Component Maintenance Manual

Cargo Hook Suspension System

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

Applicable Equipment Part Numbers

Obsolete P/Ns		Current P/Ns
200-088-00	200-089-04	200-088-10
200-089-00	200-089-05	200-088-11
200-088-01	200-089-06	200-088-50
200-089-01	200-089-10	200-089-22
200-088-02	200-089-11	200-089-23
200-088-03	200-089-20	200-089-26
200-089-03	200-089-21	200-089-27
200-088-04	200-089-24	
	200-089-25	

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

This document is proprietary to Onboard Systems Int'l. Disclosure or reproduction is not allowed. © 2025 Onboard Systems Int'l., all rights reserved.

RECORD OF REVISIONS

Revision	Date	Page(s)	Reason for Revision
1	06/12/13	5, 18, 19	Updated ATP to remove testing that is duplicated in cargo hook's CMM ATP. Added manual release cable inspection at annual inspection.
2	12/12/13	5, 7, 26, 27	Added requirement to maintain record of all maintenance activity (pg 5). Added Section 6.3. Corrected overhaul kit qty for item 8.20 and removed item 8.53 to reflect actual kit contents.
3	07/13/15	23 & 29	Removed 232-011-00 Load Bolt Assembly and 556-017-00 Lower Oil Seal from overhaul kit.
4	07/24/15	7	Increased overhaul interval to 6 years/1500 hours of external load operations.
5	03/24/16	10, 25, 27	Listed Bumper P/N 291-874-00 as alternate to P/N 220-040-00. Changed zinc chromate primer specification to TTP1757B for bushing installation.
6	02/21/17	23	Listed Load Cell Assembly P/N 210-088-02 as optional in kit P/N 200-089-20.
7	02/16/18	9, 19, 23 – 25	Added kit P/N 200-088-11, 200-089-24, and 200-089-25 which include cargo hook w/ Surefire. Removed Load Link Assembly from NDT list.
8	11/09/18	7, 9	Added instructions to return load cell assembly to the factory for inspection and calibration (section 7.3). Removed some parts from NDT requirement list.
9	01/14/20	9	Changed NDT inspection of Clevis Assembly (1), Bell Housing (8.8) and Load Tube (8.15) to visual inspection under magnification. Moved inspection step to Table 9.1. Added additional inspection criteria for Bumper (12, 22.7) to Table 9.1.
10	05/19/25	1, 5, 7, 14, 19, 20, 23-25	Added grace period for annual/100 hour and 6 year/1500 hour overhaul intervals. Changed preventative maintenance (section 4.2) to "as needed per visual condition". Added P/Ns 200-089-26 and 200-089-27.

Register Your Products for Automatic Notifications

Onboard Systems offers a free notification service via fax or email for product alerts and documentation updates. By registering your Onboard Systems products at our website, we will be able to contact you if a service bulletin is issued, or if the documentation is updated.

You can choose to receive notices on an immediate, weekly, or monthly schedule via fax, email or both methods. There is no charge for this service. Please visit our website at www.onboardsystems.com/notify.php to get started.

1.0 Introduction

1.1 **Scope.** This component maintenance manual contains instructions for inspection, maintenance and overhaul.

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

180-055-00 Acceptance Test Procedure

120-031-01 Owner's Manual – UH-1 Cargo Hook Suspension System

120-044-00 Owner's Manual – 6000 Pound Cargo Hook P/N 528-002-00 and -01

120-084-00 Owner's Manual – UH-1 Cargo Hook Suspension System w/ Keeperless Hook

122-004-00 Component Maintenance Manual – Cargo Hook (528-020-xx series)

3.0 Service Bulletins

3.1 This component is subject to the following service bulletins. Service bulletin documents may be obtained from the Onboard Systems website. Verify compliance with all service bulletins prior to maintenance.

Service Bulletin	Description	P/N Applicability	S/N Applicability
159-002-00	Load Link Replacement	200-088-00 200-088-01	All

4.0 Maintenance

4.1 Maintain a record of ALL cargo hook suspension maintenance activities including aircraft installation and removal, inspections, repair and overhaul as well as inactivity and storage events.



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

4.2 **Daily or Before a Flight Involving External Load Operations**

Refer to Rotorcraft Flight Manual Supplement.

4.3 **Cleaning and Preventative Maintenance**

As needed per visual condition remove accumulated soils from exterior with a soft bristle brush and mild solvent/cleaner.

As needed per visual condition, in saltwater environments, apply a corrosion preventative compound such as ACF-50 to all exterior surfaces.

4.4 **Annual Inspection**

Annually or 100 hours of external load operations (see section 6.2 for definition), whichever comes first, remove the Cargo Hook Suspension System from the aircraft. A one-month or 10-hour grace period can be applied if needed. No additional extension is allowed beyond this grace period.

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. Inspect Cargo Hook Suspension System external electrical harnesses and their connectors for damage, chafing, and security.

Re-install Cargo Hook Suspension System on the aircraft and inspect the manual release cable rigging and adjust if necessary. Refer to Owner's Manual 120-084-00 for manual release cable rigging instructions if using the keeperless cargo hook (P/N 528-020-XX) or refer to Owner's Manual 120-031-01 if using the keepered cargo hook (P/N 528-002-00).

4.5 **Overhaul**

Overhaul the Cargo Hook Suspension System in accordance with the overhaul schedule and instructions contained here-in.

4.6 **Repair**

Repair the Cargo Hook Suspension in accordance with the repair instructions contained here-in.

5.0 Repair Instructions

5.1 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 14, instructions for returning equipment to the factory.

5.2 Reference numbers throughout this manual shown in parentheses ( ) refer to tables and figures in section 13.

5.3 Follow these steps to repair the Cargo Hook Suspension System, 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.

5.4 Note that repair instructions for the Cargo Hook (11) are not contained in this Component Maintenance Manual. Refer to the appropriate Cargo Hook maintenance manual (doc. no. 120-044-00 for the keepered cargo hook (P/N 528-002-00) and 122-004-00 for the keeperless cargo hook (P/N 528-020-XX)).

6.0 Overhaul Schedule

6.1 The Cargo Hook Suspension System shall be overhauled every 1500 hours of external load operations or 6 years, whichever comes first. A six-month or 150-hour grace period can be applied if needed. No extension to maintenance is allowed beyond this grace period.

6.2 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.

6.3 The 6 year period is from the initial installation date when the cargo hook suspension system is new or newly overhauled, regardless of storage or inactivity periods. If initial installation date is unknown, then the 6 year period is from date of manufacture as indicated on the data plate or 6 years from date of last overhaul indicated on the overhaul sticker.

