



AIRCRAFT PRESSURE DECAY TESTER
OPERATIONAL INSTRUCTIONS
FOR HET

CD70100 or CD70200
(Pictured)



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Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

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Airworthiness Directives

Janitrol Combustion Heater AD2004-21-05	ATTACHED
Janitrol Combustion Air Switch AD2004-25-16R1.....	ATTACHED
South Wind Combustion Heater AD81-09-09	ATTACHED

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Table 1

Combustion Air Tube- Pressure Supply Assemblies

P/N	Size	Application
CD70015	¾" ID	Janitrol S15 Series & South Wind 940
CD70016	1" ID	Janitrol B1500-B4050 Series & S25 Series
CD70017	1 ½" ID	Janitrol S25, S50 Series & South Wind 8240, 8259, 8472 Series
CD70018	1 ¾" ID	Janitrol S100 Series
CD70019	2" ID	Janitrol S200 Series
CD70070	2 ½" ID	Janitrol S50, S100 & S200 Series

Table II

Expansion Bulbs

NOT TO EXCEED 90 PSI

P/N	Size	Application
CD70010	7/8" OD	Janitrol B1500-B4050 w/ ½" nominal diameter area to be sealed
CD70011	1 1/8" OD	Janitrol B1500-B4050 w/ ½" nominal diameter area to be sealed
CD70012	1 9/16" OD	Janitrol B1500-B4050 w/ 2" nominal diameter area to be sealed
CD70013	2 ¼" OD	Janitrol & South Wind Heaters other than listed above, use largest expansion bulb possible for size of exhaust opening.
CD70014	2 ¾" OD	Janitrol & South Wind Heaters other than listed above, use largest expansion bulb possible for size of exhaust opening.

NOTE: ALWAYS USE THE LARGEST BULB SIZE POSSIBLE. DETERMINE BY WHATEVER BULB DIAMETER THAT WILL FIT PAST SENSING LINE. Insert the expansion bulb as far as possible into the exhaust (against inner burner chamber). See Fig. 4 or 6.

- ❖ On Cessna 337 Aircraft, the heater has a 90° turn in the exhaust pipe. The elbow on the expansion bulb supply line (for connection to the PDT) may be used on the CD70010 bulb for sealing the exhaust. This elbow allows for a 90° turn of the line, at the PDT unit. It is necessary to use this elbow for insertion into the expansion bulb for testing this particular heater. The other end of the tubing can then be inserted into the expansion bulb air outlet on the PDT unit.
- ❖ Beech Baron Aircraft (1974 and up) also have bends in the exhaust extension. A tip for inserting the expansion bulb into this heater: Remove the expansion bulb from the Poly-Flo tubing and insert the tubing up the exhaust unit until it strikes the inner exhaust tube. Before removing the tubing from the exhaust, mark it (by wrapping a piece of tape around it at the end of the exhaust). Remove the tubing and install the expansion bulb. Re-insert the bulb and tubing back into the exhaust. When the line is inserted within 2" of the tape to the end of the exhaust, you know it is located properly.

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JANITROL & SOUTH WIND INSPECTION PROCEDURES

These recommended procedures should be used in conjunction with Janitrol AD2004-21-05, Janitrol Maintenance/Overhaul Manual 24E25-1 and South Wind AD81-09-09. Testing procedures are basically the same on all heaters. Equipment necessary is a PDT unit and shop air (60 PSI min.)

- ➔ **Fuel Monitor:** This gauge should be connected in the system between the fuel pump outlet and the heater solenoid assembly. Depending on the heater assembly, the pressures are different for high and low settings. Check heater or aircraft manuals for proper limits and instructions regarding fuel pressure regulators and fuel pumps.
- ➔ **Pressure Decay Tester (PDT) Setup:** To conduct the pressure decay test, the heater must be sealed at all openings into the combustion chamber assembly. This includes the combustion air inlet tube, combustion air pressure switch connection (on Janitrol), fuel drain and exhaust tube. See Fig. 1
 - Loosen and remove flex tubing, elbows and adaptors (air flow switch, (Fig. 2) that may be mounted between the combustion air and the heater.
 - If the combustion air pressure switch is mounted directly on the heater (Fig. 3), loosen the combustion air sensing lines from the combustion air pressure switch. Identify and then loosen two (2) wires from the combustion air pressure switch. Remove the combustion air pressure switch from heater by unscrewing the switch from the fitting (CCW). Test the pressure switch as outlined on page 6. S15 and S25 series heaters have a combustion air relief valve that must be removed for testing the combustion tube.

CAUTION: The heater combustion air pressure switch must NOT be pressurized during the pressure decay test on Janitrol heaters or switch will be damaged.

- The airflow switch is mounted directly on the heater (Fig. 1). Identify and disconnect two (2) wires from terminal from terminal switch. Remove the nut, washer, clamps, and/or screws and pull straight up on the airflow switch assembly to remove it. On the 940 series it will be necessary to remove the thermal fuse, if so equipped, and the elbow from combustion tube testing.
- On certain aircraft it may be necessary to loosen and remove aircraft mounted exhaust tube and exhaust tube shroud from the heater assembly to obtain access to the heater mounted exhausted tube. On most aircraft the heater exhaust tube is accessible at the aircraft skin line.

