

Quality Harness & Cable Assembly



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**ATG CONVERSION
REPORT NO. ATG 2**

**MODEL: SAAB SF340A
SAAB 340B**

**REVISION 7
23 October, 2008**

Action Taken by FAA Special
Certification Office, ASW-190

Approved
 Accepted As Approved Data
 Approved Recommendation
 No Response Necessary
 Receipt Acknowledged
 Comments To Follow

Engineer: Kyle Collier
Date: 23 Oct 08

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Dated: 23 October, 2008

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APPLICABILITY

<u>Part No.</u>	<u>Description</u>	<u>Aircraft Applicability</u>
ATG123270	NLG/Steering	SAAB SF340A Pre SB 340-32-064
ATG130898	NLG/Steering	SAAB SF340A, SAAB 340B Post SB 340-32-064
ATG133250	NLG/Steering	SAAB 340B Pre Mod. SB 32-03
ATG134158	NLG/Steering	SAAB 340B Post Mod. SB 32-03
ATG123272	MLG/WOW (LH)	SAAB SF340A
ATG123273	MLG/WOW (RH)	SAAB SF340A
ATG130900	NLG/Drag Brace	SAAB SF340A, SAAB 340B
ATG130901	NLG/Up Lock	SAAB SF340A, SAAB 340B
ATG130902	MLG/Drag Brace	SAAB SF340A, SAAB 340B
ATG130904	WSS/MLG (LH)	SAAB 340B
ATG130905	WSS/MLG (RH)	SAAB 340B
ATG130906	MLG/WOW (LH)	SAAB 340B
ATG130907	MLG/WOW (RH)	SAAB 340B
ATG404HE2-6	MLG/Up Lock	SAAB SF340A, SAAB 340B

(*) These harness assemblies are produced by Quality Harness and Cable Assembly as direct replacements. There is no weight/moment change.
(*) Removal, installation, adjustment and testing is IAW the applicable sections in the SAAB or AP Precision Hydraulics, Component Maintenance Manuals. See Appendix 5 and 6 of STC # SA1673GL for details.

DRAWINGS

See individual drawings listed in ATG 2 Conversion Report.

Revision 7

Dated: October 23, 2008

LIST OF DRAWINGS

Part Name	Part Number	Revision #
NLG/Steering	ATG123270	Rev 2
WOW/MLG (LH)	ATG123272	Rev 6
WOW/MLG (RH)	ATG123273	Rev 5
NLG/Steering	ATG130898	Rev 2
NLG/Down Lock	ATG130900	Rev 3
NLG/Up Lock	ATG130901	Rev 2
MLG/Drag Brace	ATG130902	Rev 3
Speed Sensor		
WSS/MLG (LH)	ATG130904	Rev 2
Speed Sensor		
WSS/MLG (RH)	ATG130905	Rev 2
WOW/MLG (LH)	ATG130906	Rev 3
WOW/MLG (RH)	ATG130907	Rev 3
NLG/Steering		
Pre Mod SB32-03	ATG133250	Rev 1
NLG/Steering		
Post Mod SB32-03	ATG134158	Rev 1

**ATG LANDING GEAR HARNESS CONVERSION FOR
THE SAAB SF340A AND SAAB 340B
(TYPE CERTIFICATE DATA SHEET NO. A52EU)**

QUALITY HARNESS AND CABLE ASSEMBLY

4902 THORNCLIFFE DRIVE

ARLINGTON, TEXAS 76016-6260

4 OCTOBER, 1990

John A. Walker

REPORT NO. ATG 2

Note: Any reference in this report to Aviation Technologies Group, Inc. (ATG) should be changed to Quality Harness and Cable Assembly. All data, prints and information published in this STC # SA1673GL is property of Quality Harness and Cable Assembly. These assemblies will be manufactured by QH&C under FAA-PMA authority.

