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Owner's Manual
For the
**Cargo Hook Swing
Suspension System**
On the
Airbus Helicopters AS355 Series

**System Part Number
200-292-01**

*Owner's Manual Number 120-112-01
Revision 7
05/27/14*



13915 NW 3rd Court Vancouver Washington 98685 USA
Phone: 360-546-3072 Fax: 360-546-3073 Toll Free: 800-275-0883
www.OnboardSystems.com

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Record of Revisions

<i>Revision</i>	<i>Date</i>	<i>Page(s)</i>	<i>Reason for Revision</i>
0	9/13/04	All	First issue
1	3/16/05	Cover, TOC pg 2, 1-2, 2-1, 2-4, 6-2, 6-4, 6-12	Implemented new release handle assembly. New part number is 232-187-00 and the old part number was 232-150-00. Removed reference to Airbus Helicopters modification 07-2772 on page 2-1 Corrected part number and length of item #31 on page 6-12
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3	07/14/08	1-1, 2-17, 2-18, 2-20	Added AS355NP model. Corrected manual release cable rigging instructions to state .125" minimum free play (was approximately .125"), added metric equivalent. Updated note format on page 2-17.
4	05/28/10	TOC, Section 1, 2-17, 2-19, 2-20, 3-8, 3-9, 3-10, 3-12, 4-1, 4-3 & 4-4	Replaced Warnings, Cautions and Notes section with Explanation of Signal Words and Symbols section. Updated Signal Symbols through-out manual to current format. Replaced Load Cell P/N 210-214-00 with P/N 210-249-01.
5	09/21/10	6-12	Corrected Load Cell P/N 210-249-01 to P/N 210-249-02.
6	01/21/11	2-13, 2-14, 5-1 & 6-12	Revised Connector Bracket Assembly (P/N 232-156-00) installation instructions. Replaced bolt (P/N 510-505-00) with bolt (P/N 510-762-00) in swing frame assembly parts list. Updated RMA instructions. Updated RMA instructions.
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Section 1

General Information

Introduction

The P/N 200-292-01 Cargo Hook Swing Suspension System provides a means for a helicopter to transport and jettison external loads. These kits include the cargo hook, a swing suspension assembly which serves as the structural assembly to transfer loads on the cargo hook to attach points on the helicopter's skid gear cross tubes, the electrical release system which interfaces with the existing cyclic mounted release switch, and the backup manual release system which includes a release lever mounted to the collective.

The system consists of fixed provisions (P/N 210-210-01) and removable provisions (P/N 210-209-01). The fixed provisions kit is permanently installed on the aircraft while the removable provisions kit is easily removed when not required on the helicopter's mission.

These kits are approved for installation on Airbus Helicopters AS355E, AS355F, AS355F1, AS355F2, AS355N, and AS355NP.

Explanation of Signal Words and Symbols

The following definitions apply to the symbols used throughout this manual to draw the reader's attention to safety instructions as well as other important messages.



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.

Specifications

Table 1-1 P/N 200-292-01 Suspension System Specifications

Design load*	3,100 lbs. (1406 kg.)
Design ultimate strength	11,625 lbs. (5272 kg.)
Unit weight - Fixed Provisions	4.5 lbs. (2.04 kg.)
Unit weight - Removable Provisions	30.5 lbs. (13.83 kg.)

Table 1-2 P/N 528-023-01 Cargo Hook Specifications

Design load*	3,500 lbs. (1,587 kg.)
Design ultimate strength	15,750 lbs. (7,140 kg.)
Electrical release capacity	8,750 lbs. (3,970 kg.)
Mechanical release capacity	8,750 lbs. (3,970 kg.)
Force required for mechanical release at 3,500 lb.	8 lb. Max. (.600" travel)
Electrical requirements	22-32 VDC 6.9 – 10 amps
Minimum release load	0 pounds
Unit weight	3.0 pounds (1.35 kg.)
Mating electrical connector	PC06A8-2S SR



Load capacities given are for the equipment described only. Loading limits for your particular helicopter model still apply. Consult your flight manual supplement.

Inspection

Inspect the kit items for evidence of damage, corrosion and security of lock wire and fasteners. If damage is evident, do not use the items until they are repaired.

Bill of Materials

The following items are included with the 200-292-01 Swing Suspension System, the 210-210-01 Fixed Provisions Kit, and the 210-209-01 Removable Provisions Kit. If shortages are found contact the company from whom the system was purchased.

Table 1-3 Onboard Systems Bill of Materials

Part Number	Description	Total Kit No. 200-292-01	Fixed Kit No. 210-210-01	Removable Kit No. 210-209-01
120-112-01	Owner's Manual	1	1	1
121-019-01	RFMS	1	1	1
122-005-00	Cargo Hook Service Manual	1	-	1
123-017-01	ICA Maintenance Manual	1	1	1
210-095-00	C-39 Indicator	1	1	-
215-165-00	Multiple Sticker Sheet	1	1	-
215-176-00	Max Load 2303 Placard	1	-	1
215-178-00	Max Load 2500 Placard	1	-	1
232-137-01	Shackle Assembly	2	2	-
232-140-01	Forward Attach Cable Assembly	2	-	2
232-187-00	Release Handle Assembly	1	1	-
232-151-00	QD Bracket Assembly	1	1	-
232-156-00	Connector Bracket Assembly	1	1	-
232-157-01	Aft Attach Cable Assembly	2	-	2
232-172-01	Hook/Frame Assembly	1	-	1
268-030-01	Manual Release Cable Assembly	1	-	1
270-117-00	LW Internal Harness	1	1	-
270-118-00	Release Internal Harness	1	1	-
270-125-00	Ground Strap, Fixed	1	1	-
290-772-00	Indicator Mount Bracket	1	1	-
290-780-00	Attachment Bracket	1	1	-
290-783-00	Relay Bracket	1	1	-
445-005-00	Relay	1	1	-
510-029-00	Nut	8	8	-
510-042-00	Washer	2	2	-
510-062-00	Washer	8	8	-
510-085-00	Washer	1	1	-
510-095-00	Washer	3	3	-
510-102-00	Nut	4	4	-
510-277-00	Screw	1	1	-
510-278-00	Washer	1	1	-
510-279-00	Nut	1	1	-
510-419-00	Washer	1	1	-
510-453-00	Bolt	3	3	-
510-455-00	Bolt	1	1	-
510-457-00	Screw	4	4	-
510-475-00	Screw	3	3	-
510-481-00	Screw	8	8	-
510-486-00	Rivet	4	4	-
512-024-00	Adel Clamp	2	2	-

Bill of Materials *continued*

The following items must be on the aircraft or purchased from Airbus Helicopters or Onboard Systems to complete the installation.

Table 1-4 Airbus Helicopters Part Numbers

Airbus Helicopters P/N	Description	Qty	Reference
ASN52320BH060N	Nut	8	Figure 2.1.1
22201BE120074L	Screw	2	Figure 2.1.1
23111AG120LE	Washer	4	Figure 2.1.1
ASN52320BH120N	Nut	2	Figure 2.1.1
355A86-2004-00	Shackle	2	See Note 1 below
355A86-2012-21	Spacer	2	See Note 1 below
22129BC080044L	Screw	2	See Note 1 below
23119AG080LE	Washer	2	See Note 1 below
22453BC080L	Nut	2	See Note 1 below
23310AA015020L	Split Pin	2	See Note 1 below
355A86-2007-06	Clamp, Yoke Half Assembly	2	See Note 1 below
355A86-2007-21	Clamp, Half	2	See Note 1 below
ASNA3917E015	Elastomer Plate, 960 x 960	AR	See Note 1 below
2101-0605	Rivet	2	See Note 1 below
22201BE060020L	Screw	8	See Note 1 below
23111AG060LE	Washer	8	See Note 1 below
355A86-2008-20	Shim	16	See Note 1 below
A3125-2 H179	Clamp	1	Figure 2.2.6
SL211M5-1*	Nut Clip	3	Page 2-8
DG-36	Grommet	1	Figure 2.2.3

Note 1: These parts are for installing the aft attachment points (at the aft landing gear cross tubes) for the swing suspension cables. See page 2-1 of this manual and Airbus Helicopters Service Bulletin No. 25.04 for the AS355 for additional information.

Theory of Operation

The 200-292-01 Cargo Hook Swing Suspension System is composed of:

- A suspended pyramid frame that supports the cargo hook.
- An electrical release system that provides means for release by pilot actuation of the push-button switch in the cockpit. When the push-button switch is pressed, it energizes the DC solenoid in the cargo hook, and the solenoid opens the latch in the internal mechanism.
- A manual release system, which provides a means of releasing a cargo hook load in the event of an electrical release system failure. A lever mounted to the collective stick actuates it.
- Ground personnel may also release a load by the actuation of a lever located on the side of the cargo hook.
- A load weigh system, which is comprised of an Indicator, mounted within the cockpit connected to a load cell between the cargo hook and frame.

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

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

Section 2

Installation Instructions

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

The installation of this swing suspension kit requires the presence of Airbus Helicopters Cargo Swing fixed parts (as noted in Table 1-4). If these parts are not present on the helicopter, Airbus Helicopters Service Bulletin No. 25.04 is required to supplement these installation instructions where noted.

The installation instructions for the swing suspension system are divided into separate sections (see below). Items 1 through 4 represent the fixed provisions of the kit and items 5 through 7 are the removable provisions.

Fixed Provisions

1. Shackle Installation – See Section 2.1
2. Fixed Manual Release Cable Installation – See Section 2.2
3. C-39 Indicator Installation – See Section 2.3
4. Fixed Electrical Wiring Installation – See Section 2.4

Removable Provisions

5. Swing Suspension Installation – See Section 2.5
6. Removable Manual Release Cable Installation – See Section 2.6
7. Removable Electrical Cable Installation – See Section 2.7
8. Placard Installation – See Section 2.8

To prepare the helicopter for installation of the swing suspension, remove: the pilot's seat, instrument panel cowling and trimming, lower cowlings, and forward inspection door and LH hold door.

2.1 Shackle Assembly Installation

This installation requires that Airbus Helicopters landing gear fittings be present on the forward and aft landing gear cross beams. If the aft fittings are not present, install per Airbus Helicopters Service Bulletin No. 25.04.

2.1 Shackle Assembly Installation, continued

- Attach the two Shackle Assemblies (P/N 232-137-01) to the forward landing gear fittings with hardware as illustrated in Figure 2.1.1 (Airbus Helicopters part numbers are shown in italics) except at the RH fitting install an Attachment Bracket on the inboard side as illustrated in Figure 2.1.2. Torque the nuts to 100-130 in-lbs.
- At the Attachment Bracket fasten an Adel Clamp (P/N 512-024-00) with hardware as illustrated. Do not torque nut down until manual release cable is routed through (see section 2.2.).

Figure 2.1.1 LH Attach Fitting Installation

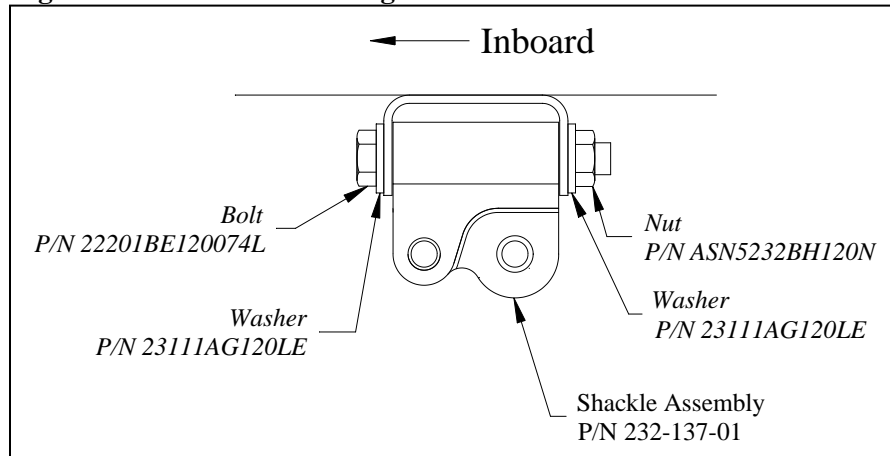
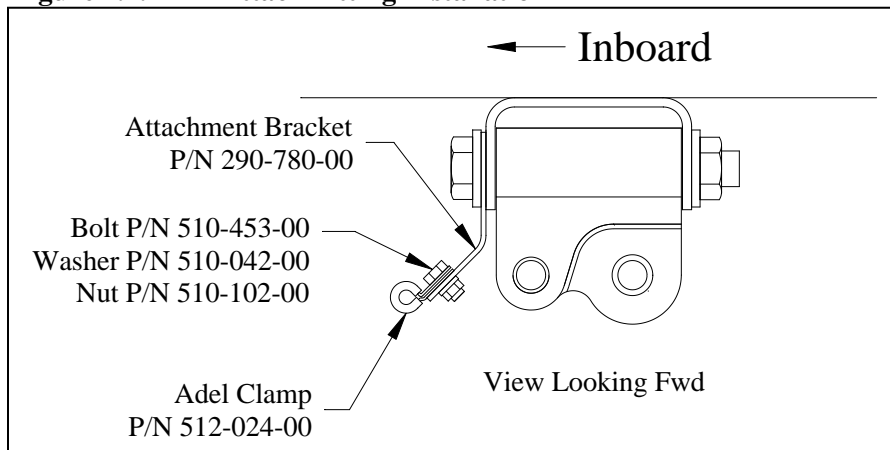


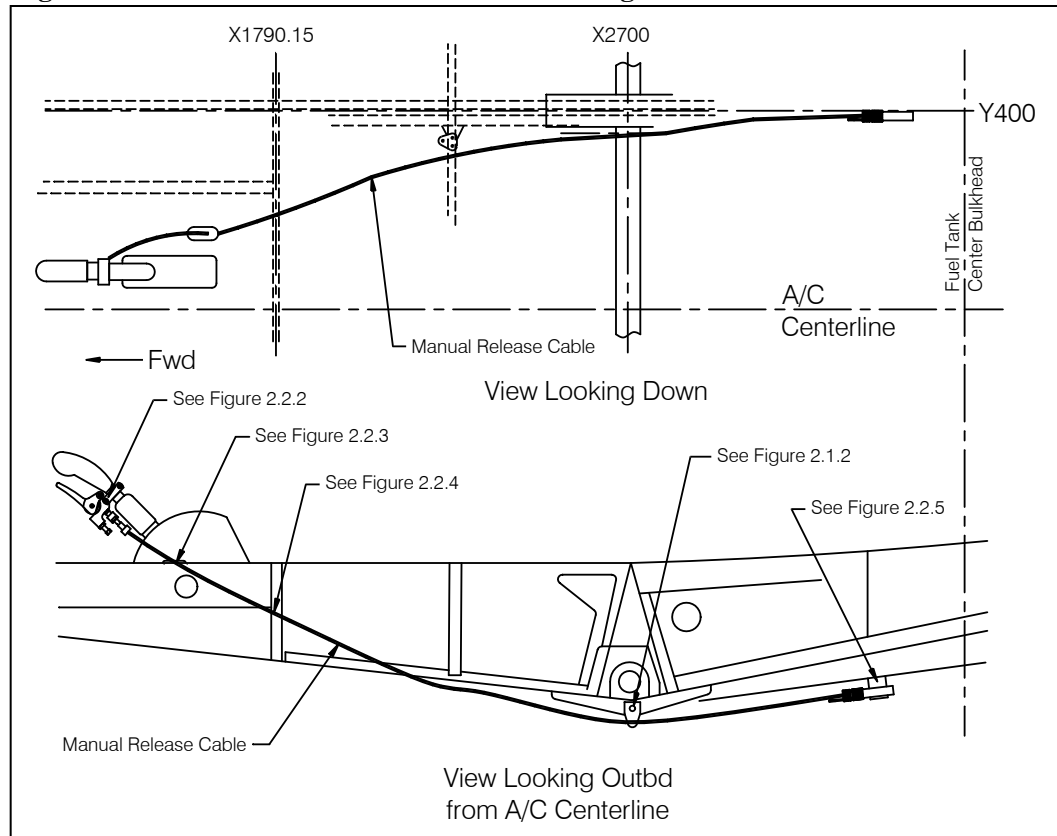
Figure 2.1.2 RH Attach Fitting Installation



2.2 Fixed Manual Release Cable Assembly Installation

The manual release cable installation consists of a fixed section (P/N 268-025-00) and a removable section. The fixed section is routed from the release lever at the collective, aft to an external bracket attached to the lower rear cowling, at the centerline of the forward fuel tank center bulkhead (as shown in Figure 2.2.1). Figure 2.2.1 is an overview of the cable routing and the figures following detail the cable support installations at various points.

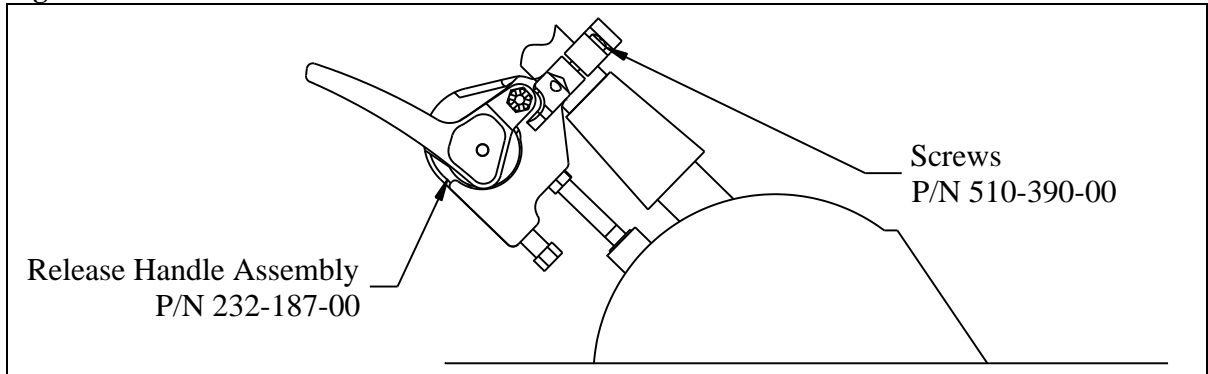
Figure 2.2.1 Fixed Manual Release Cable Routing Overview



2.2 Fixed Manual Release Cable Assembly Installation *continued*

- Mount the Release Handle Assembly (P/N 232-187-00) to the collective stick with the Clamp Half (P/N 290-879-00) and two screws (P/N 510-390-00) provided pre-assembled on the assembly, as illustrated below.

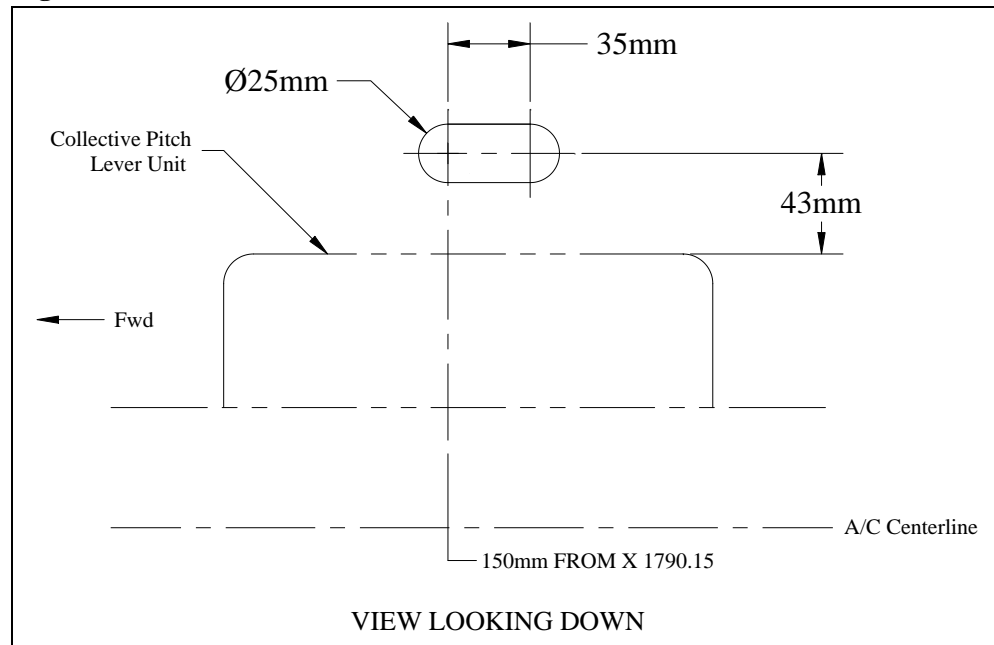
Figure 2.2.2 Manual Release Lever Installation



- Route the cable to underneath the cabin floor through the existing slot* by removing the grommet to allow the cable end fitting to be fed through.
- Re-install grommet.

* If the slot in floor does not exist, create one with dimensions as shown below in the cabin floor 43 mm from the collective pitch lever unit and 150 mm forward of the frame at X1790.15 (see below) and install and slit the grommet (Airbus Helicopters P/N DG-36).

