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Owner's Manual

For The

Robinson R22 Series
Cargo Hook Kit

Kit Part Numbers
200-225-00, Without Load Weigh
200-226-00, With Load Weigh

Owner's Manual Number 120-070-00
Revision 15
02/27/14

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RECORD OF REVISIONS

Revision	*Date*	*Page(s)*	*Reason for Revision*
8	10/11/04	2-18	Updated Table 2-2 to reflect new verbiage of placard 215-113-00.
9	12/16/05	Section 2 Section 5	General update of installation instructions including correction of p/n's, incorporated new configuration of doubler (290-476-02) and revised its installation instructions. Updated maintenance section to include overhaul inspection for suspension system components and reference to 122-013-00 for cargo hook maintenance.
10	11/30/06	Title, 1-1, 1-2, 1-3, 2-18, 5-2 & 5-3	Replaced Cargo Hook P/N 528-010-03 with 528-010-06 as per service bulletin 159-017-00. Change daily inspection to daily check. Added RFMS to BOM.
11	09/19/07	TOC, Section 1, 2-2, 2-4, 2-9, 2-15, 2-18, 3-7 to 3-9, 3-12 & Section 4	Added explanation of warnings, cautions and notes to general information section. Updated warnings, cautions and notes to current format throughout.
12	02/26/08	TOC, 1-2, & 2-14 thru 2-22	Updated to incorporate switch assembly P/N 232-114-01.
13	10/15/10	Section 1, 2-2, 2-4, 2-9, 2-17, 2-20, 3-8, 3-9, 3-12, Section 4, 5-1, 5-2, 5-3 & 5-5	Replaced service manual 122-013-00 with 122-001-00. Replaced Warnings, Cautions and Notes section with Safety Labels section. Updated safety label format throughout document.
14	03/17/11	1-2 & 5-6	Changed Multiple Decal Sheet from P/N 215-116-00 to 215-118-00. Added External Load Limit 400 Decal P/N 215-113-00 to Bill Of Materials. Updated RMA information.
15	02/27/14	1-2 & 2-13	Updated Bill Of Materials and installation instructions to replace switch housing, cap, and switch (P/N 232-052-00, 400-054-00 and 400-053-00) with switch housing and switch (P/N 232-052-01 and 400-059-00).

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Section 1
General Information

Introduction

The 200-225-00 and 200-226-00 Cargo Hook Kits are approved for the Robinson R22 Series Helicopters.

Safety Labels

The following definitions apply to the symbols used throughout this manual to draw the reader's attention to safety instructions as well as other important messages.

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.

Bill of Materials

The following items are included with the Cargo Hook Kit. If shortages are found contact the company from whom the system was purchased.

Table 1-1 Bill of Materials

Part Number	Description	200-225-00 W/out Load Weigh	200-226-00 With Load Weigh
120-070-00	Owner's Manual	1	1
121-022-00	RFMS	1	1
122-001-00	Cargo Hook Service Manual	1	1
210-181-00	R22 Load Cell	-	1
210-095-01	C-39 Indicator 12Volt	-	1
215-010-00	Placard	-	2
215-012-00	Placard	-	1
215-113-00	External Load Limit 400 Decal	1	1
215-118-00	R22/44 Multiple Decal Sheet	1	1
232-049-00	Gimbal Assembly	1	1
232-050-00	Link Assembly	1	-
232-051-01	Mount Block Assembly	1	1
232-052-01	Cyclic Switch Housing Assy	1	1
232-114-01	Switch Housing Assembly	1	1
268-013-02	Release Cable Assembly	1	1
270-047-00	Harness Assembly	-	1
270-088-00	Wire Bundle	1	1
270-089-00	Wire Assembly	1	1
290-461-01	Pillow Block	1	1
290-476-02	Doubler	1	1
290-478-01	Switch Guard	1	1
400-048-00	Power Switch	-	1
400-059-00	Switch	2	2
410-162-00	Ring Terminal	2	2
440-006-00	Circuit Breaker	1	1
445-002-00	Relay	1	1
500-065-00	Grommet	1	1
500-066-00	Spacer	1	1
505-011-00	Grommet	1	1
505-012-00	Grommet	2	2
510-095-00	Washer	8	8
510-100-00	Washer	2	2
510-102-00	Nut	3	3
510-115-00	Cotter Pin	2	2
510-117-00	Nut	3	3

Bill of Materials, continued

Table 1-1 Bill of Materials, continued

Part Number	Description	200-225-00 W/out Load Weigh	200-226-00 With Load Weigh
510-209-00	Washer	1	1
510-253-00	Bolt	2	2
510-273-00	Nut	2	2
510-274-00	Bolt	1	1
510-275-00	Bolt	1	1
510-277-00	Screw	2	2
510-278-00	Washer	2	2
510-279-00	Nut	2	2
510-280-00	Bolt	2	2
510-281-00	Rivet	3	3
510-282-00	Rivet, Aluminum	3	3
510-286-00	Nut	1	1
510-287-00	Screw	1	1
510-288-00	Bolt	3	3
510-292-00	Cap Head Screw	1	1
510-297-00	Screw	1	1
512-010-00	Clamp	1	1
512-018-00	Adel Clamp	2	2
528-010-06	3,500 Lb. 12V Cargo Hook	1	1

Inspection

Inspect the kit items for evidence of damage, corrosion and security of lock wire and fasteners. If damage is evident, do not use the items until they are repaired.

Specifications

Table 1-2 System Specifications

Design Load	400 lbs. (181 kg.)
Design Ultimate Strength	1,800 lbs. (816 kg.)
Unit Weight P/N 200-225-00	5.0 pounds (2.26 kg.)
Unit Weight P/N 200-226-00	6.2 pounds (2.81 kg.)

Table 1-3 P/N 528-010-06 Cargo Hook Specifications

Design load	3,500 lbs. (1,580 kg.)
Design ultimate strength	15,750 lbs. (7,140 kg.)
Electrical release capacity (12v DC)	4,500 lbs. (2,041 kg)
Mechanical release capacity	8,750 lbs. (3,970 kg.)
Force required for mechanical release at 3,500 lb.	8 lb. Max (.400” travel)
Electrical requirements	10-15 VDC 7.7-11.5 amps
Minimum release load	7 pounds
Unit weight	3 pounds (1.35 kg.)
Mating electrical connector	PC06A8-2S SR

Theory of Operation

The primary elements of the Cargo Hook are the load beam, the internal mechanism, and a DC solenoid. The load beam supports the load and is latched through the internal mechanism. The DC solenoid, an external manual release cable and a manual release lever provide the means for unlatching the load beam.

The load beam is normally returned to its closed position after release of the load by a spring in the internal mechanism. In the closed position, a latch engages the load beam and latches it in this position. The load is attached to the load beam by passing the cargo sling ring into the throat of the load beam past a spring-loaded keeper, which secures the load.

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. A spring in the internal mechanism then drives the load beam back to its closed and latched position.

A load release can be initiated by three different methods. Normal release is achieved by pilot actuation of a push-button switch in the cockpit. When the push-button switch is pressed, it energizes the DC solenoid in the Cargo Hook, and the solenoid opens the latch in the internal mechanism. A secondary release button is also provided on the left seat lower outboard support. In an emergency, release can be achieved by operating a mechanical release lever. A manual release cable attached to the lever operates the internal mechanism of the Cargo Hook to unlatch the load beam. The load can also be released by the actuation of a lever located on the side of the Cargo Hook.

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Section 2
Installation Instructions

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

The R22 maintenance and parts manuals should be available throughout the installation as various R22 components will be referred to by name and part number. The part numbers for Robinson components are provided for reference and may be changed at a later time by Robinson.

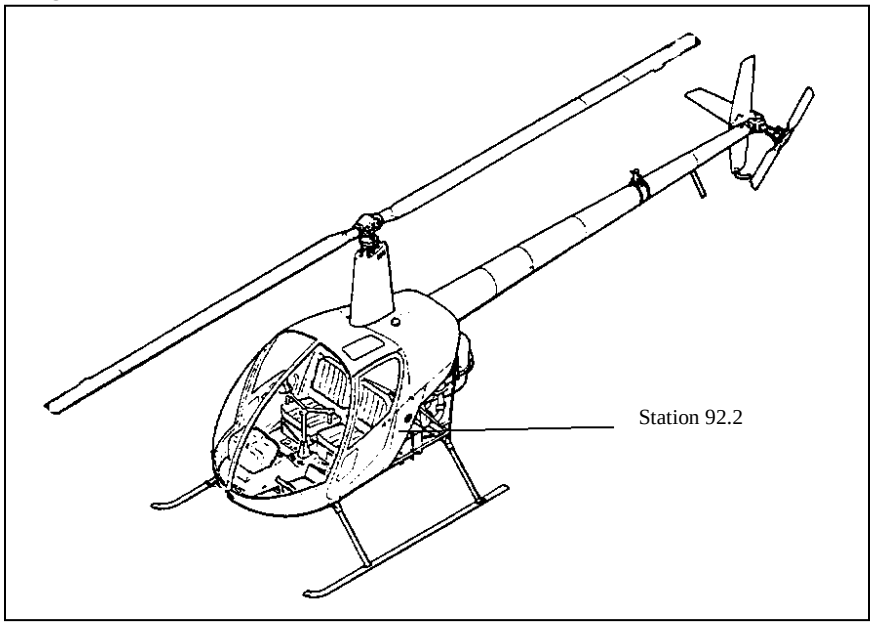
All equipment removed and replaced shall be done in accordance with the R22 maintenance manual. All installed hardware shall be torqued in accordance with standard torque of AC43.13 unless noted otherwise. Apply torque stripe where applicable.

1. Disconnect the battery.

Mount Block and Doubler Installation

1. Remove the A445-2 horizontal tunnel panel between the seats. Remove the A794-2 belly panel. Remove the A606-1 fiberglass throttle cover under the left seat.
2. Disconnect the forward end of the A336-1 throttle push/pull rod and the lower end of the A327-1 overtravel spring. Observe the washer stack up on the throttle push/pull rod for proper re-assembly later. Remove the four attaching screws from the A605-1 housing and six screws from the A607-1 support and rotate the support and housing forward.

Figure 2-1 Robinson R22



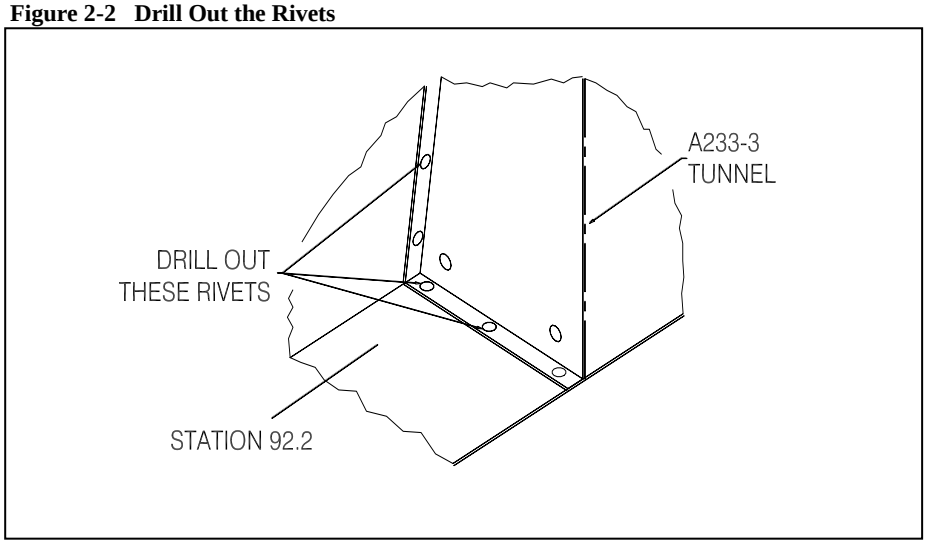
Mount Block and Doubler Installation, continued

3. Remove the A729-6 manifold pressure tube along with the 10-4-2-N-O connector, 0253-2-4 bulkhead adapter and the AN894D4-3 bushing to provide clearance in the aft tunnel area to install the doubler.

4. Remove the B134-2 Block, Doubler and "TIE DOWN ONLY" decal, if present. They will not be used for this installation.

5. Drill out the three rivets identified in Figure 2-2 using a .098 inch #40 drill bit. This will enable the 232-051-01 Mount Block to fit flush against the surface of the firewall and belly skin. Note the two relief spotfaces on the Mount Block enable it to fit over the heads of the other rivets.

Figure 2-2 Drill Out the Rivets



6. Position the Mount Block tight in the corner against the aft side of the firewall (A233-1) and the left side of the tunnel (A233-3). Ensure that the upper hole in the Mount Block is aligned with the existing hole* in the tunnel. Drill out the existing upper hole in the tunnel to 0.189 with a #12 drill (reference Figure 2-3).

** If upper hole is not in tunnel, drill tunnel to match Mount Block.*

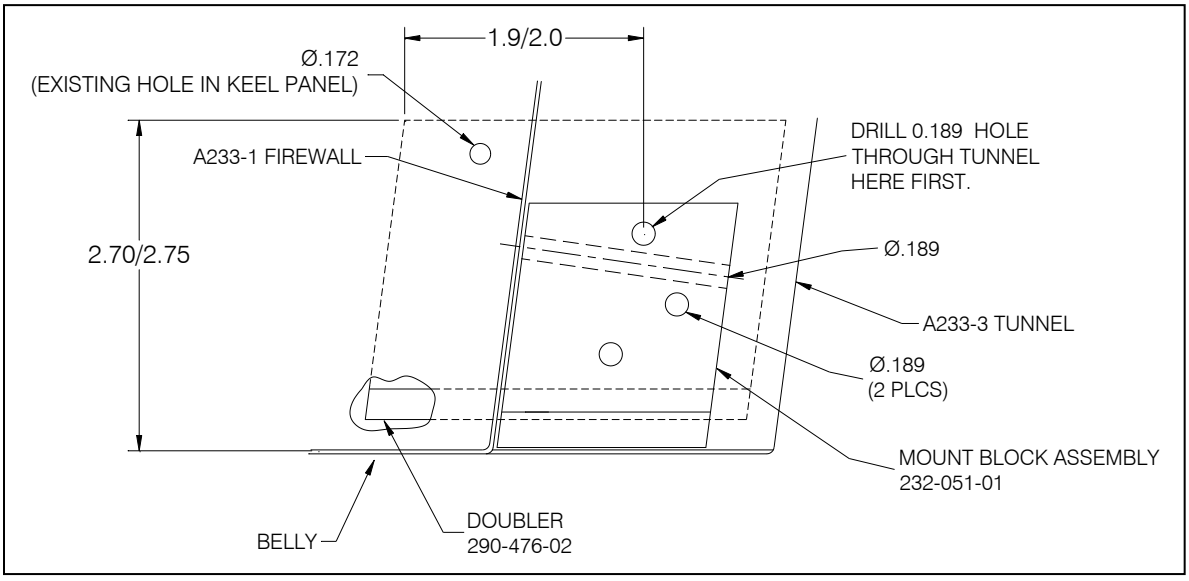
NOTICE

The 232-051-01 Mount Block is supplied with three 0.152 diameter holes. These are pilot holes, and are meant to be an aid in transferring hole locations to the tunnel in helicopters without an existing Robinson hard point kit installed. The 0.152 holes must eventually be drilled out to 0.189.

Mount Block and Doubler Installation, continued

7. Position the Doubler, P/N 290-476-02, against the inside wall of the tunnel orienting it such that the machined step is at the bottom and overlapping the flange in the tunnel. Locate the upper edge of the doubler 2.70/2.75 inches up from the lower skin (see Figure 2-3). Locate the upper forward corner of the Doubler 1.9/2.0 inches forward of the hole drilled on previous step (see below). Clamp the Doubler to the tunnel.
8. Transfer the previously drilled upper tunnel hole location to the Doubler. Drill a 0.189 hole in the Doubler.
9. Secure the Mount Block and Doubler using 510-288-00 (NAS6603-7) bolt, 510-095-00 (AN960-10L) washers and 510-117-00 (NAS679A3) nut. Tighten the bolt and nut snugly.

Figure 2-3 Mount Block and Doubler Installation



Mount Block and Doubler Installation, continued

10. Using the 0.189 longitudinal hole through the Mount Block as a drill guide, enlarge the hole through the firewall. Temporarily install 510-292-00 Bolt and 510-102-00 Nut.

