CHAPTER 30

ICE AND RAIN PROTECTION

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ICE AND RAIN PROTECTION - DESCRIPTION/OPERATION

1. General

This Chapter includes those units and components which are installed on the AA-5, AA-5A and AA-5B aircraft, as a means of preventing and disposing of ice formation in the carburetor and pitot system, and the elimination of frost and fog on the windows and windshield.

This Chapter contains the following systems and their related components.

Carburetor Heat System

Pitot Heat System

Windshield Defrosting and Window Defogging System

CARBURETOR HEAT SYSTEM – DESCRIPTION/OPERATION

1. General

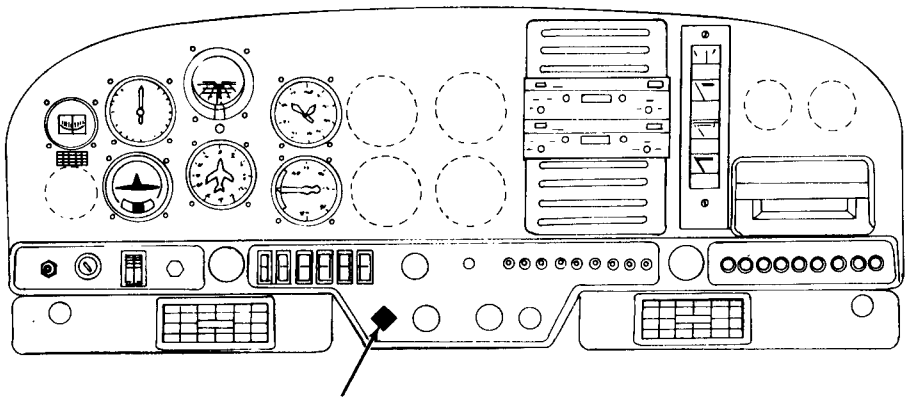
The aircraft engine is equipped with a carburetor heat system which is used when carburetor icing conditions exist. The system provides a source of heated air to the carburetor from an alternate hot air source of the induction system. The system is controlled from the instrument panel by the carburetor heat control which is connected to a shutoff valve on the carburetor air box by a wire linkage. When the carburetor heat control is in the OFF (pushed in) position, filtered air is drawn through ducting into the carburetor. On the AA-5, AA-5A and AA-5B aircraft when the carburetor heat control is in the ON (pulled out) position, the shutoff valve shuts off the filtered air source and warm, unfiltered air from a shroud around the exhaust system is directed to the carburetor.

NOTE: On AA-5, AA-5A, and AA-5B aircraft, limited operation of the carburetor heat system is recommended since no filter is incorporated in the hot air source.

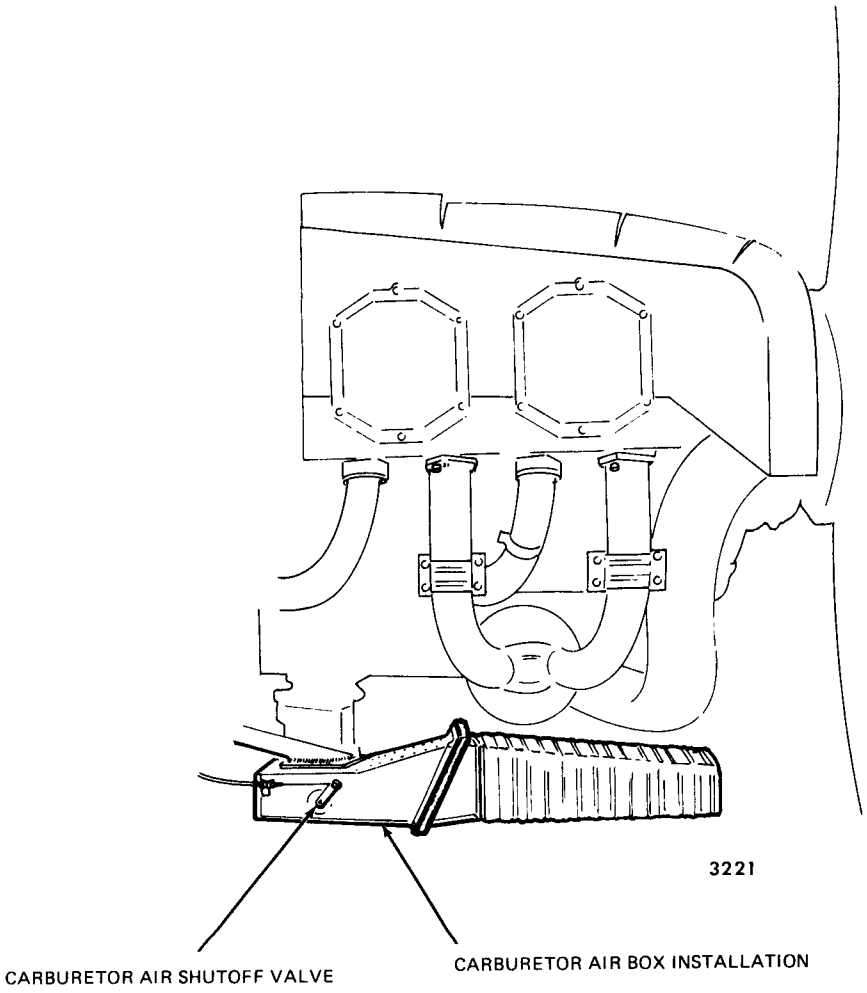
2. Major Components and Their Location

A. Carburetor Heat System

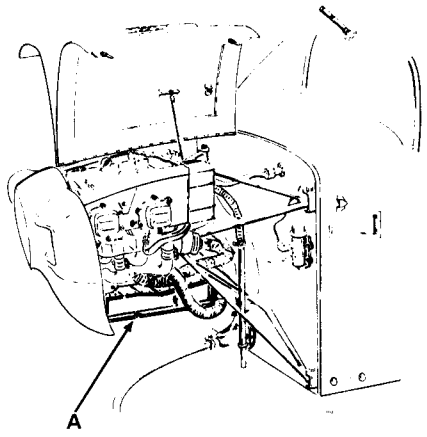
Unit	No. Per Aircraft	Location
Carburetor Heat Control	1	On lower instrument panel to left of throttle.
Carburetor Heat Shutoff Valve	1	On carburetor air box housing.
Carburetor Heat Control Cable (Wire)	1	Runs from control handle on instrument panel to shutoff valve on carburetor air box.

