SPECIAL ATTENTION

Number: **727-34-0245**
Date: June 04, 2008
ATA System: 2732 3418

SUBJECT: NAVIGATION - Stall Warning System - Angle of Airflow Sensor Inspection

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Summary

SUBJECT: NAVIGATION - Stall Warning System - Angle of Airflow Sensor Inspection

BOEING RECOMMENDS THAT EACH OPERATOR EXAMINE THIS SERVICE BULLETIN IMMEDIATELY.

CONCURRENT REQUIREMENTS

None.

BACKGROUND

This service bulletin gives instructions for a one-time inspection of Conrac/Ametek/Gulton Angle of Airflow (AOA) sensors with part numbers 2566A21 and 2566A30. This inspection will do a check for a misalignment between the AOA sensor shaft and the sensor synchro transmitter. This misalignment is caused by a defective set screw condition. The airplane could have incorrect control column shaker activation if the inspection given in this service bulletin is not accomplished.

One 747-400 operator reported a control column shaker activation on takeoff. The control column shaker activation continued while the airplane was in flight and EICAS messages ALT DISAGREE and IAS DISAGREE were displayed. The flight crew used the alternative Air Data Computer (left ADC) and the altitude and airspeed indications cancelled. After landing the right ADC was replaced. On the subsequent flight the control column shaker operated again at takeoff and the flight crew had to do a Rejected Takeoff (RTO). Troubleshooting steps found that the right AOA sensor was unserviceable. ADC installed on 727-100/200 airplanes do not use data from the AOA sensor but they do use Conrac/Ametek/Gulton AOA sensors that are equivalent in design and construction to the defective AOA sensor on the 747-400 airplane.

The inspection of the AOA sensor showed that the set screw connected to the synchro transmitter was not correctly attached to the AOA sensor shaft. Accomplishment of this service bulletin will stop incorrect control column shaker activation.

Boeing Service Related Problem (SRP) 727-SRP-34-0114 is related to this service bulletin.

Fleet Team Digest (FTD) 727 FTD 34-07001 is related to this service bulletin.

ACTION

Part 1

Do a visual inspection of the AOA sensor. If the AOA sensor is found to be a Conrac/Ametek/Gulton sensor, do Part 2 of the service bulletin.

Part 2

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Do a test of the AOA sensor. If the AOA sensor fails to activate the control column shaker, do Part 3 of the service bulletin.

Part 3

Do an Aircraft Maintenance Manual (AMM) Operational Test of the Stall Warning System. If the AOA sensor fails to activate the control column shaker, replace the AOA sensor.

NOTE: New part is only necessary if the inspection and tests indicate that the existing sensor must be replaced.

EFFECTIVITY

727/727C/727-100/100C/200/200F Airplanes. Refer to Paragraph 1.A., Effectivity., Airplanes for the list of affected airplanes.

COMPLIANCE

Refer to Paragraph 1.E., Compliance.

INDUSTRY SUPPORT INFORMATION

Boeing warranty remedies are not available for the inspection or tests given in this service bulletin.

MANPOWER

Refer to Paragraph 1.G., Manpower.

MATERIAL INFORMATION

None.

