

## NOTICE

AT THE TIME OF ISSUANCE, THIS INFORMATION MANUAL WAS AN EXACT DUPLICATE OF THE OFFICIAL PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL AND IS TO BE USED FOR GENERAL PURPOSES ONLY.

IT WILL NOT BE KEPT CURRENT AND, THEREFORE, CANNOT BE USED AS A SUBSTITUTE FOR THE OFFICIAL PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL INTENDED FOR OPERATION OF THE AIRPLANE.

THE PILOT'S OPERATING HANDBOOK MUST BE CARRIED IN THE AIRPLANE AND AVAILABLE TO THE PILOT AT ALL TIMES.

## PERFORMANCE - SPECIFICATIONS

### CARGO VERSION

**\*SPEED (KTAS):**

Maximum Cruise at 10,000 Feet . . . . .	175 Knots
Maximum Cruise at 20,000 Feet . . . . .	164 Knots
RANGE: With 2224 pounds usable fuel and fuel allowance for engine start, taxi, takeoff, climb, descent and 45 minutes reserve.	
Max Cruise at 10,000 Feet . . . . .	Range 862 NM
. . . . .	Time - 5.1 Hours
Max Cruise at 18,000 Feet . . . . .	Range - 1044 NM
. . . . .	Time - 6.6 Hours
Max Range at 10,000 Feet . . . . .	Range - 963 NM
. . . . .	Time - 6.5 Hours
Max Range at 18,000 Feet . . . . .	Range - 1076 NM
. . . . .	Time - 7.0 Hours
RATE-OF-CLIMB AT SEA LEVEL . . . . .	925 FPM
SERVICE CEILING . . . . .	22,800 Feet
MAXIMUM OPERATING ALTITUDE . . . . .	25,000 Feet
TAKEOFF PERFORMANCE:	
Ground Roll . . . . .	1405 Feet
Total Distance Over 50 Foot Obstacle . . . . .	2500 Feet
LANDING PERFORMANCE:	
Ground Roll . . . . .	915 Feet
Total Distance Over 50 Foot Obstacle . . . . .	1740 Feet
STALL SPEED (KCAS):	
Flaps Up, Idle Power . . . . .	78 Knots
Flaps Full, Idle Power . . . . .	61 Knots
MAXIMUM WEIGHT:	
Ramp . . . . .	8785 Pounds
Takeoff . . . . .	8750 Pounds
Landing . . . . .	8500 Pounds
STANDARD EMPTY WEIGHT . . . . .	4680 Pounds
Maximum USEFUL LOAD . . . . .	4105 Pounds

\*Speeds are based on mid-cruise weight.

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## PERFORMANCE - SPECIFICATIONS

### CARGO VERSION (Continued)

WING LOADING .....	31.3 Pounds/Square Foot
POWER LOADING .....	13.0 Pounds/Shaft Horsepower
FUEL CAPACITY.....	335.6 Gallons
OIL CAPACITY .....	14 Quarts
ENGINE: Pratt & Whitney Canada .....	PT6A-114A
Free Turbine Flat Rated at 675 Shaft Horsepower	
PROPELLER:	
McCaughey 3-bladed, Constant Speed,	
Full Feathering, Reversible Propeller	
Diameter.....	106 Inches

### NOTE

The above performance figures are based on indicated weights, standard atmospheric conditions, level, hard-surfaced dry runways and no wind. They are calculated values derived from flight tests conducted by Cessna Aircraft Company under carefully documented conditions and will vary with individual airplanes and numerous factors affecting flight performance. Performance for other operational conditions can be derived by reference to operational data in other sections of this POH/AFM.

## PERFORMANCE - SPECIFICATIONS

### PASSENGER VERSION

## \* SPEED (KTAS):

Maximum Cruise at 10,000 Feet . . . . .	184 Knots
Maximum Cruise at 20,000 Feet . . . . .	174 Knots
RANGE: With 2224 pounds usable fuel and fuel allowance for engine start, taxi, takeoff, climb, descent and 45 minutes reserve.	
Max Cruise at 10,000 Feet . . . . .	Range - 907 NM
. . . . .	Time - 5.1 Hours
Max Cruise at 18,000 Feet . . . . .	Range - 1109 NM
. . . . .	Time - 6.6 Hours
Max Range at 10,000 Feet . . . . .	Range - 1026 NM
. . . . .	Time - 6.6 Hours
Max Range at 18,000 Feet . . . . .	Range - 1163 NM
. . . . .	Time - 7.4 Hours

RATE-OF-CLIMB AT SEA LEVEL . . . . . 975 FPM

SERVICE SEALING . . . . . 23,700 Feet

MAXIMUM OPERATING ALTITUDE . . . . . 25,000 Feet

## TAKEOFF PERFORMANCE:

Ground Roll . . . . .	1365 Feet
Total Distance Over 50 Foot Obstacle . . . . .	2420 Feet

## LANDING PERFORMANCE:

Ground Roll . . . . .	950 Feet
Total Distance Over 50 Foot Obstacle . . . . .	1795 Feet

## STALL SPEED (KCAS):

Flaps Up, Idle Power . . . . .	78 Knots
Flaps Full, Idle Power . . . . .	61 Knots

## MAXIMUM WEIGHT:

Ramp . . . . .	8785 Pounds
Takeoff . . . . .	8750 Pounds
Landing . . . . .	8500 Pounds

STANDARD EMPTY WEIGHT . . . . . 4511 Pounds

Maximum USEFUL LOAD . . . . . 4274 Pounds

\*Speeds are based on mid-cruise weight.

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## PERFORMANCE - SPECIFICATIONS

### PASSENGER VERSION (Continued)

WING LOADING ..... 31.3 Pounds/Square Foot  
POWER LOADING ..... 13.0 Pounds/Shaft Horsepower  
FUEL CAPACITY..... 335.6 Gallons  
OIL CAPACITY..... 14 Quarts  
ENGINE: Pratt & Whitney Canada ..... PT6A-114A  
Free Turbine Flat Rated at 675 Shaft Horsepower

#### PROPELLER:

McCaughey 3-bladed, Constant Speed,  
Full Feathering, Reversible. Diameter ..... 106 Inches

### NOTE

The above performance figures are based on indicated weights, standard atmospheric conditions, level, hard-surfaced dry runways and no wind. They are calculated values derived from flight tests conducted by Cessna Aircraft Company under carefully documented conditions and will vary with individual airplanes and numerous factors affecting flight performance. Performance for other operational conditions can be derived by reference to operational data in other sections of this POH/AFM.





# Information Manual

# GRAND

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# CARAVAN



**Cessna Aircraft Company**

**Model 208B G1000**

This manual incorporates information issued in the Pilot's Operating Handbook and FAA approved Airplane Flight Manual at Revision 1, Dated 5 June 2008 (Part Number 208BPHBUS-01).

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WICHITA, KANSAS, USA





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**WARNINGS, CAUTIONS, AND NOTES**

Throughout the text, warnings, cautions, and notes pertaining to airplane handling and operations are utilized. These adjuncts to the text are used to highlight or emphasize important points.

**WARNING**

**Operating procedures, techniques, etc., which can result in personal injury or loss of life if not carefully followed.**

**CAUTION**

Operating procedures, techniques, etc., which can result in damage to equipment if not carefully followed.

**NOTE**

An operating procedure, technique, etc., which is considered essential to emphasize.

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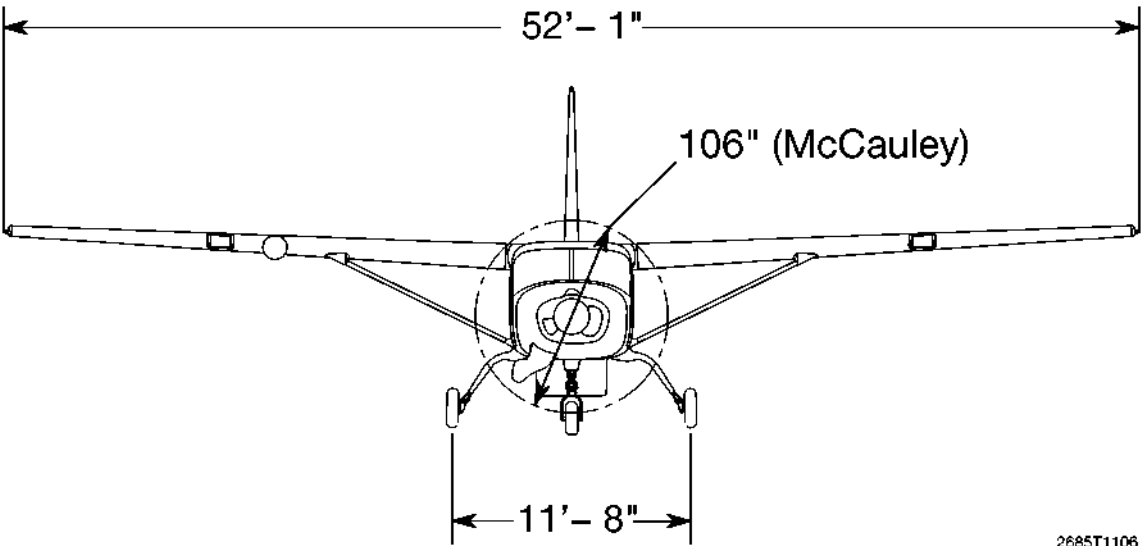
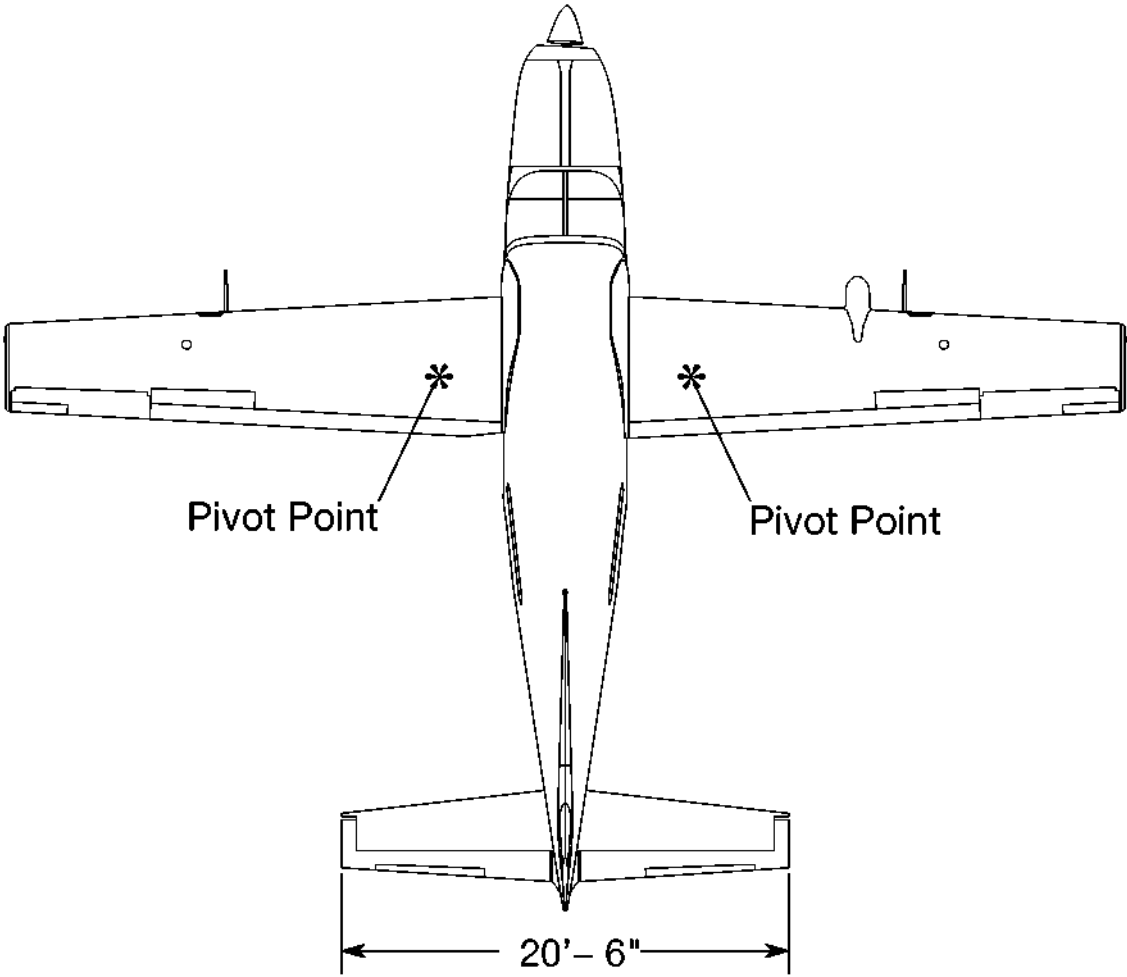
## GENERAL

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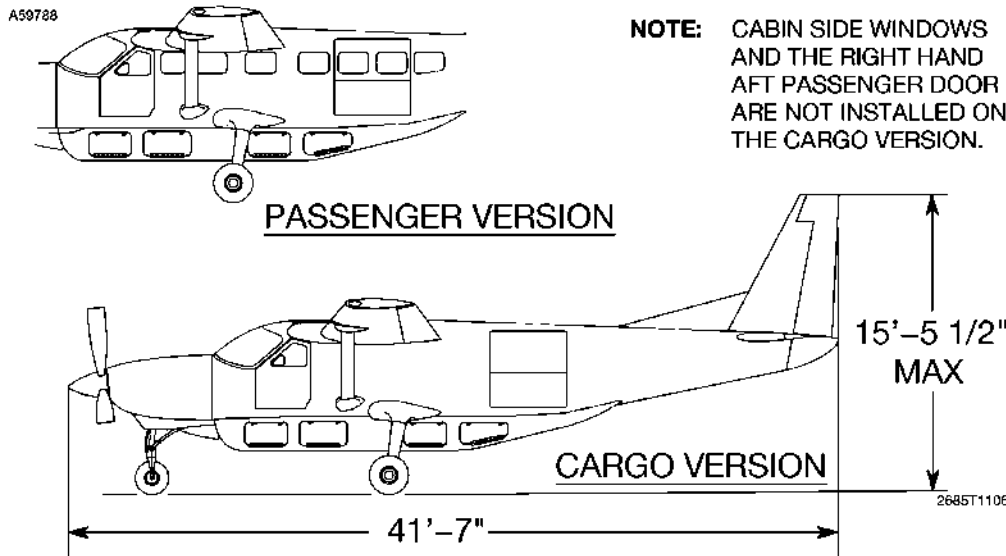


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Figure 1-1 (Sheet 1 of 2)



**NOTE:** CABIN SIDE WINDOWS AND THE RIGHT HAND AFT PASSENGER DOOR ARE NOT INSTALLED ON THE CARGO VERSION.

Figure 1-1 (Sheet 2)

**NOTE**

1. Dimensions shown are based on standard empty weight and proper inflation of nose and main gear tires.
2. Wing span dimension includes strobe lights.
3. Maximum height shown with nose gear depressed as far as possible.
4. Wheel base length is 13'-3 1/2".
5. Wing area is 279.4 square feet.
6. Minimum turning radius (\*pivot point to outboard wing tip strobe light) is 33' -8".
7. Propeller ground clearance with standard tires and nose gear fork:
  - a. Nose tire inflated and nose gear barrel extended 3 5/8": 11 1/4".
  - b. Nose tire deflated and nose strut fully compressed: 2 1/2".
8. Propeller ground clearance with standard tires and extended nose gear fork:
  - a. Nose tire inflated and nose gear barrel extended 3 5/8": 14 3/4".
  - b. Nose tire deflated and nose strut fully compressed: 5 7/8".



## INTRODUCTION

This POH/AFM contains 9 sections, and includes the material required to be furnished to the pilot by Federal Aviation Regulations and additional information provided by Cessna Aircraft Company. This handbook constitutes the FAA Approved Airplane Flight Manual.

### WARNING

- **This POH/AFM is not intended to be a guide for basic flight instruction or a training manual and should not be used as one. It is not a substitute for adequate and competent flight instruction, pilot skill, and pilot knowledge of current Airworthiness Directives, applicable federal aviation regulations and/or advisory circulars.**
- **Assuring the airworthiness of the airplane is the responsibility of the airplane owner or operator. Determining if the airplane is safe for flight is the responsibility of the pilot in command. The pilot is also responsible for adhering to the operating limitations set forth by instrument markings, placards, and this POH/AFM.**

Generally, information in this POH/AFM is applicable to both the cargo version and the passenger version of the Model 208B. Some equipment differences exist between these versions. Specific versions are identified through use of the terms “Cargo Version” and “Passenger Version”. When one of these terms appears in text or on an illustration, the information applies only to that group of airplanes. If no term appears, the information applies to all airplanes.

Section 1 provides basic data and information of general interest. It also contains definitions or explanations of symbols, abbreviations, and terminology commonly used.

## DESCRIPTIVE DATA

### ENGINE

Number of Engines . . . . . 1  
Engine Manufacturer . . . . . Pratt & Whitney Canada, Inc.  
Engine Model Number . . . . . PT6A-114A  
Engine Type:

Free turbine, two-shaft engine utilizing a compressor section having three axial stages and one centrifugal stage, an annular reverse-flow combustion chamber, a one-stage compressor turbine, a one-stage power turbine, and a single exhaust. The power turbine drives the propeller through a two-stage planetary gearbox at the front of the engine.

Horsepower . . . . . Flat rated at 675 shaft horsepower.

### PROPELLER

Propeller Manufacturer . . . . . McCauley Accessory Division  
Propeller Model Number . . . . . 3GFR34C703/106GA-0  
Number of Blades . . . . . 3  
Propeller Diameter . . . . . Maximum 106 Inches  
Minimum 104 Inches

Propeller Type:

Constant-speed, full-feathering, reversible, hydraulically-actuated aluminum-bladed propeller, with a feathered blade angle of 88°, a low pitch blade angle of 15.6°, and a maximum reverse blade angle of -14° (30-inch station).

## **FUEL**

Approved Fuel Grade (Specification):

JET A (ASTM-D1655)

JET A-1 (ASTM-D1655)

JET B (ASTM-D1655)

JP-1 (MIL-L-5616)

JP-4 (MIL-T-5624)

JP-5 (MIL-T-5624)

JP-8 (MIL-T-83133A)

Alternate/Emergency Fuels:

Aviation Fuel (All grades of military and commercial aviation gasoline).

### **CAUTION**

Aviation gasoline is restricted to emergency use and shall not be used for more than 150 hours in one overhaul period; a mixture of one part aviation gasoline and three parts of Jet A, Jet A-1, JP-5 or JP-8 may be used for emergency purposes for a maximum of 450 hours per overhaul period.

Approved Fuel Additives:

One of the following additives is required for anti-icing protection:

Ethylene Glycol Monomethyl Ether

Diethylene Glycol Monomethyl Ether

### **CAUTION**

JP-4 and JP-5 fuel per MIL-T-5624 and JP-8 fuel per MIL-T-83133A contain the correct premixed quantity of an approved type of anti-icing fuel additive and no additional anti-ice compounds should be added.

If additional anti-static protection is desired, the following additive is approved for use:

Dupont Stadis 450

If additional biocidal protection is desired, the following additives are permitted for use in certain conditions:

Sohio Biobor JF

Kathon FP 1.5

(Continued Next Page)

**FUEL** (Continued)

**NOTE**

Refer to Section 8 for allowable concentrations of the above additives and additional information.

Fuel Capacity:

Total Capacity	335.6 U.S. Gallons
Total Capacity Each Tank	167.8 U.S. Gallons
Total Usable	332.0 U.S. Gallons

**OIL**

Oil Grade (Specification):

Oil conforming to Pratt & Whitney Engine Service Bulletin No. 1001, and all revisions or supplements thereto, must be used. Refer to Section 8 for a listing of approved oils.

Total Oil Capacity: 14 U.S. Quarts  
(including filter, cooler, and hoses)

Drain and Refill Quantity 9.5 U.S. Quarts  
(approximately)

Oil Quantity Operating Range:

Fill to within 1 1/2 quarts of MAX HOT or MAX COLD (as appropriate) on dipstick. Quart marking indicate U.S. quarts low if oil is hot. For example, a dipstick reading of 3 indicates the system is within 2 quarts of MAX if the oil is cold and within 3 quarts of MAX if the oil is hot.

**WARNING**

**Make sure oil dipstick cap is securely latched down. Operating the engine with less than the recommended oil level and with the dipstick cap unlatched will result in excessive oil loss and eventual engine stoppage.**

(Continued Next Page)

**OIL** (Continued)

**NOTE**

To obtain an accurate oil level reading, it is recommended the oil level be checked within 10 minutes after engine shutdown while the oil is hot (MAX HOT marking) or prior to the first flight of the day while the oil is cold (MAX COLD marking). If more than 10 minutes has elapsed since engine shutdown and engine oil is still warm, perform an engine dry motoring run before checking oil level.

**MAXIMUM CERTIFICATED WEIGHTS**

Ramp.....	8785 Pounds
Takeoff.....	8750 Pounds
Landing.....	8500 Pounds

**NOTE**

Refer to Section 6 of this POH/AFM for recommended loading arrangements.

**CABIN AND ENTRY DOOR DIMENSIONS**

Detailed dimensions of the cabin interior and entry door openings are illustrated in Section 6.

**BAGGAGE/CARGO COMPARTMENT AND CARGO DOOR ENTRY DIMENSIONS**

Detailed dimensions of the baggage/cargo area and cargo door openings are illustrated in Section 6.

**SPECIFIC LOADINGS**

Wing Loading.....	31.3 Pounds/Square Foot
Power Loading.....	13.0 Pounds/Shaft Horsepower

## SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

### GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS	<b>Knots Calibrated Airspeed</b> is indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level.
KIAS	<b>Knots Indicated Airspeed</b> is the speed shown on the airspeed indicator and expressed in knots.
KTAS	<b>Knots True Airspeed</b> is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature.
$V_A$	<b>Maneuvering Speed</b> is the maximum speed at which full or abrupt control movements may be used without overstressing the airframe.
$V_{FE}$	<b>Maximum Flap Extended Speed</b> is the highest speed permissible with wing flaps in a prescribed extended position.
$V_{MO}$	<b>Maximum Operating Speed</b> is the speed that may not be deliberately exceeded at any time.
$V_S$	<b>Stalling Speed or the minimum steady flight speed</b> is the minimum speed at which the airplane is controllable.
$V_{SO}$	<b>Stalling Speed or the minimum steady flight speed</b> is the minimum speed at which the airplane is controllable in the landing configuration at the most forward center of gravity.
$V_X$	<b>Best Angle-of-Climb Speed</b> is the speed which results in the greatest gain of altitude in a given horizontal distance.
$V_Y$	<b>Best Rate-of-Climb Speed</b> is the speed which results in the greatest gain in altitude in a given time.

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## SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

(Continued)

OAT	<b>Outside Air Temperature</b> is the free air static temperature. It may be expressed in either degrees Celsius (°C) or degrees Fahrenheit (°F).
Pressure Altitude	<b>Pressure Altitude</b> is the altitude read from an altimeter when the altimeter's barometric scale has been set to 29.92 inches of mercury (inHg) (1013.2 mb).
ISA	<b>International Standard Atmosphere</b> is an atmosphere in which: <ol style="list-style-type: none"><li>1. The air is a perfect dry gas;</li><li>2. The temperature at sea level is 15°C;</li><li>3. The pressure at sea level is 29.92 inches of mercury (inHg) (1013.2 mb);</li><li>4. The temperature gradient from sea level to the altitude at which the temperature is -56.5°C is -1.98°C per 1000 feet.</li></ol>

## ENGINE POWER TERMINOLOGY

Beta Mode	<b>Beta Mode</b> is the engine operational mode in which propeller blade pitch is controlled by the power lever. The beta mode may be used during ground operations only.
Flameout	<b>Flameout</b> is the unintentional loss of combustion chamber flame during operation.
Flat Rated	<b>Flat Rated</b> denotes constant horsepower over a specific altitude and/or temperature.
Gas Generator RPM (N <sub>g</sub> )	<b>Gas Generator RPM</b> indicates the percent of gas generator RPM based on a figure of 100% being 37,500 RPM.
GCU	<b>GCU</b> is the generator control unit.
Hot Start	<b>Hot Start</b> is an engine start, or attempted start, which results in an ITT exceeding 1090°C.
ITT	<b>ITT</b> signifies interstage turbine temperature.
Maximum Climb Power	<b>Maximum Climb Power</b> is the maximum power approved for normal climb. Use of this power setting is limited to climb operations. This power corresponds to that developed at the maximum torque limit, ITT of 765°C or N <sub>g</sub> limit, whichever is less. This power corresponds to that shown in the Maximum Engine Torque for Climb figure of Section 5.

(Continued Next Page)

## SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

(Continued)

**Maximum Rated Power** **Maximum Rated Power** is the maximum power rating not limited by time. Use of this power should be limited to those abnormal circumstances which require maximum aircraft performance (i.e., severe icing conditions or windshear downdrafts). This power corresponds to that developed at the maximum torque limit, ITT of 805°C or  $N_g$  limit, whichever is less.

$N_g$   **$N_g$**  signifies gas generator RPM.

**Propeller RPM** **Propeller RPM** indicates propeller speed in RPM.

**Reverse Thrust** **Reverse Thrust** is the thrust produced when the propeller blades are rotated past flat pitch into the reverse range.

**RPM** **RPM** is revolutions per minute.

**SHP** **SHP** is shaft horsepower and is the power delivered at the propeller shaft.

$$\text{SHP} = \frac{\text{Propeller RPM} \times \text{Torque (foot-pounds)}}{5252}$$

**Takeoff Power** **Takeoff Power** is the maximum power rating and is limited to a maximum of 5 minutes under normal operation. Use of this power should be limited to normal takeoff operations. This power corresponds to that shown in the Maximum Engine Torque For Takeoff figure of Section 5.

**Torque** **Torque** is a measurement of rotational force exerted by the engine on the propeller.

**Windmill** **Windmill** is propeller rotation from airstream inputs.

(Continued Next Page)



## **SYMBOLS, ABBREVIATIONS AND TERMINOLOGY**

(Continued)

### **AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY**

Demonstrated Crosswind Velocity    **Demonstrated Crosswind Velocity** is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests. The value shown is not considered to be limiting.

g    **g** is acceleration due to gravity.

NM/1000 lbs    **Nautical Miles Per Thousand Pounds of Fuel** is the distance which can be expected per 1000 Pounds of fuel consumed at a specific engine power setting and/or flight configuration.

PPH    **PPH** signifies pounds per hour and is the amount of fuel used per hour.

Usable Fuel    **Usable Fuel** is the fuel available for flight planning.

Unusable Fuel    **Unusable Fuel** is the quantity of fuel that can not be safely used in flight.

### **WEIGHT AND BALANCE TERMINOLOGY**

Arm    **Arm** is the horizontal distance from the reference datum to the center of gravity (C.G.) of an item.

Basic Empty Weight    **Basic Empty Weight** is the standard empty weight plus the weight of optional equipment.

Center of Gravity (C.G.)    **Center of Gravity** is the point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.

C.G. Arm    **Center of Gravity Arm** is the arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.

C.G. Limits    **Center of Gravity Limits** are the extreme center of gravity locations within which the airplane must be operated at a given weight.

MAC    **MAC (Mean Aerodynamic Chord)** of a wing is the chord of an imaginary airfoil which throughout the flight range will have the same force vectors as those of the wing.

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## SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

(Continued)

Maximum Landing Weight	<b>Maximum Landing Weight</b> is the maximum Landing weight approved for the landing touchdown.
Maximum Ramp Weight	<b>Maximum Ramp Weight</b> is the maximum weight approved for ground maneuver, and includes the weight of fuel used for start, taxi and runup.
Maximum Takeoff Weight	<b>Maximum Takeoff Weight</b> is the maximum weight approved for the start of the takeoff roll.
Moment	<b>Moment</b> is the product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this POH/AFM to simplify balance calculations by reducing the number of digits.)
Reference Datum	<b>Reference Datum</b> is an imaginary vertical plane 100 inches forward of the front face of the firewall.
Residual Fuel	<b>Residual Fuel</b> is the fuel remaining when the airplane is defueled in a specific attitude by the normal means and procedures specified for draining the tanks.
Scale Drift	<b>Scale Drift</b> may occur on some types of electronic scales because of the inability of the scale to return to a true zero reading after weighing. If present, this deviation from zero should be accounted for when calculating the net weight of the airplane.
Standard Empty Weight	<b>Standard Empty Weight</b> is the weight of a standard airplane, including unusable fuel, full operating fluids and full engine oil.
Fuselage Station	<b>Fuselage Station</b> is a location along the airplane fuselage given in terms of the distance from the reference datum.
Tare	<b>Tare</b> is the weight of chocks, blocks, stands, etc. used when weighing an airplane, and is included in the scale readings. Tare is deducted from the scale reading to obtain the actual (net) airplane weight.
Useful Load	<b>Useful Load</b> is the difference between ramp weight and the basic empty weight.

# AUTOPILOT/FLIGHT DIRECTOR AND AFCS TERMINOLOGY

## CAUTION

A thorough understanding of the difference between an autopilot, a flight director, and an AFCS is required before operating any of the components of the Garmin G1000/GFC 700 Flight Control System. Refer to Garmin Cockpit Resource Guide (CRG) for complete operating details.

Autopilot	<b>Autopilot</b> is a system which automatically controls attitude and/or flight path of the airplane as directed by the pilot through the system's computer.
Flight Director	<b>Flight Director</b> is a system which provides visual recommendations to the pilot to allow him to manually control the airplane attitude and/or flight path in response to his desires as selected through the system's computer.
Automated Flight Control System (AFCS)	<b>AFCS</b> applies to the union of autopilot and flight director systems which allows the pilot to manage his flight by observing computed visual recommendations while the autopilot automatically follows these recommendations as selected by the pilot using the system's controls.
Course Datum	<b>C/D</b> is the compass reference used by the autopilot, along with course deviation, to provide lateral control when tracking a navigation signal.

## **WARNINGS, CAUTIONS, AND NOTES**

### **WARNING**

**An operating procedure, technique, or maintenance practice which may result in personal injury or loss of life if not carefully obeyed.**

### **CAUTION**

An operating procedure, technique, or maintenance practice which may result in damage to equipment if not carefully obeyed.

### **NOTE**

An operating procedure, technique, or maintenance condition which is considered essential to emphasize.

## **METRIC/IMPERIAL/U.S. CONVERSION CHARTS**

The following charts have been provided to help international operators convert U.S. measurement supplied with the POH/AFM into metric and imperial measurements.

The standard followed for measurement units shown is the National Institute of Standards Technology (NIST), Publication 811, "Guide for the Use of the International System of Units (SI)."

Please refer to the following pages for these charts.

## WEIGHT CONVERSIONS

(Kilogrames x 2.2046 = Pounds)      (Pounds x 0.4536 = Kilograms)

### Kilograms into Pounds Kilogrammes en Livres

kg	0	1	2	3	4	5	6	7	8	9
	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb
0	---	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	52.91	55.12	57.32	59.52	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.77	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.43	114.64	116.84	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.09	143.30	145.50	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.75	171.96	174.16
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.00	196.21
90	198.41	200.62	202.82	205.03	207.23	209.44	211.64	213.85	216.05	218.26
100	220.46	222.66	224.87	227.07	229.28	231.48	233.69	235.89	238.10	240.30

### Pounds into Kilograms Livres en Kilogrammes

lb	0	1	2	3	4	5	6	7	8	9
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
0	---	0.45	0.91	1.36	1.81	2.27	2.72	3.18	3.63	4.08
10	4.54	4.99	5.44	5.90	6.35	6.80	7.26	7.71	8.16	8.62
20	9.07	9.53	9.98	10.43	10.89	11.34	11.79	12.25	12.70	13.15
30	13.61	14.06	14.52	14.97	15.42	15.88	16.33	16.78	17.24	17.69
40	18.14	18.60	19.05	19.50	19.96	20.41	20.87	21.32	21.77	22.23
50	22.68	23.13	23.59	24.04	24.49	24.95	25.40	25.86	26.31	26.76
60	27.22	27.67	28.12	28.58	29.03	29.48	29.94	30.39	30.84	31.30
70	31.75	32.21	32.66	33.11	33.57	34.02	34.47	34.93	35.38	35.83
80	36.29	36.74	37.20	37.65	38.10	38.56	39.01	39.46	39.92	40.37
90	40.82	41.28	41.73	42.18	42.64	43.09	43.55	44.00	44.45	44.91
100	45.36	45.81	46.27	46.72	47.17	47.63	48.08	48.54	48.99	49.44

Figure 1-2 (Sheet 1 of 2)

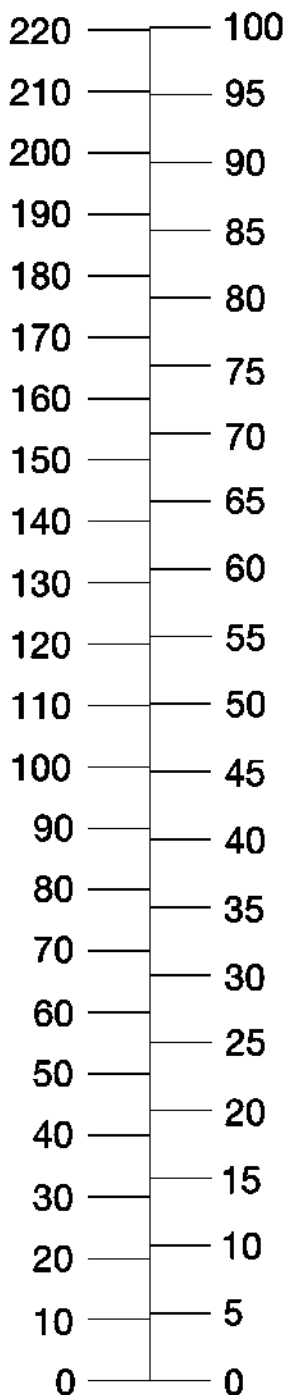
## WEIGHT CONVERSIONS

B3081

(Kilograms x 2.205 = Pounds)

(Pounds x .454 = Kilograms)

POUNDS      KILOGRAMS



Units x 10, 100, etc.

0585T1027

Figure 1-2 (Sheet 2)

## LENGTH CONVERSIONS

(Meters x 3.2808 = Feet)

(Feet x 0.3048 = Meters)

### Meters into Feet Metres en Pieds

m	0	1	2	3	4	5	6	7	8	9
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0	---	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.05	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.70	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.79	141.07	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.44	183.72	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.53	219.81	223.09	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.18
80	262.46	265.74	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.27	298.55	301.83	305.11	308.40	311.68	314.96	318.24	321.52	324.80
100	328.08	331.36	334.64	337.92	341.20	344.48	347.76	351.05	354.33	357.61

### Feet into Meters Pieds en Metres

ft	0	1	2	3	4	5	6	7	8	9
	m	m	m	m	m	m	m	m	m	m
0	---	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.94
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.56	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.18
100	30.48	30.78	31.09	31.39	31.70	32.00	32.31	32.61	32.92	33.22

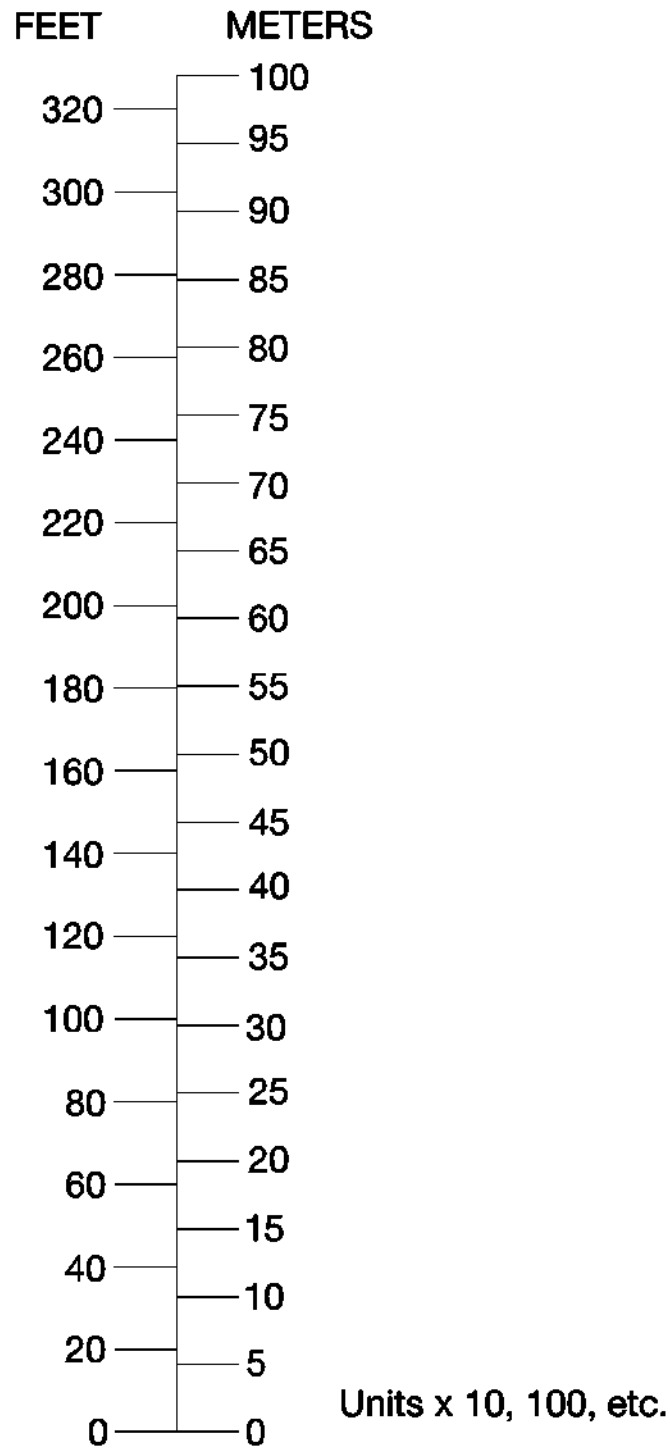
Figure 1-3 (Sheet 1 of 4)

# LENGTH CONVERSIONS

B3082

(Meters x 3.281 = Feet)

(Feet x .305 = Meters)



0585T1027

Figure 1-3 (Sheet 2)



## LENGTH CONVERSIONS

(Centimeters x 0.3937 = Inches)      (Inches x 2.54 = Centimeters)

### Centimeters into Inches Centimetres en Pouces

cm	0	1	2	3	4	5	6	7	8	9
	in	in	in	in	in	in	in	in	in	in
0	---	0.39	0.79	1.18	1.57	1.97	2.36	2.76	3.15	3.54
10	3.94	4.33	4.72	5.12	5.51	5.91	6.30	6.69	7.09	7.48
20	7.87	8.27	8.66	9.06	9.45	9.84	10.24	10.63	11.02	11.42
30	11.81	12.20	12.60	12.99	13.39	13.78	14.17	14.57	14.96	15.35
40	15.75	16.14	16.54	16.93	17.32	17.72	18.11	18.50	18.90	19.29
50	19.69	20.08	20.47	20.87	21.26	21.65	22.05	22.44	22.83	23.23
60	23.62	24.02	24.41	24.80	25.20	25.59	25.98	26.38	26.77	27.17
70	27.56	27.95	28.35	28.74	29.13	29.53	29.92	30.31	30.71	31.10
80	31.50	31.89	32.28	32.68	33.07	33.46	33.86	34.25	34.65	35.04
90	35.43	35.83	36.22	36.61	37.01	37.40	37.80	38.19	38.58	38.98
100	39.37	39.76	40.16	40.55	40.94	41.34	41.73	42.13	42.52	42.91

### Inches into Centimeters Pouces en Centimetres

in	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

Figure 1-3 (Sheet 3)

# LENGTH CONVERSIONS

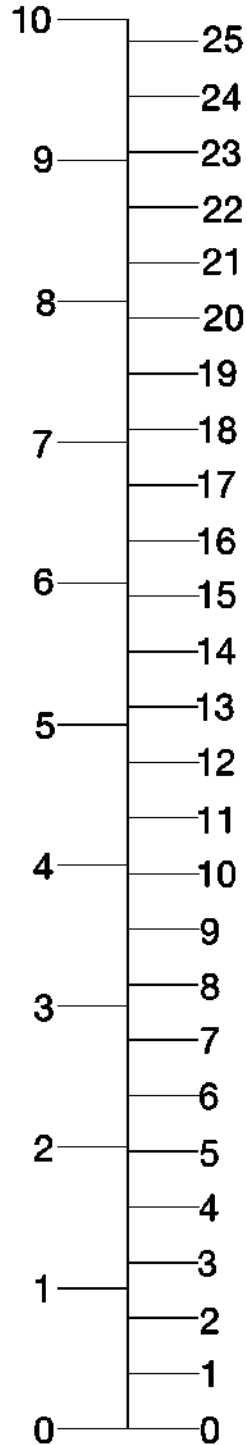
B9083

(Centimeters x .394 = Inches)

(Inches x 2.54 = Centimeters)

INCHES

CENTIMETERS



Units x 10, 100, etc.

0585T1028

Figure 1-3 (Sheet 4)

## DISTANCE CONVERSIONS

E3084

(Statute Miles x 1.609 = Kilometers)      (Kilometers x .622 = Statute Miles)  
 (Statute Miles x .869 = Nautical Miles)      (Nautical Miles x 1.15 = Statute Miles)  
 (Nautical Miles x 1.852 = Kilometers)      (Kilometers x .54 = Nautical Miles)

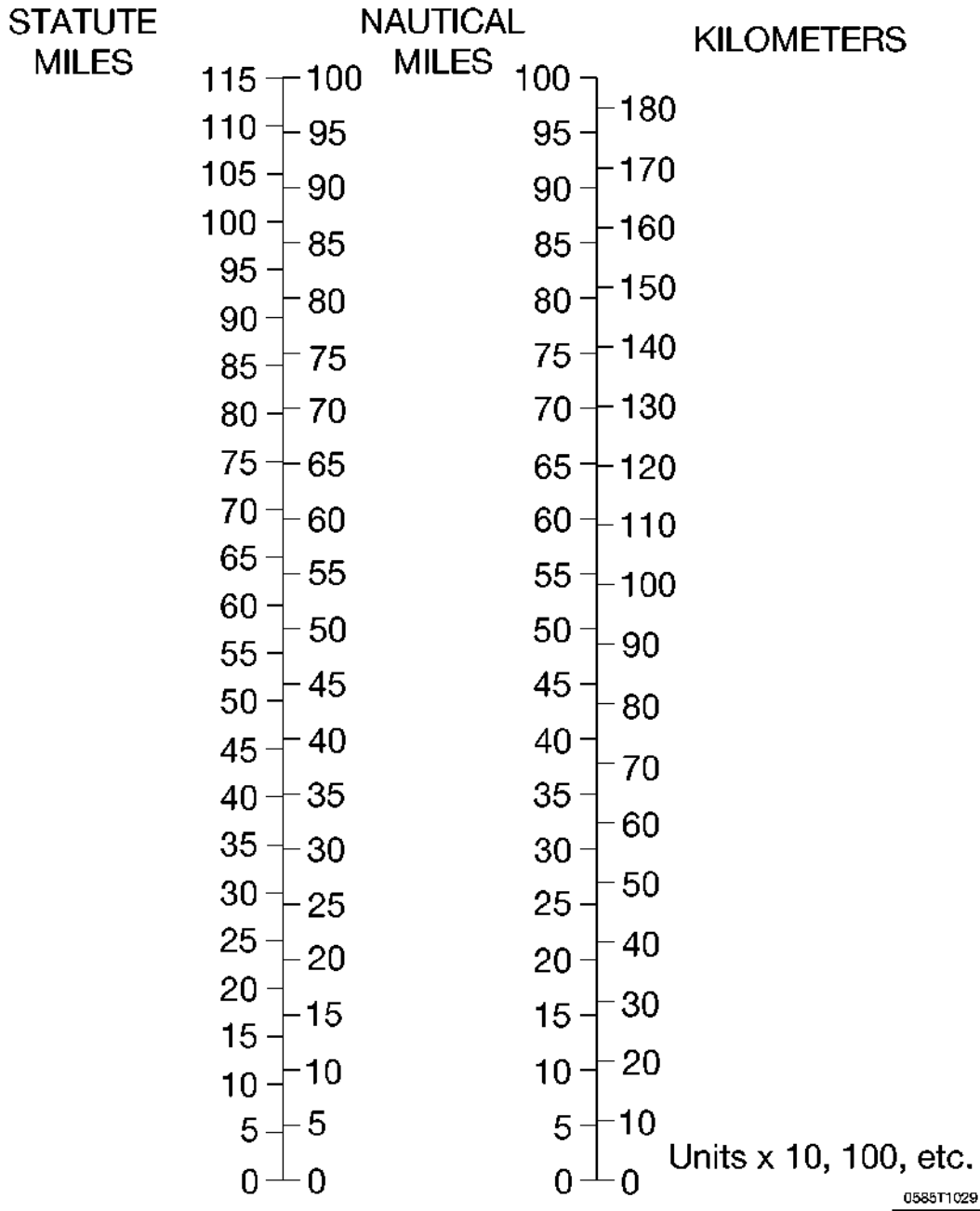


Figure 1-4

## VOLUME CONVERSIONS

(Imperial Gallons x 4.546 = liters)      (Liters x 0.22 = Imperial Gallons)

### Liters into Imperial Gallons Litres en Gallons Imperial

L	0	1	2	3	4	5	6	7	8	9
	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
0	---	0.22	0.44	0.66	0.88	1.10	1.32	1.54	1.76	1.98
10	2.20	2.42	2.64	2.86	3.08	3.30	3.52	3.74	3.96	4.18
20	4.40	4.62	4.84	5.06	5.28	5.50	5.72	5.94	6.16	6.38
30	6.60	6.82	7.04	7.26	7.48	7.70	7.92	8.14	8.36	8.58
40	8.80	9.02	9.24	9.46	9.68	9.90	10.12	10.34	10.56	10.78
50	11.00	11.22	11.44	11.66	11.88	12.10	12.32	12.54	12.76	12.98
60	13.20	13.42	13.64	13.86	14.08	14.30	14.52	14.74	14.96	15.18
70	15.40	15.62	15.84	16.06	16.28	16.50	16.72	16.94	17.16	17.38
80	17.60	17.82	18.04	18.26	18.48	18.70	18.92	19.14	19.36	19.58
90	19.80	20.02	20.24	20.46	20.68	20.90	21.12	21.34	21.56	21.78
100	22.00	22.22	22.44	22.66	22.88	23.10	23.32	23.54	23.76	23.98

### Imperial Gallons into Liters Gallons Imperial en Litres

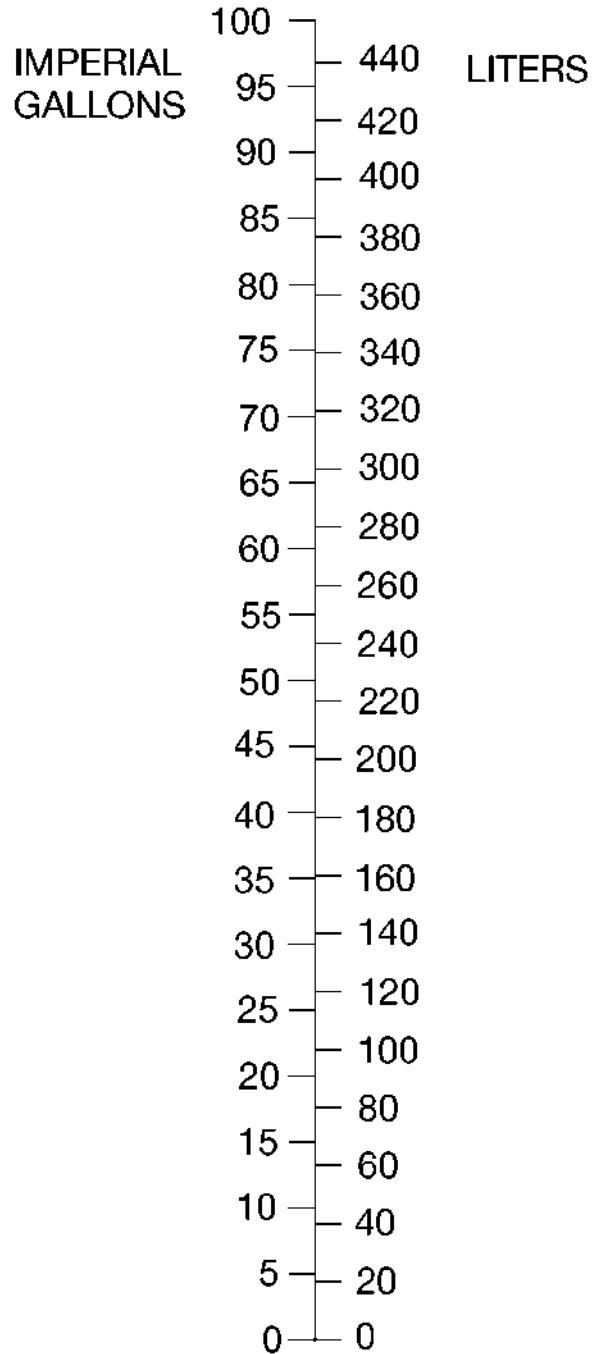
IG	0	1	2	3	4	5	6	7	8	9
	L	L	L	L	L	L	L	L	L	L
0	---	4.55	9.09	13.64	18.18	22.73	27.28	31.82	36.37	40.91
10	45.46	50.01	54.55	59.10	63.64	68.19	72.74	77.28	81.83	86.37
20	90.92	95.47	100.01	104.56	109.10	113.65	118.20	122.74	127.29	131.83
30	136.38	140.93	145.47	150.02	154.56	159.11	163.66	168.20	172.75	177.29
40	181.84	186.39	190.93	195.48	200.02	204.57	209.12	213.66	218.21	222.75
50	227.30	231.85	236.39	240.94	245.48	250.03	254.58	259.12	263.67	268.21
60	272.76	277.31	281.85	286.40	290.94	295.49	300.04	304.58	309.13	313.67
70	318.22	322.77	327.31	331.86	336.40	340.95	345.50	350.04	354.59	359.13
80	363.68	368.23	372.77	377.32	381.86	386.41	390.96	395.50	400.05	404.59
90	409.14	413.69	418.23	422.78	427.32	431.87	436.42	440.96	445.51	450.05
100	454.60	459.15	463.69	468.24	472.78	477.33	481.88	486.42	490.97	495.51

Figure 1-5 (Sheet 1 of 3)

# VOLUME CONVERSIONS

B3085

(Imperial Gallons X 4.546 = Liters)  
(Liters X .22 = Imperial Gallons)



Units x 10, 100, etc.

0585T1032

Figure 1-5 (Sheet 2)

# VOLUME CONVERSIONS

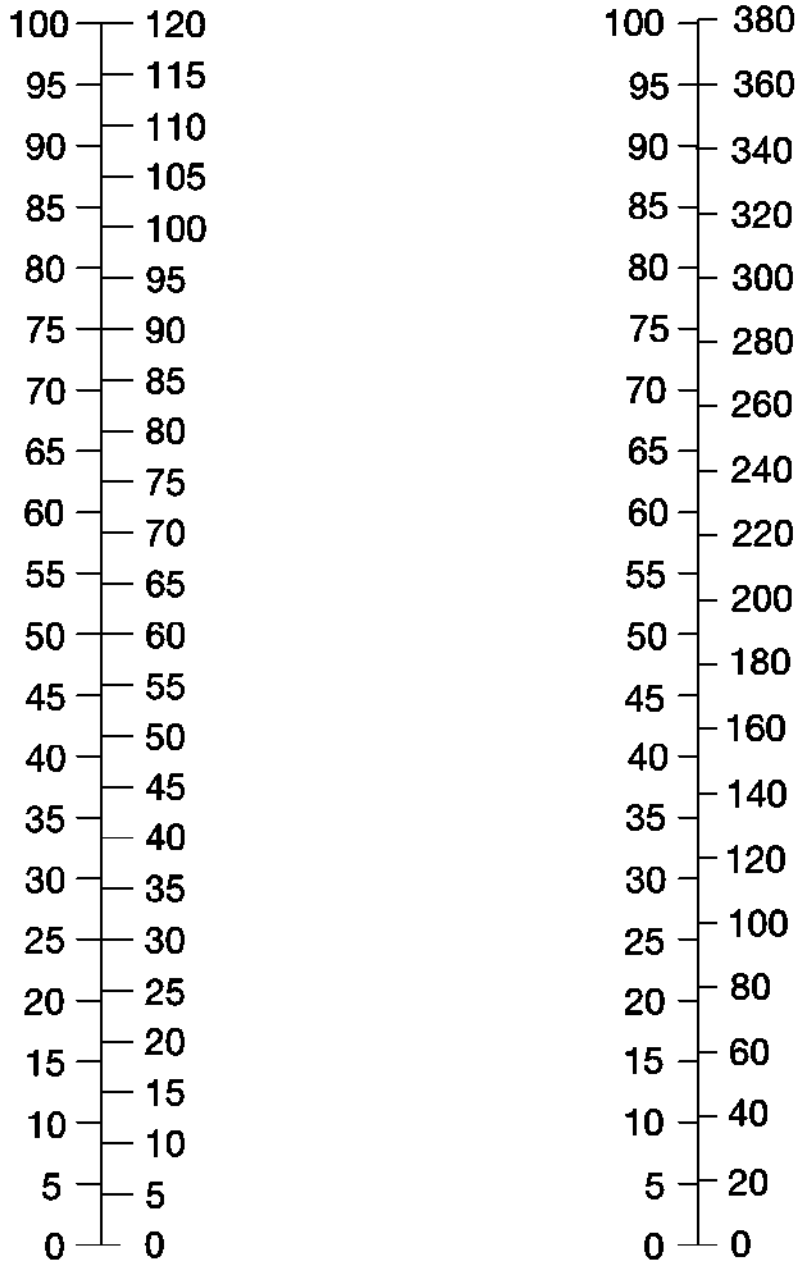
B3086

(Imperial Gallons x 1.2 = U.S. Gallons)  
(U.S. Gallons x .833 = Imperial Gallons)  
(U.S. Gallons x 3.785 = Liters)  
(Liters x .264 = U.S. Gallons)

IMPERIAL  
GALLONS

U.S.  
GALLONS

LITERS



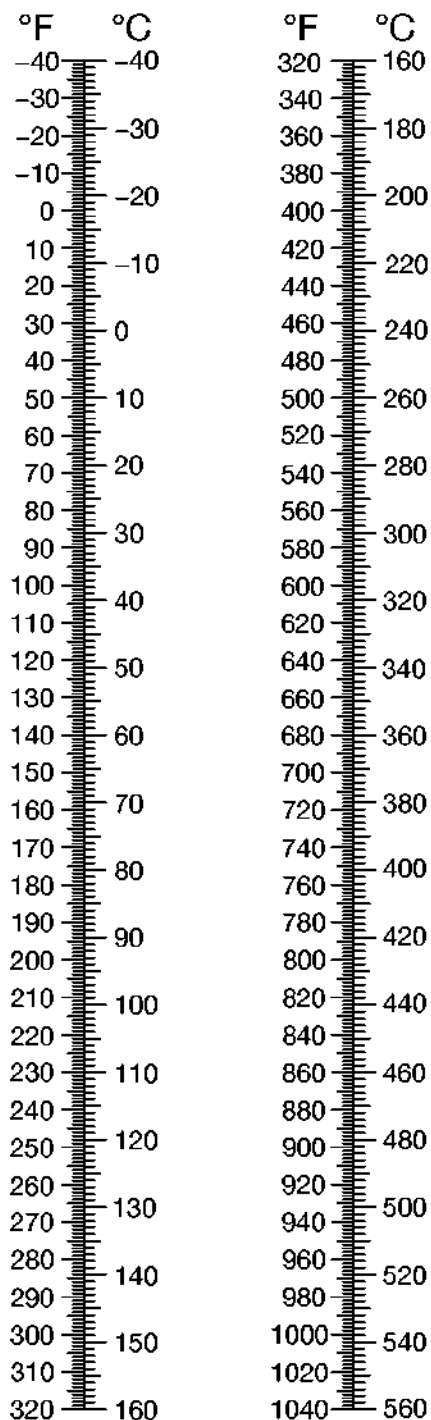
0585T1033

Figure 1-5 (Sheet 3)

## TEMPERATURE CONVERSIONS

B3087

$$(^{\circ}\text{F} - 32) \times \frac{5}{9} = ^{\circ}\text{C} \quad ^{\circ}\text{C} \times \frac{9}{5} + 32 = ^{\circ}\text{F}$$



0585T1034

Figure 1-6

# PRESSURE CONVERSION

## HECTOPASCALS TO INCHES OF MERCURY

B3995

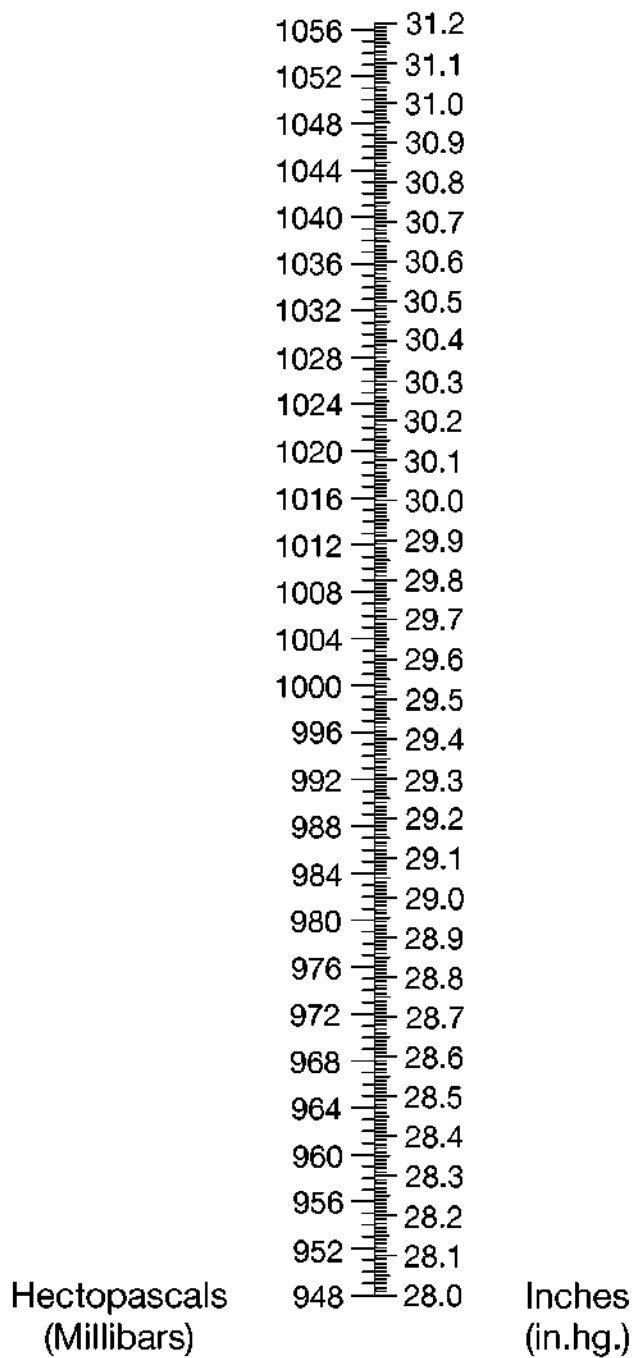


Figure 1-7



## LIMITATIONS

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## INTRODUCTION

Section 2 includes the operating limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, its engine, standard/non-standard systems and standard/non-standard equipment.

### WARNING

**The limitations included in this section and in Section 9 have been approved by the Federal Aviation Administration. Observance of these operating limitations is required by federal aviation regulations.**

### NOTE

- Operation in countries other than the United States may require observance of other limitations, procedures or performance data.
- Refer to Section 9 of this POH/AFM for amended operating limitations, procedures, performance data and other necessary information for supplemental systems.
- The airspeeds listed in Airspeed Limitations chart, and Airspeed Indicator Markings chart are based on Airspeed Calibration data shown in Section 5 with the normal static source. If the alternate static source is being used, ample margins should be observed to allow for the airspeed calibration variations between the normal and alternate static sources as shown in Section 5.

Your Cessna is certificated under FAA Type Certificate No. A37CE as Cessna Model No. 208B.

## AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Airspeed Limitations chart.

	SPEED	KCAS	KIAS	REMARKS
$V_{MO}$	Maximum Operating Speed	175	175	Do not exceed this speed in any operation.
$V_A$	Maneuvering Speed: 8750 Pounds 7500 Pounds 6250 Pounds 5000 Pounds	148 137 125 112	148 137 125 112	Do not make full or abrupt control movements above this speed.
$V_{FE}$	Maximum Flap Extended Speed: UP - 10° Flaps 10° - 20° Flaps 20° - FULL	175 150 125	175 150 125	Do not exceed these speeds with the given flap settings.
	Maximum Open Window Speed	175	175	Do not exceed this speed with window open.

Figure 2-1

## AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in Airspeed Indicator Markings chart.

<b>MARKING</b>	<b>KIAS VALUE OR RANGE</b>	<b>SIGNIFICANCE</b>
<b>Red Band</b>	20 - 50	Low Airspeed Warning
<b>White Band</b>	50 - 125	Full Flap Operating Range. Lower limit is maximum weight $V_{S0}$ in landing configuration. Upper limit is maximum speed permissible with flaps fully extended.
<b>Green Band</b>	63 - 175	Normal Operating Range. Lower limit is maximum weight $V_S$ at most forward C.G. with flaps retracted. Upper limit is maximum operating speed.
<b>Red Line</b>	175	Maximum speed for all operations.

Figure 2-2

### POWER PLANT LIMITATIONS

Engine Manufacturer . . . . . Pratt & Whitney Canada Inc.  
Engine Model Number . . . . . PT6A-114A  
Engine Operating Limits . . . Refer to Engine Operating Limits chart  
Fuel Grade and Approved Fuel Additives . .Refer to Fuel Limitations

Oil Grade (Specification):

Oil conforming to Pratt & Whitney Engine Service Bulletin No. 1001, and all revisions or supplements thereto, must be used. Refer to Section 8 for a listing of approved oils. When adding oil, service the engine with the type and brand which is currently being used in the engine.

#### CAUTION

Do not mix types or brands of oil.

PROPELLER:

Propeller Manufacturer . . . . . McCauley Propeller Systems  
Propeller Model Number . . . . . 3GFR34C703/106GA-0  
Propeller Diameter  
    Maximum . . . . . 106 Inches  
    Minimum . . . . . 104 Inches

Propeller Blade Angle at 30-inch Station:

Feathered . . . . . 88°  
Low Pitch . . . . . 15.6°  
Maximum Reverse . . . . . -14°

(Continued Next Page)

## **POWER PLANT LIMITATIONS** (Continued)

### Propeller System Operating Limits:

An overspeed governor check shall be performed before the first flight of the day, after engine control system maintenance, or if adjustment has been made.

Propeller RPM must be set at 1900 during all instrument approaches.

### Engine Control Operating Limits:

Flight operation with the POWER Lever retarded below the IDLE position is prohibited. Such positioning may lead to loss of airplane control or may result in an engine overspeed condition and consequent loss of engine power.

Operation of the EMERGENCY POWER Lever is prohibited with the POWER Lever out of the IDLE position.

### Engine Starting Cycle Limits:

Using the airplane battery, the starting cycle shall be limited to the following intervals and sequence:

- 30 seconds ON - 60 seconds OFF,
- 30 seconds ON - 60 seconds OFF,
- 30 seconds ON - 30 minutes OFF.

Repeat the above cycle as required.

Using external power, the starting cycle shall be limited to the following intervals and sequence:

- 20 seconds ON - 120 seconds OFF,
- 20 seconds ON - 120 seconds OFF,
- 20 seconds ON - 60 minutes OFF.

Repeat the above cycle as required.

(Continued Next Page)

**POWER PLANT LIMITATIONS** (Continued)

**ENGINE OPERATING LIMITS**

POWER SETTING	TORQUE Foot-Pound	MAXIMUM ITT °C	GAS GEN RPM %N <sub>g</sub> (2)	PROP RPM	OIL PSIG (3)	OIL TEMP °C (7)	SHP
Takeoff	(1), (4)	805 (9)	101.6	1900	85 to 105	10 to 99	675
Maximum Climb	(4), (12)	765	101.6	1900	85 to 105	0 to 99	675
Maximum Cruise	(4), (13)	740	101.6	1900	85 to 105	0 to 99	675
Idle	---	685 (14)	52 Minimum	---	40 Minimum	-40 to 99	---
Maximum Reverse (5)	1865	805	101.6	1825	85 to 105	0 to 99	675
Transient	2400 (6)	850 (10)	102.6 (10)	2090	---	0 to 104 (11)	---
Starting	---	1090 (10)	---	---	---	-40 Minimum	---
Maximum Rated (8)	1865	805	101.6	1900	85 to 105	10 to 99	675

**NOTE**

1. Per the Maximum Engine Torque for Takeoff figure in Section 5.
2. For every 10°C (18°F) below -30°C (-22°F) ambient temperature, reduce maximum allowable N<sub>g</sub> by 2.2%.
3. Normal oil pressure is 85 to 105 PSI at gas generator speeds above 72% with oil temperature between 60° and 70°C (140° and 158°F). Oil pressures below 85 PSI are undesirable and should be tolerated only for the completion of the flight, preferably at a reduced power setting. Oil pressures below normal should be reported as an engine discrepancy and should be corrected before the next flight. Oil pressures below 40 PSI are unsafe and require that either the engine be shut down or a landing be made as soon as possible using the minimum power required to sustain flight.
4. Propeller RPM must be set so as not to exceed 675 SHP with torque above 1865 foot-pounds. Full 675 SHP rating is available only at RPM setting of 1800 or greater.

Figure 2-3 (Sheet 1 of 2)



**POWER PLANT LIMITATIONS** (Continued)  
**ENGINE OPERATING LIMITS**

5. Reverse power operation is limited to one minute.
6. These values are time-limited to 20 seconds.
7. For increased oil service life, an oil temperature between 74° and 80°C (165° and 176°F) is recommended. A minimum oil temperature of 55°C (130°F) is recommended for fuel heater operation at takeoff power.
8. Use of this rating is intended for abnormal situations (e.g., maintain altitude or climb out of severe icing or windshear conditions).
9. When the ITT exceeds 765°C, this temperature power setting is time-limited to five minutes.
10. The values are time-limited to two seconds.
11. These values are time-limited up to 10 minutes.
12. Per the Maximum Engine Torque for Climb figure in Section 5.
13. Per the Maximum Cruise Torque figure in Section 5.
14. Increase  $N_g$  to keep within limit.

Figure 2-3 (Sheet 2)

## POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color significance are shown in Power Plant Instrument Markings chart.

INSTRUMENT	RED LINE	GREEN BAND	YELLOW BAND	RED LINE
	MINIMUM LIMIT	NORMAL OPERATING	CAUTION RANGE	MAXIMUM LIMIT
Torque Indicator Foot-Pound (1)(4)	---	0 to 1865	---	1865 to 1970
Interstage Turbine Temperature (ITT) Indicator °C (2)	---	100 to 740	765 to 805	805
Gas Generator Indicator % RPM (3)	---	52% to 101.6%	---	101.6%
Propeller RPM Indicator	---	1600 to 1900	---	1900
Oil Pressure Indicator PSI	40	85 to 105	40 to 85	105
Oil Temperature Indicator °C	-40	10 to 99	-40 to +10 99 to 104	104

### NOTE

1. Incorporates red line that moves to compensate for propeller RPM variation.
2. Incorporates enlarged ITT scaling with engine OFF and during start (STRT) sequence to aid temperature monitoring.
3. Incorporates red line that moves to compensate for OAT. 100% N<sub>g</sub> is 37,500 RPM.
4. Propeller RPM must be set so as not to exceed 675 SHP with torque above 1865 foot-pounds. Full 675 SHP rating is available only at RPM settings of 1800 or greater.

Figure 2-4

## MISCELLANEOUS INSTRUMENT MARKINGS

Power plant instrument markings and their color significance are shown in Miscellaneous Instrument Markings chart.

INSTRUMENT	RED LINE	GREEN BAND	YELLOW BAND	RED LINE
	MINIMUM LIMIT	NORMAL OPERATING	CAUTION RANGE	MAXIMUM LIMIT
<b>Fuel Quantity Indicators (1)</b>	E (2.8 Gallons Unusable Each Tank)	---	---	---
<b>Oxygen Pressure Gage PSI</b>	---	1550 to 1850	0 to 300	2000
<b>Gen Amps Amps</b>	---	---	< -10 > 200	---
<b>Alt Amps Amps</b>	---	---	< -10 > 75	---
<b>Bat Amps Amps</b>			< -5	
<b>Bus Volts Volts</b>	24.5	---	---	32
<b>Prop Anti-Ice Amps</b>		20 to 24		

### NOTE

1. Total unusable fuel when operating with both tanks ON is 3.6 U.S. gallons.

Figure 2-5

## **PREFLIGHT**

Takeoff is prohibited with any frost, ice, snow, or slush adhering to the wings, horizontal stabilizer, vertical stabilizer, control surfaces, propeller blades, and/or engine inlets.

### **WARNING**

**Even small amounts of frost, ice, snow or slush on the wing may adversely change lift and drag. Failure to remove these contaminants will degrade airplane performance and will prevent a safe takeoff and climb.**

## **VISUAL AND TACTILE CHECK**

If the outside air temperature (OAT) is below 10°C (50°F) a tactile check of the wing leading edge and upper surface per Section 4 of the POH/AFM is required in addition to a visual inspection. During ground icing conditions, takeoff must be accomplished within five minutes of completing the tactile inspection unless the airplane is operated per 14 CFR 135.227(b)(3).

Ground icing conditions are defined as:

1. The OAT is 2°C (36°F) or below and visible moisture is present (i.e. rain, drizzle, sleet, snow, fog, water is present on the wing, etc.), or,
2. The OAT is 5°C (41°F) or below and conditions are conducive to active frost formation (e.g. clear night with a dew point temperature/OAT difference of 3°C (5°F) or less).

Takeoff is prohibited if frost, ice or snow may reasonably be expected to adhere to the airplane between the tactile check and takeoff (e.g. snow near freezing temperature with no deicing/anti-ice fluid application).

Refer to the preflight procedures in Section 4 of this POH/AFM.

## **WEIGHT LIMITS**

Maximum Ramp Weight . . . . .	8785 Pounds
Maximum Takeoff Weight . . . . .	8750 Pounds
Maximum Landing Weight . . . . .	8500 Pounds

### **NOTE**

Refer to Section 6 of this POH/AFM for recommended loading arrangements in the Standard 208B (Passenger and Cargo Version).

## **CENTER OF GRAVITY LIMITS**

Center of Gravity Range:

Forward: 179.60 inches (3.06% MAC) aft of datum at 5500 pounds or less, with straight line variation to 193.37 inches (23.80% MAC) aft of datum at 8000 pounds, and straight line variation to 199.15 inches (32.50% MAC) aft of datum at 8750 pounds.

Aft: 204.35 inches (40.33% MAC) aft of datum at all weights up to 8750 pounds.

Reference Datum: 100 inches forward of front face of firewall.

Mean Aerodynamic Chord (MAC):

The leading edge of the MAC is 177.57 inches aft of the datum. The MAC length is 66.40 inches.

## **MANEUVER LIMITS**

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60°.

Aerobatic maneuvers, including spins, are not approved.

## FLIGHT LOAD FACTOR LIMITS

Flight Load Factors: (Maximum Takeoff Weight - 8750 pounds)

\*Flaps UP..... +3.8g, -1.52g

\*Flaps Down (All Settings)..... +2.4g

\*The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

## FLIGHT CREW LIMITS

One pilot required in left seat.

## KINDS OF OPERATIONS EQUIPMENT LIST

The Cessna 208B with Garmin G1000 is equipped for day or night VFR or IFR operations and flight into known icing conditions when appropriate equipment is installed. The operating limitation placard reflects the limits applicable at the time of Airworthiness Certificate issuance.

The following equipment lists identify the systems and equipment upon which type certification for each kind of operation was predicated. These systems and equipment items must be installed and operable unless:

1. The airplane is approved to be operated in accordance with a current Minimum Equipment List (MEL) issued by the FAA.

Or;

2. An alternate procedure is provided in the basic FAA Approved Airplane Flight Manual for the inoperative state of the listed equipment and all limitations are complied with.

### NOTE

The following systems and equipment list does not included all equipment required by the 14 CFR Parts 91 and 135 Operating Requirements. It also does not include components obviously required for the airplane to be airworthy such as wings, primary flight controls, empennage, engine, etc.

(Continued Next Page)

# KINDS OF OPERATIONS EQUIPMENT LIST

(Continued)

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N D I A G H T	I F R D A Y	I F R D I A G H T	I C I N G	
<b>PLACARDS AND MARKINGS</b>						
208B POH/AFM	1	1	1	1	1	Accessible to pilot in flight.
Garmin G1000™ Cockpit Reference Guide	1	1	1	1	1	Accessible to pilot in flight.
<b>AIR CONDITIONING</b>						
1. Deck Skin Fans (2)	0	0	0	0	0	
2. PFD Fans (2)	0	0	0	0	0	
3. MFD Fan	0	0	0	0	0	
4. Cockpit Temperature Control System	0	0	0	0	1	
5. Cabin Temperature Control System	0	0	0	0	1	
6. Ventilations Fans (2)	0	0	0	0	0	
7. Air Conditioning System	0	0	0	0	0	
8. Cabin Heat Firewall Shutoff System	1	1	1	1	1	
<b>COMMUNICATIONS</b>						
1. Communication Systems (VHF) (2)	0*	0*	1*	1*	1*	* Or as required by operating regulation.
2. Audio Control Panel	1	1	1	1	1	
3. Static Wicks (22)	17*	17*	17*	17*	17*	* One may be missing from any control surface. Static wick on stinger can not be missing.
4. Hand Microphone	0*	0*	1	1	1	

(Continued Next Page)

**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
<b>ELECTRICAL POWER</b>						
1. DC Generator	1	1	1	1	1	
2. DC Generator VOLTS Display**	1	1	1	1	1	
3. DC Generator AMPS Display**	1	1	1	1	1	
4. Main Battery	1	1	1	1	1	
5. Battery AMPS Display**	1	1	1	1	1	
6. Battery Temperature Monitoring System	1*	1*	1*	1*	1*	* Required only with NiCad battery option.
7. Standby Electrical System	0	0	0*	0*	1	* Or as required by operating regulation.
<b>EQUIPMENT AND FURNISHINGS</b>						
1. Passenger Seat Belts	0*	0*	0*	0*	0*	* One per occupied seat.
2. Crewmember Seat Belts (2)	1*	1*	1*	1*	1*	* One per occupied seat. Left side required.
3. Aircraft Emergency Locator Transmitter (ELT)	0*	0*	0*	0*	0*	* Or as required by operating regulation.
<b>FIRE PROTECTION</b>						
1. Engine Fire Detection System (1)	1	1	1	1	1	
** Displayed as part of the Engine Indication System (EIS).						

(Continued Next Page)



**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
<b>FIRE PROTECTION (Continued)</b>						
2. Portable Fire Extinguisher (2)	2	2	2	2	2	
<b>FLIGHT CONTROLS</b>						
1. Primary Flap System	1*	1*	1*	1*	1*	* May be inoperative provided standby flap system is operative
2. Standby Flap System	1*	1*	1*	1*	1*	* May be inoperative provided primary flap system is operative
3. Flap Position Indicator	1	1	1	1	1	
4. Trim Systems - Elevator, Aileron, Rudder (3)	3	3	3	3	3	
5. Trim Position Indicator Systems - Elevator, Aileron, Rudder (3)	3	3	3	3	3	
<b>ICE AND RAIN PROTECTION</b>						
1. Wing and Wing Strut Leading Edge Porous Panels (2)	0	0	0	0	2	
2. Horizontal Stabilizers Leading Edge Porous Panels (2)	0	0	0	0	2	

(Continued Next Page)

**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I A G H T	I F R D A Y	I F R N I A G H T	I C I N G	
<b>ICE AND RAIN PROTECTION (Continued)</b>						
3. Vertical Stabilizer Leading Edge Porous Panel	0	0	0	0	1	
4. Propeller Fluid Slinger Assembly	0	0	0	0	1	
5. TKS Equipment Pack	0	0	0	0	1	
6. Windshield Spray Bar	0	0	0	0	1	
7. Heated Lift Detector (Stall Warning) Vane	0	0	0	0	1	
8. Alternate Static Source	0	0	1	1	1	
9. Pitot/ Static Tube Heat System (Left Side)	0	0	1	1	1	
10. Wing Ice Inspection Light	0	0	0	0	1	
11. Engine Inertial Separator	0*	0*	0*	0*	0*	* May be inoperative provided separator doors are secured in the BYPASS position.
12. Heater and Defroster	0	0	0	0	1	
13. McCauley TKS Propeller	0	0	0	0	1	

(Continued Next Page)

**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
<b>ICE AND RAIN PROTECTION (Continued)</b>						
14. Cargo Pod	0	0	0	0	1	
<b>INDICATING/ RECORDING SYSTEMS</b>						
1. Stall Warning System	1	1	1	1	1	
2. Aural Warning Systems	*	*	*	*	*	* All audio warnings must be operational.
3. Crew Alerting System Messages	*	*	*	*	*	* All CAS messages must be operational.
<b>LANDING GEAR</b>						
1. Parking Brake	0	0	0	0	0	
<b>LIGHTS</b>						
1. Anti-Collision Light System (Wing Strobes) (2)	0	2	0	2	0	
2. Flashing Beacon Light	1	1	1	1	1	
3. Position Lights System	0	1	0	1	0	
4. Taxi/ Recognition Lights (2)	0	0	0	0	0	
5. Landing Lights (2)	0	1*	0	1*	0	* May be inoperative provide one taxi light is operative
6. Fasten Seat Belt Sign	1*	1*	1*	1*	1*	* May be inoperative only if no passengers carried in cabin.
7. Cabin Lights	0	2*	0	2*	0	* One light each by cabin door and emergency exit.

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**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	VFR DAY	VFR NIGHT	IFR DAY	IFR NIGHT	ICING	
<b>LIGHTS (Continued)</b>						
8. Cockpit and Instrument Lighting System	0	1	0	1	0	
9. Windshield Ice Detection Light	0	0	0	1*	1*	* Required for night ice detection.
10. Wing Ice Detection Light	0	0	0	1*	1	* Required for night ice detection.
<b>NAVIGATION</b>						
1. Primary Flight Display (PFD) (2)	1*	1*	1*	1*	1*	*Refer to Note 1
2. Multi-Function Display (MFD)	0*	0*	0*	0*	0*	* May be inoperative provided one PFD is operative. Refer to Note 2
3. Air Data Computers (ADC) (2)	1	1	1	1	1	
4. Attitude/ Heading Reference System (AHRS) (2)	1	1	1	1	1	
5. Standby Airspeed Indicator	0	0	1	1	1	
6. Standby Attitude Indicator	0	0	1	1	1	
7. Standby Altimeter	0	0	1	1	1	
8. Magnetic Compass	1	1	1	1	1	

(Continued Next Page)

**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
<b>NAVIGATION (Continued)</b>						
9. ATC Transponder (2)	0*	0*	1*	1*	1*	* Or as required by operating regulation.
10. VHF Nav Receivers (2)	0*	0*	1*	1*	1*	* Or as required by operating regulation.
11. GPS Receivers (2)	0*	0*	1*	1*	1*	* Or as required by operating regulation.
12. Automatic Direction Finder (ADF) (Opt)	0*	0*	0*	0*	0*	* Or as required by operating regulation.
13. Distance Measuring Equipment (DME) (Opt)	0*	0*	0*	0*	0*	* Or as required by operating regulation.
14. Marker Beacon Receivers	0*	0*	0*	0*	0*	* Or as required by operating regulation.
15. TAWS (Opt)	0*	0*	0*	0*	0*	* Or as required by operating regulation.
16. Weather Radar (Opt)	0	0	0	0	0	
17. XM Datalink Weather (Opt)	0	0	0	0	0	
18. TAS (Opt)	0	0	0	0	0	
<b>OXYGEN</b>						
1. Oxygen System Including Pressure Gage	0*	0*	0*	0*	0*	* Or as required by operating regulation.

(Continued Next Page)

**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R D I G H T	I C I N G	
<b>OXYGEN (Continued)</b>						
2. Passenger Oxygen System	*	*	*	*	*	* If any passenger seat is occupied, the number of installed masks must equal the number of passenger seats plus one.
3. Crew Oxygen Masks (2)	0*	0*	0*	0*	0*	* Or as required by operating regulation.
<b>VACUUM</b>						
1. Engine-Driven Vacuum Pump	0	0	1	1	1	
<b>ENGINE FUEL AND CONTROL</b>						
1. Fuel Boost Pump	1	1	1	1	1	
2. Fuel Quantity Indications** (2)	2	2	2	2	2	
3. Fuel Flow Indication**	1	1	1	1	1	
4. Fuel Firewall Shutoff System	1	1	1	1	1	
5. Engine-Driven Fuel Pump	1	1	1	1	1	
6. Dual Igniter System	1	1	1	1	1	
** Displayed as part of the Engine Indication System (EIS).						

(Continued Next Page)

**KINDS OF OPERATIONS EQUIPMENT LIST (Continued)**

SYSTEM AND/ OR COMPONENT	KIND OF OPERATION					COMMENTS
	VFR DAY	VFR NIGHT	IFR DAY	IFR NIGHT	ICING	
<b>ENGINE FUEL AND CONTROL (Continued)</b>						
7. Engine Indications (TQ, ITT, Ng, Oil Press, Oil Temp)**	1	1	1	1	1	
8. Standby Torque Indicator	0	0	1	1	1	
<b>MISCELLANEOUS EQUIPMENT</b>						
1. Passenger Briefing Cards	*	*	*	*	*	* One for each occupied passenger seat.
** Displayed as part of the Engine Indication System (EIS).						

**NOTE**

1. PFD backlighting is required for day VFR flight if MFD backlighting has failed. Display backup mode must be active so engine indicators are shown.
2. MFD backlighting is required for day VFR flight if PFD backlighting has failed. Display backup mode must be active so flight instruments are shown.

## FUEL LIMITATIONS

Total Fuel	Both Tanks	335.6 U.S. gallons
	Each Tank	167.8 U.S. gallons
Usable Fuel	Both Tanks ON	332.0 U.S. gallons
	Single Tank ON	165.0 U.S. gallons
Unusable Fuel	Both Tanks ON	3.6 U.S. gallons
	Single Tank ON	2.8 U.S. gallons

### NOTE

To achieve full capacity, fill fuel tank to the top of the filler neck. Filling fuel tanks to the bottom of the fuel filler collar (level with flapper valve) allows space for thermal expansion and results in a decrease in fuel capacity of four gallons per side (eight gallons total).

With low fuel quantity (FUEL LOW CAS MSG(s) ON), continuous uncoordinated flight is prohibited. Unusable fuel quantity increases when more severe sideslip is maintained.

Due to possible fuel starvation, maximum full rudder sideslip duration time is three minutes.

Maximum fuel unbalance in flight is 200 pounds.

### Fuel Grade (Specification) and Fuel Additives:

#### CAUTION

Aviation gasoline is restricted to emergency use and shall not be used for more than 150 hours in one overhaul period; a mixture of one part aviation gasoline and three parts of Jet A, Jet A-1, JP-1, or JP-5 may be used for emergency purposes for a maximum of 450 hours per overhaul period.

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## FUEL LIMITATIONS (Continued)

### Fuel Grade Specification and Fuel Additives

FUEL GRADE	FUEL SPECIFICATION (1)	MINIMUM FUEL TEMPERATURE FOR TAKEOFF °C (2)(3)	SPECIFIC WEIGHT (POUNDS PER US GALLON AT 15 °C)	COLOR
Jet A	ASTM-D1655	-35 °C	6.7	Colorless
Jet A-1	ASTM-D1655	-40 °C	6.7	Colorless
Jet B	ASTM-D1655	-45 °C	6.5	Colorless
JP-1	MIL-L-5616	-35 °C	6.7	Colorless
JP-4	MIL-T-5624	-54 °C	6.5	Colorless
JP-5	MIL-T-5624	-40 °C	6.8	Colorless
JP-8	MIL-T-83133	-40 °C	6.7	Colorless
Av Gas (All Grades) (4)	MIL-G-5572 ASTM-D910	-54 °C	6.0	80/87 Red 100LL Blue 100/130 Green

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### NOTE

1. Fuel used must contain anti-icing fuel additive in compliance with MIL-I-27686 (EGME), or MIL-I-85470 (DIEGME).
2. Minimum starting temperature is that given or the minimum allowable oil temperature (-40 °C), whichever is warmer. Starts may be attempted with fuel at lower temperatures providing other specified engine limitations are not exceeded.
3. It is assumed that the fuel temperature is the same as the outside air temperature.
4. When using aviation gasoline, the maximum fuel and the outside air temperature for takeoff is +29 °C (85 °F) and the maximum operating altitude is 9000 feet. The boost pump must be ON for all flight operations.

Figure 2-7

Refer to Section 8 for additional approved additives and concentrations.

## MAXIMUM OPERATING ALTITUDE LIMIT

Certificated Maximum Operating Altitudes:

Non-Icing Conditions . . . . .	25,000 Feet
Icing Conditions (if so equipped) . . . . .	20,000 Feet
Any conditions with any ice on the airplane . . . . .	20,000 Feet

## OUTSIDE AIR TEMPERATURE LIMITS

Cold Day. . . . . -54°C from Sea Level to 25,000 Feet.

Hot Day:

Ground Operations. . . . .	+53°C from Sea Level to 5000 Feet ISA +37°C above 5000 Feet
Flight Operations . . . . .	ISA +35°C from Sea Level to 25,000 Feet

Refer to ISA Conversion and Operating Temperature Limits chart in Section 5, for a graphical presentation of the operating air temperature limits.

### NOTE

- With both deck skin fans inoperative, ground operations are limited to 46°C for 30 minutes.
- Ground operations up to 38°C are not time limited with both deck skin fans inoperative.

## MAXIMUM PASSENGER SEATING LIMITS

In the Cargo Version, a maximum of one seat may be installed to the right of the pilot’s seat for use by a second crew member or a passenger. In the Passenger Version, up to eleven seats may be installed. the right front seat may be occupied by either a second crew member or passenger. When the right front seat is occupied by a passenger, only eight seats in the aft cabin can be occupied. Refer to Section 6 for seat locations.

## OTHER LIMITATIONS

### FLAP LIMITATIONS

Approved Takeoff Range . . . . .	UP to 20°
Approved Landing Range . . . . .	UP to FULL
Approved Landing Range in Icing Conditions . . . . .	UP to 20°

## **TYPE II, TYPE III OR TYPE IV ANTI-ICE FLUID TAKEOFF LIMITATIONS**

### **FLAP LIMITATIONS**

Takeoff Flaps Setting . . . . . UP

### **AIRSPEED LIMITATIONS**

Takeoff Rotation Speed . . . . . 83 KIAS

## **FLIGHT IN KNOWN ICING VISUAL CUES**

As Required by AD 96-09-15, Paragraph (a) (1)

### **WARNING**

**Severe icing may result from environmental conditions outside of those for which the airplane is certificated. Flight in freezing rain, freezing drizzle, or mixed icing conditions (supercooled liquid water and ice crystals) may result in ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and may seriously degrade the performance and controllability of the airplane.**

During flight, severe icing conditions that exceed those for which the airplane is certificated shall be determined by the following visual cues. If one or more of these visual cues exists, immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the icing conditions.

1. Unusually extensive ice is accreted on the airframe in areas not normally observed to collect ice.
2. Accumulation of ice on the upper or lower surface of the wing aft of the protected area.
3. Heavy ice accumulations on the windshield, or when ice forms aft of the curved sections on the windshield.
4. Ice forms aft of the protected surfaces of the wing struts.

### **NOTE**

This supersedes any relief provided by the Master Minimum Equipment List (MMEL), or the Kinds of Equipment Limits (KOEL).

## **G1000 LIMITATIONS**

The current Garmin G1000 Cockpit Reference Guide (CRG) Part Number and System Software Version that must be available to the pilot during flight are displayed on the MFD AUX group, SYSTEM STATUS page.

GPS based IFR enroute, oceanic and terminal navigation is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.

RNAV/GPS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the G1000 navigation database. The G1000 database must incorporate the current update cycle.

Use of the NAVIGATION MAP page for pilotage navigation is prohibited. The Navigation Map is intended only to enhance situational awareness. Navigation is to be conducted using only current charts, data and authorized navigation facilities.

Use of the TERRAIN PROXIMITY information for primary terrain avoidance is prohibited. The Terrain Proximity map is intended only to enhance situational awareness. It is the pilot's responsibility to provide terrain clearance at all times.

Navigation using the G1000 is not authorized north of 70° North latitude or south of 70° South latitude due to unsuitability of the magnetic fields near the Earth's poles. In addition, operations are not authorized in the following two regions:

1. North of 65° North latitude between longitude 75° W and 120° W (Northern Canada).
2. South of 55° South latitude between longitude 120° E and 165° E (region south of Australia and New Zealand).

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## **G1000 LIMITATIONS** (Continued)

The COM 1/2 (split COM) function of the Audio Panel is not approved for use. During COM 1/2 operation, transmission by one crew member inhibits reception by the other crew member.

The fuel quantity, fuel used and fuel remaining functions of the G1000 are advisory information only and must be verified by the pilot.

Dispatch with GIA1, 2, PFD, or MFD cooling advisory message is prohibited.

## **OPERATIONAL APPROVALS**

The Garmin G1000 GPS receivers are approved under TSO C145a Class 3. The Garmin G1000 system has been demonstrated capable of, and has been shown to meet the accuracy requirements for, the following operations provided it is receiving usable navigation data. These do not constitute operational approvals.

1. Enroute, terminal, non-precision instrument approach operations using GPS and WAAS (including "GPS", "or GPS", and "RNAV" approaches), and approach procedures with vertical guidance (including "LNAV/VNAV", "LNAV + V", and "LPV") within the U.S. National Airspace System in accordance with AC 20-138A.
2. As a required Long Range Navigation (LRN) system for use in the following types of airspace when used in conjunction with Garmin WAAS Fault Detection/Exclusion Prediction Program, part number 006-A0154-01 or later approved version:
  - a. Oceanic/Remote - RNP-10 (per FAA AC 20-138A, FAA Notice 8110-60, FAA Order 8400-12A, and FAA Order 8700-1). Both GPS receivers are required to be operating and receiving usable signals except for routes requiring only one Long Range Navigation (LRN) sensor.

### **NOTE**

Each display computes an independent navigation solution based on the on-side GPS sensor. However, either display will automatically revert to the cross-side sensor if the on-side sensor fails or if the cross-side sensor is determined to be more accurate. A "BOTH ON GPS1" or "BOTH ON GPS2" message does not necessarily mean that one GPS has failed. Refer to the MFD AUX-GPS STATUS page to determine the status of the unused GPS.

(Continued Next Page)

**OPERATIONAL APPROVALS (Continued)**

- b. North Atlantic (NAT) Minimum Navigational Performance Specifications (MNPS) Airspace per AC 91-49 and AC 120-33. Both GPS receivers are required to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor.
- c. Enroute and Terminal including RNP5/BRNAV and PRNAV (RNP-1) - In accordance with JAA TGL-10, ACJ 20X4, AC 90-96A, and AC 90-100A, provided the FMS is receiving usable navigation information from one or more GPS receivers.

**GARMIN GFC 700 AUTOMATED FLIGHT CONTROL SYSTEM (AFCS)**

- 1. The GFC 700 AFCS preflight test must be successfully completed prior to use of the autopilot, flight director or manual electric trim.
- 2. A pilot, with the seat belt fastened, must occupy the left pilot's seat during all autopilot operations.
- 3. The autopilot and yaw damper must be off during all takeoff and landings.
- 4. Autopilot maximum engagement speed . . . . . **175 KIAS**  
Autopilot minimum engagement speed . . . . . **80 KIAS**  
Electric Trim maximum operating speed . . . . . **175 KIAS**
- 5. The autopilot must be disengaged below 200 feet AGL during approach operations and below 800 feet AGL during all other operations.
- 6. ILS approaches using the autopilot/flight director are limited to Category I approaches only.
- 7. Raw data ILS approaches below 400 feet AGL are prohibited.
- 8. Use of the autopilot is prohibited when the audio panel is inoperative (since the aural alert will not be provided when autopilot is disengaged).
- 9. Use of the autopilot is prohibited when conducting missed approach procedures until an established rate of climb that ensures all altitude requirements of the procedure will be met.

**L3 COMMUNICATIONS WX 500 STORMSCOPE (if installed)**

Use of the WEATHER MAP (WX-500 Stormscope) for hazardous weather (thunderstorm) penetration is prohibited. LTNG information on the NAVIGATION MAP or WEATHER MAP is approved only as an aid to hazardous weather avoidance, not penetration.

User's guide should be available to the pilot in flight.

### **TRAFFIC ADVISORY SYSTEM (TAS) (if installed)**

Use of the TRAFFIC MAP to maneuver the airplane to avoid traffic is prohibited. TAS is intended for advisory use only. TAS is intended only to help the pilot to visually locate traffic. It is the responsibility of the pilot to see and maneuver to avoid traffic.

TAS is unable to detect any intruding aircraft without an operating transponder. TAS can detect and track aircraft with either an ATCRBS (operating in Mode A or C) or Mode S transponders.

ATC procedures and the “see and avoid concept” will continue to be the primary means of aircraft separation. However, if communication is lost with ATC, TAS adds a significant backup for collision avoidance.

### **TERRAIN AWARENESS AND WARNING SYSTEM (TAWS-B) (if installed)**

Use of the Terrain Awareness and Warning System (TAWS-B) to navigate to avoid terrain or obstacles is prohibited. TAWS-B is only approved as an aid to help the pilot to see-and-avoid terrain or obstacles.

TAWS-B must be inhibited when landing at a location not included in the airport database.

Use of TAWS-B is prohibited when operating using the QFE altimeter setting (altimeter indicates 0 feet altitude when the airplane is on the runway).

The pilot is authorized to deviate from the current ATC clearance only to the extent necessary to comply with TAWS-B warnings.

The geographic area of the TAWS-B database must match the geographic area in which the airplane is being operated.

### **OPTIONAL EQUIPMENT USER’S GUIDE**

The pilot is responsible for ensuring the appropriate user’s guide(s) for all optional equipment installed in the aircraft is accessible to the pilot in flight.

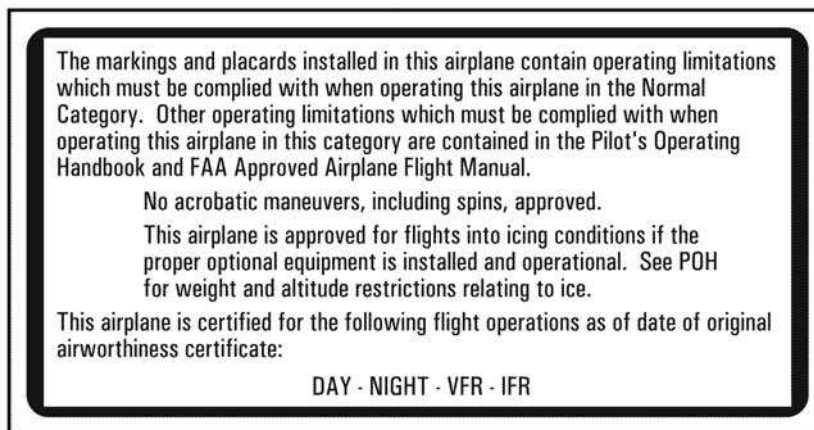
## PLACARDS

### WARNING

The following information must be displayed in the form of composite or individual placards. As a minimum, the exact wording of these placards is required as specified in this section. Placard wording can be from part numbered placards obtained from Cessna Aircraft Company or equivalent placards installed by an approved repair station in accordance with normal maintenance practices/procedures.

1. In full view of the pilot on the sunvisor or windshield trim strip on airplanes equipped for flight into known icing:

A38999



In full view of the pilot on the sunvisor or windshield trim strip on airplanes not equipped for flight into known icing:

A39000



(Continued Next Page)



## PLACARDS (Continued)

2. In full view of the pilot on the sunvisor or windshield trim on airplanes not equipped for flight into known icing and on airplanes equipped for flight into known icing not incorporating SK208-175:

**THIS AIRPLANE IS PROHIBITED FROM FLIGHT  
IN KNOWN OR FORECAST ICING**

3. On pedestal:

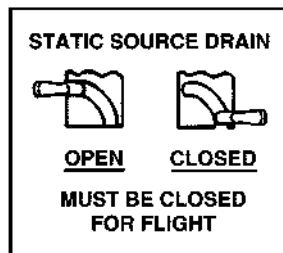
**DO NOT TAKEOFF WITH ICE/FROST/SNOW ON THE  
AIRCRAFT**

4. On control lock:

**CAUTION  
CONTROL LOCK  
REMOVE BEFORE STARTING ENGINE**

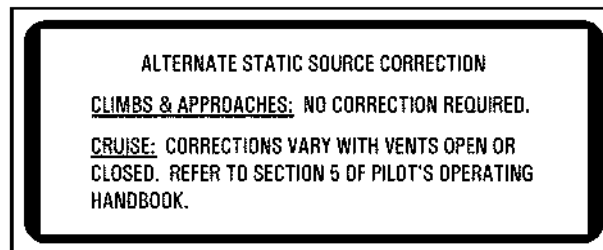
5. On left sidewall below and forward of instrument panel and (when right flight instrument panel is installed) on right sidewall below and forward of instrument panel:

A39001



6. On sunvisor or windshield trim-strip:

A39002



7. Above Pilot PFD:

**MAX WT. MANEUVER SPEED 148 KIAS  
SEE POH FOR OTHER WEIGHTS**

(Continued Next Page)

**PLACARDS** (Continued)

8. A calibration card must be provided to indicate the accuracy of the magnetic compass in 30° increments.

9. Near wing flap position indicator:

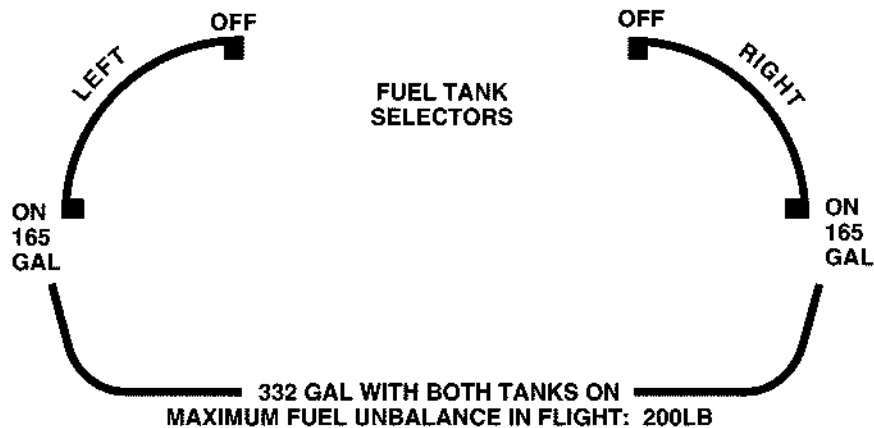
<b>UP to 10°</b>	<b>175 KIAS</b>	<b>(partial flap range with dark blue color code; also mechanical detent at 10°)</b>
<b>10° to 20°</b>	<b>150 KIAS</b>	<b>(light blue code; also mechanical detent at 20°)</b>
<b>20° to FULL</b>	<b>125 KIAS</b>	<b>(white color code)</b>

10. Below power lever:

**CAUTION**  
**USE BETA AND REVERSE ONLY**  
**WITH ENGINE RUNNING AND**  
**PROPELLER OUT OF FEATHER**

11. On fuel tank selector:

A39003

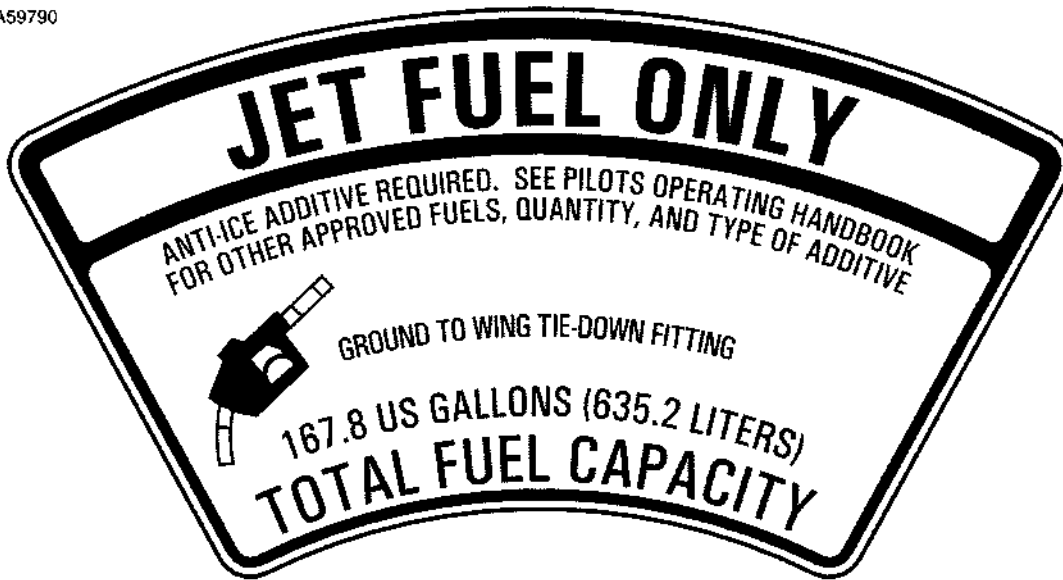


(Continued Next Page)

**PLACARDS** (Continued)

12. Adjacent to each outboard fuel tank filler cap:

A59790



13. Adjacent to each inboard fuel tank filler cap (when installed):

A41070



(Continued Next Page)

**PLACARDS** (Continued)

14. Adjacent to fuel filter:

A39006



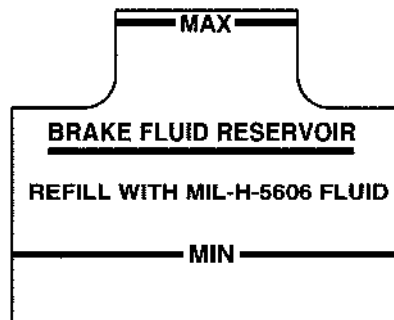
15. Adjacent to fuel drain can:

A39007



16. On the brake fluid reservoir:

A39008

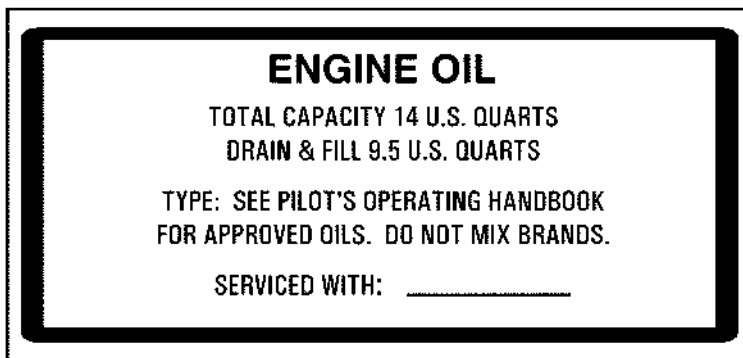


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**PLACARDS** (Continued)

17. Adjacent to oil dipstick/filler cap (on inertial separator duct):

A39009



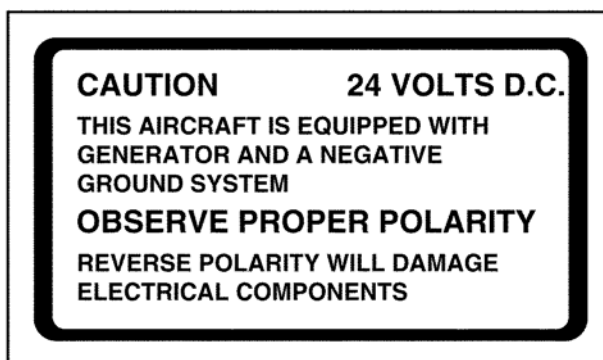
18. On side of inertial separator duct:

A39010



19. On firewall above battery tray:

A39011



(Continued Next Page)

**PLACARDS** (Continued)

20. Near ground service plug receptacle:

**EXTERNAL POWER  
28 VOLTS D.C. NOMINAL  
800 AMP  
STARTING CAPACITY MIN.  
DO NOT EXCEED 1700 AMPS**

21. On access panel on bottom of both wings just forward of aileron:

**FLUX VALVE  
USE NON-MAGNETIC  
TOOLS AND SCREWS**



22. On each side of nose strut fairing near tow limit marking (rudder lock placard required when rudder lock installed):

**WARNING  
MAXIMUM  
TOW  
LIMIT**

**CAUTION  
DO NOT TOW AIRCRAFT  
WITH RUDDER LOCK  
ENGAGED**

23. Adjacent to left crew door inside door handle:

A39014

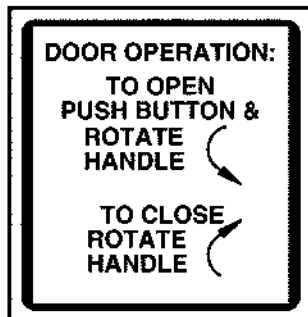
**LOCK OVERRIDE:**  
**TO UNLOCK  
PULL & ROTATE  
KNOB**   
**TO LOCK  
PULL & ROTATE  
KNOB** 

(Continued Next Page)

**PLACARDS** (Continued)

24. Adjacent to upper passenger door outside pushbutton and door handle (Passenger version only):

A39015



25. Adjacent to upper passenger door inside door handle (Passenger version only):

A39016



26. At center of lower passenger door on inside and outside (Passenger Version only):

A39017

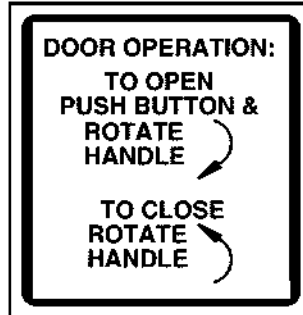


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**PLACARDS** (Continued)

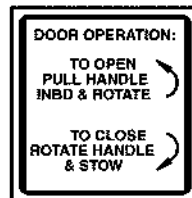
27. Adjacent to upper cargo door outside pushbutton and door handle:

A39018



28. Adjacent to upper cargo door inside door handle (Passenger Version only):

A39019



29. On right sidewall of lower passenger door (Passenger Version only):

A39020



(Continued Next Page)



**PLACARDS** (Continued)

30. On left and right sides of aft cargo barrier (Cargo Version/  
Passenger Version with cargo barrier installed):

**MAX LOAD BEHIND BARRIER  
3400 LBS TOTAL  
ZONES FWD OF LAST LOADED  
ZONE MUST BE AT LEAST  
75% FULL BY VOLUME. SEE  
POH FOR EXCEPTIONS.  
-CHECK WEIGHT AND BALANCE-**

31. On inside of lower cargo door (Cargo Version only)

**MAX LOAD BEHIND BARRIER  
3400 LBS TOTAL  
ZONES FWD OF LAST LOADED  
ZONE MUST BE AT LEAST  
75% FULL BY VOLUME. SEE  
POH FOR EXCEPTIONS.  
-CHECK WEIGHT AND BALANCE-  
LOAD MUST BE PROTECTED FROM  
SHIFTING - SEE POH -**

32. On right sidewall adjacent to Zone 5 (Cargo Version only):

**IF LOAD IN ZONE 5 EXCEEDS  
400 LBS A PARTITION NET IS REQD  
AFT OR LOAD MUST BE  
SECURED TO FLOOR**

(Continued Next Page)

**PLACARDS** (Continued)

33. On left and right sides of cabin in appropriate zones (Cargo Version only):

<b>ZONE 1 MAX LOAD 1780 LBS</b>
<b>ZONE 2 MAX LOAD 3100 LBS</b>
<b>ZONE 3 MAX LOAD 1900 LBS</b>
<b>ZONE 4 MAX LOAD 1380 LBS</b>
<b>ZONE 5 MAX LOAD 1270 LBS</b>
<b>ZONE 6 MAX LOAD 320 LBS</b>

(Continued Next Page)

**PLACARDS** (Continued)

34. On inside of cargo pod doors (if installed):

<b>FWD. COMPARTMENT MAX. WEIGHT 230 LBS. MAX. FLOOR LOADING 30 LBS. PER SQ. FT. NO SHARP EDGES</b>
<b>CTR. COMPARTMENT MAX. WEIGHT 310 LBS. MAX. FLOOR LOADING 30 LBS. PER SQ. FT. NO SHARP EDGES</b>
<b>AFT COMPARTMENT MAX. WEIGHT 270 LBS. MAX. FLOOR LOADING 30 LBS. PER SQ. FT. NO SHARP EDGES</b>
<b>AFT COMPARTMENT MAX. WEIGHT 280 LBS. MAX. FLOOR LOADING 30 LBS. PER SQ. FT. NO SHARP EDGES</b>

35. At each sidewall and ceiling anchor plate (except heavy duty anchor plates with additional structural support) and at anchor plate at center of lower cargo door (Cargo Version only):

A39021





## SECTION 3 EMERGENCY PROCEDURES

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SECTION 3  
EMERGENCY PROCEDURES

CESSNA  
MODEL 208B G1000



## INTRODUCTION

Section 3 provides checklist and amplified procedures for coping with emergencies that can occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered. However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem. Emergency procedures associated with standard avionics, the ELT, or any optional systems can be found in Section 9.

