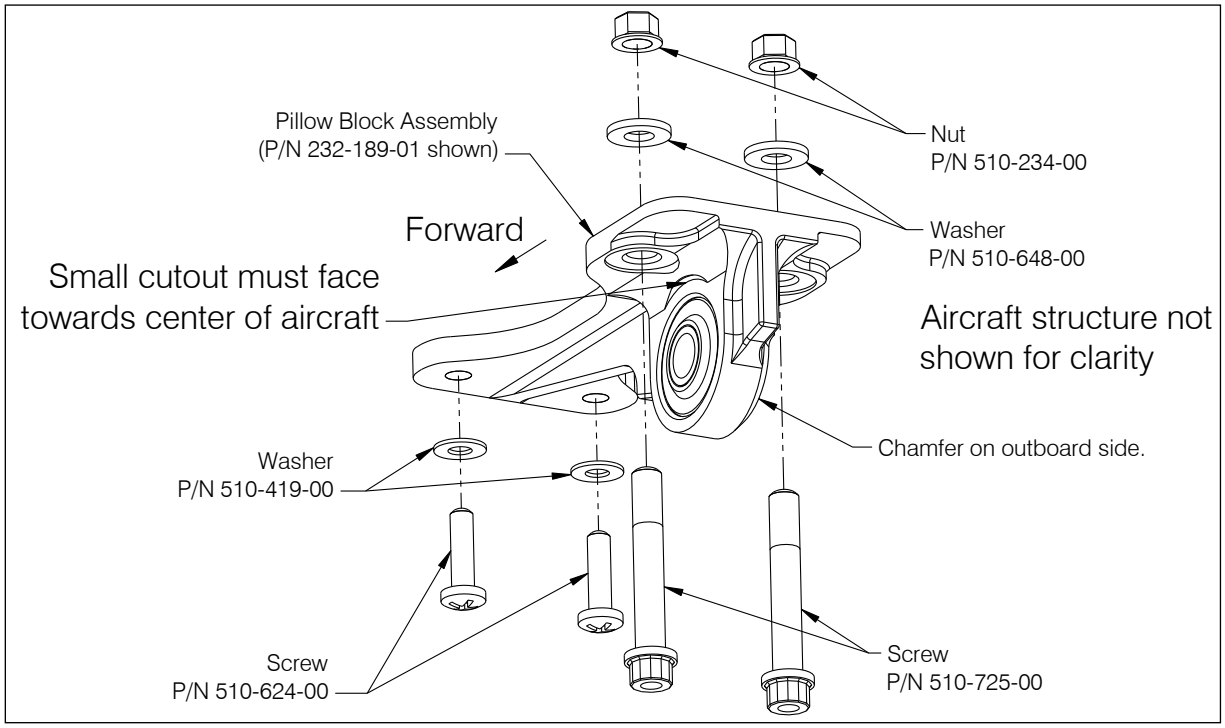


4.1.6 Pillow Block Installation

The pillow blocks attach to the aircraft belly with the aft pair of holes aligning with the pair of holes in the bulkhead fittings installed earlier.

1. Apply sealant (MIL-S-81733) to the faying surfaces of the pillow block assemblies (P/N 232-188-01 and P/N 232-189-01) and the belly of the helicopter.
2. Position pillow blocks on the belly of the helicopter and align the four holes. See Figure 4.13 for orientation of pillow block. Note orientation of small cutout, which must face towards the center of the aircraft.
3. Install fasteners in pillow block assembly. Torque nuts (P/N 510-234-00) to 84 to 107 in-lbs (9.1 to 12.1 N-m) plus drag torque.

Figure 4.14 Pillow Block Orientation (right side pillow block shown)



NOTICE

Note that the Pillow Block Assemblies are sensitive to right and left. See Figure 4.14.

4.2 Removable Provisions Kit Installation

This section covers the installation of removable provisions kit P/Ns 200-395-00 and 200-395-10 and removable provisions w/ load weight kit P/Ns 200-416-00 and 200-416-10.

1. Position the suspension assembly on pillow block assemblies with the thrust washers held in place by hand (see Figure 4.16 for orientation) and insert the Trunnion Pins. The cargo hook load beam must point to the right (when looking from the rear), see Figure 4.15.

Figure 4.15 Suspension Assembly Installation

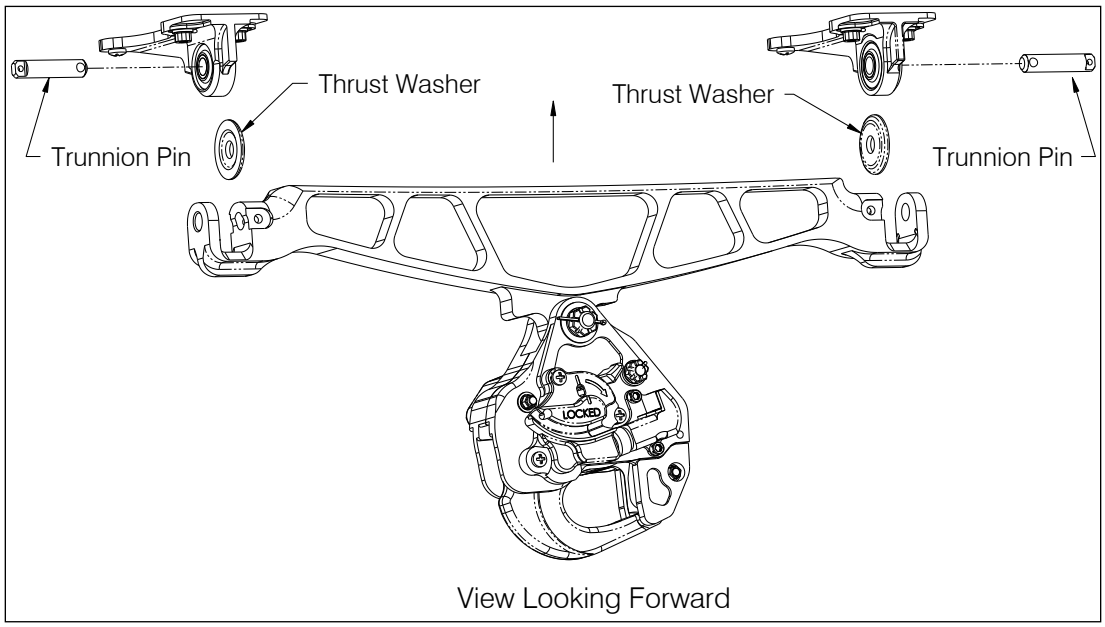
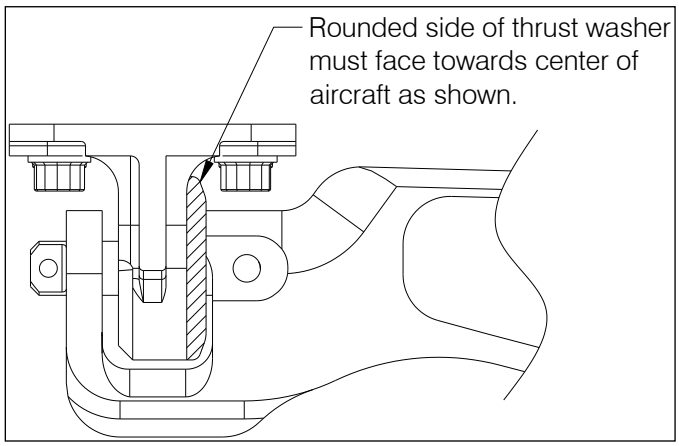


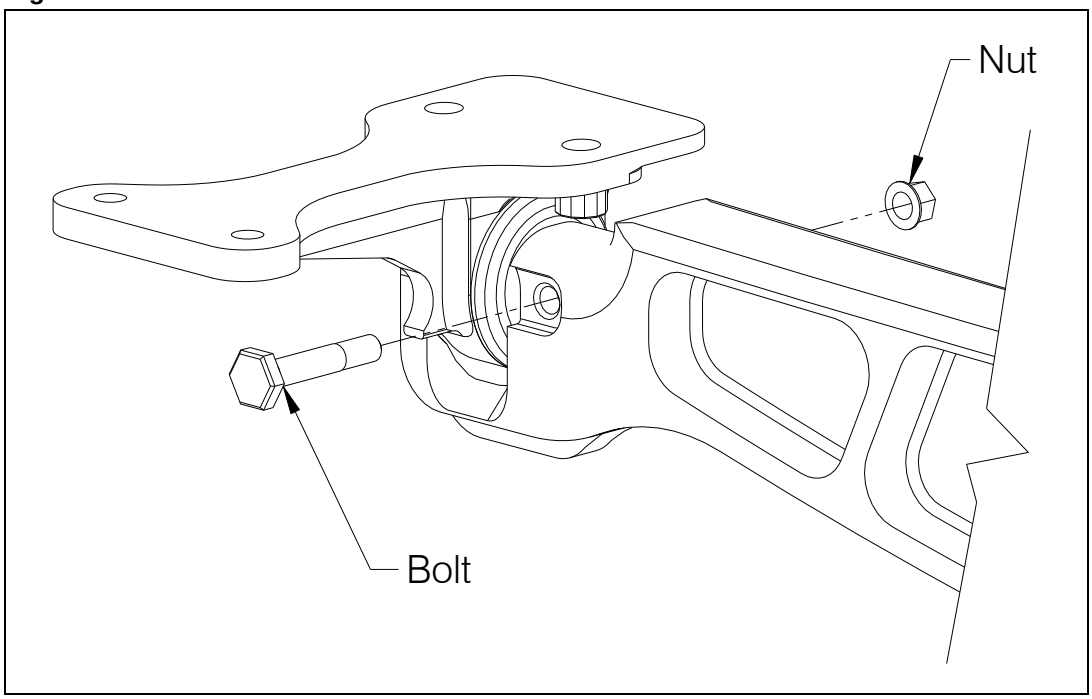
Figure 4.16 Thrust Washer Orientation



4. Insert bolt into the hole as shown in Figure 4.17. Rotate the trunnion pin as necessary to align the hole in the pin with the hole in the beam. The bolt must pass through the hole in the pin when installed. Insert the bolt so its head seats into the slot in the beam.

