DWG. 56201-1

SAFE FLIGHT SCc AoA SYSTEM
INSTALLATION INSTRUCTIONS
AND
USER MANUAL

SAFE FLIGHT®
INSTRUMENT CORPORATION
WHITE PLAINS, N.Y.

FAA APPROVED

JUN 28 2017

CHICAGO AIRCRAFT
CERTIFICATION OFFICE
CENTRAL REGION

REVISION NOTICE

SYM	CHANGE HISTORY	MADE BY	CHECKED BY	APPROVED BY
Orig.	Total pages: 30	D.Taillie 7/15/15	J.Gordon 7/15/15	R.A.Greene 7/15/15
A	Made provisions for installations on aircraft not listed in Appendix D. Made provisions for use of equivalent standards parts. ECN 14972	D.Taillie 9/30/15	J.Gordon 9/30/15	R.A.Greene 10/1/15
B	Added TC A22NM and TC A2WI to Appendix D. ECN 14998	D.Taillie 10/27/15	J.Gordon 10/28/15	R.A.Greene 10/28/15
C	Updated Proprietary Notice. Changed Table 1, para. 1.3, 2.5, 2.6, 2.7, 3.1, 3.2, 3.3, 4.2, 4.3. Replaced para. 5.4 in its entirety. Changed para. 5.8 and replaced Appendix B in its entirety. Total pages: 31 ECN 15078	J.Tiseo 6/29/16	J.Gordon 6/30/16	R.A.Greene 6/30/16
D	Updated Proprietary Notice. Changed Table 1, Table 3, para. 2.4 and added Appendix E. Total pages: 34 ECN 15127	K.Basting 1/18/17	J.Gordon 1/23/17	R.A.Greene 1/23/17
E	Changed para. 1.2, Table 1, Table 2 and added new Table 2A. Changed para. 2.2, 2.3, 2.4, 2.6, 3.2, 3.4, 5.4.2 and 5.4.3. Added new Appendices F, G and H. Total pages: 39 ECN 15173	K.Basting 6/12/17	T.Scofield 6/12/17	R.A.Greene 6/12/17

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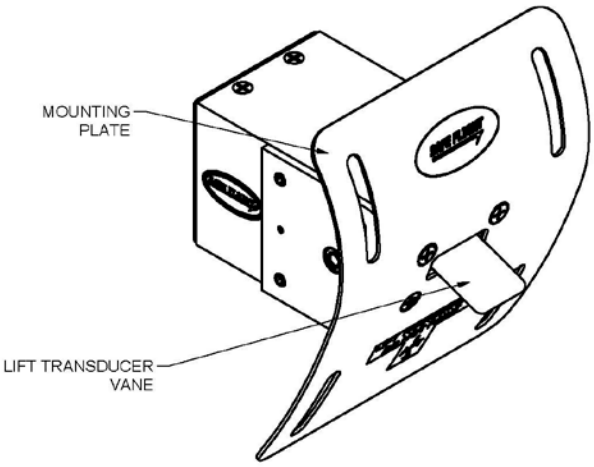
1.0 SYSTEM DESCRIPTION

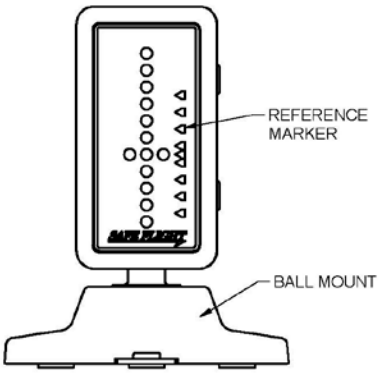
1.1 SCc

The Safe Flight SCc Angle of Attack (AoA) System is an accurate wing lift measuring and display system designed as an aid to help the pilot achieve consistent takeoff, climb, cruise and landing approach performance. Using a wing leading edge flow measurement device, the SCc AoA System precisely senses the flow field about the wing's leading edge. The SCc AoA indication is accurate regardless of aircraft weight, wing loading, turbulence or wing flap configuration. This system provides the pilot with AoA-based guidance for high-lift operational conditions including normal and short-field takeoff, Best Rate (V_y) and Best Angle (V_x) of climb, wind-compensated Long Range Cruise (LRC), maximum endurance, normal and short-field runway performance, and Low Airspeed (high AoA) Awareness (LAA).

1.2 System Components



Lift Transducer



Indexer Computer

The SCc AoA System consists of a wing leading edge mounted Lift Transducer and a glareshield mounted Indexer Computer. The kit of installation parts includes the wiring, connectors, and installation hardware required. Table 1 lists the components included as part of the SCc Kit. Table 2 lists the contents of the Installation Kit K-350-4(3). Table 3 shows the components of the Ball Mount Kit, which is used to attach the Indexer Computer to the glareshield.

(3) See Appendix G for alternate installation using Installation Kit K-350-2.

Table 1: SCc Included Components

COMPONENT	PART NUMBER	WEIGHT (lbs.)	VDC	AMP
Installation Instructions and User Manual	56201-1_D			
Quick Reference Guide	56202-1_A			
Wiring Diagram SC-C	70308800-13			
Lift Transducer	3704-6 (2)	0.3		
Indexer Computer	1504-4	0.2	10-32 V	0.20A @ 28V
Indexer Computer Mounting Kit (1)	K-400-2 (1)	0.1		
Installation Kit	K-350-4 (3)	1		

Table 2: Installation Kit (K-350-4) (3)

Description	Hardware	Part Number	Quantity
Cable Assembly, Indexer	Indexer Computer Cable Assembly	1504-150-2	1
Cable Assembly, CAT5E	Lift Transducer Cable Assembly	3704-150-1 or equivalent	1
Doubler	Lift Transducer Doubler Plate	3704-223-6 or equivalent	1
Screw, MACH, Pan HD, 6/32 x 1/2	Mounting Screws, 6-32 x ½ (Lift Transducer)	MS51957-30	5
Nut, Plain, Blind Rivet	Rivet Nuts (Lift Transducer)	NAS1329A06-75	5
Rivet	Rivets (Doubler to skin)	NAS1097-AD-4-3	10
Plug, Modular RJ45, 8P8C	RJ45 Connector	514075-1	1
Tape, Adhesive, Double-sided			1
Label	Advisory Placard	55562-1	1

(1) See Appendix E for alternate installation using Mounting Kit K-400-1.
(2) See Appendix F for alternate installation using Lift Transducer 3704-4.
(3) See Appendix G for alternate installation using Installation Kit K-350-2.

Table 2A: Installation Kit Accessories

Description	Hardware	Part Number
Cable Assembly, CAT5E	8-ft. length; Male-Male	3704-150-2
Cable Assembly, CAT5E, Extension	8-ft. length; Male-Female	3704-160-1

NOTE Addition or removal of Installation Kit Accessories from an SCc installation does not affect the function of the system.

Table 3: Indexer Computer Mounting Kit K-400-2 (1)

Description	Hardware	Part Number	Quantity
Backup Disc		1504-214-5	1
Ball Assembly		1504-128-4	1
Base & Spring Assembly		1504-126-4	1
Cover		1504-229-4	1
Screw, Tapping, 100° Flat Head, Spaced Thread, 6-20x1/2	Base Mounting Screws	MS21207C6-8	4
Screw, Tapping-Thread Forming, Type AB, Pan Head, Cross-Recessed, 6-20x3/8	Backup Disc Screws	MS51861-24C	2

See Table 1 for weight of Indexer Computer Mounting Kit.

For all standard hardware included in the kits, equivalent components may be used. See AC 43-13 for guidance on the use of equivalent parts. Any substitution is the sole responsibility of the installer.

Listed below are the tools needed to complete the SCc installation.

- Proper sheet metal cutting equipment
- Fine tipped pen
- Drill and drill bits
- Riveting tools for NAS1097-AD-4-3 rivets
- Rivet nut installation tools
- Phillips head screwdriver
- Combination square with level
- (2) Plumb lines

(1) See Appendix E for alternate installation using Mounting Kit K-400-1.

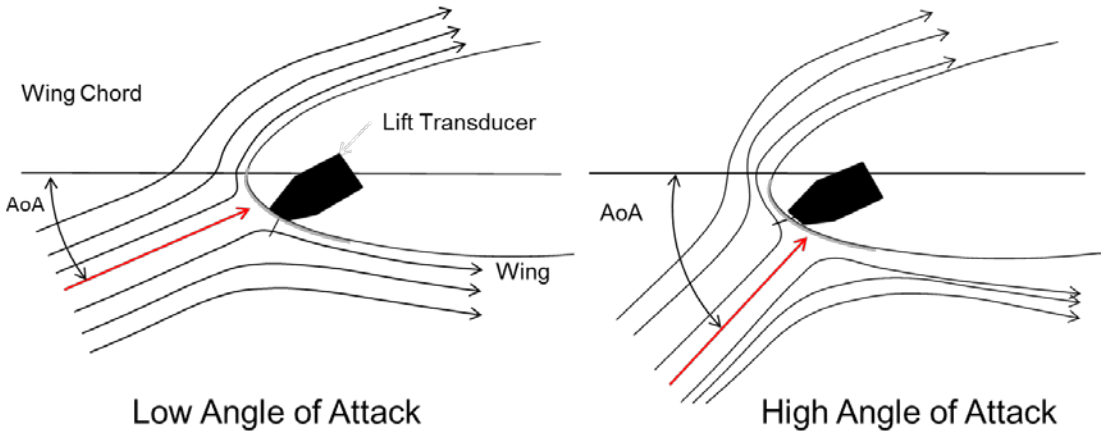
1.3 Theory of Operation

As the aircraft wing moves through the air it divides the air mass. At the center of this divided airflow is a narrow region known as the stagnation point. The location of the stagnation point uniquely represents the wing's AoA.

