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Owner's Manual
For the
Cargo Hook
Suspension System
on the
Robinson R44 and R44 II
Helicopter

Kit Part Numbers
200-326-00, 200-327-00, 200-327-01, 200-327-02
200-327-10, 200-327-11, 200-327-12
200-396-00

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Record of Revisions

<i>Rev.</i>	<i>Date</i>	<i>Page(s)</i>	<i>Reason for Revision</i>
10	02/10/14	2-4, 2-6, 2-7	Loosened tolerances on relay location, moved manual release cable T-handle location .80 inches inboard to provide clearance with a/c structure. Updated Notice for locating T-handle.
11	02/13/14	1-3, 1-4, 2-1, 2-2, & 3-2	Replaced bolt P/N 290-505-00 with 511-076-00.
12	08/24/15	1-4, 2-9, 3-3, 3-4	Added load cell P/N 210-301-01. Updated cargo hook rigging section.
13	10/09/15	Section 1, 2-24 thru 2-32	Added remote hook electrical release kit P/N 200-396-00.
14	07/29/16	1-1, 1-4, 2-13, 2-16, 2-17, 2-25	Clarified applicability of kits by aircraft voltage rather than aircraft model. Replaced remote hook release kit's external connector assembly P/N 270-230-00 with P/N 270-230-01. Clarified switch installation instructions and added plug P/N 506-016-00. Removed load weigh operation instructions and replaced with reference to manual no. 120-039-00.
15	03/30/17	2-4	Updated instructions for locating relay.
16	03/31/17	1-1, 1-3 thru 1-7, 2-32, 2-33, 3-1	Added kit P/N 200-327-10 and P/N 200-327-11 which include cargo hook P/N 528-029-02 with Surefire release. Added instructions associated with this cargo hook P/N.
17	03/01/19	2-1, 2-2	Added information on installation location of cargo hook suspension.
18	03/12/20	1-2, 1-3, 1-4, 1-8, 2-21 thru 2-25	Added C-40 load weigh indicator and associated kits and instructions.
19	11/21/23	1-4 and 1-5	Replaced C-40 Indicator P/N 210-293-00 with P/N 210-293-01 in new production kits.

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CONTENTS

***Section 1* General Information**

- Introduction, 1-1
- Safety Labels, 1-2
- Bill of Materials, 1-3
- Specifications, 1-6
- Theory of Operation, 1-7

***Section 2* Installation Instructions**

- 2.1 Cargo Hook Suspension Assembly Installation, 2-1
- 2.2 Electrical Release Wiring Installation, 2-3
- 2.3 Manual Release Cable and Cargo Hook Installation, 2-6
- 2.4 Electrical Wiring to Cargo Hook, 2-12
- 2.5 Electrical Release Switches Installation, 2-13
- 2.6 Optional Left Seat Release Switch Installation, 2-20
- 2.7 Load Weigh System Installation, 2-21
- 2.8 Remote Hook Electrical Release Kit Installation, 2-26
- 2.9 Placards, 2-33
- 2.10 Installation Check-Out, 2-34
- 2.11 Component Weights, 2-35
- 2.12 Cargo Hook Location, 2-35
- 2.13 Paperwork, 2-35

***Section 3* Operation Instructions**

- Operating Procedures, 3-1
- Optional Flight Configuration, 3-3
- Cargo Hook Loading, 3-3
- Cargo Hook Rigging, 3-4

***Section 4* Maintenance**

- Instructions for Returning a System to the Factory, 4-1

***Section 5* Certification**

- FAA STC, 5-1
- Canadian Approval, 5-3
- EASA Approval, 5-5
- ANAC Approval, 5-7

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Section 1

General Information

Introduction

The P/N 200-326-00, 200-327-00, 200-327-01, 200-327-02, 200-327-10, 200-327-11, and 200-327-12 Cargo Hook Suspension System Kits are approved for use on the Robinson R44 and R44 II helicopters. These kits include the cargo hook, suspension assembly, internal electrical wiring including release switches, and manual release cable. Kit P/Ns 200-327-01, 200-32702, 200-327-11, and 200-327-12 include a load weigh system. The P/N 200-326-00 kit is intended for use on R44 aircraft which have a 14V electrical system while the P/N 200-327 series kits are intended for use on R44 and R44 II aircraft which have a 28V electrical system. Kit P/N 200-327 series also include a different cyclic switch housing assembly than the P/N 200-326-00 kit to accommodate the R44 II cyclic configuration.

The P/N 200-326-00 cargo hook suspension kit includes the P/N 528-029-01 14V keeperless cargo hook. This cargo hook is directly interchangeable with earlier model Onboard Systems P/N 528-023-03 and P/N 528-010-06 cargo hooks.

The P/N 200-327 series cargo hook suspension kits include the P/N 528-029-00 28V keeperless cargo hook. This cargo hook is directly interchangeable with earlier model Onboard Systems P/N 528-023-01 and P/N 528-010-04 cargo hooks. The earlier models may be used with the respective cargo hook suspension kits.

Kit P/Ns 200-327-10 and 200-327-11 are identical to P/Ns 200-327-00 and 200-327-01 respectively except they include a cargo hook with Surefire release as part of its 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. See Theory of Operation section for complete description of Surefire release.

Kit P/Ns 200-327-02 and 200-327-12 include the next generation C-40 Indicator instead of the C-39 Indicator.

A Remote Hook Electrical Release Kit (P/N 200-396-00) for 28 volt R44 II models is available as a complement to the kits listed above. This kit provides the fixed electrical provisions for the operation of a remote cargo hook such as the Onboard Systems P/N 210-242-00 cargo hook or the 528-018 series of cargo hooks. It includes a cyclic mounted switch, circuit breaker, relay, wiring, and connector bracket. Refer to section 2.9 for installation instructions for this kit.



The P/N 200-396-00 kit is limited to use with intermittent electrical loads only (such as for the electrical release of a remote cargo hook).

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.

Bill of Materials

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

Table 1.1 Suspension System Bill of Materials

Part No.	Description	200-326-00	200-327-00	200-327-01	200-327-02	200-327-10	200-327-11	200-327-12
120-039-00	Owner's Manual, C-39	-	-	1	-	-	1	-
120-152-00	Owner's Manual, C-40	-	-	-	1	-	-	1
120-132-00	Owner's Manual	1	1	1	1	1	1	1
121-048-00	RFM Supplement	1	1	1	1	1	1	1
122-017-00	CMM, Cargo Hook	1	1	1	1	1	1	1
123-030-00	ICA	1	1	1	1	1	1	1
528-029-01	Cargo Hook, 14V	1	-	-	-	-	-	-
528-029-00	Cargo Hook, 28V	-	1	1	1	-	-	-
528-029-02	Cargo Hook, 28V, Surefire	-	-	-	-	1	1	1
232-292-01 ²	Suspension Assembly	1	1	1	1	1	1	1
511-076-00 ¹	Drilled Head Cap Screw	2	2	2	2	2	2	2
270-089-00	Wire Assembly	1	1	1	1	1	1	1
215-118-00	Multiple Decal Sheet	1	1	1	1	1	1	1
215-119-00	External Load Limit Decal	1	1	1	1	1	1	1
215-343-00	Cockpit Decal, Surefire	-	-	-	-	1	1	1
270-090-00	Wire Harness	1	1	1	1	1	1	1
232-114-01	Switch Housing Assembly	1	-	-	-	-	-	-
232-152-01	Switch Housing Assembly	-	1	1	1	1	1	1
290-478-01	Switch Guard, Co-pilots	1	1	1	1	1	1	1
268-014-01	Manual Release Cable	1	1	1	1	1	1	1
506-016-00	Hole Plug	-	1	1	1	1	1	1
510-297-00	Screw	1	1	1	1	1	1	1
510-286-00	Nut	1	1	1	1	1	1	1
510-209-00	Washer	1	1	1	1	1	1	1
512-010-00	Loop Clamp	1	1	1	1	1	1	1
512-027-00	Loop Clamp	3	3	3	3	3	3	3
500-066-00	Spacer	1	1	1	1	1	1	1
500-065-00	Grommet Edging	1	1	1	1	1	1	1
512-018-00	Clamp	2	2	2	2	2	2	2
440-006-00	Circuit Breaker	1	1	1	1	1	1	1
445-002-00	Relay	1	-	-	-	-	-	-
445-003-00	Relay	-	1	1	1	1	1	1
410-162-00	Ring Terminal	2	2	2	2	2	2	2
510-277-00	Screw	2	2	2	2	2	2	2
510-278-00	Washer	2	2	2	2	2	2	2
510-279-00	Nut	2	2	2	2	2	2	2
505-011-00	Grommet	2	2	2	2	2	2	2
400-059-00	Switch	1	1	1	1	1	1	1
450-001-00	Heat Shrink, ½" Lg.	4	4	4	4	4	4	4
290-332-00	Attach Bolt	1	1	-	-	1	-	-
510-183-00	Washer	2	2	1	1	2	1	1

continued

Bill of Materials continued

Table 1.1 Suspension System Bill of Materials continued

Part No.	Description	200-326-00	200-327-00	200-327-01	200-327-02	200-327-10	200-327-11	200-327-12
510-174-00	Washer	1	1	1	1	1	1	1
510-178-00	Cotter Pin	1	1	1	1	1	1	1
510-170-00	Nut	1	1	1	1	1	1	1
210-301-01 ³	Pin Load Cell Assembly	-	-	1	1	-	1	1
270-048-04	Load Weigh Internal Harness	-	-	1	-	-	1	-
270-283-04	Load Weigh Internal Harness	-	-	-	1	-	-	1
210-095-00	C-39 Indicator	-	-	1	-	-	1	-
210-293-01 ⁴	C-40 Indicator	-	-	-	1	-	-	1
400-048-00	Power Switch	-	-	1	-	-	1	-
215-010-00	Placard	-	-	2	1	-	2	1
215-012-00	Placard	-	-	1	-	-	1	-
510-028-00	Screw	-	-	4	4	-	4	4
510-029-00	Nut	-	-	4	4	-	4	4

¹Bolt P/N 511-076-00 replaces P/N 290-505-00. These parts are interchangeable.

²Suspension Assembly P/N 232-292-01 supersedes P/N 232-292-00 Suspension Assembly, P/N 291-108-00 Pillow Block, and P/N 291-107-00 Pin.

³P/N 210-301-01 supersedes P/N 210-226-01. These P/Ns are interchangeable in this installation.

⁴C-40 Indicator P/N 210-293-01 replaces P/N 210-293-00 in new production kits as of November 2023, these P/Ns are interchangeable with the exception of software compatibility. Refer to C-40 Owner's Manual 120-152-00 for software compatibility.

Bill of Materials continued

The following items are included with the optional Load Weigh Upgrade Kit (P/N 200-340-00 or 200-340-01). This kit is intended for operators using the 200-327-00 or 200-327-10 kit and who would like to add a load weigh system. It converts the P/N 200-327-00 and 200-327-10 kit configuration to a P/N 200-327-01 and 200-327-11 kit configuration respectively or P/N 200-327-02 and P/N 200-327-12 configuration respectively (if installing P/N 200-340-01 with the C-40 indicator).

Table 1.2 Load Weigh Upgrade Kit (P/N 200-340-00 and 200-340-01) Bill of Materials

Part No.	Description	Qty -00	Qty -01
210-301-01	Pin Load Cell Assembly	1	1
270-048-04	Load Weigh Internal Harness	1	-
270-283-04	Load Weigh Internal Harness, C-40	-	1
210-095-00	C-39 Indicator	1	-
210-293-01 ¹	C-40 Indicator	-	1
400-048-00	Power Switch	1	-
215-010-00	Placard	2	1
215-012-00	Placard	1	-
510-028-00	Screw	4	4
510-029-00	Nut	4	4
510-178-00	Cotter Pin	1	1
510-170-00	Nut	1	1
510-174-00	Washer	1	1
510-183-00	Washer	1	1

¹C-40 Indicator P/N 210-293-01 replaces P/N 210-293-00 in new productions kits as of November 2023, these P/Ns are interchangeable with the exception of software compatibility. Refer to C-40 Owner's Manual 120-152-00 for software compatibility

Bill of Materials continued

The following items are included with the optional 28V Remote Hook Electrical Release Kit (Kit P/N 200-396-00). If shortages are found contact the company from whom the system was purchased.

Table 1.3 Remote Hook Electrical Release Kit Bill of Materials

Part No.	Description	Qty
215-284-00	Placard	1
232-513-00	Switch Housing Assembly	1
270-198-00	Wire Assembly, Circuit Breaker	1
270-205-00	External Electrical Harness	1
270-230-01 ¹	R44 External Connector Assembly	1
410-295-00	Ring Terminal	1
410-309-00	Ring Terminal	2
420-084-00	22 Ga. Wire	6 ft
440-012-00	Circuit Breaker	1
450-001-00	Heat Shrink, ½" Lg	2

¹Supersedes P/N 270-230-00 and provides compatibility with Robinson panel P/N C794-3 with air inlet.

Specifications

Table 1.4 Specifications - Kit P/N 200-326-00, 200-327 series

Suspension design load	800 lb. (363 kg.)
Design ultimate strength	3,000 lb. (1,361 kg.)
Cargo hook electrical and mechanical release capacity	9,000 lb. (4,081 kg.)
Force required for mechanical release at 3,600 lb.	8 lb. Max. (.600" travel)
Cargo hook P/N 528-029-00, 528-029-02 electrical requirements	22-32 VDC, 6.9 - 10 amps
Cargo hook P/N 528-029-01 electrical requirements (kit P/N 200-326-00)	10-15 VDC, 7.7-11.5 amps
Cargo hook minimum release load	0 pounds
Cargo hook mating electrical connector	PC06P8-2S

Table 1.5 Specifications - Kit P/N 200-396-00

Kit Weight	1.1 lbs (0.5 kg)
Voltage Rating	28 volts
Current Rating	15 amps**
Compatible electrical connector (from long line side)	Leviton 5259-VY*

* Or equivalent 3 prong, 15 amp plug.

** The 200-396-00 remote hook release kit is limited to use with intermittent electrical loads that do not exceed 1 second in duration (such as a remote cargo hook electrical release).

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

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

A load release can be initiated by three different methods. Normal release is achieved by pilot actuation of the push-button switch in the cockpit. When the push-button switch is pressed, it energizes the 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 cable. The release cable 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.

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 528-029-02). 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.

Theory of Operation continued

In addition to its P/N, a cargo hook with Surefire can be identified by a gold color solenoid housing (see Figure 1.1). Also a placard on the underside of the solenoid housing indicates that the electrical release is delayed by ½ second.

NOTICE

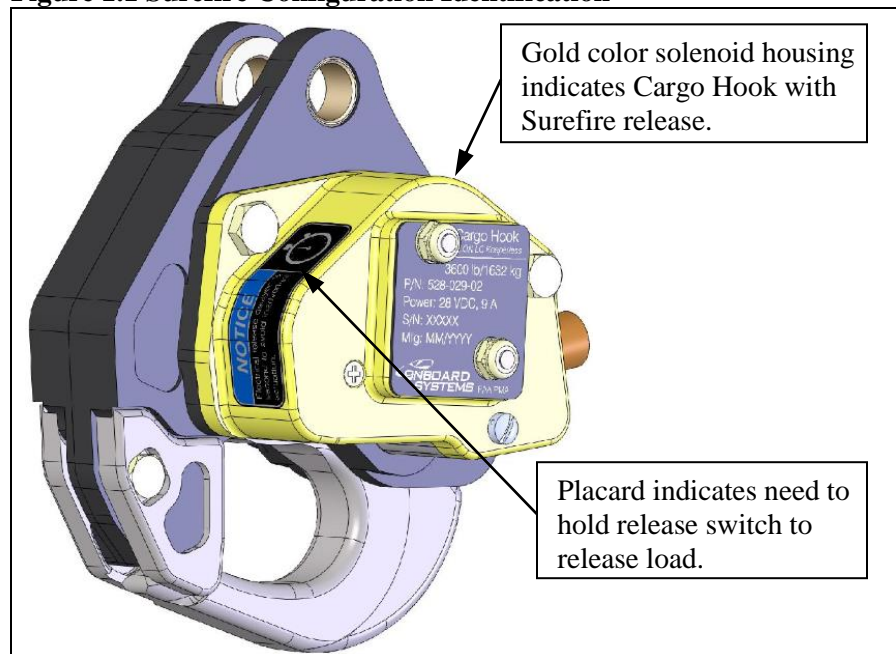
The 528-029-02 cargo hook includes an electronic delay of approximately ½ second. It is necessary to press and hold the cargo hook release button.

