KELLY AEROSPACE
Thermal Systems

1625 Lost Nation Rd., Willoughby, OH 44094
(440) 951-4744

Installation Manual/Service Letter

Document: NC-16-014
Revision: H

EFFECTIVITY

Beech Aircraft Types: 58, 58A, G58, 56TC, A56TC, 95-55, 95-A55, 95-B55, 95-B55A, 95-C55, 95-C55A, D55, D55A, E55, E55A, A36, A36TC, B36TC & G36

REVISION HISTORY

REV	DESCRIPTION	DATE
A	Initial Release, See ECN 15-016	3/14/2017
B	See ECN 15-016	3/29/2017
C	See ECN 15-016	4/11/2017
D	See ECN 17-033	9/22/2017
E	See ECN 19-028	1/9/2020
F	See ECN 19-063	1/20/2020
G	See ECN 21-020	11/24/2021
H	See ECN 22-006	5/04/2022

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

PURPOSE

For installation of Air Conditioning System.

COMPLIANCE

Not mandatory, shall be complied with at aircraft owner's discretion.

APPROVAL

FAA approval has been obtained on all technical data in this Service Letter that affects type design.

RESOURCES

100 hours of labor are required to comply with this Service Letter.

SYSTEM OVERVIEW

The Air Conditioning System consists of an electric hermetically sealed compressor, condenser and evaporator all located in the tail cone. The system is operated through temperature selection and a climate controller located on the instrument panel. There is both a fan mode only and a cooling mode. R-134a is used as a refrigerant for the system. Power is run from the alternator under the floor to the components in the rear of the aircraft.

The Baron Model 58 Air Conditioning System S/N: TH-2125 and after is powered by the Left Distribution Bus. S/N: TH-2124 and before is powered by the Main Distribution Bus. The Bonanza Model 58 Air Conditioning System is powered by Bus 1A.

The power for the Air Conditioning System is tapped off the Main Distribution Bus just downstream of the Battery Master Relay.

If the alternators have a combined output of less than 200 amps an upgrade will be required, unless an electrical load analysis is performed on the individual aircraft.

An electrical load analysis was done for this STC; load shedding of the Prop Deice will be required for Baron Model 58 (TH-2125 and after). Load shedding of the Cabin Heater, Windshield Anti-Ice, Prop Deice, Cabin Heater and Cigarette Lighter will be required for Baron Model 58 (TH-2124 and before). Load shedding of the Prop Deice will be required for Bonanza Model 36 aircraft.

MATERIAL INFORMATION

The Kelly Aerospace Thermal Systems (KATS) document NC-16-008 lists the materials required for compliance with this Service Letter. Parts can be obtained from KATS.

INSTRUCTIONS FOR COMPLIANCE

1. **Preparation**

   A. Ensure all documentation is the latest revision and that you have the appropriate schematic.
   Baron with CB-2 Controller: AC-01394
   Bonanza with CB-2 Controller: AC-01489
   B. Conduct a parts inventory to ensure all required items are present.
   C. Open the front battery compartment in the Baron or remove the engine cowling for the Bonanza per the Beechcraft Airplane Maintenance Manual (AMM).
   D. Disconnect all aircraft batteries per the AMM.
   E. Secure external power receptacle to prevent unwanted power on aircraft busses (e.g. tape over receptacle with non-metallic masking tape with label warning of hazard).

2. **General Instructions**

   A. For all references to wire stripping, crimping and tying procedures refer to AC 43.13-1B chapter 11.
   B. For all references to riveting procedures refer to AC 43.13-1B chapter 4.
   C. Consumables to be procured locally.
      1) Paint, as required for touch up and re-coloring N numbers
      2) Masking tape
      3) Assorted sizes of tie wraps
      4) M22759/16 wire or equivalent in the sizes of AWG 8, 10, 16 and 18
      5) Hysol EA 9360 and Devcon 14265 Epoxy

D. Torque Specifications

Unless otherwise specified, use the following torque values.	
6-32 UNC	7-9 inch-lbs.
8-32 UNC	17-19 inch-lbs.
10-24 UNC	20-22 inch-lbs.
10-32 UNF	28-31 inch-lbs.
1/4-20 UNC	70-75 inch-lbs.
1/4-28 UNF	90-94 inch-lbs.
5/16-24 UNF	120-145 inch-lbs.
3/8-24 UNF	200-250 inch-lbs.
7/16-20 UNF	520-630 inch-lbs.

Table 1 – Fastener Torque Specifications

Unless otherwise specified, use the following torque values.	
5/8-18 UNF	15-20 ft.-lbs.
3/4-16 UNF	21-27 inch-lbs.
7/8-14 UNF	28-33 inch-lbs.
7/8-18 UNS	28-33 inch-lbs.

Table 2 – A/C Hose Fitting Torque Specifications

3. **Remove the following components utilizing the AMM and store securely:**

   A. All seats
   B. Cabin carpet as required
   C. Floor panels as required
   D. Pilots side interior trim below the windows
   E. Aft baggage sealing panel and rear interior trim as required
   F. Aft overhead duct connecting to the back of the headliner duct & any other attaching blowers as required

4. **Alternator Upgrade (when required)**

   A. Some Baron and Bonanza aircraft will need to be upgraded to two 100 amp alternators. If the combined power of the alternators is less than 200 amps, an alternator upgrade is required.

5. **Sidewall Cutout & Reinforcement**

Reference AC-01391 Sidewall Cutout & Reinforcement Details.

A. Locate the AC-01387 and AC-01388 cutout templates per drawing notes 2 and 3. See Figure 1 and Figure 2 for examples of the sidewall cutout process. Match drill the sidewall to the template.

