

**SANDERS**



**SMOKE TECHNOLOGIES, INC.**



**SCSG-5A**

**OPERATION AND MAINTENANCE  
MANUAL**

March 22, 2014

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## 1.0 INTRODUCTION

Smoke has been used to heighten the visual impact of flight for decades. Usually smoke systems simply pump enough oil into a hot engine exhaust, reciprocating or Jet, to produce a visible plume of smoke.

With jet exhaust systems, smoke quality is generally poor due to dispersion from the high velocity exhaust. The smoke also dissipates rapidly because of high exhaust temperature. At high power settings, especially in afterburner, the smoke may disappear altogether.

The SCSG-5 is a self-contained smoke generating system developed by Sanders Smoke Technologies, Inc. to fill the need for a smoke system that is independent of the engine influence and location. The SCSG-5 has greatly expanded the application and scope to which smoke may be used in aircraft operations.

The following definitions apply to Warnings, Cautions and Notes found throughout this manual:

**Warning: Operating procedures, techniques, etc., which will result in personal injury or loss of life if not carefully followed.**

**Caution: Operating procedures, techniques, etc., which will result in damage to equipment if not carefully followed.**

**Note:** An operating procedure, technique, etc., which is considered essential to emphasize.

Black vertical bars, located in the right outside margin, will highlight the location of revised information in this manual.

These state of the art smoke generators are available to you, only through Sanders Smoke Technologies, Inc. Contact us today for a no obligation quote for your aircraft.

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## 2.0 GENERAL DESCRIPTION

### 2.01 Description of Function

The Self-Contained Smoke Generator SCSG-5A is an inert smoke system designed to operate from an aircraft equipped with a standard 14-inch NATO stores rack. The smoke generator is not a weapon; it only produces inert smoke.

Ease of operation is one of the special features of this system. The SCSG-5A is quick fitting and easily removed from the aircraft stores rack. To produce smoke; the pilot selects the on/off switch to the ON position and the smoke starts immediately. To stop smoke; the pilot selects the on/off switch to the OFF position. The smoke can be turned on and off as many times as desired until the 10 minute quantity of smoke oil is exhausted.

The SCSG-5 series of smoke generators have been operated from sea level to over 30,000 feet, from 65 knots to .80 mach (at sea level) and 9 G's. Models of the SCSG series have flown for 40+ years.

### 2.02 Approved Aircraft

The following aircraft have been approved for flight with the SCSG series:

- Aermacchi MB-339 & MB-326
- Agusta S211
- Bell AH-1 Cobra
- Boeing 747 & 727
- BA Hawk 200
- Casa 101
- McDonnell Douglas A-4
- Embraer Tucano
- Lockheed T-33 & F-16
- MBB Tornado
- MiG 17
- Pilatus PC7, PC9 & PC21
- Saab Viggen
- Sikorsky Helicopter

### 2.03 Servicing

Servicing the smoke generator between operations requires only the addition of 1 gallon of gasoline and 10 gallons of smoke oil.

### 2.04 Altitudes

Smoke generators have been operated from sea level to over 30,000 feet. If starting the smoke generator at altitudes higher than 15,000 feet is desired, some special modifications are required.

### 3.0 LIMITATIONS

#### 3.01 Declaration

Sanders Smoke Technologies, Inc. cannot accept responsibility for the satisfactory operation of equipment outside the conditions given below, without Sanders Smoke Technologies, Inc. agreement.

#### 3.02 General

Emission of and Susceptibility to electromagnetic interference.....None established  
 Exposure to Sunlight ..... Not Effected  
 External Contamination.....Ram Air Inlet must be free and clear  
 Magnetic Influence .....None established  
 Mounting Method..... 14-inch NATO stores rack  
 Shelf Life ..... Estimated 10 years  
 Ultimate Life ..... Not established  
 Water Proofness..... Spray proof

#### 3.03 Dimensions

Overall dimensions..... 10" x 80.5"  
 Dry weight ..... 55.50 (+/-2) lbs  
 Empty weight (1 gallon useable fuel) ..... 61.50 (+/-2) lbs  
 Gross weight ..... 136.50 (+0, -2) lbs  
 CG Dry .....38.88 (+/- 0.5)" aft  
 CG Empty (1 gallon useable fuel) .....36.88 (+/- 0.5)" aft  
 CG Gross .....35.50 (+/- 0.5)" aft

#### 3.04 Fuel and Smoke Oil

Preferred Fuel (2 gallons, 7.5 liters).....Aviation grade fuel (gasoline)  
 (Premium automotive gasoline may be substituted)  
 Do not service with jet fuel (JP-4, etc.)  
 Preferred Smoke Oil (10 gallons, 37.85 liters)..... Shell Morlina Oil HS 10  
 Texaco Canopus 13  
 (Experimentation may show local oils available)

Note: All paraffin based mineral oils (10 – 22 viscosity) will produce smoke. The difference between the various oils is the density and duration of the smoke produced. The best smoke is produced using the oil with the least amount of additives. Machine oil, commonly referred to as spindle oil, has very few additives and is available in all developed countries.

### 3.05 Operating Limitations

Acceleration.....	+/- 9G's
Altitude for Starting Unit .....	15,000 feet and below
Altitude while Operating .....	No altitude limitation established
Ambient Temperature Range.....	40° F (5° C) – 131° F (55° C)
Attitude Deviation during Flight .....	Unlimited
Electrical On/Off Switch .....	4mA, 28vdc, 7K ohms
Electrical Main Power.....	.10 amps, 28vdc
Minimum Starting Speed.....	100 KIAS (all altitudes)
Maximum Starting Speed.....	Sea Level to 5,000 feet – 350 KIAS 10,000 feet – 250 KIAS 15,000 feet – 150 KIAS
Minimum Smoke Speed .....	70 KIAS
Maximum Smoke Speed .....	0.8 Mach
Maximum No Smoke Speed .....	Not established
Operating Time.....	approximately 10 minutes
Rate of Climb and Descent .....	Unlimited



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## 4.0 THEORY OF OPERATION

### 4.01 General

When the pilot or ground check operator initiates the command for the smoke generator to operate, by selecting the on/off switch to the ON position, a relay circuit engages, starting the smoke sequence.

With the on command, there are three functions that take place simultaneously. The 28vdc electrical power is turned on to:

1. The capacitor discharge ignition system for igniter firing.
2. The fuel pump turns on and the fuel solenoid valve is opened. Combustion will start immediately.
3. The smoke oil pump turns on.

To stop smoke; the pilot selects the on/off switch to the OFF position; power is then turned off to all systems. The fuel solenoid valve closes; fuel pump, ignition, and the oil pump stops. The air flow is continuous in flight and keeps the combustion chamber purged and ready for the next smoke operation.

### 4.02 Auto Shutdown

The smoke generator is equipped with an auto shutdown feature. When the smoke generator is selected ON, the smoke oil pump has 8 seconds to exceed 100 PSI and close a pressure switch to continue operating. If the oil pressure drops below 60 PSI (pressure switch opens) for 8 seconds, the smoke generator will auto shutdown. This 8 second delay is designed for the occasional pressure loss during some maneuvers; the time does not accumulate. To restart the smoke generator, if auto shutdown has occurred, select the on/off switch to the OFF position and then back to the ON position.

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## 5.0 PILOT'S NOTES – INFLIGHT OPERATION

### 5.01 General

As ram air flow is required to support combustion, we recommend that the smoke generator not be started below 100 KIAS. The maximum speed at which the smoke generator can be started changes with altitude.