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- **Connecting Tester:** Install the pressure seals on the combustion chamber using the parts supplied with the PDT Unit (See Fig. 1-4). The following attachments are to be made on the heater.
- Install and tighten in place, the combustion air tube pressure supply assembly using hose clamps (See Table I for proper supply assembly). On some units, the solenoid electrical wire and fuel tube assembly are inserted in the combustion tube pressure supply assembly as shown in Fig. 4. Attach supply line as in Fig. 1-4.
 - On units, where applicable, install and tighten cap P/N CD70046 on fitting where combustion air pressure switch was mounted (See Fig. 2).
 - Loosen the overboard drain line from the heater and install a pipe plug P/N CD70048 if the drain fitting is equipped with a ¼” pipe thread, a pipe plug P/N CD70047 if the drain fitting has a 1/8” pipe thread, or a flared cap of proper size P/N CD70038 or CD70039. **NOTE:** If the drain fitting is inaccessible at the heater, it may be sealed at the aircraft skin line. On heater P/N 81D94, two (2) drain lines must be plugged.
 - Visually inspect exhaust tube of heater to determine the nominal diameter of the exhaust at the area to be sealed.
 - Attach the correct sized expansion bulb to the supply line coming from the top side of the PDT unit. **NOTE:** Always use the largest bulb possible. See Table II.
 - Prior to inflation, visually inspect to be sure that the expansion bulb is inserted past the 1/8” or 3/16” diameter sensing line that sticks into the exhaust tube. Use safety glasses or mirror and flashlight to check position of bulb in exhaust tube. (See Fig. 2)
 - After the correct expansion bulb is installed properly in the exhaust tube (See Fig. D) and while holding it in place, slowly inflate the bulb to 65psi, using the regulator on the top side of the PDT unit marked “Exhaust Seal Regulator”. When properly installed and inflated, the bulb will hold itself in place.
 - Connect the combustion tube supply line unit to the combustion air inlet seal fixture. Slowly adjust the combustion tube regulator to 2 or 3psi of air pressure. Check the exhaust seal for leakage. Pressure in the exhaust expansion bulb may be increased to 85psi max, if required to achieve a leak proof seal.
 - Check all seals for security with a soap and water solution or other satisfactory method. If all seals are leak proof, proceed with test.

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→ Pressure Decay Test:

- Apply 6.0+.5 psi to the combustion chamber with the combustion tube regulator.
- After the pressure reaches 6.0psi and stabilizes, turn off the combustion tube shut-off valve and start timing.
- After 45 seconds the pressure in the combustion tube must exceed 1psi (tap gauge lightly during 45 second timing to assure accuracy)
- If the pressure decays to less than 1psi before the end of 45 seconds indicates a leak is present either in the combustion tube or around the seals. Recheck all seals installed on the combustion tube for leaks and re-run the pressure decay test. A slow pressure loss indicates a small leak around screws, spark plug or possibly the test hook up. A fast pressure loss indicates a crack in the combustion tube.
- If the pressure test shows a slow rate of decay, inspect the spark plug, the seal at the drain line or the air supply system with leak detector fluid for possible leaks and repeat test. Cracks in the combustion tube will show high rates of pressure decay in the range of 5-15 seconds for a decay of 6-1psi in the combustion tube.
- If the heater continues to show a fast pressure decay, it will be necessary to remove the heater for a complete inspection to determine where leak is.

→ Removal of tester from heater:

- Reduce pressure in the combustion tube by opening the combustion tube shut-off and the combustion tube regulator in the center of the PDT unit.
- Reduce pressure in the exhaust tube expansion bulb by opening the exhaust seal regulator on the top of the PDT unit
- Remove all test fittings, plugs, supply lines, etc.
- Reinstall required sensing line, combustion air supply lines and drain lines which make up the aircraft installation. Reconnect drain lines and exhaust tubes and shrouds.
- If heater had leaks, remove in accordance with the aircraft manufacturer's maintenance manual.

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→ Retest of Pressure Decay:

- After the heater assembly is removed from the aircraft, repeat the pressure decay test. Check for leaks at the spark plug, fuel feed inlet gasket, screws etc.
- The heater may be reinstalled in the aircraft if it passes the pressure decay test in accordance with the aircraft manufactures maintenance manual.
- If the heater fails to pass the pressure decay test, it is to be overhauled in accordance with the manufactures maintenance manual.

→ Instructions for Janitrol Combustion Air Pressure Switch Testing: The Combustion Air Pressure Switch is not a repairable unit. However, its pressure setting is adjustable See Table 10.2 in the Janitrol Maintenance Manual. The 42D36 switch series is no longer available and must be replaced with either a new 94E42 Janitrol Switch or CD22550 C&D Combustion Air Switch. (See Fig. A)

- Disconnect the sense line and electrical wires from the switch and identify the connections for reinstallation. Remove switch from heater.
- Connect an adjustable air pressure supply line to the high pressure port that can be controlled in a range from zero to 5.0 Inches of water, i.e. CD70100 or CD70200 Pressure Decay Testers and manometer. The switch must be tested in the 45 degree position. The low pressure port must remain open.
- Connect an ohmmeter or continuity tester across the switch terminals to verify the contacts are open and to determine the exact instant of switch closing.
- Apply air pressure very slowly from zero to allow accurate pressure reading at switch actuation. Make several trials to insure switch repeatability. **WARNING:** Applying too much pressure will result in damage to switch.
- Rotate the adjusting screw clockwise to increase setting and counter-clockwise to decrease settings. Reapply torque seal to the seeing screw after final adjustment.
- Replace the switch if erratic operation, sticking or other malfunction is observed. If a 42D36 series switch is used, it must be replaced with either a new 94E42 Janitrol Switch or CD22550 C&D Combustion Air Switch.

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JANITROL COMBUSTION AIR PRESSURE SWITCH TESTING:

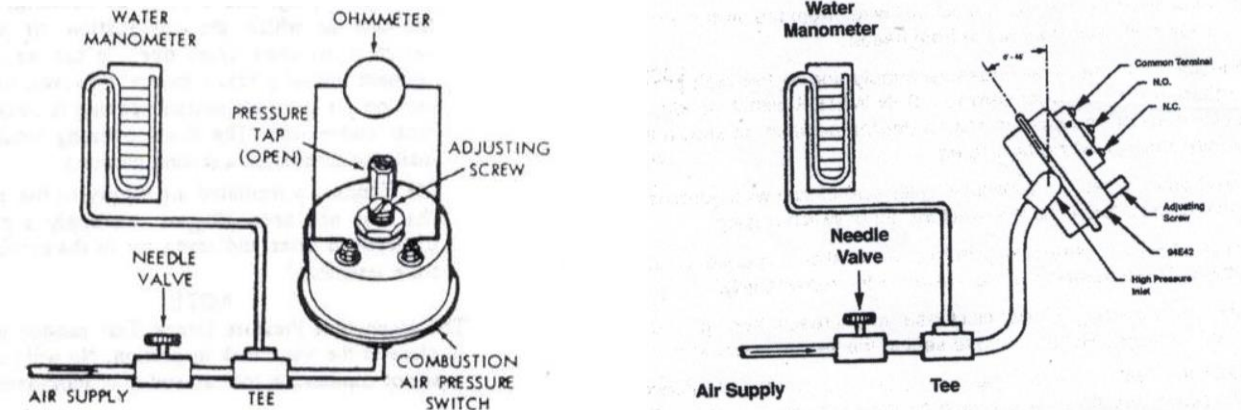


Fig. A

➔ **Instructions for C&D Combustion Air Pressure Switch Testing:**

- Testing the combustion air switch is required each time the PDT is accomplished. Use an air pressure source that can be controlled in a range of zero to 5 inches of water i.e. from the low pressure regulator on the CD70100 or CD70200 pressure decay testers or damage to the switch will occur. See Fig. B
- With the combustion air inlet adapter removed from the heater, attached the inlet adapter pressure port (1/4" air tube on the larger end of adapter) to the regulated air of the test kit. Airflow into this switch should build slowly from zero to 0.5 ± 0.1 " of water indicated on a water manometer. Leave the vacuum port tube (extending out of the small end of combustion air inlet adapter) open to atmosphere during the test.
 - Using an ohmmeter across the switch terminals or across terminals #1 and #2 of the heater terminal strip (#6 & #7 from terminal strips numbers 4, 5, 6, 7, 8, 10) to determine the exact instant of switch closing. This reading should be 0.5 ± 0.1 " of water. If an adjustment is required, using a .100 inch square drive tool, rotate (1/8" turn at a time) the set screw in the center of the switch, clockwise to increase and counter-clockwise to decrease setting. Several trials should be made to assure accuracy and consistency.

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C&D Comb. Air Pressure Switch Cont.

- Increase and decrease air pressure slowly in order to produce accurate indication. Replace switch if not adjustable. Apply tamper/vibration seal after satisfactory adjustment. **WARNING:** Applying too much pressure will result in damage to switch.
- Following the successful completion of the pressure decay test (PDT), and the combustion air pressure switch test. Remove all test fittings, plugs, supply lines, etc. and re-install combustion air supply lines and drain lines which make up the aircraft heater installation.

COMBUSTION AIR SWITCH TESTING

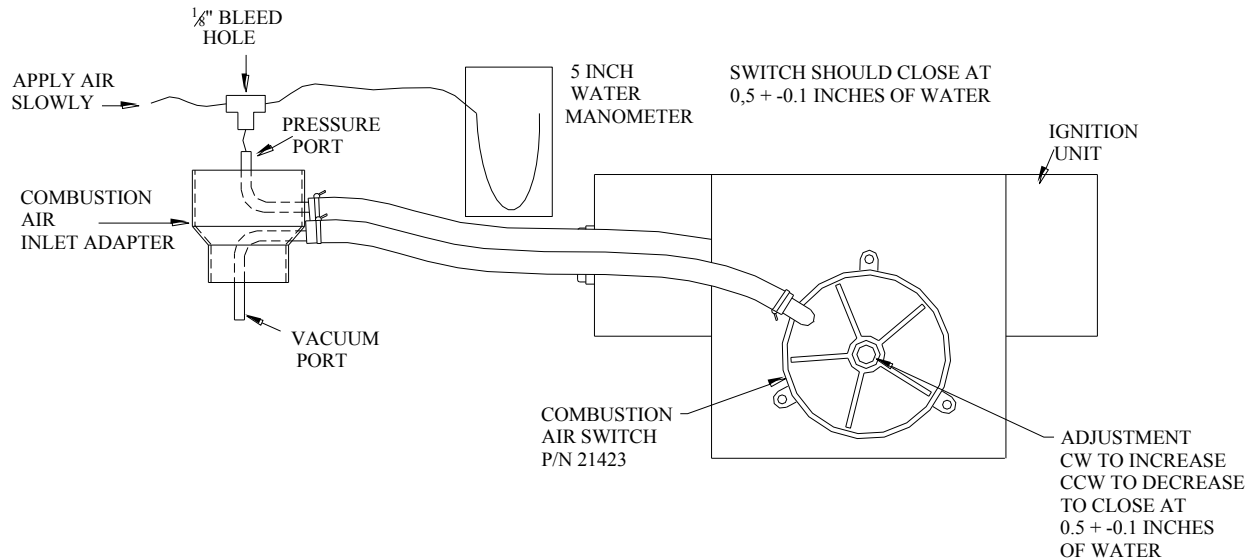


Fig. B

COMBUSTION AIR SWITCH INSTALLATION



Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

THERMOMETER

→ **Operation:** See manufactures Users Guide included in tester.

→ **Helpful Hints on care and use of Pressure Decay Tester (PDT):**

- Do NOT try to repair or use a damaged expansion bulb as it may rupture suddenly under pressure.
- Use a flashlight when examining the condition of the heater and exhaust tube prior to installing the pressure bulb. Cleaning the exhaust tube with a rag or a small stiff brush will help make a good seal.
- Clean expansion bulbs of oil, carbon, etc. after each use with soap and water.
- Do NOT allow petroleum products to remain on rubber bulbs
- Do NOT inflate expansion bulbs in an open area. Always inflate in exhaust tube or confined area, not larger than 30% of the bulbs diameter.
- Keep PDT unit closed and in a dry place when not in use.

→ **Installation and removal of one-touch fittings**

- Cut the tube perpendicularly, being careful not to damage the outside surface. Use tube cutters. Do NOT use pliers, nippers, scissors or utility knife.
- Grasp the tube. Slowly push it into the One-Touch until it comes to a dead end.
- Pull the tubing back gently to make sure that it has a positive seal.
- To remove, push in evenly on the release button
- Pull out the tube while keeping the release button depressed. If the release button is not held the tube cannot be withdrawn.
- To re-use the tubing, cut off the previously lodged portion of the tube.