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 cargo hook solenoid. If the release switch is held down, the solenoid will cycle on and off repeatedly in a “machine gun” fashion.

Figure 1.1 Surefire Configuration Identification



Theory of Operation continued

The load weigh indicator included with P/N 200-327-02 and 200-327-12 has been updated to Onboard Systems' next generation indicator, the C-40 model. The C-40 Indicator makes several improvements over the C-39 model while preserving classical features and is generally backwards compatible. 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

Refer to the Owner's Manual 120-152-00 for additional information and detailed operating instructions for the C-40 Indicator.

Section 2

Installation Instructions

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

The R44 maintenance and parts manuals should be available throughout the installation as various R44 components will be referred to by name and part number. The part numbers for Robinson components are provided for reference and are subject to change by Robinson.

All equipment removed and replaced shall be done in accordance with the R44 maintenance manual. All installed hardware shall be torqued in accordance with standard torques of AC43.13 unless noted otherwise. Apply torque stripe where applicable.

2.1 Cargo Hook Suspension Assembly Installation

The Cargo Hook Suspension Assembly is attached to the aircraft at the existing Robinson hardpoint block P/N D134-1 at STA 93.9, BL -4.1. Plugs may need to be removed (if present) from the two threaded holes in the hardpoint block.

- Insert the cap screws (P/N 290-505-00 or 511-076-00) into the two threaded holes in the hardpoint block and screw in to ensure thread integrity. Some re-work of access holes in skin may be required to allow bolt installation.
- Remove the two cap screws.
- Apply sealant to the side of the Suspension Assembly (P/N 232-292-01) Pillow Block which is to be installed against the belly skin.
- Orient the Suspension Assembly as shown in Figure 2.1.1 and secure it to the helicopter with the two P/N 290-505-00 or 511-076-00 cap screws (refer to Figure 2.1.1). **



Install the Suspension Assembly so that the engraved "F" is forward and the engraved "A" is aft as shown in Figure 2.1.1.

- Torque the P/N 290-505-00 or 511-076-00 cap screws to 26 ft-lbs.
- Safety-wire the cap screws to the ears on the pillow block.

** If installing Suspension Assembly P/N 232-292-00, Pillow Block P/N 291-108-00, and Pin P/N 291-107-00 perform the following steps (the Suspension Assembly P/N can be determined by checking the underside of the Pillow Block, P/N 232-292-01 Suspension Assembly has a "-01" on the underside of the Pillow Block).

2.1 Cargo Hook Suspension Assembly Installation continued

- Grease the Pin (P/N 291-107-00) with Mobilgrease 28 or equivalent before assembly.
- Partially insert the Pin into the Pillow Block. Hold the Suspension Assembly (P/N 232-292-00) in the orientation as shown in Figure 2.1.2, position it within the slot of the Pillow Block, and slide the Pin through the Suspension Assembly and into the other side of the pillow block.

Figure 2.1.1 Suspension Assembly Installation – (P/N 232-292-01)

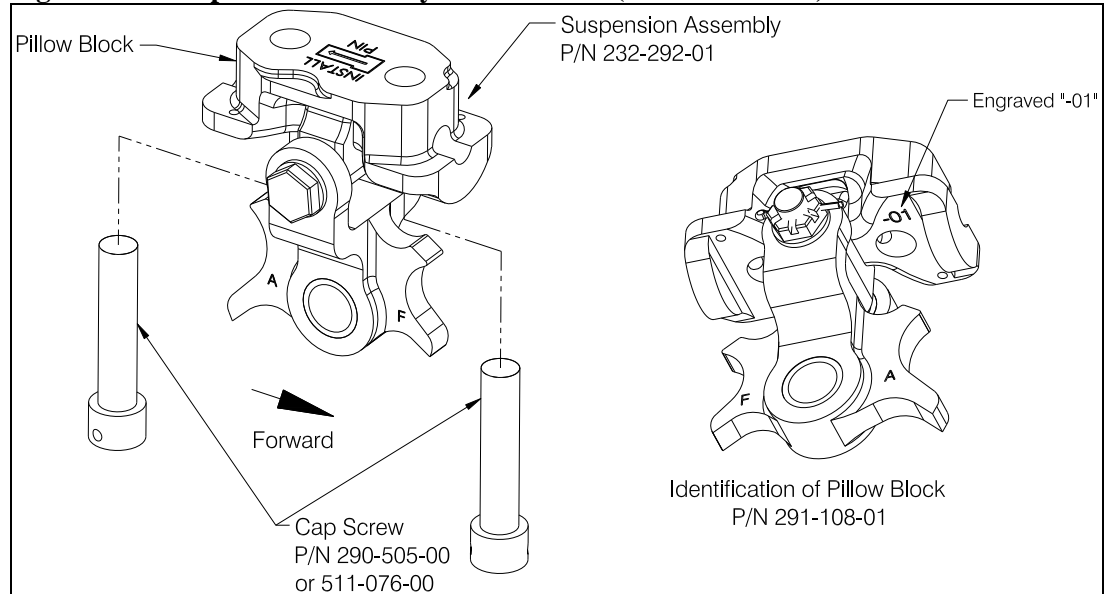
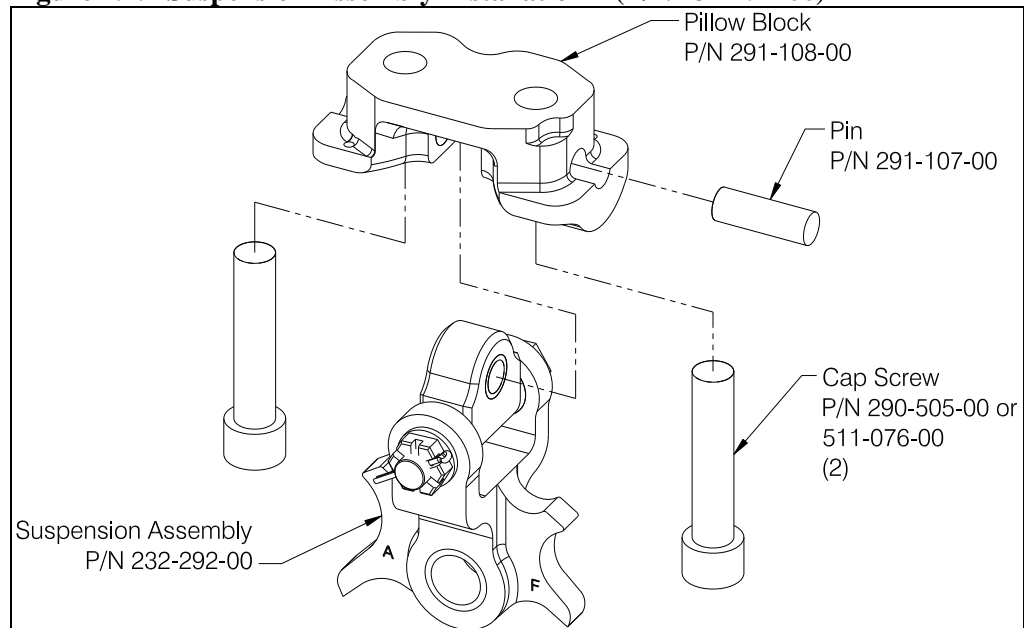


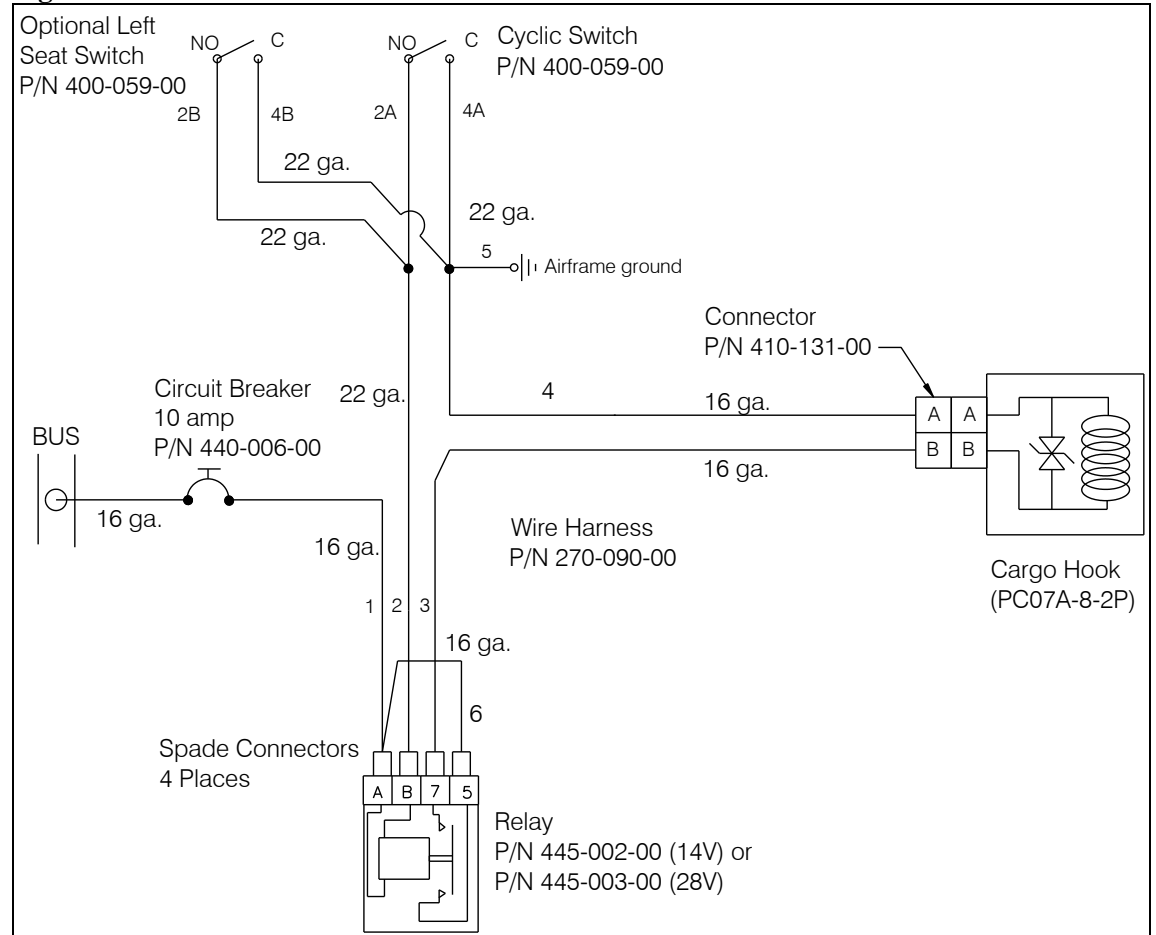
Figure 2.1.2 Suspension Assembly Installation – (P/N 232-292-00)



2.2 Electrical Release Wiring Installation

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 co-pilots 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 2.2.1.

Figure 2.2.1 Electrical Schematic



- Install the relay (P/N 445-002-00 if installing kit P/N 200-326-00 or P/N 445-003-00 if installing kit P/N 200-327-00) on the keel panel below the existing relay installation (see Figure 2.2.2) using the hardware as shown.

NOTICE

Due to differences in aircraft and changes by Robinson this location may not be possible. Install as near as possible and before drilling the holes position the relay and ensure adequate clearance for the wire harness connections and ensure the holes are a minimum of 4D edge distance from surrounding holes.

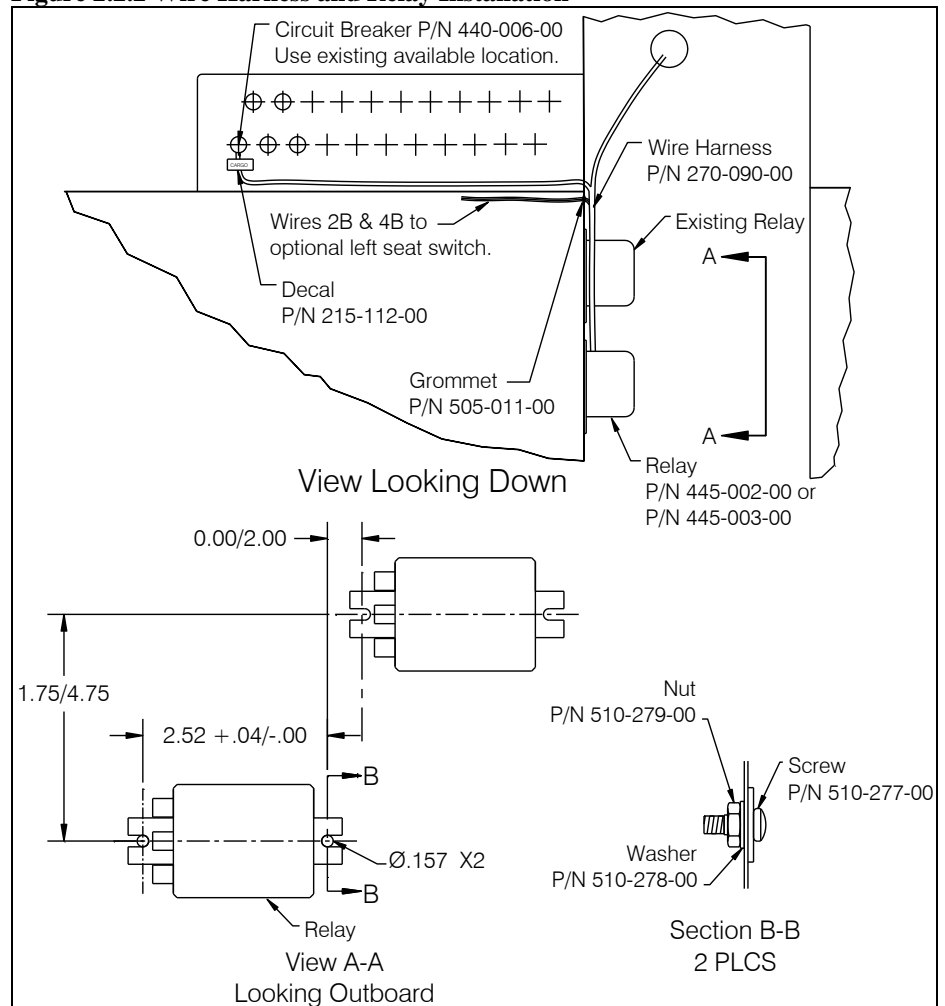
2.2 Electrical Release Wiring Installation continued

- Place the electrical release wiring harness (P/N 270-090-00) into the tunnel on top of the existing wire bundle.

NOTICE

If installing the load weigh system, it may be desirable to install its electrical harness at the same time as the release wiring harness. Refer to Section 2.7 for load weigh installation.

Figure 2.2.2 Wire Harness and Relay Installation



2.2 Electrical Release Wiring Installation continued

- Connect wire numbers 1, 2 and 3 from the main wire harness to the relay terminals A, B and 7 as shown in the 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 harness with wire ties as required.
- Remove the circuit breaker cover panel and install the 10 amp circuit breaker (P/N 440-006-00) 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.
- Open the circuit breaker to disarm the cargo hook release circuit.
- Use the wire assembly (P/N 270-089-00) and a ring terminal (P/N 410-162-00) as a jumper to power the input side of the circuit breaker in compliance with AC 43.13.
- Feed the #1 wire of the main wire bundle from the tunnel into the circuit breaker bay using the existing wire harness access hole. Connect the wire to the output side of the circuit breaker using the other ring terminal (P/N 410-162-00) provided. Secure the power wire to the existing wire harnesses with tie wraps.
- The 2A and 4A wires are routed to the cyclic switch, which is installed per Section 2.5.
- If the optional co-pilot's seat switch is to be installed, the 2B and 4B wires are routed to the outboard side of the co-pilot's seat, otherwise cap and stow these two wires. The co-pilot's seat switch is installed per section 2.6.
- The #3 and #4 electrical wires are to be routed out the same hole in the forward belly panel as the manual release cable. This hole is created during the manual release cable installation (reference section 2.3).

2.3 Manual Release Cable and Cargo Hook Installation

NOTICE

Install the manual release T-handle on the cyclic control cover in the location shown in Figure 2.3.1. If, due to configuration changes by Robinson Helicopters, this location is not available, locate it as near as possible.

