

# **MECHANICAL SPECIALTIES, INC.**

## **MODEL 303 CARGO HOOK**

**OPERATING, MAINTENANCE AND OVERHAUL MANUAL  
MSI-MNL001 REVISION B**

*2/09/12*

**LIST OF REVISIONS**

7/25/97	Initial release	Rev. A
2/09/12	Revised paragraph 5.0, added overhaul interval	Rev. B

# **OPERATING AND MAINTENANCE INSTRUCTIONS**

## **CARGO HOOK--MODEL 303**

### **1.0 GENERAL**

- 1.1 THE MODEL 303 CARGO HOOK PROVIDES A MEANS TO ENGAGE, LIFT AND TRANSPORT EXTERNAL LOADS. THE HOOK ASSEMBLY HAS AN ELECTRICAL RELEASE AS WELL AS A CABLE EMERGENCY RELEASE SYSTEM, IN ORDER TO ALLOW RELEASES TO BE CONDUCTED BY THE PILOT IN THE COCKPIT. A MANUAL RELEASE KNOB LOCATED ON THE SIDE OF THE HOOK ASSEMBLY ALLOWS CARGO RELEASES TO BE CONDUCTED BY GROUND CREW PERSONNEL.

THE LOAD BEAM IS EQUIPPED WITH A RETURN SPRING, TO PROVIDE AUTOMATIC RELATCHING OF THE LOAD BEAM AFTER RELEASE OF A LOAD. A MINIMUM LOAD OF 3# MUST BE APPLIED TO LOAD BEAM TO INSURE OPENING EITHER ELECTRICALLY OR MANUALLY.

### **BECOME FAMILIAR WITH YOUR FLIGHT MANUAL REGARDING EXTERNAL LOAD OPERATIONS.**

### **2.0 OPERATION**

- 2.1 THE LOAD SLING MEMBER OR RING IS GUIDED INTO PLACE ON THE LOAD BEAM (26). THE KEEPER (60) IS SPRING LOADED TO CLOSE AFTER LOADING TO RETAIN LOAD.

#### **2.2 GROUND CREW RELEASE -**

MANUAL RELEASE OF THE LOAD BEAM MAY BE ACCOMPLISHED BY TURNING THE MANUAL RELEASE KNOB (45) IN THE COUNTER-CLOCKWISE DIRECTION. THE LOAD BEAM RETURN SPRING (35) RETURNS THE LOAD BEAM TO THE LATCHED POSITION.  
**NOTE:** ALWAYS INSURE LOAD BEAM IS LATCHED AND LOCKED PRIOR TO FLIGHT.

#### **2.3 ELECTRICAL RELEASE -**

BY USE OF A PUSH BUTTON SWITCH LOCATED IN THE COCKPIT, THE PILOT MAY RELEASE THE LOAD ELECTRICALLY.

#### **2.4 MANUAL CABLE RELEASE -**

EMERGENCY RELEASE IS ACCOMPLISHED BY A CABLE CONTROL SYSTEM CONNECTED TO THE RELEASE ARM (40) LOCATED INSIDE THE MANUAL RELEASE HOUSING (41, 44).

### **3.0 ELECTRICAL SYSTEM**

- 3.1 THE TWO SOLENOID WIRES ARE CONNECTED TO THE PC07A-8-2P CONNECTOR, AND THE CIRCUIT IS CLOSED AT THE PUSH BUTTON SWITCH LOCATED IN THE COCKPIT. ACTUATING THE SWITCH ENERGIZES THE SOLENOID AND ALLOWS THE LOAD BEAM TO OPEN. FOR DETAILS ON ELECTRICAL RELEASE SYSTEM, REFER TO BHT-206 SI 206-94.

## 4.0 INSTALLATION

4.1 THE MODEL 303 CARGO HOOK REPLACES THE REDUNDANT SP-4232-5 CARGO RELEASE ASSEMBLY, AND ATTACHES IDENTICALLY TO THE PRIOR INSTALLATION. REFER TO MECHANICAL SPECIALTIES, INC. DRAWING 206303 FOR INSTALLATION OF THE 303 CARGO HOOK.

