BY ORDER OF THE COMMANDER
AIR FORCE SPECIAL OPERATIONS COMMAND

AIR FORCE SPECIAL OPERATIONS COMMAND MANUAL 11-201

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Flying Operations

HOSTILE ENVIRONMENT REPAIR PROCEDURES

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This manual implements Air Force Policy Document (AFPD) 11-2, *Aircrew Operations*, and Air Force Instruction (AFI) 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, by prescribing hostile environment repair procedures (HERP) for all AFSOC C-130s. This manual applies to all AFSOC units. This manual applies to Air Force Reserve Command (AFRC) units. This manual does apply to the Air National Guard (ANG). Remove all non-essential equipment from the aircraft prior to a combat mission. Use these procedures only when aircraft movement is essential and proper maintenance action is impractical. Due to the risks involved while utilizing these procedures, selected procedures or steps are restricted. These procedures are intended to recover the aircraft from austere locations and should be treated as emergency repairs until the aircraft is recovered to maintenance. Use of these restricted procedures or steps must be approved by the Aircraft Commander/Group Commander, Commander, Air Force Special Operations Forces (COMAFSOF)/Commander, Air Force Forces (COMAFFOR) for operationally assigned forces. If a combat or contingency situation makes prior coordination impractical or impossible, complete the necessary procedure and notify the approval authority at the earliest opportunity. It should be noted that not all aircrew can accomplish all procedures due to limited equipment and/or differences in aircraft configurations. Subordinate units are not permitted to supplement this manual. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the Air Force (AF) Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through

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SUMMARY OF CHANGES

This publication has been substantially revised. Amended statement that this regulation applies to AFRC. The 5th SOS currently flies MC-130Hs. Removed all references to the GTC/ATM. Removed HERP procedures involving GTC/ATM. Removed procedure for leaking brakes. Removed procedure for Prop Fails to Rotate – Failed Bleed Air Valve. Renumbered procedures in **chapter 2** as well as **Attachments 4**-13. Updated most current dates for supporting regulations.

CHAPTER 1

GENERAL INFORMATION

1.1. Waiver Authority. Headings not followed by an (**A**) or (**B**) require no approval. Procedures with headings followed by an (**A**) require aircraft commander approval in a NON-HOSTILE ENVIRONMENT. Procedures with headings followed by a (**B**) require group commander/COMAFSOF/COMAFOR approval. Procedures having an (**A**) before a step require aircraft commander approval in a NON-HOSTILE ENVIRONMENT for that step of the procedure. Procedures having a (**B**) before a step require group commander/COMAFSOF/COMAFOR approval for that step of the procedure. **Note:** If a combat or contingency situation makes prior coordination impractical or impossible, complete the necessary procedures and notify the approval authority at the earliest opportunity.

1.2. Hostile Environment Repair Tool Kit. Safe and efficient accomplishment of the hostile environment repair procedures will require the tool kit in **Table 1.1**. Store this kit in a secure place aboard each aircraft. Kits will be sealed with either a boxcar seal or wire strap to ensure security and resistance to unauthorized use/tampering. Local unit procedures will be established for security, inventory, resealing, and maintenance of these kits. Some National Stock Number (NSNs) have been provided; however, local purchase substitutions for tools are authorized. (T-2)

Table 1.1. Repair Tool Kit. (T-2).

NOMENCLATURE	STOCK NUMBER	Mission Design & Series (MDS)	
		C-130	C-130 J
Direct Current (DC) Extension Plug		X	
Two 4” Lengths 7/16” Bar Brass	9530-00-528-7489	X	
One 2" Length 5/16" Bar Brass	9525-00-249-7443	X	
Alternate (ALT)	9525-00-881-0438	X	
Two 4” Lengths Bar Brass		X	
One No. 4 Gauge Jumper Wire with Terminals		X	
Wire-18”	6145-00-553-0836	X	
Terminals 3/8” AN-4 (2 each)	5940-00-557-4338	X	
One No. 10 Gauge Jumper Wire with Alligator Clamps		X	
Wire – 16”	6145-00-553-0387	X	
Alligator Clamps 2 each (Must be insulated)	5999-00-230-1212	X	
Two No. 16 Gauge Jumper Wire with Pins		X	
Wire - 7”	6145-00-553-0829	X	
Pins (4 each)	5999-00-068-2590	X	

NOMENCLATURE	STOCK NUMBER	Mission Design & Series (MDS)	
Ignition Relay Cannon Plug	5935-00-013-9655	X	
ALT	5935-00-504-4323	X	
Speed Switch Connection Plug	5935-00-683-5439	X	
ALT	5935-00-644-7678	X	
Brake Shuttle Valve Plug (No. 6 MS) (2 Each)	4730-00-203-3709	X	X
Brake Shuttle Valve Cap (No. 6 MS) (2 Each)	4730-00-618-3572	X	X
Brake Line Plug (No. 8 MS) (2 Each)	4730-00-202-8860	X	X
Brake Line Cap (No. 8 MS) (2 Each)	4730-00-289-8634	X	X
Manifold Drip Valve Cap (No. 4 AN) (1 Each)		X	
Wood Plugs (6 Each)	5510-255-9-92US	X	X
.032 Safety Wire (1 Roll)	9505-00-640-4290	X	X
Electrical Tape	5970-00-419-4291	X	X
Geneva Lock Wrench	5120-00-715-8467	X	
Starter Wrench	5120-00-684-3605	X	
Channel Lock Pliers (10”)	5120-00-278-0352	X	X
Vice Grip Pliers (8 1/2”) 2 required	5120-00-494-1911	X	X
Allen Wrench Set (11 Each and Pouch)	5120-00-595-9244	X	X
Mechanics Pouch	5140-00-329-4306	X	X
Small Blade Common Screwdriver (NO SUBS)	5120-00-287-2504	X	X
Apex Holder	5120-00-528-2892	X	X
Bit No. 2 (Long)	5130-00-690-7259	X	X
Ballpeen Hammer		X	X
6” Metal Ruler		X	
3/4” Cold Chisel		X	
6” Needle Nose Pliers		X	X
6” Vice Grips		X	X
9/16” x 5/8 Open End Wrench		X	X
1/2” x 7/16 Open End Wrench		X	X
3/8” Combination Wrench	5120-00-228-9504	X	X

NOMENCLATURE	STOCK NUMBER	Mission Design & Series (MDS)	
5/16” Combination Wrench	5120-00-228-9503	X	X
1/4” Box End Wrench		X	X
3/8” Drive Extension (6”)		X	X
3/8” Drive Extension (3”)		X	X
3/8” Drive Ratchet		X	X
1/2” Deep Socket		X	X
7/16” Deep Socket		X	X
9/16 Deep Socket		X	X
Sider Cutter	5110-00-239-8253	X	X
Large Fuse Pullers	5120-00-224-9456	X	X
Small Fuse Pullers	5120-00-688-9868	X	X
8” Common Screwdriver	5120-00-237-6985	X	X
6” Philips Screwdriver	5120-00-234-8913	X	X
8” Crescent Wrench	5120-00-240-5328	X	X
ADDITIONAL ITEMS FOR AIRCRAFT WITH Auxiliary Power Unit (APU)	**STOCK NUMBER**		
15° Dummy Actuator Rod		X	X
Bearing End APU Actuator Rod (1 Each)	3120-00-107-1678	X	X
Nut, APU Actuator Rod End (1 Each)	5310-00-881-0944	X	X

1.3. Roles and Responsibilities. Refer to **Paragraph 1.1**

CHAPTER 2

AFSOC C-130 PROCEDURES

2.1. Jumping Battery - Aircraft to Aircraft (A): (T-3) Note: This procedure is not required on aircraft equipped with a Self-Contained Navigational System (SCNS). Swap aircraft battery with SCNS battery.

2.1.1. Position aircraft nose to nose to allow two DC winch power cable(s) to reach.

2.1.2. Join both aircraft DC winch power cables together using brass extender plugs.

2.1.3. Place one end of the cable into the DC winch receptacle on the operating aircraft. Connect the other end to the external DC power receptacle of the disabled aircraft. ***CAUTION:*** Reduce DC load on disabled aircraft.

2.1.4. DC power switch to "External DC" position on disabled aircraft. ***WARNING:*** There will be no aircraft fire protection available when the DC power switch is placed to "External DC".

2.1.5. Start APU on disabled aircraft.

2.1.6. DELETED.

2.1.7. APU generator switch – ON. **Note:** It is recommended to start at least one engine and have its generator on line before disconnecting power cables.

2.1.8. Jump battery relay using failed battery relay procedures.

2.2. Battery Damaged/Dead (B): (T-2)

2.2.1. If battery is damaged, disconnect and remove battery from aircraft. ***CAUTION:*** Reduce DC load on aircraft. **Note:** On aircraft equipped with a standard 24-volt aircraft battery to power special aircraft equipment or mission equipment i.e., Inertial Navigation System (INS), use this battery for engine start. If another aircraft is available, temporarily place the operable battery of the other aircraft in the disabled aircraft until at least one engine is operating.

2.2.2. Obtain two 12V or one 24V battery and jumper cables, if available, or suitable heavy-duty cable (DC cargo winch cable may be used).

2.2.3. **Option 1:** Install brass extender plugs to battery connector (see **Attachment 2**). (It may be necessary to file plugs down to a smaller diameter.)

2.2.3.1. **Option 2:** Install brass extender plugs into one end of the DC winch cable and plug the other end of the DC winch cable into the external DC receptacle (see **Attachment 2**). ***WARNING:*** There will be no aircraft fire protection available if **Option 2** is used.

2.2.4. Connect jumper cables to brass extender plugs and battery(s).

2.2.5. DC Power Switch - "Battery" for **option 1**; "Ext DC" for **option 2**. **Note:** With DC power switch placed in “Ext DC” position (**option 2**) check the DC ready light is ON. If no ready light, check connections and battery polarity.

