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SERVICE BULLETIN

SB-012724-A

ID NUMBER & REVISION:	SB-012724-A	
SUBJECT:	NLG Limit Switch Retrofit	
RELEASE DATE:	16 May 2024	
EFFECTIVE DATE:	16 May 2024	
SUPERSEDES NOTICE:	SB-080323-B	
AIRCRAFT AFFECTED:	**MAKE & MODEL:**	ICON A5
	SERIAL NUMBERS:	If SB-080323 was NOT completed: 00001-00015, 00018-00027, 00029-00033, 00035, 00036, 00038-00049, 00051-00072, 00074, 00076-00083, 00085, 00086, 00088-00182, 00184-00188
REQUIRED ACTION:	Retrofit reed switch style NLG actuators with mechanical limit switches with long arms.	
TIME OF COMPLIANCE:	At next service interval	
REVISION HISTORY:	**A** Initial Release	

LEVEL OF CERTIFICATION REQUIRED (any level checked can perform task):	☐	Pilot/Owner	☒	A & P
	☐	LSA Repairman – Inspection	☒	Certified Repair Station
	☒	LSA Repairman – Maintenance	☒	Manufacturer

PURPOSE:

It has been discovered that there is a potential for collapse of nose landing gear utilizing magnetic reed switches. Other failures are also possible, including but not limited to improper gear extension.

NOTE: Additional parts and steps are required to retrofit older aircraft with 1.0-configuration actuators/bell cranks (ASN 00001-00011, 00013-00020). These differences are identified below; unless otherwise indicated, steps apply to all configurations.

CONSUMABLES AND BULK MATERIALS:

PART NUMBER	DESCRIPTION	QUANTITY	ALTERNATE	
			PART NUMBER	DESCRIPTION
N/A	Powder-Free Nitrile Gloves	As Needed		
N/A	Powder-Free Latex Gloves	As Needed		
TT-I-735A	Isopropyl Alcohol	As Needed	Or Equivalent	
Sharpie, Fine Point	Permanent Marking Pen	As Needed	Sharpie, Ultra Fine Point	Permanent Marking Pen
ICA012078	Lubricant, General Purpose (Tef-Gel)	As Needed		

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ASSEMBLIES AND PARTS:

	PART NUMBER	DESCRIPTION	QUANTITY
	TY23MX	CABLE-TIE, NYLON 6-6, 18LB, TY-RAP	2
Additional parts for 1.0-config.	TY23MX	CABLE-TIE, NYLON 6-6, 18LB, TY-RAP	3
	MS21266-1N	GROMMET, PLASTIC, EDGING, .056X.150	2 INCH

IF APPLICABLE, SERVICE KITS:

KIT NUMBER	CONTENT PARTS	DESCRIPTION	QUANTITY
ME001199 (If not replacing actuator)	F4TAPEBLACK-B	TAPE, SELF-FUSING, SILICONE, .02 IN THK, 1 IN WIDE, 36’ ROLL *NO LOAD*	1
	CB200-B	ADHESIVE, ACRYLIC STRUCTURAL, 2 PART, CLICK BOND *NO LOAD* *HAZMAT*	2
	CB9120V5-B	MOUNT, CABLE TIE ANCHOR *NO LOAD*	1
	ME001202-A	NLG LIMIT SWITCH, SUBASSY	1
	ME001201-A	BRACKET, NLG LIMIT SWITCH, SUBASSY	1
	ME001177-B	HOLD DOWN BOLT, NLG BRACKET, SUBASSY	1
	TY24MX-B	CABLE-TIE, NYLON 6-6, 30LB, 5.50, TY-RAP *NO LOAD*	1
	CB4000G08CRA8P750-A	STUD, ADH BND, FBRG, A286, 8-32X.500 TRIM	2
	MS21043-08-B	NUT, SLFLKG, RDC HEX, CRES, 8-32	2
	NAS1149CN832R-B	WASHER, FLAT, CRES, #8X.032, PSVT	2
ME001200 (if replacing actuator)	CB200-B	ADHESIVE, ACRYLIC STRUCTURAL, 2 PART, CLICK BOND *NO LOAD* *HAZMAT*	2
	CB4000G08CRA8P750-A	STUD, ADH BND, FBRG, A286, 8-32X.500 TRIM	2
	CB9120V5-B	MOUNT, CABLE TIE ANCHOR *NO LOAD*	1
	F4TAPEBLACK-B	TAPE, SELF-FUSING, SILICONE, .02 IN THK, 1 IN WIDE, 36’ ROLL *NO LOAD*	1
	ME001203-A	NLG ACTUATOR, SUBASSY	1
	ME001201-A	BRACKET, NLG LIMIT SWITCH, SUBASSY	1
	ME001177-B	HOLD DOWN BOLT, NLG BRACKET, SUBASSY	1
	MS21043-08-B	NUT, SLFLKG, RDC HEX, CRES, 8-32	2
	NAS1149CN832R-B	WASHER, FLAT, CRES, #8X.032, PSVT	2
	TY24MX-B	CABLE-TIE, NYLON 6-6, 30LB, 5.50, TY-RAP *NO LOAD*	1

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ALTERNATE SERVICE KITS, FOR 10-32 STUDS:

KIT NUMBER	CONTENT PARTS	DESCRIPTION	QUANTITY
ME001206 (If not replacing actuator)	F4TAPEBLACK-B	TAPE, SELF-FUSING, SILICONE, .02 IN THK, 1 IN WIDE, 36’ ROLL *NO LOAD*	As Needed
	CB200-B	ADHESIVE, ACRYLIC STRUCTURAL, 2 PART, CLICK BOND *NO LOAD* *HAZMAT*	1
	CB9120V5-B	MOUNT, CABLE TIE ANCHOR *NO LOAD*	1
	ME001202-A	NLG LIMIT SWITCH, SUBASSY	1
	ME001201-A	BRACKET, NLG LIMIT SWITCH, SUBASSY	1
	ME001177-B	HOLD DOWN BOLT, NLG BRACKET, SUBASSY	1
	TY24MX-B	CABLE-TIE, NYLON 6-6, 30LB, 5.50, TY-RAP *NO LOAD*	1
	CB4000G3CRA8P750-A *or CB4000G3CRA8750-A*	STUD, ADH BND, FBRG, A286, 10-32X.500, PRIMERED BASE, TRIM *STUD, ADH BND, FBRG, A286, 10-32X.500, TRIM*	2
	MS21043-3-B	NUT, SLFLKG, RDC HEX, CRES, 10-32	2
	NAS1149C0332R-B	WASHER, FLAT, CRES, .203X.032, PSVT	2
ME001207 (if replacing actuator)	CB200-B	ADHESIVE, ACRYLIC STRUCTURAL, 2 PART, CLICK BOND *NO LOAD* *HAZMAT*	2
	CB4000G3CRA8P750-A *or CB4000G3CRA8750-A*	STUD, ADH BND, FBRG, A286, 10-32X.500, PRIMERED BASE, TRIM *STUD, ADH BND, FBRG, A286, 10-32X.500, TRIM*	2
	CB9120V5-B	MOUNT, CABLE TIE ANCHOR *NO LOAD*	1
	F4TAPEBLACK-B	TAPE, SELF-FUSING, SILICONE, .02 IN THK, 1 IN WIDE, 36’ ROLL *NO LOAD*	1
	ME001203-A	NLG ACTUATOR, SUBASSY	1
	ME001201-A	BRACKET, NLG LIMIT SWITCH, SUBASSY	1
	ME001177-B	HOLD DOWN BOLT, NLG BRACKET, SUBASSY	1
	MS21043-3-B	NUT, SLFLKG, RDC HEX, CRES, 10-32	2
	NAS1149C0332R-B	WASHER, FLAT, CRES, .203X.032, PSVT	2
	TY24MX-B	CABLE-TIE, NYLON 6-6, 30LB, 5.50, TY-RAP *NO LOAD*	1

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Bracket Modification Instructions

If using either kit with 10-32 studs (ME001206 or ME001207), complete the following bracket and tool modifications. (If using 8-32 studs, continue to INSTRUCTIONS.)

1. Drill the 2x holes in the Limit Switch Bracket Fixture (part of ME001201) to .191” +.005/-.000”.
2. Drill the 2x holes in the Limit Switch Subassy Bracket (ME001202 or part of ME001203) to .191” +.010/-.000”.

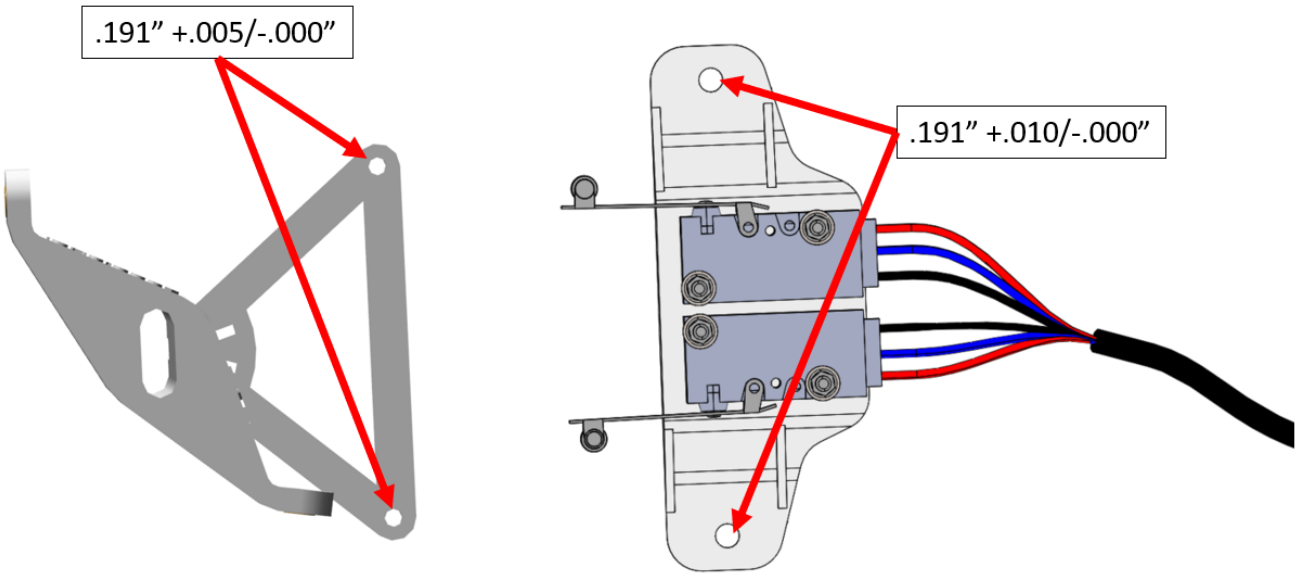

Figure 1. Bracket Modifications for 10-32 Studs

SPECIAL TOOLS:

- ITL012297 or equivalent 5 lb weight
- Rig Pins (ASN 00012, 00021+)
  - ITL002460-002 or equivalent .1875” rig pin
  - ITL002663 or equivalent .1625” rig pin
- ITL001714 NLG Rigging Tool (ASN 0001-00011, 00013-00020)
  - See “Note for 1.0 Configuration” below.
- Aircraft Battery Charger
  - Must be capable of charging battery to 14 V
  - Ex: Battery Tender 12V, 10 Amp Selectable Chemistry Battery Charger
    - Note: If charger automatically switches to a “maintenance” or “trickle charging” mode, charging may need to be reset to maintain 14 V.
- Digital Multimeter

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INSTRUCTIONS:

It is permissible to disassemble the aircraft as required to permit accessibility, inspection, adjustment, maintenance, and repair in accordance with the latest release of the online ICON Aircraft Maintenance Manual, ICA000833.

Note for 1.0 Configuration (ASN 00001-00011, 00013-00020)

1.0 configuration NLG parts are not compatible with rig pins. Instead, ITL001714 can be used to verify rig. To use ITL001714, fit the curved opening over the bellcrank, as shown in **Figure 2**.

- If the drag link fits within the hashed region of the tool (between the green lines in **Figure 3**), this is equivalent to a .1875” rig pin fitting.
- If the drag link fits within the raised region (between the red lines in **Figure 3**), this is equivalent to a .1625” rig pin fitting.

