Equipment User's Manual,

Cargo Hook

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Equipment Part Numbers

Onboard Systems 528-023-01
528-023-03
528-023-40
528-023-51

TABLE OF CONTENTS

1.0 Introduction

1.1 Scope. The scope of this document is limited to installation and operational use of the 528-023-XX series Cargo Hook, herein called "Cargo Hook". For all other information concerning the Cargo Hook, including maintenance instructions, see the Referenced Documents section.

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

1.3 **Warnings, Cautions & Notes**. The following definitions apply to Warnings, Cautions & Notes used in this manual.

Means that if this information is not observed, serious injury, death or immediate loss of flight safety could occur.

Means that there is a risk of injury or degradation in performance of equipment if this information is not observed.

Draws the reader's attention to information which may not be directly related to safety, but which is important or unusual.

2.0 Referenced Documents

145-033-00	Equipment Specification
145-040-00	Logistics Support Analysis
145-034-00	Functional & Integrated Schematics
145-037-00	Packaging, Handling, Storage and Transportation Report
145-038-00	Interface Control Drawing

3.0 Information

3.1 **System Description.** The Cargo Hook is the means used to attach an external load to the aircraft. The Cargo Hook retains the load until it is commanded to release it. There are three methods of releasing the Cargo Hook:

3.1.1 **Electrical release.** The electrical release system consists of a rotary solenoid that actuates an internal mechanism to release the load

3.1.2 **Mechanical release.** The Cargo Hook can be released mechanically by means of a mechanical control cable.

3.1.3 **Crewman release.** The load can be released by rotating the release lever located on the Cargo Hook.

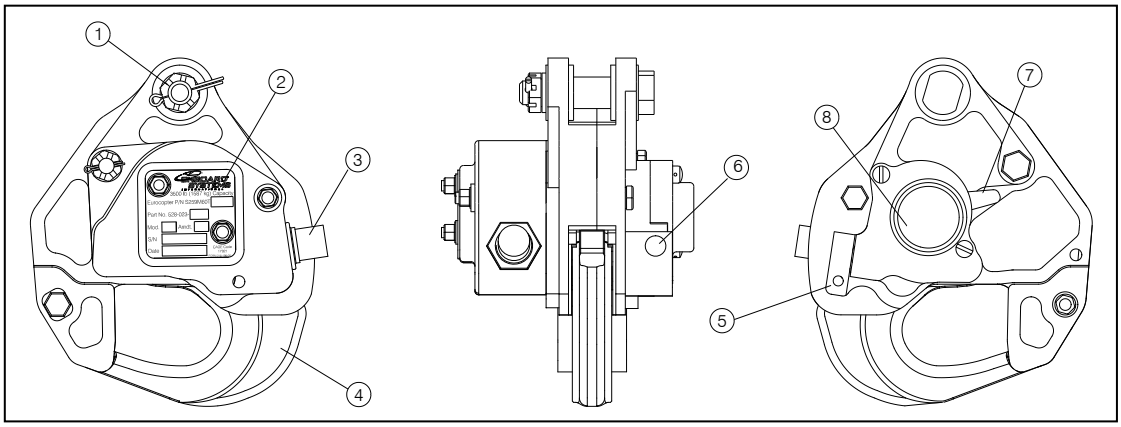
3.2 **Specifications**. A brief outline of the Cargo Hook specifications is found in Table 3.2.1 below. See Equipment Specification for the complete specifications associated with this Cargo Hook.

Table 3.2.1 Cargo Hook Specifications

Characteristic	Specification
Cargo Hook weight	3.5 lb. (1.6 kg)
Rated Load	3,500 lb. (1,588 kg)
Limit Load	8,750 lb. (3,968 kg)
Ultimate Load	13,125 lb. (5,953kg)
Mechanical Release force (cable pull at Cargo Hook)	8 lbs. Max (3.6 kg)
Supply Voltage	20-32 VDC
Current load	10 amps maximum
Minimum release load	0 lb. (0 kg)
Operating temperature range	+158 to -49^{o} F (+70 to -45 ^{o} C)
Storage temperature range	+185 to -65^{o} F (+85 to -53 ^{o} C)

3.3 **Elements**. The Cargo Hook contains the following elements as identified in Figure 3.3.1:

Figure 3.3.1 Cargo Hook Elements



1. **Attach Hardware.** Attachment hardware is provided to secure the Cargo Hook to the aircraft.