2.2.6. Start the APU.

2.2.7. DELETED.

2.2.8. APU and generator switch - ON.

2.2.9. Jump battery relay using failed battery relay procedures, if **Option 2** was used. **Note:** If this procedure fails and another aircraft is available, remove the battery from the good aircraft and install in the aircraft with the dead battery. **Note:** Start an engine to ensure that electrical power is constantly available. If it is not possible to start an engine at this time, placing the APU generator to ON keeps the APU operating with the battery removed. Any interruption of DC power will cause the APU to stop.

2.2.10. After engine/APU generators are ON, turn the battery switch to OFF and remove the battery.

2.2.11. Reinstall the low/dead battery, place the DC power switch to the BATTERY position and jump the battery relay.

2.3. Failed Battery Relay (A): (T-3)

2.3.1. DC Power Switch - "Battery".

2.3.2. Open pilot's side circuit breaker panel.

2.3.3. Jump battery relay by momentarily touching battery relay terminals A-1 and A-2 (see **Attachment 3**) using a No. 4 gauge wire from kit.

2.3.4. Check battery voltmeter to verify closing of relay (should read minimum 24 volts).

2.3.5. **(B)** If battery relay fails to close, disconnect the battery and permanently install the No. 4 gauge wire between relay terminals.

2.3.6. Reconnect battery and verify power to the isolated DC bus. ***CAUTION:*** When flying with a dead or bad battery, ensure DC power switch remains in the BATTERY position.

2.4. Failed Reverse Current Relay (RCR) Between Isolated And Essential DC Buses (A): (T-3)

2.4.1. Disconnect battery.

2.4.2. Open pilot's side circuit breaker panel.

2.4.3. Install the No. 10 gauge jumper wire with clamps from kit between the SW post and the APP post (see **Attachment 3**). **Note:** ISO DC ON BATT light should illuminate due to the isolated DC bus off indicator relay not being powered.

2.4.4. Reconnect battery.

2.4.5. **(B)** If the RCR fails to energize, disconnect battery and permanently install the No. 4 gauge wire from kit between the BATT and GEN terminals (see **Attachment 3**).

2.4.6. Reconnect battery. ***WARNING:*** The Essential DC bus cannot be isolated using bus isolation procedures in the flight manual. The Essential DC bus may be isolated by breaking the 3 current limiters below the RCR (see **Attachment 3**). **Note:** When the No. 4 jumper wire is used on the RCR, the ISO DC ON BATT light will remain ON, even though the Essential DC Bus is powering the Isolated Bus.

2.5. APU Fails To Rotate (No Start Light, or Momentary Flicker): (T-3)

2.5.1. Check the following:

2.5.1.1. APU control circuit breaker.

2.5.1.2. APU fire control handle.

2.5.1.3. Isolated bus powered.

2.5.1.4. Check APU door to ensure fully open.

2.5.1.5. Auto start relay (ASR) on the APU (upper relay) may be inoperative. Swap the ASR relay and the fuel holding relay (FHR, lower relay) (see **Attachment 4**).

2.5.2. Attempt another start. ***CAUTION:*** Anytime the APU door actuator is inoperative, and an alternate method is used to operate the APU, the door will not close when the fire handle is pulled. This may affect firefighting and containment.

2.6. APU Door Actuator Fails (A): (T-3)

2.6.1. Remove power from aircraft.

2.6.2. Pull the APU CONTROL circuit breaker on the pilot's side panel.

2.6.3. Remove the APU compartment access panel and unsnap the APU heat shield blanket in the upper compartment.

2.6.4. Remove the actuator cannon plug and install on the APU (failed actuator) start receptacle. **Note:** If the APU actuator has failed in a position that leaves the APU door opened more than approximately two inches, use of the APU dummy actuator rod is required. If the door is opened more than approximately two inches, the end of the door will make contact with the fuselage when the actuator is moved to the forward mount position.

2.6.5. **Option 1:**

2.6.5.1. Remove cotter pins, nuts, and washers from bolts, remove bolts from both the air intake door and the hinge fitting (see **Attachment 6**).

2.6.5.2. Remove or cut the ground wire from the door actuator motor to the fuselage.

2.6.5.3. Remove the inoperative door actuator.

2.6.5.4. Install the dummy actuator rod. If not preset, adjust rod as necessary to ensure door is opened 15° (4.5").

2.6.5.5. Reinstall the heat shield blanket and secure the APU access panel.

2.6.5.6. Apply aircraft power and reset APU CONTROL circuit breaker.

2.6.5.7. Start APU, start one aircraft engine, remove bleed air load on APU after the first engine has been started. ***CAUTION:*** If the APU door is opened to 15° instead of the normal ground position of 35°, delay operating the APU until immediately prior to engine start, and then only run long enough to start one engine. In-flight operation is not restricted. Upon landing, delay APU start until just prior to shut down. Limit the amount of time the APU is operated to a minimum.

2.6.6. **Option 2 (GROUND OPERATION ONLY):** ***CAUTION:*** If this procedure is used, APU emergency electrical power will not be available in-flight. When possible, the preferred procedure is use of the dummy actuator rod.

2.6.6.1. Remove the actuator mount bolt from the fuselage and reposition the actuator to the INOP position (forward mount hole) (See above note, **Paragraph 2.6.4**).

2.6.6.2. Apply aircraft power and reset APU CONTROL Circuit Breaker.

2.6.6.3. Start the APU.

2.6.6.4. Start one aircraft engine, then close the bleed air regulator and deplete manifold pressure.

2.6.6.5. Shutdown APU.

2.6.6.6. Reposition the actuator and mount bolt to close APU door.

2.6.6.7. Reinstall the heat shield blanket and secure the panel.

2.7. APU Fails To Rotate (Start Light On) (A): (T-3)

2.7.1. Remove all electrical power.

2.7.2. Open pilot's side circuit breaker panel.

2.7.3. Check APU current limiter, if bad or suspect, replace as follows:

2.7.3.1. Disconnect battery.

2.7.3.2. Remove and replace current limiter with spare (275 amp max, 200 amp min).

2.7.3.3. If no spare is available, open the copilot's upper circuit breaker panel, remove the cargo winch current limiter, and use as a replacement for the APU.

2.7.3.4. If current limiter is good, check the APU starter for broken wires, repair as necessary.

2.7.4. Connect battery and attempt another start. If no rotation occurs, tap starter relay and attempt another start.

2.8. APU Rotates - No Start - No Ignition Noise (A): (T-3)

2.8.1. Fuel holding relay (FHR) on the APU (lower relay) may be inoperative. Swap relay with auto start relay (ASR) (upper relay) to check operations (see **Attachment 4**).

2.8.2. Start APU. If the APU will not start go to **Paragraph 2.9.3**.

2.8.3. To ensure the motor operated fuel shutoff valve in the No. 2 dry bay is opening, open the fuel strainer drain valve flip down panel (underneath the APU, on the bottom of the aircraft). If available, use a drain bucket. Push in the poppet valve while placing the APU START switch to START. A heavy flow of fuel from the fuel strainer drain valve indicates the motor operated shutoff valve is opening.

2.8.4. If no fuel is present, go to **Paragraph 2.9.5**.

2.8.5. Remove the No. 2 dry bay access panel.

2.8.6. Locate the APU fuel shutoff valve in the aft left corner of the dry bay. (The valve should have an identification tag.)

2.8.7. Remove and secure the APU fuel shutoff valve cannon plug.

2.8.8. Manually open the shutoff valve by repositioning the manual lever to the open position.

2.8.9. Reinstall the dry bay access panel.

2.8.10. Start the APU.

2.8.11. If the APU does not start, the igniter, exciter, or ignition harness may be faulty. **Note:** Another fuel system troubleshooting technique is to verify fuel pressure just prior to the fuel atomizer.

2.8.12. Pull the APU CONTROL circuit breaker on the pilot's side panel.

2.8.13. Remove the APU compartment access panel.

2.8.14. Disconnect the fuel supply line at the output side of the fuel solenoid shutoff valve. Pull the line away from the fitting to allow the fuel to drain straight down. Use a drain bucket if available.

2.8.15. Reset the APU CONTROL circuit breaker.

2.8.16. Attempt APU start.

2.8.17. A steady stream of fuel coming from the open line indicates proper operation of the solenoid operated shutoff valve, and fuel cluster components.

2.8.18. Reconnect the fuel supply line and secure the APU access panel. **Note:** Although this particular method will not alleviate the possibility of fuel nozzle or atomizer problems that are preventing operation of the APU, it will determine if fuel pressure is reaching the combustion chamber.

2.9. APU Rotates - No Start With Ignition Noise (A): (T-3)

2.9.1. Manually open the APU motor operated fuel shutoff valve (Aft, left side No. 2 dry bay) (see **Attachment 5**).

2.9.2. Pull APU control circuit breaker.

2.9.3. Ensure the APU control switch is in the OFF position.

2.9.4. Remove the No. 2 dry bay access panel.

2.9.5. Remove and secure the APU fuel shutoff valve cannon plug.

2.9.6. Manually open the APU fuel shutoff valve.

2.9.7. Reinstall No. 2 dry by access panel.

2.9.8. Start the APU.

2.9.9. If APU still fails to start, swap the APU fuel control solenoid with the over speed test solenoid located on the air shroud, on the backside of APU (see **Attachment 7**) *(Not Applicable all Aircraft).*

2.10. Starting APU with Failed Oil Pressure Switch (B): (T-2) Note: A failed oil pressure switch can be detected during the start cycle when no ignition is heard or when fuel is present at the fuel regulator drain, and no fuel is present at the fuel nozzle.

2.10.1. Remove the line to the oil pressure switch. Momentarily crank the APU (oil should spurt).

2.10.2. Remove the oil pressure switch cannon plug, place the No. 16 gauge jumper wires from kit, from pin A to pin B (ignition) and from pin C to pin E (fuel). Secure with tape.

2.10.3. Start APU.

2.10.4. If APU does not start, the igniter, exciter, or ignition harness may be faulty. ***CAUTION:*** The APU will not shutdown if oil pressure is lost when the oil pressure switch is jumped. Damage may occur.

2.11. Moving Aircraft with a Flat Main Tire (B): (T-2) ***WARNING:*** This procedure should be used only as a last resort to move an aircraft from a hostile environment. Reduce aircraft weight as much as possible by unloading cargo, defueling or burning off fuel. To assist with this procedure, fuel may be transferred from the wing on the side of the flat tire to the opposite wing. Verify wing tip and propeller clearance.

