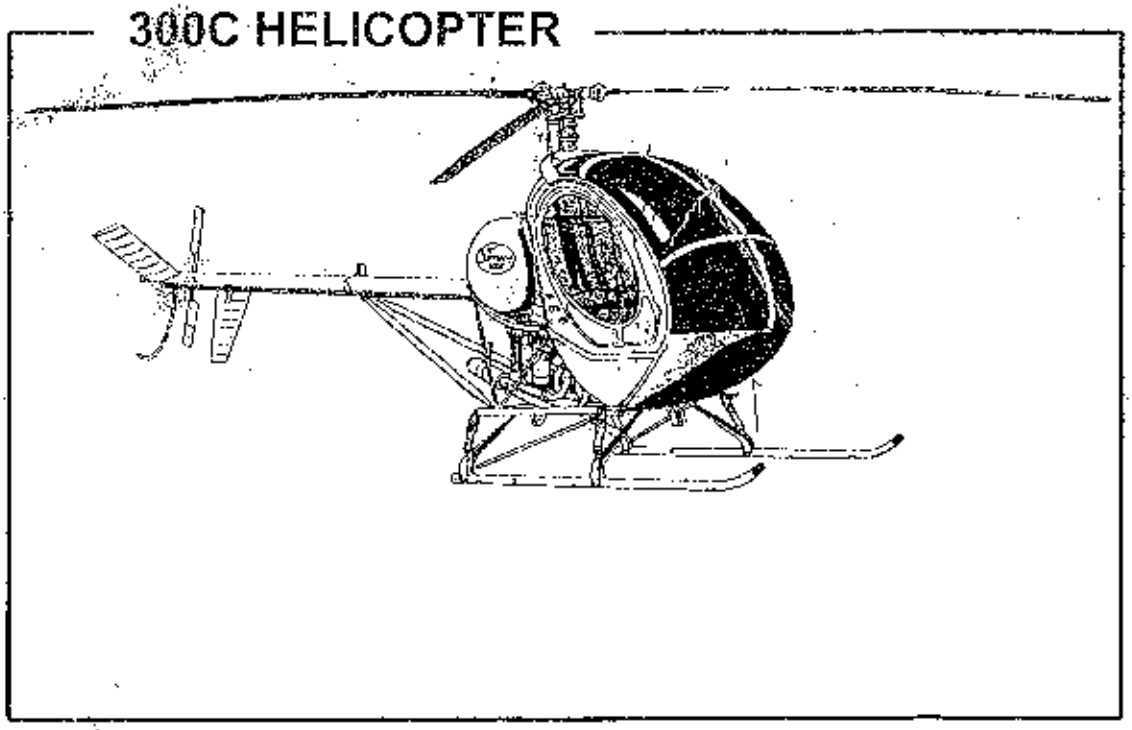
300C HELICOPTER



FAA APPROVED ROTORCRAFT FLIGHT MANUAL FOR MODEL 269C HELICOPTER

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Anthony Socias,
Manager, NYACO, ANE-170

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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 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 Limitations, 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 options and modification kits in part number sequence. Notation is made as to whether an FAA approved supplement is supplied. A table shows the compatibility of the various options with one another.

- 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 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 (▌).

HELICOPTER DESCRIPTION

- The 300C is a lightweight, versatile, small helicopter that allows economical, profitable operation. It is an all-purpose helicopter powered by a reciprocating engine.

- Advanced technology has been used in the design and construction of the helicopter, resulting in excellent handling capabilities, high payload to empty-weight ratio, passenger and crew safety, and performance capabilities of the higher order even when operating during adverse density altitude conditions. Low maintenance requirements are another bonus feature.

- The 300C was designed to allow rapid configuration changes. The helicopter may be converted from a personnel transport to a utility cargo or agricultural capability. Typical uses include the following:

- Pilot training (pilot and student only during training)

- Personnel transport (three persons)

- Aerial survey, patrol and photographic missions

- Air-sea rescue - amphibious capability

- Agricultural capabilities

- Forestry; police surveillance, patrol, and apprehension; interfacility transportation of personnel.

- Normal operations are limited to day and night visual flight conditions.

HELICOPTER CERTIFICATION

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

- The FAA model designation is Model 269C.

- The flight plan designator is H269.

- The commercial designation is Schweizer 300C.

- 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 300C 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 HIO-360-D1A reciprocating engine. 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 with out 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 three side-by-side seats, with the pilot's position on the left 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 are provided for the pilot and passenger positions, and additionally, a shoulder harness is provided for the center passenger. On later helicopters shoulder harnesses are provided for pilot and right hand position also.

- 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. Later configuration instrument consoles have a stowage compartment (glove box) which can accommodate up to 20 lbs. additional baggage.

- Control System. The pilot's position is on the far left 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 crew 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 HIO-360-D1A four-cylinder, horizontally opposed, air-cooled engine, with fuel injection. The engine is rated at 190 hp at 3200 rpm for both takeoff and maximum continuous operation at altitudes from sea level to 4200 feet (1280 m) 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 capacity of 30 or 33 U.S. gallons (113 or 114 liters) depending on aircraft S/N, and is located externally on the right-hand seat structure; an auxiliary tank may be installed aft of the left-hand seat structure. The auxiliary fuel tank with a capacity of 19 U.S. gallons (72 liters) may be attached to the left side of the bulkhead. The tanks (main and auxiliary) may be serviced from either filler neck by gravity. See Supplement CSP-C-1R for the 65 gallon auxilliary fuel system or CSP-C-1U for the 66 gallon auxilliary fuel system.

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)	2.53 ft^2	0.235 m^2

- Airfoil Data

	English	Metric
Main Rotor		
Diameter	26.83 feet	8.178 m
Blade chord	6.75 inches(constant)	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	
Antitorque (Tail) Rotor		
Diameter	4.25 feet	1.295 m
Blade chord	4.81 inches(constant)	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 C_L tailboom	2.50 feet	0.762 m
Chord	12.7 inches(constant)	322 mm
Airfoil	NACA 0015, modified	
Dihedral	35°	
Incidence	9.8°	
Vertical Stabilizer		
Span (to tailboom)	2.17 feet	0.661 m
Root chord	17.6 inches	447 mm
Tip chord	8.5 inches	216 mm
Airfoil	NACA 0015	

	English	Metric
• Dimensions		
• Length		
Maximum, rotor blades turning	30.83 feet	9.397 m
Maximum, main rotor blades at rest, one trailing	24 feet	7.315 m
Front of landing skids to back of tail skid (length without rotors)	22.19 feet	6.763 m
• Width		
Main rotor blades turning	26.83 feet	8.178 m
Cabin width	4.25 feet	1.295 m
Skid gear tread, compressed	6.54 feet	1.993 m
Main rotor blades at rest, one trailing	12.6 feet	4.15 m
• Height		
Height, top of rotor hub (gear compressed)	8.72 feet	2.658 m
Main rotor clearance, minimum (ground to tip, rotor static)	7 feet	2.13 m
Tail rotor clearance (ground to tip)	2.63 feet	0.802 m
• Miscellaneous		
Distance between main rotor and tail rotor (centerline to centerline)	15.29 feet	4.660 m

	English	Metric
• Rotor Blade Pitch Displacements		
• 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°	
• 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 inches	254 mm
Throttle angle, twist grip (full closed to full open)	130°	
Cyclic control stick (full forward to full aft)	15 inches	381 mm
Cyclic control stick (full left to full right)	16 inches	406 mm
Directional control pedals (full forward to full aft)	8 inches	203 mm

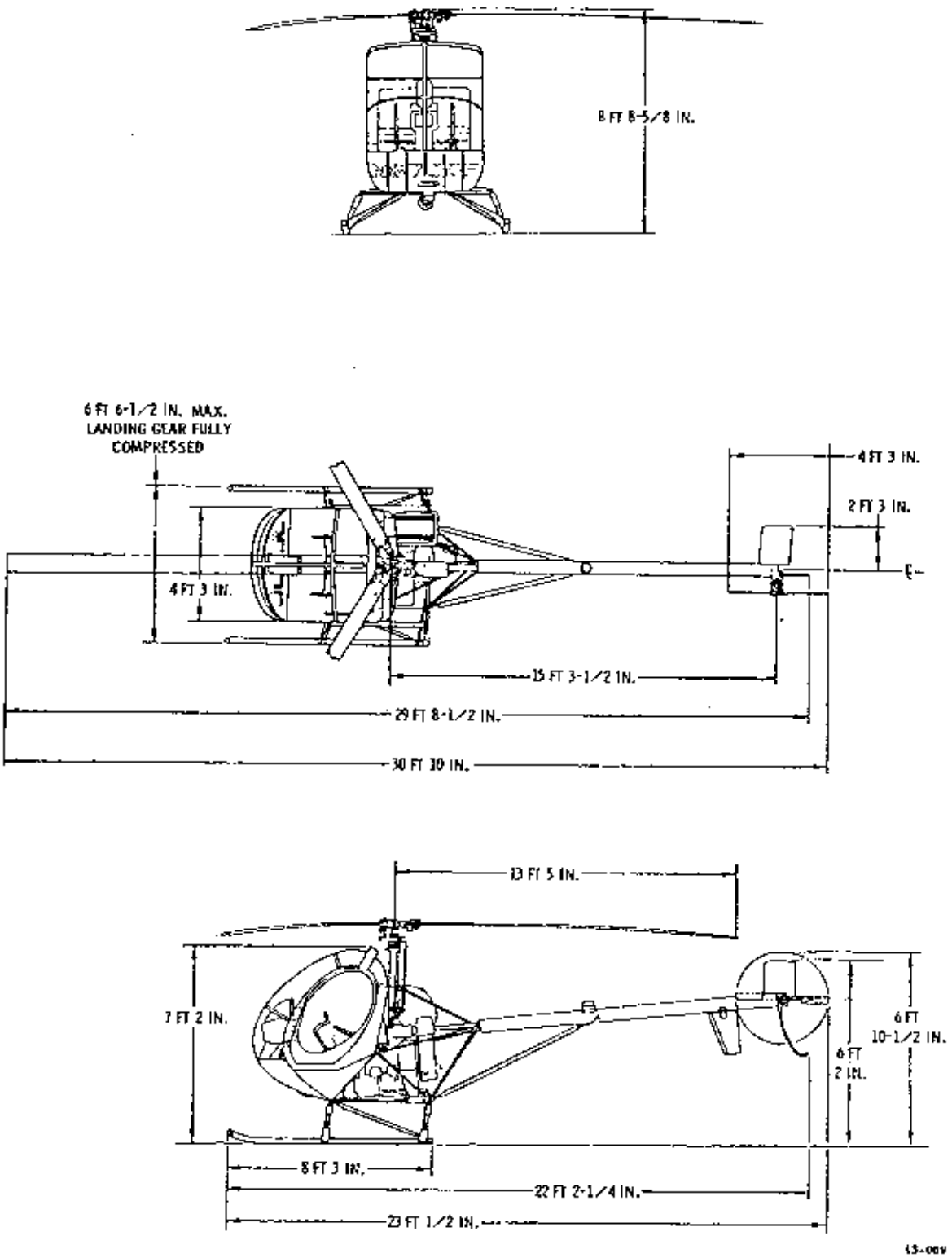

Figure 1-1. 269C Helicopter - Principal Dimensions

Table 1-1. Performance at 1900-pound (862-kg) and 2050-pound (930-kg) Gross Weight

Item	1900 Pounds		2050 Pounds	
	English	Metric	English	Metric
Maximum cruise speed, *SL, True Airspeed	84 knots (97 mph)	158 KmH	79 knots (91 mph)	146 KmH
Maximum cruise speed, 4000 ft, True Airspeed	86 knots (99 mph)	159 KmH	82 knots (94 mph)	151 KmH
Economic cruise speed, SL, True Airspeed	66 knots (76 mph)	122 KmH	65 knots (75 mph)	121 KmH
Economic cruise speed, 4000 ft, True Airspeed	70 knots (80 mph)	129 KmH	67 knots (77 mph)	124 KmH
Hover ceiling, IGE, 2-ft (0.6 m) skid height, maximum power				
Standard temperature (ISA)	7,900 ft	2,408 m	5,900 ft	1,798 m
ISA plus 20°C	6,100 ft	1,859 m	4,000 ft	1,219 m
Rate of climb, standard atmosphere, maximum power				
Sea level	990 fpm	5.03 m/sec	750 fpm	3.8 m/sec
4000 ft	990 fpm	5.03 m/sec	750 fpm	3.8 m/sec
Service ceiling	12,000 ft	3,658 m	10,200 ft	3,108 m
Range, no reserves, standard atmosphere, economic cruise speeds				
Sea level	233 mi	375 km	224 mi	360 km
4000 ft	243 mi	391 km	232 mi	373 km
Endurance, no reserves, standard atmosphere				
Sea level at 50 mph	3.6 hr	3.6 hr	3.4 hr	3.4 hr
4000 ft at 60 mph	3.5 hr	3.5 hr	3.4 hr	3.4 hr

*Maximum speed, VNE, sea level, for all weights is 91 kts CAS- 95 kts IND

NOTE: The above estimated performance is based on Lycoming Specification 2380-B for Model HIO-360-D1A engine and applies under the following conditions: standard atmosphere unless noted, clean flight configuration and engine operation at 3200 rpm.

Table 1-2. Performance at 1700-pound (771-kg) Gross Weight

Item	Units	
	English	Metric
Maximum cruise speed, *SL, True Airspeed	86 knots (99 mph)	159 KmH
Maximum cruise speed, 4000 ft, True Airspeed	89 knots (102 mph)	164 KmH
Economic cruise speed, SL, True Airspeed	68 knots (78 mph)	126 KmH
Economic cruise speed, 4000 ft, True Airspeed	71 knots (82 mph)	132 KmH
Hover ceiling, IGE, 2-ft, (0.6 m) skid height, maximum power		
Standard temperature (ISA)	10,800 ft	3,292 m
ISA plus 20°C	9,000 ft	2,743 m
Rate of climb, standard atmosphere, maximum power		
Sea level	1,305 fpm	6.63 m/sec
4000 ft	1,305 fpm	6.63 m/sec
Service ceiling	14,800 ft	4,452 m
Range, no reserves, standard atmosphere, economic cruise speeds		
Sea level	246 mi	396 km
4000 ft	258 mi	415 km
Endurance, no reserves, standard atmosphere		
Sea level at 45 mph	3.8 hr	3.8 hr
4000 ft at 50 mph	3.8 hr	3.8 hr

*Maximum speed, VNE, sea level, for all weights is 91 kts CAS-95 kts IND

NOTE: The above estimated performance is based on Lycoming Specification 2380-B for Model HIO-360-D1A engine and applies under the following conditions: standard atmosphere unless noted, clean flight configuration, and engine operation at 3200 rpm.

CONVERSION TABLES - KT/MPH/KmH

Speeds shown are straight mathematical conversions of International Knots (KT) to U.S. Miles per Hour (MPH) to Kilometers Per Hour (KmH) rounded to the nearest whole number.

Table 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	3	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 2. Temperature - F/C

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

°C	Temp. in °C or °F to be converted	°F	°C	Temp. in °C or °F to be converted	°F
-62.2	-80	-112.0	10.0	50	122.0
-56.7	-70	-94.0	12.8	55	131.0
-51.1	-60	-76.0	15.6	60	140.0
-45.6	-50	-58.0	18.3	65	149.9
-40.0	-40	-40.0	21.1	70	158.0
-34.4	-30	-22.0	23.9	75	167.0
-31.7	-25	-13.0	26.7	80	176.0
-28.9	-20	-4.0	29.4	85	185.0
-26.1	-15	5.0	32.2	90	194.0
-23.3	-10	14.0	35.0	95	203.0
-20.6	-5	23.0	37	100†	212.0†
-17.8	0*	32.0*	40.6	105	221.0
-15.0	5	41.0	43.3	110	230.0
-12.2	10	50.0	46.1	115	239.0
-9.4	**15**	**59.0**	48.9	120	248.0
-6.7	20	68.0	51.7	125	257.0
-3.9	25	77.0	54.4	130	266.0
-1.1	30	86.0	57.2	135	275.0
1.1	35	95.0	60.0	140	284.0
4.4	40	104.0	62.8	145	293.0
7. 2	45	113.0	65.6	150	302.0

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 2. Temperature - F/C (con't.)

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

°C	Temp. in °C or °F to be converted	°F	°C	Temp. in °C or °F to be converted	°F
68.3	155	311.0	137.8	280	536.0
71.1	160	320.0	143.3	290	554.0
73.9	165	329.0	148.9	300	572.0
76.7	170	338.0	154.4	310	590.0
79.4	175	347.0	160.0	320	608.0
82.2	180	356.0	165.6	330	626.0
85.0	185	365.0	171.1	340	644.0
87.8	190	374.0	176.7	350	662.0
90.6	195	383.0	182.2	360	680.0
93.3	200	392.0	187.8	370	698.0
96.1	205	401.0	193.3	380	716.0
98.9	210	410.0	198.9	390	734.0
101.7	215	419.0	204.4	400	752.0
104.4	220	428.0	210.0	410	770.0
107.2	225	437.0	215.6	420	788.0
110.0	230	446.0	221.1	430	806.0
112.8	235	455.0	226.7	440	824.0
115.6	240	464.0	232.2	450	842.0
118.3	245	473.0	237.8	460	860.0
121.1	250	482.0	243.3	470	878.0
126.7	260	500.0	248.9	480	896.0
132.2	270	518.0	254.4	490	914.0

Table 2. Temperature - F/C (con't.)

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

°C	Temp. in °C or °F to be converted	°F	°C	Temp. in °C or °F to be converted	°F
260.0	500	932.0	426.7	800	1472.0
265.6	510	950.0	437.8	820	1508.0
271.1	520	968.0	474.4	850	1562.0
276.7	530	986.0	482.2	900	1652.0
282.2	540	1004.0	510.0	950	1742.0
287.8	550	1022.0	537.7	1000	1832.0
293.3	560	1040.0	565.5	1050	1922.0
298.9	570	1058.0	593.3	1100	2012.0
204.4	580	1076.0	621.1	1150	2102.0
310.0	590	1094.0	648.8	1200	2192.0
315.6	600	1112.0	676.6	1250	2282.0
326.7	620	1148.0	704.4	1300	2372.0
337.8	640	1184.0	732.2	1350	2462.0
348.9	660	1220.0	760.0	1400	2552.0
360.0	680	1256.0	787.7	1450	2642.0
371.1	700	1292.0	815.5	1500	2732.0
382.2	720	1328.0	843.3	1550	2822.0
393.3	740	1364.0	871.1	1600	2912.0
404.4	760	1400.0	898.8	1650	3002.0
415.6	780	1436.0	926.6	1700	3092.0

Table 3. Liquid Measure - Gal/L

U.S. Gallons into Liters

Gals. →	0	1	2	3	4	5	6	7	8	9
↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓	Liters ↓
0		3.785	7.571	11.356	15.142	18.927	22.713	26.498	30.283	34.069
10	37.854	41.640	45.425	49.211	52.996	56.781	60.567	64.352	68.138	71.923
20	75.709	79.494	83.280	87.065	90.850	94.636	98.421	102.21	105.99	109.78
30	113.56	117.35	121.13	124.92	128.70	132.49	136.28	140.06	143.85	147.63
40	151.42	155.20	158.99	162.77	166.56	**170.34**	174.13	177.92	181.70	185.49
50	189.27	193.06	196.84	200.63	204.41	208.20	211.98	215.77	219.56	223.34
60	227.13	230.91	234.70	238.48	242.27	246.05	249.84	253.62	257.41	261.19
70	264.98	268.77	272.55	276.34	280.12	283.91	287.69	291.48	295.26	299.05
80	302.83	306.62	310.41	314.19	317.98	321.76	325.55	329.33	333.12	336.90
90	340.69	344.47	348.26	352.05	355.83	359.62	363.40	367.19	370.97	374.76
100	378.54	382.33	386.11	389.90	393.69	397.47	401.26	405.04	408.83	412.61

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 4. Linear Measure - In/cm

Inches into Centimeters

Inches →	0	1	2	3	4	5	6	7	8	9
↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓	Cm. ↓
0		2.54	5.08	7.62	10.16	12.70	15.24	17.78	20.32	22.86
10	25.40	27.94	30.48	33.02	35.56	38.10	40.64	43.18	45.72	48.26
20	50.80	53.34	55.88	58.42	60.96	63.50	66.04	68.58	71.12	73.66
30	76.20	78.74	81.28	83.82	86.36	88.90	91.44	93.98	96.52	99.06
40	101.60	104.14	106.68	109.22	111.76	**114.30**	116.84	119.38	121.92	124.46
50	127.00	129.54	132.08	134.62	137.16	139.70	142.24	144.78	147.32	149.86
60	152.40	154.94	157.48	160.02	162.56	165.10	167.64	170.18	172.72	175.26
70	177.80	180.34	182.88	185.42	187.96	190.50	193.04	195.58	198.12	200.66
80	203.20	205.74	208.28	210.82	213.36	215.90	218.44	220.98	223.52	226.06
90	228.60	231.14	233.68	236.22	238.76	241.30	243.84	246.38	248.92	251.46
100	254.00	256.54	259.08	261.62	264.16	266.70	269.24	271.78	274.32	276.86

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 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		0.305	0.610	0.914	1.219	1.524	1.829	2.134	2.438	2.743
10	3.048	3.353	3.658	3.962	4.267	4.572	4.877	5.182	5.466	5.791
20	6.096	6.401	6.706	7.010	7.315	7.620	7.925	8.229	8.534	8.839
30	9.144	9.449	9.753	10.058	10.363	10.668	10.972	11.277	11.582	11.887
40	12.192	12.496	12.801	13.106	13.411	13.716	14.020	14.325	14.630	14.935
50	15.239	15.544	15.849	16.154	16.459	16.763	17.068	17.373	17.678	17.983
60	18.287	18.592	18.897	19.202	19.507	19.811	20.116	20.421	20.726	21.031
70	21.335	21.640	21.945	22.250	22.555	22.859	23.164	23.469	23.774	24.070
80	24.383	24.688	24.993	25.298	25.602	25.907	26.212	26.517	26.822	27.126
90	27.431	27.736	28.041	28.346	28.651	28.955	29.260	29.565	29.870	30.174
100	30.479	30.784	31.089	31.394	31.698	32.003	32.308	32.613	32.918	33.222

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 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		0.454	0.907	1.361	1.814	2.268	2.722	3.175	3.629	4.082
10	4.536	4.990	5.443	5.897	6.350	6.804	7.257	7.711	8.165	8.618
20	9.072	9.525	9.979	10.433	10.886	11.340	11.793	12.247	12.701	13.154
30	13.608	14.061	14.515	14.969	15.422	15.876	16.329	16.783	17.237	17.690
40	18.144	18.597	19.051	19.504	19.958	20.412	20.865	21.319	21.772	22.226
50	22.680	23.133	23.587	24.040	24.494	24.948	25.401	25.855	26.308	26.762
60	27.216	27.669	28.123	28.576	29.030	29.484	29.937	30.391	30.844	31.298
70	31.751	32.205	32.659	33.112	33.566	34.019	34.473	34.927	35.380	35.834
80	36.287	36.741	37.195	37.648	38.102	38.555	39.009	39.463	39.916	40.370
90	40.823	41.277	41.730	42.184	42.638	43.091	43.545	43.998	44.453	44.906
100	45.359	45.813	46.266	46.720	47.174	47.627	48.081	48.534	48.988	49.442

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.)

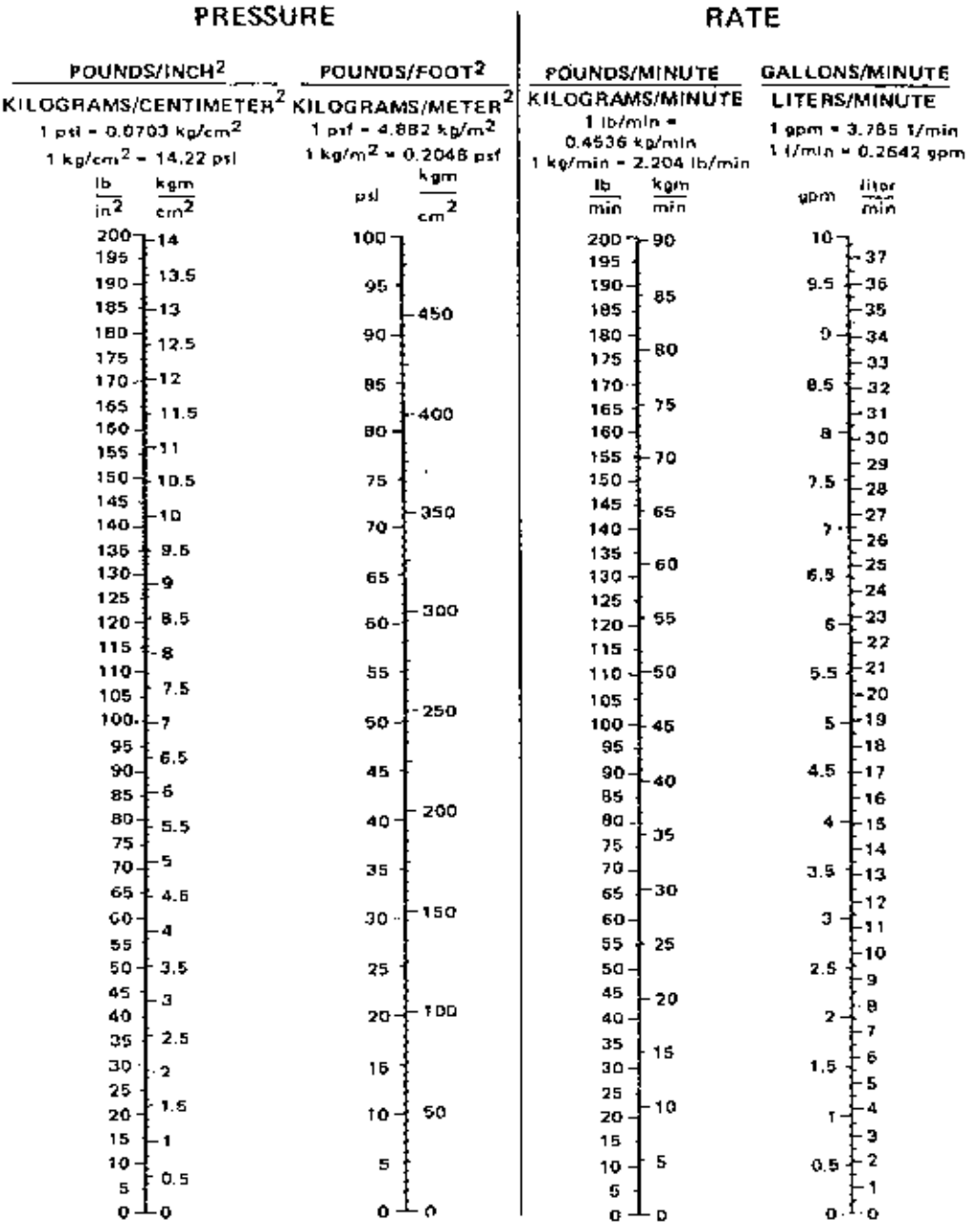

Figure 1-2. Pressure and Rate

Section II

LIMITATIONS

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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 under Instrument Flight Rules (IFR) is prohibited.
- Night flight is prohibited if the following equipment has not been installed; landing, navigation, instrument, and anticollision lights.
- Limit night flight operations 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 for the 300C Model 269C is one pilot.
- Solo flights are permitted from the left seat only.
- Shoulder harness and seat belt is required for center seat passenger.
- The maximum operating altitudes are listed below:
  - Gross Weight = 1700 pounds or less - 14,600 feet density altitude
  - Gross Weight = More than 1700 pounds - 12,000 feet density altitude
- Doors off operation:
  - Maximum V_{NE} is 89 knots (102 mph) IAS.
  - If passenger seats are not occupied, fasten the center seat back and remove right seat cushions (or lash in place).

- Turn on fuel boost pump during take-off, landings, and when under 450 feet AGL.
- Heater operation (Stewart-Warner):
- - Heater operation limited to five minutes on ground with engine running

2-3. FLIGHT LIMITATIONS PLACARDS

- This helicopter must be operated in compliance with the operating limitations specified in the approved Rotorcraft Flight Manual.
- V_{NE} placard (Either MPH or KNOTS V_{NE} placard may be installed)

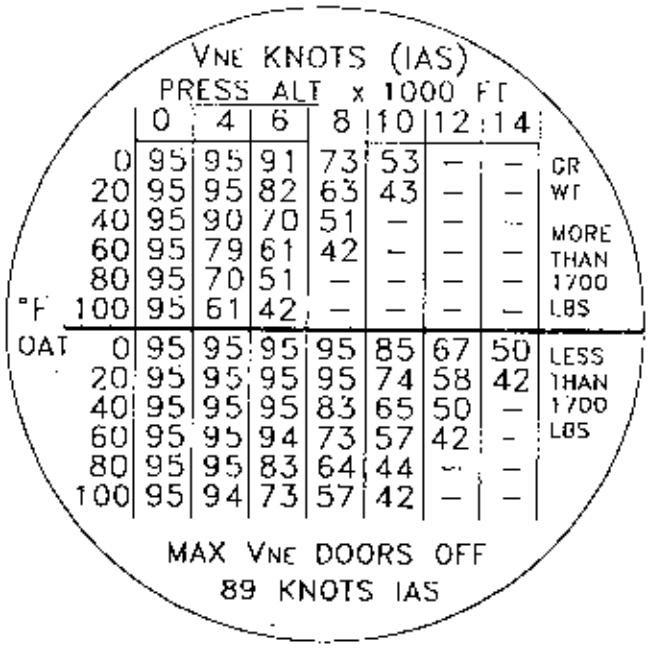
PRESS ALT / 1000 FT	VNE – MPH IAS							GR
°F OAT	0	4	6	8	10	12	14	WT
0	109	109	105	84	61	–	–	
20	109	109	94	72	49	–	–	MORE
40	109	103	81	59	–	–	–	THAN
60	109	91	70	48	–	–	–	1700
80	109	80	59	–	–	–	–	LBS
100	109	70	48	–	–	–	–	
0	109	109	109	109	98	77	58	
20	109	109	109	109	85	67	48	1700
40	109	109	109	96	75	57	–	LBS
60	109	109	108	84	66	48	–	OR
80	109	109	95	74	51	–	–	LESS
100	109	108	84	66	48	–	–	
MAX VNE DOORS OFF 102 MPH IAS								

V_{NE} KNOTS (IAS) MAX V_{NE} DOORS OFF 89 KNOTS IAS								
	PRESS. ALT. X 1000 FT.							GROSS WEIGHT
OAT °F	0	4	6	8	10	12	14	
0	95	95	91	73	53	–	–	MORE THAN 1700 LBS
20	95	95	82	63	43	–	–	
40	95	90	70	51	–	–	–	
60	95	79	61	42	–	–	–	
80	95	70	51	–	–	–	–	
100	95	61	42	–	–	–	–	
0	95	95	95	95	85	67	50	1700 LBS OR LESS
20	95	95	95	95	74	58	42	
40	95	95	95	83	65	50	–	
60	95	95	94	73	57	42	–	
80	95	95	83	64	44	–	–	
100	95	94	73	57	42	–	–	

- Manifold pressure limit placard

	O.A.T. °F / ALT.	0	20	40	60	80	100
LIMIT M.P.	S.L.	24.1	24.7	25.4	26.0	26.6	27.2
	2000	23.7	24.3	25.0	25.6	26.2	F.T.
	3000	23.5	24.1	24.8	25.4	F.T.	F.T.
	4000	23.3	24.0	24.6	F.T.	F.T.	F.T.

- V_{NE} placard (Optional on S/N 1750 & Subs.)



- Manifold pressure limit placard (S/N 1750 & Subs.)

ALT	0	20	40	60	80	100	OAT °F
S.L.	24.1	24.7	25.4	26.0	26.6	27.2	LIMIT M.P.
2000	23.7	24.3	25.0	25.6	26.2	F.T.	
3000	23.5	24.1	24,8	25.4	F.T.	F.T.	
4000	23.3	24.0	24.6	F.T.	F.T.	F.T.	

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- The following placards are required on all helicopters

600 pounds maximum gross in cabin; see Rotorcraft Flight Manual for Weight and Balance Procedure

No storage between seats with center collective installed

- The following placard is required on helicopter with exhaust muff cabin heater.