DESIGN AND RELIABILITY DATA SHEETS
Conversion Report ATG 2
Table of Contents and Appendix

- 1. Current Design**
- 2. Cause for Unreliability**
- 3. New Design**
- 4. Reasons for Improved Reliability**
- 5. Evaluation and Justification Based on Military Specifications**
- 6. Test Procedures / In-Service Evaluation**
- 7. Parts List**

Appendix 1 Current Harness Design Drawings
Appendix 2 Aircraft Schematic and Load Analysis
Appendix 3 New Harness Design Drawings
Appendix 4 Harness Component Specifications
Appendix 4 (continued) Sheets / Drawings
Appendix 5 Harness Replacement, Installation and
Appendix 5 (continued) Repair Procedures
Appendix 6 Test Procedures
Appendix 7 Applicable Mil-Spec Data

I. CURRENT DESIGN:

The SAAB SF-340 aircraft has been plagued with landing gear wiring problems.

The current landing gear harnesses for the Saab SF-340 are currently produced by A.P. Precision Hydraulics; they include:
(The following part number found in the SAAB 340 IPC)

MAIN LANDING GEAR WEIGHT-ON-WHEELS HARNESS

(SF-340A) LEFT HAND.....AIR123272
(SF-340A) RIGHT HAND.....AIR123273
(SAAB-340B & POST MOD 1912) LEFT HAND.....AIR130906
(SAAB-340B) & POST MOD 1912... RIGHT HAND.....AIR130907

MAIN LANDING DOWN LOCK HARNESS

(SF340A) AIR130902
(SAAB-340B) & POST MOD 1912 AIR130902

NOSE LANDING GEAR DOWN LOCK

(SF-340A) AIR130900
(SAAB-340B & POST MOD 1912) AIR130900

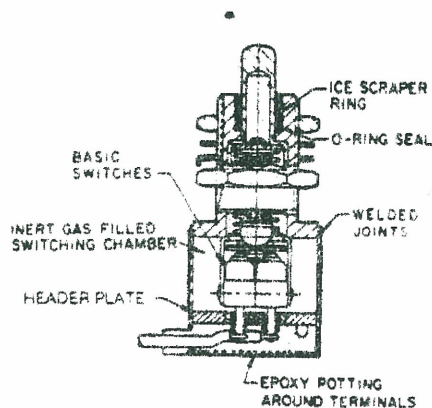
MAIN LANDING GEAR SPEED SENSOR

(SAAB-340B) & POST MOD 1912.... LEFT HAND.....AIR130904
(SAAB-340B) & POST MOD 1912.. RIGHT HAND.....AIR130905

SEE APPENDIX 1 FOR HARNESS DRAWINGS

The harness consists of a switch, wire, protective covering and harness connectors.

The switches are derived from a family of switches that are known as resiliently sealed. The resiliently sealed switches have a shaft with a Teflon seal, a rubber o-ring, and an ice scraper ring respectively. See Diagram.



FEATURES

- Environment-proof seal per Symbol 4, MIL-S-8805
- Qualified to MIL-S-8805
- Standard temperature range: - 65°F to + 195°F (- 54°C to + 85°C)
- High temperature range listings: - 65°F to + 257°F (- 54°C to + 125°C)
- Meets or exceeds mechanical and electrical life as defined in MIL-S-8805

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The wire is a non Mil-Spec wire with a protective covering. The protective covering is a semi-rigid rubber material.

II. CAUSES FOR UNRELIABILITY:

- 1. The current switches are resiliently sealed (See Diagram). Environmental factors such as sand and dirt deteriorate the seals allowing moisture to enter the switch body causing switch malfunction.**
- 2. A very small current load across the silver contacts produces silver-oxide on the face of the contacts. The silver-oxide build-up makes the switches intermittent. See Appendix 2 for aircraft schematic and load analysis.**
- 3. The wire is a non-Mil Spec wire, thus allowing wire breakdown.**
- 4. The protective covering is a semi-rigid rubber material that breaks down due to fatigue from flexure during gear retraction and extension. (SF-340A only)**
- 5. The weight-on-wheels switch has a permanent roller that wears, causing the switch movement to be excessive.**
- 6. The protective covering and the connector joints are not sealed with any type of sealing compound.**

