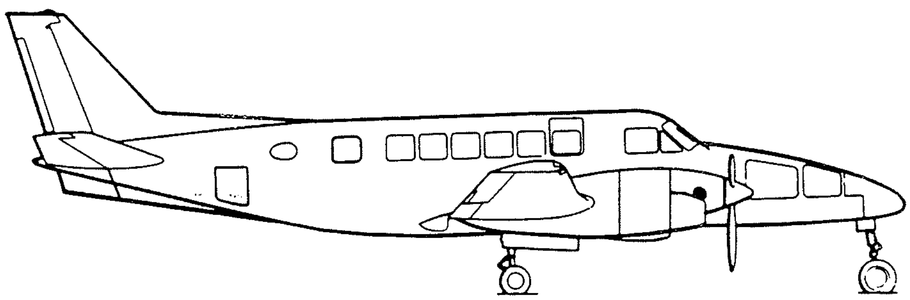
NOTE:
THIS MANUAL IS
NOT CURRENT -
Training use ONLY

F.A.A. APPROVED

FLIGHT MANUAL

FOR THE

Beechcraft **B99** *AIRLINER*



NOTE: THE FAA APPROVED FLIGHT MANUAL MUST BE KEPT WITHIN REACH OF THE PILOT DURING ALL FLIGHT OPERATIONS.

Mfr's B99 Airliner

Mfr's Serial No. ____________________

Registration No. ____________________

FAA Approved by: for
Chester A. Rembleske
BEECH AIRCRAFT CORPORATION
DOA CE-2

Date of Approval March 13, 1972

Part No. 99-590026-1

FAA Approved, based on FAR 23, Normal Category

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SECTION III EMERGENCY PROCEDURES

SECTION IV FAR 135 PERFORMANCE

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SECTIONS OF THE MANUAL

For convenience, this manual has been arranged with quick-reference tabs, each imprinted with the title of the section which it sets off. The manual has been divided into two parts separated by a full-page index tab. The portion ahead of this tab comprises the FAA Approved Flight Manual, including separate operational sections for FAR Parts 91 and 135 (Part 91 applies to general operations, while Part 135 is required for air taxi operations), and the appropriate FAA Approved Airplane Flight Manual Supplements.

PILOT'S OPERATING MANUAL REVISION RECORD

Following the title page is a List of Effective Pages or the "A" Page, as it is normally called. Take a moment now, to examine this page. A complete listing of all pages is presented along with the current status of the material contained; i.e., Original, Reissued, Revised or described in another section. Also, in the lower right corner of the blocked portion is a box containing a capital letter which denotes reissue of the manual. It will be advanced one letter, alphabetically, per issue. A reissue of the manual or the revision of any portion that does not require another revision log, will be received with a new "A" Page to replace the previous one.

FAA APPROVED AIRPLANE FLIGHT MANUAL REVISION RECORD

Note the reference to the FAA Airplane Flight Manual Log of Revisions which is located under the tab of that name in the first part of the manual. This page is used for description of all material covered under the FAA Approved portion except the Airplane Flight Manual Supplements. When a revision of any information contained in this portion of the manual is made, a new Log of Revisions sheet will be issued for insertion immediately ahead of all previously issued Log of Revisions sheets. All Log of Revisions pages must be retained in the manual to provide a current record of material status until a reissue of the manual is made at which time all pages are removed. On this page, under the column labeled Revision Number, there will be a letter indicating the current issue, followed by a number indicating the numerical revisions. The revised pages will be listed along with the description. As noted at the bottom of this page, each revised portion of the pages issued will have a black border indicating the portion changed. All revised pages listed in the new Log of Revisions are to be removed and replaced with the current page.

AIRPLANE FLIGHT MANUAL SUPPLEMENTS REVISION RECORD

Within the section entitled FAA Approved Airplane Flight Manual Supplements is a Log of Revisions page. Provided here is a listing of the FAA Approved Supplemental Equipment available for installation on the BEECHCRAFT B99 Airliner. When new supplements are received the new "Log" sheet will replace the previous one, since it contains a listing of all previous approvals, plus the new approval. The supplemental material will be added to the grouping in accordance with the descriptive listing.

VENDOR-ISSUED STC SUPPLEMENTS

When a new airplane is delivered from the factory, the manual delivered with it contains either an STC (Supplemental Type Certificate) Supplement or a Beech Flight Manual Supplement for every installed item requiring a supplement. If a new manual for operation of the airplane is obtained at a later date, it is the responsibility of the owner/operator to ensure that all required STC Supplements (as well as weight and balance and other pertinent data) are transferred into the new manual.

DIVISION TABULAR INDEX

THANK YOU . . . .

for displaying confidence in us by selecting a BEECHCRAFT airplane. Our design engineers, assemblers, and inspectors have utilized their skills and years of experience to ensure that the new BEECHCRAFT B99 Airliner meets the high standards of quality and performance for which BEECHCRAFT airplanes have become famous throughout the world.

IMPORTANT NOTICE

This manual should be read carefully in order to become familiar with the operation of the B99 Airliner. Suggestions and recommendations have been made within it to aid in obtaining maximum performance without sacrificing economy. Be familiar with and operate the new BEECHCRAFT in accordance with the Pilot's Operating Manual, Federal Aviation Administration Approved Flight Manual and/or the FAA Approved Placards which are located in the airplane.

As a further reminder, the owner and operator should also be familiar with the applicable Federal Aviation Regulations concerning operation and maintenance of the airplane, FAR Part 135 Air Taxi Operating Flight Rules and FAR Part 91 General Operating Flight Rules. Further, the airplane must be operated and maintained in accordance with FAA Airworthiness Directives which may be issued against it.

The Federal Aviation Regulations place the responsibility for the maintenance of this airplane on the owner and the operator, who should make certain that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this manual are considered mandatory for continued airworthiness to maintain the airplane in a condition equal to that of its original manufacture. Refer to the maintenance manual for any exceptions.

Authorized BEECHCRAFT Aviation Centers, International Distributors, and International Dealers can provide recommended modification, service, and operating procedures issued by both the FAA and Beech Aircraft Corporation, which are designed to get maximum utility and safety from the airplane.

WARNING

Use only genuine BEECHCRAFT or BEECHCRAFT approved parts obtained from BEECHCRAFT approved sources, in connection with the maintenance and repair of Beech airplanes.

Genuine BEECHCRAFT parts are produced and inspected under rigorous procedures to insure airworthiness and suitability for use in Beech airplane applications. Parts purchased from sources other than BEECHCRAFT, even though outwardly identical in appearance, may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in an airplane.

Salvaged airplane parts, reworked parts obtained from non-BEECHCRAFT approved sources, or parts, components, or structural assemblies, the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render the part, component or structural assembly, even though originally manufactured by BEECHCRAFT, unsuitable and unsafe for airplane use.

BEECHCRAFT expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-BEECHCRAFT approved parts.

WARNING

It shall be the responsibility of the owner/operator to ensure that the latest revisions of publications referenced in this handbook are utilized during operation, servicing, and maintenance of the airplane.

USE OF THE MANUAL

It is the Owner/Pilot's responsibility to have a current BEECHCRAFT B99 Airliner Pilot's Operating Manual.

NOTES

In an effort to provide as complete coverage as possible, applicable to any configuration of the BEECHCRAFT B99 Airliner, some optional equipment has been included in the scope of these manuals. Because of the versatility of the appointments and arrangements of the airplane, the equipment described or depicted herein may not be designated as optional equipment in every case. Through variations provided by custom designing, the illustrations in this manual will not be typical of every airplane.

Beech Aircraft Corporation expressly reserves the right to supersede, cancel, and/or declare obsolete, without prior notice, any part, part number, kit, or publication referenced in this manual.

The owner/operator should always refer to all supplements, whether STC Supplements or Beech Supplements, for possible placards, limitations, normal, emergency and other operational procedures for proper operation of the airplane with optional equipment installed.

NOTICE

The following information may be provided to the holder of this manual automatically:

1. Original issues and revisions of BEECHCRAFT Service Bulletins.
2. Original issues and revisions of FAA Approved Airplane Flight Manual Supplements.
3. Reissues and Revisions of FAA Approved Airplane Flight Manuals, Flight Handbooks, Owner's Manuals, Pilot's Operating Manuals, and Pilot's Operating Handbooks.

This service is free and will be provided only to holders of this manual who are listed on the FAA Aircraft Registration Branch List or the BEECHCRAFT International Owners Notification Service List, and then only if you are listed by Airplane Serial Number for the model for which this manual is applicable. For detailed information on how to obtain "Revision Service" applicable to this manual or other BEECHCRAFT Service Publications consult a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer, or refer to the latest revision of BEECHCRAFT Service Bulletin No. 2001.

The following information is provided to show the divisions of the book and the proper manner of updating the revision records and amending the content of the book as the material becomes available.

SECTION I

LIMITATIONS

ENGINE LIMITS

The following limitations are to be observed in the operation of this airplane equipped with two United Aircraft of Canada, Ltd. PT6A-27 or PT6A-28 engines installed on the airplane in pairs or mixed pairs. Each column is a separate limitation. The limits presented do not necessarily occur simultaneously.

OPERATING CONDITION	OPERATING LIMITS							
	SHP	*TORQUE FT LB*	*MAXIMUM OBSERVED ITT°C*	*GAS GEN RPM N_1 RPM*	*%*	*PROP RPM N_2*	*OIL PRESS PSIG (2)*	*OIL TEMP °C*
TAKE-OFF (5 min Limit)	680	1628	725	38100	101.5	2200	80 to 100	10 to 99
MAX CONT (1)	680	1628	725	38100	101.5	2200	80 to 100	10 to 99
CRUISE CLIMB	620	1628	695	38100	101.5	2200	80 to 100	0 to 99
CRUISE	620	1628 (8)	695	38100	101.5	2200	80 to 100	0 to 99
HI-IDLE (3)	—	—	—	—	—	—	—	-40 to 99
LO-IDLE (4)	—	—	660 (7)	—	—	—	40 (MIN)	-40 to 99
STARTING	—	—	1090 (5)	—	—	—	—	-40 (MIN)
ACCELERATION (3) (7)	—	2100 (5)	850 (5)	38500	102.6	2420	—	0 to 99
MAX REVERSE (6)	620	1628	725	38100	88	2100	80 to 100	0 to 99

(1) Maximum continuous rating is intended for emergency use at the discretion of the pilot.
(2) Normal oil pressure is 80 to 100 psig at power settings above 27000 rpm (72% N_1). Oil pressure below 80 psig is undesirable, and should be tolerated only for the completion of the flight, preferably at reduced power setting. Oil pressures below normal should be reported as an engine discrepancy and should be corrected before the next take-off. Oil pressures below 40 psig 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.
(3) At approximately 70% N_1.
(4) At 51% N_1 minimum.
(5) These values are time limited to two seconds.
(6) This operation is time limited to one minute.

(7) High ITT at ground idle may be corrected by reducing accessory load and/or increasing N_1 rpm. Observe the following generator load limits:

MINIMUM GAS GENERATOR RPM N_1

GENERATOR LOAD	GROUND OPERATION		AIR OPERATION	
	With Air Conditioning	*Without Air Conditioning*	*With Air Conditioning*	*Without Air Conditioning*
0 to .5	55%	50%	63%	55%
.5 to .75	59%	50%	67%	60%
.75 to .90	61%	50%	69%	63%
.90 to 1.0	62%	50%	70%	65%

(8) Cruise torque limits vary with altitude and temperature.

TEMPERATURE LIMITS

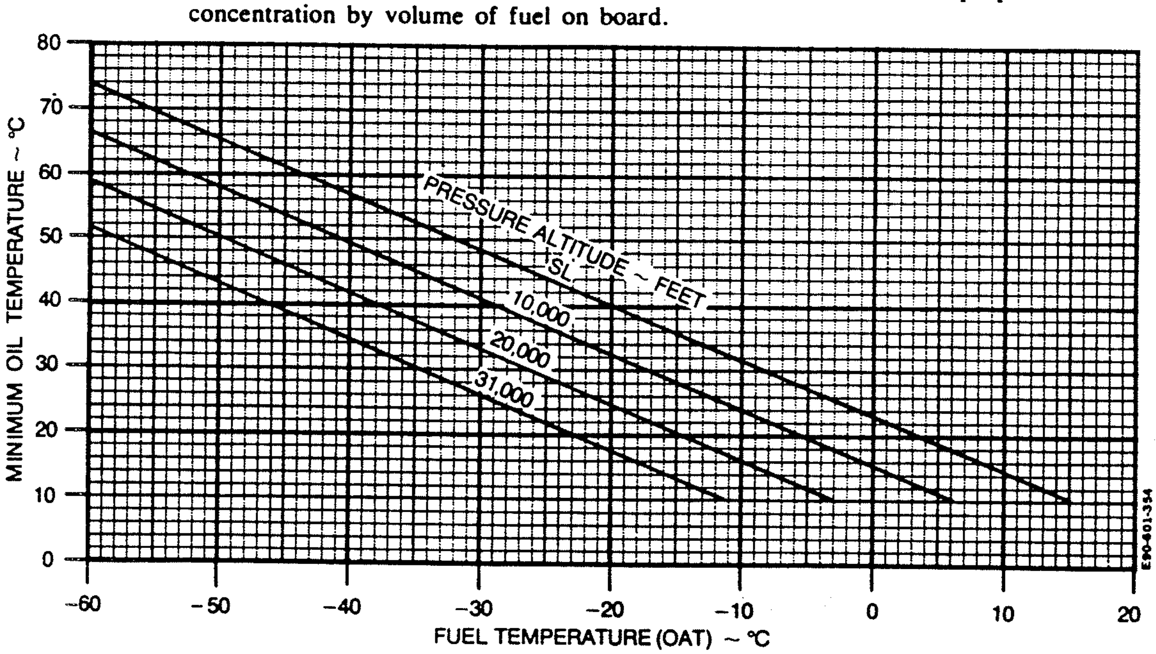
The airplane shall not be operated when take-off ambient temperature exceeds ISA + 34°C.

MINIMUM OIL TEMPERATURE REQUIRED FOR FLIGHT

Engine oil is used to heat the fuel on entering the fuel control. Since no temperature measurement is available for the fuel at this point, it must be assumed to be the same as the OAT. The graph below is supplied for use as a guide in preflight planning, based on known or forecast operating conditions, to allow the operator to become aware of operating temperatures where icing at the fuel control could occur. If the plot should indicate that oil temperatures versus OAT are such that ice formation could occur during takeoff or in flight, anti-icing per MIL-I-27686 should be mixed with the fuel at refueling to ensure safe operation.

CAUTION

Anti-icing additive must be properly blended with the fuel to avoid deterioration of the fuel cell. The additive concentration by volume shall be a minimum of .060% and a maximum of .15%. Approved procedure for adding anti-icing concentrate is contained in Section II.
JP4 fuel per MIL-I-5624 has anti-icing additive per MIL-I-27686 blended in the fuel at the refinery and no further treatment is necessary. Some fuel suppliers blend anti-icing additive in their storage tanks. Prior to refueling, check with the fuel supplier to determine if fuel has been blended to assure proper concentration by volume of fuel on board.



FUEL AND OIL

FUEL

Jet A, Jet A-1, Jet B, JP4, JP5, and JP8 turbine fuels; as well as aviation gasoline grades, 80 Red (80/87), 100LL Blue or 100L Green (Foreign), 100 Green (100/130), and 115/145 Purple, which conform to the latest revision of Pratt & Whitney Canada Ltd. Engine Service Bulletin No. 1244.

Operation on aviation gasoline is limited to 150 hours during any one engine overhaul period.

Maximum operational altitude using aviation gasoline is limited to 8000 feet.

Operation with boost light on is limited to 10 hours between engine pump overhaul or replacement.

FUEL MANAGEMENT

1. Do not take off if fuel quantity gages indicate less than 285 pounds of fuel in each wing system (all serials) or in yellow arc (serials with fuel quantity gages marked with yellow arc).
2. Crossfeed only during single-engine operation. 67 Gals

OILS

Any oil specified by brand name in the latest revision of Pratt & Whitney Canada Ltd. Engine Service Bulletin No. 1001 is approved for use.

FUEL CAPACITY

Total of 368 gallons usable in interconnected nacelle and wing tanks.

112 G. Nacelle
256 G. Wing
368

STARTERS

Use is time-limited to 40 seconds ON, 60 seconds OFF, 40 seconds ON, 60 seconds OFF, 40 seconds ON, then 30 minutes OFF.

on	off
40s	60s
40s	60s
40s	30min

PROPELLERS

Two full-feathering constant speed, reversing, three-bladed propellers are equipped with T10173E-8 blades and HC-B3TN-3 or HC-B3TN-3B hubs. Blade angles are measured at the 30 in. station: Feathered 87°, Reverse -11°, set flight idle stop to obtain 600 ± 60 Foot-Pounds Torque at 2000 rpm (prop) at S.L., standard day conditions.

Auto-feathering System must be operational and turned on for takeoff.

EMERGENCY PROPELLER RPM LIMITS

The maximum propeller overspeed limit is 2420 rpm. Propeller speeds above 2200 rpm indicate failure of primary governor. Propeller speeds above 2288 rpm indicate failure of both primary and secondary governors.

INSTRUMENT MARKINGS

Interstage Turbine Temperature: Green Arc 400°C to 695°C, Yellow Arc 695°C to 725°C, Red Radial 725°C, Dashed Red Radial 1090°C.
Torque Meter: Green Arc 400 Ft Lbs to 1628 Ft Lbs, Red Radial 1628 Ft Lbs.
Propeller Tachometer, N_2: Green Arc 1800 RPM to 2200 RPM, Red Radial 2200 RPM.
Gas Generator Tachometer, N_1: Green Arc 50% RPM to 101.5% RPM, Red Radial 101.5% RPM.
Oil Pressure: Red Radial 40 PSI, Green Arc 80 PSI to 100 PSI, Red Radial 100 PSI.
Oil Temperature: Green Arc 10°C to 99°C, Red Radial 99°C.
Propeller/Engine Air Inlet Ammeter: Green strip 14 to 18 Amperes.
Instrument Air Pressure: Green Arc, 4.3 In. Hg. to 5.9 In. Hg. For "Vacuum (Suction)" see page 1-4.
Deice (Surface) Pressure: Red Radial 15 PSI, Green Arc 15 PSI to 20 PSI, Red Radial 20 PSI.

INSTRUMENT MARKINGS (Continued)

Vacuum (Suction): For "Instrument Air Pressure" see page 1-3.
25,000 ft to 15,000 ft: Narrow Green Arc 3.0 in. Hg to 4.3 in. Hg

15,000 ft to SL: Wide Green Arc 4.3 in. Hg to 5.9 in. Hg

Flaps 13° 30%
43-44° 100%

Flap Position Indicator: White Radial at 30% extended.

Pitch Trim Indicator: Green Strip 0° to 2°, Nose Up; Red Line 4-1/4°, Nose Down

Fuel Quantity Indicators: 0 lbs to 285 lbs, No Takeoff (Yellow Arc, when marked on Gage)

AIRSPEED INDICATOR (CAS)

Maximum Operating (Red Radial) . . . . 226 knots

Normal Operating Range (Green Arc) . . . . 92 to 226 knots

Full Flap Operating Range (White Arc) . . . . 75 to 140 knots

Maximum Approach Flap (White Triangle) . . . . 182 knots

Maximum Take-off Flap (White Triangle) . . . . 182 knots

Single Engine Best Rate of Climb Speed (Blue Radial) . . . . 117 knots

Minimum Single Engine Control V_{MC} (Red Radial) . . . . 85 knots

AIRSPEED LIMITS (CAS)

Maximum Operating Speed V_{MO} . . . . 226 knots

Maximum Operating Mach Number M_{MO} . . . . .46 mach

NOTE

V_{MO}/M_{MO} may not be deliberately exceeded in any regime of flight (climb, cruise or descent).

Maximum Flap Extension Speed:

Take-off Position - 30% . . . . 182 knots

Approach Position - 30% . . . . 182 knots

Full Down Position - 100% . . . . 140 knots

Maximum Gear Extended Speed . . . . 156 knots

Maximum Gear Operating Speed *(U-146, U-148 through U-153)*

Extension . . . . 156 knots

Retraction . . . . 130 knots

U-154 And After

Extension . . . . 156 knots

Retraction . . . . 147 knots

Maximum Design Maneuvering Speed	169 knots
Maximum Demonstrated Crosswind	25 knots

ALTITUDE LIMITATIONS . . . 25,000 feet

1. FAR 91 Operations:
   - Without Oxygen . . . 12,500 feet
   - With Crew Oxygen Only (Any passenger without oxygen) . . . 15,000 feet
2. FAR 135 Operations: . . . As limited by FAR 135.83
3. Operation with aviation gasoline . . . 8,000 feet
4. Operation with Jet B, JP-4, or JP-5 . . . 13,500 feet

MANEUVERS

This is a normal category airplane. Acrobatic maneuvers, including spins, are prohibited.

FLIGHT LOAD FACTORS

At the design gross weight of 10,900 lbs:

3.25 G - Positive 1.30 G - Negative

CAUTION

Do not use controls abruptly above 169 knots CAS.

For turbulent air penetration, use maneuvering airspeed of 169 knots. Avoid over-action on power levers. Turn autopilot off. Keep wings level, maintain attitude and avoid use of stabilizer trim. Do not chase airspeed and altitude. Penetration should be at an altitude which provides adequate maneuvering margins when severe turbulence is encountered.

MAXIMUM WEIGHT

Maximum Take-off Weight	10,900 pounds
Maximum Landing Weight	10,900 pounds
Maximum Ramp Weight	10,955 pounds
Maximum Zero Fuel Weight	No Limitations

FAR Part 135 Operations

Maximum Take-off Weight	AS LIMITED BY MAXIMUM TAKE-OFF WEIGHT GRAPHS (SECTION IV)
Maximum Landing Weight	AS LIMITED BY MAXIMUM LANDING WEIGHT GRAPH (SECTION IV)

CENTER OF GRAVITY LIMITS (Landing Gear Extended)

Aft Limit: 195.0 in. aft of datum at all weights. Forward Limit: 179.0 in. aft of datum at all weights.

STABILIZER TRIM SYSTEM

Flight will not be initiated with any malfunction of either the main or standby trim systems. The Main Pitch Trim System master switch and the Standby Pitch Trim System master switch shall not be in the ON position at the same time. These systems shall be operated independently of each other.

MINIMUM FLIGHT CREW

One Pilot

PNEUMATIC SURFACE DEICE BOOTS

Minimum Ambient Temperature Operating Limit .... -40°C

STRUCTURAL LIMITATIONS

Wing and associated structure fatigue sa^f^ ''fe with
incorporation of Kit No. 99-4023-1S sr modification
(BEECHCRAFT Service Instructions .. 0986) .... 20,000 hours

NOTE

See applicable Airworthiness Directive for safelife of wing and associated structure if Kit No. 99-4023-1S has not been incorporated.

WING ATTACH BOLTS, NUTS, AND BARREL NUT ASSEMBLIES

Refer to chapter five of the 99 Airliner Series Maintenance Manual.

PLACARDS

On Overhead Panel in Cockpit: (U-146, U-148 through U-153)

AIRSPEED LIMITATIONS

MAX OPERATION 226 KNOTS (S.L. TO 15,500 FT) DECREASE BY 4 KNOTS FOR EVERY 1000 FT ABOVE 15,500 FT

MAX GEAR EXTENSION	156 KNOTS	MAX TAKE OFF FLAP	182 KNOTS
MAX GEAR RETRACT	130 KNOTS	MAX FULL DOWN FLAP	140 KNOTS
MAX GEAR EXTENDED	156 KNOTS	MAX MANEUVERING	169 KNOTS
MAX DEMONSTRATED CROSSWIND	25 KNOTS		

RECOMMENDED TWIN ENGINE CLIMBS, BEST ANGLE 101 KNOTS BEST RATE 121 KNOTS

RECOMMENDED APPROACH SPEED 98 KNOTS

PLACARDS (Continued)

On Overhead Panel in Cockpit: (U-154 And After)

AIRSPEED LIMITATIONS

MAX OPERATION 226 KNOTS (S.L. TO 15,500 FT) DECREASE BY 4 KNOTS FOR EVERY 1000 FT ABOVE 15,500 FT

MAX GEAR EXTENSION	156 KNOTS	MAX TAKE OFF FLAP	182 KNOTS
MAX GEAR RETRACT	147 KNOTS	MAX FULL DOWN FLAP	140 KNOTS
MAX GEAR EXTENDED	156 KNOTS	MAX MANEUVERING	169 KNOTS
MAX DEMONSTRATED CROSSWIND	25 KNOTS		

RECOMMENDED TWIN ENGINE CLIMBS, BEST ANGLE 101 KNOTS BEST RATE 121 KNOTS
RECOMMENDED APPROACH SPEED 98 KNOTS

OPERATION LIMITATIONS

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS
NO ACROBATIC MANEUVERS INCLUDING SPINS ARE APPROVED

CAUTION

STALL WARNING IS INOPERATIVE WHEN MASTER SWITCH IS OFF

THIS AIRPLANE APPROVED FOR VFR, IFR DAY & NI OPERATION.

On overhead panel U-146, U-148 through U-151:

CAUTION

STANDBY COMPASS IS ERRATIC WHEN WINDSHIELD ANTI-ICE IS ON
STANDBY COMPASS IS ERRATIC WHEN VENT BLOWER IS ON

On Edgelight Overhead Panel U-152 and after:

STANDBY COMPASS IS ERRATIC WHEN WINDSHIELD ANTI-ICE AND OR VENT BLOWER IS ON

On aircraft equipped with surface, propeller and engine air inlet deice, heated pitot, heated windshield, heated stall warning and wing ice lights.

THIS AIRPLANE IS EQUIPPED FOR OPERATION IN ICING CONDITIONS

On aircraft not equipped with complete deicing equipment

WARNING

THIS AIRCRAFT IS NOT FULLY EQUIPPED FOR FLIGHT IN ICING CONDITIONS

PLACARDS (Continued)

On Instrument Panel Adjacent to Each Gyroscopic Instrument (Depending on Gyro's Power Source):

AIR AC DC

On Top Pedestal Adjacent to Flap Position Indicator:

T.O. FLAPS 182 KNOTS MAX
FULL FLAPS 140 KNOTS MAX

On Instrument Panel Adjacent to Each Airspeed Indicator:

SEE LIMITATIONS PLACARD
FOR "MAX. OPERATION"
ABOVE 15,500 FT

On Left Side Panels.

EMERGENCY
STATIC AIR SOURCE
NORMAL ALTERNATE
WARNING
SEE FLIGHT MANUAL EMER
PROCEDURE FOR
INSTR CAL ERROR

On Pedestal Adjacent to Power Lever:

CAUTION
REVERSE
ONLY WITH
ENGINES
RUNNING

On Left Subpanel (U-146, U-148 through U-153) Adjacent to Landing Gear Switch:

EXT 156 KN MAX
RET 130 KN MAX

On Left Subpanel (U-154 And After) Adjacent to Landing Gear Switch:

EXT 156 KN MAX
RET 147 KN MAX

On Floor Between Pilot & Co-Pilot Seats: (Mechanical Landing Gear)

LANDING GEAR
EMERGENCY EXTENSION
1. PULL UP HANDLE AND → TURN CLOCKWISE TO LOCK
← 2. REMOVE LEVER FROM SECURING CLIP AND PUMP

On Floor Between Pilot & Co-Pilot Seats: (Hydraulic Landing Gear)

LANDING GEAR
EMERGENCY EXTENSION

1. REMOVE PUMP HANDLE FROM SECURING CLIP AND PUMP.
2. AFTER ALL THREE GREEN INDICATOR LIGHTS ARE ILLUMINATED AND FURTHER RESISTANCE IS FELT, SECURE HANDLE IN STOWED POSITION.

On Pilot's & Co-Pilot's window Sills and On Overhead Escutcheon in Cabin:

NOT INSTALLED

WARNING

DO NOT SMOKE WHILE OXYGEN IS IN USE
HOSE PLUG MUST BE PULLED OUT TO
STOP FLOW OF OXYGEN

On center of aft baggage door and On center of aft baggage bulkhead:

NOT INSTALLED

BAGGAGE COMPARTMENT

MAXIMUM LOADING
100 LBS

On baggage compartment webbing:

NOT INSTALLED

BAGGAGE COMPARTMENT
MAXIMUM LOADING 100 LBS

On Center of Fwd baggage doors:

On aircraft with 50 to 170 lbs of avionic equipment.

BAGGAGE
COMPT LIMITATIONS

MAX WEIGHT 600 LBS

On webbing for increased optional baggage compartment loading:

NOT INSTALLED

CARGO LOADING AFT
OF THIS WEB 440 LBS WITH
BOTH WEBS IN PLACE

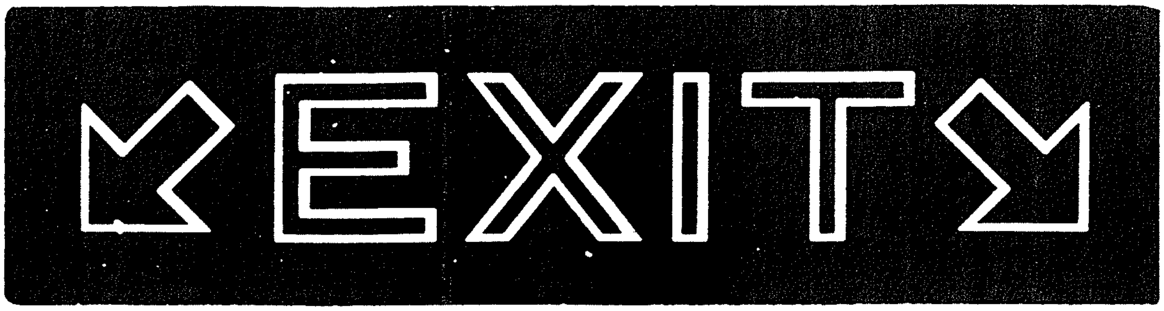
On center of Fwd baggage doors.

CAUTION

DO NOT CARRY INFLAMMABLE
FLUIDS IN THIS COMPARTMENT

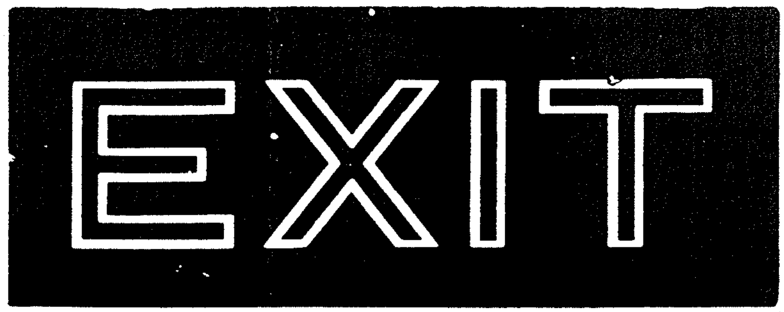
PLACARDS (Continued)

On Ceiling Aft of Fwd Curtain: NOT INSTALLED



On Ceiling Fwd of Entrance Door:

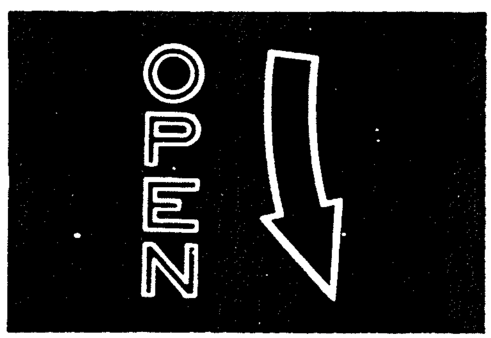
NOT INSTALLED



On emergency exit handle:

NOT INSTALLED

On airstair door adjacent to inside handle: NOT INSTALLED



On airstair door adjacent to chain attachment (if chain is installed):

On Airstair Door Step (Airplanes in compliance with BEECHCRAFT Service Bulletin No. 2007):

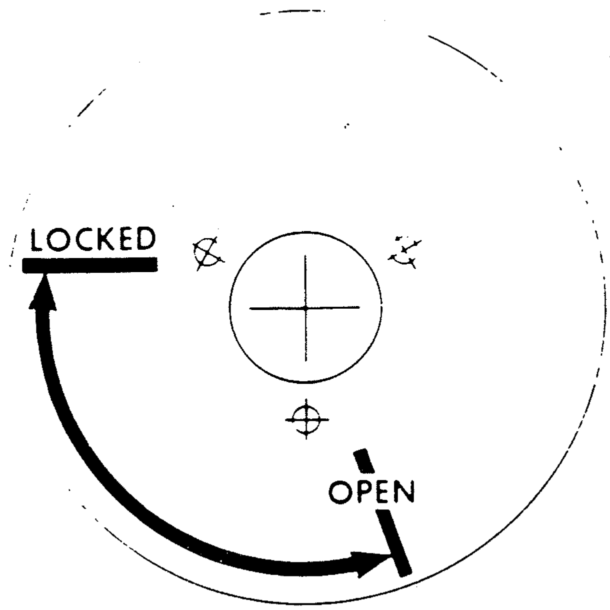
PULL PINS
TO STOW STEP
WHILE IN FLIGHT

RETURN STEP TO LOCKED
POSITION PRIOR TO
OPENING DOOR

LIFT STEP TO
INSPECT DOOR
LOCK

PLACARDS (Continued)

Below Pilot's Entrance Hatch (Optional): N/A



CAUTION
REMOVE PILOTS ENTRY LADDER
BEFORE FLIGHT

STORE LADDER IN NOSE BAGGAGE COMPT
WHEN TRANSPORTING PASSENGERS OR
ON BACK OF PILOTS CHAIR WHEN
HAULING CARGO

INTENTIONALLY LEFT BLANK

KINDS OF OPERATIONS EQUIPMENT LIST

This airplane may be operated in day or night VFR, day or night IFR and icing conditions when the appropriate equipment is installed and operable.

The following equipment list identifies the systems and equipment upon which type certification for each kind of operation was predicated and must be installed and operable for the particular kind of operation indicated. However, certain operations may be authorized with certain listed equipment and/or systems inoperative under certain conditions and under provisions defined by a current Minimum Equipment List (MEL) approved by the FAA and authorized under an operating regulation which provides for use of an MEL.

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Icing	
ELECTRICAL POWER						
1. Battery	1	1	1	1	1	
2. D.C. Generator	2	2	2	2	2	
3. D.C. Loadmeter	2	2	2	2	2	
4. D.C. Generator Warning Light	2	2	2	2	2	
5. Inverter	2	2	2	2	2	
6. Inverter Warning Light	1	1	1	1	1	
7. Bus Fault Light	1	1	1	1	1	
8. Battery Feeder Fault Reset Light	1	1	1	1	1	
9. Battery Monitor System	1	1	1	1	1	
10. AC Volt Meter (If installed)	1	1	1	1	1	
EQUIPMENT/FURNISHINGS						
1. Exit Signs - Self-Illuminated	4	4	4	4	4	
FIRE PROTECTION						
1. Engine Fire Detector System	2	2	2	2	2	
2. Firewall Fuel Shutoff System	2	2	2	2	2	
FLIGHT CONTROLS						
1. Flap System	1	1	1	1	1	
2. Flap Position Indicator	1	1	1	1	1	
3. Horizontal Stabilizer Trim System - Main	1	1	1	1	1	
4. Horizontal Stabilizer Trim System - Standby	1	1	1	1	1	
5. Stabilizer out-of-trim Aural Warning Indicator	1	1	1	1	1	
6. Trim-in-Motion Aural Indicator	1	1	1	1	1	
7. Horizontal Stabilizer Position Indicator	1	1	1	1	1	
8. Stall Warning Horn	1	1	1	1	1	
9. Trim Tab Indicator - Rudder	1	1	1	1	1	
10. Trim Tab Indicator Aileron	1	1	1	1	1	
FUEL						
1. Fuel Boost Pumps (4 are installed)	PER AFM Limitations					
2. Fuel Quantity Indicator	2	2	2	2	2	
3. Fuel Quantity Gauge Selector Switch	1	1	1	1	1	
4. Nacelle Not-Full Warning Light	2	2	2	2	2	
5. Crossfeed Light	1	1	1	1	1	
6. Fuel Boost Pump Low Pressure Warning Light	2	2	2	2	2	
7. Fuel Flow Indicator	2	2	2	2	2	
8. Jet Transfer Pump	2	2	2	2	2	

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Icing
ICE AND RAIN PROTECTION					
1. Engine Inlet Scoop Deicer Boot	2	2	2	2	2
2. Indicator - Propeller/Inlet Deicer	1	1	1	1	1
3. Engine Inertial Anti-Icing System	2	2	2	2	2
4. Pitot Heat	0	0	2	2	2
5. Alternate Static Air Source	0	0	1	1	1
6. Engine Auto-Ignition System (If Installed)	2	2	2	2	2
7. Propeller Deicer System	0	0	0	0	1
8. Windshield Heat (Left)	0	0	0	0	1
9. Surface Deicer System	0	0	0	0	1
10. Stall Warning Mounting Plate Heater	0	0	0	0	1
11. Wing Ice Light (Left)	0	0	0	0	1
12. Windshield Wiper (Left)	1	1	1	1	1
LANDING GEAR					
1. Landing Gear Position Indicator Lights	3	3	3	3	3
2. Landing Gear Handle Light	1	1	1	1	1
3. Flap-Controlled Landing Gear Aural Warning	1	1	1	1	1
4. Nose Steering Disconnect Actuator	1	1	1	1	1
5. Landing Gear Hydraulic Pump (If Installed)	1	1	1	1	1
LIGHTS					
1. Cockpit and Instrument (Required Illumination)	0	1	0	1	0
2. Anti-Collision	0	2	0	2	0
3. Landing Light Bulbs (any 2 of 4 bulbs)	0	2	0	2	0
4. Position Lights	0	3	0	3	0
5. Cabin Door Warning Light (Note)	1	1	1	1	1
6. Baggage Door Warning Light (Note)	1	1	1	1	1
Note: Where combined into one cabin/baggage annunciator - one (1) is required for all conditions.					
NAVIGATION (INSTRUMENT)					
1. Altimeter (left)	1	1	1	1	1
2. Airspeed (left)	1	1	1	1	1
3. Magnetic Compass	1	1	1	1	1
4. Outside Air Temperature	1	1	1	1	1
VACUUM SYSTEM					
1. Suction or Pressure Gauge	1	1	1	1	1
2. Instrument Air System	1	1	1	1	1
PROPELLER					
1. Autofeather System	2	2	2	2	2
2. Low Pitch light (If installed)	2	2	2	2	2
3. Do not Reverse Warning Light	1	1	1	1	1
4. Propeller Reversing	2	2	2	2	2

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Icing	
ENGINE INDICATING						
1. Tachometer Indicator (Propeller)	2	2	2	2	2	
2. Tachometer Indicator (Gas Generator)	2	2	2	2	2	
3. ITT Indicator	2	2	2	2	2	
4. Torque Indicator	2	2	2	2	2	
ENGINE OIL						
1. Oil Temperature Indicator	2	2	2	2	2	
2. Oil Pressure Indicator	2	2	2	2	2	
3. Low Oil Pressure Light	2	2	2	2	2	
4. Engine Chip Detector System	2	2	2	2	2	

Note 1: The zeros (0) used in the above list mean that the equipment and/or system was not required for type certification for that kind of operation.

Note 2: The above system and equipment list is predicated on a crew of one pilot.

Note 3: Equipment and/or systems in addition to those listed above may be required by operating regulations (FAR Part 135) that may specify certain items of equipment for more than one pilot.

Note 4: The above system and equipment list does not include specific flight instruments and communications/navigation equipments required by the FAR Part 91 and 135 operating requirements.

SECTION II

NORMAL PROCEDURES

PREFLIGHT

LEFT WING

1. Flaps - CHECK
2. Gravity Feed Line - DRAIN
3. Aileron and Tab - CHECK
4. Lights - CHECK
5. Stall Warning - CHECK
6. Deice Boot - CHECK
7. Wing Fuel Tank - CHECK
8. Drain 3 Fuel Sumps:
   a. One Outboard of Nacelle
   b. Two Aft of Oil Cooler
9. Fuel Vent - CLEAR
10. Landing Gear, Tires, Brakes, Wheel Well and Doors - CHECK
11. Fire Extinguisher Pressure - CHECK
12. Tie-Down and Chocks - REMOVED
13. Propeller - CHECK
14. Engine Air and Oil Cooler Intakes - CLEAR; Inertial Separator Vane - RETRACTED
15. Engine Air Inlet Boot - CHECK
16. Engine Oil - CHECK QUANTITY, CAP SECURE
17. Firewall Fuel Filter - DRAIN
18. Cowling, Doors and Panels - CHECK
19. Lower Antennas and Beacon - CHECK

NOSE SECTION

1. Pitot Cover - REMOVE
2. Static Port - CLEAR
3. Ram Air Inlet - CLEAR
4. Access Panels and Baggage Door - SECURE
5. Windshield Wipers - CHECK
6. Nose Gear, Tire, Wheel Well, Doors and Shimmy Dampener - CHECK
7. Baggage Door and Access Panels - SECURE
8. Pitot Cover - REMOVE
9. Static Port - CLEAR

RIGHT WING

1. Propeller - CHECK
2. Engine Air and Oil Cooler Intakes - CLEAR; Inertial Separator Vane - RETRACTED
3. Engine Air Inlet Boot - CHECK
4. Engine Oil - CHECK QUANTITY, CAP SECURE
5. Firewall Fuel Filter - DRAIN
6. Cowling, Doors and Panels - CHECK
7. Drain 3 Fuel Sumps:
   a. One Outboard of Nacelle
   b. Two Aft of Oil Cooler
8. Fuel Vent - CLEAR
9. Landing Gear, Tires, Brakes, Wheel Well and Doors - CHECK
10. Fire Extinguisher Pressure - CHECK
11. Tie-Down and Chocks - REMOVED
12. Wing Fuel Tank - CHECK

13. Deice Boot - CHECK
14. Lights - CHECK
15. Aileron - CHECK
16. Gravity Feed Line - DRAIN
17. Flaps - CHECK

TAIL SECTION

1. Baggage Door - SECURE
2. Emergency Locator Transmitter - ARMED
3. Access Panels - SECURE
4. Deice Boots - CHECK
5. Control Surfaces and Rudder Tab - CHECK
6. Lights - CHECK
7. Stabilizer Setting - NOTE
8. Top Antennas - CHECK

BEFORE STARTING ENGINES

1. Exterior Inspection - COMPLETED
2. Cabin Door - LOCKED

WARNING

Only qualified personnel should close and lock the door.

3. Cabin Door Folding Step - Pull Pins and Stow Against Door
4. Load and Baggage - SECURE; Weight and C.G. - CHECKED
5. Emergency Exits - SECURE AND UNLOCKED
6. Control Locks - REMOVED
7. Seat Belts and Shoulder Harnesses - SECURE
8. Brake - SET
9. Pilot's Entrance Hatch (if installed) - LOCKED

CAUTION

To properly lock the hatch, the locking handle must be rotated counterclockwise to the fully opened position, then the handle rotated into the locked position. The locking mechanism should be felt to go "over center" into the locked position, and the handle should align with the locked position indicator on the placard behind the handle.

10. Emergency Static Air Valve - NORMAL
11. Oxygen Pressure - Check
12. All Switches - OFF
13. Landing Gear Handle - DOWN
14. Power Levers - IDLE
15. Propeller Controls - FULL FORWARD
16. Condition Levers - CUT-OFF
17. Cabin Temp Mode and Blower - OFF
18. Circuit Breakers - IN
19. Battery Switch - ON

CAUTION

NEVER CONNECT AN EXTERNAL POWER SOURCE TO THE AIRPLANE UNLESS A BATTERY INDICATING A CHARGE OF AT LEAST 20 VOLTS IS IN THE AIRPLANE. If the battery voltage is less than 20 volts, the battery must be recharged, or replaced with a battery indicating at least 20 volts, before connecting external power.

When an auxiliary power source is used, ascertain that the polarity of the APU is the same as that of the airplane. If polarity of the APU is unknown, use a voltmeter to assure correct polarity before connecting it to the airplane.

The battery switch must be ON when starting engines with auxiliary power and the generators should be OFF until the auxiliary power has been disconnected.

After the second engine has been started, disconnect the auxiliary power source and secure the access door.