### WARNING

**There is no substitute for correct and complete preflight planning habits and continual review to minimize emergencies. Be thoroughly knowledgeable of hazards and conditions which represent potential dangers. Also be aware of the capabilities and limitations of the airplane.**

## AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:

WING FLAPS Handle UP .....	<b>100 KIAS</b>
WING FLAPS Handle FULL .....	<b>80 KIAS</b>

Maneuvering Speed:

8750 lbs. ....	<b>148 KIAS</b>
7500 lbs. ....	<b>137 KIAS</b>
6250 lbs. ....	<b>125 KIAS</b>
5000 lbs. ....	<b>112 KIAS</b>

Maximum Glide:	With Cargo Pod	Without Cargo Pod
8750 lbs	<b>95 KIAS</b>	<b>97 KIAS</b>
7500 lbs	<b>87 KIAS</b>	<b>90 KIAS</b>
6250 lbs	<b>79 KIAS</b>	<b>82 KIAS</b>
5000 lbs	<b>71 KIAS</b>	<b>74 KIAS</b>

Precautionary Landing (Engine Power/Flaps FULL) ..... **80 KIAS**

Landing Without Engine Power:

WING FLAPS Handle UP .....	<b>100 KIAS</b>
WING FLAPS Handle FULL .....	<b>80 KIAS</b>

## GENERAL

### OPERATING PROCEDURES - GENERAL

The operating procedures contained in this manual have been developed and recommended by Cessna Aircraft Company and are approved for use in the operation of this airplane.

This section contains the Emergency and Abnormal Procedures for your airplane. For your convenience, definitions of these terms are listed in Section I. Operating procedures in this airplane flight manual are organized into Emergency, Abnormal, and Normal Procedures.

Normal procedures are those recommended for routine day-to-day preflight, flight, and postflight operation and include expanded systems information and procedures. Some checks, as noted in the Limitations Section of this airplane flight manual, are required to assure proper system integrity.

The Garmin G1000 Integrated Avionics System monitors most of the airplane systems for faults or failures and displays this information to the crew as messages in the Crew Alerting System (CAS) portion of the Primary Flight Display (PFD) in front of each pilot. Some Garmin G1000 faults are also displayed as messages in the Primary Flight Display (PFD) or Multi Function Display (MFD). These messages are listed within the appropriate portion of the Emergency and Abnormal procedures sections of the FAA Approved POH/AFM or appropriate Garmin Cockpit Reference Guide for the 208 series aircraft.

Emergency procedures are generally associated with Red CAS MSG(s) or Garmin G1000 messages. Some procedures, such as Maximum Glide/Emergency Landing, are not associated with any particular message, but can involve one or more messages. All emergency procedures are organized by appropriate systems and include each Red CAS or Garmin message if applicable exactly as it appears on the PFD, or MFD. Emergency Procedures require immediate pilot recognition and corrective action by the crew. Red CAS MSG(s) will flash and pressing the WARNING softkey will silence the repeating chime and change the CAS MSG to steady.

(Continued Next Page)

## **OPERATING PROCEDURES - GENERAL** (Continued)

Some emergency situations require immediate memorized corrective action. These numbered steps are printed in boxes within the emergency procedures and should be accomplished without the aid of the checklist.

Abnormal Procedures are general procedures that can be associated with one or more Amber CAS, or Garmin G1000 messages. Some procedures are not associated with any particular CAS or Garmin G1000 message but can involve one or more messages. These procedures are organized by related systems.

An Abnormal Procedure is one requiring the use of special systems and/or the alternate use of regular systems that will maintain an acceptable level of airworthiness. These procedures require immediate pilot awareness and subsequent crew action may be required. Amber CAS MSG(s) will initially flash. Pressing the CAUTION softkey will change the CAS message to a steady state.

### **NOTE**

- White CAS MSG(s) provide general information, indicate the need for additional crew awareness and the possible necessity of future pilot action.
- In order to avoid confusion due to multiple messages, at critical times, some CAS MSG(s) are inhibited when a Line Replaceable Unit (LRU), such as the GEA-71 (Garmin Engine Airframe Computer), has failed.
- Generally, the following Emergency and Abnormal Procedures do not direct the pilot to check/reset circuit breakers. This is considered basic airmanship and can be accomplished at the pilot's discretion.
- Except where specific action is required, these procedures do not specify action when on the ground. Conditions resulting in a Red or Amber message should be corrected prior to flight. Reasons for White CAS MSG(s) should be determined prior to flight.
- If a Red or Amber CAS MSG occurs in flight, consideration should be given to landing at an airport where corrective maintenance can be performed.

## ENGINE FAILURES

### ENGINE FAILURE DURING TAKEOFF ROLL

1. POWER Lever . . . . .	<b>BETA RANGE</b>
2. Brakes . . . . .	<b>APPLY</b>
3. WING FLAPS Handle . . . . .	<b>RETRACT</b>

#### IF AIRPLANE CANNOT BE STOPPED ON REMAINING RUNWAY:

- 4. FUEL CONDITION Lever . . . . . **CUTOFF**
- 5. FUEL SHUTOFF Knob . . . . . **PULL OFF**
- 6. FUEL TANK SELECTORS . . . . **OFF** (warning horn will sound)
- 7. BATTERY Switch . . . . . **OFF**

### ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed . . . . .	<b>85 KIAS</b>
2. PROP RPM Lever . . . . .	<b>FEATHER</b>
3. WING FLAPS Handle . . . .	<b>AS REQUIRED</b> (20° recommended)
4. FUEL CONDITION Lever . . . . .	<b>CUTOFF</b>
5. FUEL SHUTOFF Knob . . . . .	<b>PULL OFF</b>
6. FUEL TANK SELECTORS . . . .	<b>OFF</b> (warning horn will sound)
7. BATTERY Switch . . . . .	<b>OFF</b>

### ENGINE FAILURE DURING FLIGHT

1. Airspeed . . . . .	<b>95 KIAS</b>
2. POWER Lever . . . . .	<b>IDLE</b>
3. PROP RPM Lever . . . . .	<b>FEATHER</b>
4. FUEL CONDITION Lever . . . . .	<b>CUTOFF</b>
5. WING FLAPS Handle . . . . .	<b>UP</b>
6. FUEL BOOST Switch . . . . .	<b>OFF</b>
7. FUEL SHUTOFF Knob . . . . .	<b>PULL OFF</b>
8. IGNITION Switch . . . . .	<b>NORM</b>

(Continued Next Page)

**ENGINE FAILURE DURING FLIGHT** (Continued)

- 9. STBY ALT PWR Switch . . . . . **OFF**
- 10. Electrical Load . . . . . **REDUCE**
  - a. AVIONICS STBY PWR Switch . . . . . **OFF**
  - b. AVIONICS BUS TIE Switch . . . . . **OFF**
  - c. PRIMARY Switch (if installed) . . . . . **NORM**

**NOTE**

TKS Ice Protection System PRIMARY switch must be kept in NORM in order to keep the electrical load within limits on BATTERY power ONLY.

- d. PROP HEAT Switch (if installed) . . . . . **OFF**
- e. CABIN Lights . . . . . **OFF**
- f. STROBE lights . . . . . **OFF**
- g. LDG and TAXI/RECOG lights. . . . . **OFF**

**NOTE**

Keep LDG and TAXI/RECOG lights OFF until required for approach and landing. Prior to landing, only turn the LEFT LDG light ON to keep electrical load below limit.

- h. VENT AIR FANS . . . . . **OFF**
- i. AIR CONDITIONING (if installed) . . . . . **OFF**
- j. GEN CONT and GEN FIELD Circuit Breakers. . . . . **PULL**  
(top row, last two breakers on forward end)
- k. RIGHT PITOT HEAT Circuit Breaker . . . . . **PULL**  
(second row, third breaker from aft end)
- l. RDNG LIGHT Circuit Breaker . . . . . **PULL**  
(third row, second breaker from aft end)
- m. RADAR R/T Circuit Breaker . . . . . **PULL**  
(AVN BUS 1, second row, sixth breaker from left side)
- n. AVIONICS No. 2 Switch . . . . . **OFF**
- 11. BATT AMPS . . . . . **VERIFY BELOW 45 AMPS**
- 12. FLIGHT . . . . . **TERMINATE (as soon as possible)**  
(as described in Emergency Landing Without Engine Power)

## ENGINE FLAMEOUT DURING FLIGHT

### IF GAS GENERATOR SPEED (N<sub>G</sub>) IS ABOVE 50%:

- |                          |             |
|--------------------------|-------------|
| 1. POWER Lever .....     | <b>IDLE</b> |
| 2. IGNITION Switch ..... | <b>ON</b>   |

### AFTER SATISFACTORY RELIGHT AS EVIDENCED BY NORMAL ITT AND N<sub>g</sub>.

- |                          |                   |
|--------------------------|-------------------|
| 3. POWER Lever .....     | <b>AS DESIRED</b> |
| 4. IGNITION Switch ..... | <b>NORM</b>       |
- (if cause of flameout has been corrected.)

### IF GAS GENERATOR SPEED (N<sub>G</sub>) IS BELOW 50%:

- |  |               |
|--|---------------|
| 5. FUEL CONDITION Lever .....                      | <b>CUTOFF</b> |
| 6. Refer to Airstart checklists for engine restart |               |

## AIRSTART

### STARTER ASSIST (Preferred Procedure)

- |   |                            |
|---|----------------------------|
| 1. BATTERY Switch .....                       | <b>ON</b>                  |
| 2. AVIONICS No. 1 Switch .....                | <b>ON</b>                  |
| 3. Electrical Load .....                      | <b>REDUCE</b>              |
| a. STBY ALT PWR Switch .....                  | <b>OFF</b>                 |
| b. AVIONICS Bus 2 Switch .....                | <b>OFF</b>                 |
| c. IGNITION Switch .....                      | <b>NORM</b>                |
| d. Left LIGHTS Panel Switches (9 total) ..... | <b>OFF</b>                 |
| e. POWER OUTLET Switch .....                  | <b>OFF</b>                 |
| f. VENT AIR FANS .....                        | <b>OFF</b>                 |
| g. AIR CONDITIONING (if installed) .....      | <b>OFF</b>                 |
| h. BLEED AIR HEAT Switch .....                | <b>OFF</b>                 |
| 4. EMERGENCY POWER Lever .....                | <b>NORMAL</b>              |
| 5. POWER Lever .....                          | <b>IDLE</b>                |
| 6. PROP RPM Lever .....                       | <b>MIN RPM</b>             |
| 7. FUEL CONDITION Lever .....                 | <b>CUTOFF</b>              |
| 8. FUEL SHUTOFF Knob .....                    | <b>ON (push in)</b>        |
| 9. FUEL TANK SELECTORS .....                  | <b>BOTH ON</b>             |
| 10. FUEL BOOST Switch .....                   | <b>ON</b>                  |
| 11. Altitude .....                            | <b>20,000 FEET MAXIMUM</b> |

(Continued Next Page)

**STARTER ASSIST (Preferred Procedure)** (Continued)

- 12. STARTER Switch ..... **START and OBSERVE**
  - a. IGNITION ON CAS MSG ..... **CHECK ON**
  - b. Engine Oil Pressure Indication ..... **CHECK**
  - c.  $N_g$  ..... **12% MINIMUM**
- 13. FUEL CONDITION Lever ..... **LOW IDLE and OBSERVE**
  - a. FLOW PPH ..... **90-140 pph**
  - b. ITT ..... **MONITOR** (1090°C maximum)
  - c.  $N_g$  ..... **52% MINIMUM**
- 14. STARTER Switch ..... **OFF**

**WARNING**

**If conditions exist such as heavy precipitation or nearly empty fuel tanks, turn the IGNITION Switch ON.**

- 15. FUEL BOOST Switch ..... **NORM**  
(unless it cycles on and off; then leave ON)
- 16. FUEL CONDITION Lever ..... **HIGH IDLE**
- 17. PROP RPM Lever ..... **SET**
- 18. POWER Lever ..... **SET**
- 19. STBY ALT PWR Switch ..... **ON**
- 20. AVIONICS No. 2 Switch ..... **ON**
- 21. Electrical equipment ..... **AS REQUIRED**

**NO STARTER ASSIST**

- 1. BATTERY Switch ..... **ON**
- 2. GENERATOR Switch ..... **TRIP**
  - a. STBY ALT PWR Switch ..... **OFF**
  - b. AVIONICS Bus 2 Switch ..... **OFF**
  - c. Left LIGHTS Panel Switches (9 total) ..... **OFF**
  - d. POWER OUTLET Switch ..... **OFF**
  - e. VENT AIR FANS ..... **OFF**
  - f. AIR CONDITIONING (if installed) ..... **OFF**
  - g. BLEED AIR HEAT Switch ..... **OFF**
- 3. EMERGENCY POWER Lever ..... **NORMAL**
- 4. POWER Lever ..... **IDLE**
- 5. PROP RPM Lever ..... **MIN RPM**

(Continued Next Page)

**NO STARTER ASSIST** (Continued)

- 6. FUEL CONDITION Lever ..... **CUTOFF**
- 7. FUEL SHUTOFF Knob ..... **ON** (push in)
- 8. FUEL TANK SELECTORS ..... **BOTH ON**
- 9. FUEL BOOST Switch ..... **ON**
- 10. IGNITION Switch..... **ON**
- 11. Airspeed ..... **100 KIAS MINIMUM**  
(140 KIAS if propeller is feathered)
- 12. Altitude ..... **20,000 feet MAXIMUM**  
(15,000 feet if propeller is feathered)

**CAUTION**

Do not attempt a restart without starter assist if  $N_g$  indications indicates zero RPM.

- 13.  $N_g$  Indicator ..... **CHECK STABLE**
- 14. FUEL CONDITION Lever ..... **LOW IDLE and OBSERVE**
  - a. FLOW PPH..... **90-140 pph**
  - b. ITT ..... **MONITOR** (1090°C maximum)
  - c.  $N_g$  ..... **52% MINIMUM**
- 15. IGNITION Switch..... **NORM** ( $N_g$  52% or above)  
(unless conditions warrant leaving ON)

**WARNING**

**If conditions exist, such as heavy precipitation or nearly empty fuel tanks, turn the IGNITION Switch ON.**

- 16. FUEL BOOST Switch ..... **NORM**  
(unless it cycles on and off; then leave ON)
- 17. FUEL CONDITION Lever ..... **HIGH IDLE**
- 18. PROP RPM Lever ..... **SET**
- 19. POWER Lever..... **SET**
- 20. GENERATOR Switch ..... **RESET**
- 21. STBY ALT PWR Switch..... **ON**
- 22. AVIONICS No. 2 ..... **ON**



## FORCED LANDINGS

### EMERGENCY LANDING WITHOUT ENGINE POWER

1. Seats, Seat Belts, Shoulder Harnesses . . . . . **SECURE**
2. Airspeed . . . . . **100 KIAS** (flaps UP)  
**80 KIAS** (flaps FULL)
3. POWER Lever . . . . . **IDLE**
4. PROP RPM Lever. . . . . **FEATHER**
5. FUEL CONDITION Lever . . . . . **CUTOFF**
6. FUEL BOOST Switch . . . . . **OFF**
7. IGNITION Switch . . . . . **NORM**
8. STBY ALT PWR Switch . . . . . **OFF**
9. Nonessential Equipment. . . . . **OFF**
10. FUEL SHUTOFF Knob . . . . . **PULL OFF**
11. FUEL TANK SELECTORS . . . . . **OFF** (warning horn will sound)
12. WING FLAPS Handle . . . . . **AS REQUIRED** (FULL recommended)
13. Crew Doors. . . . . **UNLATCH PRIOR TO TOUCHDOWN**
14. GENERATOR Switch . . . . . **TRIP**
15. BATTERY Switch . . . . . **OFF** (when landing is assured)
16. Touchdown . . . . . **SLIGHTLY TAIL LOW**
17. Brakes. . . . . **APPLY HEAVILY**

### PRECAUTIONARY LANDING WITH ENGINE POWER

1. Seats, Seat Belts, Shoulder Harnesses . . . . . **SECURE**
2. WING FLAPS Handle . . . . . **10°**
3. Airspeed . . . . . **90 KIAS**
4. Selected Field. . . . . **FLY OVER**  
(noting terrain and obstructions)
5. Nonessential Equipment  
(except BATTERY, GENERATOR and STBY ALT). . . . . **OFF**
6. WING FLAPS Handle . . . . . **FULL DOWN** (on final approach)
7. Airspeed . . . . . **80 KIAS**
8. Crew Doors. . . . . **UNLATCH PRIOR TO TOUCHDOWN**
9. STBY ALT PWR Switch . . . . . **OFF**
10. GENERATOR Switch . . . . . **TRIP**
11. BATTERY Switch . . . . . **OFF**
12. Touchdown . . . . . **SLIGHTLY TAIL LOW**
13. POWER Lever . . . . . **BETA RANGE**
14. FUEL CONDITION Lever . . . . . **CUTOFF**
15. Brakes. . . . . **APPLY HEAVILY**

### DITCHING

1. Radio . . . . . **TRANSMIT MAYDAY** (on 121.5 MHz)  
Give location, intentions and SQUAWK 7700 if transponder is installed.
2. Heavy Objects in Cabin . . . . . **SECURE**  
(if passenger is available to assist)
3. Seats, Seat Belts, Shoulder Harnesses . . . . . **SECURE**
4. WING FLAPS Handle . . . . . **FULL DOWN**
5. POWER . . . . . **ESTABLISH 300 FT/MIN DESCENT AT 80 KIAS**
6. Approach
  - a. High Winds . . . . . **INTO THE WIND**
  - b. Light Winds, Heavy Swells . . . . . **PARALLEL TO SWELLS**
7. Face . . . . . **CUSHION at TOUCHDOWN**  
(with folded coat or similar object)
8. Touchdown . . . . . **NO FLARE** (maintain descent attitude)
9. Airplane . . . . . **EVACUATE**
10. Life Vests and Raft . . . . . **INFLATE** (when outside cabin)

### WARNING

**The airplane has not been flight tested in actual ditchings, thus the above recommended procedure is based entirely on the best judgment of Cessna Aircraft Company.**

### SMOKE AND FIRE

#### ENGINE FIRE IN FLIGHT (Red ENGINE FIRE CAS MSG)

- |  |                 |
|--|-----------------|
| 1. POWER Lever . . . . .                   | <b>IDLE</b>     |
| 2. PROP RPM Lever . . . . .                | <b>FEATHER</b>  |
| 3. FUEL CONDITION Lever . . . . .          | <b>CUTOFF</b>   |
| 4. FUEL SHUTOFF Knob . . . . .             | <b>PULL OFF</b> |
| 5. CABIN HEAT FIREWALL SHUTOFF CONTROL . . | <b>PULL OFF</b> |
6. Forward Side Vents . . . . . **CLOSE**
  7. Overhead Vents . . . . . **OPEN**
  8. VENT AIR FANS . . . . . **ON**
  9. WING FLAPS Handle . . . . . **20° - FULL**
  10. Airspeed . . . . . **80 - 85 KIAS**
  11. Forced Landing . . . . . **EXECUTE**  
(as described in Emergency Landing Without Engine Power)

**ELECTRICAL FIRE IN FLIGHT**

1. STBY ALT PWR Switch . . . . .	<b>OFF</b>
2. GENERATOR Switch . . . . .	<b>TRIP</b>
3. BATTERY Switch . . . . .	<b>OFF</b>

**WARNING**

**Without electrical power all electrically operated flight and engine indications, fuel boost pump, CAS messages, WING FLAPS Handle and all navigation and communications will be inoperative. All standby instruments, including torque indicator and vacuum-driven standby attitude indicator, will be operative.**

4. Vents . . . . .	<b>CLOSED</b> (to avoid drafts)
a. Forward Side Vents . . . . .	<b>CLOSE</b>
b. Overhead Vents . . . . .	<b>CLOSE</b>
c. VENT AIR FANS . . . . .	<b>OFF</b>
5. BLEED AIR HEAT Switch . . . . .	<b>OFF</b>
6. Fire Extinguisher . . . . .	<b>USE</b>

**WARNING**

**Occupants should use oxygen masks (if installed) until smoke clears. After discharging an extinguisher within a closed cabin, ventilate the cabin.**

7. AVIONICS Power Switches . . . . .	<b>OFF</b>
--------------------------------------	------------

**WARNING**

**With AVIONICS No. 1 and No. 2 OFF, use standby flight instruments.**

8. All Other Electrical Switches . . . . .	<b>OFF</b>
--	------------

**IF FIRE APPEARS OUT AND ELECTRICAL POWER IS NECESSARY FOR CONTINUANCE OF FLIGHT:**

9. BATTERY Switch . . . . .	<b>ON</b>
10. GENERATOR Switch . . . . .	<b>RESET</b>
11. STBY ALT PWR Switch . . . . .	<b>ON</b>
12. Circuit Breakers . . . . .	<b>CHECK</b> (for faulty circuit; do not reset)
13. AVIONICS No. 1 Switch . . . . .	<b>ON</b>

(Continued Next Page)

**ELECTRICAL FIRE IN FLIGHT** (Continued)

- 14. Electrical Switches ..... **ON**  
Turn switches on one at a time, with a delay after each until short circuit is localized.
- 15. Vents ..... **OPEN**  
(when it is verified that fire is completely extinguished)
  - a. Forward Side Vents ..... **OPEN**
  - b. Overhead Vents ..... **OPEN**
  - c. VENT AIR FANS ..... **ON**
- 16. BLEED AIR HEAT ..... **ON** (as desired)

**CABIN FIRE**

- 1. STBY ALT PWR Switch ..... **OFF**
- 2. GENERATOR Switch ..... **TRIP**
- 3. BATTERY Switch ..... **OFF**

**WARNING**

**Without electrical power all electrically operated flight and engine indications, fuel boost pump, CAS messages, WING FLAPS Handle and all navigation and communications will be inoperative. All standby instruments, including torque indicator and vacuum-driven standby attitude indicator, will be operative.**

- 4. Vents ..... **CLOSED** (to avoid drafts)
  - a. Forward Side Vents ..... **CLOSE**
  - b. Overhead Vents ..... **CLOSE**
  - c. VENT AIR FANS ..... **OFF**
- 5. BLEED AIR HEAT Switch ..... **OFF**
- 6. Fire Extinguisher ..... **ACTIVATE** (if available)

**WARNING**

**Occupants should use oxygen masks (if installed) until smoke clears. After discharging an extinguisher within a closed cabin, ventilate the cabin.**

- 7. Flight ..... **TERMINATE** (as soon as possible)

### WING FIRE

1.	PITOT/STATIC HEAT Switch .....	<b>OFF</b>
2.	STALL HEAT Switch .....	<b>OFF</b>
3.	STROBE Switch .....	<b>OFF</b>
4.	NAV Switch .....	<b>OFF</b>
5.	LDG and TAXI/ RECOG Switches .....	<b>OFF</b>
6.	FUEL QUANTITY Circuit Breakers .....	<b>OFF</b>
	(second row, third breaker from front and third row third breaker from front)	
7.	RADAR R/T Circuit Breaker (if installed) .....	<b>PULL</b>
	(AVN BUS 1, second row, sixth breaker from left side)	
8.	VENT AIR FANS .....	<b>OFF</b>
9.	AIR CONDITIONING (if installed) .....	<b>OFF</b>

### WARNING

**Perform a sideslip as required to keep flames away from the fuel tank and cabin. Land as soon as possible.**

### CABIN FIRE DURING GROUND OPERATIONS

1.	POWER Lever .....	<b>IDLE</b>
2.	Brakes .....	<b>AS REQUIRED</b>
3.	PROP RPM Lever .....	<b>FEATHER</b>
4.	FUEL CONDITION Lever .....	<b>CUTOFF</b>
5.	BATTERY Switch .....	<b>OFF</b>
6.	Airplane .....	<b>EVACUATE</b>
7.	Fire .....	<b>EXTINGUISH</b>

**ENGINE FIRE DURING START ON GROUND (Red ENGINE FIRE CAS MSG)**

1. FUEL CONDITION Lever .....	<b>CUTOFF</b>
2. FUEL BOOST Switch .....	<b>OFF</b>
3. STARTER Switch .....	<b>MOTOR</b>

**WARNING**

**It is possible to have an engine fire without an accompanying Red ENGINE FIRE CAS MSG.**

**CAUTION**

- Do not exceed the starting cycle limitations. Refer to Section 2, limitations.
- Should the fire persist, as indicated by sustained interstage turbine temperature, immediately close the fuel shutoff and continue motoring.

4. STARTER Switch .....	<b>OFF</b>
5. FUEL SHUTOFF Knob .....	<b>PULL OFF</b>
6. BATTERY Switch .....	<b>OFF</b>
7. Airplane .....	<b>EVACUATE</b>
8. Fire .....	<b>EXTINGUISH</b>

## **ICE AND RAIN PROTECTION**

### **THE FOLLOWING WEATHER CONDITIONS CAN BE CONDUCTIVE TO SEVERE IN-FLIGHT ICING - As Required by AD 96-09-15, Paragraph (a) (2):**

1. Visible rain at temperatures below 0°C (32°F) ambient air temperature.
2. Droplets that splash or splatter on impact at temperatures below 0°C (32°F) ambient air temperature.

### **PROCEDURES FOR EXITING THE SEVERE ICING ENVIRONMENT - As Required by AD 96-09-15, Paragraph (a) (2):**

These procedures are applicable to all flight phases from takeoff to landing. Monitor the ambient air temperature. While severe icing can form at temperatures as cold as -18°C (0°F), increased vigilance is warranted at temperatures around freezing with visible moisture present. If the visual cues specified in Section 2, Limitations for identifying severe icing conditions are observed, accomplish the following:

1. Immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the severe icing conditions in order to avoid extended exposure to flight conditions more severe than those for which the airplane has been certificated.
2. Avoid abrupt and excessive maneuvering that can exacerbate control difficulties.
3. Do not engage the autopilot.
4. If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot.
5. If an unusual roll response or uncommanded roll control movement is observed, reduce the angle-of-attack.
6. If the flaps are extended, do not retract them until the airframe is clear of ice.
7. Report these weather conditions to Air Traffic Control.

### INADVERTENT ICING ENCOUNTER

- |  |               |
|--|---------------|
| 1. IGNITION Switch . . . . .                 | <b>ON</b>     |
| 2. INERTIAL SEPARATOR . . . . .              | <b>BYPASS</b> |
| 3. PITOT/STATIC HEAT Switch . . . . .        | <b>ON</b>     |
| 4. STALL HEAT Switch . . . . .               | <b>ON</b>     |
| 5. PROP HEAT Switch (if installed) . . . . . | <b>AUTO</b>   |

**IF ABOVE 20,000 FEET:**

- |                       |  |
|-----------------------|--|
| 6. Airspeed . . . . . | <b>160 KIAS MAX</b>  |
| 7. Altitude . . . . . | <b>DESCEND TO 20,000 FEET OR BELOW</b><br>(as soon as practical) |

Turn back or change altitude to obtain an outside air temperature that is less conducive to icing.

- |                                    |  |
|------------------------------------|--|
| 8. IGNITION Switch . . . . .       | <b>OFF</b> (after 5 minutes operation) |
| 9. BLEED AIR HEAT Switch . . . . . | <b>ON</b>                              |
| 10. TEMP Control . . . . .         | <b>ADJUST</b>                          |

Push FWD CABIN HEAT control full in and pull defrost control full out to obtain maximum windshield defroster effectiveness.

- |                              |   |
|------------------------------|---|
| 11. PROP RPM Lever . . . . . | <b>1900 RPM</b><br>(to minimize ice build-up) |
|------------------------------|---|

#### NOTE

If BYPASS is used at any point during flight or aircraft operation due to suspected or actual icing conditions, do not return it to NORMAL until the separator has been visually inspected and verified that the separator and its door are free of ice and water.

#### CAUTION

If excessive vibration is noted, momentarily reduce propeller RPM to 1600 with the PROP RPM Lever, then rapidly move the control full forward. Cycling the RPM flexes the propeller blades and high RPM increases centrifugal force, causing ice to shed more readily.

If icing conditions are unavoidable, plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable off airport landing site.

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## **INADVERTENT ICING ENCOUNTER** (Continued)

With an ice accumulation of 1/4 inch or more on the wing leading edges, be prepared for a significantly higher power requirement, approach speed, stall speed, and longer landing roll.

If necessary, set up a forward slip for visibility through the left portion of the windshield during the landing approach.

Use approach speed of 120 KIAS with flaps at 20°. With ice suspected on the airframe, or operating at 5°C (41°F) or less in visible moisture, do not extend flaps beyond 20° for landing.

12. Landing Distance . . . . . **MULTIPLY POH/AFM DISTANCE BY:**  
2.2 - FLAPS UP  
2.1 - FLAPS 10°
13. Minimum Approach Airspeed . . . . . **AT OR ABOVE:**  
120 KIAS - Flaps UP  
110 KIAS - Flaps 10°

### **WARNING**

**With heavy ice accumulations on the horizontal stabilizer leading edge, do not extend flaps while enroute or holding. When landing is assured, select the minimum flap setting required, not to exceed 20°, and maintain extra airspeed consistent with available field length. Do not retract the flaps once they have been extended, unless required for go-around. Then retract flaps in increments while maintaining 5 to 10 knots extra airspeed.**

### **NOTE**

- Land on the main wheels first, avoiding a slow and high flare.
- Missed approaches should be avoided whenever possible because of severely reduced climb capability. However, if a go-around is mandatory, make the decision much earlier in the approach than normal. Apply takeoff power and maintain 95 to 110 KIAS while retracting the flaps slowly in small increments.

## AVIONICS/AUTOPILOT

### PITCH TRIM FAILURE (Red PTRM ON PFD)

1. Control Wheel . . . . . **GRIP FIRMLY**
2. AP/TRIM DISC Button . . . . . **PRESS**  
(high elevator control forces possible)
3. ELEVATOR TRIM . . . . . **RETRIM** (using manual trim wheel)

#### NOTE

Actuate each half of the pilot and copilot Manual Electric Pitch Trim Switches separately to make sure trim does not actuate with only one half switch.

#### IF Red PTRIM CAS MESSAGE CLEARS

Procedure complete

#### IF Red PTRM MESSAGE REMAINS

4. Autopilot . . . . . **DO NOT RE-ENGAGE**

### YAW DAMPER INOPERATIVE (Red AFCS OR YAW CAS MSG)

1. AFCS Circuit Breaker (circuit breaker panel) . . . . . **CHECK**

#### IF STILL INOPERATIVE

2. Autopilot will be inoperative.

## ELECTRICAL FAILURES

### GENERATOR FAILURE (Amber GENERATOR OFF CAS MSG)

1. BUS VOLTS ..... **CHECK**  
Monitor voltage and generator output.
2. STBY ALT PWR ..... **VERIFY ON**

#### IF BUS VOLTS IS LESS THAN 28.5:

3. GEN AMPS..... **CHECK**

#### IF GEN AMPS IS ZERO:

- a. GEN CONT and GEN FIELD Circuit Breakers. . . **PUSH IN**  
(top row last 2 breakers on forward end)
- b. GENERATOR Switch ..... **RESET**

#### IF GENERATOR OUTPUT RESUMES:

- c. BUS VOLTS ..... **MONITOR**  
(and monitor GEN AMPS)

If BUS VOLTS increases past 32.5, expect the generator to trip offline again. If this occurs, complete the Generator Failure checklists beginning with step 3d.

(Continued Next Page)

**GENERATOR FAILURE (Amber GENERATOR OFF CAS MSG)** (Continued)

**IF GEN AMPS IS STILL ZERO:**

- d. GENERATOR Switch . . . . . **TRIP**
- e. AVIONICS BUS TIE Switch . . . . . **ON**
- f. AVIONICS STBY PWR Switch . . . . . **ON**

**NOTE**

AVIONICS No. 1 and No. 2 Switches must remain ON in order for the battery to power the avionics buses.

- g. Electrical Load . . . . . **REDUCE**
- (1) CABIN Switch . . . . . **OFF**
- (2) POWER OUTLETS Switch . . . . . **OFF**
- (3) STROBE Switch . . . . . **OFF**
- (4) LDG and TAXI/ RECOG Switches . . . . . **OFF**

**NOTE**

Keep LDG and TAXI/ RECOG OFF until required for approach and landing. Prior to landing, only turn LEFT LDG light ON to keep electrical load below limit.

- (5) VENT AIR FANS . . . . . **OFF**
- (6) AIR CONDITIONING (if installed) . . . . . **OFF**
- (7) GEN CONT and GEN FIELD Circuit Breakers . . **PULL**  
    (top row, last two breakers on forward end)
- (8) RIGHT PITOT HEAT Circuit Breaker . . . . . **PULL**  
    (second row, third breaker from aft end)
- (9) RDNG LIGHT Circuit Breaker . . . . . **PULL**  
    (third row, second breaker from aft end)
- (10) RADAR R/T Circuit Breaker . . . . . **PULL**  
    (AVN BUS 1, second row, sixth breaker from left side)
- (11) HF RCVR and HF AMP Circuit Breakers . . . . . **PULL**  
    (AVN BUS 2, second row, fifth and sixth breakers from left side)

- h. ALT AMPS . . . . . **VERIFY BELOW 75 AMPS**  
    (continue shedding if not below 75 amps)
- i. Flight . . . . . **CONTINUE**

**NOTE**

With Standby Alternator powering the electrical system, the flight can continue to destination airport with the Amber GENERATOR OFF CAS message displayed. Monitor alternator load using ENGINE SYSTEM page.

**VOLTAGE HIGH (Red VOLTAGE HIGH CAS MSG)**

- 1. BUS VOLTS ..... **MONITOR**  
If BUS VOLTS increases past 32.5, expect the generator to trip offline automatically. BUS VOLTS will turn red/ white at 32.1 volts to give advanced warning of an automatic trip. If this occurs, complete the generator failure checklist beginning with step 3a.

**IF THE GENERATOR DOES NOT TRIP AUTOMATICALLY ABOVE 32.5 VDC:**

- 2. GENERATOR Switch ..... **TRIP**  
Complete the GENERATOR FAILURE checklist beginning with step 3d.

**VOLTAGE LOW (Red VOLTAGE LOW CAS MSG)**

- 1. BUS VOLTS ..... **CHECK**

**CAUTION**

A Red VOLTAGE LOW CAS MSG followed by a BUS 1, BUS 2 or STBY PWR Circuit Breaker tripping can indicate a feeder fault that has isolated itself. Do not reset the tripped breaker. The Red VOLTAGE LOW CAS MSG should disappear.

- 2. STBY ALT PWR ..... **VERIFY ON**  
**IF VOLTAGE IS LESS THAN 24.5, Amber GENERATOR OFF AND Amber STBY PWR INOP CAS MSG(s) ON:**

- 3. GEN CONT and GEN FIELD Circuit Breakers ..... **PUSH IN**
- 4. GENERATOR Switch ..... **RESET**
- 5. STBY ALT PWR Switch ..... **OFF; THEN ON**

**IF BUS VOLTS IS STILL LESS THAN 24.5:**

- 6. GENERATOR Switch ..... **TRIP**
- 7. STBY ALT PWR Switch ..... **OFF**

(Continued Next Page)

**VOLTAGE LOW (Red VOLTAGE LOW CAS MSG)** (Continued)

- 8. Electrical Load . . . . . **REDUCE**
  - a. AVIONICS STBY PWR Switch . . . . . **OFF**
  - b. AVIONICS BUS TIE Switch . . . . . **OFF**
  - c. ANTI-ICE PRIMARY Switch . . . . . **NORM**

**NOTE**

TKS Ice Protection System PRIMARY switch must be kept in NORM in order to keep the electrical load within limits on BATTERY power ONLY.

- d. PROP HEAT Switch (if installed) . . . . . **OFF**
- e. CABIN Lights . . . . . **OFF**
- f. STROBE lights . . . . . **OFF**
- g. LDG and TAXI/RECOG lights . . . . . **OFF**

**NOTE**

Keep LDG and TAXI/RECOG lights OFF until required for approach and landing. Prior to landing, only turn the LEFT LDG light ON to keep electrical load below limit.

- h. VENT AIR FANS . . . . . **OFF**
- i. AIR CONDITIONING (if installed) . . . . . **OFF**
- j. GEN CONT and GEN FIELD Circuit Breakers . . . . . **PULL**  
(top row, last two breakers on forward end)
- k. RIGHT PITOT HEAT Circuit Breaker . . . . . **PULL**  
(second row, third breaker from aft end)
- l. RDNG LIGHT Circuit Breaker . . . . . **PULL**  
(third row, second breaker from aft end)
- m. RADAR R/T Circuit Breaker . . . . . **PULL**  
(AVN BUS 1, second row, sixth breaker from left side)
- n. AVIONICS No. 2 Switch . . . . . **OFF**
- 9. BATT AMPS . . . . . **VERIFY BELOW 45 AMPS**
- 10. FLIGHT . . . . . **TERMINATE (as soon as possible)**  
(refer to the appropriate FORCED LANDINGS procedure in this Section)

## ENGINE MALFUNCTIONS

### LOSS OF OIL PRESSURE (Red OIL PRESS LOW CAS MSG)

1. Oil Pressure Indication . . . . . **MONITOR**

#### CAUTION

If oil pressure indications confirm warning CAS MSG, proceed in accordance with Engine Failures checklists or at the discretion of the pilot and consistent with safety, continue engine operation in preparation for an emergency landing as soon as possible.

### FUEL CONTROL UNIT MALFUNCTION IN THE PNEUMATIC OR GOVERNOR SECTIONS (Engine Power Rolls Back To Idle)

1. POWER Lever . . . . .	<b>IDLE</b>
2. EMERGENCY POWER Lever . . . . .	<b>USE</b>
(maintain 65% N <sub>g</sub> minimum during flight)	

#### CAUTION

The EMERGENCY POWER lever overrides normal fuel control functions and results in the direct operation of the fuel metering valve. Utilize slow and smooth movement of the EMERGENCY POWER lever to avoid engine surges, and/or exceeding ITT, N<sub>g</sub>, and torque limits.

### EMERGENCY POWER LEVER NOT STOWED (Red EMERG PWR LVR CAS MSG)

1. EMERGENCY POWER Lever . . . . . **VERIFY NORMAL**

## FUEL SYSTEM

### FUEL FLOW INTERRUPTION TO FUEL RESERVOIR (Red RSVR FUEL LOW CAS MSG)

- |    |                           |                |
|----|---------------------------|----------------|
| 1. | FUEL TANK SELECTORS ..... | <b>BOTH ON</b> |
| 2. | IGNITION Switch .....     | <b>ON</b>      |
| 3. | FUEL BOOST Switch .....   | <b>ON</b>      |
4. If Red RSVR FUEL LOW CAS MSG remains and there is usable fuel in the wing tanks:
    - a. Carefully monitor engine indications and Amber FUEL PRESS LOW CAS MSG for signs of fuel starvation.
    - b. Land as soon as possible and determine cause of Red RSVR FUEL LOW warning.

#### WARNING

If there are signs of fuel starvation, prepare for a forced landing (as described in Emergency Landing Without Engine Power).

### FUEL TANK SELECTOR OFF DURING ENGINE START (Red FUEL SELECT OFF CAS MSG And Both Fuel Selector Warning Horns Activated)

- |    |                           |                |
|----|---------------------------|----------------|
| 1. | FUEL TANK SELECTORS ..... | <b>BOTH ON</b> |
|----|---------------------------|----------------|

### FUEL LEVEL LOW AND SINGLE FUEL SELECTOR OFF (Red FUEL SELECT OFF and Amber L, R, OR L-R FUEL LOW CAS MSG(s)) and/or BOTH FUEL TANK SELECTORS OFF (Red FUEL SELECT OFF CAS MSG AND ONE FUEL WARNING HORN ACTIVATED)

1. FUEL TANK SELECTORS .....
  2. Fuel Balance .....
- BOTH ON**  
**MONITOR**  
Maximum 200 pounds imbalance.



**START CONT AND/OR FUEL SELECT WARN CIRCUIT  
BREAKER(S) TRIPPED (Red FUEL SELECT OFF CAS  
MSG)**

1. Tripped Circuit Breaker(s) . . . . . **RESET**

**NOTE**

With either the START CONT or FUEL SELECT WARN Circuit Breaker tripped, the Red FUEL SELECT OFF CAS MSG will be displayed and the FUEL SELECT WARNING HORNS will be inoperative.

**CAUTION**

Do not reset circuit breakers more than once and only after a 2 minute cool off period.

## **EXPANDED EMERGENCY**

### **ENGINE FAILURE**

If an engine failure occurs during the takeoff roll, the most important thing to do is stop the airplane on the remaining runway. Those extra items on the checklist will provide added safety after a failure of this type.

Prompt lowering of the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after takeoff. Feathering the propeller substantially reduces drag, thereby providing increased glide distance. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions. Altitude and airspeed are seldom sufficient to execute a 180° gliding turn necessary to return to the runway. The checklist procedures assume that adequate time exists to secure the fuel and electrical systems prior to touchdown.

After an engine failure in flight, the best glide speed, as shown in Figure 3-1, should be established as quickly as possible. Propeller feathering is dependent on existing circumstances and is at the discretion of the pilot. Maximum RPM selection will provide increased gas generator windmilling speed for emergency restarts in the event of a starter failure. On the other hand, to obtain the maximum glide, the propeller must be feathered.

(Continued Next Page)

## **ENGINE FAILURE** (Continued)

While gliding toward a suitable landing area, an effort should be made to identify the cause of the power loss. An engine failure might be identified by abnormal temperatures, mechanical noises or high vibration levels in conjunction with the power loss. A flameout will be noticed by a drop in ITT, torque and %  $N_g$ .

### **CAUTION**

Do not attempt to restart an engine that is definitely known to have failed.

A flameout can result from the engine running out of fuel, or by unstable engine operation. Unstable engine operation such as a compressor surge (possible due to a bleed valve malfunction) can be identifiable by an audible popping noise just before flameout. Once the fuel supply has been restored to the engine or cause of unstable engine operation eliminated, the engine can be restarted.

The best airstart technique is to initiate the relight procedure immediately after a flameout occurs, provided the pilot is certain that the flameout was not the result of some malfunction that might make it hazardous to attempt a relight.

Regardless of airspeed or altitude, there is always the possibility that the engine can light up successfully just as soon as the ignition is turned on. In an emergency, turn on the ignition just as soon as possible after flameout, provided the gas generator speed has not dropped below 50%. Under these circumstances, it is not necessary to shut off the fuel or feather the propeller. The POWER lever, however, should be retarded to IDLE position.

### **CAUTION**

The pilot should determine the reason for power loss before attempting an airstart.

If a flameout has occurred and the gas generator speed has dropped below 50%, the FUEL CONDITION lever should be moved to the CUTOFF position before an airstart is attempted.

(Continued Next Page)

# ENGINE FAILURE (Continued)

## MAXIMUM GLIDE

A59794

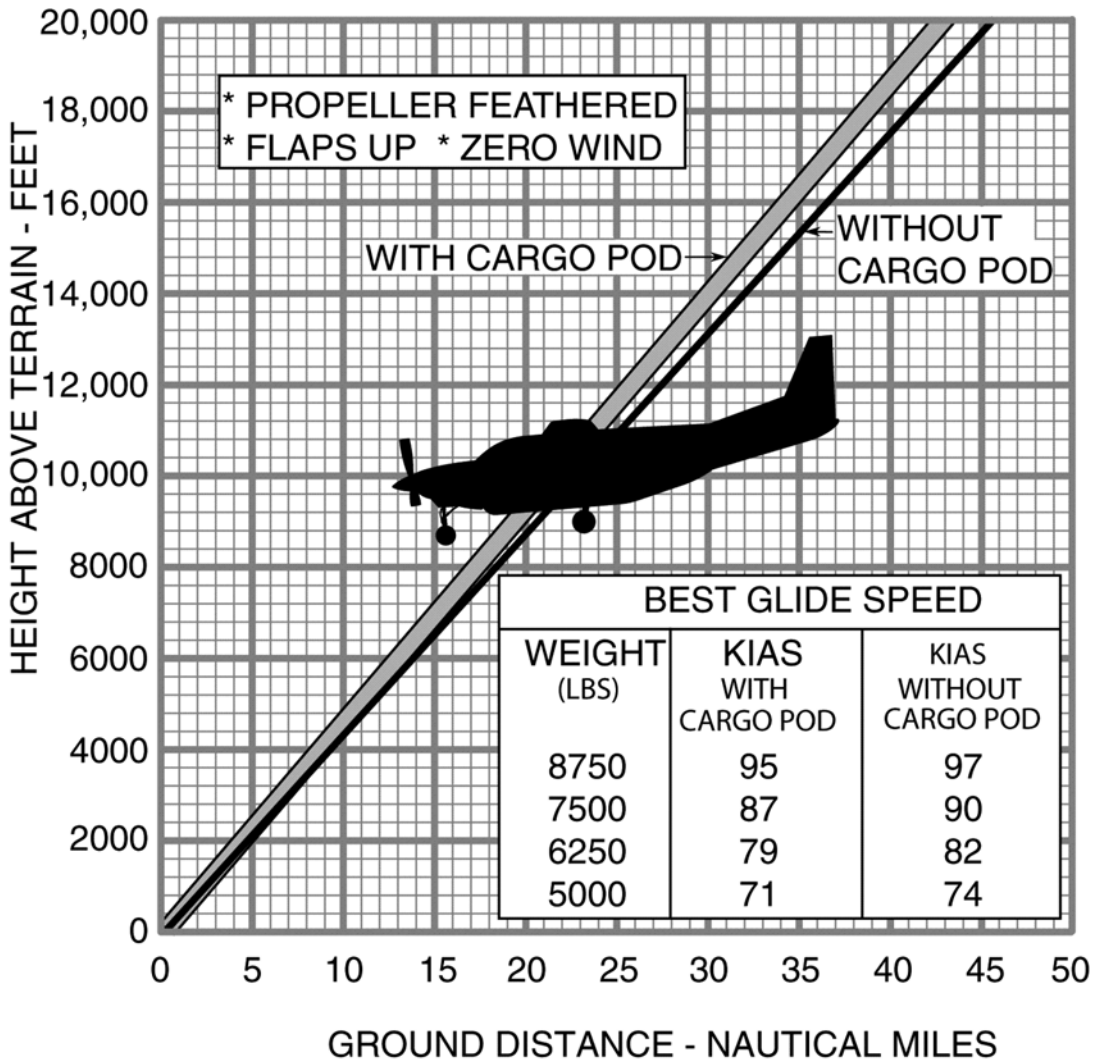


Figure 3-1

Propeller feathering is dependent on circumstances and is at the discretion of the pilot. However, if engine oil pressure drops below 15 psi, the propeller should be feathered.

If an airstart is to be attempted, follow the checklist procedures. The Starter Assist procedure is preferred since it results in cooler engine starts. Successful airstarts (with starter assist) can be achieved at all airspeeds normally flown and up to an altitude of 14,000 feet. However, above 14,000 feet, or with the gas generator RPM below 10%, starting temperatures tend to be higher and caution is required.

(Continued Next Page)

## **ENGINE FAILURE** (Continued)

### **CAUTION**

The FUEL CONDITION Lever can be moved momentarily to CUTOFF and then back to LOW IDLE if overtemperature tendencies are encountered. This reduces the flow of fuel to the combustion chamber.

If the engine starter is inoperative, follow the No Starter Assist checklist procedures for an airstart.

### **CAUTION**

- If a rise in  $N_g$  and ITT are not indicated within 10 seconds, place FUEL CONDITION lever to cutoff and abort start. Refer to Emergency Procedures Engine Failure During Flight and Emergency Landing Without Engine Power.
- Emergency airstarts can be attempted below 10%  $N_g$  and outside the normal airspeed envelope, but ITT should be closely monitored. the FUEL CONDITION lever can be moved alternately to cutoff and then back to low idle if overtemperature tendencies are encountered.
- Do not attempt an airstart without starter assist with 0%  $N_g$ .

## **FORCED LANDINGS**

If all attempts to restart the engine fail and a forced landing is imminent, select a suitable field and prepare for the landing as discussed under the Emergency Landing Without Engine Power checklist.

Before attempting an off-airport landing with engine power available, one should fly over the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as discussed in the Precautionary Landing With Engine Power checklist.

### **NOTE**

The overhead fuel tank selectors control shutoff valves at the wing fuel tank outlets. To minimize the possibility of a fire, these selectors can be set to the OFF position during the final phase of an approach to an “off-airport” landing. With the selectors turned OFF, there is adequate fuel in the fuel reservoir tank for 3 minutes of maximum continuous power operation or approximately 9 minutes idle power operation. A warning horn will sound with both fuel selectors turned OFF. If the noise of the warning horn is too distracting, it can be silenced by pulling the START CONT circuit breaker.

### **WARNING**

**If the precautionary landing is aborted, turn the fuel tank selectors to the on position after initiating the bailed landing.**

## **DITCHING**

Prepare for ditching by securing or jettisoning heavy objects located in the baggage area and collect folded coats for protection of occupants' faces at touchdown. Transmit Mayday message on 121.5 MHz giving location and intentions and squawk 7700. Avoid a landing flare because of difficulty in judging height over a water surface.

## LANDING WITHOUT ELEVATOR CONTROL

Using power lever and elevator trim control, trim for approximately 500 fpm descent with 20° flaps at 85 KIAS. Then control the glide angle by adjusting power. If required, make small trim changes to maintain approximately 85 KIAS as power is adjusted during the approach.

The landing flare can be accomplished by a gentle power reduction accompanied by nose up trim. At forward C.G. loadings, it can be necessary to make a small power increase in the final flare stage to bring the nose up and prevent touchdown on the nose first. After touchdown, move the POWER lever to idle.

## SMOKE AND FIRE

In the event a fire is encountered, the following information will be helpful in dealing with the emergency as quickly and safely as possible.

The preflight checklist in Section 4 is provided to aid the pilot in detecting conditions which could contribute to an airplane fire. As a fire requires a combustible material, oxygen and a source of ignition, close preflight inspection should be given to the engine compartment and the underside of the wing and fuselage. Leaks in the fuel or oil systems can lead to a ground or in-flight fire.

### WARNING

**Flight should not be attempted with known fuel or oil leaks. The presence of fuel or unusual oil stains can be an indication of system leaks and should be corrected prior to flight.**

Probable causes of an engine fire are a malfunction of the fuel control unit and improper starting procedures. Improper procedures such as starting with the EMERGENCY POWER Lever out of NORMAL position or introducing fuel into the engine when gas generator speed is below 10% RPM will cause a hot start which can result in an engine fire. In the event that this occurs, proceed in accordance with the Engine Fire During Start On Ground checklist.

If an airplane fire is discovered on the ground or during takeoff, but prior to committed flight, the airplane should be stopped and evacuated as soon as practical.

(Continued Next Page)

## **SMOKE AND FIRE** (Continued)

Engine fires originating in flight must be controlled as quickly as possible in an attempt to prevent major structural damage. Immediately shut off all fuel to the engine and shut down the engine. Close the cabin heat firewall shutoff control and forward side vents to avoid drawing fire into the cabin, open the overhead vents, extend 20° to FULL flaps and slow down to 80-85 KIAS. This provides a positive cabin pressure in relation to the engine compartment. An engine restart should not be attempted.

An open foul weather window produces a low pressure in the cabin. To avoid drawing the fire into the cabin, the foul weather window should be kept closed.

A fire or smoke in the cabin should be controlled by identifying and shutting down the faulty system. Smoke can be removed by opening the cabin ventilation controls. When the smoke is intense, the pilot can choose to expel the smoke through the foul weather window. The foul weather window should be closed immediately if the fire becomes more intense when the window is opened.

The initial indication of an electrical fire is usually the odor of burning insulation. The checklist for this problem should result in elimination of the fire.

## **EMERGENCY OPERATION IN CLOUDS**

If the vacuum pump fails in flight, the standby attitude indicator will not be accurate. The pilot must rely on the attitude and heading information (from the AHRS) shown on the PFD indicators. With valid HDG or GPS/NAV inputs, autopilot operation will not be affected.

If a single AHRS unit fails in flight (red X's shown through the PFD attitude and heading indicators), the pilot must rely on the cross-side AHRS for attitude and heading information.

The autopilot will not operate if a single AHRS unit fails. The pilot must manually fly the airplane with crossside AHRS input. Refer to Section 7, Airplane and Systems Description, for additional details on autopilot operations.

The following instructions assume a dual AHRS failure and that the pilot is not very proficient at instrument flying.



## **EXECUTING A 180° TURN IN CLOUDS (AHRS FAILURE)**

Upon inadvertently entering the clouds, an immediate turn to reverse course and return to VFR conditions should be made as follows:

### **DUAL AHRS FAILURE**

1. Note the non-stabilized magnetic compass heading.
2. Set rudder trim to the neutral position.
3. Using the standby attitude indicator, initiate a 15° bank left turn. Keep feet off rudder pedals. Maintain altitude and 15° bank angle. Continue the turn for 60 seconds, then roll back to level flight.
4. When the compass card becomes sufficiently stable, check the accuracy of the turn by verifying that the compass heading approximates the reciprocal of the original heading.
5. If necessary, adjust the heading by keeping the wings level and using the rudder to make skidding turns (the compass will read more accurately) to complete the course reversal.
6. Maintain altitude and airspeed by cautious application of elevator control. Keep the roll pointer and index aligned and steer only with rudder.

## **EMERGENCY DESCENT THROUGH CLOUDS (AHRS FAILURE)**

When returning to VFR flight after a 180° turn is not practical, a descent through the clouds to VFR conditions below can be appropriate. If possible, obtain an ATC clearance for an emergency descent through the clouds.

### **DUAL AHRS FAILURE**

Choose an easterly or westerly heading to minimize non-stabilized magnetic compass card sensitivity. Occasionally check the compass heading and make minor corrections to hold an approximate course. The autopilot will not operate if the AHRS unit fails. The pilot must manually fly the airplane without AHRS input.

(Continued Next Page)

## **DUAL AHRS FAILURE (Continued)**

Before descending into the clouds, prepare for a stabilized descent as follows:

1. Set rudder trim to neutral position.
2. Turn pitot heat on.
3. Set power for a 500 to 800 feet per minute rate of descent.
4. Set the elevator trim for a stabilized descent at 115 KIAS.
5. Use the standby attitude indicator roll pointer and index to keep wings level.
6. Check trend of compass card movement and make cautious corrections with rudder to stop the turn.
7. Upon breaking out of clouds, resume normal cruising flight.

## **RECOVERY FROM SPIRAL DIVE IN THE CLOUDS (AHRS FAILURE)**

### **DUAL AHRS FAILURE**

If a spiral is entered while in the clouds, continue as follows:

1. Retard POWER lever to idle position.
2. Remove feet from rudder pedals.
3. Stop turn by carefully leveling the wings using aileron control to align the roll index and roll pointer of the standby attitude indicator.
4. Cautiously apply elevator back pressure to slowly reduce the airspeed to 115 KIAS.
5. Adjust the elevator trim control to maintain an 115 KIAS glide.
6. Set rudder trim to neutral position.
7. Use aileron control to maintain wings level (keep roll pointer and index aligned) and constant heading.
8. Resume EMERGENCY DESCENT THROUGH THE CLOUDS procedure.
9. Upon breaking out of clouds, resume normal cruising flight.

## **SPINS**

Intentional spins are prohibited in this airplane. Should an inadvertent spin occur, the following recovery technique can be used.

1. RETARD POWER LEVER TO IDLE POSITION.
2. PLACE AILERONS IN NEUTRAL POSITION.
3. APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.
4. IMMEDIATELY AFTER THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL. Full down elevator will be required at aft center of gravity loadings to assure optimum recoveries.
5. HOLD THESE CONTROL INPUTS UNTIL ROTATION STOPS. Premature relaxation of the control inputs can extend the recovery.
6. AS ROTATION STOPS, NEUTRALIZE RUDDER AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

## **ENGINE MALFUNCTIONS**

### **LOSS OF OIL PRESSURE**

The complete loss of oil pressure, as evidenced by the Red OIL PRESS LOW CAS MSG and confirmed by the oil pressure indication reading, implies that the pilot will eventually lose control of the propeller as the propeller springs and counterweights drive the propeller blades into feather. Also, the engine will eventually seize. Therefore, if the pilot elects to continue to operate the engine after loss of oil pressure, engine and propeller operation should be closely monitored for indication of the onset of propeller feathering or engine seizure and the engine failure checklist should be completed at that time.

Operation of the engine at a reduced power setting (preferably at the minimum power required for the desired flight regime) will generally prolong the time to loss of engine/propeller thrust.

Operation of the engine with the oil pressure in the yellow band is not considered critical, but is a cause for concern and should be tolerated only for the completion of the flight. Continued monitoring of the oil pressure gauge will provide an early indication of dropping oil pressure due to insufficient oil supply or a malfunctioning oil pump, and will give the pilot additional time to divert to a suitable emergency landing area with the engine operating.

## **FUEL CONTROL UNIT MALFUNCTION IN THE PNEUMATIC OR GOVERNOR SECTIONS**

A malfunction in the pneumatic or governor sections of the fuel control unit can cause engine power to decrease to minimum flow idle. Symptoms of this type failure would be an ITT indication in the typical idle range of 500°C to 600°C,  $N_g$  of 48% or above (increases with altitude), and no engine response to POWER lever movement. If this type of malfunction has occurred, the EMERGENCY POWER lever (fuel control manual override) can be used to restore engine power. To use the manual override system, place the POWER lever at its IDLE position and move the EMERGENCY POWER lever forward of its IDLE gate and advance as required.

### **CAUTION**

When using the fuel control manual override system, engine response can be more rapid than when using the POWER lever. Utilize slow and smooth movement of the EMERGENCY POWER lever to avoid engine surges, and/or exceeding ITT,  $N_g$ , and torque limits.

### **NOTE**

- When using EMERGENCY POWER lever, monitor gas generator RPM when reducing power near idle, to keep it from decreasing below 65% in flight.
- The EMERGENCY POWER lever can have a dead band, such that no engine response is observed during the initial forward travel from the IDLE position.

## **EMERGENCY POWER LEVER NOT STOWED**

The Red EMERG PWR LVR CAS message was designed to alert the pilot of the Emergency Power Lever position prior to and during the engine start sequence. If the Emergency Power Lever is moved from the NORMAL position at any time with the engine running, no CAS message will be displayed.

## **FUEL SYSTEM MALFUNCTION/INADVERTENT FUEL FLOW INTERRUPTION PROCEDURES**

Fuel flows by gravity from the wing tanks, through fuel tank shutoff valves at the inboard end of each wing tank, and on to the reservoir located under the center cabin floorboard. After engine start, the main ejector pump (located in the reservoir) provides fuel to the engine-driven fuel pump at approximately 10 psi.

If the main ejector pump should malfunction, a pressure switch will activate the Amber FUEL PRESS LOW CAS MSG as well as turn on the auxiliary boost pump (when the FUEL BOOST Switch is in the NORM position) anytime the fuel pressure drops below approximately 4.75 psi.

Anytime the level of fuel in the reservoir drops to approximately one half full, the Red RSVR FUEL LOW CAS MSG will illuminate. If this occurs, the pilot should immediately verify that both FUEL TANK SELECTORS (located in the overhead panel) are ON and turn on the ignition and FUEL BOOST Switches.

### **WARNING**

**There is only enough fuel in the reservoir for approximately 1-1/2 minutes of engine operation at maximum continuous power after illumination of the Red RESERVOIR FUEL LOW CAS MSG.**

If the FUEL TANK SELECTORS have been left off, turning them on will quickly fill the reservoir and extinguish the Red RSVR FUEL LOW CAS MSG. Once the cause of the Red RSVR FUEL LOW condition has been determined and corrected (CAS MSG extinguished), the ignition and FUEL BOOST Switches can be returned to their NORM positions.

A fuel selector off warning system advises the pilot if both fuel tank selectors are in the OFF position before engine start, if either fuel tank selector is OFF during engine start, or if one FUEL TANK SELECTOR is OFF and the fuel level in the tank being used drops below approximately 25 gallons. The warning system includes a Red CAS MSG labeled FUEL SELECT OFF and two warning horns. If the FUEL SELECT WARN circuit breaker has popped or the START CONT circuit breaker has been pulled (possibly for ground maintenance), the Red FUEL SELECT OFF CAS MSG will be illuminated even with both FUEL TANK SELECTORS in the ON position. This is a warning to the pilot that the fuel selector off warning system has been deactivated. See Section 7 for further details on the fuel selector off warning system.

## **ELECTRICAL FAILURES**

### **GENERATOR OR MAIN BUS MALFUNCTIONS**

Illumination of the VOLTAGE LOW CAS MSG is a warning that the power distribution bus voltage is low enough to start discharging the battery. BUS VOLTS reading is used to verify the low bus voltage. A low or zero reading of the GEN AMPS confirms that the charge is insufficient or generator output current is zero. If the GENERATOR OFF CAS MSG is illuminated, it indicates that the generator contactor has disconnected the generator from the power distribution bus. The most likely causes of a generator trip (disconnection) are line surges, tripped circuit breakers or accidental switch operation. In these cases, follow the checklist procedures to restore generator operation.

The airplane is equipped with two starter contactors. One is used for starts on external power and the other for battery starts. If either contactor does not open after reaching approximately 46%  $N_g$ , the amber STARTER ON CAS MSG will remain illuminated. In most cases when this occurs, the generator will not transfer to the generator mode, and the GENERATOR OFF CAS MSG will remain illuminated. Under these conditions, it will be necessary to shut down the engine using checklist procedures and correct the malfunction prior to flight.

Illumination of the Amber GENERATOR AMPS CAS MSG indicates 1 of 2 conditions:

1. The current load on the generator is above its rated value for that flight condition. The pilot should reduce the electrical load, or change flight conditions as noted in the 300 Amp Starter Generator supplement.
2. The reverse current protection of the GCU has failed. If the GEN AMPS is below -10 amps the pilot should disconnect the generator from the electrical system by tripping the GENERATOR Switch.

The electrical power distribution system consists of a primary power distribution bus in the engine compartment which receives power from the battery and the generator, and two (No. 1 and No. 2) main power buses located in the circuit breaker panel. The main buses are each connected to the power distribution bus by three feeder cables. Each feeder cable is protected by a fuse link and a circuit breaker. This multiple feeder system provides automatic isolation of a feeder cable ground fault. If one of the three 30-amp feeder circuit breakers on either bus opens, it should be assumed that a feeder cable ground fault has been isolated, and attempted resetting of these breakers prior to troubleshooting is not recommended. The electrical load on the affected bus should be maintained below the remaining 60-ampere capacity.

## **LOSS OF ELECTRICAL POWER**

The design of the electrical power system, due to the self-exciting feature of the generator and the multiple protected busing system, minimizes the possibility of a complete electrical power loss. However, a fault to ground (airframe) on the generator or battery cables can be identified by one or more of the following: illumination of the GENERATOR OFF CAS MSG, sudden dimming of lights, contactor chattering, circuit breaker tripping, or arcing noises. Monitoring GEN AMPS, ALT AMPS, BAT AMPS, and BUS VOLTS on the ELECTRICAL section of the EIS Systems page will provide further information concerning the location of the fault, or the system affected by the fault. In the event of the above indications, the portion of the system containing the fault should be isolated. Following the checklist procedures for Generator Failure should result in restoration of electrical power to the distribution buses. The electrical section of the EIS Systems page should be monitored to assure that ground fault currents have been shut off and the capacity of the remaining power source(s) is not exceeded.

## **PARTIAL AVIONICS POWER FAILURE**

Avionics power is supplied to the No. 1 and No. 2 avionics buses from the power distribution bus in the engine compartment through separate protected feeder cables. In the event of a feeder cable failure, both avionics buses can be connected to the remaining feeder by closing the guarded AVIONICS BUS TIE Switch. If a ground fault has occurred on one feeder, it will be necessary to verify the avionics power switch/breaker associated with the affected feeder is off before the AVIONICS BUS TIE Switch will restore power to both avionics buses. The maximum avionics load with one feeder should be limited to 30 amperes. Nonessential avionics equipment should be turned off.

## **STANDBY ELECTRICAL SYSTEM MALFUNCTIONS**

An operational check of the standby electrical system is performed by following the Normal Procedures, Before Takeoff checklist. With the generator supplying the electrical load and the STBY ALT PWR Switch ON, both the Amber STBY PWR ON CAS MSG and STBY PWR INOP CAS MSG, should be extinguished.

The ALT AMPS should indicate zero amps. If the STBY PWR INOP CAS MSG is illuminated, it indicates that the alternator has no output. If a line voltage surge or temporary condition has tripped the ACU (alternator control unit), then cycling the STBY ALT PWR Switch to OFF, then back ON, can reset the ACU and restore standby power.

(Continued Next Page)



## **STANDBY ELECTRICAL SYSTEM MALFUNCTIONS**

(Continued)

If, due to a power system malfunction, the standby electrical system is carrying part of the electrical load (more than 10 amps), the STBY PWR ON CAS MSG will be illuminated and the ALT AMPS in the EIS Systems page will indicate the amount of current being supplied by the standby electrical system.

To attempt to restore main power, refer to the Section 3 emergency procedures for Generator Failure. If this attempt is successful, the standby electrical system will revert to its normal no-load condition and the STBY PWR ON CAS MSG will extinguish. If main electrical power cannot be restored, reduce nonessential loads as necessary to remain within the 75-amp capability of the standby electrical system. Loads in excess of this capability will be indicated by an Amber ALTNR AMPS CAS MSG.

If the reverse current protection of the ACU fails, an Amber ALTNR AMPS CAS MSG will display when the reverse current is detected to be less than -8 amps. The pilot should disconnect the standby alternator by turning the STBY ALT PWR Switch OFF.

## **EMERGENCY EXITS**

Use of the crew entry doors, the passenger entry doors, and the cargo doors for emergency ground egress from the Standard 208B is illustrated in Emergency Exit chart. Emergency ground egress from the Cargomaster is accomplished by exiting the airplane through the left and right crew entry doors as shown in Figure 3-2.

### **WARNING**

- **Do not attempt to exit the Cargomaster through the cargo doors. Since the inside of the upper door has no handle, exit from the airplane through these doors is not possible.**
- **When exiting the airplane, avoid the propeller area.**

(Continued Next Page)

## EMERGENCY EXITS (TYPICAL)

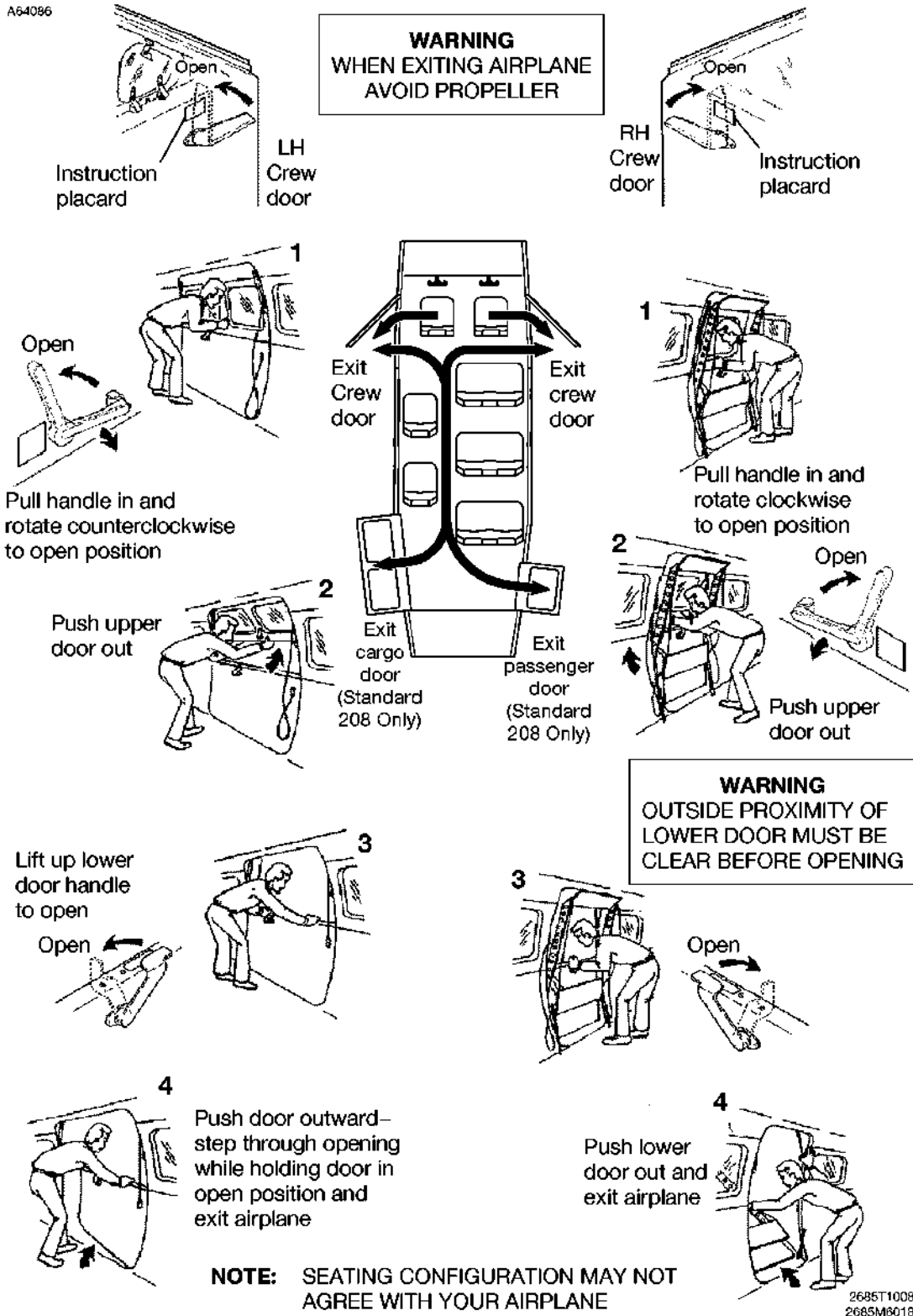


Figure 3-2

## SECTION 3 ABNORMAL PROCEDURES

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## ABNORMAL LANDING

### LANDING WITH FLAT MAIN TIRE

1. Airplane. . . . . **FLY** (as desired to lighten fuel load)
2. FUEL SELECTORS . . . . . **POSITION ONE SIDE OFF**  
(to lighten load on side of flat tire maximum  
fuel unbalance of 200 pounds)
3. Approach . . . . . **NORMAL** (FLAPS FULL)
4. Touchdown . . . . . **INFLATED TIRE FIRST**  
Hold airplane off flat tire as long as  
possible with aileron control.
5. Directional Control . . . . . **MAINTAIN**  
(using brake on wheel with inflated tire as required)

### LANDING WITH FLAT NOSE TIRE

1. Passengers and Baggage . . . . . **MOVE AFT** (if practical)  
Remain within approved C.G. envelope.
2. Approach . . . . . **NORMAL** (FLAPS FULL)
3. Touchdown . . . . . **NOSE HIGH**  
Hold nose wheel off as long as possible during roll.
4. Brakes. . . . . **MINIMUM NECESSARY**

## AVIONICS/AUTOPILOT

### AILERON MISTRIM (←AIL OR AIL→ INDICATION PFD)

1. Control Wheel. . . . . **GRIP FIRMLY**
2. AP/TRIM DISC Button . . . . . **PRESS**  
(high aileron control forces possible)

#### NOTE

The YAW DAMPER does not need to be disconnected for this procedure. Therefore it is permissible to use the LEFT half of either Manual Electric Pitch Trim Switch or 1 press of the AP button on the Autopilot Mode Control panel to disconnect the autopilot.

3. AILERON TRIM . . . . . **RETRIM**
4. Autopilot . . . . . **ENGAGE** (as desired)

**ELEVATOR MISTRIM (↑ELE OR ↓ELE INDICATION PFD)**

1. Control Wheel . . . . . **GRIP FIRMLY**
2. AP/TRIM DISC Button. . . . . **PRESS**  
(high elevator control forces possible)

**NOTE**

The yaw damper does not need to be disconnected for this procedure. Therefore it is permissible to use the LEFT half of either Manual Electric Pitch Trim Switch or one press of the AP button on the Autopilot Mode Control panel to disconnect the autopilot.

3. Elevator Trim Switch . . . . . **AS REQUIRED**
4. Autopilot . . . . . **ENGAGE** (as desired)



**RUDDER MISTRIM (←RUD OR RUD→ INDICATION PFD)**

1. Rudder Pedals . . . . . **HOLD FIRMLY**
2. AP/TRIM DISC Button . . . . . **PRESS**  
(high rudder control forces possible)
3. RUDDER TRIM. . . . . **AS REQUIRED**
4. Autopilot and Yaw Damper . . . . . **ENGAGE** (as desired)

**ALTITUDE MISCOMPARE (Amber ALT MISCOMP INDICATION PFD)**

1. Altimeter Settings . . . . . **VERIFY**  
(both pilot and copilot have the correct altimeter setting)

**IF ANNUNCIATION DOES NOT CLEAR**

2. Pilot and Copilot Altitude. . . . . **COMPARE**  
(with Standby Altimeter)

**WARNING**

■ **The Standby Altimeter uses the same static sources as the pilot’s side air data computer (ADC1). Do not use Standby Altimeter as sole source in determining correct altitude.**

**IF COPILOT PFD AND STANDBY ALTIMETER AGREE (PILOT PFD DIFFERS)**

3. SENSOR Softkey (pilot PFD) . . . . . **PRESS**
4. ADC2 Softkey . . . . . **PRESS**
5. PFD ADI Displays . . . . . **CONFIRM**  
("BOTH ON ADC2" is displayed on both PFDs)

**IF PILOT PFD AND STANDBY ALTIMETER AGREE (COPILOT PFD DIFFERS)**

6. Autopilot . . . . . **DISENGAGE** (altitude hold mode)
7. ALT STATIC . . . . . **PULL FULL ON**

**NOTE**

The alternate static source is connected to the left PFD and standby instruments only. Refer to Section 5, Performance for airspeed and altimeter corrections.

(Continued Next Page)

**ALTITUDE MISCOMPARE (Amber ALT MISCOMP INDICATION PFD) (Continued)**

**IF PILOT PFD AND STANDBY ALTIMETER AGREE (COPILOT PFD STILL DIFFERS)**

6. Compare indicated altitude to GPS altitude on MFD AUX-GPS STATUS page to aid in determining which primary system is most accurate.

**NOTE**

- When comparing indicated altitude to GPS altitude, deviations from standard temperature or pressure can cause indicated altitude to deviate from GPS altitude. These errors are largest at high altitude and can amount to over 2,500 feet under some conditions. However, below 10,000 feet with the correct local altimeter setting set, GPS altitude will usually be within 600 feet or better of the correct indicated altitude. Use the following guidelines to help estimate correct altitude for non-standard conditions:
- Temperatures **WARMER** than standard can cause GPS altitude to read **HIGHER** than indicated altitude.
- Pressures **LOWER** than standard can cause GPS altitude to read **HIGHER** than indicated altitude.

**IF ABLE TO IDENTIFY ACCURATE ALTITUDE SOURCE**

5. Use **SENSOR REVERSION** to select most accurate ADC on both PFDs.
6. Land as soon as practical.

**IF UNABLE TO IDENTIFY ACCURATE ALTITUDE SOURCE**

5. Land as soon as practical. Consider diversion to visual conditions.
6. Maintain altitudes based on **LOWEST** indicated altitude.
7. ATC . . . . . **ADVISE** (of inability to verify correct altitude)
8. If unable to descend into visual conditions, plan ILS approach with course intercept well outside the Final Approach Fix (FAF).
9. Once glideslope is captured, determine most accurate altitude source when crossing FAF.

(Continued Next Page)

**ALTITUDE MISCOMPARE (Amber ALT MISCOMP INDICATION PFD) (Continued)**

10. Reference ILS Decision Height to most accurate altimeter based on FAF crossing.

**WARNING**

**TAWS alerts are based on GPS altitude and position information and are independent of ADC data. If a TAWS alert is received, it should be considered valid and appropriate terrain avoidance action should be taken.**

**AIRSPEED MISCOMPARE (Amber IAS MISCOMP INDICATION PFD)**

1. Pilot and Copilot Airspeed . . . . . **COMPARE**  
(with Standby Airspeed Indicator)

**WARNING**

**The Standby Airspeed Indicator uses the same Pitot-Static sources as the pilot's side air data computer (ADC1). Do not use Standby Airspeed Indicator as sole source in determining correct airspeed.**

(Continued Next Page)

**AIRSPEED MISCOMPARE (Amber IAS MISCOMP INDICATION PFD)** (Continued)

**IF STANDBY AIRSPEED AND COPILOT PFD AGREE (PILOT PFD DIFFERS)**

- 2. SENSOR Softkey (pilot PFD) . . . . . **PRESS**
- 3. ADC2 Softkey . . . . . **PRESS**
- 4. PFD ADI Displays . . . . . **CONFIRM**  
("BOTH ON ADC2" is displayed on both PFDs)

**IF PILOT PFD AND STANDBY AIRSPEED AGREE (COPILOT PFD DIFFERS)**

- 2. Pilot and Copilot ALTITUDE . . . . . **NOTE**

**IF ALTITUDES AGREE**

- 3. Airspeed . . . . . **120 KIAS MINIMUM** (on slowest indicator)
- 4. Monitor all three airspeed indicators during changes in power setting or altitude to determine which indicators are inaccurate. Indications of inaccurate airspeed include:
  - a. No change in indicated airspeed when power changed and altitude maintained.
  - b. Indicated airspeed increases when climbing or decreases when descending.
- 5. Use SENSOR REVERSION to select most accurate ADC on the affected PFD.
- 6. Airspeed . . . . . **RESUME NORMAL SPEEDS**

**IF ALTITUDES DO NOT AGREE**

- 3. Refer to Abnormal Procedures, ALT MISCOMP procedure to determine most accurate ADC.

## **PITCH/ROLL/HEADING MISCOMPARE (Amber PIT/ROLL/ HDG MISCOMP INDICATION PFD)**

This message is displayed when the G1000 detects a difference between the pilot's and copilot's attitude or heading information (displayed in the upper right of the PFD). Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

### **PITCH OR ROLL MISCOMP INDICATION**

1. Refer to STANDBY ATTITUDE indicator to determine which AHRS is providing the most accurate data.
2. Use SENSOR REVERSION to select the most accurate AHRS on the affected PFD.

### **HEADING MISCOMP**

1. Refer to Magnetic Compass to determine which AHRS is providing the most accurate heading information.
2. Use SENSOR REVERSION to select the most accurate AHRS on the affected PFD.

### **NOTE**

The magnetic compass is influenced by air conditioning. It must be turned OFF prior to referencing magnetic compass heading then may be reselected ON.

## DISPLAY UNIT FAILURE

This is indicated by a complete loss of image on a display. If only individual elements of the display are failed, refer to appropriate procedures for the individual failures.

### IF PFD

1. DISPLAY BACKUP Button . . . . . **PRESS** (if required)  
Flight and EICAS information are displayed on the MFD.

### NOTE

The PFD CDI SYNC and BARO SYNC settings must be ON to allow the copilot's PFD controls to affect settings on the MFD. These settings are accessible using the PFD MENU button.

2. Flight Director . . . . . **TRANSFER**  
(XFR button) to operating PFD)
3. FD Modes/AUTOPILOT . . . . . **RESELECT and REENGAGE**  
(as required)
4. Transponder . . . . . **SWITCH** (to operating transponder)
5. COM and NAV Radios. . . . . **SWITCH**  
(to operating Com and Nav radios)
6. PFD Controls. . . . . **USE OPERATING PFD**  
(for required data entry (Com, Nav, Baro setting, etc.)

### IF MFD

1. Either DISPLAY BACKUP Button . . . . . **PRESS**  
(EIS info will be displayed on PFDs)

## **DUAL GPS FAILURE (Amber “DR” OR “LOI” ON HSI INDICATION PFD)**

### **IF ALTERNATE NAVIGATION SOURCES (ILS, LOC, VOR, DME, ADF) ARE AVAILABLE**

1. Navigation. . . . . **USE ALTERNATE SOURCES**

### **IF NO ALTERNATE NAVIGATION SOURCES ARE AVAILABLE**

Dead reckoning (DR) mode active when the airplane is greater than 30 nautical miles from the destination airport.

1. Navigation. . . . . **USE**  
(the airplane symbol and magenta course line on the map display)

### **WARNING**

- **All information normally derived from GPS turns amber. All of this information will become more inaccurate over time.**
- **TAWS is inoperative.**

### **NOTE**

- DR mode uses heading, airspeed, and the last known GPS position to estimate the airplane’s current position.
- All maps with an airplane symbol show a ghosted airplane and a “DR” label.

(Continued Next Page)





## LOSS OF RADIO TUNING FUNCTIONS

1. COM Frequency Toggle Button  
(affected PFD) . . . . . **PRESS AND HOLD** (for 2 seconds)

### NOTE

This procedure will tune the active COM field to the emergency frequency 121.5. Certain failures of the tuning system will automatically tune 121.5 without pilot action.

## TRANSPONDER FAILURE

1. TRANSPONDER . . . . . **SELECT OPPOSITE**
  - a. PFD XPDR Softkey . . . . . **PRESS**
  - b. XPDR1 or XPDR2 Softkey . . . . . **PRESS**  
(to select opposite transponder)
2. XPDR1 or XPDR2 Circuit Breaker (affected side) . . . . . **PULL**

### NOTE

The second transponder is an option on the 208.

## FAILED AIRSPEED, ALTITUDE, AND/OR VERTICAL SPEED (Red "X" ON PFD AIRSPEED, ALTITUDE, AND/OR VERTICAL SPEED INDICATORS)

This indicates a loss of valid air data system information to the respective system.

### IF BOTH SIDES

1. Airspeed and Attitude . . . . . **MONITOR**  
(using standby instruments)
2. Land as soon as practical.

(Continued Next Page)

**FAILED AIRSPEED, ALTITUDE, AND/OR VERTICAL SPEED (Red "X" ON PFD AIRSPEED, ALTITUDE, AND/OR VERTICAL SPEED INDICATORS)** (Continued)

**IF ONE SIDE ONLY**

1. Affected PFD SENSOR Softkey ..... **PRESS**
2. Affected PFD ADC1/2 Softkey . . **SELECT** (opposite side ADC)
3. PFD ADI Displays ..... **CONFIRM**  
(BOTH ON ADC1 or 2 is displayed on both PFDs)

**FAILED ATTITUDE AND/OR HEADING (ATTITUDE FAIL AND/OR RED "X" OVER HEADING DISPLAY ON PFD)**

**IF BOTH SIDES**

1. Attitude ..... **MONITOR**  
(using standby attitude gyro)

**NOTE**

Turn off air conditioner to reference Magnetic Compass.

2. Heading ..... **MONITOR**  
(using magnetic compass)
3. Land as soon as practical.

(Continued Next Page)

**FAILED ATTITUDE AND/OR HEADING (ATTITUDE FAIL  
AND/OR Red "X" OVER HEADING DISPLAY ON PFD)**

(Continued)

**NOTE**

- The autopilot will disconnect and may not be re-engaged.
- Reference the GPS track on MFD/PFD map to improve situational awareness. GPS will continue to display correct GPS based map, position, and track.
- Air conditioner will affect the magnetic compass.

**IF ONE SIDE ONLY**

1. Standby Attitude Gyro . . . . . **MONITOR**
2. Affected PFD SENSOR softkey . . . . . **PRESS**
3. Affected PFD AHRS 1/2 softkey . . . . . **SELECT OPPOSITE  
SIDE AHRS**
4. PFD ADI Displays . . . . . **CONFIRM**  
(“BOTH ON AHRS 1 or 2” is displayed on both PFDs)

**NOTE**

The autopilot will disconnect and may not be re-engaged.

### **LOSS OF NAVIGATION DATA (LATERAL DEVIATION BAR NOT PRESENT AND/OR GLIDESLOPE INDEX CLEARS)**

This indicates a loss of data from the selected NAV source. Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

1. Opposite NAV Source . . . . . **SELECT**
2. PFD HSI Displays . . . . . **CONFIRM OPPOSITE**  
(LOC1/LOC2” or “VOR1/VOR2 is displayed on both PFDs)

### **INACCURATE OVERSPEED WARNING**

Indicated by overspeed warning tone sounding when airspeed is below the limit speed.

1. AIRSPEED . . . . . **CROSS CHECK**  
(with opposite PFD)
2. AIRSPEED . . . . . **REDUCE** (as required)

### **IF BOTH AIRSPEEDS INDICATE BELOW $V_{MO}$ AND TONE STILL SOUNDS**

3. AIR SPEED Circuit Breaker . . . . . **PULL**  
(fifth row, eighth breaker from aft)
4. Land as soon as practical.

### **IF AIRSPEEDS DO NOT AGREE**

3. Refer to IAS MISCOMP procedure.

## INACCURATE FLIGHT DIRECTOR DISPLAY

Indicated by one or both flight directors commanding attitude contrary to intended flight path.

1. AP/TRIM DISC Button . . . . . **PRESS**
2. Attitude . . . . . **CROSS CHECK BOTH PFDs**  
(with the Standby Attitude Indicator)
3. Flight Director Modes . . . . . **RESELECT** (as desired)

### NOTE

If continued use of the flight director is desired, it is recommended that only basic modes (i.e., ROL and PIT) be selected initially. If this proves satisfactory, HDG and ALT may then be selected. Make sure navigation systems are set up correctly prior to attempting to engage NAV mode.

4. Autopilot . . . . . **ENGAGE AS DESIRED**  
(if flight director commands are appropriate)

## BOTH ON ADC1/2

1. PFD SENSOR softkey . . . . . **PRESS on PFD**  
(displaying data from opposite side ADC)
2. PFD ADC1/2 softkey. . . . . **SELECT ON-SIDE ADC**  
(ADC1 for Pilot PFD, ADC2 for copilot PFD)
3. PFD Displays . . . . . **CONFIRM**  
("BOTH ON ADC1 or 2" message clears on both PFDs)

**BOTH ON AHRS 1/2**

1. PFD SENSOR softkey . . . . . **PRESS on PFD**  
(displaying data from opposite side AHRS)
2. PFD AHRS 1/2 softkey . . . . . **SELECT ON-SIDE AHRS**  
(AHRS 1 for Pilot PFD, AHRS2 for copilot PFD)
3. PFD Displays. . . . . **CONFIRM**  
("BOTH ON AHRS 1 or 2" message clears on both PFDs)

**BOTH ON GPS1/2**

1. GPS Status . . . . . **CHECK**
  - a. Select MFD. . . . . **AUX-GPS STATUS PAGE**
  - b. Select GPS1 then GPS2 softkeys and verify sufficient satellite reception.

**XSIDE ADC**

1. Either PFD SENSOR softkey . . . . . **PRESS**
2. PFD ADC1/2 softkey . . . . . **SELECT ON-SIDE ADC**  
(ADC1 for Pilot PFD, ADC2 for copilot PFD)
3. PFD Displays. . . . . **CONFIRM**  
("BOTH ON ADC1 or 2" message displays on both PFDs)
4. Repeat procedure on opposite PFD.
5. PFD Displays. . . . . **CONFIRM**  
("BOTH ON ADC1 or 2" message clears on both PFDs)

**XSIDE AHRS**

1. Either PFD SENSOR softkey . . . . . **PRESS**
2. PFD AHRS 1/2 softkey . . . . . **SELECT ON-SIDE AHRS**  
(AHRS 1 for Pilot PFD, AHRS2 for copilot PFD)
3. PFD Displays. . . . . **CONFIRM**  
("BOTH ON AHRS 1 or 2" message displays on both PFDs)
4. Repeat procedure on opposite PFD.
5. PFD Displays. . . . . **CONFIRM**  
("BOTH ON AHRS 1 or 2" message clears on both PFDs)

**MULTI-FUNCTION DISPLAY FAN FAILED (White MFD FAN FAIL CAS MSG)**

1. DECK SKIN FAN Circuit Breaker . . . . . **CHECK IN**

**PRIMARY FLIGHT DISPLAY 1 FAN FAILED (White PFD1 FAN FAIL CAS MSG)**

1. DECK SKIN FAN Circuit Breaker . . . . . **CHECK IN**

**PRIMARY FLIGHT DISPLAY 2 FAN FAILED (White PFD 2 FAN FAIL CAS MSG)**

1. DECK SKIN FAN Circuit Breaker . . . . . **CHECK IN**

**DOORS**

**UPPER HALF OF CARGO DOOR OR UPPER HALF OF PASSENGER AIRSTAIR DOOR OPEN (Amber DOOR UNLATCHED CAS MSG)**

1. Airspeed . . . . . **MAINTAIN LESS THAN 100 KIAS**
2. WING FLAPS . . . . . **FULL**  
Wing downwash with flaps extended will move the doors near their normally closed position.
3. If available or practical, have a second crew member go aft to close and latch door.
4. SEAT BELT/NO SMOKE Light . . . . . **ON**
5. If landing is required with door open:
  - a. Approach and Landing . . . . . **NORMAL**

**LOWER HALF OF PASSENGER AIRSTAIR DOOR OPEN**

- 1. Airspeed ..... **MAINTAIN LESS THAN 100 KIAS**
- 2. Flight Controls ..... **MANEUVER** (for return for landing)
- 3. WING FLAPS ..... **FULL**
- 4. Approach ..... **NORMAL**
- 5. Landing ..... **SLIGHTLY TAIL LOW** (avoid nose high flare)

**RIGHT OR LEFT CREW DOORS OPEN**

- 1. Airspeed ..... **MAINTAIN LESS THAN 125 KIAS**
- 2. Door ..... **PULL CLOSED and LATCH**

**CARGO POD DOOR(S) OPEN**

- 1. Airspeed ..... **MAINTAIN LESS THAN 125 KIAS**
- 2. Land ..... **AS SOON AS PRACTICAL**
  - a. Approach ..... **NORMAL**
  - b. Landing ..... **AVOID A NOSE HIGH FLARE**

**ELECTRICAL**

**STARTER CONTACTOR DOES NOT DISENGAGE AFTER START (Amber STARTER ON CAS MSG)**

- |                              |                            |
|------------------------------|----------------------------|
| 1. Battery Switch.....       | <b>OFF</b>                 |
| 2. External Power Unit ..... | <b>OFF, then DISENGAGE</b> |
| 3. Fuel Condition Lever..... | <b>CUTOFF</b>              |
| 4. Engine Shutdown .....     | <b>COMPLETE</b>            |

**GENERATOR LOAD ABOVE LIMIT (Amber GENERATOR AMPS CAS MSG)**

- 1. GEN AMPS..... **CHECK**

**If amperes are above limit:**

- 2. Electrical Load..... **REDUCE**

**ALTERNATOR LOAD ABOVE LIMIT (Amber ALTNR AMPS CAS MSG)**

- 1. ALT AMPS..... **CHECK**

**If amperes are above limit:**

- 2. Electrical Load..... **REDUCE**



**STANDBY POWER INOPERATIVE (Amber STBY PWR INOP CAS MSG)**

1. STBY ALT PWR Switch ..... **CHECK ON**

**IF CAS MESSAGE REMAINS:**

2. STBY ALT PWR Switch ..... **OFF, THEN ON**

**NOTE**

If the STBY ALT PWR CAS MSG remains, the alternator system may still be operational. A bus voltage surge may have temporarily tripped the ACU (alternator control unit). The ACU can be restored by cycling the STBY ALT PWR Switch.

**IF CAS MESSAGE STILL REMAINS:**

3. STBY ALT PWR Switch ..... **OFF**

Complete flight using generator power only. Avoid icing conditions.

**STANDBY POWER ON (White STBY PWR ON CAS MSG)**

**NOTE**

- During ground operations with CONDITION Lever at LOW IDLE, it is possible that a generator underspeed condition may occur allowing the standby alternator to automatically assist with the electrical load. In this case advance the CONDITION Lever to HIGH IDLE to increase engine speed and bring the generator online.
- The Standby Alternator Power may have automatically turned on due to a failure of another system. Address any Red or Amber CAS MSGs that are present.

## ENGINE

### GEAR BOX CONTAMINATION (Amber CHIP DETECT CAS MSG)

1. Engine Indications . . . . . **CAREFULLY MONITOR**  
(for abnormal oil pressure,  
oil temperature or power indications)

#### CAUTION

- If engine indications are normal, proceed to destination and determine cause of Amber CHIP DETECT CAS MSG prior to next flight.
- If engine indications confirm Amber CHIP DETECT CAS MSG, proceed in accordance with Engine Failures checklists or at the discretion of the pilot and consistent with safety, continue engine operation in preparation for an emergency landing as soon as possible.

### IGNITION ON (White IGNITION ON CAS MSG)

1. IGNITION Switch . . . . . **CHECK**

#### IF CONDITIONS WARRANT:

2. IGNITION Switch . . . . . **NORM**

## FLIGHT CONTROLS

### ASYMMETRIC FLAP EXTENSION OR SUDDEN FLAP RETRACTION ON ONE SIDE

- |   |
|---|
| <ol style="list-style-type: none"> <li>1. Apply aileron and rudder to stop the roll.</li> <li>2. WING FLAPS . . . . . <b>UP</b></li> <li>3. Airspeed . . . . . <b>SLOW to 100 KIAS</b> (or less)</li> </ol> |
|---|
4. If both flaps retract to a symmetrical setting:
    - a. Plan a flaps up landing.
    - b. Refer to Section 5 (notes above landing performance tables) for increase in approach speed and landing distance.
  5. If both flaps cannot be retracted to a symmetrical setting:
    - a. Land as soon as practical.
    - b. Maintain a minimum airspeed of 90 KIAS on the approach and avoid a nose high flare on landing.

### **FLAPS FAIL TO EXTEND OR RETRACT**

1. FLAP MOTOR and STBY FLAP MOTOR  
Circuit Breakers . . . . . **CHECK IN**
2. If flaps still fail to extend or retract:
  - a. Guarded and Safetied STBY FLAP MOTOR Switch  
(Overhead) . . . . . **MOVE GUARD, BREAKING  
SAFETY WIRE, AND POSITION SWITCH TO STBY**
  - b. Guarded and Safetied STBY FLAP MOTOR UP/ DOWN  
Switch (Overhead. . . . . **MOVE GUARD,  
BREAKING SAFETY WIRE, AND  
POSITION SWITCH UP OR DOWN**

Hold switch until flaps reach desired position, except release switch before flaps reach full up or full down travel.

### **CAUTION**

With the standby flap system in use, limit switches which normally shut off the primary flap motor when reaching the flap travel limits are electrically inactivated. Therefore, the pilot must release the standby flap motor up/down switch before the flaps reach their travel limit to prevent overloading and damage to the flap system.

3. Guarded STBY FLAP MOTOR Switch . . . . . **LEAVE in STBY**  
(until maintenance action can be accomplished)

## FUEL

### AUXILIARY FUEL BOOST PUMP ON (Amber FUEL BOOST ON CAS MSG)

1. FUEL BOOST Switch . . . . . **CHECK ON**

#### IF CONDITIONS DO NOT WARRANT ITS USE:

2. FUEL BOOST Switch . . . . . **NORM**

### LOSS OF FUEL PRESSURE (Amber FUEL PRESS LOW CAS MSG)

- |                                  |                |
|----------------------------------|----------------|
| 1. FUEL TANK SELECTORS . . . . . | <b>BOTH ON</b> |
| 2. FUEL BOOST Switch. . . . .    | <b>ON</b>      |
| 3. IGNITION Switch. . . . .      | <b>ON</b>      |

4. If FUEL PRESS LOW CAS MSG extinguishes:
  - a. Carefully monitor fuel quantity and cabin odor for evidence of a fuel leak.
  - b. Land as soon as practical and determine cause for motive flow failure before next flight.
5. If FUEL PRESS LOW CAS MSG and FUEL BOOST ON CAS MSG are illuminated:
  - a. Carefully monitor engine indications for sign of fuel starvation.
  - b. Land as soon as possible.

### FUEL LEVEL LOW (Amber L, R, L-R FUEL LOW CAS MSG(S))

1. FUEL TANK SELECTORS . . . . . **BOTH ON**
2. Fuel Balance . . . . . **MONITOR**  
Maximum 200 pounds imbalance.

## ICE AND RAIN PROTECTION

### **PITOT/ STATIC HEAT FAILURE (Amber L, R OR L-R P/S HEAT CAS MSG)**

1. PITOT HEAT Circuit Breakers (L and R) . . . . . **CHECK IN**

If ice begins to form near the static port of the left pitot/static tube (from compensation ring to aft end of tube) or if amber IAS MISCOMP and/ or ALT MISCOMP CAS messages are displayed on the pilot's PFDs:

2. Pilot and Copilot Airspeed . . . . . **COMPARE**  
(with Standby Airspeed Indicator)

### **WARNING**

**The Standby Airspeed Indicator uses the same pitot-static sources as the pilot's side air data computer (ADC1). Do not use Standby Airspeed Indicator as sole source in determining correct airspeed.**

3. Autopilot . . . . . **DISENGAGE** (altitude hold mode)
4. ALT STATIC AIR . . . . . **PULL FULL ON**

### **NOTE**

The alternate static source is connected to the left PFD and standby instruments only. Refer to Section 5, Performance for airspeed and altimeter corrections.

### **IF STANDBY AIRSPEED AND COPILOT PFD AGREE (PILOT PFD DIFFERS)**

2. SENSOR Softkey (pilot PFD) . . . . . **PRESS**
3. ADC2 Softkey . . . . . **PRESS**
4. PFD ADI Displays . . . . . **CONFIRM**  
(“BOTH ON ADC2” is displayed on both PFDs)

If ice begins to form near the pitot port (forward end) of the pitot/ static tube:

### **IF PILOT PFD AND STANDBY AIRSPEED AGREE (COPILOT PFD DIFFERS)**

2. Pilot and Copilot Altitude . . . . . **NOTE**

(Continued Next Page)

**PITOT STATIC HEATER FAILURE (Amber L, R OR L-R P/S  
HEATER CAS MSG) (Continued)**

**IF ALTITUDES AGREE**

1. Airspeed . . . . . **120 KIAS MINIMUM** (on slowest indicator)
2. Monitor all three airspeed indicators during changes in power setting or altitude to determine which indicators are inaccurate. Indications of inaccurate airspeed include:
  - a. No change in indicated airspeed when power changed and altitude maintained.
  - b. Indicated airspeed increases when climbing or decreases when descending.
3. Use SENSOR REVERSION to select most accurate ADC on the affected PFD.
4. Airspeed . . . . . **RESUME NORMAL SPEEDS**

**IF ALTITUDES DO NOT AGREE (Amber ALT MISCOMP INDICATION PFD)**

1. Altimeter Settings . . . . . **VERIFY**  
(both pilot and copilot have the correct altimeter setting)

**IF ANNUNCIATION DOES NOT CLEAR**

2. Pilot and Copilot Altitude . . . . . **COMPARE**  
(with Standby Altimeter)

**WARNING**

**The Standby Altimeter uses the same static sources as the pilot's side air data computer (ADC1). Do not use Standby Altimeter as sole source in determining correct altitude.**

**IF COPILOT PFD AND STANDBY ALTIMETER AGREE (PILOT PFD DIFFERS)**

3. SENSOR Softkey (pilot PFD) . . . . . **PRESS**
4. ADC2 Softkey . . . . . **PRESS**
5. PFD ADI Displays . . . . . **CONFIRM**  
(“BOTH ON ADC2” is displayed on both PFDs)

(Continued Next Page)

**PITOT STATIC HEATER FAILURE (Amber L, R OR L-R P/S HEATER CAS MSG)** (Continued)

**IF PILOT PFD AND STANDBY ALTIMETER AGREE (COPILOT PFD DIFFERS)**

1. Autopilot . . . . . **DISENGAGE** (altitude hold mode)
2. ALT STATIC AIR . . . . . **PULL FULL ON**

**NOTE**

The alternate static source is connected to the left PFD and standby instruments only. Refer to Section 5, Performance for airspeed and altimeter corrections.

**IF PILOT PFD AND STANDBY ALTIMETER AGREE (COPILOT PFD STILL DIFFERS)**

3. Compare indicated altitude to GPS altitude on MFD AUX-GPS STATUS page to aid in determining which primary system is most accurate.
  - When comparing indicated altitude to GPS altitude, deviations from standard temperature or pressure can cause indicated altitude to deviate from GPS altitude. These errors are largest at high altitude and can amount to over 2,500 feet under some conditions. However, below 10,000 feet with the correct local altimeter setting set, GPS altitude will usually be within 600 feet or better of the correct indicated altitude. Use the following guidelines to help estimate correct altitude for nonstandard conditions:
    - Temperatures **WARMER** than standard can cause GPS altitude to read **HIGHER** than indicated altitude.
    - Pressures **LOWER** than standard can cause GPS altitude to read **HIGHER** than indicated altitude.

**IF ABLE TO IDENTIFY ACCURATE ALTITUDE SOURCE**

4. Use **SENSOR REVERSION** to select most accurate ADC on both PFDs.

Land as soon as practical.

(Continued Next Page)

**PITOT STATIC HEATER FAILURE (Amber L, R OR L-R P/S  
HEATER CAS MSG) (Continued)**

**IF UNABLE TO IDENTIFY ACCURATE ALTITUDE SOURCE**

1. Land as soon as practical. Consider diversion to visual conditions.
2. Maintain altitudes based on LOWEST indicated altitude.
3. ATC ..... **ADVISE**  
(of inability to verify correct altitude)
4. If unable to descend into visual conditions, plan ILS approach with course intercept well outside the Final Approach Fix (FAF).
5. Once glideslope is captured, determine most accurate altitude source when crossing FAF.
6. Reference ILS Decision Height to most accurate altimeter based on FAF crossing.

**WARNING**

**TAWS alerts are based on GPS altitude and position information and are independent of ADC data. If a TAWS alert is received, it should be considered valid and appropriate terrain avoidance action should be taken.**



### STALL HEAT FAILURE (Amber STALL HEAT CAS MSG)

If ice is observed forming on the stall warning vane or its mounting plate:

1. STALL WARN Circuit Breaker ..... **CHECK**  
(verify circuit breaker is IN)

#### CAUTION

With continued ice buildup, expect no stall warning horn during slow speed operation. The autopilot will not automatically disconnect during a stall with out the stall warning vane working properly.

2. Airspeed ..... **MONITOR**

#### NOTE

Do not rely on the stall warning system. Maintain airspeed in accordance with the minimum speed for icing conditions in Section 2, Limitations of this supplement.

## MISCELLANEOUS

### EMERGENCY DESCENT PROCEDURES

#### ROUGH AIR

1. Seats, Seat Belts, Shoulder Harnesses ..... **SECURE**
2. POWER Lever ..... **IDLE**
3. PROP RPM Lever..... **MAX** (full forward)
4. WING FLAPS ..... **UP**
5. Weights and Airspeed:
  - 8750 Pounds ..... **148 KIAS**
  - 7500 Pounds ..... **137 KIAS**
  - 6250 Pounds ..... **125 KIAS**
  - 5000 Pounds ..... **112 KIAS**

#### SMOOTH AIR

1. Seats, Seat Belts, Shoulder Harnesses ..... **SECURE**
2. POWER Lever ..... **IDLE**
3. PROP RPM Lever..... **MAX** (full forward)
4. WING FLAPS ..... **10°**
5. Airspeed ..... **175 KIAS**

## **EXPANDED ABNORMAL**

### **ELEVATOR MISTRIM**

Indicates a mistrim of the elevator while the autopilot is engaged. The autopilot will normally trim automatically as required. However, during rapid acceleration, deceleration, or configuration changes, momentary illumination of this message may occur accompanied by minor fluctuations in the flight path. If the autopilot is disconnected while this message is displayed, high elevator control forces are possible. In the event of a sustained illumination, the following procedure should be followed:

### **ALTITUDE MISCOMPARE**

This message is displayed when the G1000 detects a difference of 200 feet or greater between the pilot's and copilot's altitude information (displayed in the upper right of the PFD). Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

### **AIRSPEED MISCOMPARE**

This message is displayed when the G1000 detects a difference of 7 KIAS or greater between the pilot's and copilot's airspeed information (10 KIAS difference during takeoff or landing roll). Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

### **DUAL GPS FAILURE**

When both GPS receivers are inoperative, the G1000 system will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the HSI by an amber "DR" or "LOI". Which mode is active depends on the distance from the destination airport in the active flight plan.

### **TRANSPONDER FAILURE**

Transponder failure may be indicated by a red "X" across the transponder display or failure of the transponder to accept codes or mode changes from the PFD.

## **FAILED ATTITUDE AND/OR HEADING**

This message indicates a loss of pitch, roll, and/or heading information from AHRS. Refer to GARMIN G1000 Cockpit Reference Guide for additional information. Interference from GPS repeaters operating inside nearby hangars can cause an intermittent loss of attitude and heading displays while the aircraft is on the ground. This is usually accompanied by a BOTH ON GPS1/2 message. Moving the aircraft more than 100 yards away from the source of the interference should alleviate the condition.

### **BOTH ON ADC1/2**

This message is displayed on both PFDs and indicates that both pilot's and copilot's PFDs are displaying data from the same Air Data Computer. Normally the pilot's side displays ADC1 and the copilot's side displays ADC 2. Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

### **BOTH ON AHRS 1/2**

This message is displayed on both PFDs and indicates that both pilot's and copilot's PFDs are displaying data from the same Attitude Heading Reference System. Normally the pilot's side displays AHRS 1 and the copilot's side displays AHRS 2. Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

### **XSIDE ADC**

This message is displayed on both PFDs and indicates that both PFDs are displaying data from the opposite side Air Data Computer. Normally the pilot's side displays ADC1 and the copilot's side displays ADC 2. Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

## **XSIDE AHRS**

This message is displayed on both PFDs and indicates that both PFDs are displaying data from the opposite side Attitude Heading Reference System. Normally the pilot's side displays ADC1 and the copilot's side displays ADC 2. Refer to GARMIN G1000 Cockpit Reference Guide for additional information.

## **MULTI-FUNCTION DISPLAY FAN FAILED**

An overheat condition may arise in the associated display. In this case, screen brightness will be reduced automatically by 50% to lower internal temperature. Use reversionary capabilities, if necessary.

## **PRIMARY FLIGHT DISPLAY 1 FAN FAILED**

An overheat condition may arise in the associated display. In this case, screen brightness will be reduced automatically by 50% to lower internal temperature. Use reversionary capabilities, if necessary.

## **PRIMARY FLIGHT DISPLAY 2 FAN FAILED**

An overheat condition may arise in the associated display. In this case, screen brightness will be reduced automatically by 50% to lower internal temperature. Use reversionary capabilities, if necessary.

## **INADVERTENT OPENING OF AIRPLANE DOORS IN FLIGHT**

If any of the airplane doors should inadvertently open in flight, the airplane should be slowed to 125 KIAS or less to reduce buffeting of the doors. If the upper cargo door is open, slow to 100 KIAS or less and lower flaps to full down so that wing downwash will move the door towards its normally closed position. Closing the upper cargo door (or upper half of the passenger door on the Standard 208B) can be accomplished after airspeed has been reduced by pulling the door forcefully closed and latching the door. If the door cannot be closed in flight, a landing should be made as soon as practical in accordance with the checklist procedures. On Cargo Versions, an open cargo door cannot be closed in flight since the inside of the upper door has no handle.

If any cargo pod doors inadvertently open in flight, the airplane should be slowed to 125 KIAS or less and landed as soon as practical. During the landing, avoid a nose-high flare to prevent dragging an open rear cargo pod door on the runway.

## NORMAL PROCEDURES

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## INTRODUCTION

Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Section 9.

### WARNING

**There is no substitute for proper and complete preflight planning habits and their continual review in minimizing emergencies. Become knowledgeable of hazards and conditions which represent potential dangers, and be aware of the capabilities and limitations of the airplane.**

## AIRSPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 8750 pounds for takeoff and 8500 pounds for landing and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance, climb performance, and landing distance, the speed appropriate to the particular weight must be used.

