SECTION 5

PERFORMANCE

CONTENTS

SECTION 5

PERFORMANCE

GENERAL

Hover controllability has been substantiated in 17 knot wind from any direction up to 11,000 feet density altitude. Refer to hover performance charts for allowable gross weight.

Indicated airspeed (KIAS) shown on charts assumes zero instrument error.

CAUTION

Performance data presented in this section was obtained under ideal conditions. Performance under other conditions may be substantially less.

USE OF CHARTS

POWER ASSURANCE CHART

The power assurance chart shows maximum allowable MGT at a specified torque. If the observed MGT is greater than indicated by the chart, the engine may not produce the power necessary to achieve the performance data given in this section without exceeding MGT limits.

A power assurance check may be done in a hover or in forward flight and should be performed at the maximum practical power for best accuracy. The chart assumes no generator load and stabilized conditions. Temperature stabilization may take up to two minutes. Generator load should be minimal or the generator may be switched OFF during the check. An example on the chart shows correct use.

The chart may also be read in reverse, giving the minimum allowable torque at a specified MGT. It may be useful to use the chart to predict the torque available at MGT limits for a given pressure altitude and OAT.

USE OF CHARTS (cont'd)

HOVER PERFORMANCE

In-ground-effect (IGE) and out-of-ground-effect (OGE) hover performance is given in the Hover Ceiling vs. Gross Weight charts on pages 5-7 and 5-8, respectively. Note that hover performance is limited by the MGT five-minute limit, not by torque. Hover performance is substantiated up to 11,000 feet density altitude; however, data is presented beyond 11,000 feet density altitude only to determine performance with engine anti-ice, cabin heat, and/or generator loads over 50 amps. With anti-ice and cabin heat OFF, maximum IGE hover gross weight is 2700 lb up to 11,000 feet density altitude at any OAT within limits.

To correct for anti-ice, cabin heat, and/or high generator load, increase the actual OAT as specified on the charts. The following example illustrates the calculation of an effective OAT when anti-ice and cabin heat are turned ON, and there is a 90-amp generator load (40 amps over the 50-amp load on which the charts are based):

Pressure altitude:	9000 ft
Actual OAT:	0°C
Anti-ice ON correction:	10°C
Cabin heat ON correction:	20°C
90-amp load correction:	(90 - 50)/20 = 2°C
Effective OAT:	0 + 10 + 20 + 2 = 32°C

A pressure altitude of 9000 ft and OAT of 32°C are therefore used with the charts, giving a maximum gross weight of 2580 lb for IGE hover and 2320 lb for OGE hover.

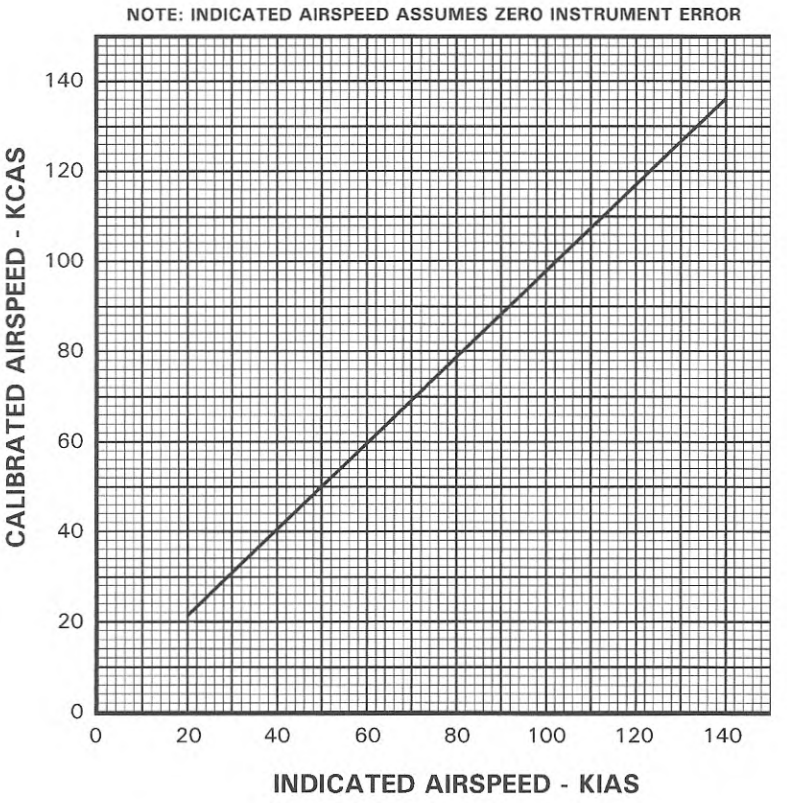
CLIMB PERFORMANCE

Climb performance charts are given for maximum gross weight (2700 lb) and for 2200 lb gross weight at 60 KIAS climb speed and maximum continuous torque or MGT (whichever is less). Each chart gives the potential reduction in climb rate due to anti-ice and cabin heat. The charts assume a 50-amp generator load; generator load has a small effect on climb rate. Note that predicted climb rate is approximate; variations in aircraft and operating conditions may significantly affect performance.

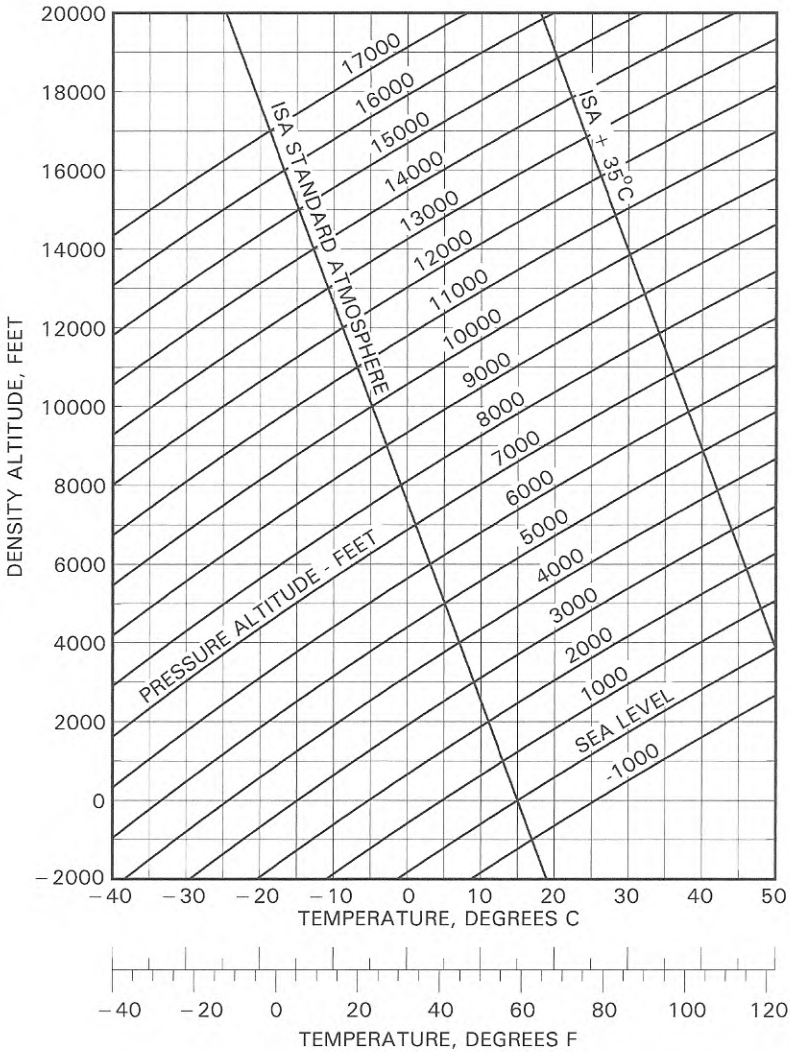
USE OF CHARTS (cont'd)

HEIGHT-VELOCITY DIAGRAM

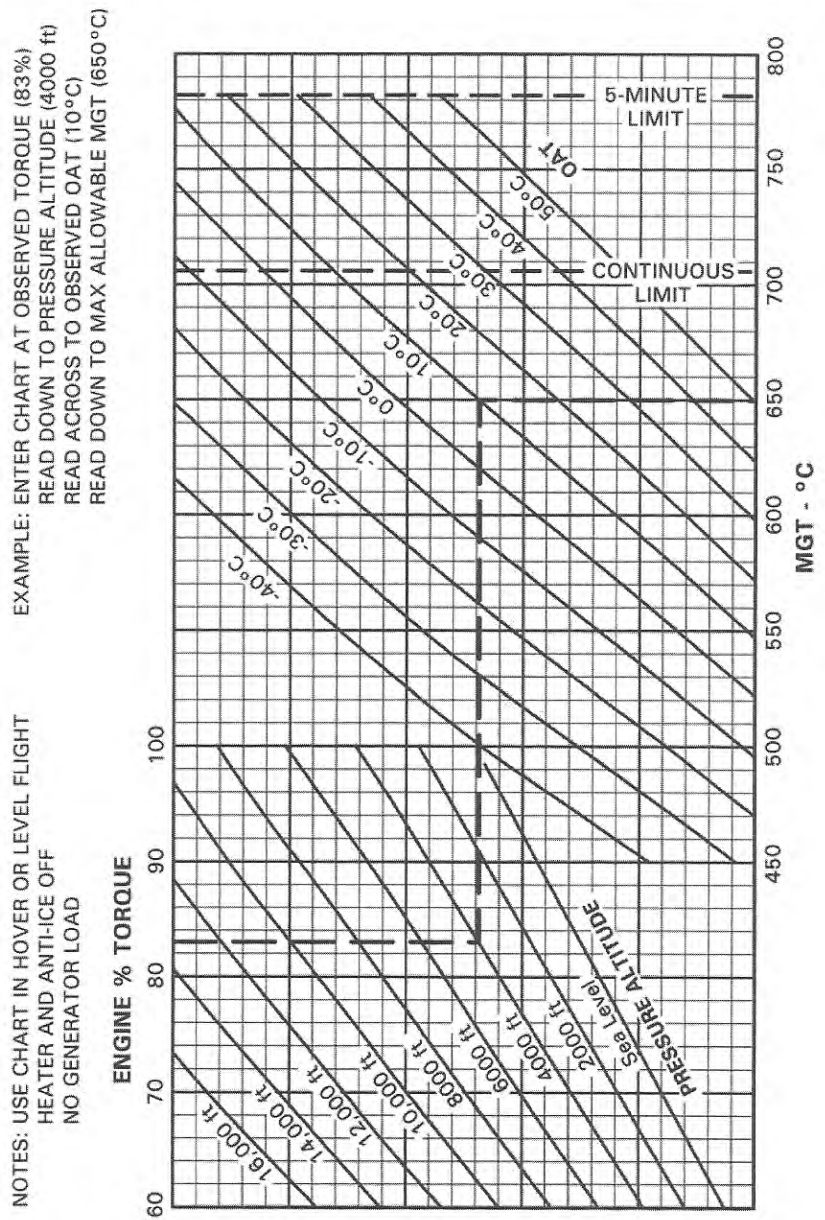
The height-velocity diagram is given for maximum gross weight at sea level and at 7800 feet density altitude. An appropriate curve for altitudes between sea level and 7800 feet may be estimated by interpolation. For example, a curve with a hover point at 600 feet AGL may be used for 3900 feet density altitude.



