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# *Owner's Manual*

*For the*

# *Cargo Hook Swing Suspension System*

*On the*

# *Airbus Helicopters AS350 Series*

## *System Part Number 200-280-04*

## *STC SR01164SE*

*Owner's Manual Number 120-104-03*
*Revision 10*
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# Record of Revisions

| *Revision* | *Date* | *Page(s)* | *Reason for Revision* |
|---|---|---|---|
| 3 | 03/15/11 | 1-3 to 1-6 & 2-5 | Updated Bill Of Materials to include corrected quantities of P/N 510-102-00, 510-085-00 & 510-455-00. Added fuel drain guard items to Bill of Materials. Updated figure 2.2.6 to show correct P/N 510-454-00 to 510-085-00. |
| 4 | 03/21/11 | 6-10 & 6-12 | Added Fuel Drain Warning Placard to System Parts Numbers section under swing hook/frame assembly. |
| 5 | 05/02/11 | 1-4 | Added Half Clamp Pad (EC P/N 350A-41-1099-20) to the table of Eurocopter required part numbers. |
| 6 | 09/09/11 | 1-5, 2-13, 2-14 | Updated electrical system interface information to include Eurocopter mod. # 073475. |
| 7 | 02/19/13 | 1-5, 2-13, 2-14 | Updated electrical schematic to reflect a/c side wiring interface of post mods 07-4280 and 07-3450. Added note regarding post-mod. 07-4280. |
| 8 | 05/09/14 | Title, 1-1, 1-4, 1-5, Section 2, 4-4, 6-12 | Updated Eurocopter to Airbus Helicopters. Replaced load cell P/N 210-249-00 with P/N 210-249-03. Replaced fuel drain guard P/N 290-889-00 with 290-889-01. Updated Figure 4.5. Added note regarding contact P/N 410-194-00 (on page 1-5). |
| 9 | 02/01/16 | 2-15, 2-21, 3-1 | Removed C-39 load weigh indicator operation instructions and replaced with reference to 120-039-00. Added tightening instructions for hardware for attaching cable assemblies to swing frame. Added fuel tank P/N 350A55-1015-0252 as eligible P/N for fuel drain guard. |
| 10 | 07/27/16 | 1-4, 2-9, 2-12, 2-16 | Listed bracket P/N 235-274-00 and added associated installation instructions for it. |

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# *Section 1*
# General Information

## Introduction

The P/N 200-280-04 Cargo Hook Swing Suspension System kit consists of fixed provisions (P/N 210-202-01) and removable provisions (P/N 210-201-03). The fixed provisions are permanently installed on the aircraft while the removable provisions are easily removed when not required on the helicopter's mission.

These kits are approved for installation on Airbus Helicopters AS350B, AS350BA, AS350D, AS350B1, AS350B2, and AS350B3 helicopters.

## Safety Labels

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


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


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


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


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


Used to address practices not related to personal injury.

# Specifications

**Table 1.1 Suspension System Specifications**

| | |
|---|---|
| Design load | 3,086 lbs. (1,400 kg.) |
| Design ultimate strength | 11,574 lbs. (5,250 kg.) |
| Unit weight - Fixed Provisions | 5 lbs. (2.3 kg.) |
| Unit weight - Removable Provisions | 30 lbs. (13.6 kg.) |

**Table 1.2 P/N 528-029-00 Cargo Hook Specifications**

| | |
|---|---|
| Design load | 3,600 lbs. (1,633 kg.) |
| Design ultimate strength | 13,500 lbs. (6,123 kg.) |
| Electrical release capacity | 9,000 lbs. (4,082 kg.) |
| Mechanical release capacity | 9,000 lbs. (4,082 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.*

# 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 200-280-04 Swing Suspension System, the 210-202-01 fixed provisions kit, and the 210-201-03 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 200-280-04 Qty | Fixed Kit 210-202-01 Qty | Removable Kit 210-201-03 Qty |
|---|---|---|---|---|
| 120-104-03 | Owner's Manual | 1 | 1 | 1 |
| 121-012-03 | RFMS | 1 | 1 | 1 |
| 122-017-00 | Cargo Hook Service Manual | 1 | - | 1 |
| 123-011-03 | ICA | 1 | 1 | 1 |
| 210-095-00 | C-39 Indicator | 1 | 1 | - |
| 210-095-04* | C-39 Indicator, NVG Lights | 1 | 1 | - |
| 215-165-00 | AS350 Multiple Decal Sheet | 1 | 1 | - |
| 215-166-00 | Max Hook Load 3086 Decal | 1 | - | 1 |
| 215-168-00 | Max Hook Load 2557 Decal | 1 | - | 1 |
| 232-137-01 | Shackle Assembly | 4 | 4 | - |
| 232-140-01 | Forward Attach Cable Assembly | 2 | - | 2 |
| 232-141-01 | Aft Attach Cable Assembly | 2 | - | 2 |
| 232-145-03 | Hook-Frame Assembly | 1 | - | 1 |
| 232-150-00 | Release Handle Assembly | 1 | 1 | - |
| 232-151-00 | Quick Disconnect Assembly | 1 | 1 | - |
| 268-024-02 | Manual Release Cable Assembly | 1 | - | 1 |
| 270-106-02 | LW Internal Harness | 1 | 1 | - |
| 270-108-00 | 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 | - |
| 290-782-00** | Connector Bracket | 1 | 1 | - |
| 290-783-00 | Relay Bracket | 1 | 1 | - |
| 290-888-00 | Retainer | 1 | 1 | - |
| 290-889-01 | Guard | 1 | 1 | - |
| 290-893-00 | Bracket | 1 | 1 | - |
| 445-005-00 | Relay | 1 | 1 | - |
| 500-065-00 | Grommet Edging | 1 | 1 | - |
| 510-029-00 | Nut | 8 | 8 | - |
| 510-042-00 | Washer | 2 | 2 | - |
| 510-062-00 | Washer | 8 | 8 | - |
| 510-085-00 | Washer | 4 | 4 | - |
| 510-095-00 | Washer | 3 | 3 | - |
| 510-102-00 | Nut | 6 | 6 | - |
| 510-277-00 | Screw | 2 | 2 | - |
| 510-278-00 | Washer | 2 | 2 | - |
| 510-279-00 | Nut | 2 | 2 | - |
| 510-453-00 | Bolt | 2 | 2 | - |
| 510-455-00 | Bolt | 4 | 4 | - |

# Bill of Materials continued

**Table 1.3 Onboard Systems Bill of Materials (Continued)**

| Part Number | Description | Total Kit 200-280-04 Qty | Fixed Kit 210-202-01 Qty | Removable Kit 210-201-03 Qty |
|---|---|---|---|---|
| 510-457-00 | Screw | 4 | 4 | - |
| 510-475-00 | Screw | 3 | 3 | - |
| 510-481-00** | Screw | 8 | 8 | - |
| 510-526-00 | Cotter Pin | 2 | 2 | - |
| 512-024-00 | Loop Clamp | 2 | 2 | - |
| 610-024-00 | Fuel Valve Seal | 1 | 1 | - |

** The 210-095-04 Indicator is equipped with NVG compatible lights. It is an optional indicator that can be ordered in place of the 210-095-00 Indicator.*

*** If the Airbus Helicopters crash resistant fuel tank is installed, Connector Bracket P/N 235-274-00 and eight (8) of screw P/N 510-672-00 are needed to complete the installation in place of Connector Bracket P/N 290-782-00 and screw P/N 510-481-00.*

The following is needed for installation of the fuel drain guard and is not included with the kit and should be obtained before installation is begun.

**Table 1.4 Needed Supplies**

| Part Number | Description | Quantity |
|---|---|---|
| PR1422-B | Sealant | AR |

To complete the cargo hook installation the following Airbus Helicopters parts may be necessary to obtain (these parts are frequently found to be on the aircraft from the factory or are standard Airbus Helicopters parts).

**NOTICE**

*These items may or may not be installed with a standard aircraft, therefore verification is recommended before purchasing them.*

**Table 1.5 Airbus Helicopters Part Numbers**

| Airbus Helicopters P/N | Description | Quantity |
|---|---|---|
| 22201BE120074L | Screw | 4 |
| 23111AG120LE | Washer | 8 |
| ASN52320BH120N | Nut | 4 |
| DHS751-160.62 | Grommet | 1 |
| SL211M5-1 | Nut | 3 |
| A3125-2 H179 | Quick Disconnect Clamp | 2 |
| 350A-41-1097-20 | Half Clamp, Rear | 2 |
| 350A-41-1099-20 | Half Clamp Pad | 2 |
| 350A86-0020-33 | Bracket | 1 |
| ASNA0078A403 | Rivet | 3 |

The cargo hook electrical system interfaces with the aircraft's electrical panel. Earlier versions (pre-mod. #07-3274) of the AS350 utilize a fuse type switch panel. The following electrical panel components for these versions are typically found to be on the aircraft, but may be necessary to obtain.

# Bill of Materials continued

**Table 1.6 Airbus Helicopters Electrical Parts – Pre-mod. #07-3274**

| Airbus Helicopters P/N | Description | Qty |
|---|---|---|
| DHS775-160-42 | Indicator Light Body | 1 |
| DHS775-240-22 | Indicator Light | 1 |
| EN2240-6839 | Lamp | 4 |
| DI-2-5* | Fuse 2.5A | 1 |
| DA8-16A* | Fuse 16A | 1 |

AS350B2 and B3 aircraft with modification #07-3274 incorporated utilize a circuit breaker type switch panel. The following electrical panel components for these versions are typically found to be on the aircraft, but may be necessary to obtain.

**Table 1.7 Airbus Helicopters Electrical Parts – with Mod. #07-3274**

| Airbus Helicopters P/N | Description | Qty |
|---|---|---|
| 045004A127A | Cargo Hook Sling Switch | 1 |
| ECS0744A02A5 | Circuit Breaker 2.5A | 1 |
| ECS0744B15A0 | Circuit Breaker 15A | 1 |

AS350B2 and B3 aircraft with modification #07-3475 (introduced by Airbus Helicopters Service Bulletin No. AS350-25.01.09) incorporate a 10 amp circuit breaker installed in the 44 ALPHA panel rather than the 15 amp circuit breaker listed in Table 1.7. This 10 amp circuit breaker (P/N EN2495-10AM) may be necessary to obtain.

For AS350 B2 and B3 aircraft post-mod 07-4280 refer to the Airbus Helicopters IPC for Sling switch and circuit breaker P/Ns.

For early B2 models with a Honeywell switch panel, to connect the electrical harnesses to the switch panel it will be necessary to obtain two IDC contacts that are not supplied with the kit (Amp P/N 640632-3, Onboard Systems P/N 410-194-00).

# Theory of Operation

The 200-280-04 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 to the RH door pillar 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.

The Cargo Hook Swing Suspension Kit includes a fuel drain guard. The fuel drain guard protects the fuel drain valve on the helicopter from accidentally being opened or damaged by the cargo swing. The fuel drain valve is located on the bottom of the fuel tank and extends below the belly skin of the helicopter. In this position it is vulnerable to damage or uncommanded opening. The most common occurrence of the cargo hook swing suspension striking the fuel drain valve happens when the helicopter lands on snow or on uneven terrain. The swing has limited ground clearance and when the skid gear sinks into the snow, the swing suspension is pushed upward into the fuel drain valve, opening it and causing fuel to drain. The fuel drain valve can also be opened in flight by the swing suspension flying vertically due to aerodynamics when ferrying with no load or from recoil effects from releasing large cargo hook loads.

# *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.

## 2.1 Shackle Assembly Installation

Airbus Helicopters landing gear fittings (P/N 350A41-1097-20) are standard on B3 and optional on earlier models. If not present, install per Airbus Helicopters modification 07-2772.

Attach the four Shackle Assemblies (P/N 232-137-01) to the helicopter landing gear fittings with hardware as illustrated in Figure 2.1.1 (Airbus Helicopters part numbers are shown in italics) except at the RH forward hard point install an Attachment Bracket at the inboard side as illustrated in Figure 2.1.2. Note the orientation of the Shackle Assembly. Torque the nuts to 100-130 in-lbs.

At the Attachment Bracket fasten a Loop 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 Shackle Assembly Installation**

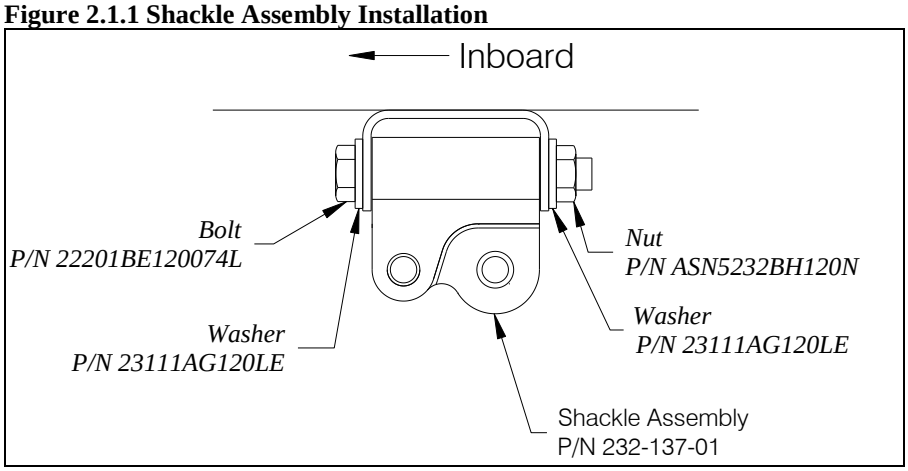
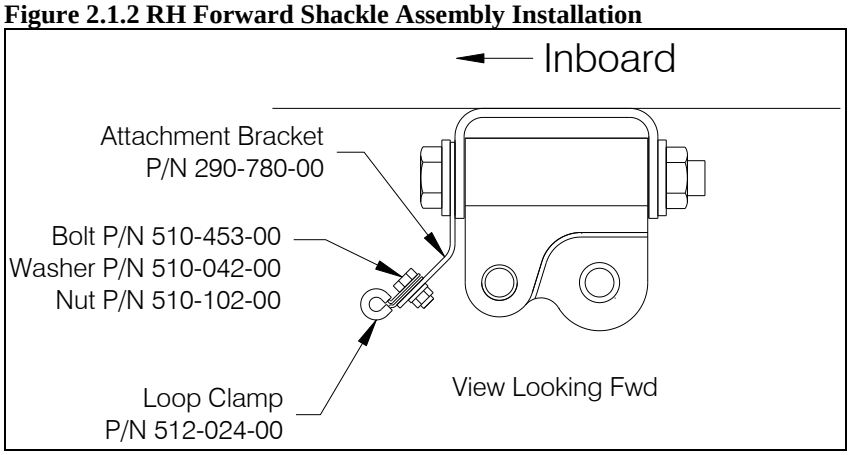



**Figure 2.1.2 RH Forward Shackle Assembly Installation**

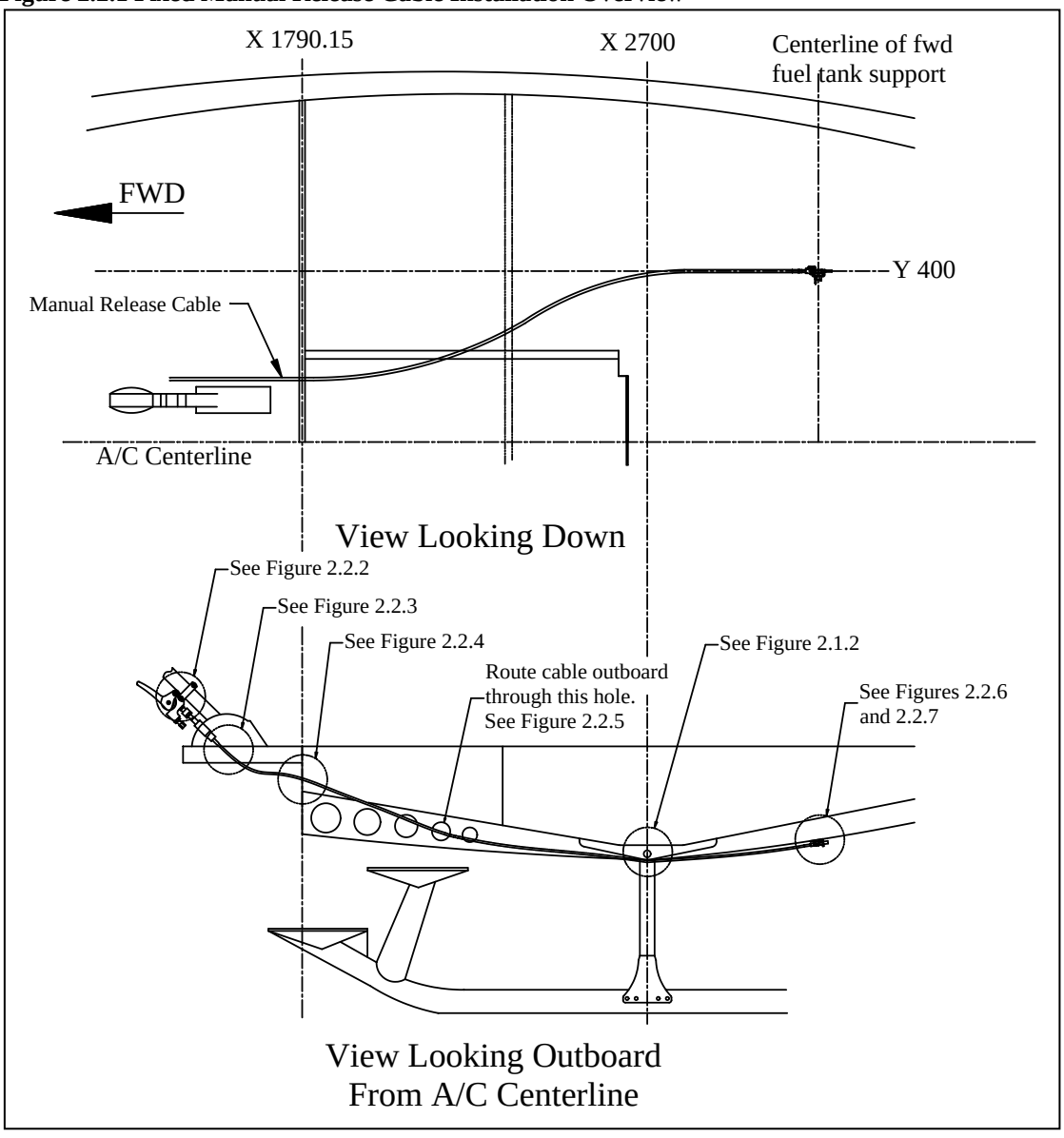


## 2.2 Fixed Manual Release Cable Assembly Installation

Remove the lower fairings on the helicopter in order to obtain access to cable routing areas.

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 fairing, at the centerline of the forward fuel tank support frame (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.

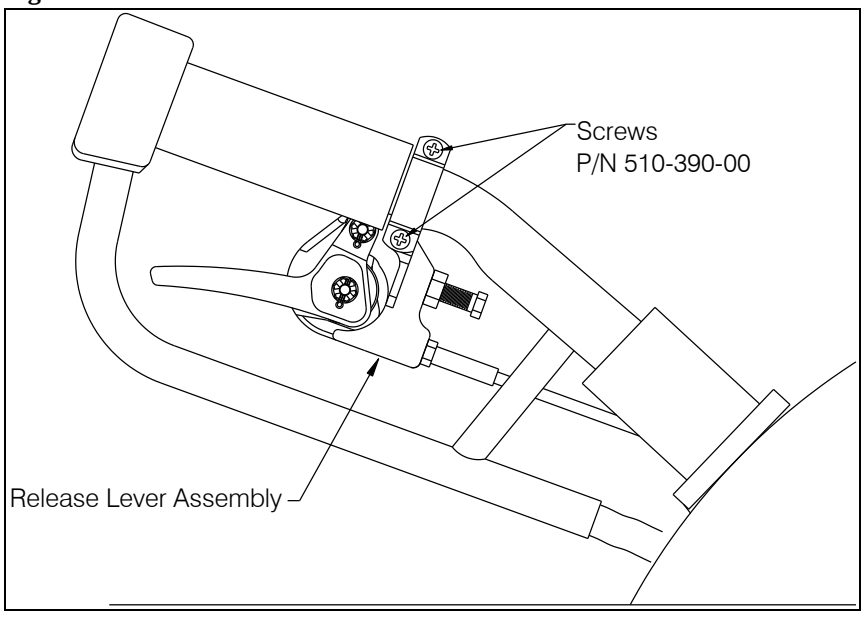
**Figure 2.2.1 Fixed Manual Release Cable Installation Overview**



## 2.2 Fixed Manual Release Cable Assembly Installation continued

- Mount the manual release lever (assembly P/N 232-150-00) to the collective stick with the Clamp Half (P/N 290-753-00) and two screws (P/N 510-390-00) provided pre-assembled on the release lever assembly, as illustrated below.

