

# Nomad

## SERVICE BULLETIN

### ICE PROTECTION SYSTEMS – REMOVAL OF WING, TAILPLANE AND FIN BOOTS AND RELATED SYSTEMS

#### 1. PLANING INFORMATION

##### A. Effectivity

- (1) Aircraft affected:  
N22C-93, TNI-AL Registration P-820 only
- (2) Spares  
Not applicable

##### B. Reason

To remove all external items of Customer Options G18 and G22, and some internal components, and return the wing and tail configuration to normal N22C standard. This also includes fitting dual Stall Warning Detectors in lieu of the single unit (CO G400).

##### C. Description

- (1) This aircraft is presently fitted with Customer Option G18 (Airframe De-Icing) and G22 (Propeller de-icing). As the G18 operating system is currently disabled, it is considered safer to remove the de-icing boots and some of the internal components and make it electrically safe.
- (2) A procedure is provided for initial fitment of metal Stall Breaker Strips to the wings.
- (3) Procedures are also provided for pre-flight test, flight test of the Stall Warning System and flight tests for determining the final position of the Stall Breaker Strips.

##### D. Compliance

The provisions of this Service Bulletin shall be complied with prior to next flight.

##### E. Approval

The requirement detailed herein has been approved by a person authorised under Civil Aviation Regulation 35 and conforms to the type certification requirements.

##### F. Manpower

As required.

##### G. Material – Price and availability

None

##### H. Tooling

None

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### I. **Weight and Balance Change**

- (1) See Para 2.A.(2)(d).
- (2) See Para 2.I.(1).

### J. **References**

1. Nomad N22 Series Maintenance Manual (MM)
2. Nomad N22 Series Illustrated Parts Catalogue (IPC)
3. Nomad N22 Series Customer Option G18 Data (Sep 21/79)
4. Nomad N22 Series Customer Option G22 Data (Feb 28/75)
5. Nomad N22 Series Customer Option G401 Data (Sep 27/79)
6. Nomad N22 Series Customer Option G400 Data (Oct 5/79)
7. Nomad N22 & N24 Structural Repair Manual (SRM)
8. Nomad N22 Series Wiring Diagram Manual (WDM)
9. Service Bulletin NMD-27-50
10. N22C Flight Manual, Publication No 12.28C-1)

### K. **Publications Affected**

None

## 2. **ACCOMPLISHMENT INSTRUCTIONS**



BEFORE PERFORMING ANY WORK ON THE AIRCRAFT, ENSURE THAT THE BATTERY SWITCH ON THE OVERHEAD CONSOLE IS SET TO OFF AND THAT THE INTERNAL AIRCRAFT BATTERY AND EXTERNAL POWER IS DISCONNECTED.

### A. **Tailplane**

- (1) It is recommended that the Tailplane be replaced with a standard non de-iced Tailplane.
- (2) Alternatively:
  - (a) Remove De-icer Boots as per Ref 3. MM data Para 1.A. Touch up with Alodine, Prime and Paint as required as per Ref 7. Ch 51-30-00.
  - (b) Remove pipes, brackets etc within or on the tailplane.
  - (c) Repair holes for bleed air connections from the de-icer boots in Tailplane as per Ref 7. SRM Ch 55-10-11, Figure 4.
  - (d) Following the removal of de-icing boots and other components from the horizontal stabiliser and carrying out any repairs required and after painting, a Static Balance Check shall be carried out as per Ref 7. SRM, Ch 55-10-00, Para 3 and Table 1 for Option R18B.

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### **B. Dorsal Fin**

- (1) With reference to Ref 3. IPC Data Fig 5, remove Tube and Hose Assembly, items 6, 7, 8 and 9 and cap T-fitting, item 1A using Cap AN929-6.

### **C. Fin**

- (1) Remove De-icer Boots as per Ref 3. MM data Para 1.A.
- (2) Touch up with Alodine, prime and paint as required as per Ref 7. SRM, Ch 51-30-00.
- (3) Repair holes for bleed air connections from the de-icer boots in Fin as per Ref 7. SRM, Ch 55-30-11, Figure 3.
- (4) Within the Fin with reference to Ref 3. IPC Data Fig 5, remove Tube and Hose Assembly, items 40, 41 and 42 and cap Bulkhead Fitting item 39 using Cap AN929-6.