AIRSPEED CALIBRATION CURVE

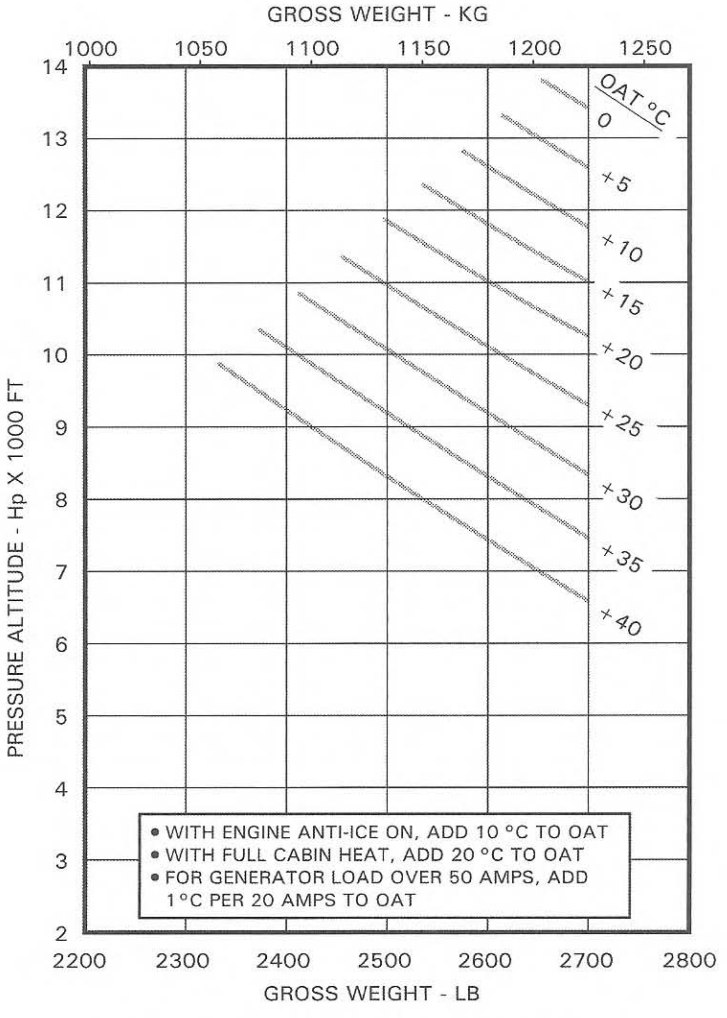


DENSITY ALTITUDE CHART



POWER ASSURANCE CHART

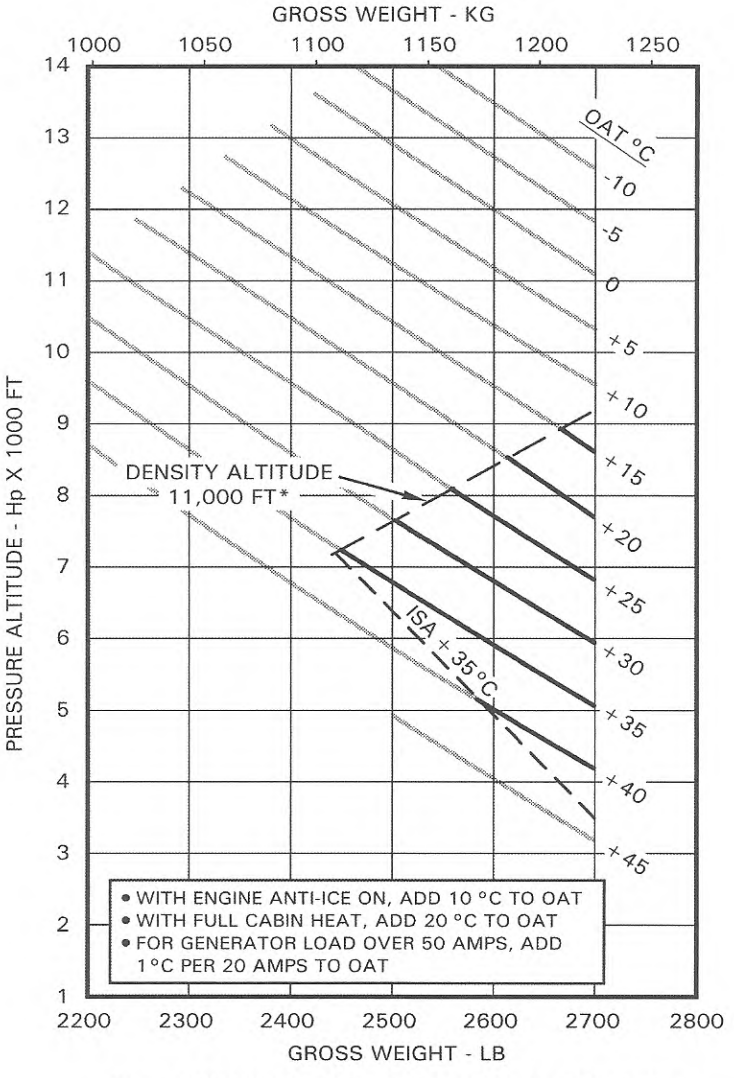
IN GROUND EFFECT AT 2 FOOT SKID HEIGHT AND ZERO WIND
MGT 5-MINUTE LIMIT
ENGINE ANTI-ICE AND CABIN HEAT OFF
50 AMP GENERATOR LOAD



IGE HOVER CEILING VS. GROSS WEIGHT

NOTE: Hover performance substantiated up to 11,000 feet density altitude. Data is presented only to determine performance with engine anti-ice, cabin heat and/or generator loads over 50 amps.

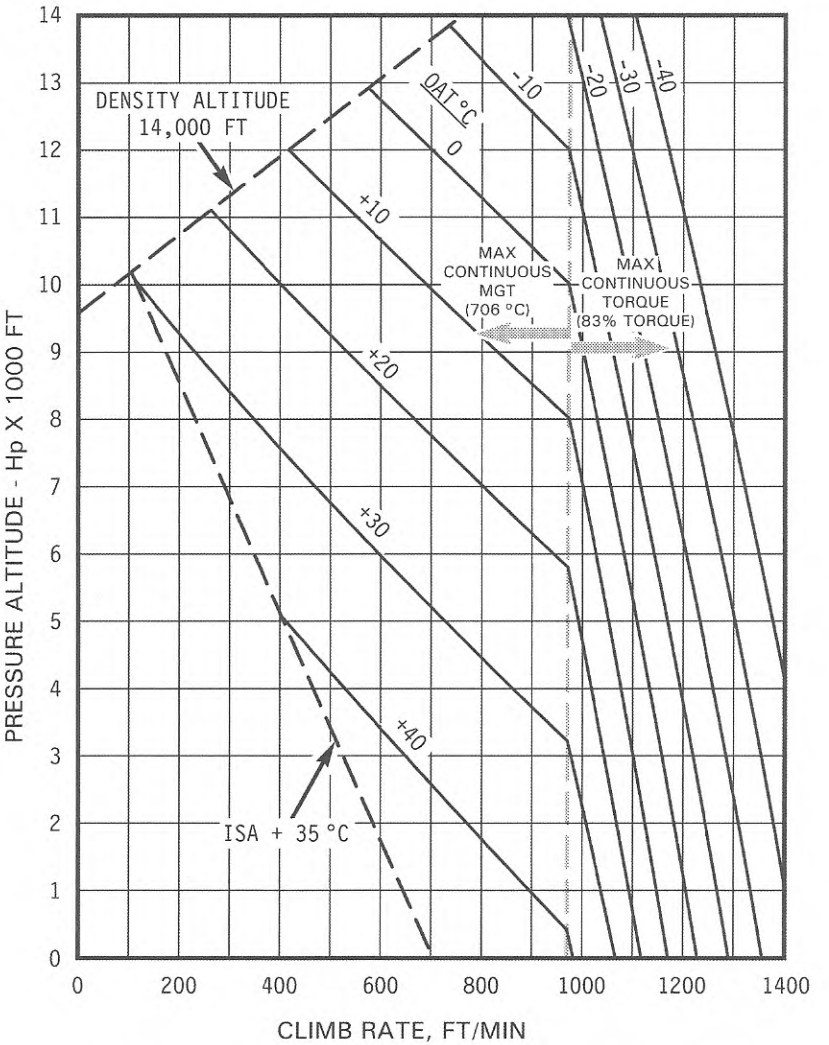
OUT OF GROUND EFFECT, ZERO WIND
MGT 5-MINUTE LIMIT
ENGINE ANTI-ICE AND CABIN HEAT OFF
50 AMP GENERATOR LOAD



OGE HOVER CEILING VS. GROSS WEIGHT

*Hover performance substantiated up to 11,000 feet density altitude. Data beyond ISA + 35 °C and above 11,000 feet density altitude is presented only to determine performance with engine anti-ice, cabin heat, and/or generator loads over 50 amps.

