

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

Number SA02707CH

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 herein meets the airworthiness requirements of Part 4a of the Civil Aviation Regulations.

See Type Certification Data Sheet No. A-734 for complete certification basis.

Original Product--Type Certificate Number: A-734

Make: Gulfstream American

Model: G-44, G-44A

Description of Type Design Change:

Installation of C&D Associates combustion heater Kit P/N CD12015K26 in accordance with Installation Instructions IN12015K26, Rev. A, dated April 29, 2008 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 Flight Manual Supplement, Rev. New, dated March 12, 2009, or later FAA approved revision is required as part of this installation.
3. 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.
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: December 27, 2007

Date reissued: February 11, 2016

Date of issuance: March 18, 2009

Date amended:

By direction of the Administrator



(Signature)
Timothy P. Smyth
Manager,
Chicago Aircraft Certification Office

(Title)



HEATER INSTALLATION INSTRUCTIONS FOR HEATER KIT #26, P/N CD12015K26

For Grumman Widgeon G-44, G-44A.

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.
Utilize appropriate fasteners and grades of hardware in accordance
with AC43.13-1B Chapter 7.

1. PREPARATION:
 - A. (Heater Install access) Remove rear cabin bulkhead panel allowing access to tail section at station 22.
 - B. (Heater air access) Remove seats and floor (co-pilot area only section not accessed)
 - C. (Fuel and electrical access) Ceiling panels right side from rear cabin bulkhead forward to fuel tank cross feed line.
2. HEATER BRIDGE MOUNT INSTALLATION
 - A. At St. 24 (left side, vertical) measure up from center horizontal stiffener 3" and mark stringer. This determines top of bridge mount. Insert bridge mount P/N 21941 between St. 23, 24 & 25.



- B. Transfer 8 (4 each side) holes onto #23, #24 & #25 vertical stringers. Drill using 3/16 bit.
 - C. Anchor bridge to A/C using appropriate fasteners.
3. EXHAUST HOLE & DEFLECTOR (P/N 21931)
 - A. Mark intersection (left side, between St. 23 & 24) 3 1/2" horizontally aft of St. 23 & 4 3/4" down from bottom edge of bridge extension.
 - B. At intersection make 1 1/2" hole through skin. Deburr.
 - C. (Exterior) center exhaust deflector P/N 21931 1 1/2" hole over 1 1/2" hole in skin (narrow side facing aft) Use template (A) to transfer rivet pattern thru skin and attach utilizing AC 43.13-1B Chapter 4 section 4 and paragraph 4-57. Attach to A/C using appropriate fasteners including sealer of choice between deflector and skin.

- D. Transfer remaining 3/8" hole in deflector through skin. Install grommet P/N 60531.



4. FUEL PUMP MOUNT

- A. Mount on forward side of right engine firewall. Attach securely to firewall using appropriate fasteners.

5. COMBUSTION AIR INLET/SCOOP

- A. Outside A/C mark intersection 3 1/2" forward of overlapping seam at station 24, and inboard of A/C left edge, 13".



- B. At intersection, make 1 1/2" hole through skin.
- C. Use template C to transfer all holes to skin. Template holes are pilot only. Pattern set for 5/32 rivet. Utilize appropriate lengths according to AC 43.13-1B Chapter 4 section 4 and paragraph 4-57. Note: Red highlighted holes rivet together and sandwich skin between combustion air inlet and scoop.
- D. From inside install combustion air inlet adapter, short end up and out. Attach with appropriate fasteners and sealer.
- E. On exterior, center combustion air scoop over inlet adaptor, opening forward. Install remaining rivets appropriately.

6. VENT AIR SUPPLY

- A. Ram Air shut off optional equipment
- a. Outside A/C mark intersection, 4" forward of overlapping seam at station 25, and inboard of A/C left edge 8".