20. Landing Gear Handle Lights - TEST
21. Annunciator Panel and Warning Lights - TEST
22. Fuel Firewall Handles - PULL (OFF)
23. Primary Boost Pumps - ON (Check Fuel Press Lights - ON)
24. Fuel Firewall Handles - PUSH ON (Check Fuel Press Lights - OFF)
25. Primary Boost Pumps - OFF
26. Secondary Boost Pumps - CHECK
27. Crossfeed - OPEN; Light On - CHECK; Operate One Boost Pump, Both Fuel Press Lights Out - CHECK - Crossfeed - CLOSED
28. Fire Detectors - CHECK

ENGINE START

1. Right Boost Pump - ON
2. Right Ignition and Start Switch - ON
3. Right Condition Lever - LOW IDLE (after N_1 rpm stabilizes for 5 seconds; 12% minimum)
4. ITT and N_1 - MONITOR (1090°C Max)
5. Right Ignition and Start Switch - OFF (at 50% N_1, or above)
6. Right N_1 Speed - ADJUST to a minimum of 15% above IDLE
7. Right Generator - ON (Refer to NICKEL-CADMIUM BATTERY CONDITION CHECK, this section)
8. Right Oil Pressure - CHECK (Right propeller unfeathered indicates oil pressure)
9. Left Boost Pump - ON
10. Left Ignition and Start Switch - ON
11. Left Condition Lever - LOW IDLE (after N_1 speed stabilizes for 5 seconds; 12% minimum)
12. ITT and N_1 - MONITOR (1090°C Max)
13. Left Ignition and Start Switch - OFF (at 50% N_1, or above)
14. Left Generator - ON
15. Inverters - BOTH CHECKED, then select inverter to be used
16. Right and Left Oil Pressure - CHECK by gage pressure
17. Right N_1 - REDUCE TO IDLE

CAUTION

If no ITT rise is observed within 10 seconds after moving the Condition Lever to LOW IDLE, move the Condition Lever to CUT-OFF and Start Switch to OFF. Allow 30 seconds to drain fuel, then follow the Engine Clearing Procedure.

If starting attempt is discontinued, the entire starting sequence must be repeated after allowing the engine to come to a complete stop.

ENGINE CLEARING PROCEDURE

1. Condition Lever - CUT-OFF
2. Battery Switch - ON
3. Boost Pump - ON (Primary or secondary)
4. Ignition and Start Switch - STARTER ONLY for 30 to 45 seconds. Do not exceed the starter time limit, see SECTION I.

5. Ignition and Start Switch - OFF
6. Boost Pump - OFF

AFTER STARTING AND TAXI

1. Fuel Quantity - CHECKED
2. Radios - ON
3. Cabin Temperature and Mode - AS REQUIRED (observe ITT limits and minimum N_1 limits and minimum N_1 if air conditioner is used)
4. Gyro and Deice Pressure - CHECK
5. Voltage and Loadmeters - CHECK
6. Cabin Sign - ON
7. Lights - AS REQUIRED
8. Annunciator Lights - OUT
9. Instruments - CHECK
10. Brakes - CHECK

CAUTION

Taxiing on slush covered surfaces can result in slush being sprayed into the engine air inlets by the nose gear. Nose wheel spray pattern should be observed and taxi speed reduced accordingly.

NOTE

Propeller Beta Range may be used during taxi with a minimum of blade erosion up to the point where N_1 increases. Care must be exercised when taxiing on sandy or dusty ground. Conduct engine check on a hard surface swept clean of sand an dust, if possible, to preclude pitting of propeller blades and aircraft surfaces.

CAUTION

If either CHIP DETECT annunciator light (if installed) illuminates during runup, do not takeoff. Shut down the engine, investigate the cause, and initiate necessary repairs.

BEFORE TAKEOFF

* 1. Pitch Trim Indicator - COMPARE WITH STABILIZER POSITION NOTED DURING PREFLIGHT.
2. Pitch Trim System - CHECK
   a. Standby Pitch Trim Switch - ON
   b. Individual Dual Element Switches - MOVE FWD AND AFT, check that there is no movement of indicator.
   c. Both Dual Element Switches - MOVE FWD AND AFT, check movement with indicator.
   d. Standby Pitch Trim Switch - OFF while both dual element switches activated to check system deactivation.
   e. Main Pitch Trim Switch - ON
   f. Pilot's Individual Dual Element Switches - MOVE FWD AND AFT, check no movement of indicator.
   g. Both Pilot's Dual Element Switches - MOVE FWD AND AFT;
      (1) Check travel to full extreme with indicator. Note that nose down travel stops on red line.
      (2) Note aural trim-in-motion indication.
      (3) Trim Release Button - DEPRESS while trim is in motion in each direction to deactivate system. RELEASE (trim movement should continue)

h. Copilot's Individual Dual Element Switches - MOVE FWD AND AFT, check no movement of indicator.
i. Both Copilot's Dual Element Switches - MOVE FWD AND AFT

(1) Check Trim Release Button while trim in motion (Travel to full extremes not required).

j. Out of Trim Warning System - CHECK

(1) Activate pilot's (or copilot's) main trim switches until trim indicator needle is above or below green arc.
(2) Advance left engine power lever to 90% N_1 position or above. Warning horn should sound.
(3) Retard left engine power lever to IDLE.

WARNING

Operation of the trim system should occur only by movement of pairs of switches. Any movement of the indicator while depressing one switch denotes a malfunctioning system. Flight shall not be initiated with any malfunction of either the main or standby trim systems.

The Main Pitch Trim System Master Switch and the Standby Pitch Trim System Master Switch shall not be in the ON position at the same time. These systems shall be operated independently of each other.

3. Pitch Trim Indicator - SET FOR TAKEOFF (GREEN ARC)
4. Trim Tabs - SET
5. Engine Control Friction Locks - ADJUST
6. Flaps - CHECK AND SET.
7. Flight Controls - CHECK FOR PROPER DIRECTION OF TRAVEL AND FREEDOM OF MOVEMENT

* 8. Overspeed Governors - TEST:
   a. Propeller Levers - HIGH RPM
   b. Power Levers - BELOW 1900 RPM
   c. Propeller Test Switch(es) - HOLD TO OVERSPEED GOV
   d. Power Levers - INCREASE TO STABILIZED RPM (1900 to 2100). Observe ITT and Torque Limits.
   e. Power Levers - REDUCE TO 1900 RPM
   f. Propeller Test Switch(es) - RELEASE

* 9. Primary Governors - EXERCISE AT 1900 RPM.

* 10. Engine Ice Protection Controls - PULL; check torque drop; PUSH; regain original torque.

11. Autofeather - CHECK
   a. Condition Levers - LOW IDLE
   b. Power Levers - APPROXIMATELY 500 FT-LBS TORQUE
   c. Autofeather Switch - TEST (hold)
   d. Power Levers - RETARD INDIVIDUALLY; at approximately 400 foot-pounds - opposite light - OUT; at approximately 220 foot-pounds - both lights out and propeller starts to feather.
   e. Power Levers - BOTH RETARDED; both lights out - neither prop feathers.
   f. Autofeather Switch - ARM

* 12. Secondary Low Pitch Stops (if installed) - TEST:
   a. Condition Levers - HIGH IDLE
   b. Power Levers - IDLE (Read propeller rpm.)
   c. Prop Test Switches - HOLD TO SEC LOW PITCH STOP TEST.
   d. Power Levers - ALIGN AFT EDGE WITH TOP OF BETA RANGE MARKS.
   e. Secondary Low Pitch Lights - CHECK ON
   f. RPM - CHECK STABILIZED AT 210 ± 40 ABOVE RPM IN STEP "b".
   g. Prop Test Switches - RELEASE
   h. RPM - CHECK (MUST INCREASE ABOVE STEP "f".)
   i. Power Levers - IDLE
   j. Prop Test Switches - MOMENTARILY TO SEC LOW PITCH STOP TEST (to extinguish lights)

CAUTION

Do not force the Power Levers into FULL REVERSE position with the Secondary Low Pitch Stop test switches ON.

13. Propeller Feathering (manual) - CHECK at LOW IDLE.
14. Radios and Radar - CHECK
15. Autopilot - CHECK, THEN OFF
16. Oil Temperature - CHECK (Oil temperature must be above the minimum shown in LIMITATIONS Section to preclude ice formation in the fuel control.)
17. Pilot's Entrance Hatch (if installed) - LOCKED

WARNING

If the pilot's entrance hatch has been unlocked or suspected of being unlocked, the locking mechanism should be relocked. The lock mechanism cannot be properly locked unless the handle has been moved to the fully open position first.

18. Ice Protection - AS REQUIRED

* May be omitted for quick turn-around at pilot's discretion.

TAKEOFF

WARNING

If a CHIP DETECT annunciator light (if installed) illuminates during takeoff, return to the field for investigation of the cause and initiate corrective action.

Monitor ITT and engine torque. Check autofeather armed lights ON. Increasing airspeed will cause torque and ITT to increase. Observe Landing Gear and Flap Operating Airspeed Limits.

CAUTION

When the air conditioner is operating, the power levers should be advanced slowly to assure symmetrical power application.

CLIMB

1. Autofeather Switch - OFF
2. Climb Power - SET PER CRUISE POWER GRAPHS or TABLES
3. Propeller RPM - 2000
4. Propeller Synchronizer - ON
5. Engine Instruments - MONITOR
6. Cabin Sign - AS REQUIRED

CRUISE

WARNING

Do not lift power levers in flight.

WARNING

Any illumination (or flicker) of either CHIP DETECT annunciator light (if installed) requires immediate shutdown of the affected engine. See EMERGENCY PROCEDURES Section, "ENGINE FAILURE DURING CLIMB OR CRUISE/ ILLUMINATION OF MAGNETIC CHIP DETECTOR ANNUNCIATOR (IF INSTALLED)." After securing the engine, proceed to the nearest facility for investigation and necessary corrective action prior to further flight.

1. Cruise Power - SET (Observe both ITT and Torque Limits.)
2. Engine Instruments - MONITOR
3. Fuel Quantity - MONITOR
4. Battery Condition - MONITOR

DESCENT

1. Power - AS REQUIRED
2. Altimeter - SET
3. Cabin Sign - AS REQUIRED
4. Windshield Anti-Ice - AS REQUIRED (Turn on well before descent into warm moist air to aid in defogging.)

LANDING

CAUTION

If either of the PROP LOW PITCH warning lights (if installed) has become illuminated in flight, asymmetrical reversing may occur.

1. Cabin Sign - ON
2. Propeller Synchronizer - OFF
3. Autofeather Switch - ARM
4. Flaps - 100%
5. Landing Gear - DOWN
6. Landing and Taxi Lights - AS REQUIRED
7. Power Levers - BETA RANGE (AS REQUIRED AFTER TOUCHDOWN)

CAUTION

During hot weather operation with air conditioner on, it is possible for the ITT limits to be exceeded at low rpm.

MAXIMUM REVERSE POWER LANDING

CAUTION

To ensure consistent reversing characteristics, the Propeller Controls must be in the FULL INCREASE RPM position.

1. Condition Levers - HIGH IDLE
2. Propeller Controls - FULL INCREASE RPM
3. Power Levers - LIFT AND REVERSE AFTER TOUCHDOWN.

CAUTION

If possible, propellers should be moved out of reverse above 40 knots to minimize propeller blade erosion. Care must be exercised when reversing on runways with loose sand or dust on the surface. Flying gravel will damage propeller blades, and dust may impair the pilot's forward visibility at low airplane speeds.

4. Condition Levers - LOW IDLE

BALKED LANDING

1. Power - TAKE-OFF (1628 ft-lbs or ITT 725°C at 2200 RPM)
2. Airspeed - BALKED LANDING CLIMB SPEED (When clear of obstacles ESTABLISH 100 KNOTS.)
3. Flaps - UP
4. Landing Gear - UP

AFTER LANDING

1. Flaps - UP
2. Landing and Taxi Lights - AS REQUIRED
3. Ice Protection - OFF
4. Electrical Load - OBSERVE LIMITS
5. Trim - SET TO ZERO

ENGINE SHUTDOWN AND SECURING

1. Parking Brake - SET
2. Radios - OFF
3. Cabin Vent Blower and Mode Control - OFF
4. Inverter - OFF
5. Autofeather Switch - OFF
6. Light Switches - OFF
7. Battery - CHARGED (Refer to "NICKEL-CADMIUM BATTERY CONDITION CHECK", this section.)
8. ITT - BELOW 585°C FOR ONE MINUTE
9. Propellers - FEATHERED
10. Condition Levers - CUT-OFF

CAUTION

Monitor ITT during shutdown. If sustained combustion is observed, proceed immediately to the ENGINE CLEARING procedure. During shutdown, ensure that the compressors decelerate freely. Do not close the Fuel Firewall Shutoff Valve for normal engine shutdown.

11. Boost Pumps - OFF
12. Battery and Generator Switches - OFF (Below 15% N_1)

NOTE

N_1 decreasing below 15% indicates the starter relay is not engaged.

13. Cabin Door - Return Step to Locked Position Prior to Opening Door
14. Install wheel chocks and release parking brake if airplane is to be left unattended
15. Control Locks and Tie-down - AS REQUIRED
16. External Covers - INSTALL - AS REQUIRED

NIGHT OR INSTRUMENT FLIGHT

1. Internal Lights - CHECK
2. External Lights - CHECK
3. Flight Instruments - CHECK
4. Instrument Air Pressure - CHECK
5. Voltage and Loadmeters - CHECK
6. Auto-ignition - CHECK

ICING FLIGHT

Stalling airspeeds may increase when ice has accumulated on the airplane. For the same reason stall warning devices are not accurate and should not be relied upon. Keep a comfortable margin of airspeed above the normal stall airspeed with ice on the airplane.

1. Engine Anti-Ice
   a. Preflight: Check inertial separator vanes retracted
   b. Before take-off: 1000 ft lbs torque or above
      (1) Engine Ice Protection Controls
         (a) Extend (pull) - Check for torque drop, indicating vane extension.
         (b) Retract (push) - Check for torque increase to previous readings, indicating vane retraction.

   c. In Flight:
      (1) Before visible moisture is encountered at + 5°C and below, or
      (2) At night when freedom from visible moisture is not assured at + 5°C and below
         (a) Engine ice protection - PULL
         (b) Check proper operation by noting torque drop.
         (c) Regain torque by increasing power levers if desired (observe ITT limits).

CAUTION

If in doubt, extend the vanes. Engine icing can occur even though no surface icing is present. If freedom from visible moisture can not be assured, engine ice protection should be activated. Visible moisture is moisture in any form; clouds, ice crystals, snow, rain, sleet, hail or any combination of these.

NOTE

At night, moisture in the form of ice crystals may be seen by turning the landing lights on.

2. Engine Auto-ignition

   a. Before Take-Off
      (1) Power Levers - IDLE
      (2) Auto-ignition Switches - ARM
      (3) Annunciator Panel - IGNITION ON
      (4) Power Levers - ADVANCE TO ABOVE 425 FOOT POUNDS TORQUE
      (5) Auto-ignition ARM Lights - CHECK ON

   b. In Flight
      (1) Auto-ignition - ARM

NOTE

Engine Auto-ignition must be ARMED for icing flights and flights at night above 14,000 feet. To prevent prolonged operation of the igniters during descent when AUTO-ignition is armed, do not reduce power below 425 ft lbs torque.

3. Electrothermal Propeller Deice

CAUTION

Do not operate propeller deicers when the propellers are static.

a. Before Take-Off
   (1) Propeller Deice Switch - ON
   (2) Propeller Deice Ammeter - CHECK 14 to 18 AMPERES
   (3) To check the automatic timer, watch the propeller ammeter closely for at least two minutes. A small momentary needle deflection approximately every 30 seconds shows that the timer is switching and indicates normal system operation.

b. In Flight
   (1) Propeller Deice Switch - ON. The system may be operated continuously in flight and will function automatically until the switch is turned OFF.
   (2) Relieve propeller imbalance due to ice by increasing rpm briefly and returning to the desired setting. Repeat as necessary.

CAUTION

If the propeller ammeter reads above 18 amperes or below 14 amperes, refer to the EMERGENCY PROCEDURES SECTION.

4. Engine Air Inlet:
   a. In Flight
      (1) Inlet Anti-Ice Switches - Test, individually
      (2) Inlet Anti-Ice Ammeter - CHECK 14 to 18 AMPERES
      (3) Inlet Anti-Ice Switches - ON (before ice forms)

5. Surface Deice System
   a. Preflight: Check boots for damage and cleanliness.
   b. Before take-off: Deice Switch - SINGLE (up)
      (1) Check Deice pressure gage.
      (2) Check boots visually for inflation and hold down
   c. In Flight: When ice accumulates 1/2 to 1 inch; deice switch - SINGLE. Repeat as required.

CAUTION

Operation of the surface deice system in ambient temperatures below -40°C can cause permanent damage to the deice boots.

NOTE

Either engine will supply sufficient air for deice operation.

6. Windshield Heat Switch - AS REQUIRED (before ice forms)

NOTE

The electrically heated windshields may be turned off for a fifteen second period to allow the pilot to take a compass reading on the standby compass for the purpose of resetting the directional gyro.

7. Pitot Heat - ON

8. Stall Warning Heat - ON

CAUTION

Prolonged use of pitot and stall warning heat on the ground will damage the heating elements.

9. Emergency Static Air Source - Refer to EMERGENCY PROCEDURE SECTION

BLENDING ANTI-ICING ADDITIVE TO FUEL

The following procedure will be used when blending anti-icing additive complying with MIL-I-27686 as the aircraft is being refueled.

1. Using "Hi-Flo Prist" blender (Model PHF-204), remove cap containing tube and clip assembly.
2. Attach piston grip on collar.
3. Press tube into button.
4. Clip tube end to fuel nozzle.
5. Pull trigger firmly to assure full flow and lock in place.
6. Start flow of additive when refueling begins. (Refueling should be at 30 gal/min minimum, 60 gal/min maximum. A rate of less than 30 gal/min may be used when topping off tanks.)

CAUTION

Assure that the additive is directed into the flowing fuel stream and that additive flow is started after fuel flow starts and is stopped before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel cells or aircraft painted surfaces. Use not less than 20 fl. oz. of additive per 260 gallons of fuel or more than 20 fl. oz. of additive per 104 gallons of fuel.

ADDING BIOCIDE TO FUEL

Refer to the latest revision of Pratt & Whitney Canada Ltd. Engine Service Bulletin No. 1244 for procedures, recommendations, and limitations pertaining to the use of biocidal/fungicidal additives in turbine fuels.

AIR CONDITIONING

During operation in AUTO, MANUAL HEAT, or MANUAL COOL, the ventilation blower operates in the LOW Position. For increased air circulation, turn the Blower Switch to HIGH.

DEFROSTER AIR

1. Windshield Defroster Air Control - ON (pull)
2. Pilot and Copilot Ventilation Air Control - OFF

NOTE

Pulling defroster air control full on will shut off all heated airflow to the aft cabin.

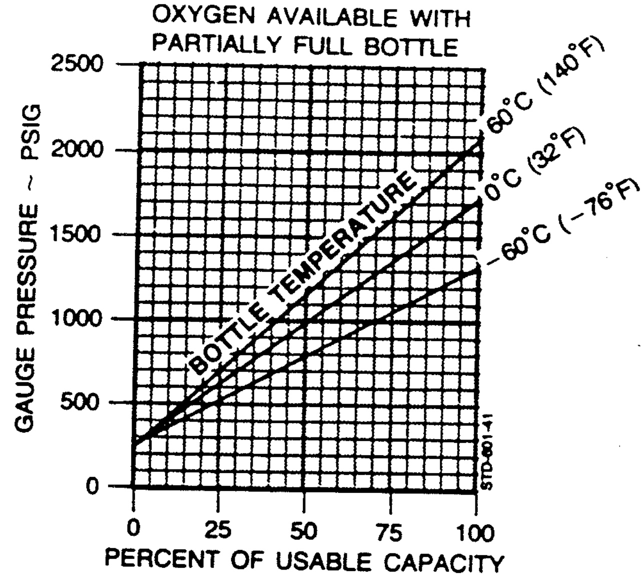
FRESH AIR VENTILATION

1. Cabin and cockpit - Open the individual eyeball outlets and adjust as required.
2. Ram Air - PULL ON

OXYGEN SYSTEM

PREFLIGHT

1. Check Oxygen Pressure Gage for Pressure reading.
2. Determine bottle temperature.
3. Determine percent of full system from graph.
4. Multiply oxygen duration in minutes (from OXYGEN DURATION table) by percent of usable capacity.



OXYGEN DURATION

Oxygen duration is computed for Scott Oxygen masks which regulate the flow rate to 2.5 Standard Liters Per Minute (SLPM). These masks, identified by an aluminum anodized color coded plug-in, are approved for altitudes up to 27,000 feet.

Cylinder Volume Cu Ft	NUMBER OF PEOPLE USING																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	DURATION IN MINUTES																
22	222	112	74	54	44	37	31	28	24	22	20	18	17	16	15	14	13
49	501	250	167	125	100	83	71	60	55	50	45	41	38	35	33	31	29
64	668	334	222	167	133	111	95	83	74	66	60	55	51	47	44	41	39
98	1003	501	334	250	200	167	143	125	111	100	91	83	77	71	66	62	59
115	1180	590	393	295	236	196	168	147	131	118	107	98	90	84	78	73	69

IN FLIGHT (Altitude 10,000 feet or above):

1. Oxygen shut-off valve - OPEN.
2. Mask - Insert fitting and don masks.

NOTE

Pilot and Copilot masks are in the their seat; passenger masks are in chair pockets.

3. Oxygen-flow indicator - Check that red plunger lifts from its seat when the hose is inserted into the oxygen coupling.
4. Disconnect masks by pulling the fitting out.

AFTER USING OXYGEN

Oxygen shut-off valve - CLOSED

NICKEL–CADMIUM BATTERY CONDITION CHECK

DURING ENGINE START

a. Start one engine on battery
b. Generator - ON
c. Volt Meter - INDICATING 28 VOLTS
d. After the load meter stabilizes, momentarily turn the Battery Switch off, noting the change in meter indication.

NOTE

The change in loadmeter indications is the battery charge current and should be no more than .025 (only perceivable needle movement) within 5 minutes following a normal engine start. Failure to obtain a reading below .025 within 5 minutes indicates a partially discharged battery. Continue to charge battery repeating the check each 90 seconds until the charge current decreases below .025. No decrease of charge rate between checks, indicates an unsatisfactory condition. The battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

IN FLIGHT

If an unsatisfactory battery condition is suspected, the battery condition can be checked in flight using the following procedures:

1. Battery Switch - OFF (Momentarily)
2. Loadmeter - NOTE CHANGE

NOTE

The change in loadmeter indications is the battery charge current and should be no more than .025 (only perceivable needle movement). With a loadmeter indication greater than .025, turn the battery switch off and proceed to destination. (The battery switch should be turned on for landing in order to avoid electrical transients caused by power fluctuations.) A shutdown battery condition check as outlined below should be made after landing. If the battery indicates unsatisfactory, it should be removed and checked by a qualified Nickel-Cadmium Battery shop.

DURING ENGINE SHUTDOWN

a. One Generator - OFF
b. Volt Meter - INDICATING 28 VOLTS
c. Momentarily turn the Battery Switch OFF, noting the change in load meter indication.

NOTE

The change in loadmeter indication is the battery charge current and should be no more than .025 (only perceivable needle movement). If the result of the first check is not satisfactory, allow the battery to charge repeating the test each 90 seconds. If the results are not satisfactory within 3 minutes, the battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

SECTION III
EMERGENCY PROCEDURES

SINGLE-ENGINE PROCEDURES

NOTE

To obtain best performance with one engine inoperative, the airplane must be banked 3° to 5° into the operating engine while maintaining a constant heading.

ENGINE FAILURE DURING TAKEOFF

1. Below Take-off Speed:
   a. Power - IDLE
   b. Brakes - AS REQUIRED

If insufficient runway remains for stopping

   c. Condition Levers - CUT-OFF
   d. Fuel Firewall Valves - PULL
   e. Electrical Power - OFF (Gang bar down)

2. If aircraft is airborne, and conditions preclude an immediate landing:
   a. Power - TAKE-OFF (or as required)
   b. Propeller RPM - FULL INCREASE
   c. Airspeed - Maintain speed attained at engine failure until obstacles are cleared. Reduce speed only if single engine best rate of climb speed is exceeded.
   d. Landing Gear - UP
   e. Confirm inoperative engine

CAUTION

Do not retard the failed engine power lever until the autofeather system has completely stopped propeller rotation: To do so will deactivate the autofeather circuit and prevent automatic feathering.

   f. Propeller (inoperative engine) - FEATHERED
   g. Airspeed - BEST ANGLE OF CLIMB SPEED (unless already exceeded)
   h. Flaps - UP
   i. Airspeed - BEST RATE OF CLIMB SPEED OR HIGHER
   j. Air Conditioning - OFF
   k. Condition Lever (inoperative engine) - CUT-OFF
   l. Boost Pumps (inoperative engine) - OFF
   m. Generator (inoperative engine) - OFF
   n. Autofeather switch - OFF
   o. Electrical Load - MONITOR

SINGLE ENGINE TAKE-OFF AND CLIMB SPEEDS
(ASSUMING ENGINE FAILURE AT LIFT-OFF)
KNOTS IAS (ASSUMING ZERO INSTRUMENT ERROR)

WEIGHT POUNDS	FLAPS 30%		FLAPS UP			
	LIFT-OFF	50 FEET	LIFT-OFF	50 FEET	S.E. BEST ANGLE	S.E. BEST RATE
10,900	98	94	103	98	103	114
10,000	94	91	99	95	101	111
9000	92	89	96	92	98	108
8000	92	89	96	92	95	105

ENGINE FAILURE DURING CLIMB OR CRUISE/ILLUMINATION OF MAGNETIC CHIP DETECTOR ANNUNCIATOR (IF INSTALLED)

Affected engine:

1. Power Lever - IDLE
2. Propeller - FEATHER
3. Condition Lever - CUT-OFF
4. Clean-up (inoperative engine):
   a. Boost Pump - OFF
   b. Generator - OFF
   c. Propeller Synchronizer - OFF
5. Electrical Load - MONITOR

ENGINE FLAME-OUT (2nd ENGINE)

1. Power Lever - IDLE
2. Condition Lever - CUT-OFF
3. Propeller - DO NOT FEATHER
4. Conduct Air Start Procedures

NOTE

The propeller will not unfeather without engine operating.

ENGINE FAILURE IN FLIGHT BELOW MINIMUM SINGLE ENGINE CONTROL SPEED

1. Reduce power on operative engine as required to maintain control.
2. Lower nose to accelerate above minimum control speed.
3. Power - AS REQUIRED
4. Power Lever - IDLE (inoperative engine)
5. Propeller - FEATHER
6. Condition Lever - CUT-OFF
7. Clean-up (inoperative engine):
   a. Boost Pump - OFF
   b. Generator - OFF
   c. Propeller Synchronizer - OFF
8. Electrical Load - MONITOR

SINGLE ENGINE LANDING

Use normal landing procedures with the following exceptions:

1. Power Lever (inoperative engine) - FULL FORWARD (to rearm landing gear warning horn).
2. Propeller RPM (operative engine) - FULL INCREASE.
3. Approach Speed - 15 KNOTS ABOVE NORMAL (This will increase the total normal landing distance by one-third.)

NOTE

After touchdown, the residual thrust of the operative engine may be reduced by use of the beta range.

CAUTION

Caution must be exercised when using reverse thrust on smooth, dry, paved surfaces. Use assymetrical braking to maintain directional control.

SINGLE ENGINE GO-AROUND

1. Power - TAKE-OFF (1628 ft lbs or ITT 725°C at 2200 RPM)
2. Flaps - UP
3. Landing Gear - UP
4. Airspeed - BEST RATE OF CLIMB SPEED

ENGINE FIRE (GROUND)

Affected engine:

1. Condition Lever - CUT-OFF
2. Fuel Firewall Valve - PULL (Close)
3. Starter Switch - STARTER ONLY (If fire is in engine exhaust)
4. Boost Pumps - OFF
5. Fire Extinguisher - ACTUATE (as required)

ENGINE FIRE (FLIGHT)

Affected engine:

1. Fuel Firewall Valve - PULL (Close)
2. Power Lever - IDLE
3. Condition Lever - CUT-OFF
4. Propeller - FEATHER
5. Fire Extinguisher - ACTUATE (as required)
6. Boost Pumps - OFF

CAUTION

The fire extinguisher is a single-shot system, with one cylinder for each engine. Inadvertent operation of the cylinder may cause engine stoppage.

AIR START

STARTER ASSIST

CAUTION

The pilot should determine the reason for engine failure before attempting an air start.

Above 20,000 feet, starts tend to be hotter. During engine acceleration to idle speed, it may become necessary to periodically move the condition lever into CUT-OFF in order to avoid over temp.

1. Cabin Temp Mode and Blower - OFF
2. Radar - STANDBY or OFF
3. Windshield Heat - OFF
4. Power Lever - IDLE
5. Condition Lever - CUT-OFF
6. Fuel Firewall Valve - OPEN (push)
7. Boost Pump - ON

NOTE

If condition permits, retard operative engine ITT to 675°C or less to reduce the possibility of exceeding ITT limit.

8. Ignition and Start Switch - ON (up), Check ignition light - ON
9. Condition Lever - LOW IDLE (8 seconds after starter switch - ON)
10. Ignition and Start Switch - OFF (N_1 above 50%)
11. Generator Switch - ON
12. Propeller - AS REQUIRED
13. Power Lever - AS REQUIRED
14. Electrical Equipment - AS REQUIRED

WINDMILLING ENGINE AND PROPELLER (NO STARTER ASSIST)

1. Cabin Temp Mode and Blower - OFF
2. Radar - STANDBY or OFF
3. Windshield Heat - OFF
4. Power Lever - IDLE
5. Propeller Lever - 2200 RPM
6. Condition Lever - CUT-OFF
7. Fuel Firewall Valve - OPEN
8. Boost Pump - ON
9. Generator (inoperative engine) - OFF
10. Airspeed - 140 KNOTS MINIMUM
11. Altitude - BELOW 20,000 FEET
12. Auto-ignition Switch - ARM
13. Condition Lever - LOW IDLE (8 seconds after auto-ignition - ARM)
14. Power - AS REQUIRED (after ITT has peaked)
15. Generator - ON
16. Auto-ignition Switch - OFF
17. Electrical Equipment - AS REQUIRED

CROSSFEED

1. Boost Pumps - ON (one left and one right)
2. Crossfeed - OPEN; Check Light ON
3. Boost Pump (non-feeding tank) - OFF; CHECK both FUEL PRESS Lights - OUT.

NOTE

The crossfeed is to be used for single-engine operation only. Do not feed both engines simultaneously from one side.

To Discontinue Crossfeed:

1. Boost Pumps - ON (one left and one right)
2. Crossfeed switch - CLOSED

BOOST PUMP FAILURE

1. Both Boost Pumps - ON (primary and secondary)
2. Failed Boost Pump - OFF

PITCH TRIM INOPERATIVE

MAIN TRIM SYSTEM INOPERATIVE

1. Main Pitch Trim Master - OFF
2. Standby Pitch Trim Master - ON
3. Standby Pitch Trim Switches - AS REQUIRED

STANDBY TRIM SYSTEM INOPERATIVE

1. Autopilot pitch trim may be inoperative.

BOTH MAIN AND STANDBY PITCH TRIM INOPERATIVE

1. Maintain Airspeed for Low Control Forces.
2. For landing, use flaps only as required to reduce pull forces as speed is decreased. Push forces may be avoided by using only enough flaps to give desired wheel forces.

NOTE

With stabilizer inoperative in cruise position, extending full flaps will give zero elevator force at 100 to 125 knots.

UNSCHEDULED PITCH TRIM

1. Aircraft Attitude - MAINTAIN using elevator control
2. Main Pitch Trim Switches - HOLD to opposite direction of unscheduled trim.

CAUTION

If trim continues to run, depress and hold TRIM RELEASE. The pilot may only have three seconds to execute corrective action before control force exceeds 75 pounds.

3. Main Pitch Trim Master - OFF
4. Standby Pitch Trim Master - ON
5. Standby Pitch Trim Switches - AS REQUIRED

NOTE

If standby pitch trim system is inoperative. DO NOT REACTIVATE PRIMARY PITCH TRIM SYSTEM. Out-of-trim push forces can be reduced by decreasing power and airspeed. Pull forces can be reduced by decreasing airspeed below the appropriate flap airspeed limit and extending flaps as required.

GO-AROUND (PITCH TRIM INOPERATIVE)

1. Power Levers - AS REQUIRED
2. Airspeed - Maintain to avoid push forces from increasing, or increase to reduce pull forces.
3. Flaps - Change position only to reduce elevator forces
4. Gear - Retract (No trim change results)

ELECTRICAL SYSTEM FAILURE

GENERATOR INOPERATIVE (GENERATOR light on)

1. Generator Switch - OFF, then ON (to reset) If generator will not reset:
2. Generator Switch - OFF
3. Operating Generator - Do not exceed 1.0 load

EXCESSIVE LOADMETER INDICATIONS (over 1.0)

1. Non-Essential Loads - OFF

If indication is still excessive:

2. Battery Switch - OFF
3. Equipment - ON (as required)

CIRCUIT BREAKER TRIPPED

1. Non-Essential Circuit - DO NOT RESET IN FLIGHT
2. Essential Circuit:
   a. Circuit Breaker - PUSH TO RESET
   b. If circuit breaker trips again - DO NOT RESET

BATTERY FEEDER FAULT (LIGHT ON)

1. Battery Switch - OFF
2. All circuits will continue to operate on generators

BUS FEEDER FAULT (LIGHT ON)

All circuits will continue to operate. This is an advisory function to indicate that one of the Circuit Breaker Panel Bus Feeder Limiters has opened due to a short or open in one of the feeder wires.

INVERTER INOPERATIVE

1. Select other inverter.

ELECTRICAL SMOKE OR FIRE

Action to be taken must consider existing conditions and equipment installed.

1. Battery and Generator Switches - OFF (Gang Bar down)

CAUTION

Electrical gyro flight instruments and pitch trim will become inoperative.

2. Switches for all but essential equipment - OFF
3. Battery and generator switches - ON

ELECTROTHERMAL PROPELLER DEICE

AUTO SYSTEM

Abnormal Readings on Propeller Deice Ammeter: (Normal Operation 14 to 18 amp)

1. Zero Amps:
   a. Switch Breaker - CHECK
   b. If OFF, reposition to ON after 30 seconds.
   c. If ON with zero amps, system is inoperative. Position switch OFF.

2. Zero to 14 Amps:
   a. Continue Operation.
   b. If propeller imbalance occurs, increase rpm briefly to aid in ice removal.

3. 18 to 23 Amps:
   a. Continue Operation.
   b. If propeller imbalance occurs, increase rpm briefly to aid in ice removal.

4. More than 23 Amps:
   a. Avoid icing conditions, since continued operation of the system cannot be assured.
   b. Do not operate the system except in emergencies.
   c. Restrict time of operation to a minimum.

MANUAL SYSTEM (Serials U-152 through U-164)

1. To use the manual propeller deice system hold the switch placarded PROP MANUAL - INNER - OUTER alternately in the INNER and OUTER positions for approximately 45 seconds each. This procedure may be repeated as required to avoid a significant buildup of ice which will result in loss of performance, vibration, and impingement of ice on the fuselage.

2. Monitor the manual system current requirement using the airplane loadmeters when the switch is in either the INNER or OUTER position. A small needle deflection (approximately 5%) indicates the system is functioning.

LANDING GEAR EMERGENCY EXTENSION

(Mechanical Landing Gear)

1. Airspeed - ESTABLISH 120 Kts IAS
2. LANDING GEAR CONT Circuit Breaker - PULL
3. Landing Gear Handle - DOWN
4. Emergency Engage Handle - PULL UP TO ENGAGE AND TURN 90° CLOCKWISE TO STOP POSITION TO LOCK.
5. Extension Lever - PUMP up and down until 3 green GEAR DOWN lights are illuminated.

CAUTION

Do not continue operation of extension lever after receiving a gear down indication. Further movement of the handle could bind the drive mechanism and prevent subsequent electrical gear retraction.

WARNING

If for any reason the green GEAR DOWN lights do not illuminate (e.g., in case of an electrical system failure), continue pumping until sufficient resistance is felt to ensure that the gear is down and locked, even though this procedure may damage the drive mechanism. Do not stow pump handle.

WARNING

After an emergency landing gear extension has been made, do not move any landing gear controls, or reset any switches or circuit breakers until the airplane is on jacks, since the failure may have been in the gear-up circuit and the gear might retract on the ground. The landing gear cannot be retracted manually.

LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION

(Mechanical Landing Gear)

After a practice manual extension of the landing gear, the gear may be retracted as follows:

1. Emergency Engage Handle - TURN COUNTERCLOCKWISE TO STOP POSITION TO UNLOCK THEN PUSH DOWN TO DISENGAGE. Secure the pump handle under the clip.
2. LANDING GEAR CONT Circuit Breaker - PUSH IN
3. Landing Gear Handle - UP

CAUTION

After a landing gear PRACTICE manual extension, ensure the pump handle is in the full down position prior to placing the pump handle in the securing clip, to assure proper operation of the normal system for a subsequent retraction.

LANDING GEAR EMERGENCY EXTENSION

(Hydraulic Landing Gear)

1. Airspeed - ESTABLISH 120 - 130 kts IAS
2. LANDING GEAR CONT Circuit Breaker - PULL
3. Landing Gear Handle - DOWN
4. Manual Extension Pump Handle - UNSTOW AND PUMP (up and down until 3 green GEAR DOWN lights are acquired). Continue to pump until further resistance is felt (pressure build up) on pump handle.
5. Manual Extension Pump Handle - STOW

WARNING

If for any reason the green GEAR DOWN lights do not illuminate (e.g., in case of an electrical system failure, or in the event an actuator is not locked "down"), continue pumping until sufficient resistance is felt to ensure that the gear is down and locked. Do not stow pump handle.

After an emergency landing gear extension has been made, do not move any landing gear controls or reset any switches or circuit breakers until the airplane is on jacks, since the failure may have been in the gear-up circuit and the gear might retract on the ground. The landing gear cannot be retracted manually.

LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION

(Hydraulic Landing Gear)

After a practice manual extension of the landing gear, the gear may be retracted as follows:

1. Manual Extension Pump Handle - STOW Under Securing Clip
2. LANDING GEAR CONT Circuit Breaker - PUSH IN
3. Landing Gear Handle - UP

CAUTION

After a landing gear PRACTICE manual extension, ensure the pump handle is in the full down position prior to placing the pump handle in the securing clip, to assure proper operation of the normal system for a subsequent retraction.

EMERGENCY STATIC AIR SOURCE

THE EMERGENCY STATIC AIR SOURCE SHOULD BE USED FOR CONDITIONS WHERE THE NORMAL STATIC SOURCE HAS BEEN OBSTRUCTED. When the airplane has been exposed to moisture and/or icing conditions (especially on the ground), the possibility of obstructed static ports should be considered. Partial obstructions will result in the rate of climb indication being sluggish during a climb or descent. Verification of suspected obstructions is possible by switching to the emergency system and noting altitude changes beyond normal calibration differences.

Whenever any obstruction exists in the Normal Static Air System, or the Emergency Static Air Source is desired for use:

1. Pilot's Emergency Static Air Source Switch To ALTERNATE (Right side panel)
2. For Airspeed Calibration and Altimeter Correction, refer to FAA Performance Section.

CAUTION

Be certain the emergency static air valve is in the NORMAL position when system is not needed.

FAILURE OF SECONDARY (ELECTRICAL) LOW PITCH STOP (IF INSTALLED)

With a combination of both low airspeed (below 110 kts) and low power (below 400 ft-lbs) if either Prop Low Pitch light illuminates in flight DO NOT pull the "PROP TEST & LOW PITCH" circuit breaker, and DO NOT attempt reversing upon landing.

At airspeeds above 110 kts and/or power settings above 400 ft-lbs, if either Prop Low Pitch light illuminates in flight, AND the respective propeller begins feathering:

1. Power Lever (affected side) - REDUCE AS REQUIRED (to keep torque within limits).
2. "PROP TEST & LOW PITCH" Circuit Breaker (Right Circuit Breaker Panel) - PULL. (Light should extinguish and propeller speed should increase to governor setting.)
3. Power Lever (affected side) - RETURN TO DESIRED POWER

WARNING

If the Secondary Low Pitch Stop system is installed in the airplane, any malfunction of the system must be repaired before the next flight.

EMERGENCY DESCENT PROCEDURE

1. Propeller Controls - FULL INCREASE RPM
2. Power Levers - IDLE
3. Flaps - 30%
4. Landing Gear - EXTENDED
5. Airspeed - 156 KNOTS MAXIMUM

GLIDE

1. Landing Gear - UP
2. Flaps - UP (0%)

WARNING

Determine that procedures for re-starting first and second failed engines are ineffective before feathering second propeller.

3. Propellers - FEATHERED
4. Airspeed - 130 KIAS

NOTE

The zero wind glide ratio in this configuration is 1.8 nautical miles of glide distance for each 1000 feet of altitude. Decrease the glide ratio by 0.2 nautical miles per 1000 feet for each 10 knots of headwind.

EMERGENCY EXITS *(one on each side of the forward cabin)*

1. Release Handle - PULL
2. This is a plug type door and opens into the cabin.

CAUTION

Emergency exit doors may be locked with a key. Before flight make certain the doors are unlocked.

*CABIN BAG DOOR WARNING ANNUNCIATOR ILLUMINATED

WARNING

Do not attempt to check the security of the cabin door while in flight.

1. If the CABIN BAG DOOR warning annunciator (located on the annunciator panel) indicates that the cabin door may not be secure, remain as far from the door as possible, with seat belts fastened, until the airplane has landed.
2. Cabin door security may be checked (on the ground) by observing the position of the arm and plunger, and the alignment of the green stripe on the lock pin. On airplanes in compliance with BEECHCRAFT Service Bulletin No. 2007 it will be necessary to lift the folded door step to accomplish this check. If the unlocked position of the arm is indicated, turn the door handle toward the locked position until the arm and plunger are in position and the green stripe is aligned with the pointer.

** Depending upon which of the various annunciator panel configurations is installed the CABIN DOOR annunciator and BAG DOOR annunciator warning functions may be separate or combined on the face of one annunciator.*

SPINS

If a spin is entered inadvertently:

Immediately move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as near simultaneously as possible; then continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral during recovery.

NOTE

Federal Aviation Administration Regulations do not require spin demonstration of airplanes of this weight; therefore, no spin tests have been conducted. The recovery technique is based on the best available information.

SECTION IV

FAR PART 135 PERFORMANCE

TABLE OF CONTENTS

TITLE PAGE

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INTRODUCTION TO FAA APPROVED PERFORMANCE FOR FAR 135 OPERATIONS

The performance information in this section is provided as a part of the FAA Approved Flight Manual. Compliance with operating limitations in this section is mandatory for Part 135 operations.

This statement is outdated information Reference AFM in Aircraft for current language

The maximum operating weights are limited by the following performance requirements:

1. Maximum take-off weight may not exceed the most restrictive of the following:

   a. Take-off configuration climb requirements, page 4-15 or 4-17.
   b. Enroute configuration climb requirements, page 4-14.
   c. Field length requirements, page 4-16 or 4-18.

2. Maximum enroute weight may not exceed enroute climb requirements page 4-23.
3. Maximum landing weight may not exceed balked landing climb requirements, page 4-24.

*Field lengths shown in this manual consider the aircraft stopped on the end of the runway. At the option of the operator, regulations permit an overrun (ground speed at the end of runway) of 35 knots (40 mph). The distance to decelerate from 35 knots to stop is approximately 100 feet. Operators desiring to use this option are authorized to subtract 100 feet from the distance read from the Field Length Graph (pages 4-16 or 4-18).

NOTE

> If an engine failure occurs at the decision speed during a weight-limited take-off, considerable distance is required to accelerate to the best rate of climb speed after the propeller has auto-feathered and the gear and flaps have been retracted. The total distance from the start of the take-off to accelerate to this speed is much greater than the accelerate-stop field lengths as shown on pages 4-16 (0% flaps) and 4-18 (30% flaps). This maneuver has been demonstrated as not requiring exceptional pilot skill, but particular attention must be paid to airspeed control.

As an example, Maximum Take-Off, enroute and Landing Weights were determined for a flight from Billings, Montana to Casper, Wyoming.

