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Cargo Hook Kits

For The

MD Helicopters
369 Series and 500N

STC SR01778SE

System Part Numbers
200-378-XX
200-379-XX

Owner's Manual

Owner's Manual Number 120-207-00
Revision 8
12/08/23

ONBOARD™ SYSTEMS INTERNATIONAL

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Record of Revisions

Revision	*Date*	*Page(s)*	*Reason for Revision*
0	03/02/11	All	Initial Release
1	05/01/12	1-2, 1-3, 2-8	Added attach point assembly 232-449-01 (supersedes 232-449-00).
2	11/18/13	2-9 to 2-21	Updated pin load cell installation instructions.
3	08/21/15	1-2, 2-2, 2-9, 4-2, 4-3	Added load cell P/N 210-301-03. Updated cargo hook rigging section.
4	02/04/16	All	Added kit P/N's 200-378-10, 200-379-01, 200-378-10, and 200-379-11 which include cargo hook P/N 528-028-02 with Surefire release.
5	08/14/17	2-15	Changed supplied bleed kit P/N to 212-014-02 which includes MIL-PRF-87257 hydraulic fluid.
6	07/30/19	Sections 1, 2 and 3	Added C-40 load indicator and associated instructions.
7	08/08/23	1-3	Updated spiral wrap P/N from 590-013-00 to 590-046-00 and corrected quantity of 215-010-00 to 1 for kit P/N 200-379-00 and -10.
8	12/08/23	1-3, 4, 5, and 2-2	Replaced C-40 Indicator P/N 210-293-00 with 210-293-01 in new production kits.

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Section 1
General Information
Introduction

This Owner's Manual contains installation and operation instructions for cargo hook kit P/Ns 200-378-00, 200-378-10, 200-379-00, 200-379-01, 200-379-10, and 200-379-11. These cargo hook kits are approved for installation on the following MD Helicopter models: 369D, 369E, 369F, 369FF, 369HS, 369HM, 369HE, and 500N.

These kits are suitable for installation on these listed models which are equipped with an MD Helicopter 369H90072 series cargo hook kit (with cargo hook assembly P/N 369H92105-501), or Onboard Systems Cargo Hook Kits 200-187-00, 200-264-00, or 200-264-01.

Kit P/Ns 200-378-10, 200-379-10, and 200-379-11 include a Cargo Hook with Surefire release as part of the electrical release system. Surefire is a safety enhancement to protect against inadvertent load release due to accidental contact with the release switch or mistaken actuation of the release switch when another is intended. See Theory of Operation section for complete description of the Surefire release.

Kit P/N 200-379 series include a load weigh system. The load weigh system is a compliment to the helicopter external load lifting system. Its purpose is to display the weight of the load carried on the cargo hook. It consists of three components: the cockpit mounted load weigh indicator, the load cell, and the interconnecting electrical harness between them.

P/N 200-379-01 and 200-379-11 kits include a C-39 load indicator with an NVG backlight.

The load weigh indicator included with P/N 200-379-00 and 200-379-10 has been updated to Onboard Systems' next generation indicator, the C-40 model. The C-40 Indicator makes several improvements over the C-39 model while preserving classical features and is generally backwards compatible. The C-40 Indicator offers these improvements:

- Full color display
- Load measurement displayed in full, not X 10 (C-39 is X 10)
- Addition of Analog Bar and Maximum Load features
- Simplified user interface
- Addition of Cargo Hook hour meter
- Selectable backlight control voltage, 5 or 28 VDC
- Improved moisture resistance
- Expanded signal input range
- Field-upgradable firmware

Refer to the Owner's Manual 120-152-00 for additional information and detailed operating instructions for the C-40 Indicator.

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.

Bill of Materials

The following items are included with the 200-378-XX and 200-379-XX kits.

Table 1.1 Bill of Materials

Part No.	Description	Qty 200-378-XX		Qty 200-379-XX			
		-00	-10	-00	-01	-10	-11
210-095-04	C-39 Indicator, NVG, 28V	-	-	-	1	-	1
210-293-01	C-40 Indicator***	-	-	1	-	1	-
210-301-03**	Pin Load Cell Assembly	-	-	1	1	1	1
212-014-02	Hydraulic Hook Bleed Kit	1	1	1	1	1	1
215-343-00	Cockpit Decal - Surefire	-	1	-	-	1	1
232-197-00	Release Lever Assy with Plumbing	1	1	1	1	1	1
232-203-00	Cargo Hook/Slave Cylinder Assembly	1	-	1	1	-	-
232-203-02	Cargo Hook/Slave Cylinder Assembly	-	1	-	-	1	1
232-449-01*	Attach Point Assembly	1	1	1	1	1	1
232-456-00	Spacer Assembly	1	1	1	1	1	1
270-047-01	Load Weigh Internal Harness	-	-	-	1	-	1
270-283-02	Load Weigh Internal Harness	-	-	1	-	1	-
270-132-00	Electrical Release Harness	1	1	1	1	1	1
290-332-00	Attach Bolt	1	1	-	-	-	-
290-909-00	Modified Loop Clamp	1	1	1	1	1	1
215-010-00	Load Weigh Placard	-	-	1	2	1	2
215-012-00	Load Weigh Placard	-	-	-	1	-	1
400-048-00	Power Switch	-	-	-	1	-	1
505-014-00	Grommet	1	1	1	1	1	1
505-015-00	Grommet	1	1	1	1	1	1
510-028-00	Screw, #4-40	-	-	4	4	4	4
510-029-00	Nut	-	-	4	4	4	4
510-062-00	Washer	-	-	4	4	4	4
510-100-00	Washer	4	4	4	4	4	4
510-170-00	Nut	1	1	1	1	1	1
510-174-00	Washer	1	1	1	1	1	1
510-178-00	Cotter Pin	1	1	1	1	1	1
510-183-00	Washer	2	2	1	1	1	1
510-308-00	Bolt	4	4	4	4	4	4
512-001-00	Ty-rap – 3.5”	10	10	10	10	10	10
512-026-00	Cushioned Loop Clamp	2	2	2	2	2	2
511-211-00	Screw	-	-	4	-	4	-
590-046-00	Spiral Hose Wrap	18”	18”	18”	18”	18”	18”

continued

Bill of Materials continued

Table 1.1 Bill of Materials continued

Part No.	Description	Qty 200-378-XX		Qty 200-379-XX			
		-00	-10	-00	-01	-10	-11
120-039-00	Owner's Manual, C-39 Load Indicator	-	-	-	1	-	1
120-152-00	Owner's Manual, C-39 Load Indicator	-	-	1	-	1	-
120-207-00	Owner's Manual	1	1	1	1	1	1
121-028-01	RFM Supplement	1	1	1	1	1	1
122-015-00	CMM, Cargo Hook	1	1	1	1	1	1

***** *Supersedes 232-449-00. 232-449-01 provides compatibility with the Onboard Systems E-51 load cell assembly, otherwise these assemblies are interchangeable (the E-51 is approved under a separate STC).*

****** *Supersedes P/N 210-226-03, these P/Ns are interchangeable in this installation.*

*****The C-40 Indicator (P/N 210-293-01) supersedes the C-39 Indicator (P/N 210-095-00) and is supplied with Load Weigh Internal Harness P/N 270-283-02 which supersedes P/N 270-047-01 used with the C-39.*

C-40 Indicator P/N 210-293-01 replaces P/N 210-293-00 in new productions kits as of November 2023, these are interchangeable with the exception of software compatibility. Refer to C-40 Owner's Manual 120-152-00 for specific software versions.

NOTICE

The C-40 Indicator is a direct replacement for the C-39 Indicator if optional items of Figure 2.2.1 (analog meter, C-30 data recorder, etc.) are not connected to the C-39 (see Section 2.3).

Bill of Materials continued

Kit P/N 200-383-00 is a load weigh upgrade kit intended for operators using the 200-378-XX kit and who would like to add a load weigh system (non-NVG version). It converts the P/N 200-378-XX kit to a P/N 200-379-XX kit. The following items are included with this kit.

Table 1.2 Bill of Materials – Kit P/N 200-383-00

Part No.	Description	Qty
210-293-01*	C-40 Indicator	1
210-301-03	Pin Load Cell Assembly	1
270-283-02	Load Weigh Internal Harness	1
215-010-00	Load Weigh Placard	2
215-012-00**	Load Weigh Placard	-
400-048-00**	Power Switch	-
510-028-00	Screw, #4-40	4
510-029-00	Nut	4
510-062-00	Washer	4
120-152-00	Owner's Manual, C-40 Load Indicator	1

**Indicator P/N 210-293-01 supersedes 210-095-00 and is supplied with Load Weigh Internal Harness P/N 270-283-02 which supersedes P/N 270-047-01 used with the C-39 Indicator. Indicators are interchangeable.*

*** Items not included with the C-40 Indicator, were previously included with C-39 Indicator.*

Specifications

Table 1.3 P/N 528-028-00, -02 Cargo Hook Specifications

Design load	3,500 lbs. (1,580 kg.)
Design ultimate strength	13,125 lbs. (5,953 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.	14 lbs max. @ Master Cylinder
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	PC05A8-2S

Table 1.4 P/N 232-449-00/-01 Attach Point Assembly Specifications

Design Load	2,500 lbs (1134 kgs)
Design Ultimate Strength	9,375 lbs (4,252 kgs)

Loads given are an indication of the structural capacity of the equipment only. All helicopter external load limits as described in the RFM still apply.

Theory of Operation

The primary elements of the Cargo Hook are the load beam, the internal mechanism, and a DC solenoid. The load beam supports the load and is latched through the internal mechanism. The DC solenoid and an external hydraulic release system provide the means for unlatching the load beam.

The load is attached to the load beam by passing the 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 slides off the load beam. The load beam then remains in the open position awaiting the next load.

A load release can be initiated by three different methods. Normal release is achieved by pilot actuation of the push-button release switch in the cockpit. When the switch is pressed, it energizes the DC solenoid in the Cargo Hook, and the solenoid opens the latch in the internal mechanism. In an emergency, release can be achieved by operating a hydraulic release lever. The hydraulic release lever operates the internal mechanism of the Cargo Hook to unlatch the load beam. The load can also be released by the actuation of a lever located on the side of the Cargo Hook.

The optional cargo hook with Surefire includes a short time delay circuit built into the cargo hook's electrical release system (cargo hook P/N 528-028-02). This feature is a safety enhancement to protect against inadvertent load release due to accidental contact with the release switch or mistaken actuation of the cargo hook switch when another is intended. The time delay feature requires that the release switch be depressed and held for more than a 1/2 second to open the cargo hook. Surefire makes the electrical release a more deliberate pilot command. If the cargo hook must be released immediately, use the mechanical backup release.

In addition to its P/N, a cargo hook with Surefire can be identified by a gold color solenoid housing (see Figure 1.3). Also, a placard on the underside of the solenoid housing indicates that the electrical release is delayed by ½ second.

NOTICE

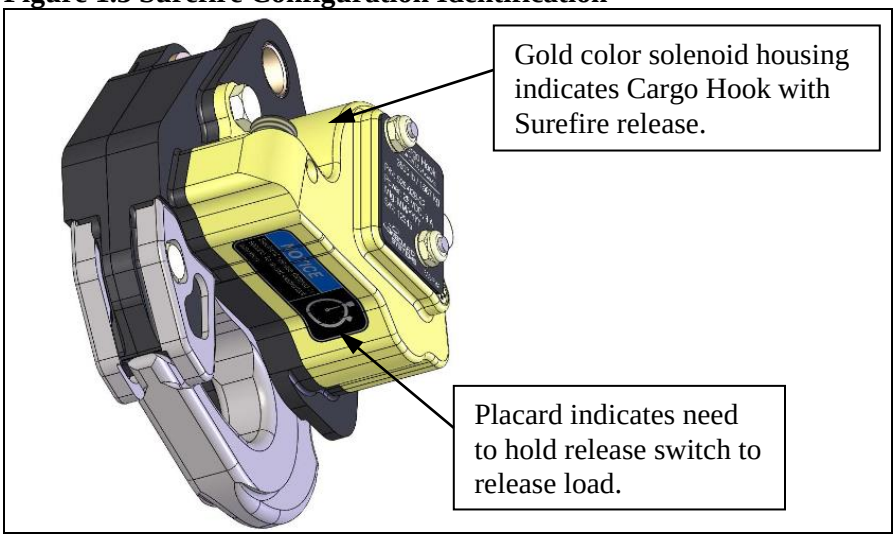
The 528-028-02 cargo hook includes an electronic delay of approximately ½ second. It is necessary to press and hold the cargo hook release button.

