Instructions for Continued Airworthiness

Cargo Hook Kit

for

UH-60A, EH-60A, HH-60L, S-70A, S-70C, S-70M Model Helicopters

STC SR02698SE

Kit Part Numbers
200-437-00
200-438-00
200-438-01

Onboard Systems International, LLC
13915 NW 3rd Court
Vancouver, WA 98685 United States of America
Cage Code: 1Y921

Toll Free Phone: (800) 275-0883
Phone: (360) 546-3072

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

RECORD OF REVISIONS

Revision	Date	Page(s)	Reason for Revision
0	06/19/2020	All	Initial Release
1	04/08/2022	1, 7	Added EH-60A and HH-60L models. No change to content.
2	04/06/2023	1, 5, 7, 23, 24	Added S-70A, S-70C, and S-70M models. Added Kit P/N 200-438-01 (for the S-70M model). Updated primary release system schematic to reflect alternative ground module and the backup release schematic to reflect disconnect of test switch as optional.
3	08/04/2023	12, 14, 16, 24	Incorporated cargo hook P/N 528-043-12.

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Contents

Figures

Section 0 Introduction

0.4 Scope

The following information is necessary to carry out the service, maintenance, and inspection of Cargo Hook Kit P/N's 200-437-00, 200-438-00, and 200-438-01. These kits serve as replacement cargo hook kits for the original Aeroquip/Breeze Eastern cargo hook on the helicopter. They include the cargo hook (see Figure 0.1 and Figure 0.2), an electrical harness to connect to the helicopter's existing fixed cargo hook electrical release system, electrical components to adapt the helicopter's existing cargo hook's cartridge actuated device (CAD, also referred to as squib) electrical system to the backup quick release system of the cargo hook, and an optional load weigh system. For additional details on the scope of the STC wiring modifications and aircraft interfaces, refer to the wiring diagrams in Section 98.

Kit P/N 200-437-00 is the base cargo hook kit and kit P/N 200-438-00 is the same except it includes the load weigh system. The load weigh system includes the pin load cell assembly (integrated into the cargo hook, refer to Figure 0.3), a load weigh indicator (C-40 Indicator), and the interconnecting wire harness. Kit P/N 200-438-01 is for the S-70M model and is the same as 200-438-00 except it includes a unique Doubler.