### TAKEOFF:

Normal Climb, Flaps 20° . . . . . **85-95 KIAS**  
Short Field Takeoff, Flaps 20°, Speed at 50 Feet . . . . . **83 KIAS**  
Type II, Type III or Type IV Anti-ice Fluid Takeoff (Flaps UP) **83 KIAS**

### ENROUTE CLIMB, FLAPS UP:

Cruise Climb . . . . . **110-120 KIAS**  
Best Rate of Climb, Sea Level to 10,000 Feet . . . . . **104 KIAS**  
Best Rate of Climb, 20,000 Feet . . . . . **87 KIAS**  
Best Angle of Climb, Sea Level to 20,000 Feet . . . . . **72 KIAS**

### LANDING APPROACH:

Normal Approach, Flaps UP . . . . . **100-115 KIAS**  
Normal Approach, Flaps FULL . . . . . **75-85 KIAS**  
Short Field Approach, Flaps FULL . . . . . **78 KIAS**

(Continued Next Page)

## AIRSPEEDS FOR NORMAL OPERATION (Continued)

### BALKED LANDING:

Takeoff Power, Flaps 20° ..... **80 KIAS**

### MAXIMUM RECOMMENDED TURBULENT AIR PENETRATION SPEED:

8750 Pounds ..... **148 KIAS**

7500 Pounds ..... **137 KIAS**

6250 Pounds ..... **125 KIAS**

5000 Pounds ..... **112 KIAS**

### MAXIMUM DEMONSTRATED CROSSWIND VELOCITY:

Takeoff or Landing ..... **20 KNOTS**



## **PREFLIGHT INSPECTION WARNINGS**

### **WARNING**

- **Visually check airplane for general condition during walk-around inspection and remove any inlet, exit or exhaust covers. If cargo pod is installed, check its installation for security during the walk-around inspection. Use of a ladder will be necessary to gain access to the wing for visual checks, refueling operations, checks of the stall warning and pitot heat, and to reach outboard fuel tank sump drains.**
- **It is the pilot's responsibility to ensure that the airplane's fuel supply is clean before flight. Any traces of solid contaminants such as rust, sand, pebbles, dirt, microbes, and bacterial growth or liquid contamination resulting from water, improper fuel type, or additives that are not compatible with the fuel or fuel system components must be considered hazardous. Carefully sample fuel from all fuel drain locations during each preflight inspection and after every refueling.**
- **It is essential in cold weather to remove even the smallest accumulations of frost, ice, snow, or slush from the wing, tail, control surfaces, propeller blades, and engine air inlets. Exercise caution to avoid distorting the vortex generators on horizontal stabilizer while deicing. To assure complete removal of contamination, conduct a visual and tactile inspection of all critical surfaces. Also, make sure the control surfaces contain no internal accumulations of ice or debris. If these requirements are not performed, aircraft performance will be degraded to a point where a safe takeoff and climb may not be possible.**
- **Prior to any flight in known or forecast icing conditions, check that PITOT/ STATIC tube(s) and STALL warning heaters are warm to touch after turning PITOT/STATIC and STALL HEAT switches ON for 30 seconds, then OFF. Make sure the pitot covers are removed prior to turning PITOT/STATIC HEAT ON.**
- **If a night flight is planned, check operation of all lights, and make sure a flashlight is available and properly stowed.**

# CHECKLIST PROCEDURES

## PREFLIGHT INSPECTION

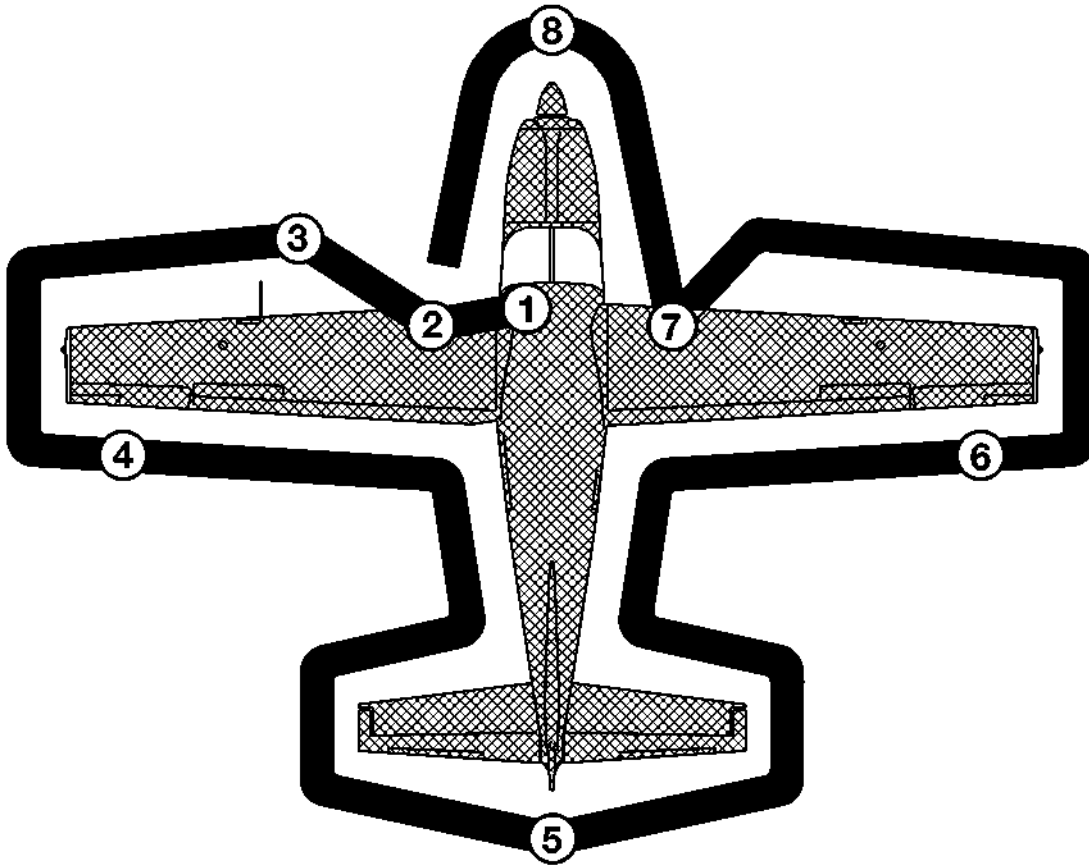


Figure 4-1

### ① CABIN

- 1. PITOT/ STATIC Tube Covers ..... **REMOVED**
- 2. Pilot's Operating Handbook..... **ACCESSIBLE TO PILOT**
- 3. Garmin G1000 CRG ..... **ACCESSIBLE TO PILOT**
- 4. Control Locks ..... **REMOVE** (disengage RUDDER LOCK)
- 5. PARKING BRAKE ..... **SET**

(Continued Next Page)

**CABIN** (Continued)

- 6. All Switches ..... **OFF**
- 7. Circuit Breakers ..... **IN**
- 8. ALT STATIC AIR ..... **OFF**
- 9. INERTIAL SEPARATOR T-Handle ..... **NORMAL**
- 10. STBY FLAP MOTOR Switch ..... **GUARDED NORM**
- 11. OXYGEN SUPPLY PRESSURE (if installed) ..... **CHECK**
- 12. Oxygen Masks (if installed) ..... **CHECK AVAILABLE**
- 13. FUEL TANK SELECTOR Valves ..... **BOTH ON**  
(feel against stop)
- 14. VENTILATION FANS/ AIR CONDITIONING (if installed) . . **OFF**
- 15. BLEED AIR HEAT Switch ..... **OFF** (down)
- 16. EMERGENCY POWER Lever ..... **NORMAL**
- 17. TRIM Controls ..... **SET**
- 18. FUEL SHUTOFF Knob ..... **ON** (push in)
- 19. CABIN HEAT FIREWALL SHUTOFF Control ..... **CHECK IN**
- 20. BATTERY Switch ..... **ON**  
(verify deck skin fans audible and airflow from each fan)
- 21. AVIONICS No. 1 Switch ..... **ON**
- 22. PFD 1 ..... **CHECK** (verify PFD 1 - ON)
- 23. AVIONICS No. 2 Switch ..... **ON**
- 24. PFD 2 and MFD ..... **CHECK** (verify PFD2 and MFD - ON)
- 25. FUEL QTY ..... **CHECK QUANTITY**
- 26. ENGINE Softkey ..... **SELECT SYSTEM**
- 27. SYSTEM Softkey ..... **RST FUEL** (if desired)  
Reset Fuel Totalizer if desired. Select ENGINE Softkey to return to main page.
- 28. WING FLAPS Handle ..... **FULL DOWN**
- 29. PITOT/STATIC and  
STALL HEAT Switches ..... **ON FOR 30 SECONDS;  
THEN OFF**
- 30. AVIONICS No. 1 and No. 2 Switches ..... **OFF**
- 31. BATTERY Switch ..... **OFF**

② **LEFT SIDE**

1. WING LIGHT . . . . . **CHECK** (verify condition)
2. Fuel Reservoir Drain (bottom of fuselage or left side of cargo pod) . . . . . **DRAIN** (using fuel sampler)  
Drain to check for water, sediment, and proper fuel before each flight and after each refueling. If water is observed, take additional samples until clear. Take repeated samples from all fuel drain points (see Section 7, Fuel System Schematic for all nine drain locations) until all contamination has been removed.

**NOTE**

Properly dispose of samples from all fuel drains. Aviation turbine fuel will deteriorate asphalt surfaces.

3. Main Landing Gear . . . . . **CHECK**  
(check proper tire inflation and condition of gear)
4. Inboard Fuel Tank Sump and External Sump Quick-Drain Valves . . . . . **DRAIN** (using fuel sampler)  
Drain to check for water, sediment, and proper fuel before each flight and after each refueling. If water is observed, take additional samples until clear. Take repeated samples from all fuel drain points until all contamination has been removed.

③ **LEFT WING Leading Edge**

**WARNING**

- **It is essential in cold weather to remove even the smallest accumulations of frost, ice, snow, or slush from the wing and control surfaces. To assure complete removal of contamination, conduct a visual and tactile inspection up to two feet behind the protected surfaces at one location along the wing span as a minimum. Also, make sure the control surfaces contain no internal accumulations of ice or debris. If these requirements are not performed, aircraft performance will be degraded to a point where a safe takeoff and climb may not be possible.**

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**LEFT WING Leading Edge (Continued)**

**WARNING**

- **Prior to any flight in known or forecast icing conditions, check that PITOT/STATIC tube(s) and STALL warning heaters are warm to touch after turning PITOT/STATIC and STALL HEAT switches ON for 30 seconds, then OFF. Make sure the pitot covers are removed prior to turning PITOT/STATIC HEAT ON.**

1. Wing Tie-Down . . . . . **DISCONNECT**
2. Stall Warning Vane . . . . . **CHECK**  
(verify freedom of movement, audible warning and warmth)  
Ensure the elevator control is off the forward stop in order to check audible warning.
3. PITOT/ STATIC Tube . . . . . **CHECK**  
(verify security, openings for stoppage and warmth)
4. LDG and TAXI/RECOG Lights . . . . . **CHECK**  
(verify condition and cleanliness)
5. Fuel Quantity . . . . . **VISUALLY CHECK**  
See Measured Fuel Depth vs. Fuel Quantity chart in Section 4.
6. Fuel Filler Cap . . . . . **SECURE**
7. Outboard Fuel Tank Sump  
Quick-Drain Valve . . . . . **DRAIN** (using fuel sampler)  
Drain to check for water, sediment and proper fuel before each flight and after each refueling. If water is observed, take additional samples until clear. Take repeated samples from all fuel drain points until all contamination has been removed.
8. NAV and STROBE Lights . . . . . **CHECK**  
(verify condition and cleanliness)

④ **LEFT WING Trailing Edge**

1. Fuel Tank Vent ..... **CHECK**  
(verify no obstructions)
2. Aileron and Servo Tab ..... **CHECK**  
(verify condition and security)
3. Static Wicks (4 total) ..... **CHECK**  
(verify condition)
4. Spoiler ..... **CHECK**  
(verify condition and security)
5. Flap Leading Edge Vortex Generators ..... **CHECK**  
(verify condition and security)
6. Flap ..... **CHECK**  
(verify condition and security)

**MEASURED FUEL DEPTH VS. FUEL QUANTITY**

Universal XL Fuel Gage	Fuel Quantity		Generic Fuel Gage-Inches	Fuel Quantity	
	Gage Scale	Gallons		Pounds	Inches
0.50	87.4	585	0.50	88.4	592
0.75	91.1	610	0.75	92.6	621
1.00	94.7	634	1.00	96.7	648
1.25	98.2	658	1.25	100.8	675
1.50	101.8	682	1.50	104.7	702
1.75	105.2	705	1.75	108.6	727
2.00	108.6	727	2.00	112.4	753
2.25	111.9	750	2.25	116.1	778
2.50	115.1	771	2.50	119.7	802
2.75	118.3	793	2.75	123.2	826
3.00	121.5	814	3.00	126.7	849
3.25	124.5	834	3.25	130.1	871
3.50	127.5	855	3.50	133.4	894
3.75	130.5	874	3.75	136.6	915
4.00	133.4	894	4.00	139.7	936
4.25	136.2	912	4.25	142.8	956
4.50	138.9	931	4.50	145.7	976
4.75	141.6	949	4.75	148.6	996
5.00	144.3	966	5.00	151.4	1015
5.25	146.8	984	5.25	154.1	1033
5.50	149.3	1000	5.50	156.8	1050
5.75	151.8	1017	5.75	159.3	1068
6.00	154.1	1033	6.00	161.8	1084
6.25	156.5	1048	6.33	165.0	1105
6.50	158.7	1063			
6.75	160.9	1078			
7.00	163.0	1092			
7.25	165.0	1106			

Figure 4-2

⑤ **EMPENNAGE**

**WARNING**

**It is essential in cold weather to remove even the smallest accumulations of frost, ice, snow, or slush from the tail and control surfaces. Exercise caution to avoid distorting the vortex generators on horizontal stabilizer while deicing. To assure complete removal of contamination, conduct a visual and tactile inspection of all critical surfaces. Also, make sure the control surfaces contain no internal accumulations of ice or debris. If these requirements are not performed, aircraft performance will be degraded to a point where a safe takeoff and climb may not be possible.**

1. Baggage . . . . . **CHECK SECURE** (through cargo door)
2. Cargo Door . . . . . **CLOSED and LATCHED**
3. Horizontal Stabilizer Leading Edge . . . . . **CHECK**  
Verify condition, security, and verify 18 vortex generators on the upper side of each horizontal stabilizer.
4. Control Surfaces and Elevator Trim Tabs . . . . . **CHECK**  
Verify condition, security, freedom of movement and tab position.
5. Static Wicks (14 total) . . . . . **CHECK**  
Verify condition and security; verify 4 static wicks per elevator half, 5 on the rudder, and 1 on the stinger.
6. Rudder Gust Lock . . . . . **DISENGAGE**
7. NAV Light . . . . . **CHECK**  
(verify condition and cleanliness)
8. Tail Tie-Down . . . . . **DISCONNECT**
9. Oxygen Filler Door (if installed) . . . . . **SECURE**
10. Passenger Entry Door (if installed) . . . . . **CHECK**  
(condition and security)



⑥ **RIGHT WING Trailing Edge**

1. Flap. . . . . **CHECK**  
(verify condition and security)
2. Spoiler. . . . . **CHECK**  
(verify condition and security)
3. Flap Leading Edge Vortex Generators . . . . . **CHECK**  
(verify condition and security)
4. Aileron and Trim Tab. . . . . **CHECK**  
(verify condition and security)
5. Static Wicks (4 total) . . . . . **CHECK**  
(verify condition)
6. Fuel Tank Vent . . . . . **CHECK**  
(verify no obstructions)

⑦ **RIGHT WING Leading Edge**

**WARNING**

- **It is essential in cold weather to remove even the smallest accumulations of frost, ice, snow, or slush from the wing and control surfaces. To assure complete removal of contamination, conduct a visual and tactile inspection up to two feet behind the protected surfaces at one location along the wing span as a minimum. Also, make sure the control surfaces contain no internal accumulations of ice or debris. If these requirements are not performed, aircraft performance will be degraded to a point where a safe takeoff and climb may not be possible.**
- **Prior to any flight in known or forecast icing conditions, check that PITOT/ STATIC tube(s) and STALL warning heaters are warm to touch after turning PITOT/STATIC and STALL HEAT switches ON for 30 seconds, then OFF. Make sure the pitot covers are removed prior to turning PITOT/STATIC HEAT ON.**

(Continued Next Page)

**RIGHT WING Leading Edge (Continued)**

1. NAV and STROBE Lights . . . . . **CHECK**  
(verify condition and cleanliness)
2. Fuel Quantity . . . . . **VISUALLY CHECK**  
See Measured Fuel Depth vs. Fuel Quantity chart in Section 4.
3. Fuel Filler Cap . . . . . **SECURE**
4. Outboard Fuel Tank Sump Quick-Drain Valve  
(if airplane parked with one wing low on a sloping ramp) . . . **DRAIN** (using fuel sampler)  
Drain to check for water, sediment and proper fuel before each flight and after each refueling. If water is observed, take additional samples until clear. Take repeated samples from all fuel drain points until all contamination has been removed.
5. LND and TAXI/ RECOG Lights . . . . . **CHECK**  
(verify condition and cleanliness)
6. PITOT/ STATIC Tube . . . . . **CHECK**  
(verify security, openings for stoppage and warmth)
7. Radome (if installed) . . . . . **CHECK**  
(verify condition and security)
8. Wing Tie-Down . . . . . **DISCONNECT**
9. Inboard Fuel Tank Sump and External Sump  
Quick-Drain Valves . . . . . **DRAIN** (using fuel sampler)  
Drain to check for water, sediment, and proper fuel before each flight and after each refueling. If water is observed, take additional samples until clear. Take repeated samples from all fuel drain points until all contamination has been removed.
10. Main Landing Gear . . . . . **CHECK**  
(check proper tire inflation and condition of gear)

**⑧ NOSE**

**WARNING**

**It is essential in cold weather to remove even the smallest accumulations of frost, ice, snow, or slush from the propeller blades and spinner, and the air inlets (starter/generator, oil cooler and engine inlets). To assure complete removal of contamination, conduct a visual and tactile inspection of all critical surfaces. If these requirements are not performed, aircraft performance will be degraded to a point where a safe takeoff and climb may not be possible.**

1. Right Crew Door . . . . . **CLOSED**
2. Exhaust Cover (if installed) . . . . . **REMOVE**
3. Cowling . . . . . **OPEN**  
(right side of upper cowling for access and  
check condition and security)
4. Engine (right side) . . . . . **CHECK**  
(verify general condition, security, fuel and oil  
leakage and damage to any components)

**WARNING**

**Avoid touching the output connectors or coupling nuts or ignition excitor with bare hands.**

5. Battery . . . . . **CHECK**  
(verify condition and power cables security)
6. Exhaust System . . . . . **CHECK**  
(verify condition, security, cracks, distortion and damage)
7. Cowling . . . . . **CLOSE and LATCH** (right side)
8. Propeller Anchor . . . . . **REMOVE**
9. Air Inlet Covers . . . . . **REMOVE**
10. Air Inlets . . . . . **CHECK**  
Check starter/generator blast tube opening and oil cooler inlet  
(right) and engine induction air inlet (left) for condition,  
restrictions, and debris.

(Continued Next Page)

**NOSE** (Continued)

- 11. Propeller . . . . . **CHECK**  
Inspect blades for nicks, gouges, looseness of material, erosion and cracks. Also, inspect blades for lightning strike (darkened area near tips), boots for security, condition and evidence of grease and oil leaks.
- 12. Propeller Spinner . . . . . **CHECK**  
(verify condition and security)
- 13. Nose Wheel Strut and Tire . . . . . **CHECK**  
Check condition, red over-travel indicator block and cable intact (not fallen into view), and proper inflation of tire.
- 14. Cowling . . . . . **OPEN**  
(left side of upper cowling for access and check condition and security)
- 15. Engine (left side) . . . . . **CHECK**  
(verify general condition, security, fuel, no oil leakage, and no damage to any components)
- 16. INERTIAL SEPARATOR Bypass Outlet . . . . **CHECK CLOSED**  
(verify duct free of debris)
- 17. Oil Dipstick/Filler Cap . . . . . **CHECK**  
Check oil level. Check dipstick/ filler cap SECURE. Fill to within 1 1/2 quarts of MAX HOT or MAX COLD (as appropriate) on dipstick. Markings indicate U.S. quarts low if oil is hot.

**WARNING**

**Make sure the oil dipstick cap is securely latched down. Operating the engine with less than the recommended oil level and with the dipstick cap unlatched will result in excessive oil loss and eventual engine stoppage.**

- 18. Electrical Power Box Circuit Breakers and Diodes . . . . **CHECK**  
(verify all circuit breakers, including standby alternators are IN and diodes are clear)
- 19. Standby Alternator and Belt . . . . . **CHECK** (condition)
- 20. Fuel Filter . . . . . **CHECK FUEL FILTER BYPASS FLAG**  
(for proper location - flush)

(Continued Next Page)

**NOSE (Continued)**

- 21. Brake Fluid Reservoir . . . . . **CHECK LEVEL**
- 22. Cowling . . . . . **CLOSE and LATCH** (left side)
- 23. Fuel Filter Quick-Drain Valve . . . . . **DRAIN** (using fuel sampler)  
Drain to check for water, sediment, and proper fuel before each flight and after each refueling. If water is observed, take additional samples until clear. Take repeated samples from all fuel drain points until all contamination has been removed.
- 24. Fuel Drain Can . . . . . **DRAIN** (until empty)
- 25. Fuel Pump Drain Reservoir . . . . . **DRAIN** (until empty)

**BEFORE STARTING ENGINE**

- 1. Preflight Inspection . . . . . **COMPLETE**  
(verify weight and balance is checked and tail stand is removed and stowed)
- 2. All Key Locking Cabin Doors . . . . . **UNLOCKED**  
(except cargo configured aircraft)  
Cargo door can be locked if no passengers occupy cargo section of airplane.
- 3. Passenger Briefing . . . . . **COMPLETE**
- 4. Cabin Doors . . . . . **LATCHED** (check aft doors)
- 5. Left Crew Door Lock Override Knob and  
Right Crew Door Inside Lock . . . . . **UNLOCKED**
- 6. PARKING BRAKE . . . . . **SET**  
(depress brake pedals and pull control out)
- 7. Control Lock . . . . . **REMOVE**
- 8. Seats, Seat Belts, Shoulder Harnesses **ADJUST and SECURE**  
(crew seat lock indicator pin(s) extended)

**WARNING**

**Failure to correctly use seat belts and shoulder harnesses could result in serious or fatal injury in the event of an accident.**

- 9. Switches . . . . . **OFF**
- 10. IGNITION Switch . . . . . **NORM**
- 11. Circuit Breakers . . . . . **CHECK IN**
- 12. FUEL TANK SELECTORS . . . . . **BOTH ON**
- 13. VENTILATION FANS/ AIR CONDITIONING . . . . . **OFF**
- 14. BLEED AIR HEAT Switch . . . . . **OFF** (down)

(Continued Next Page)

**BEFORE STARTING ENGINE** (Continued)

**CAUTION**

Leaving the BLEED AIR HEAT Switch ON (up) can result in a hot start or abnormal acceleration to idle.

- 15. CABIN HEAT MIXING AIR Control . . . . . **FLT-PUSH**
- 16. EMERGENCY POWER Lever . . . . . **NORMAL**
- 17. POWER Lever . . . . . **IDLE**
- 18. PROP RPM Lever . . . . . **MAX** (full forward)
- 19. FUEL CONDITION Lever . . . . . **CUTOFF**
- 20. FUEL SHUTOFF Knob . . . . . **ON** (push in)
- 21. BATTERY Switch . . . . . **ON**
- 22. WING FLAPS Handle . . . . . **UP**
- 23. NO SMOKE/SEAT BELT Switches (if installed) . . . . . **ON**  
(or as required/ desired)
- 24. TEST SWITCH . . . . . **PUSH UP** (for FIRE DETECT warning)  
**PUSH DOWN** (for FUEL SELECTOR warning)

**STARTING ENGINE (Battery Start)**

- 1. BATTERY Switch . . . . . **ON**
- 2. BCN Switch . . . . . **ON**
- 3. AVIONICS No. 1 Switch . . . . . **ON**
- 4. EIS . . . . . **CHECK PARAMETERS** (verify no red X's)
- 5. BUS VOLTS . . . . . **CHECK** (24 volts minimum)
- 6. EMERGENCY POWER Lever . . . . . **NORMAL** (full aft position)  
(verify EMERG PWR LVR CAS MSG - OFF)

**CAUTION**

Make sure that the EMERGENCY POWER Lever is in the NORMAL (full aft) position or an over-temperature condition will result during engine start.

(Continued Next Page)

**STARTING ENGINE (Battery Start)** (Continued)

- 7. Propeller Area . . . . . **CLEAR**
- 8. FUEL BOOST Switch . . . . . **ON**
  - a. FUEL BOOST ON CAS MSG . . . . . **ON**
  - b. FUEL PRESS LOW CAS MSG . . . . . **OFF**
  - c. FLOW PPH . . . . . **ZERO**
- 9. STARTER Switch . . . . . **START**
  - a. IGNITION ON CAS MSG . . . . . **ON**
  - b. OIL PSI . . . . . **CHECK**
  - c.  $N_g$  . . . . . **STABLE** (12% minimum)
- 10. FUEL CONDITION Lever . . . . . **LOW IDLE**
  - a. FLOW PPH . . . . . **CHECK** (for 90 to 140 pph)
  - b. ITT . . . . . **MONITOR**  
(1090°C maximum, limited to 2 seconds)

**CAUTION**

- If ITT climbs rapidly towards 1090°C, be prepared to return the FUEL CONDITION Lever to CUTOFF.
- Under hot OAT and/or high ground elevation conditions, idle ITT can exceed maximum idle ITT limitation of 685°C. Increase  $N_g$  and/or reduce accessory load to maintain ITT within limits.

- c.  $N_g$  . . . . . **52% MINIMUM**
- 11. STARTER Switch . . . . . **OFF**  
(verify STARTER ON CAS MSG OFF)
- 12. EIS . . . . . **CHECK NORMAL**
- 13. GENERATOR . . . . . **CHECK LOAD**  
(verify GENERATOR OFF CAS MSG  
OFF and BAT AMPS charging)
- 14. FUEL BOOST Switch . . . . . **NORM**  
(verify FUEL BOOST ON CAS MSG - OFF)
- 15. AVIONICS No. 2 Switch . . . . . **ON**
- 16. NAV LIGHTS . . . . . **ON**
- 17. Cabin Heating, Ventilating and  
Defrosting Controls . . . . . **AS DESIRED**

### STARTING ENGINE (External Power Start)

(24-28 Volt, Minimum 800 Amp and Maximum 1700 Amp Capacity)

1. BATTERY Switch ..... **ON**
2. AVIONICS No. 1 Switch ..... **ON**
3. EIS ..... **CHECK PARAMETERS** (verify no red X's)
4. EXTERNAL POWER Switch ..... **OFF**
5. BUS VOLTS ..... **CHECK** (20 volts minimum)
6. AVIONICS No. 1 Switch ..... **OFF**
7. BATTERY Switch ..... **OFF**
8. External Power Unit. .... **ENGAGE; then ON**
9. EXTERNAL POWER Switch ..... **BUS**

#### CAUTION

Make sure that the EMERGENCY POWER Lever is in the NORMAL position or an over-temperature condition will result during engine start.

10. BATTERY Switch ..... **ON**
11. BCN Switch ..... **ON**
12. AVIONICS No. 1 Switch ..... **ON**
13. BUS VOLTS ..... **CHECK** (24-28.5 Volts)
14. EXTERNAL POWER Switch ..... **STARTER**
15. EMERGENCY POWER Lever. .... **NORMAL**  
(verify EMERG PWR LVR CAS MSG - OFF)
16. Propeller Area ..... **CLEAR**
17. FUEL BOOST Switch ..... **ON**
  - a. FUEL BOOST ON CAS MSG ..... **ON**
  - b. FUEL PRESS LOW CAS MSG ..... **OFF**
  - c. FFLOW PPH ..... **ZERO**

#### CAUTION

If the external power unit drops off the line, initiate engine shutdown.

18. STARTER Switch ..... **START**
  - a. IGNITION ON CAS MSG ..... **CHECK ON**
  - b. OIL PSI ..... **CHECK**
  - c.  $N_g$  ..... **STABLE** (12% minimum)

(Continued Next Page)



**STARTING ENGINE (External Power Start) (Continued)**

- 19. FUEL CONDITION Lever . . . . . **LOW IDLE**
  - a. FLOW PPH . . . . . **CHECK** (for 90 to 140 pph)
  - b. ITT . . . . . **MONITOR**  
(1090°C maximum, limited to 2 seconds)

**CAUTION**

- If ITT climbs rapidly towards 1090°C, be prepared to return the FUEL CONDITION Lever to CUTOFF.
- Under hot OAT and/or high ground elevation conditions, idle ITT can exceed maximum idle ITT limitation of 685°C. Increase  $N_g$  and/or reduce accessory load to maintain ITT within limits.

- c.  $N_g$  . . . . . **52% MINIMUM**
- 20. STARTER Switch . . . . . **OFF**  
(verify STARTER ON CAS MSG - OFF)
- 21. EIS . . . . . **CHECK NORMAL**
- 22. EXTERNAL POWER Switch . . . . . **OFF**
- 23. External Power Unit . . . . . **OFF, then DISENGAGE**
- 24. GENERATOR . . . . . **CHECK LOAD**  
(verify GENERATOR OFF CAS MSG  
OFF and BAT AMPS charging)
- 25. FUEL BOOST Switch . . . . . **NORM**  
(verify FUEL BOOST ON CAS MSG - OFF)
- 26. AVIONICS No. 2 Switch . . . . . **ON**
- 27. NAV LIGHTS . . . . . **AS REQUIRED**
- 28. Cabin Heating, Ventilating and  
Defrosting Controls . . . . . **AS DESIRED**

**TAXIING**

- 1. Brakes . . . . . **CHECK**

**NOTE**

Propeller BETA range can be used during taxi with minimum blade erosion up to the point where  $N_g$  increases (against beta range spring) to control taxi speed and improve brake life.

- 2. Flight Instruments . . . . . **CHECK**

**BEFORE TAKEOFF**

- 1. PARKING BRAKE . . . . . **SET**
- 2. Seats, Seat Belts, Shoulder Harnesses . . . . **CHECK SECURE**

**WARNING**

**Failure to correctly use seat belts and shoulder harnesses can result in serious or fatal injury in the event of an accident.**

- 3. Flight Controls . . . . . **FREE and CORRECT**
- 4. Flight Instruments . . . . . **CHECK**
- 5. Altimeters:
  - a. PFD 1 and 2 BARO . . . . . **SET**
  - b. Standby Altimeter . . . . . **SET**
- 6. ALT SEL . . . . . **SET**
- 7. Standby Flight Instruments . . . . . **CHECK**
- 8. FUEL BOOST Switch . . . . . **NORM**
- 9. FUEL TANK SELECTORS . . . . . **BOTH ON**
- 10. FUEL QTY. . . . . **CHECK**
- 11. FUEL SHUTOFF Knob . . . . . **FULLY ON**
- 12. ELEVATOR, AILERON, and RUD TRIM Controls . . . . . **3 SET**  
(for takeoff)
- 13. POWER Lever . . . . . **400 FT-LBS**
  - a. BUS VOLTS . . . . . **CHECK**
  - b. INERTIAL SEPARATOR . . . . . **CHECK**  
Turn control counterclockwise, pull to BYPASS position and check torque drop; move control back to NORMAL position and check that original torque is regained.
  - c. EIS . . . . . **CHECK**  
See Section 2, Limitations for minimum oil temperature required for flight.

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**BEFORE TAKEOFF** (Continued)

- 14. Overspeed Governor ..... **CHECK**  
(first flight of the day and after maintenance)
  - a. PROP RPM Lever ..... **MAX** (full forward)
  - b. OVERSPEED GOVERNOR  
TEST Button ..... **PRESS and HOLD**
  - c. POWER Lever ..... **ADVANCE**  
(propeller RPM stabilize at 1750 ±60 RPM)
  - d. POWER Lever ..... **IDLE**
  - e. OVERSPEED GOVERNOR TEST Button ..... **RELEASE**
- 15. Quadrant Friction Lock ..... **ADJUST**
- 16. Standby Power ..... **CHECK**  
(first flight of the day and before all  
flights into known icing conditions)
  - a. ENGINE Softkey ..... **SELECT SYSTEM**
  - b. STBY ALT PWR Switch ..... **ON**
  - c. GEN AMPS ..... **LOAD**  
(to approximately 30 amps)  
  
Generator load can be increased by using the TAXI/RECOG  
Lights. Do not exceed 60 amps.
  - d. ALT AMPS ..... **VERIFY** (alternator output near zero)
  - e. GENERATOR Switch ..... **TRIP**
  - f. ALT AMPS ..... **VERIFY LOAD**
  - g. BUS VOLTS ..... **CHECK**  
(for alternator output and voltage approximately  
one volt less than with generator ON)

**NOTE**

A fully charged battery will carry part of the electrical load when initially switching from generator to standby alternator power because of the generator's higher voltage regulation.

- h. STBY PWR ON CAS MSG ..... **CHECK ON**  
(verify GENERATOR OFF CAS MSG ON)
- i. GENERATOR Switch ..... **RESET**  
(verify GENERATOR OFF CAS MSG OFF)
- j. STBY PWR ON CAS MSG ..... **CHECK OFF**
- k. STBY ALT PWR Switch ..... **OFF**  
(verify STBY PWR INOP CAS MSG ON)
- l. STBY ALT PWR Switch ..... **ON**

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**BEFORE TAKEOFF** (Continued)

- 17. Manual Electric Pitch Trim (MEPT) . . . . . **CHECK and SET**
  - a. Push both sides of trim switch NOSE DOWN (verify correct trim wheel and pointer movement). Press AP DISC/TRIM INTER Switch (verify trim wheel stops moving).
  - b. Push both sides of trim switch NOSE UP (verify correct trim wheel and pointer movement). Press AP DISC/TRIM INTER Switch (verify trim wheel stops moving).
  - c. Verify pilot's trim switch command overrides copilot's trim switch command.
  - d. Set trim as required within TAKEOFF band.
- 18. Known Icing System (if installed) . . . **PREFLIGHT COMPLETE**  
(see Systems Checks prior to any flight in icing conditions)
- 19. Ice Protection (if installed) . . . . . **AS REQUIRED**
  - a. PITOT/STATIC HEAT . **ON** (when OAT is below 5°C (41°F))
  - b. STALL HEAT . . . . . **ON** (when OAT is below 5°C (41°F))
  - c. PROP HEAT . . . . . **ON** (when OAT is below 5°C (41°F))
- 20. INERTIAL SEPARATOR . . . . . **SET**
- 21. Avionics and Radar . . . . . **SET FOR DEPARTURE**
- 22. Nav Source . . . . . **SET FOR DEPARTURE**
- 23. XPDR . . . . . **ON ALT**
- 24. STROBE Lights . . . . . **ON**
- 25. CAS MSG(s) . . . . . **CHECK**
- 26. WING FLAPS Handle . . . . . **SET FOR TAKEOFF**
- 27. CABIN HEAT MIXING AIR Control . . . . . **FLT-PUSH**
- 28. Window . . . . . **CLOSE**
- 29. Brakes . . . . . **RELEASE**
- 30. FUEL CONDITION Lever . . . . . **HIGH IDLE**

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## BEFORE TAKEOFF (Continued)

### WARNING

- When ground icing conditions are present, a pre-takeoff visual and tactile check should be conducted by the pilot in command within five minutes of takeoff, preferably just prior to taxiing onto the active runway.
- Takeoff is prohibited with any frost, ice, snow, or slush adhering to the wings, tail, control surfaces, propeller blades, or engine air inlets.
- Even small amounts of frost, ice, snow, or slush on the wing can adversely change lift and drag. Failure to remove these contaminants will degrade airplane performance to a point where a safe takeoff and climb may not be possible.
- Make sure that the anti-ice fluid (if applied) is still protecting the airplane.

## TAKEOFF

### NORMAL TAKEOFF

1. WING FLAPS Handle . . . . . **20°**
2. POWER Lever . . . . . **SET FOR TAKEOFF**  
(observe Takeoff ITT and  $N_g$  limits)  
Refer to Maximum Engine Torque for Takeoff chart in Section 5.
3. CAS MSG(s) . . . . . **CHECK**
4. Rotate . . . . . **70-75 KIAS**
5. Airspeed . . . . . **85-95 KIAS**
6. WING FLAPS Handle  
**RETRACT to 10°** (after reaching 85 KIAS)  
**RETRACT to UP** (after reaching 95 KIAS)

(Continued Next Page)

### SHORT FIELD TAKEOFF

1. WING FLAPS Handle ..... **20°**
2. Brakes ..... **APPLY**
3. POWER Lever ..... **SET FOR TAKEOFF**  
(observe Takeoff ITT and  $N_g$  limits)  
Refer to Maximum Engine Torque for Takeoff chart in Section 5.
4. CAS MSG(s) ..... **CHECK**
5. Brakes ..... **RELEASE**
6. Rotate ..... **70 KIAS**
7. Airspeed ..... **83 KIAS** (until all obstacles are cleared)  
Refer to Section 5 for speeds at reduced weights.
8. WING FLAPS Handle  
**RETRACT to 10°** (after reaching 85 KIAS)  
**RETRACT to UP** (after reaching 95 KIAS)

### TYPE II, TYPE III OR TYPE IV ANTI-ICE FLUID TAKEOFF

1. WING FLAPS Handle ..... **UP**
2. Power Lever ..... **SET FOR TAKEOFF**  
(observe Takeoff ITT and  $N_g$  limits)  
Refer to Maximum Engine Torque for Takeoff chart in Section 5.
3. CAS MSG(s) ..... **CHECK**
4. Rotate ..... **83 KIAS**
5. Airspeed ..... **104 KIAS**

### ENROUTE CLIMB

#### CRUISE CLIMB

1. Ice Protection (if installed) ..... **AS REQUIRED**
  - a. PITOT/STATIC HEAT . **ON** (when OAT is below 5°C (41°F))
  - b. STALL HEAT ..... **ON** (when OAT is below 5°C (41°F))
  - c. PROP HEAT ..... **ON** (when OAT is below 5°C (41°F))
2. INERTIAL SEPARATOR ..... **SET**
3. Airspeed ..... **110-120 KIAS**
4. PROP RPM Lever ..... **1600-1900 RPM**
5. INERTIAL SEPARATPOR ..... **SET**

#### NOTE

To achieve maximum flat rated horsepower, use a minimum of 1800 RPM.

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**CRUISE CLIMB** (Continued)

6. POWER Lever ..... **SET**  
(observe Maximum Climb ITT and  $N_g$  limits)  
Refer to Maximum Engine Torque for Climb chart in Section 5.

**NOTE**

Engine operations which exceed 740°C ITT can reduce engine life.

**CAUTION**

For every 10° below -30°C ambient temperature, reduce maximum allowable  $N_g$  by 2.2%.

**MAXIMUM PERFORMANCE CLIMB**

1. Ice Protection (if installed) ..... **AS REQUIRED**
  - a. PITOT/STATIC HEAT . **ON** (when OAT is below 5°C (41°F))
  - b. STALL HEAT ..... **ON** (when OAT is below 5°C (41°F))
  - c. PROP HEAT..... **ON** (when OAT is below 5°C (41°F))
2. INERTIAL SEPARATOR..... **SET**
3. Airspeed ..... **104 KIAS** (from sea level to 10,000 feet)  
decreasing to **87 KIAS** (at 20,000 feet)
4. PROP RPM Lever..... **1900 RPM**
5. POWER Lever ..... **SET** (1865 ft-lbs maximum)  
(observe Maximum Climb ITT and  $N_g$  limits)  
Refer to Maximum Engine Torque for Climb chart in Section 5.

**CAUTION**

- Engine operations which exceed 740°C ITT can reduce engine life.
- For every 10° below -30°C ambient temperature, reduce maximum allowable  $N_g$  by 2.2%.

## CRUISE

1. Ice Protection (if installed) . . . . . **AS REQUIRED**
  - a. PITOT/STATIC HEAT . **ON** (when OAT is below 5°C (41°F))
  - b. STALL HEAT . . . . . **ON** (when OAT is below 5°C (41°F))
  - c. PROP HEAT . . . . . **ON** (when OAT is below 5°C (41°F))
2. INERTIAL SEPARATOR . . . . . **SET**
3. PROP RPM Lever . . . . . **1600 to 1900 RPM**
4. POWER Lever . . . . . **SET**  
(observe Maximum Cruise ITT and N<sub>g</sub> limits)  
Refer to Cruise Performance and/or Cruise Maximum Torque charts in Section 5.
5. Fuel Balance . . . . . **CHECK**  
(maximum 200 pounds imbalance)

### NOTE

Engine operations which exceed 740°C ITT can reduce engine life.

### CAUTION

For every 10° below -30°C ambient temperature, reduce maximum allowable N<sub>g</sub> by 2.2%.

## DESCENT

1. Ice Protection (if installed) . . . . . **AS REQUIRED**
  - a. PITOT/STATIC HEAT . **ON** (when OAT is below 5°C (41°F))
  - b. STALL HEAT . . . . . **ON** (when OAT is below 5°C (41°F))
  - c. PROP HEAT . . . . . **ON** (when OAT is below 5°C (41°F))
2. INERTIAL SEPARATOR . . . . . **SET**
3. NO SMOKE/SEAT BELT SIGN Switches (if installed). . . . . **ON**
4. Altimeters . . . . . **SET**
5. NAV Source . . . . . **SELECT**

### NOTE

The overspeed warning horn and MAXSPD annunciation will activate when either PFD1 or PFD2 airspeed reaches greater than 175 KIAS. In addition, the overspeed warning horn and MAXSPD annunciation may appear prior to 175 KIAS if the aircraft is accelerating at a rate that will rapidly exceed V<sub>MO</sub>.

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## **DESCENT** (Continued)

### **CAUTION**

Set PROP RPM Lever at 1900 RPM prior to beginning any instrument approach procedure.

6. POWER Lever ..... **AS REQUIRED**

## **BEFORE LANDING**

### **NOTE**

Refer to Landing Distance chart in Section 5 for anticipated ground roll and total distance requirements.

1. Seats, Seat Belts, Shoulder Harnesses ..... **SECURE**

### **WARNING**

**Failure to correctly use seat belts and shoulder harnesses could result in serious or fatal injury in the event of an accident.**

2. FUEL TANK SELECTORS ..... **BOTH ON**
3. FUEL CONDITION Lever ..... **HIGH IDLE**
4. PROP RPM Lever ..... **MAX** (full forward)
5. Radar ..... **STANDBY**
6. AP/YD ..... **OFF**  
(before 200 feet AGL on approach or 800 feet AGL)
7. WING FLAPS Handle ..... **SET**

## **LANDING**

### **NORMAL LANDING**

1. WING FLAPS Handle ..... **FULL**
2. Airspeed ..... **75-85 KIAS**
3. Touchdown ..... **MAIN WHEELS FIRST**
4. POWER Lever ..... **BETA RANGE AFTER TOUCHDOWN**
5. Brakes ..... **APPLY**

### SHORT FIELD LANDING

1. WING FLAPS Handle . . . . . **FULL**
2. Airspeed . . . . . **78 KIAS**

Refer to Landing Distance charts in Section 5 for speeds at reduced weights.

3. POWER Lever. . . . . **REDUCE to IDLE** (after clearing obstacles)
4. Touchdown . . . . . **MAIN WHEELS FIRST**
5. POWER Lever. . . . . **BETA RANGE AFTER TOUCHDOWN**

#### NOTE

Use of reverse thrust will reduce the landing roll by approximately 10% (see Section 5).

6. Brakes . . . . . **MAXIMUM**  
(while holding elevator control full aft)
7. WING FLAPS Handle . . . . . **RETRACT**  
(for maximum brake effectiveness)

### BALKED LANDING

1. POWER Lever. . . . . **ADVANCE** (for takeoff power)
2. WING FLAPS Handle . . . . . **RETRACT to 20°**
3. Airspeed . . . . . **80 KIAS MINIMUM**  
(until obstacles are cleared)
4. WING FLAPS Handle . . . . . **RETRACT**  
(after reaching safe altitude and airspeed)

## AFTER LANDING

1. WING FLAPS Handle . . . . . **UP**
2. Ice Protection (if installed) . . . . . **OFF**
  - a. PITOT/STATIC HEAT . . . . . **OFF**
  - b. STALL HEAT . . . . . **OFF**
  - c. PROP HEAT . . . . . **OFF**
3. STBY ALT PWR . . . . . **OFF**
4. STROBE Lights . . . . . **OFF**
5. LDG and TAXI/RECOG Lights . . . . . **SET**
6. FUEL CONDITION Lever . . . . . **LOW IDLE**  
(when clear of the runway)

### CAUTION

If the FUEL CONDITION Lever is moved past the LOW IDLE position and the engine  $N_g$  falls below 53%, moving the lever back to the LOW IDLE position can cause an ITT over-temperature condition. If the engine has started to shutdown in this situation, allow the engine to complete its shutdown sequence, and proceed to do a normal engine start using the “Starting Engine” checklist.

## SHUTDOWN AND SECURING AIRPLANE

1. PARKING BRAKE ..... **SET**
2. BLEED AIR HEAT, VENTILATION FANS/ AIR  
CONDITIONING (if installed). ..... **OFF**
3. POWER Lever. .... **IDLE**
4. ITT. .... **STABILIZED**  
(at minimum temperature for one minute)
5. PROP RPM Lever ..... **FEATHER**
6. FUEL CONDITION Lever ..... **CUTOFF**
7. LIGHTS ..... **OFF**
8. FUEL BOOST Switch ..... **OFF**
9. AVIONICS No 1 and No 2 Switches ..... **OFF**
10. BATTERY Switch ..... **OFF**
11. Control Lock ..... **INSTALL**
12. OXYGEN SUPPLY Control Lever (if installed) ..... **OFF**
13. FUEL TANK SELECTORS ..... **LEFT OFF or RIGHT OFF**  
Turn high wing tank off if parked on a sloping surface to prevent  
crossfeeding.
14. Tie-Downs and Chocks ..... **AS REQUIRED**
15. External Covers. .... **INSTALL**
16. Fuel Filter ..... **CHECK FUEL FILTER BYPASS FLAG**  
(for proper location - flush)
17. Oil Breather Drain Can ..... **DRAIN** (until empty)

### NOTE

Possible delays of subsequent flights, or even missed flights, are often eliminated by routinely conducting a brief postflight inspection. Usually, a visual check of the airplane for condition, security, leakage, and tire inflation will alert the operator to potential problems, and is therefore recommended.

## **AMPLIFIED PROCEDURES**

### **PREFLIGHT INSPECTION**

The Preflight Inspection, described in Figure 4-1 and adjacent checklist, is recommended. If the airplane has been in extended storage, has had recent major maintenance, or has been operated from rough or unprepared surfaces, an extensive exterior inspection is recommended.

#### **WARNING**

**Flights at night and in cold weather involve a careful check of other specific areas discussed in this section.**

After major maintenance has been performed, the flight controls and trim tabs should be double-checked for free and correct movement and security. The security of all inspection plates on the airplane should be checked following periodic inspections.

If the airplane has been exposed to excessive ground handling in a crowded hangar, it should be checked for dents and scratches on wings, fuselage, and tail surfaces, as well as damage to navigation and anti-collision lights, and avionics antennas. Outside storage in windy or gusty areas, or tie-down adjacent to taxiing airplanes, calls for special attention to control surface stops, hinges, and brackets to detect the presence of wind damage.

If the airplane has been operated from an unimproved runway, check the propeller for nicks and stone damage and the leading edges of the horizontal tail for abrasion. Airplanes that are operated from rough fields, especially at high altitude, are subjected to abnormal landing gear abuse. Frequently check all components of the landing gear, tires, and brakes.

Outside storage can result in water and obstructions in airspeed system lines, condensation in fuel tanks, and dust and dirt in the engine air inlet and exhaust areas. If any water is suspected in the static source system, open both static source drain valves and thoroughly drain all water from the system.

#### **WARNING**

**If the static source drain valves are opened, assure both valves are completely closed before flight.**

(Continued Next Page)

## **PREFLIGHT INSPECTION** (Continued)

If any water is detected in the fuel system, the inboard fuel tank sump and external sump quick-drain valves, fuel reservoir quick-drain valve, and fuel filter quick-drain valve should all be thoroughly drained until there is no evidence of water or sediment contamination. If the airplane is parked with one wing low on a sloping ramp, draining of the outboard fuel tank sump quick-drain valves (if installed) is also recommended.

Prolonged storage of the airplane will result in a water buildup in the fuel which "leaches out" the fuel additive. An indication of this is when an excessive amount of water accumulates in the fuel tank sumps. Refer to Section 8 for fuel additive servicing.

To prevent loss of fuel in flight, make sure the fuel tank filler caps are tightly sealed after any fuel system check or servicing. Fuel system vents should also be inspected for obstructions, ice or water, especially after exposure to cold, wet weather.

The interior inspection will vary according to the planned flight and the optional equipment installed. Prior to high-altitude flights, it is important to check the condition and quantity of oxygen face masks and hose assemblies. The oxygen supply system (if installed) should be functionally checked to ensure that it is in working order and that an adequate supply of oxygen is available.

## **BEFORE STARTING ENGINE**

### **WARNING**

- **It is the responsibility of the pilot in command to make sure that the airplane is correctly loaded within the weight and center of gravity limits prior to takeoff.**
- **Failure to correctly use seat belts and shoulder harnesses could result in serious or fatal injury in the event of an accident.**

(Continued Next Page)

## **BEFORE STARTING ENGINE** (Continued)

The Before Starting Engine checklist procedures should be followed closely to assure a satisfactory engine start. Most of the checklist items are self-explanatory. Those items that may require further explanation are noted in the following discussion.

When setting electrical switches prior to engine start, only those lighting switches that are necessary for a night-time engine start should be turned on. All other switches, including exterior lights, anti-ice, deice, ventilation fans/ air conditioning (if installed) switches, should be turned off. The BLEED AIR HEAT Switch should be off to prevent excessive compressor bleed during the engine start. Also, the standby power switch should be off during engine starts.

### **CAUTION**

Leaving the BLEED AIR HEAT Switch ON can result in a hot start or abnormal acceleration to idle.

The generator switch is spring-loaded to the ON position. When the starter switch is placed in the START or MOTOR position, the generator control unit (GCU) opens the generator contactor. When the starter switch is returned to the OFF position after an engine start, the GCU closes the generator contactor, thereby placing the generator on the line.

The IGNITION Switch is left in the NORM position for engine starting with the starter motor (non-windmilling start). In this position, the igniters are energized when the starter switch is placed in the START position. Ignition is automatically terminated when the starter switch is turned OFF.

### **CAUTION**

It is especially important to verify that the EMERGENCY POWER Lever is in the NORMAL position (aft of the IDLE gate) during engine starts. With the lever forward of this gate, excessive quantities of fuel will be discharged through the fuel nozzles when the FUEL CONDITION Lever is moved to the LOW IDLE position and a hot start will result.

(Continued Next Page)

## **BEFORE STARTING ENGINE** (Continued)

Before starting the engine, the POWER Lever is placed at the IDLE position (against the BETA gate), the propeller control lever is moved to the MAX RPM position (full forward), and the FUEL CONDITION Lever is stowed in the CUTOFF position.

### **CAUTION**

The propeller reversing linkage can be damaged if the POWER Lever is moved aft of the IDLE position when the engine is not running and the propeller is feathered.

## **STARTING ENGINE**

The Starting Engine checklist procedures should be followed closely to assure a satisfactory engine start. With the FUEL CONDITION Lever in the CUTOFF position, move the starter switch to the START position; verify that the STARTER ON and IGNITION ON CAS MSG(s) are displayed. Next, check for a positive indication of engine oil pressure. After  $N_g$  stabilizes (minimum of 12%), move the FUEL CONDITION Lever to the LOW IDLE position and verify fuel flow in the general range of 90 to 140 pph. After the engine "lights off" and during acceleration to idle (approximately 52%  $N_g$ ), monitor ITT and  $N_g$ . Maximum ITT during engine start is 1090°C, limited to 2 seconds. Typically, the ITT during start is well below this maximum value. After the engine has stabilized at idle, the STARTER ON CAS MSG should be OFF. If this CAS MSG remains ON, it indicates the starter has not been automatically disengaged during the engine starting sequence due to a failed speed sensor.

### **CAUTION**

If no ITT rise is observed within 10 seconds after moving the FUEL CONDITION Lever to the LOW IDLE position, or ITT rapidly approaches 1090°C, move the FUEL CONDITION Lever to CUTOFF and perform the Engine Clearing Procedure in this section.

(Continued Next Page)



## **STARTING ENGINE** (Continued)

After the engine reaches stabilized idle (52%  $N_g$  or above), return the starter switch to the OFF position. With a cold engine or after making a battery start (high initial generator load into battery), it may be necessary to advance the POWER Lever slightly ahead of the idle detent to maintain a minimum idle of 52%  $N_g$ . To assure maintaining the minimum  $N_g$  and ITT within limits, advance the POWER Lever to obtain approximately 55%  $N_g$  before turning the starter switch OFF (the generator contactor closes when the starter switch is turned OFF).

### **CAUTION**

Under hot OAT and/or high ground elevation conditions, idle ITT can exceed maximum idle ITT limitation of 685°C. Increase  $N_g$  and/or reduce accessory load to maintain ITT within limits.

### **NOTE**

If the STARTER ENERGIZED CAS MSG fails to go out after the starter switch has been moved to the OFF position, the start contactor can be closed and the generator will not function. Perform an engine shutdown.

Engine starts can be made with airplane battery power or with an external power unit (EPU). However, it is recommended that an EPU be used when the ambient air temperature is less than -18°C (0°F). Refer to Cold Weather Operation in this section when ambient temperature is below -18°C (0°F).

### **CAUTION**

- In the event the external power unit drops off the line during engine start, a loss of electrical power to the starter will result which could cause a hot start. Should a loss of external power occur, immediately place the FUEL CONDITION Lever to CUTOFF, monitor ITT, and make sure the engine is shutting down. Turn the external power switch off and place the starter switch to the MOTOR position to aid in reducing ITT if necessary.

(Continued Next Page)

## **STARTING ENGINE** (Continued)

- When an external power unit is used, make sure the unit is negatively grounded and regulated to 28 volts DC with a capability of providing a minimum of 800 amperes during the starting cycle. External power units with output exceeding 1700 amperes shall not be used.

Before engine starting with the airplane battery, check the BUS VOLTS for a minimum of 24 volts. Monitor ITT during each engine start to guard against a hot start. The operator must be ready to immediately abort the start if ITT exceeds 1090°C or is rapidly approaching this limit. Usually, hot starts are not a problem if the normal starting procedures are followed.

### **CAUTION**

A minimum battery voltage of 24 volts is not always an indication that the battery is near full charge or in good condition. Therefore, if gas generator acceleration in the initial part of the start is less than normally observed, return the FUEL CONDITION Lever to CUTOFF and discontinue the start. Recharge the battery or use an external power unit before attempting another start.

If the starter accelerates the gas generator rapidly above 20%, suspect gear train decouple. Do not continue start. Rapid acceleration through 35%  $N_g$  suggests a start on the secondary nozzles. Anticipate a hot start.

After an aborted start for whatever reason, it is essential before the next start attempt to allow adequate time to drain off unburned fuel. Failure to drain all residual fuel from the engine could lead to a hot start, a hot streak leading to hot section damage, or the torching of burning fuel from engine exhaust on the next successful ignition.

A dry motoring, within starter limitations after confirming that all fuel drainage has stopped, will ensure that no fuel is trapped before the next start.

# ENGINE CLEARING PROCEDURES (DRY MOTORING RUN)

The following procedure is used to clear an engine at any time when it is deemed necessary to remove internally trapped fuel and vapor, or if there is evidence of a fire within the engine. Air passing through the engine serves to purge fuel, vapor, or fire from the combustion section, gas generator turbine, power turbine, and exhaust system.

- 1. FUEL CONDITION Lever . . . . . **CUTOFF**
- 2. IGNITION Switch . . . . . **NORM**
- 3. BATTERY Switch . . . . . **ON**  
(to supply current for the starter motor)
- 4. AVIONICS No 1 Switch. . . . . **ON**
- 5. FUEL SHUTOFF Knob . . . . . **OPEN** (push in)
- 6. FUEL BOOST Switch . . . . . **OFF**

## WARNING

**If fire is suspected, leave the FUEL BOOST switch OFF, otherwise turn it ON to provide lubrication for the engine-driven fuel pump elements.**

- 7. STARTER Switch . . . . . **MOTOR**

## CAUTION

- Do not exceed the starting cycle limitations; refer to Section 2.
- Should a fire persist, as indicated by sustained ITT, close the FUEL SHUTOFF Knob and continue motoring the engine.

- 8. STARTER Switch . . . . . **OFF**
- 9. FUEL BOOST Switch . . . . . **OFF**
- 10. AVIONICS No 1 Switch. . . . . **OFF**
- 11. FUEL SHUTOFF Knob . . . . . **CLOSED** (pull out)
- 12. BATTERY Switch . . . . . **OFF**

Allow the required cooling period for the starter before any further starting operation is attempted.

## **ENGINE IGNITION PROCEDURES**

For most operations, the IGNITION Switch is left in the NORM position. With the switch in this position, ignition is on only when the starter switch is in the START position.

### **NOTE**

The use of ignition for extended periods of time will reduce ignition system component life.

The IGNITION Switch should be turned ON to provide continuous ignition under the following conditions:

1. Emergency engine starts without starter assist (refer to Section 3, AIRSTART).
2. Operation on wet or contaminated runways.
3. Flight in heavy precipitation.
4. Flight in moderate or greater turbulence.
5. During inadvertent icing encounters prior to the INERTIAL SEPARATOR being selected to BYPASS.
6. When near fuel exhaustion as indicated by Red RSVR FUEL LOW CAS MSG.

Refer to Section 7, Engine Ignition System, for further details regarding the ignition system.

## **ENGINE INERTIAL SEPARATOR PROCEDURES**

An INERTIAL SEPARATOR system is built into the engine air inlet duct to prevent ice buildups on the compressor inlet screen. The INERTIAL SEPARATOR control should be moved to the BYPASS position prior to running the engine during ground or flight operation in visible moisture (clouds, rain, snow or ice crystals) with an OAT of 5°C (41°F) or less.

The BYPASS mode can also be used for ground operations or takeoffs with dusty, sandy field conditions to minimize ingestion of foreign particles into the compressor. Refer to charts in Section 5 for performance changes associated with the INERTIAL SEPARATOR in the BYPASS mode.

The NORMAL mode is used for all other operating conditions, since it provides substantial inlet ram recovery. This results in more efficient engine operation and higher critical altitude for a particular power setting.

Do not return the INERTIAL SEPARATOR to NORMAL until after engine shutdown and inspection if icing conditions are encountered.

Refer to Section 7, Engine Air Induction System for further details regarding the INERTIAL SEPARATOR.

## **TAXIING**

POWER Lever BETA range can be used during taxi to control taxi speed and improve brake life. A leaf spring is installed in the control quadrant which the POWER Lever contacts and provides the pilot with a noticeable "feel". With the POWER Lever moved to this position in the BETA range, the propeller is near zero thrust in a static, 52% idle condition. Besides acting as a zero thrust reference during taxi, this POWER Lever position (lever against spring) is used after landing to minimize brake wear. POWER Lever movement further aft of the BETA range will result in increased engine power and reverse thrust from the propeller blades.

### **CAUTION**

- The use of reverse thrust should be minimized, especially on unprepared surfaces, to minimize propeller blade erosion and possible damage.
- Do not leave the POWER Lever in the BETA range for extended periods (greater than 30 seconds) when parked with a right crosswind to avoid damage to the cargo pod.

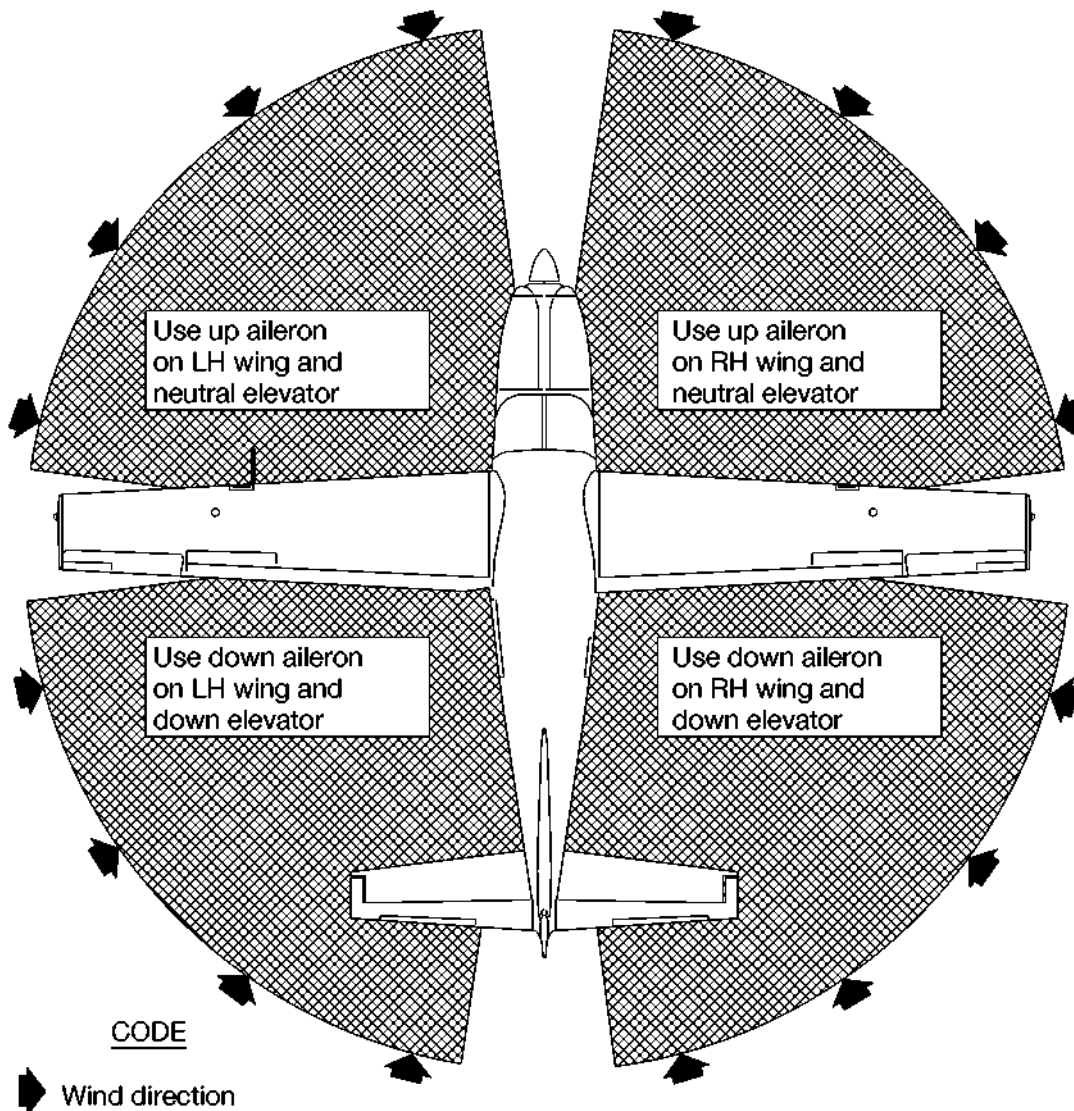
### **NOTE**

During low-speed taxi with a strong tailwind, or when stopped with a strong tailwind, a moderate vibration can occur as a result of reverse airflow through the propeller disk with the blades at a positive pitch angle. This vibration can be significantly reduced by placing the POWER Lever in the BETA range, or it can be eliminated by turning the airplane into the wind.

Refer to the Taxiing Diagram figure for additional taxiing instructions.

## TAXIING DIAGRAM

A39132



### NOTE

Strong quartering tail winds require caution. Avoid excessive use of power and sharp braking when the airplane is in this attitude. Use the steerable nose wheel and rudder to maintain direction.

Figure 4-3

## **BEFORE TAKEOFF**

The FUEL TANK SELECTORS are normally both ON for takeoff and all flight operations. However, one side can be turned OFF as required to balance the fuel load.

### **WARNING**

- **Do not exceed 200 pounds fuel imbalance in flight.**
- **To obtain accurate fuel quantity indicator readings, verify the airplane is parked in a laterally level condition; or, if in flight, make sure the airplane is in a coordinated and stabilized condition.**

When checking the INERTIAL SEPARATOR with engine power set at 400 foot-pounds, it is typical to see an approximate 25 foot-pound drop in torque when the T-handle is pulled to the BYPASS position. This torque drop will vary some with wind conditions during static check.

A neutral index mark is added to the pedestal cover which corresponds to the zero degree trim tab position. As loadings vary towards the forward C.G. limit or aft C.G. limit, elevator trim settings towards the nose up and nose down ends of this takeoff range, respectively, will provide comfortable control wheel forces during takeoff and initial climb.

Prior to takeoff, the FUEL CONDITION Lever is moved forward to the HIGH IDLE position (approximately 65%  $N_g$ ) to remain in this position until after landing. The higher gas generator idle speed for flight provides faster engine acceleration when adding power (from an idle condition) on approach or for a balked landing go-around.

## TAKEOFF

### POWER SETTING

Refer to the Maximum Engine Torque for Takeoff chart in Section 5 to determine the torque corresponding to the surface altitude and OAT conditions. This torque should be obtainable without exceeding 805°C ITT or 101.6% N<sub>g</sub>.

Takeoff roll is most smoothly initiated by gradually advancing the POWER Lever until propeller RPM nears 1900. Smoothly release the brakes and continue advancing the POWER Lever until the takeoff torque is reached.

#### NOTE

As airspeed increases during takeoff, an increase in torque at a fixed POWER Lever position is normal and need not be reduced provided the torque limit (1865 foot-pounds) is not exceeded.

### WING FLAP SETTINGS

A flap setting of 20° is recommended for all takeoffs unless a strong crosswind exists at which time 10° flaps may be preferred. Use of 20° flaps provides for a lower liftoff speed, as well as a reduction in ground roll and total distance over an obstacle compared to takeoff with flaps up.

Flap settings greater than 20° are not approved for takeoff.

### SHORT FIELD TAKEOFF

If an obstruction dictates the use of a steep climb angle after liftoff, accelerate to and climb at an obstacle clearance speed of 83 KIAS with 20° flaps. Takeoff performance data is shown in Section 5 based on this speed and configuration.

#### NOTE

The 83 KIAS obstacle clearance speed is a recommended safe speed under all conditions, including turbulence and complete engine failure. The actual V<sub>X</sub> speed with flaps 20° is 70 KIAS at maximum takeoff weight as noted in the Climb Gradient - Takeoff Flap Setting - Flaps 20 chart in Section 5.

(Continued Next Page)



## **SHORT FIELD TAKEOFF** (Continued)

After clearing the obstacle, and reaching a safe altitude, the flaps can be retracted slowly as the airplane accelerates to the normal climb airspeed.

Minimum ground roll takeoffs are accomplished by using 20° flaps, lifting the nose wheel off the ground as soon as practical and leaving the ground in a slightly tail-low attitude. However, after liftoff the airplane should be leveled immediately to accelerate to a safe climb airspeed.

## **TYPE II, TYPE III OR TYPE IV ANTI-ICE FLUID TAKEOFF**

When Type II, Type III or Type IV anti-ice fluid is applied to the airplane, a rotation speed of 89 KIAS with flaps UP is required. Use of flaps UP allows the airplane to accelerate to a higher rotation speed without any liftoff tendencies, which is required for the Type II, Type III or Type IV anti-ice fluid to be effective. Takeoff performance data shown in Section 5 is based on this speed and configuration.

## **CROSSWIND TAKEOFF**

Takeoffs into strong crosswinds normally are performed with FLAPS 10° or 20°. With the ailerons partially deflected into the wind, the airplane is accelerated to a speed higher than normal, and then rotated to prevent settling back to the runway. When clear of the ground, make a coordinated turn into the wind to correct for drift. The use of flaps 10° will improve directional control, but will also increase the takeoff distance. Increase the flaps 20° short field takeoff lift off and 50 feet obstacle speeds by 7 knots, if flaps 10° is used for takeoff.

## **ENROUTE CLIMB**

Normally, maximum climb power is maintained during the climb to cruise altitude. Adjust the POWER Lever as required to prevent exceeding maximum climb torque, maximum climb ITT of 765°C, or maximum climb N<sub>g</sub> of 101.6%, whichever occurs first.

### **NOTE**

Engine operations which exceed 740°C ITT can reduce engine life.

(Continued Next Page)

## ENROUTE CLIMB (Continued)

At lower altitudes and cool outside air temperatures (below approximately 10,000 feet), the engine will reach the torque limit before reaching the ITT or  $N_g$  limit. As the climb progresses and the torque is maintained by POWER Lever advancement, the ITT and  $N_g$  will increase until an altitude is reached where ITT or  $N_g$  will dictate POWER Lever positioning. When operating near the ITT limit, advance POWER Lever slowly to allow the current ITT to be indicated. The rate of power (and temperature) increase of the engine is greater than the response rate of the ITT indicating system; therefore, a rapid POWER Lever advance could allow an over-temperature condition to exist momentarily in the engine before the over-temperature would be indicated.

For maximum performance climb, the best rate-of-climb airspeed should be used with 1900 RPM and maximum climb power. This speed is 104 KIAS from sea level to 10,000 feet, decreasing to 87 KIAS at 20,000 feet.

For improved visibility over the nose, a cruise climb airspeed of 115 - 125 KIAS may be desirable at altitudes up to approximately 12,000 feet. Adjust the POWER Lever (in accord with the Maximum Engine Torque for Climb chart in Section 5) with the PROP PRM set at 1900 to prevent exceeding the maximum allowable shaft horsepower for the ambient conditions. After Climb Torque is set, PROP RPM can be reduced in accord the following table for improved passenger comfort.

Under no circumstances should the following limitations be exceeded:

1. The MAX TORQUE for the corresponding PROP RPM
2. A maximum climb ITT of 765°C
3. A maximum  $N_g$  of 101.6%

RPM	MAX TORQUE
1900	1865
1800	1970
1700	1970
1600	1970

### NOTE

- Engine operations which exceed 740° C ITT can reduce engine life.
- To achieve maximum flat-rated horsepower, use a minimum of 1800 RPM.

If an obstruction dictates the use of a steep climb angle, climb with Flaps UP and maximum continuous power at 86 KIAS.

## **CRUISE**

Normal cruise is performed using any desired power setting up to the maximum cruise power (observe ITT, torque, and  $N_q$  cruise limits). Do not exceed the maximum cruise torque or 740°C ITT shown in Cruise Performance or Cruise Maximum Torque charts in Section 5 for the particular altitude and temperature. Normally, a new engine will exhibit an ITT below 710°C when set to the maximum cruise torque.

The Sample Cruise Performance chart illustrates the advantage of higher altitude on both true airspeed and nautical miles per 1000 pounds of fuel. In addition, the beneficial effect of lower cruise power on nautical miles per 1000 pounds of fuel at a given altitude can be observed. Charts are provided in Section 5 to assist in selecting an efficient altitude based on available winds aloft information for a given trip. The selection of cruise altitude on the basis of the most favorable wind conditions and the use of low power settings are significant factors that should be considered to reduce fuel consumption.

PITOT/STATIC and STALL HEAT should be ON anytime the OAT is below 5°C (41°F). If icing conditions are encountered, ensure that the additional anti-icing systems (airframe ANTI-ICE (if installed) and INERTIAL SEPARATOR) are ON and in the BYPASS mode before encountering visible moisture below approximately 5°C (41°F). Windshield anti-ice (if installed) and propeller anti-ice (if installed) systems should also be turned ON.

(Continued Next Page)

## SAMPLE CRUISE PERFORMANCE CHART

PARAMETERS:

Standard Conditions

1900 RPM

Zero Wind

ALTITUDE (Feet)	Maximum Cruise Power		Maximum Range Power	
	KTAS	NM/1000 LBS	KTAS	NM/1000 LBS
5,000	182	430	155	470
10,000	182	480	157	530
15,000	177	540	159	580
20,000	167	610	161	610

**(WITHOUT CARGO POD)**

ALTITUDE (Feet)	Maximum Cruise Power		Maximum Range Power	
	KTAS	NM/1000 LBS	KTAS	NM/1000 LBS
5,000	173	410	149	450
10,000	172	460	151	500
15,000	167	510	152	540
20,000	157	570	156	570

**(WITH CARGO POD)**

Figure 4-4

(Continued Next Page)

## **CRUISE** (Continued)

These systems are designed to prevent ice formation, rather than removing it after it has formed. Even if the airplane is equipped with the "Flight Into Known Icing" package, accumulation of some airframe ice is unavoidable; this will increase airplane weight and drag and decrease airspeed and general airplane performance. It is always wise to avoid icing conditions, if practical.

Fuel quantity should be monitored to maintain a balanced fuel condition. Normally, both FUEL TANK SELECTORS are left ON and fuel will feed equally from each tank. If a fuel imbalance condition approaching 200 pounds does occur, the fuel tank selector for the tank with less fuel should be turned OFF until the fuel quantity is balanced. With one fuel tank selector OFF and fuel remaining in the tank being used is less than approximately 170 lbs (25 gallons), the FUEL SELECT OFF CAS MSG will come ON and a warning horn will sound.

### **WARNING**

**Turn IGNITION ON when flying in heavy precipitation or icing conditions. Refer to Engine Ignition Procedures in this section for additional information on use of ignition.**

### **CAUTION**

Prolonged zero or negative "G" maneuvers will starve the engine oil pump and result in engine damage.

Supplemental oxygen should be used by all occupants when cruising above 12,500 feet. It is often advisable to use oxygen at altitudes lower than 12,500 feet under conditions of night flying, fatigue, or periods of physiological or emotional disturbances. Also, the habitual and excessive use of tobacco or alcohol will usually necessitate the use of oxygen at less than 10,000 feet.

(Continued Next Page)

## **CRUISE** (Continued)

### **WARNING**

- **Operation up to the maximum allowable operating altitude is predicated on the availability and use of supplemental oxygen above 12,500 feet as specified by 14 CFR 91.211.**
- **Smoking is prohibited when using oxygen. Oil, grease, soap, lipstick, lip balm, and other fatty materials constitute a serious fire hazard when in contact with oxygen. Be sure hands and clothing are oil-free before handling oxygen equipment.**

## **STALLS**

Stall characteristics are conventional and aural warning is provided by a stall warning horn which sounds between 5 and 10 knots above the stall in all configurations.

Idle-power stall speeds at maximum weight for both forward and aft C.G. are presented in Section 5.

### **NOTE**

Practice of stalls should be done conservatively and with sufficient altitude for a safe recovery.

## **LANDING**

### **NORMAL LANDING**

Normal landing approaches can be made with power-on or idle power with any flap setting desired and the PROP RPM Lever set at 1900. Use of FULL flaps is normally preferred to minimize touchdown speed and subsequent need for braking. For a given flap setting, surface winds and turbulence are usually the primary factors in determining the most comfortable approach speed.

Actual touchdown should be made with idle power and on the main wheels first, just slightly above stall speed. The nose wheel is then gently lowered to the runway, the POWER Lever repositioned to the BETA range, and brakes applied as required. When clear of the runway, reposition the FUEL CONDITION Lever from HIGH IDLE to LOW IDLE. This will reduce cabin and exterior noise levels as well as reduce braking requirements when the POWER Lever is positioned ahead of the REVERSE range. Landings on rough or soft fields are accomplished in a similar manner except that the nose wheel is lowered to the runway at a lower speed to prevent excessive nose gear loads.

#### **NOTE**

The use of BETA range after touchdown is recommended to reduce brake wear. Generally, the POWER Lever can be moved aft of the IDLE gate until it contacts a spring in the control quadrant without substantial propeller erosion from loose debris on the runway or taxiway.

### **SHORT FIELD LANDING**

For short field landings, make a power approach at 78 KIAS with the PROP RPM lever at MAX (full forward) and with full flaps. After all approach obstacles are cleared, reduce power to idle. Maintain 78 KIAS approach speed by lowering the nose of the airplane. Touchdown should be made with the POWER Lever at IDLE, and on the main wheels first. Immediately after touchdown, lower the nose gear, reposition the POWER Lever against the spring in the BETA range, and apply heavy braking as required.

For maximum brake effectiveness after all three wheels are on the ground, hold full nose up elevator and apply maximum possible brake pressure without sliding the tires.

(Continued Next Page)

## **SHORT FIELD LANDING** (Continued)

The landing performance in Section 5 is based on the above procedure. A reduction in ground roll of approximately 10% will result from the use of reverse thrust (POWER Lever full aft to provide increased power from the gas generator and a reverse thrust propeller blade angle).

### **CAUTION**

To minimize propeller blade erosion or possible propeller blade damage, reverse thrust should be used only when necessary to shorten the ground roll. Bringing the propeller out of reverse before decelerating through approximately 25 knots will minimize propeller erosion.

## **CROSSWIND LANDING**

For crosswind approaches, either the wing-low, crab or combination method can be used. A flap setting between 10° and 30° is recommended. Use a minimum flap setting for the field length. After touchdown, lower the nose wheel and maintain control. Maintain a straight course using the steerable nose wheel, ailerons, and occasional braking if necessary.

## **BALKED LANDING**

In a balked landing (go-around) climb, the wing flap setting should be reduced to 20° after takeoff power is applied. After all obstacles are cleared and a safe altitude and airspeed are obtained, the WING FLAPS should be retracted.



## **AFTER SHUTDOWN**

If dusty conditions exist or if the last flight of the day has been completed, install engine inlet covers to protect the engine from debris. The covers can be installed after the engine has cooled (ITT indicator showing "off scale" temperature). Secure the propeller to prevent windmilling since no oil pressure is available for engine lubrication when the engine is not running.

## **COLD WEATHER OPERATION**

Special consideration should be given to the operation of the airplane fuel system during the winter season or prior to any flight in cold temperatures. Proper preflight draining of the fuel system is especially important and will eliminate any free water accumulation. The use of an additive is required for anti-ice protection. Refer to Section 8 for information on the proper use of additives.

Cold weather often causes conditions which require special care prior to flight. Operating the elevator and aileron trim tabs through their full travel in both directions will assure smooth operation by reducing any stiffness in these systems caused by the cold weather effects on system lubrication. Even small accumulations of frost, ice, snow or slush must be removed, particularly from wing, tail and all control surfaces to assure satisfactory flight performance and handling. Also, control surfaces must be free of any internal accumulations of ice or snow.

The use of an external pre-heater reduces wear and abuse to the engine and the electrical system. Pre-heat will lower the viscosity of the oil trapped in the oil cooler, prior to starting in extremely cold temperatures.

Use of an GPU is recommended when ambient temperatures are below  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ). Assure that oil temperature is in the green band ( $10^{\circ}\text{C}$  to  $99^{\circ}\text{C}$ ) prior to takeoff.

If snow or slush covers the takeoff surface, allowance must be made for takeoff distances which will be increasingly extended as the snow or slush depth increases. The depth and consistency of this cover can, in fact, prevent takeoff in many instances.

## **HIGH ALTITUDE OPERATION**

At altitudes above 20,000 feet, a compressor surge can be experienced if engine power is rapidly re-applied immediately after a power reduction. This characteristic is not detrimental to the engine and can be eliminated completely by turning BLEED AIR HEAT ON and adjusting the TEMP HOT knob to at least the one-half setting.

## **ENGINE COMPRESSOR STALLS**

An engine compressor stall can be noted by a single or multiple loud popping noise from the engine compartment. This situation can be resolved by reducing the engine power to a point where the "popping" discontinues, and slowly advancing the throttle to the necessary setting for continued flight. The use of BLEED AIR HEAT can also help eliminate engine compressor stalls if this situation is encountered.

## **NOISE CHARACTERISTICS**

Increased emphasis on improving the quality of our environment requires renewed effort on the part of all pilots to minimize the effect of airplane noise on the public.

We, as pilots, can demonstrate our concern for environmental improvement, by application of the following suggested procedures, and thereby tend to build public support for aviation:

1. Pilots operating aircraft under VFR over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level can be consistent with the provisions of government regulations.
2. During departure from or approach to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas.

### **NOTE**

The above recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgment, an altitude of less than 2000 feet is necessary for him to adequately exercise his duty to see and avoid other aircraft.

The certificated noise level for the Model 208B at 8750 pounds maximum weight is 82.7 dB(A). These measurements were obtained using a takeoff profile. No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

## PERFORMANCE

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## INTRODUCTION

Performance data charts on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy. The data in the charts has been computed from actual flight tests using average piloting techniques and an airplane and engine in good condition and equipped with a Hartzell propeller. Airplanes equipped with a McCauley propeller will have comparable performance and should also use the data shown.

### WARNING

**To make sure that performance in this section can be duplicated, the airplane and engine must be maintained in good condition. Pilot proficiency and proper preflight planning using data necessary for all flight phases is also required to assure expected performance with ample margins of safety.**

It should be noted that the performance information presented in the range and endurance profile charts allows for 45 minutes reserve fuel at the specified cruise power and altitude. Some indeterminate variables such as engine and propeller condition, and air turbulence may account for variations of 10% or more in range and endurance. Therefore, it is important to utilize all available information to estimate the fuel required for the particular flight.

Notes have been provided on various graphs and tables to approximate performance with the inertial separator in BYPASS and/or cabin heat on. The effect will vary, depending upon airspeed, temperature, and altitude. At lower altitudes, where operation on the torque limit is possible, the effect of the inertial separator will be less, depending upon how much power can be recovered after the separator vanes have been extended.

In some cases, performance charts in this section include data for temperatures which are outside of the ISA Conversion and Operating Temperature Limits chart. This data has been included to aid in interpolation.

## USE OF PERFORMANCE CHARTS

Performance data is presented in tabular or graphical form to illustrate the effect of different variables. Sufficiently detailed information is provided in the tables so that conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

## **SAMPLE PROBLEM**

The following sample flight problem utilizes information from the various charts to determine the predicted performance data for a typical flight of an airplane equipped with a cargo pod. A similar calculation can be made for an airplane without a cargo pod using charts identified as appropriate for this configuration. The following information is known:

### **AIRPLANE CONFIGURATION (CARGO POD INSTALLED)**

Takeoff weight	8600 Pounds
Usable fuel	2224 Pounds

### **TAKEOFF CONDITIONS**

Field pressure altitude	3500 Feet
Temperature	16°C (standard + 8°C)
Wind component along runway	12 Knot Headwind
Field length	4000 Feet

### **CRUISE CONDITIONS**

Total distance	650 Nautical Miles
Pressure altitude	11,500 Feet
Temperature	8°C
Expected wind enroute	10 Knot Headwind

### **LANDING CONDITIONS**

Field pressure altitude	1500 Feet
Temperature	25°C
Field length	3000 Feet

## TAKEOFF

The Takeoff Distance chart shows distances that are based on the short field technique. Conservative distances can be established by reading the chart at the next higher value of weight, altitude and temperature. For example, in this particular sample problem, the takeoff distance information presented for a weight of 8750 pounds, pressure altitude of 4000 feet and a temperature of 20°C should be used and results in the following:

Ground roll	1875 Feet
Total distance to clear a 50-foot obstacle	3295 Feet

These distances are well within the available takeoff field length. However, a correction for the effect of wind may be made based on Note 2 of the takeoff chart. The correction for a 12 knot headwind is:

### 12 Knots

11 Knots X 10% = 11% Decrease

This results in the following distances, corrected for wind:

Ground roll, zero wind	1875 Feet
Decrease in ground roll (1875 feet X 11%)	<u>-206 Feet</u>
Corrected ground roll	1669 Feet
Total distance to clear a 50-foot obstacle, zero wind	3295 Feet
Decrease in total distance (3295 feet X 11%)	<u>-362 Feet</u>
Corrected total distance to clear a 50-foot obstacle	2933 Feet

The Maximum Engine Torque For Takeoff chart should be consulted for takeoff power setting. For the above ambient conditions, the power setting is:

Takeoff torque	1865 Ft-Lbs
----------------	-------------

The Maximum Engine Torque For Climb chart should be consulted for climb power setting from field elevation to cruise altitude. For the above ambient conditions, the power setting is:

Field Elevation Maximum Climb Torque	1740 Ft-lbs
Cruise Altitude Maximum Climb Torque	1360 Ft-lbs

## CRUISE

The cruising altitude should be selected based on a consideration of trip length, winds aloft, and the airplane's performance. A cruising altitude and the expected wind enroute have been given for this sample problem. However, the power setting selection for cruise must be determined based on several considerations. These include the cruise performance characteristics presented in the Cruise Performance, Cruise Maximum Torque charts, Fuel and Time Required, and the Range and Endurance Profile charts.

The Range Profile chart shows range at maximum cruise power and also at maximum range power. For this sample problem, maximum cruise power and 1900 RPM will be used.

The Cruise Performance chart for 12,000 feet pressure altitude is entered using 10°C temperature. These values most nearly correspond to the planned altitude and expected temperature conditions. The torque setting for maximum cruise power is 1280 Ft-Lbs torque at 1900 RPM which results in the following:

True Airspeed	158 Knots
Cruise Fuel Flow	306 PPH

## FUEL REQUIRED

The total fuel requirement for the flight may be estimated using the performance information in the Time, Fuel, and Distance to Climb chart, Cruise Performance chart, and Time, Fuel, and Distance to Descend chart or in the Fuel and Time Required (Maximum Cruise Power) chart and Fuel and Time Required (Maximum Range Power) chart. The longer detailed method will be used for this sample problem, but the use of Fuel and Time Required (Maximum Cruise Power) or Fuel and Time Required (Maximum Range Power) charts will provide the desired information for most flight planning purposes.

Assuming a maximum climb, Time, Fuel, and Distance to Climb (Maximum Rate Climb) chart may be used to determine the time, fuel and distance to climb by reading values for a weight of 8000 pounds and a temperature 20°C above standard. The difference between the values shown in the table for 4000 feet and 12,000 feet results in the following:

Time	16 Minutes
Fuel	94 Pounds
Distance	33 Nautical Miles

(Continued Next Page)



**FUEL REQUIRED** (Continued)

Similarly, Time, Fuel, and Distance to Descend chart shows that a descent from 12,000 feet to sea level results in the following:

Time	15 Minutes
Fuel	72 Pounds
Distance	43 Nautical Miles

The distances shown on the climb and descent charts are for zero wind. A correction for the effect of wind may be made as follows:

Distance during climb with no wind:	33 Nautical Miles
Decrease in distance due to wind (16/60 X 10 knot headwind)	<u>-3 Nautical Miles</u>
Corrected distance to climb	30 Nautical Miles

Similarly, the distance for descent may be corrected for the effect of wind and results in 40 nautical miles.

The cruise distance is then determined by subtracting the distance during climb and distance during descent.

Total distance	650 Nautical Miles
Distance during climb and descent	<u>-70 Nautical Miles</u>
Cruise distance	580 Nautical Miles

With an expected 10 knot headwind, the ground speed for cruise is predicted to be:

158 Knots
<u>-10 Knots</u>
148 Knots

Therefore, the time required for the cruise portion of the trip is:

$$\frac{580 \text{ Nautical Miles}}{148 \text{ Knots}} = 3.9 \text{ Hours}$$

The fuel required for cruise is:

$$3.9 \text{ hours} \times 306 \text{ pounds/hour} = 1194 \text{ Pounds}$$

A 45-minute reserve requires:

$$\frac{45}{60} \times 306 \text{ pounds/hour} = 230 \text{ Pounds}$$

(Continued Next Page)

### **FUEL REQUIRED** (Continued)

The total estimated fuel required is as follows:

Engine start, taxi, and takeoff	35 Pounds
Climb	+94 Pounds
Cruise	+1194 Pounds
Descent	+72 Pounds
Reserve	+ <u>230 Pounds</u>
Total fuel required	1625 Pounds

Once the flight is underway, ground speed checks will provide a more accurate basis for estimating the time enroute and the corresponding fuel required to complete the trip with ample reserve.

### **LANDING**

A procedure similar to takeoff should be used for estimating the landing distance at the destination airport. The estimated landing weight is as follows:

Takeoff weight	8600 Pounds
Fuel required for climb, cruise, and descent	- <u>1625 Pounds</u>
Landing weight	6975 Pounds

The Short Field Landing Distance chart presents landing distance information for the short field technique. The landing distances for a weight of 7000 pounds and corresponding to 2000 feet pressure altitude and a temperature of 30°C should be used and are as follows:

Ground roll	850 Feet
Total distance to clear a 50-foot obstacle	1650Feet

A correction for the effect of wind may be made based on Note 2 of the landing chart using the same procedure as outlined for takeoff.

## AIRSPEED CALIBRATION NORMAL STATIC SOURCE

**CONDITIONS:**

8750 Pounds

Power required for level flight or maximum rated RPM dive.

<b>Flaps UP</b>									
KIAS	---	80	100	120	140	160	175	---	
KCAS	---	85	100	120	140	160	175	---	
<b>Flaps 10°</b>									
KIAS	75	80	100	120	140	160	175	---	
KCAS	79	83	100	120	140	160	175	---	
<b>Flaps 20°</b>									
KIAS	65	70	80	90	100	110	130	150	
KCAS	71	74	81	91	100	110	130	150	
<b>Flaps FULL</b>									
KIAS	65	70	80	90	100	110	125	---	
KCAS	69	72	80	90	101	111	126	---	

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### NOTE

Where airspeed values have been replaced by dashes, the airspeed would be either below stall speed at maximum weight or above the maximum approved operating limit speed for the condition.

Figure 5-1 (Sheet 1 of 2)

## AIRSPEED CALIBRATION ALTERNATE STATIC SOURCE

**CONDITIONS:**

8750 Pounds

Power required for level flight or maximum rated RPM dive.

Refer to Sheet 1 for appropriate notes applicable to this chart.

### VENTS CLOSED

<b>Flaps UP</b>							
NORMAL KIAS	80	100	120	140	160	175	---
ALTERNATE KIAS	86	103	123	144	165	180	---
<b>Flaps 10°</b>							
NORMAL KIAS	70	80	100	120	140	160	175
ALTERNATE KIAS	76	84	103	124	145	166	182
<b>Flaps 20°</b>							
NORMAL KIAS	60	70	80	100	120	140	150
ALTERNATE KIAS	66	74	83	104	125	147	157
<b>Flaps FULL</b>							
NORMAL KIAS	60	70	80	90	100	110	125
ALTERNATE KIAS	65	73	83	94	105	116	132

### VENTS OPEN

<b>Flaps UP</b>							
NORMAL KIAS	80	100	120	140	160	175	---
ALTERNATE KIAS	82	99	119	140	160	176	---
<b>Flaps 10°</b>							
NORMAL KIAS	70	80	100	120	140	160	175
ALTERNATE KIAS	72	80	100	120	141	162	178
<b>Flaps 20°</b>							
NORMAL KIAS	60	70	80	100	120	140	150
ALTERNATE KIAS	62	70	79	100	121	143	153
<b>Flaps FULL</b>							
NORMAL KIAS	60	70	80	90	100	110	125
ALTERNATE KIAS	61	70	79	90	101	112	128

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Figure 5-1 (Sheet 2)

**ALTIMETER CORRECTION  
ALTERNATE STATIC SOURCE  
VENTS CLOSED**

Condition	Correction to be Added - Feet					
	KIAS					
	80	90	100	120	140	160
<b>Flaps UP</b>						
Sea Level	---	15	20	40	55	80
10,000 FT	---	20	30	50	75	---
20,000 FT	---	25	40	70	---	---
<b>Flaps 20°</b>						
Sea Level	20	25	35	55	75	---
10,000 FT	25	35	50	75	---	---
<b>Flaps FULL</b>						
Sea Level	15	25	35	60	---	---
10,000 FT	20	35	50	85	---	---

**VENTS OPEN**

Condition	Correction to be Added - Feet					
	KIAS					
	80	90	100	120	140	160
<b>Flaps UP</b>						
Sea Level	---	-15	-10	-10	5	10
10,000 FT	---	-20	-20	-15	10	---
20,000 FT	---	-30	-25	-15	---	---
<b>Flaps 20°</b>						
Sea Level	-20	-10	-5	10	25	---
10,000 FT	-25	-15	-5	15	---	---
<b>Flaps FULL</b>						
Sea Level	-15	-10	0	20	---	---
10,000 FT	-20	-10	0	25	---	---

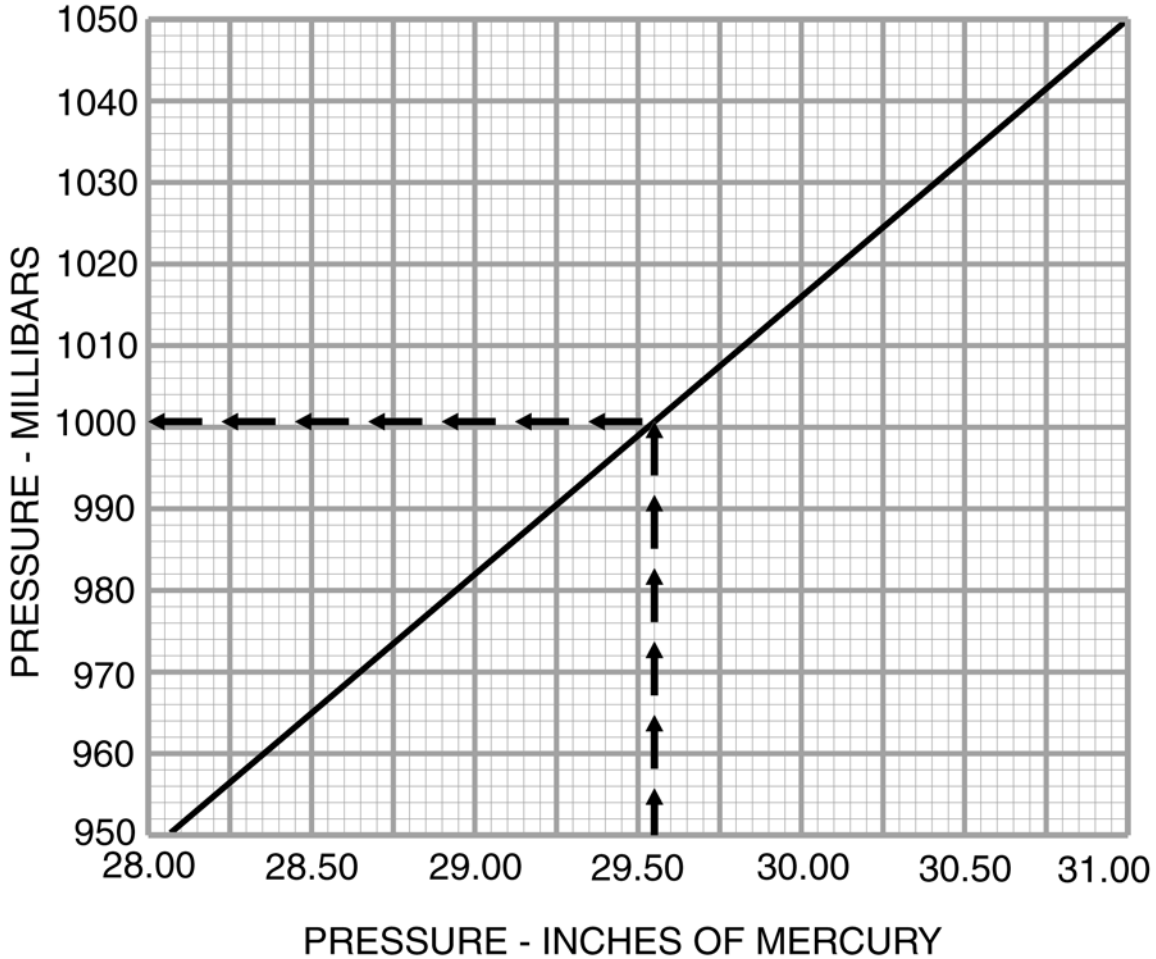
**NOTE**

1. Add correction to desired altitude to obtain indicated altitude to fly.
2. Where altimeter correction values have been replaced by dashes, the correction is unnecessary because of conditions in which airspeed is not attainable in level flight.

Figure 5-2

## PRESSURE CONVERSION

A39230



Example:

Pressure = 29.55 inches of mercury.

Pressure = 1000.6 millibars.

Figure 5-3

# TEMPERATURE CONVERSION CHART

A39231

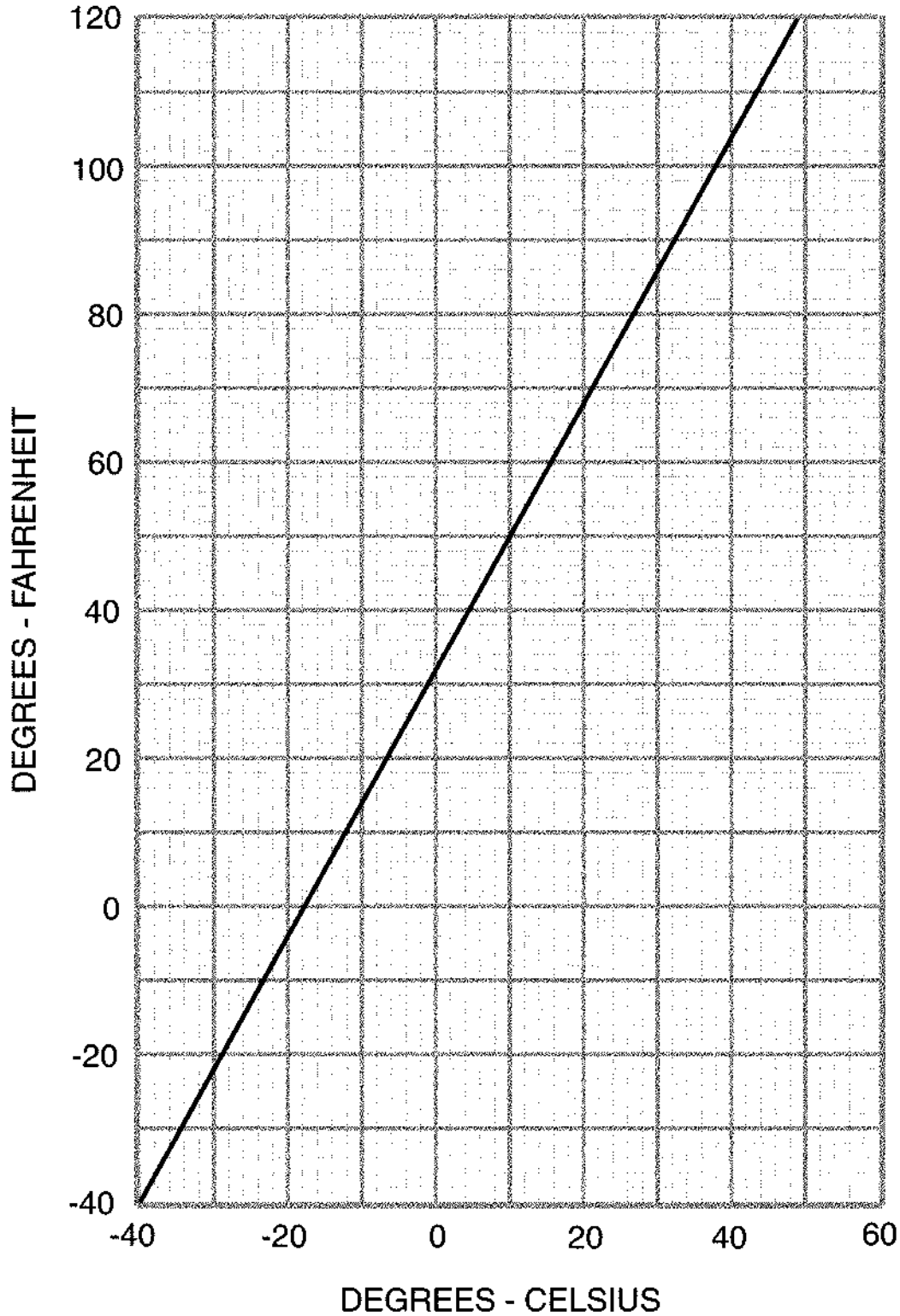


Figure 5-4

# ISA CONVERSION AND OPERATING TEMPERATURE LIMITS

## CAUTION

Do not Operate in shaded area of chart.

A39232

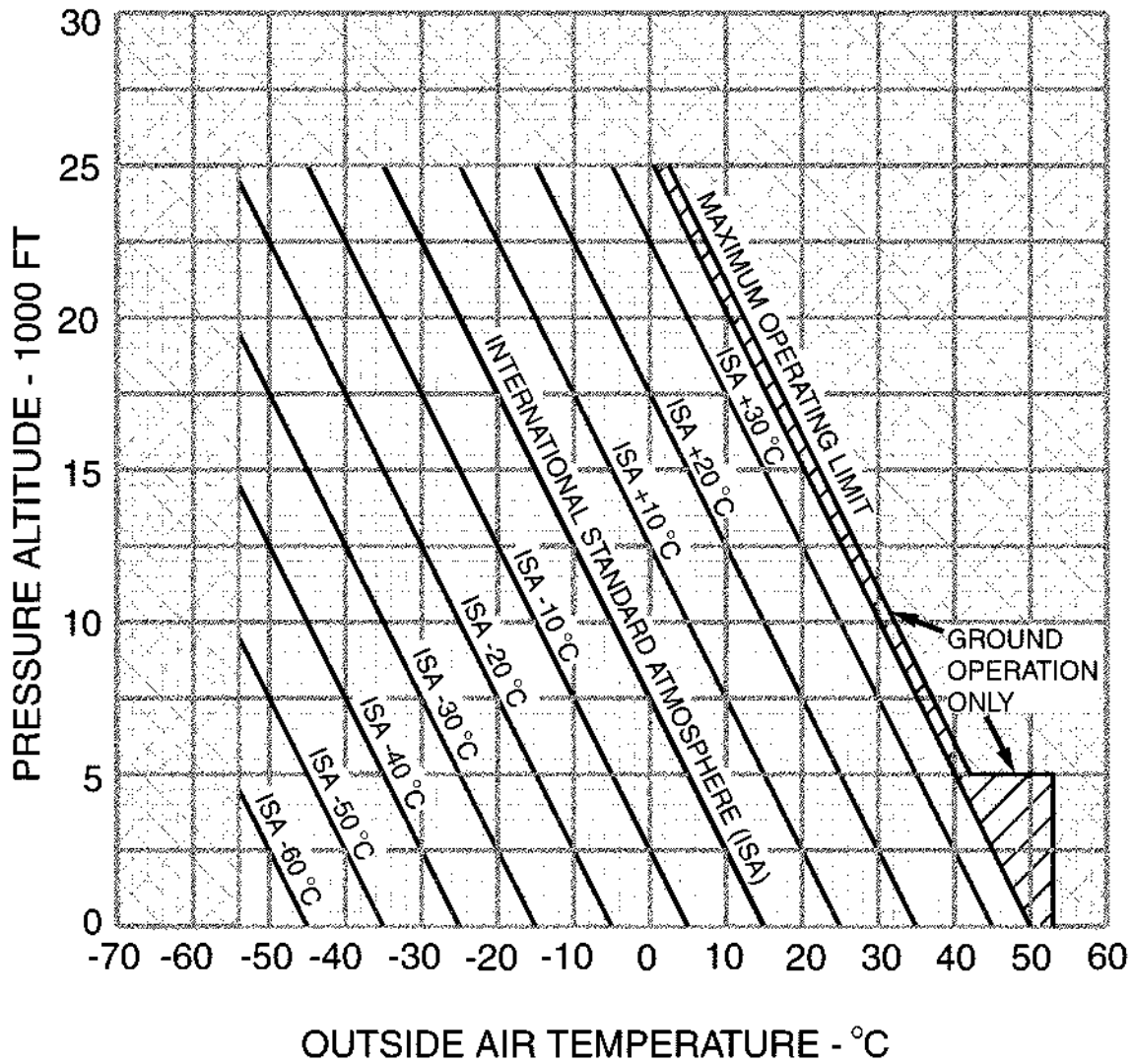


Figure 5-5



## STALL SPEEDS

CONDITIONS:

8750 Pounds

POWER Lever **IDLE**

FUEL CONDITION Lever **HIGH IDLE**

### MOST REARWARD CENTER OF GRAVITY

Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
<b>UP</b>	63	78	68	84	75	93	89	110
<b>10°</b>	58	69	62	74	69	82	82	98
<b>20°</b>	53	63	57	68	63	75	75	89
<b>FULL</b>	48	60	52	64	57	71	68	85

### MOST FORWARD CENTER OF GRAVITY

Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
<b>UP</b>	63	78	68	84	75	93	89	110
<b>10°</b>	60	70	64	75	71	83	85	99
<b>20°</b>	54	64	58	69	64	76	76	91
<b>FULL</b>	50	61	54	66	59	73	71	86

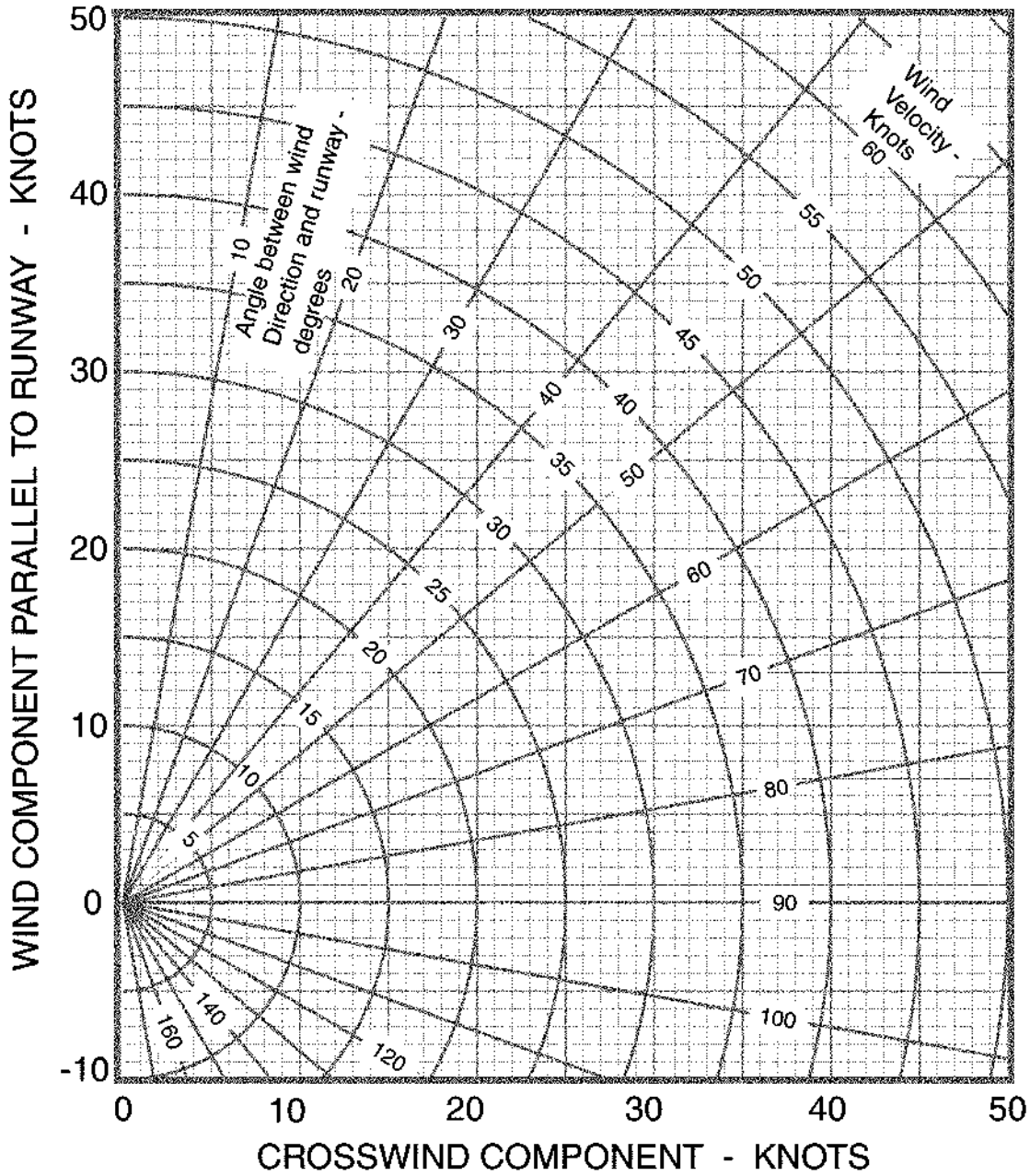
### NOTE

- Altitude loss during a stall recovery may be as much as 300 feet from a wings-level stall, and even greater from a turning stall.
- KIAS values are approximate.

Figure 5-6

# WIND COMPONENTS

A39233



## NOTE

Maximum demonstrated crosswind velocity is 20 knots (not a limitation).

Figure 5-7

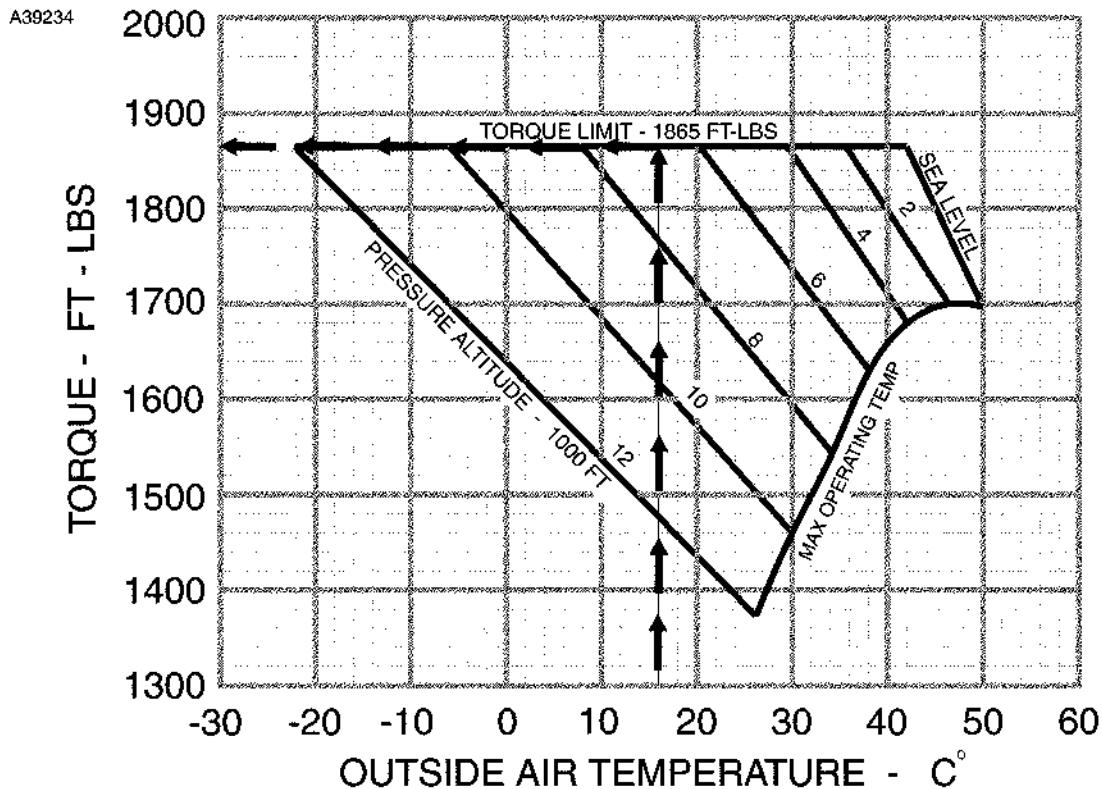
## MAXIMUM ENGINE TORQUE FOR TAKEOFF

CONDITIONS:

1900 RPM

60 KIAS

INERTIAL SEPARATOR **NORMAL**



### NOTE

1. Torque increases approximately 10 Ft-Lbs from 0 to 60 KIAS.
2. Torque on this chart shall be achieved without exceeding 805°C ITT or 101.6 percent  $N_g$ . When the ITT exceeds 765°C, this power setting is time limited to 5 minutes.
3. With the inertial separator in BYPASS, where altitude and temperature do not permit 1865 Ft-Lbs for takeoff, decrease torque setting by 15 Ft-Lbs.
4. With the cabin heater ON, where altitude and temperature do not permit 1865 Ft-Lbs for takeoff, decrease torque setting by 65 Ft-Lbs.

