PFN NUMBER 011-9766
SEPTEMBER 2004

STUDENT GUIDE

FOR

UH-60 UTILITY SYSTEMS

THIS PACKAGE HAS BEEN DEVELOPED FOR USE BY:	**Blackhawk (UH-60) Helicopter Maintenance Test Pilot Training Program**
PROPONENT FOR THIS TSP IS:	**U.S. Army Maintenance Test Pilot School AVIATION TRAINING BRIGADE ATTN: ATZQ-ATB-CA Ft. Rucker, Alabama 36362-5000**
FOREIGN DISCLOSURE RESTRICTIONS:	**Unclassified: This product/publication has been reviewed by the product developers in coordination with the USAALS foreign disclosure authority. This product is releasable to students from foreign countries on a case-by-case basis.**

SEPTEMBER 2004

UH-60 UTILITY SYSTEM

TABLE OF CONTENTS

SECTION I. - INTRODUCTION

TERMINAL LEARNING OBJECTIVE:

ACTION: Maintain the UH-60 utility system

CONDITIONS: As a UH-60 maintenance test pilot

STANDARD: IAW TM 1-1520-237-23-7

SAFETY REQUIREMENTS:

Will be addressed as NOTES, CAUTIONS, and WARNINGS throughout the lesson outline.

RISK ASSESSMENT LEVEL: Low

ENVIRONMENTAL CONSIDERATIONS: There are no environmental concerns for this lesson.

EVALUATION: Evaluation will be accomplished with performance exam at the end of this module of instruction.

SECTION II. - PRESENTATION

A. ENABLING LEARNING OBJECTIVE No.1

ACTION: Identify the function of the UH-60 Utility System.

CONDITIONS: As a UH-60 Test Pilot

STANDARD: IAW TM 1-1520-237-23-7

a. Function of the Utility System

Frame #0017 (MENU)

(1) The UH-60 Utility System has 5 sub-systems. These lessons will give you a brief overview of each.

(a) Windshield Wiper System

(b) Windshield Anti-ice System

(c) Heater and Ventilation System

(d) Cargo Hook System

(e) Pitot Static System

B. ENABLING LEARNING OBJECTIVE No.2

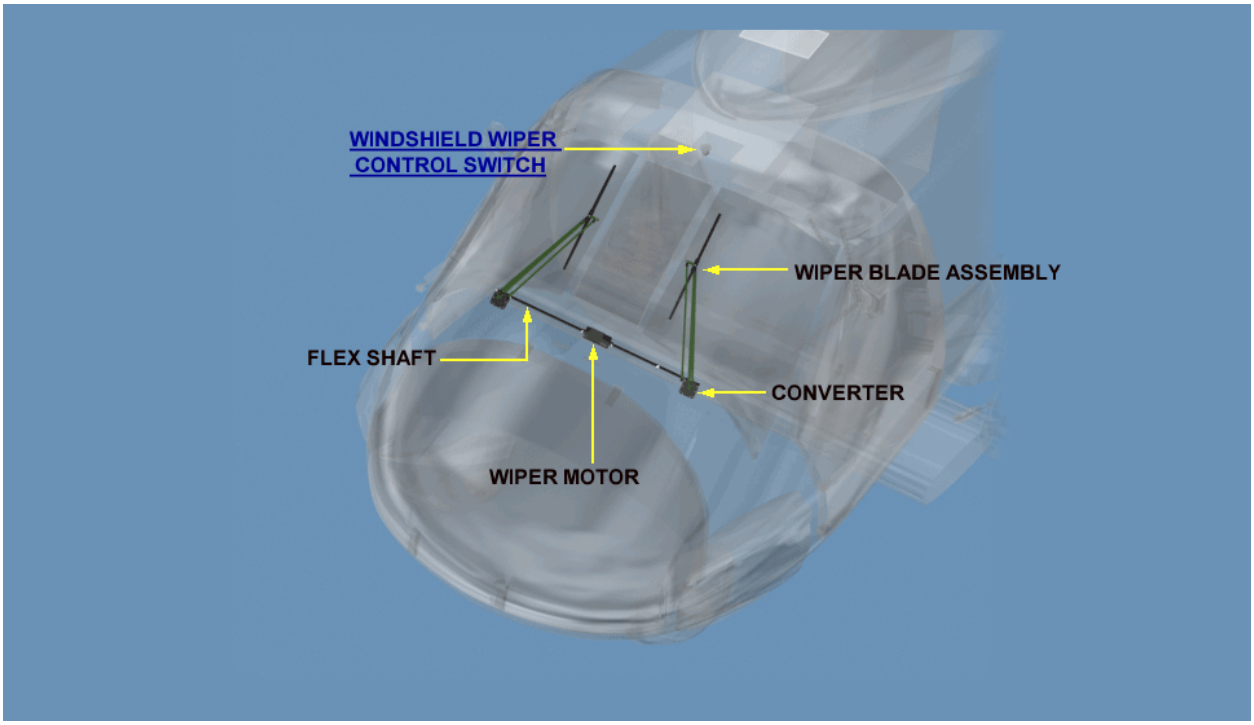
ACTION: Identify the components of the windshield wiper system.

CONDITION: Given a list of component and functions. Using TM 1-1520-237-7

STANDARD: IAW TM 1-1520-237-23-7

a. Windshield Wiper System

Frame #0025 (Windshield Wiper System Location)



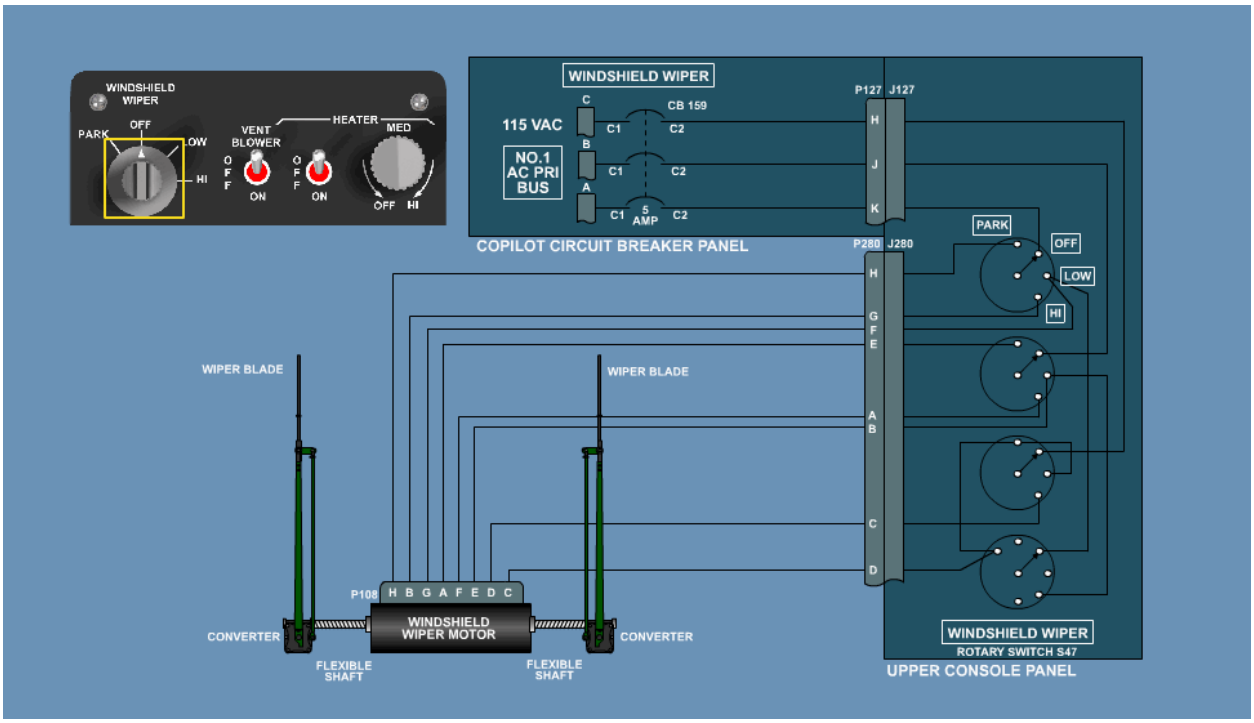
(1) The electrically-operated windshield wiper system consists of a two-speed AC motor, two converters, two wipers, and a control switch.

(2) Power for the wiper system is supplied by the No. 1 primary AC bus through the WSHLD WIPER circuit breaker on the copilot circuit breaker panel.

(3) Windshield Wiper Components

(a) Windshield Wiper Switch

Frame #0026 (Windshield Wiper Switch FLASH)



1) The electrically-operated windshield wiper system consists of a two-speed AC motor, two converters, two wipers, and a control switch.

2) The HI and LOW positions of the WINDSHIELD WIPER control switch, on the upper console, control the wiper blade speed.

3) The PARK position is used to return the wiper blade to the inboard edge of the windshields.

4) Power for the wiper system is supplied by the No. 1 AC primary bus through the WSHLD WIPER circuit breaker on the copilot's circuit breaker panel.

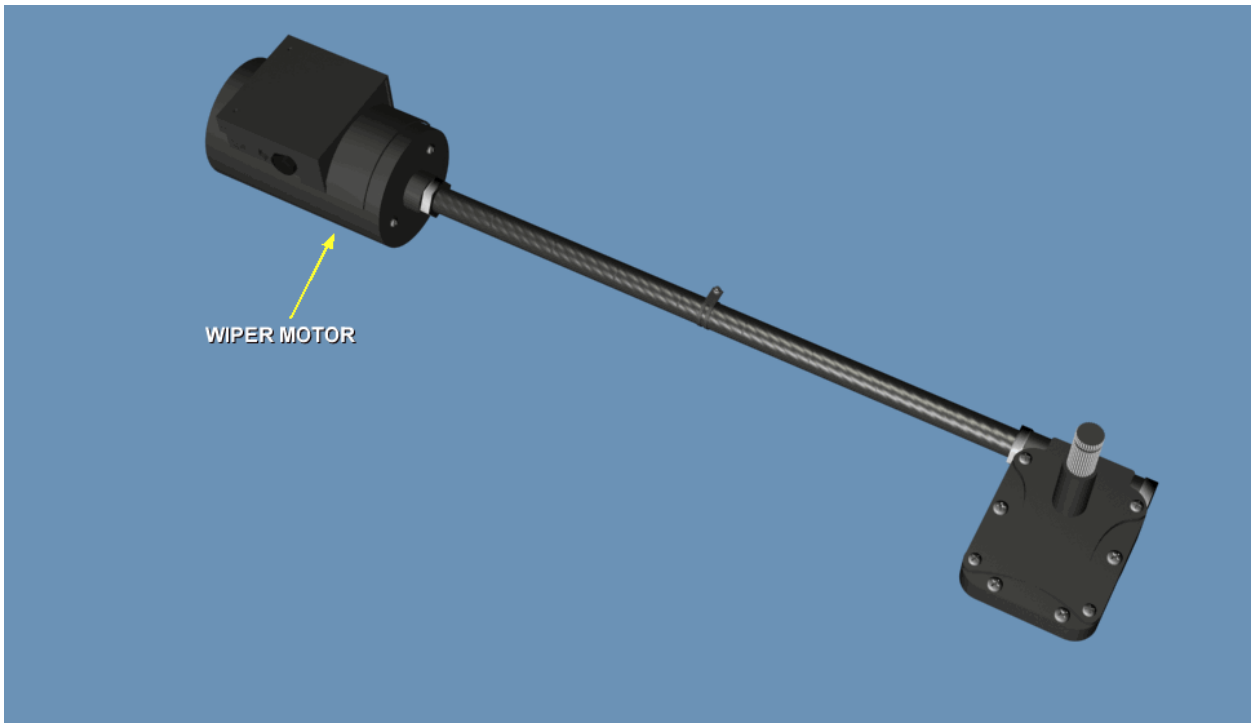
5) Power flows from No. 1 AC primary bus, phase A, to the WIPER MOTOR. When the switch is turned from OFF to LOW or HI, the wipers will operate at the corresponding speed.

6) Power flows from No.1 AC primary bus, phase B, to the WIPER MOTOR. When the switch is released, it will return to OFF.

7) Power flows from No. 1 AC primary bus, phase C to the WIPER MOTOR.

(b) Wiper Motor

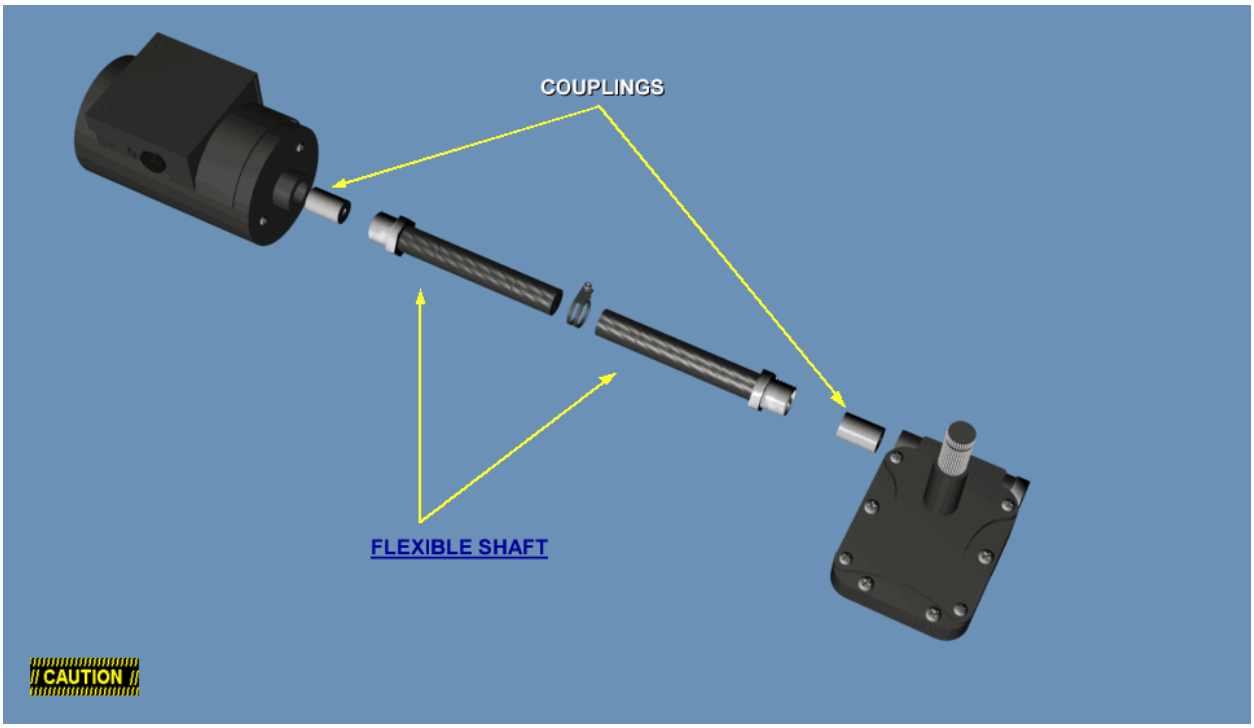
Frame #0027 (Wiper motor)



1) A 115 V AC motor powered through a 5 amp circuit breaker on the No. 1 AC primary bus circuit breaker panel, drives the wiper blades at the selectable speeds; LOW and HIGH.

