

VERTICAL AVIATION TECHNOLOGIES, INC
MODEL 300LS HUMMINGBIRD

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7. a.) Night flight is prohibited if the following equipment is not installed: landing, navigation, and instrument lights.
- b.) Minimum crew, one pilot. Solo flight permitted from right seat only.
- c.) Maximum operating altitude:
Gross weight = 2,500 lbs or less – 14,000 feet.
Gross weight = more than 2,500 lbs – 12,000 feet.
- d.) Doors off operation is approved.

8. Placards

a.

PASSENGER WARNING THIS AIRCRAFT IS AMATEUR-BUILT AND DOES NOT COMPLY WITH THE FEDERAL SAFETY REQUIREMENTS FOR “STANDARD AIRCRAFT.”

b. Compass Correction Card. _____

SECTION II
DESCRIPTION

FLIGHT CONTROL SYSTEM:

The flight control system is dual, consisting of a conventional control stick and foot pedals, and a main rotor control with the throttle contained in its outer end. The co-pilot's control stick and pitch control are removable. Lateral control is by lateral movement of the stick and longitudinal control by longitudinal movement of the stick. These controls when combined represent main rotor cyclic pitch control, and thusly provide the method for the helicopter to fly forward, backward or sideways. An electric cyclic trim system allows the pilot to set and hold the control stick in any position required for level flight. The foot pedals vary the lateral thrust of the tail rotor, thusly controlling the helicopter in yaw for directional control. The main rotor pitch control lever provides vertical control for ascent or descent by producing a simultaneous increase or decrease of main rotor blade incidence, thusly varying its lift. A rotor brake locks the main rotor.

CONTROL STICKS: Located directly in front of the pilot's and co-pilot's seats are the control sticks. At the top of the pilot's control stick is a grip, with a switch for operation of the radio microphone and cyclic trim system.

MAIN ROTOR PITCH CONTROL: The pilot's main rotor pitch control is located to the left of the pilot's seat. The removable co-pilot's pitch control is located to the left of the co-pilot's seat. The grip at the top of the pitch control is the throttle, which is partially synchronized with the control. A frictional sliding lock, which will lock the main rotor pitch control in any desired position is operated by a knob located on the floor at the base of the slide.

TAIL ROTOR CONTROL PEDALS: Located directly in front of the pilot's and co-pilot's seats are foot pedals for tail rotor pitch control.

POWERPLANT:

A fuel injected LS7 engine supplies power for driving the main and tail rotors. It is installed aft of the cabin, at an angle, with the drive shaft inclined approximately 30 degrees forward toward the main gear box. The engine rating for take-off is 280 b.h.p. at 3275 rpm at sea level. The engine transmits power through the clutch.

THROTTLE: The throttle is a turnable grip located at the end of the main rotor pitch control. It is opened when the grip is turned to the left and closed when turned to the right. The throttle is synchronized with the main rotor pitch control so that an increase in pitch will automatically provide an increase in throttle setting and a decrease in pitch will automatically provide a decrease. A friction nut for control of the pressure required for turning the throttle grip, as well as to prevent it from creeping, is located immediately aft of the grip. The LS7 engine is equipped

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with a maximum overspeed governor that allows engine r.p.m. of no more than 3275. This limit is preset in the engine ECM. After reaching 3275 r.p.m, additional input of the twist grip will not increase the engine r.p.m. The overspeed governor will automatically maintain 3275 r.p.m. regardless of collective position. Closing the throttle grip to below 3275 r.p.m. will then allow the throttle twist grip to control engine r.p.m. below the maximum r.p.m. allowed by the overspeed governor.

CAUTION

Whenever the pitch control is pulled up, the throttle grip must not be held so tightly that it cannot turn in normal synchronization with the pitch control. Normal increase in pitch causes an automatic increase of the throttle. If this automatic turning is prevented by tight holding of the grip, damage to the throttle control rods will result.

IGNITION SWITCH: The ignition switch is on the right side of the switch panel. Marked toggle switch. Pull up to move positions.

STARTER SWITCH: The starter switch is located in the center console. The switch must be held in the "ON" position to energize the starter.