⚠ CAUTION

If a Surefire-equipped cargo hook must be released immediately without any delay (such as the case of engine failure or snagged load), use the mechanical backup release.

In addition to the delay feature the circuit includes on-off cycling to limit the duty-cycle on the cargo hook solenoid. If the release switch is held down, the solenoid will cycle on and off repeatedly in a "machine gun" fashion.

Figure 1.3 Surefire Configuration Identification



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 Existing Equipment Removal

Remove the existing Cargo Hook from the aircraft and disconnect the electrical release cable from the belly mounted bulkhead connector.

Disconnect the manual release cable from the cargo hook and remove the entire cable and manual release lever from the aircraft by disconnecting it from the cyclic stick and attaching clamps.

Remove the bolt used to attach the Cargo Hook and/or load cell to the attach point or load cell (if installed) and separate the Cargo Hook from the aircraft.

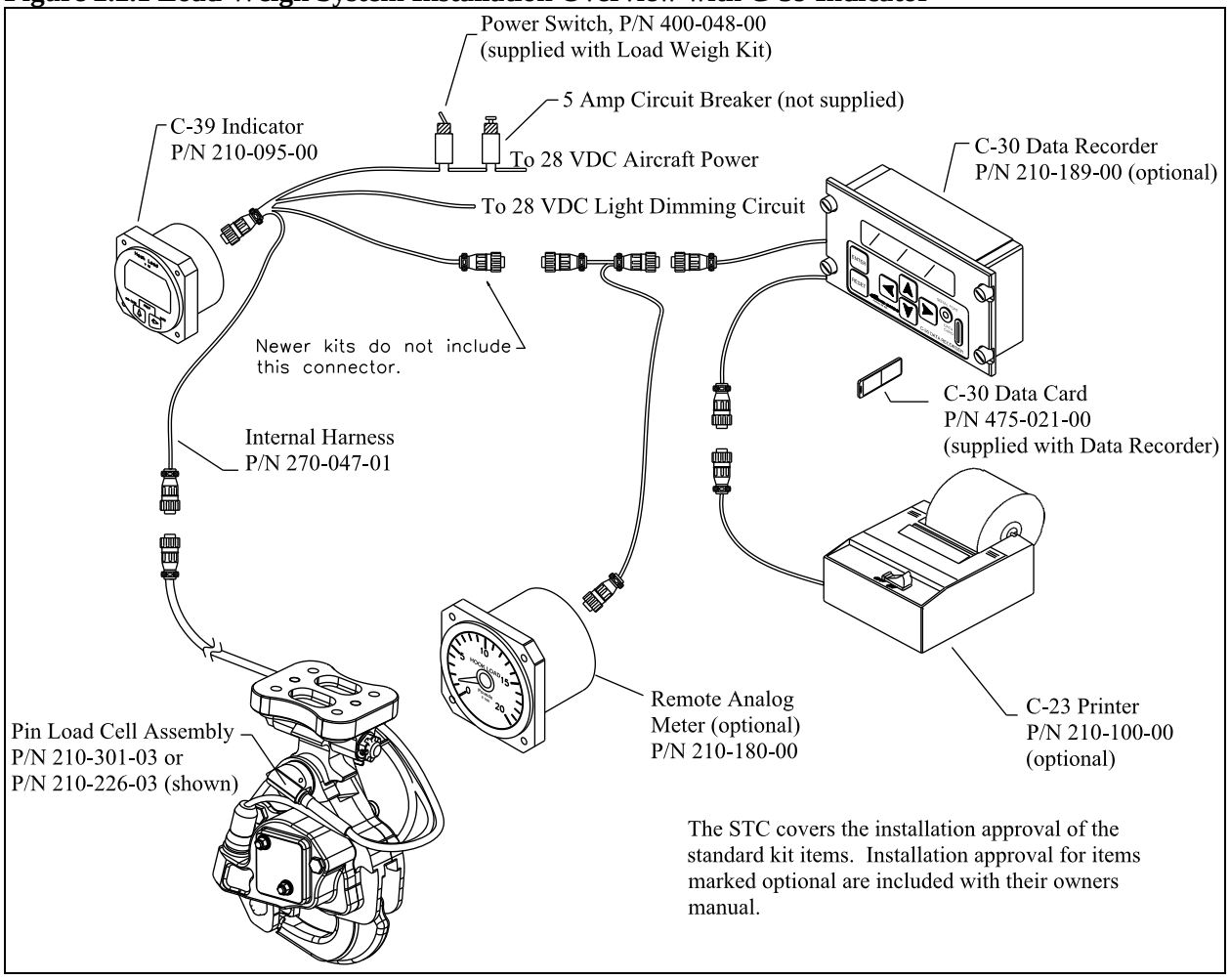
Remove existing attach point components by removing the four bolts and washers that attach it to the belly of the helicopter.

2.2 C-39 Load Weigh System Installation

This section describes how to install the components of the C-39 Load Weigh System; the C-39 load weigh indicator is identified by P/N 210-095-00. If installing the next generation C-40 indicator (P/N 210-293 series) load weigh system skip to section 2.3. If installing kits without the load weigh system (P/N 200-378-00 or 200-378-10) skip to section 2.4.

Figure 2.2.1 is an overview of the Load Weigh System installation with the C-39 Indicator. The optional items are not compatible with the C-40 indicator.

Figure 2.2.1 Load Weigh System Installation Overview with C-39 Indicator



2.2 C-39 Load Weigh System Installation continued

2.2.1 Internal Harness Installation

The Internal Harness (P/N 270-047-01) is made up of four cables terminated to one connector. The connector is plugged into the back of the Indicator. One of the cables is marked "LOAD CELL" and is fitted with a bulkhead connector. This cable is connected to the connector from the load cell. Another cable is marked "POWER" and is connected to the aircraft electrical power. Another cable is marked "LIGHT" and is used to power the indicator's back lighting (refer to section 2.2.2 for installation instructions). The last cable is marked "DATA" and can be connected to the optional Data Recorder or Analog Slave Meter. These optional items are not included under this STC.

The data cable may or may not be terminated with a connector depending on manufacture date.

Locate a convenient position directly aft of the existing hole in the aircraft skin that allowed the manual release cable to pass through (under the pilot's seat) to install the load cell bulkhead connector. Layout the connector hole pattern and drill the required holes. Install the bulkhead connector with the supplied hardware (screw P/N 510-028-00 (qty 4), nut P/N 510-029-00 (qty 4), and washer P/N 510-062-00 (qty 4)).

Secure the cables to the existing wiring bundles with the Ty-wraps provided. If it is necessary to remove the load cell bulkhead connector to ease cable routing, connect using the color code below.

Table 2.2.1 Load Cell Bulkhead Connections

Wire Color	Connector Pin
White	A
WH/GN	B
WH/OR	C
WH/BLU	D
Shield	E

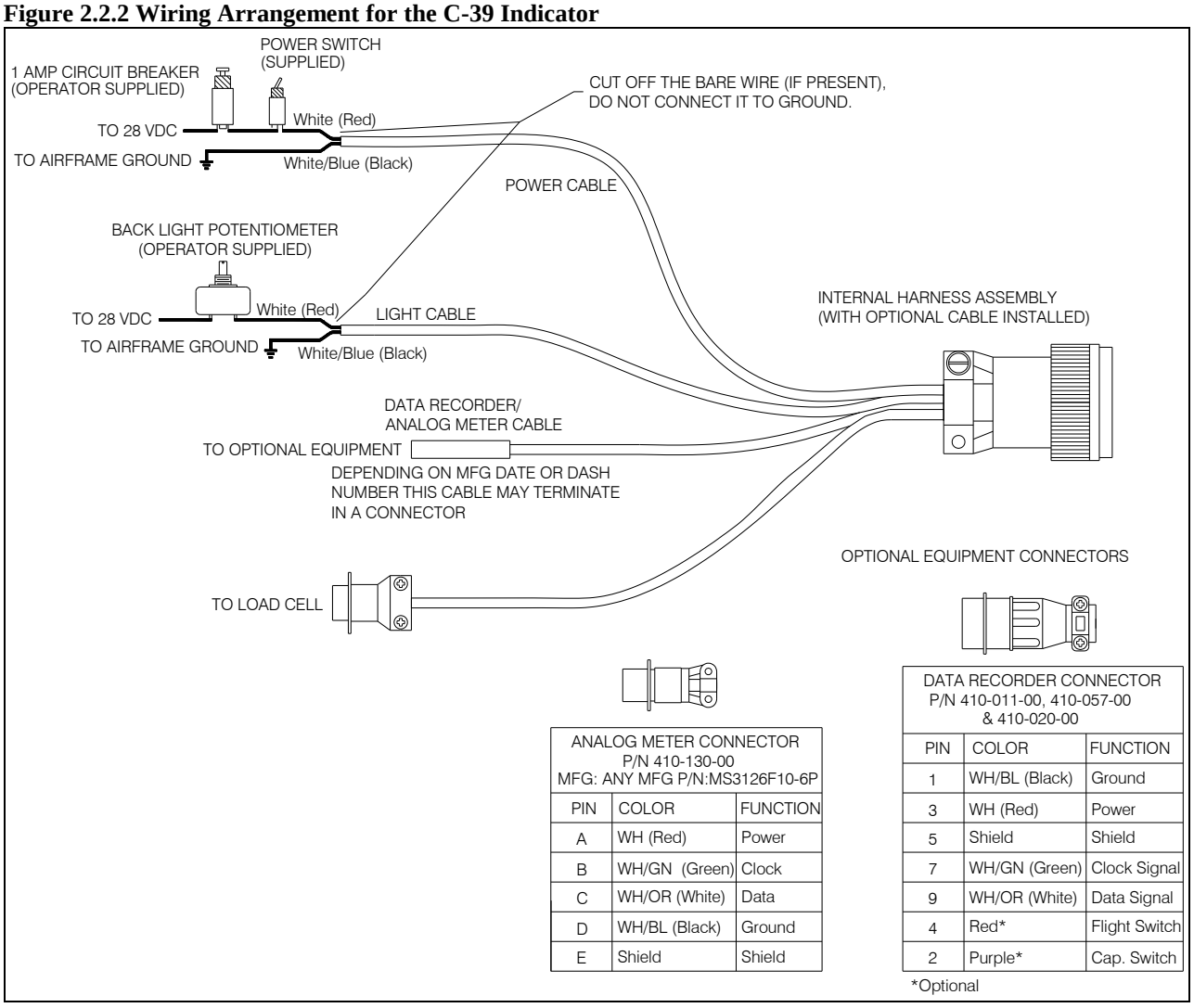
Ensure the cables are clear of flight control rods.

