United States Army Warfighting Center
Fort Rucker, Alabama
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STUDENT HANDOUT

TITLE: CH−47D ENVIRONMENTAL SYSTEMS

FILE NUMBER: 011−2111-1

PROPONENT FOR THIS STUDENT HANDOUT IS:

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CH−47D ENVIRONMENTAL SYSTEMS

STUDENT HANDOUT

TERMINAL LEARNING OBJECTIVE (TLO):

Action: Describe the components, operational characteristics, functions, and limitations of the CH−47D Environmental Systems.

Conditions: In a classroom, and given a student handout.

Standards: Correctly answer in writing, without reference, Three of the Four questions pertaining to components, operational characteristics, limitations, and functions of the CH−47D Environmental Systems, In Accordance With (IAW) TM 1−1520−240−10 and the student handout.

Safety Requirements: None.

Risk Assessment Level: Low.

Environmental Considerations: None.

Evaluation: Each student will be evaluated on this block of instruction during the third written examination. This will be a criterion type examination requiring a GO on each scored unit. You will have 90 minutes for the exam.

A. Enabling Learning Objective (ELO) 1

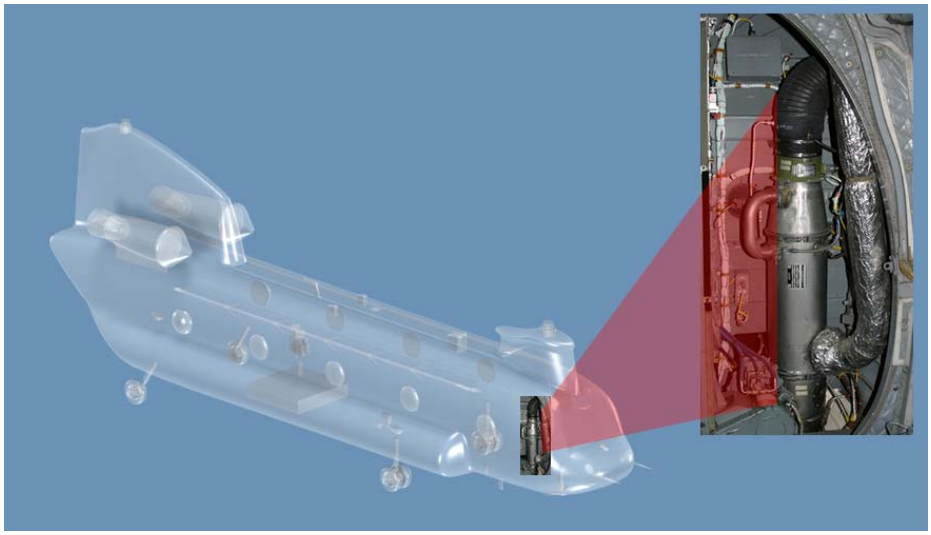
Action: Provide instructions on the components, operational characteristics, functions, and limitations of the CH-47D Heating and Ventilating system.

Condition: In a classroom given a student handout.

Standard: IAW TM 1−1520−240−10 and the student handout.

1. **Learning Step/Activity 1 − List the components of the Heating and Ventilating system.**

   a. Heater unit.



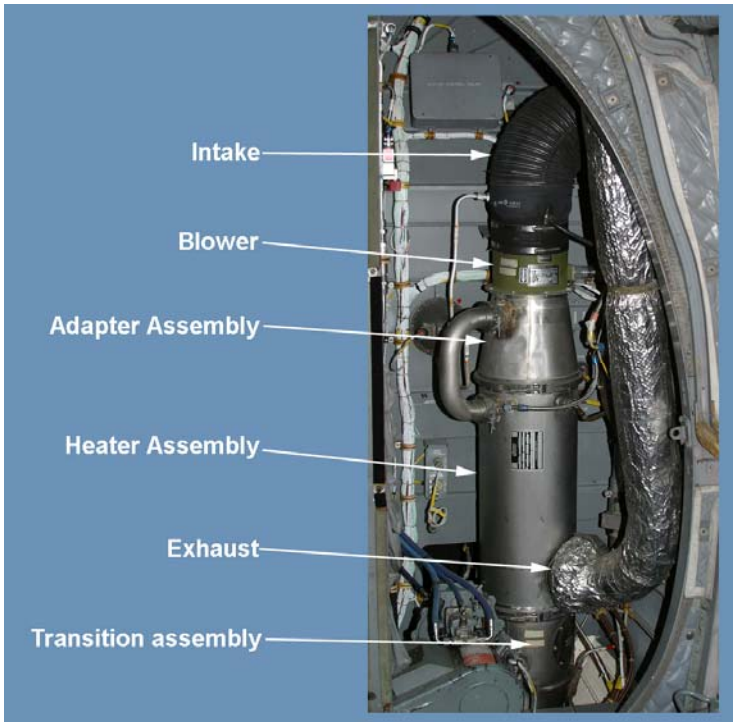
   (1) The heater unit is located in right forward compartment, Sta.110.

   (2) It is a 200,000 British Thermal Unit (BTU)/Hr capacity, internal combustion heating system.

NOTE: One BTU is equal to the amount of heat required to raise the temperature of one pound of liquid water by 1°F at its maximum density, which occurs at a temperature of 39.1°F.

   (3) It receives fuel from the right main tank using one of the main boost pumps.

   (4) Consumes 15 Pounds Per Hour (PPH).



b. Intake system.

(1) The intake is mounted to the airframe.

(2) Intake duct carries air from the outside of the aircraft to the blower assembly.

c. Exhaust system.

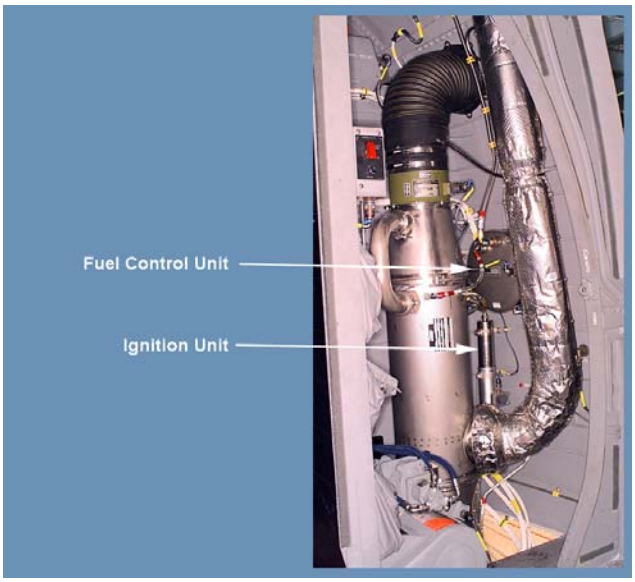
(1) The exhaust is mounted on the bottom R/H side of the heater unit assembly.

(2) Removes burnt gases from the assembly from the exhaust port on the right side of the aircraft forward of the cabin door.

d. Blower.