7.0 Overhaul Instructions

7.1 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 suspension system after overhaul. See Section 14, instructions for returning equipment to the factory.

7.2 Overhaul kit P/N 212-022-00 is recommended to complete the Cargo Hook Suspension System overhaul. The overhaul kit contains all recommended items to be replaced at time of overhaul. Table 13.1 lists detail parts contained in the overhaul kit.

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

1. Obtain Overhaul Kit P/N 212-022-00.
2. Completely disassemble.
3. If present, return the optional Load Cell Assembly (3) to the factory for inspection and calibration. The factory will inspect the condition of the load cell and perform acceptance test procedures including calibration and zero balance, repairing as necessary.
4. Discard all items that are to be replaced by an item in Overhaul Kit P/N 212-022-00 listed in table 13.1 (springs, bearings, roll pins, cotter pins, fasteners, nuts and washers).
5. Inspect disassembled parts.
6. Obtain required replacement parts.
7. Reassemble.
8. Acceptance test.
9. Inspect for return to service.

7.4 Note that overhaul instructions for the Cargo Hook (11) are not contained in this Component Maintenance Manual. Refer to appropriate Cargo Hook Component Maintenance Manual.

8.0 Disassembly Instructions

Refer to figures 13.1 and 13.2 and tables 13.1 and 13.2 for illustrated parts breakdown and parts lists.

8.1 Remove the Cargo Hook Suspension System from the aircraft.

8.2 Cut and remove all safety wire.

8.3 Note the routing of the ground strap, manual release cable and the electrical release cable to the cargo hook for re-assembly purposes.

8.4 Remove the cotter pin (7) from the nut (6) and remove nut and washer (5) from the load bolt (4) in order to separate the load link assembly (2) from the bell housing (8.8). Repeat at upper end of load link to separate the load link assembly from the Clevis Assembly (1).

8.5 Remove the two bolts (8.9) and washers (8.2) from the bayonet key (8.11) and remove the bayonet key.

8.6 Hold the bell housing (8.8) and rotate the bayonet housing (8.22) 90 degrees and pull the bayonet housing from the bell housing.

8.7 Separate the tube (8.32) from the load tube (8.15) by removing nuts (8.28), tube spacers (8.3), washers (8.29) and bolts (8.31, 8.33).

8.8 Separate the yoke (8.39) from the tube (8.32) by removing nuts (8.28), washers (8.29) and bolts (8.33).

8.9 Remove the slip ring assembly (8.27) from the suspension system by sliding the slip-ring assembly over the load tube.

8.10 Remove the four screws (27.4) retaining the wiper assembly (27.5) and carefully remove the assembly (refer to Figure 13.2 for slip ring assembly parts breakdown). Remove the three screws (27.4) that retain the bearing cap (27.8), remove the bearing cap with a twisting pulling action. Separate the slip ring housing (27.13) from the slip ring core assembly (27.11).

8.11 Disassemble the rest of the Cargo Hook Suspension System using standard methods.

8.12 Note that disassembly instructions for the Cargo Hook (11) are not contained in this Component Maintenance Manual. Refer to appropriate Cargo Hook Component Maintenance Manual.

9.0 Inspection Instructions

9.1 Thoroughly clean all parts to be inspected using a soft bristle brush and mild solvent/cleaner. Parts should be completely free of surface contaminants, soils or grease before beginning inspections.

9.2 Carefully inspect detail parts in accordance with the instructions in Table 9.1. Inspect the parts in a clean, well-lit room using standard dimensional measuring tools and visual methods. Repair parts found within inspection limits. Replace any part found beyond limits.

9.3 Note that inspection instructions for the Cargo Hook (11) are not contained in this Component Maintenance Manual. Refer to appropriate Cargo Hook Component Maintenance Manual.

Table 9.1, Cargo Hook Suspension System Inspection Criteria

Seq	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
1.	Clevis Assembly (1), Bell Housing (8.8), Load Tube (8.15), Tube (8.32)	Cracks. Inspect under illuminated magnification (2X power or higher).	None. Cracks of any size are cause for part replacement.	N/A	No
2.	Clevis Assembly (1)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on lower bushing ID, .630 in. (16 mm) maximum. Wear on upper bushing ID, .505 in. (12.82 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions. Install bushings with wet zinc chromate primer (TTP1757B-1CY or similar).	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
3.	Load Bolt Assembly (4)	Wear on OD, .610 in. (15.49 mm) minimum.	None	None	No
4.	Link Assembly (2)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on bushing ID, .630 in. (16 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions. Replace bushings if required. Install bushing with wet zinc chromate primer (TTP1757B-1CY or similar).	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
5.	Load Cell Assembly (3)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on bushing ID, .630 in. (16 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions. Replace bushings if required. Install bushing with wet zinc chromate primer (TTP1757B-1CY or similar).	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
6.	Bell Housing (8.8)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on bushing ID, .630 in. (16 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions. Replace bushings if required. Install bushing with wet zinc chromate primer (TTP1757B-1CY or similar).	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No

Seq	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
7.	Cable Bracket (8.5)	Excessive wear, general condition and corrosion.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
8.	Cable Clamp (8.3)	Excessive wear, general condition and corrosion.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
9.	Bayonet Key (8.11)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
10.	Slip-Ring Mounting Bracket (8.10)	Cracks or severe corrosion.	Remove corrosion.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
11.	Funnel (8.13)	Damage.	None	None	No
12.	Load Tube (8.15)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on holes ID, .323 in. (8.20 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
13.	Bayonet Housing (8.22)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
14.	Slip-Ring Bearing Cap (27.8)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
15.	Slip-Ring Upper Bushing (27.10)	ID 1.763 in. (44.78 mm) maximum.	None	None	No

Seq	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
16.	Slip-Ring Core Assembly (27.11)	Inspect the 8 rings and 2 bushing journals for security, damage, corrosion and wear. Ring pitting or corrosion 0.020 in. (0.50 mm) deep maximum. Upper journal OD 1.744 in. (44.29) minimum. Lower journal OD 2.119 in. (53.82 mm) minimum.	Blend at 10:1 ratio as required to provide smooth transitions. Lubricate with MIL-PRF-23827 grease or similar.	None	No
17.	Slip-Ring Lower Bushing (27.12)	ID 2.138 in. (54.30 mm) maximum.	None	None	No
18.	Slip-Ring Housing (27.13)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
19.	Slip-Ring Wiper Assembly (27.5)	Inspect wiper fingers for any damage, wear or corrosion.	Lubricate with MIL-PRF-23827 grease or similar.	N/A	No
20.	Tube (8.32)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on holes ID, .323 in. (8.20 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
21.	Yoke (8.39)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on upper holes ID, .323 in. (8.20 mm) maximum. Wear on lower holes ID .442 in. (11.22 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No