Sea Level to 5,000 feet	350 KIAS
10,000 feet	250 KIAS
15,000 feet	150 KIAS

If the smoke generator does not start, try a slower airspeed; this will richen the air/fuel ratio. Also allow approximately 15 seconds between start attempts to allow the combustion chamber to clear out excess fuel. Once started the smoke generator should function to a max airspeed of .8 Mach. The smoke generator can be turned on and off as many times as desired. Once all smoke oil is consumed (approximately 10 minutes) the smoke generator should be selected OFF.

### 5.02 Smoke Generator Start

Selecting the on/off switch to the ON position will start the smoke immediately.

Note: To restart the smoke generator if auto shutdown has occurred, select the on/off switch to the OFF position and then back to the ON position.

### 5.03 Smoke Generator Stop

Selecting the on/off switch to the OFF position will immediately stop all systems in the smoke generator.

Note: After shutting off the smoke generator a small flame (6 to 8 inches) will be visible for approximately 3 seconds.

### 5.04 Landing Precautions

The smoke generator should be selected OFF a minimum of 1 minute prior to landing. This allows time for the combustion chamber to purge and cool down.

We recommend that all electrical power to the smoke generator be OFF. This guarantees that the smoke generator cannot be in the on condition.

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## **6.0 SAFETY PROCEDURES**

### **6.01 Handling**

The smoke generator should be clean and free of oil on the outside. The smoke generator is rather heavy if serviced and can be very slippery if wet.

### **6.02 Servicing**

The aircraft should be grounded (earthed) when servicing the smoke generator. Because of flammable liquids (fuel and oil); a fire extinguisher must be available.

### **6.03 Ground Testing and Troubleshooting**

While performing ground tests or troubleshooting of components, because of flammable liquids (fuel and oil), a fire extinguisher must be available.

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## 7.0 MOUNTING

### 7.01 Pre-installation Check – Aircraft

Check that 28vdc electrical power is available.

### 7.02 Pre-installation Check – Smoke Generator

1. Check that nose cone, tail cone and access door screws are in and tight.
2. Visually check that there is no damage to the smoke generator.
3. Visually check that the ram air inlet is free and clear.
4. Recommend loading of smoke generator with a minimum of oil and fuel in tanks to avoid lifting an extra 81.00 lbs.

### 7.03 Loading Procedures

1. Smoke generator to be installed on aircraft per instructions for 14-inch NATO stores rack.
2. Connect 28vdc power to smoke generator.

### 7.04 Pre-unloading Procedures

1. Aircraft should be grounded (earthed) when draining fuel and oil from smoke generator. Because of flammable liquids (fuel and oil); a fire extinguisher must be available.
2. It may be desirable, while the smoke generator is still installed on the aircraft, to remove drain plugs from the bottom of the smoke generator and drain fuel and oil, so that the smoke generator is lighter and easier to handle during unloading.

Note: Fuel drain plug has a 1/8" outside diameter (3.2mm) vent pipe attached.

Note: Removing filler plugs will expedite draining.

3. Recommend checking smoke generator for any stray oil that may make the generator hard to handle unloading. Wipe clean.

### 7.05 Unloading Procedures

1. Disconnect 28vdc power.
2. Smoke generator to be removed from aircraft per instructions for 14-inch NATO stores rack.

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## 8.0 SERVICING

### 8.01 General

**Caution:** Clean oil and fuel are essential; clean funnels, buckets, etc. must be used.

**Caution:** Do not over tighten the filler or drain plugs. Excessive tightening will cause increased wear or seizing of the plugs.

**Recommended torque:** filler plugs - 240 lb. in. (27Nm)  
drain plugs - 50 lb. in. (6Nm).

### 8.02 Fuel (Gasoline)

1. Remove 3/4" pipe plug from the forward tank marked "FUEL".
2. Service with approximately 2 gallons (7.5 liters) of gasoline. Aviation grade fuel is preferred. Premium automotive gasoline may be substituted.

**Caution:** Do not service with jet fuel (JP-4, etc). The smoke generator will not function.

3. Lubricate plug with fuel resistant grease. Reinstall servicing plug.



### 8.03 Smoke Oil

1. Remove 3/4" pipe plug from the aft tank marked "SMOKE OIL".
2. Service with approximately 10 gallons (37.85 liters) of smoke oil.
3. Reinstall servicing plug.

## 9.0 GROUND TEST

### 9.01 General

A supply of 28vdc will be needed for a ground test of the smoke generator.

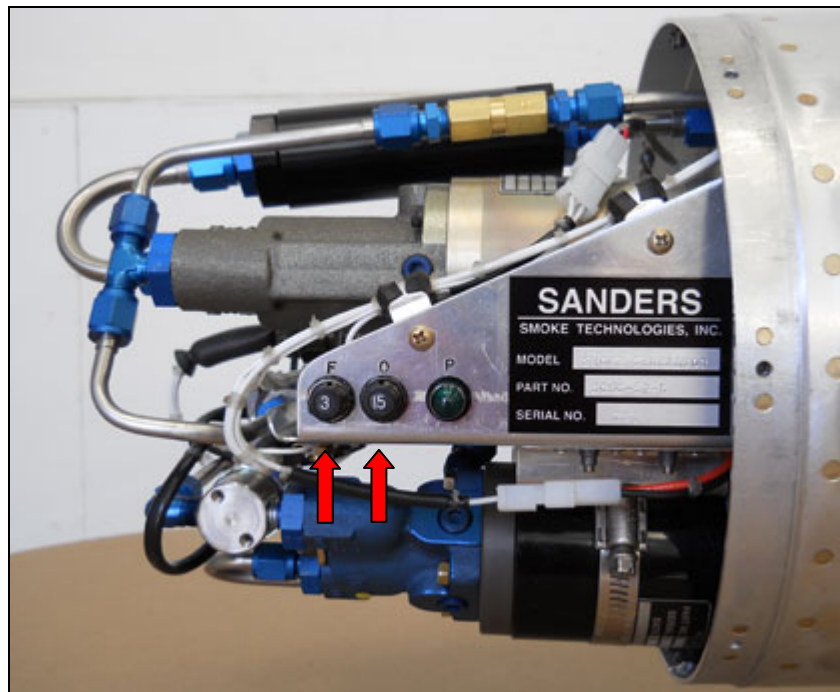
An electrical on/off switch is needed or the aircraft systems may be used.

### 9.02 Passive Ground Test

The following ground test is recommended before flight:

**Caution: Have fire extinguisher available.**

1. Remove nose cone.



2. Pull out both fuel (F) and smoke oil (O) circuit breakers.
3. Select the on/off switch to the ON position. The power light should illuminate, then after 8 seconds, the power light should go out indicating the auto shutdown system has operated.
4. Select the on/off switch to the OFF position.
5. Select the on/off switch to the ON position (you have 8 seconds, until the smoke generator will auto shutdown, to accomplish the following checks).
6. Check power light is illuminated.
7. Visually check igniter spark in combustion chamber from rear of smoke generator. Stand minimum 3 feet (1 meter) behind the tail pipe.

8. Check oil and fuel pump operation:

**WARNING: Do not push both breakers in at the same time.**

- a) **Momentarily** (less than one second) push in oil circuit breaker (also activates fuel solenoid valve). Listen for pump operation.
- b) **Momentarily** (less than one second) push in fuel circuit breaker (fuel solenoid valve remains closed). Listen for pump operation.