Figure 5-8

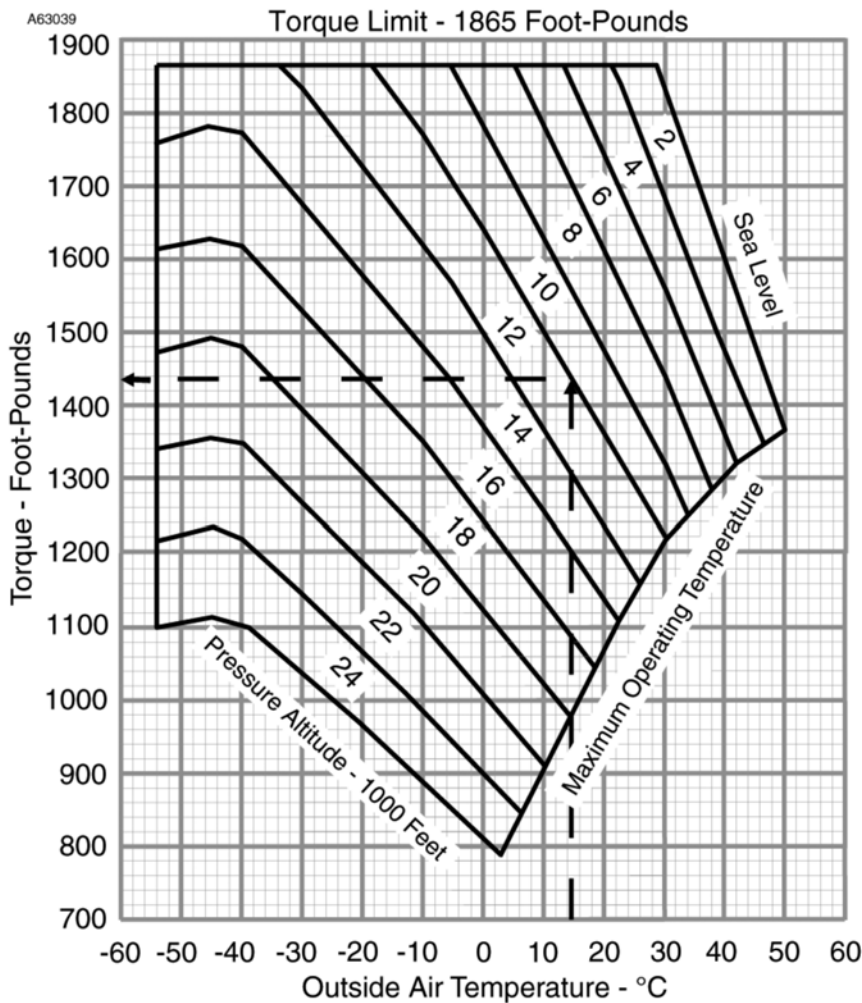
# MAXIMUM ENGINE TORQUE FOR CLIMB

CONDITIONS:

1900 RPM

V<sub>y</sub> KIAS

INERTIAL SEPARATOR **NORMAL**



## NOTE

1. Torque on this chart shall be achieved without exceeding 765°C ITT or 101.6 percent N<sub>g</sub>.
2. With the inertial separator in BYPASS, decrease torque setting by 100 Ft-Lbs.
3. With the cabin heater ON, decrease torque setting by 80 Ft-Lbs.

Figure 5-9

## **CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE**

### **NOTE**

The following general information is applicable to all SHORT FIELD TAKEOFF DISTANCE Charts.

1. Use short field takeoff technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwind up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "Ground Roll" figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 10% for CABIN HEAT ON.
5. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those distances which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.
6. For operation above 40°C and below the operating temperature limits, increase distances at 40°C by 20%.

Figure 5-10 (Sheet 1 of 5)

## CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 70 KIAS

**8750 Pounds:**

Speed at 50 Feet:

83 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1205	2160	1280	2295	1365	2430
2000	1360	2430	1455	2580	1545	2740
4000	1550	2745	1655	2920	1760	3105
6000	1765	3115	1890	3325	2015	3540
8000	2025	3560	2165	3805	2345	4125
10,000	2335	4090	2585	4580	2930	5325
12,000	2875	5155	3270	6030	3745	7175

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1445	2570	1535	2720	1625	2870
2000	1645	2905	1745	3075	1910	3400
4000	1875	3295	1995	3510	2290	4135
6000	2145	3765	2435	4370	2805	5195
8000	2670	4815	3065	5715	3565	7005
10,000	3370	6350	3915	7790	---	---
12,000	4350	8865	5130	11,755	---	---

Figure 5-10 (Sheet 2)

## CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 67 KIAS

**8300 Pounds:**

Speed at 50 Feet:

80 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1050	1870	1120	1980	1190	2095
2000	1190	2095	1265	2225	1345	2360
4000	1350	2360	1440	2510	1530	2665
6000	1535	2675	1640	2850	1750	3030
8000	1760	3045	1880	3250	2030	3515
10,000	2025	3490	2235	3890	2530	4485
12,000	2480	4350	2810	5040	3205	5915

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1260	2215	1335	2340	1415	2470
2000	1430	2495	1515	2640	1660	2910
4000	1630	2825	1735	3005	1980	3510
6000	1860	3220	2105	3710	2415	4360
8000	2305	4070	2635	4775	3050	5745
10,000	2890	5275	3340	6345	---	---
12,000	3700	7135	4330	8965	---	---

Figure 5-10 (Sheet 3)

## CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 64 KIAS

**7800 Pounds:**

Speed at 50 Feet:

76 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	895	1585	955	1680	1015	1775
2000	1015	1775	1080	1880	1145	1990
4000	1150	1995	1225	2115	1300	2245
6000	1305	2250	1395	2395	1485	2545
8000	1495	2555	1595	2725	1720	2940
10,000	1715	2920	1890	3240	2130	3705
12,000	2090	3605	2360	4135	2680	4800

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1075	1875	1140	1975	1205	2080
2000	1215	2105	1290	2225	1410	2440
4000	1385	2375	1470	2525	1675	2925
6000	1580	2700	1780	3085	2030	3595
8000	1945	3375	2215	3920	2550	4645
10,000	2425	4310	2785	5100	---	---
12,000	3075	5685	3575	6920	---	---

Figure 5-10 (Sheet 4)



## CARGO POD INSTALLED SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 61 KIAS

**7300 Pounds:**

Speed at 50 Feet:

73 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	760	1345	805	1420	855	1500
2000	855	1500	910	1585	970	1680
4000	970	1680	1035	1780	1100	1885
6000	1100	1895	1175	2010	1250	2130
8000	1255	2145	1340	2280	1445	2455
10,000	1440	2440	1585	2695	1780	3065
12,000	1750	2985	1970	3405	2225	3910

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	910	1580	960	1665	1015	1755
2000	1025	1775	1085	1870	1185	2045
4000	1165	1995	1240	2115	1405	2435
6000	1330	2260	1495	2570	1695	2965
8000	1630	2800	1845	3225	2115	3780
10,000	2020	3530	2305	4130	---	---
12,000	2540	4575	2930	5460	---	---

Figure 5-10 (Sheet 5)

## **CARGO POD INSTALLED FLAPS UP TAKEOFF DISTANCE**

### **NOTE**

The following general information is applicable to all FLAPS UP TAKEOFF DISTANCE Charts.

1. Use Type II, Type III, or Type IV anti-ice fluid takeoff technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "Ground Roll" figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 10% for CABIN HEAT ON.

Figure 5-11 (Sheet 1 of 3)

## CARGO POD INSTALLED FLAPS UP TAKEOFF DISTANCE

CONDITIONS:

Flaps **UP**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 83 KIAS

**8750 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1720	3205	1840	3420	1960	3645	2085	3880
2000	1950	3625	2085	3875	2225	4140	2370	4410
4000	2215	4125	2370	4415	2535	4725	2700	5045
6000	2530	4715	2710	5060	2900	5425	3095	5805
8000	2900	5425	3110	5835	3335	6270	3605	6825
10,000	3340	6280	3590	6775	3995	7660	4575	9045
12,000	3930	7485	4475	8740	5135	10,385	5955	12,585

Lift Off: 83 KIAS

**8300 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1620	3015	1730	3220	1845	3430	1965	3650
2000	1835	3410	1960	3645	2095	3890	2230	4145
4000	2085	3875	2230	4150	2385	4435	2540	4735
6000	2380	4430	2550	4750	2725	5090	2910	5445
8000	2725	5090	2925	5475	3130	5880	3385	6395
10,000	3140	5890	3375	6350	3750	7170	4285	8450
12,000	3690	7010	4195	8170	4810	9685	5570	11,705

Figure 5-11 (Sheet 2)

## CARGO POD INSTALLED FLAPS UP TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **UP**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 83 KIAS

**7800 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1510	2810	1615	2995	1720	3190	1830	3395
2000	1710	3175	1825	3390	1950	3620	2075	3855
4000	1940	3605	2080	3860	2220	4125	2365	4400
6000	2215	4115	2370	4415	2535	4730	2705	5055
8000	2535	4730	2720	5085	2910	5455	3145	5930
10,000	2920	5465	3135	5890	3480	6640	3975	7810
12,000	3430	6495	3890	7555	4460	8935	5155	10,765

Lift Off: 83 KIAS

**7300 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1405	2605	1500	2780	1595	2960	1695	3145
2000	1585	2945	1695	3145	1810	3355	1925	3570
4000	1800	3340	1925	3575	2055	3820	2190	4075
6000	2055	3810	2200	4085	2350	4375	2505	4675
8000	2350	4375	2520	4700	2695	5040	2910	5475
10,000	2705	5050	2905	5440	3220	6125	3675	7190
12,000	3170	5995	3595	6960	4115	8215	4750	9865

Figure 5-11 (Sheet 3)

## CARGO POD INSTALLED RATE OF CLIMB - TAKEOFF FLAP SETTING FLAPS 20°

**CONDITIONS:**

Takeoff Power

1900 RPM

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	92	875	855	835	815	795
	2000	90	860	835	815	795	730
	4000	89	835	815	790	765	645
	6000	88	815	790	765	740	555
	8000	87	785	760	735	620	435
	10,000	85	760	730	665	500	---
	12,000	84	725	680	540	380	---
8300	Sea Level	91	955	940	920	900	880
	2000	89	940	920	895	875	810
	4000	88	915	895	870	850	725
	6000	86	895	870	845	820	630
	8000	85	865	840	815	700	505
	10,000	84	835	810	745	575	---
	12,000	82	805	760	615	450	---
7800	Sea Level	89	1055	1035	1020	1000	980
	2000	87	1035	1015	995	975	910
	4000	86	1015	995	970	950	820
	6000	85	990	965	945	920	720
	8000	83	965	940	915	795	595
	10,000	82	935	905	840	665	---
	12,000	80	905	855	710	540	---
7300	Sea Level	88	1160	1145	1130	1110	1090
	2000	86	1145	1125	1105	1085	1020
	4000	85	1125	1105	1080	1060	925
	6000	84	1100	1075	1055	1030	825
	8000	82	1075	1050	1025	900	690
	10,000	81	1045	1015	950	765	---
	12,000	79	1015	965	810	635	---

### NOTE

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease rate of climb by 20 FPM for INERTIAL SEPARATOR set in BYPASS and 45 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-12

## CARGO POD INSTALLED CLIMB GRADIENT - TAKEOFF FLAP SETTING FLAPS 20°

**CONDITIONS:**

Takeoff Power  
1900 RPM

Zero Wind

INERTIAL SEPARATOR NORMAL

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb Gradient - Feet/Nautical Mile (FT/NM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	70	710	670	630	595	560
	2000	71	675	630	590	555	500
	4000	71	635	590	555	520	430
	6000	71	595	555	515	480	355
	8000	72	555	515	475	390	270
	10,000	72	515	475	420	310	---
	12,000	72	475	430	330	225	---
8300	Sea Level	68	790	745	705	665	630
	2000	69	750	705	660	625	565
	4000	69	710	665	620	585	490
	6000	69	665	620	580	545	410
	8000	69	625	580	540	450	325
	10,000	69	580	540	475	360	---
	12,000	69	540	490	385	275	---
7800	Sea Level	65	890	840	795	755	715
	2000	65	845	795	750	710	645
	4000	66	800	750	705	665	565
	6000	66	755	705	665	625	480
	8000	66	710	660	620	525	390
	10,000	67	665	620	550	430	---
	12,000	67	620	565	450	335	---
7300	Sea Level	62	1005	950	900	855	810
	2000	62	955	900	855	805	735
	4000	63	905	855	805	760	650
	6000	63	855	805	755	715	560
	8000	63	805	755	710	605	460
	10,000	64	760	710	635	505	---
	12,000	64	710	650	530	405	---

### NOTE

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease climb gradient by 10 FT/NM for INERTIAL SEPARATOR set in BYPASS and 30 FT/NM for CABIN HEAT ON.
3. Where climb gradient values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those climb gradients which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-13

**CARGO POD INSTALLED  
MAXIMUM RATE OF CLIMB  
FLAPS UP**

CONDITIONS:  
1900 RPM  
INERTIAL SEPARATOR NORMAL

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	104	975	960	940	920	705
	4000	104	940	915	890	785	450
	8000	104	890	865	780	515	215
	12,000	101	840	710	510	275	---
	16,000	95	610	445	260	50	---
	20,000	87	345	195	20	---	---
	24,000	78	95	---	---	---	---
8300	Sea Level	103	1065	1045	1025	1005	780
	4000	103	1025	1000	980	865	520
	8000	103	980	950	865	590	275
	12,000	100	930	795	585	340	---
	16,000	94	690	520	330	110	---
	20,000	86	420	260	80	---	---
	24,000	77	165	15	---	---	---
7800	Sea Level	101	1170	1150	1135	1115	880
	4000	101	1130	1110	1090	975	610
	8000	101	1085	1060	975	685	355
	12,000	98	1035	900	680	425	---
	16,000	91	790	615	415	185	---
	20,000	83	510	345	160	---	---
	24,000	73	245	95	---	---	---
7300	Sea Level	99	1285	1270	1250	1235	990
	4000	99	1250	1230	1210	1090	710
	8000	99	1205	1180	1090	790	445
	12,000	96	1155	1015	790	520	---
	16,000	88	900	720	510	275	---
	20,000	80	605	440	245	---	---
	24,000	69	330	175	---	---	---

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. With climb power set below the torque limit, decrease rate of climb by 30 FPM for INERTIAL SEPARATOR set in BYPASS and 65 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected or operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-14

**CARGO POD INSTALLED  
CLIMB GRADIENT - TAKEOFF  
FLAPS UP**

**CONDITIONS:**

Takeoff Power

1900 RPM

Zero Wind

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb Gradient - Feet/Nautical Mile (FT/NM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	68	735	695	655	620	475
	2000	69	695	655	615	580	390
	4000	69	660	615	580	500	305
	6000	70	620	580	545	410	230
	8000	70	580	540	475	330	165
	10,000	71	545	505	390	250	---
	12,000	72	505	420	305	180	---
8300	Sea Level	66	810	770	725	690	535
	2000	66	770	730	685	650	445
	4000	67	730	690	650	565	360
	6000	68	690	645	610	470	280
	8000	68	650	605	540	380	210
	10,000	69	610	570	445	300	---
	12,000	69	570	475	355	225	---
7800	Sea Level	61	910	860	815	775	615
	2000	62	865	820	775	735	515
	4000	62	820	775	730	640	425
	6000	62	780	730	690	540	340
	8000	63	735	690	615	445	265
	10,000	63	690	645	515	360	---
	12,000	63	645	550	420	280	---
7300	Sea Level	59	1020	970	920	875	700
	2000	59	975	920	875	830	595
	4000	59	925	875	830	730	500
	6000	59	880	830	780	620	405
	8000	59	830	780	700	520	330
	10,000	59	785	735	595	430	---
	12,000	59	735	630	490	340	---

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**NOTE**

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease climb gradient by 10 FT/NM for INERTIAL SEPARATOR set in BYPASS and 40 FT/NM for CABIN HEAT ON.
3. Where climb gradient values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those climb gradients which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-15



**CARGO POD INSTALLED  
CRUISE CLIMB  
FLAPS UP - 115 KIAS**

CONDITIONS:  
1900 RPM  
INERTIAL SEPARATOR NORMAL

Weight Pounds	Pressure Altitude Feet	Rate of Climb - Feet Per Minute (FPM)				
		-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	940	915	890	865	635
	2000	915	890	865	840	495
	4000	890	865	835	715	355
	6000	865	835	805	570	225
	8000	835	800	710	425	105
	10,000	800	765	555	285	---
8300	Sea Level	1015	990	970	945	700
	2000	995	970	945	915	555
	4000	970	940	915	790	410
	6000	945	910	880	635	275
	8000	915	880	785	485	150
	10,000	880	845	625	340	---
7800	Sea Level	1115	1090	1065	1040	780
	2000	1090	1065	1040	1010	630
	4000	1065	1040	1010	880	475
	6000	1040	1005	975	715	330
	8000	1010	975	875	555	200
	10,000	975	935	705	405	---
7300	Sea Level	1220	1195	1175	1150	870
	2000	1195	1170	1145	1120	710
	4000	1170	1145	1115	975	550
	6000	1145	1115	1080	805	395
	8000	1115	1080	975	635	255
	10,000	1080	1040	795	475	---
	12,000	1040	875	615	310	---

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. With climb power set below the torque limit, decrease rate of climb by 50 FPM for INERTIAL SEPARATOR set in BYPASS and 70 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected or operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-16

**CARGO POD INSTALLED  
RATE OF CLIMB  
BALKED LANDING - FLAPS FULL**

**CONDITIONS:**

Takeoff Power

1900 RPM

**INERTIAL SEPARATOR NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8500	Sea Level	83	825	805	780	760	735
	2000	82	805	780	755	735	670
	4000	81	780	755	730	705	590
	6000	80	755	730	700	675	495
	8000	79	730	700	670	560	380
	10,000	78	700	665	600	440	---
	12,000	77	665	620	480	325	---
8000	Sea Level	82	915	895	870	850	830
	2000	81	895	870	850	825	760
	4000	80	870	845	820	795	675
	6000	79	845	820	795	765	580
	8000	78	820	790	760	645	460
	10,000	77	790	760	690	525	---
	12,000	76	755	710	565	405	---
7500	Sea Level	81	1015	995	975	950	930
	2000	80	995	975	950	925	860
	4000	79	970	950	925	900	775
	6000	78	950	920	895	870	675
	8000	77	920	890	865	745	550
	10,000	75	890	860	790	620	---
	12,000	74	860	810	660	490	---
7000	Sea Level	80	1125	1105	1085	1065	1045
	2000	79	1105	1085	1065	1040	970
	4000	78	1085	1060	1035	1010	880
	6000	77	1060	1035	1010	980	780
	8000	75	1035	1005	975	850	645
	10,000	74	1005	970	900	720	---
	12,000	73	970	920	765	590	---

**NOTE**

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease rate of climb by 15 FPM for INERTIAL SEPARATOR set in BYPASS and 45 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-17

## CARGO POD INSTALLED TIME, FUEL, AND DISTANCE TO CLIMB MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps **UP**

Zero Wind

1900 RPM

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb From Sea Level								
			20°C Below Standard			Standard Temperature			20°C Above Standard		
			Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM
8750	Sea Level	104	0	0	0	0	0	0	0	0	0
	4000	104	4	32	8	5	33	8	6	38	10
	8000	104	9	64	16	9	66	17	12	80	24
	12,000	102	14	98	25	15	105	29	22	132	43
	16,000	96	20	136	37	23	152	45	35	202	71
	20,000	88	28	186	54	36	219	72	69	349	142
	24,000	79	49	278	93	75	388	152	---	---	---
8300	Sea Level	103	0	0	0	0	0	0	0	0	0
	4000	103	4	29	7	4	30	7	5	34	9
	8000	103	8	58	14	8	60	15	11	72	21
	12,000	101	13	89	23	14	95	26	19	116	37
	16,000	95	18	123	33	21	135	40	30	172	60
	20,000	87	25	165	47	31	189	61	51	265	104
	24,000	77	40	233	76	54	287	106	---	---	---
7800	Sea Level	101	0	0	0	0	0	0	0	0	0
	4000	101	4	26	6	4	27	6	4	30	8
	8000	101	7	52	13	8	54	14	10	63	18
	12,000	99	11	80	20	12	84	22	16	100	31
	16,000	92	16	110	29	18	119	34	25	145	49
	20,000	84	22	146	41	27	163	51	40	210	79
	24,000	74	33	198	62	42	229	81	88	395	178
7300	Sea Level	99	0	0	0	0	0	0	0	0	0
	4000	99	3	24	5	3	24	6	4	27	7
	8000	99	7	47	11	7	49	12	9	55	16
	12,000	97	10	72	18	11	75	20	14	87	27
	16,000	89	14	99	25	16	105	30	21	124	41
	20,000	80	20	129	35	23	141	43	32	173	63
	24,000	70	29	171	52	34	191	65	55	260	108

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. Add 35 pounds of fuel for engine start, taxi, and takeoff allowances.
3. With INERTIAL SEPARATOR set in BYPASS, increase time, fuel, and distance numbers by 1% for each 2000 feet of climb and for CABIN HEAT ON, increase time, fuel, and distance numbers by 1% for each 1000 feet of climb.
4. Where time, fuel, and distance values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected.

Figure 5-18 (Sheet 1 of 2)

## CARGO POD INSTALLED

### TIME, FUEL, AND DISTANCE TO CLIMB

#### CRUISE CLIMB - 115 KIAS

CONDITIONS:

Flaps **UP**  
1900 RPM

Zero Wind

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb From Sea Level								
		20°C Below Standard			Standard Temperature			20°C Above Standard		
		Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM
8750	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	17	4	2	17	5	3	20	6
	4000	5	33	9	5	35	9	6	42	13
	6000	7	50	14	7	53	15	10	65	20
	8000	10	68	19	10	71	20	14	91	30
	10,000	12	86	24	13	92	27	19	122	42
	12,000	15	105	30	17	115	35	26	159	58
8300	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	15	4	2	16	4	3	18	5
	4000	4	31	8	4	32	9	6	38	11
	6000	6	46	12	7	48	13	9	59	18
	8000	9	62	17	9	65	18	13	82	27
	10,000	11	79	22	12	84	24	17	108	37
	12,000	13	96	27	15	104	32	23	140	50
7800	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	14	4	2	14	4	2	17	5
	4000	4	28	7	4	29	8	5	34	10
	6000	6	42	11	6	44	12	8	52	16
	8000	8	56	16	8	59	17	11	73	24
	10,000	10	71	20	11	75	22	15	95	33
	12,000	12	87	25	14	94	29	20	122	44
7300	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	13	3	2	13	4	2	15	4
	4000	4	25	7	4	26	7	5	30	9
	6000	5	38	10	5	39	11	7	47	15
	8000	7	51	14	7	53	15	10	65	21
	10,000	9	64	18	10	68	20	13	85	29
	12,000	11	78	22	12	84	26	17	107	38

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. Add 35 pounds of fuel for engine start, taxi, and takeoff allowances.
3. With INERTIAL SEPARATOR set in BYPASS or CABIN HEAT ON, increase time, fuel, and distance numbers by 1% for each 1000 feet of climb.

Figure 5-18 (Sheet 2)

## **CARGO POD INSTALLED CRUISE PERFORMANCE**

### **NOTE**

The following general information is applicable to all CRUISE PERFORMANCE Charts.

1. The highest torque shown for each temperature and RPM corresponds to maximum allowable cruise power. Do not exceed this torque, 740°C ITT, or 101.6% Ng, whichever occurs first.
2. The lowest torque shown for each temperature and RPM corresponds to the recommended torque setting for best range in zero wind conditions.
3. With the INERTIAL SEPARATOR in BYPASS and power set below the torque limit (1865 foot-pounds), decrease the maximum cruise torque by 100 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 15 pounds per hour (PPH) higher.
4. With the CABIN HEAT ON and power set below the torque limit (1865 foot-pounds), decrease maximum cruise torque by 80 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 7 PPH higher.

Figure 5-19 (Sheet 1 of 11)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 2000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR NORMAL

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
46	1225	343	145	1313	343	144	1402	343	143
				1200	314	132			
40	1363	362	152	1457	362	151	1555	362	149
				1200	314	132	1550	361	149
30	1584	393	161	1689	393	160	1797	393	157
	1420	367	153	1500	365	151	1600	365	150
				1465	360	150	1545	357	147
20	1794	424	168	1910	424	166	1970	416	162
	1600	393	160	1800	407	162	1800	390	156
	1395	361	150	1600	376	154	1600	361	148
				1460	356	148	1535	352	146
10	1865	433	168	1970	430	167	1970	411	160
	1700	406	162	1800	404	161	1800	386	154
	1500	375	154	1600	373	153	1600	358	147
	1385	356	148	1450	351	146	1515	346	143
0	1865	430	167	1970	427	165	1970	407	159
	1700	403	160	1800	400	159	1800	382	153
	1500	372	152	1600	370	151	1600	354	146
	1385	354	147	1435	345	144	1500	341	141
-10	1865	427	165	1970	423	163	1970	403	157
	1700	400	159	1800	397	157	1800	379	151
	1500	369	150	1600	367	150	1600	351	144
	1370	349	144	1425	341	142	1480	335	139
-20	1865	424	163	1970	419	161	1970	400	155
	1700	397	157	1800	393	155	1800	375	150
	1500	366	148	1600	364	148	1600	347	142
	1375	347	143	1405	335	140	1460	328	137
-30	1865	422	161	1970	415	159	1970	396	153
	1700	395	155	1800	390	154	1800	372	148
	1500	364	147	1600	360	146	1600	343	141
	1365	344	141	1400	331	138	1460	325	135
			1390	330	137				
-40	1865	420	159	1970	413	157	1970	392	152
	1700	392	153	1800	387	152	1800	368	146
	1500	361	145	1600	357	144	1600	340	139
	1365	341	139	1400	329	136	1455	320	134
			1380	326	135				
-50	1865	419	156	1970	411	155	1970	388	150
	1700	390	150	1800	383	150	1800	364	144
	1500	359	143	1600	354	142	1600	336	137
	1360	338	136	1400	326	134	1435	314	131
			1375	322	133				
-54	1865	418	155	1970	410	154	1970	386	149
	1700	389	150	1800	382	149	1800	362	144
	1500	359	142	1600	353	141	1600	335	137
	1370	339	136	1400	325	133	1435	313	130
			1375	321	132				

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Figure 5-19 (Sheet 2)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 4000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
42	1204	329	146	1289	329	145	1376	329	143
40	1248	335	148	1335	335	147	1426	335	145
30	1460	365	158	1558	365	157	1658	365	155
	1375	352	154	1420	345	151	1505	343	148
20	1661	395	166	1769	395	164	1876	395	162
	1500	369	159	1600	369	158	1700	368	155
	1355	346	152	1415	340	149	1500	339	147
10							1485	337	146
	1859	426	172	1970	425	170	1970	406	164
	1700	399	166	1800	397	164	1800	379	158
	1500	366	157	1600	366	156	1600	350	150
0	1335	341	149	1405	336	147	1480	333	145
	1865	425	170	1970	422	168	1970	402	162
	1700	396	164	1800	394	162	1800	376	156
	1500	364	155	1600	362	154	1600	347	148
-10	1330	337	147	1400	332	145	1450	325	142
				1390	331	145			
	1865	423	168	1970	419	167	1970	397	160
	1700	394	162	1800	390	161	1800	372	154
-20	1500	361	154	1600	359	153	1600	343	147
	1320	333	145	1400	329	144	1435	320	140
				1375	326	143			
	1865	421	166	1970	417	165	1970	393	158
-30	1700	391	160	1800	387	159	1800	369	153
	1500	359	152	1600	356	151	1600	340	145
	1305	329	143	1400	327	142	1415	314	138
				1370	322	141			
-40	1865	419	164	1970	414	163	1970	390	157
	1700	388	158	1800	383	157	1800	365	151
	1500	356	150	1600	353	149	1600	337	144
	1310	327	141	1400	324	141	1415	310	136
-50				1345	316	138			
	1865	417	162	1970	411	161	1970	387	155
	1700	386	156	1800	380	155	1800	362	149
	1500	354	148	1600	351	147	1600	333	142
-54	1295	323	139	1400	321	139	1395	305	134
				1330	311	136			
	1865	416	160	1970	409	159	1970	384	153
	1700	385	154	1800	378	153	1800	358	148
-54	1500	352	146	1600	348	146	1600	329	140
	1305	322	137	1400	318	137	1395	301	132
				1315	306	133			
	1865	415	159	1970	408	158	1970	383	152
-54	1700	384	153	1800	377	152	1800	357	147
	1500	351	145	1600	346	145	1600	328	140
	1315	323	137	1400	317	137	1400	301	131
				1320	306	133	1380	298	131

Figure 5-19 (Sheet 3)

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**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 6000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
38	1178	315	146	1260	315	145	1345	315	143
30	1340	338	155	1430	338	154	1522	338	152
	1330	337	155	1380	330	151	1460	329	148
20	1533	367	164	1632	367	162	1731	367	159
	1400	345	157	1500	346	156	1600	347	154
	1320	333	153	1360	325	149	1455	325	147
10	1720	396	170	1828	396	169	1934	396	166
	1600	375	165	1700	375	164	1800	374	161
	1400	343	156	1500	343	155	1600	343	153
	1305	328	150	1360	322	148	1435	319	145
0	1865	423	174	1970	421	172	1970	399	165
	1700	390	168	1800	388	166	1800	370	159
	1500	357	159	1600	356	158	1600	340	151
	1300	325	148	1400	325	149	1420	314	143
-10	1285	323	148	1355	318	146			
	1865	421	172	1970	418	170	1970	396	164
	1700	388	166	1800	386	164	1800	366	158
	1500	354	157	1600	353	156	1600	337	150
	1300	322	147	1400	322	147	1400	308	141
-20	1280	319	146	1330	312	143			
	1865	419	170	1970	415	168	1970	392	162
	1700	387	164	1800	383	162	1800	363	156
	1500	352	155	1600	350	154	1600	334	148
	1300	320	145	1400	319	145	1400	305	139
	1265	315	143	1320	308	142	1380	302	138
-30	1865	417	168	1970	413	166	1970	389	160
	1700	385	162	1800	380	160	1800	360	154
	1500	349	153	1600	347	153	1600	331	147
	1300	318	144	1400	317	144	1400	302	138
	1265	312	142	1315	304	140	1370	298	137
-40	1865	415	166	1970	410	164	1970	386	158
	1700	383	160	1800	378	158	1800	357	153
	1500	347	151	1600	344	151	1600	327	145
	1300	316	142	1400	314	142	1400	299	136
	1265	311	140	1290	298	137	1350	292	134
-50	1865	413	164	1970	407	162	1970	383	156
	1700	381	158	1800	376	156	1800	354	151
	1500	345	149	1600	341	149	1600	324	143
	1300	314	140	1400	311	140	1400	296	135
	1270	309	138	1280	294	134	1340	287	132
-54	1865	412	163	1970	406	161	1970	382	155
	1700	381	157	1800	375	156	1800	352	150
	1500	344	149	1600	340	148	1600	322	143
	1300	313	139	1400	310	140	1400	295	134
	1265	307	137	1280	293	134	1335	286	131

Figure 5-19 (Sheet 4)



**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 8000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR NORMAL

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
30	1209	311	150	1291	311	149	1375	311	146
20	1390	338	160	1481	338	158	1572	338	155
	1290	322	154	1325	314	150	1410	313	147
10	1564	364	167	1663	364	165	1760	364	162
	1400	337	159	1500	338	158	1600	338	155
0	1290	319	153	1325	310	149	1405	309	146
	1736	396	173	1844	396	171	1949	396	168
	1600	369	167	1700	368	165	1800	368	162
	1400	335	157	1500	335	156	1600	335	154
-10	1265	313	150	1325	307	147	1400	306	144
							1380	302	143
	1865	420	176	1970	418	174	1970	396	167
	1700	387	170	1800	385	168	1800	364	161
	1500	349	161	1600	348	159	1600	332	153
-20	1300	316	150	1400	316	150	1400	303	143
	1250	308	147	1310	303	145	1365	297	141
	1865	418	174	1970	415	172	1970	393	165
	1700	385	168	1800	383	166	1800	361	159
	1500	346	159	1600	345	158	1600	329	151
-30	1300	314	148	1400	314	148	1400	300	142
	1240	304	145	1295	298	143	1340	291	139
	1865	415	172	1970	412	170	1970	389	163
	1700	383	166	1800	380	164	1800	358	157
	1500	344	157	1600	342	156	1600	326	150
-40	1300	312	147	1400	311	147	1400	297	141
	1235	302	143	1285	294	141	1330	286	137
	1865	413	170	1970	409	168	1970	386	161
	1700	381	164	1800	377	162	1800	356	156
	1500	343	155	1600	340	154	1600	323	148
-50	1300	310	145	1400	308	145	1400	294	139
	1230	299	141	1265	288	138	1315	282	135
	1865	411	168	1970	406	166	1970	383	159
	1700	380	161	1800	375	160	1800	353	154
	1500	342	153	1600	338	152	1600	320	146
-54	1300	308	143	1400	306	143	1400	291	137
	1240	298	140	1255	284	136	1310	277	133
	1865	410	167	1970	405	165	1970	382	159
	1700	379	161	1800	374	159	1800	352	153
	1500	341	152	1600	338	151	1600	318	146
-54	1300	307	142	1400	305	143	1400	289	137
	1230	296	139	1240	281	134	1300	275	132

Figure 5-19 (Sheet 5)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 10,000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
25	1176	298	150	1254	298	148	1335	298	145
20	1259	310	155	1342	310	154	1426	310	150
				1320	307	152	1395	306	149
10	1420	334	163	1510	334	161	1600	334	158
	1300	315	156	1400	317	156	1395	302	148
	1275	310	155	1305	302	150			
0	1580	364	170	1678	364	168	1775	363	165
	1400	329	161	1500	330	159	1600	331	157
	1270	307	153	1295	298	148	1400	300	147
						1385	298	146	
-10	1738	394	175	1847	394	173	1949	394	170
	1600	366	169	1700	366	167	1800	365	164
	1400	327	159	1500	328	158	1600	328	155
	1240	301	150	1300	296	147	1400	298	146
			1290	294	147	1365	292	144	
-20	1865	417	178	1970	414	176	1970	394	169
	1700	384	171	1800	382	169	1800	362	162
	1500	344	162	1600	344	161	1600	325	154
	1300	308	152	1400	308	151	1400	295	144
	1235	297	148	1285	291	145	1350	287	142
-30	1865	414	176	1970	412	174	1970	390	167
	1700	382	169	1800	380	167	1800	358	161
	1500	343	160	1600	342	159	1600	322	152
	1300	306	150	1400	306	150	1400	292	143
	1220	293	145	1275	287	143	1320	280	139
-40	1865	412	174	1970	409	172	1970	386	165
	1700	380	167	1800	377	166	1800	355	159
	1500	341	158	1600	339	157	1600	320	151
	1300	304	148	1400	303	148	1400	289	142
	1200	288	143	1265	283	141	1305	275	137
-50	1865	411	172	1970	407	170	1970	382	163
	1700	378	165	1800	374	164	1800	353	157
	1500	340	156	1600	337	156	1600	317	149
	1300	302	146	1400	301	147	1400	286	140
	1205	287	141	1255	279	139	1295	271	135
-54	1865	411	171	1970	406	169	1970	381	162
	1700	378	164	1800	373	163	1800	352	156
	1500	339	156	1600	336	155	1600	316	149
	1300	301	146	1400	300	146	1400	285	140
	1200	285	140	1250	277	138	1280	268	134

Figure 5-19 (Sheet 6)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 12,000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
20	1132	284	148	1207	284	147	1283	284	143
10	1280	306	158	1362	306	156	1445	306	153
	1255	302	156	1310	298	153	1390	297	149
0	1431	333	166	1520	333	164	1609	332	160
	1300	307	158	1400	310	157	1500	312	155
	1250	299	155	1295	293	151	1380	293	148
-10	1578	361	172	1676	361	169	1771	361	166
	1400	325	162	1500	327	161	1600	328	158
	1240	295	153	1300	291	150	1400	293	148
				1280	288	149	1370	288	146
-20	1702	383	175	1808	383	173	1908	383	170
	1500	343	166	1700	363	169	1800	363	166
	1300	304	155	1500	324	159	1600	325	157
	1230	292	151	1300	288	149	1400	291	147
				1280	285	147	1350	282	144
-30	1823	408	178	1936	408	176	1970	392	170
	1700	381	173	1800	380	171	1800	360	164
	1500	342	164	1600	342	162	1600	322	155
	1300	302	153	1400	303	153	1400	288	146
	1220	287	148	1265	280	145	1335	277	142
-40	1865	415	178	1970	413	175	1970	389	169
	1700	379	171	1800	377	169	1800	356	162
	1500	340	162	1600	339	161	1600	320	154
	1300	301	151	1400	301	151	1400	285	144
	1205	283	146	1255	276	143	1300	270	139
-50	1865	414	176	1970	410	173	1970	385	167
	1700	377	169	1800	374	167	1800	353	160
	1500	339	160	1600	337	159	1600	317	152
	1300	300	150	1400	299	150	1400	282	143
	1185	278	143	1245	272	141	1280	264	136
-54	1865	413	175	1970	410	172	1970	384	166
	1700	377	168	1800	374	166	1800	352	159
	1500	338	159	1600	336	158	1600	316	152
	1300	299	149	1400	299	149	1400	281	142
	1175	276	142	1235	270	140	1285	264	136

Figure 5-19 (Sheet 7)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 14,000 FEET**

CONDITIONS:

8750 Pounds

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

**NOTE**

Do not exceed maximum cruise torque or 740°C ITT.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
15	1081	269	145	1152	269	143	1225	269	139
10	1151	280	151	1225	280	149	1300	280	145
0	1291	304	160	1372	304	158	1454	303	155
	1230	292	156	1295	289	153	1380	290	150
-10	1428	330	167	1516	329	165	1603	329	161
	1300	304	160	1400	307	159	1400	291	150
	1215	287	154	1280	284	151	1365	284	148
-20	1546	352	172	1642	352	169	1734	352	166
	1400	322	164	1500	324	163	1600	326	160
	1200	283	152	1300	286	151	1400	288	149
				1260	278	149	1355	279	146
-30	1658	374	175	1761	373	173	1859	373	170
	1500	341	168	1600	341	166	1700	342	163
	1300	301	156	1400	303	156	1500	304	153
	1185	279	149	1255	275	147	1335	274	144
-40	1774	398	178	1885	398	176	1970	394	172
	1600	359	171	1700	358	169	1800	358	166
	1400	319	160	1500	320	159	1600	320	157
	1200	280	148	1300	282	148	1400	284	147
	1165	274	146	1235	269	144	1305	267	141
-50	1865	414	180	1970	412	177	1970	390	170
	1700	379	173	1800	378	171	1800	354	164
	1500	337	164	1600	336	162	1600	317	155
	1300	298	153	1400	298	153	1400	282	145
	1135	267	142	1215	264	142	1285	261	139
-54	1865	413	179	1970	411	176	1970	389	169
	1700	379	172	1800	377	170	1800	353	163
	1500	336	163	1600	336	161	1600	316	154
	1300	298	152	1400	298	152	1400	281	145
	1130	265	141	1210	263	141	1275	258	138

Figure 5-19 (Sheet 8)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 16,000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR NORMAL

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
10	1033	256	141	1101	256	138	1168	256	132
0	1163	277	153	1237	277	151	1311	277	147
-10	1287	300	162	1367	300	159	1447	300	155
	1165	276	153	1235	275	150	1330	278	147
-20	1401	322	167	1488	322	165	1572	322	161
	1200	282	154	1300	285	153	1400	289	151
-30	1150	272	150	1215	268	147	1305	270	145
	1504	341	171	1597	341	169	1687	341	166
	1300	300	159	1400	303	158	1500	305	156
-40	1130	267	147	1200	264	146	1300	267	144
							1290	265	143
	1610	364	175	1710	364	172	1805	363	169
	1500	339	169	1600	340	167	1600	321	160
-50	1300	299	158	1400	301	157	1400	284	149
	1115	262	145	1200	262	144	1265	259	140
				1185	259	143			
-54	1720	385	178	1824	384	175	1923	384	172
	1600	360	172	1700	359	170	1800	359	167
	1400	317	162	1500	317	161	1600	317	158
	1200	278	150	1300	279	149	1400	281	148
-54	1095	257	142	1160	253	140	1235	252	137
	1717	383	177	1820	382	174	1921	382	171
	1600	359	171	1700	359	169	1800	358	166
	1400	316	161	1500	316	160	1600	316	157
-54	1200	277	149	1300	279	149	1400	280	147
	1085	255	140	1160	253	140	1235	251	137

Figure 5-19 (Sheet 9)

**CARGO POD INSTALLED  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 18,000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

**NOTE**  
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-5	1103	263	149	1173	263	146	1242	263	141
-10	1160	274	154	1232	274	151	1305	273	146
-20	1268	294	162	1346	294	159	1423	294	155
	1145	270	152	1210	267	149	1315	273	147
-30	1361	311	167	1446	311	164	1528	311	160
	1200	279	155	1300	283	155	1400	286	152
	1135	266	150	1195	263	147	1300	268	145
-40	1456	331	171	1547	331	168	1633	331	164
	1300	298	161	1400	300	160	1500	303	157
	1130	263	148	1200	262	146	1300	265	144
-50				1175	257	144	1275	261	143
	1552	351	174	1647	350	171	1739	350	168
	1400	317	166	1500	320	164	1600	321	161
	1200	276	153	1300	279	152	1400	281	150
-54	1110	259	146	1165	253	142	1250	254	140
	1547	348	173	1642	348	170	1735	348	167
	1400	317	165	1500	319	163	1600	320	160
	1200	276	152	1300	278	151	1400	281	149
	1100	256	144	1155	251	141	1230	249	138

**CRUISE PRESSURE ALTITUDE 20,000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

**NOTE**  
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-15	1090	258	148	1158	258	144	1225	258	138
-20	1142	268	153	1212	268	150	1282	267	144
-30	1229	284	160	1305	284	157	1379	284	152
	1170	272	155	1235	270	152	1335	275	149
-40	1315	302	165	1397	301	162	1475	301	158
	1200	277	156	1210	263	149	1315	268	147
-50	1150	267	153						
	1402	319	169	1487	319	166	1570	318	162
	1200	275	155	1300	279	154	1400	282	152
-54	1130	262	150	1190	257	146	1310	265	146
	1395	317	168	1481	317	165	1566	316	162
	1200	275	154	1300	279	154	1400	281	152
	1135	261	149	1180	255	145	1295	261	145

Figure 5-19 (Sheet 10)

**CARGO POD INSTALLED**  
**CRUISE PERFORMANCE**  
**CRUISE PRESSURE ALTITUDE 22,000 FEET**

CONDITIONS:  
8300 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-25	1065	250	152	1131	250	148	1197	250	142
-30	1106	258	155	1175	258	152	1243	258	147
-40	1186	274	161	1260	274	158	1332	274	154
	1105	256	154	1165	254	151	1255	258	148
-50	1264	290	166	1341	290	163	1417	289	159
	1100	254	153	1200	259	153	1300	264	151
-54	1090	251	152	1145	248	148	1255	254	147
	1257	288	165	1336	288	162	1414	287	158
	1100	253	152	1200	259	152	1300	263	150
	1090	251	151	1135	246	147	1245	252	146

**CRUISE PRESSURE ALTITUDE 24,000 FEET**

CONDITIONS:  
7800 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-30	994	234	151	1057	234	147	1119	234	141
-40	1069	249	158	1136	249	155	1202	248	150
	1040	242	155	1100	241	151	1190	245	149
-50	1140	263	163	1210	263	160	1279	262	156
	1025	238	152	1100	239	151	1165	238	146
-54	1133	262	162	1085	236	149			
	1020	236	151	1204	261	159	1275	261	155
				1070	233	148	1165	238	146

Figure 5-19 (Sheet 11)

## **CARGO POD INSTALLED CRUISE MAXIMUM TORQUE**

### **NOTE**

The following general information is applicable to all CRUISE MAXIMUM TORQUE Charts.

1. The highest torque shown for each temperature and RPM corresponds to maximum allowable cruise power. Do not exceed this torque, 740°C ITT, or 101.6% Ng, whichever occurs first.
2. With the INERTIAL SEPARATOR in BYPASS and power set below the torque limit (1865 foot-pounds), decrease the maximum cruise torque by 100 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 15 pounds per hour (PPH) higher.
3. With the CABIN HEAT ON and power set below the torque limit (1865 foot-pounds), decrease maximum cruise torque by 80 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 7 PPH higher.
4. Where torque values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those torque values which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-20 (Sheet 1 of 7)



## CARGO POD INSTALLED CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 1000 Feet			Pressure Altitude 2000 Feet			Pressure Altitude 3000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
50	1196	1284	1371	1144	1228	1311	---	---	---
45	1307	1399	1495	1252	1341	1433	1198	1283	1371
40	1424	1523	1625	1367	1461	1560	1310	1400	1495
35	1538	1642	1750	1478	1578	1682	1419	1515	1615
30	1649	1759	1871	1586	1692	1800	1525	1626	1730
25	1762	1877	1970	1696	1807	1919	1632	1738	1847
20	1865	1970	1970	1796	1912	1970	1730	1841	1954
15	1865	1970	1970	1865	1970	1970	1829	1945	1970
10	1865	1970	1970	1865	1970	1970	1865	1970	1970
5	1865	1970	1970	1865	1970	1970	1865	1970	1970
0	1865	1970	1970	1865	1970	1970	1865	1970	1970
-5	1865	1970	1970	1865	1970	1970	1865	1970	1970
-10	1865	1970	1970	1865	1970	1970	1865	1970	1970
-15	1865	1970	1970	1865	1970	1970	1865	1970	1970
-20	1865	1970	1970	1865	1970	1970	1865	1970	1970
-25	1865	1970	1970	1865	1970	1970	1865	1970	1970
-30	1865	1970	1970	1865	1970	1970	1865	1970	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

Figure 5-20 (Sheet 2)

## CARGO POD INSTALLED CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 4000 Feet			Pressure Altitude 5000 Feet			Pressure Altitude 6000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
45	1144	1226	1310	---	---	---	---	---	---
40	1253	1340	1431	1198	1281	1368	1142	1222	1306
35	1360	1453	1549	1303	1392	1484	1246	1331	1419
30	1464	1561	1661	1403	1497	1594	1344	1434	1527
25	1568	1671	1775	1506	1604	1705	1444	1539	1635
20	1664	1771	1879	1599	1702	1806	1536	1635	1735
15	1761	1873	1970	1694	1802	1909	1628	1731	1835
10	1861	1970	1970	1791	1903	1970	1722	1830	1937
5	1865	1970	1970	1865	1970	1970	1813	1927	1970
0	1865	1970	1970	1865	1970	1970	1865	1970	1970
-5	1865	1970	1970	1865	1970	1970	1865	1970	1970
-10	1865	1970	1970	1865	1970	1970	1865	1970	1970
-15	1865	1970	1970	1865	1970	1970	1865	1970	1970
-20	1865	1970	1970	1865	1970	1970	1865	1970	1970
-25	1865	1970	1970	1865	1970	1970	1865	1970	1970
-30	1865	1970	1970	1865	1970	1970	1865	1970	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

Figure 5-20 (Sheet 3)

## CARGO POD INSTALLED CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 7000 Feet			Pressure Altitude 8000 Feet			Pressure Altitude 9000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
40	1082	1159	1238	---	---	---	---	---	---
35	1183	1265	1349	1124	1201	1282	1066	1140	1217
30	1278	1364	1452	1214	1297	1381	1154	1233	1314
25	1374	1465	1557	1307	1393	1482	1243	1325	1410
20	1464	1559	1655	1394	1485	1577	1328	1415	1503
15	1554	1653	1752	1480	1575	1670	1410	1501	1592
10	1645	1748	1850	1568	1666	1764	1494	1589	1683
5	1735	1843	1949	1655	1758	1860	1579	1678	1775
0	1823	1936	1970	1739	1848	1953	1660	1763	1864
-5	1865	1970	1970	1825	1939	1970	1742	1850	1954
-10	1865	1970	1970	1865	1970	1970	1822	1935	1970
-15	1865	1970	1970	1865	1970	1970	1865	1970	1970
-20	1865	1970	1970	1865	1970	1970	1865	1970	1970
-25	1865	1970	1970	1865	1970	1970	1865	1970	1970
-30	1865	1970	1970	1865	1970	1970	1865	1970	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

Figure 5-20 (Sheet 4)

## CARGO POD INSTALLED CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 10,000 Feet			Pressure Altitude 11,000 Feet			Pressure Altitude 12,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
30	1097	1171	1249	1041	1113	1187	984	1052	1123
25	1181	1261	1342	1123	1198	1276	1062	1134	1208
20	1264	1348	1432	1204	1284	1364	1141	1217	1295
15	1343	1430	1518	1280	1363	1447	1214	1293	1374
10	1424	1514	1605	1357	1444	1530	1288	1370	1454
5	1506	1600	1694	1436	1526	1616	1364	1450	1536
0	1583	1682	1779	1511	1606	1698	1437	1527	1616
-5	1662	1766	1865	1587	1686	1782	1510	1604	1696
-10	1741	1850	1953	1665	1768	1867	1584	1683	1777
-15	1805	1918	1970	1726	1834	1936	1646	1749	1847
-20	1865	1970	1970	1789	1900	1970	1706	1813	1913
-25	1865	1970	1970	1851	1967	1970	1766	1877	1970
-30	1865	1970	1970	1865	1970	1970	1828	1941	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

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Figure 5-20 (Sheet 5)

## CARGO POD INSTALLED CRUISE MAXIMUM TORQUE

CONDITIONS:  
INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 13,000 Feet			Pressure Altitude 14,000 Feet			Pressure Altitude 15,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
25	1004	1073	1144	949	1015	1082	---	---	---
20	1080	1153	1227	1022	1091	1162	969	1034	1102
15	1151	1227	1304	1092	1164	1238	1036	1105	1175
10	1222	1301	1381	1160	1235	1311	1100	1173	1246
5	1295	1377	1459	1229	1308	1386	1167	1242	1317
0	1366	1452	1537	1298	1380	1462	1233	1312	1390
-5	1436	1525	1614	1365	1451	1535	1298	1379	1460
-10	1507	1601	1692	1434	1523	1610	1364	1448	1532
-15	1570	1668	1761	1497	1590	1680	1426	1515	1601
-20	1627	1729	1825	1551	1648	1741	1479	1571	1660
-25	1685	1790	1889	1607	1708	1803	1533	1628	1719
-30	1743	1852	1953	1663	1767	1864	1586	1685	1778
-35	1806	1917	1970	1722	1828	1928	1642	1743	1839
-40	1865	1970	1970	1784	1893	1970	1701	1806	1903
-45	1865	1970	1970	1844	1958	1970	1760	1867	1968
-50	1865	1970	1970	1865	1970	1970	1817	1929	1970
-54	1865	1970	1970	1865	1970	1970	1815	1925	1970

Temp °C	Pressure Altitude 16,000 Feet			Pressure Altitude 17,000 Feet			Pressure Altitude 18,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
20	919	981	1046	872	932	993	---	---	---
15	983	1049	1117	934	997	1062	888	948	1009
10	1045	1114	1184	993	1058	1125	943	1006	1070
5	1108	1179	1252	1052	1120	1190	999	1065	1131
0	1172	1246	1322	1113	1184	1256	1057	1125	1194
-5	1232	1310	1388	1171	1245	1320	1113	1184	1255
-10	1295	1376	1456	1230	1307	1384	1169	1243	1316
-15	1358	1442	1525	1291	1371	1450	1227	1303	1379
-20	1407	1495	1580	1340	1423	1505	1275	1355	1433
-25	1459	1549	1637	1388	1475	1559	1321	1404	1484
-30	1509	1603	1693	1437	1526	1612	1368	1453	1536
-35	1562	1658	1750	1486	1578	1667	1414	1502	1587
-40	1619	1718	1812	1539	1633	1724	1464	1554	1641
-45	1674	1777	1873	1592	1690	1782	1514	1607	1696
-50	1731	1837	1937	1646	1747	1843	1566	1661	1753
-54	1731	1836	1937	1645	1744	1841	1563	1658	1750

Figure 5-20 (Sheet 6)

## CARGO POD INSTALLED CRUISE MAXIMUM TORQUE

CONDITIONS:  
INERTIAL SEPARATOR NORMAL

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 19,000 Feet			Pressure Altitude 20,000 Feet			Pressure Altitude 21,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
15	842	899	958	---	---	---	---	---	---
10	896	955	1016	842	899	957	792	846	901
5	950	1012	1075	894	953	1014	842	898	955
0	1005	1070	1135	947	1009	1071	893	951	1011
-5	1058	1126	1194	1000	1064	1129	944	1005	1067
-10	1111	1182	1252	1051	1118	1185	993	1057	1121
-15	1166	1239	1311	1103	1173	1242	1043	1109	1175
-20	1214	1290	1365	1152	1225	1296	1093	1161	1230
-25	1258	1336	1413	1195	1269	1343	1133	1204	1275
-30	1302	1383	1462	1237	1314	1390	1174	1248	1320
-35	1346	1430	1511	1280	1359	1437	1215	1291	1365
-40	1392	1478	1562	1323	1405	1485	1256	1335	1411
-45	1441	1529	1615	1369	1453	1536	1301	1381	1460
-50	1489	1580	1667	1416	1502	1585	1345	1426	1506
-54	1485	1575	1664	1410	1496	1581	1338	1421	1502

Temp °C	Pressure Altitude 22,000 Feet			Pressure Altitude 23,000 Feet			Pressure Altitude 24,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
10	744	795	847	---	---	---	---	---	---
5	792	846	900	745	796	847	700	748	797
0	841	897	953	792	845	899	746	796	847
-5	891	949	1008	840	895	951	791	844	897
-10	938	999	1060	886	944	1002	837	891	947
-15	986	1049	1112	932	992	1052	880	937	995
-20	1035	1100	1166	979	1041	1103	925	984	1044
-25	1074	1142	1210	1019	1083	1148	966	1027	1089
-30	1114	1184	1253	1057	1123	1190	1002	1066	1129
-35	1153	1226	1297	1095	1164	1232	1039	1104	1170
-40	1193	1267	1341	1133	1204	1274	1075	1143	1210
-45	1235	1312	1387	1172	1245	1318	1113	1183	1252
-50	1277	1354	1431	1211	1286	1359	1149	1221	1291
-54	1270	1348	1427	1205	1280	1356	1143	1215	1287

Figure 5-20 (Sheet 7)

## CARGO POD INSTALLED FUEL AND TIME REQUIRED

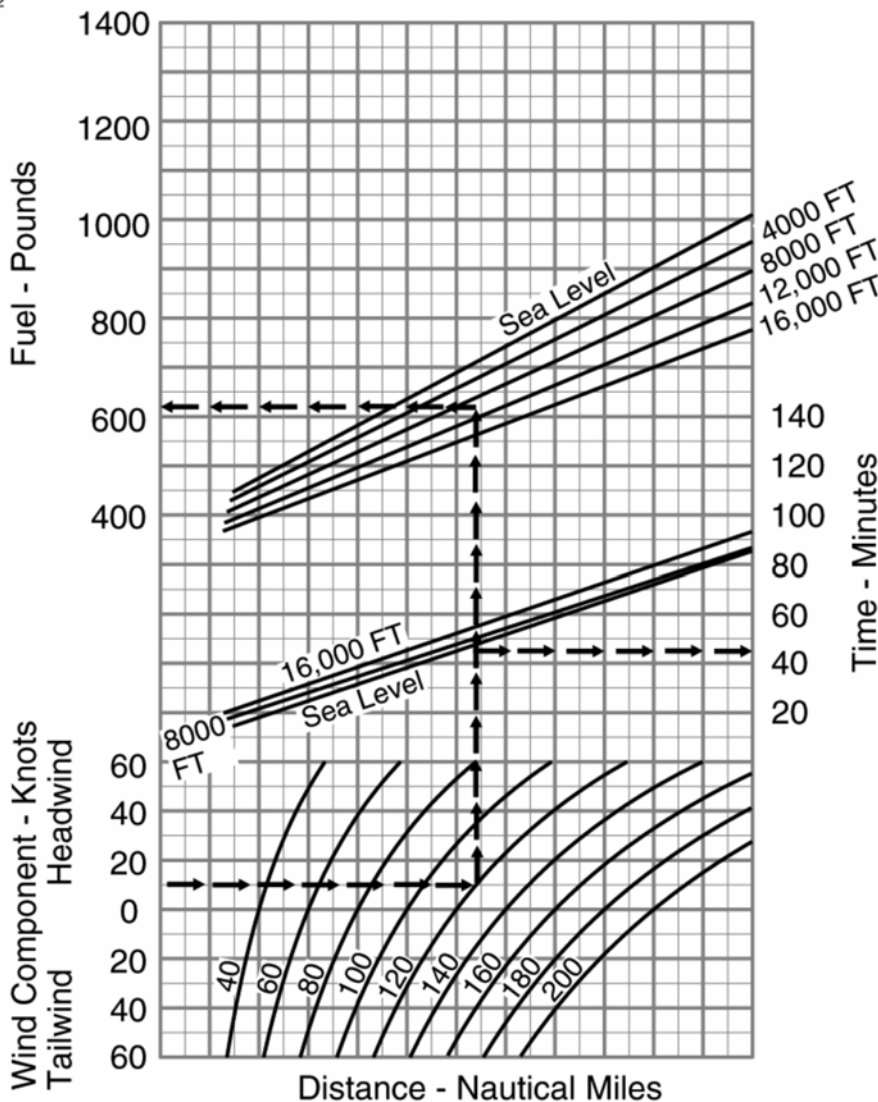
MAXIMUM CRUISE POWER (40-200 Nautical Miles)

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**

A39932



### NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPAS, increase time by 4% and fuel by 2% or CABIN HEAT ON, increase time by 3% and fuel by 2%.

Figure 5-21 (Sheet 1 of 2)

## CARGO POD INSTALLED FUEL AND TIME REQUIRED

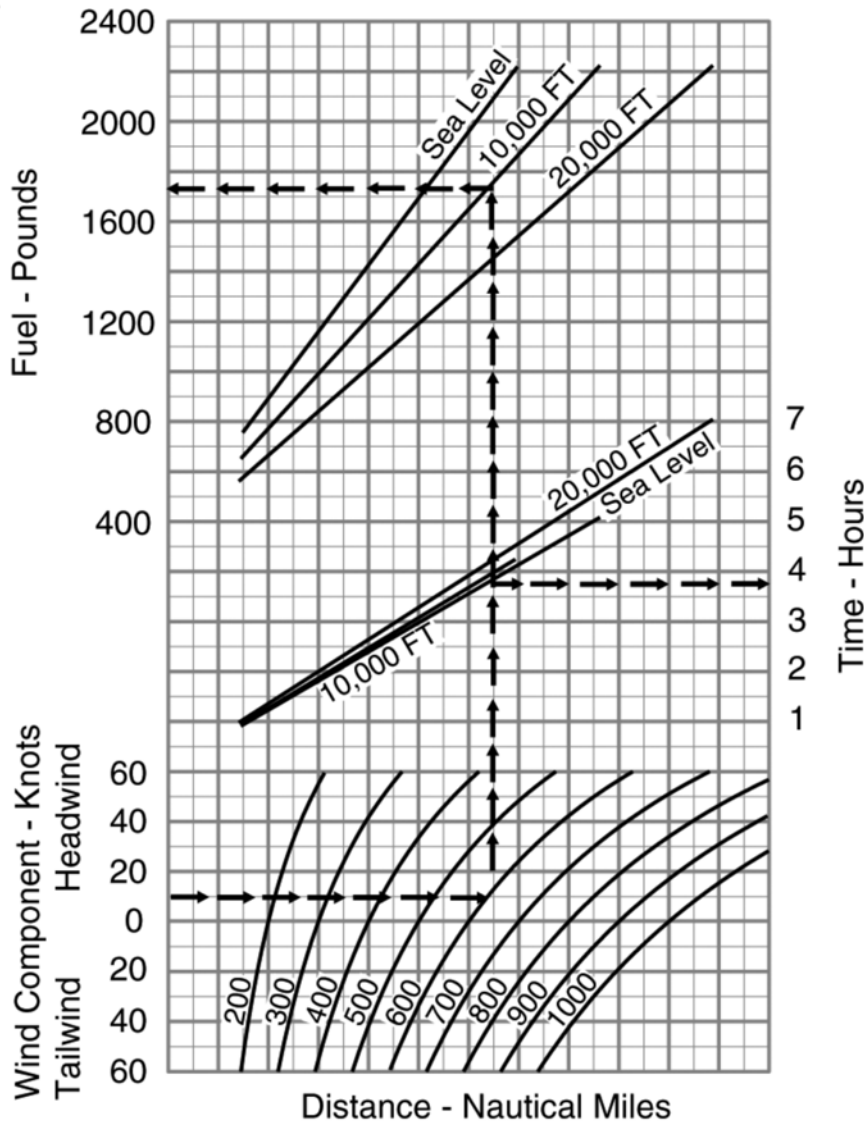
MAXIMUM CRUISE POWER (200-1000 Nautical Miles)

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**

A39933



### NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPASS, increase time by 5% and fuel by 2% or CABIN HEAT ON, increase time by 5% and fuel by 4%..

Figure 5-21 (Sheet 2)



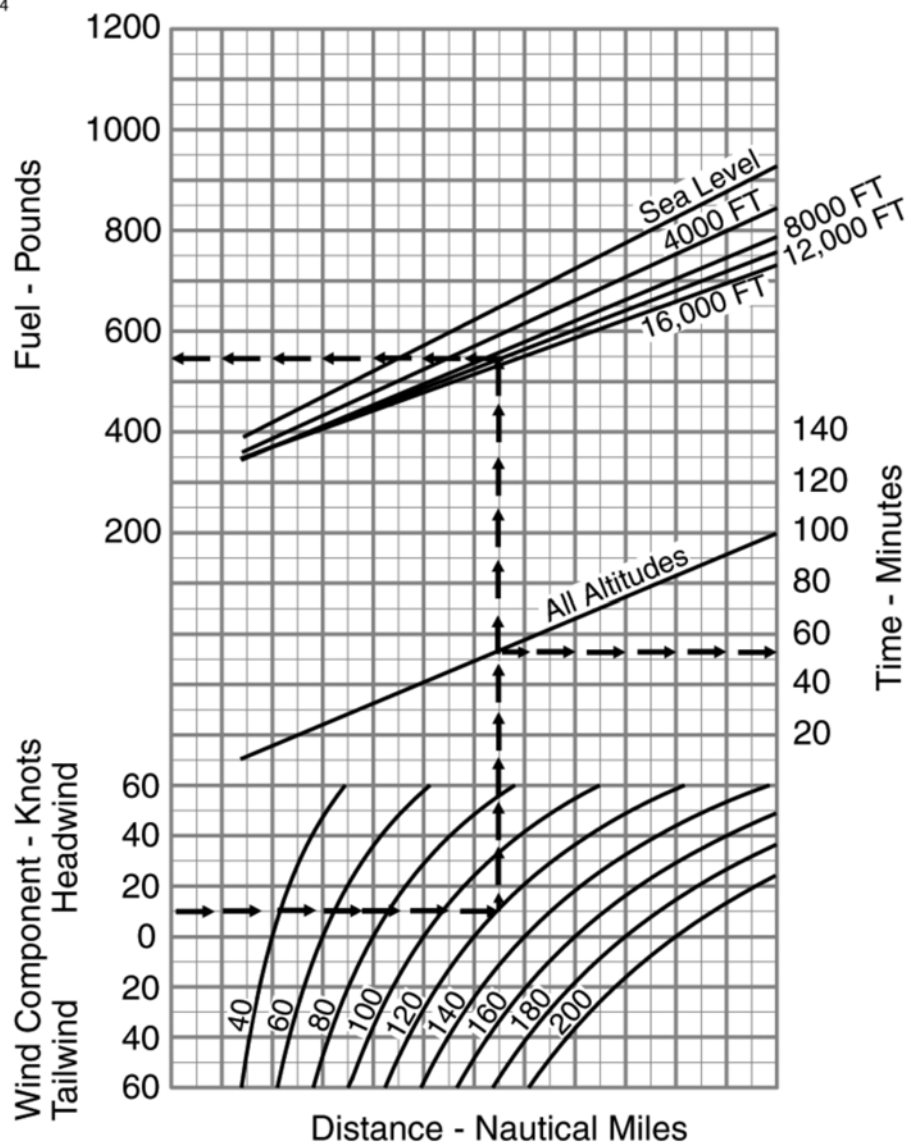
CARGO POD INSTALLED  
**FUEL AND TIME REQUIRED**  
MAXIMUM RANGE POWER (40-200 Nautical Miles)

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**

A39934



**NOTE**

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPAS, increase time by 1% and fuel by 2% or CABIN HEAT ON, increase time by 1% and fuel by 3%.

Figure 5-22 (Sheet 1 of 2)

CARGO POD INSTALLED  
**FUEL AND TIME REQUIRED**

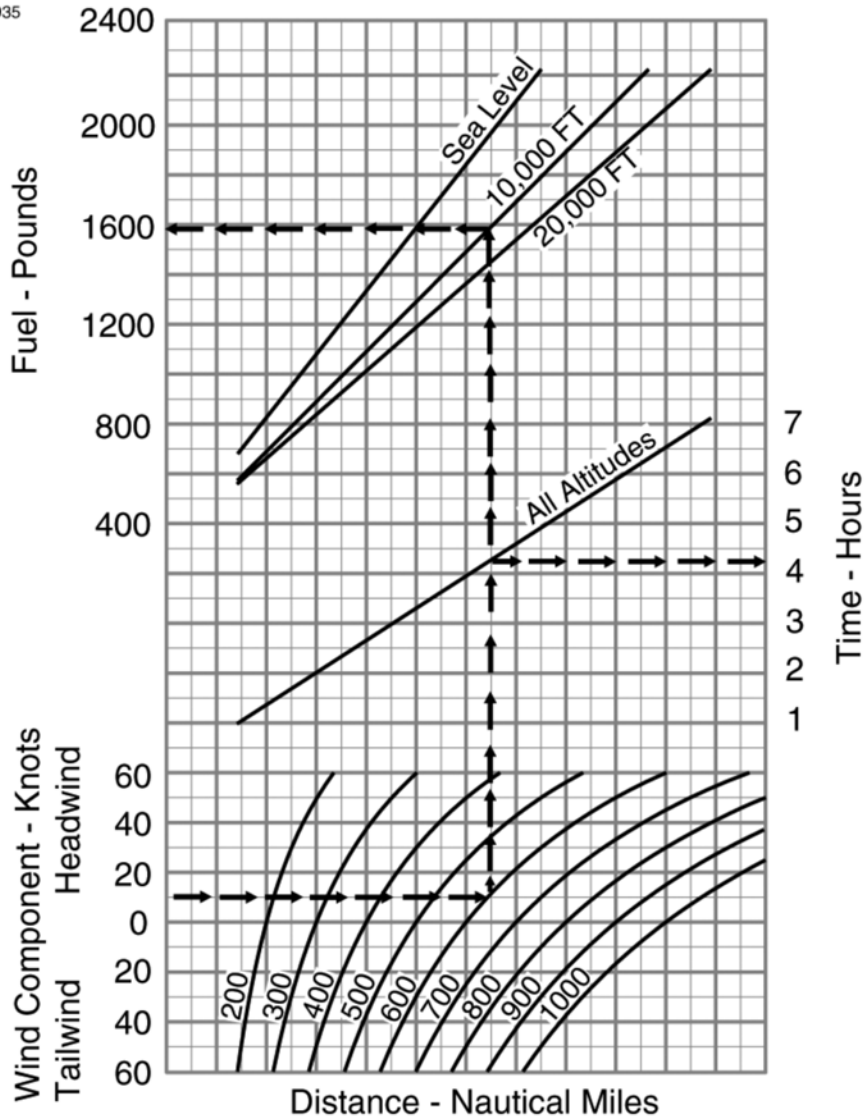
MAXIMUM RANGE POWER (200-1000 Nautical Miles)

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**

A39935



**NOTE**

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPASS, increase time by 1% and fuel by 2% or CABIN HEAT ON, increase time by 1% and fuel by 3%.

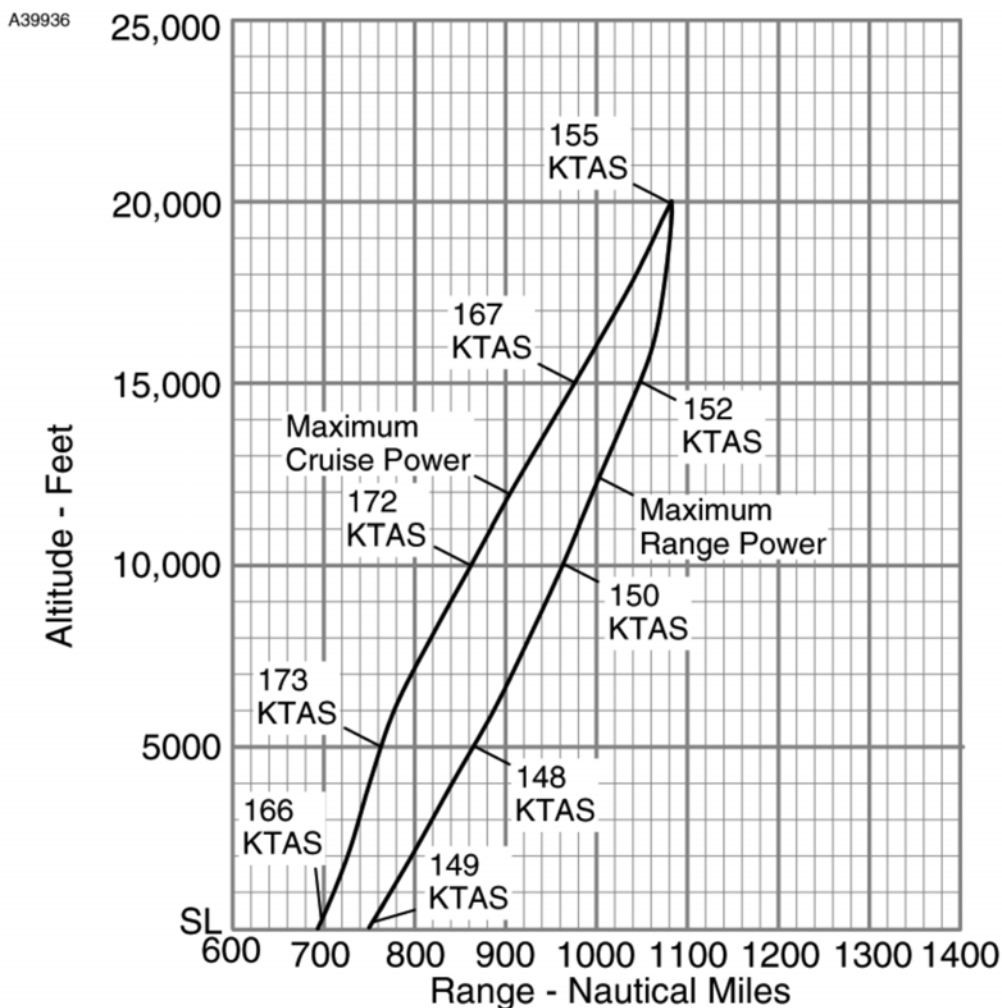
Figure 5-22 (Sheet 2)

CARGO POD INSTALLED  
**RANGE PROFILE**  
**45 MINUTES RESERVE**  
**2224 POUNDS USABLE FUEL**

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**  
Zero Wind



**NOTE**

1. This chart allows for the fuel used for engine start, taxi, takeoff, climb and descent. The distance during a maximum climb and the distance during descent are included.
2. With INERTIAL SEPARATOR in BYPAS, decrease range by 2%, or with CABIN HEAT ON, decrease range by 3%.

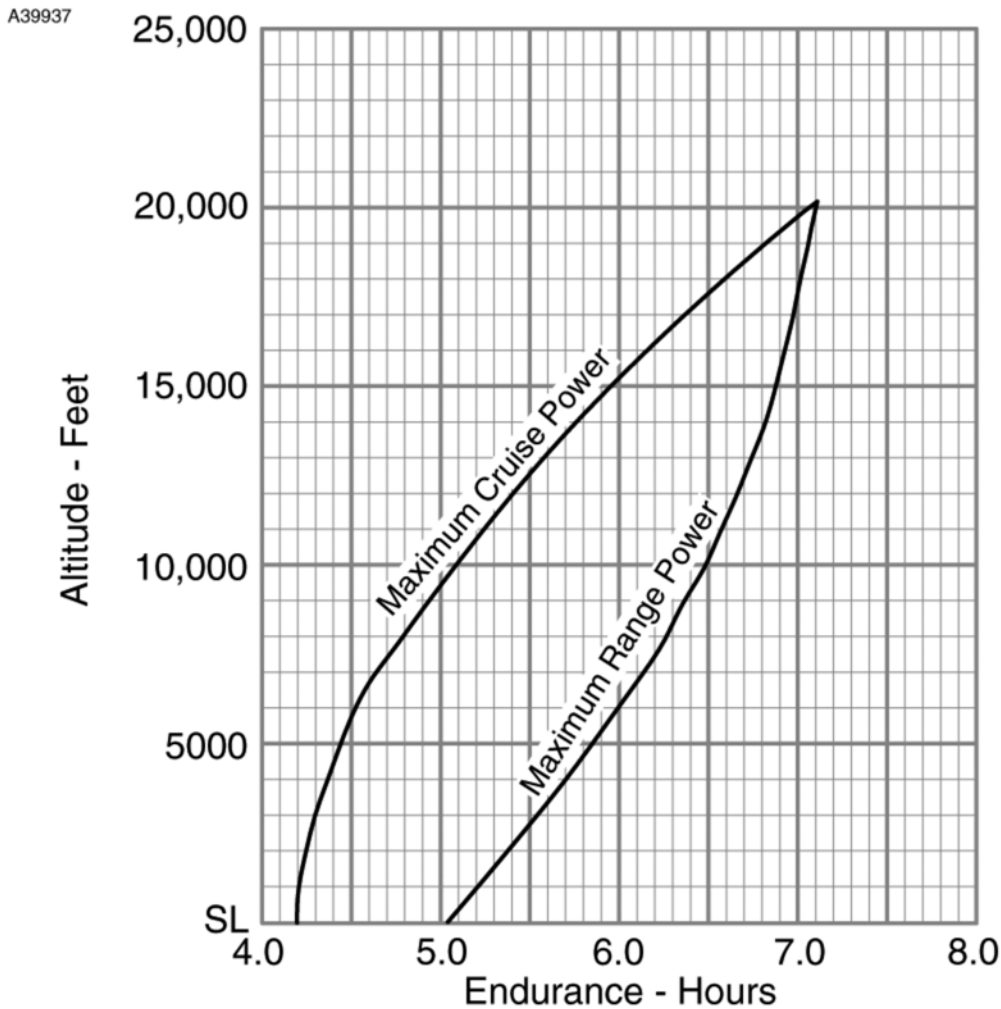
Figure 5-23

CARGO POD INSTALLED  
**ENDURANCE PROFILE**  
**45 MINUTES RESERVE**  
**2224 POUNDS USABLE FUEL**

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**



**NOTE**

1. This chart allows for the fuel used for engine start, taxi, takeoff, climb and descent. The time during a maximum climb and the time during descent are included.
2. With INERTIAL SEPARATOR in BYPAS, decrease endurance by 2%, or with CABIN HEAT ON, decrease endurance by 3%.

Figure 5-24

**CARGO POD INSTALLED**  
**TIME, FUEL, AND DISTANCE TO DESCEND**

CONDITIONS:

Flaps **UP**

Zero Wind

8750 Pounds

1900 RPM

140 KIAS Above 16,000 Feet

160 KIAS Below 16,000 Feet

Power Set for 800 Feet per Minute Rate of Descent

Pressure Altitude Feet	Descent to Sea Level		
	Time Minutes	Fuel Pounds	Dist NM
24,000	30	131	91
20,000	25	113	75
16,000	20	95	59
12,000	15	71	43
8000	10	48	28
4000	5	24	14
Sea Level	0	0	0

Figure 5-25

## **CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE**

### **NOTE**

The following general information is applicable to all SHORT FIELD LANDING DISTANCE Charts.

1. Use short field landing technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind.  
For operation with tailwind up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 40% of the "Ground Roll" figure.
4. If a landing with flaps UP is necessary, increase the approach speed by 15 KIAS and allow for 40% longer distances.
5. Use of maximum reverse thrust after touchdown reduces ground roll distance by approximately 10%.
6. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those distances which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.

Figure 5-26 (Sheet 1 of 5)

## CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

CONDITIONS:

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing  
obstacles. **BETA** range (lever  
against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**8500 Pounds:**

Speed at 50 Feet:

78 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	835	1625	865	1670	900	1715
2000	900	1715	935	1765	965	1815
4000	965	1815	1005	1865	1040	1920
6000	1040	1920	1080	1975	1120	2030
8000	1125	2035	1165	2095	1210	2155
10,000	1215	2160	1260	2220	1305	2285
12,000	1310	2295	1360	2360	1410	2430

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	930	1765	965	1810	995	1855
2000	1000	1860	1035	1910	1070	1960
4000	1075	1970	1115	2020	1150	2070
6000	1160	2085	1200	2140	1240	2195
8000	1250	2210	1295	2270	1340	2330
10,000	1350	2345	1400	2410	---	---
12,000	1460	2495	1510	2560	---	---

Figure 5-26 (Sheet 2)

## CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**8000 Pounds:**

Speed at 50 Feet:

75 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	785	1555	815	1600	845	1640
2000	845	1640	880	1690	910	1735
4000	910	1735	945	1785	980	1835
6000	980	1835	1020	1890	1055	1940
8000	1060	1945	1100	2000	1140	2055
10,000	1140	2060	1185	2120	1230	2180
12,000	1235	2190	1280	2255	1330	2320

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	875	1685	905	1730	935	1770
2000	940	1780	975	1825	1005	1870
4000	1015	1880	1050	1930	1085	1980
6000	1090	1995	1130	2045	1165	2095
8000	1180	2110	1220	2165	1260	2225
10,000	1270	2240	1315	2300	---	---
12,000	1375	2380	1420	2445	---	---

Figure 5-26 (Sheet 3)



## CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**7500 Pounds:**

Speed at 50 Feet:

**73 KIAS**

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	740	1480	765	1520	795	1565
2000	795	1565	825	1605	855	1650
4000	855	1650	885	1700	920	1745
6000	920	1745	955	1795	990	1845
8000	995	1850	1030	1905	1070	1955
10,000	1070	1960	1115	2020	1155	2075
12,000	1160	2080	1205	2145	1245	2205
Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	820	1605	850	1645	880	1685
2000	885	1695	915	1740	945	1780
4000	950	1790	985	1835	1015	1885
6000	1025	1895	1060	1945	1095	1995
8000	1105	2010	1145	2060	1180	2115
10,000	1195	2130	1235	2185	---	---
12,000	1290	2265	1335	2325	---	---

G208B/G1000

Figure 5-26 (Sheet 4)

## CARGO POD INSTALLED SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

Refer to Sheet 1 for appropriate notes applicable to this chart.

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

**7000 Pounds:**

Speed at 50 Feet:

71 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	690	1410	715	1450	740	1485
2000	740	1485	770	1525	795	1570
4000	795	1570	825	1615	855	1655
6000	860	1660	890	1705	925	1755
8000	925	1755	960	1805	995	1855
10,000	1000	1860	1035	1915	1075	1970
12,000	1080	1975	1120	2030	1160	2090

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	765	1525	790	1565	820	1600
2000	825	1610	850	1650	880	1690
4000	885	1700	915	1745	945	1790
6000	955	1800	990	1845	1020	1890
8000	1030	1905	1065	1955	1100	2005
10,000	1115	2020	1150	2075	---	---
12,000	1205	2145	1245	2205	---	---

Figure 5-26 (Sheet 5)

## WITHOUT CARGO POD SHORT FIELD TAKEOFF DISTANCE

### NOTE

The following general information is applicable to all SHORT FIELD TAKEOFF DISTANCE Charts.

1. Use short field takeoff technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwind up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "Ground Roll" figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 9% for CABIN HEAT ON.
5. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those distances which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.
6. For operation above 40°C and below the operating temperature limits, increase distances at 40°C by 20%.

Figure 5-27 (Sheet 1 of 5)

## WITHOUT CARGO POD SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 70 KIAS

**8750 Pounds:**

Speed at 50 Feet:

83 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1170	2095	1245	2220	1325	2350
2000	1325	2350	1410	2500	1500	2650
4000	1505	2655	1605	2825	1710	3000
6000	1715	3010	1835	3210	1955	3420
8000	1965	3435	2105	3670	2270	3975
10,000	2265	3945	2505	4410	2840	5115
12,000	2785	4955	3165	5770	3620	6835

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1405	2490	1490	2630	1575	2775
2000	1595	2810	1690	2970	1855	3285
4000	1820	3185	1935	3390	2220	3985
6000	2080	3635	2360	4205	2715	4985
8000	2585	4630	2965	5470	3445	6660
10,000	3260	6065	3780	7385	---	---
12,000	4200	8360	4940	10,800	---	---

Figure 5-27 (Sheet 2)

## WITHOUT CARGO POD SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 67 KIAS

**8300 Pounds:**

Speed at 50 Feet:

80 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1020	1815	1090	1920	1155	2035
2000	1155	2030	1230	2155	1310	2285
4000	1310	2290	1395	2430	1485	2580
6000	1495	2590	1595	2755	1700	2930
8000	1705	2945	1825	3145	1970	3395
10,000	1965	3370	2170	3755	2450	4315
12,000	2405	4195	2725	4840	3100	5660

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1225	2150	1300	2270	1375	2390
2000	1390	2420	1475	2555	1610	2815
4000	1580	2735	1685	2910	1925	3390
6000	1810	3110	2045	3580	2340	4195
8000	2235	3925	2550	4585	2950	5495
10,000	2800	5060	3230	6055	---	---
12,000	3575	6790	4180	8430	---	---

Figure 5-27 (Sheet 3)

## WITHOUT CARGO POD SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 64 KIAS

**7800 Pounds:**

Speed at 50 Feet:

76 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	875	1540	930	1630	985	1725
2000	985	1725	1050	1825	1115	1930
4000	1115	1935	1190	2055	1265	2175
6000	1270	2185	1355	2320	1445	2465
8000	1450	2475	1550	2640	1670	2845
10,000	1665	2825	1835	3130	2065	3575
12,000	2030	3480	2290	3990	2600	4615

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1045	1820	1105	1920	1170	2020
2000	1185	2045	1255	2155	1370	2365
4000	1345	2305	1430	2445	1630	2830
6000	1535	2615	1730	2985	1970	3470
8000	1890	3260	2145	3775	2470	4465
10,000	2350	4150	2695	4895	---	---
12,000	2980	5445	3455	6585	---	---

Figure 5-27 (Sheet 4)

## WITHOUT CARGO POD SHORT FIELD TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **20°**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 61 KIAS

**7300 Pounds:**

Speed at 50 Feet:

73 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	740	1305	785	1380	835	1460
2000	835	1455	885	1540	940	1630
4000	945	1635	1005	1730	1070	1830
6000	1070	1840	1145	1950	1215	2070
8000	1220	2080	1305	2210	1405	2380
10,000	1400	2365	1540	2610	1730	2965
12,000	1700	2890	1910	3290	2160	3775
Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	885	1535	935	1620	985	1705
2000	1000	1720	1060	1815	1155	1985
4000	1135	1935	1205	2055	1365	2360
6000	1295	2190	1450	2490	1650	2870
8000	1585	2710	1790	3115	2050	3645
10,000	1960	3410	2235	3975	---	---
12,000	2465	4400	2835	5230	---	---

Figure 5-27 (Sheet 5)

## **WITHOUT CARGO POD FLAPS UP TAKEOFF DISTANCE**

### **NOTE**

The following general information is applicable to all FLAPS UP TAKEOFF DISTANCE Charts.

1. Use Type II, Type III, or Type IV anti-ice fluid takeoff technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "Ground Roll" figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 9% for CABIN HEAT ON.

Figure 5-28 (Sheet 1 of 3)



## WITHOUT CARGO POD FLAPS UP TAKEOFF DISTANCE

CONDITIONS:

Flaps **UP**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 83 KIAS

**8750 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1685	3135	1800	3345	1920	3560	2040	3790
2000	1910	3545	2040	3785	2175	4040	2315	4305
4000	2170	4025	2320	4310	2475	4605	2640	4915
6000	2475	4595	2650	4930	2835	5280	3025	5645
8000	2835	5280	3040	5675	3255	6095	3515	6625
10,000	3260	6105	3505	6580	3895	7420	4450	8730
12,000	3835	7260	4355	8445	4995	9995	5775	12,050

Lift Off: 83 KIAS

**8300 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1590	2950	1695	3145	1805	3350	1920	3560
2000	1795	3330	1920	3560	2050	3795	2180	4045
4000	2040	3785	2185	4050	2330	4325	2485	4615
6000	2325	4320	2490	4630	2665	4955	2840	5300
8000	2665	4955	2855	5325	3060	5715	3305	6210
10,000	3065	5725	3290	6170	3655	6950	4175	8160
12,000	3600	6800	4085	7900	4680	9330	5405	11,215

Figure 5-28 (Sheet 2)

## WITHOUT CARGO POD FLAPS UP TAKEOFF DISTANCE

**CONDITIONS:**

Flaps **UP**

1900 RPM

CABIN HEAT **OFF**

INERTIAL SEPARATOR **NORMAL**

Torque Set Per Figure 5-8

Paved, Level, Dry Runway

Zero Wind

Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 83 KIAS

**7800 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1480	2750	1580	2930	1685	3120	1790	3315
2000	1675	3100	1790	3315	1910	3535	2030	3760
4000	1900	3520	2035	3765	2170	4020	2310	4290
6000	2165	4015	2320	4305	2480	4605	2645	4920
8000	2480	4605	2660	4945	2845	5305	3070	5760
10,000	2850	5315	3060	5720	3395	6440	3875	7545
12,000	3345	6300	3790	7310	4335	8610	5000	10,320

Lift Off: 83 KIAS

**7300 Pounds:**

Speed at 50 Feet: 104 KIAS

Pressure Altitude Feet	-20°C		-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1375	2550	1465	2720	1565	2890	1660	3075
2000	1555	2875	1660	3070	1770	3275	1885	3485
4000	1765	3260	1885	3490	2010	3725	2145	3970
6000	2010	3720	2150	3985	2295	4260	2450	4550
8000	2295	4260	2460	4575	2635	4905	2845	5320
10,000	2640	4915	2835	5285	3140	5945	3580	6950
12,000	3095	5815	3505	6735	4005	7920	4610	9465

Figure 5-28 (Sheet 3)

**WITHOUT CARGO POD  
RATE OF CLIMB - TAKEOFF FLAP SETTING  
FLAPS 20°**

CONDITIONS:  
Takeoff Power  
1900 RPM

**INERTIAL SEPARATOR NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	92	910	890	875	855	835
	2000	90	890	870	850	830	770
	4000	89	870	850	825	805	685
	6000	88	845	820	800	775	590
	8000	87	820	795	770	655	470
	10,000	85	790	760	700	535	---
	12,000	84	760	715	575	415	---
8300	Sea Level	91	990	975	955	935	915
	2000	89	970	955	935	910	850
	4000	88	950	930	905	885	765
	6000	86	925	905	880	855	670
	8000	85	900	875	850	735	545
	10,000	84	870	840	780	610	---
	12,000	82	835	790	650	485	---
7800	Sea Level	89	1085	1070	1055	1035	1015
	2000	87	1070	1050	1030	1010	950
	4000	86	1050	1025	1005	985	860
	6000	85	1025	1000	980	955	760
	8000	83	995	970	950	830	630
	10,000	82	965	940	875	705	---
	12,000	80	935	890	740	575	---
7300	Sea Level	88	1195	1185	1165	1150	1130
	2000	86	1180	1160	1145	1125	1060
	4000	85	1160	1140	1120	1095	965
	6000	84	1135	1110	1090	1065	865
	8000	82	1105	1085	1060	935	730
	10,000	81	1080	1050	985	805	---
	12,000	79	1045	1000	845	670	---

**NOTE**

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease rate of climb by 20 FPM for INERTIAL SEPARATOR set in BYPASS and 45 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-29

**WITHOUT CARGO POD  
CLIMB GRADIENT - TAKEOFF FLAP SETTING  
FLAPS 20°**

**CONDITIONS:**

Takeoff Power  
1900 RPM

Zero Wind

**INERTIAL SEPARATOR NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb Gradient - Feet/Nautical Mile (FT/NM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	70	730	685	645	610	575
	2000	71	690	645	605	570	515
	4000	71	650	610	570	535	445
	6000	71	610	570	530	495	370
	8000	72	570	530	495	410	290
	10,000	72	530	490	435	325	---
	12,000	72	495	445	345	245	---
8300	Sea Level	68	805	760	720	680	645
	2000	69	765	720	680	640	580
	4000	69	725	680	640	600	505
	6000	69	680	635	595	560	430
	8000	69	640	595	555	465	340
	10,000	69	600	555	495	375	---
	12,000	69	555	505	400	290	---
7800	Sea Level	65	905	860	810	770	730
	2000	65	865	815	765	725	660
	4000	66	815	770	725	680	580
	6000	66	770	725	680	640	500
	8000	66	725	680	635	540	405
	10,000	67	680	635	570	445	---
	12,000	67	635	580	470	350	---
7300	Sea Level	62	1020	965	915	870	830
	2000	62	975	920	870	825	755
	4000	63	925	870	820	775	670
	6000	63	875	820	775	730	580
	8000	63	825	770	725	620	475
	10,000	64	775	725	655	520	---
	12,000	64	725	665	545	420	---

**NOTE**

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease climb gradient by 10 FT/NM for INERTIAL SEPARATOR set in BYPASS and 30 FT/NM for CABIN HEAT ON.
3. Where climb gradient values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those climb gradients which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-30

**WITHOUT CARGO POD  
MAXIMUM RATE OF CLIMB  
FLAPS UP**

CONDITIONS:  
1900 RPM  
INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	104	1025	1005	990	970	755
	4000	104	990	970	945	840	505
	8000	104	945	920	840	575	275
	12,000	101	895	765	565	335	75
	16,000	95	660	495	315	105	---
	20,000	87	390	240	65	---	---
	24,000	78	135	---	---	---	---
8300	SL	103	1110	1095	1075	1060	835
	4000	103	1075	1055	1035	925	580
	8000	103	1035	1010	925	650	340
	12,000	100	985	850	645	400	135
	16,000	94	740	570	385	165	---
	20,000	86	465	310	130	---	---
	24,000	77	205	60	---	---	---
7800	SL	101	1215	1200	1185	1170	935
	4000	101	1185	1165	1145	1030	670
	8000	101	1145	1120	1035	745	420
	12,000	98	1090	955	740	490	210
	16,000	91	840	665	470	245	---
	20,000	83	555	395	210	---	---
	24,000	73	285	135	---	---	---
7300	SL	99	1335	1320	1305	1290	1045
	4000	99	1305	1285	1265	1150	770
	8000	99	1265	1240	1155	855	510
	12,000	96	1210	1070	850	585	290
	16,000	88	950	770	565	330	65
	20,000	80	650	485	295	75	---
	24,000	69	370	220	40	---	---

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. With climb power set below the torque limit, decrease rate of climb by 30 FPM for INERTIAL SEPARATOR set in BYPASS and 65 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected or operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.

Figure 5-31

**WITHOUT CARGO POD  
CLIMB GRADIENT - TAKEOFF  
FLAPS UP**

**CONDITIONS:**

Takeoff Power

1900 RPM

Zero Wind

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb Gradient - Feet/Nautical Mile (FT/NM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	68	750	710	670	635	490
	2000	69	715	675	635	600	405
	4000	69	675	635	600	515	325
	6000	70	640	600	560	430	250
	8000	70	600	560	495	345	185
	10,000	71	565	525	405	270	---
	12,000	72	525	440	320	195	---
8300	Sea Level	66	830	785	745	705	555
	2000	66	790	745	705	670	465
	4000	67	750	705	665	580	375
	6000	68	710	665	625	485	300
	8000	68	670	625	555	400	230
	10,000	69	630	585	460	320	---
	12,000	69	590	495	375	240	---
7800	Sea Level	61	925	880	835	795	635
	2000	62	885	835	795	755	535
	4000	62	840	795	750	660	440
	6000	62	795	750	710	560	355
	8000	63	755	705	635	465	285
	10,000	63	710	665	530	380	---
	12,000	63	665	565	435	295	---
7300	Sea Level	59	1040	990	940	895	720
	2000	59	995	940	895	850	615
	4000	59	945	895	850	750	515
	6000	59	900	845	800	640	425
	8000	59	850	800	720	540	345
	10,000	59	805	755	610	450	---
	12,000	59	755	650	510	360	---

**NOTE**

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease climb gradient by 10 FT/NM for INERTIAL SEPARATOR set in BYPASS and 40 FT/NM for CABIN HEAT ON.
3. Where climb gradient values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those climb gradients which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-32

**WITHOUT CARGO POD  
CRUISE CLIMB  
FLAPS UP - 115 KIAS**

CONDITIONS:  
1900 RPM  
INERTIAL SEPARATOR NORMAL

Weight Pounds	Pressure Altitude Feet	Rate of Climb - Feet Per Minute (FPM)				
		-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	1000	980	960	940	705
	2000	980	960	935	910	570
	4000	960	935	910	795	435
	6000	935	905	880	650	305
	8000	910	880	790	505	190
	10,000	880	845	640	370	---
	12,000	845	705	485	235	---
8300	Sea Level	1085	1060	1040	1020	780
	2000	1065	1040	1020	995	635
	4000	1040	1015	990	870	495
	6000	1015	990	960	720	360
	8000	990	960	870	570	235
	10,000	960	925	710	430	---
	12,000	925	780	550	285	---
7800	Sea Level	1185	1165	1145	1120	865
	2000	1165	1140	1120	1095	715
	4000	1140	1115	1090	965	565
	6000	1115	1090	1060	805	420
	8000	1090	1060	965	645	295
	10,000	1060	1025	795	500	---
	12,000	1025	870	630	350	---
7300	Sea Level	1300	1275	1255	1235	960
	2000	1275	1255	1230	1205	800
	4000	1255	1230	1205	1065	645
	6000	1230	1200	1170	900	490
	8000	1200	1170	1070	730	355
	10,000	1170	1135	890	575	---
	12,000	1135	970	715	415	---

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. With climb power set below the torque limit, decrease rate of climb by 50 FPM for INERTIAL SEPARATOR set in BYPASS and 70 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected or operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-33

**WITHOUT CARGO POD  
RATE OF CLIMB  
BALKED LANDING - FLAPS FULL**

**CONDITIONS:**

Takeoff Power

1900 RPM

**INERTIAL SEPARATOR NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8500	Sea Level	83	845	830	810	785	765
	2000	82	830	805	785	760	700
	4000	81	805	780	755	735	620
	6000	80	780	755	730	700	525
	8000	79	755	725	695	590	410
	10,000	78	725	695	630	470	---
	12,000	77	690	645	505	350	---
8000	Sea Level	82	940	920	900	880	860
	2000	81	920	900	875	855	790
	4000	80	900	875	850	825	705
	6000	79	875	845	820	795	610
	8000	78	845	820	790	675	490
	10,000	77	815	785	720	555	---
	12,000	76	785	735	595	435	---
7500	Sea Level	81	1040	1020	1000	980	960
	2000	80	1020	1000	980	955	890
	4000	79	1000	975	950	930	805
	6000	78	975	950	925	900	705
	8000	77	945	920	890	775	580
	10,000	75	915	890	820	650	---
	12,000	74	885	840	690	520	---
7000	Sea Level	80	1150	1135	1115	1095	1075
	2000	79	1135	1115	1095	1070	1005
	4000	78	1115	1090	1065	1045	915
	6000	77	1090	1065	1040	1010	810
	8000	75	1060	1035	1005	885	680
	10,000	74	1030	1000	930	750	---
	12,000	73	1000	950	795	620	---

**NOTE**

1. Do not exceed torque limit for takeoff per **MAXIMUM ENGINE TORQUE FOR TAKEOFF** chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.
2. With climb power set below the torque limit, decrease rate of climb by 15 FPM for INERTIAL SEPARATOR set in BYPASS and 45 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-34



## WITHOUT CARGO POD TIME, FUEL, AND DISTANCE TO CLIMB MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps **UP**

1900 RPM

Zero Wind

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb From Sea Level								
			20°C Below Standard			Standard Temperature			20°C Above Standard		
			Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM
8750	Sea Level	104	0	0	0	0	0	0	0	0	0
	4000	104	4	30	7	4	31	8	5	35	10
	8000	104	8	60	15	9	62	16	11	74	22
	12,000	102	13	92	24	14	98	27	19	119	38
	16,000	96	19	128	34	21	140	42	31	177	62
	20,000	88	26	173	50	33	198	65	54	280	111
	24,000	79	43	249	82	59	314	119	---	---	---
8300	Sea Level	103	0	0	0	0	0	0	0	0	0
	4000	103	4	27	7	4	28	7	5	32	9
	8000	103	8	55	14	8	57	14	10	66	19
	12,000	101	12	84	21	13	89	24	17	106	34
	16,000	95	17	116	31	19	126	37	27	154	53
	20,000	87	24	155	44	29	173	56	43	227	88
	24,000	77	36	213	69	46	252	92	174	719	363
7800	Sea Level	101	0	0	0	0	0	0	0	0	0
	4000	101	4	25	6	4	26	6	4	28	8
	8000	101	7	50	12	7	52	13	9	59	17
	12,000	99	11	76	19	12	80	21	15	93	29
	16,000	92	15	104	27	17	112	32	23	133	45
	20,000	84	21	138	38	25	151	47	35	187	70
	24,000	74	31	184	57	38	208	73	65	301	131
7300	Sea Level	99	0	0	0	0	0	0	0	0	0
	4000	99	3	23	5	3	23	5	4	25	7
	8000	99	6	45	11	7	47	11	8	52	15
	12,000	97	10	69	17	10	72	19	13	81	25
	16,000	89	14	94	24	15	100	28	20	115	38
	20,000	80	19	123	34	22	133	40	29	158	57
	24,000	70	27	161	49	32	177	60	47	227	93

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. Add 35 pounds of fuel for engine start, taxi, and takeoff allowance.
3. With INERTIAL SEPARATOR set in BYPASS, increase time, fuel, and distance numbers by 1% for each 2000 feet of climb and for CABIN HEAT ON, increase time, fuel, and distance numbers by 1% for each 1000 feet of climb.
4. Where time, fuel, and distance values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected.

Figure 5-35 (Sheet 1 of 2)

**WITHOUT CARGO POD  
TIME, FUEL, AND DISTANCE TO CLIMB  
CRUISE CLIMB - 115 KIAS**

CONDITIONS:

Flaps **UP**  
1900 RPM

Zero Wind

**INERTIAL SEPARATOR NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb From Sea Level								
		20°C Below Standard			Standard Temperature			20°C Above Standard		
		Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM
8750	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	15	4	2	16	4	3	18	5
	4000	4	31	8	4	32	9	6	38	11
	6000	7	47	13	7	48	13	9	58	18
	8000	9	63	17	9	65	18	12	80	26
	10,000	11	79	22	12	84	24	17	105	36
	12,000	14	96	27	15	104	32	22	134	48
8300	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	14	4	2	15	4	2	17	5
	4000	4	28	8	4	29	8	5	34	10
	6000	6	43	12	6	44	12	8	53	16
	8000	8	57	16	8	60	17	11	72	24
	10,000	10	72	20	11	76	22	15	94	32
	12,000	12	88	25	14	94	29	19	119	43
7800	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	13	3	2	13	4	2	15	4
	4000	4	26	7	4	27	7	5	31	9
	6000	5	39	11	6	40	11	7	47	15
	8000	7	52	14	8	54	15	10	65	21
	10,000	9	66	18	10	69	20	13	84	29
	12,000	11	80	23	12	85	26	17	106	38
7300	Sea Level	0	0	0	0	0	0	0	0	0
	2000	2	12	3	2	12	3	2	14	4
	4000	3	24	6	3	24	7	4	28	8
	6000	5	35	10	5	37	10	6	42	13
	8000	7	47	13	7	49	14	9	58	19
	10,000	8	60	17	9	62	18	12	75	26
	12,000	10	72	21	11	77	23	15	94	33

**NOTE**

1. Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.
2. Add 35 pounds of fuel for engine start, taxi, and takeoff allowance.
3. With INERTIAL SEPARATOR set in BYPASS or CABIN HEAT ON, increase time, fuel, and distance numbers by 1% for each 1000 feet of climb.

Figure 5-35 (Sheet 2)

## **WITHOUT CARGO POD CRUISE PERFORMANCE**

### **NOTE**

The following general information is applicable to all CRUISE PERFORMANCE Charts.

1. The highest torque shown for each temperature and RPM corresponds to maximum allowable cruise power. Do not exceed this torque, 740°C ITT, or 101.6% Ng, whichever occurs first.
2. The lowest torque shown for each temperature and RPM corresponds to the recommended torque setting for best range in zero wind conditions.
3. With the INERTIAL SEPARATOR in BYPASS and power set below the torque limit (1865 foot-pounds), decrease the maximum cruise torque by 115 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 15 pounds per hour (PPH) higher.
4. With the CABIN HEAT ON and power set below the torque limit (1865 foot-pounds), decrease maximum cruise torque by 80 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 7 PPH higher.

