

OWNERS M A N U A L

ELECTRONIC
HOOK LOAD MEASURING SYSTEM
FOR
BELL 204, 205, 212 & 412 SERIES
WITH THE 204-072-915-103 SUSPENSION SYSTEM

MODEL E-47

ONBOARD SYSTEMS
11212 NW SAINT HELENS RD.
PORTLAND, OR. 97231
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SYSTEM PART NUMBERS
200-006-00 For System with LB Indicator
200-007-00 For System with KG Indicator
DOCUMENT NUMBER 120-003-00
DOCUMENT REVISION 0
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TABLE OF CONTENTS

SECTION 1	GENERAL INFORMATION
1.1	Introduction
1.2	Specifications
1.3	Drawing List
1.4	Inspection
SECTION 2	INSTALLATION INSTRUCTIONS
2.1	Introduction
2.2	Indicator Installation P/N 210-005-00
2.3	Harness Installation P/N 270-003-00
2.4	Load Cell Installation P/N 210-020-00
2.5	Electrical Connections
2.6	Installation Check Out
2.7	Weight and Balance
2.8	Paper Work
SECTION 3	OPERATION INSTRUCTIONS
3.1	Introduction
SECTION 4	CALIBRATION
4.1	Introduction
4.2	The Calibration Procedure
SECTION 5	MAINTENANCE
5.1	Indicator Maintenance
5.2	Cable Maintenance
5.3	Load Cell Maintenance
SECTION 6	TROUBLE SHOOTING
6.1	Introduction
6.2	Instructions For Returning a System to the Factory
SECTION 7	LIMITED WARRANTY
7.1	Introduction
SECTION 8	STC SH4751NM FAA Flight Manual Supplement

SECTION 1
GENERAL INFORMATION

1.1 INTRODUCTION

The Onboard Hook Load system is a compliment to the helicopter lifting system. Its purpose is to display the weight of the load carried on the cargo hook. The weight is displayed on both a digital and analog readout indicator. The indicator is scaled for readings in pounds (standard configuration) or kilograms. The system is designed specifically for each helicopter and is intended to be a permanent installation.

1.2 SPECIFICATIONS

Operating voltage.....	20-30 VDC
Current consumption.....	100 MA
Max. storage temp.....	158F (70C)
Max. operating temp.....	158F (70C)
Min. storage temp.....	-40F (-40C)
Min. operating temp.....	-5F (-20C)
Load sensor overload capacity.....	4 times