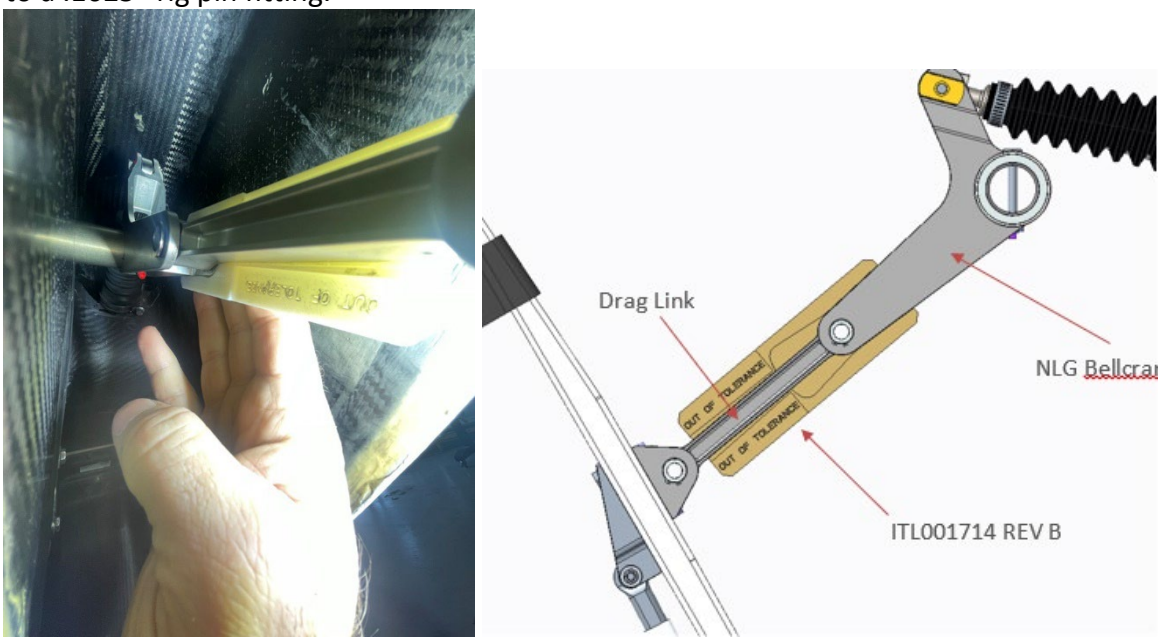

Figure 2. ITL001714

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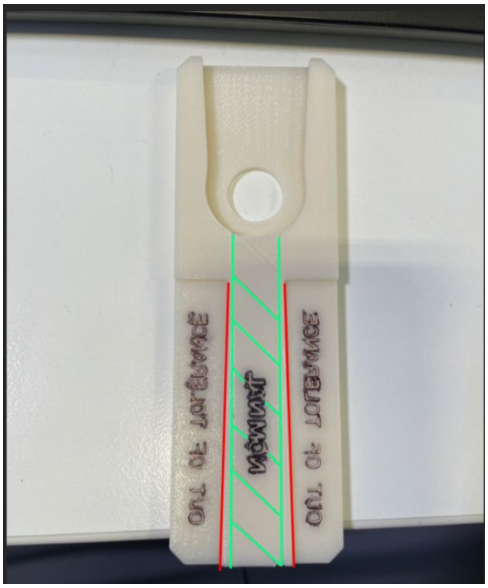

Figure 3. ITL001714 Rigging Interpretation

Inspection

1. In lieu of jacking aircraft, support the nose as follows:
    a. Remove the main landing gear 15A fuse from the overhead console. Save this fuse.
    b. Remove instrument panel top(s) (See Aircraft Maintenance Manual Section 100514 or 100547/100397).
    c. Fold the wings of the aircraft. This will move the center of gravity aft so that it is easier to lift the nose up and down during the NLG rigging checks.
    d. Connect battery charger to the charging terminals. The charger used must have a selectable Lithium charging mode.
    e. Have a foam block or equivalent nearby that can be placed under the aircraft on the keel aft of the NLG wheel well that will allow the nose wheel of the aircraft to have approximately 1 in or more clearance from the ground. This block will need to be removed numerous times during the procedure.
2. Charge aircraft battery to 14.0 V ± 0.1 V (measured using a multimeter at the remote charging terminals) as measured with the MASTER switch in the ON position (this is higher than standard trickle charging).
    a. This may be accomplished using a manually selectable chemistry charger set to “Lithium” mode.
    b. CAUTION: Monitor battery voltage while charging to avoid damaging battery by over-charging.

c. The battery voltage must be maintained at 14.0 V ± 0.1 V, as measured with the MASTER switch in the ON position, prior to any landing gear extend and/or retract cycles.

3. Inspect the nose landing gear (NLG) system (See Aircraft Maintenance Manual Section 100304).
4. Validate that the difference between the forward and aft bellcrank positions is less than 1.5°:
   a. With the weight off the nose landing gear, gently rotate the NLG bellcrank forward with moderate hand pressure. Measure the angle with a digital protractor (**Figure 4**). Record measurement.
   b. With the weight off the nose landing gear, gently rotate the NLG bellcrank backward with moderate hand pressure. Measure the angle with a digital protractor, taking care to take the measurement in the same location as before. Record measurement.
   c. If the measured difference is greater than 1.5°, the actuator, and all mounting hardware (bushings, bolts, etc), must be replaced.