2.11.1. Install the main gear towing/jacking fitting on strut with flat tire (see **Attachment 11**).

2.11.2. Install a 10,000 lb chain around top of strut above upper track shoes.

2.11.3. Connect a 10,000 lb tie-down device to towing device; connect chain and tighten.

2.11.4. Open strut Schrader valve and bleed all air out of strut slowly. ***WARNING:*** Do not open Schrader valve more than 3/4 of a turn. Do not allow lower nut to loosen. Allowing the lower nut to loosen could cause a blowout of the Schrader valve.

2.11.5. After air is depleted, compress strut by using J bar, strap, chocks, milk stool, or any other available means. Aircraft may be taxied up onto shoring to elevate the tire.

2.11.6. Tighten tie-down device to completely compress strut.

2.11.7. Remove tire (if required/possible).

2.11.8. Fly with the gear down and landing gear control circuit breaker pulled.

2.12. Failed Engine Driven Hydraulic Pump (A): (T-3)

2.12.1. With DC power on aircraft, pull the Emergency Feather and Feather & Air Start circuit breakers on the Essential DC bus.

2.12.2. Pull fire handle for the affected engine (this closes the hydraulic shutoff valve).

2.12.3. Pull firewall hydraulic shutoff circuit breaker on Essential DC bus.

2.12.4. Reset fire handle.

2.12.5. Reset the Emergency Feather and Feather & Air Start circuit breakers on the Essential DC bus.

2.12.6. Open upper right-side engine cowling.

2.12.7. Using a 7/16” wrench and channel lock pliers remove pump and install pad. (Use starter pad. If starter pad is not available, remove hydraulic pump shaft and reinstall pump.)

2.12.8. Secure hydraulic lines and cowling. **Note:** It may be advisable to swap hydraulic pumps from the booster side (engines 3 and 4) to the utility side (engines 1 and 2) to ensure utility system operations.

2.13. Failed Fuel Valves (A): (T-3)

2.13.1. Remove cannon plug and manually open or close failed valve(s). ***CAUTION:*** On some aircraft, dump mast shutoff valves (X-valves) must be manually closed to refuel and reopened before flight.

2.14. Failed Speed Sensitive Switch (A): (T-3)

2.14.1. Pull the ignition control circuit breaker on the Essential DC bus.

2.14.2. Open the left side lower engine cowling.

2.14.3. Using vice grips/channel locks, remove the speed sensitive control cannon plug (use caution not to loosen back shell of cannon plug).

2.14.4. Install the prewired cannon plug from the kit and secure (see **Attachment 12**).

2.14.5. If plug is not available, jump pins A, C, E, F, and H together with safety wire. Secure cowling.

2.14.6. Do not reset the ignition control circuit breaker at this time.

2.14.7. At 16% Revolutions Per Minute (RPM) - reset the ignition control circuit breaker. **Note:** The secondary fuel pump pressure light will be illuminated and the pumps will be in parallel until the ignition control circuit breaker is pulled. Using this procedure, anytime the ignition control circuit breaker is reset, the igniters are operating. Therefore, limit the amount of time the circuit breaker is reset.

2.14.8. Once engine is on-speed, pull the ignition control circuit breaker. **Note:** Any time the ignition control circuit breaker is pulled on an inboard engine, the ice detection system is inoperative.

2.14.9. After landing, shutdown the engine as follows: **Note:** When using this procedure, it is not recommended to wait the 2 minutes in low-speed ground idle prior to engine shutdown.

2.14.9.1. Ignition control circuit breaker - RESET.

2.14.9.2. Condition lever - GROUND STOP.

2.14.9.3. When fuel flow drops to zero and RPM decreases, pull the ignition control circuit breaker.

2.15. Failed Speed Sensitive Valve (A): (T-3)

2.15.1. Open the left side lower engine cowling.

2.15.2. Using an 11/16" wrench, disconnect the air supply line (the line with the filter) to the speed sensitive valve at the valve and plug by using a No. 6 plug and 5/8" wrench (see **Attachment 10**).

2.15.3. Find the torque meter shroud anti-icing line (see **Attachment 8**). Follow it aft to the balance line elbow. Using channel lock pliers disconnect torque meter anti icing line at elbow.

2.15.4. Disconnect the line from the top side of the speed sensitive valve and connect it to the balance line elbow where the torque meter shroud anti-icing line was connected.

2.15.5. Close the engine cowling. **Note:** Start another engine first to provide bleed air.

2.15.6. Select the engine inlet duct anti-icing switch, for the affected engine to ON.

2.15.7. Start affected engine.

2.15.8. Select the Prop and Engine Anti-Icing Master switch to MANUAL. When engine RPM reaches 94% RPM; the acceleration bleed valves should close. **Note:** There will be continuous anti-icing on the engine. This will reduce the torque on the affected engine. It is recommended to operate the affected engine with bleed closed. ***WARNING:*** When the Prop and Engine Anti-Icing Master Switch is in MANUAL, the engine anti-icing/de-ice systems will be actuated if their respective switches are turned to ON. These switches normally are turned on during the BEFORE TAKEOFF CHECKLIST. Switches for the other engines should NOT be turned to ON unless absolutely necessary. The propeller system should be left off. The engines will experience decreased torque to operate the anti-ice system. The prop anti-ice/de-ice system will be immediately actuated and cause overheating of the blade/spinner anti-ice/de-ice systems if the aircraft stays on the ground for longer than the two cycle limit. ***WARNING:*** Do not place the affected engine to Low-Speed Ground Idle during ground operations. To do so may cause the engine to stall or overtemp. ***CAUTION:*** Torque meter shroud anti-icing will not be operational and icing conditions should be avoided when using this procedure.

2.15.9. Engine shutdown – From ground idle - GROUND STOP.

2.16. Failed Fuel Shutoff Valve (Geneva Lock) (A): (T-3) Note: Prior to attempting maintenance, remove power from the aircraft and cycle condition lever back and forth from Run to Ground Stop. This action may free fuel shutoff valve.

2.16.1. Open the lower left side engine cowling.

2.16.2. Using a 5/32" Allen wrench and Geneva lock wrench, remove the defective fuel control shutoff actuator (Geneva lock) from the fuel control (3 bolts) (see **Attachment 8**). **Note:** Experience has shown that it is very difficult to gain access to the back bolt. Depending upon the situation, shearing the bolt head off with a screwdriver prior to removal of the other two bolts may be advisable. If shearing off the bolt head is accomplished, take care not to lose the bolt head.

2.16.3. Using a small screwdriver, insert it into the spline end of the fuel control and rotate in a counterclockwise direction until fuel control opens. There will be no fuel leakage from where the actuator was removed.

2.16.4. Disconnect and secure the cannon plug.

2.16.5. Close the engine cowling. **Note:** Tailpipe torching may be observed at light-off and higher than normal turbine inlet temperature (TIT) can be expected. More than the normal amount of fuel may be observed coming from the drain mast until the 16% switch is actuated.

2.16.6. For engine shutdown, place the condition lever to FEATHER.

2.17. Bad Engine Fuel Drip Valve (A): (T-3)

2.17.1. Use enrichment on the next start. The sudden surge of fuel pressure should close the drip valve. Tailpipe torching may be observed at light-off.

2.17.2. If the drip valve still does not close, remove line aft of the bulkhead (see **Attachment 9**) using a wrench and install a No. 4 AN plug provided in the HERP kit.

2.18. Prop Fails To Rotate (No Light In Switch) (A): (T-3)

2.18.1. If the starter switch is actuated and the propeller fails to rotate, use normal trouble-shooting procedures. The possibility exists for a lack of electrical power to the starter switch. All starter switches share a common power source. Select a starter switch for an engine that is not operating (do not open the engine bleed air valve), and push both starter switches simultaneously. If this was the problem, the engine will rotate and start normally. Both switches must be held in until 60% RPM.

2.19. Severe Fuel Leaks (B): (T-2)

2.19.1. Fuel leaks from bullet holes can be plugged by screwing or driving wooden plugs into the holes. Cut or break off plugs flush with the wing surface.

2.20. Failed Radome Anti-Icing Valve (Stuck Open) (A): (T-3)

2.20.1. Recognized by a rapid drop in bleed air pressure, a slight vibration in the flight deck floor and/or the sound of rushing air during the bleed air check. To verify the bleed air valve is stuck, enter the nose wheel well and listen for rushing air coming from the right upper side of the wheel well (see **Attachment 10**).

2.20.2. Ensure the Radome Anti-Icing Switch is OFF.

2.20.3. Deplete bleed air pressure from manifold.

2.20.4. Tap the shutoff valve with a mallet (see **Attachment 12**).

2.20.5. Perform a bleed air check.

2.20.6. If the anti-icing valve is still stuck open, deplete bleed air pressure. Enter nose wheel area and locate the filter in the bleed air manifold prior to the valve in the right forward area of the wheel well (see **Attachment 9**). Disconnect the line from the filter. Follow the line down to a T fitting located between the filter and the regulator. At the bottom of the T fitting is a cap used to drain moisture from the bleed air manifold. Remove cap and reinstall the cap below the filter. Capping this line will prevent air from going to and through the regulator to the diaphragm in the valve (this prevents the valve from opening).

2.20.7. Perform a bleed air check.

2.21. Failed Ignition Relay (A): (T-3)

2.21.1. Pull the Ignition Control circuit breaker.

2.21.2. Open the lower left-hand engine cowling and locate the ignition relay. Using vice grips or channel lock pliers, disconnect the cannon plug and install the prewired cannon plug from the kit and secure (if plug is not available, jump pins C, D, and E together using safety wire) (see **Attachment 12**).

2.21.3. Close cowling.

2.21.4. Do not reset the Ignition Control circuit breaker at this time.

2.21.5. Start engine using the following procedures:

2.21.5.1. At 16%, reset the Ignition Control circuit breaker. At 65%, pull the Ignition Control circuit breaker. **Note:** Any time the Ignition Control circuit breaker is pulled on an inboard engine, the ice detection system for that engine is inoperative.

