Owner's Manual
Talon Carousel Hook

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Applicable Equipment Part Numbers

528-044-00

528-044-10

528-044-01

528-044-11

210-303-00

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

RECORD OF REVISIONS

Revision	Date	Page(s)	Reason for Revision
0	09/17/13	All	Initial release.
1	01/02/14	17, 21-25, 30-31, 33	Removed washers from solenoid cam. Corrected cam pivot bolt torque to be 30-40 in-lbs.
2	05/27/14	24 & 25	Added corrosion preventive compound and corrected torque values for cam, toggle, and load beam bolts.
3	08/14/15	8, 27, 32	Replaced Molex connector with circular connector. Added schematic and terminal block figure. Added diode installation instructions.
4	08/12/16	1, 4, 5, 7, 10, 11, 12, 18, 20, 22, 23, 28, 30, 31, 33, 34, 35, 36, 37, & 38	Added electrical wiring information and remote hook installation regarding 2K hooks, 528-044-01 & 528-044-11. Rearranged sections.
5	03/28/19	41	Replaced 511-074-00 with 510-223-00. Parts are the same.
6	01/16/20	22 & 23	Replaced NDT inspection of Load Beam (8), Side plates (9)(10), and Toggle (6.1) with magnified visual inspection; moved inspection step to Table 13.1.

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1.0 Introduction

1.1 Scope

This owner's manual contains instructions for installation, operation, and maintenance of the Talon 1K and 2K Carousel Hooks (P/N's 528-044-00 and 528-044-10, and 528-044-01 and 528-044-11 respectively).

1.2 Capability

The instructions contained in this document are provided for the benefit of experienced aircraft maintenance personnel and facilities that are capable of carrying out the procedures.

1.3 Safety labels

The following definitions apply to safety labels used in this manual.

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Draws the reader's attention to important or unusual information not directly related to safety.

Used to address practices not related to personal injury.

2.0 Referenced Documents

Acceptance Test Procedure	Applicable P/Ns
180-233-00	528-044-00 & 528-044-10
180-233-01	528-044-01 & 528-044-11

3.0 System Overview

3.1 Description

The cargo hook provides the means to attach and secure an external load at the end of a helicopter long line. The cargo hooks discussed herein are designed for installation within a multi-hook carousel system or as a remote hook when used with available cage (see section 4.2).

An external load is attached to the cargo hook by inserting a load ring into the throat of the open load beam and pushing up to close and lock the cargo hook (refer to Figure 3.1 and Figure 3.2 for cargo hook overview).

To release the load, the cargo hook features an electrical release system using a rotary solenoid which is powered from the aircraft electrical system. The solenoid actuates the cargo hook's internal mechanism (see Figure 3.3) to release the load. The external load can also be released from the cargo hook by ground personnel by actuating a release lever located on the cargo hook. The release lever on the cargo hook is designed to minimize the possibility of being inadvertently actuated by contact with tree branches, sticks, etc. near the ground. The release lever is also designed to be easily accessible when the cargo hook is mounted within a typical carousel system.

A ground crewman can verify that the load beam is locked through a mechanical indication on the side of the cargo hook.

Cargo Hooks P/N 528-044-10 and 528-044-11 include a light which can be used to provide indication of the cargo hook's status when used in a multi-hook carousel system.

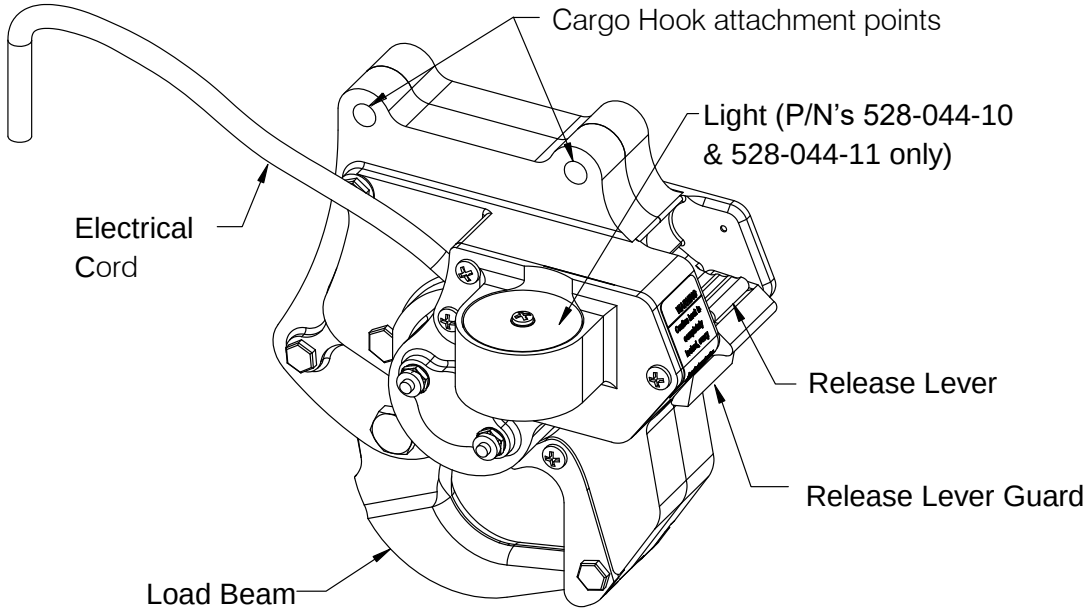


Figure 3.1 Cargo Hook Overview, Electrical Side (P/N 528-044-10 Shown)

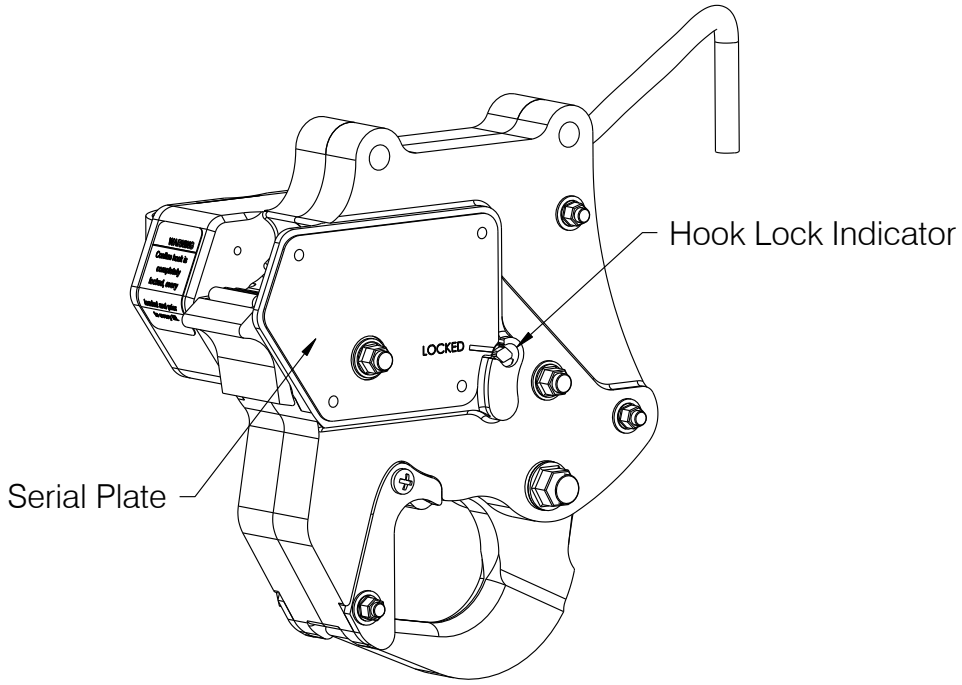


Figure 3.2 Cargo Hook Overview, Indicator Side

To release the load, the internal mechanism's cam is rotated in the counterclockwise direction by the action of the electrical solenoid through the solenoid actuator or by actuating the manual release lever (see Figure 3.3). As the cam rotates, the cam roller bearing rides on its surface until it reaches the load release point. At the load release point, the cam roller drops over the edge of the cam surface and the toggle assembly is free to rotate. The load then is able to pull the load beam open and fall free.

