United States of America
Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA02002CH

This certificate issued to

Hartzell Engine Technologies LLC
2900 Selma Highway
Montgomery, Alabama 36108

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 3 *of the* Civil Air *Regulations.*
See Aircraft Specification No. 5A4 for complete certification basis.

Original Product--Type Certificate Number: 5A4

Make: Raytheon (Beech)

Model: 50 (L-23A), B50 (L-23B), C50, D50 (L-23E), D50A, D50B, D50C, D50E, D50E-5990, E50 (L-23D, RL-23D), F50, G50, H50, J50

Description of Type Design Change:
Installation of C&D Associates Combustion Heater Kit 14 P/N CD14060K14, in accordance with C&D Associates heater Installation Instructions IN14060K14, Rev. A, dated April 15, 2004 or later FAA approved revision.

Limitations and Conditions:

1. Compatibility of this design change with previously approved modifications must be determined by the installer.
2. FAA Approved Airplane Flight Manual Supplement signed and dated May 28, 2004 is required.
3. Check aircraft Weight and Balance.
4. Full compliance with the C&D Combustion Heater Airworthiness Limitations, MM10000 Maintenance Manual, Second Edition, Rev A, dated April 4, 2002, or later FAA approved revision, is required.
5. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: April 27, 2004

Date reissued: February 11, 2016

Date of issuance: July 7, 2004

Date amended:

By direction of the Administrator

(Signature)

Timothy P. Smyth
Manager,
Chicago Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

C&D ASSOCIATES, INC.

HEATER INSTALLATION INSTRUCTIONS FOR
HEATER KIT #14, P/N CD14060K14

For Twin Bonanza 50 (L-23A), B50 (L-23B), C50, D50 (L-23E), D50A, D50B, D50C, D50E, D50E-5990, E50 (L-23D, RL-23D), F50, G50, H50, and J50

READ COMPLETE INSTRUCTIONS BEFORE BEGINNING INSTALLATION
Accomplish all wiring in accordance with AC43.13-1B Chapter 11, Electrical Systems.
Accomplish all plumbing in accordance with AC43.13-1B Chapter 8, Section 2, par. 8-31.

1. Preparation

A. Heater removal (Refer to Fig 46, Locator Schematic)
Note: Follow the existing aircraft manual or other FAA instructions for removal of the following items.
1) Remove the following items as completely as possible:
a. Heater (under nose baggage floor – right side)

FIGURE 1
O.E. SYSTEM UNDER NOSE BAGGAGE FLOOR

FIGURE 2

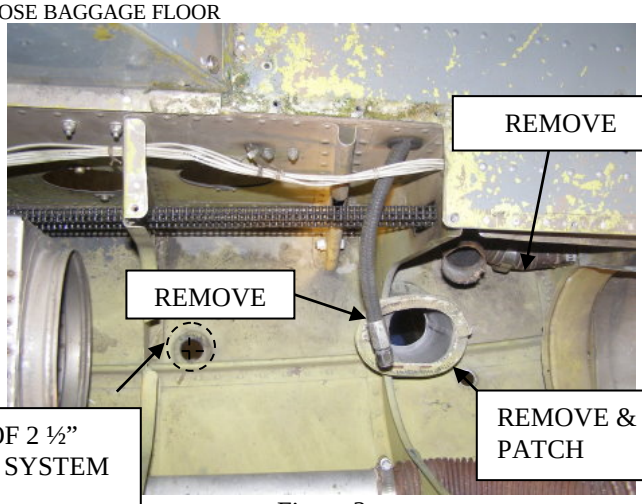


Figure 3
O.E. HEATER REMOVED ACCESS
FOR EXHAUST SHROUD REMOVAL AND PATCH

b. Ventilation Blower Assembly removed. Remove Static Air Blower assembly (P/N 50-554098-1) including blower duct assembly (P/N 50-554128 (-1) (nose wheel well)

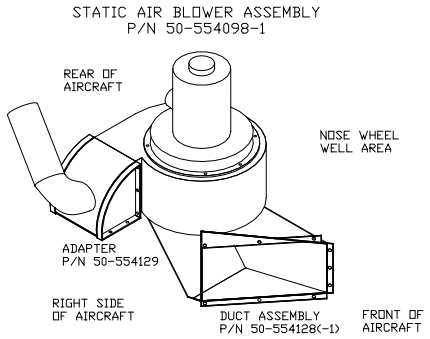


FIGURE 4

FIGURE 5
PRIOR TO BLOWER REMOVAL.
(RIGHT SIDE NOSE GEAR CAVITY)

FIGURE 6
VENTILATION PLENUM, REMOVE TWO PLUGS AND USE LONG REACH PHILLIPS TO REACH HIDDEN SCREWS

FIGURE 7
WITH O.E. BLOWER ASSEMBLY REMOVED

c. Ignition Removal, (A55A00 series or 11C30 series) and ignition lead (left side nose wheel well).

FIGURE 8 (BEFORE)
(LEFT SIDE NOSE GEAR CAVITY)

FIGURE 9 (AFTER)
IGNITION UNIT & LEAD REMOVED.

d. Exhaust shroud and gasket (P/N 50-554061 and 50-554091) (Riveted to A/C at bottom of heater cavity area)

FIGURE 10
REMOVAL OF O.E. EXHAUST SHROUD
IN PREP FOR PATCH

e. Fuel pumps and shut off valve (right wheel well)

FIGURE 11 (BEFORE)
O.E. FUEL TRAIN.
(INBOARD SIDE RIGHT GEAR WELL)

FIGURE 12 (AFTER)
WITH O.E. PUMP & SOLENOID REMOVED.

f. Fuel shut off (nose wheel well), Fuel filter assembly and flex line to heater.

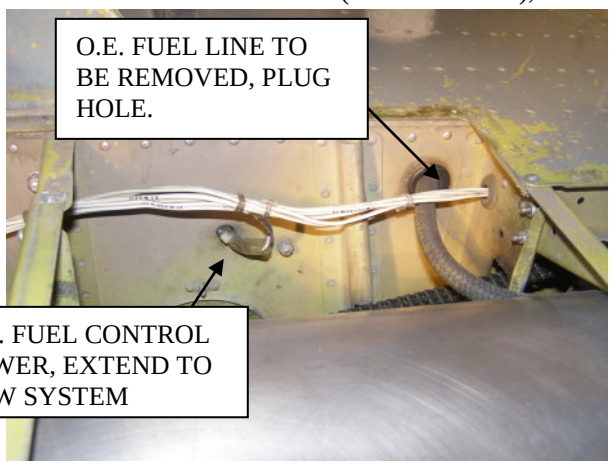


FIGURE 13

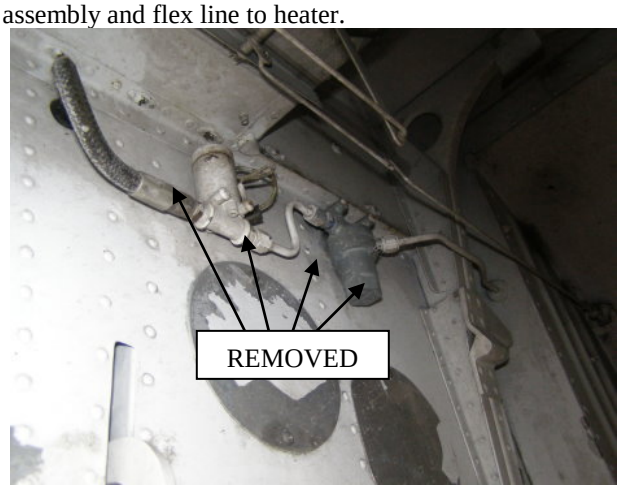


FIGURE 14
O.E. FUEL CONTROL (RIGHT SIDE NOSE GEAR WELL)

g. Thermostat sensor in cabin and attaching parts [P/N 50-554003 (-602) or 25623150 (-1)]
h. Thermostats C-150 and C-300T (located aft of heater in the outlet plenum, outboard side)