9. Select the on/off switch to the OFF position and check power light is not illuminated.

10. Push in circuit breakers.

11. Re-install nose cone.

### 9.03 Operational Ground Test

It is impractical to have the smoke generator produce smoke on the ground. You may simulate operation by having the fuel and oil by-pass the nozzles.

The smoke generator needs to be serviced with gasoline in the fuel tank (minimum 3/4 full) and sufficient oil in the oil tank (approximately 2 gallons, [7.5 liters]).

**Caution: Do not operate pumps without fuel and oil.**

**Caution: Have fire extinguisher available.**

1. Remove nose cone.



2. Disconnect fuel line at the solenoid valve.
3. Attach hose at solenoid valve. Place hose into a container.
4. Disconnect oil pressure line at the oil pump.
5. Attach hose to pressure side of oil pump. Install a restrictor with a .055" (1.397mm) diameter hole to other end of hose. Place hose into a container.

**Caution: The oil pump should put out 100 to 150 PSI.**

Note: An open line on the oil pump will not provide sufficient pressure to close the pressure switch and the smoke generator will auto shutdown after 8 seconds.

6. Select the on/off switch to the ON position.
7. Check power light is illuminated.
8. Observe operation of fuel pump, oil pump, and ignition.

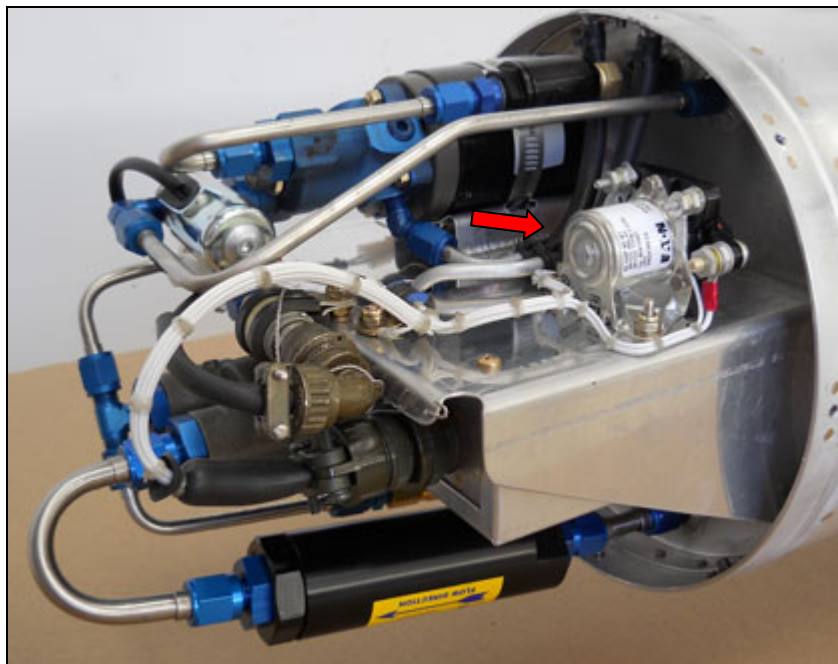
Note: Visual inspection of the ignition may be observed by standing a minimum 3 feet (1 meter) behind the tail pipe.

9. For re-assembly, reverse disassembly procedures.
10. If ignition, fuel or oil does not function, proceed with appropriate check.

#### 9.04 Power Relay Check

**WARNING: Fuel and oil pump circuit breakers must be pulled out for this check.**

1. Remove nose cone.



2. Pull out both fuel (F) and smoke oil (O) circuit breakers.



3. Select the on/off switch to the ON position.

Note: The smoke generator will auto shutdown after 8 seconds due to no smoke oil pressure.

4. Check that the power light (P) is illuminated indicating that the power relay has operated.

Note: The ignition system will be operating.

### Troubleshooting

**WARNING: Fuel and oil pump circuit breakers must be pulled out for this check.**

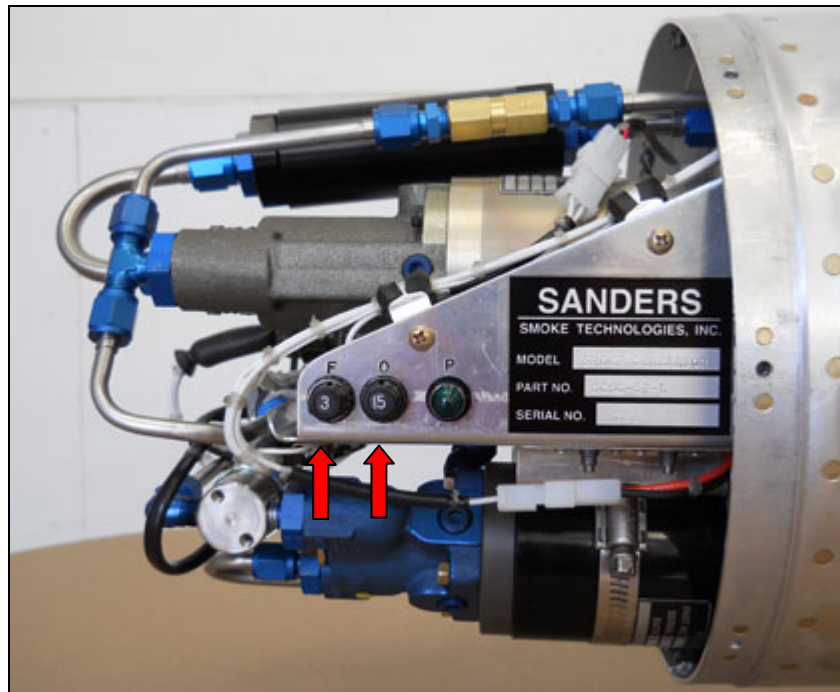
1. If the power light is not illuminated check that the light bulb is not burned out.
2. Check electrical power to the relay.
3. If the power relay does not operate replace the Ignition/Control Box.
4. If the Ignition/Control Box is functioning replace the power relay.

### 9.05 Ignition Check

**Caution: Do not remove sealed access door #1 or #2. If door is removed for inspection and cleaning purposes, fuel tank sealant MIL-S-8802D will be required to reinstall the tank access door.**

**WARNING: Fuel and oil pump circuit breakers must be pulled out for this check.**

1. Remove nose cone.



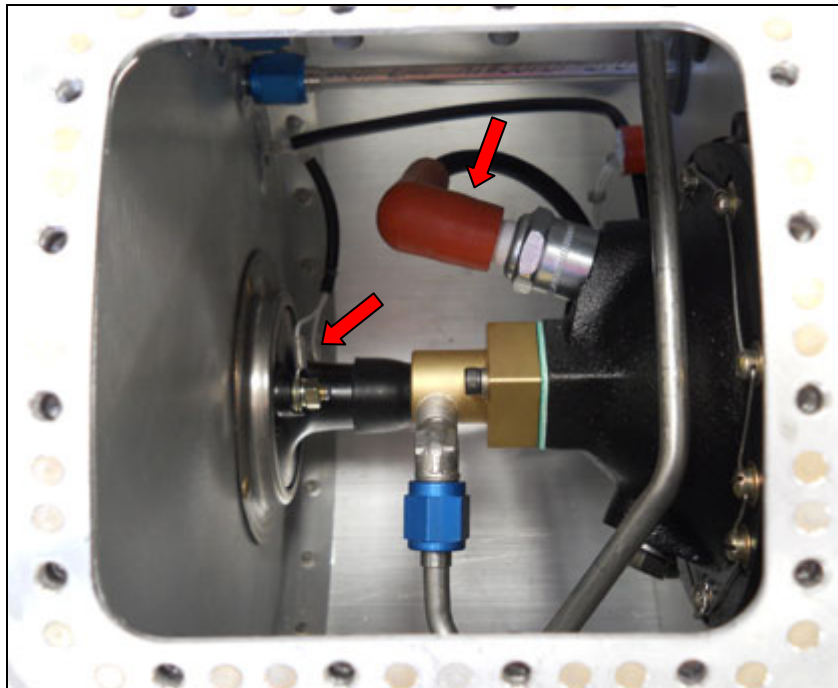
2. Pull out both fuel (F) and smoke oil (O) circuit breakers.