(1) Mounted above the heater combustor assembly.

(2) The blower provides air for the heating system.



e. Fuel control unit.

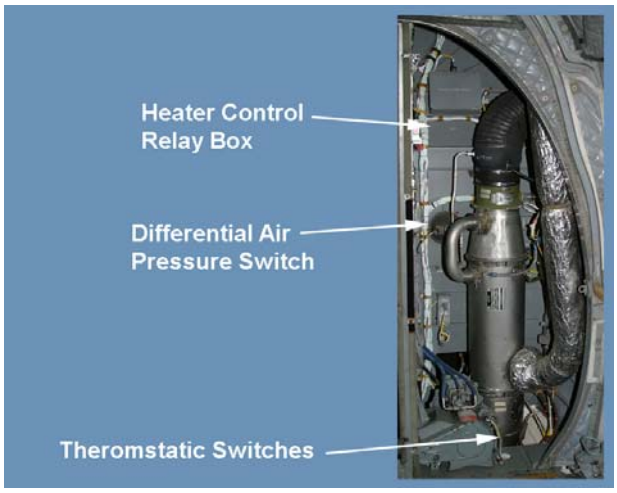
(1) Located on the middle R/H side of the heater compartment.

(2) Supplies fuel to the heater assembly from the R/H main tank.

f. Ignition unit.

(1) Located on the lower R/H side of the heater compartment.

(2) Provides the high voltage for ignition during heater operation.



g. Air pressure switch.

(1) Mounted on the back wall of the heater compartment.

(2) Used to ensure that the heater is getting a supply of air for combustion.

h. Thermostatic switches.

(1) Located on the transition assembly below the heater.

(2) These switches are thermal protection for the heater.

i. Control relays.

(1) Located in the heater temperature control box, which is mounted on the back wall of the heater compartment.

(2) The relays in the control box control the operation of the heater.

j. Overhead heater (HTG) control panel.

(1) Located on the L/H side of the overhead panel in the cockpit.

(2) Used to control the heater operation.

(3) Used to control the temperature of the heated air exiting the heater.

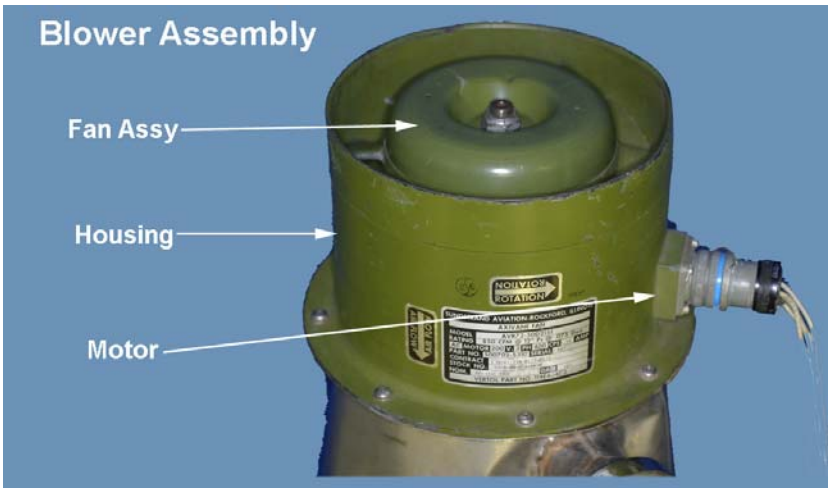
k. Cabin thermostat.

(1) Mounted on the L/H side of the cabin compartment at Sta.335

(2) The thermostat senses cabin temperature.

2. **Learning Step/Activity 2 − Describe the components and operation of the heating and ventilating system.**

a. Blower assembly.



(1) The cabin heater blower is mounted in the heater compartment between the inlet duct and the transition assembly.

(2) The air inlet duct pulls in air from above the main cabin entrance door.

(3) Three piece assembly consisting of:

(a) Motor assembly.

(b) Fan assembly.

(c) Housing assembly.

(4) The blower draws in outside air and circulates it for heating and ventilating at 850 cubic feet per minute.

(5) Operates on 115 volt three phase AC from the No.2 AC bus, and is controlled through the K1 heater relay in the #2 PDP.

(6) The blower operates when:

CAUTION: Cycling of the heater blower switch may disable power steering control. (Page 8-28)

(a) The heater switch on the overhead panel is in the Vent Blower Only position.

(b) The heater switch is in the ON or OFF position and the temperature of the air in the transition assembly is above 49°C.

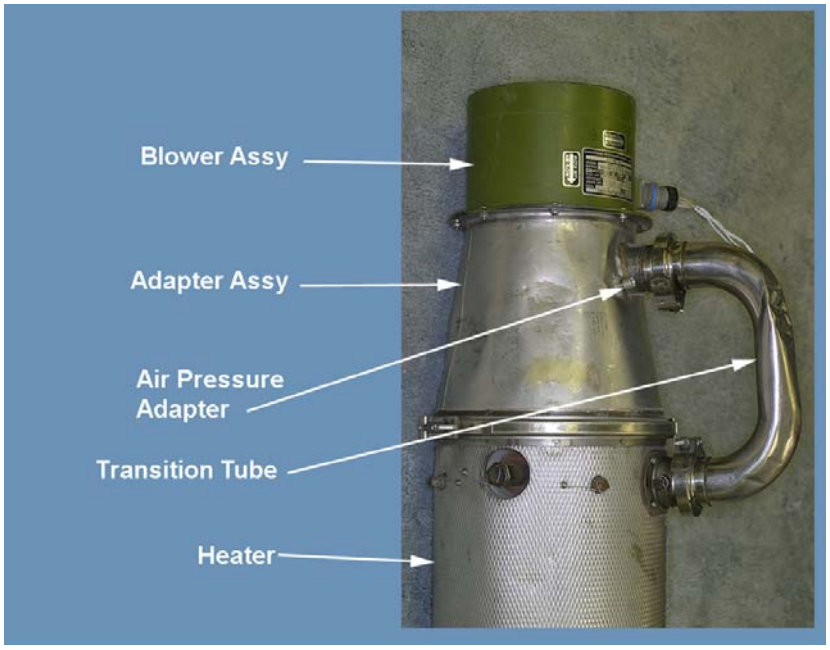
1. Controlled by the blower overrun switch located on the transition assembly.

2. When the temperature in the assembly is above 49°C the switch closes connecting 28V DC to the relay in the heater relay box, applying 115V AC to the blower.

