PUBLICATION NO. CSP-C1-1

SCHWEIZER

PILOT'S FLIGHT MANUAL

CONTAINING THE FAA APPROVED ROTOCRAFT FLIGHT MANUAL FOR

SCHWEIZER S300CB™/CBi™ HELICOPTER MODEL 269C-1

Reissued: 16 Jan 2019 Schweizer RSG, LLC. | Fort Worth, TX 76106

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300CB HELICOPTER

FAA APPROVED ROTORCRAFT FLIGHT MANUAL FOR MODEL 269C-1 HELICOPTER

Type Certificate No. 4H12

Registration No. _____

Serial No. _____ Date

of Reissue #2: 16 January 2019

Approved By: RYAN BRUCE NELSON Digitally signed by RYAN BRUCE NELSON Date: 2019.03.19 11:16:41 -05'00'

Acting Manager, Southwest Flight Test Section
Federal Aviation Administration
Fort Worth, TX

Date of Approval: 19 March 2019

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PILOTS AND OPERATORS OF 269C-1 HELICOPTERS -
HAVE YOU BRIEFED YOUR PASSENGERS?

BE ALERT ... DON'T FORGET THE BASIC RULES OF SAFETY!

REMIND YOUR PASSENGERS OF THE FOLLOWING, ESPECIALLY IF THEY ARE NOT FAMILIAR WITH HELICOPTERS.

Always approach the aircraft from the front, where the pilot can see you. Beware of slopes. The main rotor is closer to you as you walk down a hill toward the helicopter.

Keep loose belongings (purses, coats, briefcases) clear of all the control sticks and pedals.

Keep seat belts and harnesses tight and securely fastened.

No smoking on the ground within 50 feet of the helicopter. No smoking in flight unless an ashtray is provided.

Depart the helicopter to the front and beware of turning rotors. Keep hands and arms low.

When flying with the cabin doors removed, leave loose items on the ground, or keep them firmly secured.

Do not place any items, including seat belts, between the seat cushion and center console.

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IMPORTANT

THE FAA APPROVED ROTORCRAFT FLIGHT MANUAL CONTAINED IN SECTIONS II - LIMITATIONS, III - EMERGENCY AND MALFUNCTION PROCEDURES, IV - NORMAL PROCEDURES, AND V -PERFORMANCE DATA MUST BE KEPT IN THE HELICOPTER AT ALL TIMES.

THE HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS AS SET FORTH IN SECTION II OF THIS DATA. SECTIONS III, IV AND V ARE RECOMMENDED DATA.

GENERAL WARNING

Operating the aircraft in configurations not authorized by Schweizer RSG, LLC., or failure to comply with the limitations and procedures in this Flight Manual, may result in damage to equipment, personal injury or loss of life.

WARNING

Components from helicopters involved in crashes/accidents may be offered for sale and use on airworthy helicopters. Please be advised that whenever a part is subjected to stresses, thermal effects or other damage outside of the normal operating parameters, someadverse change in that part may occur. Such change may not be visually detectable and may therefore require destructive testing to determine airworthiness. Unless stresses, thermal effects, or other damage to which parts are subjected as the result of a crash can be evaluated and determine to be within design parameters, any part that may affect safe operation of the helicopter must be assumed to be damaged beyond acceptable limits and must not be re-used on airworthy helicopters. For the safety of your helicopter and the people who fly with you, it is necessary that the integrity of crash damaged parts be assessed by you before you fly.

SUMMARY OF REVISIONS
To FAA Approved
ROTORCRAFT FLIGHT MANUAL
For Model 269C-1

- The Model 269C-1 is certificated in compliance with all applicable Department of Transportation - Federal Aviation Administration rules and regulations in the normal category. The basic helicopter was type certificated by amend ment to Type Certificate, 4H12 dated 15 May 1970.
- The initial issue of the FAA Approved Rotorcraft Flight Manual for Model 269C-1 helicopter was approved and dated 31 Jul 1995.
- Subsequent revisions are listed below by date with appropriate remarks.

Revision No.	Revision Date	Pages Revised	Remarks	FAA Approval
	Issued 31 Jul 1995			
1	08 Nov 1995		Added caution in practice autorotation, and misc. other changes.	
2	17 Apr 1996		Added Hot Mic switch on instrument panel, added corrected Airspeed Calibration Curve, Pitot Heat and misc. other changes.	
3	18 Jul 1996		Revised pre-flight inspection checklist, added accessory power plug.	
4	14 Aug 1996		Revised to incorporate data for optional auxiliary fuel tank installation.	

SUMMARY OF REVISIONS (con't)

Revision No.	Revision Date	Pages Revised	Remarks	FAA Approval
5	28 Feb 1997		Revised to incorporate data for ground handling wheels, exhaust diffuser installation and other miscellaneous changes.	
6	28 Mar 1997		Revised to incorporate data for muff-type cabin heater.	
7	12 Dec 1997		Revised to incorporate mixture data for modified carburetor Model No. HA-6 10-6030-1.	
8	08 Jan 1998		Revised to incorporate limitation for heater use during ground and hover operations.	
9	12 Nov 1998		Revised to incorporate improved starting procedure.	
10	23 Jul 1999		Revised to incorporate new alternate instrument panel.	
11	23 Mar 2000		Revised to incorporate 33 gallon fuel tank/66 gallon fuel system. Revised to incorporate emergency procedure for use of cabin heater during engine fire and smoke and fume elimination in flight.	
12	20 Jun 2002		Revised and/or added additional information on tail rotor emergency procedures, clutch control cable inspection and misc. other changes.	
13	19 Jul 2002		Revised to incorporate new 269C-1 S/N 0139 & Subs. information.	
14	17 Sep 2002		Revised to incorporate missing data and errata correction.	

SUMMARY OF REVISIONS (con't)

Revision No.	Revision Date	Pages Revised	Remarks	FAA Approval
15	24 Oct 2002		Revised to identify aircraft with fuel injected engines by engine description rather than by serial numbers and incorporate corrections on instrument panel and misc. changes	
16	14 Jul 2010		Revised for miscellaneous typos and minor changes.	
17	25 Oct 2010		Revised to update lubrication specifications.	
18	28 Jun 2011		Revised to include additional information on engine operation.	
Reissue #1	Reissued: 07 Dec 2012		Added Sikorsky name, reformat. Added idle mixture information to Pilot's Check of Idle Mixture, Idle Speed, and Fuel Boost procedure.	5/8/13
1	19 Nov 2014	4-8	Revised to update pulley bracket inspection.	11/19/14
Reissue #2	Reissued: 16 Jan 2019		1. Reformated to Schweizer RSG. 2. Added FAA approved data sections per 14CFR27.1581 & AC 27-1B	RYAN BRUCE NELSON Digitally signed by RYAN BRUCE NELSON Date: 2019.03.19 11:16:41 -05'00'

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LOG OF PAGES
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ROTORCRAFT FLIGHT MANUAL
For Model 269C-1

- The Log of Pages lists individual pages by section, page number or title, and date; and carries an FAA Approval signature.

- New, changed or deleted information is designated by a change bar (▌) in the margin of individual pages.

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Section I

GENERAL

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Section I

GENERAL

INTRODUCTION

The Pilot's Flight Manual has been prepared to provide the pilot with information necessary to accomplish the intended mission with the maximum amount of safety and economy possible.

SCOPE

The manual meets all FAA requirements for APPROVED DATA and that data is so designated.

Included in this manual is additional supplemental data to provide the pilot with information that expands, enhances and eases his task.

ORGANIZATION

This manual contains nine sections. Each section is provided with an INDEX, listing the data by paragraph number, title, and the page number.

A page number and date summary lists the numbers and date of the most recent change. The summary for non-FAA approved data is taken care of in the front matter (preceding this section); a similar summary is provided for FAA approved data in Section II, for all information in Sections II through V.

Sections of this manual are as follows:

SECTION I GENERAL

Information of general interest to the pilot, owner or operator of the helicopter.

SECTION II LIMITATIONS (FAA APPROVED)

Specifically defines the limiting factors, procedures and regime within which the helicopter may be operated. FAA regulations require that limitations are not to be exceeded.

SECTION III EMERGENCY AND MALFUNCTION PROCEDURES (FAA APPROVED)

Each type of normally expected problem encountered in flight is defined and the procedures necessary to cope with or alleviate the situation are given. The data is recommended by the manufacturer and the FAA as appropriate.

SECTION IV NORMAL PROCEDURES (FAA APPROVED)

Normal operation from the pilot's preflight onward. As with emergency procedures, the data given is that recommended by the manufacturer and the FAA as appropriate.

SECTION V PERFORMANCE DATA (FAA APPROVED)

Helicopter performance is defined within certain conditions; some of these are airspeed, weight, altitude, temperature, humidity and wind velocity. The data given is in tabular or graph form and allows the pilot to determine the helicopter's capabilities related to the intended mission and current conditions.

SECTION VI WEIGHT AND BALANCE DATA

Helicopter weight and balance are major operational factors. Data is provided by chart, graph and examples which allow the pilot to accurately determine the helicopter's gross weight and whether the load is distributed within the fore and aft, and lateral center of gravity limits.

The original weight and balance report and the equipment list, (equipment both required and optional) installed on the helicopter at the time of licensing are also contained in this section.

SECTION VII HELICOPTER HANDLING, SERVICING AND MAINTENANCE

The information contained in this section is extracted from the Handbook of Maintenance Instructions and is highly selective. The subjects chosen are those with which the pilot will have direct involvement, either while at a normal base of operations or in the field.

SECTION VIII ADDITIONAL OPERATIONS AND PERFORMANCE DATA

Section V provides all basic data required and approved by the FAA. The information in Section VIII is given by the manufacturer to further inform the pilot of the helicopter's capabilities. Charts, graphs and tables permit utilization of the helicopter to a maximum degree.

SECTION IX OPTIONAL EQUIPMENT SUPPLEMENTS

A number of pieces of optional equipment are available for the performance of specific tasks. In many cases the equipment is readily removable and may be used in combination(s) with other optional items. Whenever the installation of an option affects FAA Approved Limita-

tions, Procedures or Performance (Sections II through V), an FAA approved supplement is required.

The supplements are filed in part number sequence in the section. In addition, there is a tabular listing of all FAA approved option supplements for the 269C-1 helicopter.

FAA Approved Option Supplements have their own indexes.

METHOD OF PRESENTATION

General information in the various sections is presented in narrative form. Other information is given in step by step procedures, graphs, charts or tabular form.

The information in the step by step procedure is presented in the imperative mode; each statement describes a particular operation to be accomplished. Expansion of the steps is accomplished as follows:

NOTE: Notes are used to expand and explain the preceding step and provide provide further understanding of the reason for the particular operation.

CAUTION

Cautions are used to alert the individual that damage to equipment may result if the procedural step is not followed to the letter.

WARNING

WARNINGS ARE USED TO BRING TO THE PILOT'S IMMEDIATE ATTENTION THAT NOT ONLY DAMAGE TO EQUIPMENT BUT PERSONAL INJURY MAY OCCUR IF THE INSTRUCTION IS DISREGARDED.

New or changed information is designated by a heavy black change bar in the margin (▌).

GENERAL DESCRIPTION

The 269C-1 is a lightweight, versatile, piston-powered helicopter that features economical, reliable, and safe operation. It is a derivative of the Model 269C helicopter and is configured to provide lower life cycle costs.

Advanced technology has been used in the design and construction of the helicopter to provide responsive handling capabilities, high payload to empty-weight ratio, improved margins of safety and crashworthiness, and excellent performance. Inspection and maintenance schedules have been realigned and time life component hours have been increased to simplify maintenance and reduce maintenance man hours per flight hour.

The 269C-1 was designed to accommodate multi-purpose operation. The helicopter may be rapidly converted from a training role to a utility configuration with the installation of optional equipment. Typical uses include the following:

1. Pilot training
2. Personal transportation
3. Aerial survey and powerline patrol
4. Airborne law enforcement
5. Electronic news gathering and aerial photography
6. Utility, cargo lift, and cattle mustering

Normal operations are limited to visual flight conditions during the day or night.

HELICOPTER CERTIFIATION

The helicopter is Federal Aviation Certificated under FAA type Certification Number 4H12.

1. The FAA model designation is Model 269C-1.
2. The commercial designation is SCHWEIZER S-300CB (S/N 0001 - 0138), S-300CBi (S/N 0139 & Subs).
3. The flight plan designator is H269.

Certification for the airframe and engine has been accomplished in accordance with all applicable United States Department of Transportation, Federal Aviation Administration Regulations in the normal helicopter category.

DESIGN AND CONSTRUCTION DESCRIPTION

The 269C-1 helicopter has a three bladed, fully articulated single main rotor system. A two bladed tail rotor is used for torque reaction and directional control. Power is supplied by a Textron Lycoming Model HO-360-C1A reciprocating engine (Original factory installation in S/N 0001-0138) or HIO-360-G1A (Original factory installation in S/N 0139 & Subs.). The engine power is transmitted through a belt drive transmission assembly to the main transmission and tail rotor drive shaft. The belt drive assembly incorporates an overrunning clutch to permit autorotation without driving the belts or engine.

The fuselage with a central, tubular steel, open frame forms the load-carrying structure for the helicopter. The center frame provides attachments for and supports all helicopter components above the landing gear, which is attached to the underside of the frame. The forward section holds the pilot's compartment; the cabin contains two seats, with the pilot's position on the right side. Seat cushions and backs are contoured for personnel comfort. The seat support, to which the cushions are affixed, provides an installation of maximum personnel safety as a result of the impact-yielding capability. Seat belts and shoulder harnesses are provided for the pilot and passenger positions.

An instrument panel is located forward of the seats at the helicopter centerline. The panel includes flight and engine instruments in addition to warning and caution lights and various switches and controls. Space provisions exist for communication and navigation equipment. A 28 volt accessory power plug is located below the left side of the instrument panel on later serial number aircraft. Instrument consoles have a stowage compartment (glove box) which can accommodate up to 20 lbs. additional baggage.

The pilot's position is on the right side of the cabin, with a cyclic control stick and tail rotor pedals provided in front of the pilot's seat. The pedals are adjustable. A collective pitch control stick is provided to the left of the pilot's seat. The cyclic and collective control system is the mechanically linked, solid type, using tubular push-pull rods. The tail rotor control system utilizes cables and pulleys in one link of its otherwise solid system of tubular push-pull rods. A cabin, mounted forward of the center frame, is formed by the canopy, two cabin doors, a floor section and a seat structure. The cabin encloses the pilot and passenger area and contains the flight controls, seats, instrument panel and other furnishings. The canopy and door transparent areas are of cast acrylic material. An airfoil which modifies the airflow around the cabin, extends above and across the canopy upper windshield section.

The cabin floor structure consists of aluminum floor beams, channels, panels and other structural components. The floor structure supports the instrument panel and provides for mounting the tail rotor directional control pedals.

The seat structure is an assembly of riveted aluminum beams, frames, bulkheads, supports and other structural components. The support structure for the crew and passenger seats is a raised horizontal platform across the width of the cabin, with an upright vertical bulkhead at the rear of the horizontal seat platform. The horizontal platform provides mounting facilities and support for the seats and collective and cyclic flight controls. The vertical bulkhead forms the rear of the cabin and mounts the upright portions of the seats. At the center rear of the vertical bulkhead, the main rotor mast is secured to the upper structural member of the bulkhead; additionally, the mast is rigidly attached to the center frame by three structural members.

The lower forward section of the seat structure is riveted to the floor structure. The two door frames are riveted to each side of the structural unit formed by the seat and floor structures.

A lower forward fairing is attached to the forward edge of the floor structure and extends downward and rearward to the forward crossbeam of the landing gear. It provides for streamlining below the cabin and supports the engine air induction system.

A tailboom assembly extends rearward from its attachment to the center frame section. It is a monocoque structure of aluminum and houses the tail rotor drive shaft and tail rotor control rod. At the aft end, it supports the tail rotor gearbox and tail rotor, in addition to the horizontal and vertical stabilizers.

The landing gear is the skid type and is nonretractable. Fore and aft crossbeams attach to the underside of the center frame section and provide for attachment of struts and oleo-type, shock-absorbing dampers. Right and left stabilizer assemblies connect the outboard ends of the crossbeams and provide stepping areas for entry to each side of the cabin and for servicing and inspecting the helicopter. Skid tubes attached to contoured fittings at the lower ends of the struts provide attachment points for installation of ground handling wheels.

The powerplant is the Textron Lycoming Model HO-360-C1A (Original factory installation in S/N 0001-0138) four-cylinder, horizontally opposed, air-cooled, carbureted engine with a primer system. The HIO-360-G1A (Original factory installation in S/N 0139 & Subs.) is an injected engine of the same type. The engine is rated at 180 hp at 2700 rpm for both takeoff and

maximum continuous operation at sea level with standard atmosphere conditions. The engine is mounted horizontally on shock mounts within the center frame section.

The engine transmits power through a belt drive transmission assembly to the main transmission and tail rotor drive shaft. The lower pulley of the belt drive receives power from the engine crankshaft and directs the power to the upper pulley through a matched set of V-belts. An idler pulley running against the set of belts and connected to a pilot-controlled actuating mechanism operates as a clutch to engage and disengage the upper pulley with the lower pulley. The upper pulley attaches to the input shaft of the main transmission and incorporates an over running clutch that permits the main rotor to drive during the autorotation without engine power.

The main transmission mounts on the lower end of the nonrotating main rotor mast and is rigidly fixed in position by support members connected to the center frame section. The transmission is lubricated by a self-contained lubrication system and is cooled by airflow around the housing.

The main rotor drive shaft transmits power from the main transmission to the main rotor hub. A thrust bearing, acting upon a shoulder on the drive shaft, positions the shaft within the mast.

The three-bladed main rotor system is fully articulated with flapping hinges and lead-lag hinged blade attachment.

The one-piece tail rotor drive shaft requires no intermediate couplings or bearings. Excessive oscillation of the drive shaft during acceleration and deceleration of the drive system is suppressed by the drive shaft damper, located near the center of the tailboom.

The tail rotor transmission is located at the aft end of the tailboom and has a self-contained lubricant supply. The tail rotor is mounted on the output shaft of the tail rotor transmission and consists of two variable-pitch blades. The blades are interconnected by a high-strength, tension-torsion strap assembly.

The helicopter main fuel tank has a total capacity of 35.2 or 33.0 U.S. gallons (133 or 125 liters) depending on aircraft S/N, and is located externally on the left-hand side of the cabin bulkhead. An auxiliary tank with a total capacity of 30.0 or 33.0 U.S. Gallons (113 or 125 liters) depending on aircraft S/N may be attached externally to the right-hand side of the cabin bulkhead.

GENERAL DIMENSIONAL DATA

This summary covers pertinent information on areas, dimensions, and airfoil data.

Airfoil Areas and Ratios	**English**	**Metric**
Main rotor blade area	22.64 ft^2	2.103 m^2
Main rotor geometric disc area	565.49 ft^2	52.534 m^2
Main rotor geometric solidity ratio	0.04	0.04
Tail rotor blade area	1.69 ft^2	0.157 m^2
Tail rotor geometric disc area	14.19 ft^2	1.318 m^2
Tail rotor geometric effective solidity ratio	0.116	0.116
Horizontal stabilizer area (to tailboom)	2.65 ft^2	0.246 m^2
Vertical stabilizer area (to tailboom)	1.00 ft^2	.093 m^2

Airfoil Data	**English**	**Metric**
Main Rotor		
Diameter	26.83 ft.	8.178 m
Blade chord (constant)	6.75 in.	171.5 mm
Airfoil (NACA)	0015	
Blade twist	-8°39′	
Number of blades	3	
RPM limits, power on	442 to 471 rpm	
power off	390 to 504 rpm	

Airfoil Data (cont)	**English**	**Metric**
Antitorque (Tail) Rotor		
Diameter	4.25 ft.	1.295 m
Blade chord (constant)	4.81 in.	122.2 mm
Airfoil (NACA)	0014, modified	
Blade twist	-8°00′	
Number of blades	2	
RPM limits, power on	2901 to 3094 rpm	
Horizontal Stabilizer		
Span to ℄ tailboom	2.50 ft.	0.762 m
Chord (constant)	12.7 in.	322 mm
Airfoil (NACA)	0015, modified	
Dihedral	35°	
Incidence	9.8°	
Vertical Stabilizer		
Span (to tailboom)	1.25 ft.	.381
Root chord	23.6 in.	60.0 mm
Tip chord	0.0 in.	0.0 mm
Airfoil	symmetrical (fin 1.00 in. thick)	

Dimensions		
Length		
Maximum, rotor blades turning	30.83 ft.	9.397 m
Maximum, main rotor blades at rest, on trailing	24 ft.	7.315m
Front of landing skids to back of tail skid (length without rotors)	22.19 ft.	6.763 m

Dimensions (cont)	English	Metric
Width		
Main rotor blades turning	26.83 ft.	8.178 m
Cabin width	4.25 ft.	1.295 m
Skid gear tread, compressed	6.54 ft.	1.993 m
Main rotor blades at rest, one trailing	12.6 ft.	4.15 m
Height		
Height, top of rotor hub (gear compressed)	8.72 ft.	2.658 m
Main rotor clearance, minimum (ground to tip, rotor static)	7 ft.	2.13 m
Tail rotor clearance (ground to tip)	2.63 ft.	0.802 m
Miscellaneous		
Distance between main rotor and tail rotor (centerline to centerline)	15.29 ft.	4.660 m

Rotor Blade Pitch Displacements	English
Main rotor blade	
Collective pitch full down (3/4 radius)	2.5° ± 1.5°
Collective pitch travel	12° ± 1°
Longitudinal cyclic pitch	
Full forward	8.5° to 9.5°
Full aft	6.5° to 7.5°
Lateral cyclic pitch	
Full left	6.5° to 7.5°
Full right	4.5° to 6.5°

Rotor Blade Pitch Displacements (cont)	English	Metric
Tail rotor blade		
Collective pitch at 3/4 radius		
Full left pedal (thrust to right)	+ 25° to + 27°	
Full right pedal (thrust to left)	- 11° to - 13°	
Control Stick and Pedal Movements		
Collective stick (full down to full up)	10 in.	254 mm
Throttle angle, twist grip (full closed to full open)	130°	
Cyclic control stick (full forward to full aft)	15 in.	381 mm
Cyclic control stick (full left to full right)	16 in.	406 mm
Directional control pedals (full forward to full aft)	8 in.	203 mm

Engine General Data

Powerplant (Carbureted):

Type	Lycoming Horizontally Opposed
Designation	HO-360-C1A
Cylinders	4
Horsepower	180 hp at 2700 rpm

Powerplant (Fuel Injected):

Type	Lycoming Horizontally Opposed
Designation	HIO-360-G1A
Cylinders	4
Horsepower	180 hp at 2700 rpm