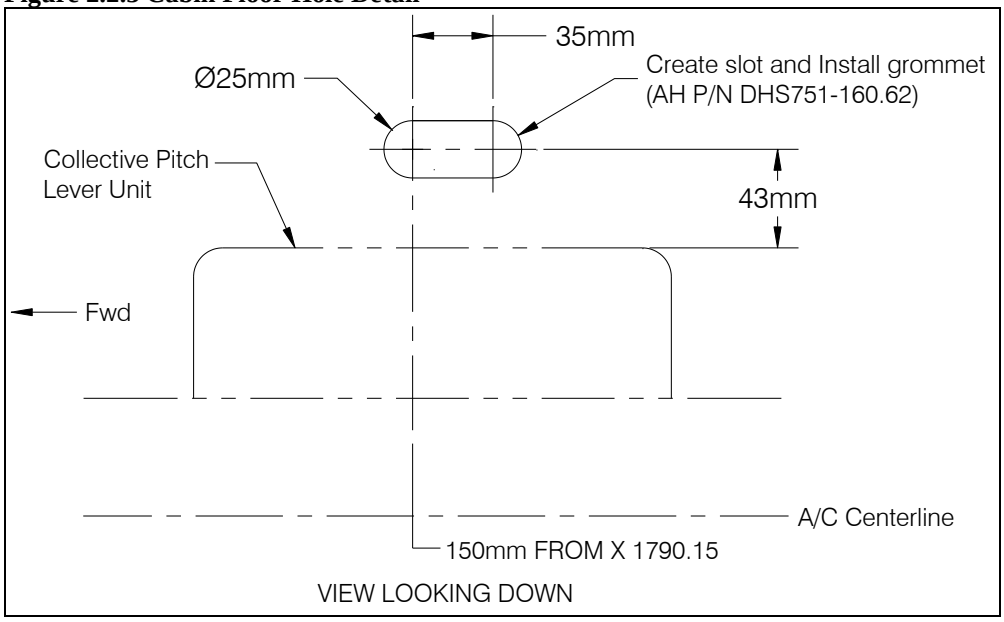
**Figure 2.2.2 Manual Release Lever Installation**




- 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 the 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 X1790.15 (see below) and install the grommet (Airbus Helicopters P/N DG-38).

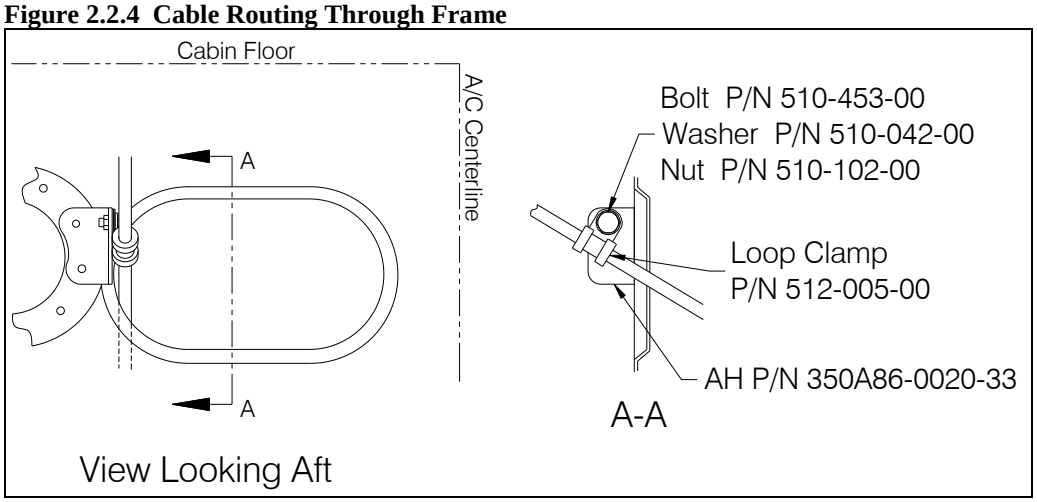
**Figure 2.2.3 Cabin Floor Hole Detail**



## 2.2 Fixed Manual Release Cable Assembly Installation continued

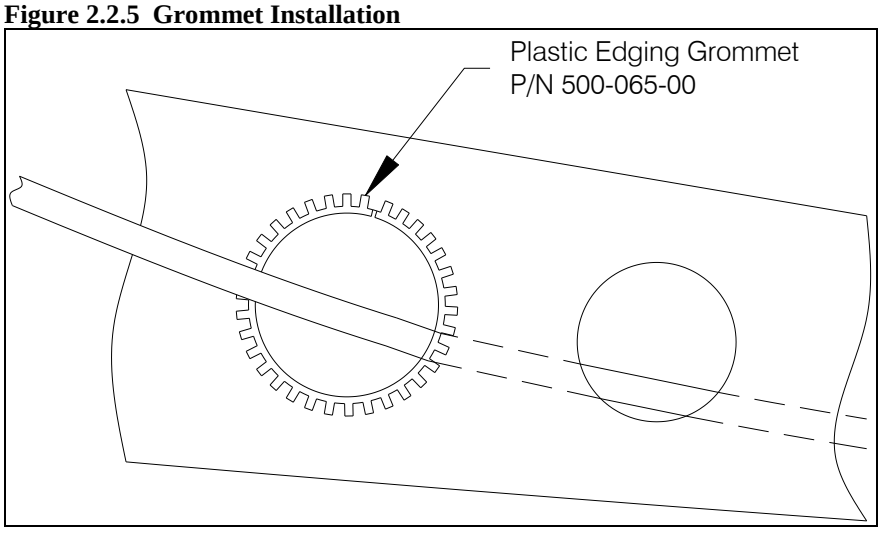
- Underneath the floor, route the manual release cable through an existing hole in the frame immediately aft of the collective. Secure the cable at this point with a cushioned loop clamp (P/N 512-024-00). Fasten the loop clamp to the existing bracket (Airbus Helicopters P/N 350A86-1051-00) with hardware as illustrated below.

**Figure 2.2.4 Cable Routing Through Frame**




- Aft of the frame, route the cable outboard through the hole in the structural member as shown in Figure 2.2.1 and Figure 2.2.5 and install Plastic Edging Grommet (P/N 500-065-00).

**Figure 2.2.5 Grommet Installation**



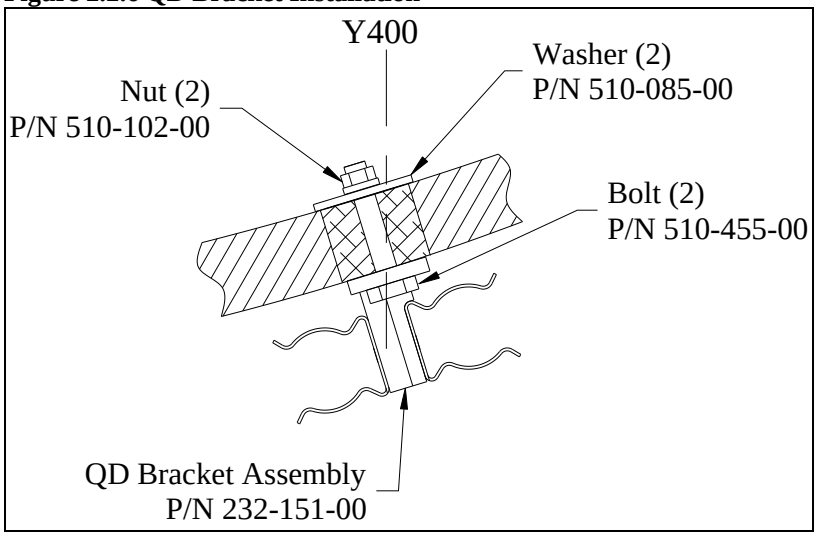
## 2.2 Fixed Manual Release Cable Assembly Installation continued

- At the RH forward hard point (X2700) secure the cable to the cushioned loop clamp installed per Figure 2.1.2.
- Install Quick Disconnect Bracket Assembly (P/N 232-151-00) on the RH rear lower fairing (with the fairing removed) at a location 400mm (15.7 in.) to the right of the A/C centerline and in line with the fwd fuel tank support (reference Figure 2.2.1) utilizing the existing insert holes in the honeycomb panel structure. Secure with fasteners (provided pre-assembled on bracket) as illustrated below.

**NOTICE**

*If your helicopter does not have holes in the honeycomb panel, modify panel per Airbus Helicopters Service Bulletin No. 25.00.62.*

**Figure 2.2.6 QD Bracket Installation**



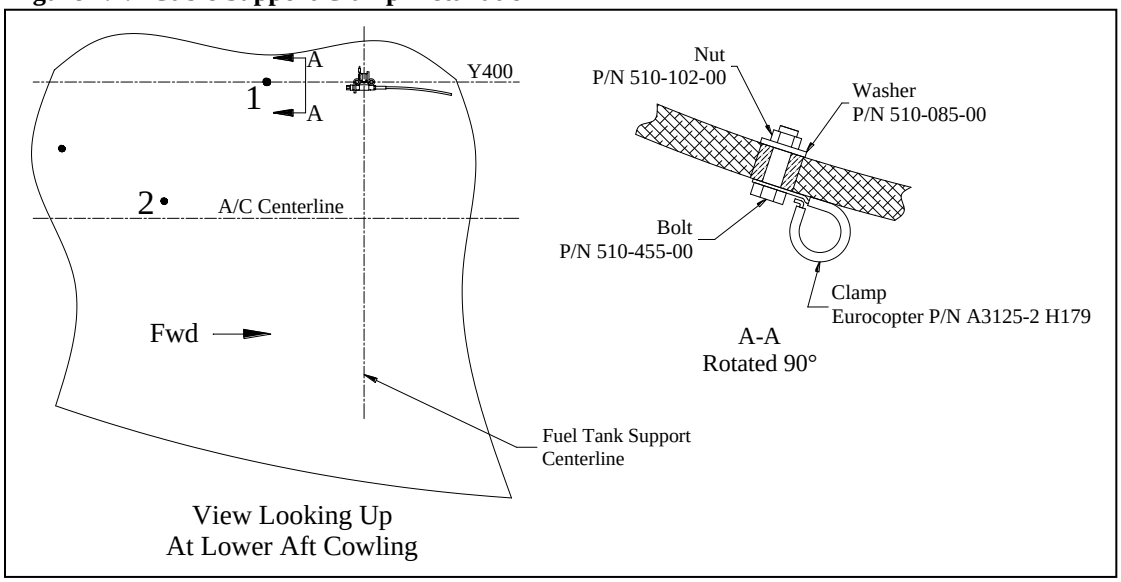
## 2.2 Fixed Manual Release Cable Assembly Installation continued

- ❑ Install the two clamps (Airbus Helicopters P/N A3125-2 H179) in the RH rear lower fairing that will support the removable section of the manual release cable. The clamps are installed at points 1 and 2 (see below) using existing inserts in the belly of the helicopter. Do not install a clamp at the furthest aft insert.

**NOTICE**

*If your helicopter does not have holes in the honeycomb panel, modify it per Airbus Helicopters Service Bulletin No. 25.00.04.*

**Figure 2.2.7 Cable Support Clamp Installation**

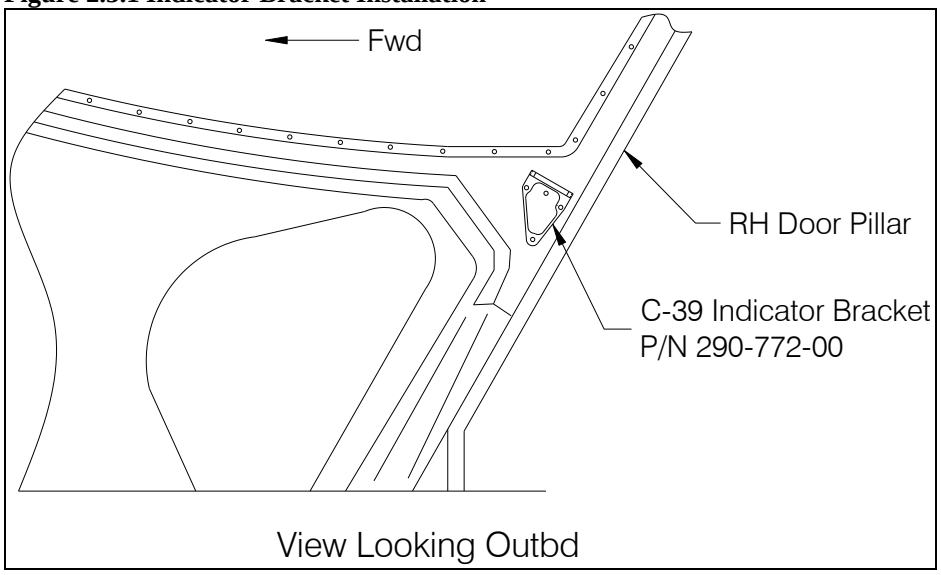


## 2.3 Cockpit Indicator Installation

The Indicator is mounted on the RH door pillar. If nut clips are not pre-installed in the door pillar, install them per the following.

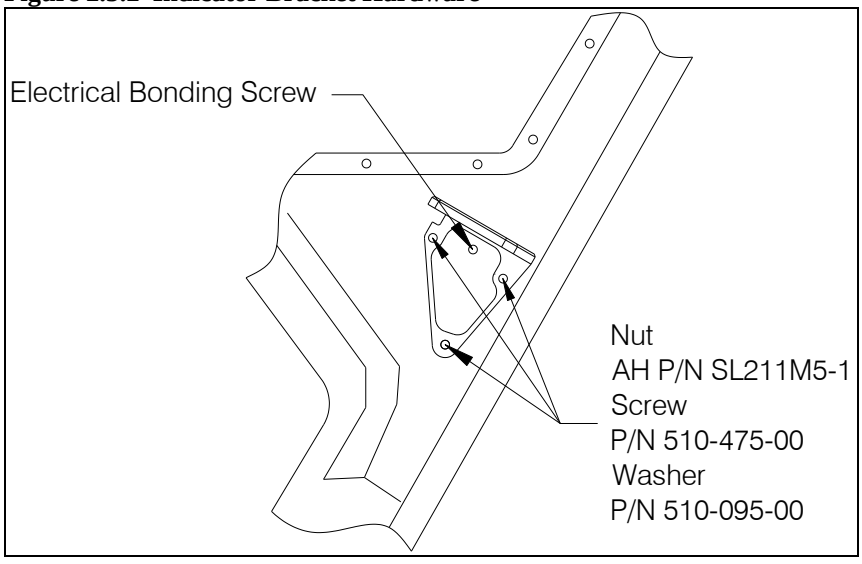
- Hold the Indicator Bracket (P/N 290-772-00) at a location as shown below and transfer its hole pattern to the door pillar.

**Figure 2.3.1 Indicator Bracket Installation**




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

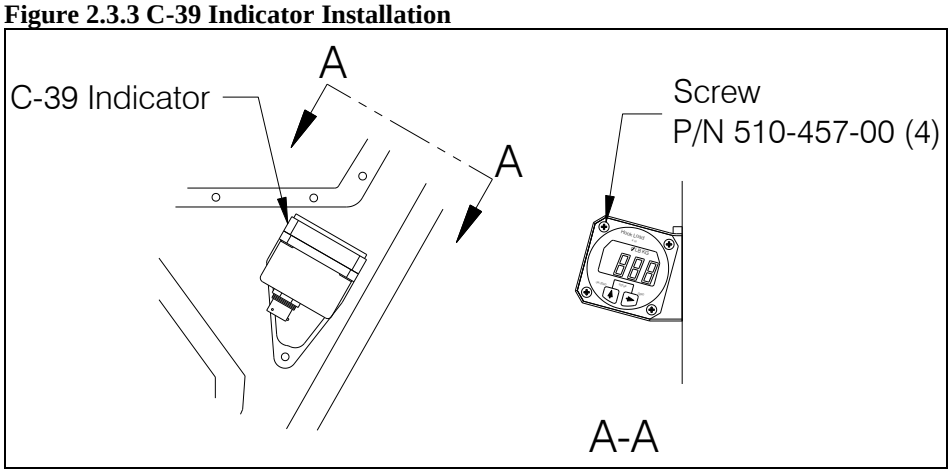
**Figure 2.3.2 Indicator Bracket Hardware**



## 2.3 Cockpit Indicator Installation continued

- Install C-39 Indicator (P/N 210-095-00 or P/N 210-095-04) onto bracket with hardware as illustrated below.

**Figure 2.3.3 C-39 Indicator Installation**



# 2.4 Electrical Wiring Installation

Install electrical harnesses (P/N 270-106-02 and P/N 270-108-00). Refer to Figure 2.4.8 for electrical schematic. Make connections to the aircraft with the contacts provided with the harnesses.

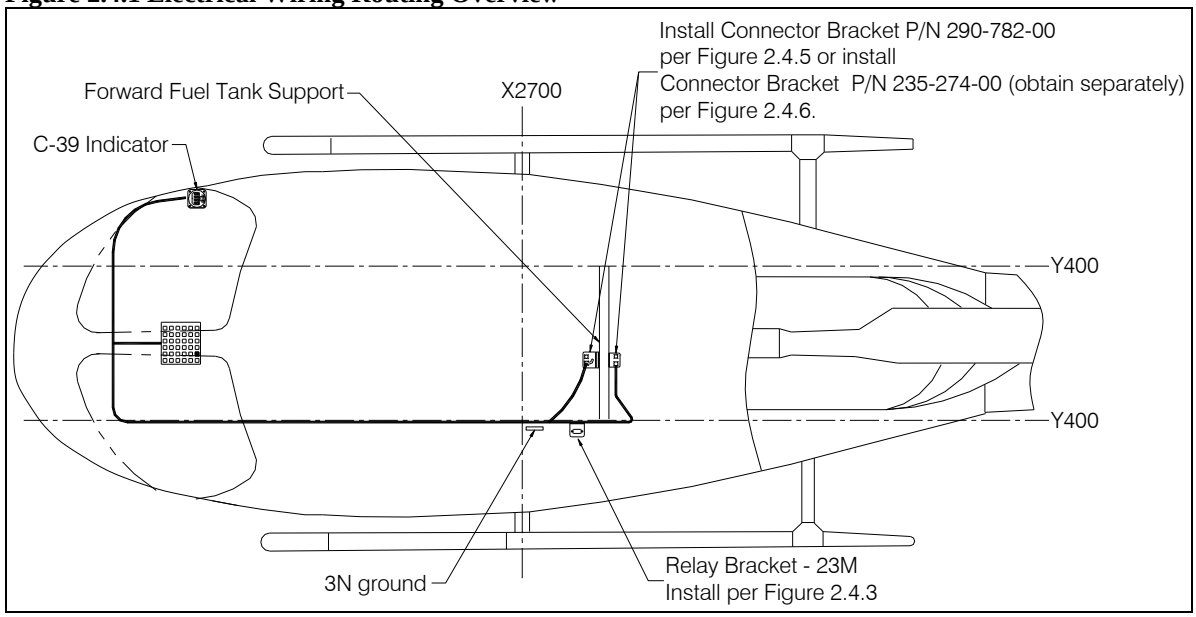
Route the harnesses along the existing harnesses (reference Figure 2.4.1) while observing the following precautions.

- 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 0.13".

Secure the C-39 indicator harness along the canopy with clamps and connect to the C-39 indicator.

The electrical harness includes a line with that can be equipped an accessory connector for use with an Onboard Systems Data Recorder or Analog Meter. These items are not included under this STC. If the accessory line is not used, stow this line of the harness.