NOTE: After heating and ventilating system has been stopped with the generator(s) ON, the blower will continue to operate until the temperature within the heater combustion chamber is below 49°C.

b. Heater unit is comprised of three main parts:

(1) Adapter assembly

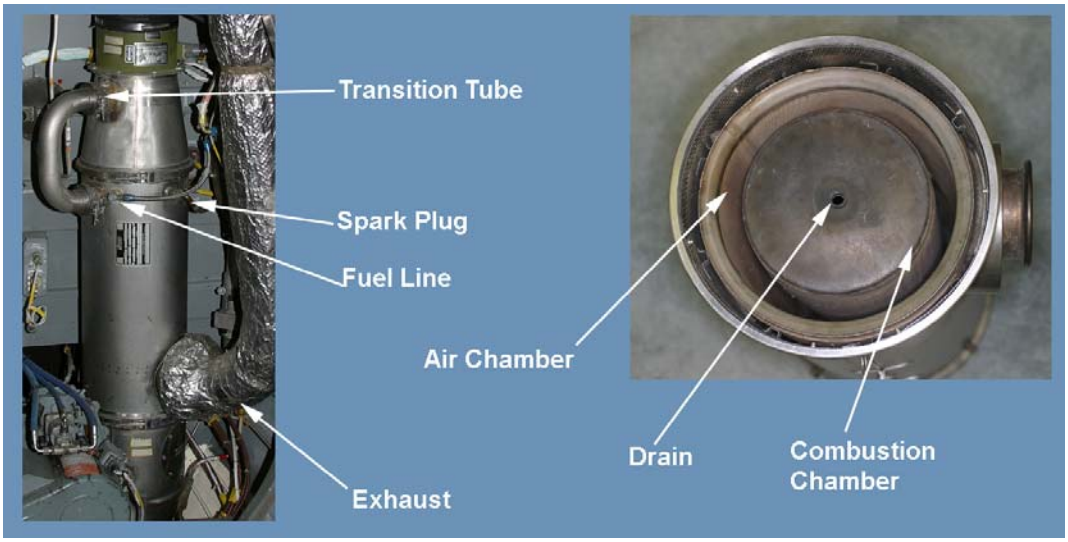


(a) The adapter assembly connects the blower to the heater assembly.

(b) Mounted to the adapter assembly is an air transition tube that will direct air to the combustion chamber of the heater.

(c) Includes a fitting for monitoring the air pressure in the adapter assembly.

(2) Heater assembly.



(a) The heater unit is mounted between the adapter assembly and the transition assembly in the heater compartment.

(b) The heater assembly consists of two chambers, one within the other.

1. The inner chamber is the combustion chamber.

a. The mixing of fuel air and ignition takes place in this chamber generating heat.

b. There are openings in the sides for the fuel, air, exhaust, drain, and ignition to the inner chamber.

a) Fuel is supplied to the heater through the fuel control unit from the right main tank.

b) Outside air is forced in from via the air inlet duct by the blower.

c) The exhaust gases are sent through the exhaust pipe and discharged outside.

d) Unburned fuel is drained overboard through a drain tube.

2. The outer chamber is fitted over the combustor chamber.

a. Directs air around the combustor chamber to provide heated air.

b. The heated air is discharged at the bottom for distribution to the duct system via the transition assembly.

c. Provides the attachment points for:

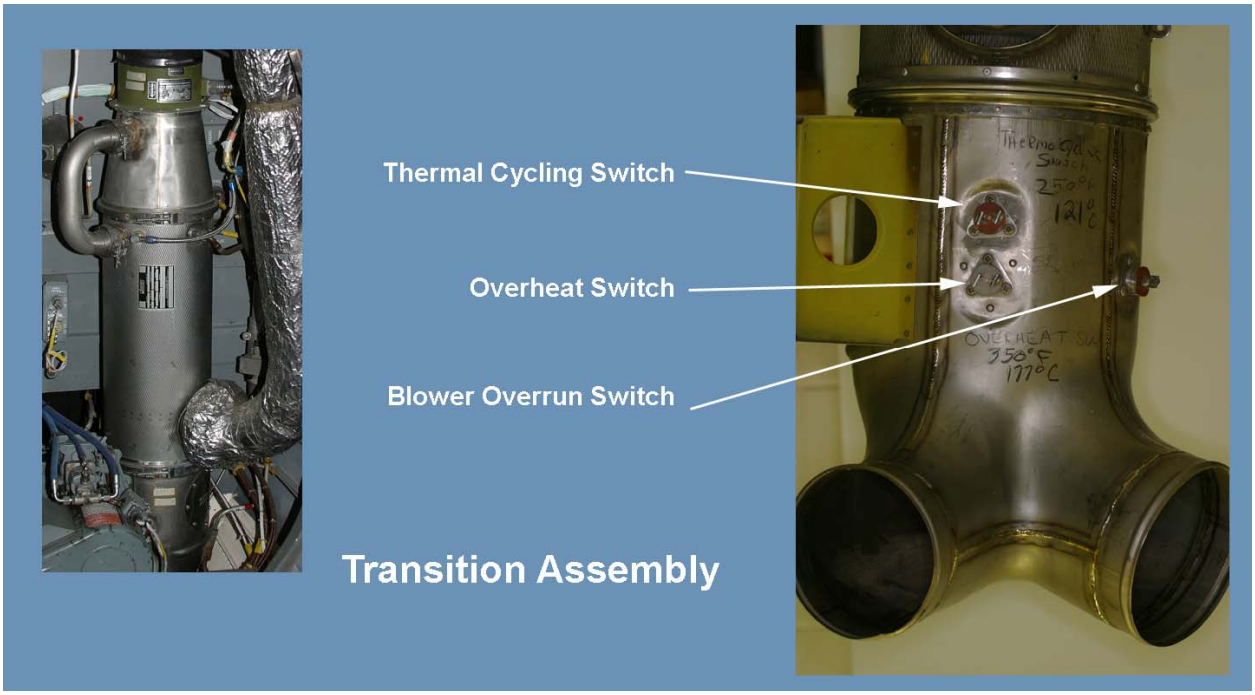
1) Fuel line for the combustor chamber.

2) Spark plug for ignition.

3) Transition tube for air for the combustor chamber.

4) Exhaust tube.

(3) Transition assembly.



(a) Mounted to the bottom of the heater assembly.

(b) Divides the air between the cockpit and the cabin.

(c) Three thermostatic switches are mounted on the assembly to control the heater and blower operation.

1. Blower overrun switch which keeps the blower on after heater shutdown.

2. Thermal cycling switch interrupts the circuit to the fuel control solenoid valve.

3. Overheat switch is a backup in case the thermal cycling switch fails.

NOTE: Thermostatic switches will be discussed later in the lesson.

c. Exhaust system.

(1) Mounted between the bottom of the heater combustor and the outside of the helicopter.

(2) The exhaust tube assembly is made of heat resistant steel.

(3) The exhaust tube is enclosed by four piece shroud to protect personnel from being accidentally burnt.

NOTE: Prior to starting the heater, ensure that the exhaust plug is removed.

d. Master fuel valve (fuel solenoid valve).

(1) Located in the right inner-tank area.

(2) Used to control the flow of fuel from the right main tank to the heater fuel control.