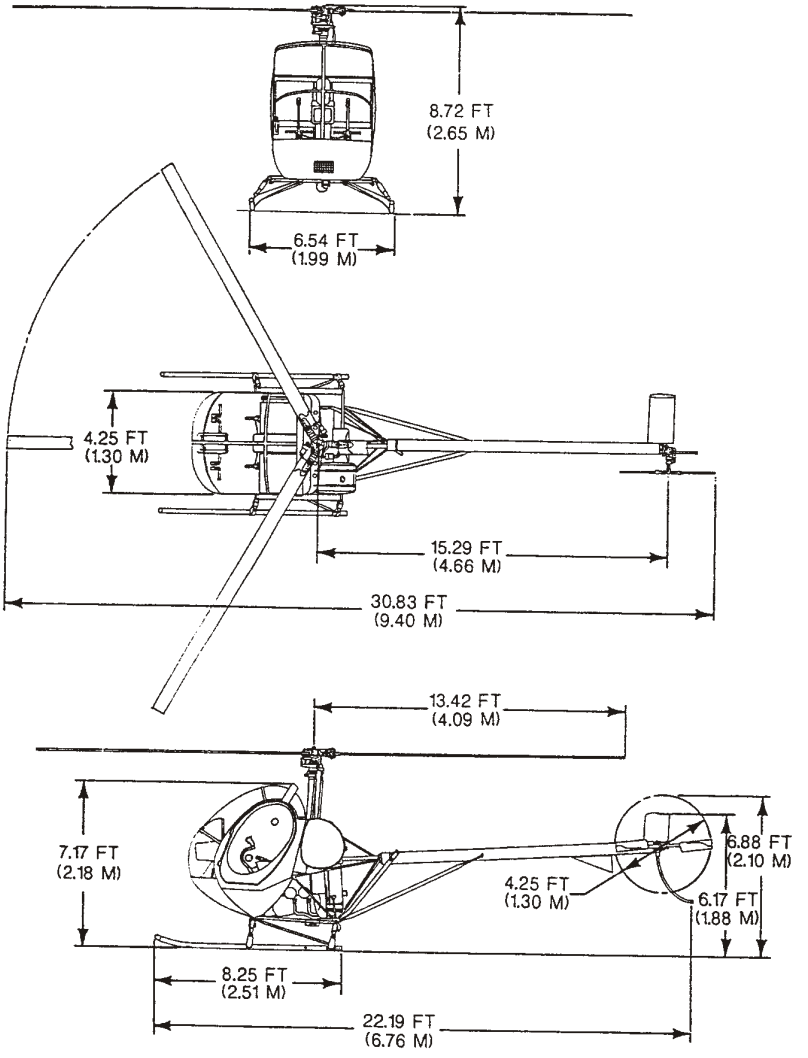

Figure 1-1. 269C-1 Helicopter - Principal Dimensions

CONVERSION TABLES - KT/MPH/KmH

Table 1-1. Velocity

KT	MPH (Approx.)	KmH (Approx)	KT	MPH (Approx.)	KmH (Approx.)
1	1	2	20	23	37
2	2	4	30	35	56
3	4	6	40	46	74
4	5	7	50	58	93
5	6	9	60	69	111
6	7	11	70	81	130
7	8	13	80	92	148
8	9	15	90	104	167
9	10	17	100	115	185
10	12	19	110	127	204
1KT = 1.15 MPH or 1.85 KmH					

Table 1-2. Temperature - °C/°F

°F = 9/5 °C + 32 = 1.8 (°C + 17.8)
°C = 5/9 (°F - 32)

°C	Temp. in °C or °F to be converted	°F
-31.7	-25	-13.0
-28.9	-20	-4.0
-26.1	-15	5.0
-23.3	-10	14.0
-20.6	-5	23.0
-17.8	0*	32.0*
-15.0	5	41.0
-12.2	10	50.0
-9.4	**15**	**59.0**
-6.7	20	68.0
-3.9	25	77.0
-1.1	30	86.0
1.1	35	95.0
4.4	40	104.0
7.2	45	113.0
10.0	50	122.0
12.8	55	131.0
15.6	60	140.0
18.3	65	149.9
21.1	70	158.0
23.9	75	167.0
26.7	80	176.0
29.4	85	185.0
32.2	90	194.0
35.0	95	203.0
37	100†	212.0†

NOTE: The center column is used to convert °C to °F OR °F to °C
EXAMPLE: 15°C = 59.0°F OR 15°F = -9.4°C

* Water Freezes, † Water Boils

Table 1-3. Liquid Measure - Gal/L

U.S. Gallons into Liters

Gals. → / Liters ↓	0	1	2	3	4	5	6	7	8	9
	Liters	Liters	Liters	Liters	Liters	Liters	Liters	Liters	Liters	Liters
0		3.8	7.6	11.4	15.1	18.9	22.7	26.5	30.3	34.1
10	37.9	41.6	45.4	49.2	53.0	56.8	60.6	64.4	68.1	71.9
20	75.7	79.5	83.3	87.1	90.9	94.6	98.4	102.2	106.0	109.8
30	113.6	117.4	121.1	124.9	128.7	132.5	136.3	140.1	143.9	147.6
40	151.4	155.2	159.0	162.8	166.6	**170.3**	174.1	177.9	181.7	185.5
50	189.3	193.1	196.8	200.6	204.4	208.2	212.0	215.8	219.6	223.3
60	227.1	230.9	234.7	238.5	242.3	246.1	249.8	253.6	257.4	261.2
70	265.0	268.8	272.6	276.3	280.1	283.9	287.7	291.5	295.3	299.1
80	302.8	306.6	310.4	314.2	318.0	321.8	325.6	329.3	333.1	336.9
90	340.7	344.5	348.3	352.1	355.8	359.6	363.4	367.2	371.0	374.8
100	378.5	382.3	386.1	389.9	393.7	397.5	401.3	405.0	408.8	412.6

NOTE: The horizontal “Gals.” column represents 1 through 9 Gallons; the vertical “Gals.” column represents 10 through 100 Gallons.
EXAMPLE: 45 Gallons = 170.34 Liters (Follow 40 Gals. line to right to intersect with 5 Gals. column.)

Table 1-4. Linear Measure - In/cm

Inches into Centimeters

Inches → / Cm. ↓	0	1	2	3	4	5	6	7	8	9
	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.
0		2.5	5.1	7.6	10.2	12.7	15.2	17.8	20.3	22.9
10	25.4	27.9	30.5	33.0	35.6	38.1	40.6	43.2	45.7	48.3
20	50.8	53.3	55.9	58.4	61.0	63.5	66.0	68.6	71.1	73.7
30	76.2	78.7	81.3	83.8	86.4	88.9	91.4	94.0	96.5	99.1
40	101.6	104.1	106.7	109.2	111.8	**114.3**	116.8	119.4	121.9	124.5
50	127.0	129.5	132.1	134.6	137.2	139.7	142.2	144.8	147.3	149.9
60	152.4	154.9	157.5	160.0	162.6	165.1	167.6	170.2	172.7	175.3
70	177.8	180.3	182.9	185.4	188.0	190.5	193.0	195.6	198.1	200.7
80	203.2	205.7	208.3	210.8	213.4	215.9	218.4	221.0	223.5	226.1
90	228.6	231.1	233.7	236.2	238.8	241.3	243.8	246.4	248.9	251.5
100	254.0	256.5	259.1	261.6	264.2	266.7	269.2	271.8	274.3	276.9

NOTE: The horizontal “Inches” column represents 1 through 9 Inches; the vertical “Inches” column represents 10 through 100 Inches.
EXAMPLE: 45 Inches = 114.30 Centimeters (Follow 40 Inches line to right to intersect with 5 Inches column.)

Table 1-5. Linear Measure - Ft/M

Feet into Meters

Feet →	0	1	2	3	4	5	6	7	8	9
↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓	Meters ↓
0		0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7
10	3.0	3.4	3.7	4.0	4.3	4.6	4.9	5.2	5.5	5.8
20	6.1	6.4	6.7	7.0	7.3	7.6	7.9	8.2	8.5	8.8
30	9.1	9.4	9.8	10.1	10.4	10.7	11.0	11.3	11.6	11.9
40	12.2	12.5	12.8	13.1	13.4	**13.7**	14.0	14.3	14.7	15.0
50	15.2	15.5	15.8	16.2	16.5	16.8	17.1	17.4	17.7	18.0
60	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.4	20.7	21.0
70	21.3	21.6	21.9	22.3	22.6	22.6	23.2	23.5	23.8	24.1
80	24.4	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.8	27.1
90	27.4	27.7	28.0	28.3	28.7	29.0	29.3	29.6	29.9	30.2
100	30.5	30.8	31.1	31.4	31.7	32.0	32.3	32.6	32.9	33.2

NOTE: The horizontal "Feet" column represents 1 through 9 Feet; the vertical "Feet" column represents 10 through 100 Feet.
EXAMPLE: 45 Feet = 13.716 Meters (Follow 40 Feet line to right to intersect with 5 Feet column.)

Table 1-6. Weight - Lb/kg

Pounds to Kilograms

Lbs. →	0	1	2	3	4	5	6	7	8	9
↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓	Kg ↓
0		0.5	0.9	1.5	1.8	2.3	2.7	3.2	3.6	4.1
10	4.5	5.0	5.4	5.9	6.4	6.8	7.3	7.7	8.2	8.6
20	9.1	9.5	10.0	10.4	10.9	11.3	11.8	12.2	12.7	13.2
30	13.6	14.1	14.5	15.0	15.4	15.9	16.3	16.8	17.2	17.7
40	18.1	18.6	19.1	19.5	20.0	**20.4**	20.9	21.3	21.8	22.2
50	22.7	23.1	23.6	24.0	24.5	25.0	25.1	25.9	26.3	26.8
60	27.2	27.7	28.1	28.6	29.0	29.5	29.5	30.4	30.8	31.3
70	31.8	32.2	32.7	33.1	33.6	34.0	34.5	34.9	35.4	35.8
80	36.3	36.7	37.2	37.6	38.1	38.6	39.0	39.5	39.9	40.4
90	40.8	41.3	41.7	42.2	42.6	43.1	43.5	44.0	44.5	44.9
100	45.4	45.8	46.3	46.7	47.2	47.6	48.1	48.5	49.0	49.4

NOTE: The horizontal "Lbs." column represents 1 through 9 Pounds; the vertical "Lbs." column represents 10 through 100 Pounds.
EXAMPLE: 45 Pounds = 20.412 Kilograms (Follow 40 Lbs. line to right to intersect with 5 Lbs. column.)

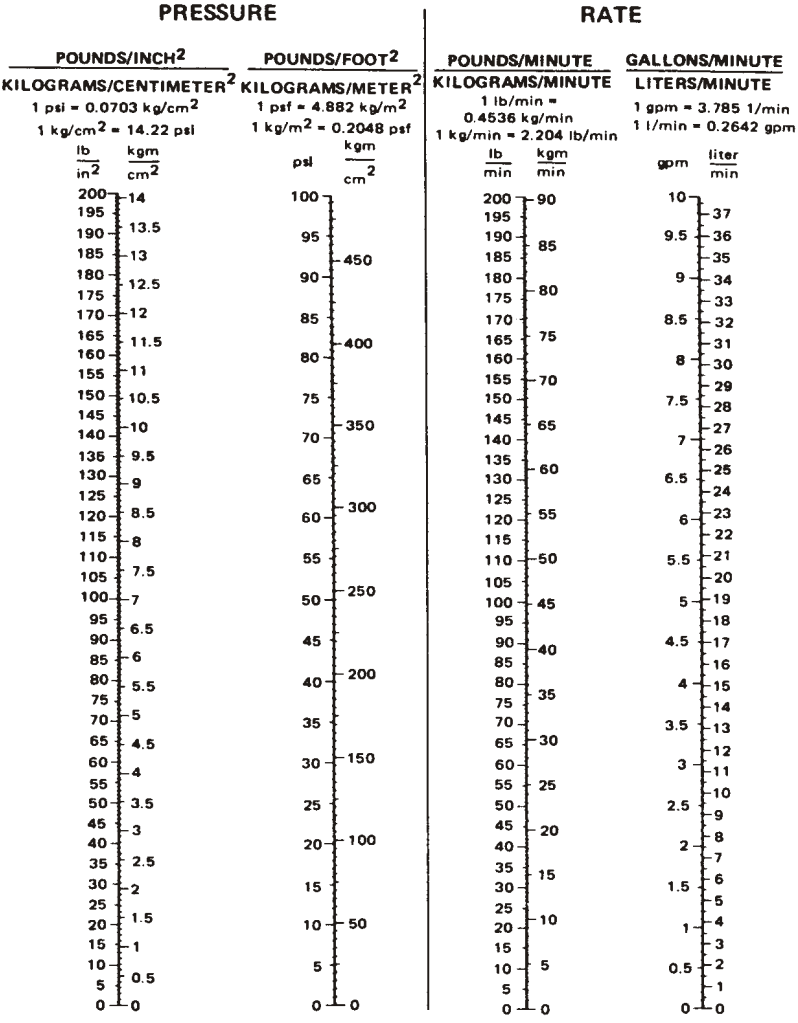

Table 1-7. Pressure and Rate

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Section II

LIMITATIONS

INDEX

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Section II

LIMITATIONS

2-1. ROTORCRAFT CERTIFICATION

Certification. The helicopter defined in this manual constitutes the basic design bearing FAA Type Certificate Number 4H12.

2-2. FLIGHT LIMITATIONS

Flight operation under Instrument Flight Rules (IFR) is prohibited.

Flight operation is permitted at night only when landing, navigation, instrument, and anticollision lights are operable.

Flight operation at night is limited to VFR conditions.

Note: Maintain orientation through visual reference to ground objects, solely as a result of ground lights or adequate celestial illumination.

The minimum crew is one pilot.

1. Solo flights are permitted from the right seat only.

Maximum operating altitudes:

1. Takeoff/Landing - 8,000 ft density altitude.
2. Enroute - 10,000 ft density altitude.

Doors off operation:

1. Maximum V_{NE} is 90 kt (104 mph) IAS.
2. If passenger/co-pilot seat is not occupied fasten seat belts and seat cushions (secure or remove).

Heater operation: (269A4451-101/-103, Muff-type using engine cooling air source)

1. Avoid use of heater during hover and ground operations.

2-3. FLIGHT LIMITATIONS PLACARDS

The following placards are required on all helicopters

THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE FAA APPROVED ROTORCRAFT FLIGHT MANUAL

V_{NE} KNOTS (IAS) MAX V_{NE} DOORS OFF 90 KTS IAS						
OAT °F \ PRESS. ALT. X 1000 FT.	0	4	6	8	10	12
0	94	94	94	94	83	63
20	94	94	94	92	73	53
40	94	94	94	82	62	–
60	94	94	91	71	53	–
80	94	94	82	61	–	–
100	94	92	73	53	–	–
120	94	85	64	–	–	–

**600 POUNDS MAXIMUM GROSS IN CABIN
SEE ROTORCRAFT FLIGHT MANUAL
FOR WEIGHT & BALANCE PROCEDURE**

NO STORAGE BETWEEN SEAT

**NO
SMOKING**

The following placard is required on helicopter with instrument console glove box.

20 LBS MAX GROSS WEIGHT IN GLOVE BOX

2-4. MULTIPURPOSE UTILITY OPERATIONS

The installation and use of certain optional equipment is approved by the FAA and requires supplemental flight data, when limitations, performance or procedures are affected. Refer to the appropriate Flight Manual Supplemental (Section IX).

2-5. AIRSPEED LIMITATIONS

At sea level, never exceed a speed (V_{NE}) of 94 kt (108 mph) IAS.

V_{NE} with Doors OFF: 90 kt (104 mph) IAS.

Above sea level, reduce V_{NE} (Doors ON or OFF) in accordance with Figure 2-1.

2-6. ROTOR SPEED LIMITATIONS

The maximum rotor speed limitation is 504 rpm (with power OFF).

The minimum rotor speed limitation is 390 rpm (with power OFF).

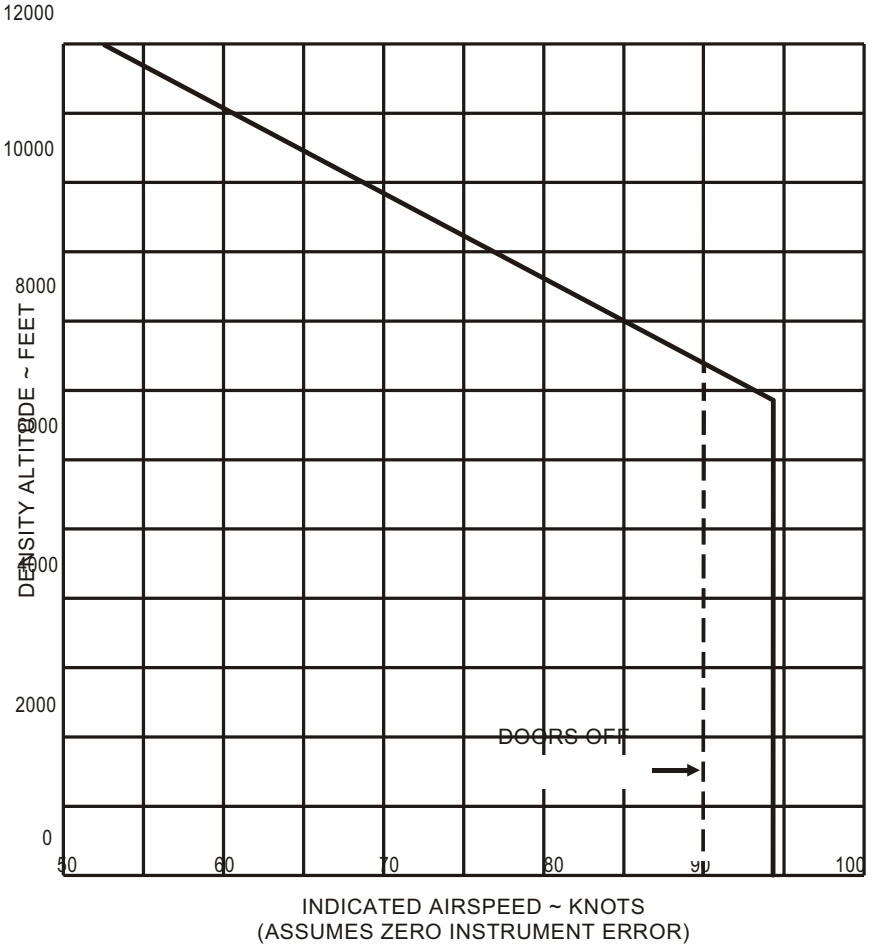


Figure 2-1. Variation of V_{NE} with Altitude at 1750 lbs. Gross Weight

2-7. WEIGHT AND CG LIMITATIONS

Maximum Gross Weight	1750 pounds
Forward CG limit station	95.0
Aft CG limit station	101.0

Note: Datum line is 100.0 inches forward of rotor centerline.

Lateral CG limits: +4.0 to -2.5 (see Fig. 2-2).

Plus ("+ ") is right of centerline, minus ("-") is left of centerline of helicopter when viewing forward (see Fig. 2-2).

Note: Lateral datum line is the centerline of the helicopter through the main rotor.

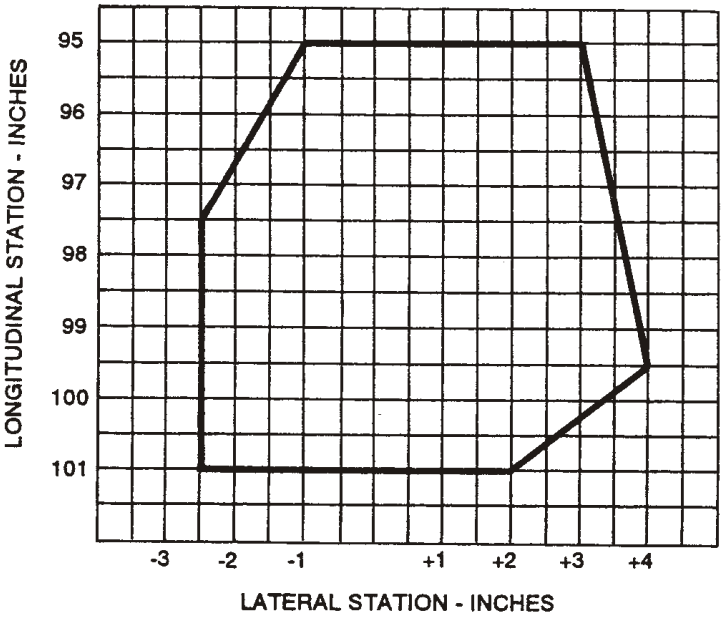


Figure 2-2. Center-of-Gravity Envelope

2-8. POWER PLANT LIMITATIONS

Lycoming: HO-360-C1A

Carburetor: Model HA-6 10-6030-1 on Aircraft S/N 73 thru 0138

Model HA-6 10-6030 on Aircraft S/N 1-72 unless retrofitted with Model HA-6 10-6030-1

Lycoming: HIO-360-G1A, Fuel injected.

Maximum continuous power is 180 horsepower at 2700 revolutions per minute. (No momentary overspeed is allowed, reference Lycoming Service Bulletin No. 369J).

The minimum rpm is 2530.

The range for engine idle speed is 1200 to 1600 rpm.

With rotor disengaged, avoid engine idle speed in excess of 1600 rpm.

CAUTION

If engine RPM exceeds 2000 RPM with rotor disengaged inspection of drive shaft in accordance with HMI Appendix B is required before any future operation.

The initial clutch engagement speeds are 1500 to 1600 rpm.

Minimum grade fuel = 100/130 or 100LL.

Lubricating oil recommendations (see Table 2-1, See Lycoming Service Instruction No. 1014K or later revision for additional oil recommendations).

Table 2-1. SAE Oil Grades

Single Viscosity	Multiple Viscosity	Average Ambient Air Temperature
—	15W50 or 20W50	All Temperatures
60	—	Above 80°F
50	—	Above 60°F
40	—	30° to 90°F
30	20W40	0° to 70°F
20	20W30	Below 10°F

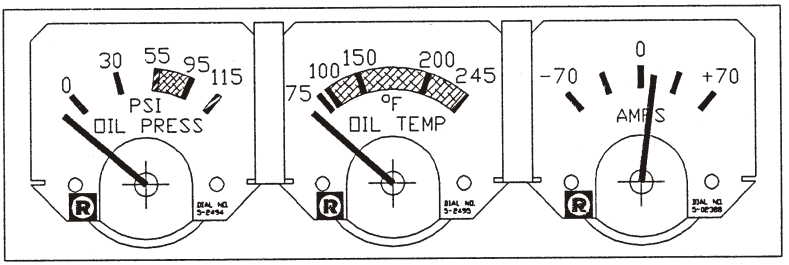
2-9. FUEL SYSTEM

Fuel Capacity, see Table 2-2.