### 4.2 MANUAL RELEASE SYSTEM-

THE MANUAL RELEASE SYSTEM IS IDENTICAL TO THE INSTALLATION REFERED TO TO IN BHT-206 SI 20694, WITH THE EXCEPTION OF MOUNTING BRACKET P/N 206-072-904-1. THIS BRACKET IS REPLACED BY BRACKET P/N 3160-1. REFER TO BHT-206 SI 20694 FOR MECHANICAL RELEASE RIGGING INSTRUCTIONS AND MECHANICAL SPECIALTIES DRAWING 206303 FOR INSTALLATION OF BRACKET.

## 5.0 OVERHAUL INSTRUCTIONS

**OVERHAUL INTERVAL - EVERY 1000 HRS. OR 5 YEARS, WHICH EVER COMES FIRST.**

### 5.1 TOOLS AND EQUIPMENT -

NO SPECIAL TOOLS ARE REQUIRED TO DISASSEMBLE OR REASSEMBLE THE CARGO HOOK. HOWEVER THE FOLLOWING TEST EQUIPMENT IS REQUIRED:

- A) 28 VDC 14 AMP POWER SUPPLY
- B) PULL TEST FIXTURE
- C) VOLT OHM METER

### 5.2 DISASSEMBLY

#### 5.2.1 ACCESS TO THE CABLE RELEASE ARM(40)-

THE FRONT COVER AND MANUAL RELEASE KNOB (44, 45) ARE REMOVED AS AN ASSEMBLY, TO ACCOMPLISH THIS REMOVE THE FOUR SCREWS (46) ATTACHING THE COVER TO THE HOUSING. REMOVE COVER, THE RELEASE ARM WILL NOW BE ACCESSIBLE FOR INSTALLATION OR REMOVAL OF CONTROL CABLE, IF THE RELEASE ARM IS TO BE REMOVED, THE HOUSING (41) MUST BE REMOVED, TO ACCOMPLISH THIS, REMOVE THE THREE SCREWS (39) ATTACHING THE HOUSING TO THE SIDEPLATE (31). THE ROLL PIN (36) CAN NOW BE REMOVED ALLOWING REMOVAL OF RELEASE ARM.

#### 5.2.2 ACCESS TO MAIN LATCHING MECHANISM-

REMOVE MANUAL RELEASE COVER AND HOUSING (REFER TO SECTION 5.2.1). REMOVE SAFETY WIRE FROM THE THREE SOLENOID COVER SCREWS (48), REMOVE SCREWS AND COVER (49). REMOVE ELECTRICAL CONNECTOR (PC07A-8-2P) FROM SOLENOID COVER. REMOVE LOAD BEAM RETURN SPRING (35) FROM LOAD BEAM RETURN ARM (36). REMOVE ROLL PIN (37), THE LOAD BEAM RETURN ARM MAY NOW BE REMOVED. REMOVE ALL REMAINING NUTS AND SCREWS. BOLTS (53, 59) SHOULD BE LEFT IN PLACE UNTIL SIDEPLATE (31) IS REMOVED, TO RETAIN INTERNAL MECHANISM ALIGNMENT. SIDEPLATE (31) MAY NOW BE REMOVED TO EXPOSE INTERNAL LATCHING MECHANISM.

## 6.0 SERVICE AND INSPECTION

### 6.1 INSPECTION-

CLEAN ALL PARTS IN CLEANING SOLVENT AND DRY WITH AIR. INSPECT THE CARGO HOOK PARTS IN ACCORDANCE WITH TABLE 1.

### 7.0 REASSEMBLY

#### 7.1 REASSEMBLE THE HOOK IN THE REVERSE ORDER OF DISASSEMBLY, NOTING THE FOLLOWING PROCEDURES:

\*ASSEMBLE ALL MOVING PARTS WITH MIL-G-81322D OR EQUIVALANT GREASE.