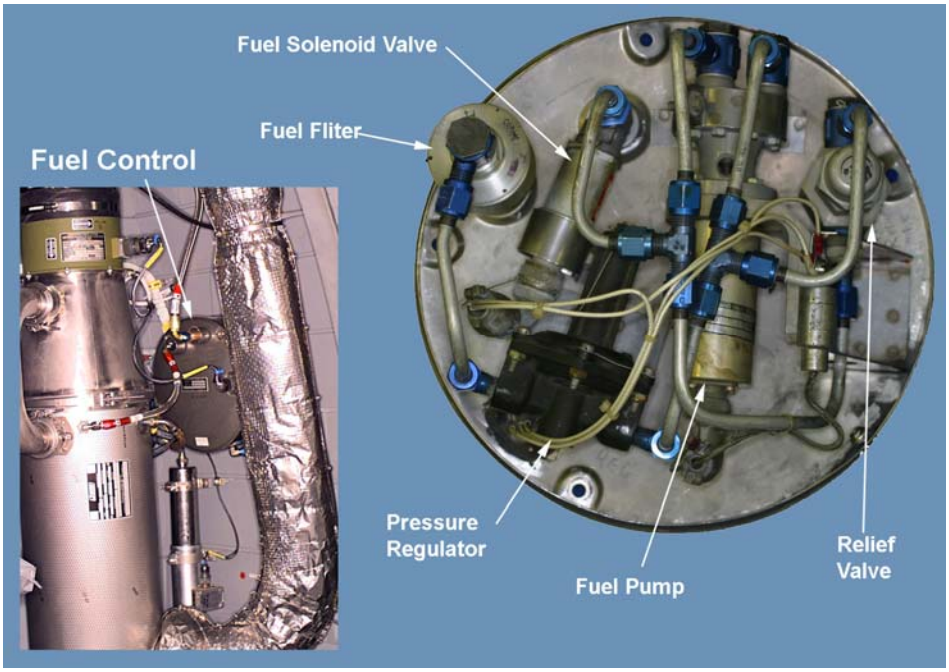
(3) Operates on 28 VDC and is open when the following three conditions are met:

(a) The heater switch is on.

(b) The overheat switch is closed.

(c) The air pressure switch is closed.

e. Fuel control.



(1) Located on the R/H side of the heater closet.

(2) The fuel control unit consists of:

(a) Fuel filter, which filters fuel prior to the pump.

(b) Pressure regulator, maintains the fuel pressure to the pump.

(c) Fuel Pump, increases the fuel pressure to about 100 PSI

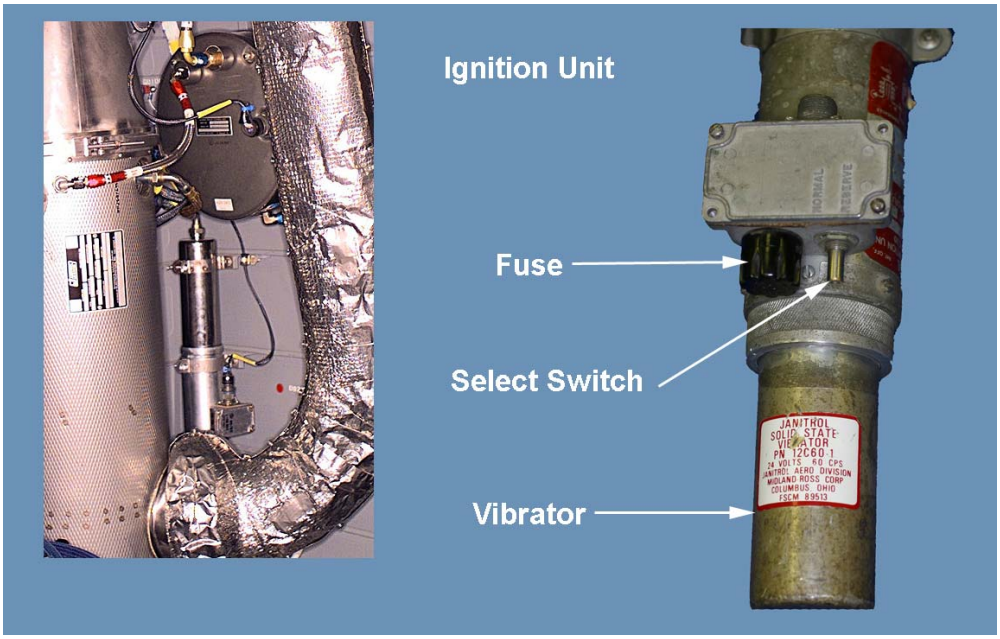
(d) Relief valve, relieves pressure above 100 PSI and routes it back to the input side of the fuel pump.

(e) Solenoid valve, controls the flow of fuel to the combustor chamber.

1. Powered by 28 VDC.

2. Through the heater relay box.

f. Ignition unit.



(1) Located in lower R/H side of the heater closet.

(2) The ignition unit assembly is designed to convert 28 volts DC to a high voltage AC current capable of producing a continuous spark during heater operation.

(3) Mounted externally are the junction box (which contains a fuse), vibrator changeover switch, power input receptacle, vibrator assembly.

(a) The heater may be equipped with either a solid state vibrator or an electromechanical vibrator.

(b) The electromechanical vibrator may experience vibrator contact failure, which will result in failure of the heater to operate.

(c) Heaters equipped with electromechanical vibrators are identified by a rotary selector switch on the heater junction box.

(d) The electromechanical vibrator is equipped with two separate sets of contacts designated NORMAL and RESERVE. Upon failure of the normal contacts, the reserve set may be brought into operation by placing the switch on the junction box to RESERVE.

(4) Connected to a single spark plug located in the heater assembly.

g. Air pressure switch (differential air pressure switch).

(1) The cabin air pressure switch is mounted on the aft side of the heater closet.

(2) The air pressure switch is in a hemispherical housing consisting of:

(a) Diaphragm.

(b) Micro-switch.

(c) Electrical connector.

(3) The tubing to the switch assembly is connected to the intake duct and the adapter assembly.

(4) When the difference in pressure is greater than .07psi, the diaphragm is displaced and closes the switch.