FIGURE 15
SHOWN WITHOUT CONDENSER

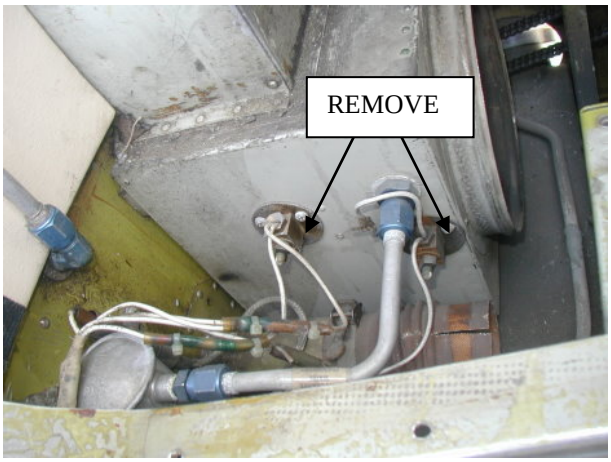


FIGURE 16
SHOWN WITH COOL AIR CONDENSER & PUMP

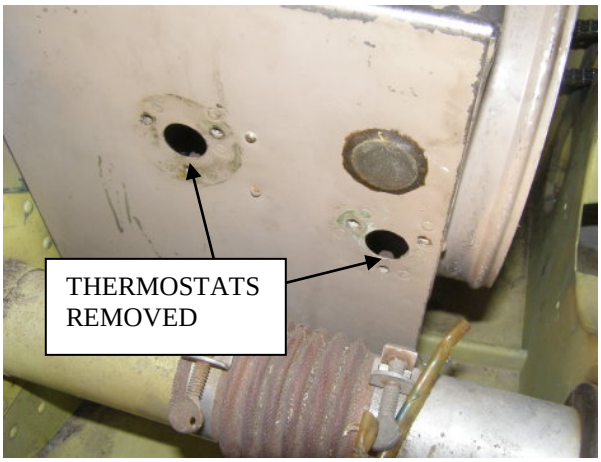


FIGURE 17

i. Flapper door located inside the fresh air inlet plenum must be removed. Best access is accomplished once the heater is removed.

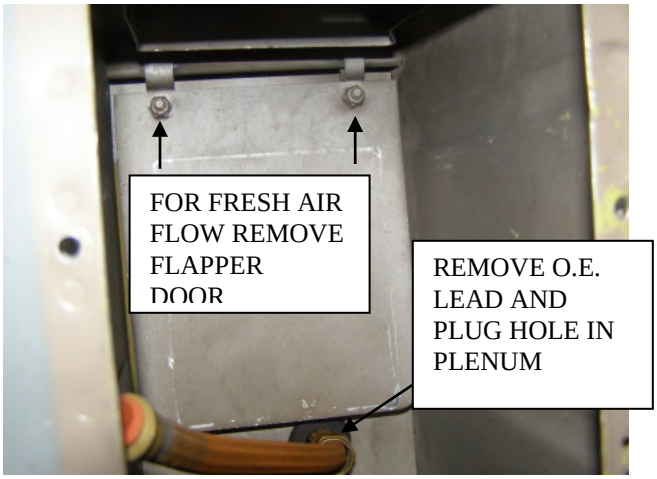


FIGURE 18 (BEFORE)

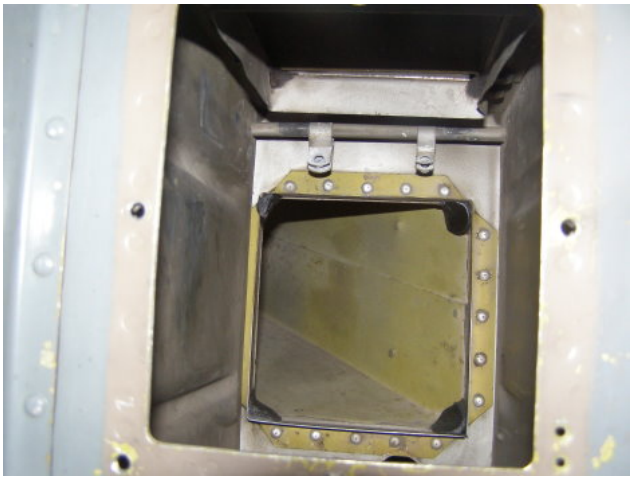


FIGURE 19 (AFTER)
FLAPPER DOOR REMOVED.

NOTE: Return all above removed items for core credit.

B. Remove lightning hole covers in nose gear bay on right side.

FIGURE 20 (AFTER)
WITH LIGHTNING HOLES REMOVED

C. Remove nose cone and ventilation air iris valve for ease of blower installation.

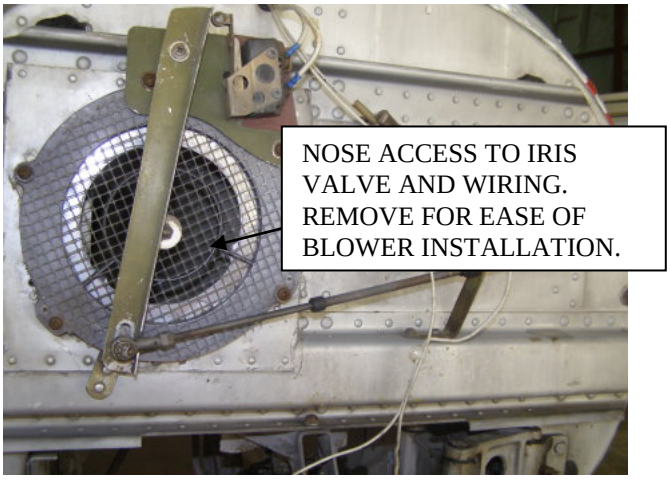


FIGURE 21 (BEFORE)

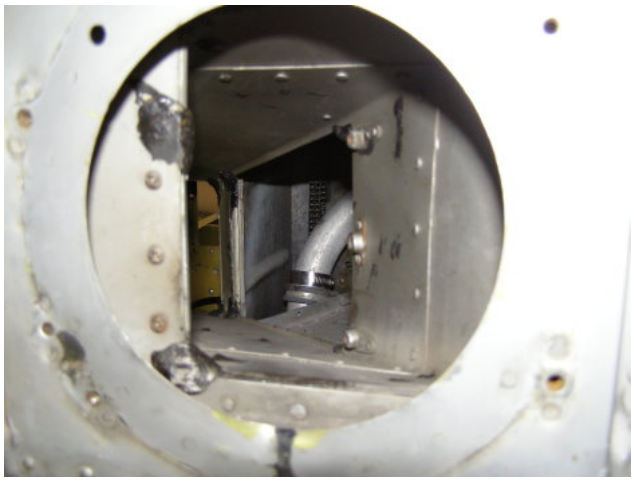


FIGURE 22 (AFTER)
IRIS REMOVED. SHOWN WITH O.E. BLOWER ASSEMBLY REMOVED.

