

ENGINE AIR CLEANER

95-560-1. AIR CLEANER KIT INSTALLATION (SEE FIGURE 95-560-1).

95-560-2. DESCRIPTION.

Engine inlet air is filtered by an air cleaner/mist eliminator mounted on the engine deck behind the firewall. Air, dust and liquid droplets are drawn through separator tubes in the air cleaner. Static swirl vanes in each tube cause the incoming air to spin. Dust and large liquid droplets are centrifugally spun off into a collecting chamber. Ejectors powered by engine bleed air draw out the contaminants in the chamber and eject them overboard. The partially cleansed air then passes through the mist eliminator. The moisture droplets coalesce on the wire surfaces in the mist eliminator and drip to the bottom of the assembly and drain overboard through two moisture drain holes in the header assembly. The small amount of very fine dust (mostly less than 10 microns) which gets by the air cleaner separator tubes is trapped in the mist eliminators.

95-560-3. TROUBLESHOOTING THE AIR CLEANER SYSTEM.

Refer to Table 95-560-1 for air cleaner system troubleshooting data.

95-560-4. REMOVAL OF AIR CLEANER SYSTEM.

- a. Loosen clamps securing flexible couplings to the engine, Y-duct and elbow.
- b. Remove clamps securing Y-duct to engine mount assembly and remove Y-duct, flexible couplings and clamps.
- c. Remove elbows from header assembly. Remove and retain seal gaskets.
- d. Disconnect bleed air line from front right side of air cleaner.
- e. Remove clamps securing top of air cleaner to engine mount assembly.
- f. Remove screws and washers attaching support brackets to the deck.
- g. Remove bolts securing support brackets to air cleaner. Remove support brackets.
- h. Remove air cleaner with header assembly attached.

95-560-5. INSTALLATION OF AIR CLEANER SYSTEM

Installation of the air cleaner system is the reverse of removal.

CAUTION: Avoid excessive tightening of clamps around flexible couplings to prevent cracking of the fiberglass elbows and Y-duct.

NOTE: Maintain a .125 inch minimum gap between engine and Y-duct, and elbows and Y-duct. If necessary, parts may be trimmed outside the beads. Do not allow fiberglass to fall into the engine inlet or ducting.

NOTE: When installing a new elbow, secure elbow to header assembly with C-clamps. Assure proper alignment with Y-duct before drilling new attaching holes.

95-560-6. INSPECTION AND CLEANING OF AIR CLEANER SYSTEM

- a. Check scavenge air ejector operation every 100 hours. With engine at idle, there should be air coming out from each of the two ejector bundles. This can be felt by holding one's hand over each outlet location. No flow or backflow is indicative of clogged bleed air nozzle or blocked ejector throat. Remove the affected ejector bundle and clear blocked passages. Reassemble.
- b. Remove ejector bundle(s) as follows:
 - (1) remove four (4) screws attaching retainer plates to air cleaner box
 - (2) remove both halves of retaining plate
 - (3) pull ejector out of air cleaner box
- c. Assemble ejector bundle(s) to air cleaner box as follows:
 - (1) press bellmouth end of ejector(s) into box cutout at nozzle tip location
 - (2) attach one half of the split retaining plate to the box, making certain that ejector crossbar(s) is outboard of the retaining plate
 - (3) push retainer plate toward ejector, taking up all screw clearance, then tighten screws securely
 - (4) attach second half of retaining plate between box and ejector crossbar(s)
 - (5) clamp retaining plate halves tightly together, then tighten securely the screws on the second retaining plate
- d. The engine inlet plenum downstream of the air cleaner/mist eliminator should be inspected for signs of dirt accumulation. There should not be any presence of dust accumulation. Presence of dust accumulation is indicative of a leak or malfunction in the system. Refer to Table 95-560-1 for corrective action.
- e. The mist eliminator should be cleaned every 100 operating hours. Hosing with hot water, steam cleaning or washing with solvent are acceptable cleaning methods.
- f. The freshly cleaned and dried mist eliminator element should be sprayed with approximately 2.5 oz. of synthetic engine oil, half to each side and any excess wiped off. Application by a paint spray gun is suggested. This will enhance efficiency of the air cleaner system.
- g. At the end of each operating season, the assembly should be removed from the aircraft and inspection for damage. Clean out covers should be removed. Any low density debris (bugs, straw, etc.) and accumulated dirt within the air cleaner panel should be flushed out and cover plates reinstalled.