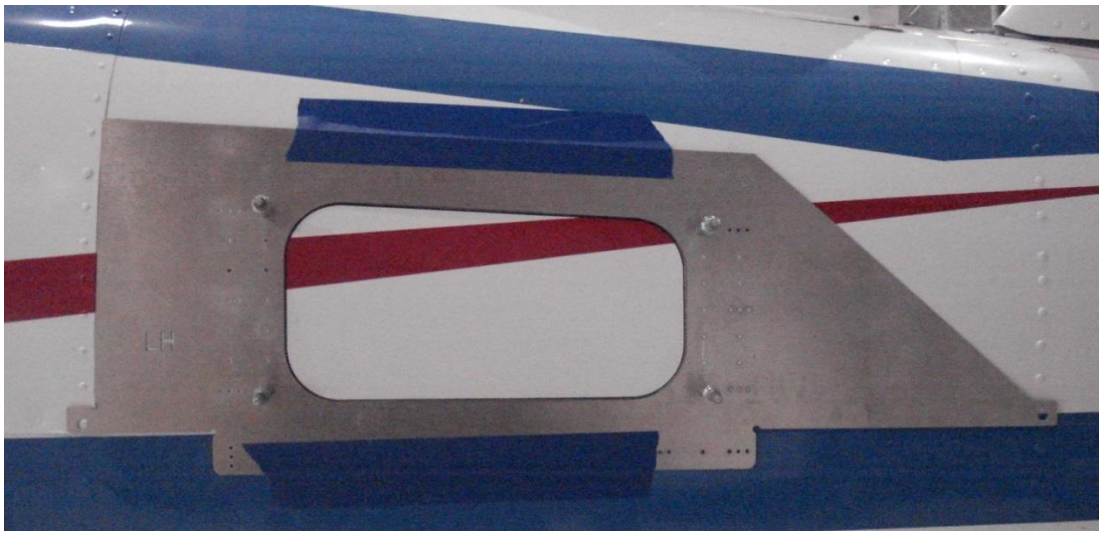

Figure 1 – LH Sidewall Cutout Template

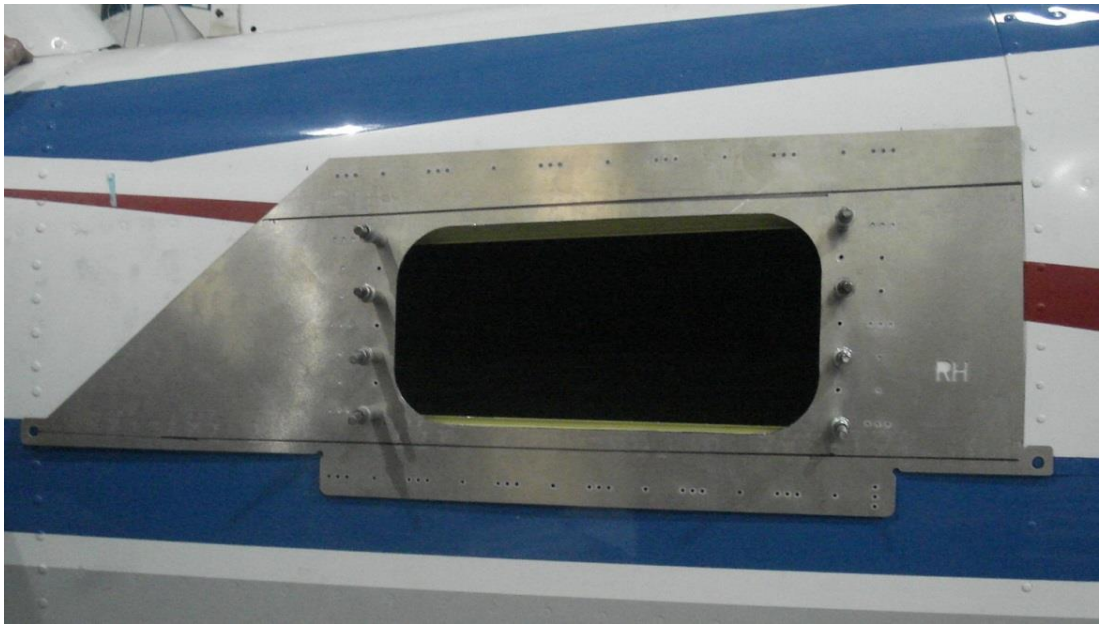

Figure 2 – RH Sidewall Cutout Template

B. WARNING: Do not cut through any stringer or bulkhead when making sidewall cutout.
C. Back drill the AC-01377 & AC-01381 sidewall doublers and match drill the AC-01345 and AC-01360 sidewall flanges, match drill the AC-01504 sidewall doubler shims beneath the portion of the stiffener below the horizontal seam per drawing notes 4 & 5. Rivet all together per same notes. See illustration in Figure 3.