2. Heater
   A. Preparation
      1) New Heater exhaust Hole: (See Fig. 24)
         a. Hole for new exhaust. (Figure 24) Center of this hole is approximately 4.75” forward of heater distribution plenum (Box only) and 1 5/8” inboard of stringer.
         b. Place knockout along the inside of the stringer and forward of the aft heater cradle edge.
         c. File and deburr.
         d. For proper clearance bend stringer out and away from where exhaust shroud will protrude through skin. (Fig 23)
         e. Form and fit exhaust doubler P/N 21950 externally or internally to A/C centering over new exhaust hole and utilizing rivet holes currently through stringers. (We have found external fitting to be more aesthetically pleasing)
         f. Attach doubler as prescribed per AC-43.13.

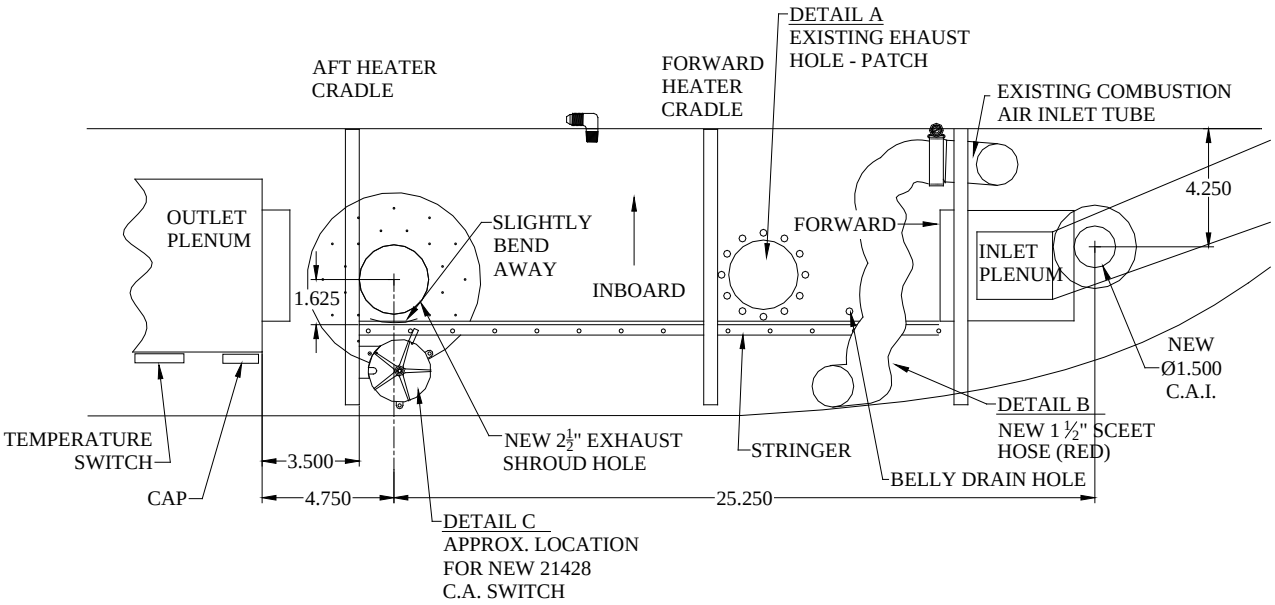


FIGURE 23

2) Appropriately patch hole where OEM exhaust shroud had been riveted to airframe. (Fig. 23, Detail A, Fig. 24)

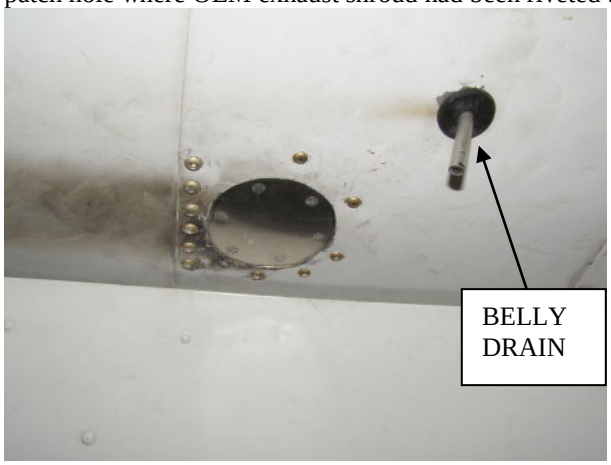


FIGURE 24 (AFTER)
FLUSH PATCH OVER ORIGINAL
EXHAUST HOLE

3) Connect 1 ½" sceet (red 8") to OEM 1 ½" combustion air inlet tube in heater cavity, forward, inboard corner. This tube will route under new heater forward of drain and up along outboard side of aircraft. (Fig.23, Detail B)

B. Installation

1) Connect drain "Y" 22336 to heater belly drain with short leg leading toward fuel solenoid box. Use rubber hose 21279 between short leg on drain and fuel box. Secure both ends.
2) Trial fit heater into cavity with 1 1/2" red sceet laying forward of belly drain.
   a. While setting maneuver heater belly drain through and out forward drain hole in skin (Fig 24)
3) Place CD14060-1 heater in the cavity and anchor using OEM clamps. (Fig. 25)
   a. Narrow clamp over aft section and wider Clamp (OEM P/N 45A04) over forward section including flange cap (OEM P/N 50-554068). Verify centering tabs on clamps are between new heater and airframe flange.
   b. Once secure safety wire clamp buckles.
   c. Verify exhaust shroud extends approximately ¼" through skin.

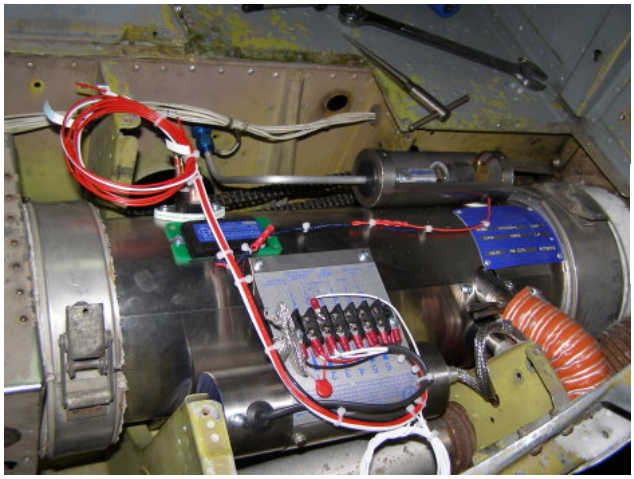


FIGURE 25 (AFTER)
NEW SYSTEM TRIAL FIT WITH CLAMPS

C. Combustion Air Switch Mounting
   1) Locate combustion air switch mounting bracket on aft heater cradle (Figure 23 Detail C). Ensure switch and bracket will be clear of all components and floor.
   2) Mark and drill holes (11/64) through aft cradle using mounting bracket as template.
   3) Use appropriate fasteners to install bracket.
   4) Attach white wires from heater to pins on combustion air switch.
   5) Attach switch to bracket. Wires down and adjustment screw up.
   6) Connect neoprene tubes from switch to combustion air inlet on heater.
      a. Top port on combustion air switch to in board (vacuum) port on heater air inlet. (IMPORTANT!!)
      b. Lower port of combustion air switch to outboard (pressure) port on heater air inlet. (IMPORTANT!!)