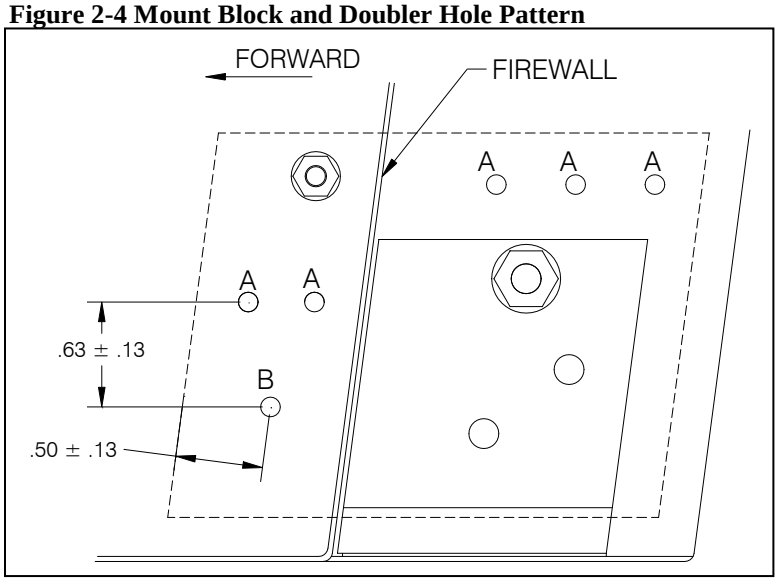
11. Using the existing A607-1 support mount hole in the keel panel as a drill guide, drill through the 290-476-02 Doubler with a .172 inch drill bit. Ensure that the Doubler is level before drilling this hole. Temporarily re-install the support mount screw and nut through the keel panel and doubler.

12. Transfer the existing hole locations in the tunnel and keel panel (indicated by "A" in Figure 2-4) to the Doubler. Drill 0.1285 holes (quantity 5) in the Doubler at these locations and drill a sixth .1285 hole through the keel panel and Doubler (forward of the firewall), at location "B".

NOTICE

If existing holes are not present, layout six holes, three aft of the firewall and above the Mount Block, and three forward of the firewall. Edge distances should not be less than 2 times the diameter of the rivet and spacing between any fastener should not be less than 3 times the diameter of the larger fastener.

Figure 2-4 Mount Block and Doubler Hole Pattern



13. Drill the remaining two holes in the Mount Block and tunnel through the doubler with a .189 inch #12 drill bit.

Mount Block and Doubler Installation, continued

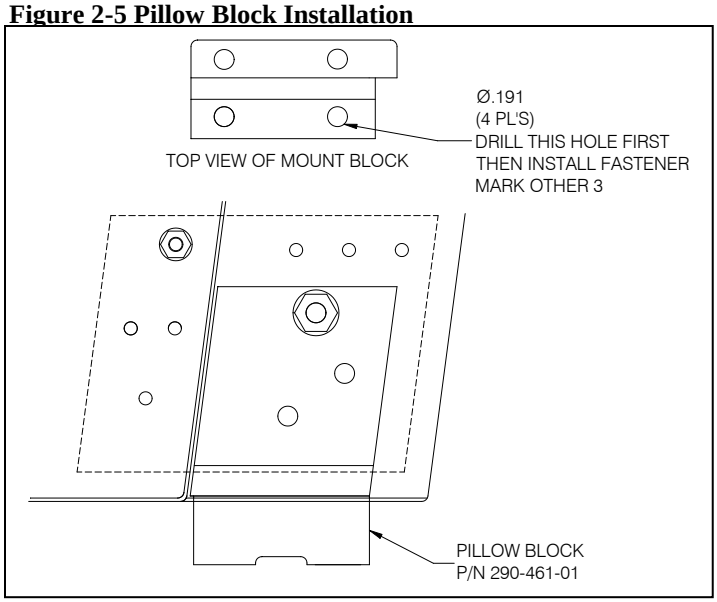
14. Using the Mount Block as a drill guide, drill the aft outboard vertical hole for the pillow block mounting fastener using a .191 inch drill bit (see Figure 2-5).

15. Temporarily install the 290-461-01 pillow block using a 510-280-00 (NAS6603H17) bolt, 510-095-00 (AN960-10L) washer, and 510-102-00 (MS21042-3) nut.

16. Align the pillow block to be parallel with the aircraft centerline using the rivet line on the inboard side. Using the pillow block as a guide and a .1875 inch drill or smaller, spot mark the hole locations without going through the skin. Optional procedure is to punch mark the drill hole locations.

17. Remove the pillow block, mounting block and doubler. Drill the three marked holes, starting with the .1875 inch drill and then a .234 inch #A drill, being careful not to penetrate the vertical firewall. Also oversize the aft outboard hole used for the temporary fastener installation with the .234 inch drill. Place the 232-051-01 Mount Block and the 290-461-01 Pillow Block in place and verify that the clearance holes align with the fastener holes in the blocks.

Figure 2-5 Pillow Block Installation



18. Deburr all the drilled holes.

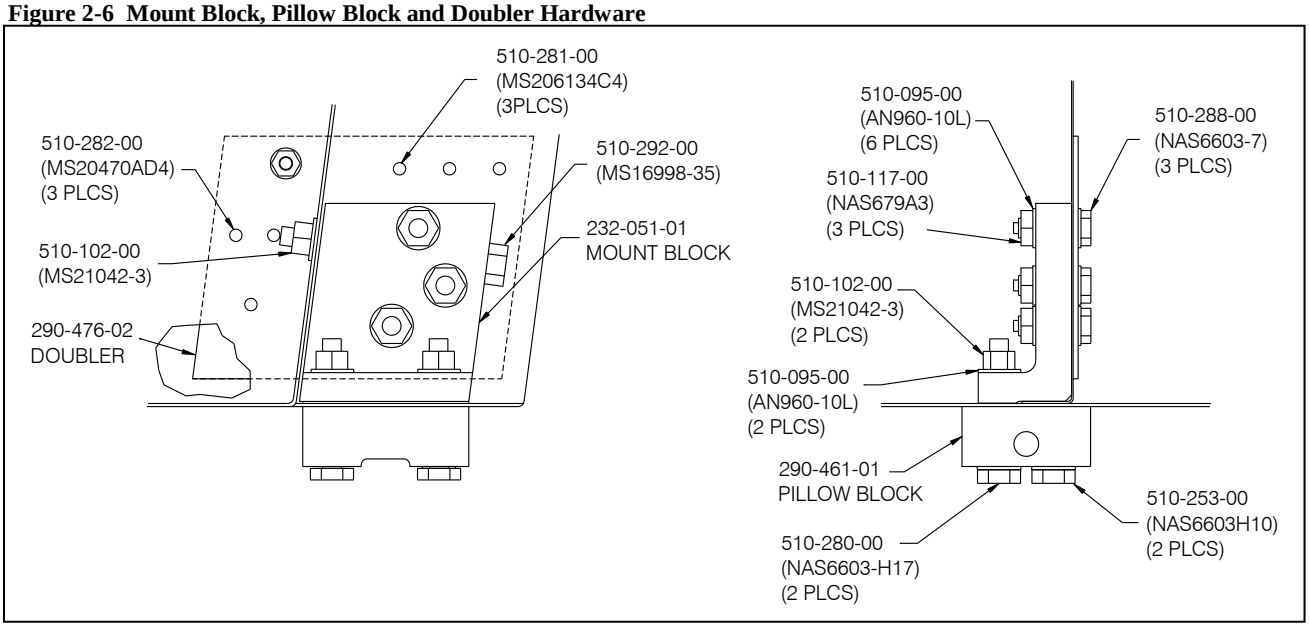
19. Reinstall the 290-476-02 Doubler.

20. Install the 232-051-01Mount Block with the correct hardware (Figure 2-6) and wet zinc chromate primer (or equivalent) on the forward and inboard surfaces. Torque the 510-117-00 nuts to 18-25 in-lbs. and the 510-102-00 nut to 34-45 in-lbs. Apply torque stripe where applicable.

Mount Block and Doubler Installation, continued

21. Use three 510-282-00 aluminum rivets to rivet the Doubler onto the left keel panel through the three forward holes. Use three 510-281-00 stainless steel rivets to rivet the Doubler to the firewall through the three top aft holes.

Figure 2-6 Mount Block, Pillow Block and Doubler Hardware

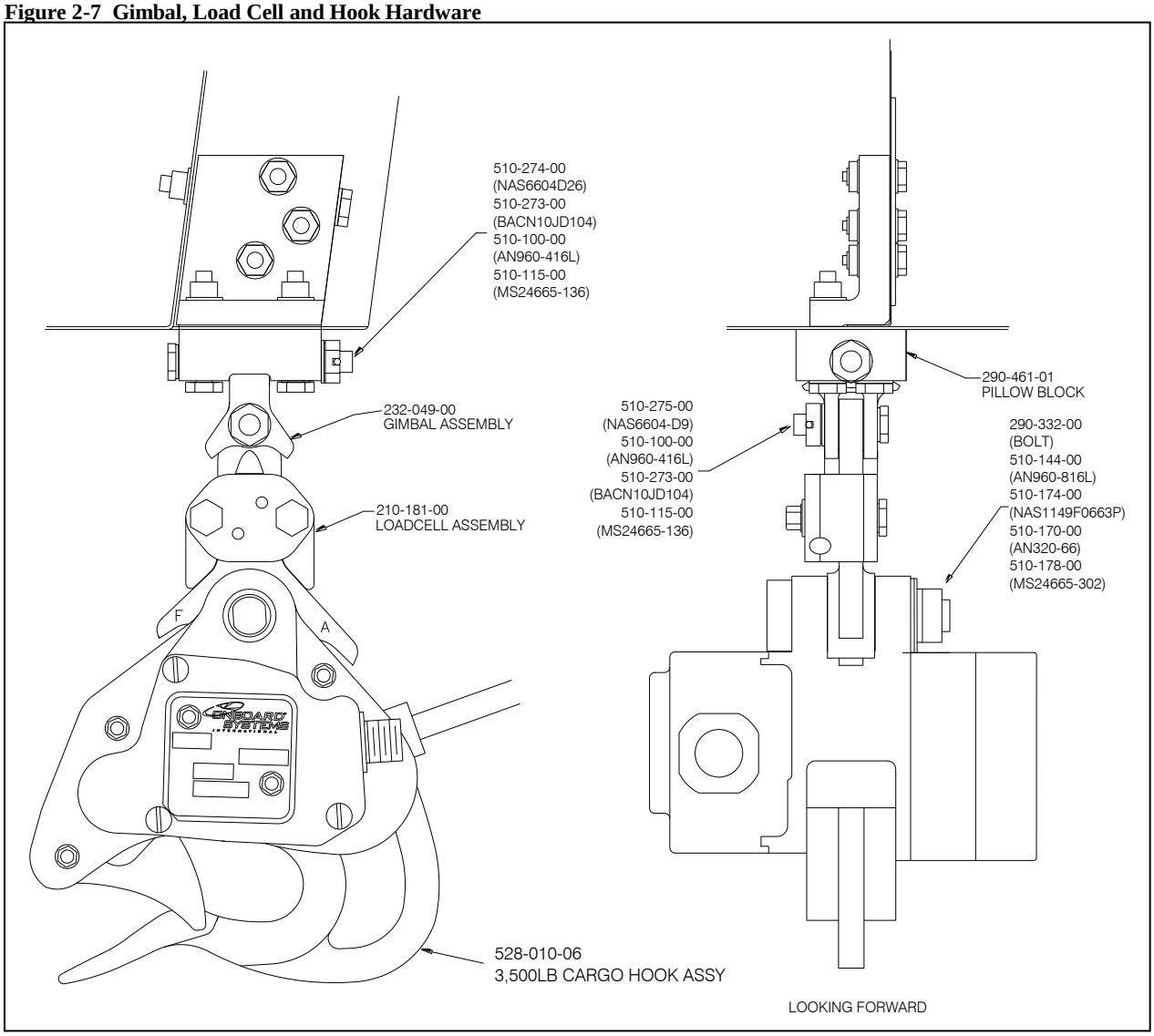


22. Install the pillow block using the hardware shown in Figure 2-6. Safety wire the drilled head bolts in place.
23. Reinstall the A605-1 housing and the A607-1 support.
24. Reinstall the A0580-4 manifold pressure tubing at the firewall.
25. Reconnect the A36-1 throttle push/pull rod and the lower end of the overtravel spring.
26. Reinstall the A606-1 throttle cover, the horizontal tunnel panel and the belly panel.
27. Install the 215-112-00 maximum cargo weight decal on the belly of the helicopter next to the pillow block installation.

Gimbal and Link Installation

1. Install the 232-049-00 gimbal assembly in the 290-461-01 Pillow Block using the hardware shown in Figure 2-7. Grease the bushing with Aeroshell 7, MIL-G-23827 or equivalent before assembly.
2. Install the 210-181-00 Load Cell Assembly or the 232-050-00 link assembly to the 290-455-00 gimbal using the hardware shown in Figure 2-7. Install the load cell link so that the travel limiter identified with the F is facing forward and the travel limiter identified with the A is facing aft. Grease the bushings with Aeroshell 7 before assembly.

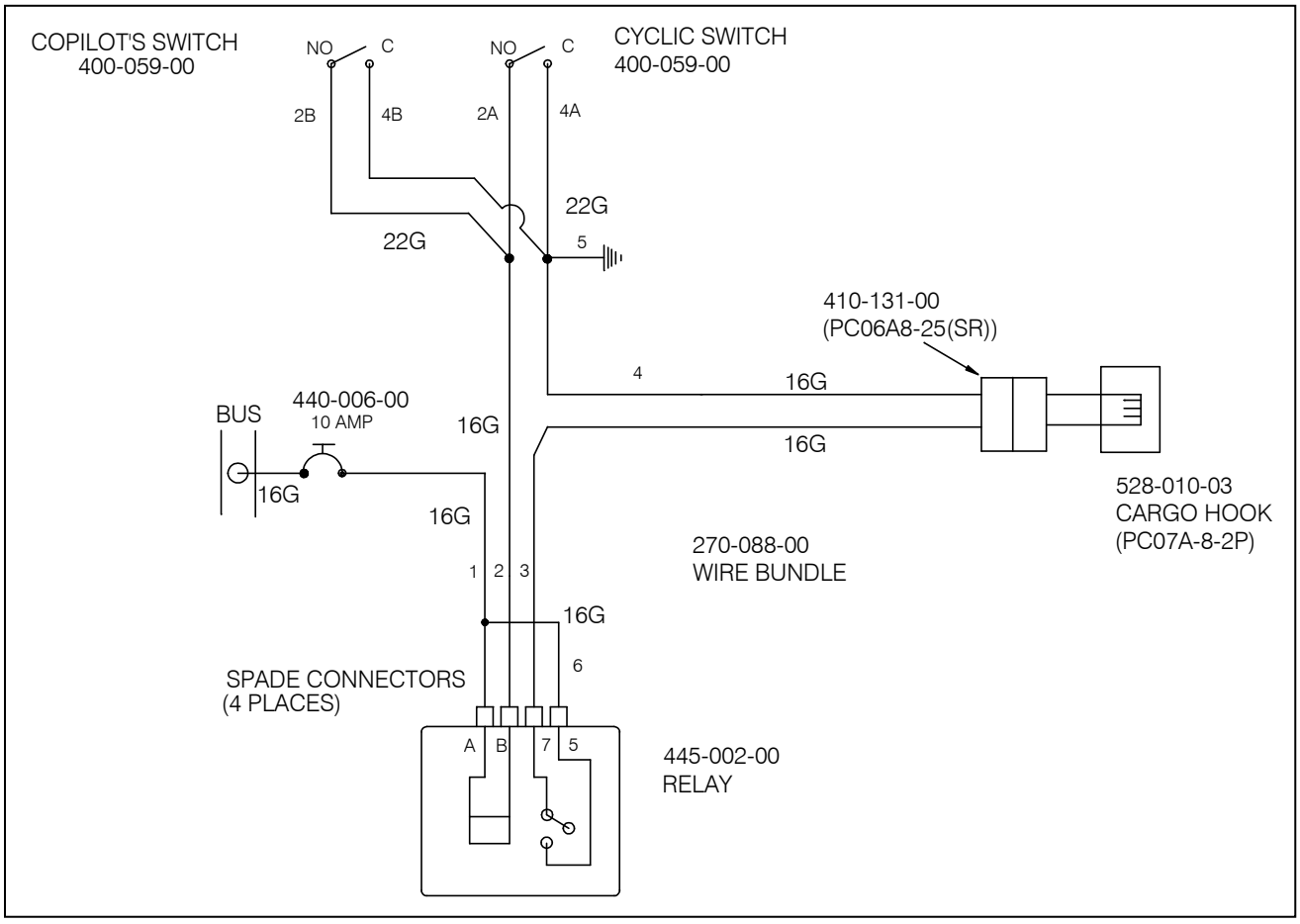
Figure 2-7 Gimbal, Load Cell and Hook Hardware



Electrical Schematic

The electrical release system is powered from the bus through a 10 amp circuit breaker to a relay in the center tunnel. Switches on the cyclic and copilots seat support control the relay and energize the DC solenoid in the Cargo Hook, opening the hook and releasing the cargo. A schematic for the electrical system is shown below in Figure 2-8.