5. Install nut and torque to 20-25 in-lbs.

Figure 4.17 Trunnion Pin Retention Bolt



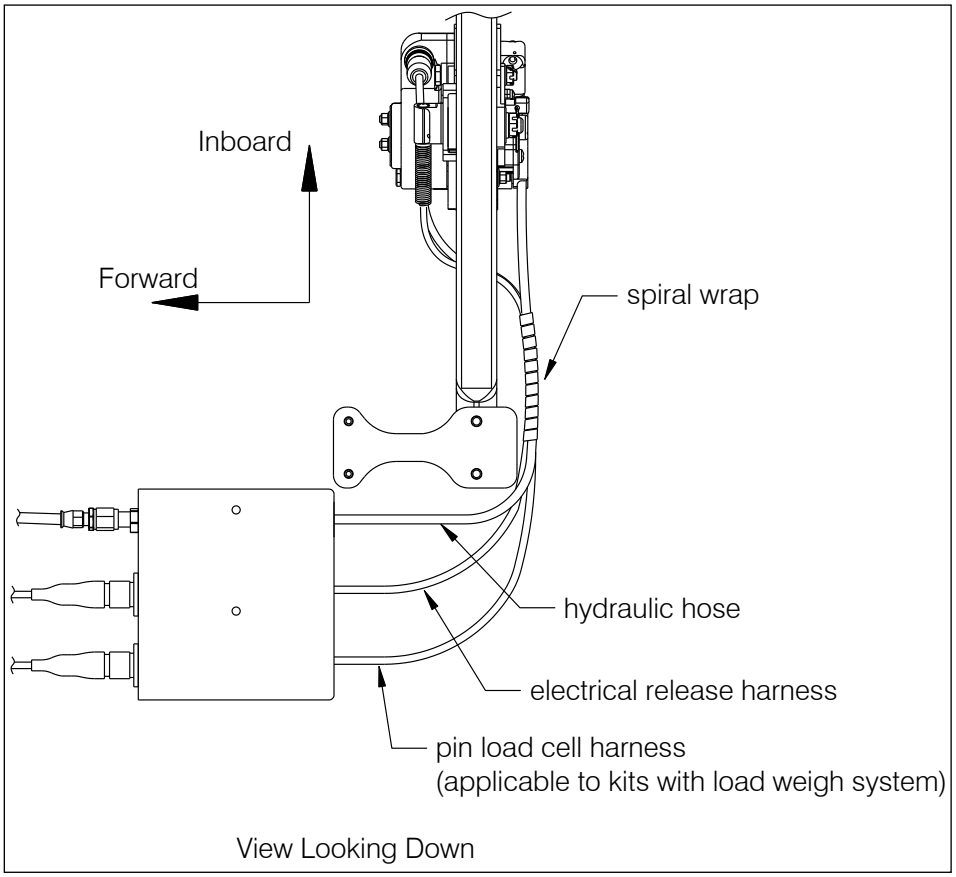
6. Route the slave cylinder plumbing hose, the electrical release harness, and load cell harness (if installed) as shown in Figure 4.18 and connect them to the respective fixed connectors at the bracket. See Table 4.1 for connector pin out information.

Table 4.1 Cargo Hook Connector

Pin	Function
A	Ground
B	Power

7. Swing the cargo hook and beam in all possible directions and observe the hose and harness(es) to ensure they do not get pulled tight. If necessary adjust position and/or trim length of the spiral wrap (P/N 590-017-00) over the harness(es) and hydraulic hose.

Figure 4.18 Hose and Harness Routing



8. If installing cargo hook P/N 528-028-02 with Surefire Release, adhere the Cockpit Decal (P/N 215-343-00) near the Cargo Release switch on the cyclic in view of the pilot

4.3 Load Weigh System Installation

The load weigh system is included with kit P/N 200-413 series and is available as parts (see Table 3.10) that may be added to the cargo hook suspension kit P/N 200-395-00 and -10 to convert it to a 200-413 series configuration.

NOTICE

If not installing the load weigh kit, skip this section and proceed to section 0, Installation Checkout.

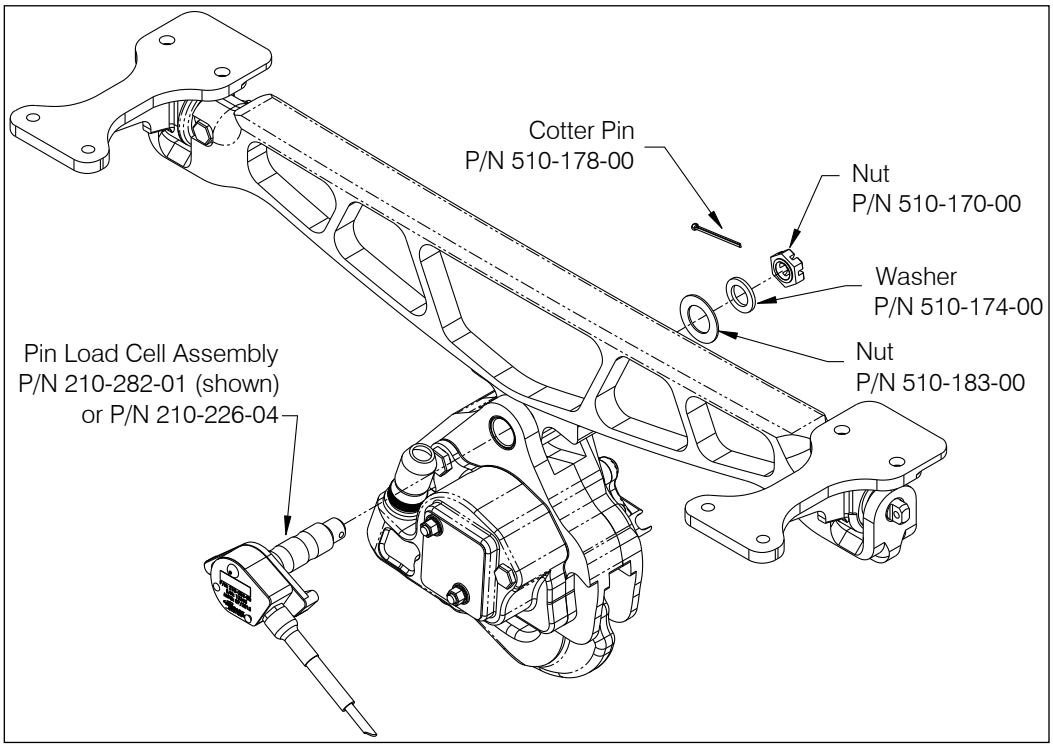
There are three primary components to install – the pin load cell assembly, the internal electrical harness and the load weigh indicator. Refer to the following sections for installation instructions for each.

4.3.1 Pin Load Cell Installation

The pin load cell replaces the cargo hook attach bolt in the suspension assembly. It is installed per the following instructions.

1. Remove the nut (P/N 510-170-00), washer (P/N 510-174-00) and washer (P/N 510-183-00) from the end of the attach bolt.
2. Remove the attach bolt (P/N 290-332-00) and washer (P/N 510-183-00) from the cargo hook, separating the cargo hook from the beam. The bolt and washer are not used with the load weigh installation.
3. Install the pin load cell through the cargo hook and suspension beam. Install so that the head (harness end) of the load cell is forward, it is to be on the same side of the cargo hook as the electrical connector.

Figure 4.19 Pin Load Cell Installation



4. Install nut (P/N 510-170-00), washer (P/N 510-174-00) and washer (P/N 510-183-00) onto the end of the pin load cell.

5. Tighten nut on pin load cell until fully seated, finger tight only. Back off nut to previous castellation, if needed, when aligning cotter pin for installation. Install and secure cotter pin.

CAUTION

Do not tighten nut on pin load cell more than finger tight. Over-tightening will damage load cell.

4.3.2 Load Indicator Installation

The C-39 indicator (P/N 210-095-00 (28V backlight) or P/N 210-095-02 (5V backlight)) or C-40 Indicator* (P/N 210-293-00 or 210-293-01) can be mounted in a standard 2 ¼" instrument panel hole. It should be mounted in a position that is convenient, accessible and visible to the pilot. A consideration for the C-40 model mounting location is access to the USB port on the back, this USB port is intended for the firmware updates.

The C-40 Indicator kit includes four screws (P/N 511-211-00, MS35214-26) for mounting it, depending on the thickness of the mounting panel use another length MS35214 screw as needed.

*The C-40 Indicator is directly interchangeable with the C-39 Indicator (without changing the internal harness) except it does not support the optional components (Analog Meter, C-30 Data Recorder).

4.3.3 Load Weigh Internal Harness Installation for the C-39

If installing the C-40 Indicator skip to section 4.3.4.

The primary leg of the load weigh harness (P/N 270-153-00) is routed from the C-39 indicator to the bracket at the belly of the helicopter. Install the connector at the bracket with screws (P/N 510-481-00), washers (P/N 510-062-00), and nuts (P/N 510-029-00). Route the harness from the pin load cell as shown in Figure 4.19 and connect to this fixed connector.

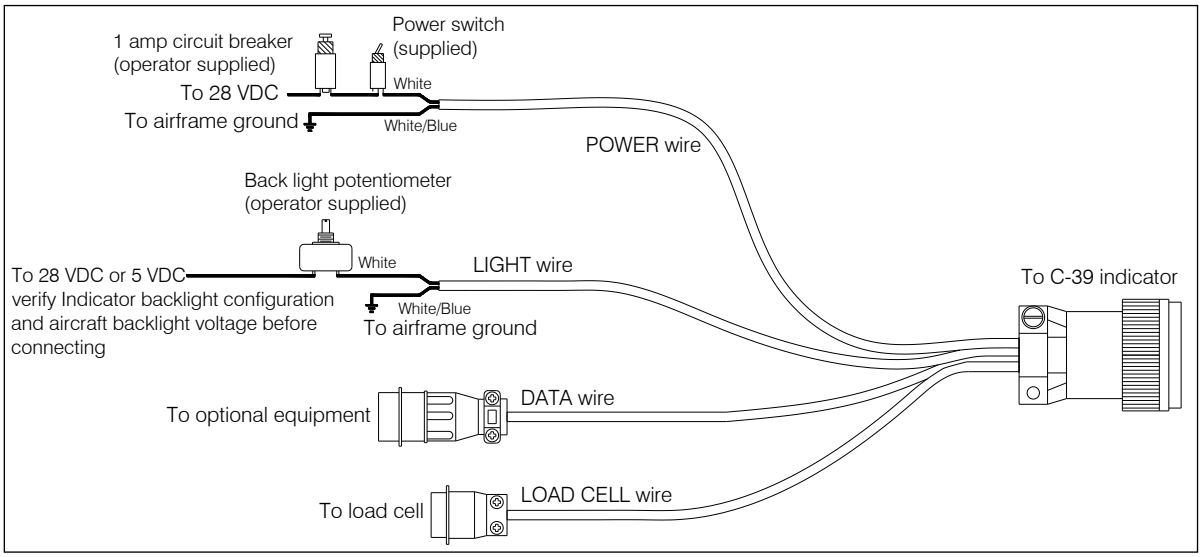
Two other legs are routed from the indicator to pick up power and lights and the fourth leg features a DATA connector, which may be used for optional equipment such as an analog meter or data recorder (reference Figure 4.20). Route the wires with existing wire harnesses, securing them with ty-wraps (P/N 512-001-00).

Route the POWER wire to a convenient location for the installation of the switch (P/N 400-048-00). The wire is supplied extra long, cut off the excess wire and use as needed to connect the switch and circuit breaker. Connect the white wire in the POWER wire to one side of the power switch, connect another piece of suitable wire to the other side of the switch and then to an available 1 or 2 amp circuit breaker. Connect the white/blue wire to ground. Install a placard 215-010-00 "ELECTRONIC WEIGHING SYSTEM" next to the power switch and circuit breaker. Install the placard 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" next to the Indicator.

NOTICE

If the C-23 Printer is being utilized with the C-20 or C-30 Data Recorder, a 5 amp circuit breaker should be used.

Figure 4.20 Load Weigh Wiring



If it is necessary to remove the load cell connector to ease cable routing, reconnect using the color code below.

Wire Color	Connector Pin
White	A
WH/GN	B
WH/OR	C
WH/BLU	D
Shield	E

4.3.4 Load Weigh Internal Harness Installation for the C-40

The internal harness (P/N 270-241-00) provided with the C-40 indicator has an additional wire (TEDS DATA, refer to Figure 4.22) which will be used on future updates to the C-40 indicator otherwise it's interchangeable with the harness for the C-39 indicator. Install it per the following.