(c) Flexible Shaft

Frame #0028 (Flexible Shaft)

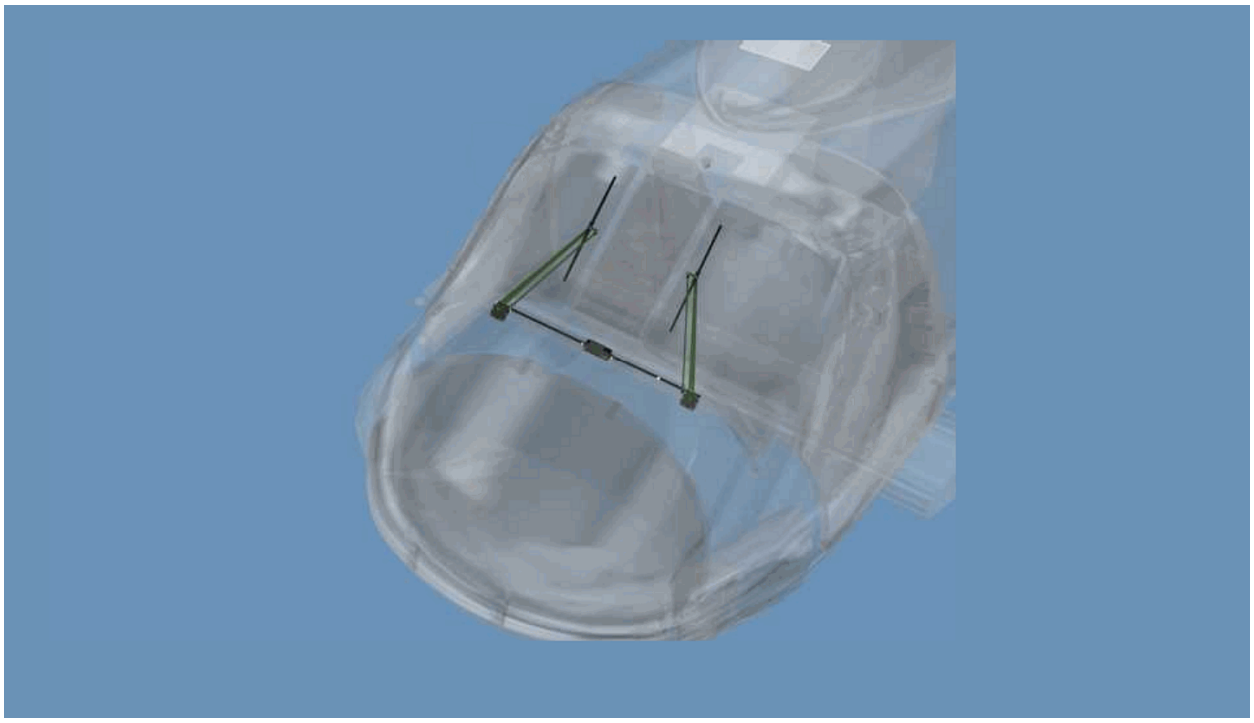


CAUTION: Damage may occur when disconnecting flexible drive shaft from converter and wiper motor. Make sure couplings do not fall from drive shaft casings, converter, or motor, into electronic compartment.

1) Flexible Shaft: The Flexible Shaft connects the motor to the mechanical converter and routes the drive force.

2) It is connected by a small coupling at the motor and the converter.

Frame #0034 (Wiper Motion FLASH)



3) To prevent the scratching of the windshield, make sure windshield is clean and kept wet during operational/troubleshooting procedure, or install cotter pin in hold off pin hole.

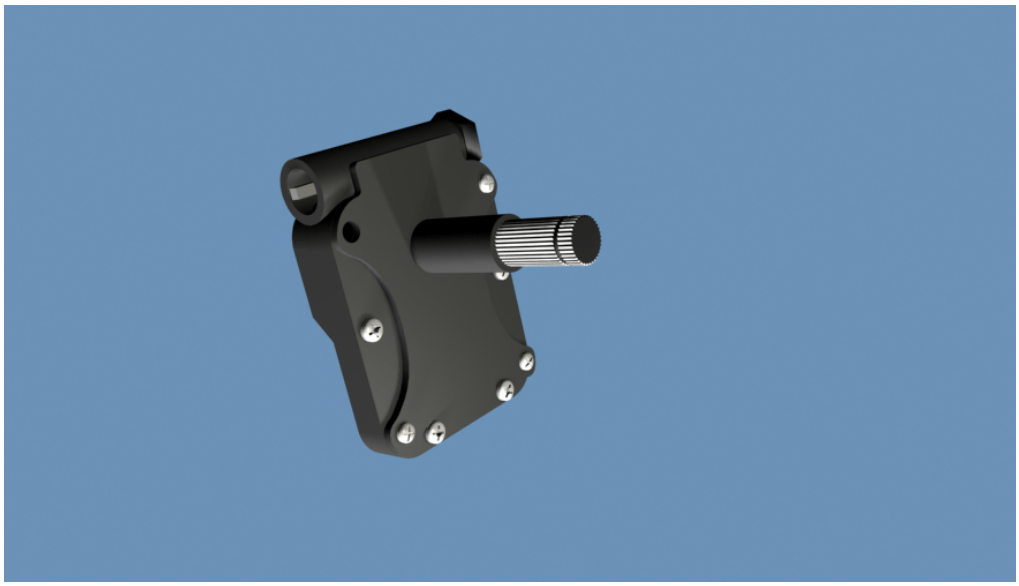
4) Make sure WSHLD WIPER circuit breaker on copilot's circuit breaker panel is pushed in.

5) Both pilot's and copilot's wipers shall operate in both LOW and HI.

6) Both wipers shall return to the normal PARK position (wiper blades parallel to inboard edge of windshield).

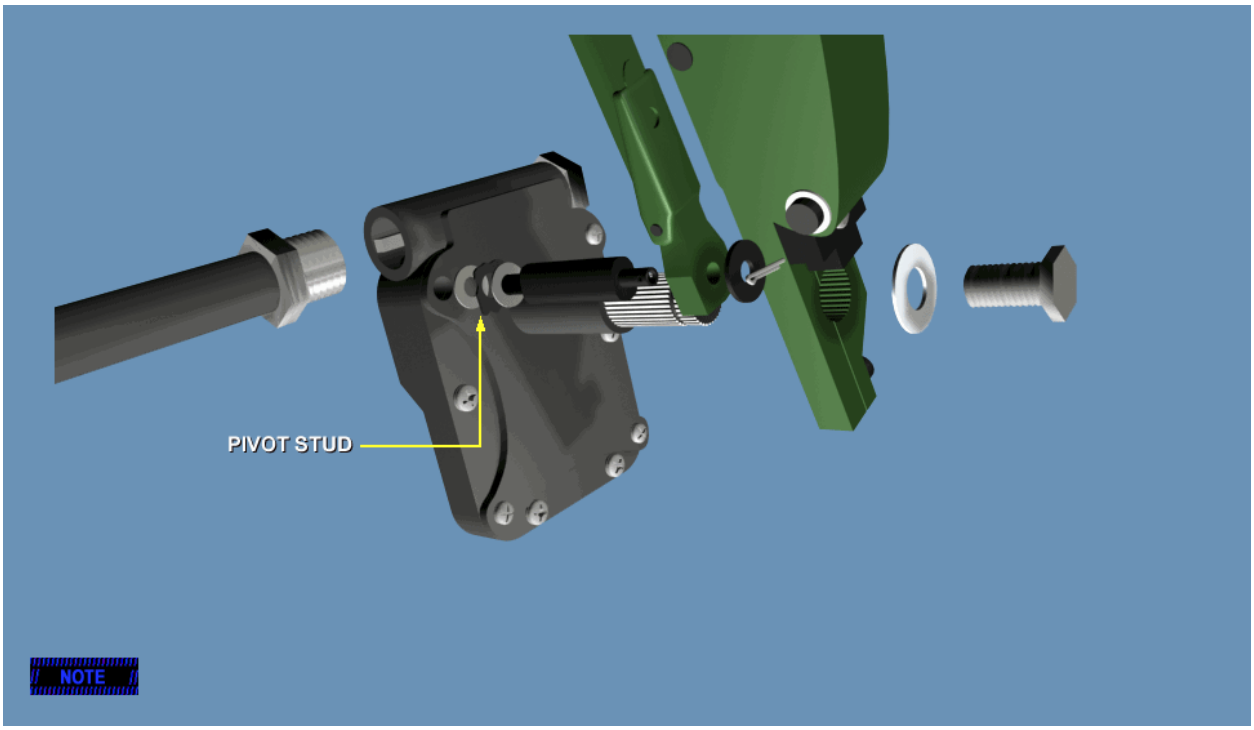
(d) Wiper Converters

Frame #0029 (Wiper Converters)



1) The Converter is a mechanical component, which drives the wiper blade assemblies and encloses a slip clutch mechanism that allows for the "Clap hand" motion.

Frame #0030 (Pivot Stud)



NOTE: Make sure there is one washer, AN960KD10, per three screws and one pivot stud (total of four) is installed between airframe and converter.

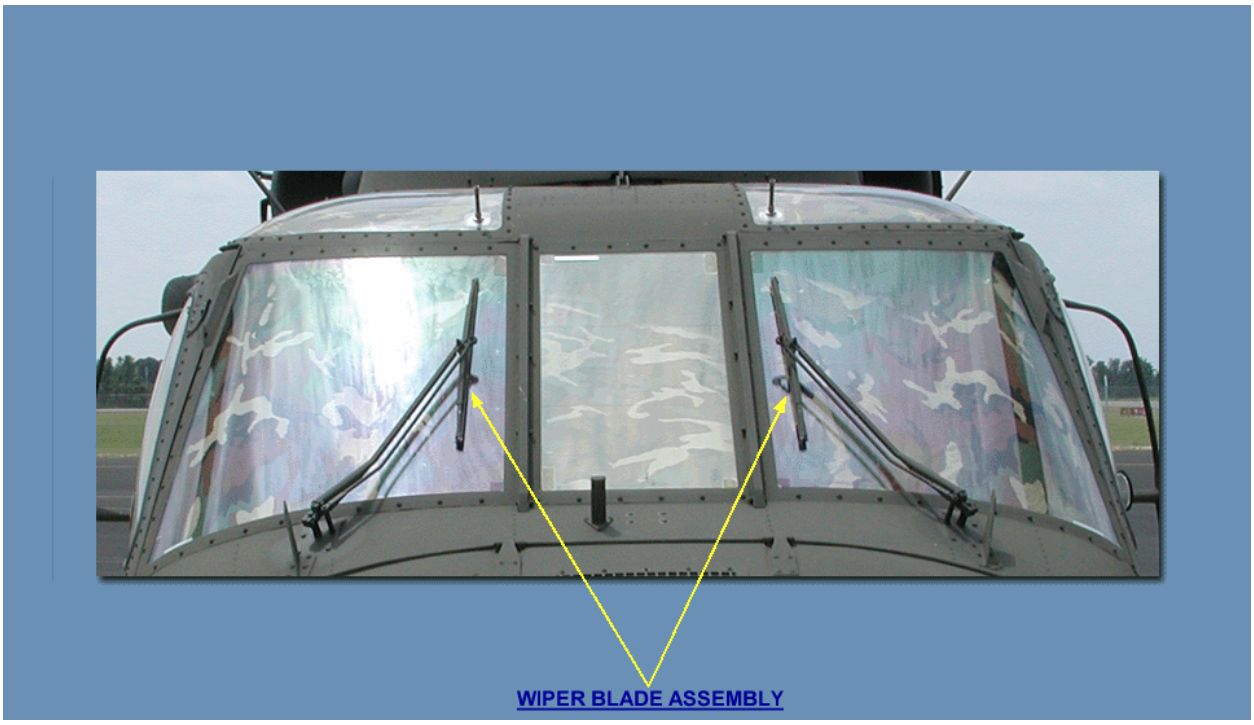
Pay close attention to the small coupling that attaches the Pivot stud to the assembly. It is very small and can get lost easily. This item is normally NOT stocked in tech supply.

2) The Pivot Stud maintains the alignment on the wiper blade while it presses against the windshield.

3) It requires lubrication every 14 days/10 aircraft hours and the Converter every 500 aircraft hours (PMS2) cycle.

(e) Wiper Blade Assembly

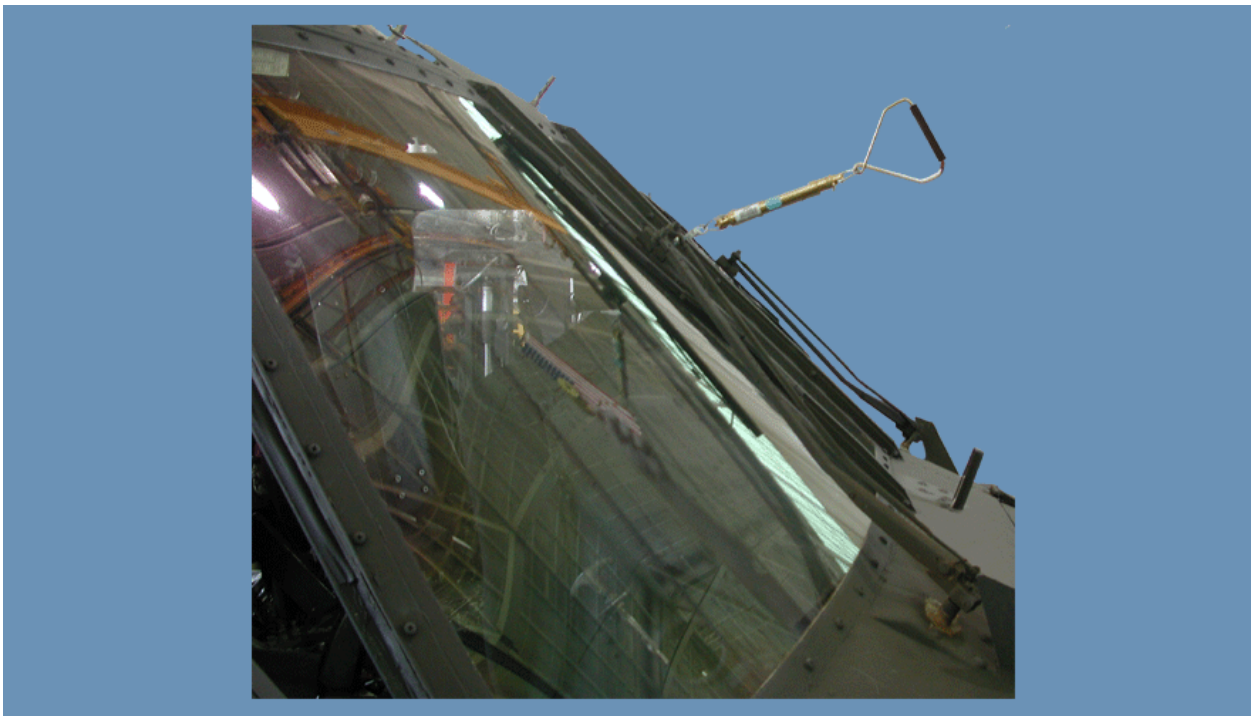
Frame #0031 (Wiper Blade assembly)



1) The Wiper Blade assembly consists of a rubber blade, a link, and an arm.