Seq	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
22.	Lower Link (8.40), (8.47)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep. Wear on lower holes ID .442 in. (11.22 mm) maximum.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
23.	Lower Control Cable (21)	Any kinking, fraying or wear. No damage allowed at ball ends.	None	N/A	No
24.	Manual Release Cable Assembly (8.49)	Kinking that inhibits the free travel of the inner wire rope, crushing of the other housing, any kinking or fraying to the inner wire rope. No damage allowed at swaged ends.	None	N/A	No
25.	Swing Arm (8.53) Pivot Block (8.50) Cable Support (8.46)	Dents, nicks, gouges, scratches and corrosion – 0.030 in. (0.762 mm) deep.	Blend at 10:1 ratio as required to provide smooth transitions.	Apply zinc chromate primer (MIL-PRF-23377 or similar) to affected surfaces**	No
26.	Bumper (12 or 22.7)	Cracks, gouges w/ void > .25 in (6mm), degradation of material nature from fluid contaminants or heat, abraded rough bumper surface.	None	None	No
27.	Serial Number Sticker (16)	Damaged or illegible.	None	N/A	Yes
28.	Load weigh wiring, electrical release harness, stray voltage wires, and connectors.	Deterioration, loose, missing, or mutilated contact pins, cracked case, or worn insulator.	Replace	N/A	No

Seq	Component	Inspection Criteria & Limit	Repair Action	Finish	Recommended replacement at overhaul.
29.	All remaining nuts, bolts, roll pins, cotter pins, washers, heli-coils.	Wear, corrosion or deterioration.	None. Replace.	N/A	Yes
30.	Load Indicator	N/A	C-39 model only: verify calibration of the system by lifting a load of known weight.	N/A	No
31.	Cargo Hook (11)	See appropriate Cargo Hook Component Maintenance Manual.	See appropriate Cargo Hook Component Maintenance Manual.	See appropriate Cargo Hook Component Maintenance Manual.	See appropriate Cargo Hook Component Maintenance Manual.

** Note – For service at Onboard Systems Int'l, optionally remove paint and plate finishes and re-apply per drawing.

10.0 Re-assembly Instructions

Refer to Figures 13.1 and 13.2 and Tables 13.1 and 13.2 for illustrated parts breakdowns and parts lists.

10.1 Replace all parts found to be un-serviceable or beyond limits.

10.2 Coat all bearings, thrust washers, o-rings, slip-rings and wipers with general purpose grease such as MIL-PRF-23827.

10.3 Reassemble the Slip Ring Assembly (8.27) and carefully inspect the contacts through the Inspection Cover (27.3) openings to ensure that each contact is properly seated against its appropriate ring and is not overlapping another ring. Ensure that each contact is flat on the ring and exerting a force of not less than 60 grams on the ring.

10.4 Thoroughly grease (use a general-purpose grease such as MIL-PRF-23827) inside of bayonet housing (8.22) and press the two roller bearings (8.20) into bayonet housing. Pack the roller bearings with grease.

10.5 Install radius filler (8.21) into bayonet housing.

10.6 Grease thrust washers (8.18) and thrust bearing (8.19) and assemble them into bayonet housing (8.22).

10.7 Install O-ring (8.26) into groove of bayonet housing (8.22)

10.8 Install Load Tube (8.15) into bayonet housing.

10.9 Attached ground wire to inside of load tube with screw (8.17) using Loctite 262 on the threads.

10.10 Press bushings (8.7) into bell housing (8.8) and install O-ring (8.12) into groove of bell housing.

10.11 Assemble tube (8.32) onto yoke (8.39) with four bolts (8.33), washers (8.29) and nuts (8.28). Tighten nuts to 100-140 in-lbs plus drag.

10.12 Insert the tube spacers (8.45) within the yoke at the lower two holes and attach the longer lower link (8.40) using bolts (8.41, 8.42), washers (8.36, 8.38), and nuts (8.35, 8.37). Attach the shorter link using bolt (8.42), washer (8.36), and nut (8.35). Tighten the castellated nuts (8.35) finger tight and rotate to the next castellation to install the cotter pin (8.34). Do not tighten self-locking nut (8.37) yet. Insert all bolts in the same direction. The side which the bolts heads are on will be referred to as the FRONT side from here on.

10.13 Insert the cable support (8.46) between the links with the slots open towards the back of the assembly. Insert two bolts (8.43) through cable support but do not secure bolts yet.

10.14 Insert the manual release cable assembly up through the tube from the bottom.

10.15 Install the swing arm assembly onto the lower link using screw (8.55), washer (8.38) and nut (8.6). Tighten nut to 20-25 in-lbs plus drag.

10.16 Slide the slip-ring assembly over the tube. It will be secured at a later step.

10.17 Insert the ground strap attached to the load tube down through the tube and route it to the left of the bolt installed through the center (on the opposite side from the manual release cable). Orient the load tube such that the ground strap mounting point is directly above the area to the left of the bolt to which the ground strap is routed. Looking from the FRONT, route the ground strap to the right at the bottom of the assembly.

10.18 Insert bolt (8.31) through spacers (8.30), washers (8.29) and through the lowest of the four upper attach holes of the tube and load tube. Install nut (8.28) and torque to 100-140 in-lbs plus drag.

10.19 At the remaining three upper holes in the tube, insert bolt (8.33) through washers (8.29), tube, and load tube, and secure with nut (8.28). Torque nuts to 100-140 in-lbs plus drag.

10.20 Grease funnel (8.13) extensively and assemble spring (8.14) over it. Insert spring and funnel onto bayonet housing.

10.21 Apply grease to cad plated surfaces of bayonet housing.

10.22 Thread manual release cable through bell housing and assemble bell housing onto bayonet housing. Rotate bayonet housing clockwise until bayonet key (8.11) can be inserted.

10.23 Secure mounting bracket (8.10) and bayonet key onto bell housing using two bolts (8.9) and washers (8.2).

10.24 Slide slip ring assembly up and attach to mounting bracket with two screws (17) and two washers (18). The spacers installed previously at the lower bolt must engage the SMALL notch in the slip ring core inner tube.

10.25 Route ground strap and electrical harnesses down the lower links and secure with loop clamps (8.44) and nuts (8.6). Tighten nuts to 20-25 in-lbs plus drag torque.