Figure 0.1 Overview of Cargo Hook, Right Side Shown

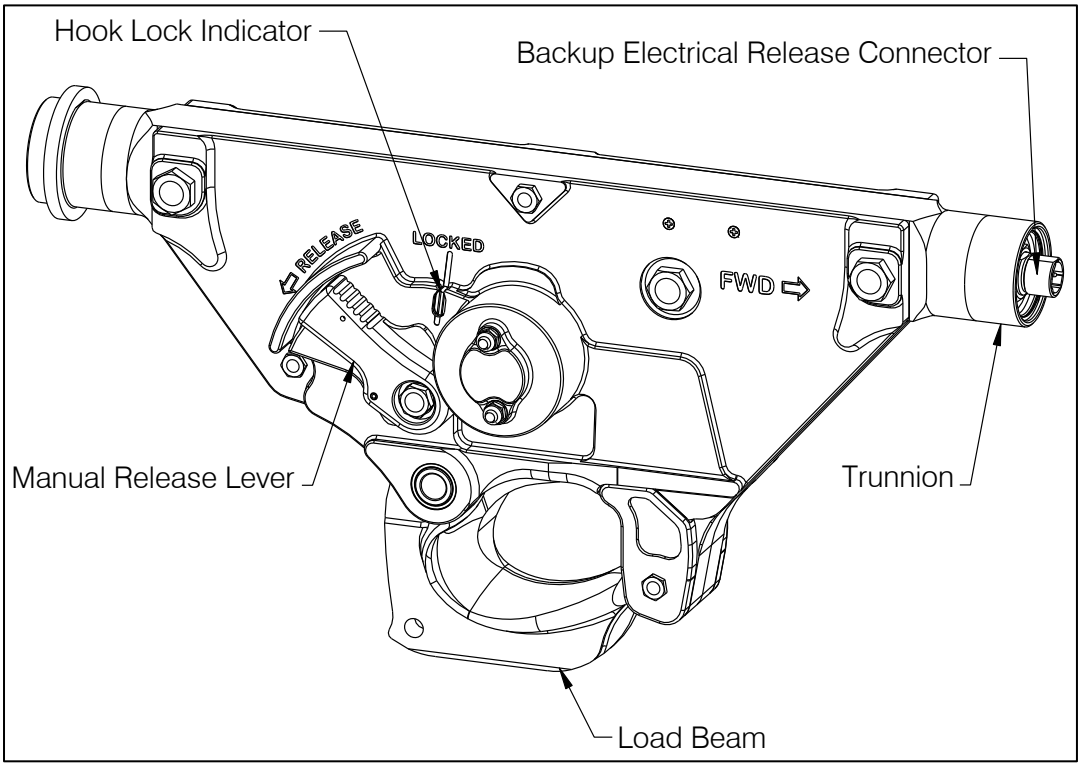


Figure 0.2 Overview of Cargo Hook, Left Side

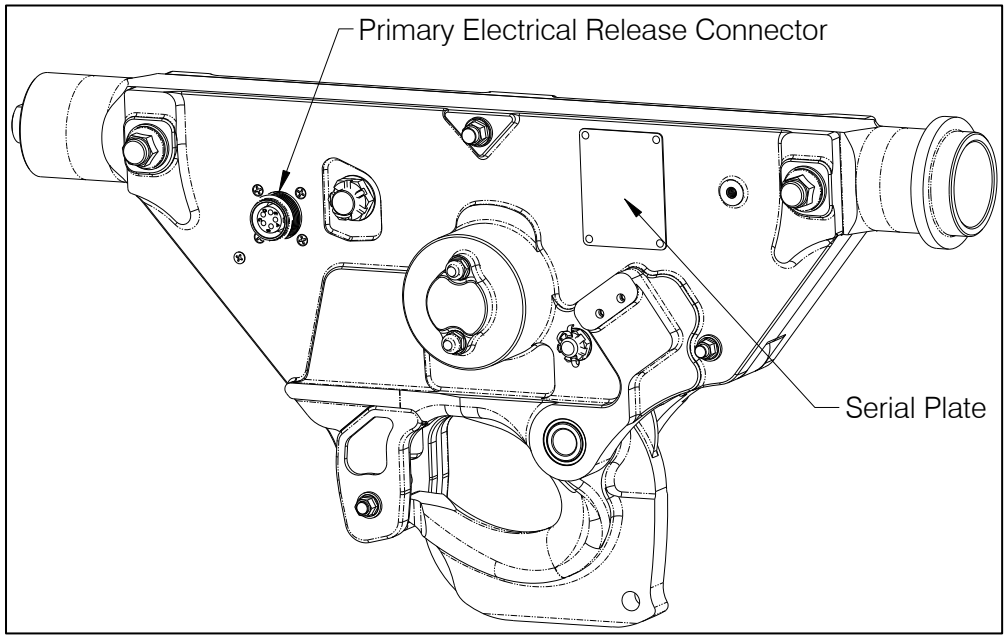
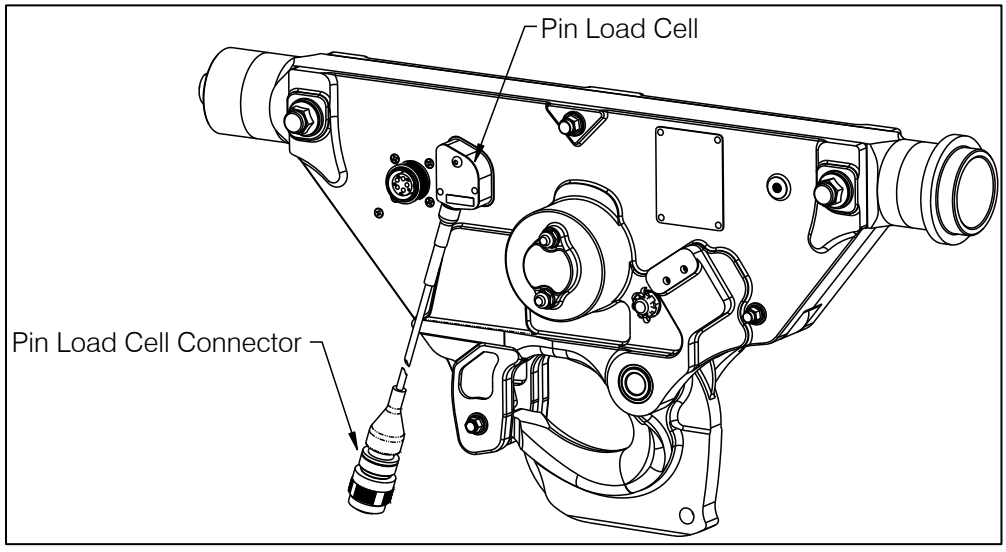


Figure 0.3 Cargo Hook with Pin Load Cell



0.5 Arrangement

The manual is arranged in the general order that maintenance personnel would use to maintain and operate the Cargo Hook Kit in service.

The arrangement is:

Section 0 Introduction

Section 4 Airworthiness Limitations (None apply to this System.)

Section 5 Inspection and Overhaul Schedule

Section 11 Placards and Markings

Section 12 Servicing

Section 25 Equipment and Furnishings

Section 98 Wiring Diagrams

0.6 Applicability

These Instructions for Continued Airworthiness are applicable to Cargo Hook Kit P/Ns 200-437-00, 200-438-00, and 200-438-01 on UH-60A, EH-60A, HH-60L, S-70A, S-70C, and S-70M model helicopters.

0.9 Abbreviations

CMM Component Maintenance Manual

ICA Instructions for Continued Airworthiness

FAA Federal Aviation Administration

0.12 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.

0.19 Distribution of Instructions for Continued Airworthiness

Before performing maintenance ensure that the Instructions for Continued Airworthiness (ICA) in your possession is the most recent revision. Current revision levels of all manuals are posted on Onboard Systems Int'l web site at www.onboardsystems.com.

Onboard Systems offers a free notification service via fax or e-mail for product alerts and documentation updates. By registering Onboard Systems products on the web site, we will be able to contact you if a service bulletin is issued, or if the documentation is updated.

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Section 4 Airworthiness Limitations

The Airworthiness Limitations section is FAA approved and specifies maintenance required under Secs. 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

No airworthiness limitations are associated with this type design change.