Figure 5-36 (Sheet 1 of 12)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 2000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
46	1232	343	153	1320	343	152	1410	343	151
40	1369	362	160	1464	362	159	1563	362	157
30	1590	393	169	1696	393	168	1804	393	166
	1400	363	160	1500	364	159	1600	363	158
	1390	362	159	1450	357	157	1525	353	154
20	1800	424	176	1916	424	175	1970	414	170
	1600	392	168	1800	406	171	1800	389	164
	1400	361	158	1600	375	162	1600	360	156
10	1385	358	157	1440	351	155	1510	348	152
	1865	432	177	1970	429	175	1970	410	168
	1700	405	170	1800	402	169	1800	385	162
0	1500	374	161	1600	372	161	1600	357	155
	1375	354	155	1435	348	153	1485	341	150
	1865	429	175	1970	425	173	1970	406	167
-10	1700	402	168	1800	399	167	1800	381	161
	1500	371	160	1600	369	159	1600	353	153
	1375	351	154	1415	342	151	1480	337	148
-20	1865	426	173	1970	422	171	1970	402	165
	1700	399	166	1800	395	165	1800	378	159
	1500	368	158	1600	366	157	1600	350	151
-30	1355	346	151	1405	337	148	1460	331	146
	1865	423	171	1970	418	169	1970	398	163
	1700	396	164	1800	392	163	1800	374	157
-40	1500	365	156	1600	362	155	1600	346	150
	1355	344	149	1395	333	146	1455	326	144
	1865	421	168	1970	414	167	1970	395	161
-50	1700	394	162	1800	389	161	1800	370	156
	1500	363	154	1600	359	153	1600	342	148
	1360	342	147	1400	331	145	1440	321	141
-54	1865	419	166	1970	412	165	1970	391	159
	1700	391	160	1800	386	159	1800	367	154
	1500	361	152	1600	356	151	1600	339	146
-54	1350	338	145	1400	328	143	1435	316	139
	1865	417	164	1970	410	163	1970	387	157
	1700	389	158	1800	382	157	1800	363	152
-54	1500	358	150	1600	353	149	1600	335	144
	1355	336	143	1400	325	141	1415	311	137
	1865	417	163	1970	409	162	1970	385	156
-54	1700	388	157	1800	381	156	1800	361	151
	1500	357	149	1600	352	148	1600	334	143
	1360	336	142	1400	324	140	1410	309	136
				1360	318	138			

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Figure 5-36 (Sheet 2)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 4000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR NORMAL

<b>NOTE</b> Do not exceed maximum cruise torque or 740 °C ITT.
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Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
42	1211	329	154	1295	329	153	1384	329	152
40	1255	335	156	1342	335	156	1433	335	154
30	1466	365	167	1564	365	166	1664	365	163
	1350	347	161	1395	340	157	1500	341	156
20	1667	395	175	1775	395	173	1883	395	170
	1500	368	167	1600	368	166	1700	367	163
	1330	342	158	1395	336	156	1500	338	155
10	1864	426	181	1970	424	179	1970	405	172
	1700	398	174	1800	396	172	1800	378	166
	1500	365	165	1600	365	164	1600	349	158
	1320	337	156	1400	334	155	1445	327	151
0	1865	424	179	1970	421	177	1970	400	170
	1700	395	172	1800	393	171	1800	375	164
	1500	363	163	1600	361	162	1600	346	156
	1315	333	154	1400	331	153	1430	322	148
-10	1865	422	177	1970	418	175	1970	396	168
	1700	392	170	1800	389	169	1800	371	162
	1500	360	161	1600	358	161	1600	342	155
	1305	330	152	1400	329	151	1415	316	146
-20	1865	420	175	1970	416	173	1970	392	167
	1700	390	168	1800	386	167	1800	368	161
	1500	358	159	1600	355	159	1600	339	153
	1295	326	149	1400	326	150	1395	311	144
-30	1865	418	172	1970	413	171	1970	389	165
	1700	387	166	1800	382	165	1800	364	159
	1500	355	157	1600	352	157	1600	336	151
	1295	324	148	1400	323	148	1395	307	142
-40	1865	416	170	1970	410	169	1970	386	163
	1700	385	164	1800	379	163	1800	361	157
	1500	353	155	1600	350	155	1600	332	149
	1300	323	146	1400	320	146	1400	305	141
-50	1290	321	145	1315	308	142	1380	302	140
	1865	415	168	1970	408	166	1970	383	161
	1700	384	162	1800	377	161	1800	357	155
	1500	351	153	1600	347	153	1600	328	147
-54	1300	320	144	1400	317	144	1400	301	139
	1285	318	143	1305	304	140	1365	297	137
	1865	414	167	1970	407	165	1970	382	160
	1700	383	161	1800	376	160	1800	356	154
-54	1500	350	152	1600	346	152	1600	327	147
	1300	320	143	1400	316	143	1400	300	138
	1285	318	143	1305	303	139	1360	295	137

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Figure 5-36 (Sheet 3)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 6000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
38	1186	315	155	1268	315	154	1353	315	152
30	1346	338	164	1436	338	163	1529	338	160
	1305	332	161	1355	326	158	1440	325	156
20	1538	367	172	1638	367	171	1737	367	168
	1400	344	165	1500	345	165	1600	346	162
	1295	328	159	1345	322	156	1425	320	154
10	1725	396	179	1833	396	177	1940	396	174
	1600	375	174	1700	374	172	1800	373	169
	1400	342	164	1500	342	163	1600	342	161
	1275	322	157	1340	318	155	1405	314	152
0	1865	422	183	1970	420	181	1970	398	174
	1700	389	176	1800	387	174	1800	369	167
	1500	356	167	1600	355	166	1600	339	159
	1300	324	156	1400	324	156	1400	311	150
-10	1270	319	155	1330	314	153	1390	309	149
	1865	420	181	1970	417	179	1970	395	172
	1700	387	174	1800	385	172	1800	365	166
	1500	353	165	1600	352	164	1600	336	158
	1300	322	155	1400	321	155	1400	308	148
-20	1265	316	153	1310	308	150	1375	303	147
	1865	418	179	1970	414	177	1970	391	170
	1700	386	172	1800	382	171	1800	362	164
	1500	351	163	1600	349	162	1600	333	156
	1300	319	153	1400	318	153	1400	304	147
	1245	310	150	1300	304	148	1355	298	145
-30	1865	416	177	1970	412	175	1970	388	168
	1700	384	170	1800	379	168	1800	359	162
	1500	348	161	1600	346	160	1600	330	154
	1300	317	151	1400	316	151	1400	301	145
	1240	308	148	1285	299	145	1350	294	143
-40	1865	414	174	1970	409	172	1970	385	166
	1700	382	168	1800	377	166	1800	356	160
	1500	346	159	1600	343	158	1600	326	153
	1300	315	149	1400	313	149	1400	298	144
	1240	306	146	1260	293	142	1340	289	141
-50	1865	412	172	1970	406	170	1970	382	164
	1700	381	165	1800	375	164	1800	353	158
	1500	344	157	1600	340	156	1600	323	151
	1300	313	147	1400	310	148	1400	295	142
	1250	305	144	1265	291	141	1325	284	138
-54	1865	411	171	1970	405	169	1970	381	163
	1700	380	165	1800	374	163	1800	352	157
	1500	343	156	1600	339	155	1600	322	150
	1300	312	146	1400	309	147	1400	294	141
	1250	304	144	1245	287	139	1310	282	137

Figure 5-36 (Sheet 4)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 8000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
30	1215	311	159	1297	311	158	1382	311	155
20	1397	338	169	1488	338	167	1579	338	164
	1260	316	161	1305	309	157	1400	310	155
10							1385	308	154
	1571	364	176	1670	364	174	1767	364	171
	1400	336	167	1500	337	166	1600	337	164
0	1245	311	158	1295	305	155	1400	308	154
							1370	303	152
	1743	397	182	1852	396	180	1957	396	177
	1600	368	176	1700	367	174	1800	367	171
-10	1400	334	165	1500	334	165	1600	334	162
	1235	307	156	1300	303	154	1400	304	153
				1290	302	153	1355	298	150
	1865	419	185	1970	416	183	1970	395	176
-20	1700	386	178	1800	384	176	1800	363	169
	1500	348	169	1600	347	168	1600	331	161
	1300	315	158	1400	315	158	1400	302	151
	1225	303	153	1275	297	151	1335	293	148
-30	1865	416	183	1970	414	181	1970	392	174
	1700	384	176	1800	382	174	1800	360	167
	1500	345	167	1600	344	166	1600	328	159
	1300	313	156	1400	313	156	1400	299	150
-40	1210	299	151	1265	292	149	1315	287	145
	1865	414	181	1970	411	179	1970	388	172
	1700	382	174	1800	379	172	1800	357	166
	1500	343	165	1600	341	164	1600	325	157
-50	1300	311	154	1400	310	155	1400	296	148
	1210	296	149	1250	288	146	1305	282	143
	1865	412	178	1970	408	176	1970	385	170
	1700	380	172	1800	376	170	1800	355	164
-54	1500	342	163	1600	339	162	1600	322	156
	1300	309	152	1400	307	153	1400	293	147
	1215	295	148	1230	282	143	1295	278	141
	1865	410	176	1970	405	174	1970	382	168
-54	1700	379	169	1800	374	168	1800	352	162
	1500	341	161	1600	337	160	1600	319	154
	1300	307	151	1400	305	151	1400	290	145
	1210	293	146	1230	280	142	1275	272	139
-54	1865	409	175	1970	404	173	1970	381	167
	1700	378	168	1800	373	167	1800	351	161
	1500	340	160	1600	337	159	1600	317	153
	1300	306	150	1400	304	150	1400	289	144
	1205	291	144	1225	278	141	1270	271	138

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Figure 5-36 (Sheet 5)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 10,000 FEET**

CONDITIONS:

8750 Pounds

INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b>
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
25	1182	298	159	1261	298	158	1341	298	155
20	1266	310	164	1349	310	163	1433	310	159
	1235	306	162	1285	301	159	1355	299	155
10	1426	334	172	1516	334	170	1606	334	167
	1300	314	165	1400	316	164	1500	318	162
	1235	303	160	1280	297	157	1355	295	154
0	1586	364	179	1685	364	177	1782	364	174
	1400	328	169	1500	330	168	1600	330	165
	1215	298	158	1300	298	157	1400	299	155
				1265	292	155	1340	290	152
-10	1745	394	184	1854	394	182	1957	394	179
	1600	365	178	1700	365	176	1800	364	173
	1400	326	167	1500	326	166	1600	326	164
	1205	294	155	1300	295	155	1400	296	154
-20				1260	289	153	1330	286	150
	1865	416	187	1970	413	184	1970	393	177
	1700	383	180	1800	381	178	1800	361	171
	1500	343	171	1600	343	169	1600	324	162
	1300	308	160	1400	307	160	1400	294	152
-30	1195	290	153	1250	284	151	1300	279	147
	1865	413	185	1970	410	182	1970	389	175
	1700	381	178	1800	379	176	1800	357	169
	1500	342	169	1600	341	168	1600	321	161
	1300	305	158	1400	305	158	1400	291	151
-40	1185	287	151	1230	279	148	1280	274	145
	1865	411	183	1970	408	180	1970	385	173
	1700	379	176	1800	376	174	1800	354	167
	1500	340	167	1600	338	166	1600	319	159
	1300	303	156	1400	302	156	1400	288	149
-50	1180	284	149	1220	275	146	1275	270	143
	1865	410	180	1970	406	178	1970	381	171
	1700	377	173	1800	373	172	1800	352	165
	1500	339	164	1600	336	164	1600	316	157
	1300	301	154	1400	300	154	1400	285	148
-54	1180	282	147	1215	272	144	1265	265	141
	1865	409	179	1970	405	177	1970	380	170
	1700	377	173	1800	372	171	1800	351	164
	1500	338	163	1600	335	163	1600	316	156
	1300	300	153	1400	299	153	1400	284	147
	1180	281	146	1205	270	142	1260	263	140

Figure 5-36 (Sheet 6)



**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 12,000 FEET**

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
20	1138	284	158	1213	284	156	1290	284	153
10	1287	306	167	1369	306	165	1452	306	162
	1220	295	163	1275	291	160	1350	290	156
0	1437	333	175	1527	333	173	1615	333	169
	1300	306	167	1400	309	166	1500	311	163
	1215	293	161	1260	286	157	1340	286	154
-10	1586	361	181	1684	361	179	1778	361	175
	1400	324	171	1500	326	170	1600	327	167
	1205	288	159	1300	290	158	1400	292	156
				1255	283	155	1330	281	152
-20	1708	384	185	1815	384	182	1915	384	179
	1600	362	180	1700	362	178	1800	362	175
	1400	323	169	1500	324	168	1600	324	165
	1200	286	156	1300	288	157	1400	290	155
	1185	284	156	1240	278	153	1305	275	150
-30	1835	409	188	1947	409	186	1970	391	179
	1700	380	182	1800	378	180	1800	359	173
	1500	341	172	1600	341	171	1600	321	164
	1300	302	161	1400	302	161	1400	287	154
	1185	281	154	1230	274	151	1280	269	147
-40	1865	414	187	1970	411	184	1970	388	177
	1700	378	180	1800	376	178	1800	355	171
	1500	339	170	1600	338	169	1600	319	162
	1300	300	159	1400	300	159	1400	284	152
	1165	276	151	1210	269	148	1260	263	144
-50	1865	412	184	1970	409	182	1970	384	175
	1700	376	178	1800	373	176	1800	352	169
	1500	338	168	1600	336	167	1600	316	160
	1300	299	158	1400	299	157	1400	281	151
	1160	273	149	1210	266	147	1250	259	142
-54	1865	411	183	1970	408	181	1970	383	174
	1700	376	177	1800	372	175	1800	351	168
	1500	337	167	1600	335	166	1600	315	160
	1300	299	157	1400	298	157	1400	280	150
	1160	273	148	1200	265	145	1245	257	142
			1190	263	145				

Figure 5-36 (Sheet 7)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 14,000 FEET**

CONDITIONS:

8750 Pounds

INERTIAL SEPARATOR **NORMAL**

**NOTE**  
Do not exceed maximum cruise torque or 740°C ITT.

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
15	1087	270	155	1159	270	153	1232	270	149
10	1157	280	161	1232	280	159	1307	280	155
0	1297	304	170	1379	304	168	1460	304	164
	1210	287	164	1265	283	160	1335	282	156
-10	1434	330	177	1523	330	174	1610	330	171
	1300	303	168	1400	306	167	1500	309	165
	1190	281	161	1240	276	157	1325	277	154
-20	1553	352	181	1649	352	179	1741	352	175
	1400	322	173	1500	323	172	1600	325	169
	1200	282	160	1300	285	160	1400	287	158
	1180	278	158	1235	273	156	1315	272	152
-30	1666	374	185	1768	374	182	1865	374	179
	1500	340	176	1600	340	175	1700	341	172
	1300	300	165	1400	302	164	1500	303	162
	1160	273	156	1225	269	153	1300	269	150
-40	1790	400	188	1899	399	186	1970	393	181
	1600	358	179	1700	357	177	1800	357	174
	1400	319	169	1500	319	168	1600	319	165
	1200	280	156	1300	281	157	1400	283	155
	1150	269	153	1210	264	151	1270	261	147
-50	1865	413	189	1970	411	186	1970	389	179
	1700	378	182	1800	376	180	1800	353	172
	1500	336	172	1600	335	171	1600	316	163
	1300	298	161	1400	298	161	1400	281	153
	1125	264	150	1195	260	148	1245	254	144
-54	1865	412	188	1970	409	185	1970	387	178
	1700	378	181	1800	376	179	1800	352	171
	1500	336	171	1600	335	170	1600	316	163
	1300	297	160	1400	297	160	1400	280	153
	1115	262	148	1200	260	148	1245	253	144
			1180	257	147				

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Figure 5-36 (Sheet 8)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE**  
CRUISE PRESSURE ALTITUDE 16,000 FEET

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740°C ITT.
--

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
10	1039	256	152	1107	256	149	1176	256	144
0	1169	277	163	1243	277	161	1317	277	157
	1160	275	162	1235	275	160	1315	276	157
-10	1293	301	171	1374	301	169	1453	301	165
	1140	270	160	1215	269	157	1300	271	155
-20	1407	322	177	1494	322	174	1579	322	171
	1300	301	170	1300	284	163	1400	288	160
	1130	266	157	1200	265	155	1285	266	153
-30	1510	342	181	1604	342	178	1693	341	175
	1400	319	175	1400	302	167	1500	304	165
	1200	279	161	1200	263	154	1300	266	153
	1115	262	155	1185	260	153	1265	260	150
-40	1622	365	185	1721	365	182	1813	364	179
	1500	338	178	1600	339	176	1700	340	174
	1300	298	167	1400	300	166	1500	301	163
	1095	257	152	1200	262	153	1300	265	151
	1165	255	150	1165	255	150	1245	254	148
-50	1737	387	188	1842	386	185	1941	386	182
	1600	359	181	1700	358	179	1800	358	176
	1400	316	171	1500	316	169	1600	316	167
	1200	277	158	1300	279	158	1400	281	156
	1075	252	149	1145	250	147	1225	249	145
-54	1737	386	187	1842	385	184	1943	384	181
	1600	358	180	1700	357	178	1800	357	175
	1400	315	170	1500	316	169	1600	315	166
	1200	276	157	1300	278	157	1400	280	156
	1070	251	148	1140	248	146	1215	246	144

Figure 5-36 (Sheet 9)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 18,000 FEET**

CONDITIONS:

8750 Pounds

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

**NOTE**

Do not exceed maximum cruise torque or 740°C ITT.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-5	1109	263	160	1179	263	157	1249	263	152
-10	1165	274	164	1239	274	162	1311	274	157
	1110	263	159	1180	262	157	1285	269	155
-20	1273	294	171	1352	294	169	1430	294	165
	1105	260	158	1200	265	157	1300	269	155
-30	1367	312	176	1452	311	174	1534	311	170
	1200	278	164	1300	282	164	1400	286	161
-40	1085	256	155	1140	251	151	1250	257	150
	1464	332	180	1553	332	178	1640	332	174
-50	1300	296	170	1400	300	169	1500	302	166
	1100	257	154	1200	261	155	1300	264	153
-54	1070	251	152	1130	248	150	1220	250	148
	1568	352	184	1663	352	181	1754	351	178
-54	1400	317	174	1500	318	173	1600	320	170
	1200	276	161	1300	278	161	1400	280	159
-54	1065	250	151	1115	243	147	1200	244	145
	1567	351	183	1660	350	180	1752	350	177
-54	1400	316	174	1500	318	172	1600	319	169
	1200	275	160	1300	278	160	1400	279	158
-54	1065	249	150	1110	241	146	1200	244	145
							1185	241	143

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Figure 5-36 (Sheet 10)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE**  
CRUISE PRESSURE ALTITUDE 20,000 FEET

CONDITIONS:  
8750 Pounds  
INERTIAL SEPARATOR **NORMAL**

<b>NOTE</b> Do not exceed maximum cruise torque or 740 °C ITT.
---

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-15	1097	259	159	1166	259	156	1233	258	151
-20	1148	268	164	1219	268	161	1289	268	156
	1130	264	162	1200	264	159			
-30	1235	284	170	1311	284	167	1386	284	163
	1115	260	160	1200	263	158			
				1180	259	157			
-40	1321	302	175	1403	302	172	1482	302	168
	1200	276	166	1200	261	157			
	1095	255	157	1145	250	153			
-50	1415	321	179	1500	320	176	1582	320	172
	1300	296	172	1300	278	164			
	1100	255	156	1140	248	151			
	1080	251	154						
-54	1409	319	178	1494	318	175	1578	318	172
	1300	296	171	1300	277	163			
	1100	255	155	1135	245	150			
	1080	250	154						

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Figure 5-36 (Sheet 11)

**WITHOUT CARGO POD  
CRUISE PERFORMANCE  
CRUISE PRESSURE ALTITUDE 22,000 FEET**

CONDITIONS:

8300 Pounds

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

**NOTE**

Do not exceed maximum cruise torque or 740°C ITT.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-25	1071	251	162	1138	251	159	1204	250	154
-30	1111	258	166	1180	258	163	1249	258	158
	1060	248	161	1135	250	159	1230	254	156
-40	1192	274	171	1265	274	168	1338	274	164
	1055	245	159	1115	243	156	1205	247	154
-50	1275	292	176	1352	291	173	1428	291	169
	1100	253	162	1200	259	162	1300	263	160
-54	1040	241	156	1090	237	153	1205	244	153
	1268	290	175	1346	289	172	1425	289	168
	1100	253	161	1200	258	162	1300	263	160
	1035	240	156	1085	235	152	1175	238	150

**CRUISE PRESSURE ALTITUDE 24,000 FEET**

CONDITIONS:

7800 Pounds

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

**NOTE**

Do not exceed maximum cruise torque or 740°C ITT.

Temp °C	1900 RPM			1750 RPM			1600 RPM		
	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS	Torque Ft-Lbs	Fuel Flow PPH	KTAS
-30	999	234	162	1062	234	158	1125	234	153
-40	1074	249	168	1141	249	165	1208	249	161
	990	232	160	1050	230	157	1145	236	155
-50	1149	265	173	1219	264	170	1289	264	166
	1000	232	159	1100	238	160	1135	232	153
-54	990	230	159	1040	227	155			
	1142	263	172	1214	263	169	1285	262	165
	1000	232	159	1100	238	160	1130	230	153
	985	228	157	1025	223	153			

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Figure 5-36 (Sheet 12)

## **WITHOUT CARGO POD CRUISE MAXIMUM TORQUE**

### **NOTE**

The following general information is applicable to all CRUISE MAXIMUM TORQUE Charts.

1. The highest torque shown for each temperature and RPM corresponds to maximum allowable cruise power. Do not exceed this torque, 740°C ITT, or 101.6% Ng, whichever occurs first.
2. With the INERTIAL SEPARATOR in BYPASS and power set below the torque limit (1865 foot-pounds), decrease the maximum cruise torque by 115 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 15 pounds per hour (PPH) higher.
3. With the CABIN HEAT ON and power set below the torque limit (1865 foot-pounds), decrease maximum cruise torque by 80 foot-pounds. Do not exceed 740°C ITT. Fuel flow for a given torque setting will be 7 PPH higher.
4. Where torque values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those torque values which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 5-37 (Sheet 1 of 7)

## WITHOUT CARGO POD CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 1000 Feet			Pressure Altitude 2000 Feet			Pressure Altitude 3000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
50	1204	1291	1379	1151	1235	1319	---	---	---
45	1314	1406	1503	1259	1348	1440	1204	1290	1378
40	1431	1530	1633	1373	1468	1567	1316	1407	1502
35	1545	1649	1757	1484	1585	1689	1425	1522	1621
30	1656	1766	1879	1592	1698	1807	1531	1632	1737
25	1769	1884	1970	1702	1813	1926	1638	1745	1853
20	1865	1970	1970	1802	1918	1970	1736	1847	1960
15	1865	1970	1970	1865	1970	1970	1835	1952	1970
10	1865	1970	1970	1865	1970	1970	1865	1970	1970
5	1865	1970	1970	1865	1970	1970	1865	1970	1970
0	1865	1970	1970	1865	1970	1970	1865	1970	1970
-5	1865	1970	1970	1865	1970	1970	1865	1970	1970
-10	1865	1970	1970	1865	1970	1970	1865	1970	1970
-15	1865	1970	1970	1865	1970	1970	1865	1970	1970
-20	1865	1970	1970	1865	1970	1970	1865	1970	1970
-25	1865	1970	1970	1865	1970	1970	1865	1970	1970
-30	1865	1970	1970	1865	1970	1970	1865	1970	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

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Figure 5-37 (Sheet 2)



## WITHOUT CARGO POD CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 4000 Feet			Pressure Altitude 5000 Feet			Pressure Altitude 6000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
45	1151	1233	1317	---	---	---	---	---	---
40	1260	1347	1438	1204	1288	1375	1149	1229	1313
35	1366	1459	1555	1309	1398	1490	1252	1337	1426
30	1469	1567	1668	1409	1503	1600	1350	1440	1533
25	1574	1677	1782	1511	1610	1711	1449	1545	1641
20	1670	1777	1886	1605	1708	1812	1541	1641	1741
15	1767	1879	1970	1700	1807	1915	1633	1737	1840
10	1865	1970	1970	1797	1909	1970	1728	1836	1943
5	1865	1970	1970	1865	1970	1970	1819	1932	1970
0	1865	1970	1970	1865	1970	1970	1865	1970	1970
-5	1865	1970	1970	1865	1970	1970	1865	1970	1970
-10	1865	1970	1970	1865	1970	1970	1865	1970	1970
-15	1865	1970	1970	1865	1970	1970	1865	1970	1970
-20	1865	1970	1970	1865	1970	1970	1865	1970	1970
-25	1865	1970	1970	1865	1970	1970	1865	1970	1970
-30	1865	1970	1970	1865	1970	1970	1865	1970	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

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Figure 5-37 (Sheet 3)

## WITHOUT CARGO POD CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 7000 Feet			Pressure Altitude 8000 Feet			Pressure Altitude 9000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
40	1089	1165	1245	---	---	---	---	---	---
35	1190	1271	1356	1130	1207	1289	1072	1146	1223
30	1284	1371	1459	1221	1303	1388	1160	1239	1320
25	1381	1472	1564	1313	1400	1489	1249	1332	1417
20	1471	1566	1662	1401	1492	1584	1334	1421	1509
15	1561	1660	1759	1487	1582	1677	1416	1507	1599
10	1652	1756	1858	1574	1673	1771	1500	1595	1689
5	1742	1851	1956	1662	1765	1867	1585	1684	1782
0	1830	1944	1970	1746	1855	1960	1666	1770	1871
-5	1865	1970	1970	1833	1947	1970	1749	1858	1962
-10	1865	1970	1970	1865	1970	1970	1829	1943	1970
-15	1865	1970	1970	1865	1970	1970	1865	1970	1970
-20	1865	1970	1970	1865	1970	1970	1865	1970	1970
-25	1865	1970	1970	1865	1970	1970	1865	1970	1970
-30	1865	1970	1970	1865	1970	1970	1865	1970	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

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Figure 5-37 (Sheet 4)

## WITHOUT CARGO POD CRUISE MAXIMUM TORQUE

CONDITIONS:

INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 10,000 Feet			Pressure Altitude 11,000 Feet			Pressure Altitude 12,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
30	1102	1177	1255	1047	1119	1194	989	1058	1129
25	1187	1266	1348	1129	1205	1283	1068	1140	1214
20	1270	1354	1438	1210	1290	1371	1147	1223	1301
15	1349	1436	1524	1286	1369	1453	1220	1299	1380
10	1430	1520	1611	1363	1450	1537	1294	1377	1460
5	1512	1606	1700	1442	1533	1623	1370	1456	1542
0	1590	1689	1786	1518	1612	1705	1443	1533	1622
-5	1669	1773	1873	1594	1693	1789	1516	1611	1703
-10	1748	1857	1960	1671	1776	1875	1591	1690	1785
-15	1813	1925	1970	1735	1841	1943	1654	1756	1854
-20	1865	1970	1970	1800	1911	1970	1717	1822	1920
-25	1865	1970	1970	1865	1970	1970	1780	1889	1970
-30	1865	1970	1970	1865	1970	1970	1843	1956	1970
-35	1865	1970	1970	1865	1970	1970	1865	1970	1970
-40	1865	1970	1970	1865	1970	1970	1865	1970	1970
-45	1865	1970	1970	1865	1970	1970	1865	1970	1970
-50	1865	1970	1970	1865	1970	1970	1865	1970	1970
-54	1865	1970	1970	1865	1970	1970	1865	1970	1970

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Figure 5-37 (Sheet 5)

## WITHOUT CARGO POD CRUISE MAXIMUM TORQUE

CONDITIONS:  
INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 13,000 Feet			Pressure Altitude 14,000 Feet			Pressure Altitude 15,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
25	1009	1078	1149	954	1020	1088	---	---	---
20	1086	1158	1233	1028	1097	1168	973	1039	1107
15	1157	1233	1310	1097	1170	1243	1041	1110	1181
10	1228	1307	1387	1165	1241	1317	1106	1178	1251
5	1300	1383	1465	1234	1313	1392	1172	1247	1323
0	1372	1458	1543	1304	1386	1468	1239	1317	1396
-5	1442	1532	1620	1371	1457	1542	1303	1385	1466
-10	1514	1608	1699	1440	1530	1617	1370	1455	1539
-15	1576	1674	1768	1503	1596	1686	1432	1522	1608
-20	1636	1737	1832	1559	1655	1747	1486	1578	1666
-25	1697	1801	1898	1618	1717	1810	1542	1637	1726
-30	1758	1865	1965	1676	1779	1874	1598	1696	1788
-35	1822	1934	1970	1737	1844	1942	1656	1758	1852
-40	1865	1970	1970	1799	1909	1970	1716	1821	1919
-45	1865	1970	1970	1860	1970	1970	1774	1883	1970
-50	1865	1970	1970	1865	1970	1970	1831	1944	1970
-54	1865	1970	1970	1865	1970	1970	1833	1945	1970

Temp °C	Pressure Altitude 16,000 Feet			Pressure Altitude 17,000 Feet			Pressure Altitude 18,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
20	923	986	1051	876	936	998	---	---	---
15	988	1054	1122	939	1002	1066	892	952	1014
10	1050	1119	1189	997	1063	1130	947	1010	1074
5	1112	1184	1257	1057	1125	1195	1004	1069	1136
0	1177	1252	1327	1118	1189	1261	1062	1130	1199
-5	1238	1316	1394	1176	1251	1325	1118	1189	1260
-10	1301	1382	1462	1236	1313	1390	1174	1248	1322
-15	1363	1448	1531	1297	1377	1457	1232	1309	1385
-20	1414	1501	1587	1345	1429	1511	1281	1360	1439
-25	1467	1557	1643	1395	1481	1565	1327	1409	1490
-30	1520	1613	1701	1446	1535	1619	1376	1460	1541
-35	1575	1672	1762	1498	1590	1676	1425	1512	1595
-40	1633	1733	1827	1553	1648	1737	1476	1567	1652
-45	1689	1792	1889	1606	1704	1797	1528	1621	1710
-50	1746	1853	1954	1661	1762	1859	1580	1676	1768
-54	1749	1855	1957	1665	1766	1863	1583	1678	1771

Figure 5-37 (Sheet 6)

## WITHOUT CARGO POD CRUISE MAXIMUM TORQUE

CONDITIONS:  
INERTIAL SEPARATOR **NORMAL**

Refer to sheet 1 for appropriate notes applicable to this chart.

Temp °C	Pressure Altitude 19,000 Feet			Pressure Altitude 20,000 Feet			Pressure Altitude 21,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
15	847	905	963	---	---	---	---	---	---
10	900	960	1022	847	904	962	797	851	906
5	954	1017	1080	899	959	1019	847	903	960
0	1009	1074	1140	952	1014	1076	897	956	1016
-5	1063	1131	1199	1005	1069	1134	949	1010	1072
-10	1116	1187	1257	1056	1123	1190	998	1062	1126
-15	1171	1244	1317	1109	1179	1248	1048	1115	1181
-20	1219	1295	1370	1158	1230	1302	1098	1167	1235
-25	1263	1341	1419	1200	1275	1348	1138	1209	1280
-30	1309	1389	1468	1243	1320	1396	1179	1253	1326
-35	1355	1438	1518	1288	1367	1443	1222	1297	1371
-40	1404	1490	1572	1334	1415	1494	1266	1343	1418
-45	1453	1542	1627	1382	1466	1547	1312	1392	1470
-50	1502	1594	1682	1428	1515	1600	1357	1439	1520
-54	1504	1595	1684	1429	1515	1600	1356	1438	1520

Temp °C	Pressure Altitude 22,000 Feet			Pressure Altitude 23,000 Feet			Pressure Altitude 24,000 Feet		
	Propeller Speed RPM			Propeller Speed RPM			Propeller Speed RPM		
	1900	1750	1600	1900	1750	1600	1900	1750	1600
10	749	800	852	---	---	---	---	---	---
5	797	850	905	750	800	853	705	753	802
0	846	901	958	797	850	904	750	800	852
-5	895	954	1013	844	900	956	796	848	902
-10	943	1003	1065	890	948	1007	841	896	951
-15	991	1054	1117	936	996	1057	885	942	1000
-20	1040	1106	1171	984	1046	1109	930	989	1049
-25	1079	1147	1215	1023	1088	1153	970	1032	1094
-30	1119	1189	1259	1061	1128	1195	1006	1070	1134
-35	1159	1231	1302	1099	1168	1237	1043	1109	1174
-40	1201	1274	1346	1139	1209	1279	1080	1147	1215
-45	1245	1321	1396	1181	1254	1324	1120	1189	1257
-50	1288	1367	1444	1223	1298	1372	1161	1232	1302
-54	1286	1365	1443	1220	1295	1369	1157	1229	1299

Figure 5-37 (Sheet 7)

**WITHOUT CARGO POD  
FUEL AND TIME REQUIRED**

MAXIMUM CRUISE POWER (40-200 Nautical Miles)

CONDITIONS:

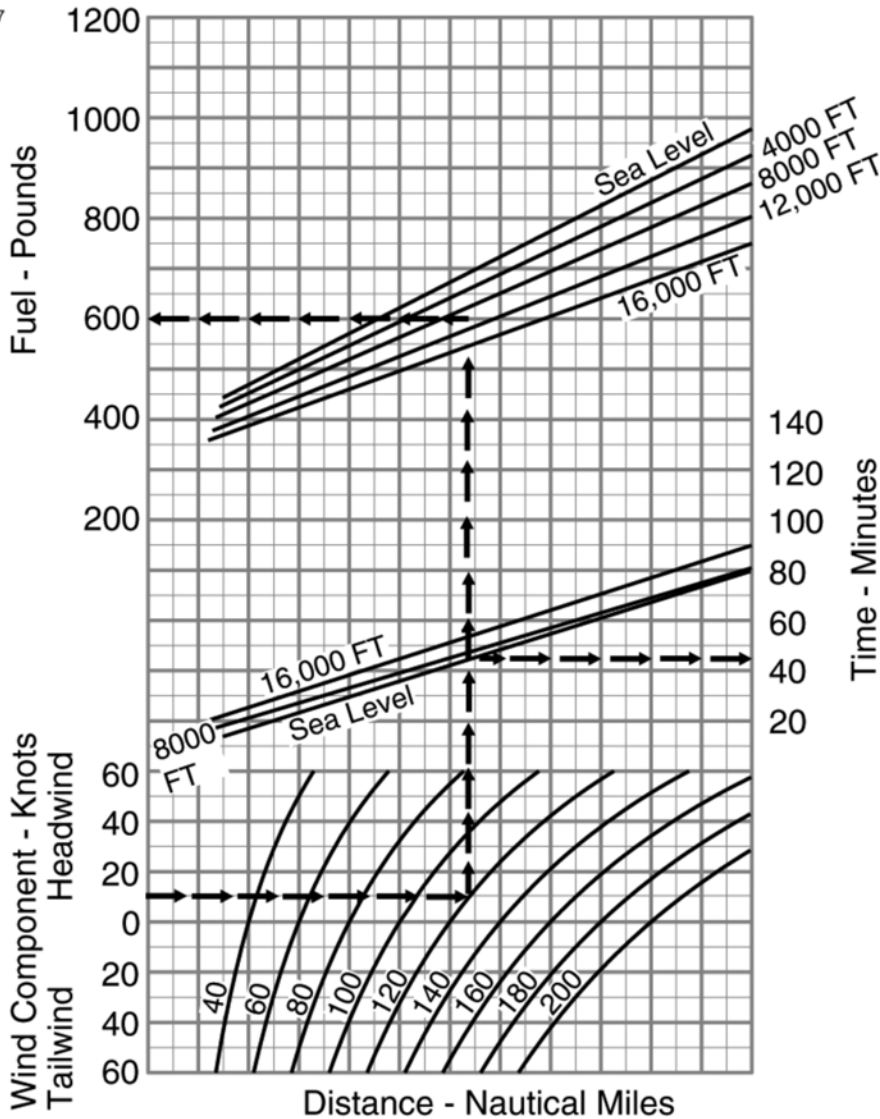
8750 Pounds

Standard Temperature

1900 RPM

INERTIAL SEPARATOR **NORMAL**

A39947



**NOTE**

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPASS, increase time by 4% and fuel by 2%, or CABIN HEAT ON, increase time by 3% and fuel by 2%.

Figure 5-38 (Sheet 1 of 2)

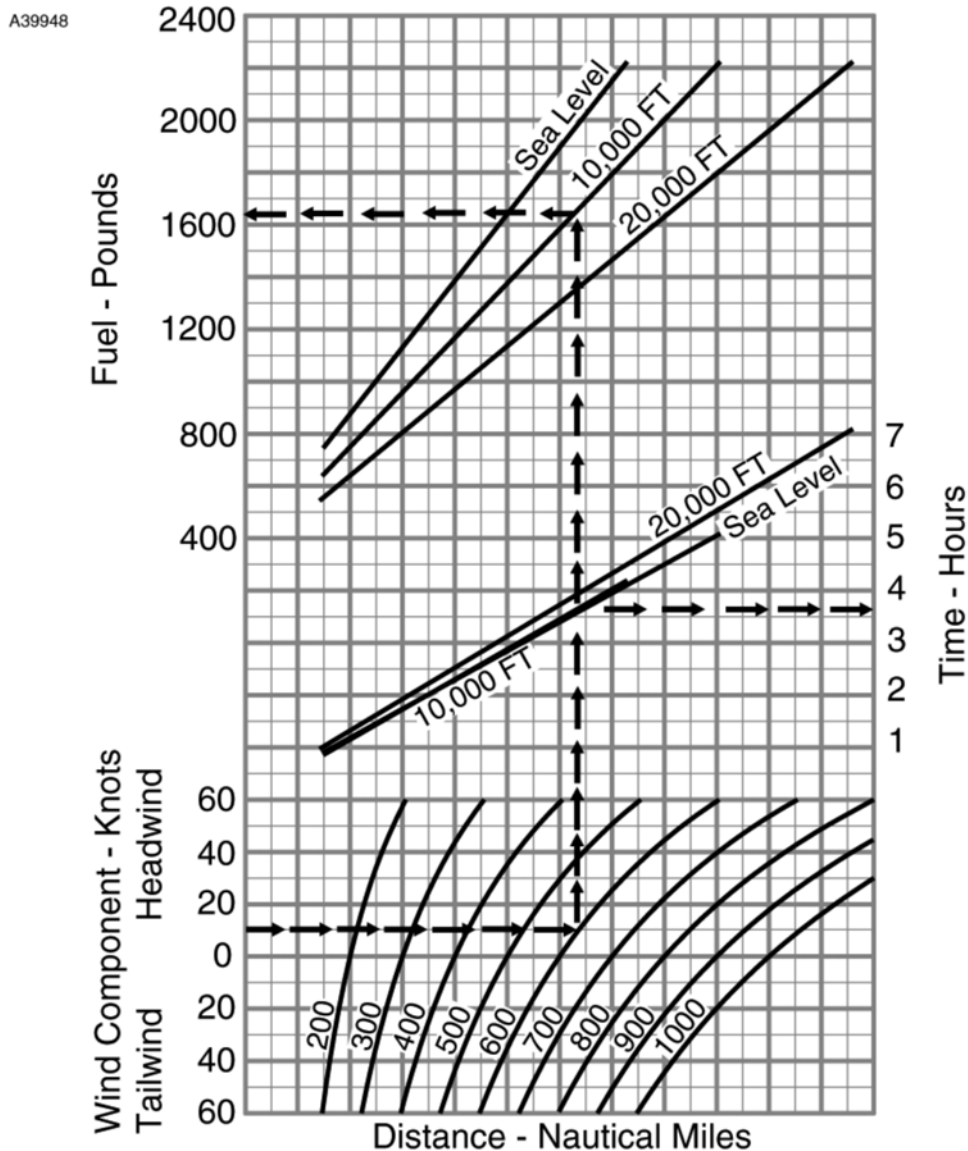
## WITHOUT CARGO POD FUEL AND TIME REQUIRED

MAXIMUM CRUISE POWER (200-1000 Nautical Miles)

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**



### NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPASS, increase time by 5% and fuel by 2%, or CABIN HEAT ON, increase time by 4% and fuel by 3%.

Figure 5-38 (Sheet 2)

WITHOUT CARGO POD

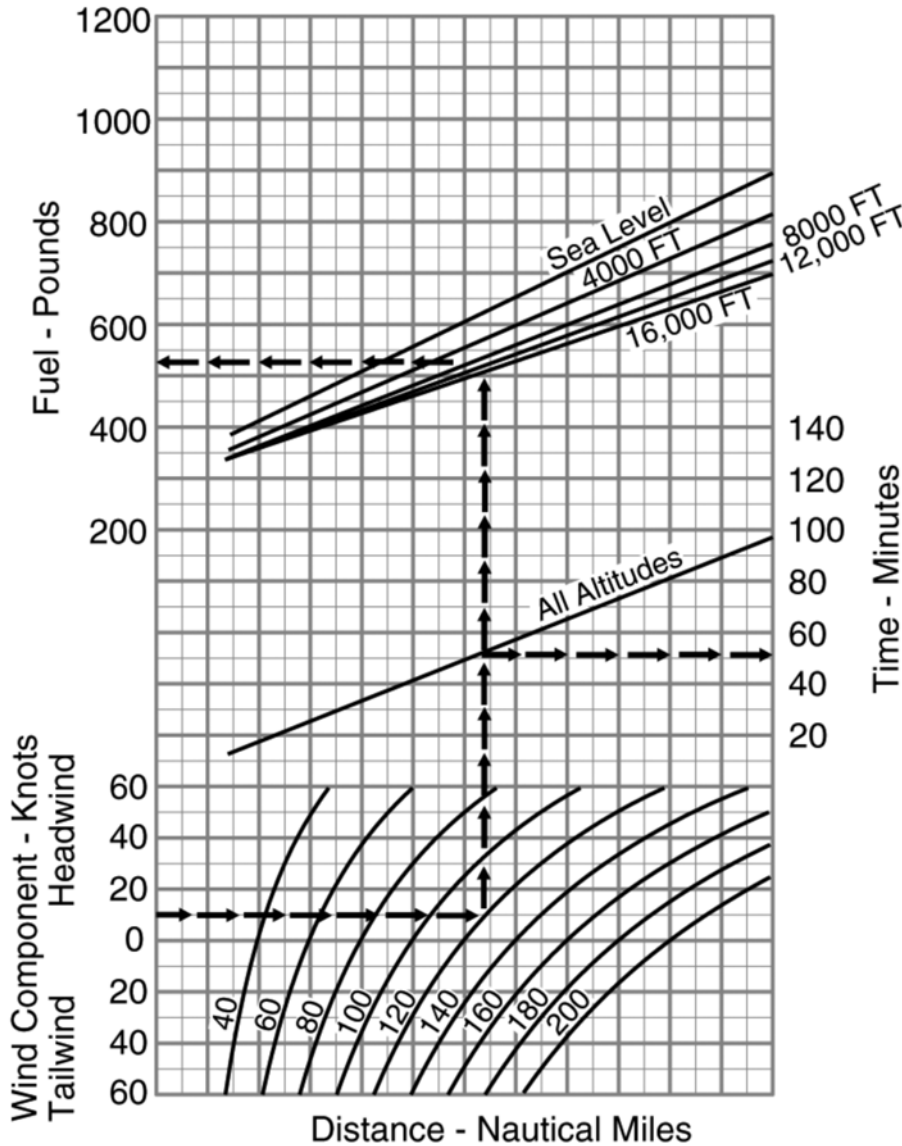
# FUEL AND TIME REQUIRED

MAXIMUM RANGE POWER (40-200 Nautical Miles)

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**



## NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPASS, increase time by 1% and fuel by 2%, or CABIN HEAT ON, increase time by 1% and fuel by 3%.

Figure 5-39 (Sheet 1 of 2)



WITHOUT CARGO POD

## FUEL AND TIME REQUIRED

MAXIMUM RANGE POWER (200-1000 Nautical Miles)

CONDITIONS:

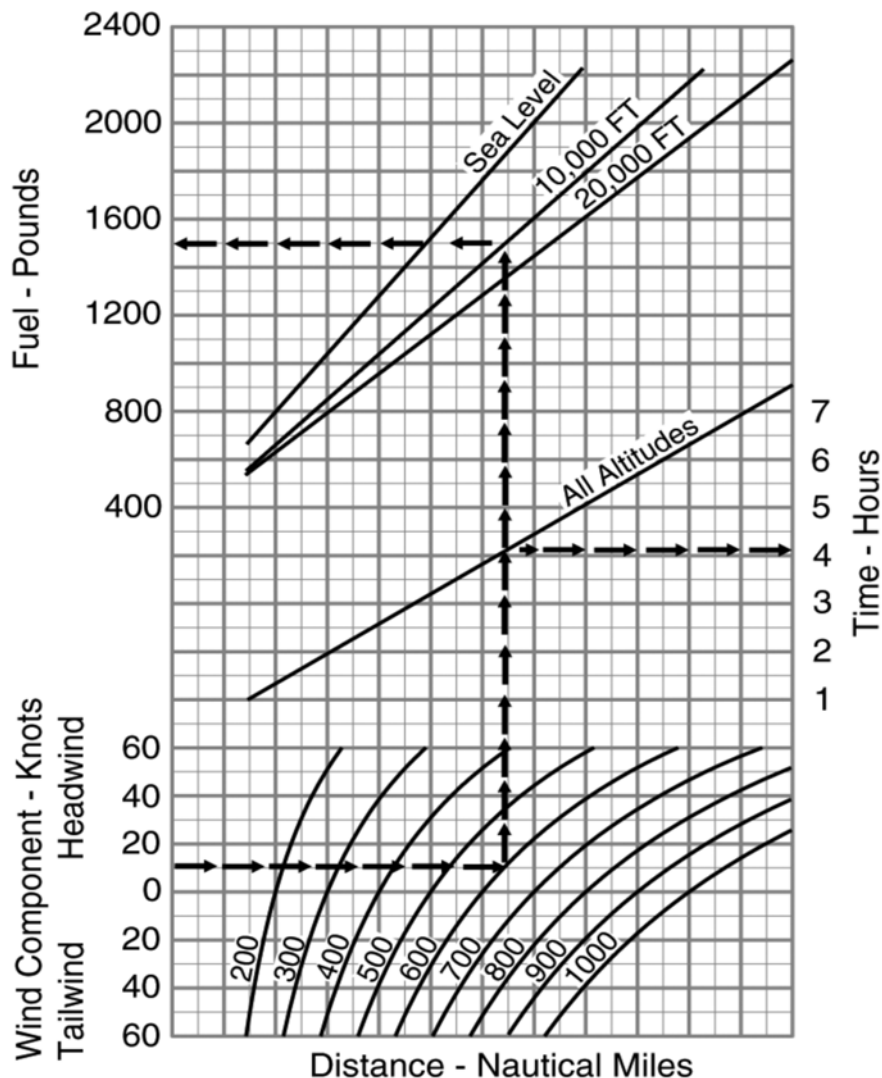
8750 Pounds

Standard Temperature

1900 RPM

INERTIAL SEPARATOR **NORMAL**

A39950



### NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPASS, increase time by 1% and fuel by 2%, or CABIN HEAT ON, increase time by 1% and fuel by 3%.

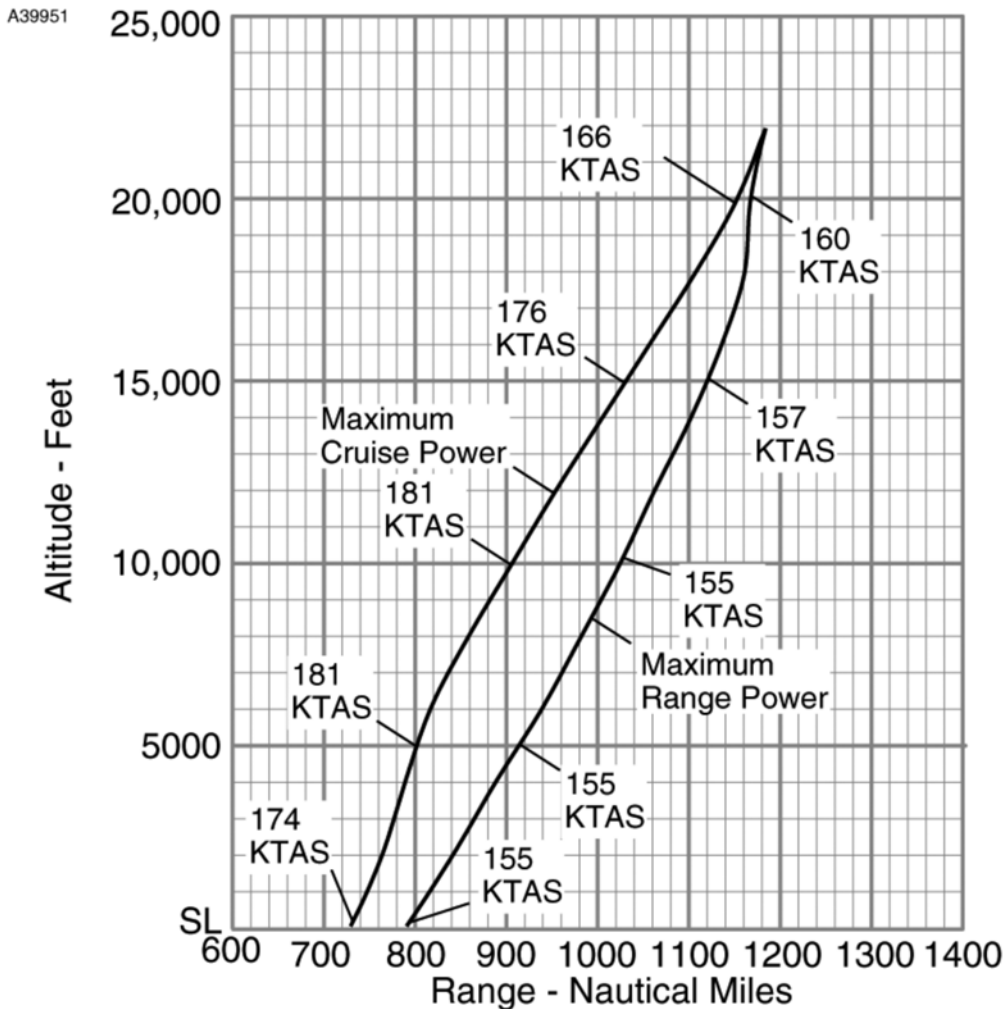
Figure 5-39 (Sheet 2)

WITHOUT CARGO POD  
**RANGE PROFILE**  
**45 MINUTES RESERVE**  
**2224 POUNDS USABLE FUEL**

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**  
Zero Wind



**NOTE**

1. This chart allows for the fuel used for engine start, taxi, takeoff, climb and descent. The distance during a maximum climb and the distance during descent are included.
2. With INERTIAL SEPARATOR in BYPASS, decrease range by 2%, or CABIN HEAT ON, decrease range by 3%.

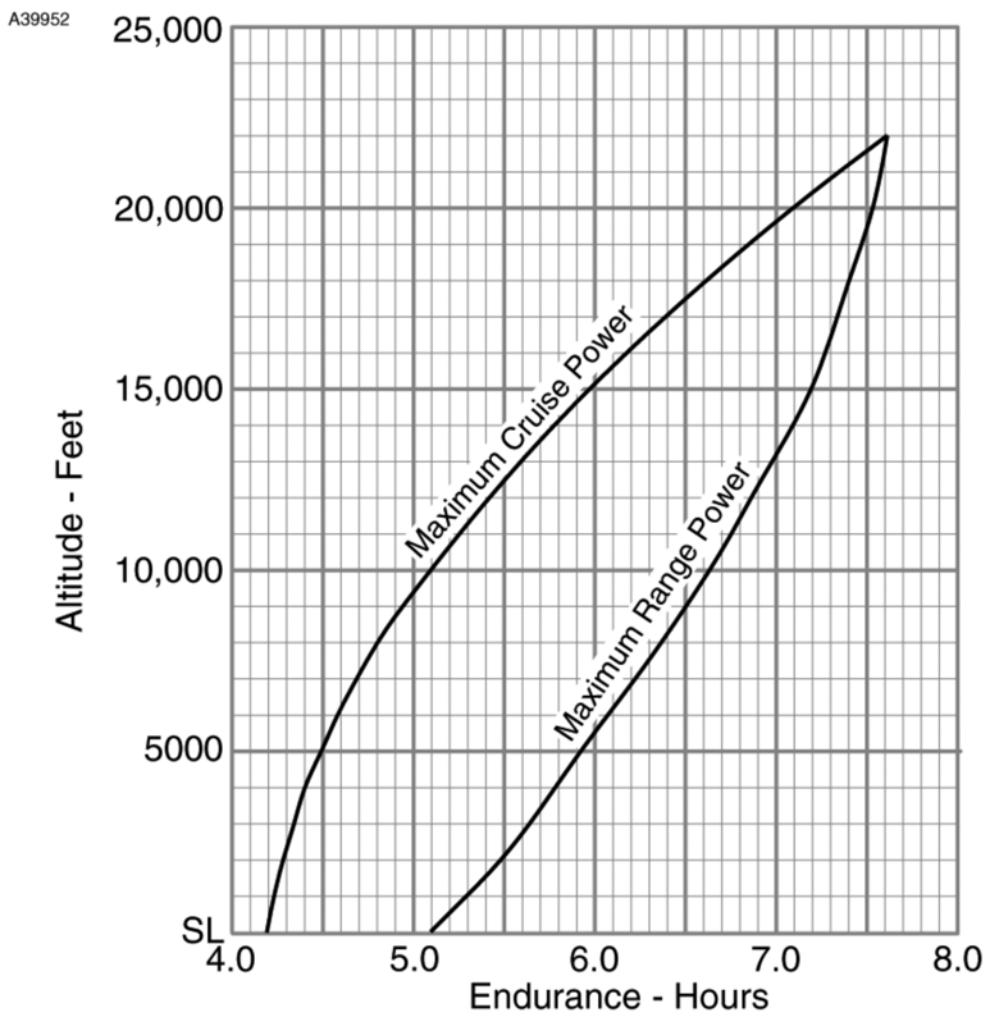
Figure 5-40

WITHOUT CARGO POD  
**ENDURANCE PROFILE**  
**45 MINUTES RESERVE**  
**2224 POUNDS USABLE FUEL**

CONDITIONS:

8750 Pounds  
1900 RPM

Standard Temperature  
INERTIAL SEPARATOR **NORMAL**



**NOTE**

1. This chart allows for the fuel used for engine start, taxi, takeoff, climb and descent. The time during a maximum climb and the time during descent are included.
2. With INERTIAL SEPARATOR in BYPASS, decrease endurance by 2%, or CABIN HEAT ON, decrease endurance by 3%.

Figure 5-41

**WITHOUT CARGO POD**  
**TIME, FUEL, AND DISTANCE TO DESCEND**

CONDITIONS:

Flaps UP

Zero Wind

8750 Pounds

1900 RPM

140 KIAS Above 16,000 Feet

160 KIAS Below 16,000 Feet

Power Set for 800 Feet per Minute Rate of Descent

Pressure Altitude Feet	Descent to Sea Level		
	Time Minutes	Fuel Pounds	Dist NM
24,000	30	116	91
20,000	25	101	75
16,000	20	85	59
12,000	15	64	43
8000	10	44	28
4000	5	23	14
Sea Level	0	0	0

Figure 5-42

## **WITHOUT CARGO POD SHORT FIELD LANDING DISTANCE**

### **NOTE**

The following general information is applicable to all SHORT FIELD LANDING DISTANCE Charts.

1. Use short field landing technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwind up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 40% of the "Ground Roll" figure.
4. If a landing with flaps UP is necessary, increase the approach speed by 15 KIAS and allow for 40% longer distances.
5. Use of maximum reverse thrust after touchdown reduces ground roll distance by approximately 10%.
6. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those distances which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.

Figure 5-43 (Sheet 1 of 5)

## WITHOUT CARGO POD SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**8500 Pounds:**

Speed at 50 Feet:

78 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	870	1675	900	1725	935	1770
2000	935	1770	970	1820	1005	1870
4000	1005	1870	1040	1925	1080	1980
6000	1080	1980	1125	2040	1165	2095
8000	1165	2100	1210	2160	1255	2220
10,000	1260	2230	1310	2295	1355	2360
12,000	1360	2365	1415	2435	1465	2505
Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	965	1820	1000	1865	1030	1910
2000	1040	1920	1075	1970	1110	2020
4000	1120	2035	1155	2085	1195	2140
6000	1205	2155	1245	2210	1285	2265
8000	1300	2285	1345	2345	1390	2405
10,000	1405	2425	1450	2490	---	---
12,000	1515	2575	1570	2645	---	---

Figure 5-43 (Sheet 2)

## WITHOUT CARGO POD SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**8000 Pounds:**

Speed at 50 Feet:

**75 KIAS**

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	815	1605	845	1650	880	1695
2000	880	1695	910	1740	945	1790
4000	945	1790	980	1840	1015	1890
6000	1020	1895	1055	1950	1095	2000
8000	1100	2005	1140	2065	1180	2120
10,000	1185	2130	1230	2190	1275	2250
12,000	1280	2260	1330	2325	1380	2390

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	910	1740	940	1785	970	1830
2000	980	1835	1010	1885	1045	1930
4000	1055	1940	1090	1995	1125	2045
6000	1135	2055	1175	2110	1210	2165
8000	1225	2180	1265	2235	1305	2295
10,000	1320	2315	1365	2375	---	---
12,000	1430	2460	1475	2525	---	---

G208B/G1000

Figure 5-43 (Sheet 3)

## WITHOUT CARGO POD SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**7500 Pounds:**

Speed at 50 Feet:

**73 KIAS**

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	765	1530	795	1570	825	1615
2000	825	1610	855	1655	885	1705
4000	885	1705	920	1750	955	1800
6000	955	1800	990	1855	1030	1905
8000	1030	1910	1070	1965	1110	2020
10,000	1115	2025	1155	2080	1200	2140
12,000	1205	2150	1250	2210	1295	2275

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	855	1655	885	1695	910	1740
2000	920	1750	950	1795	980	1835
4000	990	1850	1020	1895	1055	1945
6000	1065	1955	1100	2005	1140	2055
8000	1150	2075	1190	2125	1225	2180
10,000	1240	2200	1285	2255	---	---
12,000	1340	2335	1385	2400	---	---

Figure 5-43 (Sheet 4)



## WITHOUT CARGO POD SHORT FIELD LANDING DISTANCE

**CONDITIONS:**

Flaps **FULL**

Zero Wind

Maximum Braking

PROP RPM Lever **MAX**

Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

**7000 Pounds:**

Speed at 50 Feet:

**71 KIAS**

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	715	1455	740	1495	770	1535
2000	770	1530	795	1575	825	1620
4000	825	1620	860	1665	890	1710
6000	890	1710	925	1760	960	1810
8000	960	1810	995	1865	1035	1915
10,000	1035	1920	1075	1975	1115	2030
12,000	1120	2040	1165	2095	1205	2155
Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	795	1575	825	1615	850	1650
2000	855	1660	885	1705	915	1745
4000	920	1755	950	1800	985	1845
6000	990	1855	1025	1905	1060	1950
8000	1070	1965	1105	2020	1145	2070
10,000	1155	2085	1195	2140	---	---
12,000	1250	2215	1290	2275	---	---

G208B/G1000

Figure 5-43 (Sheet 5)



# WEIGHT AND BALANCE/ EQUIPMENT LIST

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## INTRODUCTION

This section describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference. Procedures for calculating the weight and moment for various operations are also provided.

In order to achieve the performance and flight characteristics which are designed into the airplane, it must be flown within approved weight and center of gravity limits. Although the airplane offers flexibility of loading, it cannot be flown with full fuel tanks and a full complement of passengers or a normal crew and both cabin and cargo pod (if installed) loading zones filled to maximum capacity. The pilot must utilize the loading flexibility to ensure the airplane does not exceed its maximum weight limits and is loaded within the center of gravity range before takeoff.

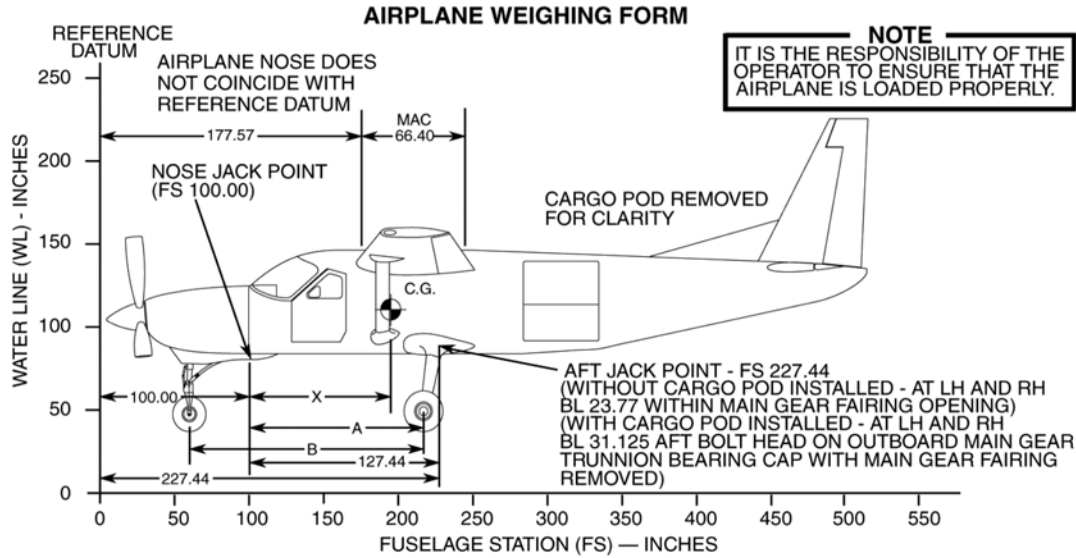
Weight is important because it is a basis for many flight and structural characteristics. As weight increases, takeoff speed must be greater since stall speeds are increased, the rate of acceleration decreases, and the required takeoff distance increases. Weight in excess of the maximum takeoff weight may be a contributing factor to an accident, especially when coupled with other factors such as temperature, field elevation, and runway conditions, all of which may adversely affect the airplane's performance. Climb, cruise, and landing performance will also be affected. Flights at excess weight are possible, and may be within the performance capability of the airplane, but loads for which the airplane was not designed may be imposed on the structure, especially during landing.

The pilot should routinely determine the balance of the airplane since it is possible to be within the maximum weight limit and still exceed the center of gravity limits. An airplane loading which exceeds the forward center of gravity limit may place heavy loads on the nose wheel, and the airplane will be slightly more difficult to rotate for takeoff or flare for landing. If the center of gravity is too far aft, the airplane may rotate prematurely on takeoff, depending on trim settings.

(Continued Next Page)

# AIRPLANE WEIGHING FORM

A30620



**LOCATING CG WITH AIRPLANE ON LANDING GEAR**

FORMULA for Longitudinal CG

$$(X) = (A) \frac{(\text{Nose Gear Net Weight})(\quad) X (B)}{\text{Nose and Main Landing Gear Weight Totaled}(\quad)} = (\quad) \text{ Inches}$$

CG Arm of Airplane = 100 + (X) = ( ) Inches Aft of Datum

**MEASURING A AND B**

MEASURE A AND B PER PILOT'S OPERATING HANDBOOK INSTRUCTIONS TO ASSIST IN LOCATING CG WITH AIRPLANE WEIGHED ON LANDING GEAR

**LOCATING CG WITH AIRPLANE ON JACK PADS**

FORMULA for Longitudinal CG

$$\text{CG Arm of Airplane} = 227.44 - \frac{127.44 X (\text{Nose Jack Point Net Weight})(\quad)}{\text{Nose and Aft Jack Point Weight Totaled}(\quad)} = (\quad) \text{ Inches Aft of Datum}$$

**LEVELING PROVISIONS**

LONGITUDINAL - LEFT SIDE OF FUSELAGE AT FS 239.00 & 272.00  
LATERAL - SEAT RAILS AFT OF PILOT AND FRONT PASSENGER SEATS

**LOCATING PERCENT MAC**

FORMULA for Percent MAC

$$\text{CG Percent MAC} = \frac{(\text{CG Arm of Airplane}) - 177.57}{0.6640}$$

**AIRPLANE AS WEIGHED TABLE**

POSITION	SCALE READING	SCALE DRIFT	TARE	NET WEIGHT
LEFT SIDE				
RIGHT SIDE				
NOSE				
AIRPLANE TOTAL AS WEIGHED				

**BASIC EMPTY WEIGHT AND CENTER-OF-GRAVITY TABLE**

ITEM	WEIGHT (POUNDS)	CG ARM (INCHES)	MOMENT/1000 (INCH-POUNDS/100)
AIRPLANE (CALCULATED OR AS WEIGHED) (INCLUDES ALL UNDRAINABLE FLUIDS AND FULL OIL)			
DRAINABLE UNUSABLE FUEL AT 6.7 POUNDS PER GALLON S/N 208B0001 Thru 208B0089 Not Modified With SK208-52	20.1	205.7	4.1
S/N 208B0001 Thru 208B0089 Modified With SK208-52 And S/N 208B0090 And On	24.1	206.4	5.0
BASIC EMPTY WEIGHT			

2685T1099

Figure 6-1

## WEIGHT AND BALANCE RECORD

### WEIGHT AND BALANCE RECORD

(Continuous History of Changes in Structure or Equipment Affecting Weight and Balance)

AIRPLANE MODEL:		SERIAL NUMBER:										PAGE NUMBER:	
		DESCRIPTION OR ARTICLE OF MODIFICATION		WEIGHT CHANGE						RUNNING BASIC EMPTY WEIGHT			
				ADDED (+)			REMOVED (-)			WEIGHT POUNDS	MOMENT INCH- POUND/1000		
DATE	ITEM NO.	IN	OUT	WEIGHT POUNDS	ARM INCH	MOMENT INCH- POUND/1000	WEIGHT POUNDS	ARM INCH	MOMENT INCH- POUND/1000	WEIGHT POUNDS	MOMENT INCH- POUND/1000	WEIGHT POUNDS	MOMENT INCH- POUND/1000

Figure 6-2

## **INTRODUCTION** (Continued)

A properly loaded airplane, however, will perform as intended. Before the airplane is licensed, a basic empty weight, center of gravity (C.G.) and moment are computed. Specific information regarding the weight, arm, moment, and installed equipment for this airplane as delivered from the factory can be found in the plastic envelope in the back of this POH/AFM. Using the basic empty weight and moment, the pilot can determine the weight and moment for the loaded airplane by computing the total weight and moment and then determining whether they are within the approved Center of Gravity Moment Envelope

### **WARNING**

**It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.**

## **AIRPLANE WEIGHING PROCEDURES**

### 1. Preparation:

- a. Remove all snow, ice or water which may be on the airplane.
- b. Inflate tires to recommended operating pressure.
- c. Lock open fuel tank sump quick-drains and fuel reservoir quick-drain to drain all fuel.
- d. For aircraft with non-standard (optional) equipment installed, see the appropriate POH/AFM supplement for additional weighing procedures.
- e. Service engine oil as required to obtain a normal full indication (MAX HOT or MAX COLD, as appropriate, on dipstick).
- f. Slide to move pilot and front passenger seats to position the seat locking pins on the back legs of each seat at Fuselage Station 145.0. Aft passenger seats (if installed) have recommended fixed positions and should be located, using a Fuselage Station location code on the seat rails, as described in the Cabin Internal Loading Arrangements figure. In the event the aft seats were moved to accommodate a custom loading, they should be returned to the standard locations prior to weighing.
- g. Raise flaps to fully retracted positions.
- h. Place all control surfaces in neutral position.

(Continued Next Page)



## **AIRPLANE WEIGHING PROCEDURES** (Continued)

2. Leveling:
  - a. Place scales under each wheel (minimum scale capacity, 2000 pounds nose, 4000 pounds each main). The main landing gear must be supported by stands, blocks, etc., on the main gear scales to a position at least four inches higher than the nose gear as it rests on an appropriate scale. This initial elevated position will compensate for the difference in waterline station between the main and nose gear so that final leveling can be accomplished solely by deflating the nose gear tire.
  - b. Deflate the nose tire to properly center the bubble in the level (see Airplane Weighing Form). Since the nose gear strut contains an oil snubber for shock absorption rather than an air/oil strut, it can not be deflated to aid in airplane leveling.
3. Weighing:
  - a. Weigh airplane in a closed hangar to avoid errors caused by air currents.
  - b. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare from each reading.
4. Measuring:
  - a. Obtain measurement A by measuring horizontally (along airplane centerline) from a line stretched between the main wheel centers to a plumb bob dropped from the center of the nose jack point located below the firewall and housed within the nose strut fairing.
  - b. Obtain measurement B by measuring horizontally and parallel to the airplane centerline, from center of nose wheel axle, left side, to a plumb bob dropped from the line between the main wheel centers. Repeat on right side and calculate the average of the measurements.
5. Using weights from step 3 and measurements from step 4, the airplane weight and C.G. can be determined.
6. Basic Empty Weight may be determined by completing the Airplane Weighing Form in this section.

## WEIGHT AND BALANCE

The following information will enable you to operate your Cessna within the prescribed weight and center of gravity limitations. To figure weight and balance, use the sample Loading Problem, Weight and Moment Tables, and Center of Gravity Moment Envelope as follows:

1. Take the basic empty weight and moment from appropriate weight and balance records carried in your airplane, and enter them in the column titled, "YOUR AIRPLANE" on the Sample Loading Problem.

### NOTE

In addition to the basic empty weight and moment noted on these records, the C.G. arm (Fuselage Station) is also shown, but need not be used on the Sample Loading Problem. the moment which is shown must be divided by 1000 and this value used as the moment/1000 on the loading problem.

2. Use the Weight and Moment Tables to determine the moment/1000 for each additional item to be carried, then list these on the loading problem.

### NOTE

Information on the Weight and Moment Tables for different fuel grades is based on average fuel density at fuel temperatures of 60°F. However, fuel weight increases approximately 0.1 pounds per gallon for each 25°F decrease in fuel temperature. Therefore, when environmental conditions are such that the fuel temperature is different than shown in the chart heading, a new fuel weight calculation should be made using the 0.1 pounds per gallon increase in fuel weight for each 25°F decrease in fuel temperature. Assume the tanks are completely filled and the fuel temperature is at 35°F (25°F below the 60°F noted on the chart).

(Continued Next Page)

### **WEIGHT AND BALANCE** (Continued)

3. Calculate the revised fuel weight by multiplying the total usable fuel by the sum of the average density (stated on chart) plus the increase in density estimated for the lower fuel temperature. In this particular sample, as shown by the calculation below, the resulting fuel weight increase due to lower fuel temperature will be 33.6 pounds over the 2224 pounds (for 332 gallons) shown on the chart, which might be significant in an actual loading situation:

332 gallons X (6.7 + 0.1 pounds per gallon) = 2257.6 pounds revised fuel weight.

Then calculate the revised fuel moment. the revised moment is in direct proportion to the revised fuel weight:

$$\frac{X \text{ (revised moment)}}{451.7 \text{ (average moment)}} = \frac{2257.6 \text{ (revised weight)}}{2224 \text{ (average weight)}}$$

$$X = (451.7 \times 2257.6) / 2224$$

The revised moment of X = 458.5. This value would be used on the Sample Loading Problem as the moment/1000 in conditions represented by this sample.

(Continued Next Page)

## **WEIGHT AND BALANCE** (Continued)

### **NOTE**

Information on the Weight and Moment Tables for crew, passenger, and cargo is based on the pilot and front passenger sliding seats positioned for average occupants (e.g., Fuselage Station 135.5), the aft passenger fixed seats (if installed) in the recommended position, and the baggage or cargo uniformly loaded around the center (e.g., Fuselage Station 172.1 in Zone 1) of the zone fore and aft boundaries (e.g., Fuselage Stations 155.4 and 188.7 in Zone 1) shown on the Cabin Internal Loading Arrangements figure. For loadings which may differ from these, the Loading Arrangements figure and Sample Loading Problem lists Fuselage Stations for these items to indicate their forward and aft C.G. range limitations. Additional moment calculations, based on the actual weight and C.G. arm (Fuselage Station) of the item being loaded, must be made if the position of the load is different from that shown on the Weight and Moment Tables. For example, if seats are in any position other than stated on the Cabin Internal Loading Arrangements figure, the moment must be calculated by multiplying the occupant weight times the arm in inches. A point nine inches forward of the intersection of the seat bottom and seat back (with cushions compressed) can be assumed to be the occupant C.G. For a reference in determining the arm, the forward face of the raised aft cargo floor is Fuselage Station 332.0.

Total the weights and moments/1000 and plot these values on the Center of Gravity Moment Envelope to determine whether the point falls within the envelope, and if the loading is acceptable.

### **WARNING**

**It is the responsibility of the pilot to ensure that the airplane is loaded properly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.**

(Continued Next Page)

## **WEIGHT AND BALANCE PLOTTER**

A Weight and Balance Plotter is available to quickly determine the weight and balance of the airplane when loading cargo. If the plotter shows a marginal condition developing, or if there is a question concerning the results in any way, then a more precise weight and balance should be determined using the weight and balance procedure in this section. Instructions for use of the plotter are included on the plotter.

## **WEIGHT AND BALANCE RECORD (LOAD MANIFEST)**

A Weight and Balance Record (Load Manifest) is available for recording the cargo loading configuration of each flight and verifying that the airplane weight and takeoff center of gravity in terms of % Mean Aerodynamic Chord (MAC) is acceptable. A sample of this record is shown in this section. The procedure for using this record is summarized below.

1. Enter flight date and number, point of departure and destination, and airplane identification in spaces provided.
2. Enter weight of cargo in each cabin cargo zone in appropriate ITEM WEIGHT spaces. Total cabin cargo weights in space provided as a check that maximum allowable cabin cargo weight of 3400 pounds is not exceeded. Refer to other portions of the POH/AFM for additional limitations which must be observed.
3. Enter weight of cargo in cargo pod and weight of pilot, copilot, and TKS fluid (if installed).
4. Complete ITEM INDEX column for all cargo, pilot, passenger, and TKS fluid (if installed) by referring to adjacent WEIGHT INDICES listing. For each cargo or personnel weight recorded previously, read across horizontally to the vertical column having an identical weight at the top. The number shown at this intersection is the weight index for the recorded weight. As an example, 300 pounds of cargo loaded in cabin Zone 1 has a weight index of 988, and this number should be entered under ITEM INDEX for cabin Zone 1.

(Continued Next Page)

## WEIGHT AND BALANCE RECORD (LOAD MANIFEST)

(Continued)

### NOTE

If weight to be loaded does not match one of the weight increments provided, and a more precise weight index is needed, use the LOAD ITEM INDEX formula on the backside of the Weight and Balance Record (Load Manifest) to calculate the index. However, as shown in the sample calculation below for a 315-pound load (instead of 300 pounds) in cabin Zone 1, minor weight variables do not affect the weight index significantly. The ARM used in the following calculation is the centroid of cabin Zone 1 as shown on the diagram on the backside of the record.

$$\frac{315 \times (172.1 - 192)}{500} = -12.5$$
$$1000 - 12.5 = 987.5$$

The weight index of 987.5, when rounded to the next highest number, would still result in the 988 given in the example above for a 300-pounds load.

5. Add weight of pod cargo, pilot, passenger, and TKS fluid (if installed) to sub-total weight for cabin cargo and enter this value as the weight of the total payload; the sum of all item indices recorded is the item index for the total payload. For calculation purposes, enter only the last three digits of the total in the ITEM INDEX columns.
6. Enter basic empty weight (from airplane weight and balance information) in ITEM WEIGHT column for aircraft empty weight. Calculate weight index using the BASIC AIRPLANE INDEX formula on the backside of the Weight and Balance Record (Load Manifest). The sample calculation below is for an airplane with a basic empty weight of 5005 pounds and a C.G. arm of 185.69.

$$\frac{5005 \times (185.69 - 192) + 500}{500} = 436.84$$

In the aircraft empty weight spaces for the airplane in this sample, a weight of 5005 and an index of 437 would be entered.

(Continued Next Page)

## **WEIGHT AND BALANCE RECORD (LOAD MANIFEST)**

(Continued)

7. Add aircraft empty weight and index to payload weight and index to acquire a zero fuel weight and index. A plot of this weight and index on the adjacent chart indicates the location of the zero fuel weight center of gravity in terms of % MAC. A C.G. % MAC space is provided to enter this value. If the zero fuel weight C.G. falls well within clear area of chart envelope, the loading will likely be acceptable. However, if the C.G. at this weight falls near or within shaded area, a careful recheck of the loading and C.G. is important.
8. The weight available for takeoff fuel is the difference between zero fuel weight and takeoff weight. A FUEL INDICES table at bottom of Weight and Balance Record (Load Manifest) provides an index for the weight of fuel to be carried. The fuel weight and this index should be entered for takeoff fuel. When calculating takeoff fuel, 35 pounds of additional fuel can be allowed as taxi fuel under average conditions. A space for taxi fuel weight is provided.
9. Add takeoff fuel weight and index to zero fuel weight and index to acquire a takeoff weight and index which can be plotted to determine the takeoff C.G. location in terms of % MAC. A C.G. % MAC space is provided for this value.
10. Enter 8750 pounds as the maximum allowable takeoff weight for this airplane. The additional 35 pounds of taxi fuel provides a maximum ramp weight of 8785 pounds.

# WEIGHT AND BALANCE RECORD (LOAD MANIFEST)

A30621

CESSNA 208B WEIGHT AND BALANCE RECORD										DEP. DATE 2		ORIGIN		AIRCRAFT NO.																	
										FLIGHT NO.		DESTINATION																			
ITEM	ZONE	MAX LOAD	WEIGHT INDICES						ITEM WEIGHT	ITEM INDEX																					
			25	50	75	100	150	200			250	300	350	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3100
C	1	1780	999	998	997	996	994	992	990	988	986	984	980	976	972	968	964	960	952	944	936	928									
A	2	3100	1	3	4	5	8	10	13	15	18	21	26	31	36	41	48	52	62	72	83	93	103	114	124	134	144	155	160		
I	3	1900	4	7	11	14	22	29	38	43	51	58	72	87	101	116	130	145	174	203	232	261	290								
N	4	1380	5	10	15	21	31	41	51	62	72	82	103	123	144	164	185	205	246	287											
C	4	1380	6	13	19	26	38	51	64	77	89	102	128	153	179	204	230	255	305	387											
A	5	1270	8	15	23	30	46	61	76	91	108																				
R	6	320																													
G	TOTAL	3400	997	994	991	988	982	976	970																						
O	A	230	000	999	999	998	997	996	996	994	993																				
P	B	310	2	4	6	8	12	17	21	25	21																				
D	C	270	5	10	14	19	29	38	48	57																					
	D	280	997	984	992	989	983	977	972	968																					
PILOT & FLT KIT			+																												
OBSERVER			+																												
TKS FLUID			+																												
TOTAL PAYLOAD			-																												
A/C EMPTY WT.			+																												
ZERO FUEL WEIGHT			-																												
T.O. FUEL			+																												
T.O. WEIGHT			-																												
MAX ALLOWABLE T.O. WEIGHT			-																												
TAXI FUEL			-																												
RAMP WEIGHT			-																												

FUEL INDICES			
WT.	INDEX	WT.	INDEX
50	1	500	11
100	2	550	12
150	3	600	13
200	4	650	14
250	5	700	16
300	7	750	17
350	8	800	18
400	9	850	19
450	10	900	20
		950	21
		1000	23
		1050	24
		1100	25
		1150	26
		1200	27
		1250	28
		1300	29
		1350	31
		1400	32
		1450	33
		1500	34
		1550	35
		1600	36
		1650	37
		1700	38
		1750	39
		1800	40
		1850	42
		1900	43
		1950	44
		2000	45
		2050	46
		2100	47
		2150	48
		2200	49
		2224	49

ENTER ONLY LAST THREE DIGITS OF THE TOTAL IN ITEM INDEX COLUMNS

C.O.% MAC

C.O.% MAC

NOTES:

FLIGHT CREWMEMBER (SIGNATURE) \_\_\_\_\_  
EMPLOYEE NO. \_\_\_\_\_

ALL FAA AND COMPANY LOADING LIMITATIONS AND WEIGHT AND BALANCE REQUIREMENTS SATISFIED IN ACCORDANCE WITH FAA 135.43C AND 125.299C

Figure 6-3 (Sheet 1 of 2)



# WEIGHT AND BALANCE RECORD (LOAD MANIFEST)

A72484

MAXIMUM STRUCTURAL WEIGHTS  
 MAX RAMP 8785 LBS  
 MAX TAKEOFF 8750 LBS  
 MAX LANDING 8500 LBS

### INDEX FORMULA

BASIC AIRPLANE INDEX = $\frac{WT (ARM - 192)}{500} + 500$	
LOAD ITEM INDEX = $\frac{WT (ARM - 192)}{500}$	= (IF NEG. SUBTRACT FROM 1000)

CENTROID (C.G. ARM)	POD STATION ARM	CENTROID C.G. ARM	CABIN STATION ARM
------------------------	--------------------	----------------------	----------------------

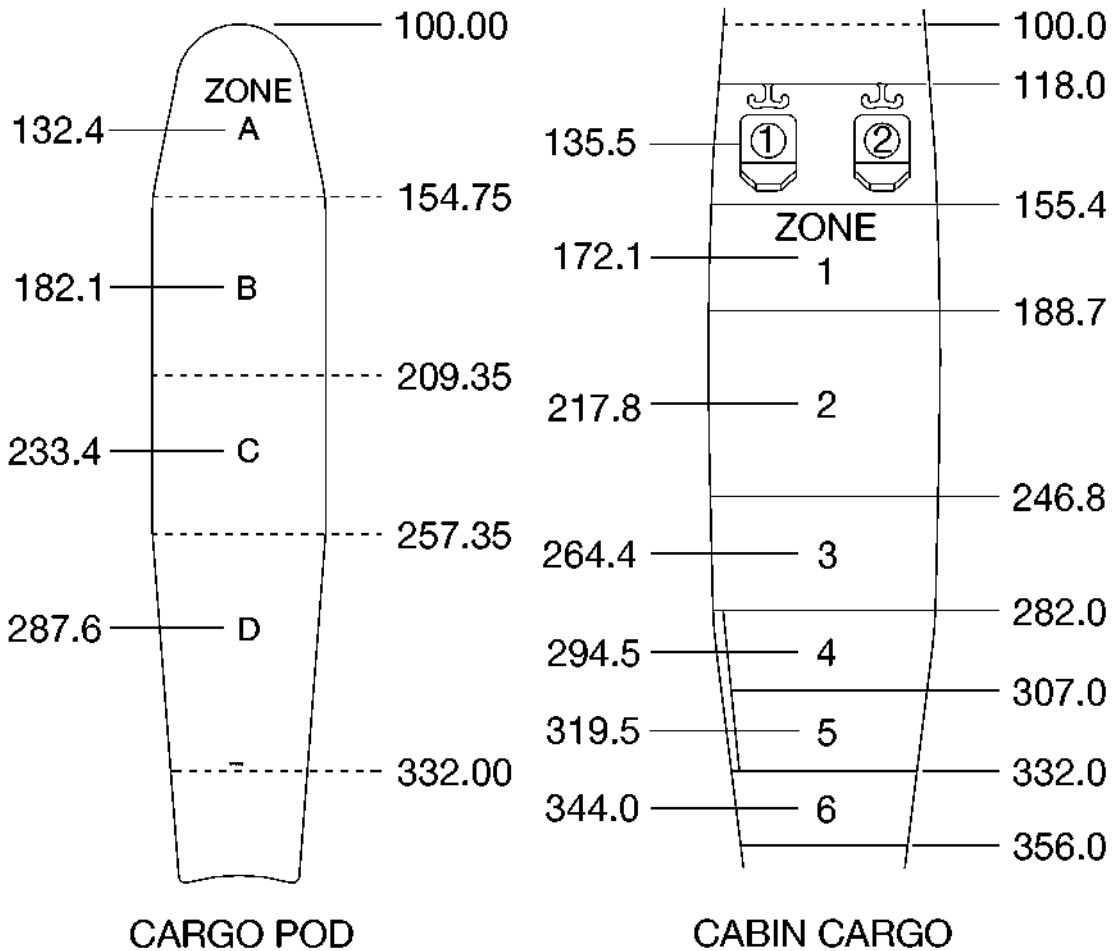


Figure 6-3 (Sheet 2)

## **CREW AND PASSENGER LOADING**

The pilot and front passenger positions in all airplanes have six-way adjustable seats. These seats slide fore and aft on tracks that have adjustment holes for seat position.

The Passenger Version has aft passenger seating with two configurations of Commuter Seating.

The first Commuter Seating configuration has three individual, fixed-position passenger seats in the left side of the cabin, and three two place fixed-position, bench seats located in the right side of the cabin in a side-by-side arrangement.

The second Commuter Seating configuration includes four individual, fixed-position, passenger seats on the left side of the cabin and four individual, fixed-position passenger seats on the right side of the cabin in a side-by-side arrangement.

### **WARNING**

**None of the airplane seats are approved for installation facing aft.**

## **BAGGAGE/CARGO LOADING**

### **CABIN CARGO AREA**

Cargo may be carried in the cabin of either the Cargo Version or the Passenger Version. The cabin interior of the Cargo Version is specifically equipped for the carriage of cargo. However, after seat removal and the installation of miscellaneous equipment, the Passenger Version will also fulfill the requirements of cargo missions. The following paragraphs generally describe the cargo area of both versions.

To facilitate the carrying of large or bulky items, all aft seats (Passenger Version Only) and the front passenger seat may be removed from the airplane. If a cargo barrier and its three barrier nets are available for installation, removal of the front passenger seat may not be desired. Mission requirements will dictate whether the barrier is to be used and the number of seats removed. If seats are removed for hauling cargo and the cargo barrier and its nets added, the basic empty weight and C.G. moment of the airplane should be adjusted so that these values accurately represent the weight and moment of the airplane before loading.

To calculate the new weight and moment, refer to the airplane equipment list and acquire the weight and C.G. arm of each item of equipment to be removed or added, then record these values on the Sample Weight and Balance Record, to assist in the calculation. For each item of equipment, multiply its weight by its C.G. arm to provide the moment for that item. Subtract weights of removed items (seats) and add weights of installed items (cargo barrier and its nets) to the original basic empty weight to provide a new basic empty weight. Likewise, subtract the moments of removed items and add the moments of installed items to the original moment to provide a new airplane moment. Remember that the moment value is to be divided by 1000 to reduce the number of digits. The new basic empty weight and moment/1000 can be used as illustrated in the Sample Loading Problem when figuring airplane loading with the selected items of equipment removed/installed.

(Continued Next Page)

## **CABIN CARGO AREA** (Continued)

With all seats except the pilot's seat removed, a large cabin volume is available for baggage/cargo. If a cargo barrier is installed, the total volume available for cargo behind the barrier is 340 cubic feet. Cargo can be loaded through the large, almost square, two-piece cargo door. The floor is flat from the firewall at Fuselage Station 100.0, except in the rudder pedal area, to the aft side of the cargo door (Fuselage Station 332.0), and has a 200 pound per square foot allowable loading. Strategically located nutplates are provided which will allow the installation of plywood flooring (standard equipment on Cargo Versions) for ease of loading and distribution of concentrated loads. Between Fuselage Stations 332.0 and 356.0, additional cargo space with a capacity of 320 pounds is provided on a floorboard raised approximately five inches above the main floorboard.

In the area of the removed front passenger seat, "I" section seat tracks are installed from Fuselage Station 125.00 to 159.98, and tie-down block assemblies which clamp to the tracks can be installed to serve as tie-down attach points. From Fuselage Station 158.00 aft to the raised baggage/cargo floor, seat tracks are provided and are designed to receive quick-release tie-down fittings which can be snapped into the tracks at intervals of 1 inch. The raised baggage/cargo floor contains eight anchor plates to which quick-release tie-down fittings can be attached. If rope, cable or other fittings are used for tie-downs, they should be rated at a minimum of 2100 pounds when used with all fittings noted in the table on the Cargo Tie-Down Attachments figure, except the double-stud quick-release tie-downs which require a 3150 pound rating. Maximum allowable cargo loads will be determined by the individual zone weight limitation and by the airplane weight and C.G. limitations. The number of tie-downs required is dependent on the load(s) to be secured. The Cargo Tie-Down Attachments figure, shows the maximum allowable cargo weight for each type of cargo tie-down attachment.

On Cargo Versions, the sidewalls in the cargo area are marked with vertical lines to facilitate the identification of six loading zones. Markings located on the sidewalls between the lines identify each zone by number and display the maximum load which can be carried within the zones. Refer to Cabin Internal Load Markings (Cargo Version) figure for maximum zone weight limits.

(Continued Next Page)

## **CABIN CARGO AREA** (Continued)

### **CAUTION**

The maximum load values marked in each zone are predicated on all cargo being tied down within the zones.

On Cargo Versions, a horizontal line labeled “75%” is prominently marked along each sidewall as a loading reference. As indicated on a placard on the lower cargo door, zones forward of the last loaded zone must be at least 75% full by volume. Whenever possible, each zone should be loaded to its maximum available volume prior to loading the next zone. An additional placard located on the right sidewall between Zones 5 and 6 cautions that if the load in Zone 5 exceeds 400 pounds, a cargo partition net (if available) is required aft of the load or the load must be secured to the floor.

A cargo barrier and three barrier nets may be installed directly behind the pilot’s and front passenger’s seats. The barrier and nets preclude loose cargo from moving forward into the pilot’s and front passenger’s stations during an abrupt deceleration. The barrier consists of a U-shaped assembly of honeycomb composite construction. The assembly attaches to the four pilot and front passenger seat rails at the bottom at Fuselage Station 153.0 and to cabin top structure at approximately Fuselage Station 166.0. The cargo barrier nets consist of three nets, one for the left sidewall, one for the right sidewall, and one for the center. The left and right nets fill in the space between the barrier assembly and the airplane sidewalls. The side nets are fastened to the airplane sidewalls and the edge of the barrier with six quick-release fasteners each, three on each side. The center net fills in the opening in the top center of the barrier. The center net is fastened with four fasteners, two on each side. Horizontal lines labeled 75% are marked on the aft side of the cargo barrier. Placards above the horizontal lines caution that the maximum allowable load behind the barrier is 3400 pounds total, and that zones forward of the last loaded zone must be at least 75% full by volume. Refer to the Cargo Barrier and Barrier Nets figure for additional details.

(Continued Next Page)

## **CABIN CARGO AREA** (Continued)

### **WARNING**

- **When utilized, the cargo barrier and its attached nets provide cargo forward crash load restraint and protection of the pilot and front passenger; however, the cargo must still be secured to prevent it from shifting due to takeoff, flight, landing, and taxi accelerations and decelerations. On the passenger version, if passengers, as well as cargo, are located aft of the barrier, cargo placement must allow movement and exit of the passengers and the cargo must be secured for crash load restraint conditions. Refer to Cargo Load Restraint in this section for additional information concerning cargo restraint with and without a cargo barrier.**
- **Make sure the barrier net fasteners are secured for takeoff, flight, and landing operations, and are momentarily detached only for movement of the nets for loading or unloading of items through the crew area.**

Cargo partition nets are available and can be installed to divide the cargo area into convenient compartments. Partitions may be installed in all of the five locations at Fuselage Stations 188.7, 246.8, 282.0, 307.0 and 332.0. The cargo partitions are constructed of canvas with nylon webbing reinforcement straps crisscrossing the partition for added strength. The ends of the straps have quick-release fasteners which attach to the floor tracks and two floor-mounted anchor plates located just forward of the raised cargo floor and other anchor plates on the sidewalls and ceiling. Four straps have adjustable buckles for tightening the straps during installation of the partition. Refer to the Cargo Partition Nets figure for additional details.

Zones divided by cargo partitions can be loaded without additional tie-downs if a total loaded density for each partitioned zone does not exceed 7.9 pounds per cubic foot and the zone is more than 75% full. Cargo loading that does not meet these requirements must be secured to the cabin floor.

(Continued Next Page)

## **CABIN CARGO AREA** (Continued)

### **CAUTION**

The maximum cargo partition load is the sum of any two zones. No more than two adjacent zones can be divided by one partition. The partitions are designed to prevent the cargo from shifting forward and aft in flight. They should not be considered adequate to withstand crash loads and do not replace the need for a cargo barrier.

Various tie-down belt assemblies and tie-down ring anchors are available for securing cargo within the airplane. The belts may also be used for tying down the airplane. A standard configuration is offered and contains three 3000-pound rated belt assemblies with ratchet-type adjusters and six single-stud, quick-release tie-down ring anchors. A heavy-duty configuration consists of three 5000-pound rated belts with ratchet-type adjusters and six double-stud, quick-release anchors. Three 5000-pound rated belts with over center-type locking devices are also available for heavy-duty use. The six single-stud and double-stud tie-down ring anchors are also available separately. The single-stud anchors can be attached to any tie-down point in the airplane which isn't placarded for attachment for partition nets only, whereas the double-stud anchors can be attached to the aft seat tracks only. See the Cargo Tie-Down Attachments figure for maximum load ratings and tie-down ring anchor spacing restrictions.

Refer to Maximum Zone/Compartment Loading for maximum zone weight limits.

(Continued Next Page)

## CARGO POD

The airplane may be equipped with a 111.5 cubic foot capacity cargo pod attached to the bottom of the fuselage. The pod is divided into four compartments (identified as Zones A, B, C, and D) by bulkheads and has a maximum floor loading of 30 pounds per square foot and maximum load weight limit of 1090 pounds. Each compartment has a loading door located on the left side of the pod. The doors are hinged at the bottom, and each has two latches. When the latch handles are rotated to the horizontal position with the doors closed, the doors are secured. Refer to the Pod Internal Dimension and Load Markings and Cargo Pod Loading Arrangements figures for additional details.

## MAXIMUM ZONE/COMPARTMENT LOADINGS

Maximum zone loadings are as follows:

	ZONE/ COMPART- MENT	VOLUME (CUBIC FEET)	WEIGHT LIMITS (Pounds)		C.G. (STATION LOCATION)
			*SECURED BY TIE-DOWNS	**UNSECURED USING PARTITIONS OR IN CARGO POD	
FUSELAGE	1	52.9	1780	415	172.1
	2	109.0	3100	860	217.8
	3	63.0	1900	495	264.4
	4	43.5	1380	340	294.5
	5	40.1	1270	315	319.5
	6	31.5	320	245	344.0
CARGO POD	A	23.4	---	230	132.4
	B	31.5	---	310	182.1
	C	27.8	---	270	233.4
	D	28.8	---	280	287.6

\* THIS IS THE MAXIMUM CARGO ALLOWED IN THE BAY INDICATED.

\*\*DENSITY MUST BE 7.9 LBS/FT<sup>3</sup> OR LESS AND BAY 75% OR MORE FULL.



## **CENTER OF GRAVITY PRECAUTIONS**

Since the airplane can be used for cargo missions, carrying various types of cargo in a variety of loading configurations, precautions must be taken to protect the forward and aft C.G. limits. Load planning should include a careful comparison of the mission requirements with the volume and weight limitation in each loading zone and the final airplane C.G. Cargo loaded in the forward zones may need to be balanced by loading cargo in one or more aft zones. Conversely, loadings can not be concentrated in the rear of the airplane, but must be compensated by forward cargo to maintain balance. Under ideal conditions, loadings should be accomplished with heavy items on the bottom and the load distributed uniformly around the C.G. of the cabin cargo area zone and/or cargo pod compartment. Loading personnel must maintain strict accountability for loading correctly and accurately, but may not always be able to achieve an ideal loading. A means of protecting the C.G. aft limit is provided by supplying an aft C.G. location warning area between 38.33% MAC and the maximum allowable aft C.G. of 40.33% MAC. The warning area is indicated by shading on the Center of Gravity Moment Envelope and C.G. Limits figures.

### **CAUTION**

- This shaded area should be used only if accurate C.G. determination can be obtained.
- Exercise caution while loading or unloading heavy cargo through the cargo doors. An ideal loading in every other respect can still cause tail tipping and structural damage if proper weight distribution is ignored. For example, heavy cargo loaded through the doors and placed momentarily in zones 4 and 5, plus the weight of personnel required to move it to a forward zone, could cause an out-of-balance condition during loading.

## **CARGO LOAD RESTRAINT**

### **PREVENTION OF MOVEMENT**

Cargo restraint requires the prevention of movement in five principal directions: forward, aft, upward (vertical), left (side), and right (side). These movements are the result of forces exerted upon the cargo due to acceleration or deceleration of the airplane in takeoffs and landings as well as forces due to air turbulence in flight. Correct restraint provides the proper relationship between airplane configuration (with or without barrier), weight of the cargo, and the restraint required. Restraint is required for flight, landing, taxi loads, and for crash loads.

Cargo must be tied down for flight, landing, and taxi load, and/or crash load. When a cargo barrier is not installed, all cargo must be prevented from movement in the five principal directions and secured to provide crash load restraint. The maximum rated loads specified for loadings without a barrier in the table in the Cargo Tie-Down Attachments figure should be used for each tie-down. Consistent use of these loading criteria is important, and it is the responsibility of the pilot to make sure the cargo is restrained properly. When a cargo barrier is installed, cargo aft of the barrier must also be secured to prevent movement in the five principal directions, but only to the extent that shifting due to flight, landing, and taxi loads is provided. The maximum rated loads specified for loadings with a barrier installed shown in the table in the Cargo Tie-Down Attachments figure should be used for each tie-down. With a barrier installed, all cargo must be loaded such that loading zones forward of the last loaded zone must be 75% full by volume.

(Continued Next Page)

## **PREVENTION OF MOVEMENT (Continued)**

### **WARNING**

**In special loading arrangements which allow the carriage of passengers as well as cargo behind the barrier in the passenger version, all cargo must be secured to prevent movement in the five principal directions and provide the same crash load restraint as though a barrier was not installed using the maximum rated loads specified for loading without a barrier. In this arrangement, cargo placement must allow for movement and exit of the passengers. The pilot must be responsible to make sure proper load restraint in all loadings.**

Refer to the Typical Cargo Restraint Methods figure for diagrams of typical cargo tie-down methods for prevention of movement. Also, the cargo partition nets available for the airplane can be installed at Fuselage Stations 188.7, 246.8, 282.0, 307.0 and 332.0 to divide the cabin cargo area into compartments. If the partitions are used, they must be used in conjunction with the cargo barrier. Since partitions are not designed to withstand crash loads, they cannot be considered as a replacement for the barrier. Each partition will withstand the forward and aft operational loads applied during takeoff, flight, and landing by any two zones forward or aft of the partition. Use of the partitions will allow loading of the zones without tying down cargo if the load density is no more than 7.9 pounds per cubic foot and the zone is more than 75% full. Cargo loading that does not meet these requirements must be secured to the cabin floor.

### **LOADING OF PIERCING OR PENETRATING ITEMS**

Regardless of cargo location, items of a piercing or penetrating nature shall be located so that other cargo is loaded between the barrier/nets, cargo partitions, and rear wall and the piercing or penetrating items to provide a buffer. The density of this cargo shall be sufficient to restrain the piercing or penetrating items from passing through the barrier/nets, partitions, and rear wall under critical emergency landing conditions. If the condition cannot be complied with, the piercing or penetrating items shall be tied down separately.

## **TRANSPORTATION OF HAZARDOUS MATERIALS**

Special protection of the airplane and training of personnel are key considerations in conducting approved transportation of hazardous materials.

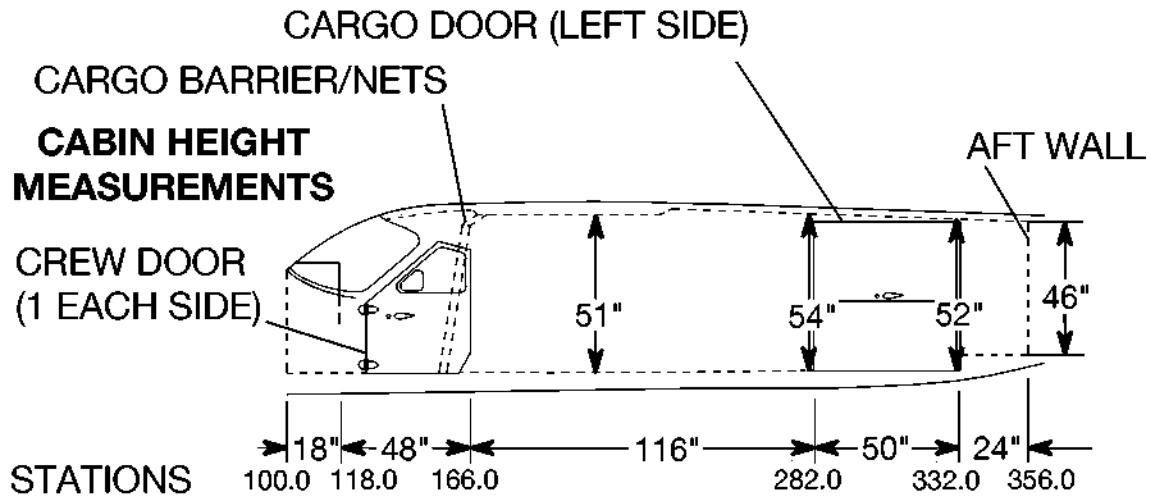
Protection against hazardous materials has been provided in the fuselage bilge area under the cargo compartment from Fuselage Station 168.0 to 356.0, and these materials may be carried in any location within this area.

In addition to the pilot-in-command and flight crew member (if used), other personnel such as cargo receiving and loading personnel should be properly trained concerning the acceptance, handling, storage, loading and unloading of hazardous materials if these materials are to be carried. Information and regulations pertaining to the air transportation of hazardous materials is outlined in the Code of Federal Regulation (CFR) Title 49 and in the International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air. Additional details on training subject matter and location references for this information are included in the Cargo Loading Manual for this airplane. Some general guidelines important to safe carriage of hazardous materials are also described in the Cargo Loading Manual.

## **EQUIPMENT LIST**

For a complete list of equipment installed in the airplane as delivered from the manufacturer, refer to the equipment list furnished with the airplane.

### CABIN INTERNAL DIMENSIONS (CARGO VERSION)



#### DOOR OPENING DIMENSIONS

	WIDTH (TOP)	WIDTH (MID/ OVERALL)	WIDTH (BOTTOM)	HEIGHT (FRONT)	HEIGHT (MID/ OVERALL)	HEIGHT (REAR)
CREW DOORS	11 7/8"	35 5/8"	31 7/8"	24 3/8"	41 3/4"	44 3/4"
CARGO DOOR	49"	49"	49"	50"	50"	50"

#### CABIN WIDTH MEASUREMENTS

#### WIDTH MAX. CABIN BREADTH \* CABIN FLOOR

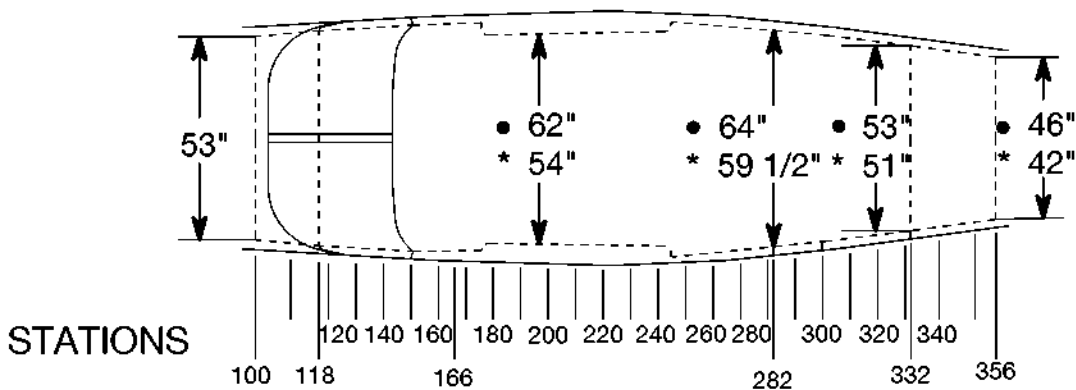
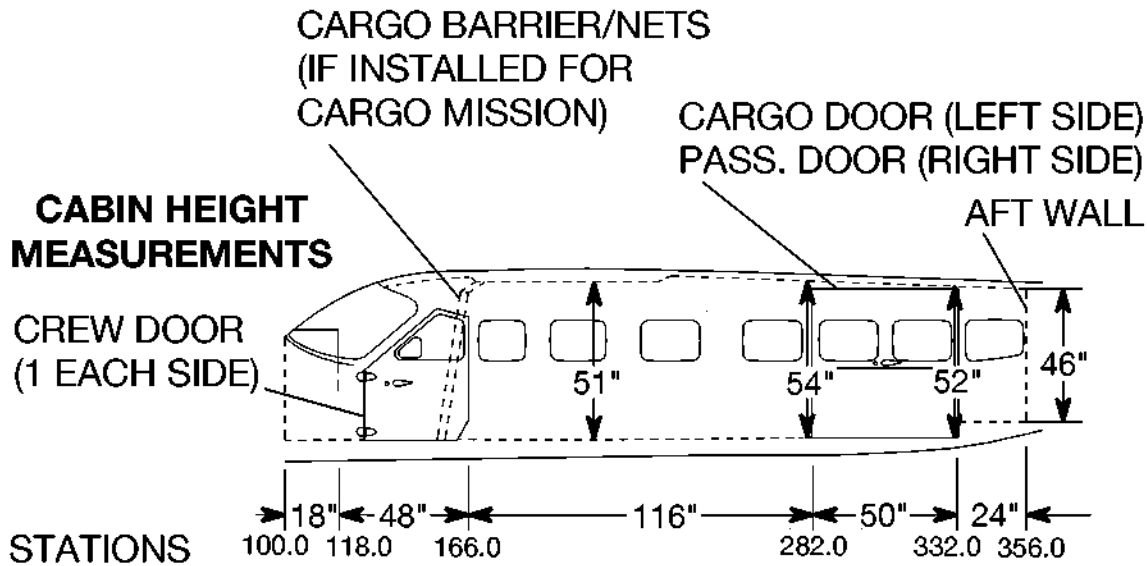


Figure 6-4 (Sheet 1 of 2)

### CABIN INTERNAL DIMENSIONS (PASSENGER VERSION)



### DOOR OPENING DIMENSIONS

	WIDTH (TOP)	WIDTH (MID/ OVERALL)	WIDTH (BOTTOM)	HEIGHT (FRONT)	HEIGHT (MID/ OVERALL)	HEIGHT (REAR)
CREW DOORS	11 7/8"	35 5/8"	31 7/8"	24 3/8"	41 3/4"	44 3/4"
CARGO DOOR	49"	49"	49"	50"	50"	50"
PASSENGER DOOR	24"	24"	24"	50"	50"	50"

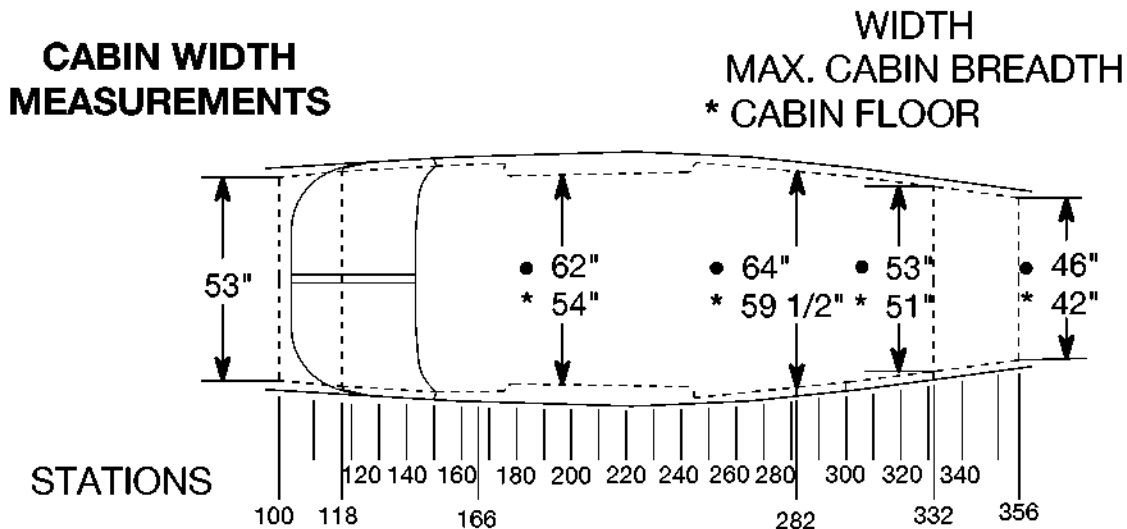
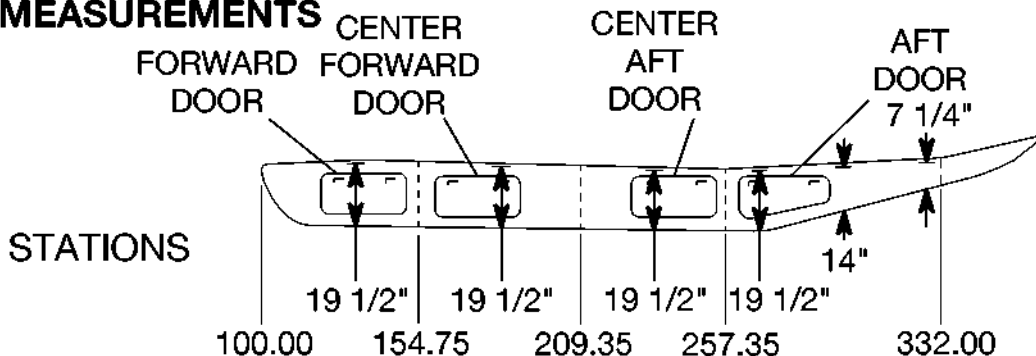


Figure 6-4 (Sheet 2)

# POD INTERNAL DIMENSIONS AND LOAD MARKINGS

A72026

## CARGO POD HEIGHT MEASUREMENTS



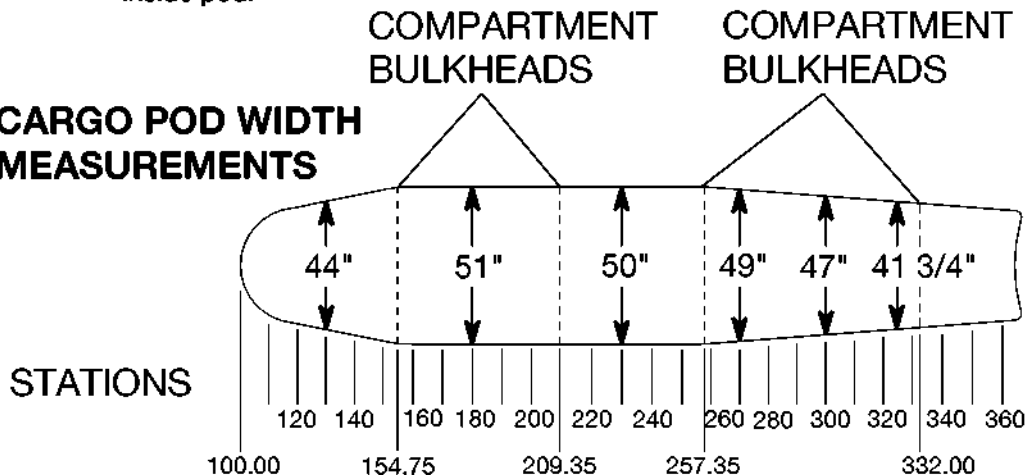
**NOTE 1:** Height dimensions are approximate and measured at Fuselage Stations shown from bottom of fuselage to inside floor.

**NOTE 2:** Width dimensions are approximate and measured at Fuselage Stations shown and on waterline 68.00 inside pod.

## DOOR OPENING DIMENSIONS

	WIDTH	HEIGHT (FRONT)	HEIGHT (MID)	HEIGHT (REAR)
FORWARD DOOR	27 1/2"	---	14 1/2"	---
FWD. CTR. DOOR	30 1/2"	---	15 1/4"	---
AFT CTR. DOOR	27 1/2"	---	14 1/2"	---
AFT DOOR	30 1/2"	13 1/2"	---	8 1/2"

## CARGO POD WIDTH MEASUREMENTS



## CARGO POD DOOR MARKINGS

FWD COMPARTMENT MAX. WEIGHT 230 LBS.	CTR. COMPARTMENT - FWD MAX WEIGHT 310 LBS.	CTR. COMPARTMENT - AFT MAX. WEIGHT 270 LBS.	AFT COMPARTMENT MAX. WEIGHT 280 LBS.
MAX FLOOR LOADING 30 LBS. PER SQ. FT.	MAX. FLOOR LOADING 30 LBS. PER SQ. FT.	MAX. FLOOR LOADING 30 LBS. PER SQ. FT.	MAX. FLOOR LOADING 30 LBS. PER SQ. FT.
NO SHARP EDGES	NO SHARP EDGES	NO SHARP EDGES	NO SHARP EDGES

2685T1096

Figure 6-5

# CABIN INTERNAL LOAD MARKINGS (CARGO VERSION)

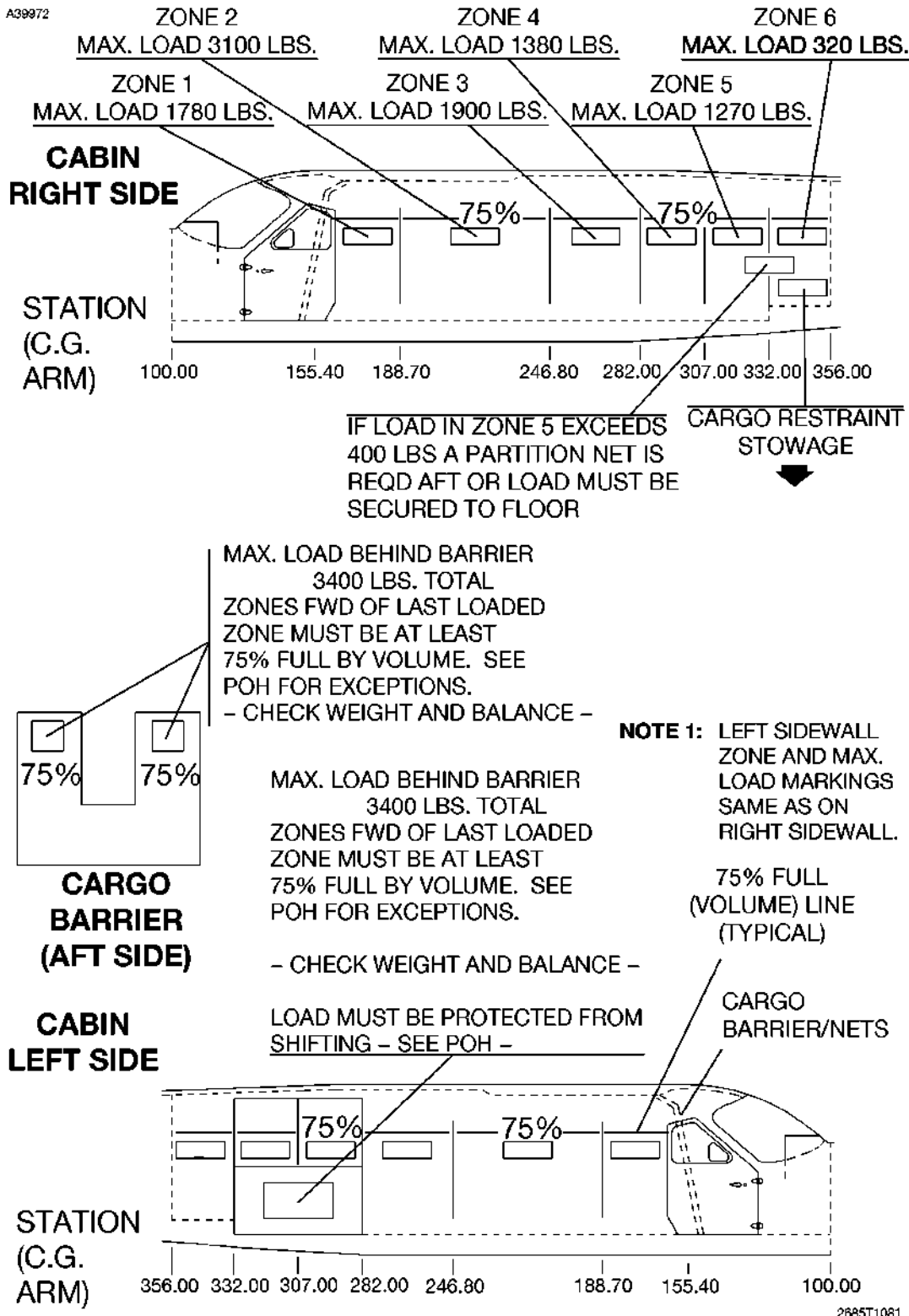
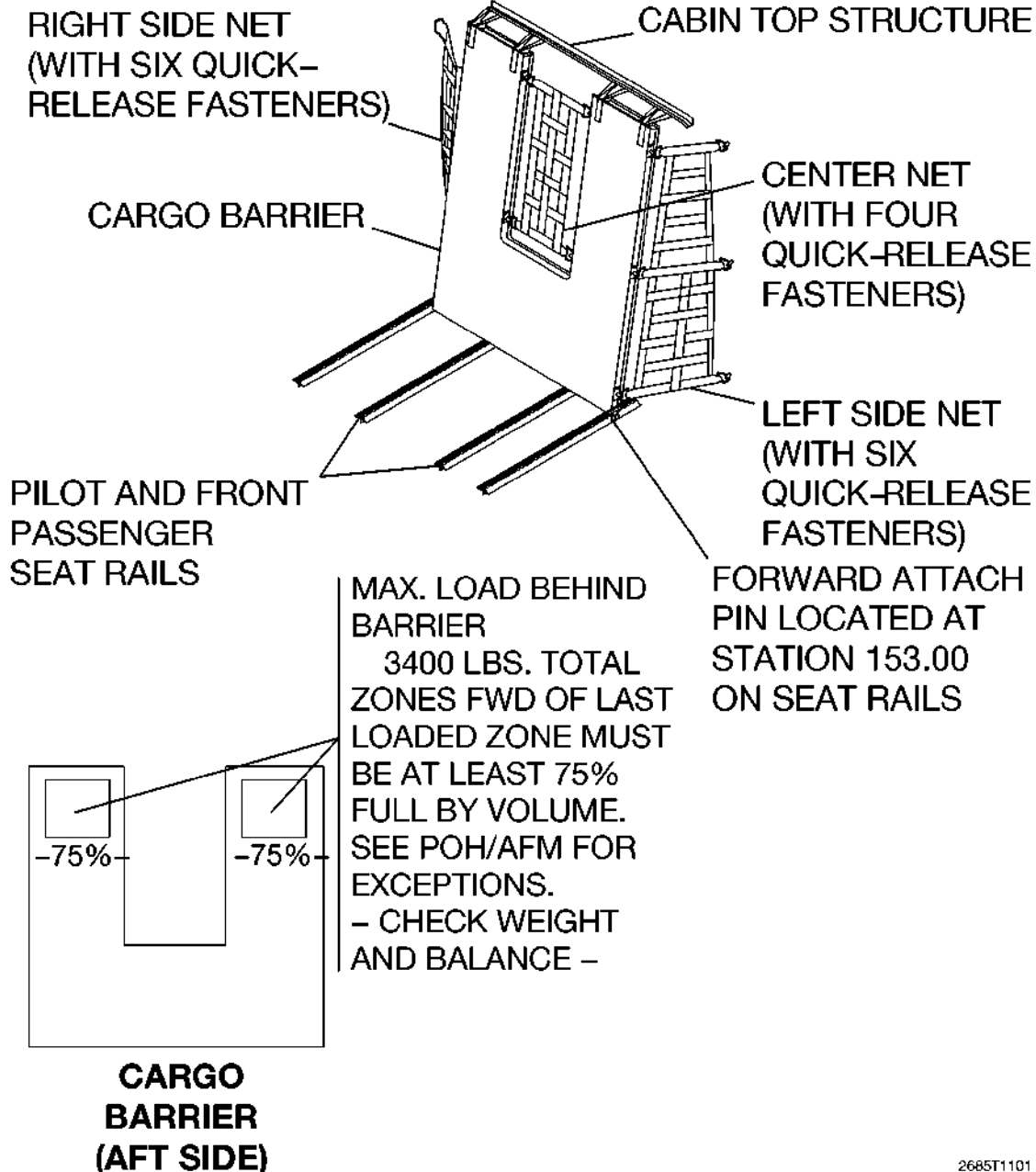


Figure 6-6



## CARGO BARRIER AND BARRIER NETS

A72025



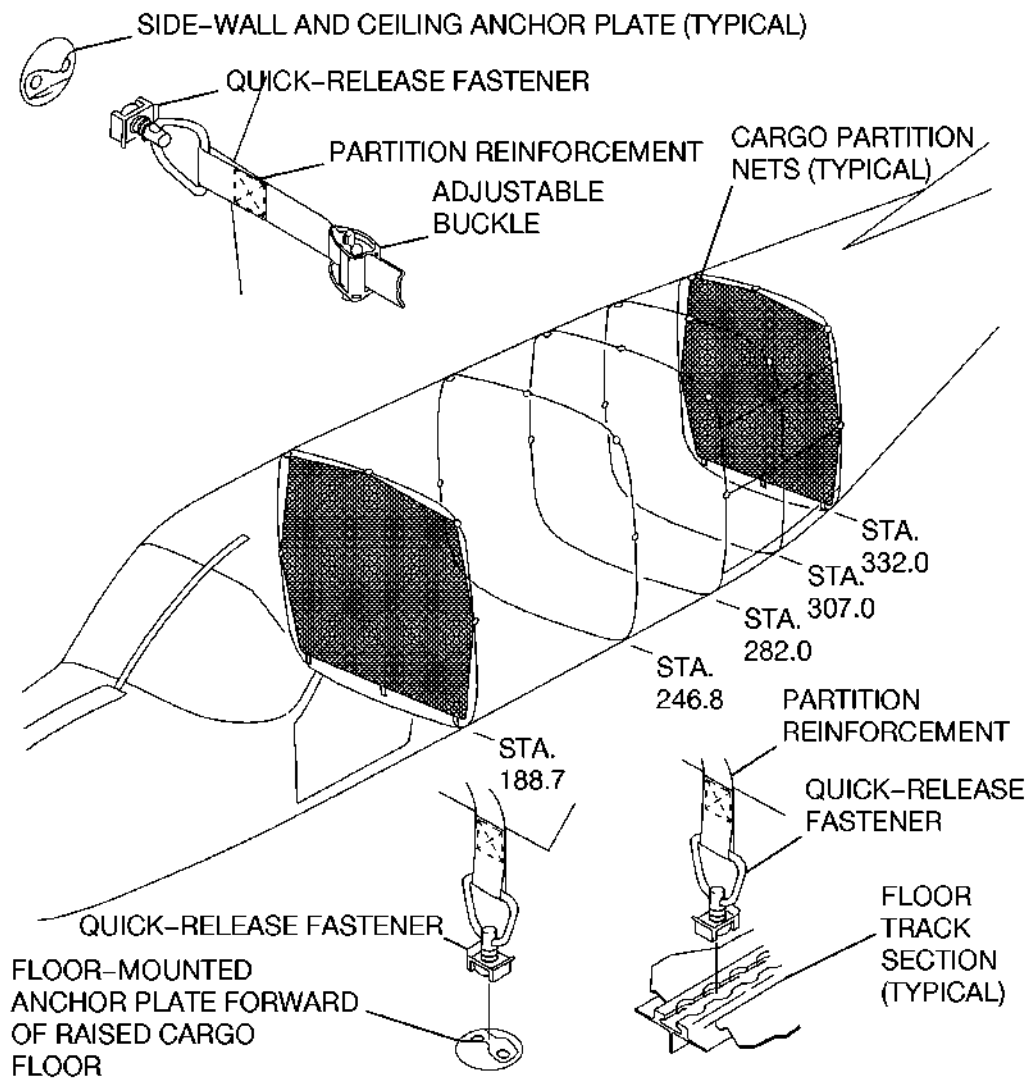
2685T1101

### NOTE

1. Installation of the fire extinguisher on the cargo barrier is not shown.
2. The cargo barrier and attached barrier nets must be installed to provide forward crash load restraint.
3. The quick-release fasteners which secure the center and side barrier nets allow momentary detachment of the nets for loading and unloading of items through the crew area.