10.26 Attach the bumper (12 or 22.7) to the cargo hook (11) using bolts, spacers, and nuts. If using keeperless cargo hook (P/N 528-020-XX series), in order to slide the bumper up over the cargo hook remove the nut, washer and bolt from the cargo hook which secures the orange load beam bumper in place. If the 528-020-XX cargo hook has the red manual release lever, retract it to get the bumper past it. Torque nuts securing the bumper to 100-140 in-lbs. Re-install bolt, washer and nut onto cargo hook and tighten nut to 10-15 ft-lbs.

10.27 Attach cargo hook to links using bolts (8.42), washers (8.36), and nuts (8.35). Tighten nuts finger tight and rotate to next castellation to install cotter pin (8.48).

10.28 Tighten the upper nut (8.37) through the lower link (8.40) to 20-25 in-lbs plus the drag torque.

10.29 Attach hook ground wire (8.16) to cargo hook (11) with existing cargo hook screw. Encapsulate screw head with Cho-Bond 1038.

10.30 Safety-wire Cargo Hook electrical connector to the wire harness. Install all cotter pins.

10.31 Attach the load link assembly (2) or load cell assembly (3) onto bell housing with load bolt (4), washer (5), and nut (6). Tighten nut finger tight and rotate to next castellation to insert cotter pin (7). Ensure load link pivots freely within bell housing clevis.

10.32 Attach clevis assembly onto load link/load cell with load bolt (4), washer (5), and nut (6). Tighten nut finger tight and rotate to next castellation to insert cotter pin (7). Ensure load link pivots freely within clevis.

10.33 Apply MIL-PRF-23827 grease through the zerk fittings on each load bolt assembly (4).

10.34 Attach Cable Bracket (8.5), washer (8.2) and bolt (8.4) to bell housing and tighten bolt to 20-25 in-lbs.

10.35 Loosely attach cable clamp (8.3) to cable bracket (8.5) with bolt (8.1), washer (8.2), and nut (8.6).

10.36 Adjust and test the manual release mechanisms per applicable Owner's Manual (doc. no. 120-084-00 if using keeperless cargo hook (P/N 528-020-XX) or doc. no. 120-031-01 if using keepered cargo hook) and the appropriate Bell Service Instructions and secure cable within cable clamp (8.3) when satisfactory setting is obtained.

10.37 If the Cargo Hook Suspension System was overhauled, fill out and affix Overhaul Label (23).

10.38 Perform the acceptance test procedure per this manual.

11.0 Acceptance Test Procedure

11.1 When the Cargo Hook Suspension System is repaired or overhauled, it must be subjected to the following acceptance test procedure (ATP) before being returned to service. The Cargo Hook Suspension System is required to pass each of the following tests/verifications before being eligible to be returned to service.

11.2 Examine the Cargo Hook Suspension System externally for security of the lock wire, cotter pins and fasteners.

11.3 Verify that the clevis (1) and load link (2) rotate smoothly.

11.4 Verify that the load tube rotates within the bell housing smoothly.

11.5 Verify that the mechanical release is rigged correctly per Owner's Manual instructions (doc. no. 120-084-00 if using keeperless cargo hook (P/N 528-020-XX) or doc. no. 120-031-01 if using keepered cargo hook).

11.6 Verify that the cargo hook (11) is grounded to the suspension system and the exposed screw is encapsulated with Cho-Bond 1038.

11.7 Suspend the Cargo Hook Suspension System from a suitable test rig.

11.8 Connect an adjustable 20 – 28 VDC supply with a momentary release switch wired into the positive wire, to the cargo hook suspension system connector. Note: the 200-088-50 suspension uses pins A and B (cargo hook power) of the a/c interface connector for cargo hook release. All others use pin B (cargo hook power) and pin C (ground).

11.9 Load the cargo hook using a steel ring that can drop clear of the load beam. Measure the force required to release the system using the manual release with a 10 LB (4.5 KG) load. The release force should not exceed 75 LB (34 KG).

11.10 Load the cargo hook using a steel ring that can drop clear of the load beam. Verify that the system releases the 10 LB (4.5 KG) load electrically.

CAUTION

Damage to the cargo hook release solenoid can occur if the release switch is operated for more than 20 seconds continuously.

11.11 Verify that continuity exists between each input and output of each of the 8 slip-ring assembly (8.27) channels.

11.12 Perform the following tests on Cargo Hook Suspension System P/N's 200-088-01, -02, -03, -04 and 200-089-01, -02, -03, -04.

1. With no weight on the cargo hook load beam, apply 22 VDC to the electrical release mechanism while the lower suspension is rotated 360 degrees. Verify the cargo hook continues to cycle rapidly without interruption.
2. Open the load beam, then close the latch and allow the load beam tip to rest against the latch. With the load beam in this position, apply 22 VDC to the electrical release mechanism and verify that the cargo hook re-latches.

11.13 Perform the following tests on Cargo Hook Suspension System P/N's 200-088-10, 200-089-10, -11, -20, -21, -22, -23, -24, -25, -26, -27 or -50.

1. With no weight on the cargo hook load beam, apply 22 VDC to the electrical release mechanism. The load beam should drop open. Close the load beam and verify that it latches. Rotate the lower portion of the suspension and repeat this test at 6 different locations within a complete revolution. This test is to verify that the electrical slip rings are functional.

11.14 Remove the Cargo Hook Suspension System from the test rig.

11.15 End of acceptance test procedure.

11.16 For service at Onboard Systems, optionally use the following Onboard Systems factory acceptance test procedures.

Table 11.1 Onboard Systems Optional Factory Acceptance Test Procedures

Acceptance Test Procedure	**Applicable P/Ns**			
180-055-00	200-088-01	200-089-01	200-088-02	200-089-02
	200-088-03	200-089-03	200-088-04	200-089-04
	200-089-05	200-089-06	200-088-10	200-088-11
	200-088-50	200-089-10	200-089-11	200-089-20
	200-089-21	200-089-22	200-089-23	200-089-24
	200-089-25	200-089-26	200-089-27	