As the AoA increases, the leading edge stagnation point moves aft chordwise on the lower surface of the wing. The Lift Transducer senses the location of the stagnation point by means of a spring-loaded vane. The Lift Transducer is designed to detect the location of the stagnation point and relays this signal to the Indexer Computer.

The location of the Transducer on the wing is carefully chosen so that the sensed airflow is optimized for all of the high lift performance regimes of the aircraft. These include near maximum wing lift during normal and short-field takeoff and landing operations and the AoA's associated with optimized long range cruise and maximum endurance.

Decreasing the AoA of the wing moves the stagnation point forward (UP); increasing AoA moves it aft (DOWN) as shown below. At a maximum aft position, wing lift rapidly decreases, which is the AoA at which the stall occurs.



In the Aircraft Flight Manual (AFM) or Pilot Operating Handbook (POH), the speed at which the stall occurs is given in terms of indicated airspeed. The stall speed varies with aircraft gross weight, center of gravity, bank angle, maneuvering load and wing flap configuration. As each of these is reflected by the movement of the stagnation point, the Lift Transducer senses the wing's leading edge flow field giving an accurate and repeatable indication of the AoA.

The AoA, measured relative to stall, is displayed on the color-coded LEDs (*green/amber/red*) on the Indexer Computer, which is mounted vertically on the instrument panel glare shield. A pilot-selected reference mark may be set for the desired operational reference.

For Low Airspeed Awareness (LAA), high-AoA trend information supplements the aircraft's stall warning system by the display of two blinking *red* LEDs and a 'Geiger counter'-like audio output to the cockpit speaker and/or pilot headset. The audio begins when two *yellow* LEDs are illuminated and increases frequency as the AoA approaches stall.

1.4 Scope

The system meets the requirements of FAA Memo AIR100-14-110-PM01, dated February 5, 2014, regarding the Approval of Non-Required Angle-of-Attack (AoA) Indicator Systems. These installation instructions become the approved data necessary for the installation of the SCc.

1.4.1 These installation instructions are FAA Approved Data to be utilized only for the installation of the AoA system described herein on aircraft certified under 14 CFR Part 23 (or predecessors). Provided all of the requirements of section 2.0 of this document are met, no further FAA approval is required for the installation of this AoA system on a Part 23 aircraft. If the limitations of section 2.0 are not met, further FAA approval may be required.

1.4.2 These installation instructions are only approved for the aircraft listed in Appendix D. For aircraft not listed in Appendix D, additional structural data may be required for installation approval. Consult with the local FSDO.

1.5 Limitations

1.5.1 The Safe Flight SCc System is non-required and is to be used only as advisory information to the pilot. The system cannot replace the certified stall warning system. No performance credit can be taken from the system, such as reduced approach speeds, reduced takeoff or landing distances, etc.

1.5.2 The aircraft Pilot Operating Handbook or Aircraft Flight Manual always supersedes this system's manual.

1.5.3 SCc cannot be installed in a Commuter or Transport category airplane.

1.6 Specifications

Operational Temperature Range	-45°C to 70°C (DO160G Level B2)
Survival Temperature Range	-55°C to 70°C (DO160G Level B2)
Operating Humidity Range	Meets DO160G Level B (95% max.)
Operating Altitude Range	0 – 25,000 ft. (DO160G Level B2)
Operating Airspeed Range	V_{S0} to ~2 x V_{S0}
Precipitation	No limitations
Icing	Not for use in icing conditions
Deicing Fluids	No limitations
Emissions of RF Energy	Meets DO/160G Category M
Voltage Operating Range	10-32 V

2.0 INSTALLATION, ADJUSTMENT AND FUNCTIONAL CHECK

2.1 Installation Procedure

The installation of the SCc AoA System requires installing the Lift Transducer on the leading edge of the wing, installing the Indexer Computer, and system wiring. After installation, both a ground functional and a flight check are performed. The data from the flight check is to be recorded in Appendix B. If needed, Appendix C provides a guide for adjustment of the Lift Transducer mounting plate on the wing to adjust the results obtained from the flight test data.

2.2 Lift Transducer Wing Position

The following is a procedure for finding the initial location for the mounting of the Lift Transducer.

The installation of the SCc Lift Transducer should typically be made on the wing opposite to the existing stall warning device, at the same or close to the same spanwise position. This location may be varied in order to facilitate the ease of installation access of the wing components through an existing wing panel access.

NOTE The SCc System cannot be used as a replacement for or modification of an existing FAA approved Stall Warning System.

The location should be clear of any internal interference from ribs and other aircraft structure. Be sure to note locations of pitot lines, wiring, fuel tanks, fuel lines, and other aircraft hardware to avoid any interference.

The Lift Transducer typically mounts at 1% chord; however, this location may change depending on the airfoil. Deviations from 1% chord are acceptable. Check www.safeflight.com for any known deviations from the 1% chord location. Also, if previous installations in an aircraft model have required deviation from 1% chord, use that information for the location for subsequent Lift Transducer installations in that model.

Once the appropriate chord location is determined, use the method described in Appendix A to determine the proper location for mounting the Lift Transducer. Place a mark on the wing at this location. This will be the leading edge chord mark for the Lift Transducer Doubler installation.

NOTE Flight test is the only way to verify proper Lift Transducer location. The location may have to be adjusted based upon flight test results.

2.3 Doubler Installation (2)

Contour and temporarily tape the Cutout Template in Appendix H to the leading edge of the wing.

NOTE Ensure that the Cutout Template being used is properly scaled. This can be confirmed using the scale on the template.

Align the chord mark line of the template with the leading edge chord mark. Using a fine-tipped marker, trace the outline of the template cutout so as to mark the area of aircraft skin that is to be removed from the wing's leading edge for the installation of the Lift Transducer. Also mark the pilot hole locations indicated on the template.

Remove the template.

Cut through the wing along the outline of the template cutout to create the Lift Transducer mounting hole.

(2) See Appendix F for alternate Doubler Installation instructions using Lift Transducer 3704-4.

2.0 INSTALLATION, ADJUSTMENT AND FUNCTIONAL CHECK (continued)

Through a nearby access panel, insert the Doubler into the wing and align it with the leading edge wing hole. Bend the Doubler to match the wing contour at this position. Rivet the Doubler to the inside wing surface using the rivets supplied in the kit or equivalent in accordance with AC 43-13. Ensure that sufficient space is left for rivnut installation.

Place the Lift Transducer in the hole, forming the Mounting Plate to the contour of the leading edge. As with the Doubler, the Lift Transducer Mounting Plate has been contoured to the approximate curvature of the wing's leading edge. Final adjustments to the Lift Transducer mounting plate will be made during the installation on the wing.

At the two pilot hole locations marked per the Cutout Template, drill through the wing and through the Doubler. When the Lift Transducer is installed, it should be able to move 5/8" forward (up) and 1/4" aft (down). These holes will be used to initially mount the Lift Transducer for flight test. If the range of travel of the Lift Transducer is correct, enlarge the pilot holes and install two rivet nuts (Nut, Plain, Blind Rivet) or equivalent.

2.4 Indexer Computer

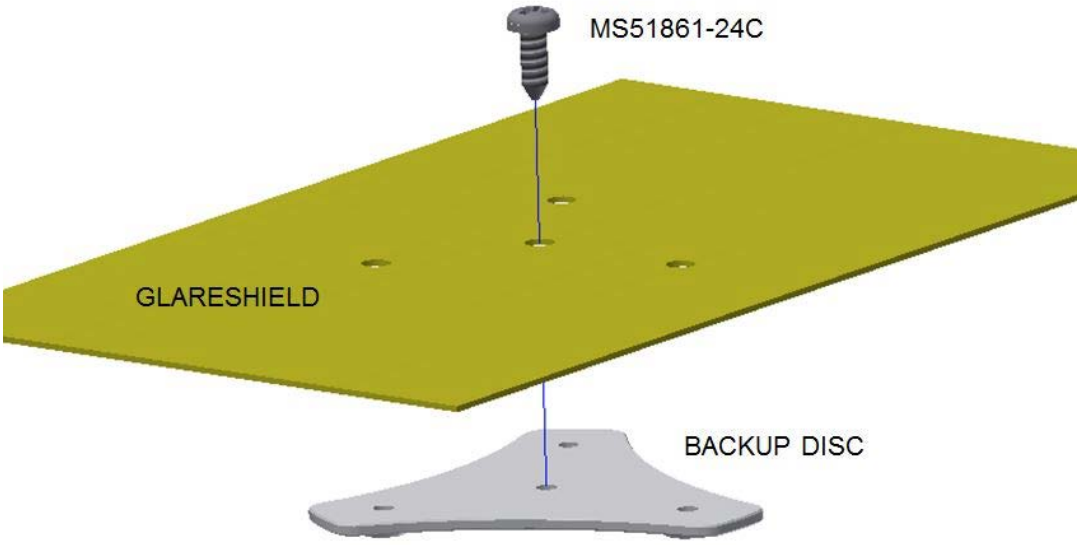
The Indexer Computer is installed on top of the instrument panel glareshield using the Ball Mount Assembly kit.