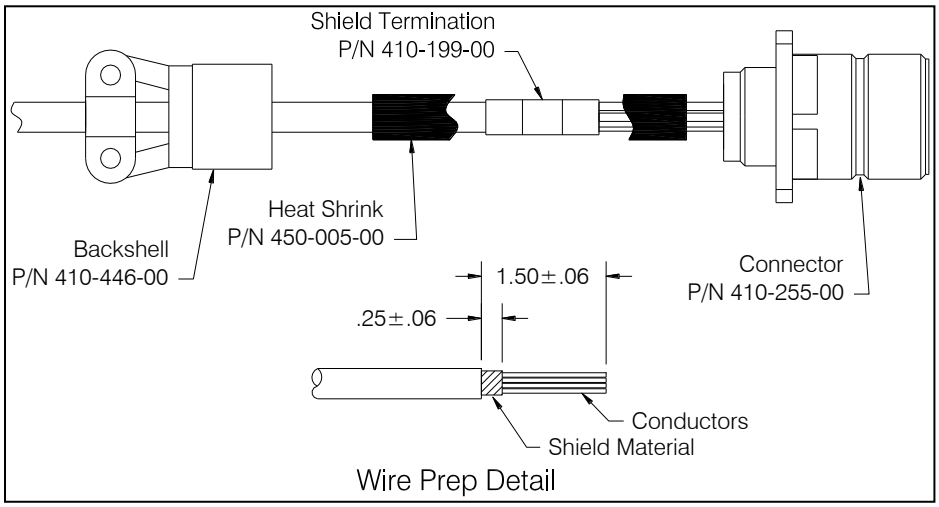
1. Connect the wire harness connector (labeled C-40) to the Indicator.
2. Route the wire labeled POWER to the circuit breaker panel and install a 1 or 2-amp circuit breaker (not supplied) and connect this wire to it. Apply the supplied placard P/N 215-417-00 adjacent to the circuit breaker.
3. Wire numbers BACKLIGHT SIG and BACKLIGHT COM are for the C-40 Indicator's backlight control voltage. Connect wire BACKLIGHT SIG to the instrument panel lighting circuit and wire BACKLIGHT COM to aircraft ground.

NOTICE

The Indicator does function normally without the Backlight Control Voltage wired, but will just not dim with other instruments. Full brightness of the Indicator is overridden by the aircraft dimming control voltage (if connected).

1. Wire AIRCRAFT GND is to be connected to a suitable aircraft ground per AC43.13.
2. Route the "LOAD CELL" leg of the harness to the hole in the belly under the center console (which the original manual release cable was routed through) and route underneath back to the connector bracket.
3. Slide backshell (P/N 410-446-00), heat shrink (P/N 450-005-00), and shield termination (P/N 410-199-00) over it and prep the "LOAD CELL" 6 conductor wire end per the Wire Prep Detail of Figure 4.21. Center the shield termination over the exposed shield and heat with heat gun until the solder ring melts, flows and wets the shield and ground lead. Cut the lead to the length of the surrounding 6 conductor wires.

Figure 4.21 Wire Prep Detail



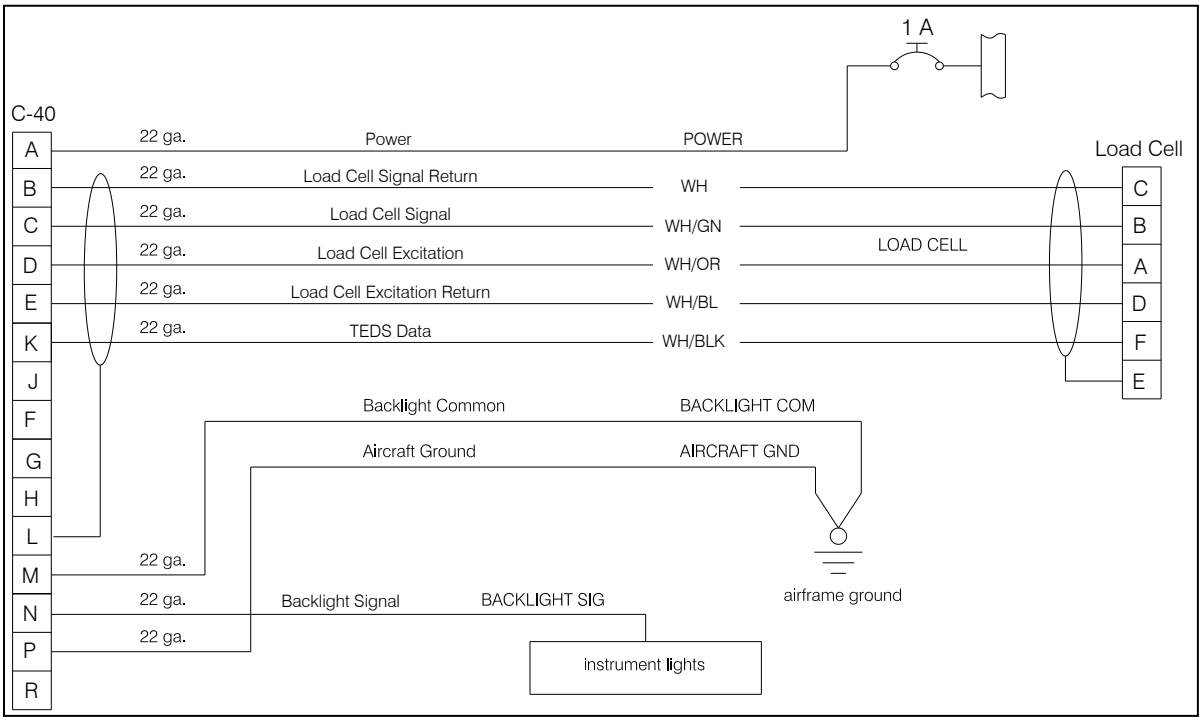
4. Strip the individual wire ends, crimp on contacts supplied with connector, and terminate wires at the connector (P/N 410-255-00) per Table 4.2, refer also to the schematic in Figure 4.22.
5. Position the heat shrink over the shield termination and shrink in place with heat gun.
6. Slide the backshell up to and thread it over the connector threads and tighten securely.

Table 4.2 Connector Pin-Out

Harness P/N 270-241-00	
Wire	**Connector Pin**
WH	C
WH/GN	B
WH/OR	A
WH/BLU	D
WH/BLK	F
Shield	E

7. Secure the load weigh connector to the Connector Bracket with four screws (P/N 510-481-00), washer (P/N 510-062-00), and nuts (P/N 510-029-00).

Figure 4.22 Load Weigh Internal Harness Wiring Schematic (C-40)



4.4 Hydraulic Hook Upgrade Kit Installation

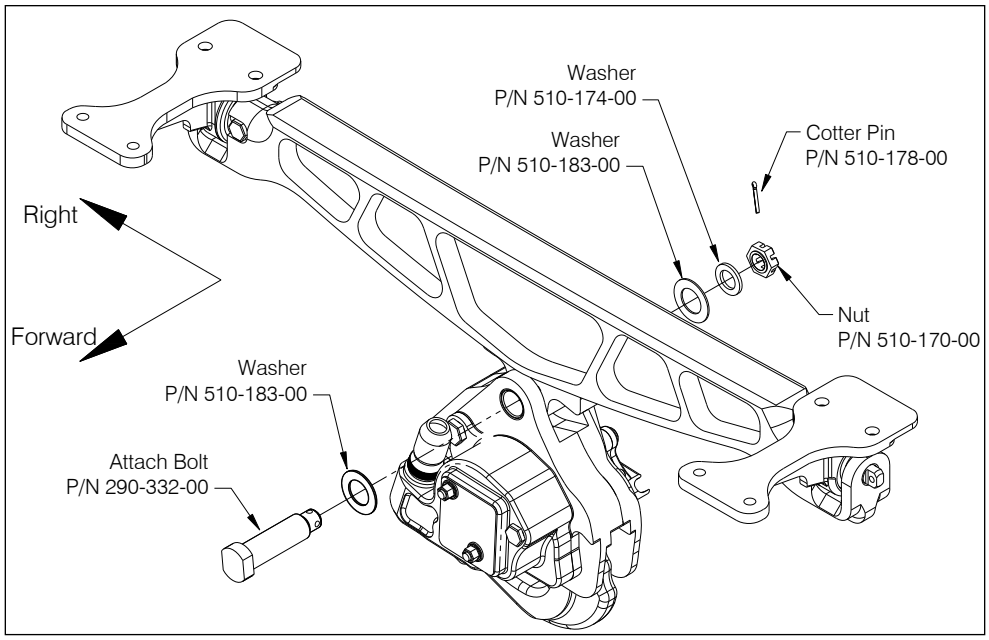
An existing installation with cargo hook P/N 528-029-00 installed can be upgraded to the configurations of this manual with the parts in Table 3.11. These parts serve as a hydraulic hook upgrade kit for operators with the Onboard Systems cargo hook (P/N 528-029-00) with mechanical release cable installed on the fixed beam suspension (Kit P/N 200-328-00 and P/N 200-329-00). Installing these parts will convert the existing configuration to a P/N 200-412 series configuration.

Install this kit per the following:

1. Remove the cargo hook, the electrical release harness from the cargo hook to the belly-mounted bracket, and the manual release cable from the cargo hook to the bracket.
2. Disconnect all connectors from the belly mounted bracket and remove the bracket from the belly.
3. Remove the fixed manual release cable including the T-handle in the cockpit by removing the cushioned loop clamps along the belly and removing the center console cover in the cockpit to disassemble and remove the T-handle.
4. The T-handle Support Bracket can be left installed as it will not interfere with the hydraulic release installation but cover the hole for the T-handle to prevent FOD from entering into the area under the console.
5. Install the hydraulic release system and supplied connector bracket (P/N 235-216-00) per section 4.1.2.

6. Install the cargo hook/slave cylinder assembly onto the suspension assembly with the attach bolt (P/N 290-332-00) and hardware as shown in Figure 4.23.

Figure 4.23 Cargo Hook Installation Hardware



7. Tighten nut on cargo hook attach bolt or pin load cell until fully seated, finger tight only. Back off nut to previous castellation, if needed, when aligning cotter pin for installation. Install and secure cotter pin.

CAUTION

Do not tighten nut on pin load cell more than finger tight. Over-tightening will damage load cell.

8. Connect the electrical release harness (P/N 270-197-00) to the cargo hook and to the fixed electrical release connector on the connector bracket.
9. Connect the slave cylinder hydraulic hose from the cargo hook to the fixed connector on the connector bracket.
10. Route and wrap the harness and hose per section 4.2

4.5 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 123-040-00, 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.