2. **Identification Plate**. The identification plate shows adequate information to identify the Cargo Hook.

3. **Electrical Connector**. The electrical connector provides a disconnect location from an interfacing wire harness.

4. **Load Beam**. The load beam is the main structural element, which supports the weight of the cargo being carried.

5. **Grounding location**. The grounding location is a threaded hole. When properly bonded with a ground strap, it provides electrical continuity from the Cargo Hook to the airframe.

6. **Manual Release Cable Attach**. This threaded hole on the Cargo Hook receives a mating manual release or bowden cable.

7. **Release Lever**. The release lever is a non-remote means of releasing the Cargo Hook.

8. **Internal Latch (not visible)**. The internal latch is the locking mechanism that secures the load beam in a locked position and also allows it to release when commanded.

4.0 Installation

4.1 **Install Manual Release Cable**. The Cargo Hook must be used with a manual release cable. The cable serves as an alternate means of release to the electrical system. This cable may or may not be supplied with the Cargo Hook. Install Manual Release Cable Assembly per the following instructions.

4.1.1 Locate the release handle end of the manual release cable. (The orientation of the cable may be accomplished visually by observing the marking "Cargo Hook" on the opposite end of the cable or by identifying the shorter of the two swaged end-fittings).

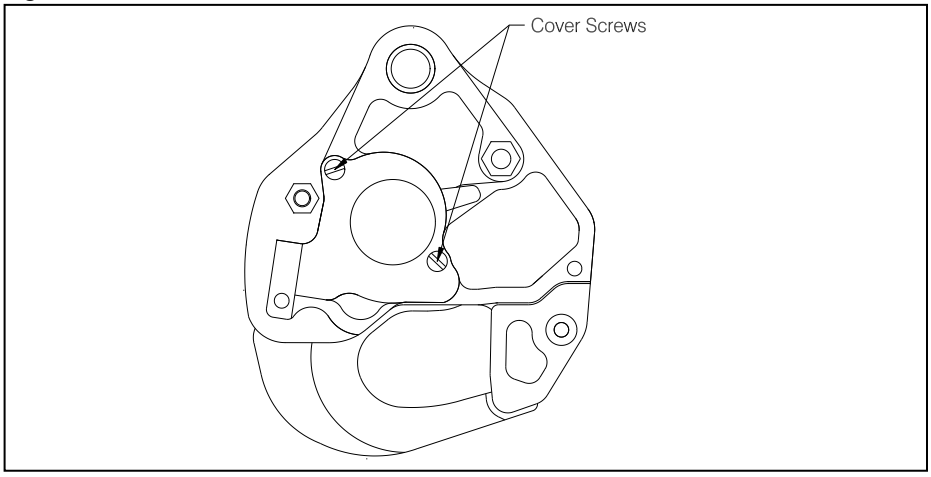
4.1.2 Install the manual release cable at the release handle end in the cockpit or cabin of the aircraft.

⚠ CAUTION

Do not reverse the direction of the manual release cable. The end marked "Cargo Hook" must be installed in the Cargo Hook.

4.1.3 Remove the manual release cover from the Cargo Hook by removing the two cover screws. See figure 4.1.1.

Figure 4.1.1 Manual Release Cover Removal



4.1.4 Thread the fitting at the end of the manual release cable into the Cargo Hook by rotating the Cargo Hook. Bottom the fitting against the Cargo Hook and torque to 30 in-lbs.