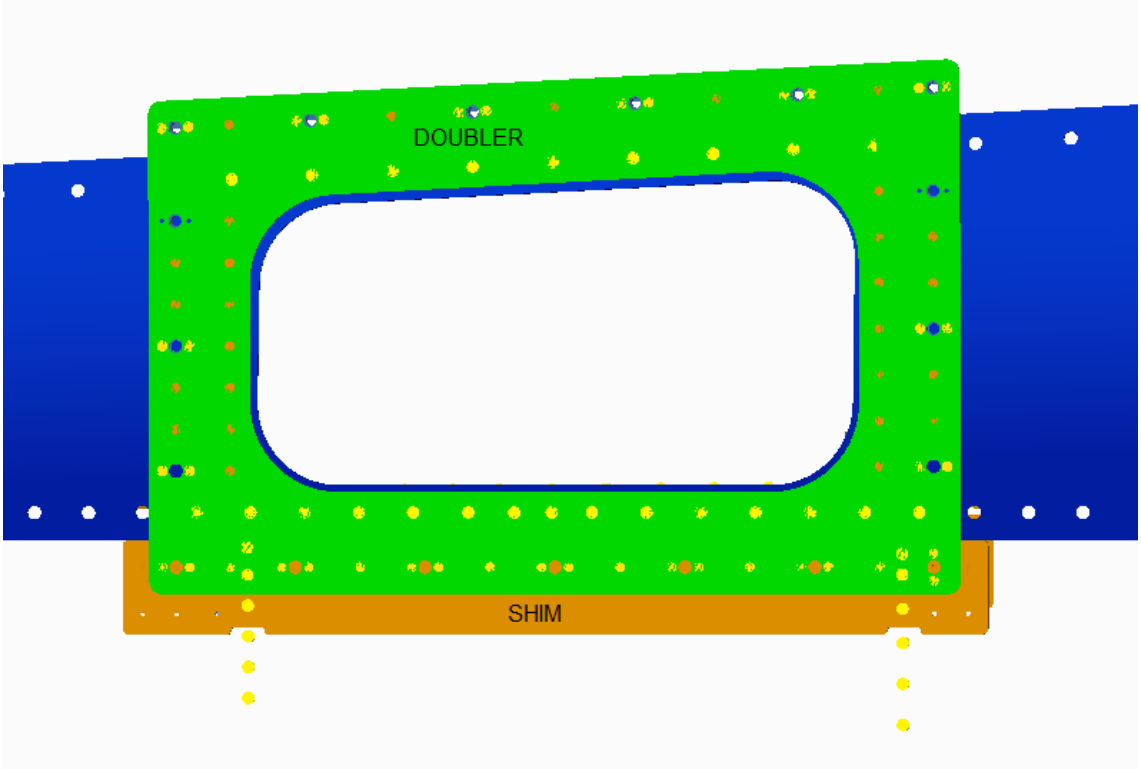

Figure 3 – LH Sidewall Cutout Stiffener

D. Locate the AC-01296, AC-01299, AC-01302 & AC-01305 condenser/compressor sidewall support brackets and angles per drawing notes 7 and 8. Results are also visible on Figure 3.
E. Drill out and replace existing 3/32” rivets per note 6.
F. Install AC-01496 and AC-01499 Condenser Support Bracket Assemblies as per drawing note 7, back drilling through the skin and shim.
G. Locate the front AC-01308 and AC-01311 sidewall supports per drawing note 9.
H. Locate the floor drains per drawing note 10.

6. **Condenser & Compressor Installation Details**

Reference AC-01390 Condenser & Compressor Installation Details.

A. Start the screws that connect AC-01340 inlet plenum to the inlet flange and the inlet flange to AC-01335 condenser assembly and the condenser assembly to support angles all at once before going back and gradually tightening everything while aligning it. See Figure 4 below.

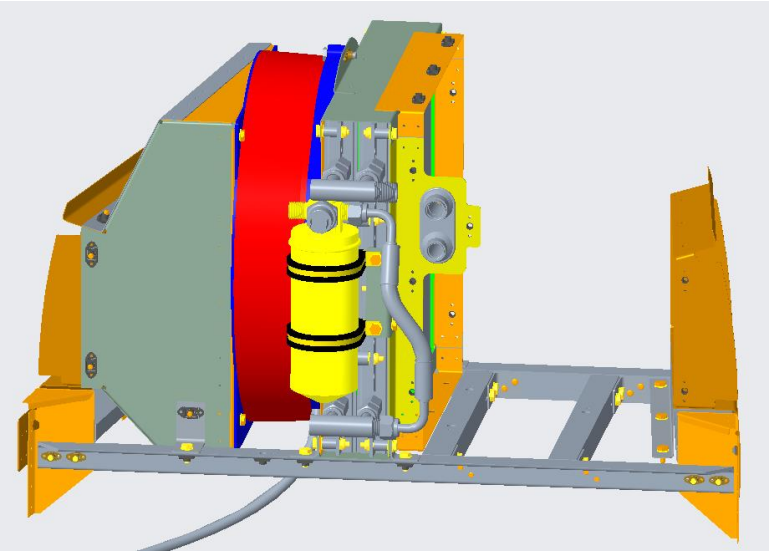

Figure 4 - Condenser Installation

B. Assemble the compressor side of the plenum and route hoses and wires per notes 3 through 6. See Figure 5 below.

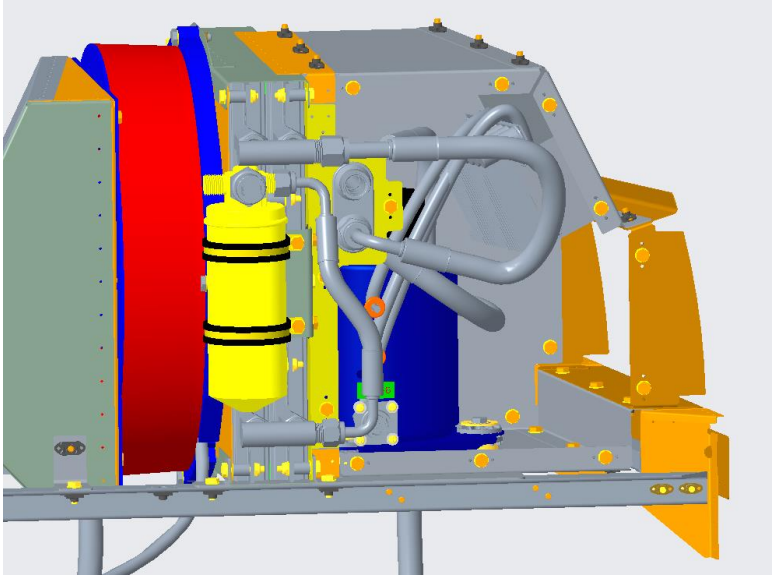

Figure 5 – Compressor Installation
(Front Cover not Visible)

7. **Evaporator Installation Details**

Reference AC-01392 Evaporator Installation Details

A. Connect the support angle to the support brackets on the sidewall per note 2.
B. Connect AC-01365 support assembly to the front of AC-01375 evaporator per note 3; secure the thermostat to the evaporator assembly per note 6. See Figure 6.

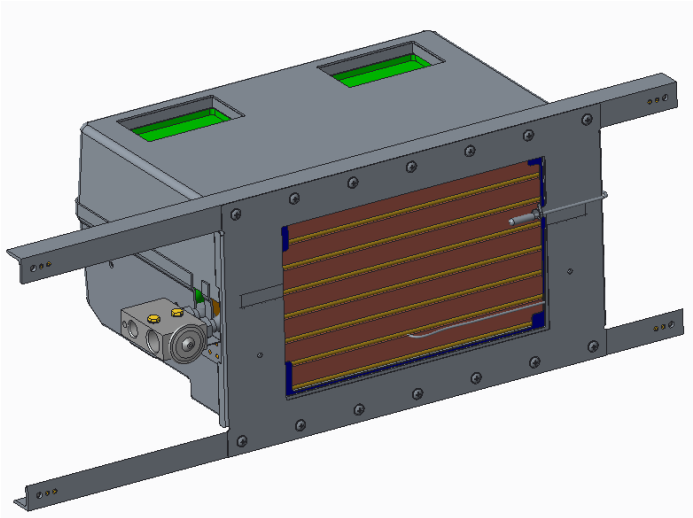

Figure 6 – Evaporator Support Assembly

C. Connect the back of AC-01375 evaporator to AC-01319 support angle per notes 2 and 4.
D. Referencing note 5 and Figure 7; connect the a/c hoses. Connect the junction harness per note 7 and 9. Referencing the appropriate schematic, connect the wiring per notes 8 & 10. Connect the drain hose per note 11.