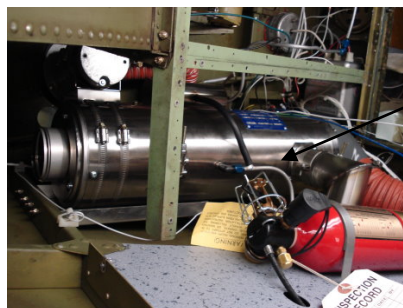
- b. At intersection, make 3" hole through skin.
- c. Use template B to transfer all holes to skin. Template holes are pilot only. Pattern set for 5/32 rivet. Utilize appropriate lengths according to AC 43.13-1B Chapter 4 section 4 and paragraph 4-57. Note: Red highlighted holes sandwich skin between vent air inlet and scoop.
- d. Install vent air inlet adaptor, short end up and protruding out. Attach with appropriate fasteners.
- e. Exterior, center vent air scoop over inlet adapter, opening forward. Attach with appropriate fasteners and sealer.

7. HEATER INSTALLATION

- A. Loosely install heater minus exhaust extension. Utilizing 2 ea 7" clamps provided P/N 60900-104
Note: With exhaust straight down, verify combustion air blower assembly is free and clear of all A/C controls.



- B. Fit exhaust extension to heater. Only exhaust, not shroud should protrude from A/C. Trim if necessary. Install clamp.
- C. Fit supplied aluminum drain "Y" (P/N 21335) to belly drain of heater. Short leg should face inboard. Bend long leg where appropriate to protrude through grommet in exhaust deflector approx 1". Run supplied rubber drain line from "Y" drain short leg, up and on fuel box leg. Secure.



DRAIN

- D. Supplied (black) 1 1/2" ceet hose. Extend from combustion air blower assembly up and onto combustion air inlet scoop adaptor. Trim length as necessary and secure both ends using hose clamps.
- E. Secure all clamps at this point. **ATTENTION:** Verify clearance from all controls. Check full range of movement. Verify no rubbing or possible chafe points. Verify heater and components are secure.

8. VENT AIR SUPPLY (continues from Part 7)

- A. **Option 1** – Ram Air/Shutoff
 - a. Position P/N 21930 Gate assembly over and onto 3” adaptor located on fresh air intake end of heater. (Should be tight fit) Orient so gate is vertical pointing toward ram air inlet adapter. On inboard side drill 1/8” hole through gate assembly and on through 3” adaptor on heater. Secure with appropriate sheet metal screw.
 - b. Supplied 3” black ceet hose extend from top of gate assembly up and onto ram air inlet adapter. Trim length as necessary and secure both ends with hose clamps.
- B. **Option 2** – Vent air
 - a. Appropriately (path of least resistance) route 3” black ceet hose from 3” adaptor located on fresh air intake end of heater, forward and on to inlet previously installed on ram air scoop. Trim length as necessary and secure both ends using hose clamps.

NOTE: Verify clearance from all controls.

9. HEATED AIR DISTRIBUTION

- A. **Option 1** – (Multiple outlets + Defrost optional)
 - a. Route 3” red sceet from heater outlet plenum straight down. Extend forward through station 22 under floor. Route to center of St. 21 and extend forward. Trim so approx. 3” hang forward of St. 18
 - b. Clamp 3” end of plenum P/N 21915 on to 3” sceet.
 - c. Clamp 2” sceet onto 2” sides of distribution plenum and extend out board, one to the right, one to the left.
 - d. Route 3” red sceet from forward side of distribution plenum (P/N 21915) up to St. 12, hang a left over to left side of St. 11 and continue forward, centered under pilot seat.
 - e. Trim so approx. 3” hang forward of St. 11
 - d. Install box P/N 21932 under pilot seat and secure to airframe. With this option 21253 thermostat should be installed onto out board side of defrost box (wires up).
 - e. Route 1” sceet (2 ea) from defrost box forward and up under panel. Install defrost outlets as desired to dash. Connect as pictured.



- f. Install cabin vent diffusers right and left as desired under rear seats. Connect to previously run 2” sceet.
- g. Secure all hose and verify clearance.