2) The link is adjustable in order to facilitate alignment of the blade parallel to the center windshield.

Frame #0032 (Adjusting Wiper Blade)



3) The arm is adjustable in order to set the arm angle to center windshield and get proper blade tension.

CHECK ON LEARNING

1. The Flexible shaft is connected by a small coupling at the _____?

1.

2. How often should the Pivot Stud get lubed _____?

2.

3. What are the four positions of the Multi-Position switch?

SECTION III. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the Windshield Wiper System Lesson.
The key points to remember are:

- The UH-60 Blackhawk uses a two bladed, electro-mechanical windshield wiper system, which drive the wiper blades.
- A four-position switch, labeled OFF, LOW, HIGH and PARK, is located on the overhead console. It controls the speed of the wiper blades.
- The 115V AC motor, powered through a 5-amp circuit breaker on the NO. 1 AC primary bus circuit breaker panel, drives the wiper blades at two selectable speeds; LOW and HIGH.
- The Flexible Shaft connects the motor to the mechanical converter and routes the drive force. The flexible shaft is connected by a small coupling at the motor and converter. If the coupling is not installed, the system will NOT operate.
- The Converter is a mechanical component, which drives the wiper blades and assembly, and encloses a slip clutch mechanism that allows for a "Clap hand" motion.
  - Pivot Stud requires lubrication every 14 days/10 aircraft hours, and the Converter every 500 aircraft hours (PMS2).
- The Wiper Blade assembly consists of a rubber blade, a link, and an arm. The link is adjustable in order to facilitate alignment of the blade parallel to the center windshield.

C. ENABLING LEARNING OBJECTIVE No.3

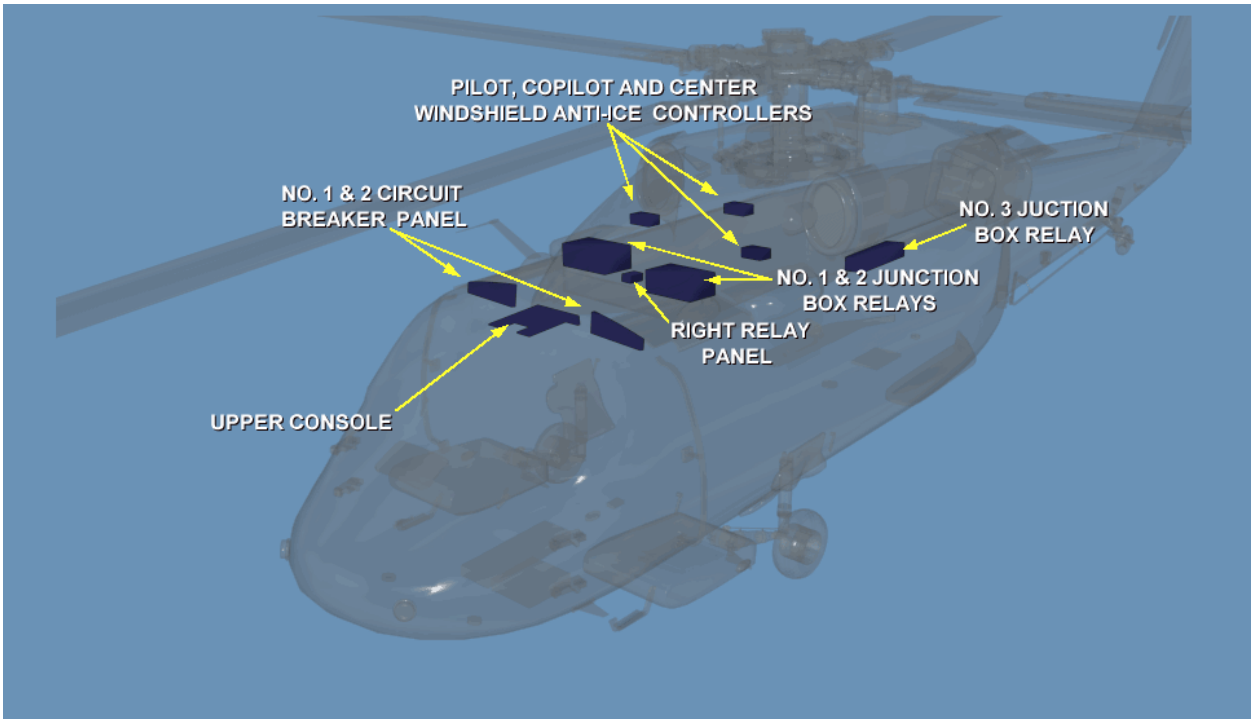
ACTION: Identify the components of the Windshield Anti-ice system.

CONDITIONS: Using TM 1-1520-237-23-7

STANDARDS: IAW TM 1-1520-237-23-7

a. Windshield Anti-Ice System

Frame #0065 (Windshield Anti-ice System component Location Diagram)



(1) The UH-60 Windshield Anti-ice System is designed to prevent ice accumulation by utilizing electrically heated elements laminated between two sheets of glass.

(2) Operation of the system is required prior to entering potential icing conditions (+4 ºC in free air temperature with visible moisture).

(3) Major components location.

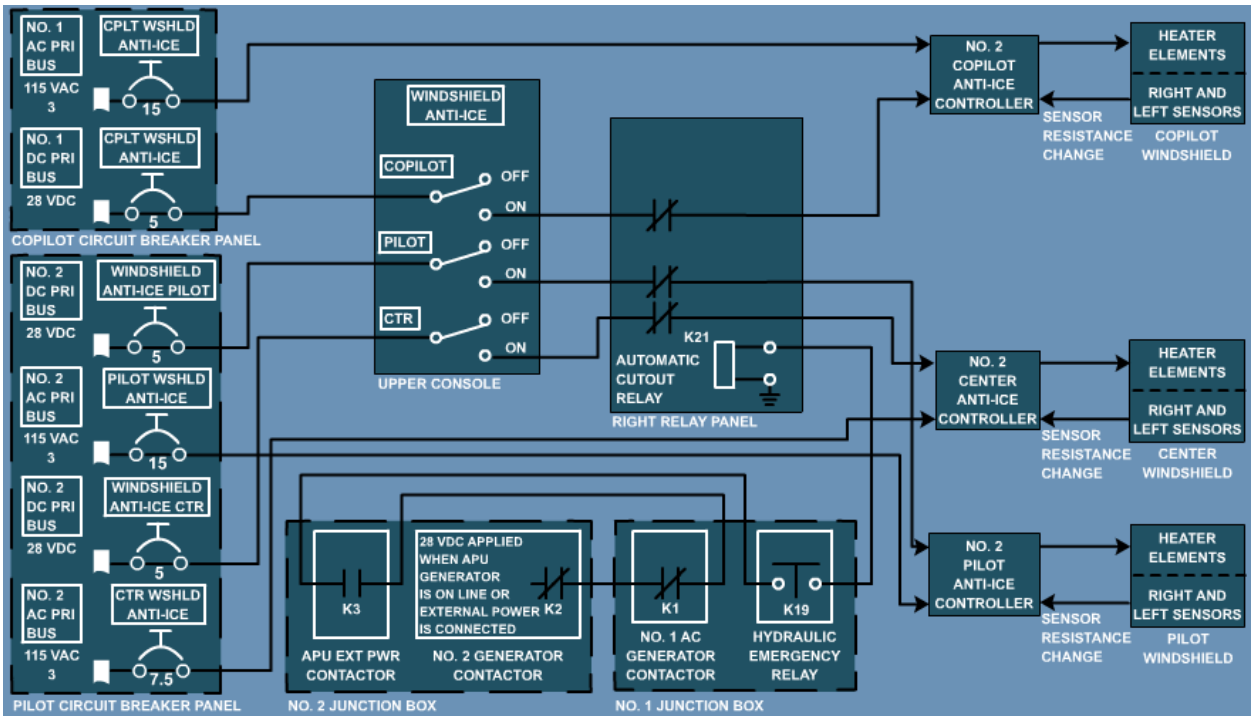
Frame #0070 (Windshield Anti-ice Toggle Switch)

(a) Windshield Anti-ice Toggle Switch

1) Each windshield has a separate Anti-ice toggle switch, located on the overhead console, labeled ON and OFF.

2) This switch controls the 28 V DC to the controller.

Frame #0071 (Anti-ice wiring Diagram)



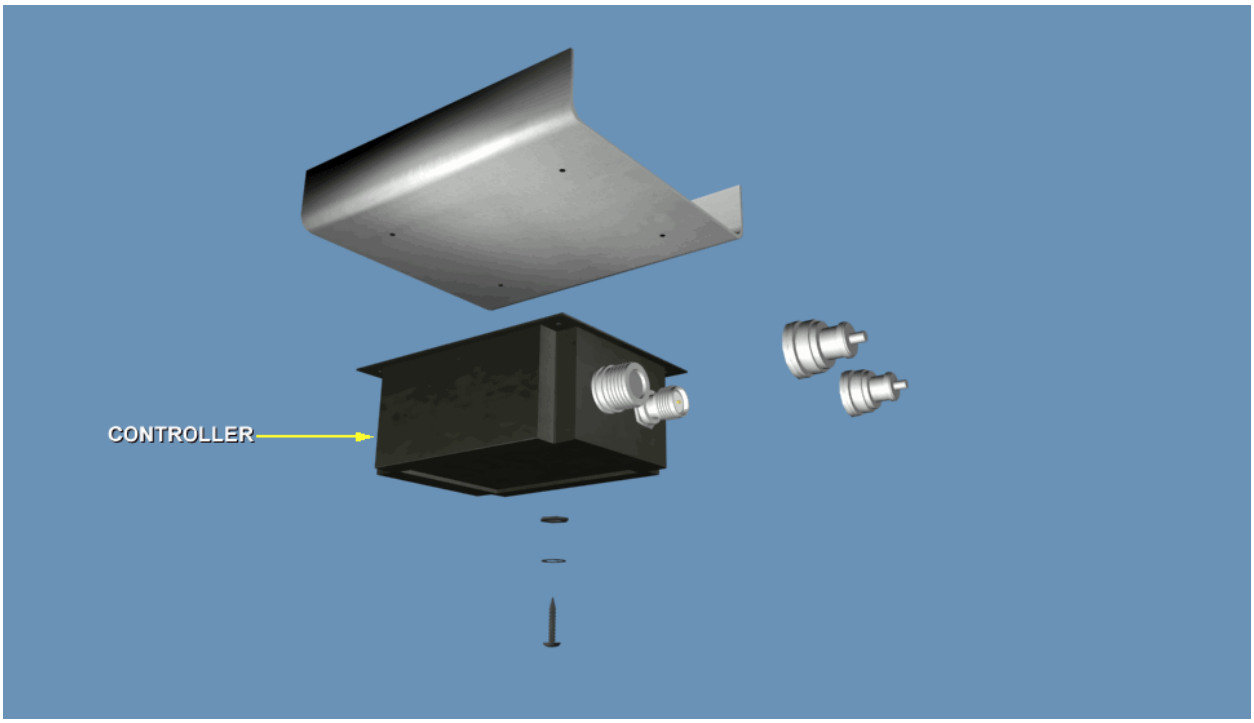
3) With external electrical PWR applied, the windshield anti-ice system is provided ac and dc electrical power from the pilots and copilots circuit breaker panels.

4) Electrical power of 28 V DC is supplied by the No. 1 and No. 2 DC primary buses and routed through the CPLT WSHLD ANTI-ICE, PILOT WSHLD ANTI-ICE, and CTR WSHLD ANTI-ICE circuit breakers and switches.

5) Electrical power of 115 V AC is supplied by the No. 1 and No. 2 AC primary buses and routed through the anti-ice circuit breakers to the pilot, copilot, and center anti-ice controllers.

(b) Controllers

Frame #0075 (Anti-ice Controller)



1) Each windshield has its own controller, controlling the rate and distribution of 115 V AC to the elements.

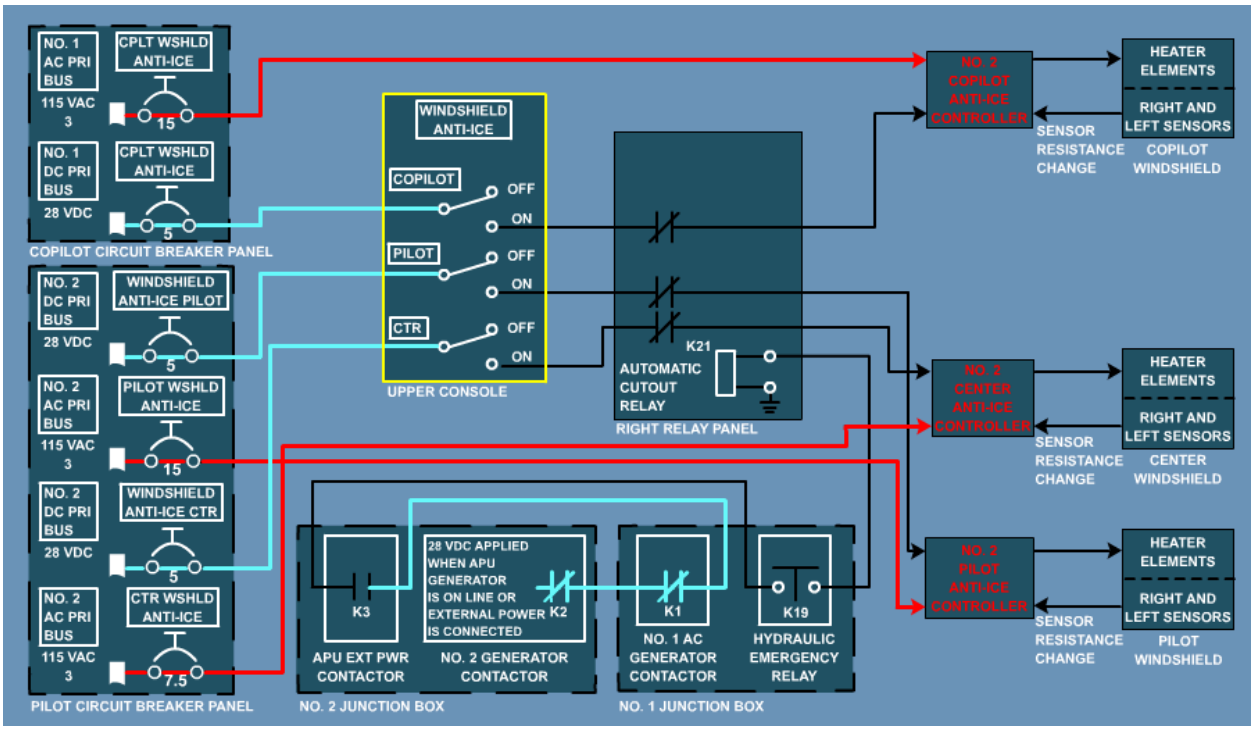
2) The controller contains protection circuitry to prevent damage to the windshield in case of a fault.