Table 2-2. Fuel Capacity

SYSTEM CAPACITIES	QUANTITY	USABLE QUANTITY
STD	35.2 U.S. gallons	35.0 U.S. gallons
STD + AUX (if installed)	65.2 U.S. gallons	63.0 U.S. gallons
OR - Depending on aircraft S/N		
STD	33.0 U.S. gallons	32.5 U.S. gallons
STD + AUX (if installed)	66.0 U.S. gallons	64.0 U.S. gallons

2-10. INSTRUMENT MARKINGS

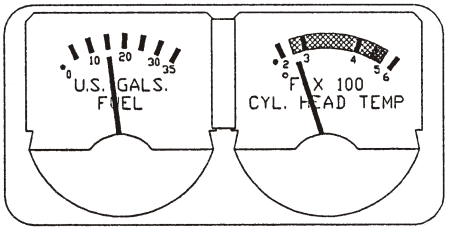


OIL PRESSURE:

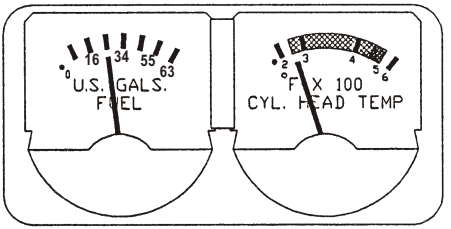
LOWER RED LINE -	55 PSIG
GREEN ARC -	55 TO 95 PSIG
UPPER RED LINE -	115 PSIG

OIL TEMPERATURE:

GREEN ARC -	100° - 245°F
RED LINE -	245°F



STD. FUEL TANK CONFIGURATION
Helicopters with carbureted engine (HO-360-C1A)



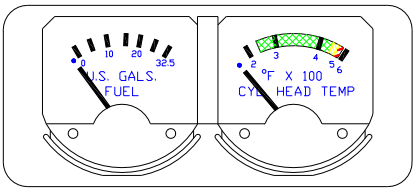
AUX FUEL TANK CONFIGURATION
Helicopters with carbureted engine (HO-360-C1A)

FUEL GAGES SHOWN REPRESENT 35.0 OR 63.0 GALLON USABLE FUEL CAPACITY INSTALLATIONS

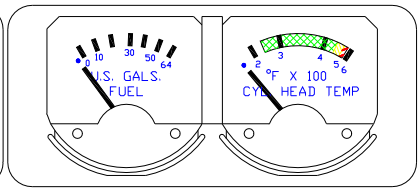
CYLINDER HEAD TEMPERATURE:

GREEN ARC -	230° TO 450°F
YELLOW ARC -	450° TO 500°F
RED LINE -	500°F

Figure 2-3. Aircraft Instruments (Sheet 1 of 4)



STD. FUEL TANK CONFIGURATION
Helicopters with carbureted engine (HO-360-C1A)

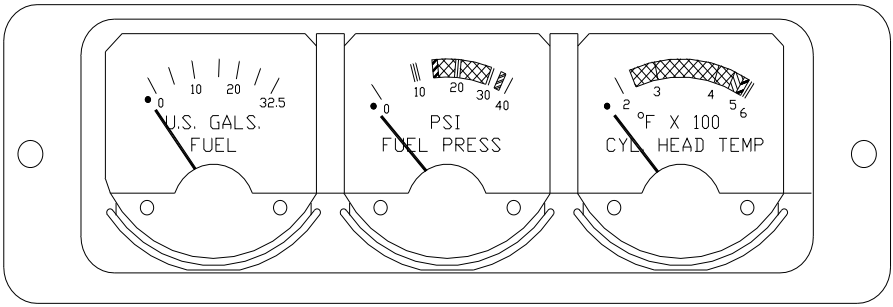


AUX FUEL TANK CONFIGURATION
Helicopters with carbureted engine (HO-360-C1A)

FUEL GAGES SHOWN REPRESENT 32.5 OR 64.0 GALLON USABLE FUEL CAPACITY INSTALLATIONS

CYLINDER HEAD TEMPERATURE:

GREEN ARC -	230° TO 450°F
YELLOW ARC -	450° TO 500°F
RED LINE -	500°F



STD. FUEL TANK CONFIGURATION
Helicopters with fuel injected engine (HIO-360-G1A)

FUEL PRESS (PSI)

RED RADIAL - 14 AND 35 PSIG

GREEN ARC - 14 TO 30 PSIG

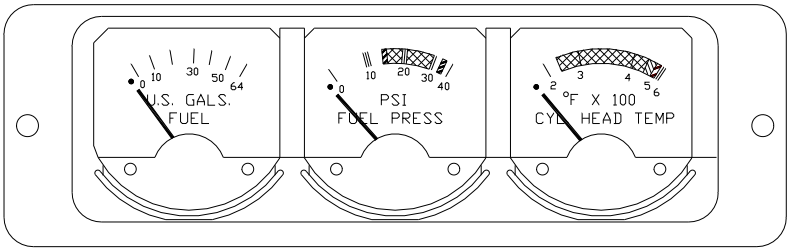
CYLINDER HEAD TEMPERATURE:

GREEN ARC - 230°F TO 450°F

YELLOW ARC - 450°F TO 500°F

RED RADIAL - 500°F

Figure 2-3. Aircraft Instruments (Sheet 2 of 4)



AUX. FUEL TANK CONFIGURATION
Helicopters with fuel injected engine (HIO-360-G1A)

FUEL PRESS (PSI)

RED RADIAL - 14 AND 35 PSIG

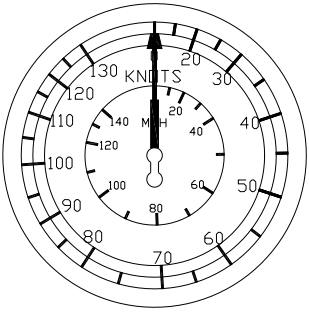
GREEN ARC - 14 TO 30 PSIG

CYLINDER HEAD TEMPERATURE:

GREEN ARC - 230°F TO 450°F

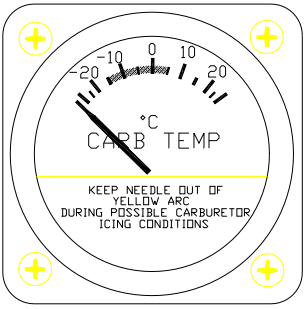
YELLOW ARC - 450°F TO 500°F

RED RADIAL - 500°F



AIRSPEED INDICATOR

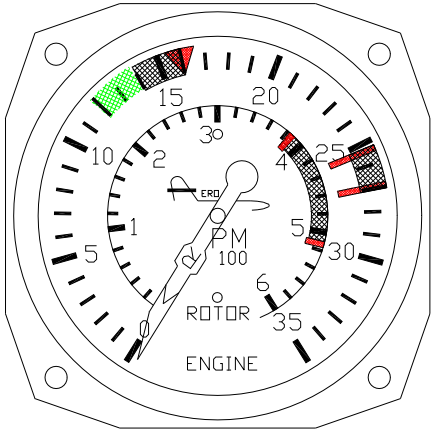
RED LINE (V_{NE}) - 94 KTS (108 MPH)



CARB TEMP - Helicopters with carbureted engine (HO-360-C1A)

YELLOW ARC- -15°C TO +5°C

Figure 2-3. Aircraft Instruments (Sheet 3 of 4)



ENGINE/ROTOR TACHOMETER

GREEN ARC ENGINE -	1200 TO 1600
RED TRIANGLE ENGINE -	1600 (Max Engine RPM Rotors Disengaged)
LOWER RED LINE ENGINE -	2530
GREEN ARC ENGINE -	2530 TO 2700
UPPER RED LINE ENGINE -	2700
LOWER RED LINE ROTOR -	390
GREEN ARC ROTOR -	390 TO 504
UPPER RED LINE ROTOR -	504

Figure 2-3. Aircraft Instruments (Sheet 4 of 4)

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Section III

EMERGENCY AND MALFUNCTION PROCEDURES

INDEX

Section III

EMERGENCY AND MALFUNCTION PROCEDURES

INDEX

Section III

EMERGENCY AND MALFUNCTION PROCEDURES

EMERGENCIES

3-1. ENGINE FAILURE - ALTITUDE ABOVE 450 FEET

1. Lower collective pitch.
2. Enter normal autorotation.
3. Establish a steady glide of 52kt (60 mph) IAS approximately.
4. At an altitude of approximately 50 feet, initiate a flare.
5. At approximately 10 feet, coordinate collective pitch with forward movement of cyclic stick to level aircraft and cushion landing. Make ground contact with aircraft level.
6. Avoid rapid lowering of collective pitch or the use of aft cyclic stick during initial ground contact or during ground slide.
7. In the event of engine failure at night, do not turn on landing light above 1,000 feet above terrain in order to preserve battery power.

3-2. ENGINE FAILURE - ALTITUDE ABOVE 7 FEET AND BELOW 450 FEET

Conduct takeoff operation in accordance with the restrictions shown on Height Velocity Diagram (Figure 5-2). In the event of power failure during takeoff, lower the collective pitch (altitude permitting), in order to maintain rotor speed. The amount and duration of collective reduction depends upon the height above the ground at which the engine failure occurs. As the ground is approached, use aft cyclic and collective as needed to decrease forward and vertical velocity. Establish a level attitude prior to ground contact. Apply collective pitch as necessary in order to cushion landing.

3-3. ENGINE FAILURE - ALTITUDE BELOW 7 FEET

A power failure is indicated by a sudden yawing of the ship to the left. Do not reduce collective pitch. Apply right pedal to prevent excessive yawing and right stick to minimize drift. Apply collective pitch as necessary in order to cushion landing.

3-4. DITCHING - POWER OFF

Note: Follow the procedures defined in paragraphs 3-1 through 3-3 for autorotation approach and landing. Upon contact with water, proceed as follows:

1. Lower collective pitch and apply sideward cyclic stick after contact is made with water.
2. Release seat belt and shoulder harness.
3. Open both doors and exit helicopter.

WARNING

CLEAR HELICOPTER IMMEDIATELY TO PREVENT INJURY.

3-5. DITCHING - POWER ON

1. Descend to hovering altitude over water.
2. Unlatch doors.
3. Passenger exit aircraft
4. Fly a safe distance away
5. Turn battery and alternator switches OFF
6. Close twistgrip to idle position
7. Allow aircraft to settle in a level attitude, apply full collective.
8. When aircraft begins to roll, reduce collective to full down.
9. Release seat belt and shoulder harness.

10. When rotor blades have stopped turning, clear aircraft as quickly as possible.

3-6. TRANSMISSION WARNING/CAUTION INDICATORS

Main Rotor Transmission

1. Transmission Oil Temperature and Pressure. (Figure 3-1 & 3-1A) A red warning light (M/R XMSN TEMP/PRESS) on the instrument panel comes on when transmission oil pressure drops below 2-1/2 psi or temperature exceeds 235°F.

   a. Land as soon as possible if light comes on in flight.

2. Optional Chip Detector Caution Indicator (If Installed). (Figure 3-1) An amber caution light (M/R XMSN CHIPS) on the instrument panel comes on to indicate possible deterioration of components within the main rotor transmission.

   a. Land as soon as possible if light comes on in flight.

Tail Rotor Transmission

1. Chip Detector Caution Indicator. (Figure 3-1) An amber caution light (T/R XMSN CHIPS) on the instrument panel comes on to indicate possible deterioration of components within the tail rotor transmission.

   a. Land as soon as possible if light comes on in flight.

3-7. FUEL LOW, CAUTION INDICATOR

1. An amber fuel low caution light (FUEL LOW) on the instrument panel comes on in flight when approximately one gallon of usable fuel remains in the tank.

2. If fuel low caution light comes on during flight, land immediately.

CAUTION

Do not use fuel low caution light as a working indication of fuel quantity (flight time remaining).

3-8. CLUTCH WARNING LIGHT

1. A red clutch warning light (RELEASE) is illuminated whenever the clutch is not fully engaged.

2. Be prepared to enter autorotation.

3. Land as soon as possible if clutch warning light comes on in flight.

3-9. TAIL ROTOR FAILURE

1. Different types of failure may require slightly different techniques for optimum success in recovery.

2. General Corrective Action:

   a. Complete loss of tail rotor thrust:

      1) Failure is normally indicated by an uncontrollable (by pedal) yawing to the right.

   b. In Forward Flight:

      1) Reduce power by lowering collective.

      2) Adjust airspeed to 50 to 60 knots.

      3) Use left lateral cyclic in combination with collective pitch to limit left sideslip to a reasonable angle.

      4) If conditions permit, place the twistgrip in the IDLE position once a landing area is selected, and perform a normal autorotation. Plan to touch down with little or no forward speed.

WARNING

WHEN HOVERING AT ALTITUDES WITHIN OR ABOVE THE CROSS-HATCHED AREAS DEPICTED ON THE HEIGHT VELOCITY DIAGRAM (FIG. 5-2), IT IS NECESSARY TO REDUCE ALTITUDE TO 7 FEET OR LESS PRIOR TO PLACING THE TWISTGRIP IN THE GROUND IDLE

POSITION AND PERFORMING A HOVERING AUTOROTATION.

c. While at a hover: Place the twistgrip in the IDLE position and perform a hovering autorotation.

d. Tail Rotor Control Failure - Fixed Pitch Setting:

1) Adjust power to maintain 50 to 60 knots airspeed.

2) Perform a shallow approach and running landing to a suitable area, touching down into wind at a speed between effective translational lift and 30 knots. Directional control may be accomplished by small adjustments in throttle and/or collective control.

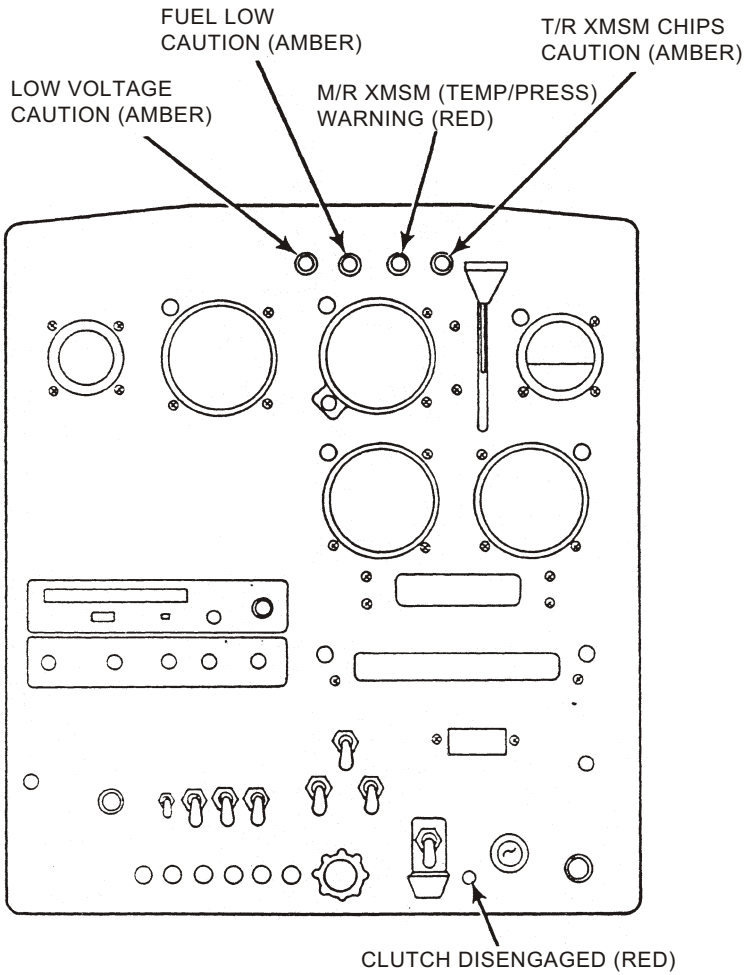

Figure 3-1. Instrument Panel - Warning/Caution Lights
(Helicopters with carbureted engine - HO-360-C1A)

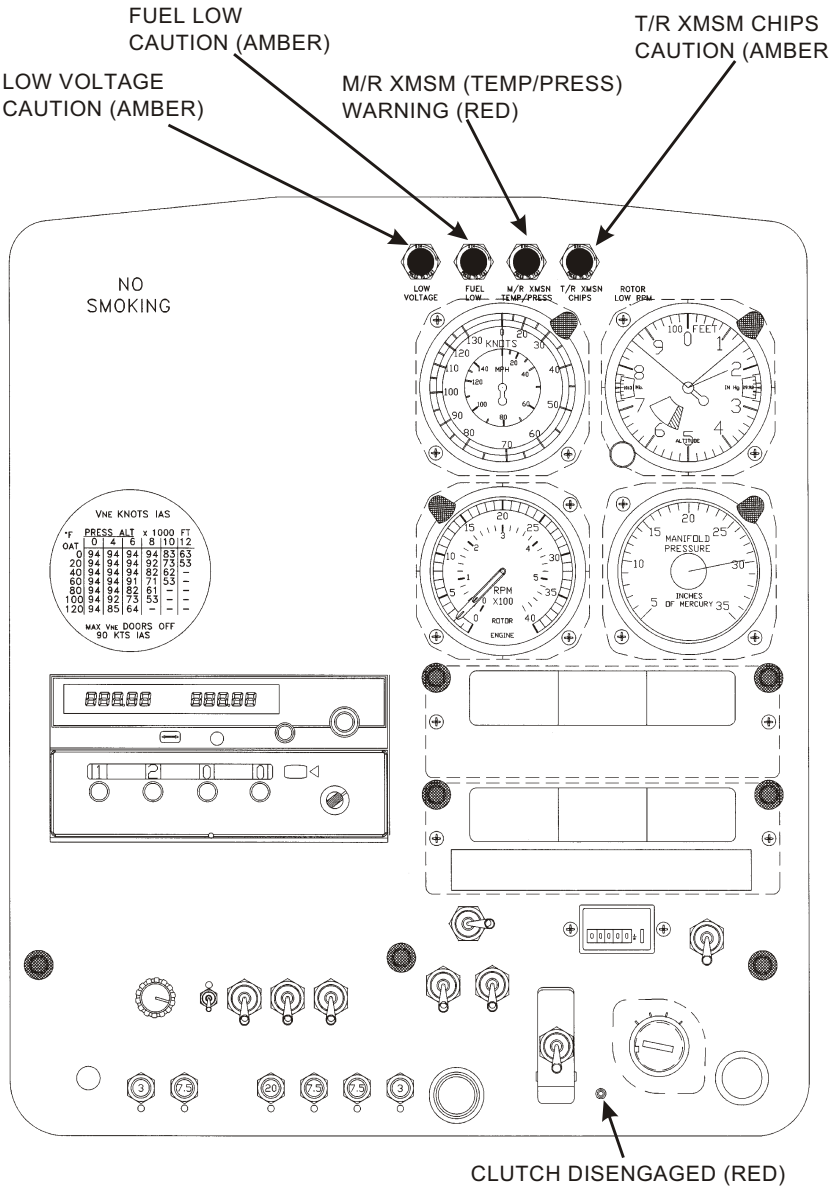

Figure 3-1A. Instrument Panel - Warning/Caution Lights
(Helicopters with fuel injected engine - HIO-360-G1A)

3-10. ENGINE IDLE AT ALTITUDE

Engine idle speeds at high density altitudes may be less than those set at sea level conditions. Do not rapidly reduce throttle to idle stop in flight.

WARNING

TO MINIMIZE POSSIBILITY OF ENGINE STOPPAGE, RAPID THROTTLE REDUCTIONS TO FULL IDLE DURING FLIGHT SHALL NOT BE CONDUCTED AT ANY ALTITUDE.

3-11. AIR RESTART

1. Establish 52 kt (60 mph) autorotation.
2. Pick out landing spot. If less than 2000 feet above terrain, proceed with autorotation landing.
3. If altitude permits (Helicopters with carbureted engine - HO-360-C1A):
   a. Mixture - FULL RICH
   b. Throttle - CRACK APPROXIMATELY 1/2 AN INCH
   c. Starter - ENGAGE
4. If altitude permits (Helicopters with fuel injected engine - HIO-360-G1A):
   a. Mixture - IDLE CUTOFF
   b. Throttle - CRACK APPROXIMATELY 1/2 AN INCH.
   c. Starter - ENGAGE
   d. Mixture push to FULL RICH when engine fires.

   Note: If fuel pump was on at time of engine stoppage, a flooded condition may have resulted necessitating additional use of the starter

3-12. ENGINE/FUSELAGE/ELECTRICAL FIRE ON THE GROUND.

1. Mixture - IDLE CUTOFF (Pull)
2. Fuel valve - CLOSE (Pull)
3. Battery - OFF
4. Alternator - OFF

WARNING

REMAIN CLEAR OF ROTOR BLADES DURING AND AFTER EVACUATION.

5. Exit aircraft with fire extinguisher
6. Extinguish fire

3-13. ENGINE/FUSELAGE FIRE, OR FIRE OF UNDETERMINED ORIGIN, IN FLIGHT - LOW/CRUISE ALTITUDE.

Note: If a fire is observed during flight, prevailing conditions such as day/night, altitude, and available landing areas must be considered in order to determine whether to execute a power-on or power-off landing.

Power-On Landing:

1. Maintain airspeed and rotor RPM; be prepared to perform a full autorotation at any point in the approach.
2. Immediately perform power-on landing to suitable area
3. If time permits:
   a. Battery - OFF
   b. Alternator - OFF
   c. Cabin Heater - OFF

3-13. ENGINE/FUSELAGE FIRE, OR FIRE OF UNDETERMINED ORIGIN, IN FLIGHT - LOW/CRUISE ALTITUDE (cont)

Power-On Landing: (cont)

4. Upon landing:
   a. Throttle - CLOSE
   b. Mixture - IDLE CUTOFF (Pull)
   c. Fuel valve - CLOSE (Pull)
   d. Exit aircraft with fire extinguisher
   e. Extinguish fire

Power-Off Landing:

1. Immediately enter autorotation.
2. If time permits:
   a. Mixture - IDLE CUTOFF (Pull)
   b. Fuel valve - CLOSE (Pull)
   c. Battery - OFF
   d. Alternator - OFF
   e. Cabin Heater - OFF
3. Upon landing:
   a. Exit aircraft with fire extinguisher.
   b. Extinguish fire.

3-14. ELECTRICAL FIRE - IN FLIGHT

1. Battery - OFF
2. Alternator - OFF
3. Immediately perform power-on landing to suitable area
4. Upon landing:
   a. Throttle - CLOSE
   b. Mixture - IDLE CUTOFF (Pull)
   c. Fuel valve - CLOSE (Pull)
   d. Exit aircraft with fire extinguisher.
   e. Extinguish fire.

3-15. SMOKE AND FUME ELIMINATION - IN FLIGHT

1. Smoke and/or toxic fumes entering the cockpit can be exhausted as follows:
   a. Open vents.
   b. Adjust cabin heat and defog handle, as required.
   c. Land as soon as possible.

3-16. THROTTLE FAILURE - IN FLIGHT

1. If the throttle becomes inoperative in flight, continue to a landing area that will permit a shallow approach and running landing. As descent is begun, make collective pitch adjustments smoothly and minimize the amount of movement to aid in maintaining RPM within limits. If descent cannot be made without an excessively high RPM, fly to a suitable area and accomplish an autorotational landing. In this situation, the mixture control must be moved to the lean position before the collective pitch is lowered to enter autorotation. If the throttle fails at a hover, lower the collective (disregarding engine RPM) and land. After the helicopter is on the ground, move the mixture control to the lean position.

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Section IV

NORMAL PROCEDURES

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Section IV

NORMAL PROCEDURES

INDEX

Section IV

NORMAL PROCEDURES

4-1. PREFLIGHT REQUIREMENTS

1. Have a thorough understanding of operating limitations. (Refer to Section II.)

2. Service the helicopter as required. (Refer to Aircraft Handling, Servicing and Maintenance, Section VII.)

3. Determine that the helicopter loading is within limits. Refer to Section II and VI

4. Check the helicopter performance data. Refer to Sections V, VI and VIII.

5. Perform a pilot's preflight inspection prior to each flight.

   NOTE: Refer to the applicable Lycoming Operator's and Maintenance Manuals listed in Related Publications and Directives table, Section II, Basic HMI for detailed requirements on daily inspection of the engine.

   It is the prerogative and responsibility of the helicopter operator or owner to increase the extent and/or frequency of inspection to promote safe operation when unusual local conditions (environment, utilization, etc.) dictate.

   Refer to HMI for complete periodic inspection criteria (Appendix B, Tables B2 and B3).

4-2. PILOT'S PREFLIGHT INSPECTION

Visually check the following items for wear, general condition and obvious damage. Damage is defined as any condition that is not normal or not within limits. Examples of conditions to look for are: inoperable equipment, excessive leakage, discoloration due to heat, dents, cracks, punctures, abrasion, chaffing, galling, nicks and evidence of corrosion. These are the most common types of damage; however, do not limit inspection to the above conditions.

1. If discrepancies are noted perform further inspection prior to flight.

2. Flight is prohibited when unrepaired damage exists which makes the rotorcraft unairworthy.

WARNING

GROUND RESONANCE MAY RESULT IF HELICOPTER IS OPERATED WHEN THE LANDING GEAR DAMPERS ARE NOT IN GOOD OPERATING CONDITION. (REFER TO BASIC HMI, SECTION 12 FOR DETAILED INSPECTIONS.)

EXTERIOR

NOSE AREA ①

1.	Aircraft tiedowns and covers	**REMOVED**
2.	Aircraft attitude for weak or damaged oleos	**CHECK**

NOTE: With fuel tank full, observe stance of helicopter. Normal stance is slightly nose up.