Figure 6-7

## CARGO PARTITION NETS

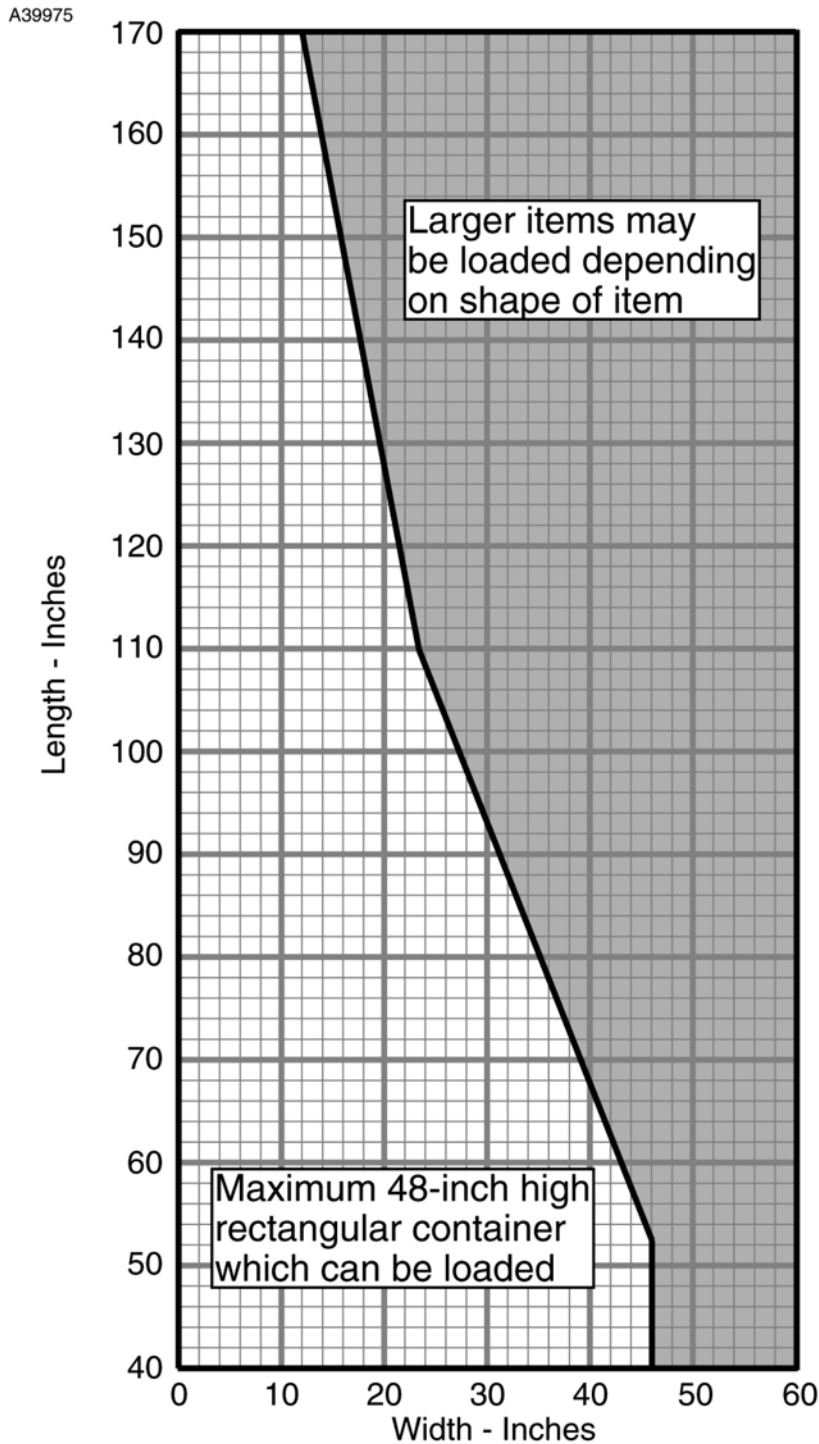


### NOTE

1. Partition nets are available for installation at Fuselage Stations 188.7, 246.8, 282.0, 307.0 and 332.0.
2. If partitions are used, they must be used in conjunction with the cargo barrier. Partitions are not designed to withstand crash loads, therefore they cannot be considered as a replacement for the barrier.
3. Each partition will withstand the forward and aft operational loads applied during takeoff, flight, and landing by any two zones forward or aft of the partition. Use of the partitions will allow loading of the zones without tying down the cargo if the load density is no more than 7.9 pounds per cubic foot and the zone is more than 75% full. Cargo loading that does not meet these requirements must be secured to the cabin floor.

Figure 6-8

### MAXIMUM CARGO SIZES



**NOTE**

1. Approximately one inch clearance allowed from sidewall and ceiling.
2. Subtract roller height and pallet thickness, if applicable.

Figure 6-9

## CARGO TIE-DOWN ATTACHMENTS

A72104

Item	Location	* Maximum Rated Load (Pounds)	
		Without Cargo Barrier/Nets Installed	With Cargo Barrier Nets Installed
Tie-down block on seat track	On front passenger seat tracks	100	100
Single-stud quick-release Tie-down on seat track	On aft passenger seat tracks	100	200
Single-stud quick-release Tie-down on baggage floor Anchor plates	On raised baggage floor	100	200
Double-stud quick-release Tie-down on seat track	On aft passenger seat tracks	150	300

When utilizing the aft seat rails for tying down cargo, minimum spacing for single-stud quick release tie-down rings is 12 inches.

\*Tie-downs are required toward and aft of cargo load to prevent the load from shifting. The type of tie-downs available, the sum of their individual rated loads, and the height and length of the load whether configured with or without a cargo barrier/nets, and whether passengers are carried aft of the cargo barrier/nets, are the determining factors in selecting the number of tie-downs needed.

FOR EXAMPLE:

A 600-pound load which has a height dimension that is equal to or less than its length dimension requires a minimum of six tie-downs (three forward and three aft). When the cargo barrier/nets are installed, the number of tie-downs can be reduced by 1/2 as long as load shifting can be prevented. The minimum number of tie-downs for this example would then be four (three plus one, to utilize an even number of tie-downs). Regardless of whether the cargo barrier/nets are installed, if the cargo height is greater than its Length, then the minimum number of tie-downs must be doubled. If passengers are carried aft of the cargo barrier/nets, cargo must be secured per the requirements without the barrier/nets installed. Refer to Cargo Load Restraint in this section for additional information.

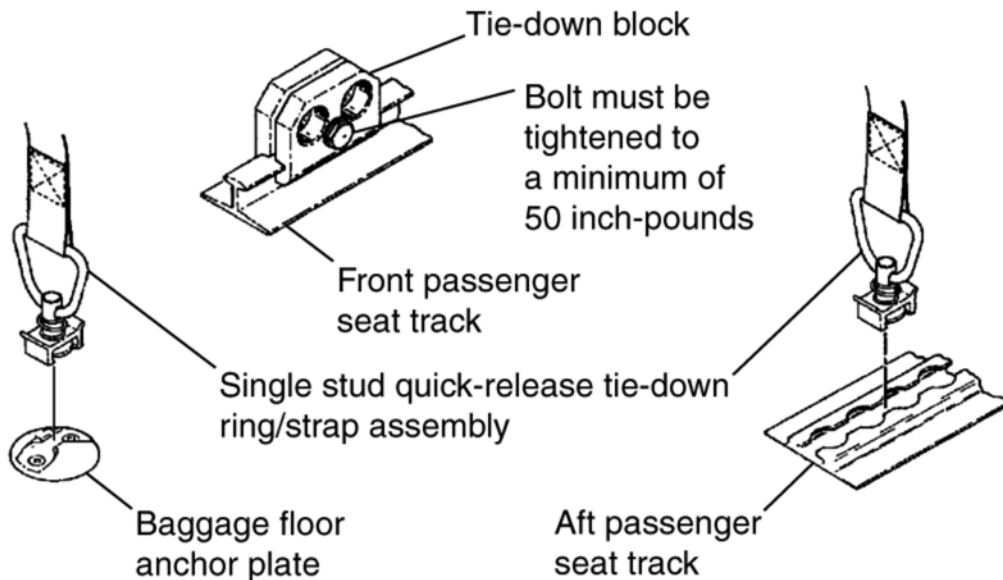


Figure 6-10 (Sheet 1 of 2)

# CARGO TIE-DOWN ATTACHMENTS

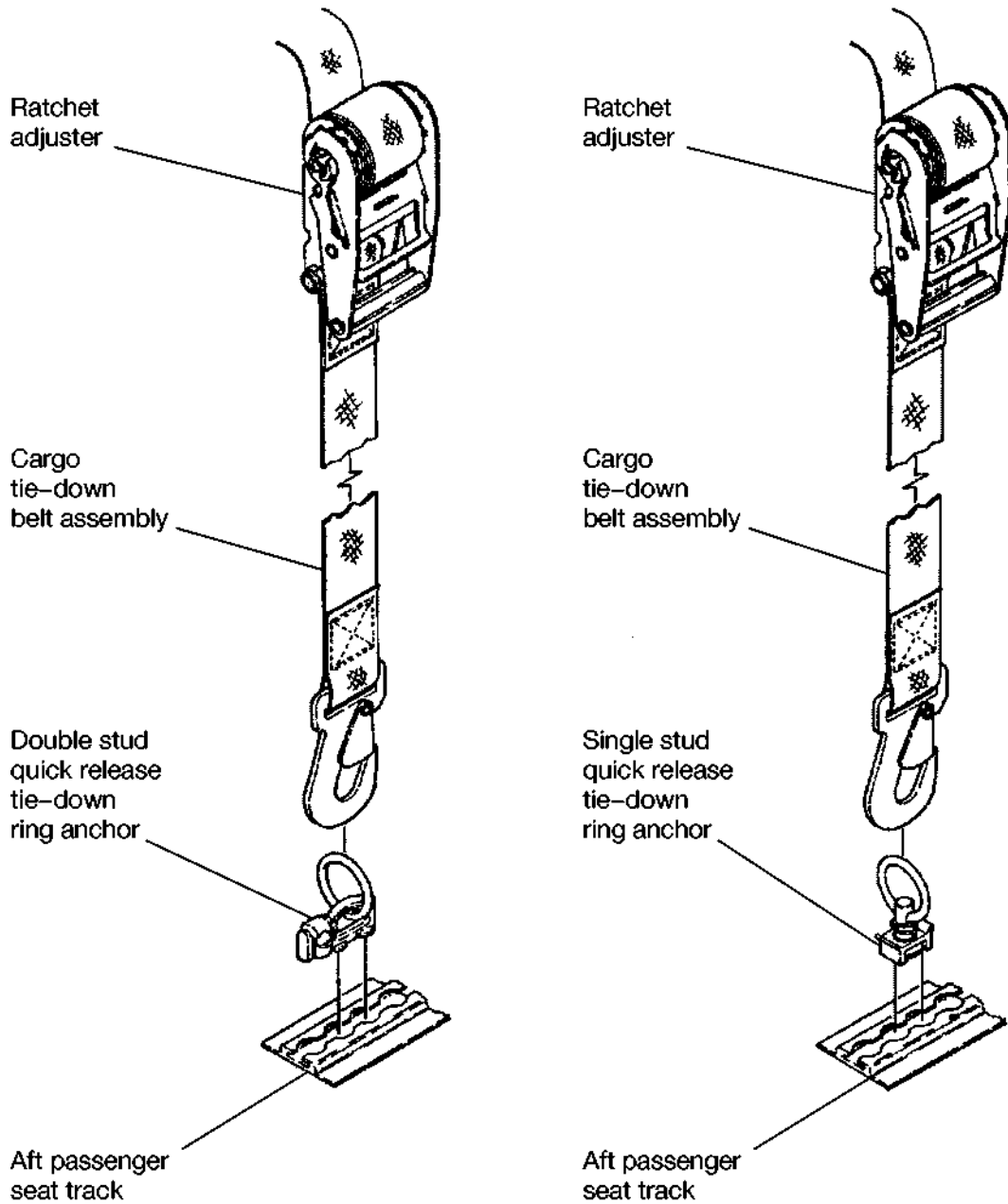
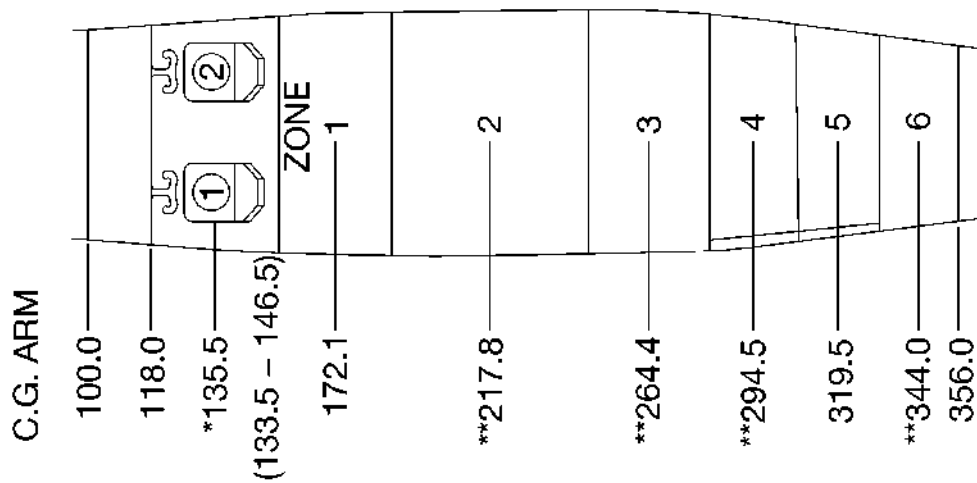
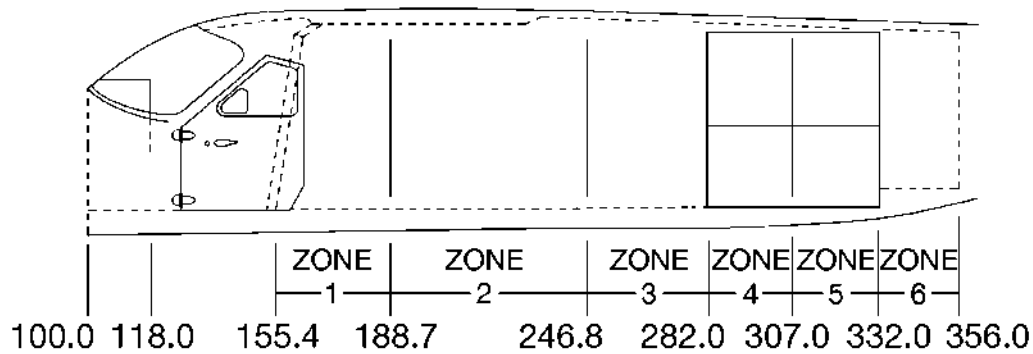


Figure 6-10 (Sheet 2)

# CABIN INTERNAL LOADING ARRANGEMENTS (CARGO VERSION)

A72290



2685T1091

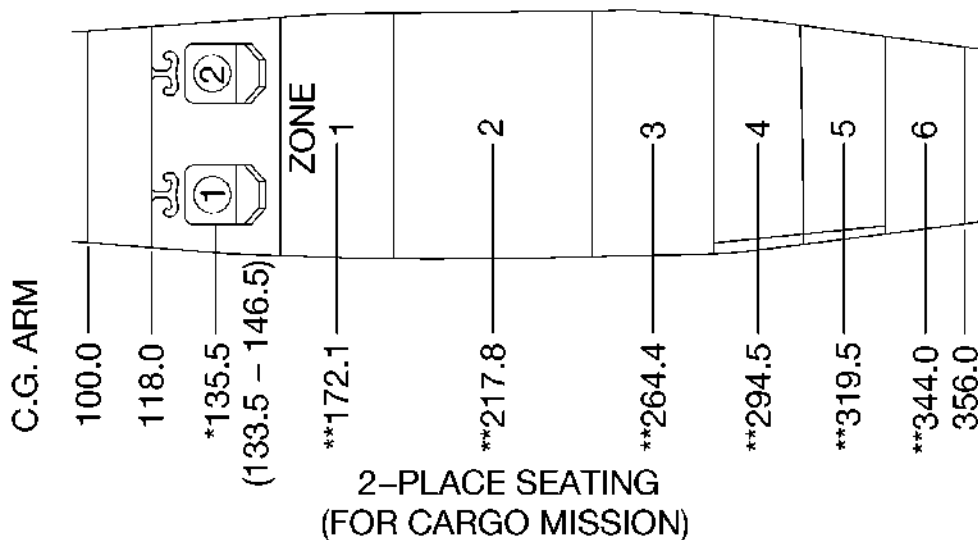
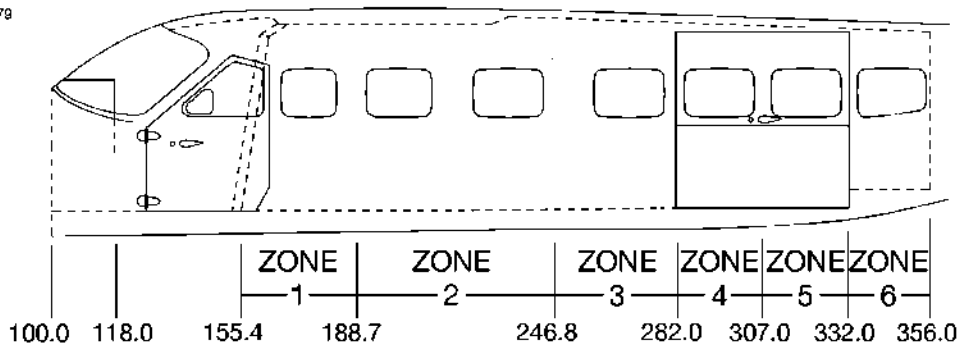
## NOTE

1. \*Pilot or front passenger center of gravity on adjustable seats positioned for an average occupant with the seat locking pin at Fuselage Station 145.0. Numbers in parentheses indicate forward and aft limits of occupant center of gravity range.
2. \*\*Cargo area center of gravity in Zones 1 thru 6 based on the mid point of the zone.
3. Vertical lines marked on the cargo area sidewalls or the forward face of the raised floor (Fuselage Station 332.0) can be used as a convenient reference point for determining the location of occupant or cargo Fuselage Station.

Figure 6-11 (Sheet 1 of 3)

# CABIN INTERNAL LOADING ARRANGEMENTS (PASSENGER VERSION)

A72479



2685T1091

## NOTE

1. \*Pilot or front passenger center of gravity on adjustable seats positioned for an average occupant with the seat locking pin at Fuselage Station 145.0. Numbers in parentheses indicate forward and aft limits of occupant center of gravity range.
2. \*\*Cargo area center of gravity in Zones 1 thru 6 based on the mid point of the zone.
3. The forward face of the raised floor (Fuselage Station 332.0) can be used as a convenient reference point for determining the location of occupant or cargo Fuselage Stations.
4. When a cargo barrier is installed, two-place Commuter seat 4 and 5 or individual Commuter seats 3 and 4 must be removed. Mission requirements will dictate if any aft passenger seating is to remain installed.

Figure 6-11 (Sheet 2)

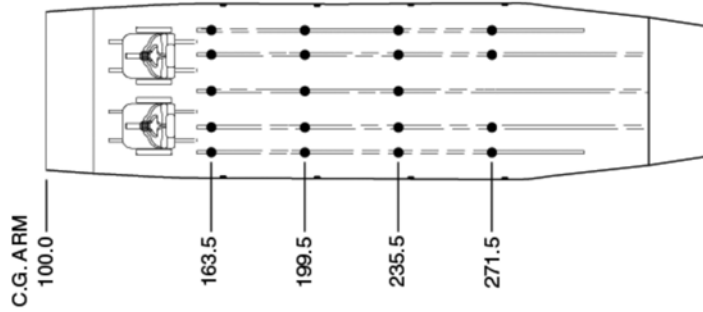
# CABIN INTERNAL LOADING ARRANGEMENTS (PASSENGER VERSION)

A71511

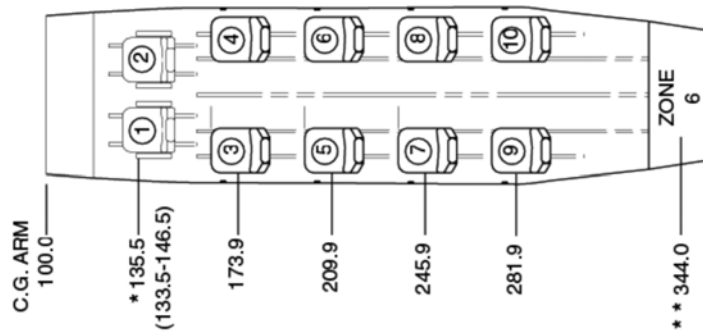
## SEATING POSITIONS

## AFT PASSENGER

- Location of seat front leg plungers on seat rails for standard placement.

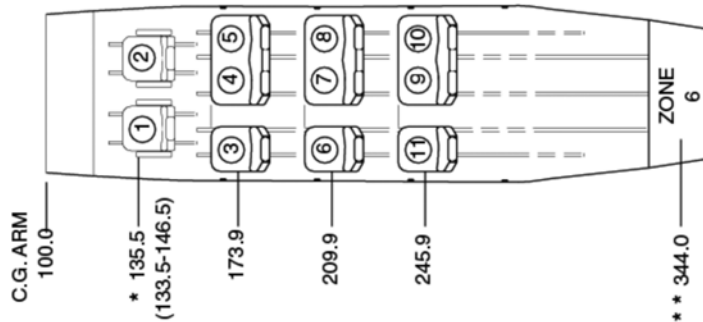


- Airplane may be configured with left commuter seats installed on the right side, and right commuter seats installed on the left side. Actual seat location should be noted when computing Airplane Weight and Balance.



10- PLACE COMMUTER

PILOT = ①  
PASSENGERS = ② THRU ⑩



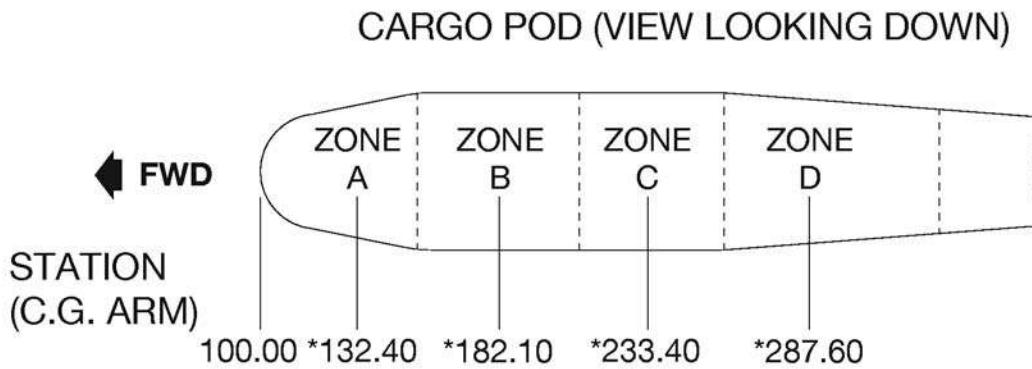
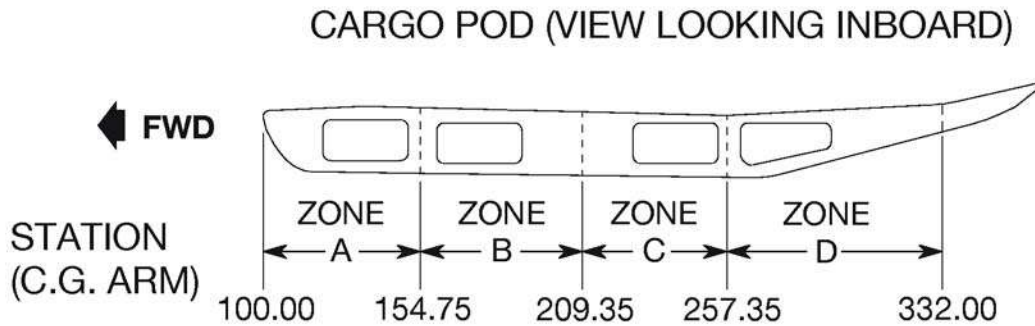
11- PLACE COMMUTER

2685T1092A

Figure 6-11 (Sheet 3)



## CARGO POD LOADING ARRANGEMENT



2685T1098

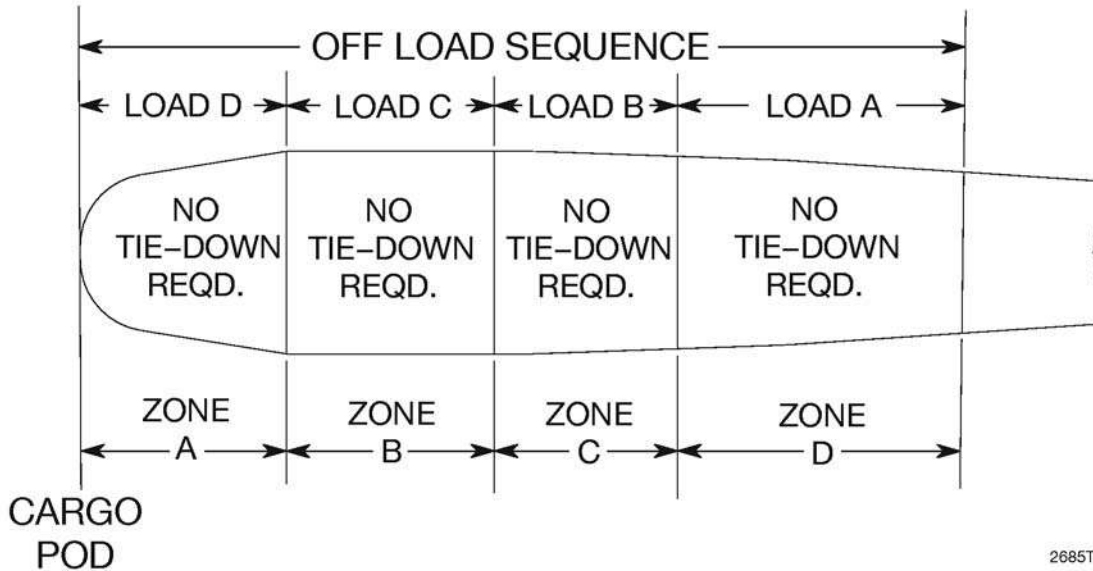
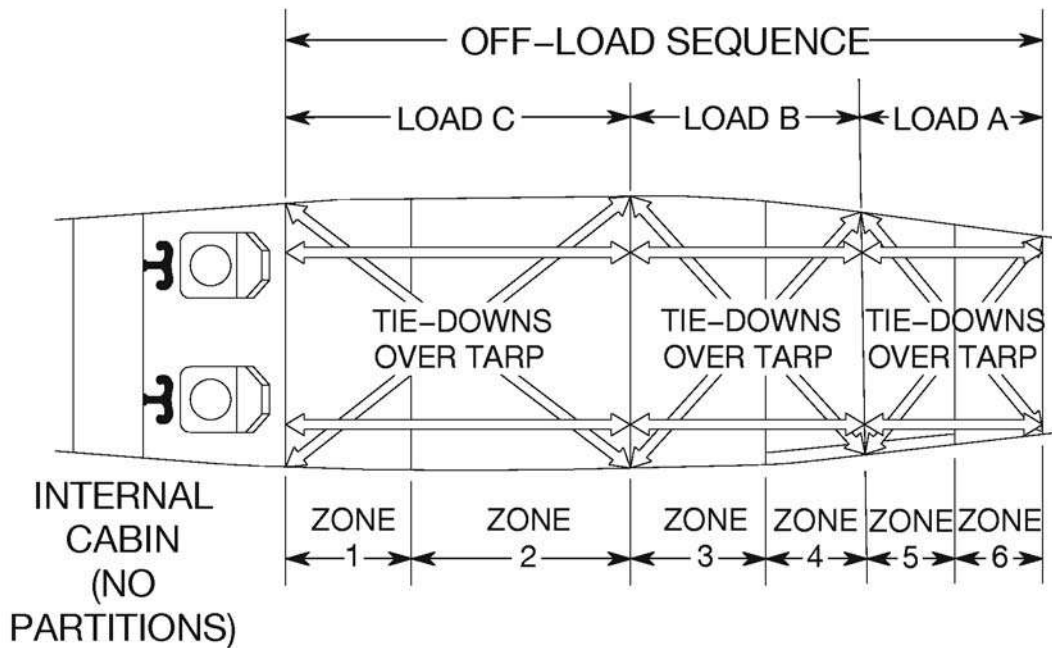
### NOTE

1. \*Cargo bay center of gravity in Zones A, B, C, and D.
2. Compartment bulkheads that separate Zones A and B (Station 154.75), Zones B and C (Station 209.35), and Zones C and D (Station 257.35) can be used as a reference point for determining the location of cargo Fuselage Station.

Figure 6-12

# LOADING/TIE-DOWN BY ZONE AND LOAD (OFF-LOADING SEQUENCE)

A39979



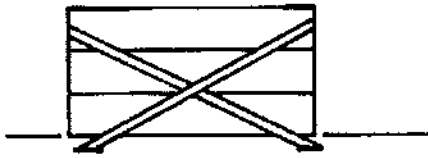
2685T1096

## NOTE

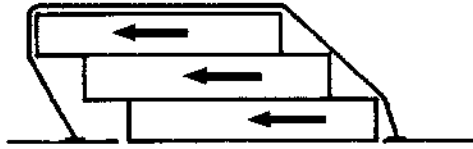
1. If cargo partitions are not utilized, individual loads must be secured by adequate tie-downs over tarps.
2. Protection against hazardous materials has been provided in the fuselage bilge area under the cargo compartment from Fuselage Station 168.0 to 356.0. These materials can be carried in any location within this area.

Figure 6-13

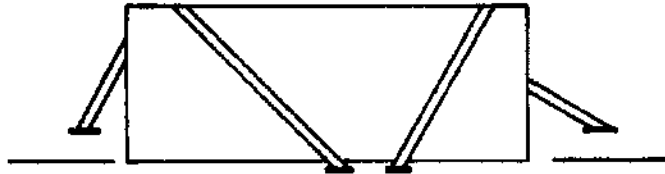
## TYPICAL CARGO RESTRAINT METHODS



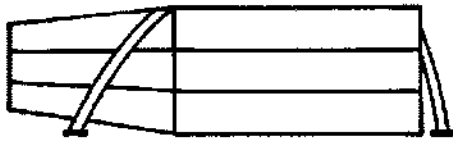
Cargo properly tied,  
no shifts occur



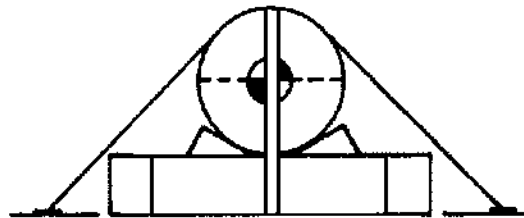
Cargo improperly tied,  
shifts occur



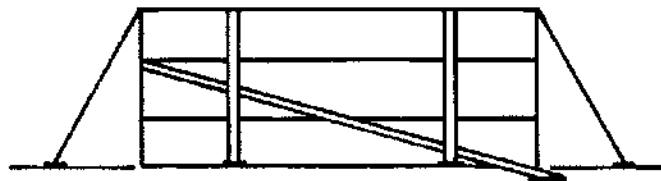
Multiple forces secured by fewer straps



Upward cargo restraint



Cylindrical cargo tie-down



Proper tie-down for all forces

Figure 6-14

**WEIGHT AND MOMENT TABLES  
PILOT AND FRONT PASSENGER  
CARGO VERSION**

Weight Pounds	Moment Inch-Pound/1000 (Arm = 135.50 Inch)
1	0.1
2	0.3
3	0.4
4	0.5
5	0.7
6	0.8
7	0.9
8	1.1
9	1.2
10	1.4
20	2.7
30	4.1
40	5.4
50	6.8
60	8.1
70	9.5
80	10.8
90	12.2
100	13.6
200	27.1
300	40.7
<b>EXAMPLE:</b>	
To obtain moments for a 170 pounds pilot, add moments shown for 100 pounds (13.6) and 70 pounds (9.5) for a total moment of 23.1 inch-pound/1000.	

Figure 6-15 (Sheet 1 of 7)

**WEIGHT AND MOMENT TABLES**  
**11 PLACE COMMUTER**  
**Crew and Passengers**  
**(Single/ Bench Commuter Seating)**

Weight Pounds	Pilot/ Front Passenger Seats 1 and 2 (Arm = 135.5 Inch)	Aft Passengers Seats		
		3, 4, and 5 (Arm = 173.9 Inch)	6, 7, and 8 (Arm = 209.9 Inch)	9, 10, and 11 (Arm = 245.9 Inch)
Moment (Inch-Pound/1000)				
1	0.1	0.2	0.2	0.2
2	0.3	0.3	0.4	0.5
3	0.4	0.5	0.6	0.7
4	0.5	0.7	0.8	1.0
5	0.7	0.9	1.0	1.2
6	0.8	1.0	1.3	1.5
7	0.9	1.2	1.5	1.7
8	1.1	1.4	1.7	2.0
9	1.2	1.6	1.9	2.2
10	1.4	1.7	2.1	2.5
20	2.7	3.5	4.2	4.9
30	4.1	5.2	6.3	7.4
40	5.4	7.0	8.4	9.8
50	6.8	8.7	10.5	12.3
60	8.1	10.4	12.6	14.8
70	9.5	12.2	14.7	17.2
80	10.8	13.9	16.8	19.7
90	12.2	15.7	18.9	22.1
100	13.6	17.4	21.0	24.6
200	27.1	34.8	42.0	49.2
300	40.7	52.2	63.0	73.8

**EXAMPLE:**

To obtain moments for a 185 pounds passenger in seat 3, add moments shown for 100 pounds (17.4), 80 pounds (13.9), and 5 pounds (0.9) for a total moment of 32.2 inch-pound/1000.

**NOTE**

The airplane may be configured with left single commuter seats installed on the right side, and right bench commuter seats installed on the left side. Actual seat location should be noted when computing airplane weight and balance.

Figure 6-15 (Sheet 2)

**WEIGHT AND MOMENT TABLES**  
**10 PLACE COMMUTER**  
**Crew and Passengers**  
**(Single Commuter Seating)**

Weight Pounds	Pilot/ Front Passenger Seats 1 and 2 (Arm = 135.5 Inch)	Aft Passengers Seats			
		3 and 4 (Arm = 173.9 Inch)	5 and 6 (Arm = 209.9 Inch)	7 and 8 (Arm = 245.9 Inch)	9 and 10 (Arm = 281.9 Inch)
Moment (Inch-Pound/1000)					
1	0.1	0.2	0.2	0.2	0.3
2	0.3	0.3	0.4	0.5	0.6
3	0.4	0.5	0.6	0.7	0.8
4	0.5	0.7	0.8	1.0	1.1
5	0.7	0.9	1.0	1.2	1.4
6	0.8	1.0	1.3	1.5	1.7
7	0.9	1.2	1.5	1.7	2.0
8	1.1	1.4	1.7	2.0	2.3
9	1.2	1.6	1.9	2.2	2.5
10	1.4	1.7	2.1	2.5	2.8
20	2.7	3.5	4.2	4.9	5.6
30	4.1	5.2	6.3	7.4	8.5
40	5.4	7.0	8.4	9.8	11.3
50	6.8	8.7	10.5	12.3	14.1
60	8.1	10.4	12.6	14.8	16.9
70	9.5	12.2	14.7	17.2	19.7
80	10.8	13.9	16.8	19.7	22.6
90	12.2	15.7	18.9	22.1	25.4
100	13.6	17.4	21.0	24.6	28.2
200	27.1	34.8	42.0	49.2	56.4
300	40.7	52.2	63.0	73.8	84.6

**EXAMPLE:**

To obtain moments for a 185 pounds passenger in seat 5, add moments shown for 100 pounds (21.0), 80 pounds (16.8), and 5 pounds (1.0) for a total moment of 38.8 inch-pound/1000.

**NOTE**

The airplane may be configured with left single commuter seats installed on the right side, and right single commuter seats installed on the left side. Actual seat location should be noted when computing airplane weight and balance.

Figure 6-15 (Sheet 3)

**WEIGHT AND MOMENT TABLES**  
**FUEL (JET FUEL WITH DENSITY OF 6.7 POUNDS/GALLON AT**  
**60 °F)**

Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)	Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)
5	34	6.8	175	1173	238.4
10	67	13.6	180	1206	245.2
15	101	20.4	185	1240	252.0
20	134	27.2	190	1273	258.8
25	168	34.0	195	1307	265.7
30	201	40.8	200	1340	272.5
35	235	47.6	205	1374	279.3
40	268	54.4	210	1407	286.1
45	302	61.2	215	1441	292.9
50	335	68.0	220	1474	299.7
55	369	74.8	225	1508	306.5
60	402	81.6	230	1541	313.3
65	436	88.4	235	1575	320.1
70	469	95.2	240	1608	326.9
75	503	102.0	245	1642	333.7
80	536	108.8	250	1675	340.5
85	570	115.7	255	1709	347.3
90	603	122.5	260	1742	354.1
95	637	129.3	265	1776	360.9
100	670	136.1	270	1809	367.7
105	704	142.9	275	1843	374.5
110	737	149.7	280	1876	381.2
115	771	156.6	285	1910	388.0
120	804	163.4	290	1943	394.8
125	838	170.2	295	1977	401.6
130	871	177.0	300	2010	408.4
135	905	183.8	305	2044	415.2
140	938	190.6	310	2077	422.0
145	972	197.5	315	2111	428.8
150	1005	204.3	320	2144	435.6
155	1039	211.1	325	2178	442.4
160	1072	217.9	327	2189	444.7
165	1106	224.7	330	2211	449.1
170	1139	231.5	332	2224	451.7

Figure 6-15 (Sheet 4)

**WEIGHT AND MOMENT TABLES**  
**FUEL (AVIATION GASOLINE WITH DENSITY OF 6.0**  
**POUNDS/GALLON AT 60 °F)**

Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)	Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)
5	30	6.1	175	1050	213.5
10	60	12.2	180	1080	219.6
15	90	18.3	185	1110	225.7
20	120	24.4	190	1140	231.8
25	150	30.5	195	1170	237.9
30	180	36.5	200	1200	244.0
35	210	42.6	205	1230	250.1
40	240	48.7	210	1260	256.2
45	270	54.8	215	1290	262.3
50	300	60.9	220	1320	268.4
55	330	67.0	225	1350	274.5
60	360	73.1	230	1380	280.6
65	390	79.2	235	1410	286.7
70	420	85.3	240	1440	292.8
75	450	91.4	245	1470	298.9
80	480	97.5	250	1500	304.9
85	510	103.6	255	1530	311.0
90	540	109.7	260	1560	317.1
95	570	115.8	265	1590	323.2
100	600	121.9	270	1620	329.2
105	630	128.0	275	1650	335.3
110	660	134.1	280	1680	341.4
115	690	140.2	285	1710	347.5
120	720	146.3	290	1740	353.6
125	750	152.4	295	1770	359.6
130	780	158.5	300	1800	365.7
135	810	164.6	305	1830	371.8
140	840	170.7	310	1860	377.9
145	870	176.8	315	1890	384.0
150	900	182.9	320	1920	390.1
155	930	189.1	325	1950	396.2
160	960	195.2	326	1957	397.6
165	990	201.3	330	1980	402.2
170	1020	207.4	332	1992	404.6

Figure 6-15 (Sheet 5)



**WEIGHT AND MOMENT TABLES  
CARGO (CABIN LOCATIONS)**

Weight Pounds	Zone 1 (Arm = 172.1 Inch)	Zone 2 (Arm = 217.8 Inch)	Zone 3 (Arm = 264.4 Inch)	Zone 4 (Arm = 294.5 Inch)	Zone 5 (Arm = 319.5 Inch)	Zone 6 (Arm = 344.0 Inch)
	Moment (Inch-Pound/1000)					
1	0.2	0.2	0.3	0.3	0.3	0.3
2	0.3	0.4	0.5	0.6	0.6	0.7
3	0.5	0.7	0.8	0.9	1.0	1.0
4	0.7	0.9	1.1	1.2	1.3	1.4
5	0.9	1.1	1.3	1.5	1.6	1.7
6	1.0	1.3	1.6	1.8	1.9	2.1
7	1.2	1.5	1.9	2.1	2.2	2.4
8	1.4	1.7	2.1	2.4	2.6	2.8
9	1.5	2.0	2.4	2.7	2.9	3.1
10	1.7	2.2	2.6	2.9	3.2	3.4
20	3.4	4.4	5.3	5.9	6.4	6.9
30	5.2	6.5	7.9	8.8	9.6	10.3
40	6.9	8.7	10.6	11.8	12.8	13.8
50	8.6	10.9	13.2	14.7	16.0	17.2
60	10.3	13.1	15.9	17.7	19.2	20.6
70	12.0	15.2	18.5	20.6	22.4	24.1
80	13.8	17.4	21.2	23.6	25.6	27.5
90	15.5	19.6	23.8	26.5	28.8	31.0
100	17.2	21.8	26.4	29.5	32.0	34.4
200	34.4	43.6	52.9	58.9	63.9	68.8
300	51.6	65.3	79.3	88.4	95.9	103.2
400	68.8	87.1	105.8	117.8	127.8	
500	86.1	108.9	132.2	147.3	159.8	
600	103.3	130.7	158.6	176.7	191.7	
700	120.5	152.5	185.1	206.2	223.7	
800	137.7	174.2	211.5	235.6	255.6	
900	154.9	196.0	238.0	265.1	287.6	
1000	172.1	217.8	264.4	294.5	319.5	
2000		435.6				
3000		653.4				

**EXAMPLE:**

To obtain moments for 350 pounds of cargo in Zone 1, add moments shown in Zone 1 for 300 pounds (51.6) and 50 pounds (8.6) for a total moment of 60.2 inch-pound/1000.

Figure 6-15 (Sheet 6)

**WEIGHT AND MOMENT TABLES**  
**CARGO (CARGO POD LOCATIONS)**

Weight Pounds	Zone A (Arm = 132.4 Inch)	Zone B (Arm = 182.1 Inch)	Zone C (Arm = 233.4 Inch)	Zone D (Arm = 287.6 Inch)
	Moment (Inch-Pound/1000)			
1	0.1	0.2	0.2	0.3
2	0.3	0.4	0.5	0.6
3	0.4	0.5	0.7	0.9
4	0.5	0.7	0.9	1.2
5	0.7	0.9	1.2	1.4
6	0.8	1.1	1.4	1.7
7	0.9	1.3	1.6	2.0
8	1.1	1.5	1.9	2.3
9	1.2	1.6	2.1	2.6
10	1.3	1.8	2.3	2.9
20	2.6	3.6	4.7	5.8
30	4.0	5.5	7.0	8.6
40	5.3	7.3	9.3	11.5
50	6.6	9.1	11.7	14.4
60	7.9	10.9	14.0	17.3
70	9.3	12.7	16.3	20.1
80	10.6	14.6	18.7	23.0
90	11.9	16.4	21.0	25.9
100	13.2	18.2	23.3	28.8
200	26.5	36.4	46.7	57.5
300		54.6		

**EXAMPLE:**

To obtain moments for 48 pounds of cargo in Zone A, add moments shown in Zone A for 40 pounds (5.3) and 8 pounds (1.1) for a total moment of 6.4 inch-pound/1000.

Figure 6-15 (Sheet 7)

### SAMPLE LOADING PROBLEM

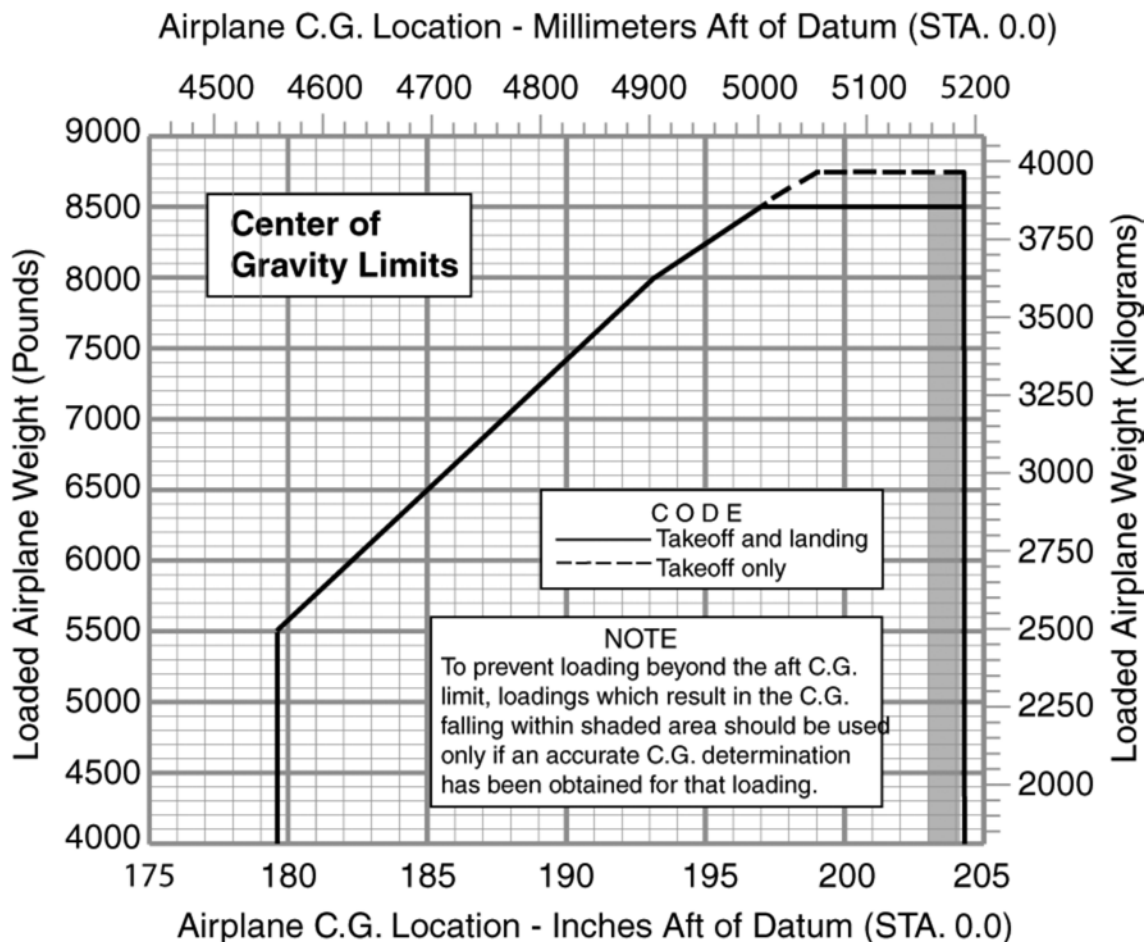
(CARGO LOADING SHOWN)	SAMPLE AIRPLANE		YOUR AIRPLANE	
	Weight Pounds	Moment Inch-Pound/1000	Weight Pounds	Moment Inch-Pound/1000
1. Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped (includes unusable fuel and full oil).	5005	929.4		
2. Usable Fuel (332 Gallons Max)	2224	451.7		
3. Pilot (Seat 1) (STA. 133.5 to 146.5)	170	23.1		
4. Front Passenger (Seat 2) (STA. 133.5 to 146.5)				
5. Aft Passengers (Commuter Seating):				
STA. 173.9				
STA. 209.9				
STA. 245.9				
STA. 281.9				
6. Baggage/Cargo (Cabin Locations):				
Zone 1 (STA. 155.40 to 188.70)	120	20.6		
Zone 2 (STA. 188.70 to 246.80)	416	90.6		
Zone 3 (STA. 246.80 to 282.00)	200	52.9		
Zone 4 (STA. 282.00 to 307.00)	200	58.9		
Zone 5 (STA. 307.00 to 332.00)	200	63.9		
Zone 6 (STA. 332.00 to 356.00)	50	17.2		
7. Baggage/Cargo (Cargo Pod Locations):				
Zone A (STA. 100.00 to 154.75)	50	6.6		
Zone B (STA. 154.75 to 209.35)	50	9.1		
Zone C (STA. 209.35 to 257.35)	50	11.7		
Zone D (STA. 257.35 to 332.00)	50	14.4		
<b>8. RAMP WEIGHT AND MOMENT</b>	<b>8785</b>	<b>1750.1</b>		
9. Fuel Allowance (for engine start, taxi, and runup)	-35	-7.0		
<b>10. TO WEIGHT AND MOMENT</b> (Subtract Step 9 from Step 8)	<b>8750</b>	<b>1743.1</b>		
11. Locate this point (8750 at 1743.1) on the Center of Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.				
<b>NOTE</b>				
Refer to the Weight and Moment Tables for weight and moment of crew, passengers, usable fuel, and cargo being carried. Refer to Cabin Internal Loading Arrangements for aft passengers seating arrangements.				

Figure 6-16 (Sheet 1 of 2)



## CENTER OF GRAVITY LIMITS

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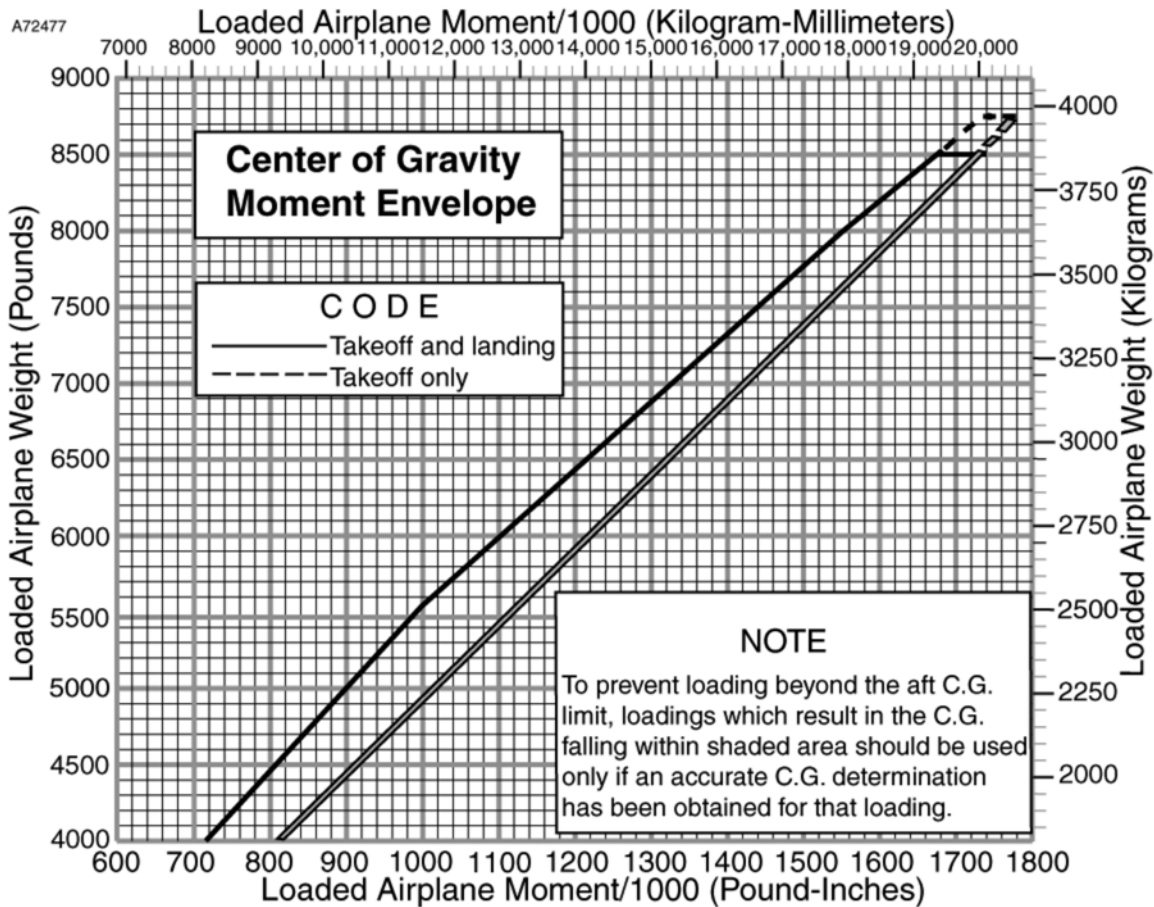


### WARNING

**It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.**

Figure 6-17

# CENTER OF GRAVITY MOMENT ENVELOPE



## WARNING

- Because loading personnel may not always be able to achieve an ideal loading, a means of protecting the C.G. envelope is provided by supplying an aft C.G. location warning (shaded area) between 38.33% mac and the maximum aft c.g. of 40.33% mac on the center of gravity moment envelope. Points falling within this shaded area should be used only if accurate C.G. determination for cargo loadings can be obtained.
- It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.

Figure 6-18

## SECTION 7 AIRPLANE & SYSTEMS DESCRIPTIONS

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## INTRODUCTION

This section provides description and operation of the airplane and its systems. Refer to Section 9, Supplements for details of other supplemental systems and equipment.

### WARNING

**Complete familiarity with the airplane and its systems will not only increase the pilot's proficiency and ensure optimum operation, but could provide a basis for analyzing system malfunctions in case an emergency is encountered. Information in this section will assist in that familiarization. The responsible pilot will want to be prepared to make proper and precise responses in every situation.**

## AIRFRAME

The airplane is an all-metal, high-wing, single-engine airplane equipped with tricycle landing gear and designed for general utility purposes. The construction of the fuselage is a conventional formed sheet metal bulkhead, stringer, and skin design referred to as semimonocoque. Major items of structure are the front and rear carry-through spars to which the wings are attached, a bulkhead and forgings for main landing gear attachment and a bulkhead with attaching plates at its base for the strut-to-fuselage attachment of the wing struts.

The externally braced wings, having integral fuel tanks, are constructed of a front and rear spar with formed sheet metal ribs, doublers, and stringers. The entire structure is covered with aluminum skin. The front spars are equipped with wing-to-fuselage and wing-to-strut attach fittings. The aft spars are equipped with wing-to-fuselage attach fittings. The integral fuel tanks are formed by the front and rear spars, upper and lower skins, and inboard and outboard closeout ribs. Extensive use of bonding is employed in the fuel tank area to reduce fuel tank sealing.

Round-nosed ailerons and single-slot type flaps are made from conventional formed sheet metal ribs and smooth aluminum skin construction. A slot lip spoiler, mounted above the outboard end of each flap, is of conventional construction. The left aileron incorporates a servo tab while the right aileron incorporates a trimmable servo tab, both mounted on the outboard end of the aileron trailing edge.

(Continued Next Page)

## **AIRFRAME** (Continued)

The empennage (tail assembly) consists of a conventional vertical stabilizer, rudder, horizontal stabilizer, and elevator. The vertical stabilizer consists of a forward and aft spar, sheet metal ribs and reinforcements, four skin panels, formed leading edge skins, and a dorsal fin. The rudder is constructed of a forward and aft spar, formed sheet metal ribs and reinforcements, and a wrap-around skin panel. The top of the rudder incorporates a leading edge extension which contains a balance weight. The horizontal stabilizer is constructed of a forward and aft spar, ribs and stiffeners, four upper and four lower skin panels, and two left and two right wrap-around skin panels which also form the leading edges. The horizontal stabilizer also contains dual jack screw type actuators for the elevator trim tabs. Construction of the elevator consists of a forward and aft spar, sheet metal ribs, upper and lower skin panels, and wrap-around skin panels for the leading and trailing edges. An elevator trim tab is attached to the trailing edge of each elevator by full length piano-type hinges. Dual pushrods from each actuator located in the horizontal stabilizer transmit actuator movement to dual horns on each elevator trim tab to provide tab movement. Both elevator tip leading edge extensions provide aerodynamic balance and incorporate balance weights. A row of vortex generators on the top of the horizontal stabilizer just forward of the elevator enhances nose down elevator and trim authority.

To assure extended service life of the airplane, the entire airframe is corrosion proofed. Internally, all assemblies and sub-assemblies are coated with a chemical film conversion coating and are then epoxy primed. Steel parts in contact with aluminum structure are given a chromate dip before assembly. Externally, the complete airframe is painted with an overall coat of polyurethane paint which enhances resistance to corrosive elements in the atmosphere. Also, all control cables for the flight control system are of stainless steel construction.

## **CARGO POD**

The airplane may be equipped with a cargo pod which provides additional cargo space. The pod attaches to the bottom of the fuselage with screws and can be removed, if desired, for increased performance and useful load. The pod is fabricated with a Nomex inner housing, a layer of Kevlar, and an outer layer of fiberglass. Complete instructions for removal and installation of the cargo pod are contained in the Maintenance Manual.

(Continued Next Page)

## **CARGO POD** (Continued)

The volume of the cargo pod is 111.5 cubic feet and has a load-carrying capacity of 1090 pounds. The pod has aluminum bulkheads that divide it into four separate compartments. Each compartment has a door on the left side of the pod that is hinged at the bottom. Each door has two handles that latch the doors in the closed position when rotated 90 degrees to the horizontal position.

## **FLIGHT CONTROLS**

The airplane's flight control system (see Flight Control And Trim Systems figure) consists of conventional aileron, elevator and rudder control surfaces and a pair of spoilers mounted above the outboard ends of the flaps. The control surfaces are manually operated through mechanical linkage using a control wheel for the ailerons, spoilers and elevator and rudder/brake pedals for the rudder. The wing spoilers improve lateral control of the airplane at low speeds by disrupting lift over the appropriate flap. The spoilers are interconnected with the aileron system through a push-rod mounted to an arm on the aileron bell crank. Spoiler travel is proportional to aileron travel for aileron deflections in excess of 5° up. The spoilers are retracted throughout the remainder of aileron travel. Aileron servo tabs provide reduced maneuvering control wheel forces.

## **TRIM SYSTEMS**

Manually-operated aileron, elevator, and rudder trim systems are provided (see Flight Control And Trim Systems figure). Aileron trimming is achieved by a trimmable servo tab attached to the right aileron and connected mechanically to a knob located on the control pedestal. Rotating the trim knob to the right (clockwise) will trim right wing down; conversely, rotating it to the left (counterclockwise) will trim left wing down.

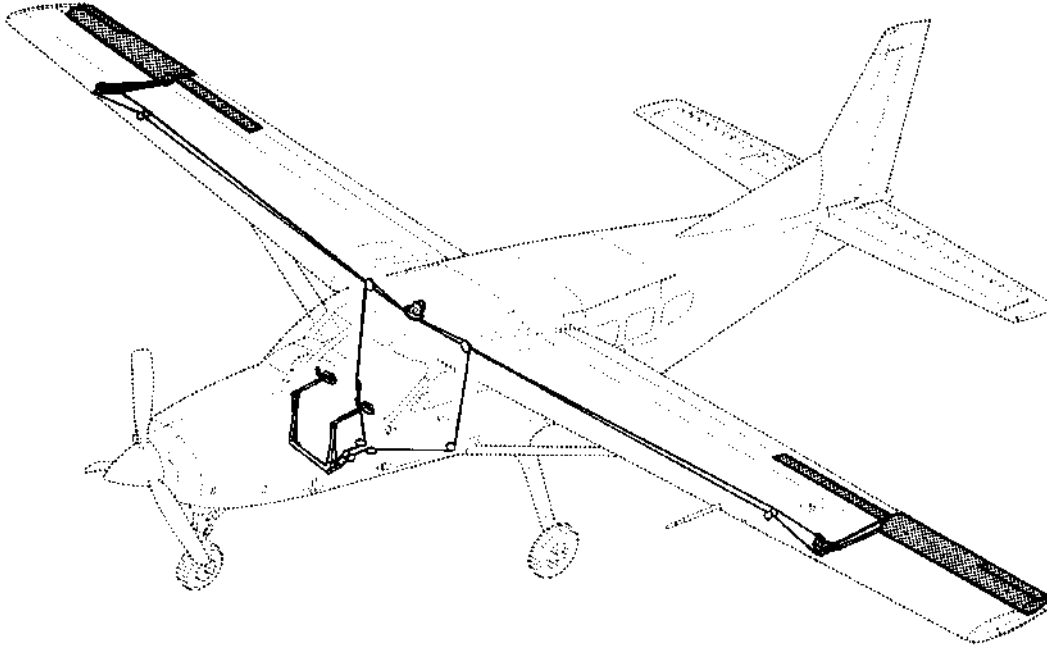
Elevator trimming is accomplished through two elevator trim tabs by utilizing the vertically mounted trim control wheel on the top left side of the control pedestal. Forward rotation of the control wheel will trim nose-down; conversely, aft rotation will trim nose-up. The airplane is also equipped with an electric elevator trim system.

Rudder trimming is accomplished through the nose wheel steering bungee connected to the rudder control system and a trim control wheel mounted on the control pedestal by rotating the horizontally mounted trim control wheel either left or right to the desired trim position. Rotating the trim wheel to the right will trim nose-right; conversely, rotating it to the left will trim nose-left.

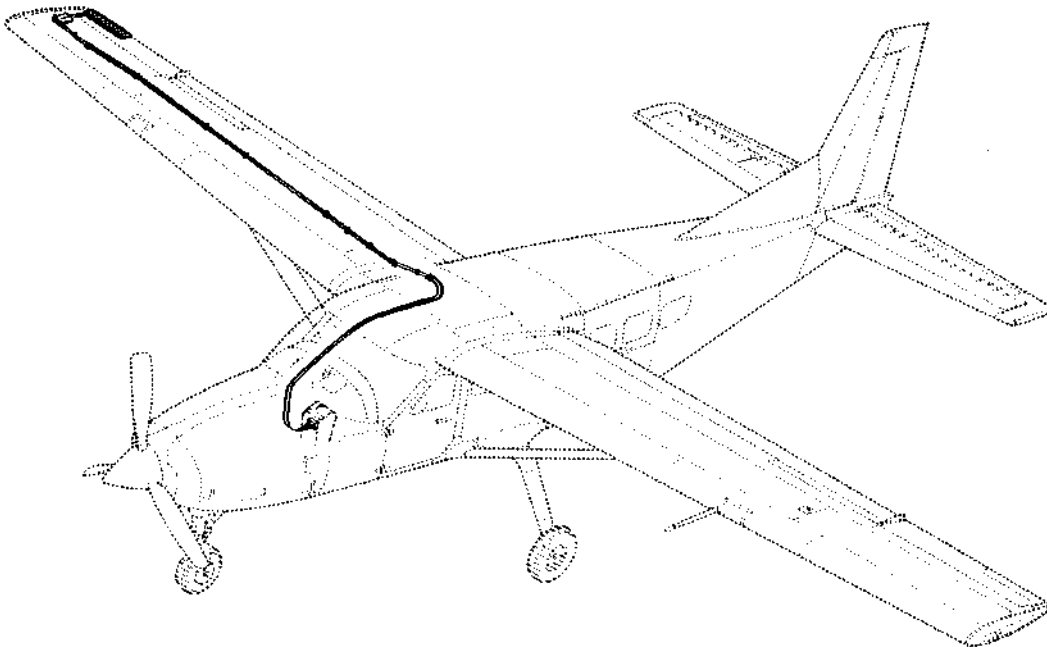
# FLIGHT CONTROL AND TRIM SYSTEMS

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## AILERON/SPOILER CONTROL SYSTEM



## AILERON TRIM CONTROL SYSTEM



268ST6025  
268ST6026

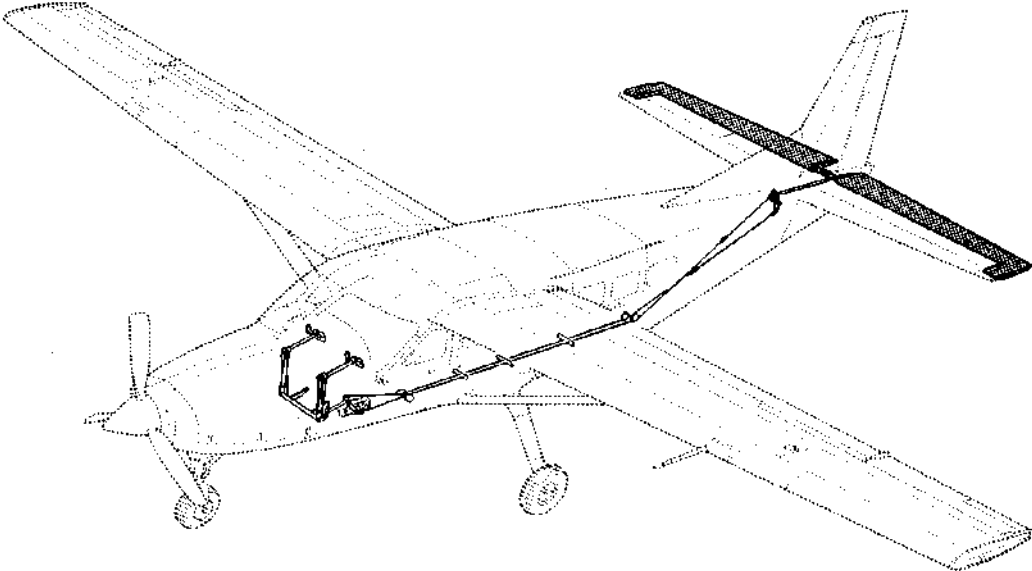
Figure 7-1 (Sheet 1 of 3)



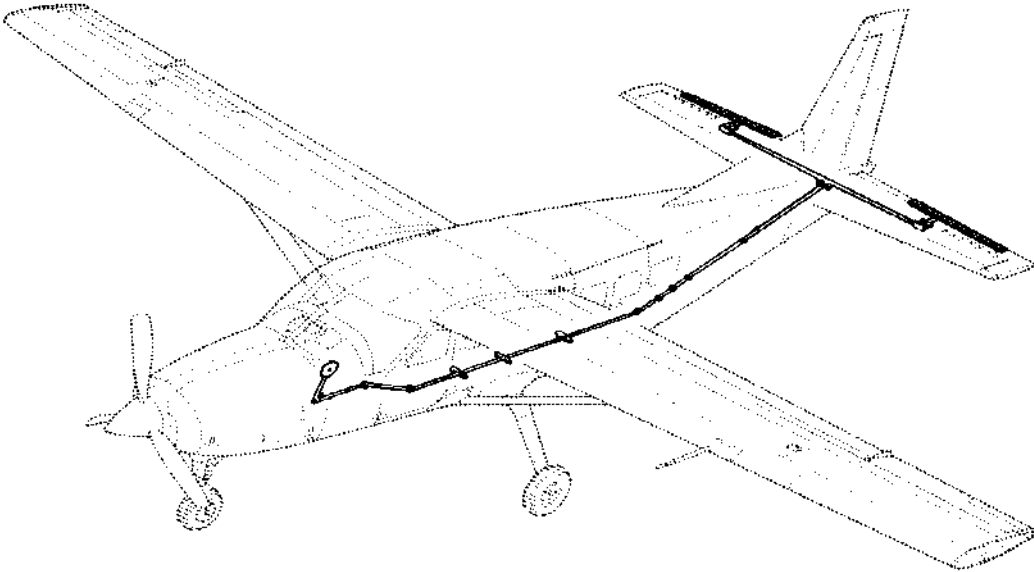
# FLIGHT CONTROL AND TRIM SYSTEMS

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## ELEVATOR CONTROL SYSTEM



## ELEVATOR TRIM CONTROL SYSTEM



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2685T6028

Figure 7-1 (Sheet 2 of 3)

## FLIGHT CONTROL AND TRIM SYSTEMS

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### RUDDER AND RUDDER TRIM CONTROL SYSTEM

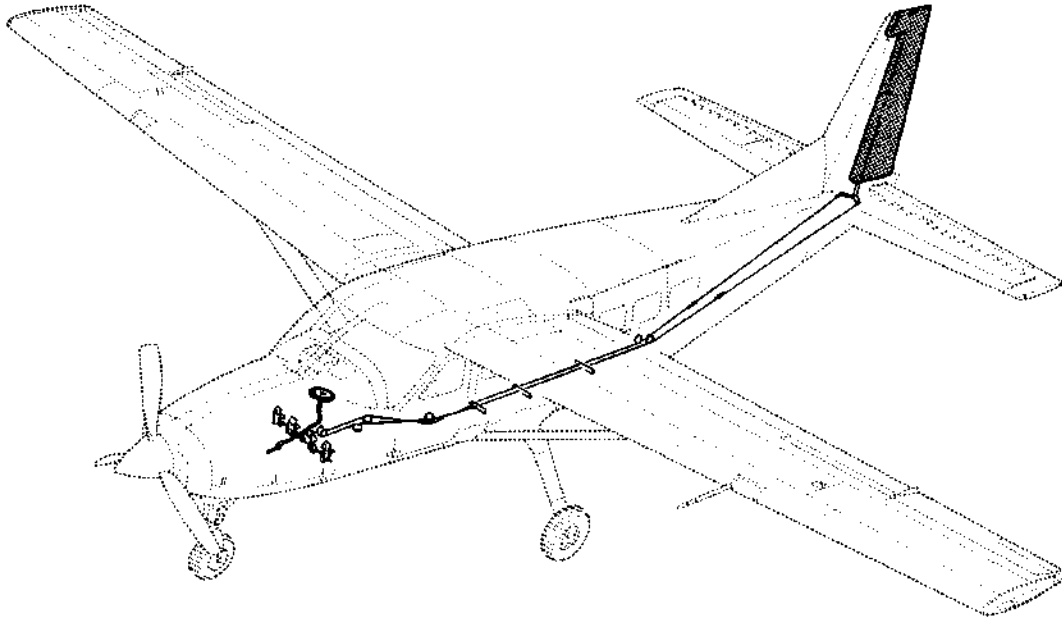


Figure 7-1 (Sheet 3 of 3)

## **INSTRUMENT PANEL**

The instrument panel is designed around the Garmin G1000 Integrated Avionics System. The instrument panel is of all metal construction and is installed in sections so equipment can be easily removed for maintenance. Equipment mounted on this panel is illustrated in the Typical Instrument Panel figure. Additional controls and displays are mounted on a pedestal extending from the center of the instrument panel to the floor, on a separate panel mounted on the left sidewall, and on an overhead panel.

## **GARMIN INTERFACES**

The interfaces to the Garmin system are three Garmin Display Units (GDUs), an audio panel, and an autopilot mode controller. The three GDUs are configured as two Primary Flight Displays (PFDs) and one Multifunction Flight Display (MFD). Refer to the Garmin G1000 CRG for specific operating information on all Garmin equipment.

The PFDs, centered above the yokes in front of the pilot and copilot, show the primary flight instruments and display any Crew Alert System (CAS) messages and alerts. During reversionary operation (MFD or PFD 1 failure) or when the DISPLAY BACKUP switch is selected, the Engine Indication System (EIS) is shown on the PFD.

The MFD, located between the two PFDs, depicts EIS information along the left side of the display and shows navigation, terrain, lightning and traffic data on the moving map. Flight management or display configuration information can be shown on the MFD in place of the moving map pages.

The Garmin audio panel is located between the pilot PFD and the MFD. It integrates all of the communication and navigation digital audio signals, intercom system and marker beacon controls. A pushbutton switch labeled DISPLAY BACKUP allows manual selection of reversionary mode for the PFDs and MFD.

The Garmin autopilot mode controller, located above the MFD, is the pilot interface with the autopilot system.

## **PANEL LAYOUT**

To the left of the pilot PFD is a switch panel which has many of the switches necessary to operate the airplane systems. At lower left are a circuit breaker panel for avionics systems, the left fresh air outlet and pull knob, test switches for prop overspeed, fire detection, and fuel selection warning systems, microphone and headset jacks and an alternate static source valve.

Below the MFD are standby indicators for airspeed, attitude, altitude, and torque. Below these indicators are the parking brake, light dimming controls, inertial separator control, and cabin heat controls. Provisions are included for optional air conditioning controls and HF and ADF displays.

At lower right are the map compartment, right fresh air outlet and pull knob, and microphone and headset jacks. At upper right are the hour meter and ELT remote switch. Mounted above the glare shield is a magnetic compass. For details concerning the instruments, switches, and controls on this panel, refer in this section to the description of the systems to which these items are related.

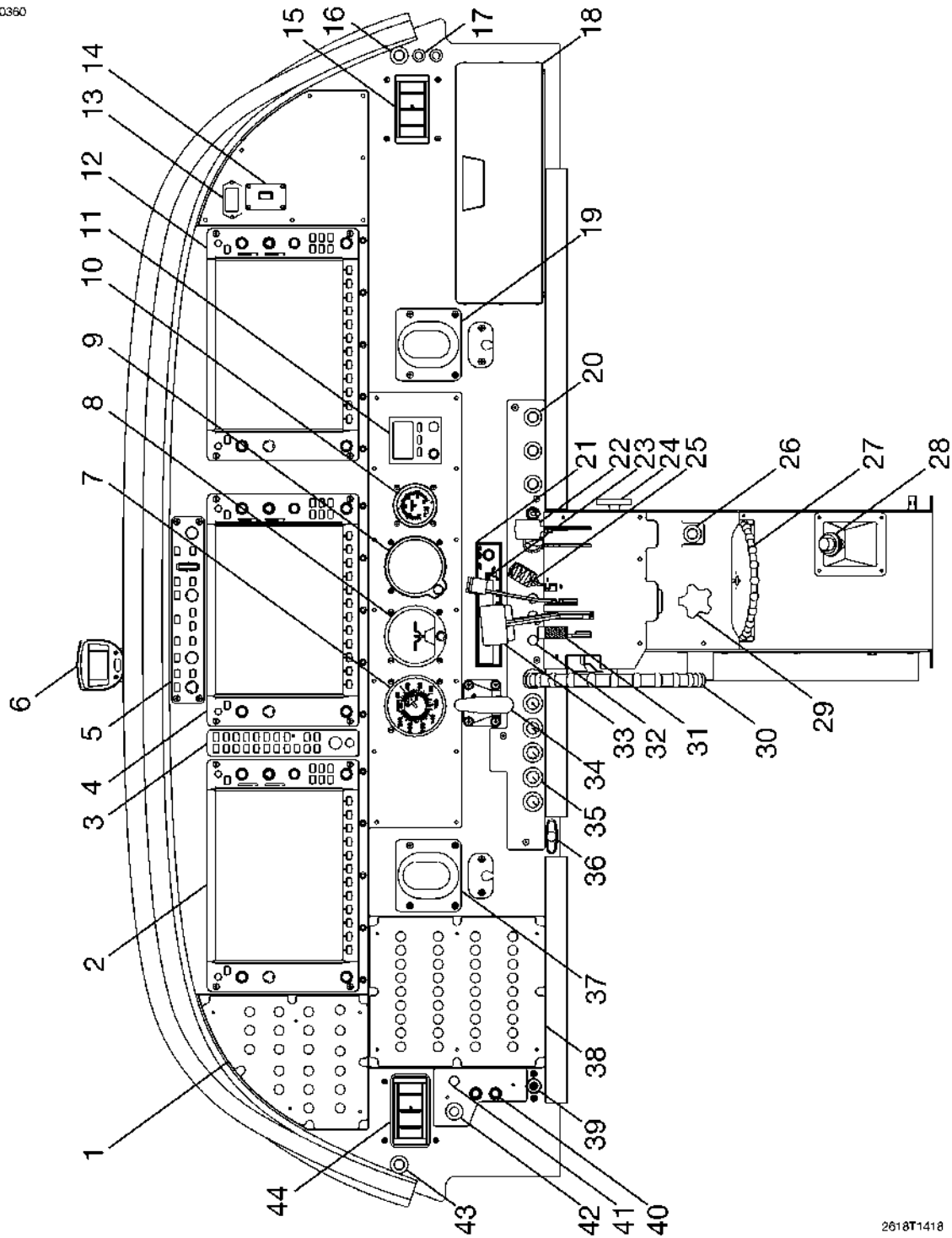
## **CONTROL PEDESTAL**

A control pedestal, extending from the center of the instrument panel to the floor, contains the EMERGENCY POWER Lever, power lever, PROP RPM Lever, FUEL CONDITION Lever, WING FLAP selector and position indicator, elevator, rudder and aileron trim controls with position indicators, the fuel shutoff valve control, cabin heat firewall shutoff valve control, a microphone, 12VDC power outlet, and an auxiliary audio input jack

Equipment mounted on this panel is illustrated in the Typical Instrument Panel figure. For details concerning the instruments, switches, and controls on the pedestal, refer in this section to the description of the systems to which these items are related.

# TYPICAL INSTRUMENT PANEL

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Figure 7-2 (Sheet 1 of 2)

## TYPICAL INSTRUMENT PANEL

- Instrument Panel
1. Switch Panel
  2. Primary Flight Display (PFD), Pilot
  3. Audio Panel
  4. Multi-Function Display (MFD)
  5. Autopilot Mode Controller
  6. Magnetic Compass
  7. Airspeed Indicator (Backup)
  8. Attitude Indicator (Backup)
  9. Altimeter (Backup)
  10. Torque Indicator (Backup)
  11. HF Radio Control Head (Optional)
  12. Primary Flight Display (PFD), Co-pilot
  13. Flight Hourmeter
  14. ELT Remote Switch
  15. Instrument Panel Ventilation Outlet
  16. Instrument Panel Ventilation Control
  17. Right Auxiliary Mic and Phone Jacks
  18. Map Compartment
  19. Co-Pilot's Control Wheel Location
  20. Cabin Heat Controls
  21. ADF Receiver (Optional)
  22. Wing Flap Selector Lever and Position Indicator
  23. Propeller Control Lever
  24. Quadrant Friction Lock
  25. Fuel Condition Lever
  26. Fuel Shutoff Control
  27. Rudder Trim Control Wheel and Position Indicator
  28. Cabin Heat Firewall Shutoff Control
  29. Aileron Trim Control Knob and Position Indicator
  30. Elevator Trim Control Wheel and Position Indicator
  31. Emergency Power Lever
  32. Air Conditioning Switches (Optional)
  33. Power Lever
  34. Inertial Separator Control
  35. Lighting Rheostats
  36. Parking Brake Handle
  37. Pilot's Control Wheel Location
  38. Avionics Circuit Breaker Panel
  39. Static Pressure Alternate Source Valve
  40. Pilot's Auxiliary Mic and Phone Jacks
  41. Fuel Shutoff Warning and Fire Detect Test Switch
  42. Overspeed Governor Test Switch
  43. Instrument Panel Ventilation Control
  44. Instrument Panel Ventilation Outlet

Figure 7-2 (Sheet 1 of 2)

## **LEFT SIDEWALL SWITCH AND CIRCUIT BREAKER PANEL**

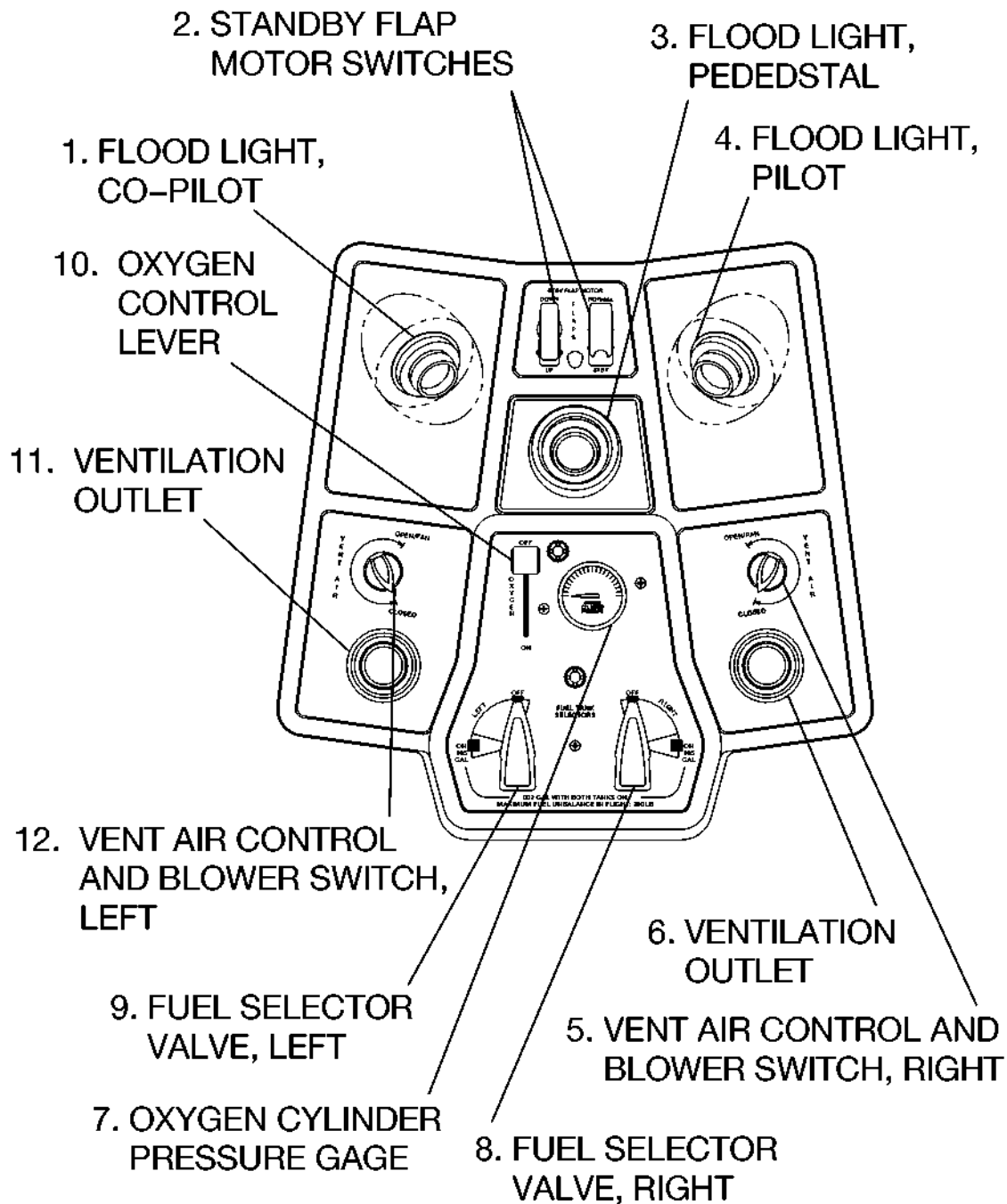
Most of the engine control switches and non-avionics circuit breakers are located on a separate panel mounted on the left cabin sidewall adjacent to the pilot. Switches and controls on this panel are illustrated in the Typical Left Sidewall Switch and Circuit Breaker Panel figure. For details concerning the instruments, switches, and controls on this panel, refer to the ELECTRICAL EQUIPMENT descriptions in this section.

## **OVERHEAD PANEL**

The overhead panel, located above and between the pilot and copilot, contains fuel selector controls, oxygen control and pressure gage, vent outlets and controls, overhead lighting, and standby flap controls. Equipment mounted on this panel is illustrated in the Overhead Panel figure. For details concerning the instruments, switches, and controls on the overhead panel, refer in this section to the description of the systems to which these items are related.

## OVERHEAD PANEL

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2614T1411

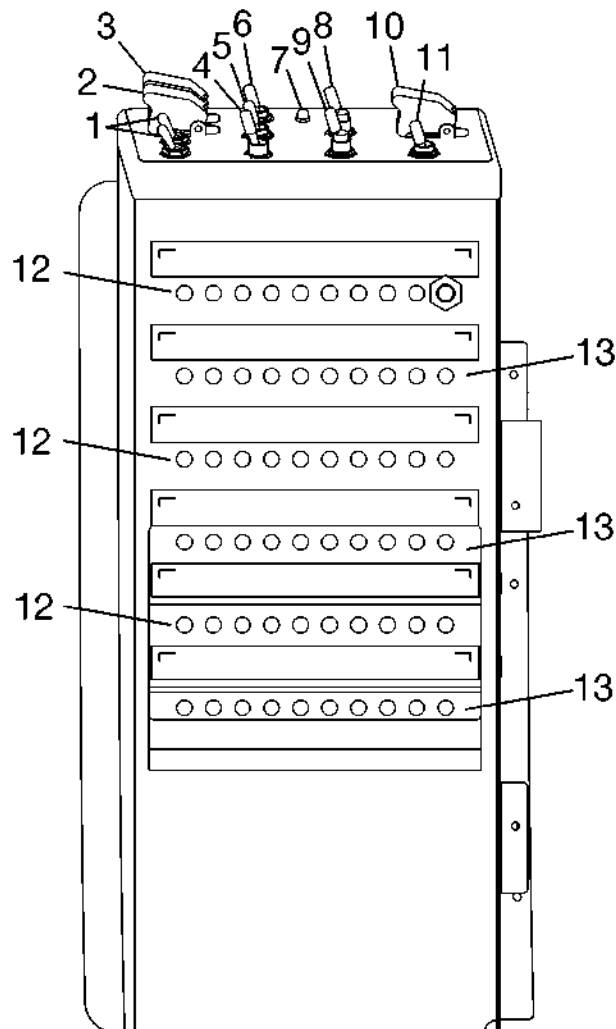
Figure 7-3



## TYPICAL LEFT SIDEWALL SWITCH AND CIRCUIT BREAKER PANEL

A70353

1. AVIONICS POWER SWITCH/BREAKERS (2)
2. AVIONICS BUS TIE SWITCH/BREAKER
3. AVIONICS STANDBY POWER SWITCH/BREAKER
4. STARTER SWITCH
5. IGNITION SWITCH
6. STANDBY POWER SWITCH
7. STANDBY POWER INDICATOR LIGHT
8. FUEL BOOST SWITCH
9. GENERATOR SWITCH
10. EXTERNAL POWER SWITCH
11. BATTERY SWITCH
12. GENERAL CIRCUIT BREAKER BUS 1
13. GENERAL CIRCUIT BREAKER BUS 2



2618T1417

Figure 7-4

## CAS MESSAGES

1. OIL PRESS LOW (RED) - Indicates engine oil pressure is less than 40 psi.
2. VOLTAGE LOW (RED) - Indicates electrical system bus voltage is less than 24.5 volts and power is being supplied from the battery.
3. VOLTAGE HIGH (RED) - Indicates electrical system bus voltage is greater than 32.0 volts.
4. ENGINE FIRE (RED) - Indicates an excessive temperature condition and/or fire has occurred in the engine compartment.
5. RSVR FUEL LOW (RED) - Indicates the fuel level in the reservoir tank is approximately one-half or less. There is adequate fuel in the fuel reservoir for approximately 3 minutes of maximum continuous power or approximately 9 minutes at idle power.
6. EMERG PWR LVR (RED) - Indicates when the Emergency Power Lever is out of the stowed (Normal) position prior to and during the engine start (ITT in the OFF and STRT modes ONLY).
7. FUEL SELECT OFF (RED) - Indicates left and right fuel selectors are both OFF at any time, or left fuel selector is OFF when right tank is low, or right fuel selector is OFF when the left tank is low; or that either left or right selectors are OFF when starter switch is ON. It can also indicate that the FUEL SEL WARN circuit breaker has been pulled.
8. GENERATOR OFF (AMBER) - Indicates that the generator is not connected to the aircraft bus.
9. DOOR UNLATCHED (AMBER) - Indicates the upper cargo door and/or upper aft passenger door (passenger version only) are not latched.
10. L FUEL LEVEL LOW (AMBER) - Indicates fuel quantity in the left fuel tank is 25 gallons (170 lbs) or less.

(Continued Next Page)

## **CAS MESSAGES** (Continued)

- 11.R FUEL LEVEL LOW (AMBER) - Indicates fuel quantity in the right fuel tank is 25 gallons (170 lbs) or less.
- 12.L-R FUEL LEVEL LOW (AMBER) Indicates fuel quantity in both the left and right fuel tanks is 25 gallons (170 lbs) or less.
- 13.FUEL BOOST ON (AMBER) - Indicates the auxiliary fuel pump is operating.
- 14.STBY PWR INOP (AMBER) - Indicates electrical power is not available from the standby alternator.
- 15.PROP DE-ICE (AMBER) - Indicates that one or more propeller blades are not heating, there is a malfunction in the monitoring system, or that the PROP ANTI-ICE circuit breaker is pulled.
- 16.FUEL PRESS LOW (AMBER) - Indicates fuel pressure in the fuel manifold assembly is below 4.75 psi.
- 17.STARTER ON (AMBER) - Indicates the starter-generator is operating in starter mode.
- 18.CHIP DETECT (AMBER) Indicates that metal chips have been detected in either or both the accessory gearbox or reduction gearbox.
- 19.L P/S HEAT (AMBER) - Indicates that either the left side pitot/static vane heater system has malfunctioned or that the LEFT PITOT HEAT circuit breaker is pulled.
- 20.R P/S HEAT (AMBER) - Indicates that either the right side pitot/static vane heater system has malfunctioned or that the RIGHT PITOT HEAT circuit breaker is pulled.
- 21.L-R P/S HEAT (AMBER) - Indicates that either both pitot/static vane heater systems (left and right) have malfunctioned or that both the LEFT and RIGHT PITOT HEAT circuit breakers are pulled.
- 22.STALL HEAT (AMBER) - Indicates that the stall warning heater system has malfunctioned or the STALL WARN circuit breaker is pulled in conditions below 19°C (66°F) or above 52°C (125°F).

(Continued Next Page)

## **CAS MESSAGES** (Continued)

- 23. GENERATOR AMPS (AMBER) - Indicates that the generator output is less than -10 amps or greater than 200 amps (-15/300 with 300 amp starter generator).
- 24. ALTNR AMPS (AMBER) - Indicates that the alternator output is less than -10 amps or greater than 75 amps.
- 25. IGNITION ON (WHITE) - Indicates electrical power is being supplied to the engine ignition system.
- 26. STBY PWR ON (WHITE) - Indicates that the standby alternator is generating electrical power.
- 27. SPD NOT AVAIL (WHITE) - Indicates that the "SPD" key was pressed on Autopilot Mode Control panel.

## **GROUND CONTROL**

Effective ground control while taxiing is accomplished through nose wheel steering by using the rudder pedals; left rudder pedal to steer left and right rudder pedal to steer right. When a rudder pedal is depressed, a spring-loaded steering bungee (which is connected to the nose gear and to the rudder bars) will turn the nose wheel through an arc of approximately 15° each side of center. By applying either left or right brake, the degree of turn may be increased up to 51.5°.

Moving the airplane by hand is most easily accomplished by attaching a tow bar (stowed in aft cargo compartment) to the nose gear fork axle holes. If a tow bar is not available, or pushing is required, use the wing struts as push points. Do not use the propeller blades or spinner to push or pull the airplane. If the airplane is to be towed by vehicle, never turn the nose wheel beyond the steering limit marks either side of center. If excess force is exerted beyond the turning limit, a red over-travel indicator block (frangible stop) will fracture and the block, attached to a cable, will fall into view alongside the nose strut. This should be checked routinely during preflight inspection to prevent operation with a damaged nose gear.

The minimum turning radius of the airplane, using differential braking and nose wheel steering during taxi, is as shown in the Minimum Turning Radius figure.

### MINIMUM TURNING RADIUS

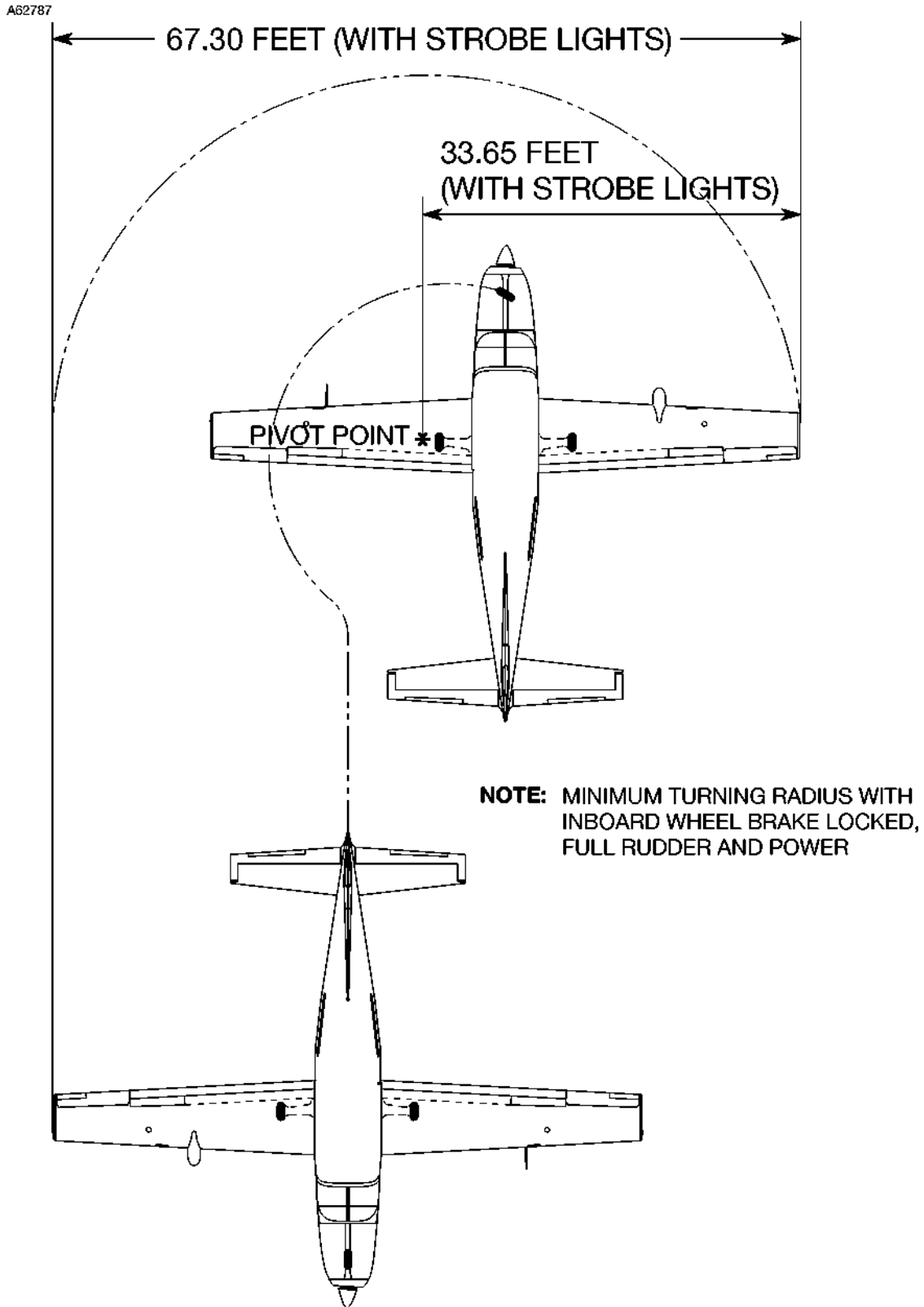


Figure 7-5

## WING FLAP SYSTEM

The wing flaps are large span, single-slot type (see Wing Flap System figure) and incorporate a trailing edge angle and leading edge vortex generators to reduce stall speed and provide enhanced lateral stability. The flaps are driven by an electric motor. They are extended or retracted by positioning the WING FLAP selector lever on the control pedestal to the desired flap deflection position. The selector lever is moved up or down in a slotted panel that provides mechanical stops at the 10° and 20° positions. For flap deflections greater than 10°, move the selector lever to the right to clear the stop and position it as desired. A scale and white-tipped pointer on the left side of the selector lever provides a flap position indication. The wing flap system is protected by a “pull-off” type circuit breaker, labeled FLAP MOTOR, on the left sidewall switch and circuit breaker panel.

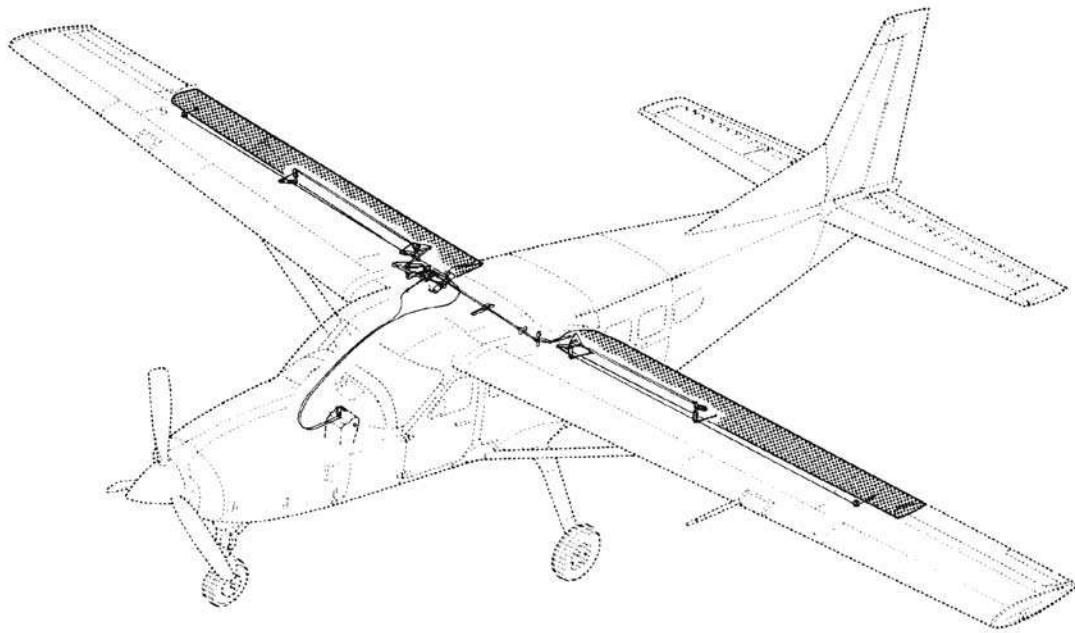
A standby system can be used to operate the flaps in the event the primary system should malfunction. The standby system consists of a standby motor, a guarded standby flap motor switch and a standby flap motor up/down switch located on the overhead panel. Both switches have guards which are safetied in the closed position, with breakable copper wire.

The guarded standby flap motor switch has NORM and STBY positions. The guarded NORM position of the switch permits operation of the flaps using the control pedestal mounted selector; the STBY position is used to disable the dynamic braking of the primary flap motor when the standby flap motor system is operated.

The standby flap motor up/down switch has UP, center OFF and DOWN positions. The switch is guarded in the center off position. To operate the flaps with the standby system, lift the guard breaking safety wire, and place the standby flap motor switch in STBY position; then, lift the guard, breaking safety wire and actuate the standby flap motor up/down switch momentarily to UP or DOWN, as desired. Observe the flap position indicator to obtain the desired flap position. Since the standby flap system does not have limit switches, actuation of the standby flap motor up/down switch should be terminated before the flaps reach full up or down travel. After actuation of the standby flap motor system, switch guards should be resafetied to the closed position by maintenance personnel when maintenance action is accomplished. The standby flap system is protected by a “pull-off” type circuit breaker, labeled STBY FLAP MOTOR, located on the left sidewall switch and circuit breaker panel.

## WING FLAP SYSTEM

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Figure 7-6

## LANDING GEAR SYSTEM

The landing gear is of the tricycle type with a steerable nose wheel and two main wheels. Shock absorption is provided by the tubular spring-steel main landing gear struts, an interconnecting spring-steel tube between the two main landing gear struts, and the nose gear oil-filled shock strut and spring-steel drag link. Each main gear wheel is equipped with a hydraulically-actuated single-disc brake on the inboard side of each wheel. To improve operation from unpaved runways, and in other conditions, the standard nose gear fork can be replaced with a three-inch extended nose gear fork.

## **BAGGAGE/CARGO COMPARTMENT**

In the passenger version, the space normally used for baggage consists of the raised area from the back of the cargo doors to the aft cabin bulkhead. Access to the baggage area is gained through the cargo doors, the aft passenger door or from within the cabin. Quick-release tie-down ring/strap assemblies are provided for securing baggage and are attached to baggage floor anchor plates provided in the airplane. When utilizing the airplane as a cargo carrier, refer to Section 6 for complete cargo loading details. When loading aft passengers in the passenger version, they should not be placed in the baggage area unless the airplane is equipped with special seating for this area. Also any material that might be hazardous to the airplane or occupants should not be placed anywhere in the airplane. For baggage/cargo area and door dimensions, refer to Section 6.

## **SEATS**

Standard seating consists of both a pilot's and copilot's six-way adjustable seat. Additional cabin seating is available in the passenger version in two different Commuter configurations and one Utility configuration. One Commuter configuration consists of three rows of two-place fixed seats and two (or three) rows of one-place fixed seats. A second Commuter configuration consists of four rows of one-place fixed seats on each side of the cabin. The Utility configuration consists of four rows of one-place, fixed-position collapsible seats on each side of the cabin.

### **WARNING**

**None of the airplane seats are approved for installation facing aft.**

## **PILOT'S AND COPILOT'S SEATS**

The six-way adjustable pilot's or copilot's seats may be moved forward or aft, adjusted for height, and the seat back angle changed. Position the seat by pulling on the small T-handle under the center of the seat bottom and slide the seat into position; then release the handle, and check that the seat is locked in place by attempting to move the seat and by noting that the small pin on the end of the T-handle sticks out.

(Continued Next Page)



## **PILOT'S AND COPILOT'S SEATS** (Continued)

The seat is not locked if the pin is retracted or only partially extends. Raise or lower the seat by rotating a large crank under the front right corner of the seat. Seat back angle is adjusted by rotating a small crank under the front left corner of the seat. The seat bottom angle will change as the seat back angle changes, providing proper support. Seats are equipped with armrests which can be moved to the side and raised to a position beside the seat back for stowage.

## **AFT PASSENGERS' SEATS (COMMUTER) (Passenger Version)**

The third, sixth and eleventh seats of one Commuter configuration and all aft seats of the second Commuter configuration are individual fixed-position seats with fixed seat backs. Seats for the fourth and fifth, seventh and eighth, and ninth and tenth positions of the first Commuter configuration are two-place, fixed-position bench type seats with fixed seat backs. All seats are fastened with quick-release fasteners in the fixed position to the seat tracks. The seats are lightweight and quick-removable to facilitate cargo hauling.

## **AFT PASSENGERS' SEATS (UTILITY) (Passenger Version)**

Individual collapsible seats are available for the aft eight passenger positions. The seats, when not in use, are folded into a compact space for stowage in the aft baggage area. When desired, the seats can be unfolded and installed in the passenger area. The seats are readily fastened with quick-release fasteners to the seat tracks in any one of the eight seat positions.

## **HEADRESTS**

Headrests are available for all pilot and passenger seat configurations, except the Utility aft passenger seats. To adjust a pilot's seat or copilot seat headrest, apply enough pressure to it to raise or lower it to the desired level. The aft passenger seat headrests are not adjustable.

