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

Supplemental Type Certificate

Number SA01660CH

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 * of the * Regulations. **

Original Product - Type Certificate Number: *See attached FAA Approved Model List

*Make:** (AML) No. SA01660CH for list of approved airplane

*Model:** models and applicable airworthiness regulations

Description of Type Design Change:

Remove Janitrol P/N C15C54 or Twin Commander P/N 88035-5 combustion heater and install C&D Associates, Inc. Model CD35K heater kit 10 P/N CD12043K10 in accordance with C&D Associates, Inc. Installation Instructions as listed on AML No. SA01660CH, 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, Rev. -, dated March 4, 2002, and Instructions for Continued Airworthiness/ Maintenance Manual MM10000, Second Edition, Rev. none, dated April 4, 2002 or later FAA approved revision are required.
3. Check aircraft Weight and Balance.
4. A copy of this certificate and FAA Approved Model List (AML) No. SA01660CH, dated June 24, 2002, or later FAA approved revision must be maintained as part of the permanent records for the modified aircraft.
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: January 8, 2002

Date of issuance: June 24, 2002

Date reissued: February 11, 2016

Date amended:

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.

FAA APPROVED MODEL LIST (AML) NO. SA01660CH

HARTZELL ENGINE TECHNOLOGIES LLC

FOR INSTALLING COMBUSTION HEATER MODEL CD35K KIT 10 P/N CD12043K10

Date of Issuance: June 24, 2002

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NUMBER/DATE	AML AMENDMENT DATE
					NUMBER	REVISION & DATE		
1.	Twin Commander	500, 500-A, 500-B, 500-S, S/N 0131 and up, 500-U, 520, 560, 560-A, 560-E	6A1	CAR 3	IN12043K10	REV. – Dated 1/8/2002 or later FAA approved revision	Rev. -, date: 3/4/2002	
2.	Twin Commander	560-F, 680, 680-E, 680-F, 680-FL, 680FL (P)	2A4	CAR 3	IN12043K10	REV. A Dated 1/8/2002 or later FAA approved revision	Rev. -, date: 3/4/2002	6/20/2000

Date reissued: February 11, 2016

FAA Approved: _____

Timothy P. Smyth
Manager,
Chicago Aircraft Certification Office

C&D ASSOCIATES, INC.

HEATER INSTALLATION INSTRUCTIONS FOR
HEATER KIT #10, P/N CD12043K10

For Twin Commander Models L-3805, 500, 500-A, 500-B, 500-S S/N 0131 and up, 500-U, 520, 560, 560-A, 560-E, 560-F, 680, 680-E, 680-F, 680-FL, 680-FL(P)

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.

LOG OF REVISIONS

Rev.	Description	Pages Revised	Date
G	Reformatted and updated "TESTING" section	ALL	9/24/15

1. PREPARATION

1.1. Heater Removal:

1.1.1. Follow the Aircraft Service Manual or other FAA approved source for removal of the existing combustion heater

1.1.2. Remove ignition unit, lead assembly,a nd combustion air hose.

1.2. 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. INSTALLATION

2.1. Combustion Blower: (Figure 5)

- Mount the new combustion air blower on the floor to the outboard side of the heater location use the mounting clamp as a template.

2.2. Heater

- Install the new heater using the original mounting clamps.

2.3. Drain Line Installation:

2.3.1. Drill a 7/16" hole 2" inboard of the exhaust hole.

2.3.2. Route the drain line, with the "y" extension outboard, through the floor hole just forward of the exhaust shroud. Bend as needed to insert the drain line through the grommet.

2.3.3. Cut the drain line with a 20º scarf aft and approximately 1" extruding out past the grommet.

2.3.4. Attach the drain hose, from the fuel line housing drain to the new drain line "y" extension, with two small cable ties.

2.4. Fuel Line:

- Route the new fuel line from the existing 90º elbow, located in the floor under the aft end of the heater, to the heater fuel connection.

2.5. Combustion Air Blower Hook-up:

2.5.1. Connect the new combustion air blower to the heater.

2.5.2. Run the 1 ½" red sceet hose from the blower outlet under the heater and in front of the drain line to the combustion air inlet adapter on top of the heater.