Avoid prolonged sideward flight

- The following placard is required on helicopter with Stewart-Warner cabin heater.

For heater operation on ground with engine not running, mixture control must be in IDLE CUTOFF

- The following placards are required on helicopter with searchlight.

Remove R.H. cyclic stick when operating searchlight

Stow and lock light handle in forward position with R.H. cyclic stick installed

- The following placard also required on helicopter with the extendable searchlight.

Retract light for landing

2-3. FLIGHT LIMITATIONS PLACARDS (Cont)

- 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 Section IX for Options Supplemental Flight Data.

2-5. AIRSPEED LIMITATIONS

- At sea level, never exceed a speed (V_{NE}) of 95 knots (109 mph) IAS (Doors OFF, 89 knots (102 mph) IAS).

- Above sea level, reduce (V_{NE}) 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).

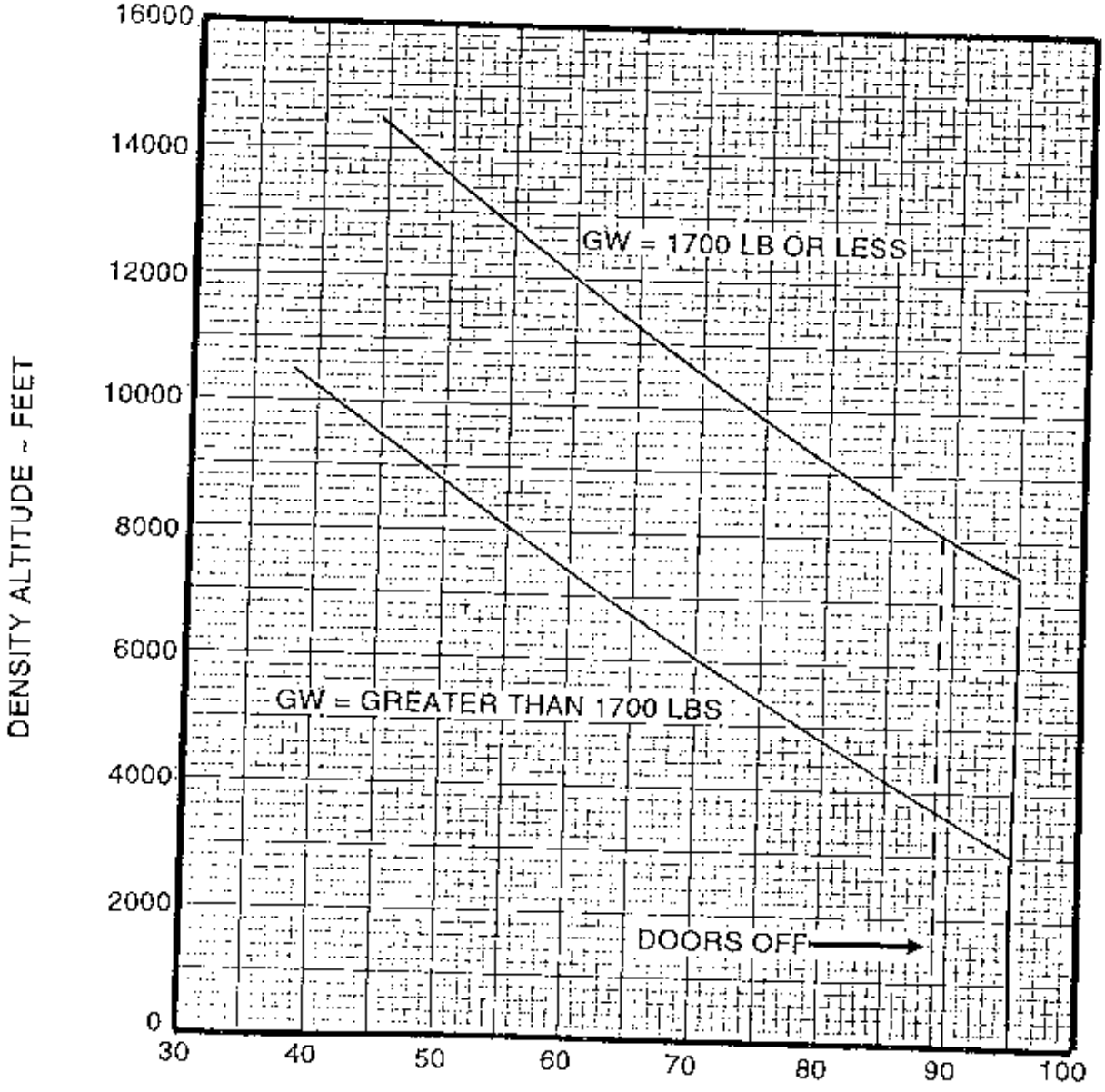


Figure 2-1. Variation of V_{NE} with Altitude

2-7. WEIGHT AND CG LIMITATIONS

- Maximum Gross Weight

  Late helicopters (Serial No. 210 and subs.) 2050 pounds
  Early helicopters (Serial No. 004 through 209) 1900 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

At Station 95	+3.0 to -1.0
At Station 99.5	+4.0 to -2.12
At Station 101	+2.0 to -2.5

- Linear variations between corners: plus (" + ") is right of centerline, minus ("-") is left of centerline of helicopter when viewing forward (see Figure 2-2).

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

2-8. CENTER OF GRAVITY (CG ENVELOPE)

- The permissible range of longitudinal and lateral center-of-gravity travel is illustrated in Figure 2-2.

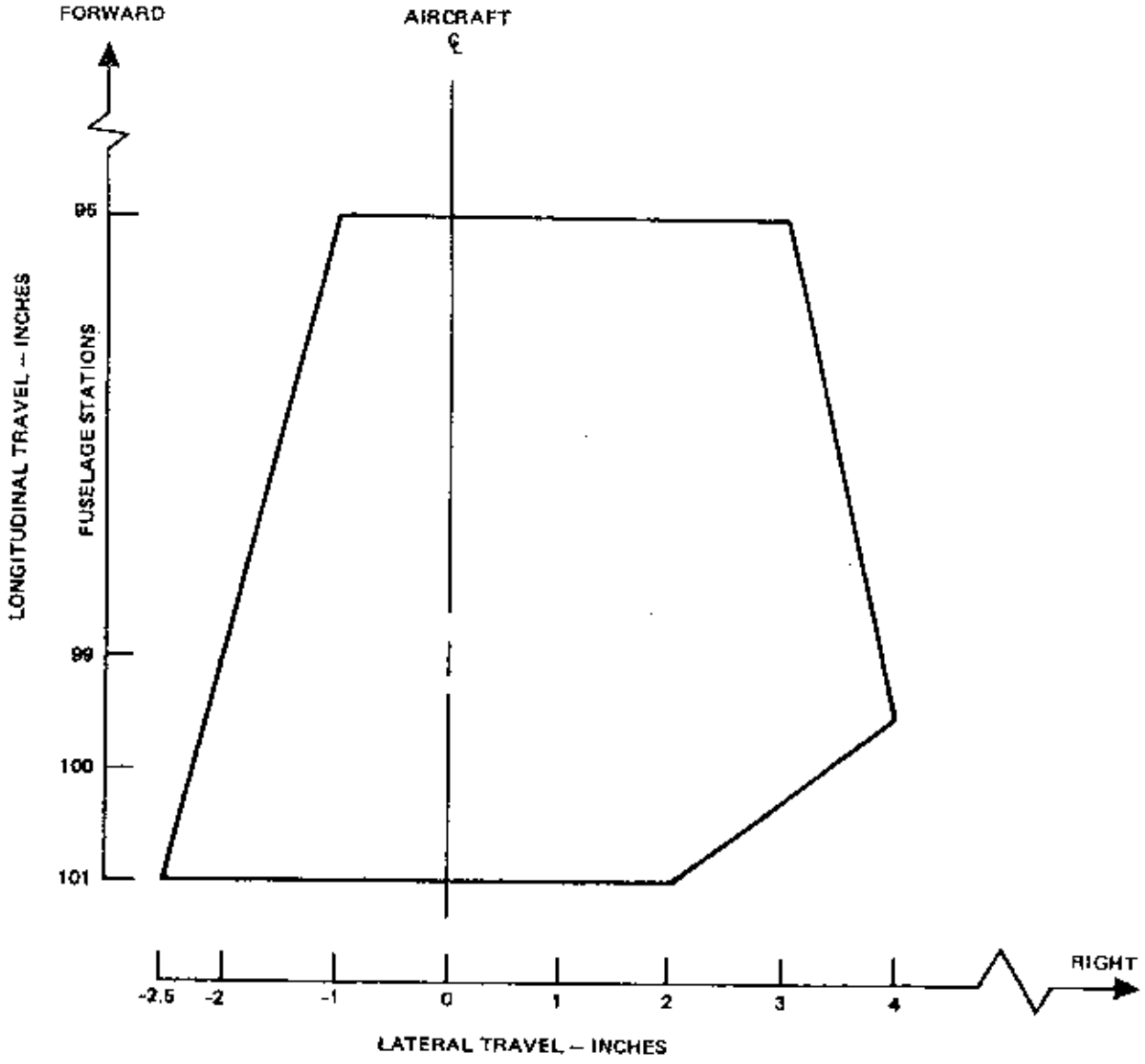


Figure 2-2. Center-of-Gravity Envelope

2-9. POWER PLANT LIMITATIONS (LYCOMING HIO-360-D1A)

- Maximum continuous power is 190 horsepower at 3200 revolutions per minute with 26.0 inches of manifold pressure (MP) at sea level. This varies linearly to 24.7 inches MP at 4200 feet altitude for standard day. Refer to manifold pressure placard.
- The minimum rpm is 3000.
- 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.
- Lubricating oil recommendations (see Table 2-1).

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°F to 90°F
30	20W40	0°F to 70°F
20	20W30	Below 10°F

- Powerplant

Type	Lycoming Horizontally Opposed
Designation	HIO-360-D1A
Cylinders	4
Horsepower	190 hp at 3200 rpm

2-10. FUEL SYSTEM

- Fuel Capacity, see Table 2-2.

Table 2-2. Fuel Capacity

Tank	*Quantity*	*Usable Quantity*
Main	30 U.S. gallons	29.8 U.S. gallons
Aux	19 U.S. gallons	18.8 U.S. gallons
Total	49 U.S. gallons	48.6 U.S. gallons
	OR	
Main	33 U.S. gallons	32.5 U.S. gallons

See supplements CSP-C-1R or CSP-C-1U for auxilliary quantities

2-11. AUXILIARY FUEL TANK CALIBRATION

- Auxiliary Fuel Quantity, see Table 2-3.

Table 2-3. Auxiliary Fuel Quantity

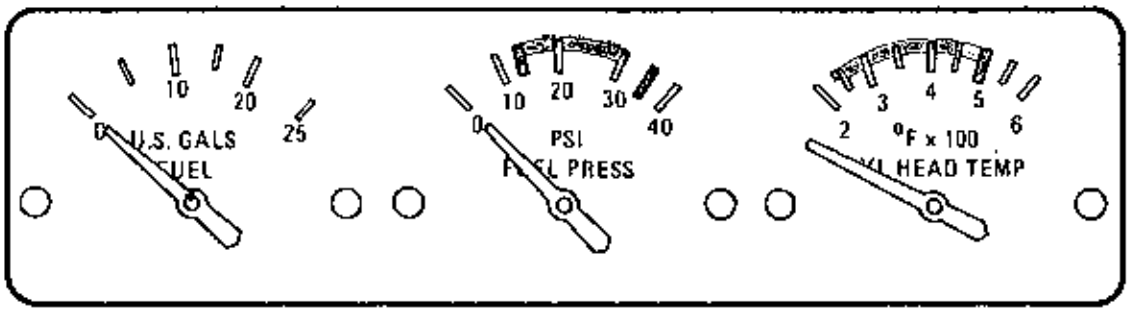
Gage	0	5	10	15	20	25	30
Total	0	10	18	27	34	42	49

2-12. INSTRUMENT MARKINGS

RED	YELLOW	GREEN
RED INDICATES MAXIMUM AND MINIMUM OPERATING LIMITS; THE EDGE OF A RED LINE IS THE LIMITING VALUE; THE POINTER SHOULD NOT ENTER THE RED DURING NORMAL OPERATIONS.	YELLOW INDICATES CAUTIONARY OPERATING RANGE.	GREEN INDICATES NORMAL OPERATING RANGE.

NOTE

The instruments shown on this page are no longer in production.



U.S. GALS FUEL

PSI FUEL PRESSURE

°F x 100

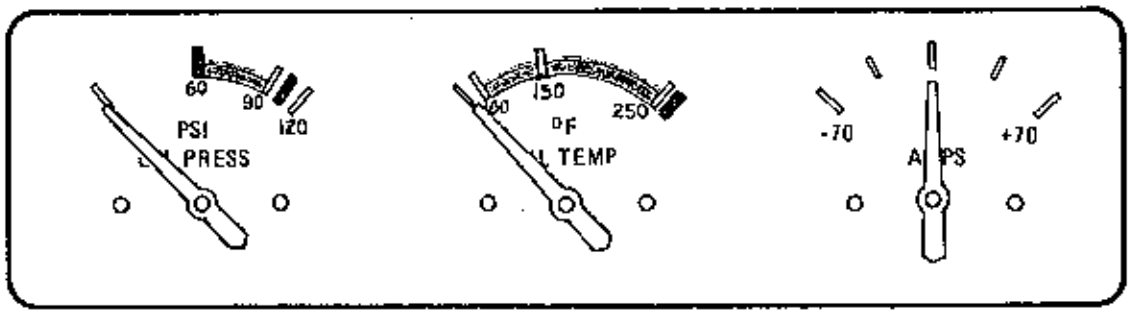
14 AND 35 PSIG RED RADIAL

14 TO 30 PSIG GREEN ARC

500°F RED RADIAL

450° TO 500°F YELLOW ARC

230° TO 450°F GREEN ARC



PSI OIL PRESS

°F OIL TEMP

AMPS

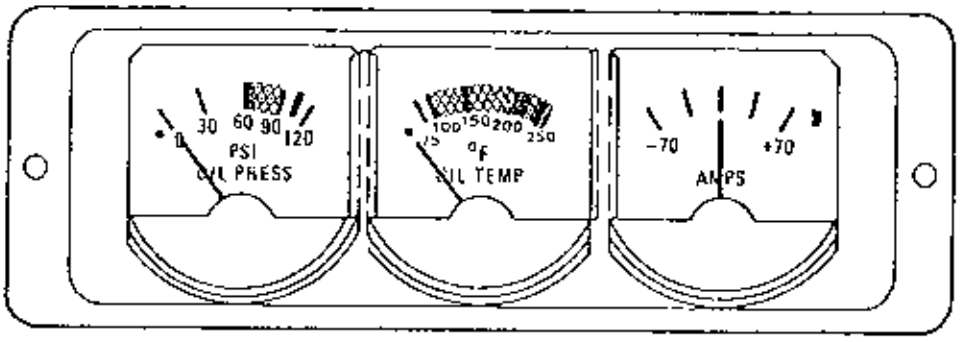
60 AND 100 PSIG RED RADIAL

60 TO 90 PSIG GREEN ARC

260°F RED RADIAL

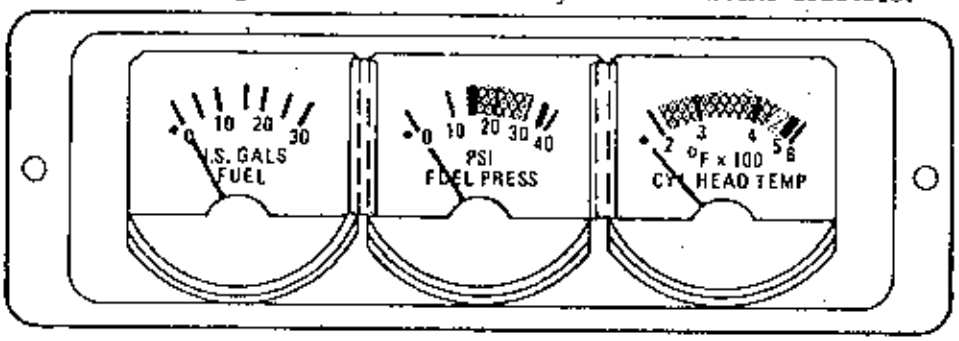
100° TO 250°F GREEN ARC

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



NOTE

The **ABOVE** instrument cluster is no longer in production. The **FOLLOWING TWO** instrument clusters represent the new instrument configuration. The color coding is the same. Early style instrument clusters may be replaced with current style instruments clusters.



FUEL (U.S. GALS)

*NEW FUEL QUANTITY CONFIGURATION HAS A USABLE CAPACITY OF 32.5 U.S. GALLONS

FUEL PRESS (PSI)

RED RADIAL
14 AND 35 PSIG

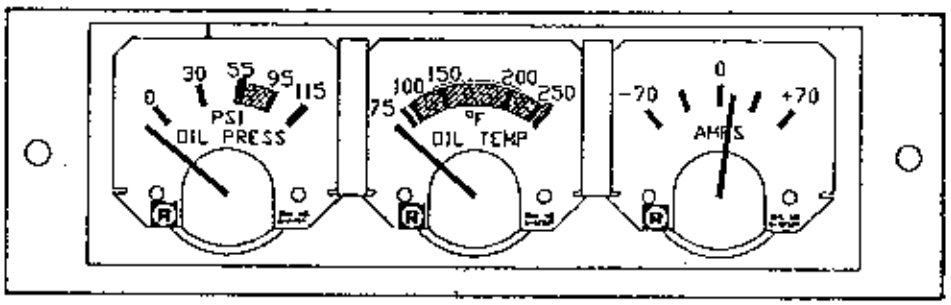
GREEN ARC
14 TO 30 PSIG

C.H.T. (°F X 100)

RED RADIAL
500°F

YELLOW ARC
450°F TO 500°F

GREEN ARC
230°F TO 450°F



OIL PRESS (PSI)

RED RADIAL
55 AND 115 PSIG

GREEN ARC
55 TO 95 PSIG

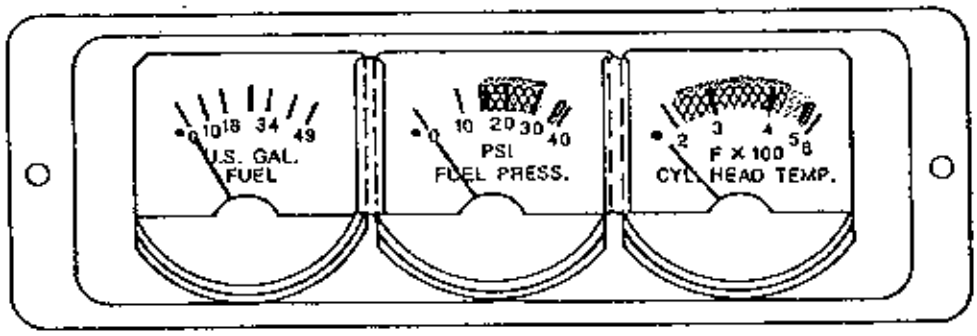
OIL TEMP (°F)

RED RADIAL
260°F

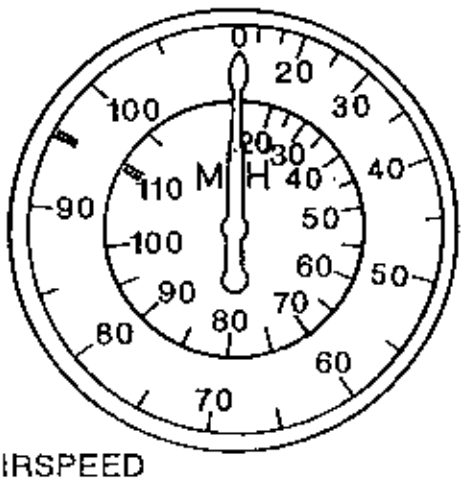
GREEN ARC
100°F TO 250°F

AMPS

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

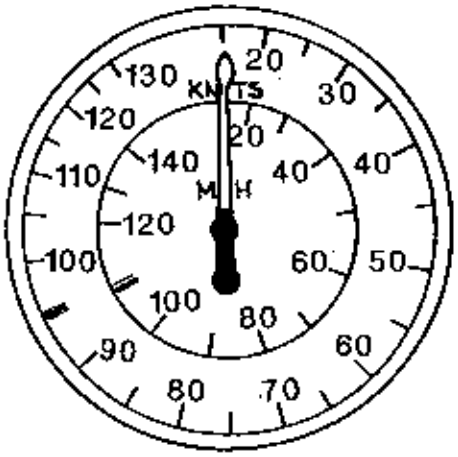


The above instrument cluster represents the "OPT" configuration available for aircraft equipped with an aux. fuel tank.



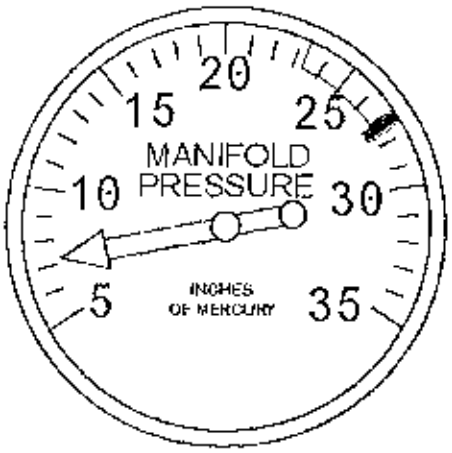
AIRSPEED

109 MPH/95 KTS



109 MPH/95 KTS

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

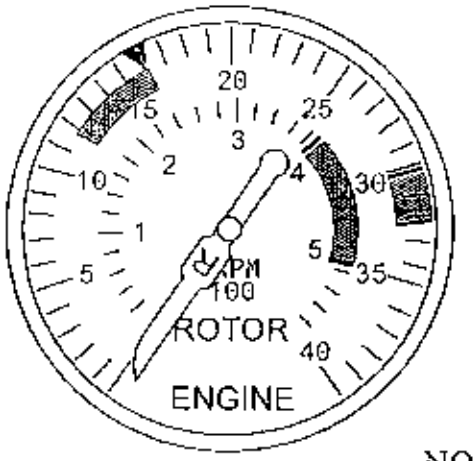


MANIFOLD PRESSURE

27.2 IN. Hg RED RADIAL

23.3 TO 27.2 IN. Hg YELLOW ARC

YELLOW INDICATES VARIABLE MP LIMIT 190 HORSEPOWER BASED ON AMBIENT TEMPERATURE



ENGINE/ROTOR TACHOMETER

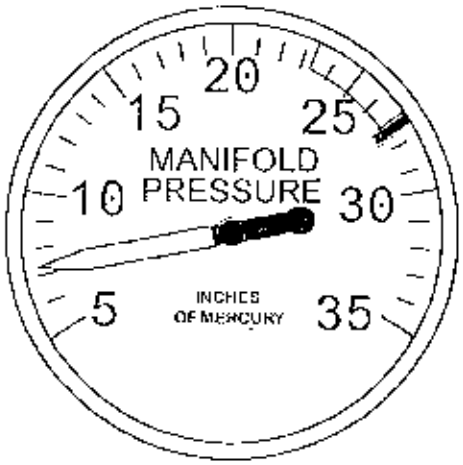
RED TRIANGLE 1600
(MAX ENGINE RPM WITH ROTORS DISENGAGED)

RED RADIAL
ENGINE 3000 AND 3200
ROTOR 390 AND 504

GREEN ARC
ENGINE 1200 TO 1600
3000 TO 3200
ROTOR 390 AND 504

NOTE

The **ABOVE** instrument are no longer in production. The **FOLLOWING** instruments represent the new configuration. The color coding is the same. Early style instrument may be replaced with current style.



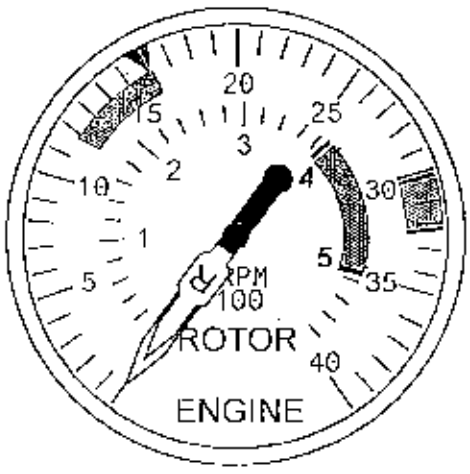


Figure 2-3. Aircraft Instruments (Sheet 4 of 4)

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Section III

EMERGENCY AND MALFUNCTION PROCEDURES

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Section III

EMERGENCY AND MALFUNCTION PROCEDURES

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Section III

EMERGENCY AND MALFUNCTION PROCEDURES

EMERGENCIES

3-1. ENGINE FAILURE - ALTITUDE ABOVE 450 FEET

- Lower collective pitch.
- Enter normal autorotation.
- Establish a steady glide of 52 knots (60 mph) IAS approximately.
- At an altitude of 50 feet, begin steadily to apply back cyclic stick to decrease forward speed.
- At approximately 10 feet, coordinate collective pitch with forward movement of cyclic stick to level ship and cushion landing. Make ground contact with ship level.
- Avoid rapid lowering of collective pitch or the use of aft cyclic stick during initial ground contact or during ground slide.
- 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 back cyclic and collective as needed to decrease forward and vertical velocity. Establish a level attitude prior to ground contact.

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. 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:

- Lower collective pitch and apply sideward cyclic stick after contact is made with water.
- Application of cyclic stick will cause rotor blades to strike water and stop rotating.
- Release seat belt and shoulder harness.
- Open both doors and exit helicopter.

WARNING

CLEAR HELICOPTER IMMEDIATELY TO PREVENT INJURY.

3-5. DITCHING - POWER ON

- Descend to hovering attitude over water.
- Set battery and alternator switches in OFF position.
- Leave magneto switch in ON position.
- Unlatch door.
- Maintain level attitude; accomplish normal landing.
- Close throttle.

- Lower collective pitch and apply sideward cyclic stick after contact is made with water.

  Note: Application of cyclic stick will cause rotor blades to strike water and stop rotation.

- Release seat belt and shoulder harness.

- Open both doors and exit helicopter.

WARNING

CLEAR HELICOPTER IMMEDIATELY TO PREVENT INJURY.

3-6. TRANSMISSION WARNING/CAUTION INDICATORS

Main Rotor Transmission

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

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

- Optional Chip Detector Caution Indicator (If Installed). (Figure 3-1 or 3-2, as applicable) 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.

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

Tail Rotor Transmission

- Chip Detector Caution Indicator. (Figure 3-1 or 3-2, as applicable) 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.

  Note: Indicator was factory-installed beginning with aircraft No. 950. Indicator kits may be retrofitted on early aircraft.

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

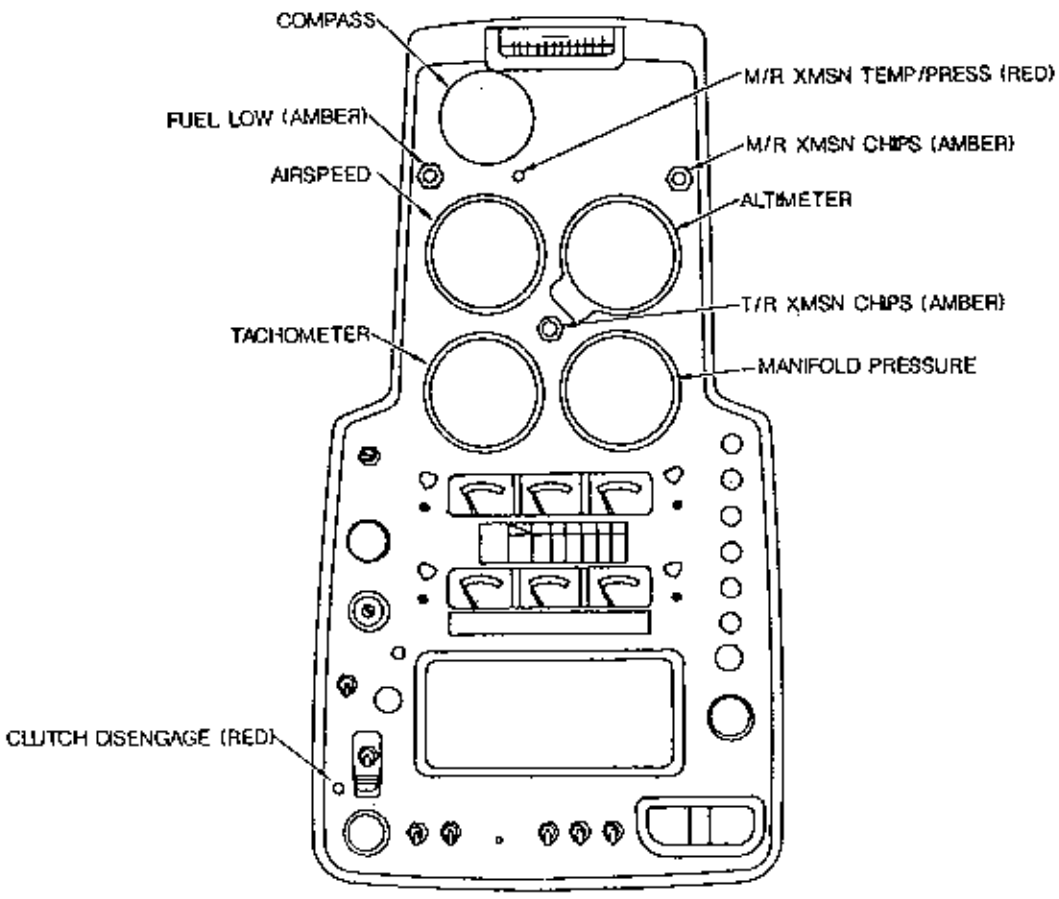

Figure 3-1. Instrument Panel (269A4804-11/-21) - Warning/Caution Lights

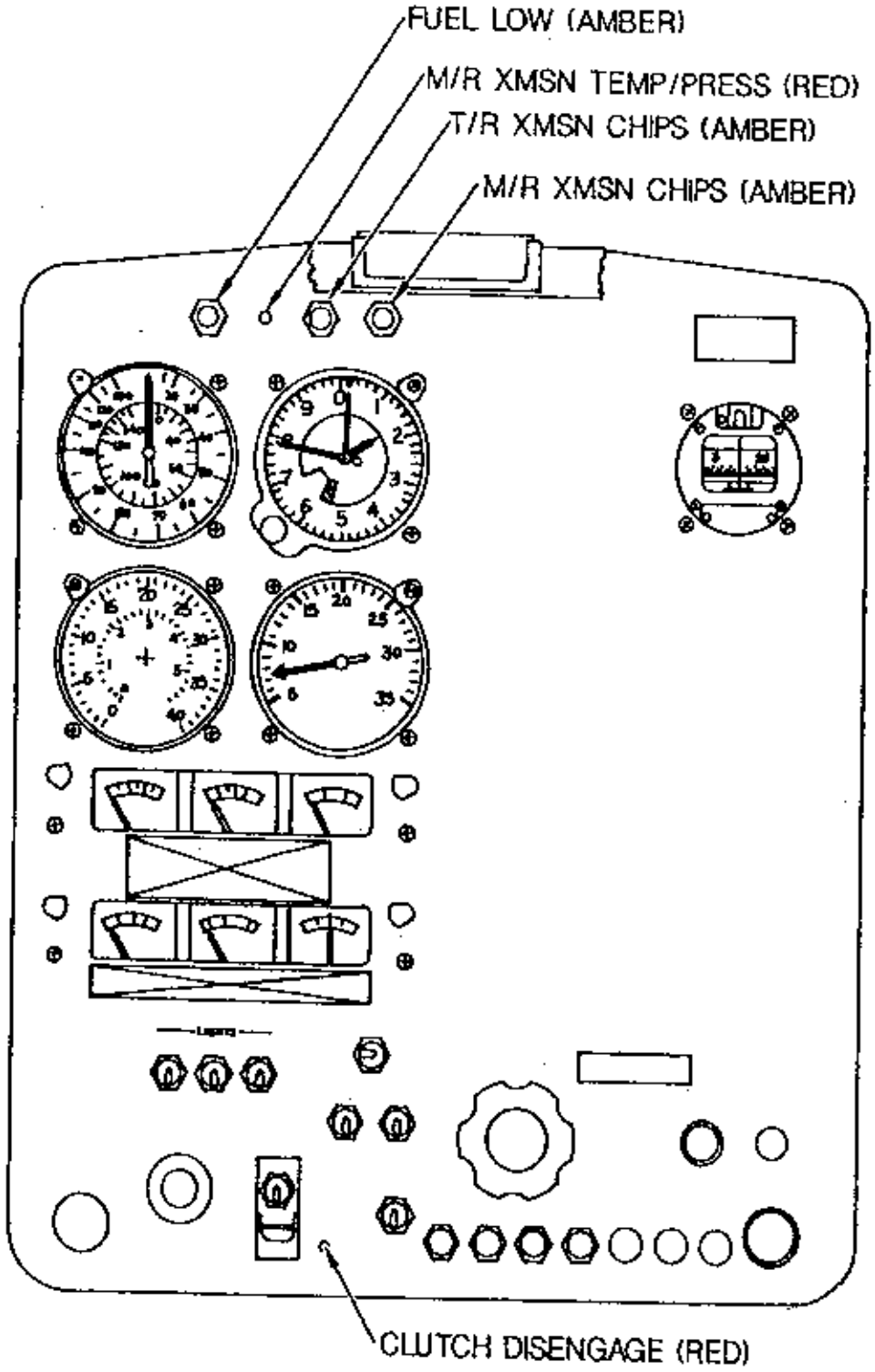

Figure 3-2. Instrument Panel (269A4540, Prior to S/N 1750) - Warning/Caution Lights