2.21.6. Complete these steps before engine shutdown: **Note:** When using this procedure, it is not recommended to wait the 2 minutes in Low-Speed Ground Idle prior to engine shutdown.

2.21.6.1. Circuit breaker - Reset.

2.21.6.2. Condition lever - Ground Stop.

2.21.6.3. When fuel flow drops to zero and RPM decreases, pull the Ignition Control circuit breaker.

2.22. Ferry Flight with Inboard Main Tanks Empty (B): (T-2)

2.22.1. When using the following fuel management procedures, the maximum maneuver load factor is 2.5G, maximum airspeed is 225 knots, and no external stores loaded. Use these procedures only to move an aircraft to a destination with repair capability. These procedures require Commander Air Force Special Operations Command (COMAFSOC)/COMAFSOF/COMAFFOR approval). **Note:** External stores are classified as the pylons outboard of the number 1 and number 4 engines along with any equipment attached to those pylons. (i.e., air refueling pods).

2.22.2. Use the following fuel management procedures with external tanks installed and empty or without external tanks installed:

2.22.2.1. Outboard and auxiliary tanks may be filled to capacity. If not filled to capacity, fill outboard tanks to at least 1,000 pounds per side more than auxiliary tanks.

2.22.2.2. Takeoff operating engines 1 and 4 on direct cross-feed from the outboard main tanks. Operate engines 2 and 3 on cross-feed from the auxiliary tanks with the cross-feed separation valve OPEN. ***WARNING:*** Do not place the auxiliary or external tanks dump pump switches to the dump position while those tanks are supplying fuel to the engines.

2.22.2.3. As soon as practical after takeoff, close the cross-feed separation valve.

2.22.2.4. When the auxiliary tank fuel is 1,000 pounds per side, open the outboard tank cross-feed valves and place all engines on cross-feed.

2.22.2.5. When the auxiliary tanks are empty, close auxiliary tank cross-feed valves and turn off the auxiliary tank pumps.

2.22.2.6. For landing, flight manual limits on touchdown rate of sink and outboard tank fuel are applicable.

2.22.2.7. Upon completion of landing, leave the main tank cross-feed valves open and maintain at least two engines in normal ground idle until the aircraft is parked.

2.22.3. Alternate fuel management, with fuel in the external tanks:

2.22.3.1. Fill the outboard main and auxiliary tanks to maximum capacity, then put fuel in the external tanks as needed for mission requirements.

2.22.3.2. For takeoff, operate engines 1 and 4 on direct feed from the outboard main tanks. Operate engines 2 and 3 on cross-feed from the auxiliary tanks with the cross-feed separation valve OPEN. ***WARNING:*** Do not place the auxiliary or external tank dump pump switches to the dump position while those tanks are supplying fuel to the engines.

2.22.3.3. As soon as practical after takeoff, close the cross-feed separation valve and place all engines on cross-feed from the auxiliary tanks.

2.22.3.4. When auxiliary tank fuel is reduced to between 4,000 to 4,500 pounds per side, stop cross-feed from the auxiliary tanks and place all engines on cross-feed from the external tanks. ***CAUTION:*** Do not reduce internal fuel (main and auxiliary) to less than 25,000 pounds if external tank fuel exceeds 4,700 pounds per side.

2.22.3.5. When the external tanks are empty, place engines 2 and 3 on cross-feed from the auxiliary tanks and engines 1 and 4 on direct feed from the outboard main tanks. Close external tank cross-feed valves and turn off external tank pumps.

2.22.3.6. When the auxiliary tank fuel is 1,000 pounds per side, open the outboard tank cross-feed valves to place all engines on cross-feed.

2.22.3.7. When the auxiliary tanks are empty, close the auxiliary tank cross-feed valves and turn off auxiliary tank pumps.

2.22.3.8. For landing, flight manual limits on touchdown rate of sink and outboard tank fuel are applicable.

2.22.3.9. Upon completion of landing, leave the main tank cross-feed valves open and maintain at least two engines in normal ground idle until the aircraft is parked.

2.23. C-130 Operations With Suspected Fuel Tank Foam Fire (B): (T-2) Note: These procedures are for when it is essential to operate the aircraft, and inspections by appropriate maintenance personnel are not practical or possible.

2.23.1. Warner Robins Air Logistics Center engineers have determined if a fuel tank flash fire is suspected, and the tank is not leaking, then no structural damage has occurred. If the fuel quantity system is operational, the fire was of low order, and if the vent is open, another fire will not result in damage.

2.23.2. Normally, maintenance personnel will determine whether immediate tank entry is warranted or if the aircraft can continue to operate until the fuel tank is entered for normal/routine fuel tank maintenance.

2.23.3. During operations at bare base locations where maintenance is not available, the flight engineer will make the following inspections prior to the aircraft commander making a determination for continued operation.

2.23.4. Inspect the outside of the affected tank for structural damage.

2.23.5. Inspect the affected fuel tank for leaks. Fuel leaks could indicate possible structural damage.

2.23.6. Ensure the fuel quantity indicator system for the affected tank is operational.

2.23.7. Ensure the vent screen for the affected tank is clean and the vent system is open by transferring fuel into the affected tank and ensuring air flows through the tank.

2.23.8. Inform proper waiver authority and maintenance quality assurance as soon as details are known and a course of action is determined. Inspections by maintenance personnel will be performed at the first opportunity. Reports will require the following information:

2.23.8.1. Type of foam installed (Gray, Blue, Yellow, or Black).

2.23.8.2. Which tank(s) involved.

2.23.8.3. Fuel quantity of the tank when fire occurred (If known).

2.23.8.4. Type of fuel in aircraft fuel tank (e.g., JP-4, JP-5, JP-8, kerosene, commercial jet fuel, etc.).

2.23.8.5. If refueling, type of fuel being transferred and refueling pressure.

2.23.8.6. Components damaged and extent of the damage.

2.23.8.7. How was the fire detected (i.e., observed soot/smoke, fuel quantity anomaly, venting fuel, wingman observed flash from vent mast, etc.).

2.23.8.8. If fire occurred in-flight:

2.23.8.8.1. Mission profile.

2.23.8.8.2. Flight activity at time fire occurred (if known).

2.23.8.8.3. Mission duration.

2.23.8.8.4. If fire occurred on the ground:

2.23.8.8.4.1. Type of activity (preflight, refueling, taxi, etc.).

2.23.8.8.4.2. Type of power applied to aircraft (external, APU/ATM, engine(s), etc.).

2.24. Propeller Servicing Procedures (B): (T-2) Note: These procedures are for when it is essential to operate the aircraft, and inspections by appropriate maintenance personnel are not practical or possible. **Note:** For best results, check servicing within 30 minutes after engine operation. **Note:** The propeller being checked must be in the GROUND IDLE position. **Note:** This procedure will require annotation in the AFTO Form 781A, *Maintenance Discrepancy and Work Document*. ***CAUTION***: Wait 2 minutes after engine shutdown for pressure to dissipate within the pressurized sump.

2.24.1. Open the affected propeller access panel to gain access to the pressurized sump filler cap see **Attachment 13**.

2.24.2. Open the pressurized sump filler cap by removing the safety wire and locking pin as seen in **Attachment 13**.

2.24.3. Using a six inch screwdriver, check the fluid level in the pressurized sump by inserting the screwdriver into the pressurized sump until it bottoms out on the flange inside the pressurized sump filler cap.

2.24.4. Remove the screwdriver from the pump housing and record the fluid level. Measurements are taken from the base of the screwdriver handle to the fluid level recorded on the screwdriver blade. Use the table in **Table 2.1** to determine pressurized sump servicing.

Table 2.1. Pressurized Sump Servicing.

Measurement	Fluid level

3/4 inch	Full
2 5/8 inch	1 quart. Low
4 3/4 inch	2 quart. Low

2.24.5. Close and secure the pressurized sump and filler cap with the locking pin and safety wire.

2.24.6. Remove and wipe atmospheric sump dipstick (see **Attachment 13**), insert and lock dipstick in dipstick tube, then remove dipstick again. Check fluid level, using the table in **Table 2.2**, measure the amount of fluid on the atmospheric dipstick from lower tip of dipstick to the fluid mark. **Note:** The fluid height measurements are intended to be approximate. If the measurement falls between two numbers in the following table, round up or down to the nearest number.

2.24.7. Add the fluid level on the atmospheric dipstick to the fluid level observed in the pressurized sump (see **Paragraph 2.24.4**). RESULT: For a properly serviced propeller there should be 1 quart (2 inches) of fluid in the atmospheric sump when the pressurized sump dipstick indicates full (6 quarts). The Pump Housing which includes both sumps holds a total of 7 quarts. Example: If the pressurized sump is 1 quart low (5 quarts) and the atmospheric sump is reading 2 quarts (3 3/4 inches) 5 + 2 = 7 quarts, then the control is properly serviced.

2.24.8. If fluid level is low, add fluid to control. Fill the control through the valve housing cover as follows:

2.24.8.1. Remove valve housing cover cap (see **Attachment 13**).

2.24.8.2. Service the required amount of hydraulic fluid that was determined from **Paragraph 2.24.6** to the control. Use MIL-H-87257 (preferred) or MIL-H-83282 (alternate) and pour the required amount of fluid into the control through the valve housing cover cap.

2.24.8.3. Ensure pressurized sump filler cap is secured with locking pin and safety wire.

2.24.8.4. Close and secure valve housing cover cap.

2.24.8.5. Install removed access panels.

Table 2.2. Atmospheric Sump Servicing.

Inches	Fluid
1/2	1/2 quart.
2	1 quart.
3	1 1/2 quart.
3 3/4	2 quart.
5	2 1/2 quart.
6 1/2	3 quart.
7 3/4	3 1/2 quart.

8 1/2	4 quart.

2.25. Continued Flight With Prop Low Oil Light After Servicing Has Been Checked (B): (T-2)

2.25.1. If it has been determined that a propeller is fully serviced and the prop low oil light for that engine remains illuminated due to an electrical failure in the indicating system (failed float switch), flight to a location with repair capabilities may be continued after receiving proper approval. The crew must closely monitor RPM, gearbox oil pressure, and conditions for the affected propeller as further malfunctions may be difficult to detect. En route stops are NOT authorized.

