P/N 60-590001-17
Revised: October, 1996

INSTRUCTION SHEET

Raytheon Aircraft

DUKE® 60, A60, AND B60 LANDPLANES
FAA Approved Airplane Flight Manual Supplement
for

FLIGHT IN KNOWN ICING CONDITIONS

This Supplement is applicable to the following Manual(s)

P/N 60-590000-5
P/N 60-590000-11

INSTRUCTIONS

1. Turn to the *SUPPLEMENTS* Section of the manual.
2. An Airplane Flight Manual Log of Revisions page (entitled Pilot's Operating Handbook and FAA Approved Airplane Flight Manual Log of Supplements in GAMA-format manuals) for each manual affected accompanies this instruction sheet. Identify the one applicable to the particular manual being updated, and discard all other accompanying log pages.
3. Compare the existing Supplements Log of Revisions page (or Log of Supplements) in the manual with the corresponding applicable page accompanying this Instruction Sheet. It may occur that the Log Page already in the manual is dated later than the applicable Log Page accompanying this Instruction Sheet. In any case, retain the Log Page having the later date in the folio at the bottom-left corner of the page, and discard the older Log Page.
4. Remove from the manual the old supplement (if any exists) which bears the same Part Number as the supplement accompanying this Instruction Sheet. Discard the old supplement and insert the new one, placing it in the position indicated on the Log Page.

After compliance, this Instruction Sheet may be discarded.

BEECHCRAFT® DUKE® 60 AND A60 LANDPLANES
FAA APPROVED AIRPLANE FLIGHT MANUAL
P/N 60-590000-5
LOG OF SUPPLEMENTS

FAA Supplement must be in the airplane for flight operation when subject equipment is installed.

Part Number	Subject	Rev No.	Date
60-590001-3	BEECHCRAFT B-5P and B-VIII Flight Control System	1	February 20, 1970
60-590001-9	BEECHCRAFT H-14 Autopilot	3	December 15, 1972
60-590001-11	Continuous Pressure Operated Surface Deice System	4	August 31, 1973
60-590001-13	Goodrich Electrothermal Propeller Deice System	4	June, 1981
60-590001-15	Landing Gear Safety System	1	February 20, 1970
60-590001-17	Flight In Known Icing Conditions	6	October, 1996
60-590001-19	Woodward Electronic Propeller Synchronizer	1	August 31, 1973
60-590001-21	Area Navigation System, King KNC-610 and King KN-74	3	August 15, 1975
60-590001-23	Reduced Power Procedures, Duke A60, For Certification in Switzerland	2	March 20, 1973
60-590001-31	Nickel-Cadmium Battery Charge Current Detector	2	October 1, 1973
131426	Wet Wing Tip Fuel System		April 1, 1977
131787	AiResearch Pressurization System (Kit 60-5024)		August, 1981

NOTE: Supplements applicable to equipment other than that installed may, at the discretion of the owner/operator, be removed from the manual.

** Supplements marked with an asterisk will not be supplied with handbooks sold through Authorized Beech Outlets due to their limited applicability. If a document is required for your airplane, please order the document through normal channels.*

BEECHCRAFT® DUKE® B60 LANDPLANES
FAA APPROVED AIRPLANE FLIGHT MANUAL
P/N 60-590000-11
LOG OF SUPPLEMENTS

FAA Supplement must be in the airplane for flight operation when subject equipment is installed.

Part Number	Subject	Rev No.	Date
60-590001-33	BEECHCRAFT H-14 Autopilot	4	August 31, 1973
60-590001-11	Continuous Pressure Operated Surface Deice System	4	August 31, 1973
60-590001-13	Goodrich Electrothermal Propeller Deice System	4	June, 1981
60-590001-17	Flight In Known Icing Conditions	6	October, 1996
60-590001-19	Woodward Electronic Propeller Synchronizer	1	August 31, 1973
60-590001-21	Area Navigation System, King KNC-610 and King KN-74	3	August 15, 1975
60-590001-37	Reduced Power Procedures, Duke B60, For Certification in Switzerland, Germany and Austria	2	July, 1980
60-590001-39	Collins ANS-31, NCS-31 Area Navigation System		October 24, 1975
60-590001-41	AirData AD611/D RNAV/VNAV System	1	November, 1979
60-590001-43	Collins ANS-351 Area Navigation System		December 29, 1977
60-590001-45	Bendix NP-2041A Nav Computer Programmer		February, 1979
60-590001-51	King KNS-81 Integrated Navigation System		August, 1980
60-590001-53	King KNR-665A Area Navigation System		September, 1980
101-590010-175	AirData RNAV-612 Area Navigation System	1	December, 1983
131787	AiResearch Pressurization System (Kit 60-5024)		August, 1981

NOTE: Supplements applicable to equipment other than that installed may, at the discretion of the owner/operator, be removed from the manual.

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Raytheon Aircraft

DUKE® 60, A60, AND B60 LANDPLANES
FAA Approved Airplane Flight Manual Supplement
for

FLIGHT IN KNOWN ICING CONDITIONS

This Supplement is applicable to the following manual(s):

P/N 60-590000-5
P/N 60-590000-11

Airplane Serial Number: ______________________

Airplane Registration Number: ______________________

FAA Approved:

A.C. Jackson
Raytheon Aircraft Company
DOA CE-2

GENERAL

The information in this supplement is FAA-approved material which, together with the FAA Approved Airplane Flight Manual, must be in the airplane during all flight operations when the airplane has been certified as properly equipped for flight into icing conditions per Special Conditions issued to Beech Aircraft Corporation via Letter CE 213 dated 1 June 1967.

LIMITATIONS

1. Airplane must be equipped with the following items and all equipment listed must be operable:
   a. Wing and Empennage Continuous Pressure Operated Surface Deice System
   b. Goodrich Electrothermal Propeller Deice System
   c. Fuel Vent Heaters
   d. Heated Stall Warning (Goodrich 3E1793 or Safe Flight 190-1, 190-3, or 191-52)
   e. Pitot Heat
   f. Left Windshield Heat
   g.. Antenna Mast capable of withstanding ice loads
   h. Windshield Defroster
   i. Wing Ice Lights
   j. FAA Approved Airplane Flight Manuals (P/N 60-590000-5E or 60-590000-11 with latest revision)
   k. FAA Approved Airplane Flight Manual Supplements
      P/N 60-590001-11 dated August 31, 1973 or later, Continuous Pressure Operated Surface Deice System
      P/N 60-590001-13 dated August 31,1973 or later, Goodrich Electrothermal Propeller Deice System
2. When the above listed equipment is installed and operational, a placard will be placed on the Operation Limitation panel which states "THIS AIRPLANE IS APPROVED FOR FLIGHT IN KNOWN ICING CONDITIONS".
3. Minimum airspeed for sustained flight in icing conditions .... 140 knots
4. Minimum ambient temperature for operation of deicing boots .... -40°C
5. Sustained flight in icing conditions with flaps extended is prohibited except for approach and landings.