12.0 Troubleshooting

12.1 The following section lists symptoms and probable causes to aid in equipment troubleshooting.

Symptom	Probable Cause	Remedy
Cargo hook does not open, solenoid inoperative, no power to connector.	Faulty wiring, circuit breaker, switch, solenoid or slip-ring contacts.	Repair or replace defective parts. Check continuity through the slip-ring assembly. Refer also to the Component Maintenance Manual for the Cargo Hook.
Circuit breaker opens when the circuit to cargo suspension assembly is energized.	Short in the system, faulty circuit breaker or switch.	Repair or replace defective wiring, circuit breaker and switch.
Cargo hook does not release when mechanical CARGO RELEASE pedal is depressed.	Broken cable, cable disconnected or damaged pulley, improper adjustment.	Replace cable and/or pulley, adjust rigging.
Slip-Ring accessories do not operate, no power to receptacle.	Faulty wiring, circuit breaker, switch, or slip-ring contacts.	Check continuity through the slip-ring assembly. Repair or replace defective parts.
Circuit breaker opens when slip-ring accessories are energized.	Short in the system, faulty wiring, circuit breaker, switch, or slip-ring contacts.	Check continuity through the slip-ring assembly. Repair or replace defective parts.
Load Weigh Indicator does not light up.	Faulty wiring, circuit breaker or switch.	Check the power switch, circuit breaker and wiring. If this doesn't help, return the unit to the factory.
Where am I in Load Weigh Indicator menu?	N/A	Turn the Indicator power off for a few moments. When it comes to life it will be in the Run mode.
Displayed load is incorrect.	Incorrect Calibration Code.	Insure the correct Calibration Code has been entered.
C-39 model Indicator: Displayed load is not stable.	Dampening level is too small.	Adjust the Dampening level to a larger number (C-40 Indicator does not have dampening level adjustment).
C-39 Indicator: Displayed load takes too long to change the reading when the load is changed.	Dampening level is too large.	Adjust the Dampening level to a smaller number (C-40 Indicator does not have dampening level adjustment).
C-39 Indicator: Do not recognize the displayed numbers on the Indicator.	NV Ram failure, A/D or D/A circuit failure.	Refer to *Error Codes* in Owner's Manual.
Load Weigh Indicator does not change with changing hook loads.	Defective load cell or damaged internal harness.	Check for damaged internal harness, replace load cell.