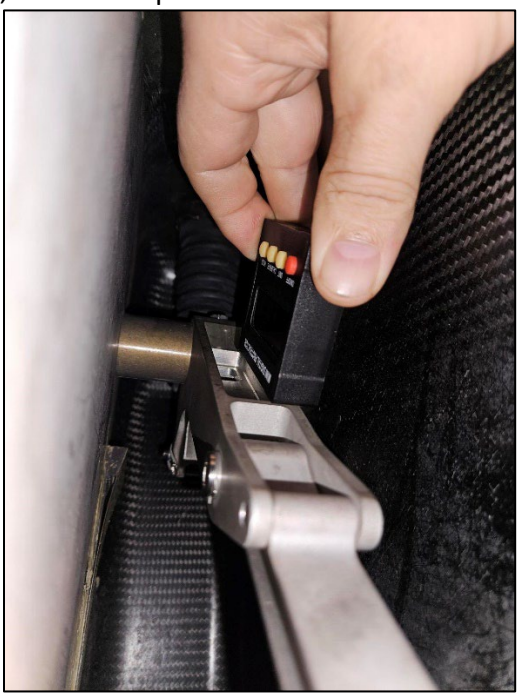

Figure 4. Bellcrank Measurement

5. Ensure landing gear is extended. Insert .1875 rigging pin (ITL002460-002), locking the NLG, or use ICON Tool No. ITL001714-B if no rigging pin hole is available (1.0 config). If extended gear is out of rig (adjustment is required to insert the pin) or actuator needs to be replaced, disconnect the actuator where it attaches to the NLG bellcrank, then insert the rig pin.

Repair

1. If replacing actuator, disconnect bolts, worm drive hose clamp, and boot in accordance with Aircraft Maintenance Manual section 100425. Cut zip tie around NLG connector and disconnect the NLG connector D9024J. (Reference **Figure 5.**) Skip to Repair step **7.**

2. Remove the instrument panel top(s) (See Aircraft Maintenance Manual, Section 100514 or 100547/100397).
3. Modify the NLG actuator harness as follows:
    a. Cut zip tie around NLG connector and disconnect the NLG connector D9024J. (Reference **Figure 5.)**
    b. Remove Wedge lock from actuator-side connector body. (Reference **Figure 5**.)

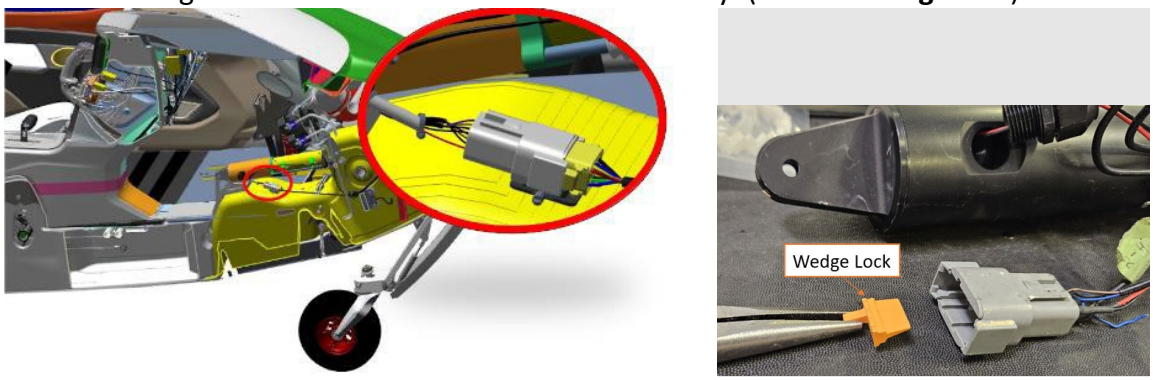

Figure 5. NLG Connector D9024J, Wedge Lock (orange)

    c. Mark wires pinned to connector positions 1 and 8 with masking tape. Remove all electrical connector pins/wires in the existing NLG connector PN D9024J, (located on the actuator side).
    d. Remove sleeving from the actuator wire bundle and pull the wires out of the bundle that leads to the magnetic reed switches located on the connector body. Note: The reed switch wires are encased in larger black insulation. Trim the reed switch wires where they exit the reed switches as shown in **Figure 6**. Discard these trimmed wires. Note: the wires that were located in connector positions 1 and 8, the red and black wires that enter the actuator body and were marked in step c, must not be trimmed or altered in any way.

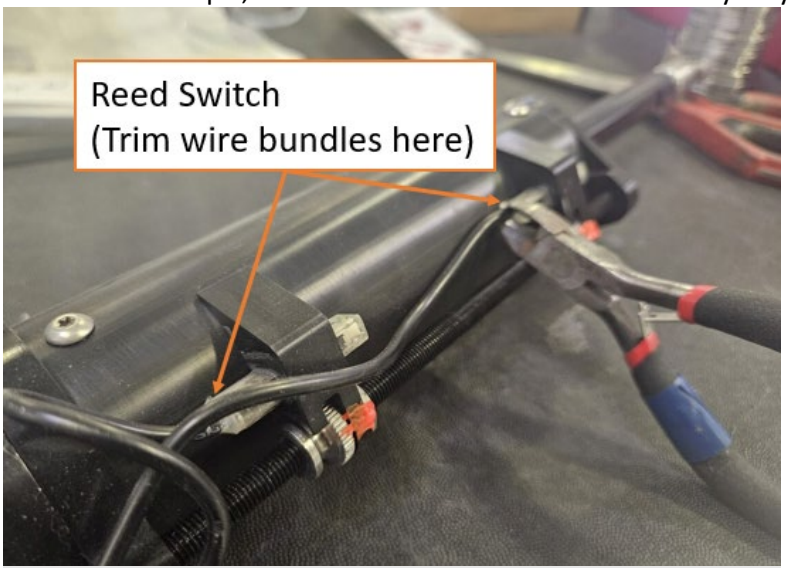

Figure 6. Trim wires at reed switches

4. (1.0 config only) Remove zip- tie securing the wiring harness to the brake line (**Figure 7**.)
   NOTE: If additional slack for harness is needed, it is permissible to also relocate the zip- tie shown in **Figure 18**.