LIMITATIONS WHEN ENCOUNTERING SEVERE ICING CONDITIONS

WARNING

Severe icing may result from environmental conditions outside of those for which the airplane is certificated. Flight in freezing rain, freezing drizzle, or mixed icing conditions (supercooled liquid water and ice crystals) may result in ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and may seriously degrade the performance and controllability of the airplane.

1. During flight, severe icing conditions that exceed those for which the airplane is certificated shall be determined by the following visual cues. If one or more of these visual cues exists, immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the icing conditions.
   a. Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice.
   b. Accumulation of ice on the upper surface of the wing aft of the protected area.

c. Accumulation of ice on the propeller spinner farther aft than normally observed.

2. Since the autopilot may mask tactile cues that indicate adverse changes in handling characteristics, use of the autopilot is prohibited when any of the visual cues specified above exist, or when unusual lateral trim requirements or autopilot trim warnings are encountered while the airplane is in icing conditions.
3. All icing detection lights must be operative prior to flight into icing conditions at night. [NOTE: This supersedes any relief provided by the Master Minimum Equipment List (MMEL).]

NORMAL PROCEDURES

This airplane is approved for flight in icing conditions when the equipment listed in the Limitations Section of this supplement is installed and operational. This approval is based on tests conducted in natural and simulated icing conditions. These conditions do not include, nor were tests conducted in, all icing conditions that may be encountered (e.g., freezing rain, freezing drizzle, mixed conditions, or conditions defined as severe). Such icing conditions have the potential of producing hazardous ice accumulations, which: 1) exceed the capabilities of the airplane's ice protection equipment; and/or 2) create unacceptable airplane performance. Flight into icing conditions which lie outside those tested is not prohibited; however, pilots must be prepared to divert the flight promptly if hazardous ice accumulations occur.

BEFORE TAKEOFF

1. Surface Deice System - CHECK
   a. Power - 2000 RPM
   b. Deice Switch - ONE-CYCLE (UP)
   c. Pneumatic Pressure - 15 to 18 PSI
   d. Wing Boots - CHECK VISUALLY FOR INFLATION AND HOLD-DOWN.
2. Electrothermal Propeller Deice - CHECK
   a. PROP HT Switch - ON
   b. PROP AMP Indicator - CHECK 14 or 18 AMPERES
   c. Automatic Timer - CHECK PROPELLER AMMETER FOR TWO MINUTES. Needle deflection every 30 seconds (serials prior to P-579) or 90 seconds (serials P-579 and after) indicates normal operation.
3. Fuel Vent Heat
   a. Left Switch - ON
   b. Right Switch - ON

NOTE

Switches should remain ON throughout operation.

4. Pitot Heat and Heated Stall Warning
   a. Left Pitot Heat Switch - ON (Note deflection on loadmeter.)
   b. Right Pitot Heat and Stall Warning Switch - ON (Note deflection on loadmeter.) (Stall warning heat is reduced or disconnected by a landing gear switch to protect against overheat during ground operation.)

NOTE

Switches may be left on throughout flight. Prolonged operation on the ground could damage the Pitot Heat System.

5. Left Windshield Heat - CHECK:

FOR AIRPLANES WITH WINDSHIELD HEAT INVERTER VOLTMETER

   a. Propellers - 1200 to 1500 RPM
   b. Both Generators - ON
   c. WSHLD HT Switch - ON

CAUTION

On airplanes prior to P-556, the inverter voltmeter should indicate in the green band (220 to 260). Indication outside of the green band indicates insufficient windshield heat. On airplanes P-556 and after, voltmeter indication will be cyclic. The voltmeter should indicate in the green band until the heated section reaches approximately 110°F, at which time the voltmeter will drop to 0. When the heated section cools to approximately 90°F the inverter will reactivate and the voltmeter will indicate in the green band. Indications above 0 but outside the green band indicate insufficient windshield heat.

d. Windshield - CHECK (Feel for warming)

NOTE

WSHLD HT switch may be left on for flight operation.

FOR AIRPLANES WITHOUT WINDSHIELD HEAT INVERTER VOLTMETER

e. Propeller - 1200 TO 1500 RPM

f. One Generator (left or right) - OFF

g. WSHLD HT Switch - ON (Note increase on operative loadmeter - minimum of .20 units)

CAUTION

Loadmeter increase of less than .20 units indicates insufficient windshield heat.

h. Windshield - CHECK (Feel for warming)

NOTE

WSHLD HT switch may be left on for flight operation.

i. Both Generators - ON

6. Defrost Air - CHECK OPERATION
7. Wing Ice Lights - CHECK

IN FLIGHT

WARNING

Due to distortion of the wing airfoil, ice accumulations on the leading edges can cause a significant loss in rate of climb and in speed performance, as well as increases in stall speed. Even after cycling the deicing boots, the ice accumulation remaining on the boots and unprotected areas of the airplane can cause large performance losses. For the same reason, the aural stall warning system may not be accurate and should not be relied upon. Maintain a comfortable margin of airspeed above the normal stall airspeed. In order to minimize ice accumulation on unprotected surfaces of the wing, maintain a minimum of 140 knots during operations in sustained icing conditions. Prior to a landing approach, cycle the deicing boots to shed any accumulated ice.

1. Surface Deice System

When ice accumulates 1/2 to 1 inch:

a. Deice Switch - ONE CYCLE (UP)

b. Pneumatic Pressure Gage - CHECK 15 - 18 PSI (while system is on pressure cycle).

c. Repeat as required.

CAUTION

Rapid cycles in succession, or cycling before at least 1/2 inch of ice has accumulated, may cause the ice to grow outside the contour of the inflated boots and prevent ice removal.

NOTE

Either engine will supply sufficient vacuum and pressure for deice operation.

NOTE

Failure of ONE-CYCLE function can be overcome by use of the MANUAL switch.

2. Electrothermal Propeller Deice

   a. PROP HT Switch - ON

NOTE

Systems may be operated continuously in flight. Relieve propeller imbalance by increasing rpm. If PROP AMPS reads above 18 amperes or below 14 amperes, refer to Emergency Procedures in this supplement.

3. Fuel Vent Heat

   a. Left and right switches ON before takeoff. Continuous operation is recommended.

4. Left and Right Pitot Heat (Heated Stall Warning Switch combined with or in place of Right Pitot Switch) - Switches ON

   a. May be turned on before takeoff. System may be operated continuously in flight. Check both switches ON when encountering visible moisture.

CAUTION

Prolonged use of Pitot Heat on the ground will damage the heating elements.

5. Heated Windshield

   a. WSHLD HT Switch(es) - ON AS REQUIRED (Heat should be applied before ice forms.)

CAUTION

The electrically heated windshield should be turned off for a 15-second period to allow the pilot to take a reading on the standby compass for the purpose of resetting the directional gyro.

Ground use of windshield heat is limited to 10 minutes.

6. Defrost Air

   a. Defrost Air - PULL ON (Before entering icing condition)

NOTE

For maximum windshield defrosting, PULL OFF pilot and copilot air and place vent blower switch in HI position.