4.1.5 Place the cable ball end fitting into the manual release lever fork as illustrated in Figure 4.3.1.

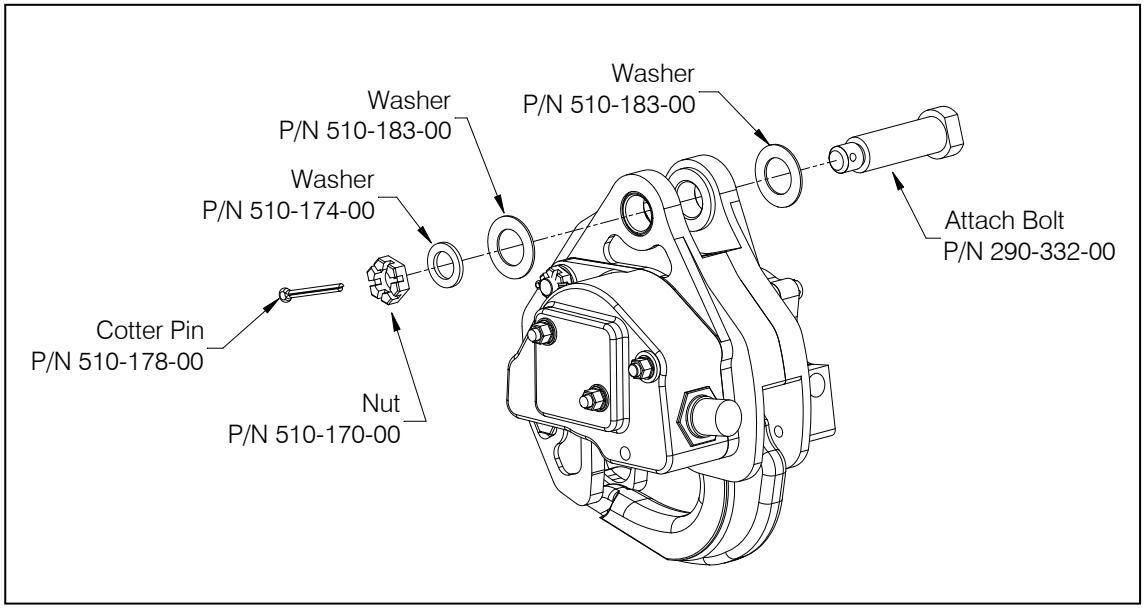
4.2 **Install Cargo Hook onto Aircraft**. The Cargo Hook is supplied with the installation hardware. Remove the hardware, and install the Cargo Hook onto the aircraft, re-installing the hardware (reference Figure 4.2.1 below). Apply grease (AeroShell 17, MIL-G-21164 or Mobilgrease 28, MIL-G-81322 are recommended) to the Attach Bolt 290-332-00 upon installation.

4.2.1 Tighten the Nut, 510-170-00, finger tight. Then rotate the nut to the next castellation to install the Cotter Pin, 510-178-00. See figure 4.2.1.

WARNING

The installation of the Cargo Hook is orientation sensitive. Consult airframe installation manual for orientation.

Figure 4.2.1 Cargo Hook Installation Hardware



4.3 **Adjust Rigging**. Adjust the rigging of the manual release cable as follows:

⚠ CAUTION

Rigging adjustments must be done with the cargo hook load beam in the closed and locked position.

4.3.1 Rotate the manual release lever in the clockwise direction until the boss on its underside contacts the cam stop and hold in this position. See figure 4.3.1.

NOTE

The manual release system must be adjusted at the release handle end. There are no provisions for adjusting the rigging at the Cargo Hook end.

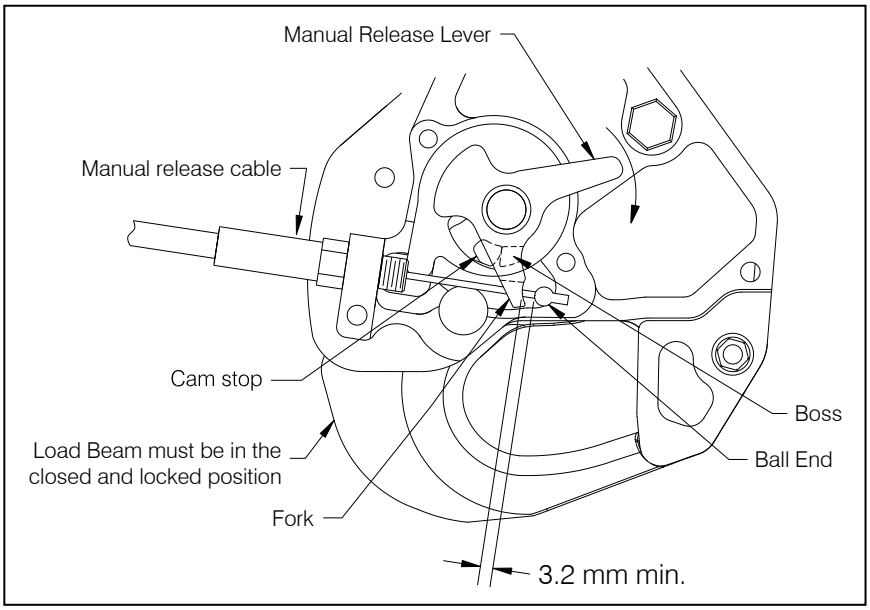
4.3.2 Measure the cable ball end free play with the manual release handle in the cockpit in the non-release position.

