
COLUMBIA BASIN HELICOPTERS, INC.

60035 BLUE SKY DR.

LA GRANDE, OR 97850 USA

N171PL

A94-0047

CARGO HOOK MODEL 601

OPERATING & MANUAL

INSTRUCTION FOR CONTINUED AIRWORTHINESS

REVISION E

MECHANICAL SPECIALTIES, LLC

975 85TH AVENUE SE OLYMPIA, WASHINGTON 98501

PLEASE RETURN TO THE ROTORCRAFT FILE CABINET

7.0 SERVICE AND INSPECTION

- Clean all parts in cleaning solvent and dry with compressed air not to exceed 35 PSI.
- Inspect the cargo hook parts in accordance with Table 1.
- If bare aluminum exists, prevent corrosion by using anodize pen or primer & paint.

TABLE 1 – Component Inspection Methods

ITEM	METHOD OF INSPECTION	REMARKS
Bolts, Screws	Visual <i>HM</i>	Check for cross, deformed, or broken threads.
Springs (3, 23, 24)	Visual <i>HM</i>	Check for broken coils, deformed ends.
Bearings (29, 30)	Visual <i>HM</i>	Check for freedom of rotation, binding, excessive wear.
Bushings (6, 9, 12)	Visual <i>HM</i>	Check for excessive wear.
Load Beam (33)	Visual <i>HM</i>	Check for wear, twisting, and bending. Check for burrs where load beam contacts roller (38).
Latch & Roller (38)	Visual <i>HM</i>	Check for excessive wear, and burrs where latch (38) contacts bearing (30), and where roller (38) contacts load beam (33), Ensure the roller (38) rotates freely.
Lever (19)	Visual <i>HM</i>	Check for wear or bending.
Shaft & Arm Assy. (35)	Visual <i>HM</i>	Check for wear or bending.
Pins (2, 17, 26, 27, 28, 42, 43)	Visual <i>HM</i>	Check for wear or bending.
Trunnion (10)	Visual <i>HM</i>	Check for wear or bending.
Link (18)	Visual <i>HM</i>	Check for wear in holes.

Mechanical specialties Hook
Model 601
SN # 110-11AA
Inspected 7/29/22
HM

**MECHANICAL SPECIALTIES, LLC
975 85TH AVE SE
OLYMPIA, WA 98501**

MODEL 601 CARGO HOOK

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

OPERATING AND MAINTENACE MANUAL

REVISION E

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REVISION HISTORY

Rev.	Date	Description of Changes
A	1/4/2012	Changed parts breakdown
B	10/9/2013	Added overhaul interval
C	5/19/2016	Changed section I, subsection 8.1 and 11.2
D	10/6/2016	Updated drawings and parts breakdown list
E	12/15/2021	Reformatted Manual. Updated Manual to reflect new part numbering system. Added more detailed parts breakdowns. Added EC Declaration of Conformity

OPERATING AND MAINTENANCE INSTRUCTIONS

CARGO HOOK – MODEL 601

RELEASE OF LIABILITY



Helicopter external cargo load operations are, in the best of conditions, dangerous work. Mechanical Specialties, LLC cannot be, in any way held responsible for injury or death due to accidents resulting directly or indirectly from this type of work.



The user of this hook understands and accepts this liability.

1.0 SCOPE

This manual contains the overhaul instruction and test procedures for CARGO HOOK ASSEMBLY, Model No. 601, manufactured by MECHANICAL SPECIALTIES, LLC, OLYMPIA, WA 98501.

2.0 GENERAL

2.1 INTENDED USE

The Model 601 cargo hook is designed for use as a remote or long line hook attached to the helicopter by means of a certified belly hook. The 601 hook is never to be attached to the helicopter unless it is attached to a certified belly hook. The 601 hook is not certified for any aircraft, and is never to be used as a primary or belly hook.

The hook is designed to provide a means to engage, lift and transport and unload external loads from a long line suspended below the helicopter. The hook assembly has an electrical 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 re-latching of the load beam after release of a load.

BECOME FAMILIAR WITH YOUR FLIGHT MANUAL REGARDING EXTERNAL LOAD OPERATIONS.

2.2 CONSTRUCTION OF THE HOOK

Load hook for use as a remote or longline hook.

2.3 MANUFACTURER ADDRESS

MECHANICAL SPECIALTIES, LLC
OLYMPIA, WA 98501

2.4 DECLARATION OF CONFORMITY

We hereby confirm that the hook was manufactured in accordance with the technical documentation.