3) If a windshield temperature sensor opens or shorts, or if there is a loss of AC or DC power, the anti-ice controller removes power from the windshield heater elements.

4) Each controller in the Anti-ice system is interchangeable.

(c) Anti-ice Wiring Diagram

Frame #0076 (Anti-ice wiring Diagram)



1) With external power applied, the pilot turns on the Anti-ice System utilizing cockpit switches on the overhead console.

2) Once turned on, sensors and controllers monitor and determine the heating functions of the system.

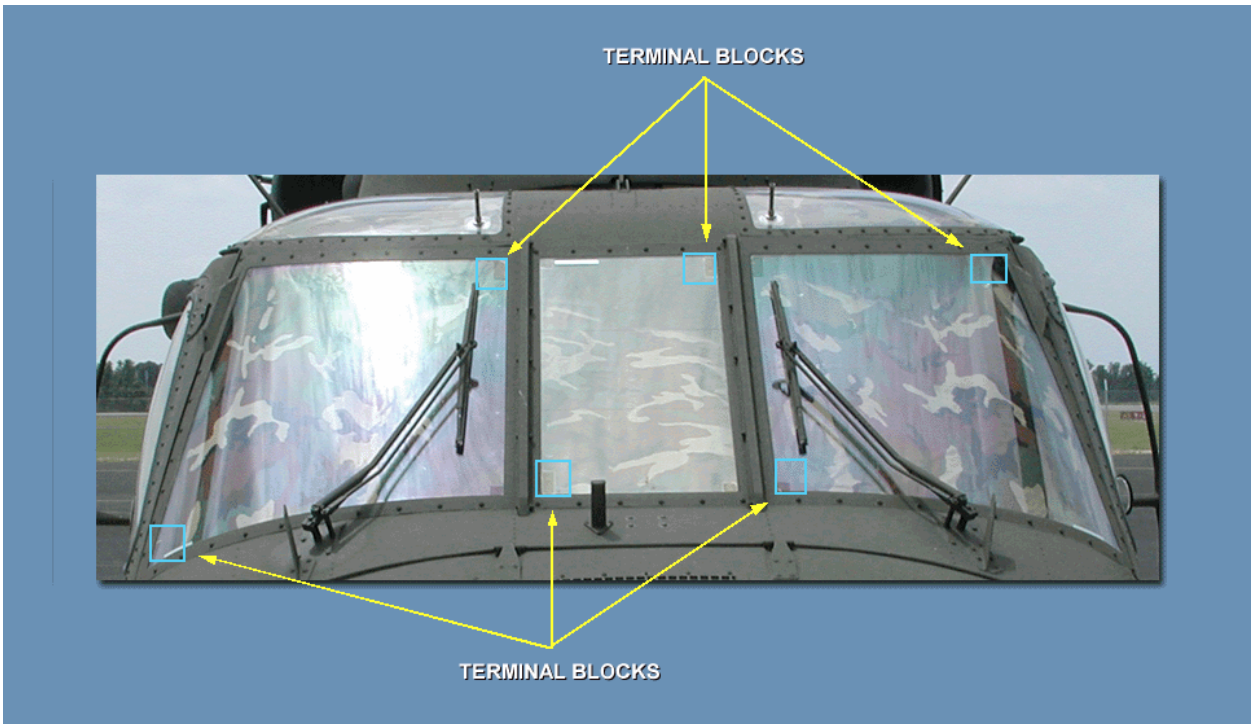
3) The controller then controls the application of 115 V AC to the heating elements.

4) Temperature sensors, in conjunction with fixed resistance elements within the controller, provide resistance signals, which are used to monitor the element temperature between 75 ºF and 115 ºF (23.9 ºC to 46.1 ºC).

5) If a malfunction occurs that allows the temperature to exceed 46 ºC, the controller will automatically turn off.

(d) Terminal blocks

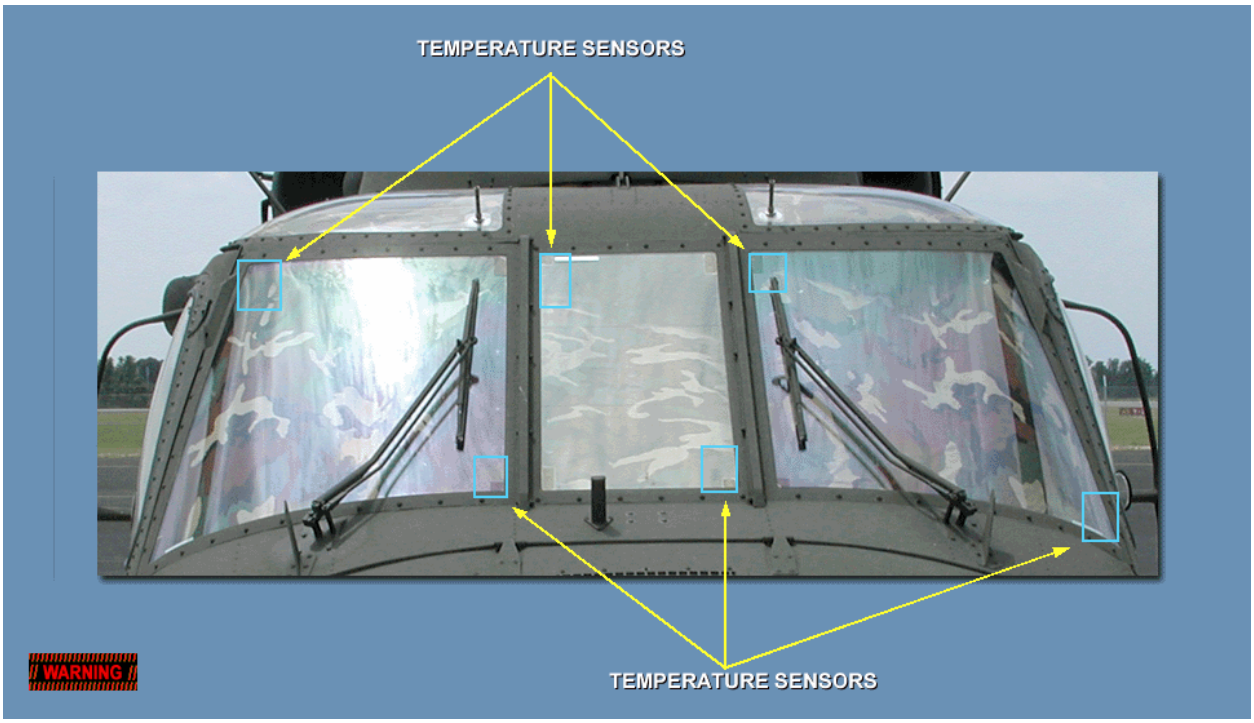
Frame #0079 (Terminal Blocks)



1) The Terminal Blocks carries three-phase, 115 V AC power to heater elements within the windshield to maintain a temperature of 75 ℉ to 115 ℉ on the windshield surface.

(e) Temperature Sensors

Frame #0080 (Temperature Sensors)

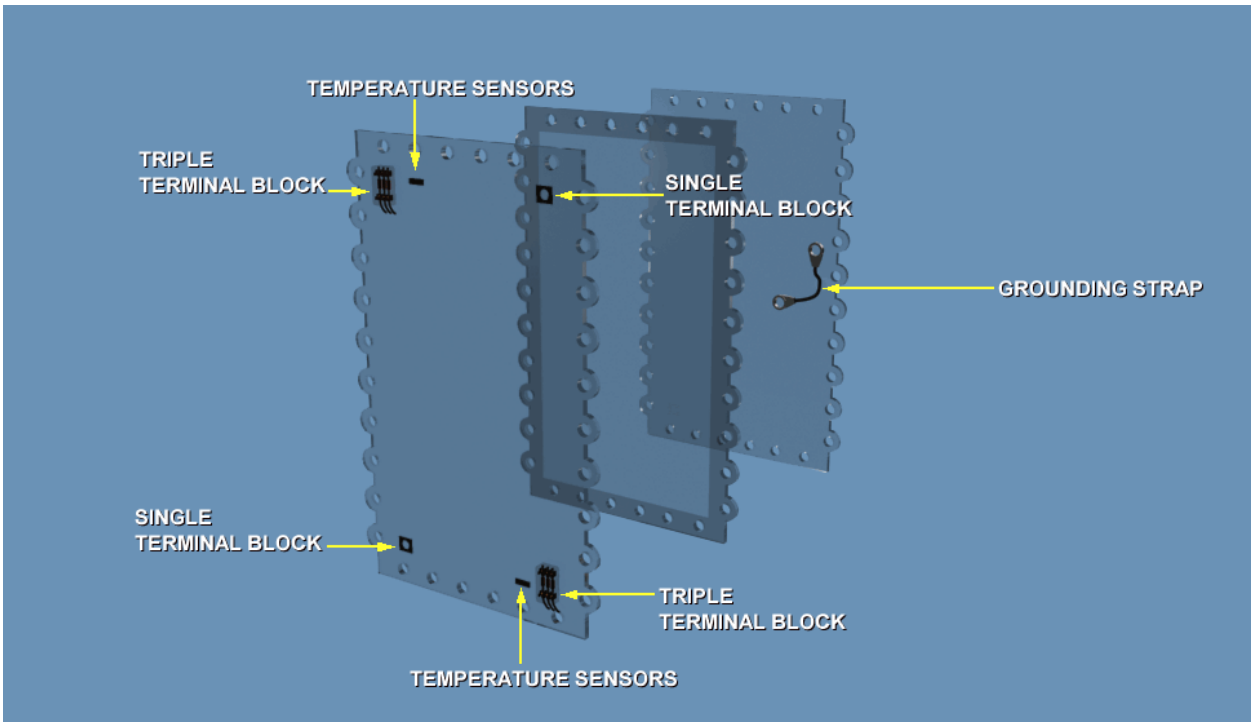


WARNING: If ice is allowed to accumulate on the windshield prior to turning on the anti-ice system, shedding of windshield ice may enter the engine inlets and result in FOD and/or flameout.

1) The system consists of temperature sensors in the pilot, copilot and center windshield.

(f) Windshields

Frame #0081 (Windshields Laminate)



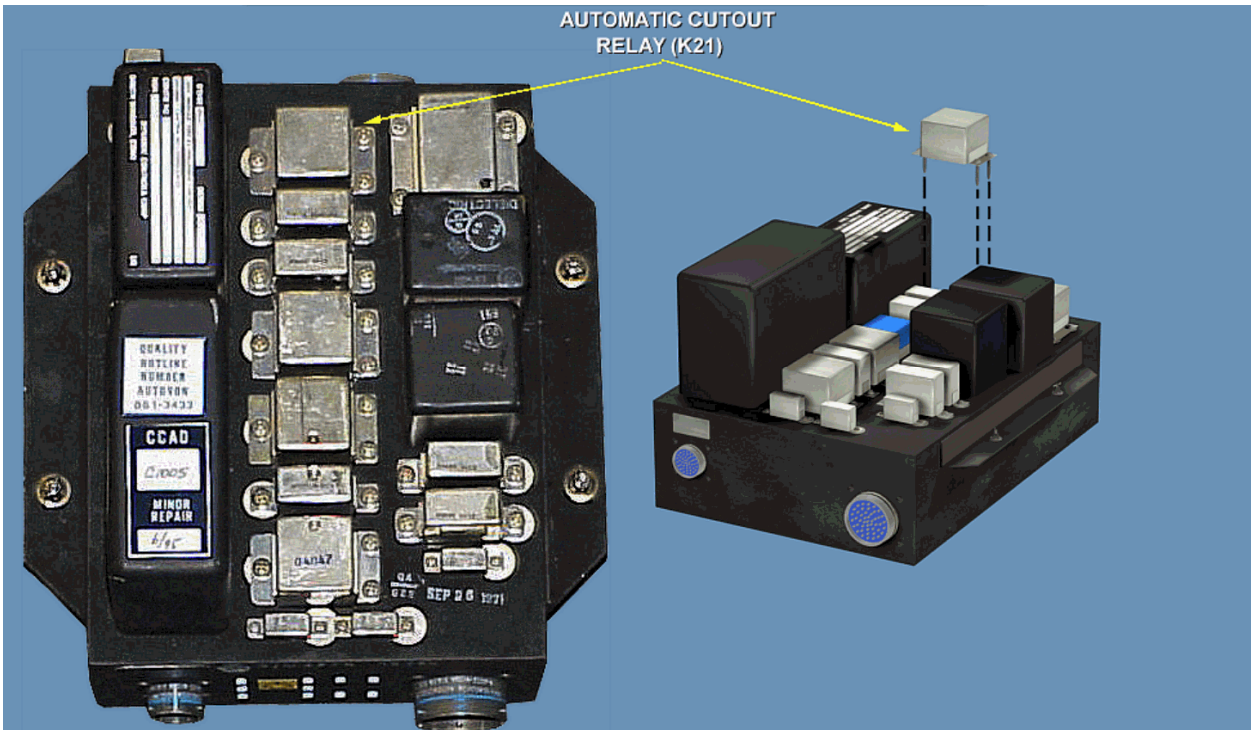
1) The windshield is made of laminated glass with attached heating elements.

2) UH-60 aircraft designated 85-24441 and subsequent, and all aircraft modified with MWO 1-1520-237-50-70 include a center windshield heating element.

3) The windshield has electrical terminals for the power input from the controller and two parallel wired temperature sensors.