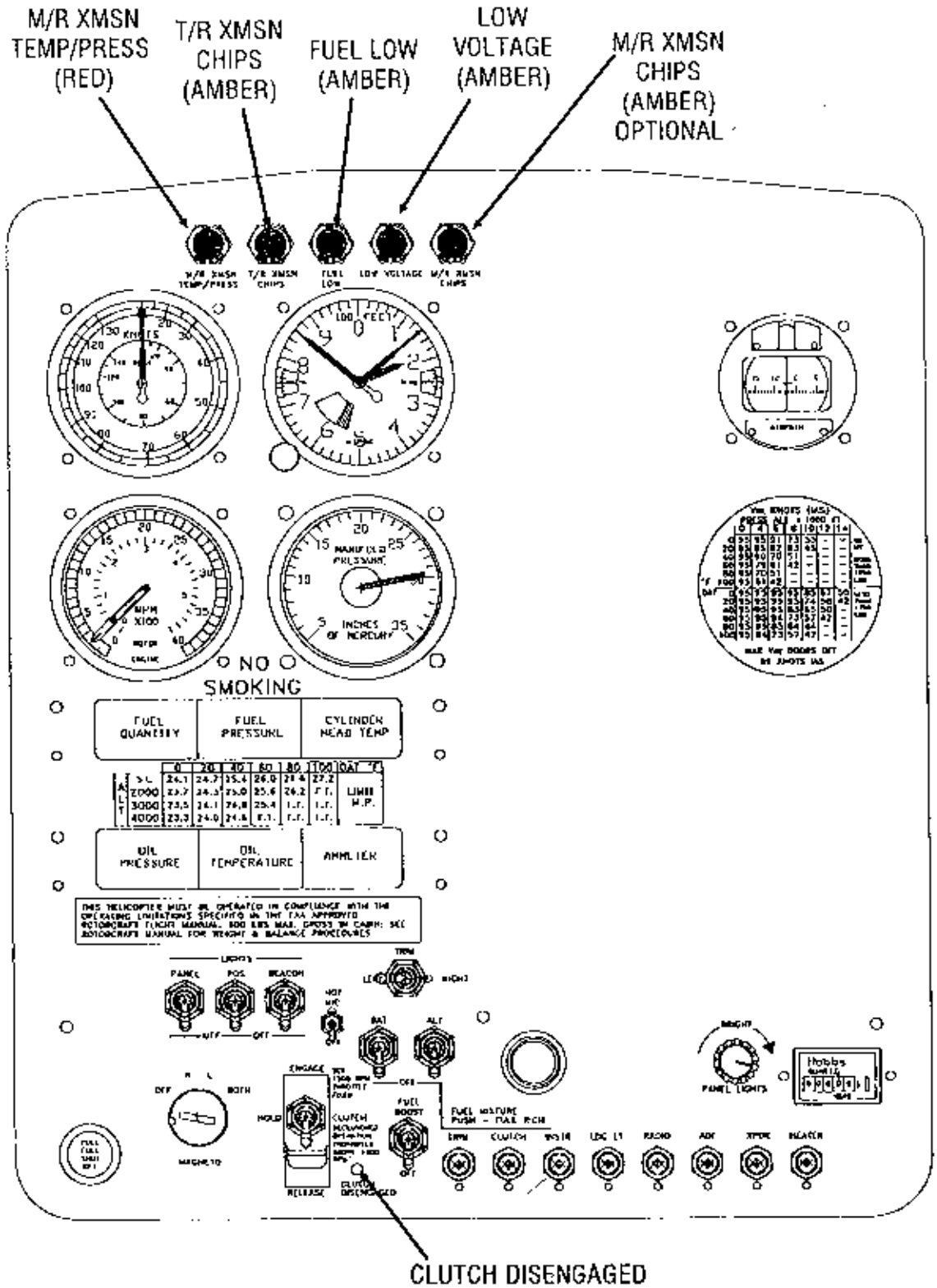

Figure 3-2A. Instrument Panel (269A4540, S/N 1750 & Subs.) - Warning/Caution Lights

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3-7. FUEL LOW, CAUTION INDICATOR

- 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.
- 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

- A red clutch warning light (RELEASE) is illuminated whenever the clutch is not fully engaged. Land as soon as possible if clutch warning light comes on in flight.

3-9. TAIL ROTOR FAILURE

- Different types of failure may require slightly different techniques for optimum success in recovery.
- General Corrective Action:
- - Complete loss of tail rotor thrust:
- - - Failure is normally indicated by an uncontrollable (by pedal) yawing to the right
- - In Forward Flight
- - - Reduce power by lowering collective.
- - - Adjust airspeed to 50 to 60 knots.
- - - Use left lateral cyclic in combination with collective pitch to limit left sideslip to a reasonable angle.

- 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.

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

- Tail Rotor Control Failure - Fixed Pitch Setting:

- Adjust power to maintain 50 to 60 knots airspeed.

- 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.

3-10. ENGINE IDLE AT ALTITUDE

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

3-10. ENGINE IDLE AT ALTITUDE (cont)

WARNING

AVOID THROTTLE CHOPS TO FULL IDLE AT ALTITUDES ABOVE 7000 FEET, TO AVOID POSSIBILITY OF ENGINE STOPPAGE.

3-11. AIR RESTART

- Establish 52 knots (60 mph) autorotation.
- Pick out landing spot. If less than 2000 feet above terrain, proceed with autorotation landing.
- Pull mixture control to IDLE CUTOFF when time permits to stop flow of fuel from nozzles.
- If altitude permits:
  - With mixture in IDLE CUTOFF.
  - Throttle - crack approximately 1/2 an inch.
  - Starter - press to engage.
  - Mixture - push to FULL RICH position when engine fires.

Note: If fuel boost 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.

- Pull mixture control to IDLE CUTOFF.
- Set fuel shutoff valve in CLOSED position.
- Set battery switch in OFF position.
- Set alternator switch in OFF position.

WARNING

REMAIN CLEAR OF ROTOR BLADES DURING AND AFTER EVACUATION.

- Exit aircraft with fire extinguisher.

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:
  - Maintain airspeed and rotor RPM; be prepared to perform a full autorotation at any point in the approach.
  - Immediately perform power-on landing to suitable area.
  - If time permits:
    - Set battery switch in OFF position.
    - Set alternator switch in OFF position.
    - Set cabin heater switch in OFF position.

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

- Upon landing:
  - Close Throttle.
  - Pull mixture control to IDLE CUTOFF.
  - Set fuel shutoff valve in CLOSED position.
  - Exit aircraft with fire extinguisher.
- Power-off landing:
  - Immediately enter autorotation.
  - If time permits:
    - Pull mixture control to IDLE CUTOFF.
    - Set fuel shutoff valve in CLOSED position.
    - Set battery switch in OFF position.
    - Set alternator switch in OFF position.
    - Set cabin heater switch in OFF position.
  - Upon landing, exit aircraft with fire extinguisher.

3-14. ELECTRICAL FIRE - IN FLIGHT.

- Set battery switch in OFF position.
- Set alternator switch in OFF position.
- Immediately perform power-on landing to suitable area.
- Upon landing:
  - Close throttle.
  - Pull mixture control to IDLE CUTOFF.
  - Set fuel shutoff valve in CLOSED position.
  - Exit aircraft with fire extinguisher.

3-15. SMOKE AND FUME ELIMINATION - IN FLIGHT

- Smoke and/or toxic fumes entering the cockpit can be exhausted as follows:
  - Open vents.
  - Adjust cabin heat and defog handle, as required.

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Section IV

NORMAL PROCEDURES

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Section IV

NORMAL PROCEDURES

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Section IV

NORMAL PROCEDURES

4-1. PREFLIGHT REQUIREMENTS

- Have a thorough understanding of operating limitations. (Refer to Section II.)
- Service the helicopter as required. (Refer to Aircraft Handling, Servicing and Maintenance, Section VII.)
- Determine that the helicopter loading is within limits. Refer to Section II and VI.
- Check the helicopter performance data. Refer to Sections V, VI and VIII.
- Determine that a Daily Inspection (in accordance with the Handbook of Maintenance Instructions (HMI)) has been accomplished within 24 hours prior to the first flight of each day.
- 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.

NOTE: Group all inspections by locations so that inspection can be performed on an area-by-area basis. Accomplish inspection of the entire helicopter by starting at the front and working in counterclockwise progression.

Refer to HMI for complete inspection criteria (Appendix B, Tables B1 through 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.
- Perform further inspection prior to the next flight if discrepancies are noted to determine if the rotorcraft is airworthy.
- 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. IF EXTENSION IS NOT CORRECT, A DETAILED INSPECTION PROCEDURE MUST BE PERFORMED BEFORE FURTHER FLIGHT OPERATIONS. REFER TO PILOT'S FLIGHT MANUAL, SECTION 7.

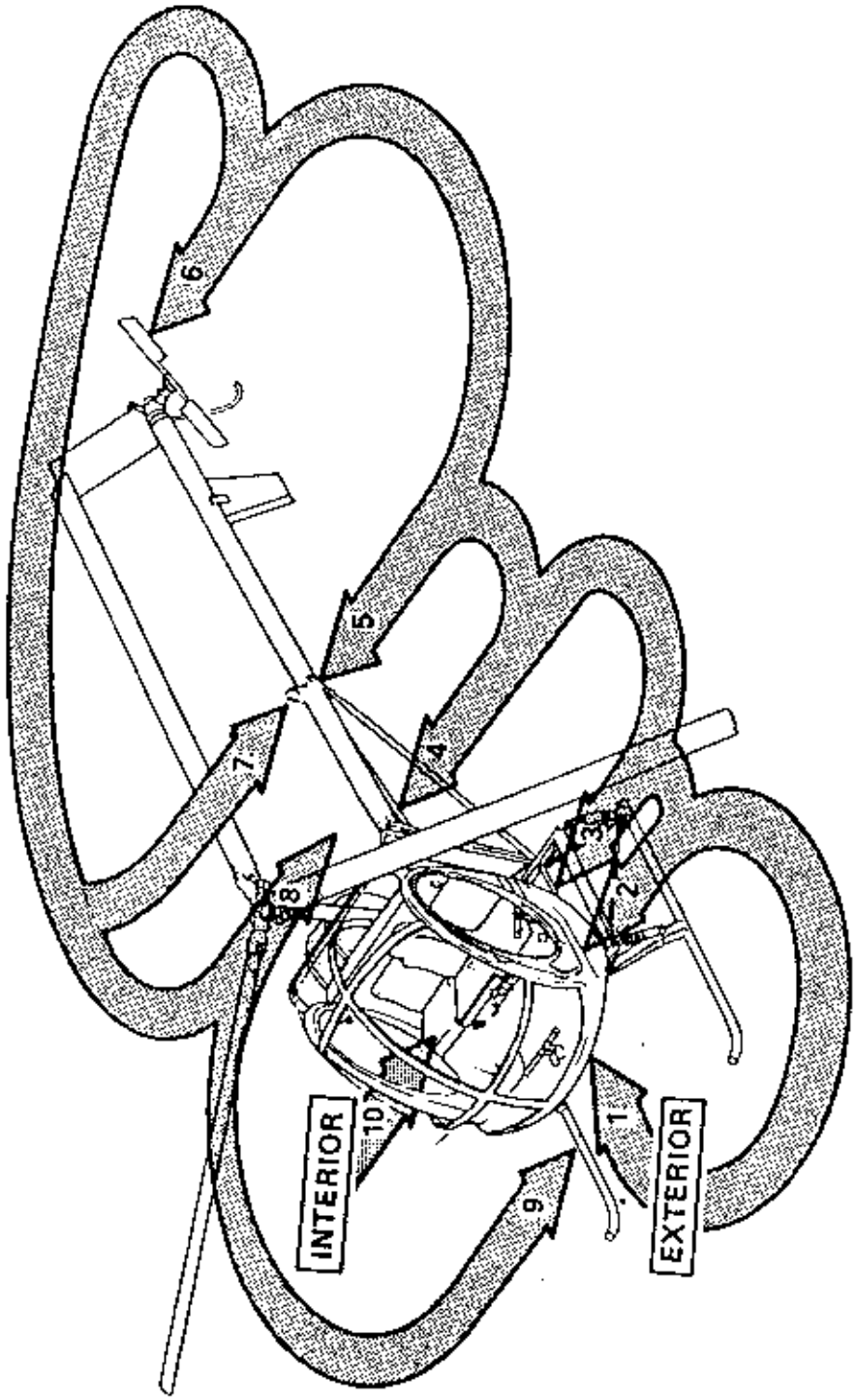

Figure 4-1. Pilot's Preflight Guide

EXTERIOR

NOSE AREA ①

- Aircraft tiedowns and covers — **REMOVED**
- Aircraft attitude for weak or damaged oleos — **CHECK**

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

- Canopy for condition and cleanliness — **CHECK**
- OAT thermometer sun shield — **NO OBSTRUCTIONS**
- Induction System and Fairing — **NO OBSTRUCTIONS**
- Pitot tube — **NO OBSTRUCTIONS**
- Frame, front crossbeam, drag strut, and skid for damage — **CHECK**
- Tail rotor pedals for condition and security of retaining pins (both sides if dual controls) — **CHECK**
- Landing Light, and forward rotating beacon for damage or security — **CHECK**

  NOTE: Late model helicopters equipped with standard height landing gear have the landing light mounted on the aft crossbeam. Late model helicopters have strobes (in lieu of rotating beacon) mounted with navigation lights.

- VHF antenna for damage or security — **CHECK**

CABIN - LEFT SIDE ②

- Cabin for damage or dents — **CHECK**
- Door and latching — **CHECK**
- Canopy slat for damage or looseness — **CHECK**
- Front oleo damper extension — **CHECK**
- Skid tube — **CHECK**
- Ground handling wheel (if installed) in up position with quick-release pin installed — **CHECK**

- Left navigation light and strobe for damage or looseness — CHECK

ENGINE - LEFT SIDE ③

- Engine oil level — CHECK
- Engine sump plug — CHECK
- Engine and components, exhaust and intake tubes, fuel and oil lines — CHECK
- Alternator drive belt and belt tension — CHECK
- Engine lower coupling shaft
  - Fore and aft movement — CHECK
  - Using a flashlight (or equivalent), inspect exterior of boot for cracking, fraying, chips, and deterioration. If any damage is observed, replace boot prior to next flight.
  - Audibly inspect lower coupling drive shaft for adequate lubrication as follows:
    - 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 impeller (any indication of looseness) — CHECK
- Belt drive lower H-frame tie bar bracket and strut for cracks and security — CHECK
- Aft crossbeam — CHECK
- Battery — INSPECT

ENGINE - LEFT SIDE (cont) ③

- Rear oleo damper extension — CHECK

CAUTION

IF CRACKING OF CLUSTER FITTINGS IS SUSPECTED, A DYE PENETRANT INSPECTION MUST BE PERFORMED BEFORE FURTHER FLIGHT OPERATIONS.

- Center frame aft cluster fittings for cracks, deformation, or damage — CHECK

MAIN ROTOR SYSTEM ④

- Main rotor transmission and mast — CHECK
- Main transmission oil level — CHECK
- Blades and rotor head — CHECK
- Main rotor dampers — CHECK
- Main rotor swashplate, pitch links, upper and lower bearings — CHECK
- Main rotor mixer bellcrank — CHECK
- Main rotor control rods — CHECK
- Tail rotor shaft, set alignment marks — CHECK

TAILBOOM LEFT SIDE ⑤

- Tailboom for damage or dents — CHECK
- Tailboom supports and fittings - for cracks, deformation, damage, looseness and security — CHECK
- Beacon light — CHECK
- Static port clear of obstructions — CHECK
- Tailboom support strut end fitting for cracks, deformation, or damage — CHECK
- Exhaust diffuser installation (if installed) for cracks, deformation, damage, looseness and security. — CHECK

TAIL ROTOR ®

- Tail rotor shaft alignment — CHECK
- Tail rotor blade pitch links and swashplate — CHECK
- Tail rotor teetering bearings
  - Conical for looseness — CHECK
  - Elastomeric for deterioration (if installed) — CHECK

CAUTION

IF POOR ABRASION STRIP BOND IS SUSPECTED, BUT NOT CONFIRMED, A BLADE INSPECTION PROCEDURE MUST BE PERFORMED BEFORE FURTHER FLIGHT OPERATIONS.

- Tail rotor abrasion strip — CHECK
  - Visually check each tail rotor blade abrasion strip for any evidence of paint cracking or chipping along the abrasion strip/airfoil bond line.
  - If paint cracking or chipping is observed, use a 10X magnifying glass to examine the abrasion strip/airfoil bond line and blade tip for any bond separation between epoxy adhesive and abrasion strip.

CAUTION

IF TAIL ROTOR BLADE ATTACHMENT BUSHING HOLE CRACKING IS SUSPECTED, A DYE PENETRANT INSPECTION MUST BE PERFORMED BEFORE FURTHER FLIGHT OPERATIONS.

- Tail rotor blade attachment bushing hole for evidence of cracks — CHECK
- Tail rotor push-pull rod — CHECK
- Tail skid — CHECK
- Tail rotor transmission/oil level — CHECK

- Horizontal stabilizer, vertical fin, and tail light — CHECK

TAILBOOM, RIGHT SIDE ⑦

- Tailboom for damage or dents — CHECK
- Tailboom supports and fittings for cracks, looseness, security, deformation, or damage — CHECK
- Tailboom support strut end fitting for cracks, deformation, or damage — CHECK

ENGINE - RIGHT SIDE ⑧

- Belt drive lower pulley bearings — CHECK
- - Place hand between engine and V-belt drive cover; 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.
- Idler pulley for smooth rotational movement and fore and aft freedom of movement — CHECK
- Clutch control cable, spring assembly, and lower end of spring retainer
- - 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.
- - Clutch engaged and disengaged: Check lower end of spring retainer tube for wear and wear deposits.
- - Clutch disengaged: Check spring assembly for freedom.
- Fuel quantity level; match with fuel gauge — CHECK
- Fuel tank cap seal for proper condition — CHECK

- Fuel tank sump, for water (30 gallon tank) — DRAIN
- Fuel strainer, for debris or water — DRAIN
- Fuel tank vent — NO OBSTRUCTIONS
- Engine driven fuel pump drain line for security (Service Bulletin B-235) — CHECK
- General engine area for loose wires, fittings or damage — CHECK

CAUTION

IF CRACKING OF CLUSTER FITTINGS IS SUSPECTED, A DYE PENETRANT INSPECTION MUST BE PERFORMED BEFORE FURTHER FLIGHT OPERATIONS.

- Center frame aft cluster fittings for cracks, deformation, or damage — CHECK
- Rear oleo damper extension, strut, and skid — CHECK
- Ground handling wheel (if installed) in up position with quick-release pin installed — CHECK
- Ground handling wheel handle (if installed); quick-release pin installed — CHECK
- Tail rotor control cable — CHECK

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CABIN - RIGHT SIDE ⑨

- Front oleo damper extension — CHECK
- Canopy and canopy slat for damage or looseness — CHECK
- Right navigation light and strobe for damage or looseness — CHECK
- Door and latch — CHECK

HELICOPTER INTERIOR ⑩

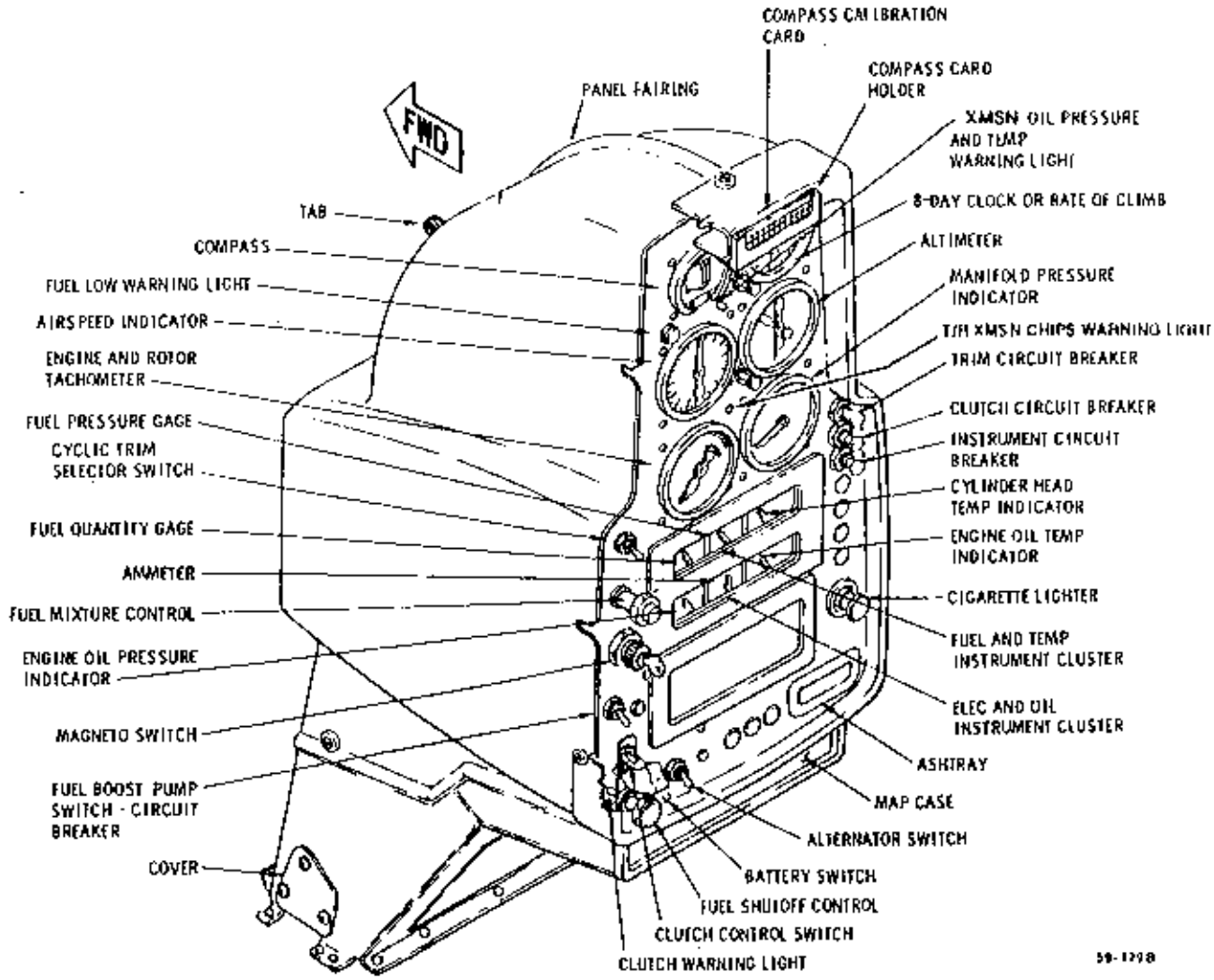
- Set battery, landing light, navigation light and rotating beacon switches to ON position; check each light for operation; turn all switches to OFF position — CHECK

WARNING

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

- Adjust tail rotor pedals and add shim(s) between pedals and retaining pins to remove play. Check security and condition of pins (Refer to Paragraph 7-14). — CHECK
- Seat belts and shoulder harness — CHECK
- If equipped, glove box door closed and latched — CHECK
- Ensure that no items that could interfere with collective mechanism, including seat belts, are between the seat and center seat support. — CHECK
- Control friction locks — RELEASE
- Controls, freedom of movement — CHECK
- Collective full down, center cyclic, friction on — CHECK
- Altimeter — SET

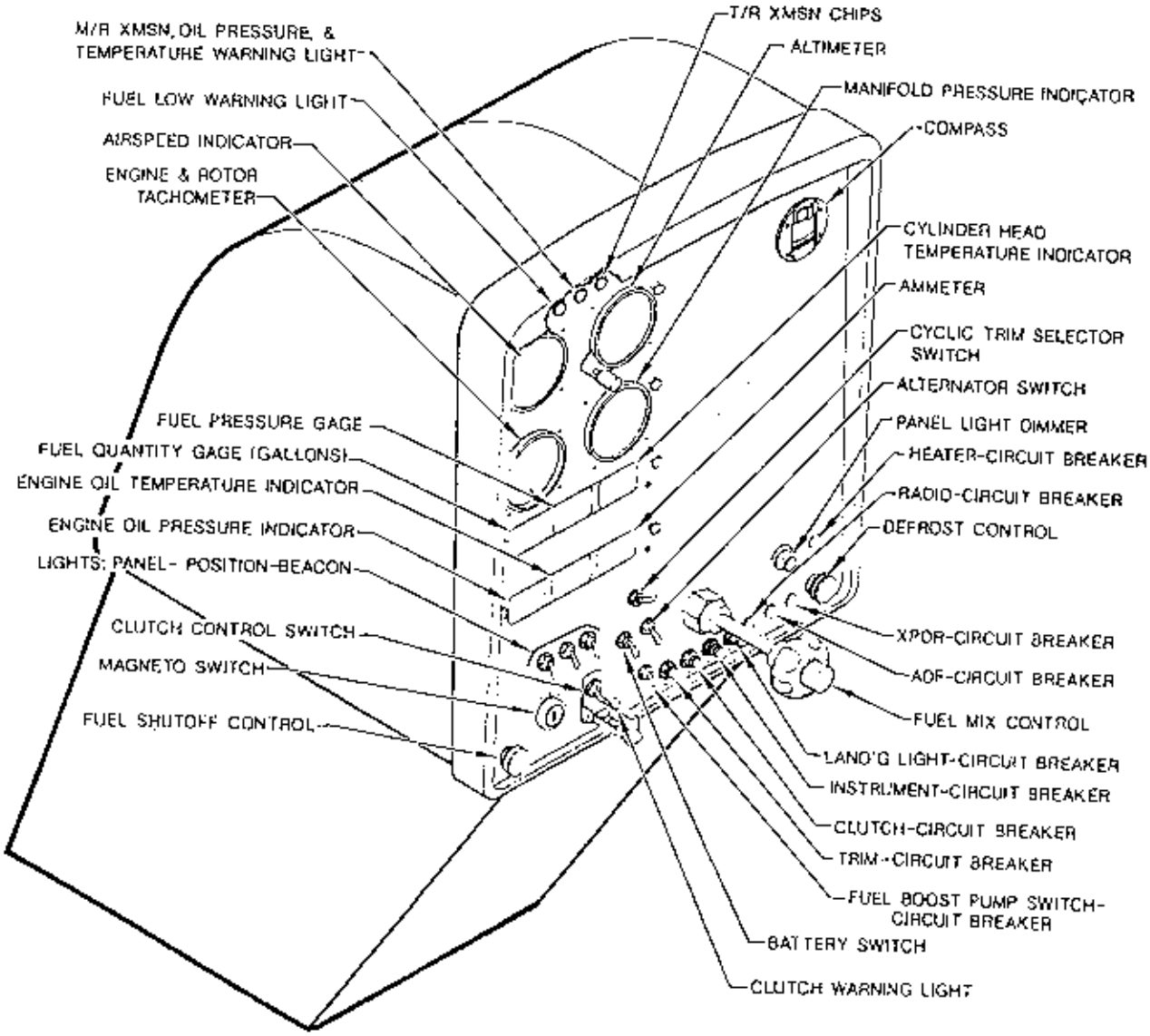
(HELICOPTER INTERIOR continued on page 4-12)



NOTE:

STANDARD EQUIPMENT ON HELICOPTERS THROUGH S/N 1438, OPTIONAL FOR S/N 1439 AND SUBSEQUENT.

Figure 4-2. Instrument Panel (269A4804-11/-21)



NOTE:

STANDARD EQUIPMENT ON 269C HELICOPTERS, S/N 1439 to 1749, OPTIONAL EQUIPMENT ON 269C PRIOR TO S/N 1439.

Figure 4-2A. Instrument Panel (269A4540-7)

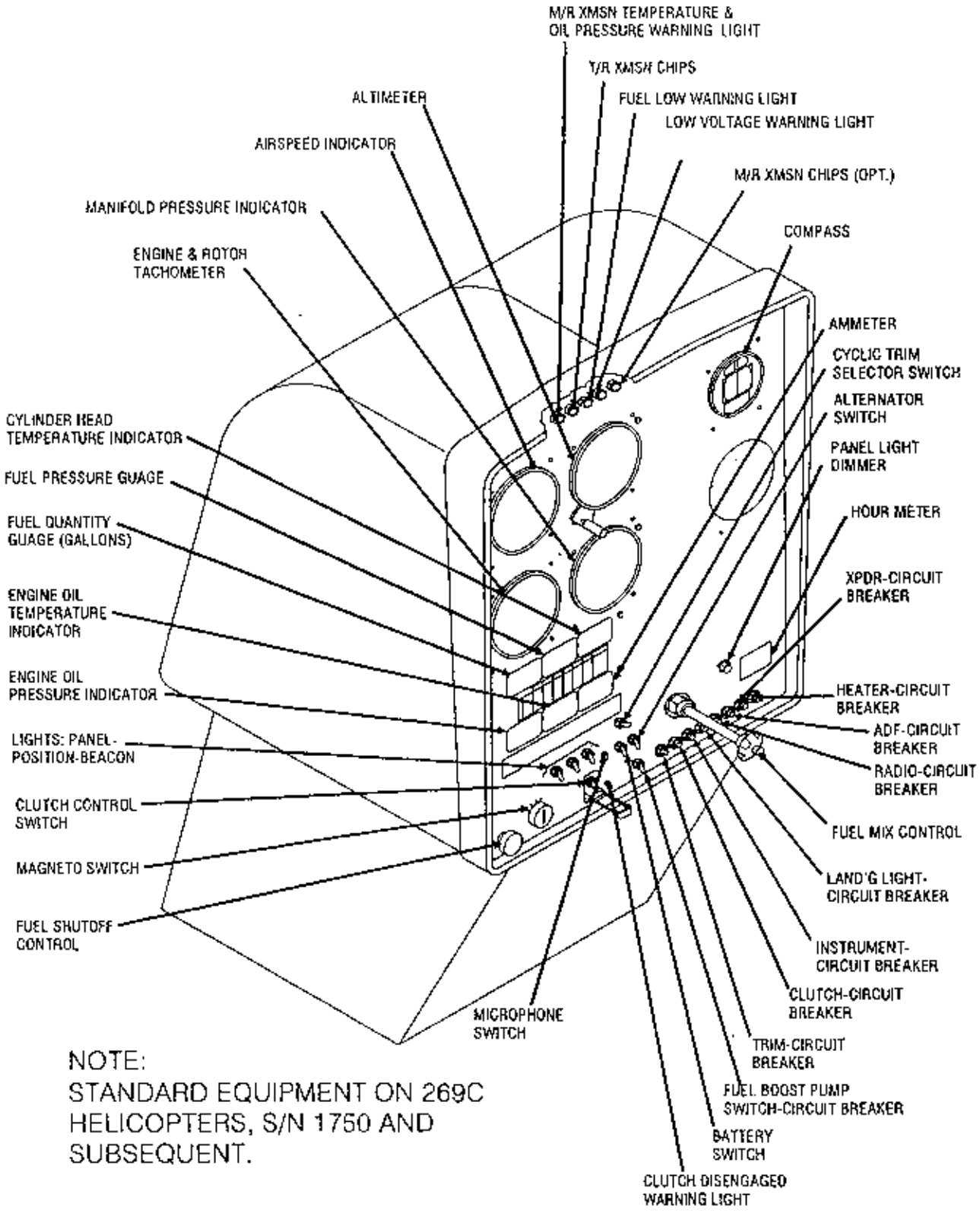


Figure 4-2B. Instrument Panel (269A4540-7, S/N 1750 & Subs.)