\*INSURE THAT THE HEADS OF SCREWS (56) ARE FLUSH OR SLIGHTLY BELOW THE SURFACE OF THE SIDEPLATES (1, 31).

\***WARNING-TIGHTEN BOLTS (53, 59) SO THAT THE NUT JUST CONTACTS THE SIDEPLATE, AND THE BOLTS CAN BE EASILY TURNED USING A SHORT WRENCH. (OVER TIGHTENING OF THESE BOLTS MAY CAUSE BINDING OF LATCHING MECHANISM, WHICH COULD CAUSE IMPROPER OPERATION OF HOOK.) IMPROPER ASSEMBLY OF THE CARGO HOOK CAN RESULT IN INJURY OR DEATH OF PERSONNEL.**

### 7.0 TESTING

#### 7.1 ELECTRICAL CHECK-

PLACE THE LEADS OF A VOLT-OHM METER ACROSS THE LEADS OF THE SOLENOID, VERIFY THAT ELECTRICAL CONTINUITY EXISTS.

ATTACH ONE LEAD OF A VOLT-OHM METER TO ONE OF THE SOLENOID LEADS, AND THE OTHER OHM METER LEAD ON SIDEPLATE (1, 31) AND INSURE THAT CONTINUITY **DOES NOT** EXIST.

#### 7.2 LOAD TESTING-

PLACE HOOK IN PULL TEST CELL, APPLY LOAD OF 3,000 LBS TO LOAD BEAM. **DO NOT RELEASE HOOK AT THIS LOAD.** HOLD THIS LOAD FOR ONE MINUTE, GRADUALLY REDUCE THIS LOAD.

PERFORM THE FOLLOWING RELEASES:

<u>LOAD</u>	<u>RELEASE METHOD</u>	<u>REMARKS</u>
10 LBS.	22 VDC	*****
10 LBS.	MANUALLY	*****
1000 LBS.	22 VDC	HOLD 1 MINUTE
1000 LBS.	MANUALLY	“
1500 LBS.	22 VDC	“
1500 LBS.	MANUALLY	“

**TABLE 1**

<u>ITEM</u>	<u>METHOD OF INSPECTION</u>	<u>REMARKS</u>
BOLTS	VISUAL	CHECK FOR CROSS, DEFORMED, OR BROKEN THREADS.
SPRINGS (13, 20, 35, 62)	VISUAL	CHECK FOR BROKEN COILS, DEFORMED ENDS.
BEARINGS (8, 9, 22)	VISUAL	CHECK FOR FREEDOM OF ROTATION, BINDING, EXCESSIVE WEAR.
BUSHINGS (15, 25, 33)	VISUAL	CHECK FOR EXCESSIVE WEAR. (SEE NOTE 1, 2)
LOAD BEAM (26)	VISUAL	CHECK FOR WEAR, TWISTING, AND BENDING. CHECK FOR BURRS WHERE LOAD BEAM CONTACTS ROLLER (24). (SEE NOTE 3)
LATCH & ROLLER (23, 24)	VISUAL	CHECK FOR EXCESSIVE WEAR, AND BURRS WHERE LATCH (23) CONTACTS BEARING (9), AND WHERE ROLLER (24) CONTACTS LOAD BEAM (26). (SEE NOTE 3) INSURE THE ROLLER (24) ROTATES FREELY.
LEVER (14)	VISUAL	CHECK FOR WEAR OR BENDING.
SHAFT & ARM ASSY. (17)	VISUAL	CHECK FOR WEAR OR BENDING.
PINS (3, 5, 11, 12)	VISUAL	CHECK FOR WEAR OR BENDING.
TRUNNION ( 27 )	VISUAL	CHECK FOR WEAR OR BENDING. (SEE NOTE 4)

**TABLE 1 NOTES**

NOTE 1-- BUSHING (15, 33) BORE DIAMATER TOLERANCES.  
ACCEPTABLE-----.627-.635

NOTE 2-- BUSHING (25) BORE DIAMATER TOLERANCES.  
ACCEPTABLE-----.497-.505

NOTE 3-- IF NECESSARY A VERY LIGHT SMOOTHING WITH FINE EMERY CLOTH OR FILE  
IS PERMISSIBLE.