3. Select the on/off switch to the ON position.
4. Check power light is illuminated.  
Note: The smoke generator will auto shutdown after 8 seconds due to no smoke oil pressure.
5. Visual inspection of the ignition is accomplished by standing a minimum 3 feet (1 meter) behind tail pipe.
6. Select the on/off switch to the OFF position and check power light is not illuminated.
7. Push in circuit breakers.
8. Reinstall nose cone.

### Troubleshooting

**WARNING: Fuel and oil pump circuit breakers must be pulled out for this check.**

1. If there is no ignition, a visual inspection of the igniter can be accomplished by removing access door #3 and removing igniter. If igniter is dirty, clean or replace.

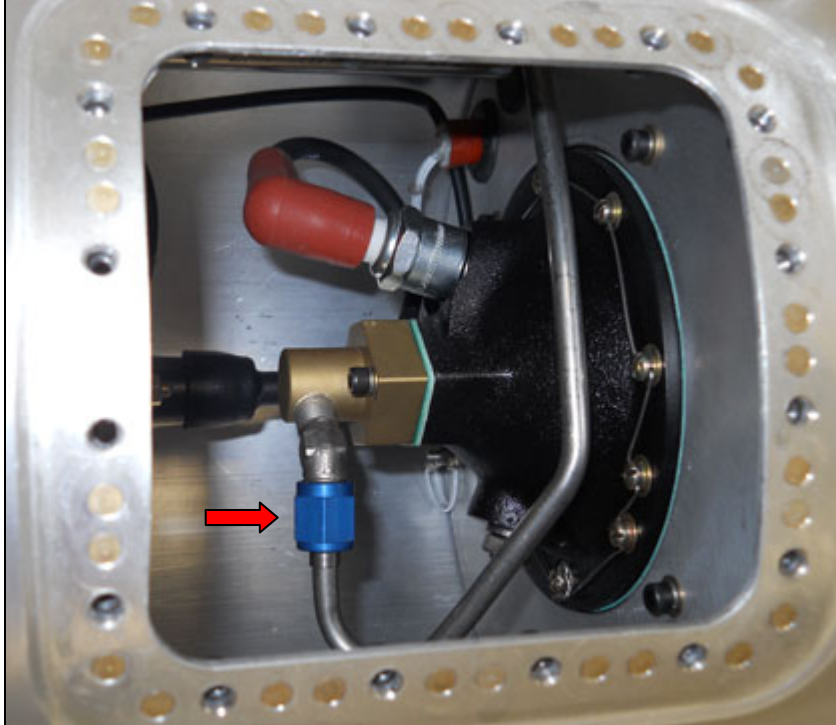


2. Check electrical connections at ignition coil and ignition cable at ignition coil and igniter.
3. If there is still no ignition, replace the Ignition/Control Box.

## 9.06 Fuel Check

**WARNING: Electrical connector on oil pump must be disconnected.**

1. Remove access door #3.



2. Disconnect line to fuel nozzle block.
3. Remove two 8-32 allen cap screws and remove fuel nozzle block.
4. Remove nozzle from block using 5/8" socket.
5. Inspect filter screen on nozzle for contamination.
6. Reinstall nozzle. Recommended torque: 180 lb. in. (20Nm).
7. Plumb fuel line overboard into a container.
8. Remove nose cone.
9. Disconnect oil pump electrical connector.
10. Select the on/off switch to the ON position.
11. Check power light is illuminated.

Note: The smoke generator will auto shutdown after 8 seconds due to no smoke oil pressure.

12. Visually check for fuel flow.

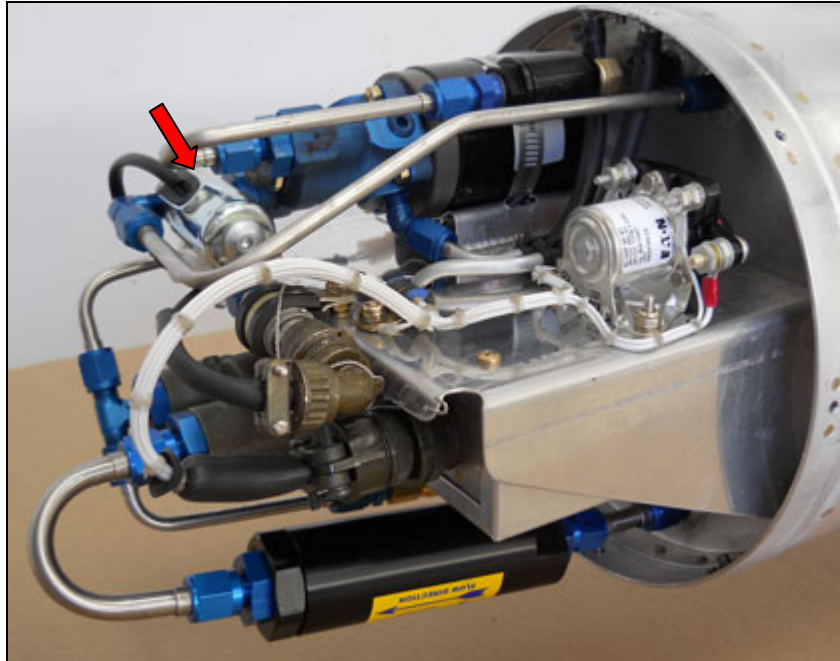
Note: Ignition system will also be operating at this time.

13. For re-assembly, reverse disassembly procedures.

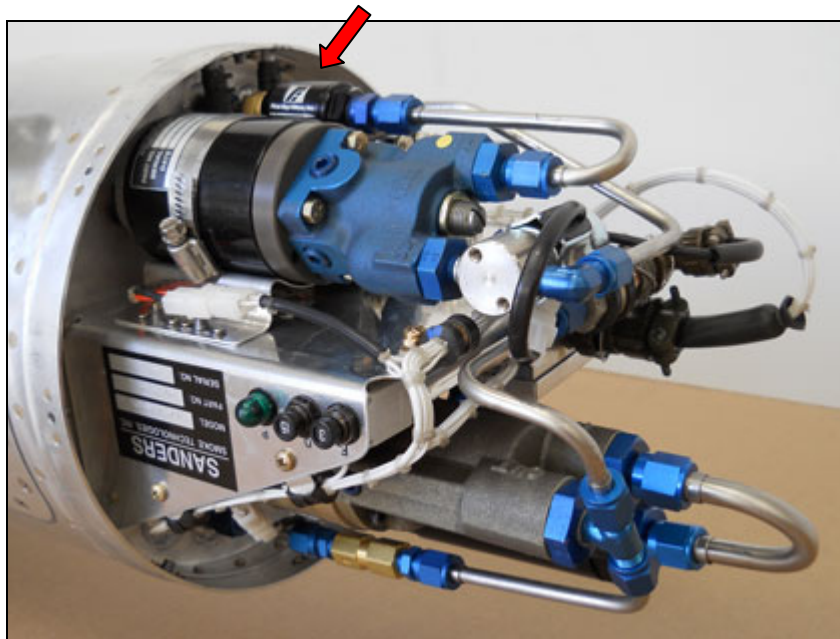
## Troubleshooting

**WARNING: Electrical connector on oil pump must be disconnected.**

1. If there is no fuel flow, check that the fuel pump is turning on.
2. Check that enough fuel is in the tank (minimum 3/4 full).
3. Check that the fuel solenoid valve, attached on the outlet side of the fuel pump, is energized allowing fuel to flow.