4.3.3 Adjust the manual release cable system for a minimum of 3.2mm (.125 inches) of free play at the fork as shown in Figure 4.3.1. Replace manual release cover.

NOTE

The Manual Release Lever must be rotated to the position shown before the dimension can be measured.

Figure 4.3.1 Manual Release Cable Rigging



⚠ WARNING

A mechanical release system that is not adjusted properly may cause an uncommanded release of load.

4.4 **Connect Electrical wire harness**. Connect an electrical harness to the Cargo Hook, referring to table 4.4.1 for pin function. The Cargo Hook uses a Bendix, PC07A-8-2P style connector. There are several options for mating connectors. Safety-wire the mating connectors on the Cargo Hook.

Table 4.4.1 Cargo Hook Connector

Pin	*Function*
A	Ground
B	Power

4.4.1 Route the electrical wire harness to the aircraft. This user's manual does not cover installation of the electrical wire harness to the aircraft.

⚠ CAUTION

The Cargo Hook is equipped with an arc suppression diode that will be damaged if the Cargo Hook electrical connection is reversed.

4.5 **Installation Checkout**. After installation of the Cargo Hook, perform the following functional checks.

4.5.1 Swing the installed Cargo Hook throughout its range of motion to ensure that it moved unimpeded by the manual release cable or electrical wire harness.

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

4.5.3 With no load on the Cargo Hook load beam, pull the manual release lever in the cockpit and verify the Cargo Hook releases. Reset the Cargo Hook load beam.

4.5.4 With no load on the Cargo Hook load beam, depress the Cargo Hook electrical release button in the cockpit, the Cargo Hook must release. Reset the Cargo Hook load beam by hand.

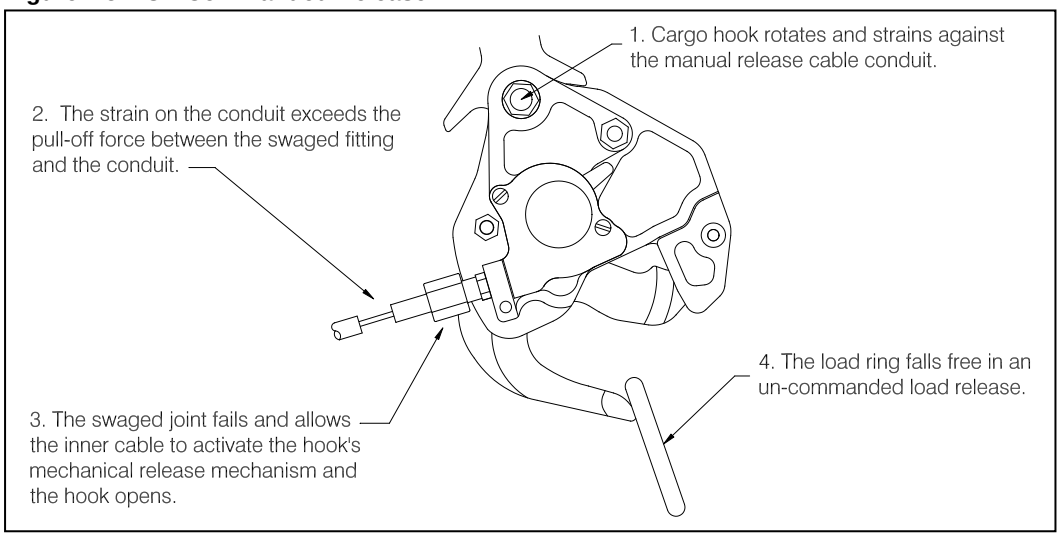
⚠ CAUTION

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

⚠ WARNING

Un-commanded Cargo Hook release will happen if the manual release cable is restrained is any form throughout the movement of the Cargo Hook. See figure 4.5.1.