Section 5 Inspection and Overhaul Schedule

5.1 Cargo Hook Kit Inspection

The scheduled inspection intervals noted below are maximums and are not to be exceeded. If the cargo hook is subjected to unusual circumstances, extreme environmental conditions, etc., it is the responsibility of the operator to perform the inspections more frequently to ensure proper operation.

Refer to the Technical Manual for the aircraft for inspection of the cargo hook's aircraft interface.

There is no maintenance to be performed on the C-40 Indicator. **Do not open the enclosure**, if repair is needed return it to the factory.

Annually or 100 hours of external load operations, whichever comes first, inspect the cargo hook kit per the following.

NOTICE

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

NOTICE

The C-40 Indicator also records and displays external load time accumulated on the cargo hook to facilitate timely inspection and overhaul of the cargo hook. Refer to the Owner's Manual for the Indicator for details and using this function.

1. Check the function of the cargo hook's primary (normal) electrical release system per the following.

NOTICE

By design (to help protect against inadvertent load release) the primary electrical release systems of cargo hook P/Ns 528-043-00 and 528-043-10 require that the Cargo Release switch on the cyclic be held for at least ½ second to release the load. This delay circuit is also referred to Surefire release.

- Very briefly press the Cargo Release switch on the cyclic, the cargo hook solenoid should NOT actuate and the load beam should remain closed.
- With no load on the cargo hook, press and hold the Cargo Release switch on the cyclic for a few seconds, the cargo hook's load beam should fall to the open position and its solenoid should continue to cycle repeatedly. The Cargo Hook Open advisory light on the aircraft's notification panel should illuminate.
- Push up on the load beam and verify that it latches and the hook lock indicator (located adjacent to the manual release lever) is aligned with the engraved lines on the outside of the cargo hook (see Figure 5.1). The Cargo Hook Open advisory light on the aircraft's notification panel should extinguish.

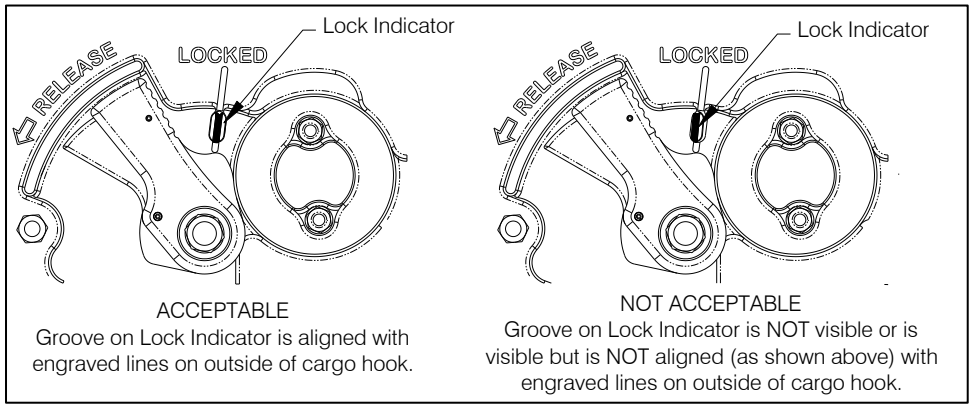
For Cargo Hook P/N 528-043-12, with time delay circuit disabled, perform the following

- With no load on the cargo hook, press the Cargo Release switch on the cyclic, the cargo hook's load beam should fall to the open position. The Cargo Hook Open advisory light on the aircraft's notification panel should illuminate.
- Push up on the load beam and verify that it latches and the hook lock indicator (located adjacent to the manual release lever) is aligned with the engraved lines on the outside of the cargo hook (see Figure 5.1). The Cargo Hook Open advisory light on the aircraft's notification panel should extinguish.

2. Check the function of the cargo hook's backup (emergency) electrical release system per the following.

- Press the emergency release switch on the collective. With no load on it, the cargo hook 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 lines on the outside of the cargo hook.

Figure 5.1 Hook Lock Indicator



3. At the Cargo Hook, squeeze the manual release lever assembly and rotate it in the counterclockwise direction. The lever should rotate smoothly and the cargo hook load beam should fall open. Release the lever and the inner gold part should extend back out and the manual release lever assembly should return to its starting position.

4. Rotate the cargo hook laterally throughout its range of motion and ensure it pivots freely and that the electrical harness(es) are not pulled tight in any position and are not pinched or chafed.

5. Rotate the cargo hook to the right until it engages the stowage latch. Ensure that it latches securely and unlatches without binding.

6. Visually inspect cargo hook for presence and security of fasteners.

7. Visually inspect the cargo hook external electrical harnesses (including pin load cell harness if installed) and their connectors for damage and security.

8. Visually inspect the cargo hook housing and load beam for cracks and damage. If damage is observed refer to the cargo hook CMM for limits.

9. If the Load Weigh Indicator is installed inspect it for security of attachment.

5.2 Cargo Hook Overhaul

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

Overhaul instructions for the cargo hook are contained in CMM 122-032-00. Contact Onboard Systems for guidance to locate authorized overhaul facilities.

Section 11 Placards and Markings

The following placards are included with the cargo hook kit.