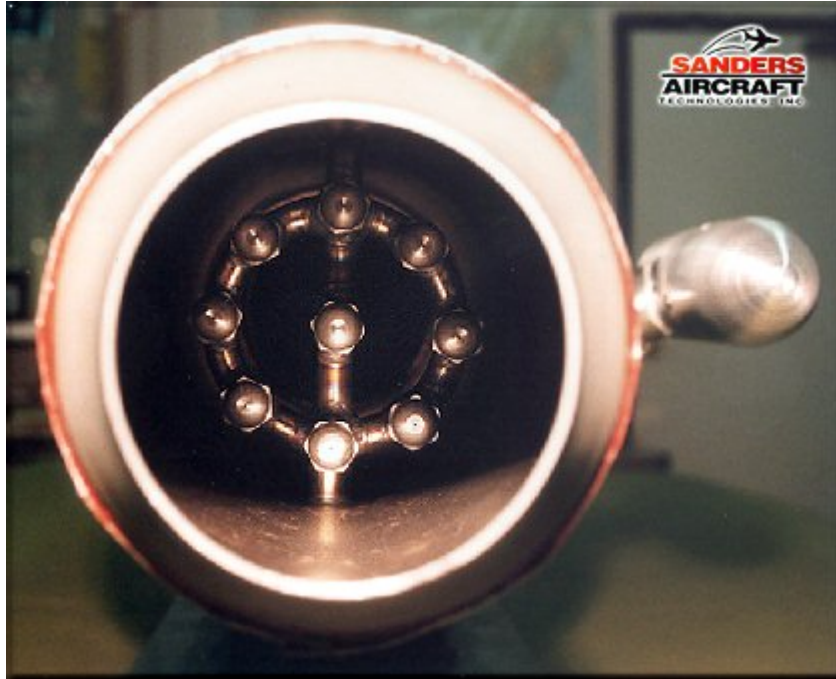


4. If the fuel pump runs and solenoid valve is energized, but there is no fuel flow, check for clogging of the fuel pump inlet filter.



5. If fuel pump does not operate, check electrical power to the fuel pump.
  - a) If no power, check electrical wiring, power relay and Ignition/Control Box.
  - b) If there is power, replace the fuel pump.

#### 9.07 Smoke Oil Check



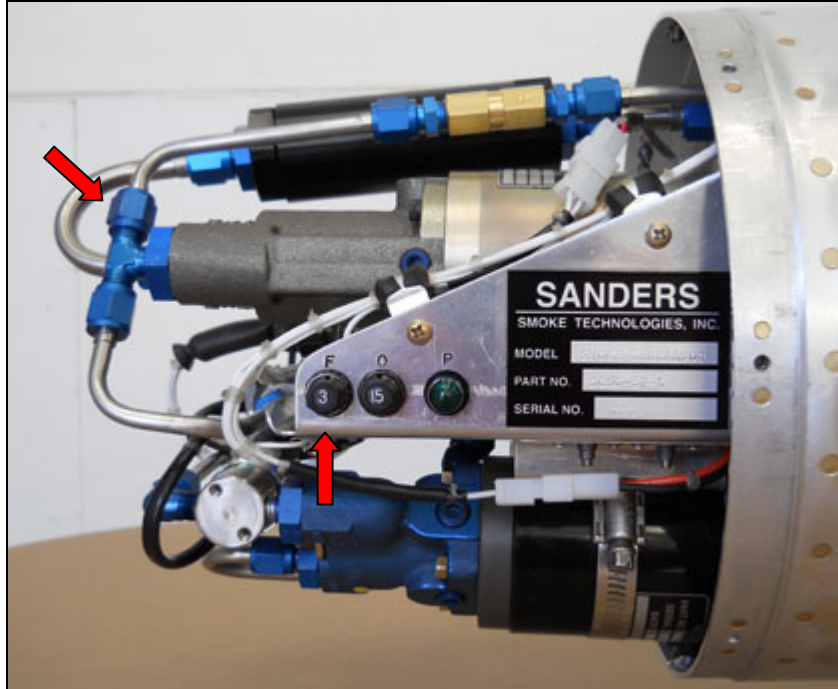
#### Nozzles

1. Check the oil nozzles for clogging. There are 9 nozzles located inside the tail pipe, approximately 12 inches forward.
2. Remove nozzles with 5/8" socket and an extension.
3. Inspect and clean filter screens on nozzles.
4. Apply antiseize (MIL-A-907E or equivalent) to nozzle threads.
5. Reinstall nozzles. Recommended torque: 180 lb. in. (20Nm).

## Oil Pump

**WARNING: Fuel pump circuit breaker must be pulled out for this check.**

1. Remove nose cone.



2. Disconnect oil pressure line at the oil pump.
3. Attach hose to pressure side of oil pump. Install a restrictor with a .055" (1.397mm) diameter hole to other end of hose. Place hose into a container.

Note: An open line on the oil pump will not provide sufficient pressure to close the pressure switch and the smoke generator will auto shutdown after 8 seconds.

4. Pull out fuel (F) circuit breaker.
5. Select the on/off switch to the ON position.
6. Check power light is illuminated.
7. Visually check for oil flow.

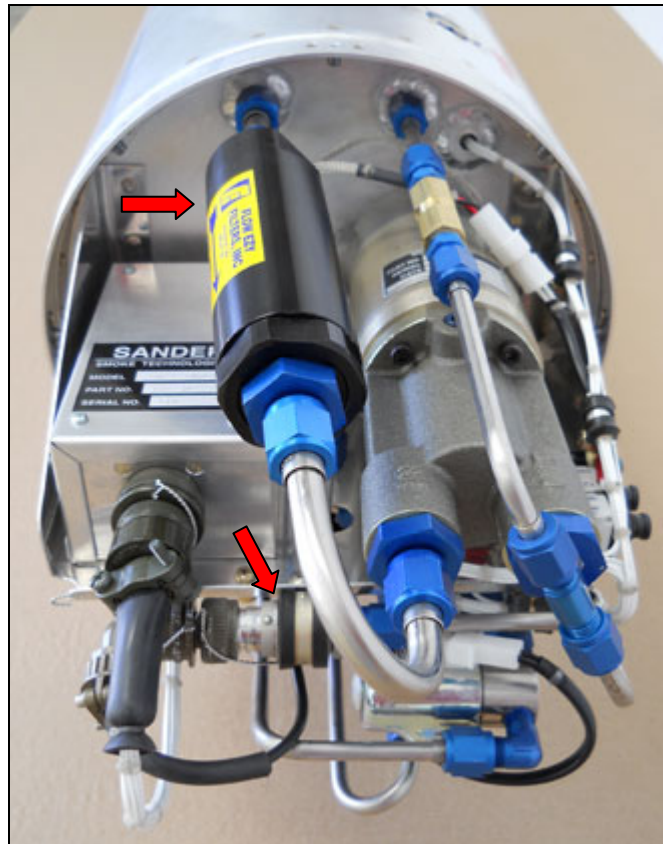
Note: If the smoke generator runs for 8 seconds and then shuts down, the oil pump may not have sufficient pressure to close the pressure switch.