3.	Canopy for condition and cleanliness	**CHECK**
4.	Battery	**INSPECT**
5.	OAT thermometer sun shield	**NO OBSTRUCTIONS**
6.	Induction system and fairing	**NO OBSTRUCTIONS**

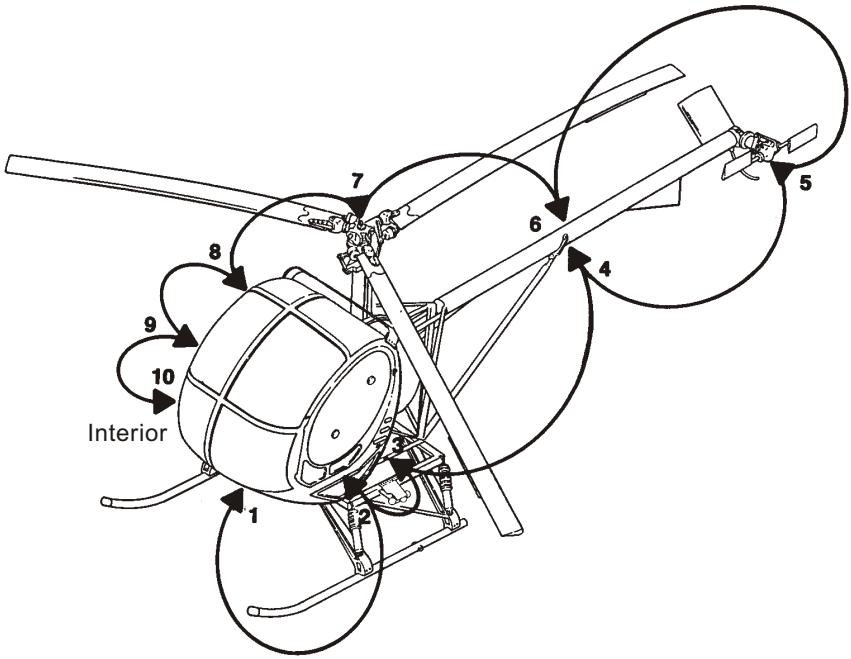

Figure 4-1. Pilot's Preflight Guide

EXTERIOR

NOSE AREA (cont) ①

7.	Pitot tube	**NO OBSTRUCTIONS**
8.	Frame, front crossbeam, drag strut, and skid for damage	**CHECK**
9.	Tail rotor pedals for condition and security of retaining pins/shims (both sides if dual controls)	**CHECK**
10.	VHF antenna for damage or security	**CHECK**

CABIN - LEFT SIDE ②

1.	Cabin for damage or dents	**CHECK**
2.	Door and latch	**CHECK**
3.	Canopy slat for damage or looseness	**CHECK**
4.	Left navigation light and beacon for damage or looseness	**CHECK**
5.	Front oleo damper extension	**CHECK**
6.	Skid tube	**CHECK**
7.	Ground handling wheel (if installed) in up position with quick-release pin installed.	**CHECK**

ENGINE - LEFT SIDE ③

1.	Engine oil level	**CHECK**
2.	Engine oil drain plug (If installed)	**CHECK**
3.	Engine and components, exhaust and intake tubes, fuel and oil lines	**CHECK**
4.	Fuel quantity level; verify gage reading	**CHECK**
5.	Fuel tank cap seal for proper condition	**CHECK**

6.	Fuel strainer, for debris or water	**DRAIN**
7.	Fuel tank vent	**NO OBSTRUCTIONS**
8.	Alternator drive belt and belt tension	**CHECK**
9.	Belt drive lower H-frame tie bar bracket and strut for cracks and security	**CHECK**
10.	Aft crossbeam	**CHECK**
11.	Landing light	**CHECK**
12.	Rear oleo damper extension	**CHECK**

CAUTION

If cracking of cluster fittings is suspected dye penetrant inspect in accordance with HMI prior to further flight.

13.	Center frame aft cluster fittings for cracks, deformation, or damage	**CHECK**

TAILBOOM LEFT SIDE ④

1.	Tail rotor shaft, set alignment marks	**CHECK**
2.	Tailboom for damage or dents	**CHECK**
3.	Tailboom supports and fittings - for cracks, deformation, damage, looseness and security	**CHECK**
4.	Static port clear of obstructions	**CHECK**
5.	Tailboom support strut end fitting for cracks, deformation, or damage	**CHECK**
6.	Exhaust tailpipe support at tailboom	**CHECK**
7.	Exhaust diffuser installation (if installed) for cracks, deformation, damage, looseness and security	**CHECK**

TAIL ROTOR ⑤

1.	Tail rotor shaft alignment	**CHECK**

TAIL ROTOR (cont) ⑤

2. Tail rotor blade pitch links, teetering bearings, and swashplate — **CHECK**

CAUTION

If poor abrasion strip bond is suspected, but not confirmed, inspect blade in accordance with HMI prior to further flight.

3. Tail rotor abrasion strip bonding — **CHECK**

CAUTION

If tail rotor blade attachment bushing hole cracking is suspected, perform dye penetrant inspection in accordance with HMI prior to further flight.

4. Tail rotor blade attachment bushing hole for evidence of cracks — **CHECK**
5. Tail rotor push-pull rod — **CHECK**
6. Tail skid — **CHECK**
7. Tail rotor transmission/oil level — **CHECK**
8. Horizontal stabilizer, vertical fin, and tail light — **CHECK**

TAILBOOM, RIGHT SIDE ⑥

1. Tailboom for damage or dents — **CHECK**
2. Tailboom supports and fittings for cracks, looseness, security, deformation, or damage — **CHECK**
3. Tailboom support strut end fitting for cracks, deformation, or damage — **CHECK**

MAIN ROTOR SYSTEM ⑦

1. Main rotor transmission and mast **CHECK**
2. Main transmission oil level **CHECK**
3. Blades and rotor head **CHECK**
4. Main rotor dampers **CHECK**
5. Main rotor swashplate, pitch links, upper and lower bearings **CHECK**
6. Main rotor mixer bellcrank **CHECK**
7. Main rotor control rods **CHECK**

ENGINE - RIGHT SIDE ⑧

1. Belt drive lower pulley bearings **CHECK**

   a. Place hand between engine and V-belt drive cover (if installed); grasp forward edge of pulley (lower coupling drive) and try to move at right angles to shaft. Observe bearing to determine if bearing inner race is a tight fit on lower pulley shaft.

2. Engine lower coupling shaft **CHECK**

   a. Fore and aft movement

   b. Using a flashlight (or equivalent), inspect exterior of boot for cracking, fraying, chips, and deterioration. If any damage is observed, replace boot prior to flight.

3. Audibly inspect lower coupling drive shaft for adequate lubrication as follows: **CHECK**

   a. Grasp lower pulley AFT spacer and rotate coupling shaft back and forth to take up backlash in both directions (CW and CCW). Listen for hard metal-to-metal contact noise between gear teeth. If any metal-to-metal contact noise is heard, lower coupling drive shaft and engine adapter must be removed and inspected in accordance with Basic HMI, Section 10 prior to further flight.

ENGINE - RIGHT SIDE (cont) ⑧

4. Engine impeller (any indication of looseness) **CHECK**

5. Idler pulley for smooth rotational freedom and fore and aft freedom of movement **CHECK**

6. Clutch control cable, spring assembly, and lower end of spring retainer

   a. Clutch engaged: With a flashlight carefully check clutch cable where it enters spring assembly for any broken strands at the end of the internal swaged fitting. No broken strands permitted; Check spring tension mark.

   b. Clutch engaged and disengaged: Check lower end of spring retainer tube for wear and wear deposits.

   c. Clutch disengaged: Check spring assembly for freedom. Check pulley bracket for cracks and security.

7. General engine area for loose wires, fittings or damage **CHECK**

CAUTION

If Cracking of cluster fittings is suspected dye penetrant inspect in accordance with HMI prior to further flight.

8. Center frame aft cluster fittings for cracks, deformation, or damage **CHECK**

9. Tail rotor control cable **CHECK**

10. Engine oil drain plug **CHECK**

11. Engine sump fuel drain (if installed) **CHECK**

12. Aux. fuel quantity level (if installed) **CHECK**

13. Aux fuel tank (if installed) cap seal for proper condition — **CHECK**

14. Aux. fuel tank sump for water (if installed) — **DRAIN**

15. Cabin heater (if installed); security of muff and hoses, heater control operation — **CHECK**

CABIN - RIGHT SIDE ⑨

1. Canopy, canopy slat — **CHECK**

2. Door and latch — **CHECK**

3. Rear oleo damper extension, drag strut and skid — **CHECK**

4. Right navigation light and beacon for damage or looseness — **CHECK**

5. Front oleo damper extension — **CHECK**

6. Skid tube — **CHECK**

7. Ground handling wheel (if installed) in up position with quick-release pin installed — **CHECK**

8. Ground handling wheel handle (if installed); quick-release pin installed — **CHECK**

1. Compass
2. Airspeed Ind.
3. Altimeter
4. Low Voltage Caution Light
5. Fuel Low Caution Light
6. M/R XSMS (Temp/Press) Warning Light
7. T/R XMSM Chips Caution Light
8. Carburetor Heat Control
9. Carb Temp Indicator
10. Engine & Rotor Tachometer
11. Manifold Pressure Indicator
12. Radio
13. Radio
14. Fuel Qty/Cyl Head Temp
15. Oil Press/Oil Temp/Amps
16. Running Time Meter
17. Panel Light
18. Panel Light Dimmer
19. Panel Light Switch
20. Position Light Switch
21. Beacon Light Switch
22. Battery Switch
23. Trim Switch
24. Alternator Switch
25. Transponder Circuit Breaker
26. Radio Circuit Breaker
27. Landing Light Circuit Breaker
28. Instrument Circuit Breaker
29. Clutch Circuit Breaker
30. Trim Circuit Breaker
31. Fuel Mixture Control
32. Clutch Control Switch
33. Magneto Key Switch
34. Fuel Shutoff Control
35. Clutch Disengaged Warning Light

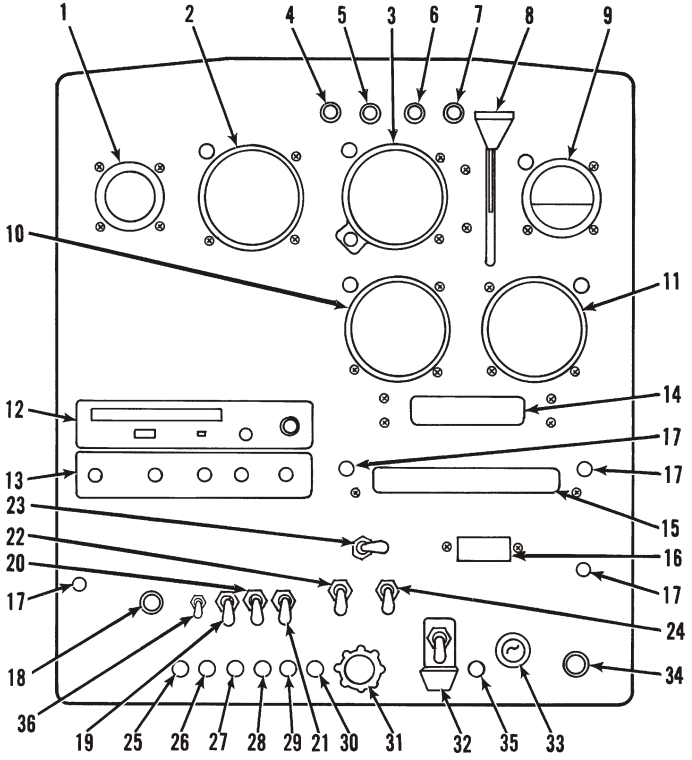

Figure 4-2. Typical Instrument Panel Configuration (Helicopters with carbureted engine - HO-360-C1A)

1. Manifold Pressure Indicator
2. Airspeed Ind.
3. Low Voltage Caution Light
4. Fuel Low Caution Light
5. M/R XSMS (Temp/Press) Warning Light
6. T/R XMSM Chips Caution Light
7. Altimeter
8. Carburetor Heat Control
9. Carb Heat Indicator
10. Trim Switch
11. Fuel Shutoff Control
12. Magneto Key Switch
13. Clutch Disengaged Warning Light
14. Clutch Control Switch
15. Alternator Switch
16. Battery Switch
17. Fuel Mixture Control
18. Trim Circuit Breaker
19. Clutch Circuit Breaker
20. Beacon Light Switch
21. Instrument Circuit Breaker
22. Position Light Switch
23. Landing Light Circuit Breaker
24. Radio Circuit Breaker
25. Panel Light Switch
26. Transponder Circuit Breaker
27. Hot Mic Switch
28. Panel Light Dimmer
29. Panel Light
30. Running Time Meter
31. Oil Press/Oil Temp/Amps
32. Fuel Qty/Cyl Head Temp
33. Engine & Rotor Tachometer

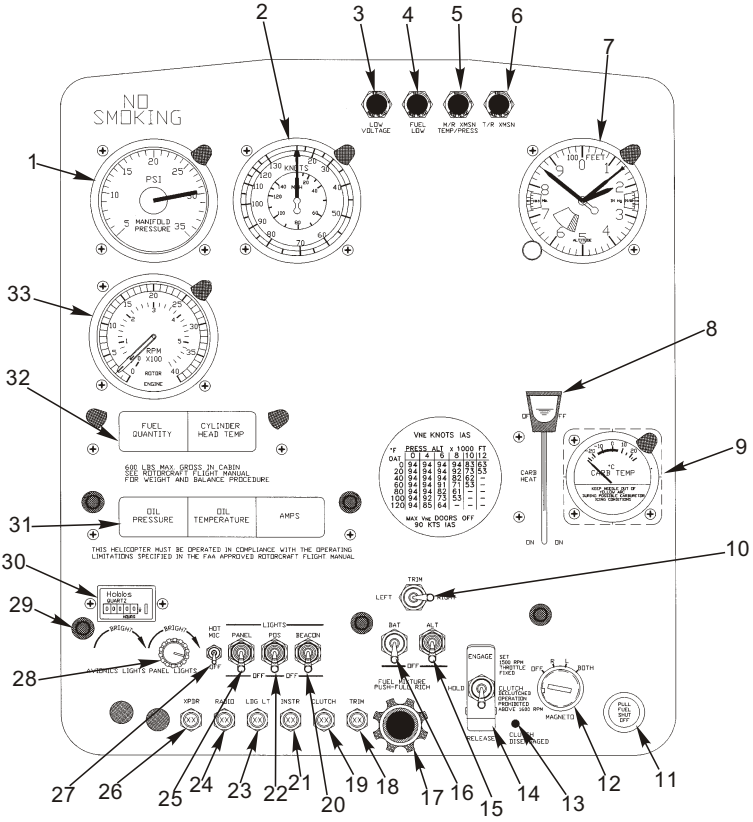

Figure 4-2A. Alternate Instrument Panel Configuration
(Helicopters with carbureted engine - HO-360-C1A)

1. Air speed Ind.
2. Al tim e ter
3. Low Voltage Caution Light
4. Fuel Low Caution Light
5. M/R XSMS (Temp/Press) Warning Light
6. T/RXMSM Chips Caution Light
7. En gine & Ro tor Ta chom e ter
8. (Re served)
9. (Re served)
10. Man i fold Pres sure In di ca tor
11. Ra dio
12. Fuel Qty/Fuel Press/Cyl Head Temp
13. Oil Press/Oil Temp/Amps
14. Running Time Meter
15. (Re served)
16. Panel Light Dimmer
17. Panel Light Switch
18. Position Light Switch
19. Beacon Light Switch
20. Bat tery Switch
21. Trim Switch
22. Al ter na tor Switch
23. Tran sponder Cir cuit Breaker
24. Ra dio Cir cuit Breaker
25. Landing Light Circuit Breaker
26. In stru ment Cir cuit Breaker
27. Clutch Circuit Breaker
28. Trim Circuit Breaker
29. Fuel Mixture Control
30. Clutch Control Switch
31. Magneto Key Switch
32. Fuel Shutoff Control
33. Clutch Dis en gaged Warn ing Light
34. Hot Mic Switch
35. Fuel Pump Switch

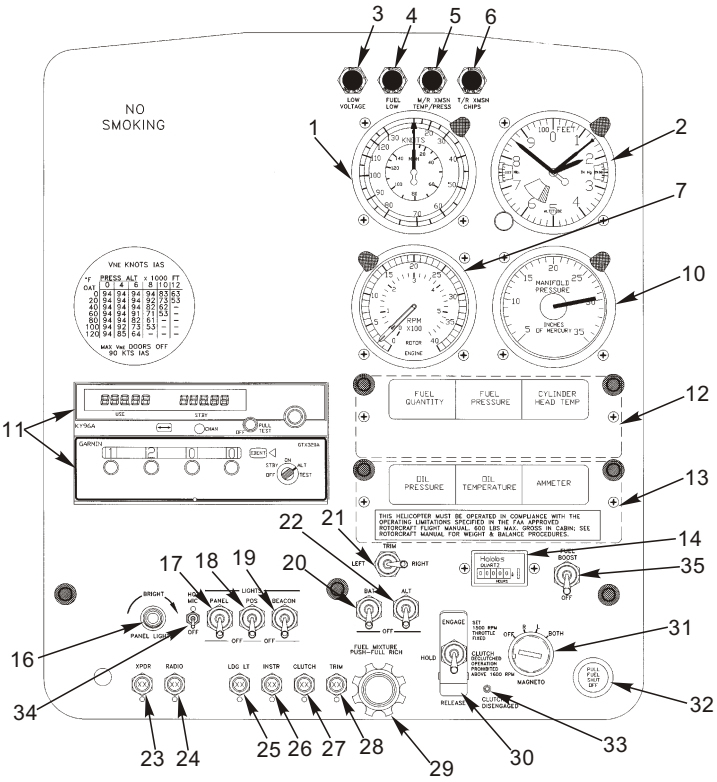

Figure 4-2B. Typical Instrument Panel Configuration
(Helicopters with fuel injected engine - HIO-360-G1A)

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HELICOPTER INTERIOR ⑩

1. Set battery, landing light, navigation or position lights and beacon switches to ON position; check each light for operation; turn all switches to OFF position — **CHECK**

WARNING

EXCESSIVE PLAY IN TAIL ROTOR PEDALS COULD RESULT IN RESTRICTION OF TAIL ROTOR CONTROL.

2. Adjust tail rotor pedals and add shim(s) between pedals and retaining pins to remove play. Check security and condition of pins (Section VII). — **CHECK**

WARNING

CHECK SEAT BELTS FOR SNUGNESS OF FIT AND ENGAGEMENT OF EXTENSION MECHANISM EACH TIME BELT IS FASTENED.

3. Seat belts and shoulder harness — **CHECK**

4. Glove box door closed and latched — **CHECK**

5. Ensure that any items that could interfere with collective mechanism, including seat belts, are properly stowed. — **CHECK**

5A. Ensure that all equipment attached to accessory power plug (if installed) is secure and does not interfere with flight controls. — **CHECK**

6. Control friction locks — **RELEASE**

7. Controls, freedom of movement — **CHECK**

8. Control frictions — **ON**

9. Altimeter — **SET**

10. All switches	**OFF**
11. Circuit breakers	**IN**
12. Throttle	**CLOSED**
13. Mixture	**IDLE CUTOFF (Pull)**
14. Battery switch	**ON**
15. Fuel quantity	**CHECK**
16. Fuel low caution light	**OFF (Press-to-test)**
17. Tail rotor transmission chip detector caution light	**OFF (Press-to-test)**
18. Transmission warning light	**ON**
19. Clutch control switch, guard open	**RELEASE POSITION**
20. Clutch disengaged warning light	**ON**

4-3. ENGINE PRESTART COCKPIT CHECK

1. Battery switch — **ON**
2. Communication equipment for proper operation; all switches off after check. — **CHECK**

4-4. ENGINE STARTING PROCEDURE

A. Helicopters with carbureted engine (HO-360-C1A).

1. Fuel valve — **OPEN (Push)**
2. Throttle friction — **ADJUST**
3. Carb Heat — **OFF**
4. Throttle: (**Cold engine or first start of the day**) - Rotate throttle control from full closed to full open three to four times. Close throttle, then open throttle 1/8 inch.

   (**Warm engine**) — **THROTTLE CLOSED**
5. Magneto Switch — **BOTH**
6. Mixture Control — **FULL RICH (Push)**
7. Starter — **ENGAGE**

   NOTE: The engine will usually start within the first few turns.

   Idle mixture and rpm are set at home base altitude. When engine starts are to be made at altitudes considerably higher than home base, some throttle opening may be required.
8. Disengage starter when engine starts.
9. Continue to sub-paragraph C on page 4-13.

B. Helicopters with fuel injected engine (HIO-360-G1A).

1. Mixture control in IDLE CUTOFF position.

2. Fuel shutoff valve in ON position.

3. Release throttle friction lock; rotate throttle partially open (approximately 1/2 inch).

4. Turn fuel pump to ON position; check for pressure indication.

5. Push mixture control in FULL RICH for 2.5 to 3 seconds, return mixture control to IDLE CUTOFF position.

6. Turn fuel pump to OFF position.

7. Magneto switch to BOTH.

CAUTION

For normal operations, do not open the throttle for starting. An overspeed can result from even a partially open throttle.

8. Close throttle, then open throttle 1/8-inch. Engage starter.

   NOTE: The engine will usually start within the first few turns.

   NOTE: Idle mixture and rpm are set at home base altitude. When engine starts are to be made at altitudes considerably higher than home base, some throttle opening may be required.

9. Disengage starter when engine starts, push mixture control to FULL RICH position.

C. THE FOLLOWING STEPS ARE APPLICABLE TO ALL AIRCRAFT.

CAUTION

Do not exceed 1600 RPM with rotor disengaged. Disregard of this limitation may result in structural damage to the lower coupling drive shaft.

10. Stabilize engine at approximately 1400 rpm.

CAUTION

Shut down engine if minimum oil pressure is not reached within 30 seconds after engine starts.

11. Observe oil pressure gage for minimum oil pressure 25 psig.

12. Set alternator switch in ON position **ON**

4-5. ENGINE STARTING PROCEDURE - HOT/FLOODED CONDITIONS

A. Helicopters with carbureted engine (HO-360-C1A).

1. Hot engine; prime may not be required. Proceed with normal starting sequence.

2. Flooded engine:

   a. Throttle **FULL OPEN**

   b. Magnetos **OFF**

   c. Starter **ENGAGE (3 SEC)**

3. After clearing engine, close throttle.

4. Proceed with normal starting sequence.

B. Helicopters with fuel injected engine (HIO-360-G1A).

1. Hot engine; a short prime may be required. Proceed with normal starting sequence.

   NOTE: If engine fails to start after 2 to 3 revolutions, slowly move mixture control to FULL RICH while continuing to crank engine.

2. Flooded engine; throttle fully OPEN, magneto switch in OFF position, fuel boost pump switch in OFF position, press starter button, crank engine 3 seconds.

3. After clearing engine, close throttle. Proceed with normal starting sequence.

4-6. ROTOR ENGAGEMENT

CAUTION

Damage to the helicopter can result if the collective stick is allowed to rise. Inadvertent application of collective pitch and throttle will result. The collective stick must be restrained in the full down position with or without the use of friction.

1. Collective pitch stick — **DOWN AND FRICTION ON**

2. Anti-torque pedals — **NEUTRAL POSITION**

NOTE: Do not use trim controls to move cyclic stick into position; this practice induces strain on the trim control system and may burn out the trim motors.

3. Manually center cyclic stick; use longitudinal and lateral trim as necessary to stabilize stick in center position, then lock friction.

4. Visually check aircraft vicinity for personnel and equipment.

5. Engine speed (1500 rpm) — **SET**

NOTE: Maintain fixed throttle during rotor engagement.

CAUTION

Too rapid or excessive engagement of clutch can lead to aircraft structural damage.

6. Set clutch control switch in ENGAGE position. When engine rpm drops approximately 100 rpm, move the switch to the HOLD position. Repeat this procedure until engine and rotor rpm needles are superimposed.

CAUTION

Never apply power until the clutch release light is out. Malfunctions are indicated if rotor and engine RPM indicator needles are not superimposed when engine is driving rotor.

7. When rotor and engine tachometer needles are superimposed, set clutch switch in ENGAGE position, check light out, and close guard.

8. Visually check engine and rotor tachometer reading after engagement is completed.

4-7. ENGINE GROUND CHECK

1. Engine Speed — **2000 RPM**

2. Engine oil temperature and pressure (within green arcs) — **CHECK**

3. All warning/caution lights — **OFF**

4. Check ammeter reading for charging indication.

   a. Move alternator switch from ON to OFF position, then back to ON; observe ammeter.

NOTE: Proper alternator operation is indicated by movement of ammeter needle.

5. Release control frictions, gently move cyclic stick; observe rotor tip for correct movement and track.

6. Raise collective pitch stick to 15 inches MP at 2000 rpm.

7. Magneto drop (check both mags); 125 rpm max allowable drop within 5 seconds.

   NOTE: No engine roughness should be noticed when operating on either left or right magneto.

8. Carb heat **CHECK**

9. Collective pitch stick **FULL DOWN**

10. Close throttle; observe engine and main rotor tachometer needles for separation.

    NOTE: Needle separation indicates proper operation of overrun clutch.

11. Check throttle override. Do not raise collective.

12. V_{NE} **NOTE**

13. Check the following items for proper indication or position, before takeoff. Under certain weather conditions it may not be possible to obtain the green range while on the ground; however, stabilize temperatures before takeoff.

    a. Fuel quantity

    b. Cylinder head temperature

    c. Engine oil pressure

    d. Engine oil temperature

    e. Transmission warning light **OFF**

    f. Switches and circuit breakers

    g. Fuel valve **OPEN (Push)**

    h. **Helicopters with carbureted engine (HO-360-C1A)**

       Mixture **AS REQUIRED**

       NOTE: (Helicopters with carbureted engine - HO-360-C1A) Overleaning may cause engine stoppage. Should engine stoppage occur, engage starter before rotor RPM decays.