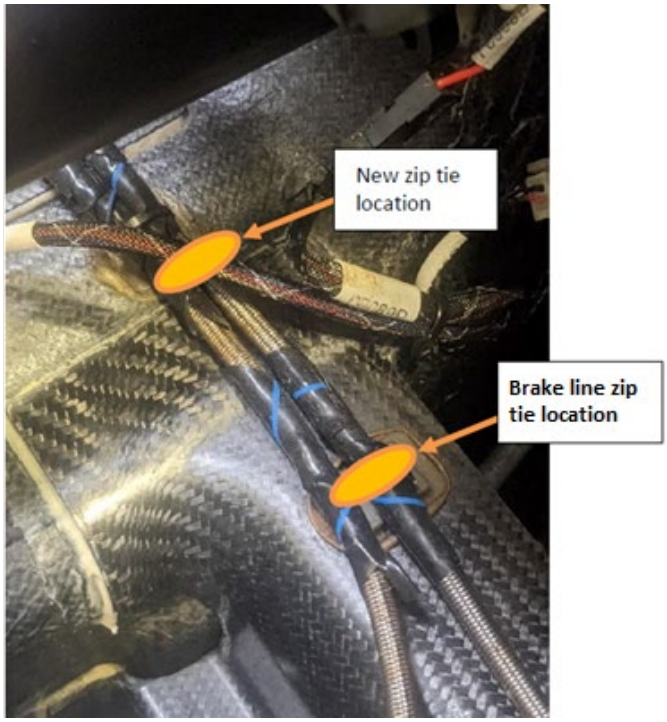

Figure 7. Zip- tie Locations

5. Remove wedge lock from limit switch assembly connector D9024J. Insert the RED and BLACK power/ground wires, previously removed, into the limit switch assembly connector D9024J, positions 1 and 8. Secure actuator wire within 0.500 inch of limit switch assembly sleeving end D9024J with a cable tie (TY23MX). Reference **Figure 8.**
6. Re-insert wedge lock into D9024J.

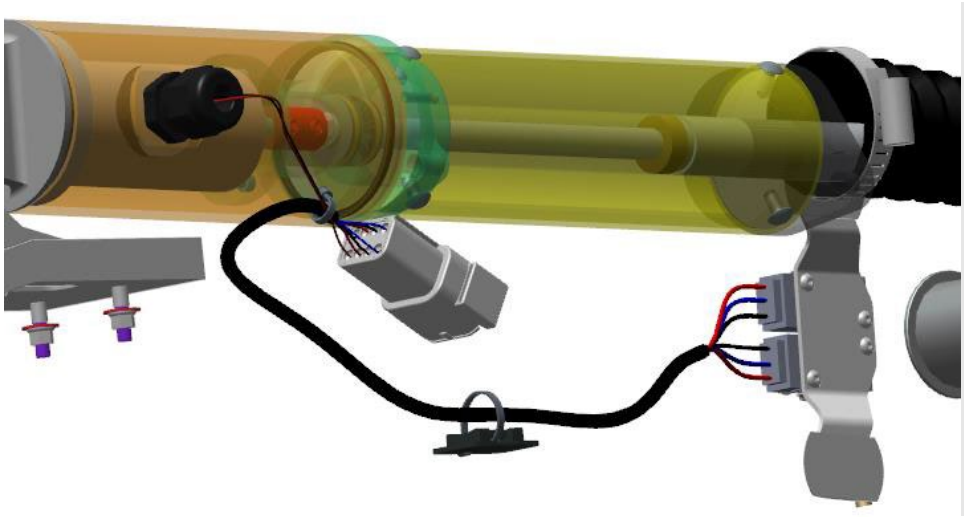

Figure 8. Limit switch assembly with modified NLG harness

7. Preinstall the new retrofit Limit Switch Bracket sub-assembly into the bell crank shaft. Orient the assembly so it slides over the bell crank shaft bolt shown in **Figure 9**.
8. If needed, identify any areas of interference between the Limit Switch Bracket and ECS heater bracket by pre-installing 1 each of the CLICKBOND studs (CB4000G08CRA8P750 or CB4000G3CRA8P750) approximately as shown in **Figure 10**. Mark the area of interference with ECS heater bracket with a permanent black marker. Loosen from each CLICKBOND stud, shim the gap and cut away interference area with a hand cutting tool. Be careful not to damage the surrounding area. Clean working area to remove all FOD, including carbon dust, with a shop vac.

