

United States of America
Department of Transportation -- Federal Aviation Administration
Supplemental Type Certificate

Number SA01751CH

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 Type Certificate Data Sheet No A20SO for complete certification basis.

Original Product - Type Certificate Number: A20SO
Make: Piper
Model: PA-31, PA-31-300, PA-31-325, PA-31-350

Description of Type Design Change:

Installation of C&D Associates auxiliary rear combustion heater Model CD35K heater kit, P/N CD12031K9 in accordance with Drawing CD12031K9, Rev. -, dated October 19, 2001, and Installation Instructions IN12031K9, Rev. A, dated November 22, 2001, or later FAA approved revisions.

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. A copy of this certificate must be maintained as part of the permanent records for the modified aircraft.
4. 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 7, 2002

Date reissued: February 11, 2016

Date of issuance: January 2, 2003

Date amended:



By direction of the Administrator

(Signature)
Timothy Smyth
Manager, Chicago Aircraft Certification Office

(Title)

C&D ASSOCIATES, INC.

IN12031K9

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11/22/01

Rev A

REAR HEATER INSTALLATION INSTRUCTIONS FOR MODEL CD35K KIT, P/N CD12031K9

For Piper PA-31, PA-31-300, PA-31-350, 31-325

READ COMPLETE INSTRUCTIONS AND VIEW DRAWING CD12031K9 PAGES 1-4
BEFORE BEGINNING INSTALLATION

1. Preparation:

- A. Shut off (close) the right fuel shut off. Remove the flooring and forward lower wing root ferring from the right side of the aircraft to allow the fuel pump, fuel line and wiring to be installed. For the heater installation, remove the cabin aft bulkhead. Distance will vary from straight Navajo to Chieftain. Not all clamps or brackets supplied in kit are needed for straight Navajo.

2. Plumbing and Electrical Installation: (See Drawing CD12031K9 pg 4 of 4)

NOTE: Clamp fuel line as required per AC 43.13-1A chapter 14 section 2 paragraph 709

A. Plumbing:

- a. Install as indicated in drawing 4 of 4. Begin the fuel line with an elbow AN821-4D just aft of the main spar. Route as indicated under the floor, through the lightning holes, past the rear cabin bulkhead, approximately 3'.

B. Electrical wiring:

- a. Along the fuel line, route the electrical wires. Leaving approximately 3' to work with, place two yellow 16G, one blue 14G and one white 14G wire from the new heater area under the floor to the new heater switch location. Also one white 16G wire from the new heater area to the rear of the main spar and down under to the new fuel pump location in the wing root location. Fasten the new fuel line and wires as indicated on the drawing on pg 4 of 4, view F-F and G-G.

NOTE: Hanger item 25 is not used at main spar station 140.00.

3. Fuel Pump: (See Drawing CD12031K9 pg 4 View D-D and E-E)

- A. Install the fuel pump, removable filter cap forward, as indicated, straddling the skin overlap (view D-D). Use the pump mounting legs as a template.

CAUTION: When drilling the 3/8" mount holes in the fuselage use extreme caution that damage is not caused when penetrating the hull. Insert the two shock fasteners, item 31 into the holes and fasten the pump with ground wire using Items 32, 33 and 34.

- B. Install a ground wire from the lower leg of the pump to the airframe. Connect the 16G white wire, run previously, to the pump.
- C. Confirm that the right fuel shut off near the pilot seat is closed. Remove the 45° elbow from the shut off valve in the right wing root area just forward of the main spar. Install the new elbow P/N 22063, item 28 with the #4 nipple facing inboard. Reconnect the fuel line running to the sump (view E-E).
- D. Fabricate one fuel line from the fuel shut off #4 nipple in the elbow (item 28) to the inlet of the pump.
- E. Fabricate one fuel line from the pump outlet to the 90° elbow AN821-4D located aft of the main spar installed earlier. Fasten as indicated on drawing pg 4, view E-E with clamp (items 14, 15 and 16). Before flaring both ends install hose item 59 onto the fuel line. Position the hose as indicated in view E-E to protect the fuel line from chafing the bottom of the main spar and the wing root ferring area when installed.

4. Heater Mount Installation: (See Drawing CD12031K9 pg 1)

- A. The main heater mount consists of four primary parts. Item 1 P/N 24012 left frame support, Item 2 P/N 24011 right frame support, Item 3 P/N 24014 front connecting plate, and Item 4 P/N 24010 rear connecting plate.