2.2 C-39 Load Weigh System Installation continued

2.2.1 Internal Harness Installation continued

Install the supplied power switch, P/N 400-048-00. The "POWER" cable on the Internal Harness is supplied extra long, cut off the excess cable and use as needed to connect the switch and circuit breaker. Connect the "POWER" white wire to one side of the power switch, connect another piece of suitable white wire to the other side of the switch and then to an available 1 or 2-amp circuit breaker as illustrated in Figure 2.2.2. Connect the circuit breaker to the 28 VDC bus. Connect the white/blue wire to the ground bus. The bare wire should be cut off (if present), as it is not needed at this end of the cable. Use a minimum of 22 AWG wire to make all connections. Secure the connections and protect from corrosion.

Figure 2.2.2 Wiring Arrangement for the C-39 Indicator



ANALOG METER CONNECTOR
P/N 410-130-00
MFG: ANY MFG P/N:MS3126F10-6P

PIN	COLOR	FUNCTION
A	WH (Red)	Power
B	WH/GN (Green)	Clock
C	WH/OR (White)	Data
D	WH/BL (Black)	Ground
E	Shield	Shield

DATA RECORDER CONNECTOR
P/N 410-011-00, 410-057-00
& 410-020-00

PIN	COLOR	FUNCTION
1	WH/BL (Black)	Ground
3	WH (Red)	Power
5	Shield	Shield
7	WH/GN (Green)	Clock Signal
9	WH/OR (White)	Data Signal
4	Red*	Flight Switch
2	Purple*	Cap. Switch

*Optional

2.2 C-39 Load Weigh System Installation continued

2.2.1 Internal Harness Installation continued

NOTICE

If the C-23 Printer is being utilized with the C-30 Data Recorder, a 5-amp circuit breaker should be used.

2.2.2 Indicator Installation

The Indicator should be mounted in a position that is convenient, accessible and visible to the pilot. It can be mounted in a standard 2¼" instrument hole.

Connect the Internal Harness to the Indicator connector. Install the placard P/N 215-010-00 "ELECTRONIC WEIGHING SYSTEM" next to the power switch and circuit breaker. Install placard P/N 215-012-00 "TURN THE WEIGHING SYSTEM OFF WHEN NAVIGATION EQUIPMENT IN USE. NO AIRCRAFT OPERATION SHOULD BE PREDICATED ON THE READING OF THE ONBOARD WEIGHING SYSTEM" next to the Indicator.

The 210-095-00 Indicator is equipped with an Internal Back Lighting System that can be connected to the aircraft 28 VDC light dimming circuit. Use a 22 AWG, twisted pair, shielded cable to connect the aircraft dimming circuit to the Internal Harness. Connect the cable shield wire to airframe ground at the light dimmer end of the cable **ONLY**.

2.3 C-40 Load Weigh System Installation

The C-40 Indicator is directly interchangeable with the C-39 Indicator (without changing the internal harness) except it does **not** support the optional components (Analog Meter, C-30 Data Recorder) shown in Figure 2.2.1.

The internal harness provided with new C-40 Indicator kits is the same as the C-39 internal harness except it does not include the data line but does include an additional wire for TEDS data which will provide for future capability to automatically recognize the load cell's calibration code.

NOTICE

If installing the C-40 indicator as a replacement for the C-39 indicator, the internal harness does not need to be replaced.

2.3.1 C-40 Indicator Installation

The C-40 Indicator is designed to be mounted in a standard 2¼" instrument hole and should be located in a position that is convenient, accessible and visible to the pilot. Another consideration for its location is access to the USB port on the back, this USB port is intended for firmware updates.

Secure the C-40 Indicator in its mounting location with the four screws (P/N 511-211-00, MS35214-26) provided, use an alternate length of MS35214 screw if needed to accommodate the thickness of mounting surface.

2.3.2 C-40 Internal Harness Installation

Route all wires using the following general guidance.

- Pick up existing wire runs by opening existing cable clamps nylon ties alone may not be used for primary support.
- New wire runs should be supported with MS21919WDG loop clamps.
- The distance between supports should not exceed 21 inches.
- The minimum radius of bends in wire groups or bundles must not be less than 10 times the outside diameter of the largest wire or cable.
- Inspect and verify that the wire harness may not be manually deflected into a structure with a bend radius less than .125".

Connect the larger of the connectors on the load weigh harness (P/N 270-283-02) to the back of the C-40 indicator.

Route the "LOAD CELL" leg of the harness to the belly of the aircraft. Locate a convenient position to install the load cell connector directly inboard or aft of the existing hole in the aircraft skin that allowed the manual release cable to pass through (under the pilot's seat). Layout the connector hole pattern and drill the required holes. Install the connector with the supplied hardware (screw P/N 510-028-00 (qty 4), nut P/N 510-029-00 (qty 4), and washer P/N 510-062-00 (qty 4)).

2.3 C-40 Load Weigh System Installation continued

2.3.2 C-40 Internal Harness Installation continued

If it is necessary to remove the load cell bulkhead connector to facilitate routing, re-connect the wires referring to the schematic in Figure 2.3.1.

Route the wire labeled POWER to the circuit breaker panel in the center console and install a 1 or 2-amp circuit breaker (not supplied) and connect this wire to it. Apply the supplied placard P/N 215-010-00 adjacent to the circuit breaker.

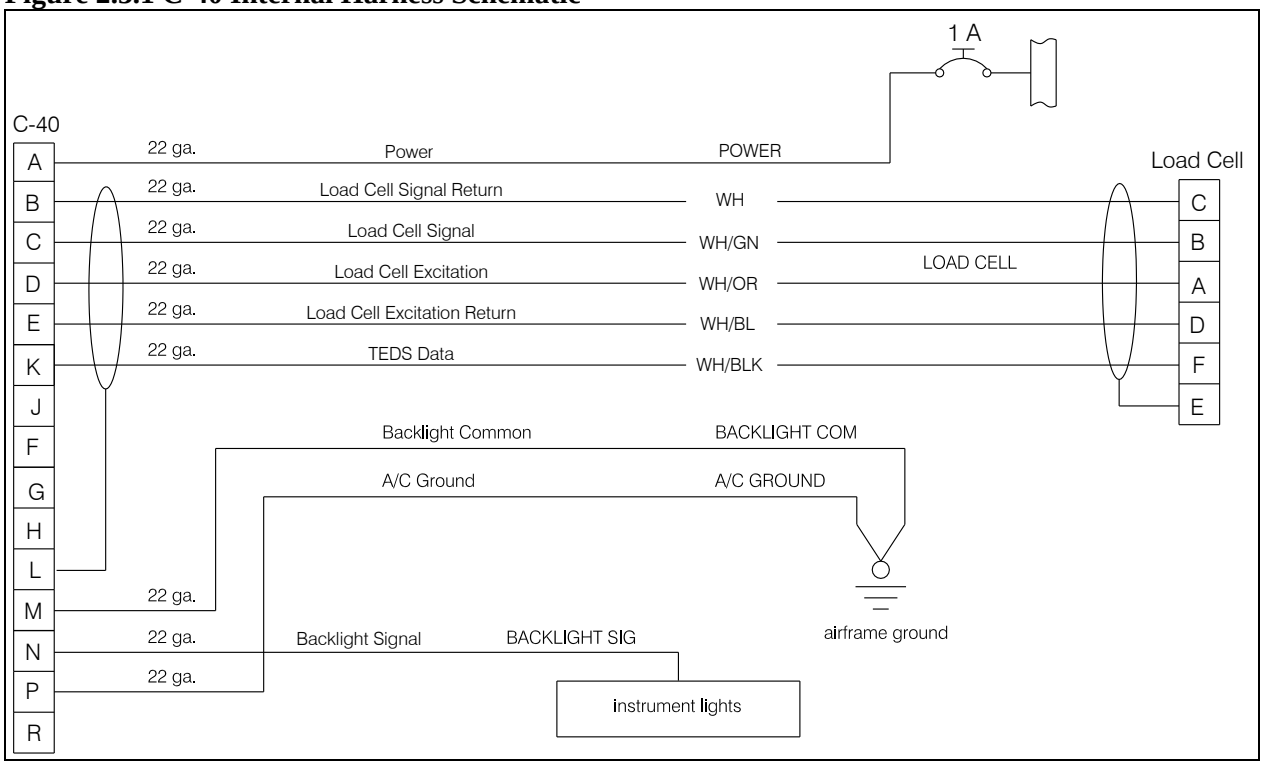
Wire numbers BACKLIGHT SIG and BACKLIGHT COM are for the C-40 Indicator's backlight control voltage. Connect wire BACKLIGHT SIG to the instrument panel lighting circuit and wire BACKLIGHT COM to aircraft ground.

NOTICE

The Indicator will function normally without the Backlight Control Voltage wired, but will not dim with other instruments. Full brightness of the Indicator is overridden by the aircraft dimming control voltage (if connected).

Wire A/C GROUND is to be connected to a suitable aircraft ground.

Figure 2.3.1 C-40 Internal Harness Schematic

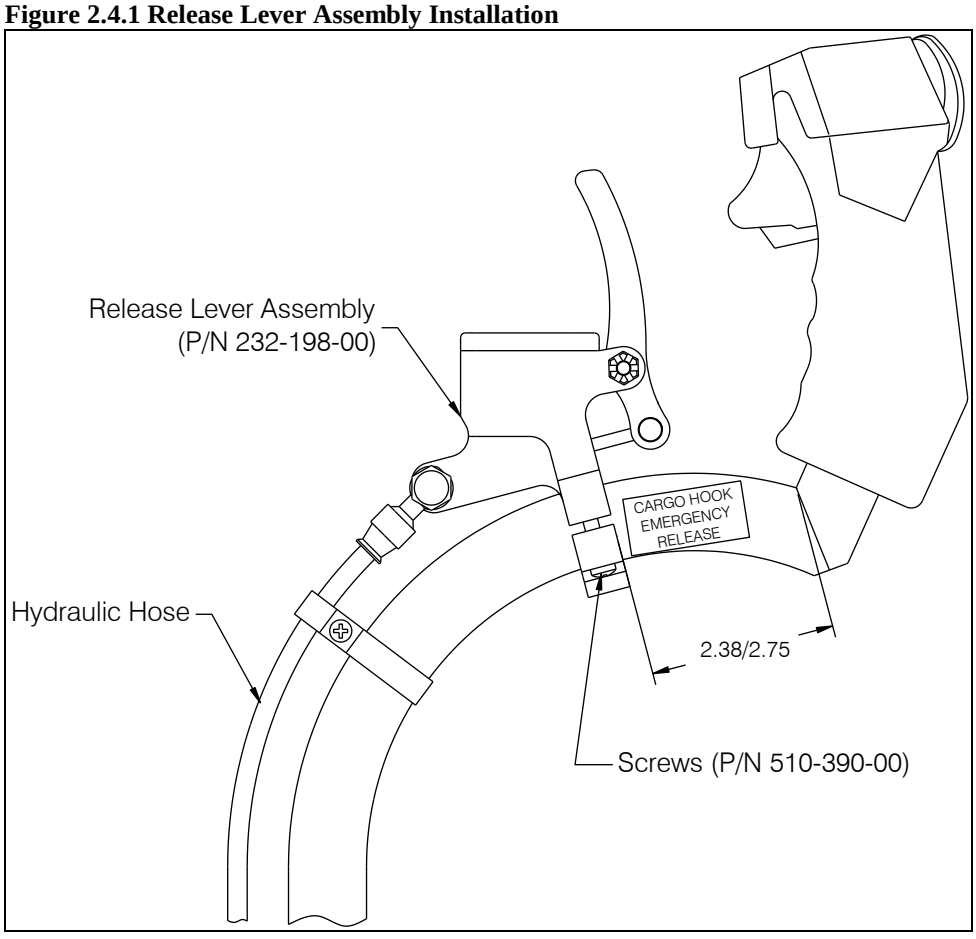


2.4 Release Lever Assembly Installation

The hydraulic release system is supplied dry. It is recommended that the system be filled and bled on the bench before installing on the helicopter. Refer to section 2.7 for filling and bleeding instructions.

