

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

Number SA02641CH

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 3 of the Civil Air Regulations.
(See Type Certificate Data Sheet No. A8EA for complete certification basis.)

Original Product Type Certificate Number: A8EA
Make: Piper Aircraft
Model: PA-31T, PA-31T1

Description of Type Design Change:

Installation of C&D Associates Combustion Heater Kit 30 (P/N CD11003K30), in accordance with C&D Associates Installation Instructions IN11003K30, dated September 3, 2008.

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 dated October 15, 2008, or later approved revision is required as part of this installation.
3. Full compliance with the C&D Combustion Heater Airworthiness Limitations, MM10001 Maintenance Manual, First Edition, Rev. none, dated January 1, 2008, 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: September 3, 2008

Date reissued: February 11, 2016

Date of issuance: October 22, 2008

Date amended:

By direction of the Administrator




(Signature)

Timothy P. 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.



REAR HEATER INSTALLATION INSTRUCTIONS FOR MODEL CD25K KIT, P/N CD11003K30

For Piper Cheyanne PA-31T, PA-31T1

READ COMPLETE INSTRUCTIONS AND VIEW DRAWING
CD11003K30

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.

1. Preparation:

NOTE: Seal all pressure bulkhead open areas in accordance Piper Cheyanne service manual paragraphs 4-100 thru 4-116. Sealants may be available from Seal Pack, 2301 N.Hoover, Wichita, Kansas 67205, Ph. 316-942-6211.

A. General:

- 1. Close fuel selector, left and right side.
- 2. Electrical Master Off/Recommend disconnecting batteries.

B. Interior Access:

- 1. Remove seating on right side, including co-pilot.
- 2. Remove beverage cabinets also forward and aft partitions, right side.
- 3. Remove carpet and all floor access panels on right side.
- 4. Remove all floor access panels in rear baggage area.
- 5. Remove aft cabin bulkhead pressurization return air cover.
- 6. Remove forward most kick panel on right side (co-pilot), extending from forward fire wall back under breaker panel.

C. Exterior Access:

- 1. Remove forward most leading edge ferring and lower wing root ferring on right side.
- 2. Remove from tail section, both left and right side access panels.

2. Plumbing and Electrical Installation:

A. Plumbing:

NOTE: Clamp fuel line as required per AC 43.13-1B chapter 8 section 2 paragraph 8-31 maintaining a minimum of 2" dist. from all electrical wiring.

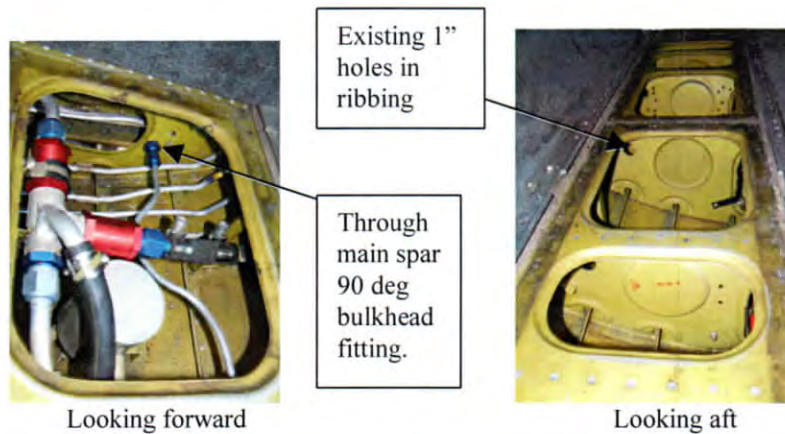
- 1. Install as indicated in Fig 1. Begin the fuel line with an elbow just aft of the main spar. Route as indicated under the floor, through the lightning holes or if available utilize 1" holes already located in ribs as pictured. Use supplied grommets P/N 60532 (10ea) to secure fuel line throughout route., past the rear cabin bulkhead, extending approximately 5.' Otherwise fasten the new fuel line as indicated in Fig. 2, view A & B.
- 2. Install bulkhead elbow P/N AN821-4D thru existing 7/16" hole located just to the right of lighting hole in spar. 90 deg bend should be out and pointing toward right main gear.

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B. Electrical wiring: In accordance with AC43.13-1B Chapter 11 Section 8 paragraph 11-96.

- 1. Place two yellow 16G, one red 16G, one green 16G, one blue 14G and one white 14G wire from the new heater area under the floor to the new heater switch location in panel.

