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

Supplemental Type Certificate

Number SA01566CH

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 therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air *Regulations.*
See Aircraft Specification No. 1A10 for complete certification basis.
Original Product Type Certificate Number: 1A10

Make: Piper
Model: PA-23, PA-23-160, PA-23-235, PA-23-250, PA-E23-250

Description of Type Design Change:

1. Installation of C&D Associates Combustion Heater Kit 1 P/N CD11005K1, on PA-23, PA-23-160, PA-23-235 in accordance with C&D Associates heater Installation Instructions IN11005K1, Rev. -, dated March 15, 2001 or later FAA approved revision.
2. Installation of C&D Associates Combustion Heater Kit 2A(c) P/N CD11005K2 (C) for carbureted engine, on PA-23-250, PA-E23-250 in accordance with C&D Associates heater Installation Instructions IN11005K2, Rev. -, dated March 15, 2001 or later FAA approved revision.
3. Installation of C&D Associates Combustion Heater Kit 2A(f) P/N CD11005K2 (F) for fuel injected engine, on PA-23-250, PA-E23-250 in accordance with C&D Associates heater Installation Instructions IN11005K2, Rev. -, dated March 15, 2001 or later FAA approved revision.
4. Installation of C&D Associates Combustion Heater Kit 2B P/N CD11006K2, on PA-23-250, PA-E23-250 in accordance with C&D Associates heater Installation Instructions IN11006K2, Rev. -, dated March 15, 2001 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. Check aircraft Weight and Balance.
3. FAA approved flight manual supplement Rev. no change, dated 8/30/2004, is required.
4. Full compliance with the C&D Combustion Heater Airworthiness Limitations, revision B, dated January 1, 2000, 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 reissued: March 4, 2004; November 1, 2004
February 11, 2016

Date of application: March 15, 2001

Date amended: September 7, 2004

Date of issuance: November 5, 2001

By direction of the Administrator

(Signature)

Timothy 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.

INSTALLATION INSTRUCTIONS FOR HEATER KIT #1

P/N CD11005K1

For Piper Aircraft PA-23, PA-23-160, PA-23-235 (12VDC)
Apache S/N 23-1and up, S/N 27-505 thru 27-622.

READ COMPLETE INSTRUCTIONS BEFORE BEGINNING INSTALLATION

This system has been built to be installed on an aircraft that conforms to that aircrafts original Type Certificate (TC). If this aircraft has been modified from the original TC, (modifications such as props, engines, fuel system etc.) contact C&D Associates, Inc. for possible adjustments to this 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.

LOG OF REVISIONS

Rev.	Description	Pages Revised	Date
G	Reformatted instructions and changed testing section	1-5	5/7/15

1. Follow the Aircraft Service Manual or other FAA approved source for removal of the existing combustion heater.
2. Install the C&D Associates, Inc., TSO-C20 Approved combustion heater utilizing the existing Aircraft Service Manual or other FAA approved source where applicable.
   - 2.1 For ease of installation two “retainer plates” can be utilized to secure combustion heater to air frame. Install 1 each lengthwise in place of bolt location and anchor to airframe with supplied 60172 nut and 60177 washer. Set combustion heater in place and secure to retainer plates with 2 each supplied 7” worm drive clamps, making sure clamps sit completely over retainer plates on forward and aft edges. Tighten retainer plate nuts and 7” clamps.
   - 2.2 Remove the old safety valve and fuel filter assembly from the firewall. For carbureted aircraft install the new fuel pump (CD21197) with the safety wired end cap down, using the legs of the pump as a template for the new bolt pattern. Replace the fuel lines with those included with the kit.
   - 2.3 Replace the old exhaust pipe, shroud and shroud retainer with the new ones included with the heater kit. Secure the exhaust pipe and shroud with the exhaust clamp and pin assembly supplied with exhaust pipe.

The shroud retainer will replace the old one in the A/C skin if desired. If needed trim the exhaust shroud to allow a ½" extension beyond the aircraft skin. The exhaust pipe should extend 2" beyond the skin of the aircraft, maintaining the same exhaust scarf aft and the shroud may be trimmed flush.

2.4 Combustion Air Blower: If room permits locate the combustion air blower on the heater using the mounting bracket P/N 21191B and two six inch clamps. (Figure 1) If room does not permit, discard the bracket and two clamps and install the combustion air blower above the heater on the existing shelf. Connect the combustion air hose (red) as shown. (Figure 2)

FIGURE 1

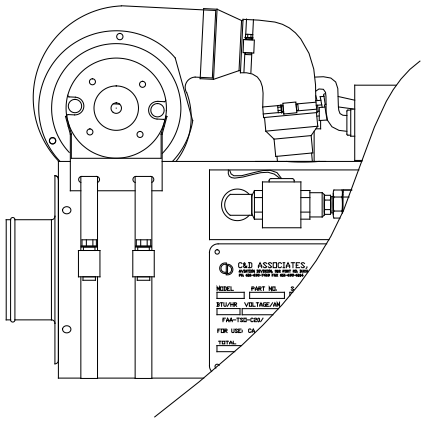
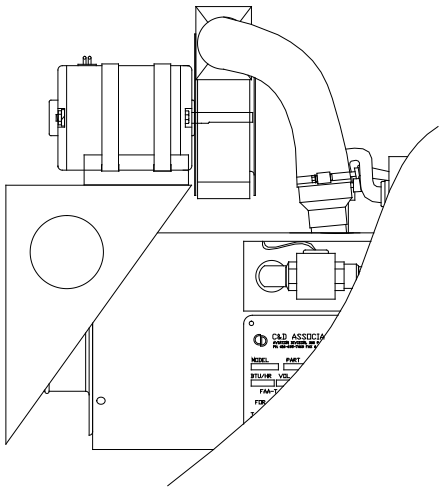


FIGURE 2



Optional combustion air blower installation locations.

2.5 The adjustable duct switch P/N CD21253 is to be installed aft of the heater in the plenum. Make two 1/16" holes 2-5/8" apart in a convenient location. Half way between the 1/16" holes, drill a 1/2" hole for the thermistor and mount the switch using two sheet metal screws.

3. Electrical: This heater installation comes with a new heater control switch P/N CD20654. This switch replaces the old heater wiring, old heater control switch and high-low switch if equipped. The new switch rotates from the full counter clockwise position of "off" to "fan" and 10 positions to "full heat" in the full clockwise position.