Figure 2-8 Electrical Schematic



Wire Harness and Relay

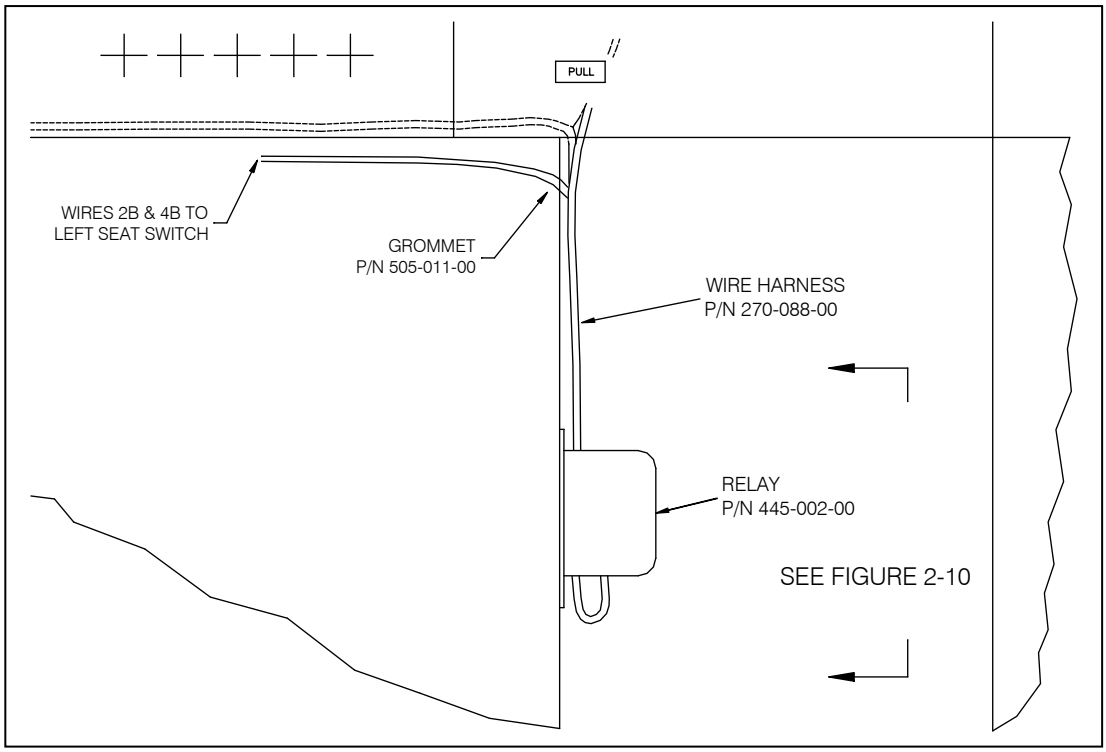
Install the 445-002-00 relay on the keel panel below the existing relay installation using the correct hardware as shown in Figure 2-9 and 2-10.

NOTICE

Due to possible minor configuration changes incorporated by Robinson Helicopters, install the relay per figures 2-9 and 2-10 or as near as possible. Ensure adequate clearance between the relays associated wire bundle and the push/pull control rods.

Place the 270-088-00 main wire bundle into the tunnel on top of the existing wire bundle.

Figure 2-9 Wire Harness and Relay Installation



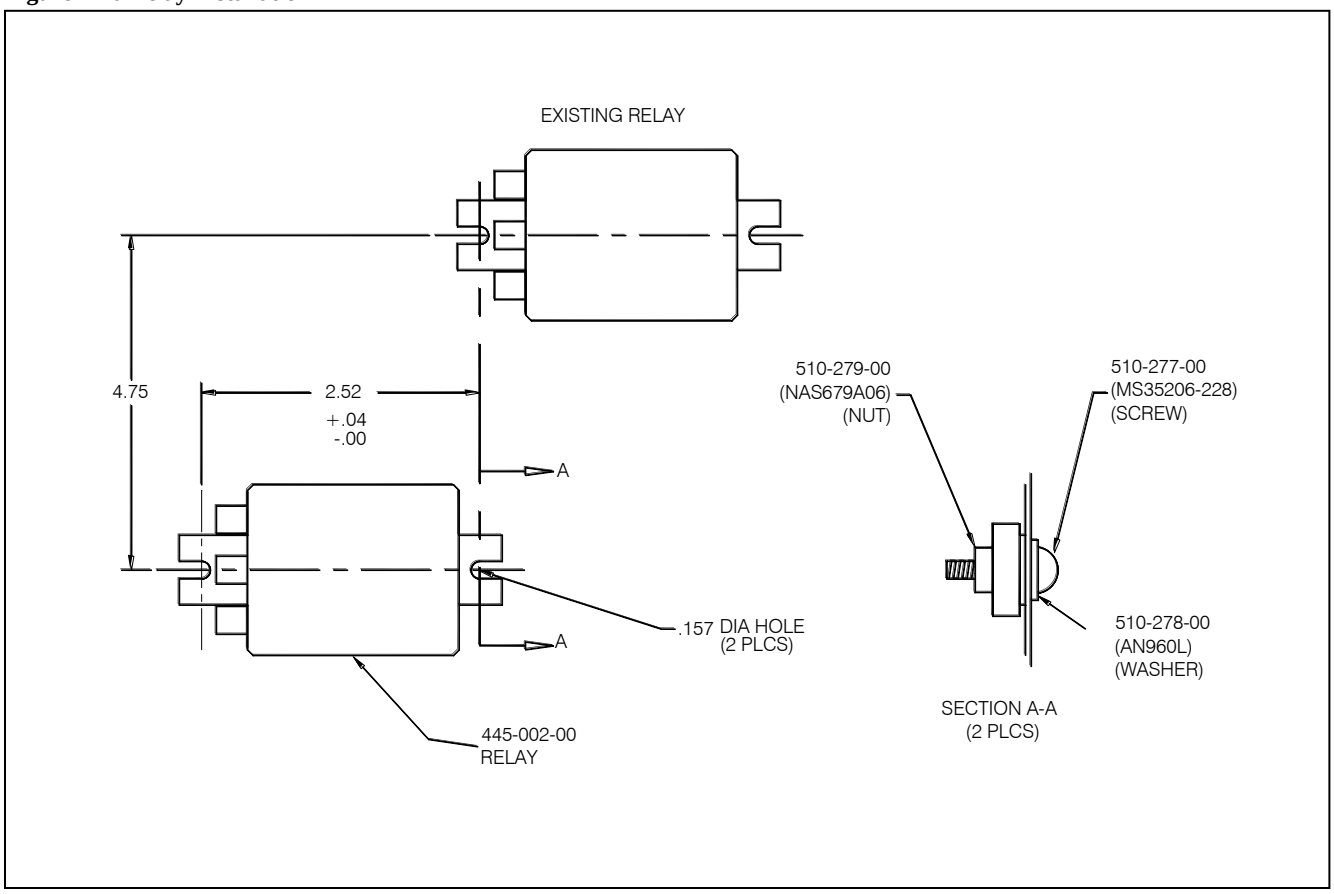
Wire Harness and Relay, continued

Connect wire numbers 1, 2 and 3 from the main bundle to the relay terminals A, B and 7 as shown in the Figure 2-8 electrical system schematic. Connect jumper wire 6 to relay terminal 5.

Connect the ground lead of wire number 5 to any convenient existing ground location in the tunnel.

Secure the wire bundle with wire ties as required.

Figure 2-10 Relay Installation



Wiring to Circuit Breaker Panel and Circuit Breaker Installation

1. Remove the circuit breaker cover panel and install the 440-006-00 10 amp circuit breaker in an available location. On some early models, it may be necessary to remove the panel and make a hole for the additional circuit breaker.
2. Open the circuit breaker to disarm the cargo hook release circuit.
3. Use the 270-089-00 wire assembly and a 410-162-00 ring terminal as a jumper to power the input side of the circuit breaker in compliance with AC 43.13.
4. Feed the number 1 wire of the main wire bundle from the tunnel into the circuit breaker bay using the existing wire bundle access hole. Connect the wire to the output side of the 440-006-00 circuit breaker using the other 410-162-00 ring terminal provided. Secure the power wire to the existing wire bundles with tie wraps.

Release Switches Installation

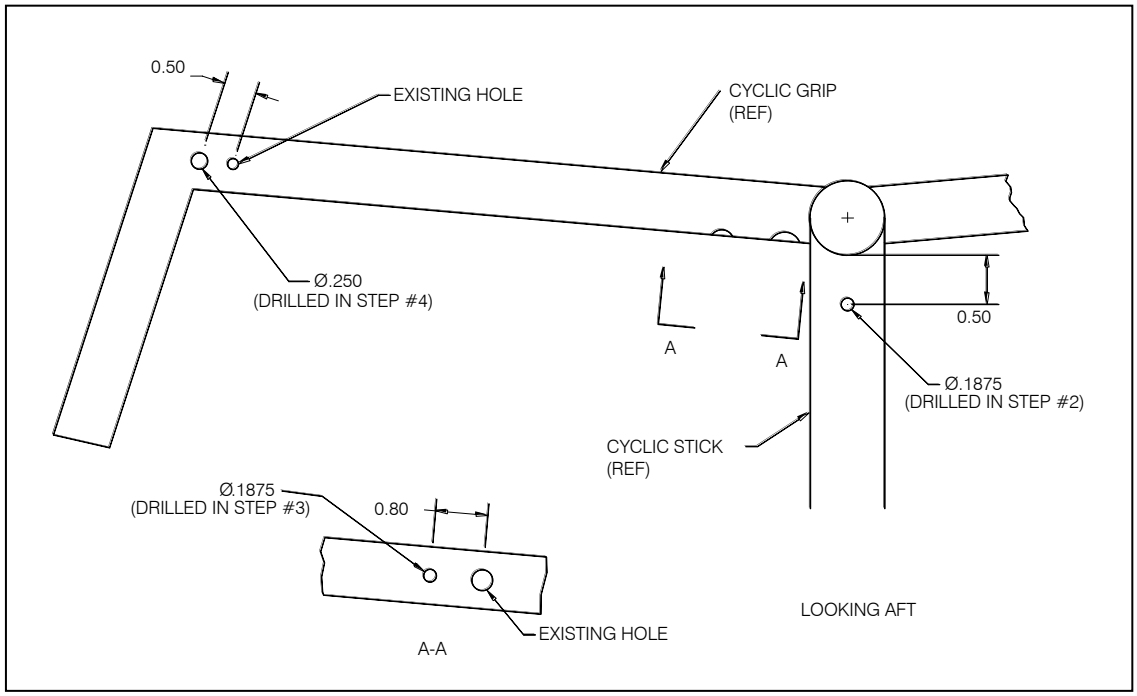
Cyclic Release Switch Installation

1. Disconnect the A216-1 housing and ensure its wires are clear of the areas to be drilled on the horizontal cyclic control handle and stick.
2. If there is enough room through the existing Robinson cyclic wire routing grommets use them for routing the cyclic release switch wiring. Otherwise create additional cyclic release switch wiring routing holes in steps 2 and 3.
3. Drill a .1875 inch diameter hole on the forward side of the cyclic stick as shown in Figure 2-11.
4. Drill a .1875 inch hole on the bottom side of the cyclic grip near the existing wire routing hole as shown in Figure 2-11.
5. Drill a .250 inch diameter hole on the forward side of the cyclic grip near the existing fastener hole for the A216-1 housing as shown in Figure 2-11.
6. Insert a lead wire in the hole at the top of the cyclic stick, pushing it down and out the bottom. Pull the number 2A and 4A wire bare switch ends up through the cyclic stick and out the hole. Place a 505-012-00 grommet over the wires and into the cyclic stick hole. Slide another 505-012-00 grommet over the wires to be installed on the cyclic grip hole. Place heat shrink over the portion of both wires that will be exposed between the grommets.
7. Using a lead wire, pull the number 2A and 4A wires up through the cyclic grip and out the hole on the front of the cyclic grip.

Release Switches Installation, continued

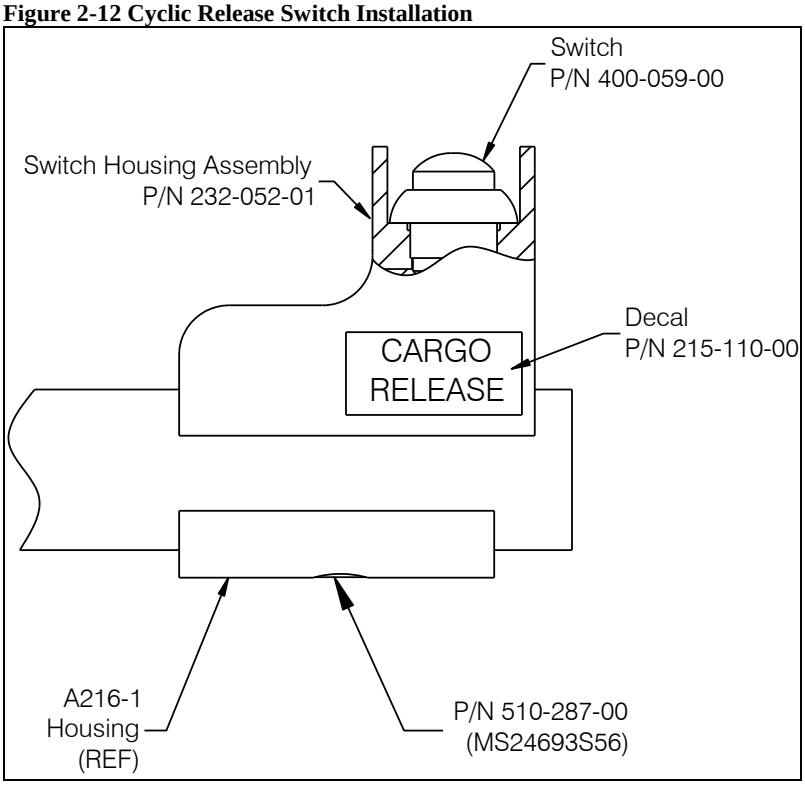
8. Place a 1” length of heat shrink over each wire to the cyclic switch. Prepare each wire end and solder them to the appropriate switch terminals as shown in the Figure 2-8 wiring schematic. Leave enough slack in the wire to re-install the cyclic switch housing assembly. Using a heat gun, shrink the covering material to final size.

Figure 2-11 Cyclic Switch Wire Routing



Release Switches Installation, continued

Figure 2-12 Cyclic Release Switch Installation



9. Install the P/N 400-059-00 switch in the P/N 232-052-01 cyclic switch housing assembly using needle nose pliers to hold the switch. Install the completed switch housing assembly with the correct hardware as shown in Figure 2-12, by removing the existing A216-1 housing screw and replacing it with the longer P/N 510-287-00 screw. Re-install the A216-1 housing and wires.

10. Check the cyclic for freedom of motion throughout its complete travel range and ensure the wires are not chafing on any components.

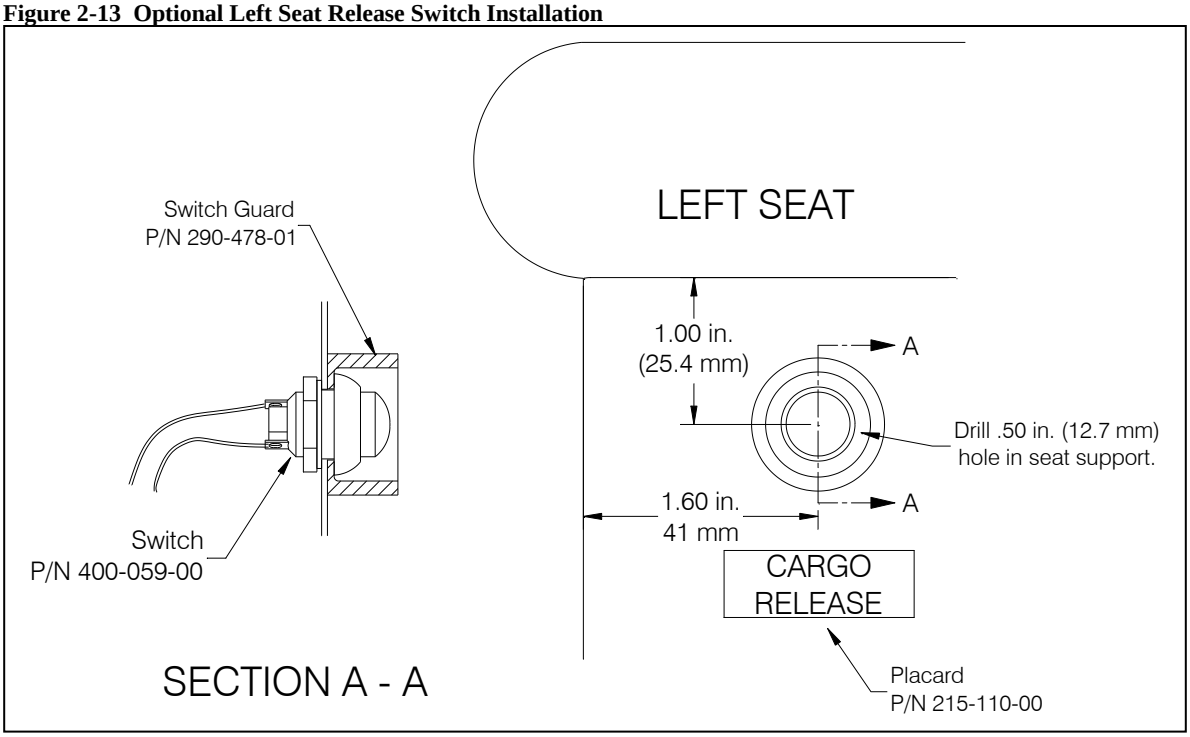
Release Switches Installation, continued

Left Seat Release Switch Installation

If the left seat release switch installation is not desired, cap and stow wires 2B and 4B per AC 43.13 and omit steps 1 thru 4 below.