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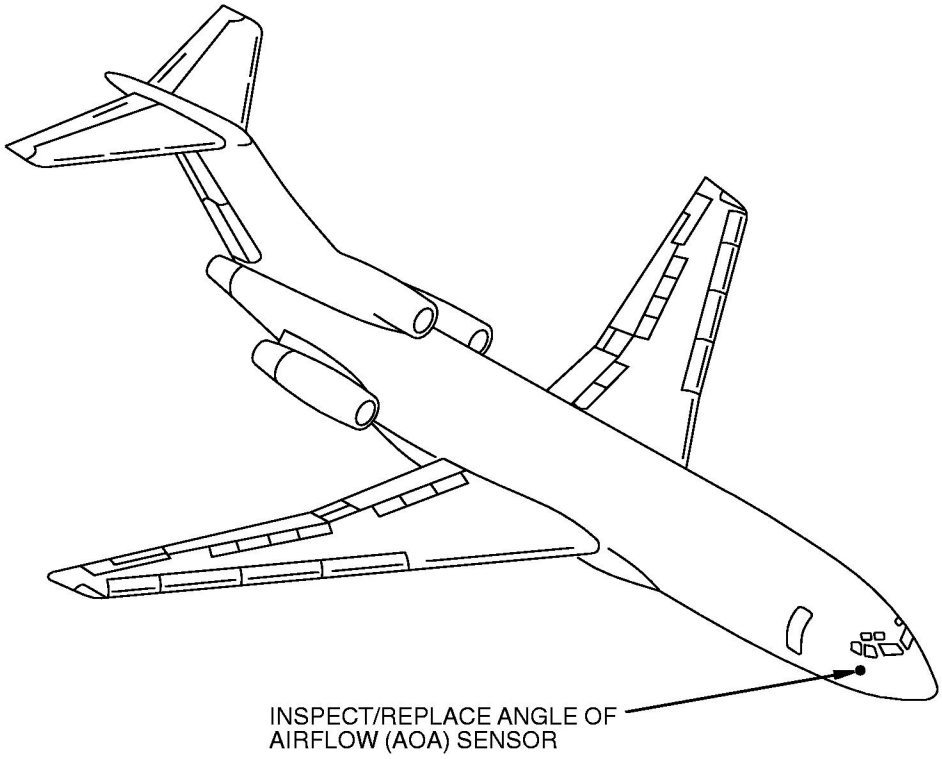

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1. PLANNING INFORMATION

A. Effectivity

1. Airplanes

Refer to Service Bulletin Index Document D6-9825 Part 3 for Airplane Variable Number, Line Number, and Serial Number data.

This service bulletin is for the airplanes shown below.

GROUP	CONFIGURATION	DESCRIPTION
1	-	All 727-100 and -200 airplanes that require Angle of Airflow sensor inspection

Airplane Models:

727, 727-100, 727-100C, 727-200, 727-200F, 727C

Variable Number	Group
E0001 - E0042	1
E0101 - E0140	1
E0201 - E0216	1
E0301 - E0351	1
E0401 - E0423	1
E3001 - E3006	1
E3011 - E3014	1
E3021 - E3040	1
E3059	1

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Variable Number	Group
E3061 - E3077	1
E3101 - E3103	1
E3111 - E3118	1
E3141 - E3152	1
E3171 - E3177	1
E3201 - E3206	1
E3221 - E3224	1
E3241 - E3290	1
E3341 - E3350	1
E3401 - E3421	1
E3451 - E3452	1
E3471 - E3474	1
E3501 - E3513	1
E3516 - E3523	1
E3551 - E3553	1
E3571 - E3578	1
E3601 - E3604	1
E3621 - E3622	1
E3651 - E3655	1
E3677	1
E3681 - E3684	1
E3701 - E3704	1
E3751 - E3755	1
E3781 - E3784	1
E5001 - E5011	1
E5031 - E5068	1
E5101 - E5116	1
E5141 - E5143	1
E5161 - E5164	1
E5201 - E5203	1
E5221 - E5245	1
E5251 - E5252	1
E5271 - E5281	1

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Variable Number	Group
E5301 - E5306	1
E5351 - E5353	1
E5381 - E5382	1
E5401 - E5424	1
E5426 - E5429	1
E5433	1
E5435	1
E5451 - E5455	1
E5481 - E5483	1
E5501 - E5502	1
QA001 - QA046	1
QA051 - QA099	1
QA101 - QA199	1
QA201 - QA225	1
QA301 - QA349	1
QA351 - QA376	1
QA378	1
QA401 - QA499	1
QA501 - QA537	1
QA551 - QA579	1
QA581 - QA585	1
QA601 - QA688	1
QA701 - QA753	1
QA801 - QA805	1
QA851 - QA899	1
QA901 - QA946	1
QA949	1
QB001 - QB002	1
QB031 - QB049	1
QB051 - QB068	1
QB101 - QB110	1
QB114 - QB119	1
QB121 - QB149	1