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- B. Install the right frame (Item 2) just outside of the existing stringer at BL 5.8. Slide the frame forward all the way flush with the aircraft frame at station 274.00 and hold in place with temporary fasteners. Using flush rivets secure the frame to the skin at 1" increments. Replace the temporary fasteners with #4 cherry rivets (item 46). Fasten the rear strap to the aft side of station 296.00 using three #4 cherry rivets (item 46).
- C. Position items 1, 3 and 4 in place using temporary fasteners. Secure Item 1 to existing frame at station 274 using #4 cherry rivets. Secure front plate and rear plate using rivets item 13 as indicated.
- D. Complete the heater mount installation by installing item 54 P/N 24015, frame extension. Place fully aft, against station 296.00 bulkhead frame and rivet, using three #4 cherry rivets (item 46), into station 296.00 bulkhead. Rivet frame extension to left frame support (item 1) using item 13.

5. Exhaust Hole Installation:

- A. Place a 2 3/4" exhaust hole in the skin of the aircraft. Center the hole 5 3/4" aft of the bulkhead station 274.0 and 6 1/4" outboard of the right frame support P/N 24011 (item 2).

6. Combustion Air Inlet:

- A. Install combustion air inlet adapter P/N 21356 (item 5) to the left side of left support frame, P/N 24012 (item 1). Center a hole 1.375 diameter between left frame support and next stringer, 3" aft of existing frame at station 274.00. With the scarf forward, rivet P/N 21356 (item 5) into place with to six equally spaced counter sunk rivets (item 60).

7. Drain Line Hole:

- A. Install a 7/16" hole 6 3/4" aft of station 274.00 centered between the left support frame and next stringer to the left side of airframe. Install grommet (item 20).

8. Inlet and Outlet Plenum:

- A. Mount as indicated in drawing CD12031K9 pg 2 of 4. Clearance holes for rivnuts are required in referenced bulkhead mainframe as indicated in view of section C-C for both out and in plenum mounting. Fasten in each location using three blind rivets (item 36).

9. Heater Installation:

- A. Place the new heater assembly into position. Fasten using two 6" clamps, (item 6) around the heater and flanges on frames.
- B. Drain connection and routing as indicated on page 1 of drawing. Bend as needed for clearance. Connect drain hose (item 18) from fuel box to drain line (item 19) using small tie wraps.
- C. Install 4" black Ceet hose (item 9) to inlet of heater and fasten with two 4" clamps (item 7)
- D. Connect 4" red Sceet hose (item 8) to outlet plenum (item 11) and upper distribution box with 4" clamps (item 7)
- E. 1 1/2" diameter combustion air hose (item 61) from combustion air blower inlet to adapter in skin (item 5). Clamp with two clamps (item 17). Fasten hose, as indicated, using tie wrap (item 55).
- F. Fuel Line Connection:
 - a. Route the fuel line under heater, outboard of right frame support to heater fuel box. Fasten to right support frame with clamp (item 25) and hanger (item 26).
- G. Electrical Hook Up:
 - a. Route wires, previously run, up the right support, clamp as indicated to frame. Fasten to the heater terminal strip. Blue 14G wire from switch to terminal #6 using blue #6 ilet (item 44). White 14G wire from switch to terminal #1 using blue #6 ilet (item 44). White 16G wire from fuel pump to terminal #2 using red #6 ilet (item 45). The two remaining yellow wires connect to the two wires on the terminal strip. Connect a ground wire from terminal #5 to the right support frame.

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10. Control Switch Installation:

- A. Install as indicated in drawing CD12031K9, pg 3 of 4. Install the control switch (items 47, 48 and 49) in a convenient location near existing heater controls. Assure that the area behind the switch has adequate clearance. Interconnect previously installed wire harness to new rear heater switch using same wire color-coding.
- B. Circuit breaker installation as indicated in view 1, 2, 4 and 5.

11. Operation Check:

- A. Return right fuel shut off to on position. With master switch on, turn the heater control to first position "Fan." Verify the ventilation fan is operational. Airflow out of the top outlet.
- B. Heater Control Switch to next position "Heat." Verify that the ventilation fan is still operational and that the combustion air motor is operating with airflow out the exhaust. Check for voltage at the heater terminal strip numbers 1, 2 and 6. Terminal #3 may or may not have power depending on temperature in area. Rotate heater control switch until power is evident at terminal #3 and heater fires. With fuel pump running, check for fuel leaks full length of new installation.

12. IMPORTANT! Final Inspection before closing:

- A. Inspect all fuel lines and their connections for any possible leaks and mounting security. Verify that electrical wire, fuel line, and heater installation are clear of any aircraft control cable movement before installing flooring and panels.
- B. After installation, complete the operation and heat output tests specified in the C&D Associates, Inc. MM10000 Maintenance Manual for aircraft combustion heaters Second Edition dated 4-4-02. 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 Airworthiness" step #1 "Preflight/Operational check and Shutdown Procedure."