### **D. Wings**

- (1) Remove De-icer Boots as per Ref 3. MM data Para 1.A.
- (2) Touch up with Alodine, prime and paint as required as per Ref 7. SRM Ch 51-30-00.
- (3) Repair holes for bleed air connections from the de-icer boots in Wing Leading Edge as per Ref 7. SRM, Ch 57-30-00 Figure 3.
- (4) If required, trim each of the rubber Hose Connectors (to de-icing Boots) to approximately 2.00 in length; use Plug (Ref Item 1 of Fig 1 of this Service Bulletin) using existing Hose Clamps (AN737TW26).
- (5) At the inner boot installation (approx wsta 24, LH and RH side) disable the bleed air supply to the de-icing system by plugging Adaptor AN840-11D, see Ref 3. IPC Data Fig 2 Sheet 1, Item 7 using Plug (Ref Item 2 of Fig 1 of this Service Bulletin), wet installed to upper end of Adaptor using PR1422, PR1440 or similar. Reinstall and assemble to Wig-O-Flex Fitting per Ref 1. MM, Ch 21-20-00, Page 201, Para F.

### **E. Re-Installation/Adjustment of Stall Breaker Strips.**

- (1) Figures 3 and 4 are provided for reference. It is suggested that prior to the removal of the De-Icing boots from the wing leading edge, measurements are taken of the position of the existing rubber Stall Breaker Strips.
- (2) For reference the inboard edge of the Stall Breaker Strip is at wsta 99.0 in (Ref Fig 3) and the position of the apex of the Strip on the leading edge of the wing is 10.4 in forward of the leading edge skin line (Ref Fig 3).
- (3) If on removal of Boots it is found that two rows of filled rivet holes exist (on each wing leading edge) such that metal Stall Breaker Strips may have originally been fitted, a new Stall Breaker Strip (Part Number 1M/N-20-609/10 as appropriate) should be offered up to each wing leading edge in a position to correspond to the pre-existing rivet holes and attached with double-sided adhesive tape.  
If no pre-existing holes are present, then a new Stall Breaker Strip (Part Number 1M/N-20-609/10, as appropriate) should be offered up to each wing leading edge in a position as near as possible to the measurements taken in Para (1) above, and attached with double-sided adhesive tape. The object being to position the apex of the new metal Stall Breaker Strip as near as possible to the position of the apex of the original rubber Stall Breaker Strip.
- (4) The procedure for conducting flight tests to determine the correct final position of the Stall Breaker Strip is detailed in Para 3.A.(2).

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- (5) On satisfactory completion of the above tests the Stall Breaker Strip should be finally fastened to the wing leading edge skin as follows (Ref Fig 4):
  - (a) Locate Stall Breaker Strip in final position.
  - (b) At wing rib positions (wstas 104.62 and 114.15) drill out existing rivets and back-drill (#30) into Stall Breaker Strip.
  - (c) If original holes exist, back drill (#30) Stall Breaker Strip from rest of holes in wing leading edge; else drill new holes as shown in Figure 4.
  - (d) Deburr all holes. Wet assemble and rivet in position.
  - (e) Touch-up prime and paint as required.

### F. **Electrical Rework - De-activation of Airframe De-Icing System**

- (1) Cabin
  - (a) Remove Airframe De-Ice Timer (Ref Fig 2).
  - (b) Cap and stow connector onto adjacent wiring in accordance with accepted aircraft practice.
- (2) Cockpit - Overhead Console
  - (a) Remove Airframe De-Ice Circuit Breaker (see Ref 5. IPC Data, Figure 1, item 10), and plug redundant hole with Plug Button type item 27 of Ref 5.
  - (b) Cap and stow wire H140A22 on adjacent wiring in accordance with accepted aircraft practice.
- (3) Cockpit - Icing Panel (See Ref 5., CO G401)
  - (a) Remove "Airframe De-ice" switch item 26 Page 2 of Ref 5. (and link wire H140G22), and plug redundant hole with Plug Button type item 27 of Ref 5..
  - (b) Cap and stow four wires H140A22, H141A22, H143A22, and H144A22 in accordance with accepted aircraft practice.
  - (c) Remove five Airframe De-ice indicating lights (1 off Tail, 2 off Inboard and 2 off Outboard + Root) item 29 on Figure 1 of Ref 5., the diode network items 38 and 5 off item 41 on Figure 1 of Ref 5., and the "Test Switch" item 37 on Figure 1 of Ref 5..
  - (d) Remove all interconnecting wires between these items consisting of:
    - 5 wires H140B22 through H140F22.
    - 5 wires H145B22, H147B22, H149B22, H151B22 and H153B22 routed to the diode network
    - 4 wires H155A22 through H155D22 and the Test Switch earth wire H156A22N.

