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VERTICAL AVIATION TECHNOLOGIES, INC.

HUMMINGBIRD 300L

FLIGHT MANUAL

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Operating limitations in Section I are mandatory. All other data in this manual pertains to recommended operating practice and are not considered mandatory.

LOG OF REVISIONS

Section	Revision Date	Page Numbers	Revision Description	Approved By	Date
2	12/8/2020	2-6	Fuel Octane changed	B.G.C	12/8/2020
5	12/8/2020	5	Deleted VA-540 inf.	B.G.C	12/8/2020
2	10/11/2021	2-4,6	Maximum Airspeed changed & Caution Placard removed	B.G.C	10/11/2021
4	10/11/2021	6	Max. Speed Limits Chart Changed	B.G.C	10/11/2021
2	11/16/2021	3,5,6	Max.CHT, Max. Hg, Engine Oil Temp & XMSN Oil Press. Deleted Caution Placard	B.G.C	11/22/2021
4	11/16/2021	2-11	Fuel Shut off Valve Deleted, Mixture Added, Warm up RPM's Changed, Max. Speed Chart Changed, Pilot Check List Changed	B.G.C	11/22/2021
3	11/19/2021	2	Rotor RPM's Changed	B.G.C	11/22/2021
7	11/22/2021	3,4	Engine HP, Ignition Switch, Starter Switch & Fuel Shut Off Changed. Shell Rotella 30WT Oil Added.	B.G.C	11/22/2021

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SECTION 1

GENERAL

SECTION 1

GENERAL

INTRODUCTION

This Pilot's Operating Handbook is designed as an operating guide for the pilot. It includes the material required to be furnished to the pilot by 14 CFR parts 21, 27, and 36. It also contains supplemental data supplied by the helicopter manufacturer.

This handbook is not designed as a substitute for adequate and content flight instruction or for knowledge of current airworthiness directives, applicable federal aviation regulations, and advisory circulars. Nor is it intended to be a guide for basic flight instruction or a training manual. It should not be used for operational purposes unless kept in a current status.

Assuring that the helicopter is in airworthy condition is the responsibility of the owner. The pilot in command is responsible for determining that the helicopter is safe for flight. The pilot is also responsible for remaining within the operating limitations as outlined by the instrument markings, placards, and this handbook.

Since it is very difficult to refer to a handbook while flying a helicopter, the pilot should study the entire handbook and become familiar with the limitations, performance, procedures, and operational handling characteristics of the helicopter before flight.

This handbook has been divided into seven numbered sections. Limitations and emergency procedures have been placed ahead of normal procedures, performance, and other sections to provide easier access to that information. Provisions for expansion of the handbook have been made by deliberate omission of certain paragraph numbers, figure numbers, item numbers, and pages noted as being intentionally blank.

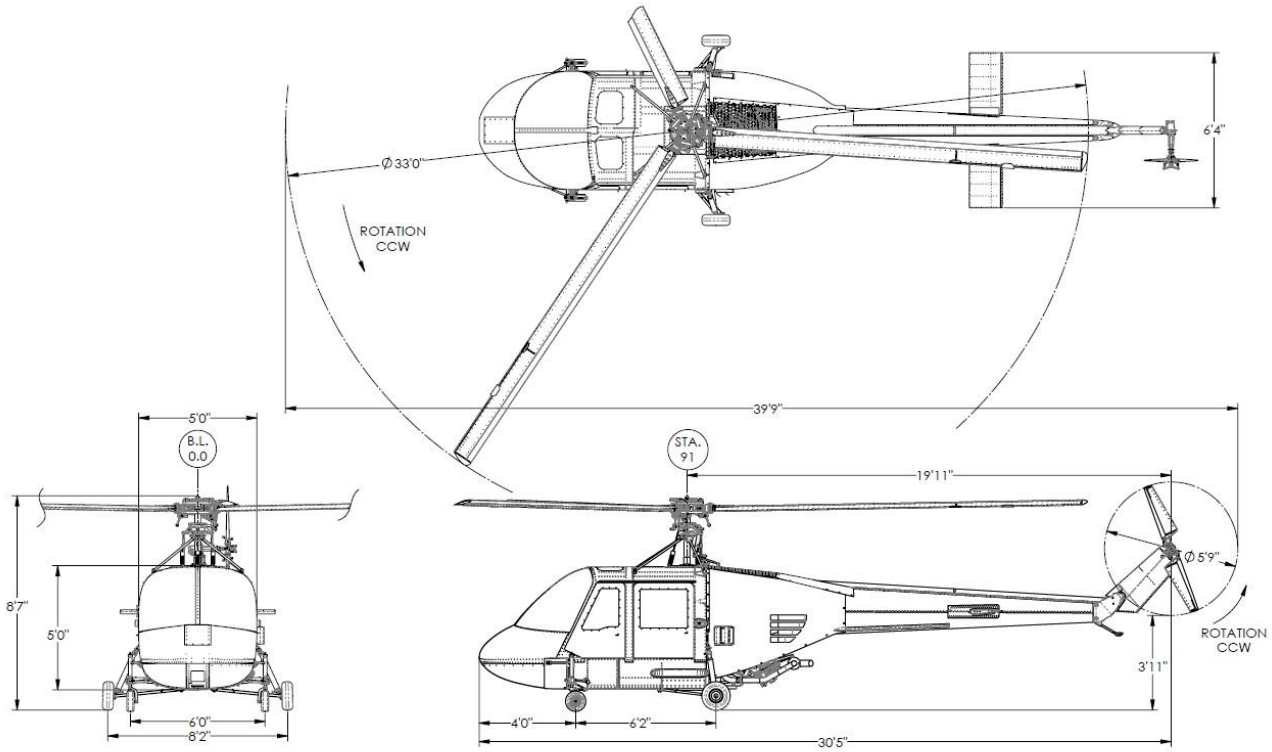
CAUTIONS AND NOTES

Cautions and Notes emphasize the important information and are used as follows:

CAUTION Equipment damage, injury, or death can result if procedure or instruction is not followed.

NOTE Provides emphasis or supplementary information.

THREE VIEW OF 300L HELICOPTER



PRINCIPAL DIMENSIONS

General	
Main rotor disk diameter	33 feet
Tail rotor disk diameter	5 feet, 9 inches
Width (overall)	
Maximum (with rotor stationary)	33 feet
Minimum (with rotor stationary)	25 feet, 1 inch
Minimum (with main rotor blades removed)	8 feet, 2 inches
Length (overall)	
Maximum (both rotors at extreme positions)	39 feet, 9 inches
Minimum (both rotors at minimum positions)	28 feet, 8 inches
Minimum (main rotor at minimum position; tail rotor at extreme position)	31 feet, 3 inches
Minimum (main rotor at extreme position; tail rotor at minimum position)	37 feet, 3 inches
Minimum (main and tail rotor blades removed or folded)	30 feet, 5 inches
Height (overall)	
Maximum (tail rotor at high position)	9 feet, 5 inches
Weight	
Design gross weight	2800 lbs.
Main Rotor Blades	
Airfoil section (curve identification)	NACA .0014
Total blade area (three blades)	42.54 sq. ft.
Area per blade	14.18 sq. ft.
Area of rotation (rotor disk area)	855.3 sq. ft.
Blade radius	16 feet, 6 inches
Chord at root	10.25 inches
Chord at tip	10.25 inches
Clearance above ground	
Rotating	8 feet, 1 inch
Static	7 feet, 1 inch
Tail Rotor Blades	
Total blade area (two blades)	2.8 sq. ft
Area per blade	1.4 sq. ft.
Area of rotation (rotor disk area)	23.2 sq. ft.
Blade radius	2 feet, 9 inches

PRINCIPAL DIMENSIONS CONTINUED

Tail Rotor Blades Continued	
Clearance above ground	
Rotating	3 feet, 11 inches
Static	3 feet, 11 inches
Fuselage (without main and tail rotor blades)	
Maximum width (without alighting gear)	5 feet
Maximum length	30 feet, 5 inches
Maximum height (without alighting gear)	5 feet
Height of door level above ground (static)	25 inches
Door Dimensions	
Right front door (pilot)	
Height	38 inches
Width	33-23/32 inches
Left front door (co-pilot)	
Height	37-7/16 inches
Width	29-11/16 inches
Left Back door	
Height	37-1/8 inches
Width	29-7/8 inches
Powerplant	
Model	VA-540-A7A1N
Fuel	
Approved fuel grades and capacity:	See Section 2
Oil	
Approved oil grades and capacity:	See Section 7

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SECTION 2

LIMITATIONS

SECTION 2

LIMITATIONS

GENERAL

This section includes operating limitations, instrument markings, and basic placards required for safe operation of the helicopter, its engine and other systems.

COLOR CODE FOR INSTRUMENT MARKINGS

Red	Operating limit. Edge of red line indicates limit. Pointer should not enter red during normal operation.
Yellow	Precautionary or special operating procedure range.
Green	Normal operating range.

AIRSPEED LIMITS

Never exceed speed: VNE, 95 knots at sea level, 3275 engine rpm, up to 2800 lbs. gross weight

Decrease Vne 4 knots per 1000 feet of altitude above sea level.

ROTOR SPEED LIMITS

Power off (rotor tachometer)

Maximum:	350 rpm
Minimum:	260 rpm

POWERPLANT LIMITATIONS

ENGINE

Model VA-540-A7A1N

Revised October 11, 2021

POWERPLANT LIMITATIONS CONTINUED

Engine Operating Limitations

Fuel:	Minimum octane 93 rating
Minimum idle rpm:	900
Minimum operating rpm:	3000
Maximum take-off rpm (5 min):	3275
Maximum Continuous rpm:	3275
Maximum cylinder head temperature:	260°C (500°F)
Minimum cylinder head temperature:	120°C (248°F)
Maximum oil inlet temperature:	118°C (244.4°F)
Minimum oil inlet temperature:	40°C (104°F)
Maximum manifold pressure:	28.5 Hg (280Hp)

WEIGHT LIMITS

Maximum Weight: 2800 lbs.