(g) Automatic Cutout Relay

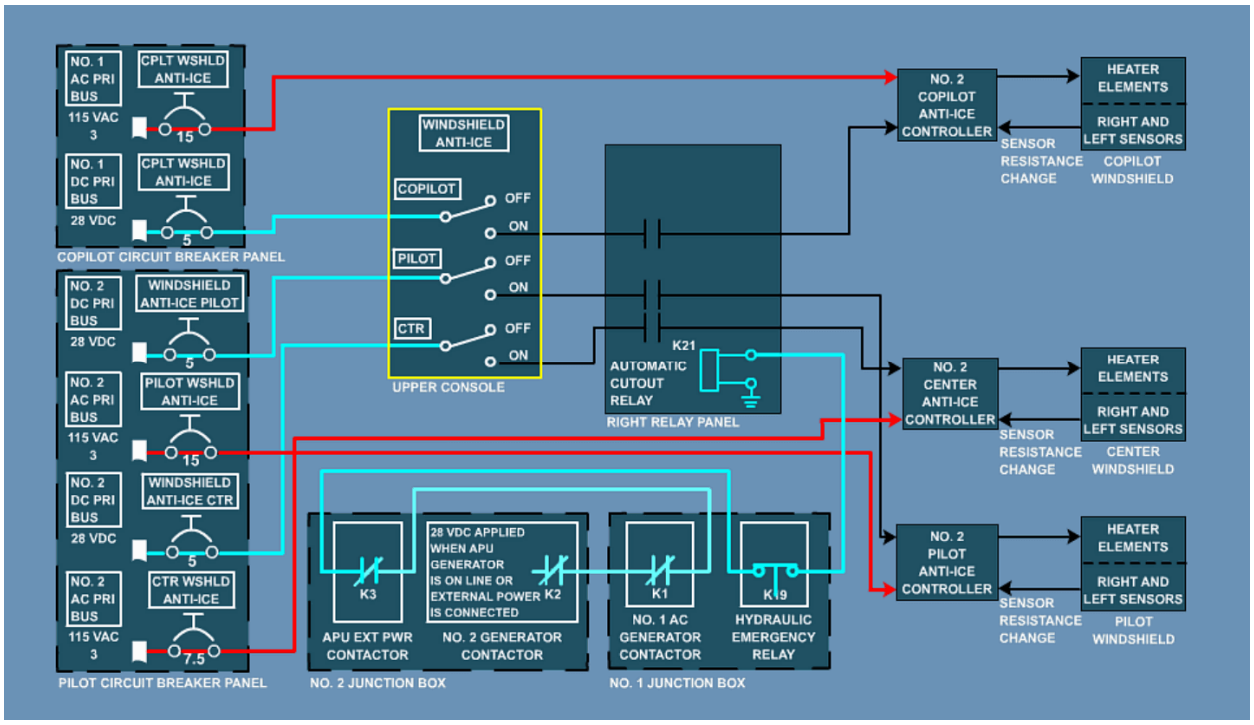
Frame #0085 (Automatic Cutout Relay)



1) When any one of the WINDSHIELD ANTI-ICE switches is placed ON, 28 V DC control voltage is applied through the switch and normally closed contacts of the Automatic Cutout Relay (K21) in the right relay panel, to the respective anti-ice controller.

(h) Principles of Operation.

Frame #0086 (Wiring Diagram Flow)



1) The system will automatically shut off if the auxiliary power unit (APU) generator is the only source of electrical power and the backup hydraulic pump is on.

2) Under these conditions, 28 V DC from the APU is applied through the normally closed contacts of No. 2 and No. 1 AC generator contactors K2 and K1, through the energized contacts of APU/external power contactor K3, and the energized contacts of hydraulic emergency relay K19 to energize automatic cutout relay K21.

3) With K21 energized, the 28 V DC is removed from the anti-ice controller and the system shuts off.

CHECK ON LEARNING

1. Each windshield has its own _____.

2. Where does the electrical terminals in the windshield receive it's power from?

SECTION IV. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the Windshield Anti-ice system lesson.
The key points to remember are:

- The UH-60 Windshield Anti-ice System is designed to prevent ice accumulation by utilizing electrically heated elements laminated between two sheets of glass.
- Each windshield has a separate toggle switch, located on the overhead console, labeled ON and OFF. This switch controls the 28 V DC to the controller.
- Each windshield has its own controller. The controller controls the rate and distribution of 115 V AC to the elements.
- Each windshield incorporates a laminated heating element. UH-60 aircraft designated 85-24441 and subsequent, and all aircraft modified with MWO 1-1520-237-50-70 include a center windshield heating element.
- The windshield has electrical terminals for the power input from the controller and two parallel-wired temperature sensors.
- The windshield anti-ice lockout relay is located inside the right relay panel. Windshield anti-ice will be locked out anytime the APU generator is the sole source of power and the back-up hydraulic pump is ON.

D. ENABLING LEARNING OBJECTIVE No.4

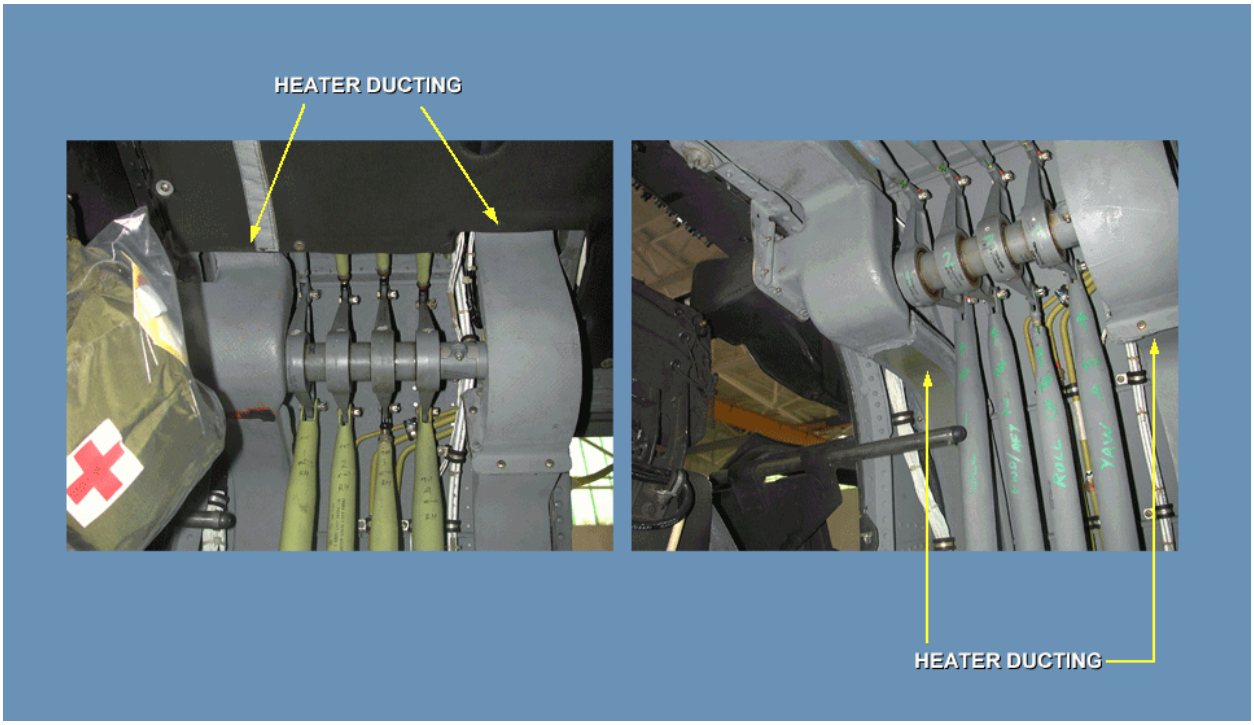
ACTION: Identify the components of the Heater and Ventilation system.

CONDITIONS: Using TM 1-1520-237-23-7

STANDARDS: IAW TM 1-1520-237-23-7

a. Heater and Ventilation System

Frame #0105 (Heater Air Duct Installation)

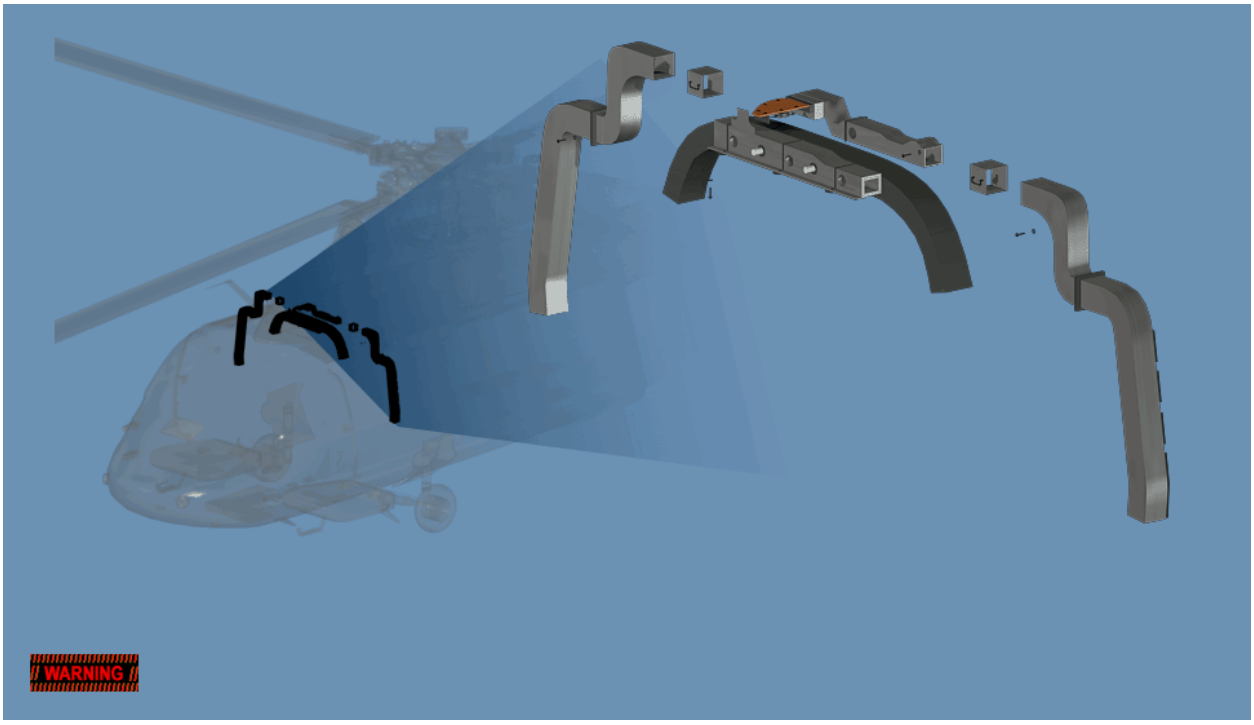


(1) The heating and ventilation system consists of a heating system with a winterized subsystem, a ventilation system, heat and ventilation controls.

(2) The heating system is supplied with bleed-air by the main engines under flight conditions or the APU during ground operations.

(3) The heater system uses a bleed-air mixing valve to mix engine or APU bleed-air and ambient air at a cockpit selected mixture temperature.

Frame #0107 (Heating Ventilation)



WARNING: Because of the temperature ranges when cleaning the ducts: Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard. Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.

(4) Heated air is distributed to the cockpit and cabin through a system of ducts.

(5) Heat and vent ducts are made from Kevlar/epoxy (reinforced plastic).

(6) Dampeners, slide assemblies, brackets, and angles are aluminum alloy.

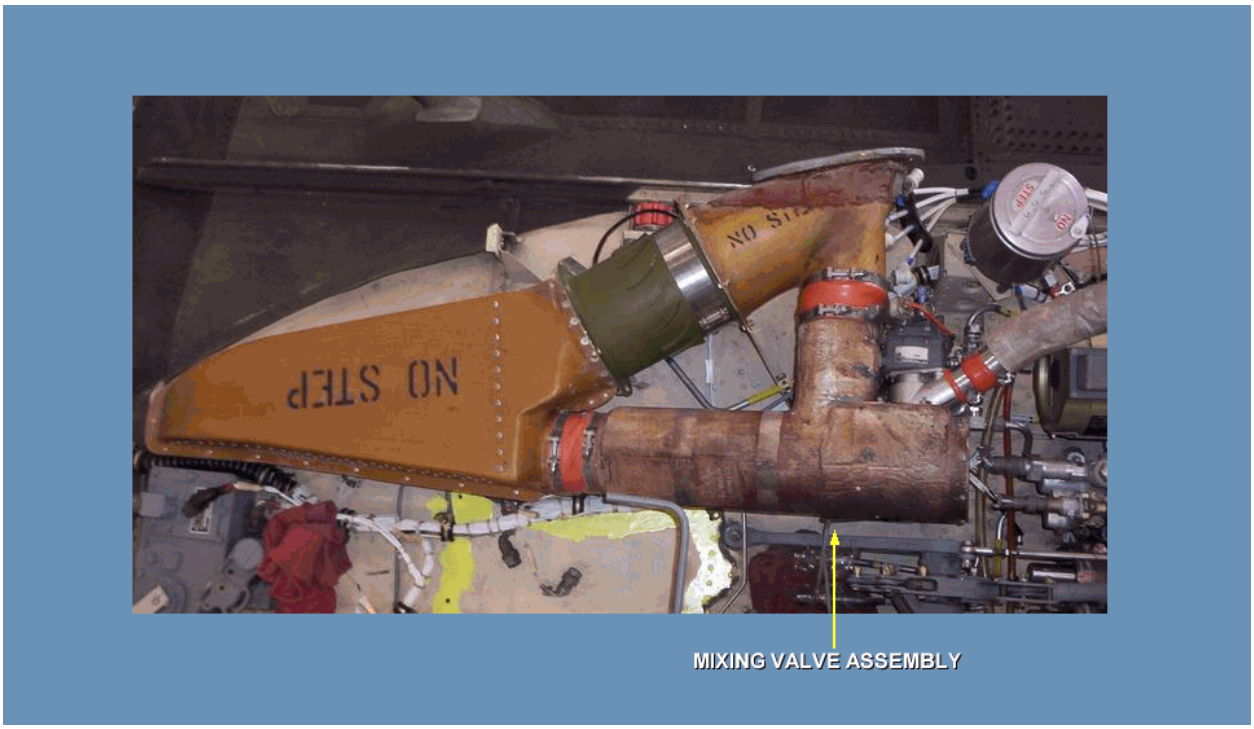
(7) Shafts for dampeners are made from 4130 steel rod.

(8) The ventilation system provides ventilated air to the cockpit and cabin.

(9) Air obtained from outside the helicopter by an air intake duct is then distributed by the blower unit through the heating system ducts.