NOTE: Follow existing wire bundle, right side, running from tail section all the way forward ending with approx 3ft behind and extending from dash panel, co-pilot side for routing the K30 electrical wires. Leaving approximately 4' to work with in tail.

- 2. Place 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.



Existing wire bundle looking aft.



Existing wire bundle looking forward

- 3. In tail section secure the new wires as indicated in Fig. 2, view A-A & B-B



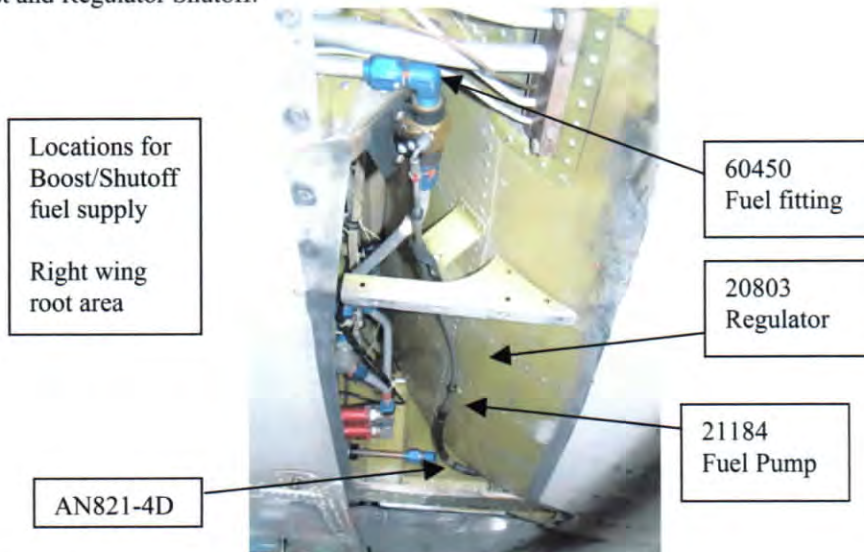
View from tail - right access. Fuel line and electrical secured as described in fig 2. A-A & B-B.



View from tail - left access Fuel line and electrical secured as described in fig 2. A-A & B-B.

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3. Fuel Pump Boost and Regulator Shutoff:



A. Preparation:

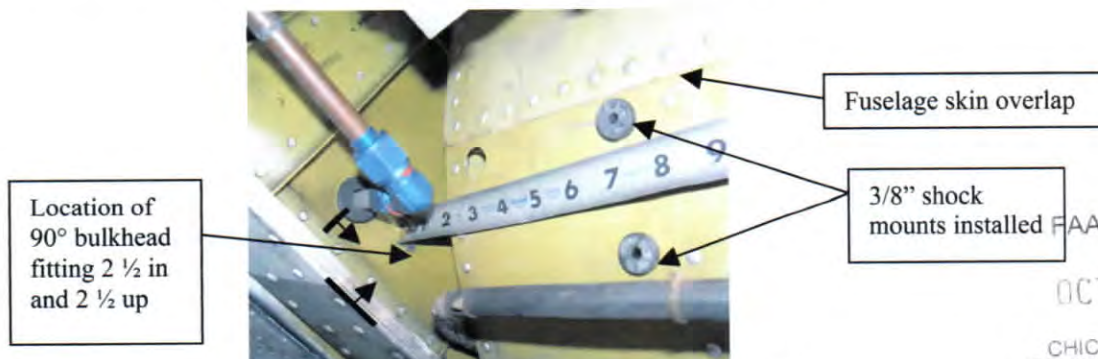
- 1. Measuring forward from spar under right wing 7" and mark fuselage. At this mark hold fuel pump legs against skin horizontally with filter end forward. Bring upper leg down even with skin overlap as pictured.
- 2. With the fuel pump (p/n 21184), removable filter cap forward (view C-C). Use the pump mounting legs as a template to mark locations for 2 ea. 3/8" holes.
- 3. At marks drill both to 3/8".
- 4. Looking at forward side of spar at right wing root, just aft of location where 21184 fuel pump is to be installed, mark 2 1/2" up from bottom of spar and 2 1/2" inboard from center of main drain lines.
- 5. Drill this location to 7/16" using drill stop set at 3/4" or just enough to penetrate the .051 aluminum.
- 6. Install bulkhead elbow P/N AN821-4D from aft side of spar and secure with 90° bend facing elbow installed in step 2.A.2.
- 7. Fabricate fuel line connecting these two bulkhead fittings aft of spar and secure.