4-7. ENGINE GROUND CHECK (cont)

h. **Helicopters with carbureted engine (HO-360-C1A) (cont)**

Leaning is only recommended above 3750 feet density altitude.

Allow cylinder head temperature to reach 300°F prior to leaning.

(1) Manual Leaning Procedure (no EGT gage):

Engine Speed	**2600 rpm**
Mixture	**Lean to maximum engine RPM, then set mixture by turning mixture knob two complete revolutions clockwise.**

(2) EGT Gage Leaning Procedure:

Engine Speed	**2600 rpm**
Mixture - S/N 73 & Subs. (HA-6 10-6030-1 carburetor)	**Lean to peak EGT, then set mixture to 100° -125°F rich of peak EGT**
Mixture - S/N 1-72 (unless retrofitted with HA-6 10-6030-1carburetor)	**Lean to peak EGT, then set mixture to 175°F rich of peak EGT**

Helicopters with fuel injected engine (HIO-360-G1A)

Mixture	**FULL RICH**

NOTE: (Helicopters with fuel injected engine - HIO-360-G1A) Leaning is not permitted.

i. Clutch disengaged warning light — **OFF/GUARD CLOSED**

j. Fuel low caution light — **OFF**

k. Fuel Pressure: boost pump OFF, boost pump ON.

NOTE: Boost pump must be ON during takeoff and landing and when under 450 feet AGL; operation of the pump during other engine operations is permissible at the discretion of the pilot.

l. Pitot heat (if installed) **AS REQUIRED**

14. Release CONTROL frictions and set as desired.

15. Adjust cyclic trim controls as desired.

4-8. HOVERING AND TAKEOFF

NOTE: Before hover or takeoff is attempted, check that cylinder head and oil temperature gauge indicators are in the green. Under certain weather conditions it may not be possible to obtain the green range while on the ground; however, stabilize temperatures before takeoff.

1. Carb Heat (for Helicopters with carbureted engine - HO-360-C1A only)

   a. Carburetor air temp not in yellow (adjust carb heat as required).

2. Use 2700 rpm for hover and takeoff; add collective to establish hover at a 3-foot skid height to check power and control response. Adjust throttle during lift-off to maintain rotor rpm.

   NOTE: When maximum performance is required, use rpm and skid height specified on the Performance Charts in Section V.

3. For climb out, apply only sufficient additional collective to maintain ground clearance until translational lift is obtained. One inch of MP above hover power is recommended.

4. Perform climb out at 2700 rpm. Lower nose and accelerate to climb speed following profile in Height Velocity Diagram (Figure 5-2). Above 450 AGL, reduce rpm to 2600 to 2700 range.

4-8. HOVERING AND TAKEOFF (cont)

NOTE: Exercise caution to assure that the throttle system is not in the override position (full throttle) when reducing collective to avert overspeed. Avoid excessive nose down attitude.

4-9. CRUISE

1. Cruise in 2600 to 2700 rpm range.

2. Carb Heat (Helicopters with carbureted engine - HO-360-C1A only) **AS REQUIRED**

CAUTION

In-flight leaning is not recommended.

CAUTION

(Helicopters with carbureted engine - HO-360-C1A only) If ground leaning procedure was accomplished at high altitude, be sure the mixture control is pushed back in before descending to lower altitude, otherwise, engine may quit. If engine stops, lower collective, push mixture to full rich and restart using left hand. Do not disengage clutch. (Helicopters with fuel injected engine - HIO-360-G1A.) Do not lean.

3. Mixture
   - Helicopters with carbureted engine - HO-360-C1A **AS REQUIRED**
   - Helicopters with fuel injected engine - HIO-360-G1A **FULL**

WARNING

TO MINIMIZE POSSIBILITY OF ENGINE STOPPAGE RAPID THROTTLE REDUCTIONS TO FULL IDLE SHALL NOT BE CONDUCTED.

Engine idle speeds at high density altitude may be less than those set at sea level conditions.

4-11. PRACTICE AUTOROTATION

WARNING

DURING POWER RECOVERY FROM PRACTICE AUTOROTATIONS, AIRSPEED AND ALTITUDE COMBINATIONS THAT ARE INSIDE THE HEIGHT VELOCITY CURVE SHALL BE AVOIDED. HIGH RATES OF DESCENT MAY DEVELOP FROM WHICH RECOVERY MAY BE DIFFICULT OR NOT POSSIBLE.

WARNING

PRACTICE AUTOROTATIONS SHALL BE CONDUCTED IN AN AREA WITH A SUITABLE LANDING SITE AVAILABLE TO MINIMIZE HAZARDS ASSOCIATED WITH INADVERTENT ENGINE STOPPAGE.

WARNING

TO REDUCE THE CHANCE OF ENGINE STOPPAGE WHEN INITIATING PRACTICE AUTOROTATIONS OR SIMULATED FORCED LANDING TRAINING THE THROTTLE SHALL NOT BE ABRUPTLY RETARDED TO THE IDLE POSITION.

CAUTION

At high power settings an overspeed might occur if throttle is not reduced slightly when collective is lowered.

4-11. PRACTICE AUTOROTATION (cont)

Ensure fuel boost pump (Helicopters with Fuel Injected Engine - HIO-360-G1A) is activated prior to commencing autorotation training. Split the needles by reducing throttle slightly and lowering the collective. The throttle correlation will establish a high idle rpm (approximately 2000 rpm) which will aid in preventing the engine from loading up or stalling during recovery. Conversely, for recovery increase throttle slightly when the collective is raised, the correlation is such that only minor throttle adjustments will be required to perform a smooth recovery without exceeding 2700 rpm.

If engine stops make a touchdown auto landing.

4-12. USE OF CARBURETOR HEAT (HELICOPTERS WITH CARBURETED ENGINE - HO-360-C1A ONLY)

WARNING

CAT GAGE IS ONLY EFFECTIVE ABOVE 18 INCHES MP. DURING DESCENTS OR AUTO-ROTATION UNDER CONDITIONS CONDUCIVE TO CARB ICE, IGNORE GAGE AND APPLY FULL CARB HEAT.

1. When conditions conducive to carburetor ice are known or suspected, such as fog, rain, high humidity, or when operating near water, use carb heat as follows:

   a. During hover or cruise flight above 18 inches MP, apply Carb Heat as required to keep the CAT gage out of the Yellow Arc. If an unexplainable drop in manifold pressure or RPM occurs, apply full Carb Heat for about one minute and check for an increase in MP or RPM.

   b. During autorotation or reduced power below 18 inches MP apply full Carb Heat regardless of CAT gage temperature. When power is reapplied, return Carb Heat control to full cold or partial heat position.

   c. Additional information is given in Section 3 of the Lycoming Operator's Manual.

4-13. LANDING APPROACH

1. Set engine rpm at 2700.

CAUTION

Fire can result from a landing in tall dry grass due to exhaust heat; exercise care in selecting landing site. In case of a grass fire move aircraft to a clear area.

CAUTION

At high power settings an overspeed might occur if throttle is not reduced slightly when collective is lowered.

2. Slow airspeed to approximately 53 kt (61 mph) for a normal approach and reduce collective for the desired rate of descent. Maintain 2700 rpm. On approaching the desired landing spot, reduce airspeed and rate of descent until a hover is established.

4-14. RUNNING LANDING

CAUTION

Avoid rapid lowering of collective pitch control after ground contact.

Thirty-six (36) knots (41 mph) maximum recommended ground contact speed for smooth hard surface.

4-15. ENGINE COOLING SHUTDOWN

1. Perform Paragraph 4-16 if last flight of day.

WARNING

SHUTDOWN ENGINE BEFORE EXITING HELICOPTER.

2. Collective stick down — **FRICTION ON**
3. Throttle — **FRICTION AS DESIRED**
4. Cyclic stick neutral — **FRICTIONS ON**

5. Maintain 2500 rpm with full down collective pitch for two minutes; watch for cylinder head temperature to decrease and stabilize.

6. Decrease to and hold 2000 rpm until CHT stabilizes.

7. Close throttle to IDLE STOP.

8. Set clutch control switch in RELEASE position (guard open) and maintain throttle against stop.

CAUTION

Damage to rotor blades and tailboom may result if collective pitch is used to slow rotor.

9.	Mixture	**IDLE CUTOFF (Pull)**
10.	Magnetos	**OFF**
11.	Alternator	**OFF**
12.	Battery (after clutch is fully disengaged)	**OFF**
13.	All remaining switches	**OFF**
14.	Fuel valve	**CLOSE (Pull)**

4-16. PILOT'S CHECK OF IDLE MIXTURE, IDLE SPEED, AND FUEL BOOST PUMP (HELICOPTERS WITH FUEL INJECTED ENGINE - HIO-360-G1A)

NOTE: This check of idle mixture and idle speed shall be accomplished at the end of the last flight each day, prior to engine shutdown. In the event that the idle mixture check was not accomplished and recorded, the procedure must be accomplished prior to first flight of the day.

1. Accomplish this idle mixture check by first hovering the aircraft until normal in-flight operating temperatures of cylinder heads and engine oil are achieved. Once normal operating temperatures are achieved, perform the idle mixture check as follows:

4-16. PILOT'S CHECK OF IDLE MIXTURE, IDLE SPEED, AND (HELICOPTERS WITH FUEL INJECTED ENGINE - HIO-360-G1A) FUEL BOOST PUMP (cont)

a. Land from a hover with engine cylinder head temperature and oil temperature as near to in-flight conditions as possible, friction on the collective and cyclic controls and engine speed at operational rpm.

b. Ensure MIXTURE is set to FULL RICH.

CAUTION

Aircraft may rotate if landing gear is set on a smooth, hard surface and operator does not correct for loss of torque with pedals.

c. Rapidly rotate throttle to CLOSED position. (Set at normal idle stop, do not override.)

d. If engine quits, notify appropriate maintenance personnel to make adjustments.

NOTE: Engine speed will immediately decrease to idle level. Rotor speed, however, will decline gradually. The next step must be peformed before rotor tachometer needle superimposes with engine tachometer needle.

e. Observe engine tachometer needle and smoothly move mixture control toward IDLE CUTOFF position.

f. Return mixture control to FULL RICH before the rpm decreases to a point where the engine will stop.

NOTE: Engine rpm rise is required to be between 25 and 100 rpm for this check.

g. If rpm rise is not within the required limits, notify the appropriate maintenance personnel to perform proper idle speed and mixture adjustments.

2. Accomplish an idle speed check as follows:

a. Operate helicopter at operational rpm with rotor system engaged, friction on the collective and cyclic controls.

4-16. PILOT'S CHECK OF IDLE MIXTURE, IDLE SPEED, AND (HELICOPTERS WITH FUEL INJECTED ENGINE - HIO-360-G1A) FUEL BOOST PUMP (cont)

CAUTION

Aircraft may rotate if landing gear is set on a smooth, hard surface and operator does not correct for loss of torque with pedals.

b. Rapidly rotate throttle closed and into full override position.

c. Read and record engine idle rpm prior to engine and rotor tachometer needles superimposing.

d. With engine head temperature near 300°F, but not above, repeat the three preceding steps, without going into full override (set throttle at normal idle stop).

NOTE: The first check (throttle into full override) should produce an idle speed no less than 1400 rpm. The second check (throttle at normal idle stop) should produce an idle speed no greater than 1600 rpm.

e. If engine idle speed is not within the required limits, notify the appropriate maintenance personnel to perform adjustments in accordance with the Basic HMI.

3. (Helicopters with fuel injected engine - HIO-360-G1A) Perform a fuel boost pump check.

a. Operate helicopter at idle rpm with fuel boost pump ON.

b. Turn fuel boost pump OFF while observing engine tachometer.

c. If a change in engine rpm is observed, ground helicopter and troubleshoot fuel system.

NOTE: Any noticeable change in engine rpm is unacceptable and must be entered in the Helicopter Log Book.

4-17. POST FLIGHT REQUIREMENTS

1. Brief PAX on exit safety.
2. Shutdown in accordance with Paragraph 4-15 & 4-16.
3. Service aircraft as required.
4. Notify maintenance of discrepancies.
5. Secure aircraft as required.

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Section V

PERFORMANCE DATA

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Section V

PERFORMANCE DATA

5-1. PERFORMANCE DATA

Note: The following performance figures are based on normal gross weight (1750 pounds) and standard day conditions:

Best rate of climb speed 41 KIAS

Hovering ceiling 4600 feet density altitude
(2-foot skid height, mixture leaned)

Controllability has been shown to be adequate in 17 kt (20 mph) winds from any direction.

Indicated airspeed (IAS) corrected for position and instrument error equals Calibrated Airspeed (CAS). (See Figure 5-1, Airspeed Calibration Curve.)

5-2. NOISE

The Model 269C-1 Helicopter meets FAR36 Appendix J. At maximum gross weight, the helicopter produces the following noise levels:

Exhaust Configuration	Noise Level
269A8257-9 Exhaust Pipe Installation	78.8 dBA SEL
269A8263-1 Exhaust Diffuser Installation	81.8 dBA SEL

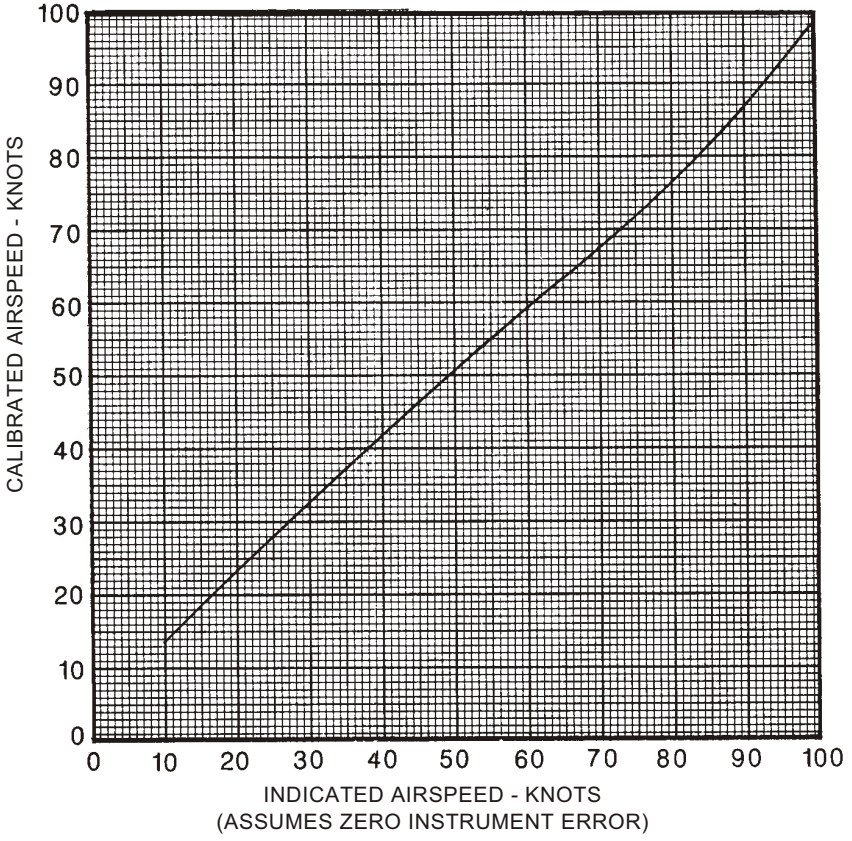

Figure 5-1. Airspeed Calibration Curve - Standard Pitot Tube

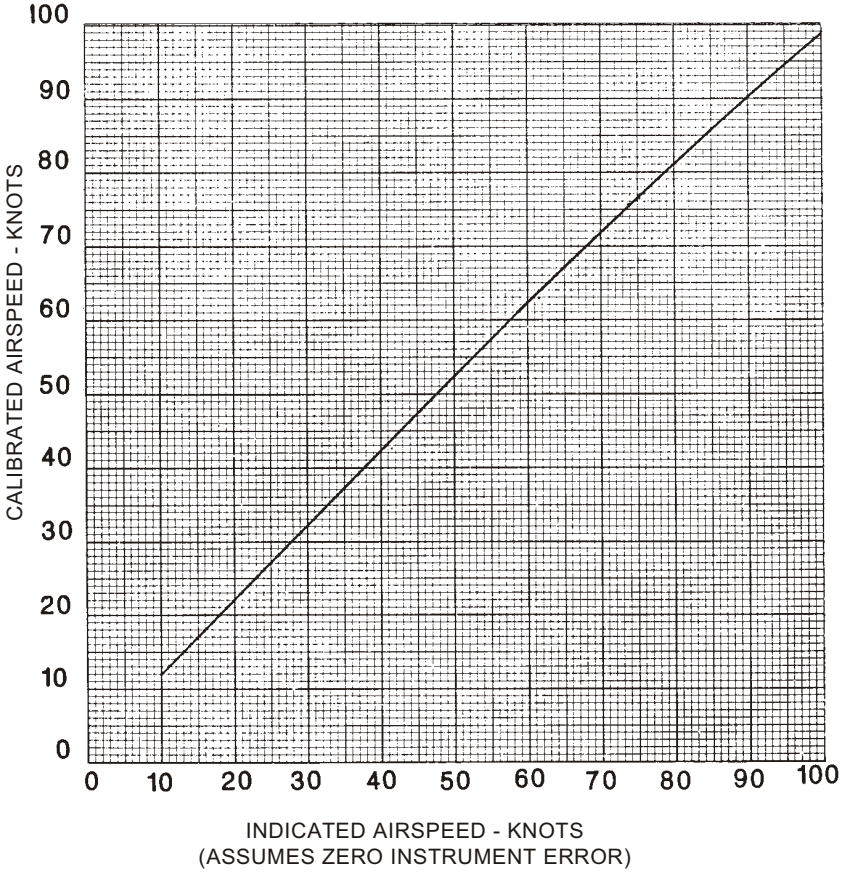

Figure 5-1A. Airspeed Calibration Curve - Heated Pitot Tube

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NOTE: TO MAINTAIN CONDITIONS SHOWN IN FIGURE 5-2 AT ALTITUDE. DO NOT EXCEED GROSS WEIGHT VS ALTITUDE (MIXTURE LEANED) SHOWN IN FIG. 5-4

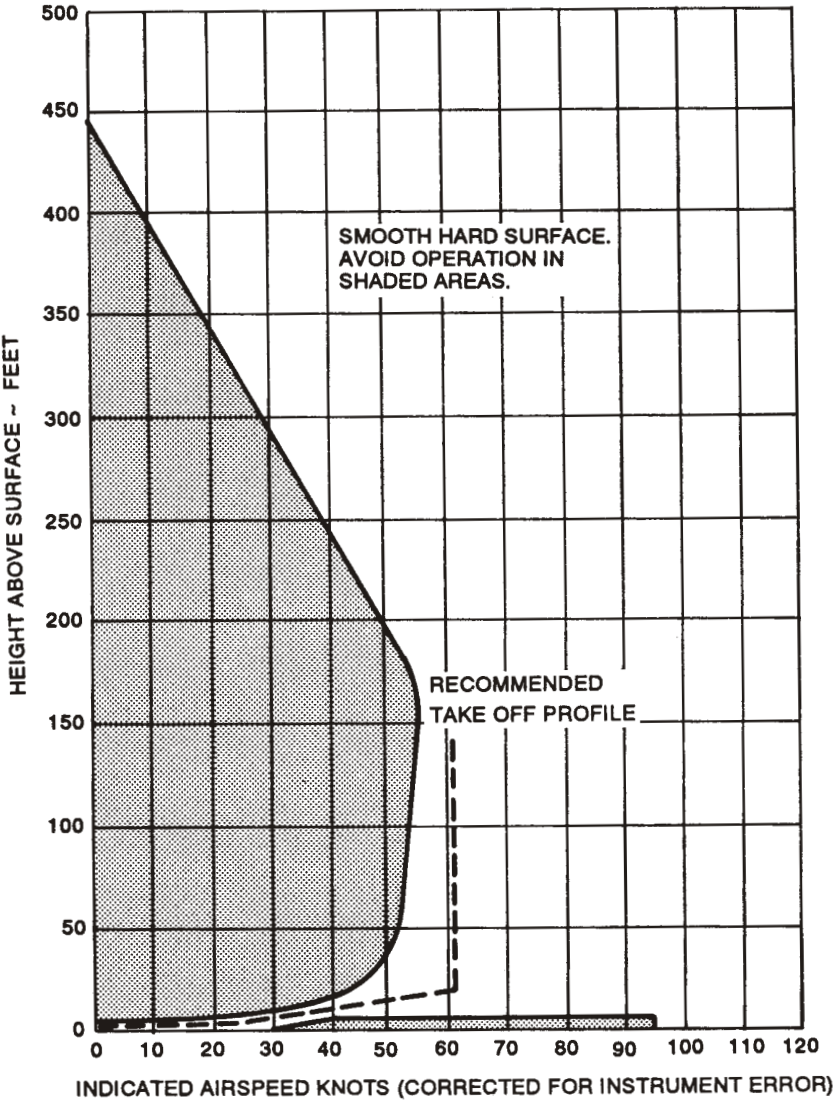

Figure 5-2. Height Velocity Diagram at Sea Level

°F	°C
0	-18
20	-7
40	4
60	16
80	27
100	38
120	49

THIS CHART BASED ON:

- Full Throttle at 2700 RPM.
- Mixture Full Rich
- Carburetor Heat Off.
- 2-Foot Skid Height
- Upstack Exhaust Pipe Installed
- No M/R Blade Abrasion Tape.

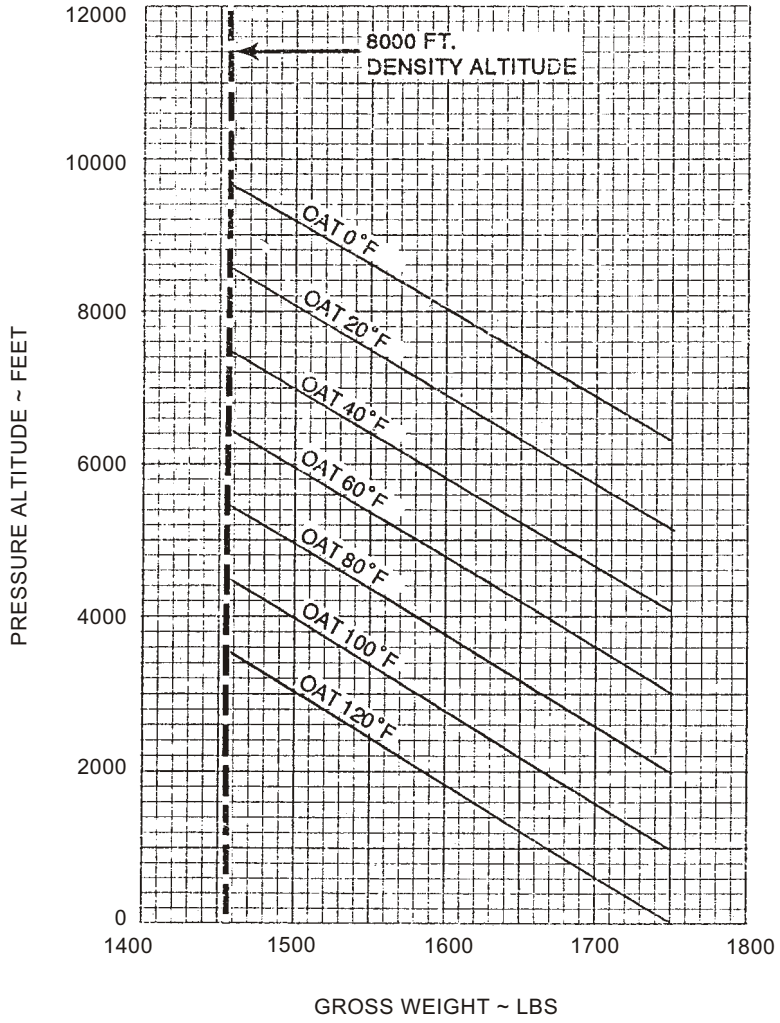

Figure 5-3. In Ground Effect Hover Ceiling Versus Gross Weight (Helicopters with carbureted engine - HO-360-C1A)

°F	°C
0	-18
20	-7
40	4
60	16
80	27
100	38
120	49

THIS CHART BASED ON:

- Full Throttle at 2700 RPM.
- Mixture Leaned
- Carburetor Heat Off.
- 2-Foot Skid Height
- Upstack Exhaust Pipe Installed
- No M/R Blade Abrasion Tape.