3. Blower Plate Assembly (21489)
   A. Preparation
      1) Through accessible lightning hole in nose gear right side, cut the OE 1 1/2" fixed combustion air tube off approx. 1" above bend. (approximately half way up lightning hole) Remove top portion and deburr remaining.

FIGURE 26 (BEFORE)

2) Installation of 21356 combustion air inlet scoop
   a. Mark intersecting cross hairs forward from center of new exhaust hole 25¼" and 4 ¼" outboard of nose wheel well. (Fig 23)
   b. Knockout 1 ½" hole in this location and install inlet scoop. Screw or rivet in place.
   NOTE: Inlet scarf, short end, must face forward for proper heater operation. Flange must be inside skin.

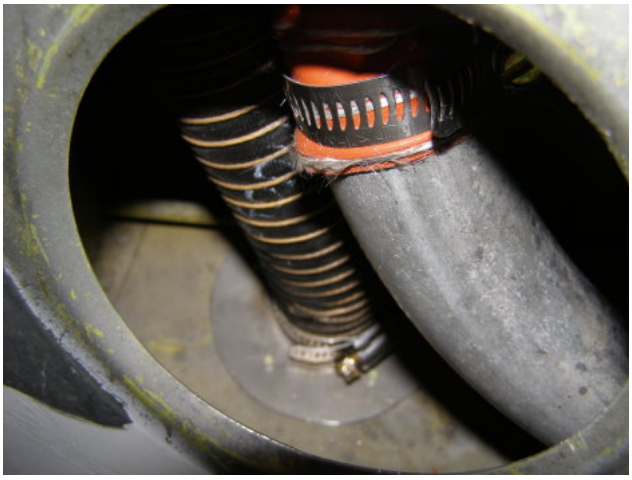


FIGURE 27 (AFTER)
COMBUSTION AIR INLET HOSES AND SCOOP

FIGURE 28 (AFTER)
COMBUSTION AIR INLET INSTALLED SCOOPING AIR FORWARD

B. Installation
   1) Remove combustion air blower from assembly for ease of installation.

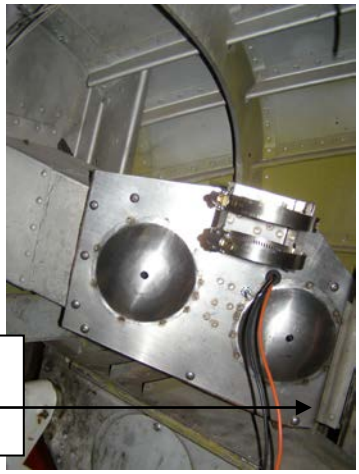


FIGURE 29
NEW BLOWER INSTALLED. NOTE REMOVAL OF COMBUSTION AIR BLOWER BEFORE PLATE ATTACHED FOR EASE OF INSTALLATION.

   2) Trial fit plate assembly. Be sure plate is snug against OE duct and cork gasket is seated properly. Secure assembly with 9 (8-32x1/2") screws.

3) Verify fan clearance by removing forward iris valve located under nose cone. This allows hand spinning of fan and ability to see which direction the unit must be adjusted to allow 1/8" MINIMUM clearance needed for optimum airflow, avoiding damage to fan from vibration. Adjust as needed.

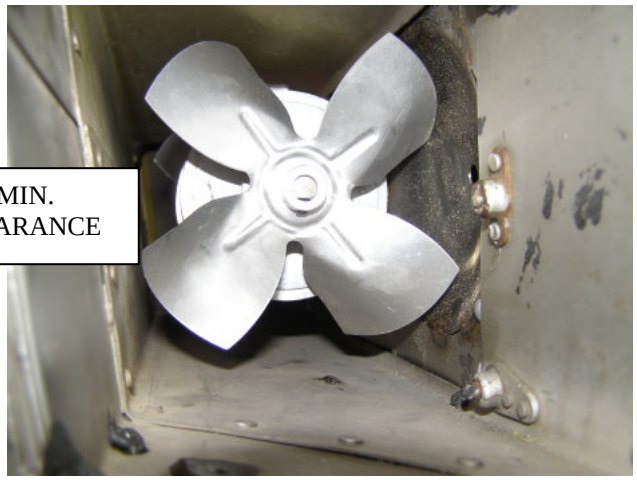


FIGURE 30 (AFTER)
(THROUGH IRIS VALVE) NEW BLOWER INSTALLED. VERIFY CLEARANCE OF **BOTH** FANS 1/8" ALL AROUND BY HAND SPINNING

NOTE: Fan can be adjusted with long reach Allen wrench 3/16" through ¼" hole in center of extrusion on blower plate.

4) Finish blower plate installation by applying small bead of silicone around airframe duct mounting surface and allow to tac.
5) Reinstall blower plate assembly.
6) Verify fan clearance one more time.
7) Secure combustion air blower, previously removed, to blower plate, fan portion up and outlet pointed aft.
   a. Install 1 ½" ceet (black) to combustion blower inlet. Route hose between fresh air duct and nose well wall, connect to new inlet scoop.
   b. Install 1 ½" sceet (red) to blower outlet. Route between heater duct and nose well wall, connect to previously cut OE 1 ½" fixed combustion air tube.

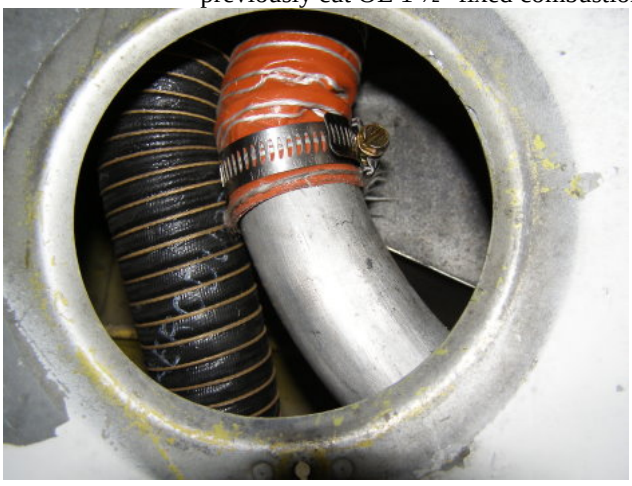


FIGURE 31 (AFTER)
UPPER PORTION OF FIXED INLET REMOVED. SCEET (RED) IN PLACE.