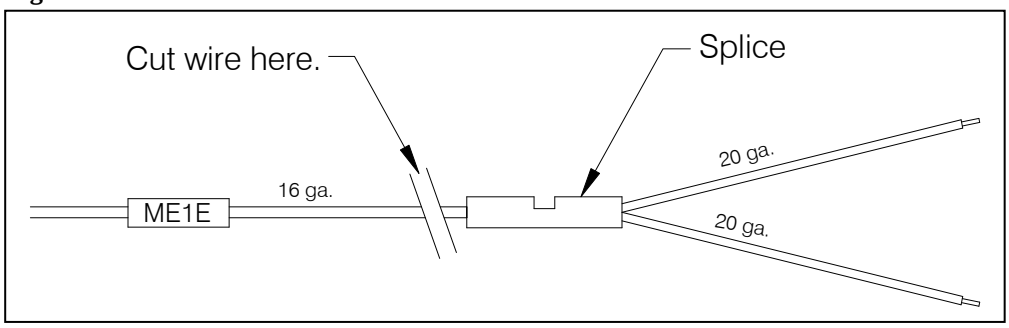
**Figure 2.4.1 Electrical Wiring Routing Overview**



## 2.4 Electrical Wiring Installation continued

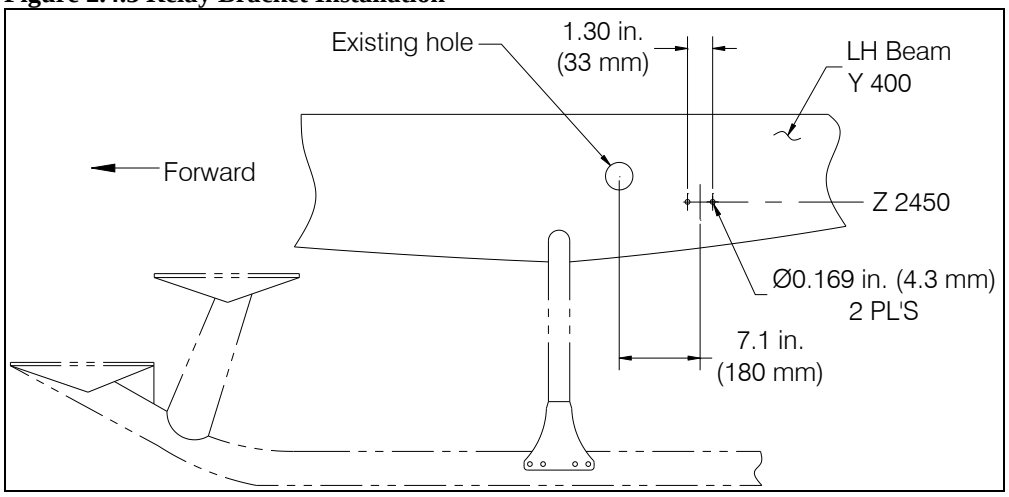
If installing the wire harnesses on a newer AS350B2 or B3 model equipped with a switch panel of circuit breaker design (Airbus Helicopters mod. #07-3274 incorporated) the electrical harness P/N 270-108-00 requires a minor modification. Cut the ME1E wire off just prior to the butt splice and discard the splice and the 20 ga. wires.

**Figure 2.4.2 P/N 270-108-00 Harness Modification**



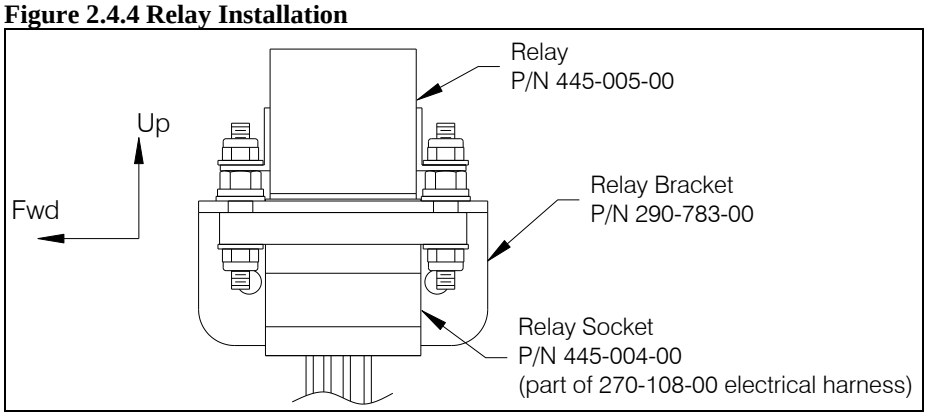

- In preparation for installing the Relay Bracket (P/N 290-783-00) create two holes in the LH beam at Y400 as illustrated in Figure 2.4.3.

**Figure 2.4.3 Relay Bracket Installation**




- Secure Relay Bracket with two screws (P/N 510-277-00), two washers (P/N 510-278-00), and two nuts (P/N 510-279-00).
- Place relay socket (part of 270-108-00 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**



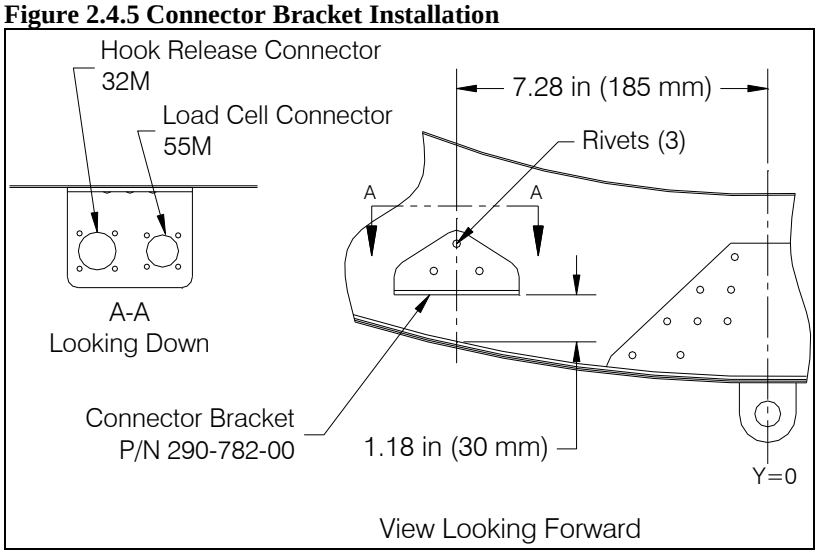

The connector bracket P/N and installation location depends on which fuel tank is installed. The following steps pertain to aircraft with fuel tank P/N 350A55-1015-0251 or 350A55-1015-0252 or similar installed (these tanks are not of the "new" crash resistant design).

- ❑ Locate Connector Bracket (P/N 290-782-00) at forward fuel tank support frame as illustrated below (same location as TC connector).
- ❑ Drill out pilot holes in bracket to 0.129/0.132" (3.2/3.4 mm) diameter and drill fuel tank support (if holes are not present) to match.
- ❑ Secure Connector Bracket with three rivets (P/N 510-486-00).
- ❑ 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).

**NOTICE**

*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).*

**Figure 2.4.5 Connector Bracket Installation**

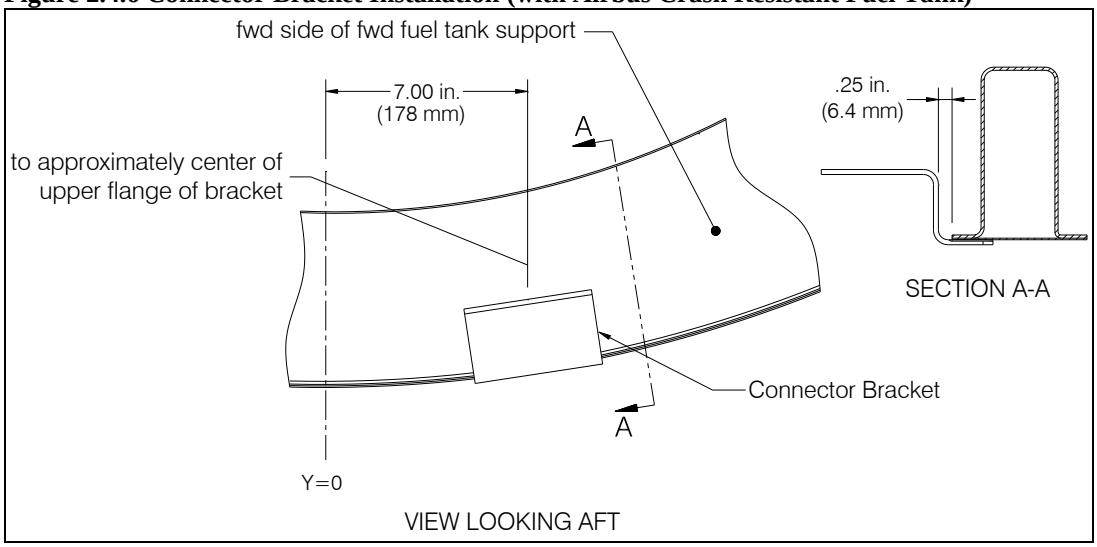


## 2.4 Electrical Wiring Installation continued

If the crash resistant fuel tank is installed on the helicopter then Connector Bracket P/N 235-274-00 is installed (this bracket is not included with kit P/N 200-280-04 but must be purchased separately). This Connector Bracket is installed on the forward side of the fuel tank support as described in the following steps.

- Position the Connector Bracket as dimensioned below and mark the three rivets to be drilled out on the forward flange of the fuel tank support. Drill out the rivets.
- Re-position the Connector Bracket on the fuel tank support flange and transfer the locations of the three holes to its flange.
- Drill three .129" holes in the Connector Bracket flange at the marked locations.
- Secure the Connector Bracket to the fuel tank support flange with three rivets of the same series as were removed above (these are not provided with the kit, reference Airbus Helicopters IPC for P/Ns).
- Fasten hook release connector (32M) and load cell connector (55M) to the Connector Bracket with three screws (P/N 510-672-00), washers (P/N 510-062-00), and nuts (P/N 510-029-00).
- With the connector bracket P/N 235-274-00 installed on the forward side of the fuel tank support the electrical harnesses will have extra length. Coil and stow this extra length.

**Figure 2.4.6 Connector Bracket Installation (with Airbus Crash Resistant Fuel Tank)**



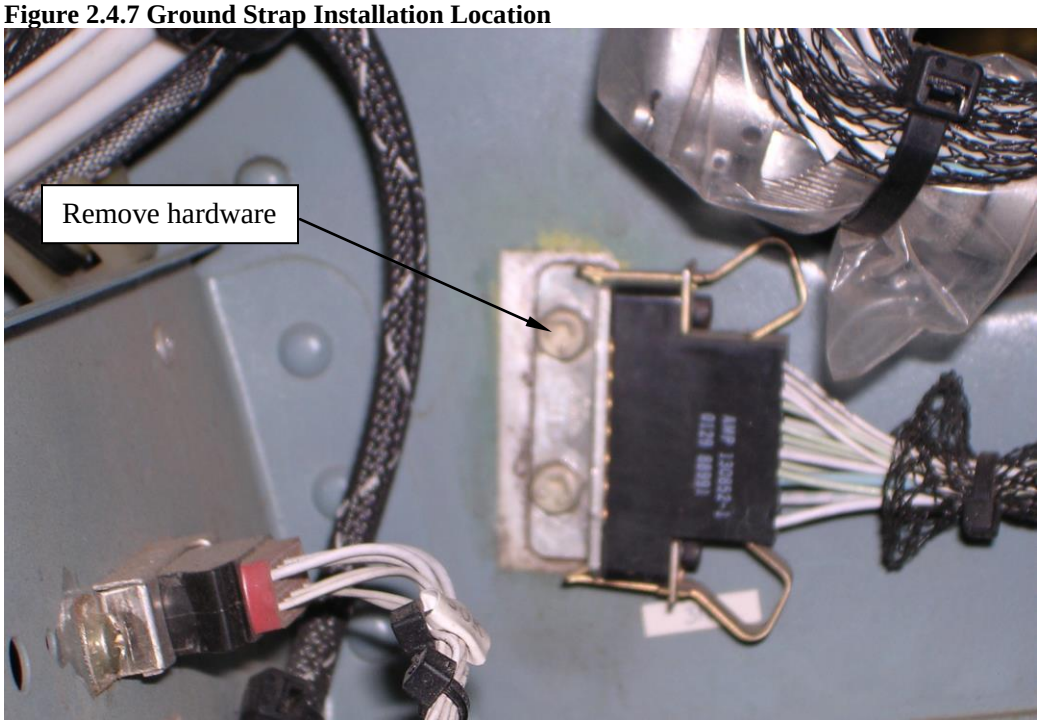

- Install electrical markers (P/N 215-165-00).

## 2.4 Electrical Wiring Installation continued

Install the Ground Strap (P/N 270-125-00) terminal at the 3N ground connector bracket at the LH airframe beam at Y400 per the following:

- Remove upper mounting hardware (see below) for 3N connector bracket and retain.
- Prepare the surface for electrical bonding per Airbus Helicopters electrical bonding procedure. Refer to section 20.02.07 of the Airbus Helicopters Standard Practices Manual.
- Install ground strap terminal, re-using hardware removed per above step.

**Figure 2.4.7 Ground Strap Installation Location**




- 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).

## 2.4 Electrical Wiring Installation continued

The electrical schematic for the electrical release system and the load weigh system is shown below along with the aircraft's interface points. Airbus Helicopters modification #'s 07-4280 and 07-3450 are reflected below. Earlier Airbus Helicopters configurations which affected how and where wire numbers ME1E, ME2E and ME10E of the electrical release harness and load weigh harness interface with the helicopter are shown on the following page. Refer to the applicable Airbus Helicopters Wiring Diagrams Manual for additional information and for other cargo hook aircraft side wiring configurations that may not be shown.

For the C-39 Indicator backlighting, install wire 2LK71E to an available pin in the instrument panel or console lighting circuit (31L for pre-mod 07-4280). At 28 volts the indicator's internal bulb draws 25 mA.

If existing Airbus Helicopters cargo hook or load weigh wiring is installed and terminated at the locations below, remove the wires completely or remove from connectors and cap and stow them.

**Figure 2.4.8 Electrical Schematic**

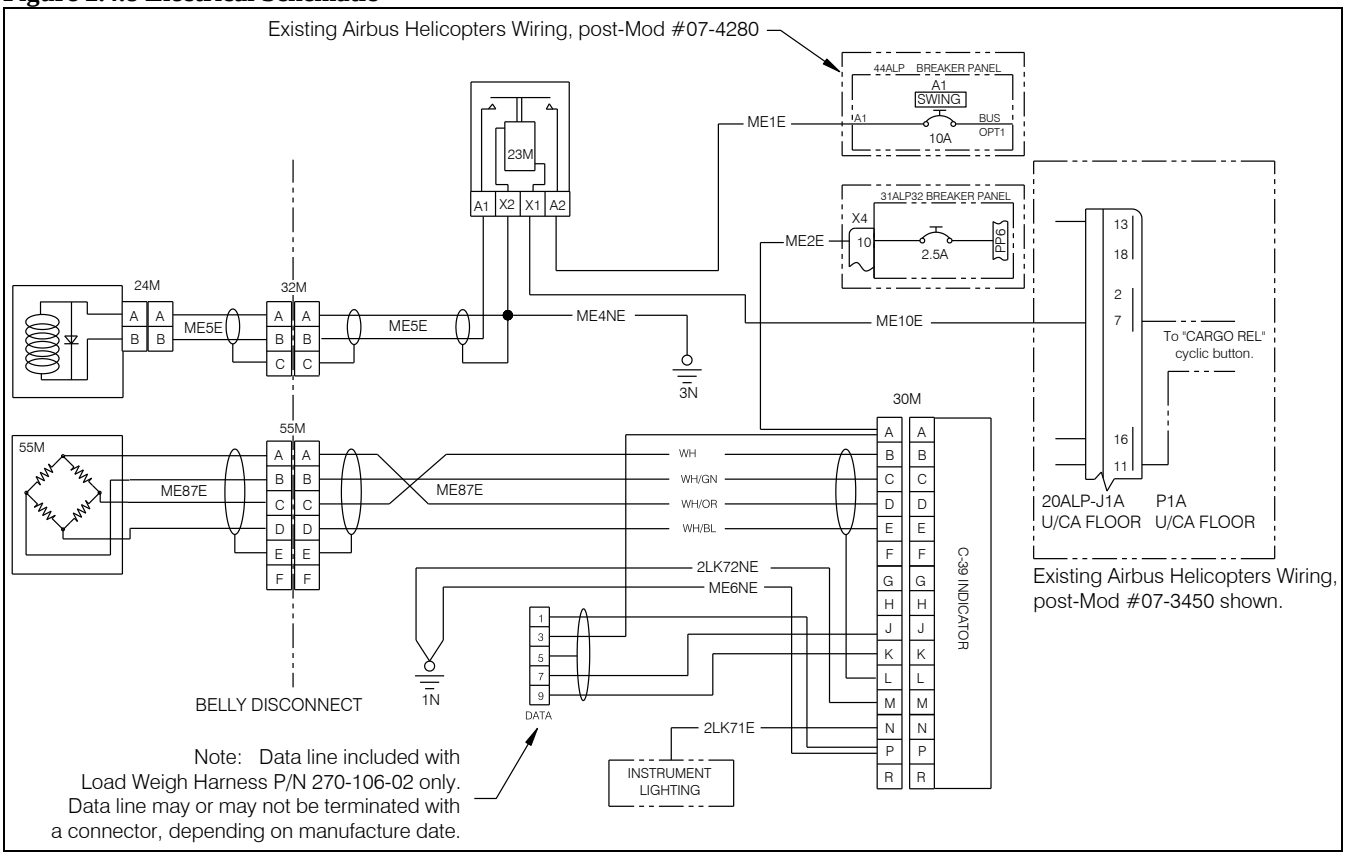
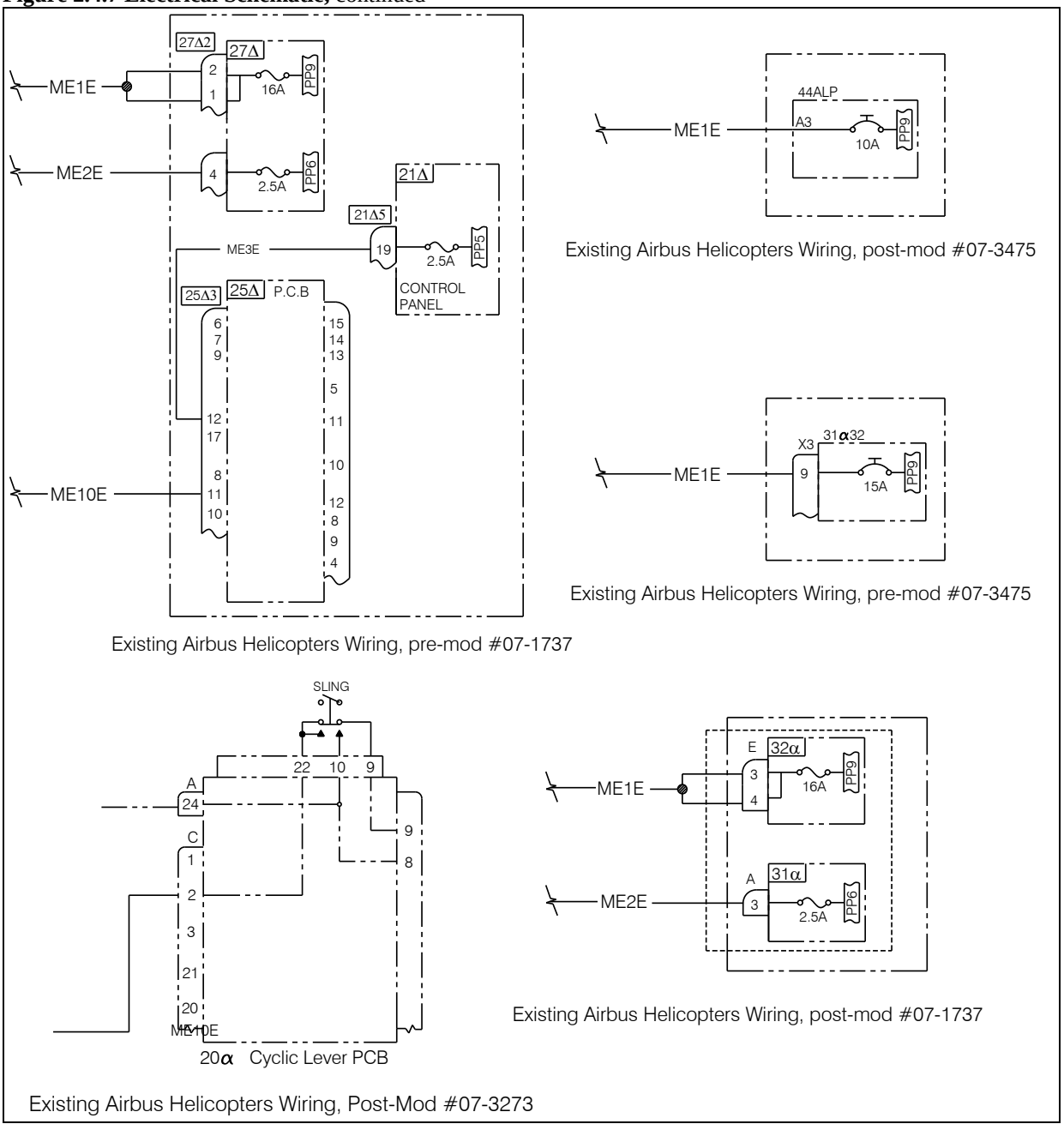