EC Declaration of Conformity (Original EC Declaration of Conformity)	
We,	Mechanical Specialties, LLC 975 85 th Avenue SE Olympia, WA 98501 USA
hereby declare that the product type serial number	Remote Cargo Hook Model 601
Satisfies all the essential requirements of the following Directives:	2006/42/EC (Machinery Directive) and their amendments
Person authorized to compile the technical file in accordance with Annex VII A of Directive 2006/42/EC:	Mechanical Specialties, LLC Engineering Department 975 85 th Avenue SE Olympia, WA 98501 USA
Harmonized standards applied:	SAE AS9100, Rev D ISO 9004:2015
Other technical standards and specifications applied:	
Remark:	This Declaration of Conformity replaces all previous ones of the above model(s).
Olympia, WA, USA 14 DEC 2021	 Jeff Winner, General Manager

2.5 SUPPORTING DOCUMENTS FOR SAFE USE, MAINTENANCE AND REPAIR

For maintenance and repair see § 9

Airborne noise emission of the device: less than 70 dB (A)

No further security-relevant requirements.

3.0 SAFETY REGULATIONS

3.1 GENERAL OBLIGATION

- The maintenance staff to perform all work according to valid, up-to-date, documentation.

3.2 TRAINING

Crew, pilots, and ground crew: Initial training and recurring training.

3.3 SAFETY NOTATIONS



Information about dangers that can lead directly to death, serious bodily harm or major property-damage.



Information about dangers that can lead to moderate or minor physical injuries or damage to property.



Information that indicates technical or economic requirements. Failure to comply can lead to malfunctions, inefficiency and possibly to production losses.

3.4 LOAD LIMIT

The Model 601 Cargo Hook has a working load limit of 6,000lb/2721kg. A minimum load of 15lb/7kg must be applied to load beam to ensure opening either electrically or manually.

3.5 DISREGARD OF THE SAFETY REGULATIONS

Failure to observe the safety regulations may lead to malfunctions or, in the worst case, to an incident/accident.

4.0 OPERATION

4.1 DAILY FUNCTION CHECK

A pre-flight visual check shall be performed prior to conducting sling operations, on at least a daily basis. Unless the cargo hook passes the following minimum inspection, it should not be used.

- 4.1.1 Check hook for secure attachment to suspending line.
- 4.1.2 Check hook electrical connectors and wiring for frayed wire or loose connections.
- 4.1.3 Functionally check electrical release.
- 4.1.4 Functionally check manual release.
- 4.1.5 Check load beam for binding.
- 4.1.6 Visually check the load beam and hook frame for cracks, unusual wear and latch engagement.
- 4.1.7 Inspect keeper on hook. If damaged beyond repair, replace.
- 4.1.8 Check return springs and arms for serviceability.
- 4.1.9 Check hook body for loose or missing hardware. Except as noted in section 6.0, tighten or replace as necessary before use.
- 4.1.10 Check hook load beam bumper for serviceable condition. Replace if necessary before lift operations. VERY IMPORTANT!

4.2 LOADING

The load sling member or ring is guided into place on the load beam (24). The keeper (64) is spring loaded to close after loading to retain load.

4.3 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 (48) returns the load beam to the latched position.

4.4 ELECTRICAL RELEASE

By use of a switch located in the cockpit, the pilot may release the load electrically.

NOTE

ALWAYS ENSURE LOAD BEAM IS LATCHED AND LOCKED PRIOR TO FLIGHT.

5.0 ELECTRICAL SYSTEM

- 5.1 The two solenoid wires are connected to electrical cable, which is then connected to the operator's connector for use with their long line/electrical set up. The circuit is closed at the switch located in the cockpit. Actuating the switch energizes the solenoid and allows the load beam to open.

NOTE

SOLENOID IS NOT POLARITY SENSITIVE.

6.0 MAINTENANCE INSTRUCTIONS

Time Between Overhaul (TBO) Recommended interval maximum of 5 years.

6.1 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 Ohmmeter

6.2 DISASSEMBLY

1. Remove the three bolts, nuts and washers from the guard
2. Pull hook out of guard.
3. Remove the four screws (49) and remove the solenoid cover (37).
4. Remove the set screw (45) from the manual release knob (39) and remove knob.
5. Remove spring (3), remove the spring pin from the return arm (16), then pull the return arm off the trunnion (10).
6. Remove all the remaining bolts, nuts and screws.
7. Place the hook on a bench with the solenoid facing down.
8. The front cover may now be lifted off to service the internal parts.

7.0 SERVICE AND INSPECTION

- Clean all parts in cleaning solvent and dry with compressed air not to exceed 35 PSI.
- Inspect the cargo hook parts in accordance with Table 1.
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Link (18)	Visual	Check for wear in holes.