- Remove the two screws (P/N 510-390-00) provided pre-assembled onto the assembly.
- Position the Release Lever Assembly w/ Plumbing (P/N 232-197-00) on the pilot's cyclic stick as shown below and re-install the screws but do not fully tighten at this point.
- Adjust the location if necessary so that the lever is accessible and comfortably reached by hand from the cyclic stick grip but not be able to contact or interfere with operation of any cyclic grip control when it is fully actuated. This will be verified at installation check out (when the release system is operational).

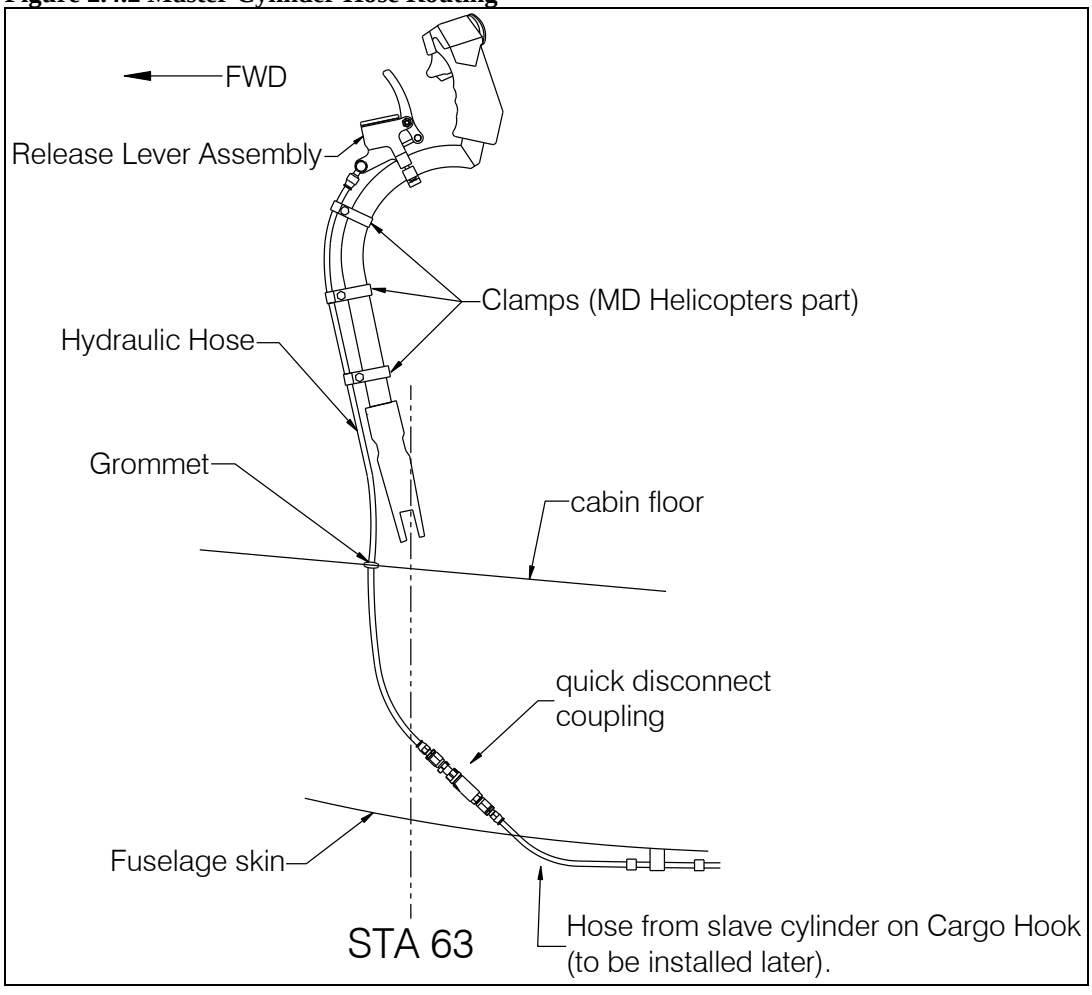
Figure 2.4.1 Release Lever Assembly Installation



2.4 Release Lever Assembly Installation continued

- The hydraulic hose on the cyclic should follow the same path as the manual release cable that is shown in MDHI Publication CSP-005.
- Secure the hydraulic hose to the cyclic using the same clamps that were used with the manual release cable.
- The quick disconnect end of the hose is to be routed to underneath the cabin floor using the same hole that the manual release cable used. Open up the hole to 0.69 inches (17.5 mm) to accommodate the quick disconnect and grommet P/N 505-014-00. If necessary, split the grommet to facilitate installation.
- Connect the hose at the quick disconnect to the hose routed from the slave cylinder at the Cargo Hook.
- Secure to prevent free movement or chafing during flight.

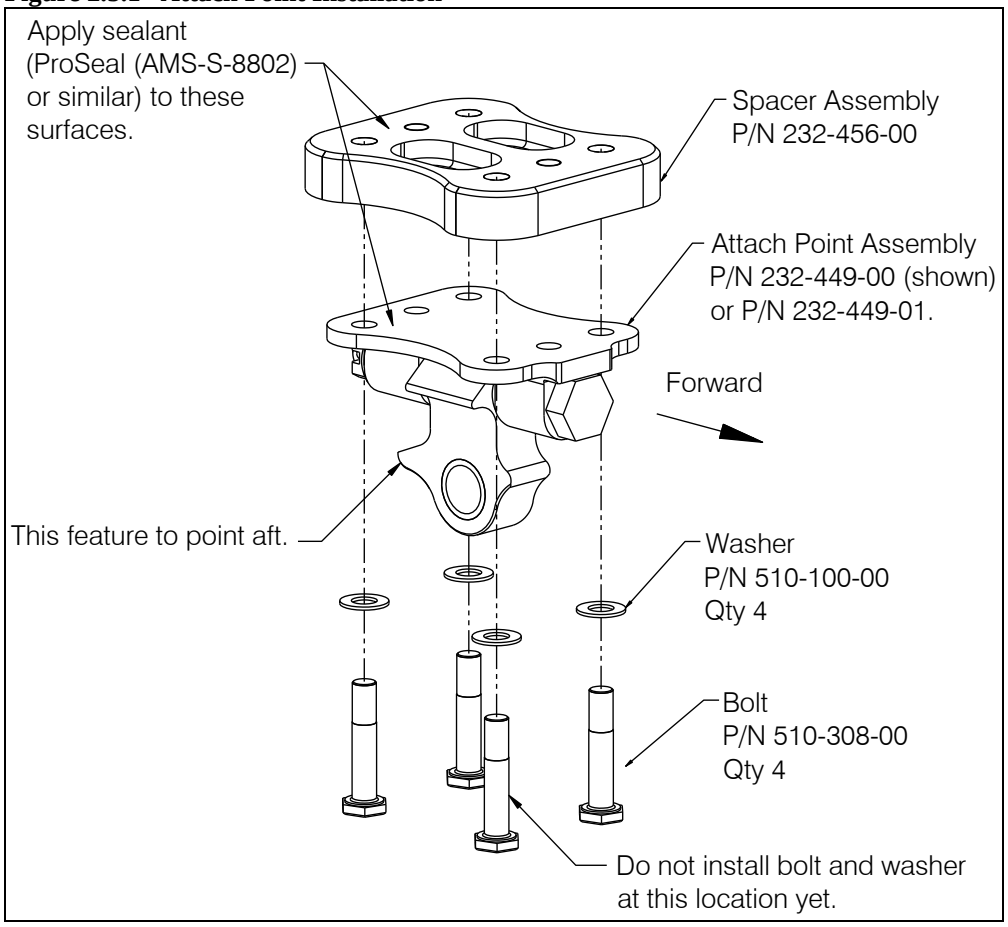
Figure 2.4.2 Master Cylinder Hose Routing



2.5 Attach Point Installation

- Install the Attach Point components to the belly of the helicopter using the hardware supplied, as illustrated below, leaving the forward right bolt and washer out until the electrical harnesses and hose can be routed through a loop clamp to be installed here.
- Torque the three bolts to 50-80 in-lbs.
- Since the Attach Point Assembly has built in travel limiters, the rubber pads glued to the skin can be removed at the operator's option (if present). Before removal of the pads, verify that the cargo hook does not contact the skin at the full limits of its travel.

Figure 2.5.1 Attach Point Installation



2.6 Cargo Hook and Load Cell Installation

- Connect the cargo hook to the Attach Point Assembly with Attach Bolt (applicable to kit P/Ns 200-378-XX) or the Pin Load Cell Assembly (kit P/Ns 200-379-XX) as shown below. The cargo hook load beam must point forward.

Figure 2.6.1 Cargo Hook Installation w/o Pin Load Cell

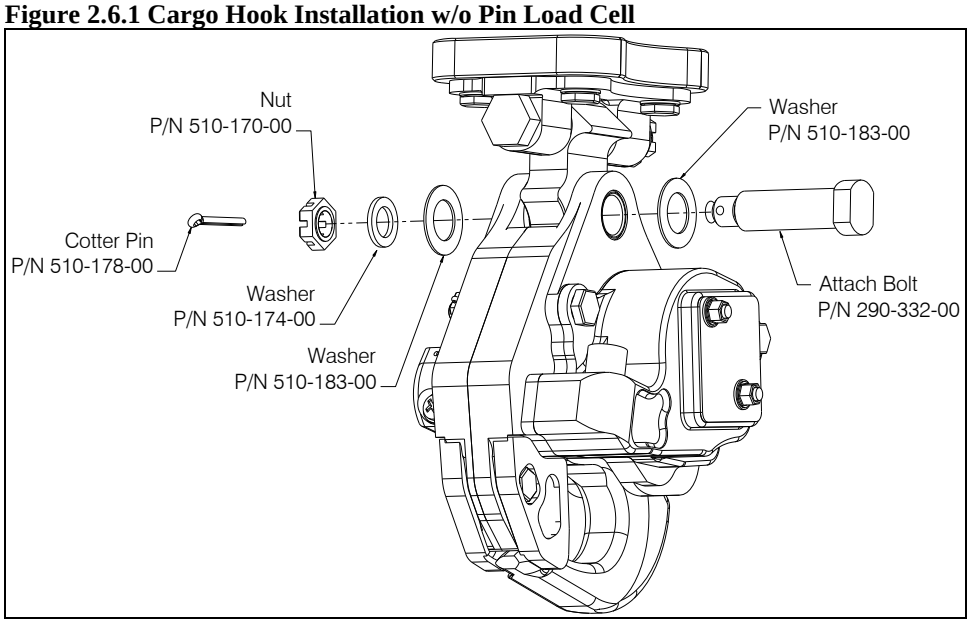
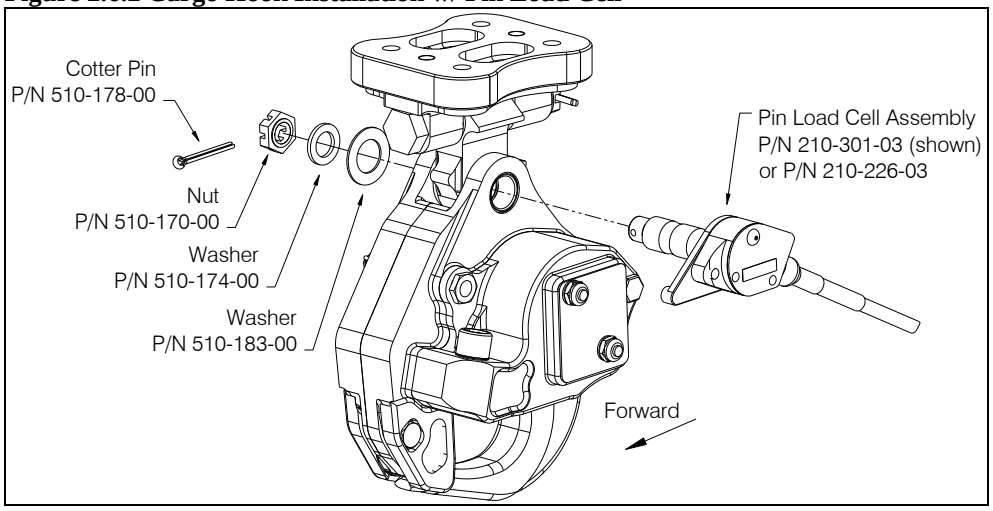