Placard part number (P/N) and appearance	Location
P/N 215-343-00 	Located adjacent to the cargo hook release switch on the cyclic (primary release only). This is applicable to operation with Surefire, not applicable to cargo hook P/N 528-043-12.
P/N 215-169-00 	Located under the Test light on the cargo hook control panel in the upper console.
Included on P/N 215-394-00 placard sheet. 	Located on the DC essential bus panel, adjacent to 15A circuit breaker for cargo hook backup (emergency) release.
Included on P/N 215-394-00 placard sheet. 	Located on the DC essential bus panel, adjacent to 15A circuit breaker for cargo hook backup (emergency) release.
Included on P/N 215-394-00 placard sheet. 	Located on the DC essential bus panel, adjacent to 5A circuit breaker for cargo hook backup (emergency) release.

Section 25 Equipment and Furnishings

25.5 Component Weights and CG

The weight and cg of the cargo hook and Load Weigh Indicator is listed in the table below. The remainder of the kit components including electrical harness, doubler, miscellaneous hardware, etc. weigh less than 2 lbs with weight distributed from the Cargo Hook forward.

Item	Weight	Station
Cargo Hook	18.5 lbs. (8.4 kg)	353.0
C-40 Load Indicator	0.5**5** lbs (.24 kg)	*****

*Location is optional within the cockpit.

25.12 Storage Instructions

Refer to the CMM 122-032-00 for Cargo Hook storage instructions.

25.15 Trouble Shooting

Table 25.1 is provided with the intention of isolating the cause of malfunctions within the system. Sections 25.16 and 25.17 include instructions for removing and replacing defective components.

Table 25.1 Trouble Shooting

Malfunction	Probable Cause	Corrective Action
Cargo hook does not open with primary or backup electrical release or the manual release lever.	Defective internal mechanism.	Remove and replace cargo hook (see sections 25.16 and 25.17) or repair per CMM 122-032-00.
Cargo hook does not open with primary electrical release, opens with backup release.	Release switch not held down long enough.	Hold the release switch for a longer time. The primary electrical release of cargo hook P/N 528-043-00 and P/N 528-043-10 includes a time delay circuit which incorporates an electronic delay of approximately ½ second after which time the cargo hook solenoid will activate repeatedly. If the release switch is not held down long enough the solenoid will not activate. P/N 528-043-12 does not include the time delay circuit.
	Open electrical circuit, faulty wiring, circuit breaker, relay, switch or solenoid.	Check the aircraft circuit for opens and shorts by using a multi-meter on the primary release connector (on the side of the hook). When the release switch is pressed 28V aircraft voltage should be present on the connector pins. Check the aircraft connector polarity. The time delay circuit is polarity sensitive and protected against reverse polarity. +28V should be on pin B and ground on pin A. Check the power pins on the hook itself. For the Surefire time delay, a multi-meter set to the kilo-ohms range should read between 2 and 8 kilo-ohms. Some auto-ranging meters will not read properly so be sure to try a manual kilo-ohms range. If the meter reads open or short there is a problem with the solenoid module itself and the hook should be replaced or repaired per CMM 122-032-00. Cargo hook's primary release uses aircraft's existing circuit breaker, relay, switches, and internal wiring. Refer to technical manual for the aircraft for these items.
Indicator displays large negative load.	Indicator was zeroed under load.	Un-zero indicator. Refer to the Owner's Manual for the C-40 Indicator for instructions.
Indicator displays incorrect load.	Calibration code entered doesn't match the calibration code of load cell or load cell damaged.	Check calibration code of the load cell and set the indicator to the same calibration code. Refer to the Owner's Manual for the C-40 Indicator for instructions.
Analog bar not in sync with displayed load.	Indicator is zeroed; analog bar always displays un-zeroed load.	Un-zero indicator. Refer to the Owner's Manual for the C-40 Indicator for instructions.

25.16 Component Removal

25.16.1 Cargo Hook Removal

1. Disconnect the primary release system's electrical harness connector at the left side of the cargo hook.

2. Disconnect the load cell harness (if the load cell is installed) at the left side of the hook well.

3. At the forward and aft frames that make up the hook well remove the two bolts at the clamps over each end of the cargo hook trunnion. The bolts and clamps are parts of the aircraft's original cargo hook installation, refer to the aircraft's technical manual for part numbers.

4. Lift the aft end of the cargo hook out of the airframe cradle and move it to the left or right and then rotate down about the forward end. Move the cargo hook aft just enough to access the backup release system's electrical connector in the forward end of the trunnion. Disconnect this connector and remove the cargo hook from the aircraft.