Figure 2.2.3 Cabin Floor Hole Detail

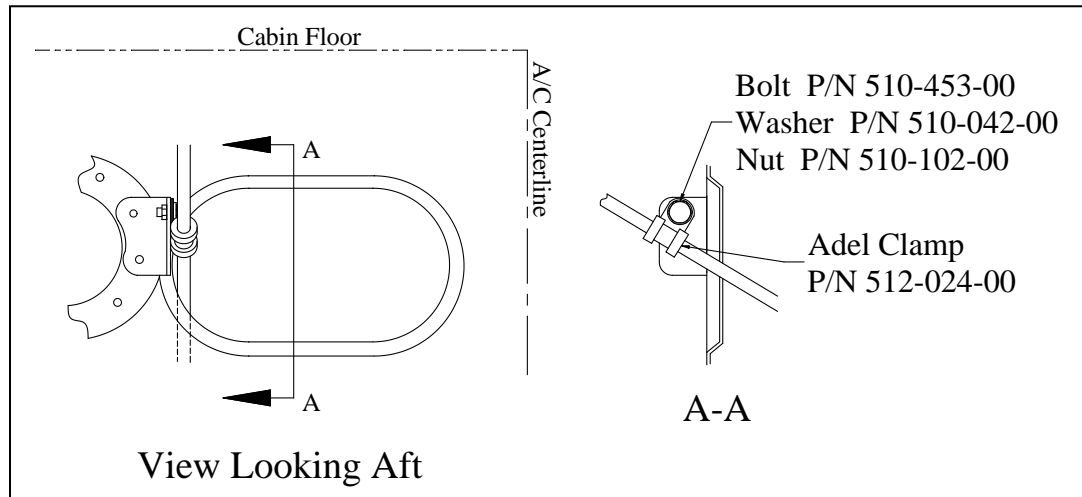


2.2 Fixed Manual Release Cable Assembly Installation *continued*

- Underneath the floor, route the manual release cable through the frame immediately aft of the collective (see Figure 2.2.4). Secure the cable at this frame with an Adel clamp (P/N 512-024-00). Fasten the adel clamp to the existing bracket* with hardware as illustrated below.

* If the bracket is not present install it per Airbus Helicopters Service Bulletin No. 25.04.

Figure 2.2.4 Cable Routing Through Frame

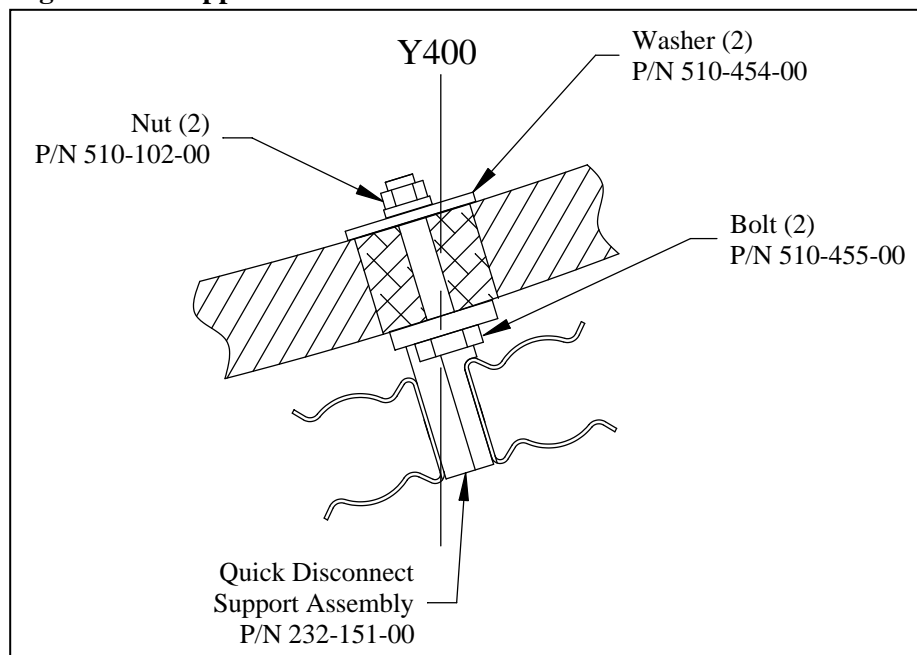


2.2 Fixed Manual Release Cable Assembly Installation *continued*

- ❑ At the RH forward landing gear fitting (X2700) secure the cable to the bracket with the adel clamp installed per Figure 2.1.2.
- ❑ Install Quick Disconnect Support Assembly (P/N 232-151-00) on the RH rear lower cowling (with the cowling removed) at a location 400mm (15.7 in.) to the right of the A/C centerline (reference Figure 2.2.1). Utilize the existing insert holes* in the lower cowling structure.
- ❑ Secure with fasteners provided pre-assembled on the bracket as illustrated below.

* If your helicopter does not have these two holes in the cowling, modify panel per Airbus Helicopters Service Bulletin No. 25.04.

Figure 2.2.5 Support Bracket Installation

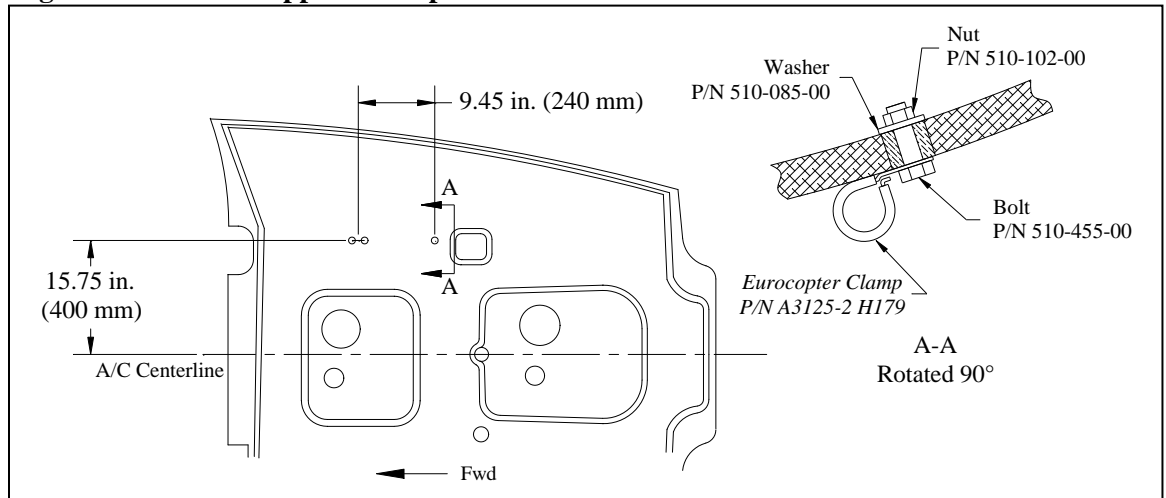


2.2 Fixed Manual Release Cable Assembly Installation continued

Install a clamp (Airbus Helicopters P/N A3125-2 H179) in the rear lower cowling: (the clamp will support the removable section of the manual release cable).

- ❑ Install an insert in the cowling 9.45 inches (240 mm) aft of and in line with the two holes for the Quick Disconnect Support Assembly (see Figure 2.2.6). Install the insert in accordance with chapter 02.120 of Airbus Helicopters's Standard Practices Manual.
- ❑ Install the clamp as shown per A-A of Figure 2.2.6 with hardware shown.

Figure 2.2.6 Cable Support Clamp Installation



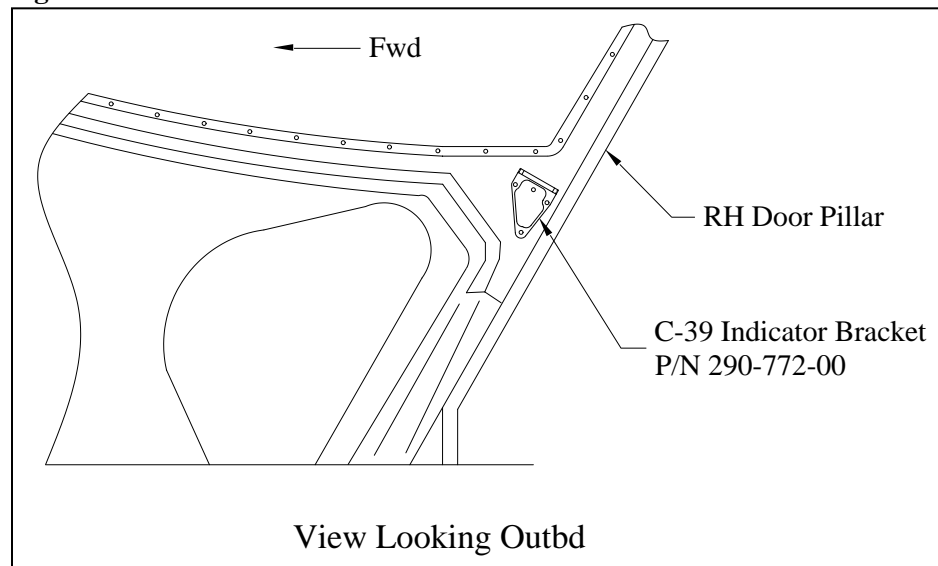
2.3 C-39 Indicator Installation

The C-39 Indicator is to be mounted on the RH door pillar.

If nut clips are not pre-installed in the door pillar, install them per the following.

- ❑ Hold the Indicator Bracket (P/N 290-772-00) at a location as shown below and transfer its hole pattern to the door pillar.

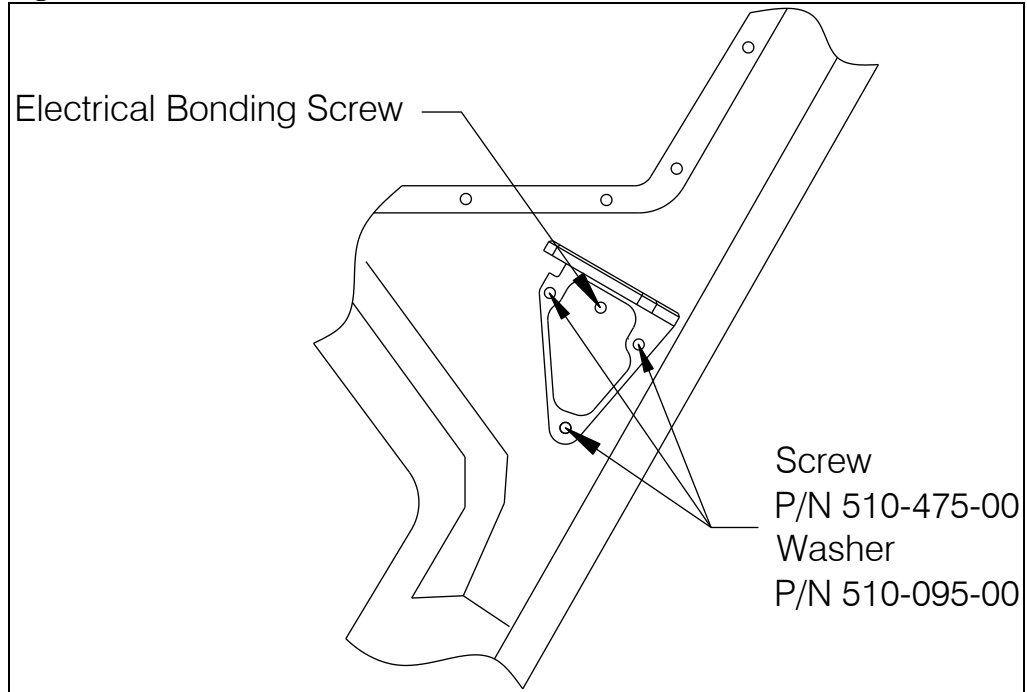
Figure 2.3.1 Indicator Bracket Installation



- ❑ Drill three mounting holes in the RH door pillar to install the nut clips (Airbus Helicopters P/N SL211M5-1). Reuse the electrical bonding screw at the fourth location (see below).
- ❑ After completing electrical bonding, install the three nut clips.
- ❑ Fasten Indicator Bracket with three screws (P/N 510-475-00) and three washers (P/N 510-095-00).

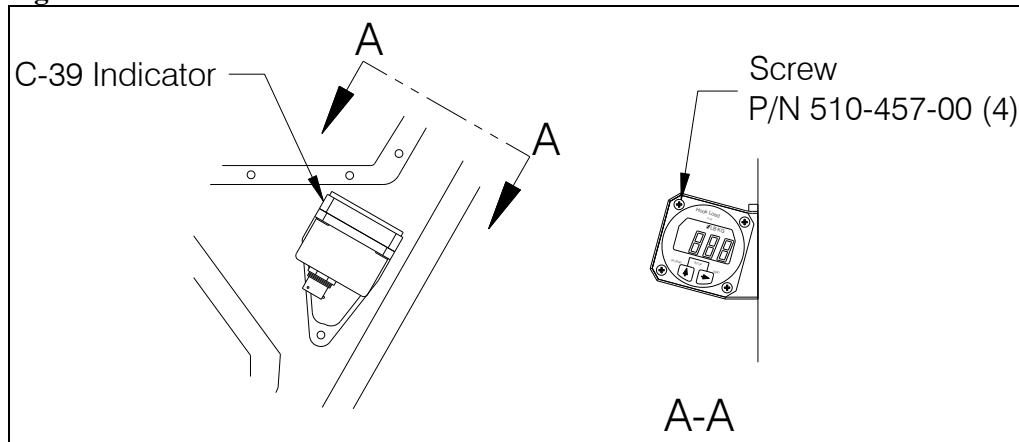
2.3 C-39 Indicator Installation continued

Figure 2.3.2 Indicator Bracket Hardware



- ❑ Install the C-39 Indicator (P/N 210-095-00) onto the bracket with hardware as illustrated below.

Figure 2.3.3 C-39 Indicator Installation



2.4 Electrical Wiring Installation

Install electrical harnesses (P/N 270-117-00 and P/N 270-118-00). Route them along the existing harnesses (reference Figure 2.4.1) where possible while observing the following precautions:

- Pick up existing wire runs by opening existing cable clamps. Nylon ties alone may not be used for primary support.
- The distance between supports should not exceed 21 inches.
- Bend radius of wire or harness must not be less than 10 times the wire or harness diameter.
- Inspect and verify that the wire harness may not be manually deflected into a structure with a bend radius of less than .13".

Make the appropriate connections to overhead panel with butt splices and other connections with contacts. These items are supplied with wire harnesses. Refer to Figure 2.4.2 for electrical wiring schematic.

Figure 2.4.1 Electrical Wiring Routing Overview

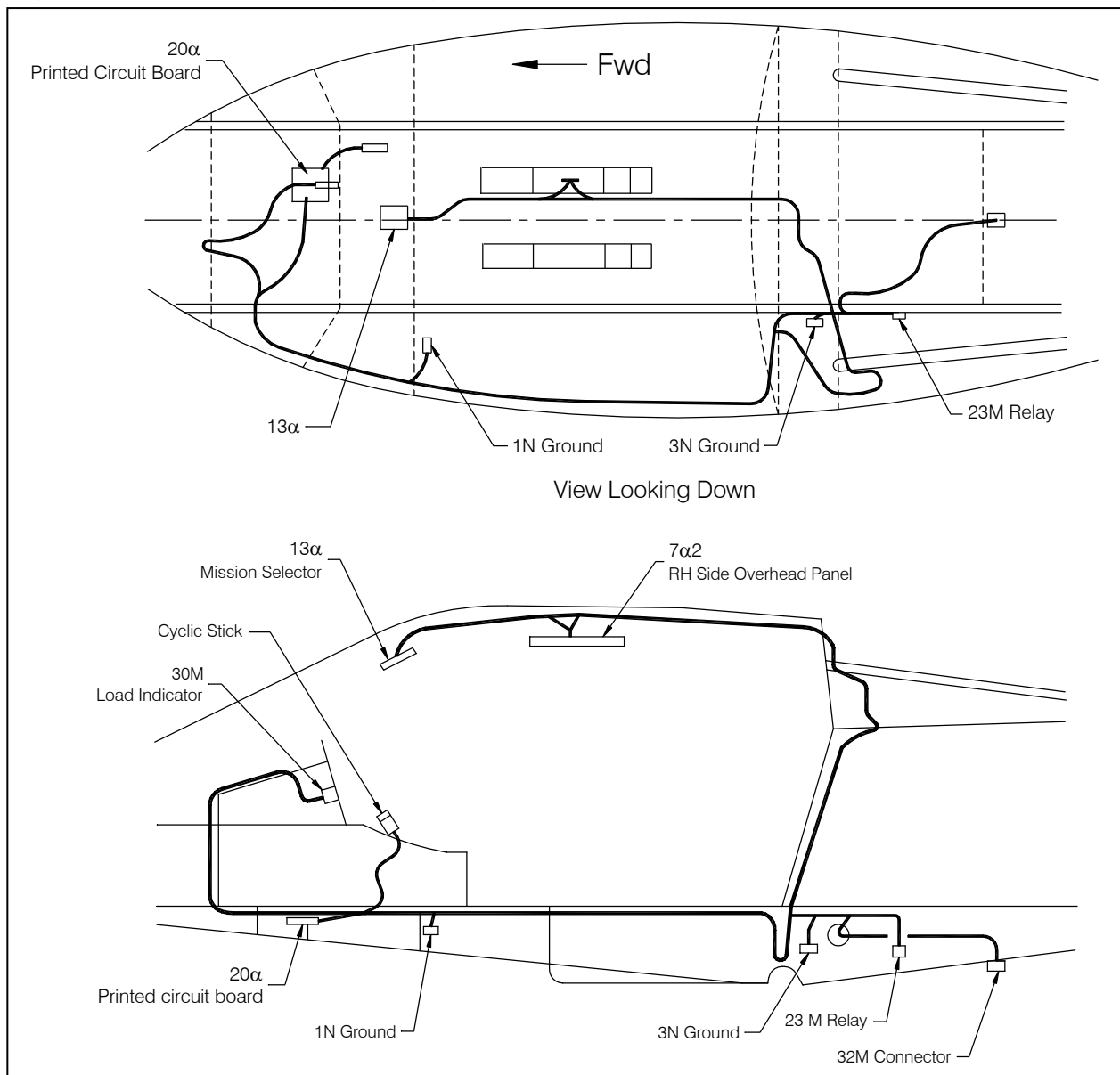
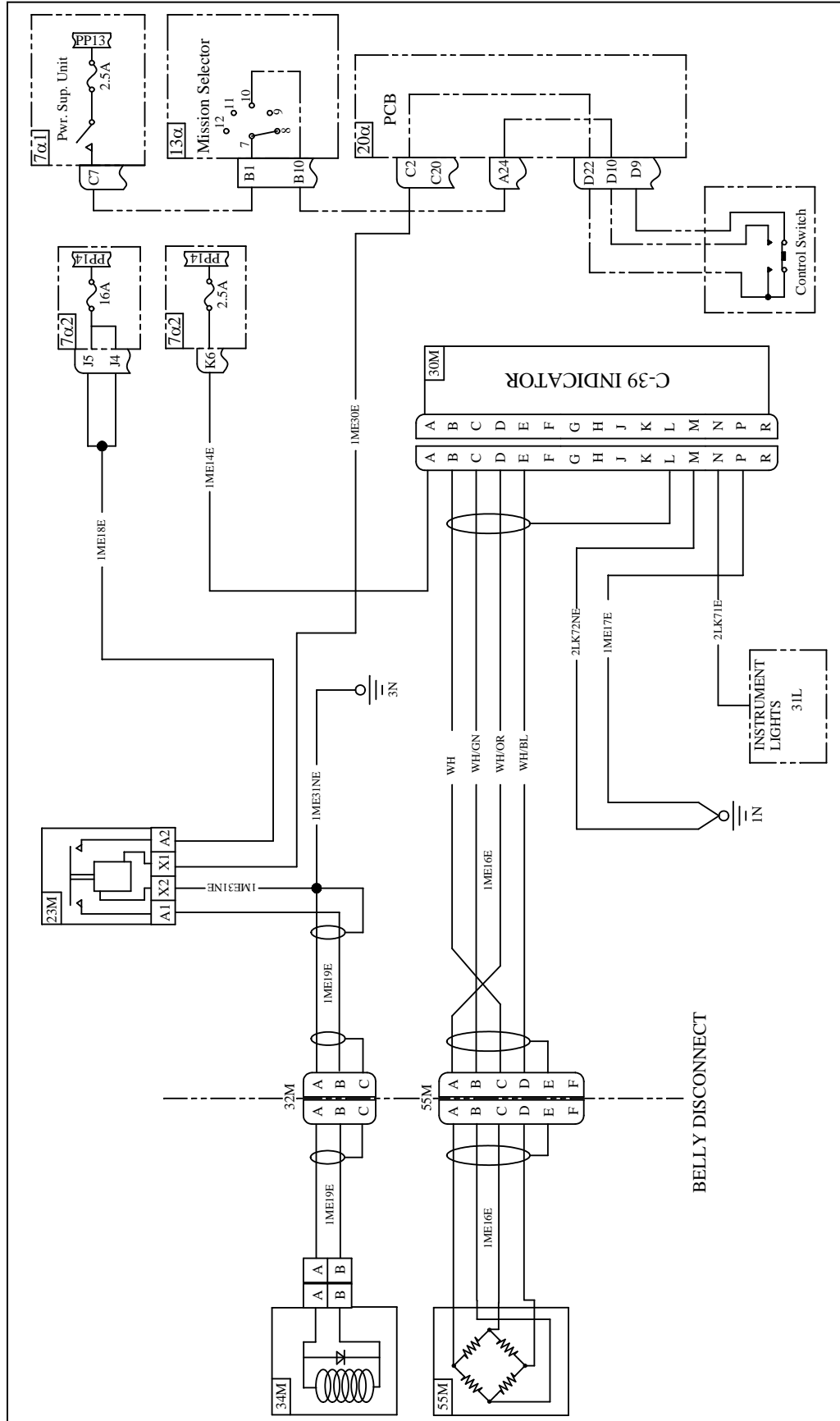