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TYPICAL TEST SET-UP PRESSURE DECAY TEST

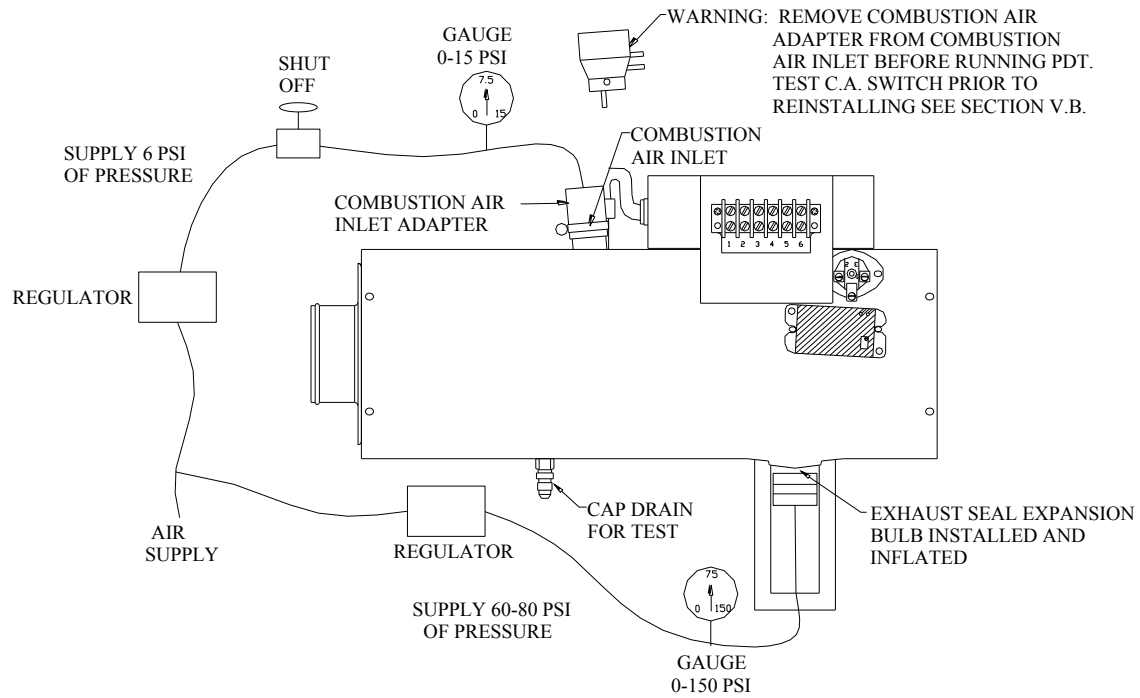
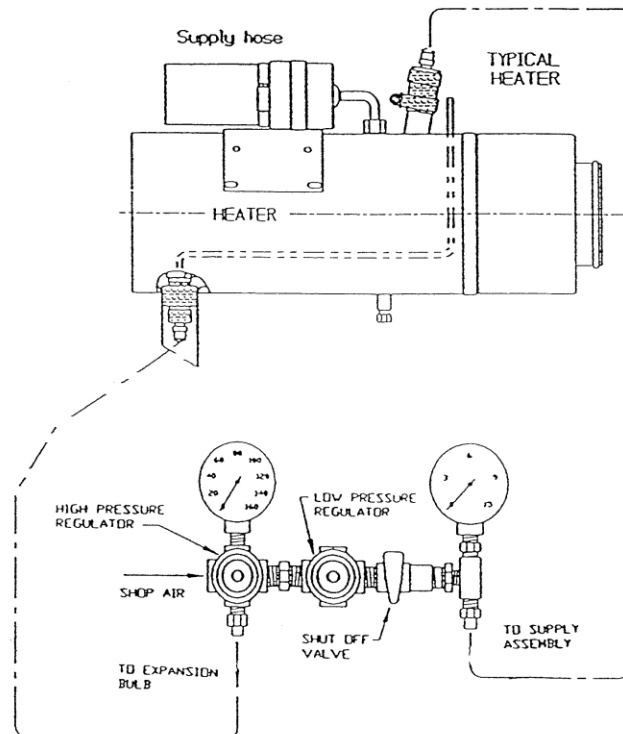


Fig. C (Top CD70100 Bottom CD70200)



Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

TYPICAL EXHAUST TUBE SEAL SHOWN INSTALLED

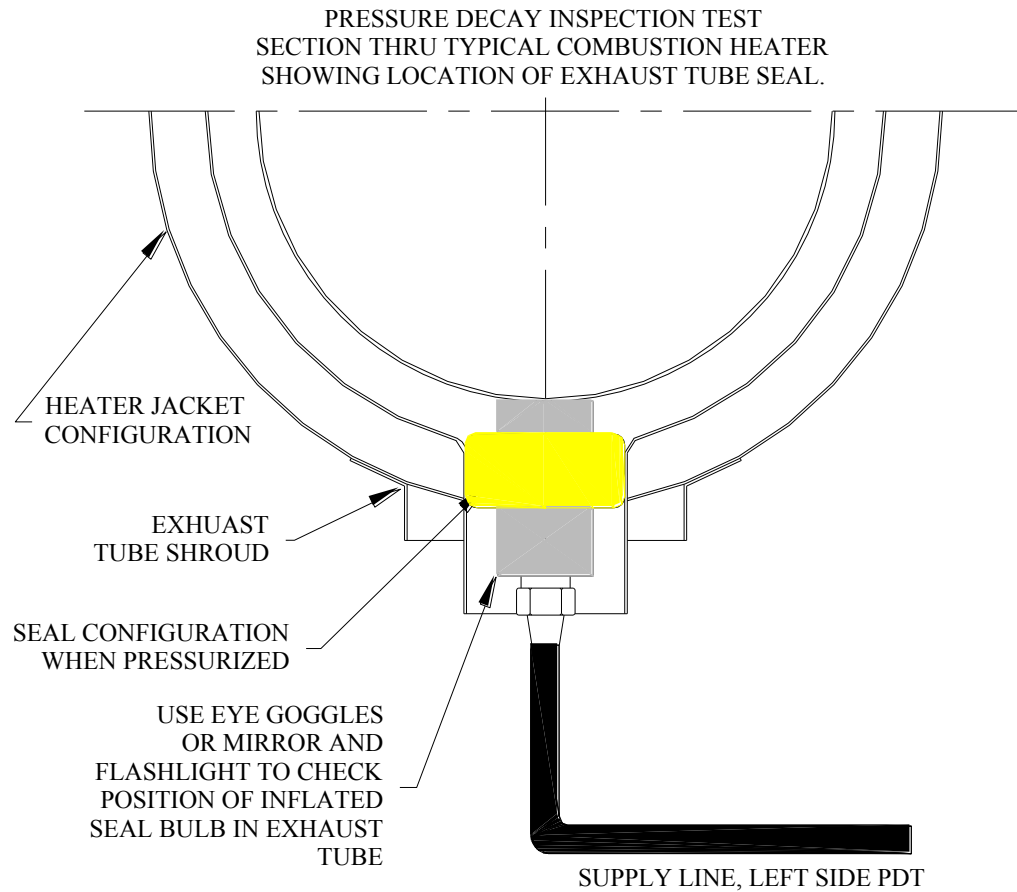


Fig. D



Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

PDT HOOK-UP ON JANITROL HEATER

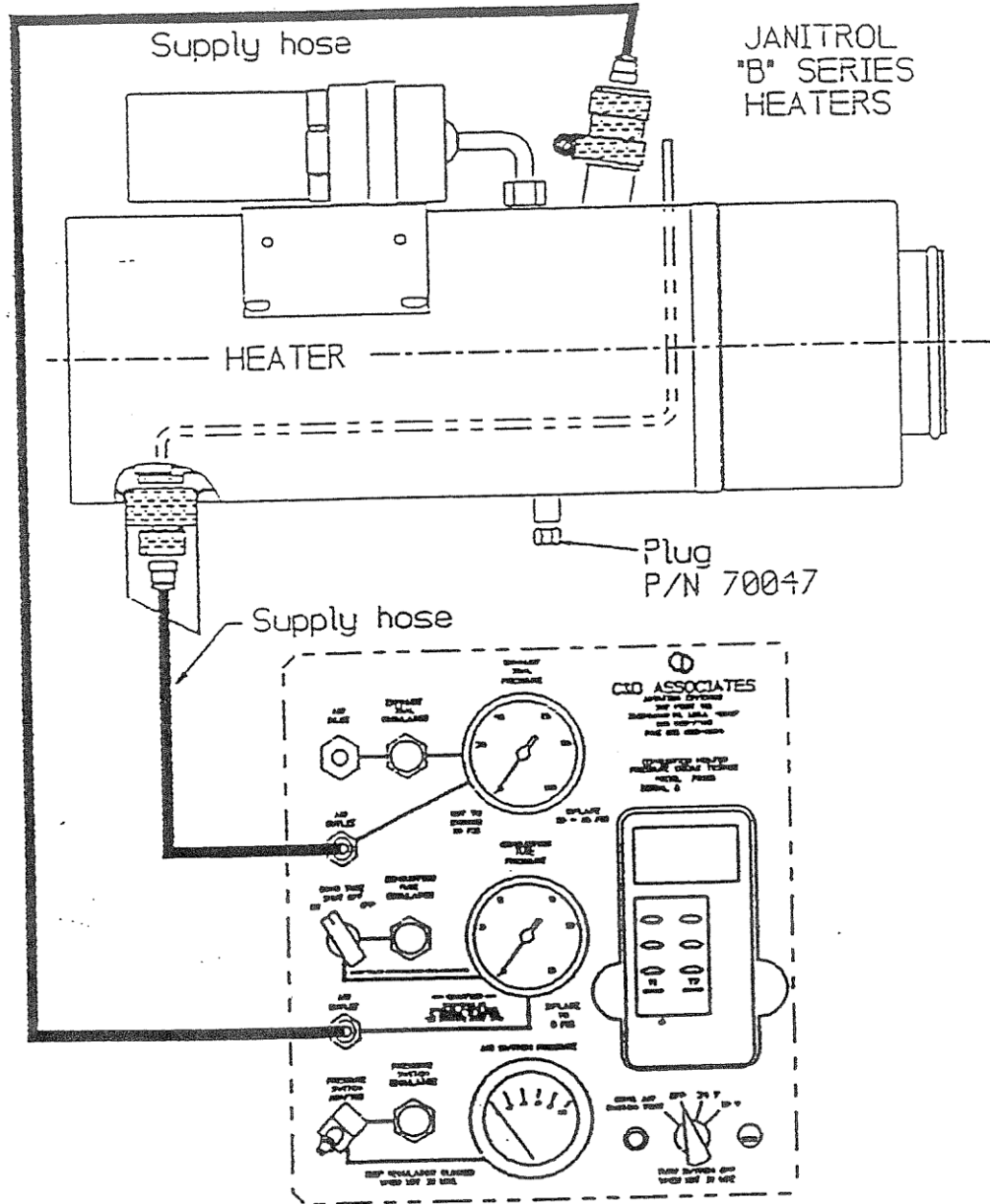


Fig. 1

Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

JANITROL HOOK-UP (TOP VIEW)

