

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

Number SA01772CH

This certificate is 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. A-782 for complete certification basis.

Original Product - Type Certificate Number: A-782

Make: Navion Aircraft Company, Ltd.

Model: Navion (L-17A), Navion A (L-17B, L-17C), Navion B, Navion D, Navion E, Navion F, Navion G, Navion H

Description of Type Design Change:

Installation of C&D Associates Combustion Heater Kit P/N CD11007K8, in accordance with C&D Associates heater Installation Instructions IN11007K8, Rev. A, dated July 2, 2002 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. Full compliance with the C&D Combustion Heater Instructions for Continued Airworthiness, second edition, revision none, dated April 4, 2002, or later FAA approved revision, is required.
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: November 12, 2002

Date reissued: February 11, 2016

Date of issuance: February 20, 2003

Date amended:



By direction of the Administrator

A blue ink signature of Timothy Smyth, written over a horizontal line.

(Signature)

Timothy Smyth
Manager, Chicago Aircraft Certification Office

(Title)

HEATER INSTALLATION INSTRUCTIONS FOR MODEL CD25K KIT, P/N CD11007K8

Navion, Navion A, Navion B, Navion D, Navion E, Navion F, Navion G, Navion H

1. GENERAL (Read complete installation instructions before beginning)
 - A. Remove the existing heating system or inlet distribution box if installed.
 - B. Install all fuel lines in accordance with AC43.13-1B, Chapter 8, Section 2, paragraph 8-31
 - C. Install all electrical in accordance with AC43.13-1B, Chapter 11.
 - D. References in brackets refer to Navion parts book.
 - E. Temporarily position new heater and note location for exhaust clamp to clear exhaust or augments.

2. FUEL PUMP INSTALLATION (P/N 40051E)
 - A. In the lower forward right hand section of the fuselage, remove the fuselage baffle of the engine air cooling exhaust to gain access to the electric fuel pump area. Remove the aircraft electric fuel pump to ease modification.
 - B. Disconnect and remove the main rigid fuel line that runs from the aircraft electric fuel pump back and through the right hand nose gear box beam assembly to the fuel strainer. Also remove the AN816-6 nipple from the fuel pump that the main fuel line was connected to.
 - C. From inside the nose gear area on the right hand gearbox beam assembly, measure back from the nose gear drag brace support channel [Item 1408 P/N 145-34204] 6 inches. Place a location mark up from the bottom 5 inches and at 2.5 inches. Drill two holes, for 1/4" bolts, at the location marks for the pump mounting legs. With the pump's removable filter cap and the inlet port forward, secure the pump with 2 each 1/4" bolts and nuts.

3. FUEL LINE (AC43.13-1B, Chapter 8, Section 2, paragraph 8-31)
 - A. Install the new running T fitting P/N MS20826-6D with its adapter bushing P/N AN 894-6-4D into the aircraft electric fuel pump using thread sealer on the pipe thread. Direct the bushing that will supply fuel to the heater toward the nose wheel well. Utilizing the removed rigid fuel line, shorten by 1/2 inch, reflare and re-install.
 - B. Inboard of the right exhaust pipe hanger on the fire wall are two bulkhead fittings for the existing fuel supply to the engine. Drill a .4375 hole and insert the AN833-4D bulkhead fitting for the new heater line.
 - C. Fabricate three new fuel lines:
 - 1) Connect the IN side of the heater fuel pump, forward connection to the bushing on the new running T installed in the aircraft electric fuel pump.
 - 2) Install one line from the back OUT connection of the heater fuel pump to the bulkhead fitting in the firewall.
 - 3) Fabricate a fuel line from the lower firewall bulkhead filling up to the heater fuel box. Secure half way up with a clamp.

4. HEATER EXHAUST CLAMP INSTALLATION
 - A. Using the heater exhaust clamp as a pattern, locate 1" above the cabin floor rivet pattern located in the firewall and outboard of the right engine exhaust pipe hanger or augmentor. Mark and drill two .375-inch holes. Place the rubber retaining mounts P/N 21379 into the holes. With the two mounting screws and lock washers placed into the metal bracket, install three large washers as spacers on each screw and secure to the firewall mounts.
 - B. (Optional) Exhaust pipe modification: Aircraft without augmentors require shortening the exhaust. Measuring from the heater shroud 10.75" and maintain the same scarf angle. Cut and debur. This will allow heater exhaust to expel into discharge airflow of the engine.

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5. HEATER INSTALLATION

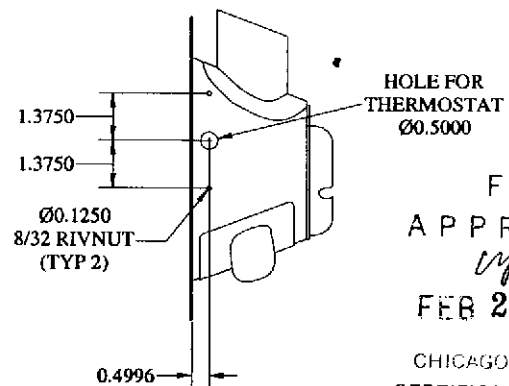
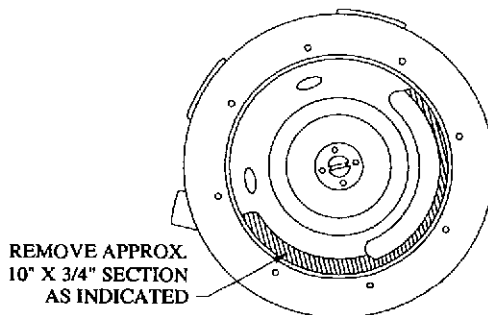
- A. Install the new heater with eight retaining screws thru the supporting bracket and firewall. Secure with washers and lock nuts. Secure the exhaust shroud onto the exhaust mounting bracket with the worm drive clamp.
- B. Fuel line connection:
 - 1) Connect the fuel line from the new fire wall bulkhead fitting to the fuel connection located in the fuel feed housing on the top left of the heater.
- C. Route and secure the fuel drain hose from the fuel feed housing down past the fire wall and 1" into the engine exhaust cavity area.
- D. OPTION 1: (Cowling scoop) Install the air inlet adapter C&D P/N 22064 just aft of the right hand center cowl fastener bracket [Figure 10, Key 29, Item 1722, P/N 145-31926-7] using two 10/32 screws, washers and nuts. The air inlet adapter bracket may have to be bent slightly in order to achieve a good fit when cowling is closed. If the original cowling scoop [Item 1739, P/N 145-31501-136] was previously removed, C&D P/N CD22066 is available.
- E. OPTION 2: (Air tube) Remove the air inlet adapter bracket from P/N 22064 and discard. Connect the remaining CD22066 adapter to the fresh inlet air duct.