2.5.3. Install the black 1 ½" Ceet hose from the blower inlet to the inlet plenum.

2.5.4. Clamp both hoses using hose clamps.

2.6. Wiring:

2.6.1. Option 1: Using existing switching

2.6.1.1. Replace cabin heat circuit breaker switch with 10-amp circuit breaker switch.

2.6.1.2. Remove relay access panel located to the right of nose gear door.

2.6.1.3. Identify the outboard (first) lower safety relay.

2.6.1.4. Remove the wire coming from the heater control switch identified with numbers 451A-18, 463-16-5, 463-18, or 5451A-18 connected to X1 on the soft relay. Re-route this wire to the new heater terminal strip, terminal #1. Identification can also be made by locating the smaller terminal (X1) stud containing a jumper wire that goes to a larger stud (A1) on the same solenoid. This jumper wire must be removed and discarded. Confirm choice by removing wire and with master on check for voltage at the removed wire when heater switch is activated.

2.6.1.5. Connect a 16G wire from the heater terminal strip #2 to the safety relay X1 position where the switch wire and jumper had been removed.

2.6.1.6. Re-route the old ignition wire numbered 455A-18, 469-16-4, 469-18 or 5455A-18 to the new heater terminal strip #3.

2.6.2. Option 2: Using new rotary switch and electronic thermostat.

2.6.2.1. Install new rotary switch in a convenient location for the new heater control. Provide 10-amp circuit breaker protected power to the red wire of the new switch.

2.6.2.2. Route white wire from new switch to new heater terminal #1.

2.6.2.3. Remove the wire coming from the old heater control switch identified in option1 step 2. Tape this wire off, as it will not be used.

2.6.2.4. Route 16G wire from the new heater terminal #2 to X1 location on the safety relay where the old switch wire had been removed.

2.6.2.5. Thermostat: Install the thermostat board in the heat distribution box forward of the pilots knee area.

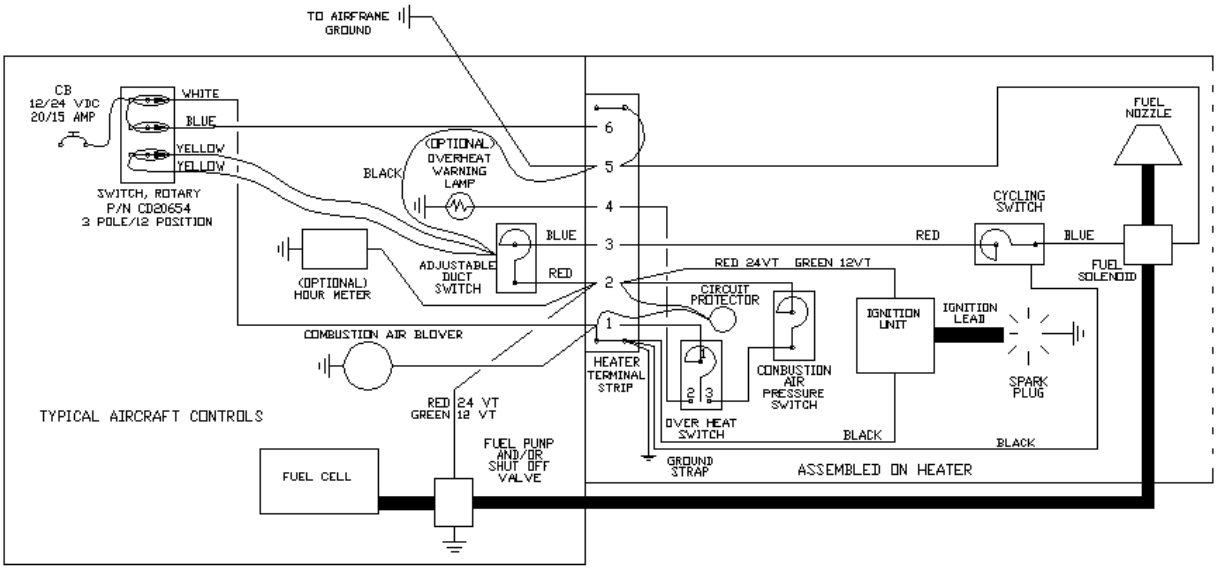
2.6.2.6. From the safety relay, remove from large terminal A1, wire 453A-18, 461-16-5, 461-18, or 5453A-18. This terminal can be identified as not having a jumper to smaller terminal and has two wires. Tape the removed wire off, as it will not be used. Connect the blue wire from the new rotary switch to the A1 terminal of this safety relay where the old wire was removed.