95-560-7. MINOR REPAIR OF AIR CLEANER SYSTEM.

Repair of laminated fiberglass - engine air intake Y-duct, elbows and header assembly. Repair impregnated laminated fiberglass in accordance with the following procedures. Size, location, and number of patches are not limited so long as compliance with specified repair procedures is possible, although extremely large damaged areas require replacement of the component.

CAUTION: BECAUSE EPOXY RESIN MIXTURES CAN CAUSE DERMATITIS AND HIGH VAPOR CONCENTRATIONS OF THE MATERIAL MAY PRODUCE IRRITATION OF EYES AND MUCOUS MEMBRANES, OBSERVE THE FOLLOWING PRECAUTIONARY MEASURES:

- 1) HANDLE MATERIALS IN WELL VENTILATED AREAS ONLY.
- 2) AVOID DIRECT SKIN CONTACT BY WEARING PROTECTIVE CLOTHING AND PROTECT EYES FROM CURING AGENT FUMES.
- 3) MAINTAIN GOOD STANDARDS OF HOUSEKEEPING AND PERSONAL HYGIENE.
- 4) KEEP FIRE EXTINGUISHERS READILY AVAILABLE, SINCE RESIN SOLVENTS ARE INFLAMMABLE AND COULD PRESENT A FIRE HAZARD.

- a. Stop-drill crack ends. Where jagged holes exist, remove damaged area by trimming to form a uniformly smooth-edged hole. Chamfer trim edges 30-45 degrees.
- b. Use solvent (Specification P-D-680) to clean surface adjacent to damaged area thoroughly until the resin or cloth is exposed. Roughen surface in the patch area with abrasive grit paper. Be sure surface is clean and dry before applying patch.
- c. Cut fiberglass (unimpregnated) cloth plies of a size and shape adequate to cover the cut-out area with a minimum 1-inch overlap. Cut successive layers of cloth plies uniformly larger in size to produce a scarfed or feathered edge.

NOTE: Plies may be applied to both sides of area provided the total added thickness is equal to, or greater than, thickness of panel under repair.

- d. In order to maintain original dimensions and contours of component being repaired, prepare a back-up block of desired size and shape from wood, cardboard, metal or similar suitable material. Coat back-up block thoroughly with paraffin or heavy paste wax to prevent adherence of patch to block during curing process.
- e. Prepare resin adhesive for application of fiberglass plies as follows:

- 1) Follow manufacturer's recommendations for mixing catalyst with resin.

NOTE: Mix catalyst and resin by stirring only; do not beat the mixture, as beating will create undesirable foaming and air bubbles.

- 2) Keep mixture in a covered vessel until used; the mixture has a pot life of approximately 30 minutes.
- f. Apply the fiberglass patch by building up alternate layers of prepared fiberglass plies and brush coats of resin adhesive, beginning with the smallest size, and building up to the largest desired patch thickness. Maintain a scarfed or feathered edge. Finish patch with a coat of resin adhesive. Remove excess resin.
- g. The patch may be cured at ambient room temperature 69°F (20°C) for a period of 24 hours, or curing may be accelerated by use of an oven or heat lamps for a time-temperature selected from the following:

<u>Minutes</u>	<u>Degrees F.</u>
120	150
45	200
30	250
10	300

- h. Sand the patch smooth and refinish the area with lacquer of the desired colour.

NOTE: Avoid painting the intake interior as paint may chip and be ingested by the engine compressor.

TABLE 95-560-1 TROUBLESHOOTING AIR CLEANER SYSTEM

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
No air coming out of one or both of the ejector bundles.	Clogged bleed air nozzle or blocked ejector throat	Disassemble the affected ejector bundle and clear blocked passages
Dirt accumulation in the engine inlet plenum downstream of the air cleaner	Improperly installed or loose flexible couplings Damaged flexible couplings Broken or defective gaskets between elbows and header assembly or between header assembly and air cleaner body. Improperly adjusted by-pass doors	Install couplings correctly and tighten clamps Replace flexible couplings Replace broken or defective gaskets Readjust by-pass doors.