CHAPTER 3

AFSOC C-130J SERIES PROCEDURES

3.1. APU Door Actuator Fails (A): (T-3)

3.1.1. Accomplish the Before Leaving Aircraft Checklist.

3.1.2. Disconnect aircraft batteries.

3.1.3. Remove the APU compartment access panel and unsnap the APU heat shield blanket in the upper compartment.

3.1.4. Remove the actuator cannon plug and install on the APU (failed actuator) start receptacle. **Note:** If the APU actuator has failed in a position that leaves the APU door opened more than approximately two inches, use of the APU dummy actuator rod is required. If the door is opened more than approximately two inches, the end of the door will make contact with the fuselage when the actuator is moved to the forward mount position. To install the APU dummy rod, follow steps provided in **Paragraph 3.1.5**

3.1.5. **(A) :**

3.1.5.1. Remove cotter pins, nuts, and washers from bolts, remove bolts from both the air intake door and the hinge fitting.

3.1.5.2. Remove or cut the ground wire from the door actuator motor to the fuselage.

3.1.5.3. Remove the inoperative door actuator.

3.1.5.4. Install the dummy actuator rod. If not preset, adjust rod as necessary to ensure door is opened 15° (4.5”).

3.1.5.5. Reinstall the heat shield blanket and secure the APU access panel.

3.1.5.6. Reconnect Aircraft batteries.

3.1.5.7. Run Power Up checklist.

3.1.5.8. Start APU, start one aircraft engine, remove bleed air load on APU after the first engine has been started. ***CAUTION:*** If the APU door is opened to 15° instead of the normal ground position of 35°, delay operating the APU until immediately prior to engine start, and then only run long enough to start one engine. In-flight operation is not restricted. Upon landing, delay APU start until just prior to shut down. Limit the amount of time the APU is operated to a minimum.

3.2. Hydraulic-Leaking Brakes (A): (T-3)

3.2.1. Disconnect brake lines from both sides of the brake shuttle valve.

3.2.2. Use the No. 6 and the No. 8 plugs and caps to seal off brake lines and shuttle valve. (If caps are not available, substitute with a dime). **Note:** Performance data changes; recommend using Runway Condition Reading of 2 or lowest Runway Condition Reading available.

3.3. Moving Aircraft with a Flat Main Tire (B): (T-2) ***WARNING:*** This procedure should be used only as a last resort to move an aircraft from a hostile environment. Reduce aircraft weight

as much as possible by unloading cargo, defueling or burning off fuel. To assist with this procedure, fuel may be transferred from the wing on the side of the flat tire to the opposite wing. Verify wing tip and propeller clearance.

3.3.1. Install the main gear towing/jacking fitting on strut with flat tire.

3.3.2. Install a 10,000 lb chain around top of strut above upper track shoes.

3.3.3. Connect a 10,000 lb tie-down device to towing device; connect chain and tighten.

3.3.4. Open strut Schrader valve and bleed all air out of strut slowly. ***WARNING:*** Do not open Schrader valve more than 3/4 turn. Do not allow lower nut to loosen. Allowing the lower nut to loosen could cause a blowout of the Schrader valve.

3.3.5. After air is depleted, compress strut by using J bar, strap, chocks, milk stool, or any other available means. Aircraft may be taxied up onto shoring to elevate the tire.

3.3.6. Tighten tie-down device to completely compress strut.

3.3.7. Remove tire (if required/possible).

3.3.8. Fly with the gear down and landing gear control circuit breaker pulled.

3.4. Severe Fuel Leaks (B): (T-2)

3.4.1. Fuel leaks from bullet holes can be plugged by screwing or driving wooden plugs into the holes. Cut or break off plugs flush with the wing surface.

3.5. C-130 Operations with Suspected Fuel Tank Foam Fire (B): (T-2) Note: These procedures are for when it is essential to operate the aircraft, and inspections by appropriate maintenance personnel are not practical/possible.

3.5.1. Warner Robins Air Logistics Center engineers have determined if a fuel tank flash fire is suspected, and the tank is not leaking, then no structural damage has occurred. If the fuel quantity system is operational, the fire was of low order, and if the vent is open, another fire will not result in damage.

3.5.2. Normally, maintenance personnel will determine whether immediate tank entry is warranted or if the aircraft can continue to operate until the fuel tank is entered for normal/routine fuel tank maintenance.

3.5.3. During operations at bare base locations where maintenance is not available, the loadmaster will make the following inspections prior to the aircraft commander making a determination for continued operation.

3.5.4. Inspect the outside of the affected tank for structural damage.

3.5.5. Inspect the affected fuel tank for leaks. Fuel leaks could indicate possible structural damage.

3.5.6. Ensure the fuel quantity indicator system for the affected tank is operational.

3.5.7. Ensure the vent screen for the affected tank is clean and the vent system is open by transferring fuel into the affected tank and ensuring air flows through the tank.

3.5.8. Inform proper waiver authority and maintenance quality assurance as soon as details are known and a course of action is determined. Inspections by maintenance personnel will be performed at the first opportunity. Reports will require the following information:

3.5.8.1. Type of foam installed (Gray, Blue, Yellow, or Black).

3.5.8.2. Which tank(s) involved.

3.5.8.3. Fuel quantity of the tank when fire occurred (If known).

3.5.8.4. Type of fuel in aircraft fuel tank (e.g., JP-4, JP-5, JP-8, kerosene, commercial jet fuel, etc.).

3.5.8.5. If refueling, type of fuel being transferred and refueling pressure.

3.5.8.6. Components damaged and extent of the damage.

3.5.8.7. How was the fire detected (i.e., observed soot/smoke, fuel quantity anomaly, venting fuel, wingman observed flash from vent mast, etc.).

3.5.8.8. If fire occurred in-flight:

3.5.8.8.1. Mission profile.

3.5.8.8.2. Flight activity at time fire occurred (if known).

3.5.8.8.3. Mission duration.

3.5.8.8.4. If fire occurred on the ground:

3.5.8.8.4.1. Type activity (preflight, refueling, taxi, etc.).

3.5.8.8.4.2. Type of power applied to aircraft (external, APU/ATM, engine(s), etc.).

BRENDA P. CARTIER, Brig Gen, USAF
Director of Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 11-2, *Aircrew Operations,* 31 January 2019

AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure,* 21 September 2018

AFMAN 33-363, *Management of Records*, 1 March 2008

AFI 33-360, *Publications and Forms Management*, 1 December 2015

Prescribed Forms

None

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

AFTO Form 781, *Maintenance Discrepancy and Work Document*

Abbreviations andAcronyms

AFPD—Air Force Policy Document

AFRC—Air Force Reserve Command

ALT—Alternate

ANG—Air National Guard

APU—Auxiliary Power Unit

ASR—Auto Start Relay

COMAFSOC—Commander Air Force Special Operations Command

COMAFSOF—Commander Air Force Special Operations Forces

COMAFFOR—Commander Air Force Forces

DC—Direct Current

FHR—Fuel Holding Relay

HERP—Hostile Environment Repair Procedures

INS—Inertial Navigation System

MDS—Mission Design & Series

NSN—National Stock Number

OPR—Office of Primary Responsibility

RCR—Reverse Current Relay

RPM—Revolutions Per Minute

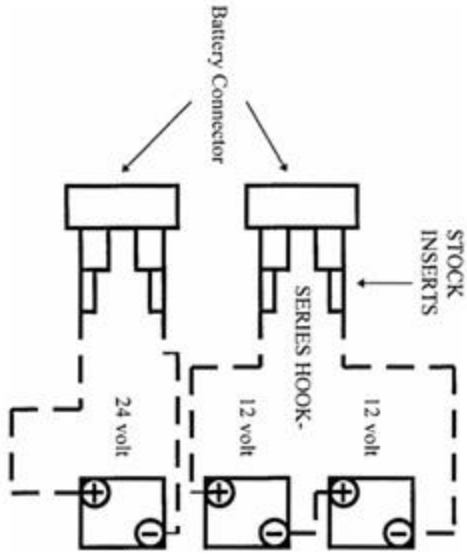
SCNS—Self Contained Navigation System

TIT—Turbine Inlet Temperature

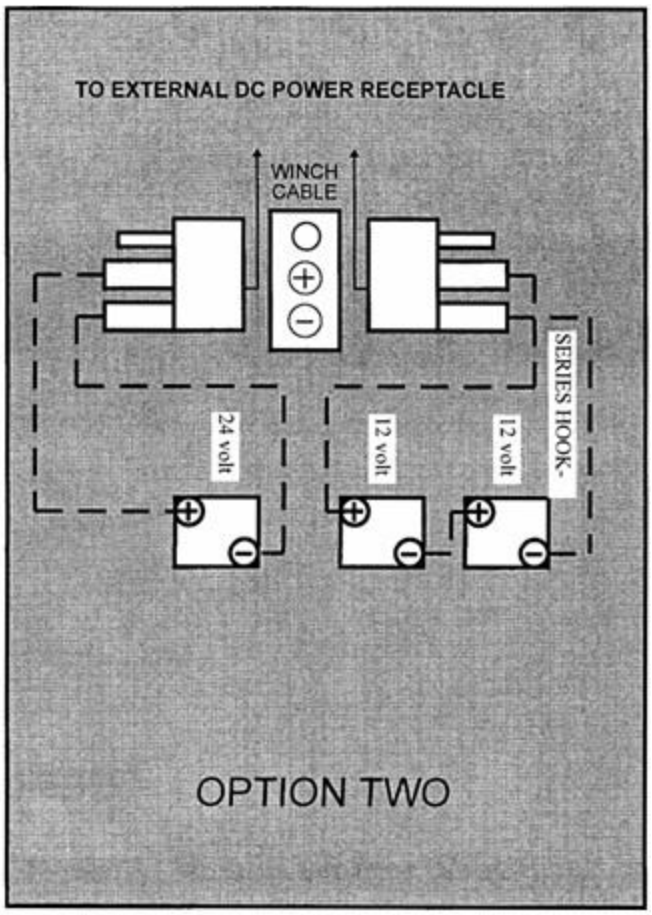
Attachment 2

BATTERY DAMAGED/DEAD BATTERY DAMAGED/DEAD

Figure A2.1. BATTERY DAMAGED/DEAD BATTERY DAMAGED/DEAD.