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HELICOPTER INTERIOR ⑩ (Cont)

• All switches OFF	CHECK
• Circuit breakers IN (except heater fan)	CHECK
• Throttle	CLOSED
• Mixture	IDLE CUTOFF (Pull)
• Ground power cart (if used)	CONNECT
• Battery switch	ON
• Fuel quantity	CHECK
• Fuel low caution light	OFF (Press-to-test)
• Transmission warning light	ON
• Clutch control switch RELEASE position, guard open	CHECK
• Clutch disengaged warning light	ON
• Tail rotor transmission chip detector caution light	OFF (Press-to-test)

4-3. ENGINE PRESTART COCKPIT CHECK

WARNING

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

• Battery switch ON	POSITION
• Communication equipment for proper operation; all switches OFF after check.	CHECK
• Exhaust heater blower fan for proper operation; circuit breaker out.	CHECK

4-4. ENGINE STARTING PROCEDURE

- Mixture control in IDLE CUTOFF position.
- Fuel shutoff valve in ON position.
- Release throttle friction lock; rotate throttle partially open (approximately 1/2 inch).
- Turn fuel boost pump to ON position; check for pressure indication.
- Push mixture control in FULL RICH for 2.5 to 3 seconds, return mixture control to IDLE CUTOFF position.
- Turn fuel boost pump to OFF position.
- Magneto switch to BOTH.

CAUTION

FOR NORMAL OPERATIONS, DO NOT OPEN THE THROTTLE MORE THAN 1/8 INCH DURING STARTING. AN OVERSPEED MAY RESULT WITH EXCESSIVE THROTTLE OPENING.

- 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, more throttle opening may be required.

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

CAUTION

DO NOT EXCEED 1600 RPM WITH ROTOR DISENGAGED. DISREGARD OF THIS LIMITATION MAY RESULT IN STRUCTURAL DAMAGE TO THE LOWER COUPLING DRIVE SHAFT.

- Stabilize engine at approximately 1400 rpm.

CAUTION

IF THE AIRCRAFT HAS BEEN EQUIPPED WITH THE OPTIONAL EXHAUST CABIN HEATER (PARAGRAPH 4-17) THE BLOWER ASSEMBLY (HEATER) CIRCUIT BREAKER MUST BE ON. HELICOPTER OPERATION WITH THE BLOWER OFF MAY CAUSE DAMAGE TO THE EXHAUST STACKS OR HEATER ASSEMBLY. PROCEDURE NOT APPLICABLE TO AIRCRAFT EQUIPPED WITH THE COMBUSTION CABIN HEATER.

- Set HEATER circuit breaker to ON position.
- Turn fuel boost pump to ON position.

CAUTION

SHUT DOWN ENGINE IF MINIMUM OIL PRESSURE IS NOT REACHED WITHIN 30 SECONDS AFTER ENGINE STARTS.

- Observe oil pressure gage for minimum oil pressure 25 psig.
- Disconnect external power if used.
- Set alternator switch in ON position.

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

- 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.

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

- Check collective pitch stick for full down and locked condition.
- Check tail rotor pedals for 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.

- Manually center cyclic stick; use longitudinal and lateral trim as necessary to stabilize stick in center position, then lock friction.
- Visually check aircraft vicinity for personnel and equipment.
- Using throttle, set engine speed (1500 rpm).

  NOTE: Maintain fixed throttle during rotor engagement.

CAUTION

TOO RAPID OR EXCESSIVE ENGAGEMENT OF CLUTCH CAN LEAD TO AIRCRAFT STRUCTURAL DAMAGE.

NOTE: If practical, warm up engine before the clutch is engaged; do not exceed 1600 rpm with clutch disengaged. After engaging clutch, increase rpm to 2000, maintain rpm until a definite rise in temperature is seen.

- 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 FULL 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.

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

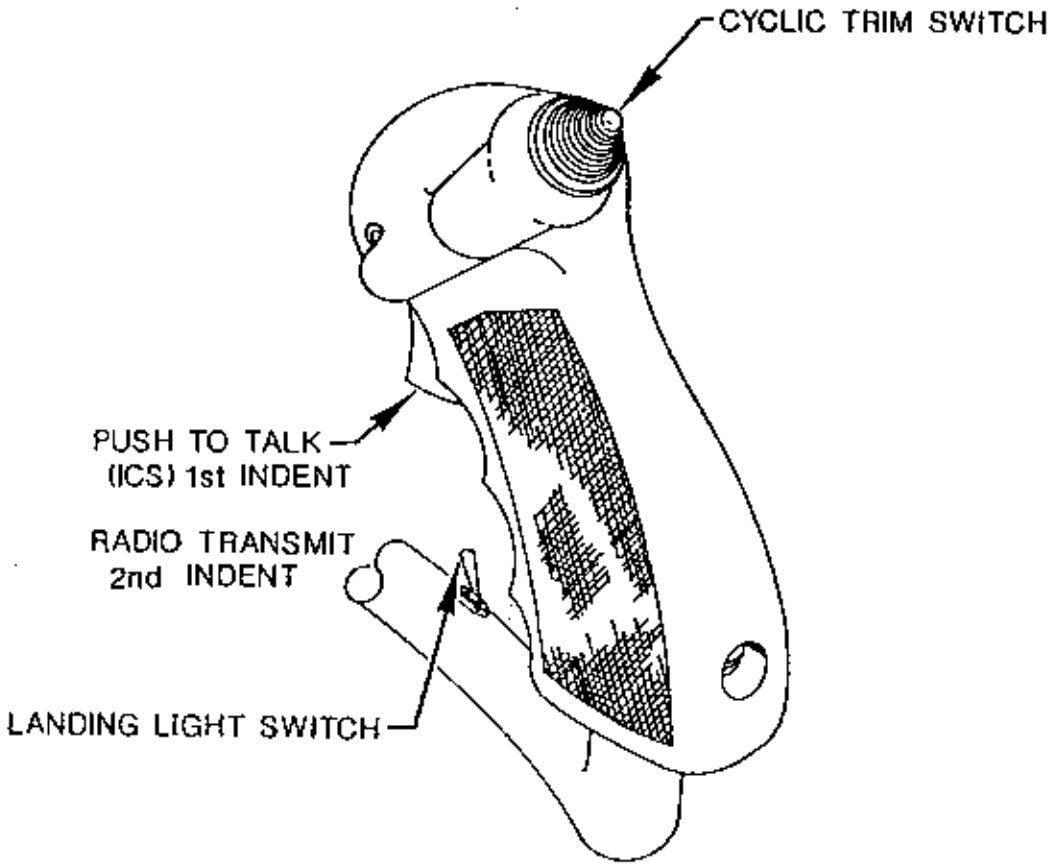

Figure 4-3. Pilot's Cyclic Grip

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

4-7. ENGINE GROUND CHECK

- Using throttle, set engine speed at 2500 rpm.
- Check engine oil temperature and pressure (within green arcs).
- Check main transmission warning light (XMSN TEMP/PRESS); check tail rotor transmission chip detector light (TR XMSN CHIPS) (both lights OFF).
- Check press-to-test low fuel caution light (OFF).
- Check ammeter reading for charging indication.
- Move alternator switch from ON to OFF position, then back to ON; observe ammeter. Check operation of low voltage warning light (if installed).

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

- Release control frictions, gently move cyclic stick; observe rotor tip for correct movement and track,center the cyclic stick, apply friction.
- Raise collective pitch stick to 14 inches MP at 2500 rpm.
- Move ignition switch from BOTH to LEFT position; observe engine rpm drop on tachometer (125 rpm maximum allowable drop within 5 seconds).
- Move ignition switch from LEFT to BOTH position; allow engine rpm to stabilize (2500 rpm).
- Move ignition switch from BOTH to RIGHT position; observe engine rpm drop on tachometer (125 rpm maximum allowable drop within 5 seconds).
- Move ignition switch from RIGHT to BOTH position (2500 rpm).

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

- Move collective pitch stick to FULL DOWN position (collective friction ON).
- Close throttle; observe engine and main rotor tachometer needles for separation.

NOTE: Needle separation indicates proper operation of overrun clutch.

- Check throttle override. Do not raise collective.
- Check the following items for proper indication or position, before takeoff.
- • Fuel quantity.
- • 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.
- • Cylinder head temperature.
- • Engine oil pressure.
- • Engine oil temperature.
- • Transmission warning light OFF.
- • Switches and circuit breakers.
- • Fuel shutoff valve full ON.
- • Mixture control FULL RICH.
- • Clutch warning light OUT.
- • Fuel low warning light OUT.
- Release CONTROL frictions and set as desired.
- Adjust cyclic trim controls as desired.
- Pitot heat (if installed) — As required

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.

- Use 3100 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 engine rpm.

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

- 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. Do not exceed MP placard limit.

- Perform climb out at 3100 rpm. Lower nose and accelerate to climb speed following profile in with Height Velocity Diagram (Figure 5-2). Above 450 AGL, reduce rpm to 3000 to 3100 range.

  NOTE: Above the critical altitude (altitude at which full throttle is obtained), exercise caution to assure that the throttle system is not in the override position when reducing collective to avert overspeed.

  Avoid excessive nose down attitude.

4-9. CRUISE

- Cruise in 3000 to 3100 rpm range.

4-10. PRACTICE AUTOROTATION

WARNING

DURING POWER RECOVERY FROM PRACTICE AUTOROTATIONS, AVOID AIRSPEED AND ALTITUDE COMBINATIONS THAT ARE INSIDE THE HEIGHT VELOCITY CURVE. HIGH RATES OF DESCENT MAY DEVELOP THAT ARE NOT CONTROLLABLE. ALWAYS PRACTICE IN AN AREA WITH A SUITABLE LANDING SITE TO MINIMIZE HAZARDS ASSOCIATED WITH INADVERTENT ENGINE STOPPAGE.

- Split the needles by lowering the collective while maintaining throttle setting. The throttle correlation will establish a high idle rpm (approximately 2500 rpm) which will aid in preventing the engine from loading up or stalling during recovery. Conversely, when the collective is raised without increasing throttle, the correlation is such that only minor throttle adjustments will be required to perform a smooth recovery without exceeding 3200 rpm.

4-11. ENGINE OVERSPEED LIMITERS

- If installed, the limiter should be adjusted so that rpm limits of the Rotorcraft Flight Manual are complied with.

  NOTE: Under no circumstances should the limiter be used as a governor to replace pilot skill; the occasions for limiter use should be extremely rare and only to prevent a catastrophic engine overspeed.

4-12. LANDING APPROACH

- Set engine rpm at 3100.

  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.

- Slow airspeed to approximately 60 mph for a normal approach and reduce collective for the desired rate of descent. Maintain 3100 rpm. On approaching the desired landing spot, reduce airspeed and rate of descent until a hover is established.

4-13. RUNNING LANDING

  CAUTION

  AVOID RAPID LOWERING OF COLLECTIVE PITCH CONTROL AFTER GROUND CONTACT.

- 40 mph maximum recommended ground contact speed for smooth hard surface.

4-14. PILOT'S CHECK OF IDLE MIXTURE, IDLE SPEED, AND FUEL BOOST PUMP

NOTE: This check of idle mixture, idle speed, and fuel boost pump shall be accomplished at the end of the last flight each day, prior to engine shutdown.

- Accomplish the engine idle mixture check as follows:

- 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, governor disengaged, and engine speed at operational rpm.

- 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.

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

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

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

- 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.

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

- Accomplish an idle speed check as follows:

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

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.

- • Rapidly rotate throttle closed and into full override position.
- • Read and record engine idle rpm prior to engine and rotor tachometer needles superimposing.
- • 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.

- • If engine idle speed is not within the required limits, notify the appropriate maintenance personnel to perform adjustments in accordance with the Basic HMI.
- Perform a fuel boost pump check.
- • Operate helicopter at idle rpm with fuel boost pump ON.
- • Turn fuel boost pump OFF while observing engine tachometer.
- • 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.

4-15. ENGINE COOLING SHUTDOWN

CAUTION

SHUT DOWN THE ENGINE BEFORE EXITING THE HELICOPTER UNLESS SAFETY OR OPERATIONAL CONSIDERATIONS DICTATE OTHERWISE.

- After landing, maintain 3000 rpm with full down collective pitch for two minutes; watch for cylinder head temperature to decrease and stabilize.

- Decrease to and hold 2000 rpm until CHT stabilizes at lowest reading.
- Set cyclic stick in neutral position.
- Tighten all friction controls.
- Close throttle to IDLE STOP.
- Set clutch control switch in RELEASE position (guard open) and maintain throttle against stop until tachometer indicates rotor disengagement.

CAUTION

DAMAGE TO ROTOR BLADES AND TAILBOOM MAY RESULT IF COLLECTIVE PITCH IS USED TO SLOW ROTOR.

- Set mixture control in IDLE CUTOFF position.
- Set magneto switch in OFF position.
- Set alternator switch in OFF position.
- Set battery switch in OFF position.
- Set all remaining switches in OFF position.
- Set fuel shutoff valve in CLOSED position.

4-16. ENGINE IDLE AT ALTITUDE

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

WARNING

AVOID THROTTLE CHOPS TO FULL IDLE AT ALTITUDES ABOVE 7000 FEET, TO AVOID POSSIBILITY OF ENGINE STOPPAGE.

4-17. HEATER OPERATION

- Exhaust cabin (muff) heater (optional, see Table 9-3).
- Heater may be used during all operations.

- ● Check that HEATER (blower) circuit breaker is in.

CAUTION

BLOWER MUST BE ON DURING ALL ENGINE OPERATION. OPERATION WITH BLOWER OFF MAY CAUSE DAMAGE TO EXHAUST STACKS OR HEATER ASSEMBLY.

- ● Position push-pull control to regulate cabin temperature.
- Stewart-Warner combustion cabin heater (optional, see Table 9-3).

WARNING

LIMIT HEATER GROUND OPERATION TO FIVE MINUTES WITH THE ENGINE RUNNING TO PREVENT INGESTION OF ENGINE AND EXHAUST FUMES INTO AIRCRAFT CABIN (PARAGRAPH 2-2).

- ● Steps 1. through 8. apply to ground operation of the heater with the engine not running.

1. Set fuel shutoff valve to OPEN position.
2. Set mixture control in IDLE CUTOFF position.
3. Set fuel boost pump switch in ON position.
4. Set heater control switch in PRIME position (2 seconds).
5. Set heater control switch in HEAT position.
6. Position push-pull control to regulate cabin temperature.
7. Set heater control switch to OFF position to discontinue heater operation.
8. Set fuel shutoff valve to CLOSED position.

- ● Steps 1. through 4. apply to in-flight operation of the heater.

1. Set heater control switch in PRIME position (2 seconds).
2. Set heater control switch in HEAT position.
3. Position push-pull control to regulate cabin temperature.

4. Set heater control switch to OFF position to discontinue heater operation.

4-18. SEARCHLIGHT OPERATION (IF INSTALLED)

- To turn on the searchlight, use the ON-OFF switch located on the remote control handle. Use the handle to direct the searchlight beam.
- To operate the extendable searchlight, pull out on the extension handle, just below the aiming grip, and push down until it locks in the down position. To retract the light, pull out on the extension handle and lift up until it locks in the up position. Check that the red warning light is out.

CAUTION

DURING TAKEOFF AND LANDING, DO NOT OPERATE THE EXTENDABLE SEARCHLIGHT IN AN INTERMEDIATE EXTENDED POSITION, TO AVOID HITTING THE LANDING LIGHT OR OTHER STRUCTURE.

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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 (2050 pounds) and standard day conditions:

Best rate of climb speed: 41 knots (47 mph) IAS

Hovering ceiling: 5900 feet altitude (2-foot skid height)

Controllability has been shown to be adequate in 17 knot (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 LEVEL

The Model 269C Helicopter equipped as follows meets FAR 36 Appendix J, Addendum 20. At maximum gross weight, the helicopter produces the following noise levels.

Exhaust Configuration	Noise Level
269A8257-3/-9 Exhaust Pipe Installation	78.8
269A8801-5 Exhaust Muffler	81.1
269A8245-BSC Exhaust Muffler and Resonator	79.2

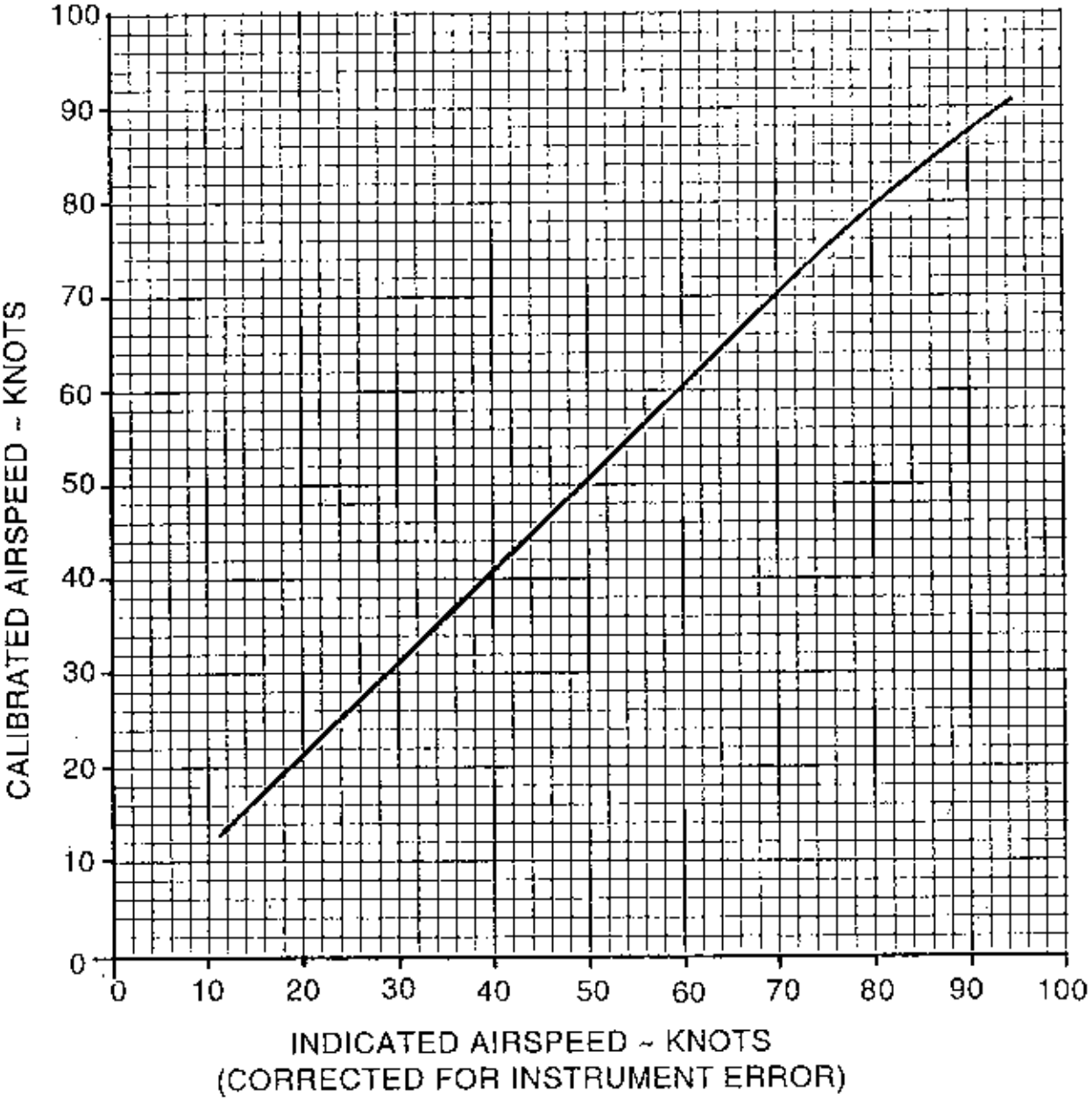

Figure 5-1. Airspeed Calibration Curve

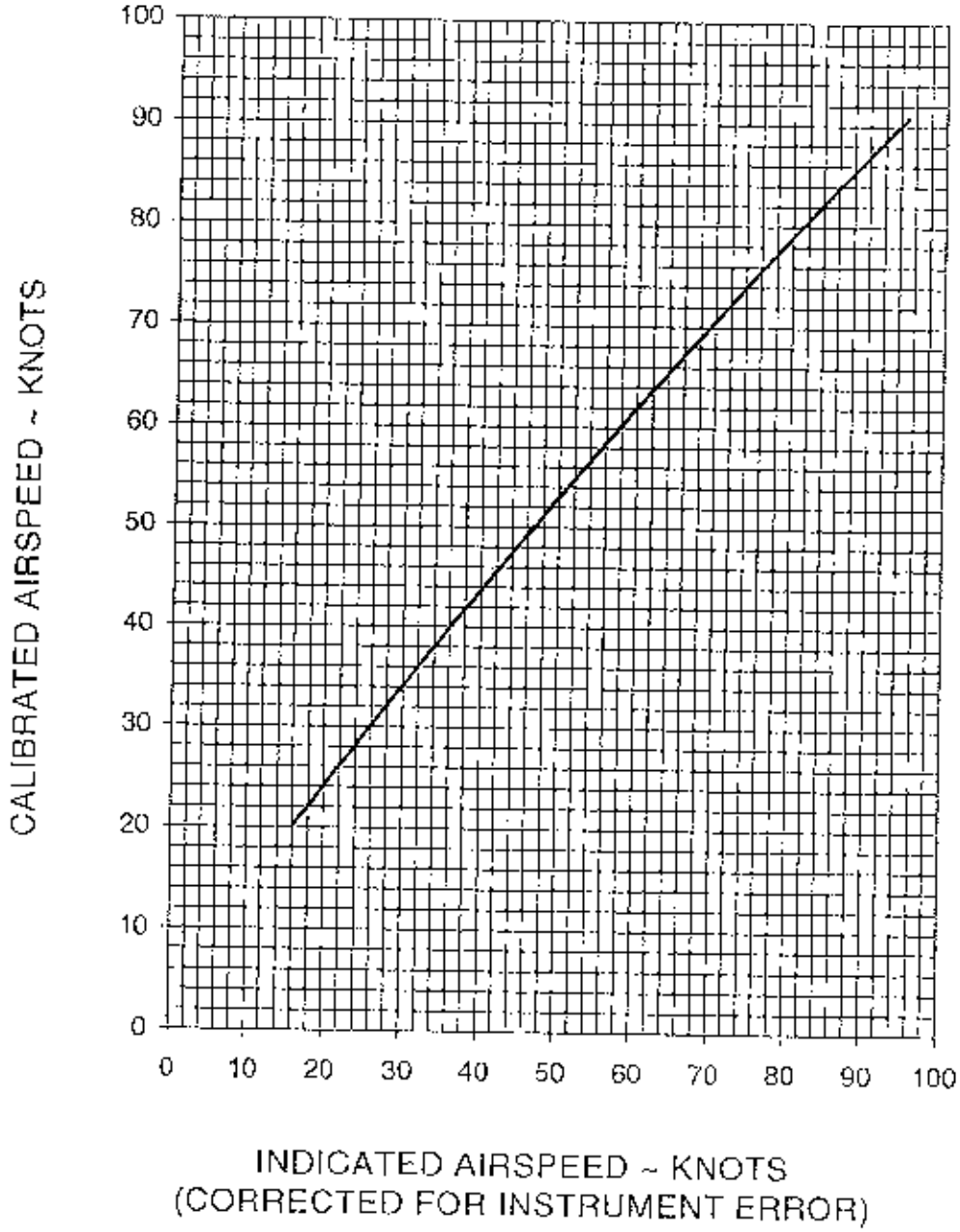

Figure 5-1A. Airspeed Calibration Curve-Heated Pitot Tube

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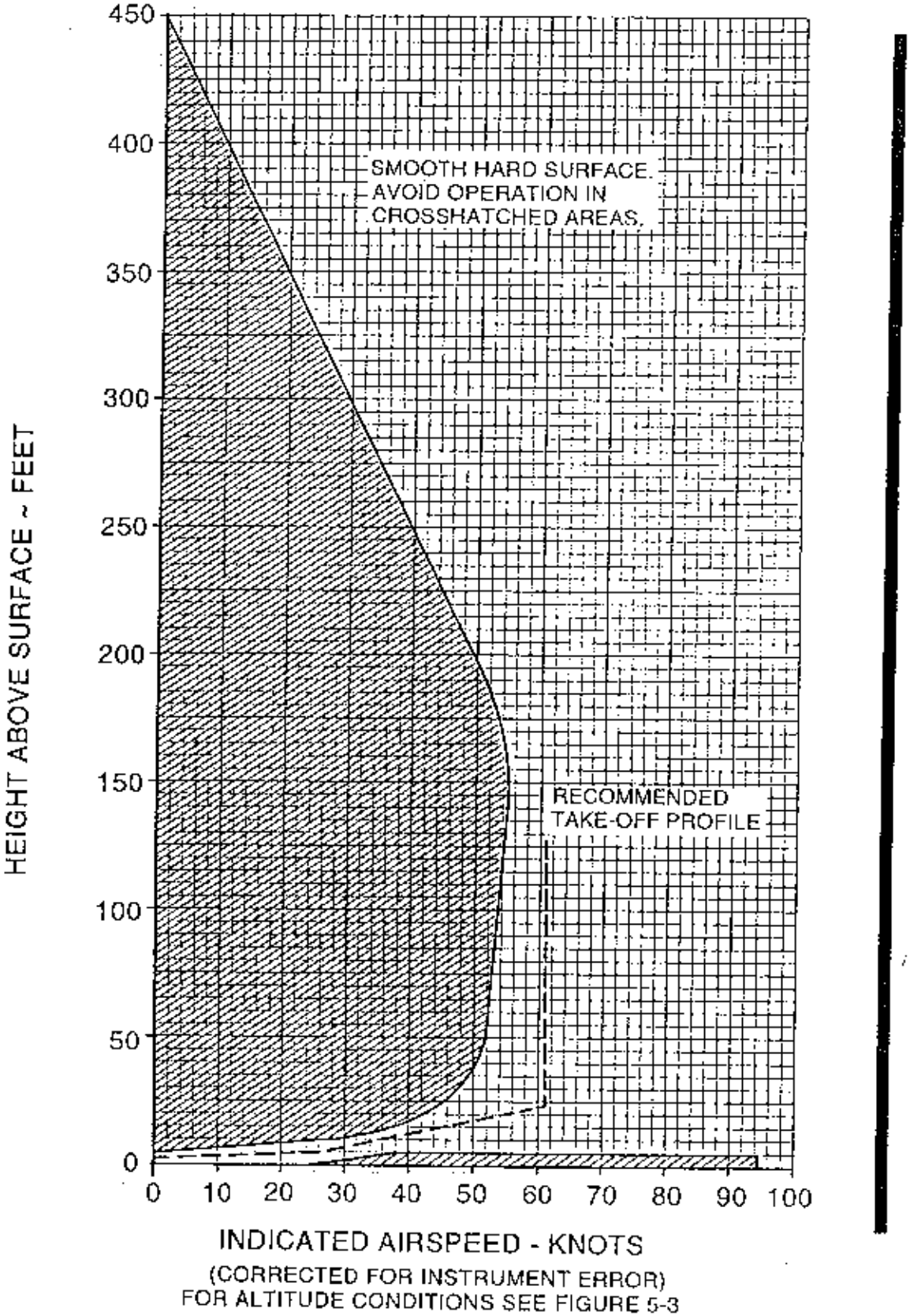

Figure 5-2. Height Velocity Diagram at Sea Level

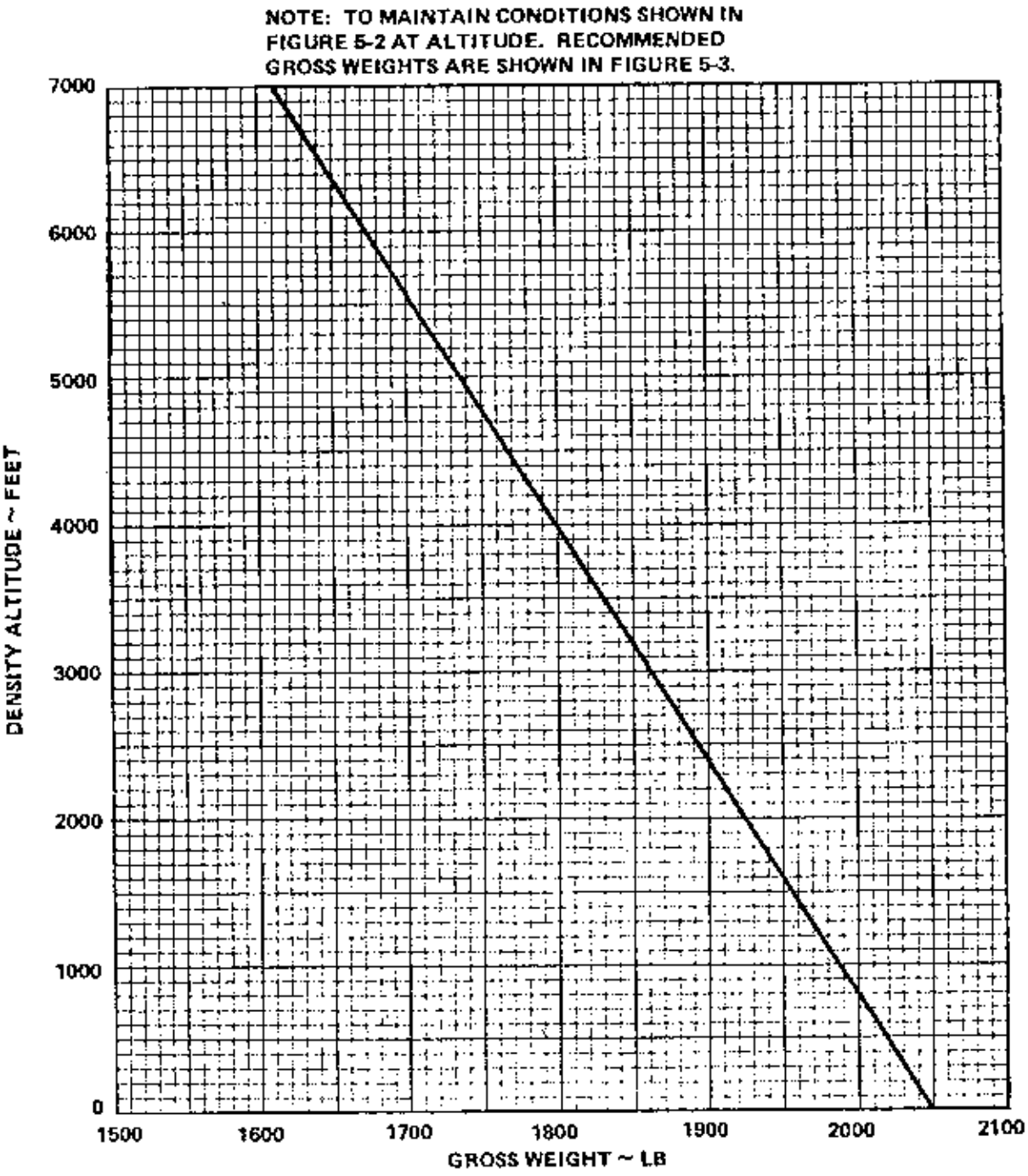

Figure 5-3. Gross Weight Versus Density Altitude at Takeoff

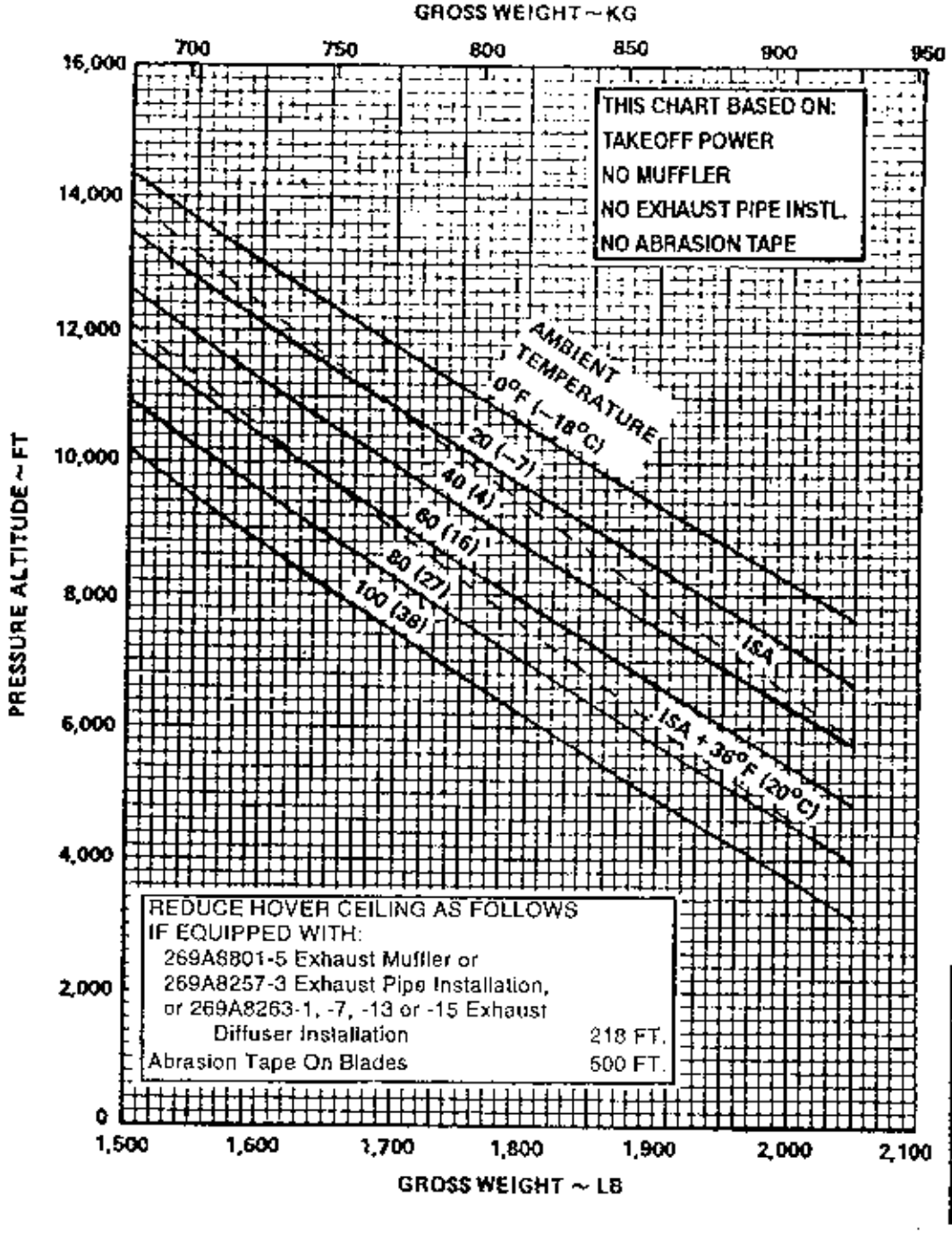

Figure 5-4. In Ground Effect Hover Ceiling Versus Gross Weight
(2-Foot Skid Height, 3200 rpm)