Figure 4.5.1 Un-Commanded Release



5.0 Operation Instructions

5.1 **Daily Check**. Prior to each hook use, perform the following:

5.1.1 Be completely familiar with the Cargo Hook operating instructions of this manual.

5.1.2 Arm the electrical release system. Engage the Cargo Hook release switch. Ensure the Cargo Hook releases. Reset the load beam by hand. If the hook does not release or re-latch, do not use the Cargo Hook until the difficulty is resolved.

5.1.3 Activate the manual release lever to test the Cargo Hook manual release mechanism. The Cargo Hook load beam must release. Reset the load beam by hand. If the hook does not re-latch do not use the unit until the difficulty is resolved.

5.1.4 Ensure that the manual release cable and electrical release harness do not limit the movement of the Cargo Hook.

⚠ WARNING

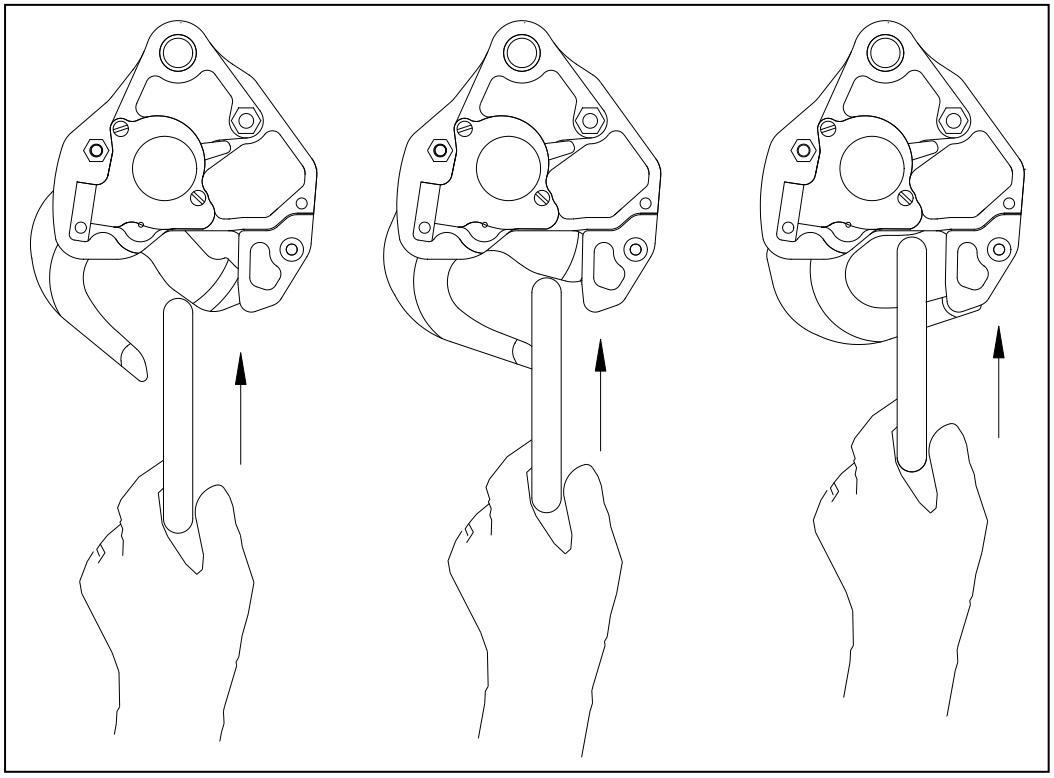
Little or no free play in the release lever is a sign that the Cargo Hook mechanical release system is improperly adjusted.