OPTION ONE

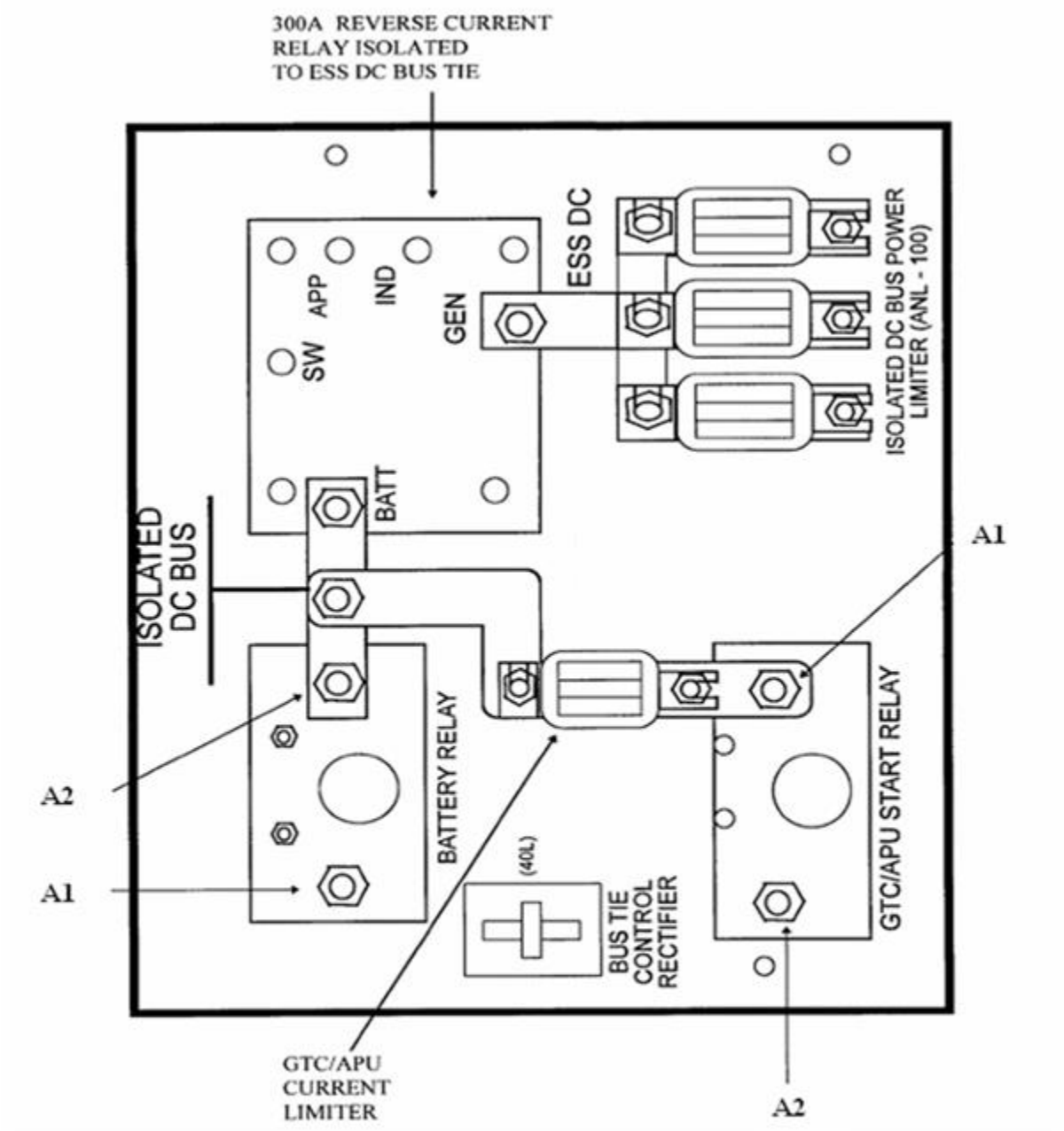


OPTION TWO

Attachment 3

COPILOT ISOLATED BUS CURRENT LIMITER REMOVED

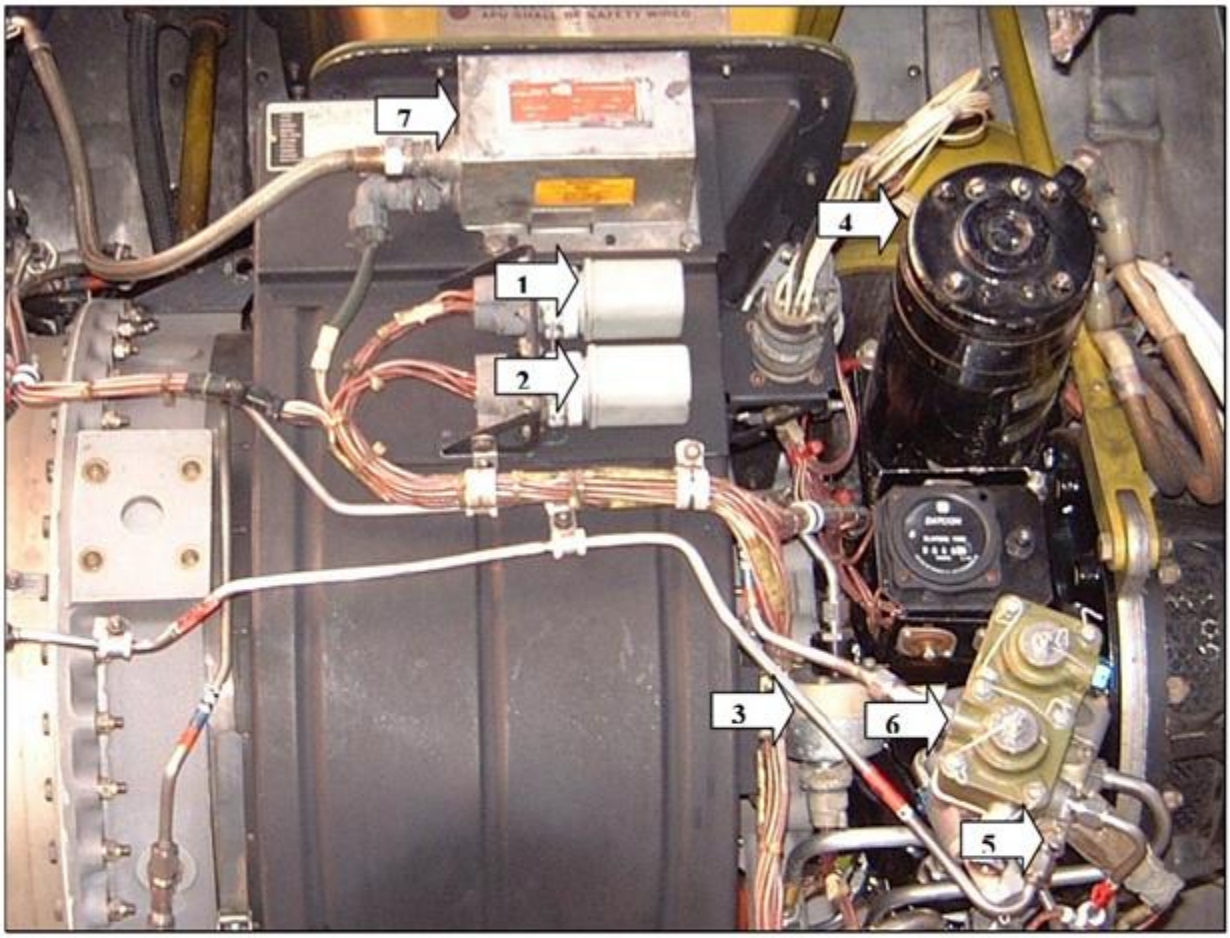
Figure A3.1. COPILOT ISOLATED BUS CURRENT LIMITER REMOVED.



Attachment 4

APU COMPONENTS

Figure A4.1. APU COMPONENTS.