8. For re-assembly, reconnect all lines and push in circuit breaker.
9. Reinstall nose cone.

## Troubleshooting

**WARNING: Fuel pump circuit breaker must be pulled out for this check.**

1. If there is no oil flow, check that the oil pump is turning on.
2. Check that enough oil is in the tank (approximately 2 gallons [7.5 liters]).
3. Inspect the oil pump inlet filter for obstructions. Clean filter if necessary.
4. If oil pump does not operate, check for electrical power to oil pump.
  - a) If no power, check electrical wiring, power relay and Ignition/Control Box.
  - b) If there is power, replace the oil pump.



5. If there is oil flow and the smoke generator still shuts down, attach a hose to pressure side of the oil pump with a pressure gauge and a restrictor with a .055" (1.397mm) diameter hole to other end of hose. Place hose into a container. If the pump pressure is less than 100 PSI, replace the oil pump. If the pump pressure is 100 PSI or greater, check that the pressure switch is closing. If the smoke generator still shuts down, replace the Ignition/Control Box.

### 9.08 Ram Air Regulator



This is the only adjustable item on the smoke generator; however no adjustment should be required. If necessary, for maintenance reasons, it is set with 7 turns pre-load on the relief valve spring.

### 9.09 Auto Shutdown

This feature consists of three components: the Ignition/Control Box, power relay and a pressure switch. When the smoke generator is selected ON, the Ignition/Control Box provides a ground to the power relay coil, thus closing the relay and supplying power to all systems. The smoke oil pump has 8 seconds to come up in pressure (100 PSI minimum) and close the pressure switch. The pressure switch provides a ground to the Ignition/Control Box completing a circuit thus keeping the relay closed. If at any time the oil pressure drops below 60 PSI, the pressure switch will open the circuit. If the circuit remains open for 8 seconds or more, the smoke generator will auto shutdown.

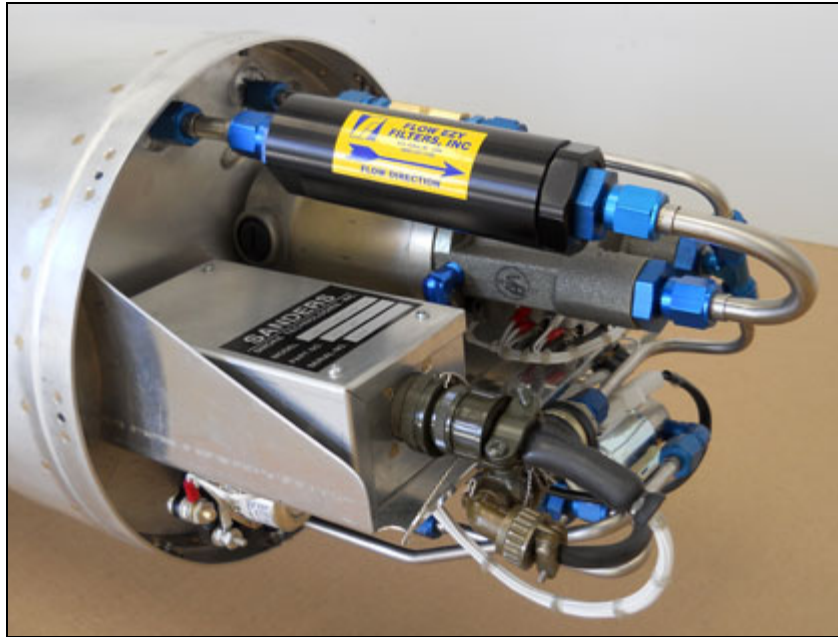
#### Troubleshooting

1. The smoke generator will not turn on. Check electrical wiring, power relay and Ignition/Control Box.
2. The smoke generator turns on for 8 seconds and then shuts down. Check to be sure that there is sufficient pressure from the oil pump to close the pressure switch (100 PSI minimum). See Oil Pump Troubleshooting. If the switch is closing, replace the Ignition/Control Box. If the switch does not close (100 PSI minimum), replace the switch.



## 9.10 Component Replacement

### Ignition/Control Box



1. Remove nose cone.
2. Remove cannon plug and two 8-32 screws on the bottom of the component tray.
3. For replacement, reverse removal procedures.

### Fuel Pump

1. Remove nose cone.
2. Remove fuel lines and disconnect electrical connectors.
3. Loosen screw clamp holding fuel pump to mounting bracket.
4. For replacement, reverse removal procedures.

### Oil Pump

1. Remove nose cone.
2. Remove the oil lines and disconnect electrical connector.
3. Remove four 1/4-20 screws on the bottom of the component tray.

Note: Fuel pump and mounting bracket must be removed for access to 1/4-20 screws.

4. For replacement, reverse removal procedures.

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### Pressure Switch

1. Remove nose cone.
2. Disconnect oil pressure line.
3. Disconnect cannon plug.
4. Remove the adel mounting clamp.
5. For replacement, reverse removal procedures.

### Power Relay

1. Remove nose cone.
2. Disconnect electrical wires.
3. Remove the two 8-32 screws on the top of the component tray.  
Note: Ignition/Control Box must be removed for access to 8-32 screws.
4. For replacement, reverse removal procedures.

### Ignition Coil

The ignition coil is mounted in the aft bulkhead of the oil tank. It is not a field service item. If it is determined to be defective, return the smoke generator to Sanders Smoke Technologies, Inc. for repair.

### Fuel Nozzle

1. Remove access door #3.
2. Disconnect line to fuel nozzle block.
3. Remove the two 8-32 allen cap screws and remove fuel nozzle block.
4. Remove nozzle from block using 5/8" socket.
5. For replacement, reverse removal procedures.  
Note: Recommended nozzle torque 180 in. lbs. (20Nm).

### Igniter

1. Remove access door #3.
2. Disconnect ignition lead and remove igniter.
3. For replacement, reverse removal procedures.

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### **Combustion Chamber**

1. Remove tail cone.
2. Disconnect oil line at the nozzle holder.
3. Remove air regulator.
4. Remove access door #3.
5. Disconnect and remove fuel line.
6. Remove the fuel nozzle block from the combustion head (two 8-32 allen cap screws).
7. Disconnect ignition lead and remove igniter.
8. Remove the four 8-32 allen cap screws mounting the combustion chamber to the bulkhead.
9. Extract combustion chamber through tail of the smoke generator.
10. For replacement, reverse removal procedures.

### **Oil Nozzles**

1. There are 9 nozzles located inside the combustion chamber, approximately 12 inches forward.
2. Remove the nozzles using a 5/8" socket and an extension.
3. For replacement, apply antiseize (MIL-A-907E or equivalent) to nozzle threads. Recommended torque: 180 in lbs (20Nm).

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## 10.0 RECOMMENDED MAINTENANCE

### 10.01 External Inspection

Recommended after every flight: Check for damage to nose cone, fluid leaks, loose screws and rivets. Check ram air inlet is free and clear. Check fuel and oil vents are clear. Check that the stencils indicating the operating points and warning message (if any) are not faded.

### 10.02 Fuel and Oil Filters

Cleaning pump filters with available solvent is recommended every 20 flights under normal conditions.

### 10.03 Fuel and Oil Nozzle Filters

Cleaning nozzle filters with available solvent is recommended every 20 flights under normal conditions.