8.0 REASSEMBLY

Reassemble the hook in the reverse order of disassembly, noting the following procedures:

- Assemble all moving parts with LUBRIPLATE 130AA (or equivalent).
- Ensure that the heads of screws (59) are flush or slightly below the surface of the side plates (4, 5).
- Use Loctite RC/609 to secure the bushings (6, 9, 12).
- If bearing (29) is to be replaced, press out. Press in new bearing using Loctite RC/609 and press on the outer race only. It must be staked using new locations for staking.

CAUTION

- Tighten bolts (53, 54) so that the nut just touches the side plate and the bolt can easily be turned in the side plates using a short wrench. Over tightening of these bolts will cause the latch or lever to drag on the side plates, thus causing improper opening and closing.

WARNING

**IMPROPER ASSEMBLY OF THE CARGO HOOK CAN RESULT
IN INJURY OR DEATH OF PERSONNEL.**

9.0 TESTING

9.1 ELECTRICAL CHECK

Place the leads of a volt-ohmmeter across the leads of the solenoid (25). Verify that electrical continuity exists. Attach one lead of a volt-ohmmeter to one of the solenoid leads, and the other ohm meter lead on side plate (4 or 5) and ensure that continuity **does not** exist. Ensure the other solenoid lead is not touching the hook.

9.2 LOAD TESTING

Place hook in test cell. Perform the following load tests:

<u>LOAD</u>	<u>RELEASE METHOD</u>	<u>REMARKS</u>
10lb/4.5kg	22 VDC	Hold 5 seconds.
10lb/4.5kg	Manually	Hold 5 seconds.
1,000lb/454kg	22 VDC	Hold 2 Min.
1,500lb/680kg	22 VDC	Hold 2 Min.
2,000lb/907kg	22 VDC	Hold 2 Min.
6,000lb/2,721kg	28 VDC	Hold 2 Min.
6,000lb/2,721kg	Manually	Hold 2 Min.
12,000lb/5,442kg	DO NOT RELEASE AT THIS LOAD	Hold one minute. Relieve pressure gradually then release at zero load.

10.0 TRANSPORT PACKAGING

- 10.1 The Model 601 hook is only to be transported with the hook frame installed. For shipping, e.g. to the manufacturer, the hook is to be packed so that it is protected to prevent damage during transport.

11.0 DECOMMISSIONING, STORAGE

- 11.1 The Model 601 hook can be treated with an anti-corrosive agent and stored in a suitable location. The storage location should be protected from moisture and not be subject to major variances in temperature.

12.0 DISPOSAL

- 12.1 The Model 601 hook is made from steel and aluminum and may be disposed of accordingly.

NOTE

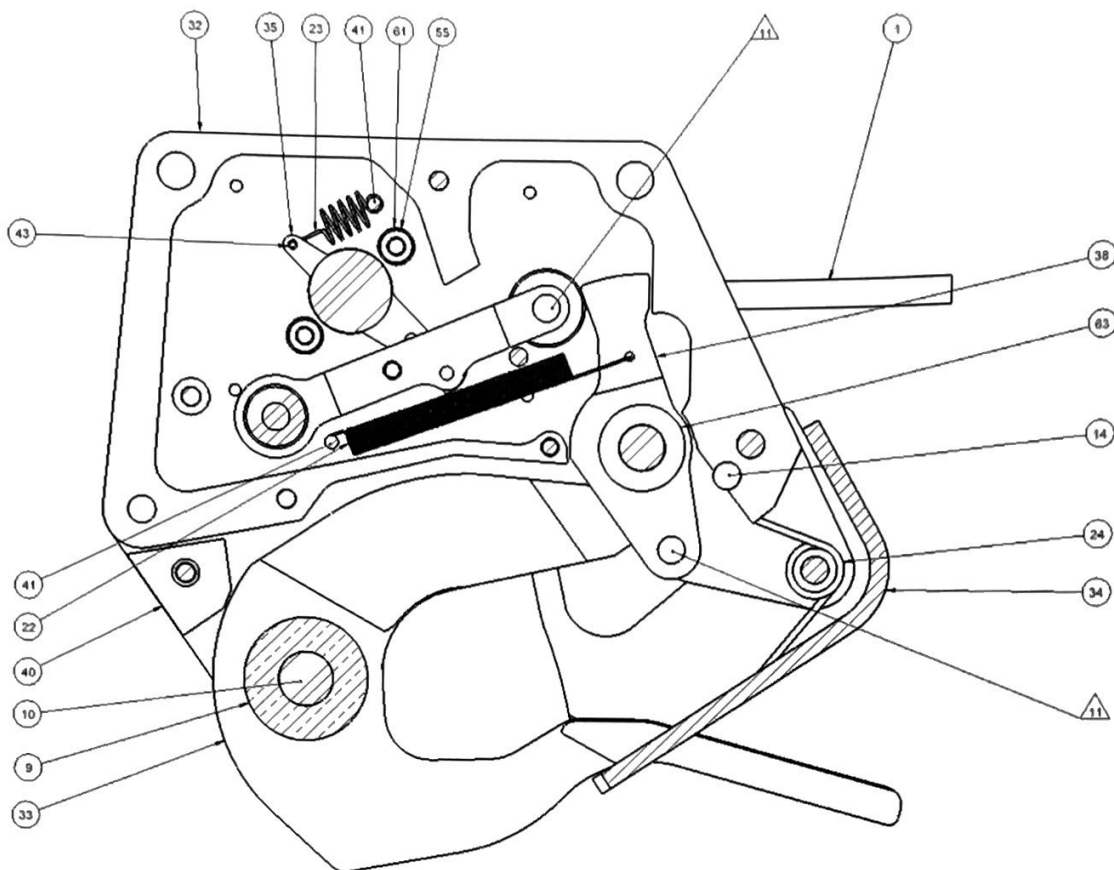
Some hooks may not have washers under bolt heads. The Ø1/4 and Ø3/8 inch AN960 / NAS1149 .063 thick washers under the nuts may be replaced with two .032 thick washers as specified in the table below (#54 & #55), one each under each nut and bolt head.