- B. **Option 2** – Cabin Rear Distribution only.
 - a. Mount, centered, 21253 thermostat on flat of heater outlet plenum.
 - b. Mount cabin heat outlet through rear cabin bulkhead St. 22 (P/N 21942). Outlet should be close to cabin floor, directly down from heater. (as pictured).
 - c. Route 3” red scet from heater outlet plenum down to cabin outlet. Connect both ends with clamps.



10. ELECTRICAL

- A. Install 20654, 12 or 24V in panel as desired.
- B. Install 15 amp (24V) or 20amp (12V) breaker.



- C. Wire per schematic.
 - a. From 20654 splice in and run 12g min. white and blue wires back to heater terminal strip following path of heat duct mentioned in 9. Opt 1.
 - b. From 20654 splice and run two yellow 18g wires to 21253 thermostat.
 - c. From 21253 thermostat, splice and run 18g red and blue wires back to heater terminal strip
 - d. Connect all points according to wiring schematic. Be sure heater, 21253 and 20654 are properly grounded to airframe! Anchor bundle appropriately and securely.
 - e. Red 18g from fuel pump to heater terminal #2. Black ground to airframe. Properly secure.

11. Ram Air Gate Activator (if so equipped as outlined in 7.A.)
A. Route push-pull cable with gentle bends from location close to 20654 in panel, following wire bundle back to heater. Anchor and attach to gate arm on ram air/shutoff assy.

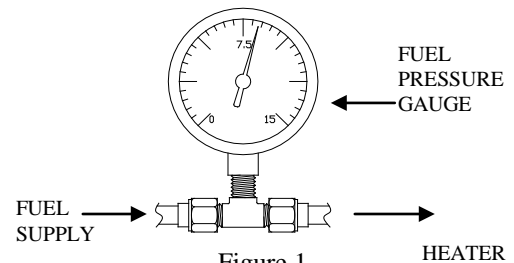


12. PLUMBING

- A. Gain access to cross feed fuel line, right side ceiling panel under wing. Should find capped #4 "T" fitting either directly under wing or just down right side between St. 12 and 15.
 C. Appropriately route fuel line from fuel pump outlet over to heater fuel solenoid. anchor securely to airframe.

13. HEATER OPERATIONAL TEST AFTER INSTALLATION:

- IMPORTANT!! Please complete the followings steps after the new heater is installed in the aircraft.
- A. 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.
- B. 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.
- C. Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 1)
D. With the heater running, verify fuel pressure.
Preferred pressure is 8psi. (6.5psi min, 10psi max)
E. With the heater running, verify that the outlet plenum temp. is approx. 250°. Adjust the cycling switch if needed. Clock-wise to increase, counter-clock-wise to decrease temperature. (Fig. 3)
NOTE: Adjust screw no more than ¼ turn at a time.
- F. 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.
G. Remove the temperature probe. If drilled, seal the 1/8" hole (see 14.A.) with high temperature silicone.
H. Remove the fuel gauge installed in step 3. Leave the "tee" fitting and cap off for future pressure readings if desired.



If the hoses need to be replaced, we recommend Scelet-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 2