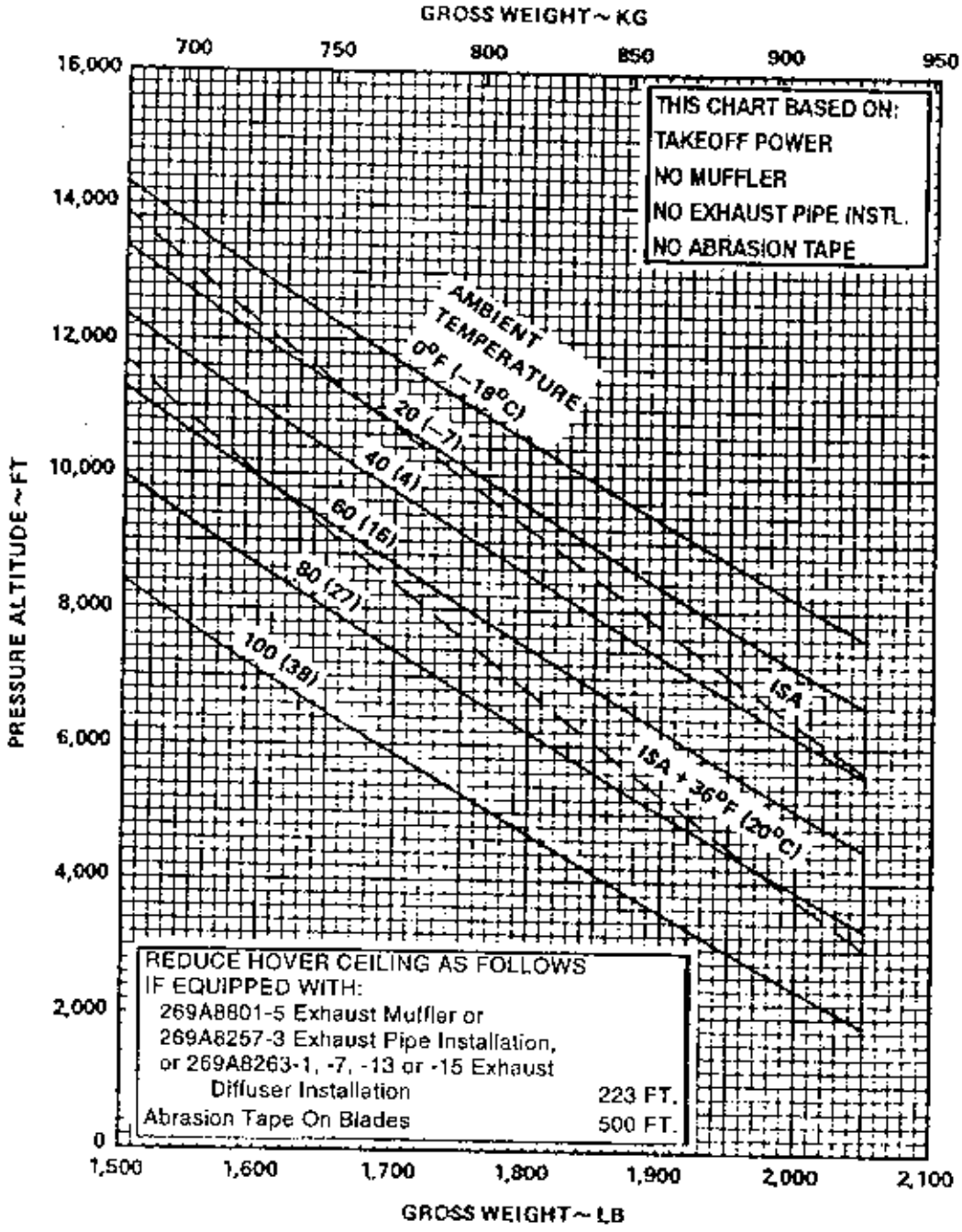

Figure 5-5. In Ground Effect Hover Ceiling Versus Gross Weight
(2-Foot Skid Height, 3200 rpm, 80% Relative Humidity)

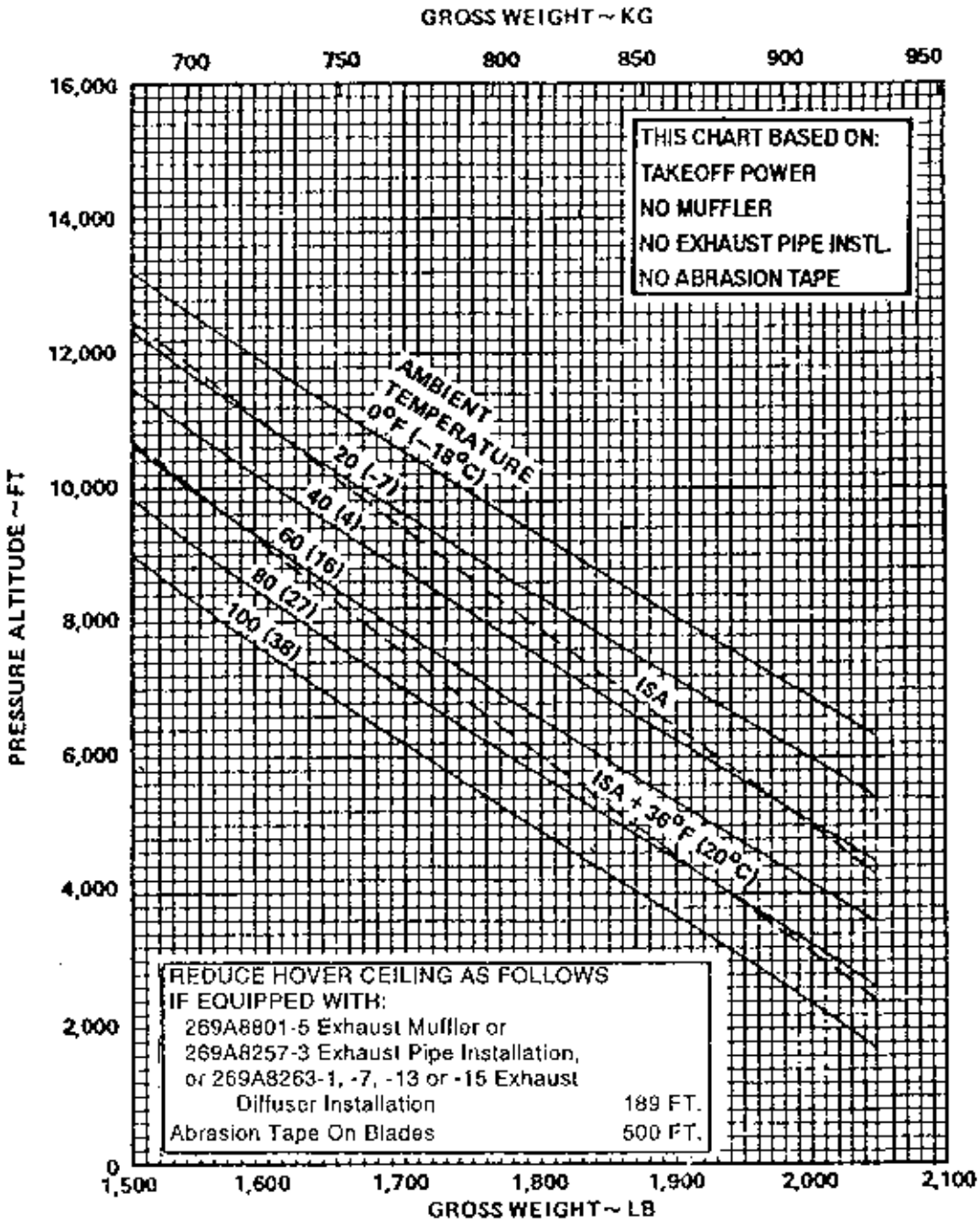

Figure 5-6. In Ground Effect Hover Ceiling Versus Gross Weight
(2-Foot Skid Height, 3000 rpm)

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Section VI

WEIGHT AND BALANCE DATA

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Section VI

WEIGHT AND BALANCE DATA

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Section VI

WEIGHT AND BALANCE DATA

6-1. INTRODUCTION

- 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.

6-2. WEIGHT AND BALANCE CHARACTERISTICS

- 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. The forward lower edge of the lower stabilizer is station 252.3. 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:

  - Maximum Gross Weight

Late helicopters (Serial No. 210 and subs.)	2050 lbs.
Early helicopters (Serial No. 004 through 209)	1900 lbs.

- 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.

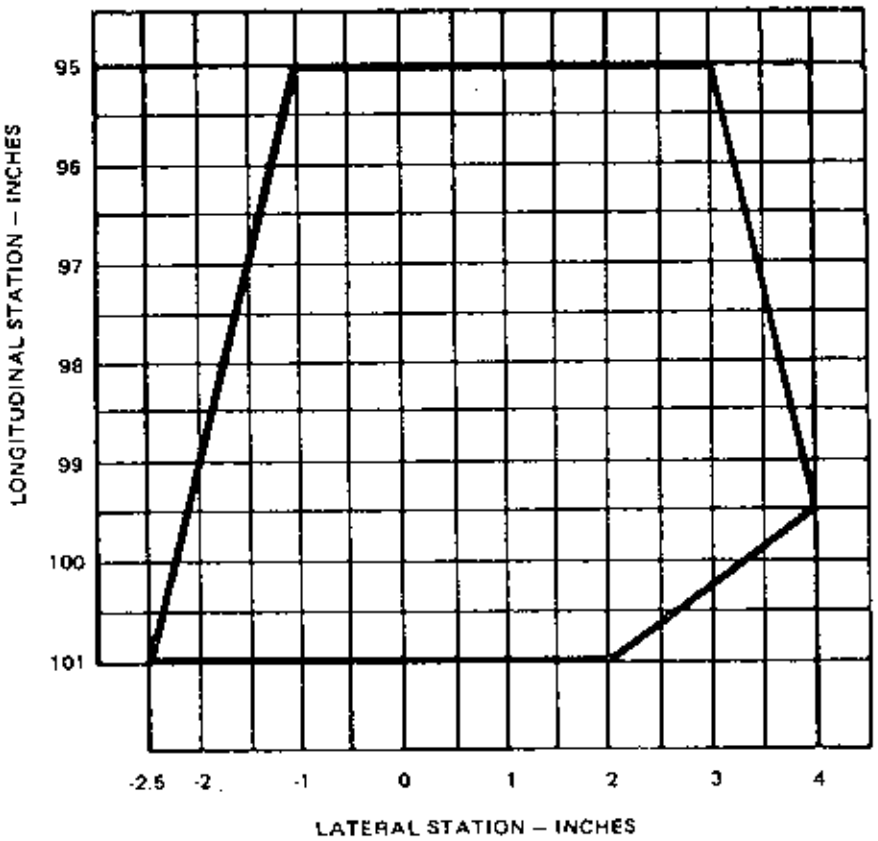


Figure 6-1. Center of Gravity Envelope

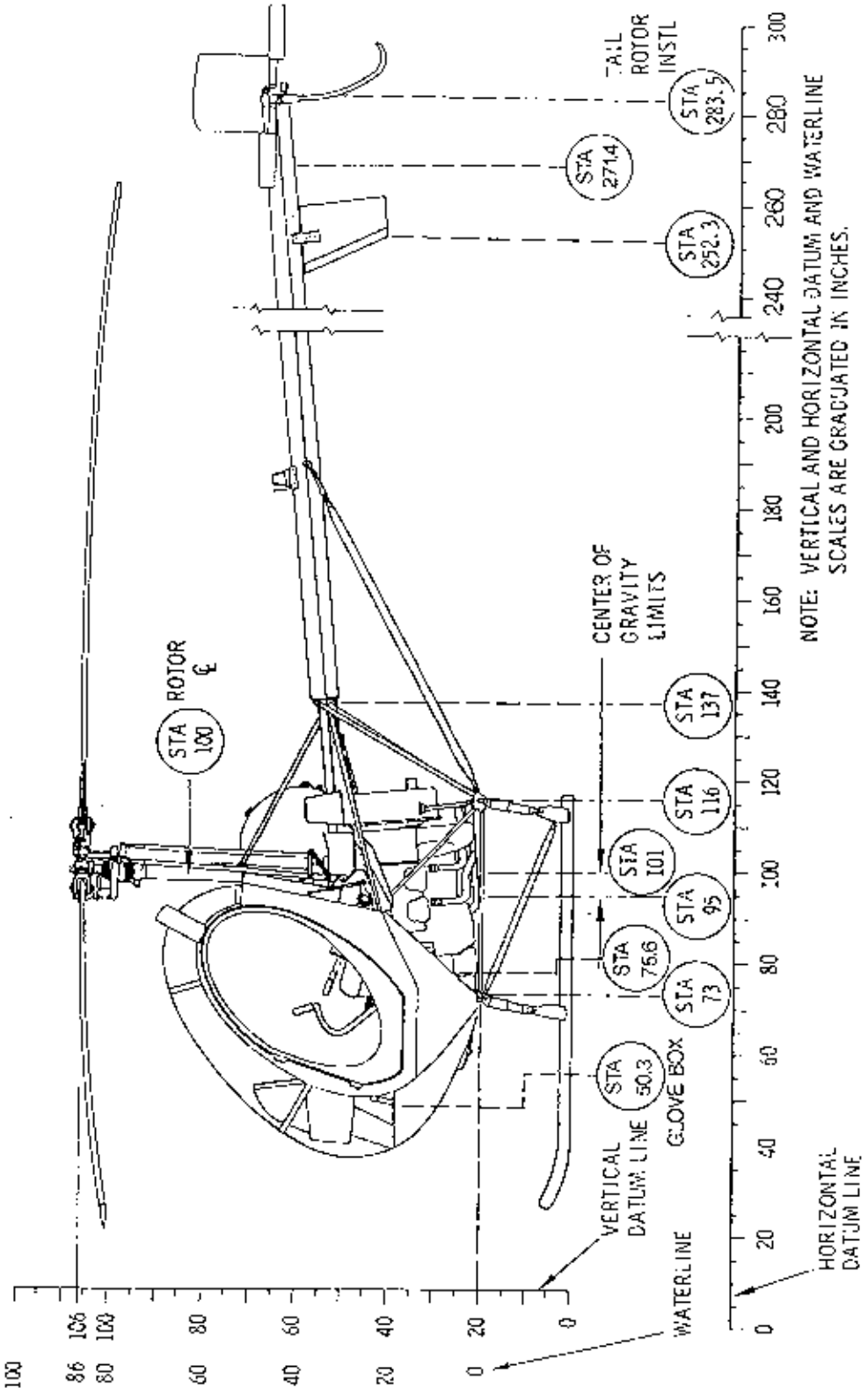
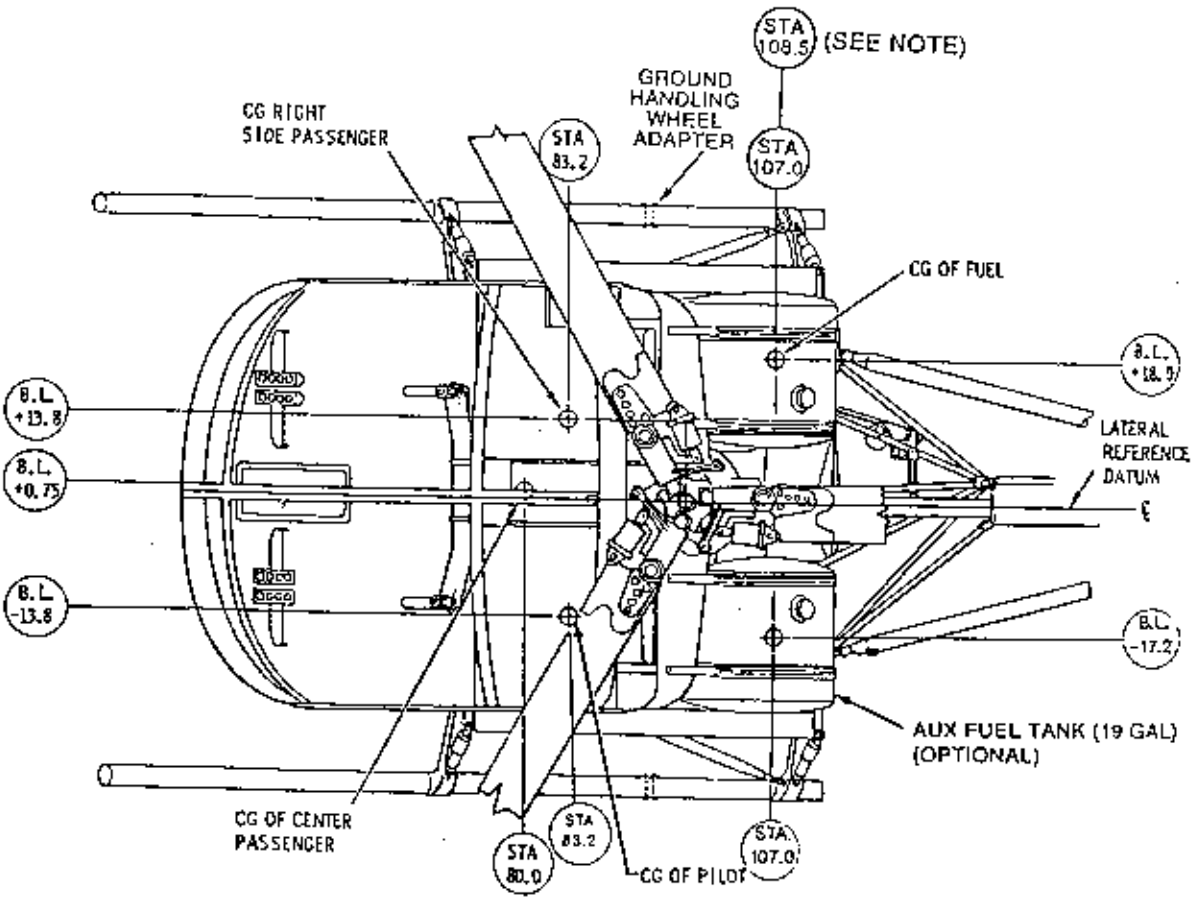


Figure 6-2. Station Diagram



NOTE: CG OF FUEL IS STA 107.0 FOR S/N 004 THRU 1742 AND 1745 OR STA 108.5 FOR S/N 1743, 1744, 1746 AND SUBSEQUENT.

Figure 6-3. Balance Diagram

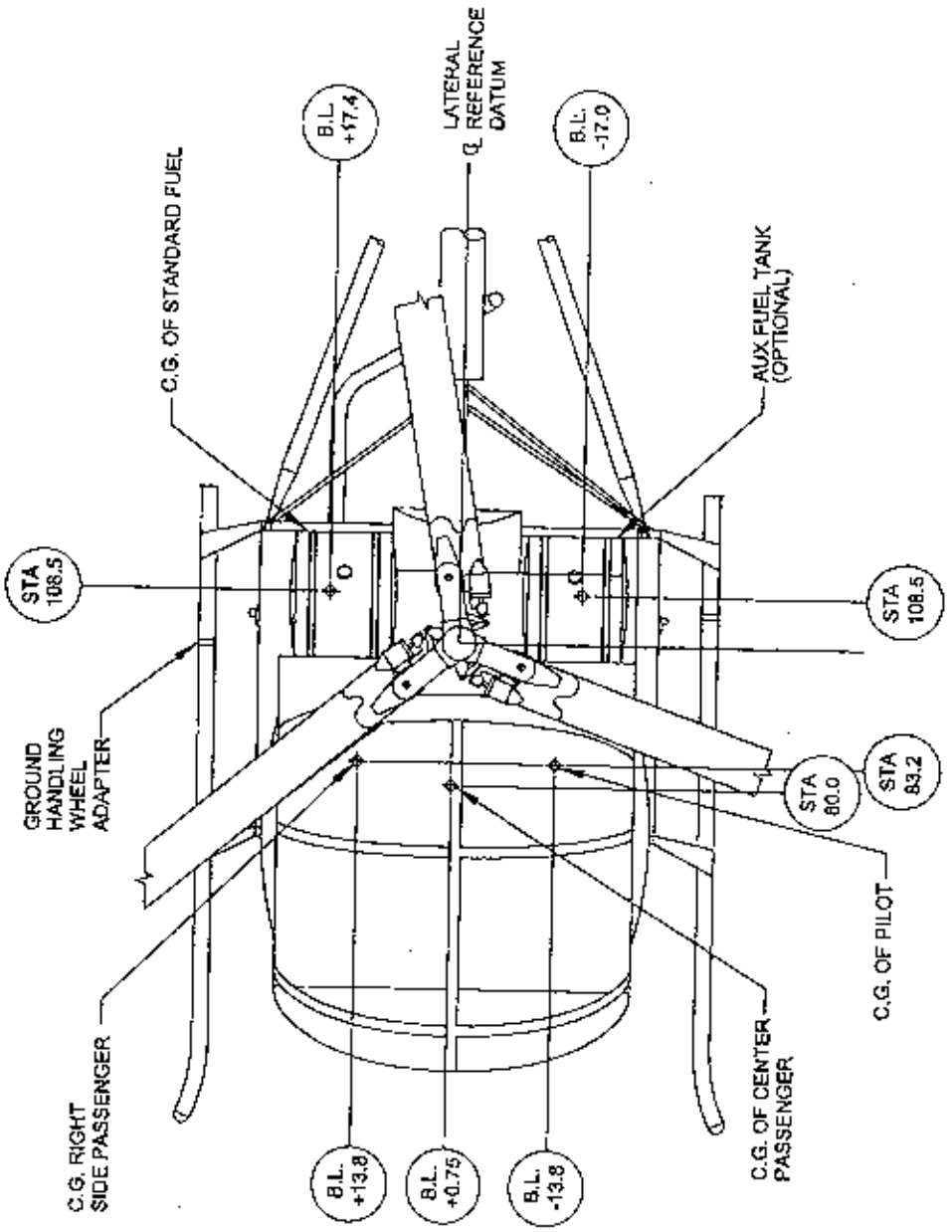


Figure 6-3A. Balance Diagram (33 gallon standard tank)

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HELICOPTER MODEL	SERIAL NUMBER	REGISTRATION NUMBER
269C		
DATE		WEIGHED BY

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	482	1.9	480	75.6	36288	-19.0	- 9120
RIGHT MAIN	500	1.9	498	75.6	37649	+19.0	+ 9462
AFT	148	2.9	145	271.4	39353	+0.6	+ 87
TOTAL (AS WEIGHED)	1130	6.7	1123	100.9	113290	+0.4	+ 429

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	[X] 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		
405 FLIGHT MANUAL	1.0	48.0	48	0	0		
UNUSEABLE FUEL (33 gal. fuel tank)*	3.0	108.5	325	+17.4	+52		
NOTE: Removable portions of ground handling wheel installation (if so equipped) are NOT included in aircraft empty weight.							
TOTAL	4.0	93.3	373	+13	+52		

SURPLUS EQUIPMENT IN AIRCRAFT AT TIME OF WEIGHING

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

*Unusable fuel for 30 gallon tank is .2 gallon at
108.5 inch or 107 inch depending on aircraft S/N.
Sample based on single 33 gallon fuel tank configuration

Figure 6-4. Sample Weight and Balance Worksheet (Sheet 1 of 3)

BASIC WEIGHT	WEIGHT (LB)	LONG. ARM (IN.)	LONG. MOMENT (IN.-LB)	LAT. ARM (IN.)	LAT. MOMENT (IN.-LB)
WEIGHT (AS WEIGHED)	1123	100.9	113290	.4	429
SURPLUS WEIGHT					
MISSING EQUIPMENT WEIGHT	4.0	93.3	373	13	52
TOTAL BASIC WEIGHT (DELIVERED)	1127	100.9	113663	.4	481

MOST FORWARD LOADING	WEIGHT (LB)	LONG. ARM (IN.)	LONG. MOMENT (IN.-LB)	LAT. ARM (IN.)	LAT. MOMENT (IN.-LB)
BASIC WEIGHT	1127	100.9	113663	.4	481
PILOT	170	83.2	14144	-13.8	-2346
USEABLE FUEL	0	107.0	0		
PASSENGER, CENTER	170	80.0	13600	.75	128
PASSENGER, RH	170	83.2	14144	13.8	2346
TOTAL GROSS WEIGHT	1637	95.0	155551	.4	609
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	1127	100.9	113663	.4	481
PILOT	170	83.2	14144	-13.8	-2346
FUEL, FULL 30 GAL	180	107.0	19260	18	3240
FUEL, AUX 19 GAL	114	107.0	12198	-17.2	-1961
TOTAL GROSS WEIGHT	1591	100.1	159265	-.4	-586
APPROVED AFT LIMIT 101 INCHES					

CG OF FUEL AT STA 107.0 - S/N 004 THRU 1742 AND 1745

Figure 6-4. Sample Weight and Balance Worksheet (Sheet 2 of 3)

BASIC WEIGHT	WEIGHT (LB)	LONG. ARM (IN.)	LONG. MOMENT (IN.-LB)	LAT. ARM (IN.)	LAT. MOMENT (IN.-LB)
WEIGHT (AS WEIGHED)	1123	100.9	113290	.4	429
SURPLUS WEIGHT					
MISSING EQUIPMENT WEIGHT	4.0	93.3	373	13	52
TOTAL BASIC WEIGHT (DELIVERED)	1127	100.9	113663	.4	481
LATERAL CENTER OF GRAVITY ⟶ + 0.4					
MOST FORWARD LOADING	**WEIGHT (LB)**	**LONG. ARM (IN.)**	**LONG. MOMENT (IN.-LB)**	**LAT. ARM (IN.)**	**LAT. MOMENT (IN.-LB)**
BASIC WEIGHT	1127	100.9	113663	.4	481
PILOT	170	83.2	14144	-13.8	-2346
USEABLE FUEL	0	108.5	0		
PASSENGER, CENTER	170	80.0	13600	.75	128
PASSENGER, RH	170	83.2	14144	13.8	2346
TOTAL GROSS WEIGHT	1637	95.0	155551	.4	609
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	1127	100.9	113663	.4	481
PILOT	170	83.2	14144	-13.8	-2346
FUEL, FULL (32.5 USEABLE GAL.)	195	108.5	21158	17.4	3393
TOTAL GROSS WEIGHT	1492	99.8	148965	1.0	1528
APPROVED AFT LIMIT 101 INCHES					

CG OF FUEL AT STA 108.5 - S/N 1743, 1744, 1746 AND SUBSEQUENT

Sample based on single 33 gallon fuel tank

Figure 6-4. Sample Weight and Balance Worksheet (Sheet 3 of 3)

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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 or 269D | SERIAL NUMBER | REGISTRATION NUMBER | PAGE | OF

ITEM NO.				LONGITUDINAL			LATERAL		RUNNING TOTAL - EMPTY AIRCRAFT				
DATE	IN	OUT	DESCRIPTION OF ARTICLE OR MODIFICATION	WEIGHT + ADD - REMOVE	ARM	MOMENT	ARM + RIGHT - LEFT	MOMENT	WEIGHT	LONGITUDINAL ARM	LONGITUDINAL MOMENT / IN/LB	LATERAL ARM	LATERAL MOMENT / IN/LB
			TOTAL DELIVERED WEIGHT						1123.4	100.9	113311	+.4	+427
1/24/94		1	REMOVE 7 LBS. ITEM AT STA. 193, LBL 12	-7	193	-721	-12	+84	1116.4	100.8	112590	+.5	+511
1/27/94	2		ADD 11 LBS. ITEM AT STA. 74, RBL 6	+11	74	+814	+6	+66	1127.4	100.6	113404	+.5	+577

S-351 (REV. 2/94)

Figure 6-5. Sample Weight and Balance Record

6-3. LOAD LIMITS AND BALANCE CRITERIA

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

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

- 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 Figures 6-4 and 6-5).

- For the Removable Skid Mounted Ballast - When weight and balance calculations show that loading conditions cause an out of limits lateral C.G. condition, it can be corrected by installing the 269A2122-53/ -133 skid mount ballast kit. This ballast can be installed on either the right or left hand skid tubes. The kit contains a basic weighted mount of approximately 27 pounds and one bolt-on weight of approximately 25 pounds. This ballast is considered disposable weight and is NOT included in the aircraft empty weight. If this kit is used, it is installed in accordance with instructions found in Section 7 of this manual and must be included in the pilots weight and balance calculations prior to flight. For weight and balance calculations, use the actual weight numbers stenciled on the individual weights in conjunction with Figures 6-5A and 6-5B.

  Ballast C.G. location

Longitudinal station	94.1
Right lateral station	+32.7
Left lateral station	-32.7

6-4. EQUIPMENT REMOVAL OR INSTALLATION

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

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

- 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.