CAUTION: When drilling the 3/8" mount holes in the fuselage use extreme caution that damage is not caused when penetrating the hull. Use of a drill stop is recommended set only deep enough for skin to be penetrated.

B. Installation:

- 1. Insert the two shock fasteners P/N 60122 into the holes made in step 3.A.3. and fasten the pump using P/N 60804, AN960-3 and 60088 fasteners.

NOTE: This is not part of the pressure bulkhead, no sealant will be required.



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- 2. Install ground wire from the pump to the airframe.
- 3. Connect the 16G white wire, run previously, to the pump.
- 4. Confirm that both the right and left fuel shut off near the pilot seat is closed.
- 5. Fabricate one fuel line from the pump outlet to the 90° elbow AN821-4D now located in the main spar.
- 6. Install regulator 20803 just forward of 21184 fuel pump and secure to airframe.
- 7. Fabricate fuel line from IN port on fuel pump to OUT port on regulator.
- 8. Black wire from regulator ground to airframe and red wire from regulator, connect at white wire used to supply voltage to pump.
- 9. With aircraft fuel in off positions, loosen #8 fitting from 90° elbow just downstream from main fuel shut off valve and let drain.
- 10. Remove #8 90° elbow (Piper P/N 458898/AN822-8D) and replace with supplied P/N 60450 "T" fitting using same orientation.
- 11. From the #4 adapter installed on 60450 fitting, fabricate fuel line and connect to IN port on 20803 regulator.
- 12. Reconnect aircraft fuel feed to other end of "T" fitting 60450.

4. Heater Mount Installation: (P/N 21867)

A. Preparation: Access through left sidetail access

- 1. Utilizing template C, transfer (6) .125 holes (3 per stringer) onto underside of the two horizontal stringers that are pictured.



Template C
transfer to
bottom side
of these
stringers



- 2. On the upper stringer, open these three .125 holes to .219
 - 3. On the lower stringer, open these three .125 holes to .250 and install rivnuts P/N 60123 up from the bottom of the stringer.
 - 4. Holding mount in place (P/N 21878), where middle stringer is visible through (3ea) .219 holes in the center of mount, transfer marks through holes onto stringer.
 - 5. On middle stringer where marked, drill to .25 and install rivnuts P/N 60123.
- B. Install heater mount P/N 21878 "This side up" as indicated on mount, utilizing screws P/N 60012 and lock washers P/N 60098.
- 1. On upper stringer, 3 each, through stringer **into mount**.
 - 2. On lower stringer, 3 each, through mount **into stringer**.
 - 3. On middle stringer, 3 each, through mount **into stringer**.

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Showing mount installed from left tail access

5. Exhaust Hole Installation:

A. Preparation:

- 1. Reaching in with tape measure from tail section access hole on left side of aircraft measure toward you from center of the belly 17 1/4" and mark. (This should locate you between 2 stringers)
- 2. From station 296.0 **forward**, measure 9 1/2" and mark.
- 3. Intercept these 2 marks, 17 1/4" outboard from center and 9 1/2" forward from station 296.0 (This locates exhaust center)
- 4. Make 2.500 hole through belly at this point. File and de-bur as needed.
- 5. Centering the 2.500 holes, install doubler P/N 21876 outside of belly using doubler as template for rivet hole locations. Include drilling out existing flush rivets (should be 3 rivets per stringer) and installing rivets through doubler into stringers.
- 6. Install a 7/16" hole 18 aft of station 274.00 centered between the same two stringers used for exhaust
- 7. Install grommet P/N MS35489-6.

6. Relocating of Pressurization Vent Sensor: Piper #587870

- A. From cabin baggage area, attach template D to upper left corner of rear bulkhead. Tape template to bulkhead. Lining up dashed lines of template with rows of rivets on bulkhead.
- B. Use template A to locate and drill new location/ also at this time mark and drill holes for return air adaptor to be installed in step 7.



- C. Reinstall and seal using sealant material in accordance with Piper Cheyenne manual page 4-100.

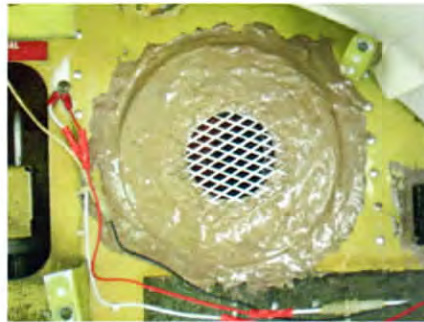
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7. Return Air Hole:

- A. Cut or knockout 2 1/2" hole marked previously in step 6 in accordance with template A. File and de-bur
- B. From cabin side apply a film of sealant to mating surface. Insert P/N 21869 through hole. Anchor using 2117-T4 rivets in accordance with AC-43-13-1B
- C. Seal using MIL-S-7502 class A 1/2, A-2, B-2(Seal Pack, Ph. 316-942-6211) sealant material in accordance with Piper Cheyenne manual.