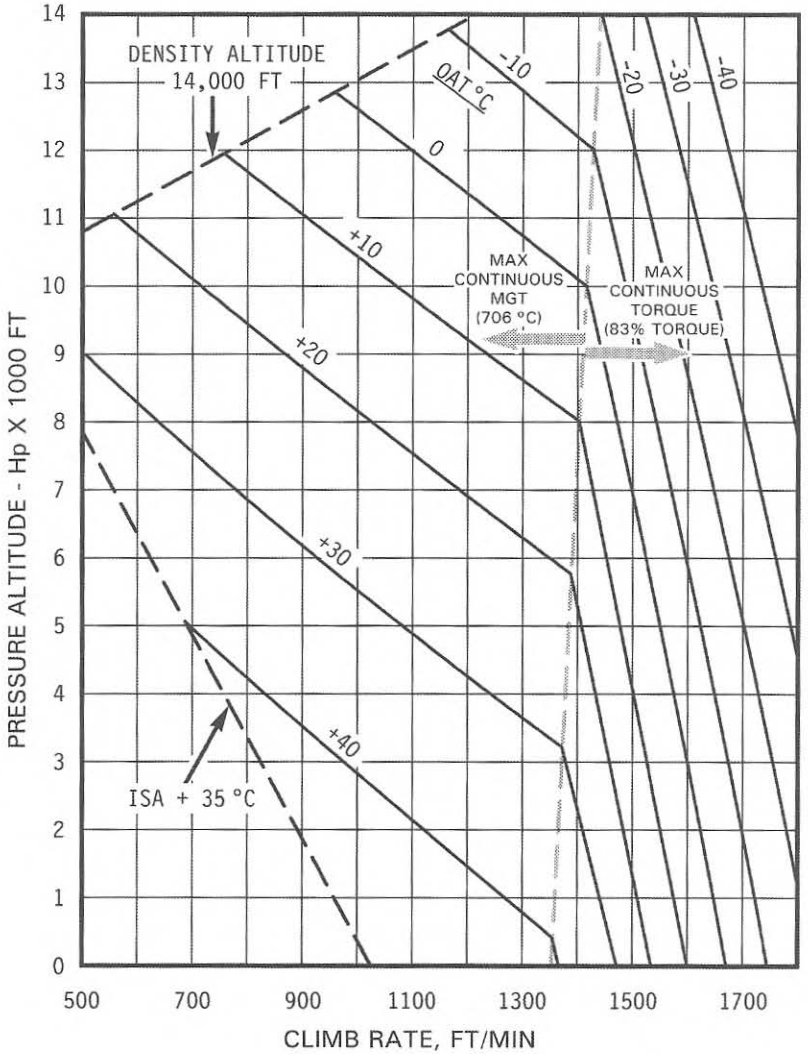
MAXIMUM CONTINUOUS TORQUE OR MAXIMUM CONTINUOUS MGT
60 KIAS CLIMB SPEED
ENGINE ANTI-ICE AND CABIN HEAT OFF



ENGINE ANTI-ICE MAY REDUCE CLIMB RATE UP TO 300 FT/MIN
FULL CABIN HEAT MAY REDUCE CLIMB RATE UP TO 600 FT/MIN

CLIMB PERFORMANCE, 2700 LB GROSS WEIGHT

MAXIMUM CONTINUOUS TORQUE OR MAXIMUM CONTINUOUS MGT
60 KIAS CLIMB SPEED
ENGINE ANTI-ICE AND CABIN HEAT OFF

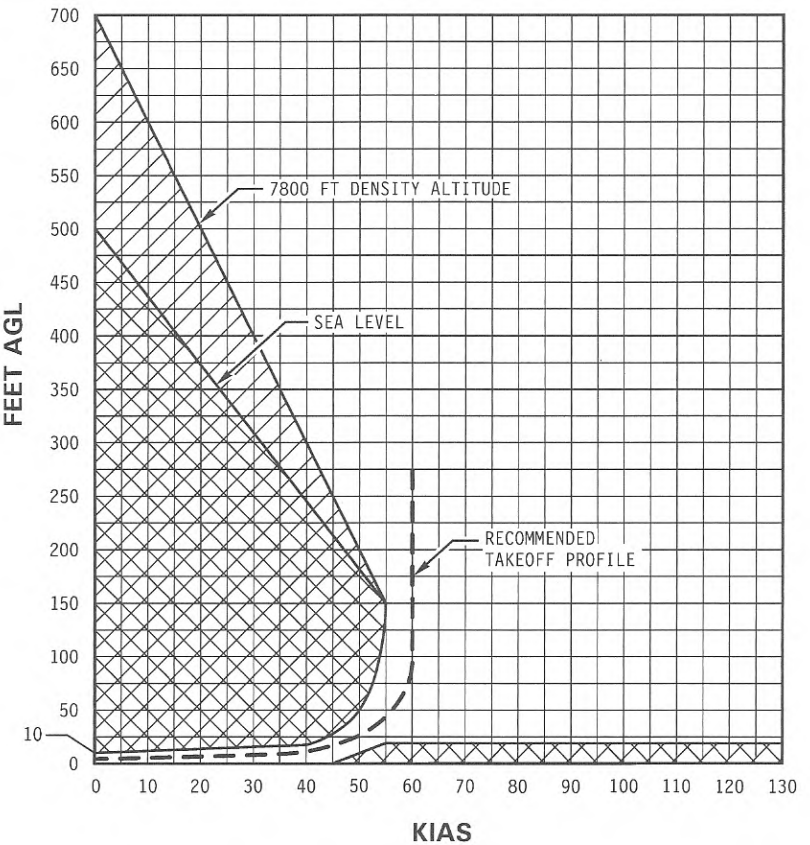


ENGINE ANTI-ICE MAY REDUCE CLIMB RATE UP TO 400 FT/MIN
FULL CABIN HEAT MAY REDUCE CLIMB RATE UP TO 700 FT/MIN

CLIMB PERFORMANCE, 2200 LB GROSS WEIGHT

DEMONSTRATED CONDITIONS:
SMOOTH HARD SURFACE
WIND CALM
2700 LB GROSS WEIGHT
HOVER POWER + 10% TORQUE FOR TAKEOFF

AVOID OPERATION IN CROSS-HATCHED AREAS



HEIGHT - VELOCITY DIAGRAM

NOISE CHARACTERISTICS

The following noise level complies with 14 CFR Part 36, Appendix J noise requirements and was obtained from FAA approved data from actual noise tests.

Model: R66
Engine: Rolls-Royce Model 250-C300/A1
Gross Weight: 2700 lb

Configuration	V_h KTAS	SEL* dB(A)
Clean with standard doors.	114	82.4
Landing gear strut fairings and rear landing gear cross-tube cover removed, and four doors with bubble windows installed.	106	83.0

*Sound Exposure Level for a level flyover at 492 feet AGL.

NOTE

No determination has been made by the Federal Aviation Administration that the noise level is or should be acceptable or unacceptable for operation at, into, or out of any airport.

SECTION 6

WEIGHT AND BALANCE

CONTENTS

SECTION 6

WEIGHT AND BALANCE

GENERAL

The helicopter must be flown only within weight and balance limits specified in Section 2. Loadings outside these limits can result in insufficient control travel for safe operation.

The center of gravity may be adjusted by adding removable ballast (any appropriate item of mass) to the baggage compartment and any under seat stowage area. Recalculate weight and balance after adding ballast, and verify ballast meets baggage compartment/stowage area limits given in Section 2.

Loaded helicopter weight and balance can be determined using the method given under LOADING INSTRUCTIONS.

In accordance with FAA procedures, the detail weight and balance data of this section are not subject to FAA approval. The loading instructions of this section, however, have been approved by the FAA as satisfying all requirements for instructions on loading of the rotorcraft within approved limits of weight and center of gravity and on maintaining the loading within such limits.

CAUTION

Fuel burn causes CG to move forward during flight. Always determine safe loading with empty fuel as well as with takeoff fuel. Payload may be limited by forward CG as fuel is burned.

WEIGHT AND BALANCE RECORD

The following form should be used to maintain a continuous record of your helicopter's weight and balance. Each time an item of equipment is removed or installed, an entry must be made and the new empty CG determined. The original factory weight and configuration is supplied with each helicopter on the Weight and Balance Summary/Equipment List (RF 134) at the end of this section. The RF 134 Weight and Balance Summary provides the first entry in the Weight and Balance Record.

NOTE

Calculated CG of empty weight plus 160 lb pilot must be STA 102.5 or forward. Following modification, adjustment to fixed nose ballast may be required. See R66 Maintenance Manual.

WEIGHT AND BALANCE RECORD (cont'd)

WEIGHT AND BALANCE RECORD
(Continuous History of Changes in Structure or Equipment Affecting Weight and Balance)

HELICOPTER MODEL R66 | SERIAL NUMBER:

DATE	DESCRIPTION OF ARTICLE OR MODIFICATION	WEIGHT CHANGE					RUNNING BASIC EMPTY WEIGHT				
		ADDED (+) REMOVED (-) WEIGHT (lb)	LONGITUDINAL		LATERAL (+ = RIGHT SIDE)		WEIGHT (lb)	LONGITUDINAL		LATERAL	
			Arm (in.)	Moment (in-lb)	Arm (in.)	Moment (in-lb)		Arm (in.)	Moment (in-lb)	Arm (in.)	Moment (in-lb)
	HELICOPTER AS WEIGHED										

LOADING INSTRUCTIONS

The following table may be used when calculating loaded helicopter weight and CG position.

COMMON ITEM WEIGHT & CG

Item	Weight (lb)	Longitudinal arm (in.)	Lateral arm (in.) (+ = right side)
Pilot (right forward seat)		49.0*	12.2
Left forward passenger		49.0*	–12.2
Aft outboard passengers		80.0	±16.0
Aft center passenger		78.0	0.0
Baggage under forward seats		42.0	±12.2
Baggage under aft seats		82.0	±15.0
Baggage in baggage compartment		107.0	0.0
Fuel		102.5	–3.0
Forward doors	7.5 each	49.5	±26.8
Aft doors	7.0 each	75.2	±27.2
Removable cyclic	0.6	35.3	–8.0
Removable collective	0.8	46.5	–21.0
Removable pedals (both pedals)	0.8	16.3	–9.5

*If additional backrest cushion is used, subtract thickness of compressed cushion.