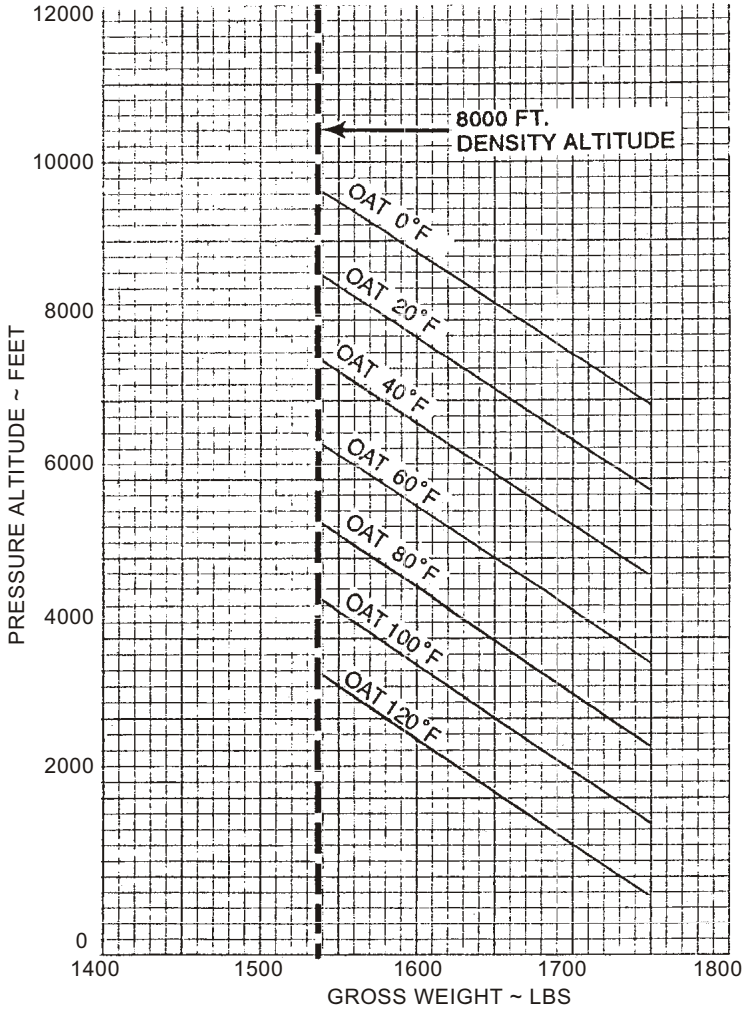

Figure 5-4. In Ground Effect Hover Ceiling Versus Gross Weight (Helicopters with carbureted engine - HO-360-C1A)

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°F	°C
0	-18
20	-7
40	4
60	16
80	27
100	38
120	49

THIS CHART BASED ON:
- Full Throttle at 2700 RPM.
- Mixture Full Rich
- 2-Foot Skid Height
- Upstack Exhaust Pipe Installed
- No M/R Blade Abrasion Tape.

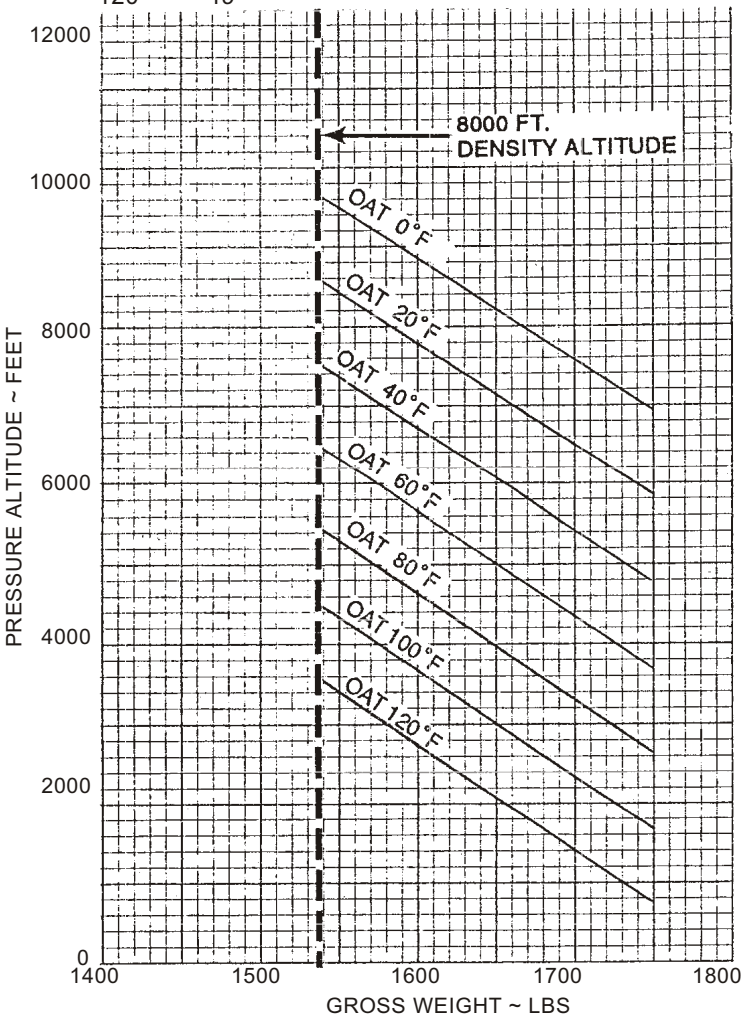

Figure 5-4A. In Ground Effect Hover Ceiling Versus Gross Weight
(Helicopters with fuel injected engine - HIO-360-G1A)

EXAMPLE:
CONDITIONS: 6,000 FT PRESSURE ALTITUDE, 15°C OAT, 100 IAS
- FIND DENSITY ALTITUDE -
FOLLOW -15°C LINE TO 6,000 FT PRESSURE ALTITUDE
LINE: READ DENSITY ALTITUDE (3780 FT)
- FIND $1/\sqrt{\sigma}$ (SIGMA) FACTOR -
READ DIRECTLY ACROSS FROM DENSITY ALTITUDE, (3780) = 1.058 = $1/\sqrt{\sigma}$ (SIGMA)

100IAS = 98.5 CAS
98.5 CAS X 1.058 = 104.2; ROUND TO 104.0 TRUE AIRSPEED

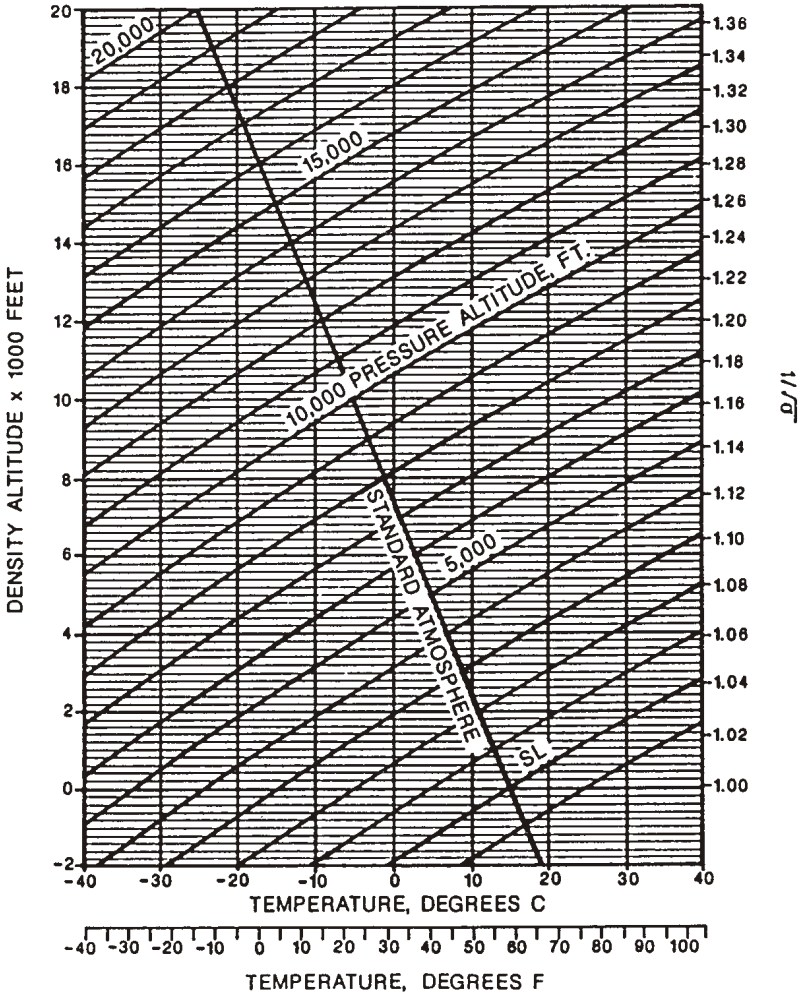

Figure 5-5. Density Altitude Chart

Section VI

WEIGHT AND BALANCE DATA

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Section VI

WEIGHT AND BALANCE DATA

6-1. INTRODUCTION

1. All helicopters are designed for certain limit loads and balance conditions. Changes in equipment which affect the empty weight and empty weight center of gravity must be entered on the Repair and Alteration Report FAA form 337, in accordance with Federal Air Regulations, which shall then become part of the helicopter file.

   Note: Lateral and longitudinal center of gravity must be controlled. Refer to Flight Manual addendums and supplements supplied with kits for special instructions regarding weight and balance data.

   Note: All samples and examples shown in this section are based on 33 gallon fuel tank total capacity and/or 66 gallon total capacity fuel system. Use actual tank capacities from your aircraft when figuring your weight and balance.

6-2. WEIGHT AND BALANCE CHARACTERISTICS

1. The removal or addition of fuel or equipment results in changes to the center of gravity and weight of the aircraft, and the permissible useful load is affected accordingly. Effects of these changes must be investigated in all cases to eliminate possible adverse effects on the aircraft's flight characteristics. The longitudinal reference "Datum" is located 100 inches forward of the centerline of the main rotor (see Figure 6-2). For convenience, station 100 is marked on the aircraft. Station numbers correspond to an inch scale and may be used to locate equipment on the aircraft. The lateral "Datum" is the centerline of the aircraft through the main rotor. The weight and balance characteristics are as follows:

   a. Maximum Gross Weight : 1750 lbs

b. Center of Gravity Limits

Approved Longitudinal Forward Center of Gravity Limit	Station 95
Approved Longitudinal Aft Center of Gravity Limit	Station 101
Approved Lateral Center of Gravity Limits	See Figure 6-1

Lateral "+" is right of centerline, lateral "-" is left of centerline when looking forward. See Figure 6-3.

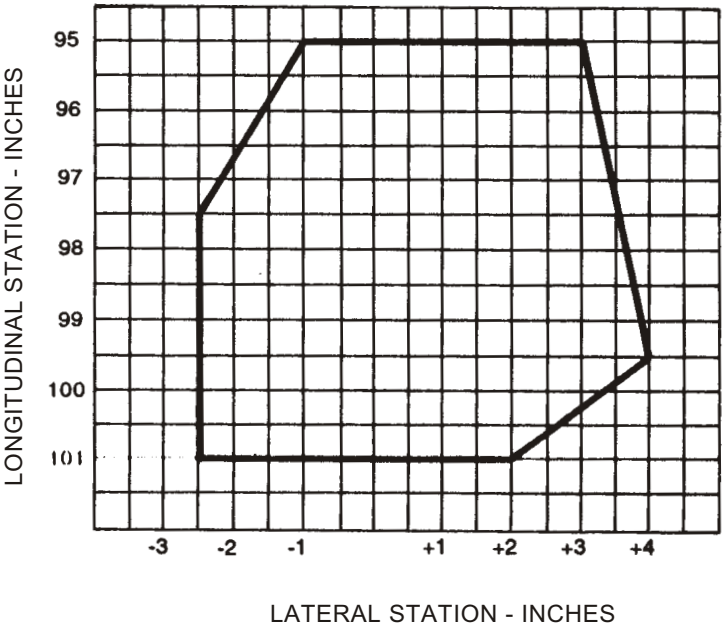

Figure 6-1. Center of Gravity Envelope

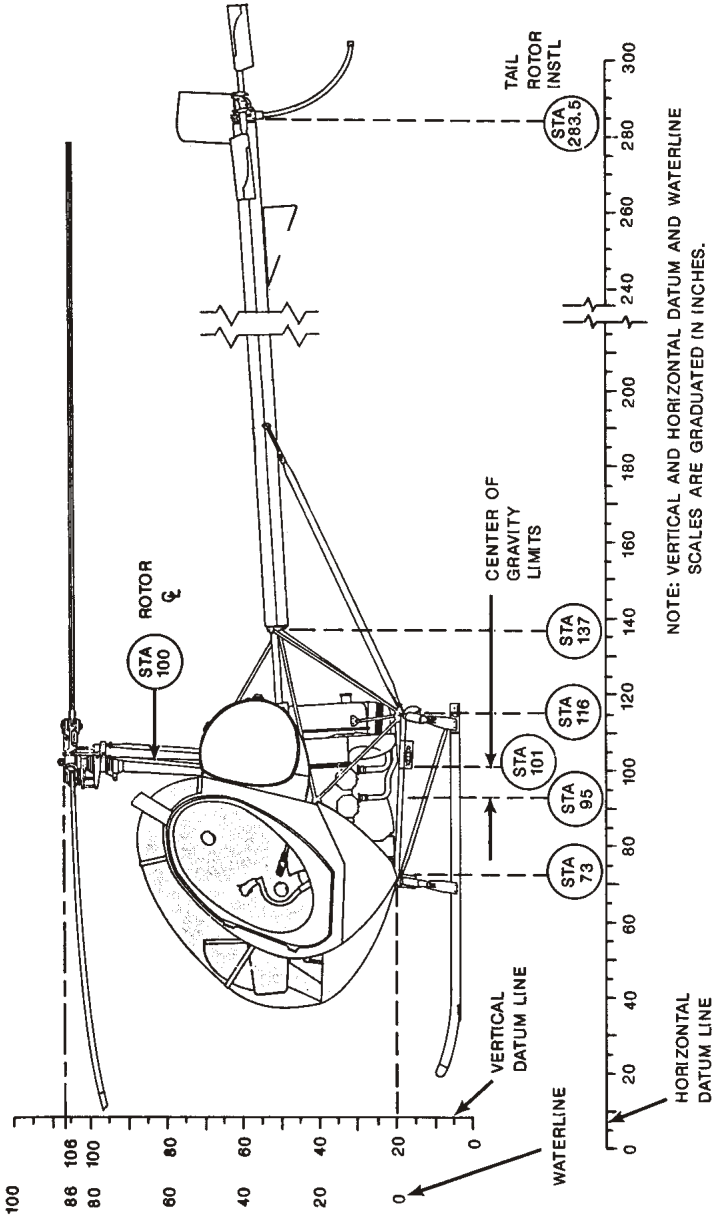

Figure 6-2. Station Diagram

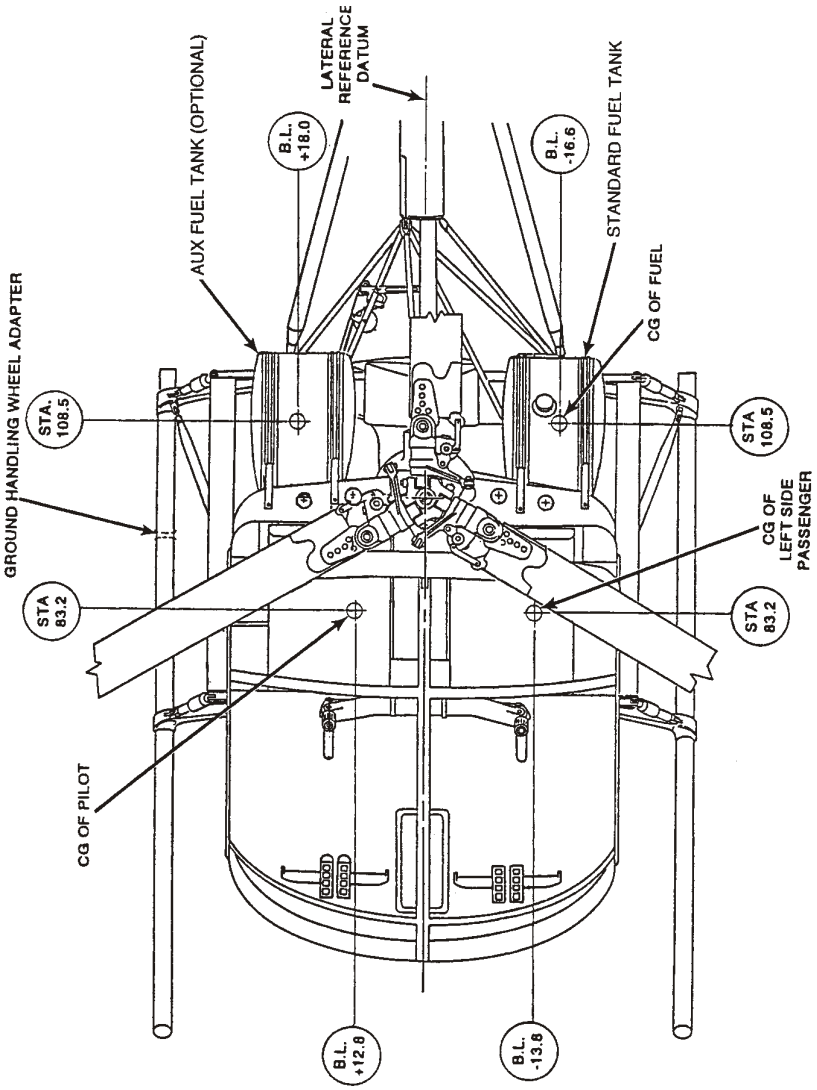

Figure 6-3. Balance Diagram (35.2 or 65.2 gallon total fuel capacity)

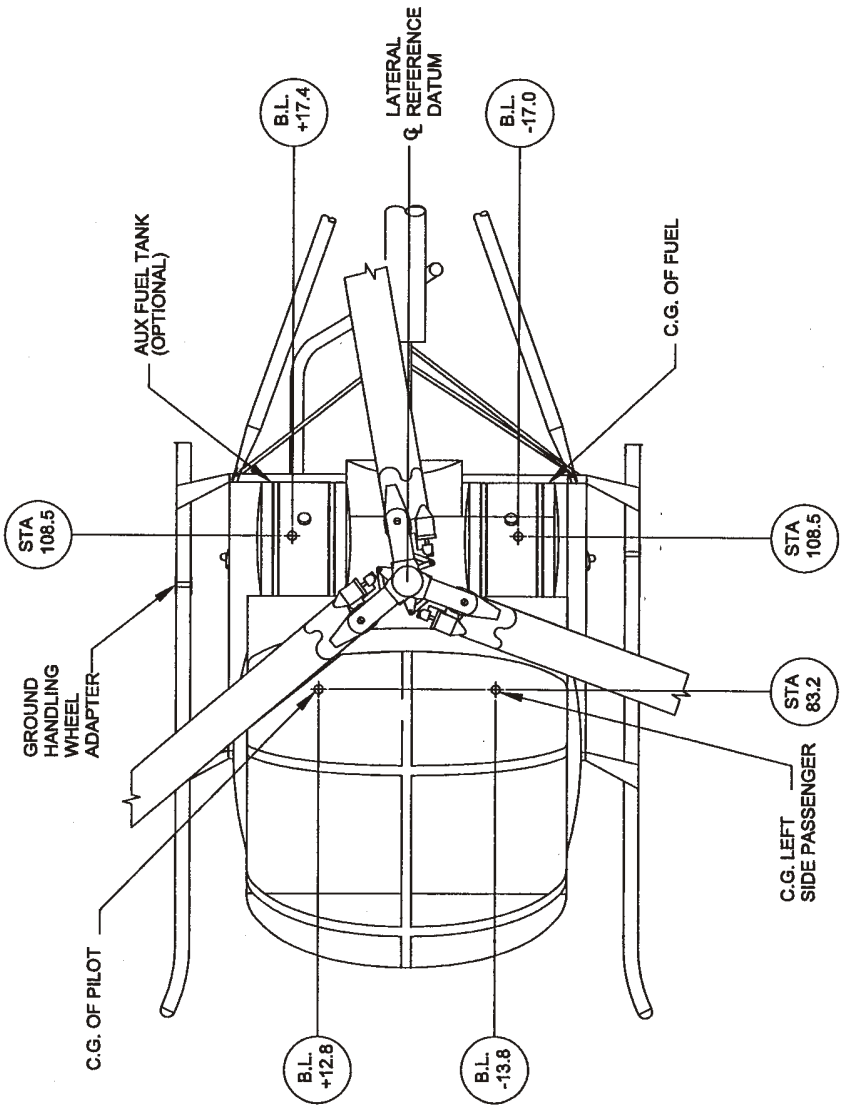

Figure 6-3A. Balance Diagram (33 or 66 gallon total fuel capacity)

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WEIGHT AND BALANCE WORKSHEET

MODEL 269C-1 (300CB)

HELICOPTER MODEL	SERIAL NUMBER	REGISTRATION NUMBER
269C-1	0002	N61442
DATE		**WEIGHED BY**
6-28-95		JOHN DOE

WEIGHING POINT	SCALE READING (LB)	TARE (LB)	NET WEIGHT (LB)	LONG. ARM (IN)	LONG. MOMENT (IN-LB)	LAT. ARM (IN)	LAT. MOMENT (IN-LB)
LEFT MAIN	464	0	464	75.6	35078	-19.0	- 8816
RIGHT MAIN	496	0	496	75.6	37498	+19.0	+ 9424
AFT	141	0	141	271.4	38267	+0.6	+ 85
TOTAL (AS WEIGHED)	1101	0	1101	100.7	110871	+0.6	+ 693

A DISTANCE FROM STATION 100.0 TO MAIN WEIGHING POINTS IN INCHES	RIGHT HAND 24.4	LEFT HAND 24.4
B AVERAGE MOMENT ARM FOR MAIN WEIGHING POINTS (100.0A)	100.0 - 24.4 = 75.6	
C MOMENT ARM FOR AFT WEIGHING POINT IN INCHES	271.4	

OIL ABOARD	[X] YES	[ ] NO
MAIN GEAR BOX	[ ] YES	[ ] NO
TAIL GEAR BOX	[X] YES	[ ] NO
FULL FUEL ABOARD	[ ] YES	[X] NO

EQUIPMENT MISSING AT TIME OF WEIGHING

ITEM NUMBER	WEIGHT	LONG. ARM	LONG. MOMENT	LAT. ARM	LAT. MOMENT		
300CB FLIGHT MANUAL	1.0	48.0	48	0	0		
UNUSEABLE FUEL (SINGLE TANK)	3.0	108.5	325	-17	-51		
(UNUSEABLE FUEL (DUAL TANK))	(12.0)	(108.5)	(1302)	(+.2)	(+2.4)		
*NOTE: Removable Portions Of Ground Handling Wheel Installation (If So Equipped) Are **NOT** Included In Aircraft Empty Weight.*							
TOTAL	4.0	93.3	373	-12.8	-51		