First, select a position for the Indexer Computer on the instrument panel glareshield, ensuring the best viewing angle for the pilot. The Indexer Computer should NOT interfere with the pilot's view of the primary flight instruments or view outside of the aircraft or cause distraction.

The Backup Disc is then installed. This disc is mounted under the glareshield, screwed directly to the glareshield and provides support for the Ball Mount Assembly and Indexer Computer.

Mark the center hole location for the Backup Disc. Using the Base Assembly as a template, mark the centers of all three outer holes. Open center hole and outer holes to accept #6 screws.

Screw the Backup Disc to the glareshield using the designated pan head screw or equivalent, reaching through instrument panel to mount Backup Disc in the determined location as shown below.

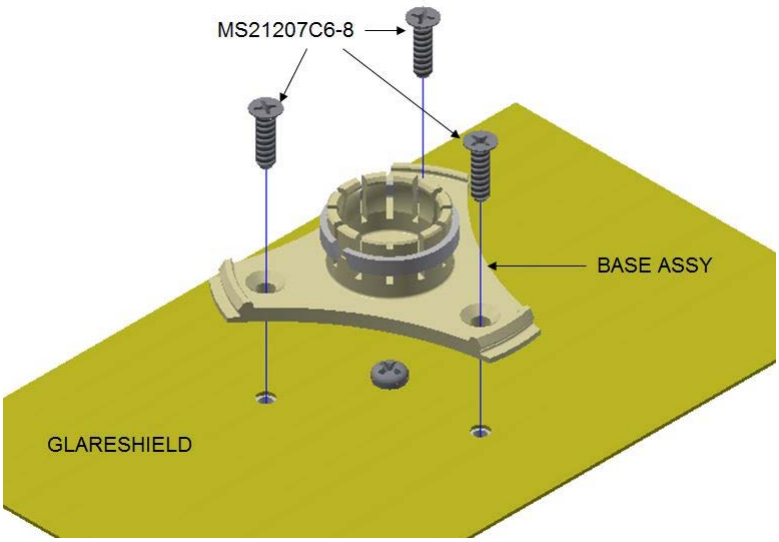


Backup Disc Installation (1)

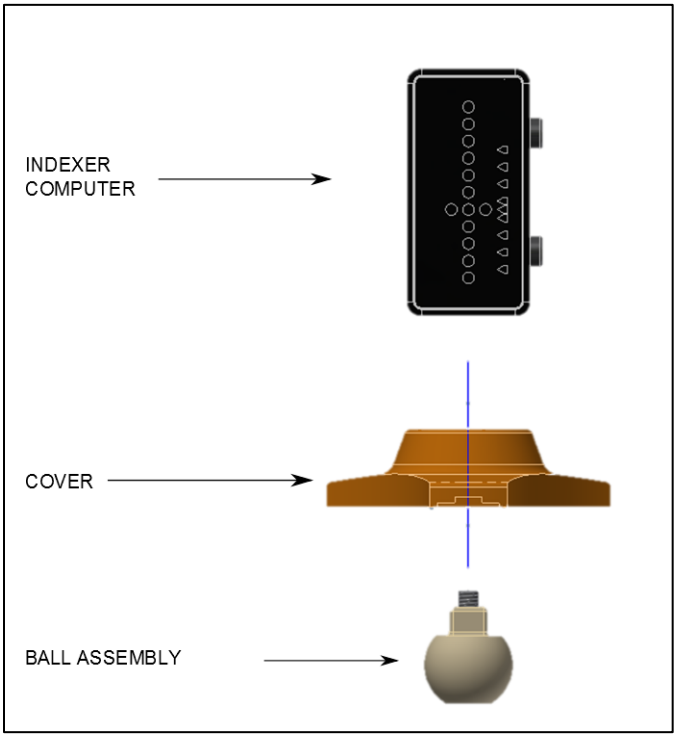
NOTE The instrument panel may need to be removed for the installation of the Backup Disc.

(1) See Appendix E for alternate installation using Mounting Kit K-400-1.

Next, the Base Assembly is mounted to the Backup Disc. Using the designated flat head screws or equivalent, attach the Base Assembly to Backup Disc through glareshield as shown below.



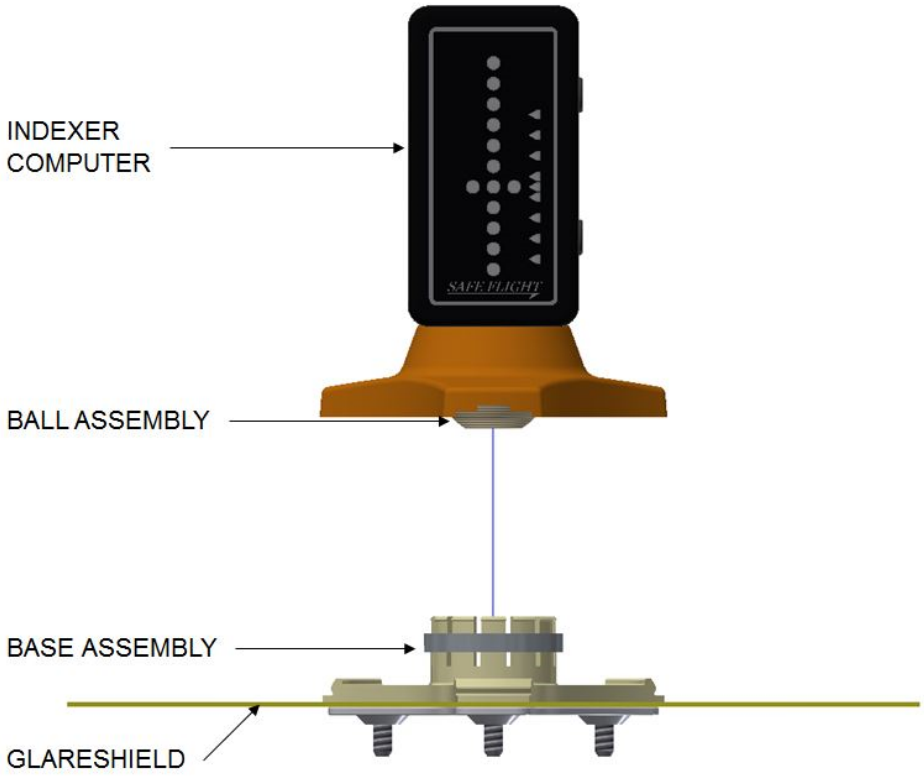
Base Assembly Installation to Backup Disc (1)



Ball Assembly Installation to Indexer Computer

Install the Ball Assembly through the Cover into the Indexer Computer. Rotate the screw in the Ball Assembly until the ball is captured securely by the threaded insert on Indexer Computer. The stem on top of Ball Assembly should fit snugly into opening on Indexer Computer. When mounted, the buttons will appear on the right-hand side of the Indexer Computer with the High AoA side of the display on top.

(1) See Appendix E for alternate installation using Mounting Kit K-400-1.



Ball Assembly Installation to Base Assembly (1)

Insert the Ball Assembly into the Base Assembly. Rotate the Indexer Computer until view of front face is acceptable.

Lock the cover onto the Base Assembly. Locking the cover contains the locking rings on the Base Assembly, requiring greater force to move the Indexer Computer.

Placard system “AoA not for use as a primary flight instrument” using the label supplied or equivalent.

Connect the Cable Assembly-Transducer and the Cable Assembly-Indexer to the Indexer Computer.

(1) See Appendix E for alternate installation using Mounting Kit K-400-1.

2.5 System Wiring

WARNING ▶ When ringing out Cable Assembly-Indexer, DO NOT insert oversized pins or probe into the main connector.

Wire the system in accordance with the Wiring Diagram (70308800-13). All wire per MIL W-81044/12. Maximum current in any wire is 0.5 A.

Power for the SCc is supplied through the main aircraft power bus. The system is also tied to the navigation lights, to facilitate day/night dimming. See the Wiring Diagram for details.

NOTE ▶ Ensure 1.9" minimum bend radius for CAT5e cable assembly. Do not over compress CAT5e cable via clamping

NOTE ▶ FAA approval of this document includes authorization for connection of audio output into aircraft audio system. See Wiring Schematic for details on audio specifications.

2.6 Lift Transducer Installation

Connect the Lift Transducer to the Cable Assembly-Transducer.

Mount the Lift Transducer using two screws in the diagonally opposite, vertically slotted holes on the mounting plate that were identified in paragraph 2.3. (Screw, MACH, Pan HD, 6/32 x 1/2) or equivalent.

2.7 Ground Functional Test

The Lift Transducer vane should move freely in both directions with no resistance.

With the electrical power OFF the Indexer Computer should not be lit.

Turn the main power ON. The Indexer Computer will perform a Power-on Self-Test, illuminating all of the LEDs for approximately five seconds. The audio alert will also be active during the self-test. After the self-test, the audio will cancel and the LEDs will indicate the current position of the Lift Transducer.

NOTE ▶ The single *red* LED will continue to blink at 1 Hz until the system has been calibrated in flight.

Observe the Indexer Computer for a transition to the low-AoA side of the display, with a single *green* LED illuminated when the Lift Transducer vane is gently pushed down (AFT).