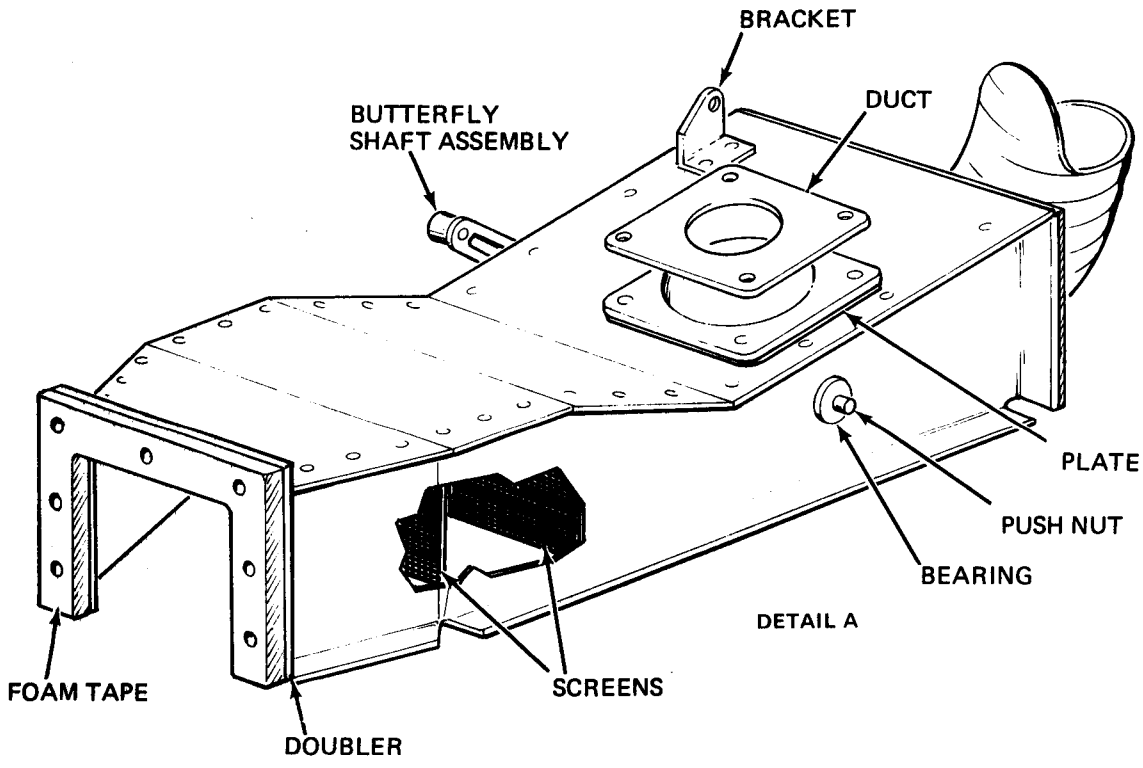


Carburetor Heat Control (AA-5, AA-5A, and AA-5B)
Figure 1

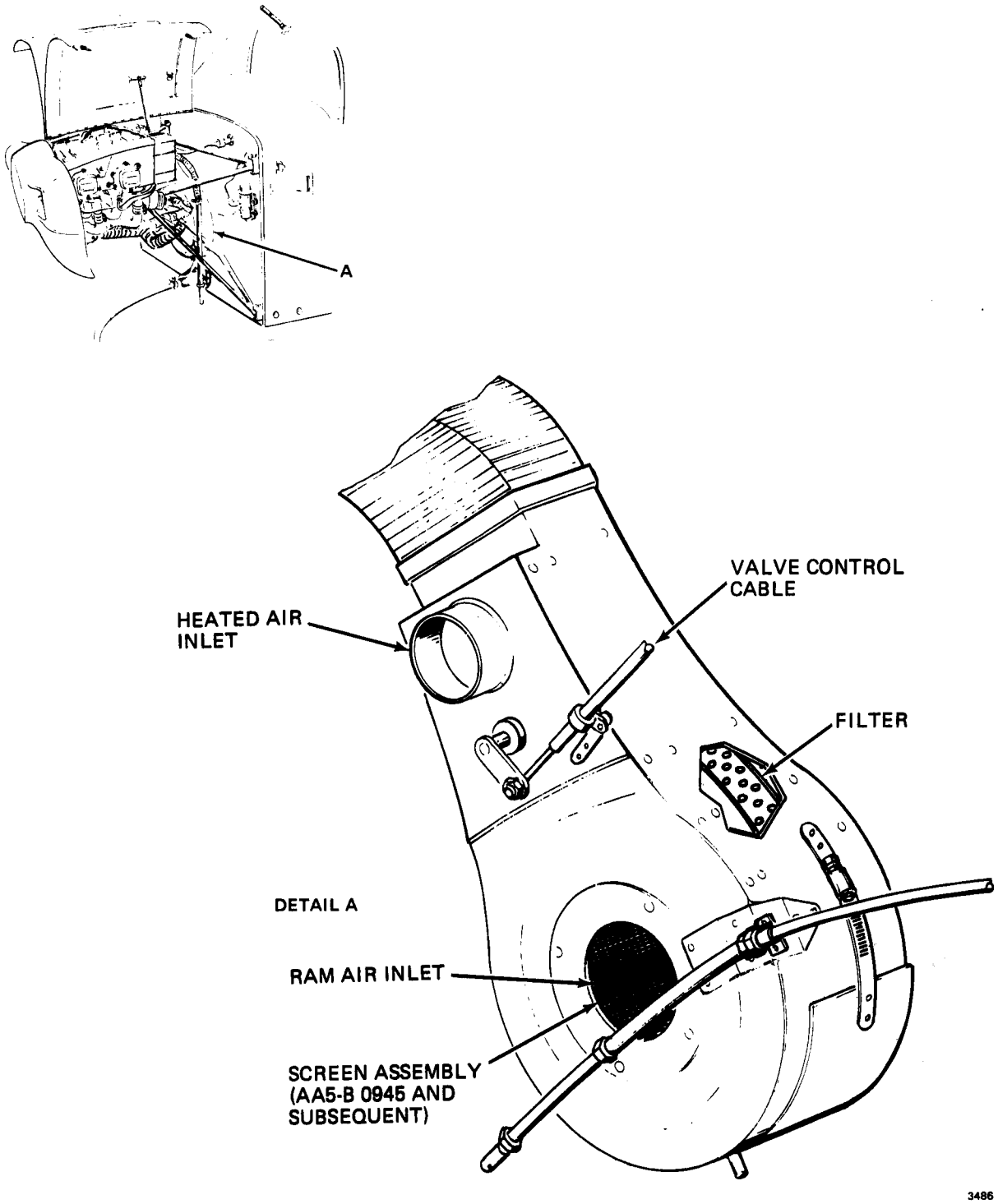


Carburetor Air Box Installation - AA-5 Serial No. 0001 thru 0640
Figure 2





Carburetor Air Box Installation — AA5-0641 and Sub. and AA5A-0001 and Sub.
Figure 3



Carburetor Air Box Installation — AA-5B
Figure 4

CARBURETOR HEAT SYSTEM — MAINTENANCE PRACTICES

1. Carburetor Heat System — Operational Test

   A. Disconnect the hot air duct at the air box assembly.

   B. Pull the carburetor heat control knob out (ON position) and make sure the shutoff valve on carburetor air box is in the fully open position. Push heat control knob to CLOSED position, and visually check that shutoff valve is fully closed. Ensure no binding exists throughout travel of heat control.

      NOTE: It is necessary to operate the aircraft engine to operationally test the carburetor heat system.

      WARNING: ENSURE THAT PROPELLER AREA IS CLEAR PRIOR TO STARTING ENGINE.

   C. Start and run engine: Refer to Pilot's Operating Handbook.

      (1) Run engine at 1800 rpm.

      (2) Pull carburetor heat control out (ON position) and check for rpm drop which indicates heat to carburetor.

      (3) Push carburetor heat control in (OFF position) and note increase in rpm.

         NOTE: Limited operation of the carburetor heat system is recommended since no filter is incorporated in the hot air source.

   D. Shut down engine: Refer to Pilot's Operating Handbook.

CARBURETOR HEAT CONTROL - DESCRIPTION/OPERATION

1. General

The carburetor heat control is used to control the flow of heated air to the carburetor during icing conditions. It consists of a control knob mounted on the lower instrument panel to the left of the throttle. The heat control is connected to a shutoff valve mounted on the carburetor air box by a wire linkage and is a push/pull type control. When it is pulled out the carburetor heat system is ON; pushing it in turns the system to OFF.