3.1. Fuel pump (Carbureted aircraft only): There is only one wire you may want to reuse. Locate this wire, marked H2B, running from the old heater terminal 2 to the safety valve on the firewall. In the new installation this wire will connect from the fuel pump over to the new heater terminal strip number 2.

3.2. Heater Electrical Connection (Figure 3): Remove the old heater control switch. Locate and identify the wire running from the heater circuit breaker to the old heater switch. Marking on this old wire will be H3A. This wire is to be connected to the red wire on the new switch. Route the remaining wires (blue, white, and two yellow) to the new heater. Secure in route in accordance with AC 43.13-1A Chapter 12 for Electrical applications. The blue wire from the new switch is for the vent fan and will be connected to the heater terminal strip number 6. The white wire is connected to the heater terminal strip number 1.

3.3. Thermostat (see step 2.5): Connect thermostat red wire to the heater terminal 2 and blue wire to terminal 3. The two yellow wires are to join the switches yellow wires, in any order.

3.4. Combustion Air Blower: Black wire to airframe ground, green wire (12V) to heater terminal strip #1.

3.5. Old Wiring: CAUTION: The old wire marked H3A or H3B is hot any time the master switch is on. Remove or secure the ends of the old wiring. Optional hour meter is connected to terminal #2. Optional overheat light may be connected to terminal #4 on the heater strip.

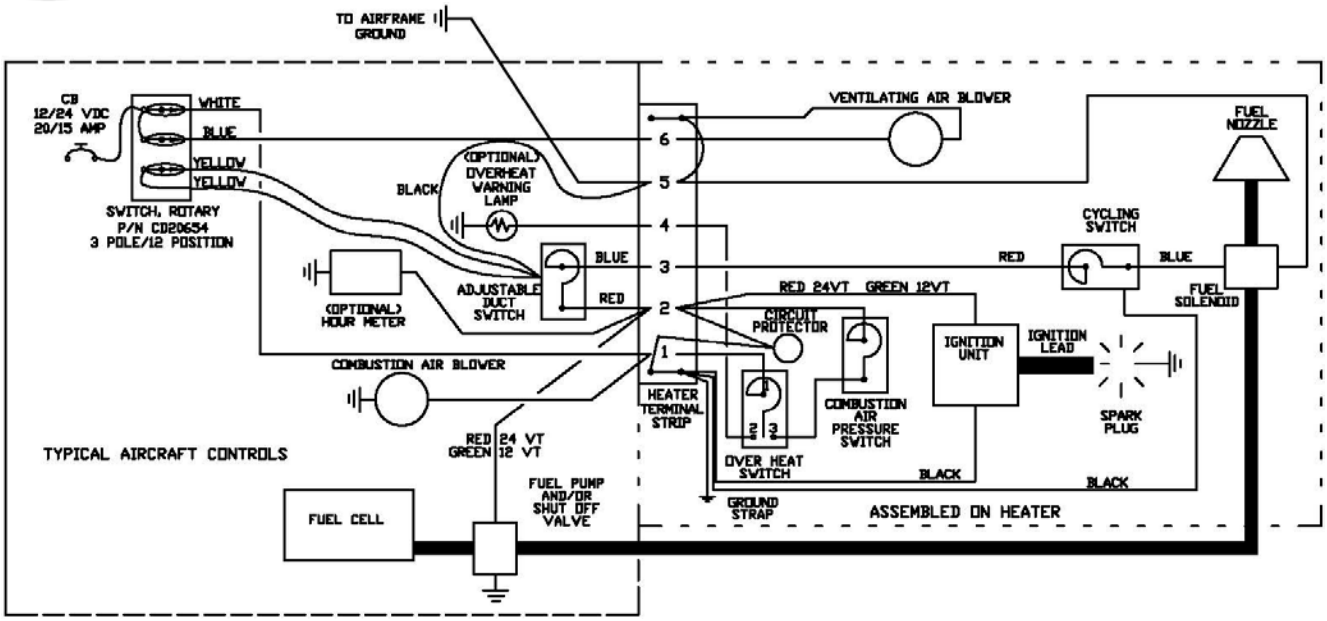


FIGURE 3

4. TESTING

4.1 HEATER OPERATIONAL TEST AFTER INSTALLATION:

IMPORTANT!! Please complete the followings steps after the new heater is installed in the aircraft. (Heater terminal strip numbered 1 2 3 4 5 6).

4.1.1 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.

CAUTION: Verify thermal couple is not touching plenum internal wall.

4.1.2 Setting upper limit temperature upper limit switch

4.1.2.1 **If your heater is equipped with a CD21252…..**

- ❑ 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. 4)

CAUTION: Be sure not to short any other terminals.

- ❑ 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 as follows:
  - For non-pressurized aircraft set switch to a low of 215º and a high of 255º. .

NOTE: Adjustment is made by rotating a small 1/16" screw located next to the wires on the side of the switch. It may have a dab of inspectors lacquer over the screw. Rotation clockwise one turn will increase temperature approx. 20° F. Decrease temperature by turning counterclockwise (Fig 5).

- ❑ After sensor is adjusted, place small drop of tamper proof seal on adjustment screw to lock in settings so as to not change due to vibration. Use a product that can be easily removed for readjustment if necessary.
- ❑ 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.
- ❑ Remove the temperature probe sealing the hole with high temperature silicone.

Figure 4

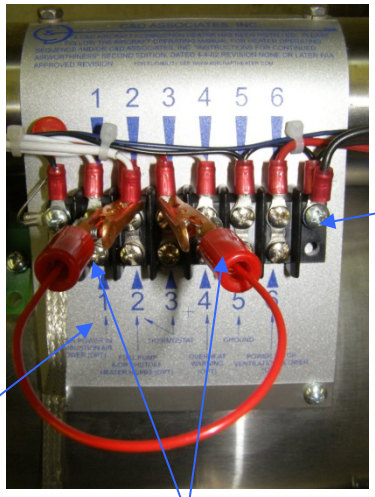
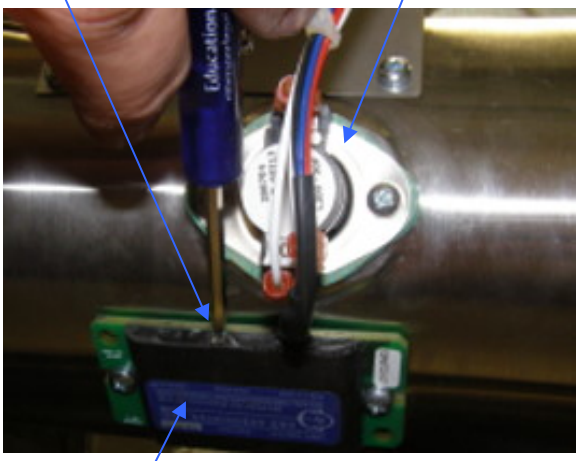


Figure 5



4.1.2.2 **If your heater is not equipped with CD21252…..**
Upper limit adjustments should be made in accordance with aircraft manufacturer's instructions.