### **NOTE**

Wire H156B22N on Icing Panel earth connection shall remain connected to earth stud.

- (e) Re-install diode network fasteners items 39, 40 and 40A on Page 2 of Ref 5. to fill redundant holes.
  - (f) Cap and stow five wires H145A22, H147A22, H149A22, H151A22 and H153A22 in accordance with accepted aircraft practice.
  - (g) Plug the redundant indicator holes (5) with Plug Button type item 27 of Ref 5..
  - (h) Fill the redundant "Test Switch" hole in accordance with good aircraft practice and touch up with black paint to match panel.
- (4) De-activation of CO G22 Propeller De-Ice, Ref 4..
    - (a) Right Hand Engine

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- 1 Disconnect connector (item 3 of Ref 4. IPC data, Fig 1, Sheet 1) to Propeller Brush Block assembly.
  - 2 Cap and stow connector onto adjacent wiring in accordance with accepted aircraft practice.
- (b) Left Hand Engine
- 1 Disconnect connector (item 3 of Ref 4. IPC data, Fig 1, Sheet 1) to Propeller Brush Block assembly.
  - 2 Cap and stow connector onto adjacent wiring in accordance with accepted aircraft practice.
- (c) Cabin
- 1 Remove Propeller De-ice timer (item 36 of Ref 4. IPC data, Fig 1, Sheet 2).
  - 2 Cap and stow connector onto adjacent wiring in accordance with accepted aircraft practice.
- (d) Cockpit - Overhead Console
- 1 Remove Propeller De-ice Circuit Breaker (item 11 on Page 2 of Ref 5.) and Bridging Link (item 12 on Page 2 of Ref 5.), and plug redundant hole with Plug Button type (item 27 of Ref 5.).
  - 2 Cap and stow wire H146A14 in accordance with accepted aircraft practice.
- (e) Cockpit - Icing Panel (See Ref 5., CO G401)
- 1 Remove "Prop De-ice" switch, (item 25 on Page 2 of Ref 5. IPC data), and plug redundant hole with Plug Button type (item 27 of Ref 5.).
  - 2 Cap and stow wires H146A14 and H148A14 in accordance with accepted aircraft practice.
  - 3 Remove Ammeter, (item 22 on Page 2 of Ref 5. IPC data), and plug redundant hole with Plug Button Carr Fasteners 50726 type, (see Ref 2. IPC, Ch 39-10-03, item 45 of Fig 1).
  - 4 Cap and stow wires H148B22 and H150B22 in accordance with accepted aircraft practice.

### G. Rework to Stall Warning System

**WARNING**

DO NOT OPERATE THE FLIGHT CONTROLS WHEN THE COMPONENTS ARE DISCONNECTED OR WHEN PERSONNEL ARE WORKING IN THE AREA CONCERNED. SERIOUS INJURY TO PERSONNEL AND OR DAMAGE TO COMPONENTS AND STRUCTURE COULD OCCUR.

#### (1) Left Hand Wing Leading Edge

It is believed aircraft N22C-93 (P-820) incorporates a SafeFlight lift detector type 165-5 in lieu of the 1/N-81-723 detector normally installed in an aircraft incorporating Customer Option G400.

- (a) Position the existing Stall Detector switch at the inboard switch position.
- (b) Install a second Stall Detector switch in the outboard position.