IMPORTANT: *Before proceeding with drilling hole for T-handle, verify there is clearance beneath the cyclic control cover for the release cable to extend down.*

- Drill a .38 inch diameter hole through the left aft corner of the cyclic control cover (Robinson P/N C444-3 or C444-5) and cyclic box (Robinson P/N C338-4) shown in Figure 2.3.1.
- Locate and drill the hole for the cable clamp in the tunnel keel panel as shown.
- Make a cutout in the forward belly panel as shown in Figure 2.3.2 and install the P/N 500-065-00 edge grommet.
- Remove the T-handle and first nut from the P/N 268-014-01 manual release cable.
- Place the 268-014-01 manual release cable inside the tunnel and route the output end of the cable through the cutout in the forward belly panel. Insert the forward end of the cable into the cyclic control cover plate and install the face nut and T-handle as shown in Figure 2.3.1. Install the loop clamp as shown (install on same side as T-handle) and secure the release cable to it.

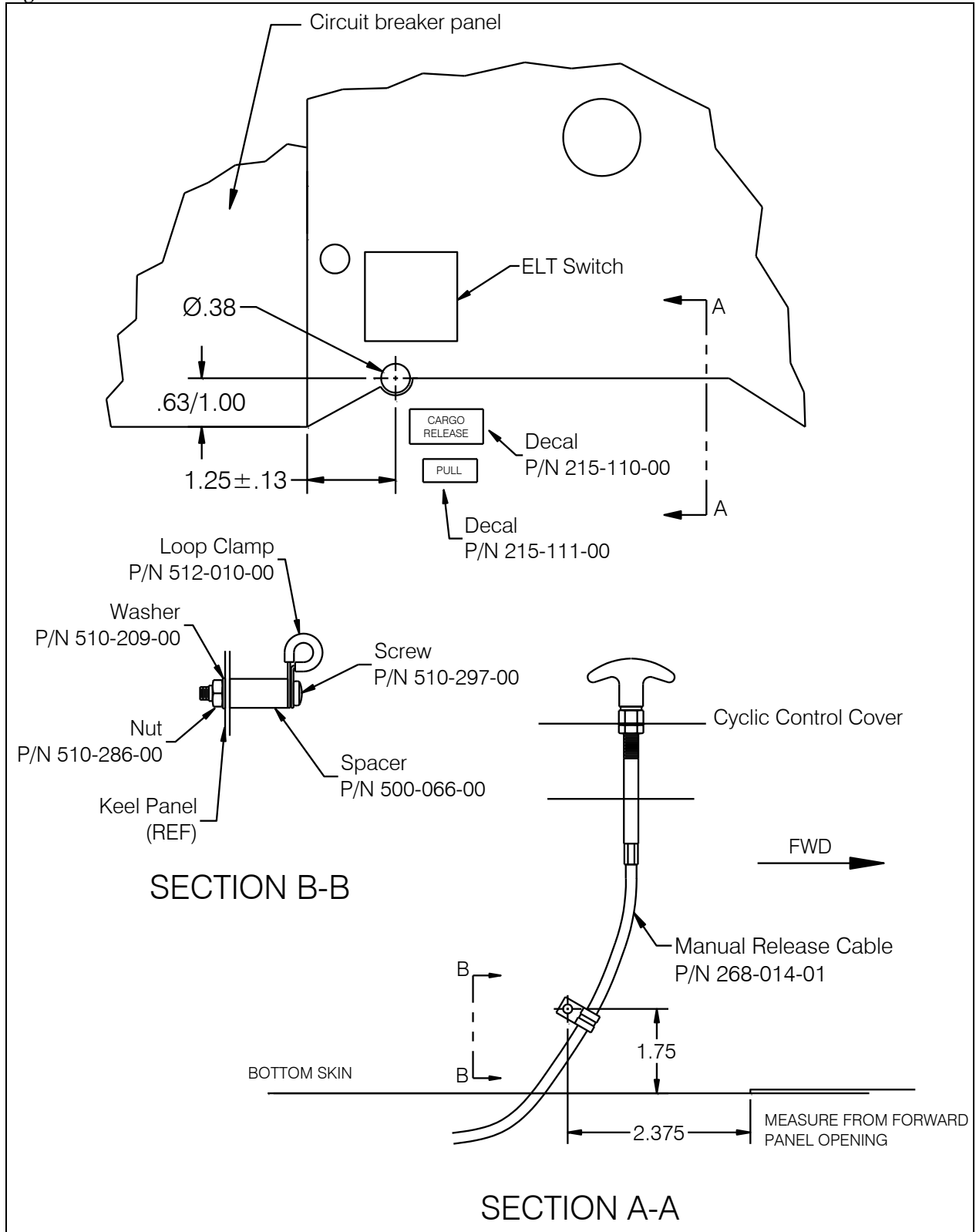
CAUTION

Verify that the manual release cable does not interfere with push/pull control rods and electrical components in the tunnel and that there is sufficient clearance between these items to allow for motion and account for any slack.

- Route the #3 and #4 electrical release wires through the cutout and route aft as shown in Figure 2.3.2 and secure them and the manual release cable with loop clamps.

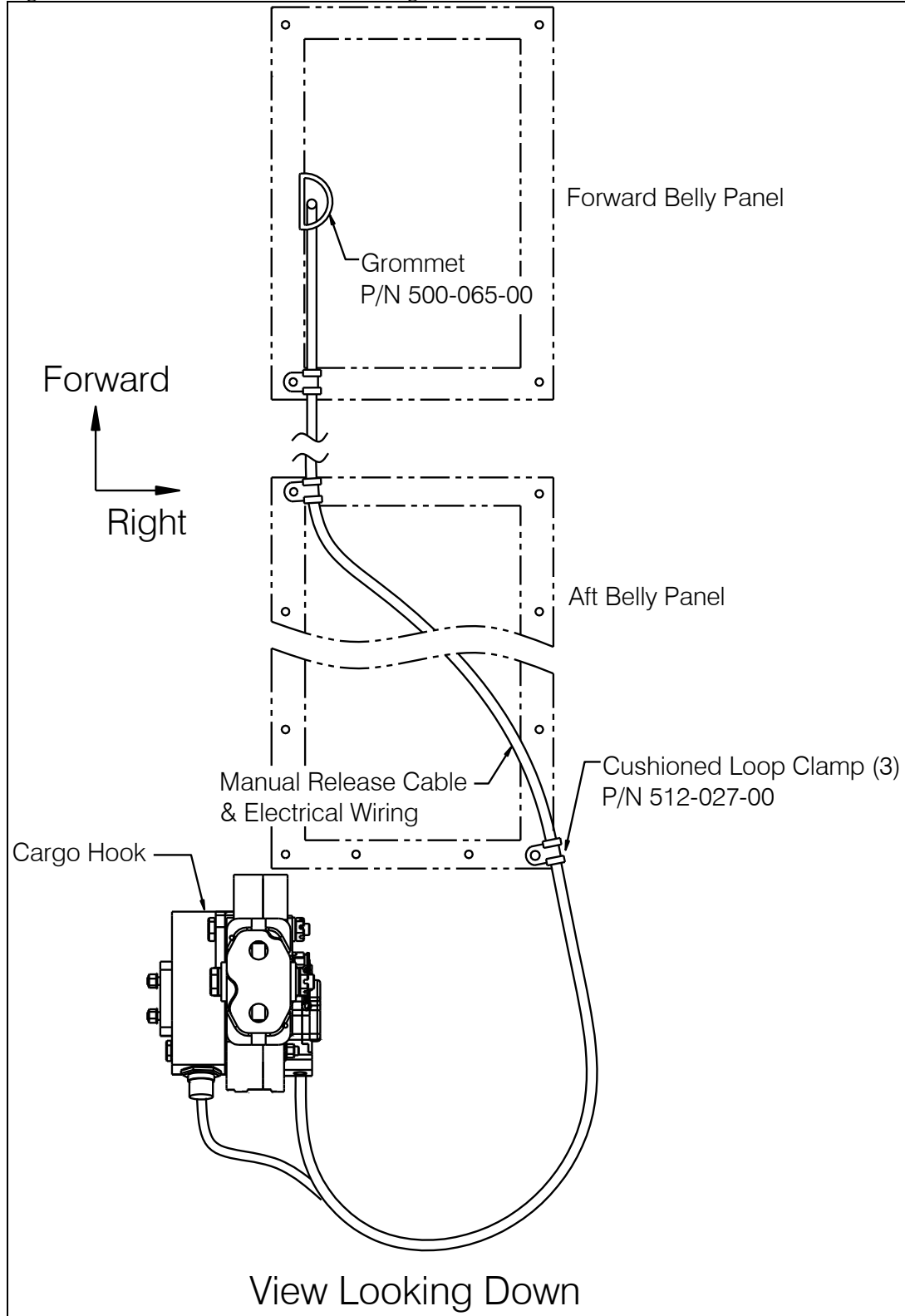
2.3 Manual Release Cable and Cargo Hook Installation continued

Figure 2.3.1 Manual Release Cable Installation



2.3 Manual Release Cable and Cargo Hook Installation continued

Figure 2.3.2 Manual Release Cable Routing



2.3 Manual Release Cable and Cargo Hook Installation continued

- Remove the manual release cover from the cargo hook.
- Screw the manual release cable into the cargo hook (see Figure 2.3.5) by holding the cable and turning the cargo hook.
- Temporarily install the cargo hook to the suspension assembly in order to set the release cable rigging. Temporarily install the cargo hook, (P/N 528-029-00, P/N 528-029-01 or P/N 528-029-02) to the suspension assembly using the hardware as shown in Figure 2.3.3.

If installing the load weigh system, temporarily install the cargo hook with the Pin Load Cell Assembly and hardware as shown in Figure 2.3.4. The cargo hook load beam must point forward.

NOTICE

Do not tighten nut and install cotter pin until after the manual release cable rigging is completed.

Figure 2.3.3 Cargo Hook Installation

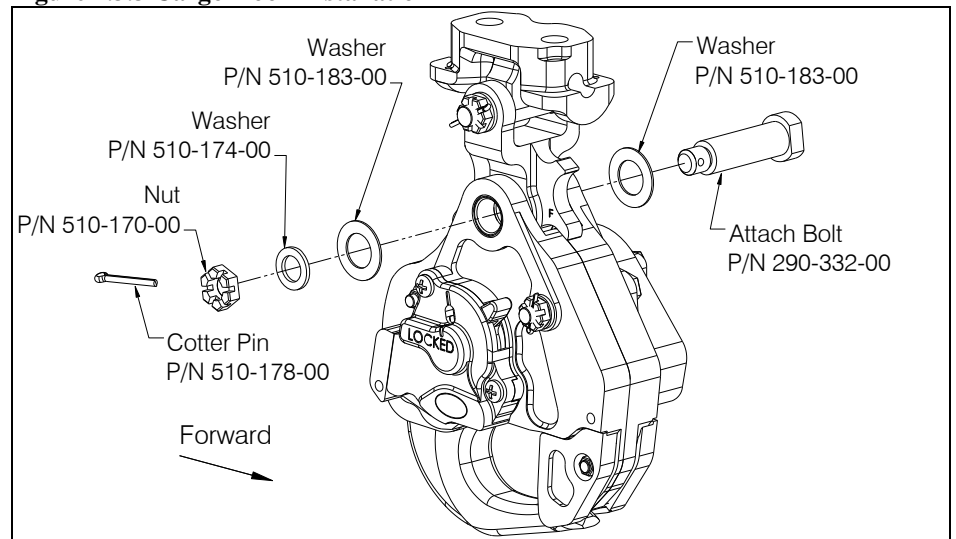
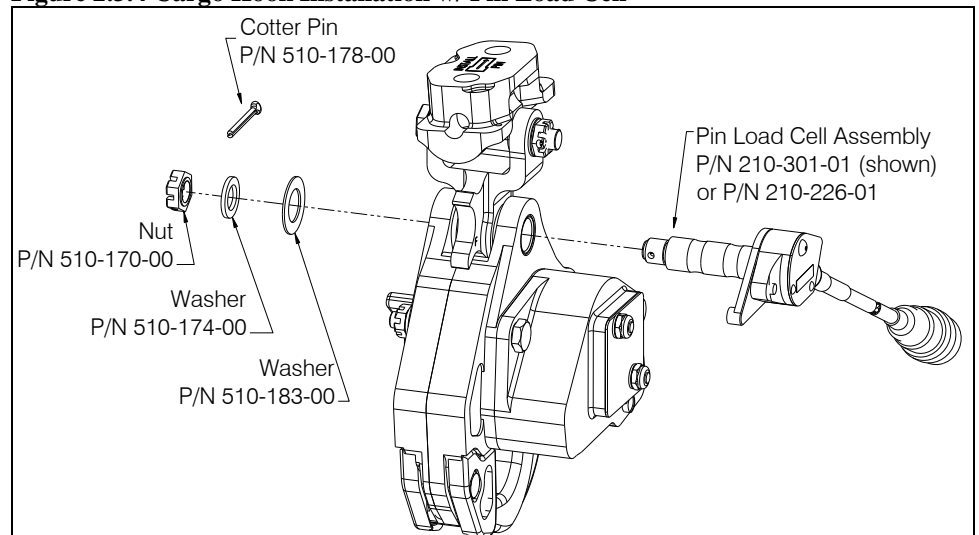


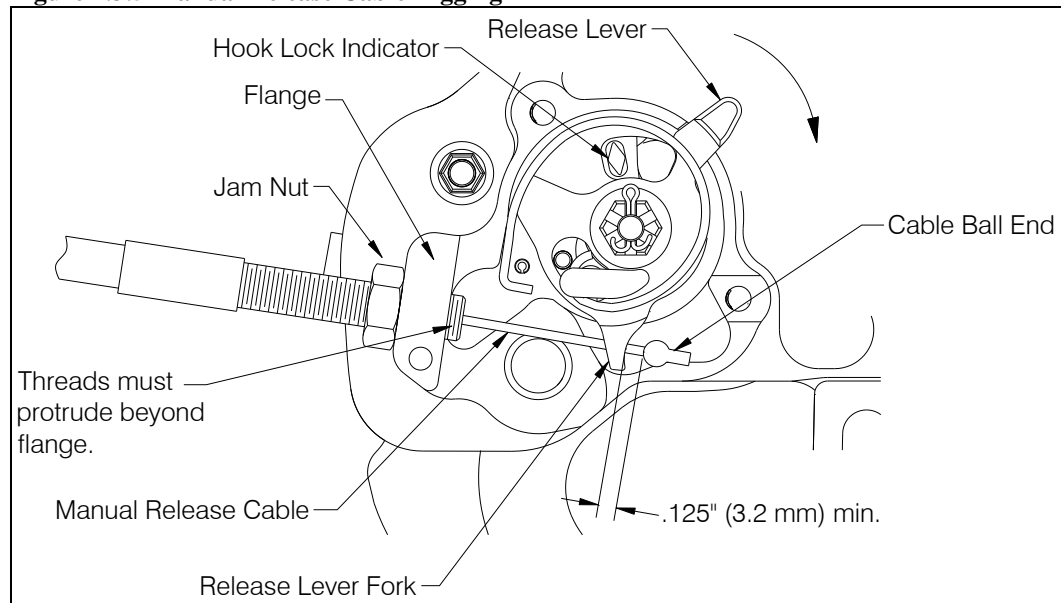
Figure 2.3.4 Cargo Hook Installation w/ Pin Load Cell



2.3 Manual Release Cable and Cargo Hook Installation continued

- Place the inner cable of the manual release cable through the slot of the release lever fork as shown in Figure 2.3.5.
- Rotate the release lever in the clockwise direction to remove free play and hold (the free play is removed when the hook lock indicator begins to move). This is also readily felt as the lever rotates relatively easily for several degrees as the free play is removed.
- Measure the gap between the release lever fork and the cable ball end with the manual release handle in the cockpit in the non-release position. The gap should measure a minimum of .125" (see below). The maximum amount of free play is limited by the manual release cover, i.e. – the ball end must fit inside the manual release cover when it is installed.
- If the gap does not measure at least .125", make adjustments at the cargo hook. This is done by removing the cargo hook from the suspension and rotating the cargo hook in the required direction.
- When correct setting is achieved, tighten the jam nut securely against the cargo hook.
- Re-install the manual release cover on the cargo hook with the two screws removed.