4.1.3 Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 6)

- ❑ With the heater running, verify fuel pressure.
  - Preferred pressure is 8psi. (6.5psi min, 10psi max)

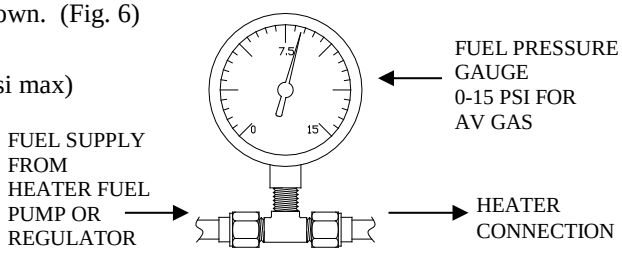


Figure 6

4.1.4 Remove the fuel gauge installed in step 4.1.3. Leave the "tee" fitting and cap off for future pressure readings if desired.

4.2 Verify proper installation is completed in accordance with the aircraft maintenance manual.

4.2.1 Verify all wires are secure and free of obstruction and chaffing.

4.2.2 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.

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

5. After installation, complete the operation and heat output tests specified in the C&D Associates, Inc. MM10001 Maintenance Manual for aircraft combustion heaters Rev L, dated 5/21/15 or later FAA approved revision. Tests should be accomplished in accordance with section 10.3 operational test, and 10.4 for heat output. Also in accordance with the "Instructions for Continued Airworthiness" "Preflight/Operational check and Shutdown Procedure." Rev E dated 5-21-15. These FAA-approved Instructions for Continued Airworthiness must be complied with and become a permanent part of the Aircraft Operations and Procedures manual.

6. Documentation:

6.1. Weight & Balance.

6.1.1. Remove old heater of 23 lbs. (verify weight), and install new heater kit of 28 lbs. The aircraft requires a weight and balance and a 337 must be completed and a copy of the STC attached. The logbook entry should contain the STC SA01566CH and PMA Supplement # 42. Original heater replacement is authorized by way of FAA form 337. Alteration of aircraft by way of STC or PMA supplemental number and date must be recorded in the appropriate aircraft records.

6.1.2. If unchanged removal of the Combustion Heater and the installation of the C&D Associates Products TSO-C20 approved heater will have no net effect on weight and balance or electrical load requirements.

6.2. 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" located in MM10001 Rev I dated 8/1/14 or later FAA approved revision."

6.3. Utilize existing aircraft combustion heater operating instructions or other FAA approved combustion heater operating instructions where applicable.

6.4. NOTE: South Wind AD 81-09-09 Combustion Heater Airworthiness Directive does not apply to the C&D Associates, Inc. Combustion Heater.

6.5. Electrical requirements: 12VDC.

6.6. Fuel consumption: Maximum operation __ gal/hour.

DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION		Quantity	
1. FAA/PMA Supplement # 42		____	
2. Installation Instructions IN11005K1		____	
3. Label for flight manual		____	
4. MM10001 Maintenance Manual		____	
5. Quality Assurance Certificate of Compliance #527		____	
6. STC #SA01566CH		____	
7. 337 Form		____	
PARTS			**S/N**
1. Heater	CD11005-1	____	_____
2. (1) Exhaust Extension Assembly	25119	____	
3. (1) Blower Assembly	21414	____	
4. (1) Fuel Pump Assy	29101	____	
5. (1) Retainer Plate Assy	21673	____	
6. (1) Bracket, Mount Assy	21521	____	
7. (12") 1 ½" Red Sceet	60199	____	
a. (2) Worm Drive Clamps	60900-20		
8. (24") 1 ½" Black Ceet	60198	____	
a. (2) Worm Drive Clamps	60900-20		
9. (1) Drain Hose w/Clamps	21279	____	
10. (1) Adj. Solid State Duct Sw.	21253	____	_____
11. (1) Switch, Rotary	20654	____	
12. (1) Retainer Assy	20632	____	
13. (13") Fuel Line #3 w/ hardware	21081	____	
14. (40") Fuel Line #3 w/ hardware	21081	____	

Initials: _____ Date:_____

INSTALLATION INSTRUCTIONS FOR
HEATER KIT #2A

P/N CD11005K2

For Piper Aircraft PA-23-250, PA-E23-250 (12VDC)
Aztec S/N 27-1 thru 27-258, 27-365 thru 27-401, 27-403 thru 27-2297,
27-2299 thru 27-2330, 27-2332 thru 27-3049, 27-3051 thru 27-3153.

READ COMPLETE INSTRUCTIONS BEFORE BEGINNING INSTALLATION

This system has been built to be installed on an aircraft that conforms to that aircrafts original Type Certificate (TC). If this aircraft has been modified from the original TC, (modifications such as props, engines, fuel system etc.) contact C&D Associates, Inc. for possible adjustments to this 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.

LOG OF REVISIONS

Rev.	Description	Pages Revised	Date
F	Updated figures 5 and 6 and items list	4,5	10/22/13
G	Reformatted instructions and changed testing section	1-5	5/7/15

NOTE: Fuel injected aircraft require fuel regulator P/N 20800. Carbureted aircraft require fuel pump P/N 21197.