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- (c) Install electrical wires W13A20N (part of Stall Detector) and W14A22N (type M22759/34-22-9), **but do not connect to the earth lug at this time.**
  - (d) Connect wires W10D20 and W17C22 (type M22759/34-22-9), associated with the second Stall Detector switch, per Ref 8. WDM Ch 27-50-00, between the leading edge wing break connector and first Stall Detector switch.
- (2) Left Hand Wing trailing Edge
- It is believed aircraft N22C-93 (P-820) incorporates Flap Micro Switch Mod N835, per Service Bulletin NMD-27-50, and that some of the wires servicing the S4 Flap switch are capped and stowed in the wing trailing edge.
- (a) Gain access to the S4 Flap Micro Switch wires (switch "D" on Service Bulletin NMD-27-50) stowed with the Flap Micro Switch assembly.
  - (b) Install and ident wires not stowed in the trailing edge (using wire type M22759/34-22-9), in accordance with accepted aircraft practice.
  - (c) Connect the wires W17A22, W18A22 and W16B22 between Aft Wing Break connector and the Flap Switch, refer schematic Ref 8. Ch 27-50-00 Sheet 2 page 5/6, and Service Bulletin NMD-27-50, using solder sleeves NAS1746-2 at the Flap Micro Switch "D" wire interface, specified in Service Bulletin NMD-27-50.
- (3) Cockpit - Overhead console
- (a) Remove the Stall Warning Heat switch and the Stall Warning Heat circuit breaker (see Ref 6. G400 MM data, Fig 1, Page 2, details C and B).
  - (b) Plug the redundant holes with Plug type (item 43 of Ref 2. IPC Ch 39-10-03, Page 29).
  - (c) Either, remove wire W86A20 entirely, or cap and stow both ends of wire onto adjacent wiring in accordance with accepted aircraft practice.
  - (d) Re-route existing wire W10A20 from the removed Stall Warning Heat switch and prepare for termination to terminal 2 of the existing Pitot Heat switch (see Ref 1. MM Ch 39-10-00, Fig 5 Sheet 4), with existing wire F2A20, **(Do not connect wire W10A20 to Terminal 2 of Pitot Heat switch at this time. Temporally insulate from other connections and the airframe earth),** as per Ref 8. WDM Ch 27-50-00 Sheet 2, Page 5/6.
  - (e) Secure the wire to adjacent wiring in accordance with accepted aircraft practice.
- (4) Fuselage
- (a) At the Front Wing Break connector for the LH Wing, remove wire W87A22 from contact "T" and remove the wire from the aircraft, back to its destination on the Aural Warning Unit terminal "STALL-" (Refer Ref 6. WDM Data Fig 1, Page 1/2).
  - (b) Identify a new length of 22AWG wire (type M22759/34-22-9) as W16A22. Terminate one end to suit the Aural Warning Unit "STALL-" terminal **(Do not connect to Warning Unit at this time. Temporally insulate this end from other connections and the airframe earth)**, and route wire to the Rear Wing Break connector for the LH Wing and attach to contact "9". Refer Ref 8. Ch 27-50-00 Sheet 2 page 5/6. Secure the wire to adjacent wiring in accordance with accepted aircraft practice.
  - (c) Identify two new lengths of 22AWG wire (type M22759/34-22-9) as W17B22 and W18B22.
  - (d) Route the two new wires between the LH wing Front and Rear Wing Break connectors.
  - (e) Secure the wires onto adjacent wiring in accordance with accepted aircraft practice.
  - (f) At the Front Wing Break connector, attach W17B22 to contact "U" and W18B22 to contact "T".

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- (g) At the Rear Wing Break connector, attach W17B22 to contact "10" and W18B22 to contact "11". Refer Ref 8. Ch 27-50-00 Sheet 2 page 5/6.

### H. PRE-FLIGHT TESTS

- (1) Continuity and Insulation tests
  - (a) In the Wing Leading edge at the Stall Warning Vanes, disconnect wires W11A20N and W12A22N from the Earth termination and temporarily connect them to the new wires W13A20N and W14A22N.
  - (b) Tape both Stall Warning Vanes in the activated position.
  - (c) Confirm wires W10A20 and W16A22 previously insulated earlier, are isolated from earth and other connections.
  - (d) Perform a Megger check (at 250Vdc applied for 5 seconds) between the common junction of wires W13A20N, W14A22N, W11A20N and W12A22N, and the airframe earth. The recorded insulation resistance should exceed 5 Megohms.
  - (e) Remove tape from the Stall Warning Vanes.
  - (f) Connect wires W13A20N, W14A22N, W11A20N and W12A22N to the earth stud per Ref 8. Ch 27-50-00 Sheet 2 page 5/6.
  - (g) Perform continuity tests of the Stall Warning Heat and Aural Alarm system as per Ref 8. WDM, Ch 27-50-00, Sheet 2, Page 5/6.
  - (h) Connect wires W10A20 and W16A22 to their respective destinations as per Ref 8. Ch 27-50-00, Sheet 2, Page 5/6.
- (2) Functional tests
  - (a) Connect the aircraft battery in the LH pod.
  - (b) Set the BATTERY switch on the Overhead Console to ON.
  - (c) Remove Pitot Head covers.