13.0 Illustrated Parts List

Figure 13.1, Cargo Suspension System Parts

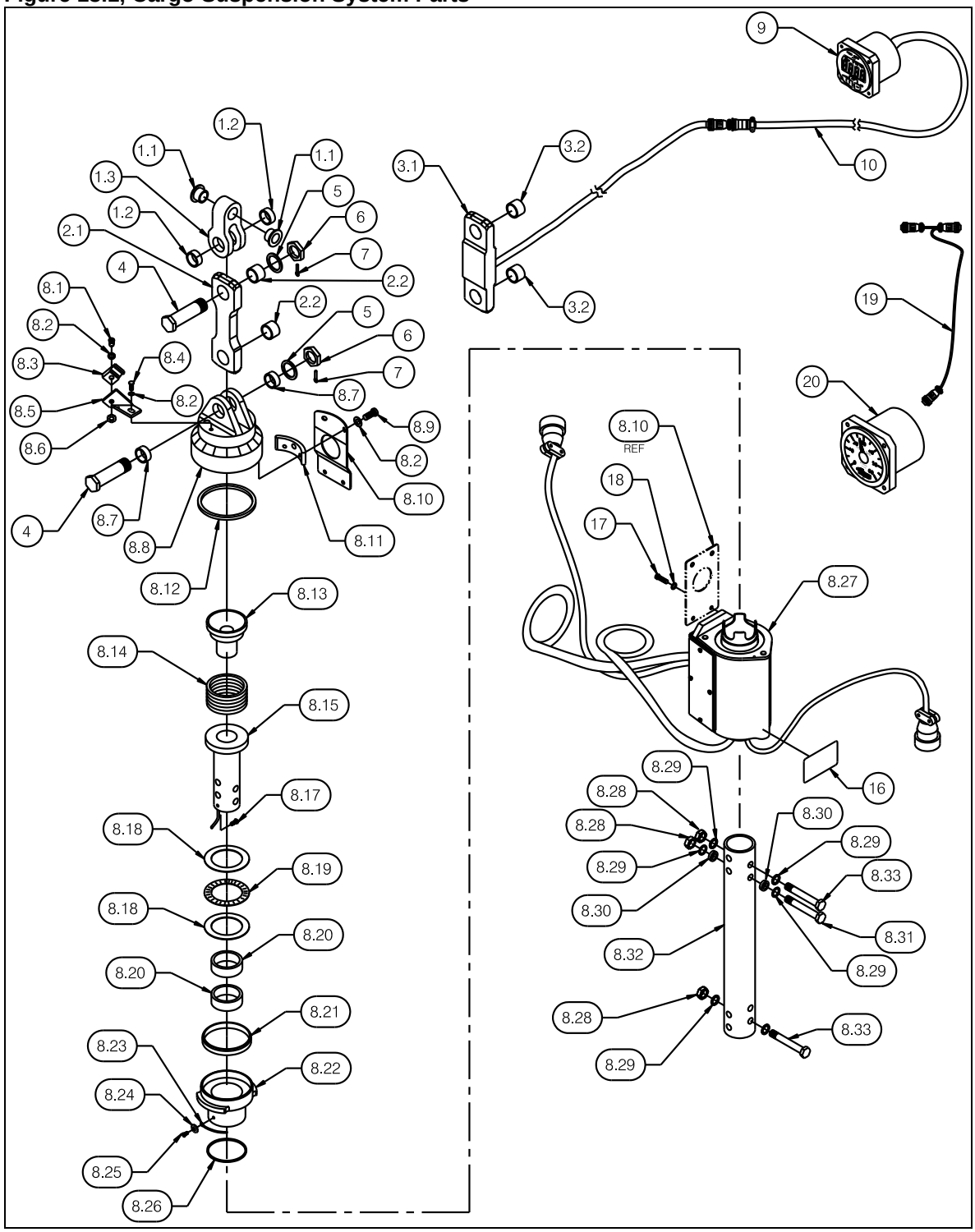


Figure 13.1 Cargo Hook Suspension System Parts continued

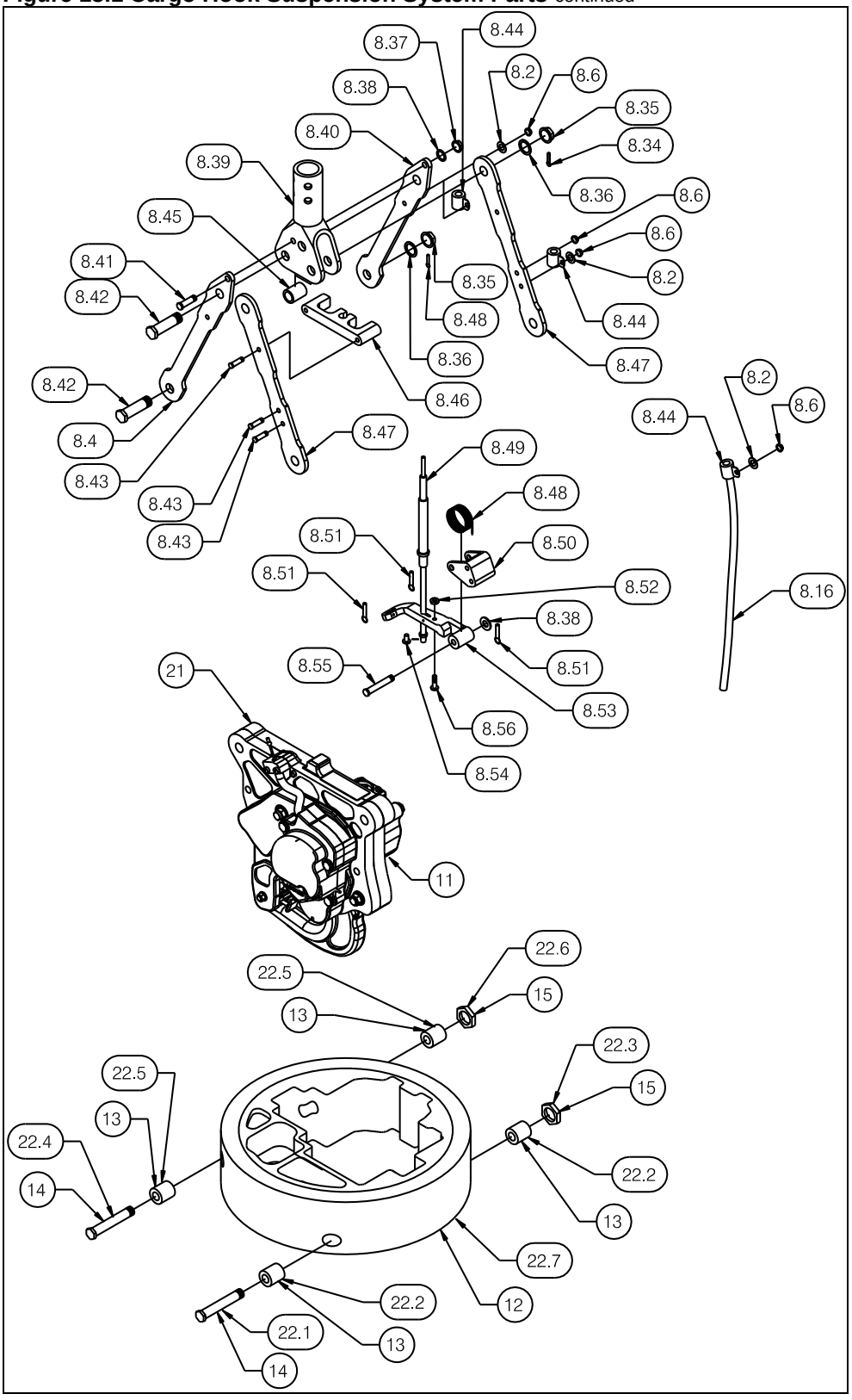


Table 13.1 Suspension System Parts

ITEM	PART NO.	DESCRIPTION	QTY																							
			200-088-01	200-089-01	200-088-02	200-089-02	200-088-03	200-089-03	200-088-04	200-089-04	200-089-05	200-089-06	200-088-10	200-088-11	200-088-50	200-089-10	200-089-11	200-089-20	200-089-21	200-089-22	200-089-23	200-089-24	200-089-25	200-089-26	200-089-27	Overhaul Kit 212-022-00
1[1]	232-010-00	Clevis Assembly	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
1.1[4]	290-172-00	Bushing	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1.2[4]	290-156-00	Bushing	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1.3	290-173-00	Clevis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
2[1]	232-009-01	Link Assembly	1	-	1	-	1	-	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-
2.1	290-175-01	Load Link	1	-	1	-	1	-	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-
2.2[4]	290-179-00	Bushing	2	-	2	-	2	-	2	-	-	-	2	2	2	-	-	-	-	-	-	-	-	-	-	2
3[1]	210-088-01	Load Cell Assembly	-	1	-	1	-	1	-	1	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-
3[1]	210-088-02	Load Cell Assembly	-	Opt	-	Opt	-	Opt	-	-	1	1	-	-	-	-	1	Opt	-	1	1	1	1	1	1	-
3.1	290-176-01	Load Cell Link	-	1	-	1	-	1	-	1	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-
3.1	290-176-02	Load Cell Link	-	Opt	-	Opt	-	-	-	-	1	1	-	-	-	-	1	-	-	1	1	1	1	1	1	-
3.2	290-179-00	Bushing	-	2	-	2	-	2	-	2	2	2	-	-	-	2	2	2	2	2	2	2	2	2	2	-
4[1]	232-011-00	Load Bolt Assembly	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-
4.1	290-169-00	Load Bolt	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
4.2[2]	518-001-00	Grease Fitting	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5[3]	510-097-00	Washer	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	510-096-00	Nut	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	510-098-00	Cotter Pin	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8[5]	232-130-00	Suspension Sub-assembly	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	-
8[5]	232-130-50	Suspension Sub-assembly	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
9[6]	210-005-00	C-38 Indicator	-	Opt	-	Opt	-	Opt	-	Opt	Opt	Opt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9[6]	210-055-00	C-38D Indicator	-	Opt	-	Opt	-	Opt	-	Opt	Opt	Opt	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 13.1 Suspension System Parts

ITEM	PART NO.	DESCRIPTION	QTY																							
			200-088-01	200-089-01	200-088-02	200-089-02	200-088-03	200-089-03	200-088-04	200-089-04	200-089-05	200-089-06	200-088-10	200-088-11	200-088-50	200-089-10	200-089-11	200-089-20	200-089-21	200-089-22	200-089-23	200-089-24	200-089-25	200-089-26	200-089-27	Overhaul Kit 212-022-00
9[6]	210-099-00	C-39 Indicator W/DB-9	-	Opt	-	Opt	-	Opt	-	Opt	Opt	Opt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	210-095-00	C-39 Indicator W/ 28V Lights	-	1	-	1	-	1	-	1	1	1	-	-	-	-	-	1	-	1	-	1	-	-	-	-
9	210-095-02	C-39 Indicator W/ 5V Lights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	Opt	1	Opt	1	-	-	-
9	210-293-00	C-40 Indicator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Opt	Opt	-
9	210-293-01	C-40 Indicator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
10	270-044-01	C-39 Internal Harness	-	1	-	1	-	1	-	1	1	1	-	-	-	-	-	-	1	1	1	1	1	1	1	-
10	270-283-01	C-40 Internal Harness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
10[6]	270-003-00	Load Cell Harness Assy W/DB-9	-	Opt	-	Opt	-	Opt	-	Opt	Opt	Opt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	528-001-00	Cargo Hook, Breeze. SP7109-12 or 62 green w/ silver load beam	1	1	Opt	Opt	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	528-002-00	Cargo Hook, Onboard gray w/ silver load beam	Opt	Opt	Opt	Opt	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	528-004-00	Cargo Hook, Breeze. SP7109-92 or 94 gray w/ silver load beam	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	528-020-00	Cargo Hook, Keeperless	-	-	-	-	-	-	-	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
11	528-020-02	Cargo Hook, Keeperless	-	-	-	-	-	-	-	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
11	528-020-04	Cargo Hook, Keeperless	-	-	-	-	-	-	-	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
11	528-020-06	Cargo Hook, Keeperless	-	-	-	-	-	-	-	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
11	528-020-08	Cargo Hook, Keeperless	-	-	-	-	-	-	-	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
11	528-020-10	Cargo Hook, Keeperless	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	-	-	1	-	-
11	528-020-12	Cargo Hook, Keeperless w/ Surefire	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	1	-
12[7]	220-040-00	Bumper Ring	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-