5.2 **Using the Cargo Hook**

5.2.1 **Releasing the Cargo Hook**. The Cargo Hook is a keeperless design that prevents load rings from escaping inadvertently. In order to load the Cargo Hook, it must be first opened. Rotate the release lever clockwise to open the load beam. The load beam will fall open.

5.2.2 **Loading the Cargo Hook**. The Cargo Hook is designed to be loaded with one hand. A load is attached to the hook by pushing the ring upward against the upper portion of the load beam throat, as illustrated in Figure 5.2.1, until an internal latch engages the load beam and latches it in the closed position.

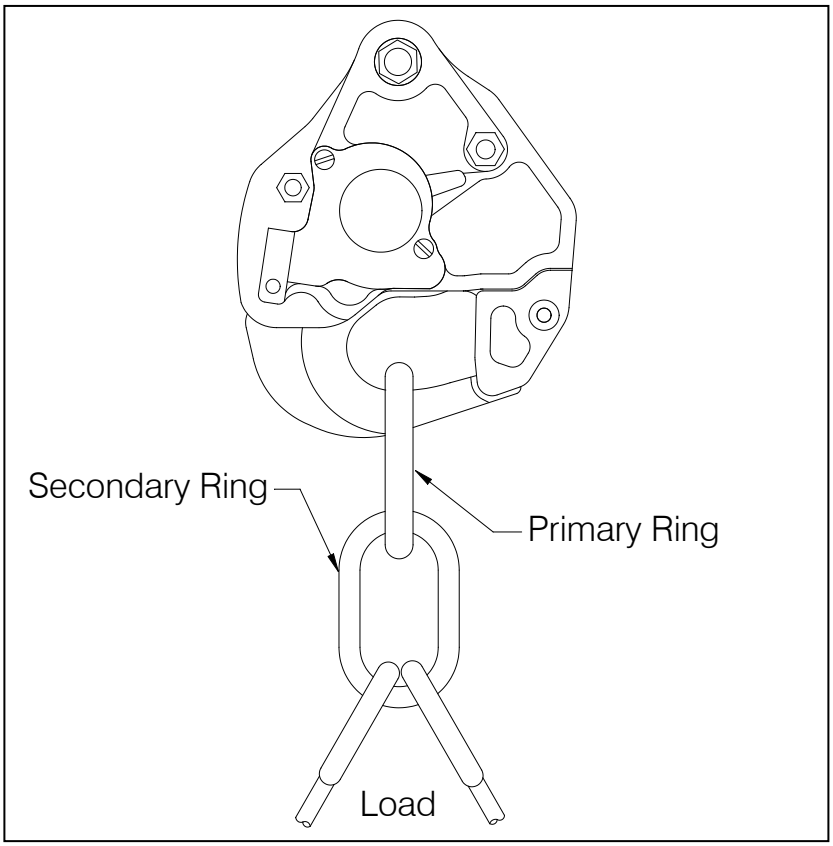
Figure 5.2.1 Cargo Hook Loading



5.2.3 **Cargo Hook Rigging**. Extreme care must be exercised when rigging a load to the Cargo Hook. Steel load rings are recommended to provide consistent release performance and resistance to fouling. Figure 5.2.2 shows the recommended rigging, but it is not intended to represent all rigging possibilities. See Interface Control Drawing for detailed rigging information.

5.2.3.1 Verify that the ring will freely slide off the load beam when it is opened. Only the primary ring should be in contact with the Cargo Hook load beam.

Figure 5.2.2 Example of Recommended Cargo Hook Rigging



CAUTION

Nylon type straps, rope or similar materials must not be used directly on the Cargo Hook.

CAUTION

Some combinations of small primary rings and large secondary rings could cause fouling during release. Test new combinations of rigging for possible fouling before use.

APPENDIX Revision History

Revision Number	Date	Revised Section / Page	Description of Change
0	01/05/2007	All	New Issue
1	09/23/2009	Section 4.3	Added Caution to state that rigging adjustments must be done with the Load Beam closed and latched. Revised Figure 4.3.1 to show Load Beam position for rigging.