**WARNING**

DO NOT LEAVE THE PITOT HEAT SWITCH SET TO ON FOR AN EXTENDED TIME AS THE PITOT HEAD WILL BECOME EXTREMELY HOT, WHICH MAY RESULT IN SEVERE BURNS IF INADVERTENT CONTACT IS MADE WITH IT, AND MAY ALSO RESULT IN DAMAGE TO THE HEAD AND ELEMENT.

- (d) Turn the PITOT HEAT switch on the Overhead Console to ON. The Pitot Head shall become hot and both stall detector vanes shall become warm after a short time.
- (e) Switch OFF the Pitot Heat switch.
- (f) When the Pitot Heads have cooled, replace covers.
- (g) Ensure the Flaps are fully UP, then set the BATTERY switch on the Overhead Console to OFF.
- (h) With the Flaps positioned UP, push the vane of the outboard stall detector UP. Verify the Aural Horn in the cockpit emits a continuous 2000Hz tone whilst the vane is held UP.
- (i) Set the BATTERY switch on the Overhead Console to ON and position the Flaps fully DOWN. Set the BATTERY switch to OFF.

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- (j) With the Flaps positioned DOWN, push the vane of the inboard stall detector UP. Verify the Aural Horn in the cockpit emits a continuous 2000Hz tone whilst the vane is held UP.
- (k) With the BATTERY switch on the Overhead Console set to ON, activate the flaps over their full operating range and verify that the outboard vane, when pushed UP, causes the Aural Alarm to sound whilst the flaps are within the range Fully UP to 15 degrees down, and the inboard vane causes the alarm to sound over the flap range 23 degrees Down, to fully Down.
- (l) Set the BATTERY switch on the Overhead Console to OFF and disconnect the aircraft battery, if required.

### I. Aircraft Weighing

- (1) On completion of all work the aircraft shall be subjected to a full weight and balance procedure (Ref Maintenance Manual Ch 8-10-00).

### 3. FLIGHT TESTS AND LIMITATIONS

#### A. Flight Tests

The aircraft shall be operated in accordance with N22C-93 (P820) Flight Manual (Ref 10.) and FAA Advisory Circular 23.8. If further detail is sought regarding any of the following contact ASTA.



AS THE FOLLOWING FLIGHT TESTS REQUIRE OPERATION OF THE FLAPS TO 38° THE OPERATOR WILL REQUIRE TO OBTAIN A DISPENSATION FROM THE TNI-AL AIRWORTHINESS AUTHORITY, FROM THE LIMITATIONS OF ALERT SERVICE BULLETIN ANMD-57-18.

- (1) For the adjustment of Stall Warning Vanes refer to Ref 1., MM Ch 31-52-00.
- (2) The procedure for determining final placement of the Stall Breaker Strips is as follows:
  - (a) Carry out checks of the Stall Warning System (Ref 1. MM Ch 31-52-00, Para 2.B.).
  - (b) Carry out an engine run (Ref 1., MM Ch 71-00-00) checking for and if necessary adjusting the Flight Idle propeller blade angles (Ref 1., MM Ch 61-20-00).

#### NOTE

It is essential for the following flight tests that the left and right engines/propellers, at Flight Idle, are symmetrical within the prescribed tolerances.

- (c) From the Flight Manual (Ref 10.), Section 3, Figure 3.1, determine the scheduled stalling speeds for the expected weight of the aircraft in flight. Stall warning can be expected at between 5 and 10 KIAS above the stall speed for each flap setting.
- (d) At an altitude not less than 5000 ft AGL in clear undisturbed air, carry out stalls in each flap configuration with Flight Idle power with 100% N<sub>2</sub> set.
  - 1 Trim the aircraft in each condition at 1.5 V<sub>S</sub> (150% of scheduled stall speed), then reduce speed at no greater than 1 Knot/sec.
  - 2 Expect the stall warning horn to sound at between 5 and 10 KIAS above the scheduled stall speed.