1. Follow the Aircraft Service Manual or other FAA approved source for removal of the existing combustion heater.
2. Install the C&D Associates, Inc., TSO-C20 Approved combustion heater utilizing the existing Aircraft Service Manual or other FAA approved source where applicable.
   2.1 For ease of installation two “retainer plates” can be utilized to secure combustion heater to air frame. Install 1 each lengthwise in place of bolt location and anchor to airframe with supplied 60172 nut and 60177 washer. Set combustion heater in place and secure to retainer plates with 2 each supplied 7” worm drive clamps, making sure clamps sit completely over retainer plates on forward and aft edges. Tighten retainer plate nuts and 7” clamps.
   2.2 Remove the old safety valve and fuel filter assembly from the firewall and return with old heater for core value. Install the new fuel pump P/N 21197 (carbureted aircraft only) or the remote fuel regulator shutoff (fuel injected only). Replace the fuel lines with those included with the kit.
   2.3 Replace the old exhaust pipe, shroud and retainer with the new ones included with the heater kit. Secure the exhaust pipe and shroud assembly P/N 25118 with the clamp assembly. The new shroud retainer P/N 20632 is to replace the old one in the A/C skin. If needed trim the exhaust shroud to allow a 1/4” extension beyond the aircraft skin. The 1 ½” exhaust pipe should extend 2” beyond the skin of the aircraft, maintaining the same exhaust scarf aft creating vacuum in flight.
   2.4 Combustion Air Blower: If room permits locate the combustion air blower on the heater using the mounting bracket P/N 21191B and two six inch clamps. (Figure 1) If room does not permit, discard the bracket and two clamps and install the combustion air blower above the heater on the existing shelf. Connect the combustion air hose (red) as shown. (Figure 2)

FIGURE 1

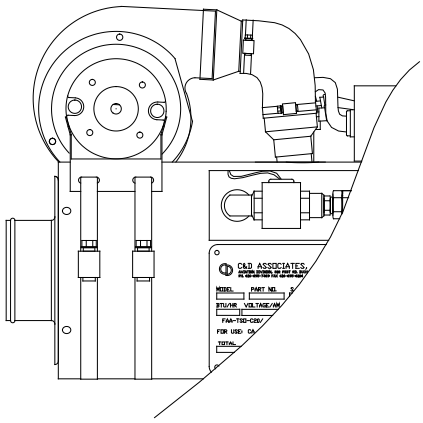
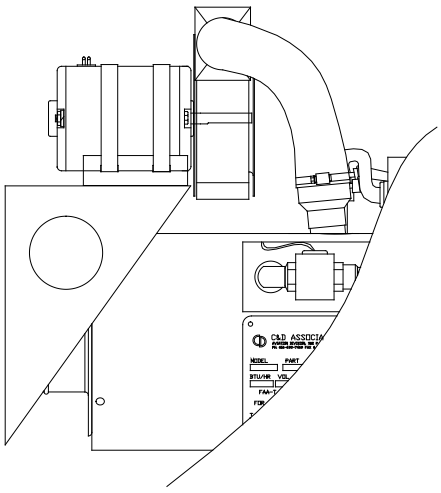


FIGURE 2



Optional combustion air blower installation locations.

   2.5 The adjustable duct switch P/N CD21253 is to be installed aft of the heater in the plenum. Make two 1/16" holes 2-5/8" apart in a convenient location. Half way between the 1/16" holes, drill a 1/2" hole for the thermistor and mount the switch using two sheet metal screws.
3. Electrical: This heater installation comes with a new heater control switch P/N CD20654. This switch replaces the old heater wiring, old heater control switch and high-low switch if equipped. The new switch rotates from the full counter clockwise position of “off” to “fan” and 10 positions to “full heat” in the full clockwise position.
   3.1. Remote shutoff (Fuel injected only) or fuel pump: There is only one wire you may want to reuse. Locate this wire, marked H2B, running from the old heater terminal 2 to the safety valve on the firewall. In the new installation this wire will connect from the fuel pump or shutoff valve over to the new heater terminal strip number 2.
   3.2. Heater Electrical Connection (Figure 3): Remove the old heater control switch. Locate and identify the wire running from the heater circuit breaker to the old heater switch. The new heater requires a 20 amp fuse. Marking

on this old wire will be H3A. This wire is to be connected to the red wire on the new switch. Route the remaining wires (blue, white, and two yellow) to the new heater. Secure in route in accordance with AC 43.13-1A Chapter 12 for Electrical applications. The blue wire from the new switch is for the vent fan and will be connected to the heater terminal strip number 6. The white wire is connected to the heater terminal strip number 1.

3.3. Thermostat (see step 2.5): Connect thermostat red wire to the heater terminal 2 and blue wire to terminal 3. The two yellow wires are to join the switches yellow wires, in any order.

3.4. Combustion Air Blower: Black wire to airframe ground, green wire (12V) to heater terminal strip #1.

3.5. Old Wiring: CAUTION: The old wire marked H3A or H3B is hot any time the master switch is on. Remove or secure the ends of the old wiring. Optional hour meter is connected to terminal #2. Optional overheat light may be connected to terminal #4 on the heater strip.