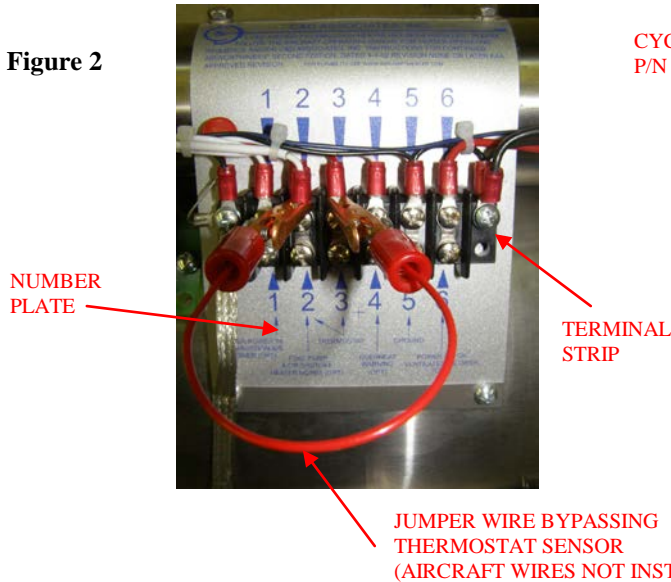
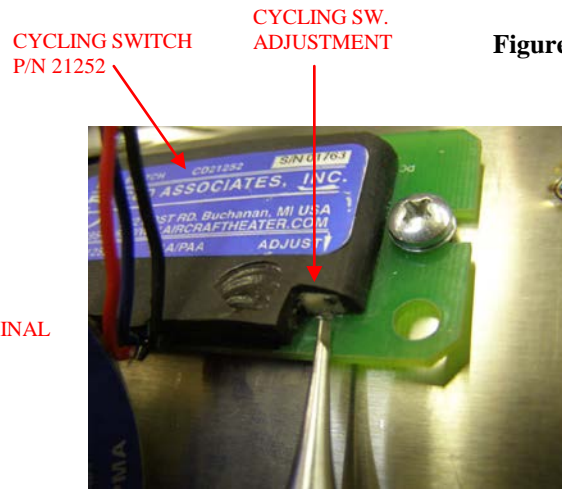


Figure 3



- I. 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 Airworthiness” step #1 “Preflight/Operational check and Shutdown Procedure.”
- J. 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.
- K. Verify all wires are secure and free of obstruction and chaffing.
- L. Verify list below
 - All A/C controls free and clear of installed components
 - Wire connections and bundles secure/ no chafe points
 - ALL ground lines secure to airframe
 - Fuel lines secure/No chafe points
 - Heater clamped and secure
 - Ram air intakes secure (if equipped)
 - Hoses (sceet and ceet) clamped and secure/ no chafe points
 - Exhaust secure
 - Combustion air blower assembly clamped and secured to heater
 - 21253 plug connection secure
 - Fuel too pump
 - Fuel connections secure
 - Grommets installed (Drain, fuel box, fuel line, etc)
 - Heat duct components secure



- Power to new heater breaker

Operation check breaker in

1st click on 20654

- Only vent blower running

2nd click and up

- Fuel pump operation (clicking)
- ALL fuel connections leak check
- Ignition of heater (NOTE: dependant of O.A.T. heater may not ignite until further rotation of 20654)
- Temperature increase with clockwise rotation of 20654
- High Temp cycle (220-240° F)
- No fuel from drains