Figure 2.3.5 Manual Release Cable Rigging



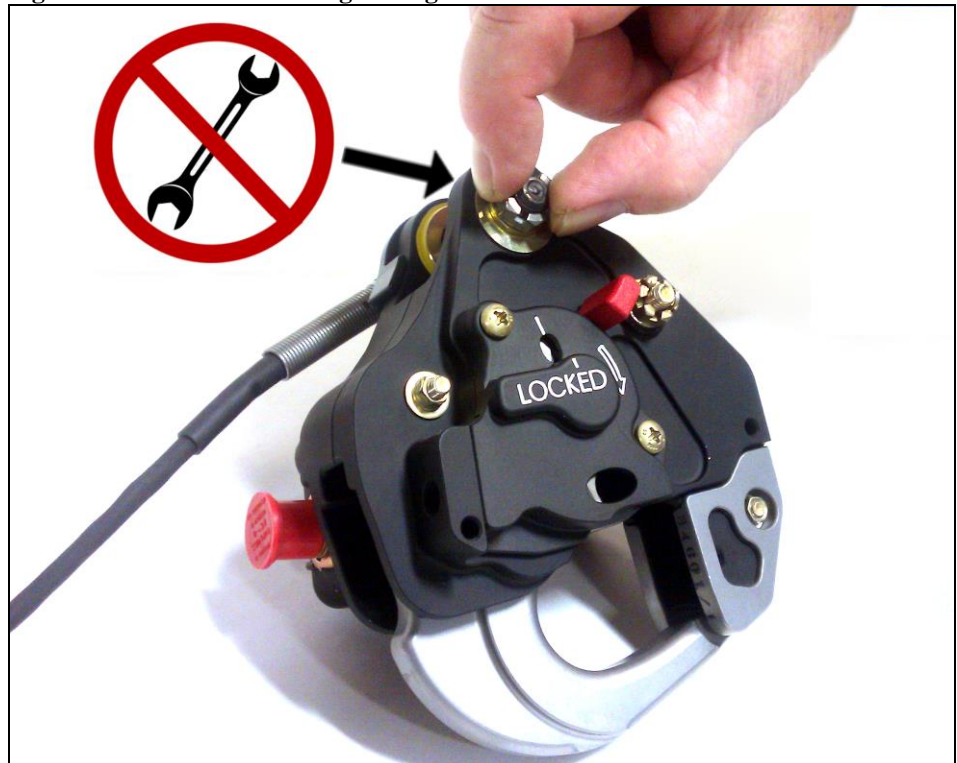
2.3 Manual Release Cable and Cargo Hook Installation continued

- Re-install the washers and nut onto the cargo hook attach bolt or if installing the load weigh system install the washers and nut onto the pin load cell.
- 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.

Figure 2.3.6 Pin Load Cell Tightening



2.4 Electrical Wiring to Cargo Hook

- Route the electrical release wiring (#3 and #4 wires) with the manual release cable to the cargo hook.
- Secure the wiring to the manual release cable with ty-wraps at approximately 12” intervals.
- Route (as far as possible) the load cell assembly harness with the manual release cable and electrical release wiring.
- Connect the cargo hook electrical release harness connector to the cargo hook. Listed below is the pin out for the cargo hook connector. Safety-wire the connector.

Table 2.4.1 Cargo Hook Connector




<i>Pin</i>	<i>Function</i>
A	Ground
B	Power

CAUTION

Early versions of the Cargo Hook were equipped with a suppression diode that will be damaged if the Cargo Hook electrical connections are reversed.

2.5 Electrical Release Switches Installation

The column to the left in the table below shows three R44 configurations; refer to the column on the right for installation instructions for the electrical release switch.

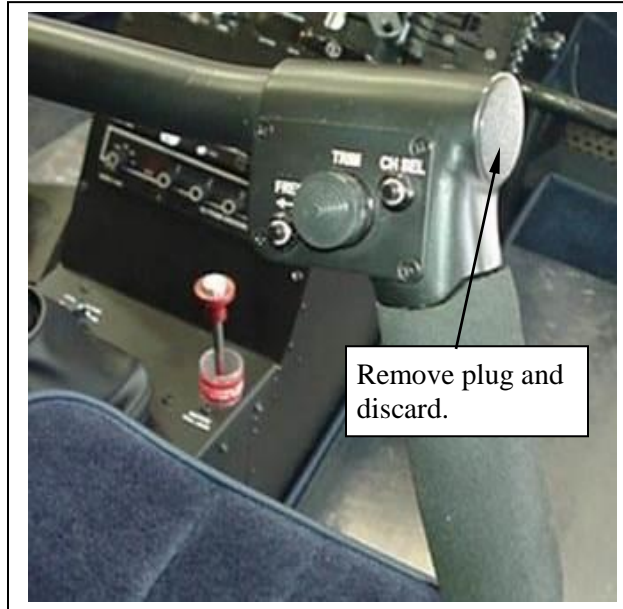
Aircraft and Cyclic Configuration	Installation Instructions
<p>R44 with 14 volt electrical system and with C058 Grip Assembly <u>without</u> Start switch (Robinson P/N B227-2) installed in end of cyclic grip.</p> 	<p>Install Switch Housing P/N 232-114-01 (included with Kit P/N 200-326-00) per Section 2.5.1.</p>
<p>R44 and R44 II with 28 volt electrical systems and with C058 Grip Assembly (<u>with and without</u> Start switch installed in end of cyclic grip).</p> 	<p>Install Switch Housing P/N 232-152-01 (included with Kit P/N 200-327 series) per Section 2.5.2. Plug is provided which is to be installed in Switch Housing if Start switch is not present (R44 model).</p>
<p>Early R44s</p> 	<p>The Switch Housing for this configuration is not supplied with these kits. Contact Onboard Systems to obtain Switch Housing P/N 232-063-01, switch P/N 400-059-00, and screw P/N 510-301-00 (qty 2) and install per Section 2.5.3.</p>

2.5 Electrical Release Switches Installation continued

2.5.1 Release Switch Installation - Robinson Grip Assembly C058 – R44

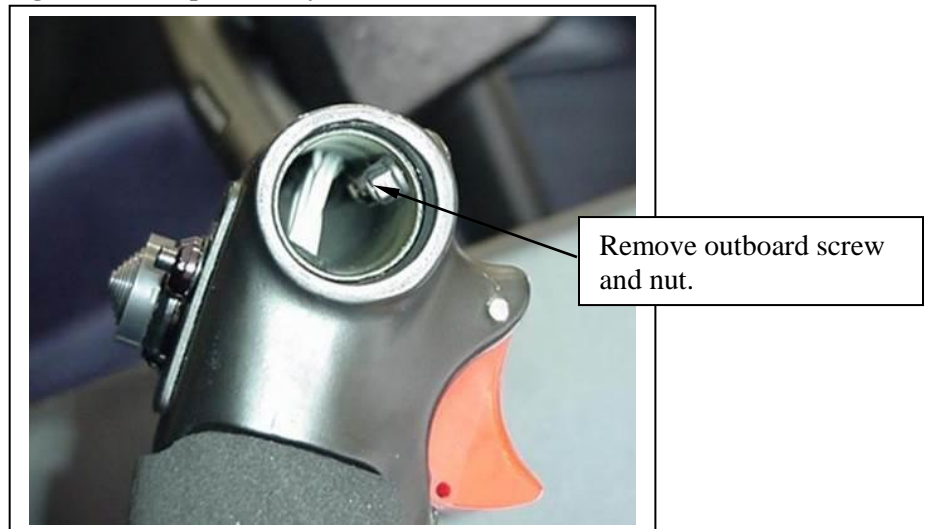
1. Remove Plug (Robinson P/N 2703) shown in Figure 2.5.1 and discard.

Figure 2.5.1 Grip Assembly C058, Plug Removal



2. Remove outboard screw (MS27039C0806) and nut (MS21042L08) shown in Figure 2.5.2.

Figure 2.5.2 Grip Assembly C058, Screw and Nut Removal

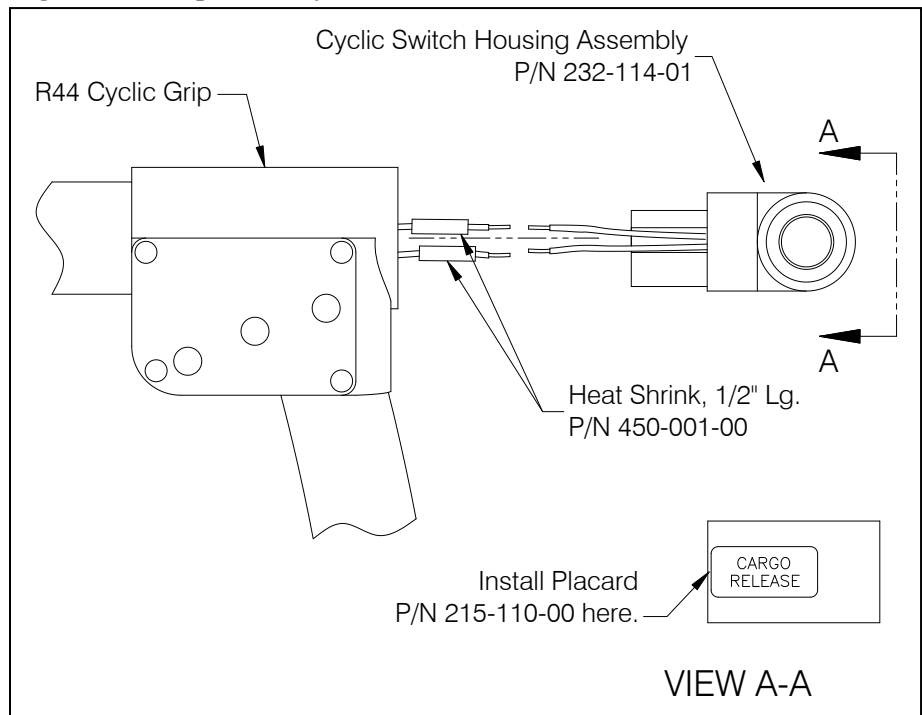


2.5 Electrical Release Switches Installation continued

2.5.1 Release Switch Installation - Robinson Grip Assembly C058 – R44 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 2.5.3).
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 2.5.3 Grip Assembly C058, Screw and Nut Removal



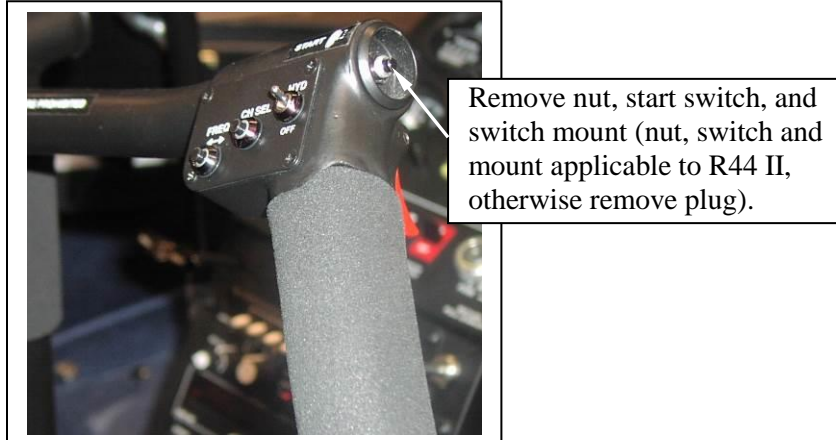
7. Install the Switch Housing Assembly into the end of the grip assembly and secure with the Screw (P/N MS27039C0806) removed earlier. The Nut (P/N MS21042L08) removed earlier will not be re-used for this installation and can be discarded.
8. Check the cyclic for freedom of motion throughout its complete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

2.5 Electrical Release Switches Installation continued

2.5.2 Release Switch Installation - Robinson Grip C058 – 28V R44

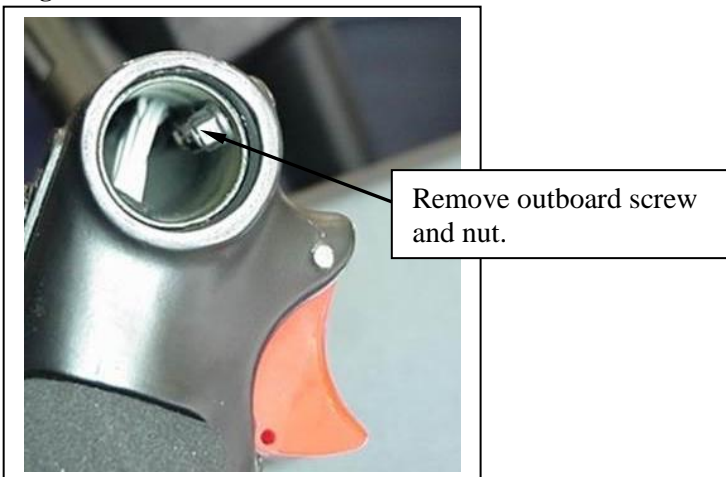
1. Remove nut (P/N B227-4) from start switch (P/N B227-2) and remove switch Mount (P/N D443-2) from end of grip assembly. The Start switch is present on the R44 II, on the R44 a hole plug is installed in lieu of the Start switch, remove this plug (ref Figure 2.5.1).

Figure 2.5.4 Start Switch Removal



2. Remove outboard screw (MS27039C0806) and nut (MS21042L08) as shown in Figure 2.5.5. The nut will not be re-used for this installation and can be discarded.

Figure 2.5.5 Screw and Nut Removal

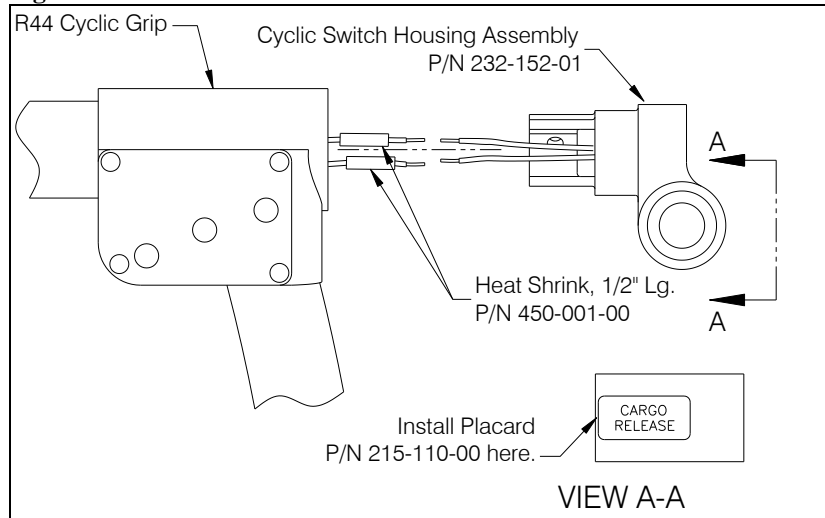


3. Using a lead wire, pull the number 2A and 4A wires up through the horizontal tube and out the end of the grip assembly.
4. Slide a piece of heat shrink (P/N 450-001-00) over the 2A and 4A wires.
5. Prep and solder, using a lap splice, the 2A wire from up through the cyclic to one of the wires from 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.

2.5 Electrical Release Switches Installation continued

2.5.2 Release Switch Installation - Robinson Grip C058 – 28V R44 continued

Figure 2.5.6 Release Switch Installation



7. Insert the Switch Housing Assembly into the end of the C058 cyclic grip while pulling the Robinson Start switch (if present) through it. Re-install the Robinson start switch into the Switch Mount (P/N D443-2) with the nut and secure the Switch Mount by tightening the pre-installed set screw in the Switch Housing Assembly.

If the Start switch is not present, insert the provided plug (P/N 506-016-00) into the end of the switch housing assembly.

8. If necessary, while inserting the Switch Housing Assembly into the cyclic grip, pull excess wire back down the cyclic grip. Secure the Switch Housing Assembly into the end of the grip assembly with the MS27039C0806 screw removed earlier.

Figure 2.5.7 Switch Housing Assembly Installed w/ Start Switch



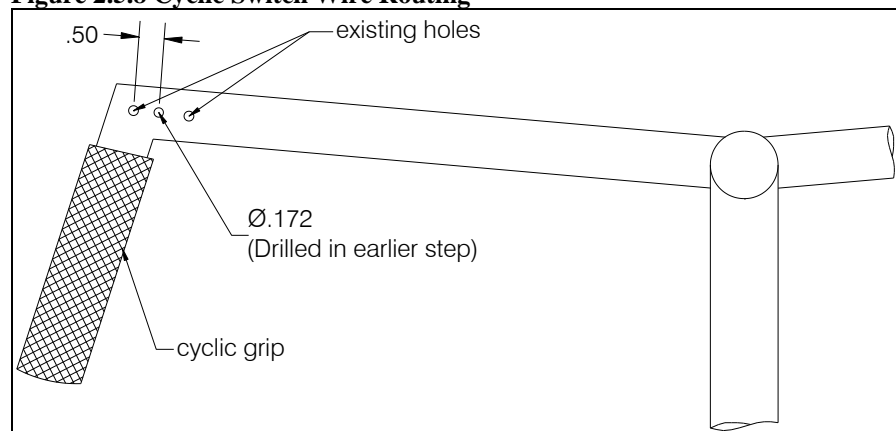
9. Install placard P/N 215-110-00 as shown in Figure 2.5.6.
10. Check the cyclic for freedom of motion throughout its complete travel range and ensure the wires are not chafing on any components.