CARBURETOR HEAT CONTROL - TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Control will not operate through full travel range.	Linkage binding, broken or crimped	Adjust linkage or replace as required.
	Control binding in instrument panel	Clean, adjust, and lubricate as required.
	Air shutoff valve binding or stuck on carburetor air box	Clean, adjust, lubricate or replace valve as required.
Control moves through full range of travel but does not fully shut off. or restricts flow of heated air to carburetor.	Control and linkage improperly adjusted	Adjust control and linkage. See Section 30-1-1, page 201 of this manual.

CARBURETOR HEAT CONTROL – MAINTENANCE PRACTICES

1. Carburetor Heat Control Removal/Installation

A. Removal

(1) Disconnect the carburetor heat cable from the shutoff valve on carburetor air box by loosening the clamp bolt assembly.

(2) Loosen the clamp on the air box assembly and slide the cable from the clamp.

(3) On AA-5 and AA-5A aircraft, remove the clamp securing the carburetor heat control cable and the throttle cable to the instrument panel support. On AA-5B aircraft, remove plastic clamps that secure cable to wiring bundle.

(4) Remove the locknut behind the instrument panel that secures the carburetor heat control.

(5) Remove the control assembly by pulling it through the firewall and instrument panel.

B. Installation

(1) Pass the end of the cable through the instrument panel and install the nut securing cable clamp to the instrument panel.

(2) Slide the cable end through the firewall and the clamp on the side of the air box assembly and connect cable loosely to the air box control arm.

(3) On AA-5 and AA-5A aircraft, install the clamps that secure the carburetor heat control cable and throttle cable to the instrument panel support. On AA-5B aircraft install the plastic clamps that secure cable to wiring bundle.

(4) On AA-5 and AA-5A aircraft, adjust the cable to provide a minimum 4-1/2 inch bend radius and tighten the clamps on the instrument panel brace and the air box.