7. Wing Ice Light
   a. Use wing ice light as required.

EMERGENCY PROCEDURES

1. Surface Deice System
   a. Failure of ONE-CYCLE Operation - HOLD TO MANUAL (8 seconds maximum).
   b. Failure of Boots to Deflate - PULL SURF SYS CIRCUIT BREAKER IN COPILOT'S SUB-PANEL.
2. Electrothermal propeller Deice Abnormal Ammeter Reading
   a. Zero Amps.
      Check prop deice circuit breaker. If the circuit breaker has tripped, a wait of approximately 30 seconds is necessary before resetting. If ammeter reads 0 and the circuit breaker has not tripped or if the ammeter still reads 0 after the circuit breaker has been reset, turn the switch off and consider the prop deice system inoperative.
   b. Zero to 14 amps.
      If the prop deice system ammeter occasionally or regularly indicates less than 14 amps, operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.
   c. 18 to 23 Amps.
      If the prop deice system ammeter occasionally or regularly indicates 18 to 23 amps, operation of the prop deice system can continue unless serious imbalance results from irregular ice throw-offs.
   d. More than 23 Amps.
      If the prop deice system ammeter occasionally or regularly indicates more than 23 amps, the system should not be operated unless the need for prop deicing is urgent.

SEVERE ICING CONDITIONS

THE FOLLOWING WEATHER CONDITIONS MAY BE CONDUCIVE TO SEVERE IN-FLIGHT ICING:

- Visible rain at temperatures below 0 degrees Celsius ambient air temperature.
- Droplets that splash or splatter on impact at temperatures below 0 degrees Celsius ambient air temperature.

PROCEDURES FOR EXITING THE SEVERE ICING ENVIRONMENT:

These procedures are applicable to all flight phases from takeoff to landing. Monitor the ambient air temperature. While severe icing may form at temperatures as cold as -18 degrees Celsius, increased vigilance is warranted at temperatures around freezing with visible moisture present. If the visual cues specified in the Limitations Section for identifying severe icing conditions are observed, accomplish the following:

1. Immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the severe icing conditions in order to avoid extended exposure to flight conditions more severe than those for which the airplane has been certificated.
2. Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
3. Do not engage the autopilot.
4. If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot.
5. If an unusual roll response or uncommanded roll control movement is observed, reduce the angle-of-attack.
6. Do not extend flaps during extended operation in icing conditions. Operation with flaps extended can result in a reduced wing angle-of-attack with the possibility of ice forming on the upper surface further aft on the wing than normal, possibly aft of the protected area.
7. If the flaps are extended, do not retract them until the airframe is clear of ice.
8. Report these weather conditions to Air Traffic Control.

PERFORMANCE

No Change

The Leading E...

...s from BFGoodrich De-I...

... - Editor

1991 - A Learning Experience

by Rick Knight, Acting General Manager

I believe 1991 will be remembered as a tough year for all of us. I am sure most of you have struggled to do well this year as much as we have.

We at De-Icing Systems and Safeway will also characterize this year as one of learning. We have learned how to better perform icing analyses, utilizing state of the art computer codes. We have learned more about our own developing technologies - Small Tube Pneumatics (STP), Pneumatic Impulse Ice Protection (PIIP) and Electro Mechanical De-Icing Systems - by constant research, development and testing in our icing wind tunnel.

We have also continued to learn more about providing the types of de-iced composite structures you are looking for, and most importantly, we learned much about what you, our customers, need and want. We appreciate your assistance in helping us to understand those needs and for continuing to select us to meet them. We want to work with you to develop and produce the very best de-icing systems in the world.

As 1991 comes to a close we look forward to 1992. We at De-Icing Systems and Safeway are working on some very exciting projects for you on some of the newest and most innovative aircraft being built today. We hope that together we can enjoy the benefits 1992 has to offer.

(Rick Knight, President of Safeway, was named ActingGeneral Manager of De-Icing Systems in November.)

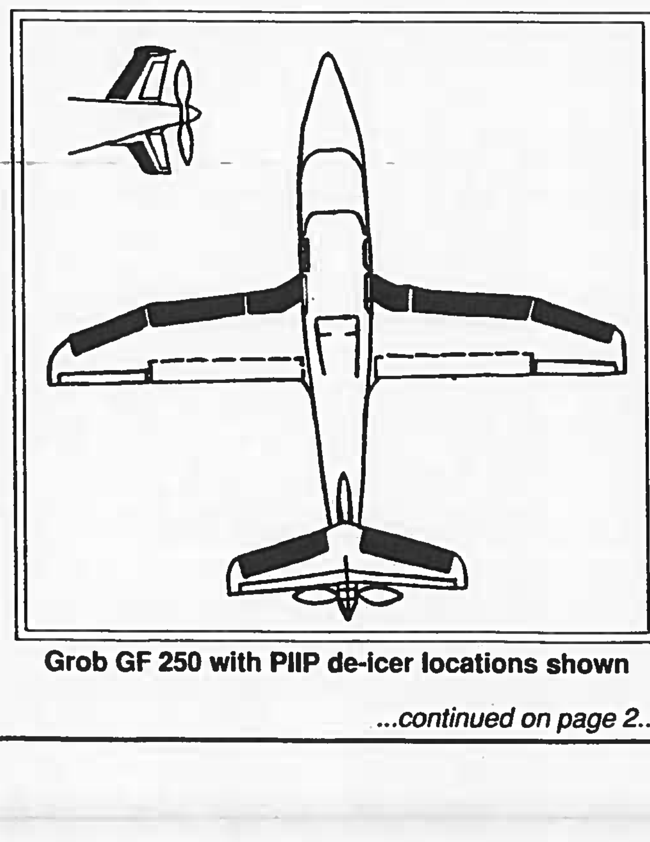
SPIN-OFFS

Announcements from BFG

BFG PIIP™ System Selected

BFGoodrich De-Icing Systems' Pneumatic Impulse Ice Protection (PIIP) system has been selected by Grob of Mattsies, Germany, for use on its new high performance aircraft, the GF 250.

The PIIP system, in development since 1986 (see *The Leading Edge* Volume 5, Issue 4, August 1989) and patented by BFG, utilizes high pressure pneumatic pulses to provide ice protection. This sytem will be used on all leading edges of the GF 250, which include the wings, horizontal stabilizers and vertical fin. Installation on the new GF 250 is the first application for the PIIP system.