# SEAT BELTS AND SHOULDER HARNESSSES

## PILOT'S AND COPILOT'S SEAT (Typical)

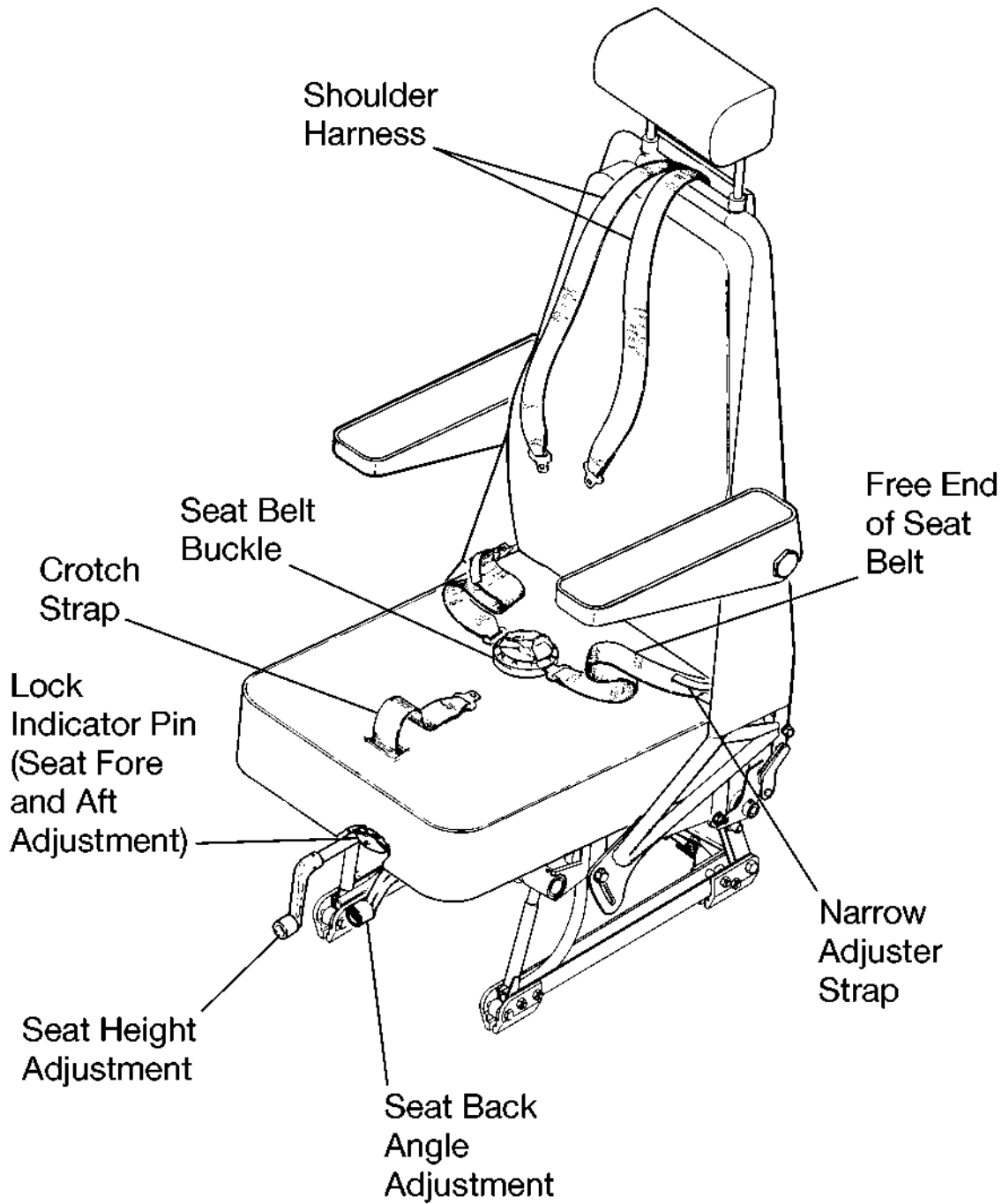


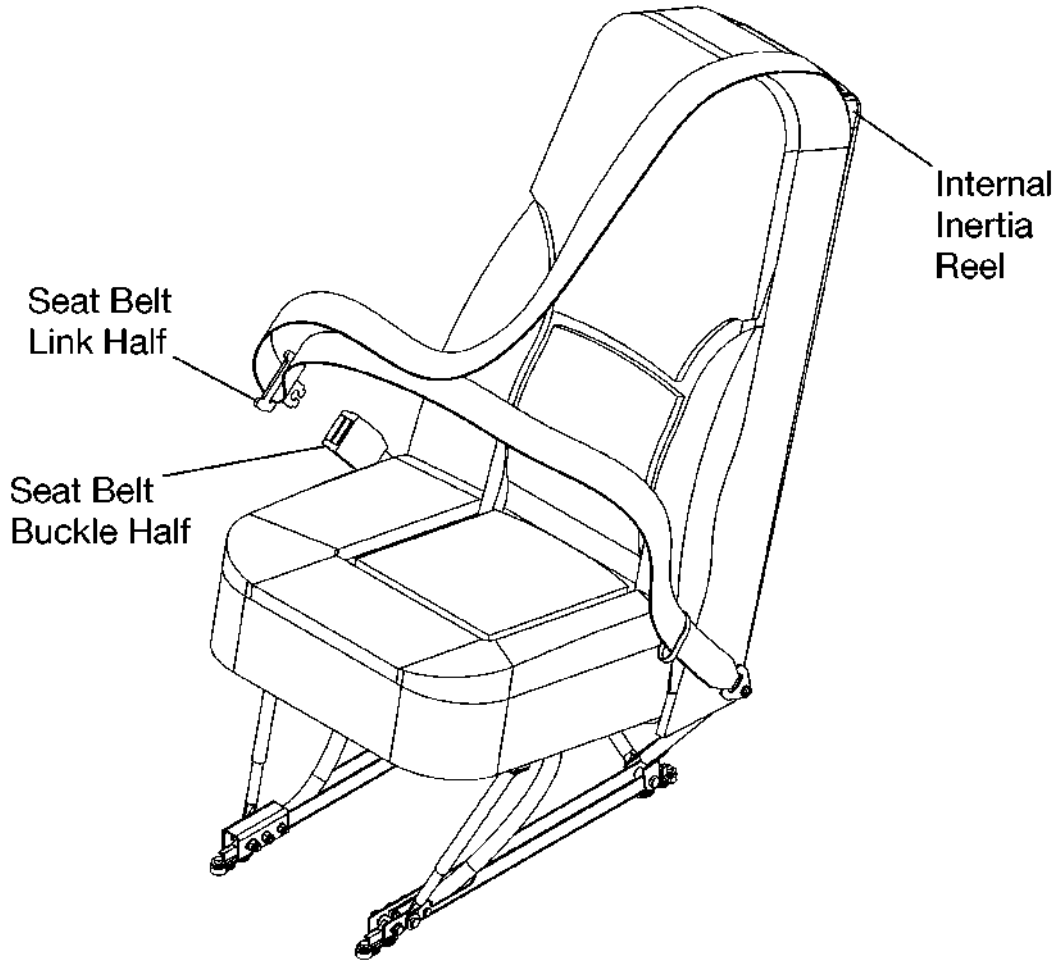
Figure 7-7 (Sheet 1 of 3)

# SEAT BELTS AND SHOULDER HARNESSSES

## AFT PASSENGERS' SEATS

(Individual Commuter Seating Shown)

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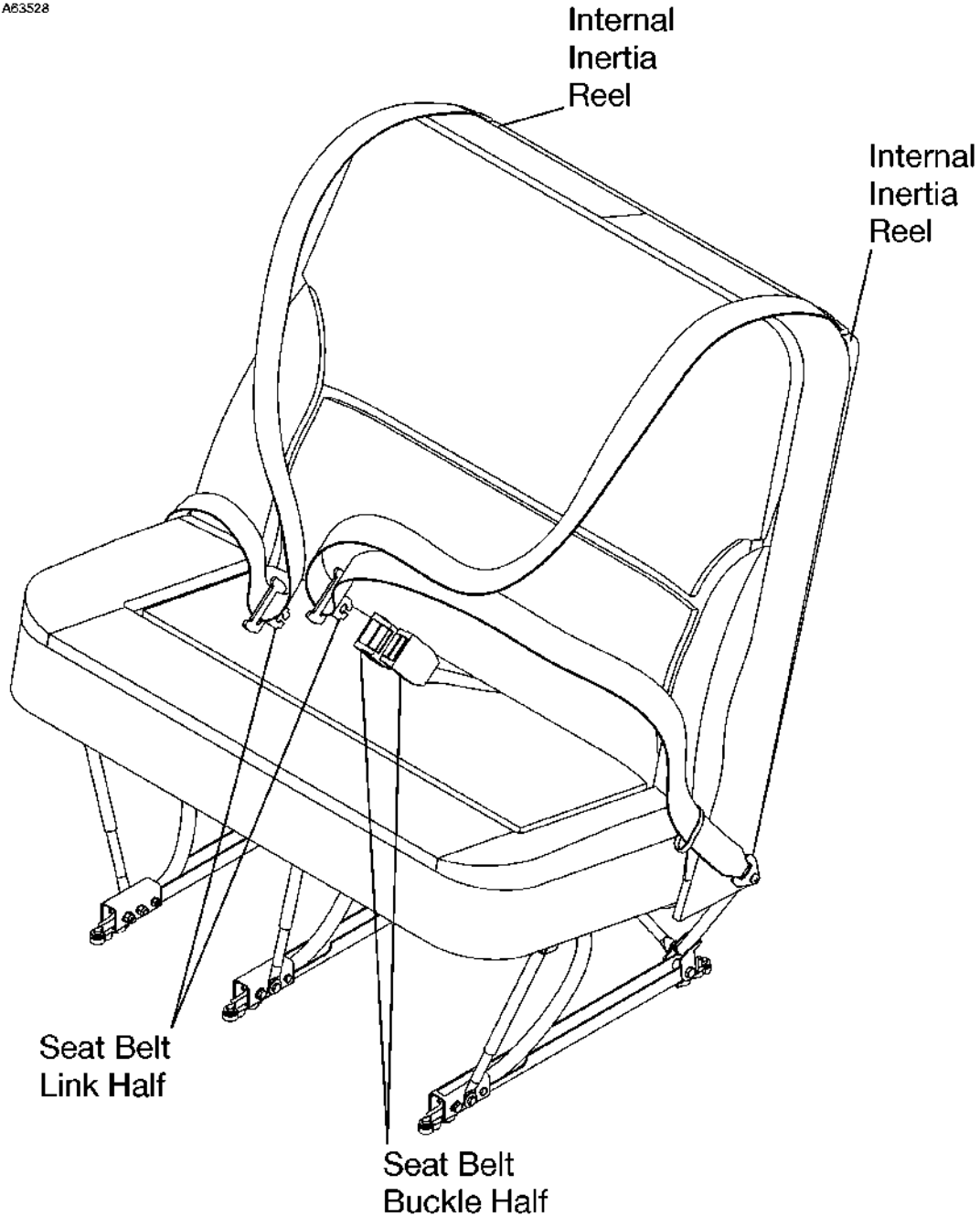
Figure 7-7 (Sheet 2 of 3)

# SEAT BELTS AND SHOULDER HARNESSSES

## AFT PASSENGERS' SEATS

(Dual Commuter Seating Shown)

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Figure 7-7 (Sheet 3 of 3)

## **SEAT BELTS AND SHOULDER HARNESSSES**

All seat positions are equipped with seat belts and shoulder harnesses. The pilot's and copilot's seat positions are equipped with shoulder harnesses with inertia reels.

### **WARNING**

**Failure to correctly use seat belts and shoulder harnesses could result in serious or fatal injury in the event of an accident.**

## **SEAT BELTS, STRAP, AND SHOULDER HARNESSSES (PILOT AND COPILOT SEATS)**

Both the pilot's and copilot's seat positions are equipped with a five-point restraint system which combines the function of conventional type seat belts, a crotch strap, and an inertial reel equipped double-strap shoulder harness in a single assembly. The seat belts and crotch strap attach to fittings on the lower seat frame and the inertia reel for the shoulder harness attaches to the frame of the seat back.

The right half of the seat belt contains the buckle, which is the connection point for the left belt half, crotch strap, and shoulder harnesses. The left belt, crotch strap, and shoulder harnesses are fitted with links which insert into the buckle. Both halves of the seat belt have adjusters with narrow straps to enable the belt halves to be lengthened prior to fastening.

(Continued Next Page)

## **SEAT BELTS, STRAP, AND SHOULDER HARNESSSES (PILOT AND COPILOT SEATS)** (Continued)

To use the restraint system, lengthen each half of the belt as necessary by pulling the buckle (or connecting link) to the lap with one hand while pulling outward on the narrow adjuster strap with the other hand. Insert the left belt link into the left slot of the buckle. Bring the crotch strap upward and insert its link into the bottom slot in the buckle. Finally, position each strap of the shoulder harness over the shoulders and insert their links into the upper slots in the buckle. the seat belts should be tightened for a snug fit by grasping the free end of each belt and pulling up and inward.

During flight operations, the inertia reel allows complete freedom of upper body movement; however, in the event of a sudden deceleration, the reel will lock automatically to protect the occupant.

### **WARNING**

**Failure to correctly use seat belts and shoulder harnesses could result in serious or fatal injury in the event of an accident.**

Release of the belts, strap, and shoulder harnesses is accomplished by simply twisting the front section of the buckle in either direction and pulling all connecting links free.

## **CABIN ENTRY DOORS**

Entry to, and exit from the airplane is accomplished through a door on each side of the cabin at the pilot's and copilot's positions and, on the Passenger Version only, through a two-piece, airstair-type door on the right side of the airplane aft of the wing (refer to Section 6 for cabin and cabin entry door dimensions). A cargo door on the left side of the airplane aft of the wing, also can be used for cabin entry.

## **CREW ENTRY DOORS**

The left door for crew entry has a conventional exterior door handle, a key-operated door lock, a conventional interior door handle, a lock override knob, and an openable window. The right door for crew entry has a conventional exterior door handle, a conventional interior door handle, and a manually-operated inside door lock. To open either entry door from outside the airplane (if unlocked), rotate the handle down and forward to the OPEN position. To close the door from inside the airplane, use the conventional door handle and door pull. The inside door handle is a three-position handle with OPEN, CLOSE and LATCHED positions. Place the handle in the CLOSE position and pull the door shut; then rotate the handle forward to the LATCHED position. When the handle is rotated to the LATCHED position, an over-center action will hold it in that position.

### **CAUTION**

Failure to correctly close and latch the left and right crew entry doors may cause the doors to open in flight.

A lock override knob on the inside of the left door for crew entry provides a means of overriding the outside door lock from inside the airplane. To operate the override, pull the knob and rotate it in the placarded direction to unlock or lock the door. Both crew doors should be latched before flight, and should not be opened intentionally during flight. To lock the doors for crew entry when leaving the airplane, lock the right door with the manually-operated inside door lock, close the left door, and, using the key, lock the door.

## **PASSENGER ENTRY DOOR (Passenger Version Only)**

The entry door for passengers consists of an upper and lower section. When opened, the upper section swings upward and the lower section drops down providing integral steps to aid in boarding or exiting the airplane. The upper door section incorporates a conventional exterior door handle with a separate key-operated lock, a pushbutton exterior door release, and an interior door handle which snaps into a locking receptacle. The lower door section features a flush handle which is accessible from either inside or outside the airplane. This handle is designed so that when the upper door is closed, the handle cannot be rotated to the OPEN position. The lower door also contains integral door support cables and a door-lowering device. A cabin door unlatched warning system is provided as a safety feature so that if the upper door is not properly latched, an Amber DOOR UNLATCHED CAS MSG located on the PFD illuminates to alert the pilot.

To enter the airplane through the passenger entry door, depress the exterior pushbutton door release, rotate the exterior door handle on the upper door section counterclockwise to the open position, and raise the door section to the overcenter position. Following this action, the automatic door lift with the telescoping gas spring raises the door to the full up position. When the upper section is open, release the lower section by pulling up on the inside door handle and rotating the handle to the OPEN position. Lower the door section until it is supported by the integral support cables. The door steps deploy automatically from their stowed positions.

### **WARNING**

**The outside proximity of the lower door section must be clear before opening the door.**

(Continued Next Page)



## **PASSENGER ENTRY DOOR (Passenger Version Only)**

(Continued)

To close the passenger entry door from the inside of the airplane, grasp the support cables of the lower door section and pull the door up until the top edge is within reach, then grasp the center of the door and pull inboard until the door is held snugly against the fuselage door frame. Rotate the inside handle forward to the CLOSE position and latch the lower door section.

Check that the lower front and rear latches are correctly engaged. After the lower door section is secured, grasp the pull strap on the upper door section and pull down and inboard. As the door nears the closed position, pull inboard firmly to make sure the latching pawls engage correctly. When the latching pawls are engaged, rotate the inside handle counterclockwise to the horizontal (latched) position, but do not use excessive force. If the handle will not rotate easily, the door is not fully closed. Use a more firm closing motion to get the latching pawls to engage and rotate the door handle again to the latched position. Then snap the interior handle into its locking receptacle.

### **CAUTION**

Refer to Section 3, Emergency Procedures, for proper operational procedures to be followed if the passenger entry door should inadvertently open in flight.

To exit the airplane through the passenger entry door, pull the upper door section inside handle from its locked position receptacle, rotating the handle clockwise to the open position as you push the door outward. When the door is partially open, the automatic door lift will raise the upper door section to the fully open position. Next, rotate the door handle of the lower section up and aft to the open position and push the door outward. The telescoping gas spring will lower the door to its fully open position and the integral steps will deploy.

### **WARNING**

**The outside proximity of the lower door section must be clear before opening the door.**

(Continued Next Page)

## **PASSENGER ENTRY DOOR (Passenger Version Only)**

(Continued)

To close the passenger entry door from outside the airplane, raise the lower door section until the door is held firmly against the door frame in the fuselage. Rotate the inside handle of the lower door section forward and down to the CLOSE position. After the lower door section is secured, grasp the pull strap on the upper door section and pull down. As the door nears the closed position, grasp the edge of the door and push inward firmly to make sure the latching pawls engage correctly. When engaged, rotate the outside door handle clockwise to the horizontal (latched) position. After entering the airplane, snap the interior handle of the upper door into its locking receptacle (unless cargo obstructs access to the door). If desired when leaving the airplane parked, use the key in the outside key lock to lock the handle in the horizontal position.

### **WARNING**

**Do not use the outside key lock to lock the door prior to flight. The door could not be opened from the inside if it were needed as an emergency exit.**

### **CAUTION**

Failure to properly latch the upper passenger door section will result in illumination of the Amber DOOR WARNING CAS MSG. Inattention to this safety feature may allow the upper cargo door to open in flight.

The exterior pushbutton-type lock release located on the upper door section just forward of the exterior door handle operates in conjunction with the interior door handle. It is used whenever it is desired to open the door from outside the airplane while the interior door handle is in the locked position. Depress the pushbutton to release the lock of the interior door handle and to allow the exterior door handle to function normally to open the door.

## CARGO DOORS

A two-piece cargo door is installed on the left side of the airplane just aft of the wing trailing edge. The cargo door is divided into an upper and a lower section. When opened, the upper section swings upward and the lower section swings forward to create a large opening in the side of the fuselage which facilitates the loading of bulky cargo into the cabin. The upper section of the cargo door incorporates a conventional exterior door handle with a separate key-operated lock, and, on the Passenger Version only, a pushbutton exterior emergency door release and an interior door handle which snaps into a locking receptacle. The upper door also incorporates two telescoping door lifts which raise the door to the fully open position, when opened. A cargo door open warning system is provided as a safety feature so that if the upper door is not properly latched an Amber CAS MSG, labeled DOOR UNLATCHED, located on the PFD, illuminates to alert the pilot. The lower door section features a flush handle which is accessible from either inside or outside the airplane. The handle is designed so that when the upper door is closed, the handle cannot be rotated to the open position.

### WARNING

**In an emergency, do not attempt to exit the cargo version through the cargo doors. Because the inside of the upper door has no handle, exit from the airplane through these doors without outside assistance is not possible.**

### CAUTION

Failure to properly latch the upper cargo door section will result in illumination of the Amber DOOR WARNING CAS MSG. Inattention to this safety feature may allow the upper cargo door to open in flight.

To open the cargo door from outside the airplane, depress the upper door section exterior pushbutton door release (Passenger Version only) and rotate the exterior door handle clockwise to the open position. Following this action, the telescoping door lifts will automatically raise the door to the full up position. When the upper section is open, release the lower section by pulling up on the inside door handle and rotating the handle to the OPEN position. Open the door forward until it swings around next to the fuselage where it can be secured to the fuselage by a holding strap or chain.

(Continued Next Page)

## **CARGO DOORS** (Continued)

To close the cargo door from outside the airplane, disconnect the holding strap or chain from the fuselage, swing the door aft to the closed position, and hold the door firmly against the fuselage door frame to assure engagement of the latching pawls. Rotate the inside handle forward and down to the CLOSE position to latch the lower door section. After the lower door section is secured, grasp the pull strap on the upper door section and pull down. As the door nears the closed position, grasp the edge of the door and push inward firmly to assure engagement of the latching pawls. When engaged, the exterior door handle can be rotated counterclockwise to the horizontal (latched) position. On the Passenger Version only, after entering the airplane, snap the upper door interior handle into its locking receptacle (unless cargo obstructs access to the door). If desired when leaving the airplane parked, use the key in the outside key lock to lock the handle in the horizontal position.

To open the cargo door from inside the airplane (Passenger Version only), pull the inside door handle of the upper door section from its locked position receptacle. Rotate the handle counterclockwise to the vertical position, and push the door outward. When the door is partially open, the automatic door lifts will raise the upper door section to the fully open position. Next, rotate the door handle of the lower section door up and aft to the open position and push the aft end of the door outward. The door may be completely opened and secured to the fuselage with the holding strap or chain from outside.

### **WARNING**

**Do not attempt to exit the cargo version through the cargo doors. Because the inside of the upper door has no handle, exit from the airplane through these doors is not possible without outside assistance.**

To close the cargo door from inside the airplane (Passenger Version only), disconnect the holding strap or chain from the fuselage and secure it to the door. Pull the door aft to the closed position and hold the aft edge of the door firmly against the fuselage door frame to assure engagement of the latching pawls. Rotate the inside handle forward and down to the CLOSE position to latch the lower door section (refer to Section 2, Placards). After the lower door section is secured, grasp the pull strap on the upper door section and pull down. As the door nears the closed position, grasp the edge of the door and pull inward firmly to assure engagement of the latching pawls. When engaged, the interior door handle can be rotated clockwise to the horizontal position. Snap the handle into its locking receptacle.

## **CABIN WINDOWS**

The airplane is equipped with a two-piece windshield reinforced with a metal center strip. The passenger version has sixteen cabin side windows of the fixed type including one each in the two crew entry doors, two windows in the cargo door upper section, and one window in the upper section of the passenger entry door. The pilot's side window incorporates a small triangular foul weather window. The foul weather window may be opened for ground ventilation and additional viewing by twisting the latch. The cargo version has only two cabin side windows, one in each crew entry door.

## **CONTROL LOCKS**

A control lock is provided to lock the aileron and elevator control surfaces to prevent damage to these systems by wind buffeting while the airplane is parked. The lock consists of a shaped steel rod and flag. The flag identifies it as a control lock and cautions about its removal before starting the engine. To install the control lock, align the hole in the right side of the pilot's control wheel shaft with the hole in the right side of the shaft collar on the instrument panel and insert the rod into the aligned holes. Installation of the lock will secure the ailerons in a neutral position and the elevators in a slightly trailing edge down position. Proper installation of the lock will place the flag over the left sidewall switch panel.

The Ruder Gust Lock is a positive locking device consisting of a bracket assembly and a bolt action lock attached to the rear bulkhead inside the tailcone stinger below the rudder. When engaged, the rudder is locked in the neutral position. A placard located below the lock handle shaft on the left side of the tailcone explains the operation of the rudder gust lock. The rudder gust lock is manually engaged and disengaged on the ground by turning the airfoil-shaped handle mounted on the shaft projecting from the left side of the tailcone. The lock is engaged by turning the handle downward so that its trailing edge points nearly due aft.

(Continued Next Page)

## **CONTROL LOCKS** (Continued)

The Rudder Gust Lock has a fail-safe connection to the elevator control system to ensure that it will always be disengaged before the airplane becomes airborne. This fail-safe connection automatically disengages the lock when the elevator is deflected upward about one-fourth of its travel from neutral. The pilot is responsible for disengaging the Rudder Gust Lock during the preflight inspection and operating the fail-safe disengagement mechanism by momentarily deflecting the elevator to the full up position after the control lock is removed and before starting the engine. If these procedures are not followed the rudder and rudder pedals will be locked in the neutral position making ground steering impossible. In the event that the engagement of the Rudder Gust Lock goes completely unnoticed and the pilot commences a takeoff run with the rudder system locked, the upward elevator deflection during rotation will disengage the Rudder Gust Lock.

Because of the fail-safe system, the elevator lock should always be engaged prior to engaging the Rudder Gust Lock when securing the airplane after shutdown.

### **NOTE**

The control lock and any other type of locking device should be removed or unlocked prior to starting the engine.

## **ENGINE**

The Pratt & Whitney Canada Inc. PT6A-114A powerplant is a free turbine engine. It utilizes two independent turbines; one driving a compressor in the gas generator section, and the second driving a reduction gearing for the propeller.

Inlet air enters the engine through an annular plenum chamber formed by the compressor inlet case where it is directed to the compressor. The compressor consists of three axial stages combined with a single centrifugal stage, assembled as an integral unit.

A row of stator vanes located between each stage of compressor rotor blades diffuses the air, raises its static pressure and directs it to the next stage of compressor rotor blades. The compressed air passes through diffuser ducts which turn it 90° in direction. It is then routed through straightening vanes into the combustion chamber.

(Continued Next Page)

## **ENGINE** (Continued)

The combustion chamber liner located in the gas generator case consists of an annular reverse-flow weldment provided with varying sized perforations which allow entry of compressed air. The flow of air changes direction to enter the combustion chamber liner where it reverses direction and mixes with fuel. The location of the combustion chamber liner eliminates the need for a long shaft between the compressor and the compressor turbine, thus reducing the overall length and weight of the engine.

Fuel is injected into the combustion chamber liner by 14 simplex nozzles supplied by a dual manifold. The mixture is initially ignited by two spark igniters which protrude into the combustion chamber liner. The resultant gases expand from the combustion chamber liner, reverse direction and pass through the compressor turbine guide vane to the compressor turbine. The turbine guide vanes ensure that the expanding gases impinge on the turbine blades at the proper angle, with a minimum loss of energy. The still expanding gases pass forward through a second set of stationary guide vanes to drive the power turbine.

The compressor and power turbines are located in the approximate center of the engine with their shafts extending in opposite directions. The exhaust gas from the power turbine is directed through an exhaust plenum to the atmosphere via a single exhaust port on the right side of the engine.

The engine is flat rated at 675 shaft horsepower (1865 foot-pounds torque at 1900 RPM varying linearly to 1970 foot-pounds torque at 1800 RPM). The speed of the gas generator (compressor) turbine ( $N_g$ ) is 37,500 RPM at 100%  $N_g$ . Maximum permissible speed of the gas generator is 38,100 RPM which equals 101.6%  $N_g$ . The power turbine speed is 33,000 RPM at a propeller shaft speed of 1900 RPM.

All engine-driven accessories, with the exception of the propeller tachometer-generator and the propeller governors, are mounted on the accessory gearbox located at the rear of the engine. These are driven by the compressor turbine with a coupling shaft which extends the drive through a conical tube in the oil tank center section.

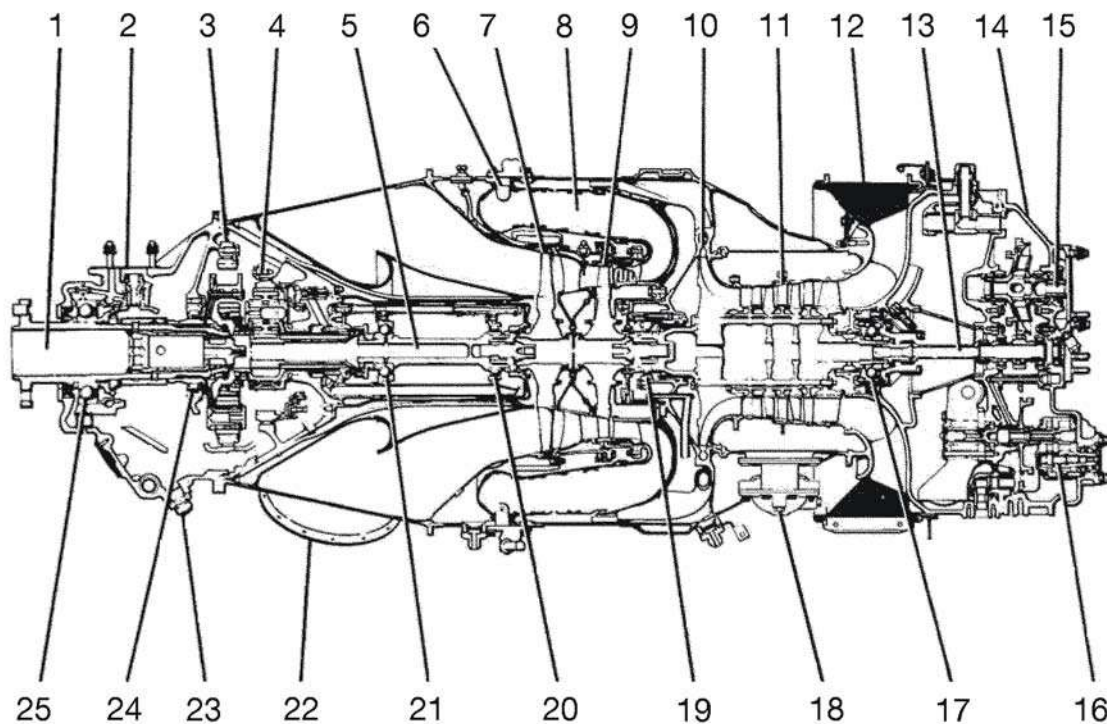
The engine oil supply is contained in an integral tank which forms part of the compressor inlet case. The tank has a drain and fill capacity of 9.5 U.S. quarts and is provided with a dipstick and drain plug.

The power turbine drives the propeller through a two-stage planetary reduction gearbox located on the front of the engine. The gearbox embodies an integral torquemeter device which is instrumented to provide an accurate indication of the engine power output.

(Continued Next Page)

## TYPICAL ENGINE COMPONENTS

A39403



- |   |                                   |
|---|-----------------------------------|
| 1. Propeller Shaft                      | 13. Accessory Gearbox Drive Shaft |
| 2. Propeller Governor Drive Pad         | 14. Accessory Gearbox Cover       |
| 3. Second Stage Planetary Gear          | 15. Starter-Generator Drive Shaft |
| 4. First Stage Planetary Gear           | 16. Oil Scavenge Pump             |
| 5. Power Turbine Shaft                  | 17. Number 1 Bearing              |
| 6. Fuel Nozzle                          | 18. Compressor Bleed Valve        |
| 7. Power Turbine                        | 19. Number 2 Bearing              |
| 8. Combustion Chamber                   | 20. Number 3 Bearing              |
| 9. Compressor Turbine                   | 21. Number 4 Bearing              |
| 10. Centrifugal Compressor Impeller     | 22. Exhaust Outlet                |
| 11. Axial-Flow Compressor Impellers (3) | 23. Chip Detector                 |
| 12. Compressor Air Inlet                | 24. Roller Bearing                |
|   | 25. Thrust Bearing                |

Figure 7-8



## **ENGINE CONTROLS**

The engine is operated by four separate controls consisting of a power lever, EMERGENCY POWER Lever, PROP RPM Lever, and a FUEL CONDITION Lever. The power and FUEL CONDITION Levers are engine controls while the PROP RPM Lever controls propeller speed and feathering.

### **POWER LEVER**

The power lever is connected through linkage to a cam assembly mounted in front of the fuel control unit at the rear of the engine. The power lever controls engine power through the full range from maximum takeoff power back through idle to full reverse. The lever also selects propeller pitch when in the BETA range. The power lever has MAX, IDLE, and BETA and REVERSE range positions. The range from MAX position through IDLE enables the pilot to select the desired power output from the engine. The BETA range enables the pilot to control propeller blade pitch from idle thrust back through a zero or no-thrust condition to maximum reverse thrust.

### **CAUTION**

The propeller reversing linkage can be damaged if the power lever is moved aft of the idle position when the propeller is feathered.

## **EMERGENCY POWER LEVER**

The EMERGENCY POWER Lever is connected through linkage to the manual override lever on the fuel control unit and governs fuel supply to the engine should a pneumatic malfunction occur in the fuel control unit. When the engine is operating, a failure of any pneumatic signal input to the fuel control unit will result in the fuel flow decreasing to minimum idle (about 48%  $N_g$  at sea level and increasing with altitude). The EMERGENCY POWER Lever allows the pilot to restore power in the event of such a failure. The EMERGENCY POWER Lever has NORMAL, IDLE, and MAX positions. The NORMAL position is used for all normal engine operation when the fuel control unit is operating normally and engine power is selected by the power lever. The range from IDLE position to MAX governs engine power and is used when a pneumatic malfunction has occurred in the fuel control unit and the power lever is ineffective. A mechanical stop in the lever slot requires that the EMERGENCY POWER Lever be moved to the left to clear the stop before it can be moved from the NORMAL (full aft) position to the IDLE position.

### **NOTE**

The knob on the EMERGENCY POWER Lever has crosshatching. The crosshatching is visible when the lever is in MAX position. Also, the EMERGENCY POWER Lever is annunciated by a Red CAS message on the PFD whenever it is unstowed from the NORMAL position with the ITT indications in either of the OFF or STRT modes. These precautions are intended to preclude starting of the engine with the EMERGENCY POWER Lever inadvertently placed in any position other than NORMAL.

### **CAUTION**

- The EMERGENCY POWER Lever and its associated manual override system are considered to be an emergency system and should be used only in the event of a fuel control unit malfunction. When attempting a normal start, the pilot must ensure that the EMERGENCY POWER Lever is in the NORMAL (full aft) position; otherwise, an over-temperature condition may result.
- When using the fuel control manual override system, engine response may be more rapid than when using the power lever. Additional care is required during engine acceleration to avoid exceeding engine limitations.

(Continued Next Page)

## **EMERGENCY POWER LEVER** (Continued)

Operation of the EMERGENCY POWER Lever is prohibited with the primary power lever out of the IDLE position. The EMERGENCY POWER Lever overrides normal fuel control functions and results in the direct operation of the fuel metering valve. The EMERGENCY POWER Lever will override the automatic fuel governing and engine acceleration scheduling controlled during normal operation by the primary power lever.

### **CAUTION**

Inappropriate use of the EMERGENCY POWER Lever may adversely affect engine operation and durability. Use of the EMERGENCY POWER Lever during normal operation of the power lever may result in engine surges, or exceeding the ITT,  $N_G$ , and torque limits.

## **PROPELLER CONTROL LEVER**

The PROP RPM Lever is connected through linkage to the propeller governor mounted on top of the front section of the engine, and controls propeller governor settings from the maximum RPM position to full feather. The PROP RPM Lever has MAX, MIN, and FEATHER positions. The MAX position is used when high RPM is desired and governs the propeller speed at 1900 RPM. PROP RPM Lever settings from the MAX position to MIN permit the pilot to select the desired engine RPM for cruise. The FEATHER position is used during normal engine shutdown to stop rotation of the power turbine and front section of the engine. Since lubrication is not available after the gas generator section of the engine has shut down, rotation of the forward section of the engine is not desirable. Also, feathering the propeller when the engine is shut down minimizes propeller windmilling during windy conditions. A mechanical stop in the lever slot requires that the PROP RPM Lever be moved to the left to clear the stop before it can be moved into or out of the FEATHER position.

## **FUEL CONDITION LEVER**

The FUEL CONDITION Lever is connected through linkage to a combined lever and stop mechanism on the fuel control unit. The lever and stop also function as an idle stop for the fuel control unit rod. The FUEL CONDITION Lever controls the minimum RPM of the gas generator turbine ( $N_g$ ) when the power lever is in the IDLE position. The FUEL CONDITION Lever has CUTOFF, LOW IDLE, and HIGH IDLE positions. The CUTOFF position shuts off all fuel to the engine fuel nozzles. LOW IDLE positions the control rod stop to provide an RPM of 52%  $N_g$ . HIGH IDLE positions the control rod stop to provide an RPM of 65%  $N_g$ .

## **QUADRANT FRICTION LOCK**

A quadrant friction lock, located on the right side of the pedestal, is provided to minimize creeping of the engine controls once they have been set. The lock is a knurled knob which increases friction on the engine controls when rotated clockwise.

## **ENGINE INSTRUMENT SYSTEM (EIS)**

The G1000 Engine Indication System provides graphical indicators and numeric values for engine, fuel, and electrical system parameters to the pilot. The EIS is shown in a vertical strip on the left side of the PFD during engine starts and on the MFD during normal operation. If either the MFD or PFD fails during flight, the EIS is shown on the remaining display.

The EIS consists of two pages that are selected using the ENGINE softkey. The ENGINE page provides indicators for Engine Torque, Engine ITT, Gas Generator RPM%, Propeller RPM, Oil Pressure, Oil Temperature, Fuel Quantity, Fuel Flow, Battery Amps, Bus Voltage, and either Anti-Ice Fluid Remaining or Propeller Amps. When the ENGINE softkey is pressed, the SYSTEM softkey will appear adjacent to the ENGINE softkey. The SYSTEM page provides numerical values for parameters on the ENGINE page that are shown as indicators only. Torque, ITT,  $N_g\%$  and  $N_p$  RPM are displayed identically on the SYSTEM page. The SYSTEM page also provides numerical indication for fuel quantity, fuel totalizer (pounds remaining and pounds used), generator amps, standby alternator amps, battery amps, bus voltage, anti-ice remaining (gallons of fluid and hours remaining), and propeller amps.

The engine and airframe unit provides data to the EIS, which displays the data for the ENGINE page described below. Engine operation is monitored by: torque, ITT,  $N_g\%$ , propeller RPM, oil pressure, oil temperature, and fuel flow.

## TORQUE INDICATIONS

Torque (TRQ) indication is displayed at the top of both the ENGINE and SYSTEM pages. The indicator is a round gage with a white pointer. The transmitter senses the difference between the engine torque pressure and the pressure in the engine case and transmits this data to the G1000. Normal operating range is indicated by a green arc that extends from 0 to redline. Redline varies from 1865 to 1970 ft-lbs depending on prop RPM.

For normal cruise flight when prop RPM is between 1600-1900, a blue torque “bug” is included on the arc. This indicates maximum allowed cruise torque per the cruise performance and maximum torque charts in section 5, Performance. The blue advisory cruise torque bug located on the EIS torque indication is not to be used as the primary means of setting cruise torque. Always refer to the appropriate performance chart in Section 5 of the POH/AFM.

## PROPELLER RPM INDICATIONS

The propeller RPM (PROP RPM) is indicated numerically below Gas Generator RPM. The digits are white with RPM between 0-1599 RPM, green between 1600-1900 RPM, and white with a red background when RPM is greater than or equal to 1910. The instrument is electrically operated from the propeller tachometer-generator which is mounted on the right side of the front case.

## ITT INDICATION

Interstage Turbine Temperature (ITT) is indicated below torque and is round dial gage with a white pointer. This instrument displays gas temperature between the compressor and power turbines. With the engine off or during start ITT indicator displays a green band from 100°C to 740°C, an Amber caution band from 766°C-805°C and a redline at 1090°C. The gage is graduated at 100 degree intervals from 600°C to 1100°C.

With the engine running a green arc indicates normal operating range from 100°C to 740°C, an Amber caution region from 765°C-805°C with a redline at 805°C. The gage is graduated at 50 degree intervals from 600°C-900°C. The digital readout flashes red when an over-temperature situation has occurred.

## GAS GENERATOR RPM INDICATIONS

Gas generator RPM ( $N_g$ ) is displayed below ITT using a round dial gage with a white pointer. RPM is displayed as a percentage of maximum gas generator RPM. The instrument is electrically operated from the gas generator tachometer-generator mounted on the lower right portion of the accessory case. The gage has tick marks at 0, 12, 50, and 105% with a redline at 101.6%.

## **FUEL FLOW INDICATIONS**

Details of the fuel flow indicator are included under Fuel System in a later paragraph in this section.

## **OIL PRESSURE INDICATION**

Oil Pressure (OIL PSI) is displayed using a varied color tape and 3 digit display on the ENGINE page. Oil pressure is indicated using a transducer that senses oil pressure from the accessory case and transmits the information to the G1000. Normal operation is indicated from 85 to 105 psi; caution region is indicated by an amber bar from 40 psi to less than 85 psi. Warning region is indicated by red lines and red flashing digits at less than 40 psi and greater than 105 psi

## **OIL TEMPERATURE INDICATION**

Oil temperature (OIL °C) is displayed using a varied color tape and digital display; the display can be 3 digits on the ENGINE page. The instrument is operated by an electrical-resistance type temperature sensor. Normal operation is indicated between 10 and 99°C; AMBER caution regions are indicated from -40 to less than 10°C and from 100 to 104°C. Red lines are included at -41 and 105°C. Digits vary in color between green, amber or red in correlation with the pointer and tape.

## **NEW ENGINE BREAK-IN AND OPERATION**

There are no specific break-in procedures required for the Pratt & Whitney Canada Inc. PT6A-114A turboprop engine. The engine may be safely operated throughout the normal ranges authorized by the manufacturer at the time of delivery of your airplane.

## **ENGINE LUBRICATION SYSTEM**

The lubrication system consists of a pressure system, a scavenge system and a breather system. The main components of the lubrication system include an integral oil tank at the back of the engine, an oil pressure pump at the bottom of the oil tank, an external double-element scavenge pump located on the back of the accessory case, an internal double-element scavenge pump located inside the accessory gearbox, an oil-to-fuel heater located on the top rear of the accessory case, an oil filter located internally on the right side of the oil tank, and an oil cooler located on the right side of the nose cowl.

Oil is drawn from the bottom of the oil tank through a filter screen where it passes through a pressure relief valve for regulation of oil pressure. The pressure oil is then delivered from the main oil pump to the oil filter where extraneous matter is removed from the oil and precluded from further circulation. Pressure oil is then routed through passageways to the engine bearings, reduction gears, accessory drives, torquemeter, and propeller governor. Also, pressure oil is routed to the oil-to-fuel heater where it then returns to the oil tank

After cooling and lubricating the engine moving parts, oil is scavenged as follows:

1. Oil from the number 1 bearing compartment is returned by gravity into the accessory gearbox.
2. Oil from the number 2 bearing is scavenged by the front element of the internal scavenge pump back into the accessory gearbox.
3. Oil from the number 3 and number 4 bearings is scavenged by the front element of the external scavenge pump into the accessory gearbox.
4. Oil from the propeller governor, front thrust bearing, reduction gear accessory drives, and torquemeter is scavenged by the rear element of the external scavenge pump where it is routed through a thermostatically-controlled oil cooler and then returned to the oil tank.
5. The rear element of the internal scavenge pump scavenges oil from the accessory case and routes it through the oil cooler where it then returns to the oil tank.

(Continued Next Page)

## **ENGINE LUBRICATION SYSTEM** (Continued)

Breather air from the engine bearing compartments and from the accessory and reduction gearboxes is vented overboard through a centrifugal breather installed in the accessory gearbox. The bearing compartments are connected to the accessory gearbox by cored passages and existing scavenge oil return lines. A bypass valve, immediately upstream of the front element of the internal scavenge pump, vents the accessory gearbox when the engine is operating at high power.

An oil dipstick/filler cap is located at the rear of the engine on the left side and is accessible when the left side of the upper cowling is raised. Markings which indicate U.S. quarts low if the oil is hot are provided on the dipstick to facilitate oil servicing. The oil tank capacity is 9.5 U.S. quarts and total system capacity is 14 U.S. quarts. For engine oil type and brand, refer to Section 8.

## **IGNITION SYSTEM**

The ignition system consists of two igniters, an ignition exciter, two high-tension leads, an ignition monitor light, an ignition switch, and a starter switch. Engine ignition is provided by two igniters in the engine combustion chamber. The igniters are energized by the ignition exciter mounted on the engine mount on the right side of the engine compartment. Electrical energy from the ignition exciter is transmitted through two high-tension leads to the igniters in the engine. The ignition system is normally energized only during engine start.

Ignition is controlled by an ignition switch and a starter switch located on the left sidewall switch and circuit breaker panel. The ignition switch has two positions, ON and NORMAL. The NORMAL position of the switch arms the ignition system so that ignition will be obtained when the starter switch is placed in the START position. The NORMAL position is used during all ground starts and during air starts with starter assist. The ON position of the switch provides continuous ignition regardless of the position of the starter switch. This position is used for air starts without starter assist, for operation on water-covered runways, during flight in heavy precipitation, during inadvertent icing encounters until the inertial separator has been in bypass for 5 minutes, and when near fuel exhaustion as indicated by illumination of the Red RSVR FUEL LOW CAS MSG.

(Continued Next Page)



## **IGNITION SYSTEM** (Continued)

The main function of the starter switch is control of the starter for rotating the gas generator portion of the engine during starting. However, it also provides ignition during starting. For purposes of this discussion, only the ignition functions of the switch are described. For other functions of the starter switch, refer to paragraph titled Starting System, in this section. The starter switch has three positions, OFF, START, and MOTOR. The OFF position shuts off the ignition system and is the normal position at all times except during engine start or engine clearing. The START position energizes the engine ignition system provided the ignition switch is in the NORMAL position. After the engine has started during a ground or air start, the starter switch must be manually positioned to OFF for generator operation.

White IGNITION ON CAS MSG will illuminate when electrical power is being applied to the igniters. The ignition system is protected by a pull-off type circuit breaker, labeled IGN, on the left sidewall switch and circuit breaker panel.

## **AIR INDUCTION SYSTEM**

The engine air inlet is located at the front of the engine nacelle to the left of the propeller spinner. Ram air entering the inlet flows through ducts and an inertial separator system and then enters the engine through a circular plenum chamber where it is directed to the compressor by guide vanes. The compressor air inlet incorporates a screen which will prevent entry of large articles, but does not filter the inlet air.

## **INERTIAL SEPARATOR SYSTEM**

An inertial separator system in the engine air inlet duct prevents moisture particles from entering the compressor air inlet plenum when in bypass mode. The inertial separator consists of two movable vanes and a fixed airfoil which, during normal operation, route the inlet air through a gentle turn into the compressor air inlet plenum. When separation of moisture particles is desired, the vanes are positioned so that the inlet air is forced to execute a sharp turn in order to enter the inlet plenum. This sharp turn causes any moisture particles to separate from the inlet air and discharge overboard through the inertial separator outlet in the left side of the cowling.

Inertial separator operation is controlled by a T-handle located on the lower instrument panel. The T-handle is labeled **BYPASS-PULL**, **NORMAL-PUSH**. The inertial separator control should be moved to the **BYPASS** position prior to running the engine during ground or flight operation in visible moisture (clouds, rain, snow, ice crystals) with an OAT of 5°C (41°F) or less. It may also be used for ground operations or takeoffs from dusty, sandy field conditions to minimize ingestion of foreign particles into the compressor. The **NORMAL** position is used for all other operations.

The T-handle locks in the **NORMAL** position by rotating the handle clockwise 1/4 turn to its vertical position. To unlock, push forward slightly and rotate the handle 90° counterclockwise. The handle can then be pulled into the **BYPASS** position. Once moved to the **BYPASS** position, air loads on the movable vanes hold them in this position.

### **CAUTION**

Do not return the **INERTIAL SEPARATOR** to **NORMAL** until after engine shutdown and inspection if icing conditions are encountered.

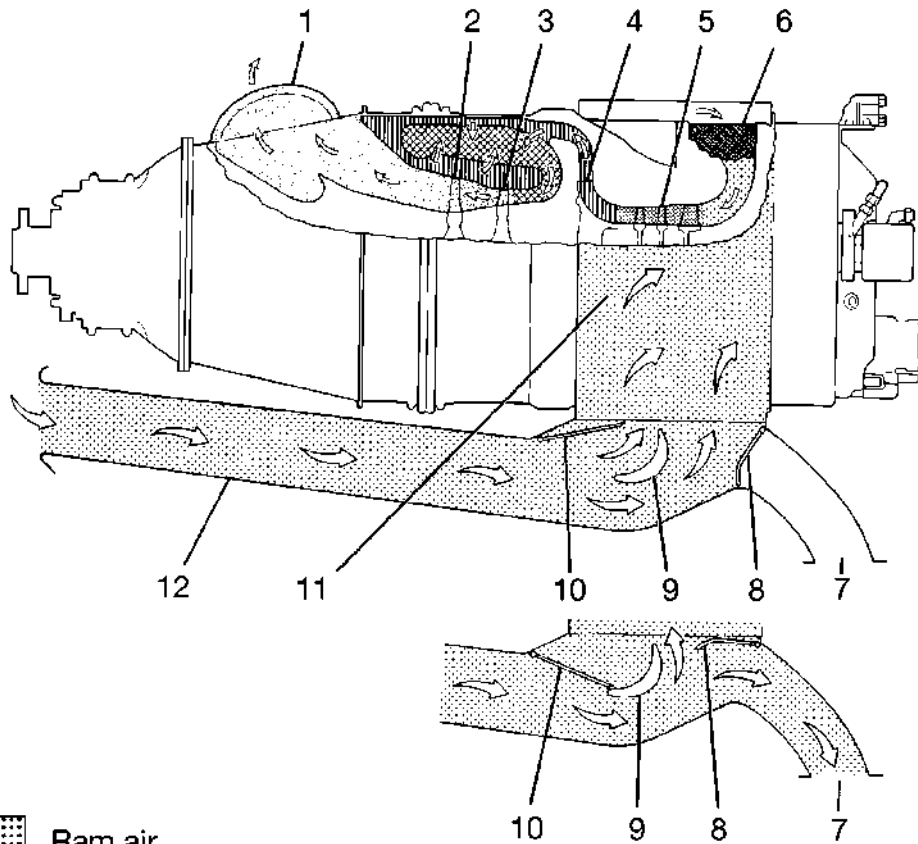
### **NOTE**

When moving the inertial separator control from **BYPASS** to **NORMAL** position during flight, reduction of engine power will reduce the control forces.

(Continued Next Page)

## ENGINE AIR FLOW

A39404



Ram air



Ram air compressed while flowing through three stages of axial-flow impellers



Ram air compressed while flowing through centrifugal impeller



Compressed air injected with fuel and ignited



Burned fuel-air mixture is expanded and drives compressor turbine and power turbine, and is then exhausted

1. Primary Exhaust Pipe
2. Power Turbine
3. Compressor Turbine
4. Centrifugal Impeller
5. Axial-Flow Impellers (3)
6. Engine Air Inlet
7. Inertial Separator Outlet
8. Inertial Separator Rear Vane
9. Inertial Separator Airfoil
10. Inertial Separator Front Vane
11. Induction Air Inlet Plenum
12. Induction Air Inlet Duct

### NOTE

The above view shows inertial separator in NORMAL position. Auxiliary view shows inertial separator in BYPASS position.

Figure 7-9

## **EXHAUST SYSTEM**

The exhaust system consists of a primary exhaust pipe attached to the right side of the engine just aft of the propeller reduction gearbox. A secondary exhaust duct, fitted over the end of the primary exhaust pipe carries the exhaust gases away from the cowling and into the slipstream. The juncture of the primary exhaust pipe and secondary exhaust duct is located directly behind the oil cooler. Since the secondary exhaust duct is of larger diameter than the primary exhaust pipe, a venturi effect is produced by the flow of exhaust. This venturi effect creates a suction behind the oil cooler which augments the flow of cooling air through the cooler. This additional airflow improves oil cooling during ground operation of the engine.

## **ENGINE FUEL SYSTEM**

The engine fuel system consists of an oil-to-fuel heater, an engine-driven fuel pump, a fuel control unit, a flow divider and dump valve, a dual fuel manifold with 14 simplex nozzles, and two fuel drain lines. The system provides fuel flow to satisfy the speed and power demands of the engine.

Fuel from the airplane reservoir is supplied to the oil-to-fuel heater which utilizes heat from the engine lubricating oil system to preheat the fuel in the fuel system. A fuel temperature-sensing oil bypass valve regulates the fuel temperature by either allowing oil to flow through the heater circuit or bypass it to the engine oil tank.

Fuel from the oil-to-fuel heater then enters the engine-driven fuel pump chamber through a 74-micron inlet screen. The inlet screen is spring-loaded and should it become blocked, the increase in differential pressure will overcome the spring and allow unfiltered fuel to flow into the pump chamber. The pump increases the fuel pressure and delivers it to the fuel control unit via a 10-micron filter in the pump outlet. A bypass valve and cored passages in the pump body enables unfiltered high pressure fuel to flow to the fuel control unit in the event the outlet filter becomes blocked.

(Continued Next Page)

## **ENGINE FUEL SYSTEM** (Continued)

The fuel control unit consists of a fuel metering section, a temperature compensating section, and a gas generator ( $N_g$ ) pneumatic governor. The fuel control unit determines the proper fuel schedule to provide the power required as established by the power lever input. This is accomplished by controlling the speed of the compressor turbine. The temperature compensating section alters the acceleration fuel schedule to compensate for fuel density differences at different fuel temperatures, especially during engine start. The power turbine governor, located in the propeller governor housing, provides power turbine overspeed protection in the event of propeller governor failure. This is accomplished by limiting fuel to the gas generator. During reverse thrust operation, maximum power turbine speed is controlled by the power turbine governor. The temperature compensator alters the acceleration fuel schedule of the fuel control unit to compensate for variations in compressor inlet air temperature. Engine characteristics vary with changes in inlet air temperature, and the acceleration fuel schedule must, in turn, be altered to prevent compressor stall and/or excessive turbine temperatures.

The flow divider schedules the metered fuel, from the fuel control unit, between the primary and secondary fuel manifolds. The fuel manifold and nozzle assemblies supply fuel to the combustion chamber through 10 primary and 4 secondary fuel nozzles, with the secondary nozzles cutting in above a preset value. All nozzles are operative at idle and above.

When the fuel cutoff valve in the fuel control unit closes during engine shutdown, both primary and secondary manifolds are connected to a dump valve port and residual fuel in the manifolds is allowed to drain into the fuel can attached to the firewall where it can be drained daily.

## **COOLING SYSTEM**

No external cooling provisions are provided for the PT6A-114A engine in this installation. However, the engine incorporates an extensive internal air system which provides for bearing compartment sealing and for compressor and power turbine disk cooling. For additional information on internal engine air systems, refer to the engine maintenance manual for the airplane.

## **STARTING SYSTEM**

The starting system consists of a starter-generator, a starter switch, and an Amber STARTER ON CAS MSG. The starter-generator functions as a motor for engine starting and will motor the gas generator section until a speed of 46%  $N_g$  is reached, at which time, the start cycle will automatically be terminated by a speed sensing switch located in the starter-generator. The starter-generator is controlled by a three-positioned starter switch located on the left sidewall switch and circuit breaker panel. The switch has OFF, START, and MOTOR positions. The OFF position deenergizes the ignition and starter circuits and is the normal position at all times except during engine start. The START position of the switch energizes the starter-generator which rotates the gas generator portion of the engine for starting. Also, the START position energizes the ignition system, provided the ignition switch is in the NORMAL position. When the engine has started, the starter switch must be manually placed in the OFF position to deenergize the ignition system and activate the generator system. The MOTOR position of the switch motors the engine without having the ignition circuit energized and is used for motoring the engine when an engine start is not desired. This can be used for clearing fuel from the engine, washing the engine compressor, etc. The MOTOR position is spring-loaded to the OFF position. Also, an interlock between the MOTOR position of the starter switch and the ignition switch prevents the starter from motoring unless the ignition switch is in the NORMAL position. This prevents unintentional motoring of the engine with the ignition on. Starter contactor operation is indicated by an Amber STARTER ON CAS MSG.

## **ENGINE ACCESSORIES**

All engine-driven accessories, with the exception of the propeller tachometer-generator and the propeller governors, are mounted on the accessory gearbox. located at the rear of the engine. These accessories are driven from the compressor turbine by a coupling shaft which extends the drive through a conical tube in the oil tank center section.

## **OIL PUMP**

Pressure oil is circulated from the integral oil tank through the engine lubrication system by a self-contained, gear-type pressure pump located in the lowest part of the oil tank. The oil pump is contained in a cast housing which is bolted to the front face of the accessory diaphragm, and is driven by the accessory gear shaft. The oil pump body incorporates a circular mounting boss to accommodate a check valve, located in the end of the filter housing. A second mounting boss on the pump accommodates a pressure relief valve.

## **FUEL PUMP**

The engine-driven pump is mounted on the accessory gearbox at the 2 o'clock position. The pump is driven through a gear shaft and splined coupling. The coupling splines are lubricated by oil mist from the auxiliary gearbox through a hole in the gear shaft. Another splined coupling shaft extends the drive to the fuel control unit which is bolted to the rear face of the pump. Fuel from the oil-to-fuel heater enters the fuel pump through a 74-micron inlet screen. Then, fuel enters the pump gear chamber, is boosted to high pressure, and delivered to the fuel control unit through a 10-micron pump outlet filter. A bypass valve and cored passages in the pump casing enable unfiltered high pressure fuel to flow from the pump gears to the fuel control unit should the outlet filter become blocked. An internal passage originating at the mating face with the fuel control unit returns bypass fuel from the fuel control unit to the pump inlet downstream of the inlet screen. A pressure regulating valve in this line serves to pressurize the pump gear bushings.

## **N<sub>g</sub> TACHOMETER-GENERATOR**

The N<sub>g</sub> tachometer-generator produces an electric current which is used in conjunction with the gas generator% RPM indicator to indicate gas generator RPM. The N<sub>g</sub> tachometer-generator drive and mount pad is located at the 5 o'clock position on the accessory gearbox and is driven from the internal scavenger pump.

## **PROPELLER TACHOMETER-GENERATOR**

The propeller tachometer-generator produces an electric signal which is used in conjunction with the propeller RPM indicator. The propeller tachometer-generator drive and mount pad is located on the right side of the reduction gearbox case and rotates clockwise with a drive ratio of 0.1273:1.

## **TORQUEMETER**

The torquemeter is a hydro-mechanical torque measuring device located inside the first stage reduction gear housing to provide an accurate indication of engine power output. The difference between the torquemeter pressure and the reduction gearbox internal pressure accurately indicates the torque being produced. The two pressures are internally routed to bosses located on the top of the reduction gearbox front case and to a pressure transducer which is electrically connected to the G1000 which indicates the correct torque. For standby indication, the pressures are routed to bosses on the top of the reduction gearcase front case and plumbed to the standby torque indicator.

## **STARTER-GENERATOR**

The starter-generator is mounted on the top of the accessory case at the rear of the engine. The starter-generator is a 28-volt, 200-amp engine-driven unit that functions as a motor for engine starting and, after engine start, as a generator for the airplane electrical system. When operating as a starter, a speed sensing switch in the starter-generator will automatically shut down the starter, thereby providing overspeed protection and automatic shutoff. The starter-generator is air cooled by an integral fan and by ram air ducted from the front of the engine cowling.

## **INTERSTAGE TURBINE TEMPERATURE SENSING SYSTEM**

The interturbine temperature sensing system is designed to provide the operator with an accurate indication of engine operating temperatures taken between the compressor and power turbines. The system consists of twin leads, two bus bars, and eight individual chromel-alumel thermocouple probes connected in parallel. Each probe protrudes through a threaded boss on the power turbine stator housing into an area adjacent to the leading edge of the power turbine vanes. The probe is secured to the boss by means of a floating, threaded fitting which is part of the thermocouple probe assembly. Shielded leads connect each bus bar assembly to a terminal block which provides a connecting point for external leads to the ITT indicator in the airplane cabin.



## **PROPELLER GOVERNOR**

The propeller governor is located in the 12 o'clock position on the front case of the reduction gearbox. Under normal conditions, the governor acts as a constant speed unit, maintaining the propeller speed selected by the pilot by varying the propeller blade pitch to match the load to the engine torque. The propeller governor also has a power turbine governor section built into the unit. Its function is to protect the engine against a possible power turbine overspeed in the event of a propeller governor failure. If such an overspeed should occur, a governing orifice in the propeller governor is opened by flyweight action to bleed off compressor discharge pressure through the governor and computing section of the fuel control unit. When this occurs, compressor discharge pressure, acting on the fuel control unit governor bellows, decreases and moves the metering valve in a closing direction, thus reducing fuel flow to the flow divider.

## **PROPELLER OVERSPEED GOVERNOR**

This propeller overspeed governor is located at the 10 o'clock position on the front case of the reduction gearbox. The governor acts as a safeguard against propeller overspeed should the primary propeller governor fail. The propeller overspeed governor regulates the flow of oil to the propeller pitch-change mechanism by means of a flyweight and speeder spring arrangement similar to the primary propeller governor. Because it has no mechanical controls, the overspeed governor is equipped with a test solenoid that resets the governor below its normal overspeed setting for ground test. The OVERSPEED GOVERNOR PUSH TO TEST Switch is located on the left side of the instrument panel. For a discussion of this switch, refer to the paragraph titled Propellers in this section.

## **ENGINE FIRE DETECTION SYSTEM**

A test switch, labeled TEST SWITCH, FIRE DETECT - UP, is located on the lower left corner of the instrument panel. When this switch is placed in the UP position, the Red ENGINE FIRE CAS MSG will illuminate on the CAS system and the warning horn will sound indicating that the fire warning circuitry is operational.

## **ENGINE GEAR REDUCTION SYSTEM**

The reduction gear and propeller shaft, located in the front of the engine, are housed in two magnesium alloy castings which are bolted together at the exhaust outlet. The gearbox contains a two-stage planetary gear train, three accessory drives, and propeller shaft. The first-stage reduction gear is contained in the rear case, while the second-stage reduction gear, accessory drives, and propeller shaft are contained in the front case. Torque from the power turbine is transmitted to the first-stage reduction gear, from there to the second-stage reduction gear, and then to the propeller shaft. The reduction ratio is from a maximum power turbine speed of 33,000 RPM down to a propeller speed of 1900 RPM.

The accessories, located on the front case of the reduction gearbox, are driven by a bevel gear mounted at the rear of the propeller shaft thrust bearing assembly. Drive shafts from the bevel drive gear transmit rotational power to the three pads which are located at the 12, 3 and 9 o'clock positions. Propeller thrust loads are absorbed by a flanged ball bearing assembly located on the front face of the reduction gearbox center bore. The bevel drive gear adjusting spacer, thrust bearing, and seal runner are stacked and secured to the propeller shaft by a key-washer and spanner nut. A thrust bearing cover assembly is secured by bolts at the front flange of the reduction gearbox front case.

## **CHIP DETECTORS**

Two chip detectors are installed on the engine, one on the underside of the reduction gearbox case and one on the underside of the accessory gearbox case. The chip detectors trigger an Amber CHIP DETECT CAS MSG on the instrument panel. The CAS message will illuminate when metal chips are present in one or both of the chip detectors. Illumination of the Amber CHIP DETECT CAS MSG necessitates the need for inspection of the engine for abnormal wear.

## **OIL BREATHER DRAIN CAN**

Model 208 airplanes have an oil breather drain can mounted on the right lower engine mount truss. This can collects any engine oil discharge coming from the accessory pads for the alternator drive pulley, starter/generator, air conditioner compressor (if installed), and the propeller shaft seal. This can should be drained after every flight. A drain valve on the bottom right side of the engine cowling enables the pilot to drain the contents of the oil breather drain can into a suitable container. The allowable quantity of oil discharge per hour of engine operation is 14 cc for airplanes with air conditioning and 11 cc for airplanes without air conditioning. If the quantity of oil drained from the can is greater than specified, the source of the leakage should be identified and corrected prior to further flight.

## **PROPELLER**

The airplane is equipped with a McCauley aluminum material, three-bladed propeller. The propeller is constant-speed, full-feathering, reversible, single-acting, governor-regulated propeller. A setting introduced into the governor with the PROP RPM Lever establishes the propeller speed. The propeller utilizes oil pressure which opposes the force of springs and counter-weights to obtain correct pitch for the engine load. Oil pressure from the propeller governor drives the blades toward low pitch (increases RPM) while the springs and counterweights drive the blades toward high pitch (decreasing RPM). The source of oil pressure for propeller operation is furnished by the engine oil system, boosted in pressure by the governor gear pump, and supplied to the propeller hub through the propeller flange.

To feather the propeller blades, the PROP RPM Lever on the control pedestal is placed in the FEATHER position; counterweights and spring tension will continue to twist the propeller blades through high pitch and into the streamlined or feathered position. Unfeathering the propeller is accomplished by positioning the PROP RPM Lever forward of the feather gate. The unfeathering system uses engine oil pressure to force the propeller out of feather.

Reversed propeller pitch is available for decreasing ground roll during landing. To accomplish reverse pitch, the power lever is retarded beyond IDLE and well into the BETA range. Maximum reverse power is accomplished by retarding the power lever to the MAX REVERSE position which increases power output from the gas generator and positions the propeller blades at full reverse pitch. An externally grooved feedback ring is provided with the propeller.

Motion of the feedback ring is proportional to propeller blade angle, and is picked up by a carbon block running in the feedback ring. The relationship between the axial position of the feedback ring and the propeller blade angle is used to maintain control of blade angle from idle to full reverse.

### **CAUTION**

The propeller reversing linkage can be damaged if the power lever is moved aft of the idle position when the propeller is feathered.

## **OVERSPEED GOVERNOR TEST SWITCH**

An overspeed governor test switch is located on the left side of the instrument panel. The switch is the push-to-test type and is used to test the propeller overspeed governor during engine run-up. The switch, when depressed, actuates a solenoid on the propeller overspeed governor which restricts propeller RPM when the power lever is advanced. To check for proper operation of the overspeed governor, during engine run-up, depress the press-to-test switch and advance the power lever until propeller RPM stabilizes; propeller RPM should not exceed 1750 +/- 60 RPM.

## **FUEL SYSTEM**

The airplane fuel system (see Fuel System figure) consists of two vented, integral fuel tanks with shutoff valves, a fuel selectors off warning system, a fuel reservoir, an ejector fuel pump, an electric auxiliary boost pump, a reservoir manifold assembly, a firewall shutoff valve, a fuel filter, an oil-to-fuel heater, an engine-driven fuel pump, a fuel control unit, a flow divider, dual manifolds, and 14 fuel nozzle assemblies. A fuel can and drain is also provided. Refer to the Fuel Quantity Data Chart for information pertaining to this system.

### **WARNING**

**Unusable fuel levels for this airplane were determined in accordance with Federal Aviation Regulations. Failure to operate the airplane in compliance with the fuel limitations specified in Section 2 may further reduce the amount of fuel available in flight.**

Fuel flows from the tanks through the two fuel tank shutoff valves at each tanks. The fuel tank shutoff valves are mechanically controlled by two fuel selectors, labeled LEFT, ON and OFF, located on the overhead panel. By manipulating the fuel selectors, the pilot can select either left or right fuel tanks or both at the same time. Normal operation is with both tanks on. Fuel flows by gravity from the shutoff valves in each tank to the fuel reservoir.

(Continued Next Page)

## **FUEL SYSTEM** (Continued)

The reservoir is located at the low point in the fuel system which maintains a head of fuel around the ejector boost pump and auxiliary boost pump which are contained within the reservoir. This head of fuel prevents pump cavitation in low-fuel quantity situations, especially during in-flight maneuvering. Fuel in the reservoir is pumped by the ejector boost pump or by the electric auxiliary boost pump to the reservoir manifold assembly. The ejector boost pump, which is driven by motive fuel flow from the fuel control unit, normally provides fuel flow when the engine is operating. In the event of failure of the ejector boost pump, the electric boost pump will automatically turn on, thereby supplying fuel flow to the engine. The auxiliary boost pump is also used to supply fuel flow during starting. Fuel in the reservoir manifold then flows through a fuel shutoff valve located on the aft side of the firewall. This shutoff valve enables the pilot to cut off all fuel to the engine.

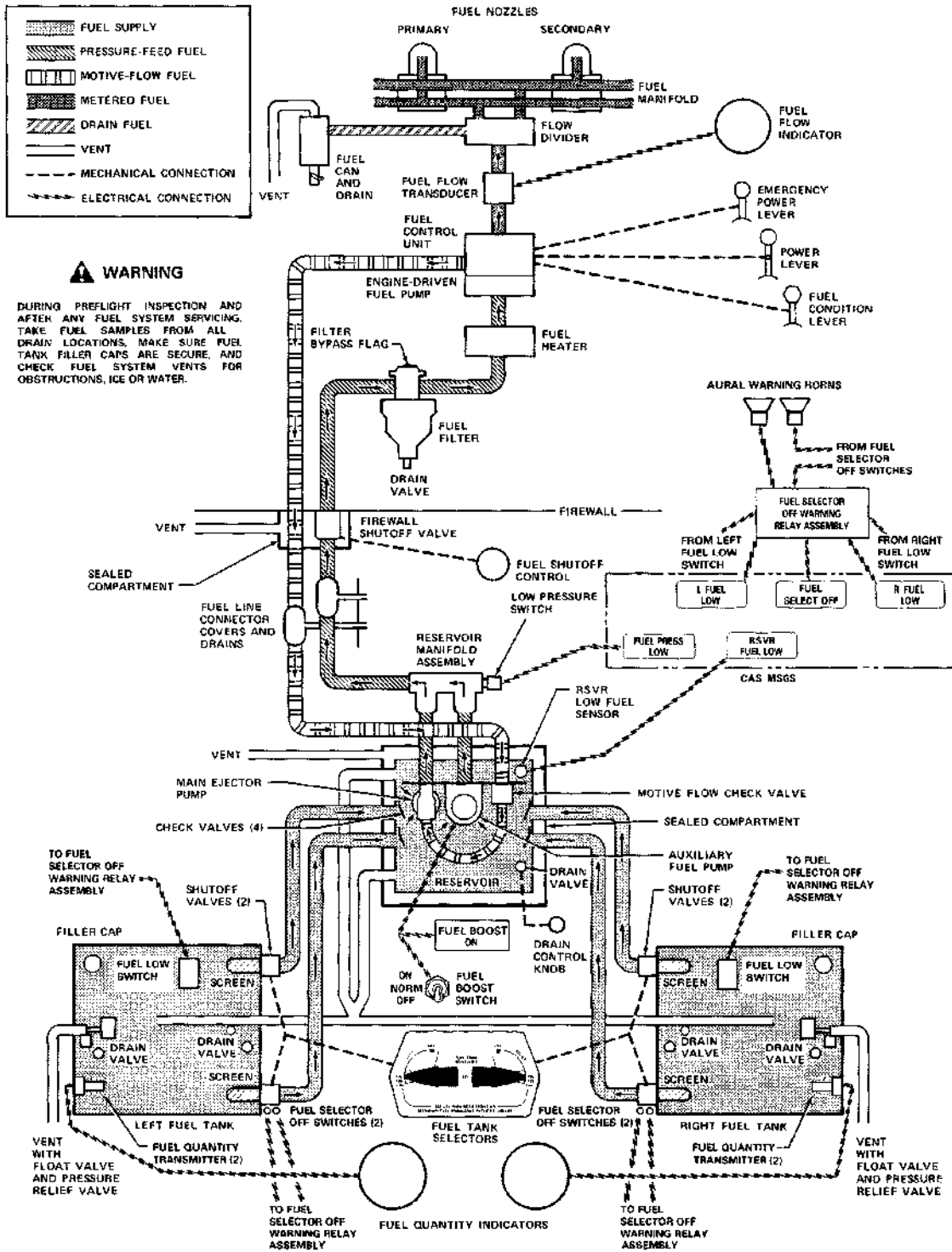
After passing through the shutoff valve, fuel is routed through a fuel filter located on the front side of the firewall. The fuel filter incorporates a bypass feature which allows fuel to bypass the filter in the event the filter becomes blocked with foreign material. A red filter bypass flag on the top of the filter extends upward when the filter is bypassing fuel. Fuel from the filter is then routed through the oil-to-fuel heater to the engine-driven fuel pump where fuel is delivered under pressure to the fuel control unit. The fuel control unit meters the fuel and directs it to the flow divider which distributes the fuel to dual manifolds and 14 fuel nozzles located in the combustion chamber. For additional details concerning the flow of fuel at the engine, refer to the Engine Fuel System paragraph in this section.

Fuel rejected by the engine on shutdown drains into a fireproof fuel can located on the front left side of the firewall. The can should be drained during preflight inspection. If left unattended, the can fuel will overflow overboard.

Fuel system venting is essential to system operation. Complete blockage of the vent system will result in decreased fuel flow and eventual engine stoppage. Venting is accomplished by check valve equipped vent lines, one from each fuel tank, which protrude from the trailing edge of the wing at the wing tips. Also the fuel reservoir is vented to both wing tanks.

# FUEL SYSTEM

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Figure 7-10

## FUEL QUANTITY DATA

FUEL QUANTITY DATA				
UNITS OF MEASURE	FUEL LEVEL (QUANTITY EACH TANK)	TOTAL FUEL	TOTAL UNUSABLE	TOTAL USABLE ALL FLT CONDITIONS
	FULL (OUTBOARD FILLERS)			
POUNDS	1124.25	2248.5	24.1	2224.4
GALLONS (U.S.)	167.8	335.6	3.6	332
UNITS OF MEASURE	FUEL LEVEL (QUANTITY EACH TANK)	TOTAL FUEL	TOTAL UNUSABLE	TOTAL USABLE ALL FLT CONDITIONS

### NOTE

Pounds are based on a fuel specific weight of 6.7 pounds per U.S. gallon.

### WARNING

**To achieve full capacity, fill fuel tank to the top of the fuel filler neck. Filling fuel tanks to the bottom of the fuel filler collar (level with the flapper valve) allows space for thermal expansion and results in a decrease in fuel capacity of four gallons per side (eight gallons total).**

Figure 7-11

## **FIREWALL FUEL SHUTOFF VALVE**

A manual firewall fuel shutoff valve, located on the aft side of the firewall, enables the pilot to shut off all fuel flow from the fuel reservoir to the engine. The shutoff valve is controlled by a red push-pull knob labeled FUEL SHUTOFF-PULL OFF and located on the right side of the pedestal. The push-pull knob has a press-to-release button in the center which locks the knob in position when the button is released.

## **FUEL TANK SELECTORS**

Two FUEL SELECTORS, one for each tank, are located on the overhead console. The selectors, labeled LEFT, ON and OFF and RIGHT, ON and OFF, mechanically control the position of the two fuel tank shutoff valves at each wing tank. When a fuel tank selector is in the OFF position, the shutoff valves in the tank are closed. When in the ON position, both shutoff valves in the tank are open, allowing fuel from that tank to flow to the reservoir. Normal fuel management is with both fuel tank selectors in the ON position.

Before refueling, or when the airplane is parked on a slope, turn off one of the fuel tank selectors (if parked on a slope, turn high wing tank off). This action prevents crossfeeding from the fuller or higher tank and reduces any fuel seepage tendency from the wing tank vents.

## **FUEL SELECTORS OFF WARNING SYSTEM**

A test switch, labeled TEST SWITCH, FUEL SELECT OFF - DN, is located on the lower left corner of the instrument panel. When this switch is placed in the DOWN position, the Red FUEL SELECT OFF MSG will illuminate and two warning horns will sound simultaneously indicating that the fuel selector warning circuitry is operational.

## **FUEL BOOST PUMP SWITCH**

An auxiliary boost pump switch, located on the left sidewall switch and circuit breaker panel, is labeled FUEL BOOST and has OFF, NORM, and ON positions. When the switch is in the OFF position, the auxiliary boost pump is inoperative. When the switch is in the NORM position, the auxiliary boost pump is armed and will operate when fuel pressure in the fuel manifold assembly drops below 4.75 psi. This switch position is used for all normal engine operation where main fuel flow is provided by the ejector boost pump and the auxiliary boost pump is used as a standby. When the auxiliary boost pump switch is placed in the ON position, the auxiliary boost pump will operate continuously. This position is used for engine start and any other time that the auxiliary boost pump cycles on and off with the switch in the NORM position, and for all operations utilizing aviation gasoline.



## **FUEL FLOW INDICATION**

A fuel flow indicator, located beneath the quantity indicators on both the ENGINE and SYSTEM pages, indicates the fuel consumption of the engine in pounds per hour based on Jet A fuel. The indicator measures the flow of fuel downstream of the fuel control unit just before being routed into the flow divider. The fuel flow indicator receives power from a pull-off type circuit breaker labeled F FLOW NP & NG, on the left sidewall switch and circuit breaker panel.

## **FUEL QUANTITY INDICATIONS**

Fuel quantity is measured by four fuel quantity transmitters (two in each tank) and indicated by two electrically-operated fuel quantity indicators on the upper portion of the instrument panel. The fuel quantity indicators, which measure volume, are calibrated in pounds (based on the weight of Jet A fuel on a standard day). An empty tank is indicated by a red line and the letter E. When an indicator shows an empty tank, approximately 2.8 gallons remain in the tank as unusable fuel. The left and right fuel quantity indicators each receive power from a pull-off type circuit breaker. The breakers are labeled LEFT FUEL QTY and RIGHT FUEL QTY, respectively, and are located on the left sidewall switch and circuit breaker panel.

### **WARNING**

**Because of the relatively long fuel tanks, fuel quantity indicator accuracy is affected by uncoordinated flight or a sloping ramp if reading the indicators while on the ground. Therefore, to obtain accurate fuel quantity readings, verify that the airplane is parked in a laterally level condition, or if in flight, make sure the airplane is in a coordinated and stabilized condition.**

## **WING TANK FUEL LOW CAUTION CAS MESSAGES**

Two float sensors one for each wing tank will trigger the appropriate amber CAS message, L FUEL LEVEL LOW or R FUEL LEVEL LOW MSG. when the fuel in the respective tank is 25 gallons (170 lbs) or less. When the fuel quantity in each tank is less than 25 gallons (170 lbs), amber L-R FUEL LEVEL LOW CAS MSG will replace the previously displayed L or R FUEL LEVEL LOW CAS message.

## **RESERVOIR FUEL LOW WARNING CAS MESSAGE**

A Red RSVR FUEL LOW CAS MSG is located on the PFD, and will illuminate when the level of fuel in the reservoir drops to approximately one-half full. There is adequate fuel in the fuel reservoir for approximately 3 minutes of maximum continuous power or approximately 9 minutes at idle power.

## **FUEL PRESSURE LOW WARNING CAS MESSAGE**

An Amber FUEL PRESS LOW CAS MSG is located on the PFD, and will illuminate when fuel pressure in the reservoir fuel manifold assembly is below 4.75 psi.

## **FUEL BOOST PUMP ON CAS MESSAGE**

An Amber FUEL BOOST ON CAS MSG is located on the PFD and will illuminate when the auxiliary boost pump is operating, such as when the auxiliary boost pump Switch is placed in the ON position or when the auxiliary boost pump Switch is in the NORM position and fuel pressure in the fuel manifold assembly drops below 4.75 psi.

## **DRAIN VALVES**

The fuel system is equipped with drain valves to provide a means for the examination of fuel in the system for contamination and grade. Drain valves are located on the lower surface of each wing at the inboard end of the fuel tank, in fuel tank external sumps, on the left side of the cargo pod for the reservoir tank, and on the underside of the fuel filter. Outboard fuel tank drain valves and their use is recommended if the airplane is parked with one wing low on a sloping ramp. The drain valves for the wing tanks and their external sumps are tool-operated poppet type and are flush-external mounted. The wing tank and external sump drain valves are constructed so that the Phillips screwdriver on the fuel sampler which is provided can be utilized to depress the valve and then twist to lock the drain valve in the open position. The drain valve for the reservoir is controlled by a double-button push-pull drain control knob. When pulled out, fuel from the reservoir drains out the rear fuel drain pipe located adjacent to the drain valve. The drain valve for the fuel filter consists of a drain pipe which can be depressed upward to drain fuel from the filter. The fuel sampler can be used in conjunction with these drain valves for fuel sampling and purging of the fuel system. The fuel tanks should be filled after each flight when practical to minimize condensation.

(Continued Next Page)

## **DRAIN VALVES** (Continued)

Before each flight of the day and after each refueling, use a clear sampler and drain fuel from the inboard fuel tank sump, external sump quick-drain valves, fuel reservoir quick-drain valve, and fuel filter quick-drain valve to determine if contaminants are present, and that the airplane has been fueled with the proper fuel. If the airplane is parked with one wing low on a sloping ramp, draining of the outboard fuel tank sump quick-drain valves is also recommended. If contamination is detected, drain all fuel drain points again. Take repeated samples from all fuel drain points until all contamination has been removed. If after repeated sampling, evidence of contamination still exists, the fuel tanks should be completely drained and the fuel system cleaned. Do not fly the airplane with contaminated or unapproved fuel.

### **WARNING**

**JP-4 and other NAPHTHA based fuels can cause severe skin and eye irritation.**

## **FUEL DRAIN CAN**

When the engine is shut down, residual fuel in the engine drains into a fuel drain can mounted on the front left side of the firewall. This can should be drained once a day or at an interval not to exceed six engine shutdowns. A drain valve on the bottom side of the cowling enables the pilot to drain the contents of the fuel drain can into a suitable container.

## **FUEL PUMP DRAIN RESERVOIR**

To control expended lubricating oil from the engine fuel pump drive coupling area and provide a way to determine if fuel is leaking past the fuel pump seal, this airplane is equipped with a drainable reservoir to collect this allowable discharge of oil and any fuel seepage. The reservoir is mounted on the front left side of the firewall. It should be drained once a day or at an interval not to exceed six engine shutdowns. A drain valve on the bottom side of the cowling enables the pilot to drain the contents of the reservoir into a suitable container. A quantity of up to 3 cc of oil and 20 cc of fuel discharge per hour of engine operation is allowable. If the quantity of oil or fuel drained from the reservoir is greater than specified, the source of leakage should be identified and corrected prior to further flight.

## **BRAKE SYSTEM**

The airplane has a single-disc, hydraulically-actuated brake on each main landing gear wheel. Each brake is connected, by a hydraulic line, to a master cylinder attached to each of the pilot's rudder pedals. The brakes are operated by applying pressure to the top of either the left (pilot's) or right (copilot's) set of rudder pedals, which are interconnected. When the airplane is parked, both main wheel brakes may be set by utilizing the parking brake which is operated by a handle below to the right of the pilot's control wheel. To apply the parking brake, set the brakes with the rudder pedals and pull the handle aft. To release the parking brake, push the handle fully in.

A brake fluid reservoir, located just forward of the firewall on the left side of the engine compartment, provides additional brake fluid for the brake master cylinders. The fluid in the reservoir should be checked for proper level prior to each flight.

For maximum brake life, keep the brake system properly maintained. Airplanes are equipped with metallic type brakes, and require a special brake burn-in before delivery (or after brake replacement). When conditions permit, hard brake application is beneficial in that the resulting higher brake temperatures tend to maintain proper brake glazing and will prolong the expected brake life. Conversely, the habitual use of light and conservative brake application is detrimental to metallic brakes.

Some of the symptoms of impending brake failure are: gradual decrease in braking action after brake application, noisy or dragging brakes, soft or spongy pedals, and excessive travel and weak braking action. If any of these symptoms appear, the brake system is in need of immediate attention. If, during taxi or landing roll, braking action decreases, let up on the pedals and then re-apply the brakes with heavy pressure. If the brakes become spongy or pedal travel increases, pumping the pedals should build braking pressure. If one brake becomes weak or fails, use the other brake sparingly while using opposite rudder, as required, to offset the good brake.

## **ELECTRICAL SYSTEM**

The airplane is equipped with a 28-volt, direct-current electrical system (see Typical Electrical System figure). The system uses a 24-volt sealed lead acid battery; located on the front right side of the firewall, as a source of electrical energy. A 200-amp engine-driven starter-generator is used to maintain the battery's state of charge. Power is supplied to most general electrical and all avionics circuits through two general buses, two avionics buses, and a hot battery bus. The battery bus is energized continuously for cabin/courtesy lights and functions requiring power when the two general busses are off. The two general buses are on anytime the battery switch is turned on. All DC buses are on anytime the battery switch and the two avionics switches are turned on.

## **STANDBY ELECTRICAL SYSTEM**

The standby electrical system serves as a power source in the event the main generator system malfunctions in flight. The system includes an alternator operated at a 75-amp capacity rating. The alternator is belt-driven from an accessory pad on the rear of the engine. The system also includes an alternator control unit located forward of the circuit breaker panel, a standby alternator contactor assembly on the left front side of the firewall and two switches on the left sidewall switch panel, labeled STBY ALT POWER and AVIONICS STBY PWR.

Circuit protection and isolation is provided by two circuit breakers, labeled STBY PWR, on the left sidewall circuit breaker panel. Field excitation to the alternator control unit is supplied through diode logic from a circuit breaker in the standby alternator relay assembly or from the HOURMETER/ACU circuit breaker in the main power relay box.

Standby Electrical system monitoring is provided by CAS messages; White STBY PWR ON CAS MSG and Amber STBY PWR INOP CAS MSG. Total amperage supplied from the standby electrical system can be monitored on the EIS SYSTEMS DISPLAY. Additionally, an ALTNR AMPS CAS message is provided if the standby alternator amperage draw exceeds normal operating ranges.

## **GENERATOR CONTROL UNIT**

The generator control unit (GCU) is mounted inside the cabin on the left forward fuselage sidewall. The unit provides the electrical control functions necessary for the operation of the starter-generator. The GCU provides for automatic starter cutoff when engine RPM is above 46%. Below 46%, the starter-generator functions as a starter, and above 46%, the starter-generator functions as a generator when the starter switch is OFF. The GCU provides voltage regulation plus high voltage protection and reverse current protection. In the event of a high-voltage or reverse current condition, the generator is automatically disconnected from the buses. The generator contactor (controlled by the GCU) connects the generator output to the airplane bus. If any GCU function causes the generator contactor to de-energize, the Amber GENERATOR OFF CAS MSG will illuminate.

## **GROUND POWER MONITOR**

The ground power monitor is located inside the electrical power control assembly mounted on the left hand side of the firewall in the engine compartment. This unit senses the voltage level applied to the external power receptacle and will close the external power contactor when the applied voltage is within the proper limits.

## **BATTERY SWITCH**

The battery switch is a two-position toggle-type switch, labeled BATTERY, and is located on the left sidewall switch and circuit breaker panel. The battery switch is ON in the forward position and OFF in the aft position. When the battery switch is in the ON position, battery power is supplied to the two general buses. The OFF position cuts off power to all buses except the battery bus.

## **STARTER SWITCH**

The starter switch is a three-position toggle-type switch, labeled STARTER, on the left sidewall switch and circuit breaker panel. The switch has OFF, START, and MOTOR positions. For additional details of the starter switch, refer to the Starting System paragraph in this section.

## **IGNITION SWITCH**

The ignition switch is a two-position toggle-type switch, labeled IGNITION, on the left sidewall switch and circuit breaker panel. The switch has ON and NORMAL positions. For additional details of the ignition switch, refer to the Ignition System paragraph in this section.

## **GENERATOR SWITCH**

The generator switch is a three-position toggle-type switch, labeled GENERATOR, on the left sidewall switch and circuit breaker panel. The switch has ON, RESET, and TRIP positions. With the switch in the ON position, the GCU will automatically control the generator line contactor for normal generator operation. The RESET and TRIP positions are momentary positions and are spring-loaded to the ON position. If a momentary fault should occur in the generating system (as evidenced by the Amber GENERATOR OFF CAS MSG, Red VOLTAGE LOW CAS MSG and/or Red VOLTAGE HIGH CAS MSG), the generator switch can be momentarily placed in the RESET position to restore generator power. If erratic operation of the generating system is observed, the system can be shutoff by momentarily placing the generator switch to the TRIP position. After a suitable waiting period, generator operation may be recycled by placing the generator switch momentarily to RESET.

## **STANDBY ALTERNATOR POWER SWITCH**

The standby alternator system switch is a two-position toggle-type switch, labeled STBY ALT POWER. There is also an amber LED above the switch that illuminates when the BATTERY switch is in the OFF position with STBY ALT POWER in the ON position. This is an alert to the operator to help prevent accidental discharging of the battery that can occur if the STBY ALT POWER switch is left ON after shutdown.

## **AVIONICS POWER SWITCHES**

Electrical power from the airplane power distribution bus to the avionics buses (see Typical Electrical System figure) is controlled by two toggle-type switch breakers located on the left sidewall switch and circuit breaker panel. One switch controls power to the number 1 avionics bus while the other switch controls power to the number 2 avionics bus. The switches are labeled AVIONICS and are ON in the forward position and OFF in the aft position. The avionics power switches should be placed in the OFF position prior to turning the battery switch ON or OFF, or applying an external power source. The number 1 AVIONICS Switch must be ON.

### **WARNING**

**Failure to have AVIONICS No. 1 ON will result in an over temperature and image damage.**

## **AVIONICS STANDBY POWER SWITCH**

The avionics standby power system switch is a guarded two-position switch/breaker, labeled AVIONICS STBY PWR. The guard covering this switch must be lifted in order to select the ON position. When switched ON, the standby electrical system directly provides power to the Avionics bus 1. When switched OFF, the standby electrical system may provide extra power to the avionics busses via the main power distribution bus, provided the STBY PWR circuit breakers on the electrical busses are not pulled. When operating solely on standby power, both AVIONICS 1 and 2 power switches should be OFF to avoid feeding a possible fault in the primary power system.

## **AVIONICS BUS TIE SWITCH**

The avionics bus tie switch is a two-position guarded toggle-type switch located on the left sidewall switch and circuit breaker panel. The switch connects the number 1 and number 2 avionics buses together in the event of failure of either bus feeder circuit. Because power for each avionics bus is supplied from a separate current limiter on the power distribution bus, failure of a current limiter can cause failure of the affected bus. Placing the bus tie switch to the ON position will restore power to the failed bus. Operation without both bus feeder circuits may require an avionics load reduction, depending on equipment installed.



# TYPICAL ELECTRICAL SYSTEM

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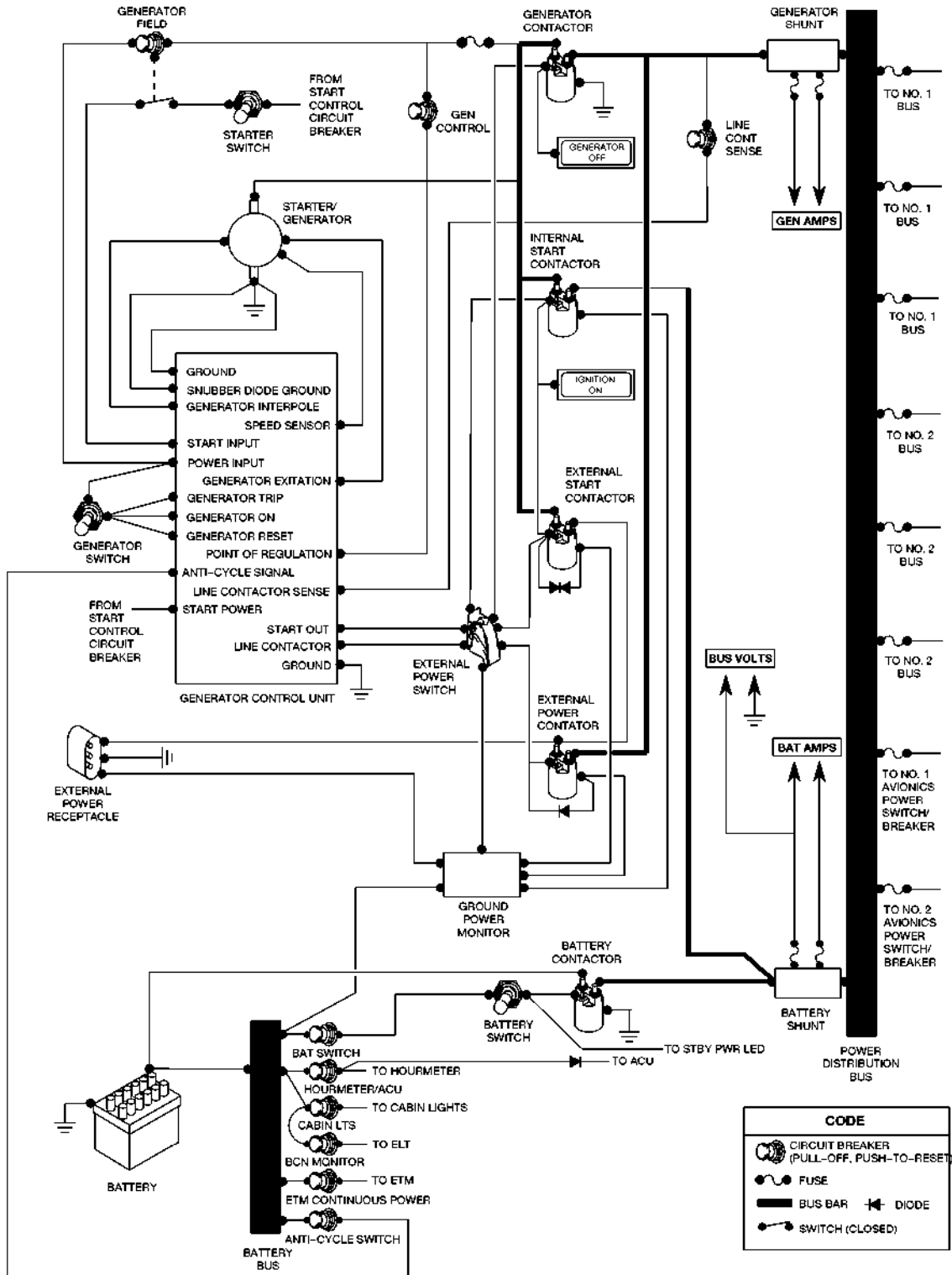
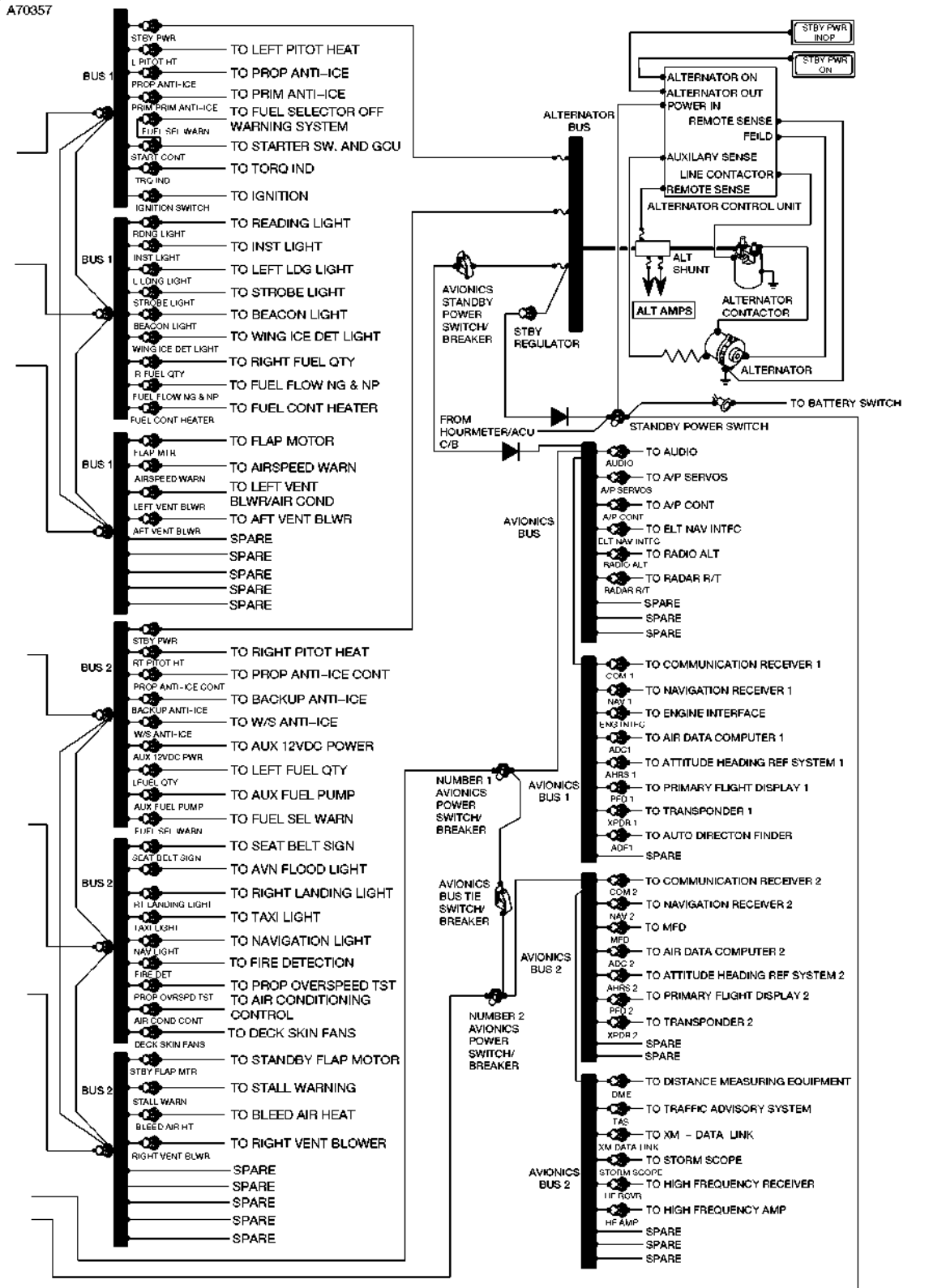


Figure 7-12 (Sheet 1 of 3)

# TYPICAL ELECTRICAL SYSTEM

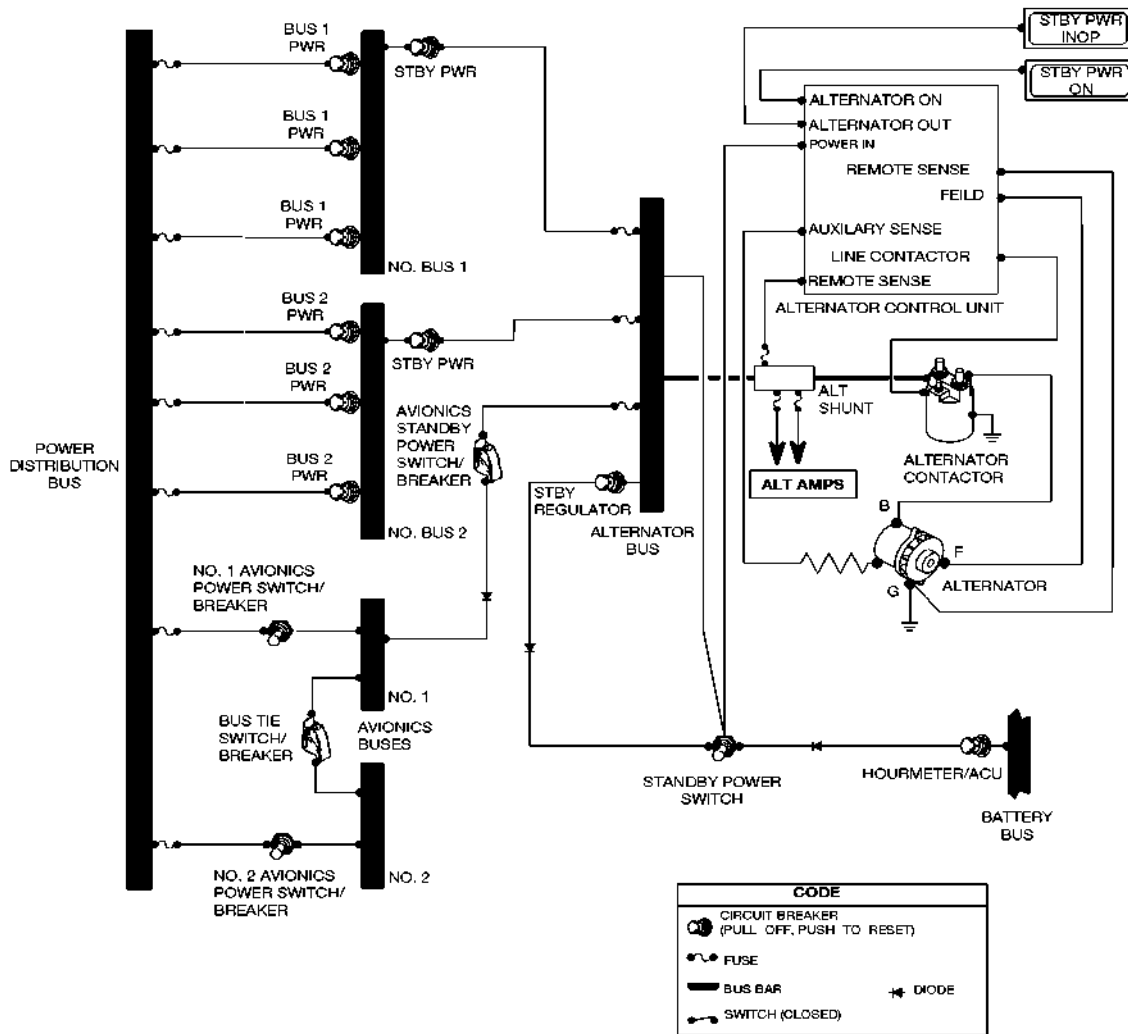


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Figure 7-12 (Sheet 2 of 3)

# TYPICAL ELECTRICAL SYSTEM

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2685T1111

Figure 7-12 (Sheet 3 of 3)

## **EXTERNAL POWER SWITCH**

The external power switch is a three-position guarded toggle-type switch located on the left sidewall switch and circuit breaker panel. The switch has OFF, STARTER, and BUS positions and is guarded in the OFF position. When the switch is in the OFF position, battery power is supplied to the main bus and to the starter-generator circuit, external power cannot be applied to the main bus, and, with the generator switch in the ON position, power is applied to the generator control circuit. When the external power switch is in the STARTER position, external power is applied to the starter circuit only and battery power is supplied to the main bus. No generator power is available in this position. When the external power switch is in the BUS position, external power is applied to the main bus and no power is available to the starter. The battery, if desired, can be connected to the main bus and external power by the battery switch; however, battery charge should be monitored to avoid overcharge.

## **CIRCUIT BREAKERS**

Most of the electrical circuits in the airplane are protected by pull-off type circuit breakers mounted on the left sidewall switch and circuit breaker panel. Should an overload occur in any circuit, the controlling circuit breaker will trip, opening the circuit. After allowing the circuit breaker to cool for approximately three minutes, it may be reset (pushed in). If the breaker trips again, it should not be reset until corrective action is taken.

### **WARNING**

**Make sure all circuit breakers are in before all flights. Never operate with tripped circuit breakers without a thorough knowledge of the consequences.**

## **VOLTAGE AND AMPERAGE DISPLAY**

The status of the electrical system can be monitored on the MFD (non-reversionary mode). Battery current (BAT AMPS) and bus voltage (BUS VOLTS) are displayed on the default EIS-ENGINE display page. By pressing the ENGINE softkey and the SYSTEM softkey, the EIS pages changes to the EIS-Systems display where generator current (GEN AMPS), and bus voltage (BUS VOLTS) can be monitored simultaneously. A negative display on BAT AMPS indicates battery discharge, while a positive display indicates battery charging.

## **GROUND SERVICE PLUG RECEPTACLE**

A ground service plug receptacle permits the use of an external power source for cold weather starting and during lengthy maintenance work on the electrical and avionics equipment. External power control circuitry is provided to prevent the external power and the battery from being connected together during starting. The external power receptacle is installed on the left side of the engine compartment near the firewall.

The ground service circuit incorporates polarity reversal and overvoltage protection. Power from the external power source will flow only if the ground service plug is correctly connected to the airplane. If the plug is accidentally connected backwards or the ground service voltage is too high, no power will flow to the electrical system, thereby preventing any damage to electrical equipment.

## **LIGHTING SYSTEMS**

### **EXTERIOR LIGHTING**

Exterior lighting consists of three navigation lights, two landing lights, two taxi/recognition lights, two strobe lights, a flashing beacon, and two underwing courtesy lights. All exterior lights are controlled by toggle switches located on the lighting control panel on the left side of the instrument panel. The toggle switches are ON in the up position and OFF in the down position.

### **NAVIGATION LIGHTS**

Conventional navigation lights are installed on the wing tips and tailcone stinger. The lights are protected by a pull-off type circuit breaker, labeled NAV LIGHT, on the left sidewall switch and circuit breaker panel.

## **LANDING LIGHTS**

Two landing lights are installed on the airplane, one in each wing leading edge mounted outboard. The lights provide illumination forward and downward during takeoff and landing. The lights are protected by two pull-off type circuit breakers, labeled LEFT LDG LIGHT and RIGHT LDG LIGHT, on the left sidewall switch and circuit breaker panel.

### **NOTE**

It is not recommended that the landing lights be used to enhance the conspicuity of the airplane in the traffic pattern or enroute, because of their relatively short service life. The taxi/recognition lights have considerably longer service life and are designed for this purpose, if desired.

## **TAXI/RECOGNITION LIGHTS**

Two taxi/recognition lights are mounted inboard of each landing light in each wing leading edge. The lights are focused to provide illumination of the area forward of the airplane during ground operation and taxiing. The lights are also used to enhance the conspicuity of the airplane in the traffic pattern or enroute. The taxi/recognition lights are protected by a pull-off type circuit breaker, labeled TAXI LIGHT, on the left sidewall switch and circuit breaker panel.

## **STROBE LIGHTS**

A high intensity strobe light system is installed on the airplane. The system includes two strobe lights (with remote power supplies) located one on each wing tip. The lights are used to enhance anti-collision protection for the airplane and are required anti-collision lights for night operations. The strobe lights are protected by a pull-off type circuit breaker, labeled STROBE LIGHT, on the left sidewall switch and circuit breaker panel.

### **WARNING**

**Strobe lights should be turned off when taxiing. Ground operation of the high intensity anti-collision lights can be considerable annoyance to ground personnel and other pilots. Do not operate the anti-collision lights in conditions of fog, clouds, or haze as the reflection of the light beam can cause disorientation or vertigo.**

## **FLASHING BEACON LIGHT**

A red flashing beacon light is installed on the top of the vertical fin as additional anti-collision protection in flight and for recognition during ground operation. The light is visible through 360°. The flashing beacon light circuit is protected by a pull-off type circuit breaker, labeled BEACON LIGHT, on the left sidewall switch and circuit breaker panel.

### **WARNING**

**The flashing beacon should not be used when flying through clouds or overcast; the flashing light reflected from water droplets or particles in the atmosphere, particularly at night, can cause disorientation or vertigo.**

## **COURTESY LIGHTS**

Two courtesy lights are installed, one under each wing. The lights illuminate the area outside of the airplane adjacent to the crew entry doors. The lights operate in conjunction with the cabin lights and are controlled by the cabin light switches as described in the Cabin Lights paragraph in this section.

## **INTERIOR LIGHTING**

Instrument and control panel lighting is provided by integral, flood and post lights. Six lighting control knobs are grouped together on the lower part of the instrument panel to the left of the control pedestal. These controls vary the intensity of the lighting for the instrument panel, pedestal, overhead panel, left sidewall panel, LED panels, Garmin displays, and internally lit instruments. The following paragraphs describe the function of these controls. The circuits for these lights are protected by two pull-off type circuit breakers, labeled AVN/FLOOD LIGHT and INST LIGHT, on the left sidewall switch and circuit breaker panel. Other miscellaneous lighting provided or available includes control wheel map lights, cabin lights, passenger reading lights, and a no smoking/seat belt sign. Discussion of these lights and their controls is also included in the following paragraphs.

## **GARMIN DISPLAYS, OPTIONAL ADF, AND HF DISPLAYS (if installed)**

The knob labeled AVIONICS varies the intensity of the Garmin and optional displays (if installed). Clockwise rotation of the knob increases display brightness and counterclockwise rotation decreases brightness. The displays cannot be dimmed to full dark. Rotating this knob counterclockwise past the dimmest setting will place the displays in photosensitive mode.

### **STANDBY INDICATOR CONTROL KNOB**

The knob labeled STANDBY IND varies the intensity of the integral lighting of the standby airspeed indicator, attitude indicator, altimeter, torque indicator, and magnetic compass. Clockwise rotation of the knob increases light brightness and counterclockwise rotation decreases brightness.

### **SWITCH/CIRCUIT BREAKER PANEL CONTROL KNOB**

The knob labeled SW/CB PANELS varies the intensity of the backlit LED panels. These panels are inscribed with labels for most of the switches, controls, and circuit breakers mounted on the instrument panel. Clockwise rotation of the knob increases panel brightness and counterclockwise rotation decreases brightness.

### **CIRCUIT BREAKER/PEDESTAL/OVERHEAD PANEL KNOB**

The knob labeled CB/PED/OVHD varies the intensity of the lights that illuminate the left sidewall switch and circuit breaker panel, the flood light that illuminates the control pedestal, and the post lights that illuminate the overhead panel. Clockwise rotation of the knob increases panel brightness and counterclockwise rotation decreases brightness.

### **LEFT FLOOD LIGHTING CONTROL KNOB**

This knob labeled LEFT FLOOD varies the brightness of the left side floodlight located on the right aft side of the overhead panel. This floodlight may also be used to illuminate the left sidewall switch and circuit breaker panel. Clockwise rotation of this control knob increases lamp brightness while counterclockwise rotation decreases brightness.

### **RIGHT FLOOD LIGHTING CONTROL KNOB**

This knob labeled RIGHT FLOOD varies the brightness of the right side floodlight located on the left aft side of the overhead panel. Clockwise rotation of this control knob increases lamp brightness while counterclockwise rotation decreases brightness.

### **CONTROL WHEEL MAPLIGHTS**

A control wheel maplight is mounted on the bottom of each control wheel. These lights illuminate the lower portion of the cabin in front of the pilot and copilot, and are used for checking maps and other flight data during night operation. Brightness of these lights is adjusted with a rheostat control knob on the bottom of the control wheel. Rotating the near side of the knob to the right increases light brightness and to the left decreases brightness.



### **CABIN LIGHTS WITHOUT TIMER (208B Passenger)**

The 208B passenger cabin light system without timer consists of four cabin lights installed on the interior of the airplane and courtesy lights under each wing to facilitate boarding or loading cargo during night operations. Two lights are located above the center cabin area, one above the aft cargo door, and one above the aft passenger door.

Controls for the lighting system consists of one 2-way toggle switch labeled CABIN on the lighting control panel as well as a rocker switch just forward of both the aft passenger and cargo doors. All three of these switches will toggle all cabin on or off at any time regardless of the other switch positions.

The circuit for the cabin lights is protected by a pull-off type circuit breaker, labeled CABIN LTS, on the J-Box panel in the engine bay.

### **CABIN LIGHTS WITH TIMER (if installed)**

The 208B cabin light system with timer consists of four cabin lights installed on the interior of the airplane and courtesy lights under each wing to facilitate boarding or loading cargo during night operations. Two lights are located above the center cabin area, one above the aft cargo door, and one above the aft passenger door.

Controls for the lighting system consists of one 3-way momentary switch labeled CABIN on the lighting control panel as well as a rocker switch just forward of both the aft passenger and cargo doors. The passenger door toggle switch will control all lights except the cargo door light, while the cargo door toggle switch will control only the cargo door light. The 3-way momentary switch labeled CABIN on the lighting control panel will control all lights regardless of the other switch positions.

The timer circuitry includes a solid state timer that will turn off all lights after 30 minutes automatically unless they are switched off manually. The circuit for the cabin lights is protected by a "pull-off" type circuit breaker, labeled CABIN LTS, on the J-Box panel in the engine bay.

### **CABIN LIGHTS WITH TIMER (Super CargoMaster)**

The Super CargoMaster cabin light system consists of four cabin lights installed on the interior of the airplane and courtesy lights under each wing to facilitate boarding or loading cargo during night operations. Two lights are located above the center cabin area, one above the aft cargo door and one opposite the aft cargo door.

Controls for the lighting system consists of one 3-way momentary switch labeled CABIN on the lighting control panel as well as a rocker switch just forward of the cargo door.