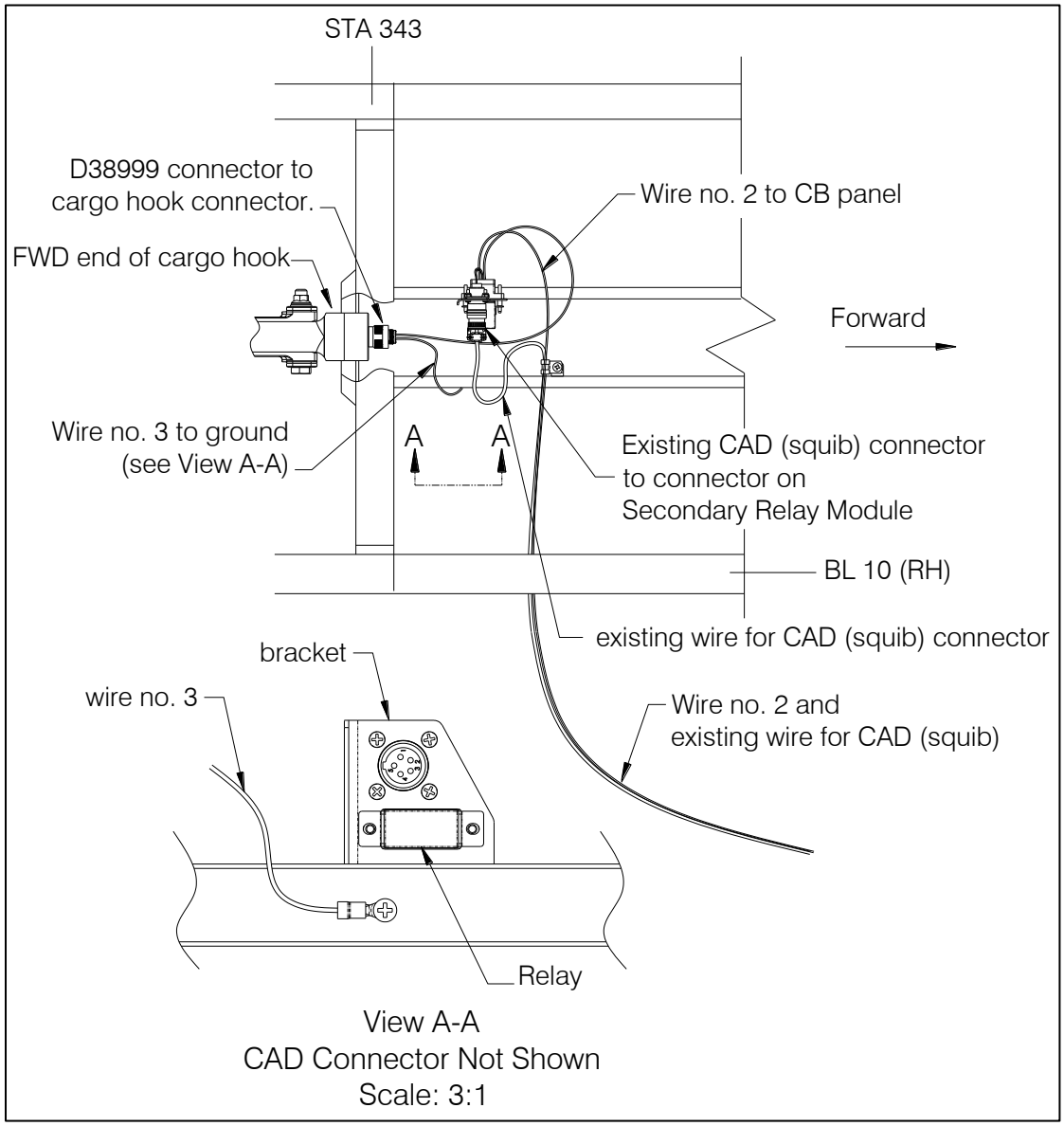
25.16.2 Relay Removal

The cargo hook's backup release system includes a relay which interfaces with the aircraft's original CAD wiring. This relay is located just forward of the hook well and is accessed by removing the floorboards in this area.

1. Remove the floorboard immediately forward of the hook well. In addition to the relay, an overview of the wiring for the cargo hook (including the original CAD wiring) is shown in Figure 25.1.

2. Remove the hardware securing the relay to the bracket and unplug the relay from the relay socket.

Figure 25.1 Relay and Wiring Overview for Backup Release



25.16.3 Load Indicator Removal

The Load Indicator location in the cockpit is optional. Remove it per the following.

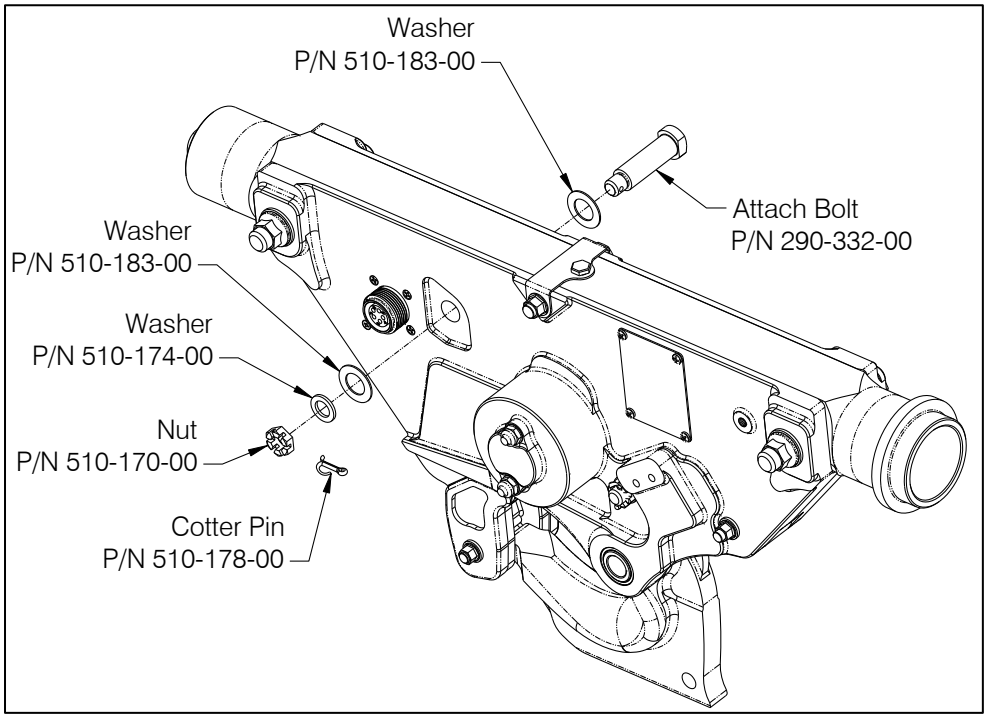
1. Disconnect the electrical connector at the back of the Indicator.
2. Remove the four screws securing the Indicator to its mounting location and remove it.