Figure 2.6.2 Cargo Hook Installation w/ Pin Load Cell



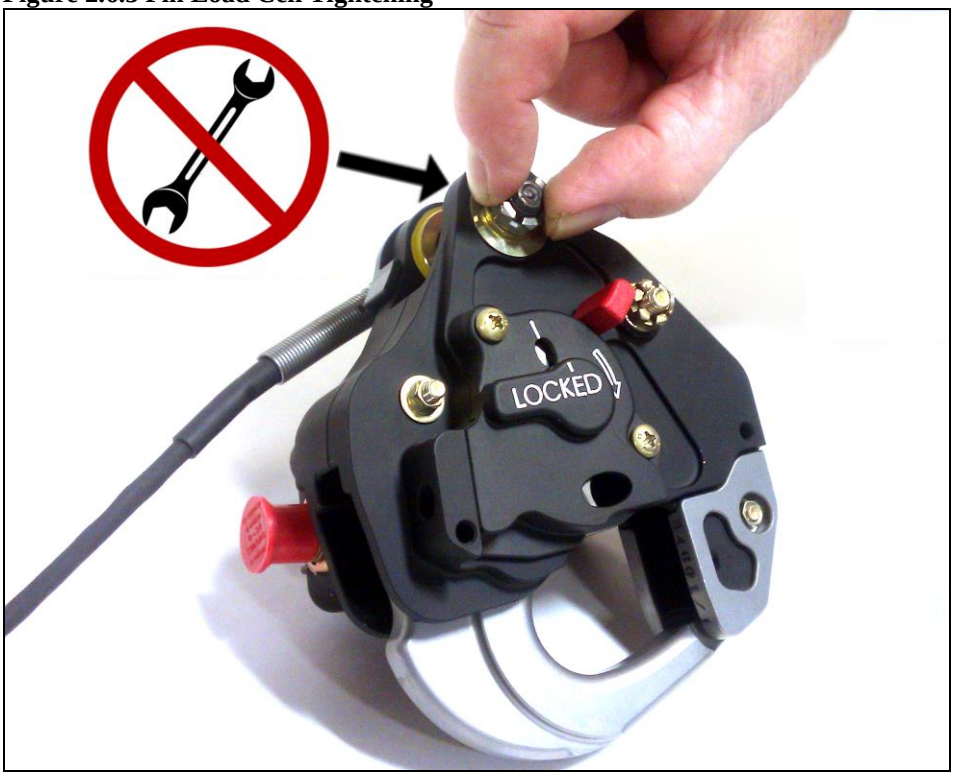
2.6 Cargo Hook and Load Cell Installation continued

- Tighten nut on cargo hook attach bolt or pin load cell until fully seated, finger tight only. Back off nut to previous castellation, if needed, when aligning cotter pin for installation. Install and secure cotter pin.

CAUTION

Do not tighten nut on pin load cell more than finger tight. Over-tightening will damage load cell.

Figure 2.6.3 Pin Load Cell Tightening



2.6 Cargo Hook and Load Cell Installation continued

- Connect the external electrical release harness (P/N 270-132-00) to the cargo hook. Listed below is the pin out for the cargo hook and the bulkhead connector.

Cargo Hook Connector

Pin	Function
A	Ground
B	Power

Bulkhead Connector

Pin	Function
A	Power
B	Ground
C	Shield

CAUTION

Earlier versions of the Cargo Hook were equipped with a suppression diode that will be damaged if the Cargo Hook electrical connections are reversed. Do not attach the electrical connector until the polarity of the aircraft connector is determined to be compatible with the Cargo Hook connector listed.

2.6 Cargo Hook and Load Cell Installation continued

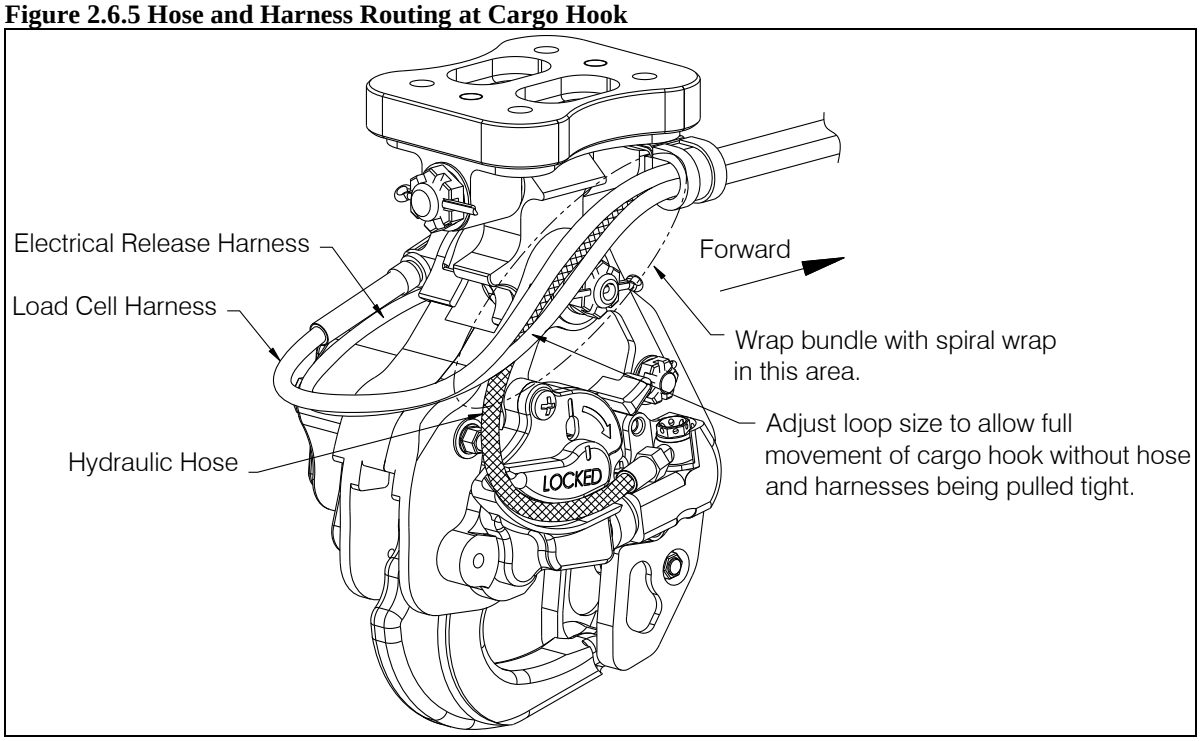
- Place the supplied loop clamp (P/N 290-909-00) over the electrical release and load cell (if present) wire harnesses and the hydraulic hose and loosely attach it at the forward right attach point mounting hole. Do not fully tighten the bolt at this point.
- Route the harness and hose approximately as shown and install the supplied spiral wrap (P/N 590-046-00) over them (see Figure 2.5.5). Adjust loop as necessary to allow full swing of the cargo hook without pulling or pinching the loop.

⚠ CAUTION

The routing must provide adequate slack in the harness and hose so that any range or direction of cargo hook travel does not create tension in any of these. Swing the cargo hook in all directions and ensure that the harness and hose are not pulled tight or adversely kinked in any position.

- After achieving a satisfactory loop for the hose and harnesses tighten the bolt where the loop clamp is installed to 50-80 in-lbs. and ensure that the hose and wire harnesses are not loose in the clamp.
- Safety wire the attach point bolts together in pairs.

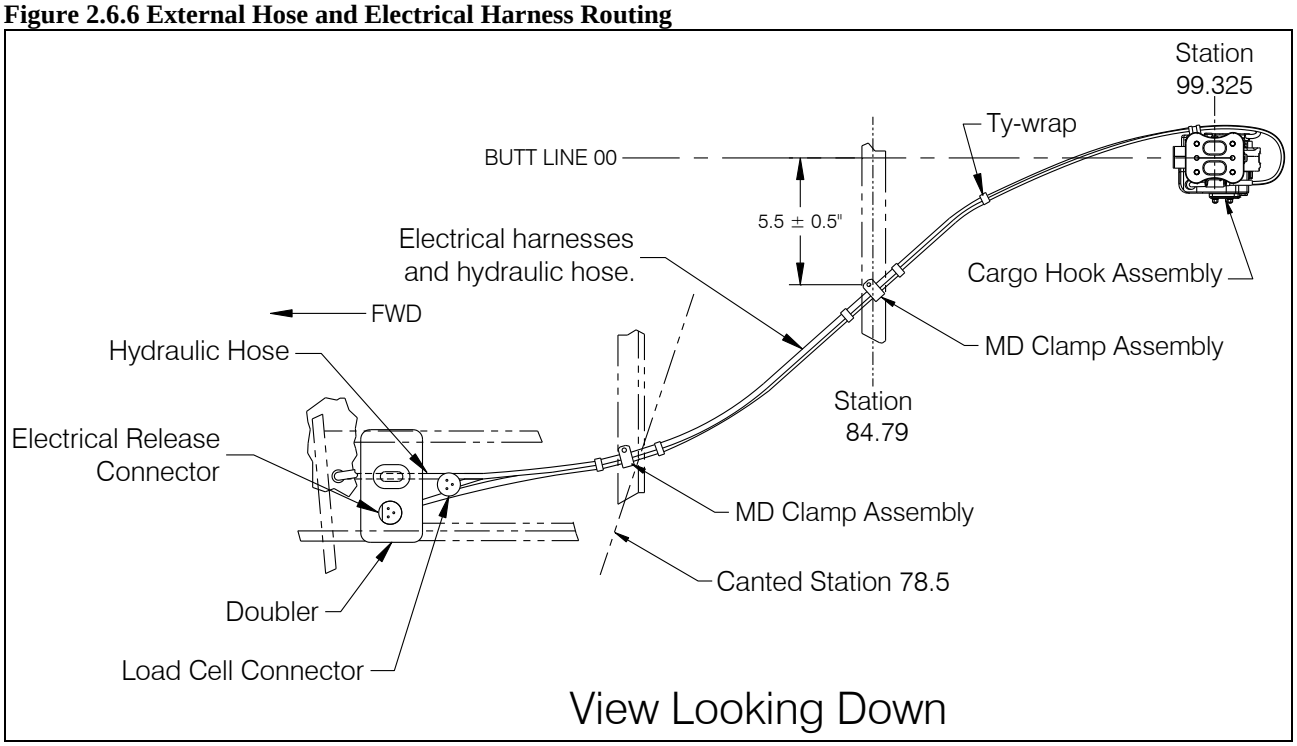
Figure 2.6.5 Hose and Harness Routing at Cargo Hook



2.6 Cargo Hook and Load Cell Installation continued

- From the loop clamp, route the hose and wire harnesses forward through the existing MD clamp assemblies located at Station 84.79 and forward of Canted Station 78.5 as shown in Figure 2.6.6.
- Secure them to the clamp assemblies (*MD P/N 369H90017-29)* using the loop clamp provided (P/N 512-026-00). Re-use the bolt and nut that came off the clamp assemblies to secure the loop clamps.