1.3 BILL OF MATERIAL

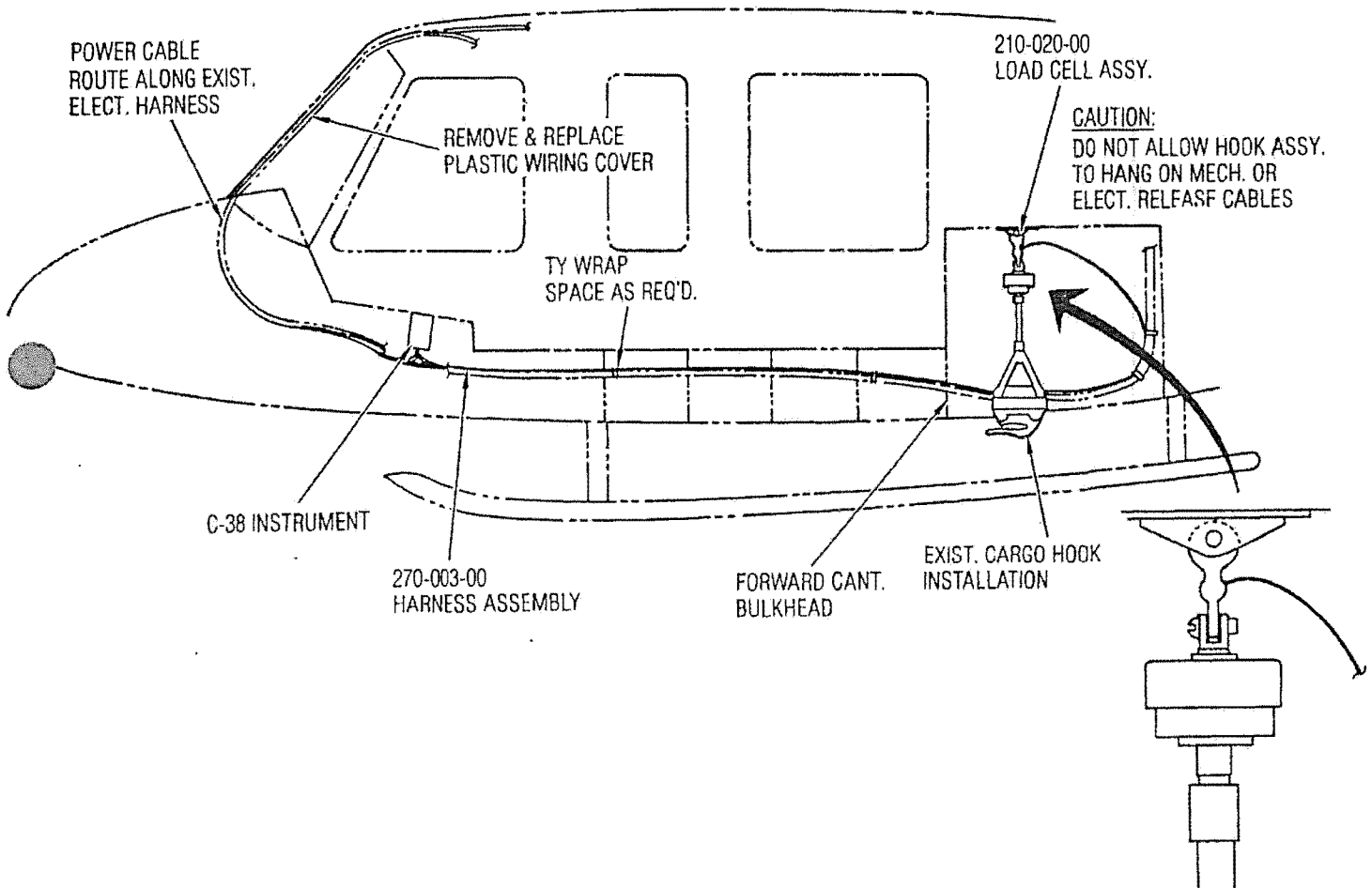
The following items are included with each system, if shortages are found contact the distributor from whom the system was purchased.

PART NUMBER	DESCRIPTION	QUANTITY
120-003-00	Owners Manual	1
210-005-00	C-38 Indicator Assembly	1
210-020-00	Load Cell Assembly	1
270-003-00	Harness Assembly	1
400-007-00	Power Switch	1
215-010-00	Placard	2
215-012-00	Placard	1
512 001-00	Ty-raps	25
510-028-00	AN Screw	4
510-029-00	AN Nut	4

SECTION 2

INSTALLATION INSTRUCTIONS

2.1 INSTALLATION OVER VIEW



2.2 INDICATOR INSTALLATION P/N 210-005-00

The indicator should be mounted in a position that is convenient, accessible and visible to the pilot. It can be mounted in a standard 2-1/4" instrument hole.

2.3 HARNESS INSTALLATION P/N 270-003-00

The harness is made up of three cables terminated to one connector. The connector is plugged into the back of the C-38 indicator. One of the cables is marked "LOAD CELL" and is fitted with a bulkhead fitting. This cable is connected to the load cell. Another cable is marked "POWER" and is connected to the aircraft electrical power. The last cable is connected to the optional data logger.

Route the load cell cable under the floor boards, with the existing aircraft wiring bundles to the " forward cant. bulkhead". Attach the bulkhead fitting to the forward cant. bulkhead using the fasteners provided.

Secure the cables to the existing wiring bundle with the with ty-raps.

SECURE THE CABLES CLEAR OF FLIGHT CONTROL RODS.