Figure 2.4.2 Wiring Schematic

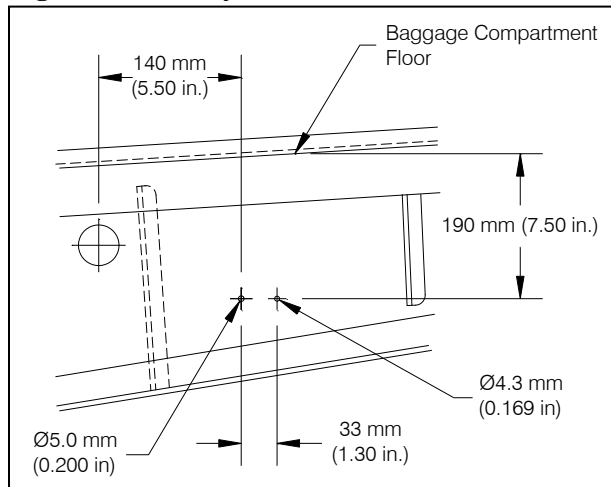


2.4 Electrical Wiring Installation continued

Install relay per the following:

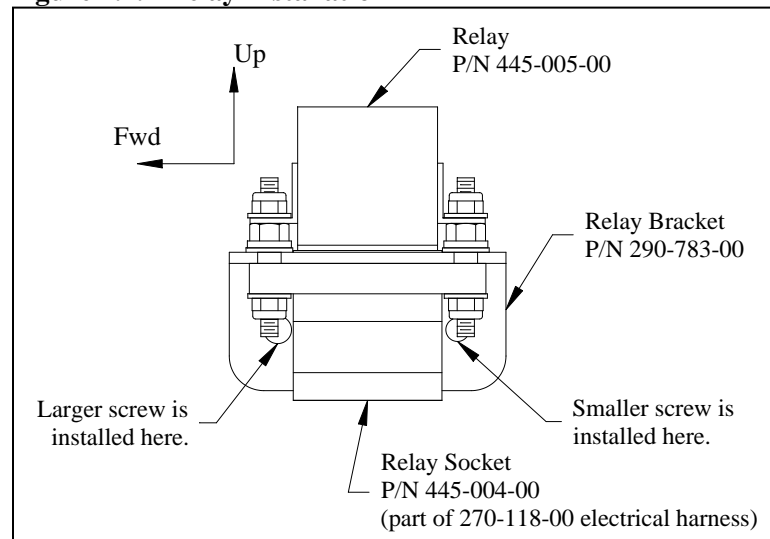
- ❑ Install Relay Bracket (P/N 290-783-00). Create two holes (if replacing Airbus Helicopters relay, use an existing hole and drill another to match bracket hole spacing) in the LH beam as illustrated in Figure 2.4.3.

Figure 2.4.3 Relay Bracket Installation



- ❑ Secure Relay Bracket with two screws (P/N 510-277-00 and 510-453-00), two washers (P/N 510-278-00 and 510-419-00), and two nuts (P/N 510-279-00 and 510-102-00). The larger screw will be used to attach a ground strap to the other side of the airframe beam at a later step.
- ❑ Place relay socket (part of 270-118-00 electrical harness) into relay bracket mounting holes from below and secure to relay and relay bracket with hardware provided with relay (as illustrated below).

Figure 2.4.4 Relay Installation



2.4 Electrical Wiring Installation continued

Install Connector Bracket Assembly (P/N 232-156-00) per the following:

- Locate Connector Bracket Assembly on the fuel tank bulkhead, 12.60 inches (320 mm) left of the aircraft centerline and low on the fuel tank bulkhead structure below the fuel tank and such that the fasteners can be installed above the flange on the opposite side of the bulkhead structure (see Figure 2.4.5).

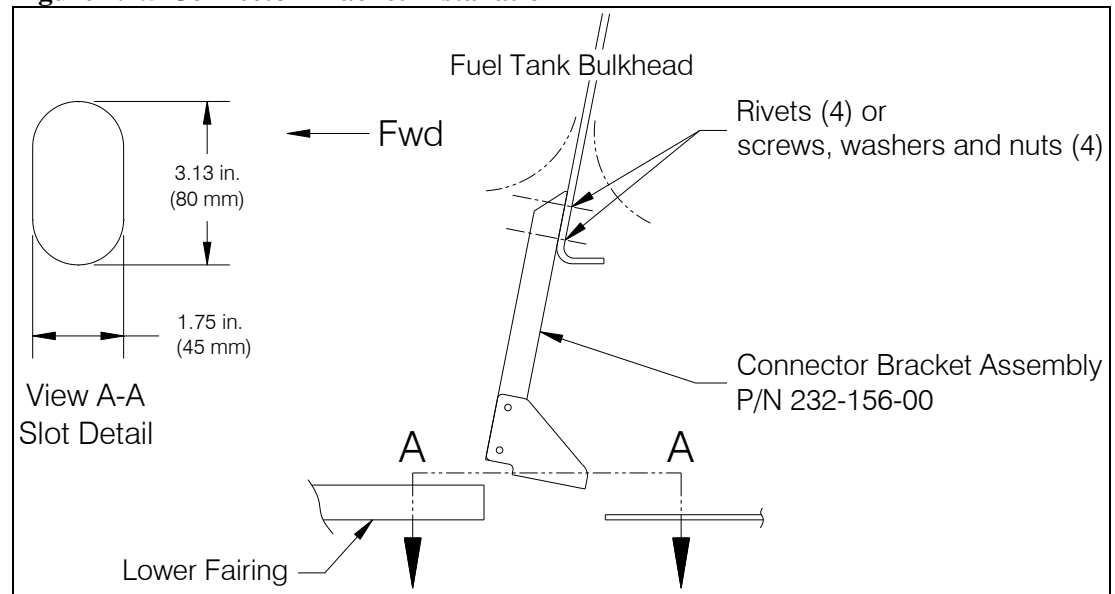
If this location is not available the Connector Bracket may be moved to the right along the fuel tank bulkhead, but before securing the Connector Bracket in this location verify that the electrical harnesses on the swing assembly will reach and will not be pulled tight in any position within the cargo hook and swing assembly range of movement.

Rivets are provided with the kit to secure the connector bracket but this bracket may optionally be attached with equivalent sized screws*, washers and self-locking nuts.

* 3 mm screws (e.g.- Airbus Helicopters P/N 22125BC030010L) or 4-40 screws (MS35206 series) of appropriate length.

- Drill (4) 0.129 inch (3.3 mm) holes in the structure to match the hole pattern in the Bracket Assembly or new .129 inch holes may be created in the Bracket Assembly to accommodate the installation location. Maintain minimum 2D edge distance and 3D spacing on the holes.
- Fasten with (4) rivets (P/N 510-486-00) or fasteners as noted above.
- Create slot in lower cowling directly below the Bracket Assembly per dimensions in Figure 2.4.5. Verify that the slot will accommodate removal and re-installation of connectors when the fairing is installed.

Figure 2.4.5 Connector Bracket Installation



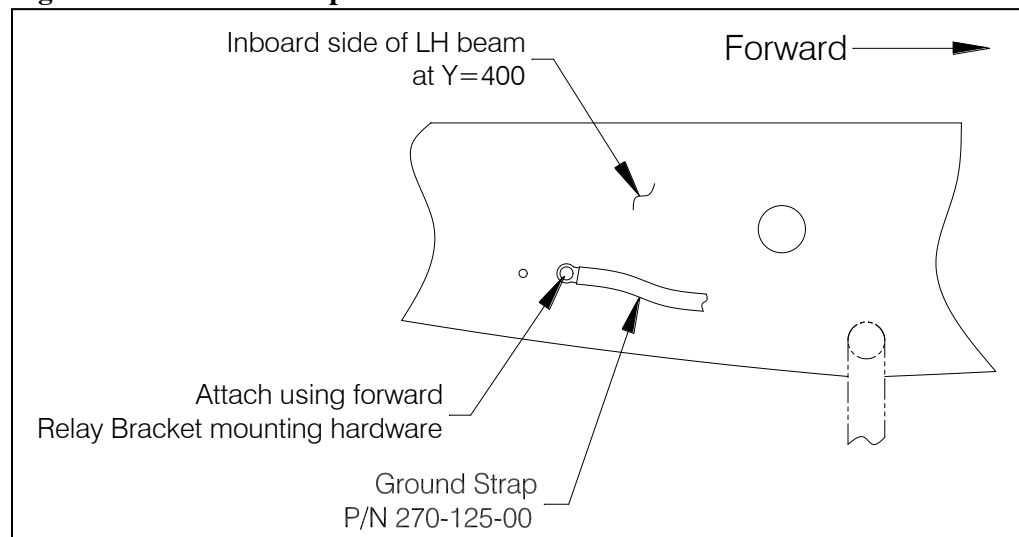
2.4 Electrical Wiring Installation *continued*

- Fasten hook release connector (32M) and load cell connector (55M) to the Connector Bracket with screws (P/N 510-481-00), washers (P/N 510-062-00), and nuts (P/N 510-029-00).

Important: Install screws with their heads on the bottom side of bracket flange (if nuts are installed on bottom side they will interfere with mating connector).

- Install electrical markers (P/N 215-165-00).
- Install Ground Strap (P/N 270-125-00) terminal onto the inboard side of the LH airframe beam (on the opposite side from the Relay Bracket) using the forward Relay Bracket mounting hardware. Bond to airframe per Airbus Helicopters electrical bonding procedure. Refer to section 20.02.07 of the Airbus Helicopters Standard Practices Manual.

Figure 2.4.6 Ground Strap Installation



- Route the Ground Strap to the load weigh and electrical release harnesses installed previously and route with these harnesses, while securing with ty-wraps, to their termination points at the Connector Bracket. Route the Ground Strap around the Connector Bracket and position it such that the disconnect fitting at the end can be routed through the connector access hole and extended below the lower fairing (when installed).
- Re-install lower fairings.

2.5 Swing Suspension Installation

- ❑ Install the cable assemblies onto the swing suspension frame with hardware provided pre-assembled onto the cable clevis end. Fasten the two shorter cable assemblies (P/N 232-140-01) onto the forward pivot points of the suspension frame and the two longer cable assemblies (P/N 232-157-01) to the aft pivot points. Torque the castellated nuts on the pivot bolts to 20 ft-lbs., then rotate nut to next castellation, not to exceed 30 ft-lbs. Install and secure cotter pins.

The forward end of the suspension is determined by the orientation of the cargo hook. **When the suspension is installed the cargo hook load beam must point to the left side of the helicopter** (the manual release cable is routed to the right side of the helicopter).

- ❑ Install the Swing Suspension onto the aircraft by attaching the forward suspension cables to the inboard holes of the forward Shackle Assemblies (shown in Figure 2.5.1) and the aft suspension cables to the Airbus Helicopters shackles (shown in Figure 2.5.2). Install the attached safety pins at each Quick Release Pin.

Figure 2.5.1 Forward Suspension Cable Attachment

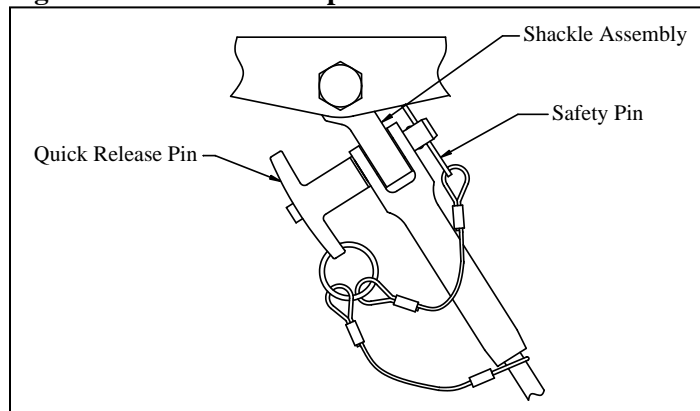
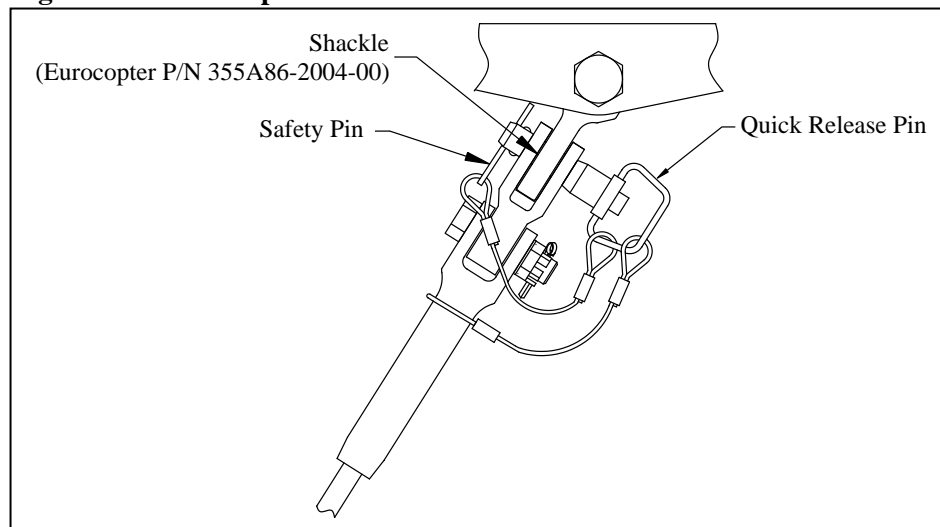


Figure 2.5.2 Aft Suspension Cable Attachment

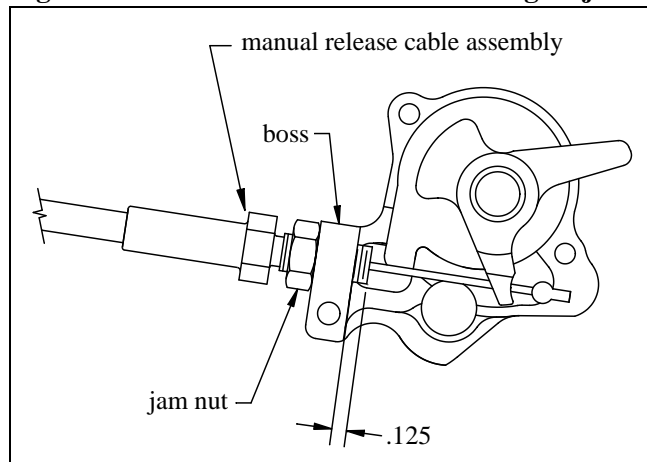


2.6 Removable Manual Release Cable Assembly Installation

Connect the removable manual release cable (P/N 268-030-01) to the cargo hook first:

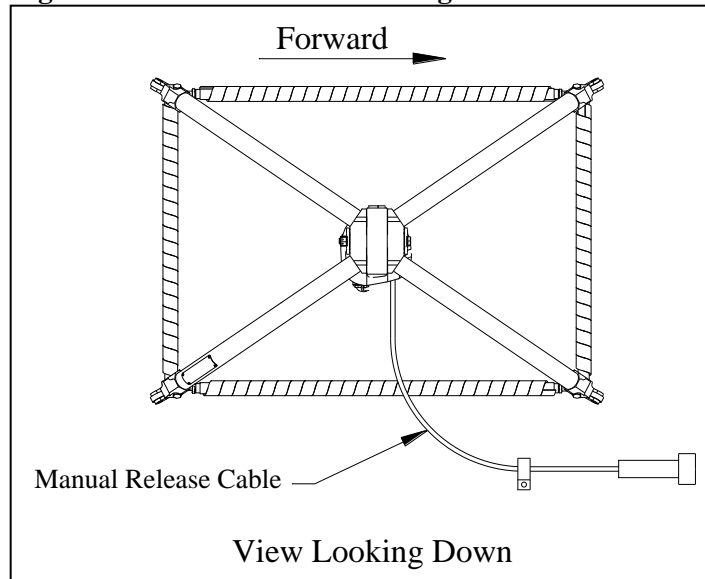
- ❑ Remove the manual release cover from the cargo hook.
- ❑ Thread the fitting at the end of the manual release cable into the manual release boss on the hook side plate until the threads protrude approximately .125" inch beyond the boss and secure with jam nut (as shown in Figure 2.6.1).
- ❑ Leave the cover off of the cargo hook until the other end of the release cable is connected, in order to verify proper setting.

Figure 2.6.1 Manual Release Cable Fitting Adjustment



- ❑ Route the cable from the hook to the end of the fixed manual release cable as illustrated below, routing it through the supporting clamp installed on the cowling per Section 2.2.

Figure 2.6.2 Release Cable Routing



2.6 Removable Manual Release Cable Assembly Installation *continued*

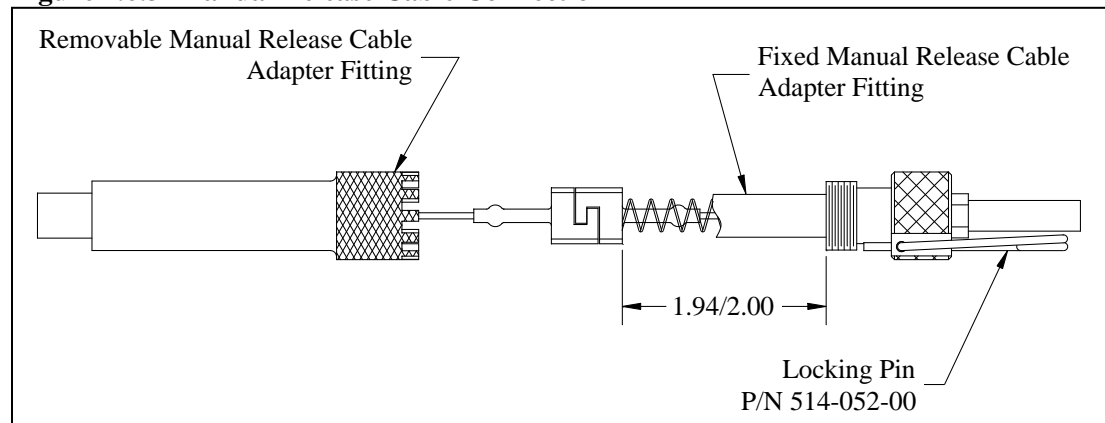
- ❑ Connect the other end of the removable cable assembly to the end of the fixed cable by sliding the Adapter Fitting back to expose the swaged cable end fitting and connecting this fitting to the swaged cable end fitting on the fixed cable as shown below.



The pre-set compressed spring length is set at the factory to be 1.94/2.00 inches (see below). If necessary, minor adjustments can be made at the release handle assembly on the collective.

- ❑ Thread the Adapter Fitting on the removable cable onto the fixed cable adapter fitting and lock in position by engaging a castellation with the Locking Pin (P/N 514-052-00).
- ❑ Snap the removable cable Adapter Fitting into the inboard spring clip on the Support Bracket Assembly.