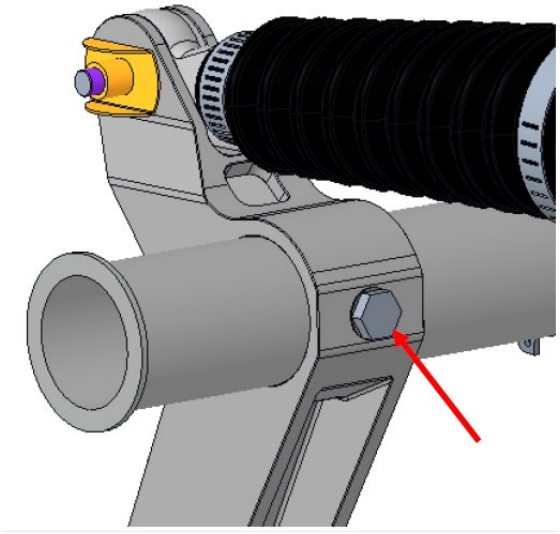

Figure 9. NLG Bell crack Shaft bolt

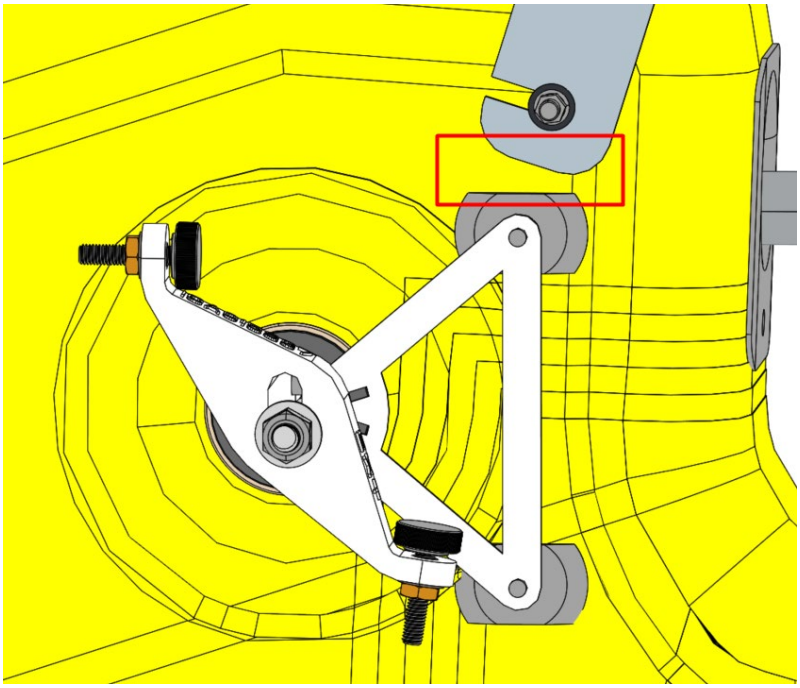

Figure 10. Gap between ECS heater bracket and trimmed CLICKBOND stud

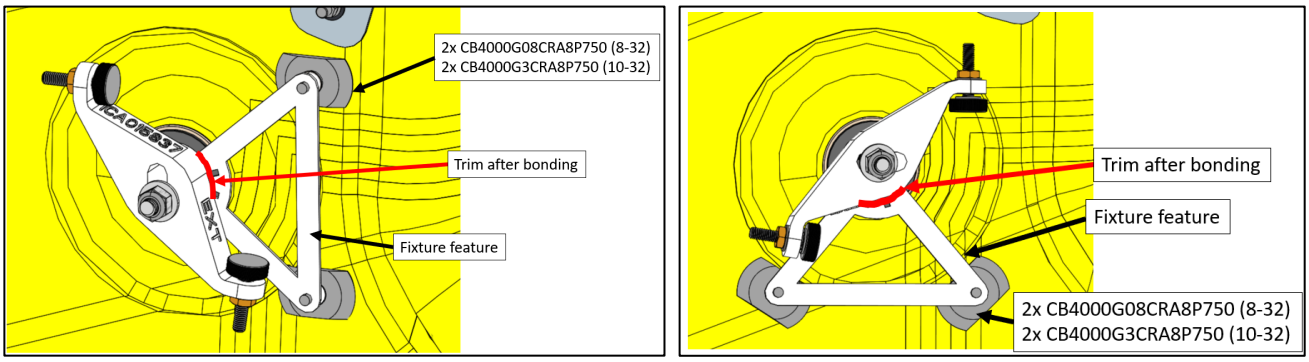

Figure 11. NLG limit switch bracket assembly installed; (1.0 configuration: orient as shown on right)

9. Insert Limit Switch Retrofit Bracket into the bell crank shaft, orient it so it slides over the bell crank shaft bolt shown in **Figure 9** above. Remove zip-tie from hold down bolt assembly, remove and retain the washer and nut. Insert hold down bolt from co-pilot side of NLG box, and secure with 1 each retained washer and 1 each locking nut (95615A120) on the pilot side of the NLG Box. Torque to 17±2 in-lbs. (Reference **Figure 12**)

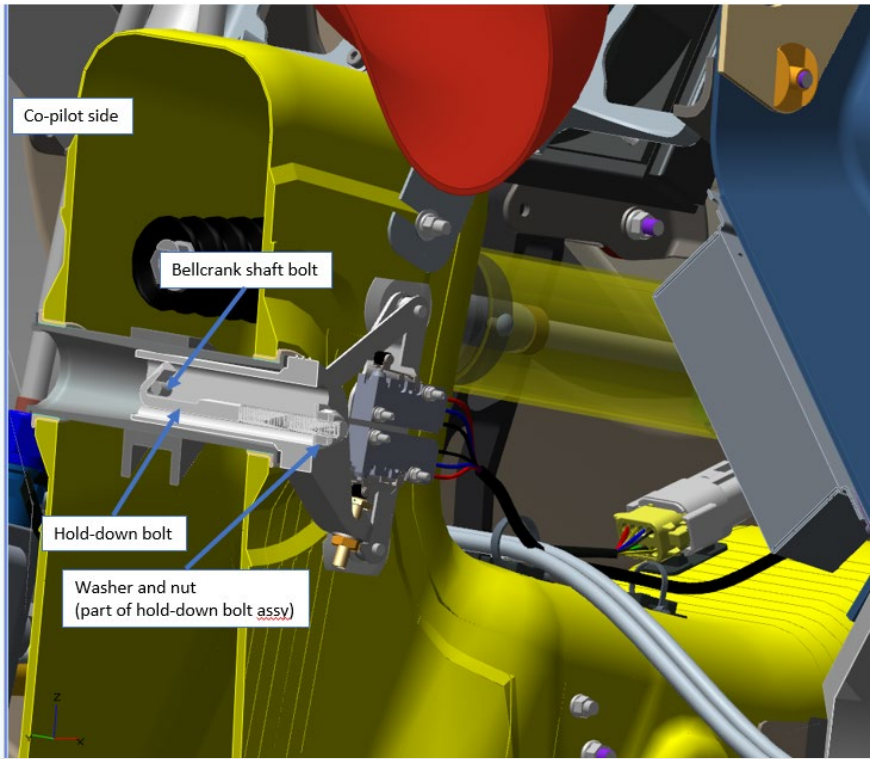

Figure 12. Cross-section view of installed bracket

10. Apply a generous amount of lubricant (ICA012078) over exposed thread end of hold-down bolt.
11. Prepare 2 each CLICKBOND (CB4000G08CRA8P750 or CB4000G3CRA8P750) and surface for bonding, in accordance with adhesive manufacturer recommendations.
12. With rig pin still installed, or using ITL001714 if no rig pin hole is available, bond CLICKBOND studs (CB4000G08CRA8P750 or CB4000G3CRA8P750) in the place oriented by the fixture (Reference **Figure 11**). Bond using CB200 in accordance with manufacturer recommendations. Backfill as needed with CB200 where stud overhangs core.
13. After allowing to adequately cure, use a razor knife to carefully trim away the fixture close to the base as shown in red line in **Figure 11.**
14. (1.0 config only) Install edging (MS21266-1N Grommet Edging)) with CB200 at location shown in **Figure 13** and route harness as shown.

Figure 13. Harness routing and edging

15. Using isopropyl alcohol, clean surfaces where lubricant will be applied. Apply ICA012078 Tef-Gel to the threads of the studs. Install limit switch assembly onto studs with 2x NAS1149CN832R washers and 2x MS21043-08 nuts torqued to 14 in-lbs (if 8-32 studs were used), or with 2x NAS1149C0332R washers and 2x MS21043-3 nuts torqued to 20 in-lbs (if 10-32 studs were used) as shown in **Figure 14** below.