NOTE 4-- TOLERANCE WHERE TRUNNION (27) MATES WITH BUSHING (25).  
ACCEPTABLE-----.486-.494

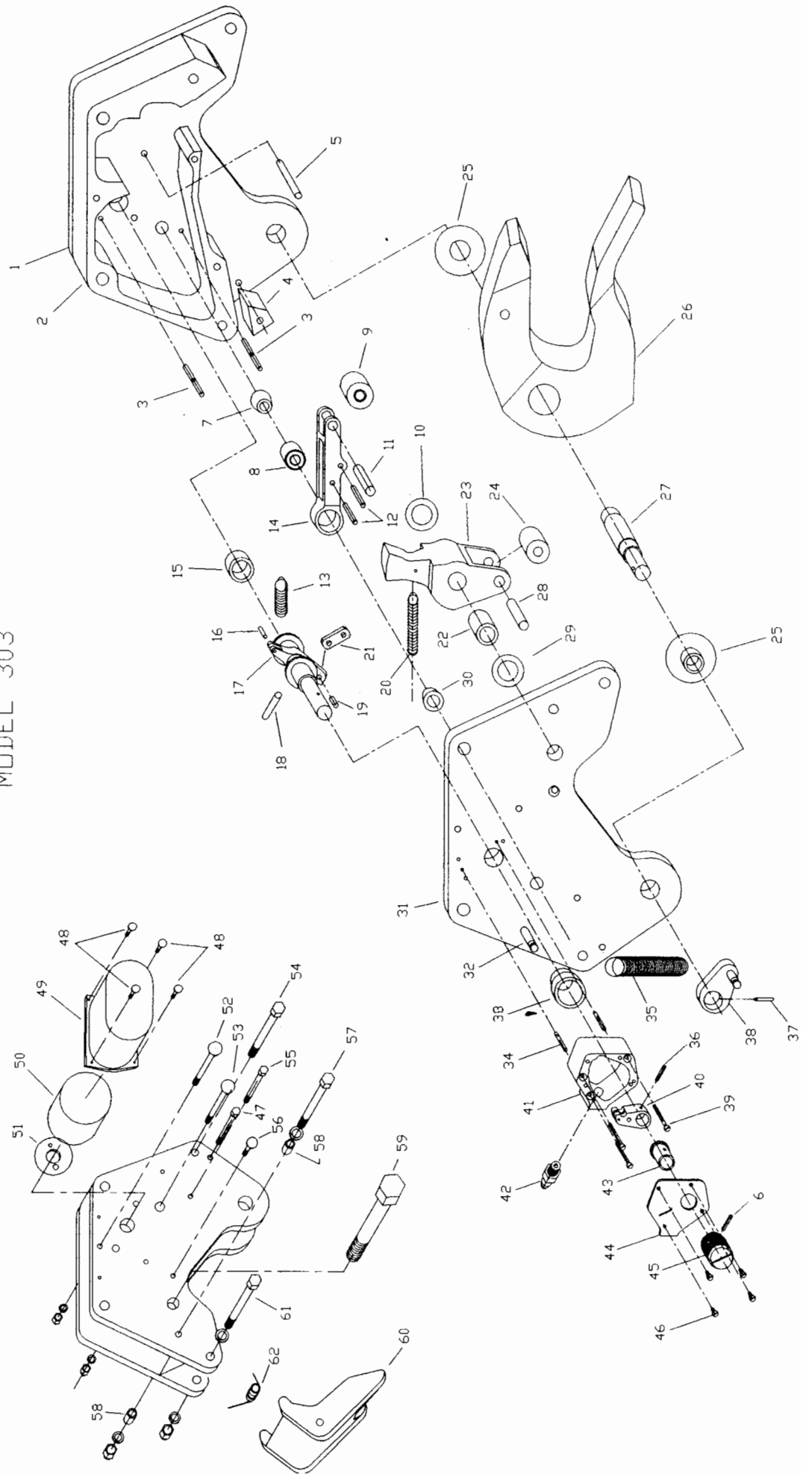
PARTS BREAKDOWN

<u>INDEX NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	3108-1	SIDEPLATE (SOLENOID SIDE)
2	3102-1	SPACER
3	3099-1	PIN (2 REQUIRED)
4	3158-A1	BUMPER
5	3120-1	PIN
6		ROLL PIN
7	3098-1	BEARING SPACER
8	4NBF614YJ	BEARING
9	4NBC612ZP	BEARING
10	AN960-616L	WASHER
11	3117-1	PIN
12	3118-1	PIN (2 REQUIRED)
13	3031-1	SPRING
14	3100-1	LEVER
15	3107-1	BUSHING
16		ROLL PIN
17	3101-A1	SHAFT & ARM ASSEMBLY
18		ROLL PIN
19	3111-1	PIN
20	3097-1	SPRING
21	3110-1	LINK
22	B 610	BEARING
23	3103-1	LATCH
24	3103-2	ROLLER
25	3121-1	BUSHING
26	3104-1	LOAD BEAM
27	3122-1	TRUNNION
28	3103-3	PIN
29	AN960-616L	WASHER
30	3098-1	BEARING SPACER
31	3106-1	SIDEPLATE (NON SOLENOID SIDE)
32	3085-1	POST
33	3125-1	BUSHING
34		ROLL PIN
35		SPRING
36		ROLL PIN
37		ROLL PIN
38	3112-1	ARM
39	MS24693S32	SCREW
40	3148-1	ARM
41	3146-1	SPACER
42	3154-1	FITTING
43	3147-1	BUSHING
44	3145-1	COVER
45	3126-1	KNOB
46	#5-40 X 1/2"	SCREW
47	AN3-15A	BOLT
48	AN500A8-8	SCREW



<u>INDEX NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
49	3105-1	SOLENOID COVER
50	3141-1	SOLENOID
51	3142-1	SOLENOID SPACER
52	AN509-10R27	BOLT
53	AN509-416R27	BOLT
54	AN4-15A	BOLT
55	AN3-15A	BOLT
56	AN509-8R6	SCREW (2 REQUIRED)
57	AN4-24A	BOLT
58	3130-1	SPACER
59	AN176-16A	BOLT
60	3114-A1	KEEPER
61	AN4-21A	BOLT
62	3144-1	KEEPER SPRING

MODEL 303



# Supplemental Type Certificate

*Number* SR09168RC

*This certificate, issued to*

**Mechanical Specialties, LLC  
1000 85th Ave SE  
Olympia, WA 98501**

*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 6 of the Civil Air Regulations.*

*Original Product—Type Certificate Number:* H2SW  
*Make:* Bell  
*Model:* 206B

*Description of the Type Design Change:* Installation of a cargo hook in accordance with Mechanical Specialties Master Drawing (MDL) 303MDL, Revision A, dated April 30, 1997, or later Federal Aviation Administration (FAA) approved revision.

*Limitations and Conditions:* This modification is limited to Bell Helicopter Textron, Inc. model 206B helicopters with Bell Helicopter Textron, Inc. Cargo Hook Kit Part Number 206-706-335 installed. Compatibility of this design change with previously approved modifications must be determined by the installer.

A copy of this certificate and MDL 303MDL, Revision A, dated April 30, 1997, or later FAA-approved revision, must be maintained as part of the permanent records for the modified aircraft.

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.

*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:* November 1, 1996

*Date reissued:* April 19, 2012

*Date of issuance:* June 25, 1997

*Date amended:*



*By direction of the Administrator*

*Kenneth Paulson*  
*for* (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.*