2.4 LOAD CELL INSTALLATION P/N 210-020-00

Remove the external cargo hook suspension assembly P/N 204-072-915-11 from the aircraft. Remove the link P/N 205-070-944-3 from the suspension assembly, the link will not be used in the installation. Load Cell 210-020-00 will be used in place of the link. Install the load cell with the electrical wire pointing to the LEFT and AFT. Reinstall the suspension assembly and load cell using the hardware removed in the above step. Use a general purpose grease (MIL-G-3278) on the bolts.

Secure the load cell cable to the existing wiring bundle with the Ty-raps provided.

AFTER THE INSTALLATION SWING THE HOOK ASSEMBLY TO THE FULL EXTREMES TO VERIFY THAT IT DOES NOT SELF TRIP.

2.5 ELECTRICAL CONNECTIONS

Connect the Power Cable to the Indicator and route the other end to a convenient location for the Indicator power switch P/N 400-007-00. The cable is supplied extra long, cut off the excess cable and use as needed to connect the switch and circuit breaker. Connect the red wire, in the power cable, to one side of the power switch and connect another piece of suitable red wire to the other side of the switch and then to an available 1 or 2 amp circuit breaker. Connect the black wire to the ground buss. The bare wire should be cut off as it is not needed at this end of the cable.

2.5 ELECTRICAL CONNECTIONS continued

Install the placard 215-010-00 "ELECTRONIC WEIGHING SYSTEM" next to the power switch and the circuit breaker. Install the placard 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.

2.6 INSTALLATION CHECK OUT

After the system has been properly installed, activate the circuit breaker to turn the system on. The indicator's analog and digital display should indicate zero after a five minute warm up period. If they do not, adjust the knob on the front of the indicator until the indicator reads zero.

The installers authorized inspector (AI) must accomplish both a satisfactory ground and flight EMI test for each installation. (Ref AC: 25-10 paragraph 5(m) and 5(n)) Special emphasis is needed for those helicopters equipped with electronic fuel control, electronic stability augmentation systems, electronic flight controls, or any other electronic device which could affect the rotorcraft safety.

INSURE THAT ALL ELECTRICAL CABLES ARE SECURED CLEAR OF FLIGHT CONTROL RODS AND HYDRAULIC LINES.

INSURE THAT THE CARGO HOOK IS FREE TO MOVE TO ITS FULL EXTREMES.

2.7 WEIGHT AND BALANCE

ITEM	WEIGHT (pounds)	STATION (inches)	MOMENT (inch pounds)
Indicator	1.0	62.0	62.0
Load sensor	1.0	138.0	138.0
Combined	2.0	100.0	200.0

2.8 PAPER WORK

Insert the Flight Manual Supplement into the aircraft flight manual.

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.

SECTION 3
OPERATION INSTRUCTIONS

3.1 INTRODUCTION

All operation procedures with the Hook Load Indicator System installed are the same as normal procedures.

The installed POWER SWITCH is used to power the system when needed.

Adjust the indicator to zero readings after a 5 minute warm up (with no load on the hook).

SECTION 4
CALIBRATION

4.1 INTRODUCTION

Calibration or recalibration is the means by which the electronics are adjusted to compensate for changes in the load sensor, cables and electronics that occur with the passage of time.

4.2 THE CALIBRATION PROCEDURE

Remove the indicator from the panel leaving the power and load cell cable connected.

Remove all weight from the cargo hook.

Turn the aircraft master switch ON.

To check the system calibration move the indicator CAL switch, located on the back of the indicator, to the ON position. The word "CAL" will appear on the indicator display and three digits will be displayed. This number should be the same as the CAL number on the Load Cell serial number tag. If the numbers are not the same adjust the "CAL" pot, located on the back of the indicator, until the numbers are the same.

Turn the indicator Cal switch off.