CENTER OF GRAVITY (CG) LIMITS

Maximum forward:	88” AFT of datum at 2800 lbs.
Maximum rearward:	94” AFT of datum at 2800 lbs.
Datum station:	91” forward of CL of main rotor

FLIGHT AND MANEUVER LIMITATIONS

Maneuvers
No acrobatic maneuvers approved.

Instrument Flight Prohibited, flight permitted in non-icing conditions only.

Limiting Height vs. Speed
Limiting heights and corresponding speeds for safe landing following power failure.

Revised November 16, 2021

FLIGHT AND MANEUVER LIMITATIONS CONTINUED

Night Flight Limitations
Operation is authorized at night under visual contact flight conditions, whereby orientation is maintained by visual reference to ground objects solely as a result of lights on the ground or adequate celestial illumination.

Minimum Crew
Minimum crew is one pilot, right seat.
Maximum operating altitude:

Gross weight = 2,500 lbs or less – 14,000 feet.
Gross weight = more than 2,500 lbs – 12,000 feet.

Doors off operation is approved

Night flight is prohibited if the following equipment is not installed: landing, navigation, and instrument lights.

FUEL LIMITATIONS

Approved Fuel Grades

100LL grade aviation fuel
93 octane minimum

Fuel Capacity

57 US gallons

INSTRUMENT MARKINGS

Air Speed Indicator:

Desired:	Green 50 to 95 knots calibrated air speed.
Caution:	Yellow 20 to 50 knots calibrated air speed.
Maximum:	Red 95 knots calibrated air speed.

Rotor Tachometer RPM (Power Off):

Minimum	260
Desired	310 to 340
Maximum autorotation	350

INSTRUMENT MARKINGS CONTINUED

Engine Tachometer RPM (Power On):

Minimum Idling	900
Minimum Operating	3000
Maximum Continuous	3275
Maximum Take-Off	3275

Engine Oil Pressure:

Green	55-95 PSI
Yellow	25 to 55 PSI 95-115 PSI
Red	25 & 115 PSI

Engine Oil Temperature:

Green	24°C - 118°C = 75.2°F – 244.4°F
Red	118°C = 244.4°F

Cylinder Head Temperature:

Green	93°C - 260°C = 199.4°F to 500°F
Red Line	260°C = 500°F

Manifold Pressure:

Red line	28.5 Hg

Fuel Pressure:

Minimum	20 PSI
Maximum	30 PSI

Transmission Oil Pressure:

Minimum Red:	10 PSI
Green:	10 to 30PSI
Maximum Red:	60 PSI

PLACARDS

Near main fuel tank filler cap:

FUEL
57 U.S. GALLONS
93 OCTANE MIN.

Inside compartment:

DECREASE Vne 4 KNOTS PER THOUSAND FT. OF ALT ABOVE SEA LEVEL

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

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SECTION 3

EMERGENCY PROCEDURES

SECTION 3

EMERGENCY PROCEDURES

ENGINE FAILURE DURING FLIGHT

WARNING

In the event of power failure, there will be a normal drop-off of approximately 50 rotor rpm due to delay in decreasing main rotor pitch. The rotor rpm will remain above the lower limit of 260. A minimum rotor rpm of 300 should be attained as quickly as possible thereafter.

POWER-OFF LANDING (Steady Autorotation): Normal forward-speed power-off landings can be accomplished in this helicopter. Glide speed should be approximately 50 knots, rotor rpm between 300 and 330 making a gradual flare upon approaching the ground. Increase main pitch to cushion final settling of helicopter. Ground contact speed will be approximately 25 knots. Landings should be made into the wind (when wind velocity is over 10 mph).

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

(1) ABOVE 500 FEET.

a. Instantly decrease main rotor pitch to produce autorotation at 300 to 330 rotor rpm. Establish a glide at approximately 50 knots.

b. If at sufficient altitude, try to restart engine by using starter. A micro switch prevents the starter from operating until the throttle is closed. If engine does not start proceed as in following paragraph.

c. Make a normal forward-speed power-off landing, as described in this section. If the terrain is unsuitable for such a landing, a much sharper flare-out will be necessary. Immediately after the flare-out utilize main pitch to cushion the final settling of the helicopter. An emergency landing of this type can be accomplished at speeds less than that required for normal power-off landings, depending on sharpness of flare-out.

(2) BELOW 500 FEET IN FAST FLIGHT:

a. Instantly reduce pitch to autorotation.
b. Reduce forward speed to 50 knots.
c. Proceed in accordance with para. 1.

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

NOTE

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

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

(4) BELOW 10 FEET:

Increase pitch as rapidly as possible.

NOTE

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

TAIL ROTOR FAILURE:

1. BELOW 500 FEET IN FAST FLIGHT:
   a. Failure is usually indicated by nose right yaw which cannot be corrected by applying left pedal.
   b. Instantly put pitch into autorotative position.
   c. Close throttle completely and go into a glide, keeping airspeed at approximately 50 knots.
   d. Make a flare-out landing suitable to the terrain.

2. UNDER 10 FEET IN SLOW FLIGHT OR HOVERING.

   Make an immediate partial-power landing.

3. BETWEEN 10 AND 500 FEET IN SLOW FLIGHT:

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

DITCHING:

1. Flare out abruptly just above the water.
2. Follow through immediately with lateral movement of the stick to the most practical side.

NOTE

This will cause the helicopter to slip into the water sidewise, using the resistance of the water to stop the main rotor blades, thus preventing the blades from injuring the occupants while abandoning the helicopter.

3. After coming to rest, release safety belts and shoulder harnesses and exit through doors.

FIRE:

1. Make an emergency landing as quickly as possible.
2. Isolate region of fire and rapidly attempt to extinguish it. Fire extinguisher is located at the front base of the pilots seat.

BAILING OUT:

1. Bail out through doors or windows.
2. Bail out away from helicopter.

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SECTION 4

NORMAL PROCEDURES

SECTION 4

NORMAL PROCEDURES

1. BEFORE ENTERING THE HELICOPTER

a. Flight Restrictions
For limitations imposed on the helicopter, refer to Section 2.

b. Loading Information
The take-off and anticipated landing gross weight and balance should be obtained before take-off and checked against the loading information, Section 6.

2. EXTERIOR INSPECTION

a. General
(1) All protective covers removed
(2) Remove tie downs
(3) Remove ice

b. Right front of fuselage
(1) Nose wheel strut for damage, leaks, and proper extension (2 inches)
(2) Tires for cuts, blisters, slippage, and proper inflation (30 lbs)
(3) Battery cover secured
(4) Pitot tube cover removed

c. Right side of fuselage
(1) Cabin door securely attached
(2) Fuselage for loose or missing rivets, dents, cracks in skin (side and under structure)
(3) Fuel filler cap for security
(4) Main landing gear strut for damage, proper inflation (6 inches)
(5) Tire for cuts, blisters, slippage, and proper inflation (50 lbs)
(6) Brakes for proper attachment, signs of leak
(7) Engine oil level and security of cap
(8) Main transmission oil level

(9) Air intake for freedom of obstruction
(10) Cowling securely fastened, signs of cracks
(11) Signs of oil or fuel leaks under engine compartment
(12) Tail cables for proper routing, fraying and tension
(13) Exhaust and silencer for cracks securely attached
(14) Fuel vent clear of obstructions

d. Right side of tail cone
(1) Tail cone for loose or missing rivets, cracks in skin
(2) Radio antennas for damage
(3) Stabilizer for security of attachment
(4) Tail driveshaft, cover for security of attachment
(5) Tail cables for security of attachment, fraying and proper routing
(6) Check oil level in intermediate gearbox
(7) Signs of oil leaks from intermediate or tail gearbox
(8) Proper attachment of flight controls
(9) Tail skid for security of attachment
(10) Tail pylon for loose or missing, rivets, security of attachment
(11) Check oil level in tail gearbox

e. Left side of tail cone
(1) Tail blades for dents, cracks, tears
(2) Flight control hardware for security of attachment, freedom of motion
(3) Stabilizer for security of attachment
(4) Tail cone for loose or missing rivets cracks in skin

f. Left side of fuselage
(1) Airframe fuel filter drain
(2) Exhaust and silencer for cracks and security of attachment
(3) Linkage properly attached
(4) Oil Cooler free from obstructions
(5) Cowling securely fastened, signs of cracks
(6) Main landing gear strut for damage, proper inflation (6 inches)
(7) Tire for cuts, blisters, slippage, and proper inflation (50 lbs)
(8) Brakes for proper attachment, signs of leaks
(9) Drain fuel sump
(10) Check clutch and fan area for cracks, and proper attachment, signs of oil leaks
(11) Rotor assembly for security of all components

(12) Rotor blades for dents cracks, or tears
(13) Move blades against starting stops
(14) Doors properly attached
(15) Nose wheel strut for damage, leaks and proper extension (2 inches)
(16) Tires for cuts, blisters, slippage, and proper inflation (30 lbs)

3. ENTERING THE HELICOPTER

a. Interior check (all flights)
(1) Cabin interior – check all items secured
(2) Fire extinguisher properly stowed
(3) Tail rotor pedals – adjust
(4) Shoulder harness and safety belt fastened
(5) When seat is not occupied the seat belt and hardness assembly needs to be buckled and tighten against the cushion
(6) All flight controls – check for free and correct movement
(7) Collective – Minimum pitch (down)
(8) Frictions properly adjusted
(9) Rotor brake on (pull up)
(10) Electrical switches off
(11) Circuit breakers set
(12) Ignition switch off
(13) Battery on
(14) Check fuel gauge for desired fuel loadings
(15) Altimeter: Check for proper setting

4. **STARTING ENGINE**:

a. Main rotor pitch control: Full Down
b. Rotor brake: "OFF"
c. Throttle control: Closed
d. Fuel Prime (Cold Start)
A. Mixture— On (Down)
B. Fuel Pump On for 5 secs then Off
Throttle Open then Close
C. Mixture— Off (Up)

a. Fuel Prime (Hot Start)
   A. Fuel Pump On for 10 secs
   B. Mixture— On (Down) for 1 sec
   C. Mixture—Up (Off)
   D. Fuel Pump Off
b. Throttle control: Cracked (not to exceed 1/10 open).
c. Ignition switch: "ON"
d. Hold control stick aft the center position. (Starting with the stick in this position prevents excessive blade feathering.)
e. Engage starter.
f. As engine starts: Note oil pressure gage. If oil pressure does not register within 30 seconds stop engine and investigate.
g. If a start is not affected almost immediately, re-prime and repeat starting procedure.
h. Fuel boost pump switch "ON"

5. **WARM-UP AND GROUND TEST**:

a. Warm up engine at 1000 rpm until oil temperature rises to 40°C or above.