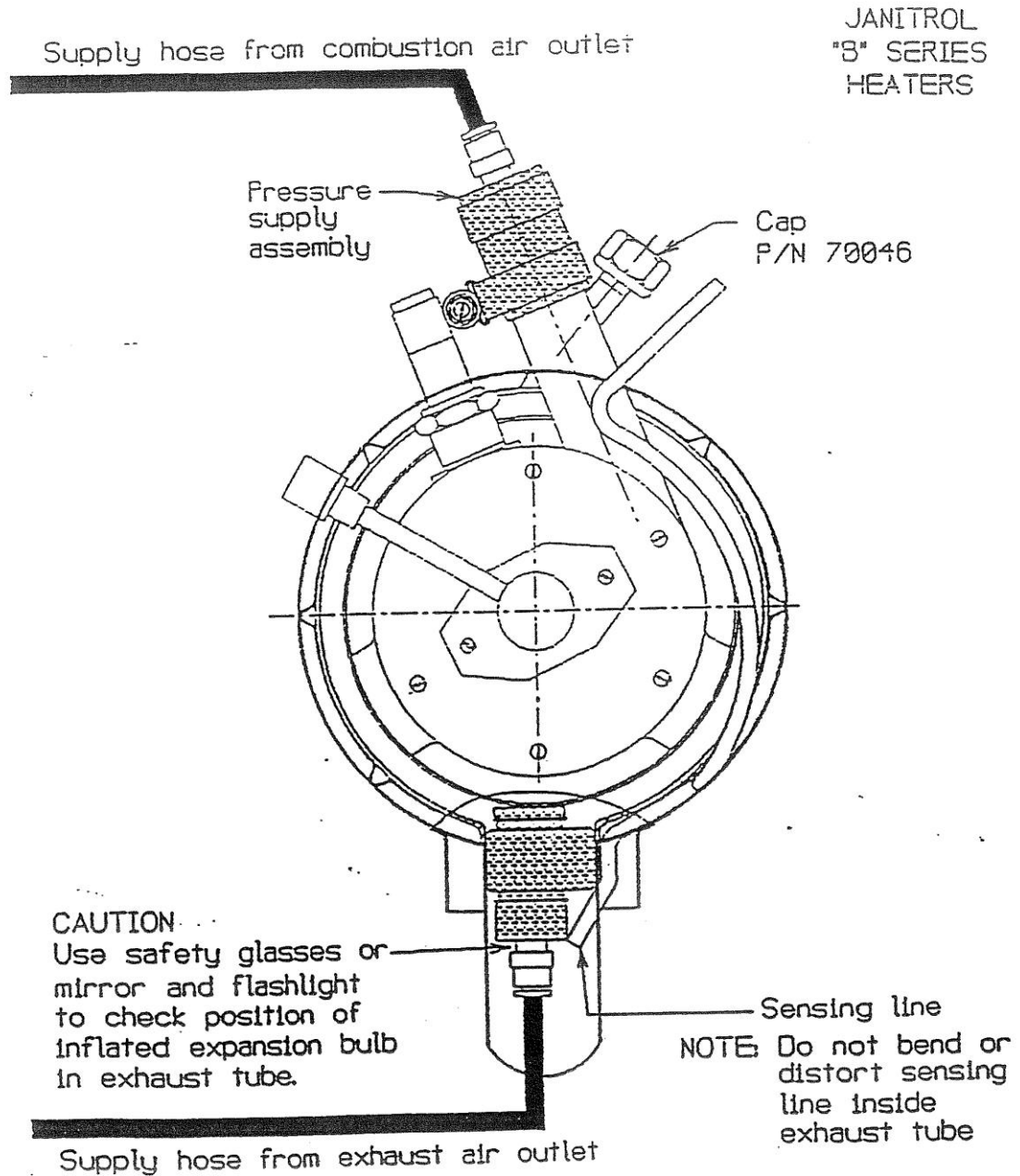


Fig. 2

Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

PDT HOOK-UP ON SOUTH WIND HEATER

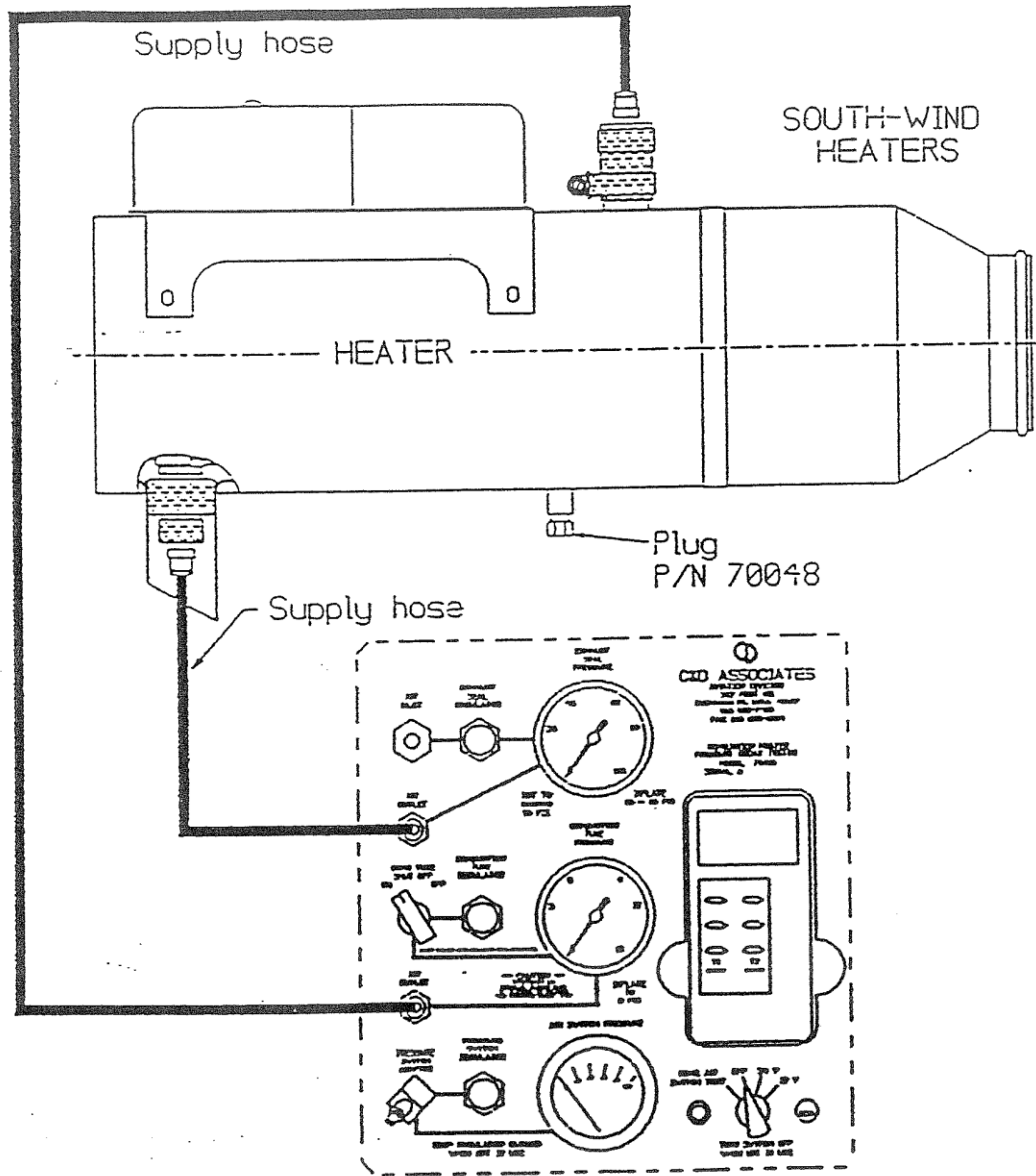


Fig. 3

Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

SOUTH WIND HEATER HOOK-UP (TOP VIEW)