**Figure 2.4.7 Electrical Schematic,** continued




Existing Airbus Helicopters Wiring, pre-mod #07-1737

Existing Airbus Helicopters Wiring, post-mod #07-3475

Existing Airbus Helicopters Wiring, pre-mod #07-3475

Existing Airbus Helicopters Wiring, post-mod #07-1737

Existing Airbus Helicopters Wiring, Post-Mod #07-3273

## 2.5 Fuel Drain Guard Installation

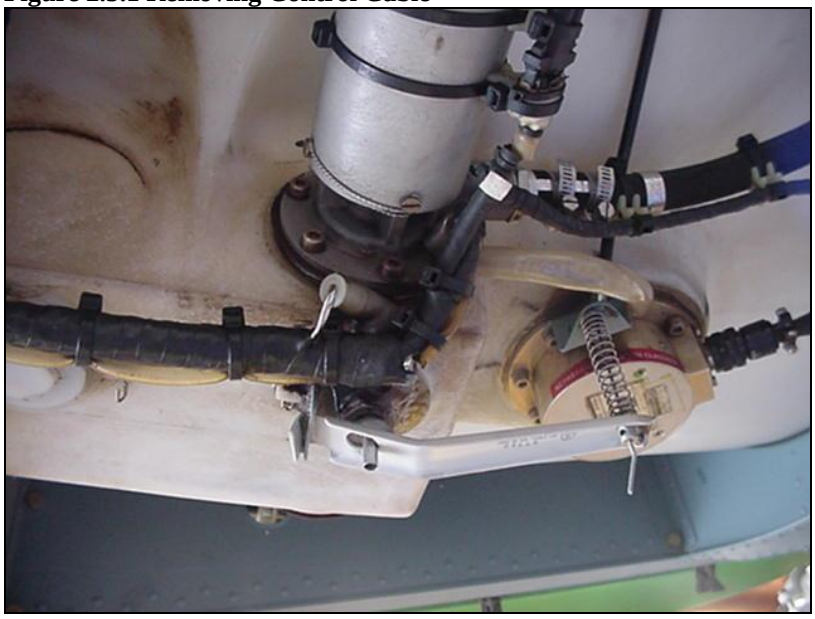
**NOTICE**

*If installing the kit on a helicopter that has NOT been retrofitted with the B-2 style dual fuel pump type tank (Airbus Helicopters P/N 350A55-1015-0251 or P/N 350A55-1015-0252) or has the Airbus crash resistant fuel tank installed, the fuel drain guard installation is omitted. Skip to section 2.6.*

In preparation for installing the fuel drain guard:

- Obtain ProSeal sealant (P/N PR1422-B).
- Verify that the fuel drain lever has been modified per AD 2005-03-08 requirements.
- Completely drain the fuel from the fuel tank.
- Begin disassembly of the fuel drain assembly by disconnecting the fuel drain control cable from the Lever (Airbus Helicopters P/N 350A55-1043-21). To free the control cable, remove the Sleeve (Airbus Helicopters P/N N1-5ALU) and Cable Grip (Airbus Helicopters P/N 58-2-009). See Figure 2.5.1.

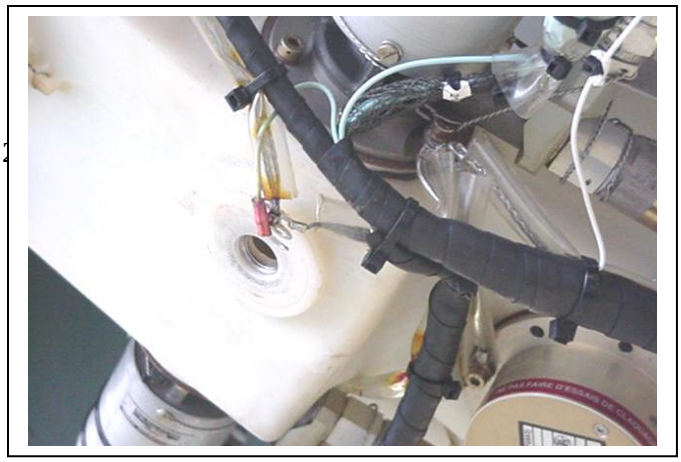
**Figure 2.5.1 Removing Control Cable**



## 2.5 Fuel Drain Guard Installation continued

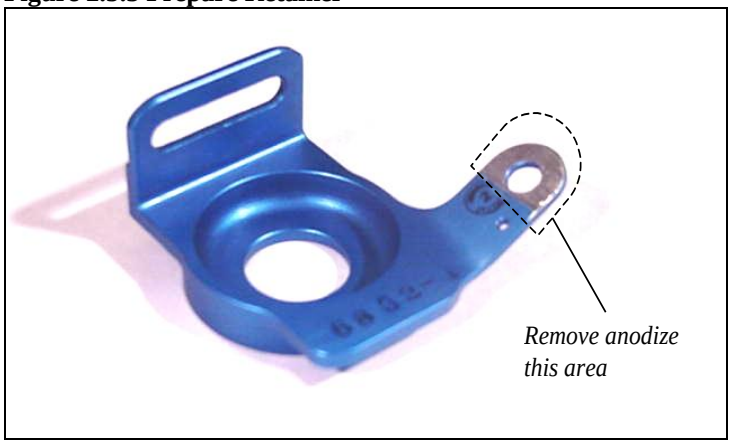
- Remove and retain spring (Airbus Helicopters P/N 350A55-1044-21) and Lever.
- Remove the cable support bracket. Retain the two attachment screws.
- Remove the connections from the common ground point on the lever retainer.
- Remove the safety wire securing the Fuel Drain Valve (Airbus Helicopters P/N 350A52-1008-01). Remove the Fuel Drain Valve and the Retainer from the tank. Discard used Fuel Valve Seal (Airbus Helicopters P/N SD16X-21P).
- Remove the residual sealant from the tank, taking care to not mar the sealing surface. Prepare the area for sealing per Airbus Helicopters Standard Practices Manual.

**Figure 2.5.2 Fuel Drain Disassembly Complete**



- Prepare the Retainer (P/N 290-888-00) for electrical bonding by removing the anodize from the area shown in Figure 2.5.3.

**Figure 2.5.3 Prepare Retainer**



## 2.5 Fuel Drain Guard Installation continued

- ❑ Prepare PR1422-B or equivalent fuel tank sealant per Airbus Helicopters Standard Practices Manual. Apply sealant to Retainer as shown in Figure 2.5.4. Retain unused sealant to ensure proper cure.

**Figure 2.5.4 Apply Sealant**

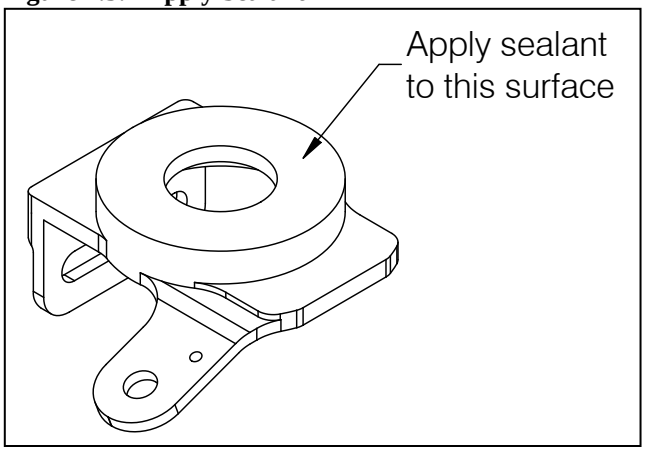
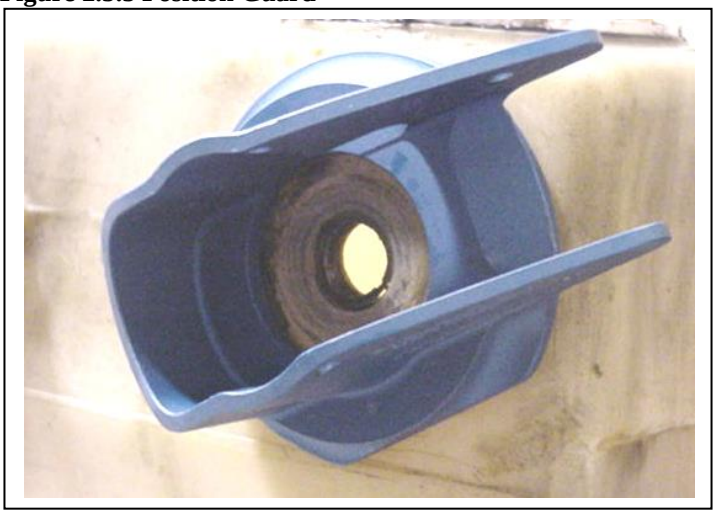



**Figure 2.5.5 Position Guard**



**NOTICE**

*On some aircraft, the guard may have to be modified to fit the key on the fuel tank. In these cases, the sides of the clearance slot on the guard should be widened the minimum amount necessary in order to fit over the key. See figures 2.5.6 and 2.5.7.*

## 2.5 Fuel Drain Guard Installation continued

**Figure 2.5.6 Fuel Tank Key**

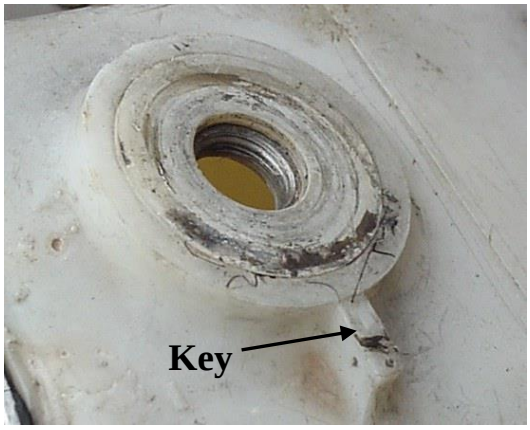
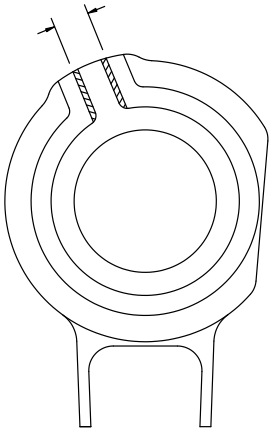



**Figure 2.5.7 Modification of Guard Slot**



- Carefully place the Retainer inside the Guard by inserting the tab through the slot in the Guard. Press the retainer to the tank firmly and center it about the drain hole. See Figure 2.5.8.

**Figure 2.5.8 Retainer/Guard Assembly**

- Secure the Guard and Retainer by re-installing the Fuel Drain Valve with Fuel Valve Seal, P/N 610-024-00 (Airbus Helicopters P/N SD16X-21P). Use a flat-blade screwdriver to prevent the Retainer from twisting when tightening the Fuel Drain Valve. Torque per Airbus Helicopters specifications.

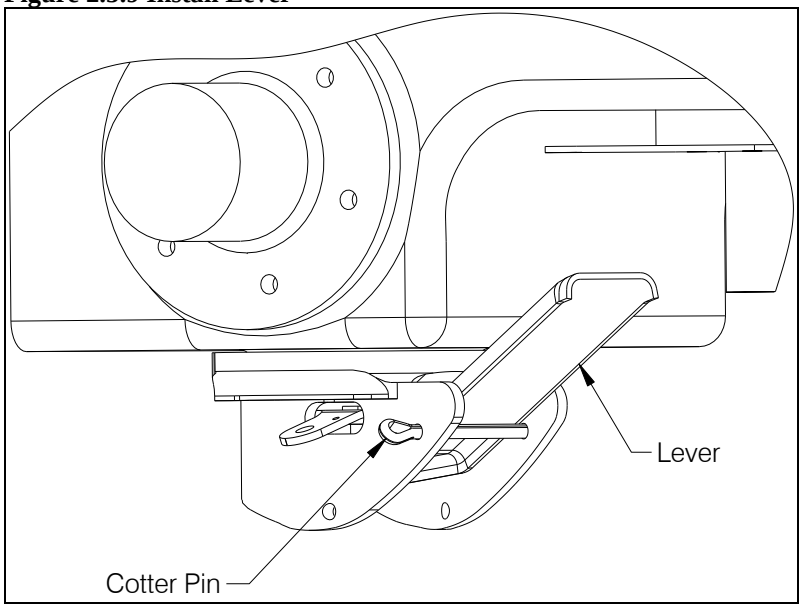
**NOTICE**

*The guard is not intended to fit tightly with the fuel tank. When properly installed, the guard should have freedom to move slightly.*

## 2.5 Fuel Drain Guard Installation continued

- Secure the Fuel Drain Valve with safety wire using the small hole in the retainer tab.
- Re-install the electrical connections to the new Retainer tab per Airbus Helicopters Electrical Bonding Procedure. Refer to Airbus Helicopters Standard Practices Manual, 20.02.07.
- Install the Lever by placing it in Retainer slot and rotating upwards. Secure with cotter pin (P/N 510-526-00). See Figure 2.5.9.

**Figure 2.5.9 Install Lever**




- Install a second cotter pin through the other holes in the Guard (this cotter pin is for valve protection only and is not used for rigging purposes).
- Prepare to install Bracket (P/N 290-893-00) by threading the control cable through the Bracket hole. Install Bracket using the two screws removed previously.
- Pass the cable through the spring and then the Lever. Install the Sleeve and Cable Grip.

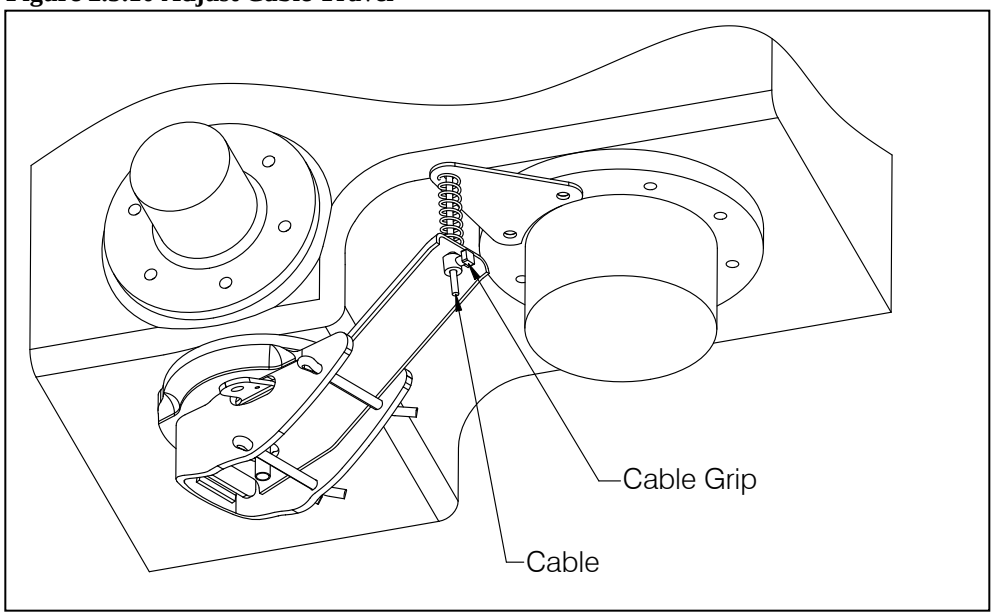
**CAUTION**

*To avoid inadvertent fuel loss, Airbus Helicopters P/N 58-2-009 Cable Grip must be used with this installation.*

- Adjust the cable travel by doing the following: allow the lever to rest against the cotter pin stop. Slide the Cable Grip up to the bottom of the lever and secure. See Figure 2.5.10.

## 2.5 Fuel Drain Guard Installation continued

**Figure 2.5.10 Adjust Cable Travel**




- Check the cable adjustment with the release handle on the side of the aircraft. There should be a minimum of .25 inch (6mm) cable travel before valve opens. Adjust the Cable Grip as required.
- Trim excess cable to within .25" of cable grip.
- Allow the sealant to cure per Airbus Helicopters Standard Practices Manual before adding fuel. Verify proper cure of unused sealant.
- Add fuel to the tank and check for leakage.
- Re-install aft lower cowling. Check for clearance between Guard and cowling. If required trim cowling cutout to provide a min of .125 inch (3.5mm) clearance between the cowling and guard. See Figure 2.5.11 for completed installation.

**Figure 2.5.11 Installation Complete**

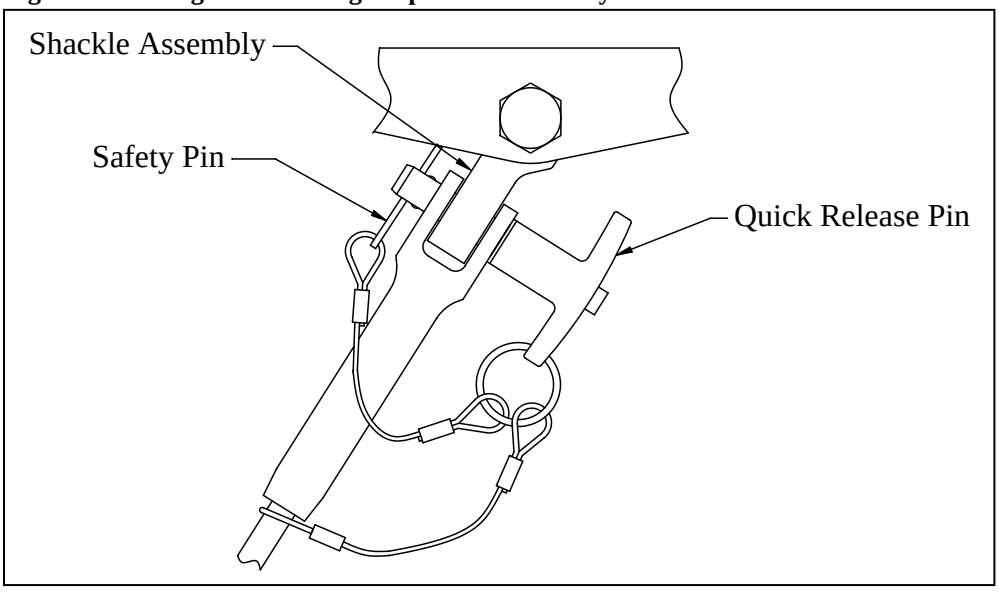
## 2.6 Swing Suspension Installation

- 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 232-141-01) to the aft pivot points. Tighten the nuts to 95-110 in-lbs and rotate to next castellation if necessary to insert cotter pin. Ensure each Cable Assembly pivots freely about the frame foot and that the bolt does not rotate.

  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 four clevises at the end of the cables to the **INBOARD** holes on the Shackle Assemblies with the Quick Release Pins (P/N 290-851-00) as shown in Figure 2.6.1. Install the attached safety pins at each Quick Release Pin.