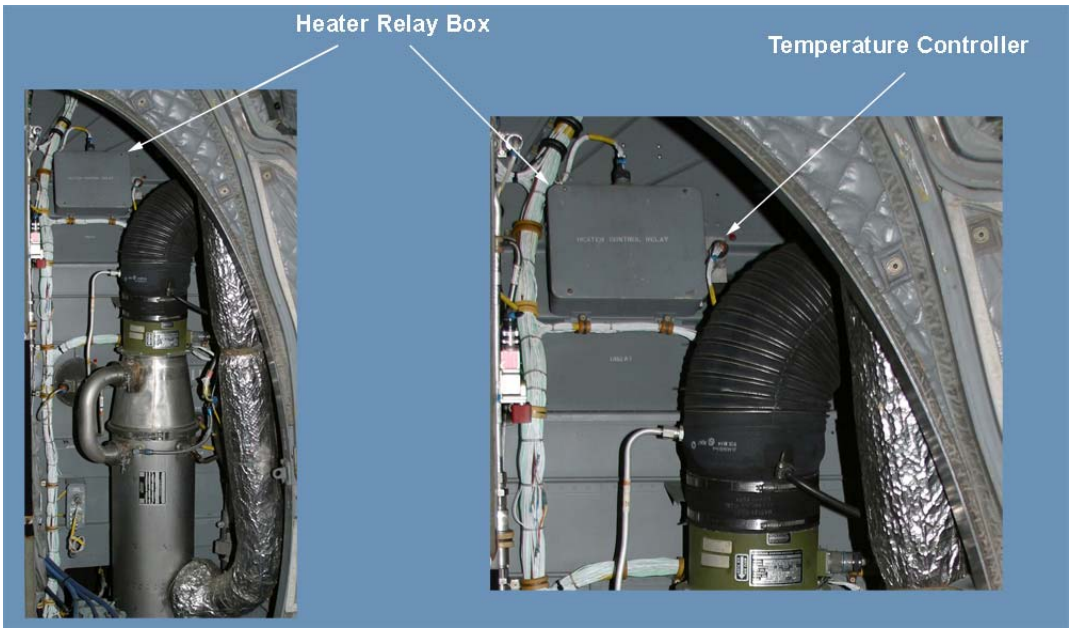
NOTE: This is also written as when the pressure through the fan drops below 1.25 to 1.75 inches of water the switch closes. Inches of Water is a traditional unit of pressure, used in plumbing to describe both water and gas pressures. The conventional equivalent of one inch of water is about 0.036127 Pounds per Square Inch (PSI).

(a) This allows the main fuel valve, fuel control, ignition unit, and temperature controller to receive power.

(b) If the pressure switch opens, these components will be deenergized.

NOTE: This means that there must be a difference in the air pressure coming in to what is going out for the heater to operate. If the intake cover is left on or the intake ices over the difference will be zero.

h. Heater control box.



(1) Metal box construction with a removable cover located on the back wall of the heater closet.

(2) Four relays are mounted in the box.

(a) K2 Relay controls the heater HOT light and the differential press switch.

(b) K3 Relay maintains power on the system after the heater start switch is released.

(c) K4 Relay creates the 10 second time delay relay for purging of the combustor.

(d) K5 Relay supplies power to the main fuel valve, fuel control, ignition unit and temperature control circuits.

NOTE: K1 Relay controls the blower and is located in the #2 PDP

(3) Cabin heater temperature controller.

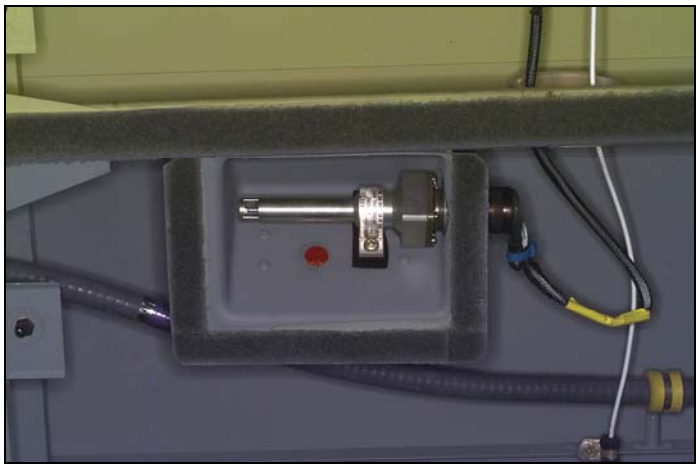
(a) Mounted to the L/H side of the heater control box.

(b) The unit operates together with the thermostat and temperature selector to control the cycling of the fuel solenoid valve in the fuel control.

(c) Removes power from the fuel solenoid valve in the fuel control when the thermostat reaches 34°C

(d) Removes power from the heater thermostat winding.

i. Cabin heater thermostat.



(1) Located at Sta.355 on the L/H side of the cabin area.

(2) The cabin thermostat consists of a column of mercury surrounded by a heater winding and works together with the temperature selector and controller to maintain cabin temperature.

(3) Current (amount based on the position of the cabin temperature rheostat) passes through the variable resistor within the temperature controller to heat the winding.

(4) When the winding raises the temperature of the mercury to 93ºF (34ºC), it opens contacts within the temperature controller relay shutting off the fuel to the heater.

(5) When the thermostat cools down, the contacts in the temperature control relay close, restoring power to the fuel solenoid valve, and the heater will start again.

j. Heating control panel.

(1) Located on the overhead in the cockpit.

(2) The heater/blower select switch is a three position switch.

(a) VENT BLOWER ONLY, which connects 115 VAC to the blower through the K1 relay.

(b) OFF which removes power from the heater system except for the blower overrun switch (activated above 49°C).

(c) HTR ON (Heater On) which powers the heater system after the start button has been pushed.

(3) The start button is spring-loaded and is labeled HTR START (Heater start).

(a) When pressed and released the blower starts to immediately purge the heater assembly of any fuel.

(b) Provides power to relay K4 creating the 10 seconds delay before fuel and ignition are introduced to the heater.

(2) Cabin temperature (TEMP) selector used to adjust the cabin temperature.

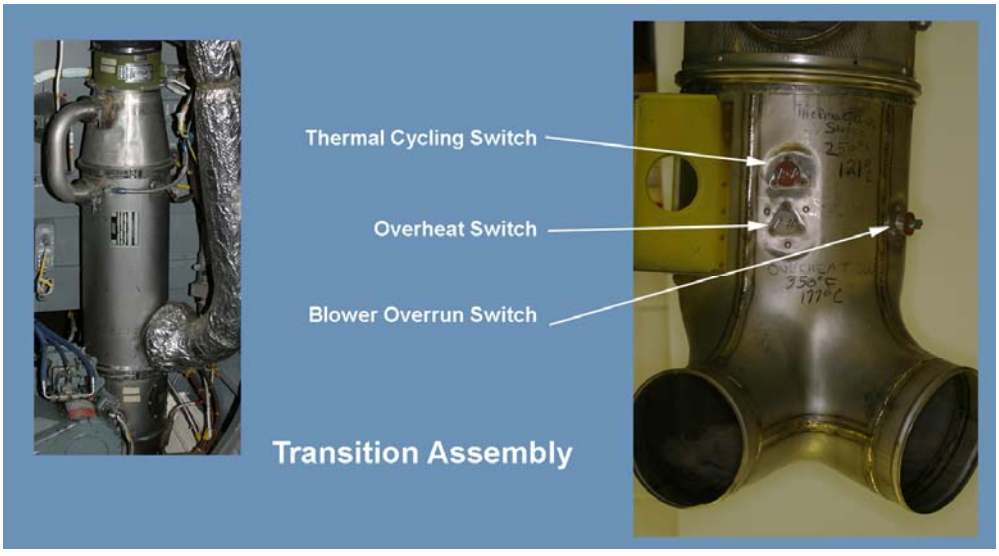
(a) Cabin temperature selector (CABIN TEMP SEL) rheostat is a rotary switch.