2.6.2.7. Connect yellow wires from the thermostat board to the yellow wires on the switch.

2.6.2.8. Red wire from the thermostat board to terminal #2 on the heater.

2.6.2.9. Blue wire from the thermostat board to terminal #3 on the heater.

CAUTION: It is very important that, prior to the aircraft's return to service, the heater temperature and complete operation is checked in accordance with the MM10001 Maintenance Manual Chapter IX "Testing after Installation or overhaul."



3. TESTING

3.1 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)

3.1.1 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.

3.1.2 Setting upper limit temperature upper limit switch

3.1.2.1 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. 2)

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 3).

- ❑ 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 2

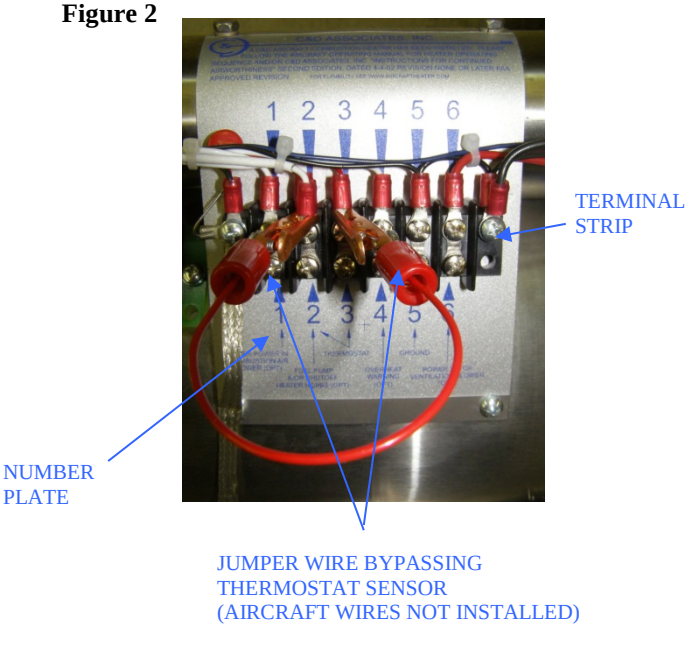
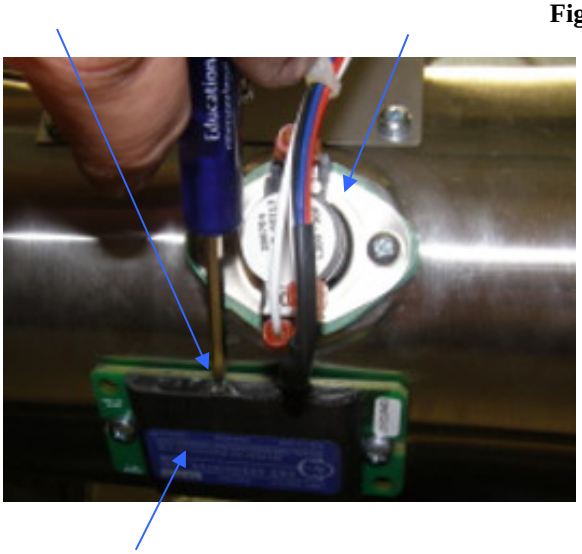


Figure 3



3.1.2.2 If your heater is not equipped with CD21252…..

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

3.1.3 Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 4)

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

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

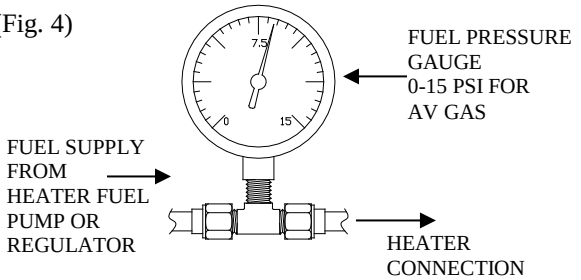


FIGURE 4

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

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

3.2.2 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.

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

4. 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.

5. Documentation:

   5.1. Weight & Balance.

      5.1.1. Weight & Balance. The aircraft does not require a weight and balance change. The logbook entry should contain the STC #SA01660CH and PMA Supplement #28. 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.

      5.1.2. 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.