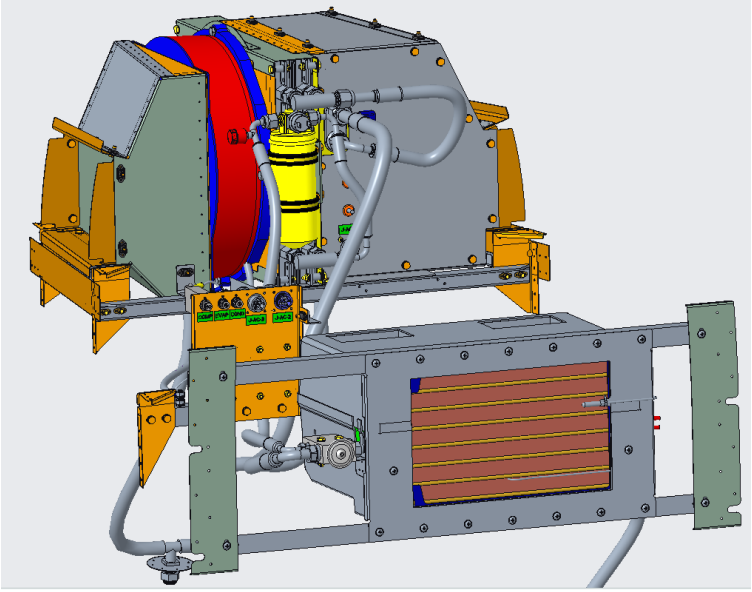

Figure 7 – Evaporator Installation

8. **Air Conditioning Installation Details**

Reference AC-01393 Air Conditioning Installation Details

A. Make the final connections per drawing notes and electrical connections per the appropriate schematic.

B. See Figure 8 and Figure 9 for illustrations of the overall installation.

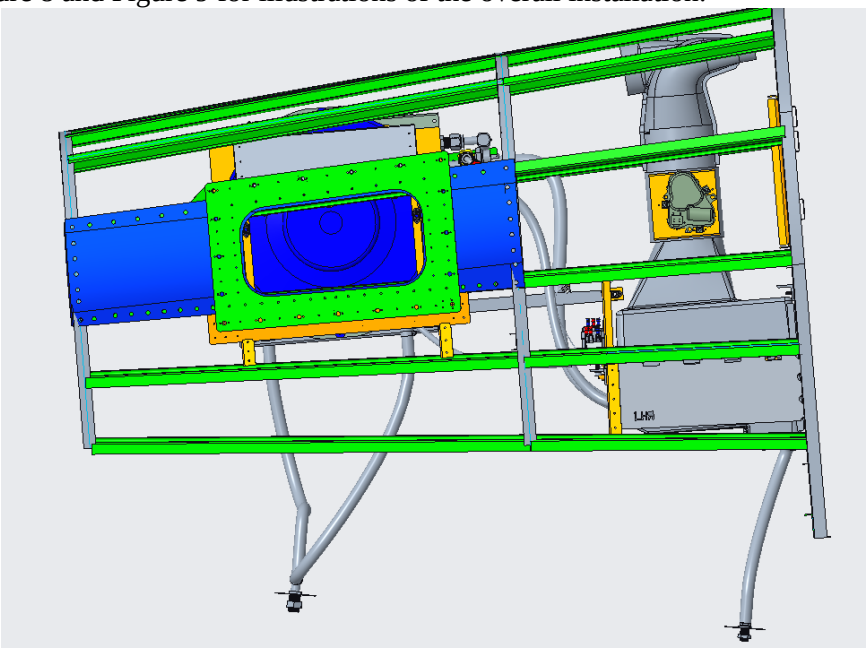

Figure 8 – Final Rear Assembly

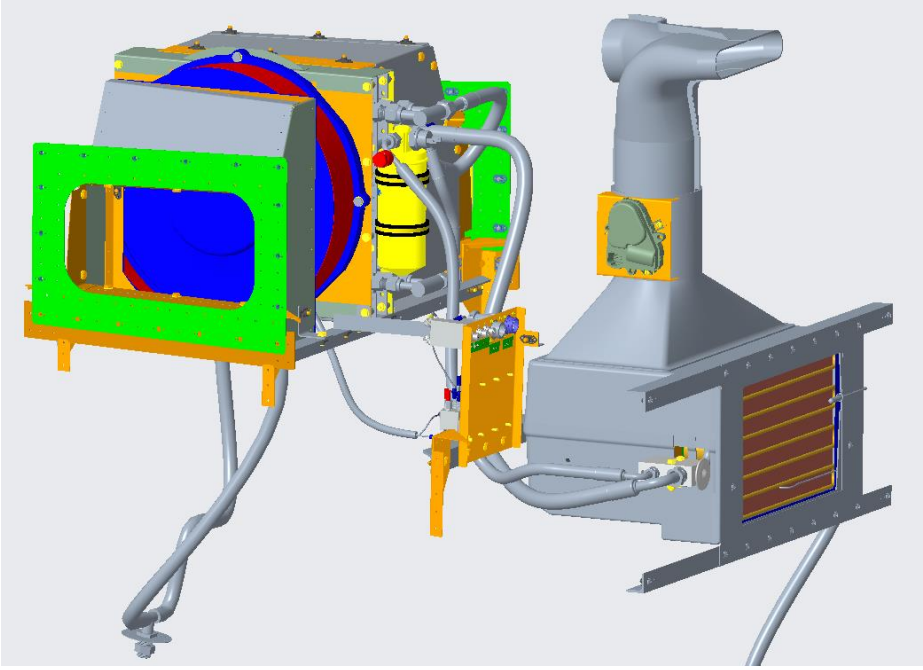

Figure 9 – Final Rear Assembly
(No Bulkheads or Stringers)

C. Connect either the AC-02006 or AC-02560 Evaporator Outlet Assembly in place of the air splitter or duct previously removed.
   1. For Baron and Bonanza aircraft with cabin overhead panel ducting that connects to Beechcraft P/N: 58-550014-3 Plenum which is supplied with fresh air from the dorsal inlet, use AC-02560 Evaporator Outlet and install the Short Duct modification per NC-20-001.
   2. For Baron and Bonanza aircraft where the overhead panel *does not* have ducting that extends to the rear of the cabin, use either AC-02006 *or* AC-02560 with the nose profile and flashing trimmed as shown in Figure 10 and install the Long Duct modification per NC-20-011.