(b) The rheostat is used to control the amount of current to the cabin thermostat windings.

k. Master caution/advisory capsule HTR HOT (heater hot).

(1) This caution indicates failure of the automatic temperature control circuit and failure of the thermal cycling switch.

(a) The thermal cycling switch is located on the transition duct.



(b) Opens the circuit at 121°C shutting off the fuel at the fuel controls solenoid valve.

(2) When the air temperature in the transition assembly rises to 177°C, an overheat switch deenergizes the automatic temperature controller relay, removes power from the main fuel solenoid, ignition unit, and the fuel pump in the fuel control. It also activates the HTR HOT caution light.

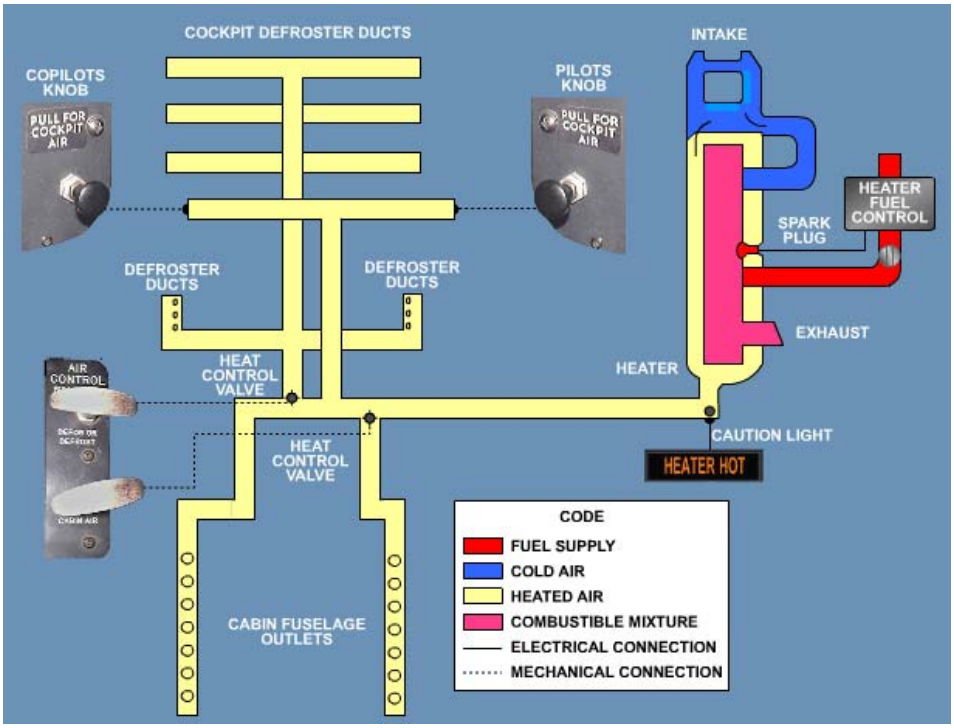
NOTE: The blower is not deactivated and will continue to operate until the air temperature in the transition assembly drops below 49°C.

(3) The heating system will not operate until the blower has lowered the heater temperature to below 121°C and the HTR START switch is pressed.

(4) Even when the temperature in the combustion chamber has lowered, the HTR HOT caution will not extinguish until the HTR START switch is pressed.

3. **Learning Step/Activity 3 − Describe components, functions, and operational characteristics of the Heating and Ventilating System Ducting.**

a. Heating and ventilating (distribution) system.



(1) Air produced by the blower is routed around the heater assembly to the transition assembly.

(2) The transition assembly divides the air between the cockpit and the cabin.

(a) Cabin air is divided to the left and right side of the helicopter through 14 adjustable vents (seven on each side).

(b) Cockpit air is divided between:

1. A set of vents are located directly below each set of pedals, which are controlled by the Cockpit Air Control knobs

a. Located on the outboard corners of both the pilot and the copilot instrument panels.

b. Each control is routed to the respective cockpit air outlet flap valve on each side of the cockpit floor console and just forward of the cockpit floor.

CAUTION: Pull out the cockpit air knobs slowly to preclude dirt and debris from being blasted into the air and the pilot's eyes.

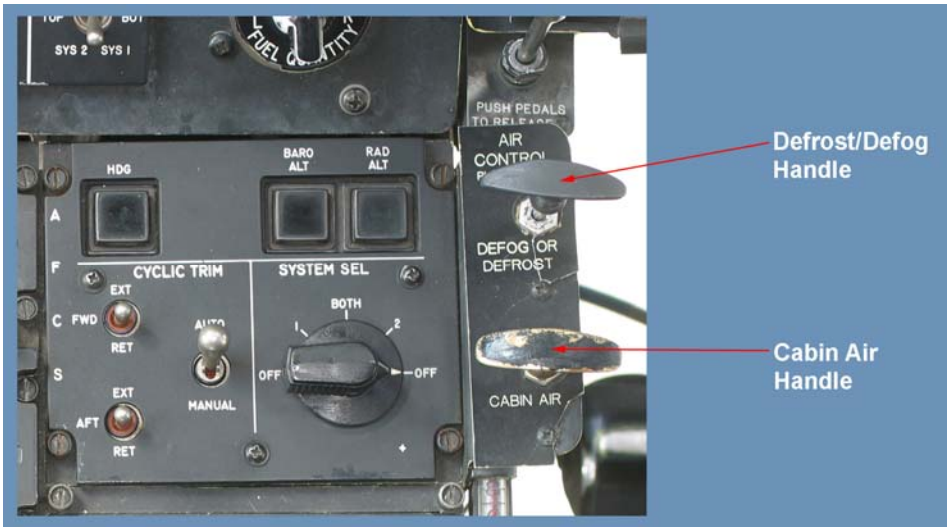
b. Defog and defroster system.

(1) Two sets of ducts:

(a) One set located along each jettisonable door.

(b) One set located in each chin bubble window.

(2) Controlled by the Defog/Defrost Air Control handle.



(a) Mounted through a placard on the right side of the canted console.

(b) The placard is labeled AIR CONTROL PULL FOR ON with each handle labeled COCKPIT DEFOG or DEFROST and CABIN AIR.

4. **Learning Step/Activity 4 − Describe the operational and restrictions of the Heating and Ventilating System.**

a Starting (**Page 8-28**).

(1) Inlet and outlet coverers — remove.

(2) BATT Switch — ON.

(3) APU — Start (**Page. 8-10**).

(4) APU GEN Switch — ON, check RECT OFF caution capsule extinguishes.

(5) R (right) MAIN FUEL PUMP switches — ON (only if heater is to be started).