1. Drill a .250 inch hole in the left side of the tunnel wall above the main wire bundle in a convenient location or use an existing unused hole in the tunnel wall. Install Grommet (P/N 505-011-00).
2. Drill a .50 inch hole in the outboard side of the left seat support as shown in Figure 2-13
3. Route the number 2B and 4B wires through the grommeted hole and through the left baggage area to the .50 inch hole on the outboard seat support. Secure the wires to the forward seat hinge fasteners with two clamps (P/N 512-018-00).
4. Slide the nut (provided with the switch P/N 400-059-00) over the wires from inside the seat support and feed the wires through the .50 inch hole and through the switch guard (P/N 290-478-01).
5. Place a .50 inch length of heat shrink over each wire to the switch. Solder the wires to the switch as shown in the Figure 2-8 wiring schematic. Use a heat gun and shrink the covering material to final size. Place the switch (P/N 400-059-00) into the switch guard and through the seat as shown in Figure 2-13 and secure with nut.

Figure 2-13 Optional Left Seat Release Switch Installation



Release Switches, continued

Grip Assembly Switch Installation

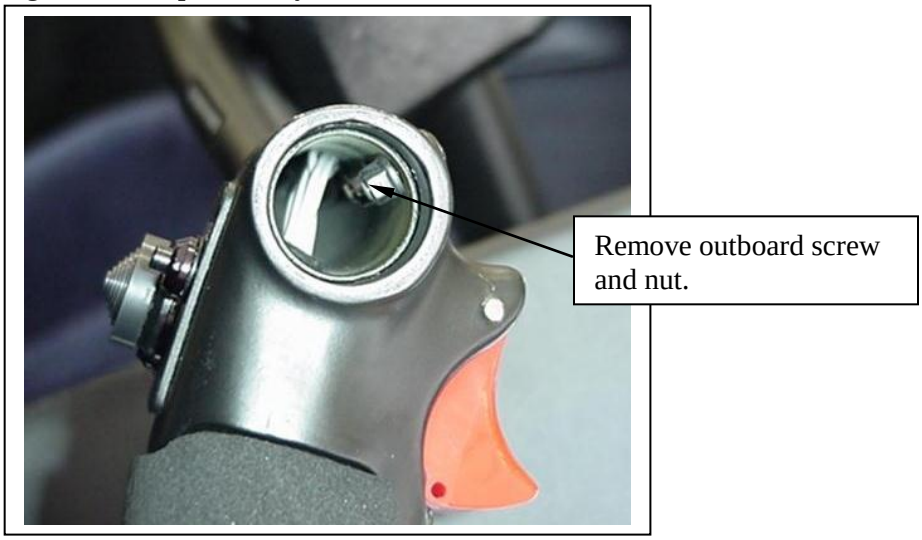
(for use with Robinson Grip Assembly C058)

1. Remove Plug (Robinson P/N DP-875) and discard as shown in Figure 2-14.

Figure 2.14 Grip Assembly C058, Plug Removal

2. Remove outboard screw (MS27039C0806) and nut (MS21042L08) as shown in Figure 2-15.

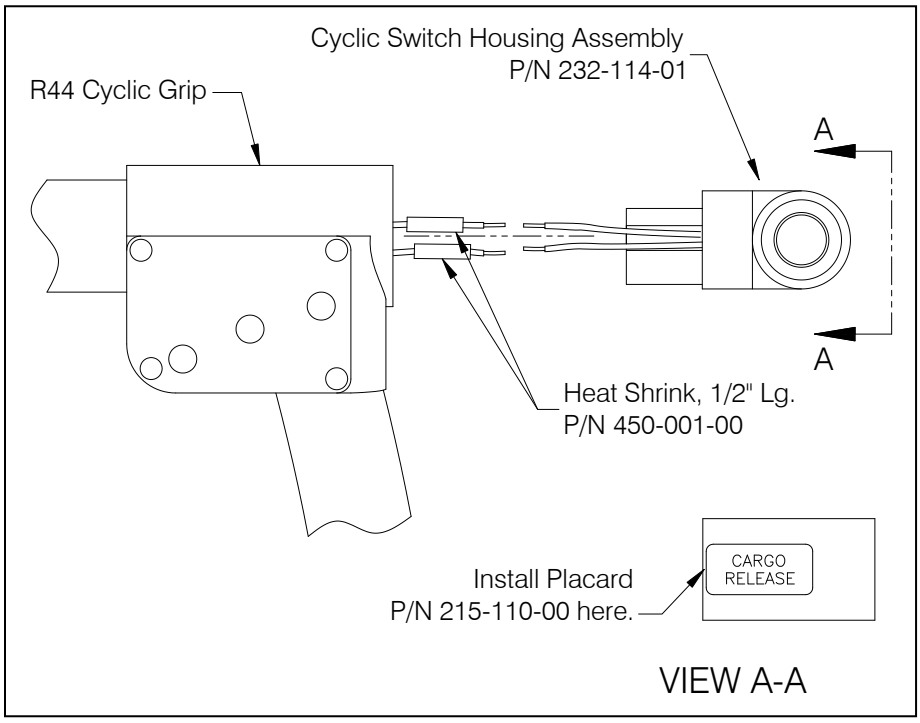
Figure 2.15 Grip Assembly C058, Screw and Nut Removal



Release Switches, continued

3. Using a lead wire, pull the number 2A and 4A wires from wire harness P/N 270-090-00 up through the horizontal tube and out the end of the grip assembly.
4. Slide a piece of heat shrink (P/N 450-001-00) over the 2A and 4A wires (ref. Figure 2-16).
5. Prep and solder, using a lap splice, the 2A wire from up through the cyclic to one of the wires from the switch and the 4A wire from the cyclic to the other wire from the switch.
6. Slide the heat shrink over the respective solder joints and shrink in place using a heat gun.

Figure 2-16 Grip Assembly C058



7. Install the Switch Housing Assembly into the end of the grip assembly and secure with the Screw (P/N MS27039C0806) removed earlier. The Nut (P/N MS21042L08) removed earlier will not be re-used for this installation and can be discarded.
8. Check the cyclic for freedom of motion throughout its complete travel range and ensure the wires are not chafing on any components.

Mechanical Release Cable Installation

NOTICE

Due to possible minor configuration changes incorporated by Robinson Helicopters, install the mechanical release cable per Figure 2-17 or as near as possible. Ensure adequate clearance between the release cable and push/pull control rods and electrical components in the tunnel.

1. Drill a .375 inch diameter hole through the left aft corner of the A444-1 cyclic control cover and 338-1 box assembly as shown in Figure 2-17. Locate and drill the hole for the cable clamp in the tunnel keel panel as shown in Figure 2-17.

2. Place the 268-013-02 mechanical release cable assembly inside the tunnel and route the output end of the cable out the bottom of the helicopter. Install the cable clamp as shown in Figure 2-17. Insert the head end of the cable into the cover plate and install the face nut and tee handle as shown in Figure 2-18.

3. Make a cutout in the A794-2 belly panel as shown in Figure 2-18 and install the 500-065-00 edge grommet using locally obtained adhesive. It is helpful to hold the panel up under the helicopter and verify the cutout location. Install the A794-2 belly panel.

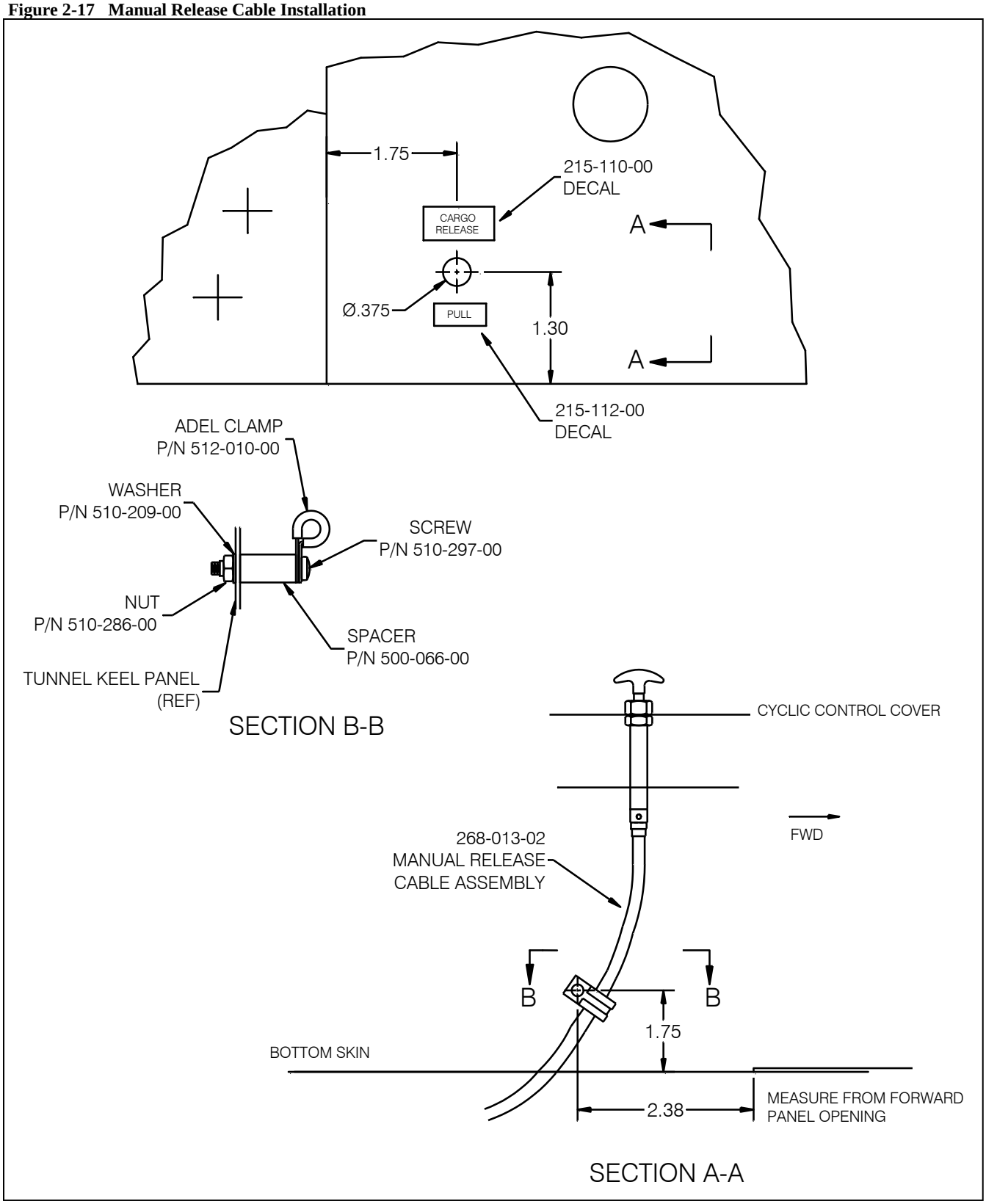
4. Install the cable through the 510-010-00 clamp as shown in Figure 2-18 and secure the clamp with the existing screw.

Electrical Release Wire Routing to the Hook

1. Route the #3 and #4 electrical release wires out the same hole in the A794-2 panel as the mechanical release cable as shown in Figure 2-18 Secure the two release wires to the mechanical release cable with wire ties as necessary and route through the same adel clamp as shown in Figure 2-18.

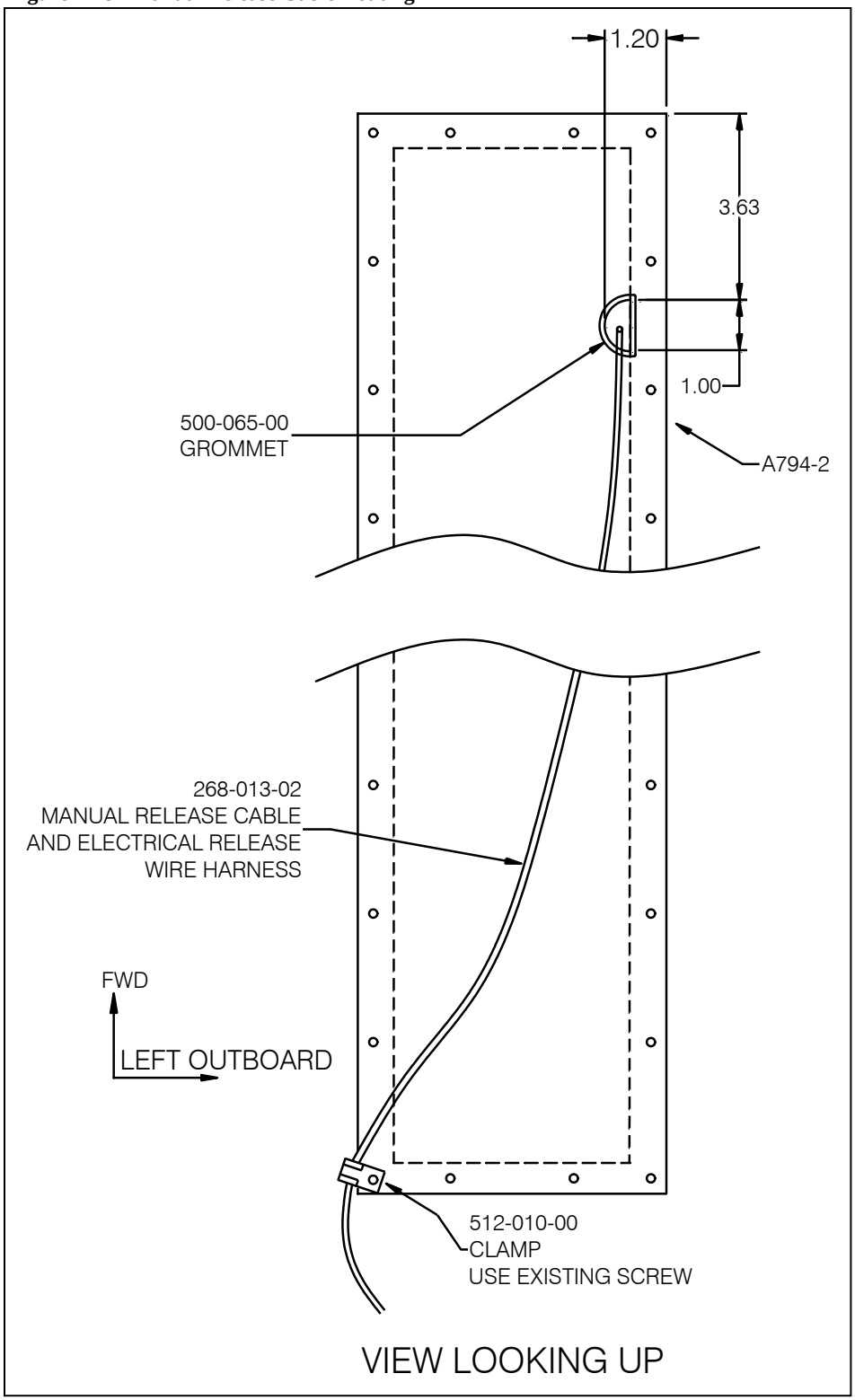
Electrical Release Wire Routing to the Hook, continued

Figure 2-17 Manual Release Cable Installation



Electrical Release Wire Routing to the Hook, continued

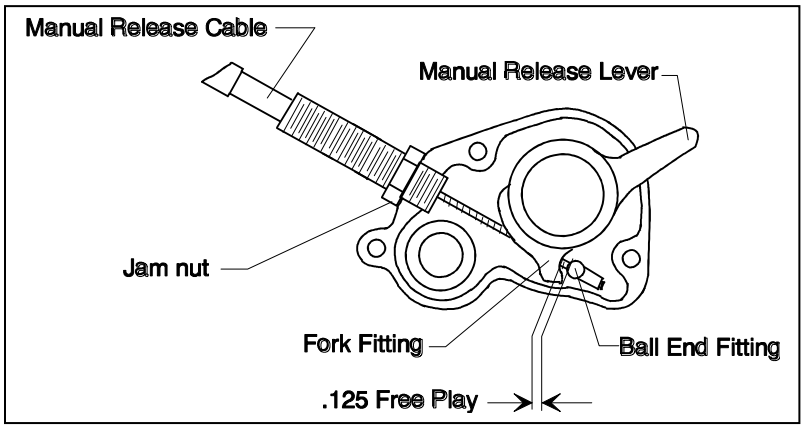
Figure 2-18 Manual Release Cable Routing



Mechanical Release and Hook Installation

Remove the manual release cover from the 528-010-06 Cargo Hook. Screw the manual release cable in the hook by holding the cable and turning the hook. Place the cable ball end fitting into the hook manual release fork fitting as illustrated in Figure 2-19. Adjust the cable to give .125" of free play with the manual release lever in the non-release position. Replace the manual release cover. Tighten the jam nut against the hook and safety wire the jam nut to the nearest cover screw. Safety wire the remaining cover screws.