Grob GF 250 with PIIP de-icer locations shown

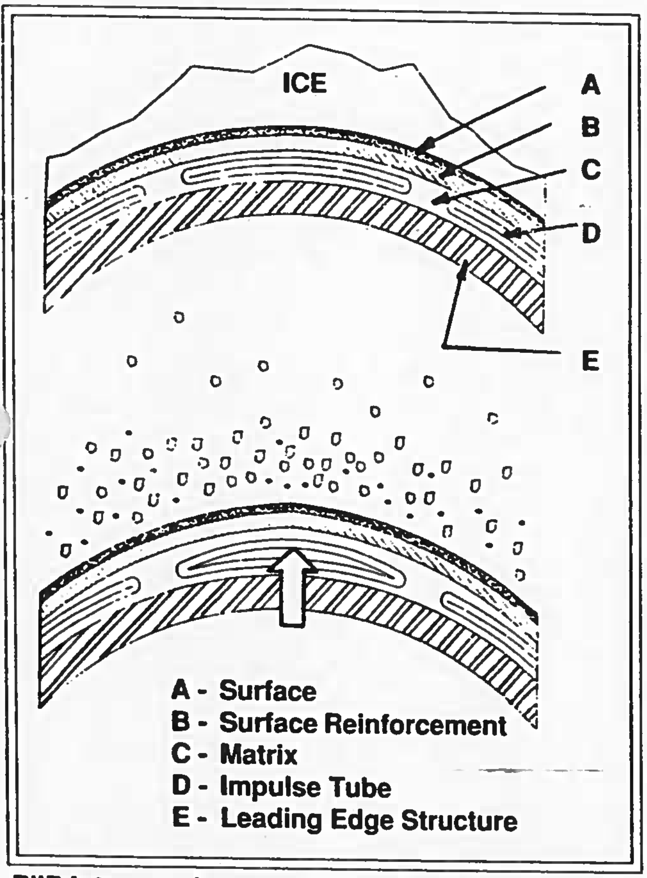
...continued on page 2...

SPIN-OFFS
Announcements from BFG

BFG PIIP™ System Selected

...continued...

The PIIP system includes a low-power, mechanical de-icer of all composite construction, with a metallic, thermoplastic or other suitable erosion surface. It can be powered by a compressor or air reservoir. Grob's GF 250 will use an air reservoir, virtually eliminating the need for aircraft power to operate the PIIP system.



PIIP integrated composite leading edge assembly

While BFG's traditional pneumatic de-icers are designed to be operated after ice builds up to about .250" or greater, the PIIP system can remove as little as .040" ice accumulation, resulting in very small ice shed particles. For this reason, the system is being considered for use on military and commercial aircraft for engine inlets and wing leading edges.

De-Icing Systems previously worked with Grob by providing silver Estane™ pneumatic de-icers for the EGRETT aircraft, which has established numerous altitude and sustained flight records.

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Pneumatic De-Icer Leadtime

by Gary Garcia, Customer Support Manager

Several times a day our customers ask the question: Do you have this or that de-icer in your stock? Or: How soon can I get one? Our answer to the first question is that we do not carry stock, and is based on the fact that BFGoodrich does not inventory finished products. Our manufacturing facility builds to order. All stocking for De-Icing Systems products is done through BFGoodrich distributors: Aviall, Cooper Aviation Supply and Piedmont Aviation Supply (see *The Leading Edge*, Volume 6, Issue 1, February 1990) or by the spares organizations of the aircraft manufacturers.

In reply to the second question, if our distributors or the aircraft manufacturer do not have the specific airframe de-icer you need, the answer to how soon you can get it is - 60-75 days. Whoa! You say - why does it take so long to build an airframe de-icer? Don't you just unroll a length of de-icer tube material, cut it to size and seal the ends? Boy, do we wish we could make de-icers that easily! It's true though, that we get raw material in rolls - lots of rolls - each one specific in thickness and composition to the de-icer which will be manufactured from it.

But let's start at the beginning to investigate the 60-75 day leadtime. For over 60 years, BFGoodrich has designed and manufactured pneumatic airframe de-icers for more than 300 different aircraft models, generating thousands of different de-icers. Airframe de-icers are like snowflakes, no two are alike. (I'm not sure who verified this statement for all the snowflakes!). There are cases in which the same de-icer part number may be used on similar aircraft models in the same family. For example, certain serial number ranges of the Beech models A90, B90 and C90 can use the same vertical fin or horizontal stabilizer de-icers because the airfoil and icing characteristics are the same. Generally, however, each model requires a unique set of de-icers specifically designed to operate efficiently in the locations and icing characteristics unique to that airframe. In other words, a de-icer used on a Beech Baron is not interchangeable with a de-icer for a KingAir. Nor will an airframe de-icer designed for a Cessna aircraft fit a Piper aircraft.

BFGoodrich actively manufactures over 1000 different de-icers. In general, we will still manufacture any airframe de-icer originally designed and manufactured by BFGoodrich as long as the aircraft which requires the de-icer is still in existence.

Now - to explain the 60-75 days to manufacture a de-icer. If we only had to make one de-icer at a time, we could do it in 2-4 days. But manufacturing one de-icer at a time isn't very efficient; our backlog would be endless, and lead time would be even longer. Instead, like any good manufacturer, we level load our production in order to keep lead times reasonable and a continuous, experienced labor force. This means we plan and schedule a good portion of our production for 12 months in advance. Our master distributors provide us with scheduled orders at the beginning of the calendar year, with monthly releases. These scheduled orders help us plan our yearly production. As additional orders are received during the year, we insert them into the schedule. **Our monthly production schedule is filled for two or more months ahead** with a combination of schedule orders from our distributors, aircraft manufacturers' orders which support new aircraft, and orders received throughout the year for replacement de-icers. Therefore, our leadtime for shipment of new orders for airframe de-icers is 60-75 days after receipt of order.

Still the question, why 60 days? Each production month has only so many manhours (number of working hours X number of workers). Our scheduling department takes all the orders in-house (keep in mind this includes yearly schedule orders from our distributors and aircraft manufacturers' production orders) and works them into the manhours available. We typically produce about 1800 airframe de-icers a month. When new orders are received they immediately go to the airframe de-icer scheduler who provides a promise (to ship) date based on where the new order fits into the existing schedule. The promise date generally falls within 60-75 days from the date the order is received at BFGoodrich. Expedite or AOG (aircraft on the ground) orders are built during overtime hours - outside of the normal manhours.

To dispel the image of a large roll of de-icer fabric being cut to length and sealed, let's talk a little bit about fabricating airframe de-icers. BFG manufactures many different styles of de-icers, called types. The types range from type 11 to type 31S de-icers, and these numbers correspond to the first part of the BFGoodrich pneumatic de-icer part numbers. Each type de-icer requires very different construction materials.

Let's look at a typical type 25S de-icer, the most common style of airframe de-icer.The type 25S de-icer is a sewn design. Several processes make up the fabrication of this de-icer. The first step is constructing the inflation area. Two plies of fabric define this area. The two plies are positioned together and fed through a multi-head sewing machine forming a number of individual chambers called tubes. A marking template is placed over this sewn fabric to establish the perimeters of the inflation area as well as the air connection (where the de-icer is attached to the aircraft air system) location. When completed, this sewn section, called a carcass, is given to a de-icer builder, who encases the carcass with plies of neoprene, and appropriate fillet material. The fillet material is used to provide different thicknesses and shapes required to configure a particular de-icer, such as tapered or full thickness edges and cut-out areas for airfoil accessories. This built-up carcass is now an uncured de-icer and is readied for cure (also called vulcanization).