Return air inlet installed and sealed

8. Heated air outlet and routing holes:

A. Routing Hole

- 1. From left side tail access, put end of tape measure up against angled stiffener/stinger (approximately 10 1/2" down from the top of the aircraft skin) and mark down left side of boxed frame to 20 3/4" and mark.
- 2. From station 274.0 mark boxed frame at 3 1/2" intercepting previous 20 3/4" mark.
- 3. Cut or knock out 2 5/8" hole at this mark. File and de-burr.
- 4. Insert chaff guard around inside of hole.



9. Heater Installation:

A. Combustion Tube/Blower Assembly

- 1. Insert tube assembly into left, access tail, blower end first. Push blower end up and towards center of tail.
- 2. Insert exhaust into and out of hole in belly.

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- 3. Use two supplied hose clamps P/N 60900-104 to anchor combustion tube assembly to mount P/N 21867.
- 4. With tube assembly in place insert upper mount P/N 21868 down onto angled stringer so that clamp mount straddles tube assembly. Top should be just below blower portion of tube assembly.
- 5. From top transfer/mark 3 hole locations in upper mount into angled stringer.
- 6. Remove tube assembly from aircraft and drill marked holes in stringer to .219.
- 7. Secure upper mount P/N 21868 to stringer using 3 ea P/N 60342, 60177, 60172.
- 8. Reinstall and secure combustion tube/blower assembly to both portions of mount, using a total of (3) 60900-104 clamps.

B. Heated Air Outlet Installation P/N 21861, 21882

- 1. Utilizing center forward most inspection panel previously located in rear baggage area. Notice how this panels covers two holes in baggage floor. Mark on inspection panel center of the **forward** hole.

NOTE: This hole in panel should be easily identified as more than likely it has "faded" onto panel.

- 2. At the center of this small hole, punch out a 2 1/2" hole into panel.
- 3. From top of panel insert heated air adapter P/N 21882 and transfer .125 holes in adapter into panel.
- 4. Drill all holes to .125 and debur.
- 5. Apply sealer MIL-S-7502 or comparable to adapter and panel mating surfaces. Realign .125 holes and anchor using 2117-T4 rivets in accord with AC 43-13-1B.

C. Routing of Heat Duct

- 1. Facing cabin baggage area, feed 2 1/2" scheet through center, forward most inspection hole.
- 2. Extend aft.
- 3. At back center inspection hole in baggage area, extend aft through lightning hole in station 274.0
- 4. From left side tail access, extend 2 1/2" scheet up and out 2 5/8" routing hole made during step 8A.
- 5. Secure 2 1/2" scheet to heater outlet using 1 each clamp P/N 60900-4.
- 6. From cabin, secure 2 1/2" scheet to aft side of heated air outlet under center baggage floor access panel as installed in step 9.C. using 1 each clamp P/N 60900-4.
- 7. Secure 2 1/2" scheet to air frame and verify free and clear of all trim cables.
- 8. Reinstall center forward most access panel in baggage compartment and install heated air outlet plenum, screen side forward, lining up with and utilizing panel screws.

NOTE: Apply small amount of silicone to screw threads for proper seal.



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10. Electrical Hook Up:

- A. Route wires, previously run, up the right support. Fasten to the heater terminal strip. Blue 14G wire from switch to terminal #6 using blue #6 ilet. White 14G wire from switch to terminal #1 using blue #6 ilet. White 16G wire from fuel pump to terminal #2 using red #6 ilet. The two remaining yellow wires connect to the two wires on the thermostat. Connect a ground wire from terminal #5 to the right support frame.
- B. Secure bundle to airframe.

11. Control Switch Installation:

- A. Install the control switch P/N 20654 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. Install circuit breaker into blank area found in right side breaker panel. "Line in" to buss bar and "load" wire up to newly installed heater switch. Connect or splice to 18g white wire on switch.