Table 13.1 Suspension System Parts

ITEM	PART NO.	DESCRIPTION	QTY																							
			200-088-01	200-089-01	200-088-02	200-089-02	200-088-03	200-089-03	200-088-04	200-089-04	200-089-05	200-089-06	200-088-10	200-088-11	200-088-50	200-089-10	200-089-11	200-089-20	200-089-21	200-089-22	200-089-23	200-089-24	200-089-25	200-089-26	200-089-27	Overhaul Kit 212-022-00
13	290-210-01	Small Spacer	-	-	-	-	-	-	-	-	-	-	4	4	4	4	4	4	4	4	4	4	4	4	4	-
14	510-314-00	Bolt, Socket Head	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	-
15	510-104-00	Nut	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	-
16	215-290-00	Data Tag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	510-131-00	Screw	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18[3]	510-149-00	Washer	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	270-059-00	Y Harness	-	Opt	-	Opt	-	Opt	-	Opt	Opt	Opt	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
20	210-180-24	Analog Meter	-	Opt	-	Opt	-	Opt	-	Opt	Opt	Opt	-	-	-	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	-
21	268-002-00	Lower Control Cable	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	210-092-00	Bumper Ring Kit	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.1	510-162-00	Bolt	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.2	290-210-01	Small Spacer	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.3	510-104-00	Nut	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.4	510-161-00	Bolt	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.5	290-209-01	Large Spacer	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.6	510-129-00	Nut	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.7	220-025-03	Bumper Ring	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	215-260-00	Overhaul Label	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
23	215-343-00	Cockpit Decal, Surefire	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	1	-

1. Items not shown as assembly.
2. Items not shown.
3. All NAS1149 series washers listed may be interchanged with thin or thick washers to obtain correct grip length adjustment.
4. Install bushings with wet primer (unreduced Zinc Chromate P/N 519-010-00 (TTP1757B-1CY)).
5. See Table 13.2 for assembly parts list.
6. Non-production item.
7. Bumper P/N 291-874-00 may be used in place of P/N 220-040-00. Install Bumper per section 10.26.

Table 13.2 Suspension Sub-assembly (P/N 232-130-00) Parts

ITEM	PART NO.	DESCRIPTION	QTY -00	QTY -50	QTY in Overhaul Kit P/N 212-022-00
8.1	510-103-00	Bolt	1	1	1
8.2[1]	510-095-00	Washer	8	8	8
8.3	290-159-00	Cable Clamp	1	1	-
8.4	510-094-00	Bolt	1	1	1
8.5	290-158-00	Cable Bracket	1	1	-
8.6	510-102-00	Nut	5	5	5
8.7	290-156-00	Bushing	2	2	2
8.8	290-151-02	Bell Housing	1	1	-
8.9	510-147-00	Bolt	2	2	2
8.10	235-074-00	Mounting Bracket	1	1	-
8.11	290-153-00	Bayonet Key	1	1	-
8.12	556-014-00	2-230 O-Ring	1	1	1
8.13	290-155-01	Funnel	1	1	-
8.14	514-002-00	Spring	1	1	1
8.15	290-150-01	Load Tube	1	1	-
8.16	270-038-00	Hook Ground Wire	1	1	1
8.17	510-520-00	Screw	1	1	1
8.18	517-003-00	Thrust Washer	2	2	2
8.19	517-004-00	Bearing	1	1	1
8.20	517-005-00	Roller Bearing	2	2	2
8.21	290-171-01	Radius Filler	1	1	1
8.22	290-152-01	Bayonet Housing	1	1	-
8.23	270-037-00	Stray Voltage Wire	1	1	1
8.24	510-158-00	Washer	1	1	1
8.25	510-005-00	Screw, Button Head	1	1	1
8.26	556-015-00	2-218 O-Ring	1	1	1
8.27[3]	210-091-03	Slip Ring Assembly	1	-	-
8.27[3]	210-091-04	Slip Ring Assembly	Opt	-	-
8.27[3]	210-091-05	Slip Ring Assembly	-	1	-
8.28	510-104-00	Nut	8	8	8
8.29	510-105-00	Washer	9	9	9
8.30	500-053-00	Tube Spacer	2	2	2
8.31	510-134-00	Bolt	1	1	1
8.32	290-163-01	Tube	1	1	-
8.33	510-106-00	Bolt	7	7	7
8.34	510-113-00	Cotter Pin	4	4	4
8.35	510-108-00	Nut	4	4	4
8.36[1]	510-109-00	Washer	Opt	Opt	-
8.36[1]	510-195-00	Washer	4	4	4
8.37	510-114-00	Nut	1	1	1
8.38[1]	510-100-00	Washer	2	2	2
8.39	290-164-00	Yoke	1	1	-
8.40	290-166-00	Lower Link, Long	2	2	-
8.41	510-099-00	Bolt	1	1	1
8.42	510-107-00	Bolt	4	4	4

ITEM	PART NO.	DESCRIPTION	QTY -00	QTY -50	QTY in Overhaul Kit P/N 212-022-00
8.43	510-101-00	Bolt	4	4	4
8.44	512-010-00	Cushioned Loop Clamp	4	4	4
8.45	290-170-00	Tube Spacer	2	2	-
8.46	290-167-00	Cable Support	1	1	-
8.47	290-165-00	Lower Link, Short	2	2	-
8.48	514-001-00	Spring	1	1	1
8.49	268-003-00	Manual Cable Assembly	1	1	-
8.50	290-168-00	Pivot Block	1	1	-
8.51	510-115-00	Cotter Pin	3	3	3
8.52	510-117-00	Nut	1	1	1
8.53	290-178-00	Swing Arm	1	1	-
8.54	290-180-00	Nylon Bushing	1	1	1
8.55	510-118-00	Pin	1	1	1
8.56	510-116-00	Bolt	1	1	1
8.57[4]	512-014-00	Lacing Cord	AR	AR	-

1. All NAS1149 series washers listed may be interchanged with thin or thick washers to obtain correct grip length adjustment.
2. Install bushings with wet primer (unreduced zinc chromate P/N 519-010-00 (TTP1757B-1CY)).
3. See Figure 13.2 and Table 13.3 for illustrated parts breakdown and parts list.
4. Item not shown.