Back to 2nd click

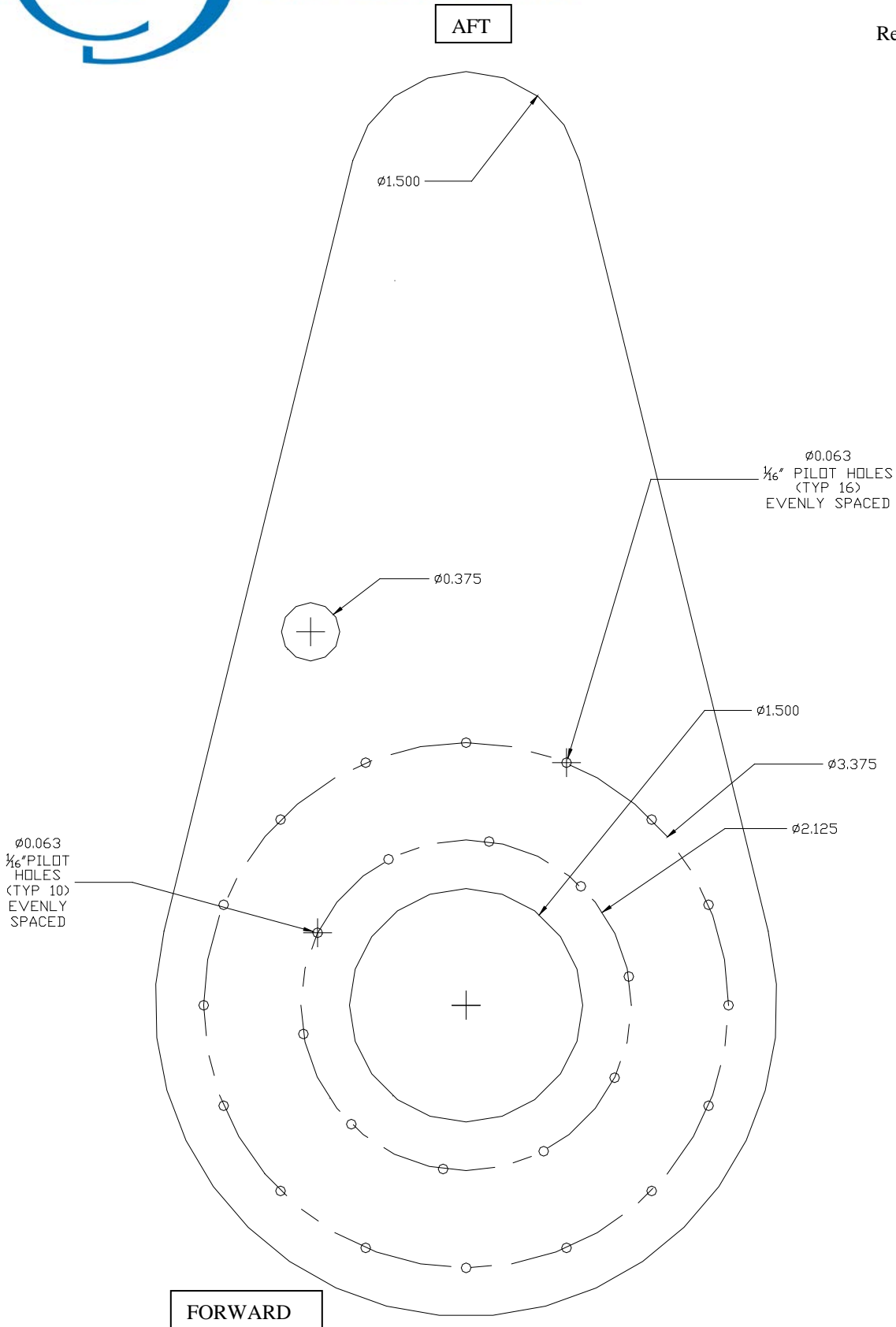
- Heater cool down, cycle below 75° F.
- Activation of push pull cable cuts power to all but terminal #6 on heater (if so equipped)