25.16.4 Pin Load Cell Removal

The Pin Load Cell is part of the optional Load Weigh System and is integrated into the cargo hook assembly. Remove it per the following.

1. Remove the cotter pin securing the nut on the Pin Load Cell.
2. Remove the nut from the Pin Load Cell and remove the Pin Load Cell from the Cargo Hook. For operation without the Load Weigh System, the Pin Load Cell must be replaced by Attach Bolt P/N 290-332-00 and hardware as shown below (hardware is the same as hardware for attaching the Pin Load Cell with the exception of Washer P/N 510-183-00 under the bolt head is used).
3. Disconnect the Pin Load Cell's electrical connector at the left side of the hook well.

Figure 25.2 Attach Bolt Hardware

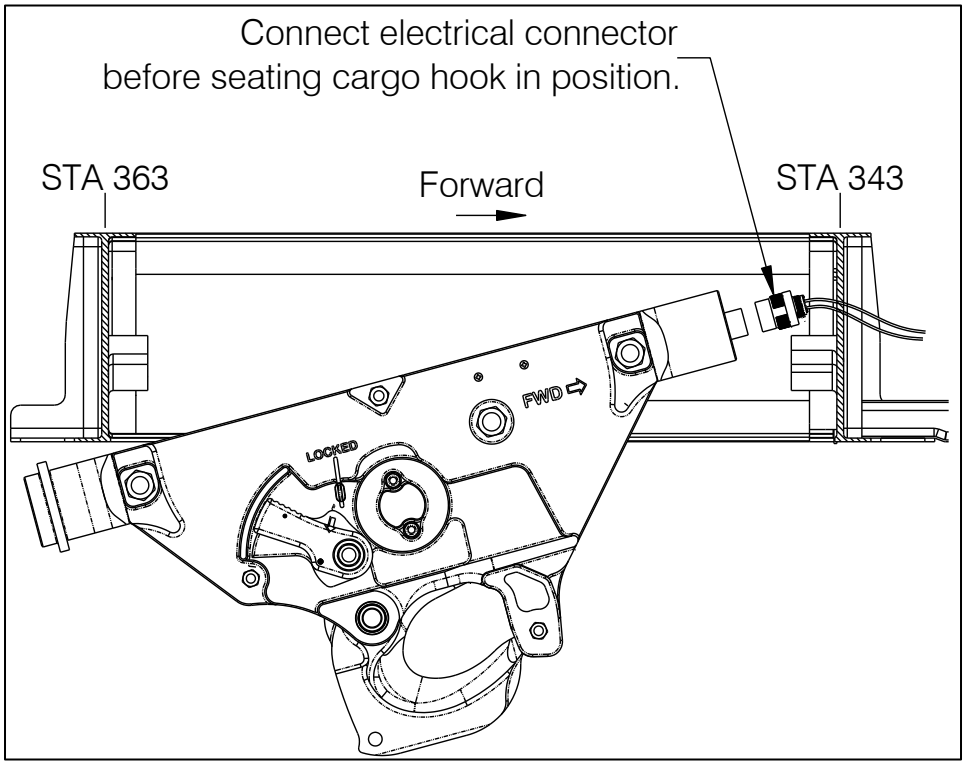


25.17 Component Re-installation

25.17.1 Cargo Hook Re-installation

1. Orient the cargo hook as shown and position it close enough to connect the electrical connector for its backup electrical release system to the connector mounted within the end of the trunnion.

Figure 25.3 Cargo Hook Re-installation



2. Position the cargo hook within the cradles at the forward and aft frames of the hook well.

3. Install the clamps over the cargo hook trunnion at each saddle. As the bolts and clamps are parts of the aircraft's original cargo hook installation, refer to the aircraft's manual for installation and torque instructions.

4. If load weigh system is installed, connect the harness from the pin load cell to the connector mounted within the left side frame of the hook well.

5. Connect the primary release system's electrical harness (P/N 270-233-00) to the cargo hook connector on its left side.

25.17.2 Relay Re-installation

The relay (P/N 445-013-00) is part of the backup electrical release system and is located under the floorboard just forward of the hook well on a bracket provided with the cargo hook kit (Figure 25.1).

1. Plug the relay into the relay socket mounted to the bracket.

2. Secure the relay with the hardware provided with the relay.

25.17.3 Load Indicator Re-installation

The C-40 Load Indicator installation position is optional in the cockpit. It is designed to fit a standard 2 ¼" instrument panel hole.

1. Connect the connector from the Load Weigh Internal Harness to the Indicator's connector.

2. Position the Load Indicator within its mounting hole and secure with the four screws P/N 511-211-00 or different length MS35214 6-32 screws as needed to accommodate the thickness of the mounting surface.