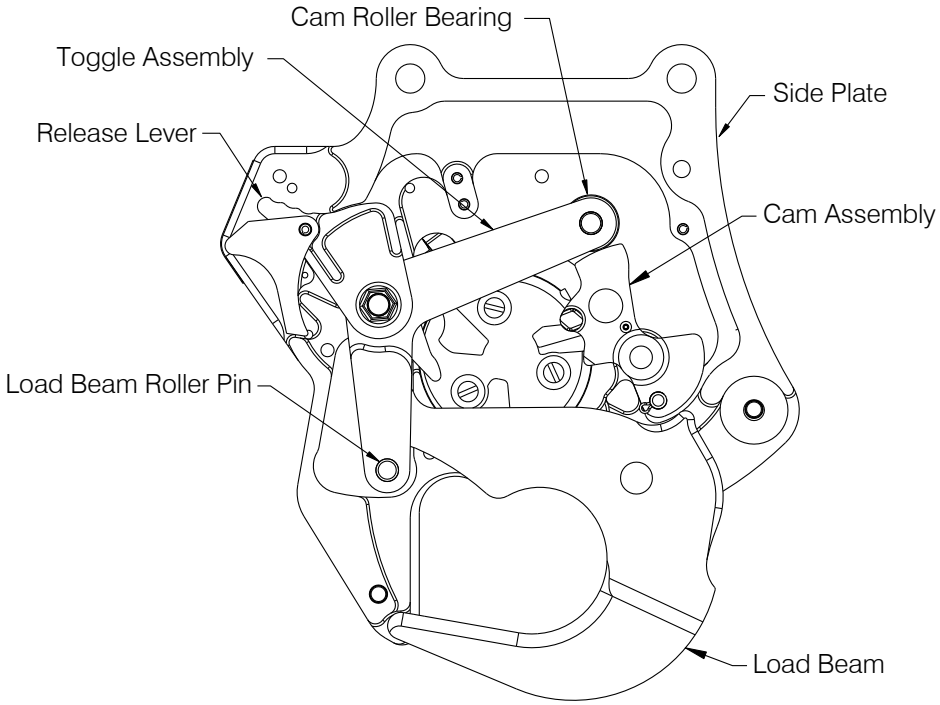


Figure 3.3 Cargo Hook Internal Mechanism

3.2 Specifications

Table 3.1 Carousel Hook Specifications

Specification	P/N 528-044-00	P/N 528-044-10	P/N 528-044-01	P/N 528-044-11
Rated Load	1,000 lbs (454 kg)		2,000 lbs (908 kg)	
Limit Load	2,500 lbs. (1,134 kg)		5,000 lbs. (2,268 kg)	
Ultimate Load	4,000 lbs. (1,814 kg)		8,000 lbs. (3628 kg)	
Primary Release Capacity	1,000 lbs. (454 kg)		2,000 lbs (908 kg)	
Equipment Weight	3.9 lb. (1.8 kg)	4.1 lb. (1.9 kg)	4.2 lb. (1.9 kg)	4.4 lb. (2.0 kg)
Equipment Dimensions	See Figure 5.1	See Figure 5.2	See Figure 5.1	See Figure 5.2
Primary Release Means	Electrical			
Ground Crew Release Means	Lever			
Minimum Releasable Load	0 lbs			
Throat Size	1.42 x 2.08 in (36 mm x 52.8 mm)			
Solenoid Power Requirements	22-30 VDC, 10 A			
Light Power Requirements	N/A	5VDC, 0.5 A	N/A	5VDC, 0.5 A
Electrical Cord	16" long 18/3 cable (SJEOOW)			
Operating Temp. Range*	-40 ºF to 158 ºF (-40 ºC to 70 ºC)			
Storage Temp. Range	-67 ºF to 185 ºF (-55 ºC to 85 ºC)			
Time Between Overhaul (TBO)	5 years / 1000 hours of external load operation**			

WARNING

**Cargo hooks are not to be used in icing conditions.*

NOTICE

*** Hours of external load operations should be interpreted to be (1) anything is attached to the 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

Lights require 5 VDC, NOT 28 VDC.

4.0 Installation

The cargo hook is designed for installation on a carousel or similar cargo external load system or can be installed in an available cage.

4.1 Cargo Hook Installation

The cargo hook should be mounted with two 5/16" diameter bolts, AN5 or NAS6205 series or equivalent to the carousel type system. Ensure the system provides adequate access for actuating the release lever and loading the cargo hook and if installing P/N 528-044-10 or 528-044-11 ensure the lights are not obstructed from above. The dimensions of the cargo hook including interface dimensions are shown in Figure 5.1 and Figure 5.2.

4.2 Cargo Hook with Cage Configuration (P/N 210-303-00) Installation

Cargo Hook P/N 528-044-01 can be installed in a cage weldment (P/N 235-272-00). This assembly (P/N 210-303-00) is intended for use as a stand-alone remote cargo hook. It can be attached directly to a long line thimble (shown in Figure 4.1) or through an Onboard Systems 2K Electric Swivel (Kit P/N 200-386-00).

Attach the cage to a long line thimble by removing the cotter pin, nut, bolt and spool from the cage and inserting the spool within the thimble and re-installing it within the cage. An appropriately sized shackle or load ring can also be used directly over the spool. Tighten the nut finger tight and then rotate to next castellation to install the cotter pin.

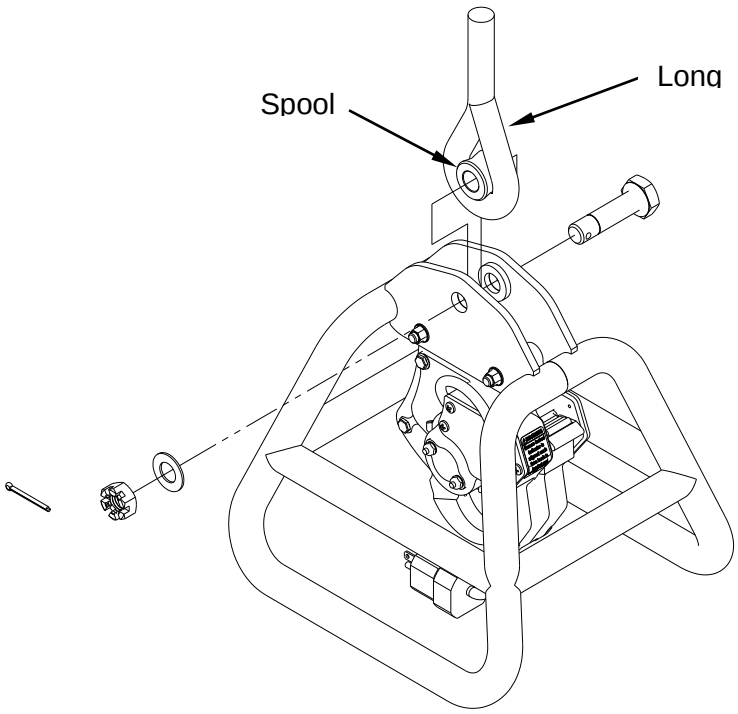


Figure 4.1 Example Installation of 210-303-00

NOTICE

To install the electric swivel within the cage it may be necessary to loosen the nuts on the bolts which attach the cargo hook to the cage plates. If the nuts are too tight they pull the cage plates inward causing the swivel lug to not fit within them. Loosen nuts just enough to fit swivel lug and allow it to rotate.

4.3 Post Installation Check-Out

After installation of the cargo hook, perform the following checks.

- Ensure that the electrical cord is protected from chafing and snagging.
- With no load on the load beam, energize the hook electrical release circuit. The load beam should release. Push the load beam up and closed by hand and ensure the load beam re-latches and the hook lock indicator on the side of the hook returns to the locked position (see Figure 7.1).
- Manually open the cargo hook using the release lever on the end of the cargo hook. Push the load beam up and closed by hand.

5.0 Interface Dimensions

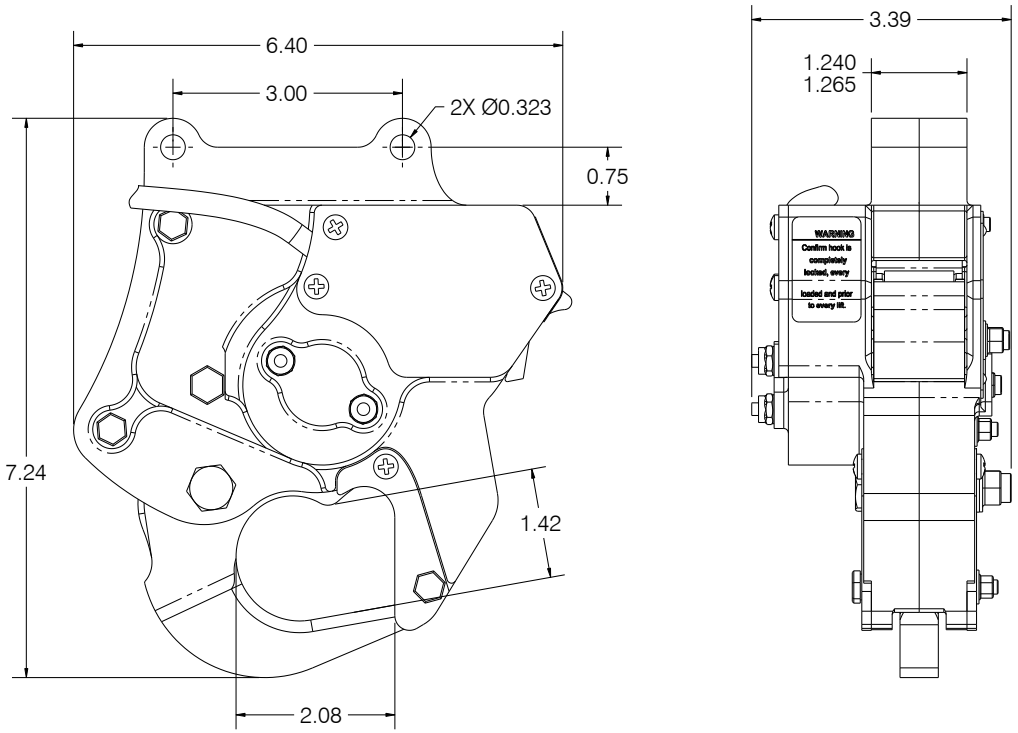


Figure 5.1 Cargo Hook Dimensions (P/N 528-044-00 & 528-044-01)