Figure 2.6.3 Manual Release Cable Connection

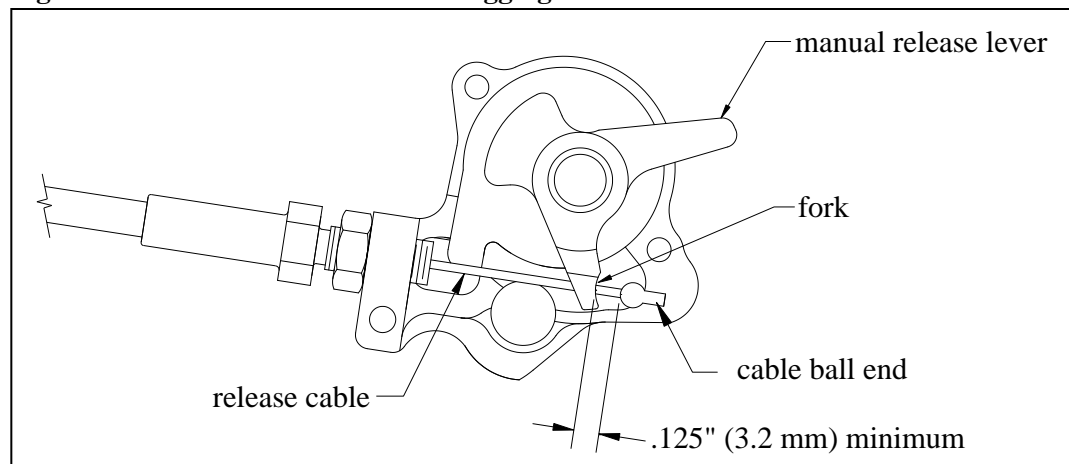


2.6 Removable Manual Release Cable Assembly Installation *continued*

Verify proper setting at the hook:

- ❑ Place the cable ball end fitting into the hook manual release fork fitting as illustrated in Figure 2.6.4.
- ❑ Move the manual release lever in the clockwise direction until it is against the cam stop and measure the cable ball end free play with the manual release handle in the cockpit in the non-release position. play with the manual release handle in the cockpit in the non-release position. The gap should measure a minimum of .125" (the maximum gap is limited by the manual release cover, i.e.- it must fit inside the cover).

Figure 2.6.4 Manual Release Cable Rigging



If the gap does not measure at least .125" (3.2 mm), make adjustments at the hook only. This is done by disconnecting the cable at the interface with the fixed manual release cable (Figure 2.6.3), loosening the jam nut, and rotating the cable in the required direction.

Manual Release Cable Installation Checkout:

- ❑ Move hook and swing frame throughout its range of motion while observing free play. At no point should the free play be less than .030" (.8 mm).
- ❑ Check that the cable housing is not kinked or pulled tight in any hook and swing frame position.
- ❑ Re-install cover.

2.7 External Electrical Release and Load Cell Cable Installation

Table 2-1 Cargo Hook Connector

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



The cargo hook is equipped with a suppression diode that will be damaged if the cargo hook electrical connection is reversed.

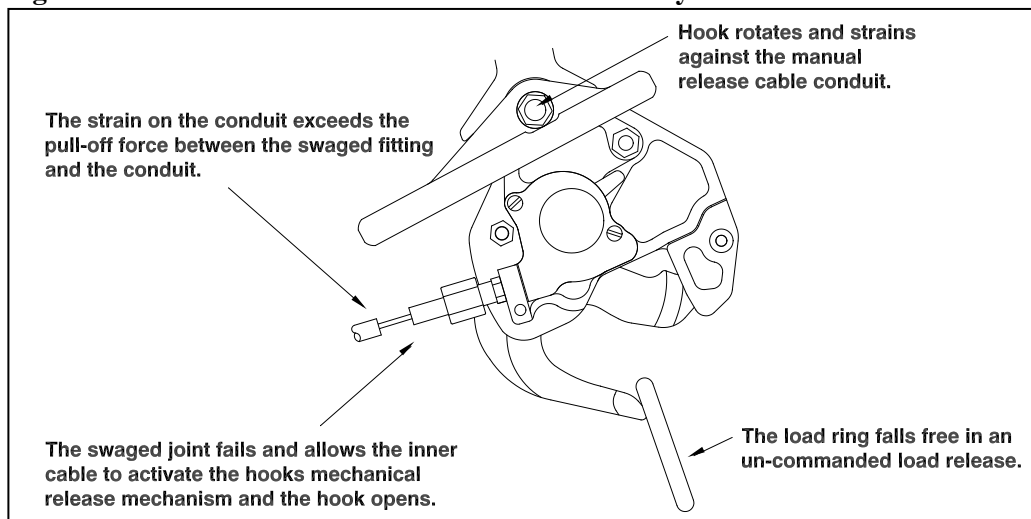
- ❑ Connect the Ground Strap from the hook to the fixed ground strap installed per section 2.4.
- ❑ Connect the electrical release cable to the appropriate connector (32M) mounted per section 2.4.
- ❑ Connect the electrical cable from the load cell (55M) to the appropriate connector (55M) mounted per section 2.4.

2.7 External Electrical Release and Load Cell Cable Installation continued



Un-commanded cargo hook release will happen if the manual release cable is improperly restrained. The cable must not be the stops that prevent the Cargo Hook from swinging freely in all directions. If the Cargo Hook loads cause the hook to strain against the manual release cable the swaged end of the cable may separate allowing the inner cable to activate the cargo hook manual release mechanism. The result is an un-commanded release. Ensure that no combination of cyclic stick or Cargo Hook position is restrained by the manual release cable.

Figure 2.7.1 Un-commanded Release From Incorrectly Secured Cable



2.8 Placard Installation

Install appropriate load limitation placard, P/N 215-176-00 (2303 lb Max. Hook Load) or P/N 215-178-00 (2500 lb Max Hook Load) depending on your model. The AS355E, F, and F1 models have a 2303 lb. (1045 kg) maximum external load limitation. The F2, N, and NP models have a 2500 lb (1045 kg) maximum external load limitation. Verify the correct external load limit by checking the appropriate flight manual.

Locate the placard on the belly of the helicopter, visible to the ground operator and near the hook.

2.9 Installation Check-Out

After installation of the Cargo Hook Swing Suspension System, perform the following checks.

1. Swing the installed Cargo Hook on the suspension and the suspension to their full extremes to ensure that the manual release cable assembly and the electrical release cable have enough slack to allow full movement without straining or damaging the cables. The cables must not be the stops that prevent the Cargo Hook or suspension from swinging freely in all directions.
2. With no load on the cargo hook load beam, pull the cargo hook mechanical release lever, the Cargo Hook should release. Reset the cargo hook load beam.
3. With no load on the cargo hook load beam, depress the cargo hook electrical release button, the Cargo Hook should release. Reset the cargo hook load beam.
4. Perform an EMI ground test per AC 43.13-1b section 11-107. For equipment that can only be checked in flight an EMI flight test may be required.



The cargo hook is of a class of equipment not known to have a high potential for interference. This class of equipment does not require special EMI installation testing (i.e. FADEC) as required in paragraphs 7 and 8 of FAA policy memorandum ASW-2001-01.

5. Power on the Indicator and allow it to warm up for 5 minutes (with no load on the hook). Press both Indicator buttons at the same time to go to the Setup Mode. Scroll through the menu until the symbol “0 in” is displayed, then press the right button. Remove any weight that is not to be zeroed out and press either button to complete the procedure.

2.10 Component Weights

The weights of the Cargo Hook Swing Suspension System components are listed below.

Table 2-2 Component Weights

Item	Weight	Station
Fixed Provisions	4.5 lbs (2.04 kg.)	92 in. (2337 mm)
Removable Provisions	30.5 lbs (13.83 kg.)	134.4 in. (3414 mm)
Complete Install	35 lbs (15.87 kg.)	128.9 in (3275 mm)

2.11 Paper Work

In the US, fill in FAA form 337 for the initial installation. This procedure may vary in different countries. Make the appropriate aircraft log book entry. Install the Rotorcraft Flight Manual Supplement P/N 121-019-01 in the Rotorcraft Flight Manual.

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Section 3

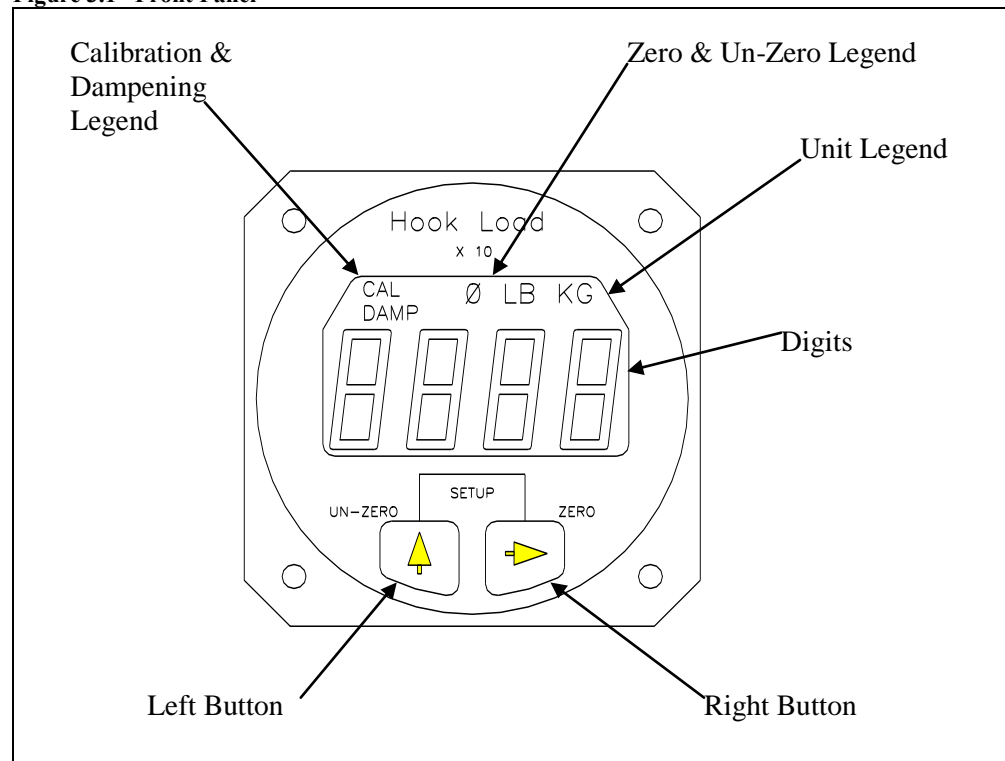
Load Weigh System Operation Instructions

Indicator Front Panel

The C-39 Indicator front panel includes the following features.

- The four 7 segment LCD digits show the weight on the Cargo Hook and display various setup information.
- The Legends clarify the digital display, i.e. - when the LB Legend is turned on, the display will be pounds, etc.
- The right button is used to Zero the display in the Run Mode and select the digit to be changed in the Setup Mode.
- The left button is used to Un-Zero the display in the Run Mode and scroll the selected digit in the Setup Mode.

Figure 3.1 Front Panel

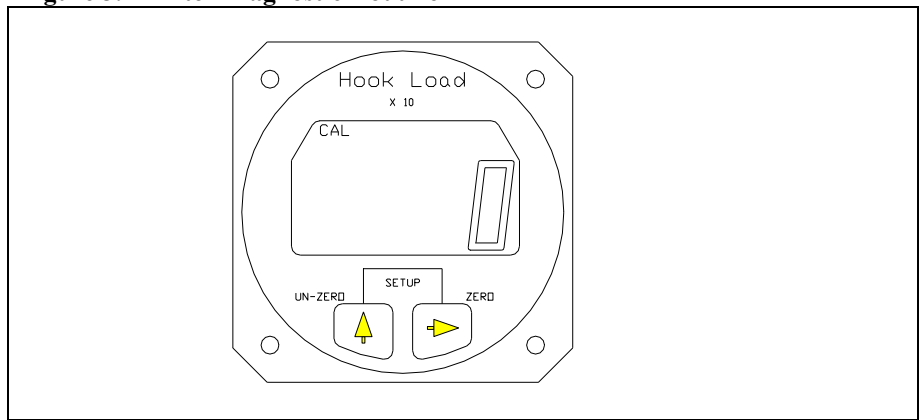


The Run Mode

The C-39 Indicator has two operating modes, Run and Setup. The Run Mode is used to display the cargo hook weight and the Setup Mode is used to setup or configure the Indicator to the helicopter and to the Load Cell. When powered up, the Indicator always comes on in the Run Mode.

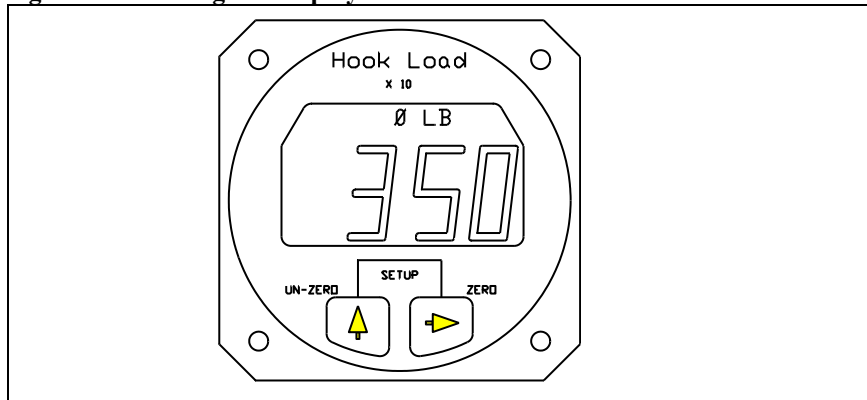
After the Indicator has been correctly installed, power it up by activating the aircraft electrical system. The Indicator will go through a self-diagnostic routine. During this routine the display will display all of the digits and legends. If a problem is found during the routine an Error Code will be displayed. For an explanation of Error Codes see the section *Error Codes*. After the diagnostic routine the display should look like this:

Figure 3.2 After Diagnostic Routine



The illustration is of the Indicator in the Run Mode with no load on the hook. Note the LB legend displayed.

Figure 3.3 LB Legend Displayed

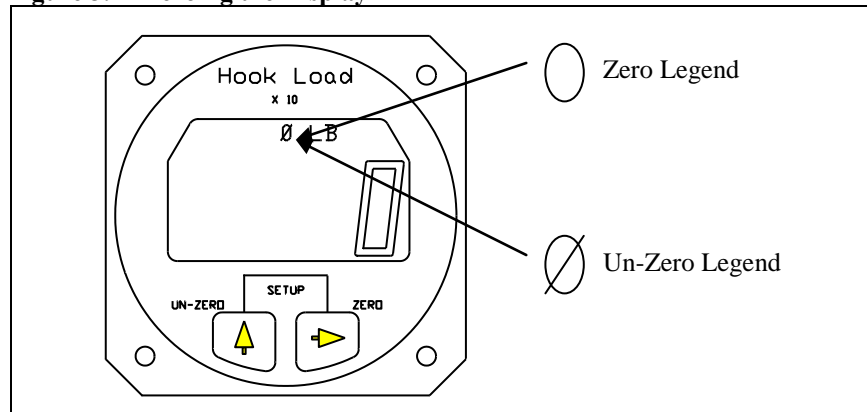


The illustration is a typical hook load reading. The display is 3,500 pounds, note the last digit is not displayed.

To Zero or Tare the Display

The zero feature is used to zero or tare the weight on the Cargo Hook that is not wanted, such as the weight of a cargo net or long line. The Right button is used to zero the Indicator reading. When the Right button is pressed the display is zeroed. The zero legend is turned on and the zeroed number is stored in memory. If the Right button is pressed again, before the Un-zero button is pressed, the display blinks in response to the button closure. Zero is only available in the Run Mode.

Figure 3.4 Zeroing the Display



To Un-Zero the Display

The Left button is used to add the zeroed value back into the current Indicator reading or Un-zero the display. When the Left button is pressed, the number previously zeroed is added to the current display and the Un-zero legend is turned on. If the Left button is again pressed before the zero button is pressed, the display blinks in response to the button closure. Un-Zero is only available in the Run Mode.

The Run Mode continued

Error Codes

Error Codes are the result of difficulties discovered during the Indicator diagnostic tests. Diagnostic tests occur at power up and during the execution of certain routines. Listed below is a matrix of the Error Code displays, their meaning and possible corrective action. Pressing either button will usually bypass the error code, however, the displayed information may be suspect.

Table 3-1 Indicator Error Codes

DISPLAY	CAUSE	POSSIBLE CORRECTIVE ACTION
Err 1	A/D or D/A circuit failure	Potential short in the optional analog meter cable. Clear short and power cycle the Indicator by turning the power to the Indicator off for a few moments. If Error Code continues, return the Indicator to the factory.
Err 2	NV Ram failure	Power cycle the Indicator; if Error Code continues, return the Indicator to the factory.
Err 3	NV Ram write failure	Re-enter data, if Error Code continues, return the Indicator to the factory.
Err 4	NV Ram busy failure	Power cycle the Indicator, if Error Code continues return the Indicator to the factory.

The Setup Mode

The C-39 Indicator can be used with a wide range of helicopters and load cells. The Setup Mode on the Indicator matches the Indicator to the Load Cell and to the helicopter. This is done by entering data into the Indicator. Entered data includes the load cell Calibration Code, the units that the Indicator should read-out (pounds or kilograms), and several other items.

The Indicator has a group of Setup routines, arranged in menu form, that are used to configure the Indicator. Shown on the next page is a matrix of the Setup routines and a brief discussion of their function and how they are programmed. A complete discussion of each setup item is presented later in this section.

To enter the Setup Mode press both the Right and Left buttons at the same time while the Indicator is powered up and in the Run Mode. To exit the Setup Mode and return to the Run Mode, press both the buttons at the same time. If you are in a Setup routine and have started to change an entry, but you change your mind before completing the procedure, power cycle the Indicator to exit the Setup Mode and then go to the Run Mode without changing the item. The Indicator is power cycled by turning the Indicator power off for a few moments.

The Setup Mode, continued

Table 3-2 Indicator Setup Routines

MENU	FUNCTION	DISPLAY
Press the Left button to scroll through the menu	Press the Right button to view or change the menu item.	To return to the Run Mode press both the Right and Left buttons at the same time.
DAMP	<u>Dampening Level</u> , sets the pilots preference for display dampening.	Blinking display is previously entered Dampening Level. Select the desired dampening level by pressing the Left button.
CODE	<u>Calibration Code</u> , matches the Indicator to the Load Cell.	Display is previously entered CAL Code. The Code is changed by selecting the digit to be changed with the Right button. The selected digit will blink. Change the blinking digit by pressing the Left button.
0 in	<u>Installation ZERO</u> , matches the Indicator to the installed Load Cell and to the helicopter. After this procedure the display will be zero when no load is on the Cargo Hook.	Display is a combination of load on the Load Cell, and normal load cell zero offset. Remove all weight from the installed Load Cell except the Cargo Hook, and press any button to complete the procedure and return to the Run Mode.
LOAD	<u>Load</u> , is used to calibrate the system by lifting a known load.	No previous display is shown. Enter the known load using the Right button to select the digit to be changed and Left button to enter the number. Known load is entered "X 10" i.e.; 5000 kilograms is entered as 500. After the known load is entered, press both buttons at the same time and lift the known load. When the load is stabilized press either button. A new Calibration Code will be calculated and the known load will be displayed. This completes the procedure.
Scale	<u>Scale</u> , matches the analog output of the Indicator to an optional remote analog meter.	Display is previously entered number. To change the number use the Right button to select a digit, use the Left button to scroll the digit to the desired number. Entry is times 10.
LB KG	<u>Units</u> , selects the Indicator units (pounds or kilograms).	Display is previously selected unit. To change the unit, use the Left button.
XX - V	<u>Version</u> , is the revision level of the Indicator hardware and software.	Version is for information only, it cannot be changed.

The Setup Mode, continued

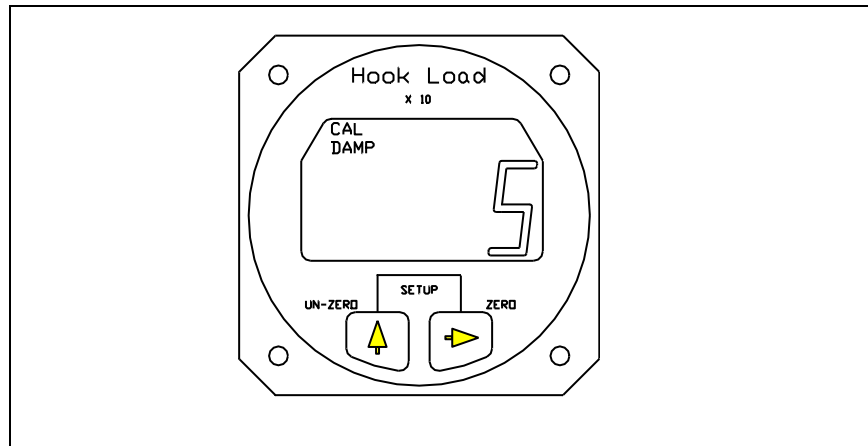
Indicator Dampening

The Damp or dampening routine allows the pilot to adjust the Indicator dampening level to his preference. The dampening routine is a program that stabilizes the Indicator reading. It offers a trade-off between Indicator responsiveness and stability. Ten dampening levels are available, from 0 through 9. At level 0 the display responds to the slightest change in weight. However, if the load bounced even slightly, the display digits would respond instantly, making the display look unstable. With a dampening level of 9, the display would be stable under the most turbulent conditions, however, it would take several seconds for the display to respond to a change in weight. The ideal dampening level will depend on the flying conditions. A mid range setting of 5 or 6 is usually adequate.

To Look at or Change the Dampening Level

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu, using the Left button, until the word DAMP is displayed. To look at or change the Dampening Level press the Right button. The display should look like this:

Figure 3.5 Changing Dampening Level



The CAL and the DAMP legend is turned on and the previously set dampening level is displayed. To return to Run without changing the current dampening level press both the Right and Left buttons at the same time. To change the dampening number, use the Left button to scroll the blinking digit to the desired number. After the selection has been made press both the Right and Left buttons at the same time to return to Run.