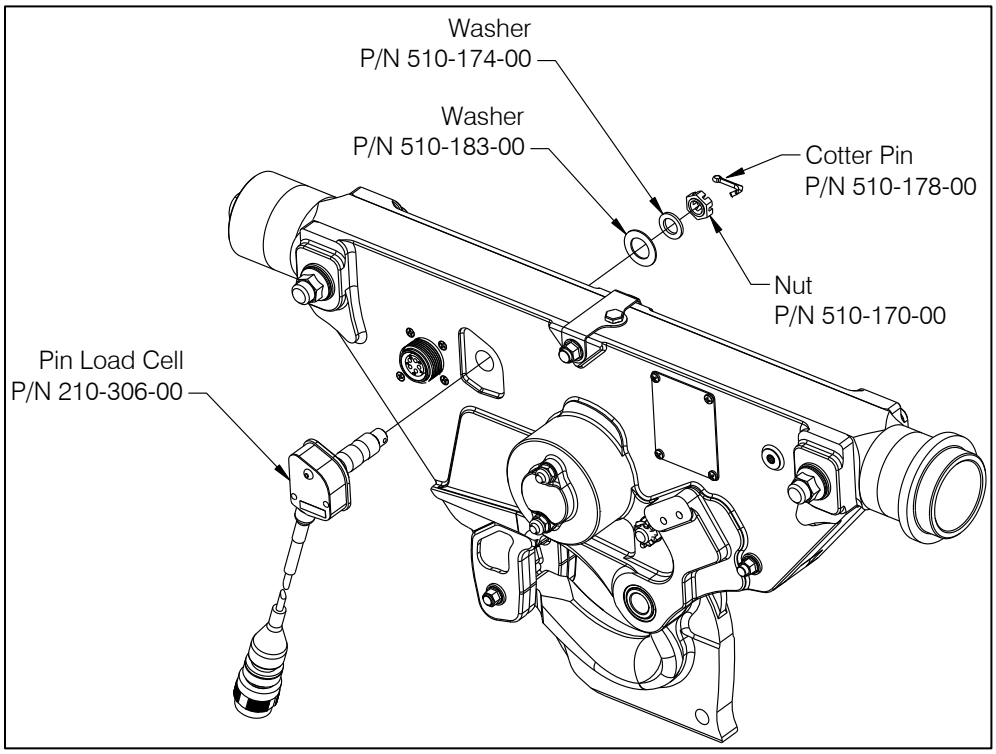
25.17.4 Pin Load Cell Re-installation

The Pin Load Cell (P/N 210-306-00) is integrated into the Cargo Hook and is calibrated individually in each cargo hook at the factory.

1. Insert the Pin Load Cell through the Cargo Hook from the left side (as shown below). For insertion it may be necessary to use a screwdriver or similar from the opposite side to align the internal Toggle hole with the holes in the side plates.

2. Install washers and nut over the end of the Pin Load Cell (refer to figure below for P/Ns). Tighten the nut 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.