**Figure 2.6.1 Cargo Hook Swing Suspension Assembly Installation**

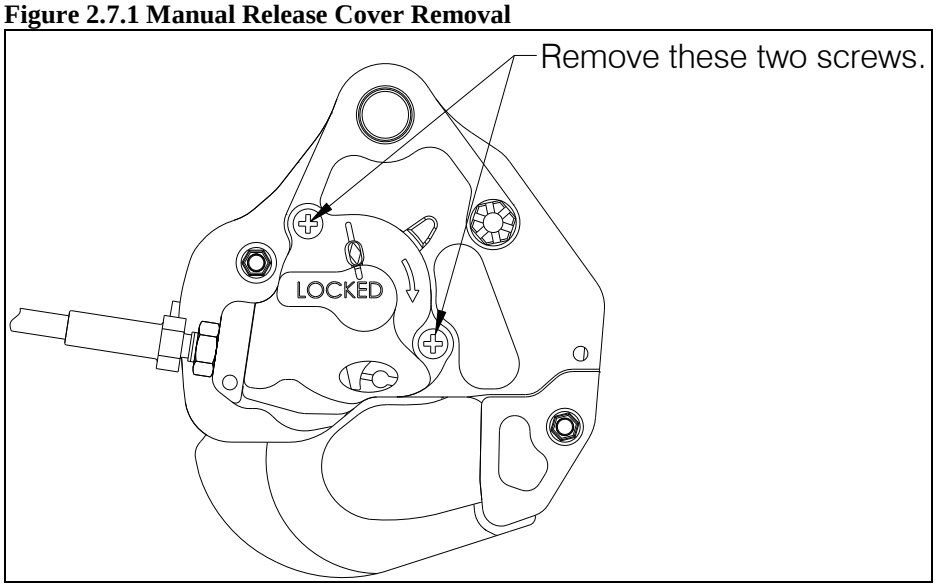


## 2.7 Removable Manual Release Cable Assembly Installation

Connect the manual release cable (P/N 268-024-02) to the cargo hook per the following instructions:

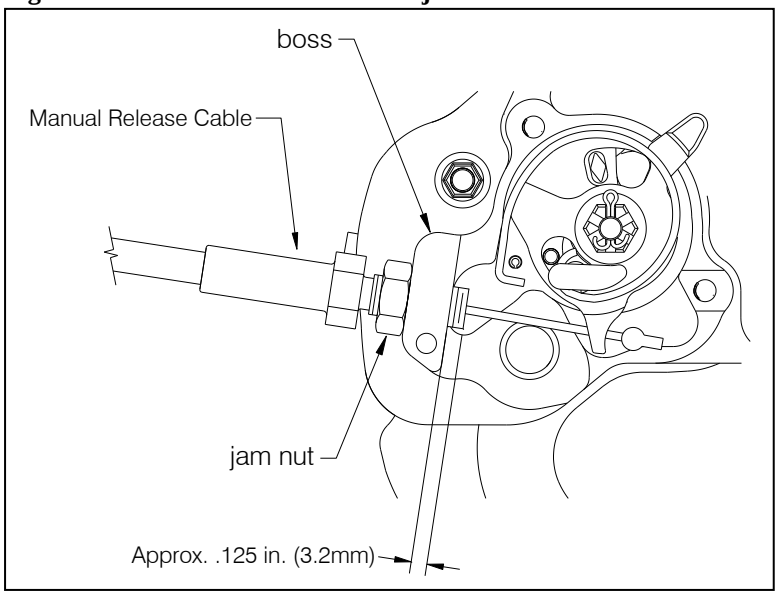
- Remove the manual release cover from the cargo hook by removing two screws (see below).

**Figure 2.7.1 Manual Release Cover Removal**




- Thread the fitting at the end of the manual release cable into the manual release boss on the cargo hook side plate until the threads protrude approximately .125 inches beyond the boss and secure with jam nut (as shown in Figure 2.7.2). Leave the manual release cover off of the cargo hook until the other end of the release cable is connected, in order to verify proper setting.

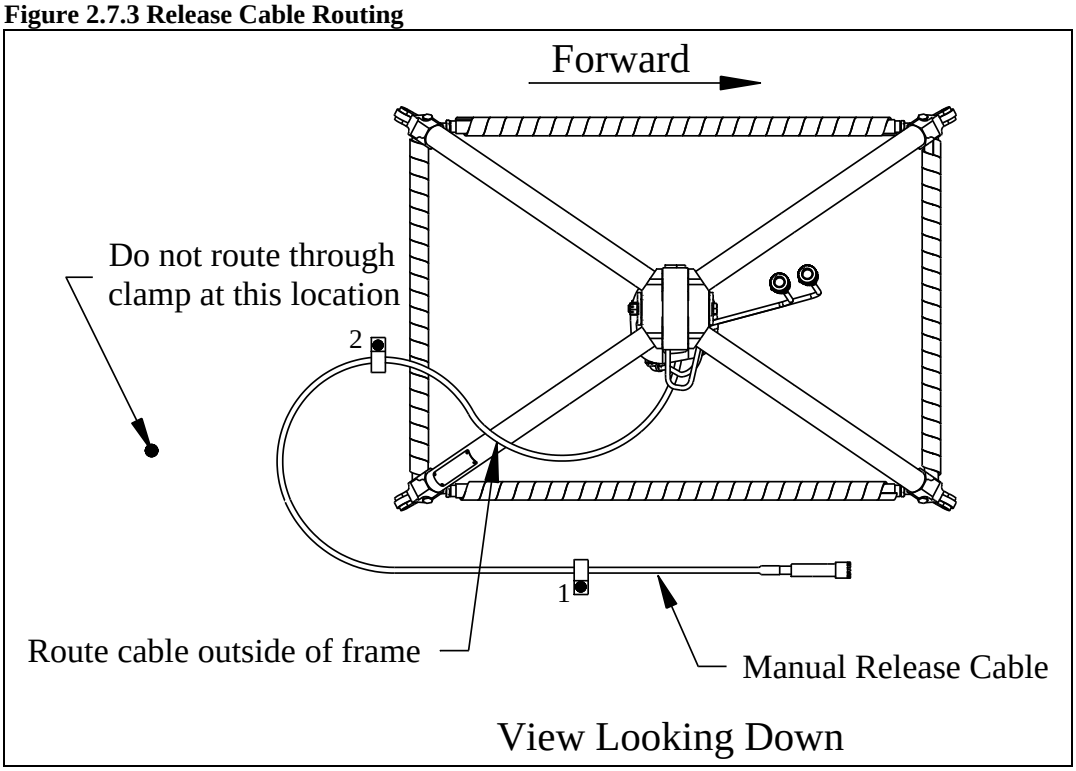
**Figure 2.7.2 Initial Release Cable Adjustment**



## 2.7 Removable Manual Release Cable Assembly Installation continued

- Route the cable from the hook through the aft end of the suspension frame as illustrated below. Clip the cable into the clamps at points 1 and 2 (installed per section 2.2).

**Figure 2.7.3 Release Cable Routing**




- 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.

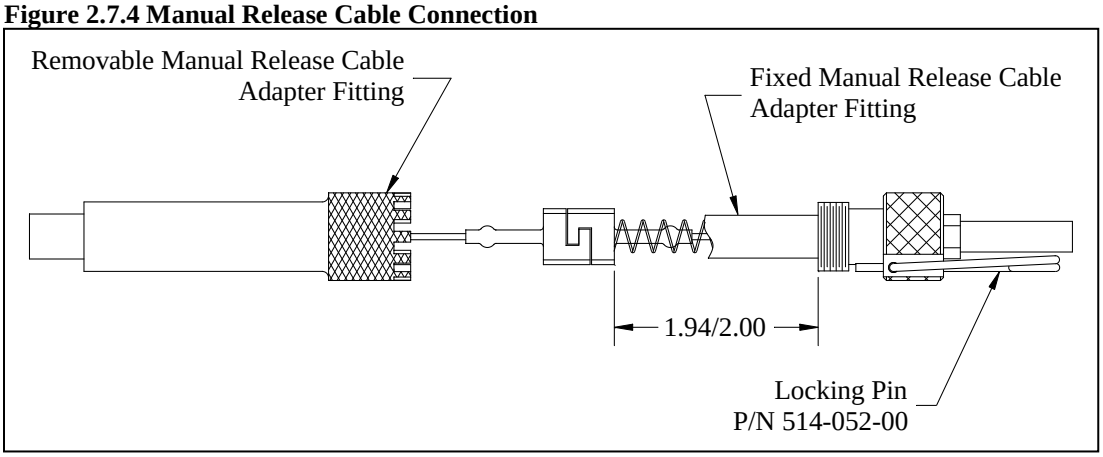
**NOTICE**

*The pre-set compressed spring length is set at the factory to be 1.94/2.00 inches (see figure 2.7.4). 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 Quick Disconnect Support Assembly.

## 2.7 Removable Manual Release Cable Assembly Installation continued

**Figure 2.7.4 Manual Release Cable Connection**



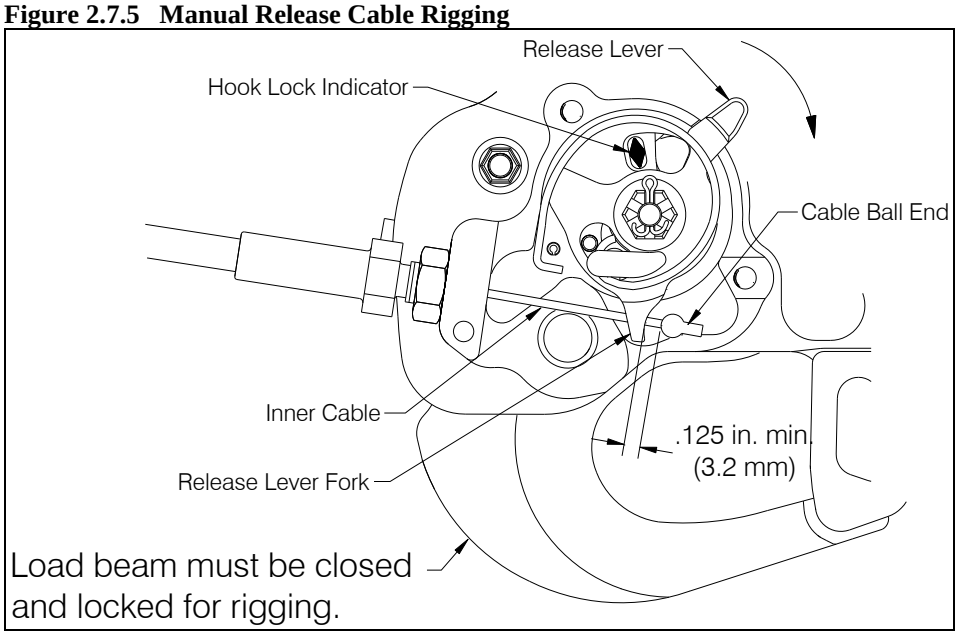

- At the cargo hook, ensure the manual release cable is between the two prongs of the release lever fork as illustrated in Figure 2.7.5.

**CAUTION**

*Manual release cable rigging must be done with the cargo hook in the closed and locked position.*

- With the cargo hook closed and locked, rotate the release lever in the clockwise direction to remove free play (the free play is taken up when the hook lock indicator begins to move, this is also felt as the lever rotates relatively easily for several degrees as the free play is taken up) and measure the gap between the cable ball end and the release lever fork with the manual release lever in the cockpit in the non-release position. This gap should be a minimum of .125 inches (3.2 mm) as shown in Figure 2.7.5.

**Figure 2.7.5 Manual Release Cable Rigging**



## 2.7 Removable Manual Release Cable Assembly Installation continued

- If necessary adjust the system to obtain the minimum gap of .125 inches at the release lever fork as shown in Figure 2.6.5 (the maximum gap is limited by the manual release cover, i.e.- the release cable must fit within the cover when it is installed). The system can be adjusted at the manual release lever on the collective or minor adjustments can be made at the cargo hook by loosening the jam nut and turning the manual release cable in the required direction (this requires that the manual release cable be disconnected from the fixed release cable and the quick release clamps on the belly). Be sure to maintain full thread engagement between the manual release cable fitting and cargo hook.
- 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".
- Check that the cable housing is not kinked or pulled tight in any hook and swing frame position.
- Re-install the manual release cover with the two screws and ensure the manual release cable jam nut is tightened securely against the cargo hook.

## 2.8 External Electrical Release and Load Cell Cable Installation

- Connect the end of the cargo hook electrical release cable to the fixed electrical release connector (32M) installed per Section 2.4.
- Connect the ground strap from the hook to the fixed ground strap installed per section 2.4.
- Connect the end of the load cell cable to the fixed load weigh harness connector (55M) installed per Section 2.4.

See Table 2.1 for connector pin out information

**Table 2.1 Cargo Hook Connector**

| *Pin* | *Function* |
|---|---|
| A | Ground |
| B | Power |

## 2.8 External Electrical Release and Load Cell Cable Installation continued

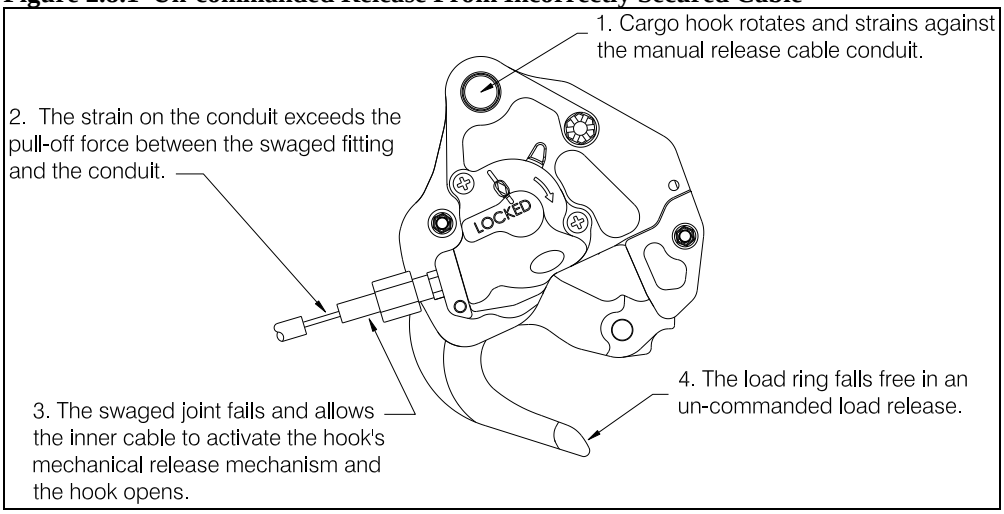
**CAUTION**

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

**WARNING**

*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 2.8.1 Un-commanded Release From Incorrectly Secured Cable**



## 2.9 Placard Installation

- Install appropriate load limitation placard, P/N 215-166-00 (3086 lb max. hook load) or P/N 215-168-00 (2557 lb max. hook load), dependent on the model of AS350 on which the system is being installed. Consult the Airbus Helicopters Flight Manual Supplement applicable to your particular helicopter for the external load limitation. Locate the placard on the belly of the helicopter, visible to the ground operator and near the hook.

**NOTICE**

*The provided load limitation placards P/N 215-166-00 and P/N 215-168-00 feature black letters on a transparent background. If being installed on a dark-colored helicopter the lettering may not be readily visible. In this instance new placards of the same size and with the same text may be fabricated with a different background to provide visibility. The lettering must contrast with the background.*

**NOTICE**

*If installation is being done under a Brazilian CHST, bilingual placards are required. The required placards are illustrated in Section 7, fabricate as shown or contact Onboard Systems for price and availability. Install appropriate load limitation placard, P/N 215-200-00 (1400 kg max. hook load) or P/N 215-201-00 (1160 kg max. hook load), dependent on the model of AS350 on which the system is being installed. Install "SOLTA-CARGA" placard (P/N 215-202-00) on the manual release lever in the cockpit over, or next to, the "CARGO RELEASE" engraving.*

## 2.10 Installation Check-Out

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

1. Swing the Cargo Hook 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 swing of the cargo hook and suspension 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 handle operated cargo hook mechanical release, the Cargo Hook should release. Reset the 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 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.

**NOTICE**

*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.
6. If fuel drain guard was installed, pull the handle on the side of the helicopter and verify that fuel is dispensed from the valve.

## 2.11 Component Weights

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

**Table 2.2 Component Weights**

| Item | Weight | Station |
|---|---|---|
| Removable Provisions | 30.0 lbs (13.6 kg) | 133 in (3375 mm) |
| Fixed Provisions | 5.5 lbs (2.5 kg) | 110 in (2794 mm) |
| Fuel Drain Guard | 0.40 lbs (.18 kg) | 135 in. (3430 mm) |
| **Total** | 35.9 lbs (16.3 kg) | 129.4 in (3288 mm) |

## 2.12 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. Insert the Rotorcraft Flight Manual Supplement P/N 121-012-03 into the Rotorcraft Flight Manual.

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# *Section 3*
# Operation Instructions

## Operating Procedures

Refer to Owner's Manual No. 120-039-00 for detailed operation instructions for the C-39 Load Weigh Indicator.

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

1. Activate the electrical system and press the Cargo Hook release button to ensure the cargo hook electrical release is operating correctly. The Cargo Hook must release. Reset the hook by hand after the release. If the hook does not release or relatch, do not use the unit until the difficulty is resolved.

**CAUTION**

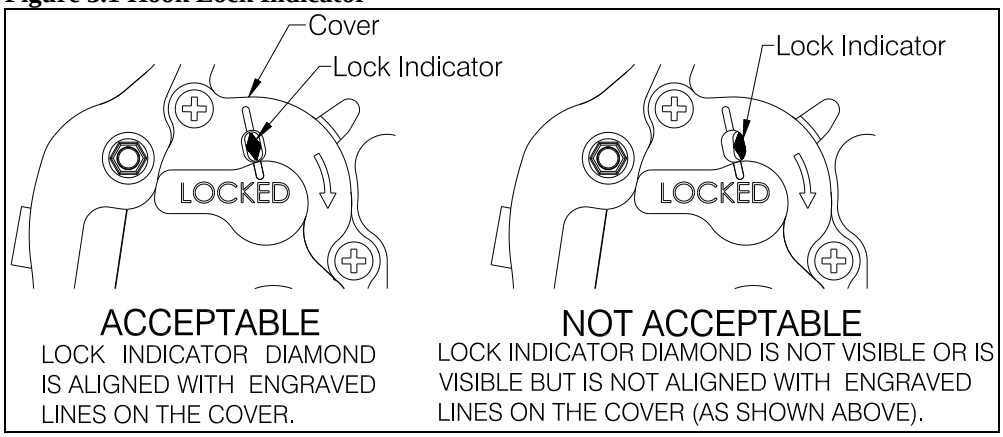
*The cargo hook release solenoid is intended to be energized only intermittently. Depressing the electrical release button continuously in excess of 20 seconds will cause the release solenoid to overheat, possibly causing permanent damage.*

2. 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 load beam by hand after release. Verify that the hook lock indicator on the side of the hook returns to the fully locked position. If the hook does not release or re-latch, do not use the unit until the problem is resolved.