Note: Apply antiseize (MIL-A-907E or equivalent) to oil nozzle threads.  
Recommended: torque: 180 in lbs (20Nm).

### 10.04 Lubrication

Fuel and oil filler plug threads should be lubricated with fuel resistant grease after servicing.

### 10.05 Internal Inspection

Every 20 flights remove nose cone, tail cone and door #3. Inspect smoke generator for fluid leaks, unusual stains, loose fittings and fasteners. Clean and repair as necessary.

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## **11.0 COMPONENTS (MAJOR) LIFE CYCLE**

### **11.01 Fuel Pump**

Life expectancy exceeds normal use of the smoke generator. Leakage from the fuel seal drain would indicate deterioration of O-rings on seal. If this happens, replace pump.

### **11.02 Oil Pump**

Life expectancy exceeds normal use of the smoke generator. Leakage from the oil seal drain would indicate deterioration of O-rings on seal. If this happens, replace pump.

### **11.03 Igniter**

Should be removed and inspected approximately every twenty flight operations. With cleaning, the igniter should be good for several hundred flights.

### **11.04 Ignition/Control Box**

The electrical components in the Ignition/Control Box are solid state, requiring no service. No life cycle established.

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## 12.0 STORAGE

### 12.01 Long Term Inactivity

1. Drain fuel and oil tanks.
2. Store in original shipping containers.
3. Store in clean, dry, indoor storage.

### 13.0 SERVICEABLE PARTS LIST

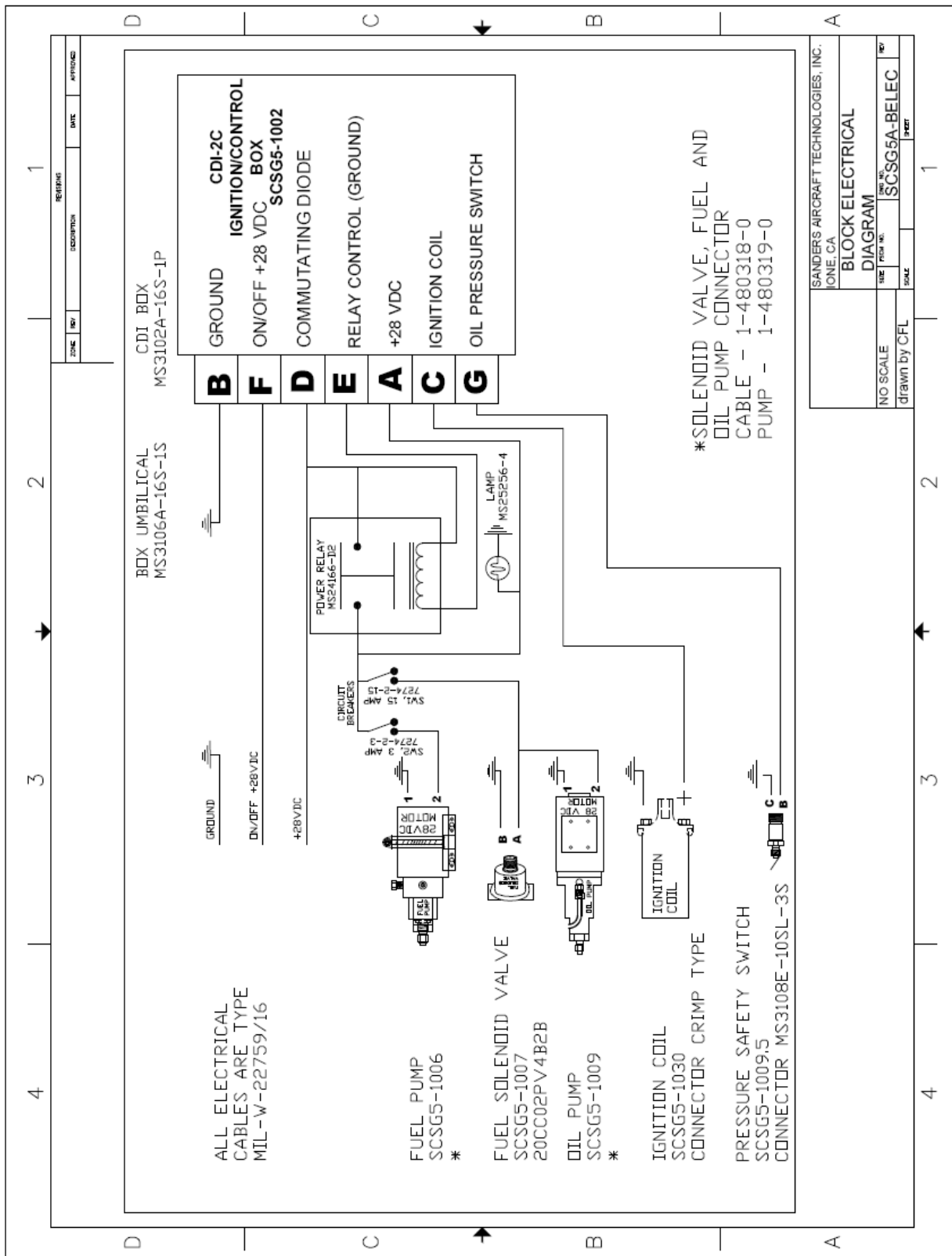
#### 13.01 Parts List

Item	Part No.
1. Ignition/Control Box	CDI-2C
2. Fuel Nozzle	10.50 70 PLP
3. Fuel Pump	A8136-B
4. Fuel Solenoid Valve	20CC02PV4B2B
5. Oil Nozzle	4.00 45 PLP
6. Oil Pump	B5034-B
7. Pressure Switch	7G1139
8. Power Relay	MS24166-D2
9. Igniter	J99
10. Oil Filter	6ILA-03S-25
11. Oil Filter Element	8504-05
12. Fuel Filter	ILA-02-74BK
13. Fuel Filter Element	6180-02
14. Access Door Screw	MS24694-5
15. Nose/Tail Cone Screw	AN526C-832R8
16. Power Light Bulb	327
17. Check Valve	985