III. NEW DESIGN:

The new design gear harnesses for the SAAB SF-340 will be produced by Quality Harness and Cable Assembly (QH&C). They include:

MAIN LANDING GEAR WEIGHT-ON-WHEELS HARNESS

(SF-340A) LEFT HAND.....ATG123272
(SF-340A) RIGHT HAND.....ATG123273
(SAAB-340B & POST MOD 1912).... LEFT HAND.....ATG130906
(SAAB-340B) & POST MOD 1912.. RIGHT HAND.....ATG130907

MAIN LANDING DOWN LOCK HARNESS

(SF340A) ATG130902
(SAAB-340B) & POST MOD 1912 ATG130902

NOSE LANDING GEAR DOWN LOCK

(SF-340A) ATG130900
(SF-340B & POST MOD 1912 ATG130900

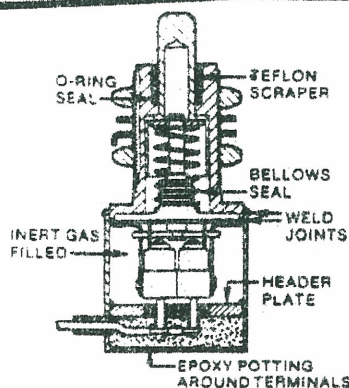
MAIN LANDING GEAR SPEED SENSOR

(SF340B) and POST MOD 1912 LEFT HAND.....ATG130904
(SAAB-340B) and POST MOD 1912 RIGHT HAND.....ATG130905

SEE APPENDIX 3 FOR HARNESS DRAWINGS

The new harnesses consist of a switch, wire, protective covering and harness connectors.

The new switches are derived from a family of switches known as hermetically sealed. The hermetically sealed switches have a Teflon scraper ring, a rubber o-ring and a bellows seal. See Diagram.



True hermetic sealing with metal-to-metal, glass-to-metal construction assures maximum seal effectiveness for exceptionally long periods of time despite continuous changes in atmospheric pressures and temperatures.

FEATURES

- *Coating:* Hermetic sealing per MIL-S-8805, hermetic symbol 5
- *qualified to military specification:* MIL-S-8805/90
- *Vibration:* 10 to 81 Hz at .060 in. (1.52mm) D.A. 81 to 2000 Hz at 20 gs
- *Shock:* 200 g, .007 second, half sine pulse
- *Strength of actuating means:* 250 lbs. (1112N)
- *Strength of mounting means:* 400 in. lbs. (45.2 Nm)

• Also meets sand and dust, explosion, icing, minimum current, and moisture resistance requirements

• *Temperature range:* - 67° F to + 257° F (- 55° C to + 125° C)

• *Weight:* 7.3 oz. (207 g) max

• *Circuitry:* Two or four single-pole, double-throw circuits

• Meets or exceeds mechanical and electrical life as defined in MIL-S-8805

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The wire is made in accordance with Mil-Spec Mil-W-22759/7 and has a protective covering. The covering is a flexible environment proof rubber material.

The connectors are a circular screw-type designed to allow positive connections.

SEE APPENDIX 3 FOR NEW HARNESS DESIGN

SEE APPENDIX 4 FOR HARNESS COMPONENT SPECIFICATION DRAWINGS

IV. REASONS FOR IMPROVED RELIABILITY:

1. The new switches are hermetically sealed under Mil-W-8805 Symbol 5 (See Diagram). The new switches will be impervious to environmental factors such as sand, dirt, water and ice.
2. Contacts within the switches will have gold contacts. The gold contacts will not oxidize under small current load. See Appendix 4 for Component Specification Drawings.
3. The wire is produced under Mil-Spec Mil-W- 22759/7 and will resist breakdown.
4. The harness protective coating is a multi-layered flexible rubber material that will not break down due to flexure from landing gear retraction and extension and will be impervious to environmental factors.
5. The weight-on-wheels switches will have a replaceable roller that can be replaced without discarding the switch.
6. The protective covering and connector joints are sealed with sealing compound. See production instructions.