Gently push the vane up (FORWARD). The Indexer Computer should transition to the high-AoA side of the display, followed by the flashing of the two *red* LEDs, indicating LAA. Turn the navigation light switch ON and observe Indexer Computer display dims.

CAUTION ▶ The aircraft's stall warning system is the primary stall warning. The AoA System is non-required equipment and is to be used only as supplemental information to the pilot.

3.0 FLIGHT CHECK AND ADJUSTMENT

CAUTION

This procedure may involve flight at near stall conditions. Choose a safe altitude to enable recovery in the event of a stall. The best results are found in non-turbulent conditions.

3.1 Background

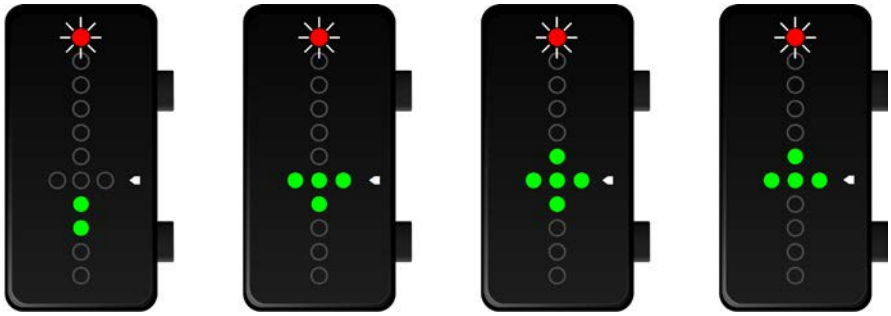
The Safe Flight SCc System is calibrated using a two-step process: accurate placement of the Lift Transducer, followed by an in-flight calibration procedure using Landing Approach and Low Airspeed Awareness data points.

Once the Lift Transducer is installed in the correct location, the system is ready for in-flight calibration.

3.2 Transducer Location Verification Flight

Using the POH recommended landing approach speed, power setting, and flap extension, fly a simulated approach (at a safe altitude for possible stall recovery) with the Lift Transducer installed in its initial location.

If the Indexer Computer displays any of the following indications, the system is ready for the final in-flight calibration.



Acceptable Indications before In-Flight Calibration

If not, the Lift Transducer needs to be moved on the wing. Land and follow Appendix C for guidance on how to adjust the Lift Transducer. Then, repeat the verification flight test procedure.

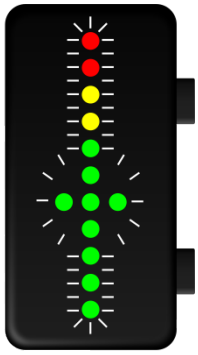
CAUTION

Do not proceed with the installation until one of the Acceptable Indications above has been displayed on the Indexer Computer during a simulated approach.

3.3 In-Flight Final Calibration Adjustment

Once the lift transducer has passed the transducer location verification flight, the system is ready for in-flight calibration.

At a safe altitude for possible stall recovery, using the POH recommended landing approach speed, power setting, and flap extension fly a simulated approach. Simultaneously, press and hold both the top and bottom buttons for two seconds to enter the calibration mode. All of the *red, yellow*, and *green* indicators will begin flashing.



Indication for Calibration Mode

(all LEDs flashing)

Press the bottom button to select the Landing Approach calibration mode. Continue flying the aircraft at the normal approach airspeed and descent rate. The Indexer Computer will begin flashing slowly the *green* center ON-SPEED indication for five seconds.

Continue flying the aircraft at the normal approach airspeed and descent rate. The Indexer Computer will begin flashing quickly the *green* ON-SPEED indication while the system is recording data for five seconds.

If the calibration is successful, the *green* ON-SPEED indication will change to solid (non-flashing).

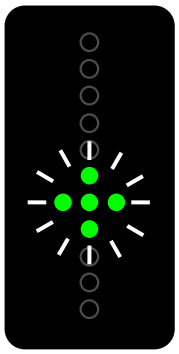
If the calibration is unsuccessful, the Indexer Computer will return to flashing slowly the ON-SPEED indications for 5 seconds, and then will transition again to flashing quickly for another 5 seconds. This sequence will repeat until the calibration is successful.

When the approach setting has been successfully accomplished, without adjusting power, pitch the aircraft nose up, slowing the aircraft to the speed where aircraft stall warning just begins to sound. Hold this speed. Press the top button to transition to the LAA calibration mode. The two *red* lights will begin slowly flashing for five seconds.

The two *red* lights will begin quickly flashing for another five seconds. During this time, maintain the stall warning target speed (at a constant power setting).

If the calibration is successful, the *red* LAA indication will change to solid (non-flashing).

If the calibration is unsuccessful, the system will return to flashing slowly for 5 seconds; then will transition again to flashing quickly for another 5 seconds. This sequence will repeat until the calibration is successful.



Indication for ON-SPEED Calibration

(Center LEDs Flashing)

Indication for LAA Calibration

(*Red* LEDs Flashing)

Press and hold both the top and bottom button for two seconds to exit the calibration mode.

NOTE

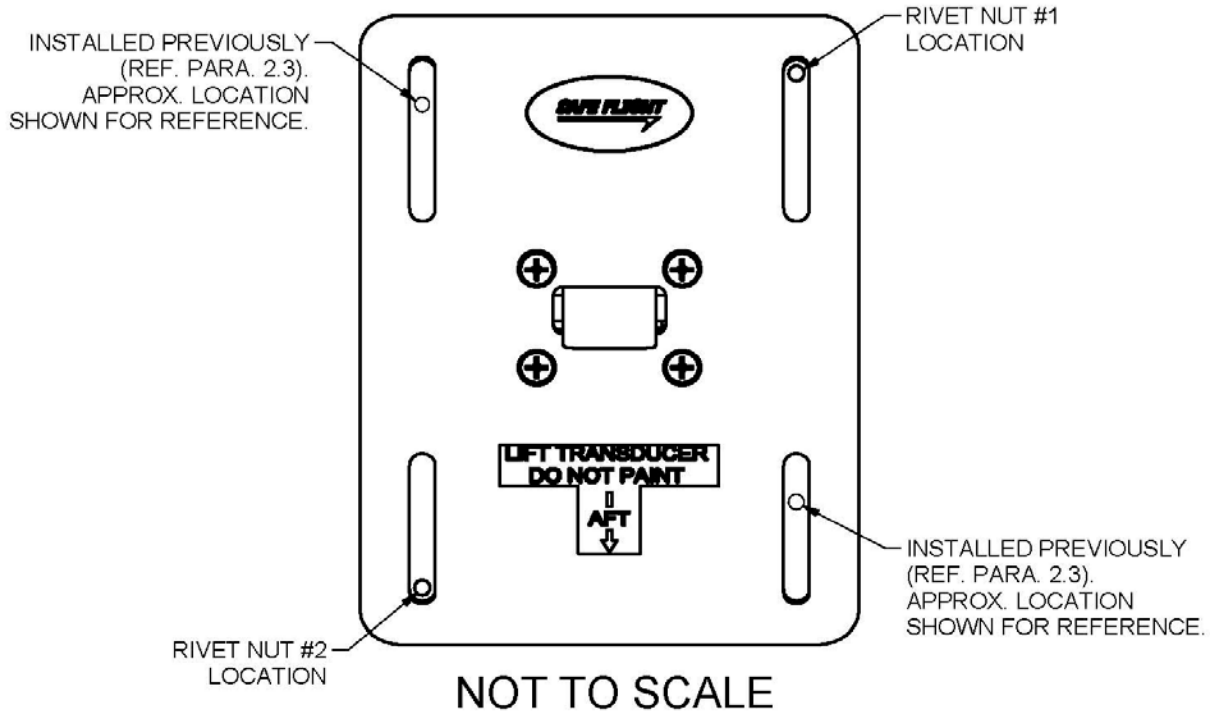
After a successful calibration, at a safe altitude, fly a simulated approach using the POH recommended landing approach speed, power, and flap extension. Verify that the given On-speed (five dots) is lit within +/–5 knots of the POH referenced speed. Without adjusting power, pitch aircraft nose up, slowing the aircraft so that the Indexer Computer displays two *amber* LEDs. Verify LAA audio is active and stall warning is not. If verification fails, repeat section 3.3.

NOTE

Pressing and holding both top and bottom buttons for two seconds at any time exits the calibration procedure.

3.4 Final Lift Transducer Installation (2)

Once the location of the Lift Transducer has been determined and the system has been calibrated, rivet nuts or equivalent must be installed for the two remaining slots on the Lift Transducer mounting plate. Mark the top of one of the remaining slots and the bottom of the other per the diagram below.



Pilot Hole Locations for Final Lift Transducer Installation

Disconnect the wiring and remove the Lift Transducer from the wing.

Install rivet nuts (Nut, Plain, Blind Rivet) or equivalent in the slot locations previously marked.

Reconnect and reinstall the Lift Transducer, using all 4 screws.

(2) See Appendix F for alternate Final Lift Transducer Installation instructions using Lift Transducer 3704-4.

3.5 Precautions

DO NOT paint or otherwise coat the vane of the Lift Transducer. All parts are adequately protected against corrosion. Any additional coating will interfere with proper operation.

DO NOT attempt to bend the Lift Transducer vane to obtain any adjustment. Refer to Section 3.0 of these instructions for the proper method of adjusting the Lift Transducer.