Indicator Calibration

The Calibration Code, or CAL code, is a mandatory input. The Indicator will not accurately display the load without the correct Calibration Code. The Calibration Code scales the signal from the Load Cell.

The Setup Mode, continued

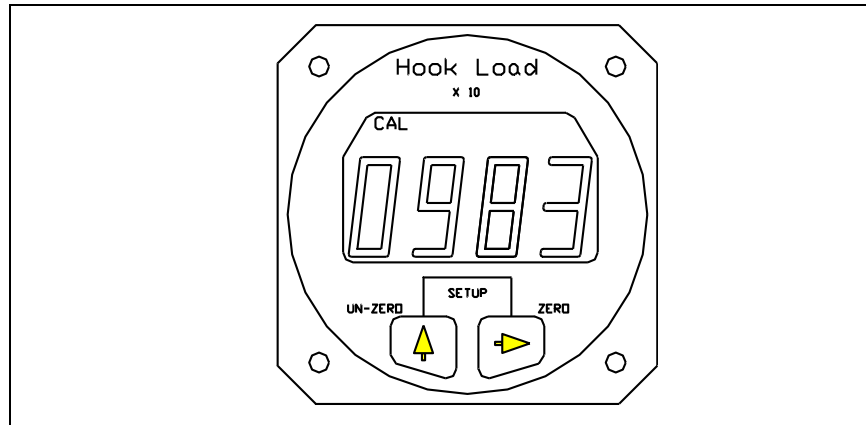
Indicator Calibration, continued

If the C-39 Indicator was supplied as part of a Load Weigh System, the Calibration Code will have been entered into the Indicator by the factory, however, it should be confirmed. If the Indicator is to be mated to a different Load Cell, it must be calibrated before use. Calibration can be done by entering a known Calibration Code or by lifting a known load and having the Indicator calibrate itself. Both options are discussed below.

To Look at or Change the Calibration Code

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word CODE is displayed, then press the Right button. The display should look like this:

Figure 3.6 Changing the CAL Code



The CAL legend is turned on and the previously entered or computed Calibration Code is displayed. To return to Run without changing the CAL Code, press both the Right and Left buttons at the same time. To change the Calibration Code, use the Right button to select the digit to be changed, then use the Left button to scroll the blinking digit to the desired number. When the Calibration Code has been entered, press both the Right and Left button at the same time to return to Run.

NOTICE

Depending on the type of Load Cell, the Calibration code could be a 3 or 4 digit number. If the Calibration Code is a 3 digit number a leading zero (0) must be used. For example if a Load Cell had a CAL Code of 395 it would be entered as 0395.

The Setup Mode, continued

To Look at or Change the Calibration Code, continued

If the load cell Calibration Code is not known or as a cross check, the Indicator can generate the Calibration Code. This is done by entering the weight of a known load into the Indicator LOAD routine and then lifting the load. See the section Calibration by Lifting a Known Load.

Installation Zero

Installation zero is a routine that matches the Indicator to the **INSTALLED** Load Cell. It adjusts the Indicator reading to compensate for the weight of the Cargo Hook on the Load Cell and whatever zero offset is built into the Load Cell. The Installation Zero procedure is not mandatory. If done the Indicator will read zero when the Un-Zero button is pressed and there is no weight on the Cargo Hook. If the Installation Zero is not done, the Indicator will show the weight of the Cargo Hook plus the value of the Load Cell zero offset.

To Run the Installation Zero Routine

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the symbol "0 in" is displayed, then press the Right button. The CAL legend will be turned on and the current weight on the Cargo Hook will be displayed and blinking. Remove any weight that is not to be zeroed out and press either button to complete the procedure and return to the Run Mode.

Calibration by Lifting a Known Weight

Calibration by lifting a known weight is a Setup routine that calculates the Calibration Code for the Load Cell attached to the Indicator. It is useful if the load cell Calibration Code is not known or as a cross check to the accuracy of a known Calibration Code. The procedure is done by entering the known weight into the Indicator and then lifting the weight. This procedure can be done in the shop or on the helicopter. The accuracy of the procedure is directly related to the weight of the known load. If for example the procedure was done with a 1,000 pound load that was assumed to weigh only 900 pounds, all subsequent lifts would be displayed 10% light.



Be sure to include the weight of everything between the Cargo Hook and the load, i.e. the cable, net, dirt, etc.

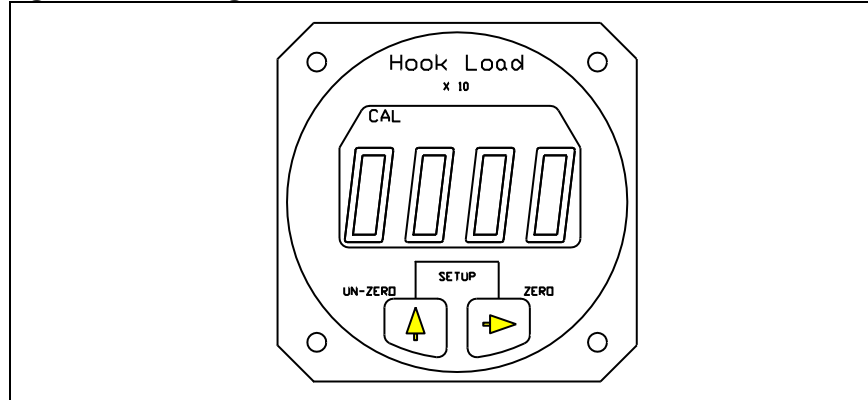
The closer the known load approaches the lifting capacity of the helicopter, the more accurate the calculated Calibration Code will be.

The Setup Mode, continued

To Run the Calibration by Lifting a Known Weight Routine

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word LOAD is displayed, then press the Right button. The display should look like this:

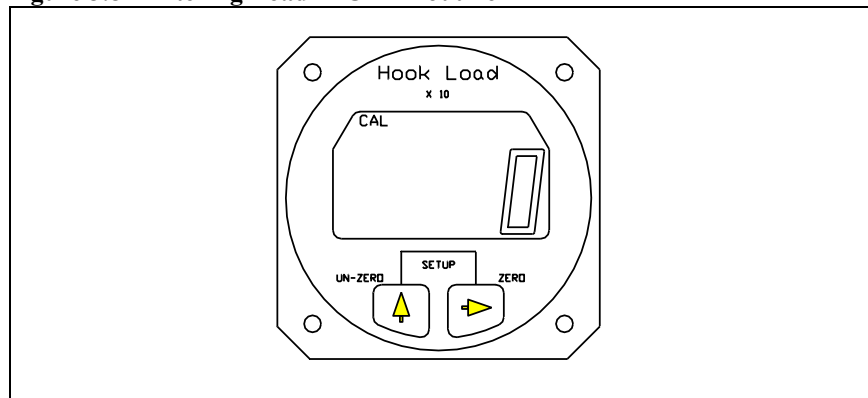
Figure 3.7 Running CAL Routine



The CAL legend is turned on and the first digit is blinking. The previous load is not displayed. At this point if you wish to return to the Run Mode without changing the Calibration Code, power cycle the Indicator. At this point it is not possible to return to the Run Mode without changing the Calibration Code by using the buttons on the Indicator front panel.

To proceed with the procedure, use the Right button to select the digit to be changed, then use the Left button to scroll the blinking digit to the desired number. Note that the known weight is entered "X 10"; a 1000 pound load is entered as 100. When the known load has been entered, press both the Right and Left button at the same time. The display will look like this:

Figure 3.8 Entering Load in CAL Routine



The Setup Mode, continued

Calibration by Lifting a Known Weight, continued

The CAL legend and the digits will be blinking. Again, at this point if you wish to return to the Run Mode without changing the Calibration Code, power cycle the Indicator. It is not possible to return to the Run Mode by using the buttons on the Indicator front panel without changing the Calibration Code. If you wish to proceed, lift the known load and when it is stabilized, press either button to complete the procedure. The Indicator will display the load. This ends the procedure. The Indicator is now calibrated to the Load Cell. It is a good practice to go to the Code routine and record the new Calibration code for later reference.

Setting the Scale for a remote analog meter

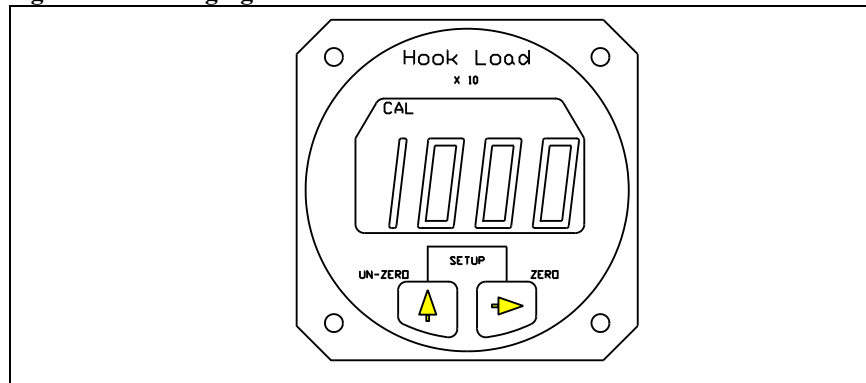
The Scale routine is used when a user supplied analog meter is connected to the Indicator. It is used to match or calibrate the analog meter to the Indicator. The Indicator outputs a 0 to 5 VDC analog signal which is proportional to the Load Cell load. The Scale number tells the Indicator at what point in pounds or kilograms it should reach the 5 VDC output. If for example a 5 volt analog meter is used and its full scale reading is 10,000 pounds, the number entered into the Indicator Scale routine would be 1000 (the number is entered X 10). This number tells the Indicator that it should output the proportional 0 to 5 VDC signal between zero pounds and 10,000 pounds.

The Scale number does not affect Onboard Slave Meters, P/N 210-106-00 or 210-180-00. This number only affects user supplied instruments connected to the analog out signal.

To Look at or Change the Scale

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word SCALE is displayed, then press the Right button. The display should look like this:

Figure 3.9 Changing the Scale



The Setup Mode, continued

To Look at or Change the Scale, continued

The CAL legend is turned on and the previously set Scale number is displayed. To return to Run without changing the Scale, press both the Right and Left button at the same time. To change the Scale number, use the Right button to select a digit to be changed, then use the Left button to scroll the blinking digit to the desired number. When the complete Scale number has been entered, press both the Right and Left button at the same time to return to Run.

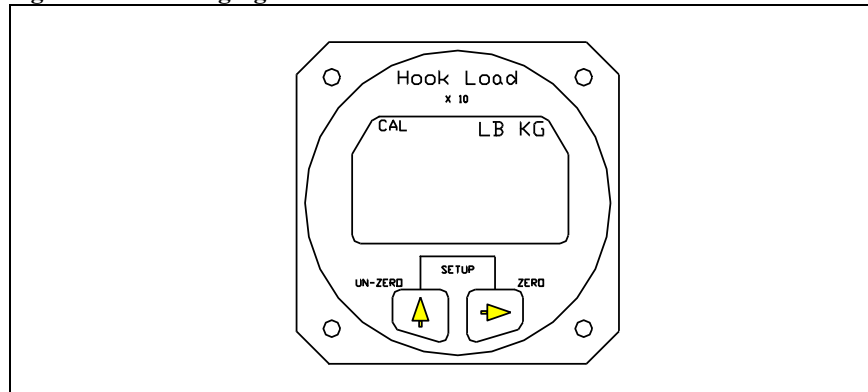
Select KG or LB Units

The units routine sets the display to read in pounds (LB) or kilograms (KG).

To look at or change the Units

With the Indicator powered up and in the Run Mode, press both buttons at the same time to go to Setup. Scroll through the menu until the word LB or KG is displayed, then press the Right button. The display should look like this:

Figure 3.10 Changing the Units



The CAL legend is turned on and the previously set unit is displayed. To return to Run without changing the units, press both the Right and Left button at the same time. To change the units press the Left button. When the selection has been made, press both the Right and Left button at the same time to return to Run.

NOTICE

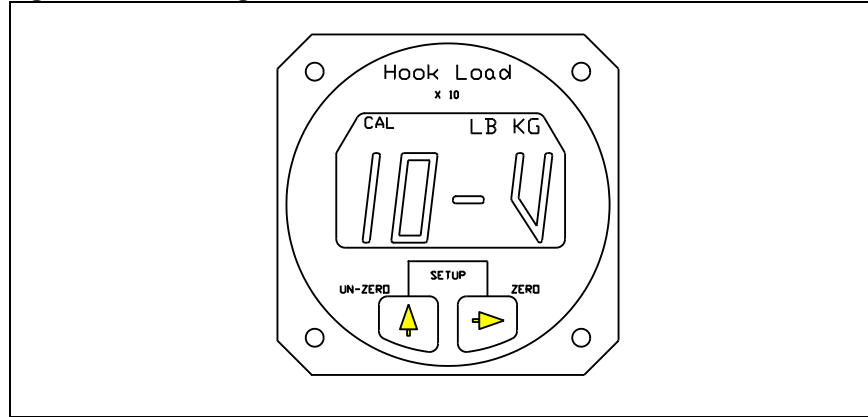
The selected units are displayed when in the Run Mode.

The Setup Mode, continued

Indicator Version

The Version routine displays the Indicator's hardware and software revision levels. Version is set at the factory and cannot be changed.

Figure 3.11 Looking at Indicator Version



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Section 4

Operation Instructions

Operating Procedures

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

1. Be completely familiar with this Owner's Manual, Cargo Hook Service Manual 122-005-00 and the ICA Maintenance Manual 123-017-01.
2. Activate the electrical system and press the Cargo Hook release button to ensure the cargo hook electrical release is operating correctly. The mechanism should operate smoothly and the Cargo Hook must release. Reset the hook by hand after the release. If the hook does not release or re-latch, do not use the unit until the difficulty is resolved.

CAUTION

The release solenoid is intended to be energized only intermittently. Depressing the electrical release button continuously in excess of 20 seconds will cause the release solenoid to overheat, possibly causing permanent damage.

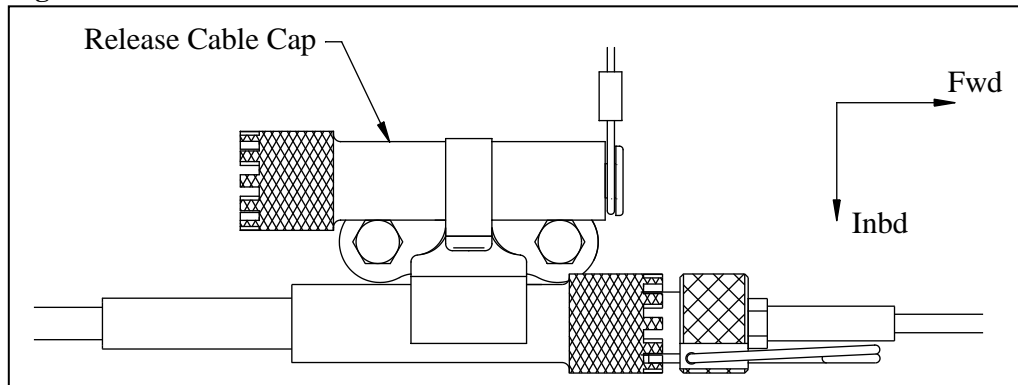
3. Activate the manual release lever to test the cargo hook manual release mechanism. The mechanism should operate smoothly and the Cargo Hook must release. Reset the hook by hand after release. If the hook does not release or relatch do not use the unit until the difficulty is resolved.
4. Swing the installed Cargo Hook and the suspension to ensure that the manual release cable assembly and the electrical release cable have enough slack to allow full swing of each component without straining or damaging the cables. The cables must not be the stops that prevent the Cargo Hook or the suspension from swinging freely in all directions.
5. Visually check for presence and security of fasteners, and condition of cables. Swing the Cargo Hook and the suspension in fore and aft and side to side directions to check for freedom of rotation at all joints.

Disconnecting Removable Provisions

For helicopter missions in which the cargo hook swing suspension system is not needed, its removable provisions may be removed per the following instructions.

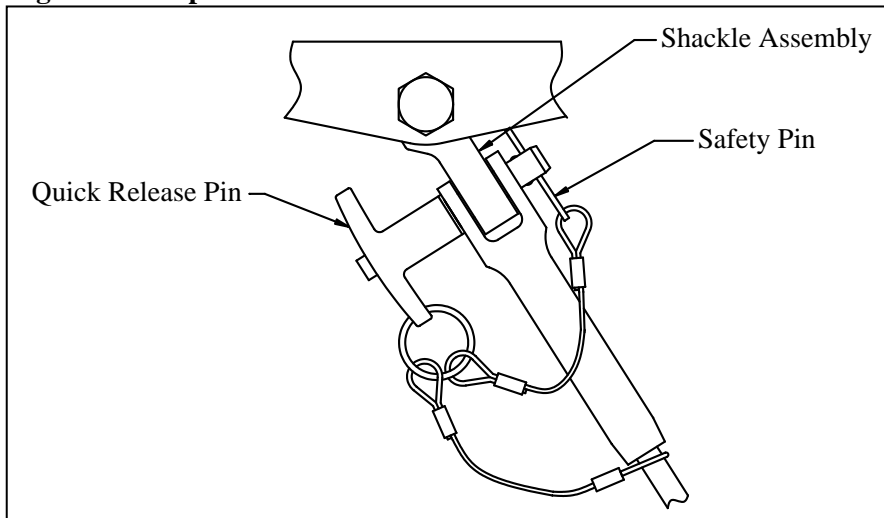
1. Remove the removable section of the manual release cable by unclipping it from the bracket on the belly of the helicopter, disengaging the locking pin and unthreading the Adapter Fitting. Unclip the Release Cable Cap (see below) from the bracket and thread it over the open end of the fixed manual release cable assembly and clip it into the inboard spring clip on the bracket.

Figure 4.1 Manual Release Cable Removal



2. Remove the electrical cables and ground strap at the belly of the helicopter.
3. Remove the Swing Suspension by removing the four safety pins and then the quick release pins that secure the cables to each of the shackle assemblies.

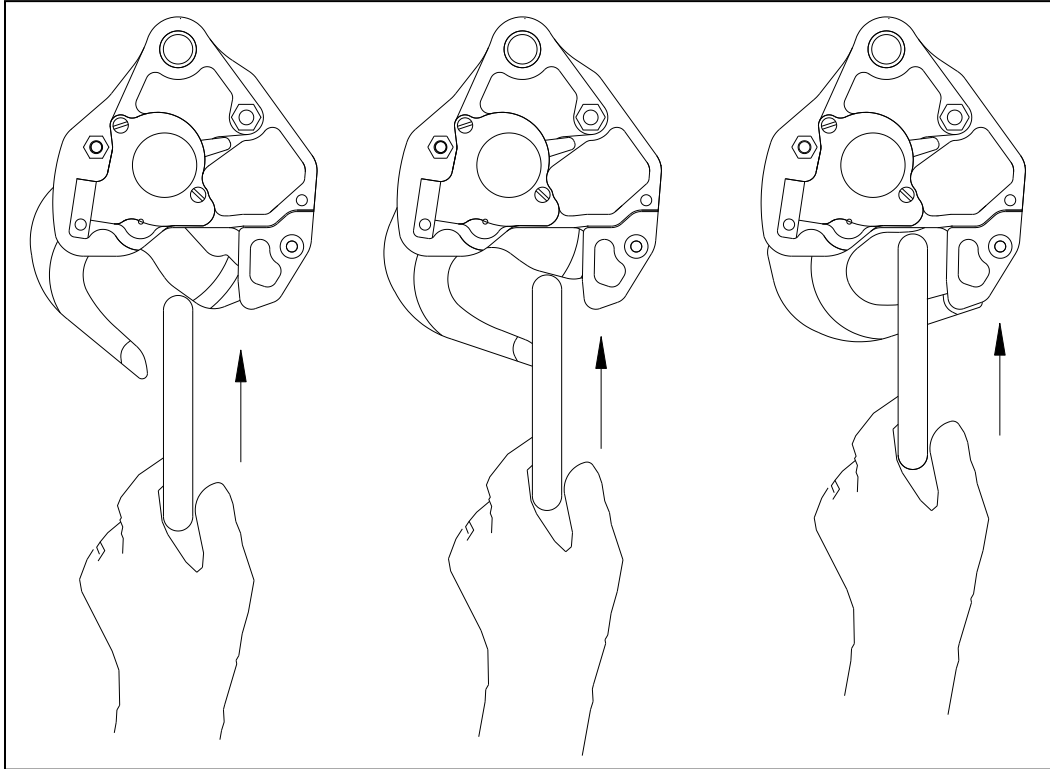
Figure 4.2 Suspension Removal



Cargo Hook Loading

The cargo hook can easily be loaded with one hand. A load is attached to the hook by pushing the ring upward against the upper portion of the load beam throat, as illustrated in Figure 4.3, until an internal latch engages the load beam and latches it in the closed position.

