400B NAV-O-MATIC AUTOPILOT SYSTEM (TYPE AF-550A)

SECTION 1 — GENERAL

This supplement provides information which must be observed when operating the 400B Nav-O-Matic autopilot system.

Description

The 400B Nav-O-Matic autopilot system is a two-axis autopilot system that controls the ailerons and elevators to maintain the airplane in a desired attitude. A horizon gyro and directional gyro are provided to display attitude and heading. An optional HSI, see Figure 3, can be installed in place of the directional gyro.

All controls and indicators necessary to properly operate the autopilot are shown in Figures 1 and 2, except for the autopilot disconnect test button, the autopilot off light, the back course selector switch and the navigation receiver selector switch.

An automatic autopilot disengage function is provided which automatically disengages the autopilot anytime the airplane pitches up or down more than a normal amount from a level flight attitude. The operational capability of the disengage function should be tested before takeoff by pressing the autopilot disconnect test button, located adjacent to the autopilot control head. When the test button is pressed with the autopilot engaged, a test voltage is inserted into the autopilot, causing slight aft control column movement and autopilot disengagement. Do not press this button in flight. Inflight actuation of the test button with the autopilot engaged will cause the airplane to pitch up sharply and disengage the autopilot.

The autopilot off (A/P OFF) light, located adjacent to the horizon gyro, will illuminate when the autopilot is disengaged by any means other than the airplane control wheel AP/TRIM DISC switch. Whenever the autopilot is disengaged by any means, the autopilot disengage horn will produce a short tone lasting 1 to 2 seconds with decreasing amplitude. The A/P OFF light will remain on until it is cancelled by pressing the airplane control wheel autopilot disengage switch.

The back course selector switch, located on the left instrument panel, is only used when conducting localizer approaches. With the navigation receiver set to a localizer frequency, positioning the switch to BACK COURSE will reverse the appropriate signals to provide for back course operation for either autopilot or manual flight. Except with an HSI type indicator, selecting BACK COURSE causes reversal of the course deviation indicator indication, whether or not the autopilot is being used.

The navigation receiver selector switch, located on the left instrument panel when dual navigation receivers are installed, allows the autopilot to operate in conjunction with either navigation receiver. If a 300 Nav/Com radio is installed, no course datum information is available. If either a 400 Nav/Com or 1000 Nav radio is installed, course datum information is available unless a non-slaved directional gyro is installed.

DEICE BOOT SYSTEM

SECTION 1 — GENERAL

This supplement provides information which must be observed when operating the deice boot system.

Description

This system is designed to remove ice after accumulation, rather than prevent ice formation.

The deice boot system consists of pneumatically operated boots, engine-driven pneumatic pumps, an annunciator light to monitor system operation and necessary hardware to complete the system.

The deice boots are attached to the leading edges of the wing and stabilizers. The boots expand and contract, using pressure and vacuum from the engine-driven vacuum pumps. Normally, vacuum is applied to all boots to hold them against the leading edge surfaces. When a deicing cycle is initiated, the vacuum is removed from the boots and a pressure is applied to "blow up" the boots. This change in contour will break the ice accumulation on the leading edges. Ice formations aft of this area will then be removed by normal in-flight air forces.

The deice system will operate satisfactorily on either or both engines. During single-engine operation, suction to the gyros will drop momentarily during the boot inflation cycle.

The deicing system is manually controlled by positioning the surface deice switch each time a deice cycle is desired. The switch will instantly spring back to OFF; however, a 12-second delay action by the sequencing system will complete the deicing inflation cycle.

The sequencing system inflates the tail section boots for approximately 6 seconds, then the wing boots for the next 6 seconds. The annunciator light, see Figure 7-1, should illuminate when the tail section boots reach proper operating pressure. No cyclic illumination after selecting a deice cycle indicates insufficient pressure for proper system operation and icing conditions should be avoided. The system may be recycled 6 seconds after the light goes out or any time thereafter as required.

SECTION 2 — LIMITATIONS

Not Applicable.

SECTION 3 — EMERGENCY PROCEDURES

Not Applicable.

SECTION 4 — NORMAL PROCEDURES

A. Preflight Inspection
   1. Deice Boots - CHECK for tears, abrasions and cleanliness.

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B. Before Takeoff
1. Surface Deice Switch - ACTUATE. Visually check operation of boots and annunciator light ON.

NOTE

Actuating the surface deice switch will result in one complete inflation and deflation cycle lasting approximately 45 seconds.

C. Inflight
1. During Icing Encounters.
a. Surface Deice Switch - ACTUATE when ice accumulates between 1/ to 1/2 inch. Repeat as necessary, allowing at least 45 seconds between actuations.

NOTE

- Accumulation of a 1/2 inch of ice may cause a cruise speed reduction of up to 30 knots as well as a significant buffet and stall speed increase. Increase power as required to maintain desired airspeed.
- Prestall buffet and stall speeds increase slightly when deice boots are actuated. Maintain extra speed, especially during an approach, before actuating the boots.
- After prolonged icing encounters, increase engine power to maintain desired airspeed as ice accumulates on the unprotected areas.
- Maintain extra airspeed on approach to compensate for the increased prestall buffet associated with ice on the unprotected areas.

2. Leave icing conditions as soon as possible if airplane is not equipped for flight in icing conditions.

NOTE

Since wing and stabilizer deice boots alone do not provide adequate protection for the entire airplane, icing conditions should be avoided whenever possible unless the airplane is equipped for flight in icing conditions. Refer to Ice Protection Equipment (Flight In Icing Conditions) supplement for details. If icing is encountered, close attention should be given to the pitot-static system, propellers, induction systems and other components subject to icing.

SECTION 5 — PERFORMANCE

A. Prestall buffet and stall speeds increase slightly when deice boots ar actuated. Maintain extra speed, especially during an approach, before actuating the boots.
B. After prolonged icing encounters, increase engine power to maintain desired airspeed as ice accumulates on the unprotected areas.
C. Maintain extra airspeed on approach to compensate for the increased prestall buffet associated with ice on the unprotected areas.
D. Airplane general performance is decreased with ice on the unprotected areas.