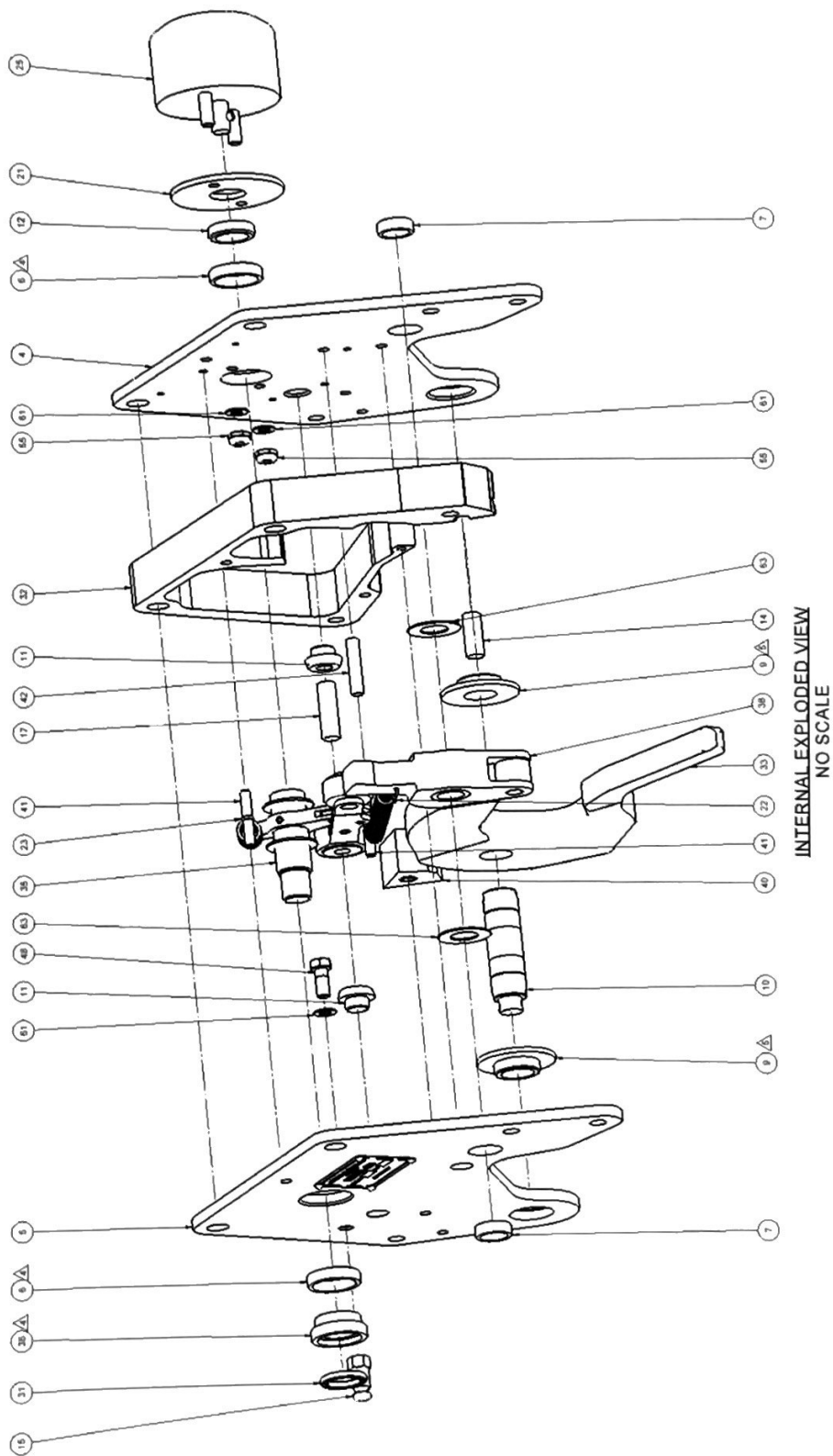
PARTS BREAKDOWN, CARGO HOOK ASSEMBLY

ITEM NO.	QTY	PART NUMBER	ALT/LEGACY P/N	DESCRIPTION
1	1	14_3 CABLE	14/3 WIRE	14/3 CABLE, 2 FT LG.
2	1	202-103-4	3117	PIN
3	1	5874	--	SPRING
4	1	601-010-201-002	51	SIDE PLATE, SOLENOID SIDE, 601
5	1	601-010-202-002	53	SIDE PLATE, NON SOLENOID SIDE, 601
6	2	601-040-100-001	58	BUSHING
7	2	601-040-150-001	--	WEAR SLEEVE
8	1	601-050-100-001	--	DATA PLATE, 601
9	2	606-020-066-001	66	BUSHING, LOAD BEAM
10	1	606-020-067-005	67	TRUNNION
11	2	606-040-056-001	56	BOSS
12	1	606-040-058-001	58	BUSHING
13	2	606-050-043-005	43 / 6043-1	BUSHING, KEEPER STOP
14	1	606-050-065-001	65	LATCH BUMPER
15	1	606-050-085-005	3085-1	POST, LOAD BEAM RETURN
16	1	606-050-112-005	83	ARM, LOAD BEAM RETURN
17	1	606-080-055-001	55	PIN
18	1	611-010-005-005	5	LINK
19	1	611-040-008-005	8	LEVER
20	1	611-040-071-005	1071-1	BUSHING
21	1	611-050-080-001	80	SOLENOID SPACER
22	1	611-060-025-005	25 / 6025-1	SPRING, LATCH
23	1	611-060-031-001	3031-1	SPRING
24	1	611-060-078-005	78	SPRING
25	1	611-070-047-001	47	SOLENOID ASSEMBLY
26	1	611-080-006-001	6	PIN, LINK
27	1	611-080-026-001	26	PIN
28	1	611-080-027-001	27	PIN
29	1	MS24461-6	6NBC914YZP	BEARING
30	1	MS24465-6	6NBF817YJ	BEARING
31	1	7411	15	SEAL
32	1	901-010-002-001	52	SPACER