Pneumatic (airframe) de-icer fabrication

After curing, the de-icer goes to the final finish station where air connections are installed, and each part is permanently identified with part number, serial number, manufacture date, PMA approval and other appropriate information through laser branding. Each de-icer is then thoroughly inspected dimensionally and functionally. Each airframe de-icer must inflate and deflate within a specific timeframe, hold a minimum operating pressure for a specified time and achieve proper inflation height.

When all this criteria are met, the part is ready to ship. For shipping, the de-icer is packaged in a heat sealed poly bag and placed in a carton. Our new packaging bags have installation instructions printed on the bag! The carton is labeled on the outside with the de-icer part number, serial number and date of manufacture. Having this data on the carton facilitates storage and inventory tasks by eliminating the need to open the box or break the sealed bag to get the information. The shipping carton provides a protective environment for de-icer storage. Properly stored, BFGoodrich airframe de-icers retain their factory warranty for up to 60 months of shelf life.

Although I have simplified the description of our airframe de-icer manufacturing procedures considerably for this article, I think it's enough to shed some light on how de-icers are manufactured and the leadtimes involved. At least I hope I've eliminated the "unroll, cut and seal" theory, and explained the 60-75 day leadtime for new orders.

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HOTLINE

Q. The leading edge of my de-icer is looking ragged - you know - pinholes, abrasion, FOD [foreign object damage]. I heard there's a BFGoodrich rubber tape to put over the de-icer leading edge to repair and protect the de-icer. Is this true?

A. In a word - **NO!** Let me explain further. There are four products manufactured by BFGoodrich De-Icing Systems which sound like they might be used for that purpose:

74-451-124	Rubber Sheet
74-451-21	Fillet
74-451-22	Neoprene Splice Tape
74-451-23	Neoprene Veneer

The 74-451-124 rubber sheet is cold patch fabric without tapered edges and peel-off backing available for inventory convenience or cutting irregular patch shapes. ***However, "cut-your-own" patch dimensions should not exceed equivalent size of the largest pre-cut patch (5"X19"), and repair guidelines (contained in BFG Report 82-32-036, Installation and Maintenance Manual for Pneumatic De-Icers) still apply.***

The 74-451-21 fillet, 74-451-22 neoprene splice tape and 74-451-23 veneer are not authorized as an abrasion strip or repair material for the leading edge of a pneumatic de-icer. Their original intended uses are no longer applicable to BFGoodrich de-icers. The 74-451-21 fillet and the 74-451-22 neoprene splice tape were designed for vulcanized field repairs of de-icers. Up until the mid-60's, the 74-451-23 neoprene veneer was used as a repair material for severe scuff damage on type 11 and 12 pneumatic de-icers. ***These three products, 74-451-21 fillet, 74-451-22 neoprene splice tape and 74-451-23 neoprene veneer are no longer authorized repair or protection materials for BFG pneumatic de-icers.***

As pneumatic de-icer technology advanced, vulcanized field repairs, abrasion strips and leading edge strip repair, along with using a hypodermic needle to remove air bubbles and resurfacing with A56B edge sealer, became obsolete. ***Throw away the hypodermic needle and put abrasion strips and strip repairs on de-icers out of your mind! The only BFG authorized repair and resurfacing products are the 74-451-C and 74-451-H cold patch repair kits and the 74-451-L resurfacing kit.***

Q. During the icing season my pneumatic de-icers seem to freeze up. What causes this and what can I do about it?

A. Freezing of pneumatic de-icers is generally caused by moisture entering the de-icers through pinholes, cuts or surface abrasions which have not been repaired. When vacuum is applied in flight to hold the de-icers tightly against the airfoil, moisture can be drawn into the de-icers through these openings and can collect in the inflation tube material. Once moisture collects here, it is very difficult to remove, and there is a possibility of de-icer freezing.

To prevent this situation, it is important to repair holes and cuts ***when first noticed.*** That's why we recommend regular inspections to detect such damage. Don't wait until winter to inspect and repair your de-icers, because most moisture accumulation will occur during the warm months.

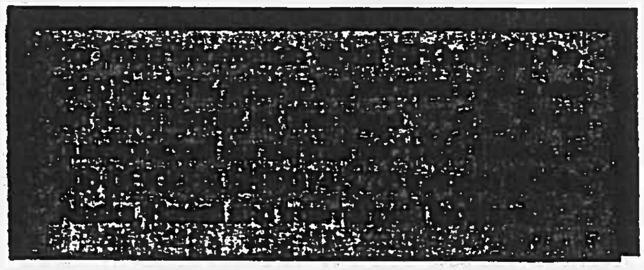
However, if you are now faced with this problem, there is a procedure which helps alleviate freezing until corrective action can be taken. Isopropyl alcohol can be used to mix with the moisture and reduce the freezing point.

NOTE: The following information applies to BFG pneumatic de-icers and components only.

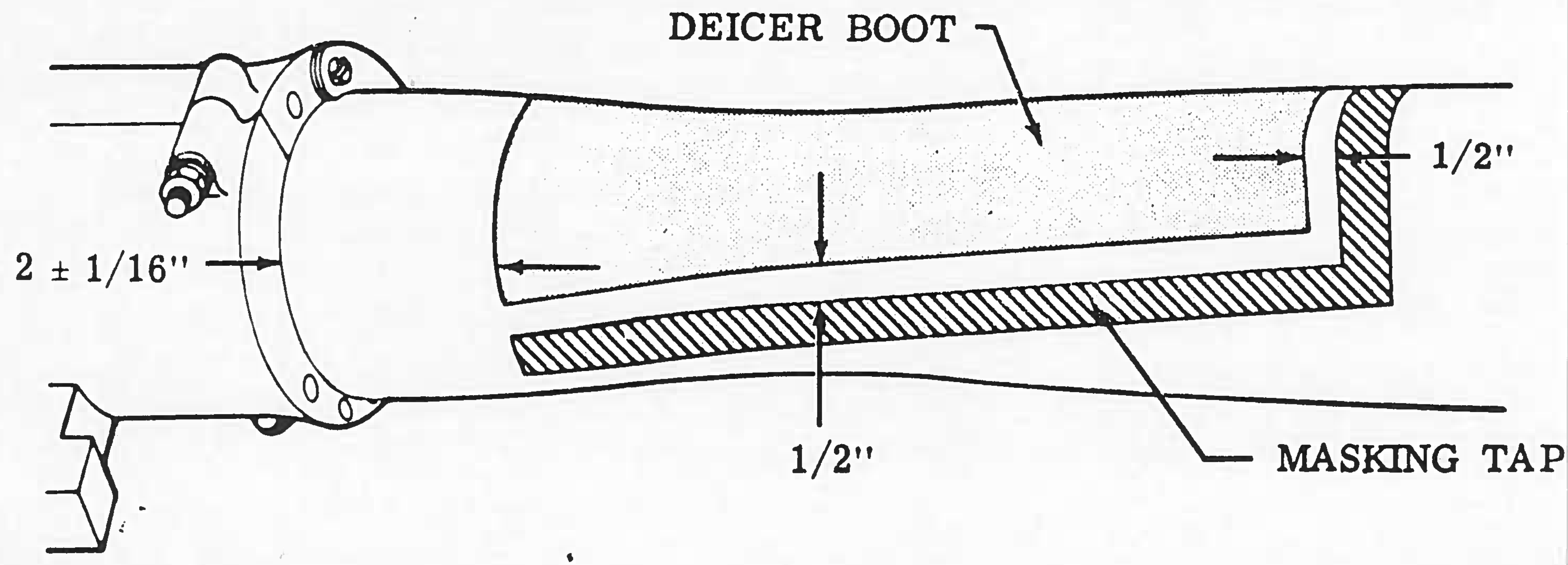
To perform this procedure, introduce the alcohol directly into the de-icers through the de-icer air connection and work it thoroughly into the inflation area. Drain excess alcohol by working it back toward the air connection where it was introduced. Inflate the de-icers several times by cycling the system.* While cycling the system, check for leaks and repair them at this time using the appropriate BFG repair kits.