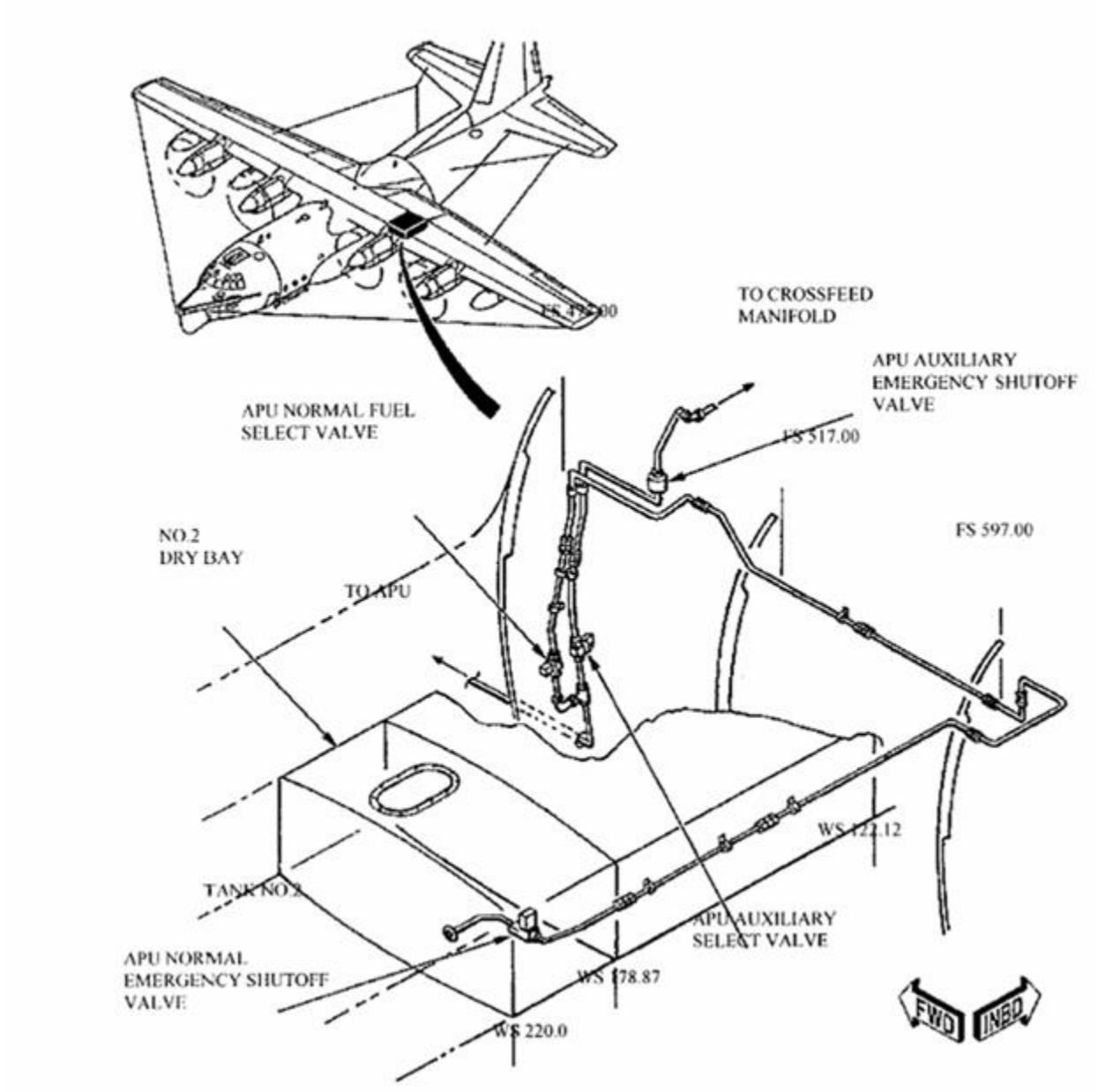


1. Auto Start Relay (ASR)
2. Fuel Holding Relay (FHR)
3. Oil Pressure Switch
4. Starter
5. Fuel Control Solenoid Valve
6. Fuel Control
7. Ignition Unit

Attachment 5

APU FUEL SHUTOFF VALVE

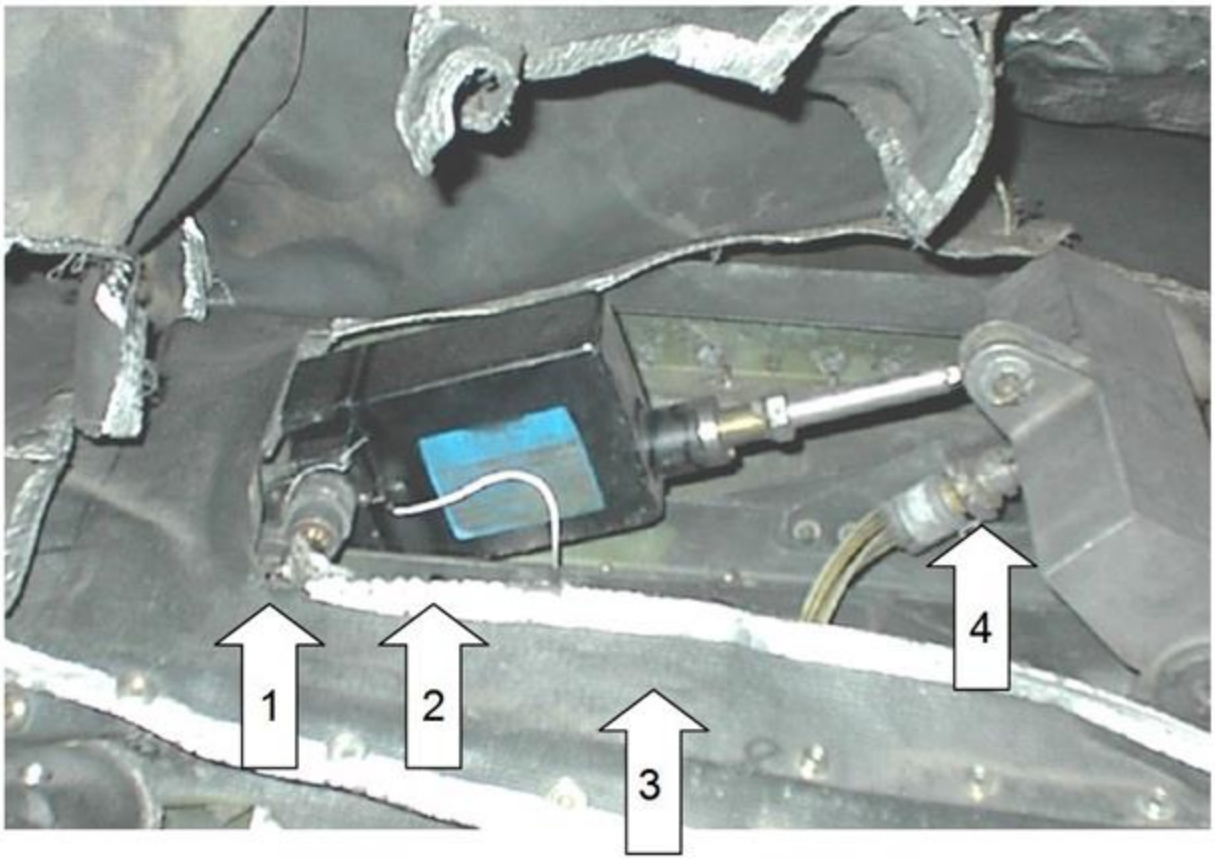
Figure A5.1. APU FUEL SHUTOFF VALVE.



Attachment 6

APU DOOR ACTUATOR

Figure A6.1. APU DOOR ACTUATOR.

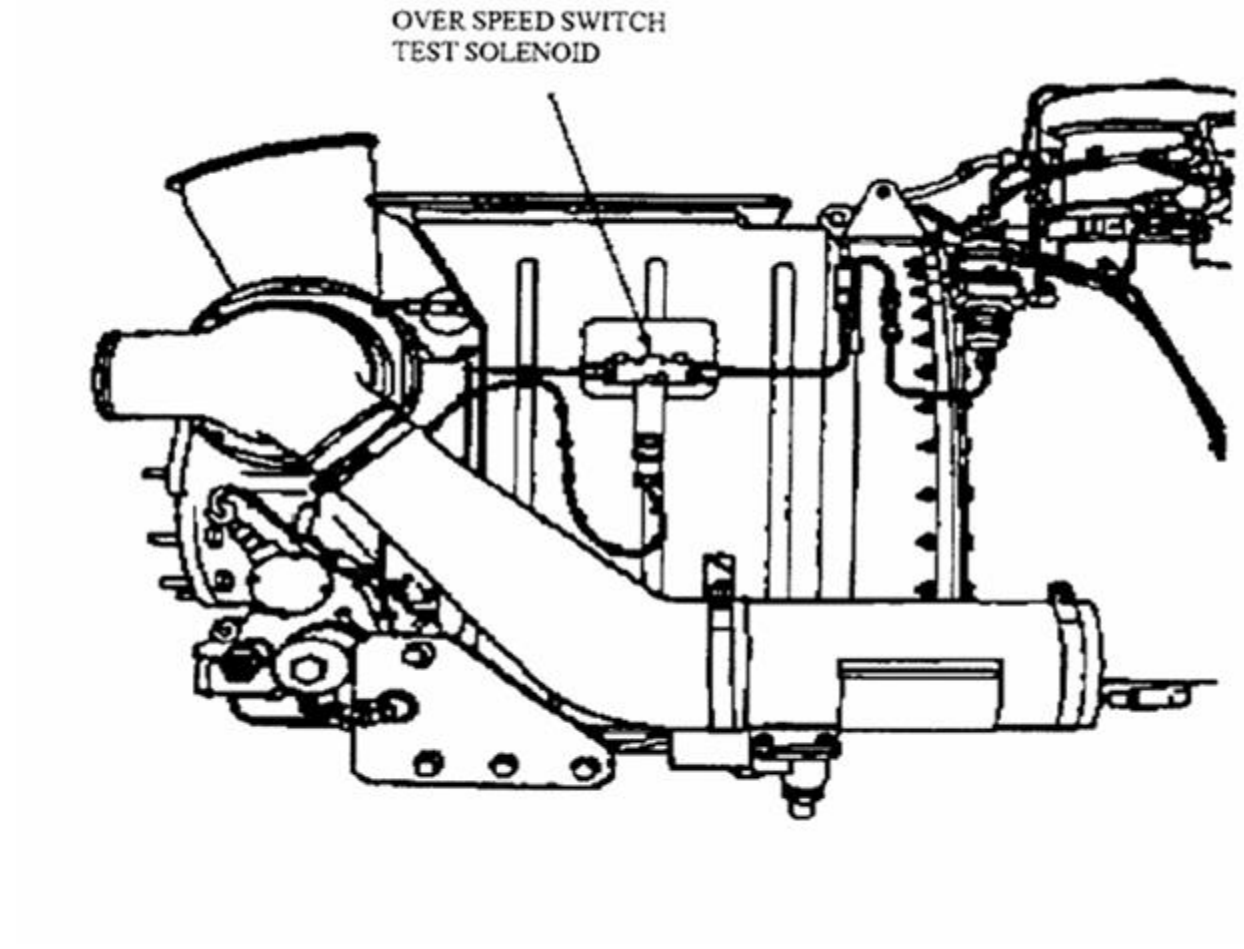


1. Mount Bolts
2. Inoperative Actuator Position Hole
3. Failed Actuator Start Receptacle (hidden)
4. Door Switch

Attachment 7

APU OVERSPEED TEST SOLENOID

Figure A7.1. APU OVERSPEED TEST SOLENOID.



Note: Location of Solenoid: Inboard Side of APU, Attached To Air Shroud

Attachment 8

ENGINE COMPONENTS

Figure A8.1. ENGINE COMPONENTS.