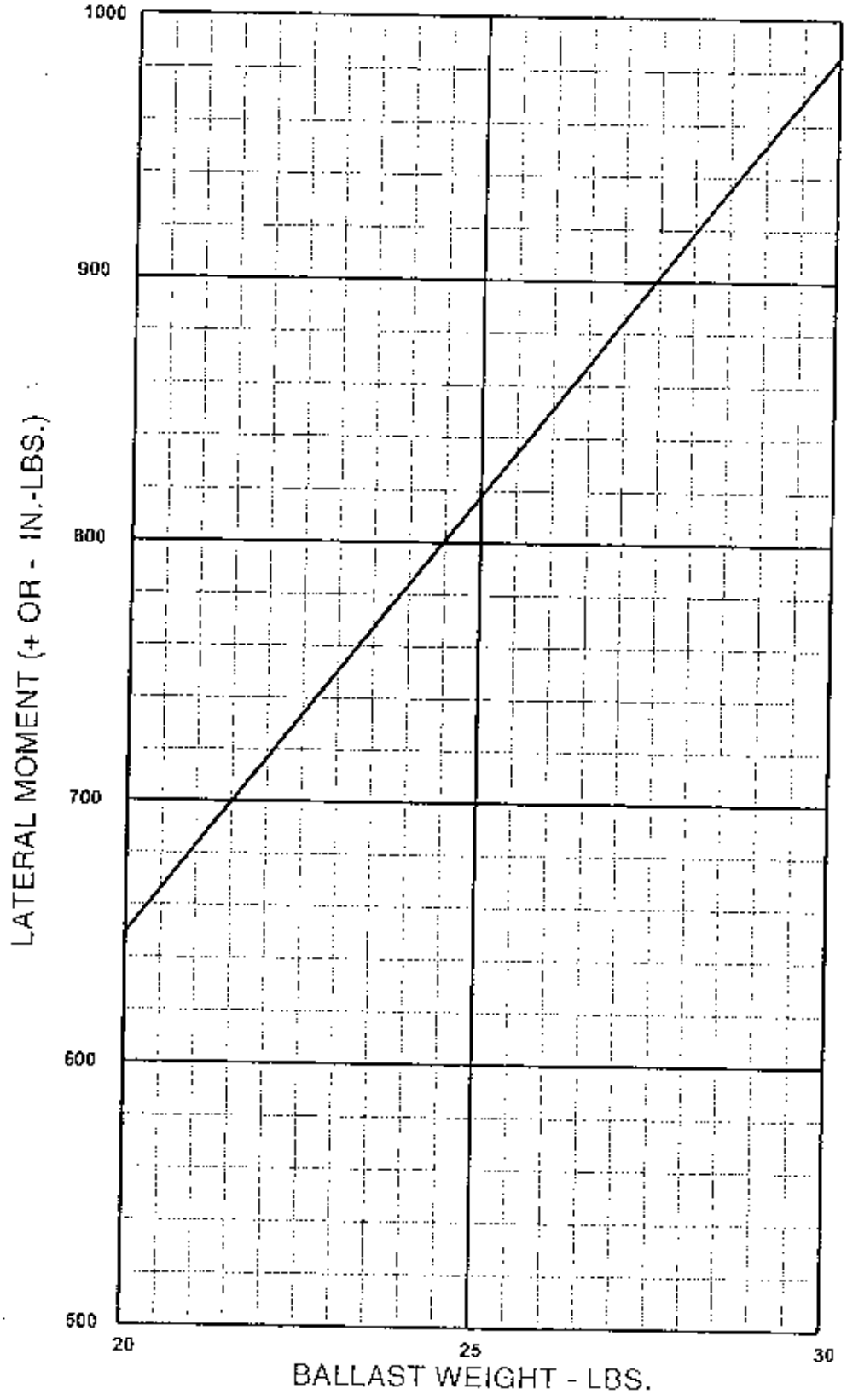

Figure 6-5A. Skid Mounted Ballast Weight - Lateral

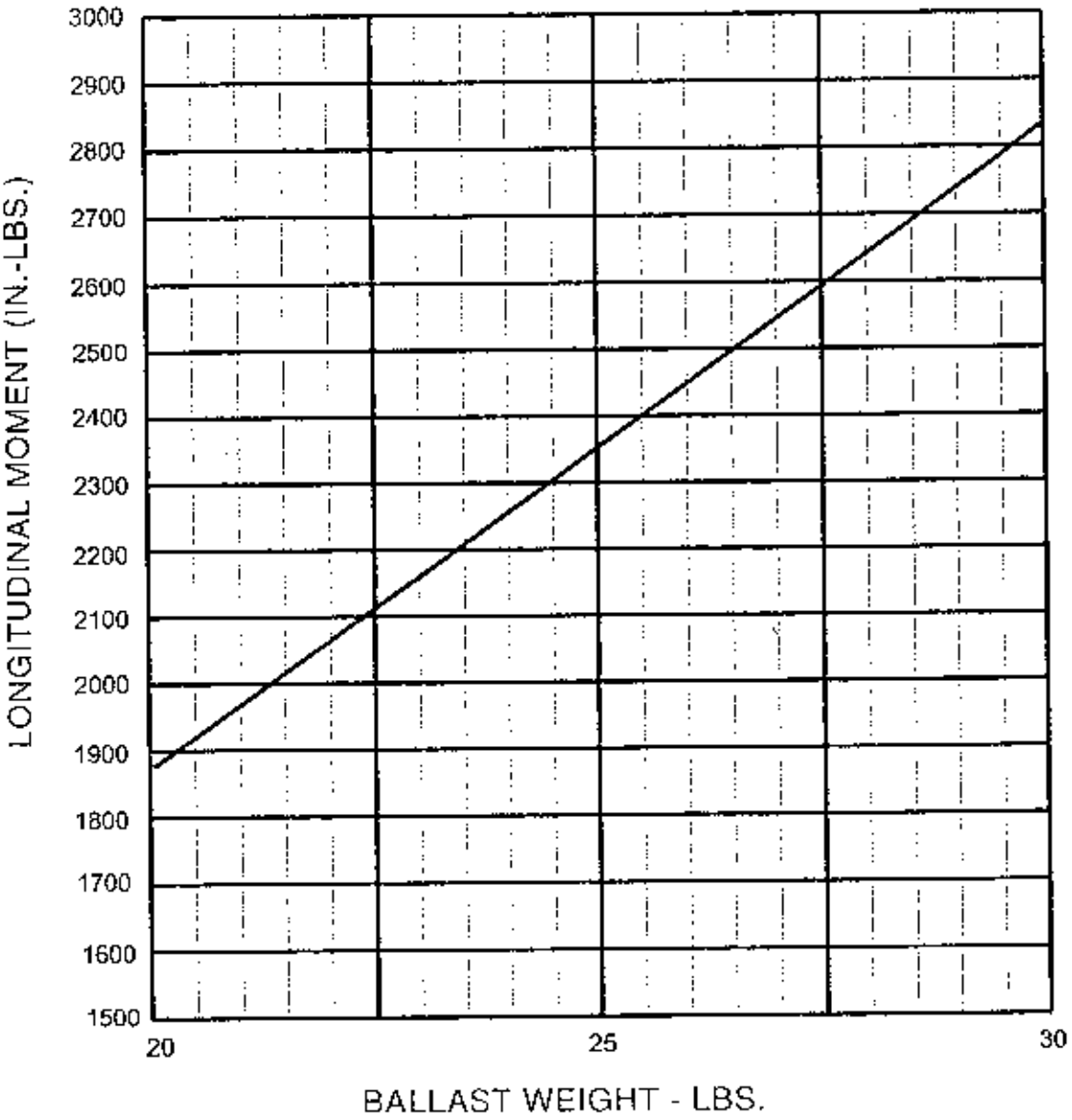

Figure 6-5B. Skid Mounted Ballast Weight - Longitudinal

6-5. WEIGHT AND BALANCE DETERMINATION - PASSENGER CONFIGURATION

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

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

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

- - Add the above items (see Example 1).

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EXAMPLE 1 - Based on 32.5 gallon useable fuel

Items	Weight (lb)	Longitudinal Moment (in.-lb.)
Delivered Weight	1,127	113,663
Pilot - Left-Hand Passenger - Right-Hand Passenger - Center	170 170 170	14,144 14,144 13,600
1. Sub-Total Gross Weight Fuel	1,637 195	155,551 21,158*
2. Gross Weight	1,832	176,709

*Fuel CG is 108.5 for S/N 1743, 1744, 1746 and subsequent.
Fuel CG is 107.0 for S/N 004 thru 1742 and 1745.

- Calculation of Longitudinal CG

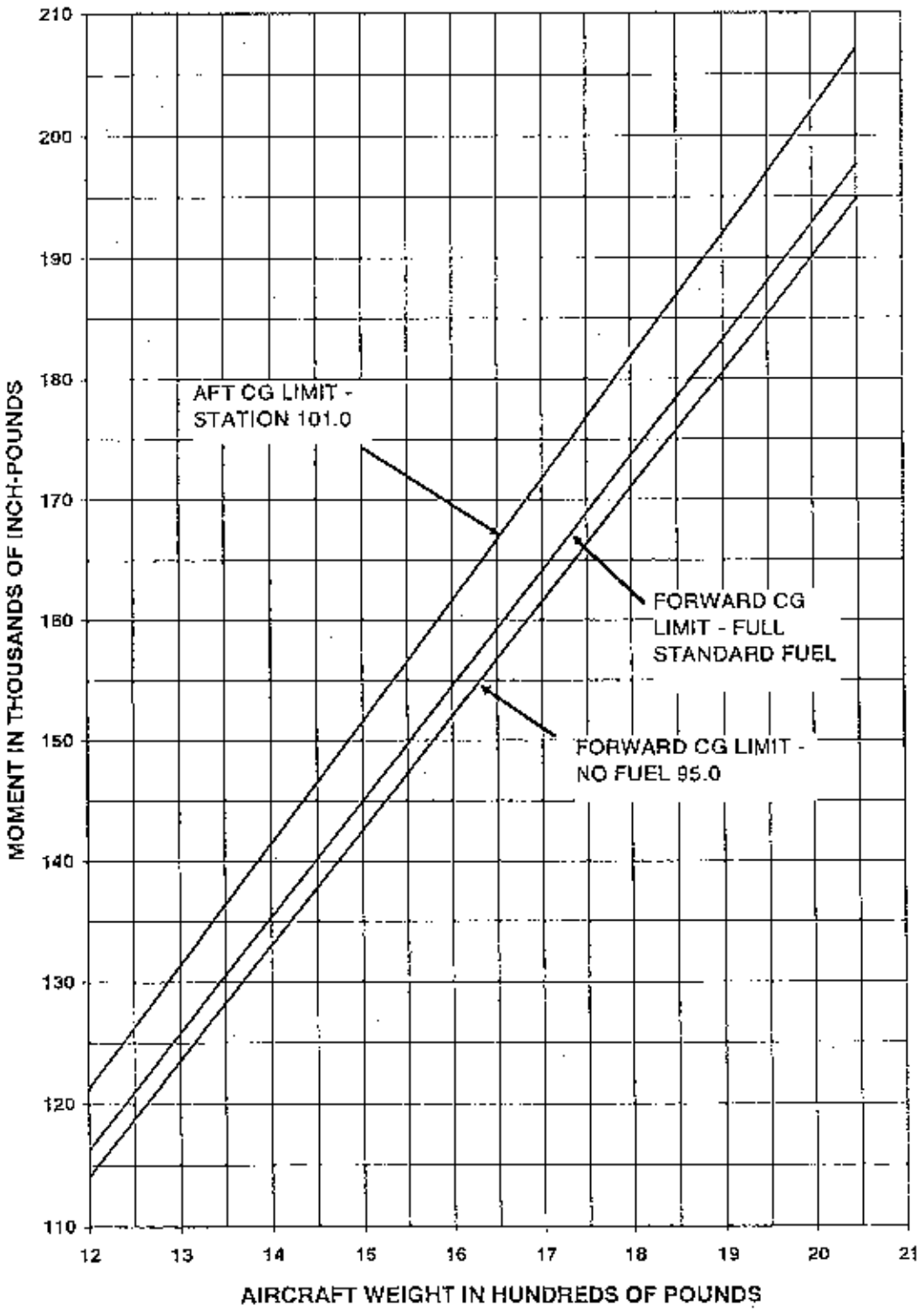
- CG (Zero Fuel Weight):

$$\frac{\text{Moment at Zero Fuel Weight}}{\text{Zero Fuel Weight}} = \frac{155{,}551}{1{,}637} = 95.0 \text{ in.}$$

- CG (Gross Weight):

$$\frac{\text{Moment at Gross Weight}}{\text{Gross Weight}} = \frac{176{,}709}{1{,}832} = 96.5 \text{ in.}$$

Note: The CG's fall within the limits specified in Figure 6-6; therefore, the loading meets the longitudinal CG requirements, for full fuel as well as zero fuel.



NOTE: This chart applies to the longitudinal center of gravity limits noted. CG limit changes or restrictions resulting from special kit installations require that CGs be determined by dividing total moment by total weight for both zero and full fuel conditions.

Figure 6-6. Loading Chart - Longitudinal

6-6. PERMISSIBLE LATERAL LOADINGS - PASSENGER CONFIGURATION

- 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.

- All combinations of passenger loadings are permissible if gross weight, longitudinal, and lateral center of gravity considerations permit.

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

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

  - Determine weight and lateral moment of useful load items (see Figure 6-6A).

  - Add the above items (see Example II).

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

EXAMPLE II - Based on 32.5 useable gallon fuel

Items	Weight (lb)	Lateral Moment (in.-lb.)
Delivered Weight	1,127	+ 481
Pilot - Left-Hand Passenger - Right-Hand Passenger - Center	170 170 170	- 2,346 +2,346 +128
1. Subtotal Gross Weight Fuel - Full Tank (32.5 useable gal)	1,637 195	+609 +3,393
2. New Gross Weight	1,832	+ 4,002

- **Calculation of Lateral CG:**

- CG (Zero Fuel Weight):

$$\frac{\text{Moment at Zero Fuel Weight}}{\text{Zero Fuel Weight}} = \frac{+609}{1{,}637} = +0.4 \text{ in.}$$

- CG (Gross Weight):

$$\frac{\text{Moment at Gross Weight}}{\text{Gross Weight}} = \frac{+4{,}002}{1{,}832} = +2.2 \text{ in.}$$

Note: The determined lateral CGs of +0.4 inch and +2.2 inch for longitudinal CGs of 95.0 inch and 96.5 inch respectively, fall within the established CG limits. (Reference Figure 6-1 and Example I.)

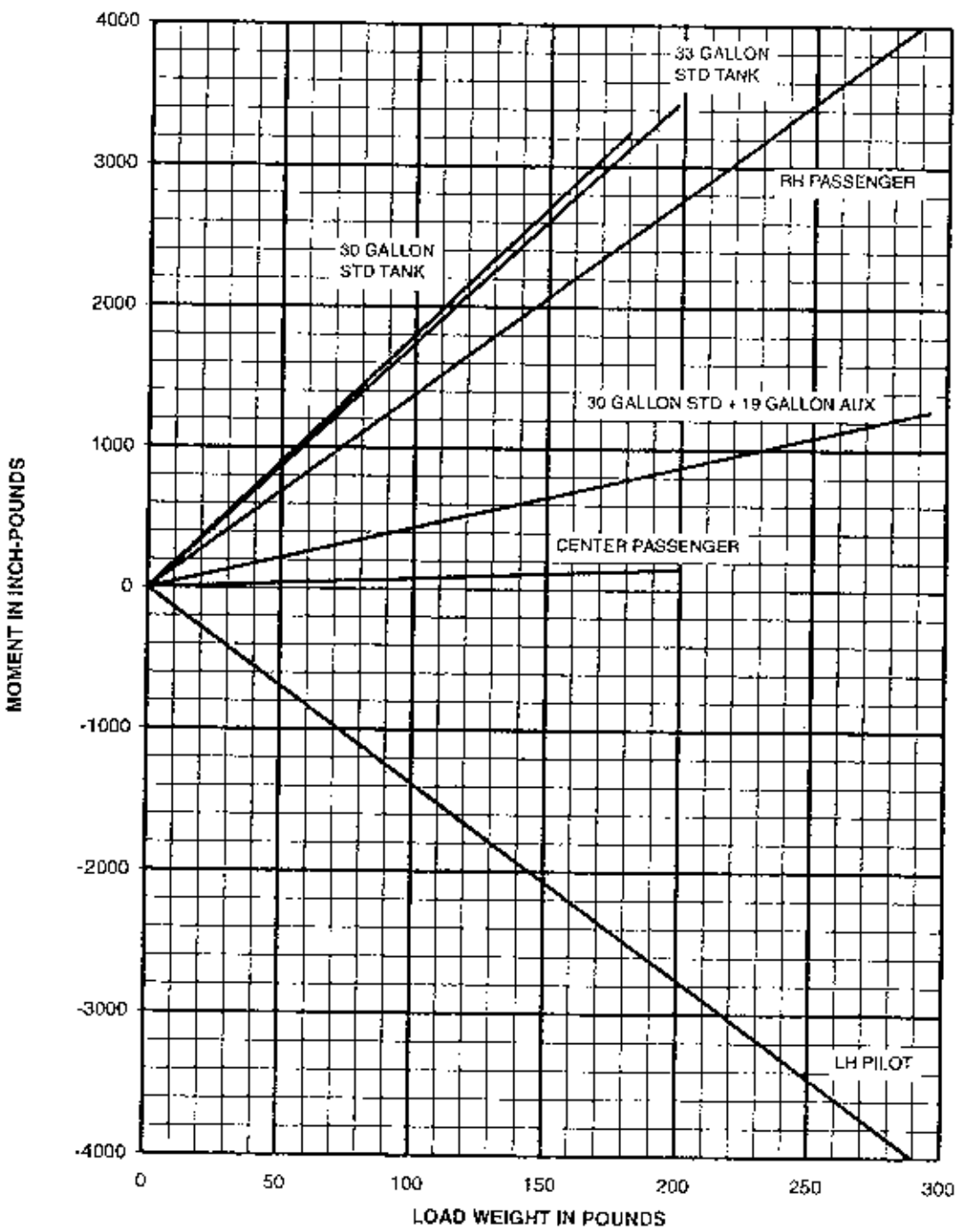


Figure 6-6A. Weight and Moment Chart - Lateral

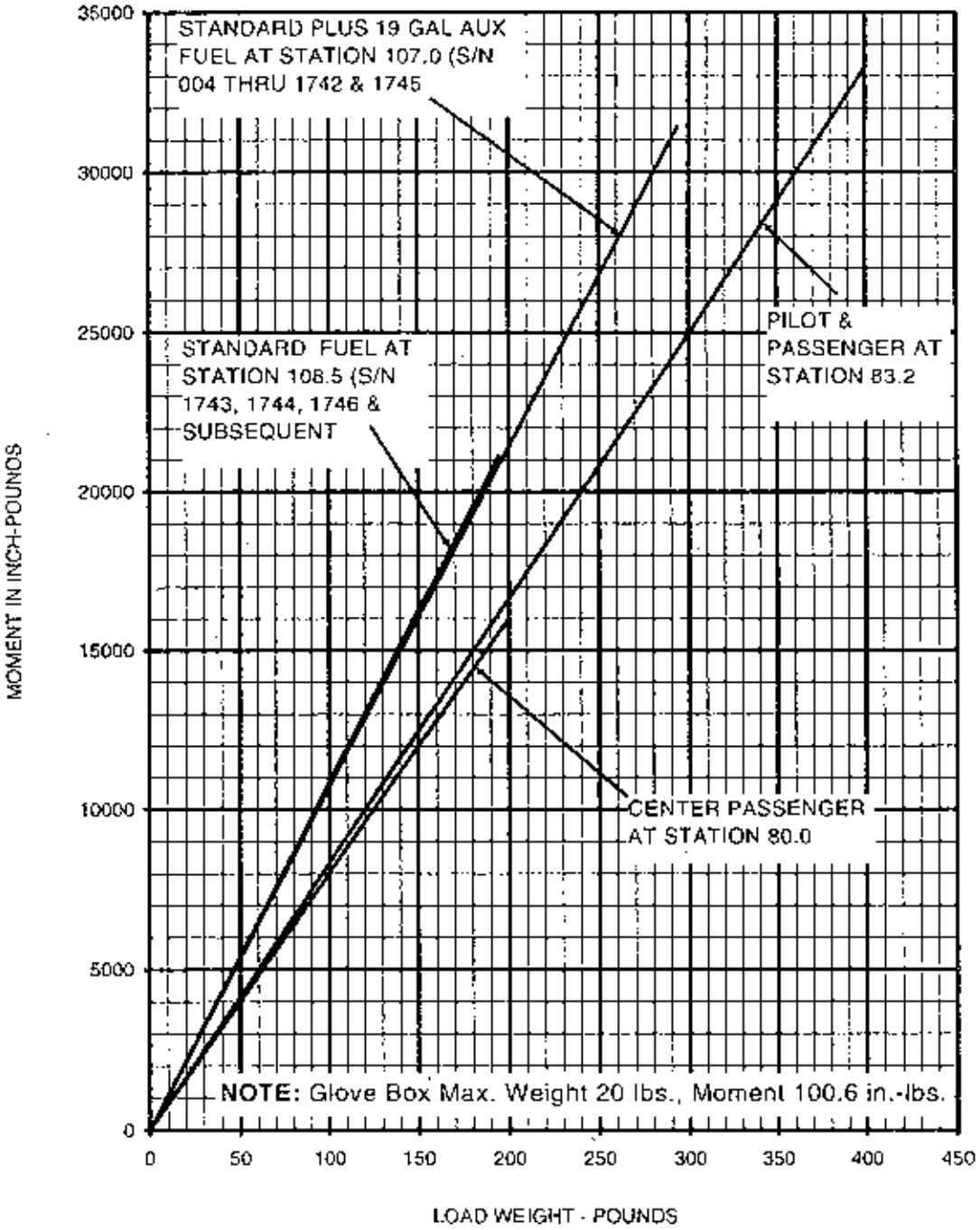


Figure 6-7. Weight and Moment Chart - Longitudinal (30 gal. std. tank)

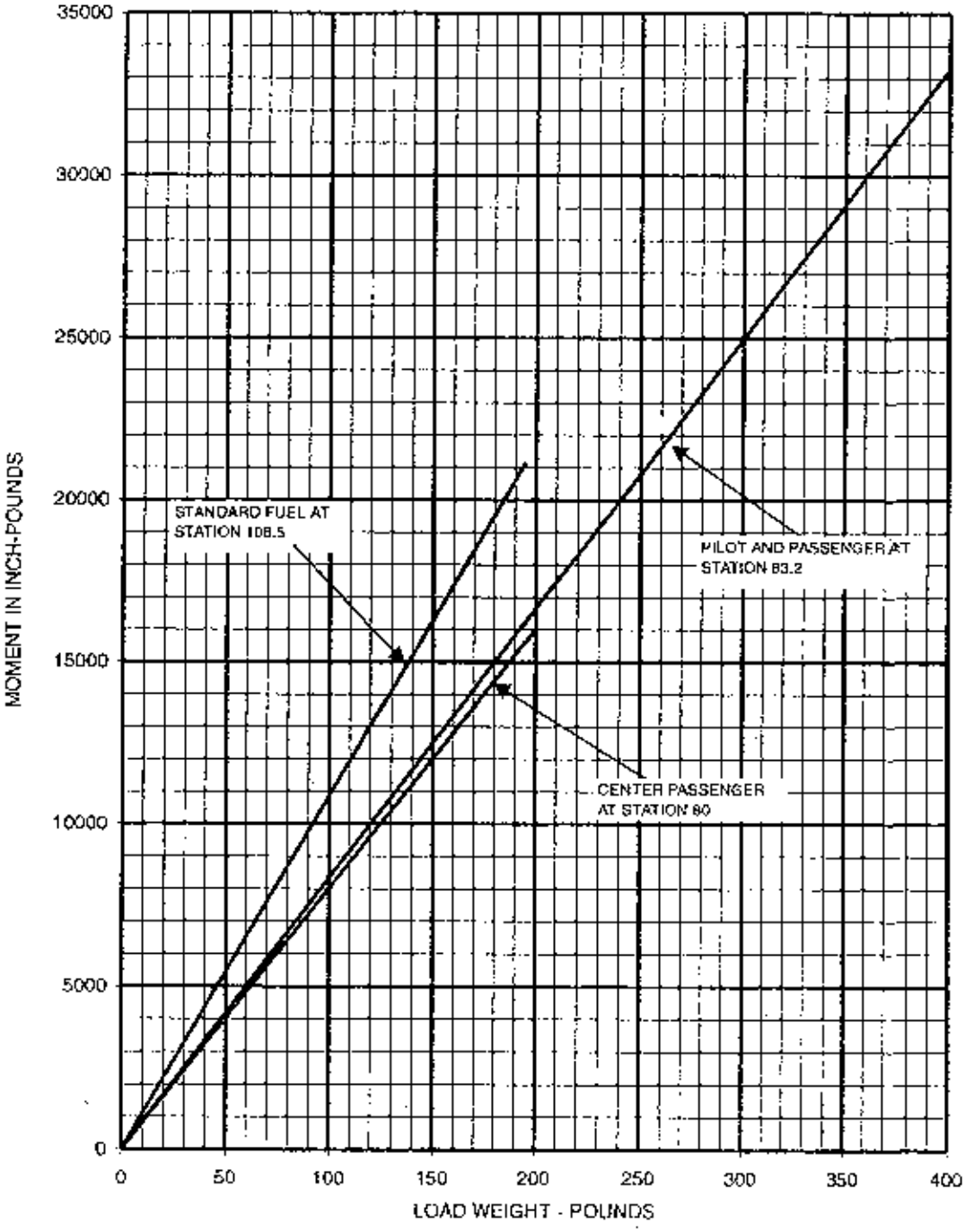


Figure 6-8. Weight and Moment Chart - Longitudinal (33 gal. std. tank)

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Section VII

AIRCRAFT HANDLING, SERVICING AND MAINTENANCE

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Section VII

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Section VII

AIRCRAFT HANDLING, SERVICING AND MAINTENANCE

CAUTION

For complete servicing requirements, refer to the handbook of maintenance instruction.

7-1. SERVICING

7-2. GENERAL

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

7-3. FUELING HELICOPTER

- The helicopter main fuel tank is located externally on the aft side of the right-hand seat structure; an auxiliary tank may be installed aft of the left-hand seat structure. The tanks (main and auxiliary) 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 AIRCRAFT CORP. 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.

- Fire extinguisher shall be readily available for all fueling and defueling operations.

- Refueling vehicle should be parked with exhaust outlet a minimum of 20 feet from helicopter filler point during fueling operation.

- Before starting fueling operation, connect ground wire from fueling nozzle or from fuel truck to the GROUND HERE receptacle or other bare metal location on helicopter.

- No smoking or open flame within 100 feet of the helicopter and fuel truck.

Fuel Capacity:

Table 7-1. Fuel Quantity

Tank	Total	Usable
Main	30 U.S. gallons	29.8 U.S. gallons
Aux (if installed)	19 U.S. gallons	18.8 U.S. gallons
Total	49 U.S. gallons	48.6 U.S. gallons
OR For Later Aircraft		
Main	33 U.S. gallons	32.5 U.S. gallons

See Supplement CSP-C-1R for 65 gallon auxiliary fuel system or CSP-C-1U for 66 gallon auxiliary fuel system.

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

7-4. 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:

Place a chamois in a clean 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.

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

WARNING

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

- Visually check fuel level; install fuel tank cap and verify that cap is secure.

- Remove ground wire.

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

- Rotate open fuel tank drain valve lever or as required fuel strainer drain valve. Allow sufficient time (about 8 to 10 seconds) for drainage to eliminate all foreign material.

WARNING

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

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

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

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.

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

1. Defuel through the filler port, using a pump.

2. Defuel by opening the fuel system drain valves.

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

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

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

- After defueling ensure that the drain valves are closed and secure.

7-5. 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 Lycoming Service Bulletin No. 480 latest revision for oil and oil filter change intervals and oil screen cleaning interval recommendations.

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

Filling - Engine Oil System

- Visually check oil level on dipstick. If oil level is at 6-quart graduation or below, add no less than 1 quart of oil.
- Using clean oil filler can, add desired quantity of oil.
- Wipe dipstick clean and recheck oil level.
- Install dipstick in engine receptacle and check for security.
- Visually check oil system components for evidence of leakage.

Draining - Engine Oil System

- Place suitable container under the engine oil sump; remove drain plug.
- Allow sufficient time for all oil to drain from sump.
- Clean engine filter screens or change filter.
- Reinstall drain plug in engine sump and attach safety wire.

7-6. BATTERY SERVICING

- The battery stores electrical energy produced by the helicopter generator/alternator and supplies current to the electrical system on demand. The helicopter uses a 12- or 24-volt battery located on either right or left-hand aft side of the center-section frame, depending on the particular helicopter. The battery is in a mounting bracket and is secured by a clamp.
- Overfilling and overcharging the battery are two common causes of electrolyte spillage during helicopter flight. To preclude corrosion of the structure and any possible deterioration of flotation gear fabric material due to battery acid spillage or spewing, perform these few simple servicing precautions:

- Maintain the proper electrolyte level in the battery; do not overfill.
- Maintain the proper charging rate (voltage) of the helicopter electrical system.
- Visually inspect battery for cracks, spilled electrolyte, corrosion, and security of mounting.
- Visually inspect adjacent structure for evidence of corrosion and spilled electrolyte.
- Remove spilled electrolyte from battery and adjacent components.
- If flotation gear is installed, wash floats regularly every week or two weeks.
- Unscrew filler caps at top of battery.
- Visually inspect electrolyte level in all cells. Maintain battery electrolyte level at bottom of filler tube (3/16 inch above plates).
- Add distilled water as required, and recheck electrolyte level.
- Install filler caps.

7-7. 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 CABLE 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:
  - Battery switch OFF
  - Connect positive lead to battery (+ pos)
  - Connect negative lead to fuselage or engine ground strap (Do not connect to battery terminal) (– neg)
  - Accomplish normal start
  - Disconnect jumper cables

7-8. 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 main-

tained, there should be no leakage or electrolyte damage to the structure or flotation gear.

- Mix one part baking soda to three parts water.

CAUTION

DO NOT ALLOW SODA SOLUTION TO ENTER BATTERY CELLS.

- Using mixed soda solution, thoroughly flush affected areas.
- Rinse affected areas with clear water and wipe dry with clean cloth.
- For additional protection of floats, coat the float fabric in the area behind the battery with DP-402 sealant. (HH Letter L-73 also provides this instruction.)

7-9. 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 MIL-L-2105B approved for use at -18°C (0°F) to 43°C (110°F).
- SAE HD80 MIL-L-2105B 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.

- Check oil level via sight gage or dipstick
- Maintain oil level between LOW and FULL graduation.
- Using oil filler can, add desired quantity of oil.
- Recheck oil level. (Wipe dipstick clean if installed)
- Re-install and secure filler cap and/or dipstick.
- Visually check main transmission and components for evidence of oil leakage and security

- Draining - Main Transmission

- 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.
- If damaged, replace O-rings used with drain plug and valve.
- Reinstall drain plug and self-closing valve in oil sump; lockwire in place.

7-10. MAIN ROTOR DAMPERS - SERVICING (Early Model Aircraft)

Note: Late model helicopters are equipped with three elastomeric dampers. The elastomeric is easily recognized; a large diameter cylindrical body is attached directly to the blade root fitting, a rod and clevis protrude from the opposite end and attach to the pitch housing. The action of the damper is in a straight line. No servicing or maintenance of the damper is required other than a visual inspection for general conditions.

- Three dampers control the lead and lag action of the main rotor blades. Inside the damper a combination of rotating and fixed friction plates, held in compression and working in oil, damp blade movement. The dampers attach to the pitch bearing case and the

trailing edge of the blade. Service the dampers with a thorough visual check and maintain a proper oil level.

- Recommended Lubricants

- Hydraulic Oil, Petroleum base MIL-H-5606
  MIL-H-6083 (alternate)

- Position main rotor blade for convenient view of damper liquid level plug window, collective down, helicopter level, cyclic forward and to right with friction locked.

  Note: Position blades by rotating the tail rotor drive shaft by hand until blade to be checked is parallel with canopy slat and on right side of helicopter.

- Visually check oil level in window.

  Note: Damper oil reservoir is full when oil level appears half-full in window. Oil level 1/8 inch above half-full mark is allowable maximum. Any fluid visible in window is allowable minimum provided damper is not leaking. Add oil according to listing below.

- Cut lockwire and remove damper filler plug.

- Remove damper vent screw.

- Using oil can, add required amount of oil.

- Visually check for proper oil level in window.

- Install damper vent screw.

- Install damper filler plug and lockwire.

- Visually check damper assemblies and components for oil leaks and obvious damage.

7-11. 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 ½ pint total

- Recommended Lubricants

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

- SAE HD80 MIL-L-2105B 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.

- With helicopter level, visually check oil level in liquid level plug window. Tail rotor transmission, oil must be at FULL mark.

- Cut lockwire and remove breather filler plug.