CAUTION

Do not idle engine below 900 rpm. To avoid clutch drag, do not warm up engine between 1100 rpm and 1400 rpm.

b. Increase rpm until clutch produces good acceleration (approximately 2000 engine rpm). Warm up at 2400 rpm approximately 2 minutes. Engagement should take approximately 10 seconds.
c. Check to see that all engine instruments are within limits.
d. Alternator "ON"
e. IGNITION CHECK:
   (1) With rotor engaged, set main rotor pitch and throttle to obtain 3000 engine rpm.
   (2) Check ignition. The drop-off should not exceed 200 rpm.
   (3) During the ignition test, do not exceed 10 seconds on either ignition.
f. Check alternator by voltage output. Alternator voltage should be higher than battery voltage.

1. **TAXIING INSTRUCTIONS**: When taxiing maintains 3000 rpm and sufficient main pitch to avoid hitting the droop stops. Maintain directional control with tail rotor pedals and wheel brakes.

2. **TAKE-OFF**: Maintain 3275 rpm, increasing main pitch until airborne.

CAUTION

In take-off or landing, avoid prolonged, hovering with wheels lightly touching the ground, as ground resonance may result. Avoid slow speed operations between 10 and 500 feet above the ground surface.

3. **CLIMB**: A good rate of climb for normal flight from sea level take-off is attained at an IAS of 45 knots.

4. **CRUISE**: **BLADE STALL**: During high speed forward flight with high values of gross weight, altitude, acceleration and power; and with low rotor rpm, a stall may occur at the outer portion of the retreating blade on the left side of the helicopter. Blade stall is indicated as a roughness in both the helicopter and the flight controls. To avoid blade stall maintain airspeeds below the values indicated in the "Table of Maximum Speed Limits" which are for level flight conditions. At higher gross weights, or when maneuvering, the airspeeds at which blade stall occurs would be lower. If blade stall should occur, it may be easily eliminated by accomplishing any one or any combination of the following:

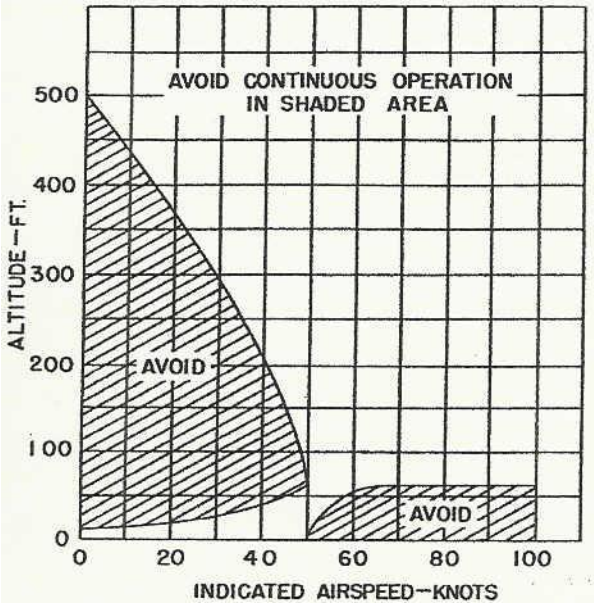
   a. Decrease airspeed.
   b. Increase rotor rpm.
   c. Reduce main rotor pitch.
   d. Decrease the severity of the maneuver.

MAXIMUM SPEED LIMITS TO AVOID BLADE STALL GROSS WEIGHT 2800 POUNDS (KNOTS)			
Altitude Feet	3000 RPM	3100 RPM	3200 RPM
0	93	100	100
5000	72	82	97
10000	50	60	74

Note: (1) For accelerated flight, reduce speeds.
(2) For mild gust conditions, reduce speeds 10 knots.
For high gust conditions, reduce speeds 20 knots.

NOTE

In prolonged part-power descent at "zero" airspeed, the rate of descent sometimes increases very rapidly after approximately 500 feet per minute is reached. Application of additional pitch and power will not always stop the descent. Recovery is definitely accomplished, however, by acquiring approximately 20 knots forward speed. Avoid prolonged part-power vertical descent at low altitudes. When executing this maneuver at proper altitudes, start recovery through forward airspeed above 500 feet.



10. **APPROACH AND LANDING**:

a. APPROACH.
   (1) Keep the approach speed above 40 knots IAS.

b. LANDING.
   (1) Make the transition from approach to hovering approximately 10 feet from the surface.
   (2) Decrease pitch very slightly for vertical descent, maintaining 3200 engine rpm.

(3) As soon as wheels are on the surface, do the following simultaneously.
   a. Decrease main rotor pitch to almost full low.
   b. Reduce throttle.

NOTE

Do not decrease throttle below 3000 engine rpm until it is certain beyond doubt that the alighting gear is secure upon solid ground. Should there be settling of either or both of the wheels, recovery may be quickly made by increasing pitch since high rpm will be present.

NOTE

Hold stick slightly forward of neutral during this operation to keep blades from striking their droop stops.

(4) Apply wheel brakes

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

12. **STOPPING OF ENGINE**:

a. Head into wind.
b. Hold control stick slightly forward and to right to prevent excessive blade feathering while at high rotor rpm.
c. Cool down engine approximately 2 minutes at 2200 rpm.
d. Shut off engine with mixture "OFF".
   When rotor rpm approaches 150 rpm the control stick must be pulled back to the "neutral position," which is about 4" aft and slightly right of the center position, this procedure will allow the anti-drooping stops to engage with minimum effort.
e. Apply rotor brake when rotor rpm is at or below 50 rpm.

13. **BEFORE LEAVING PILOT'S COMPARTMENT**:

a. All electrical switches: "OFF"
b. Rotor brake: "ON"

14. **NIGHT OPERATION**:

Night Flying Equipment. – The equipment necessary for night flight in this helicopter consists of: Individual instrument lights, position lights and landing lights.

a. Instrument Lights. – The instruments are illuminated with individual lights.

PILOT CHECKLIST 300L SERIES

Start Up

1. Preflight complete
2. Seatbelts—On
3. Frictions—Off
4. Flight Controls—Free & Correct
(Collective down, cyclic centered, throttle cracked)
5. Altimeter—Set
6. Circuit Breakers and Switches—Check
7. Rotor Brake—On
8. Mixture—Off (Up)
9. Battery—On
10. Fuel—Enough for Mission
11. Mags—Off
12. Fuel Prime (Cold Start)
A. Mixture—On (Down)
B. Fuel Pump on for 5 secs then off
C. Mixture—Off (Up)
13. Fuel Prime (Hot Start)
A. Fuel Pump On for 10 secs
B. Mixture—On (Down) for 1 sec
C. Mixture—Up (Off)
D. Fuel Pump Off
14. Throttle—Closed
15. Mags—Both
16. Starter
17. Mixture—On (Down)
18. Oil Pressure— > 40psi
19. RPM ≈ 1100 RPM
20. Fuel Pressure -24 psi
21. Fuel Pump—On ≈ 28 psi
22. Alternator—On (Check Volts/Amps)
23. Radio Master—On
24. Radio Frequencies—Set
25. Beacon—On
26. Warm Up (Oil Temp 40°C)
27. Rotor Brake—Off
28. Rotor Engagement (Approx. 2000 RPM)
(Needles joined)
29. Transmission Pressure ≈ Check (green)
30. Engine RPM—3000 RPM
31. Mag Check—150 RPM Drop Max
32. Mag—Both
33. Freewheel Check-Split Needles

Taxi Check

34. Engine RPM—3000
35. Brakes—Check

Take Off

36. Engine RPM—3275
37. Trim
A. Ground- 4 sec FWD, 3 sec Right-from center before pickup
B. Take Off-4 sec FWD and 4 sec Right
C. Aproach-3 secs AFT and 3 secs Left
D. Hover-as Required

Shutdown

38. Engine RPM—2400 RPM for 2 min
39. Cyclic 4" AFT of Center
40. Fuel Pump—off
41. Throttle Closed—Needle Split
42. Mixture—Off (Up)
43. Mags—Off
44. Alternator—Off
45. Avionics Master—Off
46. Battery—Off
47. Rotor Brake—as required below 50 rpm.

Revised April 11, 2022

EMERGENCY PROCEDURES

ENGINE FAILURE DURING FLIGHT

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

TAIL ROTOR FAILURE

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

DITCHING

Flare out abruptly just above the water. Follow through immediately with lateral movement of the stick to the most practical side. After coming to rest, release safety belts and shoulder harnesses and exit through doors.