V. EVALUATION AND JUSTIFICATION BASED ON TEST AND MILITARY SPECIFICATIONS:

Switch – The switch has true hermetic sealing (with fused glass-to-metal and metal-to-metal sealing) as defined by MIL SPEC 8805 Symbol 5. The switch is certified for sea level to 50,000 feet and is rated for 100,000 cycles. The switch is certified to meet MIL-STD-454L, Requirement 58 (Document MIL-STD-1132A) for switch selection. See Appendix 7 for MIL-STD-454L, MIL-STD-1132A and MIL SPEC 8805.

Wire – The wire is certified to meet Mil-W-22759/7.

Connectors – The connectors meet the requirements for MIL-C-26482. The connectors are corrosive resistant and fluid resistant and offer a secure seal against outside contaminants. See Appendix 4 for component specification sheets.

Harness Covering and Adhesive – The different layers of covering offer a positive environmental seal. The heat shrinkable coverings are fire retardant, non-cracking in low temperatures, and fluid resistant to jet fuel, aviation gasoline, skydrol, Mil 5606 hydraulic fluid and glycol. See Appendix four for component specification sheets.

Harness Assembly – An environment proof assembly that will withstand all adverse conditions to include extreme temperature changes, extreme moisture and lightning strikes in accordance with MIL-STD-1157.

VI. TEST PROCEDURES / IN-SERVICE EVALUATION:

Upon installation and certification of this STC the harnesses will be monitored for 500 hours or 500 cycles, whichever ever occurs first to evaluate the actual in-service life and all failures will be documented and tracked.

Each harness will be continuity tested and resistance tested prior to shipment. See Appendix 7 for test procedures.

Each harness will be installed, adjusted and tested in accordance with the SAAB SF-340 Maintenance Manual. See Appendix 6 for details.

VII: PARTS LIST:

These STC harnesses are produced by Quality Harness and Cable Assembly under PMA authority granted by the Federal Aviation Administration. These harnesses are direct replacement for the OEM harness assemblies as indicated in the DIRECT REPLACEMENT LISTING, REVISION 7, DATED: 23 OCTOBER, 2008. These harnesses are direct replacements with no modifications and no weight/moment change. There are no placards required.

DIRECT REPLACEMENT LISTING

Part Name	STC Listing PN #	Approved Replacement for OEM PN #	Note
NLG/Steering	ATG123270	AIR123270	Pre SB340-32-064
WOW/MLG (LH)	ATG123272	AIR123272	SF-340A
WOW/MLG (RH)	ATG123273	AIR123273	SF-340A
NLG/Steering	ATG130898	AIR130898	POST SB340-32-064
NLG/Down Lock	ATG130900	AIR130900	SF-340A/SAAB-340B & POST MOD 1912
NLG/Up Lock	ATG130901	N/A	SF-340A/SAAB-340B
MLG/Drag Brace	ATG130902	AIR130902	SF-340A/SAAB-340B & POST MOD 1912
Speed Sensor			
WSS/MLG (LH)	ATG130904	AIR130904	SAAB-340B & POST MOD 1912
Speed Sensor			
WSS/MLH (RH)	ATG130905	AIR130905	SAAB-340B & POST MOD 1912
WOW/MLG (LH)	ATG130906	AIR130906	SAAB-340B & POST MOD 1912
WOW/MLG (RH)	ATG130907	AIR130907	SAAB-340B & POST MOD 1912
NLG/Steering			
Pre Mod SB 32-03	ATG133250	AIR133250	PRE MOD SB32-03
NLG/Steering			
Post Mod SB32-03	ATG134158	AIR134158	POST MOD SB32-03