Figure 4.3 Cargo Hook Loading



Cargo Hook Rigging

Extreme care must be exercised when rigging a load to the Cargo Hook. Steel load rings are recommended to provide consistent release performance and resistance to fouling. The following illustration shows the recommended rigging and rigging to avoid, but is not intended to represent all rigging possibilities.



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

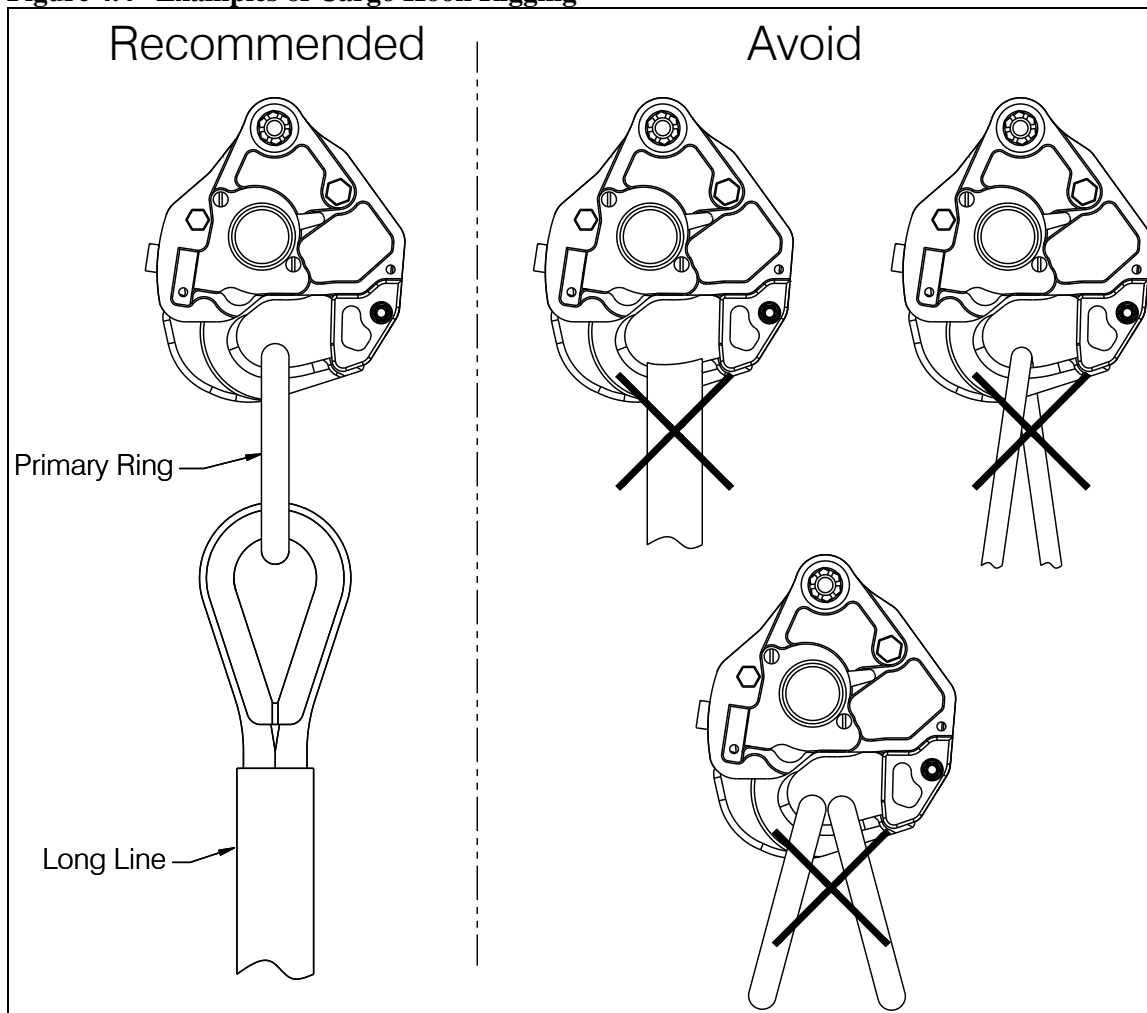
Cargo Hook Rigging, continued

Nylon Type Straps and Rope



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

Figure 4.4 Examples of Cargo Hook Rigging



Section 5

Maintenance

Refer to the Instructions for Continued Airworthiness (ICA) manual 123-017-01 for maintenance of the cargo hook suspension system. For maintenance of the cargo hook refer to Cargo Hook Service Manual 122-005-00.

Instructions for Returning Equipment to the Factory

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



An RMA number is required for all equipment returns.

- To obtain an RMA, please use one of the listed methods.
 - Contact Technical Support by phone or e-mail (Techhelp@OnboardSystems.com).
 - Generate an RMA number at our website: <http://www.onboardsystems.com/rma.php>
- After you have obtained the RMA number, please be sure to:
 - Package the component carefully to ensure safe transit.
 - Write the RMA number on the outside of the box or on the mailing label.
 - Include the RMA number and reason for the return on your purchase or work order.
 - Include your name, address, phone and fax number and email (as applicable).
 - Return the components freight, cartage, insurance and customs prepaid to:

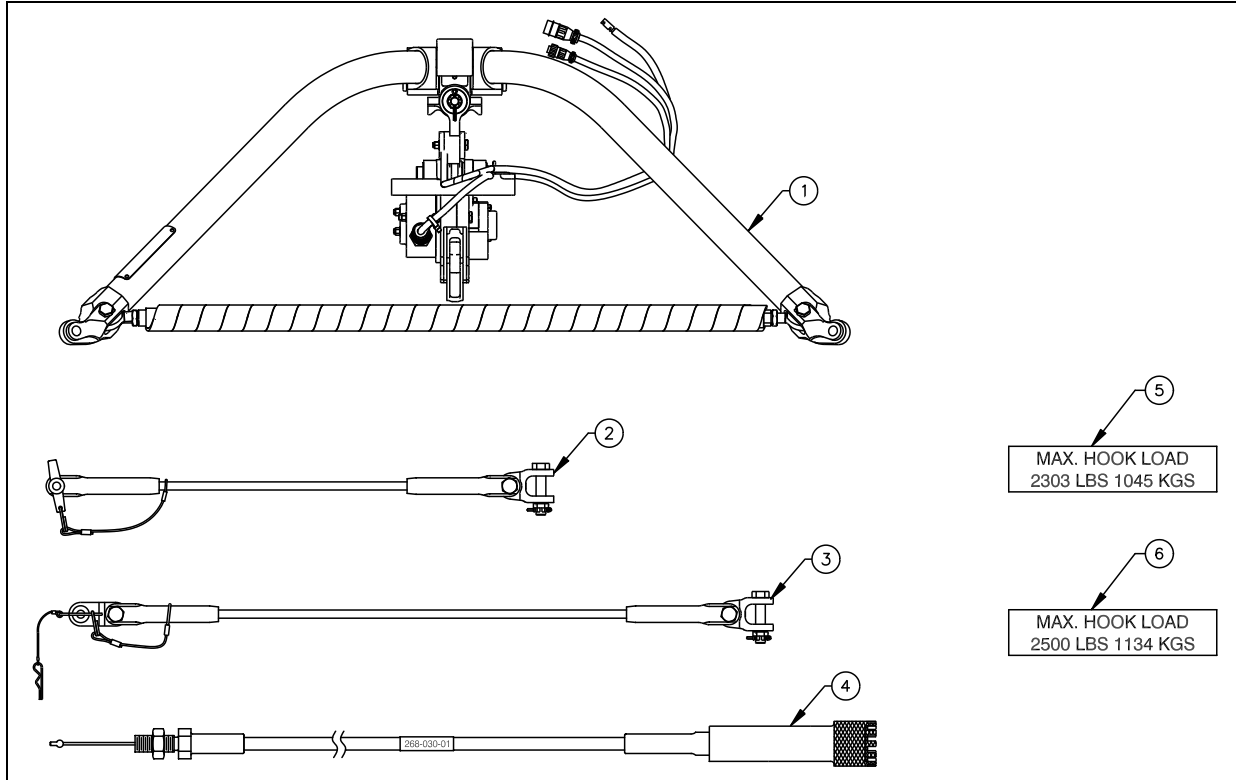
Onboard Systems
13915 NW 3rd Court
Vancouver, Washington 98685
USA
Phone: 360-546-3072

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Section 6

System Part Numbers

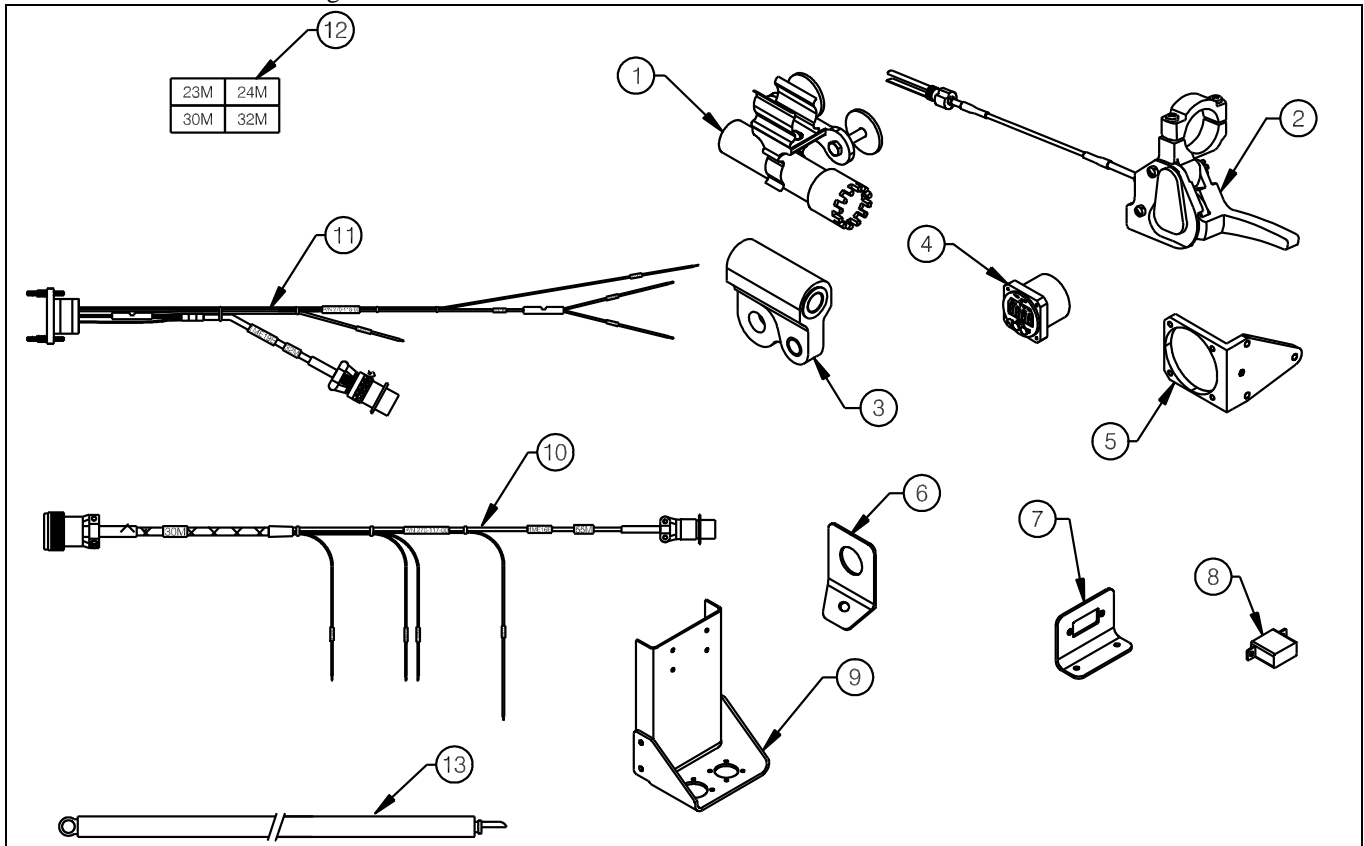
210-209-01 AS 355 Swing Removable Provisions



Item	Part Number	Description	Qty
1	232-172-01	Hook Frame Assembly	1
2	232-140-01	Forward Attach Cable Assembly	2
3	232-157-01	Aft Attach Cable Assembly	2
4	268-030-01	Manual Release Cable Assembly	1
5	215-176-00	Max Load 2303 Placard	1
6	215-178-00	Max Load 2500 Placard	1

System Part Numbers continued

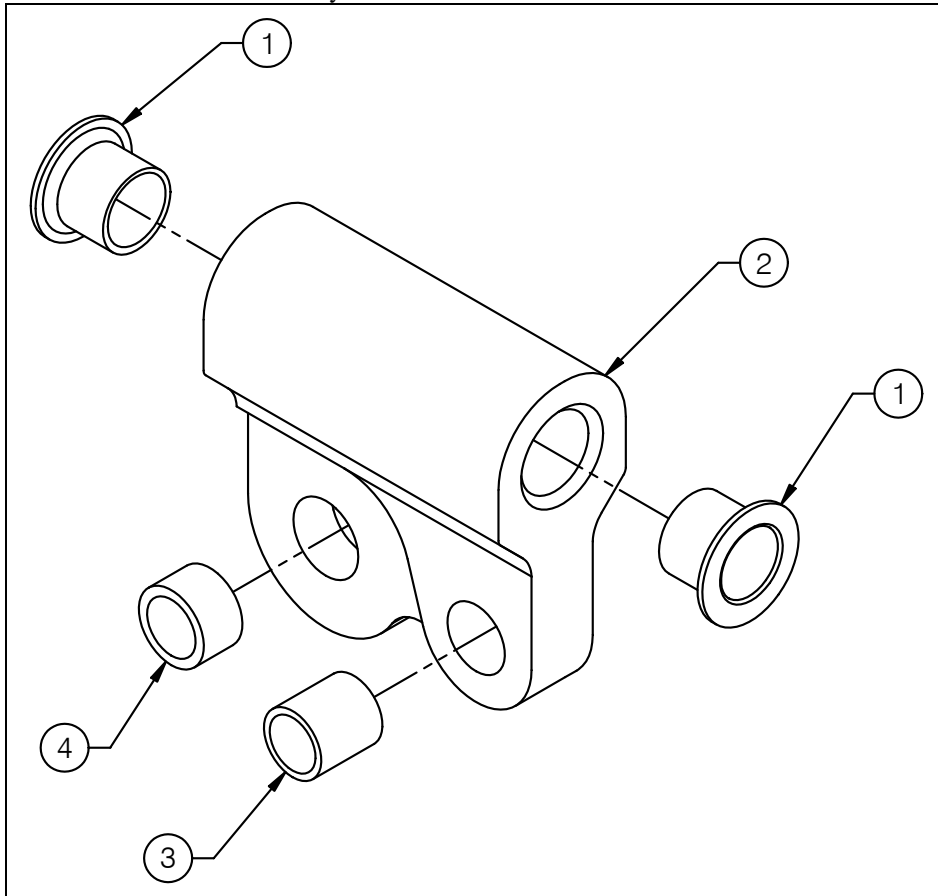
210-210-01 AS 355 Swing Fixed Provisions



Item	Part Number	Description	Qty
1	232-151-00	Quick Disconnect Support Assembly	1
2	232-187-00	Release Handle Assembly	1
3	232-137-01	Shackle Assembly	2
4	210-095-00	C-39 Indicator	1
5	290-772-00	Indicator Mount Bracket	1
6	290-780-00	Cable Attach Bracket	1
7	290-783-00	Relay Bracket	1
8	445-005-00	Relay	1
9	232-156-00	Connector Bracket Assembly	1
10	270-117-00	Load Weigh Internal Harness	1
11	270-118-00	Electrical Release Internal Harness	1
12	215-165-00	Multiple Sticker Sheet	1
13	270-125-00	Ground Strap, Fixed	1

System Part Numbers continued

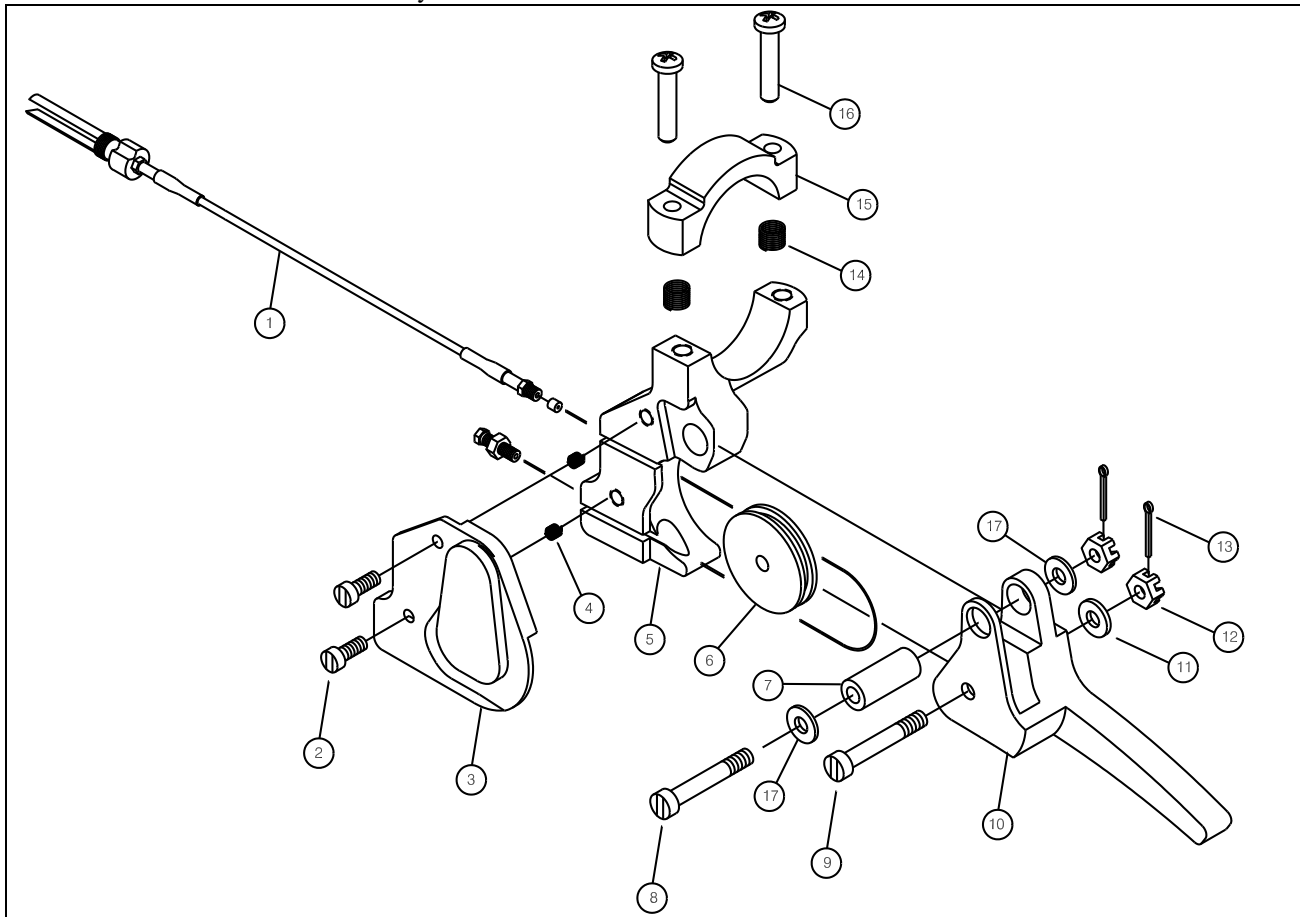
232-137-01 Shackle Assembly



Item	Part Number	Description	Qty
1	517-047-00	Bushing	2
2	290-850-00	Shackle	1
3	517-016-00	Bushing	1