FUEL AND OIL: The engine is serviced with minimum 91 octane automobile fuel or 100 low lead aviation fuel. One fuel tank having a capacity of 57 gallons with expansion space for one gallon, is located below the rear portion of the cabin. Engine oil Specification 15w-40 Rotella. The oil tank located on the right side of the engine compartment has a capacity of 2.5 U.S. gallons and expansion space for 1½ gallons.

TRANSMISSION OIL SYSTEM:

There are no pilot operated controls for the gear box oil system as each gear box is self-lubricated. The main gear box is pressure lubricated by a sump pump inside of the gear box. The intermediate and tail gear boxes are individually splash lubricated.

OIL SPECIFICATION AND GRADE: The transmission oil used in this helicopter shall conform to Specification MIL-O-6082, Grade 1100 (summer) and Grade 1065 (winter).

MAIN TRANSMISSION OIL PRESSURE GAGE: A main transmission oil pressure gage is located on the instrument panel. The gage indicated oil pressure in the main transmission only.

SECTION IV

EMERGENCY PROCEDURES

ENGINE FAILURE DURING FLIGHT

WARNING

In the event of power failure, there will be a normal drop-off of approximately 50 rotor r.p.m. due to delay in decreasing main rotor pitch. The rotor r.p.m. will remain above the lower limit of 260. A minimum rotor rpm of 310 should be attained as quickly as possible thereafter.

POWER-OFF LANDING (Steady Autorotation): Normal forward-speed power-off landings can be accomplished in this helicopter. Glide speed should be approximately 50 knots, rotor r.p.m. between 310 and 340 making a gradual flare upon approaching the ground. Increase main pitch to cushion final settling of helicopter. Ground contact speed will be approximately 25 knots. Landings should be made into the wind (when wind velocity is over 10 mph).

CROSS-WIND LANDING: With this helicopter under control it is usually not necessary to land cross-wind. However, if necessary, avoid side drift. Maximum cross-wind 25 knots.

(1) ABOVE 500 FEET.

- a. Instantly decrease main rotor pitch to produce autorotation at 310 to 340 rotor r.p.m. Establish a glide at approximately 50 knots.
- b. If at sufficient altitude, try to restart engine by using starter. A micro switch prevents the starter from operating until the throttle is closed. If engine does not start proceed as in following paragraph.
- c. Make a normal forward-speed power-off landing, as described in this section. If the terrain is unsuitable for such a landing, a much sharper flare-out will be necessary. Immediately after the flare-out utilize main pitch to cushion the final settling of the helicopter. An emergency landing of this type can be accomplished at speeds less than that required for normal power-off landings, depending on sharpness of flare-out.

(2) BELOW 500 FEET IN FAST FLIGHT:

- a. Instantly reduce pitch to autorotation.
- b. Reduce forward speed to 50 knots.

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- c. Proceed in accordance with para. 1.

(3) BETWEEN 10 AND 500 FEET IN SLOW FLIGHT:

NOTE

Continuous operation within this area should be avoided so that in event of power failure a safe autorotative landing can be accomplished.

- a. Instantly reduce pitch to autorotative position, obtain as much forward gliding speed as possible, heading into the wind if feasible.
- b. Flare-out just above the landing surface.
- c. Increase the main pitch as the helicopter settles the last few feet.

(4) BELOW 10 FEET:

Increase pitch as rapidly as possible.

NOTE

Since the landing in all probability will be a hard one under these conditions, utilize ground roll if the landing area is adequate.

TAIL ROTOR FAILURE:

1. BELOW 500 FEET IN FAST FLIGHT:

- a. Instantly put pitch into autorotative position.
- b. Close throttle completely, and go into a glide, keeping airspeed at approximately 50 knots.
- c. Make a flare-out landing suitable to the terrain.

2. UNDER 10 FEET IN SLOW FLIGHT OR HOVERING.

Make an immediate part-power landing.

3. BETWEEN 10 AND 500 FEET IN SLOW FLIGHT:

- a. Instantly reduce pitch to autorotative position.
- b. Close throttle completely, obtain as much forward gliding speed as possible, heading into wind if feasible.
- c. Flare-out just above the ground.