CONDITIONS

At Billings

Outside Air Temperature . . . . 25°C (77°F)
Field Elevation . . . . 3606 Ft
Altimeter Setting 29.56
Wind . . . . 360° at 10 Knots
Runway 34 Length . . . . 5600 Ft

Route of Trip:
BIL-V19-CPR
Weather Conditions IFR for Cruise Altitude of 11000 Feet

ROUTE SEGMENT	DISTANCE	MEA	WIND AT 11000 FEET	OAT AT 11000 FEET °C	OAT AT MEA °C	ALTIMETER SETTING
BIL-SHR	88	8000	010/20	-10	0	29.56
SHR-CZI	57	9000	350/30	-10	-4	29.60
CZI-CPR	68	7600	040/35	-10	0	29.60

Reference: Enroute low altitude charts L-8 and L-9

At Casper

- Outside Air Temperature . . . . . 15°C (59°F)
- Field Elevation . . . . . 5348 Ft
- Altimeter Setting 29.60
- Wind . . . . . 270 at 10 Knots
- Runway 25 Length . . . . . 8681 Ft

To determine pressure altitude at origin and destination airports, add 100 feet to field elevation for each .1 in. Hg. below 29.92, and subtract 100 feet from field elevation for each .1 in. Hg. above 29.92.

Pressure Altitude at BIL:

29.92 - 29.56 = .36 in. Hg.

The pressure altitude at BIL is 360 feet above the field elevation.

3606 + 360 = 3966 Ft.

Pressure altitude at CPR:

29.92 - 29.60 = .32 In. Hg.

The pressure altitude at CPR is 320 feet above the field elevation.

5348 + 320 = 5668 Ft.

There is no weight limitation due to the enroute climb requirement. For all temperatures up to ISA + 34°C, the maximum take-off weight is 10900 lbs.

Enter the graph for maximum take-off weight permitted by single engine take-off climb requirements - 0% flaps, page 4-15, at 25°C and 3966 feet pressure altitude:

Maximum allowable weight = 10725 Lbs.

Enter the graph for field length 0% flaps, page 4-16, at 10725 lbs, 3966 feet pressure altitude, 25°C and + 9.5 knot wind component:

Field length required = 4240 Ft

Since the available runway length is 5600 feet, the field length requirement would not be a limiting factor.

From cruise performance section, page 8-6, and fuel distance to climb from 3966 to 11000 feet at a temperature of 25°C (ISA + 18°C) is 84 lbs and 29 N.M., respectively. The fuel used at cruise altitude from BIL to SHR at 11000 feet and -10°C (ISA -3°C) is:

- Total Fuel Flow . . . . . .660 Lb/Hr
- Cruise True Airspeed (10500 Lbs) . . . . . .246 Knots
- Distance Traveled at 11000 feet (88-29) . . . . . 59 N.M.
- Estimated Ground Speed . . . . . .255 Knots
- Fuel Used for 59 N.M. at 255 Knots G.S. . . . . . 153 Lbs.

The total fuel used from BIL to SHR is:

55 + 84 + 153 = 292 lbs.

Enter the maximum enroute weight graph, page 4-23, at 0°C, MEA at BIL of 8000 feet and altimeter setting of 29.56. The maximum allowed enroute weight at BIL is 10900 Lbs.

The estimated weight upon reaching cruise altitude is:

Ramp weight of 10780 Lbs - 139 Lbs = 10641 Lbs

This requirement would not be a limiting factor since estimated weight is lower than limiting weight of 10900 Lbs.

Enter the same graph at -4°C, MEA of 9000 feet (SHR) and altimeter setting of 29.60. The maximum allowed enroute weight at SHR is 10900 Lbs.

This equipment would not be a limiting factor.

The estimated landing weight is determined by subtracting the fuel required for the trip from the ramp weight. (NOTE: Ramp weight is the maximum allowable take-off weight plus 55 lbs.)

Ramp Weight = 10780 Lbs.
Fuel Required for Trip = 590 Lbs
(See Cruise Performance Section, Page 8-4)
Landing Weight = 10780-590 = 10190 Lbs

Enter the maximum landing weight permitted by balked landing climb requirement, page 4-24, at 15°C and 5668 feet pressure altitude (CPR). For these conditions, this requirement is satisfied at 10900 Lbs.

SUMMARY:

Maximum Allowable Ramp Weight .... 10,780 Lbs.
Maximum Allowable Take-Off Weight .... 10,725 Lbs.
Required Take-off Field Length at Maximum Allowable
Take-Off Weight .... 4240 Ft.
Maximum Allowable Enroute Weight .... 10,900 Lbs.
Maximum Allowable Landing Weight .... 10,900 Lbs.

If the available runway length had been less than 4240 feet, two options would exist:

1. Leave the flap setting at 0% and reduce weight until the required field length is the same as the actual field length.
2. Use 30% flap setting and recalculate maximum allowable take-off weight.

If 30% flaps are used, take-off climb requirements for 30% flaps must also be met.

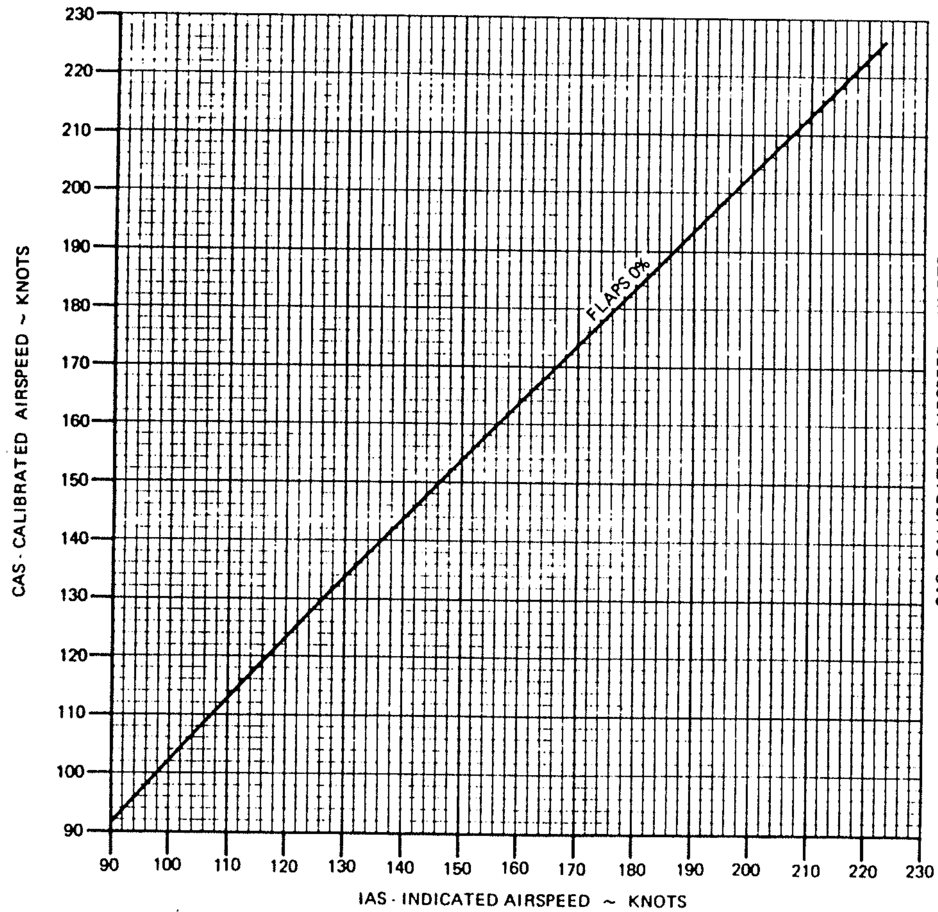
COMMENTS PERTINENT TO USE OF PERFORMANCE GRAPHS

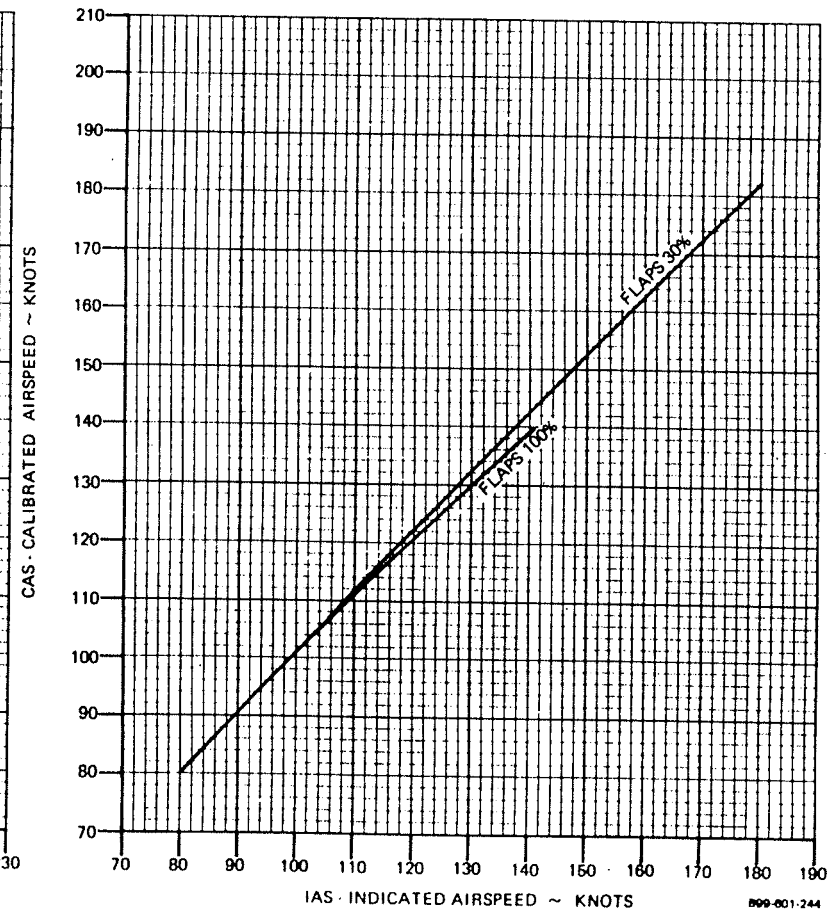
1. In addition to presenting the answer for a particular set of conditions, the example on the graph also presents the order in which the various scales on the graph should be used. For instance, if the first item in the example is OAT, then enter the graph at the known OAT.
2. A reference line indicates where to begin following the guidelines. Always project to the reference line first, then follow the guidelines to the next known item by maintaining the same PROPORTIONAL DISTANCE between the guideline above and the guideline below the projected line. For instance, if the projected line intersects the reference line in the ratio of 30% down/70% up between the guidelines, then maintain this same 30%/70% relationship between the guidelines all the way to the next known item or answer, whichever is next.
3. The associated conditions define the specific conditions form which performance parameters have been determined. They are not intended to be used as instructions; however, performance values determined from charts can only be achieved if the specified conditions exist.
4. Indicated airspeeds (IAS) were obtained by using the Airspeed Calibration - Normal System graph, or the Airspeed Calibration - Normal System - Take-off Ground Roll graph.
5. The full amount of usable fuel is available for all approved flight conditions.

AIRSPEED CALIBRATION - NORMAL SYSTEM

WEIGHT 10900 LBS

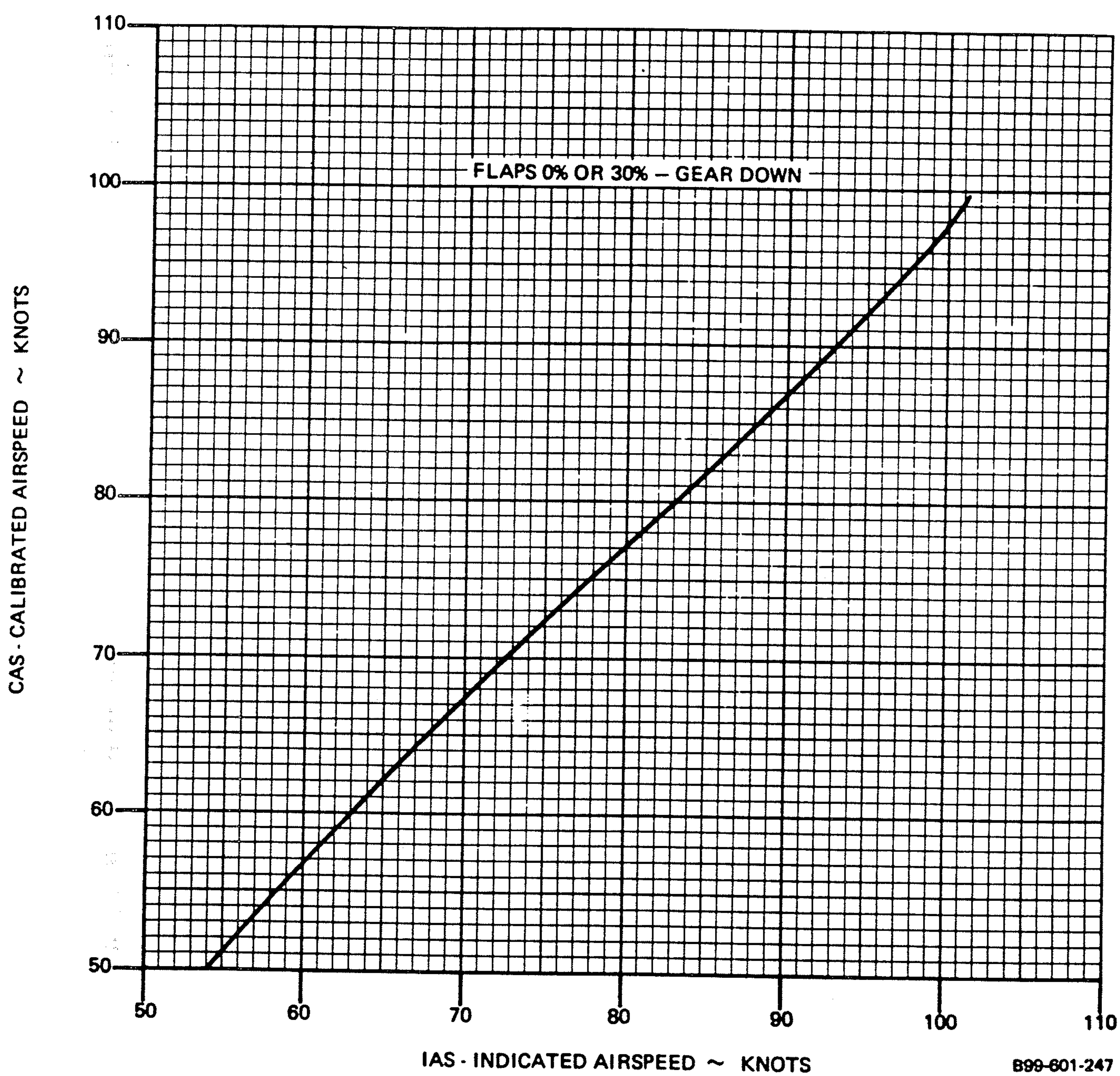
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.





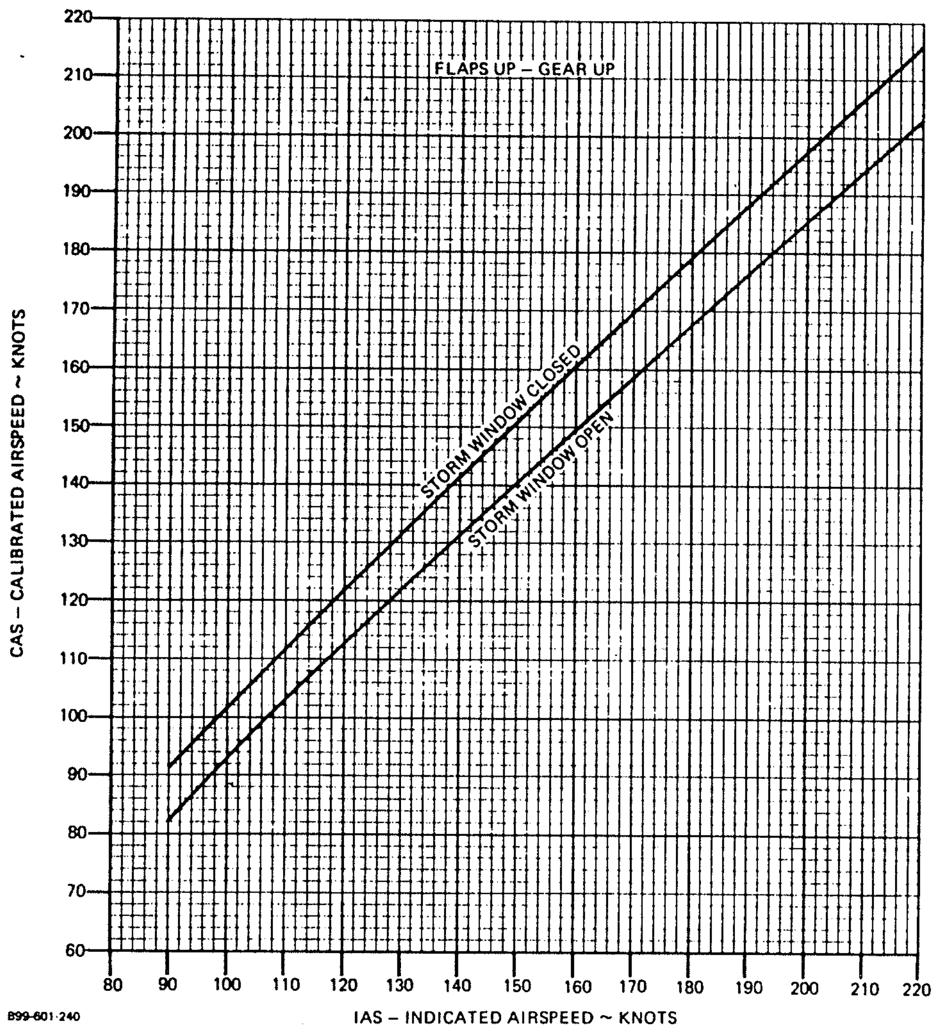
AIRSPEED CALIBRATION - NORMAL SYSTEM
TAKE - OFF GROUND ROLL

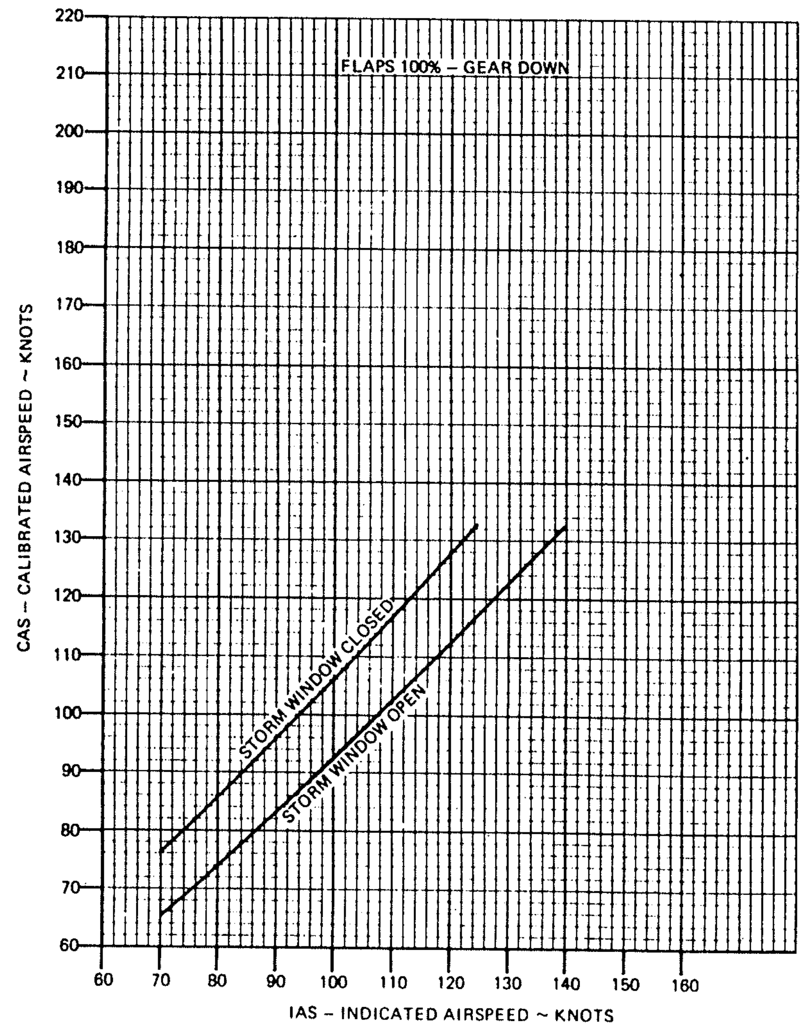
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.



AIRSPEED CALIBRATION
EMERGENCY SYSTEM

NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR



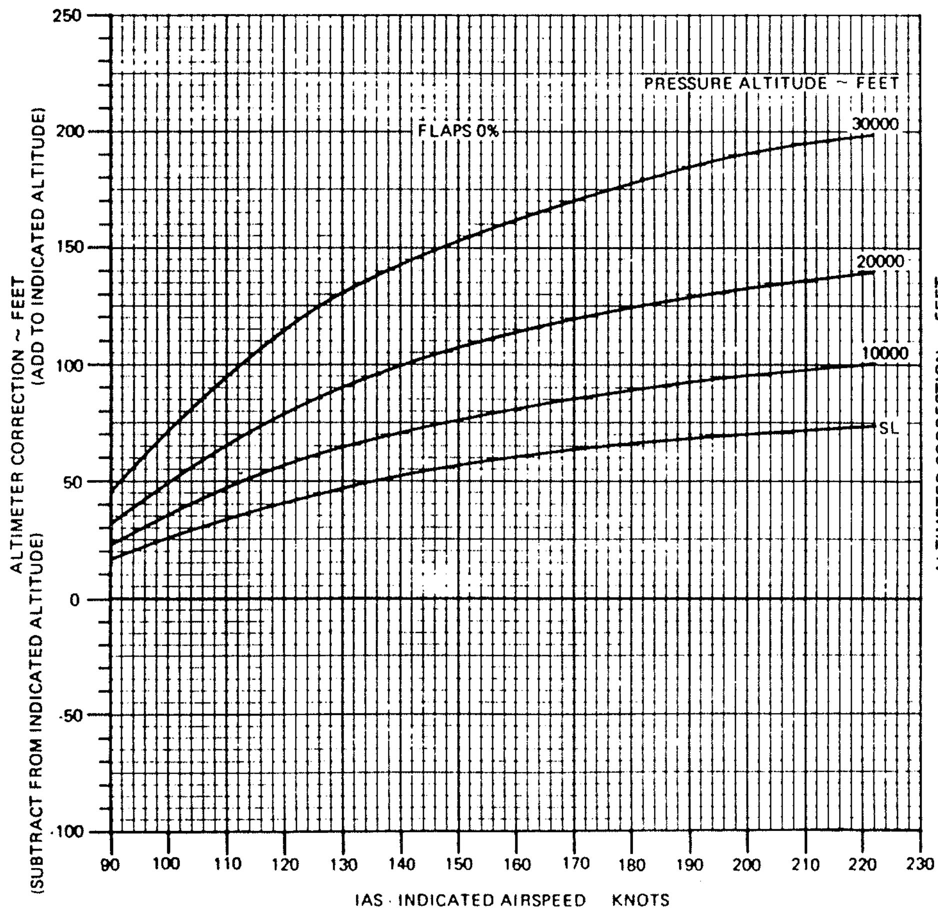


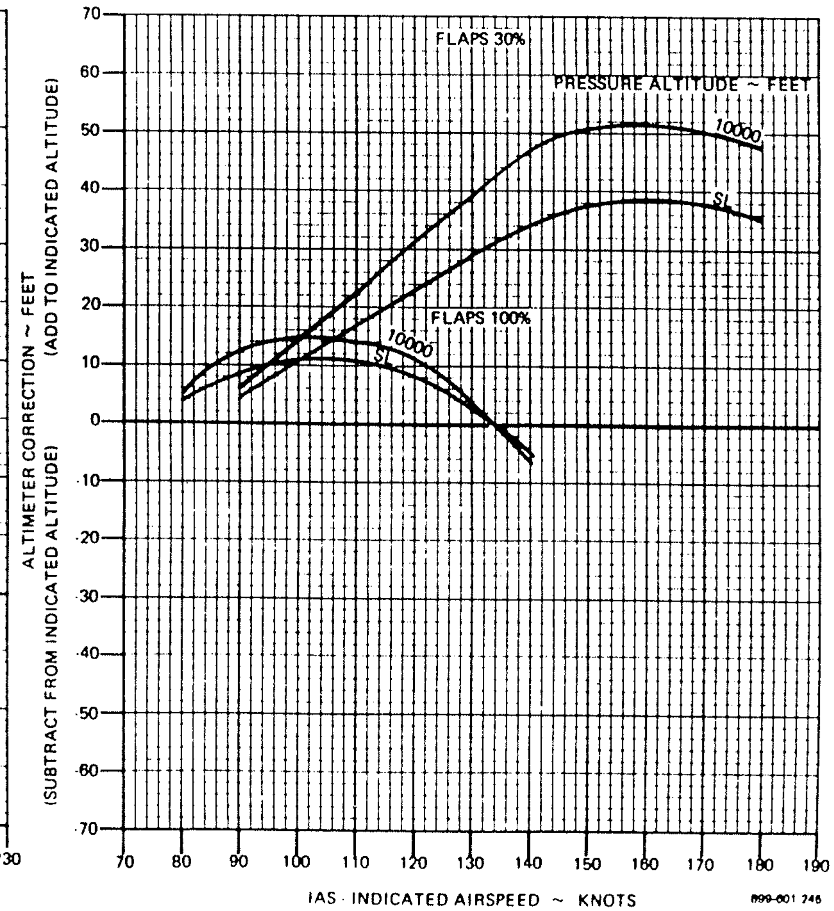
B99-601-240

ALTIMETER CORRECTION - NORMAL SYSTEM

WEIGHT 10900 LBS

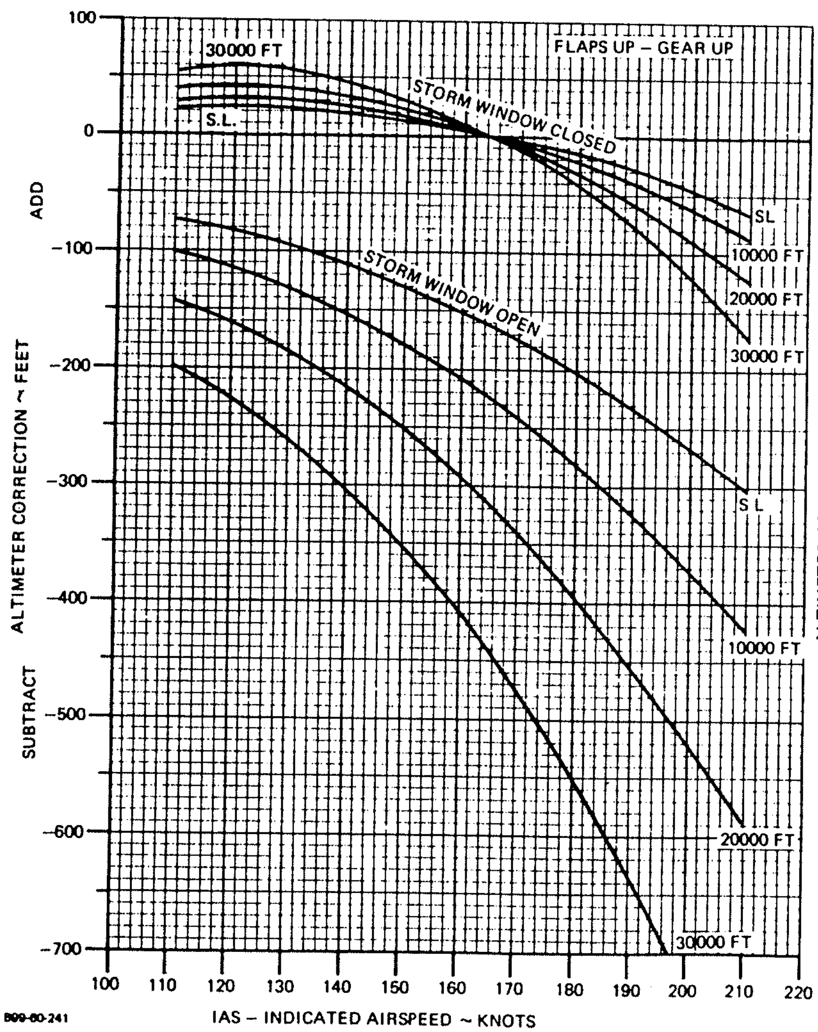
NOTE: INDICATED AIRSPEED AND INDICATED ALTITUDE ASSUME ZERO INSTRUMENT ERROR.

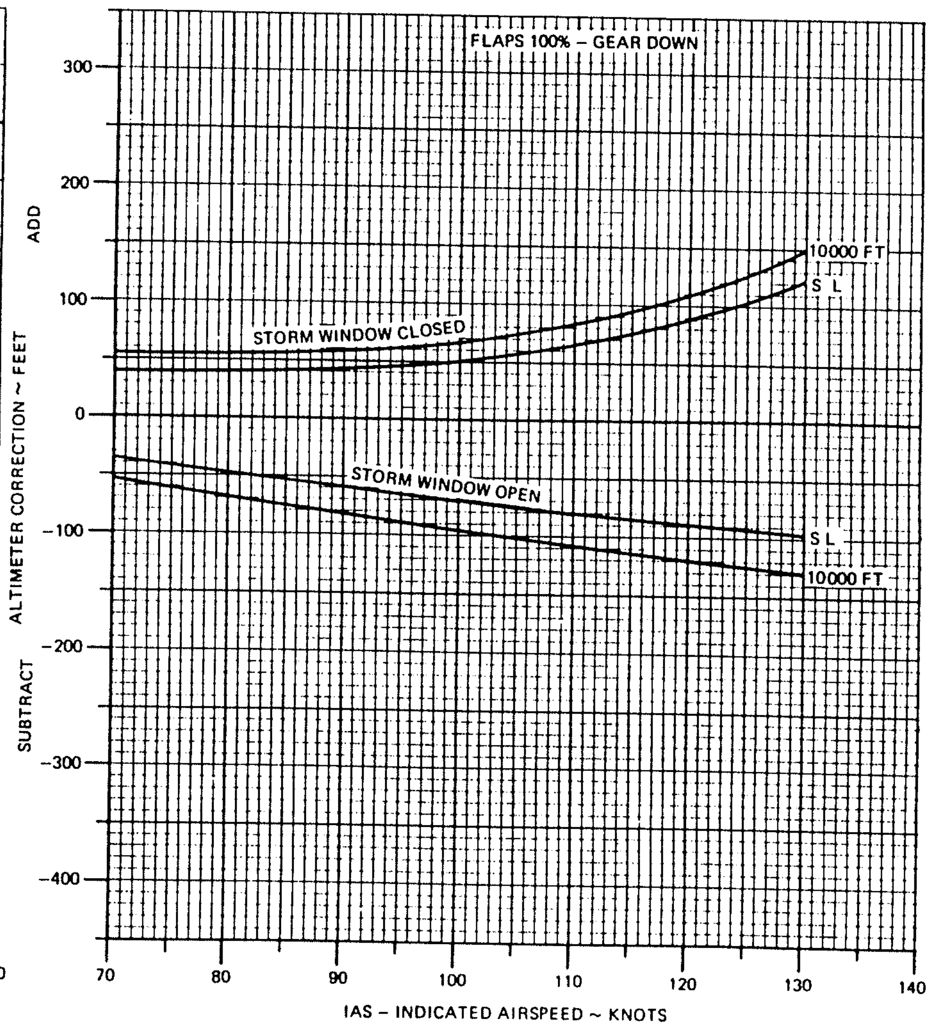




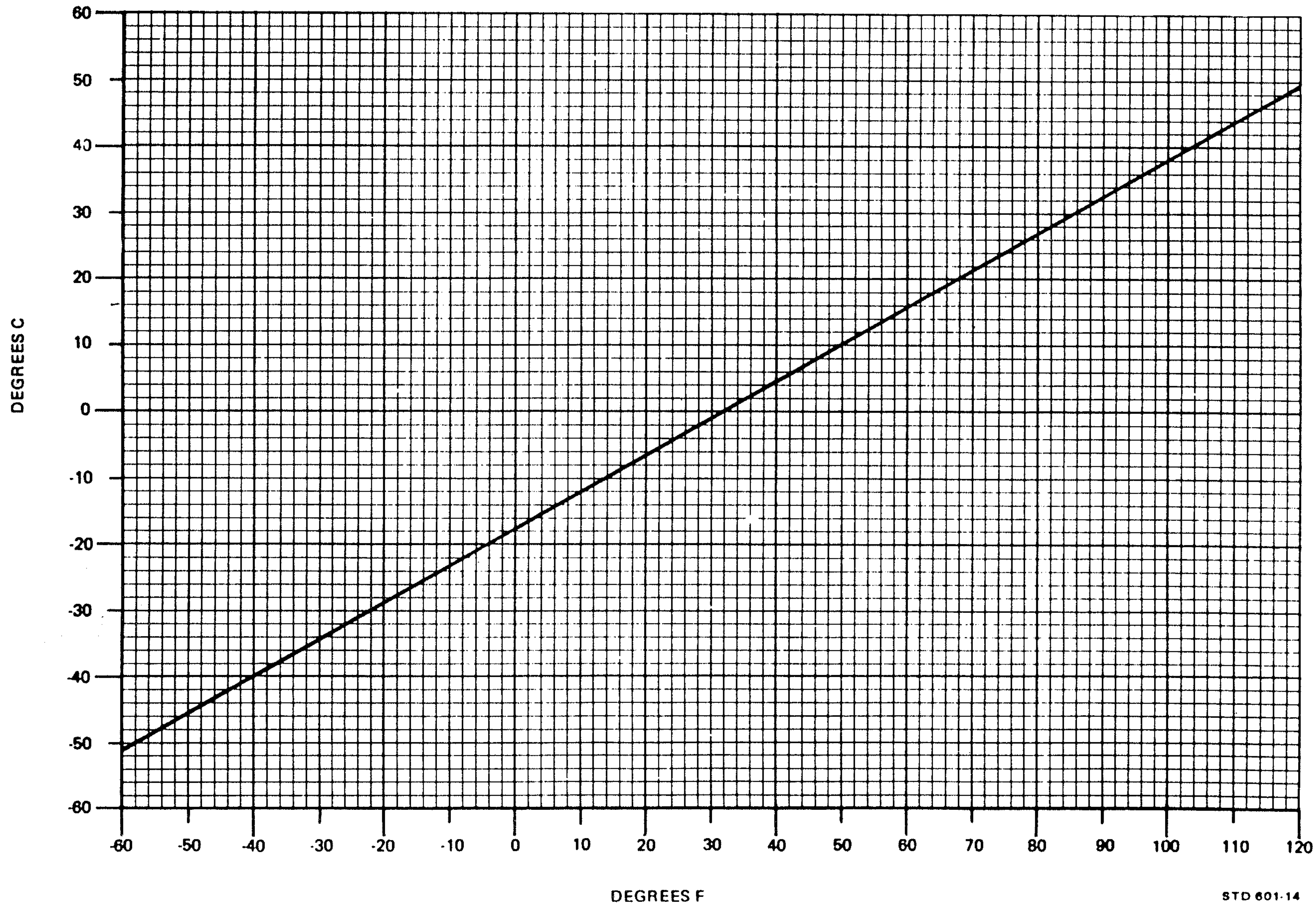
ALTIMETER CORRECTION
EMERGENCY SYSTEM

NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR

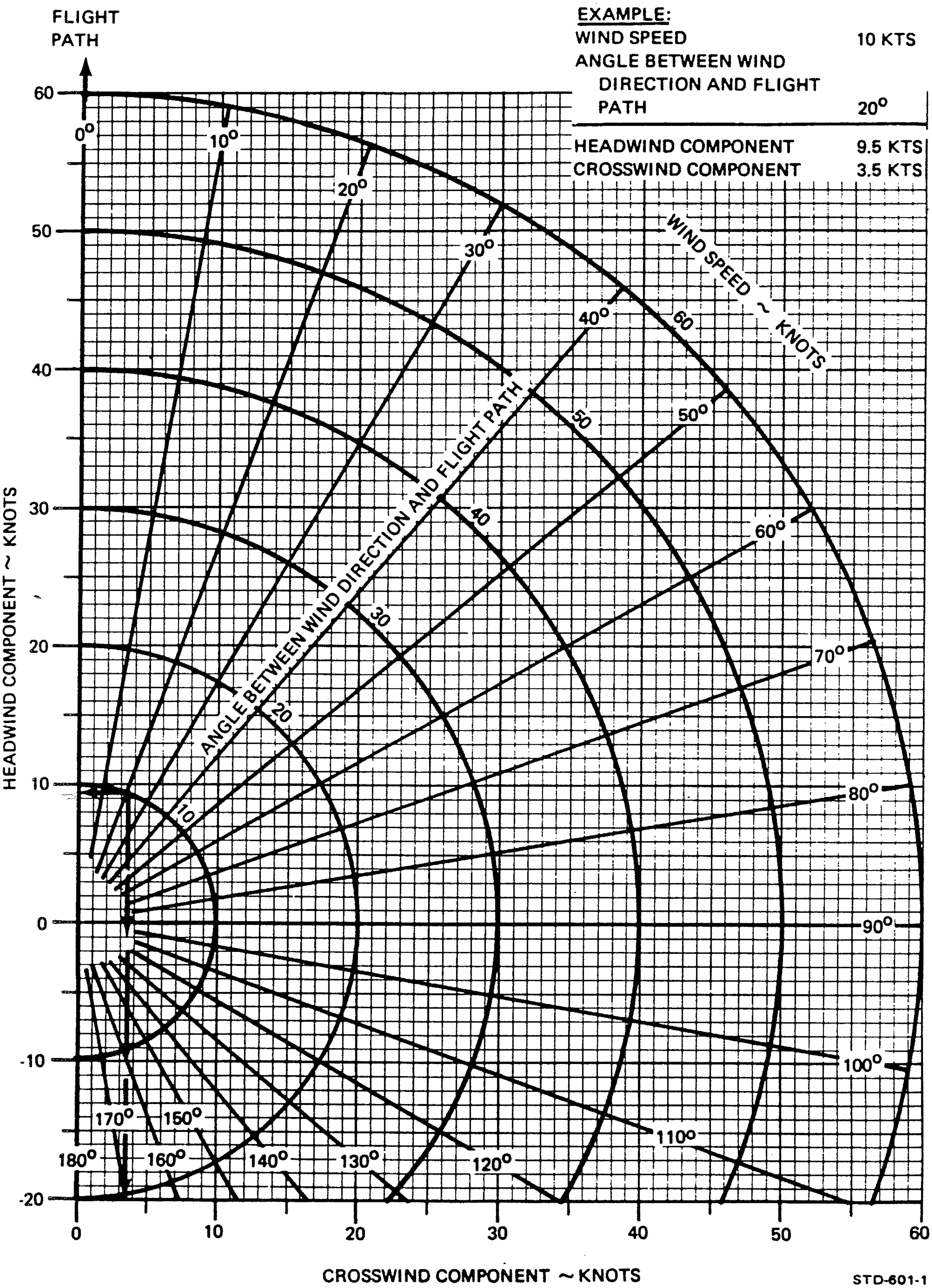




TEMPERATURE CONVERSION
°C vs °F



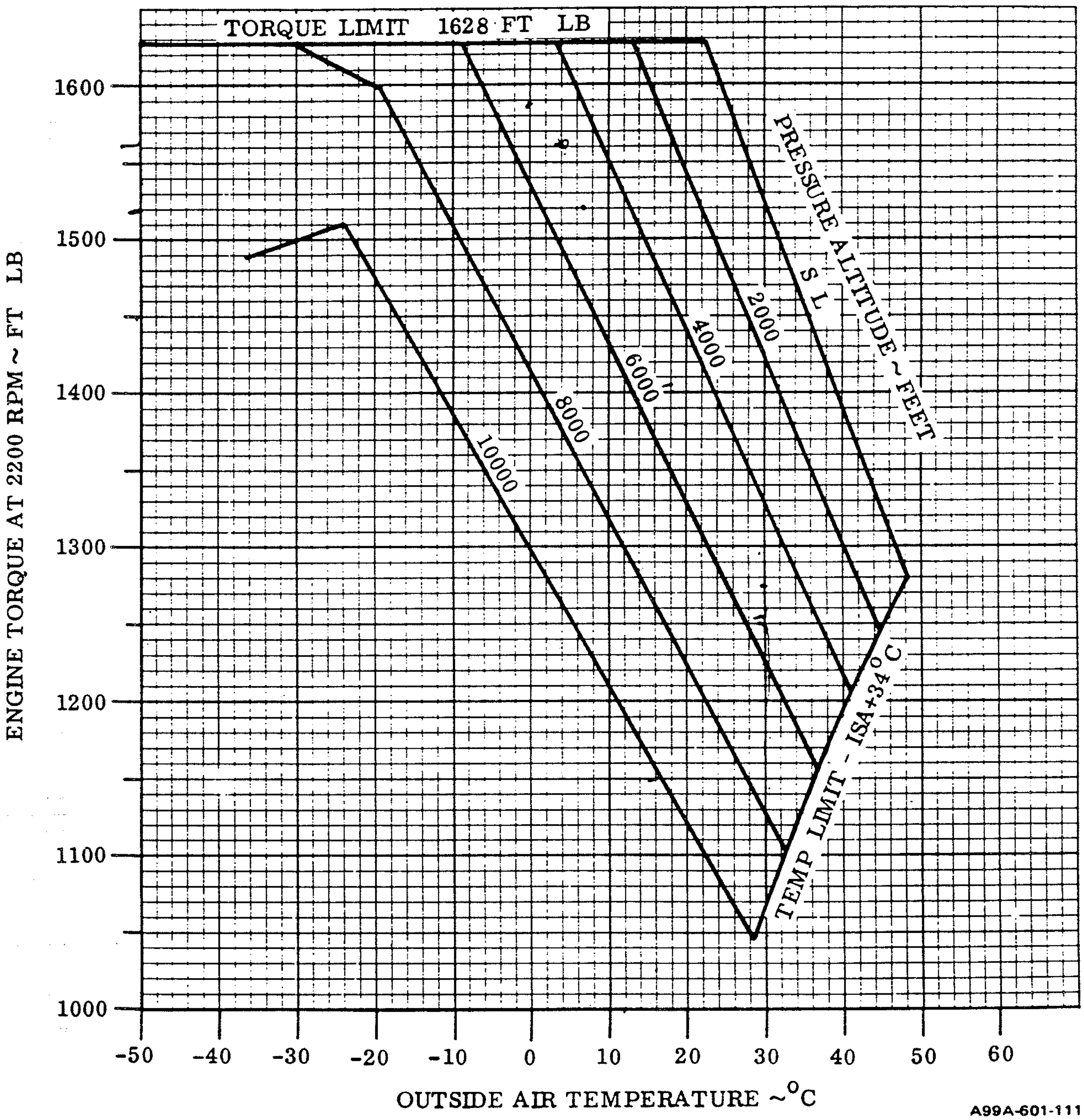
WIND COMPONENTS



MINIMUM TAKE-OFF POWER AT 2200 RPM

(55 KNOTS INDICATED AIRSPEED)

NOTES: 1. TORQUE INCREASES APPROXIMATELY 15 FT LB FROM ZERO TO 55 KIAS
2. THE POWER (TORQUE) INDICATED IS THE MINIMUM VALUE FOR WHICH TAKE-OFF PERFORMANCE IN THIS SECTION CAN BE OBTAINED. EXCESS POWER, WHICH CAN BE DEVELOPED WITHOUT EXCEEDING ENGINE LIMITATIONS, MAY BE UTILIZED.