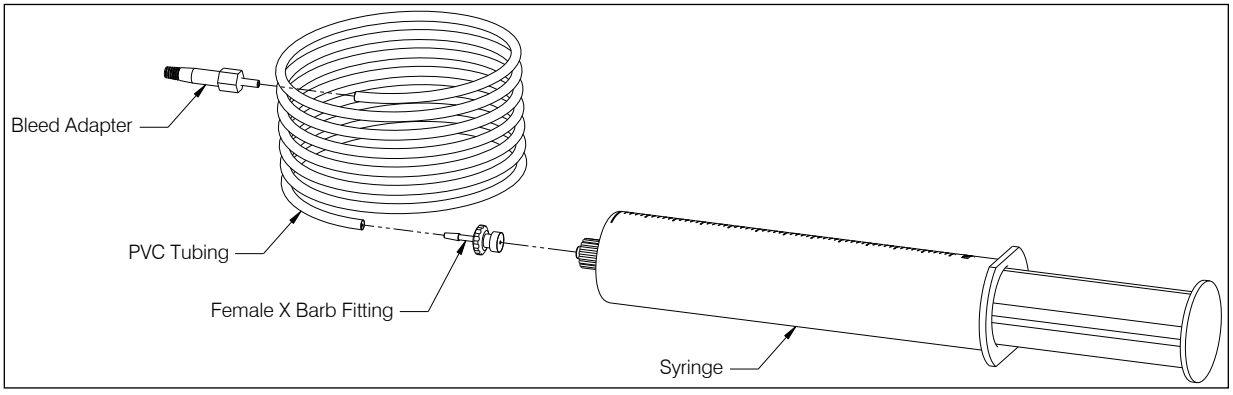
NOTICE

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

Figure 4.24 Hydraulic Hook Bleed Kit



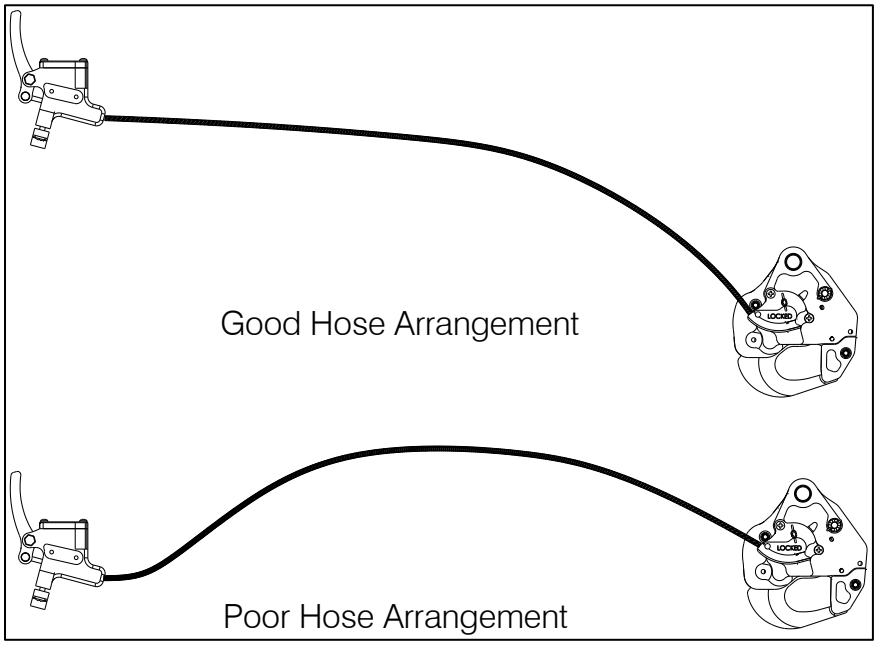
2. If the system is already installed on the aircraft, place an absorbent towel under the master cylinder. If the master cylinder is not installed on the aircraft, lightly clamp the master cylinder in a vise to hold it in a vertical position and position the slave cylinder so that its level is below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

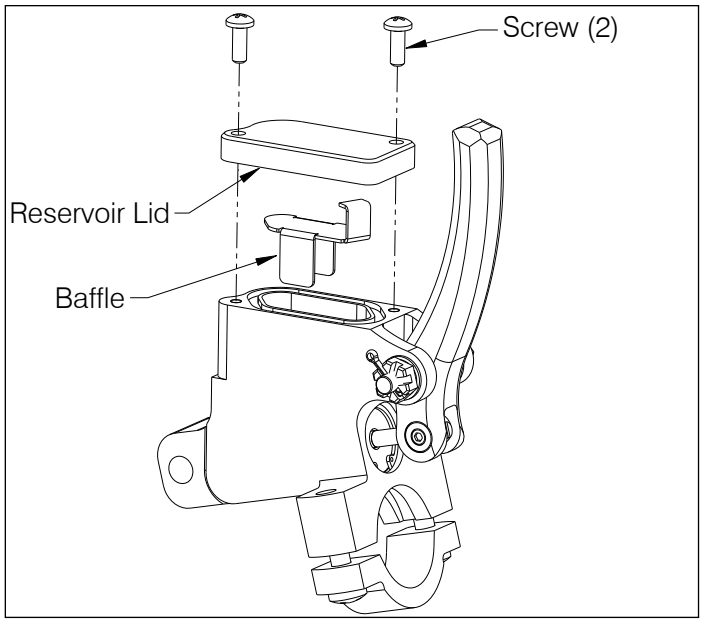
3. Connect the master cylinder assembly to the slave cylinder assembly if not already done. If filling or bleeding on the bench, as much as possible, arrange the hoses uncoiled, straight and running uphill. See Figure 4.25.

Figure 4.25 Hose Arrangement



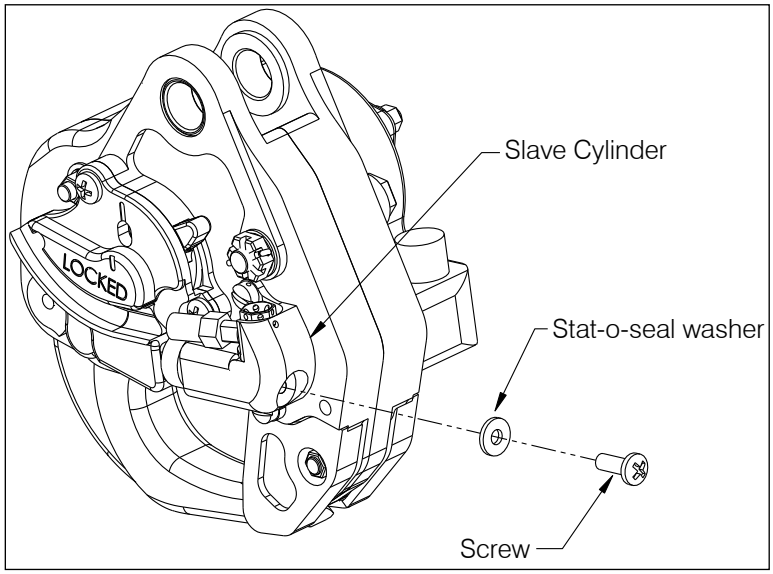
4. Remove screws, reservoir lid, and baffle from the master cylinder reservoir as shown in Figure 4.26.

Figure 4.26 Reservoir Disassembly



5. Remove the screw and stat-o-seal on the slave cylinder, see Figure 4.27.

Figure 4.27 Screw and Stat-o-seal Removal



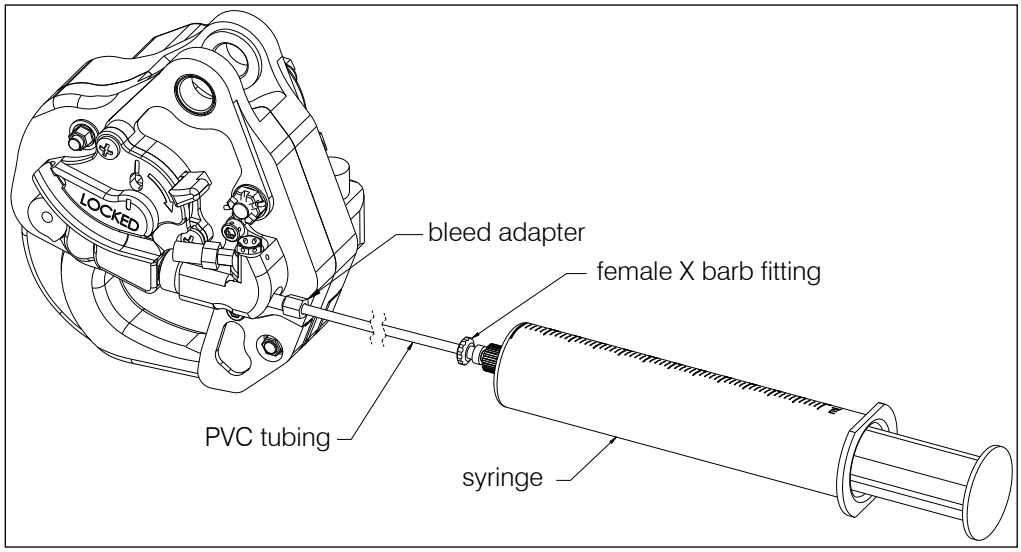
6. Fill the syringe with approximately 35 cc of hydraulic fluid and purge any remaining air in the syringe and tubing. Screw the end of the bleed adapter into the screw hole on the slave cylinder to create a tight seal. See Figure 4.28.

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 4.28 Injecting Hydraulic Fluid



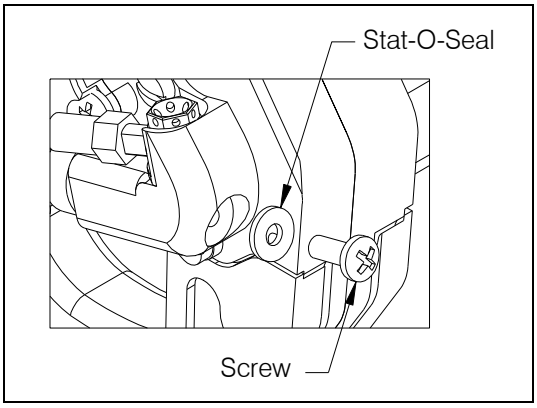
8. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

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 Stat-o-Seal (P/N 510-496-00) and screw (P/N 510-525-00), see Figure 4.29.

Figure 4.29 Screw Re-installation



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

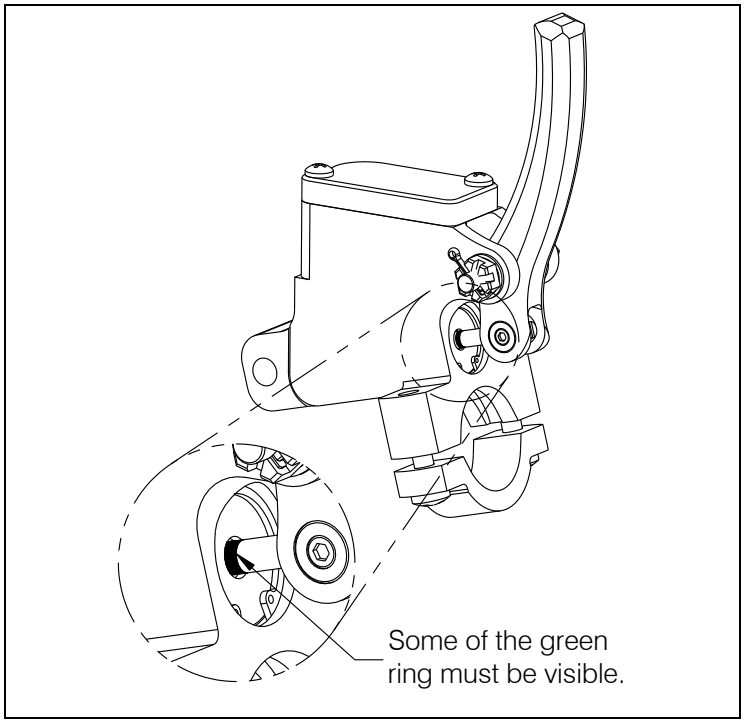
11. Very slowly pull the release lever on the master cylinder and watch for bubbles. If bubbles are observed rising within the reservoir, continue to slowly cycle the lever until there are no more. Actuating the lever releases air trapped within the master cylinder.

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 4.30). 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 4.30 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. If the two screws used to secure the reservoir lid are shoulder screws (P/N 511-124-00), install safety wire between them.
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.

4.6 Installation Check-Out

After installation of the system, perform the following functional checks.

1. Swing the installed cargo hook and suspension to their full extremes to ensure that the hydraulic hose and the electrical harnesses have enough slack to allow full range of motion without straining or damaging the hose or harnesses. The hose or harnesses must not be the stops that prevent the cargo hook and suspension beam from pivoting freely in all directions.
2. With no load on the cargo hook load beam, pull the release lever on the cyclic, the cargo hook should release. Reset the cargo hook load beam.
3. Provide power to the electrical release system with no load on the load beam. Electrical release system operation depends on the cargo hook P/N installed.