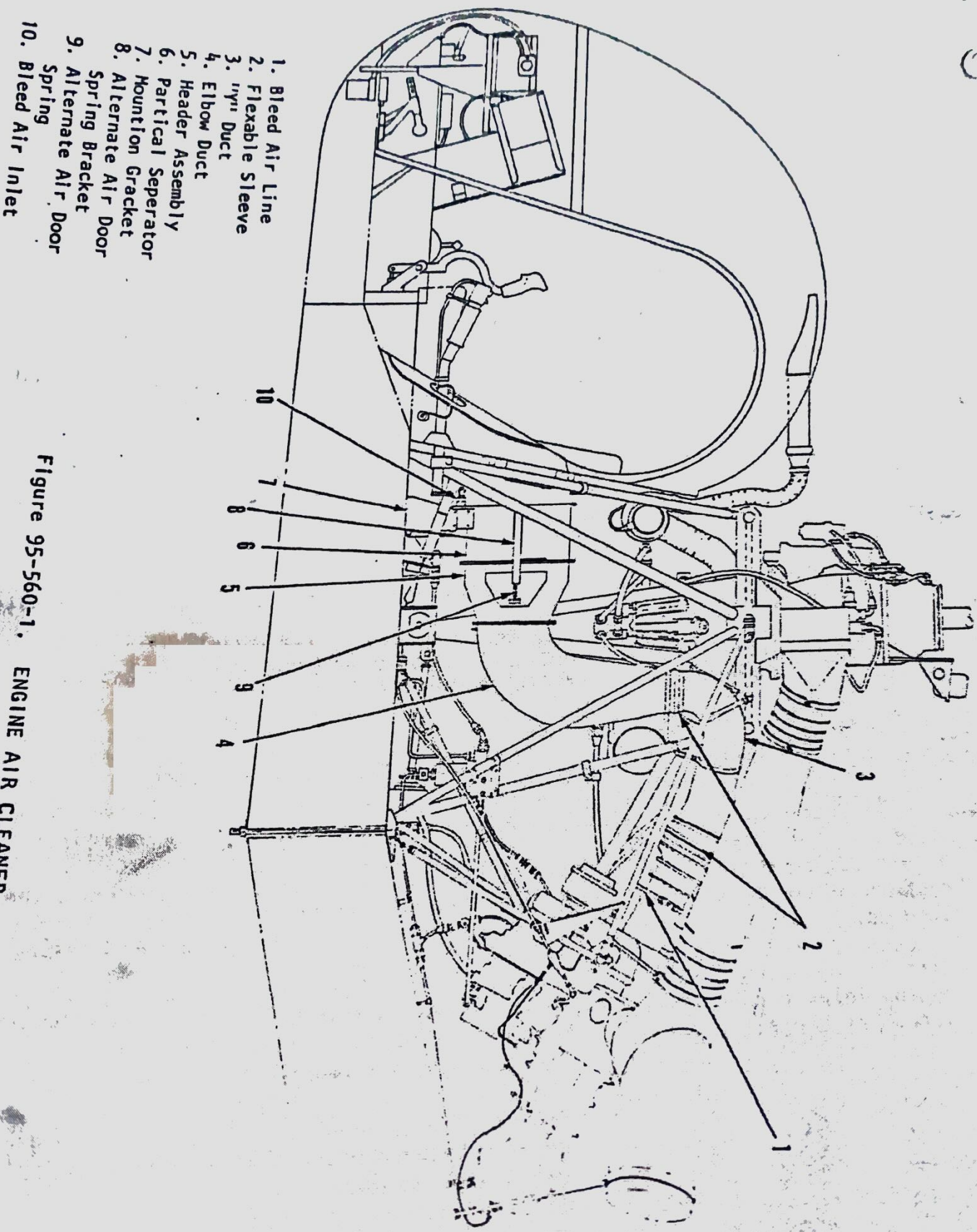


Figure 95-560-1. ENGINE AIR CLEANER.