Figure 2-19 Manual Release Cable Rig



Install the 528-010-06 Cargo Hook assembly to the link using the correct hardware as shown in Figure 2-7. The cargo hook load beam must point forward.

Wiring Connector

Connect the cargo hook electrical release cable connector to the Cargo Hook. Listed below is the pin out for the cargo hook connector. Safety wire the connector.

Table 2-1 Cargo Hook Connector

Pin	*Function*
A	Ground
B	Power

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 in Table 2-1.

Decals and Placards

Install the following decals:

Table 2-2 Decals

DECAL NUMBER (DECAL DESCRIPTION)	LOCATION
215-110-00 (CARGO RELEASE)	Mounted adjacent to the cyclic release switch in clear view of the pilot.
215-110-00 (CARGO RELEASE)	Mounted adjacent to the left seat release switch in clear view of the pilot.
215-110-00 (CARGO RELEASE)	Mounted adjacent to the mechanical release in clear view of the pilot.
215-111-00 (PULL)	Mounted adjacent to the mechanical release in clear view of the pilot.
215-112-00 (CARGO)	Mounted adjacent to the cargo hook circuit breaker in clear view of the pilot
215-113-00 (EXTERNAL LOAD LIMIT = 400 LBS (181 KGS))	Mounted on the belly of the aircraft adjacent to the cargo hook attachment point in clear view of the ground support personnel.
215-114-00 (CLASS B ROTORCRAFT..)	Mounted on the instrument panel in clear view of the pilot.
215-115-00 (FAR PART 133.35(A) OPERATIONS ...)	Mounted on the instrument panel in clear view of the pilot.

Installation Check-Out

After installation of the Cargo Hook kit, perform the following functional checks.

1. Swing the installed Cargo Hook to ensure that the manual release cable assembly and the electrical release cable have enough slack to allow full swing of the suspension assembly without straining or damaging the cables. The cables must not be the stops that prevent the Cargo Hook from swinging freely in all directions.

2. Apply 10-20 pounds to the cargo hook load beam and pull the handle operated cargo hook mechanical release, the Cargo Hook must release.

3. Reconnect the battery and close the cargo hook release circuit breaker. Apply 10-20 pounds to the cargo hook load beam and depress the cargo hook electrical release button, the Cargo Hook must release using the cyclic and left seat electrical release switches.

Weight

The weight of the system is listed in Table 2-3.

Table 2-3 Component Weights

Item	Weight lbs (kgs)
P/N 200-225-00	5.0 (2.3)
P/N 200-226-00	6.3 (2.9)

Cargo Hook Location

Table 2-4 Cargo Hook Location

Fuselage Station	92.2 in.

Paper Work

Place the Rotorcraft Flight Manual Supplement into the Rotorcraft Flight Manual. 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.

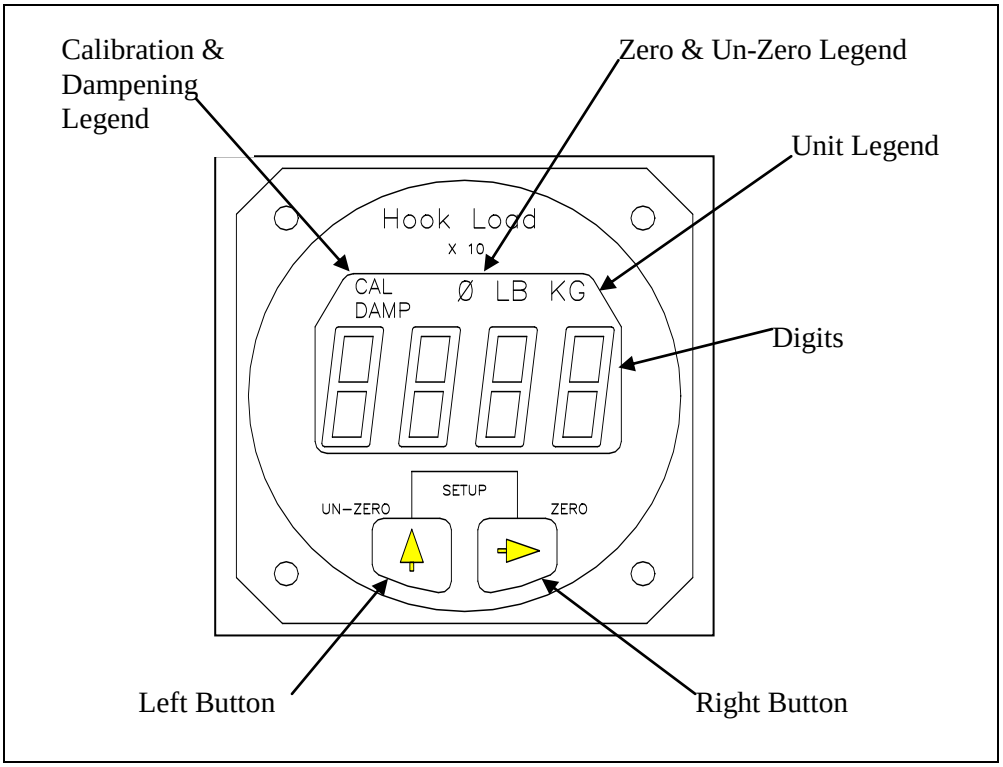
Section 3
Load Weigh System Operation Instructions

Indicator Front Panel

The C-39 Indicator front panel includes the following features.

- The four 7 segment LCD digits show the weight on the Cargo Hook and displays various Setup information.
- The Legends clarify the digital display. i.e. when the LB Legend is turned on, the display will be pounds, etc.
- The Right button is used to Zero the display in the Run Mode and select the digit to be changed in the Setup Mode.
- The Left button is used to Un-Zero the display in the Run Mode and scroll the selected digit in the Setup Mode.

Figure 3-1 Front Panel

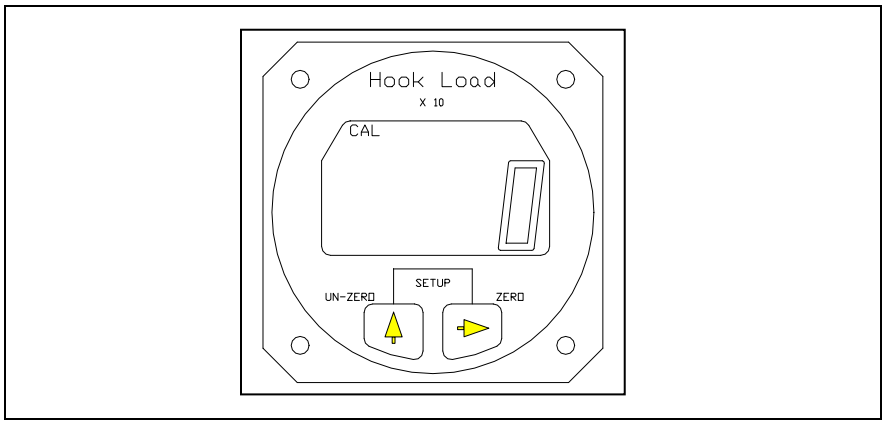


The Run Mode

The C-39 Indicator has two operating modes, Run and Setup. The Run Mode is used to display the cargo hook weight and the Setup Mode is used to setup or configure the Indicator to the helicopter and to the Load Cell. When powered up, the Indicator always comes to life in the Run Mode.

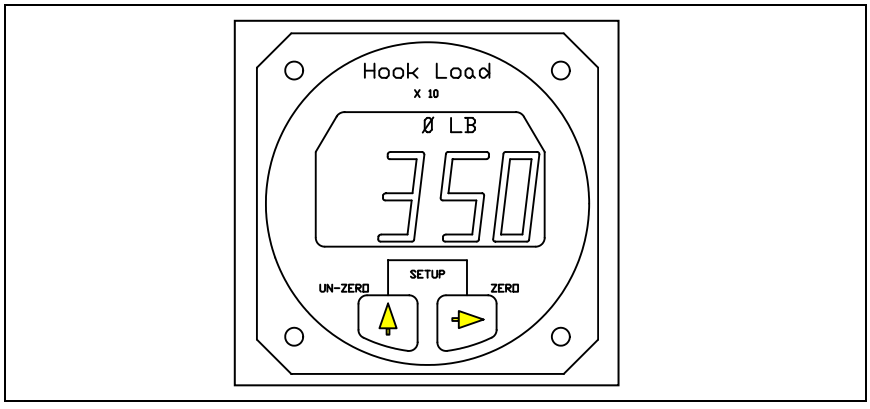
After the Indicator has been correctly installed, power it up by activating the Load Weigh Circuit Breaker. The Indicator will go through a self diagnostic routine. During this routine the display will display all of the digits and legends. If a problem is found during the routine an Error Code will be displayed. For an explanation of Error Codes see the section *Error Codes*. After the diagnostic routine the display should look like this:

Figure 3-2 After Diagnostic Routine



The illustration is of the Indicator in the Run Mode with no load on the hook. Note the LB legend displayed.

Figure 3-3 LB Legend Displayed

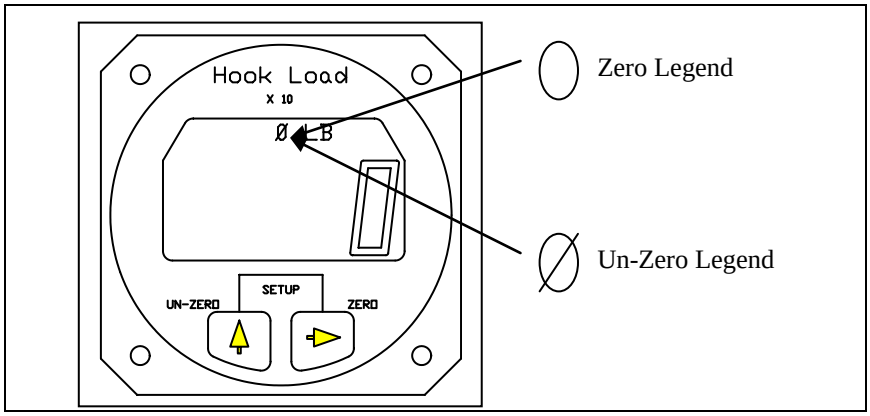


The illustration is a typical hook load reading. The display is 3,500 pounds, note the last digit is not displayed.

To Zero or Tare the Display

The zero feature is used to zero or tare the weight on the Cargo Hook that is not wanted, such as the weight of a cargo net or long line. The Right button is used to zero the Indicator reading. When the Right button is pressed the display is zeroed. The zero legend is turned on and the zeroed number is stored in memory. If the Right button is pressed again, before the Un-zero button is pressed, the display blinks in response to the button closure. Zero is only available in the Run Mode.

Figure 3-4 Zeroing the Display



To Un-Zero the Display

The Left button is used to add the zeroed value back into the current Indicator reading or Un-zero the display. When the Left button is pressed, the number previously zeroed is added to the current display and the Un-zero legend is turned on. If the Left button is again pressed before the zero button is pressed, the display blinks in response to the button closure. Un-Zero is only available in the Run Mode.

Error Codes

Error Codes are the result of difficulties discovered during the Indicator diagnostic tests. Diagnostic tests occur at power up and during the execution of certain routines. Listed below is a matrix of the Error Code displays, their meaning and possible corrective action. Pressing either button will usually bypass the error code, however, the displayed information may be suspect.

Table 3-1 Indicator Error Codes

DISPLAY	CAUSE	POSSIBLE CORRECTIVE ACTION
Err 1	A/D or D/A circuit failure	Potential short in the optional analog meter cable. Clear short and power cycle the Indicator by turning the power to the Indicator off for a few moments. If Error Code continues, return the Indicator to the factory.
Err 2	NV Ram failure	Power cycle the Indicator; if Error Code continues, return the Indicator to the factory.
Err 3	NV Ram write failure	Re-enter data, if Error Code continues, return the Indicator to the factory.
Err 4	NV Ram busy failure	Power cycle the Indicator, if Error Code continues return the Indicator to the factory.

The Setup Mode

The C-39 Indicator can be used with a wide range of helicopters and load cells. The Setup Mode on the Indicator matches the Indicator to the Load Cell and to the helicopter. This is done by entering data into the Indicator. Entered data includes the load cell Calibration Code, the units that the Indicator should read-out (pounds or kilograms), and several other items.

The Indicator has a group of Setup routines, arranged in menu form, that are used to configure the Indicator. Shown on the next page is a matrix of the Setup routines and a brief discussion of their function and how they are programmed. A complete discussion of each setup item is presented later in this section.

To enter the Setup Mode press both the Right and Left buttons at the same time while the Indicator is powered up and in the Run Mode. To exit the Setup Mode and return to the Run Mode, press both the buttons at the same time. If you are in a Setup routine and have started to change an entry, but you change your mind before completing the procedure, power cycle the Indicator to exit the Setup Mode and then go to the Run Mode without changing the item. The Indicator is power cycled by turning the Indicator power off for a few moments.

The Setup Mode, continued

Table 3-2 Indicator Setup Routines

MENU	FUNCTION	DISPLAY
Press the Left button to scroll through the menu	Press the Right button to view or change the menu item.	To return to the Run Mode press both the Right and Left buttons at the same time.
DAMP	Dampening Level, sets the pilots preference for display dampening.	Blinking display is previously entered Dampening Level. Select the desired dampening level by pressing the Left button.
CODE	Calibration Code, matches the Indicator to the Load Cell.	Display is previously entered CAL Code. The Code is changed by selecting the digit to be changed with the Right button. The selected digit will blink. Change the blinking digit by pressing the Left button.
0 in	Installation ZERO, matches the Indicator to the installed Load Cell and to the helicopter. After this procedure the display will be zero when no load is on the Cargo Hook.	Display is a combination of load on the Load Cell, and normal load cell zero offset. Remove all weight from the installed Load Cell except the Cargo Hook, and press any button to complete the procedure and return to the Run Mode.
LOAD	Load, is used to calibrate the system by lifting a known load.	No previous display is shown. Enter the known load using the Right button to select the digit to be changed and Left button to enter the number. Known load is entered "X 10" i.e.; 5000 kilograms is entered as 500. After the known load is entered, press both buttons at the same time and lift the known load. When the load is stabilized press either button. A new Calibration Code will be calculated and the known load will be displayed. This completes the procedure.
Scale	Scale, matches the analog output of the Indicator to an optional remote analog meter.	Display is previously entered number. To change the number use the Right button to select a digit, use the Left button to scroll the digit to the desired number. Entry is times 10.
LB KG	Units, selects the Indicator units (pounds or kilograms).	Display is previously selected unit. To change the unit, use the Left button.
XX - V	Version, is the revision level of the Indicator hardware and software.	Version is for information only, it cannot be changed.