   The following instructions are applicable to cargo hook P/N 528-028-02 which is equipped with Surefire electrical release.

   - 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.

   The following instructions are applicable to cargo hook P/N 528-028-00.

   - Press and release the Cargo Release switch on the cyclic, the load beam should immediately fall to the open position.
4. Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the cover.
5. 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.

If Load Weigh System with the C-39 Indicator was installed, perform the following:

6. Power on the Indicator and allow it to warm up for 5 minutes (with no load on the hook). Press both Indicator buttons at the same time to go to the Setup Mode. Scroll through the menu until the symbol "0 in" is displayed, then press the right button. Remove any weight that is not to be zeroed out and press either button to complete the procedure.

If the C-40 Indicator was installed, refer to steps 7 and 8 below.

7. On startup the C-40 Indicator will display an information screen while performing a brief self-diagnostic routine and then display the load screen. Set the Installation Zero for the installation per the instructions contained in C-40 Indicator's Owner's Manual 120-152-00.

8. In the Settings menu adjust units (lb or kg), brightness of the display, maximum load, and other settings as preferred (refer to the C-40 Indicator Owner's Manual 120-152-00 for detailed instructions). One setting that must be set properly to function is the backlight voltage. If the wire for the backlight was connected the backlight voltage must be set to the aircraft circuit voltage (5 VDC or 28 VDC).

4.7 Paper Work

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. Place the Rotorcraft Flight Manual Supplement in the aircraft Flight Manual.

5.0 Operation Instructions

5.1 Operating Procedures

Refer to Owner's Manual 120-039-00 for operation instructions for the C-39 load weigh indicator and Owner's Manual 120-152-00 for operations instructions for the C-40 load weigh indicator.

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

1. Provide power to the electrical release system. Electrical release system operation depends on the cargo hook P/N installed. 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).

   The following instructions are applicable to cargo hook P/N 528-028-00.

   - Press and release the Cargo Release switch on the cyclic, the load beam should fall to the open position.
   - 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.

   CAUTION

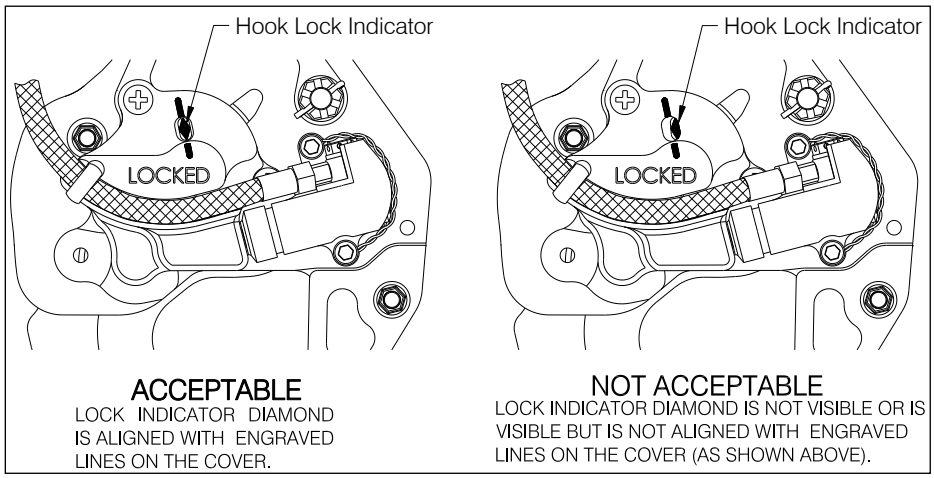
   The release solenoid is intended to be energized only intermittently. Depressing the release switch continuously in excess of 20 seconds will cause the release solenoid to overheat, possibly causing permanent damage.

2. Pull the backup release lever located on the cyclic to test the cargo hook's hydraulic release system. The system should operate smoothly and the Cargo Hook must release. Reset the cargo hook by hand after release. Verify that the hook lock indicator on the side of the hook returns to the fully locked position.

⚠ CAUTION

In the fully locked position the hook lock indicator must align with the lines on the manual release cover (see Figure 5.1).

Figure 5.1 Hook Lock Indicator

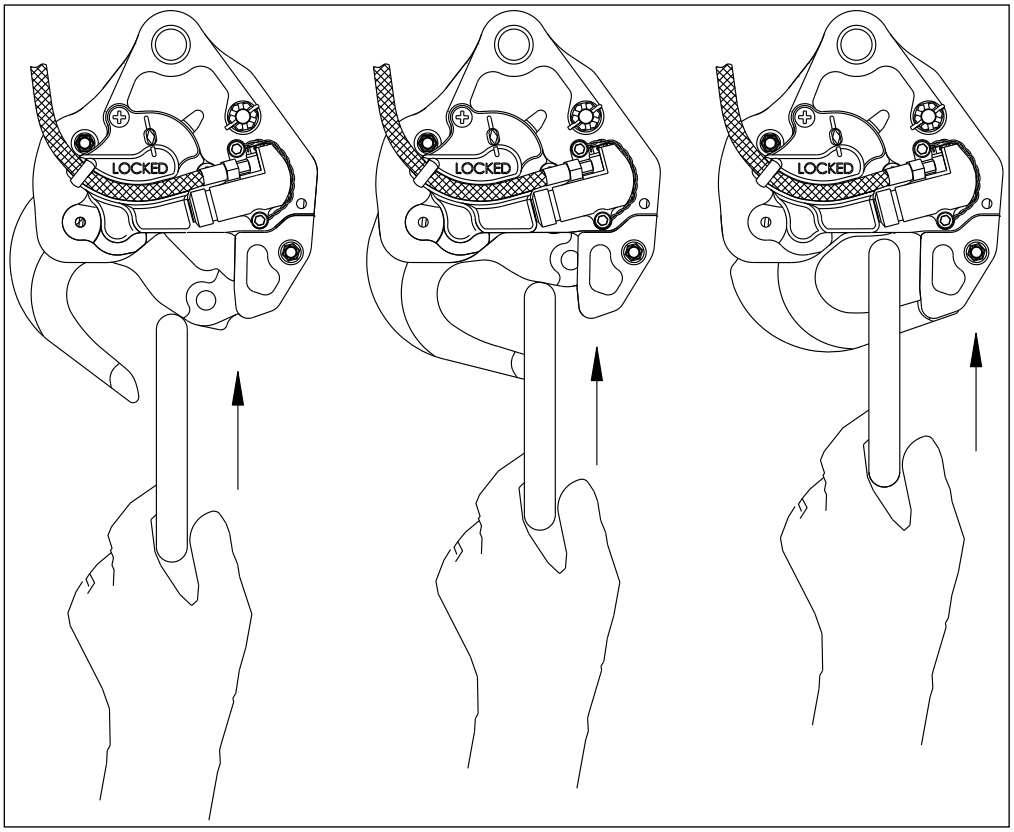


3. Swing the installed Cargo Hook and the suspension to ensure that the hydraulic hose and electrical harnesses have enough slack to allow full swing of each component without straining or damaging the harnesses and/or hydraulic hose. The hydraulic hose and/or harnesses must not be the stops that prevent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

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 5.2, until an internal latch engages the load beam and latches it in the closed position.

Figure 5.2 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.

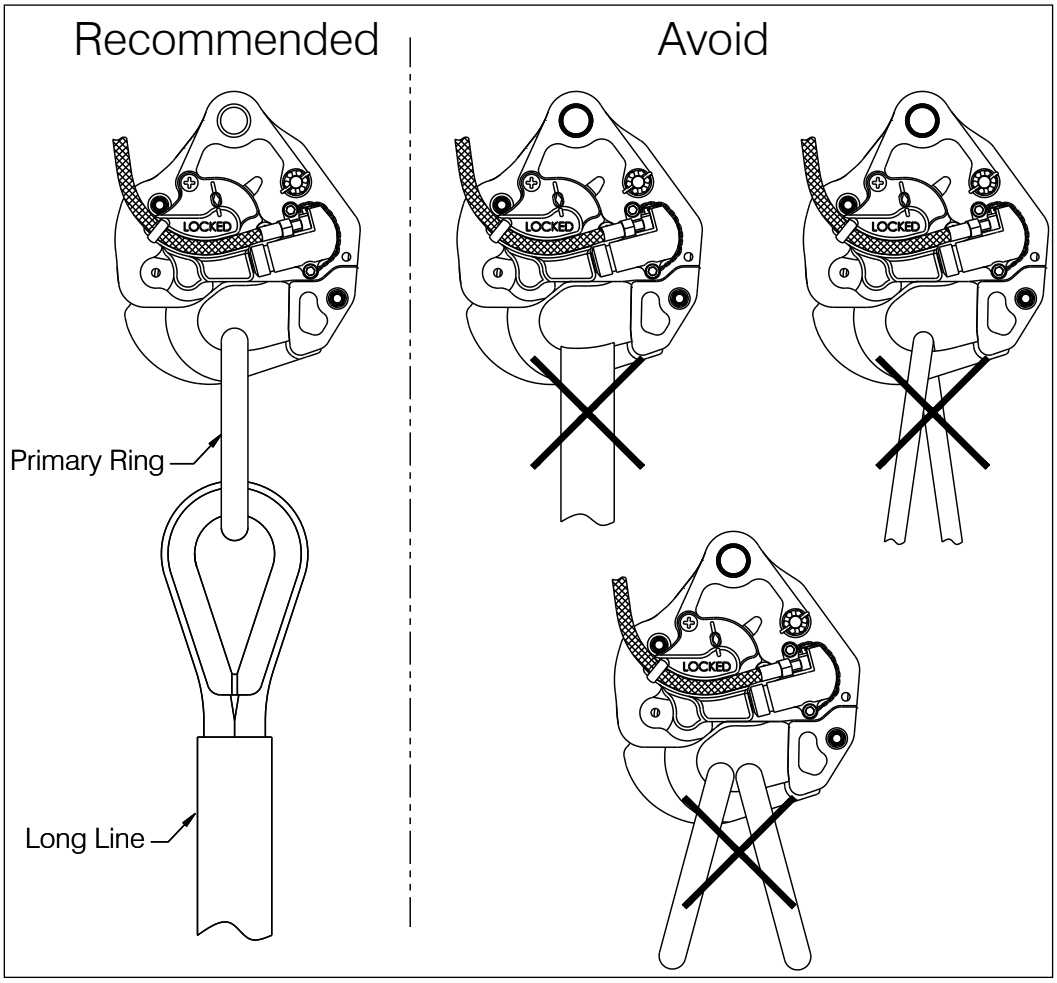
⚠ WARNING

It is the responsibility of the operator to ensure the cargo hook will function properly with each rigging.

⚠ CAUTION

Nylon type straps (or similar material) or rope should not be used directly on the cargo hook load beam. If nylon straps or rope are 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 5.3 Examples of Cargo Hook Rigging



6.0 Maintenance

Refer to the Instructions for Continued Airworthiness (ICA) manual 123-040-00 for maintenance of the fixed provisions kit, load weigh kit and cargo hook suspension kits. For maintenance specific to the cargo hook refer to the Cargo Hook Component Maintenance Manual 122-015-00.