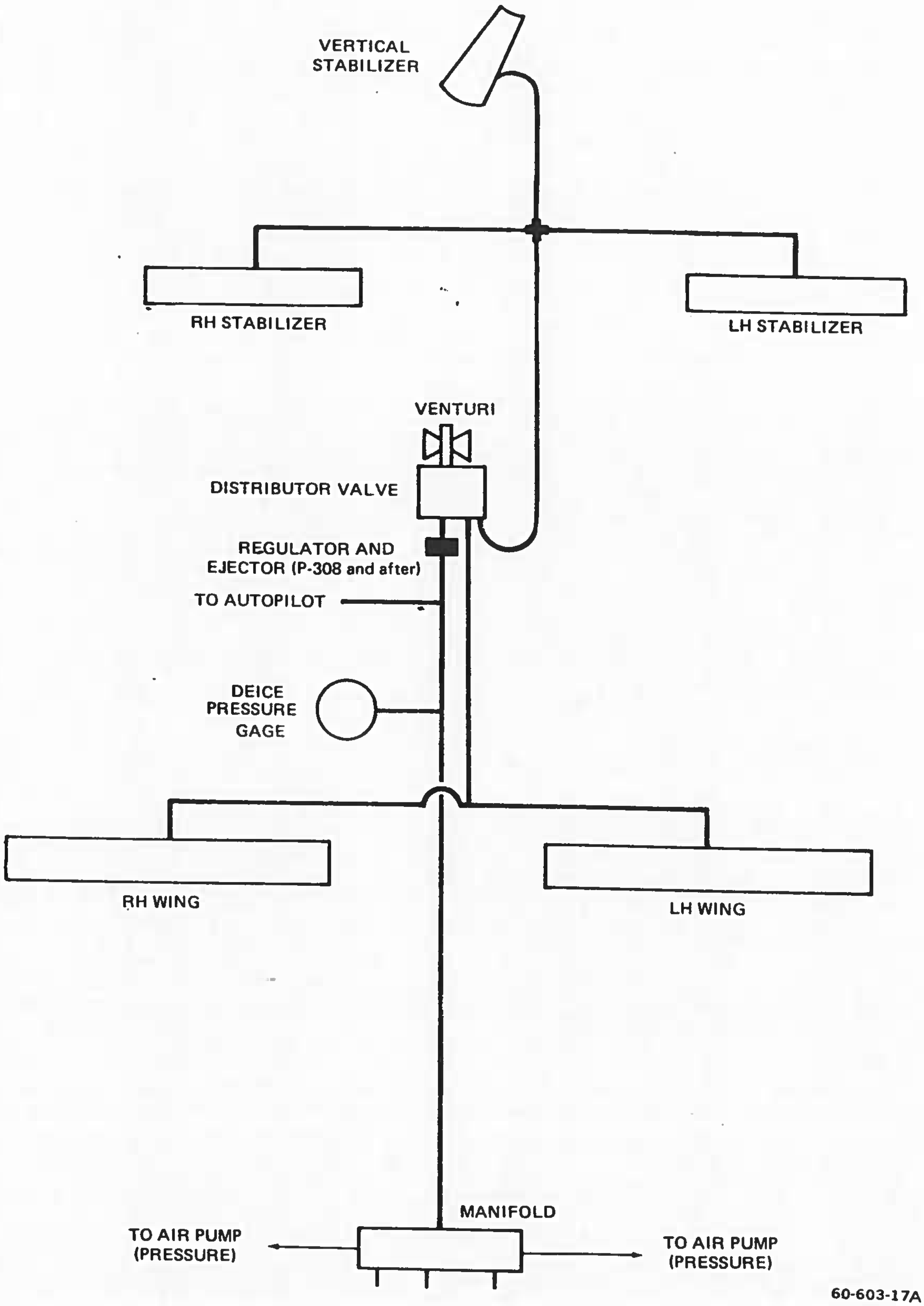
Remember this process is an interim fix. If your de-icers are in poor condition, replace them. Do not rely on this procedure to extend their service life. As always, if you have questions or concerns about this subject, contact BFG before performing this procedure.

***CAUTION: Alcohol can affect the de-icing system flow valves by removing necessary lubrication. If relubrication is required, use Dow Corning 200, 100cs silicone oil.**