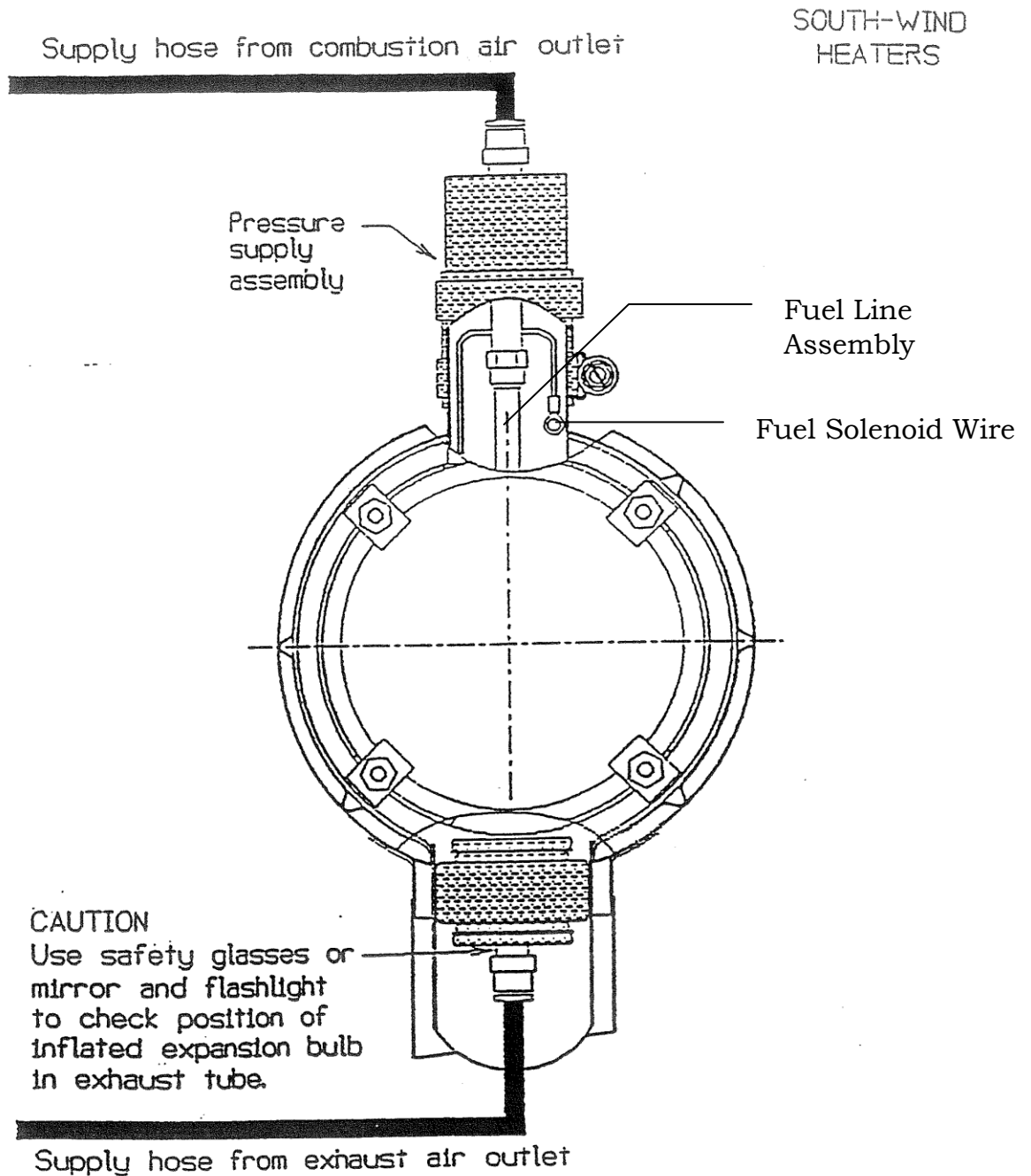


Fig. 4

Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

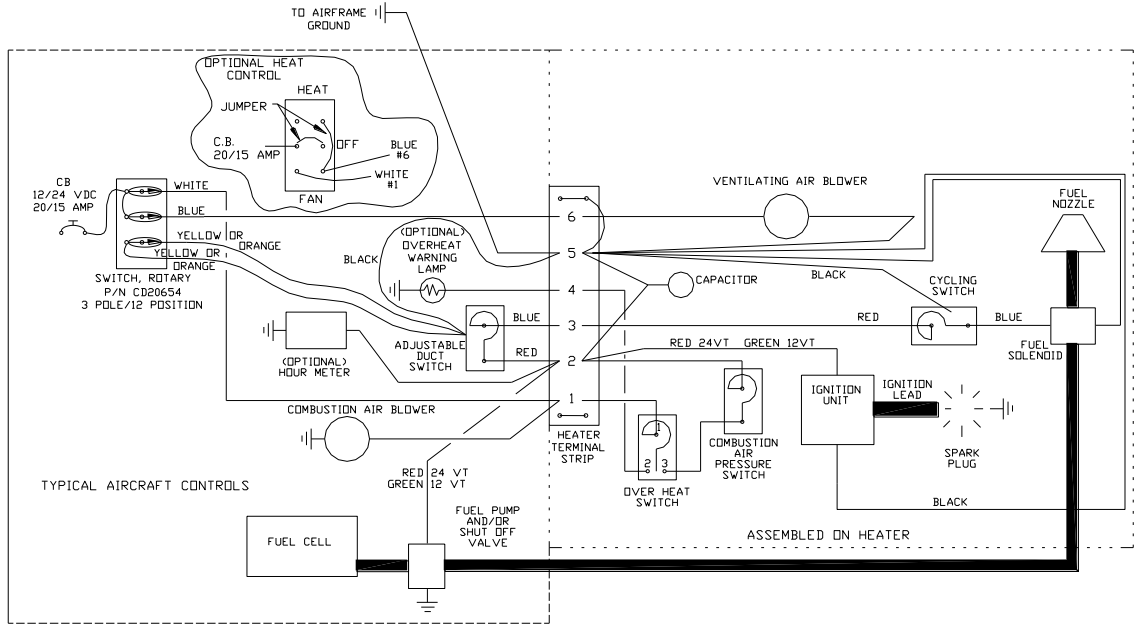
PARTS LIST

CD70100	
Part Number	Description
CD70010	7/8" OD Expansion Bulb
CD70011	1 1/8" OD Expansion Bulb
CD70012	1 9/16" OD Expansion Bulb
CD70013	2 1/4" OD Expansion Bulb
CD70014	2 3/4" OD Expansion Bulb
CD70015	3/4" ID Supply Assembly
CD70016	1" ID Supply Assembly
CD70017	1 1/2" ID Supply Assembly
CD70018	1 3/4" ID Supply Assembly
CD70019	2" ID Supply Assembly
CD70070	2 3/4" Supply Assembly
CD70089	0-30 PSI Gauge w/tee fitting
CD70046	1/8" NPT Cap
CD70047	1/8" NPT Plug
CD70038	#4 Cap (37° Flare)
CD70048	1/4" NPT Plug
CD70039	#5 Cap (37° Flare)
CD70116	1/4" X 12' Tubing (2)
CD70134	Thermo Couple Assembly (2)
CD70113	Quick Disconnect Fitting (10)
CD70103	Temperature Monitor