2.5 Electrical Release Switches Installation continued

2.5.3 Release Switch Installation – Early R44s with A756-6 Grip Assembly

1. Remove the cover to the cyclic switch housing and ensure its wires are clear of the areas to be drilled on the horizontal cyclic control handle.
2. Drill a .172 inch (4.4 mm) diameter hole on the forward side of the cyclic grip as shown in Figure 2.5.8.
3. Use a lead wire and route the number 2A and 4A wires up through the cyclic stick and out the existing wire routing hole. Place a length of heat shrink over the wires that will cover the exposed portion similar to the existing com wires.
4. Using a lead wire again, pull the number 2A and 4A wires up through the cyclic grip and out the .250 hole on the front of the cyclic grip.
5. Place a 1 inch (25.4 mm) length of heat shrink over each wire to the cyclic switch. Prepare each wire end and solder them to the normally open and closed switch terminals as shown in the Figure 2.2.1 wiring schematic. Using a heat gun, shrink the covering material to final size.

Figure 2.5.8 Cyclic Switch Wire Routing



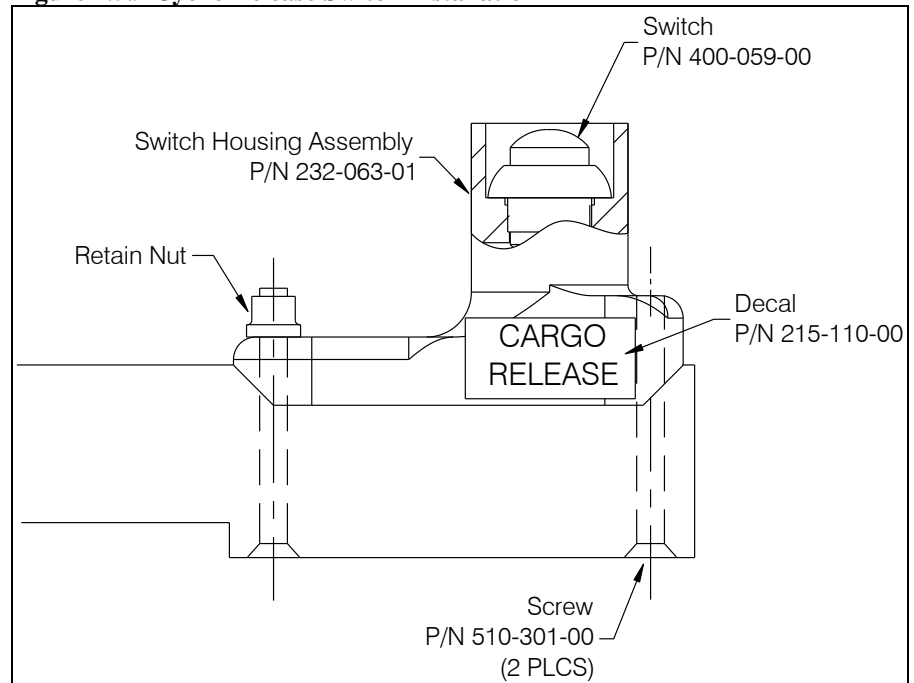
6. Install the P/N 400-059-00 switch in the 232-063-01 cyclic switch housing assembly using needle nose pliers to hold the switch. Install the completed switch housing assembly with the hardware as shown in Figure 2.5.9. Remove the existing switch housing screws and replace them with the longer 510-301-00 screws and retain one of the removed nuts as shown in Figure 2.5.9.

2.5 Electrical Release Switches Installation continued

2.5.3 Cyclic Release Switch Installation continued

7. Re-install the com switch housing and wires.
8. Check the cyclic for freedom of motion throughout its complete travel range and ensure the wires are not chafing on any components.

Figure 2.5.9 Cyclic Release Switch Installation

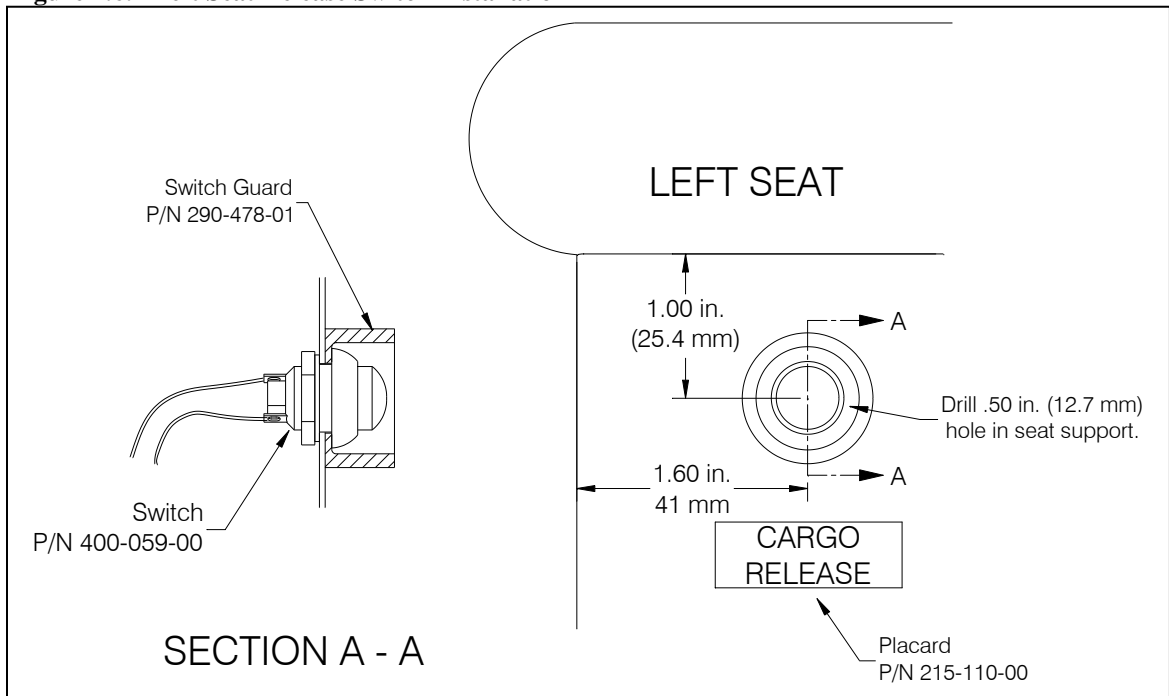


2.6 Optional Left Seat Release Switch Installation

If the left seat release switch installation is not desired, cap and stow wires 2B and 4B per AC 43.13 and skip this section.

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 2.6.1.
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 2.2.1 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 2.6.1 and secure with nut.

Figure 2.6.1 Left Seat Release Switch Installation



2.7 Load Weigh System Installation

Kit P/Ns 200-327-01, 200-327-02, 200-327-11, and 200-327-12 feature a load weigh system, which includes the load cell, an electrical wiring internal harness and a load weigh indicator, kit P/Ns 200-327-02 and 200-327-12 include the next generation C-40 load weigh indicator. Kit P/N 200-340-00 and 200-340-01 are load weigh system “upgrade” kits for an operator with kit P/N 200-327-00 or 200-327-10 installed.

Install the internal harness and C-39 indicator per section 2.7.1 or if installing the load weigh system w/ C-40 Indicator, skip to section 2.7.2; refer to section 2.3 for pin load cell installation. If a load weigh system is **not** being installed, skip to section 2.8.

2.7.1 C-39 Load Weigh System Installation

Load Weigh Internal Harness Installation

The Load Weigh Harness for the C-39 indicator is made up of four cables terminated to one connector. The connector is plugged into the back of the Indicator. One of the cables is marked “LOAD CELL” and is fitted with a bulkhead fitting. This cable is connected to the load cell. Another cable is marked “POWER” and is connected to the aircraft electrical power. Another cable is marked “LIGHT”, refer to the *Indicator Internal Back Light* section for installation instructions. The last cable is marked “DATA” and is connected to an optional Data Recorder and C-23 printer.

The load cell cable can be routed with the hook electrical release harness to the cargo hook area. The load cell connector should be mounted in a location close enough to the load cell to ensure the load cell cable is not strained when the cargo hook is moved to its furthest point, but far enough away to minimize excess cable which may be snagged. Secure the connector with the screws (P/N 510-028-00) and nuts (P/N 510-029-00) provided.

Route the harness to the electrical bus and to the Indicator mounting location. Secure the cables to the existing wiring bundles with the ty-wraps. Secure the cables clear of flight control rods.

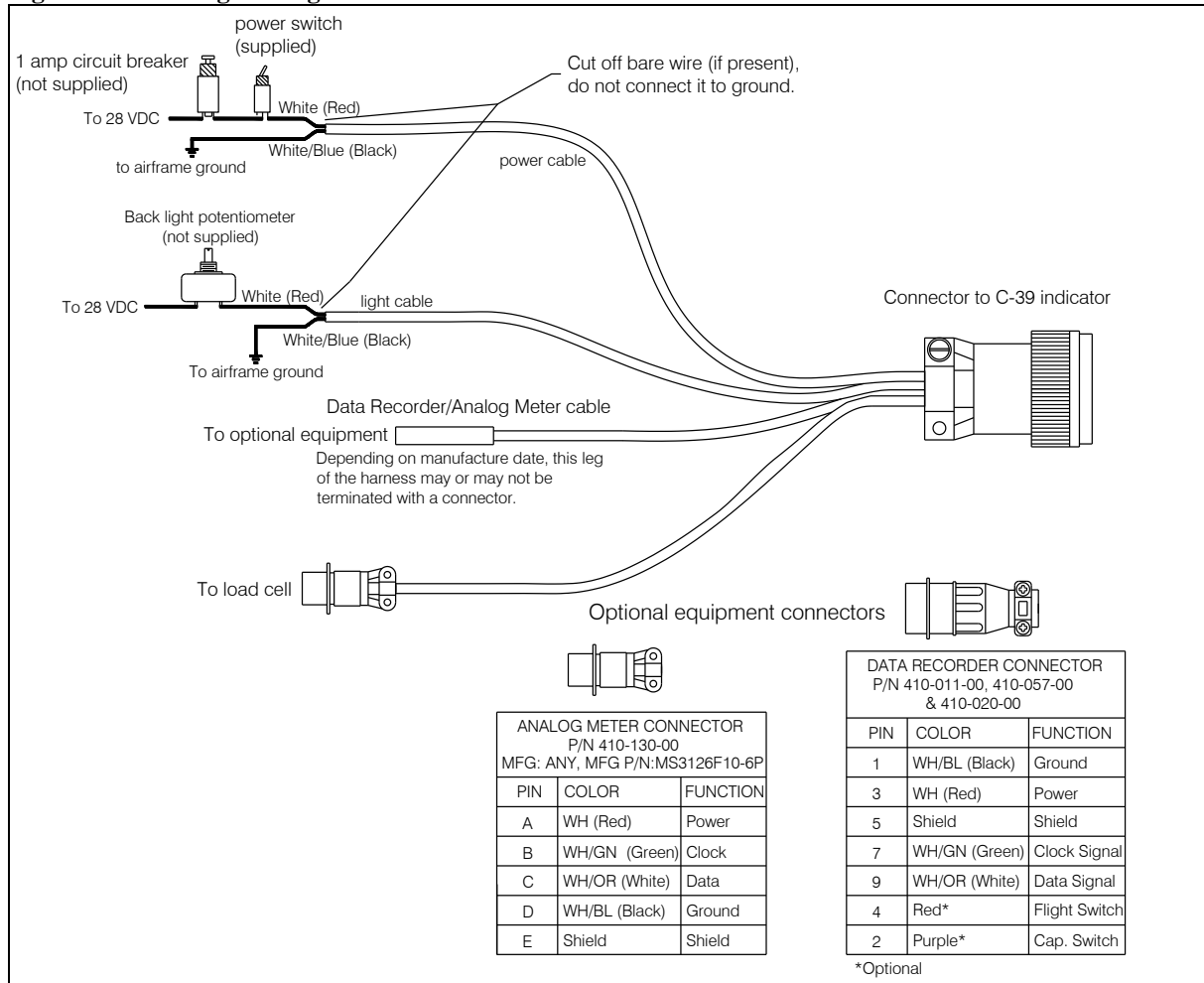
Electrical Connections

Install the supplied power switch, P/N 400-048-00. The “POWER” cable on the Internal Harness is supplied extra long, cut off the excess cable and use as needed to connect the switch and circuit breaker. Connect the “POWER” white wire (red if wire harness P/N 270-048-00 is installed) 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 as illustrated in Figure 2.7.1. Connect the circuit breaker to the 28 VDC bus. Connect the white/blue wire (black if wire harness P/N 270-048-00 is installed) to the ground bus. The cable shield wire is not grounded at this end of the cable and may be cut off. Use a minimum of 22 gauge wire to make all connections. Secure the connections and protect from corrosion.

2.7 Load Weigh System Installation continued

2.7.1 C-39 Load Weigh System Installation continued

Figure 2.7.1 Wiring Arrangement



NOTICE

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

2.7 Load Weigh System Installation continued

2.7.1 C-39 Load Weigh System Installation continued

Indicator Installation

The indicator should be mounted in a position that is convenient, accessible and visible to the pilot. It can be mounted in a standard 2¼" instrument hole. Connect the Indicator to its Internal Harness, refer to *Internal Harness Installation*.

Indicator Internal Back Light

The 210-095-00 Indicator is equipped with an Internal Back Lighting System that can be connected to the aircraft 28 VDC light dimming circuit. Use a 22 gauge, twisted pair, shielded cable to connect the aircraft dimming circuit to the Internal Harness. The cable shield wire is not grounded at this end of the cable and may be cut off.

Indicator Hook-Open Warning

The 210-095-00 Indicator is equipped with a Hook-Open Warning feature that can be connected to a cargo hook equipped with a hook open switch. Depending on the capabilities of the cargo hook switch, the Indicator will flash "HOOK OPEN" when the cargo hook load beam is open. The cargo hook switch must be normally open when the cargo hook load beam is in the closed position. When the load beam is open, one side of the switch must be grounded and the other side of the switch is to be connected to the Indicator. Use a 22 gauge, shielded wire to connect the cargo hook switch to the Indicator. Disassemble the Indicator mating connector and carefully solder the wire, from the cargo hook switch, to pin H. Connect the cable shield wire to airframe ground as close to the cargo hook as possible, at the cargo hook end of the cable ONLY.

2.7 Load Weigh System Installation continued

2.7.2 C-40 Load Weigh System Installation

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) shown in Figure 2.2.1. The functions performed by the C-30 data recorder will be integrated into the C-40 Indicator with a future software update.

The internal harness provided with new C-40 Indicator kits is the same as the C-39 internal harness except it does not include the data line but does include an additional wire for TEDS data which will provide for future capability to automatically recognize the load cell's calibration code.



If installing the C-40 indicator as a replacement for the C-39 indicator, the internal harness does not need to be replaced.

C-40 Indicator Installation

The C-40 Indicator is designed to be mounted in a standard 2¼" instrument hole and should be located in a position that is convenient, accessible and visible to the pilot. Another consideration for its mounting location is access to the USB port on the back, this USB port is intended for the firmware updates.

Secure the C-40 Indicator in its mounting location with the four screws (P/N 511-211-00) provided.

C-40 Internal Harness Installation

Route all wires using the following general guidance.

- Pick up existing wire runs by opening existing cable clamps nylon ties alone may not be used for primary support.
- New wire runs should be supported with MS21919WDG loop clamps.
- The distance between supports should not exceed 21 inches.
- The minimum radius of bends in wire groups or bundles must not be less than 10 times the outside diameter of the largest wire or cable.
- Inspect and verify that the wire harness may not be manually deflected into a structure with a bend radius less than .125".

Connect the larger of the connectors on the load weigh harness (P/N 270-283-02) to the back of the C-40 indicator.

Route the "LOAD CELL" leg of the harness to the belly of the aircraft. Locate a convenient position to install the load cell connector directly inboard or aft of the existing hole in the aircraft skin that allowed the manual release cable to pass through (under the pilot's seat). Layout the connector hole pattern and drill the required holes. Install the connector with the supplied hardware (screw P/N 510-028-00 (qty 4), nut P/N 510-029-00 (qty 4), and washer P/N 510-062-00 (qty 4)).

2.7 Load Weigh System Installation continued

2.7.2 C-40 Load Weigh System Installation continued

C-40 Internal Harness Installation continued

If it is necessary to remove the load cell bulkhead connector to facilitate routing, re-connect the wires referring to the schematic in Figure 2.7.2.