AUTO-REIGNITION KIT

97-560-1. AUTO-REIGNITION KIT. (See figures 97-560-1 through 97-560-7.)

97-560-2. DESCRIPTION.

The auto-reignition system consists essentially of a high pressure switch, a low pressure switch, a time delay relay, and associated wiring. When armed, the auto-reignition system is sensitive to torque pressure. If torque pressure falls below 35 psi during flight, the high pressure switch closes and ignition immediately occurs. After 1.5 seconds duration, the time delay relay will discontinue ignition. If torque pressure continues to fall to 15 psi or below, the low pressure switch will activate the ignition exciter and ignition will occur continuously until torque pressure exceeds 15 psi. Two diodes in the wiring system prevent the engine cycle counter from registering a start during an auto reignition cycle, as no thermal shock cycle occurs. A green ARM light indicates when the system is armed and an amber AUTO-REIGNITION light illuminates to indicate a reignition cycle. The amber AUTO-REIGNITION light will illuminate any time ignition occurs, regardless of the position of the ARM switch. The high pressure switch may be marked with a green dot and the low pressure switch marked with a red dot.

97-560-3. AUTO-REIGNITION SYSTEM REMOVAL.

Remove the auto-reignition system as follows:

1. Remove T fitting from torquemeter oil pressure (TMOP) line. Remove TMOP line to high and low pressure switch assembly. Install union in TMOP gauge line.
2. Remove high and low pressure switch assembly.
3. Remove time delay relay.
4. Remove wiring as necessary.

97-560-4. AUTO-REIGNITION SYSTEM INSTALLATION.

Accomplish installation of the auto-reignition system in the reverse order of removal. Check for proper operation of the auto-reignition system as outlined in section 97-560-5.

97-560-5. CHECKING AUTO-REIGNITION SYSTEM FOR PROPER OPERATION.

Following installation, check for proper operation of the auto-reignition system in the following manner:

1. After installation of the kit, note the number of cycles on the engine cycle counter. Start the helicopter. Bleed the torque pressure line at the back of the torque pressure gauge as well as at the high and low pressure switch assembly.

CAUTION: LINES MUST BE BLED THOROUGHLY TO ENSURE PROPER OPERATION OF AUTO-REIGNITION SYSTEM.

After bleeding torque pressure line, increase RPM to 100% N₂, (approximately 20 psi torque). Turn the Auto Relight Arm switch to the ARM position and note that the GREEN arm light comes on and that the AMBER reignition light

97-560-5. Continued.

comes on for 1½ seconds then goes out. As power is decreased to 15 psi or less, the AMBER warning light should be on continuously. If the auto-reignition is armed above 35 psi, the AMBER light should not come on.

3. After shut down, check the cycle counter: The difference in the total should be only the number of start attempts made. The counter should not cycle when the auto-reignition is activated.

97-560-6. MINOR REPAIR OF AUTO-REIGNITION SYSTEM.

Replace any wiring which shows evidence of deterioration, chafing, fraying, overheating, corrosion or other damage. Replace damaged or corroded electrical connectors. Check all equipment for damage. Make sure all mountings and connections are tight. Replace any defective tubing.

97-560-7. TROUBLESHOOTING THE AUTOMATIC REIGNITION SYSTEM.

See Table 97-560-1. for troubleshooting the automatic reignition system.

Table 97-560-1. TROUBLESHOOTING THE AUTOMATIC REIGNITION SYSTEM.

TROUBLE	PROBABLE CAUSE	REMEDY
Reignition remains on at torque pressures above 15 psi	Low pressure switch stuck closed	Replace switch
Reignition does not occur at torque pressure of 15 psi or less	Low pressure switch stuck open	Replace switch
Reignition does not occur at torque pressure of 35 psi or less	High pressure switch stuck closed or defective time delay relay	Replace switch or relay
Reignition does not occur until torque pressure falls to 15 psi	High pressure switch stuck open	Replace switch
Reignition occurs continuously when activated at 35 psi or less	Defective time delay relay or high and low pressure switch cannon plugs reversed	Replace relay or install cannon plugs correctly
Reignition occurs for 1.5 seconds when torque pressure falls to 15 psi or less	High and low pressure switch cannon plugs reversed	Install cannon plugs correctly