Off

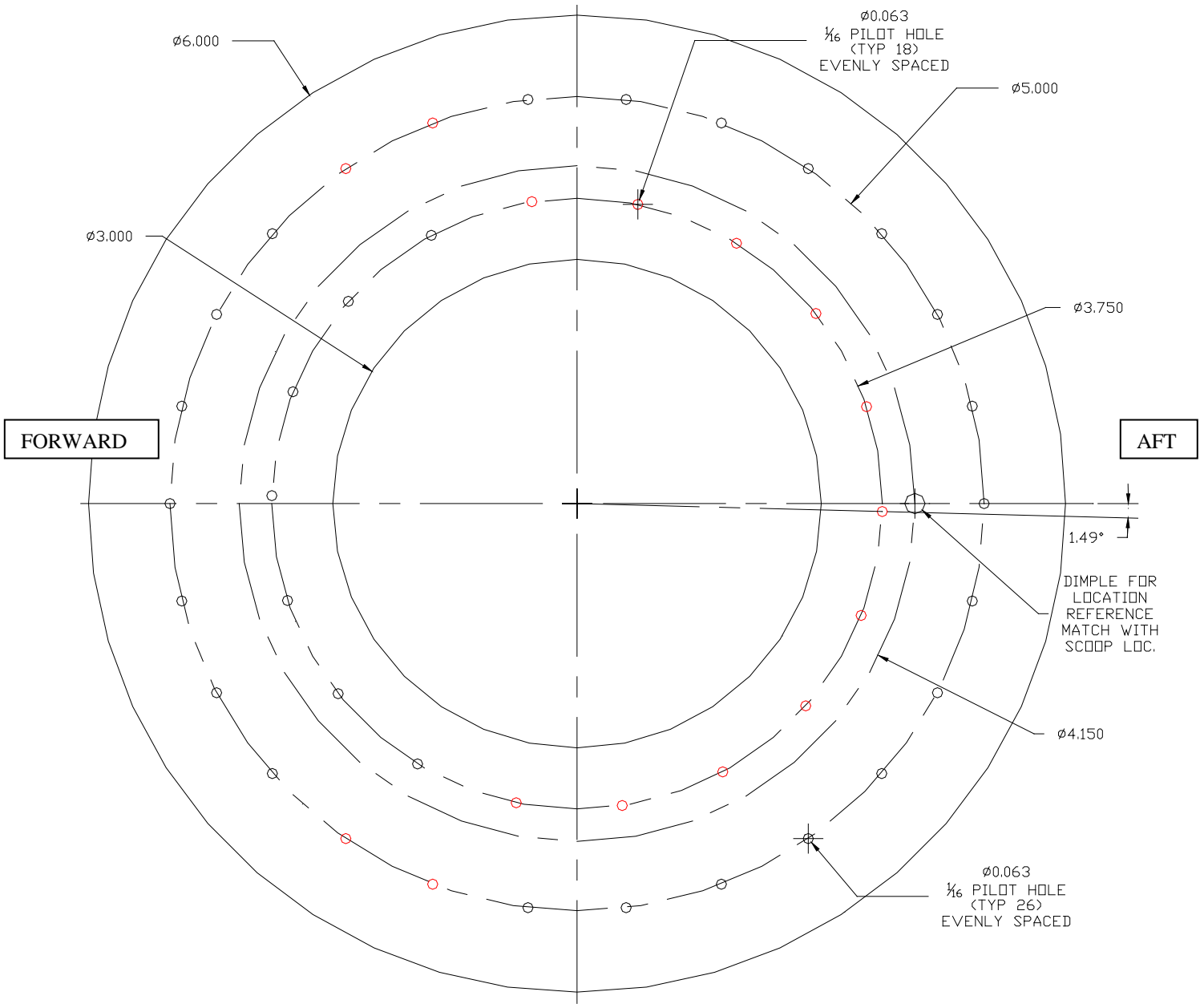
- Fuel box covers installed
- Interior installed
- All vents, diffusers and outlets installed and covered as desired
- No flammable materials close to heat source or outlets
- Weight and Balance.