This pushes fuel to the main fuel solenoid valve.

(6) Push in the air control knobs.

(7) Heater function switch — as desired (BLWR ONLY or HTR ON if BLWR only, steps 8 and 9 below do not apply).

(8) HTR START Switch — Press.

(a) 10 Second delay is initiated, blower is activated and any fuel is purged out the combustor drain.

(b) The main fuel solenoid valve opens, sending fuel to the fuel control.

(c) The fuel passes through the fuel filter, pressure regulator to the fuel pump.

(c) The fuel pump outlet fuel pressure is maintained at a constant 100 PSI by a relief valve.

(d) The fuel control solenoid valve is opened allowing fuel to flow to the combustor chamber of the heater.

(e) The blower assembly continues to provide air which is mixed with fuel

(f) The ignition unit supplies a high voltage current that produces a continuous spark in the heater combustion chamber to ignite the fuel and air mixture via the spark plug.

(i) A differential air pressure switch monitors the air below the blower to ensure that there is enough air for safe operation.

(j) Exhaust gases are sent through the exhaust pipe located on the bottom of the heater and discharged outside.

(k) Air flowing over the combustion chamber passes through the transition assembly to the cockpit and cabin providing heat.

(9) CABIN TEMP SEL Switch — As desired.

NOTE: If the left side of the helicopter is exposed to the sun, the cabin thermostat may be heated to 34°C which is sufficient to prevent starting the heater.

(a) The thermostat maintains a steady temperature in the cabin by causing a relay in the temperature controller to open or close as cabin temperature fluctuates.

(b) The heater system is protected from overheating by three thermostatic switches located on the bottom of the transition unit assembly.

b. Stopping (**Page 8-29**)

(1) Heater function switch — OFF.

(2) Wait two minutes before turning generator(s) off.

NOTE: After heating and ventilating system has been stopped with the generator(s) ON, the blower will continue to operate until the temperature within the heater combustion chamber is below 49°C.

c. Heater over-heat condition. (**Page 9-30**)

CAUTION: The heater function switch shall remain ON while performing steps 1 through 3.

(1) Wait 2 minutes for cool down.

(2) HEATER HOT caution — Monitor. The HEATER HOT caution light will not extinguish until combustion chamber temperature is below 177°C and HTR START switch is pressed.

(3) HTR START Switch — Press.

NOTE: Since the HEATER HOT caution will not extinguish until the temperature in the combustion chamber is below 177°C, and the heater will not receive fuel until the thermal cycling switch has closed at 121°C, it may take several attempts at restarting the heater before it produces heat.

d. Icing conditions.

(1) Extended flight in icing conditions can result in ice accumulation on the helicopter heater fuel drain.

(2) If the heater shuts down during icing, do not attempt a restart until ice is removed from the heater intake, exhaust and heater fuel drain. (Page 8-31)

B. Enabling Learning Objective (ELO) 2

Action: Describe components, operational characteristics, functions, and limitations of the CH−47D ice and rain protection systems.

Condition: In a classroom, and given a student handout.

Standard: TM 1−1520−240−10 and the student handout.

1. **Learning Step/Activity 1 − Describe the components, operational characteristics, functions, and limitations of the windshield wiper system.**

   a. Components of the windshield wiper system are to clear moisture from the windshields (Pilot and Co-Pilot) to provide visibility.

      (1) Windshield Wiper control panel.

      (a) Located on the HTG (heating) overhead panel.

      (b) Contains a five positions rotary switch labeled:

         (a) **PARK**. When PARK is selected, they will return to the Stowed/Parked position against the inside windshield frame to a vertical position out of the pilots view.

         (b) **OFF**. OFF position is selected while the wipers are in motion, the wipers will stop at their current position.

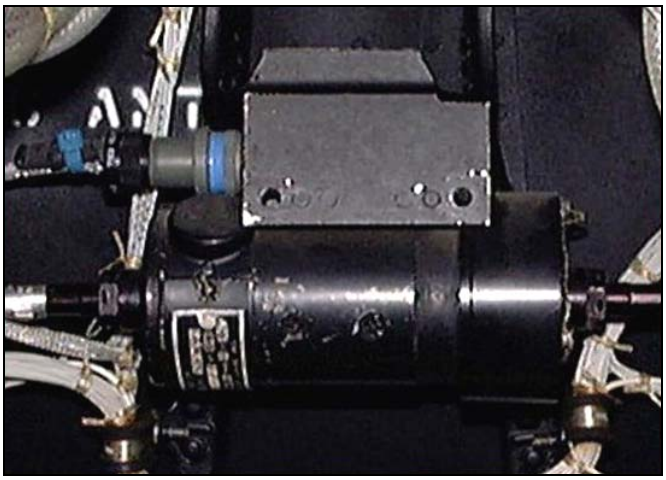
         (c) **SLOW**.

         (d) **MED** (Medium).

         (e) **FAST**.

      (c) Wiper speed can be adjusted as desired, by rotating the switch from OFF to a desired position.

(2) Windshield wiper motor.



(a) Mounted above center windshield behind the overhead panel.

(b) The windshield wiper motor is controlled by the wiper switch.

(c) The motor provides mechanical power to drive the wipers thru flexible drive shafts connected to the two actuators.

(d) The 28V DC electric motor is powered by the No.2 DC bus thru the WSHLD WIPER circuit breaker on the No.2 PDP.

(3) Windshield wiper actuators.

(1) The windshield wiper actuators are located inside the cockpit above the windshields.

(2) The actuators convert the rotary action of the motor to a back and forth motion to move the wipers through two rigid shafts.

(4) Windshield wipers.

(a) Mounted on the outside of the cockpit on the pilot and co-pilots' windshields.

(b) Two wiper arms maintain a constant pressure to hold the blades against the windshields.

(c) The wind deflecting shield on the blade assembly is installed with the upper/higher edge towards the inside frame of the windshield.

(d) The two wipers are mechanically driven thru the windshield wiper actuators.

b. Operational restrictions.

(1) To prevent windshield damage, do not operate windshield wipers when windshield is dry. (Page: 2-67).

(2) The windshield wipers shall be off at airspeeds above 130 knots (Page 5-11).

NOTE: It is considered that rain will have no detrimental effect on the flight characteristics or performance of the helicopter. The windshield wipers should be adjusted to FAST during an instrument approach in rain, as rain may present a restriction to visibility (Page 8-31).

2. **Learning Step/Activity 2 − Describe the components, operational characteristics, functions, and limitations of the windshield anti-ice system.**

a. Components of the windshield anti-ice system are used to defog or defrost the windscreens in cold weather.

(1) Helicopter windshields.

(a) Three windshields, Pilot, Co-Pilot, Center.

1. Each windshield is made of laminated layers with an embedded temperature sensor.

2. The inboard surface of the windshields outboard ply is coated with a transparent conductive coating (pyrolytic tin oxide).