**⚠ CAUTION**

*In the fully locked position the hook lock indicator must align with the lines on the manual release cover (see Figure 3.1).*

**Figure 3.1 Hook Lock Indicator**

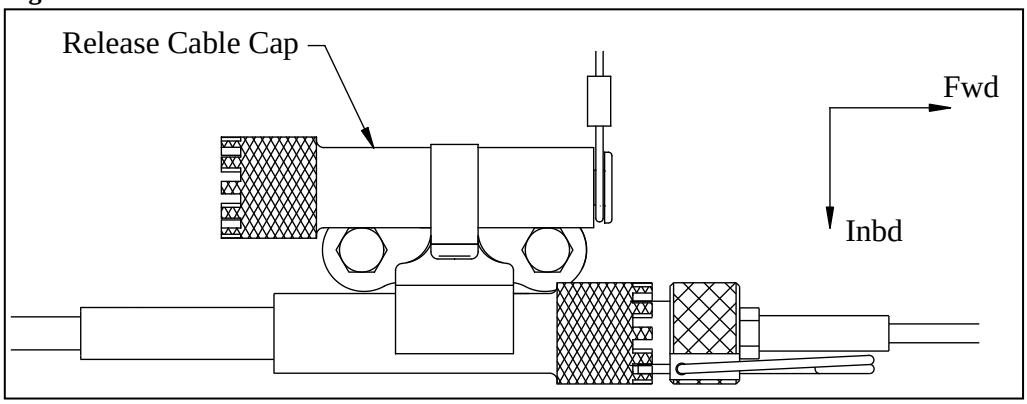


# Disconnecting Removable Provisions

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

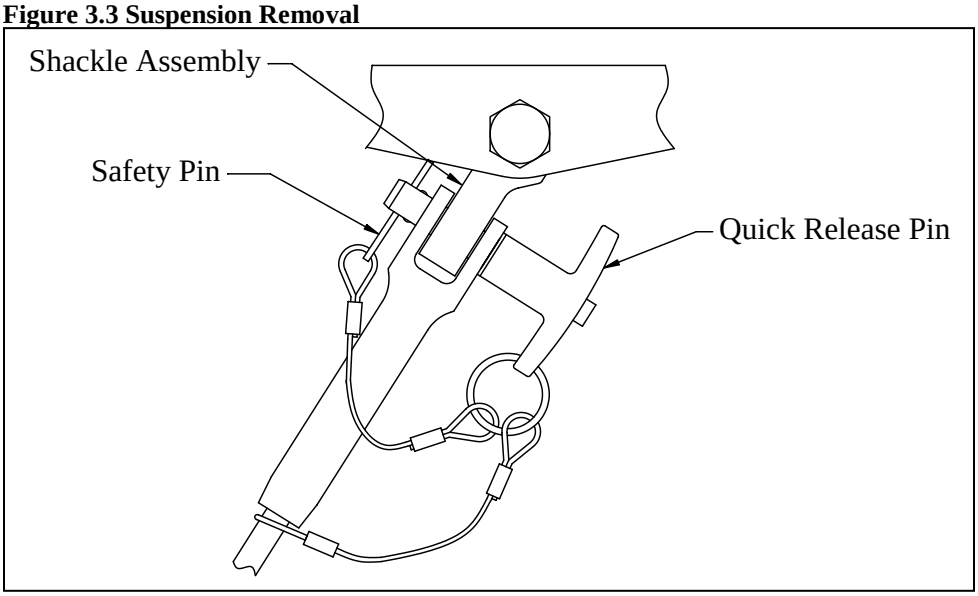
1. Remove the removable section of the manual release cable by un-clipping it from the bracket on the belly of the helicopter, disengaging the locking pin and unthreading the Adapter Fitting. Unclip the Release Cable Cap (see below) from the bracket and thread it over the open end of the fixed manual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

**Figure 3.2 Manual Release Cable Removal**




2. Disconnect the electrical cables and the ground strap at the belly of the helicopter.
3. Remove the Swing Suspension by removing the safety pins and then the quick release pins that secure the cables to each of Shackle Assemblies at the aircraft hard points.

**Figure 3.3 Suspension Removal**



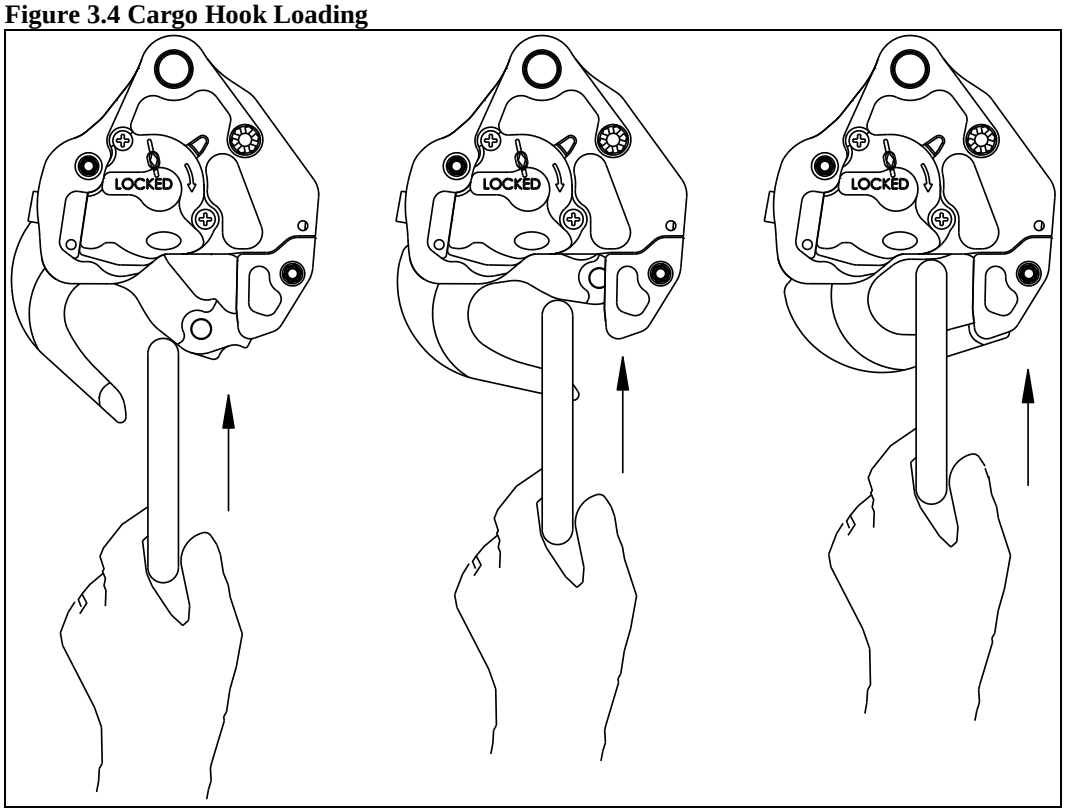
## Optional Link Assembly

An optional Link Assembly (P/N 232-436-00) may be used in place of the Load Cell Assembly. This link assembly does not provide for load weighing. It is directly interchangeable with the Load Cell Assembly, including using the same hardware. Refer to ICA manual for instructions for removal and re-installation.

## 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 3.4, until an internal latch engages the load beam and latches it in the closed position.

**Figure 3.4 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.

## Cargo Hook Rigging continued

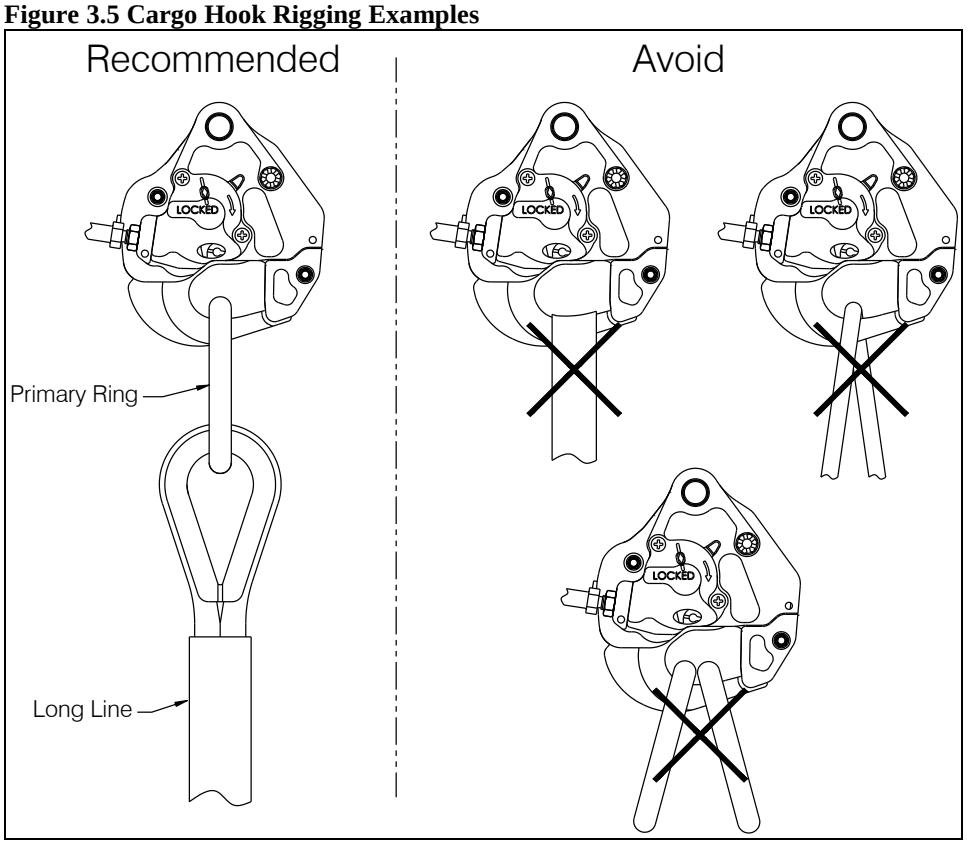
**WARNING**

*Some combinations of small primary rings and large secondary rings could cause fouling during release. It is the responsibility of the operator to assure the cargo hook will function properly with each rigging.*

**WARNING**

*Multiple load rings, 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 3.5 Cargo Hook Rigging Examples**



# *Section 4*
# Maintenance

Refer to the Instructions for Continued Airworthiness (ICA) manual 123-011-03 for maintenance of the cargo hook suspension system. For maintenance of the cargo hook refer to Cargo Hook Service Manual 122-017-00.

## 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.

**NOTICE**

*An RMA number is required for all equipment returns.*

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

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

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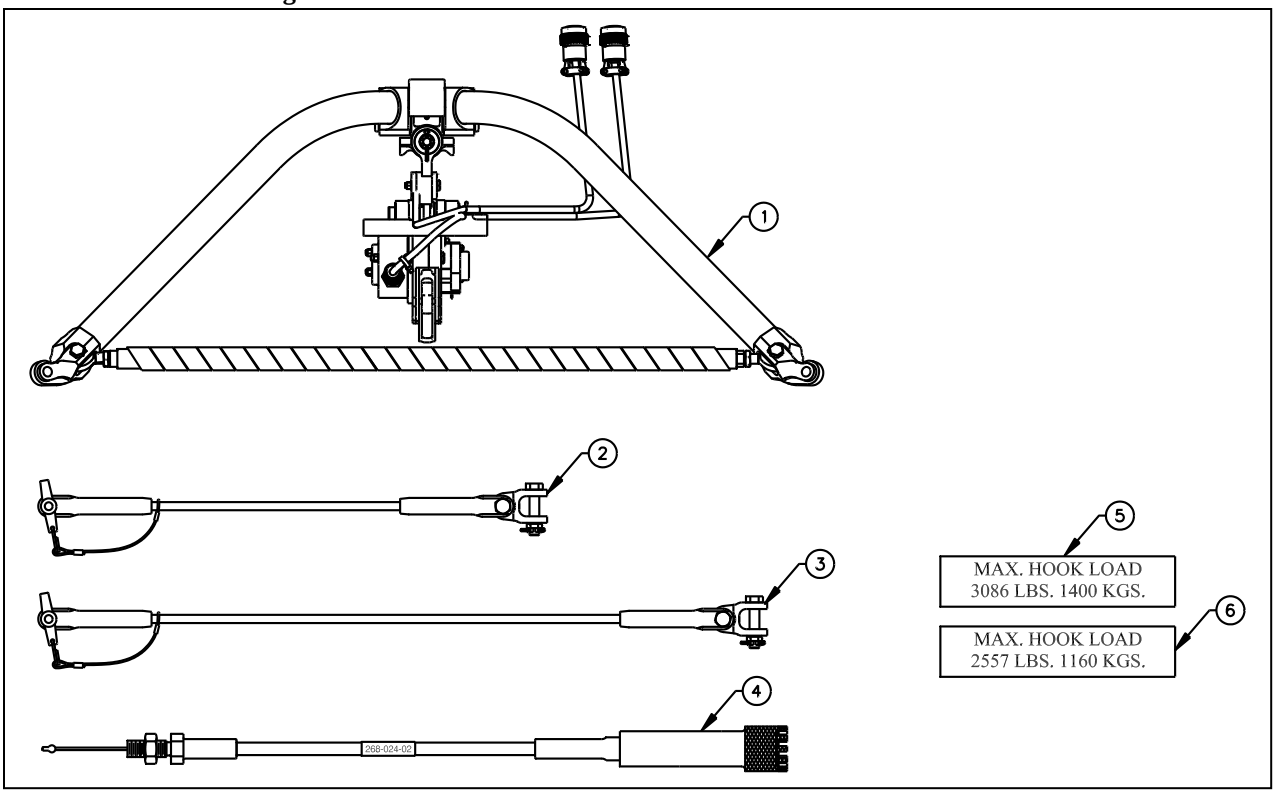
# *Section 5*
## System Part Numbers

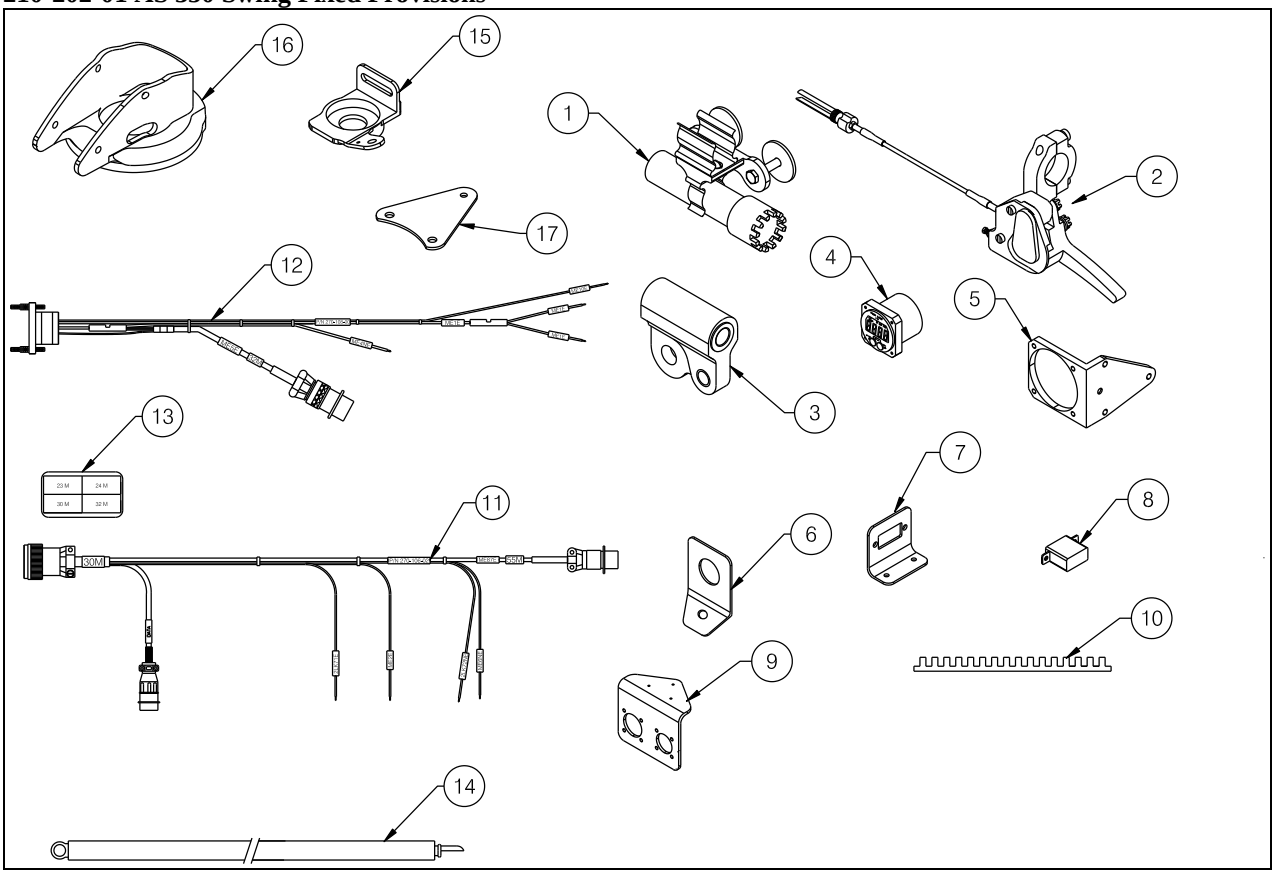
**210-201-03 AS 350 Swing Removable Provisions**




| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 232-145-03 | Hook Frame Assembly | 1 |
| 2 | 232-140-01 | Forward Attach Cable Assembly | 2 |
| 3 | 232-141-01 | Aft Attach Cable Assembly | 2 |
| 4 | 268-024-02 | Manual Release Cable Assembly | 1 |
| 5 | 215-166-00 | Max Hook Load 3086 Decal | 1 |
| 6 | 215-168-00 | Max Hook Load 2557 Decal | 1 |

# System Part Numbers continued

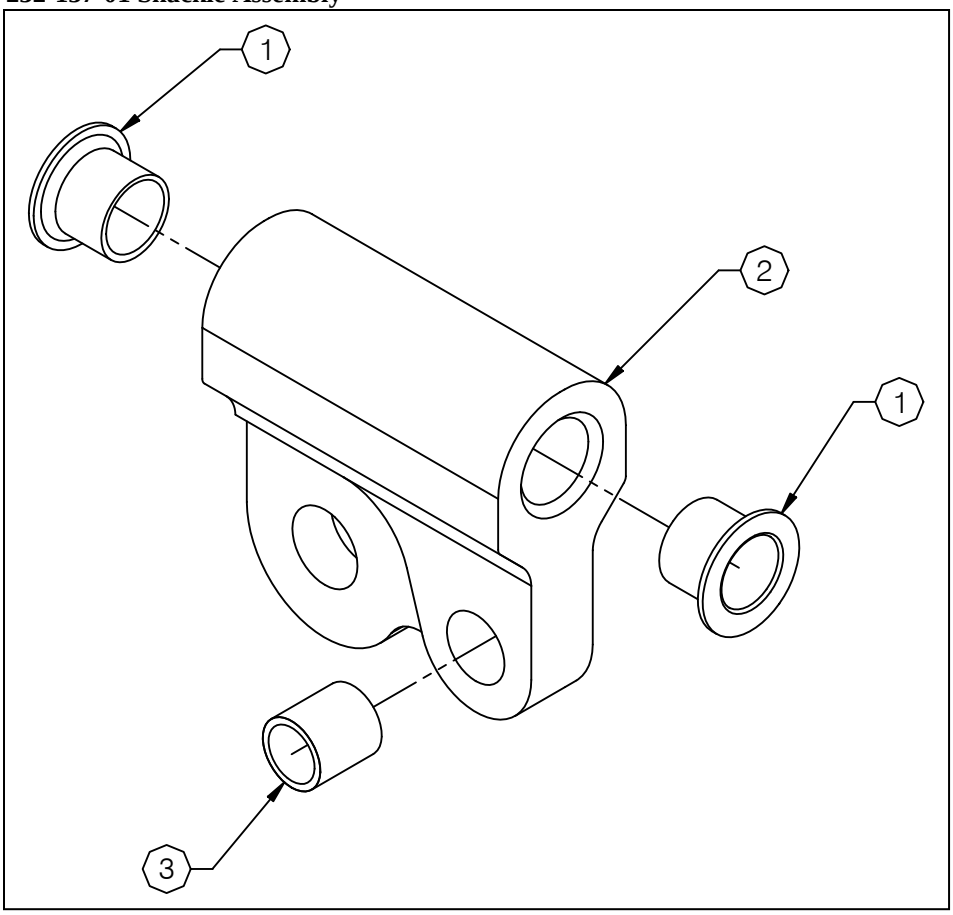
**210-202-01 AS 350 Swing Fixed Provisions**




| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 232-151-00 | Fixed Quick Disconnect Assembly | 1 |
| 2 | 232-150-00 | Release Handle Assembly | 1 |
| 3 | 232-137-01 | Shackle Assembly | 4 |
| 4 | 210-095-00 | C-39 Indicator Assembly | 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 | 290-782-00 | Connector Bracket | 1 |
| 10 | 500-065-00 | Grommet Edging | 1 |
| 11 | 270-106-02 | Load Weigh Internal Harness | 1 |
| 12 | 270-108-00 | Electrical Release Internal Harness | 1 |
| 13 | 215-165-00 | Multiple Sticker Sheet | 1 |
| 14 | 270-125-00 | Ground Strap | 1 |
| 15 | 290-888-00 | Retainer | 1 |
| 16 | 290-889-01 | Guard | 1 |
| 17 | 290-893-00 | Bracket | 1 |