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Variable Number	Group
QB151 - QB158	1
QB201 - QB220	1
QB301 - QB316	1
QB351 - QB352	1
QB401 - QB407	1
QB451 - QB458	1
QB501 - QB575	1
QB601 - QB629	1
QB651	1
QB701 - QB705	1
QB801 - QB810	1
QB901 - QB904	1
QD001 - QD012	1
QD031 - QD046	1
QD085 - QD088	1
QD101 - QD105	1
QD121 - QD127	1
QD141 - QD149	1
QD161 - QD164	1
QD191 - QD192	1
QD201 - QD239	1
QD281 - QD284	1
QD301 - QD305	1
QD321 - QD330	1
QD351	1
QD401 - QD403	1
QD407	1
QD410	1
QD421 - QD427	1
QD441 - QD453	1
QD471 - QD475	1
QD501 - QD518	1
QD551 - QD558	1

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Variable Number	Group
QD571 - QD572	1
QD581 - QD583	1
QD601 - QD607	1
QD621 - QD624	1
QD641	1
QD661 - QD663	1
QD681 - QD685	1
QD691 - QD692	1
QD701 - QD702	1
QD711 - QD717	1
QD741	1
QD761 - QD769	1
QD781 - QD782	1
QD791	1
QD801 - QD804	1
QD821 - QD828	1
QD901 - QD910	1
QD931 - QD932	1
QD951 - QD954	1
QD971 - QD973	1
QD991 - QD992	1
QE001 - QE002	1
QL001 - QL008	1
QL031 - QL032	1
QL081	1
QL501 - QL515	1

2. Spares Affected

None.

B. Concurrent Requirements

None.

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C. Reason

This service bulletin gives instructions for a one-time inspection of Conrac/Ametek/Gulton Angle of Airflow (AOA) sensors with part numbers 2566A21 and 2566A30. This inspection will do a check for a misalignment between the AOA sensor shaft and the sensor synchro transmitter. This misalignment is caused by a defective set screw condition. The airplane could have incorrect control column shaker activation if the inspection given in this service bulletin is not accomplished.

One 747-400 operator reported a control column shaker activation on takeoff. The control column shaker activation continued while the airplane was in flight and EICAS messages ALT DISAGREE and IAS DISAGREE were displayed. The flight crew used the alternative Air Data Computer (left ADC) and the altitude and airspeed indications cancelled. After landing the right ADC was replaced. On the subsequent flight the control column shaker operated again at takeoff and the flight crew had to do a Rejected Takeoff (RTO). Troubleshooting steps found that the right AOA sensor was unserviceable. ADC installed on 727-100/200 airplanes do not use data from the AOA sensor but they do use Conrac/Ametek/Gulton AOA sensors that are equivalent in design and construction to the defective AOA sensor on the 747-400 airplane.

The inspection of the AOA sensor showed that the set screw connected to the synchro transmitter was not correctly attached to the AOA sensor shaft. Accomplishment of this service bulletin will stop incorrect control column shaker activation.

Boeing Service Related Problem (SRP) 727-SRP-34-0114 is related to this service bulletin.

Fleet Team Digest (FTD) 727 FTD 34-07001 is related to this service bulletin.

D. Description

Part 1

Do a visual inspection of the AOA sensor. If the AOA sensor is found to be a Conrac/Ametek/Gulton sensor, do Part 2 of the service bulletin.

Part 2

Do a test of the AOA sensor. If the AOA sensor fails to activate the control column shaker, do Part 3 of the service bulletin.

Part 3

Do an Aircraft Maintenance Manual (AMM) Operational Test for the Stall Warning System. If the AOA sensor fails to activate the control column shaker, replace the AOA sensor.

NOTE: New part is only necessary if the inspection and tests indicate that the existing sensor must be replaced.

Affected Maintenance Zones	
Model	**Zone**
727, 727-100, 727-100C, 727-200, 727-200F, 727C	2-21, 2-22

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E. Compliance

The Federal Aviation Administration (FAA) will possibly release an Airworthiness Directive related to this service bulletin. The Airworthiness Directive will make the compliance tasks and times given in this service bulletin mandatory.

Boeing recommends that the inspection given in this service bulletin be done within 36 months after the date on this service bulletin.