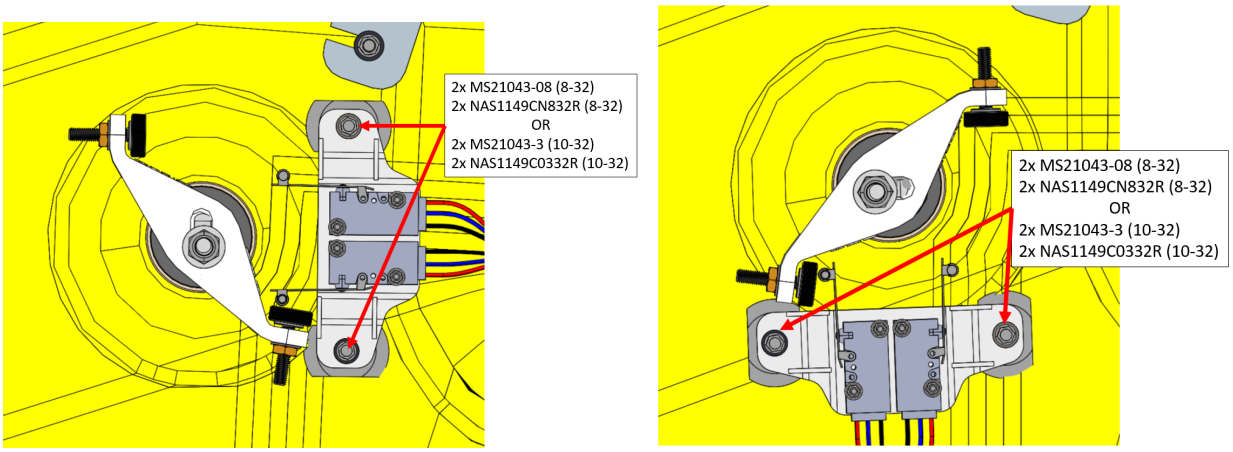

Figure 14. Installed limit switch subassembly; (1.0 config: Orient as shown on right)

16. If the actuator was previously disconnected or replaced, loosen the clamp securing the NLG boot to the shaft of the actuator. Manually rotate the shaft of the actuator (clockwise to retract, when viewed from the front) for best rig pin or ITL001714 tool alignment. Reconnect the actuator and tighten the boot clamp (See Aircraft Maintenance Manual Section 100359).

17. Adjust thumbscrew on limit switch retrofit bracket so bottom ("BOT") extended limit switch is activated. Adjust thumbscrew gap on limit switch retrofit bracket so that top ("TOP) side has the same gap as the bottom. Torque jam nut to 15±2 in-lbs. Reference **Figure 15**.

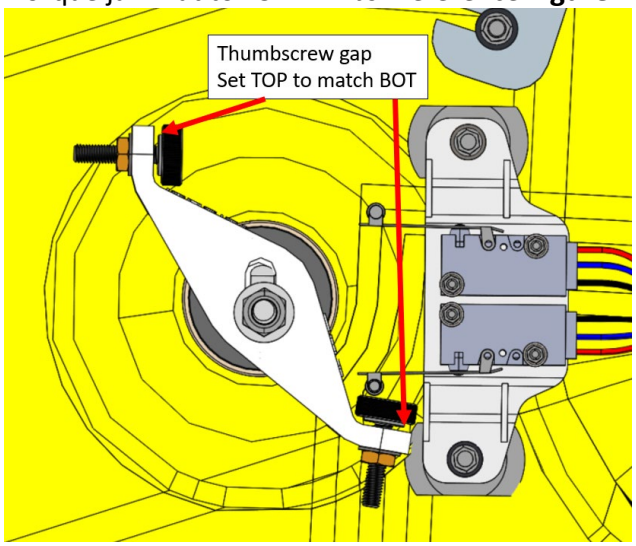

Figure 15. Adjust thumbscrew gap

18. Rig NLG system with gear UP.
    a. The battery voltage must be maintained at 14.0 V ± 0.1 V, as measured with the MASTER switch in the ON position, prior to any landing gear extend and/or retract cycles.
    b. Remove the bolt, washer, and rod which engage the doors from the NLG strut. (**Figure 15**)
    c. Attach 5lb weight (ITL012297) to NLG wheel.
    d. Confirm that 15A MLG fuse is removed and landing gear is in the DOWN position. Turn the MASTER switch to ON. Move LANDING GEAR switch to UP position to allow the landing gear to retract fully.
    e. When in the UP position a single sheet of paper should slide with minimal drag between the NLG strut and stop.

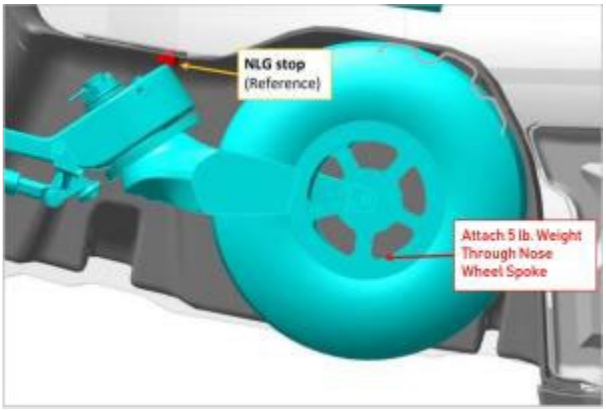

Figure 16. Rigging with gear up

f. If adjustment is needed: Extend landing gear. Adjust rigging by loosening jam nut and adjusting thumbscrew slightly (approx. 1/8 turn or less). Carefully re-torque jam nut to 15±2 in-lbs. Cycle gear. Repeat as needed.
g. Verify MASTER switch is ON and the landing gear is UP. Move LANDING GEAR switch to DOWN position to allow the landing gear to extend fully.
h. Remove 5lb weight (ITL012297) from NLG wheel.
i. Install rod into NLG strut: Using isopropyl alcohol, clean surfaces where lubricant will be applied. Apply lubricant (ICA012078) liberally to threads and shank of bolt. Install rod into NLG strut with bolt and washer. Torque bolt to 25-28 in-lb. (Reference **Figure 17**)