A99A-601-111

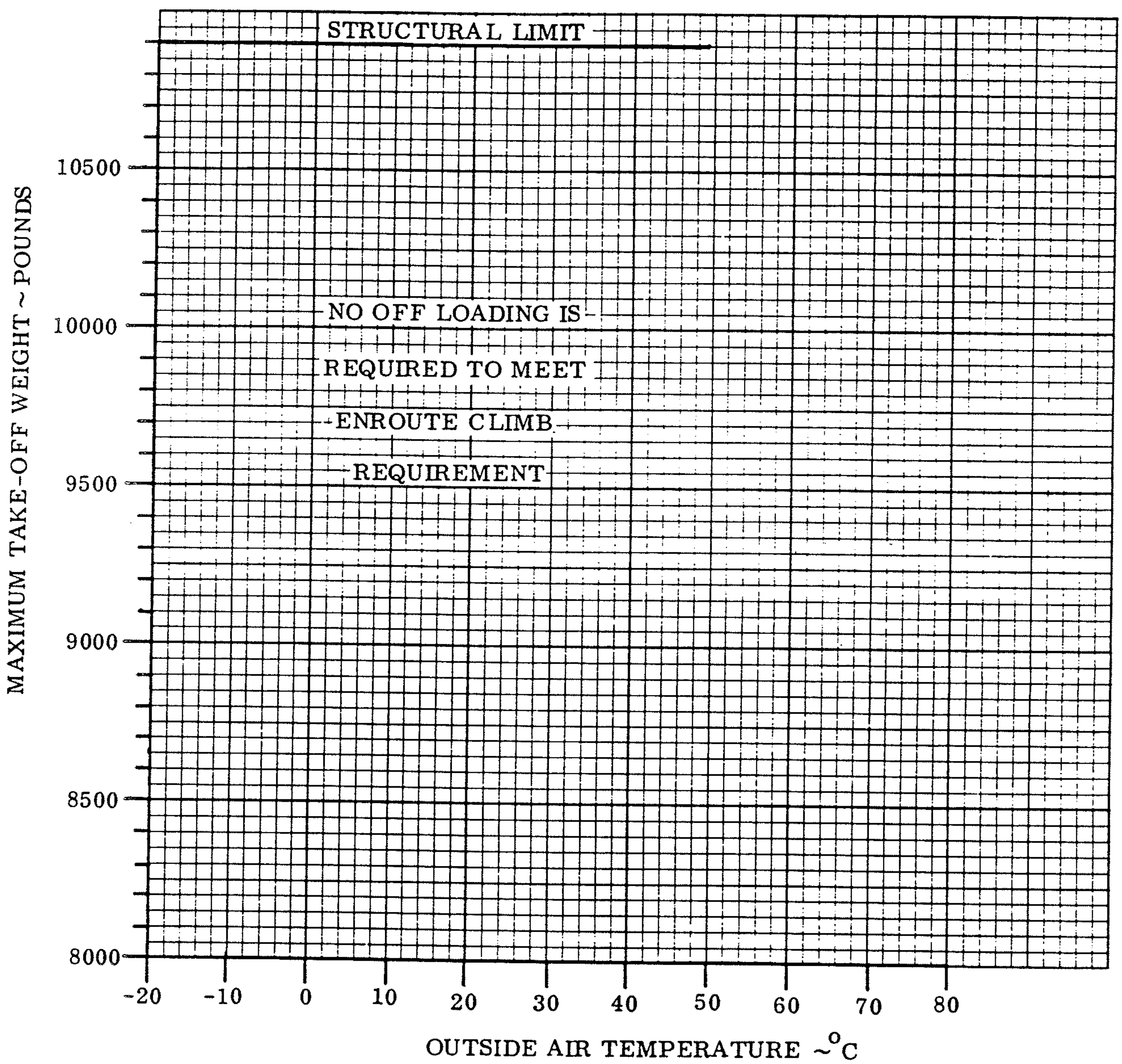
MAXIMUM TAKE-OFF WEIGHT

PERMITTED BY ENROUTE CLIMB REQUIREMENT

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP
PROPELLER	INOPERATIVE PROPELLER FEATHERED
RATE-OF-CLIMB	SINGLE ENGINE CLIMB GRAPH (PAGE 5-15)

NOTE: TAKE-OFF WEIGHT LIMIT IS IN COMPLIANCE WITH FAA REQUIREMENT FOR SINGLE ENGINE RATE OF CLIMB CAPABILITIES AT 5000 FEET PRESSURE ALTITUDE. REFER TO SINGLE ENGINE CLIMB GRAPH, 4-22, FOR ACTUAL CLIMB CAPABILITIES APPLICABLE TO THE PARTICULAR TEMPERATURE AND ALTITUDE BEING CONSIDERED.



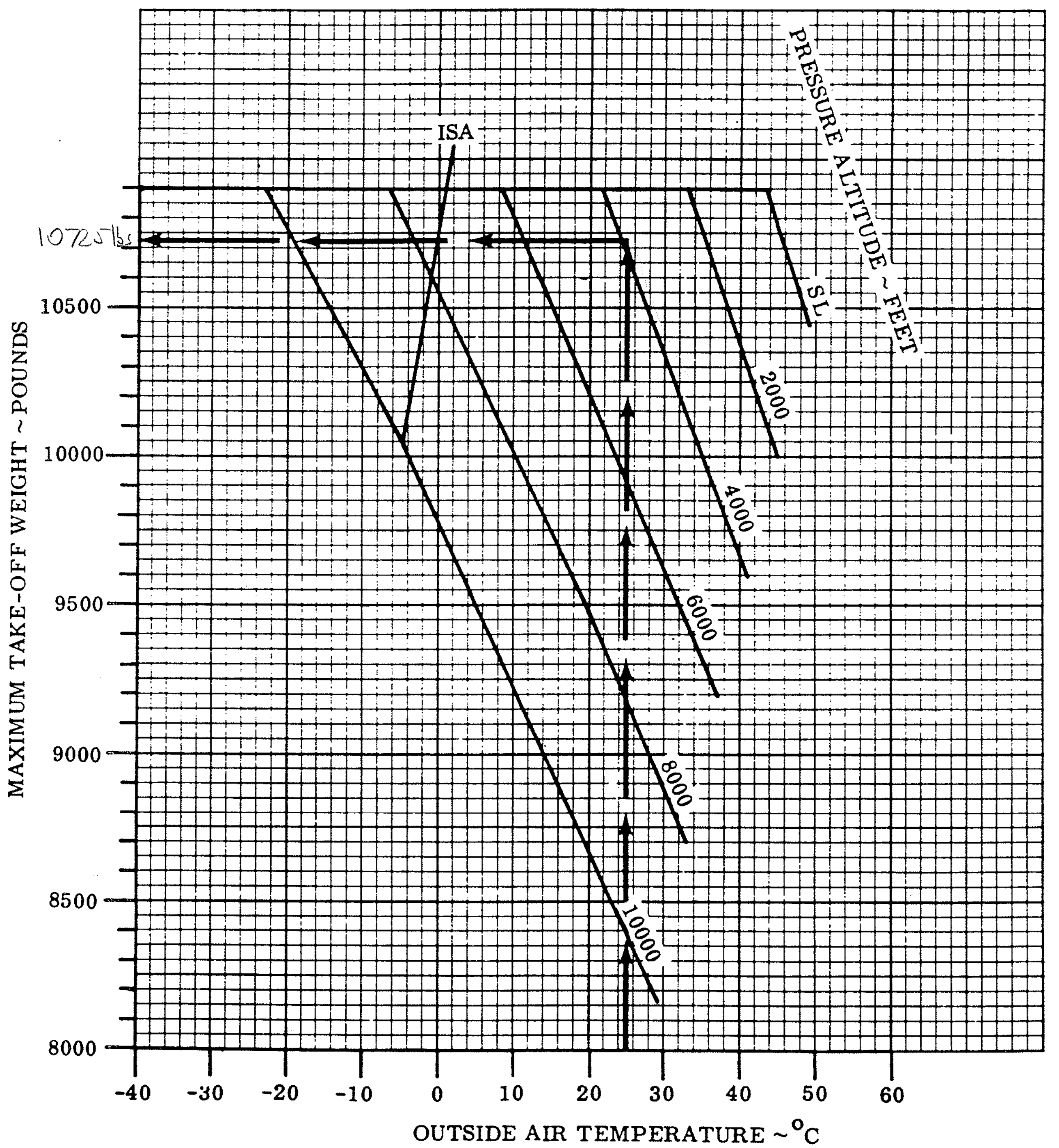
A99A-601-143

more weight Longer field length

MAXIMUM TAKE-OFF WEIGHT PERMITTED BY SINGLE ENGINE T/O CLIMB REQUIREMENT — 0% FLAPS

ASSOCIATED CONDITIONS:	
POWER	TAKE-OFF POWER
FLAPS	0%
GEAR	DOWN
INOPERATIVE PROPELLER	FEATHERED

EXAMPLE:	
OAT	25 °C
PRESSURE ALTITUDE	3966 FT
MAXIMUM T/O WEIGHT PERMITTED	10725 LBS



A99A-601-142

FIELD LENGTH — 0% FLAPS

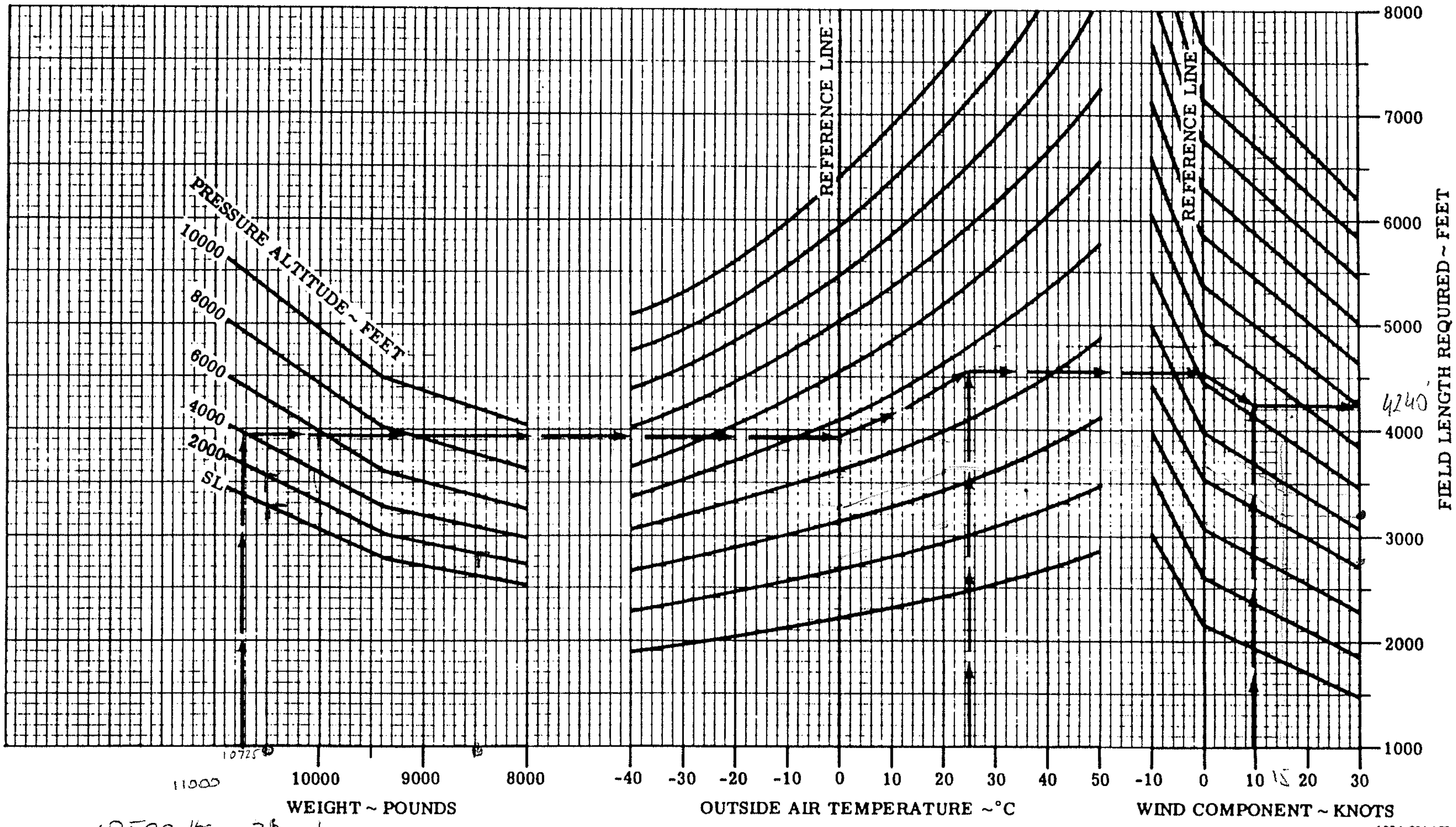
ASSOCIATED CONDITIONS:

POWER	1. TAKE-OFF POWER SET BEFORE BRAKE RELEASE 2. BOTH ENGINES IDLE AT DECISION SPEED
FLAPS	0%
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	DECISION SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	103
10000	99
9000	96
8000	96

EXAMPLE:

TAKE-OFF WEIGHT	10725 LBS
PRESSURE ALTITUDE	3966 FT
OAT	25 °C
HEADWIND COMPONENT	9.5 KTS
FIELD LENGTH REQUIRED	4240 FT
DECISION SPEED	102 KIAS



e.g. 10500 lbs 3400' running
8500 lbs 2750' running

len weight   shorter field length

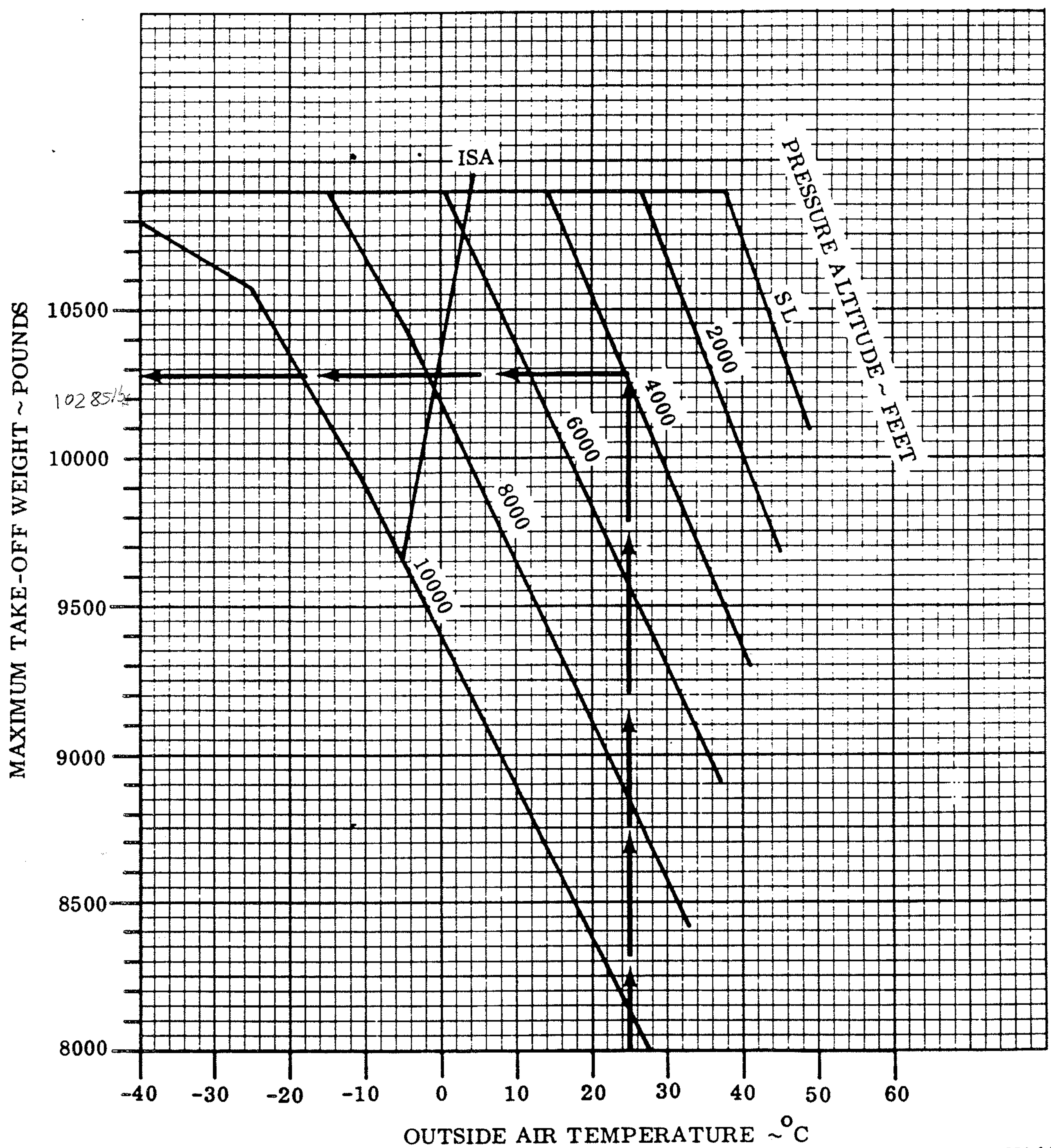
MAXIMUM TAKE-OFF WEIGHT PERMITTED BY SINGLE ENGINE T/O CLIMB REQUIREMENT 30% FLAPS

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER
FLAPS	30%
GEAR	DOWN
INOPERATIVE PROPELLER	FEATHERED

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
MAXIMUM T/O WEIGHT PERMITTED	10280 LBS



A99A-601-141

FIELD LENGTH — 30% FLAPS

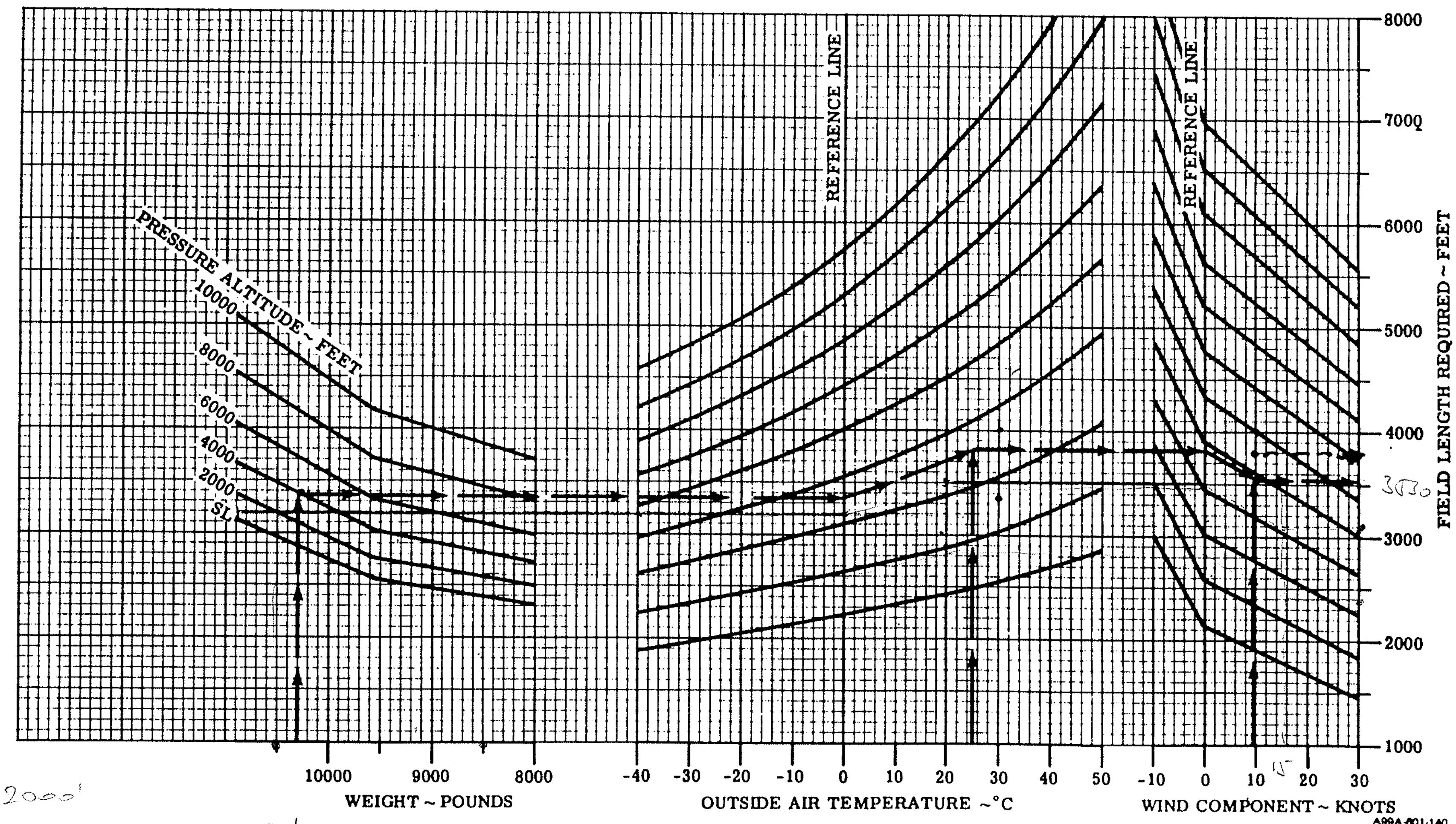
ASSOCIATED CONDITIONS:

POWER	1. TAKE-OFF POWER SET BEFORE BRAKE RELEASE
	2. BOTH ENGINES IDLE AT DECISION SPEED
FLAPS	30%
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	DECISION SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	98
10000	94
9000	92
8000	92

EXAMPLE:

TAKE-OFF WEIGHT	10280 LBS
PRESSURE ALTITUDE	3966 FT
OAT	25 °C
HEADWIND COMPONENT	9.5 KTS
FIELD LENGTH REQUIRED	3530 FT
DECISION SPEED	95 KIAS



2000'
10500 lbs 3080' runway
8500 lbs 2400' runway

TAKE-OFF DISTANCE — 0% FLAPS

TWO ENGINES

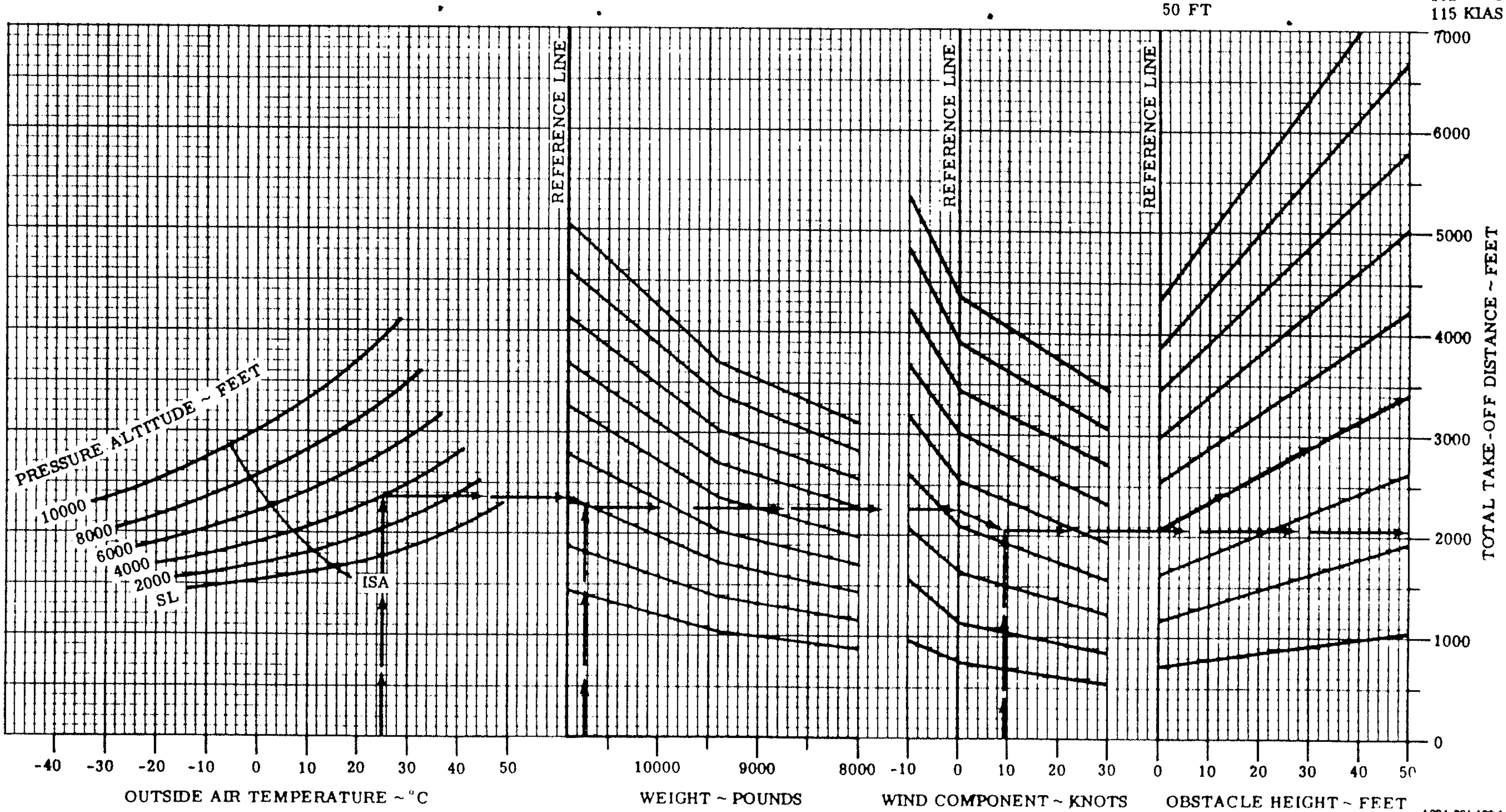
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	0%
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	TAKE-OFF SPEED KNOTS IAS (ASSUMES ZERO INST. ERROR) LIFT-OFF	50 FT
10900	103	116
10000	99	111
9000	96	105
8000	96	98

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	10725 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	2060 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	3420 FT
TAKE-OFF SPEED AT LIFT-OFF	102 KIAS
50 FT	115 KIAS



TAKE-OFF DISTANCE — 30% FLAPS

TWO ENGINES

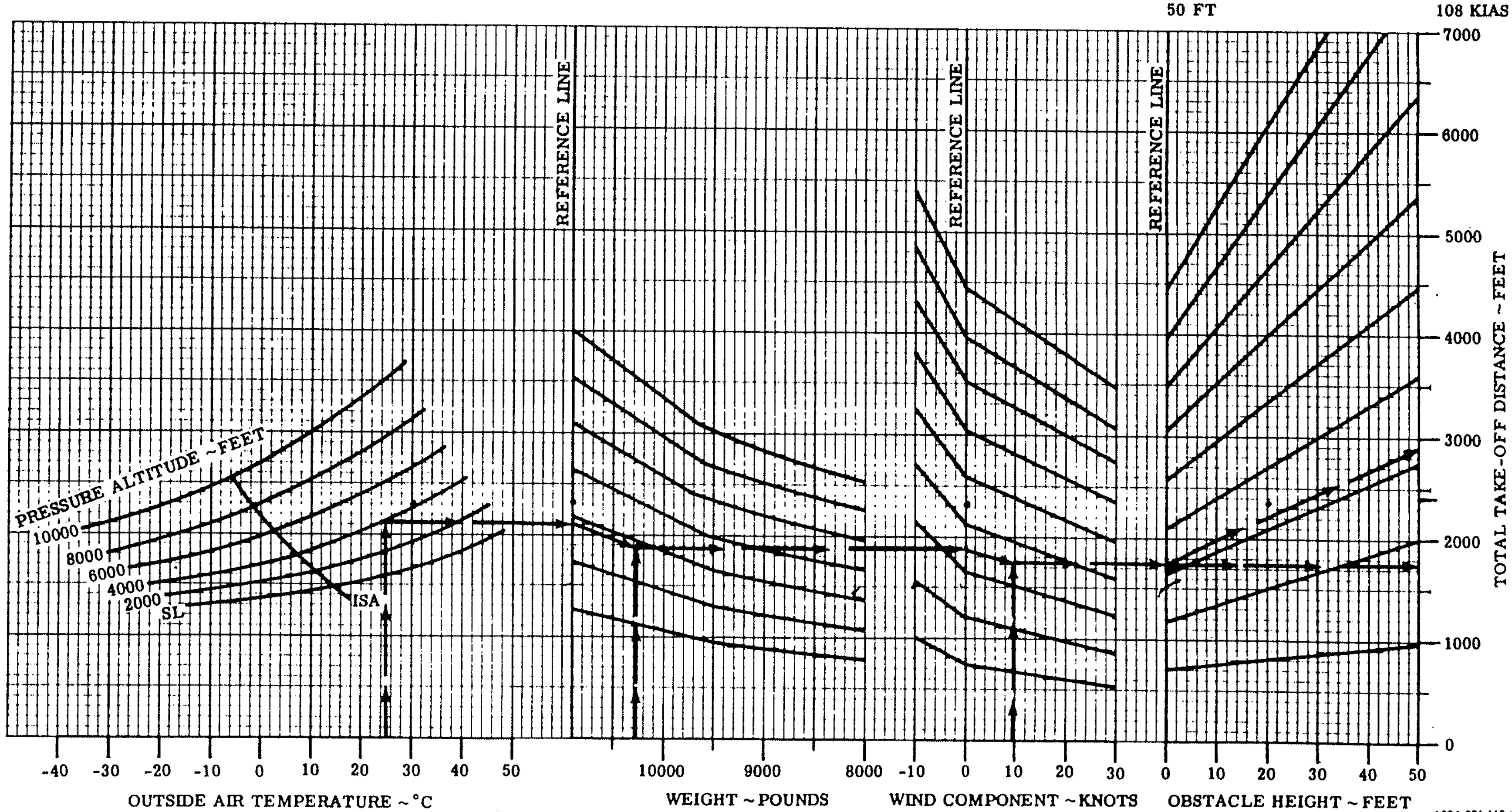
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	30%
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	TAKE-OFF SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)	
	LIFT-OFF	50 FT
10900	98	111
10000	94	106
9000	92	101
8000	92	95

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	10280 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1750 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	2900 FT
TAKE-OFF SPEED AT	
LIFT-OFF	95 KIAS
50 FT	108 KIAS



TWO ENGINE CLIMB

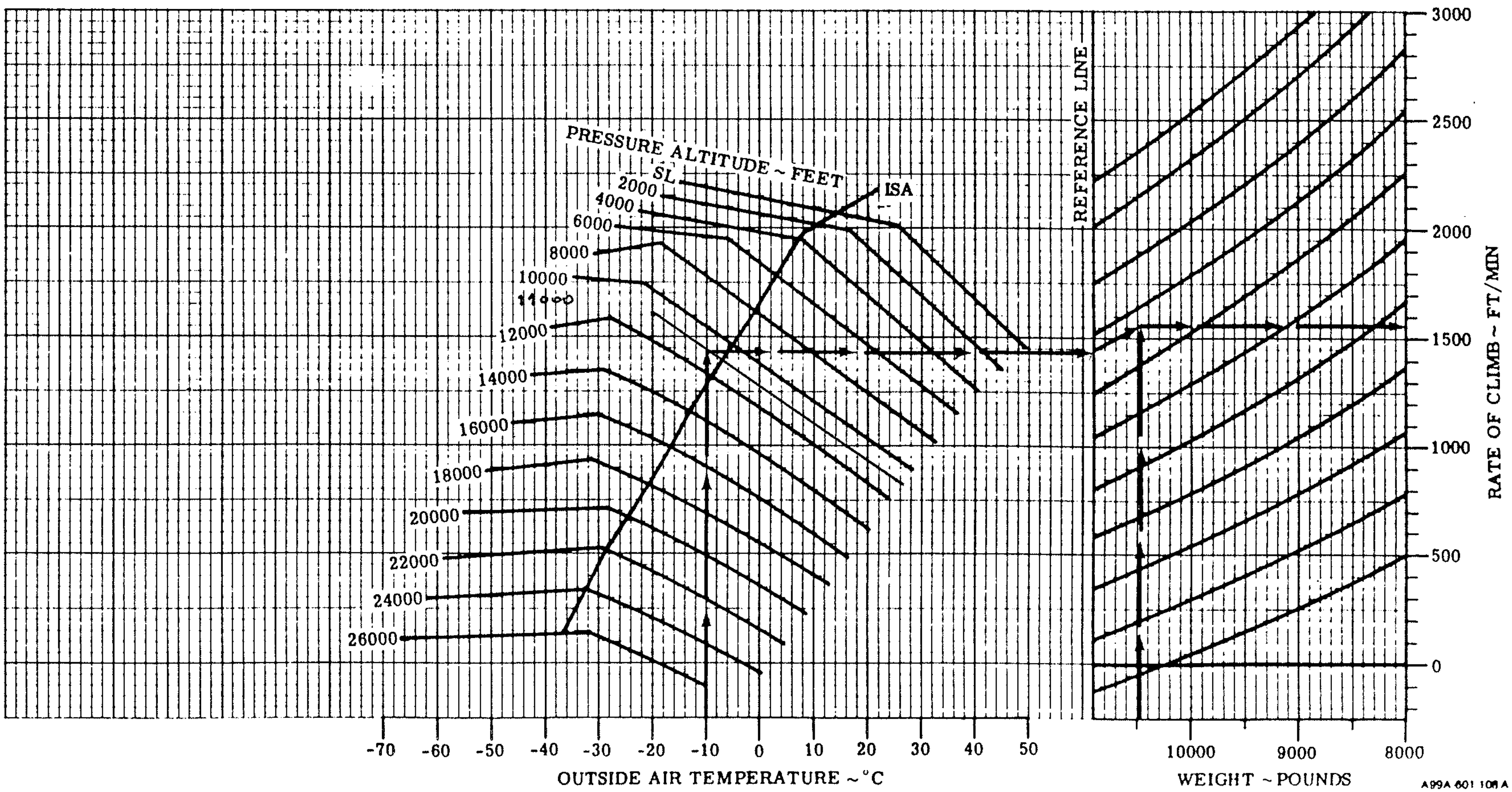
ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP

WEIGHT POUNDS	CLIMB SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	118
10000	115
9000	112
8000	109

EXAMPLE:

OAT	-10 °C
PRESSURE ALTITUDE	11000 FT
WEIGHT	10478 LBS
RATE-OF CLIMB	1560 FT/MIN
CLIMB SPEED	117 KIAS



SINGLE ENGINE CLIMB

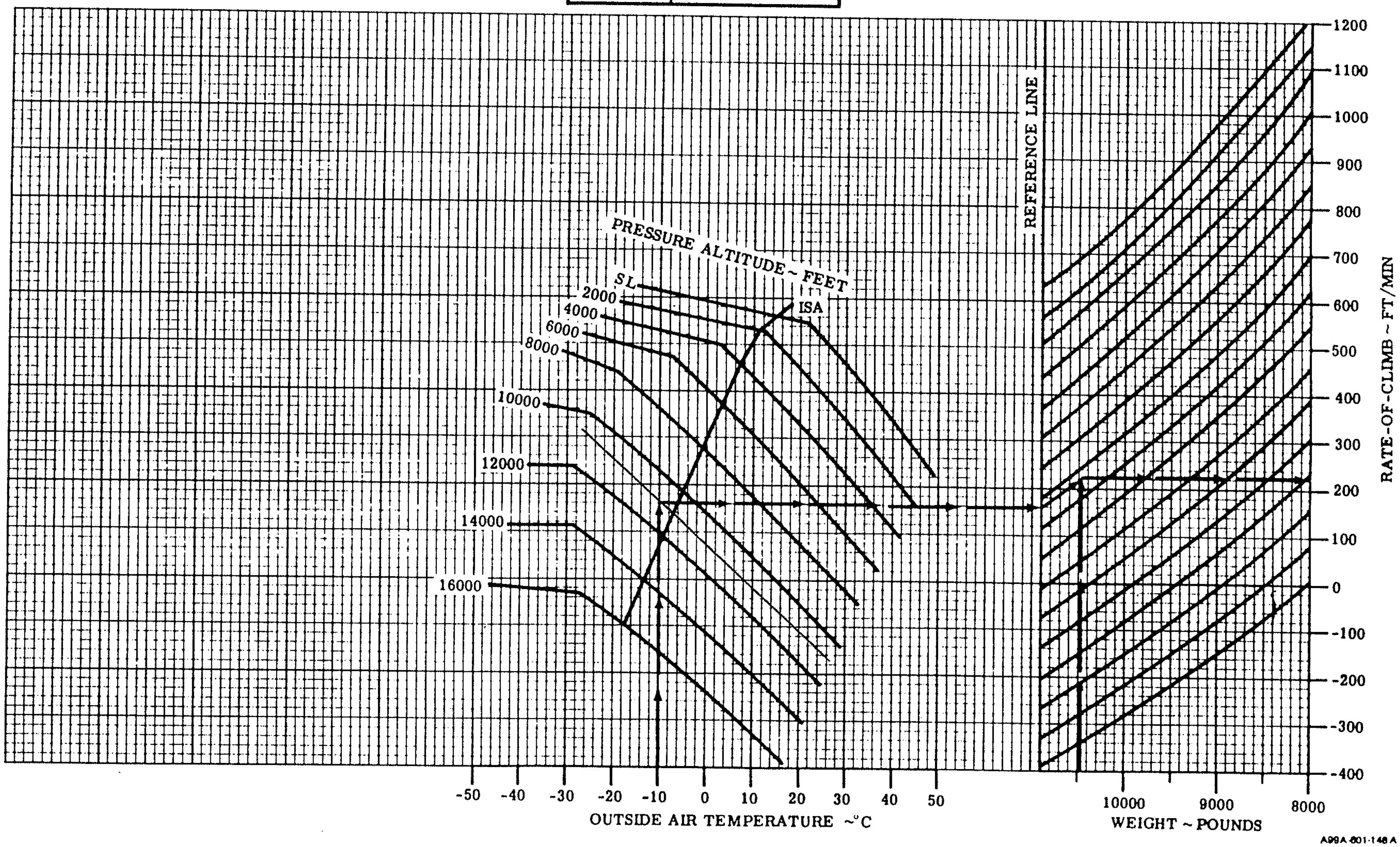
ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP
INOPERATIVE PROPELLER	FEATHERED

WEIGHT POUNDS	CLIMB SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	114
10000	111
9000	108
8000	105

EXAMPLE:

OAT	-10 °C
PRESSURE ALTITUDE	11000 FT
WEIGHT	10478 LBS
RATE-OF-CLIMB	225 FT/MIN
CLIMB SPEED	113 KIAS



MAXIMUM ENROUTE WEIGHT

ASSOCIATED CONDITIONS:

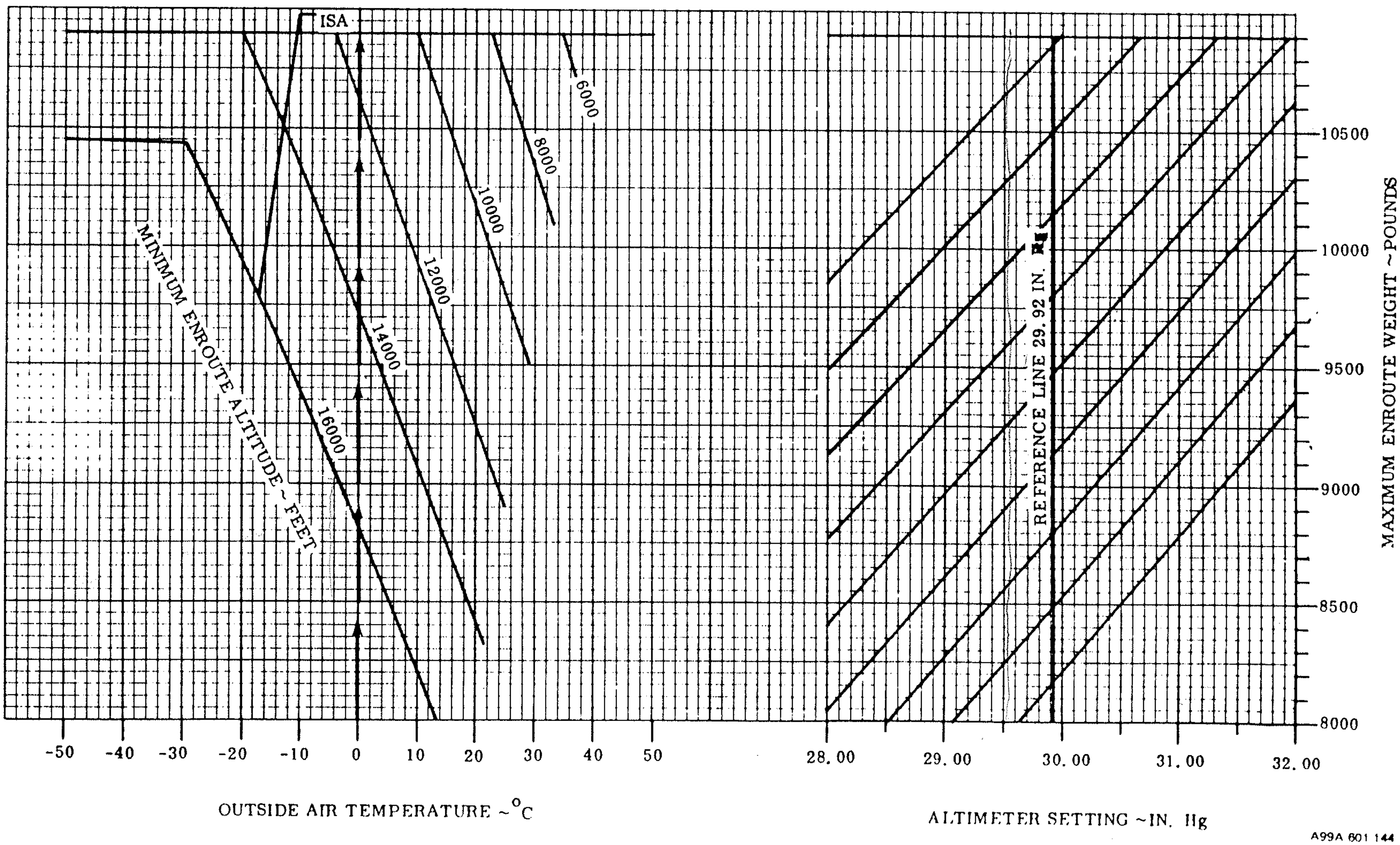
POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP
INOPERATIVE PROPELLER	FEATHERED

NOTE: 145

PER FAR 135.145, OPERATIONS OVER THE TOP OR IN IFR CONDITIONS REQUIRE THAT AIRCRAFT BE CAPABLE OF CLIMBING 50 FT/MIN AT MINIMUM ENROUTE ALTITUDE (MEA) OF PROPOSED ROUTE OR 5000 FEET MSL, WHICH EVER IS HIGHER.