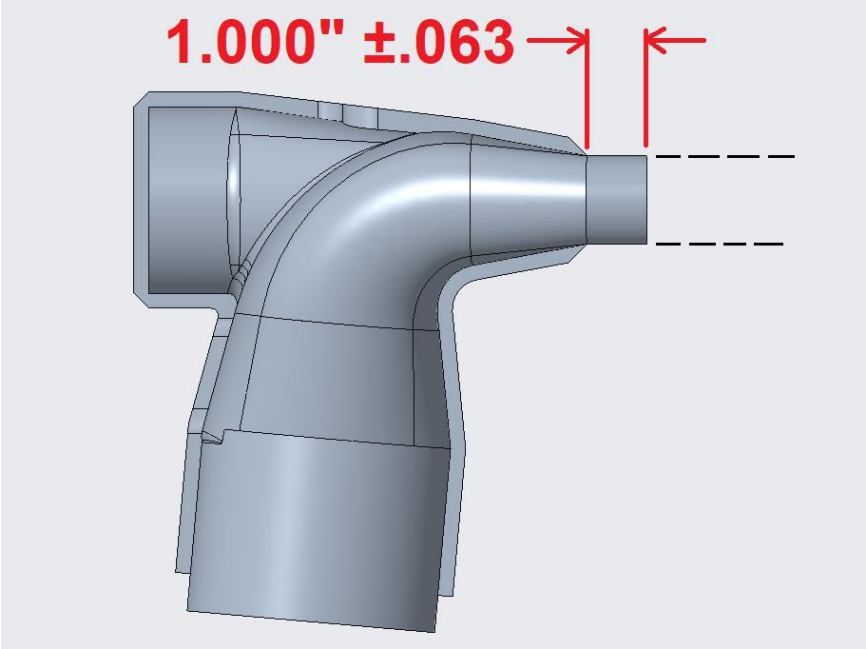

Figure 10 – AC-02560 Nose and Flashing Trimmed

   3. For all other aircraft, either modify AC-02006 by trimming material and flashing from the back *or* modify AC-02560 by trimming material and flashing from the front then the back. Either option creates the necessary thru passage from back to front. See Figure 11.

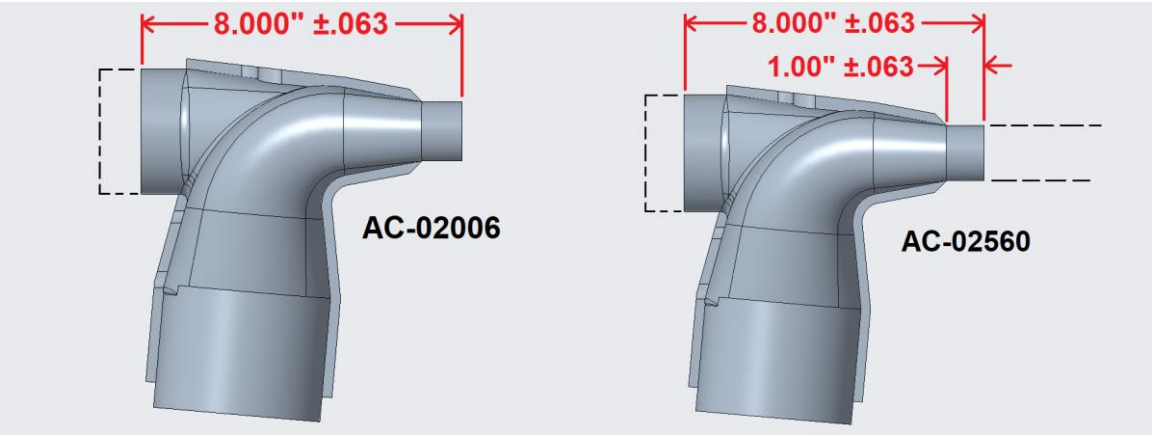

Figure 11 – AC-02006 and AC-02560 Trimmed

4. For Barons that have a vent with two inlets and a 3" flexible scat tube connected to the back: place the existing tube to the back of AC-02006/AC-02560.
5. For Barons that have a vent with one inlet and a shutoff valve inside the vent: place the valve partially inside AC-02006/AC-02560, secure with a 200-44H hose clamp. Place the existing tube to the other side of the shutoff valve. See Figure 12.
6. For Bonanzas, in all cases: the existing tubing needs to be replaced with 3" SCAT tubing and routed below the compressor stand and back up to the back of AC-02006/AC-02560. Secure hose in place with wire ties as required keeping it elevated. See Figure 13.
7. For Bonanzas that have a vent with two inlets and 3" flexible scat tube connected to the back: connect the new 3" SCAT tubing directly to the back of AC-02006/AC-02560.
8. For Bonanzas that have a vent with on inlet and shutoff valve inside the vent: place the valve partially inside AC-02006/AC-02560, secure with a 200-44H hose clamp. Place the new tube to the other side of the shutoff valve. See Figure 12.