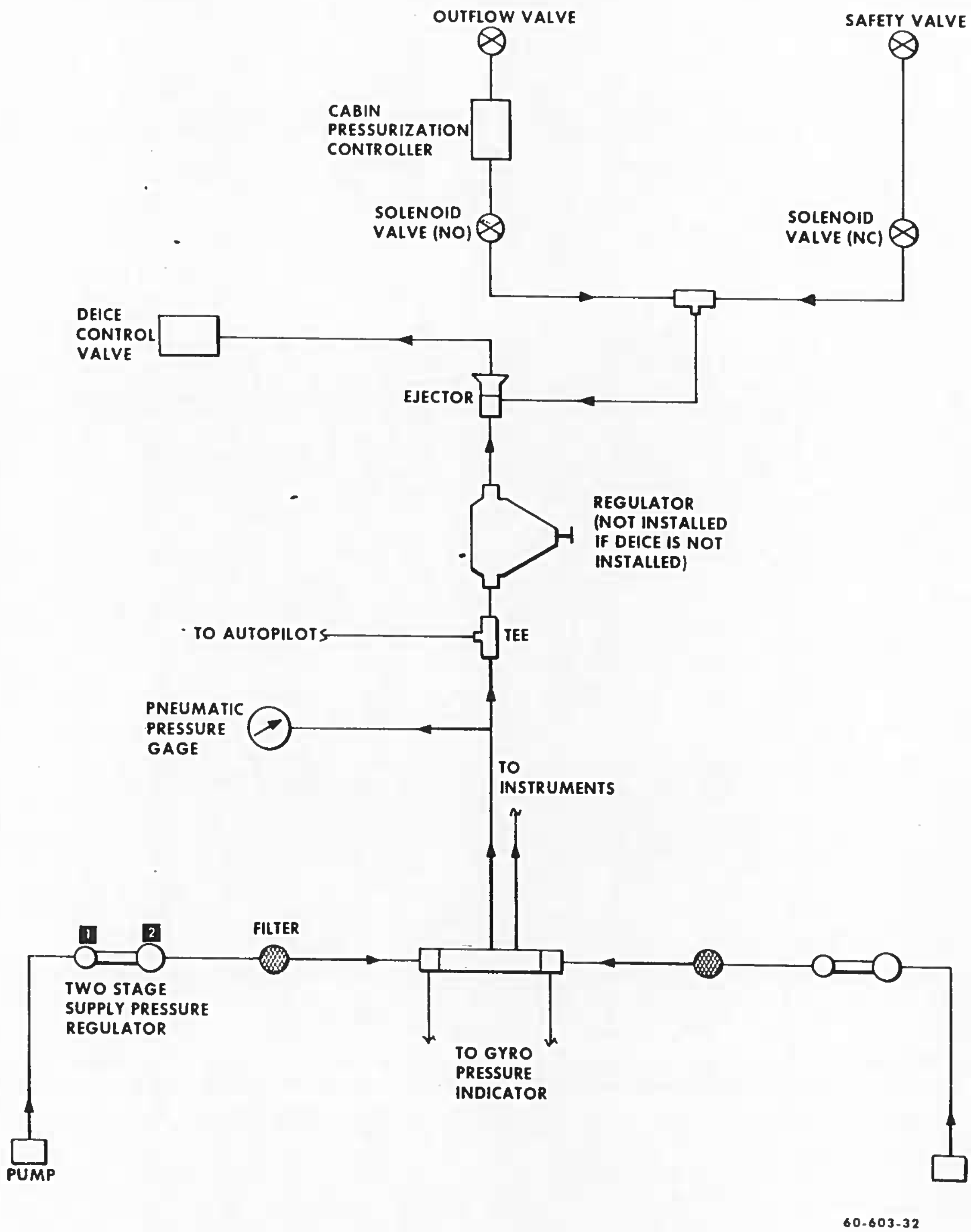
BFGoodrich De-Icing Systems
1555 Corporate Woods Parkway
Uniontown, Ohio 44685-8799
Attn: Product Support