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SECTION 5

PERFORMANCE INFORMATION

SECTION 5

PERFORMANCE INFORMATION

1. The following charts give operating performance.

   (A) Airspeed Calibration

   (B) Take-off Distance to Clear 50 Foot Obstacle at 2800 Pounds

   (C) Autorotation Landing Distance Over 50 Foot Obstacle

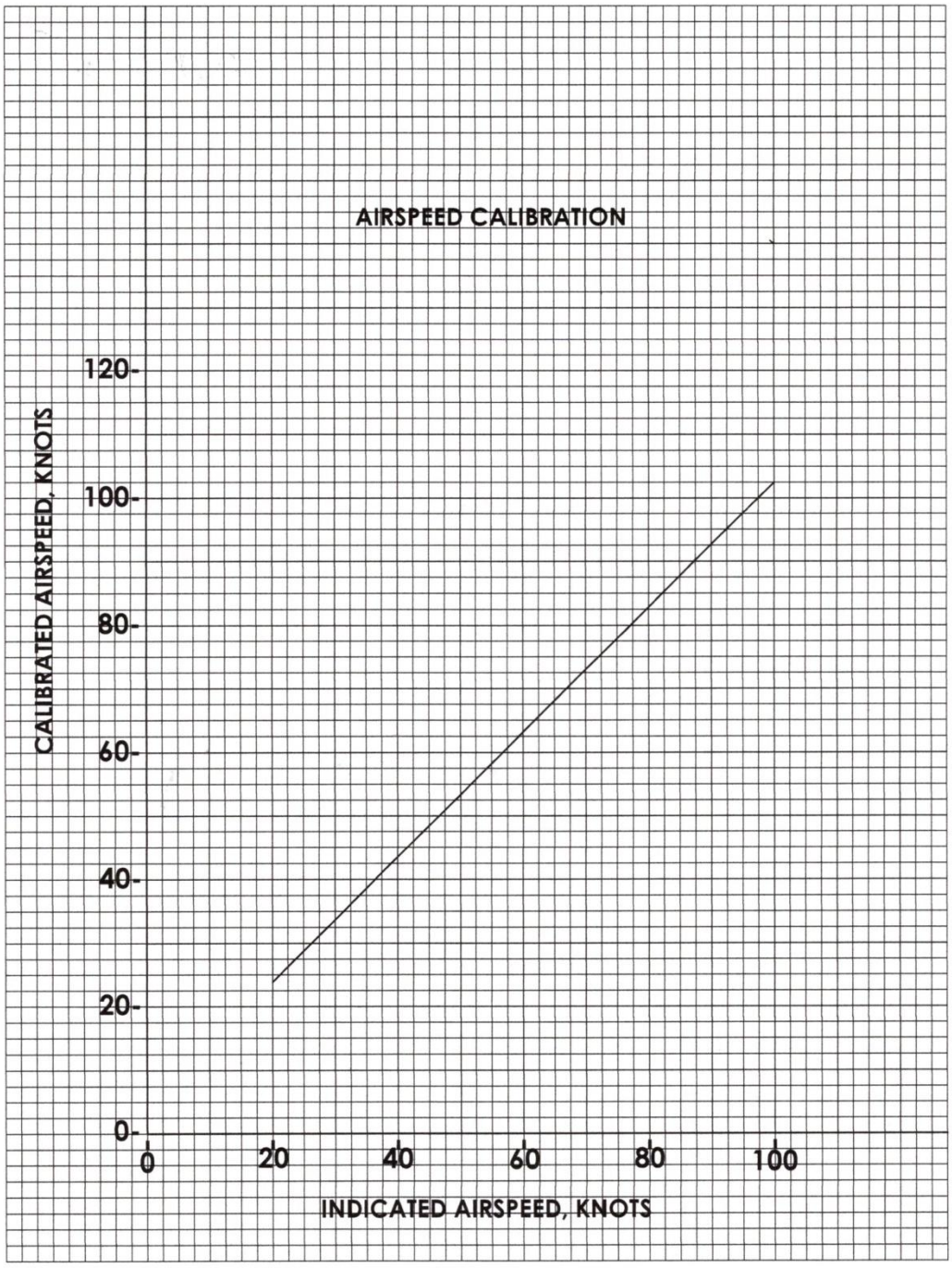
   (D) Climb Performance at Best Rate-Of-Climb Speed – 45 Knots

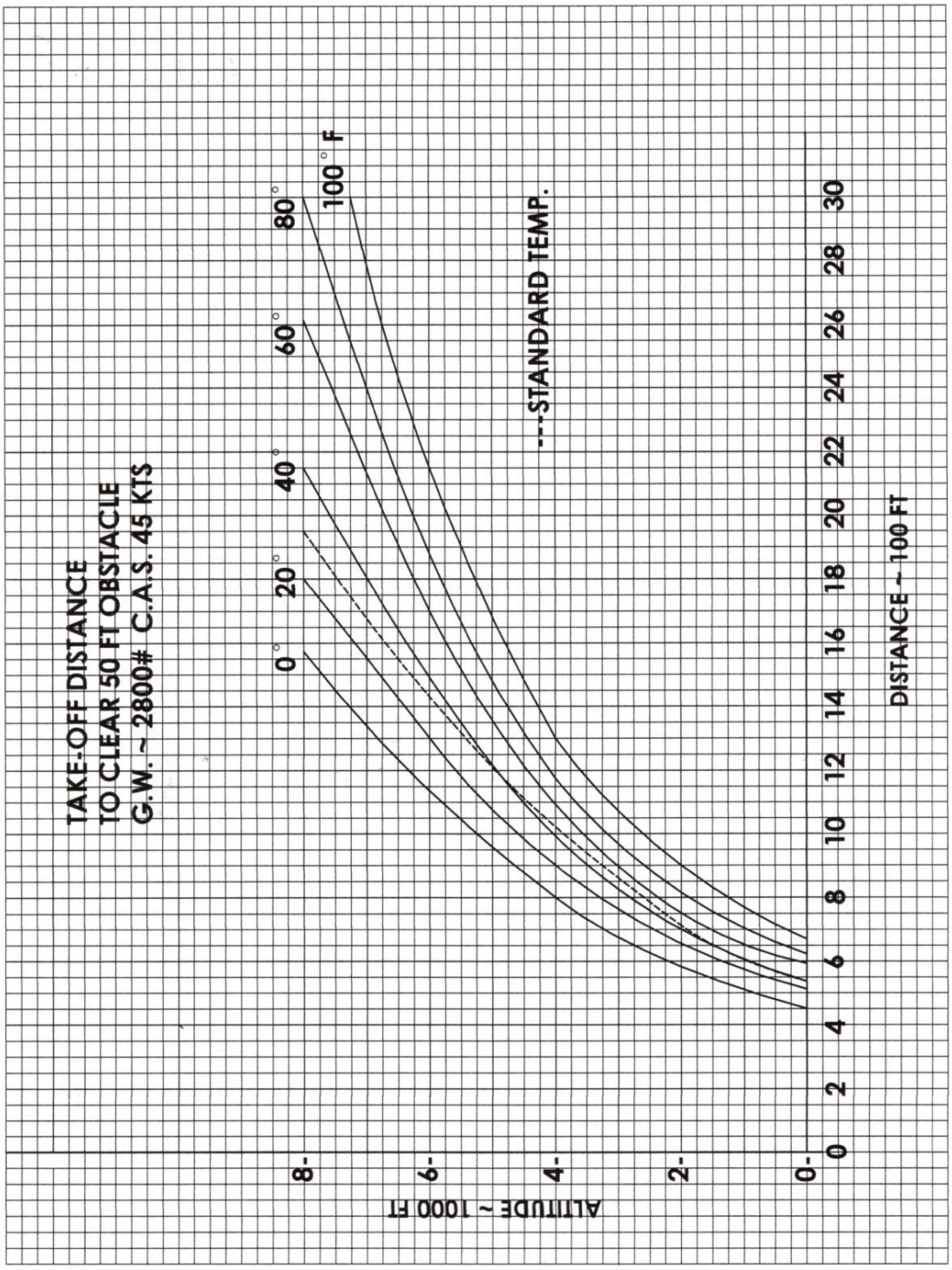
   (E) Height – Velocity Diagram For Landing After Power Failure

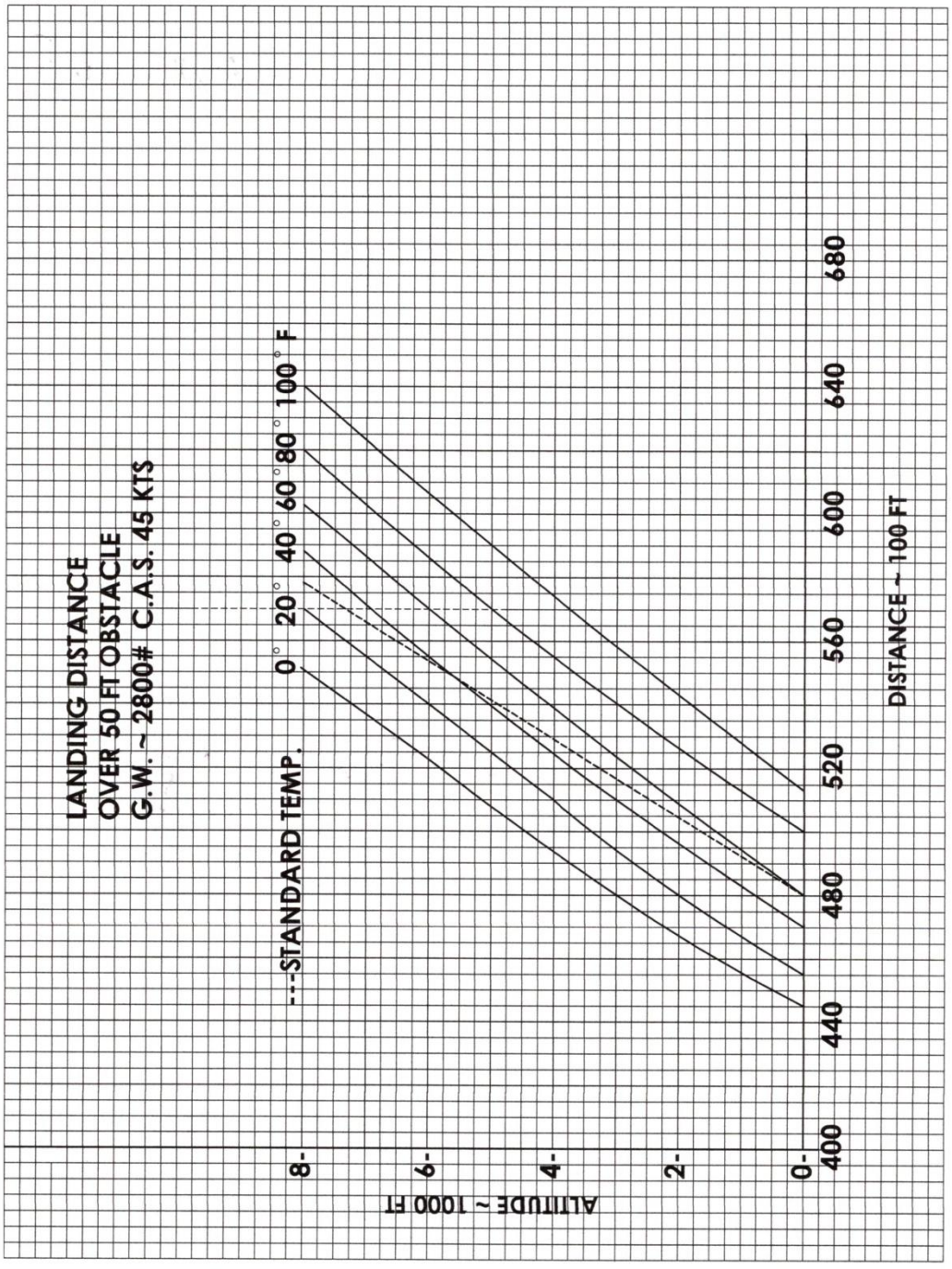
   (F) Hovering Ceiling In Ground Effect