LOADING INSTRUCTIONS (cont'd)

The following sample calculation demonstrates how to determine loaded helicopter weight and longitudinal center of gravity. A worksheet is provided on the page following the sample calculation for a weight and balance calculation for your helicopter. These may be compared with the CG limits given in Section 2 to determine safe loading. Both takeoff and empty fuel conditions must be within limits.

Lateral CG usually falls well within limits for conventional loadings. If an unusual lateral installation or loading occurs, lateral CG should be checked against the CG limits given in Section 2. The lateral reference datum is the aircraft centerline with items to the right positive and items to the left negative.

LOADING INSTRUCTIONS (cont'd)

SAMPLE LOADING CALCULATION

Item	Weight (lb)	Location		Moment	
		Long. Arm (in.)	Lat. Arm (in.) + = Right Side	Long. (in-lb)	Lat. (in-lb)
Basic empty weight	1290			140610	431
Remove fwd. right door	-7.5	49.5	26.8	–371	–201
Remove fwd. left door		49.5	–26.8		
Remove aft right door		75.2	27.2		
Remove aft left door		75.2	–27.2		
Remove cyclic		35.3	–8.0		
Remove collective		46.5	–21.0		
Remove pedals (both)		16.3	–9.5		
Pilot (forward right seat)	170	49.0	12.2	8330	2074
Left forward passenger	170	49.0	–12.2	8330	–2074
Aft right passenger	170	80.0	16.0	13600	2720
Aft center passenger	130	78.0	0.0	10140	0
Aft left passenger	170	80.0	–16.0	13600	–2720
Baggage under forward right seat	10	42.0	12.2	420	122
Baggage under forward left seat	10	42.0	–12.2	420	–122
Baggage under aft right seat	10	82.0	15.0	820	150
Baggage under aft left seat	10	82.0	–15.0	820	–150
Baggage in main baggage comp.	50	107.0	0.0	5350	0
Zero usable fuel weight and CG	**2182.5**	**92.4**	**0.1**	202069	230
Usable fuel quantity at 6.7 lb/gal	493.1	102.5	–3.0	50543	–1479
Takeoff Gross Weight and CG	**2675.6**	**94.4**	**–0.5**	**252612**	–1249

Notes: CG location (arm) for loaded helicopter is determined by dividing total moment by total weight.

LOADING INSTRUCTIONS (cont'd)

LOADING CALCULATION WORKSHEET

Item	Weight (lb)	Location		Moment	
		Long. Arm (in.)	Lat. Arm (in.) + = Right Side	Long. (in-lb)	Lat. (in-lb)
Basic empty weight					
Remove fwd. right door		49.5	26.8		
Remove fwd. left door		49.5	–26.8		
Remove aft right door		75.2	27.2		
Remove aft left door		75.2	–27.2		
Remove cyclic		35.3	–8.0		
Remove collective		46.5	–21.0		
Remove pedals (both)		16.3	–9.5		
Pilot (forward right seat)		49.0	12.2		
Left forward passenger		49.0	–12.2		
Aft right passenger		80.0	16.0		
Aft center passenger		78.0	0.0		
Aft left passenger		80.0	–16.0		
Baggage under forward right seat		42.0	12.2		
Baggage under forward left seat		42.0	–12.2		
Baggage under aft right seat		82.0	15.0		
Baggage under aft left seat		82.0	–15.0		
Baggage in main baggage comp.		107.0	0.0		
Zero usable fuel weight and CG					
Usable fuel quantity at 6.7 lb/gal					
Takeoff Gross Weight and CG					

Notes: CG location (arm) for loaded helicopter is determined by dividing total moment by total weight.

SECTION 7

SYSTEMS DESCRIPTION

CONTENTS

SECTION 7

SYSTEMS DESCRIPTION

GENERAL

The R66 is a five-place, single main rotor, single engine helicopter constructed primarily of metal and equipped with skid type landing gear.

The primary fuselage structure is welded steel tubing and riveted aluminum sheet. The tailcone is a monocoque structure in which aluminum skins carry most primary loads. Fiberglass and thermoplastics are used in secondary cabin structure and in various ducts and fairings. The cabin doors are also constructed of fiberglass and thermoplastics.

Several cowl doors provide access to the drive system, engine, engine oil tank, fuel filler cap, and fuel sump drain. A right-side door provides access to the main baggage compartment. Additional access to controls and other components for maintenance is provided by removable panels and cowlings.

The instrument console hinges up and aft to access instruments and avionics. The battery is installed under the left front seat.

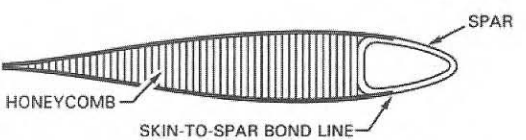
The engine is located aft of the main baggage compartment. The engine compartment is isolated from the rest of the airframe by stainless steel firewalls in front of and above the engine.

All four cabin doors may be removed and installed by maintenance personnel or pilots. To remove a door, disconnect door strut by lifting inboard end of strut while door is fully open, remove cotter rings in upper and lower hinge pins, and then lift door off. To install doors, use reverse procedure.

ROTOR SYSTEMS

The main rotor has two all-metal blades mounted to the hub by coning hinges. The hub is mounted to the shaft by a teeter hinge. The coning and teeter hinges use self-lubricated bearings. Droop stops for the main rotor blades provide a teeter hinge friction restraint which normally prevents the rotor from teetering while starting or stopping. Pitch change bearings for each blade are enclosed in a housing at the blade root. The housing is filled with oil and sealed with an elastomeric boot. Each blade has a thick stainless steel spar at the leading edge which is resistant to corrosion and erosion. Aluminum skins are bonded to the spar approximately one inch aft of the leading edge. Blades must be refinished if the paint erodes to bare metal at the skin-to-spar bond line. Bond may be damaged if bond line is exposed.

The tail rotor has two all-metal blades and a teetering hub with a fixed coning angle. The pitch change bearings have self-lubricated liners. The teeter hinge bearings are elastomeric. The tail rotor blades are constructed with wrap-around aluminum skins and forged aluminum root fittings.



MAIN ROTOR BLADE CONSTRUCTION

DRIVE SYSTEM

The engine is mounted in a 37° nose-up attitude. A sprag-type overrunning clutch mates directly to the splined engine power take-off (PTO) shaft. The clutch is connected to a shaft with flexible couplings at both ends to transmit power to the main gearbox. A ring and pinion spiral bevel gearset at the main gearbox input reduces speed to tail rotor driveline RPM. A second ring and pinion stage reduces speed from tail rotor driveline RPM to main rotor RPM.

The tail rotor drive line consists of an intermediate shaft running aft from the main gearbox and a long tail rotor driveshaft which runs the length of the tailcone. Flexible couplings are located at both ends of the intermediate shaft. The long tail rotor driveshaft has a support bearing at its front end and a damper bearing approximately one-third of the way aft on the shaft. The cooling fan is mounted to the intermediate shaft. The tail gearbox contains a single 90° splash-lubricated spiral-bevel gearset which increases speed to tail rotor RPM.

The main gearbox is pressure lubricated. The oil is pumped through an airframe-mounted filter and cooled by an oil cooler which receives its airflow from the cooling fan. The main gearbox also drives the flight control hydraulic pump.

POWERPLANT INSTALLATION

One Rolls-Royce model 250-C300/A1 (commercial designation RR300) free-turbine turboshaft engine powers the helicopter. The engine is equipped with an ignition exciter, igniter, starter-generator, two tachometer senders, and additional powerplant instrument senders. See Sections 1 and 2 for powerplant specifications and limitations.

A direct drive, squirrel cage style cooling fan is mounted to the intermediate shaft and supplies cooling air to the engine and gearbox oil coolers.

Induction air enters through multiple openings in the upper fuselage cowlings and flows into a plenum forward of the firewall. The plenum contains a radial-flow air filter at the engine compressor inlet.

If the air filter becomes blocked, spring-loaded doors at the front of the filter housing open allowing unfiltered air to the engine. The AIR FILTER annunciator illuminates when filter bypass is occurring.

NOTE

Periodically performing power assurance checks may provide indication of engine deterioration or air filter blockage. Maintenance actions such as air filter cleaning and compressor rinse should be performed if aircraft fails power assurance check (see Section 5 for power assurance check and Maintenance Manual for maintenance procedures).

A temperature switch is mounted to the firewall above the engine to detect a fire in the engine compartment. Abnormally high temperature causes the ENGINE FIRE annunciator to illuminate.

FLIGHT CONTROLS

Dual controls are standard equipment and all primary controls are actuated through push-pull tubes and bellcranks. Bearings used throughout the control system either are sealed ball bearings which do not require lubrication or have self-lubricated liners.

Flight controls are conventional. The cyclic stick appears to be different but the grip moves the same as in other helicopters due to the free hinge at the center pivot. The cyclic grip is free to move vertically allowing the pilot to rest his forearm on his knee if he chooses.

The collective control is also conventional. A twist grip provides input to the engine fuel control, and raising or lowering the collective provides power turbine governor inputs via an interconnecting linkage.

Pilot-side tail rotor pedals are adjustable. To adjust, extract quick release pin on each pedal by depressing button and pulling. Slide pedal fore or aft to most comfortable of three adjustment positions, and reinstall quick-release pin. Verify pins secure before flight.

REMOVABLE FLIGHT CONTROLS

Left seat controls may be removed and installed by maintenance personnel or pilots as follows:

1. To remove cyclic grip, extract quick release pin by depressing button and pulling, then pull outward on left grip while supporting stick. Rotate cyclic arm clockwise to stop, depress stop pin under cyclic pivot, and continue clockwise rotation one turn to wind up balance spring. To install removable cyclic, use reverse procedure.

CAUTION

Overrotating cyclic grip in either wound or unwound direction will damage balance spring.

CAUTION

After removing cyclic grip, place plastic cap on exposed cyclic tube to prevent possible injury to left seat passenger.

2. To remove collective, push boot aft to expose locking pins. Depress locking pins and pull forward on stick. To install, use reverse procedure. It may be necessary to rotate stick slightly to allow pins to snap into place.

CAUTION

When collective is installed, ensure that both locking pins are fully engaged through holes on each side.

3. To remove tail rotor pedals, depress locking pin while twisting pedal counterclockwise, then pull up. To install, use reverse procedure. A cover which is stowed under the floor scuff plate may be rotated up to cover the floor openings when the pedals are removed.