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

7.0 System Part Numbers

Figure 7.1 200-395-XX, 200-416-XX Cargo Hook/Beam Assembly

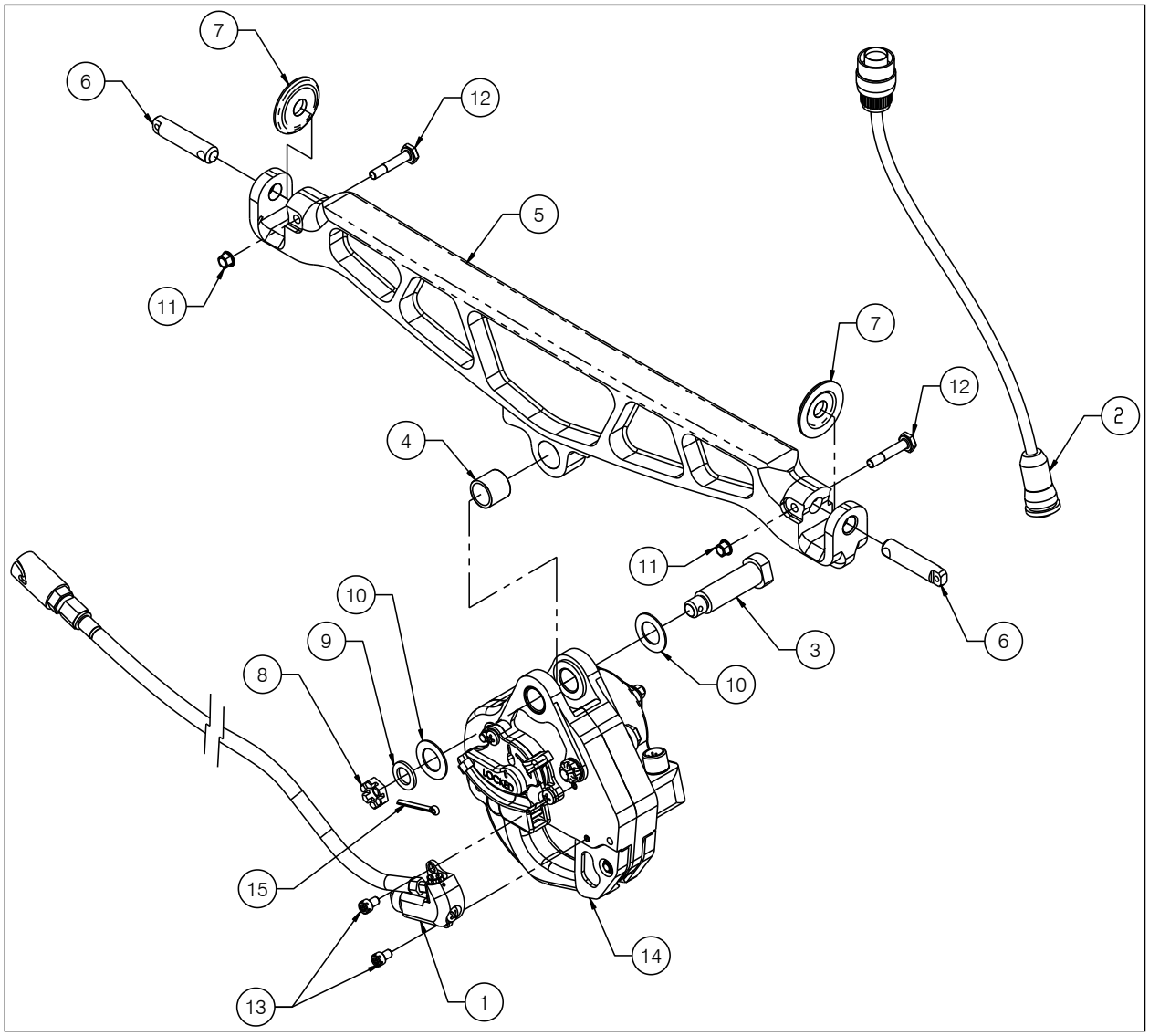


Table 7.1 200-395-00, 200-395-10, 200-416-00, 200-416-10 Cargo Hook/Beam Assembly

Item	Part No.	Description	Qty.
1	232-523-00	Slave Cylinder w/ Plumbing	1
2	270-197-00	Electrical Release Harness	1
3	290-332-00*	Attach Bolt	1
4	290-364-00	Bushing	1
5	290-852-01	Main Beam	1
6	290-854-00	Trunnion Pin	2
7	290-881-00	Thrust Bearing	2
8	510-170-00	Nut	1
9	510-174-00	Washer	1
10	510-183-00*	Washer	2
11	510-500-00	Nut	2
12	510-523-00	Bolt	2
13	510-531-00	Screw	2
14	528-028-00 or 528-028-02**	Cargo Hook	1

*In the P/N 200-416 series assembly, the attach bolt (P/N 290-332-00) and the washer (P/N 510-183-00) under its head are replaced by pin load cell assembly (P/N 210-282-01 or P/N 210-226-04).

**Cargo Hook P/N 528-028-02 includes Surefire release. This P/N is included with P/N's ending in -10.

Figure 7.2 232-188-01, Pillow Block Assembly, Left

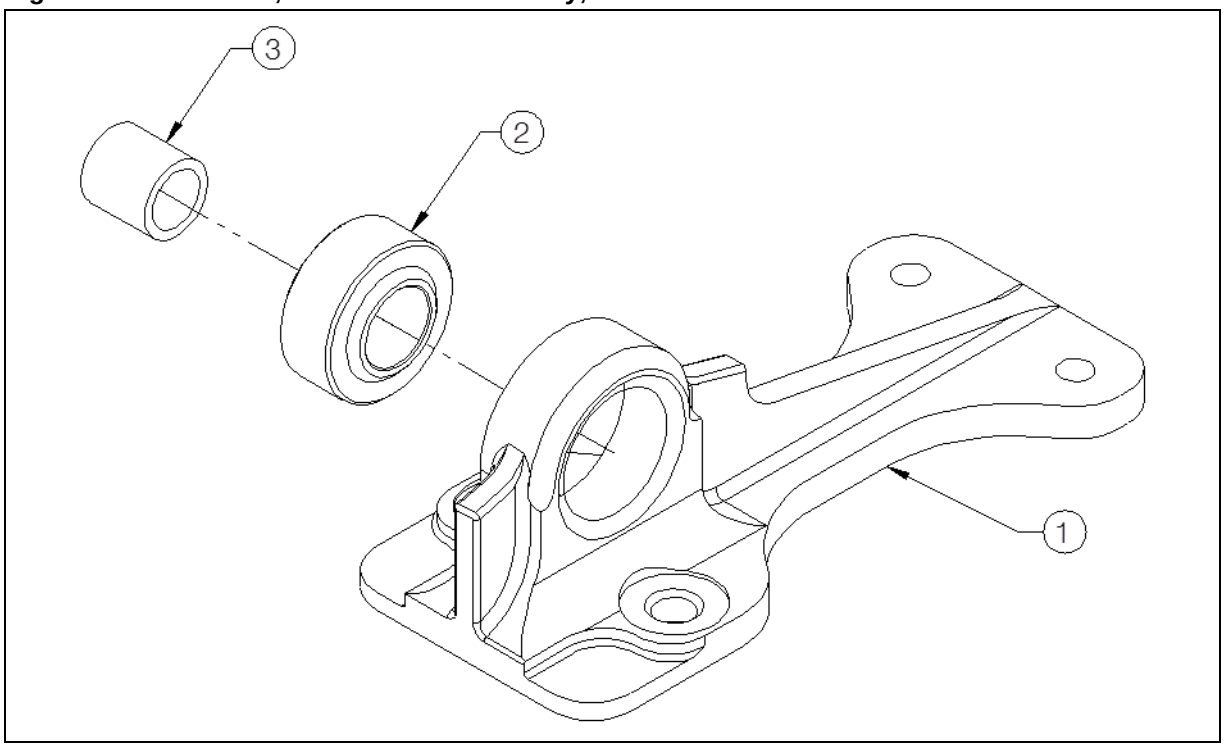


Table 7.2 232-188-01, Pillow Block Assembly, Left

Item	Part No.	Description	Qty.
1	290-853-01	Pillow Block, Left	1
2	517-012-00	Spherical Bearing	1
3	290-882-00	Shaft Bushing	1

Figure 7.3 232-189-01, Pillow Block Assembly, Right

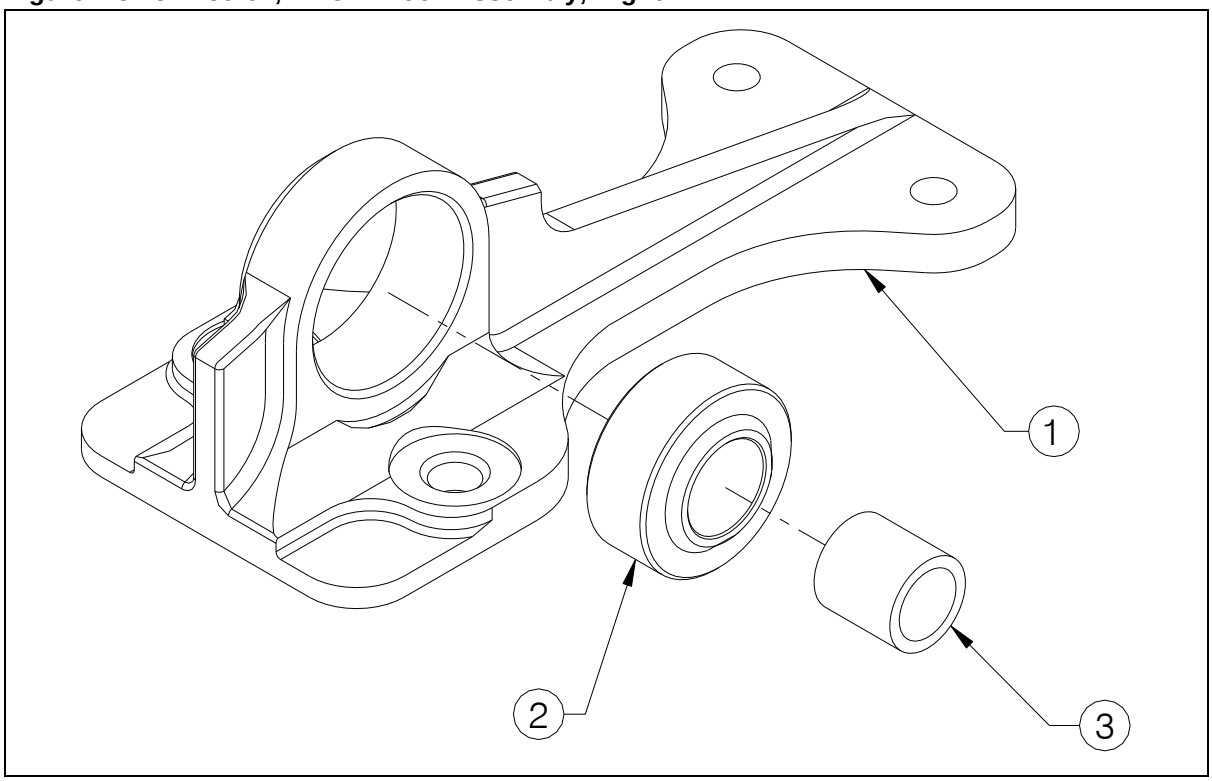


Table 7.3 232-189-01, Pillow Block Assembly, Right

Item	Part No.	Description	Qty.
1	290-883-01	Pillow Block, Right	1
2	517-012-00	Spherical Bearing	1
3	290-882-00	Shaft Bushing	1