# System Part Numbers continued

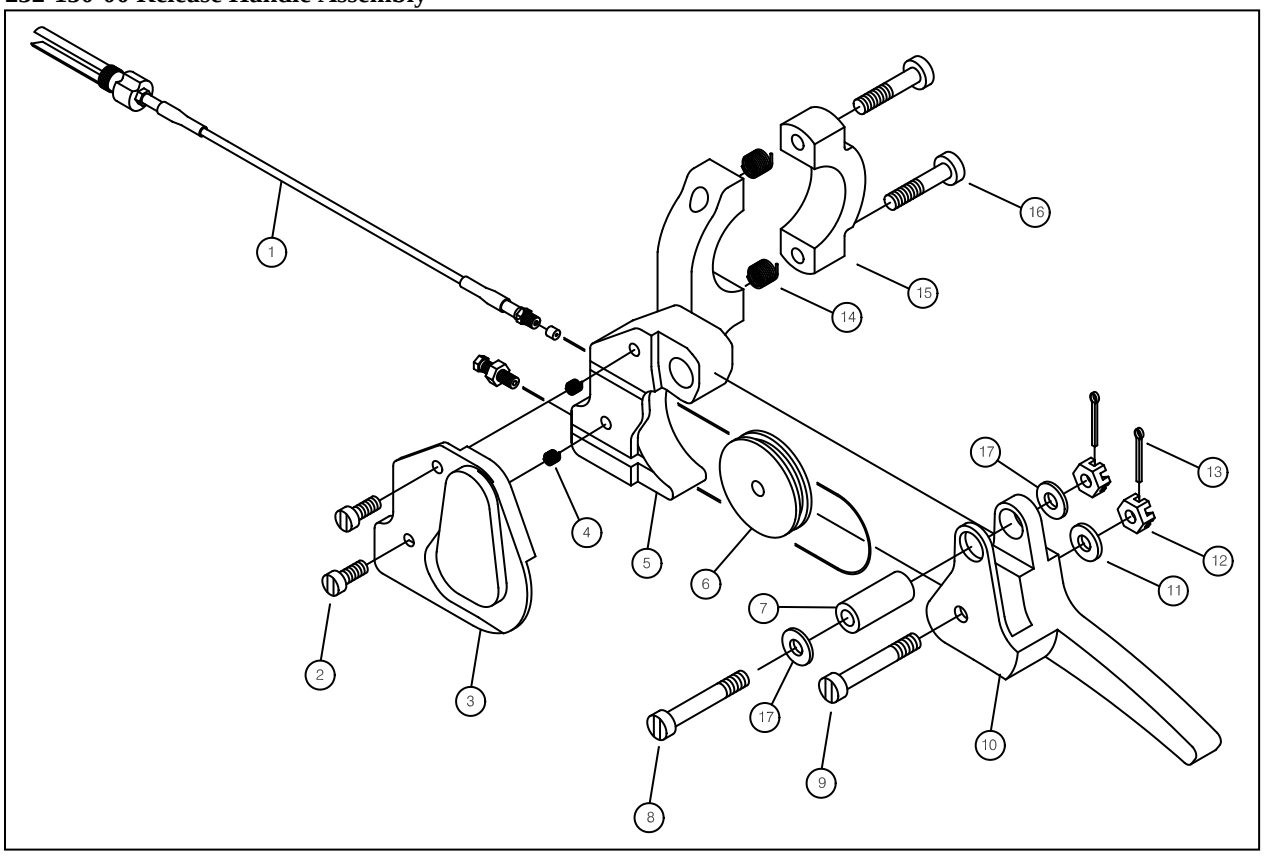
**232-137-01 Shackle Assembly**




| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 517-047-00 | Bushing | 2 |
| 2 | 290-850-00 | Airframe Attach Fitting | 1 |
| 3 | 517-016-00 | Bushing | 1 |

# System Part Numbers continued

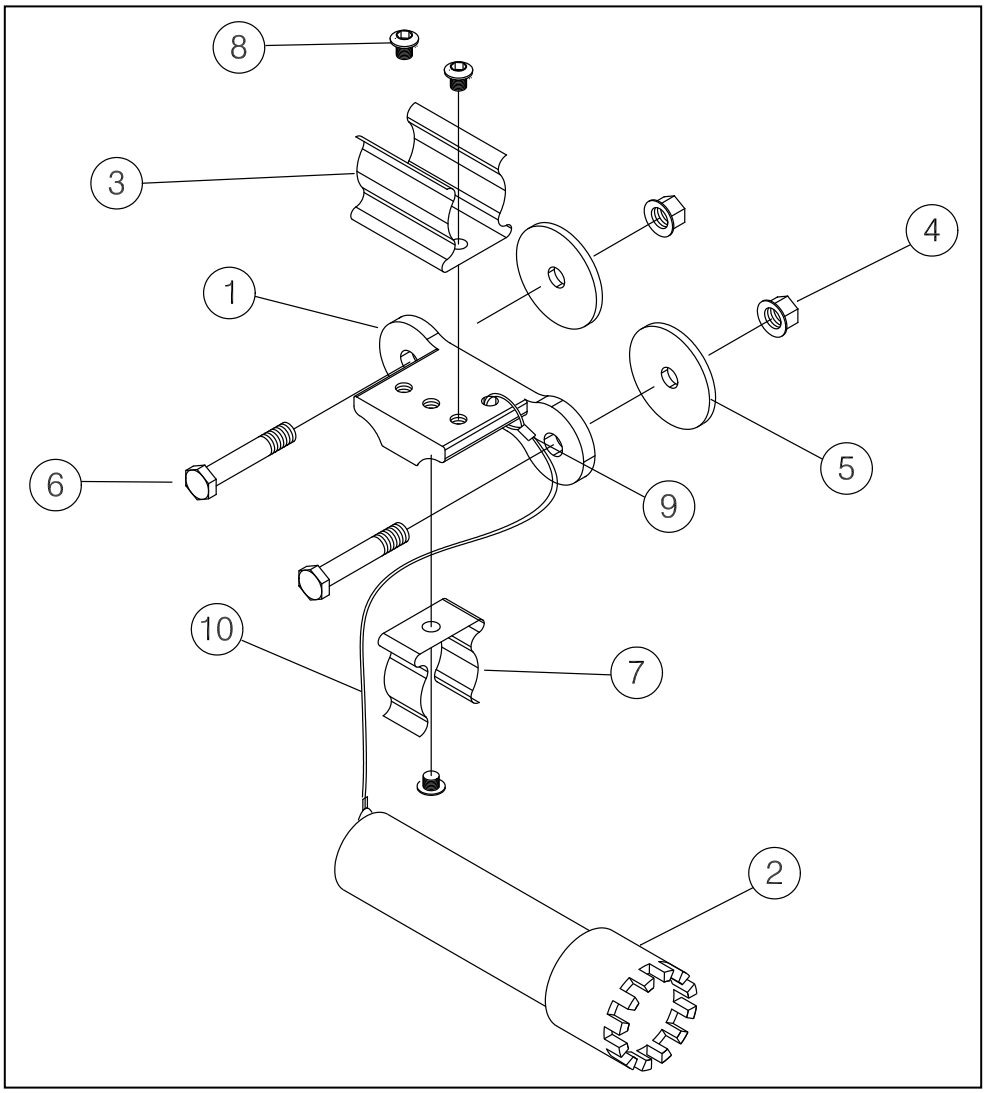
**232-150-00 Release Handle Assembly**




| 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 | 290-754-00 | 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 | 290-753-00 | Clamp Half | 1 |
| 16 | 510-390-00 | Screw, Mounting Clamp | 2 |
| 17 | 510-095-00 | Washer | 2 |

# System Part Numbers continued

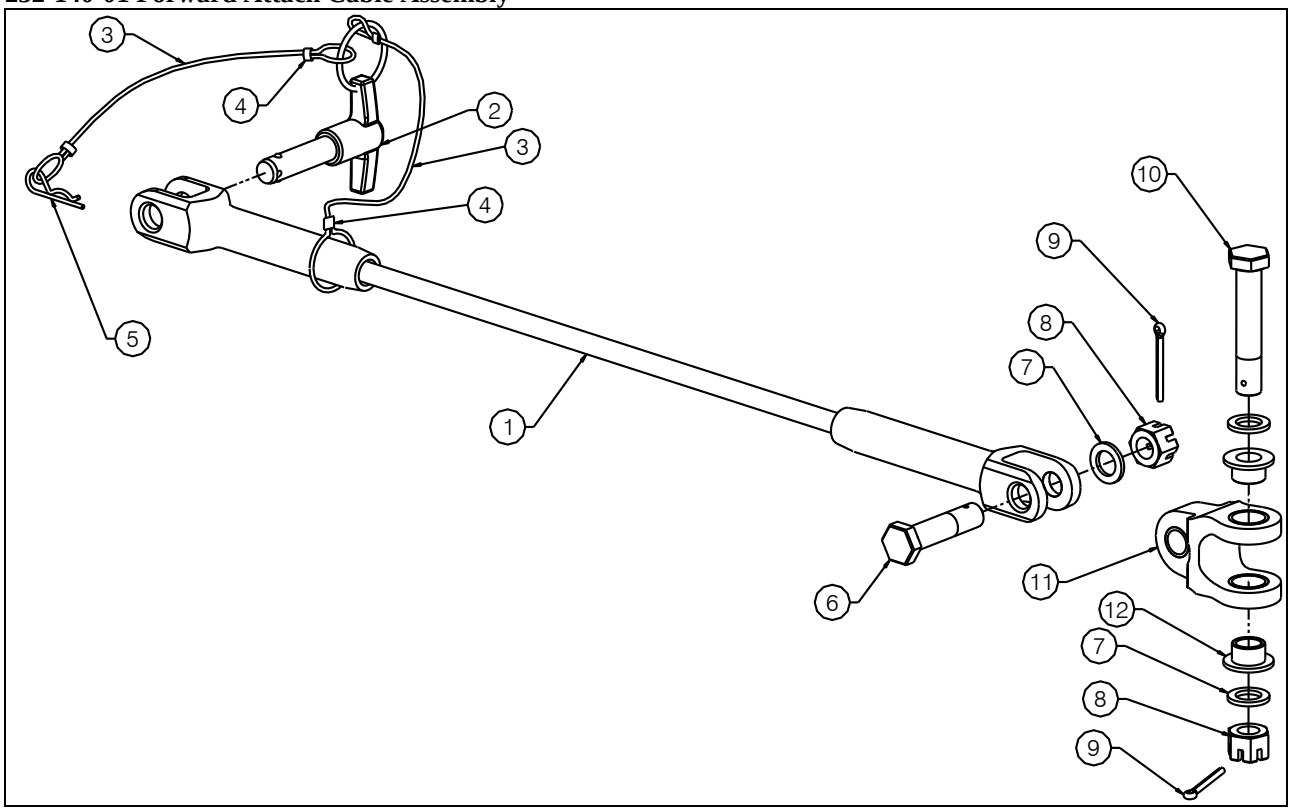
**232-151-00 Quick Disconnect Support Assembly**




| 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

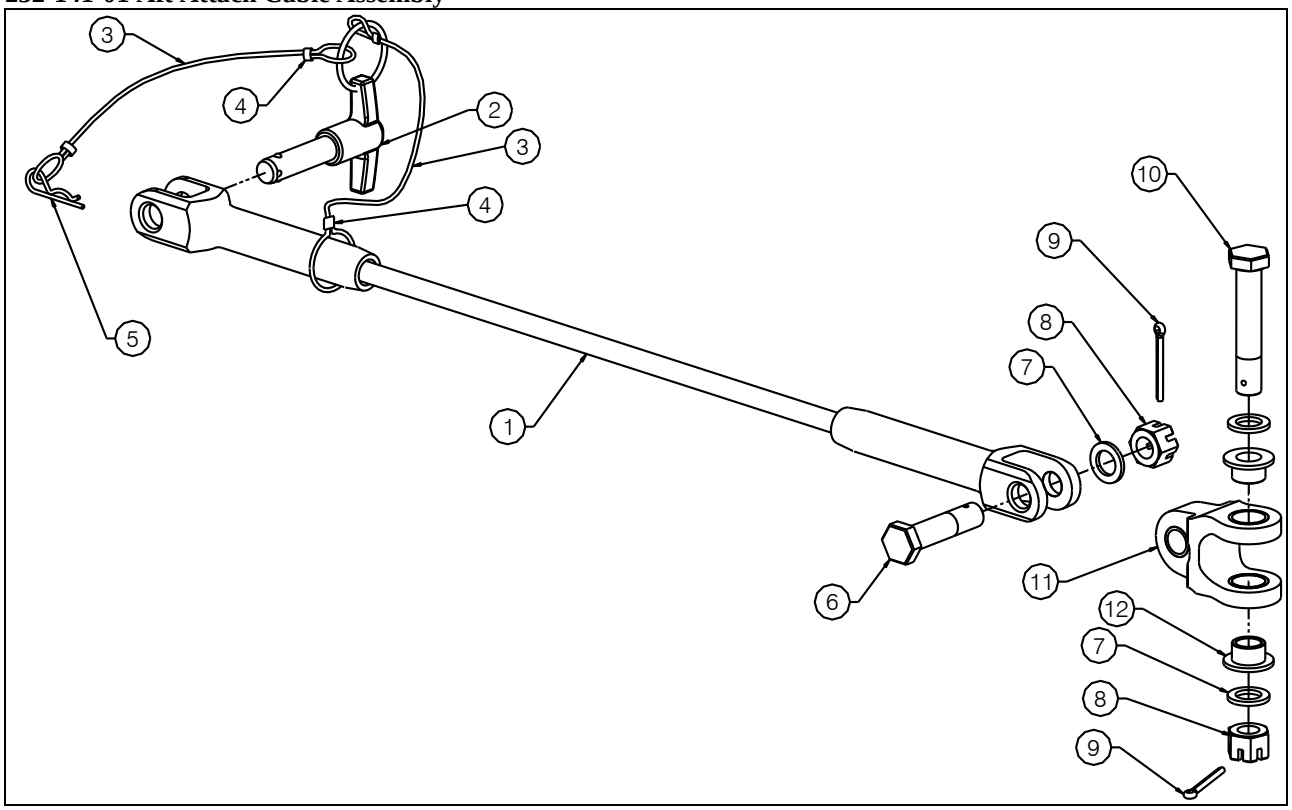
**232-140-01 Forward Attach Cable Assembly**




| 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

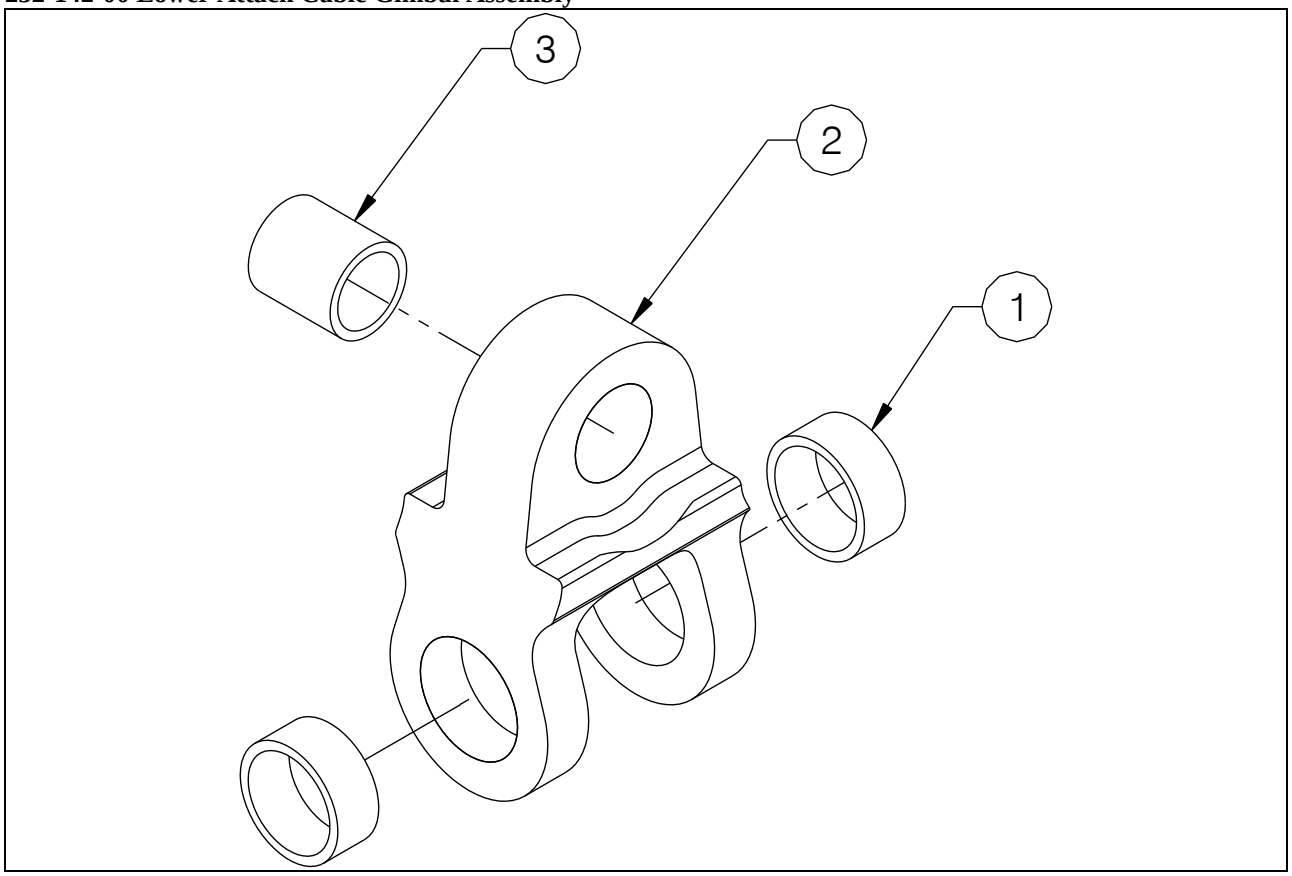
**232-141-01 Aft Attach Cable Assembly**




| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 232-178-00 | Aft 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

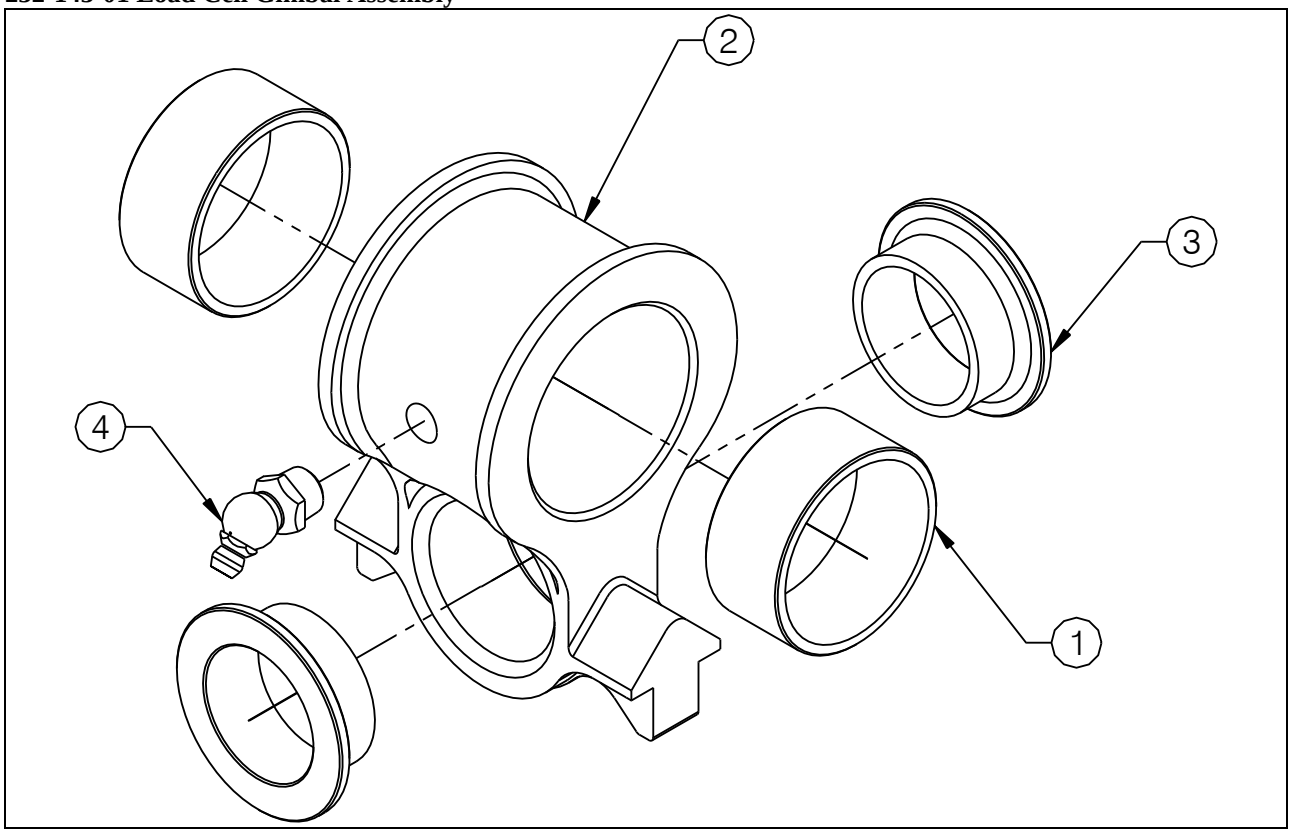
**232-142-00 Lower Attach Cable Gimbal Assembly**