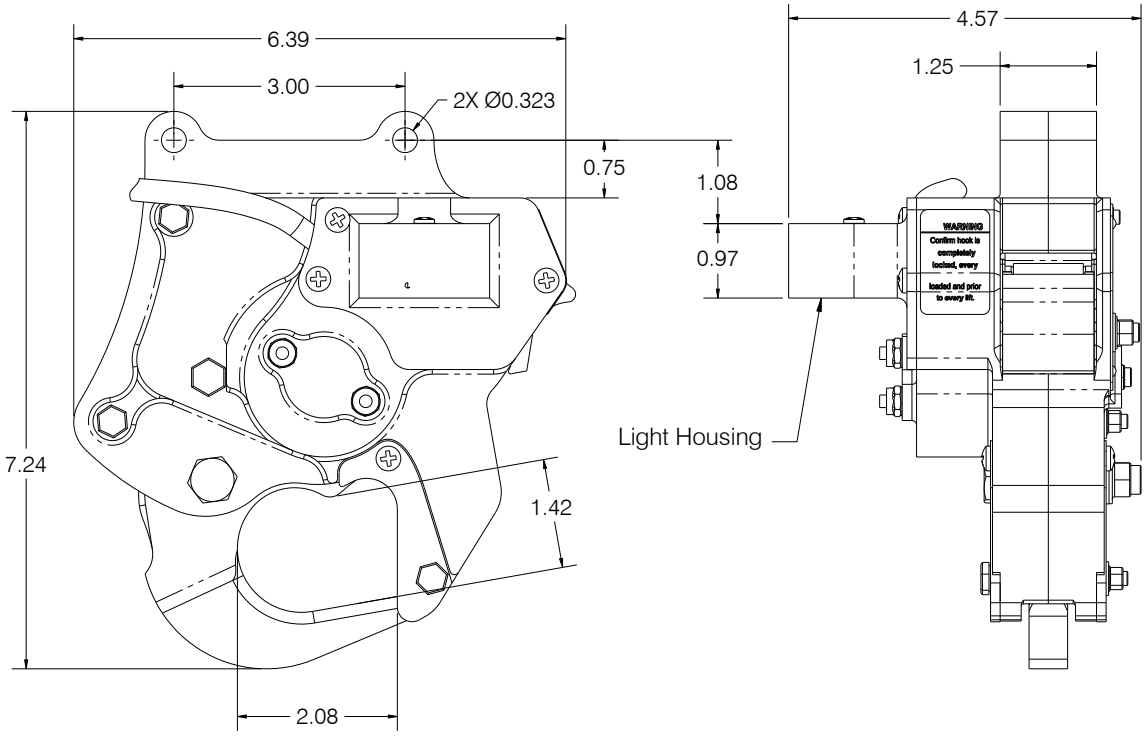


Figure 5.2 Cargo Hook Dimensions (P/N 528-044-10 & 528-044-11)

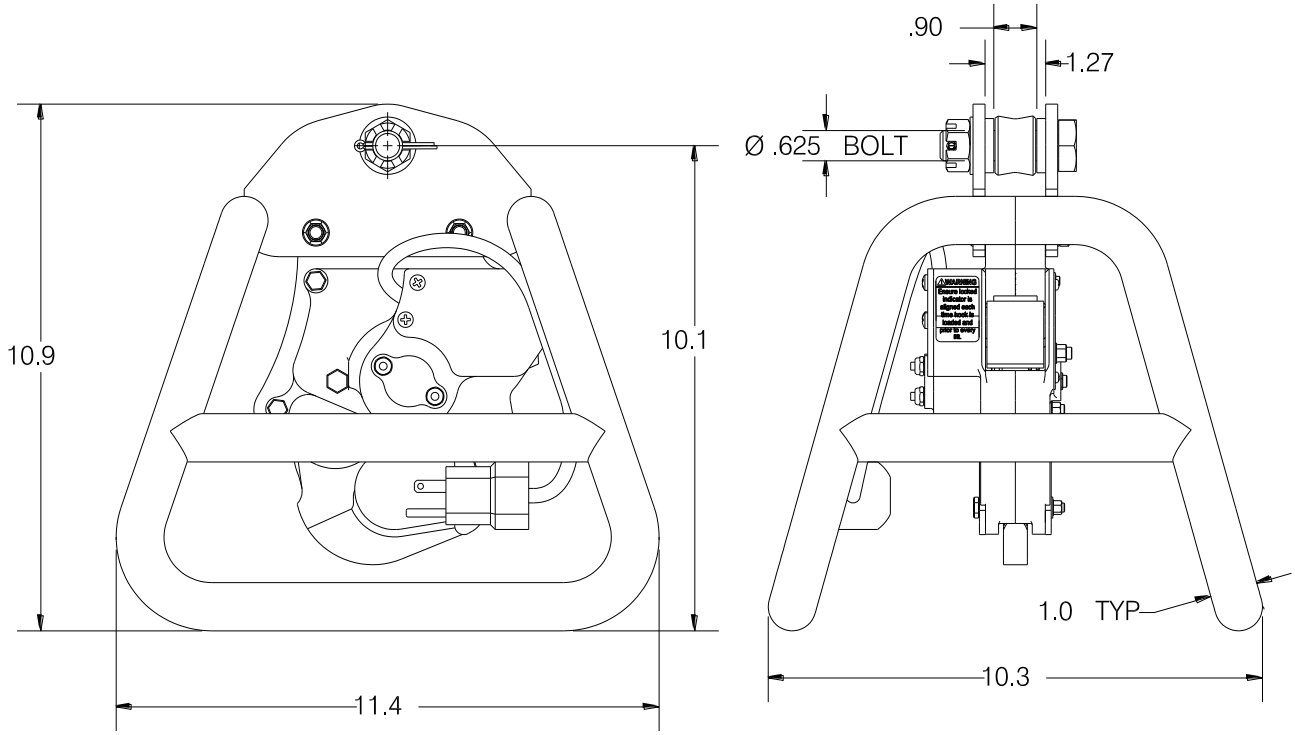


Figure 5.3 Remote Hook Dimensions

6.0 Electrical Wiring and Schematics

The cargo hook is provided with an 18/3 SJEOOW electrical cable with one end wired to a terminal block in its electrical compartment (see Figure 6.1). A bi-directional diode provides transient voltage suppression generated by the solenoid.

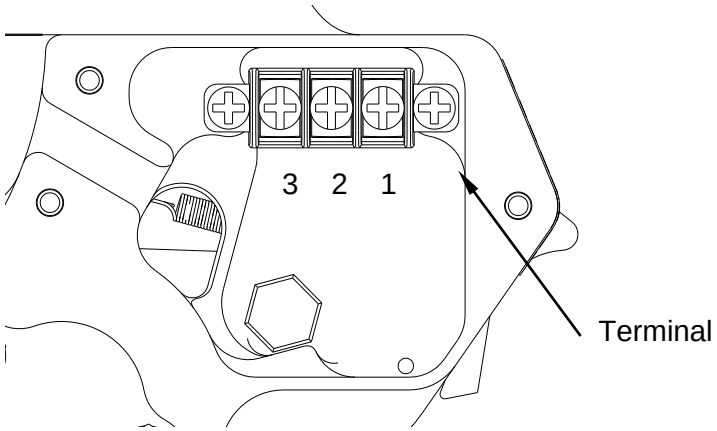
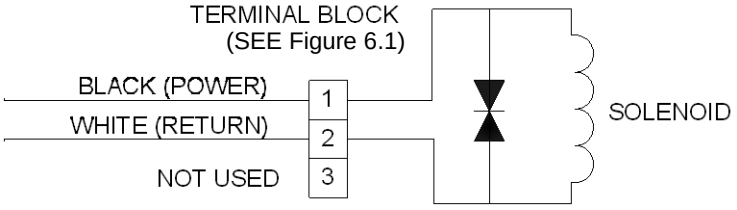


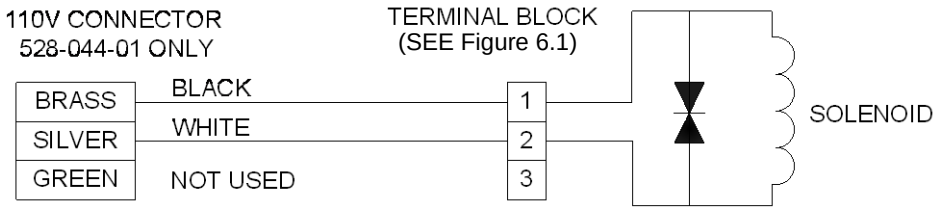
Figure 6.1 Terminal Block

Refer to the following sections for cable wire color connections and function of the different hook configurations.

6.1 Schematic and Pin-outs for 528-044-00 & 528-044-01



528-044-00 Schematic



528-044-01 Schematic

Table 6.1 Carousel Hook Wiring 528-044-00 & 528-044-01

Cable Color	Function	Terminal Number
Black	Power	1
White	Return	2
Green	Not used	3

If the cargo hook has been or is installed on an Onboard Systems remote cage, the electrical cord is terminated with a 110V three-prong NEMA 5-15 male plug. Refer to Figure 6.2 for wire connections.

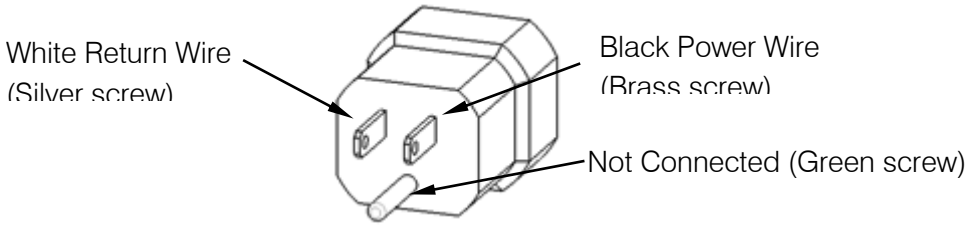
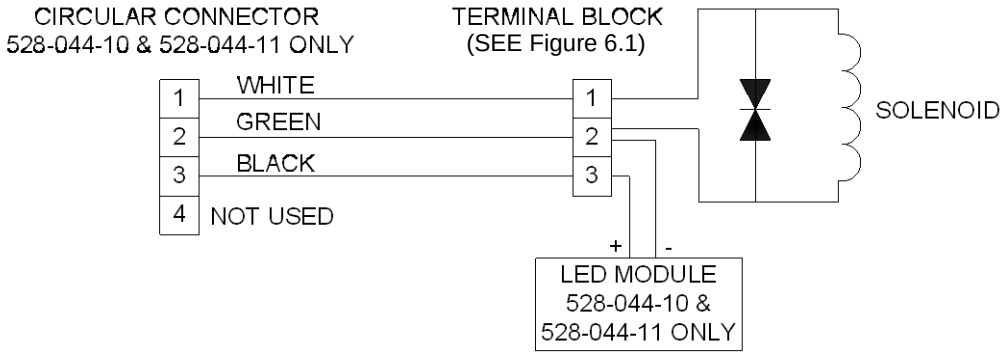


Figure 6.2 Remote Hook Installation Cord Termination

6.2 Schematic and Pin-outs for 528-044-10 & 528-044-11



528-044-10 & 528-044-11 Schematic

Table 6.2 Carousel Hook Wiring 528-044-10 & 528-044-11

Wire Color	Function	Terminal Number
Black	Light	1
Green	Return	2
White	Solenoid	3

If the cargo hook has been or is installed on an Onboard Systems carousel system, the electrical cord is terminated with a circular connector (earlier versions featured a Molex connector). Refer to Figure 6.3 and Table 6.3.