HYDRAULIC SYSTEM

Hydraulically-boosted main rotor flight controls eliminate cyclic and collective feedback forces. The hydraulic system consists of a pump, three servos, a reservoir, and interconnecting lines. Normal operating pressure is 450 to 500 psi. The pump is mounted on and driven by the main gearbox. A servo is connected to each of the three push-pull tubes that support the main rotor swashplate. The reservoir is mounted to the aft end of the main gearbox and includes a filter, pressure relief valve, and pilot-controlled pressure shut-off valve.

A sight glass for pre-flight fluid level checks is incorporated in the reservoir and accessible via a left side cowl door. A vented filler cap is located on top of the reservoir.

The pressure shut-off valve is solenoid-actuated and controlled by the hydraulic switch on the pilot's cyclic grip. The switch should be left ON during helicopter shutdown and start up except during the hydraulic system check.

NOTE

Electrical power is required to switch hydraulics OFF. Pulling HYD circuit breaker will NOT turn off hydraulics but will disable hydraulic switch.

Without hydraulic pressure, a large pilot input force is required to increase collective. Collective inputs also cause longitudinal cyclic forces which makes it difficult to maintain a steady hover. The servos have an irreversible feature to prevent rotor feedback forces from moving the controls. This allows the pilot to relax pressure on the controls in steady cruise flight. However, any cyclic input will cause the collective to lower and therefore the collective will have to be increased periodically.

CONTROL FRICTION ADJUSTMENT

Cyclic and collective controls are equipped with adjustable friction devices. A toggle type lever is located near the aft end of the pilot's collective. It is actuated aft to increase friction and forward to release it.

The cyclic friction knob is located left of the cyclic stick. Turning the knob clockwise applies friction to both longitudinal and lateral cyclic. Cyclic friction is normally applied only on the ground.

CAUTION

Control friction must be used with caution if applied in flight to avoid inadvertent locking of a control.

The pedals actuate push-pull controls connected directly to the tail rotor pitch control and do not incorporate any friction devices. An elastomeric trim spring provides a left-pedal force to balance feedback forces in flight.

ENGINE CONTROLS

A twist grip throttle control is located on each collective stick. The controls are interconnected and actuate the engine fuel control input lever via a push-pull cable. The throttle is normally not used for control but is set either fully closed (idle position) or fully open.

The engine incorporates a hydromechanical governor which attempts to maintain 100% engine output shaft RPM when the throttle is in the open position. A linkage provides the power turbine governor with collective inputs to help anticipate changing power demands.

Large power changes or varying environmental conditions may cause the governor RPM setting to vary by a few percent. A momentary toggle switch (beep switch) on the collective stick is provided to trim, or "beep", the governor setting to the desired RPM. The switch controls an actuator which adjusts the linkage between the collective and power turbine governor. Holding the beep switch up or down will change rotor RPM approximately one percent per two seconds.

ENGINE CONTROLS (cont'd)

The governor controls RPM under normal conditions. It may not prevent over- or under-speed conditions generated by aggressive flight maneuvers or rapid power changes.

Other engine controls include a push-pull fuel cutoff control on the console face, a start button on pilot's collective, a key-type igniter switch, and an anti-ice switch.

ENGINE ANTI-ICE

A solenoid-actuated valve controlled by the anti-ice switch allows hot compressor discharge air to flow to the compressor nose bearing support. The green ANTI-ICE annunciator is activated by a pressure switch in the anti-ice air line, indicating when anti-ice is ON and functioning. Because compressor discharge air is used, some performance degradation occurs with anti-ice ON (see Section 5).

Switch anti-ice ON in conditions conducive to icing. Anti-ice must be ON for operation in certain conditions per Section 2.

NOTE

Electrical power to the anti-ice solenoid is required to switch anti-ice OFF (system is fail-safe ON).

STARTER AND IGNITION SYSTEM

A single starter-generator is used for engine starting and electrical power generation. A generator control unit (GCU) controls starter-generator function. During a start, the GCU latches the starter on until N_1 reaches 58 percent RPM. Therefore, the pilot is not required to hold the start button down throughout the start sequence. Above 58 percent N_1 RPM, the GCU automatically switches out of start mode, but the generator switch should not be switched ON until idle RPM stabilizes to prevent the generator load from bringing the RPM down.

When the igniter key switch is in the enable position, depressing the start button causes a normal start sequence with the starter latching on and the igniter firing. Above 58 percent N_1 RPM, the igniter will fire while the start button is depressed.

When the igniter switch is OFF, the engine can be motored by the starter by depressing the start button without the starter latching or the igniter firing. This is useful for performing a compressor wash or rinse. If the igniter is switched OFF during a start, the starter will disengage. If the igniter is switched OFF while the engine is running, the engine will continue to run; however, this is not recommended.

NOTE

Start button is active when battery switch is ON, even if igniter switch is OFF. Rotor brake may be left engaged after shutdown to disable start button.

FUEL SYSTEM

A single bladder-type crash-resistant fuel cell supplies fuel via gravity flow to the engine. The fuel cell incorporates left and right vent fittings, a filler port, a fuel gage sender, a low-fuel sender, a sump drain, and a finger strainer at the fuel outlet. The low-fuel sender activates the LOW FUEL annunciator, indicating approximately five gallons of usable fuel remaining. The vent fittings each have a rollover valve to prevent fuel leakage in any attitude.

The fuel cell is secured inside an aluminum structure. The filler cap is located under a cowl door. The left and right side vent fittings are interconnected and are vented through two risers within the mast fairing. A fuel valve is located on the forward side of the firewall and is controlled by a push-pull cable control at the base of the pilot's collective stick.

The engine incorporates a fuel pump assembly with an inlet filter. A differential pressure switch illuminates the FUEL FILTER annunciator if the filter becomes contaminated.

A single drain allows fuel sampling from the low point in the fuel cell. The drain tube is accessible via a left side cowl door. The drain is opened by extending the plastic tube clear of the aircraft and pushing up on the drain.

PITOT-STATIC SYSTEM

The pitot-static system supplies air pressure to operate the airspeed indicator, altimeter, and vertical speed indicator. The pitot tube is located on the leading edge of the mast fairing. The static sources are located on each side of the cabin aft of the rear doors.

Water can be drained from pitot-static lines by removing the plastic drain plugs which are accessible through the aft inspection panel on the underside of the cabin. Draining lines should be required only if the airspeed indicator or altimeter appears erratic.

Pitot and static sources should be inspected frequently for bugs or other obstructions.

ELECTRICAL SYSTEM

A 28-volt DC electrical system is standard. Primary system components are a sealed lead-acid battery, a starter-generator, and a generator control unit. The battery is located beneath the left front seat or in a compartment in the left side of the baggage compartment.

The circuit breaker panel is on the ledge just forward of the left front seat. Breakers are marked to indicate function and amperage and are of the push-to-reset type.

The battery switch controls the battery relay which connects the battery to the electrical system. A wire protected by a fuse near the battery bypasses the battery relay to allow the tachometers and clock to receive battery power with the battery switch OFF.

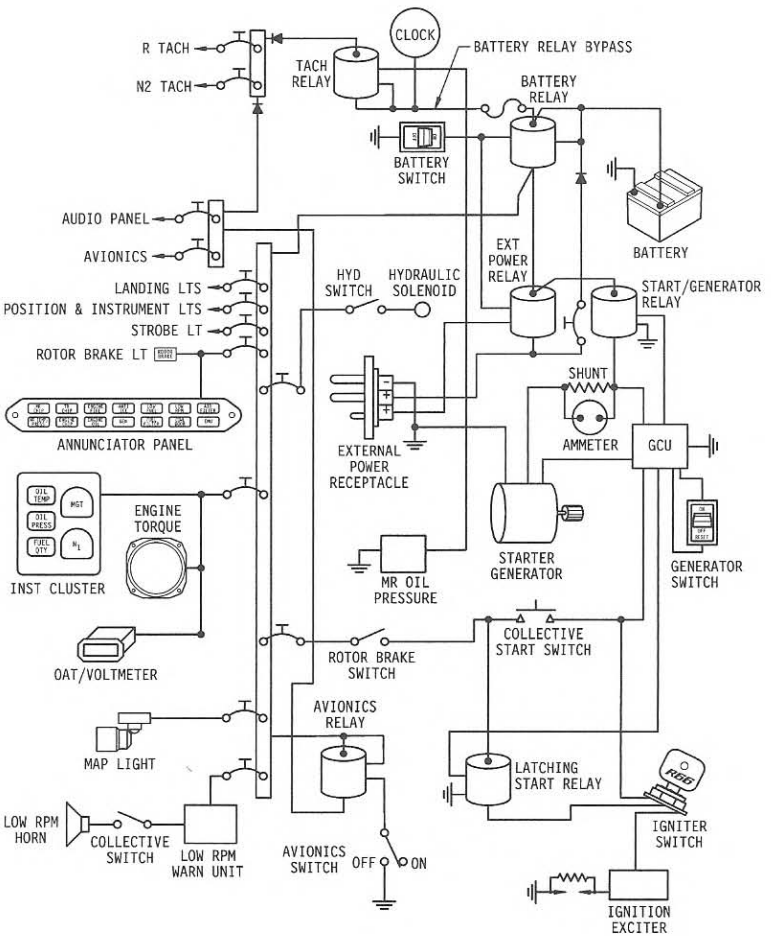
The avionics switch controls power to avionics. This allows avionics to be switched OFF via a single switch. Having sensitive electrical equipment off when the generator is switched ON protects against voltage spikes.

An ammeter indicates total generator output. A digital voltmeter which reads main bus voltage at the circuit breaker panel is incorporated as part of the OAT indicator. Normal indication is 27.3 to 28.7 volts with the generator ON.

A generator control unit (GCU) controls starter-generator function. Below 58 percent N_1 RPM, the GCU is in start mode regardless of generator switch position. Above 58 percent, the GCU automatically switches to generate mode. The generator switch should normally be off for starting to prevent applying generator load to the engine before reaching idle RPM.