6. COMBUSTION AIR BLOWER INSTALLATION

- A. From the right side of the firewall, count over to the fourth indented vertical stiffener above the heater. Place the combustion air mounting bracket with its top edge 10.75 inches down from the top of the firewall. Using the combustion air mounting bracket as a pattern, place it straddling the indented stiffener and mark the mounting holes. If required, an alternate location above the heater on the firewall may be chosen. Make sure adequate clearance for the closed cowling is maintained.
- B. Install the combustion air blower (housing down) with housing outlet pointing to the heater combustion air inlet adapter.
- C. Connect the blower outlet port to the heater combustion air inlet adapter using the red 1 1/2" scet hose and two clamps.
- D. Connect the combustion air blower inlet (45° angle) adapter to the fresh air inlet attachment using the black 1 1/2" scet hose and secure with two clamps.

7. THERMOSTAT INSTALLATION:

- A. The outlet plenum (Air Control Valve Assy, P/N 145-53301-7, Item 4628) has a rotating disc inside remove approx. 10" x 3/4" from the movable disk (P/N 145-53301-5, Item 4607 Key 10) as indicated in the drawing below. Mount the thermostat (CD21253) as indicated. Make sure the heater control as it is moved from stop to stop does not interfere with mounting of switch.



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8. ELECTRICAL (AC43.13-1B Chapter 11)

- A. Provide a 10 AMP Circuit breaker for the heater installation. Prior to removing an old control switch, locate and identify the wire from the heater circuit breaker connected to the old switch. Remove the old heater control switch and install the new rotary switch, making sure it has adequate clearance to eliminate possible shorting. Connect the red wire to the heater circuit breaker and the black wire to an airframe ground. White wire to the heater terminal strip #1. The new switch has two relays incorporated in the wiring approx. 3" from the switch. Secure the relays in such a way as to minimize movement. Secure wiring in accordance with AC 43.13-1B Chapter 1 for electrical applications.

The blue wire is not used in this installation. Cut short, insulate and secure.

The white wire is for the heater and is to be connected to terminal #1.

The two yellow wires are for the electronic thermostat and may be connected to the thermostat sensor yellow wire in any order (non-polarity).

- B. Run the electric wire from the new heater fuel pump along with the existing aircraft wiring thru the fire wall to the heater terminal strip and connect to terminal #2. Fasten as needed for support. Verify pump is grounded.

9. OPERATION:

- A. 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."
- 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.

10. DOCUMENTATION:

- A. NOTE: Insert the following statement (label 21504 provided) in the aircraft flight manual: "Combustion Heater Operation: Please follow the C&D Associates, Inc. "Instructions For Continued Airworthiness", Second Edition, Dated April 4, 2002, Revision: none or later FAA approved revision.
- B. NOTE: Installation of the C&D Associates Products TSO-C20 approved heater kit will require an electrical load of approximately 10 amps.
- C. NOTE: Total weight of kit is 25 lbs at station 47.

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DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION

- 1. FAA/PMA Supplement #XX _____
- 2. Installation Instructions IN11007K8 _____
- 3. Label for Flight Manual P/N 21504 _____
- 4. MM10000 Maintenance Manual _____
- 5. Quality Assurance Certificate of Compliance #527 _____

PARTS

- 1. Drain Hose with clamps 21279 _____
- 2. Rotary Switch 20654 _____
- 3. Adj. Solid State Duct Switch 21253 _____
- 4. 1 1/2" x 12" Scelet Hose SCEET-6 _____
- 5. 1 1/2" x 24" Scat Hose SCAT-6 _____
- 6. (4) 1 1/2" Worm Drive clamps _____
- 7. Blower assembly 21414 _____
- 8. (4) Blower mounts 95D07-1 _____
- 9. 3" Exhaust clamp _____
- 10. Fuel Pump 21370 _____
- 11. (2) Fuel Pump mounts 21379 _____
- 12. (2) Fender Washers 60091 _____
- 13. (2) Lock Washers 60098 _____
- 14. (2) SS Screws 60041 _____
- 15. Air inlet adapter 22064 _____
- 16. Heater adapter mount 22065 _____
- 17. 4' of #4 Fuel line 21337 _____
- 18. (6) Sleeves MS20819-4D _____
- 19. (6) Nuts AN818-4D _____
- 20. Tee MS20826-6D _____
- 21. Bushing AN894-6-4D _____
- 22. Elbow AN833-4D _____
- 23. Nut AN924-4D _____
- 24. 7/16" ID SS Washer _____
- 25. (2) Shock Mount 21379 _____
- 26. (2) 1 1/4" X 10/32" 18/8 SS Hex Screw _____
- 27. (6) Washers AN970-3 _____
- 28. Mount 21191A _____

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