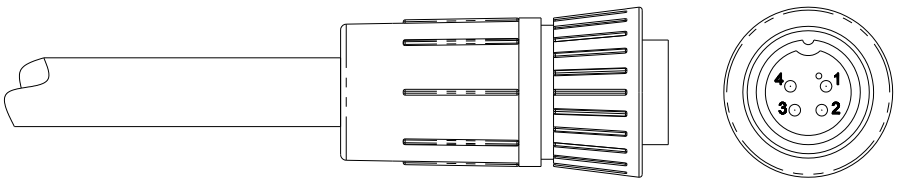


Figure 6.3 Carousel Installation Cord Termination

Table 6.3 Circular Connector Pin-out 528-044-10 & 528-044-11

Pin	Cable Color	Function
1	White	Solenoid
2	Green	Return
3	Black	Light
4	Not used	

7.0 Operation Instructions

7.1 Pre-Flight Functional Checks

Prior to external load operations perform the following functional checks of the cargo hook. If these procedures are not successful, do not use the cargo hook until the problem is resolved.

- Check the cargo hook electrical release function by energizing its electrical release circuit. The cargo hook's load beam should open with no load applied. Push the load beam up and closed by hand.

CAUTION

The solenoid in the hook is not rated for continuous duty. Continuous power applied to the solenoid for longer than 30 seconds may damage it.

Verify that the hook is locked in the closed position by checking the hook lock indication on the side of the cargo hook. The diamond shaped feature on the internal cam (visible through the opening in the side plate) must be aligned with the line on the serial plate (see Figure 7.1). Verify hook locked indicator aligns consistently when cargo hook is cycled.

- Check all fasteners to ensure that they are in place and secure.
- Check the electrical cord and connection for damage and security.
- Check the load beam, case and covers for cracks and damage.

⚠ WARNING

Ensure the cargo hook is in the locked position by ensuring the engraved line on the cam is aligned with the line on the serial plate (see Figure 7.1). If these lines are not aligned, the hook is not locked and an inadvertent load release can occur. Refer also to WARNING label on the cargo hook.

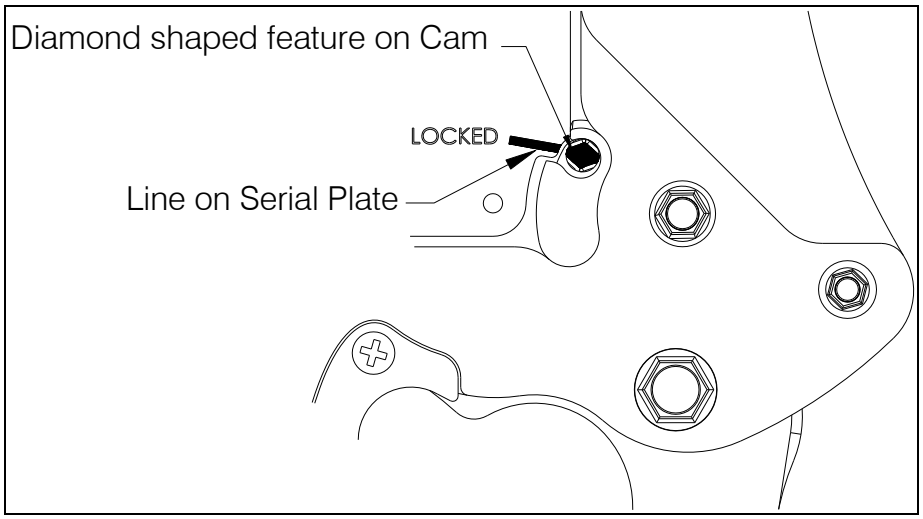


Figure 7.1 Hook Locked Indicator

- Check the release function using the manual release lever on the cargo hook. To operate the release lever, push the guard up to the lever and then pull the lever and guard down together. The mechanism should operate smoothly and the load beam should open.

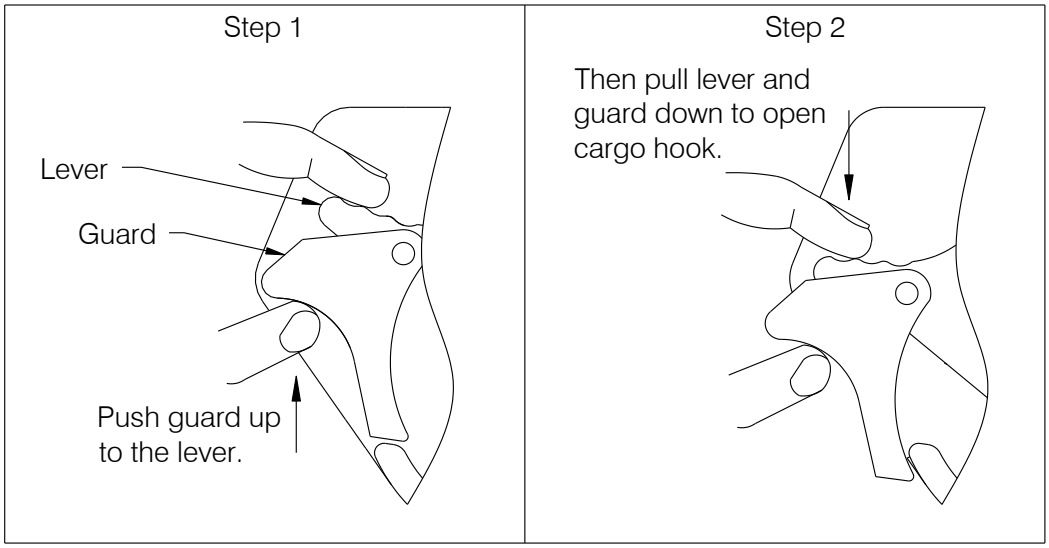


Figure 7.2 Release Lever Operation (hook side plate not shown for clarity)

WARNING

Accumulated dust, dirt and grime will cause unreliable re-latch of the cargo hook. Remove immediately from service for disassembly and cleaning if re-latch performance is sluggish.

7.2 Cargo Hook Loading

The cargo hook can be easily loaded with one hand. A load is attached by pushing a ring upward against the upper portion of the load beam throat, as illustrated in Figure 7.3, until an internal latch engages the load beam and latches it in the closed position.

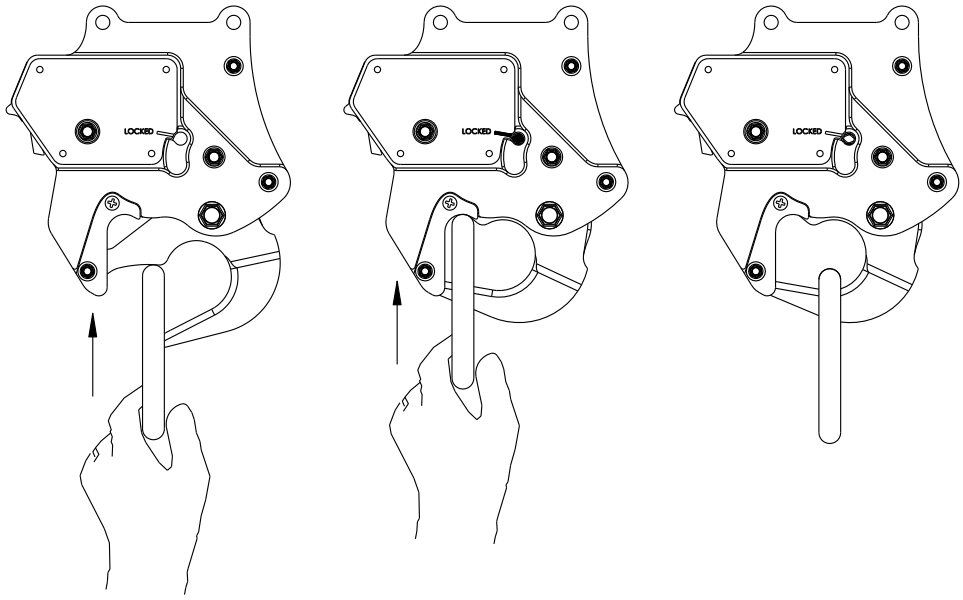


Figure 7.3 Cargo Hook Loading

7.3 Rigging

Extreme care must be exercised in rigging a load to the cargo hook. Steel primary load rings are recommended to provide consistent release performance and resistance to fouling. When using steel load rings, verify that the load ring and the rigging attached to it will freely slide off the load beam when it is opened.