An alternative and preferred method of calibration is to hang a known weight on the cargo hook. The known weight should be at least 50% of the aircraft lifting capacity. Adjust the Cal pot until the indicator digits match the known weight. The cal switch must be in the off position during this procedure. The cal switch is in the off position when the word CAL is not displayed. NOTE: This procedure will produce a new calibration code number. This new number will be displayed when the load is taken off of the cargo hook and the cal switch is turned on. This new number should be recorded for later reference.

Reinstall the Indicator into the panel.

SECTION 5
MAINTENANCE

5.1 INDICATOR MAINTENANCE

The Indicator requires no maintenance, opening or attempting repairs will void the warranty.

5.2 CABLE MAINTENANCE

Most system problems will be the result of damaged wires. Keep the cables clean and insure that they are not chafing. Replace them if the insulation and shield is damaged.

5.3 LOAD CELL MAINTENANCE

Refer to the Bell service instructions # 212-5 or later version.

DAILY INSPECTION

Inspect the load cell, P/N 210-020-00, in the area of the bolt holes for evidence of cracks. Inspect the attaching hardware for security for excessive wear. Inspect the electrical cable. Do not use and replace if cracks are found.

200 HOUR INSPECTION

Inspect the load cell P/N 210-020-00 to overhaul criteria.

OVERHAUL

Inspect the load cell using the magnetic particle method, replace if crack are found.

Inspect the holes for elongation and wear.

MINIMUM	MAXIMUM	REPLACE
0.4995	0.5005	0.5020

Check for evidence of corrosion, if found remove and treat with zinc chromate primer.

Reinstall the load cell using a general purpose grease (MIL-G-3278) on the bolts.

Preform the preferred method of calibration.

SECTION 6
TROUBLE SHOOTING

6.1 INTRODUCTION

PROBLEM	POSSIBLE CURES
The indicator does not light up.	Check the circuit breaker by replacing it or wiring around it. Check the continuity of each wire of the power cable
Indicator indicates a partial reading and does not change with changing hook loads.	The problem is a bad internal harness or load cell.
Indicator indicates a zero reading regardless of hook load	Replace load cell.

6.2 INSTRUCTIONS FOR RETURNING A SYSTEM TO THE FACTORY

If a system, or part, must be returned to the factory please follow these directions.

1. Write a detailed explanation explaining the problem, when it occurred and whether it is an intermittent problem or a permanent problem.
2. Package the unit carefully to insure safe transit.
3. Include your name, address, and phone number.
4. Return the unit freight, cartage, insurance and customs prepaid to:

ONBOARD SYSTEMS
11212 NW ST. HELENS RD.
PORTLAND, OR. 97203
USA

SECTION 7
LIMITED WARRANTY

7.1 INTRODUCTION

ONBOARD SYSTEMS warrants for a period of one year from the purchase date that the model E-47 Hook Load System will be free from defects in workmanship and material when properly installed and subjected to reasonable care for its intended purpose.

Parts which prove to be defective will be repaired or replaced free of charge FOB factory, provided:

1. No repairs have been attempted by other than Onboard System personnel.
2. The system or part have been returned properly packaged, insured with transportation charges prepaid.
3. Upon Examination, Onboard System personnel are satisfied that the defects were not caused by abuse or subjected to conditions that violate the system specifications.

No other warranties are expressed or implied, Onboard System is not liable for consequential damages. The user must satisfy himself that the System is suited to his needs and is performing according to his requirements. This warranty covers the original purchaser only.

FAA APPROVED MODEL LIST (AML) NO. SH4751NM

FOR

ONBOARD SYSTEMS

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	FAA APPROVED DRAWING/DRAWING LIST		RFM SUPPLEMENT NO. AND DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. AND DATE		
1	BELL	204B 205A 205A-1	H1SW	CAR 7, dated 8/1/58 and Amdt. 7-1 through 7-4, Category B	See STC SH4751NM	See STC SH4751NM	See STC SH4751NM	NC
2	BELL	212 412	H4SW	FAR Part 29 dated 2/1/65 and Amdts. 29-1 and 29-2. See TCDS H4SW for additional requirements	See STC SH4751NM	See STC SH4751NM	See STC SH4751NM	NC