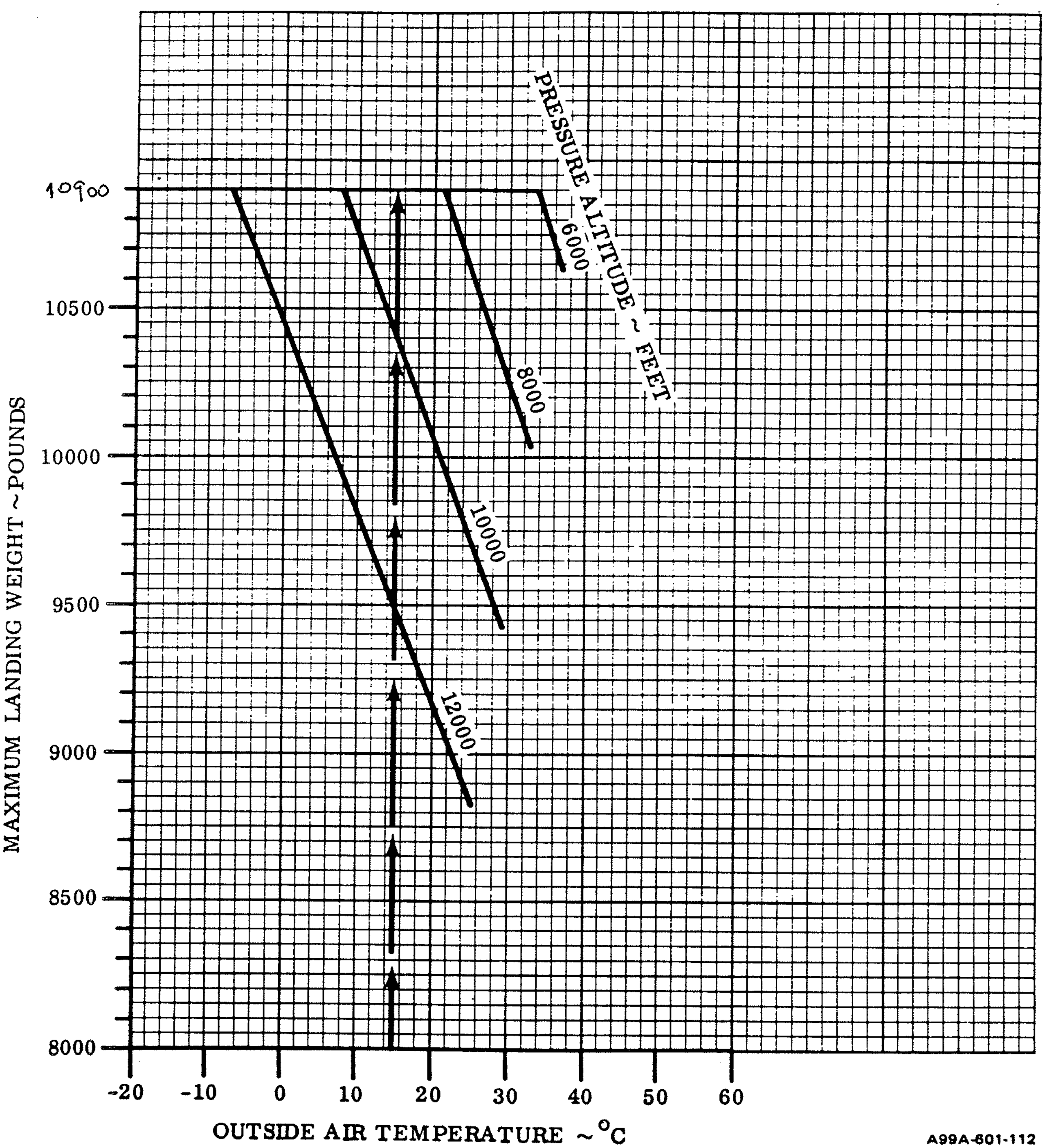
EXAMPLE:

OAT	0 °C
MINIMUM ENROUTE ALTITUDE	8000 FT
ALTIMETER SETTING	29.56 IN. Hg
MAXIMUM ALLOWABLE WEIGHT	10900 LBS



MAXIMUM LANDING WEIGHT PERMITTED BY BALKED LANDING CLIMB REQUIREMENT

ASSOCIATED CONDITIONS:		EXAMPLE:	
POWER	TAKE-OFF POWER BOTH ENGINES	OAT	15 °C
FLAPS	100%	PRESSURE ALTITUDE	5668 FT
GEAR	DOWN	MAXIMUM LANDING WEIGHT	10900 LBS



A99A-601-112

BALKED LANDING CLIMB

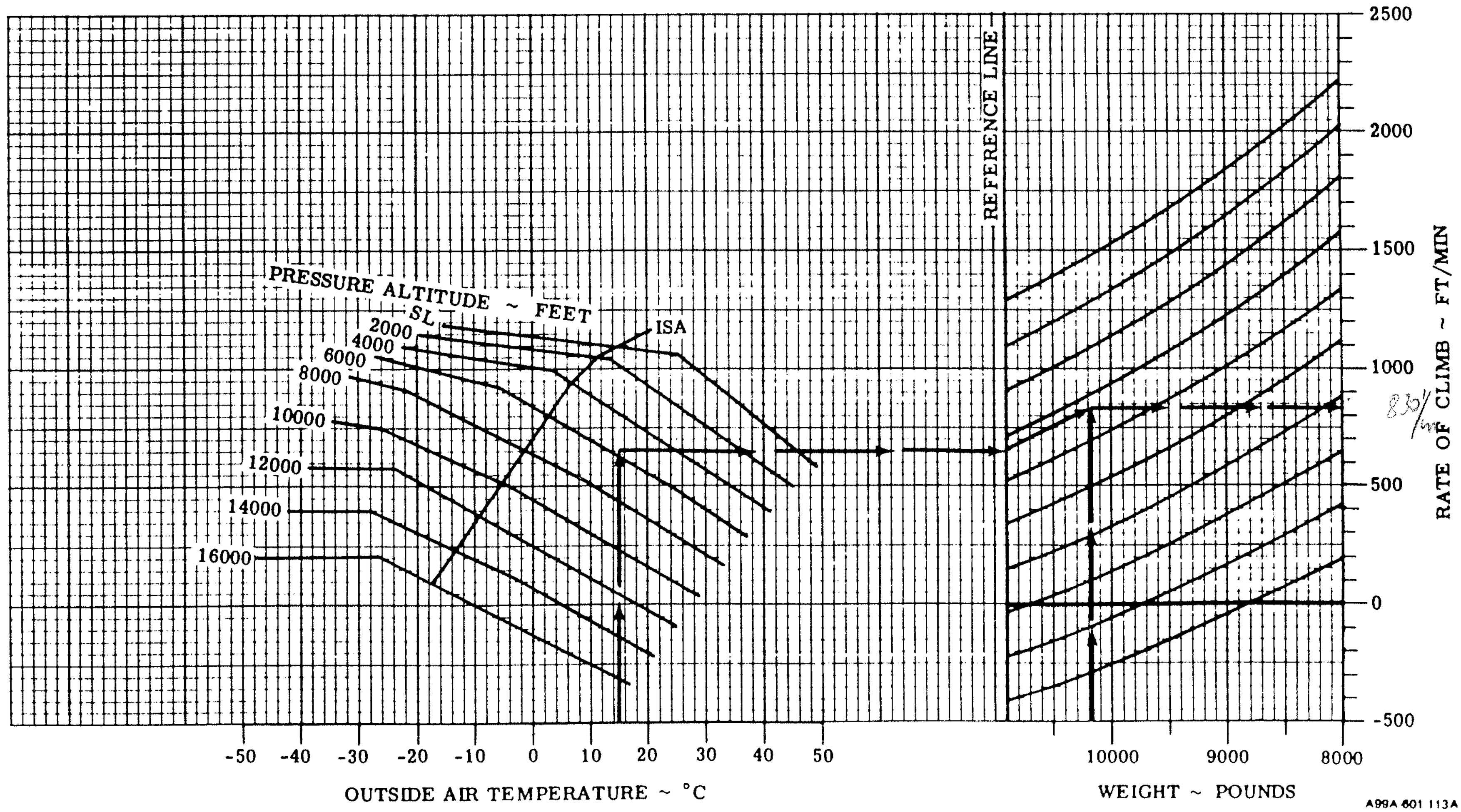
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF
FLAPS	100%
GEAR	DOWN

WEIGHT POUNDS	CLIMB SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	90
10000	87
9000	86
8000	84

EXAMPLE:

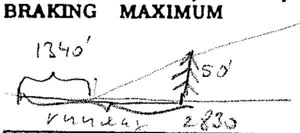
OAT	15 °C
PRESSURE ALTITUDE	5668 FT
WEIGHT	10180 LBS
RATE OF CLIMB	830 FT/MIN
CLIMB SPEED	88 KIAS



LANDING DISTANCE
WITHOUT REVERSING

ASSOCIATED CONDITIONS:

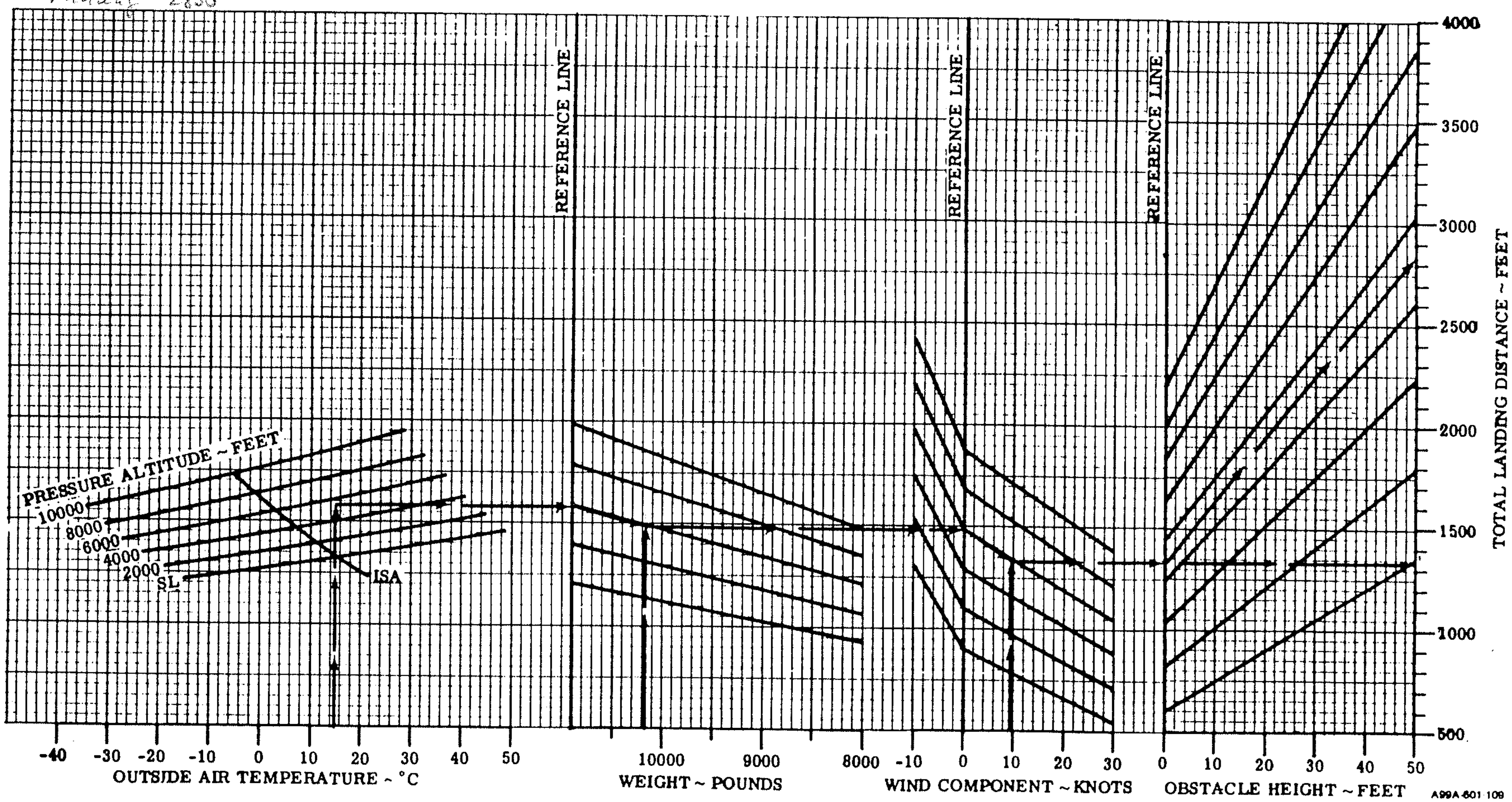
POWER	RETARDED TO MAINTAIN 500 FT/MIN ON FINAL APPROACH
FLAPS	100%
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
BRAKING	MAXIMUM



WEIGHT POUNDS	APPROACH SPEED KNOTS IAS (ASSUMES ZERO INST. ERROR)
10900	97
10000	93
9000	88
8000	83

EXAMPLE:

OAT	15 °C
PRESSURE ALTITUDE	5668 FT
LANDING WEIGHT	10180 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1340 FT
TOTAL DISTANCE OVER A 50FT OBSTACLE	2830 FT
APPROACH SPEED	94 KIAS



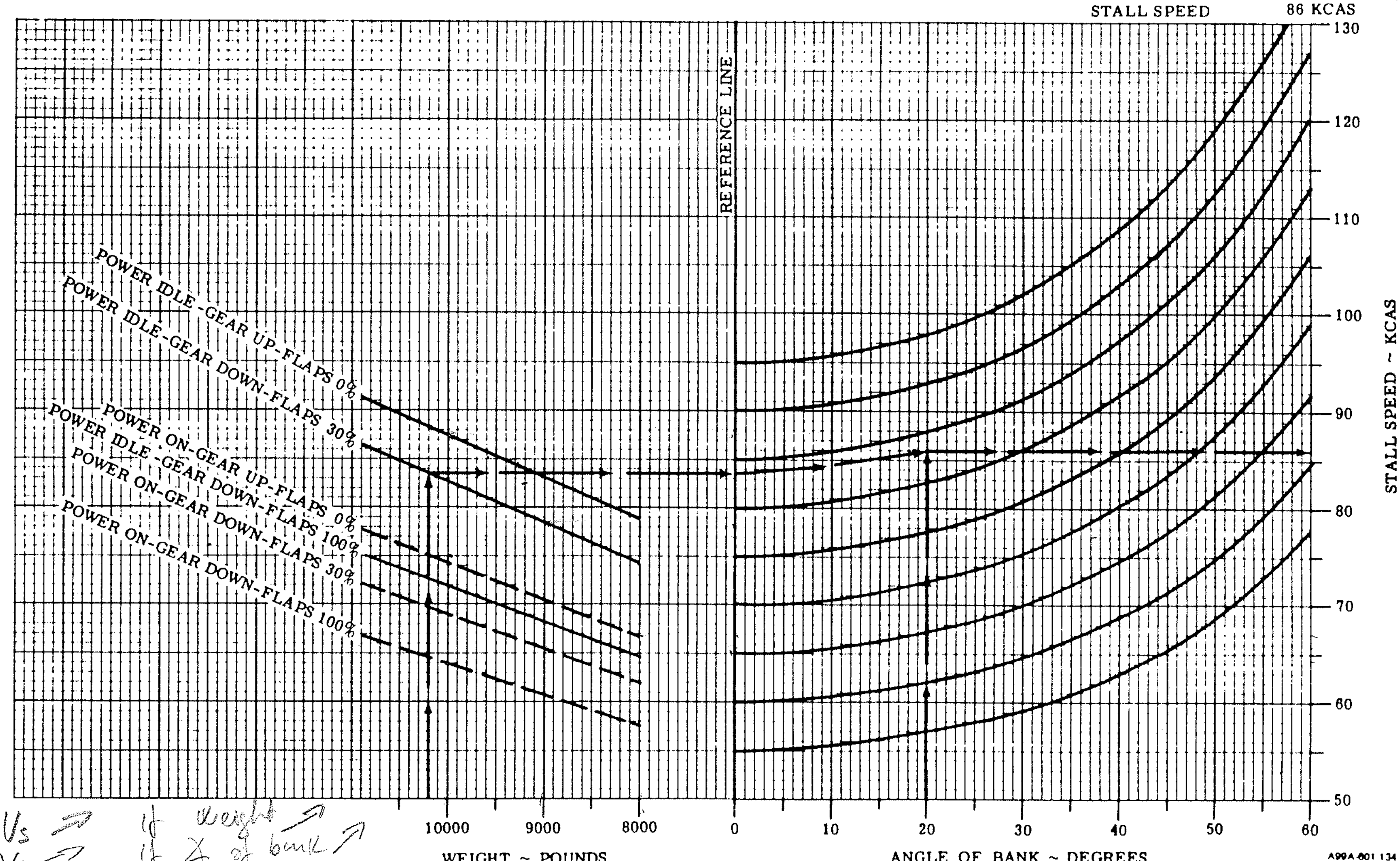
STALL SPEEDS

	8000	9000	10000
Power on: 1 gear up 0°, 2 gear d. 30°, 3 gear d. 100°	67 ① 72	66 ② 71	64. ③ 69
Power idle: 1 gear up 0°, 2 gear d. 30°, 3 gear d. 100°	65 ③ 70	78 ② 84	88 ① 94

NOTES:
1. MAXIMUM ALTITUDE LOSS DURING STALL RECOVERY IS APPROXIMATELY 600 FEET.
2. MAXIMUM NOSE DOWN PITCH ATTITUDE AND ALTITUDE LOSS DURING RECOVERY FROM SINGLE ENGINE STALLS PER FAR 23.205 ARE APPROXIMATELY 0° AND 75 FEET RESPECTIVELY.

EXAMPLE:

WEIGHT	10200 LBS
POWER	OFF
GEAR	DOWN
FLAPS	30%
ANGLE OF BANK	20 DEGREES
STALL SPEED	86 KCAS



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TAKE-OFF WITH POWER SET

TO

90% OF MINIMUM TAKE-OFF POWER

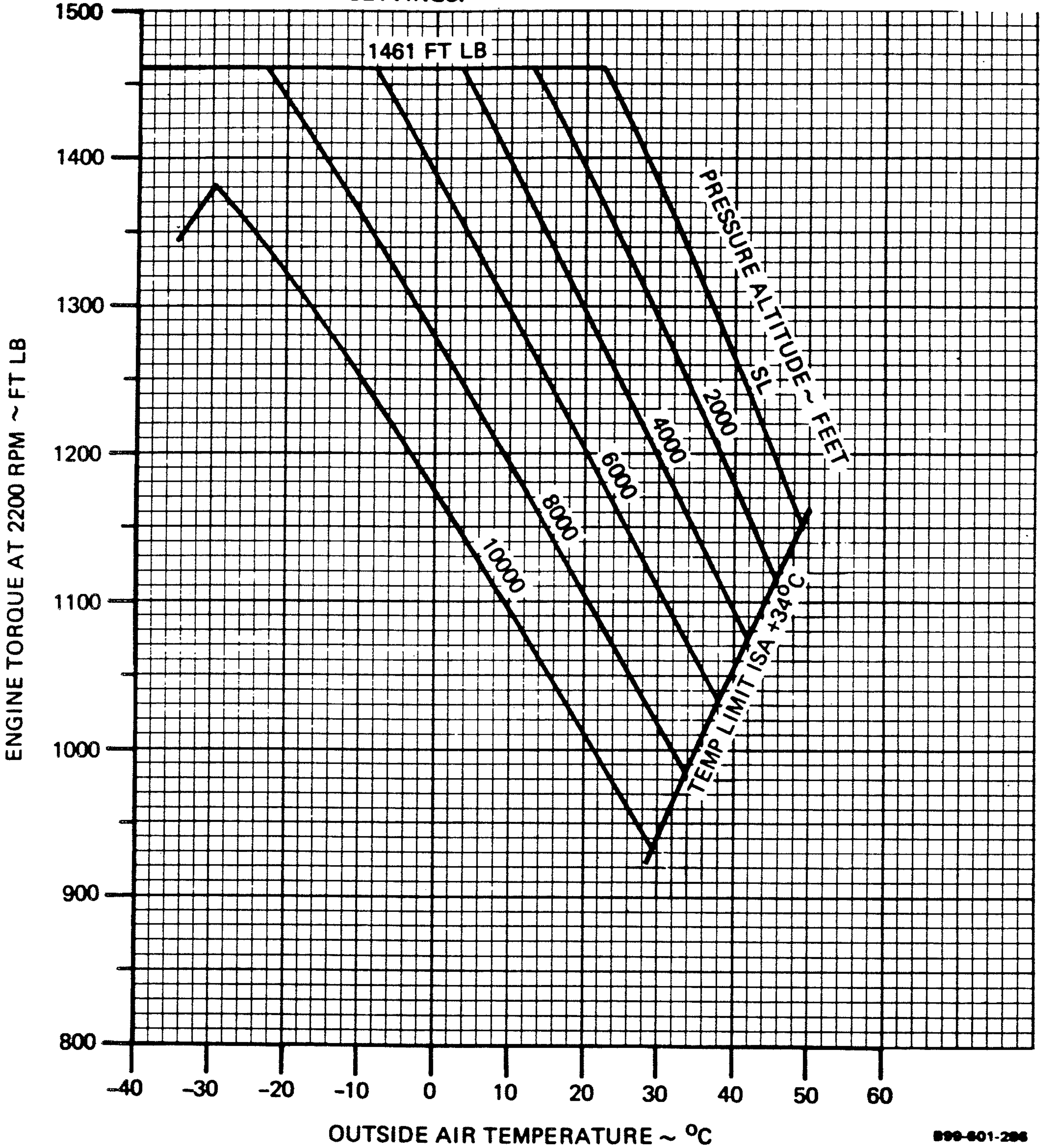
At the option of the operator, 90% of minimum take-off power may be applied in lieu of the full minimum take-off power. If the operator chooses to use this procedure, the information on the next three pages of graphs must be used together; i.e., before the power reduction may be used, the take-off weight must be no more than shown on the maximum take-off weight chart for the particular altitude and temperature. Also, the available runway length must be at least as great as that required by the field length graph, and further, if the available runway length is less than 100 feet longer than the required field length, only half of the reduction in power may be used.

The operator who elects to use this procedure must either obtain approval for a regular interval for performing rated power availability checks, or else conform with an inspection procedure which requires a check of full rated power every 400 hours, plus maintain evidence of satisfactory operation at rated take-off power at times intermediate to those checks.

The reduced power take-off procedure has been established for take-off with the flaps set 0% and should not be utilized when the take-off runway is contaminated with standing water, ice, slush or snow.

90% MINIMUM TAKE-OFF POWER
55 KNOTS IAS

NOTES: 1. TORQUE INCREASES APPROXIMATELY 15 FT LB FROM ZERO TO 55 KNOTS IAS.
2. REFER TO WEIGHT LIMITATIONS APPROPRIATE TO TAKE-OFF WITH THESE REDUCED POWER SETTINGS.



FIELD LENGTH — 0% FLAPS

90% MINIMUM TAKE-OFF POWER

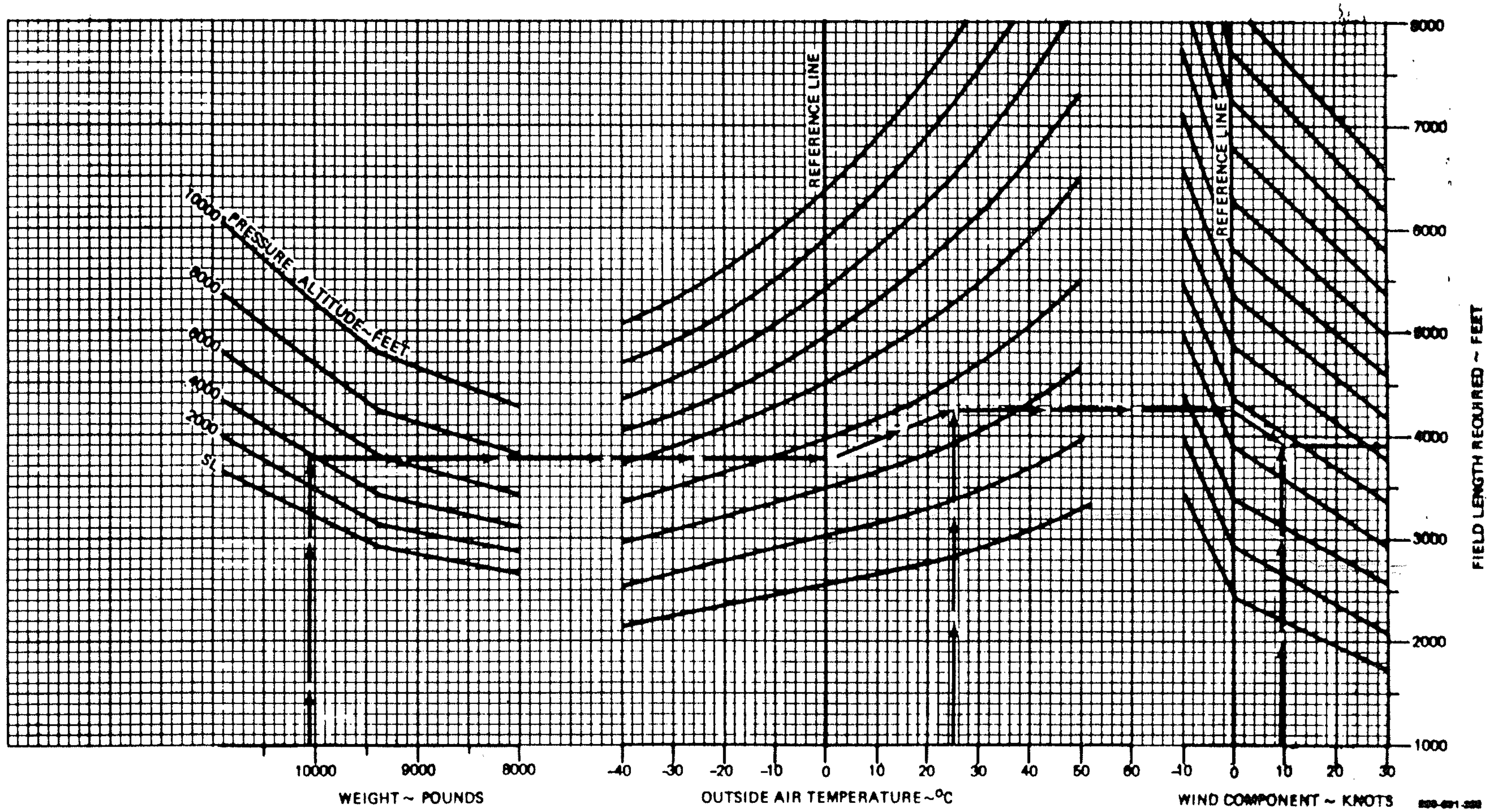
ASSOCIATED CONDITIONS:

POWER	1. 90% MINIMUM TAKE-OFF POWER SET BEFORE BRAKE RELEASE.
	2. BOTH ENGINES IDLE AT DECISION SPEED
FLAPS	0%
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	DECISION SPEED KNOTS IAS (ASSUMES ZERO INST. ERROR)
10900	103
10000	99
9000	96
8000	96

EXAMPLE:

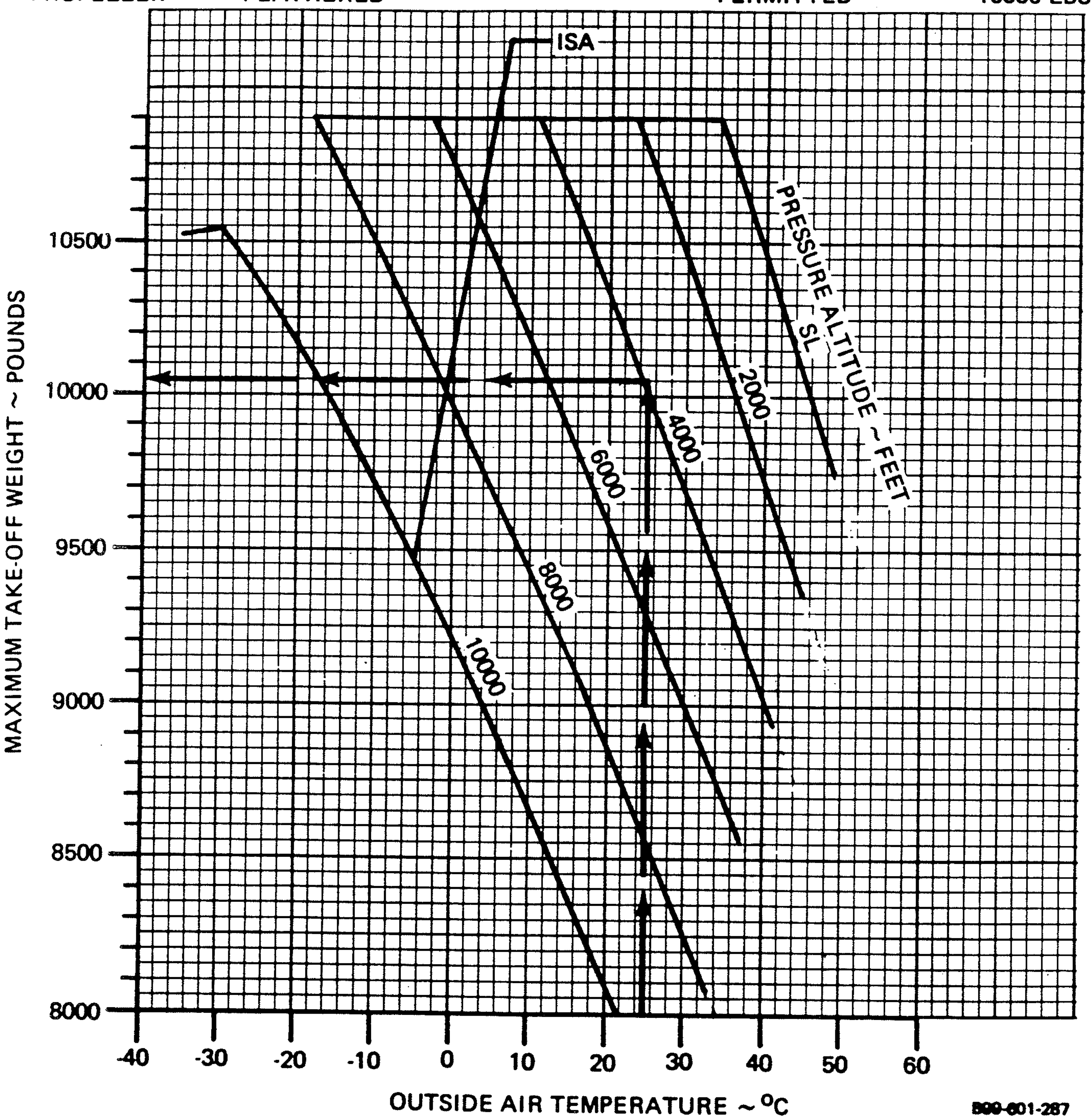
TAKE-OFF WEIGHT	10060 LBS
PRESSURE ALTITUDE	3966 FT
OAT	25°C
HEADWIND COMPONENT	9.5 KTS
FIELD LENGTH REQUIRED	3910 FT
DECISION SPEED	99 KIAS



MAXIMUM TAKE-OFF WEIGHT PERMITTED BY SINGLE ENGINE TAKE-OFF CLIMB REQUIREMENT - 0% FLAPS

ASSOCIATED CONDITIONS:	
POWER	90% MINIMUM TAKE-OFF POWER
FLAPS	0%
GEAR	DOWN
INOPERATIVE PROPELLER	FEATHERED

EXAMPLE:	
OAT	25°C
PRESSURE ALTITUDE	3966 FT
MAXIMUM T/O WEIGHT PERMITTED	10050 LBS



SECTION V
FAR PART 91 PERFORMANCE

TABLE OF CONTENTS

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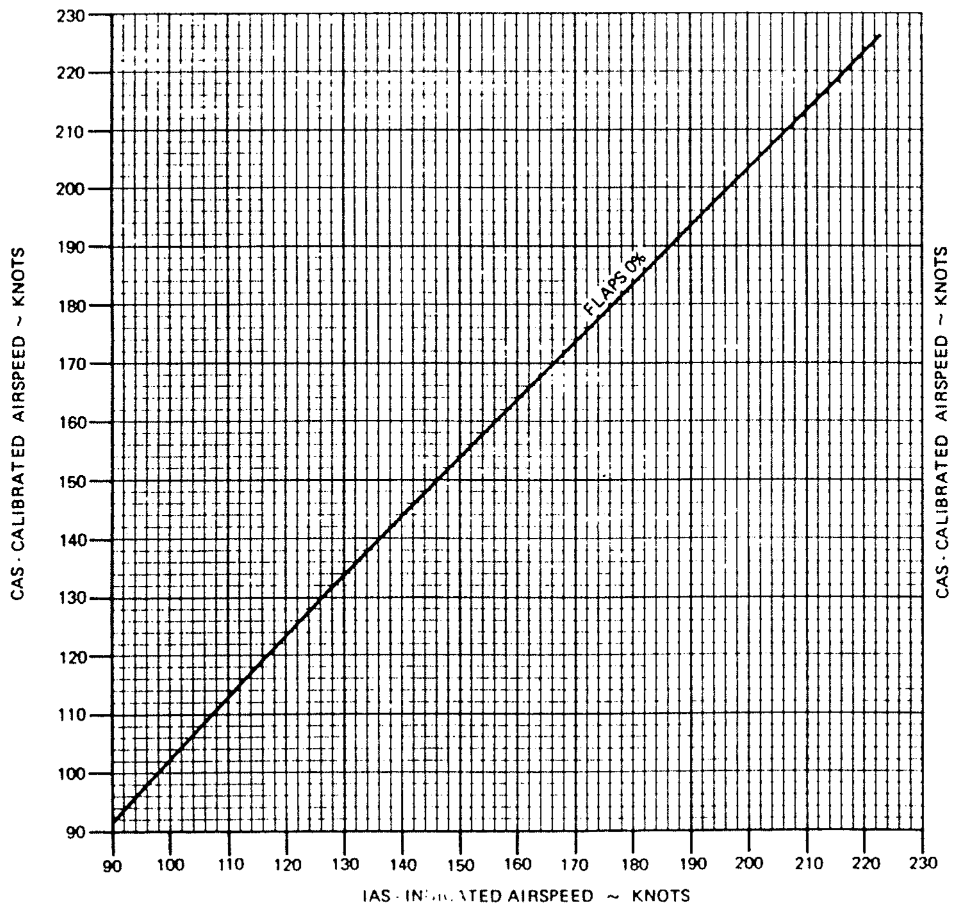
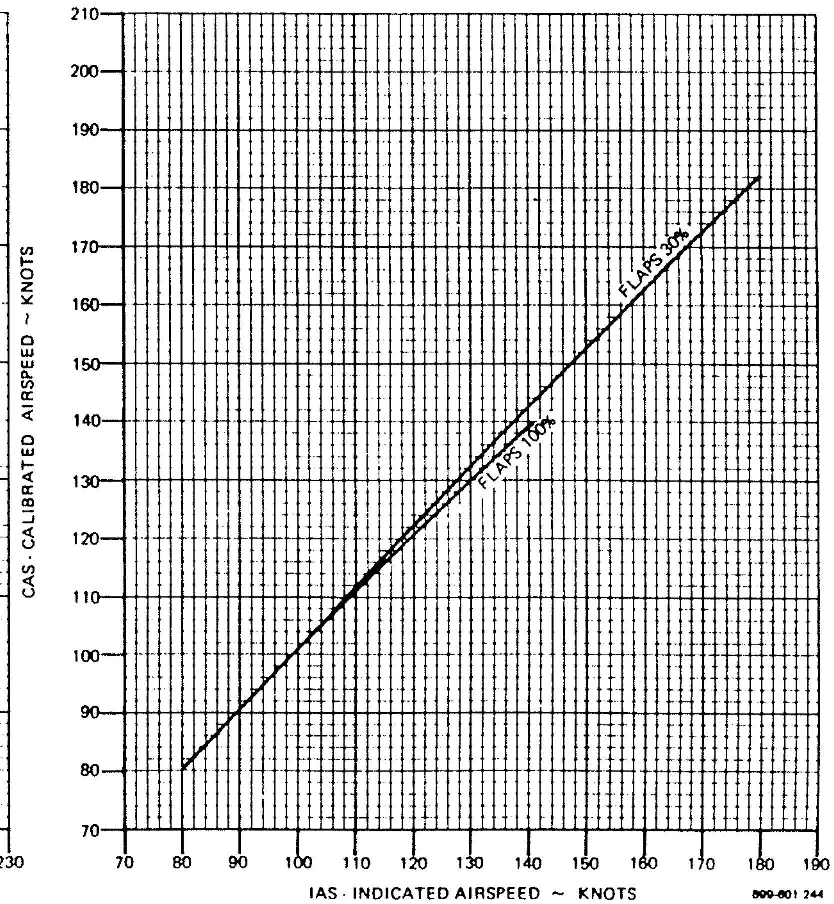
AIRSPEED CALIBRATION - NORMAL SYSTEM

WEIGHT 10900 LBS

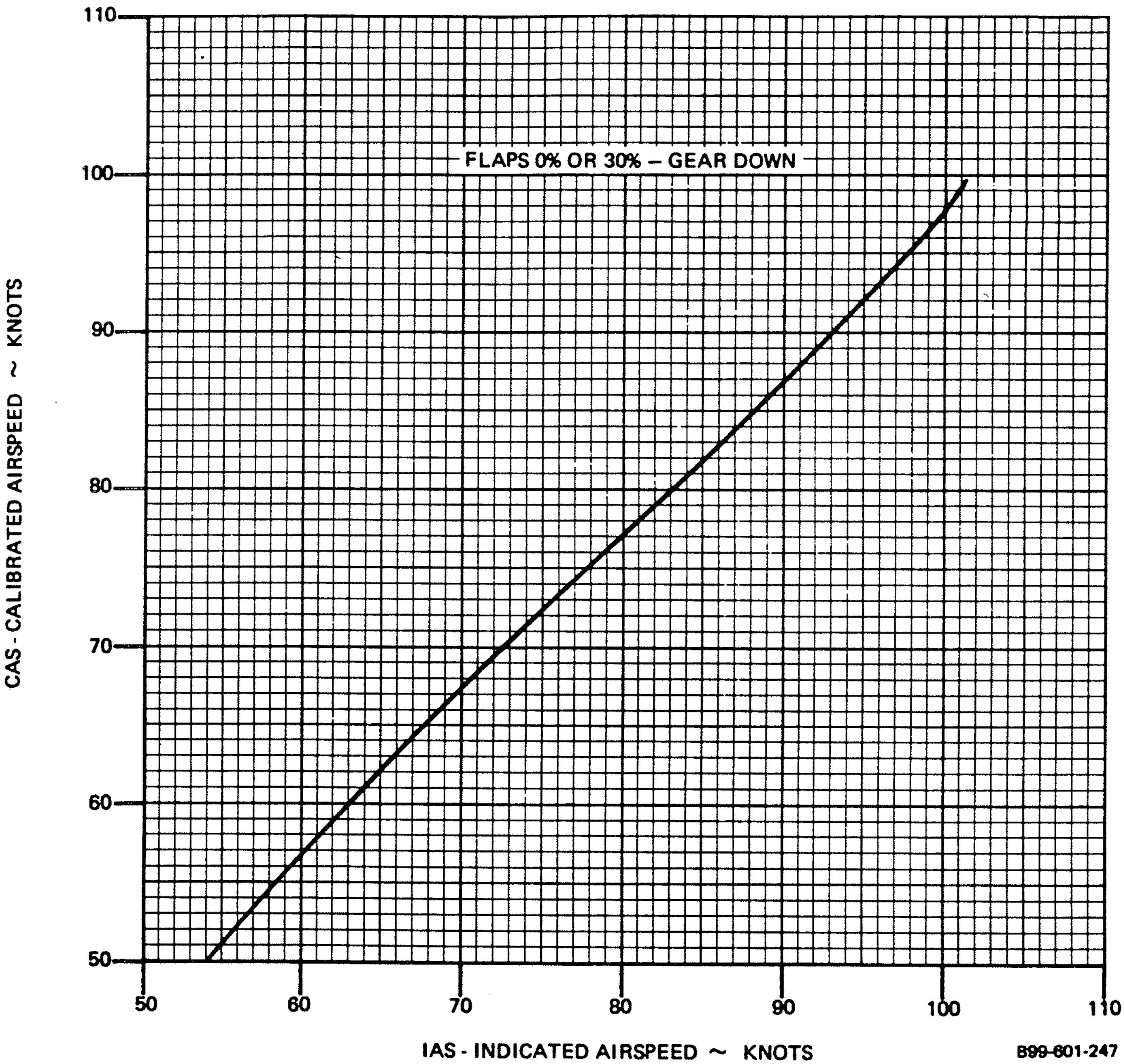
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.





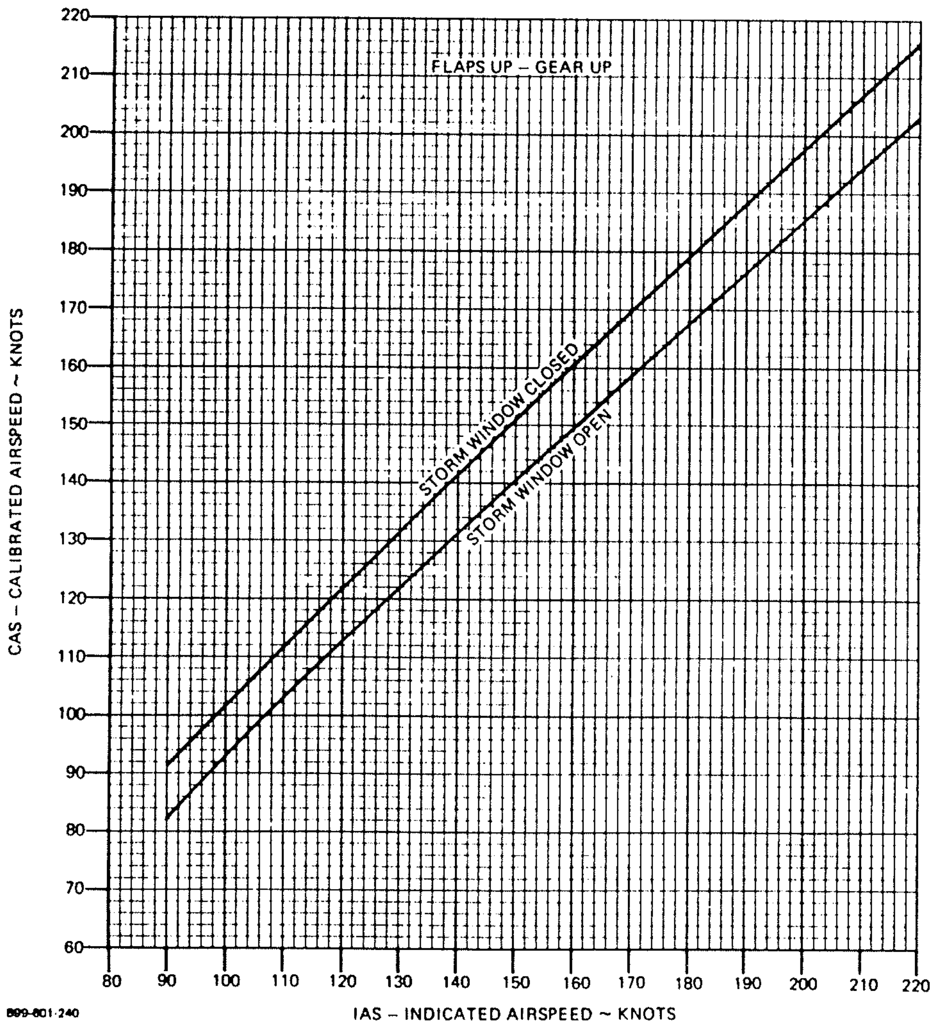
AIRSPEED CALIBRATION - NORMAL SYSTEM
TAKE - OFF GROUND ROLL

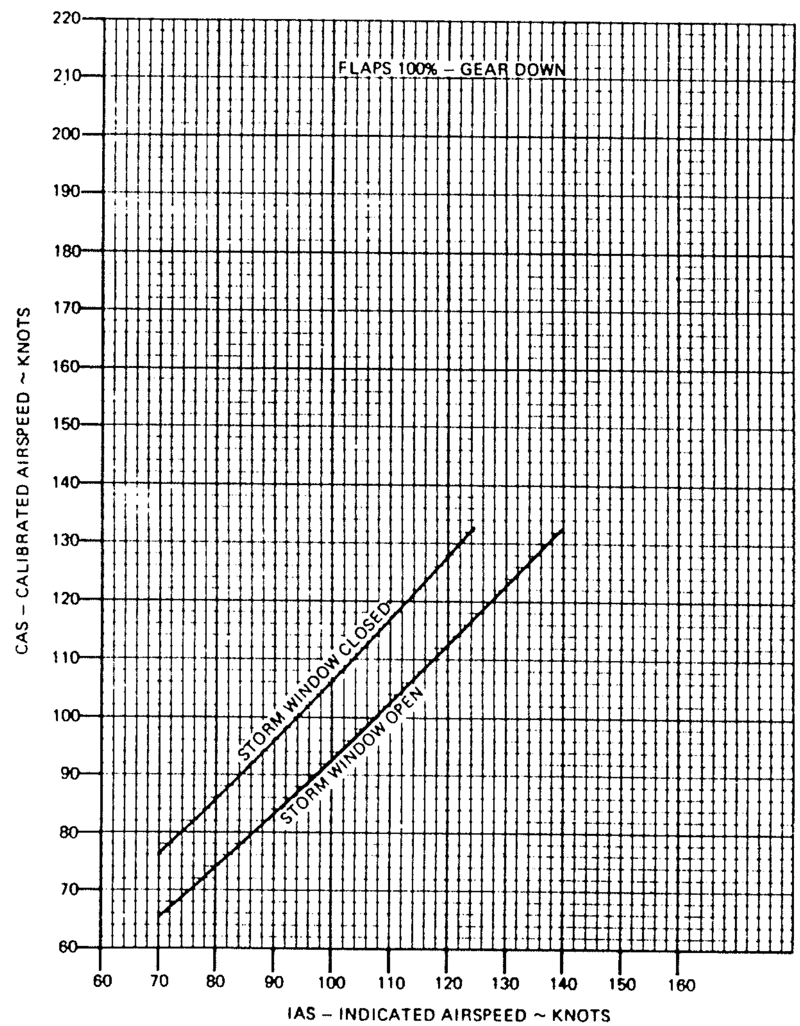
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.