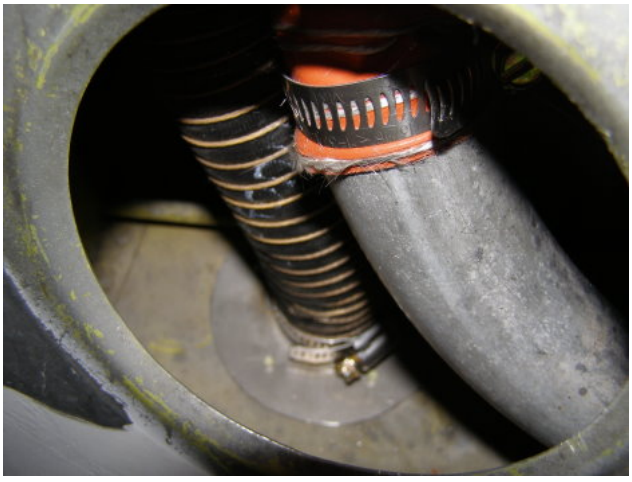


FIGURE 32 (AFTER)
COMBUSTION AIR INLET HOSES AND SCOOP

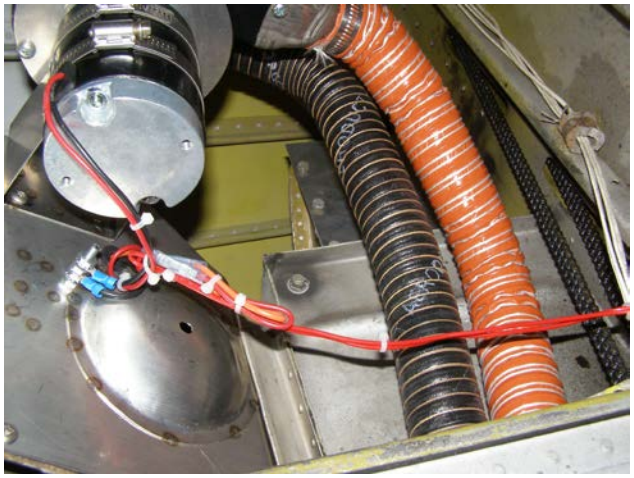


FIGURE 33 (AFTER)
NOTE ROUTING OF COMBUSTION AIR LINES.

8) Fresh air adapter (50-554129) - Cap off with 21486 plate.

FIGURE 34 (AFTER)
FRESH AIR ADAPTER CAPPED & REINSTALLED.

4. Plumbing:
   A. Right Wheel Well:
      1) Install new fuel pump in same location. Use forward mount position as only one pump is used with new installation. Install with filter side down. (The new pump is anti-siphon, replacing the old fuel solenoid valve)

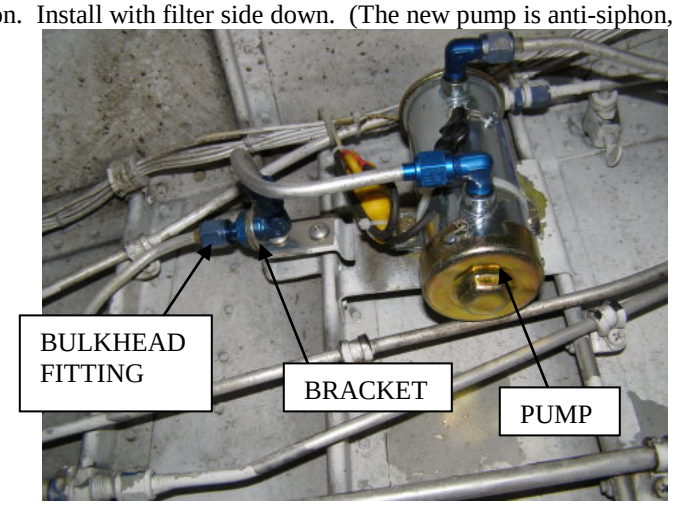


FIGURE 35 (AFTER)
NEW PUMP.

      2) Use existing plumbing and new fuel lines as needed for completion of connection.

B. Nose Wheel Well:

1) Using the existing hole where fuel solenoid wire had passed through on the nose wheel well wall, pull wire into heater cavity, as it will be used later. Install the new bulkhead elbow (P/N AN833-D4), two AN960-516 washers and nut P/N AN924-D4 face elbow aft in the nose wheel well.

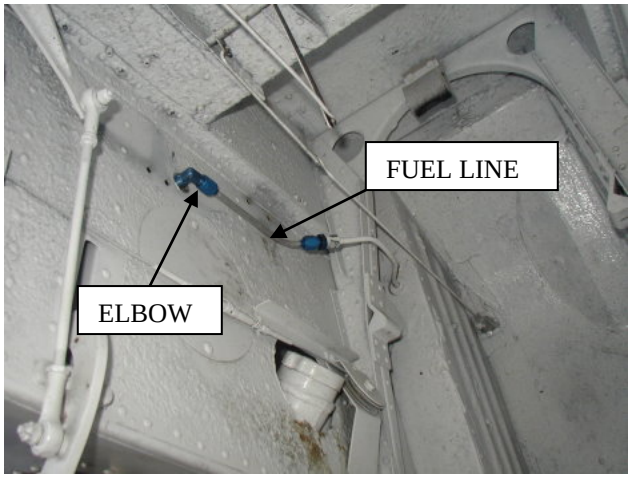


FIGURE 36
NEW FUEL SUPPLY LINE & ELBOW.

2) Connect AN815-D4 union to remaining fuel line coming forward from the back wall of the nose wheel well. Fabricate fuel line from union to the new bulkhead elbow.

3) In heater cavity, fabricate fuel line from the heater to the bulkhead elbow.

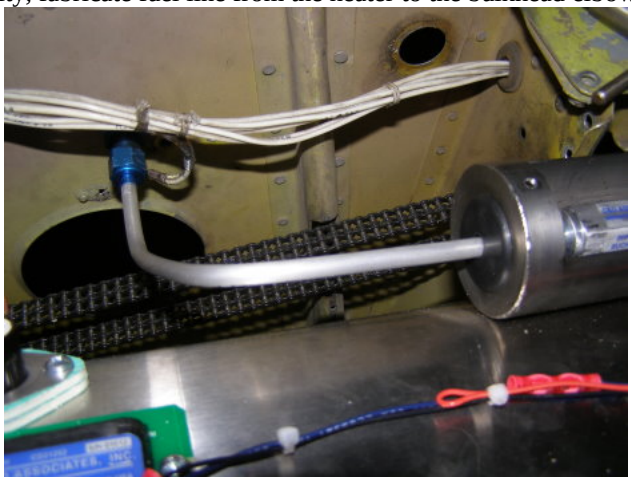
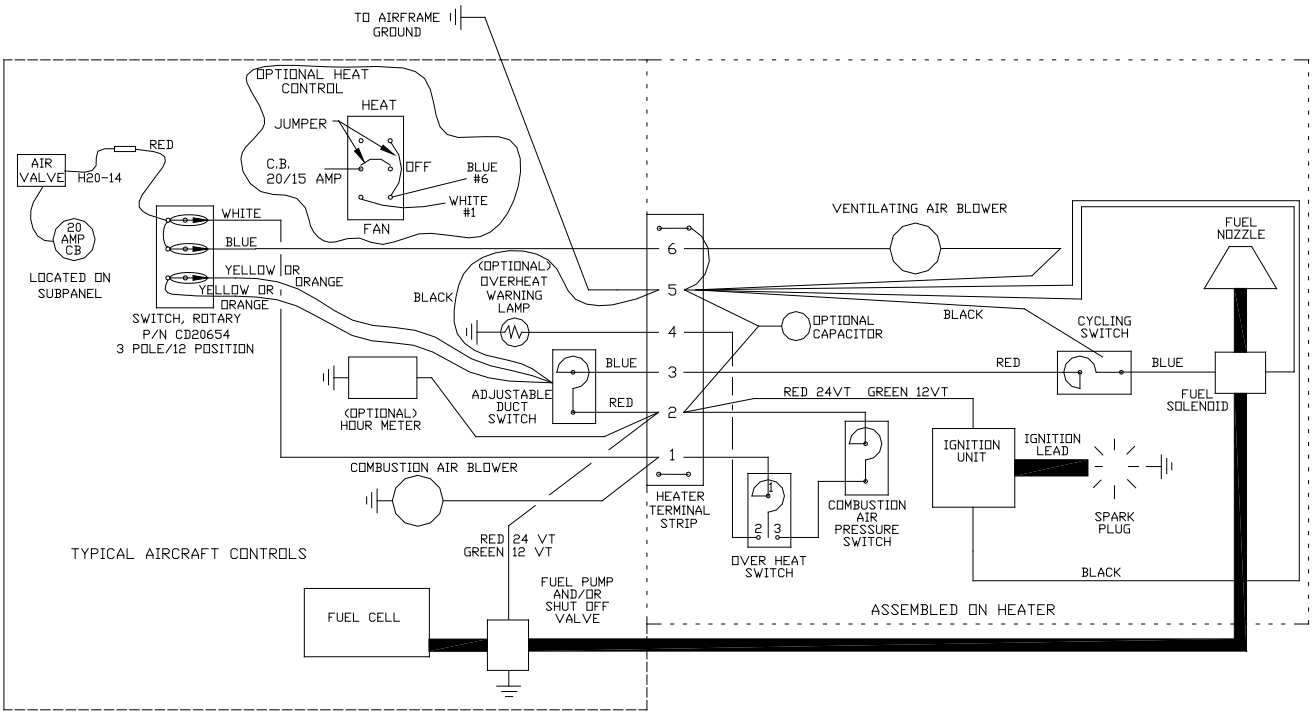