Figure 2.6.6 External Hose and Electrical Harness Routing

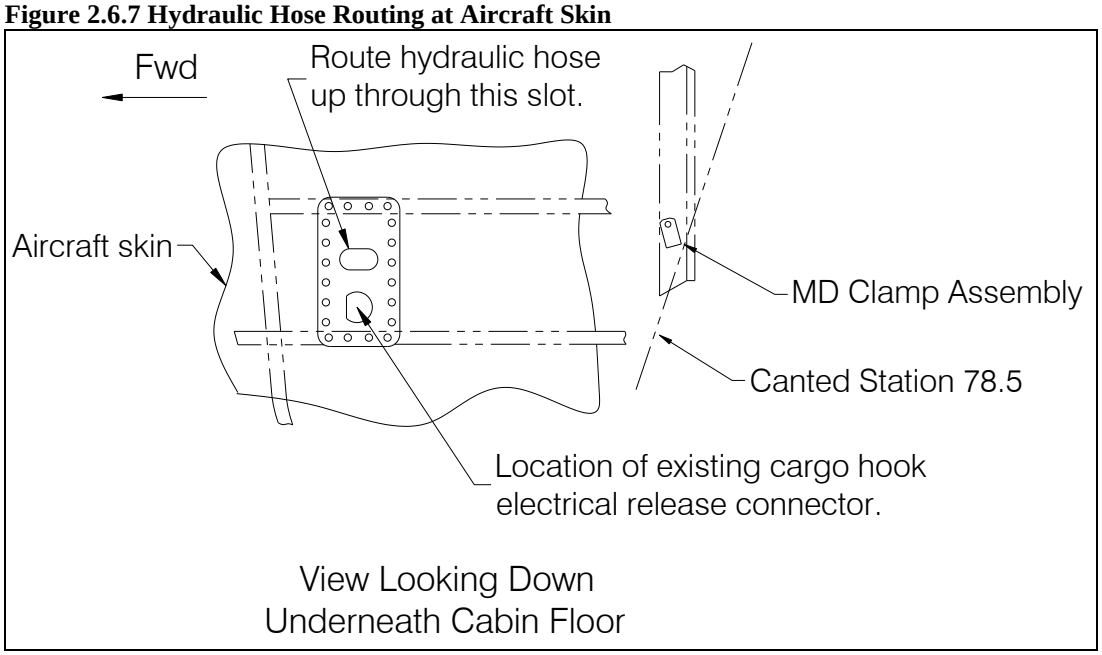


- After securing them at the clamp assemblies, route the harness and hydraulic hose forward to the doubler (as shown in Figure 2.5.7).
- Connect the cargo hook electrical release connector to the existing connector at the doubler on the aircraft skin and safety wire the connector onto the mount point.
- Connect the load cell harness connector to the fixed internal harness connector installed per section 2.2.

2.6 Cargo Hook and Load Cell Installation continued

- Remove existing grommet (if present) from the slot in the doubler at the lower skin (refer to Figure 2.6.7) that previously housed the manual release cable.
- Route the quick disconnect end of the external hydraulic hose through the new grommet (P/N 505-015-00) provided and then through the slot.
- Install the grommet in the slot (if necessary split the grommet).

Figure 2.6.7 Hydraulic Hose Routing at Aircraft Skin



- If cargo hook P/N 528-028-02 has been installed, place the Cockpit Decal P/N 215-343-00 adjacent to the Cargo Release Switch on the cyclic.

2.7 Hydraulic System Bleed Procedure

Each hydraulic system is typically shipped dry. A label affixed to the Master Cylinder and Slave Cylinder assemblies will state if the assembly has been filled and bled. Proper bleeding is critical to the operation of the hydraulic release system. An improperly bled system will not release the cargo hook mechanism.

A reservoir seal is installed beneath the reservoir lid. This seal serves to prevent hydraulic fluid left over from the testing process from leaking during shipping.

NOTICE

The reservoir seal is for shipping purposes only and must be removed and discarded before bleeding of the hydraulic release system.

If there is a need to fill and/or bleed the system, follow the procedures listed below. If there is a need to remove and repair any items in the hydraulic system, refer to 123-021-01, Instruction for Continued Airworthiness.

Filling and bleeding the hydraulic release system is most easily accomplished on the bench, prior to installation on the aircraft. This process may also be accomplished after the system is installed. Filling and bleeding requires two persons, one to inject hydraulic fluid through the system and the other to observe the reservoir.

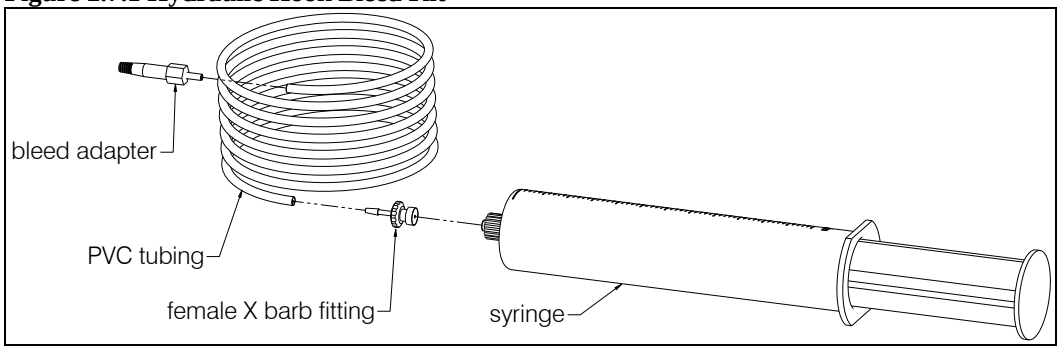
Bleeding procedure:

1. Assemble the supplied bleed kit 212-014-02 by press fitting each of the kit's components together as shown in Figure 2.7.1. This kit also includes 2 ounces of MIL-PRF-87257 fluid.

NOTICE

MIL-PRF-5606 fluid is also compatible with the hydraulic system and was formerly included with new cargo hook kits. It is interchangeable and miscible with MIL-PRF-87257 fluid.

Figure 2.7.1 Hydraulic Hook Bleed Kit



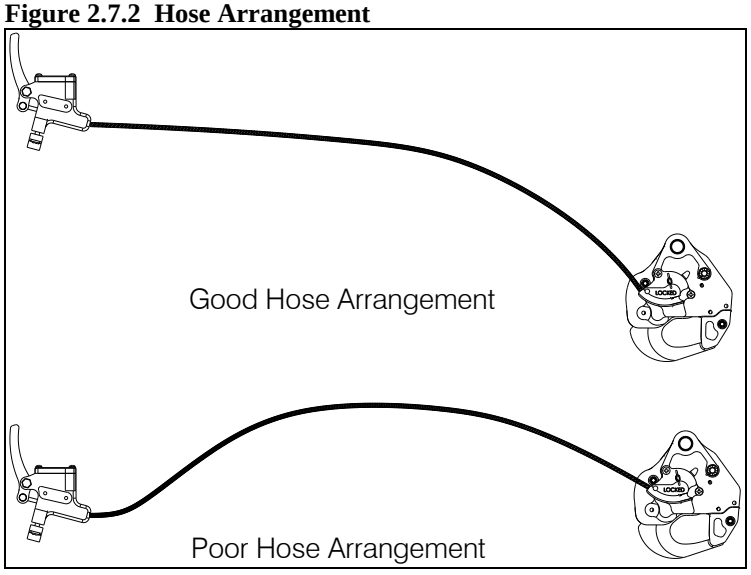
2.7 Hydraulic System Bleed Procedure continued

NOTICE

Use best shop practices to keep foreign material out of the hydraulic system. FOD will plug orifices, damage seals and/or scratch sealing surfaces necessitating system rebuild. Use only clean hydraulic fluid from sealed containers.

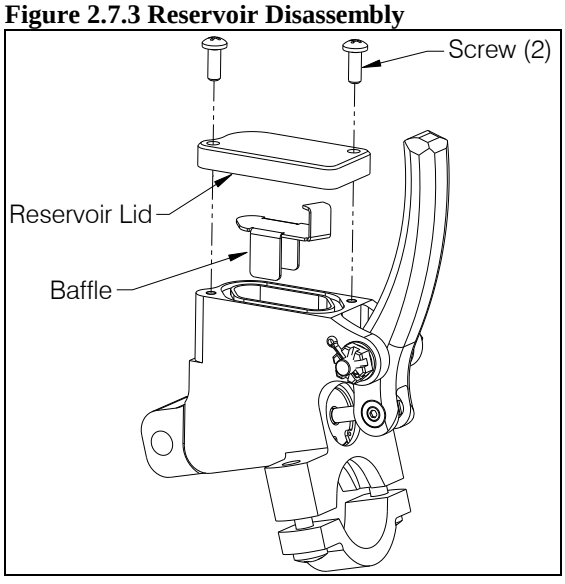
2. Connect the master cylinder assembly to the slave cylinder assembly if not already done. If filling or bleeding on the bench, as much as possible, arrange the hoses uncoiled, straight and running uphill. See Figure 2.7.2.

Figure 2.7.2 Hose Arrangement



3. Remove screws, reservoir lid, and baffle from the master cylinder reservoir as shown in Figure 2.7.3.

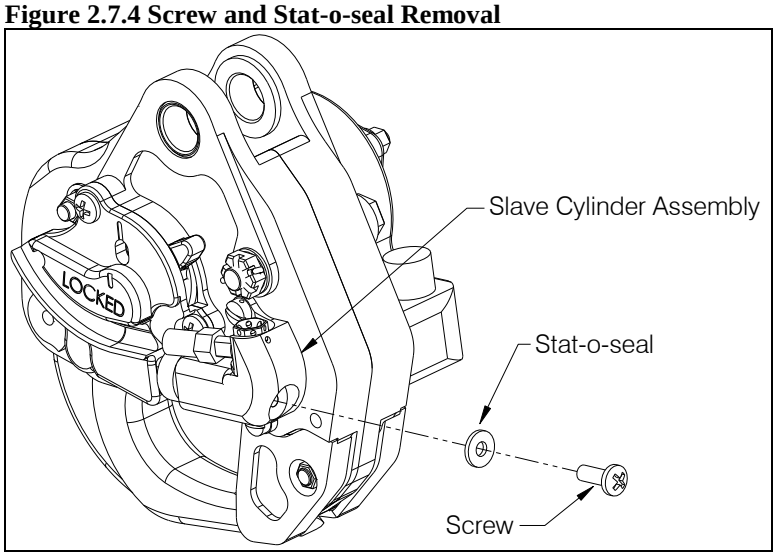
Figure 2.7.3 Reservoir Disassembly



2.7 Hydraulic System Bleed Procedure continued

4. Remove the screw and stat-o-seal on the slave cylinder, see Figure 2.7.4.

Figure 2.7.4 Screw and Stat-o-seal Removal



5. Fill a syringe with approximately 25 cc of hydraulic fluid. Thread the bleed adapter into the screw hole on the slave cylinder to create a tight seal. See Figure 2.6.5.