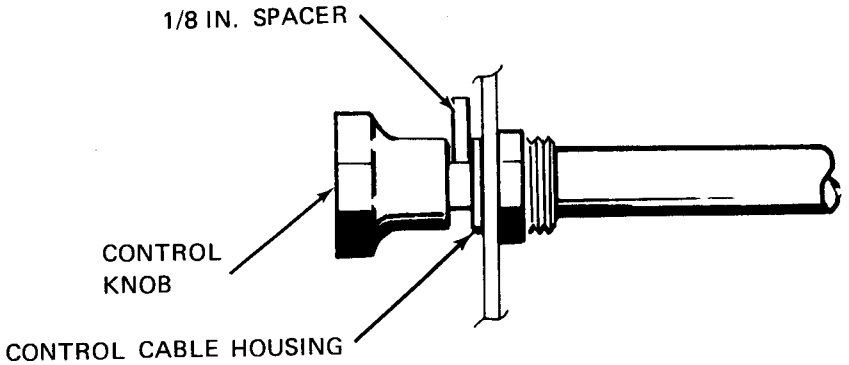
NOTE: On the Model AA-5 aircraft, the two clamps on the instrument panel brace also secure the throttle cable. Ensure that throttle cable maintains a minimum bend of 4-1/2 inches.

(5) Seal opening in firewall around carburetor heat control cable with Coast Pro-Seal 700 Firewall Sealant (MIL-S-38249, Type 1) manufactured by Essex Chemical Corp., 19451 Susana Rd., Compton, California 90221.

2. Carburetor Heat Control Adjustment/Operational Test

A. Adjustment

(1) Position the carburetor heat control arm in the completely closed position. Place a 1/8 inch spacer between the control knob and control cable housing. Refer to Figure 201.



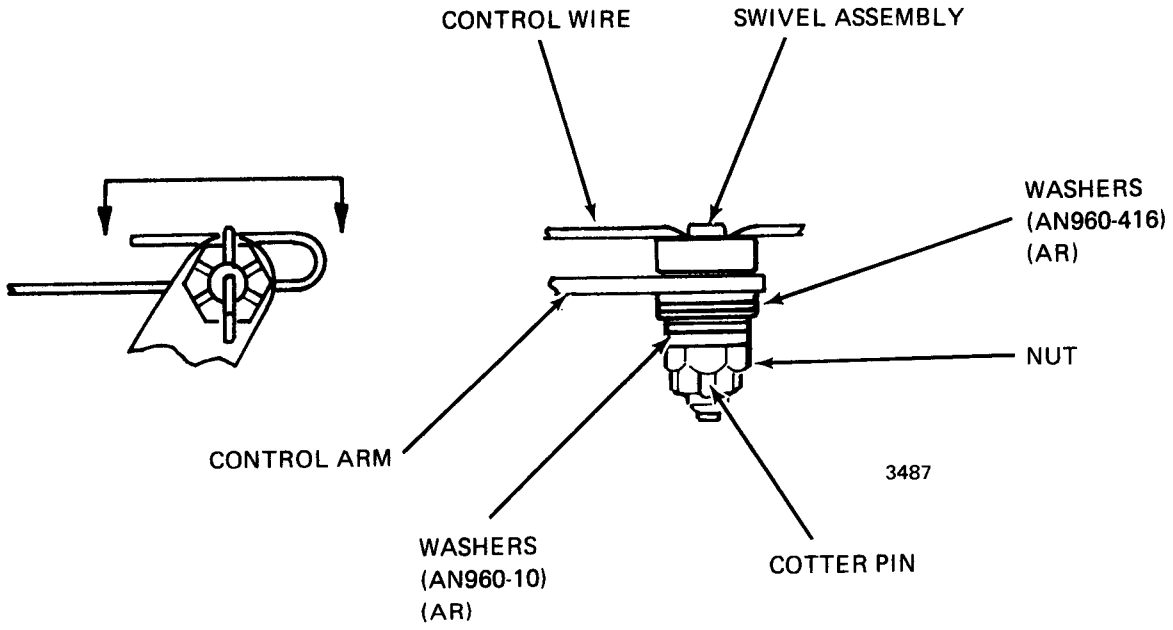
Typical Control Knob Rigging
Figure 201

(2) With the carburetor heat control in the fully closed position and the control knob against the spacer, tighten the cable clamp on the side of the carburetor air box and the control arm attaching bolt. Remove the spacer from the control knob and check carburetor heat control operation.

(3) Attach and bend the carburetor heat control cable wire (Figure 202). Tighten clamp and install the cotter pin.

B. Operational Test

Check operation of the carburetor heat control. Control should have 1/8 inch travel remaining with the control arm in fully closed position. Control cable should have 4-1/2 inches minimum bend radius.



Carburetor Heat Control Wire Installation
Figure 202

CARBURETOR HEAT SHUTOFF VALVE - DESCRIPTION/OPERATION

1. General (See Figures 2, 3 and 4 of this chapter.)

The carburetor heat shutoff valve is an integral part of the carburetor air box. The valve control arm is located on the exterior section of the carburetor air box and is connected to the carburetor heat control lever by a control wire assembly. When the shutoff valve is open, heated air is diverted to the carburetor air intake. Carburetor heat is shut off when the valve is closed.