Route the wire labeled POWER to the circuit breaker panel in the center console and install a 1 or 2 amp circuit breaker (not supplied) and connect this wire to it. Apply the supplied placard P/N 215-010-00 adjacent to the circuit breaker.

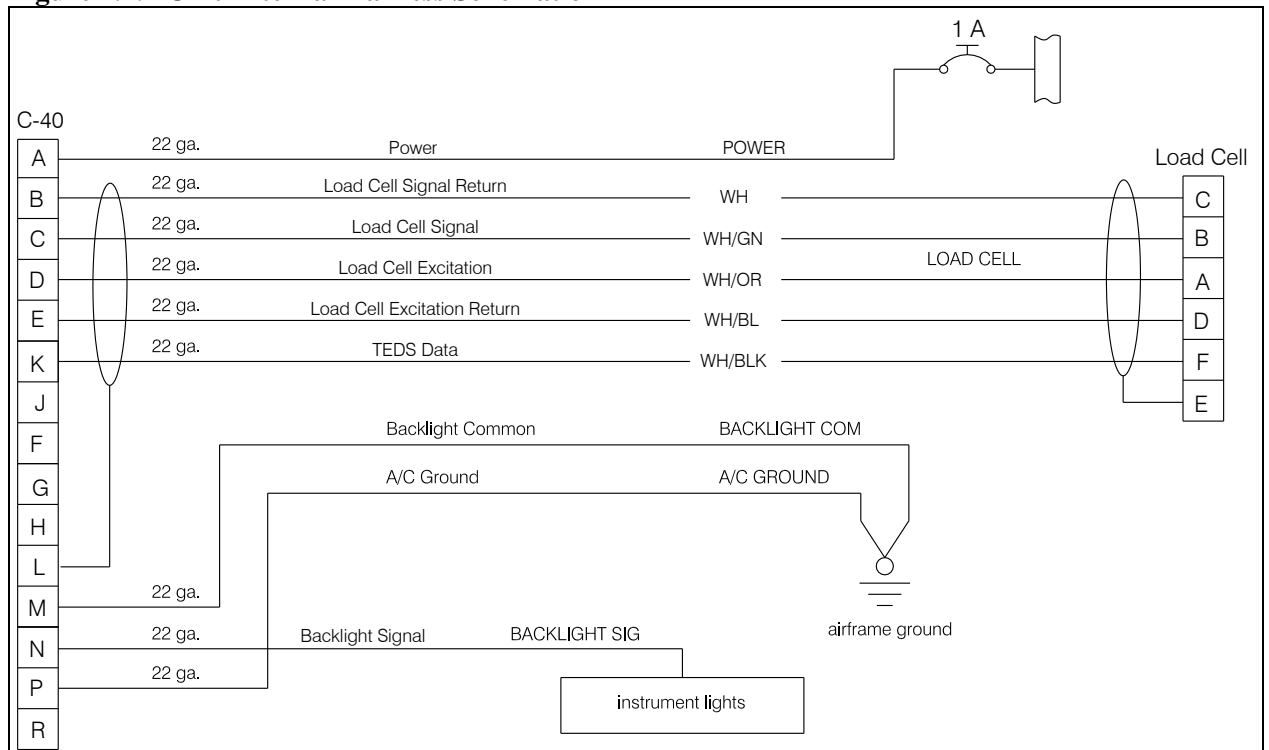
Wire numbers BACKLIGHT SIG and BACKLIGHT COM are for the C-40 Indicator's backlight control voltage. Connect wire BACKLIGHT SIG to the instrument panel lighting circuit and wire BACKLIGHT COM to aircraft ground.



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).

Wire A/C GROUND is to be connected to a suitable aircraft ground.

Figure 2.7.2 C-40 Internal Harness Schematic

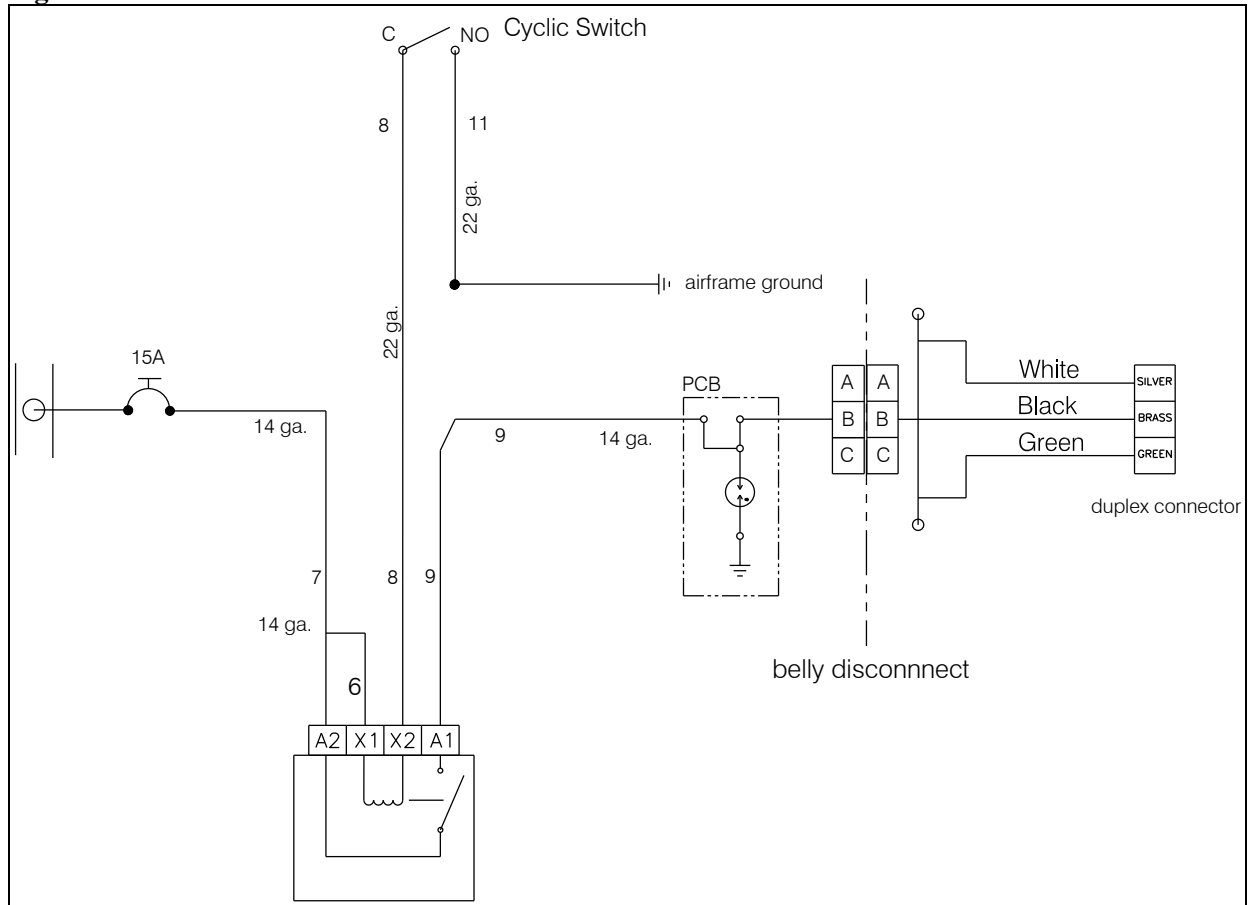


2.8 Remote Hook Electrical Release Kit Installation

This section provides instructions for the optional Remote Hook Electrical Release Kit (P/N 200-396-00). Skip to section 2.9 if not installing this kit.

The Remote Hook Electrical Release Kit includes the fixed electrical provisions (switch, circuit breaker, relay, wiring, and connector bracket) and an external harness for operating a remote cargo hook. The schematic for this system is shown below.

Figure 2.8.1 Remote Electrical Release Schematic



Circuit Breaker Installation

- Remove the circuit breaker cover panel and install the 15 amp circuit breaker (P/N 440-013-00) 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.
- Use the wire assembly (P/N 270-198-00) and a ring terminal (P/N 410-309-00) as a jumper to power the input side of the circuit breaker in compliance with AC 43.13.

2.8 Remote Hook Electrical Release Kit Installation continued

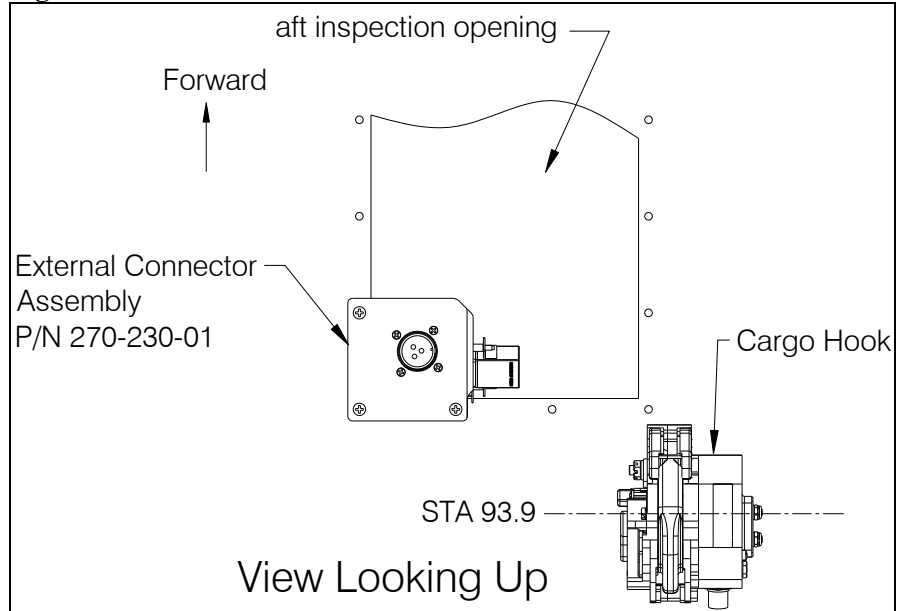
External Connector Assembly Installation

The External Connector Assembly (P/N 270-230-00* or 270-230-01) includes the connector, relay, PCB with surge arrestor for lightning protection, and the wires to route to the cyclic mounted switch and circuit breaker. It is mounted at the aft right (when looking forward) corner of the aft belly inspection panel (see below for overview of location).

**P/N 270-230-00 is not compatible with Robinson panel P/N C794-3 which has the air inlet. P/N 270-230-01 is current production version.*

The external side of the bracket is primed and ready to paint if desired. Mask the connector and top side of bracket before painting.

Figure 2.8.2 Connector Installation Location Overview



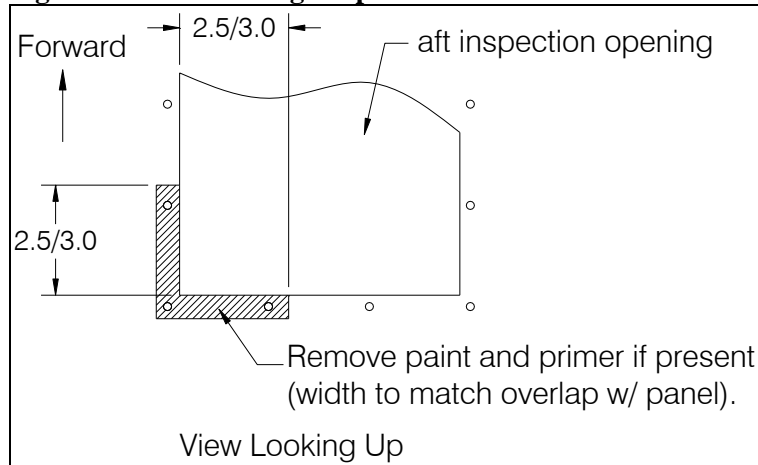
- If the cargo hook is already installed, remove the loop clamps at the inspection panel fasteners along the belly that secure the cargo hook's manual release cable and electrical wiring.
- Remove the forward and aft belly inspection panels, retain all screws as they will be re-used for the External Connector Assembly attachment as well.

2.8 Remote Hook Electrical Release Kit Installation continued

External Connector Assembly Installation continued

- If present remove paint/primer on the belly of the aircraft (at overlap of inspection panel and belly) at the faying surfaces of the External Connector Assembly's bracket and the aircraft belly (see below) to provide a ground path for the remote release electrical circuit.

Figure 2.8.3 Grounding Preparation



- Install the “OSRR1-15” label from the P/N 215-284-00 placard sheet on or adjacent to the relay and the “OSCR1-4” label adjacent to the connector.
- Attach the External Connector Assembly using a screw at the corner location and secure in place for wire routing by temporarily installing screws at the other two locations.
- Route the wires (wire nos. 7 and 8) from the External Connector Assembly across the tunnel and then up to the existing main wire bundle with the DME antennae wires and route these forward with the main wire bundle.

Route the wires using the following general guidance.

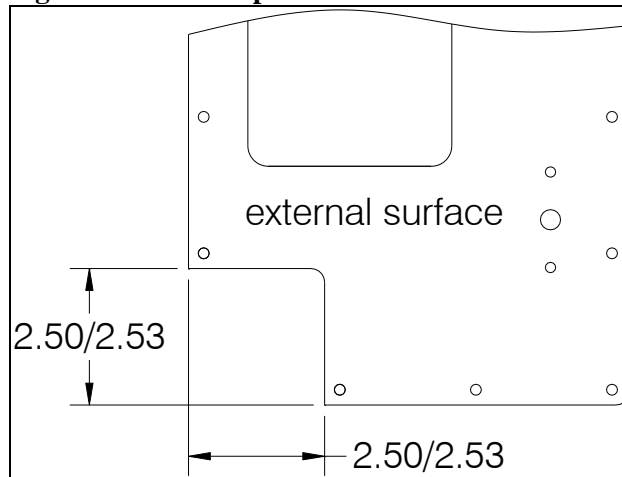
- Pick up existing wire runs by opening existing cable clamps, nylon ties alone may not be used for primary support.
- New wire runs should be supported with MS21919 type loop clamps.
- The distance between supports should not exceed 21”.
- The minimum radius of bends in wire groups or bundles must not be less than 10 times the outside diameter of the largest wire or cable.
- Inspect and verify that the wire harness may not be manually deflected into a structure with a bend radius less than .125”.
- Route the no. 7 wire (14 ga. wire) from the tunnel into the circuit breaker bay using the existing wire harness access hole. Connect the wire to the output side of the circuit breaker using the other ring terminal (P/N 410-309-00) provided.
- Route wire no. 8 to the base of the cyclic. This wire is routed to the release switch per the following section.

2.8 Remote Hook Electrical Release Kit Installation continued

External Connector Assembly Installation continued

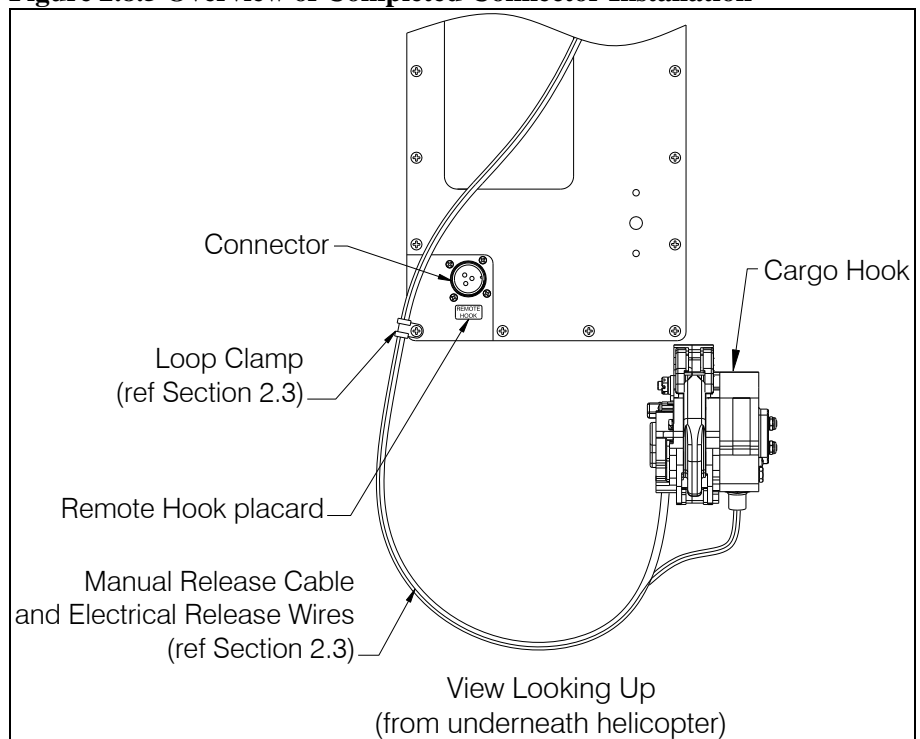
- In preparation for closing out the aft inspection opening cut out the corner of the aft inspection panel per the figure below.