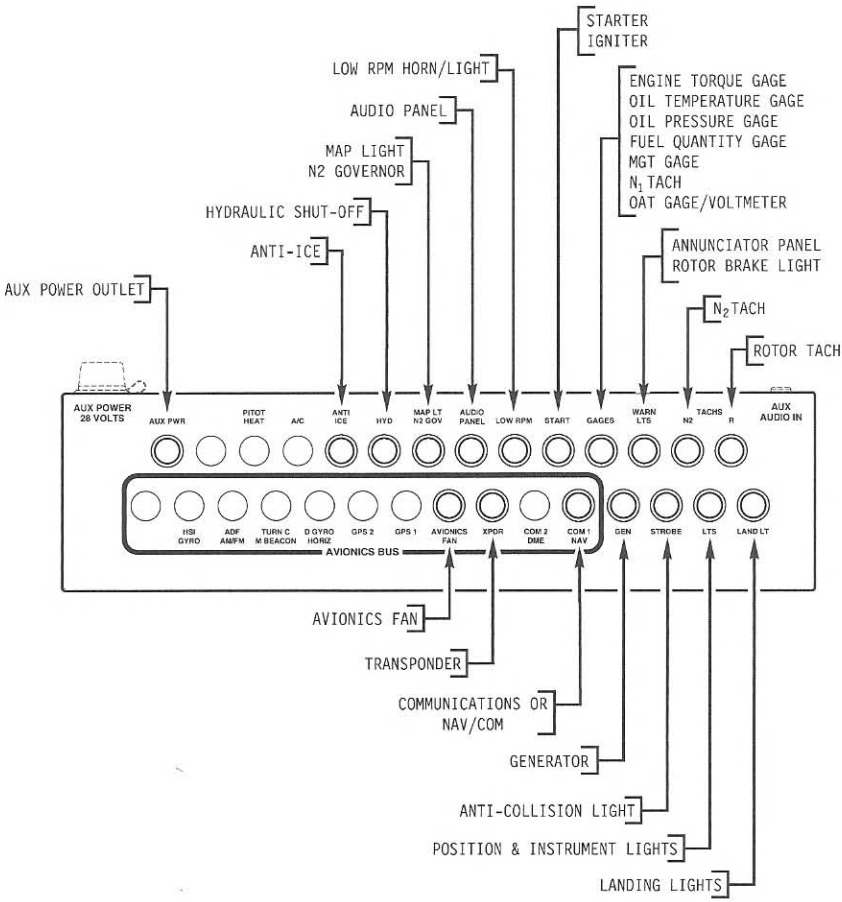
If the GEN annunciator illuminates in flight, turn off non-essential electrical equipment and switch generator to reset (momentary position) and then ON. If the GEN annunciator remains illuminated, land as soon as practical.

ELECTRICAL SYSTEM (cont'd)



ELECTRICAL SYSTEM

ELECTRICAL SYSTEM (cont'd)



CIRCUIT BREAKER PANEL - TYPICAL

LIGHTING SYSTEM

A red anti-collision light is installed on the tailcone and is controlled by the strobe switch on the instrument console. Position lights are installed on each side of the cabin and in the tail and are controlled by the nav lights switch. A light at the top of the windshield and post lights illuminate the instrument panel. Panel lighting is active when the nav lights switch is ON and lighting is dimmed via the knob above the nav lights switch. An overhead map light mounted on a swivel is controlled by an adjacent switch with high and low settings. The map light may be used for emergency lighting of the instrument panel. An additional cabin light with an adjacent switch is located just aft of the map light. The map and cabin lights are not connected to the dimmer circuit.

Two long-life, high intensity discharge (HID) landing lights are installed in the nose. One wide-angle and one narrow-beam light are used to increase lighted area. The landing light switch is located on the cyclic center post.

NOTE

Continuous operation of landing and position lights in flight is recommended to promote collision avoidance.

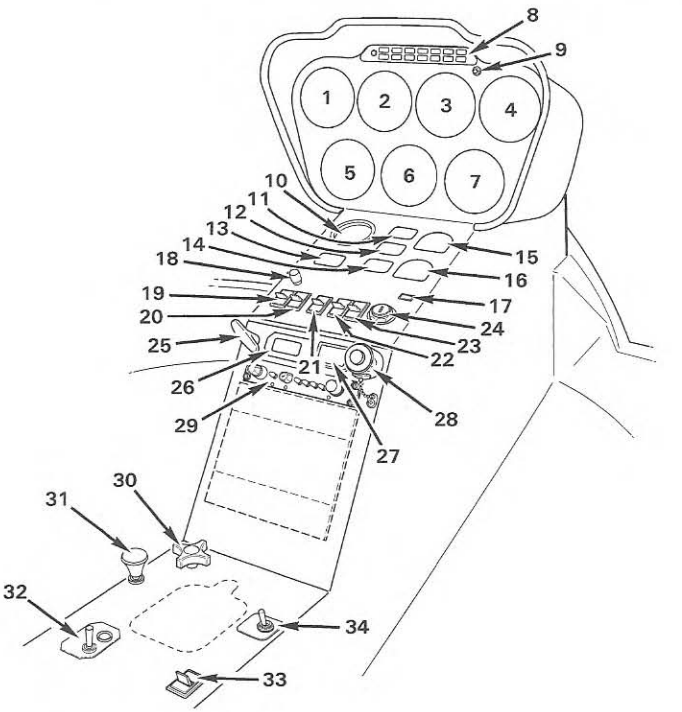
EXTERNAL POWER

A 28-volt MS3506-compatible external power receptacle is located inside the right engine cowl door. When the battery is switched ON, the external power relay and the battery relay both close, connecting external power to the aircraft electrical system and battery. The external power relay will not close if reverse polarity is provided to the receptacle.

A separate wire from the external power receptacle to the battery bypasses the external power and battery relays. This wire allows battery charging via the external receptacle with the battery switch OFF. A 10-amp circuit breaker at the receptacle opens if current exceeds normal charging levels, and a diode provides polarity protection.

INSTRUMENT PANEL

Standard primary instruments are a vertical speed indicator, airspeed indicator, engine (N_2) and rotor dual tachometer, sensitive altimeter, torque meter, and magnetic compass. Engine gages include an N_1 tachometer, measured gas (turbine) temperature, oil pressure, oil temperature, and fuel quantity. Also standard are a clock, an ammeter, a digital outside air temperature gage/voltmeter, and an hourmeter. An additional hourmeter is located outboard of the pilot's seat. Both hourmeters require main gearbox oil pressure to activate. The outboard hourmeter is collective activated and is approved for recording time in service. Space is provided for optional instruments and avionics.



1. VERTICAL SPEED INDICATOR
2. OPTIONAL INSTRUMENT
3. AIR SPEED INDICATOR
4. N_2 AND ROTOR TACH
5. ALTIMETER
6. OPTIONAL INSTRUMENT
7. TORQUE METER
8. ANNUNCIATOR PANEL
9. ANNUNCIATOR TEST BUTTON
10. CLOCK
11. ENGINE OIL TEMP GAGE
12. ENGINE OIL PRESSURE GAGE
13. AMMETER
14. FUEL GAGE
15. MGT GAGE
16. N_1 TACH
17. ROTOR BRAKE LIGHT
18. PANEL LIGHTS DIMMER
19. NAVIGATION LIGHTS SWITCH
20. STROBE LIGHT SWITCH
21. AVIONICS MASTER SWITCH
22. GENERATOR SWITCH
23. BATTERY SWITCH
24. IGNITER SWITCH
25. CABIN AIR
26. OUTSIDE AIR TEMP/VOLTMETER
27. HOURMETER
28. FUEL CUTOFF WITH GUARD
29. AUDIO CONTROL PANEL
30. CYCLIC FRICTION
31. CABIN HEAT
32. ELT SWITCH
33. ANTI-ICE SWITCH
34. HEATED PITOT SWITCH

INSTRUMENT PANEL - TYPICAL

(Exact panel configuration may vary with optional equipment and date of helicopter manufacture.)

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ANNUNCIATOR PANEL

The annunciator panel consists of illuminated segments located at the top of the main instrument panel. If a caution or warning condition occurs, the appropriate segment(s) illuminate indicating the nature of the problem.

ANNUNCIATOR PANEL

The CHIP segments are illuminated by magnetic chip detectors in each gearbox which collect metallic particles in order to complete an electric circuit. The engine gearbox has two chip detectors, either of which can illuminate the ENGINE CHIP segment.

The MR TEMP/PRESS segment is illuminated by either the temperature switch or oil pressure switch at the main gearbox. The ENGINE FIRE segment is illuminated by a temperature switch in the engine compartment. The ENGINE OIL segment is activated by a pressure switch which is independent of the oil pressure sender. The ANTI ICE segment illuminates via a pressure switch in the engine anti-ice air line. The GEN segment illuminates when the generator is disconnected from the main electrical bus.

The LOW FUEL segment is illuminated by a float switch in the tank which is independent of the fuel quantity sender. The FUEL FILTER segment illuminates when a pressure switch detects excessive pressure drop across the fuel filter.

The LOW RPM segment is illuminated by a sensor measuring driveline speed at the aft end of the main gearbox. A horn sounds simultaneously with illumination of the LOW RPM segment when rotor speed is below 95% RPM. The horn is disabled when the collective is fully down.

The COWL DOOR segment is illuminated when the fuel filler cowl door, the right engine cowl door (which accesses the external power receptacle), or the baggage door is not closed. The AIR FILTER segment illuminates when pressure drop across the filter opens bypass doors, allowing unfiltered air to the engine.

ANNUNCIATOR PANEL (cont'd)

The EMU (Engine Monitoring Unit) segment indicates the EMU status with either steady, flashing, or no illumination. The EMU segment will illuminate only when the test button is depressed.

A push-to-test button on the instrument panel should cause all segments on the annunciator panel, as well as the ROTOR BRAKE light, to illuminate when depressed. The LOW FUEL segment takes approximately two seconds before it illuminates due to a time delay in the circuit. (The time delay prevents sloshing fuel from giving a false indication.) The EMU segment takes approximately ten seconds to perform a self-test after the battery is switched ON before it will illuminate. The test button may be used on the ground or in flight to verify all circuits are functioning.

DUAL TACHOMETER

An electronic engine (N_2) and rotor dual tachometer is standard. Engine tachometer signal is provided by a transducer on the engine gearbox. Rotor tachometer signal is provided by magnets on the main gearbox tail rotor driveline yoke. Each tachometer is on a separate circuit with its own circuit breaker.