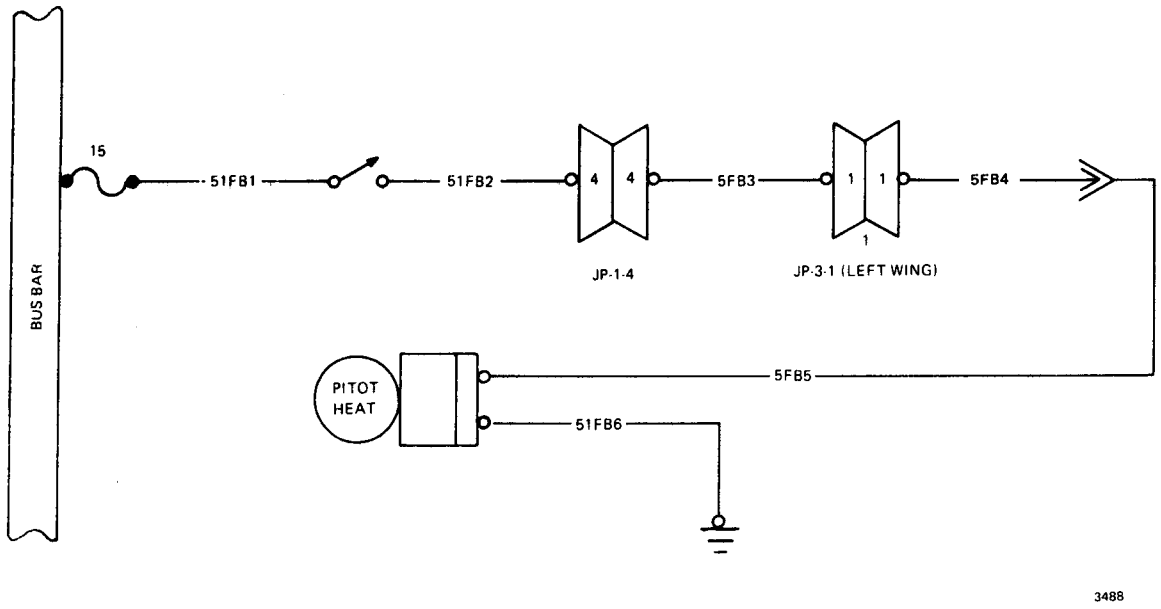
Since the carburetor heat shutoff valve is an integral part of the carburetor air box, removal or replacement of the valve requires removal of carburetor air box. (Refer to Chapter 73 of this manual).

To perform an operational test on the carburetor heat shutoff valve refer to 30-1-0, this chapter.