Figure 7.4 232-590-00, Master Cylinder Assembly w/ Plumbing

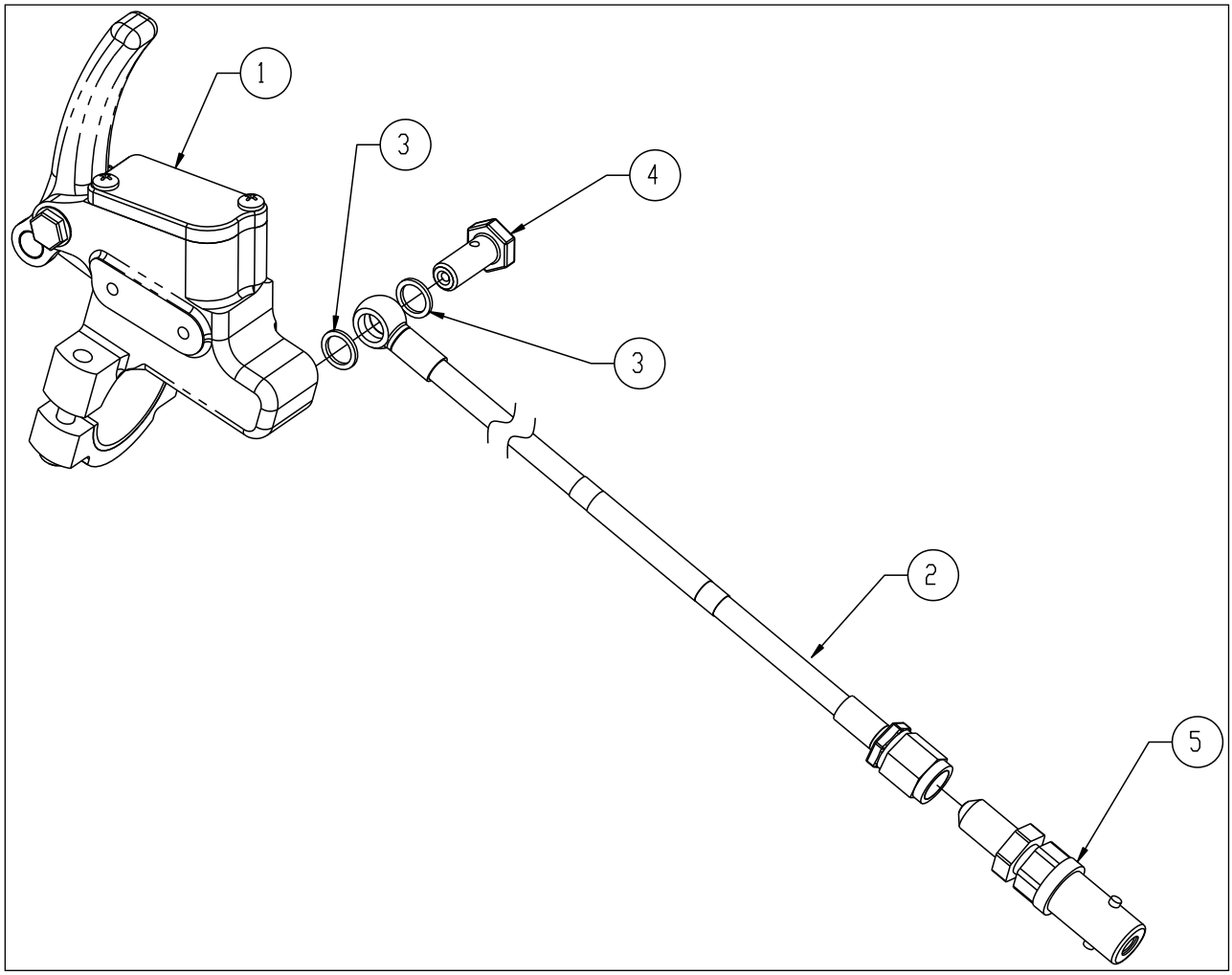


Table 7.4 232-590-00, Master Cylinder Assembly w/ Plumbing

Item	Part No.	Description	Qty.
1	232-591-00	Master Cylinder Assembly	1
2	232-589-00*	Master Cylinder Plumbing Assembly	1
3	556-040-00	Crush Washer	2
4	558-021-00	#3 Banjo Bolt	1
5	560-005-00	Quick Disconnect	1

*For a right hand side cyclic installation, plumbing assembly P/N 232-604-00 is used in place of P/N 232-589-00. It is identical to P/N 232-589-00 except longer.

Figure 7.5 232-591-00, Master Cylinder Assembly

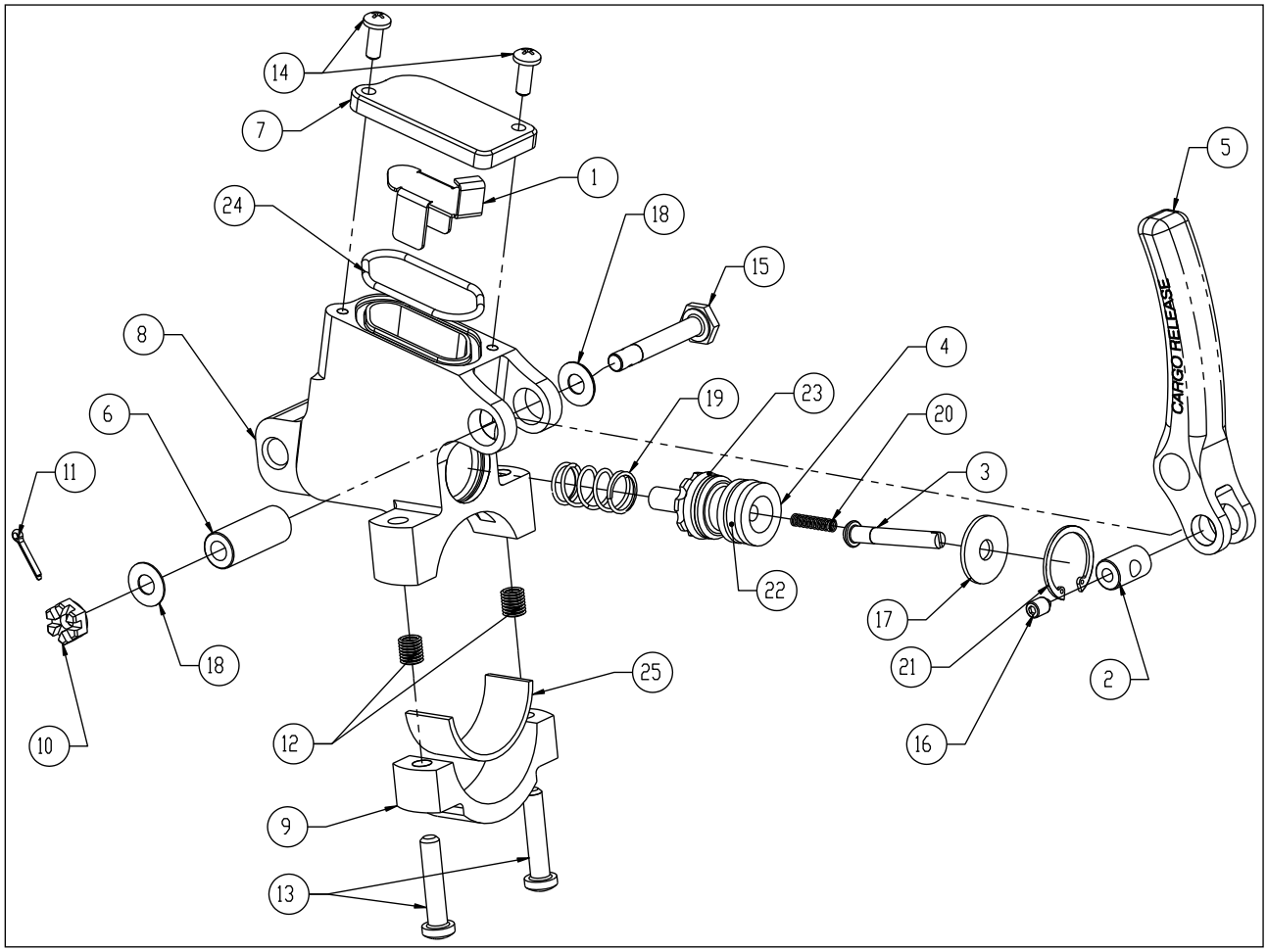


Table 7.5 232-591-00, Master Cylinder Assembly

Item	Part No.	Description	Qty.
1	235-124-00	Baffle	1
2	290-812-00	Barrel Nut	1
3	290-813-00	Push Rod	1
4	290-814-01	Piston	1
5	290-906-00	Lever	1
6	290-908-00	Shaft	1
7	290-922-00*	Reservoir Lid	1
8	291-281-00	Master Cylinder	1
9	291-282-00	Clamp Half	1
10	510-082-00	Nut	1
11	510-125-00	Cotter Pin	1
12	510-248-00	Helicoil	2
13	510-390-00	Screw	2
14	511-124-00*	Shoulder Screw	2
15	510-450-00	Bolt	1
16	510-530-00	Set Screw	1
17	510-532-00	Washer	1
18	510-986-00	Washer	2
19	514-055-00	Spring	1
20	514-060-00	Spring	1
21	515-008-00	Snap Ring	1
22	556-047-00	O-ring	1
23	556-048-00	Cup Seal	1
24	556-044-00	O-ring	1
25	291-143-00	Clamp Friction Strip	1

*for improved fit, use shoulder screw P/N 511-124-00 with Reservoir Lid P/N 290-922-00. If replacing Reservoir Lid also replace screw (P/N 510-424-00) with shoulder screw P/N 511-124-00. P/N 511-124-00 supersedes P/N 510-424-00.

Figure 7.6 232-523-00, Slave Cylinder Assembly w/ Plumbing

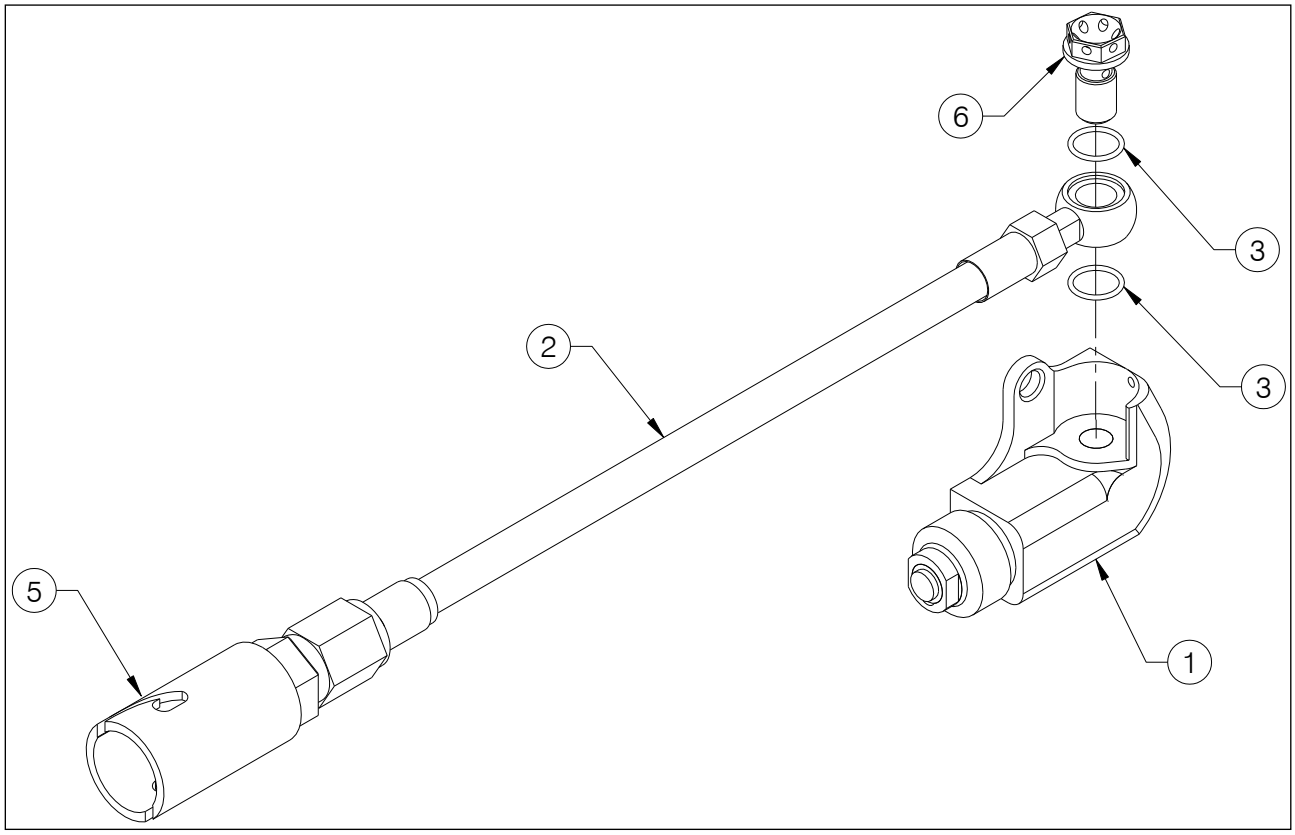


Table 7.6 232-523-00, Slave Cylinder Assembly w/ Plumbing

Item	Part No.	Description	Qty.
1	232-169-00	Slave Cylinder Assembly	1
2	232-521-00	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 7.7 232-169-00, Slave Cylinder Assembly