12. Fuel System & Shelf

- A. Between exhaust and station 296 in tail set fuel box assembly along both stringers straddling exhaust
- B. Transfer and drill holes into stringers, 2 per side and then reaming out to .219.
- C. Secure both legs of fuel system shelf to stringers using 2 per leg bolts P/N 60342, washers P/N 60177 and locknuts P/N 60172
- D. Install and secure drain.
- E. Run 2 ½ foot stratoflex fuel line from heater solenoid to out port on fuel regulator in fuel box and secure.
- F. Connect aluminum ¼" fuel line, run in step 2.A., through inboard hole in fuel box and secure to IN port on fuel pump. Secure with grommet.

13. Operation Check:

- A. Return all fuel shut off valves to on position.
- B. Reconnect batteries.
- C. With master switch on, turn the heater control to first position "Fan." Verify the ventilation fan is operational. Airflow into the top inlet and out of baggage floor outlet.
- D. 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.

14. 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.
CAUTION: Never drill into combustion heater itself!
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 thermostat.
CAUTION: Be sure not to short any other terminals.
- C. Install the fuel pressure gauge (0-150 psi) between heater solenoid and mechanical regulator OUT port located in fuel box.

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- 1. With the heater running, verify fuel pressure. Preferred pressure is 8psi up to fuel system and 100psi (+5,-0) to heater.
- 2. With the heater running, verify that the outlet plenum temp is approx. 250°. Verify heater overheat switch trips at approx 250°F and entire system shuts down with the exception of blower assembly. After approx. 5 min. in this condition, verify heater reengages operation.
- 3. 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.
- 4. Remove the temperature probe.
- 5. Remove the fuel gauge installed in step 14.C. and reconnect fuel line.
- 6. Secure lids to fuel boxes.
- 7. Run drain hose from port on heater solenoid fuel box along stratoflex fuel line and connect to port on fuel system box lid.
- 8. 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 'B' operational test, and 'C' for heat output, steps 1 and 2. Also in accordance with the "Instructions for Continued Airworthiness" step A "Preflight/Operational check and Shutdown Procedure."
- 9. Verify all wires are secure and free of obstruction and chaffing.
- 10. Verify all fuel lines are free of obstruction and chaffing.

15. DOCUMENTATION:

- A. Weight & Balance. Install new heater kit of 35 lbs at station 280" and 2 lbs at station 130". If the aircraft requires a weight and balance change, a 337 must be completed and a copy of the STC attached. 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." Located in the MM10001 Maintenance Manual.

NOTE: Follow the 'Combustion Heater PREFLIGHT/OPERATIONAL CHECK AND SHUTDOWN PROCEDURE' outlined within the Combustion Heater "**Instructions for Continued Airworthiness**", located in the MM10001 Maintenance Manual. This FAA-approved Instructions for Continued Airworthiness must be complied with and become a permanent part of the Aircraft Operations and Procedures manual.

- C. Refer to the Airplane Flight Manual Supplement for normal operating procedures.
- D. Electrical requirements: 24VDC at 15Amp.
- E. Fuel consumption: Maximum operation .40 gal/hour.

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DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION		Quantity	
1.	FAA/PMA Supplement #	_____	
2.	Installation Instructions IN11003K30	_____	
3.	Label for flight manual 21504	_____	
4.	MM10001 Maintenance Manual	_____	
5.	Quality Assurance Certificate of Compliance #527	_____	
6.	STC #	_____	
7.	337 Form	_____	
8.	Flight Manual Supplement	_____	
PARTS		S/N	
1.	(1) Heater CD11003-1	_____	_____
2.	(1) Vent/Blower Assy 21857	_____	
3.	(1) Mount Assy, Heater 21867	_____	
4.	(1) Exhaust Extension 25170	_____	
5.	(3) Clamps 60900-104	_____	
6.	(1) Bracket Assembly 21868	_____	
7.	(1) Exhaust Doubler 21876	_____	
8.	(1) Doubler 21869	_____	
9.	(2) Switch, C.A. 21423	_____	
10.	(1) Ignition Unit 21381	_____	
11.	(2) Clamps 60900-32	_____	
12.	(1) Blower Cover 21861	_____	
13.	(4) Clamps 60900-16	_____	
14.	(2) Clamps 60900-44	_____	
15.	(18") Sceet Hose 1" dia. 60348	_____	
16.	(6") Sceet Hose 2-3/4" dia. 60349	_____	
17.	(1) Lead 21249	_____	
18.	(5) Rivnuts 60123	_____	
19.	(1) Adapter 21882	_____	
20.	(1) Fuel System and Box Assy 21877	_____	
21.	(1) Installation Instructions IN11003K30	_____	

Initials: _____ Date: _____

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