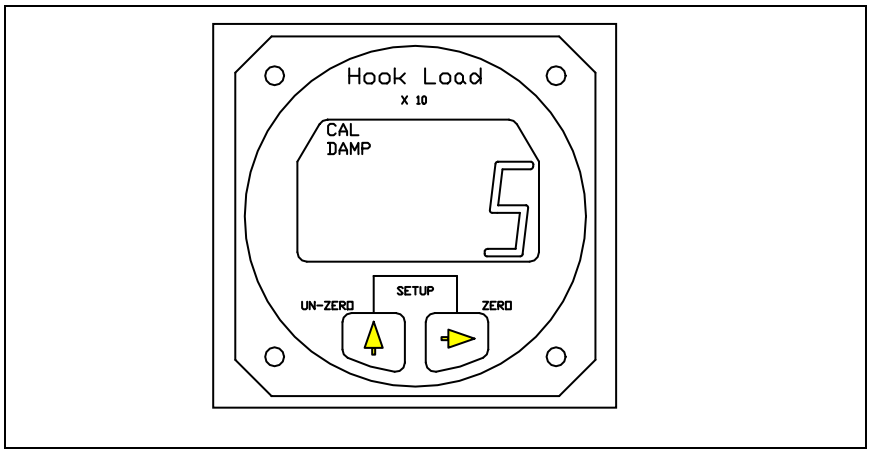
Indicator Dampening

The Damp or dampening routine allows the pilot to adjust the Indicator dampening level to his preference. The dampening routine is a program that stabilizes the Indicator reading. It offers a trade-off between Indicator responsiveness and stability. Ten dampening levels are available, from 0 through 9. At level 0 the display responds to the slightest change in weight. However, if the load bounced even slightly, the display digits would respond instantly, making the display look unstable. With a dampening level of 9, the display would be stable under the most turbulent conditions, however, it would take several seconds for the display to respond to a change in weight. The ideal dampening level will depend on the flying conditions. A mid range setting of 5 or 6 is usually adequate.

To Look at or Change the Dampening Level

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu, using the Left button, until the word DAMP is displayed. To look at or change the Dampening Level press the Right button. The display should look like this:

Figure 3-5 Changing Dampening Level



The CAL and the DAMP legend is turned on and the previously set dampening level is displayed. To return to Run without changing the current dampening level press both the Right and Left buttons at the same time. To change the dampening number, use the Left button to scroll the blinking digit to the desired number. After the selection has been made press both the Right and Left buttons at the same time to return to Run.

Indicator Calibration

The Calibration Code, or CAL code, is a mandatory input. The Indicator will not accurately display the load without the correct Calibration Code. The Calibration Code scales the signal from the Load Cell.

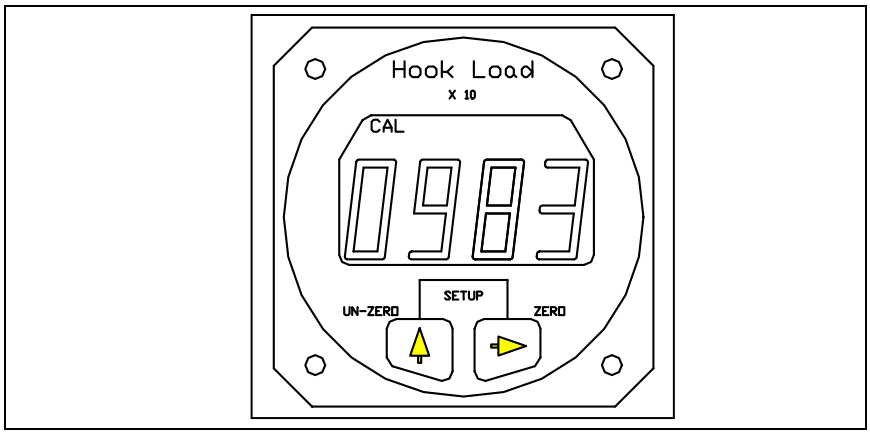
Indicator Calibration, continued

If the C-39 Indicator was supplied as part of a Load Weigh System, the Calibration Code will have been entered into the Indicator by the factory, however, it should be confirmed. If the Indicator is to be mated to a different Load Cell, it must be calibrated before use. Calibration can be done by entering a known Calibration Code or by lifting a known load and having the Indicator calibrate itself. Both options are discussed below.

To Look at or Change the Calibration Code

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word CODE is displayed, then press the Right button. The display should look like this:

Figure 3-6 Changing the CAL Code



The CAL legend is turned on and the previously entered or computed Calibration Code is displayed. To return to Run without changing the CAL Code, press both the Right and Left buttons at the same time. To change the Calibration Code, use the Right button to select the digit to be changed, then use the Left button to scroll the blinking digit to the desired number. When the Calibration Code has been entered, press both the Right and Left button at the same time to return to Run.

NOTICE

Depending on the type of Load Cell, the Calibration code could be a 3 or 4 digit number. If the Calibration Code is a 3 digit number a leading zero (0) must be used. For example if a Load Cell had a CAL Code of 395 it would be entered as 0395.

If the load cell Calibration Code is not known or as a cross check, the Indicator can generate the Calibration Code. This is done by entering the weight of a known load into the Indicator LOAD routine and then lifting the load. See the section *Calibration by Lifting a Known Load*.

Installation Zero

Installation zero is a routine that matches the Indicator to the ***INSTALLED*** Load Cell. It adjusts the Indicator reading to compensate for the weight of the Cargo Hook on the Load Cell and whatever zero offset is built into the Load Cell. The Installation Zero procedure is not mandatory. If done the Indicator will read zero when the Un-Zero button is pressed and there is no weight on the Cargo Hook. If the Installation Zero is not done, the Indicator will show the weight of the Cargo Hook plus the value of the Load Cell zero offset.

To Run the Installation Zero Routine

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the symbol "0 in" is displayed, then press the Right button. The CAL legend will be turned on and the current weight on the Cargo Hook will be displayed and blinking. Remove any weight that is not to be zeroed out and press either button to complete the procedure and return to the Run Mode.

Calibration by Lifting a Known Weight

Calibration by lifting a known weight is a Setup routine that calculates the Calibration Code for the Load Cell attached to the Indicator. It is useful if the load cell Calibration Code is not known or as a cross check to the accuracy of a known Calibration Code. The procedure is done by entering the known weight into the Indicator and then lifting the weight. This procedure can be done in the shop or on the helicopter. The accuracy of the procedure is directly related to the weight of the known load. If for example the procedure was done with a 1,000 pound load that was assumed to weigh only 900 pounds, all subsequent lifts would be displayed 10% light.

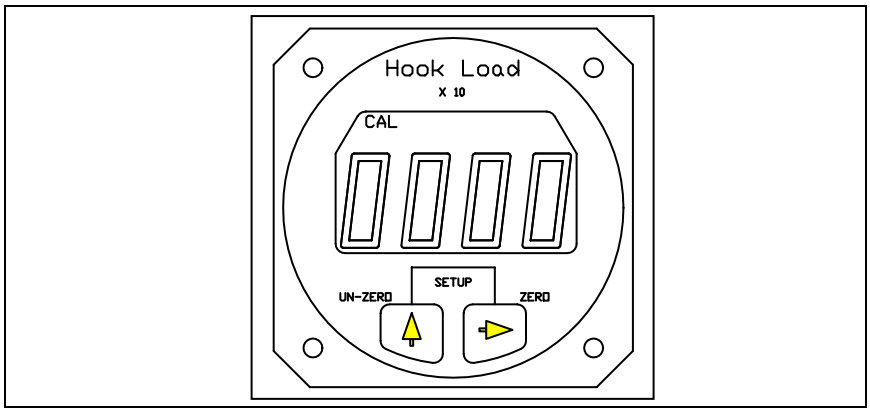
Be sure to include the weight of everything between the Cargo Hook and the load, i.e. the cable, net, dirt, etc.

The closer the known load approaches the lifting capacity of the helicopter, the more accurate the calculated Calibration Code will be.

To Run the Calibration by Lifting a Known Weight Routine

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word LOAD is displayed, then press the Right button. The display should look like this:

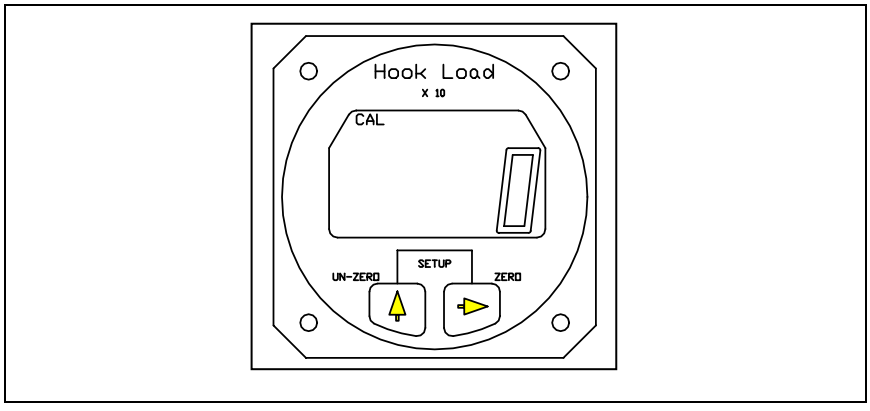
Figure 3-7 Running CAL Routine



The CAL legend is turned on and the first digit is blinking. The previous load is not displayed. At this point if you wish to return to the Run Mode without changing the Calibration Code, power cycle the Indicator. At this point it is not possible to return to the Run Mode without changing the Calibration Code by using the buttons on the Indicator front panel.

To proceed with the procedure, use the Right button to select the digit to be changed, then use the Left button to scroll the blinking digit to the desired number. Note that the known weight is entered "X 10"; a 1000 pound load is entered as 100. When the known load has been entered, press both the Right and Left button at the same time. The display will look like this:

Figure 3-8 Entering Load in CAL Routine



Calibration by Lifting a Known Weight, continued

The CAL legend and the digits will be blinking. Again, at this point if you wish to return to the Run Mode without changing the Calibration Code, power cycle the Indicator. It is not possible to return to the Run Mode by using the buttons on the Indicator front panel without changing the Calibration Code. If you wish to proceed, lift the known load and when it is stabilized, press either button to complete the procedure. The Indicator will display the load. This ends the procedure. The Indicator is now calibrated to the Load Cell. It is a good practice to go to the Code routine and record the new Calibration code for later reference.

Setting the Scale for a remote analog meter

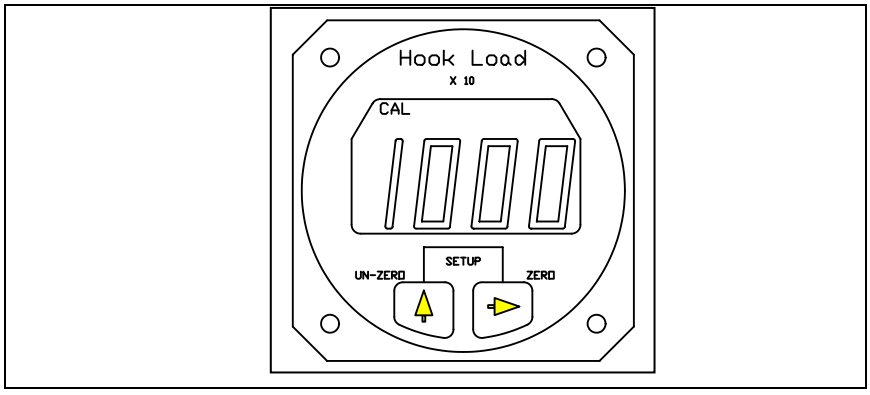
The Scale routine is used when a user supplied analog meter is connected to the Indicator. It is used to match or calibrate the analog meter to the Indicator. The Indicator outputs a 0 to 5 VDC analog signal which is proportional to the Load Cell load. The Scale number tells the Indicator at what point in pounds or kilograms it should reach the 5 VDC output. If for example a 5 volt analog meter is used and its full scale reading is 10,000 pounds, the number entered into the Indicator Scale routine would be 1000 (the number is entered X 10). This number tells the Indicator that it should output the proportional 0 to 5 VDC signal between zero pounds and 10,000 pounds.

The Scale number does not affect Onboard Slave Meters, P/N 210-106-00 or 210-180-00. This number only affects user supplied instruments connected to the analog out signal.

To Look at or Change the Scale

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word SCALE is displayed, then press the Right button. The display should look like this:

Figure 3-9 Changing the Scale



To Look at or Change the Scale, continued

The CAL legend is turned on and the previously set Scale number is displayed. To return to Run without changing the Scale, press both the Right and Left button at the same time. To change the Scale number, use the Right button to select a digit to be changed, then use the Left button to scroll the blinking digit to the desired number. When the complete Scale number has been entered, press both the Right and Left button at the same time to return to Run.

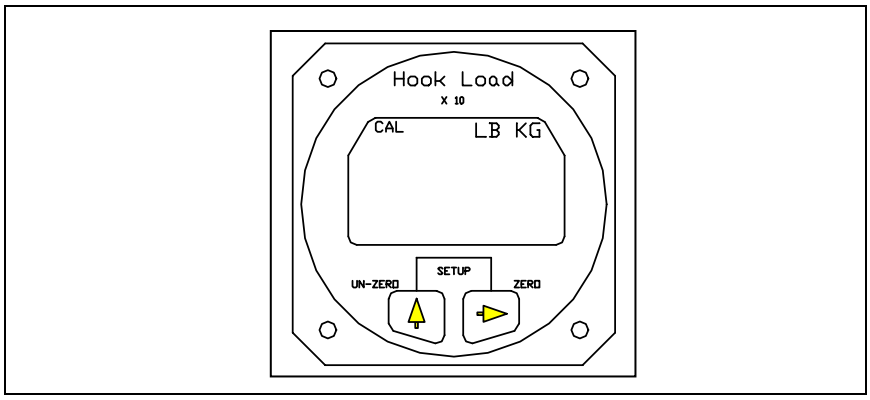
Select KG or LB Units

The units routine sets the display to read in pounds (LB) or kilograms (KG).

To look at or change the Units

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word LB or KG is displayed, then press the Right button. The display should look like this:

Figure 3-10 Changing the Units



The CAL legend is turned on and the previously set unit is displayed. To return to Run without changing the units, press both the Right and Left button at the same time. To change the units press the Left button. When the selection has been made, press both the Right and Left button at the same time to return to Run.

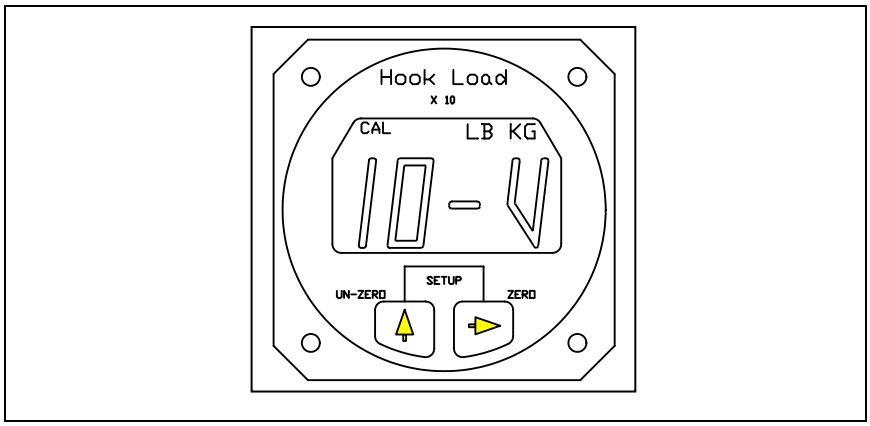
NOTICE

The selected units are displayed when in the Run Mode.

Indicator Version

The Version routine displays the Indicator's hardware and software revision levels. Version is set at the factory and cannot be changed.

Figure 3-11 Looking at Indicator Version



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Section 4
Operation Instructions

Operating Procedures

Prior to each job perform the following:

1. Ensure that the Cargo Hook has been properly installed and that the manual and electrical release cables do not limit the movement of the hook.

2. Be completely familiar with this manual, particularly the Cargo Hook rigging section.

3. Be completely familiar with all Cargo Hook operating instructions.

4. Activate the electrical system and press the cargo hook release button to ensure the cargo hook electrical release is operating correctly. The mechanism should operate smoothly and the Cargo Hook should re-latch after release. If the hook does not re-latch do not use the unit until the difficulty is resolved.

   CAUTION

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

5. Activate the manual release lever to test the cargo hook manual release mechanism. The mechanism should operate smoothly and the Cargo Hook must relatch after release. If the hook does not re-latch do not use the unit until the difficulty is resolved.

Optional Flight Configuration

The aircraft can be operated with the Cargo Hook and Gimbal Assembly removed. This may be accomplished by removing the Cargo Hook from the 210-181-00 Load Cell Assembly or 232-050-00 Link Assembly if no load weigh system is installed. Then remove the 232-049-00 Gimbal Assembly and 290-461-01 Pillow Block together by removing the four Pillow Block mounting fasteners (510-280-00, 510-253-00, See Figure 2-4). Secure the manual release cable and electrical wire bundle to any convenient location on the frame structure using tie wraps.