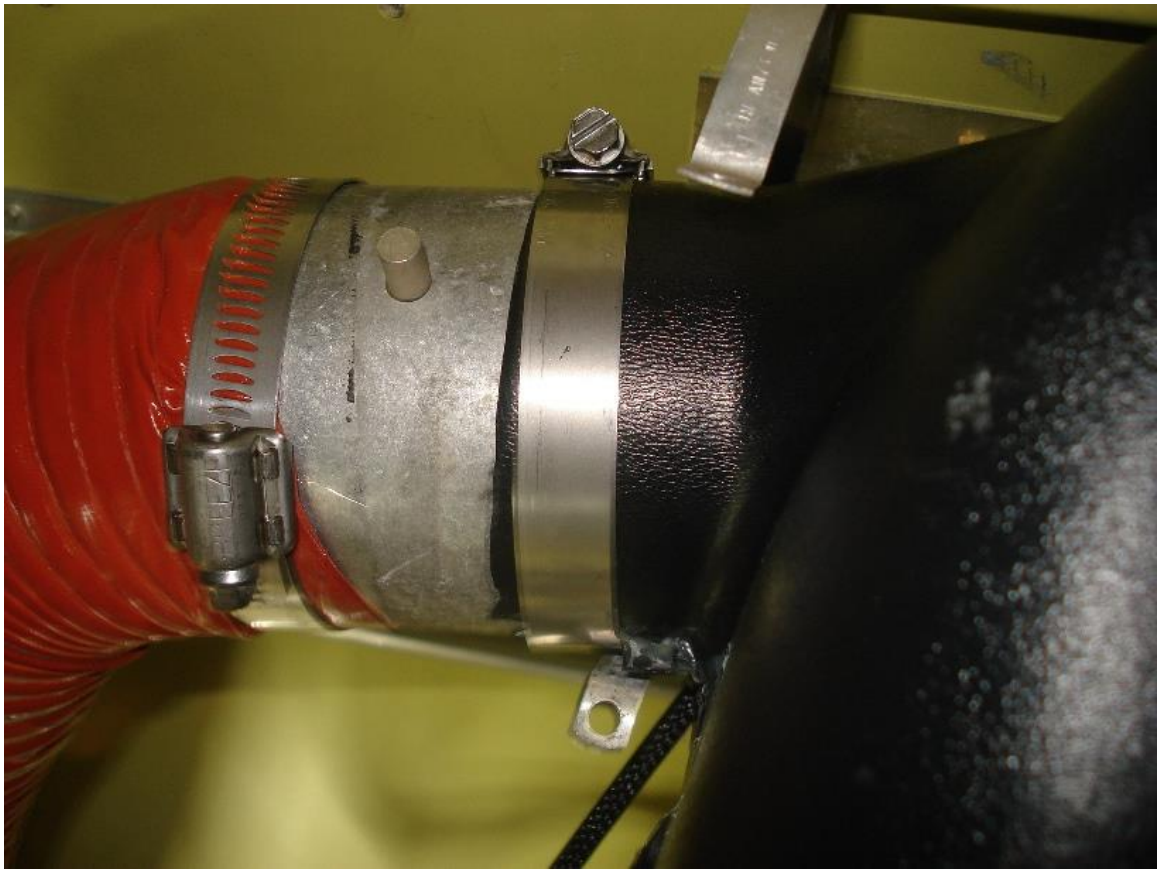

Figure 12 - Shutoff Valve and Tubing Install

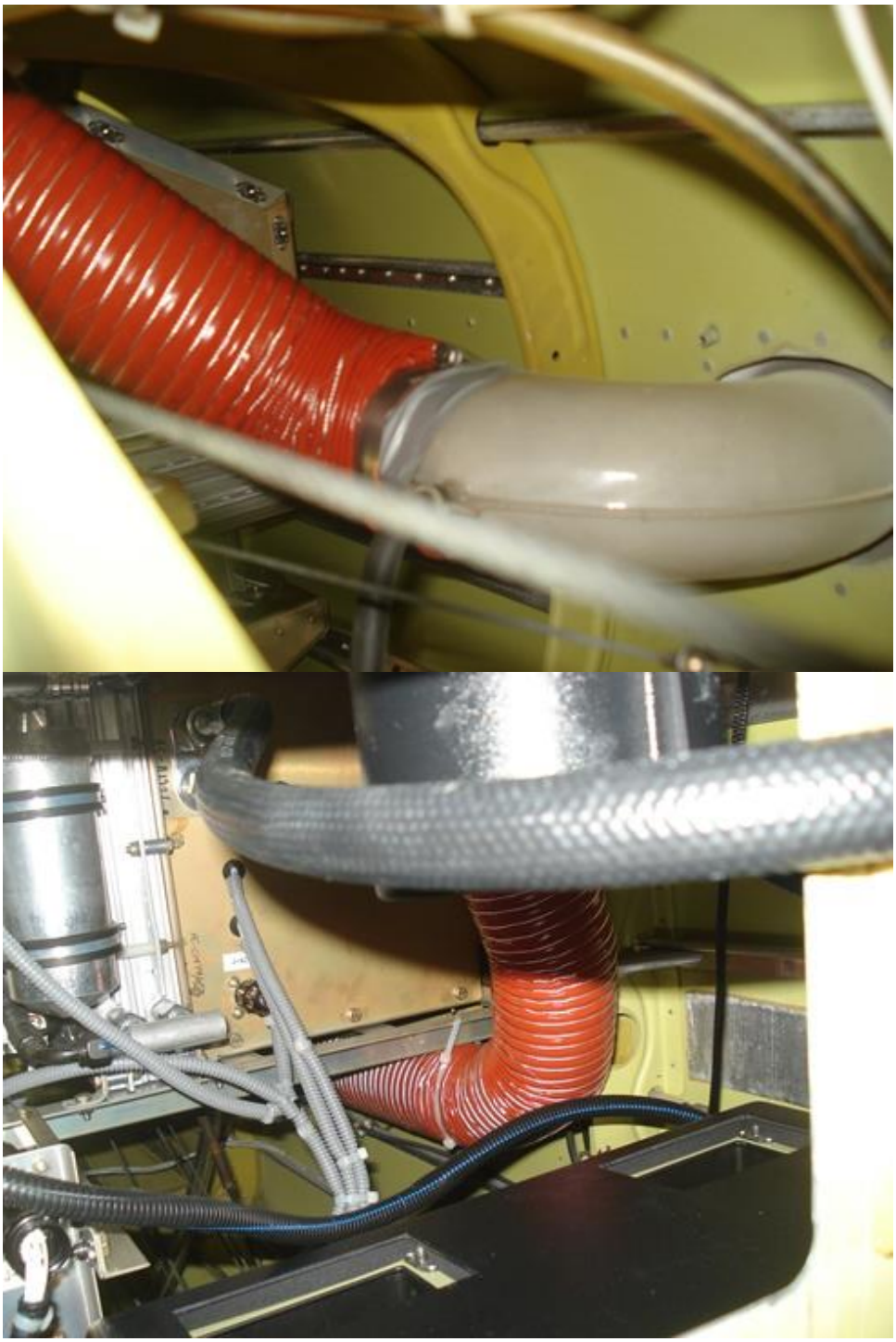

Figure 13 - Bonanza Tubing Routing

D. See Figure 14, Figure 15, Figure 16, Figure 17 & Figure 18 for suggested power wire, ground wire and controller to evaporator harness routing from beneath the instrument panel along the side of the plane back to the junction assembly.