- Using oil filler can, add required amount of oil.

- Visually check liquid level plug for proper oil level.

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

- Visually check transmission assembly for leakage and obvious damage.

- Draining - Tail Rotor Transmission.

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

- Remove lockwire, chip detector and self-closing valve. Allow sufficient time for all oil to drain from transmission.
- If damaged, replace O-rings used with chip detector and self-closing valve.
- 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.
- Wipe dry any oil spillage with a clean cloth moistened with dry-cleaning solvent.

7-12. 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
  - 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.
  - 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.

  - Using damp chamois, dry panels.

- Visually inspect panel for cracks, scratches, gouges, and crazing.

- 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.

7-13. LANDING GEAR DAMPERS - INSPECTION

- Four poppet type nitrogen charged hydraulic units in the landing gear assembly dampen landing shock and 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 during each Daily 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.

- Visually inspect landing gear dampers for leakage. Replace damper if loss of hydraulic oil is noted.

- Observe stance of helicopter. If stance is nose down or if extension of aft dampers appears to be unusual, perform the following checks.

- Raise and lower the tailboom above and below the normal at-rest position three times.

- 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.

- 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	
	Left	Right	Left	Right
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.

7-14. CLEANING INDUCTION SYSTEM - FILTER

- The filter removes all foreign material from the air before it enters the induction system. The filter element material is either porous paper or foam, and is installed in the plenum chamber located in the bottom of the lower forward fairing. With a paper filter installed, servicing consists of removal, cleaning, and inspection of the filter, plenum chamber, valve, and components. With a foam filter installed, servicing is identical except that no filter cleaning is allowed. (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 used for agricultural dusting and spraying or is operated in extremely dusty environment.

- Remove pin securing induction air filter housing cover and remove cover and filter.

- Visually inspect filter element for dents, tears, or other physical damage.

- Using soft cloth, remove foreign material from inside induction plenum chamber.

- (Paper filter only) Use low pressure compressed air to blow all foreign material from filter element; blow outward from inside the filter.

- (Paper filter only) Use a strong light, and position filter element between light and field of vision. If light is visible through porous

portion of filter, the filter is serviceable. If no light is visible, replace the element.

- Use soft cloth to remove foreign material from inside induction air filter housing cover assembly.
- Visually inspect the plenum chamber, bypass valve, and associated components.
- Hold cover assembly level and position filter element on seal inside cover. Position filter element against gasket on upper surface of induction plenum chamber.

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 AND COVER.

- Install washers and pin securing induction cover assembly and filter.
- Check that bypass valve at top of air filter is seated.

7-15. TAIL ROTOR PEDAL - ADJUSTMENT

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

7-16. 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.).

7-17. HOURMETER INSTALLATIONS

One standard and two optional hourmeter installations are offered on the Model 269C 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 value 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 HMI, Appendix B).

The hourmeter(s) (standard and/or optional) should not be used as the sole means for determining the number of flight hours used. Flight hours recorded by the pilot should be used to confirm the accuracy of the hourmeter(s) reading.

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 stick 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 the fuselage 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 slot. Install quick-disconnect pin. Rotate throttle control and observe pi-

lots collective throttle control handle for corresponding action and observe that throttle arm reaches full open and full closed stops at the fuel injector.

- 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. Check position of rubber boots and adjust 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. Locate spring loaded hinge pin tabs in 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.

7-20. REMOVABLE SKID MOUNTED BALLAST

1. Installation of ballast.

- Align the hole of the weighted base mount with the ground handling wheel bushing located in the skid tube. Insert the mount retention pin through the mount and bushing until the pin head is flush with the mount. Secure the pin in place by inserting the self-locking pin through the safety pin hole in the end of the pin.

- As required, install second ballast weight on top of the weighted base and secure to the base with two bolts in opposite corners.

- Using the actual weight numbers that are stenciled on the individual weights, calculate weight and balance in accordance with Section 6.

2. Removal of ballast.

- As required, remove top ballast weight by removing two bolts and remove weight from base.

- Remove weighted base from skid tube by removing self locking pin from base retention pin and remove retention pin from skid bushing and base. Lift weighted base mount from skid tube.

- Using the actual weight numbers that are stenciled on the individual weights, calculate weight and balance in accordance with Section 6.

Section VIII

ADDITIONAL OPERATIONS AND PERFORMANCE DATA

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Section VIII

ADDITIONAL OPERATIONS AND PERFORMANCE DATA

- Information given in this section is provided by the manufacturer to further inform the pilot of the helicopter's capabilities. By use of the data in this section the pilot may obtain maximum utilization of the helicopter.

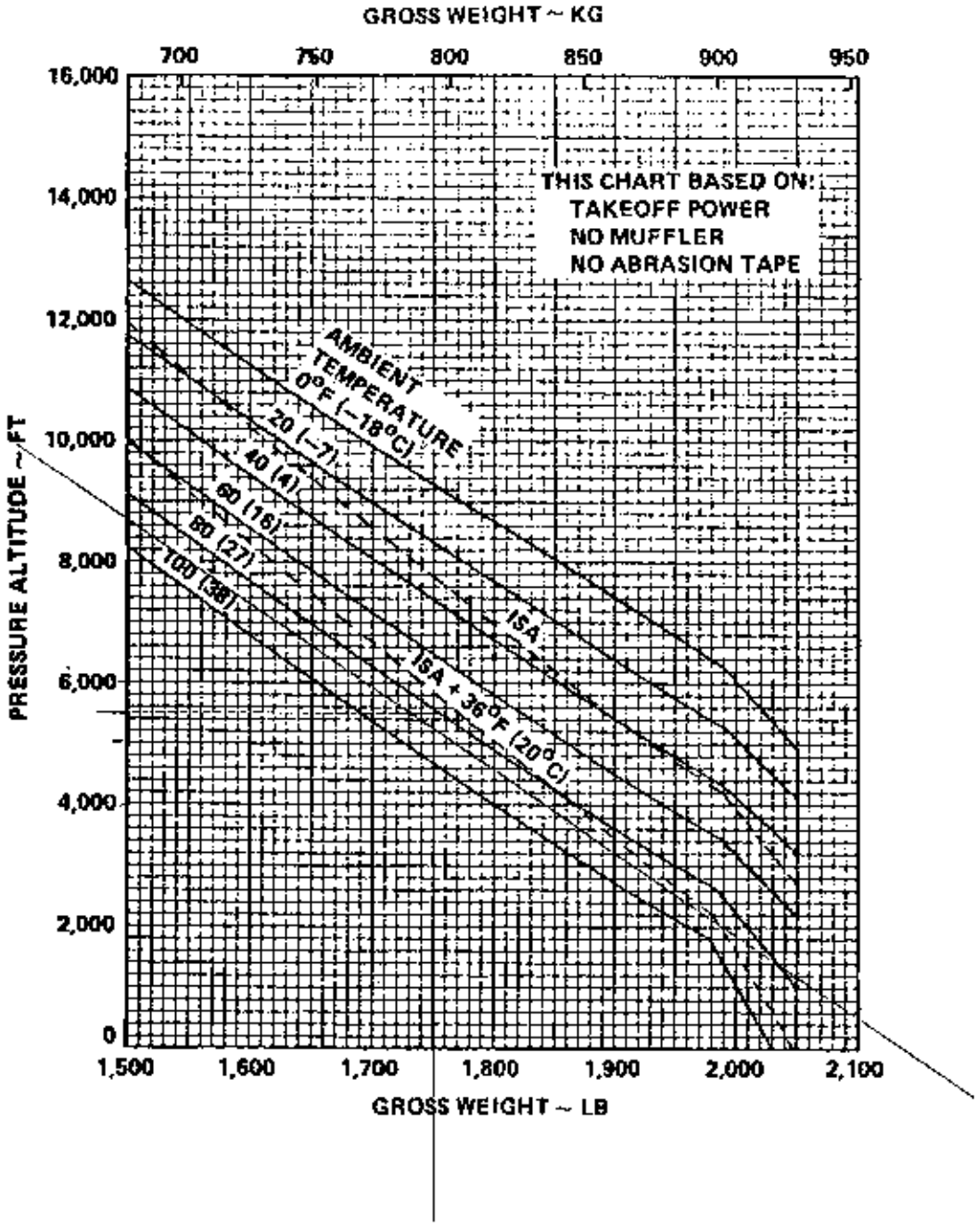
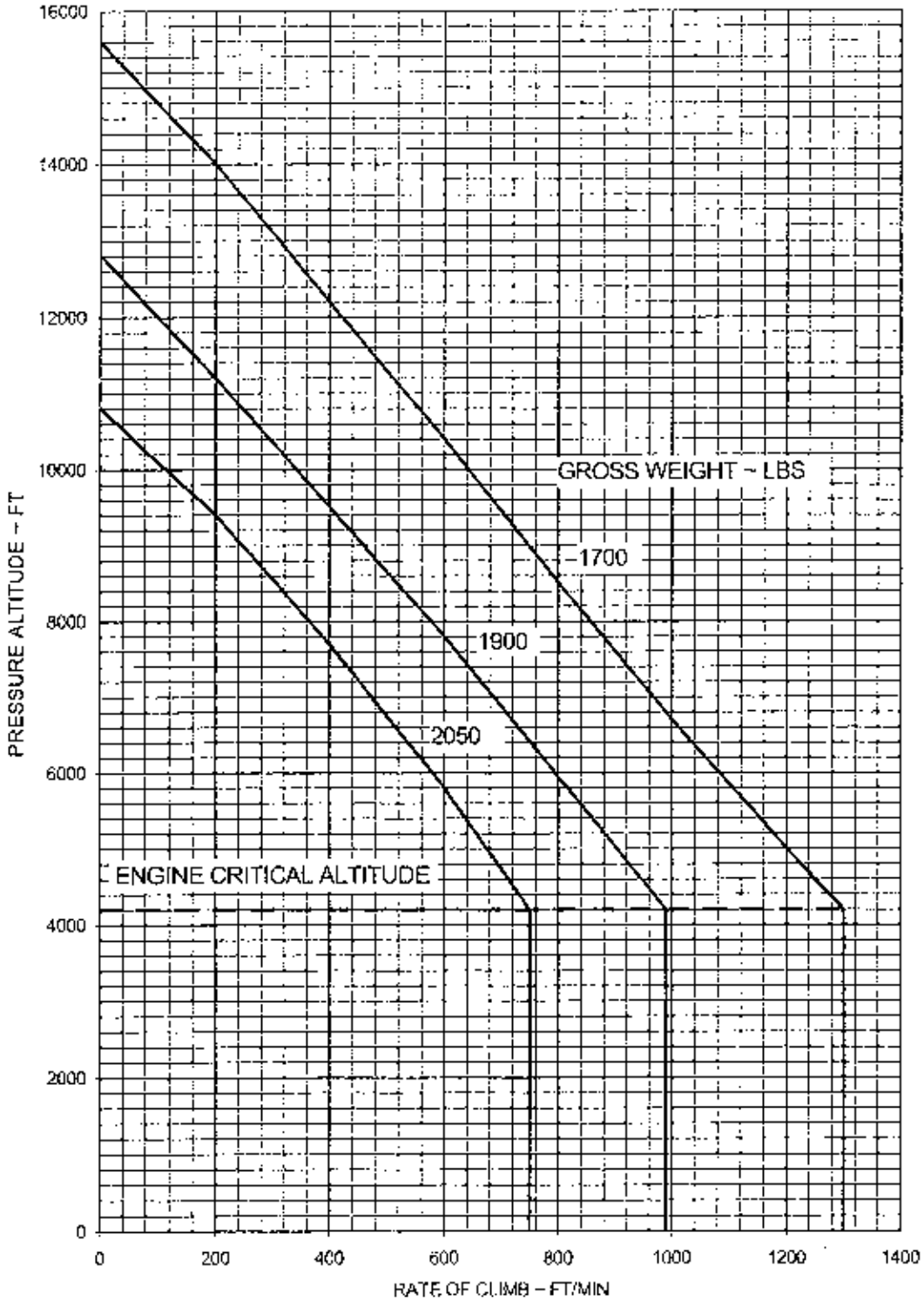
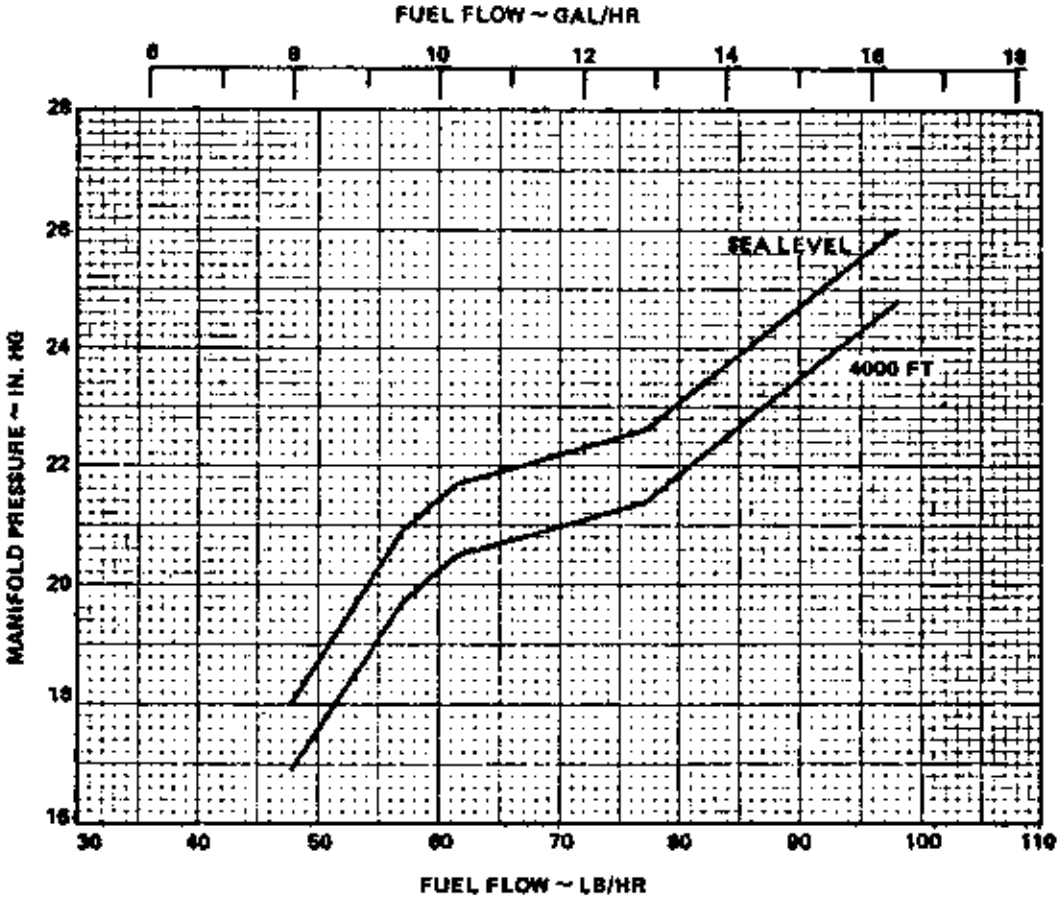


Figure 8-1. Hover Ceiling Out of Ground Effect Versus Gross Weight (3200 rpm)



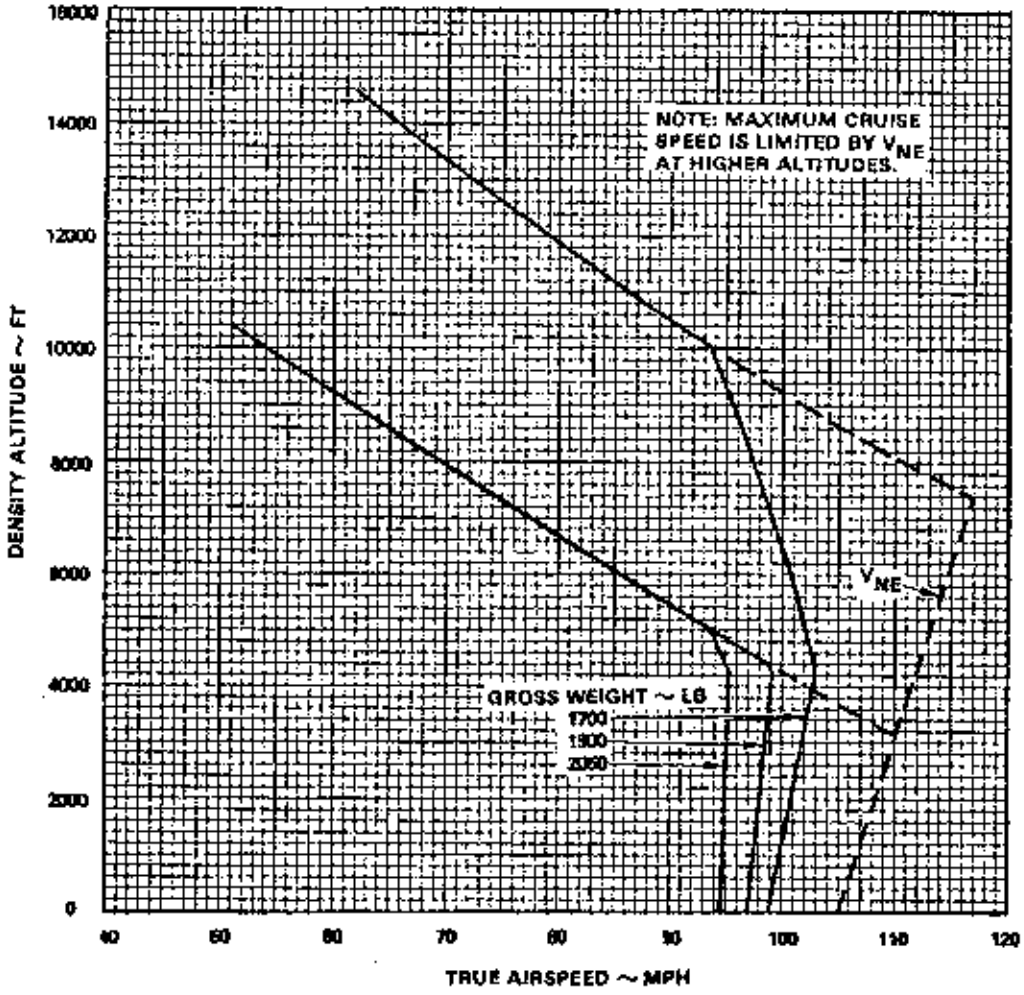
Standard Day, No Muffler, 3200 rpm, Maximum
Rate of Climb Speed: 47 mph (41 knots) IAS

Figure 8-2. Rate of Climb Chart



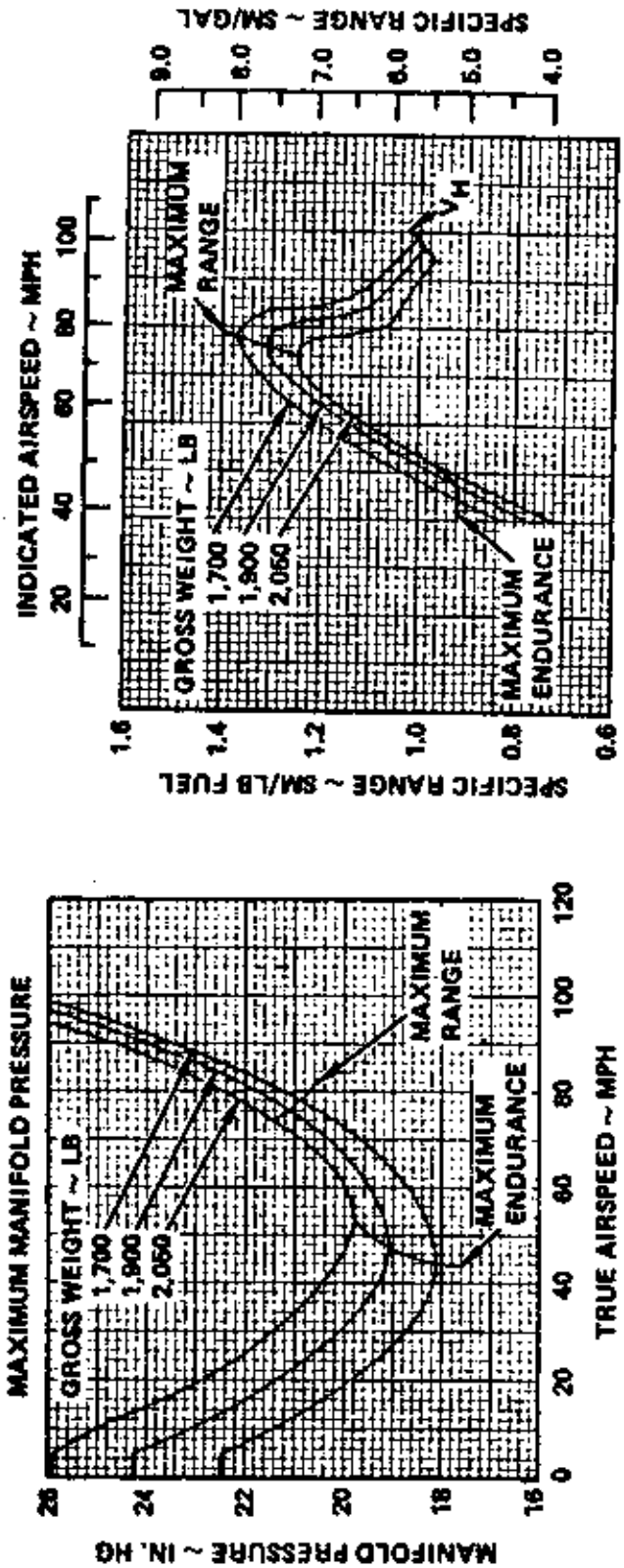
Standard Day, No Muffler, Lycoming HIO-360-D1A, 3200 Engine RPM

Figure 8-3. Fuel Flow



3200 rpm, No Muffler

Figure 8-4. Maximum Cruise Speed



Sea Level, Standard Day, 3200 Engine rpm, No Muffler

Figure 8-5. Cruise Chart

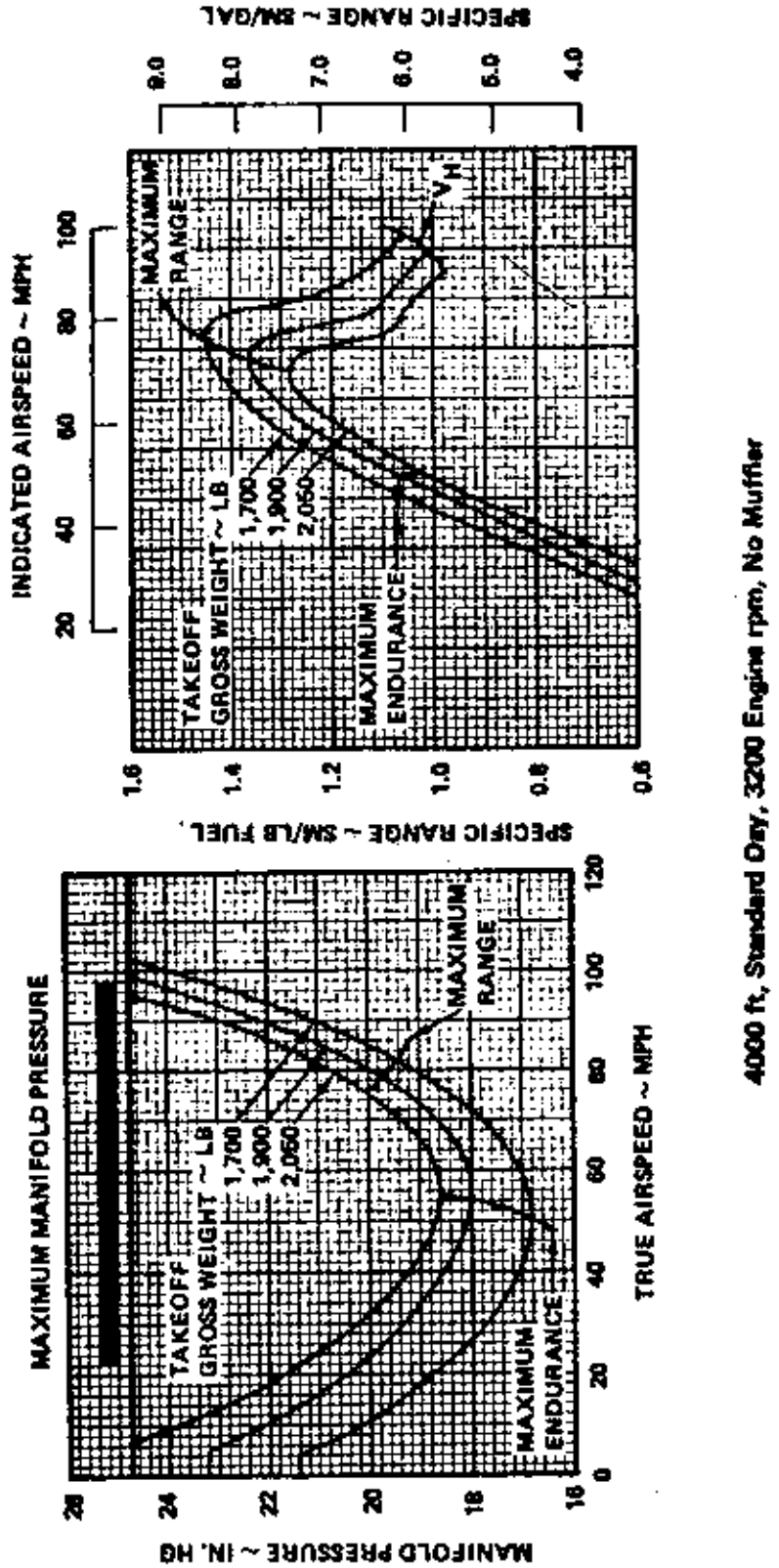
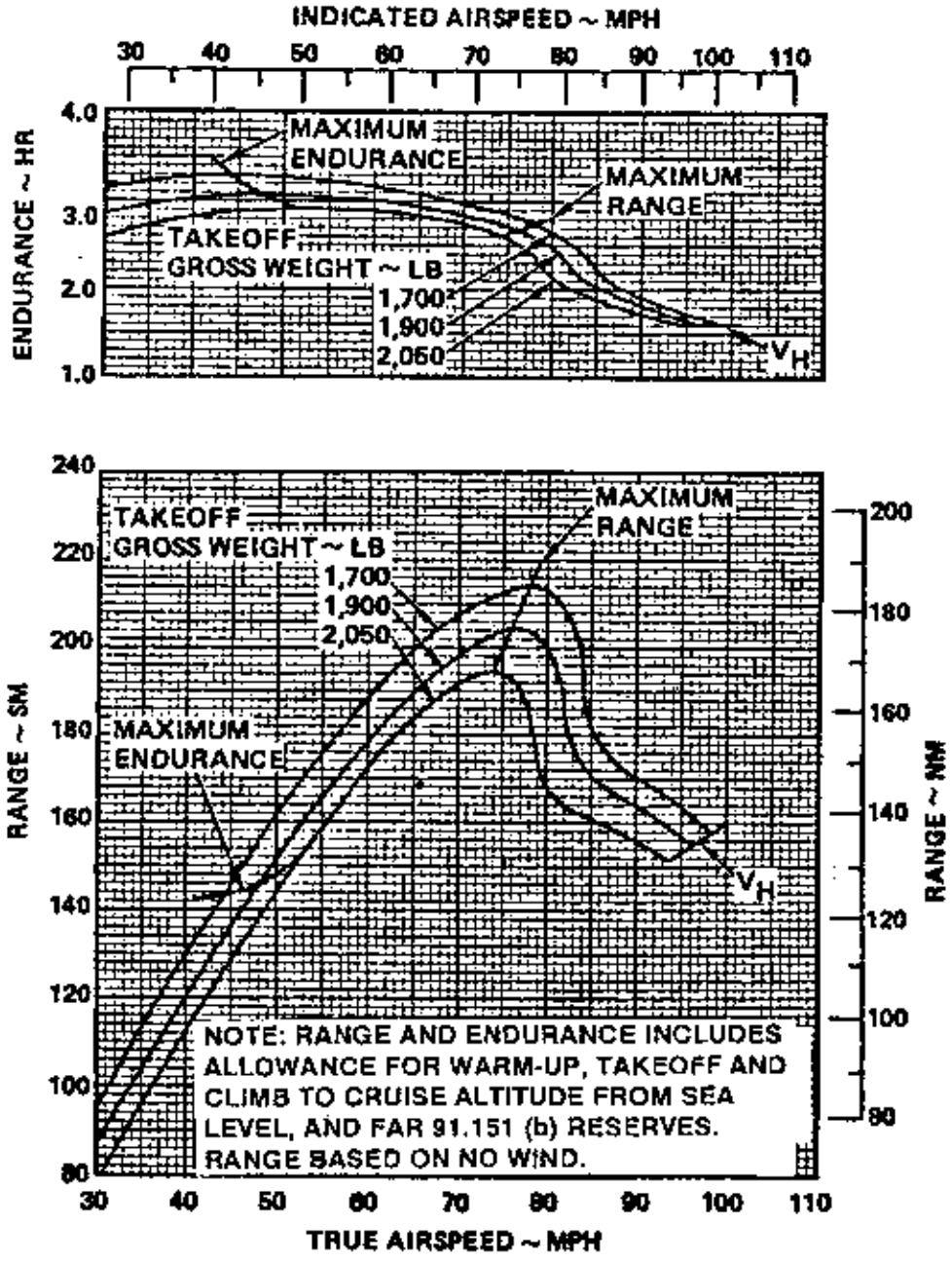


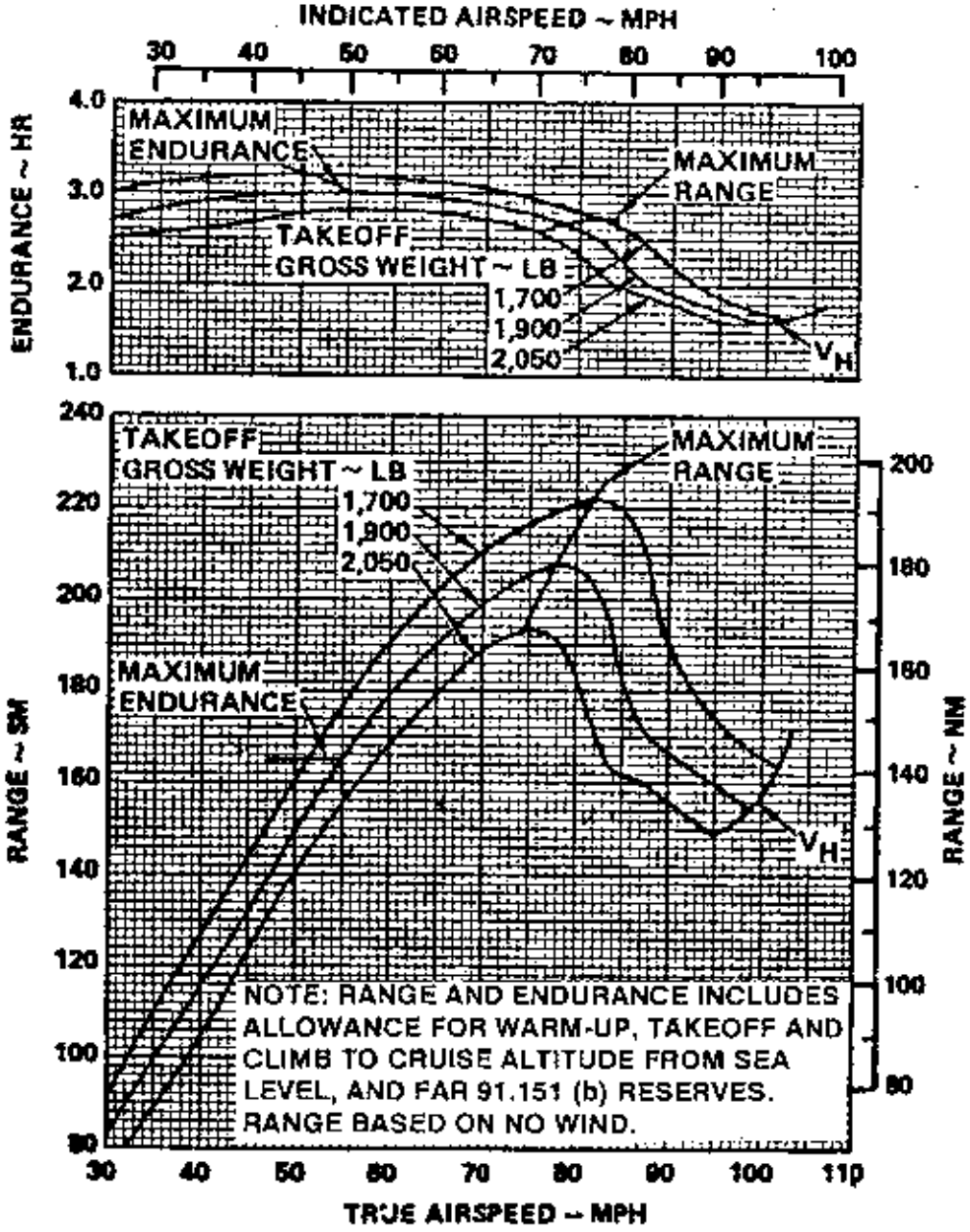
Figure 8-6. Cruise Chart



Sea Level, Standard Day, 3200 Engine rpm, No Muffler

Note: Charts are based on 30.0 gallon standard tank, use of these charts is conservative for aircraft with a 33.0 gallon standard tank.