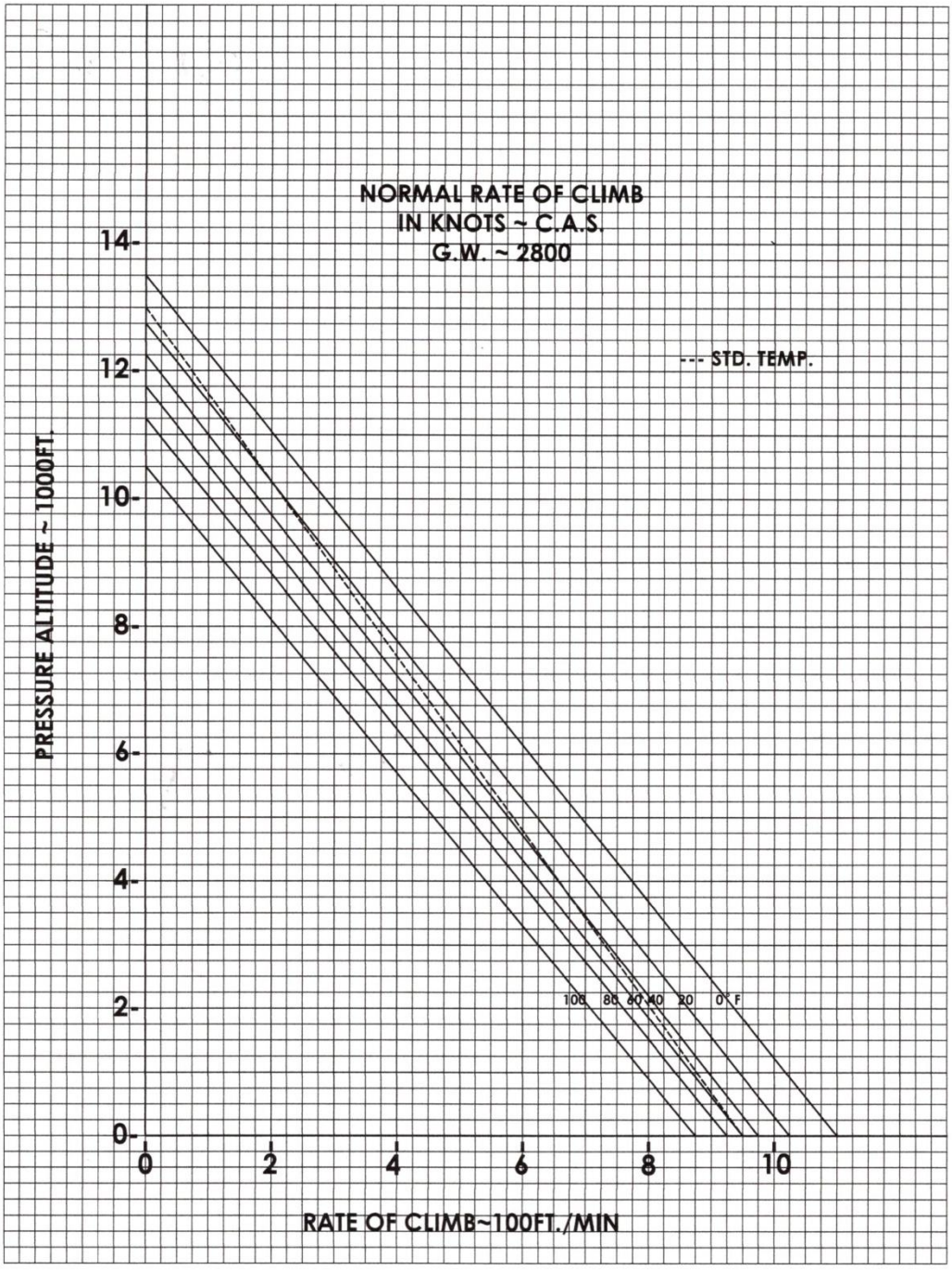
   (G) Density Altitude.

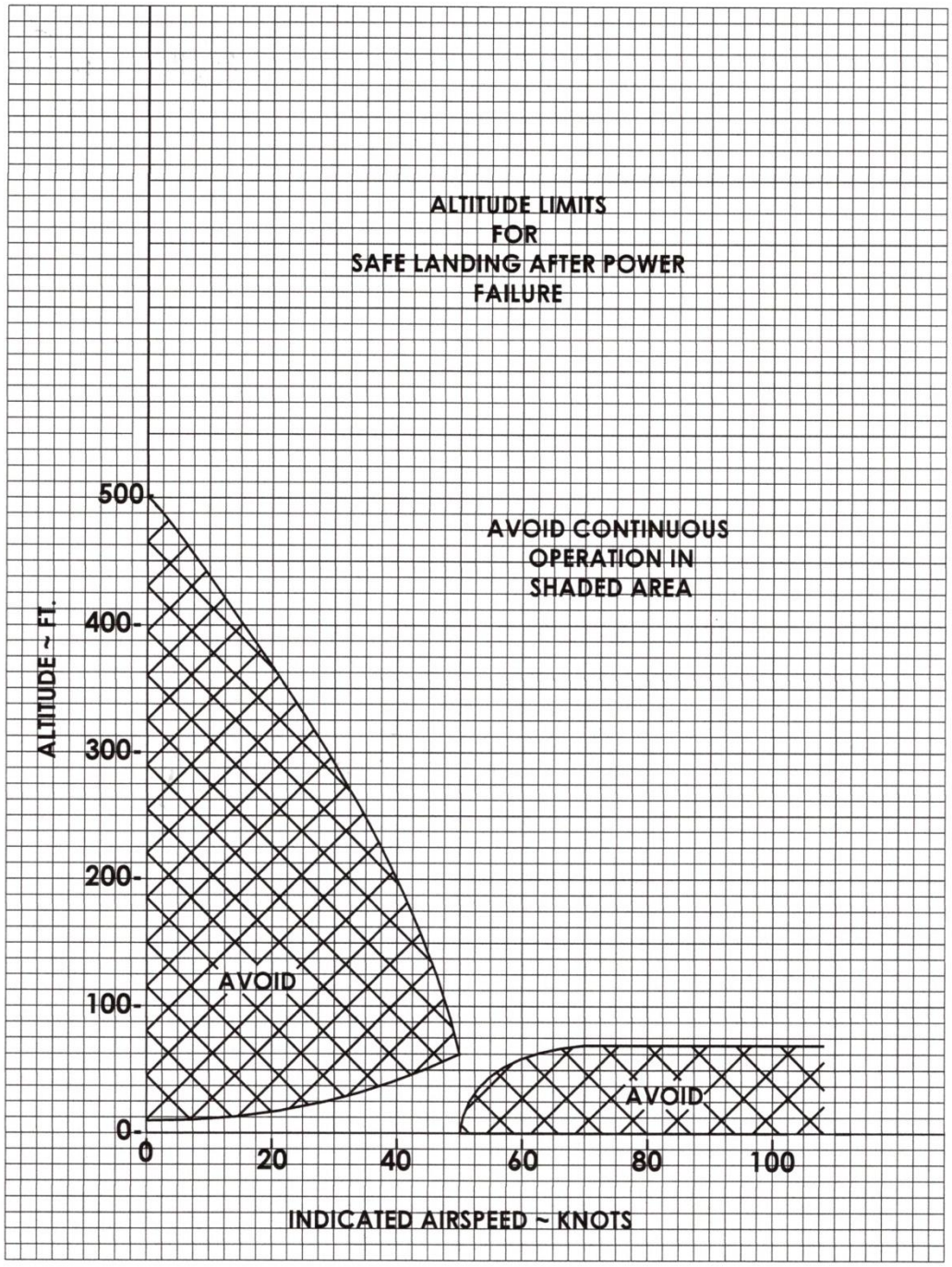
2. In winds up to 20 knots there is sufficient control to maintain any desired heading.