3.6 Weight and Balance

The Aircraft Weight and Balance and Equipment List for the aircraft should be updated to include the installation of the SCc components listed in Tables 1, 2, and 3.

4.0 TROUBLESHOOTING

4.1 System Removal

To disconnect the Indexer Computer from the Base Assembly, insert a flat-head screwdriver into the slot at the end of each leg. Lift up to release. Rotate the cover to access the screw heads. Pull gently on the Indexer Computer to remove the system after the cover has been lifted.

Remove Lift Transducer by unscrewing from rivnuts on wing. Cover the location with a cover plate if necessary.

4.2 Failure Modes

The Indexer Computer and Lift Transducer are not field repairable. If the operation of the system is in doubt, apply power to the system. If the system successfully completes the Power-On Self-Test, then the system is in operation and can be flight checked.

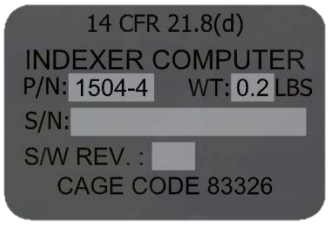
If the Power-On Self-Test is unsuccessful, hold buttons A and B for two seconds while power is still supplied. The display will illuminate all reference marker segments and then will illuminate a particular segment of the Indexer Computer display. Make note of these illuminated segments, as this will aid in diagnosing the problem.

Visit www.safeflight.com for additional troubleshooting actions.

When using the website troubleshooting guide, have the following information on hand:

1. Unit Part Number
2. Unit Serial Number
3. Unit Software Revision
4. Fault Code (which LEDs are illuminated on the Indexer)

The Part Number, Serial Number, and Software Revision can be found on the nameplate on the lower surface of the Indexer Computer.



Label on Indexer Computer (Typical)

4.3 Instructions for Continued Airworthiness

Perform the functional ground check in accordance with paragraph 2.7 at each annual inspection or anytime the SCc Indexer Computer or Lift Transducer has been disconnected.

NOTE

Following the Power-On self test, the single red LED will continue to blink at 1 Hz until the system has been calibrated in flight.

If the Lift Transducer has been replaced or if the calibration of the system is in doubt, perform the calibration procedure in accordance with paragraph 3.3.

NOTE

The "*Transducer Location Verification Flight*" procedure of paragraph 3.2 is only to be performed for the first transducer installation. When paragraph 3.2 has been completed no further transducer location adjustments can be performed.

5.0 USER MANUAL

5.1 General

The Safe Flight SCc AoA System, when properly installed and calibrated in accordance with the installation instructions, will serve as a reliable aid for flight associated with normal and short-field takeoff, climb, long range cruise, maximum endurance, and normal and short-field landing approach.

NOTE

The following indications listed in the User Manual for each desired flight profile are listed as examples only. The indication for each of these scenarios may differ from aircraft to aircraft. Consult the POH/AFM for proper speeds of all maneuvers.

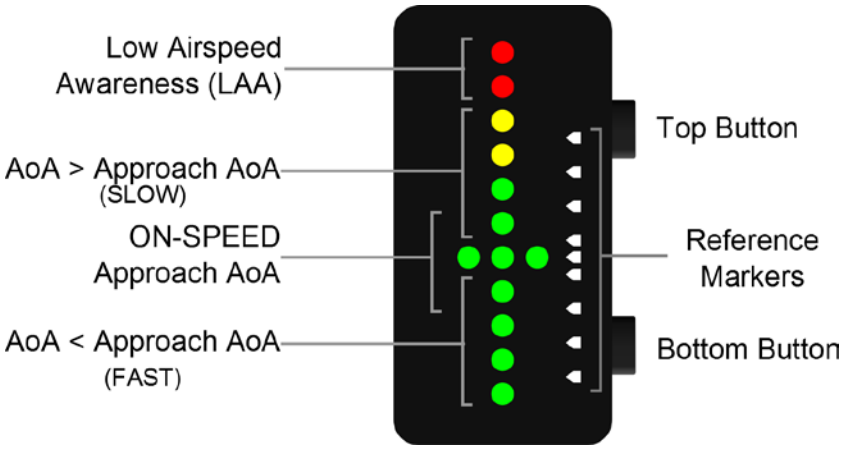
NOTE

This system is designed to be used in an advisory manner only. For proper procedures in flight, consult the POH/AFM.

NOTE

The SCc System is accurate in the calibrated region, ±5 knots for the Landing Approach indication.

5.2 System Display



System Display

5.3 Pre-Flight Ground Check Procedure

With the electrical power OFF, the Indexer Computer should not be illuminated.

With the electrical power ON, the Indexer will illuminate and perform a self-test. All of the LEDs will illuminate for approximately five seconds. The audio warning will also sound for the duration of the system test.

If a system calibration is required, the *red* LED on the top side of the display will blink slowly to signal that calibration is required. Do not use the SCc until a system calibration is completed. Refer to Section 3.0 for calibration procedure.

If any indication is not achieved as specified, discontinue use of the SCc System until a detailed check can be made to determine the cause.

5.4 Additional Button Press Functions

5.4.1 Reference Marker

5.4.1.1 Overview

The Reference Marker, a scrolling white LED arrow on the right-hand side of the Indexer Computer, is used to designate a pilot-selected AoA reference. The flight modes described below show the typical location to place the Reference Marker for the desired flight condition.

5.4.1.2 Moving the Reference Marker

The two buttons on the side of the Indexer Computer control the movement of the Reference Marker. A quick press of the top button moves the marker closer to the High AoA side (UP), a quick press of the bottom button moves the marker towards the Low AoA side (DOWN) of the display.

5.4.2 Audio Mute(1)

5.4.2.1 Normal operation is with the LAA audio active (unmuted). To mute the LAA audio, press and hold the top button for 4 seconds. After 4 seconds, you will hear a beep. This beep confirms that the audio is now muted.

5.4.2.2 To unmute the audio, press and hold the top button for 4 seconds. After 4 seconds, you will hear two beeps. Two beeps confirms that the audio is now unmuted.

When the Indexer Computer displays the AoA shown below, the audio will automatically unmute. This will also be confirmed with two beeps.

Angle of Attack for Automatic Unmuting

5.4.2.3 When the Indexer Computer is powered off and then back on, the LAA audio will automatically unmute.

(1) This function is only available with S/N 167304-01 and above and software version 1.3.0 marked on the Indexer nameplate.

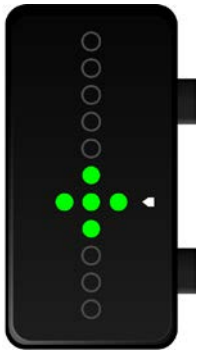
5.4.3 Brightness Control(1)

The brightness can be adjusted through the use of the bottom button on the side of the Indexer Computer. Holding the bottom button for two seconds will toggle between day/night dimming. This button can be used to override the dim setting selected through the navigation light switch.

5.5 Takeoff and Climb

Normal Takeoff and Climb

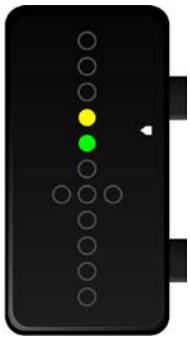
Set the Reference Marker at the center marker, adjacent to the three-dot center *green* indication. Fly the aircraft at the AFM/POH listed airspeed for the Normal Takeoff. After rotation, climb out using airspeed as the primary indication. The Indexer Computer will have the output shown below.



Normal Takeoff and Climb (Typical)

Short-Field, Obstacle Clearance Takeoff

Set the Reference Marker to correspond with the illustration below. Fly the aircraft at the POH listed airspeed for a Short-Field Takeoff. After rotation, climb out using airspeed as the primary indication. The Indexer Computer, when flying using the Short-Field Obstacle Clearance Takeoff, will have the indication shown below.



Short-Field Takeoff and Climb (Typical)

(1) This function is only available with S/N 167304-01 and above and software version 1.3.0 marked on the Indexer nameplate.

5.6 Cruise

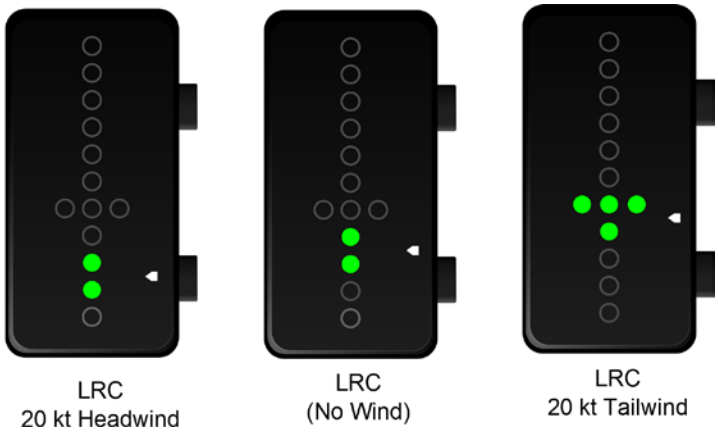
Long Range Cruise

The AoA reference may be adjusted by the pilot to give a reference that takes the headwind/tailwind component into consideration for maximum range flight. If the Reference Marker is set initially for long range cruise as shown in the middle image below, move the bar down one (1) marker from LRC (no wind) to compensate for a 20 kt. headwind. Move the Reference Marker up one (1) marker from LRC (no wind) to compensate for a 20 kt. tailwind. See below for an example.