System Part Numbers continued

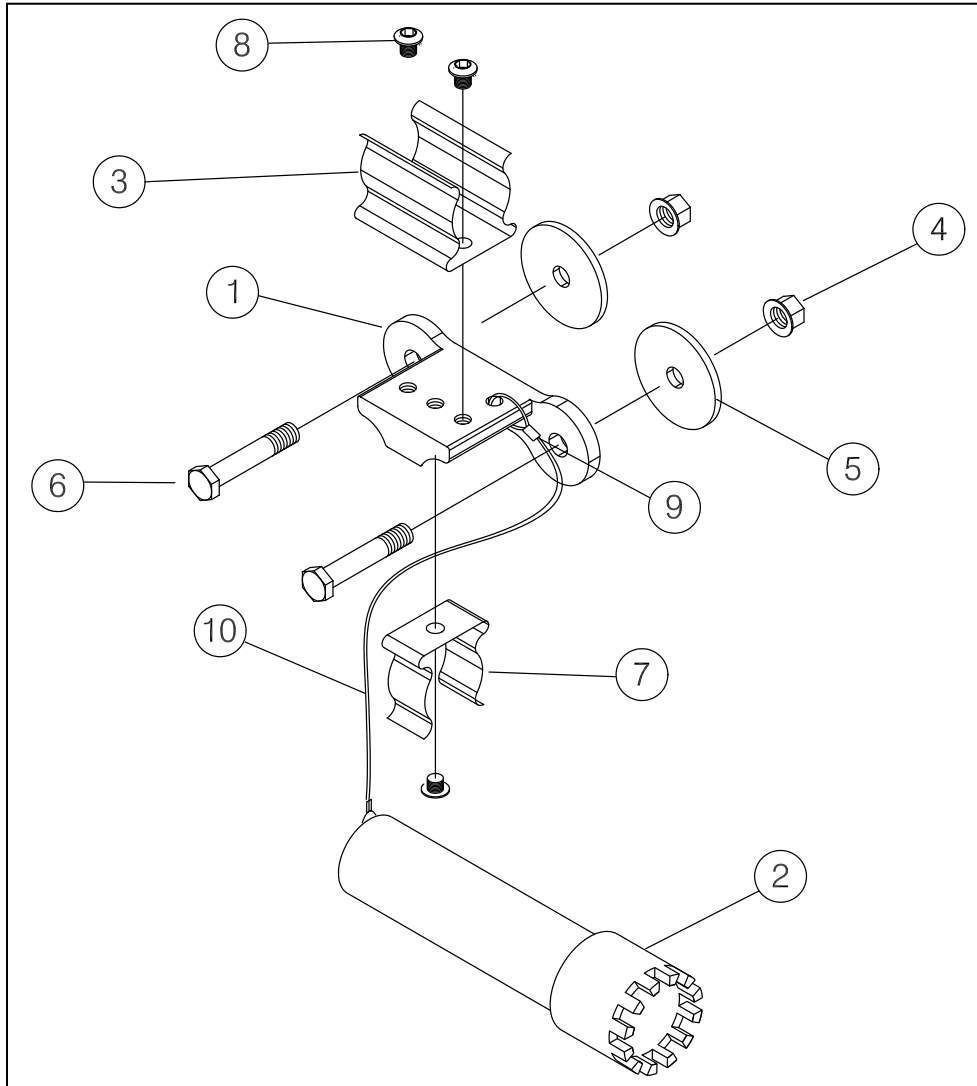
232-187-00 Release Handle Assembly



Item	Part Number	Description	Qty
1	268-025-00	Fixed Manual Release Cable	1
2	510-215-00	Cover Screws	2
3	290-757-00	Cover	1
4	510-210-00	8-32 Locking Heli-Coil	2
5	290-878-00	Lever Body	1
6	517-049-00	Pulley	1
7	290-759-00	Shaft	1
8	510-450-00	Bolt, Handle pivot	1
9	510-449-00	Bolt, Pulley Pivot	1
10	290-755-00	Handle	1
11	510-042-00	Washer	1
12	510-082-00	Nut	2
13	510-125-00	Cotter Pin	2
14	510-248-00	10-32 Heli-Coil	2
15	290-879-00	Clamp Half	1
16	510-390-00	Screw, Mounting Clamp	2
17	510-095-00	Washer	2

System Part Numbers continued

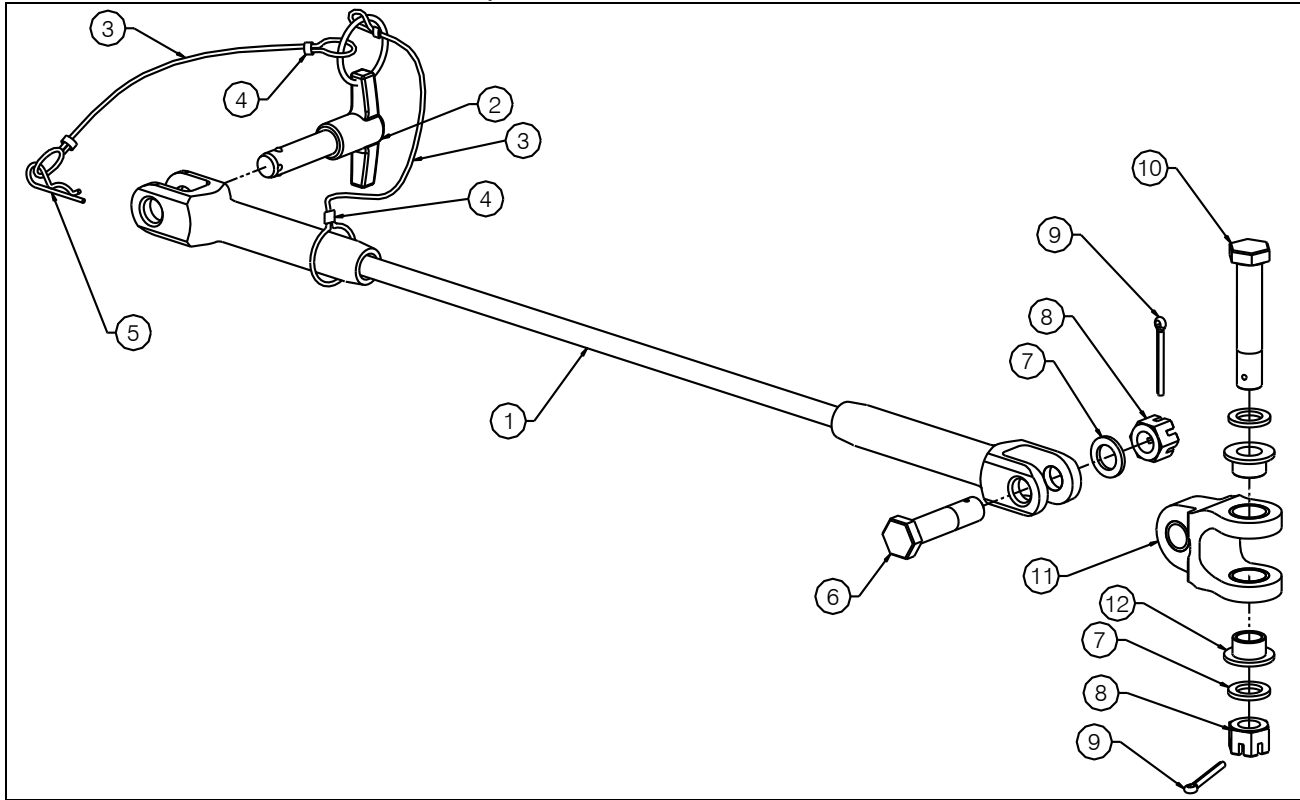
232-151-00 Quick Disconnect Support Assembly



Item	Part Number	Description	Qty
1	290-797-00	Attach Bracket	1
2	290-791-00	Release Cable Cap	1
3	514-053-00	Spring Clip	1
4	510-102-00	Nut	2
5	510-085-00	AN 970-3	2
6	510-455-00	NAS 6603-13	2
7	514-050-00	Spring Clip	1
8	510-211-00	Button Head Screw	3
9	531-016-00	Crimp Sleeve	2
10	531-015-00	Lanyard	6"

System Part Numbers continued

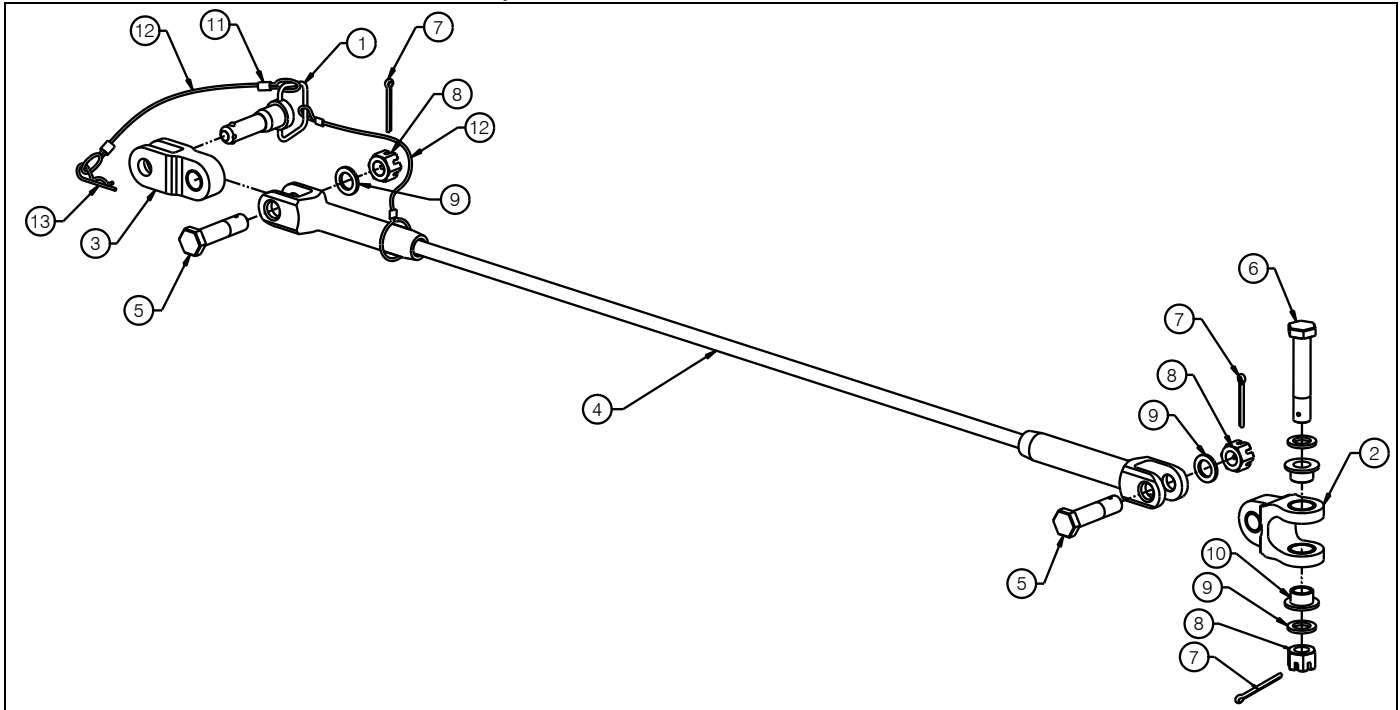
232-140-01 Forward Attach Cable Assembly



Item	Part Number	Description	Qty
1	232-177-00	Forward Attach Cable	1
2	290-851-00	Quick Release Pin	1
3	531-015-00	Lanyard Cable	2
4	531-016-00	Crimp Sleeve	2
5	510-464-00	Hitch Pin	1
6	510-438-00	Bolt	1
7	510-221-00	Washer	3
8	510-440-00	3/8" Castellated Nut	2
9	510-178-00	Cotter Pin	2
10	510-439-00	Bolt	1
11	232-142-00	Lower Attach Gimbal Assembly	1
12	290-749-00	Standoff Bushing	2

System Part Numbers continued

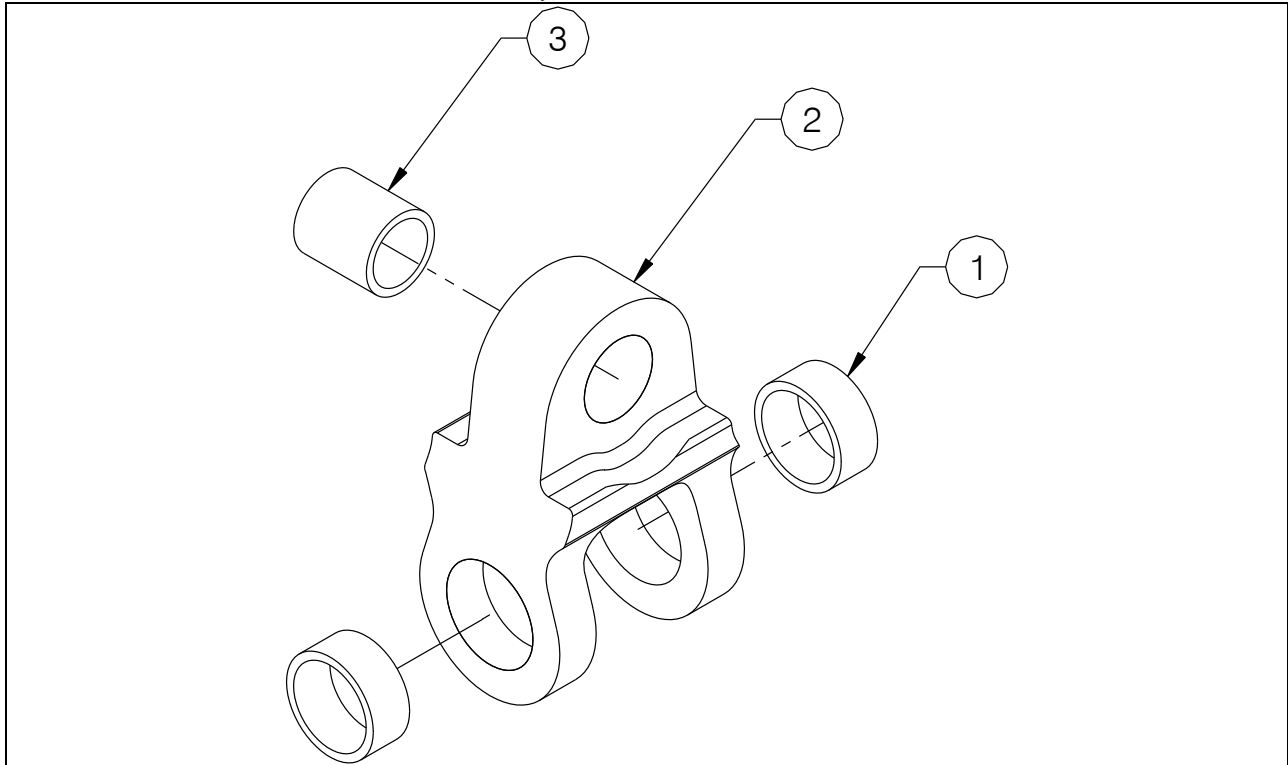
232-157-01 Aft Attach Cable Assembly



Item	Part Number	Description	Qty
1	290-784-00	Quick Release Pin	1
2	232-142-00	Lower Attach Gimbal Assembly	1
3	232-180-00	Suspension Cable Adapter Assy	1
4	232-178-00	Aft Attach Cable	1
5	510-438-00	Bolt	2
6	510-439-00	Bolt	1
7	510-178-00	Cotter Pin	3
8	510-440-00	3/8" Castellated Nut	3
9	510-221-00	Washer	4
10	290-749-00	Standoff Bushing	2
11	531-016-00	Crimp Sleeve	4
12	531-015-00	Lanyard Cable	2
13	510-464-00	Hitch Pin	1

System Part Numbers continued

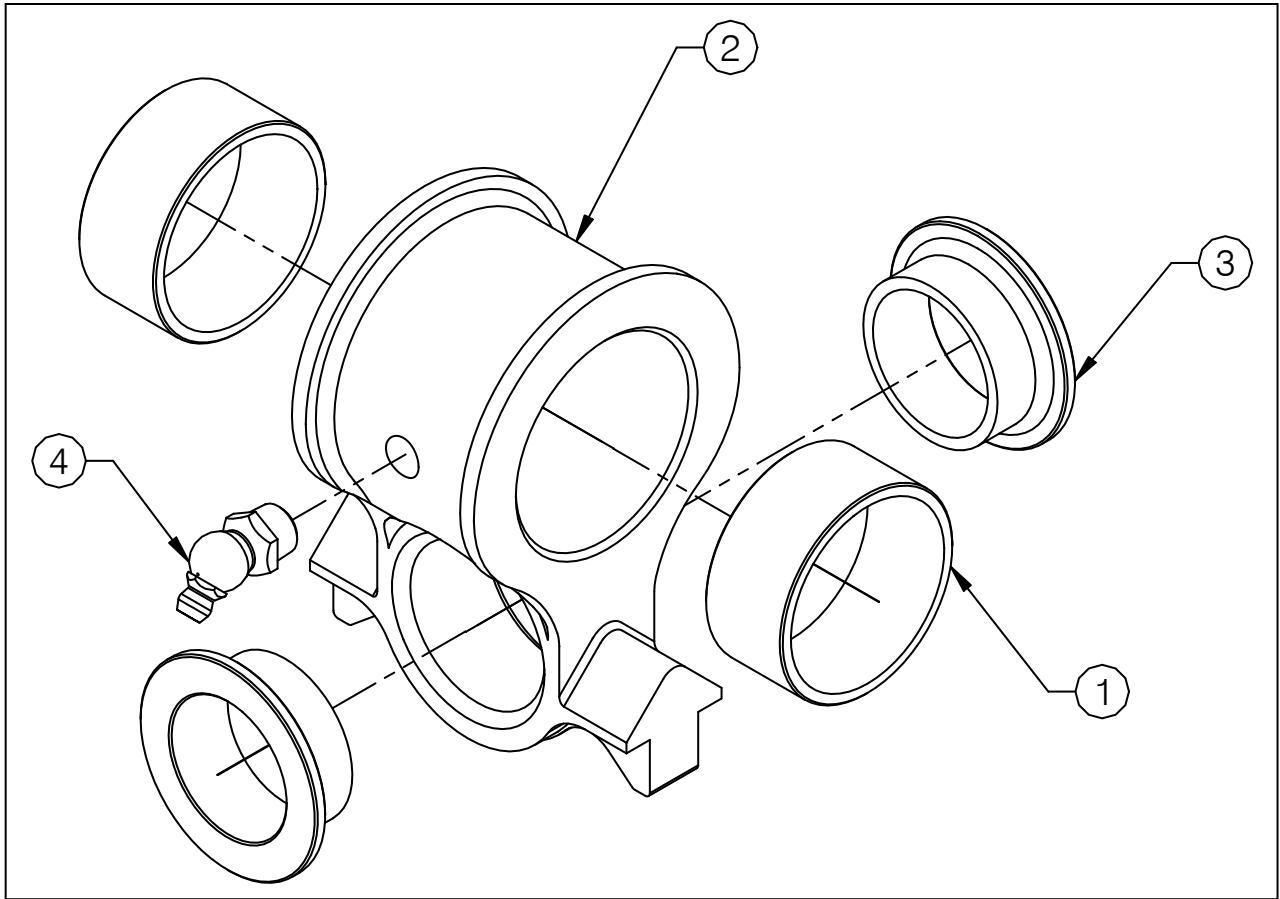
232-142-00 Lower Attach Cable Gimbal Assembly



Item	Part Number	Description	Qty
1	517-048-00	Bushing Cable gimbal lower	2
2	290-746-00	Lower Cable Gimbal	1
3	517-016-00	Bushing Cable gimbal upper	1

System Part Numbers continued

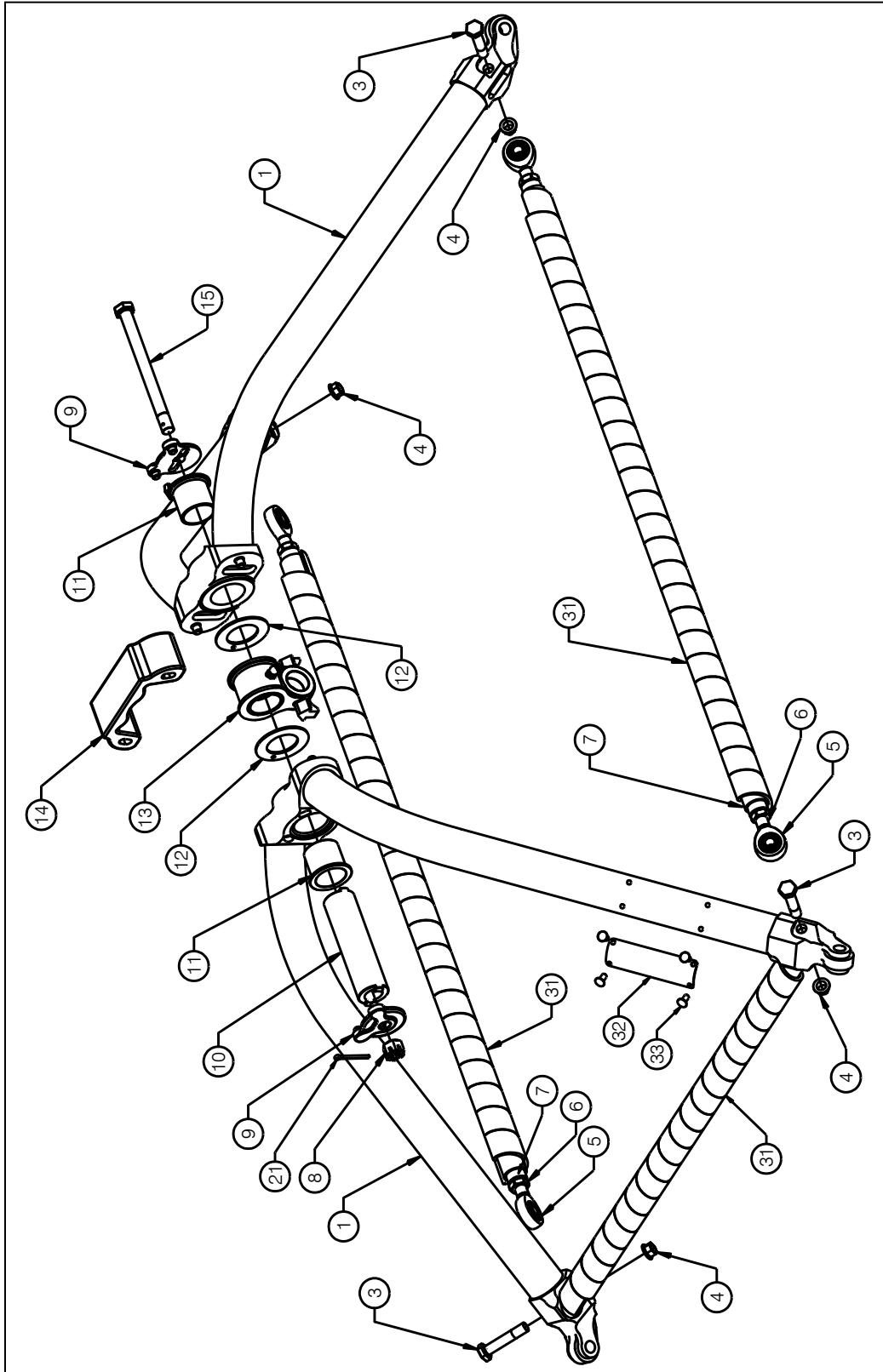
232-143-01 Loadcell Gimbal Assembly



Item	Part Number	Description	Qty
1	517-056-00	Bushing Upper Hook Gimbal	2
2	290-841-00	Gimbal Link	1
3	517-046-00	Bushing Lower Hook Gimbal	2
4	518-003-00	Grease Fitting	1