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3 At the stall there should be a gentle nose down pitch possibly accompanied by random but controllable lateral activity (refer to Ref 10. FM Section 3, Para 3.19).

4 A more severe or apparently uncontrollable wing drop at or well before the stall is indicative of the breaker strip on that side requiring to be adjusted.

(e) Adjustment

With the Stall Breaker Strips temporarily fitted using double sided tape as per Para 2.E.(3), adjust the positions of the Strip/s as follows:

1 If a wing drop occurred before the scheduled stalling speed:

(i) then the Stall Breaker Strip on that wing should be moved DOWN the leading edge of that wing by 0.25 in (6.50 mm) and the test repeated.

2 If a wing drop occurs at the scheduled stalling speed:

(i) then the Stall Breaker Strip on the opposite wing should be moved UP the leading edge of that wing by 0.25 in (6.50 mm) and the test repeated.

3 Small lateral perturbations, controllable with aileron and/or rudder may be accepted as being within the tolerance of stall handling characteristics.

When the above has been satisfactorily accomplished, the Stall Warning Vanes may need to be further adjusted (Ref Para 3.A.(1)).

#### 4. MATERIAL INFORMATION

##### A. Parts Required per Aircraft

Not Applicable.

#### 5. SPECIAL TOOLS AND EQUIPMENT

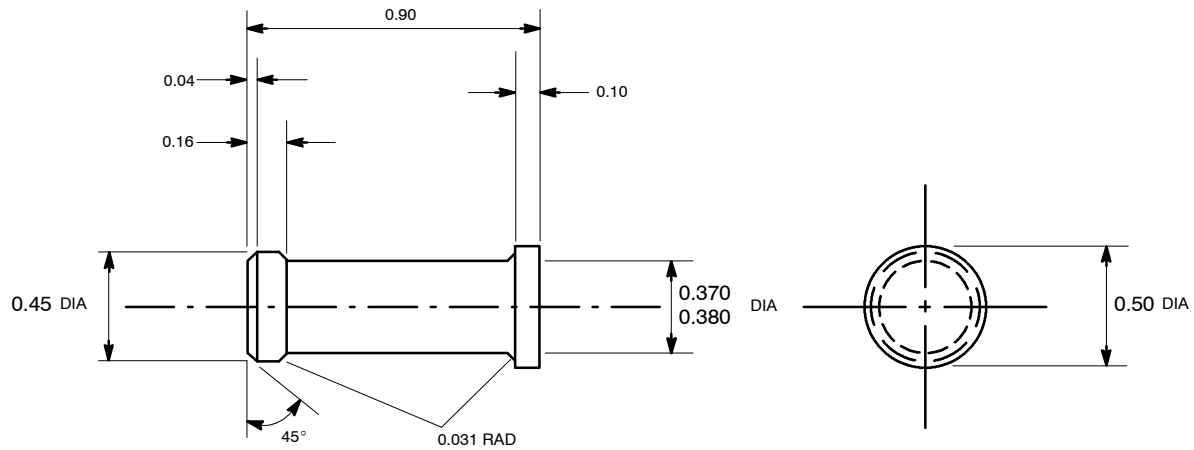
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#### 6. RECORDING ACTION

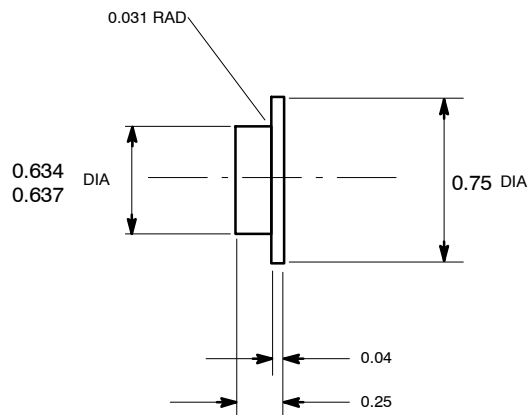
Record compliance with Service Bulletin NMD-30-3 in the Airframe Log Book.