NOTE

The following example is not for any particular aircraft make/model and is only given as a demonstration.

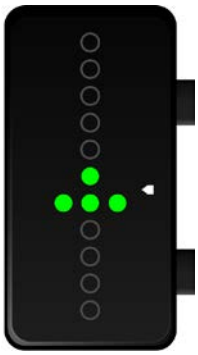
The actual AoA cruise speed adjustment for headwind/tailwind will vary by specific aircraft. Consult the aircraft POH for the required speed (AoA) bias to be applied to the SCc for your aircraft.



Long Range Cruise Indications, Compensated for Wind (Typical)

Maximum Endurance

Fly the aircraft at the speed and attitude consistent with minimum fuel flow. Set the Reference Marker for the indicated airspeed at the POH/AFM specified airspeed. This indication will be constant for the Maximum Endurance AoA as the aircraft burns fuel.



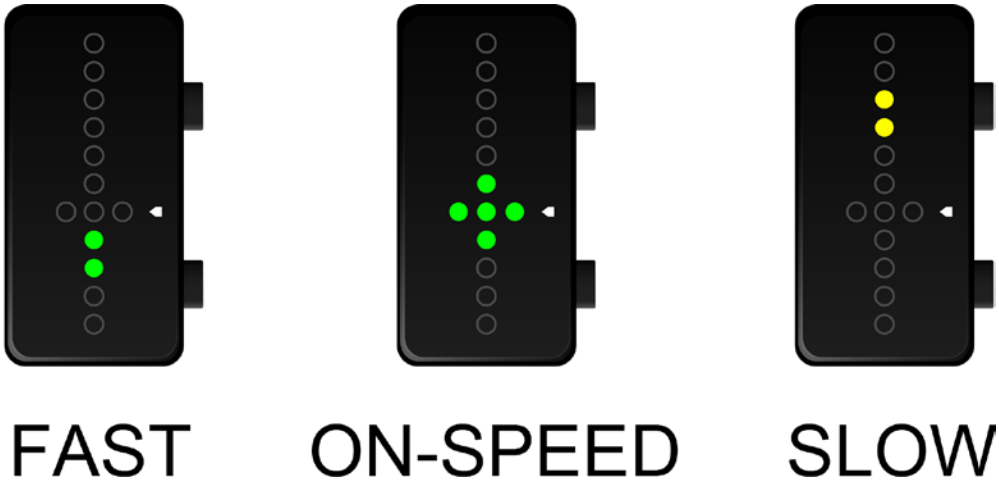
Maximum Endurance Indication (Typical)

5.7 Landing Approach

Normal Landing Approach

Fly the aircraft at the speeds indicated by the FAA-approved POH/AFM, for the applicable gross weight and flap setting. When flying this approach speed, the centermark LEDs will be illuminated, as shown below. An under-speed approach is indicated by the illumination of *green* or *amber* LEDs above the ON-SPEED condition towards the SLOW (high AoA) side of the display on the Indexer Computer. An overspeed approach is indicated by the illumination of the *green* LEDs below the ON-SPEED (low AoA) condition towards the FAST side of the display on the Indexer Computer.

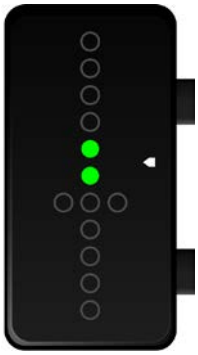
NOTE The Airspeed Indicator is the primary indication during approach. The Indexer Computer is to be used as advisory only.



Slow, On-Speed, and Fast Indications

Short-Field Landing Approach

Set the Reference Marker adjacent to the second *green* LED above the center ON-SPEED position. Fly the aircraft at the POH listed airspeed for a Short Approach. Note the corresponding Indexer Computer indication.



Short-Field Approach Indication (Typical)

5.8 Low Airspeed Awareness (LAA)

The SCc AoA System is designed with an LAA function. When the airplane reaches the near maximum limit AoA, the Indexer Computer will display two flashing *red* LEDs and an increasing frequency of 'Geiger counter' -like audio (wired into the aircraft audio panel and/or pilot headset). Prior to the stall warning horn sounding, the LAA audio will begin when two *amber* LEDs are illuminated and will increase in frequency as the AoA increases.

NOTE

The SCc AoA System is not meant to replace the aircraft's primary stall warning. The red flashing LEDs and the audio output is meant to provide a high AoA warning which is intended to increase Low Airspeed (High AoA) awareness.

Low Airspeed Awareness Indication

APPENDICES

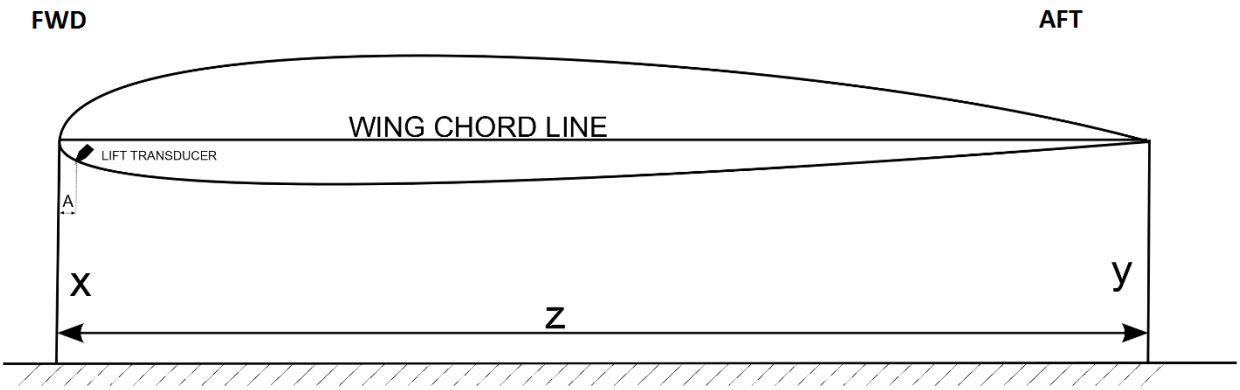
Appendix A: Method to Determine Lift Transducer Placement
Appendix B: Flight Check Data
Appendix C: Lift Transducer Adjustment Based on Indication
Appendix D: System Applicability
Appendix E: Alternate Installation Using Mounting Kit K-400-1
Appendix F: Alternate Installation Using Lift Transducer 3704-4
Appendix G: Alternate Installation Using Installation Kit K-350-2
Appendix H: Cutout Template

APPENDIX A

Method to Determine Lift Transducer Placement

For the SCc AoA System to work properly, the Lift Transducer must be installed in the correct location. The correct spanwise location should be at least two feet outboard of any propeller slipstream, clear of any leading edge devices (stall strips, etc.) or internal obstructions (ribs) and, ideally, spanwise near the flap-aileron junction.

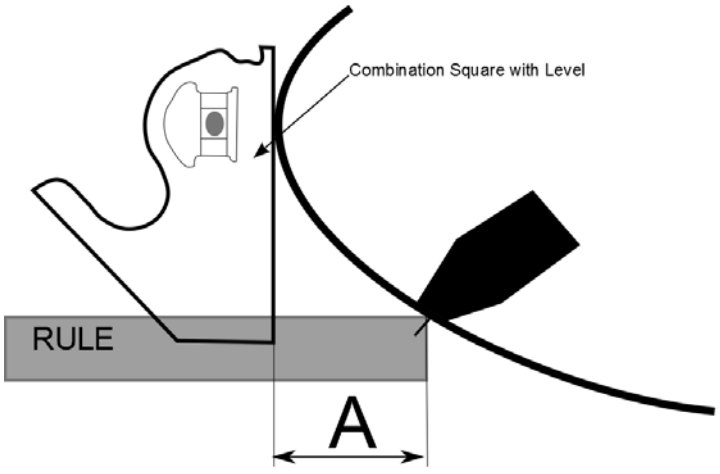
Measuring Wing Chord Length



Once the spanwise location is determined, the wing chord length must be measured at this position. To do this, drop plumb lines off the leading and trailing edge of the wing (flaps up) at the selected spanwise location (x and y). Level the aircraft.

Once the aircraft has been leveled, determine the length of the chord by measuring the distance between the two plumb lines (z).

Calculate distance (A) by multiplying (z) by the percent chord determined in paragraph 2.2. This distance (A) is shown in illustrations both above and below. Using a combination square and level, mark this calculated length (A) on the underside of the wing, measuring aft from the leading edge at the selected spanwise location, as shown below. This will be the center of the cutout for the Lift Transducer Doubler.



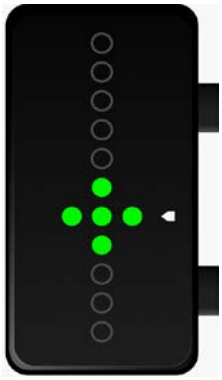
Measuring Position with Combination Square

APPENDIX B

Flight Check Data

Aircraft Data

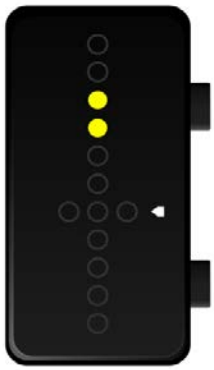
Date	
Make	
Model	
Year	
Registration Number	



On Speed Calibration Check

Flaps DOWN, Landing Approach Power

kts IAS



LAA Calibration Check

Flaps DOWN, Landing Approach Power

kts IAS

Weight of airplane at time of above readings.