FIGURE 37
NEW SYSTEM FUEL SUPPLY LINE.
VERIFY CLEARANCE WITH CHAIN

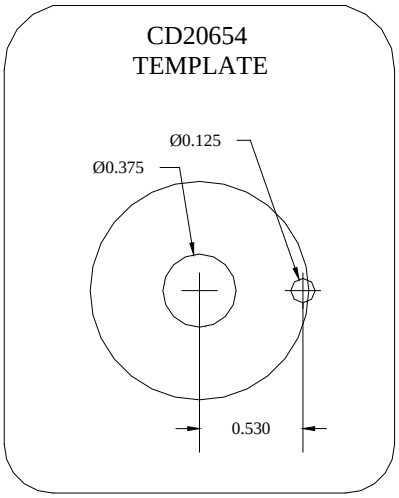
4) Attach rubber fuel hose 21279.

NOTE: Fuel lines must be secure and well clear of chafe points.

5. Electrical:
   A. Replace the original, manually operated toggle-type, circuit breaker switch on the left sub-panel (normally labeled "Blower") with 20-amp circuit breaker.



   B. Heater Control Switch Installation:
      1) Determine panel position for 20654 installation. Utilize template for size and centering of switch.



NOTE: Switch location must allow space behind panel for both the switch and relay pack.

      2) Drill (1) 3/8" hole & (1) 1/8" hole as determined by template.
      3) Apply decal.
      4) Secure switch to panel.
         NOTE: Be sure small tab on switch is resting on 1/8" hole as this will keep 20654 from spinning in panel.
      5) Allow wires to hang down.

6) Locate and identify wire H20-14 coming from the air valve switch, located under the ventilation air valve control. This wire continues over to the landing gear control switch.
   a. Remove H20-14 from the landing gear control switch and connect to red wire on new heater rotary control switch P/N 20654.
7) Connect black wire from 20654 to suitable ground.
8) Run white, blue and 2 yellow wires from 20654 along wire bundles forward and to the right corner of A/C. From this point run down behind interior panel along firewall. Follow wire bundle located just under floor into heater cavity.
9) Heater Connections:
   a. Blue wire to terminal #6 on heater
   b. White wire to terminal #1 on heater
10) Secure all wiring and verify no chafe or pinch points.

C. Thermostat Installation:
1) Install the electronic thermostat CD21253 where the aft thermostat was removed from heater outlet plenum. (See fig. 23 also)

FIGURE 38
NEW THERMOSTAT & COVER PLATE.

   a. Cover forward hole with cover plate P/N 21542.
2) Connect the blue wire to terminal #3 on the heater and the red wire to terminal #2. The black wire to airframe ground. Yellow wires to heater switch yellow wires.
3) To avoid unseating of plug, apply silicone over duct and wires of plug harness.

D. Fuel System Connection:
1) In nose wheel well, identify wire from old fuel control valve that had been previously removed, pull this wire into heater cavity.
   a. This wire number will be H36-18 on older models, or H18-18 on newer aircraft.
   b. Connect this wire to terminal #2 on the heater using same gauge wire.
2) Right main wheel well
   a. Wire new fuel pump by connecting pump lead to H8-18. Remove or secure any remaining wires.

E. Blower plate installation:
1) Fish Combustion Blower red wire 16G along wire bundle extending into heater cavity. Connect to terminal #1 on heater.
2) Repeat for Vent Blower red wire 16G. Connect to terminal #6 on heater.
3) Two black blower wires ground to airframe or blower plate.
4) Secure wires to airframe harness to avoid hang up.

6. Baggage Floor Reinforcement
   A. Install two reinforcement angles P/N's 22346 and 22347 under the floor panel as illustrated in the following drawing.
   B. Using the location holes pre-drilled as a pattern, drill and rivet in place to floor bottom as shown using AD4-3 rivets.

   NOTE: Reinstall floor after operational checks are completed.

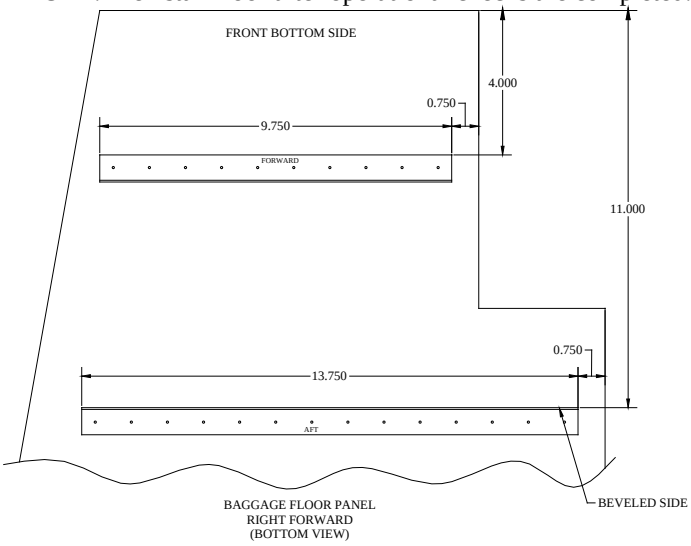


FIGURE 39

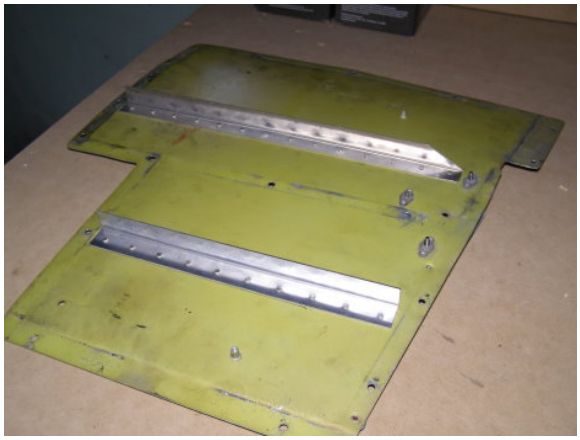


FIGURE 40

7. HEATER OPERATIONAL TEST AFTER INSTALLATION:

   IMPORTANT!! Please complete the followings steps after the new heater is installed in the aircraft.