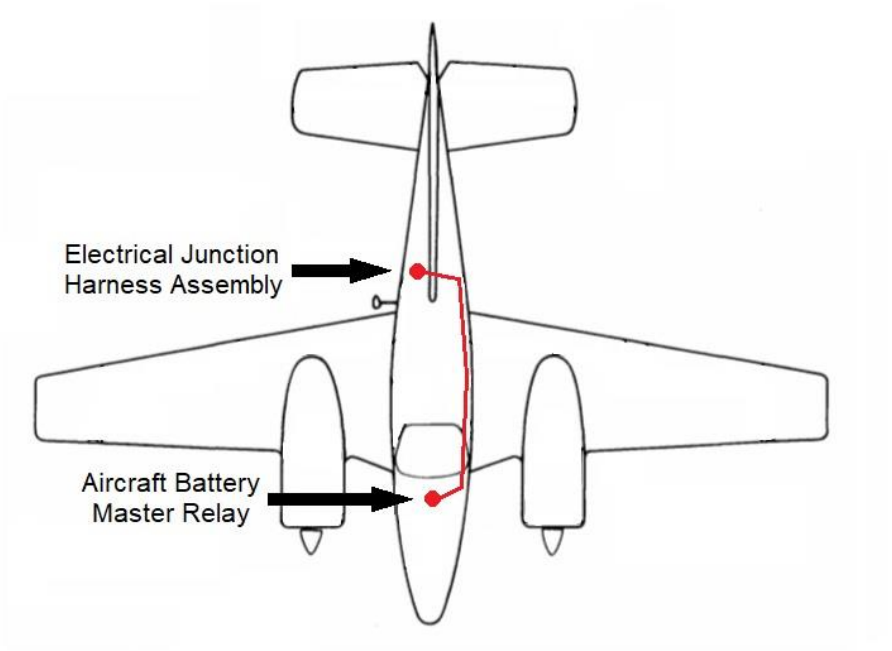

Figure 14 – Wire Routing Diagram

Figure 15 – Wire Routing, Front

Figure 16 – Wire Routing, Front Sidewall

Figure 17 – Wire Routing, Rear Sidewall

Figure 18 – Wire Routing, Rear

E. For most aircraft, the rear baggage closeout trim piece lies directly in front of the Evaporator. For this configuration, proceed to step 1). For aircraft with a hat shelf, the Evaporator has a Cabin Inlet Duct (ref Figure 20) installed. For this configuration, proceed to step 2).

1) Cut a window in the rear baggage closeout to match the evaporator inlet (approximately 11.25" x 6.875"). Install the AC-02237 Cabin Inlet Doubler around the cutout by match drilling the 14 holes in the Doubler through the closeout with a 13/64" drill bit and affixing (8) AN525-10R9 Washerhead Screws, (8) AN960-10L Washers and (8) AN365-1032A Nuts. Install (3) 1897A410 Handles to protect the inlet with (6) MS35206-265 Screws, (6) AN960-10L Washers. Touch up exposed hardware with black paint if desired. Frame back side of cutout with 8694K12 foam to ensure a complete seal between the blockoff and the face of the evaporator. Relocate registration paper holder if required. See Figure 19.

Figure 19 – Cabin Inlet Doubler Installed

2) Cut a window in the rear blockoff trim piece centered to match the Cabin Inlet Duct opening, but about ¼" smaller on each side (approx. 11.25" x 6.875"). Match drill the corresponding attachment holes with a 13/64" drill bit. Install the AC-02237 Cabin Inlet Doubler and (3) 1897A410 Handles to the blockoff trim with (6) MS35206-265 Screws, (6) AN960-10L Washers. Set the trim piece into place then affix the trim piece to the Cabin Inlet Duct with (8) AN525-10R9 Washerhead Screws. Touch up exposed hardware with black paint if desired.

Figure 20 - Evaporator with Cabin Inlet Duct

9. **Front Seat Controls**

   A. Install climate controller in instrument panel where space permits. See drawing CB-2 for the recommended panel cutout.

10. **Firewall Forward**

   A. Reference the appropriate schematic.
   B. Route AWG 6 wires through firewall with all the other power wires.
   C. Ground AWG 6 ground wires to existing 5/16 stud near battery
   D. Drill holes and mount the Fuse Holder & Fuse (Littelfuse P/N: 0498900.TXN and 0498070.M) with AN960-6L Flat Washers and AN365-632A Lock Nuts and MS35206-230 Screws near the battery. See Figure 21 for installation in the Baron in the battery bay. See Figure 22 for installation on the firewall in the Bonanza.

Figure 21 – Baron 58 Current Limiter Installation

Figure 22 – Bonanza 36 Current Limiter Installation

11. **Piezo Installation (Optional)**

A. Reference the appropriate schematic.
B. Place the Piezo switch and relay near External Power Receptacle. See Figure 23 for an installation example in the Baron. See Figure 24 for an installation example in the Bonanza.