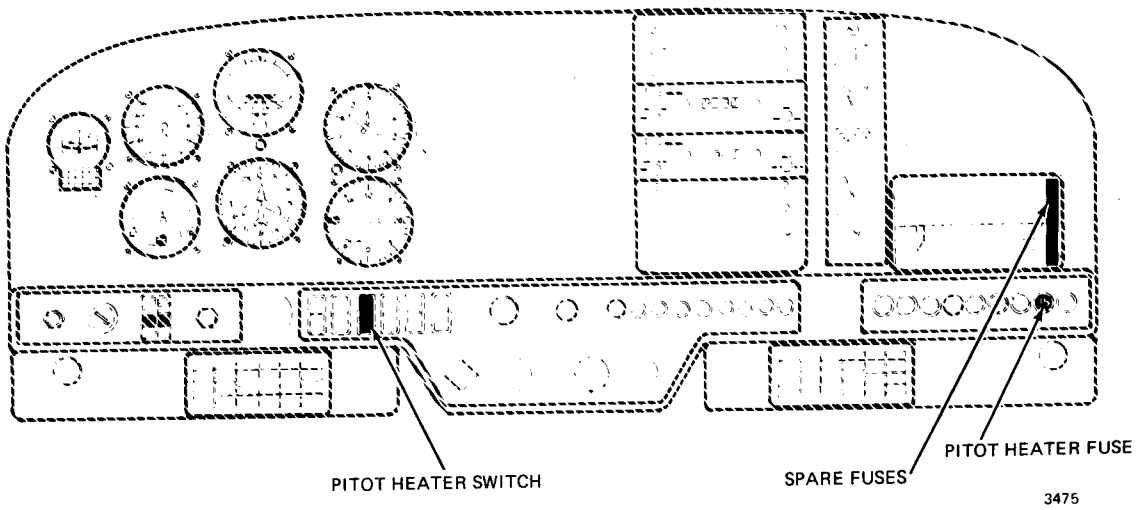
PITOT HEATER - DESCRIPTION/OPERATION

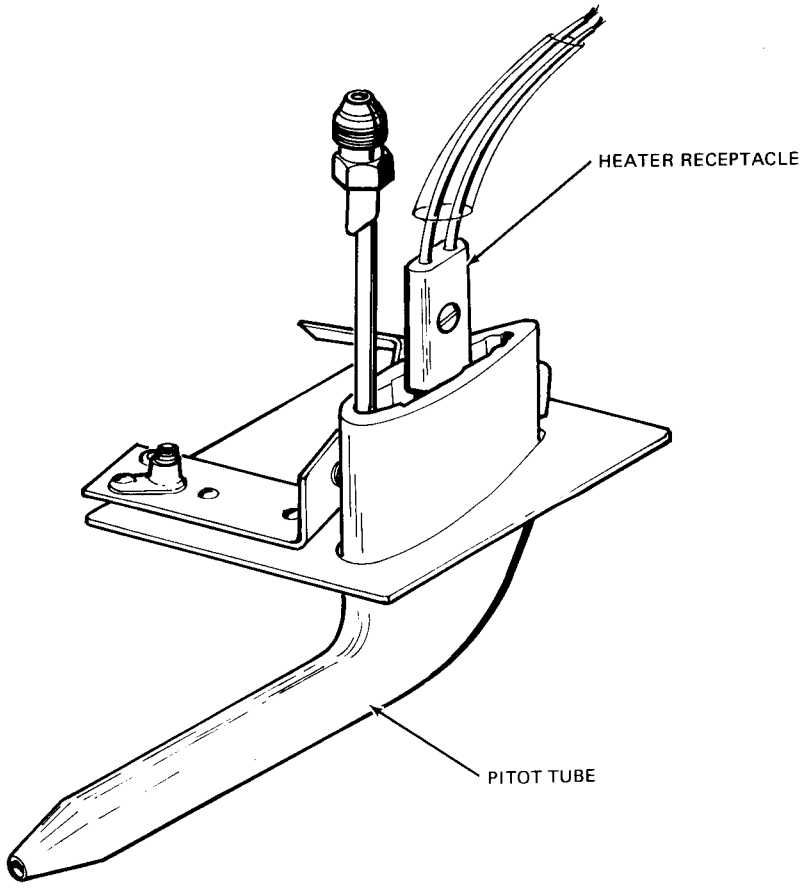
1. General

The pitot heating system (Figure 1) consists of an electric heating element which is an integral part of the pitot tube, a receptacle for connection to the element, a fuse and fuse holder, an OFF-ON switch, and associated wiring. The switch and fuse holder are of plastic construction and are mounted on the lower part of the instrument panel. The heater uses a 15-amp fuse (see Figure 2). The purpose of the pitot heater is to prevent or eliminate the formation of ice inside the pitot tube during aircraft flight. The heated pitot tube is an optional item.



Pitot Heater Circuit
Figure 1





Pitot Heater System
Figure 2

PITOT HEATER — TROUBLESHOOTING

1. Troubleshooting Pitot Heater System

TROUBLE	PROBABLE CAUSE	REMEDY
Pitot tube fails to heat.	Blown fuse	Replace with properly rated fuse.
	Defective wiring	Check with ohmmeter and repair as necessary.
	Heater element burned out	Replace pitot tube.

PITOT HEATER - MAINTENANCE PRACTICES

1. Removal/Installation of Pitot Heater

When the pitot heater becomes inoperative, the pitot tube assembly must be replaced. For removal/installation procedures refer to Chapter 34.

2. Removal/Installation of Pitot Heater Switch

A. Remove Pitot Heater Switch

(1) Ensure that master switch is in OFF position.

(2) Reach behind instrument panel and push switch unit out through the face of the panel.

(3) Disconnect wiring from switch terminals.

B. Install Pitot Heater Switch

(1) Ensure that master switch is in OFF position.

(2) Connect wiring to switch terminals.

(3) Position switch in place on instrument panel and push switch into mounting hole until switch snaps into panel.

3. Operational Test of Pitot Heater

A. Test Pitot Heater

WARNING: WHEN THE PITOT HEATER IS OPERATING THE PITOT TUBE BECOMES EXTREMELY HOT. PHYSICAL CONTACT COULD RESULT IN A SEVERE BURN.

(1) Place master switch to ON position.

(2) Place pitot heater switch to ON position. Within 2 or 3 seconds pitot tube will begin to get warm.

(3) Lightly feel the pitot tube immediately after the pitot heater switch has been placed in ON position.

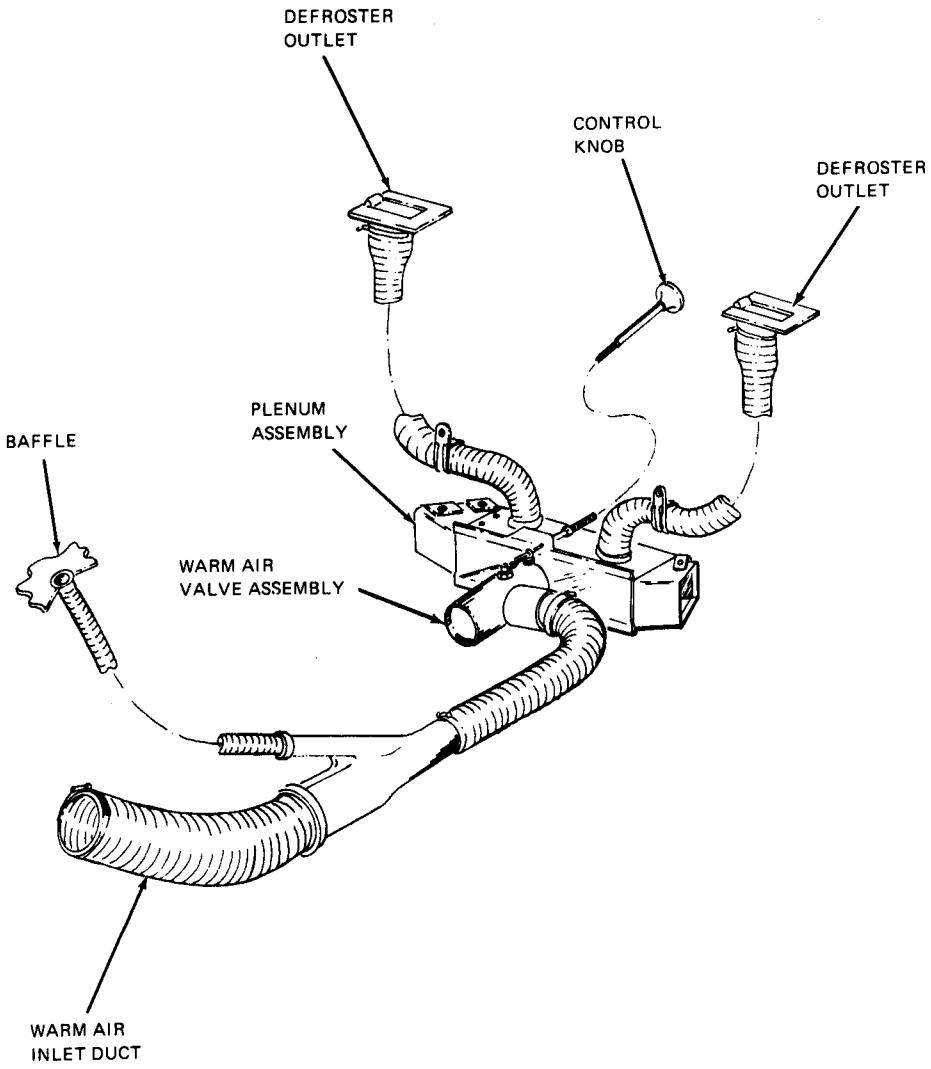
NOTE: Ground operation of the pitot heater should be held to a minimum during operational checks.