Figure 2.8.4 Aft Inspection Panel Modification



- Remove the two screws temporarily installed to secure the External Connector Assembly and re-install the modified aft inspection panel and the loop clamps for routing of the manual release cable and electrical wires.
- Adhere the “REMOTE HOOK” placard from the placard sheet adjacent to the connector.

Figure 2.8.5 Overview of Completed Connector Installation



- Connect the external harness (P/N 270-205-00) connector to the fixed connector.

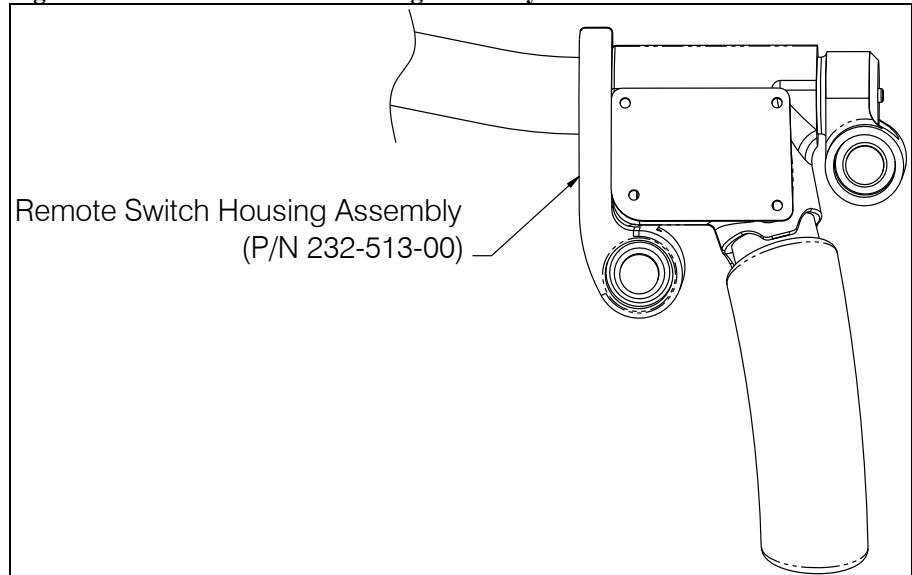
2.8 Remote Hook Electrical Release Kit Installation continued

Switch Housing Assembly Installation

The remote cargo hook release switch is provided pre-assembled into a housing (P/N 232-513-00) which is designed to mount on the cyclic tube (as shown below).

- Remove the two screws and clamp provided pre-assembled onto the switch housing.
- Position the switch housing assembly to the left of the controls housing on the end of the cyclic. The exact position of the switch housing assembly can be altered according to pilot preference by rotating it about and/or sliding it inboard on the cyclic shaft. In preparation for wire routing, temporarily secure it in the desired position with the clamp and two screws.

Figure 2.8.6 Remote Switch Housing Assembly



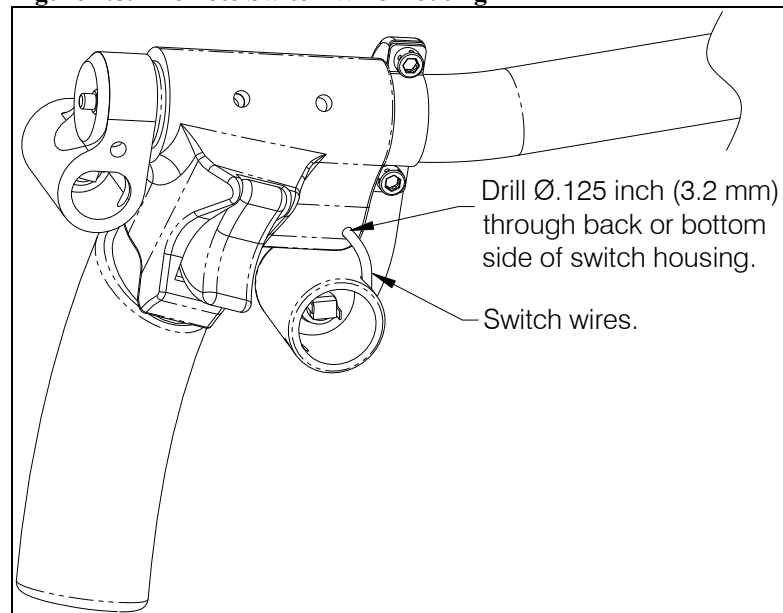
2.8 Remote Hook Electrical Release Kit Installation continued

Switch Housing Assembly Installation continued

Routing of the switch wires requires that a small hole be drilled in the cyclic control housing. The location of this hole can be through the back of the housing or through the bottom depending on the preferred position of the switch housing and/or possible interference with components internal to the housing.

- Remove the cover of the cyclic control housing and any internal components as necessary to provide clearance for drilling.
- Loosen the clamp screws and slide the switch housing assembly out of the way and drill a .125 inch (3.2 mm) hole in the cyclic controls housing in order to feed the wire leads from the switch through.

Figure 2.8.7 Remote Switch Wire Routing



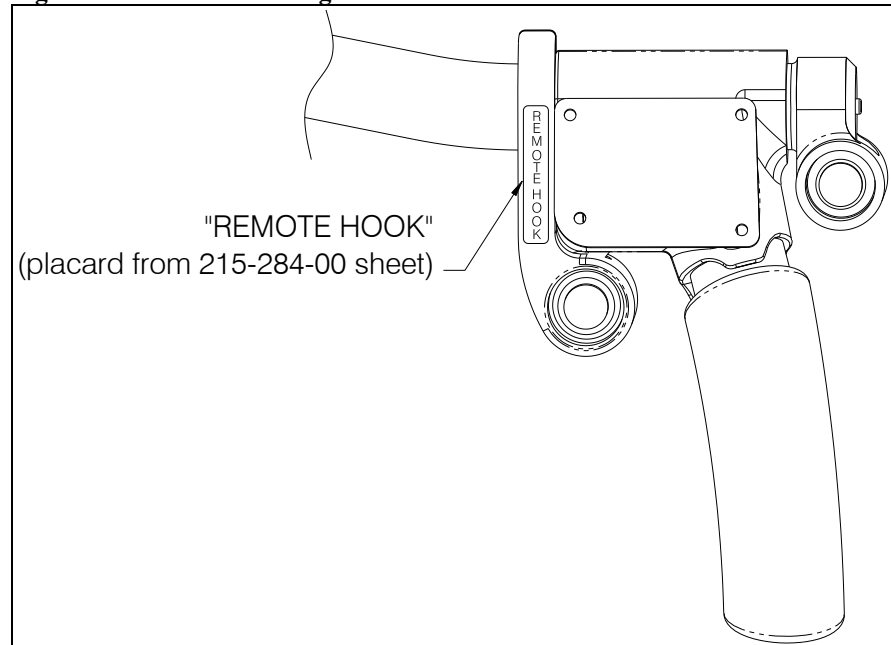
- Using a lead wire, pull wire no. 8 from the wire harness and the 6' length of 22 gauge wire (M22759/34-22-9) up through the cyclic tube and into the cyclic controls housing.
- Slide a piece of the supplied heat shrink (P/N 450-001-00) over the end of each wire (the no. 8 wire and the 22 gauge wire).
- Re-position the switch housing assembly and secure in place by tightening the two screws. Feed the wires through the drilled hole into the housing and cut them to length if necessary. If possible it may be desirable to leave a small service loop in the housing to accommodate some switch position adjustment later.
- Prep and solder (using a lap splice) the no. 8 wire from up through the cyclic to one of the wires from the switch and the 22 gauge wire from up through the cyclic to the other wire from the switch.
- Slide the heat shrink over the respective solder joints and shrink in place using a heat gun.
- Re-assemble and re-install the cyclic control cover.
- Re-install the forward inspection panel.

2.8 Remote Hook Electrical Release Kit Installation continued

Switch Housing Assembly Installation continued

- Install the narrow “REMOTE HOOK” placard from the P/N 215-284-00 placard sheet on the front of the switch housing assembly (as shown below).
- Install the remaining “REMOTE HOOK” placard from the placard sheet adjacent to the circuit breaker.

Figure 2.8.8 Switch Housing Placard Installation



2.9 Placards

Install the following placards.

Table 2.9.1 Placards

DECAL NUMBER (DECAL DESCRIPTION)	LOCATION
P/N 215-110-00 (CARGO RELEASE)	Mount adjacent to the cyclic release switch in clear view of the pilot (see Figure 2.5.3, Figure 2.5.6, or Figure 2.5.9).
P/N 215-110-00 (CARGO RELEASE)	Mount adjacent to the left seat release switch in clear view of the pilot (See Figure 2.6.1).
P/N 215-110-00 (CARGO RELEASE)	Mount adjacent to the mechanical release in clear view of the pilot. (See Figure 2.3.1)
P/N 215-111-00 (PULL)	Mount adjacent to the mechanical release in clear view of the pilot. (See Figure 2.3.1)
P/N 215-112-00 (CARGO)	Mount adjacent to the cargo hook circuit breaker in clear view of the pilot.
P/N 215-343-00 (CARGO RELEASE HOLD FOR >1 SECOND)	Mount adjacent to the cyclic release switch in clear view of the pilot (if cargo hook w/ Surefire release (P/N 528-029-02) is installed).
P/N 215-115-00 (FAR PART 133.35(A) OPERATIONS ...)	Mount on the instrument panel in clear view of the pilot.
P/N 215-119-00 (EXTERNAL LOAD LIMIT = 800 LBS (363 KGS))	Mount on the belly of the aircraft adjacent to the cargo hook attachment point in clear view of the ground support personnel.
P/N 215-284-00 (REMOTE HOOK)	If Remote Hook Release Kit is installed, install on the remote switch housing assembly in clear view of the pilot (See Figure 2.8.5).
P/N 215-284-00 (REMOTE HOOK)	If Remote Hook Release Kit is installed, mount adjacent to the cargo hook circuit breaker in clear view of the pilot.
P/N 215-284-00 (OSRR1-15)	If Remote Hook Release Kit is installed, mount on or adjacent to the cargo hook relay in the tunnel.
P/N 215-284-00 (REMOTE HOOK)	If Remote Release Kit is installed, mount adjacent to the remote accessory connector on the belly of the helicopter.
P/N 215-284-00 (OSCR1-4)	If Remote Release Kit is installed, mount adjacent to the remote accessory connector on the belly of the helicopter.

2.10 Installation Check-out

After installation of the Cargo Hook Suspension System, 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. With no load on the cargo hook load beam, pull the cargo hook mechanical release T-handle, the Cargo Hook should release. Reset the cargo hook load beam.
3. 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 528-029-02 which is equipped with Surefire electrical release. With no load on the cargo hook perform the following, repeat with the switch on the co-pilot's seat (if installed).
 - 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 cover.

The following instructions are applicable to cargo hook P/N 528-029-00.

- Press and release the Cargo Release switch on the cyclic; the load beam should immediately 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 cover.
4. If the remote hook release kit (P/N 200-396-00) was installed connect a remote hook to its connector and press the REMOTE HOOK release switch on cyclic. The remote hook should release.
 5. Power on the Load Weigh System. 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 (refer to Owner's Manual 120-039-00 for the C-39 model).
 6. 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). With the C-40 Indicator 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).

2.11 Component Weights

The weight of the system is listed in Table 2.11.1.

Table 2.11.1 Component Weights

Kit P/N	Weight lbs (kgs)
200-326-00	5.3 (2.4)
200-327-00, 200-327-10	5.3 (2.4)
200-327-01, 200-327-02, 200-327-11, 200-327-12	6.8 (3.1)
200-396-00	1.1 (0.5)

2.12 Cargo Hook Location

Table 2.12.1 Cargo Hook Location

Fuselage Station	93.9
------------------	------

2.13 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. Insert the Rotorcraft Flight Manual Supplement 121-048-00 in the Rotorcraft Flight Manual.

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Section 3

Operation Instructions

Operating Procedures

If the load weigh system is installed, refer to Owner's Manual 120-039-00 for operating instructions for the C-39 indicator or refer to Owner's Manual 120-152-00 if the C-40 indicator is installed.

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

1. Move the Cargo Hook throughout its complete range of motion and ensure that the manual release cable and the electrical release harness do not limit its movement.
2. 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 528-029-02 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.

The following instructions are applicable to cargo hook P/N 528-029-00.

- 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 electrical release button continuously in excess of 20 seconds will cause the release solenoid to overheat, possibly causing permanent damage.

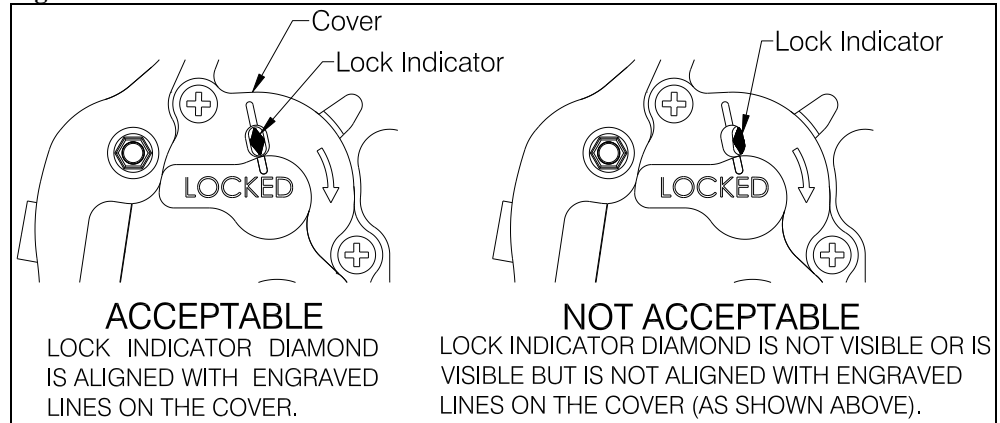
Operating Procedures continued

3. Pull up on the manual release tee handle in the cockpit to test the cargo hook manual release mechanism. The mechanism should operate smoothly and the Cargo Hook must release. Reset the load beam by hand after release. Verify that the hook lock indicator on the side of the hook returns to the fully locked position. In the fully locked position the hook lock indicator must align with the lines on the manual release cover (see Figure 3.1).



In the fully locked position the hook lock indicator must align with the lines on the manual release cover (see Figure 3.1).

Figure 3.1 Hook Lock Indicator



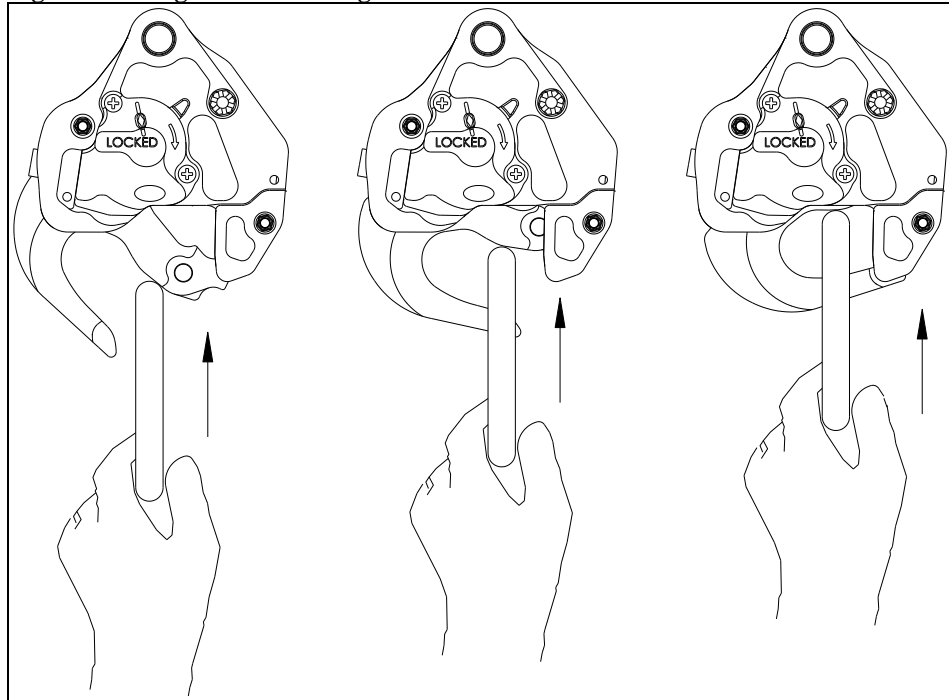
Optional Flight Configuration

The aircraft can be operated with the Cargo Hook and Gimbal Assembly removed. This may be accomplished by removing the Cargo Hook from the Suspension Assembly if no load weigh system is installed. Then remove the Suspension Assembly and Pillow Block together by removing the two Pillow Block mounting fasteners (see Figure 2.1.1). Secure the manual release cable and electrical wire bundle to any convenient location on the frame structure using tie wraps.