(a) Mixing Unit

Frame #0110 (Mixing Unit)



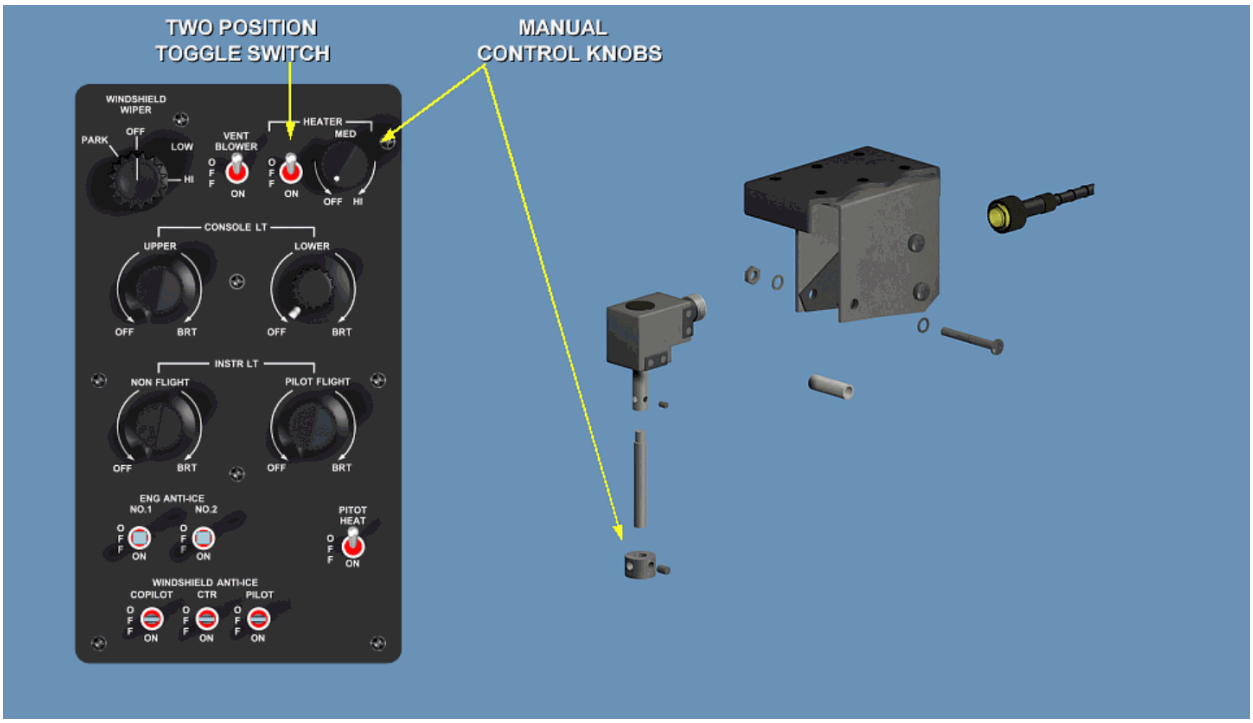
1) The Mixing Valve, or part number 70309-02113-101, has a mode that gives additional bleed-air for maximum heating capacity.

2) When the ENG ANTI-ICE No. 1 or No. 2 switch is ON, or the bleed-air pressure entering the mixing valve is above 200 °F, the winterization mode of the valve is shut off, and the valve operates in the normal mode.

3) On helicopters with mixing valve part number 70309-02101-103, the heater system gives a temperature of 40 °F when the outside ambient temperature is -25 °F, and part number 70309-02113-101, 40 °F when the outside ambient temperature is -65°F.

(b) Heater Controls

Frame #0115 (Heater Controls)

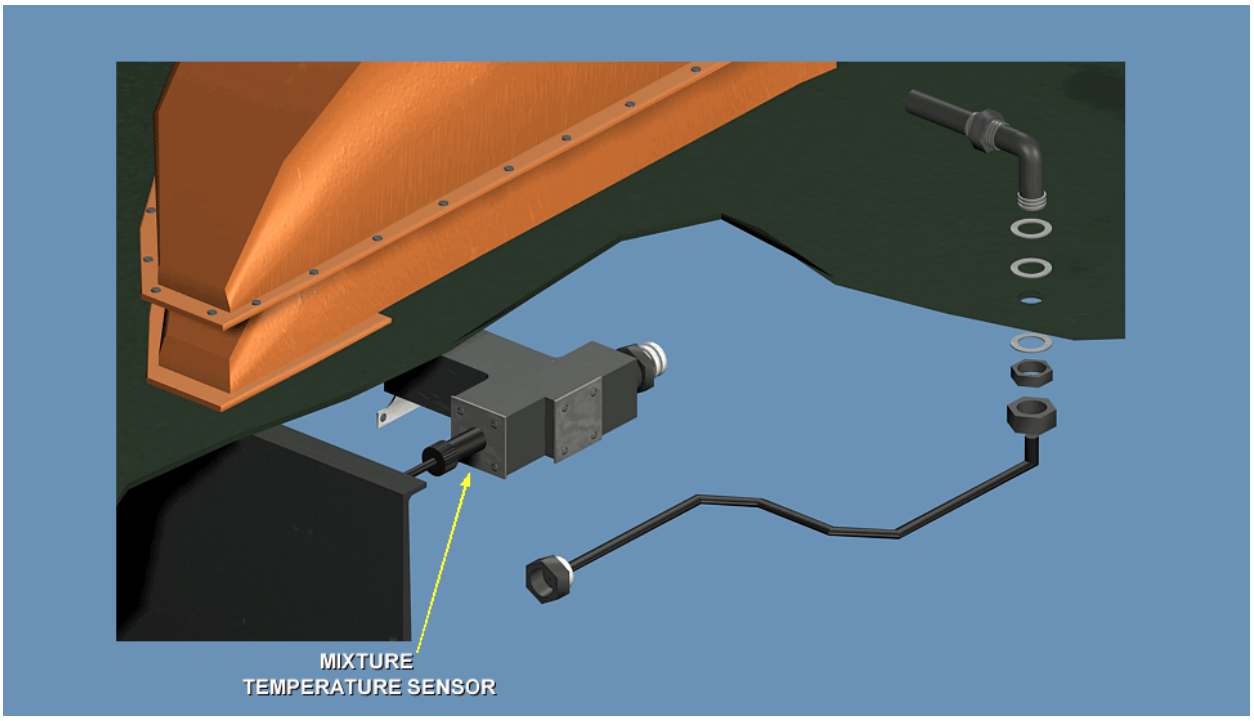


1) The manual control knob is interconnected through the upper console panel next to a two position toggle switch labeled ON and OFF, this allows 28 V DC to energize the shutoff valve and the pilot and copilot to adjust the mixer temperature to control cabin ambient temperature.

2) Turning the knob from OFF to MED or HI regulates the temperature of heated air entering the cabin by allowing more bleed-air to pass through the mixing valve into the cabin heat ducting.

(c) Mixture Temperature Sensor

Frame #0120 (Mixture Temperature Sensor)



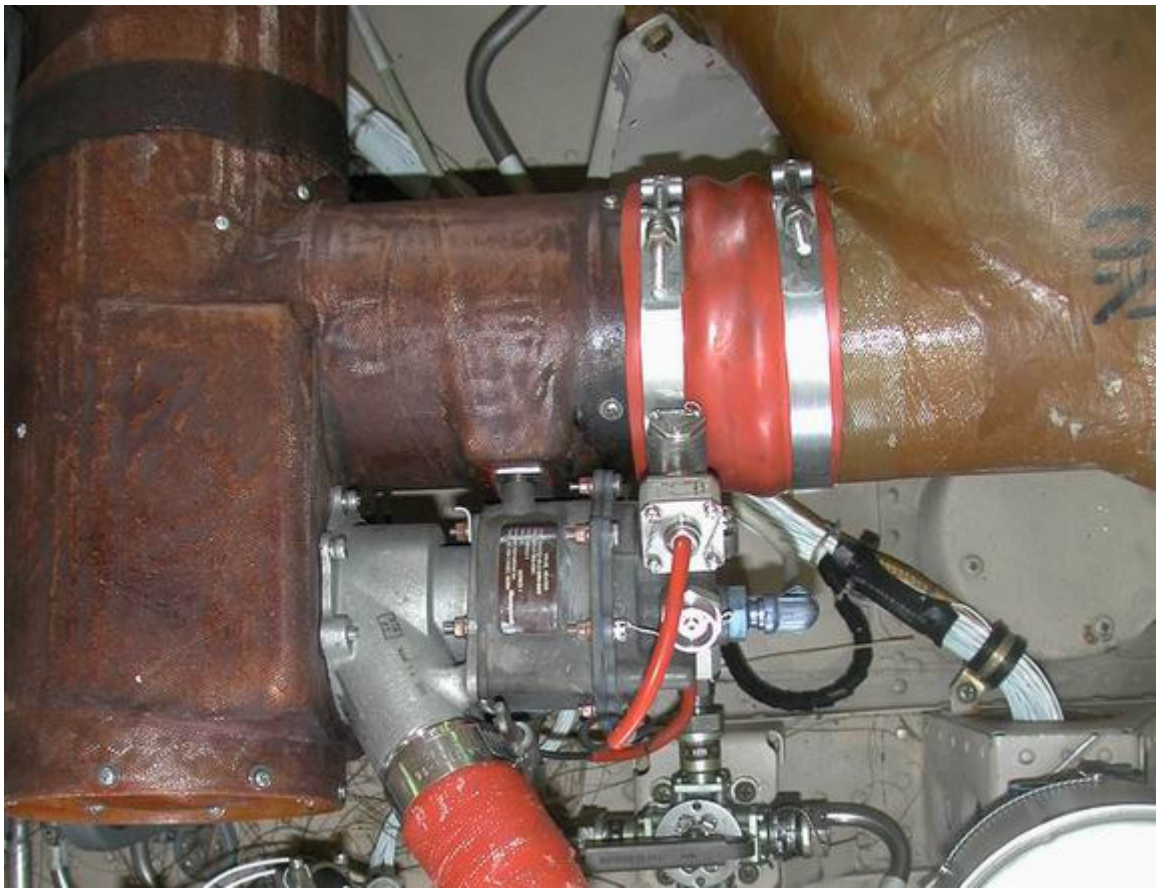
1) A Mixture Temperature Sensor works along with the bleed-air mixture valve, by regulating the bleed-air flow to match the mixture temperature selected at the cockpit heating control.

2) Temperature sensors prevent the heater from an over temperature condition, as a result of a mixer failure.

3) When the temperatures rises above 93 ºC (200 ºF) an overtemp is detected, the sensor opens a circuit to the shutoff valve, closing bleed-air flow preventing an overtemp condition.

(d) Regulation Valve

Frame #0125 (Regulation Valve)

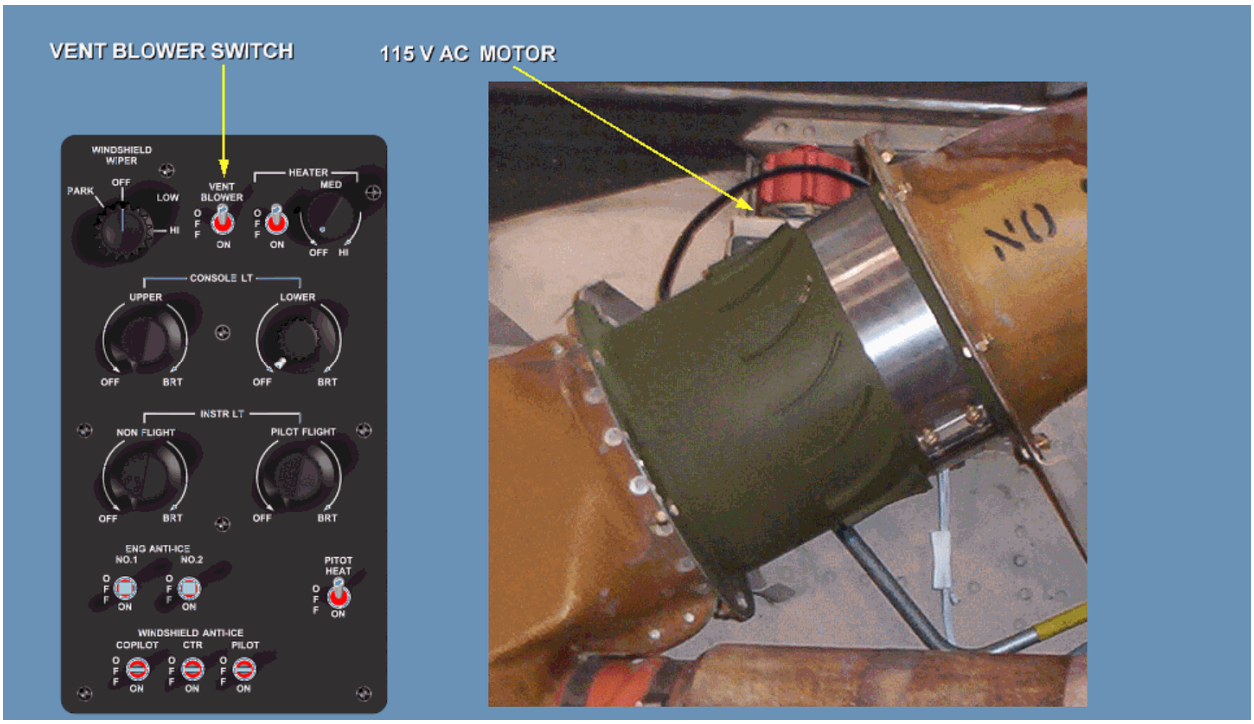


1) The regulation valve inlet pressure is pre-set at the factory.

2) The valve reduces bleed-air pressure as it comes from the engine to be mixed in the mixer valve.