13. 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.

14. NOTE: Insert the following statement (label provided) in the aircraft flight manual: "Combustion Heater Operation: Please follow the C&D Associates, Inc. Aircraft Flight Manual Supplement, Dated March 4, 2002 or later FAA approved revision.

15. NOTE: Increased electrical load is approximately 15 amps at 24 VDC. Fuel consumption with continuous burn is approximately 2 GPH.

16. NOTE: Weight and balance change: Heater Kit installation aft of rear cabin bulkhead weighing 43 lbs.

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DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION

- | | |
|--|-------|
| 1. FAA/PMA Supplement #XX | _____ |
| 2. FAA/PMA Data plate | _____ |
| 3. Installation Instructions IN12031K9 | _____ |

PARTS

- | | |
|-----------------------------------|-------------------|
| 1. (1) Frame, Left Support | 24012 |
| 2. (1) Frame, Right Support | 24011 |
| 3. (1) Plate, Connecting Front | 24014 |
| 4. (1) Plate, Connecting Rear | 24010 |
| 5. (1) Combustion Air Inlet | 21356 |
| 6. (2) Clamp, Hose | ½" x 5 ½-8" |
| 7. (4) Clamp, Hose | ½" x 3 ½-6" |
| 8. (1) Hose, Red Sceet | 4" x 34" |
| 9. (1) Hose, Black Ceet | 4" x 17" |
| 10. (1) Thermostat, Switch | 21253 |
| 11. (1) Outlet Plenum | 24016 |
| 12. (14) Clamp for wires | MS21919WG-4 |
| 13. (28) Rivets 1/8" | MS20470-AD4-4 |
| 14. (22) Nut, 8/32" | AN365-832 |
| 15. (22) Washer, #8 | AN960-8 |
| 16. (22) Screw, 8-32 | AN526-832R6 |
| 17. (2) Clamp | ½" x 1 ¼ - 2 ½ |
| 18. (1) Drain Hose | 21279 |
| 19. (1) Drain Line | 21335 |
| 20. (1) Grommet | MS35489-6 |
| 21. (16') Fuel Line | 20653 |
| 22. (3) Union | AN815-4D |
| 23. (12) Nut | AN 818-4D |
| 24. (12) Sleeve | AN819-4D |
| 25. (11) Hanger | 24019 |
| 26. (13) Clamp for fuel line | MS21919WDG-4 |
| 27. (1) Elbow | AN821-4D |
| 28. (1) Elbow | 22063 |
| 29. (2) Brass Bushing ¼"-1/8" NPT | 70085 |
| 30. (2) Elbows | MS20822-4D |
| 31. (2) 10/32 Rivnut | 60122 |
| 32. (2) Bolts | AN3-7A |
| 33. (2) Washer | AN960-3 |
| 34. (2) Lock Washer/Split | AN935-10 |
| 35. (2) Distribution Box | 24017 |
| 36. (6) 1/8" Blind Rivet | AD42ABS |
| 37. (2) Duct Mesh | 24020 |
| 38. (2) Plate | 24018 |
| 39. (1) Caution Placard Inlet | 24023 |
| 40. (1) 15 Amp Circuit Breaker | W23X1A1G-15 |
| 41A. (15') 14 G Wire, White | MIL-W-22759/16-14 |
| 41B. (15') 14G Wire, Blue | MIL-W-22759/16-14 |

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42. (30') 16G Wire, Yellow	MIL-W-22759/16-16
43. (15') 16G Wire, White	MIL-W-22759/16-16
44. (2) Blue Insulated Terminal	#6 Ilet
45. (3) Red Insulated Terminal	#6 Ilet
46. (14) Cherry Rivets	CR9163-4-2
47. (5) Butt Splices	Red Butt Splices
48. (1) Rotary Switch	20654
49. (2) Butt Splices	Blue Butt Splices
50. (1) Blue Insulated Terminal	#10 Ilet
51. (2) Butt Splices	Yellow Butt Splices
52. (1) Fuel Pump	21186
53. (1) Label, Operation	21504
54. (1) Frame, Extension	24015
55. (1) Tye Wrap, #8 Mount	4"
56. (1) Distribution Assembly (Opt)	24021
57. (1) Transition (Optional)	24022
58. (1) Caution Placard, Outlet	24024
59. (6") Hose, Chafe, fuel resistant	¼" ID
60. (28) Rivet, Flush Head	MS20426-AD4-4
61. (1) Hose, Black Ceet	1 ½ x 20"
62. (1) Heater Assembly	12031
63. (1) Installation Instructions	IN12031K9

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