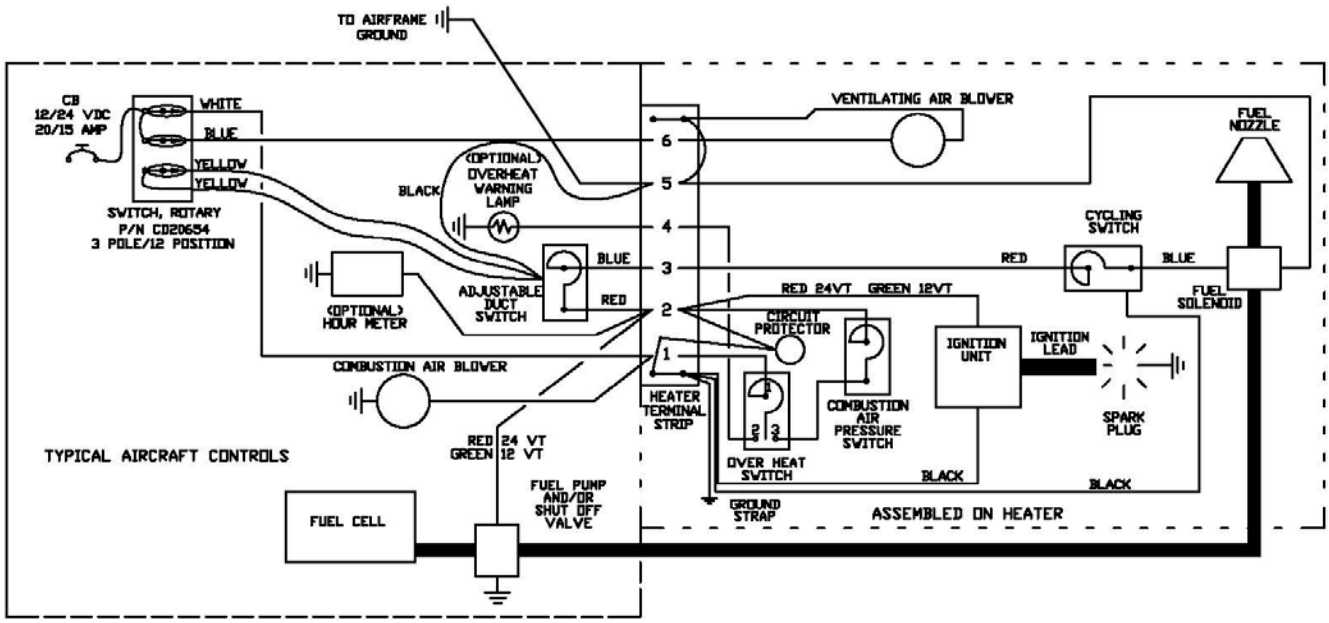


FIGURE 3

4. TESTING

4.1 HEATER OPERATIONAL TEST AFTER INSTALLATION:

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

4.1.1 (Heater terminal strip numbered 1 2 3 4 5 6).

4.1.2 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.

CAUTION: Verify thermal couple is not touching plenum internal wall.

4.1.3 **If your heater is equipped with a CD21252…..**

☐ 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. 4)

NOTE: Be sure not to short any other terminals.

☐ With the heater running, verify that the outlet plenum temp. is set properly. Adjust the temperature of the heat duct outlet distribution plenum as follows: For non-pressurized aircraft set switch to a low of 215º and a high of 255º.

NOTE: Adjustment is made by rotating a small 1/16" screw located next to the wires on the side of the switch. It may have a dab of inspectors lacquer over the screw. Rotation clockwise one turn

will increase temperature approx. 20° F. Decrease temperature by turning counterclockwise (Fig 5).

☐ After sensor is adjusted, place small drop of tamper proof seal on adjustment screw to lock in settings so as to not change due to vibration. Use a product that can be easily removed for readjustment if necessary.

☐ 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.

☐ Remove the temperature probe sealing the hole with high temperature silicone.

Figure 4

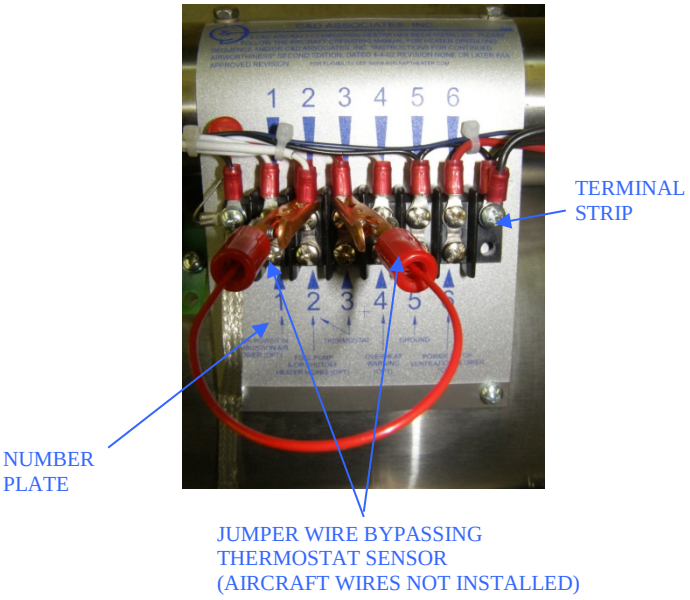
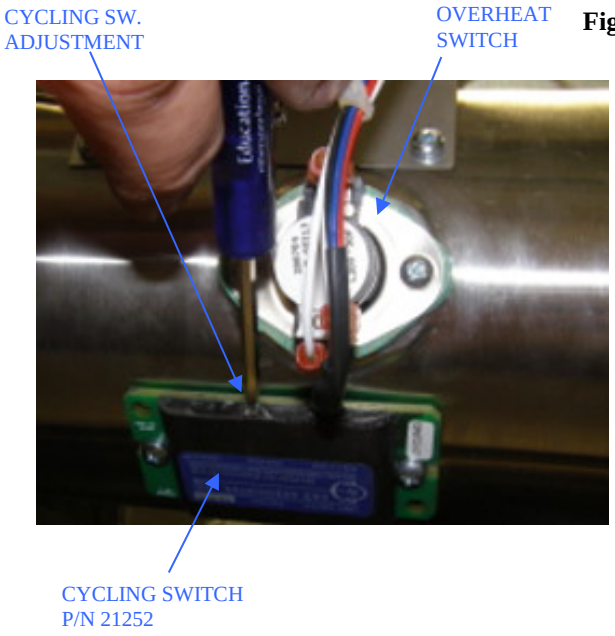


Figure 5



4.1.4 **If your heater is not equipped with CD21252…..**

☐ Upper limit adjustments should be made in accordance with aircraft manufacturer's instructions.

4.1.5 Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 6)

☐ With the heater running, verify fuel pressure.

- Preferred pressure is 8psi. (6.5psi min, 10psi max)

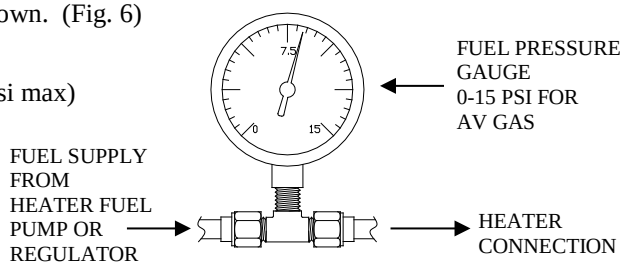


Figure 6

4.1.6 Remove the fuel gauge installed in step 4.1.5. Leave the "tee" fitting and cap off for future pressure readings if desired.

4.2 Verify proper installation is completed in accordance with the aircraft maintenance manual.

☐ Verify all wires are secure and free of obstruction and chaffing.

- 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."