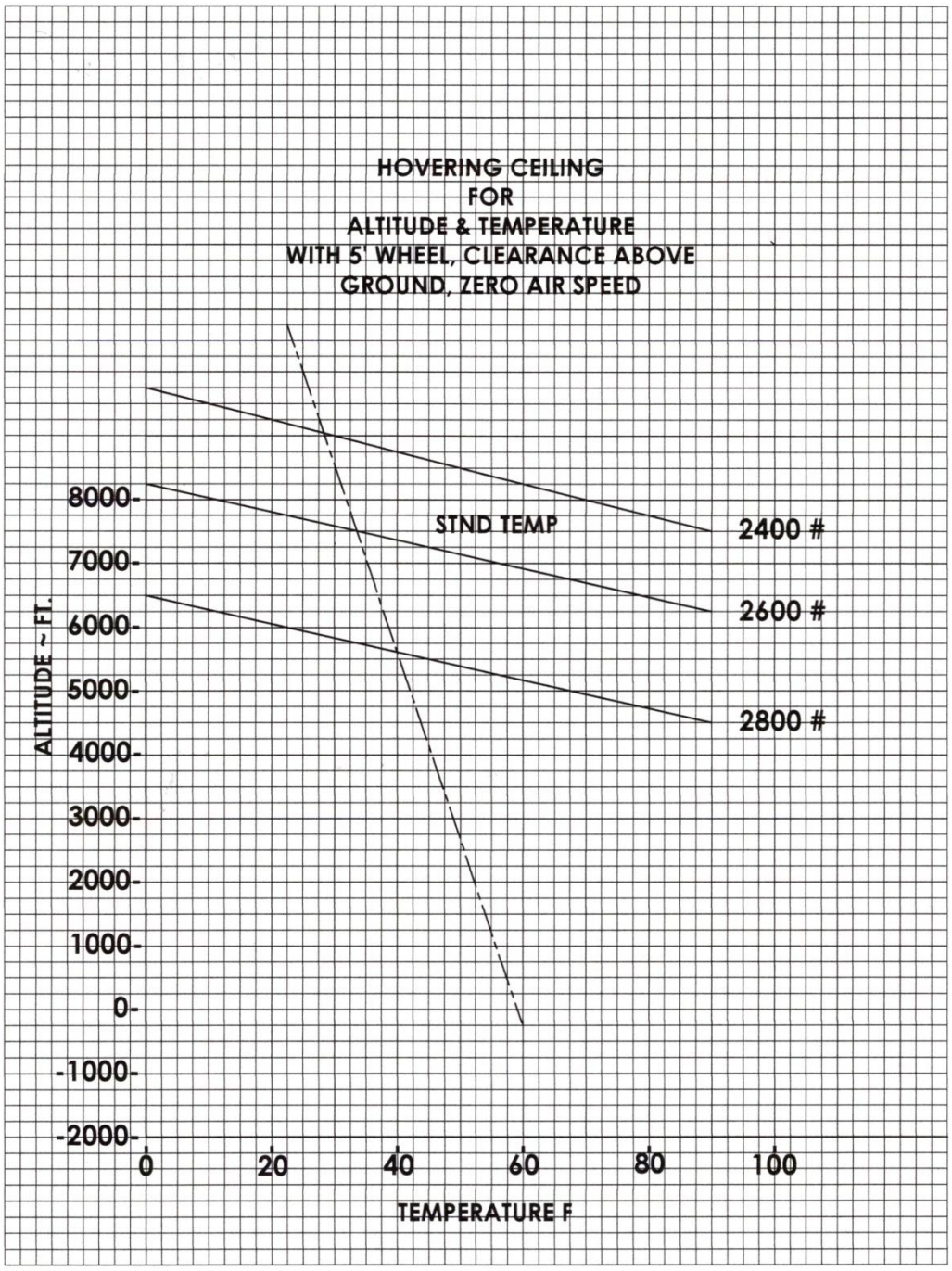

AIRSPEED CALIBRATION
CALIBRATED AIRSPEED, KNOTS
120
100
80
60
40
20
0
0
20
40
60
80
100
INDICATED AIRSPEED, KNOTS

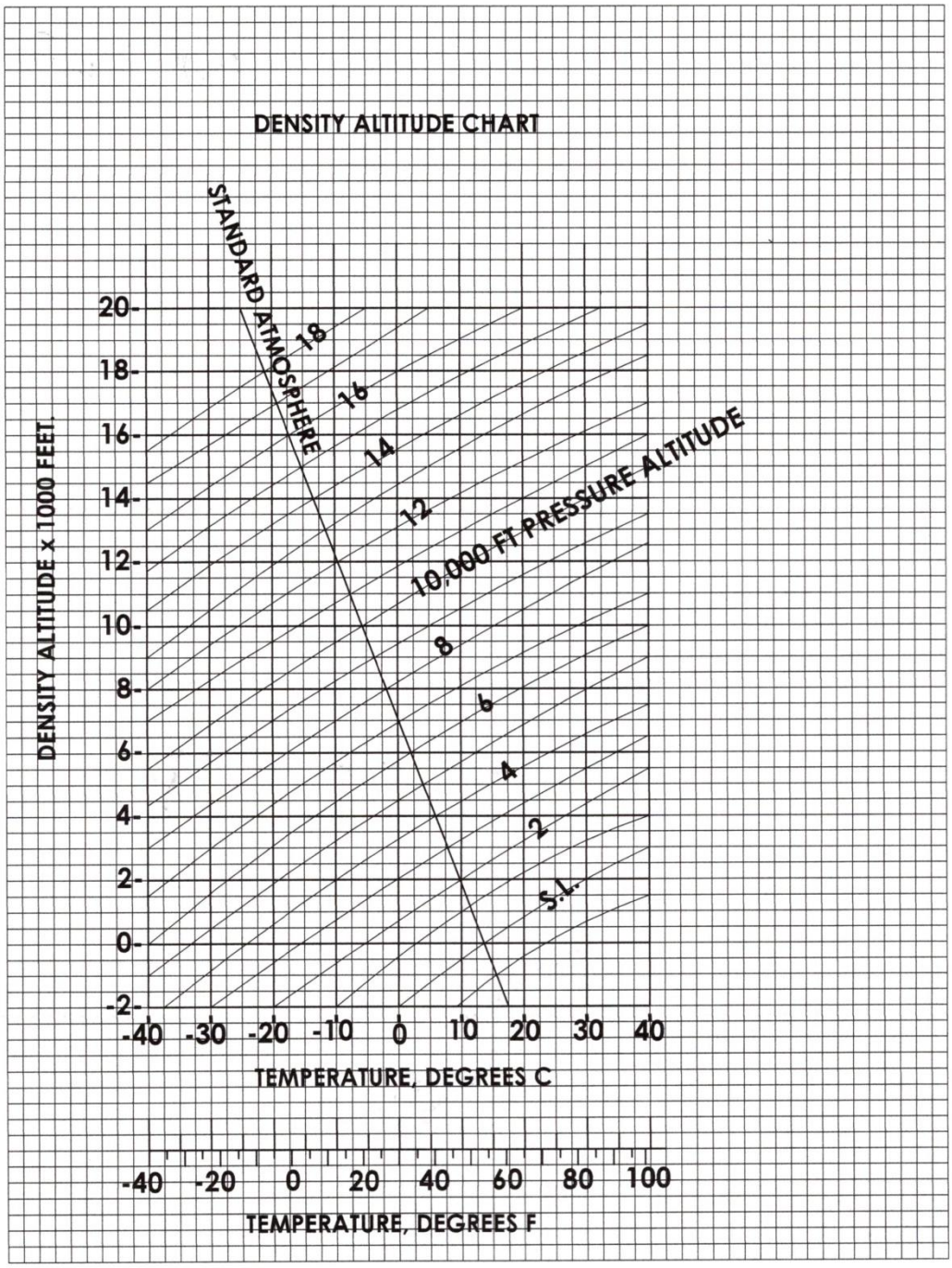

TAKE-OFF DISTANCE
TO CLEAR 50 FT OBSTACLE
G.W. ~ 2800# C.A.S. 45 KTS
---STANDARD TEMP.
0°
20°
40°
60°
80°
100° F
ALTITUDE ~ 1000 FT
8-
6-
4-
2-
0-
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
DISTANCE ~ 100 FT


LANDING DISTANCE
OVER 50 FT OBSTACLE
G.W. ~ 2800# C.A.S. 45 KTS
---STANDARD TEMP.
0°
20°
40°
60°
80°
100° F
ALTITUDE ~ 1000 FT
8-
6-
4-
2-
0-
400
440
480
520
560
600
640
680
DISTANCE ~ 100 FT


NORMAL RATE OF CLIMB
IN KNOTS ~ C.A.S.
G.W. ~ 2800
--- STD. TEMP.
PRESSURE ALTITUDE ~ 1000FT.
14-
12-
10-
8-
6-
4-
2-
0-
100 80 60 40 20 0° F
0
2
4
6
8
10
RATE OF CLIMB~100FT./MIN


ALTITUDE LIMITS
FOR
SAFE LANDING AFTER POWER
FAILURE
AVOID CONTINUOUS
OPERATION IN
SHADED AREA
ALTITUDE ~ FT.
500
400
300
200
100
0
AVOID
AVOID
0
20
40
60
80
100
INDICATED AIRSPEED ~ KNOTS


HOVERING CEILING
FOR
ALTITUDE & TEMPERATURE
WITH 5' WHEEL, CLEARANCE ABOVE
GROUND, ZERO AIR SPEED
STND TEMP
2400 #
2600 #
2800 #
ALTITUDE ~ FT.
8000-
7000-
6000-
5000-
4000-
3000-
2000-
1000-
0-
-1000-
-2000-
0
20
40
60
80
100
TEMPERATURE F


DENSITY ALTITUDE CHART
STANDARD ATMOSPHERE
10,000 FT PRESSURE ALTITUDE
18
16
14
12
10
8
6
4
2
S.L.
DENSITY ALTITUDE x 1000 FEET
20
18
16
14
12
10
8
6
4
2
0
-2
-40 -30 -20 -10 0 10 20 30 40
TEMPERATURE, DEGREES C
-40 -20 0 20 40 60 80 100
TEMPERATURE, DEGREES F

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SECTION 6

WEIGHT AND BALANCE

SECTION 6

WEIGHT AND BALANCE

1. LOADING INSTRUCTIONS

A. Obtain the current empty weight and its moment/100 and write down each in separate columns of your manifest.

B. To the above add the weight and moment/100, respectively, of the useful load items to be carried. This includes fuel, oil, pilot, passengers, cargo, etc. Do not exceed the specified compartment capacities at any time (even when ballast is used).