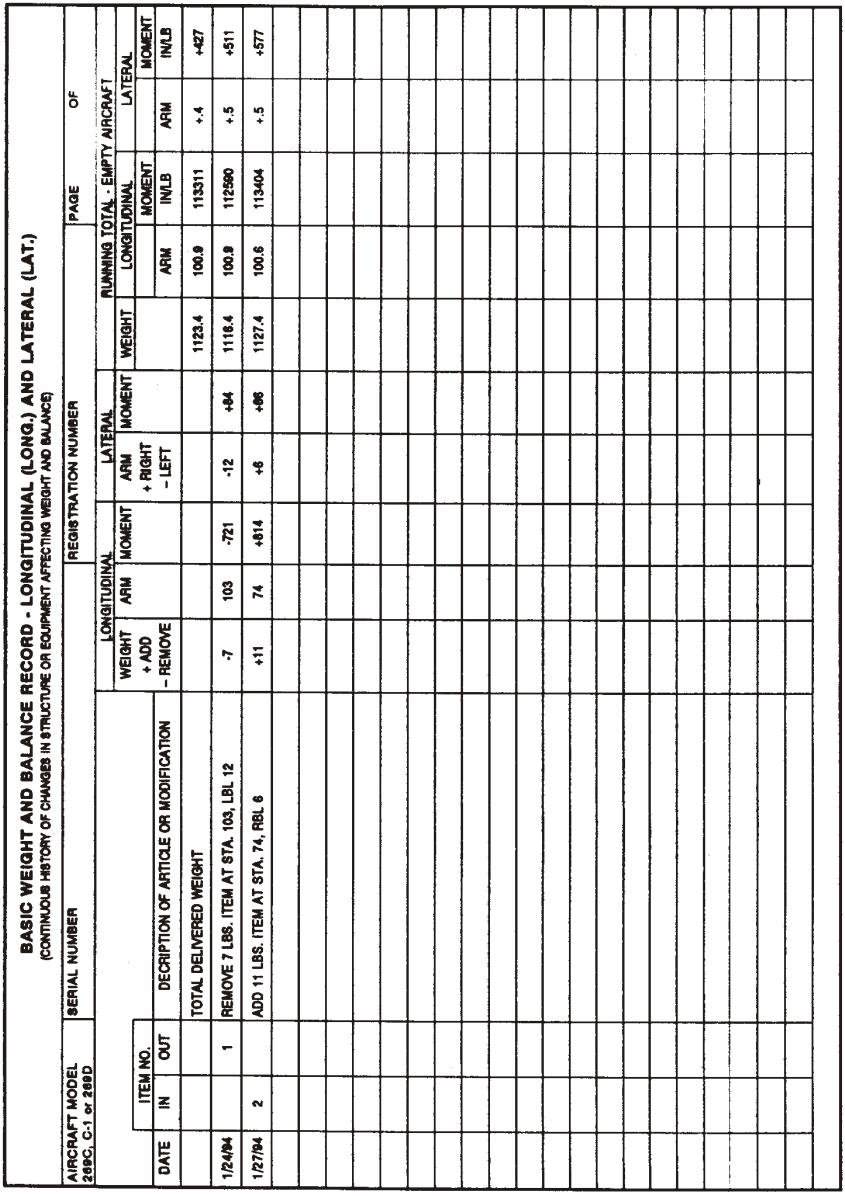
SURPLUS EQUIPMENT IN AIRCRAFT AT TIME OF WEIGHING

ITEM NUMBER	WEIGHT	LONG. ARM	LONG. MOMENT	LAT. ARM	LAT. MOMENT		
TOTAL							

Sample based on single 33 gallon tank.
66 gallon total fuel capacity installation shown above in ( ).
Figure 6-4. Sample Weight and Balance Worksheet (Sheet 1 of 2)

BASIC WEIGHT	WEIGHT (LB)	LONG. ARM (IN.)	LONG. MOMENT (IN.-LB)	LAT. ARM (IN.)	LAT. MOMENT (IN.-LB)
WEIGHT (AS WEIGHED)	1,101	100.7	110,871		
SURPLUS WEIGHT					
MISSING EQUIPMENT WEIGHT	4.0	93.3	373		
TOTAL BASIC WEIGHT (DELIVERED)	1,105	100.7	111,244		
LAT. CENTER OF GRAVITY → + 0.6					
MOST FORWARD LOADING	**WEIGHT (LBS)**	**LONG. ARM (IN.)**	**LONG. MOMENT (IN.-LB)**	**LAT. ARM (IN.)**	**LAT. MOMENT (IN.-LB)**
BASIC WEIGHT	1,105	100.7	111,274		
PILOT AND PASSENGER L.H.	340	83.2	28,288		
USEABLE FUEL	0.0	108.5	0		
TOTAL GROSS WEIGHT	1,445	96.6	139,562		
APPROVED FORWARD LIMIT 95 INCHES ↑					
MOST AFT LOADING	**WEIGHT (LB)**	**LONG. ARM (IN.)**	**LONG. MOMENT (IN.-LB)**	**LAT. ARM (IN.)**	**LAT. MOMENT (IN.-LB)**
BASIC WEIGHT	1,105	100.7	111,274		
PILOT	170.0	83.2	14,144		
FUEL, FULL 32.5 GAL. (USEABLE)	195	108.5	21,158		
(FUEL, AUX 64 GAL. (USEABLE))	(384)	(108.5)	(41,664)		
TOTAL GROSS WEIGHT	1,470	99.7	146,576		
APPROVED AFT LIMIT 101 INCHES ↑					

Sample based on single 33 gallon tank.
66 gallon total fuel capacity installation shown above in ( ).
Figure 6-4. Sample Weight and Balance Worksheet (Sheet 2 of 2)



BASIC WEIGHT AND BALANCE RECORD - LONGITUDINAL (LONG.) AND LATERAL (LAT.)
(CONTINUOUS HISTORY OF CHANGES IN STRUCTURE OR EQUIPMENT AFFECTING WEIGHT AND BALANCE)

AIRCRAFT MODEL 269C, C-1 or 269D | SERIAL NUMBER | REGISTRATION NUMBER | PAGE | OF

DATE	ITEM NO. IN	ITEM NO. OUT	DESCRIPTION OF ARTICLE OR MODIFICATION	LONGITUDINAL WEIGHT + ADD - REMOVE	LONGITUDINAL ARM	LONGITUDINAL MOMENT	LATERAL ARM + RIGHT - LEFT	LATERAL MOMENT	RUNNING TOTAL - EMPTY AIRCRAFT WEIGHT	RUNNING TOTAL - EMPTY AIRCRAFT LONGITUDINAL ARM	RUNNING TOTAL - EMPTY AIRCRAFT LONGITUDINAL MOMENT IN/LB	RUNNING TOTAL - EMPTY AIRCRAFT LATERAL ARM	RUNNING TOTAL - EMPTY AIRCRAFT LATERAL MOMENT IN/LB
			TOTAL DELIVERED WEIGHT						1123.4	100.9	113311	+.4	+427
1/24/84		1	REMOVE 7 LBS. ITEM AT STA. 103, LBL 12	-7	103	-721	-12	+84	1116.4	100.9	112590	+.5	+511
1/27/84	2		ADD 11 LBS. ITEM AT STA. 74, RBL 6	+11	74	+814	+8	+86	1127.4	100.6	113404	+.5	+577

Figure 6-5. Sample Weight and Balance Record

6-3. LOAD LIMITS AND BALANCE CRITERIA

1. The Schweizer S-300CB Model 269C-1 helicopter was designed to the loading limitations noted in paragraph 6-2.

   Note: Do not exceed these limitations at any time during flight.

2. The delivered weight (the term "delivered weight" includes oil and trapped fuel), recorded in the Weight and Balance Record inserted in this section, shall be used to perform all weight and balance computations (see Fig ures 6-4 and 6-5).

7-4. EQUIPMENT REMOVAL OR INSTALLATION

1. Removal or addition of equipment must be entered in the helicopter log book and shall be come part of the helicopter file.

2. The weight and balance effects of these changes must also be re - corded in the Weight and Balance Record inserted in this section.

3. Use the station diagram shown in Figure 6-2 and the Balance Diagram shown in Figure 6-3 as an aid for weight and balance changes.

6-5. WEIGHT AND BALANCE DETERMINATION - PASSENGER CONFIGURATION

1. To determine that the gross weight and longitudinal center of gravity (fore and aft) for a given flight are within limits, proceed as follows:

   a. Obtain the aircraft delivered weight and longitudinal moment from the Weight and Balance Record inserted in the back of this manual.

   b. Determine weights and longitudinal moments of useful load items (Figure 6-7).

   c. Add the above items (Example I).

Example I - Based on 32.5 gal usable fuel		
Items	Weight (Lb)	Long. Moment (In-Lb.)
Delivered Weight	1,105	111,274
Pilot - Right-Hand	170	14,144
Passenger - Left-hand	170	14,144
1. Sub-Total Gross Weight	1,445	139,562
Fuel-Full Tank (32.5 gal)	195	21,158
2. Gross Weight	1,640	160,720

   d. Calculation of Longitudinal CG

      (1) CG (Zero Fuel Weight):

$$\frac{\text{Moment at Zero Fuel Weight}}{\text{Zero Fuel Weight}} = \frac{139{,}562}{1{,}445} = 96.6 \text{ in.}$$

      (2) CG (Gross Weight):

$$\frac{\text{Moment at Gross Weight}}{\text{Gross Weight}} = \frac{160{,}720}{1{,}640} = 98.0$$

6-6. PERMISSIBLE LATERAL LOADINGS - PASSENGER CONFIGURATION

1. For the safe operation of this helicopter, it must be flown within the established lateral as well as longitudinal center of gravity limits.

   Note: Lateral center of gravity must be controlled.

2. Combinations of passenger loadings are permissible if gross weight, longitudinal, and lateral center of gravity considerations permit.

3. To determine that the gross weight and lateral center of gravity (left and right) are within limits for a given flight, proceed as follows:

   a. Obtain the aircraft delivered weight and moment from the Weight and Balance Record inserted in this section (Fig. 6-5).

   b. Determine weight and lateral moment of useful load items (Fig. 6-6 or 6-6A depending on fuel configuration).

   c. Add the above items (Example II).

   d. Plot on Figure 6-1 with associated longitudinal CG

Example II - Based on 32.5 gal usable fuel		
Items	Weight (Lb)	Lat. Moment (In.-Lb.)
Delivered Weight	1105	642
Pilot - Right-Hand	170	+2,176
Passenger - Left-hand	170	-2,346
1. Sub-Total Gross Weight	1,445	472
Fuel-Full Tank (32.5 gal)	195	-3,315
2. Gross Weight	1640	-2,843

e. Calculation of Lateral CG:

(1) CG (Zero Fuel Weight):

$$\frac{\text{Moment at Zero Fuel Weight}}{\text{Zero Fuel Weight}} = \frac{+472}{1{,}445} = +.33 \text{ in.}$$

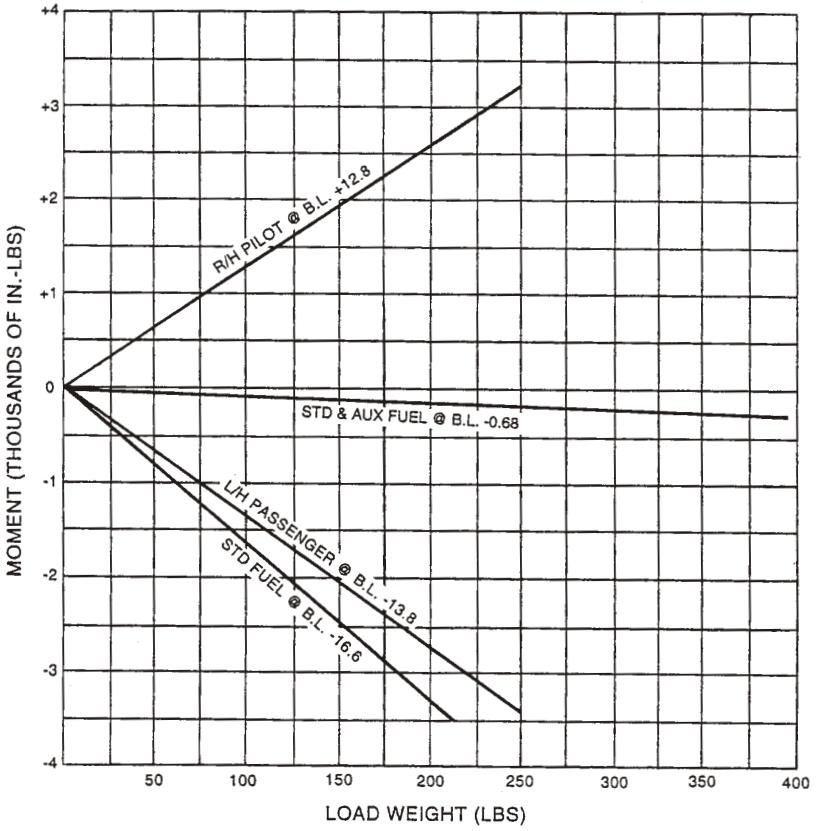
(2) CG (Gross Weight):

$$\frac{\text{Moment at Gross Weight}}{\text{Gross Weight}} = \frac{-2{,}843}{1{,}640} = -1.7 \text{ in.}$$

Note: The determined lateral CGs of +.33 inch and -1.7 inch for longitudinal CGs of 96.6 inch and 98.0 inch respectively, fall within the established CG limits. (Reference Figure 6-1 and Example I.)

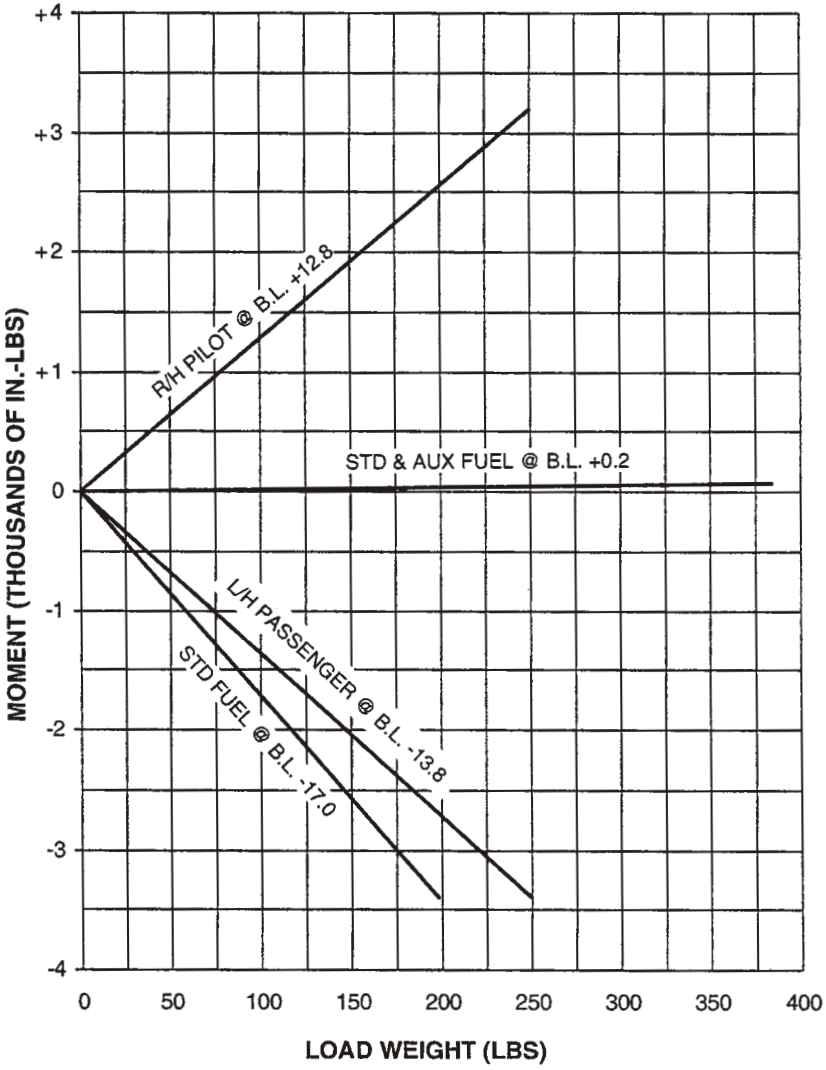
6.7 GLOVE BOX

1. Max weight - 20 lbs
2. CG - Sta. 50.3
3. Lateral CG - Zero



35.2 Gallon Fuel Tank or 65.2 Gallon Fuel System Total Capacity

Figure 6-6. Weight and Moment Chart - Lateral



33 Gallon Fuel Tank or 66 Gallon Fuel System Total Capacity
Figure 6-6A. Weight and Moment Chart - Lateral

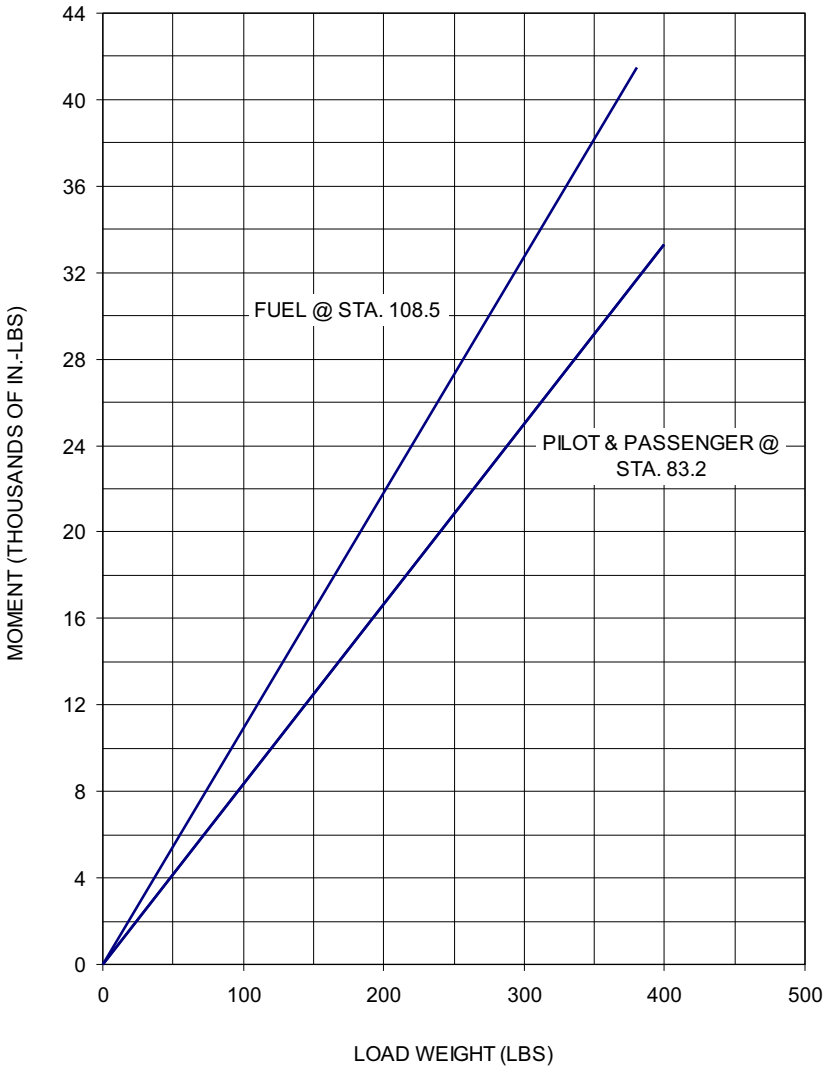


Figure 6-7. Weight and Moment Chart - Longitudinal

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Section VII

AIRCRAFT HANDLING, SERVICING AND MAINTENANCE

WARNING

FOR COMPLETE SERVICING REQUIREMENTS, REFER TO THE HANDBOOK OF MAINTENANCE INSTRUCTIONS.

7-1. SERVICING - GENERAL

Servicing of the helicopter includes refueling, changing or replenishment of oil and lubrication, and other such maintenance functions.

7-2. FUELING HELICOPTER

The helicopter main fuel tank is located externally on the aft side of the left-hand cabin bulk head; an auxiliary tank may be installed on the aft side of the right-hand cabin bulk head. The main tank and auxiliary tank (if in stalled) may be serviced from either filler neck by pressure or gravity method.

Observe the following precautions when servicing the fuel system.

WARNING

HOT REFUELING IS NOT RECOMMENDED BY SCHWEIZER RSG, LLC. PRIOR TO REFUELING, ENSURE ENGINE IS OFF, ROTOR SYSTEM IS STATIC AND ALL ELECTRICAL POWER IS REMOVED FROM HELICOPTER. DISCONNECT EXTERNAL POWER FROM HELICOPTER AND MOVE POWER UNIT AT LEAST 20 FEET FROM HELICOPTER.

DO NOT FUEL OR DEFUEL HELICOPTER INSIDE ANY HANGAR OR BUILDING. STATIC DISCHARGE CAN IGNITE FUEL VAPORS RESULTING IN EXPLOSION AND FIRE.

7-2. FUELING HELICOPTER (cont)

1. Fire extinguisher shall be readily available for all fueling and defueling operations.
2. Refueling vehicle should be parked with exhaust outlet a minimum of 20 feet from helicopter filler point during fueling operation.
3. Before starting fueling operation, connect ground wire from fueling nozzle or from fuel truck to bare metal location on helicopter.
4. No smoking or open flame within 100 feet of the helicopter and fuel truck.

Table 7-1. Usable Fuel Quantity

SYSTEM CAPACITIES	QUANTITY	USABLE QUANTITY
STD	35.2 U.S. gallons	35.0 U.S. gallons
STD+ AUX (if installed)	65.2 U.S. gallons	63.0 U.S. gallons
OR - Depending on Aircraft S/N		
STD	33.0 U.S. gallons	32.5 U.S. gallons
STD + AUX (if installed)	66.0 U.S. gallons	64.0 U.S. gallons

Fuel Capacity:

Materials: Fuel - Grade 100/130 (green) or 115/145 (purple) or 100LL (blue) MIL-F-5572

7-3. SERVICING FUEL SYSTEM

Filling - Fuel System

Refuel helicopter as soon as possible after landing to prevent moisture condensation and to keep the helicopter as heavy as possible in case of winds. The fueling operation may be accomplished by any method that parallels the following procedures as closely as possible. Refuel aircraft in level attitude to achieve accurate quantities.

CAUTION

In many instances, it will be necessary to operate the helicopter from unimproved fields that lack normal fuel servicing equipment. When fueling from drums or any questionable source of supply, carefully filter all fuel to

remove any foreign material before it enters the fuel tank. Perform the following:

Remove all foreign material from a funnel.

Place a chamois into the funnel so that it forms a cup-like depression.

Secure excess chamois to outside of funnel, using lockwire or equivalent.

Insert funnel to fuel tank filler neck before starting fueling operation.

Note: Use only natural leather chamois. Do not use artificial chamois.

1. Position fuel truck for fueling of helicopter; observe minimum clearance of 20 feet from engine exhaust outlet to fuel tank cap.
2. Attach ground wire from truck to a suitable ground spot on helicopter.
3. Remove fuel tank cap.
4. Insert fuel hose nozzle in filler neck and commence fueling operation, using correct fuel. Keep fueling nozzle free of all foreign matter.
5. Maintain constant visual check on fueling operation; prevent overfilling tank.
6. Finish the fueling operation; remove fuel hose nozzle from filler neck.

WARNING

AIRCRAFT OPERATION WITH UNSECURED FUEL FILLER CAP MAY PRODUCE FUEL VAPORS/SPILLS WHICH CAN CAUSE FIRE OR EXPLOSION.

7. Visually check fuel level; install fuel tank cap and verify that cap is secure.
8. Remove ground wire.

Note: Allow five minutes for fuel to settle before performing next step.

7-3. SERVICING FUEL SYSTEM (cont)

9. Depress fuel strainer drain valve lever. Allow sufficient time (approximately 8 to 10 seconds) for drainage to eliminate all foreign material.

WARNING

VISUALLY CHECK FUEL STRAINER DRAIN VALVE FOR A FULLY CLOSED CONDITION.

Note: Fuel leakage will show as a stain on lines, fittings, and components.

10. Visually check all fuel lines, fittings, and components for evidence of fuel leakage.

Draining - Fuel System

WARNING

PRIOR TO DEFUELING, ENSURE ENGINE IS OFF, ROTOR SYSTEM IS STATIC AND ALL ELECTRICAL POWER IS REMOVED FROM HELICOPTER.

DO NOT FUEL OR DEFUEL HELICOPTER INSIDE ANY HANGAR OR BUILDING. STATIC DISCHARGE CAN IGNITE FUEL VAPORS RESULTING IN EXPLOSION AND FIRE.

1. Accomplish fuel draining with the helicopter as level as possible. The fuel system may be defueled in two ways:

   a. Defuel through the filler port(s), using a pump.

   b. Defuel by opening the fuel strainer drain valve (and auxiliary tank sump drain valve if installed).

2. Fire extinguishers shall be readily available for all fueling and defueling operations.

3. Before beginning defueling operation, connect ground wire from defueling equipment to the GROUND HERE receptacle or other bare metal location on helicopter.