If an AOA check (such as Maintenance Planning Document (MPD) Task 4-34-06 associated with a 'C' check) has been accomplished within the last 15 months or if one is scheduled within the compliance time, it can take the place of the required check and the service bulletin is considered accomplished.

F. Approval

This service bulletin was examined by the Federal Aviation Administration (FAA). The changes specified in this service bulletin comply with the applicable regulations and are FAA approved, as well as European Aviation Safety Agency (EASA)/Joint Aviation Authorities (JAA) approved for all EASA/JAA approved airplanes listed in the service bulletin effectivity. This service bulletin and its approval were based on the airplane in its original Boeing delivery configuration or as modified by other approved Boeing changes.

If an airplane has a non-Boeing modification or repair that affects a component or system also affected by this service bulletin, the operator is responsible for obtaining appropriate regulatory agency approval before incorporating this service bulletin.

G. Manpower

The table below shows an estimate of the task hours necessary to do this visual inspection and test for each sensor. This estimate is for direct labor only, done by an experienced crew. Adjust the estimate with operator task hour data if necessary. The estimate does not include lost time. These are some examples of lost time:

- Time to adjust to the workplace
- Time to schedule the work
- Time to inspect the work
- Time to cure the materials
- Time to make the parts
- Time to find the tools.

PART 1			
Task	**Number of Persons**	**Task Hours**	**Elapsed Hours**
Inspect	1	0.10	0.10
TOTAL FOR EACH SENSOR		0.10	0.10

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PART 2			
Task	**Number of Persons**	**Task Hours**	**Elapsed Hours**
Test	2	0.50	0.25
TOTAL FOR EACH SENSOR		0.50	0.25

PART 3			
Task	**Number of Persons**	**Task Hours**	**Elapsed Hours**
Test	2	1.00	0.50
TOTAL FOR EACH SENSOR		1.00	0.50

H. Weight and Balance Changes

None.

I. Electrical Load Data

Not applicable.

J. References

1. Existing Data

   a. Boeing Service Related Problem (SRP) 727-SRP-34-0114

   b. 727 Aircraft Maintenance Manual (AMM) 24-22-00, 27-51-00, 34-18-01, 34-18-51

   c. 727 Fleet Team Digest (FTD) 34-07001

   d. Maintenance Planning Data (MPD) Task 4-34-06

2. Data supplied with this Service Bulletin

   None.

3. Installation Drawings Used in the Preparation of this Service Bulletin

   None.

K. Publications Affected

None.

L. Interchangeability and Intermixability of Parts

Accomplishment of this service bulletin does not affect interchangeability or intermixability of parts.

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2. MATERIAL INFORMATION

A. Material - Price and Availability

None.

B. Industry Support Information

Boeing warranty remedies are not available for the inspection and tests given in this service bulletin.

C. Parts Necessary For Each Airplane

1. Kits/Parts

None.

2. Parts and Materials Supplied by the Operator

Part Number / Specification	QTY	Name	Notes
2566A21 or 2566A30 (10-60878-3 or 10-60878-4)	1	Angle of Attack Sensor	(a) (b) (c) (d)
(a) Part numbers are interchangeable.			
(b) Some operators have 2 Stall Warning System Angle of Attack Sensors installed.			
(c) This part is only necessary if the inspection and tests indicate the existing sensor must be replaced.			
(d) Ametek Aerospace (V92627), 1644 Whittier Ave, Costa Mesa, California 92627-4415.			

3. Parts Modified and Reidentified

None.

4. Parts Removed and Not Replaced

None.

D. Parts Necessary to Change Spares

None.

E. Special Tooling - Price and Availability

None.

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F. Special Tooling Necessary to do this Service Bulletin

No special tools or equipment are necessary to do the change in this service bulletin. But, maintenance and overhaul tools in the manuals given in Paragraph 1.J., References, can be necessary. Examine operator tool supply to make sure all necessary tools are available.

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3. ACCOMPLISHMENT INSTRUCTIONS

A. GENERAL INFORMATION

CAUTION: KEEP THE WORK AREA, WIRES AND ELECTRICAL BUNDLES CLEAN OF METAL PARTICLES OR CONTAMINATION WHEN YOU USE TOOLS. UNWANTED MATERIAL, METAL PARTICLES OR CONTAMINATION CAUGHT IN WIRE BUNDLES CAN CAUSE DAMAGE TO THE BUNDLES. DAMAGED WIRE BUNDLES CAN CAUSE SPARKS OR OTHER ELECTRICAL DAMAGE.