Passengers	
Fuel Weight	
Empty Airplane Weight	
Total Weight	

Stall Warning Speed, Flap Down, Landing Approach Power

kts IAS

Performed flight check in accordance with installation instructions and FAR91.407(b)

Signature _____

Name _____

Certificate No. _____

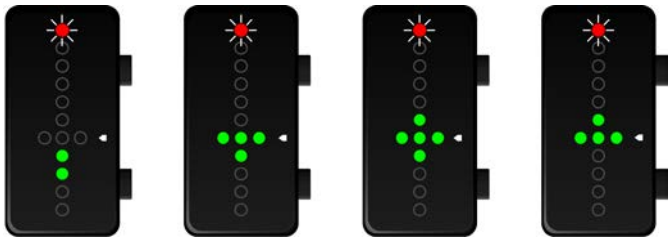
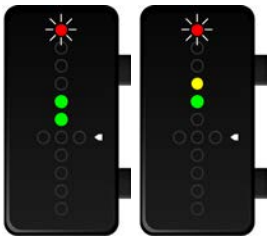
Date _____

When completed, remove this page and place it in the aircraft log book.

APPENDIX C

LIFT TRANSDUCER ADJUSTMENT BASED ON INDICATION

NOTE: This chart is included as a guide for the suggested movement of the Lift Transducer mounting plate based on the Indexer Computer indication during the initial flight check.

	Move Lift Transducer 1/4" up.
	Move Lift Transducer 1/8" up.
	No adjustment required.
	Move Lift Transducer 1/8'' aft.
	Move Lift Transducer 1/4'' aft.

NOTE: In the unlikely event that the Lift Transducer requires adjustment beyond the physical limitations of the doubler plate, modifications to the doubler plate and aircraft skin may be required. Modifications would entail a small expansion of the Lift Transducer cutout in the doubler plate and the aircraft skin to achieve the required adjustment. Consult AC 43-13 for guidance for these alterations.

APPENDIX D

SYSTEM APPLICABILITY

These installation instructions are only approved for the aircraft listed below. Models were determined by a Safe Flight Stall Warning Sytem being part of the original aircraft equipment. Safe Flight can update this list at any time with additional aircraft models as determined with the FAA Chicago ACO. These aircraft are listed by Type Certificate Data Sheet (TCDS).

For aircraft not on this list, additional structural data may be required for installation approval. Consult with the local FSDO.

This system is not approved for any FIKI certified aircraft.

Manufacturer	Models	TCDS
Aero Commander	680 Series	2A4
Beechcraft	18 Series	630
Beechcraft	23 Series	A1CE
Beechcraft	33, 35, 36 Series	3A15
Beechcraft	50 Series	5A4
Beechcraft	55,95 Series	3A16
Beechcraft	60 Series	A12CE
Beechcraft	65 Series	3A20
Beechcraft	77	A30CE
Bellanca	14-19 Series	1A3
Cessna	305 Series	5A5
Cessna	150 Series	3A19
Cessna	170 Series	A-799
Cessna	172 Series	3A12
Cessna	177 Series	A13CE
Cessna	180 Series	5A6
Cessna	182 Series	3A13
Cessna	185 Series	3A24
Cessna	188 Series	A9CE
Cessna	190-195 Series	A-790
Cessna	206 Series	A4CE
Cessna	208 Series	A37CE
Cessna	T240	A00003SE
Cessna	210 Series	3A21
Cessna	310 Series	3A10
Cessna	320 Series	3A25
Cessna	336	A2CE
Cessna	340 Series	3A25
Cessna	401 Series	A7CE
Cessna	404	A25CE
Cessna	441	A28CE

APPENDIX D

SYSTEM APPLICABILITY (continued)

Manufacturer	Models	TCDS
Champion	7 Series	A-759
Champion	8KCAB	A21CE
De Havilland	DHC-2 Series	A-806
De Havilland	DHC-3	A-815
Dornier	DO-27	A8IN
Evektor	EV-97	EASA.A.029
Extra	EA-400	A43C3
Forney	F-1 Series	A-787
Grumman	G-164 Series	1A16
Grumman	G-44	A-734
Grumman American	AA-5 Series	A16EA
Lake	LA-4 Series	1A13
Lake	Model 250	1A13
Maule	M-4, M-5, M-7, M-9 Series	3A23
Mooney	M20 Series	2A3
Navion Aircraft Co.	Navion Series	A-782
Piper	PA-18 Series	1A2
Piper	PA-18 Series	AR-7
Piper	PA-22 Series	1A6
Piper	PA-23 Series	1A10
Piper	PA-24 Series	1A15
Piper	PA-25 Series	2A8
Piper	PA-28 Series	2A13
Piper	PA-30 Series	A1EA
Piper	PA-31 Series	A20SO
Piper	PA-32 Series	A3SO
Piper	PA-34 Series	A7SO
Piper	PA-36 Series	A9SO
Piper	PA-44 Series	A19SO
Piper	PA-46 Series	A25SO
Quest	Kodiak	A00007SE
Aviat	Husky	A22NM
Kings Engineering Fellowship	Angel 44	A2WI

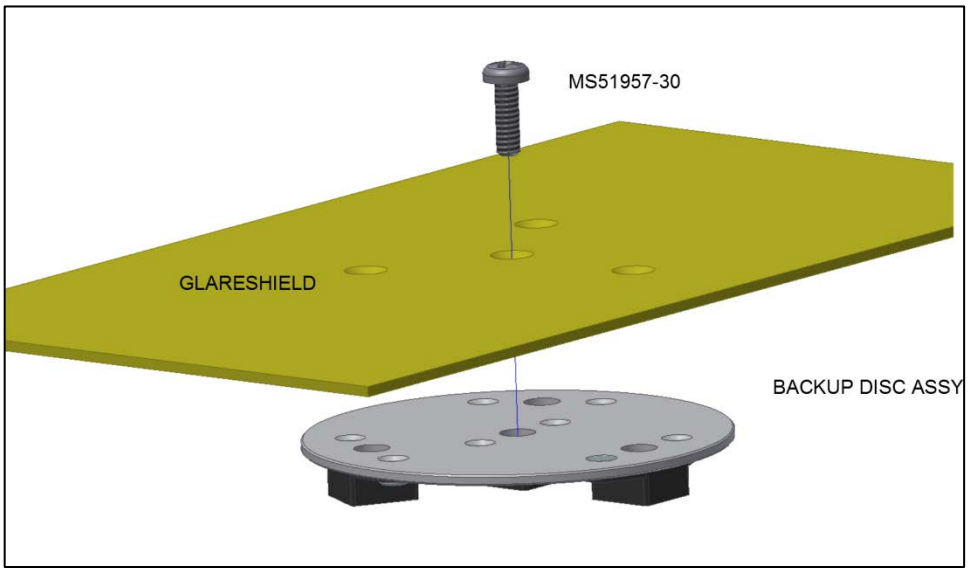
APPENDIX E

ALTERNATE INSTALLATION USING MOUNTING KIT K-400-1

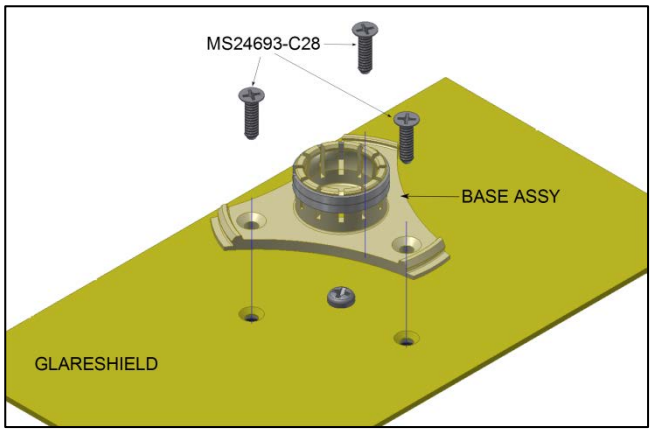
Description	Hardware	Part Number	Quantity
Backup Disc Assembly		1504-114-4	1
Ball Assembly		1504-128-4	1
Base & Spring Assembly		1504-126-4	1
Cover		1504-229-4	1
Screw, Machine Flat HD, 100 deg. 6-32 x 1/2	Base Mounting Screws	MS24693-C28	4
Screw, MACH, Pan HD, 6/32 x 1/2	Backup Disc Screws	MS51957-30	2

APPENDIX E

ALTERNATE INSTALLATION USING MOUNTING KIT K-400-1 (continued)