DEICER BOOT
1/2"
2 ± 1/16"
1/2"
MASKING TAP

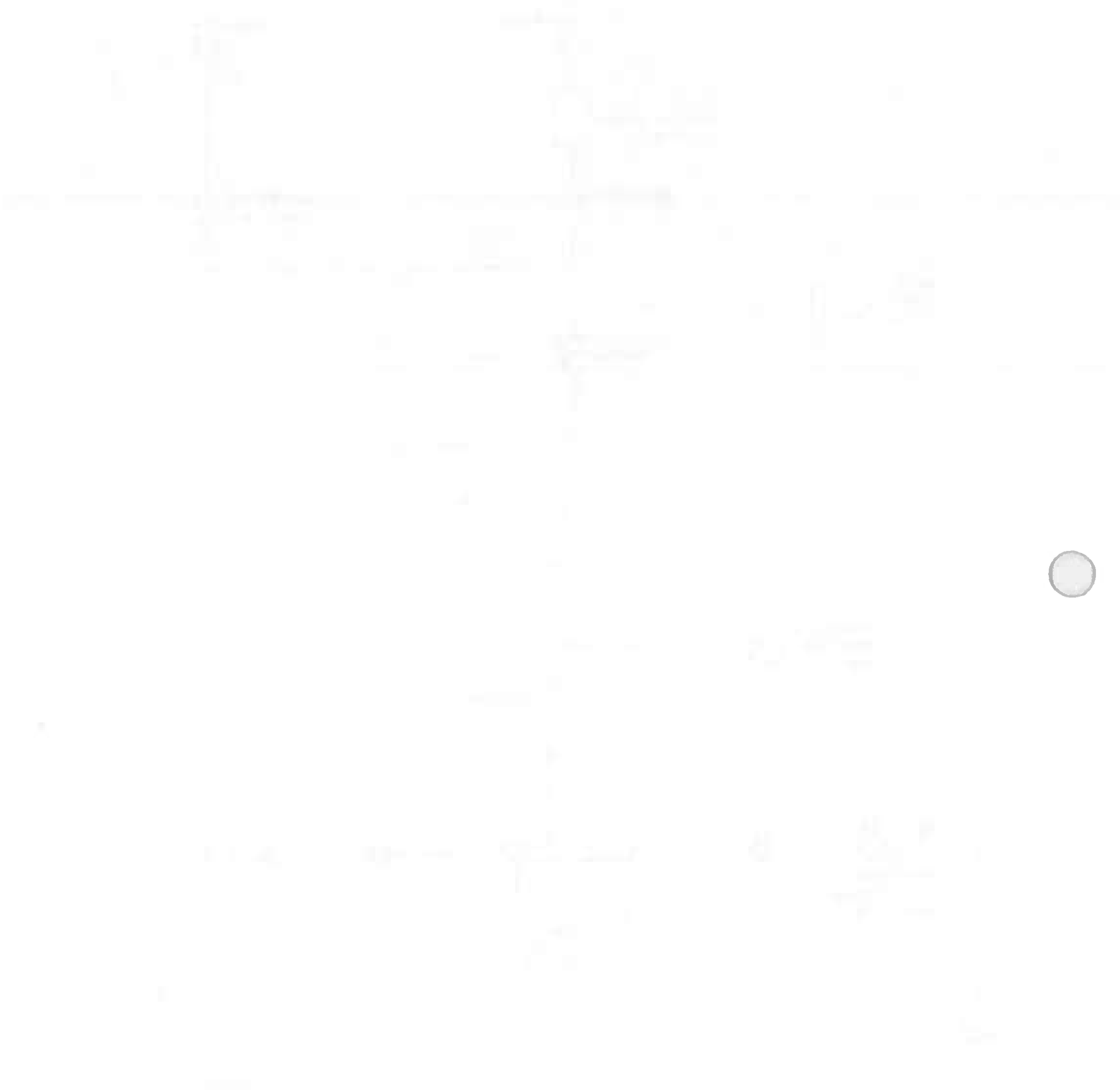


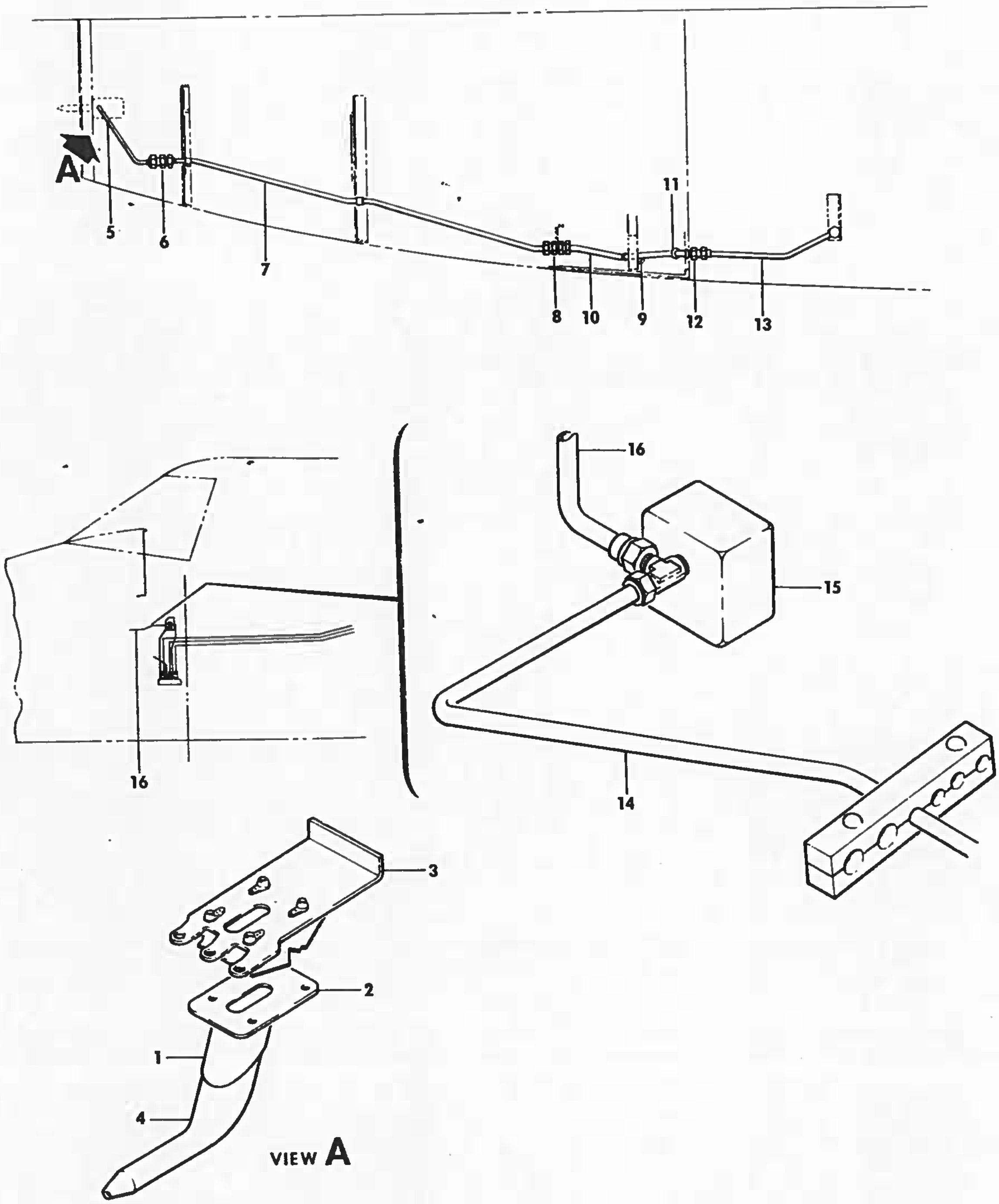
Airfoil Deice System Schematic
Figure 1

"END"



Pneumatic Pressure System (Basic with Deice)
(P-308 and after)
Figure 206





B60-394-4

FIGURE 10-01.PITOT AND STATIC SYSTEM
/SHEET 1 OF 2 SHEETS/

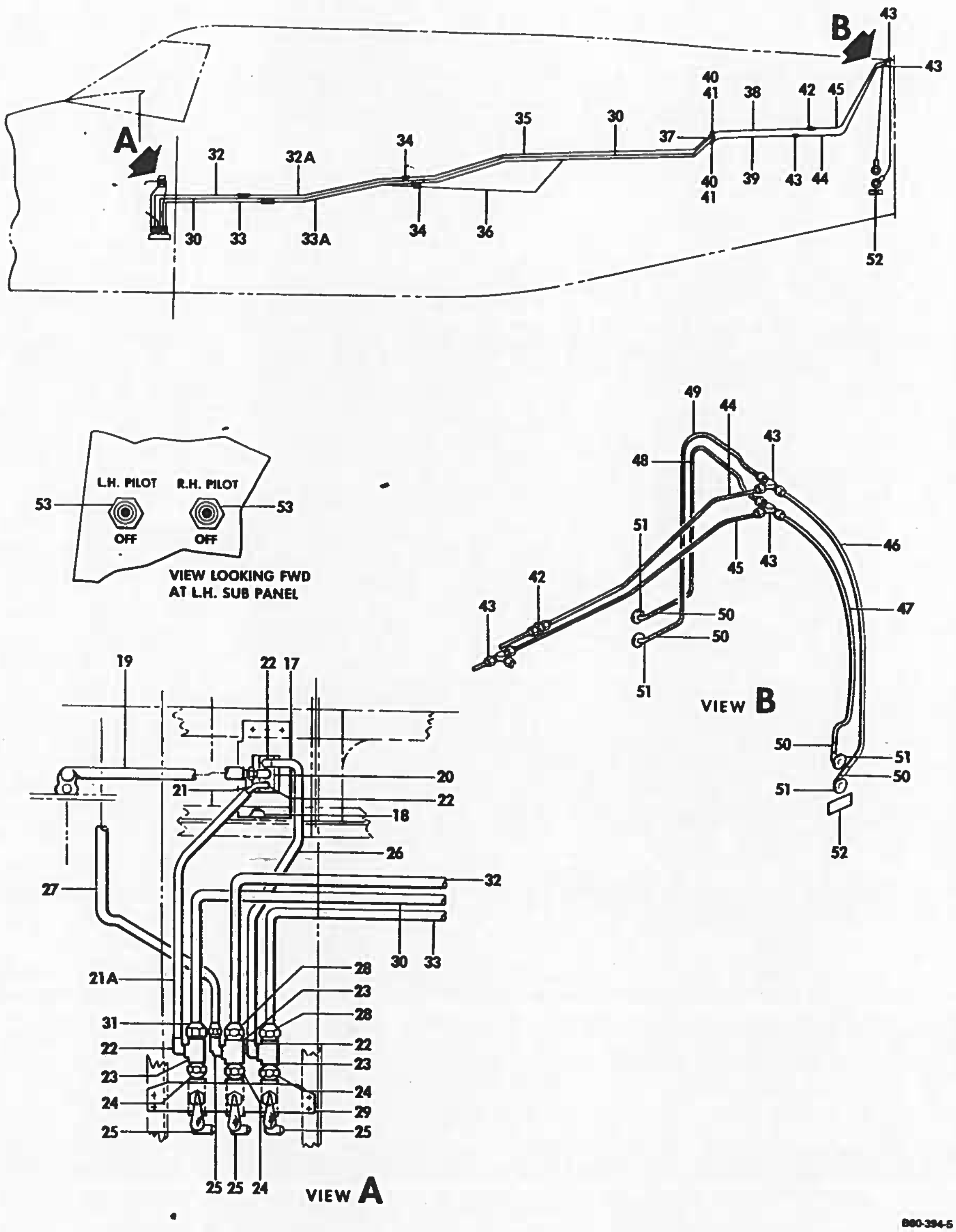


FIGURE 10-01.PITOT AND STATIC SYSTEM
/SHEET 2 OF 2 SHEETS/