1. Speed Sensitive Valve
2. Valve Outlet Line
3. Torque Meter Shroud Anti-Icing Line
4. Air Supply Line
5. Air Filter Element
6. Speed Sensitive Switch
7. Geneva Lock

Attachment 9

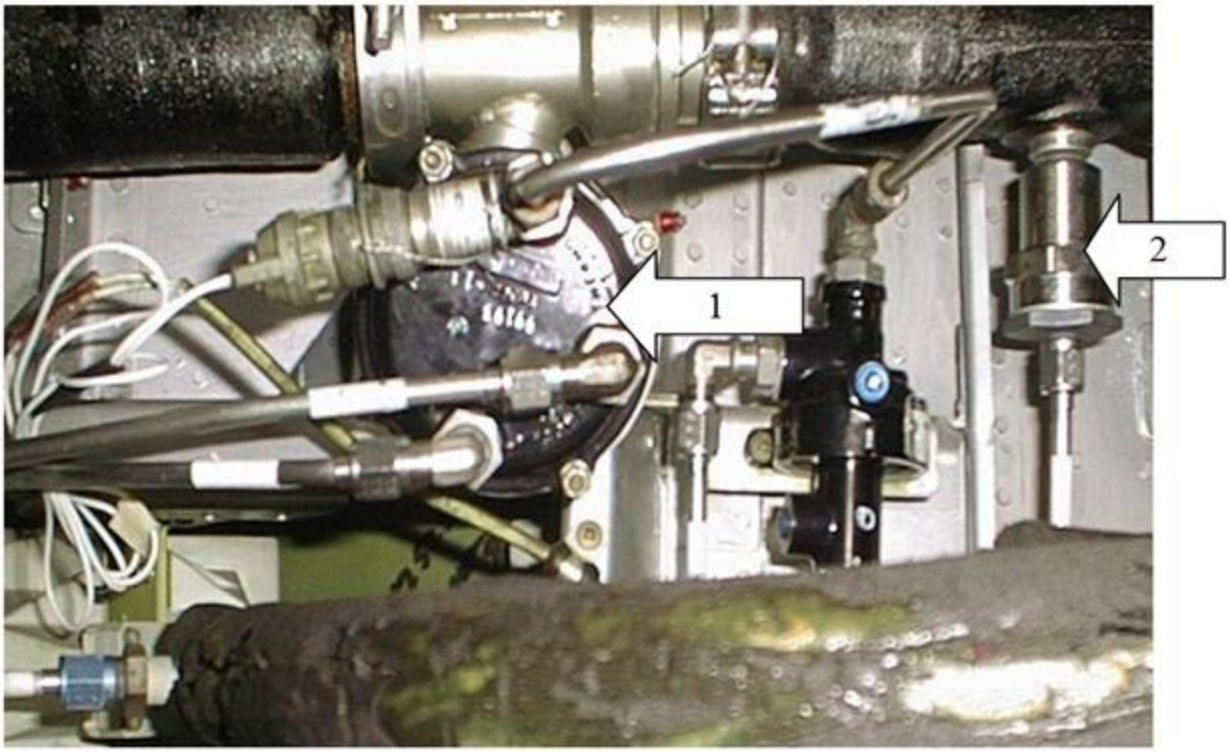
DRIP VALVE DRAIN

Figure A9.1. DRIP VALVE DRAIN.

Attachment 10

RADOME ANTI-ICE VALVE

Figure A10.1. RADOME ANTI-ICE VALVE.

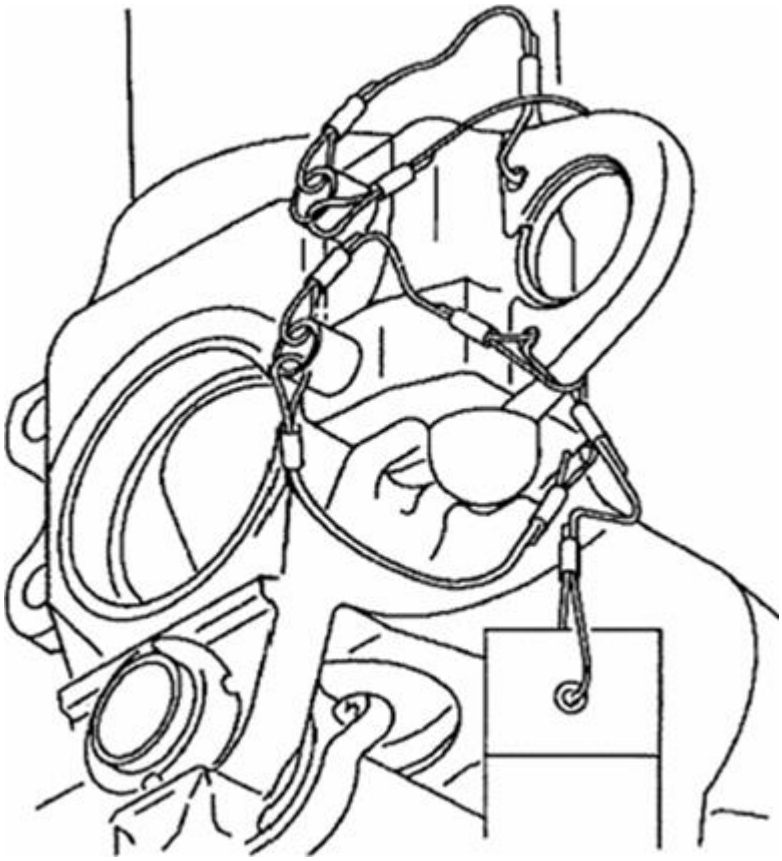


1. Anti-Ice Valve
2. Filter

Attachment 11

MAIN GEAR TOWING AND JACKING FITTING

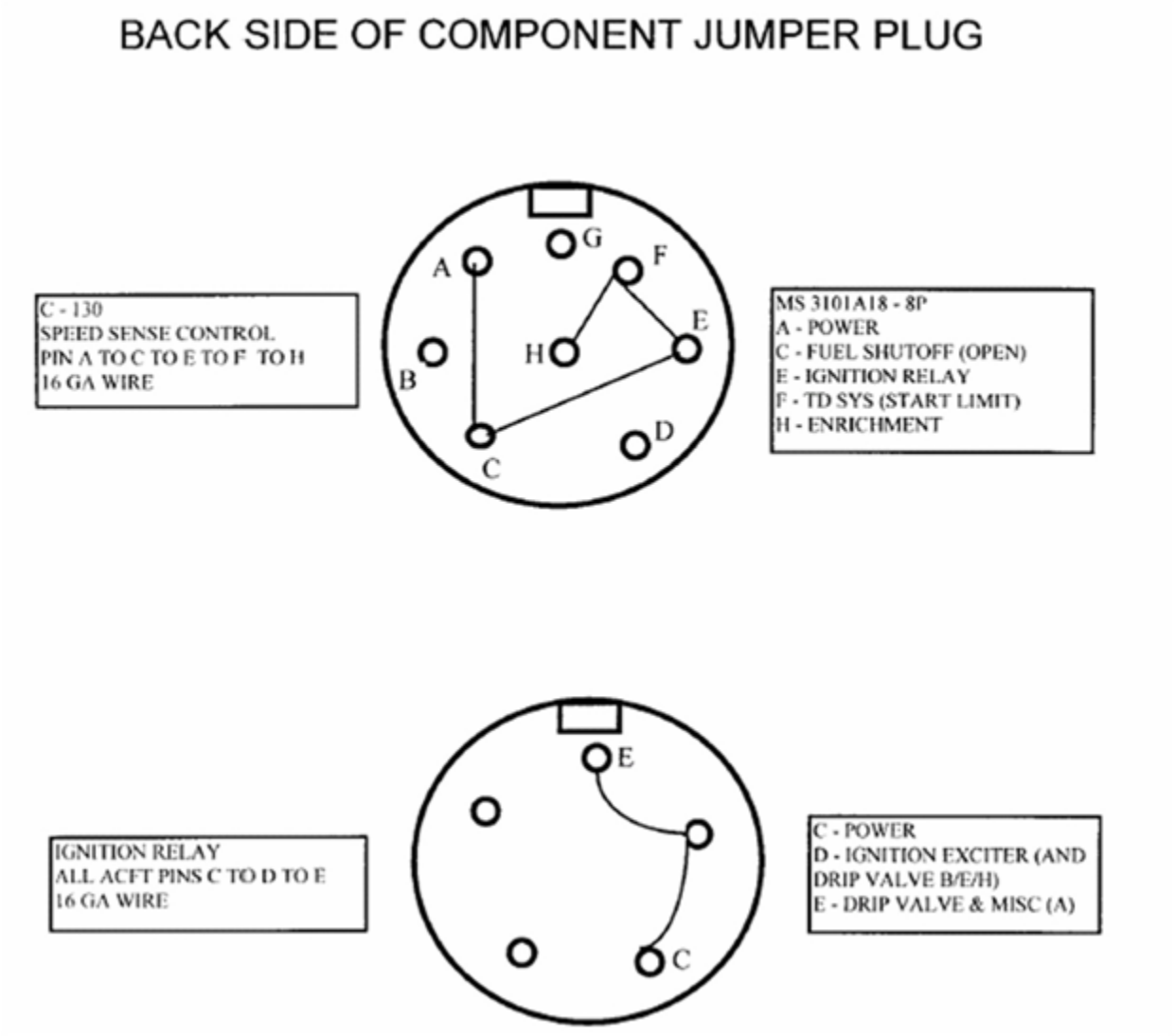
Figure A11.1. MAIN GEAR TOWING AND JACKING FITTING.



Attachment 12

JUMPER PLUGS CONFIGURATION

Figure A12.1. JUMPER PLUGS CONFIGURATION.



Attachment 13

PROPELLER SERVICING DIAGRAM

Figure A13.1. PROPELLER SERVICING DIAGRAM.

Pressurized Sump Filler Cap

Screwdriver Inserted Into Filler Cap

Safety Wire Hole On Sump Filler Cap

Atmospheric Sump Dip Stick

Valve Housing Filler Cap