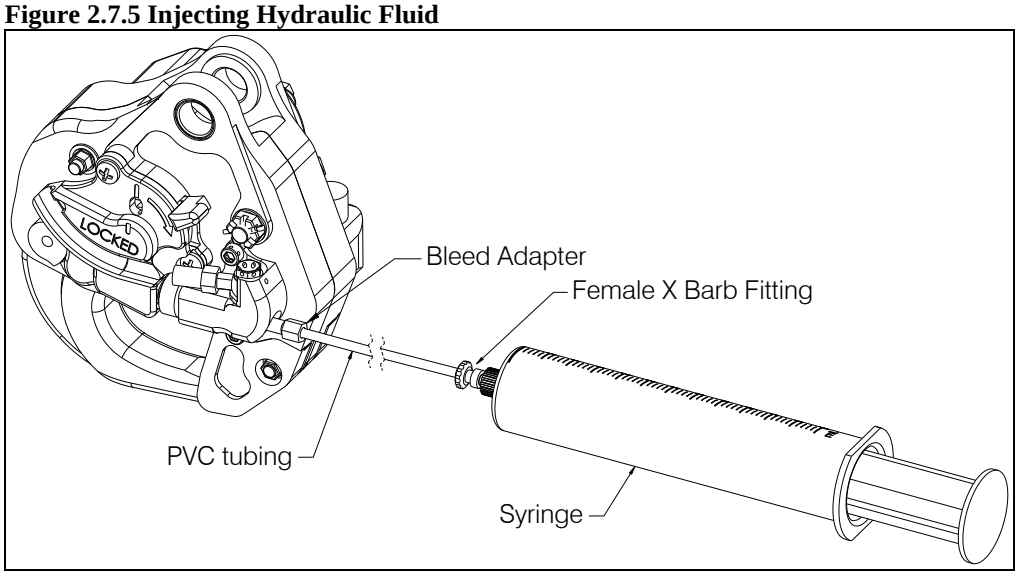
6. While observing the reservoir, **slowly** push on the syringe plunger to force fluid through the slave cylinder, hydraulic hose, and up to the master cylinder reservoir. There will be some resistance during filling—this is normal.

⚠ CAUTION

Injecting the fluid into the system too rapidly may cause the fluid to spray up and out of the master cylinder reservoir. Wear safety glasses when observing fluid reservoir while filling.

2.7 Hydraulic System Bleed Procedure continued

Figure 2.7.5 Injecting Hydraulic Fluid



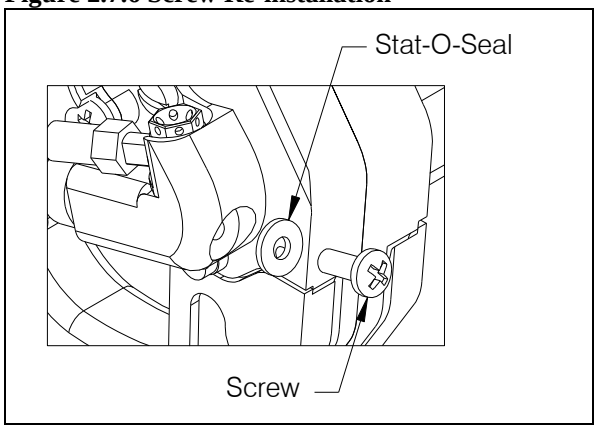
7. Continue to force fluid into the master cylinder reservoir until the reservoir is approximately half full.

NOTICE

If bleeding an already filled system, you may need to draw fluid from the master cylinder reservoir during this step to prevent overflow.

8. Remove the syringe from the screw hole. Re-install the stat-o-seal (P/N 510-496-00) and screw (P/N 510-493-00), see Figure 2.7.6.

Figure 2.7.6 Screw Re-installation



9. Allow the system to rest for several minutes. This will allow any air to rise through the system.

2.7 Hydraulic System Bleed Procedure continued

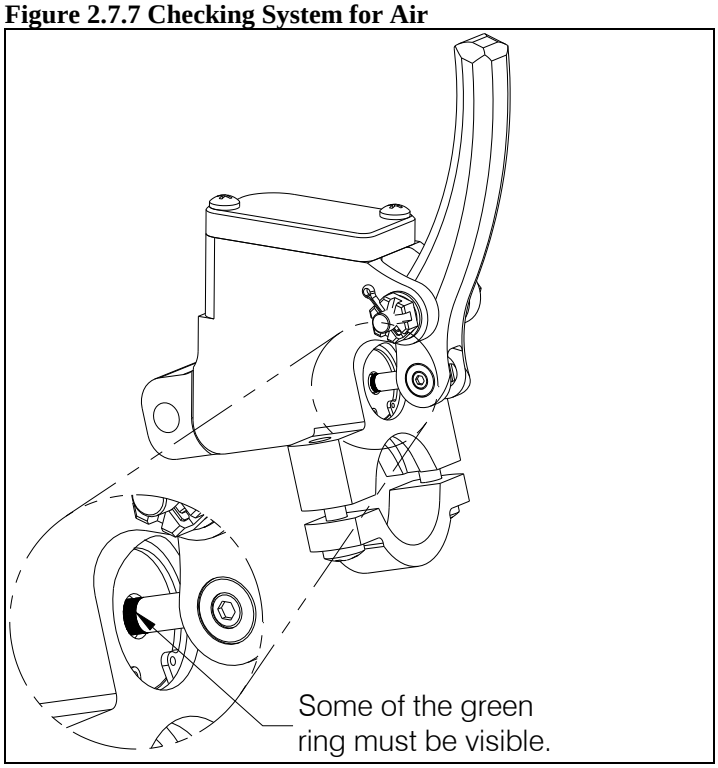
10. Very slowly pull the release lever on the master cylinder and watch for bubbles. If bubbles are observed rising within the reservoir, continue to slowly cycle the lever until there are no more. Actuating the lever releases air trapped within the master cylinder.

CAUTION

Pull the lever very slowly! When the reservoir is not baffled and capped, a hard pull will cause fluid to erupt over the edge of the reservoir.

11. Check the system for air by actuating the lever firmly until it bottoms out. Check the push rod position (see Figure 2.7.7). If some of the green ring on the push rod is visible, proceed to step 13. If none of the green ring on the push rod is visible with the lever completely pulled, the system has too much air in it and needs further bleeding. To do this, repeat steps 5 – 11.

Figure 2.7.7 Checking System for Air



12. After the system is properly bled, verify that the reservoir is approximately half full of hydraulic fluid. Fluid should be visible above the baffle.
13. Re-install the baffle and the reservoir lid.
14. Check the system for proper operation. Fully actuate the release lever. The hook must open and the lever must have a firm feel.

2.8 Installation Check-Out

After installation of the Cargo Hook Kit, activate the circuit breaker to turn the system on. Perform the following functional checks.

- Swing the installed Cargo Hook to ensure that the hydraulic release hose, the load cell harness and the electrical release harness have enough slack to allow full swing of the cargo hook. The hydraulic hose and electrical harnesses must not be the stops that prevent the Cargo Hook from swinging freely in all directions.
- Pull and fully actuate the hydraulic release lever on the pilot's cyclic stick and verify it does not contact or interfere with operation of any cyclic control.
- With no load on the cargo hook load beam, pull the lever-operated cargo hook hydraulic release. The Cargo Hook should release. Reset the cargo hook load beam. Check the hydraulic system for any signs of leaking hydraulic fluid. If leakage is found, do not use the system until the leak has been fixed.
- Provide power to the electrical release system. Electrical release system operation depends on the cargo hook P/N installed. The following instructions are applicable to cargo hook P/N 528-028-02 which is equipped with Surefire electrical release. With no load on the cargo hook perform the following.
  - *Very* briefly press the Cargo Release switch, the cargo hook should not actuate and the load beam should remain closed.
  - Press and hold the Cargo Release switch for a few seconds, the load beam should fall to the open position and the cargo hook solenoid should continue to cycle repeatedly.
  - Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the manual release cover.

  The following instructions are applicable to cargo hook P/N 528-028-00.
  - Press and release the Cargo Release switch on the cyclic, the load beam should immediately fall to the open position.
  - Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the manual release cover.
- Perform an EMI ground test per AC 43.13-lb section 11-107. For equipment that can only be checked in flight an EMI flight test may be required.

NOTICE

The load cell and cargo hook are 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.

2.8 Installation Check-Out continued

- Power on the Load Weigh System. On startup the C-40 Indicator will display an information screen while performing a brief self-diagnostic routine and then display the load screen. Set the Installation Zero for the installation per the instructions contained in C-40 Indicator's Owner's Manual 120-152-00 (refer to Owner's Manual 120-039-00 for the C-39 model).
- In the Settings menu adjust units (lb or kg), brightness of the display, maximum load, and other settings as preferred (refer to the C-40 Indicator Owner's Manual 120-152-00 for detailed instructions). With the C-40 Indicator one setting that must be set properly to function is the backlight voltage. If the wire for the backlight was connected the backlight voltage must be set to the aircraft circuit voltage (5 VDC or 28 VDC).
- 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 121-028-01 in the Rotorcraft Flight Manual.

2.9 Component Weights

The weights of the Cargo Hook Kit components are listed below.

Table 2.8.1 Component Weights

Item	**P/N 200-378-XX Lbs (kg)**	**P/N 200-379-XX Lbs (kg)**
Cargo Hook	3.0 (1.36)	3.0 (1.36)
Cargo Hook attach hardware*	0.2 (.09)	-
Slave Cylinder w/ Plumbing	0.30 (0.14)	0.30 (0.14)
Attach Point Assembly (includes Spacer and mounting hardware)	1.23 (0.56)	1.23 (0.56)
Release Lever Assembly w/ Plumbing	0.67 (0.30)	0.67 (0.30)
Electrical Release Harness	0.5 (0.23)	0.5 (0.23)
Pin Load Cell Assembly	-	0.40 (0.18)
Load Indicator	-	0.5 (0.23)
Load Weigh Internal Harness	-	0.54 (0.25)
Misc. hardware	-	0.10 (0.04)
Total	**5.90 (2.68)**	**7.21 (3.26)**

* When Kit P/N 200-379-XX is installed, the cargo hook attach bolt is replaced by the pin load cell assembly.

2.10 Cargo Hook Location

Table 2.9.1 Cargo Hook Location

Station	99.3

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Section 3
Operation Instructions
Operating Procedures

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

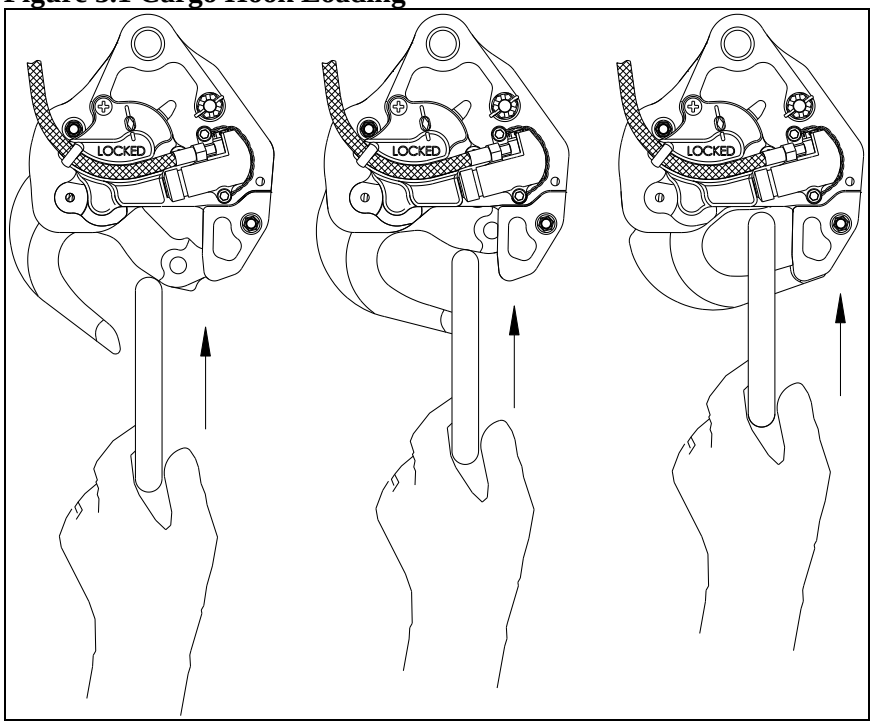
Refer to Owner's Manual No. 120-152-00 for detailed setup and operation instructions for the C-40 Load Weigh Indicator.

Refer to the applicable RFMS provided with the cargo hook kit for pre-flight checks and pilot operating procedures.