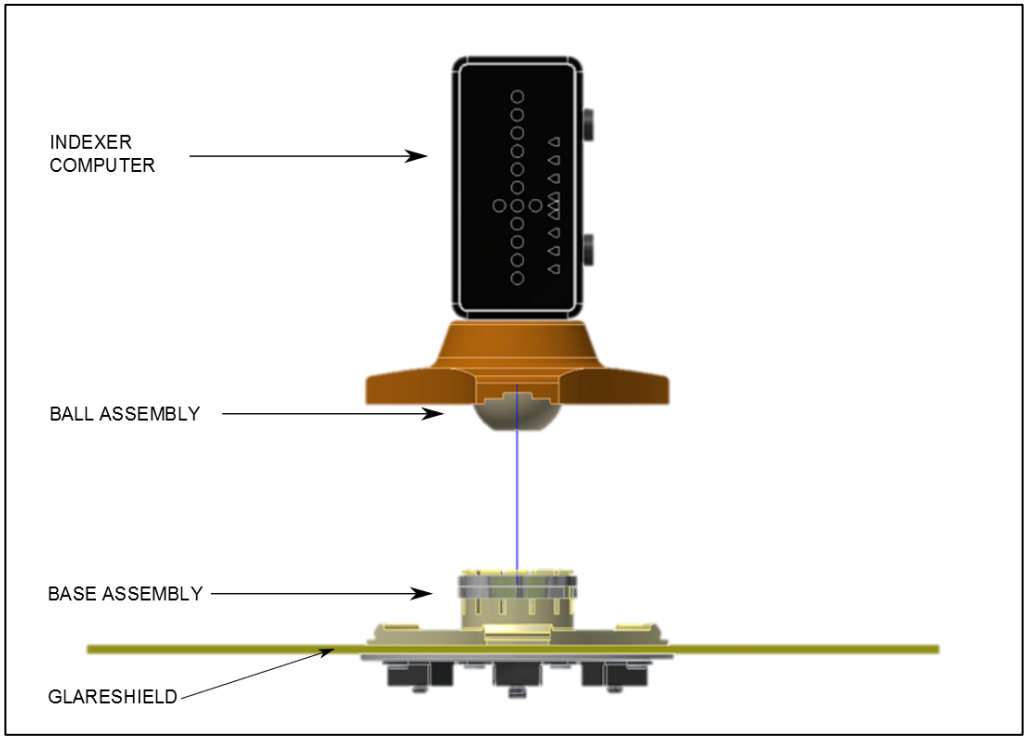
Alternate Backup Disc Installation



Alternate Base Assembly Installation to Backup Disc

APPENDIX E

ALTERNATE INSTALLATION USING MOUNTING KIT K-400-1 (continued)



Alternate Ball Assembly Installation to Base Assembly

APPENDIX F

ALTERNATE INSTALLATION USING LIFT TRANSDUCER 3704-4

COMPONENT	PART NUMBER	WEIGHT (lbs.)
Lift Transducer	3704-4	0.3

Alternate Doubler Installation Using Lift Transducer 3704-4

Contour and temporarily tape Doubler 3704-223-1 (part of alternate Installation Kit K-350-2[(3)]) to the leading edge of the wing. Align the center of the cutout of the Doubler with the leading edge chord mark. Using a fine-tipped marker, trace the outline of the Doubler cutout so as to mark the area of aircraft skin that is to be removed from the wing's leading edge for the installation of the Lift Transducer.

Remove the Doubler and reserve it for installation inside the wing.

Cut through the wing, as outlined by the Doubler cutout, to create the Lift Transducer mounting hole.

Through a nearby access panel, insert the Doubler into the wing and align it with the leading edge wing hole. Bend the Doubler to match the wing contour at this position. Rivet the Doubler to the inside wing surface using the rivets supplied in the kit or equivalent in accordance with AC 43-13. Ensure that sufficient space is left for rivnut installation.

Place the Lift Transducer in the hole, forming the Mounting Plate to the contour of the leading edge. As with the Doubler, the Lift Transducer Mounting Plate has been contoured to the approximate curvature of the wing's leading edge. Final adjustments to the Lift Transducer mounting plate will be made during the installation on the wing.

Make a mark on the wing corresponding to the center point of the vertically slotted holes in the Lift Transducer mounting plate.

At these marks, drill two pilot holes through the wing and through the Doubler. When the Lift Transducer is installed, it should be able to be moved 0.25'' forward (up) and aft (down). These holes will be used to initially mount the Lift Transducer for flight test. If the range of travel of the Lift Transducer is correct, enlarge the pilot holes and install two rivet nuts (Nut, Plain, Blind Rivet) or equivalent.

Alternate Final Lift Transducer Installation Using Lift Transducer 3704-4

Once the location of the Lift Transducer has been determined and the system has been calibrated, mark the center of the horizontal slots on the Lift Transducer mounting plate.

Disconnect the wiring and remove the Lift Transducer from the wing.

Install rivet nuts (Nut, Plain, Blind Rivet) or equivalent in the horizontal slot center locations previously marked.

Reconnect and reinstall the Lift Transducer, using all 4 screws.

(3) See Appendix G for alternate installation using Installation Kit K-350-2.

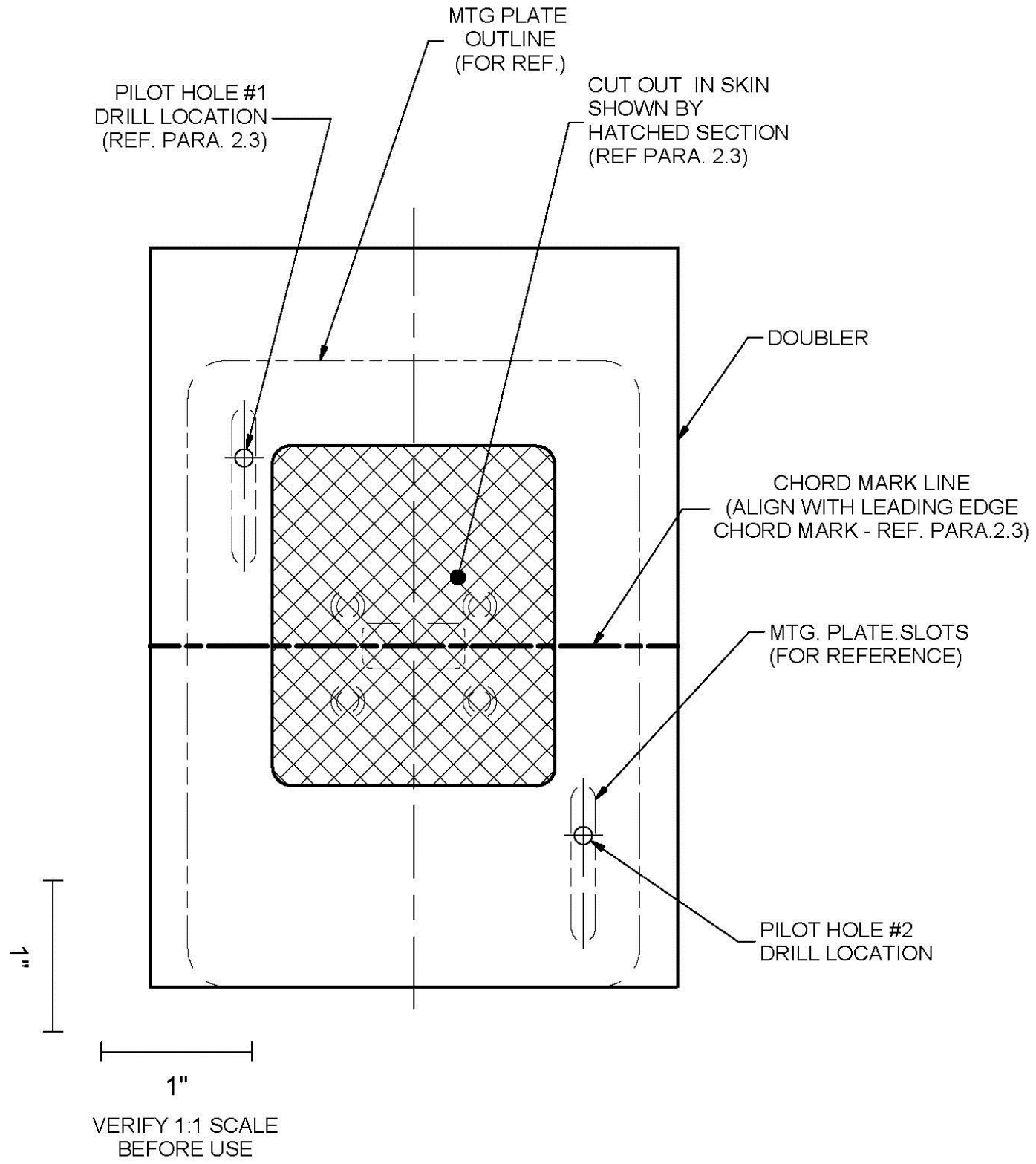
APPENDIX G

ALTERNATE INSTALLATION USING INSTALLATION KIT K-350-2

Description	Hardware	Part Number	Quantity
Cable Assembly, Indexer	Indexer Computer Cable Assembly	1504-150-2	1
Cable Assembly, CAT5E	Lift Transducer Cable Assembly	3704-150-1 or Equivalent	1
Doubler	Lift Transducer Doubler Plate	3704-223-1 or Equivalent	1
Screw, MACH, Pan HD, 6/32 x 1/2	Mounting Screws, 6-32 x ½ (Lift Transducer)	MS51957-30	5
Nut, Plain, Blind Rivet	Rivet Nuts (Lift Transducer)	NAS1329A06-75	5
Rivet	Rivets (Doubler to skin)	NAS1097-AD-4-3	10
Plug, Modular RJ45, 8P8C	RJ45 Connector	514075-1	1
Tape, Adhesive, Double-sided			1
Label	Advisory Placard	55562-1	1

APPENDIX H

CUTOUT TEMPLATE
FOR MARKING TRANSDUCER PLACEMENT AND CUTOUT
(USE FOR 3704-6)



VERIFY 1:1 SCALE
BEFORE USE