(4) Place pitot heater switch and master switch to OFF position.

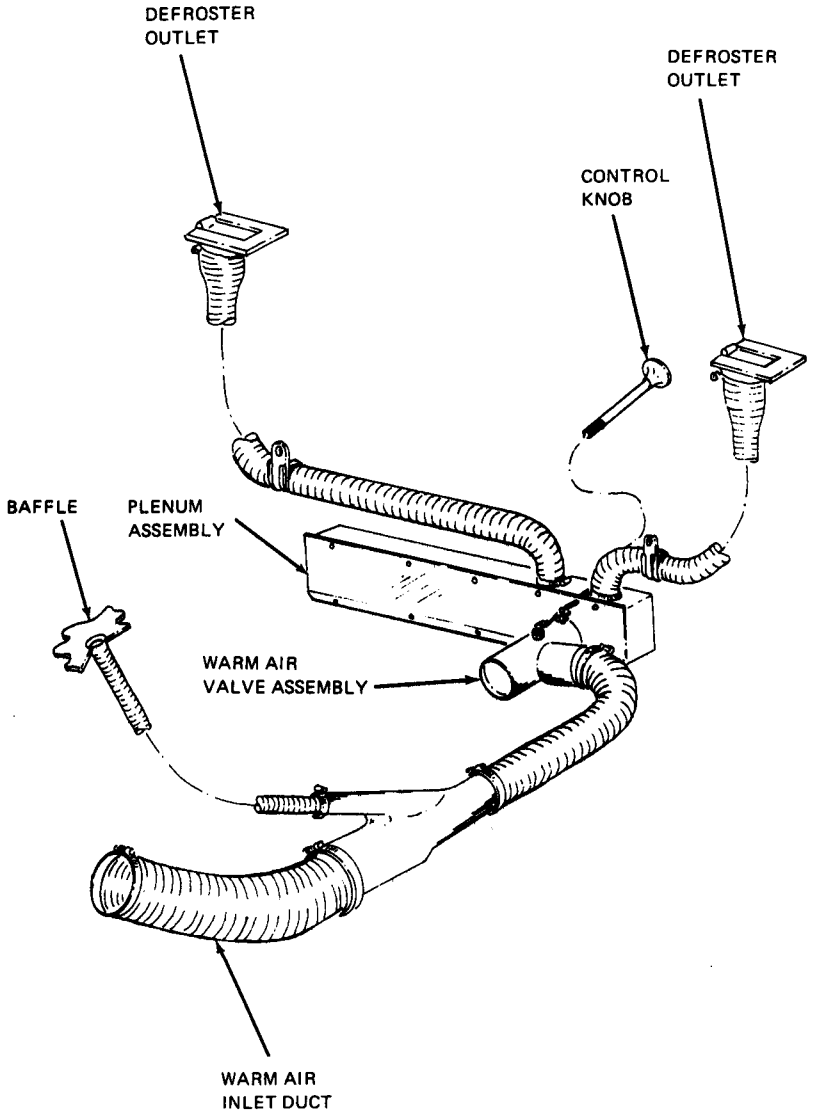
WINDSHIELD DEFROSTER - DESCRIPTION/OPERATION

1. General

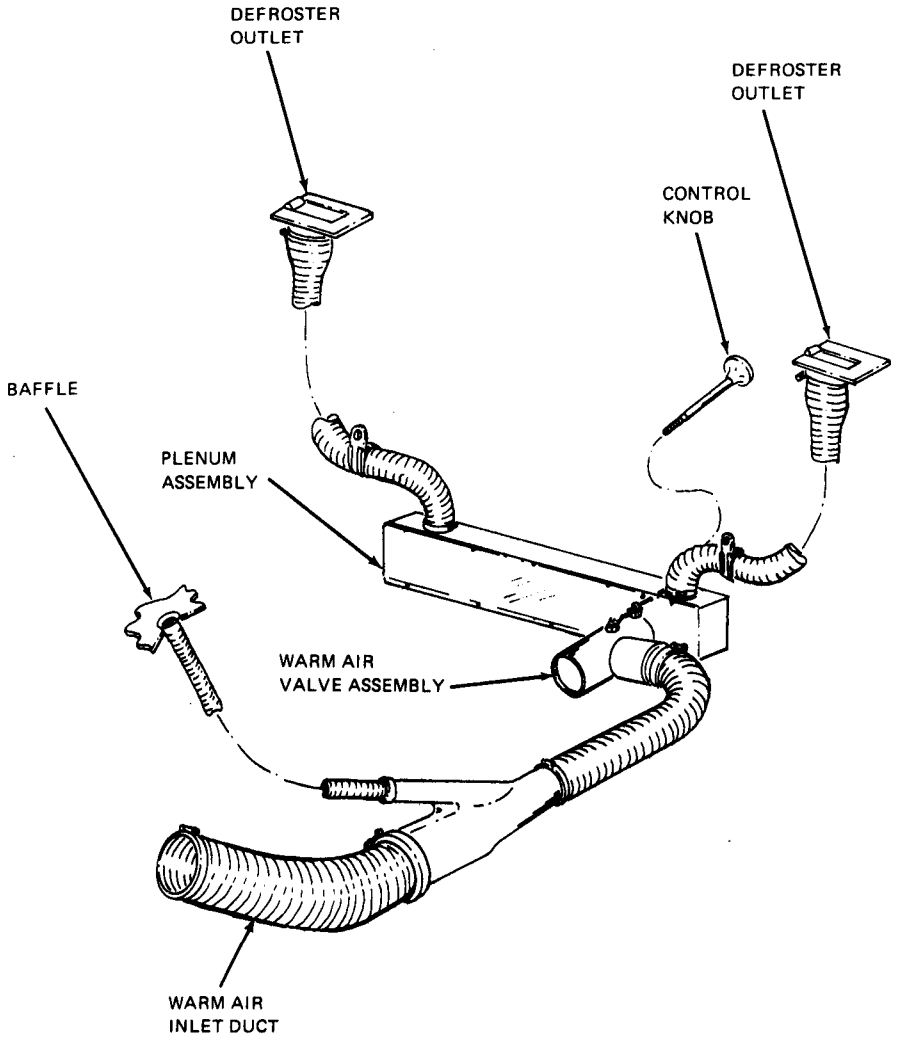
To provide for windshield defrosting, flexible ducts are connected to the plenum assembly of the heating system and terminated just below the sliding doors located on the forward panel deck. Operation of the defroster is accomplished by pulling the push-pull cabin heat control out and opening the sliding doors on the defroster outlets (see Figure 1).