#### O-Rings

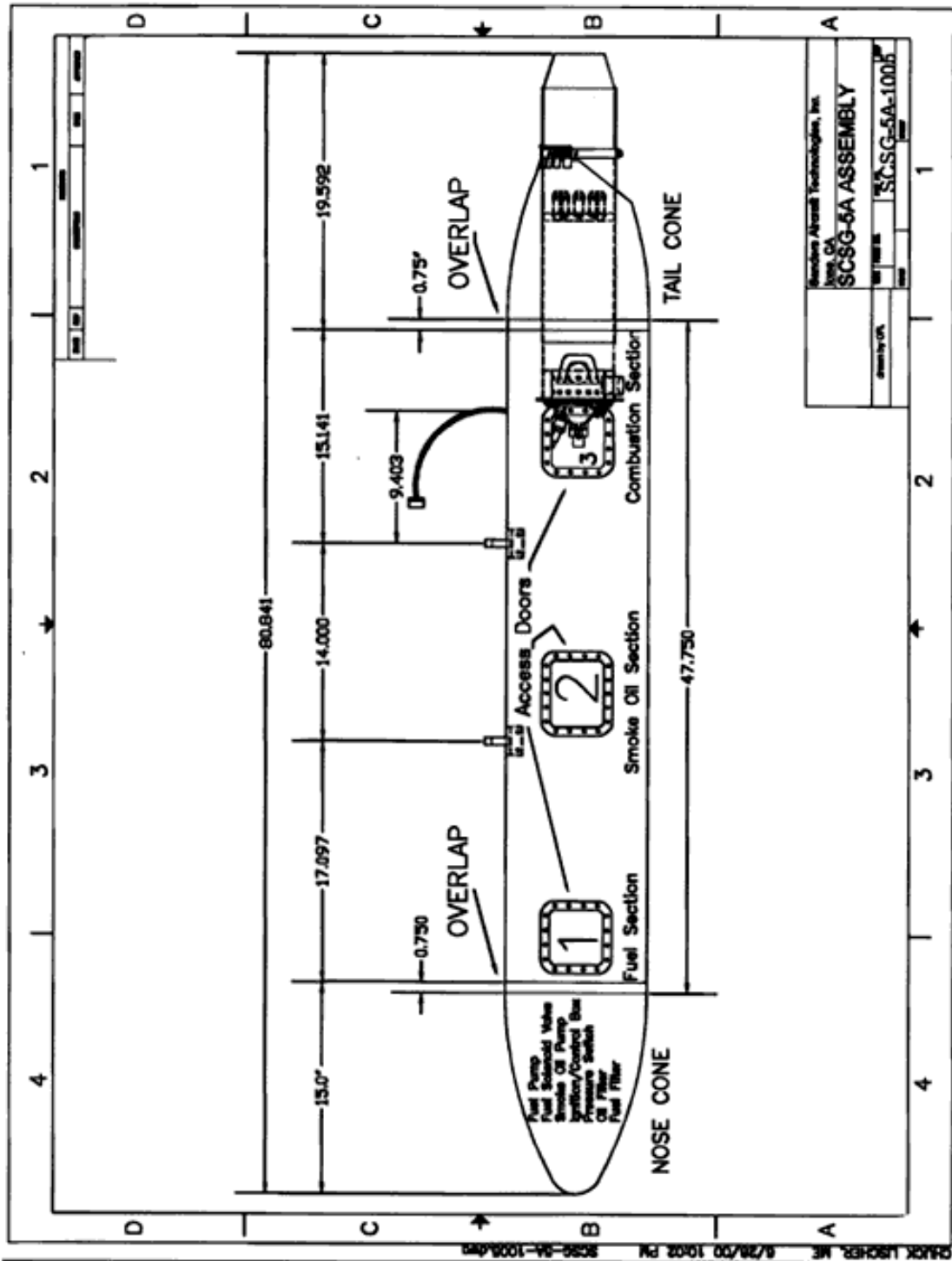
Item	Part No.
1. Fuel Pump Fittings	AS568A-906
2. Fuel Filter Body	AS568A-016
3. Oil Pump Fittings	AS568A-908
4. Oil Filter Body	AS568A-916
5. Oil Filter Element	AS568A-210
6. Oil Filter Fittings	AS568A-908

14.0 ELECTRICAL BLOCK DIAGRAM





15.0 SCSG-5A ASSEMBLY



## 16.0 SCSG-5A PARTS LIST

List of Components		
ZONE 1 (electrical)		
SCSG5-1000	Tube Body	10"OD, 0.125" 6061 T6
SCSG5-1001	Nose Cone	Spun 2024 T4
SCSG5-1002	Ignition/Control Box	CDI-2C
SCSG5-1003	Component Tray	.050 2024 T3
SCSG5-1004	Power Relay	MS24166-D2
SCSG5-1005	Fuel Filter	ILA-02-74BK
SCSG5-1005E	Fuel Filter Element	6180-02
SCSG5-1006	Fuel Pump	Weldon A8136-B
SCSG5-1007.5	Fuel Solenoid Valve	20CC02PV4B2B
SCSG5-1008	Fuel Pump Mount	.040" 2024 T3, Stainless Steel Clamp
SCSG5-1009	Oil Pump	Weldon B5034-B
SCSG5-1010	Oil Filter	6ILA-03S-25
SCSG5-1010E	Oil Filter Element	8504-05
SCSG5-1010V	Check Valve	985
SCSG5-1011	Fuel Pump Circuit Breaker	Klixon 7274-2-3
SCSG5-1011.5	Oil Pump Circuit Breaker	Klixon 7274-2-15
SCSG5-1012	Power Light	MS25256-4
ZONE 2 (liquids)		
SCSG5-1013	Bulkhead #1	.050" 6061 T6
SCSG5-1014	Filler Plug Receptacle	7075 T6, 3/8", 3/4" Pipe Thread
SCSG5-1015	Filler Plug, Fuel	316 Stainless Steel
SCSG5-1016	Drain Plug Receptacle	1/4" 7075 T6, 1/8" Pipe Thread
SCSG5-1017	Fuel Drain/Air Vent	1/8"OD 304 Stainless Steel
SCSG5-1018	Access Door #1, Fuel Tank	.050" 2024 T3
SCSG5-1019	Bulkhead #2	.050" 6061 T6
SCSG5-1020	Oil Flop Tube Mount	.050" 6061 T6
SCSG5-1021	Oil Flop Tube Assembly	SS Braided Hose, Lead Weight
SCSG5-1022	Filler Plug Receptacle	7075 T6, 3/8", 3/4" Pipe Thread
SCSG5-1023	Filler Plug, Oil	316 Stainless Steel
SCSG5-1024	Access Door #2, Oil Tank	.050"2024 T3
SCSG5-1025	FWD/AFT Attach Hangar	4130 steel
SCSG5-1026	Drain Plug Receptacle	1/4" 7075 T6, 1/8" Pipe Thread
SCSG5-1027	Drain Plug , Oil	316 Stainless Steel

List of Components		
<b>ZONE 3 (ignition)</b>		
SCSG5-1029	Bulkhead #3	.050" 6061 T6
SCSG5-1030	Ignition Coil	AC Delco U505
SCSG5-1031	Ignition Coil Mount	.032" Spun Stainless Steel
SCSG5-1032	Ignition Lead	AC Delco
SCSG5-1033	Access Door #3	.050" 2024 T3
SCSG5-1034	Combustion Head	Cast Iron
SCSG5-1034.5	Combustion Head Gasket	Klingersil C4401
SCSG5-1035	Igniter	J99
SCSG5-1036	Ground Electrode	304 Stainless Steel
SCSG5-1037L	Fuel Nozzle Block	Brass
SCSG5-1037R	Fuel Nozzle Block	Brass
SCSG5-1037.5	Fuel Nozzle Block Gasket	Klingersil C4401
SCSG5-1038	Fuel Nozzle	Monarch 10.50 70 PLP
<b>ZONE 4 (combustion)</b>		
SCSG5-1039	Bulkhead #4	.050" 6061 T6
SCSG5-1040L	Combustion Chamber	Assembly, RA 309 Stainless Steel
SCSG5-1040R	Combustion Chamber	Assembly, RA 309 Stainless Steel
SCSG5-1041	Air Regulator	Assembly, 2024 T3
SCSG5-1042	Vent, Air Scoop	.032" 2024 T3
SCSG5-1043	Oil Nozzle	Monarch 4.00 45 PLP
SCSG5-1046	Oil Nozzle Holder	Stainless Steel
SCSG5-1047	Tail Cone Bracket	Stainless Steel
SCSG5-1048	Tail Cone Clamp	Stainless Steel
SCSG5-1050	Tail Cone	Spun 2024 T4
<ul style="list-style-type: none"> <li>● L – Used in left wing SGSC-5A</li> <li>● R – Used in right wing SGSC-5A</li> </ul>		