(e) Vent Blower Switch

Frame #0128 (Vent Blower Switch)



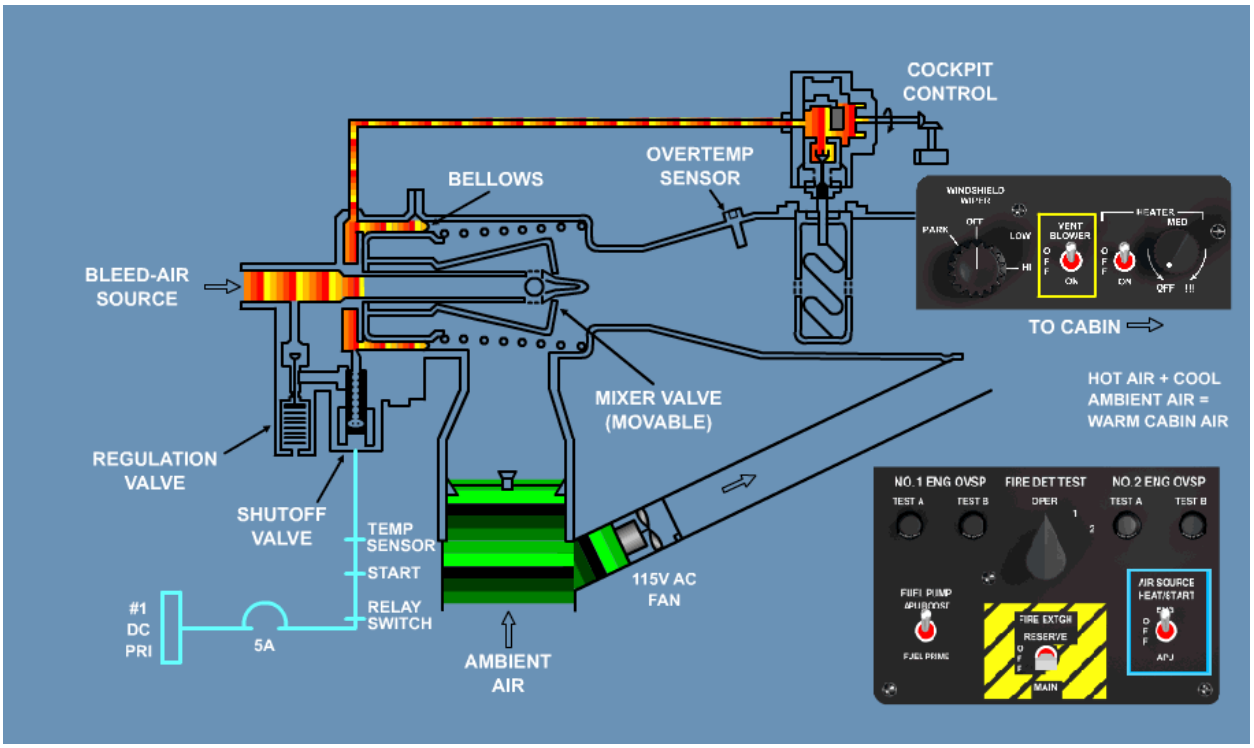
1) The VENT BLOWER switch is located on the upper console.

2) Placing the switch to the ON position completes the electrical circuit to the blower motor.

3) Ambient air obtained through the air intake duct is then distributed by the blower unit through the heating system ducts.

(f) Principles of Operation

Frame #0130 (Heater Operation FLASH)



1) Placing the AIR SOURCE HEAT/START switch on the upper console to ENG, opens the No. 1 and No. 2 engine cross-bleed valves, and engine bleed-air goes to the mixing valve.

2) The 115 V AC fan pulls in outside air through the external air intake and circulates it through the cabin heat ducting.

3) The HEATER control knob on the upper console controls the temperature of the heated air entering the cabin.

4) Turning the cockpit control knob from OFF to MED or HI, regulates the temperature of heated air entering the cabin by allowing more bleed-air to pass through the mixing valve into the cabin heat ducting.

5) Once a temperature level is set, a bimetallic strip regulates the temperature.

6) An over-temperature sensor, wired in series, protects the unit and its ducting by opening a circuit, if temperature mix exceeds 93 ºC (200 ºF).

7) The shutoff valve closes the MIXER VALVE and bleed-air flow is stopped.

CHECK ON LEARNING

1. Perform Drag and drop check on learning. (Frame 0145)

2. What function does the Over Temperature Sensor provide?

3. The heating and ventilation system provides heated air utilizing?

SECTION V. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the Heating and Ventilation lesson.
The key points to remember are:

- The heating system is a bleed-air system with bleed-air supplied by the main engines under flight conditions or the APU during ground operations.
- Heat and vent ducts are made from Kevlar/epoxy (reinforced plastic). Dampers slide assemblies, brackets, and angles are aluminum alloy. Shafts for dampers are made from 4130 steel rod.
- The Regulation valve is pre-set from the factory; it regulates incoming bleed-air pressure from the engine.
- The movement of the mixer is solely determined by the pilot. The smaller the opening (warmer setting) the more bleed-air to ambient air is mixed and released into the cabin.
- The Vent Switch located on the overhead console, allows 28V DC to energize the blower to control cabin ambient airflow.

E. ENABLING LEARNING OBJECTIVE No.5

ACTION: Identify the component of the Cargo Hook system.

CONDITIONS: Given a list of components and functions. Using TM 1-1520-237-23-7

STANDARDS: IAW TM 1-1520-237-23-7

a. Cargo Hook System

Frame #0165 (Cargo Hook System Slide)

WARNING: Injury to personnel will result if explosive cartridge accidentally fires. Explosive cartridges may be fired by radio or radar frequencies. Short circuit explosive cartridge connector pins to prevent accidental firing.

Injury to personnel and damage to equipment will result if explosive cartridges are inadvertently activated. All explosive cartridges shall be handled as live ammunition. Explosive cartridges which have been fired may retain an explosive residue capable of presenting a hazardous condition.

(1) Description - The cargo hook system consists of a 9000 pound-capacity hook and electrical circuits which control it.

(2) The hook is located in the "cargo hook well", underneath the cabin floor.

(a) The cargo hook can be placed in a stowed position (shown un-stowed) by opening the cargo hook access cover in the cabin floor, and pulling the hook to the right and up.

(b) The cargo hook shall be maintained in the stowed position while not in use.

(c) When the hook is in the stowed position, the load beam rests on a spring-loaded latch assembly and is prevented from vibrating by a Teflon bumper applying downward pressure on the load beam.

(d) To release the hook from its stowed position, downward pressure is placed on the latch assembly lever, retracting the latch from beneath the load beam, allowing the cargo hook to swing into the operating position.

(3) Cargo Hook Switches

Frame #0170 (Cargo Hook Switches)

(a) The cargo hook system consists of a 9000-pound-capacity hook and electrical circuits which control it.

(b) The hook is in the cargo hook well underneath the cabin floor.

(c) The electrical controls of the cargo hook system consist of the following:

1) A CARGO HOOK ARMING switch labeled SAFE and ARMED.

2) A CARGO HOOK CONTR switch labeled CKPT and ALL.

3) CARGO HOOK EMER REL switch labeled NORM, OPEN and SHORT.

4) A TEST light; CARGO REL switches on the pilot and copilot cyclic stick.

(4) Cargo Hook Control Buttons

Frame #0175 (Cargo Hook Control Buttons)

(a) Cargo hook emergency release power is provided by the DC essential bus through the CARGO HOOK EMER circuit breaker.

(b) When the crewman's cargo hook pendant EMER RLSE button, or the pilot's or copilot's collective stick emergency hook release switch is pressed, DC power is supplied through R4 to the EMERG REL switch on the upper console.

(c) With the EMERG REL switch placed to NORM, DC power is routed to the pressure cartridge (squib).

(d) The cartridge explodes and the pressure from the explosion drives a piston into the lock, releasing the load arm.

(5) Crew Chiefs Pendant

Frame #0180 (Crew Chiefs Pendant)

WARNING: Injury to personnel and damage to equipment will result if explosive cartridges are inadvertently activated. All explosive cartridges shall be handled as live ammunition. Explosive cartridges which have been fired may retain an explosive residue capable of presenting a hazardous condition.

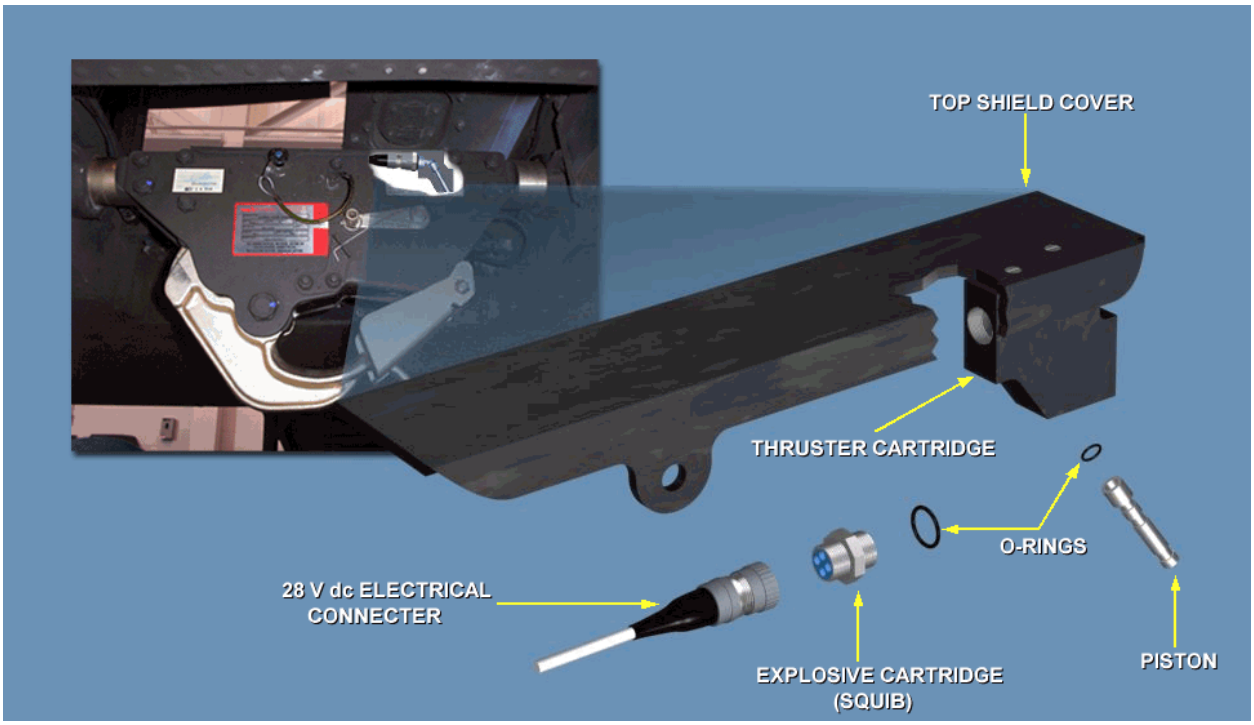
(a) The crewman cargo hook pendant consists of two normally open push-button switches marked NORMAL RLSE and EMER RLSE.

(b) The switches control the release of the cargo hook under normal and emergency conditions.

(c) Guards are mounted over each switch to prevent accidental cargo release.

(6) Cargo Hook Cartridge (Squib)

Frame #0182 (Cargo Hook Cartage Squib)



(a) The Explosive Cartridge (Squib) is located inside the cargo hook assembly.

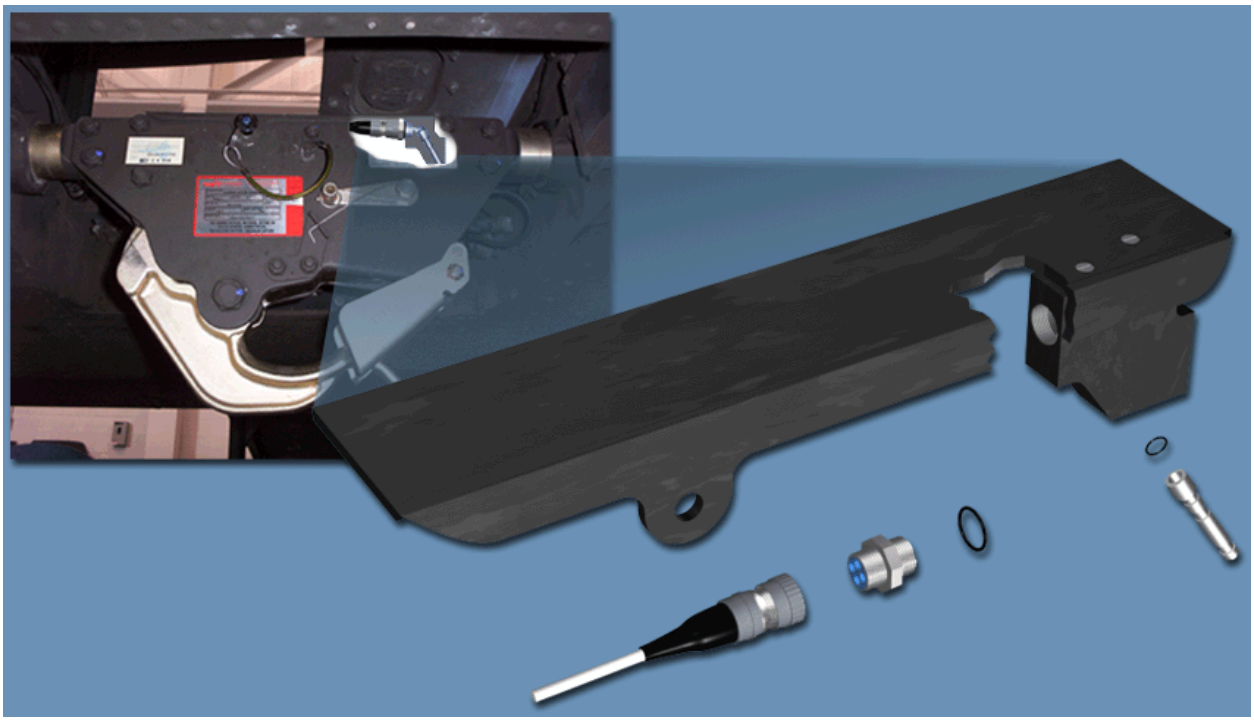
(b) This squib is used to release the load under emergency conditions.

(c) When 28 V dc is supplied to the cartridge, it explodes driving a piston from inside the squib into the hook load arm lock to release the hook.

(d) The load beam will drop the load and the CARGO HOOK OPEN light will stay on until the old squib has been replaced.

(e) If explosive cartridge (squib) has been fired, remove and replace entire top shield assembly complete with thruster cartridge.

Frame #0185 (Cargo Hook Squib)



NOTE: Installed life is the period of time a Cartridge Activated Device (CAD) is allowed to be used after its hermetically-sealed container is opened; however, the installed life expiration date shall never exceed the shelf life expiration date. The installed life expiration date is computed from the date the hermetically-sealed container is open and is always computed to the last day of the month involved. Refer to TM 9-1377-200-20 for service life extension.

(f) Check explosive cartridge electrical connector for corrosion and cracks.

(g) Check connector wire harness for cuts, cracks, or holes and clamps for tightness.

(h) Replace hooks having wiring or connector damage.

(i) Dispose of any unfired squib according to local command directives and Calendar Retirement Schedule

CHECK ON LEARNING

1. What components make up the cargo hook system?

2. How is the cargo hook pendant marked?

3. What is used to discharge the hook in an EMERGENCY?

SECTION VI. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the Cargo Hook System lesson.
The key points to remember are:

- The cargo hook system consists of a 9000 pound-capacity hook and electrical circuits which control it.
- When the hook is in the stowed position, the load beam rests on a spring-loaded latch assembly and is prevented from vibrating by a Teflon bumper applying downward pressure on the load beam.
- The electrical controls of the cargo hook system consist of the following, a CARGO HOOK ARMING switch labeled SAFE and ARMED, CARGO HOOK CONTR switch labeled CKPT and ALL, CARGO HOOK EMER RELEASE switch labeled NORM, OPEN, and SHORT, and a TEST light.
- The crewman cargo hook pendant consists of two normally open push-button switches marked NORMAL RLSE and EMER RLSE.
- The switches control the release of the cargo hook under normal and emergency conditions.