Figure 13.2 Slip Ring Assembly Parts

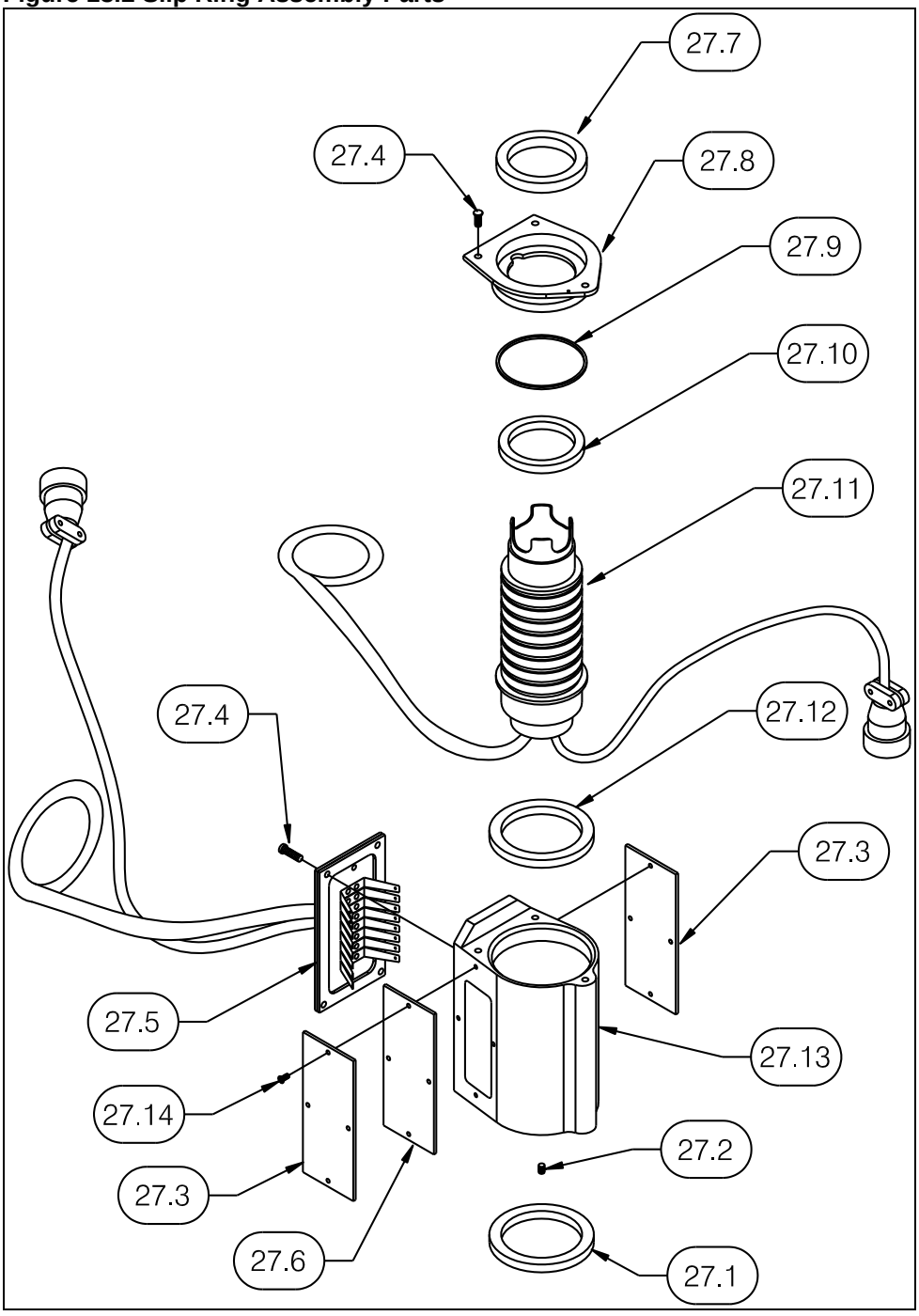


Table 13.3 Slip Ring Assembly Parts List

Item	Part No.	Description	210-091-03 Qty	210-091-04 Qty	210-091-05 Qty	212-022-00 Overhaul Kit Qty
27.1	556-017-00	Lower Seal***	1	-	-	-
27.2	510-133-00	Set Screw	3	3	3	-
27.3	235-072-00	Inspection Cover	2	-	-	-
27.3	235-072-01	Inspection Cover	-	2	2	-
27.4A	510-131-00	Screw	7	7	7	3
27.4B	510-317-00	Screw	-	4	4	4
27.5	232-014-01	Wiper Assembly	1	-	-	-
27.5	232-014-02	Wiper Assembly	-	1	-	-
27.5	232-014-03	Wiper Assembly	-	-	1	-
27.6	521-002-00	Inspection Cover Gasket	2	-	-	-
27.6	521-002-01	Inspection Cover Gasket	OPT**	2	2	2
27.7	556-016-00	Upper Seal	1	1	1	1
27.8	290-194-00	Bearing Cap	1	1	1	-
27.9	556-018-00	O-Ring	1	1	1	1
27.10	290-195-00	Upper Bushing	1	1	1	1
27.11	232-013-00	Slip Ring Core Assembly	1	1	1	-
27.12	290-196-00	Lower Bushing	1	1	1	1
27.13	290-197-00	Slip Ring Housing	1	-	-	-
27.13	290-197-01	Slip Ring Housing	Opt	1	1	-
27.14	510-132-00	Screw	8	-	-	-
27.14	510-483-00	Screw	-	8	8	8
27.15	521-003-00	Terminal Gasket	1	-	-	-
27.15	521-003-01	Terminal Gasket	-	1	1	1

*210-091-03 uses item three (3) 4A in place of three (3) item 4B.
^Screw, P/N 510-317-00, may be used as replacement for screw, P/N 510-131-00, in the 4B location.
**Preferred option, use with 510-483-00 Screws and 235-072-01 Inspection Cover.
***Lower Seal (P/N 556-017-00) is not included in the Overhaul Kit and can be omitted from assembly P/N 210-091-03 or purchased separately.

14.0 Instructions for Returning Equipment to the Factory

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