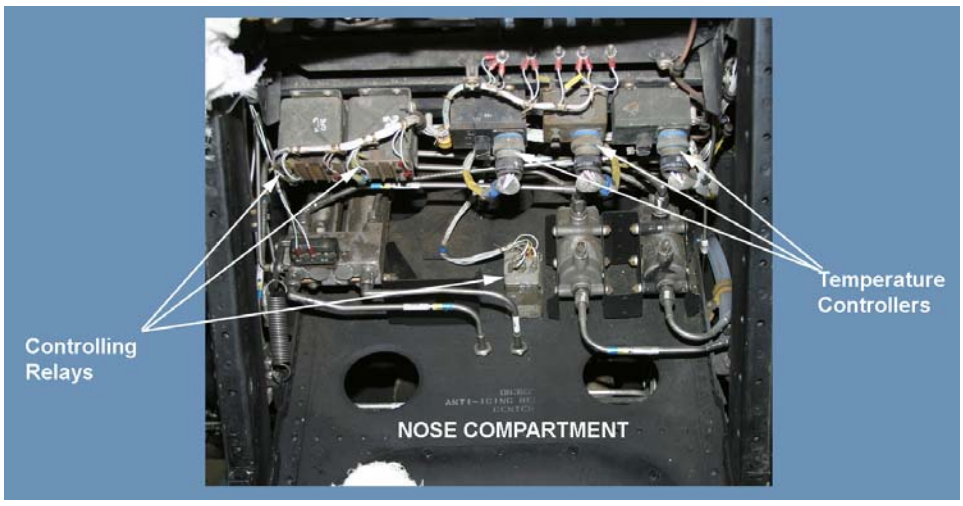
3. Each windshield has a embedded sensor to measure windshield temperature, and connection points for input of AC power used to heat the windshield.

(b) The windshield anti-icing system operates independently on the three cockpit windshields.

1. The pilot's and copilot's windshields have anti-icing and anti-fogging systems.

2. The center windshield has an anti-fogging system only.

(2) Temperature controlling.



(a) Three relays located behind the dynamic absorber in the nose compartment are use to control the AC power to heat the windshield.

(b) Three temperature controllers located in the nose compartment are used to control the DC power to the relays based on the temperature sensor in the associated windshield.

(3) Windshield Anti-Ice control panel is located on the overhead.

(a) Pilot and Co-pilot windshield switches.

1. When the switch is operated, current passes through the transparent layer, heating the windshield.

2. As windshield temperature increases, resistance within the sensor also increases.

3. When the temperature sensor reaches 43ºC, the temperature controller cuts off power to the relay cutting off power to the transparent layer.

4. When the windshield temperature sensor cools, the temperature controller re-energizes the relay and current flows again to the heating element.

(b) Center windshield switch works exactly like the pilot/co-pilots switches except for the sensor removed electric power at 27°C.

b. Operational restrictions.

(1) If bubbling or delaminating occurs around the sensor element in the windshield, immediately set the switch for the windshield to OFF (Page 2-64).

(2) Windshield heat shall not be used above 24°C (Page 5-23).

(3) Windshield anti-icing systems enable safe flight in icing conditions. Continuous flight in icing conditions below 5°C is not recommended (Page 5-16).

3. **Learning Step/Activity 3 − Describe the components, operational characteristics, functions, and limitations of the pitot heat and AFCS yaw port heating systems.**

   a. Components of the pitot and yaw port heating systems eliminate moisture and ice accumulation.

   b. System is controlled by a single switch on the Anti-Ice control panel, labeled PITOT.

      (1) Pitot tubes.

(a) Mounted on the nose of the helicopter are two pitot masts with electrically heated heads.

1. The No.1 tube is on the L/H side and feeds the #1 AFCS computer and co-pilots' airspeed indicator.

2. The No.2 tube is on the R/H side and feeds the #2 AFCS computer and the pilots' airspeed indicator.

(b) The pitot tubes are used to direct dynamic air pressure to the airspeed indicating system and the AFCS.

(c) Each pitot tubes have a 145 watt heater that protects against ice and rain accumulation.

(d) Power comes from the #2 AC bus at 115 volts.

(2) Yaw ports (sideslip ports).

(a) AFCS sideslip ports are located on the lower chin bubble windows on the L/H and R/H side of the nose.

(b) The sideslip ports are used to sense the air pressure and supply it to the sideslip transducer in each AFCS computer.

(c) Two separate systems, consisting of 4 sensors.

1. The upper ports are the No.1system and send air pressure to the #1 AFCS computer.

2. The lower ports are the No.2 system and send air pressure to the #2 AFCS computer.

(d) Each port is heated by a 25 watt heater to protect against ice or moisture.

(e) Power comes from the #2 AC bus at 115 volts.

c. Operational restrictions.

(1) The PITOT switch shall not be on for more than 5 minutes on the ground (Page 5-23)

(2) Advise crew members to use caution if checking with or without gloves.

Appendix C − Practical Exercises and Solutions

CH−47D ENVIRONMENTAL SYSTEM

PRACTICAL EXERCISE

NOTE: This practical exercise covers the instruction you received in this handout. Completion is optional, but strongly encouraged!

1. Where should the air control knobs be positioned prior to starting the heater or blower?

2. What is the time limitation for operating the pitot heat while on the ground?

3. When can pitot heat be used?

4. Will the heater blower continue to run after the heater had stopped?

5. How long should you wait after stopping the heater before you turn the generator(s) off?

6. What should you do with the heater function switch if the HEATER HOT caution light is on?

7. What is the airspeed limit for windshield wiper operation?

8. What two items is the crewmember required to check when you turn the PITOT heat switch on?

9. Fuel for the heater comes from what fuel tank?

10. Windshield anti-ice provides what two features?

11. The HEATER HOT caution light will not go out until temperature is below?

12. What is the purpose of the cabin heater thermostat?

13. What protects the heater system from overheating?

14. What component raises fuel pressure for the heater?

15 Name the three switches on the transition assembly and what each one is for.

16 Which switch on the transition assembly illuminates the HTR HOT light?

CH−47D ENVIRONMENTAL SYSTEM

PRACTICAL EXERCISE SOLUTIONS

1. IN.

2. 5 MINUTES.

3. IMC, rain, ice, water.

4. Yes, until the heater cools.

5. 2 minutes.

6. Leave it at the HEATER ON position.

7. 130 Knots.

8. PITOT tubes, YAW Ports (AFCS Sideslip ports).

9. Right main.

10. Anti-Ice and defogging.

11. 177°C

12. Maintain cabin temperature.

13. Three thermostatic switches.

14. The pump in the fuel control.

15. Blower overrun switch, keeps the blower on after the heater is shutdown (49°C).
    Thermal cycling switch, interrupts the circuit to the fuel control solenoid valve (121°C).
    Overheat switch, cuts off fuel, ignition, if the temperature of the air leaving the heater exceeds 177°C.

16. Overheat switch which occurs at 177°C.