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ALL DIMENSIONS IN INCHES



ITEM 1



ITEM 2

MATERIAL: AL. ALLOY BAR

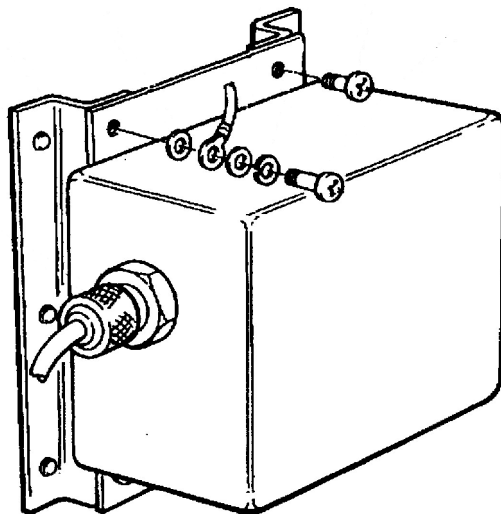
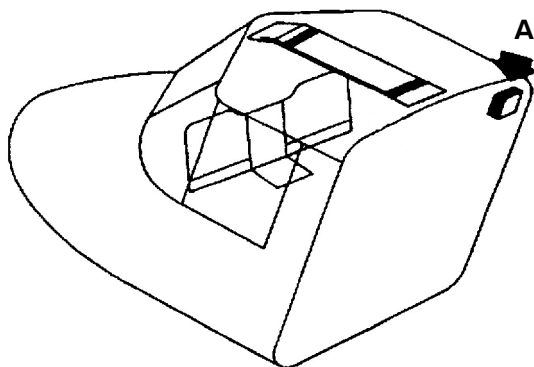
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QQ-A-225/4-T651  
QQ-A-225/6-TT851

ANODISE OR ALODINE AFTER MACHINING

**Figure 1 Blanking Plugs**

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DETAIL A

Figure 2 De-Ice Timer Unit

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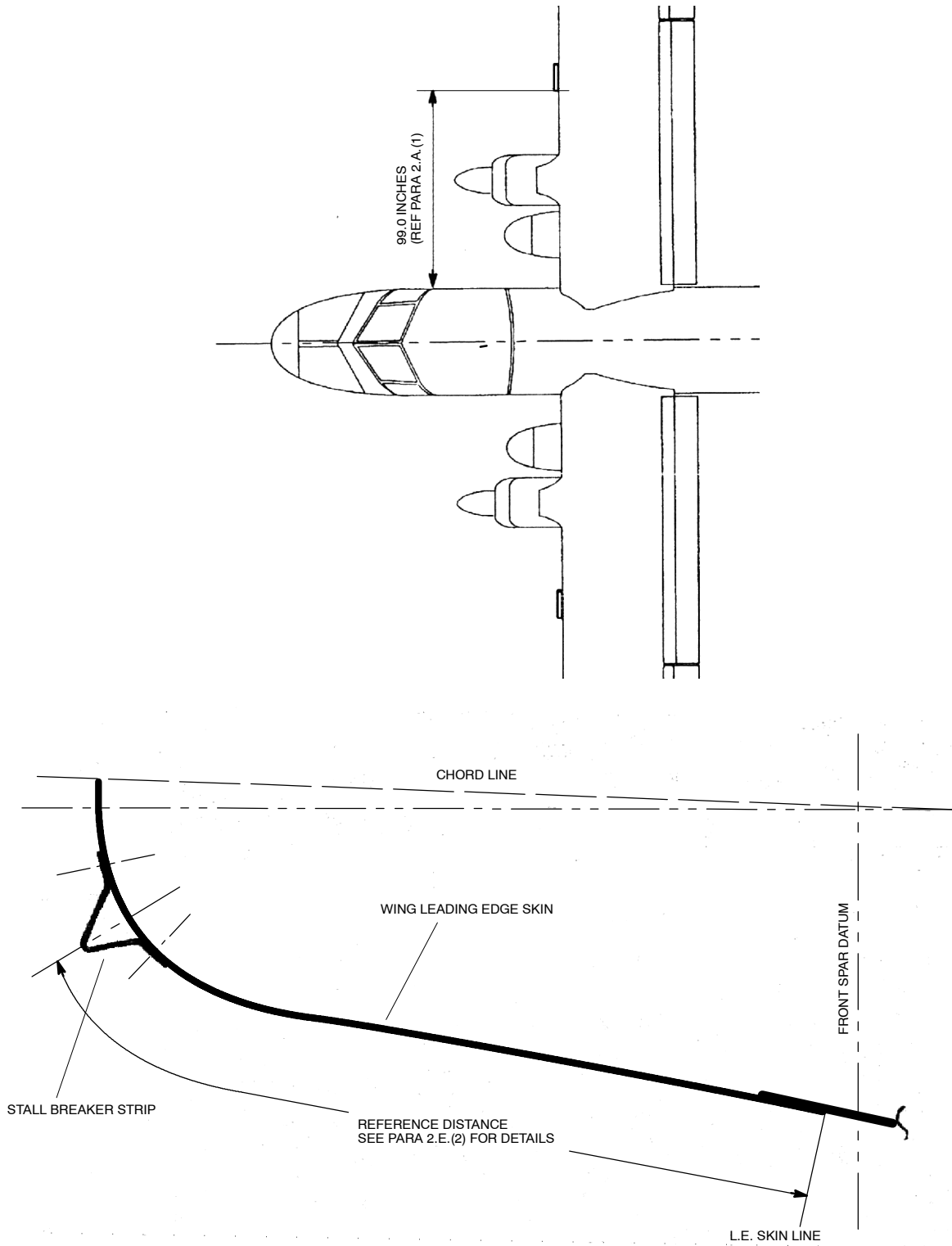