⚠ WARNING

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

If nylon straps or ropes are used, verify that they slide freely from the load beam when the cargo hook is opened. If very thin straps (less than 1/16" thick) are used they must first be attached to a steel primary ring.

⚠ WARNING

Very thin nylon straps (less than a 1/16" thick) must not be used directly on the load beam as they may be capable of working themselves around the tip of the load beam when it is latched.

8.0 Maintenance

WARNING

Failure to follow all equipment maintenance instructions and component inspection criteria may result in serious injury, death or immediate loss of flight safety.

8.1 Storage

The cargo hook may be stored in its original factory sealed bag and box for up to 2 years from its date of manufacture or last factory overhaul. If stored in its original factory sealed bag and box for less than 2 years, it may be used without any additional activity. If the period of storage in its original packaging is greater than 2 years the cargo hook must be subjected to a functional check. Perform the functional check per the instructions of the post-installation check-out (section 4.3) herein before being used.

If the cargo hook is to be removed from service, store it in indoors. If it is to be stored longer than 6 months perform the following. Prepare the cargo hook for storage by thoroughly cleaning and drying the exterior, liberally applying ACF-50 corrosion preventative compound inside and out, sealing it in a plastic bag with a desiccant, and labeling it with the date of storage. If stored in this condition for less than 2 years, it may be used without any additional activity. If the period of storage exceeds 2 years the cargo hook must be subjected to the acceptance test procedures (ATP) described herein before being used.

Time Between Overhaul criteria still apply regardless of storage conditions and time.

8.2 Monthly Preventive Maintenance

Remove accumulated soils from the exterior with a soft bristle brush and mild solvent/cleaner

In corrosive environments, apply a corrosion preventative compound such as ACF-50 to all exterior surfaces.

8.3 Annual Inspection

Annually or 100 hours of external load operations, whichever comes first, thoroughly clean the exterior with a soft bristle brush and mild solvent/cleaner and visually inspect for cracks, gouges, dents, nicks, corrosion, and missing or loose fasteners.

8.4 Overhaul

Overhaul the cargo hook in accordance with the overhaul schedule and instructions contained here-in.

8.5 Repair

Repair the cargo hook in accordance with the repair instructions contained here-in.

9.0 Repair Instructions

It is recommended that only minor repairs be attempted by anyone other than the factory. The following procedures and information are provided for the benefit of experienced aircraft maintenance facilities and trained maintenance and inspection personnel capable of carrying out the procedures. They must not be attempted by those lacking the necessary expertise and suitable equipment to acceptance test the cargo hook after maintenance. See Section 19.0 for instructions for returning equipment to the factory.

Reference numbers throughout this manual shown in parentheses ( ) refer to Table 17.1 and Figure 17.1 and Figure 17.2.

Follow these steps to repair the Cargo Hook, referring to the applicable sections in this manual.

1. Disassemble as required.
2. Inspect disassembled parts.
3. Obtain required replacement parts.
4. Re-assemble.
5. Acceptance test.
6. Inspect for return to service.

10.0 Overhaul Schedule

The Cargo Hook shall be overhauled every 1000 hours of external load operations or 5 years, whichever comes first.

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.

11.0 Overhaul Instructions

It is recommended that only minor repairs be attempted by anyone other than the factory. The following procedures and information are provided for the benefit of experienced aircraft maintenance facilities and trained maintenance and inspection personnel capable of carrying out the procedures. They must not be attempted by those lacking the necessary expertise and suitable equipment to acceptance test the cargo hook after overhaul. See Section 19.0, instructions for returning equipment to the factory.

Overhaul kit P/N 212-037-00 is recommended to complete the Cargo Hook overhaul. The overhaul kit contains all recommended items to be replaced at time of overhaul. Table 17.1 lists detail parts contained in the overhaul kit.

Follow these steps to overhaul the Cargo Hook, referring to the applicable sections in this manual:

1. Obtain Overhaul kit P/N 212-037-00.
2. Completely disassemble.
3. Discard all items that are to be replaced by an item in Overhaul Kit P/N 212-037-00 listed in Table 17.1 (bearings, roll pins, cotter pins, fasteners, nuts and washers).
4. Inspect disassembled parts.
5. Obtain required replacement parts.
6. Reassemble.
7. Acceptance test.
8. Inspect for return to service.

12.0 Disassembly Instructions

Reference numbers throughout this manual shown in parentheses ( ) refer to Table 17.1 and Figure 17.1 and Figure 17.2.

⚠ WARNING

Failure to follow all equipment maintenance instructions and component inspection criteria may result in serious injury, death or immediate loss of flight safety.

1. Remove three 10-32 nuts (19), two ¼" nuts (20) and a 3/8" nut (21) from the indicator side plate side and remove washers (17, 18, and 24).
2. The side plate assemblies (9 and 10) can now be separated. Separate the assemblies with the solenoid side down, which will allow the internal components to maintain their position.
3. Slide the tension springs (5.5, 6.7, and 36) on the cam assembly, toggle assembly, and release lever off of their respective roll pins in the side plate.
4. The cam assembly (5), toggle assembly (6), load beam (8), and manual release lever components (11, 13, and 31) can now be lifted from the side plate assembly.
5. Remove the load beam bumper (35).
6. On the solenoid side, remove the electrical compartment cover (4) (applicable to P/N 528-044-00 and 528-044-01) or Lamp Housing Assembly (applicable to P/N 528-044-10 and 528-044-11) by removing three screws (29).
7. Remove ring terminals connecting the solenoid wires to the terminal block and remove the terminal block from the electrical compartment by removing two screws (30). De-solder the two wires from the solenoid at the terminal block leads.
8. Remove the solenoid assembly from its side plate by removing two nuts (23) and washers (22).
9. Separate the solenoid actuator (12) from the solenoid by cutting safety wire and removing three screws (26).
10. Separate the armor plates (14) from the side plates by removing screws (28).
11. Bushings, bearings, and pins may be removed from detail parts and assemblies by conventional means.

13.0 Inspection Instructions

Carefully inspect detail parts in accordance with the instructions in Table 13.1. Inspect the parts in a clean, well-lighted room using standard dimensional measuring tools and visual methods. Repair parts found within inspection limits. Replace any part found beyond limits.

Table 13.1 Cargo Hook Inspection Criteria

Seq.	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
1.	Toggle (6.1), Load Beam (8) Side plates (9)(10)	Cracks. Inspect under illuminated magnification (2X or higher power)	None. Cracks of any size are cause for part replacement.	N/A	No
2.	Load Beam (8), Armor Plates (14), Toggle (6.1)*	Corrosion – 0.010 in. (0.254 mm) deep.	Glass bead blast at less than 30 PSI (2.11 KGF/CM2) to remove corrosion.	Passivate per AMS-QQ-P-35 or ASTM A967.	No
3.	Load Beam (8)	Wear, gouges and nicks – 0.060 in. (1.52 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions and ensure load rings will not hang up on load beam during release.	Passivate per AMS-QQ-P-35 or ASTM A967.	No
4.	Side Plate (9, 10), Toggle (6.1)*, Cam (5.1), Release Lever Safety (11), Solenoid Actuator (12), Release Lever (13)	Dents, nicks, cracks, gouges, scratches and corrosion – 0.020 in. (0.51 mm) deep.	Glass bead blast at less than 30 PSI (2.11 KGF/CM2) to remove corrosion. Blend at 10:1 ratio as required to provide smooth transitions.	Apply Alodine (MIL-DTL-5541) and zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces – see Note 1	No

Seq.	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
5.	Electrical Compartment Cover or Lamp Housing (4),	Dents, nicks, cracks, gouges, scratches and corrosion – 0.040 in. (1.0 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply Alodine (MIL-DTL-5541) & zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces – see Note 1.	No
6.	Self-lubricating bearings (4.6, 6.8, 37, 38)	Wear – more than 50% copper showing.	None. Replace.	N/A	Yes
7.	Bearing (6.9)	Roughness, binding, looseness, or corrosion.	None. Replace.	N/A	Yes
8.	Bumper (35)	Denting, cuts or abrasions – 0.060 in. (1.52 mm) deep.	None. Replace.	N/A	Yes
9.	Cam Assembly (5)	Visible wear or dents on surface which toggle bearing (6.9) rolls on.	None. Replace.	N/A	No
10.	Cam Assembly (5)	Roughness, binding or looseness of the Interlock Roller (5.7).	Replace Clevis Pin (5.4) and Interlock Roller (5.7).	N/A	No
11.	Toggle Assembly (6)	Roughness, binding or looseness of the Load Beam Roller (6.1).	Replace Pin (6.3), Load Beam Roller (6.1), and self-lubricating bearings (6.8).	N/A	No

Seq.	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
12.	Toggle Assembly (6)	Roughness, binding or looseness of the radial bearing (6.9).	Replace bearing (6.9) and clevis pin (6.6).	N/A	No
13.	Solenoid (16.1)	Shorted or open electrical circuit. Resistance 3.5 ± .5 ohms.	None. Replace.	N/A	No
14.	Terminal Block	Cracked housing, corroded terminals.	None. Replace.	N/A	No
15.	Serial Number Plate (1)	Damage or illegible.	None. Replace.	N/A	No
16.	Wiring Decal (2), Indicator Warning Label (3),	Damage or illegible.	None. Replace.	N/A	Yes
17.	Springs (5.5, 6.7, 36)	Cracks or deformation.	None. Replace	N/A	No
18.	Electrical wiring (7)	Deterioration.	None. Replace.	N/A	No
19.	All remaining nuts, bolts, roll pins, cotter pins, washers, heli-coils.	Wear, corrosion or deterioration.	None. Replace.	N/A	Yes

Note 1 – For service at Onboard Systems, optional finish: anodize per MIL-A-8625 Type II, Class 2 after nondestructive inspection. Prepare for anodize by using standard methods.