AIRSPEED CALIBRATION
EMERGENCY SYSTEM

NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR



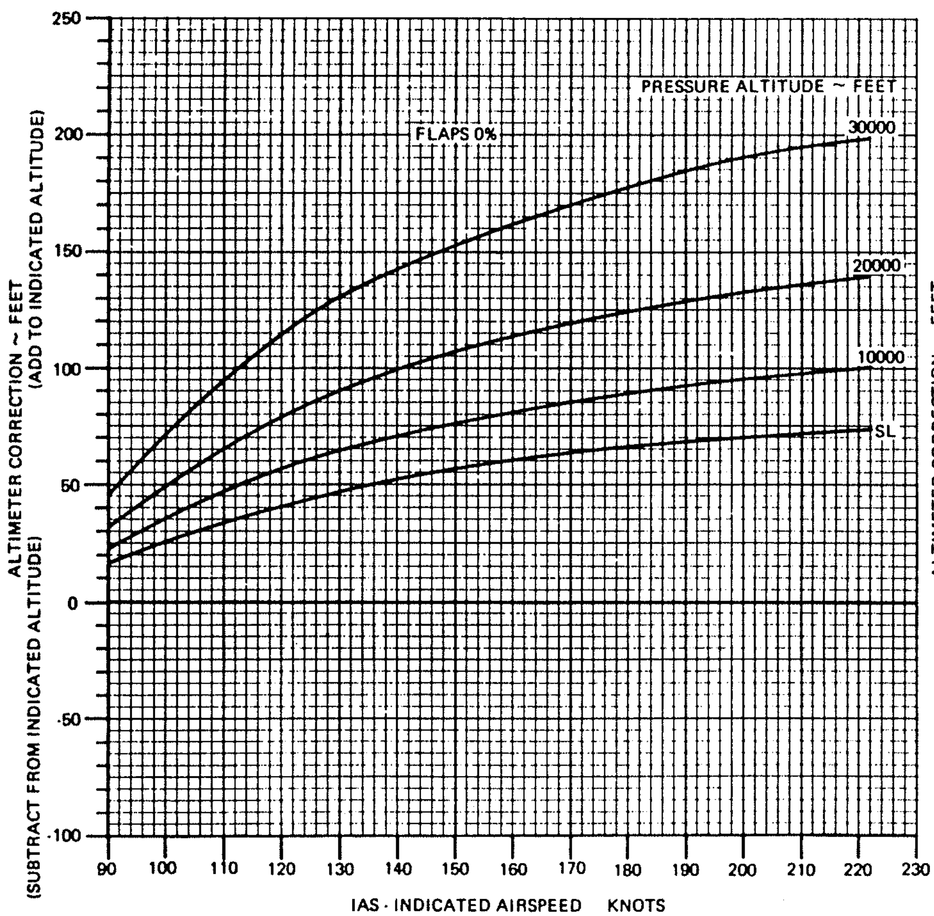


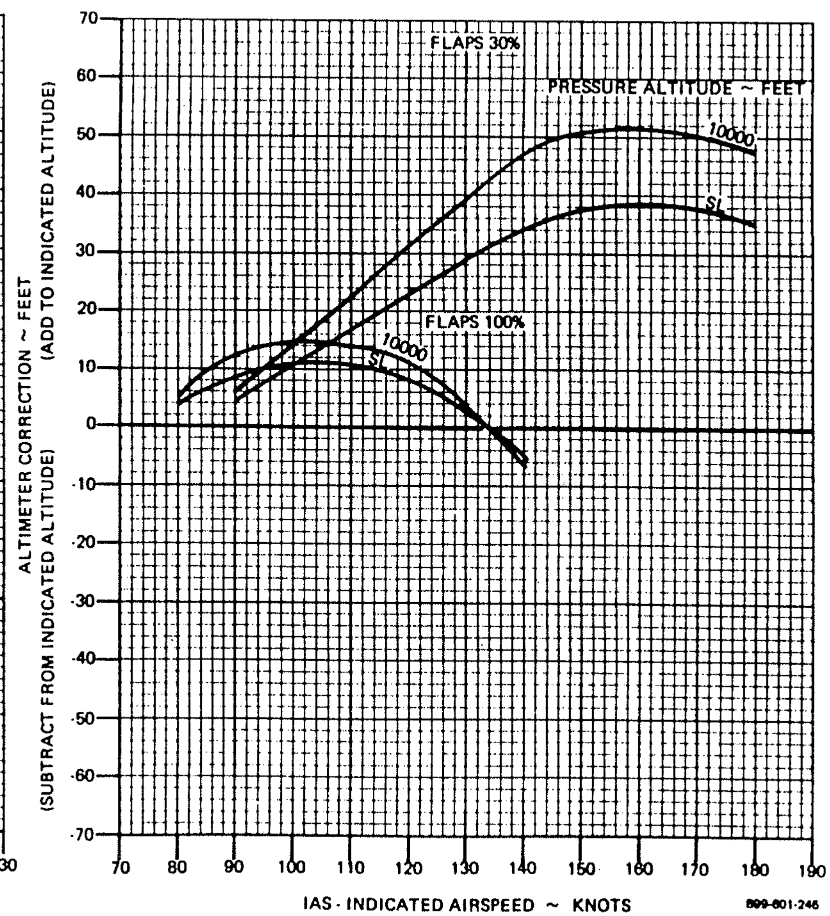
B99-801-240

ALTIMETER CORRECTION - NORMAL SYSTEM

WEIGHT 10900 LBS

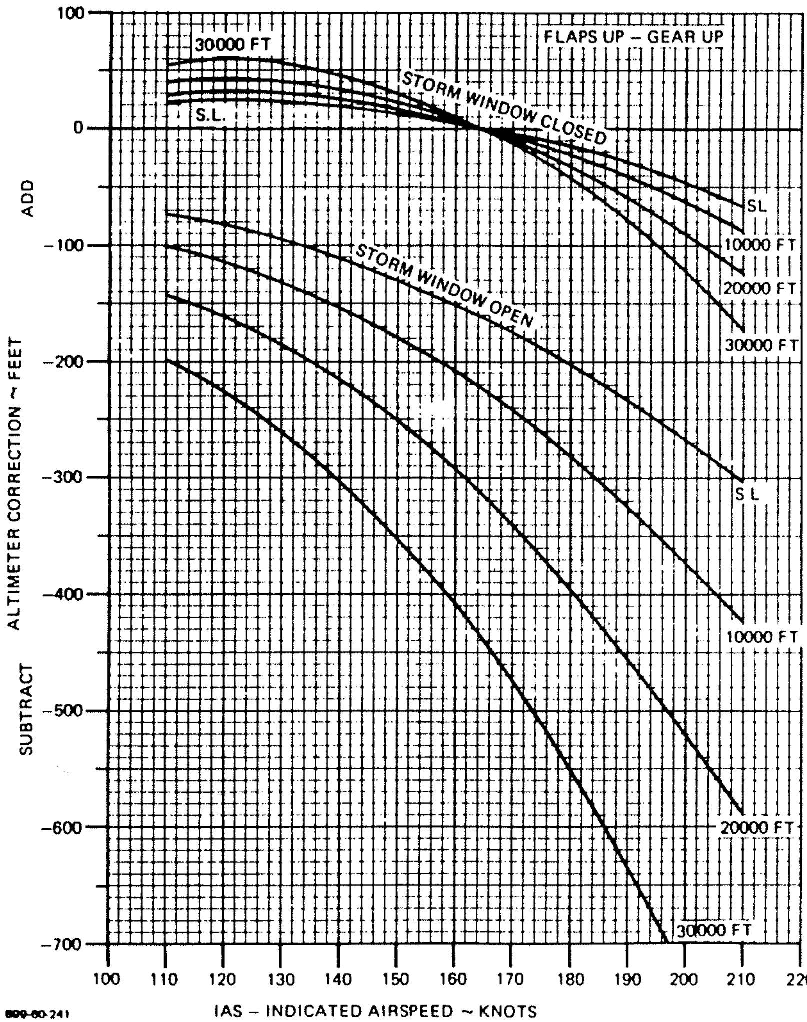
NOTE: INDICATED AIRSPEED AND INDICATED ALTITUDE ASSUME ZERO INSTRUMENT ERROR.

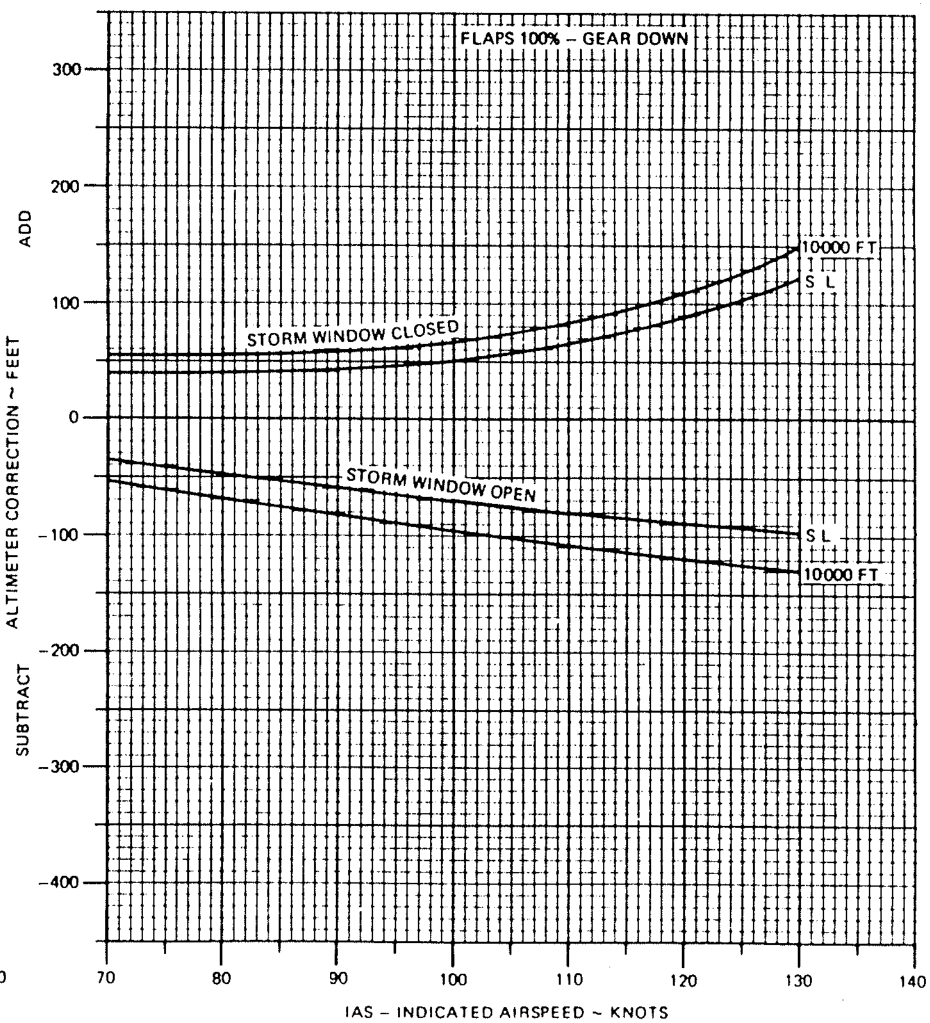




ALTIMETER CORRECTION
EMERGENCY SYSTEM

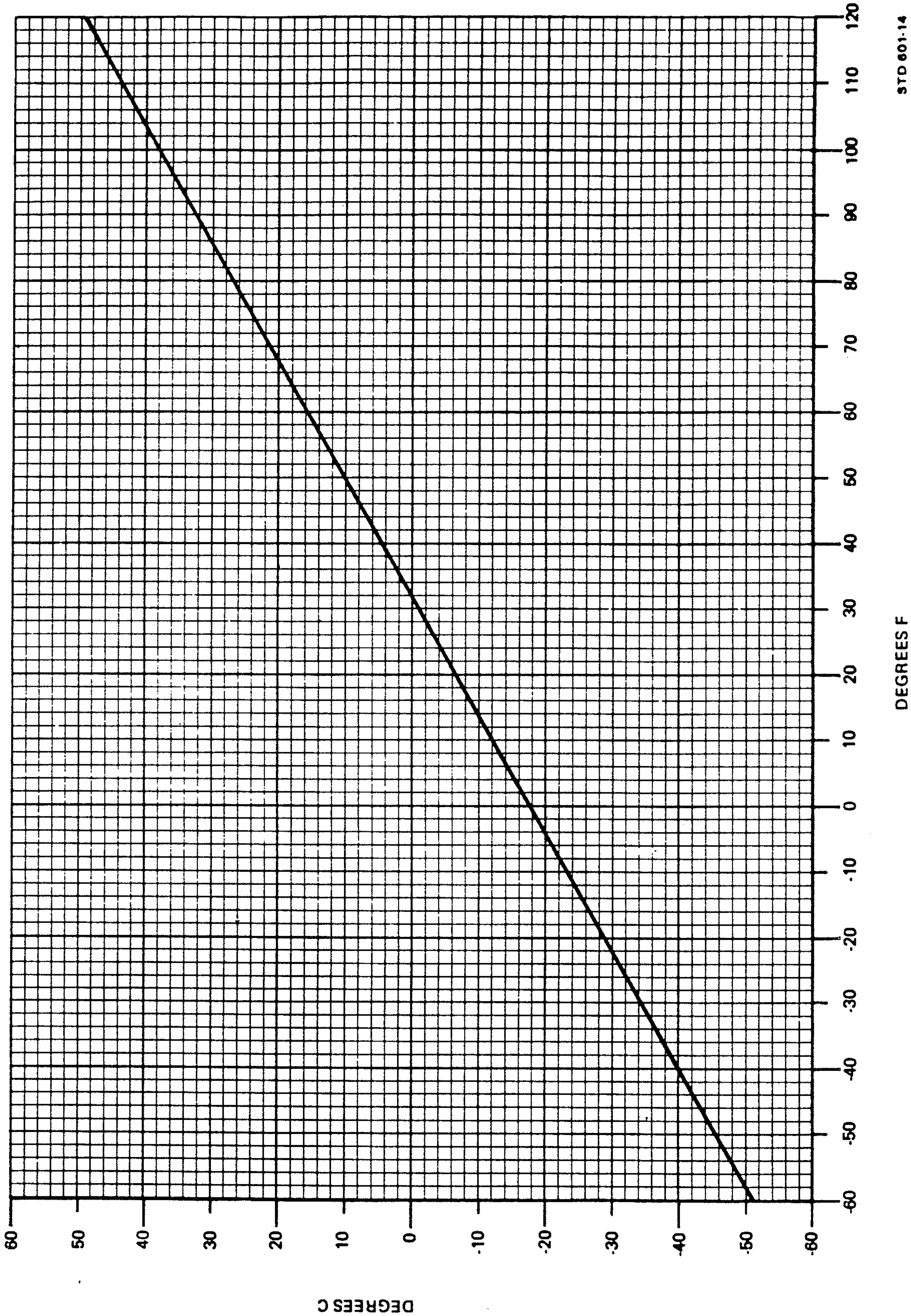
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR



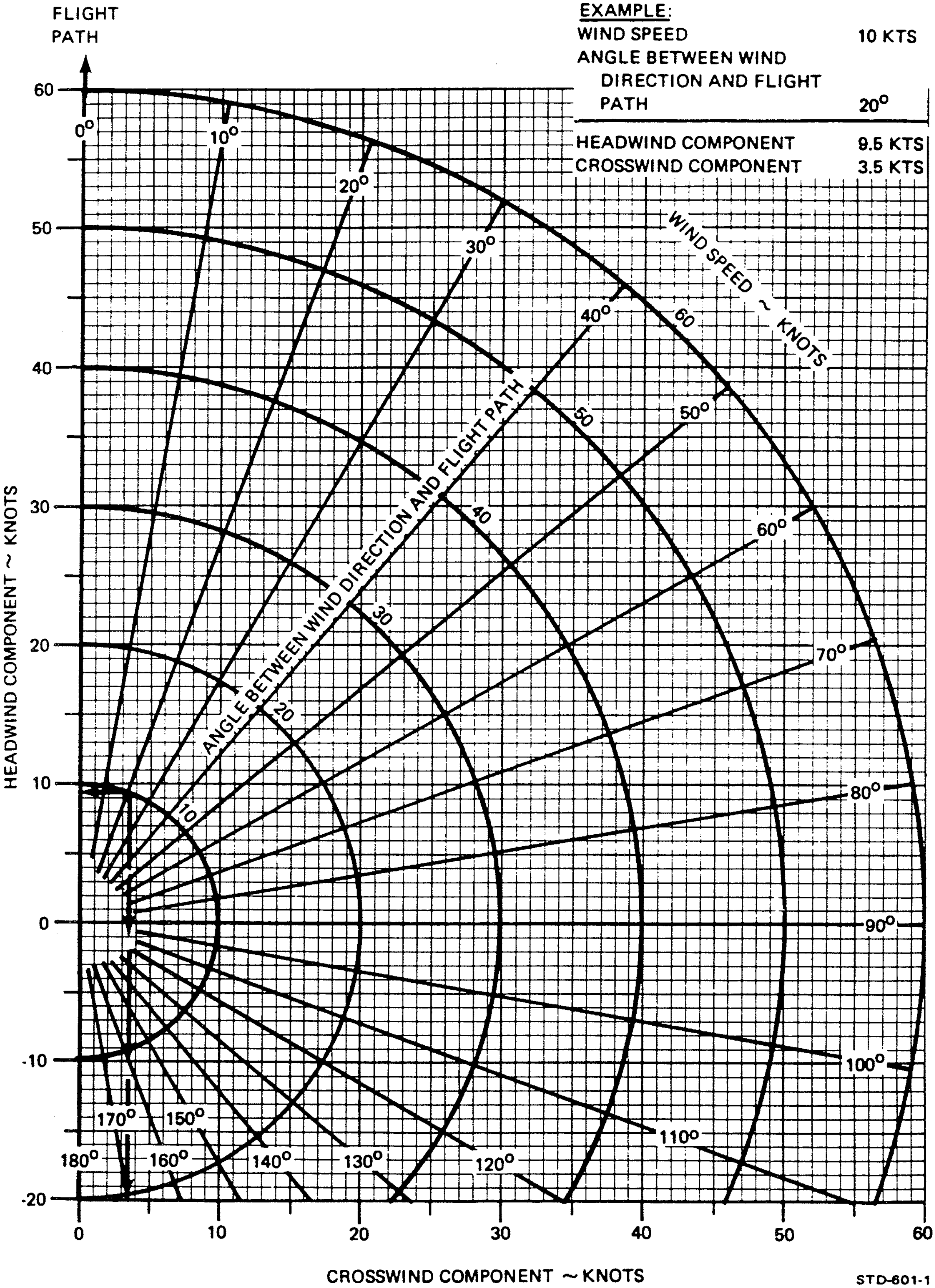


B99-60-241

TEMPERATURE CONVERSION
°C vs °F



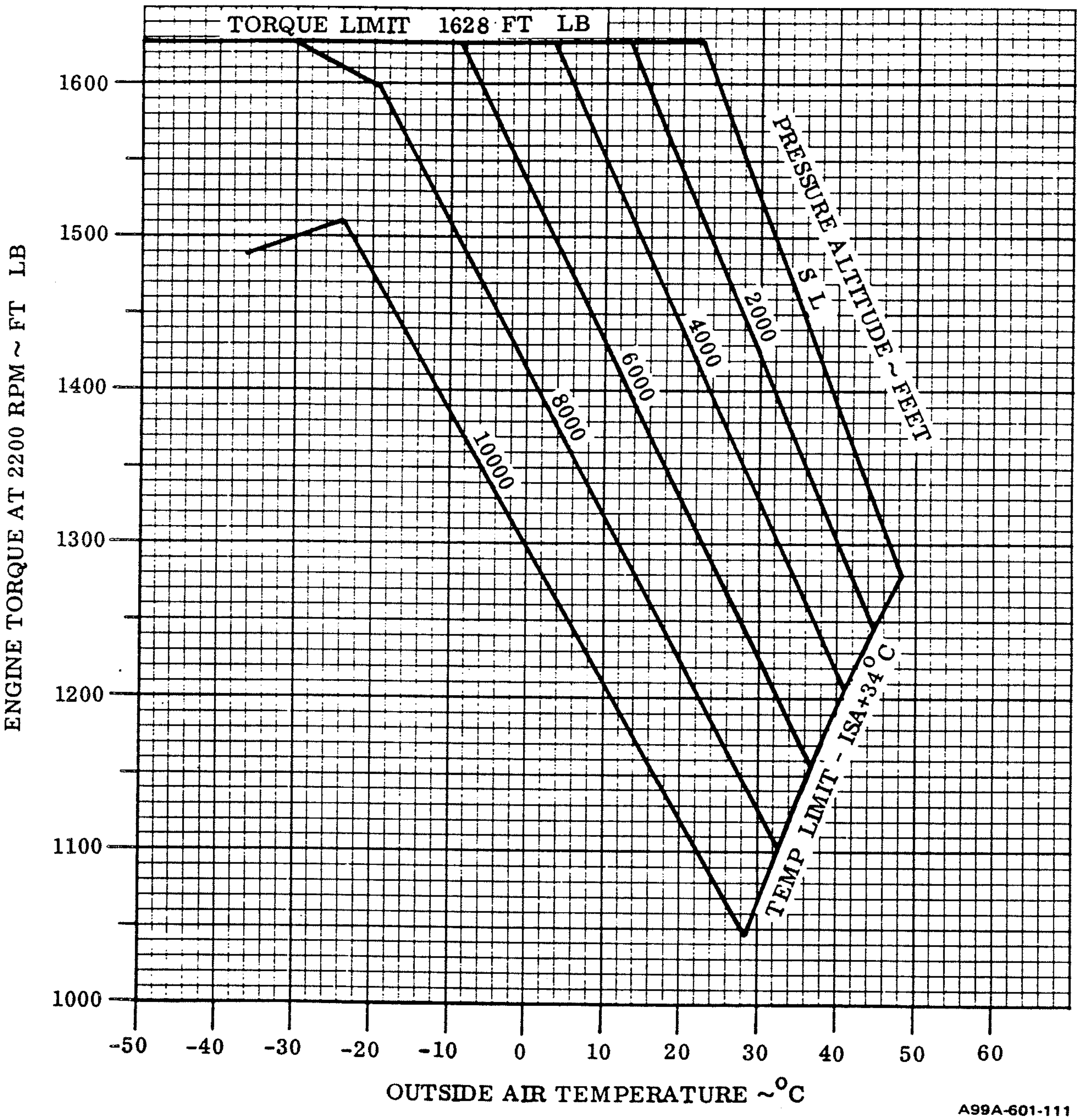
WIND COMPONENTS



MINIMUM TAKE-OFF POWER AT 2200 RPM

(55 KNOTS INDICATED AIRSPEED)

NOTES: 1. TORQUE INCREASES APPROXIMATELY 15 FT LB FROM ZERO TO 55 KIAS
2. THE POWER (TORQUE) INDICATED IS THE MINIMUM VALUE FOR WHICH TAKE-OFF PERFORMANCE IN THIS SECTION CAN BE OBTAINED. EXCESS POWER, WHICH CAN BE DEVELOPED WITHOUT EXCEEDING ENGINE LIMITATIONS, MAY BE UTILIZED.



A99A-601-111

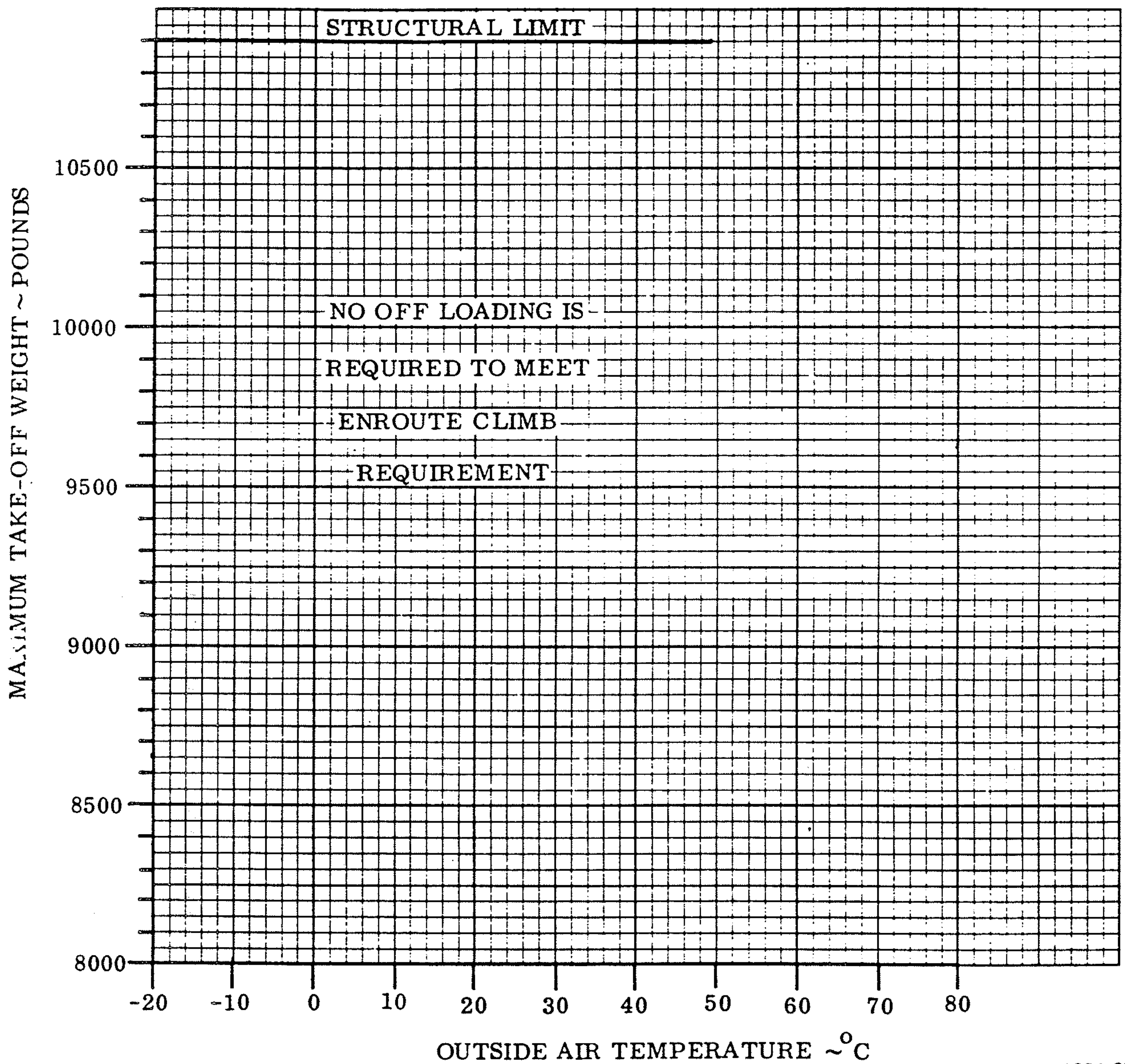
MAXIMUM TAKE-OFF WEIGHT

PERMITTED BY ENROUTE CLIMB REQUIREMENT

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP
PROPELLER	INOPERATIVE PROPELLER FEATHERED
RATE-OF-CLIMB	SINGLE ENGINE CLIMB GRAPH (PAGE 4-22)

NOTE: TAKE-OFF WEIGHT LIMIT IS IN COMPLIANCE WITH FAA REQUIREMENT FOR SINGLE ENGINE RATE OF CLIMB CAPABILITIES AT 5000 FEET PRESSURE ALTITUDE. REFER TO SINGLE ENGINE CLIMB GRAPH, 4-22, FOR ACTUAL CLIMB CAPABILITIES APPLICABLE TO THE PARTICULAR TEMPERATURE AND ALTITUDE BEING CONSIDERED.



A99A-601-143

TAKE-OFF DISTANCE — 0% FLAPS

TWO ENGINES

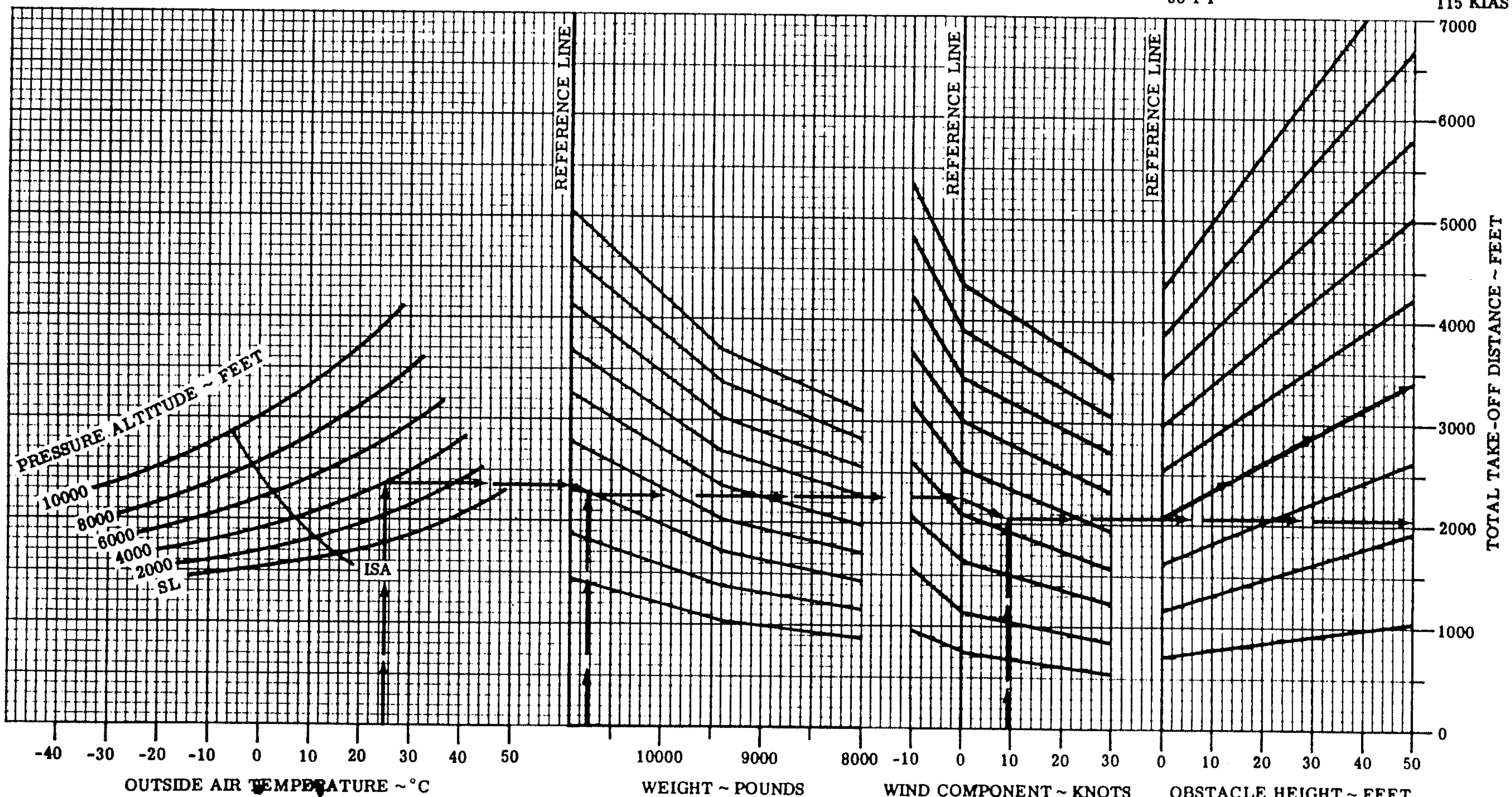
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	0%
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	TAKE-OFF SPEED KNOTS IAS (ASSUMES ZERO INST. ERROR)	
	LIFT-OFF	50 FT
10900	103	116
10000	99	111
9000	96	105
8000	96	98

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	10725 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	2060 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	3420 FT
TAKE-OFF SPEED AT	
LIFT-OFF	102 KIAS
50 FT	115 KIAS



TAKE-OFF DISTANCE — 30% FLAPS

TWO ENGINES

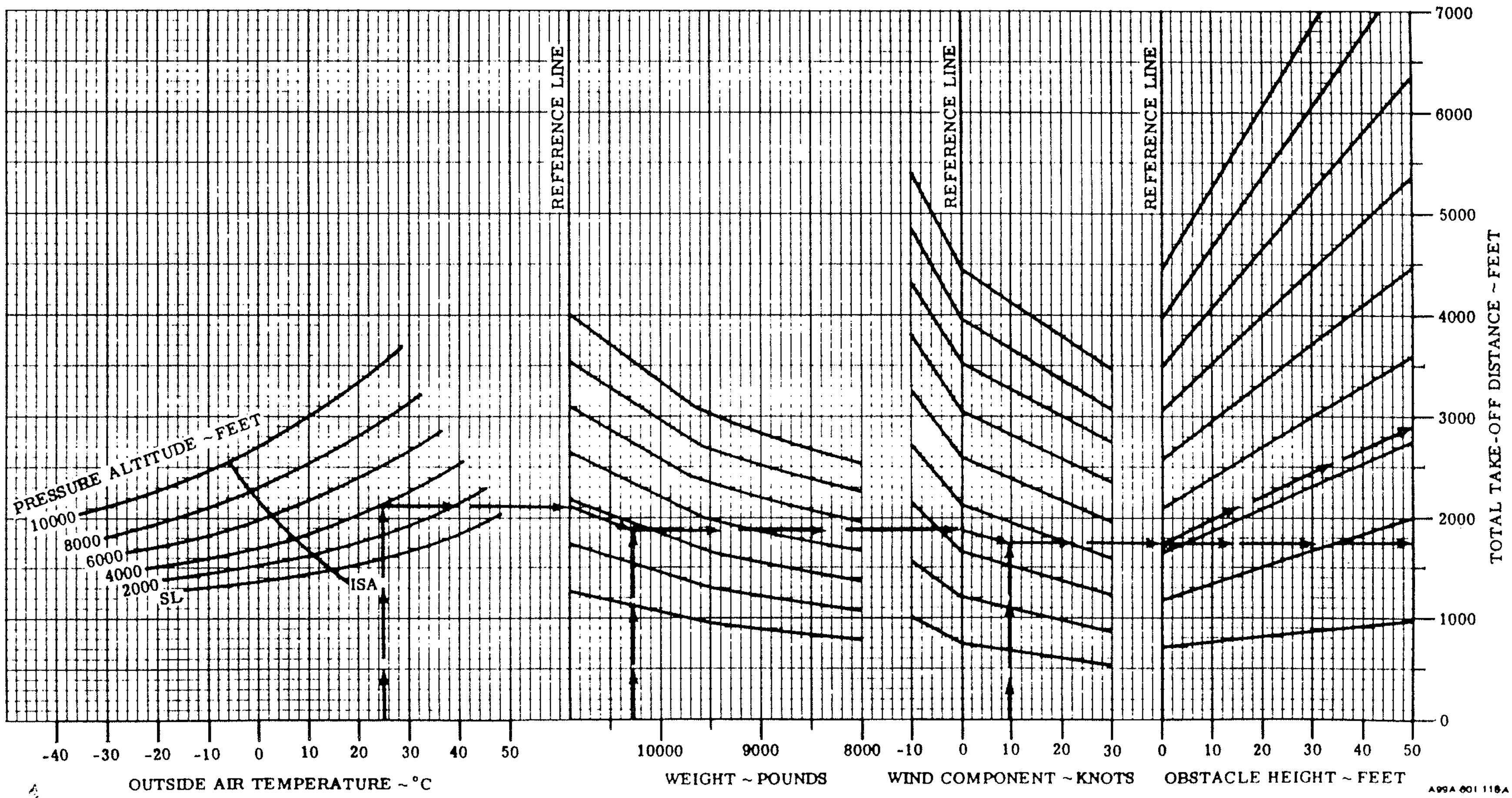
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	30%
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT POUNDS	TAKE-OFF SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)	
	LIFT-OFF	50 FT
10900	98	111
10000	94	106
9000	92	101
8000	92	95

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	10280 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1750 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	2900 FT
TAKE-OFF SPEED AT	
LIFT-OFF	95 KIAS
50 FT	108 KIAS



TWO ENGINE CLIMB

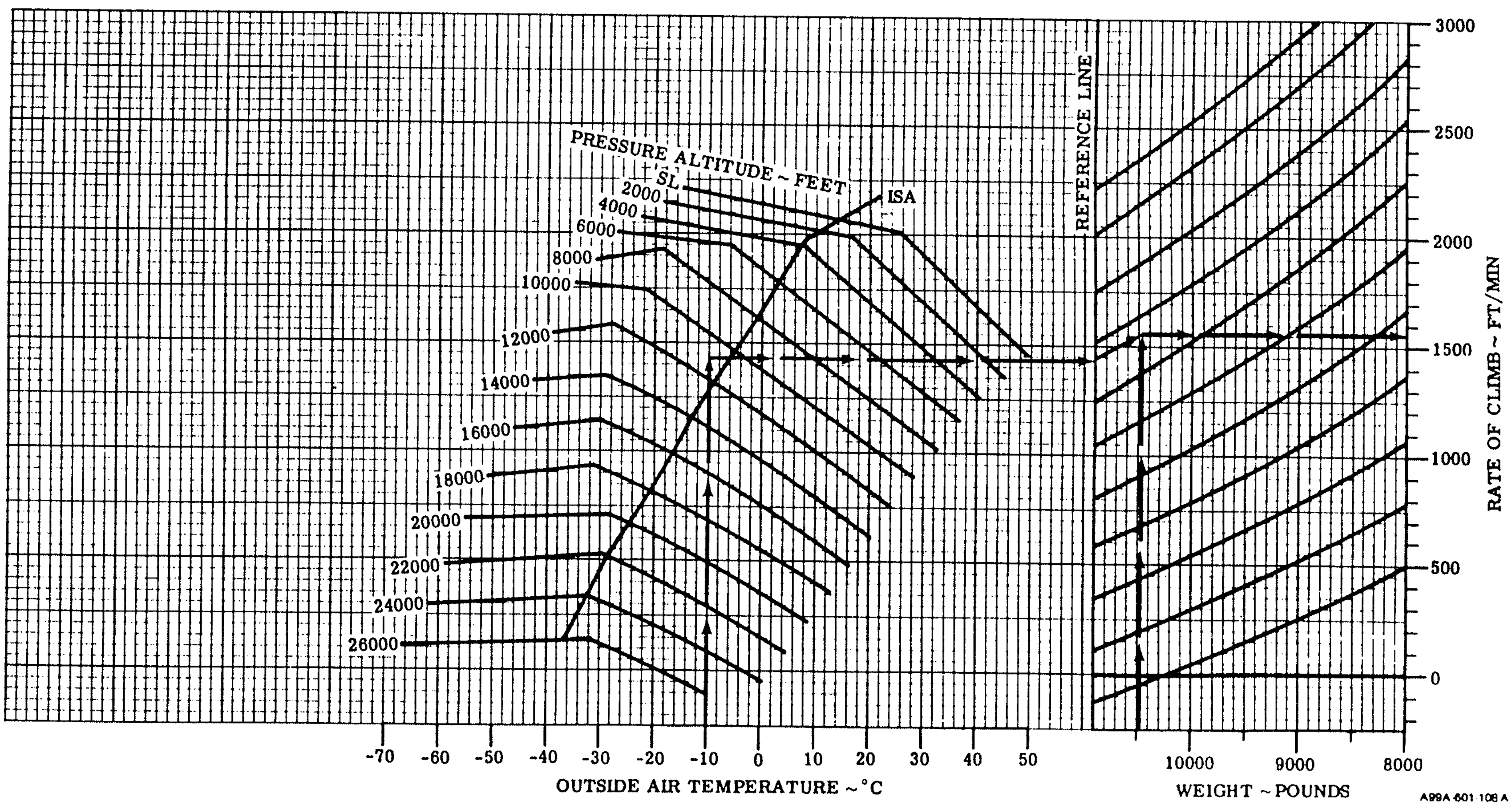
ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP

WEIGHT POUNDS	CLIMB SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	118
10000	115
9000	112
8000	109

EXAMPLE:

OAT	-10 °C
PRESSURE ALTITUDE	11000 FT
WEIGHT	10478 LBS
RATE OF CLIMB	1560 FT/MIN
CLIMB SPEED	117 KIAS



SINGLE ENGINE CLIMB

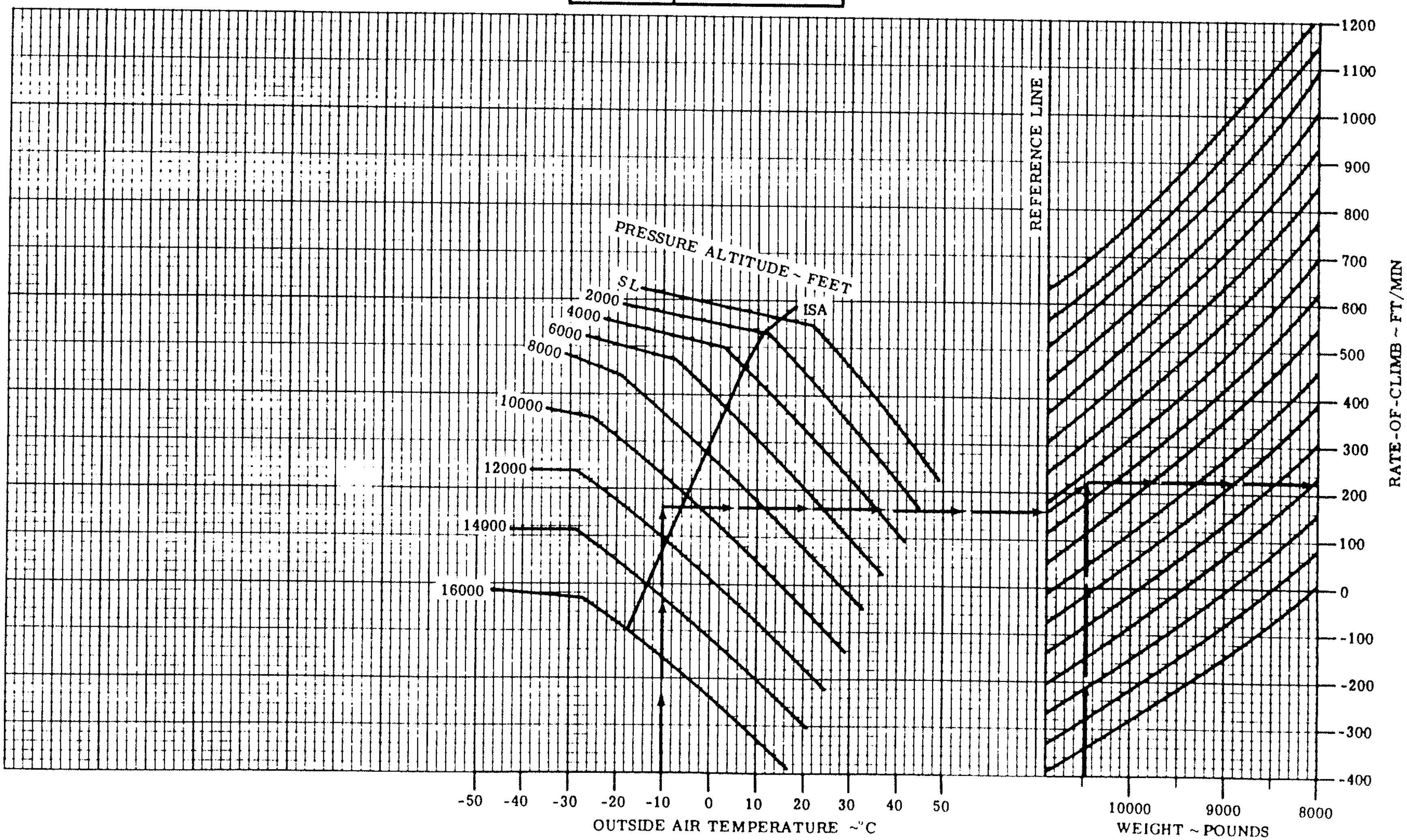
ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	0%
GEAR	UP
INOPERATIVE PROPELLER	FEATHERED

WEIGHT POUNDS	CLIMB SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	114
10000	111
9000	108
8000	105

EXAMPLE:

OAT	-10 °C
PRESSURE ALTITUDE	11000 FT
WEIGHT	10478 LBS
RATE-OF-CLIMB	225 FT/MIN
CLIMB SPEED	113 KIAS



BALKED LANDING CLIMB

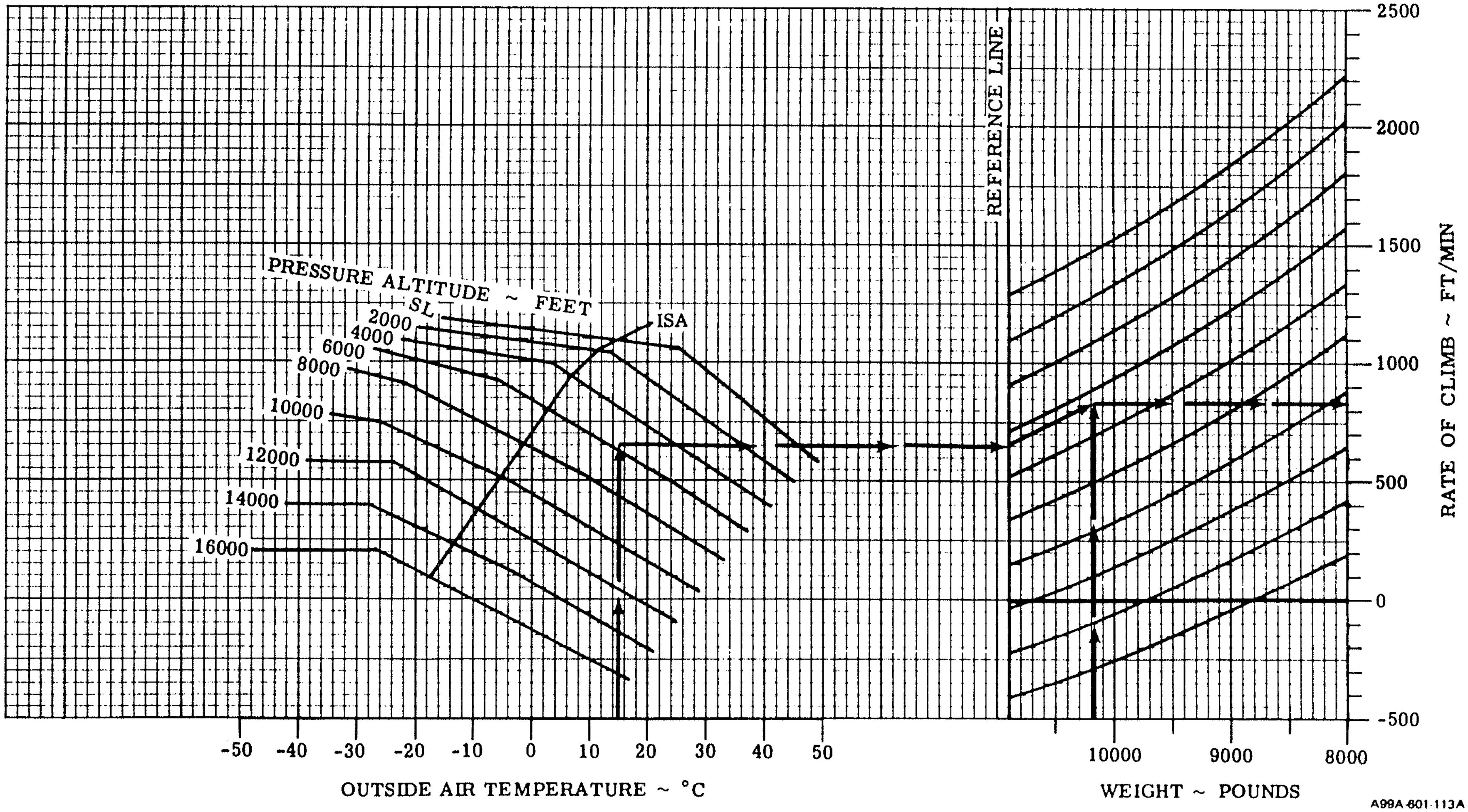
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF
FLAPS	100%
GEAR	DOWN

WEIGHT POUNDS	CLIMB SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	90
10000	87
9000	86
8000	84

EXAMPLE:

OAT	15 °C
PRESSURE ALTITUDE	5668 FT
WEIGHT	10180 LBS
RATE OF CLIMB	830 FT/MIN
CLIMB SPEED	88 KIAS



LANDING DISTANCE
WITHOUT REVERSING

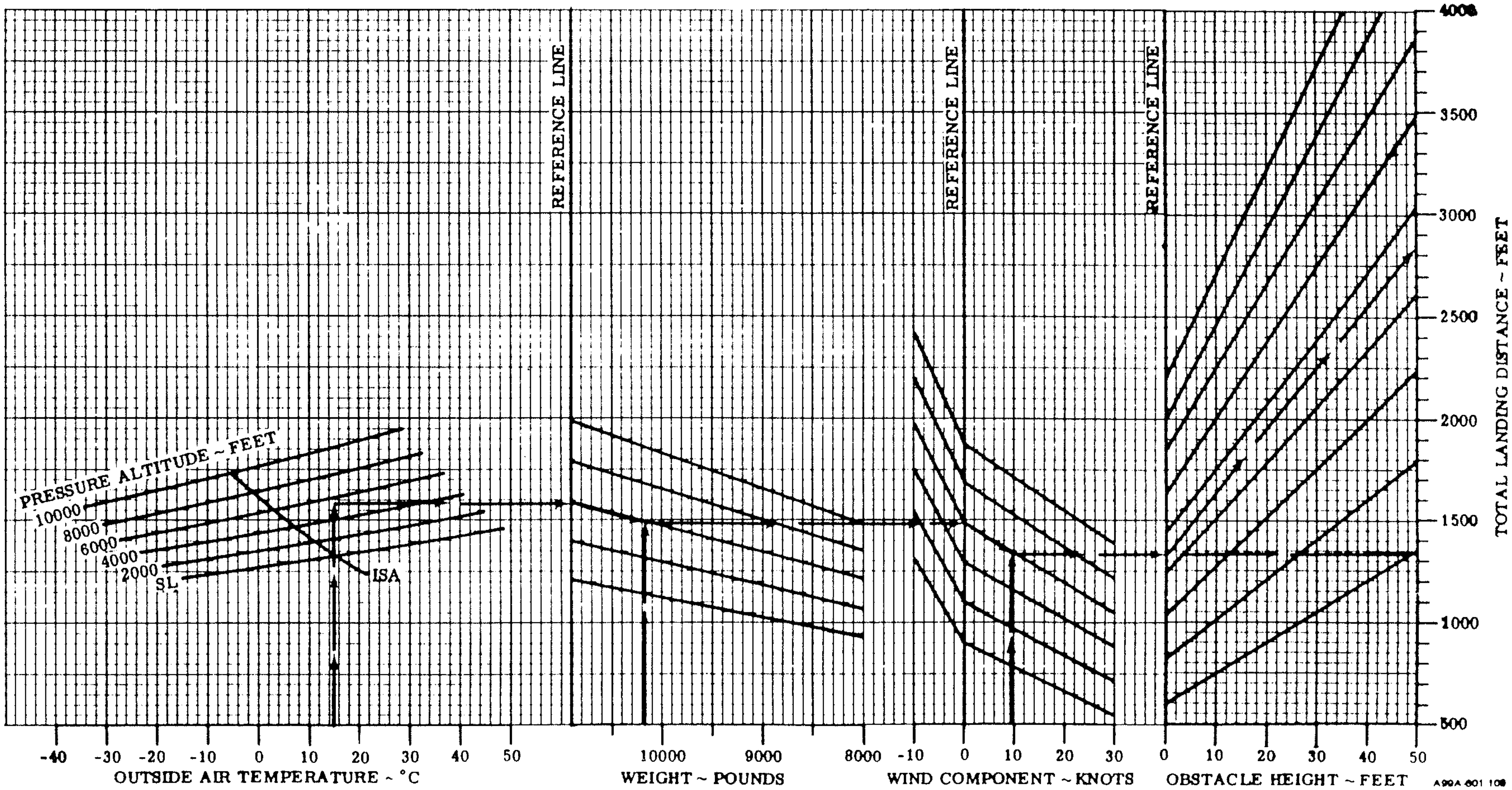
ASSOCIATED CONDITIONS:

POWER	RETARDED TO MAINTAIN 500 FT/MIN ON FINAL APPROACH
FLAPS	100%
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
BRAKING	MAXIMUM

WEIGHT POUNDS	APPROACH SPEED KNOTS IAS (ASSUMES ZERO INST. ERROR)
10900	97
10000	93
9000	88
8000	83

EXAMPLE:

OAT	15 °C
PRESSURE ALTITUDE	5668 FT
LANDING WEIGHT	10180 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1340 FT
TOTAL DISTANCE OVER A 50FT OBSTACLE	2830 FT
APPROACH SPEED	94 KIAS

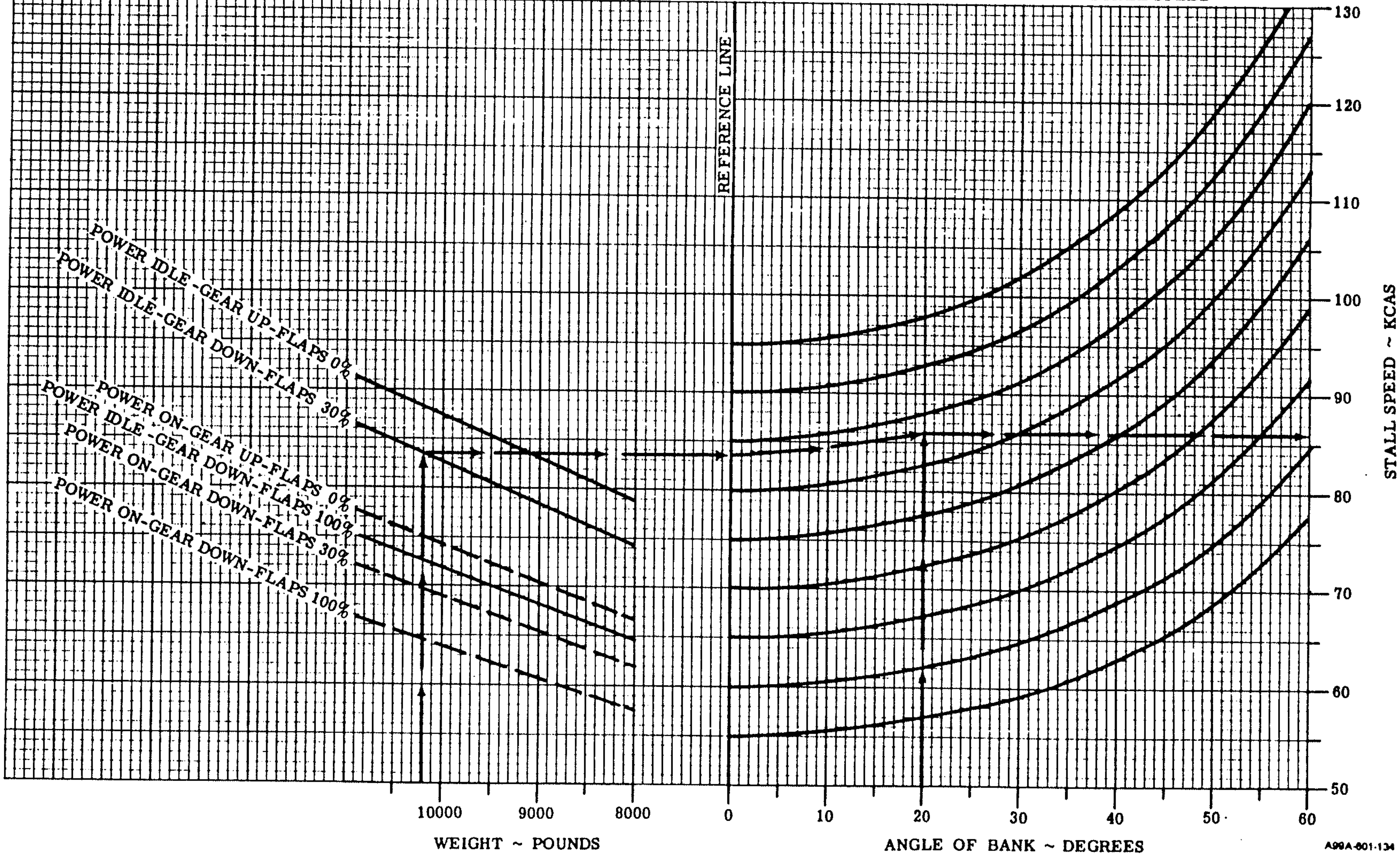


STALL SPEEDS

NOTES: 1. MAXIMUM ALTITUDE LOSS DURING STALL RECOVERY IS APPROXIMATELY 600 FEET.
2. MAXIMUM NOSE DOWN PITCH ATTITUDE AND ALTITUDE LOSS DURING RECOVERY FROM SINGLE ENGINE STALLS PER FAR 23.205 ARE APPROXIMATELY 0° AND 75 FEET RESPECTIVELY.

EXAMPLE:

WEIGHT	10200 LBS
POWER	OFF
GEAR	DOWN
FLAPS	30%
ANGLE OF BANK	20 DEGREES
STALL SPEED	86 KCAS



Custom Air Service
Willow Run Airport
Ypsilanti, Michigan

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

Beechcraft 99
with 9 passenger seats or less

Reg. No. N-222YL

Ser. No. U-151

This Supplement must be attached to the FAA Approved Airplane Flight Manual for the above stipulated aircraft when configured in accordance with STC No. SA298GL. The information contained herein supplements the information of the basic Airplane Flight Manual; for limitations, procedures and performance information not contained in this Supplement, consult the basic Airplane Flight Manual.

I. LIMITATIONS: Passenger seats installed: nine seats or less.

II. PROCEDURES: No change.

III. PERFORMANCE: No change.

FAA APPROVED: Walter F. Horn Jr.
WALTER F. HORN, JR., Acting
Chief, Eng. & Mfg. Br., AGL-210
FAA, Great Lakes Region

DATE: MAR 22 1979

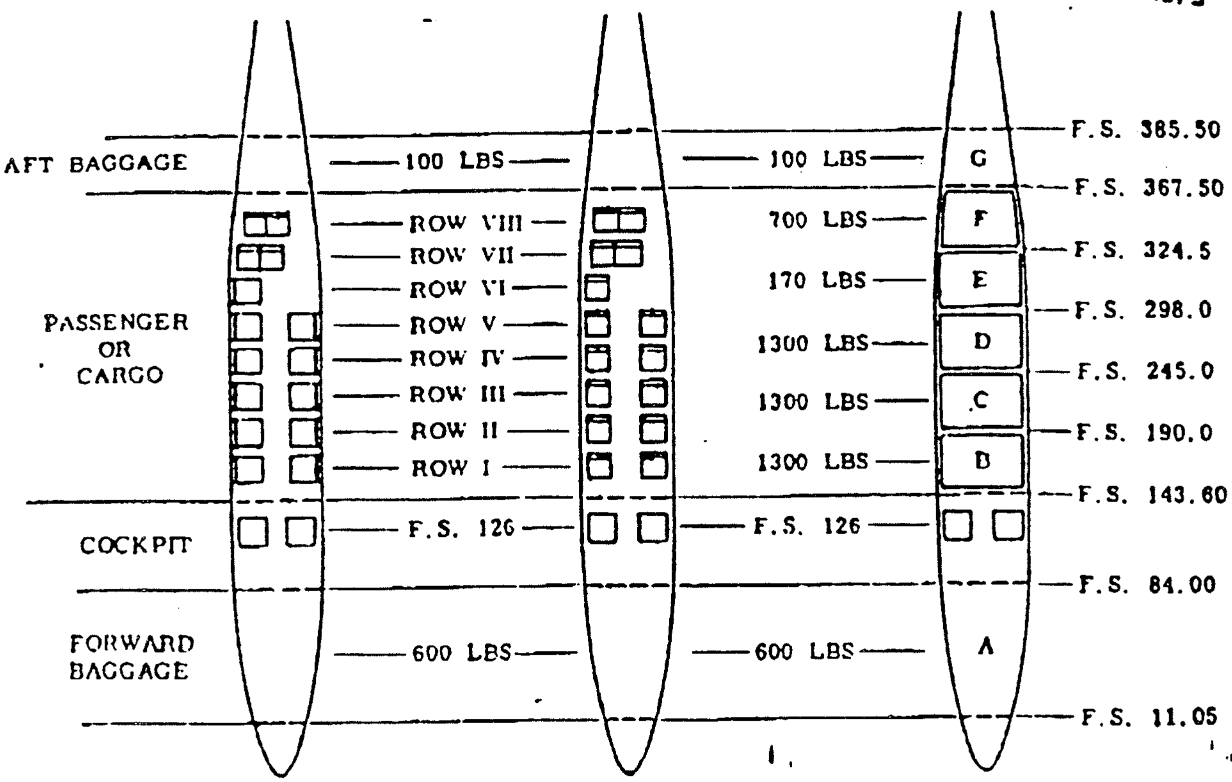
SERV. INSTR.

A1346GL-S

Beechcraft 99/99A AIRLINER

WEIGHT AND BALANCE LOADING DATA

MAR 22 1979



CONFIGURATION I
SIDEWALL MOUNTED
CHAIR

CONFIGURATION II
FLOOR MOUNTED
CHAIR

CONFIGURATION III
CARGO

PASSENGER	CENTROIDS	PASSENGER	CENTROIDS	CARGO	CENTROIDS
COPILOT	F.S. 126	COPILOT	F.S. 126	CARGO A	F.S. 52
ROW I	F.S. 157	ROW I	F.S. 155	CARGO B	F.S. 166
ROW II	F.S. 185	ROW II	F.S. 183	CARGO C	F.S. 219
ROW III	F.S. 213	ROW III	F.S. 211	CARGO D	F.S. 272
ROW IV	F.S. 241	ROW IV	F.S. 239	CARGO E	F.S. 311
ROW V	F.S. 270	ROW V	F.S. 267	CARGO F	F.S. 344
ROW VI	F.S. 297	ROW VI	F.S. 295	CARGO G	F.S. 378
ROW VII	F.S. 324	ROW VII	F.S. 324		
ROW VIII	F.S. 350	ROW VIII	F.S. 350		

99 Airliner Supplemental Operational Data

When operated under STC#SA2983L (9 seats or less), typical seating (Configuration # II) -one seat of RowV, RowVI, and both seats of Row VII and Row VIII are not installed. Other seat location combinations could be used (9 or less) to relocate C.G. or optimize C.G. with Passenger/Cargo combination loads.

Airplane Flight Manual Supplements
LOG OF REVISIONS

B99 Airliner FAA Approved Airplane Flight Manual, P/N 99-590026-1

Revision Number	Part Number	Applicable Supplement	Date
	99-590026-11	Woodward Electronic Propeller Synchronizer Installation	March 13, 1972
	99-590026-5	Foxboro Fuel Measuring System (Pounds of Fuel Remaining)	March 13, 1972
	99-590026-7	Baggage Pod	March 13, 1972
	99-590026-9	Auxiliary Bleed Air Heater	March 13, 1972
2	99-590012-11	Nickel-Cadmium Battery Charge Current Detector	October 1, 1973
1	99-590012-13	Hydraulic Landing Gear System	March 15, 1974
	99-590026-15	Aft Camera Well Installation	May 21, 1975
1	101-590010-89	Operation of Pratt and Whitney Engines with Secondary Low Pitch Stop Inoperative	October 9, 1975
	99-590012-15	Brake Deice System	April 27, 1978
	99-590012-17	Manual Landing Gear Extension Procedures	June 8, 1979
2	130944	Flight With Doors Removed	October, 1984

NOTE: Supplements applicable to equipment other than that installed may, at the discretion of the owner/operator, be removed from the manual.

BEECHCRAFT B99 AIRLINER LANDPLANE

AIRCRAFT FLIGHT MANUAL SUPPLEMENT

for the

WOODWARD ELECTRONIC PROPELLER SYNCHRONIZER

The information in this document is FAA Approved material which, together with the basic airplane flight manual is applicable and must be attached to the basic manual when the airplane is modified by the installation of the Woodward electronic propeller synchronizer in accordance with STC SA250CE.

The information in this document supersedes the basic manual only where covered in the items contained herein. For Limitations, Procedures, and Performance not contained in the supplement, consult the basic Airplane Flight Manual.

I. LIMITATIONS

The following placard must be mounted on or near the synchronizer control switch:

"SWITCH MUST BE OFF FOR TAKEOFF AND LANDING"

II. NORMAL PROCEDURES

1. Synchronize the engines manually.
2. Position control switch to ON position.
3. If a change in rpm setting is desired, move both master (left) and slave propeller governor control levers together.
4. If synchronization is not maintained with the switch ON, indicating the actuator has reached the end of its travel, turn switch OFF and repeat procedures above. With the switch in the OFF position, the actuator is returned to the center of its travel.

III. PERFORMANCE

No change in airplane performance results from the installation of the synchronizer.

IV. FUNCTIONAL TEST

The rpm range of the synchronizer may be checked in cruise by slowly moving only the master propeller control toward both high and low rpm until propellers are no longer synchronized.

Note the range of rpm over which the slave engine remains synchronized with the master engine. This is the limited range provided for safety and is the maximum speed adjustment range beyond which the slave engine cannot be adjusted by the synchronizer.

Approved:

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT B99 AIRLINER LANDPLANE

AIRCRAFT FLIGHT MANUAL SUPPLEMENT

This document is to be attached to the FAA Approved Flight Manual when the airplane is equipped with a Foxboro Fuel Measuring System, installed in accordance with BEECHCRAFT FAA Approved data.

I. LIMITATIONS

A. This system is designed to readout in pounds of fuel remaining.

B. This system is set for Jet A aviation kerosene at 80°F.

C. The initial setting of the totalizer must be based on the density of Jet A fuel at 80°F.

II. NORMAL PROCEDURES

A. The fuel counter must be set to the proper number, based on the density of Jet A fuel, before starting the engines:

1. Determine the totalizer setting from either GRAPH 1 or CHART 1, Column 1 vs. gallons of fuel on board.

2. Hold the FUEL TOTAL switch to the ON position, until the totalizer setting is set on the counter.

B. To determine the number of pounds of fuel remaining at any time, when using Jet A, Jet A-1, or JP-2:

1. Read the counter.

C. To determine the actual number of pounds of fuel remaining at any time, when using JP-4, Jet B, JP-5 or 100/130 octane aviation gasoline:

1. Read the counter.

2. Use GRAPH 2. Enter the table at the observed totalizer reading. Read the weight of the remaining fuel at the intersection with the applicable fuel density line.

or

3. Use CHART 1, reading vertically down Column 1 to the corresponding counter readout, then horizontally across Columns 2, 3 or 4 to the applicable fuel.

or

4. Multiply the Counter reading by the ratio of fuel densities:

FOR FUEL	MULTIPLY BY
JP-4	.96
Jet B	.96
JP-5	1.027
100/130 gasoline	.863

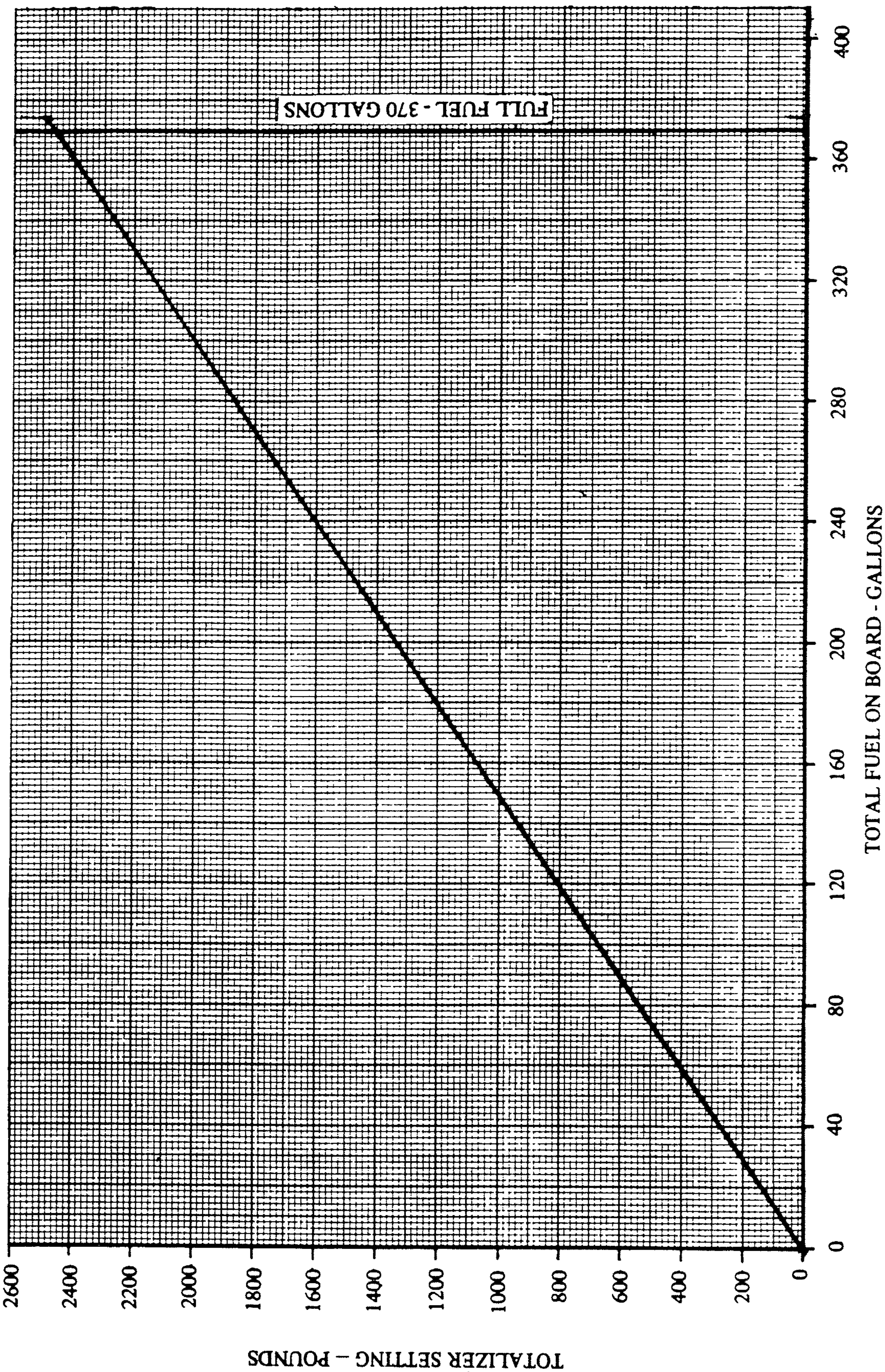
Approved: N. A. Schultz

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

GRAPH 1

INITIAL SETTING OF TOTALIZER

(BASED ON JET A, JET A-1 AND JP-1 FUEL DENSITY AT 80° F.)



FAA Approved
Date: March 13, 1972
P/N 99-590026-5

ROCKY MOUNTAIN AIRCRAFT

Aircraft Sales • Parts Sales • Service • Hangar Storage

AIRCRAFT REGISTRATION: C-FBRO

AIRCRAFT MODEL: BEECH B99

AIRCRAFT SERIAL NO: U-151

DATE: JUNE 5, 1992

MEASURED 'E' LOAD

Battery: SAFT .4076

Starter Generator/Alternator: LEAR SIEGLER 23048-018

Generator/Alternator Capacity: 250A

80% Capacity: N/A HAS DUAL LOAD METERS

Maximum continuous cruise load of 96.6 AMPS is less than 80% capacity.

Emergency load of 18.4Amps is within batery capacity for ½ hour discharge rate.

Prepared by:

DEREK DRIVER

Licence Number:

ROCKY MOUNTAIN AIRCRAFT T.C. APPROVAL 46-89 CALGARY

c/o Springbank Airport Box 27, R.R. 2, Site 16, Calgary, Alberta T2P 2G5

BEECHCRAFT B99 AIRLINER LANDPLANE

AIRPLANE FLIGHT MANUAL SUPPLEMENT

BAGGAGE POD

This document is to be attached to the FAA Approved Flight Manual when the airplane is equipped with a Baggage Pod kit 99-4002 installed in accordance with BEECHCRAFT FAA Approved data.

I. LIMITATIONS

Placards:
On inside center of each door:

**TOTAL CAPACITY
ENTIRE BAGGAGE POD 800
POUNDS MAXIMUM LOADING
EQUALLY DISTRIBUTED**

III. PERFORMANCE

The Baggage Pod installation will not decrease the climb performance or the maximum take-off weight listed in the basic FAA Flight Manual. Take-off, landing and stall speed performance is unchanged. **Cruise speeds and range are decreased approximately 2%.**

CAUTION

Water may collect above the baggage pod cover if the aircraft is parked nose down on a slope of 2° or more. This water will normally drain during taxi except under freezing conditions. If ice has collected in this area it must be removed before flight.

Approved:

R. A. Schultz

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT B99 AIRLINER LANDPLANE

AIRCRAFT FLIGHT MANUAL SUPPLEMENT

for the

Auxiliary Bleed Air Heater

This document is to be attached to the FAA Approved Flight Manual when the airplane is equipped with an Auxiliary Bleed Air Heater, installed in accordance with BEECHCRAFT FAA Approved Data.

I. LIMITATIONS

The system will not be used during Take-off, Landing and Single Engine operation.

II. NORMAL PROCEDURES

1. Mode Switch - BLEED AIR HEAT
2. Annunciator Light (BLEED AIR HEAT ON) - ILLUMINATED
3. Bleed Air Heat Control - AS REQUIRED (Pull out for Full Heat)

III. EMERGENCY PROCEDURES

The BLEED AIR LINE FAILURE light should be monitored durir engine start. Either engine will extinguish the light upon starting.

Illumination of the warning light indicates a possible ruptured bleed air line and operation in the Bleed Air Heating mode should be discontinued.

FAA Approved: R. H. Schultz

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

AIRPLANE FLIGHT MANUAL SUPPLEMENT

for the

NICKEL-CADMIUM BATTERY CHARGE CURRENT DETECTOR

The information in this supplement is FAA Approved material, which, along with the basic FAA Approved Airplane Flight Manual, is applicable to the operation of the airplane when equipped with the Nickel-Cadmium Battery Charge Current Detector, P/N 100-364285, approved by Letter ACE-210, dated September 25, 1973, FAA Central Region, Engineering and Manufacturing Branch, Wichita, Kansas and installed in accordance with Beech FAA Approved drawings or by Kit 100-3009-1.

The Battery Charge Current Detector consists of a circuit which illuminates an amber light on the instrument panel whenever the battery charge current is above normal.

The purpose of the Battery Charge Current Detector is to inform the pilot of battery charge currents which may damage the battery. The system senses all battery current and provides a visual indication of above normal charge current. Following a battery engine start, the battery recharge current is very high and causes the illumination of the BATTERY CHARGE light, thus providing an automatic self test of the detector and the battery. As the battery approaches a full charge and the charge current decreases to a satisfactory amount, the light will extinguish. This will normally occur within a few minutes after an engine start, but may require a longer time, if the battery has a low state of charge, low charge voltage per cell (20 cells battery), or low battery temperature.

The light may occasionally reappear for short intervals when heavy loads switch off, or engine speeds are varied near generator cut-in speed. High battery temperatures or high charge voltage per cell will result in a high overcharge current, which will eventually damage the battery and lead to thermal runaway. Illumination of the BATTERY CHARGE light in flight alerts the pilot that conditions exist that may eventually damage the battery. The battery should be turned off to prevent battery damage. The following procedures outline the actions to be taken in the event the BATTERY CHARGE light illuminates.

NORMAL PROCEDURES

BEFORE STARTING ENGINES

1. Caution Light (BATTERY CHARGE) - PRESS TO TEST for illumination

DURING ENGINE START

1. Caution Light (BATTERY CHARGE) - ON (approximately 6 seconds after generator is on the line)

NOTE

Light indicates a charge current above normal. The light should extinguish within 5 minutes following a normal engine start. Failure to do so indicates a partially discharged battery. Continue to charge the battery. Make a check each 90 seconds using the During Engine Shutdown procedure outlined below, until the charge current fails to decrease and the light extinguishes. Failure of the light to extinguish indicates an unsatisfactory condition. The battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

IN FLIGHT

The illumination of the amber caution light, placarded BATTERY CHARGE, in flight indicates a possible malfunction of the battery. Turn the Battery Switch - OFF. The caution light should extinguish and the flight may proceed to destination. Failure of the light to extinguish with the battery switch off indicates a battery system or a charge current detector system malfunction. The aircraft should be landed as soon as practicable. (The battery switch should be turned on for landing in order to avoid electrical transients caused by power fluctuations.) A During Engine Shutdown Battery Condition Check as outlined below, should be made after landing. If the battery indicates unsatisfactory, it should be removed and checked by a qualified Nickel-Cadmium Battery shop.

DURING ENGINE SHUTDOWN

Battery - CONDITION AND CHARGE (If the BATTERY CHARGE light is extinguished, the battery is charged and the condition is good. If the light is illuminated and fails to extinguish within 3 minutes of charging, perform the following check:)

1. One Generator - OFF
2. Volt Meter - INDICATING 28 VOLTS
3. After the load meter stabilizes, momentarily turn the Battery Switch OFF, noting the change in meter indication.

NOTE

The change in load meter indications is the battery charge current and should be no more than .025 (only perceivable needle movement). If the result of this check is not satisfactory, perform the check again after 3 minutes charging time. If the result is still unsatisfactory the battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

Approved: [signature]

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

FAA Approved
Date: October 1, 1973
P/N 99-590012-11

PERFORMANCE

Use of the brake deice system during certain ambient conditions may reduce available engine power. Consult the MINIMUM TAKE-OFF POWER chart in the FAA Performance Section of the *FAA Approved Airplane Flight Manual* to determine the minimum torque value permitted for takeoff. If this value cannot be obtained without exceeding engine limitations, the brake deice system must be turned off until the takeoff has been completed.

Use of the brake deice system in flight will result in an ITT rise of approximately 20°C. Observe ITT limitations when setting climb and cruise power.

Approved:

Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT 99A, A99A, AND B99
AIRLINER LANDPLANES

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

for the

BRAKE DEICE SYSTEM

GENERAL

The information in this supplement is FAA-approved material and must be attached to the *FAA Approved Airplane Flight Manual* when the airplane has been modified by installation of a Brake Deice System in accordance with Beech-approved data.

The information in this supplement supersedes or adds to the basic *FAA Approved Airplane Flight Manual* only as set forth within this document. Users of the manual are advised always to refer to the supplement for possibly superseding information and placarding applicable to operation of the airplane.

LIMITATIONS

1. Brake deice system is not to be operated above 15°C ambient temperature.
2. Brake deice system is not to be operated longer than 10 minutes (one deice timer cycle) with the landing gear retracted. If operation does not automatically terminate approximately 10 minutes after gear retraction, system must be manually selected off.
3. Maintain 85% N_1 or higher during periods of simultaneous brake deice and wing boot operation. If inadequate pneumatic pressure is developed for proper wing boot inflation, select brake deice system off.
4. Both sources of instrument bleed air must be in operation. Select brake deice system off during single engine operation.

NORMAL PROCEDURES

AFTER STARTING

If brakes require deicing:

1. Brake Deice - ON (check annunciator illuminated)
2. Power - 70% N_1 (Minimum)

NOTE

Once brakes have been deiced, the power may be returned to LOW IDLE.

BEFORE LANDING

If it is possible that brakes may be restricted by ice accumulations from previous ground operation or inflight icing conditions:

1. Brake Deice - ON (check annunciator illuminated)

NOTE

If automatic timer has terminated brake deice operation after last retraction of the landing gear, the landing gear must be extended to obtain further operation of the system.

EMERGENCY PROCEDURES

ILLUMINATION OF BRAKE DEICE OVERTEMP ANNUNCIATOR

NOTE

BRAKE DEICE OVERTEMP warning system is not installed on airplanes equipped with high flotation landing gear.

If either BRAKE DEICE OVERTEMP light illuminates in flight;

a. Check that the brake deice system is turned off.
b. If the system has been turned off (manually or by timer circuit, and green light is off) extend landing gear. If continued flight is desired, gear must remain extended to assure cooling of the wheel well components.

NOTE

BRAKE DEICE OVERTEMP lights may momentarily illuminate during simultaneous wing boot and brake deice operation at low N_1 speeds. If lights immediately extinguish, they may be disregarded.

SYSTEM DESCRIPTION

High temperature engine compressor bleed air is directed onto the brake assemblies by a distributor manifold on each main landing gear. This heated air is supplied by the standard bleed air pneumatic system which also provides regulated pressure to the surface deice system and vacuum source. High temperature air from the pneumatic system is routed through a solenoid control valve in each main wheel well, through a flexible hose on the main gear strut, and to the distribution manifold around the brake assembly.

A switch on the pilot's subpanel, placarded BRAKE DEICE, controls the brake deice system. When this switch is activated, both solenoid control valves are opened and an indicator light, BRAKE DEICE ON, on the annunciator panel is illuminated to advise that the system is in operation.

The brake deice system may be operated as required on a continuous basis with the landing gear extended provided the appropriate LIMITATIONS are observed. To avoid excessive wheel well temperatures with the landing gear retracted, a timer is incorporated to automatically terminate system operation approximately ten minutes after the landing gear is retracted. The system indicator light should be monitored and the control switch positioned to OFF when the light extinguishes or if brake deice operation has not automatically terminated within approximately ten minutes. The landing gear must be extended before the timer will reset and the system can be activated again.

The brake deice overtemp warning system is designed to illuminate a warning light in the cockpit prior to reaching excessive temperatures in the wheel well area. This is accomplished with a temperature sensitive tube which ruptures at approximately 200°F, causing the warning light to illuminate. Once illuminated, the warning light will not extinguish until the ruptured sensing element is replaced.

BEECHCRAFT 99, 99A, A99A, B99 and C99 AIRLINER LANDPLANES PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT for FLIGHT WITH DOORS REMOVED KIT NO. 99-5018

GENERAL

The information in this supplement is FAA approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight manual when the airplane is flown with the cabin entrance or cabin entrance and cargo doors removed.

The information in this supplement supersedes or adds to the basic Pilot's Operating Handbook and FAA Approved Airplane Flight manual only as set forth below.

BEECHCRAFT drawing number 99-5018, included in the applicable model kit, specifies required modifications which shall be accomplished prior to flight with the cabin entrance or cabin entrance and cargo doors removed.

LIMITATIONS

1. Smoking shall not be permitted.
2. When operations other than intentional parachute jumping are conducted, a suitable guard rail or equivalent safety device must be provided for the doorway.
3. All loose articles must be tied down or stowed.
4. Parachutists' static lines must be kept free of the airplane control surfaces.
5. Operation in icing conditions or precipitation is prohibited.
6. One of the following placards must be placed in full view of the pilot:

   FOR FLIGHT WITH CARGO AND CABIN DOOR REMOVED, SEE AIRCRAFT OPERATING LIMITATIONS WITH DOOR REMOVED.

   FOR FLIGHT WITH CABIN DOOR REMOVED, SEE AIRCRAFT OPERATING LIMITATIONS WITH DOOR REMOVED.

7. These operating limitations are a part of the Airworthiness Certificate.

EMERGENCY PROCEDURES - No change

NORMAL PROCEDURES

1. When operating with only the cabin entrance door removed, the cargo door shall be placed in a partially open position and secured with the upper and lower retainers provided and shown in BEECHCRAFT Kit No. 99-5018-1.

2. When operating with both the cabin entrance and cargo doors removed:

   a. The aft baggage door shall also be removed.

   b. The spoiler provided in BEECHCRAFT Kit No. 99-5018-3 shall be installed on the leading edge of the cargo door frame as directed in Kit No. 99-5018-3.

   c. The cabin door light switch on the aft door frame shall be actuated with the hardware provided in BEECHCRAFT Kit No. 99-5018-3 to extinguish the annunciator panel CABIN/BAG DOOR light.

PERFORMANCE

1. Operation with the doors removed will not decrease the take-off, climb or landing performance listed in the basic FAA Flight Manual.

2. Cruise speeds and range are decreased approximately 4% with the doors removed.

WEIGHT AND BALANCE

Kit No. 99-5018-1 Weight and Moment Change:

Weight: −34 lbs. Arm: 312 Moment: −10682

Kit No. 99-5018-3 Weight and Moment Change:

Weight: −62 lbs. Arm: 311 Moment: −19254

SYSTEMS DESCRIPTION - No change

HANDLING, SERVICING AND MAINTENANCE - No change

Approved:

W. H. Schultz
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT 99, 99A, A99A AND B99 LANDPLANE

AIRPLANE FLIGHT MANUAL SUPPLEMENT

for the

HYDRAULIC LANDING GEAR SYSTEM

The information in this document is FAA Approved material which, together with the basic Airplane Flight Manual, is applicable and must be attached to the basic manuals of aircraft serial numbers U-51 and U-154 and after and those aircraft modified by the installation of a Hydraulic Landing Gear System per BEECHCRAFT Kit Drawing 99-8010.

The information in this document supersedes the basic manual only in the items contained herein. For limitations and procedures not contained in this supplement, consult the basic Airplane Flight Manual.

The nose and main landing gear assemblies are retracted and extended by a hydraulic power pack, which is located forward of the main center section spar. The power pack consists primarily of a hydraulic pump, a 28 volt DC motor, a two section reservoir, a filter, a gear selector solenoid, and an uplock pressure switch. Hydraulic system pressure performs the uplock function of holding the gear in the UP position. Hydraulic lines for normal gear extension and retraction, and manual gear extension are routed from the power pack to the nose gear actuator and to each main gear hydraulic actuator. There is a press-to-test caution light, placarded LDG GEAR HYD FLUID LOW located on the pilot's instrument panel, which will illuminate whenever the internal thermistor in the hydraulic reservoir senses a low hydraulic fluid level.

LIMITATIONS

If the LDG GEAR HYD FLUID LOW light illuminates:

1. ON THE GROUND
   a. Service the reservoir before take-off
2. IN FLIGHT
   a. Service the reservoir before the next take-off

PLACARDS

On the floor between Pilot and Copilot seats (U-51 only)

On the floor between Pilot and Copilot seats (U-154 and after and previous airplanes which have incorporated kit 99-8010)

EMERGENCY PROCEDURES

LANDING GEAR EMERGENCY EXTENSION

1. Airspeed - Establish 120-130 KIAS (to reduce pump lever forces)
2. Landing Gear Control Circuit Breaker - PULL
3. Landing Gear Switch - DOWN
4. Manual Extension Pump Handle - UNSTOW AND PUMP (up and down until 3 green lights are acquired). Continue to pump until further resistance is felt (pressure build up) on pump handle
5. Manual Extension Pump Handle - STOW

CAUTION

After a landing gear PRACTICE manual extension, the pump handle must be stowed flush against the floor and under the securing clip to assure proper operation of the normal system for a subsequent retraction.

WARNING

After an EMERGENCY landing gear extension has been made, do not move any landing gear controls or reset any switches or circuit breakers until cause of malfunction has been determined and corrected.

Approved

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT B99 AIRLINER LANDPLANE

AIRPLANE FLIGHT MANUAL SUPPLEMENT

for the

Aft Camera Well Installation

The information in this document is FAA Approved material which, together with the appropriate basic Airplane Flight Manual, is applicable and must be carried in the airplane when it has been modified for special photographic purposes in accordance with BEECHCRAFT FAA Approved Data.

The external modification from the standard configuration is the addition of a housing or protrusion to the fuselage to accommodate a 26-1/2 inch diameter optical glass camera port. This port is covered by a mechanical sliding door that is operated by a hand crank from inside the cabin.

LIMITATIONS

None

NORMAL PROCEDURES

Camera Bay Door - CLOSED (during takeoff and landing to ensure protection of the optical glass).

FAA PERFORMANCE

Take-off, climb, stall, and landing performance is unchanged by this installation.

CRUISE CONTROL

MAXIMUM RECOMMENDED CRUISE

1. Decrease Cruise Speeds by 4%.
2. Decrease Range Values by 4%.

MAXIMUM RANGE POWER

1. Increase power as required to maintain Maximum Range Speeds.
2. Decrease Range Values by 4%.

Approved: H. H. Schultz
for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT LANDPLANES

AIRPLANE FLIGHT MANUAL SUPPLEMENT

for

OPERATION OF PT6A-20A, -21, -27, -28, and -41 ENGINES WITH SECONDARY LOW PITCH STOP INOPERATIVE

(SEE EFFECTIVITY BELOW)

GENERAL

The information in this document is FAA approved material which must be attached to the FAA Airplane Flight Manual.

The information in this document supersedes the basic FAA Approved Airplane Flight Manual where covered in the items contained herein.

LIMITATIONS

Where included, remove "Propeller Secondary Low Pitch Stop" from Required Equipment List.

NORMAL PROCEDURES

BEFORE TAKE-OFF

(Under step relative to Secondary Low Pitch Stop Test:)

Secondary Low Pitch Stop Annunciator Lights - TEST.
- Condition Levers - HIGH IDLE
- Power Levers - IDLE (Read propellers rpm)
- Prop Test Switches - HOLD TO TEST POSITION
- Power Levers - ALIGN AFT EDGE WITH TOP OF BETA RANGE MARKS
- Annunciator Lights - CHECK ON
- RPM - Check for increase of approximately 210 rpm when annunciator illuminates
- Power Levers - IDLE

NOTE

The secondary low pitch stop light in the annunciator panel must remain operative. The purpose of this light is to indicate propeller blade angle position and is required by FAA regulation. If the light illuminates during any flight condition note the RPM and torque of both engines. If no change is indicated, the blade angle is not as shown by the light and the light may be disregarded.

EMERGENCY PROCEDURES

No Change.