14. DOCUMENTATION:

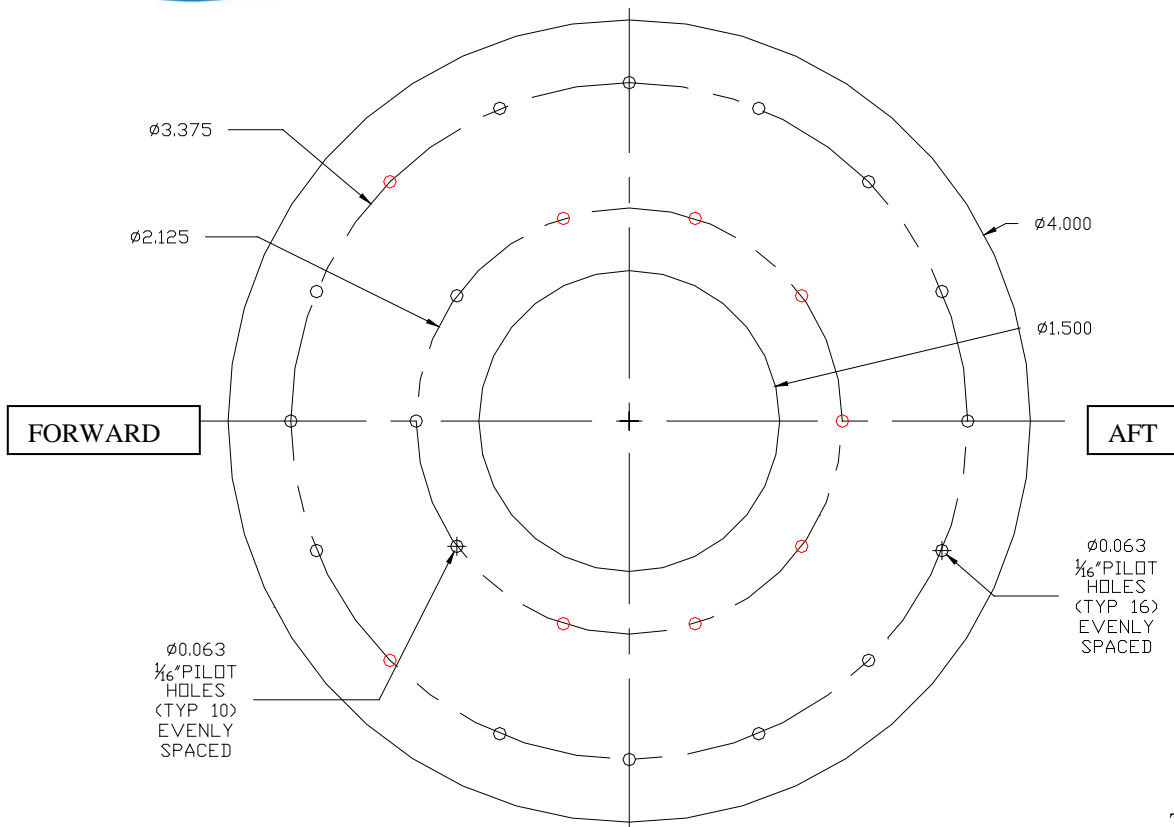
- A. Weight & Balance. The aircraft does not require a weight and balance change. The logbook entry should contain the STC and PMA Supplement #. Original heater replacement is authorized by way of FAA form 337. Alteration of aircraft by way of STC and PMA supplemental number and date must be recorded 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 15 Amp or 12VDC at 20 Amp.
- D. Fuel consumption: Maximum operation .6 Gal/hour.



TEMPLATE A



TEMPLATE B



TEMPLATE C

DOCUMENTATION AND PARTS REQUIREMENT TABLE

| DOCUMENTATION | | Quantity | |
|---------------|--|-----------|-------|
| 1. | FAA/PMA Supplement #59 | _____ | |
| 2. | Installation Instructions IN12015K26 | _____ | |
| 3. | Label for flight manual (21503) | _____ | |
| 4. | MM10001 Maintenance Manual | _____ | |
| 5. | Quality Assurance Certificate of Compliance #527 | _____ | |
| 6. | STC # SA02707CH | _____ | |
| 7. | Blank 337 form | _____ | |
| PARTS | | | S/N |
| 1. | (1) Heater | CD12015-1 | _____ |
| 2. | (1) Ram Air Kit (Opt) | 21930 | _____ |
| 3. | (1) Heat Dist Kit (Opt) | 21936 | _____ |
| 4. | (1) Single Outlet (Opt) | 21916 | _____ |
| 5. | (1) Fresh Air Intake | 21974 | _____ |
| 6. | (1) Exhaust Deflector | 21931 | _____ |
| 7. | (1) CAI Doubler | 21929 | _____ |
| 8. | (1) Comb Air Scoop | 21934 | _____ |
| 9. | (3) Angle Mount | 21944 | _____ |
| 10. | (1) Bridge Mount | 21940 | _____ |
| 11. | (2) Bridge Mount | 21941 | _____ |
| 12. | (1) Fuel Pump | 21197 | _____ |
| 13. | (1) Electrical Kit | 21954 | _____ |

Initials: _____ Date: _____