NOTE:

1. The instructions identified in Paragraph 3.B., Work Instructions and the Figure(s) give the recommended sequence of steps. The sequence of steps to do this service bulletin can be changed.

2. Manual titles are referred to by acronyms. Refer to Paragraph 1.J., References, for definition of the acronyms.

3. Obey all of the warnings and cautions given in the specified manual sections.

4. A General Visual Inspection is defined as: A visual examination of an interior or exterior area, installation or assembly to detect obvious damage, failure or irregularity. This level of inspection is made from within touching distance unless otherwise specified. A mirror may be necessary to ensure visual access to all surfaces in the inspection area. This level of inspection is made under normal available lighting conditions such as daylight, hangar lighting, flashlight or drop-light and may require removal or opening of access panels or doors. Stands, ladders or platforms may be required to gain proximity to the area being checked.

5. These work instructions refer to procedures included in other Boeing documents. When the words "refer to" are used and the operator has an accepted alternative procedure, the accepted alternative procedure can be used. When the words "as given in" are included in the instruction, the procedure in the Boeing document must be used.

B. WORK INSTRUCTIONS

PART 1: ANGLE OF AIRFLOW (AOA) SENSOR INSPECTION

1. Do a General Visual Inspection of the right AOA sensor as given in FIGURE 1.

   a. If Conrac/Ametek/Gulton AOA sensor with a paddle type vane is installed, do PART 2: TEST THE STALL WARNING SYSTEM.

   b. If BF Goodrich/Rosemount AOA sensor with a swept vane is installed, no more work is necessary.

2. If a Dual Stall Warning System is installed, do a General Visual Inspection of the left AOA sensor.

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a. If Conrac/Ametek/Gulton AOA sensor with a paddle type vane is installed, do PART 2: TEST STALL WARNING SYSTEM.

b. If BF Goodrich/Rosemount AOA sensor with a swept vane is installed, no more work is necessary.

PART 2: TEST THE STALL WARNING SYSTEM

1. Supply electrical power to the airplane. Refer to 727 AMM 24-22-00 as an accepted procedure.

2. Make sure the applicable stall warning circuit breakers on the P6 and P18 circuit breaker panels are closed. Refer to 727 AMM 34-18-01 as an accepted procedure.

3. On the P2 circuit breaker panel, make sure that the LIGHT switch is in the DIM position.

4. Move the Stall Warning selector switch to the HTR OFF position.

5. At the P5 Aft Overhead panel, make sure that the OFF light on the Stall Warning Module is on.

6. Move the trailing edge flaps to the up (0 detent) position. Refer to 727 AMM 27-51-00 as an accepted procedure.

WARNING: SENSOR VANE COULD CAUSE BURNS. ALLOW SUFFICIENT TIME TO COOL BEFORE HANDLING.

CAUTION: DO NOT SPIN VANE. DAMAGE TO SYNCHROS MAY OCCUR.

7. Make sure the AOA sensor(s) is at the horizontal position.

8. Move the trailing edge of the AOA sensor up from the horizonal position to approximately 17 degrees with reference to the airplane waterline (13 degrees position on the AOA sensor scale).

9. On the flight deck, make sure the control column shaker is activated within a tolerance of +/-1 degree.

   a. If the control column shaker is activated no more work is necessary. Put the airplane back to a serviceable condition.

   b. If the control column shaker is not activated, do PART 3: Operational Test of the Stall Warning System.

10. If a Dual Stall Warning System is installed, do steps 8. and 9. again for the left AOA sensor.

PART 3: OPERATIONAL TEST OF THE STALL WARNING SYSTEM

1. Do an Operational Test of the Stall Warning System. Refer to 727 AMM 34-18-01 as an accepted procedure.

2. If the AOA sensor fails to activate the control column shaker in this operational test, replace the AOA sensor. Refer to 727 AMM 34-18-51 as an accepted procedure.