F. ENABLING LEARNING OBJECTIVE No.6

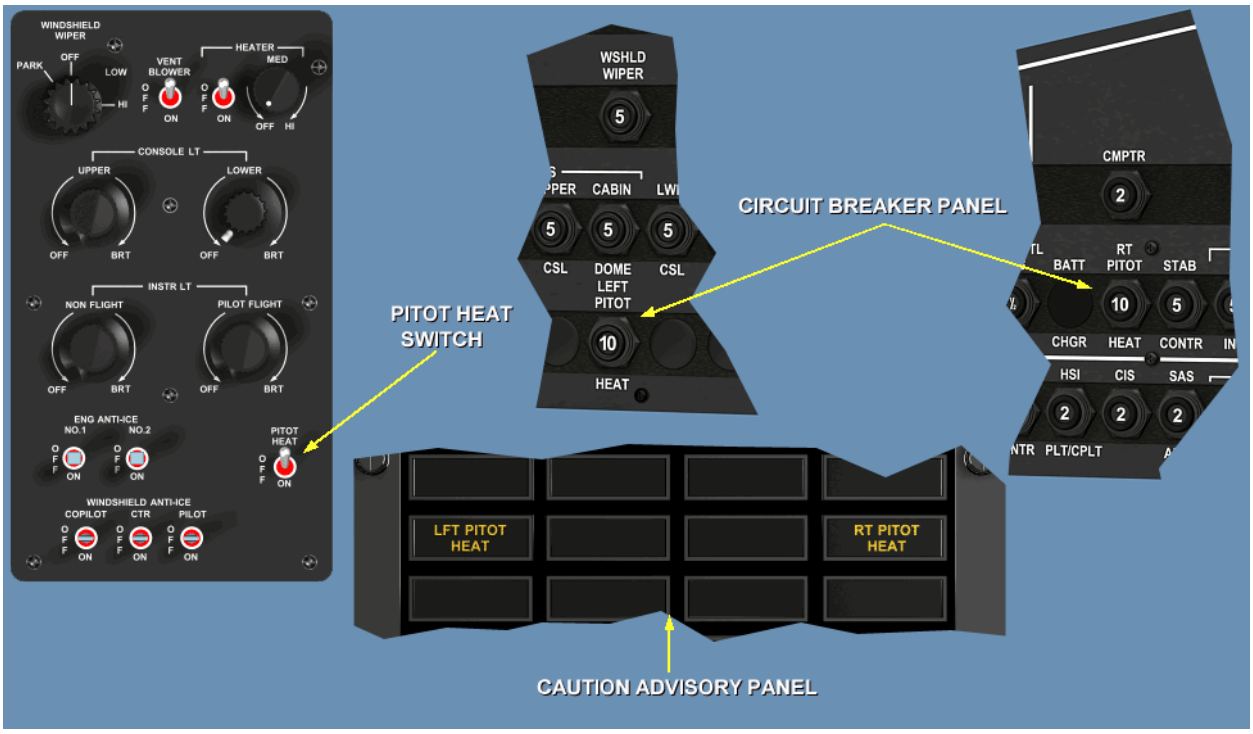
ACTION: Identify the component of the Pitot Static heater system.

CONDITIONS: Using TM 1-1520-237-23-4

STANDARDS: IAW TM 1-1520-237-23-4

a. Pitot Static System

Frame #0192 (Pitot electrical controls)

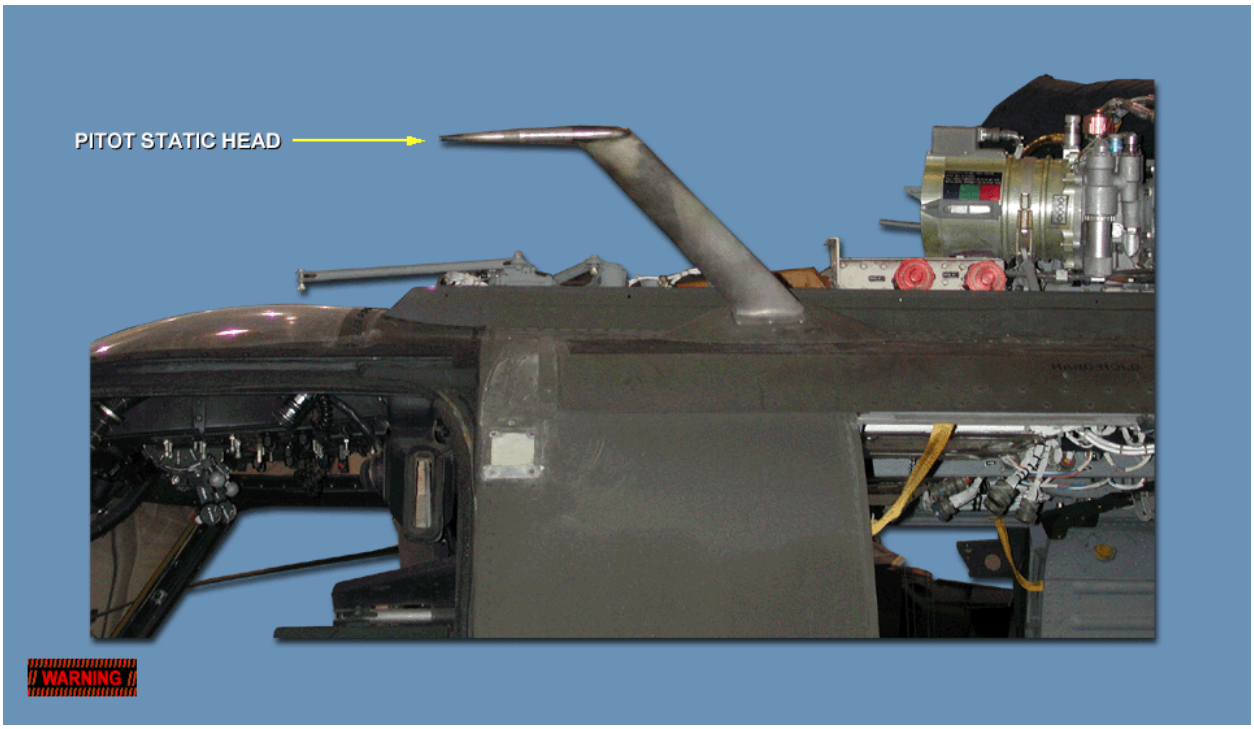


(1) Electrical power for the pitot heaters, is supplied by the No. 1 and No. 2 AC Primary Bus through the LEFT and RIGHT PITOT HEAT circuit breaker on the pilot and copilots circuit breaker panel.

(a) When a low heat or no heat condition is sensed by the current sensors, 28 V DC is then fed through the electronic switch to the caution/advisory panel, lighting the Right (RT) or Left (LFT) PITOT HEAT caution capsules.

(b) A failure of either element will cause the associated caution capsule to illuminate.

Frame #0195 (Left Pitot static head)



WARNING: Injury to personnel will result if pitot static head is hot. Make sure pitot static head is cool before attempting to remove.

(2) Left and right pitot static heads are not interchangeable.

(a) Electrically heated pitot static tubes are located on the cockpit roof above and aft of the pilot and copilot door.

(b) The pitot static heater, prevents ice from forming on the tubes.

(c) Each pitot tube has two heating elements one in the mast and one in the tube.

(3) Right Pitot Static Tube

Frame #0200 (Right Pitot static tube)

(a) The pitot-static head assembly consists of a base plate with a strut and probe tube.

(b) The base plate contains the pitot tube fitting, two static tube fittings (S1 and S2) and an electrical connector wired to two deicing heaters in the tube.

(c) The probe tube contains these pressure sensing ports; pitot, static 1, and static 2.

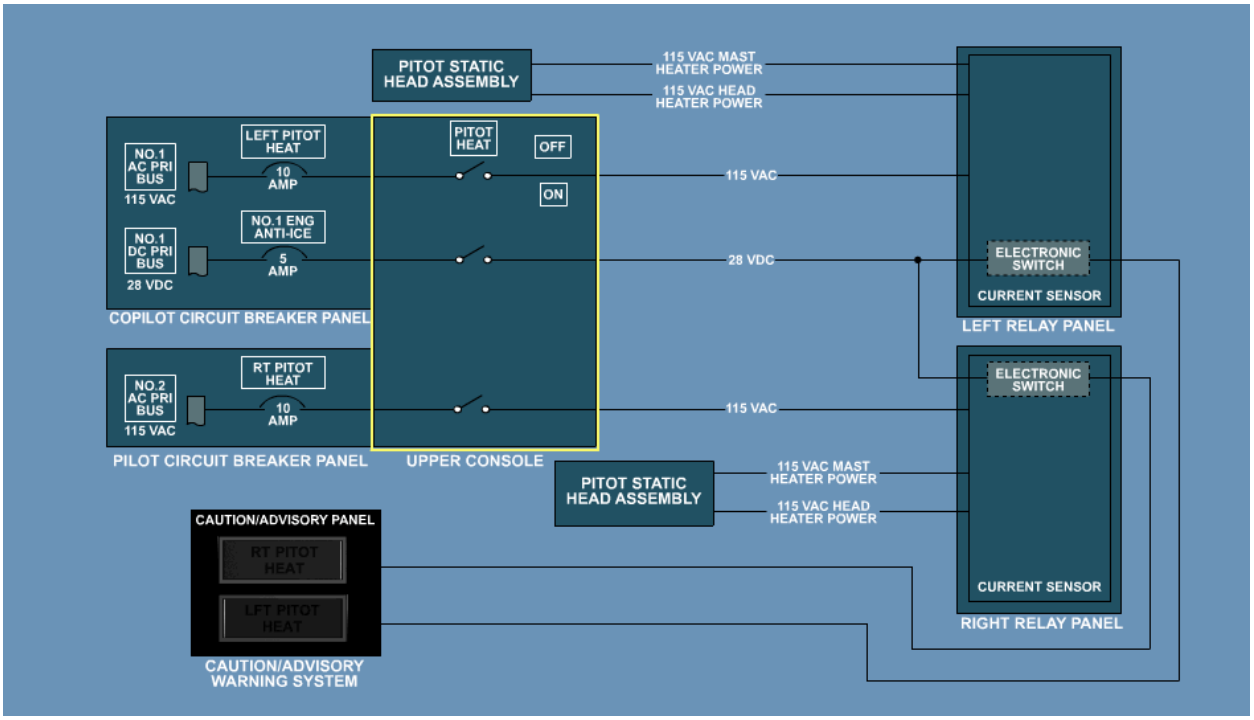
(d) Pitot pressure is sensed at the opening of the front end of the tube.

(e) Static 1 and static 2 pressure is sensed at the contoured midsection of the tube.

(f) Replacement procedures are the same for either PITOT STATIC HEAD.

(4) Pitot Static Heater System Diagram

Frame #0203 (Pitot Static Heater System Diagram)



(a) Pitot tube heat is provided by heating elements within each pitot tube head assembly.

(b) Power to operate both heating elements is controlled by a single switch on the upper console, Pitot heaters, in the pitot head assembly keep ice from forming on the tubes that restricts air flow.

(c) The No. 1 and the No. 2 AC primary bus through the LEFT/RT PITOT HEAT circuit breakers located on the copilot and pilot overhead circuit breaker panels provide 115 V AC, 28 V DC power is supplied by the No. 1 DC primary bus through the NO. 1 ENG ANTI-ICE circuit breaker.

(d) When the PITOT HEAT switch is positioned to the ON position 115 V AC is fed through current sensors in the right and left hand relay panels and to the right and left pitot static head assembly, 28 V DC is fed to a normally open electronic switch within the current sensors monitoring the head assembly.

(e) During normal operation when a low heat or no heat condition is detected by the current sensors, 28 V DC is transmitted through the electronic switch to the caution/advisory panel, illuminating the RT or LFT PITOT HEAT caution capsule.

(f) When the LFT or RT circuit breaker are manually pulled during a MTF check all 115V AC power is lost to the RT or LFT pitot static head assembly.

CHECK ON LEARNING

1. Where are the electrically heated pitot static tubes located?

2. Where are the pitot static heaters located?

SECTION VII. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the Pitot Static Heating System.
The key points to remember are:

- Left and right pitot static heads are not interchangeable.
- Electrically heated pitot static tubes are located on the cockpit roof above and aft of the pilot and copilot door.
- Electrical power of 11 5V AC for the pitot heaters is supplied by the No. 1 and No. 2 AC Primary Bus through the LEFT and RIGHT PITOT HEAT circuit breaker on the pilot, and copilot circuit breaker panel.
- When the PITOT HEAT switch is ON, power of 115 V AC is fed through current sensors in the right and left hand relay panel to the right and left pitot tube heaters, causing the de-icing heaters to go on.
- When a low heat or a no heat condition exist, 28 V DC is then fed through the electronic switch to the caution/advisory panel, lighting the RT or LFT PITOT HEAT caution capsules.

APPENDIX A

ILLUSTRATION LISTING

FRAME #	FRAME TITLE
0017	Utility Systems Menu
0025	Windshield Wiper System Location
0026	Upper Console and Switch Function
0027	Wiper Motor
0028	Flexible Shaft
0034	Wiper Motion
0029	Wiper Converters
0030	Pivot Stud
0031	Wiper Blade Assembly
0032	Adjusting Wiper Blade Pressure
0065	Windshield Anti-ice System Component Location Diagram
0070	Windshield Anti-ice Toggle Switch
0071	Anti-ice Wiring Diagram)
0075	Anti-ice Controller
0076	Anti-ice Wiring Diagram
0079	Terminal Blocks
0080	Temperature Sensors
0081	Windshield Laminate
0085	Anti-ice Lock-Out-Relay
0086	Wiring Diagram Flow
0105	Heater Air Duct Installation)
0107	Heating Ventilation Internal
0110	Mixing Unit
0115	Heater Controls
0120	Mixture Temperature Sensor
0125	Regulation Valve
0128	Vent Blower Switch
0130	Heater Operation
0165	Cargo Hook System Slide)
0170	Cargo Hook Switches
0175	Cargo Hook Control Buttons
0180	Crew Chiefs Pendant
0182	Cargo Hook Cartridge Squib
0185	Cargo Hook Squib
0192	Pitot Electrical Controls
0195	Left Pitot Static Head
0200	Right Pitot Static Head
0203	Pitot Static Heater Schematic

APPENDIX B

TEST AND TEST SOLUTIONS

1. This appendix is only used when the test and solutions are internal to the POI file.

When the test and solutions are internal to the POI file, then the POI file becomes a FOR OFFICIAL USE ONLY document.