*Applies to hooks 528-044-01 and 528-044-11 assemblies only – stainless steel material.

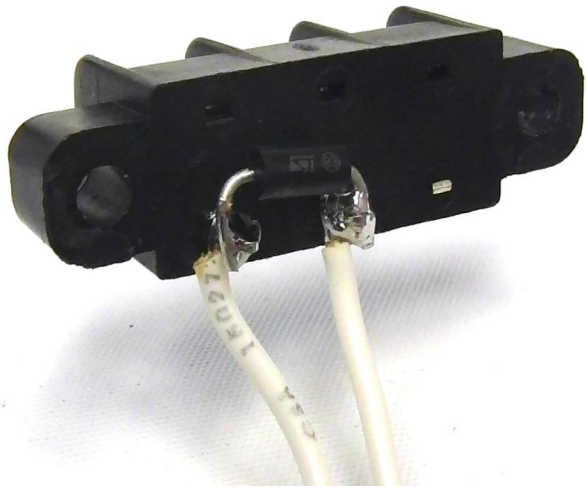
** Applies to hooks 528-044-00 and 528-044-10 assemblies only – aluminum material.

14.0 Re-assembly Instructions

1. Replace all parts found to be damaged with serviceable parts.
2. Press in self-lubricating bushings after applying zinc chromate primer (TT-P-1757 or equivalent) to their outside diameters.
3. Apply corrosion preventive compound to the faying surface of solenoid actuator (12) and solenoid (16.1) and orient solenoid actuator on solenoid as shown below. Apply Loctite 242 to screw (26) threads and secure solenoid actuator to solenoid with screws. Safety wire screws together, the starting and ending locations of the safety wire must be as illustrated.

4. Apply strip of duct tape inside solenoid cavity, route wires through adjacent hole and install solenoid into side plate (9). Route wires and capture as shown with the tape. Secure solenoid with washers (22) and nuts (23). Tighten nuts to 12-15 in-lbs.

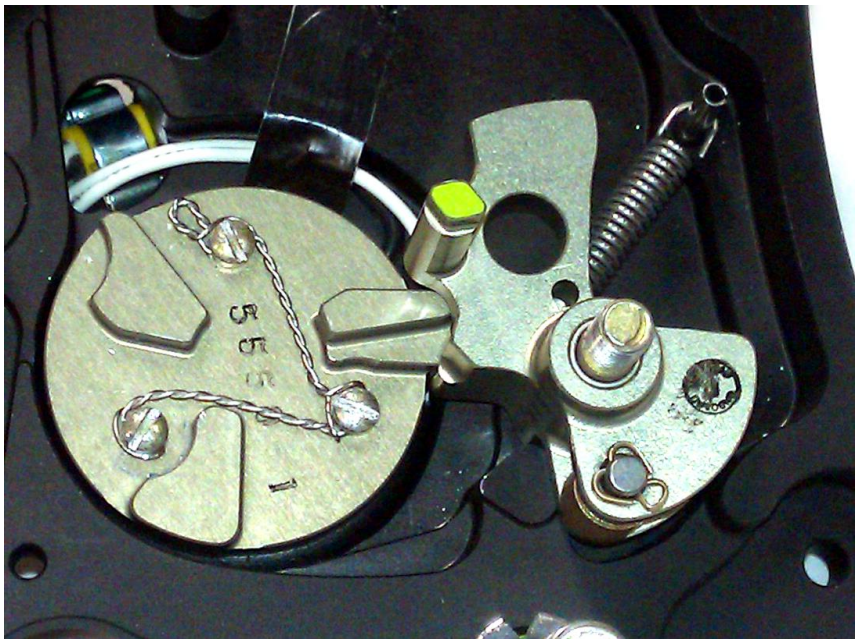
5. Solder wires and diode (39) to terminal block leads. Diode is not polarity sensitive.



6. Attach terminal block (15) inside electrical compartment using two screws (30) with Loctite 242. Ensure bare wires do not contact side plate. Note proper orientation of terminal block. Affix wiring decal (2) as shown.

7. Set the solenoid side plate assembly down with the inside facing up and insert toggle and cam pivot bolts (34) and load beam pivot bolt (32) up through outside of the solenoid side plate.

8. Set the cam assembly (5) in place over its pivot bolt and stretch its spring over the roll pin just above it.

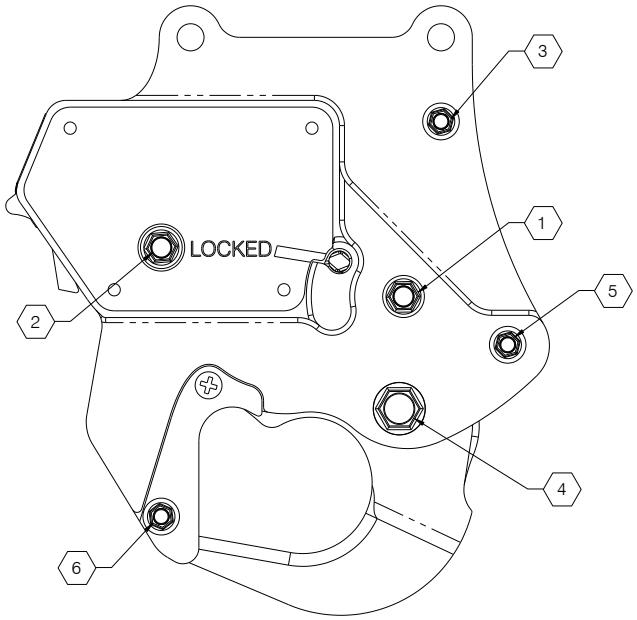


9. Slide the lever assembly (11, 13, and 31) around the toggle assembly (6) as shown and set these assemblies in place over the toggle pivot bolt in the side plate assembly. Stretch the springs over the roll pins as shown (the spring from the toggle attaches to the lower roll pin).

10. Place the load beam assembly (8 and 37) over its pivot bolt in the side plate assembly.

11. Verify no FOD is present, align the holes in the other side plate (10) with the bolts in the built up assembly, and mate the two side plates together.
12. Apply a light coat of corrosion preventive compound (such as Corban 27L) to bolt threads (32, 33, & 34) Place washers (17, 18, & 24) and nuts (19, 20, & 21) over bolts and tighten nuts finger tight only at this point.
13. Insert load beam bumper between side plates and insert bolt (33) through and apply a light coat of corrosion preventive compound (such as Corban 27L) to bolt threads. Place washer and nut over bolt and tighten nut finger tight only at this point.
14. Insert frame bolt (33) through and place washer (17) and nut (19) over it and tighten nut finger tight only at this point.
15. Lightly coat the faying surface of armor plates (14) with corrosion preventive compound (such as Corban 27L) and attach armor plates (14) to each side plate using screws (29) with Loctite 242.

16. Insert bolt (33) through armor plates and side plates and place washer (17) and nut over bolt and tighten nut to finger tight only at this point.



17. Torque the nuts onto the bolts to values listed below and in the order listed. Cam Pivot Bolt = 25-30 in-lbs

    Toggle Pivot Bolt = 25-30 in-lbs

    Frame Bolt = 20-25 in-lbs

    Load Beam Bolt = 40-45 in-lbs

    Bumper Bolt = 20-25 in-lbs

    Armor Plate Bolt = 20-25 in-lbs.

18. After tightening is complete, check the following: ensure the manual release lever opens the load beam under zero load, ensure cam returns and hook locked indicator aligns properly after closing the load beam, and ensure load beam opens freely with no binding.

19. Install harness (7) referring to schematic in section 6.0.

20. Install cover or lamp housing assembly (4) using 3 screws (28).

15.0 Acceptance Test Procedure

After the hook has been overhauled, repaired or stored for an extended period of time (see section 8.0) it must be subjected to the Acceptance Test Procedure (ATP) as follows.

1. Examine the hook externally for security of fasteners.
2. Suspend the hook from a test rig capable of loading the cargo hook to 2,000 pounds (528-044-00 and 528-044-10) or 4,000 pounds (528-044-01 and 528-044-11). Use a steel ring to apply the load to the load beam.
3. Connect an adjustable 22 - 28 VDC supply capable of 10 amps, with a momentary release switch wired into the positive wire, to the connector located on top of the solenoid housing. Connect the negative lead to pin C and the positive lead to pin B.
4. With no load on the cargo hook and with the voltage set at 22 VDC release the cargo hook with the electrical release system. The load beam should open. Close the load beam by pushing up anywhere on the lower portion of the beam. Repeat this step for a total of two cycles. Ensure that each time the load beam is closed, the hook locked indicator aligns.

CAUTION

Damage to the release solenoid can occur if the release switch is operated for more than 30 seconds continuously.

5. Gradually load the cargo hook to 2,000 lb (528-044-00 and 528-044-10) or 4,000 lb (528-044-01 and 528-044-11). Hold the load for 30 seconds. The load beam shall hold the load without unlatching. Reduce the load to zero.

⚠ WARNING

Do not release the proof test load electrically or manually. Decrease the load gradually, using the test machine, after completion of the proof load test.

6. Gradually load the cargo hook to 1,000 lb (528-044-00 and 528-044-10) or 2,000 lb (528-044-01 and 528-044-11). With the voltage set to 22 VDC, release the cargo hook with the electrical release button. The load should release. Close the load beam by pushing up anywhere on the lower portion of the beam. Repeat this step for a total of two cycles. Ensure that each time the load beam is closed, the hook locked indicator aligns.