### **PASSENGER READING LIGHTS (Passenger Version Only)**

Passenger reading lights may be installed near each of the aft passengers positions. The lights are located in 14 small convenience panels above each seat. A pushbutton-type ON, OFF switch, mounted in each panel, controls the lights. The lights can be pivoted in their mounting sockets to provide the most comfortable angle of illumination for the passenger.

### **NO SMOKE/SEAT BELT SIGN (Passenger Version Only)**

A lighted warning sign may be installed in the airplane to facilitate warning passengers of impending flight operations necessitating the fastening of seat belts and/or the extinguishing of all smoking materials. This installation consists of a small lighted panel mounted in the cabin headliner immediately aft of the overhead console and two toggle-type switches, labeled SEAT BELT and NO SMOKE, on the lighting control panel. When these switches are placed in the ON position, the warning signs illuminate, displaying the international graphic symbolism for fasten seat belts and no smoking to the rear cabin passengers. The circuit for the warning sign lights is protected by a pull-off type circuit breaker, labeled SEAT BELT SIGN, on the left sidewall switch and circuit breaker panel.

## **CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM**

The temperature and volume of airflow to the cabin is regulated by the cabin heating, ventilating and defrosting system (see Cabin Heating, Ventilating and Defrosting System figure). In the heating system, hot compressor outlet air is routed from the engine through a flow control valve, then through a mixer/muffler where it is mixed with cabin return air or warm air from the compressor bleed valve (depending on the setting of the mixing air valve) to obtain the correct air temperature before the air is routed to the cabin air distribution system. Controls are provided to direct the heated air to the forward and/or aft portions of the cabin for heating and to the windshield for defrosting. Ventilating air is obtained from an inlet on each side at the forward fuselage and through two ram air inlets, one on each wing at the upper end of the wing struts. The wing inlet ventilating air is routed through the wing into a plenum chamber located in the center of the cabin top. The plenum distributes the ventilating air to individual overhead outlets near each seat position. Two electric blowers are available for the overhead ventilating system. Details of this installation are presented in Section 9, Supplements.

## **BLEED AIR HEAT SWITCH**

A two-position toggle switch, labeled BLEED AIR HEAT, is located on the cabin heat switch and control panel. The switch controls the operation of the bleed air flow control valve. The ON position of the switch opens the flow control valve, allowing hot bleed air to flow to the cabin heating system. The OFF position (down) closes the valve, shutting off flow of hot bleed air to the heating system.

## **TEMPERATURE SELECTOR KNOB**

A rotary temperature selector knob, labeled TEMP, is located on the cabin heat switch and control panel. The selector modulates the opening and closing action of the flow control valve to control the amount and temperature of air flowing into the cabin. Clockwise rotation of the knob increases the mass flow and temperature of the air.

### **NOTE**

- If more cabin heat is needed while on the ground, move the FUEL CONDITION Lever to HIGH IDLE and/or select the GRD position (pulled out) of the mixing air control.
- Some hysteresis may be encountered when adjusting bleed air temperature. The resulting amount and temperature of bleed air may be different when approaching a particular temperature selector knob position from a clockwise versus a counterclockwise direction. Best results can usually be obtained by turning the temperature selector knob full clockwise and then slowly turning it counterclockwise to decrease bleed airflow to the desired amount.

A temperature sensor, located in the outlet duct from the mixer/muffler operates in conjunction with the temperature selector knob. In the event of a high temperature condition (overheat) in the outlet duct, the temperature sensor will be energized, closing the flow control valve and thus shutting off the source of hot bleed air from the engine.

# CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM (CARGO VERSION)

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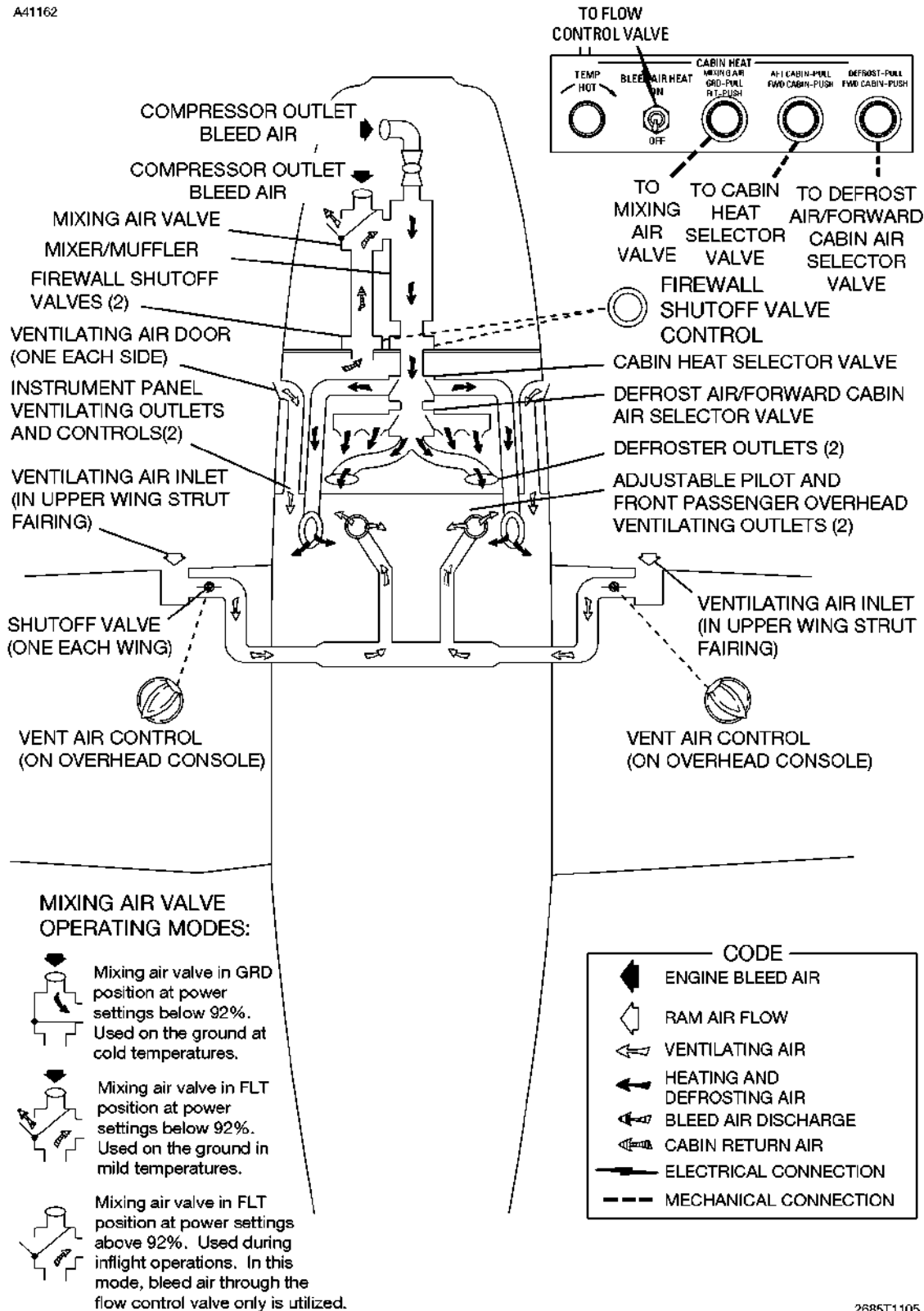
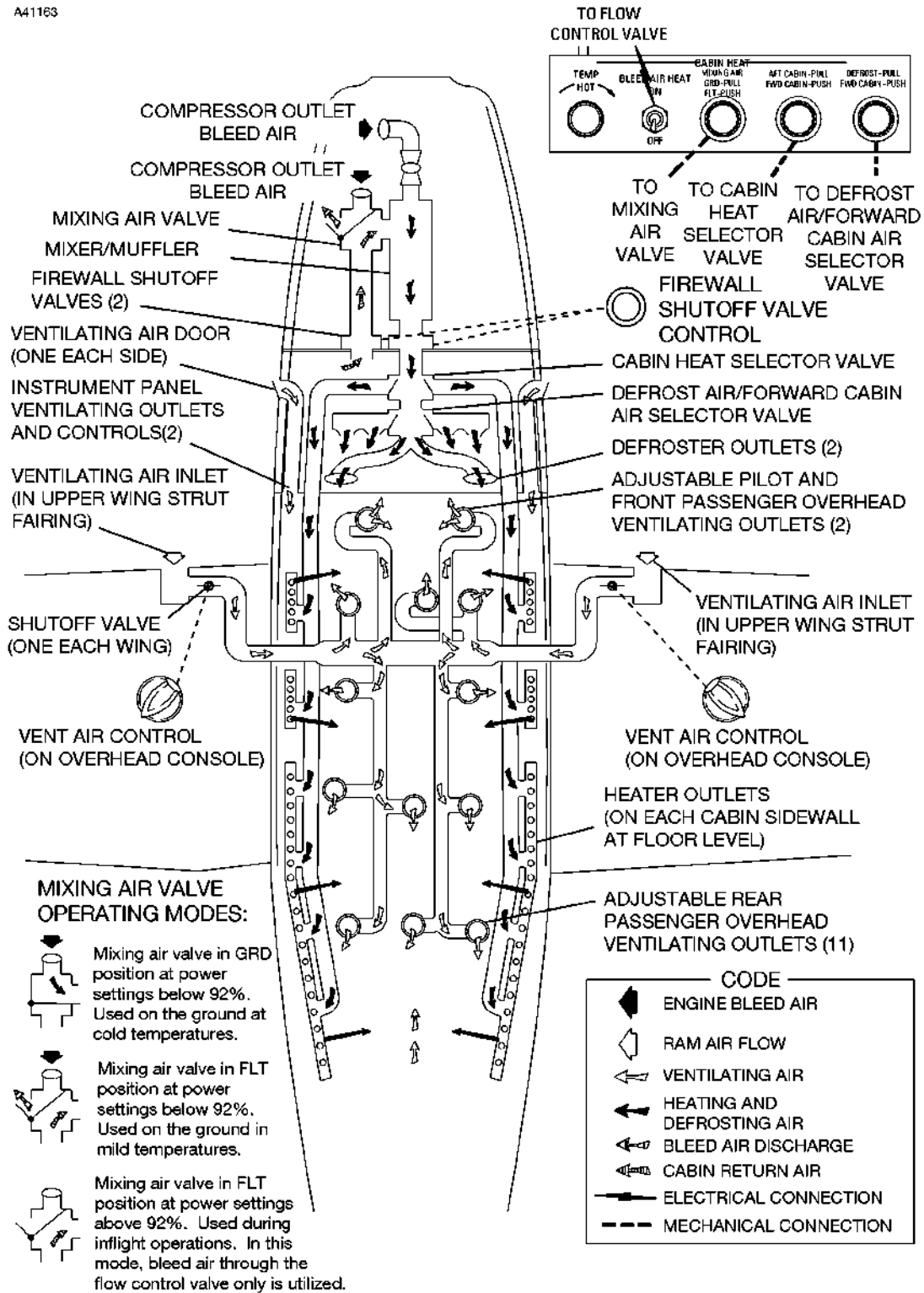


Figure 7-13 (Sheet 1 of 2)

# CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM (PASSENGER VERSION)

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Figure 7-13 (Sheet 2 of 2)

## **MIXING AIR PUSH-PULL CONTROL**

A push-pull control, labeled MIXING AIR, GRD-PULL, FLT-PUSH, is located on the cabin heat switch and control panel. With the push-pull control in the GRD position (pulled out), warm compressor bleed valve air is mixed with hot compressor outlet air in the mixer/muffler. This mode is used during ground operation when warm compressor bleed valve air is available (at power setting below 92%  $N_g$ ) and can be used as additional bleed air heat to augment the hot compressor outlet bleed air supply during periods of cold ambient temperature. With the push-pull control in the FLT position (pushed in), cabin return air is mixed with the hot compressor outlet air in the mixer/muffler. This recirculation of cabin return air enables the heating system to maintain the desired temperature for proper cabin heating. If desired, the FLT position of the push-pull control can be used on the ground when ambient temperatures are mild and maximum heating is not required. In this mode, the excess warm compressor bleed valve air available at power settings below 92%  $N_g$  is exhausted overboard from the mixing air valve.

### **CAUTION**

The mixing air push-pull control should always be in the FLT position (pushed in) when the airplane is in flight. Cabin return air must be allowed to flow through the mixing valve and blend with hot compressor outlet air during high engine power operation in order to maintain proper temperature in the cabin heat distribution system. If the FLT position is not used during flight, the system may overheat and cause an automatic shutdown.

## **AFT/FORWARD CABIN PUSH-PULL CONTROL**

A push-pull control, labeled AFT CABIN-PULL, FWD CABIN-PUSH, is located on the cabin heat switch and control panel. With the control in the AFT CABIN position (pulled out), heated air is directed to the aft cabin heater outlets located on the cabin sidewalls at floor level on the Passenger Version 208 and the outlets in the floor behind the pilot and copilot on the Cargomaster.

With the control in the FWD CABIN position (pushed in), heated air is directed to the forward cabin through four heater outlets located behind the instrument panel and/or the two windshield defroster outlets. The push-pull control can be positioned at any intermediate setting desired for proper distribution of heated air to the forward and aft cabin areas.

## **DEFROST/FORWARD CABIN PUSH-PULL CONTROL**

A push-pull control, labeled DEFROST-PULL, FWD CABIN-PUSH, is located on the cabin heat switch and control panel. With the control in the DEFROST position (pulled out), forward cabin air is directed to two defroster outlets located at the base of the windshield (the aft/forward cabin push-pull control also must be pushed in for availability of forward cabin air for defrosting). With the defrost/forward cabin push-pull control in the FWD CABIN position (pushed in), heated air will be directed to the four heater outlets behind the instrument panel.

## **CABIN HEAT FIREWALL SHUTOFF KNOB**

A push-pull shutoff knob, labeled CABIN HEAT FIREWALL SHUTOFF, PULL OFF, is located on the lower right side of the pedestal. When pulled out, the knob actuates two firewall shutoff valves, one in the bleed air supply line to the cabin heating system and one in the cabin return air line, to the off position. This knob should normally be pushed in unless a fire is suspected in the engine compartment.

### **CAUTION**

Do not place the cabin heat firewall shutoff knob in the OFF position when the mixing air control is in the GRD position because a compressor stall will occur at low power settings when the compressor bleed valve is open. The engine must be shut down to relieve back pressure on the valves prior to opening the valves.

## **VENT AIR CONTROL KNOBS**

Two vent air control knobs, labeled VENT AIR, are located on the overhead console. The knobs control the operation of the shutoff valves in each wing which control the flow of ventilating air to the cabin. The knob on the right side of the console controls the right wing shutoff valve and similarly, the knob on the left side controls the left wing shutoff valve. When the vent air control knobs are rotated to the CLOSE position, the wing shutoff valves are closed; rotating the knobs to the OPEN position progressively opens the wing shutoff valves. When the optional cabin ventilation fans are installed, rotating the knobs to the full OPEN position also turns on the ventilation fans.

## **INSTRUMENT PANEL VENT KNOBS**

Two vent knobs, labeled VENT, PULL ON, are located one on each side of the instrument panel. Each knob controls the flow of ventilating air from an outlet located adjacent to each knob. Pulling each knob opens a small air door on the fuselage exterior which pulls in ram air for distribution through the ventilating outlet.

## **VENTILATING OUTLETS**

Two vent knobs, labeled VENT, PULL ON, are located one on each side of the instrument panel. Each knob controls the flow of ventilating air from an outlet located adjacent to that knob. Pulling each knob opens a small air door on the fuselage exterior which pulls in ram air for distribution through the ventilating outlet.

## **OXYGEN SYSTEM**

Some Cargo Versions are equipped with a two-port oxygen system having quick-don type masks for the pilot and passenger; other Cargo Versions can be equipped with a two-port oxygen system utilizing conventional masks. The Passenger Version can be equipped with up to 17-port oxygen system utilizing conventional masks. Refer to Section 9, Supplements, for complete details and operating instructions.



## **PITOT-STATIC SYSTEM AND INSTRUMENTS**

There are two independent pitot-static systems on the airplane. The left pitot-static system supplies ram air pressure to Air Data Computer #1 and to the standby airspeed indicator, and supplies static pressure to Air Data Computer #1 and to the standby airspeed indicator, vertical speed indicator, and altimeter. The right pitot-static system provides ram air and static pressure to Air Data Computer #2. Each system is composed of a heated pitot-static tube mounted on the leading edge of the corresponding wing, a drain valve located on the sidewall beneath the instrument panel, and the associated plumbing necessary to connect the instruments and sources. In addition, the left system includes a static pressure alternate source valve located on the lower left corner of the instrument panel.

The static pressure alternate source valve in the left system can be used if the static source is malfunctioning. This valve supplies static pressure from inside the cabin instead of from the pitot-static tube. If erroneous instrument readings are suspected due to water or ice in the pressure line going to the static pressure source, the alternate source valve should be pulled on. Pressures within the cabin will vary with vents open or closed. Refer to Section 5, Performance for the effect of varying cabin pressures on airspeed and altimeter readings.

The drain valves incorporated in each system, located on the sidewall beneath the instrument panel, are used to drain suspected moisture accumulation by lifting the drain valve lever to the OPEN position as indicated by the placard adjacent to the valve. The valve must be returned to the CLOSED position prior to flight.

The pitot-static heat system consists of a heating element in each pitot-static tube, a two-position toggle switch, labeled PITOT/STATIC HEAT, on the de-ice/anti-ice switch panel, and two pull-off type circuit breaker, labeled LEFT PITOT HEAT and RIGHT PITOT HEAT, on the left sidewall switch and circuit breaker panel. When the pitot-static heat switch is turned on, elements in the pitot-static tubes are heated electrically to maintain proper operation in possible icing conditions.

## **AIRSPEED INDICATORS**

The Garmin PFDs are the primary sources of airspeed information. Standby airspeed information is depicted by a mechanical indicator calibrated in knots, connected to the left pitot-static system. Limitation and range markings (in KIAS) match the markings on the PFD as listed in Section 2, Limitations.

The standby airspeed indicator is a true airspeed indicator and is equipped with a knob which works in conjunction with the airspeed indicator dial in a manner similar to the operation of a flight computer. To operate the indicator, first rotate the knob until pressure altitude is aligned with outside air temperature in degrees Centigrade. To obtain pressure altitude, momentarily set the barometric scale on the altimeter to 29.92 and read pressure altitude on the altimeter. Be sure to return the altimeter barometric scale to the original barometric setting after pressure altitude has been obtained. Having set the knob to correct for altitude and temperature, read the true airspeed shown in the window by the indicator pointer. For best accuracy, the indicated airspeed should be corrected to calibrated airspeed by referring to the Airspeed Calibration chart in Section 5, Performance. Knowing the calibrated airspeed, read true airspeed in the window opposite the calibrated airspeed.

## **VERTICAL SPEED INDICATION**

The vertical speed indication on the PFDs depict airplane rate of climb or descent in feet per minute. The pointers are actuated by atmospheric pressure changes resulting from changes of altitude as supplied by the static sources.

## **ALTIMETER (STANDBY INSTRUMENT PANEL)**

Airplane altitude is depicted by a barometric type altimeter. A knob near the lower left portion of the indicator provides adjustment of the instrument's barometric scale to the current altimeter setting.

## **VACUUM SYSTEM AND INSTRUMENTS**

A vacuum system (see Typical Vacuum System figure) provides the suction necessary to operate the standby attitude indicator. Vacuum is obtained by passing regulated compressor outlet bleed air through a vacuum ejector. Bleed air flowing through an orifice in the ejector creates the suction necessary to operate the indicator. The vacuum system consists of the bleed air pressure regulator, a vacuum ejector on the forward left side of the firewall, a vacuum relief valve and vacuum system air filter on the aft side of the firewall, and the standby attitude indicator.

### **ATTITUDE INDICATOR (Standby Instrument Panel)**

Standby attitude information is depicted by a vacuum-driven attitude indicator. Bank attitude is presented by a pointer at the top of the indicator relative to the bank scale which has index marks at 10°, 20°, 30°, 60°, and 90° either side of the center mark. Pitch and roll attitudes are presented by a miniature airplane superimposed over a symbolic horizon area divided into two sections by a white horizon bar. The upper blue sky and the lower ground area have arbitrary pitch reference lines useful for pitch attitude control. A knob at the bottom of the instrument is provided for inflight adjustment of the miniature airplane to the horizon bar for a more accurate flight attitude indication.

### **LOW-VACUUM WARNING FLAG**

The standby attitude indicator includes an orange low-vacuum warning flag (GYRO) that comes into view when the vacuum is below the level necessary for reliable gyroscope operation.

#### **WARNING**

**The orange low-vacuum warning flag (gyro) is the only indication of the loss of the vacuum system.**

# TYPICAL VACUUM SYSTEM

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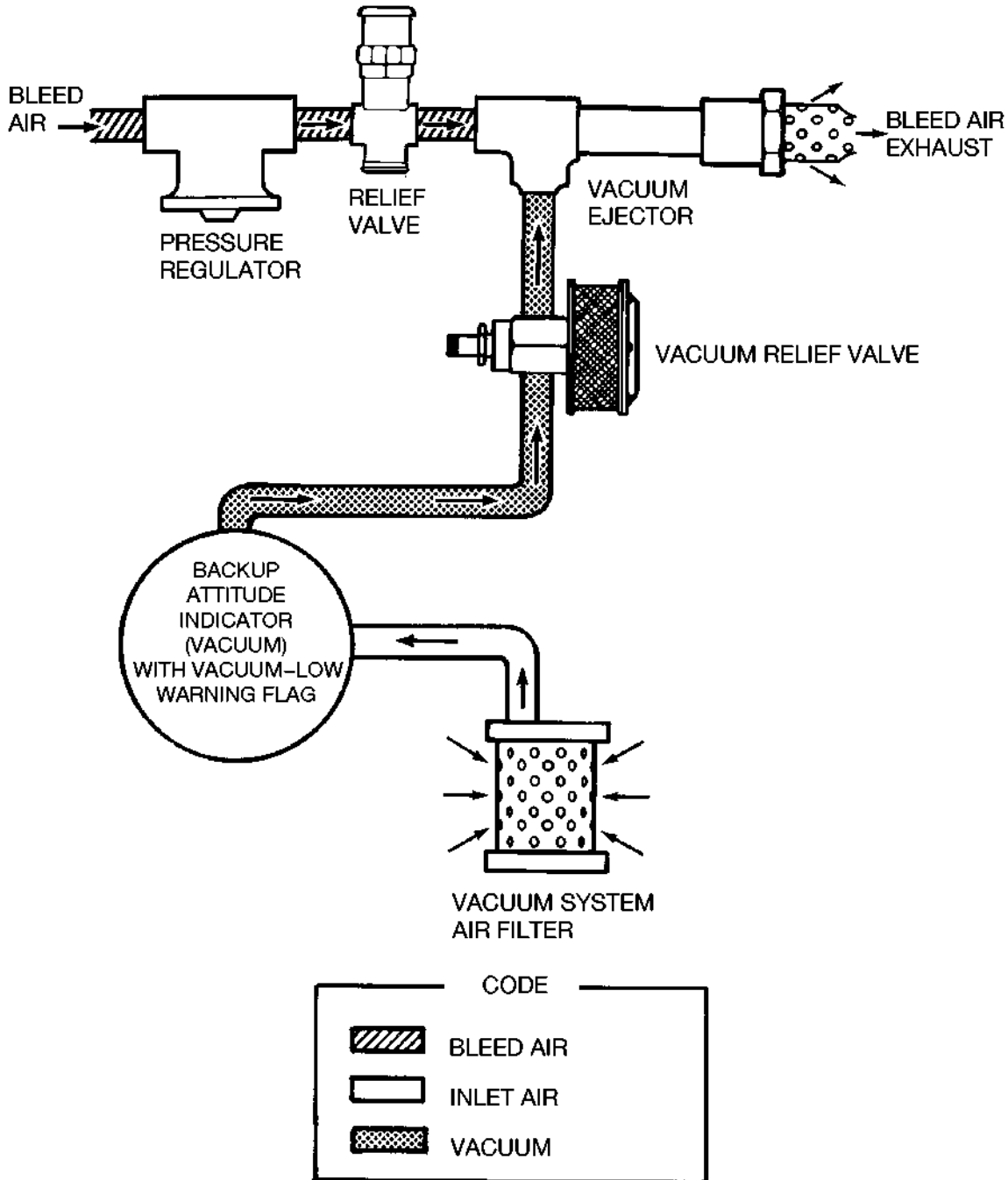


Figure 7-14

## **STALL WARNING SYSTEM**

The airplane is equipped with a vane-type stall warning unit, in the leading edge of the left wing, which is electrically connected to a stall warning horn located overhead of the pilot's position. The vane in the wing senses the change in airflow over the wing, and operates the warning horn at airspeeds between 5 and 10 knots above the stall in all configurations.

The stall warning system should be checked during the preflight inspection by momentarily turning on the battery switch and actuating the vane in the wing. The system is operational if the warning horn sounds as the vane is pushed upward. The elevator must be off the forward stop before the stall warning horn is enabled due to the fact that the aircraft is equipped with a stall warning ground disconnect switch.

A pull-off type circuit breaker, labeled STALL WRN, protects the stall warning system. Also, it is provided to shut off the warning horn in the event it should stick in the on position.

### **WARNING**

**This circuit breaker must be pushed in for landing.**

The vane and sensor unit in the wing leading edge is equipped with a heating element. The heated part of the system is operated by the STALL HEAT switch on the deice/anti-ice switch panel, and is protected by the STALL WRN circuit breaker on the left sidewall switch and circuit breaker panel.

## **AVIONICS SUPPORT EQUIPMENT**

Various avionics support equipment is installed in the airplane, and includes a microphone/speaker, mic/phone jacks, avionics cooling fans, 12VDC power outlets, an auxiliary audio input jack, and control surface static dischargers. The following paragraphs discuss these items. Description and operation of radio equipment is covered in Section 9 of this POH/AFM.

### **AVIONICS COOLING FAN**

Two DC electric deck skin fans mounted on the underside of the cowl deck draw warm air from behind the instrument panel to maintain proper operating temperatures. In addition, three DC electric fans blow air directly onto the display heat sinks for prolonged equipment life. The deck skin fans will operate when the BATTERY switch is ON and the AVIONICS No. 1 power switch is on.

### **MICROPHONE-HEADSET INSTALLATIONS**

Radio communications are accomplished by the use of a hand-held microphone and the airplane speaker, or by aviation-style headsets. The hand-held microphone stows in a hanger on the front of the pedestal and plugs into a mic jack located on the right side of the pedestal. It includes an integral push-to-talk button. The airplane speakers are located above the pilot's and copilot's positions in the cabin headliner.

The headsets plug into microphone and headset jacks located on the left side of the instrument panel for the pilot and the right side of the instrument panel for the copilot. Push-to-talk switches for the headsets are mounted on the control wheels.

Audio is controlled by the individual audio selector switches and adjusted for volume level by using the selected receiver volume controls. The system is designed so that microphones are voice activated, with transmission over the COM radios controlled by the push-to-talk switches.

## **STATIC DISCHARGERS**

As an aid in IFR flights, wick-type static dischargers are installed to improve radio communications during flight through dust or various forms of precipitation (rain, snow or ice crystals). Under P-Static conditions, the build-up and discharge of static electricity from the trailing edges of the wings, rudder, elevator, propeller tips, and radio antennas can result in loss of usable radio signals on all communications and navigation radio equipment. Usually the ADF is first to be affected and VHF communication equipment is the last to be affected.

Installation of static dischargers reduces interference from precipitation static, but it is possible to encounter severe precipitation static conditions which might cause the loss of radio signals, even with static dischargers installed. Whenever possible, avoid known severe precipitation areas to prevent loss of dependable radio signals. If avoidance is impractical, minimize airspeed and anticipate temporary loss of radio signals while in these areas.

Static dischargers lose their effectiveness with age, and therefore, should be checked periodically (at least at every annual inspection) by qualified avionics technicians, etc. If testing equipment is not available, it is recommended that the wicks be replaced every two years, especially if the airplane is operated frequently in IFR conditions. The discharger wicks are designed to unscrew from their mounting bases to facilitate replacement.

## **12VDC POWER OUTLET**

A power converter, located below the copilot seat, reduces the airplane's 28VDC power to 12VDC. This converter provides up to 10 amps of power to operate portable devices such as notebook computer and audio players. The power output connector (POWER OUTLET 12V) is located on the center pedestal (Refer to Typical Instrument Panel figure).

## **AUXILIARY AUDIO INPUT JACK**

An auxiliary audio input jack (AUX AUDIO IN) is mounted on the lower aft face of the pedestal (Refer to Typical Instrument Panel figure). It allows connection of entertainment audio devices such as cassette, compact disc, and MP3 players to play music over the airplane's headsets.

The signal from AUX AUDIO IN is automatically muted during radio communications or pilot selection of crew intercom isolation modes located on the audio panel. The AUX key on the audio panel does not control the AUX AUDIO IN signal. For a more complete description and operating instructions of the audio panel, refer to the Garmin G1000 CRG.

Since the entertainment audio input is not controlled by a switch, there is no way to deselect the entertainment source except to disconnect the source at the audio input connector.

## **CABIN FEATURES**

### **CABIN FIRE EXTINGUISHER**

A portable fire extinguisher is installed on the cargo barrier in some Cargo Versions and on the inside of the pilot's entry door in other Cargo Versions and the Passenger Version. The extinguisher in both airplanes is readily accessible in case of fire. The extinguisher should be checked prior to each flight to ensure that its bottle pressure, as indicated by the gage on the bottle, is within the green arc and the operating lever lock pin is securely in place.

To operate the fire extinguisher:

1. Loosen retaining clamp and remove extinguisher from bracket.
2. Hold extinguisher upright, pull operating lever lock pin, and press lever while directing the discharge at the base of the fire at the near edge. Progress toward the back of the fire by moving the nozzle rapidly with a side-to-side sweeping motion.

### **CAUTION**

Care must be taken not to direct the initial discharge directly at the burning surface at close range (less than five feet) because the high velocity stream may cause splashing and/or scattering of the burning material.

3. Anticipate approximately ten seconds of discharge duration.

(Continued Next Page)



## **CABIN FIRE EXTINGUISHER** (Continued)

### **WARNING**

**Ventilate the cabin promptly after successfully extinguishing the fire to reduce the gases produced by thermal decomposition. Occupants should use oxygen masks until the smoke clears.**

Fire extinguishers should be recharged by a qualified fire extinguisher agency after each use. Such agencies are listed under "Fire Extinguisher" in the telephone directory. After recharging, secure the extinguisher to its mounting bracket; do not allow it to lie loose on floor or seats.

### **SUN VISORS**

Two sun visors are mounted overhead of the pilot and copilot. The visors are mounted on adjustable arms which enable them to be swung and telescoped into the desired windshield area.

### **CHART AND STORAGE COMPARTMENTS**

A map compartment is located in the lower right side of the instrument panel. A hinged door covers the compartment and can be opened to gain access into the compartment. Storage pockets are also installed on the back of the pilot's and copilot's seats and along the bottom edge of each crew entry door and can be used for stowage of maps and other small objects.

### **MISCELLANEOUS EQUIPMENT**

#### **ENGINE INLET COVERS AND PROPELLER ANCHOR**

Various covers and an anchor are available to close engine openings and restrain the propeller during inclement weather conditions and when the airplane is parked for extended periods of time, such as overnight. The covers preclude the entrance of dust, moisture, bugs, etc. into the engine and engine compartment.

Two covers are provided which plug into the two front inlets, thereby closing off these openings. The engine inlet covers may be installed after the engine has cooled down (ITT indicator showing off scale temperature). To prevent the propeller from windmilling during windy conditions, the propeller anchor can be installed over a blade of the propeller and its anchor strap secured around the nose gear or to the bracket located on the lower right-hand cowl.

## **CREW ENTRY STEP ASSEMBLY**

The airplane may be equipped with a crew entry step for each crew entry door. The step assembly attaches to the floorboard just inside the entry door and extends toward ground level, providing two steps for entering or exiting the airplane. When not in use, the step assembly folds and stows just inside the cabin, inboard of each entry door.

## **CARGO BARRIER AND NETS**

A cargo barrier and three cargo barrier nets may be installed directly behind the pilot's and copilot's seats. The barrier and nets preclude loose cargo from moving forward into the pilot's and copilot's stations during an abrupt deceleration. The barrier consists of a U-shaped assembly of honeycomb composite construction. The assembly attaches to the four seat rails at the bottom at station 153 and to structure at the top at approximately station 166. The cargo barrier nets consist of three nets: one for the left sidewall, one for the right sidewall, and one for the center. The left and right nets fill in the space between the barrier assembly and the airplane sidewalls.

The side nets are fastened to the airplane sidewalls and the edge of the barrier with six anchor-type fasteners each, three on each side. The center net fills in the opening in the top center of the barrier. The center net is fastened with four anchor-type fasteners, two on each side.

## **CARGO PARTITIONS**

Cargo partitions are available and can be installed to divide the cargo area into convenient compartments. Partitions may be installed in all of the five locations at stations 188.7, 246.8, 282.0, 307.0, and 332.0. The cargo partitions are constructed of canvas with nylon webbing reinforcement straps crisscrossing the partition for added strength. The ends of each strap have fittings which attach to the floor tracks and anchor-type fasteners on the sides and top of the fuselage. Four straps have adjustable buckles for tightening the straps during installation of the partition.

## **CARGO DOOR RESTRAINING NET**

A restraining net may be installed on the inside of the airplane over the cargo door opening. The net precludes loose articles from falling out the cargo door when the doors are opened. The restraining net consists of two halves which part in the center of the door opening. The front and rear halves slide fore and aft, respectively, on a rod to open the net. The net is attached to the sidewall by screws and nutplates along the front and rear edges of the net. When the net is closed, the two halves are held together by snap-type fasteners.

## **CARGO/AIRPLANE TIE-DOWN EQUIPMENT**

Various items of tie-down equipment are available for securing cargo within the airplane and/or tying down the airplane. This equipment consists of tie-down belt assemblies having various load ratings and adjustment devices and two types of quick-release tie-down ring anchors for securing the belts to the cabin seat tracks and anchor plates. Refer to Section 6 for the recommended use and restrictions of this equipment.

## **HOISTING RINGS**

Provisions are made for the installation of four hoisting rings which attach to the left and right sides of both front and rear spar wing-to-fuselage attach fittings. Each hoisting ring consists of a hinge which replaces the washer on the attachment bolt of the fitting. The upper half of the hinge contains a ring which is used for attaching the hoist when the airplane is being hoisted. When not in use, the upper hinge half folds down out of the way. To gain access to the hoisting rings, when installed, it is necessary to remove the wing-to-fuselage fairing strips.

## **RELIEF TUBE**

Provisions are made for the installation of a relief tube in the aft cabin area on the Passenger Version. The relief tube is installed on the right sidewall, just aft of the passenger entry door.

## **OIL QUICK-DRAIN VALVE**

An oil quick-drain valve is available to replace the drain plug on the bottom of the engine oil tank, and provides quicker, cleaner draining of the engine oil. To drain the oil with this valve, slip a hose over the end of the valve, cut the safety wire securing the valve on-off lever in the off position, and rotate the lever to the on position. After draining, rotate the valve on-off lever to the off position, remove the hose to check for leakage, and resafety the on-off lever in the off position.



## SECTION 8 AIRPLANE HANDLING, SERVICE & MAINTENANCE

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## INTRODUCTION

This section contains factory-recommended procedures for proper ground handling and routine care and servicing of your Cessna. It also identifies certain inspection and maintenance requirements which must be followed if your airplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered in your locality.

Keep in touch with your Cessna Service Station and take advantage of his knowledge and experience. He knows your airplane and how to maintain it. He will remind you when lubrications and oil changes are necessary, and will advise you about other seasonal and periodic services.

### WARNING

**The airplane should be regularly inspected and maintained in accordance with information found in the airplane Maintenance Manual and in company issued Service Bulletins and Service Newsletters. All recommendations for product improvements called for by Service Bulletins should be accomplished and the airplane should receive repetitive and required inspections. Cessna does not condone modifications, whether by Supplemental Type Certificate or otherwise, unless these certificates are held and/or approved by Cessna. Other modifications may void warranties on the airplane since Cessna has no way of knowing the full effect on the overall airplane. Operation of an airplane that has been modified may be a risk to the occupants, and operating procedures and performance data set forth in the POH/AFM may no longer be considered accurate for the modified airplane.**

## **IDENTIFICATION PLATE**

All correspondence regarding your airplane should include the SERIAL NUMBER. The Serial Number, Model Number, Production Certificate (PC) Number and Type Certificate (TC) Number can be found on the Identification Plate located on the forward doorpost of the left crew door on early serial airplanes or on the left side of the tailcone below the horizontal stabilizer on later serial airplanes. A Finish and Trim Plate is located on the forward doorpost of the left crew door of all airplanes and contains a code describing the interior color scheme and exterior paint combination of the airplane. The code may be used in conjunction with an applicable Parts Catalog if finish and trim information is needed.

## **CESSNA OWNER ADVISORIES**

Cessna Owner Advisories are sent to Cessna airplane owners at no charge to inform them about mandatory and/or beneficial airplane service requirements and product improvements:

### **United States Airplane Owners**

If your airplane is registered in the U.S., appropriate Cessna Owner Advisories will be mailed automatically according to the latest airplane registration name and address provided to the FAA.

To request a duplicate Owner Advisory to be sent to an address different from the FAA airplane registration address, please complete and return an Owner Advisory Application (otherwise no action is required on your part).

### **International Airplane Owners**

To receive Cessna Owner Advisories, please complete and return an Owner Advisory Application.

Receipt of a valid Owner Advisory Application will establish your Cessna Owner Advisory service (duplicate Owner Advisory service for U.S. airplane owners) for one year, after which you will be sent a renewal notice.

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## **PUBLICATIONS**

The following publications and flight operation aids are furnished in the airplane when delivered from the factory:

- CESCO/CUSTOMER CARE PROGRAM HANDBOOK
- PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL (POH/AFM)
- FLIGHT MANUAL
- PILOT'S ABBREVIATED CHECKLIST
- CESSNA SALES AND SERVICE DIRECTORY

The following additional publications, plus many other supplies that are applicable to your airplane, are available from your Cessna Service Station:

- INFORMATION MANUAL (Contains POH/AFM Information)
- MAINTENANCE MANUALS and PARTS CATALOGS for your airplane, engine, accessories, avionics, and autopilot.

Cessna Service Stations have a Customer Care Supplies and Publications Catalog covering all available items, many of which are kept on hand. The Cessna Service Station representative can place an order for any item which is not in stock.

### **NOTE**

A POH/AFM that is lost or destroyed may be replaced by contacting your Cessna Service Station or Cessna Product Support. An affidavit containing the owner's name, airplane serial number and registration number must be included in replacement requests since the POH/AFM is identified for a specific airplane only.

## **AIRPLANE FILE**

1. To be displayed in the airplane at all times:
  - a. Aircraft Airworthiness Certificate (FAA Form 8100-2).
  - b. Aircraft Registration Certificate (FAA Form 8050-3).
  - c. Aircraft Radio Station License, if transmitter installed (FCC Form 556).
2. To be carried in the airplane at all times:
  - a. Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.
  - b. Weight and Balance, and associated papers (latest copy of the Repair and Alteration Form, FAA Form 337, if applicable).
  - c. Equipment List.
3. To be made available upon request:
  - a. Aircraft Maintenance Record.
  - b. Engine Maintenance Record.
  - c. Propeller Maintenance Record.
  - d. Avionics Maintenance Record.

Most of the items listed are required by the United States Federal Aviation Regulations. Since the Regulations of other nations may require other documents and data, owners/operators of airplanes not registered in the United States should check with their own aviation officials to determine their individual requirements.

Cessna recommends that these items, plus the Pilot's Checklists, CESCO/ Customer Care Program Handbook; and Customer Care Card be carried in the airplane at all times.

## **AIRPLANE INSPECTION PERIODS**

### **FAA REQUIRED INSPECTIONS**

As required by Federal Aviation Regulations, all civil airplane of U.S. registry must undergo a complete inspection (annual) each 12 calendar months. In addition to the required ANNUAL inspection, airplane operated commercially (for hire) must have a complete inspection every 100 hours of operation.

The FAA may require other inspections by the issuance of airworthiness directives applicable to the airplane, engine, propeller, and components. It is the responsibility of the owner/operator to ensure compliance with all applicable airworthiness directives and, when the inspections are repetitive, to take appropriate steps to prevent inadvertent noncompliance.

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**FAA REQUIRED INSPECTIONS** (Continued)

In lieu of the 100 HOUR and ANNUAL inspection requirements, an airplane may be inspected in accordance with a progressive inspection schedule, which allows the work load to be divided into smaller operations that can be accomplished in shorter time periods.

The Cessna Progressive Care Program has been developed to provide a modern progressive inspection schedule that satisfies the complete airplane inspection requirements of both the 100 HOUR and ANNUAL inspections as applicable to Cessna airplanes. The program assists the owner/operator in his responsibility to comply with all FAA inspection requirements, while ensuring timely replacement of life-limited parts and adherence to factory-recommended inspection intervals and maintenance procedures.

**CESSNA PROGRESSIVE CARE**

The Cessna Progressive Care Program has been designed to help you realize maximum utilization of your airplane at a minimum cost and downtime. Under this program, your airplane is inspected and maintained in four operations. The four operations are recycled each 400 hours and are recorded in a specially provided Aircraft Inspection Log as each operation is conducted.

The Cessna Aircraft Company recommends Progressive Care for airplanes that are being flown 400 hours or more per year, and the 100-hour inspection for all other airplanes. The procedures for the Progressive Care Program and the 100-hour inspection have been carefully worked out by the factory and are followed by the Cessna Service Organization. The complete familiarity of Cessna Authorized Caravan Service Stations with Cessna equipment and factory-approved procedures provides the highest level of service for Cessna owners/operators.

Regardless of the inspection method selected by the owner/operator, he should keep in mind that FAR Part 43 and FAR Part 91 establishes the requirement that properly certified agencies or personnel accomplish all required FAA inspections and most of the manufacturer recommended inspections.

**CESSNA CUSTOMER CARE PROGRAM**

Specific benefits and provisions of the Cessna Warranty plus other important benefits are contained in the CESCO/ Customer Care Program Handbook supplied with the airplane. Thoroughly review your CESCO/ Customer Care Program Handbook and keep it in the airplane at all times.

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## **CESSNA CUSTOMER CARE PROGRAM** (Continued)

Contact a Cessna Service Station either at 100 hours for the first Progressive Care Operation, or for the first 100-hour inspection depending on the program chosen for the airplane. While these important inspections will be performed by any Cessna Caravan Service Station, in most cases it is preferable to have the facility where the airplane was purchased accomplish this work.

## **PHASECARD INSPECTION**

As an alternative to the 100-Hour and Annual inspection program, the Caravan may be inspected in accordance with the Cessna PhaseCard Inspection Program. The Cessna PhaseCard Inspection Program is designed for Caravan operator's who fly more than 400 hours per year as a Part 135 operation. 14 CFR, Part 91 operators may also utilize the PhaseCard Inspection Program under the requirements of 14CFR, Part 91.409 (d). The PhaseCard program provides the mechanic with step-by-step, easy-to-follow instructions for each inspection task. Actual field experience has shown an average of 30% reduction in scheduled maintenance labor hours over progressive or periodic type inspection programs. The higher the utilization, the more valuable the program becomes.

## **CESCOM SYSTEM**

CESCOM is Cessna's Computerized Maintenance Records System. This comprehensive system provides an accurate and simple method of monitoring and scheduling inspections, Service Bulletins, Service Kits, Airworthiness Directives as well as scheduled and unscheduled maintenance activities. For detail information about CESCOM, refer to the CESCOM Instruction Manual supplied with the airplane.

## **ENGINE CONDITION TREND MONITORING**

Pratt & Whitney Canada Engine Condition Trend Monitoring is a system of recording engine instrument readings, correcting the readings for ambient conditions, and comparing actual engine operation to typical engine operating characteristics.

It has been established that engine operating characteristics, such as output torque ( $T_q$ ), propeller RPM ( $N_p$ ), interturbine temperature (ITT), gas generator RPM ( $N_g$ ), and fuel flow ( $W_f$ ) are predictable for various engine types under specific ambient conditions.

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**ENGINE CONDITION TREND MONITORING** (Continued)

Because airplane engines operate at a wide range of altitudes, outside air temperatures, and airspeeds, corrections for varying ambient conditions are also incorporated into the Trend Monitoring process.

Additional information about both of these methods may be obtained from the following sources:

- Cessna Caravan Service Station.
- Cessna Propeller Aircraft Product Support.
- Pratt & Whitney Canada, Inc.  
1000 Marie - Victorin, Longueuil, Quebec  
Canada, J4G 1A1  
Attention: Customer Support, Small Turboprops  
Mail Code: 1RC1  
Tel: (514) 677-9411
- The publication "Engine Condition Trend Monitoring and Power Management for PT6A-114, PT6A-114A Installed in the Cessna Caravan I" supplied in this Pilot's Operation Handbook, or from sources listed above.
- Pratt & Whitney Canada Aircraft Gas Turbine Operation Information Letter, No. 23.

**PILOT-CONDUCTED PREVENTIVE MAINTENANCE**

A certified pilot who owns or operates an airplane not used as an air carrier is authorized by FAR Part 43 to perform limited maintenance on his airplane. Refer to FAR Part 43 for a list of the specific maintenance operations that are allowed.

**NOTE**

Pilots operating airplanes of other than U.S. registry should refer to the regulations of the country of certification for information on preventive maintenance that may be performed by pilots.

A current 208 Series Maintenance Manual should be obtained prior to performing any preventive maintenance to ensure that proper procedures are followed. The Cessna Service Station should be contacted for further information or for required maintenance that must be accomplished by appropriately licensed personnel.

## **ALTERATIONS OR REPAIRS**

It is essential that the FAA be contacted prior to any alterations on the airplane to ensure that airworthiness of the airplane is not violated. Alterations or repairs to the airplane must be accomplished by licensed personnel.

## **GROUND HANDLING**

### **TOWING**

The airplane is most easily and safely maneuvered by hand with the towbar attached to the nosewheel. The tow bar may be stowed in Zone 6. Moving the airplane by hand will require that the individual steering with the tow bar be assisted by personnel pushing at the wing struts.

### **CAUTION**

Do not push or pull the airplane using the propeller blades or control surfaces.

Use extreme caution during towing operations, especially when towing with a vehicle. Do not exceed the nose gear turning angle limit (51.5°) on either side of center as shown by the steering limit marks.

If excess force is exerted beyond the turning limit, a red over-travel indicator block (frangible stop) will fracture and the block, attached to a cable, will fall into view alongside the nose strut. This should be checked routinely during preflight inspection to prevent operation with a damaged nose gear.

### **CAUTION**

Disengage rudder lock and remove any external rudder locks before towing.

If the airplane is towed or pushed over a rough surface during hangaring, watch that the normal cushioning action of the nose gear does not cause excessive vertical movement of the tail and the resulting contact with low hangar doors or structure. A flat nose tire will also increase tail height.

## **PARKING**

When parking the airplane, head into the wind and set the parking brakes. Do not set the parking brakes during cold weather when accumulated moisture may freeze the brakes, or when the brakes are overheated. Install the control wheel lock, engage the rudder lock, and chock the wheels (if the brakes are not utilized) to prevent airplane movement. In severe weather and high wind conditions, tie the airplane down as outlined in the tie down section.

### **CAUTION**

Any time the airplane is loaded heavily, the footprint pressure (pressure of the airplane wheels upon the contact surface of the parking area or runway) will be extremely high, and surfaces such as hot asphalt or sod may not adequately support the weight of the airplane. Precautions should be taken to avoid airplane parking or movement on such surfaces.

## **TIE DOWN**

Proper tie-down procedure is the best precaution against damage to the parked airplane by gusty or strong winds. To tie down the airplane securely, proceed as follows:

1. Head the airplane into the wind, if possible.
2. Set the parking brake.

### **CAUTION**

Do not set the parking brake during cold weather when accumulated moisture may freeze the brakes or when the brakes are overheated. If the brakes are not utilized, chock the nose and main wheels to prevent airplane movement.

3. Install the control wheel lock and engage the rudder lock (if installed).
4. Set aileron and elevator trim tabs to neutral position so that tabs fair with control surfaces.

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## **TIE DOWN** (Continued)

5. Install pitot tube cover(s), if available.
6. Secure ropes or chains of sufficiently strong tensile strength to the wing tie-down fittings and secure to ground anchors.
7. Attach a rope or chain to the tail tie-down, and secure to a ground anchor.
8. If additional security is desired, attach a rope (no chains or cables) to the nose gear torque link and secure to a ground anchor.
9. If dusty conditions exist, or the last flight of the day has been completed, install the two engine inlet covers to protect the engine from debris. The covers may be installed after the engine has cooled down (ITT indicator showing "off scale" temperature).
10. To prevent the propeller from windmilling, install the propeller anchor over a blade of the propeller and secure its anchor strap around the nose gear or to the bracket located on the lower right hand cowl.

## **JACKING**

Several jack points or jacking locations are available depending on whether a cargo pod is installed. A fuselage jack point directly below the firewall and housed within the nose gear strut fairing is accessible for nose gear jacking regardless of the installation of a cargo pod. Two additional fuselage jack points are located at the main gear supports, but are not accessible with the cargo pod installed. Their use is generally reserved for maintenance such as main gear removal or raising the entire airplane whenever the cargo pod is not installed.

Anytime the cargo pod is installed, if the main gear-to-fuselage fairings are removed, jacks can be positioned adjacent to the sides of the cargo pod and raised to engage the receptacle on the end of the jacks over the head of the outboard bolt which secures the main gear attach trunnion bearing cap (aft) on the left and right gear. These jacking locations serve essentially the same purpose as the fuselage jack points at the main gear supports. An additional jack point on each main gear axle fitting is used primarily when the cargo pod is installed and it is desired to jack a single main gear for tire replacement, etc. If desired, jack stands with wing jack pads may be fabricated so that the front wing spar at stations 141.2 or 155.9 on each wing may be used as jacking locations. A tail jack must be used in conjunction with wing jacking.

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## **JACKING** (Continued)

### **CAUTION**

- **A tail jack stand must be used when conducting maintenance inside the tail section, and should be installed in most jacking operations. Be sure the stand is suitably heavy enough to keep the tail stable under all conditions and is strong enough to support the airplane. Placing a jack stand under the nose jack point (if not used for jacking) will provide additional stability.**
- **Do not use cargo pod structure for jacking or as a blocking surface.**
- **Raise the airplane no more than required for the maintenance being performed.**

In some instances, it may be necessary to use a sling or hoisting rings for the initial lift, to be followed with jacking at the jack points. Refer to the Maintenance Manual for procedures on jacking and hoisting, and information concerning jacking equipment.

## **LEVELING**

Longitudinal leveling of the airplane for weighing will require that the main landing gear be supported by stands, blocks, etc., on the main gear scales to a position at least 4 inches higher than the nose gear as it rests on an appropriate scale. This initial elevated position will compensate for the difference in waterline station between the main and nose gear so that final leveling can be accomplished solely by deflating the nose gear tire.

### **NOTE**

Since the nose gear strut on this airplane contains an oil snubber for shock absorption rather than an air/oil shock strut, it cannot be deflated to aid in airplane leveling.

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## **LEVELING** (Continued)

The airplane can also be leveled longitudinally by raising or lowering the airplane at the jack points. Longitudinal leveling points are provided by backing out the two leveling screws located on the left side of the fuselage just forward of the cargo doors. Place a spirit level on the screws, then deflate the nose gear tire (if placed on scales) or adjust the jacks to center the bubble in the level. The pilot's seat rails can also be used for longitudinal leveling by moving the seat to the most forward position and placing the level on the rail just aft of the seat. To level the airplane laterally, center a spirit level across the seat rails aft of the pilot and right front passenger seats and raise or lower one side of the airplane. Refer to the 208 Series Maintenance Manual for additional information.

## **SERVICING**

In addition to the PREFLIGHT INSPECTION covered in Section 4, COMPLETE servicing, inspection, and test requirements for your airplane are detailed in the 208 Series Maintenance Manual. The Maintenance Manual outlines all items that require attention at 100, 200, and 400-hour intervals, plus those items that require servicing, inspection, and/or testing at special intervals.

Since Cessna Service Stations have the training and equipment necessary to conduct all service, inspection, and test procedures in accordance with applicable maintenance manuals, it is recommended that owner/operators contact the Cessna Service Station concerning these requirements and begin scheduling the airplane for service at the recommended intervals.

Cessna Progressive Care ensures that these requirements are accomplished at the required intervals to comply with the 100-hour or ANNUAL inspection as previously covered.

Depending on various flight operations, your local Government Aviation Agency may require additional service, inspections, or tests. For these regulatory requirements, owners/operators should check with local aviation officials where the airplane is being operated.

For quick and ready reference, quantities, materials, and specifications for frequently used service items are as follows:

## **OIL**

### **OIL GRADE (SPECIFICATION)**

Oil conforming to Pratt & Whitney Engine Service Bulletin No. 1001, and all revisions or supplements thereto, must be used. The oils listed below comply with the engine manufacturers specification PWA521 and have a viscosity Type II rating. These oils are fully approved for use in Pratt & Whitney Canada commercially operated engines. When adding oil, service the engine with the type and brand that is currently being used in the engine. Refer to the airplane and engine maintenance records for this information. Should oils of different viscosities or brands be inadvertently mixed, the oil system servicing instructions in the Maintenance Manual shall be carried out.

- BP Turbo Oil 2380
- Exxon Turbo Oil ETO 85 (Third generation lubricant)
- Aero Shell Turbine Oil 500
- Aero Shell Turbine Oil 555
- Aero Shell Turbine Oil 560 (Third generation lubricant)
- Royco Turbine Oil 500
- Royco Turbine Oil 555
- Royco Turbine Oil 560 (Third generation lubricant)
- Mobil Jet Oil II
- Mobil Jet Oil 254 (Third generation lubricant)
- Castrol 5000
- Turbonycoil 600

### **CAUTION**

- Do not mix brands or types of oils.
- When changing from an existing lubricant formulation to a “third generation” lubricant formulation (see list above), the engine manufacturer strongly recommends that such a change should only be made when an engine is new or freshly overhauled. For additional information on use of third generation oils, refer to the engine manufacturer’s pertinent oil service bulletins.

(Continued Next Page)

**OIL** (Continued)

**NOTE**

The oils listed above are recommended when operation will result in frequent cold soaking at ambient temperatures of 0°F (-18°C). Refer to Pratt & Whitney Engine Service Bulletin No. 1001 for additional approved oils:

If one or more of the following conditions exist, the accessory gearbox scavenge pump inlet screen and any drained oil should be inspected for the presence of carbon particles, per airplane and engine maintenance manual procedures and the engine manufacturer's pertinent engine and oil service bulletins:

1. Engine oil has been switched to a "third generation" lubricant during mid-life.
2. High oil consumption.
3. Oil leaking from engine intake.

If carbon particles are found, refer to the above referenced maintenance manuals and service bulletins for corrective action.

TOTAL OIL CAPACITY - 14 U.S. Quarts (including oil in filter, cooler and hoses).

DRAIN AND REFILL QUANTITY - Approximately 9.5 U.S. Quarts.

OIL QUANTITY OPERATING RANGE:

Fill to within 1.5 quarts of MAX HOT or MAX COLD (as appropriate) on dipstick. Quart markings indicate U.S. quarts low if oil is hot. For example, a dipstick reading of 3 indicates the system is within 2 quarts of MAX, if the oil is cold and within 3 quarts of MAX if the oil is hot.

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## **OIL** (Continued)

### **WARNING**

**Make sure oil dipstick cap is securely latched down. Operating the engine with less than the recommended oil level and with the dipstick cap unlatched will result in excessive oil loss and eventual engine stoppage.**

### **NOTE**

To obtain an accurate oil level reading, it is recommended the oil level be checked either within 10 minutes after engine shutdown while the oil is hot (MAX HOT marking) or prior to the first flight of the day while the oil is cold (MAX COLD marking). If more than 10 minutes has elapsed since engine shutdown and engine oil is still warm, perform an engine dry motoring run before checking oil level.

### **OIL DRAIN PERIOD**

For engines operated in corporate or utility airplanes with a typical utilization of 50 hours per month or less, it is recommended the oil be changed every 400 hours or 12 months, whichever occurs first. For engines operated in high utilization commuter airline type operation, a basic oil drain period of 1200 hours or 12 months is recommended. Regardless of the degree of utilization, if operating in a sandy or dusty environment, the oil change interval must be at least every 6 months.

## **FUEL**

### **APPROVED FUEL GRADE (SPECIFICATION):**

- Jet A (ASTM-D1655).
- Jet A-1 (ASTM-D1655).
- Jet B (ASTM-D1655).
- JP-1 (MIL-L-5616).
- JP-4 (MIL-T-5624).
- JP-5 (MIL-T-5624).
- JP-8 (MIL-T-83133A).

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## **FUEL** (Continued)

### ALTERNATE/EMERGENCY FUEL:

- Aviation Fuel (All grades of military and commercial aviation gasoline).

### **CAUTION**

Aviation gasoline is restricted to emergency use and shall not be used for more than 150 hours in one overhaul period. A mixture of one part aviation gasoline and three parts of Jet A, Jet A-1, JP-1, or JP-5 may be used for emergency purposes for a maximum of 450 hours per overhaul period.

### CAPACITY EACH TANK:

- 167.8 U.S. Gallons.

### **CAUTION**

To obtain accurate fuel quantity indicator readings, verify the airplane is parked in a laterally level condition, or, if in flight, make sure the airplane is in a coordinated and stabilized condition.

## **FUEL ADDITIVES**

A variety of fuels may be used in the airplane; however, each must have an anti-icing additive, EGME or DIEGME, incorporated or added to the fuel during refueling.

It is recommended that fuel anti-icing additive be used to control bacteria and fungi. The anti-ice additives EGME/DIEGME have shown (through service experience) that they provide acceptable protection from microorganisms such as bacteria and fungi that can rapidly multiply and cause serious corrosion in tanks and may block filters, screens and fuel metering equipment.

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## **FUEL ADDITIVES** (Continued)

### **CAUTION**

- JP-4 and JP-5 fuels per MIL-T-5624 and JP-8 fuel per MIL-T-83133A contain the correct premixed quantity of an approved type of anti-icing fuel additive and no additional anti-ice compounds should be added.
- Proper mixing of EGME or DIEGME compound with the fuel is extremely important. A concentration in excess of that recommended (0.15% by volume maximum) will result in detrimental effects to the fuel tanks, such as deterioration of protective primer and sealants and damage to o-rings and seals in the fuel system and engine components.
- Use only blending equipment that is recommended by the manufacturer to obtain proper proportioning.

### PROCEDURE FOR ADDING FUEL ANTI-ICING ADDITIVE

When the airplane is being refueled, use the following procedure to blend anti-icing additive to nontreated fuel:

1. Attach additive to refuel nozzle, making sure blender tube discharges in the refueling stream.
2. Start refueling while simultaneously fully depressing and slipping ring over trigger of blender.

### **WARNING**

**Anti-icing additives containing Ethylene Glycol Monomethyl Ether (EGME) are harmful if inhaled, swallowed, or absorbed through the skin, and will cause eye irritation. It is also combustible. Before using this material, refer to all safety information on the container.**

(Continued Next Page)

## **FUEL ADDITIVES** (Continued)

### **CAUTION**

- Diethylene Glycol Monomethyl Ether (DIEGME) is slightly toxic if swallowed and may cause eye redness, swelling and irritation. It is also combustible. Before using this material, refer to all safety information on the container.
- Assure the additive is directed into the flowing fuel stream with the additive flow started after the fuel flow starts and stopped before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel tank or airplane painted surface.
- Use not less than 20 fluid ounces of additive per 156 gallons of fuel or more than 20 fluid ounces of additive per 104 gallons of fuel.

### **PROCEDURE FOR CHECKING FUEL ADDITIVES**

Prolonged storage of the airplane will result in a water buildup in the fuel which "leaches out" the additive. An indication of this is when an excessive amount of water accumulates in the fuel tank sumps. The concentration of additive can be checked using an anti-icing additive concentration test kit. For additional information about this kit, refer to Chapter 12 of the 208B Series Maintenance Manual. It is imperative that the instructions for the test kit be followed explicitly when checking the additive concentration. The additive concentrations by volume for EGME/DIEGME shall be 0.10% minimum and 0.15% maximum, either individually or mixed in a common tank. Fuel, when added to the tank, should have a minimum concentration of 0.10% by volume.

### **CAUTION**

If the fuel additive concentration has fallen below 0.035% by volume, the airplane should be defueled and refueled.

(Continued Next Page)



## **FUEL ADDITIVES** (Continued)

If additional anti-static protection is desired, the following additive is approved for use:

- Dupont Stadis 450

### **CAUTION**

Additives shall not exceed a maximum concentration of 1 part per million by weight.

If additional biocidal protection is desired, an additive is permitted for use in certain conditions. Fuel tank maintenance practices are of prime importance in controlling microbial growth. However, other factors such as climate, airplane design, route structure, and utilization also affect microbial growth; therefore, occasional use of a biocide may be required.

Biocide additive may be used on a limited basis, defined as intermittent or non-continuous use in a single application, to sterilize airplane fuel systems suspected or found to be contaminated by microbial organisms. For those operators, where the need for biocide use is dictated, Pratt & Whitney Canada recommends, as a guide, a dosage interval of once a month. This interval can then be adjusted, either greater or lesser as an operator's own experience dictates. An engine operated in private and corporate airplanes, where utilization rates are relatively low, may use the additive continuously. The following additives are permitted for use:

- Sohio Biobor JF
- Kathon FP 1.5

### **CAUTION**

Additive shall not exceed a maximum concentration of 270 parts per million by weight.

## **FUEL CONTAMINATION**

Fuel contamination is usually the result of foreign material present in the fuel system and may consist of water, rust, sand, dirt, microbes, or bacterial growth. In addition, additives that are not compatible with fuel or fuel system components can cause the fuel to become contaminated.

Before each flight and after each refueling, use a clear sampler and drain at least one sampler full of fuel from the inboard fuel tank sump quick-drain valves, fuel tank external sump quick-drain valves, fuel reservoir quick-drain valve (actuated by a push-pull drain control on cargo pod), and fuel filter quick-drain valve to determine if contaminants are present and that the airplane has been fueled with the proper fuel. If the airplane is parked with one wing low on a sloping ramp, draining of the outboard fuel tank sump quick-drain valves (if installed) is also recommended.

If contamination is detected, drain all fuel drain points again. Take repeated samples from all fuel drain points until all contamination has been removed. If (after repeated sampling) evidence of contamination still exists, the fuel tanks should be completely drained and the fuel system cleaned.

Do not fly the airplane with contaminated or unapproved fuel. Anytime the filter bypass flag (red warning button) is found to be extended, the filter element has become clogged. Disassemble the filter, clean the element, and check the fuel system to determine the cause of contamination before further flight.

In addition, owners/operators who are not acquainted with a particular fixed base operator must verify that the fuel supply has been checked for contamination and is properly filtered before allowing the airplane to be serviced. Also, fuel tanks must be kept full between flights, provided weight and balance considerations will permit, to reduce the possibility of water condensing on the inside walls of partially filled tanks.

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**FUEL CONTAMINATION** (Continued)

To further reduce the possibility of contaminated fuel, routine maintenance of the fuel system must be performed in accordance with the Airplane Maintenance Manual. Only the proper fuel, as recommended in this POH/AFM, should be used, and fuel additives must not be used unless approved by Cessna and the Federal Aviation Administration.

**WARNING**

- **It is the pilot's responsibility to make sure that the airplane's fuel supply is clean before flight.**
- **Do not fly the airplane with contaminated or unapproved fuel.**
- **Any traces of solid contaminants such as rust, sand, pebbles, dirt, microbes and bacterial growth or liquid contamination resulting from water, improper fuel type, or additives that are not compatible with the fuel or fuel system components must be considered hazardous.**
- **Carefully sample fuel from all fuel drain locations during each preflight inspection and after every refueling.**

## **LANDING GEAR**

### **NOSE WHEEL TIRE PRESSURE:**

30-42 psi on 22x8.00-8, 6-Ply Rated Tire.

### **MAIN WHEEL TIRE PRESSURE:**

53-57 psi on 8.50-10, 8-Ply Rated Tires.

35-45 psi on 29x11.00-10, 10-Ply Rated Tires.

### **NOSE GEAR SHOCK STRUT:**

Keep filled with MIL-H-5606 hydraulic fluid per filling instructions placard. No air pressure is required in strut.

### **BRAKES:**

Service brake fluid reservoir with MIL-H-5606 hydraulic fluid as placarded on reservoir. Maintain fluid level between MIN and MAX markings.

## **OXYGEN**

### **AVIATOR'S BREATHING OXYGEN:**

Spec. No. MIL-O-27210.

### **MAXIMUM PRESSURE (cylinder temperature stabilized after filling):**

1850 psi at 21°C (70°F).

Refer to Oxygen Supplements (Section 9) for filling pressures.

## **GROUND DEICE/ANTI-ICE OPERATIONS**

During cold weather operations, flight crews are responsible for making sure that the airplane is free of ice contamination. Type I deice, and Type II, Type III, or Type IV anti-ice fluids may be used sequentially to ensure compliance with FAA regulations, which require that all critical components (wings, control surfaces and engine inlets as an example) be free of snow, ice, or frost before takeoff. The deicing process is intended to restore the airplane to a clean configuration so that neither aerodynamic characteristics nor mechanical interference from contaminants will occur.

(Continued Next Page)

## **GROUND DEICE/ANTI-ICE OPERATIONS** (Continued)

### **WARNING**

**Type II, Type III, and Type IV anti-ice fluid is designed for use on airplanes with a  $V_r$  speed of 85 knots or greater. Whenever Type II or Type IV anti-ice fluid is applied to the airplane, the takeoff flap setting is limited to UP and the  $V_r$  is 88 KCAS. Refer to Section 2 for limitations and Section 5 for takeoff distances with flaps UP setting and liftoff speeds in KIAS. The takeoff distance charts for flaps UP setting start with the airplane's maximum weight for normal operations. However, when icing conditions exist, the airplane must only be loaded to its maximum weight for flight into known icing conditions.**

### **NOTE**

It is recommended that flight crews refamiliarize themselves seasonally with the following publications for expanded deice and anti-ice procedures:

- Cessna 208 Series Maintenance Manual, Chapter 12.
- FAA Advisory Circular AC135-17, dated 14 December 1994 or later.
- FAA Advisory Circular AC20-117, dated 17 December 1982 or later.
- Cessna Aircraft Company SNL 08-1 and FAA notice 8900.22: FAA-Approved deicing program updates, winter 2007-2008.

Deicing and anti-icing fluids are aqueous solutions which work by lowering the freezing point of water in either the liquid or crystal phase, thus delaying the onset of freezing. For this reason, they are referred to as Freezing Point Depressant (FPD) fluids. Deicing fluid is classified as Type I. Anti-icing fluid is classified as Type II, Type III, or Type IV. Deicing and anti-icing with fluids may be performed as a one-step or two-step process. The one-step deicing procedure involves using Type I deice fluid to remove ice and slush from the airplane prior to departure and to provide minimal anti-icing protection as provided in the Type I holdover timetable (refer to FAA notice 8900.22, dated 10-12-07 or later).

(Continued Next Page)

## **GROUND DEICE/ANTI-ICE OPERATIONS** (Continued)

The procedure involves applying Type II, Type III, or type IV anti-ice fluid to make sure the airplane remains clean after deicing. Type II, Type III, or Type IV fluid is used to provide longer-term anti-icing protection. Type I, Type II, Type III, and Type IV fluids have time limitation before refreezing begins, at which time additional deicing is required. This time limitation is referred to as “holdover time”. Because holdover time depends highly on a number of factors, charts can provide only approximate estimates. It remains the responsibility of the pilot-in-command to determine the effectiveness of any deicing or anti-icing procedure. Refer to FAA notice 8900.22, dated 10-12-07 or later for Type I, Type II, Type III or Type IV fluids.

### **CAUTION**

Type I, Type II, Type III, and Type IV fluids are not compatible and may not be mixed. Additionally, most manufacturers prohibit the mixing of brands within a type. However, the same spray equipment may apply Type I and Type III fluids. Line personnel should be supervised by the pilot in command to ensure proper application of Type I deice, and Type II, Type III, or Type IV anti-ice fluids.

### **NOTE**

Deicing fluids are not intended for use in removing snow deposits. Snow is best removed by mechanically sweeping or brushing it from the airplane structure. Use caution not to damage any airplane structure or antennas when removing snow.

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**GROUND DEICE/ANTI-ICE OPERATIONS** (Continued)

Deicing may be accomplished using the ambient temperature available from a heated hangar or by mechanical means using a glycol-based Freezing Point Depressant (FPD) Type I fluid. A heated hangar is an excellent option to deice airplanes and must be utilized whenever possible. However, care must be exercised to make sure that all melted precipitation is removed from the airplane to prevent refreezing once the airplane is moved from the hangar to the flight line. Type I deicing fluids should be sprayed on the airplane (with engine shutdown) in a manner that minimizes heat loss of fluid to the air. The fluid should be applied in a temperature range from 160°F to 180°F (71°C to 82°C) using a solid cone pattern of large coarse droplets. Fluid should be sprayed as close as possible to the airplane surfaces, but not closer than approximately 10 feet if a high-pressure nozzle is used.

Application techniques for Type II, Type III, and Type IV fluids are the same as Type I, except that since the airplane is already clean, the application should last only long enough to properly coat the airplane surfaces. However, Type II, Type III, or Type IV fluid is sometimes heated and sprayed as a deicing fluid. For this case, it should be considered a Type I fluid as the heat may change the characteristics of the thickening agents in the fluid. Therefore, Type II, Type III, or Type IV fluid applied in this manner will not be as effective as it would be if it were applied at ambient temperature.

Refer to the Essential Areas to be Deiced figure for areas to spray Type I deicing fluid, Essential Areas to Apply Anti-Ice Fluid figure for areas to spray Type II, Type III and Type IV anti-icing fluid, Deice and Anti-Ice Fluid Direct Spray Avoidance Areas figure for areas to avoid spraying directly, and Deicing and Anti-icing Application figure for sequence of application. Heated solutions of FPD are more effective than unheated solutions because thermal energy is used to melt the ice, snow, or frost formations. Type I deicing fluids are used in the diluted state, with specific ratios of fluid-to-water dependent on ambient temperature. Type I deicing fluids have a very limited holdover time (refer to FAA notice 8900.22, dated 10-12-07 or later).

(Continued Next Page)

## **GROUND DEICE/ANTI-ICE OPERATIONS** (Continued)

### **CAUTION**

Type I fluids should never be used full strength (undiluted). Undiluted glycol fluid is quite viscous below 14°F (-10°C) and can actually produce lift reductions of about 20 percent. Additionally, undiluted glycol has a higher freezing point than a glycol/water mixture.

### **NOTE**

- Deicing and anti-icing procedures must be closely coordinated between the pilot in command and ground crews, and carried out in a timely manner. Ultimate responsibility for safety of flight rests with the pilot in command, and any decisions to deice or anti-ice an airplane must be accomplished under his or her direct supervision.
- The first area to be deiced and anti-iced must be visible from the cockpit and must be used to provide a conservative estimate for subsequent ice accumulations on unseen areas of the airplane before initiating takeoff.
- Due to the weight and C.G. changes that occur while deicing the airplane, a tail stand must be placed under the tail to prevent the airplane from tipping on its tail.

## **HOLDOVER TIMETABLE (TYPE I, TYPE II, TYPE III, AND TYPE IV FLUIDS)**

### **NOTE**

Refer to FAA notice 8900.22, dated 10-12-07 or later for holdover timetables.

The length of time that deicing and anti-icing fluids remain effective is known as “holdover time”. The holdover timetables for Type I deicing, and Type II, Type III, or Type IV anti-icing fluids are only an estimation and vary depending on many factors (temperature, precipitation type, wind, and airplane skin temperature). The holdover times are based on the mixture ratio appropriate for the OAT. Holdover times start when the last application has begun.

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**HOLDOVER TIMETABLE (TYPE I, TYPE II, TYPE III, AND TYPE IV FLUIDS)** (Continued)

Guidelines for maximum holdover times anticipated by SAE Type I, Type II, Type III or Type IV, and ISO Type I, Type II, Type III, or Type IV fluid mixtures are a function of weather conditions and outside air temperature (OAT).

**CAUTION**

- Aircraft operators are solely responsible for ensuring that holdover timetables contain current data.
- The tables are for use in departure planning only and should be used in conjunction with pretakeoff contamination check procedures.
- The time of protection will be shortened in heavy weather conditions. High wind velocity and jet blast may cause a degradation of the protective film. If these conditions occur, the time of protection may be shortened considerably. This is also the case when fuel temperature is significantly lower than OAT.

**NOTE**

- Holdover timetables in FAA notice 8900.22, dated 10-12-07 or later do not apply to other than SAE or ISO Type I, Type II, Type III or Type IV fluids.
- The responsibility for the application of this data remains with the user.

(Continued Next Page)

## **HOLDOVER TIMETABLE (TYPE I, TYPE II, TYPE III, AND TYPE IV FLUIDS)** (Continued)

### **WARNING**

**When ground icing conditions are present, a pretakeoff contamination check must be conducted by the pilot in command within 5 minutes of takeoff, preferably just prior to taxiing onto the active runway. Critical areas of the airplane such as empennage, wings, windshield, control surfaces, and engine inlets must be checked to make sure they are free of ice, slush, and snow and that the anti-ice fluid is still protecting the airplane.**

### **TYPE I DEICE FLUID**

#### **NOTE**

- Freezing point of Type I fluid mixture must be at least 10°C (18°F) below OAT.
- Holdover time starts when last application has begun.
- Type I fluid should be sprayed on the airplane (with engine off) in a manner which minimizes heat loss to the air. If possible, fluid should be sprayed in a solid cone pattern of large coarse droplets at a temperature of 160°F to 180°F. The fluid should be sprayed as close as possible to the airplane surfaces, but not closer than 10 feet if a high pressure nozzle is used.

### **WARNING**

**When ground icing conditions are present, a pretakeoff contamination check should be conducted by the pilot in command within 5 minutes of takeoff, preferably just prior to taxiing onto the active runway. Critical areas of the airplane such as empennage, wings, windshield, control surfaces, and engine inlets should be checked to make sure they are free of ice, slush, and snow, and that the anti-ice fluid is still protecting the airplane.**

## **TYPE II ANTI-ICE FLUID**

### **NOTE**

- Freezing point of Type II fluid mixture must be at least 10°C (18°F) below OAT.
- Holdover time starts when last application has begun.
- Application techniques for Type II fluid are the same as for Type I, except that since the airplane is already clean, the application should last only long enough to properly coat the airplane surfaces.
- Type II fluid must be applied undiluted at ambient temperature to a “clean” airplane within 3 minutes after deicing is completed due to the limited holdover times of Type I deice fluid. However, Type II fluid is sometimes heated and sprayed as a deicing fluid. For this case, it should be considered a Type I fluid, as the heat may change the characteristics of the thickening agents in the fluid. Therefore, Type II fluid applied in this manner will not be as effective as it would be if it were applied at ambient temperature.

### **WARNING**

**When ground icing conditions are present, a pre-takeoff contamination check must be conducted by the pilot in command within 5 minutes of takeoff, preferably just prior to taxiing onto the active runway. Critical areas of the airplane such as empennage, wings, windshield, control surfaces, and engine inlets must be checked to make sure they are free of ice, slush, and snow, and that the anti-ice fluid is still protecting the airplane.**

## **TYPE III ANTI-ICE FLUID**

### **NOTE**

- Freezing point of Type III fluid mixture must be at least 10°C (18°F) below OAT.
- Holdover time starts when last application has begun.
- Application techniques for Type III fluid are the same as for Type I and Type II, except that since the airplane is already clean, the application should last only long enough to properly coat the airplane surfaces.
- Type II fluid must be applied undiluted at ambient temperature to a “clean” airplane within 3 minutes after deicing is completed due to the limited holdover times of Type I deice fluid. However, Type II fluid is sometimes heated and sprayed as a deicing fluid. For this case, it should be considered a Type I fluid, as the heat may change the characteristics of the thickening agents in the fluid. Therefore, Type II fluid applied in this manner will not be as effective as it would be if it were applied at ambient temperature.

## **TYPE IV ANTI-ICE FLUID**

### **CAUTION**

The time of protection will be shortened in heavy weather conditions. Heavy precipitation rates, high moisture content, high wind velocity, or jet blast may reduce holdover time below the lowest time stated in the range. Holdover time may be reduced when airplane skin temperature is lower than OAT.

## **TYPE IV ANTI-ICE FLUID** (Continued)

### **NOTE**

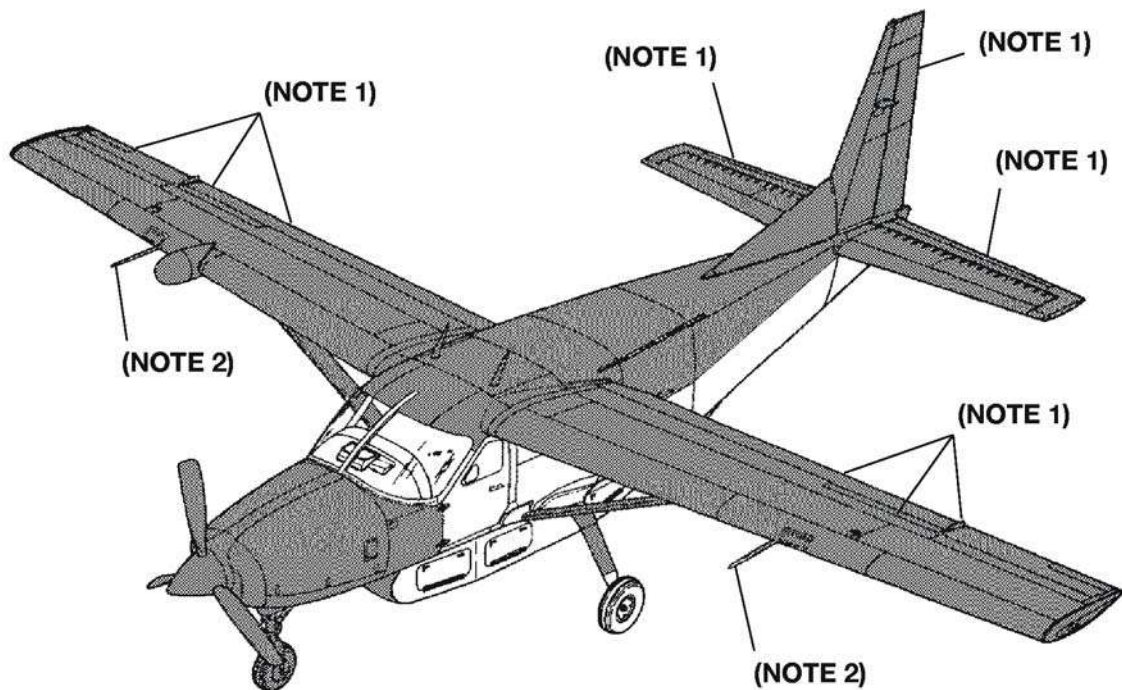
- Freezing point of Type IV fluid mixture must be at least 10°C (18°F) below OAT.
- Holdover time starts when last application has begun.
- Application techniques for Type IV fluid are the same as for Type I, except that since the airplane is already clean, the application should last only long enough to properly coat the airplane surfaces.
- Type IV fluid must be applied undiluted at ambient temperature to a “clean” airplane within 3 minutes after deicing is completed due to the limited holdover times of Type I deice fluid. However, Type IV fluid is sometimes heated and sprayed as a deicing fluid. For this case, it should be considered a Type I fluid, as the heat may change the characteristics of the thickening agents in the fluid. Therefore, Type IV fluid applied in this manner, will not be as effective as it would be if it were applied at ambient temperature.

### **CAUTION**

- Some Type IV fluids could form a thick or high strength gel during “dry-out” and when rehydrated form a slippery film.
- Some Type IV fluids exhibit poor aerodynamic elimination (flow-off) qualities at colder temperatures.
- Heated areas of airplane (i.e., heated leading edge) should be avoided due to the fact that fluid may “dry-out” into hard globular nodules.
- Type IV fluid should not be used undiluted below -24°C (-11°F).

## ESSENTIAL AREAS TO BE DEICED

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SHADED AREAS INDICATE ESSENTIAL AREAS TO BE DEICED.

### NOTE

1. Give special attention to the gaps between the flight controls. All snow, ice, and slush must be removed from these gaps.
2. Remove snow, ice and slush from pitot tubes by hand only.

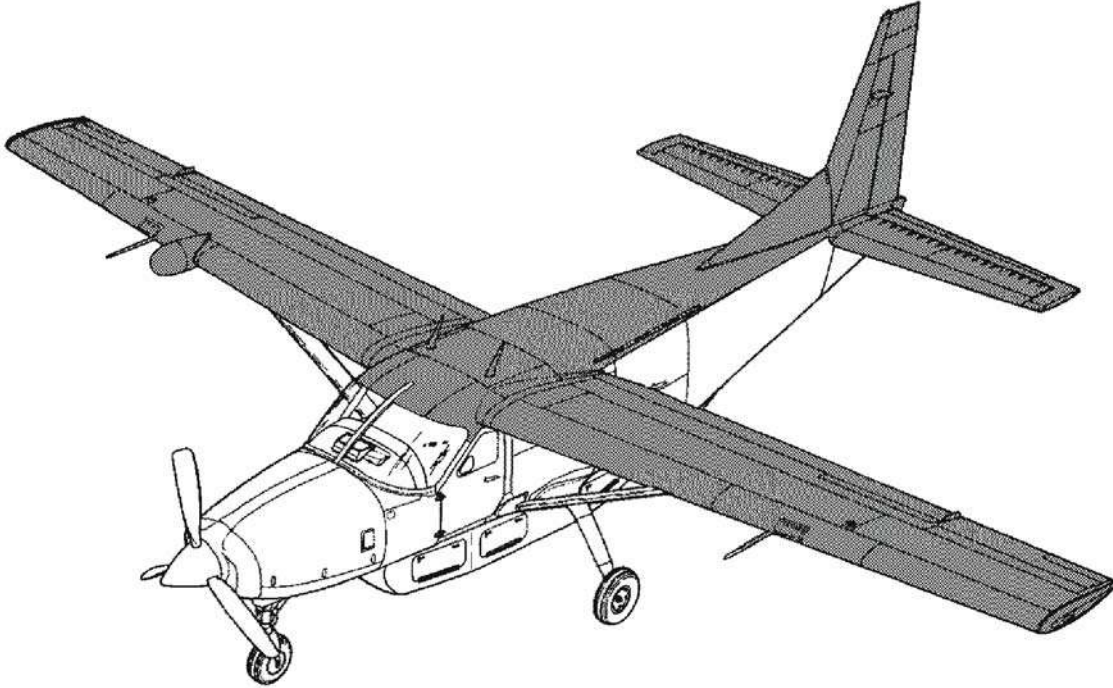
DIRECT SPRAY AVOIDANCE AREAS:

Engine Inlets and Exhaust, Brakes, Pitot-Static Tubes, Windshields, Cabin Windows, and Stall Warning Vane.

Figure 8-1

## ESSENTIAL AREAS TO APPLY ANTI-ICE FLUID

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Shaded areas indicate essential areas where anti-ice fluid is applied.

### NOTE

Anti-ice fluid must be applied at low pressure to form a thin film on surfaces. Fluid must just cover airplane without runoff.

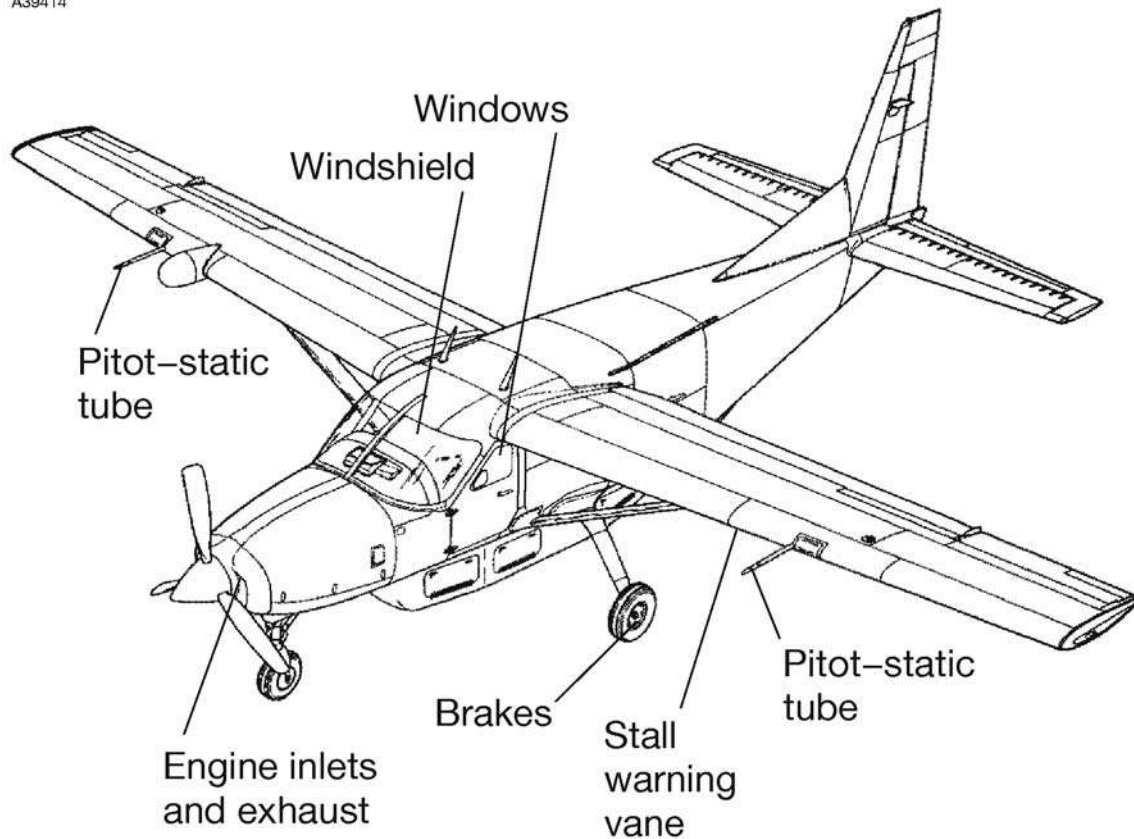
### DIRECT SPRAY AVOIDANCE AREAS:

Pitot-Static Tubes, Windshields, Cabin Windows, and Stall Warning Vane.

Figure 8-2

## DEICE AND ANTI-ICE FLUID DIRECT SPRAY AVOIDANCE AREAS

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### DIRECT SPRAY AVOIDANCE AREAS:

Engine Inlets and Exhaust, Brakes, Pitot-static Tubes, Windshields, Cabin Windows, and Stall Warning Vane.

Figure 8-3

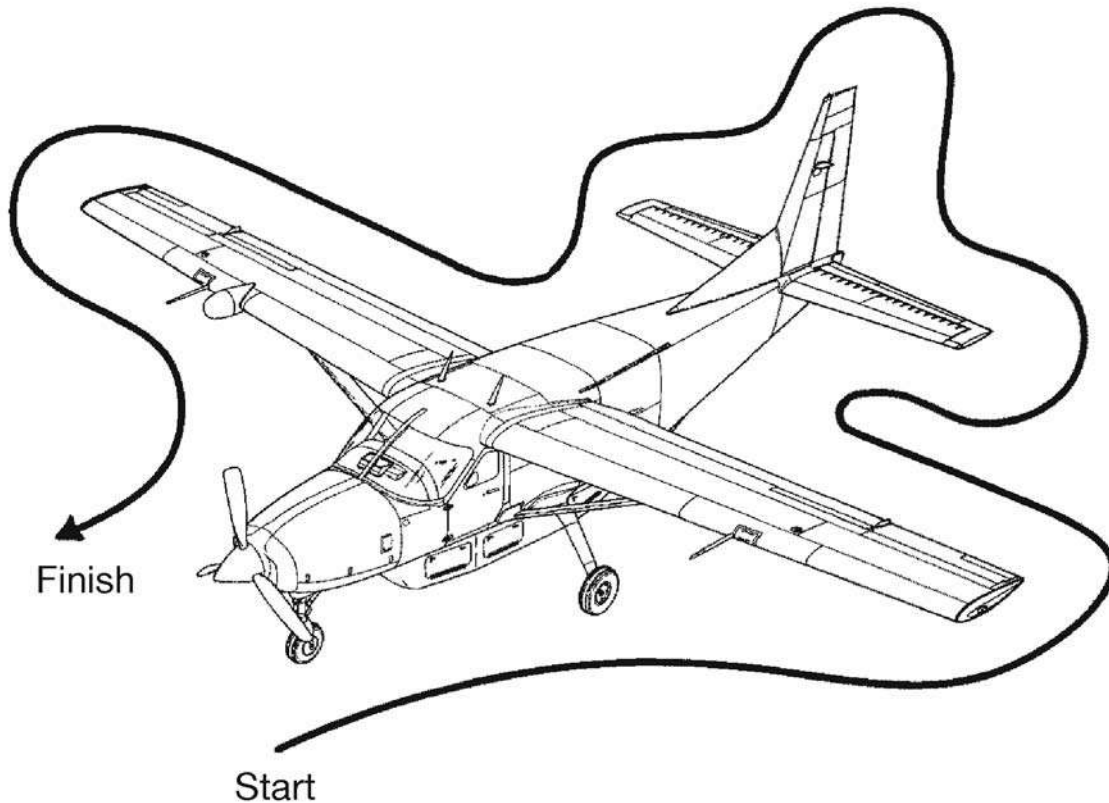


## DEICING AND ANTI-ICING APPLICATION

### NOTE

Start the deice and anti-ice application at the left front area of the airplane. The pilot can then get a conservative estimate of how quickly ice forms by observation from inside the cockpit. Because the cockpit is the first area deiced or anti-iced, it will be the first area where ice will form again.

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Figure 8-4

## **CLEANING AND CARE**

### **WINDSHIELD AND WINDOWS**

The windshield and windows are constructed of cast acrylic. The surface hardness of acrylic is approximately equal to that of copper or brass. Do not use a canvas cover on the windshield unless freezing rain or sleet is anticipated. Canvas covers may scratch the plastic surface. When cleaning and waxing the windshield and windows, use only the following prescribed methods and materials.

### **WINDSHIELD AND WINDOW MAINTENANCE PROCEDURES**

The following procedures provide the most current information regarding cleaning and servicing windshields and windows. Improper cleaning or use of unapproved cleaning agents can cause damage to these surfaces.

### **CLEANING INSTRUCTIONS**

#### **CAUTION**

Windshields and windows can be easily damaged by improper handling and cleaning techniques.

1. Place airplane inside hangar or in shaded area and allow to cool from heat of sun's direct rays.
2. Using clean (preferably running) water, flood the surface. Use bare hands with no jewelry to feel and dislodge any dirt or abrasive materials.
3. Using a mild soap or detergent (such as a dishwashing liquid) in water, wash the surface. Again, use only the bare hand to provide rubbing force. (A clean cloth may be used to transfer the soap solution to the surface, but extreme care must be exercised to prevent scratching the surface.)

(Continued Next Page)

## **CLEANING INSTRUCTIONS** (Continued)

4. On acrylic windshields and windows, if soils which cannot be removed by a mild detergent, Type II aliphatic naphtha applied with a soft clean cloth may be used as a cleaning solvent. Be sure to frequently refold the cloth to avoid redepositing soil and/or scratching the windshield and windows with any abrasive particles.
5. Rinse surface thoroughly with clean fresh water and dry with a clean cloth.

### **CAUTION**

Do not use any of the following on, or for cleaning, windshields and windows: methanol, denatured alcohol, gasoline, benzene, xylene, MEK, acetone, carbon tetrachloride, lacquer thinners, commercial or household window cleaning sprays. When in doubt about any product, do not use it.

6. Hard polishing wax should be applied to acrylic surfaces. (The wax has an index of refraction nearly the same as transparent acrylic and will tend to mask any shallow scratches).
7. Acrylic surfaces may be polished using a polish meeting Federal Specification P-P-560 applied per the manufacturer's instructions.

### **CAUTION**

On acrylic surfaces, use only rain repellents that conform to specification MIL-W-6882. Refer to the Materials For Acrylic Windshields and Windows chart for specific rain repellent products approved by Cessna.

### **NOTE**

When applying or removing wax or polish, use a clean soft cloth.

8. Windshields may have rain repellent applied per the manufacturer's instructions. Caution must be used not to get rain repellent on painted surfaces surrounding the windshield.

## **WINDSHIELD AND WINDOW PREVENTIVE MAINTENANCE**

### **CAUTION**

Utilization of the following techniques will help minimize windshield and window crazing.

1. Keep all surfaces of windshields and windows clean.
2. If desired, wax acrylic surfaces.
3. Carefully cover all surfaces during any painting, powerplant cleaning or other procedure that calls for the use of any type of solvents or chemicals. The following coatings are approved for use in protecting surfaces from solvent attack:
  - a. White Spray Lab, MIL-C-6799, Type I, Class II.
  - b. WPL-3 Masking Paper - St. Regis, Newton, MA.
  - c. 5 X N - Poly-Spotstick - St. Regis, Newton, MA.
  - d. Protex 40 - Mask Off Company, Monrovia, CA and Southwest Paper Co., Wichita, KS.
  - e. Protex 10VS - Mask Off Company, Monrovia, CA and Southwest Paper Co., Wichita, KS
  - f. Scotch 344 Black Tape - 3M Company
4. Do not park or store the airplane where it might be subjected to direct contact with or vapors from: methanol, denatured alcohol, gasoline, benzene, xylene, MEK, acetone, carbon tetrachloride, lacquer thinners, commercial or household window cleaning sprays, paint strippers, or other types of solvents.
5. Do not use solar screens or shields installed on inside of airplane or leave sunvisors up against windshield. The reflected heat from these items causes elevated temperatures which accelerate crazing.
6. Do not use power drill motor or powered device to clean, polish, or wax surfaces.

## MATERIALS REQUIRED FOR ACRYLIC WINDSHIELDS AND WINDOWS

MATERIAL	MANUFACTURER	USE
Mild soap or detergent (hand dishwashing type without abrasives)	Commercially available	Cleaning windshields and windows.
Aliphatic naphtha Type II conforming to Federal Specification TT-N-95	Commercially available	Removing deposits that cannot be removed with mild soap solution on acrylic windshields and windows.
Polishing wax: (Refer to Note 1)  Turtle Wax (paste)  Great Reflections Paste Wax  Slip-Stream Wax (paste)	Turtle Wax, Inc. Chicago, IL 60638  E.I. duPont de Nemours and Co., (Inc.)  Wilmington, DE 19898 Classic Chemical Grand Prairie, TX 75050	Waxing acrylic windshields and windows.
Acrylic polish conforming to Federal Specification P-P-560 such as:  Permatex plastic cleaner Number 403D  Mirror Glaze MGH-17	Permatex Company, Inc. Kansas City, KS 66115  Mirror Bright Polish Co. Pasadena, CA	Cleaning and polishing acrylic windshields and windows.
Soft cloth, such as: Cotton flannel or cotton terry cloth material	Commercially available	Applying and removing wax and polish.
Rain repellent conforming to Federal Specification MIL-W-6882, such as:  REPCON (Refer to Note 2)	UNELKO Corp. 7428 E. Karen Dr. Scottsdale, AZ 85260	Rain shedding on acrylic windshields.

### NOTE

1. These are the only polishing waxes tested and approved for use by Cessna Aircraft Company.
2. This is the only rain repellent approved for use by Cessna Aircraft Company for use on Cessna Model 208B series airplanes.

Figure 8-5

## **PAINTED SURFACES**

The painted exterior surfaces of the Cessna 208B have a durable, long-lasting finish. Approximately 10 days are required for the paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the airplane. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by someone experienced in handling uncured paint. Any Cessna Service Station can accomplish this work.

Generally, the painted surfaces can be kept bright by washing with water and mild soap, followed by a rinse with water and drying with cloths or a chamois. Harsh or abrasive soaps or detergents that cause corrosion or scratches must never be used. Remove stubborn oil and grease with a cloth moistened with Stoddard solvent.

To seal any minor surface chips or scratches and protect against corrosion, the airplane must be waxed regularly with a good automotive wax applied in accordance with the manufacturer's instructions. If the airplane is operated in a sea coast or other salt water environment, it must be washed and waxed more frequently to assure adequate protection. Special care must be taken to seal around rivet heads and skin laps, which are the areas most susceptible to corrosion. A heavier coating of wax on the leading edges of the wings and tail and on the cowl nose cap and propeller spinner will help reduce the abrasion encountered in these areas. Re application of wax will generally be necessary after cleaning with soap solutions or after chemical deicing operations.

When the airplane is parked outside in cold climates and it is necessary to remove ice before flight, care must be taken to protect the painted surfaces during ice removal with chemical liquids. Isopropyl alcohol will satisfactorily remove ice accumulations without damaging the paint. However, keep the isopropyl alcohol away from the windshield and cabin windows since it will attack the plastic and may cause it to craze.

## **STABILIZER ABRASION BOOT CARE**

If the airplane is equipped with stabilizer abrasion boots, keep them clean and free from oil and grease, which can swell the rubber. Wash them with mild soap and water, using Form Tech AC cleaner or naphtha to remove stubborn grease. Do not scrub the boots and be sure to wipe off all solvent before it dries. Boots with loosened edges or small tears must be repaired. Your Cessna Service Station has the proper material and knowledge how to do this correctly.

## **PROPELLER CARE**

Always conduct a preflight inspection and occasionally wipe the blades with a cloth dampened with oil to clean off grass and bug stains, minimize corrosion, and assure a longer blade life. Waxing the blades with an automotive type paste wax on a regular basis will further minimize corrosion. Damaged or blistered paint must be repainted. During the preflight inspection, check the blades for nicks, gouges, scratches, corrosion pits, etc., the anti-ice boots for security, the propeller hub for evidence of grease and oil leaks, and the propeller spinner for condition and security. Repair of small nicks and scratches may be performed by qualified mechanics in accordance with procedures specified in FAA Advisory Circular 43.13-1A. However, whenever a significant amount of metal is removed, or in the case of previously reworked blades that may be at or near minimum width and thickness limits, the appropriate McCauley Service Manual must be consulted to determine if minimum allowable blade width and thickness limits have been exceeded. If these limits are exceeded, blade replacement is required. After filing and polishing, the damaged area must be inspected by the dye penetrant method to verify that all damage has been removed and the blade is not cracked. The area should then be reprotected by localized application of chemical film per MIL-C-5541 (e.g., Alodine) and repainted as necessary. Large nicks or scratches or other damage involving such things as bent blades, balance, diameter reduction, etc. must be corrected by an FAA approved propeller repair station.

## **ENGINE CARE**

### **ENGINE EXTERIOR/COMPARTMENT CLEANING**

The engine exterior and compartment may be cleaned using a suitable solvent. Most efficient cleaning is done using a spray-type cleaner. Before spray cleaning, make sure that protection is afforded for components that might be adversely affected by the solvent. Refer to the Maintenance Manual for proper lubrication of controls and components after engine cleaning.

The benefits of performance improvements and increased service life of hot section parts accruing from instituting a regular compressor wash program cannot be overemphasized. A compressor wash ring is installed on the top of the engine adjacent to the induction air inlet screen to facilitate this maintenance program.

Compressor washes can be performed by either motoring the engine with the starter or running the engine. Depending on the nature of the operating environment and the type of deposits in the engine gas path, either of the two wash methods can be used to remove salt or dirt and other baked-on deposits that accumulate over a period of time and cause engine performance deterioration. When the wash is performed solely to remove salt deposits, it is known as a "desalination" wash. A wash performed to remove baked on deposits to improve engine performance is known as a performance recovery wash. A motoring wash is conducted at a gas generator RPM of 14-25%; the running wash is carried out at an  $N_g$  of approximately 60% (23,000 RPM). The water or cleaning mixture and rinsing solution, dependent on ambient temperature, is injected at different pressure, depending on the wash method being conducted.

Operating environment determines the nature of the wash, the frequency, and wash method recommended. If operating in a continuously salt-laden environment, a desalination wash is recommended following the last flight of the day by means of the motoring method. Occasionally, salt-laden environments may necessitate a desalination wash each week using the motoring method. Less severe and more general operating environments are not as conducive to rapid deposit buildup but eventually can contribute to performance deterioration and necessitate a performance recovery wash at intervals of 100-200 hours. In these general environments, a motoring wash is recommended for light soil and multiple motoring or a running wash is suggested for heavy soil.

### **CAUTION**

Always observe engine starting cycle limits when conducting motoring wash procedures.



## **ENGINE COMPRESSOR WASH**

A number of cleaning agents are recommended for addition to water to form the cleaning solution used for compressor wash. However, the mixture proportion of all the cleaning agents is not identical. Depending on the prevalent ambient temperature, aviation kerosene and methanol must be added to the cleaning solution in various proportions. The quality of the water used is also important; any drinking quality water is permissible for a motoring wash, but demineralized water only is recommended for a running wash. Detailed information concerning the cleaning mixture components, mixture formulation, recommended quantity and application equipment can be found in Pratt & Whitney Aircraft Gas Turbine Operation Information Letter No. 7.

## **COMPRESSOR TURBINE BLADE WASH**

Pratt & Whitney Canada has developed a procedure for performing a compressor turbine blade motoring wash. This technique will facilitate the removal of contaminants from the compressor turbine blade airfoil surfaces, thereby minimizing sulphidation attack of these surfaces. This serves as an aid for obtaining optimum blade service life. With this method, a water or water/methanol solution is injected directly into the combustion chamber by way of a special spray tube which is installed in one of the igniter plug ports. This method of engine wash does not replace the need for a normal engine compressor wash for performance recovery or desalination purposes.

Compressor turbine blade washing is accomplished using water of drinking quality (potable) only at ambient temperatures of +2°C (36°F) and above. Use a water/methanol solution at ambient temperatures below +2°C (36°F). Consult the Engine Maintenance Manual for solution strength according to ambient temperature and review Special Instruction P & WC: 4-84 for washing procedures and limitations.

## INTERIOR CARE

The instrument panel, control wheel, and control knobs need only be wiped off with a damp cloth. Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with Stoddard solvent. Volatile solvents, such as mentioned in paragraphs on care of the windshield, must never be used since they soften and craze the plastic.

The plastic trim, headliner, door panels, and floor covering in the crew area of both versions and the rear cabin headliner and sidewalls of the Passenger Version need only be wiped off with a damp cloth. In Cargo Versions, the sidewalls, cargo doors, and overhead in the cargo area are not easily soiled or stained. Dust and loose dirt must be picked up with a vacuum cleaner. Stubborn dirt can be wiped off with a cloth moistened in clean water. Mild soap suds, used sparingly, will remove grease. The soap must be removed with a clean damp cloth.

The protective plywood floor panels (if installed) and aft bulkhead covering in the cargo area must be vacuum cleaned to remove dust and dirt. A cloth moistened with water will aid in removing heavy soil. Do not use excessive amounts of water, which would deteriorate the protective floor panels.

To remove dust and loose dirt from seating upholstery, clean the seats regularly with a vacuum cleaner.

Blot up any spilled liquid on the seats promptly with cleansing tissue or rags. Do not pat the spot; press the blotting material firmly and hold it for several seconds. Continue blotting until no more liquid is taken up. Scrape off sticky materials with a dull knife, then spot-clean the area.

Oily spots on the seats may be cleaned with household spot removers, used sparingly. Before using any solvent, read the instructions on the container and test it on an obscure place on the fabric to be cleaned. Never saturate the fabric with a volatile solvent; it may damage the padding and backing materials.

Soiled seating upholstery may be cleaned with foam-type detergent used according to the manufacturer's instructions. To minimize wetting the fabric, keep the foam as dry as possible and remove it with a vacuum cleaner.

## **PROLONGED OUT-OF-SERVICE CARE**

Prolonged out-of-service care applies to all airplanes that will not be flown for an indefinite period (less than 60 days) but which are to be kept ready to fly with the least possible preparation. If the airplane is to be stored temporarily or indefinitely, refer to the Airplane Maintenance Manual for proper storage procedures. The Maintenance Manual provides amplification for the following procedures:

1. The procedure to be followed for preservation of an engine in service depends on the period of inactivity and whether or not the engine may be rotated during the inactive period. The expected period of inactivity must be established and reference made to the Engine Preservation Schedule. The preservation carried out must be recorded in the engine maintenance record and on tags secured to the engine. The following preservation schedule lists procedures to be followed:

### **CAUTION**

Under no circumstances should preservative oil be sprayed into the compressor or exhaust ports of the engine. Dirt particles deposited on blades and vanes during engine operation will adhere and alter the airfoil shape, adversely affecting compressor efficiency.

- a. 0 to 7 Days - The engine may be left in an inactive state, with no preservation protection, provided the engine is sheltered, humidity is not excessively high, and the engine is not subjected to extreme temperature changes that would produce condensation.
- b. 8 to 28 Days - An engine inactive for up to 28 days requires no preservation provided all engine openings are sealed off and relative humidity in the engine is maintained at less than 40%. Humidity control is maintained by placing desiccant bags and a humidity indicator on wooden racks in the engine exhaust duct. Suitable windows must be provided in the exhaust closure to facilitate observation of the humidity indicators.

(Continued Next Page)

## **PROLONGED OUT-OF-SERVICE CARE** (Continued)

- c. 29 to 90 Days - An engine inactive for a period exceeding 28 days, but less than 91 days, need only have the fuel system preserved, engine openings covered, and desiccant bags and humidity indicators installed.
  - d. 91 Days and Over - An engine inactive over 90 days in the airframe or removed for long-term storage in a container, must, in addition to the 29 to 90 day procedure, have the engine oil drained and unused accessory drive pads sprayed.
2. Place a cover over the pitot tube and install the two engine inlet covers. To prevent the propeller from windmilling, install the propeller anchor over a blade of the propeller and secure the strap around the nose gear or to the bracket located on the lower right hand cowl. Cover all other openings to prevent entry of foreign objects.
  3. Keep the fuel tanks full to minimize condensation in the tanks.
  4. If the airplane will be out of service for 5 days or more, disconnect the battery. If the battery is left in the airplane, it must be removed and serviced regularly to prevent discharge. If the battery is removed from the airplane, check it regularly for state of charge.
  5. If the airplane is stored outside, tie-down the airplane in accordance with the procedure in this section. Chock the nose and main wheels; do not set the parking brake if a long period of inactivity is anticipated as brake seizing can result.
  6. Every two weeks, move the airplane to prevent flat areas on the tires. Mark the tires with tape to ensure the tires are placed approximately 90° from their previous position.
  7. Drain all fuel drain points every 30 days and check for water accumulation. Prolonged storage of the airplane will result in a water buildup in the fuel which "leaches out" the fuel additive. An indication of this is when an excessive amount of water accumulates at the fuel drain points. Refer to Fuel Additive in this section for minimum allowable additive concentrations.

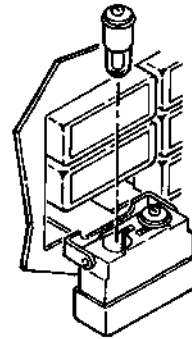
## **BULB REPLACEMENT DURING FLIGHT**

The Bulb Replacement figure provides instructions to aid the pilot to replace annunciator panel light bulbs without tools during flight. It is suggested that spare bulbs be stored in the map compartment. However, if a spare bulb is not available, an identical bulb, which is available from other lights listed herein can be substituted for the defective bulb. For a listing of other bulb requirements and specific tools needed, refer to the Maintenance Manual for this airplane.

## BULB REPLACEMENT

### ANNUNCIATOR PANEL LIGHTS

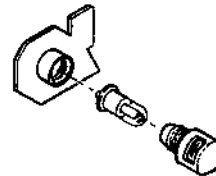
Push in on face of light assembly and allow assembly to pop out. Pull assembly out to limit of its hinged retainer and allow it to rotate 90 degrees down. Retainer will keep light assembly suspended in this position. Lift defective bulb out of assembly and replace with MS25237-327 bulb (MS25237-8918 14-volt bulb in IGNITION ON light assembly only). Rotate light assembly upward into position and press into place.



**NOTE:** Each light assembly contains two bulbs, and , if necessary, remains sufficiently illuminated with one bulb defective.

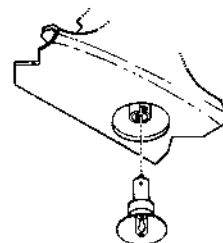
### POST LIGHTS

Grasp lens cap and pull straight out from socket. Pull bulb from cap and replace with MS25237-327 bulb. Replace cap in socket and rotate cap to direct light in desired direction.



### CONTROL WHEEL MAP LIGHT

Grasp rim of bulb, push straight up and turn counterclockwise as far as possible, then pull bulb straight down and out of socket. Replace with 24R8 bulb. To install new bulb in socket, align pins on bulb with slots in socket, then push straight up and rotate bulb clockwise as far as possible.



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Figure 8-6



## **SUPPLEMENTS**

### **INTRODUCTION**

This section consists of a series of supplements, each covering a single system which may be installed in the airplane. Each supplement contains a brief description, and when applicable, Limitations, Emergency Procedures, Normal Procedures, and Performance.

Operators should refer to each supplement to ensure that all limitations and procedures appropriate for their airplane are observed.

#### **NOTE**

Some supplements contain references to equipment manufacturers pilot's manuals which are supplied with the airplane at the time of delivery from the factory, or whenever equipment is installed after delivery. These manuals must be kept up-to-date with the latest revisions issued by the publisher. These vendor manuals contain a user registration form or instructions for obtaining future revisions or changes.

#### **WARNING**

- **Complete familiarity with the airplane and its systems will not only increase the pilot's proficiency and ensure optimum operation, but could provide a basis for analyzing system malfunctions in case an emergency is encountered. Information in this section will assist in that familiarization. The responsible pilot will want to be prepared to make proper and precise responses in every situation.**
- **Limitations contained in the following supplements are FAA approved. Observance of these operating limitations is required by Federal Aviation Regulations.**