PARTS BREAKDOWN, CARGO HOOK ASSEMBLY

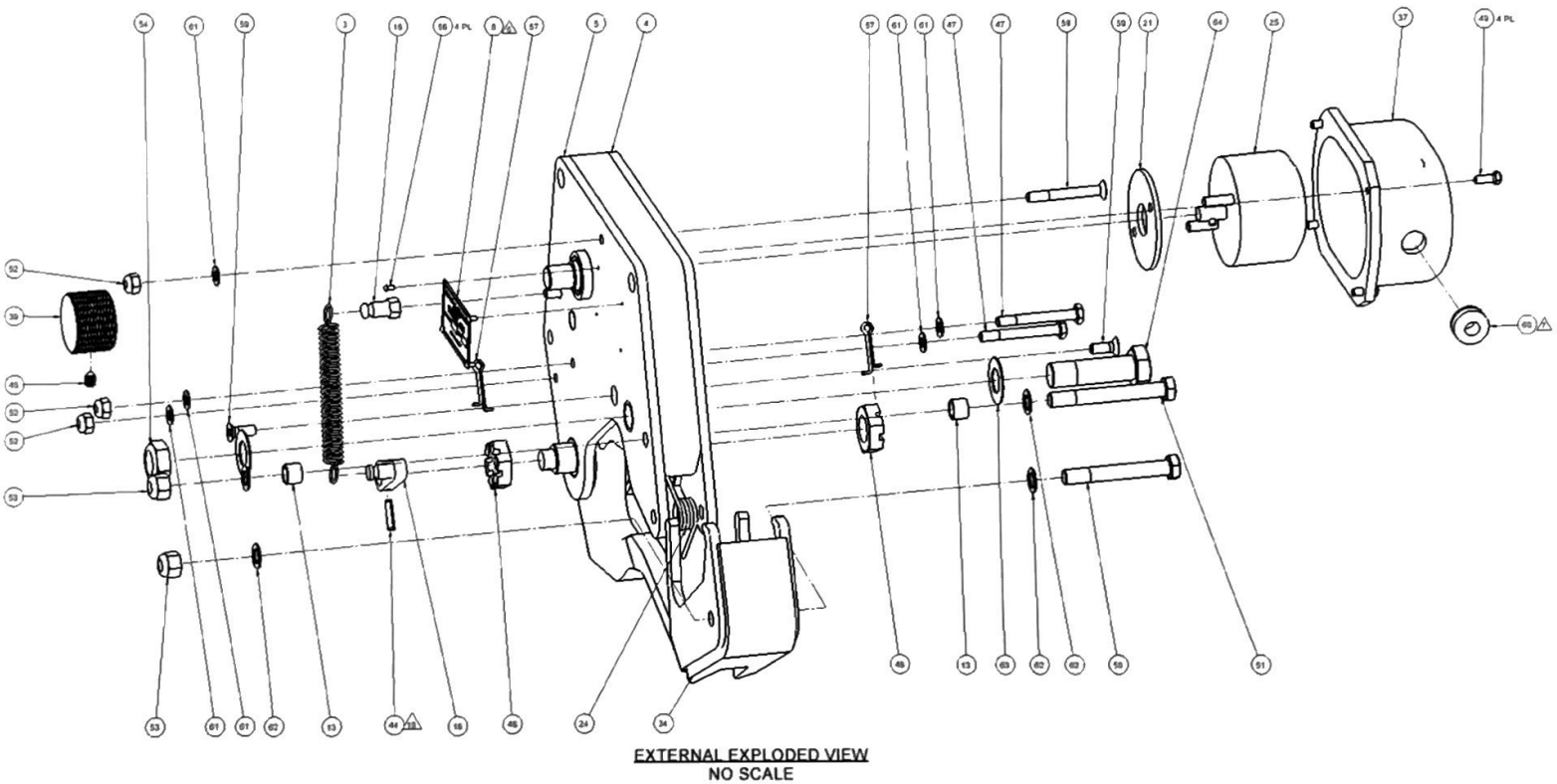
ITEM NO.	QTY	PART NUMBER	ALT/LEGACY P/N	DESCRIPTION
33	1	901-020-030-001	68	LOAD BEAM 601 / 901
34	1	901-020-049-005	79	KEEPER, STAINLESS
35	1	901-040-004-005	54	SHAFT AND ARM ASSY
36	1	901-040-059-001	59	BUSHING, SEAL HOUSING
37	1	901-050-010-001	102	SOLENOID COVER
38	1	909-010-020-005	6064-A1	LATCH ASSEMBLY
39	1	909-050-060-001	60	KNOB
40	1	909-050-158-001	6158-A1	BUMPER ASSY
41	2	909-080-057-001	57	RETAINING PIN
42	1	909-080-069-001	69	PIN, LEVER STOP
43	1	92373A174	--	SPRING PIN, 1/8 X 5/16
44	1	92373A215	--	SLOTTED SPRING PIN
45	1	92785A435		SET SCREW, 1/4-20 X 3/8
46	2	AN320-12	--	NUT, CASTELLATED
47	2	AN4-20A	--	BOLT
48	1	AN4-5A	--	BOLT
49	4	AN502-10-8	--	SCREW
50	1	AN6-25A		BOLT
51	1	AN6-27A	--	BOLT
52	3	MS21044N4	--	NUT, SELF LOCKING
53	2	MS21044N6	--	NUT, SELF LOCKING
54	1	MS21083N10	--	NUT, SELF LOCKING
55	2	MS21083N4	--	NUT
56	4	MS21318-14	--	DRIVE SCREW
57	2	MS24665-372	--	COTTER PIN
58	1	MS24694S118	--	SCREW
59	2	MS24694S97	--	SCREW
60	1	MS35489-69	--	GROMMET
61	8	NAS1149F0432P	--	WASHER
62	4	NAS1149F0632P	--	WASHER
63	4	NAS1149F1032P	--	WASHER
64	1	NAS6210-24	--	BOLT
80	A/R	MIL-G-81322	--	GREASE
81	A/R	MS20995C025	--	SAFETY WIRE, n.025
82	2	190340018	71285K93	SNAP PLUG TERMINAL - MALE
83	2	190380029	71285K92	SNAP PLUG TERMINAL - FEMALE