5. After installation, complete the operation and heat output tests specified in the C&D Associates, Inc. MM10001 Maintenance Manual for aircraft combustion heaters Rev L, dated 5/14/15 or later FAA approved revision. Tests should be accomplished in accordance with section X 'C' operational test, and 'D' for heat output. Also in accordance with the "Instructions for Continued Airworthiness" Step A "Preflight/Operational check and Shutdown Procedure." Rev D dated 10-3-11. These FAA-approved Instructions for Continued Airworthiness must be complied with and become a permanent part of the Aircraft Operations and Procedures manual.

6. Documentation:
   - 6.1. Weight & Balance.
     - 6.1.1. Remove old heater of 23 lbs. (verify weight), and install new heater kit of 28 lbs. The aircraft requires a weight and balance and a 337 must be completed and a copy of the STC attached. The logbook entry should contain the STC SA01566CH and PMA Supplement # 42. 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.
     - 6.1.2. If unchanged removal of the Combustion Heater and the installation of the C&D Associates Products TSO-C20 approved heater will have no net effect on weight and balance or electrical load requirements.
   - 6.2. 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" located in MM10001 Rev I dated 8/1/14 or later FAA approved revision."
   - 6.3. Utilize existing aircraft combustion heater operating instructions or other FAA approved combustion heater operating instructions where applicable.
   - 6.4. South Wind AD 81-09-09 Combustion Heater Airworthiness Directive does not apply to the C&D Associates, Inc. Combustion Heater.
   - 6.5. Electrical requirements: 12VDC.
   - 6.6. Fuel consumption: Maximum operation __ gal/hour.

DOCUMENTATION AND PARTS REQUIREMENT TABLE

	DOCUMENTATION	Quantity
1.	FAA/PMA Supplement # 42	____
2.	Installation Instructions IN11005K2	____
3.	Label for flight manual	____
4.	MM10001 Maintenance Manual	____
5.	Quality Assurance Certificate of Compliance #527	____
6.	STC #SA01566CH	____
7.	337 Form	____

	PARTS			S/N
1.	Heater	CD11005-1	____	_____
2.	(1) Exhaust Extension Assembly	25118	____	
3.	(1) Blower Assembly	21414	____	
4.	(1) Bracket Mount Assy	21521	____	
5.	(1) Fuel Pump Assy	29101	____	
6.	(2) Retainer Plate Assembly	21673	____	
7.	(12") 1 ½" Red Sceet	60199	____	
	a. (2) Worm Drive Clamps (1 ½")	60900-28		
8.	(24") 1 ½" x Black Ceet	60198	____	
	a. (2) Worm Drive Clamps (1 ½")	60900-28	____	
9.	(18") Drain Hose w/Clamps	21279	____	
10.	(1) Adj. Solid State Duct Sw.	21253	____	_____
11.	(1) Switch, Rotary	20654A	____	
12.	(1) Retainer Assy	20632	____	
13.	(13") Fuel Line #3 w/ hardware(carb only)	21081	____	
14.	(40") Fuel Line #3 w/ hardware	21081	____	
15.	(1) Regulator, 7.5	20800	____	
	a. (1) Elbow, 90°	60413		
16.	(1) Bracket, Mount	21191B	____	
	a. (2) Clamps (7 ¾)	60900-104	____	
17.	(2) Clamps (7 ¾)	60900-104	____	

Initials: _____ Date:_____

HEATER INSTALLATION INSTRUCTIONS FOR
KIT #2B, P/N CD11006K2

For Piper Aircraft PA-E23-250, PA-23-250 (24VDC)
Aztec S/N 27-259 thru 27-364, 27-402, 27-2298, 27-2331.

READ COMPLETE INSTRUCTIONS BEFORE BEGINNING INSTALLATION

This system has been built to be installed on an aircraft that conforms to that aircrafts original Type Certificate (TC). If aircraft has been modified from the original TC (modifications such as props, engines, fuel system etc.) contact C&D Associates, Inc. for possible adjustments to this 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. Follow the Aircraft Service Manual or other FAA approved source for removal of the existing combustion heater.

2. Install the C&D Associates, Inc., TSO-C20 Approved combustion heater utilizing the existing Aircraft Service Manual or other FAA approved source where applicable.

   2.1. For ease of installation two “retainer plates” can be utilized to secure combustion heater to air frame. Install 1 each leangthwise in place of bolt location and anchor to airframe with supplied 60172 nut and 60177 washer. Set combustion heater in place and secure to retainer plates with 2 each supplied 7” worm drive clamps, making sure clamps sit completely over retainer plates on forward and aft edges. Tighten retainer plate nuts and 7” clamps.

   2.2. Remove the old safety valve and fuel filter assembly from the firewall. For carbureted aircraft install the new fuel pump (CD21199) with the safety wired end cap down, using the legs of the pump as a template for the new bolt pattern. Replace the fuel lines with those included with the kit.

   2.3. Replace the old exhaust pipe, shroud and shroud retainer with the new ones included with the heater kit. Secure the exhaust pipe and shroud with the exhaust clamp and pin assembly supplied with exhaust pipe. The shroud retainer will replace the old one in the A/C skin if desired. If needed trim the exhaust shroud to allow a ½” extension beyond the aircraft skin. The exhaust pipe should extend 2” beyond the skin of the aircraft, maintaining the same exhaust scarf aft and the shroud may be trimmed flush.

   2.4. Combustion Air Blower: If room permits locate the combustion air blower on the heater using the mounting bracket P/N 21191B and two six inch clamps. (Figure 1) If room does not permit, discard the bracket and two clamps and install the combustion air blower above the heater on the existing shelf. Connect the combustion air hose (red) as shown. (Figure 2)

FIGURE 1

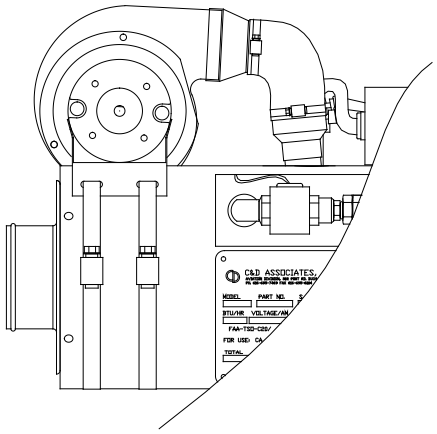
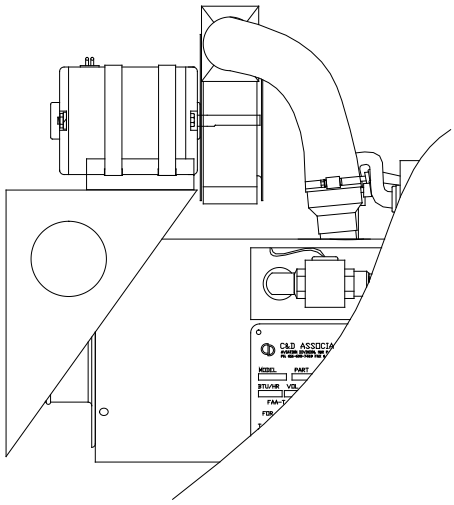


FIGURE 2



Optional combustion air blower installation locations.