7. If the cargo hook has a light module installed (P/N 528-044-10 or 528-044-11), power the LED light and ensure that each LED is steadily illuminated without flicker. Apply power for a minimum of 30 seconds.

End of acceptance test procedure.

For service at Onboard Systems, optionally use the following Onboard Systems factory acceptance test procedure(s):

Acceptance Test Procedure	**Applicable P/Ns**
180-233-00	528-044-00 and 528-044-10
180-233-01	528-044-01 and 528-044-11

16.0 Trouble Shooting

Table 16.1 Trouble Shooting

Symptom	Probable Cause	Remedy
Cargo hook does not open electrically, cargo hook opens normally with manual release lever.	Open electrical circuit, faulty wiring, circuit breaker, switch or solenoid.	Disconnect electrical release cable connection from aircraft. Remove electrical compartment cover from cargo hook and using multi-meter, check for 3.5 +/- .5 ohms between the two release solenoid wires. If open indication is obtained, replace solenoid. Check for security of connections to the terminal block within the electrical compartment.
Cargo hook cannot be opened electrically or manually.	Jammed internal mechanism, bearings seized from corrosion.	Disassemble cargo hook and inspect internal mechanism for binding, jamming, and worn or broken parts. Check each pivot point for freedom of rotation. Repair as necessary.
Cargo hook can be opened normally electrically, but cannot be opened with manual release lever.	Worn or jammed release lever mechanism.	Disassemble cargo hook and inspect manual release lever and guard for binding, jamming, and worn or broken parts. Inspect for debris around mechanism. Clean and/or repair as necessary.
Lock indicator fails to align when closed, load beam is sluggish during re-latch.	Accumulated dust, dirt and grime. Corrosion on pivot bushings.	Remove immediately from service for disassembly, inspection and cleaning.
Circuit breaker opens when cargo hook is energized.	Short in the system, faulty wiring, circuit breaker or solenoid.	Check for shorts to ground. Remove electrical compartment cover and check wiring, check solenoid resistance, repair or replace defective parts.

17.0 Illustrated Parts List

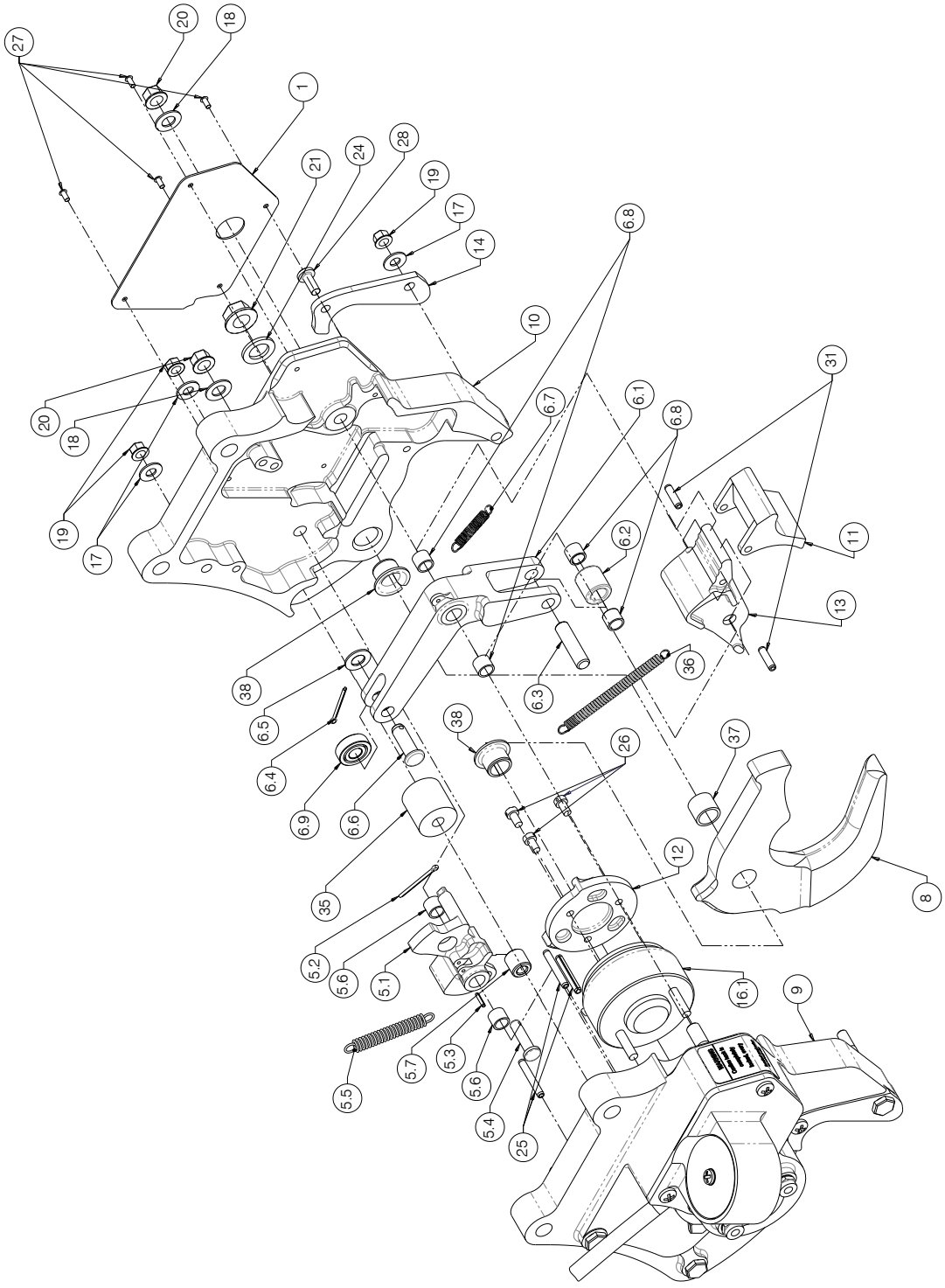


Figure 17.1 Cargo Hook Parts (528-044-10 & 528-044-11 shown)

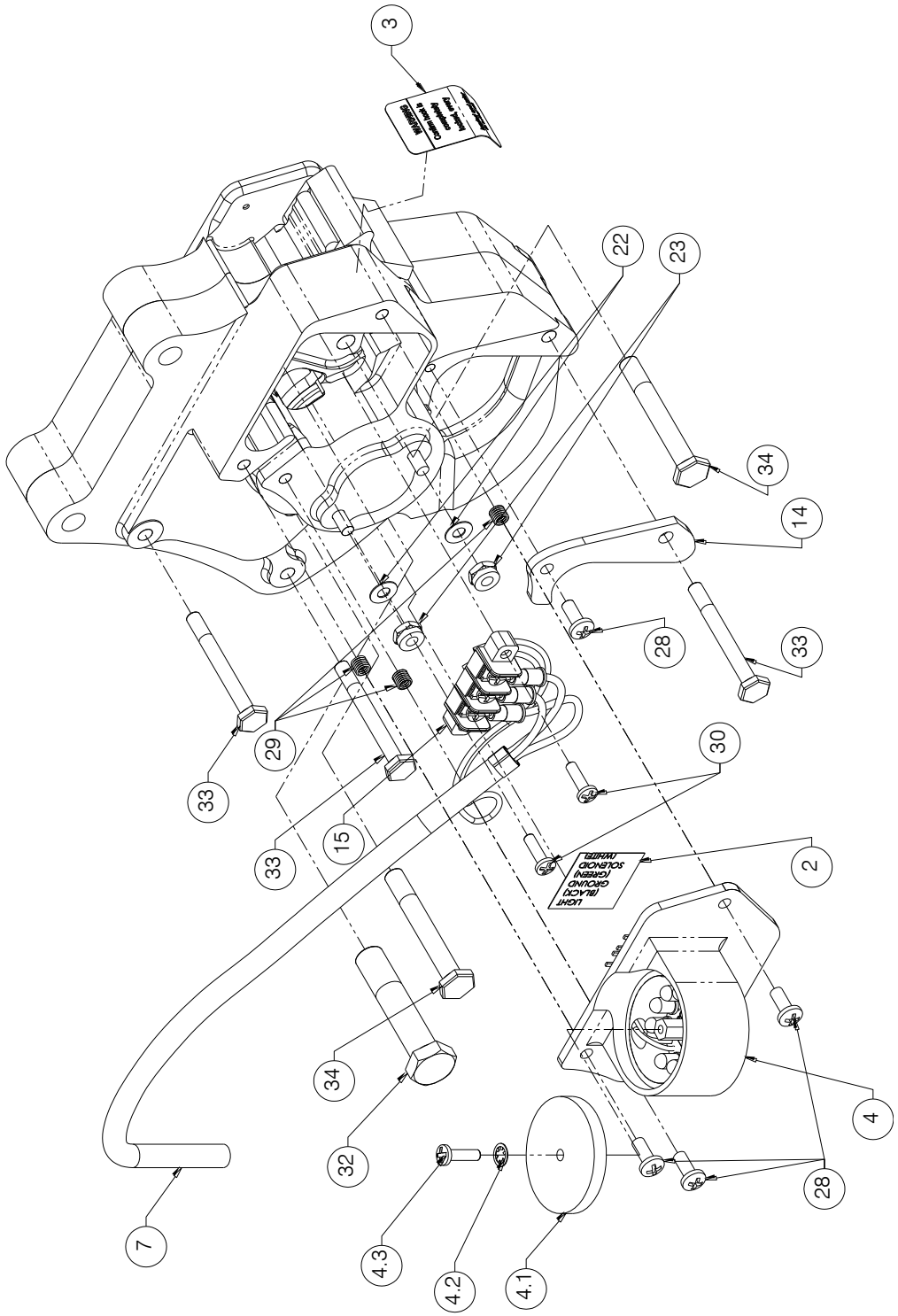


Figure 17.2 Cargo Hook Parts (528-044-10 & 528-044-11 shown)