Figure 23 – Baron Piezo Switch Installation

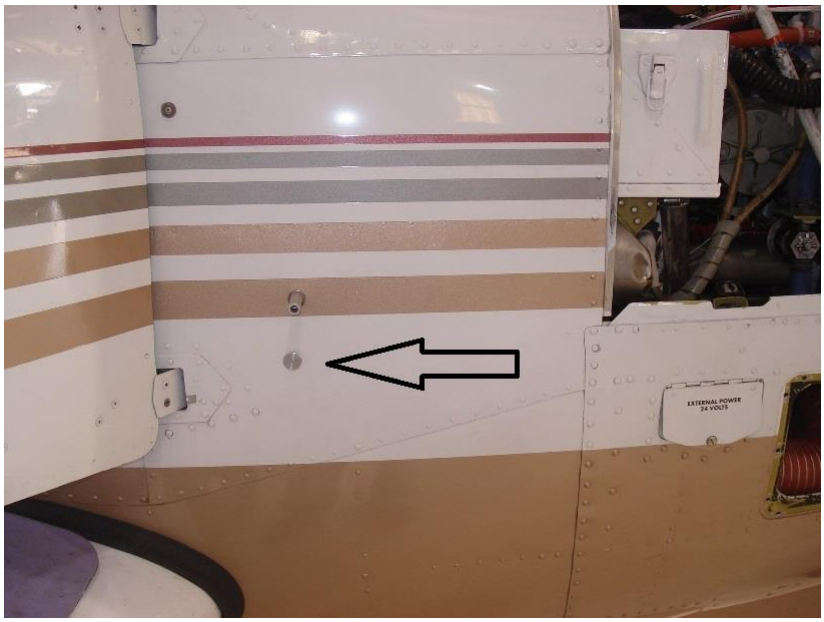

Figure 24 – Bonanza Piezo Switch Installation

12. **Wiring**

Reference the appropriate schematic.

A. All harness runs below the cabin floor and behind sidewall trim should be inside conduit.
B. The controller harness runs from copilot's instrument panel to the left aft tail cone by following the existing wiring bundles and crossing over the center line of the aircraft under the avionics/hat rack area.
C. ENSURE NO CONTROL CABLE INTERFERENCE
D. Sufficient wire bundle length has been provided to accommodate variations in wire routing.

13. **Modification of existing components**

Paint reworked areas per AMM as required.

14. **Servicing**

A. Only qualified personnel with proper equipment may service this Air Conditioning System. Connect condenser, evaporator and compressor hoses per Figure 25 below.

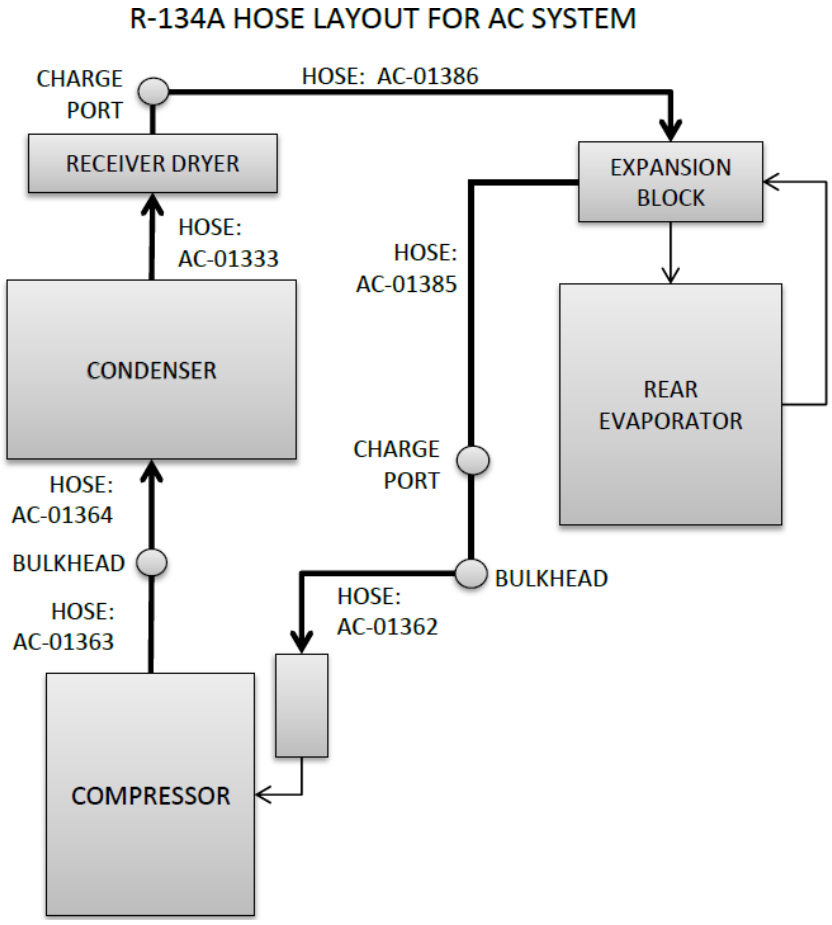

Figure 25 – Hose Layout

B. Wrap lines where required (near expansion block) to prevent sweating with cork insulation tape P/N 4217-W3.
C. Evacuate system and ensure no system leakage prior to charging with R-134a.
D. Charge system with 34oz. +/- 2 oz. of R-134a.

15. **Reassembly of aircraft**

A. **Prior to reassembly inspect entire air conditioning installation to ensure there is no interference with existing aircraft systems: i.e. Flight controls, wiring, fuel lines, etc.**

B. Reinstall the following components utilizing the AMM.
   1) All seats
   2) Cabin carpet as required
   3) Floor panels as required
   4) Pilots side interior trim
   5) Rear interior trim as required
C. Reinstall aircraft battery per the AMM.

D. Reinstall the engine cowling per the AMM.

16. **Perform operational tests of air conditioning system**

A. Plug in external power and energize.
B. Turn Master switch on.
C. Turn Climate Controller on.
D. Cabin temperature should be displayed.
E. Select fans up and fan speed should correspond.
F. Drive cabin temperature requested below ambient temperature by at least 10 degrees F.
G. Outlets should flow air 20-30 degrees cooler than ambient.
H. Check that water is coming from evaporator drain line. Water will not be present only if atmosphere is extremely dry, so if no water is flowing check for hose continuity to evaporator plenum.
I. If any items do not operate as described, troubleshoot system and correct discrepancies.
J. Turn Climate Controller off.
K. Aircraft will need to be located in a run up area to complete this section.
L. Utilizing qualified personnel operate the aircraft engine per the Pilot Operating Handbook.
M. If further assistance is needed contact KATS technical support at (440) 951-4744.

17. **Return to service**

A. Update aircraft Weight and Balance records.
B. Install Approved Flight Manual Supplement.
C. Complete FAA form 337.
D. Make aircraft log book entry.