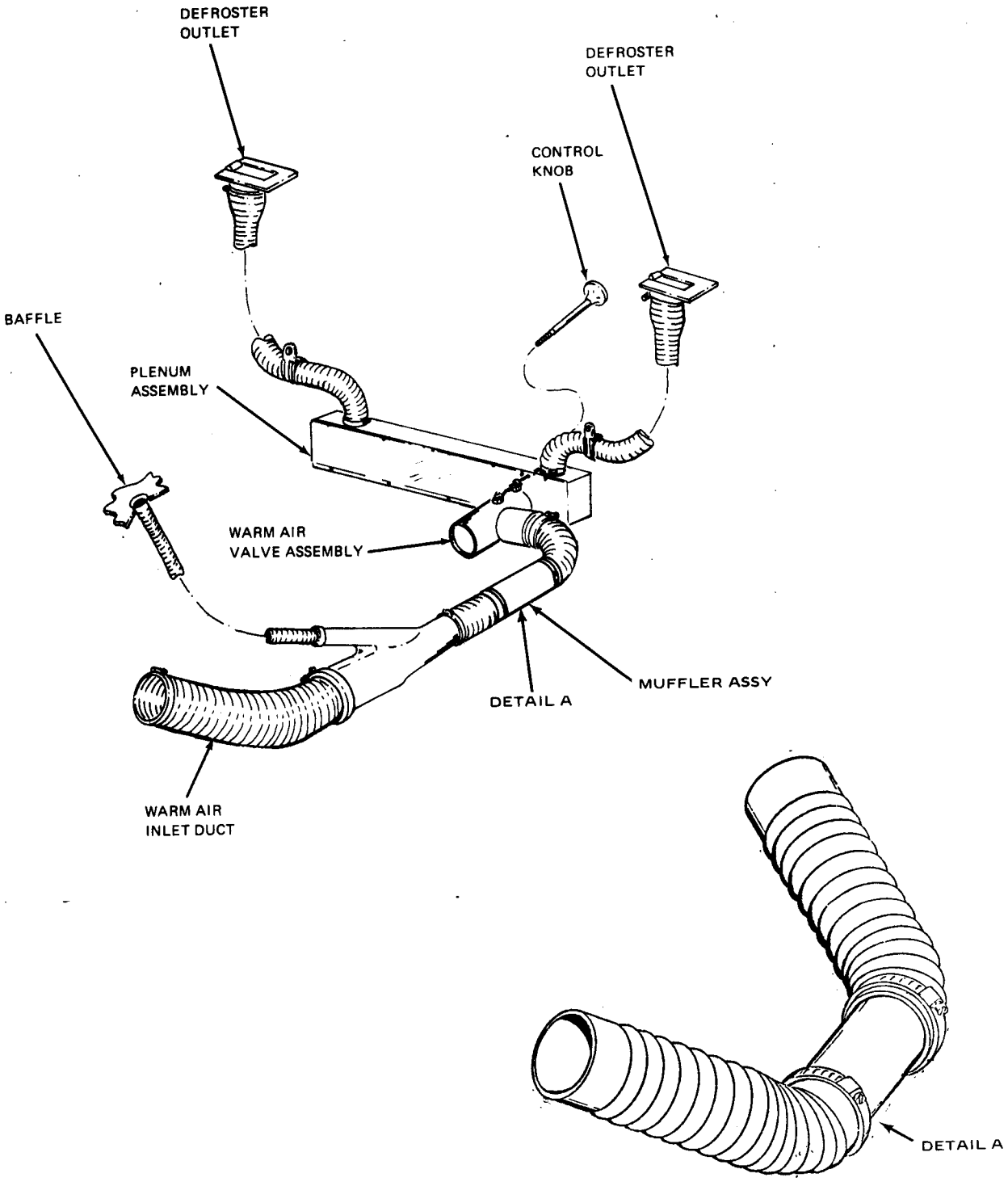
Defrosting System AA5-0001 through 0834 and AA5B-0001 through 0522 (Sheet 1 of 4)
Figure 1



Defrosting System AA5B-0001 through 0280, 0283, and 0284 (Sheet 2 of 4)
Figure 1



Defrosting System AA5B-0281, 0282, and 0285 through 0399 (Sheet 3 of 4)
Figure 1



Heating System AA5A-0523 and Subsequent AA5B-0400 and Subsequent (Sheet 4 of 4)
Figure 1