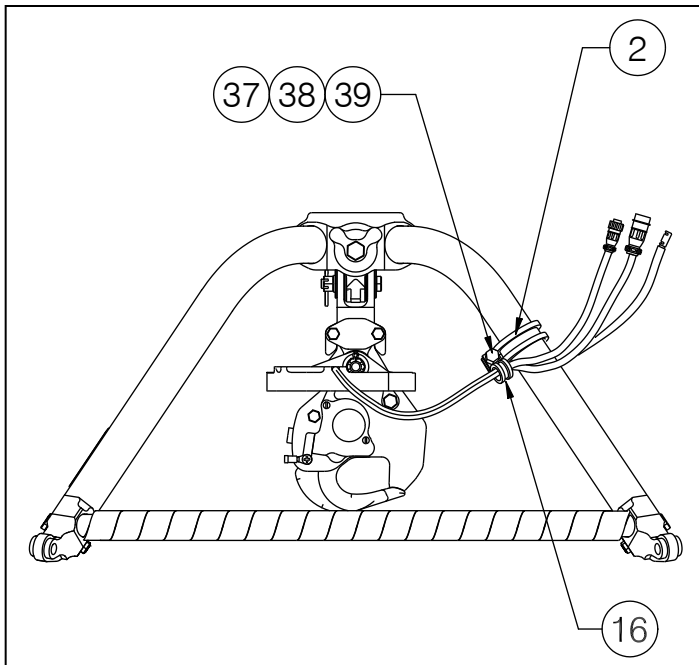
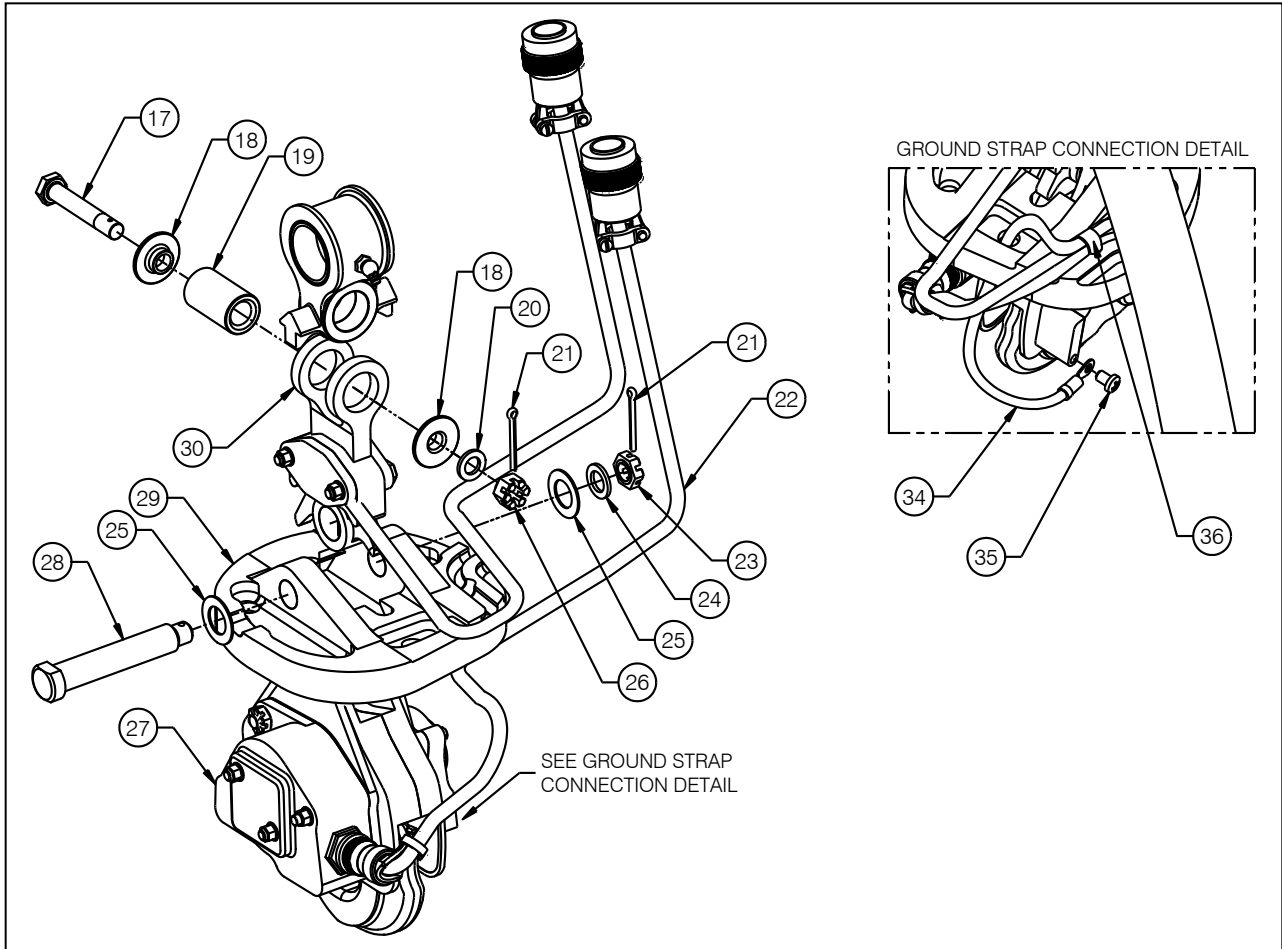
System Part Numbers continued

232-172-01 Hook-Frame Assembly



System Part Numbers continued

232-172-01 Swing Hook-Frame Assembly continued



System Part Numbers continued

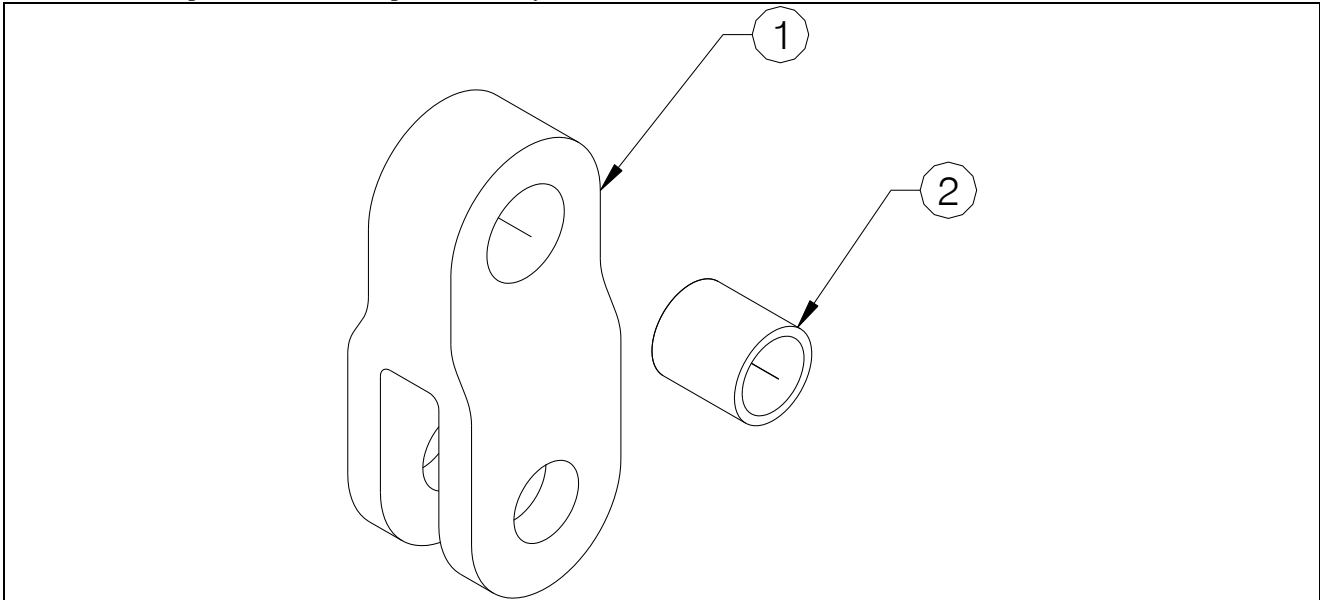
232-172-01 Swing Hook-Frame Assembly continued

Item	Part Number	Description	Qty
1	235-117-00	Swing Frame Half	2
2	512-021-00	Adel Clamp	1
3	510-762-00	Bolt	4
4	510-104-00	Nut	4
5	517-055-00	Spherical Bearing	4
6	510-510-00	Jam Nut	4
7	235-116-00	Frame Strut	2
8	510-440-00	Nut, Castellated	1
9	290-843-00	Shaft Cap	2
10	290-842-00	Shaft – Pivot	1
11	517-057-00	Bearing	2
12	517-058-00	Bearing	2
13	232-143-01	Loadcell/Gimbal Assembly	1
14	290-862-00	Bumper	1
15	510-506-00	Bolt	1
16	512-004-00	Adel Clamp	1
17	510-443-00	Bolt	1
18	290-740-00	Shaft Retaining Bushing	2
19	290-739-00	Shaft – Gimbal	1
20	510-220-00	Washer	1
21	510-178-00	Cotter Pin	3
22	270-116-00	Lower Electrical Release Cable	1
23	510-170-00	Nut	1
24	510-174-00	Washer	1
25	510-183-00	Washer	2
26	510-320-00	Nut, Castellated	1
27	528-023-01	3,500lb Keeperless Cargo Hook	1
28	290-775-00	Long Hook Attach Bolt	1
29	290-774-00	Hook Bumper	1
30	210-249-05*	AS355 Swing Loadcell Assembly	1
31	590-011-00	Plastic Tubing Wrap	129”
32	215-183-00	Serial Number Plate	1
33	510-486-00	Rivet, 1/8”	4
34	270-127-00	Ground Strap	1
35	510-391-00	Screw	1
36	512-011-00	Ty-Wrap	2
37	510-453-00	Bolt	1
38	510-102-00	Nut	1
39	510-042-00	Washer	1

* P/N 210-249-05 supersedes P/N 210-249-02 & 210-214-00. These part numbers are interchangeable.

System Part Numbers continued




232-180-00 Suspension Cable Adapter Assembly



Item	Part Number	Description	Qty
1	290-864-00	Suspension Cable Adapter	1
2	517-016-00	Bushing	1

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Section 7 Certification FAA STC

<small>United States of America</small>	
Department of Transportation - Federal Aviation Administration	
Supplemental Type Certificate	
<i>Number</i> SR01424SE	
<i>This certificate, issued to</i>	Onboard Systems International 13915 NW 3rd Court Vancouver, WA 98685
<i>certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 27 of the Federal Aviation Regulations.</i>	
<i>Original Product—Type Certificate Number:</i>	H11EU
<i>Make:</i>	Airbus Helicopters
<i>Model:</i>	AS355E, AS355F, AS355F1, AS355F2, AS355N, and AS355NP
<i>Description of the Type Design Change:</i> Fabrication of Onboard Systems Model 200-292-01 Cargo Hook Kit and Model 200-292-02 Cargo Hook Kit in accordance with Onboard Systems Master Drawing List No. 155-104-00, Revision 16, dated April 9, 2014, or later FAA-approved revision; and installation of the Model 200-292-01 cargo hook kit in accordance with Onboard Systems Owner's Manual No. 120-112-01, Revision 6, dated January 21, 2011, or later FAA-approved revision.	
(See Continuation Sheet Page 3 of 3 Pages)	
<i>Limitations and Conditions:</i> Approval of this change in type design applies to only those Airbus Helicopters models listed above. This approval should not be extended to helicopters of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that helicopter.	
Rotorcraft modified in accordance with this STC must be operated in accordance with a copy of the FAA-approved Rotorcraft Flight Manual Supplement (RFMS), Onboard Systems Document No. 121-019-01, Revision 1, dated July 23, 2008, or later FAA-approved revision for the 200-292-01 cargo hook kit.	
(See Continuation Sheet Page 3 of 3 Pages)	
<i>This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.</i>	
<i>Date of application:</i>	<i>Date received:</i>
<i>Date of issuance:</i> June 18, 2004	<i>Date amended:</i> 11/29/04; 7/24/08; 4/29/14
	<i>By direction of the Administrator</i>  <small>(Signature)</small>
	 Manager, Seattle Aircraft Certification Office <small>(Title)</small>
<hr/> <i>Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.</i>	
<i>This certificate may be transferred in accordance with FAR 21.47.</i>	
<small>FAA FORM 8110-2 (10-68)</small>	<small>PAGE 1 OF 3 PAGES</small>

United States of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number SR01424SE

Onboard Systems International

Issued: June 8, 2004

Reissued:

Amended: 11/29/04; 7/24/08; 4/29/14

Description of the Type Design Change continued: The 200-292-01 cargo hook kit must be inspected and maintained in accordance with section 5 of Onboard Systems Instructions for Continued Airworthiness (ICA) Document 123-017-01, Revision 7, dated May 7, 2012, or later FAA-accepted revision, and Onboard Systems Cargo Hook Component Maintenance Manual 122-005-00, Revision 26, dated March 26, 2013, or later FAA-accepted revision.

Installation of the Model 200-292-02 cargo hook kit in accordance with Onboard Systems Owner's Manual No. 120-112-02, Revision 0, dated April 9, 2014, or later FAA-approved revision. The 200-292-02 cargo hook kit must be inspected and maintained in accordance with section 5 of Onboard Systems ICA, Document 123-017-02, Revision 0, dated April 9, 2014, or later FAA-accepted revision, and Onboard Systems Cargo Hook Component Maintenance Manual 122-017-00, Revision 17, dated July 31, 2012, or later FAA-accepted revision.

Limitations and Conditions continued: Rotorcraft modified in accordance with this STC must be operated in accordance with a copy of the FAA-approved RFMS, Onboard Systems RFMS Document No. 121-019-02, Revision 0, dated April 24, 2014, or later FAA-approved revision for the 200-292-02 cargo hook kit .

A copy of this certificate, applicable Owner's Manual, ICA, Component Maintenance Manual, and a copy of the FAA-approved RFMS must be maintained as part of the permanent records of the modified helicopter.

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

- END -

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

This certificate may be transferred in accordance with FAR 21.47.

Canadian Approval



Transport
Canada

Transports
Canada

Civil Aviation

Aviation Civile

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

Your file *Votre référence*

Our file *Notre référence*

RDIMS 4375005

Sep 11, 2008

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

Subject: Acceptance of Foreign STC SR01424SE amended July 24, 2008

Dear Mr. Hanson,

This is in response to FAA letter-dated 2008/08/20, requesting Transport Canada approval of the subject STC.

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

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

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

Yours truly,

Paul Arnell
For Regional Manager
Aircraft Certification

Cc. Seattle Aircraft Certification Office


Canada

1/1



European Aviation Safety Agency

SUPPLEMENTAL TYPE CERTIFICATE

10016706, REV. 1

This Supplemental Type Certificate is issued by EASA, acting in accordance with Regulation (EC) No. 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation and in accordance with Commission Regulation (EC) No. 1702/2003 to

**ONBOARD SYSTEMS INT.
13915 NW 3rd COURT
VANCOUVER WA 98685
USA**

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

Original Product TC Number: EASA.R.146
TC Holder: EUROCOPTER
Model: AS355 E, AS355 F, AS355 F1,
Model: AS355 F2, AS355 N, AS355 NP
Original STC Number: FAA STC NO SR01424SE

EASA Certification Basis:

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

Description of Design Change:

Cargo Hook Kit model 200-292-01

Associated Technical Documentation:

155-104-00 revision 11 dated 9 April 2010 - Master Drawing List;
120-112-01 revision 4 dated 28 May 2010 - Owners Manual;
123-017-01 revision 4 dated 28 May 2010 - Instructions for Continued Airworthiness;
122-005-00 revision 17 dated 9 March 2010 - Cargo Hook Service Manual;
121-019-01 revision 1 dated 23 July 2008 - flight manual supplement.

Limitations:

None See Continuation Sheet(s)

For the European Aviation Safety Agency,

Date of issue: 21.07.2010


Massimo MAZZOLETTI
Certification Manager
Rotorcraft, Balloons, Airships

Note:
The following numbers are listed on the certificate:
EASA old Project Number: EASA.IM.R.S.00457, REV. 1

SUPPLEMENTAL TYPE CERTIFICATE - 10016706, REV. 1 - ONBOARD SYSTEMS INT.

EASA Form 91, Issue 3 - 11/11/2009



European Aviation Safety Agency

Conditions:

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

This Certificate shall remain valid unless otherwise surrendered or revoked.

- end -

Note:
The following numbers are listed on the certificate:
EASA old Project Number: EASA.IM.R.S.00457, REV. 1

SUPPLEMENTAL TYPE CERTIFICATE - 10016706, REV. 1 - ONBOARD SYSTEMS INT.

EASA Form 91, Issue 3 - 11/11/2009



香港特別行政區政府
民航處

Civil Aviation Department

The Government of the Hong Kong Special Administrative Region

SUPPLEMENTAL TYPE CERTIFICATE

STC-2012-29

This Supplemental Type Certificate is issued by the Civil Aviation Department in accordance with Hong Kong Aviation Requirements, HKAR-21 to

Onboard Systems International
13915 NW 3rd Court
Vancouver, WA 98685
United States

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

Hong Kong TC Number :	HK 13
Original Product TC Number :	EASA.R.146
TC Holder :	Eurocopter
Model :	AS 355N

Basis of Certification:

As recorded on FAA STC No. SR01424SE dated 24 July 2008.
The Certification Basis for the original product remains applicable to this approval.

Description of Design Change:


Fabrication and Installation of Onboard Systems Model 200-292-01 Cargo Hook Kit.
Reference: FAA STC No. SR01424SE dated 24 July 2008.

Date of issue: 2 November 2012

Date of re-issue: N/A

- See Continuation Page 2 -

Signed


Eric CHEUNG
Senior Airworthiness Officer (Certification)
for Director-General of Civil Aviation

Supplemental Type Certificate STC-2012-29 – Onboard Systems International

CAD Form 91
DCA 541 (08/2011)

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Hong Kong STC continued

Associated Technical Documentation:

1. Onboard Systems Master Drawing List 155-104-00, Revision 14, dated 6 February 2012*.
2. Onboard Systems Instructions for Continued Airworthiness (ICA) document 123-017-01, Revision 7, dated 7 May 2012*.
3. Onboard Systems Rotorcraft Flight Manual Supplement (RFMS), Document number 121-019-01, Revision 1, dated 23 July 2008*.
4. Onboard Systems Owners Manual No. 120-112-01, Revision 6, dated 21 January 2011*.
5. Onboard Systems Cargo Hook service Manual 122-005-00, Revision 23, dated 12 March 2012*.

* or later FAA approved revision

Limitations:

1. Approval of this change in type design applies to only AS 355N model rotorcraft listed.

Conditions:

1. This approval should not be extended to helicopter of AS 355N model on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in type design will introduce no adverse effect upon the airworthiness of that helicopter.
2. If the holder agrees to permit another person to use this certificate to alter a product, the holder shall give the other person written evidence of that permission.

This certificate shall remain valid unless otherwise revoked.

END



Eric CHEUNG