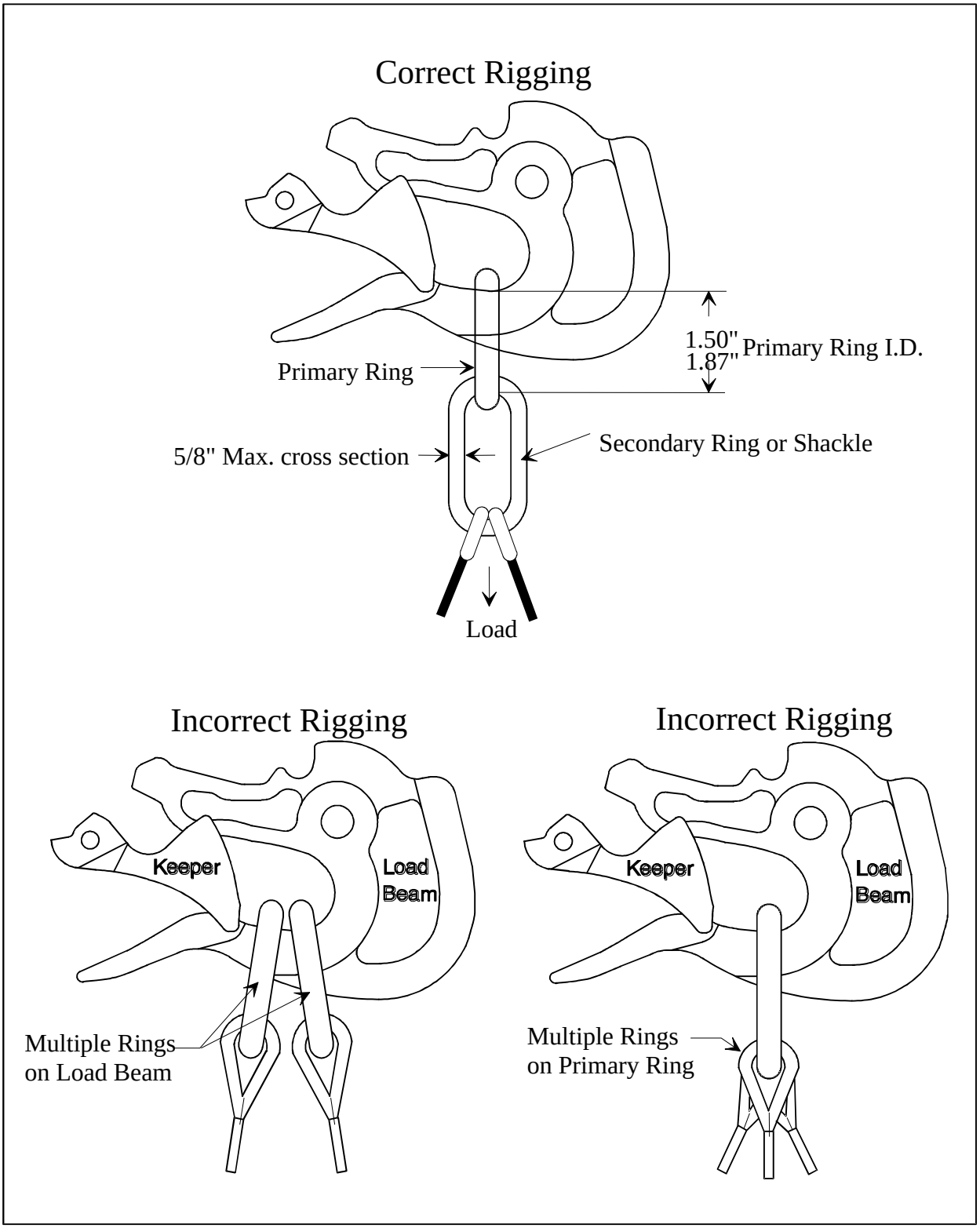
Cargo Hook Rigging

Extreme care must be exercised in rigging a load to the Cargo Hook. If the load ring is too big it may work its way around the end of the load beam and be supported for a time on the keeper and then fall free. If the load ring is too small it may jam itself against the load beam during an attempted release. The following illustrations show recommended configurations and potential difficulties that must be avoided.

The examples shown are not intended to represent all problem possibilities. It is the responsibility of the operator to assure the hook will function properly with the rigging.

Cargo Hook Rigging, continued

Figure 4-1 Examples of Correct and Incorrect Cargo Hook Rigging

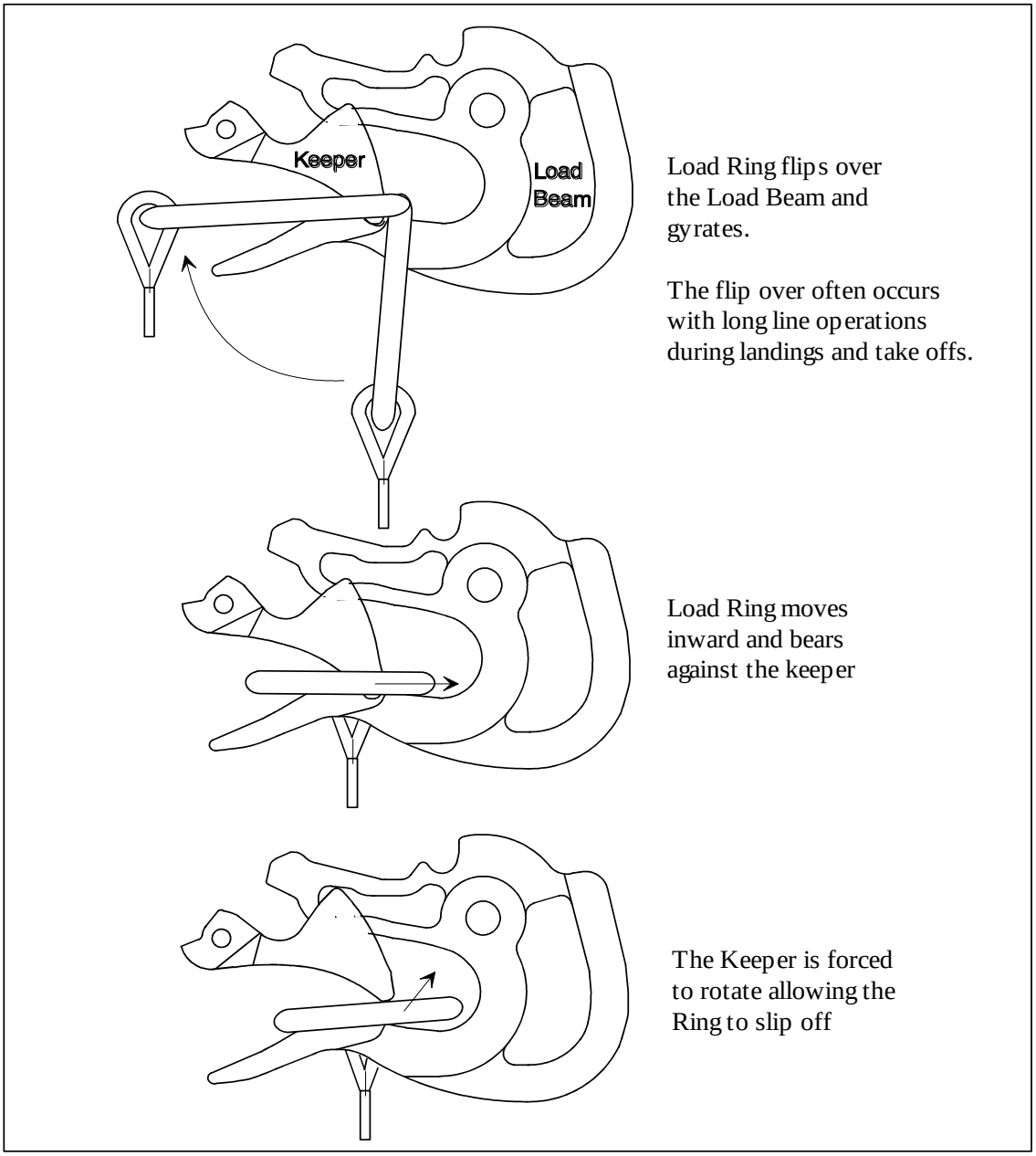


Un-Commanded Release Due to Too Large of a Load Ring

WARNING

Load rings that are too large will cause an un-commanded release. The ring will flip over the end of the load beam and flip the keeper up and then fall free. Only correctly sized load rings must be used. See examples below.

Figure 4-2 Un-Commanded Release Due to Too Large of a Load Ring

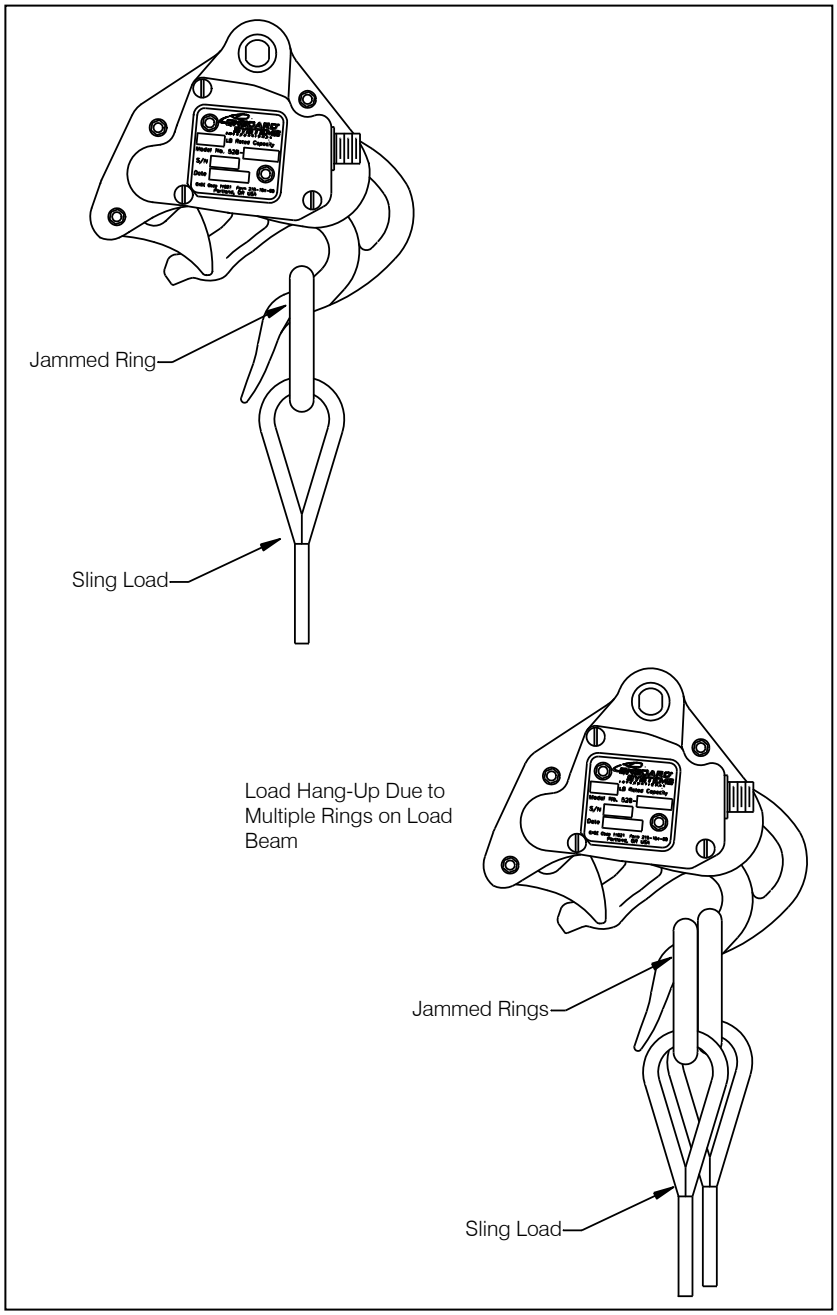


Load Hang-Up Due to Too Small of a Load Ring or Multiple Load Rings

WARNING

Load rings that are too small or multiple load rings will hang on the load beam when the load is released. Only correctly sized load rings must be used. See examples below.

Figure 4-3 Load Hang-Up Due to Too Small of a Load Ring or Multiple Load Rings

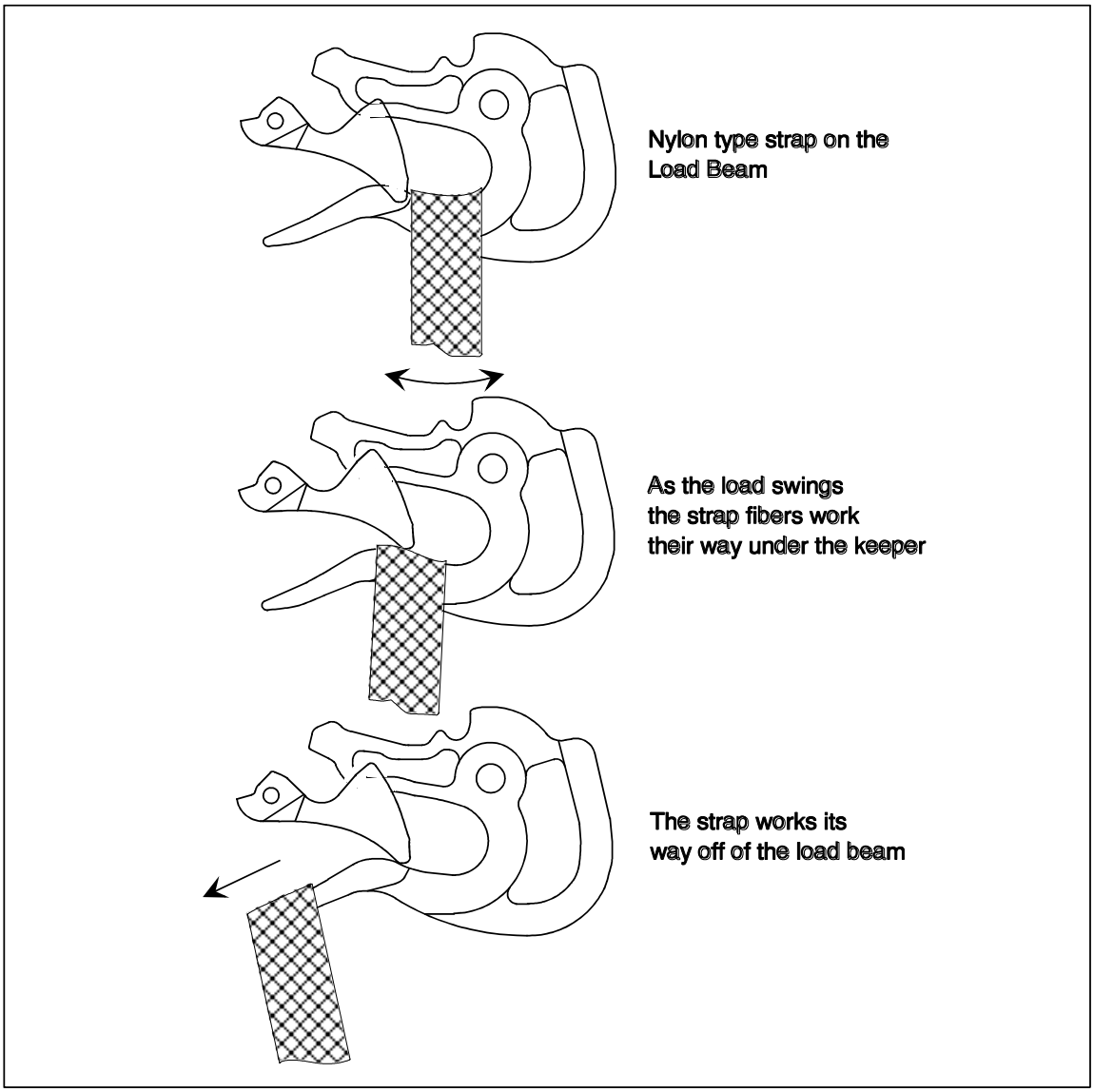


Un-Commanded Release Due to Nylon Type Straps

WARNING

Nylon type straps (or similar material) must not be used directly on the cargo hook load beam as they have a tendency to creep under the keeper and fall free. If nylon straps must be used they should be first attached to a correctly sized primary ring. Only the primary ring should be in contact with the cargo hook load beam. See examples below.