4. No smoking or open flame within 100 feet of the helicopter and defueling equipment.

5. After draining fuel system, ensure that all valves are in normal operating position and secure.

7-4. SERVICING ENGINE OIL SYSTEM

The engine has a wet sump lubrication system located on the bottom of the engine. Oil quantity is checked by using the dipstick located in the left front corner of the engine sump. The dipstick is graduated in 2-quart increments and has an O-ring to prevent oil leakage. Oil is added to the engine through the dipstick opening by using an automotive-type filler spout with a flexible hose.

Note: Check engine oil level before the first flight of the day.

Frequent oil changes are highly desirable. More frequent changes are desirable when poor environmental conditions (i.e., dust and high OAT) are present. Use an ashless dispersant oil at all times after break-in as recommended by Lycoming Service Instruction No. 1014 (latest revision). Refer to the latest revision of Lycoming Service Bulletin No. 480 for oil and oil filter change intervals and oil screen cleaning interval recommendations.

Filling - Engine Oil System

1. Visually check oil level on dipstick. If oil level is at 6-quart graduation or below, add no less than 1 quart of oil.

2. Using clean oil filler can, add desired quantity of oil.

3. Wipe dipstick clean and recheck oil level.

4. Install dipstick in engine receptacle and check for security.

5. Visually check oil system components for evidence of leakage.

Draining - Engine Oil System

1. Place suitable container under the engine oil sump; remove drain plug.

2. Allow sufficient time for all oil to drain from sump.

3. Clean engine filter screens or change filter.

4. Reinstall drain plug in engine sump and attach safety wire.

Table 7-2. Recommended Engine Oil Grades

Single Viscosity	Multiple Viscosity	Average Ambient Air Temperature
—	15W50 or 20W50	All Temperatures
60	—	Above 80°F
50	—	Above 60°F
40	—	30° to 90°F
30	20W40	0° to 70°F
20	20W30	Below 10°F

7-5. BATTERY SERVICING

The battery stores electrical energy produced by the helicopter alternator and supplies current to the electrical system on demand. The helicopter uses a 24-volt battery located on the right-hand forward side of the center-section frame.

Overfilling and overcharging the battery are two common causes of electrolyte spillage during helicopter flight. To preclude corrosion of the structure due to battery acid spillage or spewing, perform these few simple servicing precautions:

1. Maintain the proper electrolyte level in the battery; do not overfill.
2. Maintain the proper charging rate (voltage) of the helicopter electrical system.
3. Visually inspect battery for cracks, spilled electrolyte, corrosion, and security of mounting.
4. Visually inspect adjacent structure for evidence of corrosion and spilled electrolyte.
5. Remove spilled electrolyte from battery and adjacent components.
6. To check or service battery cells:
   a. Unscrew filler caps at top of battery.

b. Visually inspect electrolyte level in all cells. Maintain battery electrolyte level at bottom of filler tube (3/16 inch above plates) and add water only when battery is at full charge.

c. Add distilled water as required, and recheck electrolyte level.

d. Install filler caps.

7-6. JUMP STARTING BATTERY

CAUTION

It is not recommended to jump start a dead battery. A discharged battery is not airworthy because it will not have the necessary reserve capacity to operate the electrical system should the generating system fail in-flight. Also, the fast recharge from the alternator will damage the battery and result in premature battery failure.

CAUTION

Use care when connecting electrical jumper cables and an auxiliary battery for starting the engine when helicopter battery charge is low. Keep battery cables away from the helicopter frame and components, especially the clutch control cable. Burn damage to the cable will require cable replacement.

CAUTION

Batteries give off a gas which is flammable and explosive. Keep open flames or electric sparks away from battery. Do not smoke near battery. Batteries also contain acid which can cause personal injury, particularly to eyes. Protect your eyes, face and other exposed areas when working near a battery.

If an emergency should require the helicopter to be jump started , the following procedure should be followed.

7-6. JUMP STARTING BATTERY (CONT)

1. Battery switch OFF
2. Connect positive lead to battery (+ pos)
3. Connect Negative lead to fuselage or engine ground strap (Do not connect to battery terminal) (- neg)
4. Accomplish normal start
5. Disconnect jumper cables

7-7. CLEANING BATTERY ELECTROLYTE SPILLAGE

Note: Flight maneuvers within the maximum allowable attitudes will not cause electrolyte spillage. If the battery and helicopter electrical system are properly maintained, there should be no leakage or electrolyte damage to the structure or flotation gear.

1. Mix one part baking soda to three parts water.

CAUTION

Do not allow soda solution to enter battery cells.

2. Using mixed soda solution, thoroughly flush affected areas.
3. Rinse affected areas with clear water and wipe dry with clean cloth.

7-8. MAIN TRANSMISSION - SERVICING

The transmission transmits power to the main and tail rotor assemblies. The transmission is located aft of the cabin section along the aircraft centerline and has a self-contained lubrication system. Oil quantity is checked by viewing the sight gage or with a dipstick located on the right-hand rear side of the transmission. There are two graduations, FULL and LOW. A locking device is incorporated to prevent the dipstick from coming out of the transmission during flight. Oil is added to the transmission through a filler port above and/or forward of where the level is checked. The port incorporates an over center ramp or safety wired cap to prevent loss of oil.

Main Transmission Oil Capacity

3 U.S. quarts, total

Recommended Lubricants

SAE HD90 J2360, MIL-L-2105 or MIL-PRF-2105 approved for use at -18°C (0°F) to 43°C (110°F).

SAE HD80 J2360, MIL-L-2105 or MIL-PRF-2105 approved for use at -29°C (-20°F) to 4°C (40°F).

Filling - Main Transmission

Note: Do not open the transmission if there is blowing dust or sand in the immediate area.

1. Check oil level via sight gage or dip stick
2. Maintain oil level between LOW and FULL graduation.
3. Using oil filler can, add desired quantity of oil.
4. Recheck oil level. (Wipe dipstick clean if installed).
5. Reinstall and secure filler cap and/or dipstick.
6. Visually check main transmission and components for evidence of oil leakage and security.

Draining - Main Transmission

1. Place suitable container under main transmission oil sump. Remove magnetic drain plug and self-closing valve. Allow sufficient time for all oil to drain from sump.
2. If damaged, replace O-rings used with drain plug and valve.
3. Reinstall drain plug and self-closing valve in oil sump; lockwire in place.

7-9. TAIL ROTOR TRANSMISSION - SERVICING

The tail rotor transmission transmits power from the tail rotor drive shaft at a right-angle to the tail rotor. A set of bevel gears increases tail rotor rpm. The transmission is located on the aft end of the tailboom. Service the transmission with a thorough visual inspection and maintain proper oil level.

Tail Rotor Transmission Oil Capacity

1/2 pint, total

Recommended Lubricants

SAE HD90 J2360, MIL-L-2105 or MIL-PRF-2105 approved for use at -18°C (0°F) to 43°C (110°F).

SAE HD80 J2360, MIL-L-2105 or MIL-PRF-2105 approved for use at -29°C (-20°F) to 4°C (40°F).

Filling - Tail Rotor Transmission

Note: Do not open the transmission if there is blowing dust or sand in the immediate area.

1. With helicopter level, visually check oil level in liquid level plug window. Tail rotor transmission, oil must be at FULL mark.
2. Cut lockwire and remove breather filler plug.
3. Using oil filler can, add required amount of oil.
4. Visually check liquid level plug for proper oil level.

5. Install transmission breather-filler (45 to 55 in.-lbs) and lockwire.

6. Visually check transmission assembly for leakage and obvious damage.

Draining - Tail Rotor Transmission.

1. Place suitable container under chip detector of tail rotor transmission.

2. Remove lockwire, chip detector and self-closing valve. Allow sufficient time for all oil to drain from transmission.

3. If damaged, replace O-rings used with chip detector and self-closing valve.

4. Reinstall self-closing valve (50 to 60 in.-lbs. torque) and chip detector (40 to 50 in.-lbs. torque). Lockwire valve to gearbox and detector to valve.

5. Wipe dry any oil spillage with a clean cloth moistened with dry-cleaning solvent.

7-10. CLEANING TRANSPARENT PLASTIC

The plastic panels in the canopy and door frames provide 360-degree visibility for the pilot and passenger. The canopy panels are fabricated from acrylic plastic sheets and are strong, lightweight, with excellent optical characteristics. Maintaining the transparent enclosure consists of proper cleaning and a thorough visual inspection.

Material

Kerosene VV K-211

1. Rinse panel thoroughly with clear water. Dislodge large dirt and mud deposits with palm of hand. If required, use kerosene on small cloth pad to remove grease and oil. Plastic cleaner may be used if desired.
2. Flush cleaning agents from panels with clear water.

CAUTION

Do not use a dry cloth to dry plastic panels. A static electrical charge will build up causing abrasive dirt to adhere to panel surface.

3. Using damp chamois, dry panels.
4. Visually inspect panel for cracks, scratches, gouges, and crazing.
5. Press lightly on the side of each plastic panel, just inboard of the retainers for all plastic panels in canopy and door panels, to check for looseness between plastic panels and retainers.

7-11. LANDING GEAR DAMPERS - INSPECTION

Four poppet type nitrogen charged hydraulic units in the landing gear assembly dampen landing shock and help prevent ground resonance. The dampers are mounted between the helicopter centerframe section and the landing gear skids (two for each skid, left-and right-hand sides). Ground resonance and possible destruction of the helicopter may result if landing gear dampers are not functioning properly. Perform the following check at each preflight inspection to ensure proper extension of dampers.

Note: Ensure that the helicopter is in an empty-weight configuration (no passengers or cargo aboard) but with full fuel load.

1. Visually inspect landing gear dampers for leakage. Replace damper if loss of hydraulic oil is noted.
2. Observe stance of helicopter. If stance is nose down or if extension of aft dampers appears to be unusual, perform the following checks.
3. Raise and lower the tailboom above and below the normal at-rest position three times.
4. On the last cycle, slowly lower the tailboom to an at-rest position and observe stance of helicopter. If stance of helicopter or extension of aft dampers still appears unusual, perform the following step.
5. Measure distance from shoulder of damper upper cap to top edge of damper bottom cap on all dampers. Replace any damper measuring less than the dimensions in Table 7-3

Table 7-3. Landing Gear Damper Dimensions

	With Main Tank Only		With Auxiliary Tank Kit Installed	
	Right	Left	Right	Left
Aft	8.4	8.0*	8.0*	8.0*
Forward	9.1	8.7	8.7	8.7

*When dimension is less than 8.0 inches, recheck extension per 100-Hour Inspection Method (Refer to HMI) before replacing aft damper.

7-12. CLEANING INDUCTION SYSTEM - REPLACING FILTER

The filter removes all foreign material from the air before it enters the induction system. The filter element material is foam, and is installed in the plenum chamber located in the bottom of the lower forward fairing. If foam filter is dirty, it must be replaced; maximum foam filter life is 200 hours.

Note: A daily cleaning and inspection of the filter system is recommended when the helicopter is operated in an extremely dusty environment.

1. Release camlock fasteners securing induction air filter housing. Remove housing from chin fairing. Remove filter from housing.
2. Visually inspect filter element for dents, tears, or other physical damage.
3. Use soft cloth to remove foreign material from inside induction air filter housing cover assembly.
4. Visually inspect the plenum chamber, bypass door, and associated components.

CAUTION

If filter is not in proper position, unfiltered air may enter plenum chamber, causing damage to air induction system and engine. Use extreme care when installing filter.

5. Install filter in air filter housing. Insert housing in chin fairing and secure camlock fasteners.
6. Check that bypass door is closed and seals.
7. Check carb heat door operates and seals.

7-13. TAIL ROTOR PEDAL - ADJUSTMENT

Using various thickness shims, eliminate excessive play in pedals by shimming between top of pedal and retaining pin as required.

7-14. ACCESSORY POWER PLUG

A 28 volt, 10 amp 2-pin accessory power plug is installed below the left side of the instrument panel in later serial number aircraft. This plug is installed for use with test equipment (VIBREX, CHADWICK, ETC.). A 10 amp circuit breaker is installed forward of the accessory plug to protect the electrical system.

1. Install accessory equipment in cabin. Attach accessory equipment's 2-pin connector to accessory power plug with "hot" lead forward (reference placard on instrument panel console below plug).

CAUTION

Equipment attached to the accessory power plug must be secured to prevent interference with the flight controls.

2. Pull circuit breaker to remove power from accessory equipment.

7-15. GROUND HANDLING WHEELS

Two types of ground handling wheels are available for the helicopter.

Ground Handling Wheels Configured For Stowage on Right Side Landing Gear Stabilizer (Step).

These wheel assemblies are stowed on the right side of the helicopter in brackets located on the top side of the landing gear stabilizer (step). The shafts of the wheel assemblies are inserted into the inboard side of the brackets and secured in place with retaining pins. For ground handling, release the retaining pins and remove the wheel assemblies from the step. Have one person push down on the tailboom while another person lifts the toe of the skid. Insert the steel shaft of the wheel assembly in the bushing located in the skid tube and secure in place with the retaining pin. **Before Flight**, remove and stow the ground handling wheels in reverse order of installation. **Do Not Operate** the helicopter with the ground handling wheels installed in the skid tubes.

Over Center Ground Handling Wheels Configured For Stowage in Mounts on Skid Tubes.

These wheel assemblies are configured with mount brackets permanently attached to the skid tubes and provisions for stowage of the operating handle on the inboard side of the left hand landing gear stabilizer (step). The handle is secured in the stowage mount with a quick release pin. The single wheel assembly can remain attached to the skid tube mounts during flight or can be removed before flight. For ground handling, release the lynch pin retainer clip and remove the lynch pin from mount; rotate wheel aft to the ground. Remove the operating handle from the stowage mount and insert handle into hole in axle assembly. Rotate handle aft until lynch pin holes are aligned and insert lynch pin; secure pin with retainer clip. **Before Flight**, in reverse order of lowering the wheels, rotate wheel assemblies to the up position and secure in place with lynch pins. **Do Not Operate** the helicopter with the ground handling wheels rotated down into the ground handling position. Stow handle in mount and secure with quick release pin.

Remove the ground handling wheel assemblies from the helicopter by removing lynch pins from mounts and removing safety pins from inboard end of rotating axle. When removing the axle assemblies from the mounts, note the number and location of washers that are placed on the axle. Install the axle assembly in the mount in reverse order of removal. During installation, two or more spacing washers are placed on the axle between the wheel and the mount and one washer is placed on the inboard end of the axle between the mount and retaining pin.

CAUTION

When balancing/moving the helicopter by hand, do not push on stabilizers, tailboom support struts, tail rotor guard, or any other component or surface that may sustain damage from ground handling or pushing. If helicopter is moved in the aft direction (rearward) do not drag skid heels on the ground and avoid deep depressions in the ground surface. Damage to landing gear components may occur if heels catch on a rough surface or the wheels drop into a deep depression.

- Move helicopter on ground by manually balancing on ground handling wheels and pushing on tail rotor transmission housing and any other sturdy structural members of helicopter (i.e. cabin back structure, steel tube center frame, landing gear cross beams, etc.).

7-16. CABIN HEATER-Muff-Type Using Engine Cooling Air Source (269A4451-101/-103/-109 inst'l.)

With this installation, warm air is taken from the engine plenum and vented through the heater muff for additional heating. The heated air is then vented through the valve box and into the cabin. The cabin heat is regulated by a control lever that is mounted between the cabin seats. Through the connecting cable, this lever controls the air flow through the valve box. With the lever in OFF position, unwanted hot air is released to the atmosphere from the valve box.

To increase heater life and reduce rotorcraft empty weight, it is recommended that the muff-type cabin heater be removed and replaced with an approved exhaust system during warm weather operation. To remove the heater muff and leave provisions installed, refer to HMI Appendix A. When the muff-type heater is removed, the air duct between the control box and the heat distribution plenum must be removed and the opening in the plenum must be suitably capped.

7-17. HOURMETER INSTALLATIONS

One standard and two optional hourmeter installations are offered on the Model 269C-1 Helicopter.

1. In the standard hourmeter installations, the hourmeter is actuated by main transmission oil pressure. The hourmeter will run and record time whenever the main rotor transmission oil pressure is above the minimum value (main rotor turning, warning light out). When this installation is utilized, no multiplying factor is required when the recorded time is used to determine periodic inspection requirements overhaul intervals, and the service life of life limited components.

2. In the optional landing gear actuated hourmeter installation, the hourmeter is actuated by a "squat" switch attached to the landing gear. The hourmeter will run and record time whenever the aircraft is in flight (no weight on the landing gear). This installation records "flight time", or "time in service" as defined in

FAR Part 1.1, and NO multiplying factor is required when this recorded time is used to determine periodic inspection requirements, overhaul intervals, and the service life of life limited components.

3. In the optional collective actuated hourmeter installation, the hourmeter is actuated by a switch that senses the position of the collective control stick. The hourmeter will run and record time whenever the main rotor transmission oil pressure is above the minimum valve and the collective control is off the (down) stop. Calculated service lives are based on the percent occurrence of maneuvers provided in the FAA Approved flight spectrum. In this spectrum there is a percentage of flight time allocated for full down collective maneuvers (autorotations). In order to compensate for this unrecorded flight time when the collective actuated hourmeter is utilized, the time recorded on the hourmeter must be multiplied by 1.12 when used to determine periodic inspection requirements, overhaul intervals, and the service life of life-limited components (Model 269C-1 HMI, Appendix B).

7-18. DUAL CONTROLS REMOVAL AND INSTALLATION

The quick -disconnect co-pilot controls may be removed or installed by the pilot.

1. Removal of dual controls.

   - Collective Control: Locate and press release button of quick-disconnect pin and remove pin from collective control. Rotate collective stick to clear attachment lug from retention slot and remove from socket.

   - Cyclic Control: Rotate lock on wire bundle electrical connector and disconnect connector. Locate and press release button of quick-disconnect pin and remove pin from cyclic control; OR remove safety pin from inboard end of knob assembly; unscrew and remove knob assembly. Remove cyclic stick from socket.

- Tail Rotor Control Pedal: (If helicopter is equipped with a one-piece chin skin, remove side panel; if equipped with a three piece chin skin remove appropriate chin skin to gain access.) Under cabin floor, locate and press release buttons of quick-disconnect pins in left and right pedal sockets and remove pins. Remove left and right pedal from respective sockets and from rubber boots that are attached to cabin floor. Using plugs provided with the dual control kit, plug the rubber boots to prevent exhaust fumes from entering cabin.

- Calculate weight and balance in accordance with Section 6 and the aircraft equipment list.

2. Installation of dual controls.

- Collective Control: Gently rotate throttle control handle as the collective stick is inserted into the collective control socket. Fully seat control stick in socket and rotate attachment lug into retention slots. Install quick-disconnect pin. Rotate throttle control and observe pilots collective throttle control handle for corresponding action and observe that throttle arm reaches full open and full closed stops at the carburetor.

- Cyclic Control: Insert cyclic control stick into cyclic control socket. Align holes in cyclic stick with holes in socket and install quick-disconnect pin; OR install knob assembly and safety pin. Route cyclic control wire bundle in a manner that will not interfere with cyclic movement and attach wire connector. Rotate lock on connector to secure connection.

- Tail Rotor Control Pedal: Remove exhaust fume plugs from rubber boots. Insert left and right tail rotor controls into respective rubber boots and sockets. Align holes in pedal controls with holes in pedal sockets and install quick-disconnect pins in sockets. Adjust pedals as necessary to prevent restrictions in pedal movement. (Install fuselage side panel or appropriate chin skin, if applicable.)

- Calculate weight and balance in accordance with Section 6 and the aircraft equipment list.

7-19. CABIN DOORS REMOVAL AND INSTALLATION

Cabin doors may be removed or installed by pilot.

CAUTION

In windy conditions, canopy glass or door assembly may be damaged after the doorstop is disengaged if door is not held securely.

1. Removal of Cabin Doors.

   - Open door and disengage doorstop bracket hook from pin inside stop housing mounted on doorframe; OR if equipped with pneumatic door openers: Open door and remove wire clip from inboard end of pneumatic door opener. Using a soft mallet, disengage pneumatic door opener from socket ball.

   - Hold door open far enough to gain access to top and bottom hinge assemblies. Squeeze tabs together and rotate them out to engage slots in hinge. After pins have disengaged door hinge half, remove door. (Refer to VNE Placard for "doors off" operating limitations.)

   - Calculate weight and balance in accordance with Section 6 and the aircraft equipment list.

2. Installation of Cabin Doors:

   - Locate spring loaded hinge pin tabs in hinge assemblies attached to doorframe. Squeeze tabs together and rotate them out to engage slots in hinge. Hold door in open position and engage and align hinge assemblies. Rotate tabs out of slots to allow springs to seat pins in door hinge. Some movement of door may be required to correct alignment of hinges.

   - Engage doorstop bracket hook on pin inside stop housing mounted on doorframe; OR if equipped with pneumatic door openers: Using a soft mallet, engage inboard end of pneumatic door opener with socket ball; install wire clip.

   - Calculate weight and balance in accordance with Section 6 and the aircraft equipment list.

Section VIII

ADDITIONAL OPERATIONS AND PERFORMANCE DATA

INDEX

NO ADDITIONAL PERFORMANCE DATA
AVAILABLE AT DATE OF THIS PUBLICATION.

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Section IX

OPTIONAL EQUIPMENT SUPPLEMENTS

INDEX

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Section IX
OPTIONAL EQUIPMENT SUPPLEMENTS

9-1. GENERAL INFORMATION

- This section provides general information on optional equipment for the Model 269C-1 Helicopter.

- Also included is general information on content and usage of Optional Equipment Flight Manual Supplements. See Table 9-2.

9-2. ABBREVIATIONS

- Table 9-1 is a list of abbreviations found in Section IX

Table 9-1. Abbreviations

A/C	aircraft
AG	agriculture
ALT	altimeter
ASSY	assembly
AUX	auxiliary
COMB	combination
COMM	communications
CONT	controls
EXH	exhaust
INSTL	installation
M/R	main rotor
MT	mount
NAV	navigation
RES	resistant
STD	standard
T/R	tail rotor
UNIV	universal
WT	weight

9-2. OPTIONAL EQUIPMENT FLIGHT MANUAL SUPPLEMENTS

- A separate Optional Equipment Flight Manual Supplement is prepared and is issued whenever the installation of that equipment affects the FAA Approval Data for Limitations (Section II), Emergency and Malfunction Procedures (Section III), Normal Procedures (Section IV), and Performance Data (Section V).

- Use the Flight Manual Supplement data in conjunction with the basic Flight Manual data. It takes precedence over that data, when the equipment is installed.

CAUTION

Flight operation of the aircraft with optional equipment installed is prohibited if the applicable flight manual supplement is not onboard the aircraft and readily available to the pilot.

- Table 9-2 is a list of Flight Manual Supplements available to operators of the Model 269C-1 Helicopter.

Table 9-2. Flight Manual Supplements, Model 269C-1 Helicopter

CSP-C1-1A Instrument /Avionics Installation	Approved: 03 Oct 1995 Revised: 29 Mar 2001
CSP-C1-1B (S/N 0001 thru 0138) Engine Overspeed Installation PN 269A4997-1	Approved: 01 Dec 1995 Revised: 13 Mar 1997
CSP-C1-1C Cabin Heater Kit Installation PN 269A4451-1 or -3	Approved: 01 Dec 1995 Revised: 21 May 1997
CSP-C1-1D Garmin GPS 150 Navigation System Operating Procedures	OBSOLETE Approved: 17 Jan 1996
CSP-C1-1E Cargo Hook Installation Kit PN 269A4971-39	Approved: 20 Sep 1996
CSP-C1-1F (S/N 0001 thru 0138) Engine Winterization Kit PN 269A8627-1	Approved: 03 Mar 1997
CSP-C1-1G Left-Hand Pilot-In-Command (PIC) Helicopter Assembly	Approved: 23 Dec 1996 Revised: 01 Apr 2005
CSP-C1-1H Special Requirements for Aircraft Exported to China PN 269A0053	Approved: 04 Jun 2002
CSP-C1-1I Star System Startup RPM Limiter/ Automatic Engagement/Rotor Low RPM Warning Installation PN 269A9532	Approved: 04 Jun 2002 Revised: 24 Oct 2004
CSP-C1-1J Rotorcraft Amphibious Float Landing Gear PN 269A4300-15	Approved: 11 Aug 2004 Revised: 01 Apr 2005

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