2.5 The adjustable duct switch P/N CD21253 is to be installed aft of the heater in the plenum. Make two 1/16" holes 2-5/8" apart in a convenient location. Half way between the 1/16" holes, drill a 1/2" hole for the thermister and mount the switch using two sheet metal screws.

3. Electrical: This heater installation comes with a new heater control switch P/N CD20654. This switch replaces the old heater wiring, old heater control switch and high-low switch if equipped. The new switch rotates from the full counter clockwise position of "off" to "fan" and 10 positions to "full heat" in the full clockwise position.

3.1. Fuel pump (Carbureted aircraft only): There is only one wire you may want to reuse. Locate this wire, marked H2B, running from the old heater terminal 2 to the safety valve on the firewall. In the new installation this wire will connect from the fuel pump over to the new heater terminal strip number 2.

3.2. Heater Electrical Connection (Figure 3): Remove the old heater control switch. Locate and identify the wire running from the heater circuit breaker to the old heater switch. Marking on this old wire will be H3A. This wire is to be connected to the red wire on the new switch. Route the remaining wires (blue, white, and two yellow) to the new heater. Secure in route in accordance with AC 43.13-1A Chapter 12 for Electrical applications. The blue wire from the new switch is for the vent fan and will be connected to the heater terminal strip number 6. The white wire is connected to the heater terminal strip number 1.

3.3. Thermostat (see step 2.5): Connect thermostat red wire to the heater terminal 2 and blue wire to terminal 3. The two yellow wires are to join the switches yellow wires, in any order.

3.4. Combustion Air Blower: Black wire to airframe ground, red wire (24V) to heater terminal strip #1.

3.5. Old Wiring: CAUTION: The old wire marked H3A or H3B is hot any time the master switch is on. Remove or secure the ends of the old wiring. Optional hour meter is connected to terminal #2. Optional overheat light may be connected to terminal #4 on the heater strip.

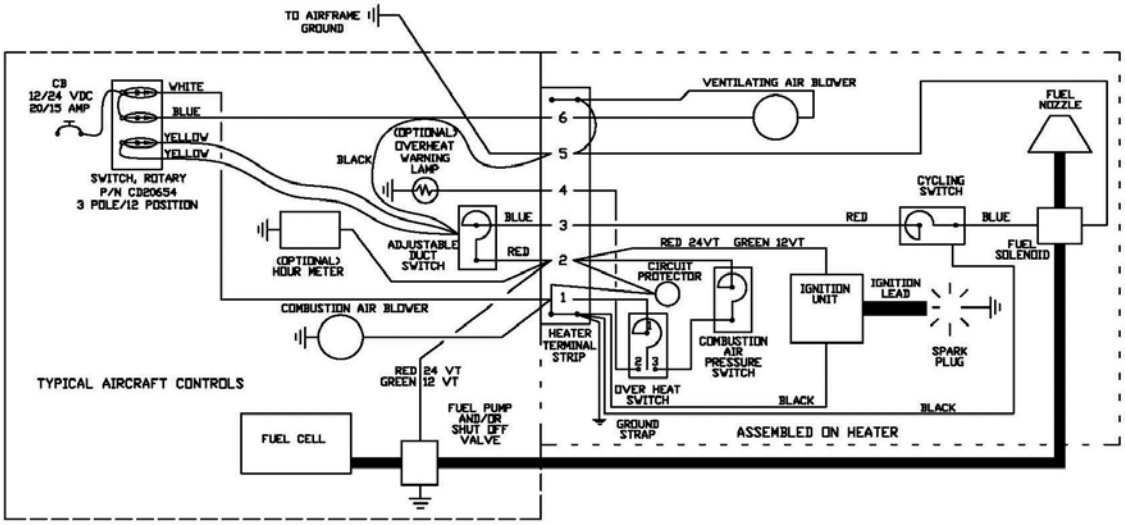


FIGURE 3

4. TESTING

4.1 HEATER OPERATIONAL TEST AFTER INSTALLATION:

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

(Heater terminal strip numbered 1 2 3 4 5 6) , 6 5 4 3 2 1), 4 5 6 7 8 10)

4.1.1 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.

CAUTION: Verify thermal couple is not touching plenum internal wall.

4.1.2 Setting upper limit temperature upper limit switch

4.1.2.1 **If your heater is equipped with a CD21252…..**

- ❑ 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. 4)

CAUTION: Be sure not to short any other terminals.

- ❑ 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 as follows.
  - For non-pressurized aircraft set switch to a low of 215º and a high of 255º.
  - For pressurized aircraft set switch to a low of 190˚ and a high of 225˚.

NOTE: Adjustment is made by rotating a small 1/16" screw located next to the wires on the side of the switch. It may have a dab of inspectors lacquer over the screw. Rotation clockwise one turn will increase temperature approx. 20° F. Decrease temperature by turning counterclockwise (Fig 5).

- ❑ After sensor is adjusted, place small drop of tamper proof seal on adjustment screw to lock in settings so as to not change due to vibration. Use a product that can be easily removed for readjustment if necessary.

- ❑ 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.
- ❑ Remove the temperature probe sealing the hole with high temperature silicone.