FAA Approved: Stewart R. Miller
Asst. Manager, Seattle Aircraft
Certification Office

Date: January 3, 1990

United States of America
Department of Transportation—Federal Aviation Administration
Supplemental Type Certificate

Number SH4751NM

This certificate, issued to Onboard Systems

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part * of the * Regulations.*

Original Product—Type Certificate Number: * See Attached Approved Model List (AML)

Make: * No. SH4751NM for list of approved rotorcraft

Model: * models and applicable airworthiness regulations

Description of Type Design Change: Fabrication of Onboard Systems Model E-47 Cargo Hook Load Cell System in accordance with FAA Approved Onboard Systems Master Drawing List No. 155-001-00, dated March 6, 1989, or later FAA approved revision; and, Installation of this system in accordance with FAA approved Onboard Systems Owners Manual No. 120-003-00, dated January 5, 1989, or later FAA approved revision. Inspect load cell in accordance with Section 5 of Onboard Systems Owners Manual No. 120-003-00, dated January 5, 1989, or later FAA approved revision.

Limitations and Conditions: Approval of this change in type design applies to only those Bell model rotorcraft listed on AML No. SH4751NM, dated January 3, 1990, or later FAA approved revision, which are equipped with Bell external cargo hook suspension assembly, P/N 204-072-915-11, and suspension link, P/N 205-070-944-3. This approval should not be extended to helicopters of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that helicopter.

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: February 28, 1989

Date issued:

Date of issuance: July 28, 1989

Date amended: January 3, 1990

By direction of the Administrator

Stewart E. Miller
(Signature)

Assistant 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.



United States of America
Department of Transportation—Federal Aviation Administration
Supplemental Type Certificate
(Continuation Sheet)

Number SH4751NM

LIMITATION AND CONDITIONS: (continued)

Rotorcraft modified in accordance with this STC must be operated in accordance with an FAA approved copy of Rotorcraft Flight Manual Supplement revised January 3, 1990 or later FAA approved revision. A copy of the Certificate, Continuation Sheet No. SH4751NM, AML No. SH4751NM and FAA approved Rotorcraft Flight Manual Supplement must be maintained as part of the permanent records of the modified helicopter.

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

Onboard Systems
P.O. Box 03413
Portland, OR 97203
STC No. SH4751NM

FAA APPROVED
ROTORCRAFT FLIGHT MANUAL SUPPLEMENT
FOR

BELL MODEL 204B, 205A, 205A-1, 212, and 412 HELICOPTERS

R/N _____ S/N _____

This supplement must be attached to the appropriate Bell FAA approved Rotorcraft Flight Manual when an Onboard Systems Model E-47 Cargo Hook load cell is installed in accordance with Supplemental Type Certificate (STC) NO. SH4751NM. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic Rotorcraft Flight Manual.

I. LIMITATIONS

Placard - Mount adjacent to the Onboard Systems digital/analog indicator in full view of the pilot and copilot:

TURN THE WEIGHING SYSTEM OFF WHEN NAVIGATION EQUIPMENT IN USE
NO AIRCRAFT OPERATION SHOULD BE PREDICATED ON THE READING OF THE
ONBOARD WEIGHING SYSTEM

- Mount adjacent to both the power switch and the circuit breaker in full view of the pilot and copilot:

ELECTRONIC WEIGHING SYSTEM

II. PROCEDURES

After installation of the system, swing the hook assembly to the full extremes to verify that it does not self trip.

PRE-FLIGHT

Adjust the instrument "zero knob" to set the display to zero.

III. PERFORMANCE

The hook load weighing system is designed and installed as a means of MONITORING the load (weight) suspended from the cargo hook. Functional and performance characteristics have not been determined on the basis of the load cell indication or display. Therefore, this instrument shall NOT be used as a primary indication of performance and flight operation must NOT be predicated on its use.

FAA Approved: Steven J. Miller
Assistant Manager, Seattle
Aircraft Certification Office

Date: January 3, 1990

Page 1 of 1