Figure 25.4 Pin Load Cell Re-installation



Section 98 Wiring Diagrams

Figure 98.1 Cargo Hook Primary Electrical Release System Schematic

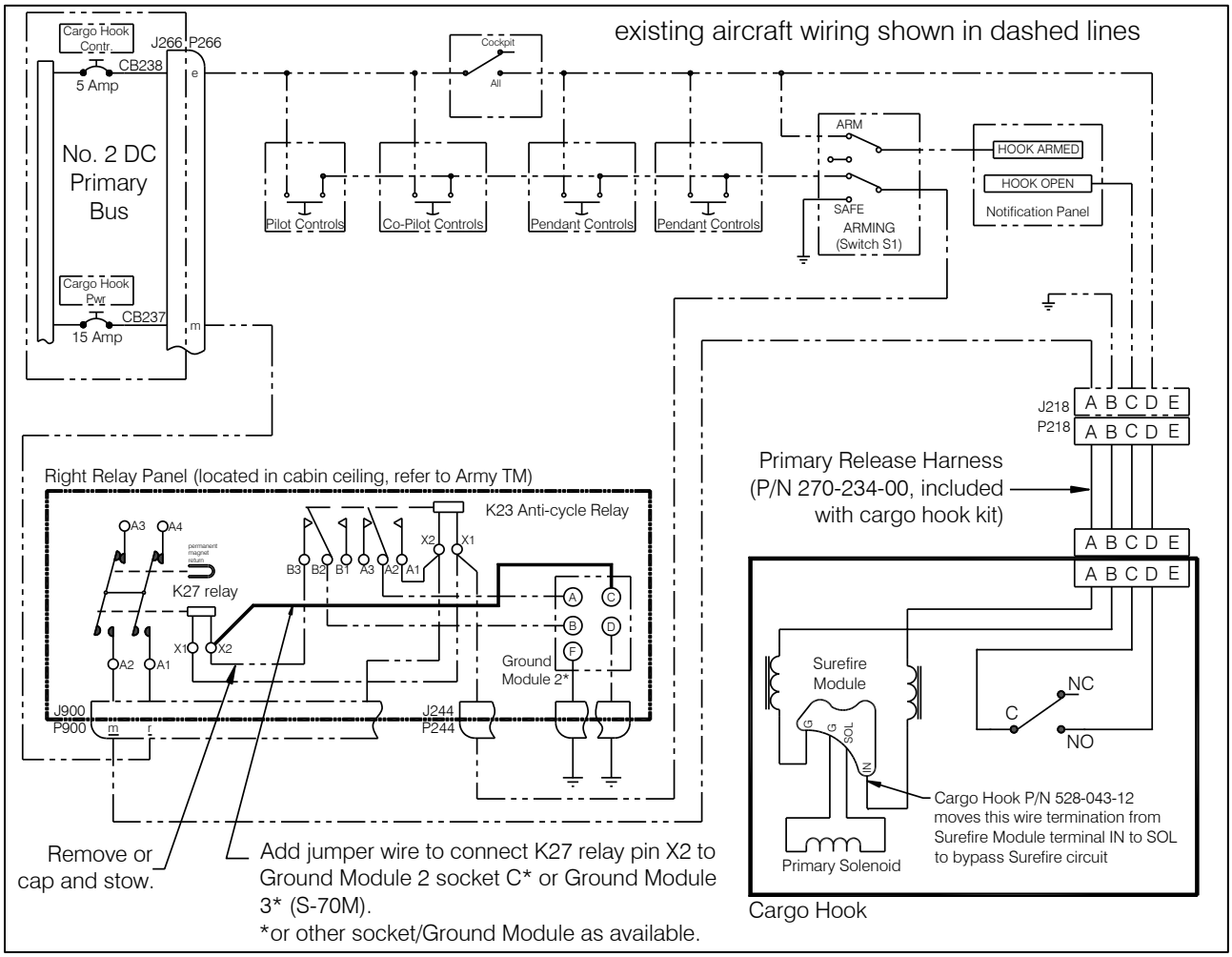


Figure 98.2 Cargo Hook Backup Electrical Release System Schematic

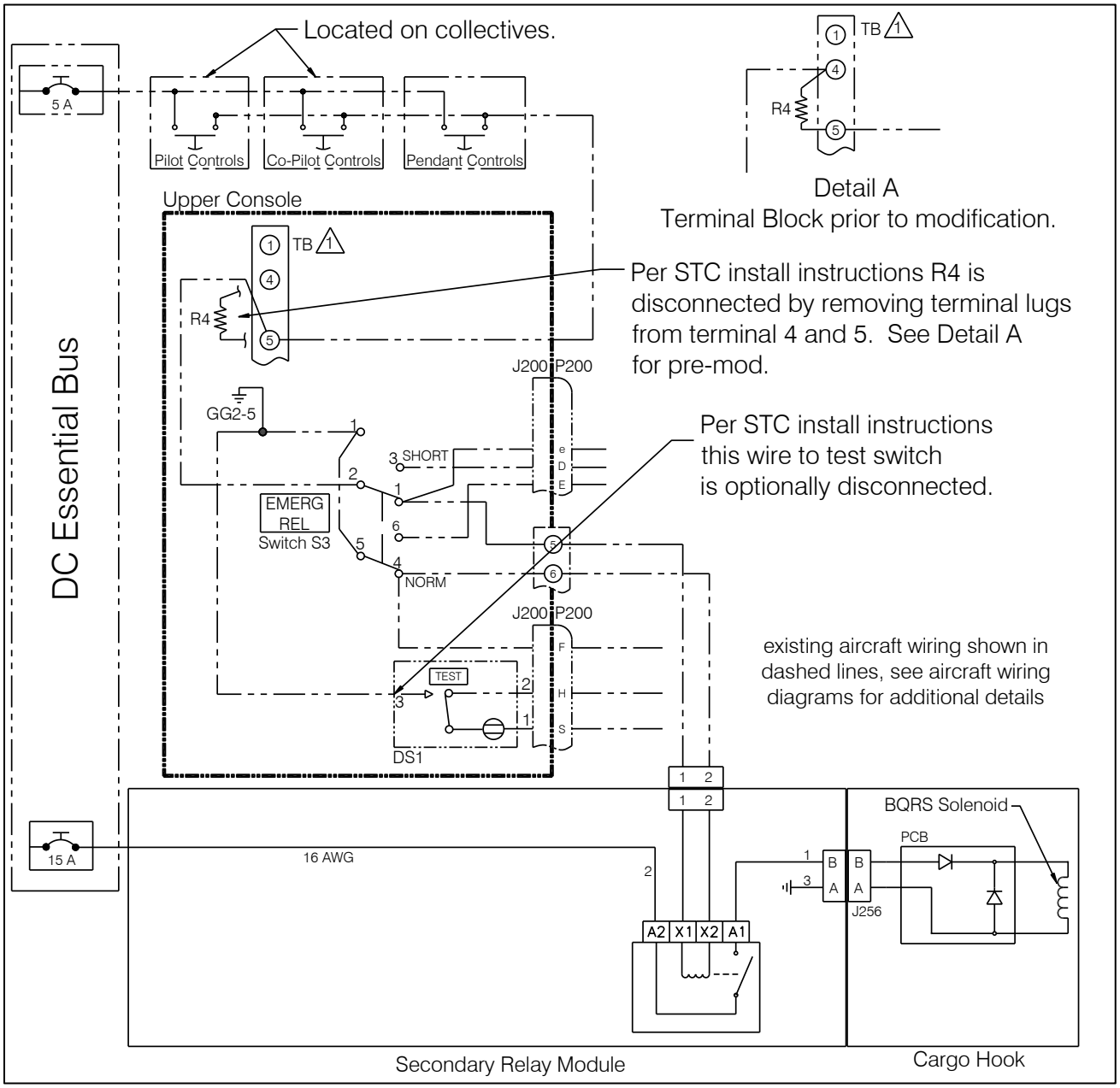


Figure 98.3 Load Weigh System Schematic