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

# System Part Numbers continued

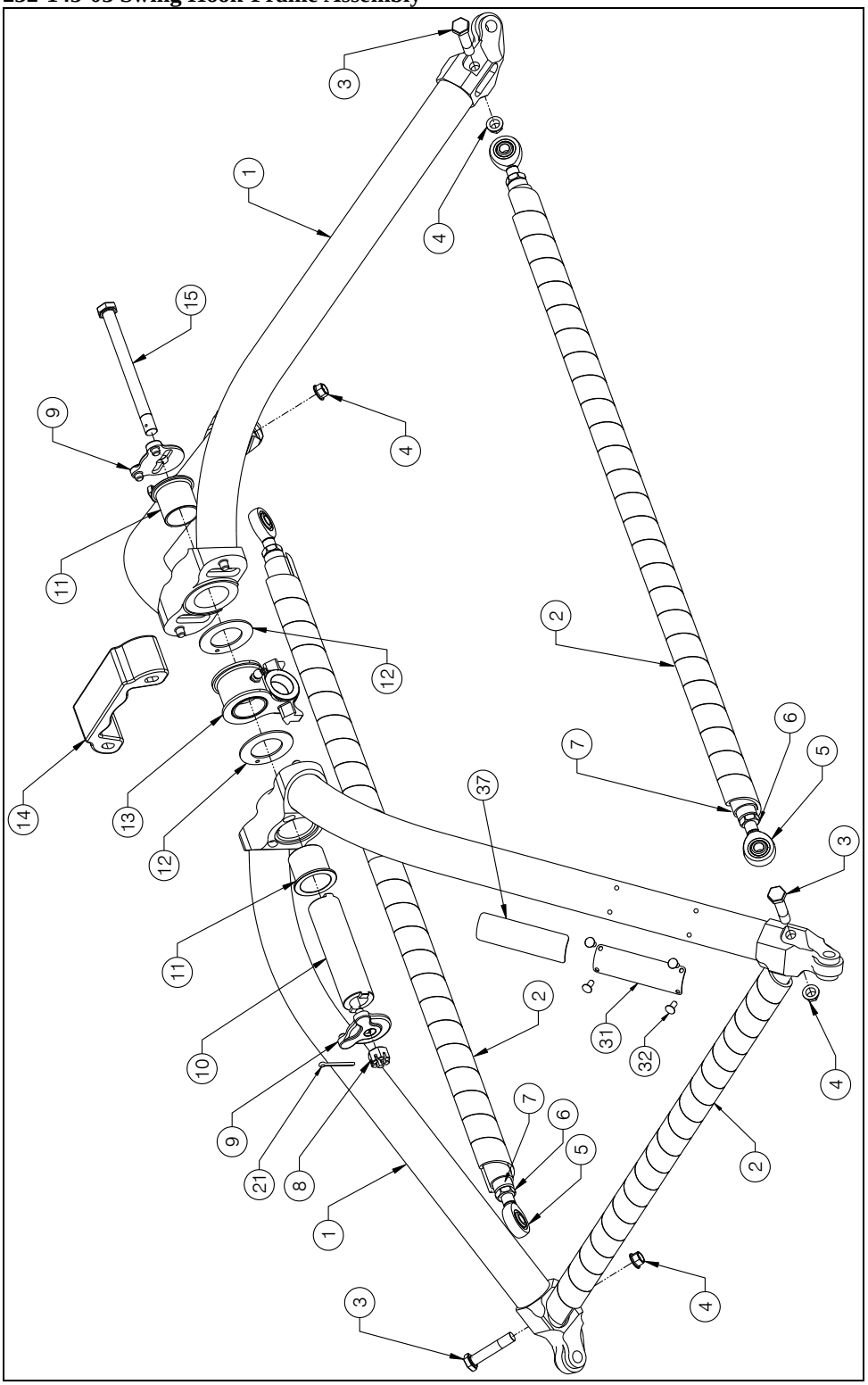
**232-143-01 Load Cell Gimbal Assembly**



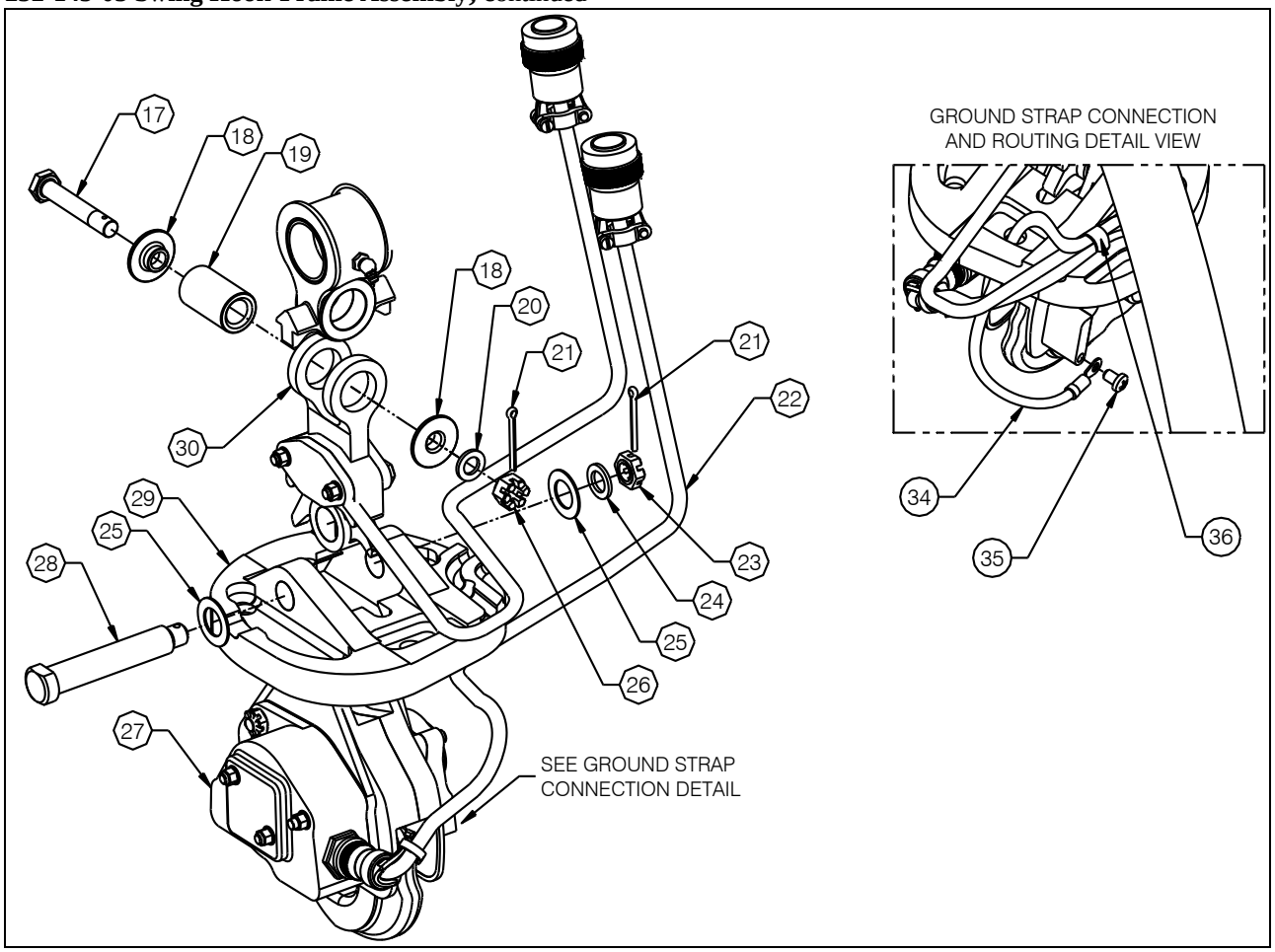

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 517-056-00 | Bushing Upper Hook Gimbal | 2 |
| 2 | 290-841-00 | Gimbal Link | 1 |
| 3 | 517-046-00 | Bushing Lower Hook Gimbal | 2 |
| 4 | 518-003-00 | Grease Fitting | 1 |

# System Part Numbers continued

**232-145-03 Swing Hook-Frame Assembly**



**232-145-03 Swing Hook-Frame Assembly,** continued



**232-145-03 Swing Hook-Frame Assembly**

| Item | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 235-117-00 | Swing Frame Half | 2 |
| 2 | 290-845-00 | Foot – Right | 2 |
| 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 | 290-846-00 | Foot – Left | 2 |
| 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 | 270-107-00 | Electrical Release Cable | 1 |
| 23 | 510-170-00 | Nut | 1 |
| 24 | 510-174-00 | Washer | 1 |
| 25 | 510-183-00 | Washer | 1 |
| 26 | 510-320-00 | Nut, Castellated | 1 |
| 27 | 528-029-00 | 3600 lb. Keeperless Cargo Hook | 1 |
| 28 | 290-775-00 | Attach Bolt | 1 |
| 29 | 290-774-00 | Hook Bumper | 1 |
| 30 | 210-249-03* | AS350 Swing Load Cell Assembly | 1 |
| 31 | 590-011-00 | Spiral Wrap | 146” |
| 32 | 215-183-00 | Serial Number Plate | 1 |
| 33 | 510-429-00 | Drive Screw | 4 |
| 34 | 270-126-00 | Ground Strap | 1 |
| 35 | 510-391-00 | Screw | 1 |
| 36 | 512-011-00 | Ty-Wrap | 2 |
| 37 | 215-271-00 | Fuel Drain Warning Placard | 1 |

* Supersedes 210-249-00, 210-199-01 and 210-199-00. These part numbers are interchangeable.

# *Section 6*
## Certification
### FAA STC

United States of America
Department of Transportation Federal Aviation Administration

# Supplemental Type Certificate

*Number* **SR01164SE**

*This certificate, issued to:* **Onboard Systems International**
**13915 NW 3rd Court**
**Vancouver, WA 98685**

*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.**

*Original Product—Type Certificate Number:* H9EU
*Make:* Eurocopter France
*Model:* AS350B, AS350B1, AS350B2, AS350B3, AS350BA, and AS350D

*Description of the Type Design Change:* Fabrication of Onboard Systems Model 200-280-01, 200-280-02, 200-280-03, or 200-280-04, Cargo Hook Swing Suspension System in accordance with FAA-approved Onboard Systems Master Drawing List No. 155-086-00, Revision 27, dated October 30, 2009, or later FAA-approved revision.

Installation of the systems in accordance with FAA-approved Onboard Systems Owner's Manual No. listed in the table below, or later FAA-approved revision. This modification must be inspected and maintained in accordance with Section 5 of the FAA-approved Onboard Systems Instructions for Continued Airworthiness (ICA) and Onboard Systems Cargo Hook Service Manual listed in the table below, or later FAA-approved revision. (See Continuation Sheet on Page 3)

*Limitations and Conditions:* Approval of this change in type design applies to the Eurocopter AS350 model rotorcraft listed above. This approval should not be extended to other rotorcraft 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 rotorcraft. Rotorcraft modified in accordance with this STC must be operated in accordance with a copy of a FAA-approved Onboard Systems Rotorcraft Flight Manual Supplement (RFMS) listed in the table below, or later FAA-approved revision. (See Continuation Sheet on Page 3)

*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.*

*Date of application:* March 29, 2002 *Date reissued:*
*Date of issuance:* January 22, 2003 *Date amended:* October 26, 2004; February 04, 2005; October 30, 2007; April 13, 2010

*By direction of the Administrator*

*(Signature)*
Acting Manager, Seattle Aircraft Certification Office
*(Title)*

*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.*

FAA FORM 8110-2 (10-68) PAGE 1 OF 3 PAGES

United States of America

Department of Transportation—Federal Aviation Administration

# Supplemental Type Certificate

## (Continuation Sheet)

*Number* **SR01164SE**

**Onboard Systems International**

*Issued:* January 22, 2003

*Reissued:* [January ##, 2001] AND/OR

*Amended:* October 26, 2004; February 04, 2005; October 30, 2007; April 13, 2010

*Description of the Type Design Change continued:*

| SYSTEM PART NUMBER (P/N) | OWNER'S MANUAL NO. | INSTRUCTIONS FOR CONTINUED AIRWORTHINESS AND CARGO HOOK SERVICE MANUAL: |
|---|---|---|
| 200-280-01 | 120-104-01 Revision 1, dated September 29, 2004 | 123-011-01 Revision 0, dated August 11, 2004<br>122-005-00 Revision 15, dated April 23, 2009 |
| 200-280-02 | 120-104-02 Revision 10, dated May 23, 2007 | 123-011-02 Revision 5, dated January 27, 2009<br>122-015-00 Revision 7, dated January 30, 2009 |
| 200-280-03 | 120-104-02 Revision 10, dated May 23, 2007 | 123-011-02 Revision 5, dated January 27, 2009<br>122-015-00 Revision 7, dated January 30, 2009 |
| 200-280-04 | 120-104-03 Revision 0, dated October 12, 2009 | 123-011-03 Revision 0, dated January 27, 2010<br>122-017-00 Revision 5, dated July 27, 2009 |

*Limitations and Conditions continued:*

| SYSTEM PART NUMBER | ROTORCRAFT FLIGHT MANUAL SUPPLEMENT |
|---|---|
| 200-280-01 | 121-012-01, Revision 2, dated June 12, 2007 |
| 200-280-02 | 121-012-02, Revision 3, dated October 25, 2007 |
| 200-280-03 | 121-012-02, Revision 3, dated October 25, 2007 |
| 200-280-04 | 121-012-03, Revision 0, dated March 4, 2010 |

A copy of this certificate, FAA-approved RFMS, ICA, and Service Manual must be maintained as part of the permanent records of the modified rotorcraft.

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.*

FAA FORM 8110-2-1 (10-69) PAGE 3 OF 3 PAGES

# Transport Canada Approval

Transport Canada
Aviation

Transports Canada
Aviation

Aircraft Certification Branch
620 - 800 Burrard Street
Vancouver, BC V6Z 2J8

*Your file* *Votre référence*
190S-03-169
*Our file* *Notre référence*

March 24, 2003

Onboard Systems
13915 NW 3rd Court
Vancouver, WA 98685
USA

Attention: Mr. Ron Pirtle

**Subject: Acceptance of Foreign STCs SR01164SE, SR01165SE, and SR01166SE**

Dear Sir:

This is in response to your letters dated February 25, 2003 making application for Canadian approvals of the subject STCs.

In accordance with our current policy associated with the review of foreign STCs, some STCs applicable to certain categories of rotorcraft 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 STCs fall within these criteria.

These STCs 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 STCs by Transport Canada. Should you require additional information with regards to this matter or clarification please do not hesitate to contact the undersigned at (604) 666-5597.

Yours truly,

H. W. Wong
Senior Engineer, Aircraft Certification

for
Minister of Transport

c.c. Mr. Jeffrey E. Duven
Acting Manager, Seattle ACO

Canada

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# EASA STC

European Aviation Safety Agency

## SUPPLEMENTAL TYPE CERTIFICATE

## 10016937, REV. 2

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.008** |
| **TC Holder:** | **EUROCOPTER** |
| **Model:** | **AS 350 B, AS 350 B1** |
| **Model:** | **AS 350 B2, AS 350 B3** |
| **Model:** | **AS 350 BA, AS 350 D** |
| **Original STC Number:** | **FAA STC SR01164SE** |

**EASA Certification Basis:**
As per EASA TCDS.R.008 Issue 04, 23 November 2009.
The Certification Basis for the original product and the following additional or alternative airworthiness requirements are applicable to this certificate/ approval.
Change under Revision 2 complies with FAR 27 at amdt 27-39.
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:**
External Load Swing Suspension System models 200-280-01 and -04 (with Keeperless Cargo Hooks) and model 200-280-02 and -03 (with Hydraulic Cargo Hooks)
Revision 1 - introduced cargo hook kit 200-280-03 with a collective friction knob and a new release lever to accommodate the AS350B3 style collective configuration
Revision 2 - introduced cargo hook kit 200-280-04 (with Keeperless Cargo Hook 528-029-00)

See Continuation Sheet(s)

**For the European Aviation Safety Agency,**

**Date of issue: 21.06.2010**

For **Massimo MAZZOLETTI**
**Certification Manager**
**Rotorcraft, Balloons, Airships**

Note:
The following numbers are listed on the certificate:
EASA old Project Number: EASA.IM.R.S.01324, REV. 2

European Aviation Safety Agency

This STC is the validation of FAA STC SR01164SE issued on January 22, 2003 and last amended on April 13, 2010

**Associated Technical Documentation:**
Definition and installation:
Onboard Systems Master Drawing List No. 155-086-00, Rev. 27, dated October 30, 2009, approved by FAA.
Onboard Systems Owner's Manual:

No. 120-104-01 (for system model 20028001), Rev. 10 dated October 30, 2008, approved by FAA,
or
No. 120-104-02 (for system model 20028002 and -03), Revision 18 dated July 1, 2009, approved by FAA,
or
No. 120-104-03 (for system model 20028004), Revision 0 dated October 12, 2009, approved by FAA.
Inspection and maintenance:
Onboard Systems Instructions for Continued Airworthiness:

No. 123011-01 (for system model 20028001), Rev. 3 dated October 29, 2007 approved by FAA,
or
No. 123011-02 (for system model 20028002 and -03), Rev. 5 dated January 27, 2009 approved by FAA,
or
No. 123011-03 (for system model 20028004), Rev. 0 dated January 27, 2010 approved by FAA,
and

Onboard Systems Service Manual:

No. 122005-00 (for Keeperless Cargo Hook 528-023-01), Rev. 17 dated March 9, 2010 approved by FAA,
or
No. 122-015-00 (for Hydraulic Cargo Hook), Rev. 7 dated January 30, 2009 approved by FAA,
or
No. 122-017-00 (for Keeperless Cargo Hook 528-029-00), Rev. 8 dated March 10, 2010 approved by FAA.
Operation:

Onboard Systems RFMS:

No. 121-012-01 (for system model 20028001), Rev. 2 dated June 12, 2007 approved by FAA,
or
No. 121-012-02 (for system model 200-280-02 and -03) Rev. 3 dated October 25, 2007 approved by FAA,
or
No. 121-012-03 (for system model 200-280-04) Rev. 0 dated March 4, 2010 approved by FAA.

Note:
The following numbers are listed on the certificate:
EASA old Project Number: EASA.IM.R.S.01324, REV. 2

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or later revisions of the above listed documents approved by EASA in accordance with EASA ED Decision 2004/04/CF (or subsequent revisions of this decision)

**Limitations:**
1. EASA-approved AS350 Flight Manual and <External Load Transport: Cargo Swing> FM supplement are required.
2. This STC is approved only for the product configuration as defined in the approved design data referred to in the paragraph "Description". Compatibility with other aircraft/engine configurations shall be determined by the installer.
3. Installation and operation of the system on AS350B3 with the modification OP-3369 incorporated is not approved.

**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.01324, REV. 2

SUPPLEMENTAL TYPE CERTIFICATE - 10016937, REV. 2 - ONBOARD SYSTEMS INT.

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