C. The totals of "A" and "B" above are the Gross – Weight and its moment/100.

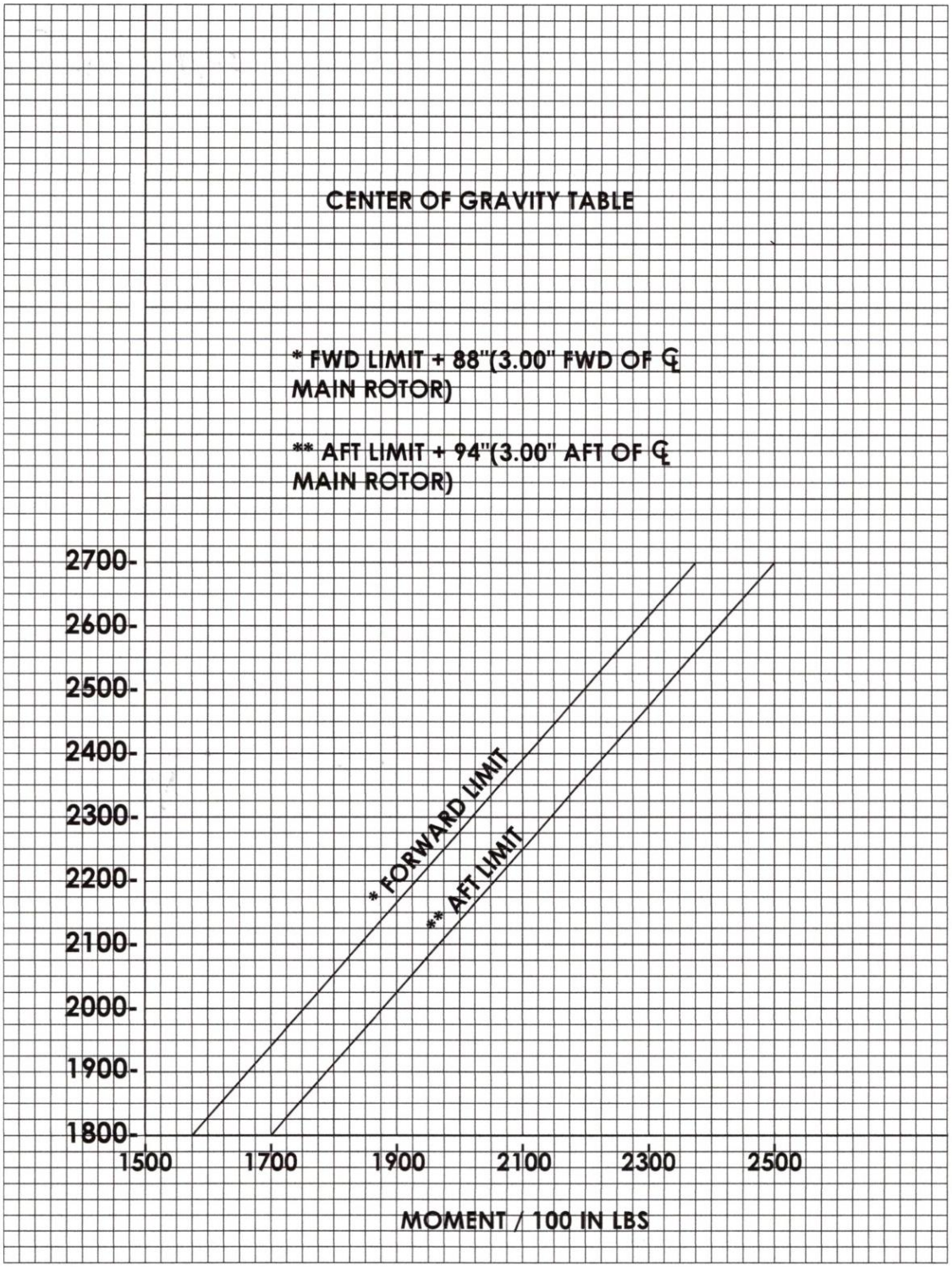
D. On the Center of Gravity Table, plot the intersection of the Gross Weight and its moment/100.

(1) If this intersection is between the most forward and the most aft limit lines, the aircraft is in balance.

(2) To assure that is will remain in balance throughout the flight, deduct the weight and moment/100 of expendable items such as fuel. If the intersection of the new totals then remains within the limit lines, the aircraft is properly loaded.

(3) If this intersection is outside the limit lines, the aircraft is not in balance and the load must be re-distributed to bring the intersection within the limit lines. Removable ballast may also be used for this purpose but it must be placed only in the cabin and must be securely fastened to prevent shifting and/or interference with personnel or equipment.

E. In a standard 300L the approved C.G. Limits will not be exceeded in the combined weight of the pilot and/or passenger in the front seats is not less than 160 lbs and not greater than 523 lbs. Within these weight limits in the front seats, it is possible to carry any weight combination of passengers and/or fuel provided the gross weight combination of passengers and/or fuel provided the gross weight of the helicopter does not exceed 2800 lbs. When fuel is expanded the helicopter will remain within limits if the above is observed.


CENTER OF GRAVITY TABLE
* FWD LIMIT + 88"(3.00" FWD OF ℄ MAIN ROTOR)
** AFT LIMIT + 94"(3.00" AFT OF ℄ MAIN ROTOR)
2700-
2600-
2500-
2400-
2300-
2200-
2100-
2000-
1900-
1800-
* FORWARD LIMIT
** AFT LIMIT
1500
1700
1900
2100
2300
2500
MOMENT / 100 IN LBS

FUEL TABLE	
WEIGHT (POUNDS)	FUSELAGE TANK CAPACITY = 57 gals. ARM = 89.5 MOMENT/100
0	0
30	27
60	54
90	81
120	107
150	134
180	161
210	188
240	215
270	242
300	269
330	295
342	306

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SECTION 7

DESCRIPTION

SECTION 7

DESCRIPTION

FLIGHT CONTROL SYSTEM:

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

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

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

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

POWERPLANT:

A normally aspirated Titan VA-540-A7A1N engine supplies power for driving the main and tail rotors. It is installed aft of the cabin, at an angle, with the drive shaft inclined approximately 30 degrees forward toward the main gear box. The engine rating for take-off is 280 hp at 3275 rpm at sea level. The engine transmits power through the clutch.

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

CAUTION

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

IGNITION SWITCH: The ignition switch is on the left side of the switch panel. Marked positions on the switch are “OFF”, “R”, “L”, “BOTH” and “Start”.

STARTER SWITCH: The starter switch is part of the ignition switch. The switch must be held in the “ON” position to energize the starter.

FUEL SHUT OFF: Fuel can be shut off with the mixture control.

OIL TEMPERATURE: The oil temperature is controlled automatically by a thermostat which by-passes the oil around the cooler when the oil temperature is low. Should the oil temperature increase above 85°C the thermostat opens a valve and oil will then pass through the cooler.

FUEL AND OIL: The engine is serviced with a minimum 93 octane or 100 low lead aviation fuel. One fuel tank having a capacity of 57 gallons with expansion space for one gallon is located below the rear portion of the cabin. The oil tank located on the bottom of the engine compartment has a capacity of 3.0 U.S. gallons and expansion space for ½ gallon.

TRANSMISSION OIL SYSTEM:

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

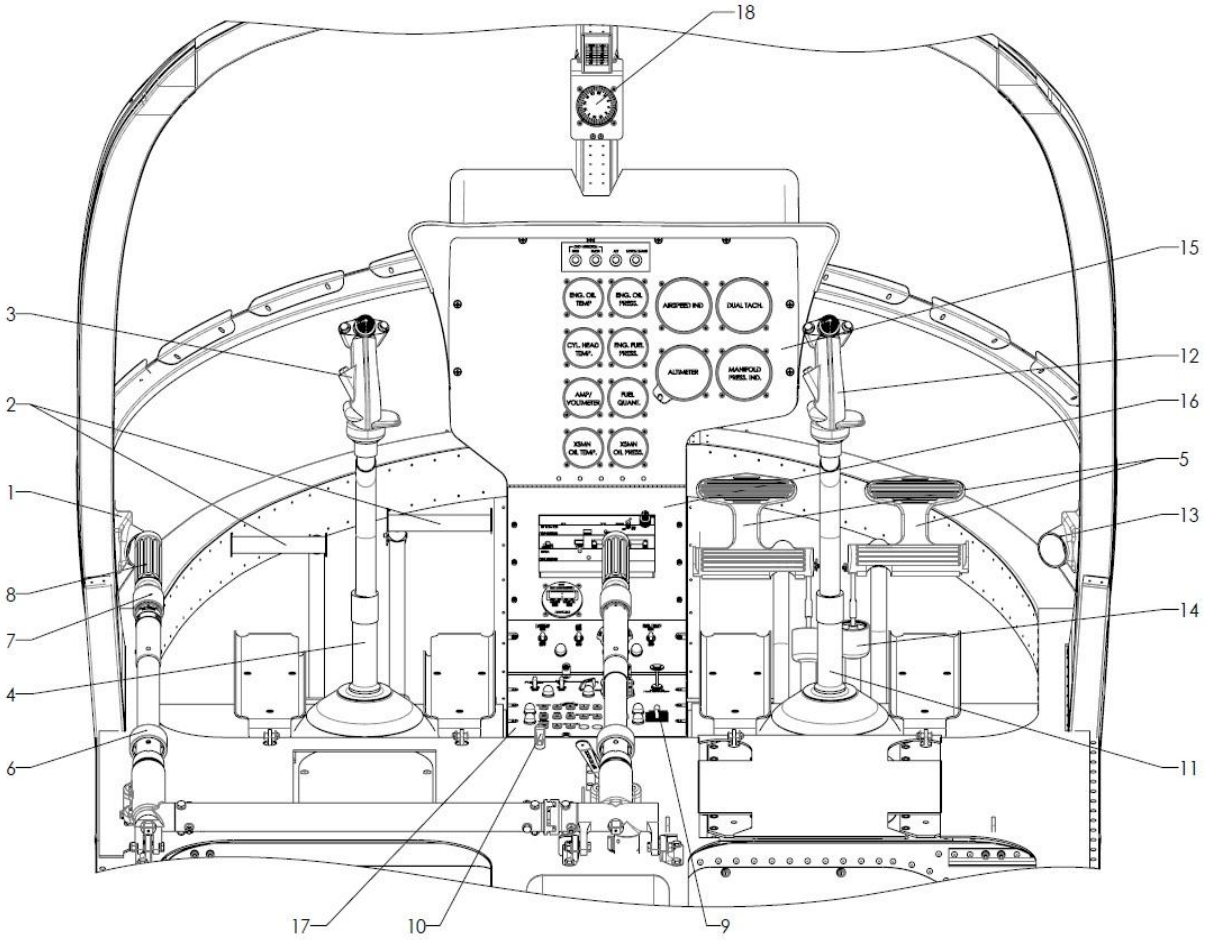
OIL SPECIFICATION AND GRADE: The transmission oil used in this helicopter shall conform to Specification MIL-O-6082, Grade 1100 (summer) and Grade 1065 (winter). Shell Rotella 30WT.