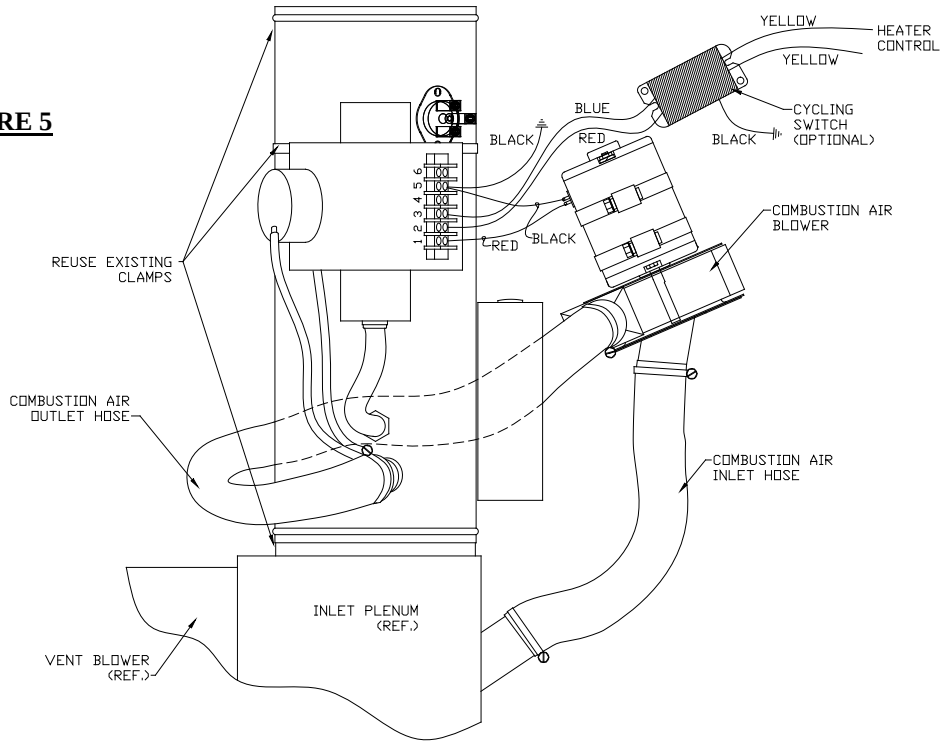
   5.2. Insert the following statement (label 21503 provided) in the aircraft flight manual: "C&D Associates Inc. Combustion heater has been installed in this aircraft. Please follow the aircraft-operating manual for combustion heater operating sequence and/or C&D Associates Inc. Instructions for airworthiness" located in MM10001 Rev I dated 8/1/14 or later FAA approved revision."

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

   5.4. Electrical requirements: 24 VDC. Removal of the combustion heater and the installation of the C&D Assoc. Products TSO-C20 approved heater will increase total electrical load by 5 amps.

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

FIGURE 5



C&D ASSOCIATES, INC.

DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION	Quantity
1. FAA/PMA Supplement #28	____
2. Installation Instructions IN12043K10	____
3. Label for flight manual	____
4. MM10001 Maintenance Manual	____
5. Quality Assurance Certificate of Compliance #527	____
6. STC #SA01660CH	____

PARTS				S/N
1. Heater		12043-1	____	_____
2. Exhaust Pipe		25056	____	
3. Exhaust Shroud		25057	____	
4. (26") Drain Line		22335	____	
5. (8") ¼" Fuel Resistant Drain Hose		21279	____	
6. (1) Grommet, Drain		MS35489-6	____	
7. (4) Screws		60056	____	
8. (1) Fuel Line Assy (8.5")		20715	____	
9. (1) Blower Assy (24V)		21475	____	
10. (4) Hose Clamps		60900-32	____	
11. (1') Ceet Hose, 1 ½" Black		60198	____	
12. (2') Sceet Hose, 1 ½" Red		60199	____	
13. (1) Switch, Adj.	(optional)	21253	____	_____
14. (1) Switch, Rotary	(optional)	20654B	____	
15. (1) Regulator Assembly	(optional)	29127	____	
16. (1) Rotary Rheostat	(optional)	21255	____	
17. (1) Blower Assembly	(optional)	CD31110	____	

Initials: _____ Date:_____

302 POST ROAD, BUCHANAN, MI 49107 USA
PH: 269-695-7469 FX: 269-695-6004 WEB: www.CDaircraftheaters.com **EMAIL:** sales@aircraftheater.com