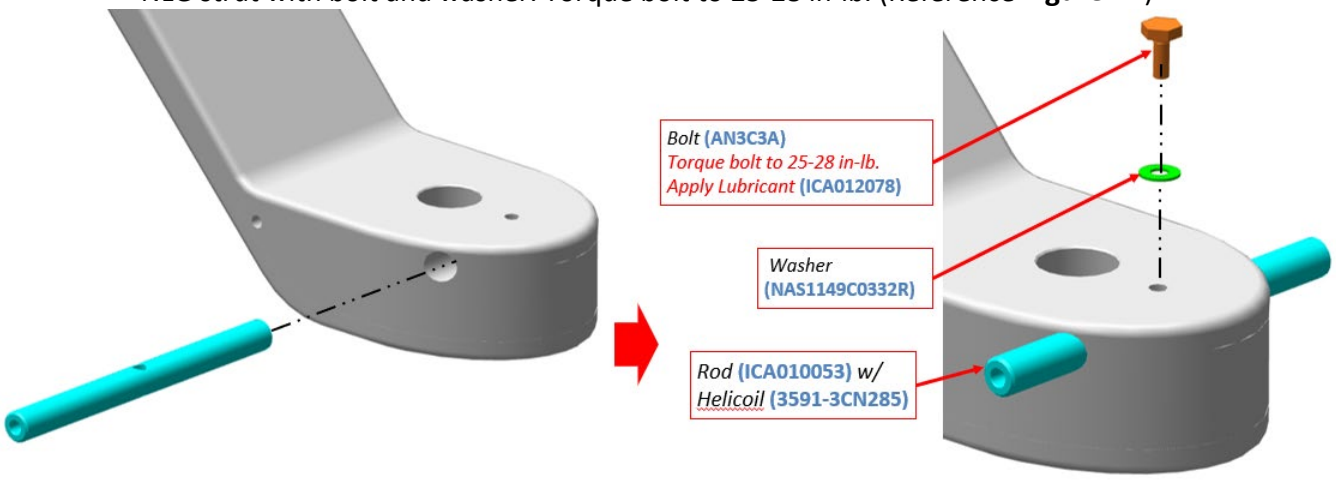

Figure 17. NLG Strut Hardware

19. Validate rigging with gear DOWN: Cycle the nose landing gear several times (with MLG fuse removed and battery voltage maintained at 14.0 V ± 0.1 V with master switch ON), verifying correct function of the following:
    a. Nose gear doors close fully against the fuselage skins with no gaps or looseness.
    b. There are uniform gaps between the edges of the doors and the fuselage joggle.
    c. The door flanges rest against each other.
    d. Instrument panel position lights indicate correctly.
    e. Normal gear function with no blown fuses.
    f. .1875 rig pin fits (or equivalent for 1.0 config).
    g. If adjustment of the extended position is necessary, adjust rigging by loosening jam nut and adjusting thumbscrew (ICA016069) slightly (approx. 1/8 turn or less). Carefully re-torque jam nut to 15±2 in-lbs.
    h. With aircraft wings extended, both HT tips installed, NLG bellcrank manually rotated aft (over-extended position), and weight on wheels, .1625 rig pin (ITL002663) fits (or equivalent for 1.0 config).
    i. With aircraft wings extended, both HT tips installed, NLG bellcrank manually rotated forward (under-extended position), and weight on wheels, .1625 rig pin (ITL002663) fits (or equivalent for 1.0 config).

20. Install tie mount on the NLG box. Center the mount with screw and about 0.400 inch upwards from tangent edge as shown in **Figure 18** below.

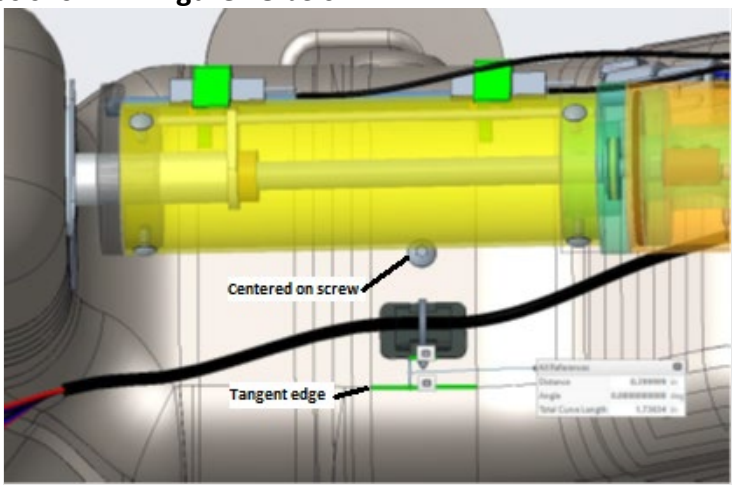

Figure 18. NLG retrofit Tie mount block

   a. (1.0 config only) Secure brake line with 1 each zip-tie (TY23MX) at brake line zip-tie location. Secure harness with 1 each zip-tie (TY23MX) at harness location (See **Figure 7**). Reinstall the removed zip-tie that secures actuator connector.
   b. Reinstall MLG 15A fuse.

It is permissible to reassemble the aircraft, as required pursuant to maintenance and repair, in accordance with the latest release of the ICON Aircraft Maintenance Manual, ICA000833.

VERIFICATION:

1. Confirm rigging was validated in final steps of repair sequence above.
2. Confirm MLG fuse has been reinstalled.

Logbook Entry:

"I hereby certify the inspection and/or repair has been completed in accordance with Service Bulletin (SB-012724-A, NLG Limit Switch Retrofit) and all referenced documents. Potentially unclear procedures have been clarified with ICON Aircraft. (ref. FAA Exemption 10829C)".

For aircraft registered outside the U.S., omit "(ref. FAA Exemption 10829C)"

If you have questions, comments, or concerns about this Service Bulletin and/or if you are no longer owner/operator of this aircraft, please forward this information to the present owner/operator and notify ICON Aircraft at:

ICON Aircraft
2141 ICON Way, Suite 100
Vacaville, CA 95688
(707) 564-4000
support@iconaircraft.com

Please include the aircraft registration number, serial number, your name, and if known the contact information of the new owner/operator.