Figure 4

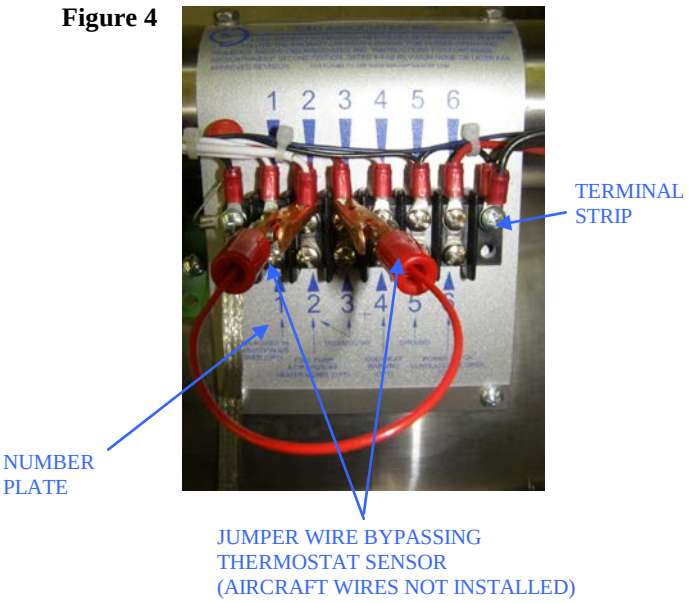
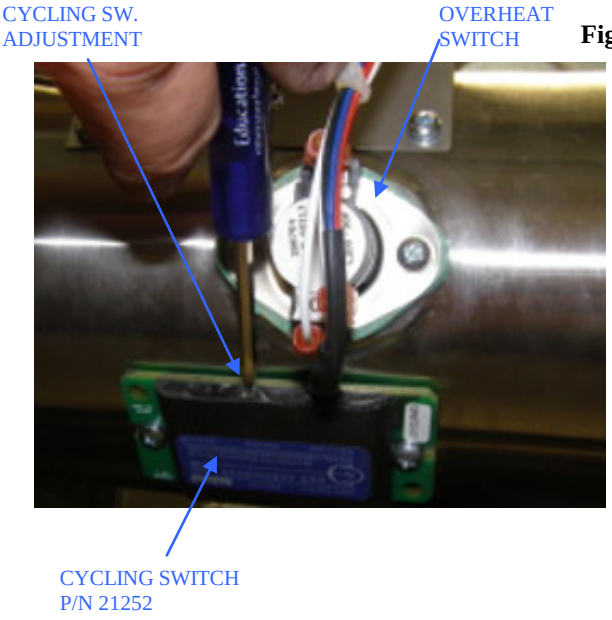


Figure 5



4.1.2.2 **If your heater is not equipped with CD21252…..**

Upper limit adjustments should be made in accordance with aircraft manufacturer's instructions**.**

4.1.3 Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 6)

- ❑ With the heater running, verify fuel pressure.
  - Preferred pressure is 8psi. (6.5psi min, 10psi max)

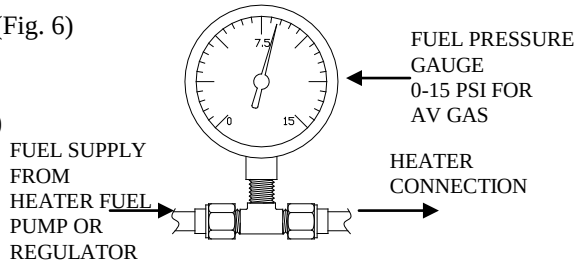


Figure 6

4.1.4 Remove the fuel gauge installed in step 4.1.3. Leave the "tee" fitting and cap off for future pressure readings if desired.

4.2 Verify proper installation is completed in accordance with the aircraft maintenance manual.

4.2.1 Verify all wires are secure and free of obstruction and chaffing.

4.2.2 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.

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

5. After installation, complete the operation and heat output tests specified in the C&D Associates, Inc. MM10001 Maintenance Manual for aircraft combustion heaters Rev L, dated 5/21/15 or later FAA approved revision. Tests should be accomplished in accordance with section 10.3 operational test, and 10.4 for heat output. Also in accordance with the "Instructions for Continued Airworthiness" "Preflight/Operational check and Shutdown Procedure." Rev E dated 5-21-15. These FAA-approved Instructions for Continued Airworthiness must be complied with and become a permanent part of the Aircraft Operations and Procedures manual.

6. Documentation:

6.1. Weight & Balance.

6.1.1. If changed remove old heater of 23 lbs (verify weight). And install new heater kit of 28 lbs. The aircraft requires a weight and balance and a 337 must be completed and a copy of the STC attached. The logbook entry should contain the STC #SA01566CH and PMA Supplement # 42. Original heater replacement is authorized by way of FAA form 337. Alteration of aircraft by way of STC or PMA supplemental number and date must be recorded in the appropriate aircraft records.

6.1.2. If unchanged removal of the Combustion Heater and the installation of the C&D Associates Products TSO-C20 approved heater will have no net effect on weight and balance or electrical load requirements.

6.2. 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" located in MM10001 Rev I dated 8/1/14 or later FAA approved revision."

6.3. Utilize existing aircraft combustion heater operating instructions or other FAA approved combustion heater operating instructions where applicable.

6.4. Electrical requirements: 24VDC.

6.5. Fuel consumption: Maximum operation __ gal/hour.

DOCUMENTATION AND PARTS REQUIREMENT TABLE

	DOCUMENTATION	Quantity
1.	FAA/PMA Supplement # 42	____
2.	Installation Instructions IN11006K2	____
3.	Label for flight manual	____
4.	MM10001 Maintenance Manual	____
5.	Quality Assurance Certificate of Compliance #527	____
6.	STC #SA01566CH	____
7.	337 Form	____

PARTS			S/N
1. Heater	CD11006-1	____	_____
2. (1) Exhaust Assembly	25118	____	
3. (1) Bracket, Mount Assy	21521	____	
4. (2) Bolt, Hex SS 10/32 x 5/16	60106	____	
5. (1) Fuel Pump	29102	____	
6. (1) Blower Assembly	21415	____	
7. (2) Retaining Plate Assy	21673	____	
8. (1) Bracket, Mount	21191B	____	
a. (2) Clamps (7 3/4")	60900-104		
9. (1) Drain Hose w/Clamps	21279	____	
10. (1) Adj. Solid State Duct Sw.	21253	____	_____
11. (1) Switch, Rotary	20654	____	
12. (1) Retainer Assembly	20632	____	
13. (13") Fuel Line #3 w/ hardware	21081	____	
14. (40") Fuel Line #4 w/ hardware	21081	____	
15. (12") 1 ½" x 12" Sceet-6	60199	____	
a. (2) Worm Drive Clamps	60900-28		
16. (24") 1 ½" x 24" Ceet-6	60198	____	
a. (2) Worm Drive Clamps	60900-28		

Initials: _____ Date:_____