3. Put the airplane back to a serviceable condition.

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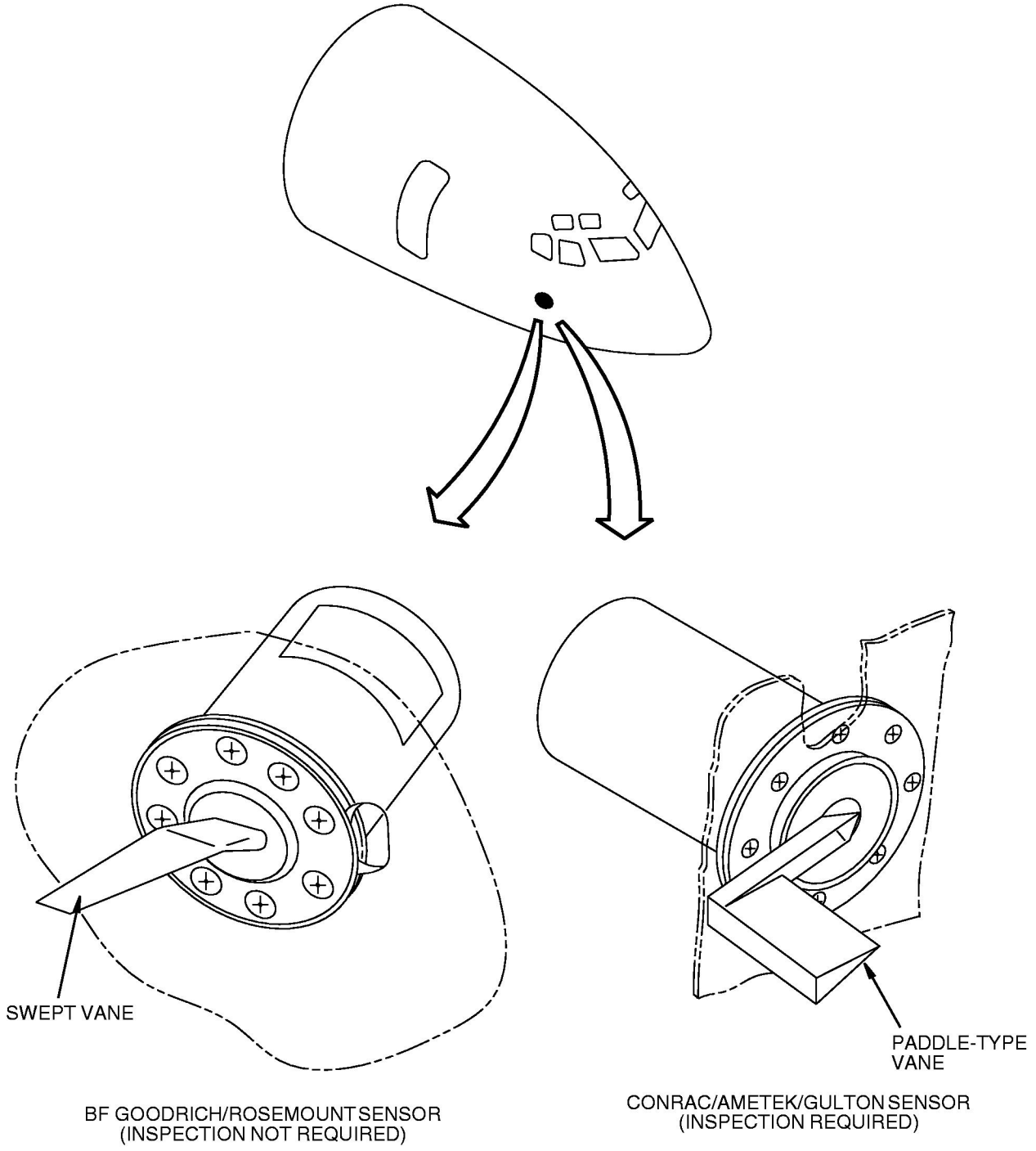

FIGURE 1: ANGLE OF AIRFLOW SENSOR - INSPECTION
(SHEET 1 OF 1)

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