The tachometer bus receives power from the avionics bus or through the battery relay bypass circuit as long as the main rotor gearbox has oil pressure. Therefore, the tachometers will receive power through the bypass circuit whenever the rotors are turning even if the avionics bus is not powered. The bypass circuit is disconnected from the tachometer bus when the annunciator test button is depressed. Pressing the test button while the helicopter is running will confirm that the tachometers are receiving power from the avionics bus.

AUDIO SYSTEM

A five-place audio system is standard. An audio control panel allows control of communication radios, intercom, and stereo-capable auxiliary audio (e.g. music) input.

The system has four modes of operation. In normal mode, all occupants hear incoming and outgoing radio communications, intercom, and auxiliary audio. The pilot and copilot can both transmit on the selected radio.

In crew mode, the pilot and copilot are isolated from rear seat occupants. The crew does not hear rear seat intercom or auxiliary audio and rear seat occupants do not hear crew intercom or radio communications.

In pilot isolate mode, the pilot is isolated from all other occupants. The copilot is grouped with the rear seat occupants for intercom and auxiliary audio.

In emergency mode, the pilot transmits and receives on the number one radio only (regardless of audio panel switch position). All other audio is disabled.

The first three modes are selectable via the audio control panel. Emergency mode occurs if power to the panel is lost. In addition to the mode control, the audio panel has controls for squelch, volume, and selection of transmit and receive radios. A detail description of these controls can be found in the audio system operation manual.

Headset jacks are located in the ceiling near each seat. Pilot and copilot intercom and transmit are controlled via trigger switches on the cyclic grips. The trigger has two detents; the first detent activates the intercom and the second detent transmits. Additional intercom buttons are located on the forward side of the rear seats and on the left forward floor. Intercom may also be set to be voice activated. Auxiliary audio may be plugged in to a jack on the forward face of the circuit breaker panel. In normal mode, auxiliary audio is automatically muted during radio communication.

ENGINE MONITORING UNIT

The Engine Monitoring Unit (EMU) is a digital recording device mounted behind the right rear seatback panel. The EMU continuously monitors N_1, N_2, engine torque, and MGT. EMU status is indicated by the EMU segment on the annunciator panel. The EMU segment will only illuminate while the annunciator panel test button is depressed. The EMU requires approximately ten seconds to initialize after the aircraft battery is switched ON. Once initialization is complete, steady illumination of the annunciator means normal EMU operation. A slowly flashing indication (once every two seconds) is given if the EMU detects a fault in its senders or circuitry. A fast flashing indication (four times per second) is given if the EMU has detected an exceedance. A fault or exceedance indication should be investigated and reset by a qualified mechanic prior to the next flight.

The EMU records exceedances of Rolls-Royce engine limits, not airframe operating limits as given in Section 2. The EMU will record an exceedance if any of the following are exceeded:

MGT during start: 999°C, or 927°C for 1 second, or 810°C for 10 seconds

MGT engine running: 843°C, or 782°C for 6 seconds, or 706°C for 5 minutes

N_1: 106%, or 105% for 15 seconds

N_2: 110%, or 105% for 15 seconds
78 to 88% for 60 seconds over 38% torque

Torque: 122% for 15 seconds, or 104% for 5 minutes

The EMU also records a start cycle when N_1 exceeds 30% and MGT is at least 343°C.

The EMU is intended to be used only as a maintenance aid. It is the pilot's responsibility to report any observed exceedances and the operator's responsibility to maintain a record of engine starts and time in service.

CABIN HEATING AND VENTILATION

Fresh air vents are located in each door and in the nose. Door vents are opened and closed using the knob near the vent door hinge. A rotating knob is provided to seal and lock vents closed. For maximum ventilation, open door vents wide during hover but only one inch or less during cruise. The rotating knob can be used to hold vents partially open.

The fresh air inlet in the nose is opened by pulling the vent handle on the console face. Rotating the vent handle clockwise will lock its position. Air from the nose inlet is directed along the inside surface of the windshield for defogging as well as for ventilation.

Bleed air from the engine compressor is used for cabin heat. Tubing routes hot air from the engine to outlets forward of the tail rotor pedals and in the rear footwells. A heater control knob located to the left of the cyclic stick actuates a valve in the aft end of the control tunnel through a push-pull cable to control cabin heat. Because the cabin heat uses engine compressor air, some performance degradation occurs with heat ON (see Section 5).

CAUTION

In case of engine fire, cabin heat should be turned OFF.

SEATS, BELTS, AND BAGGAGE

The seats are not adjustable but the pilot-side pedals are adjustable. Each helicopter is supplied with a cushion which can be placed behind the pilot to position him forward. This allows shorter pilots to reach the pedals, the cyclic stick in its most forward position, and the controls on the center console.

Each seat is equipped with a combined seat belt and inertia reel shoulder strap. The inertia reel is normally free but will lock if there is sudden movement as would occur in an accident.

The main baggage compartment is located between the cabin and the engine compartment. It is accessed via a large door on the aircraft right side. The cowl door annunciator illuminates to warn the pilot when the door is not latched. A light illuminates the compartment when the battery switch is ON. Tie down anchors are provided for securing items in the baggage compartment. Observe placarded weight limits.

Additional compartments are located under each seat except the center rear seat. Seat cushions hinge forward for access to these compartments. Do not load these compartments above the maximum fill lines. The lines indicate required crush space for the seats in an accident.

LANDING GEAR

A spring and yield skid type landing gear is used. Most hard landings will be absorbed elastically. However, in an extremely hard landing, the struts will hinge up and outward as the center crosstube yields (takes permanent set) to absorb the impact. Slight yielding of the aft crosstube is acceptable. However, yielding which allows the tail skid to be within 34 inches of the ground when the ship is sitting empty on level pavement requires crosstube replacement.

Hardened steel wear shoes are mounted on the bottom of the skids. These shoes should be inspected periodically, particularly if autorotation landings with ground contact have been performed. Have skid shoes replaced whenever the thinnest point is less than 1/16 of an inch (0.06 in.).

ROTOR BRAKE

The rotor brake is mounted on the aft end of the main gearbox and actuated by a cable connected to a pull handle located on the cabin ceiling. To stop the rotor, use the following procedure:

1. After pulling fuel cutoff, wait at least one minute.
2. Pull brake handle forward and down using moderate force (10 lb).
3. After rotor stops, release handle or, to use as parking brake, hook bead chain in slot in bracket.

An annunciator light near the igniter switch illuminates when the brake is engaged. The brake must be released before starting the engine. When the brake is engaged, the starter is disabled.

CAUTION

Applying rotor brake without waiting at least one minute after engine shutdown or using a force which stops rotor in less than ten seconds may damage brake shoes.

EMERGENCY LOCATOR TRANSMITTER (OPTIONAL)

The Emergency Locator Transmitter (ELT) installation consists of a transmitter with internal battery pack, an external antenna, and a remote switch/annunciator. The transmitter is mounted to the upper steel tube frame and is accessible through the spring loaded air intake door in the right-side cowl. The remote switch/annunciator is located left of the cyclic stick.

The ELT is operated by a switch on the transmitter and by the remote switch. The transmitter switch has been set in the ARM position at installation and should always be in this position for flight. The remote switch/annunciator is a three position switch with indicator light. This switch should be in the ARMED position for flight. With both switches set to armed, the ELT will begin transmitting when subjected to a high "G" load. When the unit is transmitting, the red indicator light illuminates.

Moving the remote switch to ON activates the transmitter. Use the ON position if an emergency landing is imminent and time permits.

If the ELT is inadvertently activated, use the momentary RESET & TEST position of the remote switch to stop transmission and reset the unit. The red indicator will extinguish when unit is reset.

For more detailed instructions on ELT operation, maintenance, and required tests, refer to manufacturer's manual supplied with the unit.

SECTION 8

HANDLING AND MAINTENANCE

CONTENTS

SECTION 8

HANDLING AND MAINTENANCE

GENERAL

This section outlines procedures recommended for handling, servicing, and maintaining the R66 helicopter. Every owner should stay in close contact with a Robinson Service Center to obtain the latest service and maintenance information. Owners should also be registered with the factory to receive service bulletins, changes to this handbook, and other helpful information as it becomes available.

Federal Regulations place responsibility for maintenance of a helicopter on the owner and operator. He must insure that all maintenance is performed by qualified mechanics and in accordance with the R66 Maintenance Manual (Instructions for Continued Airworthiness), Service Bulletins/Service Letters, and FAA Airworthiness Directives.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this handbook are considered mandatory.

Authorized Robinson Service Centers will have recommended modification, service, and operating procedures issued by the FAA and by Robinson Helicopter Company. This information will be useful in obtaining maximum utility and safety with the helicopter.

REQUIRED DOCUMENTS

The Airworthiness Certificate (FAA form 8100-2) must be displayed in the aircraft at all times. The following additional documents must be carried in the aircraft:

1. Registration Certificate (FAA Form 8050-3)
2. Pilot's Operating Handbook
3. Current Weight and Balance

The following documents should not be carried in the aircraft, but must be available for use by any mechanic or pilot servicing the aircraft:

1. Aircraft Logbook
2. Engine Logbook

NOTE

Required documents may vary in countries other than the United States.

REQUIRED INSPECTIONS

Federal Regulations require that all civil aircraft of U.S. registry undergo a complete (annual) inspection every twelve months. This annual inspection must be signed off by a mechanic with Inspection Authorization (IA). This inspection is required whether the helicopter is used commercially or privately.

In addition to the annual inspection, the R66 Maintenance Manual requires a complete inspection after every 100 hours of operation. The helicopter also incorporates a number of fatigue life-limited components which must be retired at specified time intervals. A list of these components is contained in the Airworthiness Limitations section of the R66 Maintenance Manual and Instructions for Continued Airworthiness.

The R66 helicopter includes many unique features. Even with a maintenance manual, an Airframe and Powerplant (A & P) mechanic is not qualified to perform the above inspections of the R66 helicopter without additional training. Therefore, these inspections must be performed only by properly rated personnel who have successfully completed a factory-approved maintenance course of instruction on the R66 helicopter.