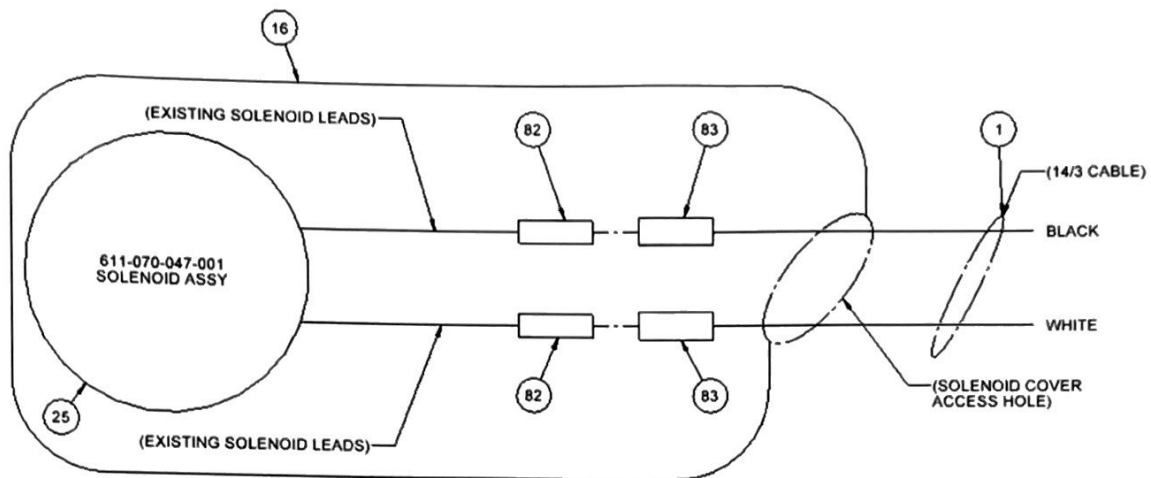




INSTRUCTIONS FOR CONTINUED AIRWORTHINESS OPERATING AND MAINTENANCE MANUAL

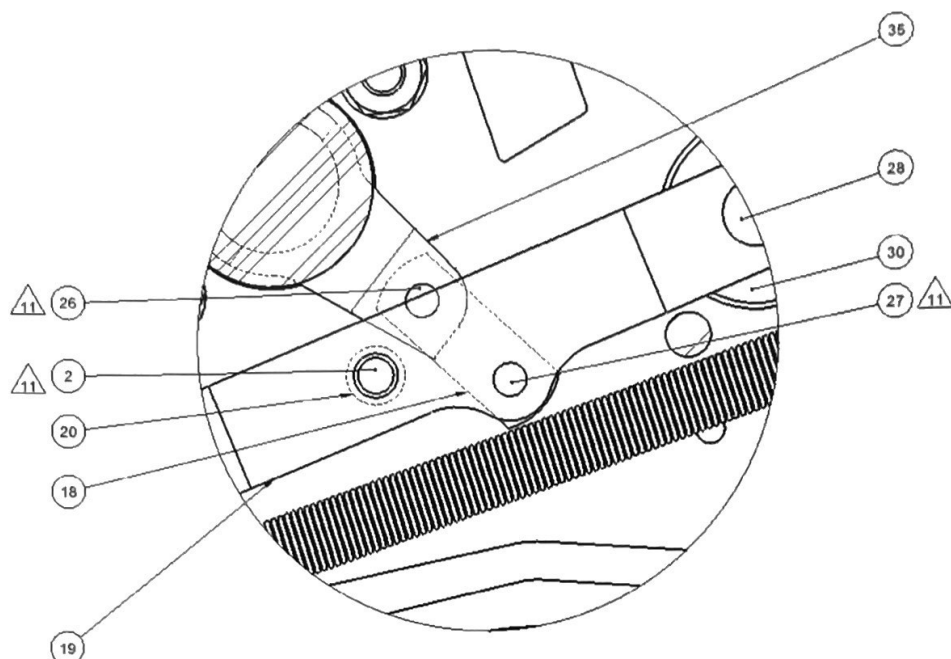
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REVISION: 12/15/2021
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ELECTRICAL DIAGRAM 
NO SCALE