   A. (Heater terminal strip numbered 1 2 3 4 5 6).
   B. Install a temperature probe (min 0-500° F) in the outlet plenum 6-8" aft of the heater. A good location would be approx. 6" aft of the heater or near the thermostat sensor. Usually you can find a small access point somewhere in the ducting aft of the heater. Otherwise it may be necessary to drill a small 1/8" hole through the heat distribution plenum allowing a thermo couple to enter unobstructed, into the heated air stream approx. 1".
      CAUTION: Never drill into combustion heater itself! Verify nothing will be damaged in this process.
      CAUTION: Verify thermal couple is not touching plenum internal wall.
   C. Place a 6" 20G jumper wire with 2 small alligator clips (or the like) across the heater terminal strip numbers 2 and 3, which will bypass the aircraft thermostat. (Fig. 42)
      CAUTION: Be sure not to short any other terminals.
   D. Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 41)
      1) With the heater running, verify fuel pressure. Preferred pressure is 8psi. (6.5psi min, 10psi max)
      2) With the heater running, verify that the outlet plenum temp. is approx. 250°. Adjust the temperature of the heat duct outlet distribution plenum to an average ambient temperature off 225°. Typical readings will be a low of 215° and a high of 255°. Adjustment is made by rotating a small 1/16" screw located next to the wires on the side of the switch. Rotation clockwise one turn will increase temperature approx. 20°F. Decrease temperature by turning counter clockwise. (Fig. 43)
         NOTE: Adjust screw no more than ¼ turn at a time.
      3) Remove the jumper wire and verify that the temperature is controlled by the aircraft thermostat from low (approx. 75° F) to medium to high (approx. 250° F) which is what the cycling switch is set at.
      4) Remove the temperature probe. If drilled, seal the 1/8" hole with high temperature silicone.
      5) Remove the fuel gauge installed in step 13.D. Leave the "tee" fitting and cap off for future pressure readings if desired.

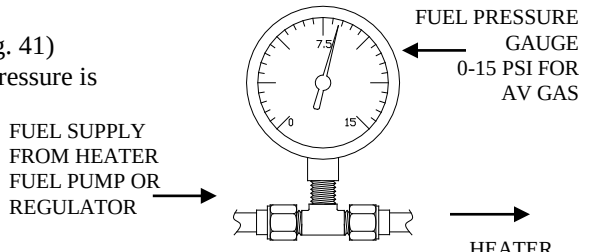


Figure 41

If the hoses need to be replaced, we recommend Sceet-6 (1 ½") red from the blower to the heater and Ceet-6 (1 ½") black from outside air to the blower.

For additional information see the "maintenance manual (MM10001)" included with this heater under "Testing after installation or overhaul."

Figure 42

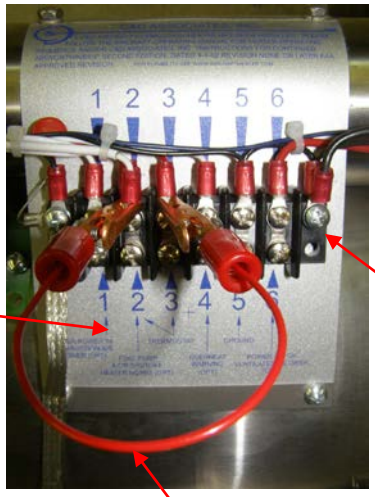
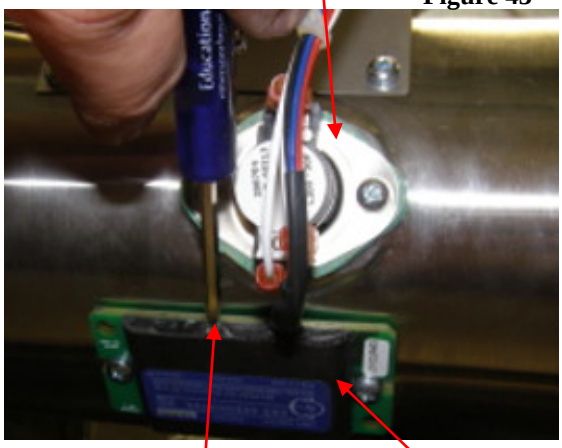


Figure 43



A. After installation, complete the operation and heat output tests specified in the C&D Associates, Inc. MM10001 Maintenance Manual for aircraft combustion heaters dated 1/1/08. Tests should be accomplished in accordance with section IX 'C' operational test, and 'D' for heat output, steps 1 and 2. Also in accordance with the "Instructions for Continued Airworhiness" step #1 "Preflight/Operational check and Shutdown Procedure."
B. NOTE: Follow the 'Combustion Heater PREFLIGHT/OPERATIONAL CHECK AND SHUTDOWN PROCEDURE' outlined within the Combustion Heater "Instructions for Continued Airworthiness", Second Edition, Revision: none, dated 04-04-02, or later revision, included with these instructions. This FAA-approved Instructions for Continued Airworthiness must be complied with and become a permanent part of the Aircraft Operations and Procedures manual.
C. Verify all wires are secure and free of obstruction and chaffing.

NOTE: Reinstall Iris Valve after operational test.

8. Final Inspection Check List:

- ☐ A. Heater secure and clamps safety wired.
- ☐ B. Heater braided ground strap properly grounded to airframe.
- ☐ C. Electrical connectors crimped properly and secure.
- ☐ D. Hole where OE Lead entered ducting patched.
- ☐ E. Fuel drains secure and overboard line protruding min. 1".
- ☐ F. Inline fuse holder on fuel pump secure
- ☐ G. Combustion air inlet, short end forward and secure.
- ☐ H. 1 ½" sceet and ceet correctly installed and secure.
- ☐ I. Fresh air "flapper" door completely removed.
- ☐ J. 21253 thermostat secure and plug completely seated.
- ☐ K. Fuel lines min 2" from electrical wires and secure.

After Operational Test

- ☐ L. No Leaks at fuel lines
- ☐ M. (Through Iris opening) Vent fan free and clear.
- ☐ N. Lightning hole, in nose gear well, covers reinstalled.
- ☐ O. Lacquer seal applied to 21252 cycling sw. adj. screw.
- ☐ P. Combustion air switch hoses secure.
- ☐ Q. Floor properly fits and is secure.
- ☐ R. Documentation including weight and balance.

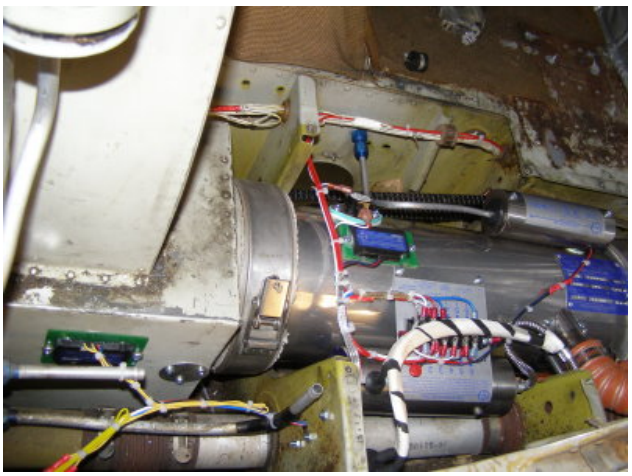


FIGURE 44
NEW SYSTEM READY FOR FLOOR INSTALL.