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

Figure 3.1 Cargo Hook Loading



Cargo Hook Rigging

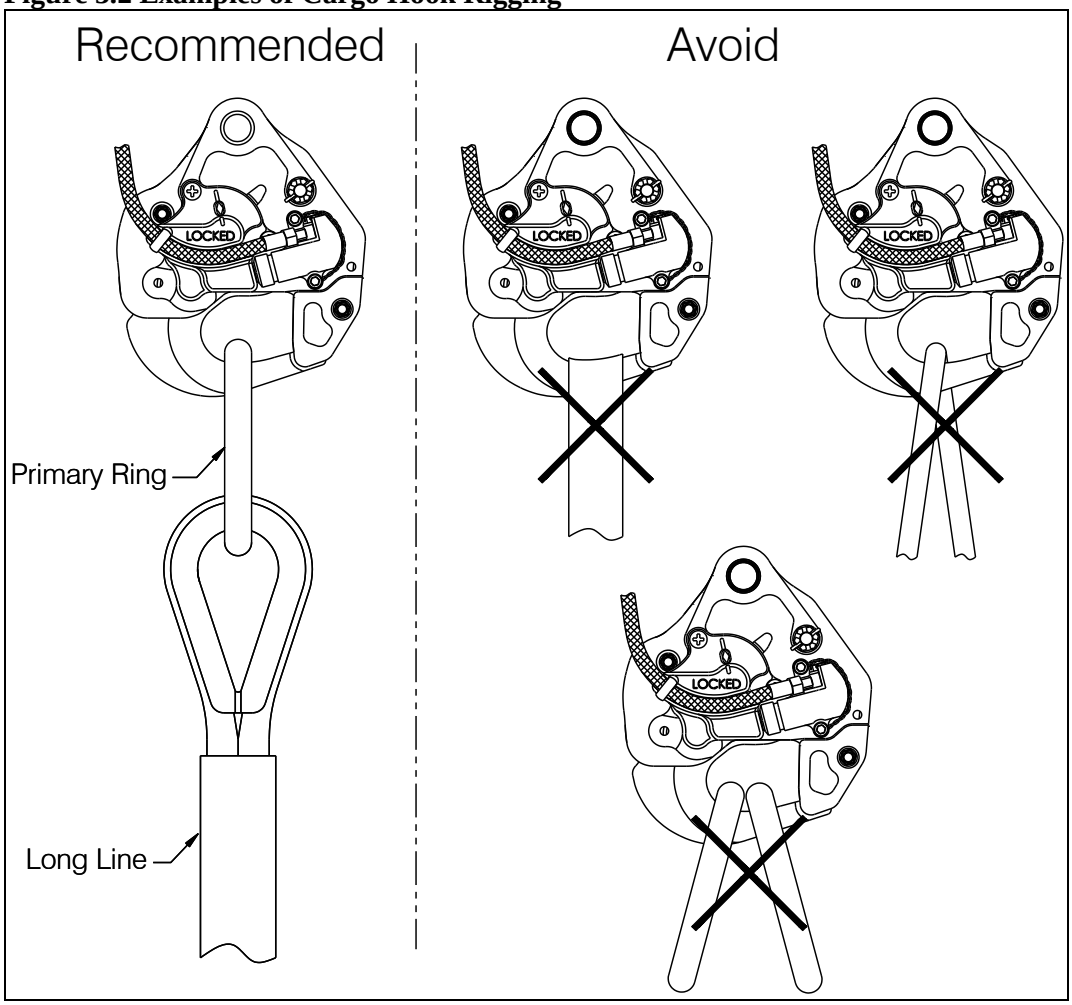
Extreme care must be exercised when rigging a load to the Cargo Hook. Steel load rings are recommended to provide consistent release performance and resistance to fouling. The following illustration shows the recommended rigging and rigging to avoid, but is not intended to represent all rigging possibilities.

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

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.

Cargo Hook Rigging continued

Figure 3.2 Examples of Cargo Hook Rigging



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Section 4
Maintenance

Refer to Component Maintenance Manual (CMM) 122-015-00 and Instructions for Continued Airworthiness (ICA) 123-021-01 for detailed maintenance information.

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

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Section 5
Certification
STC

United States of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number **SR01778SE**

This certificate, issued to

Onboard Systems International
13915 N.W. 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: H3WE
Make: MDHI (HUGHES)
Model: 389D, 369E, 369F, 369FF, 369HE, 369HM, 369HS and 500N

Description of the Type Design Change: Installation of Onboard Systems International Cargo Hook Kits and Load Weigh Kit in accordance with the Master Drawing List (MDL) No. 155-112-00, Revision 13, dated February 9, 2016, or later Federal Aviation Administration (FAA) approved revision.

Limitations and Conditions: Approval of this change in type design applies only to MDHI helicopter models listed above which are equipped with MDHI helicopter cargo hook suspension systems. This approval should not be extended to 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.

(See Continuation Sheet Page 3 of 3 Pages)

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: January 6, 2006 *Date reissued:*

Date of issuance: August 3, 2007 *Date amended:* October 31, 2011; February 1, 2017

By direction of the Administrator

(Signature)

For 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 8110-2-1 (1-69) PAGE 1 OF 3 PAGES

STC continued

United States of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number **SR01778SE**

Onboard Systems International

Date Issued: August 3, 2007

Date Amended: October 31, 2011; February 1, 2017

Date reissued:

Limitations and Conditions continued:

Maintained in accordance with FAA-accepted Instructions for Continued Airworthiness (ICA) 123-021-00, Revision 3, dated December 19, 2011, or ICA 123-021-01, Revision 5, dated February 5, 2016, as applicable, or later FAA-accepted revisions. Operated in accordance with FAA-approved Rotorcraft Flight Manual Supplements (RFMS) 121-028-00, Revision 2, dated August 12, 2015, or RFMS 121-028-01, Revision 2, dated January 19, 2017, as applicable.

A copy of this certificate, the MDL, the applicable ICA, the applicable Owner's Manual, and the applicable RFMS, 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

Canadian Approval

Transport Canada / Transports Canada
Civil Aviation / Aviation Civile

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

Your file / Votre référence
130S-GA-07-99
Our file / Notre référence
P-07-0520
RDIMS 3789419

December 20, 2007

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

Dear Mr. Hanson

Subject: Acceptance of FAA STC SR01778SE

This is in response to the FAA Seattle ACO letter dated October 4, 2007, 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,

John Nehera
Regional Manager
Aircraft Certification

Encl. (1)

c.c. Mr. Jeffrey E. Duven, Manager Seattle Aircraft Certification Office

Canada

1/1

ANAC STC

ANAC
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

CERTIFICADO SUPLEMENTAR DE TIPO
(Supplemental Type Certificate)

NÚMERO (Number) **2015S03-11**

Este certificado, emitido com base na Lei nº 7565 "Código Brasileiro de Aeronáutica", de 19 de dezembro de 1986,
(This certificate, issued in the basis of the Law No. 7565 "Código Brasileiro de Aeronáutica", dated 19 December 1986,

é conferido ao (à): (is granted to:)
Onboard Systems
13915 NW 3rd Court
Vancouver, WA 98685
USA

por ter a modificação ao projeto de tipo do produto abaixo citado, observadas as limitações e condições
(for having the change to the type design of the product mentioned below, with the limitations and conditions therefor as)

especificadas, satisfeito aos requisitos de aeronavegabilidade aplicáveis.
(specified hereon, met the applicable airworthiness requirements.)

Produto Original - Número do Certificado de Tipo: (Original Product – Type Certificate No:) * See attached ANAC Approved Model List (AML), Rev. I.R., dated 16 Mar. 2015, or later approved revisions.

Fabricante: (Manufacturer:) *.

Modelo(s): (Model(s):) *.

DESCRIÇÃO DA MODIFICAÇÃO AO PROJETO DE TIPO:
(Description of Type Design Change:)

Installation of the Cargo Hook kits in accordance with Onboard Systems Master Drawing List No. 155-112-00, Rev. 10, dated 22 April 2014 or later approved revision.

This CST validates in Brazil the STC No. SR01778SE, issued by FAA (USA).

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

See continuation sheet for applicable data.

DATAS:
(Dates of:)

Do Requerimento: 03 Nov. 2014 (Application:) **Da emissão**: 16 Mar. 2015 (Issuance:) **Da reemissão**: (Reissuance:) **Da emenda**: (Amendment:)

MÁRIO IGAWA
Gerente-Geral, Certificação de Produto Aeronáutico
(General Manager, Aeronautical Product Certification)

DINO ISHIKURA
Superintendente de Aeronavegabilidade
(Airworthiness Superintendent)

F-400-01G (04.12) Fl. 01 de 02 (Sheet) (of) H.02-4488-0

ANAC
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

Folha de Continuação ao
(Continuation Sheet to)

CERTIFICADO SUPLEMENTAR DE TIPO
(Supplemental Type Certificate)

NÚMERO **2015S03-11**
(Number)

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

I. The approval of this type design change should not be extended to other rotorcraft of this 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 rotorcraft.

II. 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.

III. Approval of this change in type design applies to only those MD Helicopter model rotorcraft listed in the AML which were previously equipped with a FAA approved installation of the MD Helicopter cargo hook suspension systems or Onboard System Model 200-187-00 or 200-264-00 cargo hook kits.

IV. Operation must be performed in accordance with the applicable FAA approved Onboard Systems Rotorcraft Flight Manual Supplement (RFMS) specified below:

- Document No. 121-028-00, Rev 1 dated 26 Oct. 2011 or later approved revisions for Cargo Hook kits 200-300-00 or 200-301-00
- Document No. 121-028-01, Rev. I.R., dated 4 October 2011 or later FAA approved revision for Cargo Hook Kits 200-378-00 or 200-379-00.

V. Instructions for Continued Airworthiness (ICA) prescribed in the attached ANAC Approved Model List (AML), or later approved revisions are required for this installation.

VI. A copy of this Certificate, the applicable Supplement referred on item IV above, the ANAC Approved Model List (AML) for CST No. 2015S03-11, ICA and Cargo Hook Service Manual shall be maintained as part of the permanent records of the modified rotorcraft.

---------- -END ----------

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ANAC AML

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AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

ANAC APPROVED MODEL LIST (AML)
FOR CST 2015S03-11

Item	Rotorcraft Make	Rotorcraft Model	Type Certification Number
1	MD Helicopters, Inc.	369D, 369E, 369FF, 369HS	H3WE (FAA)
2	MD Helicopters, Inc.	500N	9204 (ANAC)

Hook Kit P/N	Owner's Manual No.	Instructions for Continued Airworthiness and Cargo Hook Service Manual
200-300-00	120-119-00, Revision 3, dated 3 Aug. 2010	123-021-00, Rev. 3, dated 19 Dec. 2011 122-015-00, Rev 18, dated 3 Mar. 2014
200-301-00	120-121-00, Revision 5, dated 2 Mar. 2010	123-021-00, Rev. 3, dated 19 Dec. 2011 122-015-00, Rev 18, dated 3 Mar. 2014
200-378-00	120-207-00, Revision 0, dated 2 Mar. 2011	123-021-01, Rev. 3, dated 20Nov. 2013 122-015-00, Rev 18, dated 3 Mar. 2014
200-379-00	120-207-00, Revision 0, dated 2 Mar. 2011	123-021-01, Rev. 3, dated 20 Nov. 2013 122-015-00, Rev 18, dated 3 Mar. 2014
200-383-00	120-207-00, Revision 0, dated 2 Mar. 2011	123-021-01, Rev. 3, dated 20 Nov. 2013

ANAC Approved:

MÁRIO IGAWA
Gerente-Geral, Certificação de Produto Aeronáutico
(General Manager, Aeronautical Product Certification)

ANAC Approved Date: **16 Mar. 2015**

Revision: **I.R.**

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