SHAFT & ARM DETAIL



PARTS BREAKDOWN, SHAFT, ARM & LEVER ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	ALT. / LEGACY P/N	DESCRIPTION
2	1	202-103-4	3117	PIN
18	1	611-010-005-005	5	LINK
19	1	611-040-008-005	8	LEVER
20	1	611-040-071-005	1071-1	BUSHING
26	1	611-040-006-001	6	PIN, LINK
27	1	611-080-026-001	26	PIN
28	1	611-080-027-001	27	PIN
29	1	MS24461-6	6NBC914YZP	BEARING
30	1	MS24465-6	6NBF817YJ	BEARING
35	1	901-040-004-005	54	SHAFT & ARM ASSY

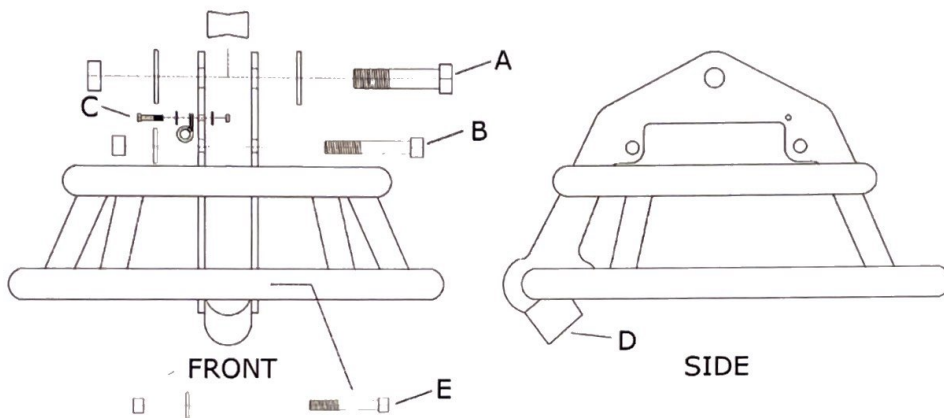
OPTIONAL HOOK GUARDS



Standard Guard
P/N: 901-050-200-001



Extended Guard
P/N: 901-050-200-002



REF	PART	DESCRIPTION	QTY
A	3/4-10 X 3-1/4 GR 8 BOLT	BOLT, MODEL 601/901 GUARD	1
A	901-050-225-005	GUARD SPACER, 601/901, SS	1
A	00385-3200-2	3/4" (1 7/16" OD) F436 HARD WASHER	2
A	3/4-10 NYLOC NUT	NYLON INSERT LOCK NUT	1
B	AN6-22A	BOLT	2
B	NAS1149F0632P	WASHER	2
B	MS21044N6	NUT	2
C	MS21919WDG6	CLAMP	1
C	AN3-6A	BOLT	1
C	NAS1149F0332P	WASHER	2
C	MS21044N3	NUT	1
D	120-050-840-001	BUMPER ASSY. (INC 3/8-16 NYLOC NUT)	1
E	AN6-25A	BOLT	1
E	NAS1149F0632P	WASHER	1
E	MS21044N6	NUT	1

LIMITED WARRANTY

MECHANICAL SPECIALTIES, LLC MAKES EVERY EFFORT TO ENSURE THAT ITS PRODUCTS MEET HIGH QUALITY AND DURABILITY STANDARDS AND WARRANTS TO THE PURCHASER OF OUR PRODUCTS THAT EACH PRODUCT BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR 12 MONTHS FROM DATE OF PURCHASE TO ORIGINAL PURCHASER ONLY.

WARRANTY DOES NOT APPLY TO DEFECTS DUE TO MISUSE, ABUSE, FAULTY ELECTRICAL SYSTEMS, NEGLIGENCE, ACCIDENTS, PRODUCTS BROKEN OR WORN IN THE COURSE OR NORMAL HOOK OPERATIONS, REPAIRS OR ALTERATIONS OUTSIDE OUR FACILITY OR TO A LACK OF MAINTENANCE. THIS WARRANTY DOES NOT COVER CONSEQUENTIAL DAMAGE OR INJURY.

TO TAKE ADVANTAGE OF THIS WARRANTY, THE PRODUCT OR PART MUST BE RETURNED TO THE FACTORY FOR EXAMINATION, AT WHICH TIME AN EVALUATION WILL BE MADE AS TO WHETHER OR NOT A WARRANTY REPLACEMENT IS JUSTIFIED.

MECHANICAL SPECIALTIES, LLC RESERVES THE RIGHT TO DECIDE WHAT IS WORTHY OF WARRANTY REPAIR OR REPLACEMENT.

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