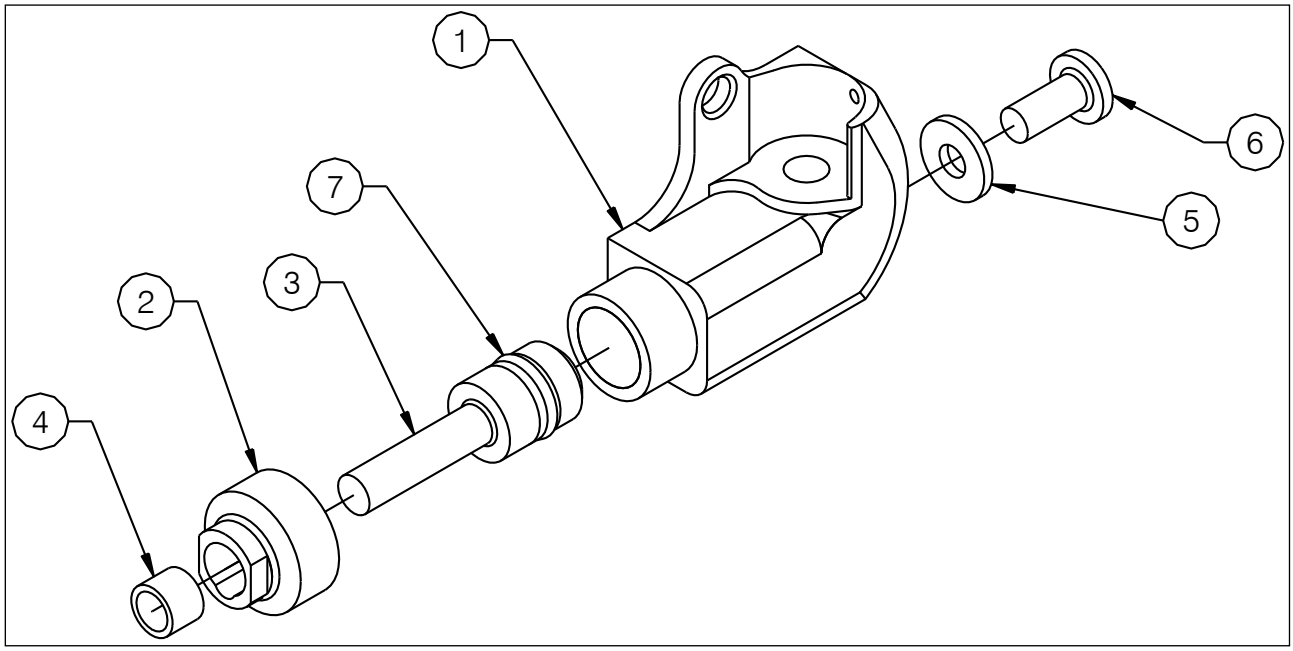


Table 7.7 232-169-00, Slave Cylinder Assembly

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 FAA STC

United States of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number **SR01943SE**

This certificate, issued to **Onboard Systems International**
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: H2SW
Make: Bell
Model: 407

Description of the Type Design Change: Installation of Onboard Systems International Cargo Hook Kits and Load Weigh Kits in accordance with the Master Drawing List (MDL) No. 155-125-00, Revision 15, dated July 14, 2016, or later Federal Aviation Administration (FAA) approved revision.

Limitations and Conditions: Approval of this change in type design applies only to the above model rotorcraft. This approval should not be extended to other rotorcraft of this model 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 rotorcraft. This modification must be maintained in accordance with Instructions for Continued Airworthiness (ICA) Document No. 123-032-00, Revision 5, dated June 24, 2016, or Document No. 123-040-00, Revision 4, dated June 24, 2016, as applicable, or later FAA-accepted revisions. This modification must be operated in accordance with RFMS 121-050-00, Revision 2, dated February 13, 2017, or RFMS No. 121-061-00, Revision 2, dated February 13, 2017, as applicable, or later FAA-approved revisions. A copy of this certificate, the applicable RFMS, the applicable Owner's Manual identified in the MDL, and the applicable ICA, must be maintained as part of the permanent records of the modified rotorcraft.

(See Continuation Sheet Page 3 of 3 Pages)

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: November 26, 2007
Date of issuance January 9, 2009
Date reissued:
Date amended: February 26, 2013; March 2, 2017

By direction of the Administrator

(Signature)

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 PAGES

United States of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number **SR01943SE**

Onboard Systems International

Issued: January 9, 2009

Reissued:

Amended: February 26, 2013; March 2, 2017

Limitations and Conditions Continued:

Operational approval for external load operations must be granted by the local Aviation Authority. For solo external load operations from the left crew seat, provisions must be made to ensure that equipment originally intended to be operated by the pilot from the right crew seat is equally operable from the left crew seat with similar controls.

- 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.

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8.2 Transport Canada STC

Transport Canada Transports Canada

Department of Transport

Supplemental Type Certificate

This approval is issued to:

Onboard Systems
13915 North West 3rd Court
Vancouver, Washington
United States of America 98685

Number: SH09-18
Issue No.: 2
Approval Date: April 23, 2009
Issue Date: May 10, 2013

Responsible Office: Pacific

Aircraft/Engine Type or Model: BELL 407

Canadian Type Certificate or Equivalent: H-92 (BELL 407)

Description of Type Design Change: Installation of Onboard Systems 200-328-00; 200-412-00 or 200-413-00 Cargo Hook Kit per FAA STC SR01943SE

Installation/Operating Data, Required Equipment and Limitations:

Fabrication of the following Onboard Systems in accordance with FAA approved Onboard Systems Master Drawing List No. 155-125-00, Rev. 8, dated October 24, 2012 *.

- 200-328-00, 200-412-00 or 200-413-00 Cargo Hook Fixed Provisions Kit;
- 200-329-00 or 200-330-00 Cargo Hook Suspension Kit;
- 200-331-00 or 200-400-00 Pin Load Weigh Kit and
- 200-414-00 Hook Upgrade Kit;

Installation of the following Onboard Systems in accordance with FAA approved Onboard Systems :

1. Owner's Manual Document 120-136-00, Rev. 5, dated March 24, 2011 *.
   - 200-328-00, Cargo Hook Fixed Provisions Kit;
   - 200-329-00 or 200-330-00 Cargo Hook Suspension Kit; and
   - 200-331-00 Pin Load Weigh Kit; or
2. Owner's Manual Document 120-146-00, Rev. 1, dated October 23, 2012 *.
   - 200-412-00 or 200-413-00 Cargo Hook Fixed Provisions Kit;
   - 200-400-00 Pin Load Weigh Kit and
   - 200-414-00 Hook Upgrade Kit.

(* or later FAA approved revision)

- See Continuation Sheet -

Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

Henry Wong
For Minister of Transport

Canada

Transport Canada Transports Canada

(Continuation Sheet)

Number: SH09-18 Issue 2

NOTE: THIS ADDENDUM SHALL REMAIN PART OF THE CERTIFICATE REFERRED TO THEREIN.

Inspect and Maintain the following Onboard Systems in accordance with Onboard Systems:

A. Instructions for Continued Airworthiness (ICA) Document 123-032-00, Rev. 2, dated March 18, 2010 **.
   - 200-328-00 Cargo Hook Fixed Provisions Kit;
   - 200-331-00 Pin Load Weigh Kit; or

B. ICA Document 123-040-00, Rev. 0, dated October 26, 2012 **.
   - 200-400-00 Pin Load Weigh Kit; or

C. ICA Document 123-032-00, Rev. 2, dated March 18, 2010 ** and Cargo Hook Component Maintenance Manual 122-017-00, Rev. 17, dated July 31, 2012 **.
   - 200-329-00 and 200-330-00 Cargo Hook Suspension Kit; or

D. ICA Document 123-040-00, Rev. 0, dated October 26, 2012 ** and Cargo Hook Component Maintenance Manual 122-015-00, Rev. 15, dated August 20, 2012 **.
   - 200-412-00 and 200-413-00 Cargo Hook Fixed Provisions Kit;
   - 200-414-00 Hook Upgrade Kit.

Rotorcraft modified with the Onboard Systems 200-328-00 Cargo Hook Fixed Provisions Kit; 200-329-00 or 200-330-00 Cargo Hook Suspension Kit and 200-331-00 Pin Load Weigh Kit approved under this STC must be operated in accordance with FAA approved Onboard Systems Rotorcraft Flight Manual Supplement No. 121-050-00, Rev. 0, dated December 5, 2008 *.

Rotorcraft modified with the Onboard Systems 200-412-00 or 200-413-00 Cargo Hook Fixed Provisions Kit; 200-414-00 Hook Upgrade Kit and 200-400-00 Pin Load Weigh Kit approved under this STC must be operated in accordance with FAA approved Onboard Systems Rotorcraft Flight Manual Supplement No. 121-061-00, Rev. 0, dated February 15, 2013 *.

Required Equipment:

For Onboard Systems 200-329-00 Cargo Hook Suspension Kit:
- Onboard Systems 200-328-00 Cargo Hook Fixed Provisions Kit; or
- Bell Part Number 206-706-341-111, -117 or -123 Auxiliary Equipment Kit.

For Onboard Systems 200-330-00 Cargo Hook Suspension Kit:
- Bell Part Number 206-706-341-125 or -127 Auxiliary Equipment Kit.

For Onboard Systems 200-331-00 Pin Load Weigh Kit:
- Onboard Systems 200-329-00 or 200-330-00 Cargo Hook Suspension Kit; or
- Bell Part Number 206-706-341-141 Auxiliary Equipment Kit.

For Onboard Systems 200-400-00 Pin Load Weigh Kit:
- Onboard Systems 200-412-00 Cargo Hook Fixed Provisions Kit

For Onboard Systems 200-414-00 Hook Upgrade Kit:
- Onboard Systems 200-328-00 Cargo Hook Fixed Provisions Kit and 200-329-00 Cargo Hook Suspension Kit.

(* or later FAA approved revision)
(** or later FAA accepted revision)

- End -

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Canada