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

Figure 3.2 Cargo Hook Loading



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.



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

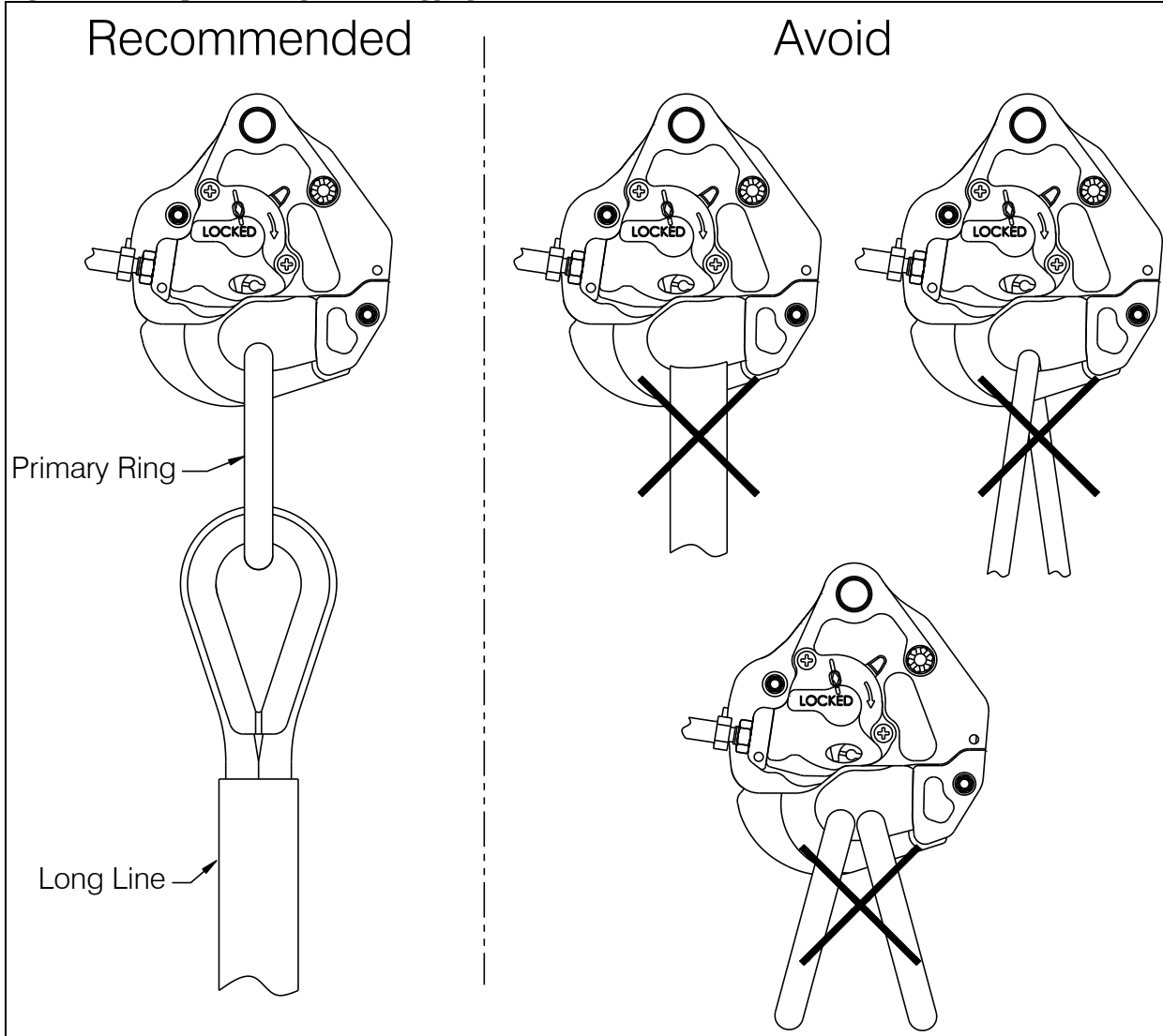
Nylon Type Straps and Rope



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

Cargo Hook Rigging continued

Figure 3.3 Examples of Cargo Hook Rigging



Section 4

Maintenance

Refer to the Instructions for Continued Airworthiness (ICA) manual 123-030-00 for maintenance of the cargo hook suspension system. For maintenance of cargo hook P/N 528-029-00, P/N 528-029-01, and P/N 528-029-02 refer to Cargo Hook Component Maintenance Manual 122-017-00.

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

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Section 5

Certification

FAA STC

United States of America
Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate

Number SR01808SE

This certificate, issued to

**Onboard Systems International
13915 N.W. 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: H11NM
Make: Robinson
Model: R44, R44 II

Description of the Type Design Change: Installation of Onboard Systems International Cargo Hook Kit in accordance with the Master Drawing List (MDL) No. 155-124-00, Revision 19, dated March 31, 2017, or later Federal Aviation Administration (FAA) approved revision.

Limitations and Conditions: Approval of this change in type design applies only to those Robinson rotorcraft models listed above which are equipped with Robinson hard point/tie down block Part Number (P/N) D134-1. Cargo Hook Kit models 200-324-00 and 200-326-00 are eligible for installation on those rotorcraft with 14 volt electrical systems. Cargo Hook Kit models 200-325-00, 200-325-01, 200-327-00, 200-327-01, 200-340-00, and 200-396-00, are eligible for installation on those rotorcraft with 28 volt electrical systems. This approval should not be extended to rotorcraft of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that 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: October 8, 2007

Date reissued:

Date of issuance: January 10, 2008

Date amended: 4/9/09; 8/11/09, 12/30/09; 11/17/11;
1/3/12; 4/4/16; 9/30/16; 6/29/17



By direction of the Administrator

Ken Fankent

(Signature)

fr

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.

United States of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate
(Continuation Sheet)

Number SR01808SE

Onboard Systems International

Date Issued: January 10, 2008

Date Amended: 4/9/09; 8/11/09; 12/30/09; 11/17/11; 1/3/12; 4/4/16; 9/30/16; 6/29/17

Date reissued:

Limitations and Conditions continued:

Maintained in accordance with FAA-accepted Instructions for Continued Airworthiness (ICA), Document No. 123-030-00, Revision 10, dated March 28, 2017, or later FAA-accepted revision. Operated in accordance with FAA-approved Rotorcraft Flight Manual Supplements, Document No. 121-048-00, Revision 5, dated May 19, 2017, or later FAA-approved revision, or Document No. 121-051-00, Revision 3, dated October 24, 2016, or later FAA-approved revision, as applicable.

A copy of this certificate, the MDL, the ICA, Owner's Manual, and the applicable RFMS, must be maintained as part of the permanent records of the modified rotorcraft.

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

- END -

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

This certificate may be transferred in accordance with FAR 21.47.

Canadian Approval



Transport
Canada

Civil Aviation

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

Transports
Canada

Aviation Civile

Your file Votre référence

Our file Notre référence

NAPA# P-08-0357
RDIMS 4432295

October 09, 2008

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

Subject: Acceptance of Foreign STC SR01808SE

Dear Mr. Hanson,

This is in response to FAA letter requesting Transport Canada approval of the subject STC.

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

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

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

Yours truly,

Paul Arnell
For Regional Manager
Aircraft Certification

Cc. Seattle Aircraft Certification Office

Canada

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EASA Approval



SUPPLEMENTAL TYPE CERTIFICATE

10017020 REV. 3

This Certificate/Approval is issued by EASA, acting in accordance with Regulation (EC) No. 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

ONBOARD SYSTEMS INTERNATIONAL

13915 NW 3RD COURT
VANCOUVER WA 98685
USA

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

Type Certificate Number: EASA.IM.R.121

Type Certificate Holder: ROBINSON HELICOPTER COMPANY

Type: R44

Model: R44, R44 II

Original STC Number: FAA SR01808SE

Description of Design Change:

Cargo Hook System Kits

The installation as defined in MDL 155-124-00 provides for different optional Cargo Hook System kits depending on aircraft voltage system, with and without load weighing system and the respective cargo hook in accordance with FAA STC SR01808SE.

With revision 2 of EASA STC 10017020 the Remote Hook Electrical Release System Kit P/N 200-396-00 is introduced.

With revision 3 two additional cargo hook kits (kit P/Ns 200-327-10 and 200-327-11) are introduced.

EASA Certification Basis:

The Certification Basis for the original product remains applicable to this certificate/ approval.

See Continuation Sheet(s)

For the European Aviation Safety Agency

Cologne, Germany, 08 May 2018


Mathieu HENRY
Heavy Rotorcraft Section
Manager



An Agency of the European Union

EASA.IM.R.S.01438

SUPPLEMENTAL TYPE CERTIFICATE - 10017020 - REV. 3 - ONBOARD SYSTEMS INTERNATIONAL - 302945

TE.CERT.00091-004 © European Aviation Safety Agency. All rights reserved. ISO9001 Certified.

Page 1 of 2

EASA Approval continued



SUPPLEMENTAL TYPE CERTIFICATE - 10017020 - REV. 3

The requirements for environmental protection and the associated certified noise and/ or emissions levels of the original product are unchanged and remain applicable to this certificate/ approval.

Associated Technical Documentation:

1. Master Drawing List (MDL) No. 155-124-00, Revision 19, dated 31 March 2017, or later FAA approved revision.
2. Continued Airworthiness (ICA), Document No. 123-030-00, Revision 10, dated 28 March 2017, or later FAA accepted revision.
3. Rotorcraft Flight Manual Supplements, Document No. 121-048-00, Revision 5, dated 19 May 2017, or later FAA approved revision, or Document No. 121-051-00, Revision 3, dated 24 October 2016, or later FAA approved revision.

Limitations/Conditions:

Approval of this change in type design applies only to those Robinson rotorcraft models listed above which are equipped with Robinson hard point/tie down block Part Number (P/N) D134-1.

Cargo Hook Kit models 200-324-00 and 200-326-00 are eligible for installation on those rotorcraft with 14 volt electrical systems. Cargo Hook Kit models 200-325-00, 200-325-01, 200-327-00, 200-327-01, 200-340-00, and 200-396-00, are eligible for installation on those rotorcraft with 28 volt electrical systems.

Prior to installation of this design change it must be determined that the interrelationship between this design change and any other previously installed design change and/ or repair will introduce no adverse effect upon the airworthiness of the product.

- End -



An Agency of the European Union

EASA IM.R.5.01438

SUPPLEMENTAL TYPE CERTIFICATE - 10017020 - REV. 3 - ONBOARD SYSTEMS INTERNATIONAL - 302945

TE.CERT.00091-004

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Page 2 of 2



ANAC

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

NÚMERO 2010S12-07
(Number)

Este certificado, emitido com base na Lei nº 7565 "Código Brasileiro de Aeronáutica", de 19 de dezembro de 1986,
(This certificate, issued in the basis of the Law No. 7565 "Código Brasileiro de Aeronáutica", dated 19 December 1986,

é conferido ao (à): Onboard Systems International
is granted to:) 13915 NW 3rd Court
Vancouver, WA 98685
USA

por ter a modificação ao projeto de tipo do produto abaixo citado, observadas as limitações e condições
(for having the change to the type design of the product mentioned below, with the limitations and conditions therefor as)
especificadas, satisfeito aos requisitos de aeronavegabilidade aplicáveis.
(specified hereon, met the applicable airworthiness requirements.)

Produto Original - Número do Certificado de Tipo: 9402 (ANAC).
(Original Product - Type Certificate No:)

Fabricante: Robinson.
(Manufacturer:)

Modelo(s): R44 and R44 II.
(Model(s):)

DESCRIÇÃO DA MODIFICAÇÃO AO PROJETO DE TIPO:
(Description of Type Design Change:)

Fabrication of Onboard System International Model 200-324-00 and 200-326-00 12V cargo hook kits, Model 200-325-00 and 200-327-00 28V cargo hook kits, Model 200-325-01 and 200-327-01 28V cargo hook kit with load weight, and Model 200-340-00 load weight Kit in accordance with Onboard Systems Master Drawing List (MDL) No. 155-124-00, Rev. 7, dated April 9, 2010, or later approved revision.

This CST validates in Brazil the STC # SR01808SE, issued by FAA (USA).

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

See continuation sheet for applicable data.

DATAS:
(Dates of:)

Do Requerimento: 17 Sep. 2010
(Application:)

Da emissão: 20 Dec. 2010
(Issue:)

Da reemissão:
(Reissue:)


HÉLIO TARQUINIO JÚNIOR
Gerente-Geral, Certificação de Produto Aeronáutico
(General Manager, Aeronautical Product Certification)


DINO ISHIKURA
Superintendente de Aeronavegabilidade
(Airworthiness Superintendent)

F-400-01E (08.10)

Fl. 01 de 03
(Sheet) (of)

H.02-3500-0



ANAC

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

Folha de Continuação ao
(Continuation Sheet to)

CERTIFICADO SUPLEMENTAR DE TIPO
(Supplemental Type Certificate)

NÚMERO 2010S12-07
(Number)

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

- I. The approval of this type design change should not be extended to other aircraft 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 aircraft.
- II. 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.
- III. Operation must be performed in accordance with the applicable FAA approved Rotorcraft Flight Manual Supplement (AFMS) specified below:
 - Document No. 121-051-00, Rev. 1, dated 25 Feb. 2010, or later approved revision, for the Onboard Systems 200-324-00, 200-325-00 and 200-325-01 Cargo Hook kits; or.
 - Document No. 121-048-00, Rev. 2, dated 01 July 2009, or later approved revision, for the Onboard Systems 200-326-00, 200-327-00 and 200-327-01 Cargo Hook kits.
- IV. Installation of the Cargo Hook Kit in accordance with the following approved documents:
 - Owner' Manual document No. 120-137-00, Rev. 4, dated 27 July 2010, or later approved revision, for the Onboard Systems 200-324-00, 200-325-00, or 200-325-01 Cargo Hook kit;
 - Owner's Manual document No. 120-132-00, Rev. 5, dated 27 July 2010, or later approved revision, for the Onboard Systems 200-326-00, 200-327-00 or 200-327-01 Cargo Hook kit.
- V. Installation of the 200-340-00 Load Weight Kit in accordance with above identified Onboard System International Owner's Manual for either the model 200-325-01 or 200-327-01 cargo hook kit, as applicable.



ANAC

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

Folha de Continuação ao
(Continuation Sheet to)

CERTIFICADO SUPLEMENTAR DE TIPO
(Supplemental Type Certificate)

NÚMERO 2010S12-07
(Number)

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

- VI. This modification must be Inspected and Maintained in accordance with:
- Onboard Systems International Instruction for Continued Airworthiness, Section ATA 5 document No. 123-030-00, Rev. 04, dated 23 July 2010 or later FAA approved revision;
 - Onboard Systems International Cargo Hook Component Maintenance Manual document No. 122-001-00, Rev. 13 dated 13 Sep. 2010, or later FAA approved revision for cargo hook kit P/N 200-324-00, P/N 200-325-00 and P/N 200-325-01;
 - Onboard Systems International Cargo Hook Service Manual document No. 122-018-00, Rev. 7, dated 17 Sep. 2010, or later FAA approved revision for cargo hook kit P/N 200-326-00; and
 - Onboard Systems International Cargo Hook Service Manual document No. 122-017-00, Rev. 10 dated 17 Sep. 2010, or later FAA approved revision for cargo hook kit P/N 200-327-00 and 200-327-01.
- VII. Approval of this change in type design applies only to those Robinson rotorcraft models listed above which are equipped with Robinson hard point/tie down block part number (P/N) D134-1,
- VIII. Cargo hook kit models 200-324-00 and 200-326-00 are eligible for installation on R44 only. Cargo Hook Kit models 200-325-00, 200-325-01, 200-327-00 and 200-327-01 are eligible for installation on R44 II only..
- IX. A copy of this Certificate and the Supplement referred on item III, as applicable, above shall be maintained as part of the permanent records of the modified aircraft.

-----END-----

F-400-01E (08.10)

Fl. 03 de 03
(Sheet) (of)

H.02-3500-0