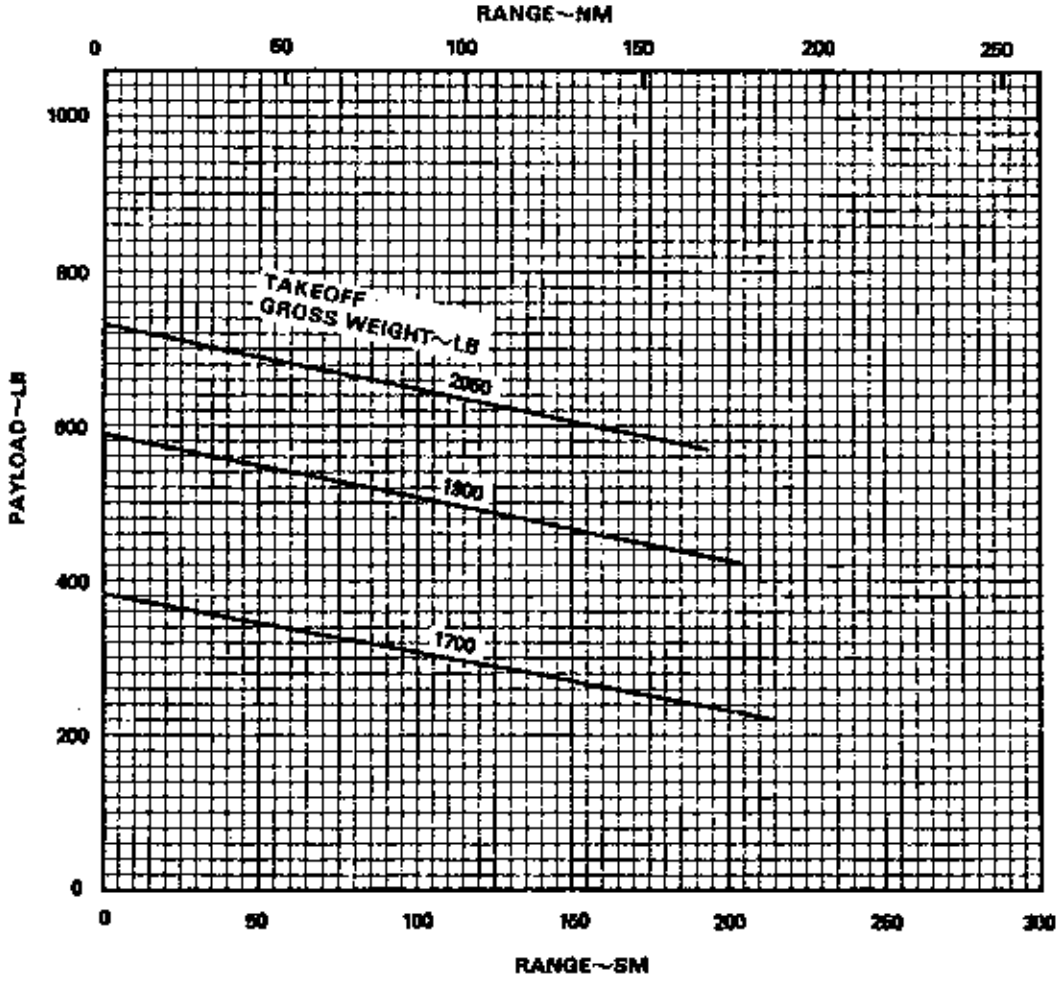
Figure 8-7. Range and Endurance



4000 ft, Standard Day, 3200 Engine rpm, No Muffler

Note: Charts are based on 30.0 gallon standard tank, use of these charts is conservative for aircraft with a 33.0 gallon standard tank.

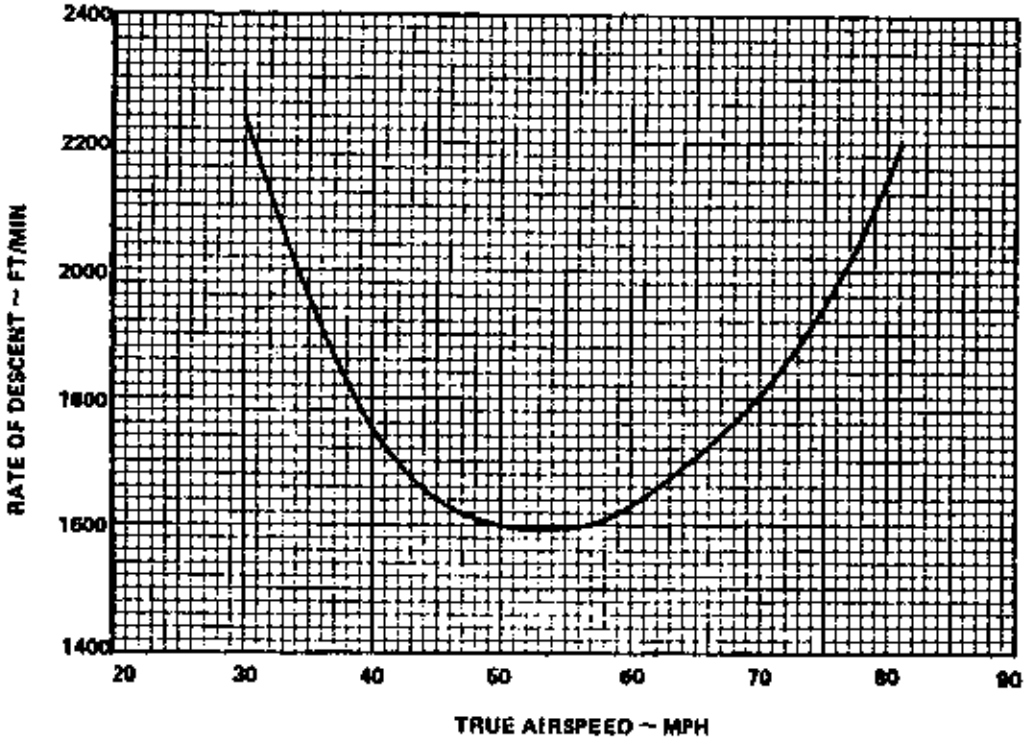
Figure 8-8. Range and Endurance



Sea Level to 4000 ft, Standard Day, 3200 Engine rpm, No Muffler

This chart shows the range trend that results from trading off fuel against payload, while keeping a constant gross weight. Maximum range for each gross weight includes a full fuel load at takeoff. Range includes allowance for warmup, takeoff, and climb to cruise altitude from sea level with reserves per FAR 91.22 (b). Range is based on no wind and cruise at maximum range speed.

Figure 8-9. Payload - Range



Autorotation, 471 Rotor rpm

Figure 8-10. Rate of Descent

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Section IX

OPTIONAL EQUIPMENT SUPPLEMENTS

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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 helicopter. The information includes a listing of usable optional equipment, compatibility of combined equipment on the helicopter and a listing of major optional equipment part numbers, publication titles and publication numbers.

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

9-2. LISTING - OPTIONAL EQUIPMENT

- Table 9-3 lists optional equipment available for and usable on the Model 269C Helicopter.

9-3. COMPATIBILITY - COMBINED OPTIONAL EQUIPMENT

- Table 9-3 identifies which optional equipment items may be used in combination on the helicopter at the same time.

9-4. 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.

9-5. 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
RES	resistant
STD	standard
T/R	tail rotor
UNIV	universal
WT	weight

9-6. OWNERS MANUAL SUPPLEMENTS

- Table 9-2 is a list of publications available to owners of the Model 269C helicopter.

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

CSP-C-1A Amphibious Float Landing Gear PN 269A4300-9	Approved: 26 Jun 1970 Reissued: 21 Sep 1988
CSP-C-1B Amphibious Float Landing Gear PN 269A4300-15	Approved: 27 May 1998
CSP-C-1C Combination Dispersal Ag Kit PN 269A4153	Approved: 07 Oct 1971 Reissued: 21 Sep 1988
CSP-C-1D Right Hand Litter & Litter Float Kit PN 269A4301-51 & 269A4301-39	Reissued: 21 Sep 1988 Revised: 04 Oct 1996
CSP-C-1E Utility Baggage Rack Kit PN 269A4887-1	Approved: 10 Oct 1973 OBSELETE Reissued: 21 Sep 1988
CSP-C-1F Rotorcraft Dual Engine RPM Operation	Approved: 18 Dec 1973 Reissued: 21 Sep 1988
CSP-C-1G Cargo Hook Installation Kit PN 269A4971	Approved: 23 Mar 1976 Reissued: 21 Sep 1988
CSP-C-1H Siren Installation (Federal PA-100) Kit - PN 269A4960	Approved: 23 Mar 1976 Reissued: 21 Sep 1988
CSP-C-1I Engine Throttle Governor Installation - PN 269A4995-301/-303	Approved: 18 Dec 1980 Reissued: 21 Sep 1988 Revised: 19 Aug 1991

CSP-C-1J Nickel Cadmium Battery Installation PN 269A4987	Approved: 01 Sep 1988 Reissued: 21 Sep 1988
CSP-C-1K Engine Overspeed Installation PN 269A4997-1 and 269A4997-3	Reissued: 21 Sep 1988 Revised: 13 Mar 1997
CSP-C-1L Rotorcraft Combination Dispersal Ag Kit PN 269A4153-3	Approved: 30 May 1986 Reissued: 21 Sep 1988
CSP-C-1M Optional Instrument Panel / Console Inst. PN 269A4540	Approved: 12 Aug 1988
CSP-C-1N Optional Instrument / Avionics Inst.	Approved: 12 Aug 1988 Revised: 29 Mar 2001
CSP-C-1Q Garmin GSP150/150XL Navigation System	Approved: 9 Mar 1994 Revised: 13 Apr 1999
CSP-C-1R 65.2 Gallon Auxiliary Fuel System Inst. PN 269A8359-7	Approved: 27 Feb 1997 Revised: 18 Dec 2006
CSP-C-1S Cabin Heater Kit Inst. PN 269A4451-105, -107, -115 & -117	Approved: 18 Jul 1997 Revised: 06 May 2003
CSP-C-1T Extended Height Landing Gear PN 269A3260-1	Approved: 12 Nov 1997
CSP-C-1U 66 Gallon Auxiliary Fuel System Inst. PN 269A8700-9	Approved: 23 Mar 2000 Revised: 18 Dec 2006
CSP-C-1V Special Requirements for Aircraft Exported to China, PN 269A0053	Approved: 04 Jun 2002

CSP-C-1W
"STAR" System Startup RPM Limiter/ Automatic Engagement/Rotor Low RPM Warning Installation
PN 269A9532-1

Approved: 04 Jun 2002
Revised: 24 Oct 2002

9-7. OPTIONAL EQUIPMENT AND NON-COMPATIBILITY

- Table 9-3 lists the items of optional equipment available for the Series 269C Helicopter. Table 9-3 also lists equipment items not compatible with other items. Also listed are special instructions, references, and supplements that are applicable to the optional equipment.

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Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Power Plant Group:		* Denotes supplemental publication
Heat insulation kit, engine exhaust system	269A8252	
Resonator, dual rpm helicopter	269A8245-3	NOTE: Install 8245-3 Resonator installation kit only on 269CHelicopters modified per M10078 Configuration Modification kit (see Miscellaneous Accessories Group).
Oil dipstick, pistol grip	269A4860	
Auxiliary fuel tank, 19 gal.	269A8387-3	Not compatible with: Agriculture kit 269A 4153 Utility compartment 4351-1
Fuel tank, 30-gal., crash resistant	269A8388-1	
Dual oil cooler	269A8580-1	
Muffler installation	269A8801	Not compatible with: Agriculture kit 269A 4153 Alternator kit 4929-1 Muffler / resonator 8245 Muffler installation 8801 Dual rpm configuration kit 4957 Resonator installation 8245-3 NOTE: Do not use basicMuffler8801 on 269C Helicopters serial numbers 0004 thru 0051, or 0085 thru 0209, if 4300-9 Float kit, 4301-39 Litter / Float kit, or 4301-51 Litter kit has been in stalled.

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Muffler installation	269A8801-3	NOTE: Install 8801-3 Muffler kit only on 269C Helicopters serial numbers 0052 thru 0084. Installation is optional on serial numbers 0004 thru 0051. This kit must be installed on all Float/Litter kit equipped aircraft.
Muffler, increased gross wt 269C	269A8801-5	NOTE: Install 8801-5 Muffler kit only on 269C Helicopters modified per M10078 Configuration Modification kit (see Miscellaneous Accessories Group)
Muffler, resonator installation kit, increased gross wt quiet helicopter	269A8245	Not compatible with: Muffler installation 269A 8801-5 Resonator installation 8245-3 NOTE: Install 8245 Muffler / Resonator installation kit only on 269C Helicopters modified per M10078 Configuration Modification kit (see Miscellaneous Accessories Group).
<u>Agricultural Group:</u>		
Wet / dry agriculture kit	269A4153	Not compatible with: Baggage tray 269A 4887 Cargo sling Litter kit 4301-51 Float kit 4300 Litter / float kit 4301-39 Counter weight 4314-17 Wheel jack 4861 SX-10 light 4334 Floats / baggage tray 4315 Searchlight 4335-1

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
		Float kit 4300-9 Float kit 4300-15 PA-100 siren 4960 Cargo hook 4971 Searchlight 4335-13 Searchlight 4335-45 Cabin heater - exhaust 4697-7 * PN 269A4153, Combination Dispersal Ag Kit, 21 Sep 1988
Wet / dry agricultural kit	269A4153-3	* PN 269A4153-3, Combination Dispersal Ag Kit, 21 Sep 1988
Wet agricultural kit	269A4153-5	
Agricultural spares kit/parts list	269A4199	
<u>Utility Group:</u>		* Denotes supplemental publication
Utility compartment	269A4351-1	Not compatible with: Searchlight 269A 4335-13 Searchlight 4335-45
Universal mounting bracket	269A4873	Not compatible with: Utility compartment 269A 4351
Baggage tray	269A4887-1	Not compatible with: Float kit 269A 4300 Litter / float kit 4301-39 Float / baggage tray 4315 SX-10 light 4334 Float kit 4300-9 Float kit 4300-15 Searchlight 4335-13 Searchlight 4335-45

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
		* PN 269A4887-1, Utility Baggage rack kit, 21 Sep 1988
Cargo hook kit	269A4971	* PN 269A4971, Cargo Hook Installation kit, 21 Sep 1988
Litter kit	269A4301-51	Not compatible with: Litter / float kit 269A 4301-39 Float / baggage tray 4315 Wheel jack 4861 Float kit 4300-9 Float kit 4300-15 Searchlight 4335-13 Searchlight 4335-13 NOTE: Litter kit 4838-9 supersedes and is two-way interchangeable with the basic 3401 and 4301-39 Litter kits on 269C Helicopters. * PN 269A4301-51, Right Hand Litter kit, 21 Sep 1988
Litter / float kit	269A4301-39	Not compatible with: Float / baggage tray 269A 4315 Wheel jack 4861 Searchlight 4335-1 PA-100 siren 4960 Searchlight 4335-13 Searchlight 4335-45 * PN 269A4301-39, Litter Float kit, (FAA)
Litter / float counter weight kit	269A4314-17	21 Sep 1988
Log book pocket	269A4192	

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Lighting Group:		* Denotes supplemental publication
Night flying kit, 12-volt	269A4838-5	Not compatible with: Night flying kit 269A4838-9
Night flying kit, 24-volt	269A4838-7	
Night flying kit, 24-volt	269A4838-9	NOTE: Night Flying kit 4838-9 effects 269C Helicopter serial numbers 0120 and subsequent aircraft.
Utility light, 12 or 24-volt	269A4191	
Strobe light, 12-volt	269A4935-3	
Strobe light, 24-volt	269A4935-1	NOTE: Must have24-volt power source.
Searchlight, 12-volt	269A4333-3	Not compatible with: SX-10 light 269A4334 Searchlight 4335-1 Searchlight 4335-13 Searchlight 4335-45
Searchlight, 12-volt	269A4333-21	
Searchlight, 12-volt	269A4333-27	
Searchlight, 24-volt	269A4333-29	NOTE: Must have 24-volt power source.
Searchlight, 24-volt	269A4333-39	NOTE: Must have 24-volt power source.
Searchlight,24-volt(SX-10) with dual alternators	269A4334	Not compatible with: Searchlight 269A4335-1 Searchlight 4335-13 Searchlight 4335-45

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Searchlight, 24-volt (SX-10) without dual alternators	269A4334-3	
Searchlight, 24-volt, quad.	269A4335-1	Not compatible with: Float kit 269A 4300-9 Float kit 4300-15 Searchlight 4335-13 Searchlight 4335-45
Searchlight, 24-volt, Donsek 301	269A4335-13	Searchlight 269A 4335-45
Searchlight, 24-volt, Dovsek 301	269A4335-45	
Strobe installation, Whelen	269A4935-13	
Landing Gear Group		* Denotes supplemental publication
Flotation gear	269A4300-9	Not compatible with: Float kit 269A 4300-15 Dual rpm config. kit 4957 PA-100 siren 4960 Searchlight 4335-13 Searchlight 4335-45 * PN 269A4300-9, Amphibious Float Landing Gear, 21 Sep 1988
Flotation gear	269A4300-15	Not compatible with: PA-100 siren 269A 4960 Searchlight 4335-13 Searchlight 4335-45 * PN 269A4300-15, Amphibious Float Landing Gear, 21 Sep 1988

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Skid shoes, heavy duty	269A3250	
Wheel jack, ground handling	269A4861	
Landing gear, extended Height	269A3260-1	Not compatible with: Float Kit 269A 4300-9 Float Kit 269A 4300-15 Cargo Hook 269A 4971 Wet/Dry Ag Kit 269A 4153 Wet/Dry Ag Kit 269A 4153-3 Wet Ag Kit 269A 4153-5 Litter Kit 269A 4301-51 Litter Float Kit 269A 4301-39
Miscellaneous Accessories Group		
Rotor tie down	269A9288-23	
Tail rotor balance weight	M10030	
Ash tray, console mounted	269A4947-1	
Ash tray, console mounted	269A4947-5	A/C 1327 & subsequent
Main rotor blade tape	M10060-1	
Tailboom static source	M10059	NOTE: Tailboom Static Source kit M10059 effects 269C Helicopter serial numbers 0004 thru 0058. Kit M10059-5 supersedes and is one-way interchangeable with M10059 kit.

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Miscellaneous Accessories Group		
Tailboom static source	M10059-5	NOTE: Use Tailboom Static Source kit M10059-5 on aircraft serial numbers 0001 thru 0059 if equipped with the cabin static system configuration. Kit M10059-5 supersedes and isone-way interchangeable with M10059 kit.
Tailboom static source	M10059-7	NOTE: Use Tailboom Static Source kit M10059-7 kit to convert aircraft serial numbers 0001 thru 0059 equipped with basic M10059 kit, and to convert serial numbers 0059 thru 0139 to M10059-5 system.

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Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
2050-lb gross weight configuration mod. kit, increased gross wt. kit, 269C	M10078	Not compatible with: Float kit 269A4300-9 NOTE: Configuration Modification kit M10078 effective only on serial numbers 0004 thru 0209.
Dual rpm configuration kit, 269C	269A4957	NOTE: Use Dual rpm Configuration kit 4957 in conjunction with 269A8801-5 Muffler or 269A8245 Muffler / Resonator installation, only on 269C Helicopters modified per M10078 Configuration Modification kit.
Dual rpm configuration kit, 269C	269A4957-3	* Rotorcraft Dual Engine rpm operation, 21 Sep 1988
Finish and marking installation	269A4510	NOTE: As required by sales order.
Line restrictor drainage fitting	M10094	Not compatible with: Line restrictor inst. M10094-3 NOTE: Use with static drainage.
Line restrictor installation	M10094-3	NOTE: Use without static drainage.
Main rotor blade sock	369D26661	
Elastomeric Damper kit	269A1292	NOTE: Supersedes and is one-way interchangeable with 269A1927 Damper Assembly and replaces all friction dampers

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Main rotor installation (fabriod bearings)	269A1002	NOTE: 269A1290-1 or -3 damper assembly supersedes and is one-way interchangeable with 1927-5 damper assembly, and replaces all friction dampers.
V-belt drive cover hat ass'y.	269A5470-19	NOTE: Clear color optional.
V-belt drive cover assembly	269A5471-11	NOTE: Clear color optional.
Door lock	269A2338-1	Not compatible with: Door assembly 269A 2280
Door lock	269A2338-2	Not compatible with: Door assembly 269A 2280
Cabin Group:		* Denotes supplemental publication
Tinted glass canopy	269A2275-35	
Interior Accessories Group:		* Denotes supplemental publication
Instrument Console Assembly	269A4540-1	
Instrument Console Assembly	269A4540-9	
Seat frame repair kit	M10103	NOTE: For repair of welded structure assembly 269A4291-5
Vinyl floor covering, single controls	269A4424-19	
Vinyl floor covering, dual controls	269A4424-21	
Shoulder harness	269A4258-11	Not compatible with: Seat belt & should. harn 269A4345

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Heel scuff plate installation	269A4023-901	1 kit required for each seat
Seat belt and shoulder harness	269A4258-13	
Seat belt and shoulder harness	269A4345	Not compatible with: Seat belt and shoulder harness 269A 4258
Nylon mesh pilot's seat	269A4291-13	Not compatible with: Standard seat armor 269A 4342
Nylon mesh pilot's seat	269A4291-15	
First aid kit	269A4339	
Fire extinguisher (Ansul)	269A4786-1	
Fire extinguisher (General)	269A4884	
Fire extinguisher (General)	269A4884-3	
Mesh seat armor	269A4340-1	Not compatible with: Standard seat armor 269A 4342
R.H. standard seat armor	269A4342-3	
L.H. standard seat armor	269A4342-5	
Headset clip kit	269A4922	
Harness installation - shoulder	269A4258-15	NOTE: Use only on aircraft equipped with 269A4263 doubler installation, in accordance with drawing 269A9900 Rev. J or later.

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
Harness installation - shoulder	269A4258-17	NOTE: Use only on aircraft equipped with 269A4263 doubler installation, in accordance with drawing 269A9900 Rev. J or later.
Harness installation - shoulder	269A4258-19	NOTE: Use only on aircraft equipped with 269A4263 doubler installation, in accordance with drawing 269A9900 Rev. J or later.
Harness installation - shoulder	269A4258-21	NOTE: Use only on aircraft equipped with 269A4263 doubler installation, in accordance with drawing 269A9900 Rev. J or later.
Controls Group:		* Denotes supplemental publications.
Tail rotor pitch link assembly	M10067	NOTE: Tail Rotor Assembly Pitch Link kit 269M10067 effective only on aircraft 0004 thru 0119.
Governor installation kit	269A4995	Not compatible with: Lycoming LW-13743 oil filter kit
Dual flight controls	269A7004-3	
Radio and Electronics Group:		* Denotes supplemental publications
12-volt, VHF, King radio (KY 90A)	269A4852	NOTE: Use only on aircraft S/N 0004C thru 0119C. Not compatible with: Transponder 269A4955 Alternator 4929-1 Transceiver (Collins) 4953-1 Transceiver (Narco) 4953-501 Transceiver (King) 4953-503

Table 9-3. Optional Equipment and Compatibility

Equipment	Part No.	Notes and Non-compatibilities
12-volt, VHF, King radio (KY 95)	269A4852-3	NOTE: Use only on aircraft S/N 0004C thru 0119C.
12-volt, VHF, King radio (KY 95E)	269A4825-5	NOTE: Use only on aircraft S/N 0004C thru 0119C.
Cockpit, floor-mounted antenna	269A4905	
24-volt, VHF, Bertea (ML-360) radio	269A4940-1	Not compatible with: Communications console 269A 4945 Bertea comm. console 4945-7 Universal comm. console 4945-5 King radio 4852 Transceiver (Collins) 4953-1 Transceiver (Narco) 4953-501 Transceiver (King) 4953-503 NOTE: Must have 24-volt power source.
12-volt, VHF, Bertea (ML-360) radio	2694940-3	NOTE: Use only on aircraft S/N 0004C thru 0119C.
24-volt, VHF, Bertea (ML-360) radio (no headsets)	269A4940-19	NOTE: Must have 24-volt power source.
12-volt, VHF, Bertea (ML-360) radio (no headsets)	269A4940-21	NOTE: Use only on aircraft S/N 0004C thru 0119C.
Bertea communications console radio	269A4945-7	Not compatible with: University sound system 269A 4190 Agricultural kit 4153 King radio 4852 Transponder 4955 PA-100 siren 4960 Transceiver (Collins) 4953-1 Transceiver (Narco) 4953-501 Transceiver (King) 4953-503

Table 9-3. Optional Equipment and Compatibility (con't.)

Equipment	Part No.	Notes and Non-compatibilities
		NOTE: Install with 269A4945-1 or -3 console only.
12-volt sound and siren (Federal)	269A4174-3	NOTE: Use on aircraft S/N 0004C thru 0119C only. Not compatible with: Univ. comm. console 269A 4945-5 University sound system 4190 Agriculture kit 4153 Alternator 4929-1 PA-100 siren 4960 NOTE: Can be used with communications console 269A4945 or Bertea comm. console 269A4945-7, on special order only.
24-volt sound and siren (Federal)	269A4174-5	NOTE: Must have 24-volt power source.
Bertea radio wire harness (12- or 24-volt)	269A4940-23	
Communications console, 24-volt	269A4945-1	Not compatible with: University sound system 269A 4190 Agriculture kit 4153 King radio 4852 Transponder 4955 PA-100 siren 4960 Transceiver (Collins) 4953-1 Transceiver (Narco) 4953-501 Transceiver (King) 4953-503 NOTE: Must have 24-volt power source.

Table 9-3. Optional Equipment and Compatibility (con't.)

Equipment	Part No.	Notes and Non-compatibilities
Communications console, 12-volt	269A4945-3	NOTE: Use only on aircraft S/N 0004C thru 0119C.
Public address and siren system (University)	269A4945-5	NOTE: Install with 269A4945-1 or -3 console only.
University sound system (12- or 24-volt)	269A4190-1	Not compatible with: Agriculture kit 269A 4153 PA-100 siren 4971
Dynamic headset / mike (Carter)	269A4942	
Headset microphone (Telex)	269A4652-3	Not compatible with: Carter headset / mike 269A 4942 Bertea radio 4940 Communications console 4945 Bertea comm. Console 4945-7 University comm. Console 4945-5
Bendix transponder, 12-volt	269A4955-1	NOTE: Use only on aircraft S/N 0004C thru 0119C.
Bendix transponder, 24-volt	269A4955-3	NOTE: Must have 24-volt power source.
Collins transceiver, 12-volt	269A4953-1	Not compatible with: Narco transceiver 269A4953-501 King transceiver 4953-503
Narco transceiver, 20-volt	269A4953-501	Not compatible with: Collins transceiver 269A4953-1 King transceiver 4953-503

Table 9-3. Optional Equipment and Compatibility (con't.)

Equipment	Part No.	Notes and Non-compatibilities
King transceiver, 12-volt	269A4953-503	Not compatible with: Collins transceiver 269A 4953-1 Narco transceiver 4953-501
PA-100 siren, Federal, 24-volt	269A4960	Not compatible with: Cargo hook kit 269A 4971 NOTE: Must have 24-volt power system. * PN 269A4960, Siren Installation (Federal PA-100), 21 Sep 1988
ELT installation	269A4986	
Footswitch installation	269A4953-11	
King KY 196A radio	269A4953-515	Not compatible with: 269A4174, 4945, 4945-5, 4945-7, 269A4190, 4852, 4953-1, 4953-501, 4953-503 NOTE: Use only on aircraft S/N 1310, 1313 & subsequent.
ICS hot mic	269A4953-509	24-volt only Not compatible with: 269A4174, 4945, 4945-5, 4945-7, 269A4190, 4852, 4953-1, 4953-501, 4953-503

Table 9-3. Optional Equipment and Compatibility (con't.)

Equipment	Part No.	Notes and Non-compatibilities
KN 53 Nav Rcvr Installation	269A4536-1	Includes KI 203 CDI Not compatible with: 269A4174, 4945, 4945-5, 4945-7, 269A4190, 4852, 4953-1, 4953-501, 4953-503
Hot mic switch installation	269A4528-1	Compatible with 269A4953-515
Blind encoder installation	269A4539	
Directional gyro	269A4529	
* Optional instrument / avionics installation		12 Aug 1988
Electrical Group:		* Denotes supplemental publication
269C Modification kit, 12- to 24-volt	M10068	NOTE: Use only on aircraft S/N 0004C thru 0119C.
External power receptacle, 12-volt	269A4839	NOTE: Use only on aircraft S/N 0004C thru 0119C. Not compatible with: External power receptacle, 24-volt 269A 4930 Alternator 4929-1
External power receptacle, 24-volt	269A4930	Not compatible with: Alternate battery location 269A 4902 NOTE: Must have 24-volt power source.
Ground receptacle, right hand	269A4059-1	
Ground receptacle, left hand	269A4059-2	

Table 9-3. Optional Equipment and Compatibility (con't.)

Equipment	Part No.	Notes and Non-compatibilities
Alternate battery location	269A4902	NOTE: Use only on aircraft S/N 0004C thru 0119C Not compatible with: Sonotone, 24-volt battery 269A 4925 269C modification kit M10068 Alternator 269A 4929-1
Sonotone battery 24-volt	269A4925	Not compatible with: 269C modification kit M10068
Alternat. inst. 28-volt, 100amp	269A4929	
Nicad battery installation	269A4987	24-volt Not compatible with: 269A4839, 4902, 4925
Low voltage warning system	269A4527-1	
<u>Instrument Group:</u>		* Denotes supplemental publication
Attitude gyro	269A4984	
Altimeter, millibar scale	369H92574	NOTE: Instrument identical to Altimeter 12003M, McLeod Instrument Corp., Ft. Lauderdale FL. Use in place of 269A4697-3 or 269A4550 Altimeters on Instrument Panel Assembly 269A4804. Attach with existing hardware.
Clock, Astro-tech	LC-2	
Inst. vert. speed indicator	269A4984	
8-day clock, 269C	269A4948-1	
Quartz clock inst. 24-volt	269A4991-1	

Table 9-3. Optional Equipment and Compatibility (con't.)

Equipment	Part No.	Notes and Non-compatibilities
Heating Group:		
Combustion cabin heater, 12-volt	269A4866-1	NOTE: Use only on aircraft S/N 0004C thru 0119C. Not compatible with: Exhaust cabin heater 269A4697-7
Combustion cabin heater, 24-volt	269A4866-11	NOTE: Must have 24-volt power source. Use only on aircraft S/N 0120 & subsequent.
Exhaust cabin heater, 12-volt	269A4869	NOTE: Use only on aircraft S/N 0004C thru 0119C. Not compatible with: Combustion heater 269A 4866 Agriculture kit 4153 Exhaust cabin heater 4697
Exhaust cabin heater, 24-volt	269A4869-5	NOTE: Must have 24-volt power source. Use only on aircraft S/N 0120C & subsequent.
Exhaust cabin heater, 24-volt	269A4869-7	NOTE: Must have 24-volt power source. Use only on aircraft S/N 0120C & subsequent.
Exhaust cabin heater, engine Plenum air intake	269A4451-105 & -107	Not compatible with: Combustion heater 269A 4866-1 4833-11 Exhaust cabin heater 269A 4869 4869-5 4869-7