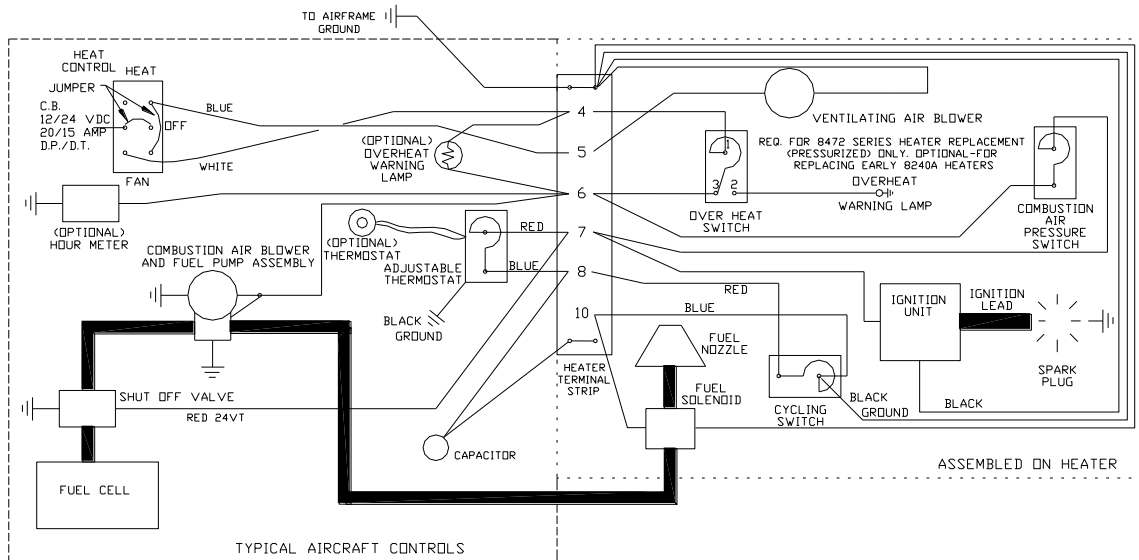
CD70200	
Part Number	Description
CD70010	7/8" OD Expansion Bulb
CD70011	1 1/8" OD Expansion Bulb
CD70015	3/4" ID Supply Assembly
CD70016	1" ID Supply Assembly
CD70017	1 1/2" ID Supply Assembly
CD70046	1/8" NPT Cap
CD70047	1/8" NPT Plug
CD70038	#4 Cap (37° Flare)
CD70048	1/4" NPT Plug
CD70039	#5 Cap (37° Flare)
CD70116	1/4" X 12' Tubing (2)
CD70113	Quick Disconnect Fitting (5)
CD70084	Temperature Probe 50-550°
CD70089	0-30 PSI Gauge w/tee fitting
CD70220	Water Manometer
CD70201	Gauge & Regulator Assy:
	CD70800 Shut Off
	CD70801 Regulators (2)
	CD70082 0-15 PSI Gauge
	CD70083 0-160 PSI Gauge
	CD70085 Bushing Reducer
	CD70086 Nipple
	CD70087 Tee-Male Branch

Pressure Decay Test Equipment CD70100 & CD70200 Operation Instructions

Typical Wiring



JANITROL TYPICAL WIRING SCHEMATIC



SOUTH WING TYPICAL WIRING SCHEMATIC