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

CAUTION

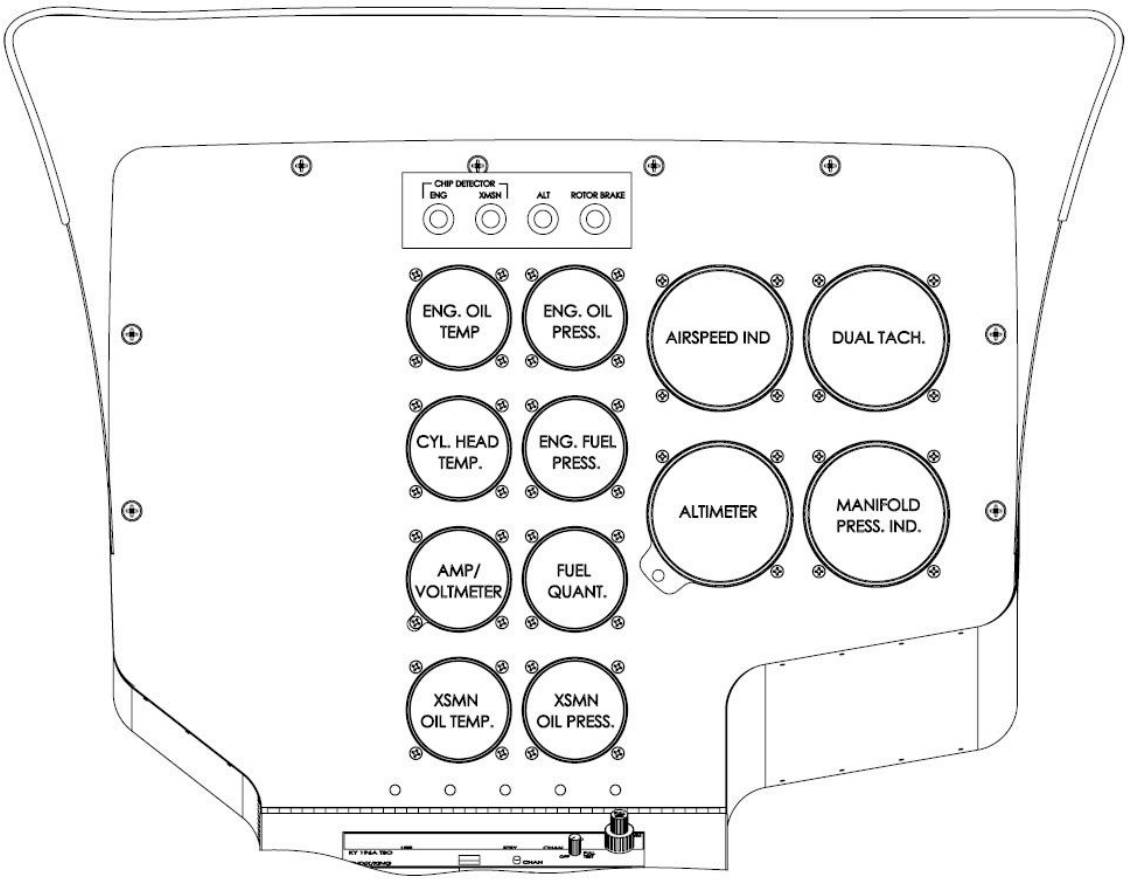
If the transmission oil pressure should drop to below 10 PSI, an immediate landing should be made as operation with low transmission oil pressure is dangerous. The loss of oil pressure should be corrected before attempting to take off.

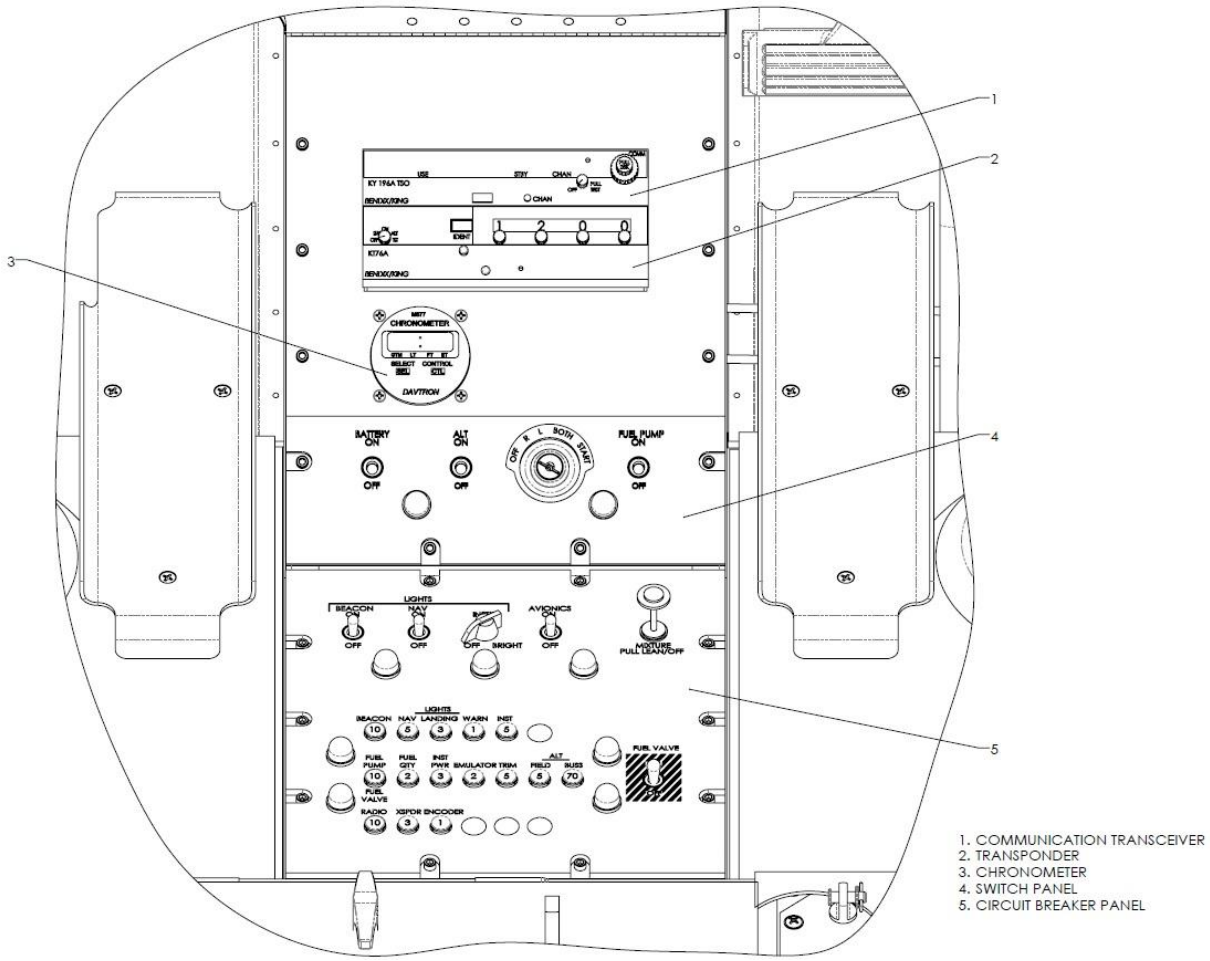
Revised November 22, 2021



Key

1. Co-pilot vent	6. Collective friction	11. Cyclic friction	16. Switch panel
2. Co-pilot pedals	7. Throttle friction	12. Pilot cyclic stick	17. Circuit breaker panel
3. Co-pilot cyclic stick	8. Throttle grip	13. Pilot vent	18. Compass
4. Cyclic friction	9. Fuel shut-off	14. Wheel brakes	
5. Pilot pedals	10. Rotor brake lever	15. Instrument panel	


CHIP DETECTOR
ENG
XMSN
ALT
ROTOR BRAKE
ENG. OIL TEMP
ENG. OIL PRESS.
AIRSPEED IND
DUAL TACH.
CYL. HEAD TEMP.
ENG. FUEL PRESS.
ALTIMETER
MANIFOLD PRESS. IND.
AMP/ VOLTMETER
FUEL QUANT.
XSMN OIL TEMP.
XSMN OIL PRESS.



1. COMMUNICATION TRANSCEIVER
2. TRANSPONDER
3. CHRONOMETER
4. SWITCH PANEL
5. CIRCUIT BREAKER PANEL

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