Table 17.1 Cargo Hook Parts

Item	Part No.	Description	Qty 528-044-00	Qty 528-044-10	Qty 528-044-01	Qty 528-044 -11	Qty O/H Kit P/N 212-037-00
1	215-302-00	Serial Plate	1	1	1	1	-
2	215-304-00	Wiring Decal	1	1	1	1	1
3	215-312-00	Warning Label	1	1	1	1	1
4	232-615-00	Lamp Housing Assy	-	1	-	1	-
4	291-774-00	Compartment Cover	1	-	1	-	-
4.1	291-804-00	Window	-	1	-	1	1
4.2	510-158-00	Lock washer	-	1	-	1	
4.3	510-923-00	Screw	-	1	-	1	1
5	232-628-00	Cam Assembly	1	1	1	1	-
5.1	291-766-00	Cam	1	1	1	1	-
5.2	510-081-00	Cotter Pin	1	1	1	1	1
5.3	510-686-00	Roll Pin	1	1	1	1	-
5.4	511-067-00	Clevis Pin	1	1	1	1	-
5.5	514-115-00	Spring	1	1	1	1	-
5.6	517-021-00	DU Bushing	2	2	2	2	2
5.7	517-126-00	DU Bushing	1	1	1	1	1
6	232-629-00	Toggle Assembly	1	1	-	-	-
6.1	291-762-00	Toggle	1	1	-	-	-
6.1	291-762-01	Toggle	-	-	1	1	-
6.2	290-438-00	Roller, Load Beam	1	1	1	1	-
6.3	291-763-00	Ground Dowel Pin	1	1	1	1	1
6.4	510-081-00	Cotter Pin	1	1	1	1	1
6.5	510-100-00	Washer	1	1	1	1	1
6.6	511-069-00	Clevis Pin	1	1	1	1	1
6.7	514-032-00	Spring	1	1	1	1	-
6.8	517-021-00	DU Bushing	4	4	4	4	4
6.9	517-127-00	Radial Bearing	1	1	1	1	1
7	270-215-00*	Carousel Harness	1	-	1	-	-
7	270-208-00*	Carousel Harness	-	1	-	1	-
8	291-761-00	Load Beam	1	1	1	1	-
9	291-767-00	Side Plate, Sol. Side	1	1	1	1	-
10	291-768-00**	Side Plate, Indicator Side	1	1	1	1	-
11	291-769-00	Release lever safety	1	1	1	1	-
12	291-770-00	Solenoid Actuator	1	1	1	1	-
13	291-771-00	Release Lever	1	1	1	1	-

Item	Part No.	Description	Qty 528-044-00	Qty 528-044-10	Qty 528-044-01	Qty 528-044 -11	Qty O/H Kit P/N 212-037-00
14	291-773-00	Armor Plate	2	2	2	2	-
15	410-389-00	Terminal Block	1	1	1	1	-
16	455-003-00	Solenoid	1	1	1	1	-
17	510-095-00	Washer	3	3	3	3	3
18	510-100-00	Washer	2	2	2	2	2
19	510-102-00	Nut	3	3	3	3	3
20	510-114-00	Nut	2	2	2	2	2
21	510-129-00	Nut	1	1	1	1	1
22	510-149-00	Washer	2	2	2	2	2
23	510-206-00	Nut	2	2	2	2	2
24	510-221-00	Washer	1	1	1	1	1
25	510-310-00	Roll Pin	3	3	3	3	3
26	510-379-00	Screw	3	3	3	3	3
27	510-429-00	Drive Screw	4	4	-	-	-
27	511-161-00**	Screw	-	-	4	4	-
28	510-493-00	Screw	5	5	5	5	5
29	510-522-00	Helicoil	3	3	3	3	3
30	510-923-00	Screw	2	2	2	2	2
31	511-047-00	Roll Pin	2	2	2	2	-
32	511-066-00	Bolt	1	1	1	1	1
33	511-073-00	Bolt	3	3	3	3	3
34	510-223-00	Bolt	2	2	2	2	2
35	514-031-00	Bumper	1	1	1	1	1
36	514-032-00	Spring	1	1	1	1	-
37	517-010-00	DU Bushing	1	1	1	1	1
38	517-125-00	Flanged DU Bushing	2	2	2	2	2
39	340-035-00†	Diode	1	1	1	1	-

* Replacement Harness P/N 270-208-00 is recommended for use with Onboard Systems Carousel Systems. This harness has a grommet and circular connector pre-installed.

** If replacing Side Plate on hooks 528-044-00 & 528-044-10 use screws, 511-161-00 to attach serial plate.

† Not shown. Not included in early production units.

18.0 Cargo Hook w/Cage Assembly

This section describes and lists the detail parts of the Cargo Hook with Cage.

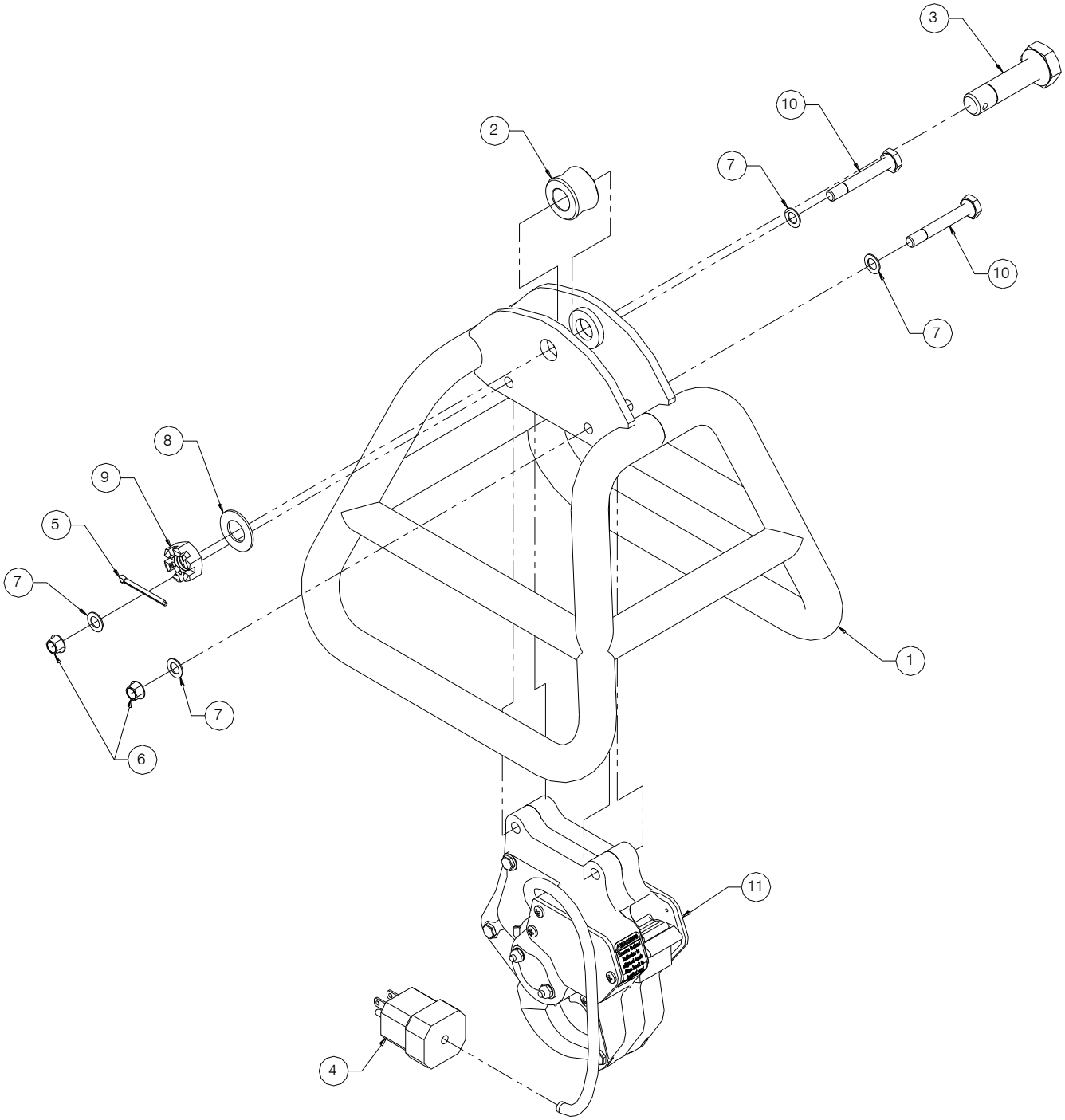


Figure 18.1 Cargo Hook w/Cage Assembly

Table 18.1 Cargo Hook w/ Cage (P/N 210-303-00) Parts List

Item	Part No.	Description	Qty
1	235-272-00	Cage Weldment	1
2	291-475-00	Spool	1
3	291-537-00	Attach Bolt	1
4	410-300-00	Plug	1
5	510-098-00	Cotter Pin	1
6	510-104-00	Nut	2
7	510-239-00	Washer	4
8	510-303-00	Washer	1
9	510-933-00	Nut	1
10	510-953-00	Bolt	2
11	528-044-01	2000lb Cargo Hook	1

19.0 Instructions for Returning Equipment to the Factory

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

NOTICE

An RMA number is required for all equipment returns.

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

- Contact Technical Support by phone or e-mail:

  (Techhelp@OnboardSystems.com).

- Generate an RMA number at our website:

  http://www.onboardsystems.com/rma.php

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

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

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