Figure 3 View Showing Stall Breaker Strip Location

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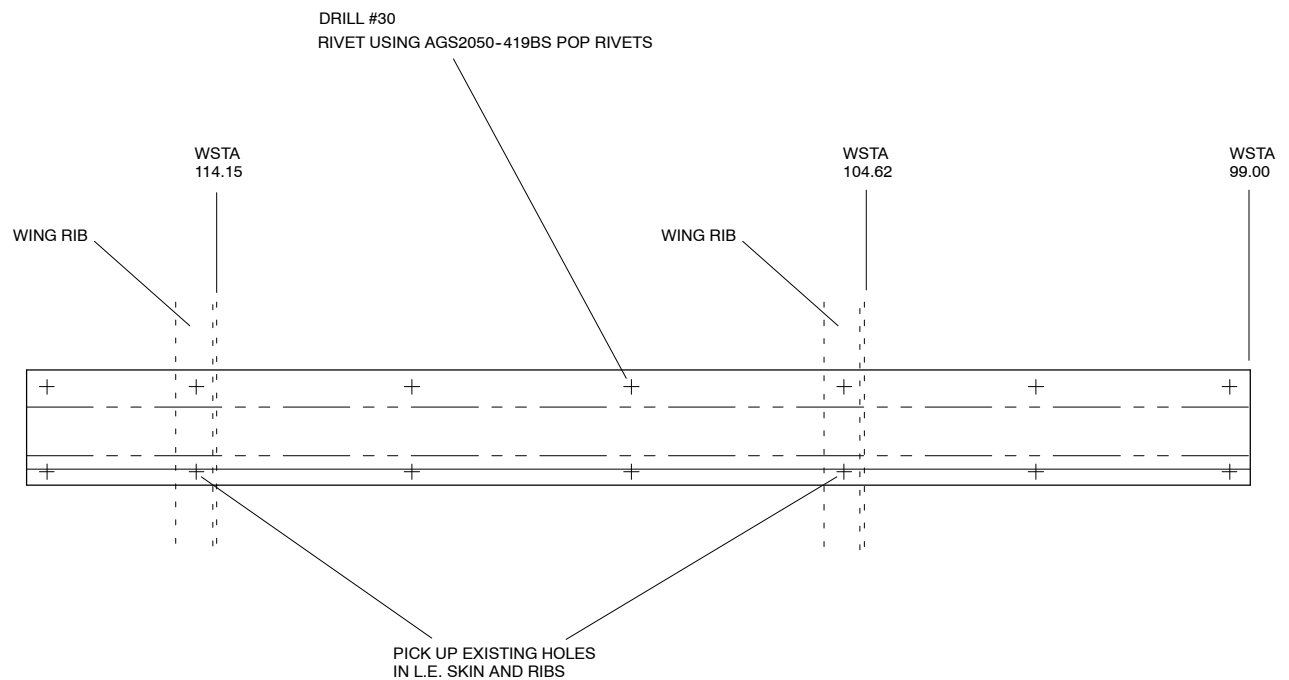


Figure 4 Detail of Stall Breaker Strip Attachment (RH Wing Shown, LH Similar)

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