The factory occasionally publishes Service Bulletins and the Federal Aviation Administration (FAA) occasionally publishes Airworthiness Directives (ADs) that apply to specific groups of aircraft. They are mandatory changes or inspections which must be complied with within the time limit specified. Owners should periodically check with Robinson Service Centers to be sure that the latest Service Bulletins and ADs issued have been complied with.

PREVENTIVE MAINTENANCE BY THE PILOT

14 CFR Part 43 of the Federal Regulations allows a certificated pilot to perform preventive maintenance. Preventive maintenance is defined in the above regulations, and, as they apply to the R66 helicopter, include the following:

1. Remove or replace cowling or inspection panels.
2. Replace bulbs, reflectors, and lenses of position and landing lights.
3. Replace the following filters: Engine air, engine oil, fuel, main gearbox oil, and hydraulic fluid.
4. Change or replenish the following: Engine oil, main and tail gearbox oil, and hydraulic fluid.
5. Inspect and clean chip detectors.
6. Service or replace battery.
7. Replace wear shoes on landing gear skids.
8. Clean or refinish exterior of aircraft.

Although the work above is allowed by law, it should only be performed by pilots confident that they are qualified to reliably complete the work. All work must be done in accordance with the R66 Maintenance Manual.

After completing the work, when required, the pilot must enter the following in the appropriate logbook:

1. Date work accomplished.
2. Description of work.
3. Total hours on aircraft.
4. Pilot certificate number.
5. Signature of pilot.

ALTERATIONS TO AIRCRAFT

The compactness and many unique design features of the R66 helicopter make any modification inadvisable. Dynamic characteristics and susceptibility to fatigue of the rotor, drive, and control systems make any modifications to these systems extremely hazardous.

Also hazardous is installation of any electronic equipment or avionics not factory-approved and supplied. The compactness of the console and tunnel containing the controls and wire bundles makes installation of any additional wires likely to interfere with free control movement. The electronic tachometers and other instruments may be affected by other electronic devices and their reliability and accuracy is essential for safe operation of the helicopter. Installation of unauthorized electrical devices can result in a hazardous condition.

Because of these potential hazards, Robinson Helicopter Company does not authorize any modification or alteration other than those which are factory-supplied and installed by factory-trained personnel.

GROUND HANDLING

For leveling, hoisting, or jacking, see appropriate sections of the maintenance manual.

The helicopter is normally maneuvered on the ground using ground handling wheels. Ground handling wheels are attached inboard of the landing gear skid tubes forward of the rear struts. Wheels must be removed for flight.

To attach wheels:

1. Hold handle and wheel with protruding spindle in its lowest position.
2. Insert spindle into support mounted on skid. Make sure spindle is all the way in.
3. Pull handle over center to raise helicopter and lock wheel in position.

CAUTION

When lowering helicopter, handle has a tendency to snap over.

Ground handling generally requires two people: one to hold the tail down and steer by holding the tail rotor gearbox and a second to push on the fuselage. Keep feet clear of skid tubes. Alternately, a Robinson electric tow cart may be used per the instructions provided.

CAUTION

Do not move helicopter by gripping tail rotor guard, outboard part of horizontal stabilizer, tail rotor, or tail rotor controls.

PARKING

1. Place cyclic control in neutral and apply friction.
2. Put collective full down and apply friction.
3. Align rotor blades approximately fore and aft. Apply rotor brake. Use blade tie-downs in windy conditions.

CAUTION

If using rotor blade tie-downs, do not over-tighten tie-down straps (5 lb max tension). Do not pull down on blades to teeter rotor. To lower a blade, push up on opposite blade.

4. During storm conditions, helicopter should be hangared or moved to a safe area.

ENGINE OIL AND FILTER

Full oil quantity is six quarts and minimum quantity for takeoff is four quarts. Quantity is indicated as follows:

Six quart indication is top of knurled section of dipstick. Four quart indication is bottom of knurled section of dipstick or center of oil tank sight glass.

Engine oil change intervals have been designed to coincide with aircraft inspection intervals. Additional oil changes should not normally be required.

Only turbine engine oil per specification AS 5780 HPC is approved. The following products are known to meet the specification and are recommended. Other products which meet the specification may also be used.

Product	Manufacturer
Mobil Jet Oil (MJO) 254	Exxon Mobil Lubricants
British Petroleum Turbine Oil (BPTO) 2197	Air BP Lubricants

The engine oil filter is located on top of the engine and is accessible via a right side cowl door. A red indicator pin (impending bypass indicator) extends from the end of the filter housing if the filter becomes contaminated. Operation with a contaminated filter may allow oil to bypass the filter element. Oil will still be supplied to the engine but will be unfiltered. If erroneous indication is suspected, the bypass indicator may be reset by pushing it back in. If indicator extends during next engine run or flight, service filter. Refer to RR300 Series Operation and Maintenance Manual for servicing instructions.

GEARBOX OIL AND FILTER

Main and tail gearbox oil quantities are indicated by sight glasses. The main gearbox sight glass is on the left side of the gearbox and can be viewed by opening a left side cowl door. A light activated by a switch at the door illuminates the sight glass. The tail gearbox sight glass is located at the aft end of the tail gearbox. Both gearboxes use Robinson P/N A257-22 oil. Both gearboxes should be filled to center of sight glass with helicopter sitting level.

A filler plug is provided on top of each gearbox. See R66 Maintenance Manual for oil addition instructions.

The main gearbox filter is located in the gearbox compartment and is accessible via a left side cowl door. A red indicator pin (impending bypass indicator) extends from the end of the filter housing if the filter becomes contaminated. Operation with a contaminated filter may allow oil to bypass the filter element. Oil will still be supplied to the gearbox but will be unfiltered. If erroneous indication is suspected, the bypass indicator may be reset by pushing it back in. If indicator extends during next run-up or flight, service filter. Refer to R66 Maintenance Manual for servicing instructions.

HYDRAULIC FLUID

Hydraulic fluid level is indicated by a sight glass in the reservoir. The sight glass can be viewed by opening a left side cowl door. A light activated by a switch at the door illuminates the sight glass. A filler/vent cap is located on top of the reservoir. If hydraulic fluid is not visible in reservoir sight gage with helicopter sitting level, add Robinson part number A257-15 fluid (MIL-PRF-5606).

NOTE

Sight glass reading will be higher with system hot.

AIR FILTER

The foam engine air filter element may be removed for cleaning as required. Element should be cleaned when visibly dirty or when contamination is indicated by the AIR FILTER annunciator. Element should be replaced if foam is visibly damaged or deteriorated. Refer to R66 Maintenance Manual for servicing procedures.

COMPRESSOR RINSE AND WASH

The engine requires periodic compressor rinses when operated in a corrosive atmosphere. Compressor washes must be completed at specified intervals or when engine performance is not satisfactory. Refer to R66 Maintenance Manual for compressor rinse and compressor wash procedures and recommend intervals.

FUEL

Approved fuel grades and capacity are given in Section 2.

The aircraft should be electrically grounded prior to fueling. Grounding provisions are provided inside the fuel filler cowl door for a grounding clip or an M83413/4-1 style plug. Attach the ground cable before removing the fuel cap.

A quick drain located at the fuel tank low point is accessible via a cowl door on the left side of the aircraft. A small quantity of fuel should be drained using the quick drain prior to the first flight each day. Drain enough fuel to remove any water or contaminants. If fuel contamination is suspected, continue to drain fuel until all contamination is eliminated.

The engine is equipped with a fuel filter. A switch at the filter illuminates the FUEL FILTER annunciator if the filter becomes contaminated. Fuel will continue to flow to the engine with a contaminated filter but may bypass the filter element. Refer to RR300 Series Operation and Maintenance Manual for filter servicing instructions.

BATTERY

The 24-volt battery is located behind a cover at the forward end of the compartment under the left front seat or in a compartment in the left side of the baggage compartment.

A discharged battery is NOT AIRWORTHY because it will not have the reserve capacity to operate the electrical system should the charging system fail in flight.

The battery may be charged using the external power receptacle located inside the right engine cowl door. For charging currents less than 10 amps, power connected to the receptacle will flow directly to the battery without the aircraft battery switch ON. For larger charging currents, the battery switch must be ON to allow current flow through the external power and battery relays rather than the 10-amp charging circuit breaker.

For information on battery replacement or capacity checks, see R66 Maintenance Manual.

CLEANING HELICOPTER

CLEANING EXTERIOR SURFACES

The helicopter should be washed with mild soap and water. Harsh abrasives, alkaline soaps, or detergents could scratch painted or plastic surfaces or could cause corrosion of metal. Cover areas where cleaning solution could cause damage. Use the following procedure:

1. Rinse away loose dirt with water.
2. Apply cleaning solution with a soft cloth, sponge, or soft bristle brush.
3. To remove stubborn oil and grease, use a cloth dampened with aliphatic naphtha.
4. Rinse all surfaces thoroughly.
5. Any good automotive wax may be used to preserve painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing.

CAUTION

Never use high-pressure spray to clean helicopter. Never blow compressed air into main or tail rotor blade tip drain holes.

CLEANING WINDSHIELD AND WINDOWS

1. Remove dirt, mud, and other loose particles from exterior surfaces with clean water.
2. Wash with mild soap and warm water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.
3. Remove oil and grease with a cloth moistened with isopropyl alcohol (rubbing alcohol) or aliphatic naphtha.

CLEANING HELICOPTER (cont'd)

CLEANING WINDSHIELD AND WINDOWS (cont'd)

CAUTION

Do not use gasoline, other alcohols, benzene, carbon tetrachloride, thinner, acetone, or window (glass) cleaning sprays.

4. After cleaning plastic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.
5. Scratches can be removed by rubbing with jeweler's rouge followed by hand polishing with commercial plastic polish. Use a figure eight motion when polishing.

CLEANING UPHOLSTERY AND SEATS

1. Vacuum and brush, then wipe with damp cloth. Dry immediately.
2. Soiled upholstery, except leather, may be cleaned with a good upholstery cleaner suitable for the material. Follow manufacturer's instructions. Avoid soaking or harsh rubbing.
3. Leather should be cleaned with saddle soap or a mild hard soap and water.

CLEANING CARPETS

Remove loose dirt with a whisk broom or vacuum. For soiled spots and stains, use nonflammable dry cleaning liquid.