Figure 4-4 Un-Commanded Release Due to Nylon Type Straps

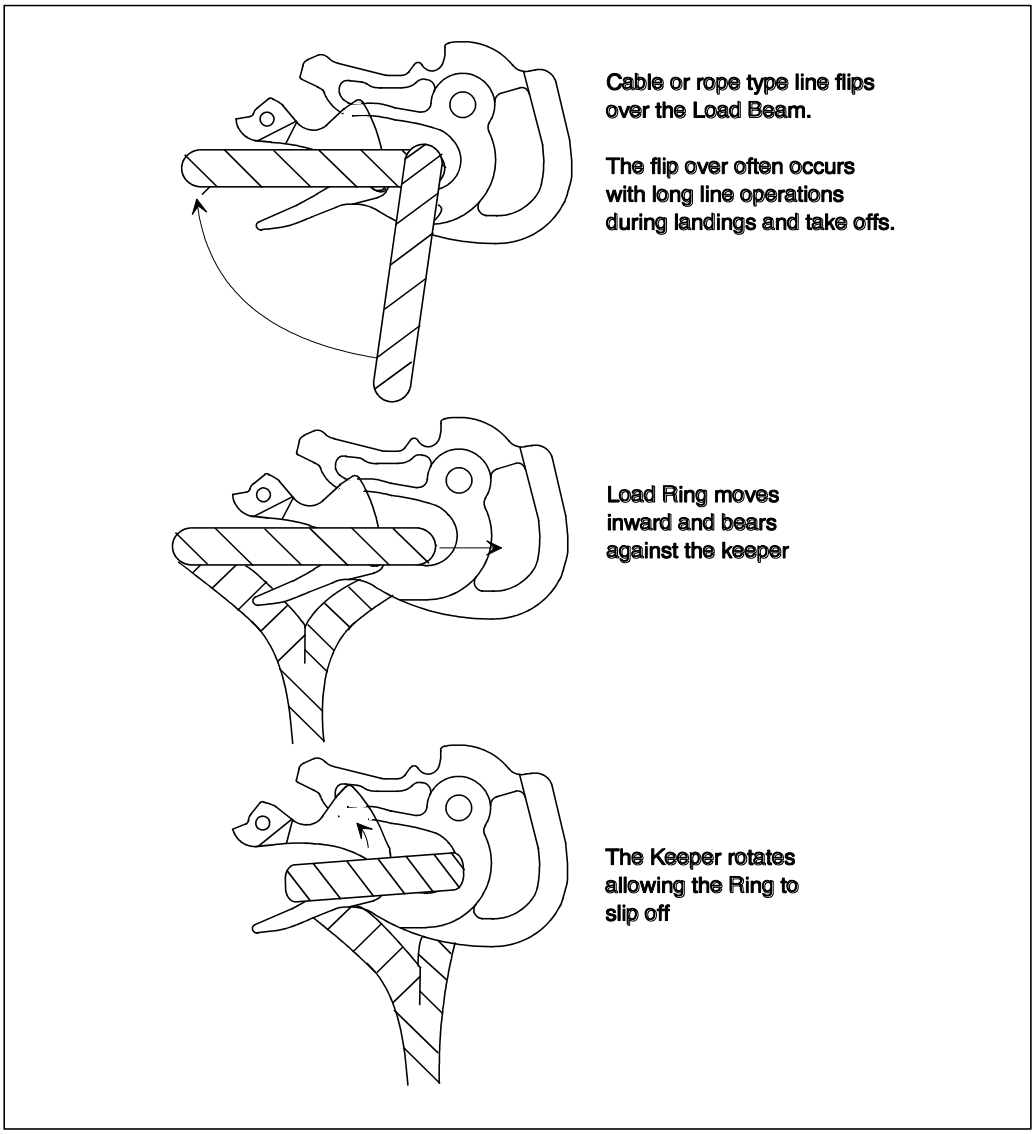


Un-Commanded Release Due to Cable or Rope Type Straps

WARNING

Cable or rope type straps must not be used directly on the cargo hook load beam. Their braided eyes will work around the end of the load beam and fall free. If cable or rope is used they should be first attached to a correctly sized primary ring. Only the primary ring should be in contact with the cargo hook load beam. See examples below.

Figure 4-5 Un-Commanded Release Due to Cable or Rope Type Straps



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Section 5
Maintenance

Storage Instructions

Clean the Cargo Hook Suspension System components thoroughly before packaging. Pack the unit in a heat-sealable package. If the unit is to be stored for long periods in a tropical climate it should be packed in a reliable manner to suit local conditions. Refer to relevant MIL specifications. After the Cargo Hook has been repaired or stored for an extended period of time it must be subjected to the Acceptance Test Procedure per service manual 122-001-00.

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

Preventive Maintenance

Remove caked-on dirt from the Cargo Hook and suspension components with a brush and clean exposed surfaces with a mild solvent. Thoroughly dry all surfaces.

In highly corrosive environments such as salt water, monthly application of a corrosion preventative compound such as ACF-50 is required. Spray exterior of hook and suspension components with corrosion preventative compound and wipe off excess.

Inspection

The inspection of the Cargo Hook Suspension System shall be in accordance with the table below.

Table 5-1 Inspection

Seq.	Part Number	Daily Check	At overhaul*
1	200-225-00 200-226-00 System	1. Inspect all items for cracks, wear and corrosion. If worn excessively or cracked, replace parts. Remove corrosion and treat with zinc chromate primer. 2. Inspect all mounting fasteners to ensure that they are tight. 3. Visually inspect the electrical cables for damage and security. 4. Visually inspect the manual release cable for damage and security. 5. Swing the Cargo Hook in all directions to ensure that it moves freely. 6. Cycle the electrical and manual release mechanisms to ensure proper Cargo Hook operation.	Tear down and inspect the detail components to the requirements outlined in the overhaul procedures of this Manual.
2	528-010-06 Cargo Hook	1. Inspect all items for cracks, wear and corrosion. If worn excessively or cracked, replace parts. Remove corrosion and treat with zinc chromate primer. 2. Inspect all mounting fasteners to ensure that they are tight. 3. Visually inspect the electrical connector for damage and security. 4. Operate the keeper manually and check that it snaps back to its normal position on the load beam. 5. Visually inspect the manual release cable for damage and security. 6. Inspect the load beam for gouges and cracks. 7. Cycle the electrical and manual release mechanisms to ensure proper cargo hook operation.	Refer to Service Manual 122-001-00.

*** Overhaul the system components at time of cargo hook overhaul, refer to Service Manual 122-001-00 for cargo hook overhaul interval.**

Inspection, continued

Table 5-1 Inspection, continued

Seq.	Part Number	Daily Check	At overhaul*
3	210-095-01 Load Indicator	1. Ensure that the Indicator has been correctly calibrated and the correct Calibration Code has been entered into the Indicator. 2. Inspect the Indicator for damage and security. If damage is found return the Indicator to the factory.	Calibrate the system by lifting a known weight.
4	270-088-00 270-089-00 Wire Bundle	1. Check for security of attachment, damaged wires and connectors. Replace if damaged.	Most system problems will be the result of damaged wires. Keep the harnesses clean and ensure that they are not chafing. Replace them if the insulation or shield is damaged.
5	270-047-00 Internal Harness Assembly	1. Check for security of attachment, damaged wires and connectors. Replace if damaged.	Most system problems will be the result of damaged wires. Keep the harness clean and ensure that wires are not chafing. Replace if the insulation or shield is damaged.
6	All fasteners	1. Inspect for cracks, excessive wear and security or attachment. If worn excessively or cracked, replace part.	Replace

*** Overhaul the system components at time of cargo hook overhaul, refer to Service Manual 122-001-00 for cargo hook overhaul interval.**

Suspension System Disassembly Procedure

Refer to Figure 5-1

1. Remove cotter pins (item 5).
2. Remove Link Assembly (items 9, 10, and 11) from the Gimbal Assembly by removing hardware (items 3, 4, and 7).
3. Remove the Gimbal Assembly (items 6 and 8) from the Pillow Block (item 1) by removing hardware (items 2, 3, and 4).

Figure 5-1 Suspension System Parts

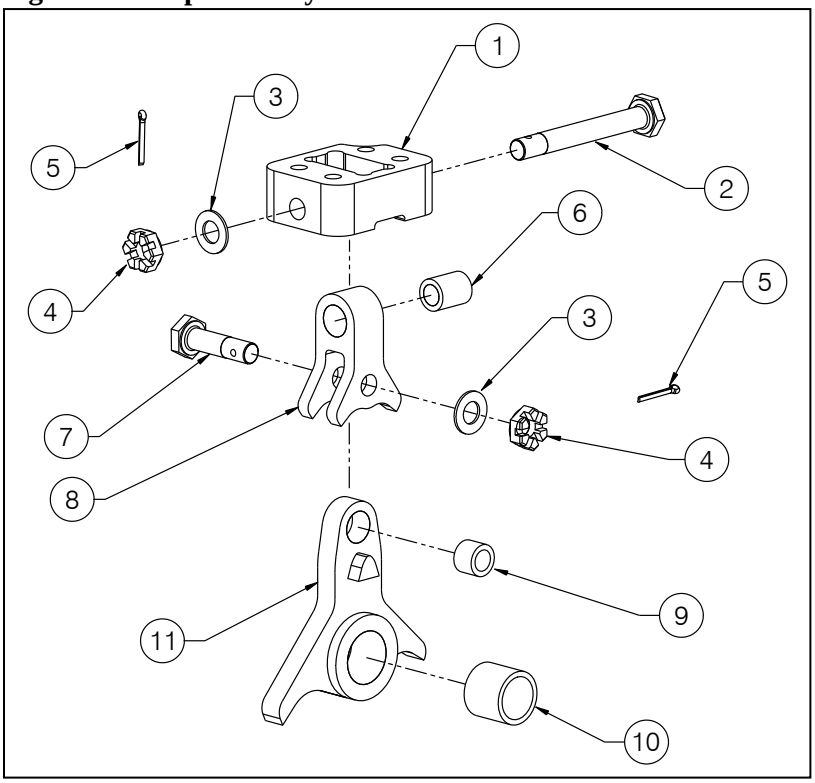

Table 5-2 Suspension System Parts

ITEM	PART NO.	DESCRIPTION	QTY
1	290-461-01	Pillow Block	1
2	510-274-00	Bolt, NAS6604-26D	1
3	510-100-00	Washer, AN960-416L	2
4	510-273-00	Nut, BACN10JD104	2
5	510-115-00	Cotter Pin, MS24665-136	2
6	290-462-00	Bushing	1
7	510-275-00	Bolt, NAS6604-9D	1
8	290-455-00	Gimbal	1
9	290-463-00	Bushing	1
10	290-364-00	Bushing	1
11	290-460-00	Load Link	1
	or		
	290-459-00*	Load Cell Link	1

* With a 200-226-00 kit (with Load Weigh) 290-459-00 is installed rather than 290-460-00.

Suspension System Overhaul Inspection

(This page may be copied and used as an inspection record sheet)

Carefully inspect and repair the suspension system detail parts in accordance with the instructions in Table 5-3. Inspect the parts in a clean, well-lit room. Refer to Service Manual 122-001-00 for Cargo Hook overhaul inspection.

Perform magnetic particle inspection in accordance with ASTM-E1444 and MIL-STD-1907, Grade A on the parts listed below. No cracks are permitted in any of these parts.

1. Gimbal (item 8)
2. Load Link or Load Cell Link (item 11) depending on kit installed.

Perform penetrant inspection per MIL-STD-6866 and MIL-STD-1907, Grade A on the part(s) listed below. No cracks are permitted in any of these parts.

1. Pillow Block (item 1)

Table 5-3 Suspension System Overhaul Inspection

Component	Damage	Tolerance	Remedy	Finish
Pillow Block P/N 290-461-01	corrosion	minor if less than .005 deep	Blend at 10:1 ratio as required to provide smooth transitions and remove pitting	Touch up with alodine and zinc chromate primer.
Pillow Block P/N 290-461-01	dents and gouges and scratches	minor if less than .005 deep	Blend at 10:1 ratio as required to provide smooth transitions.	Touch up with alodine and zinc chromate primer.
Gimbal P/N 290-455-00	gouges and nicks	.030 deep	Blend at 10:1 ratio as required to provide smooth transitions.	This part is 15-5PH, passivated. No touch up finish required.
Gimbal bushing P/N 290-462-00	wear on inside diameter	.260 max diameter	remove and replace	
Load Link P/N 290-460-00	gouges and nicks	.030 deep	Blend at 10:1 ratio as required to provide smooth transitions.	This part is 15-5PH, passivated. No touch up finish required.
Load Link bushing P/N 290-463-00	wear on inside diameter	.260 max diameter	remove and replace	
Load Link bushing P/N 290-364-00.	wear on inside diameter	.520 max diameter	remove and replace	
Threaded fasteners	N/A	N/A	Replace all threaded fasteners at overhaul.	

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.

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

Section 6
Certification

FAA STC

United States of America
Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number **SR00557SE**

This certificate, issued to **Onboard Systems**
11212 NW St. Helens Road
Portland, OR 97231

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

Original Product—Type Certificate Number: H10WE
Make: Robinson
Model: R22, R22 Alpha, R22 Beta, and R22 Mariner

Description of the Type Design Change: Fabrication of Onboard Systems Model 200-225-00 (without load weight) or 200-226-00 (with load weigh) cargo hook suspension system in accordance with FAA Approved Onboard Systems Master Drawing List No. 155-036-00, dated June 12, 1998, or later FAA approved revision; and installation of these cargo hook systems in accordance with FAA approved Onboard Systems Owner's Manual No. 120-070-00, dated May 10, 1998, or later FAA approved revision. Inspect these cargo hook systems in accordance with Section 5 of Onboard Systems Owner's Manual No. 120-070-00, dated May 10, 1998, or later FAA approved revision.

Limitations and Conditions: Approval of this change in type design applies to only those Robinson model rotorcraft listed above. This approval should not be extended to helicopters 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. Modified rotorcraft must be operated in accordance with an FAA approved copy of Onboard Rotorcraft Flight Manual Supplement (RFMS) No. 120-070-00, dated August 20, 1998, or later FAA approved revision.

(See Continuation Sheet, 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: May 28, 1998
Date of issuance: August 20, 1998

Date reissued:
Date amended:

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)

United States of America
Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate
(Continuation Sheet)

Number **SR00557SE**

Limitations and Conditions continued:

A copy of this Certificate and FAA approved RFMS must be maintained as part of the permanent records of the modified helicopter.

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.

FAA FORM 8110-2-1 (10-69) *This certificate may be transferred in accordance with FAR 21.47.*

PAGE 3 OF 3 PAGES

Canadian STC

Transport Canada Transports Canada

Department of Transport

Supplemental Type Certificate

This approval is issued to:

Onboard Systems
11212 NW St. Helens Road
Portland, OR
USA 97231

Number: SH98-50
Issue No.: 1
Approval Date: September 14, 1998
Issue Date: September 14, 1998

Responsible Office: Pacific

Aircraft/Engine Type or Model: Robinson R22, R22 Alpha, R22 Beta, and R22 Mariner

Canadian Type Certificate or Equivalent: H10WE

Description of Type Design Change: **Fabrication and Installation of Onboard Systems Cargo Hook Suspension Systems per FAA STC SR00557SE**

Installation/Operating Data, Required Equipment and Limitations:

Fabrication of Onboard Systems Model 200-225-00 (without load weigh) or 200-226-00 (with load weigh) Cargo Hook Suspension Systems in accordance with FAA approved Onboard Systems Master Drawing List No. 155-036-00, dated June 12, 1998 * ; and, **Installation** of these cargo hook systems in accordance with FAA approved Onboard Systems Owner's Manual No. 120-070-00, dated May 10, 1998 * . **Inspect** cargo hook systems in accordance with Section 5 of Onboard Systems Owner's Manual No. 120-070-00, dated May 10, 1998 *.

(* or later FAA approved revisions)

– 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.

J. H. Nehera
Regional Manager - Aircraft Certification
For Minister of Transport

Canada

Department of Transport

Supplemental Type Certificate

(Continuation Sheet)

Number: SH98-50
Issue No.: 1
Approval Date: September 14, 1998
Issue Date: September 14, 1998

Notice:
This Addendum shall remain part of the Supplemental Type Certificate referred therein.

Limitations and Conditions:

1. Approval of this change in type design applies to only those Robinson model rotorcraft listed on the front page.

2. This installation should not be incorporated in any rotorcraft on which other previously approved modifications are incorporated unless it is determined that the interrelationship between this installation and any previously approved modifications, including changes in type design, will not introduce any adverse effect upon the airworthiness of the rotorcraft.

3. Rotorcraft equipped with the Onboard Systems Model 200-225-00 or 200-226-00 Cargo Hook Suspension Systems must be operated in accordance with FAA approved Onboard Systems Rotorcraft Flight Manual Supplement (RFMS) No. 120-070-00, dated August 20, 1998 or later FAA approved revision. A copy of this Certificate and FAA Approved RFMS must be maintained as part of the permanent records for the modified rotorcraft.

4. If the STC holder agrees to permit another person to use this certificate to alter the product, the STC holder shall give the other person written evidence of that permission.

..... End .....

Canada