FIGURE 45
EXTERIOR VIEW. NOTE SIMILAR FORWARD SCARF ANGLES ON BOTH EXHAUST & COMBUSTION AIR INLET

9. Documentation:
   A. Weight & Balance. Remove old heater of 40 lbs. And install new heater kit of 25 lbs. at station +47. The aircraft requires a weight and balance, a 337 must be completed and a copy of the STC attached. The logbook entry should contain the STC and PMA Supplement #. Original heater replacement is authorized by way of FAA form 337. Alteration of aircraft by way of STC and PMA supplemental number and date must be recorded in the appropriate aircraft records.
   B. Note: Insert the following statement (label 21503 provided) in the aircraft flight manual: "C&D Associates Inc. Combustion heater has been installed in this aircraft. Please follow the aircraft-operating manual for combustion heater operating sequence and/or C&D Associates Inc. Instructions for airworthiness." "Second Edition dated April 4, 2002 revision: none, or later FAA approved revision."
   C. Electrical requirements: 24VDC at 15Amp.
   D. Fuel consumption: Maximum operation 1.5 gal/hour

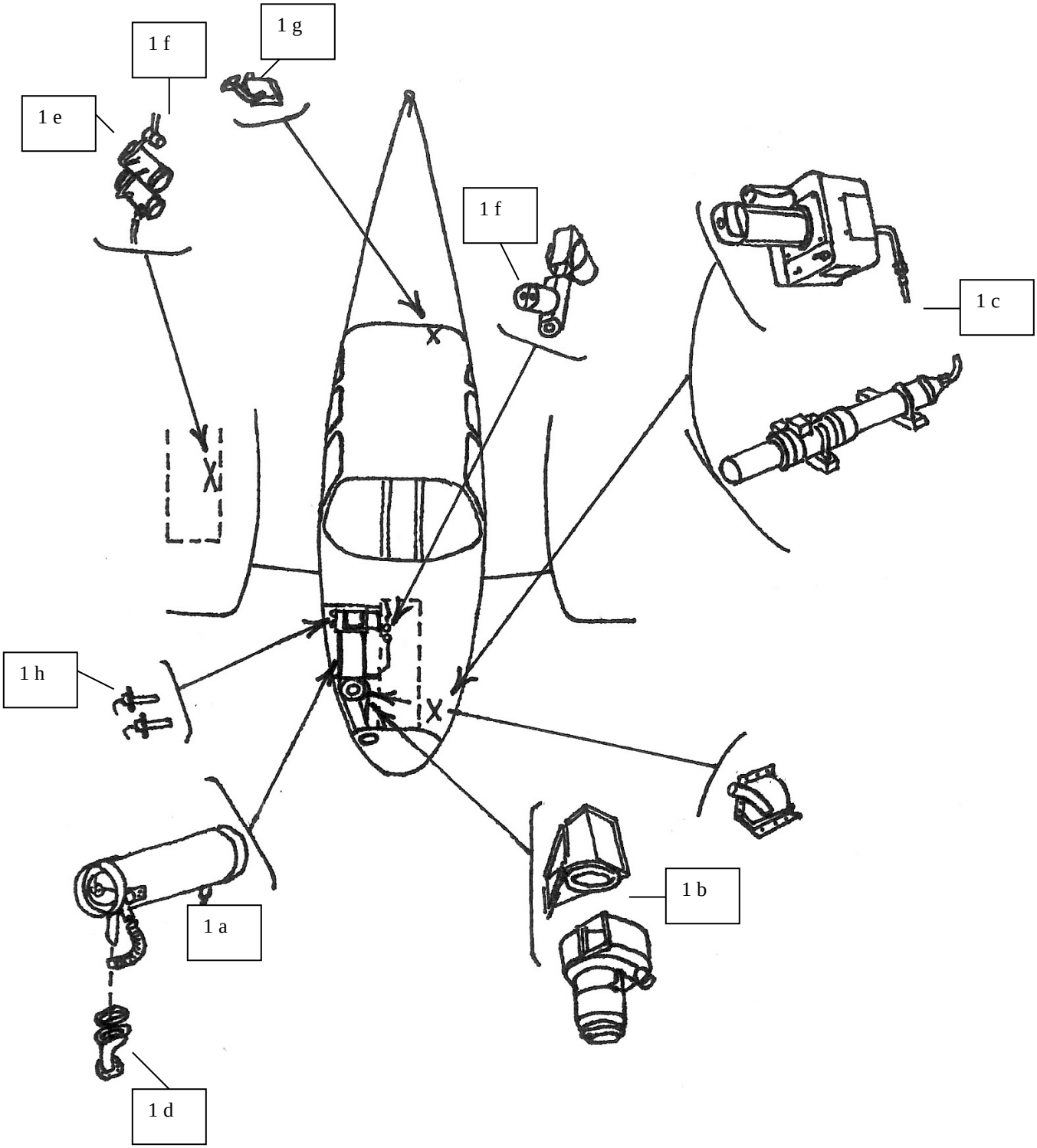


FIGURE 46
LOCATOR SCHEMATIC

DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION	Quantity
1. FAA/PMA Supplement #40	____
2. Installation Instructions IN14060K14	____
3. Label for flight manual	____
4. MM10001 Maintenance Manual	____
5. Quality Assurance Certificate of Compliance #527	____
6. STC #SA02002CH	____
7. FORM 337	____

PARTS			S/N
1. (1) Heater	CD14060-1	____	_____
2. (1) Thermostat Sensor Sw.	21253	____	_____
3. (1) Blower Assembly	21489	____	
a. (5') Red Wire	14G	____	
4. (28") Red Sceet Hose	60199	____	
5. (10") Red Sceet Hose	60199	____	
6. (18") Black Ceet Hose	60198	____	
7. (1) Rotary Switch	20654B	____	
8. (1) Combustion Air Inlet	21356A	____	
9. (1) Fuel Pump	21184	____	
a. (2) Elbows	60144	____	
10. (6) Worm Drive Clamps	60900-20	____	
11. (7") Drain Line #4	22336	____	
12. (18") Drain Hose	21279	____	
13. (1) Plate, Old Exhaust	21544	____	
14. (1) Klixon 20 Amp Breaker	7277-5-20	____	
15. (1) Plate, Old Switch Cover	21542	____	
16. (1) #4 Union	60134	____	
17. (1) Plate	21486	____	
18. (1) Bracket, Fuel Line	22340	____	
a. (1) Union, bulkhead	60816	____	
b. (2) Nut	60210	____	
c. (4) Washer	60807	____	
19. (1) Elbow, bulkhead	60212	____	
20. (24) Rivets	AD4-3	____	
21. (1) Angle	22346	____	
22. (1) Angle	22347	____	
23. (2') Fuel line	21337	____	
a. (7) Nut	60141	____	
b. (7) Sleeve	60156	____	
32. (1) Switch, Air	21423	____	
33. (1) Bracket, Mounting	60237	____	
34. (1) Exhaust Doubler	21950	____	

Initials: _____ Date:_____

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