PERFORMANCE

No Change.

Airplanes Affected:

C90 (LJ-584 and after)
E90 (LW-1 and after)
100 (B2 and after)
99A, A99A, and B99 Airliners (U-1 and after which are equipped with PT6A-27, or PT6A-28 engines)
200 (BB-2 and after)

Approved:

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

FAA Approved
Revised: October 9, 1975
P/N 101-590010-89

BEECHCRAFT 99, 99A, A99A AND B99 LANDPLANES

FAA APPROVED AIRPLANE FLIGHT MANUAL

SUPPLEMENT

for

MANUAL LANDING GEAR EXTENSION PROCEDURES

GENERAL

The information in this supplement is FAA-approved material and must be attached to the *FAA Approved Airplane Flight Manual* and be carried in the airplane at all times and be kept within reach of the pilot during all flight operations.

The information in this supplement supersedes or adds to the basic *FAA Approved Airplane Flight Manual* only as set forth within this document. Users of the manual are advised always to refer to the supplement for possibly superseding information and placarding applicable to operation of the airplane.

LIMITATIONS – No Change.

EMERGENCY PROCEDURES

LANDING GEAR *(Mechanical Gear Only)*

LANDING GEAR EMERGENCY EXTENSION

1. Airspeed – ESTABLISH 120 KNOTS IAS
2. Landing Gear Relay Circuit Breaker – PULL
3. Landing Gear Handle – DOWN
4. Emergency Engage Handle – LIFT AND TURN CLOCKWISE TO THE STOP TO ENGAGE.
5. Extension Lever – PUMP up and down until the 3 green GEAR DOWN lights illuminate.

WARNING

If for any reason the green GEAR DOWN lights do not illuminate (e.g. in case of an electrical failure), continue pumping until resistance prohibits further movement of the handle.

CAUTION

Stop pumping when the 3 green GEAR DOWN lights illuminate. Further movement of the handle could bind the drive mechanism and prevent subsequent electrical gear retraction.

WARNING

After an emergency landing gear extension has been made, do not stow pump handle, move any landing gear controls, or reset any switches or circuit breakers until the airplane is on jacks, since the failure may have been in the gear-up circuit, and the gear might retract on the ground. The landing gear cannot be retracted manually.

NORMAL PROCEDURES – No Change.

PERFORMANCE – No Change.

Approved: Donald H Petts

for W. H. Schultz
Beech Aircraft Corporation
DOA CE-2

FAA Approved
Issued: June 8, 1979
P/N 99-590012-17

SECTION VII

PERFORMANCE

TABLE OF CONTENTS

SINGLE ENGINE TAKE-OFF FLIGHT PATH

Included in this section are graphs for single engine take-off distance and single engine climb at take-off speeds. Obstacle take-off distance and obstacle landing distance graphs have been deleted because these techniques are not normally applied to operations in this type of aircraft.

The graphs on pages 7-4, 7-5, 7-6 and 7-7 provide information required to construct a single engine take-off flight path. Included are: (1) take-off distance assuming an engine failure at lift-off and (2) single engine climb gradient at take-off speeds in zero wind conditions. As an example of the use of these graphs, a take-off flight path will be constructed for a departure from Billings, Montana. Conditions and results from the example on page 4-3 will be used.

CONDITIONS

Outside Air Temperature . . . . 25°C (77°F)
Field Elevation . . . . 3606 Ft
Altimeter Setting 29.56
Surface Wind . . . . 360° at 10 Kts 9,5K he.
Runway 34 Length . . . . 5600 Ft

PARTIAL SUMMARY OF RESULTS FROM EXAMPLE, PAGE 4-3

Pressure Altitude . . . . 3966 Ft
Take-Off Weight . . . . .10725 Lbs
Flap Setting 0%

Enter the graph for Single Engine Take-Off Distance - 0% Flaps, page 7-4 at 25°C, 3966 feet pressure altitude, 10725 pounds and 9.5 knot wind component:

Ground Roll . . . . 2010 Ft
Total Distance Over 50 Ft Obstacle . . . . 4590 Ft
Take-Off Speed
  Lift-off . . . . .102 KIAS
  50 Ft. . . . . 99 KIAS

Enter the graph for a Single Engine Climb Gradient - 0% Flaps, page 7-5, at 25°C, 3966 feet pressure altitude and 10725 pounds:

Climb Gradient 2.50%
Climb Speed . . . . 99 KIAS

A 2.50% climb gradient is 25 feet of vertical height per 1000 feet of horizontal distance.

NOTE

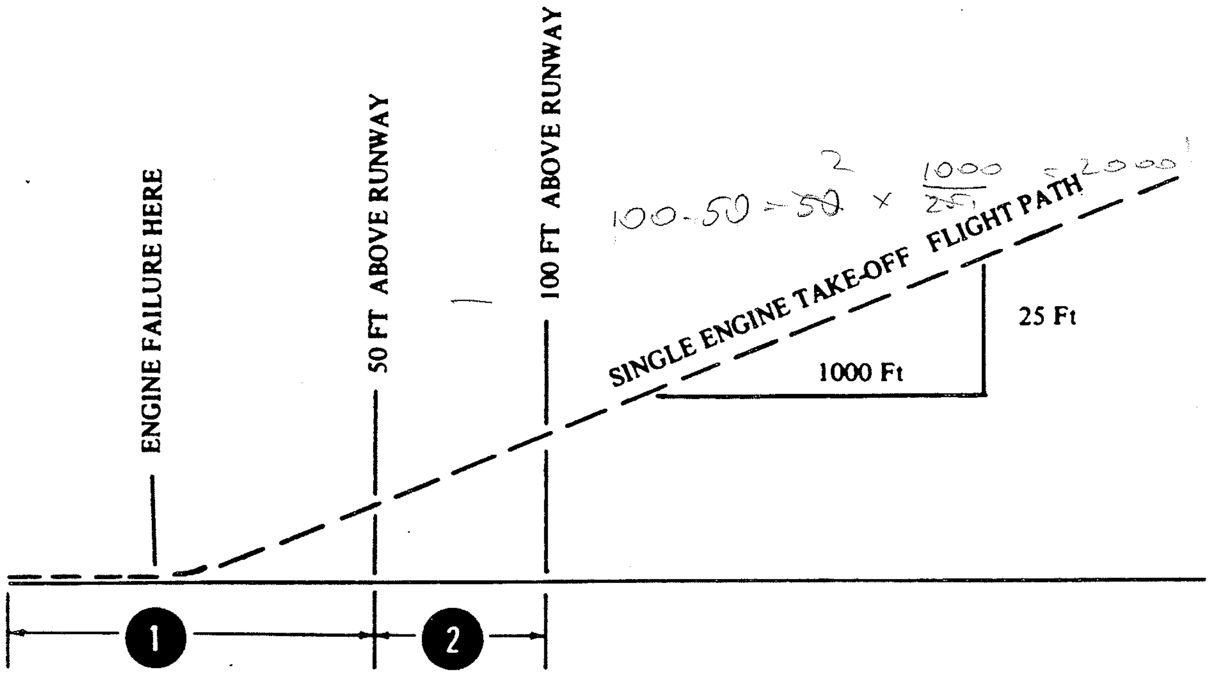
The graph for climb gradient, pages 7-5 and 7-7, assumes zero wind condition. Climbing into a headwind will result in higher angles of climb and hence better obstacle clearance capabilities.

Calculation of the horizontal distance to clear an obstacle 100 feet above the runway surface:

$$\text{Distance from 50 Ft to 100 Ft} = (100 - 50)\left(\frac{1000}{25}\right) = 2000 \text{ Ft}$$

Total distance = 4590 + 2000 = 6590 Ft

The above results are illustrated below:



1 Single engine take-off distance = 4590 Ft

2 Distance to climb from 50 Ft to 100 Ft above runway = 2000 Ft

SINGLE ENGINE TAKE-OFF DISTANCE — 0% FLAPS

ASSOCIATED CONDITIONS:

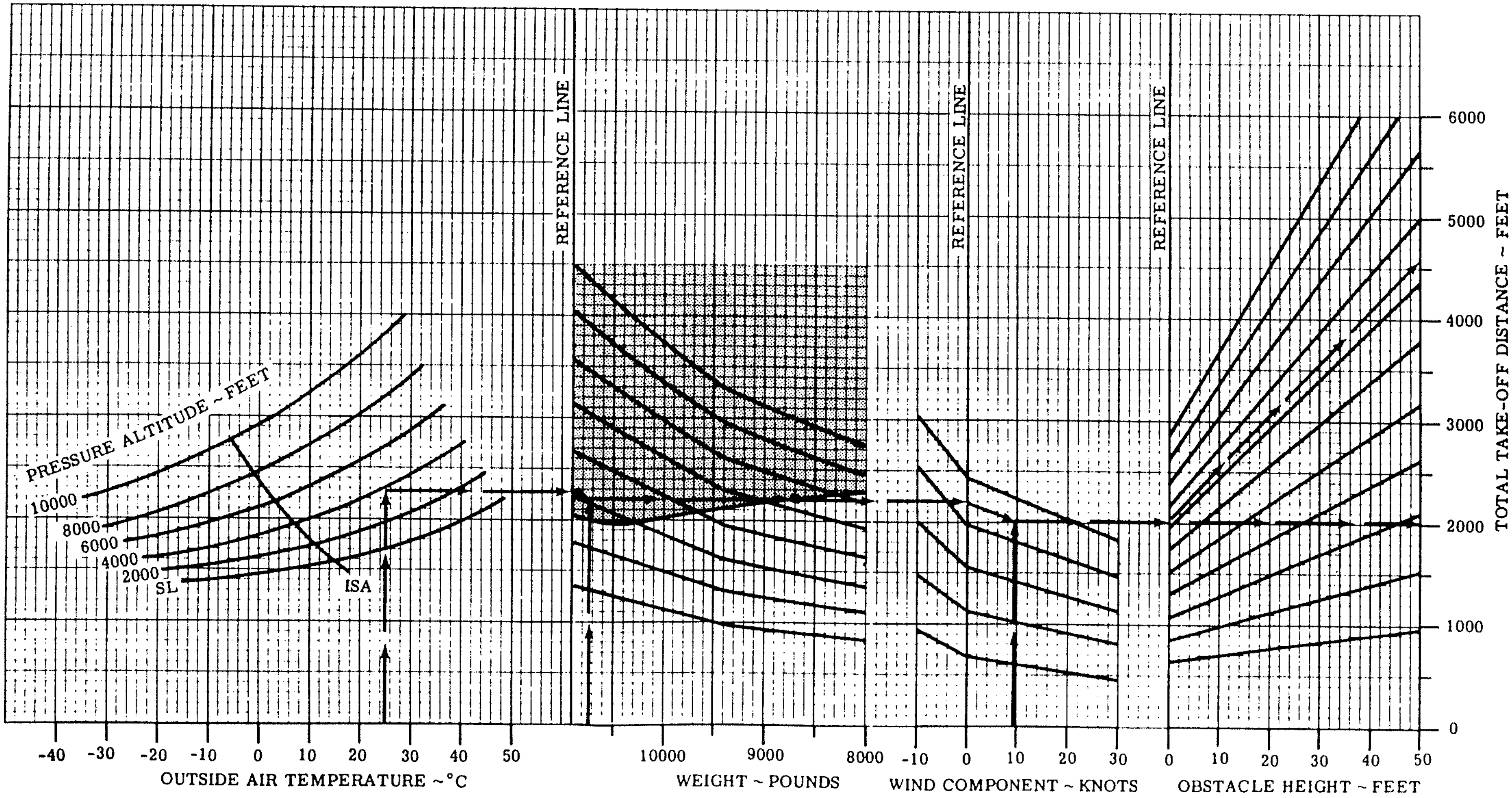
POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	0%
GEAR	RETRACT AFTER LIFT-OFF
RUNWAY	PAVED, LEVEL, DRY SURFACE

NOTE: 1. DISTANCES ASSUME AN ENGINE FAILURE AT LIFT-OFF AND PROPELLER IMMEDIATELY FEATHERED.
2. DISTANCES IN SHADED AREA NOT VALID IF WEIGHT EXCEEDS THAT PERMITTED BY MAXIMUM TAKE-OFF WEIGHT GRAPH PAGE 4-15.

WEIGHT POUNDS	TAKE-OFF SPEED KNOTS ~IAS (ASSUMES ZERO INST. ERROR)	
	LIFT-OFF	50 FT
10900	103	98
10000	99	95
9000	96	92
8000	96	92

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	10725 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	2010 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	4590 FT
TAKE-OFF SPEED AT LIFT-OFF	102 KIAS
50 FT	97 KIAS



CLIMB GRADIENT AT TAKE-OFF SPEED — 0%FLAPS

SINGLE ENGINE—ZERO WIND

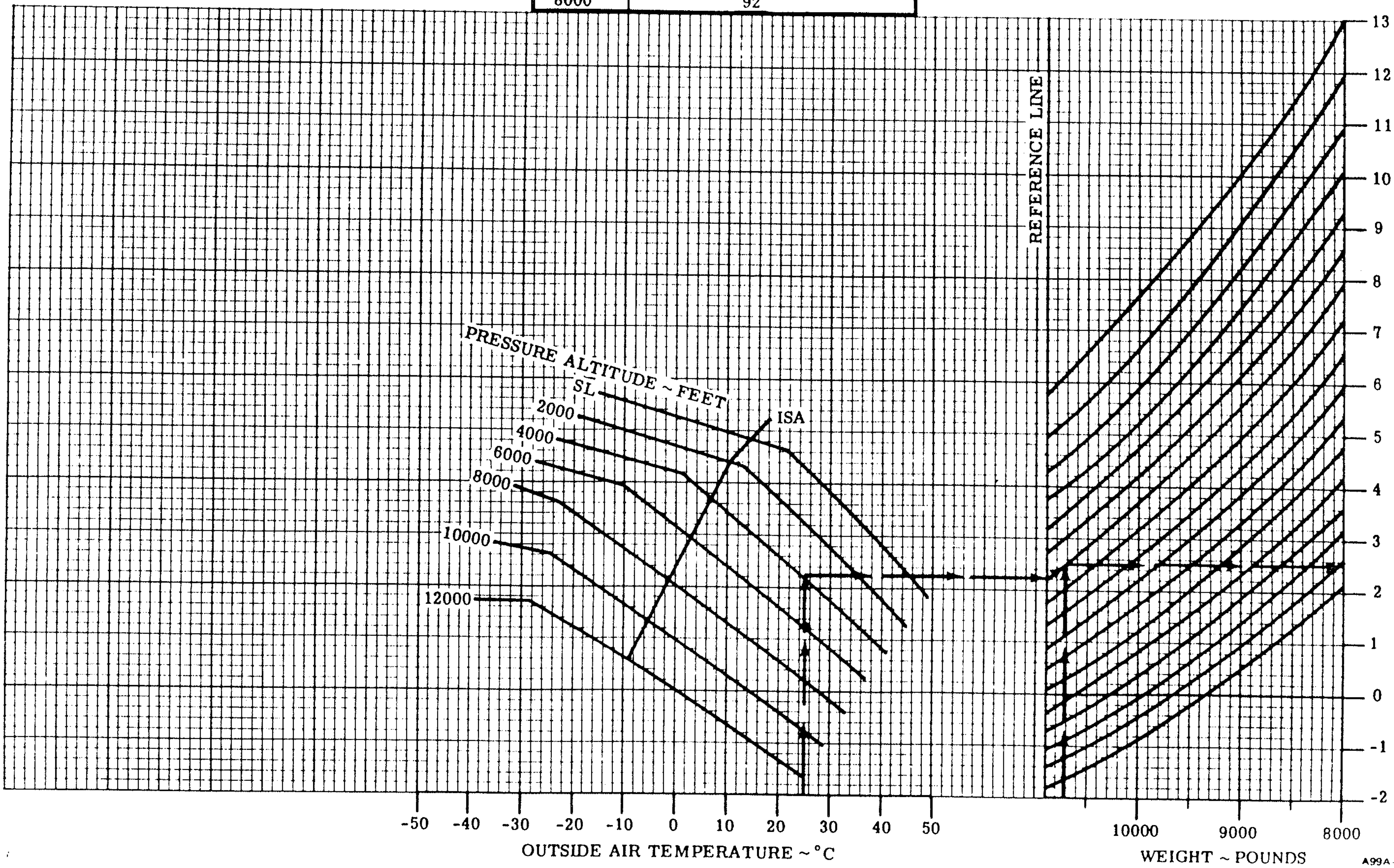
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF
FLAPS	0%
GEAR	UP
INOPERATIVE PROPELLER	FEATHERED

WEIGHT POUNDS	CLIMB SPEED SINGLE ENGINE 50 FT SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)
10900	98
10000	95
9000	92
8000	92

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
WEIGHT	10725 LBS
CLIMB GRADIENT	2.5 %
CLIMB SPEED	97 KIAS



SINGLE ENGINE TAKE-OFF DISTANCE — 30% FLAPS

ASSOCIATED CONDITIONS:

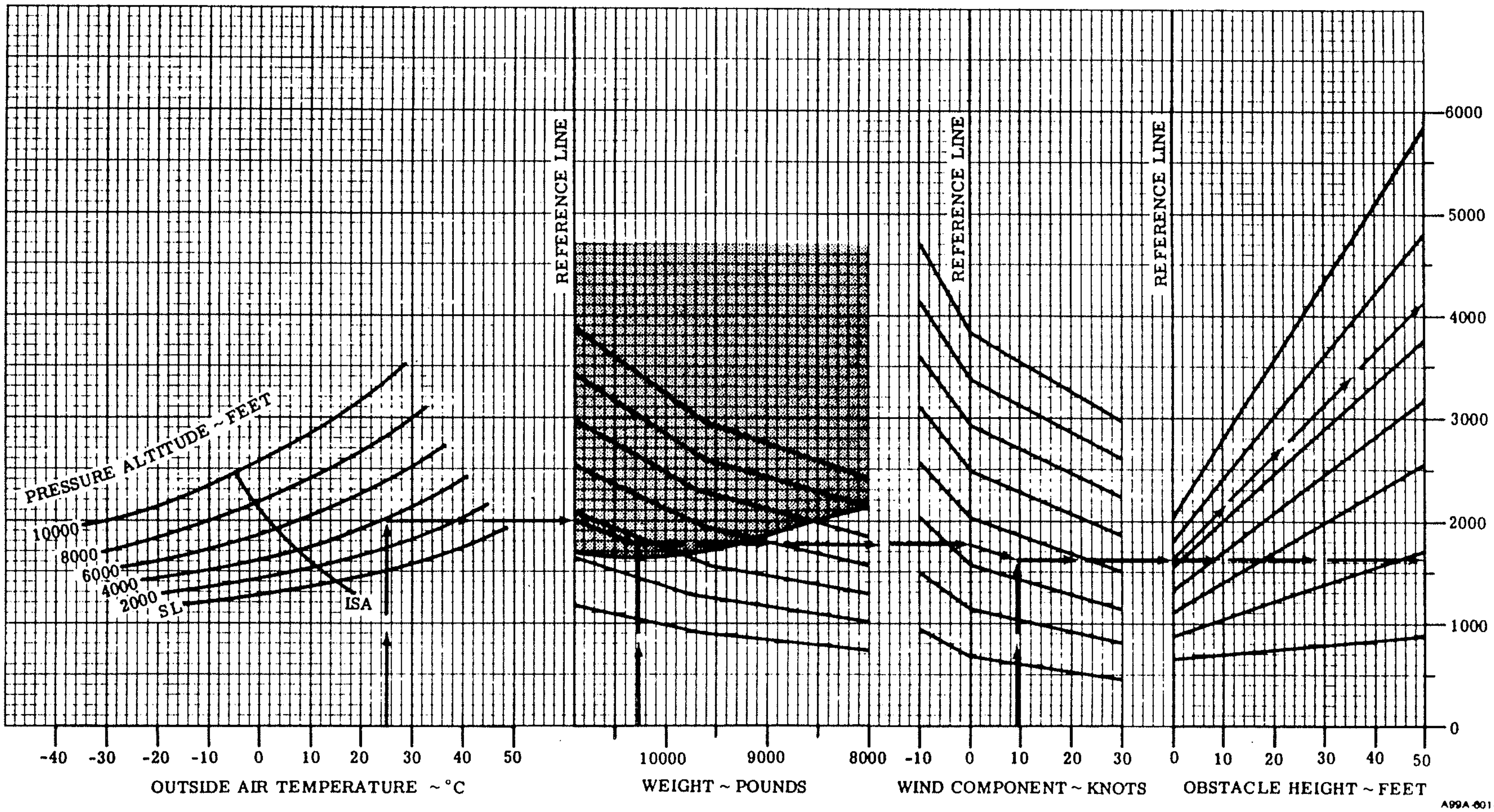
POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	30%
GEAR	RETRACT AFTER LIFT-OFF
RUNWAY	PAVED, LEVEL, DRY SURFACE

NOTE: 1. DISTANCES ASSUME AN ENGINE FAILURE AT LIFT-OFF AND PROPELLER IMMEDIATELY FEATHERED.
2. DISTANCES IN SHADED AREA NOT VALID IF WEIGHT EXCEEDS THAT PERMITTED BY MAXIMUM TAKE-OFF WEIGHT GRAPH PAGE 4-17

WEIGHT POUNDS	TAKE-OFF SPEED KNOTS ~ IAS (ASSUMES ZERO INST. ERROR)	
	LIFT-OFF	50FT
10900	98	94
10000	94	91
9000	92	89
8000	92	89

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	10280 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1620 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	4130 FT
TAKE-OFF SPEED AT	
LIFT-OFF	95 KIAS
50 FT	92 KIAS



CLIMB GRADIENT AT TAKE-OFF SPEED — 30% FLAPS

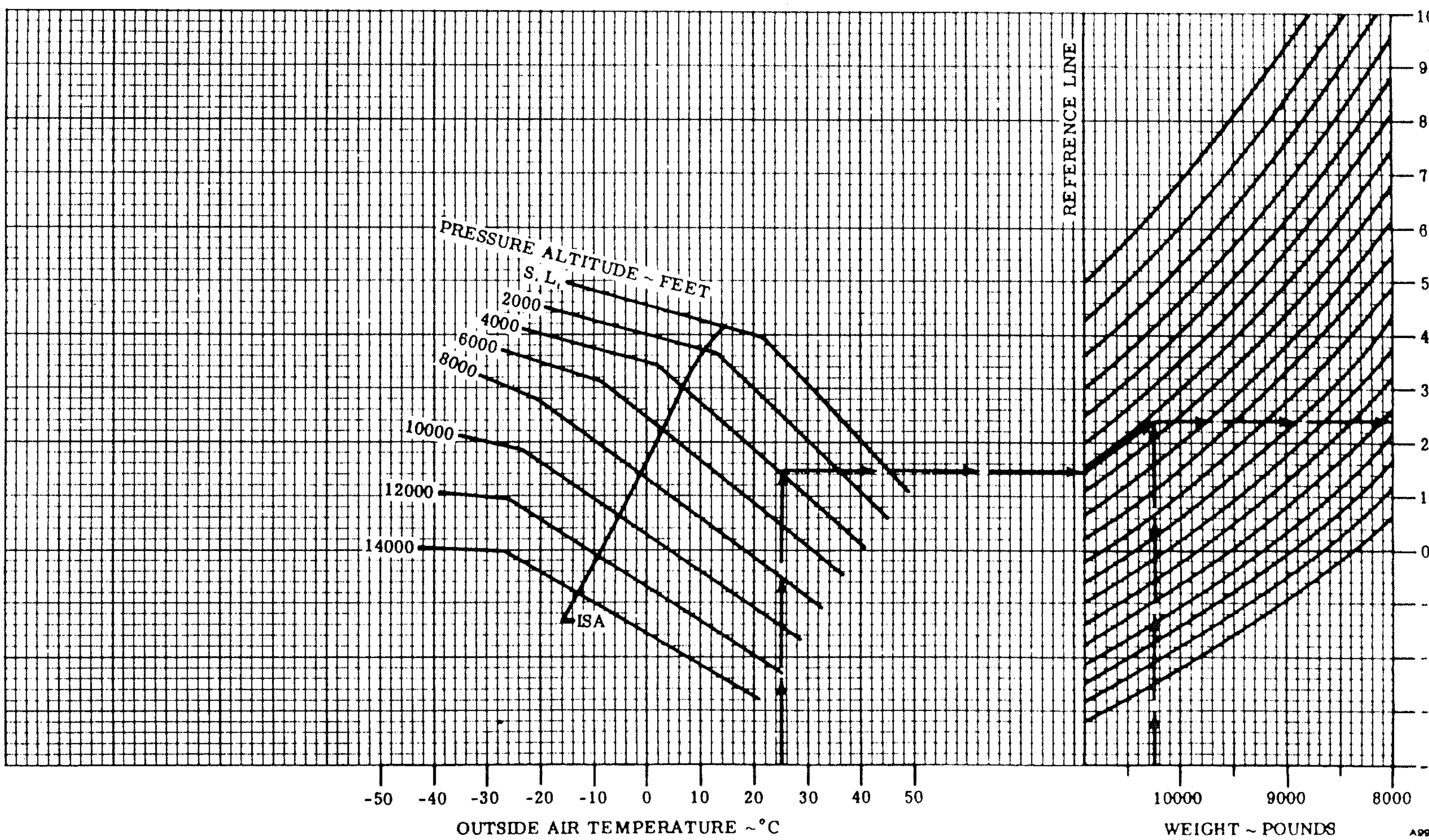
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF
FLAPS	30%
GEAR	UP
INOPERATIVE PROPELLER	FEATHERED

WEIGHT POUNDS	CLIMB SPEED SINGLE ENGINE 50 FT SPEED KNOTS ~ IAS (ASSUME ZERO INST. ERROR)
10900	94
10000	91
9000	89
8000	89

EXAMPLE:

OAT	25 °C
PRESSURE ALTITUDE	3966 FT
WEIGHT	10280 LBS
CLIMB GRADIENT	2.4 %
CLIMB SPEED	92 KIAS



FLAPS UP LANDING DISTANCES

ASSOCIATED CONDITIONS:

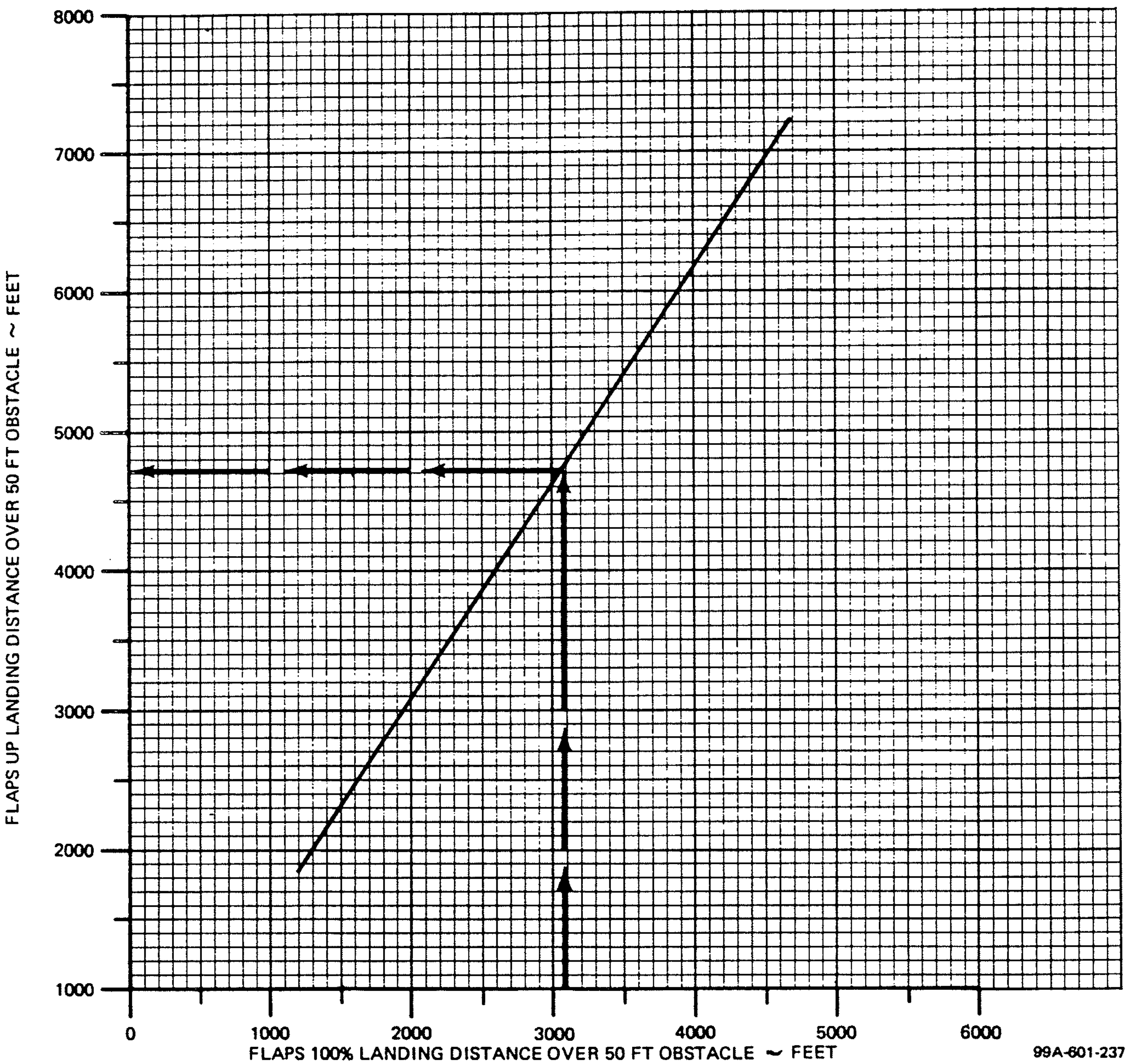
POWER	RETARDED TO MAINTAIN 500 FT/MIN ON FINAL APPROACH
FLAPS	UP
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED
BRAKING	MAXIMUM

WEIGHT POUNDS	APPROACH SPEED ~ KNOTS IAS (ASSUMES ZERO INST ERROR)
10900	116
10000	111
9000	105
8000	98
7000	92

EXAMPLE:

FLAPS 100% LANDING DISTANCE OVER 50 FT OBSTACLE (PAGE 4-26)	3080 FEET
FLAPS UP LANDING DISTANCE OVER 50 FT. OBSTACLE	4725 FEET

NOTE: To determine FLAPS UP LANDING DISTANCE, read the Flaps 100% Landing Distance appropriate to the OAT, altitude, weight and wind from the LANDING DISTANCE graph, page 4-26. Enter the FLAPS UP LANDING DISTANCE graph and read the Flaps Up Landing Distance. Flaps Up Landing Approach Speeds vs Weight are tabulated.



SECTION VIII

CRUISE CONTROL

TABLE OF CONTENTS

INTRODUCTION TO CRUISE CONTROL

The graphs and tables in this section present performance information for flight planning at various parameters of weight, power, altitude and temperature. Graphs and/or tables are included for Cruise Climb Descent, Cruise at Maximum Recommended Power, *Cruise at Maximum Range Power and Holding Time.

*NOTE

> Maximum recommended cruise power has been established by the engine manufacturer in accordance with engine warranty.

Calculations for flight time, block speed and fuel requirements for a proposed flight are detailed below using the same conditions as presented on page 4-3.

CONDITIONS

At Billings

Outside Air Temperature	25°C (77°F)
Field Elevation	3606 ft
Altimeter Setting	29.56
Wind	360° At 10 Knots
Runway 34 Length	5600 ft

Route of Trip:
BIL - V19 - CPR

Weather Conditions IFR For Cruise Altitude of 11000 Feet.

ROUTE SEGMENT	MAGNETIC HEADING	DISTANCE N.M.	MEA FEET	WIND AT 11000 FEET	OAT AT 11000 FT °C	OAT AT MEA °C	ALTIMETER SETTING
BIL - SHR	114°	88	8000	010/20	-10	0	29.56
SHR - CZI	136°	57	9000	350/30	-10	-4	29.60
CZI - CPR	158° 201°	55 13	7600	040/35	-10	0	29.60

REFERENCE: Enroute Low Altitude Charts L-8 and L-9

At Casper

Outside Air Temperature	15°C (59°F)
Field Elevation	5348 ft
Altimeter Setting	29.60
Wind	270° At 10 Knots
Runway 25 Length	8681 ft

The pressure altitude at BIL is 3966 ft
The pressure altitude at CPR is 5668 ft
(Refer to page 4-4)

Enter the graph For ISA CONVERSION, Page 8-5, At the Conditions Indicated:

BIL:	Pressure Altitude	= 3966 ft
	OAT	= 25°C
	ISA Condition	= ISA + 18°C
Enroute:	Pressure Altitude (Approx.)	= 11000 ft
	OAT	= -10°C
	ISA Condition	= ISA - 3°C
CPR:	Pressure Altitude	= 5668 ft
	OAT	= 15°C
	ISA Condition	= ISA + 11°C

Enter the Graph For Two Engine Cruise Climb, Page 8-6, at 3966 and 11000 feet, 10725 pounds and ISA + 18°C: (NOTE: The ISA Condition at take-off was arbitrarily used. The results using this temperature are conservative since the ISA Condition at 11000 feet is less.)

Time to Climb	= 12 - 3 = 9 min
Fuel Used to Climb	= 118 - 34 = 84 lbs
Distance Traveled	= 35 - 6 = 29 NM

Enter the Graph For Descent, Page 8-7, at 5668, 11000 Feet;
and 500 ft/min Rate of Descent:

Time to Descend	= 22 - 11 = 11 min
Fuel Used to Descend	= 148 - 75 = 73 lbs
Distance Traveled	= 67 - 32 = 35 NM

Enter the Tables For Maximum Recommended Cruise Power at ISA - 10°C and ISA, Pages 8-10 and 8-11, respectively. Read cruise speeds at 10,000 feet, 12000 feet and 10500 pounds (Estimated Average Cruise Weight) as follows:

Altitude	Cruise True Airspeed	
	ISA - 10°C	ISA
10000	244	240
12000	243	239

Interpolate between these speeds for 11000 feet and ISA - 3°C:

Cruise True Airspeed = 241 knots

Enter the Graph for Maximum Recommended Cruise Power at ISA - 3°C and 11000 Feet Pressure Altitude: (NOTE: For flight planning, enter this graph at the forecasted ISA Condition. For enroute power settings, enter at the actual indicated OAT.)

Torque setting per engine	= 1515 ft lb
Indicated outside air temperature	= -1°C

Enter the Graph for Fuel Flow at Maximum Recommended Cruise Power at ISA -3°C (or indicated outside air temperature of -1°C) and 11000 feet pressure altitude:

Fuel flow per engine	= 330 lb/hr
Total fuel flow	= 660 lb/hr

Time and Fuel used were calculated at Maximum Recommended Cruise Power as follows:

$$\text{Time} = \frac{\text{Distance}}{\text{Ground Speed}}$$

Fuel Used = (time) (total fuel flow)

RESULTS ARE AS FOLLOWS:

ROUTE SEGMENT	DISTANCE NM	ESTIMATED GROUND SPEED KNOTS	TIME AT CRUISE ALTITUDE HRS : MIN	FUEL USED FOR CRUISE LBS.
BIL - SHR	59*	250	0 : 14	156
SHR - CZI	57	269	0 : 13	140
CZI - CPR	33*	263	0 : 07	83

* Distance to Climb or Descend subtracted from Distance

DETERMINATION OF FLIGHT TIME BLOCK SPEED AND FUEL REQUIREMENT			
ITEM	TIME HRS : MINS	FUEL POUNDS	DISTANCE NAUTICAL MILES
Start, Runup, Taxi, Take-off, Accelerate	0 : 00	55	0
Climb	0 : 09	84	29
Cruise	0 : 35	379	149
Descent	0 : 11	73	35
Total	0 : 55	591	213

Total Flight Time: 55 Min

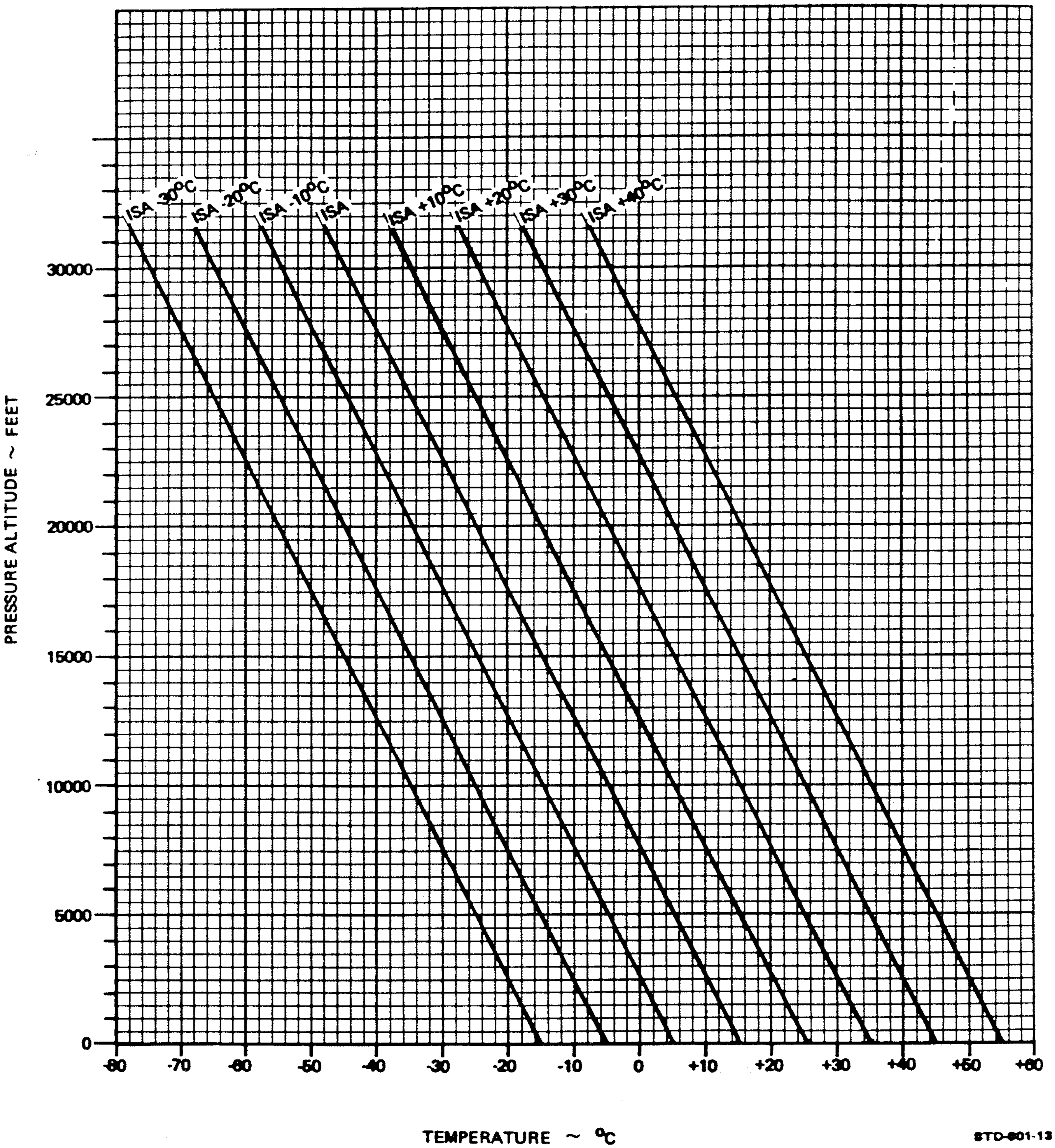
Block Speed: 213 NM ÷ 55 Min = 232 knots

Reserve Fuel: (Assumed here to be 45 minutes at maximum recommended cruise power).
45 min x 660 lb/hr. = 495 lbs

Total Fuel: 591 + 495 = 1086 lbs (162 Gal. Aviation Kerosene)

ISA CONVERSION

PRESSURE ALTITUDE VS OUTSIDE AIR TEMPERATURE



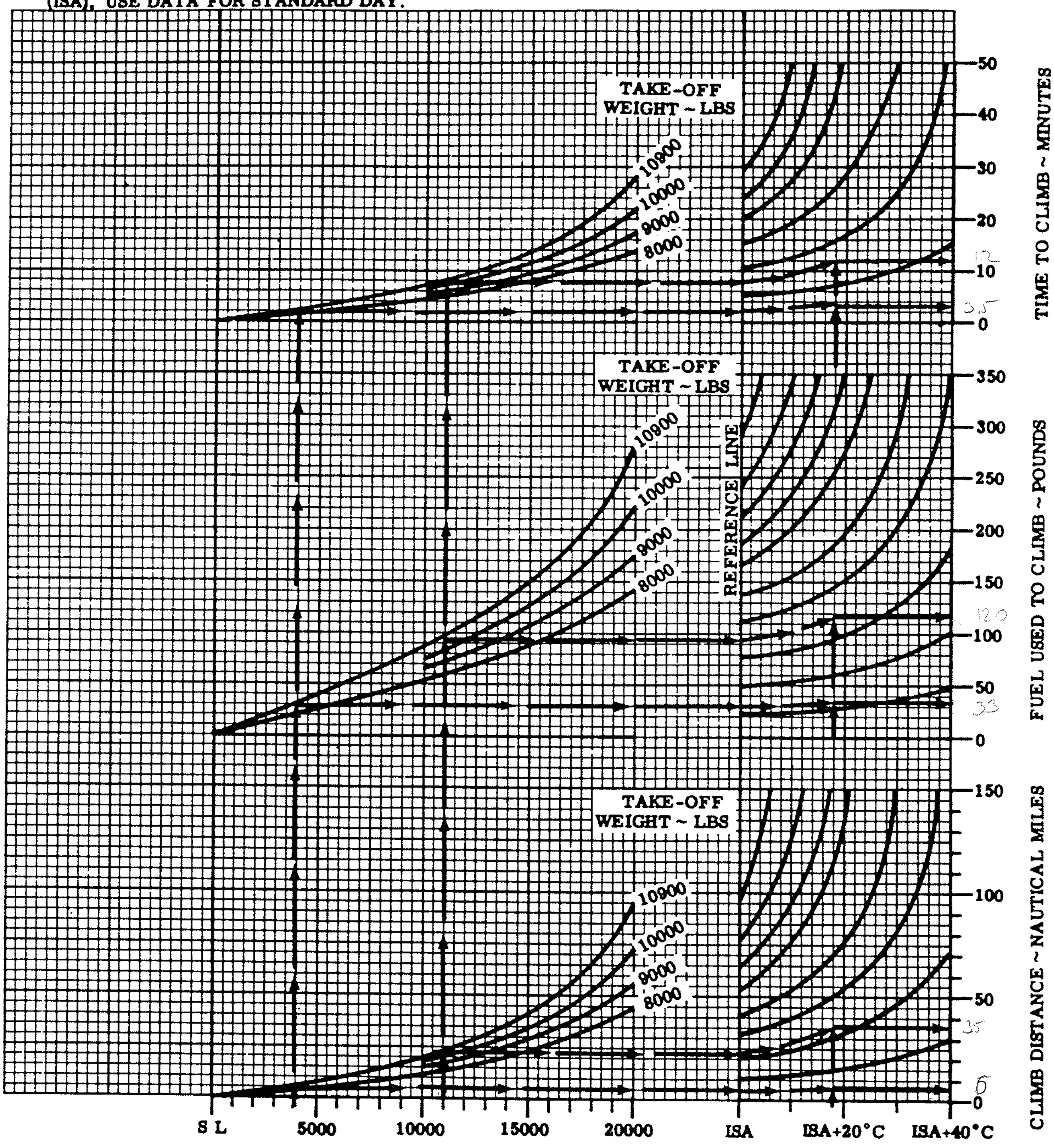
CRUISE CLIMB

CLIMB SPEED	160 KIAS
PROPELLER SPEED	2000 RPM
ITT	695 °C
OR	
TORQUE	1628 FT LBS

NOTE: ADD 55 LBS FUEL FOR TAXI, TAKE-OFF, AND ACCELERATION TO 160 KIAS. FOR TEMPERATURE BELOW STANDARD DAY (ISA), USE DATA FOR STANDARD DAY.

EXAMPLE:

AIRPORT PRESSURE ALTITUDE	3966 FT
ALTITUDE AT END OF CLIMB	11000 FT
INITIAL CLIMB WEIGHT	10725 LBS
OAT (ISA + 18°C)	25 °C
TIME TO CLIMB (12 - 3)	9 MIN
FUEL USED TO CLIMB (118-34)	84 LBS
DISTANCE TRAVELED DURING CLIMB (35 - 6)	29 NM



A99A-801-110

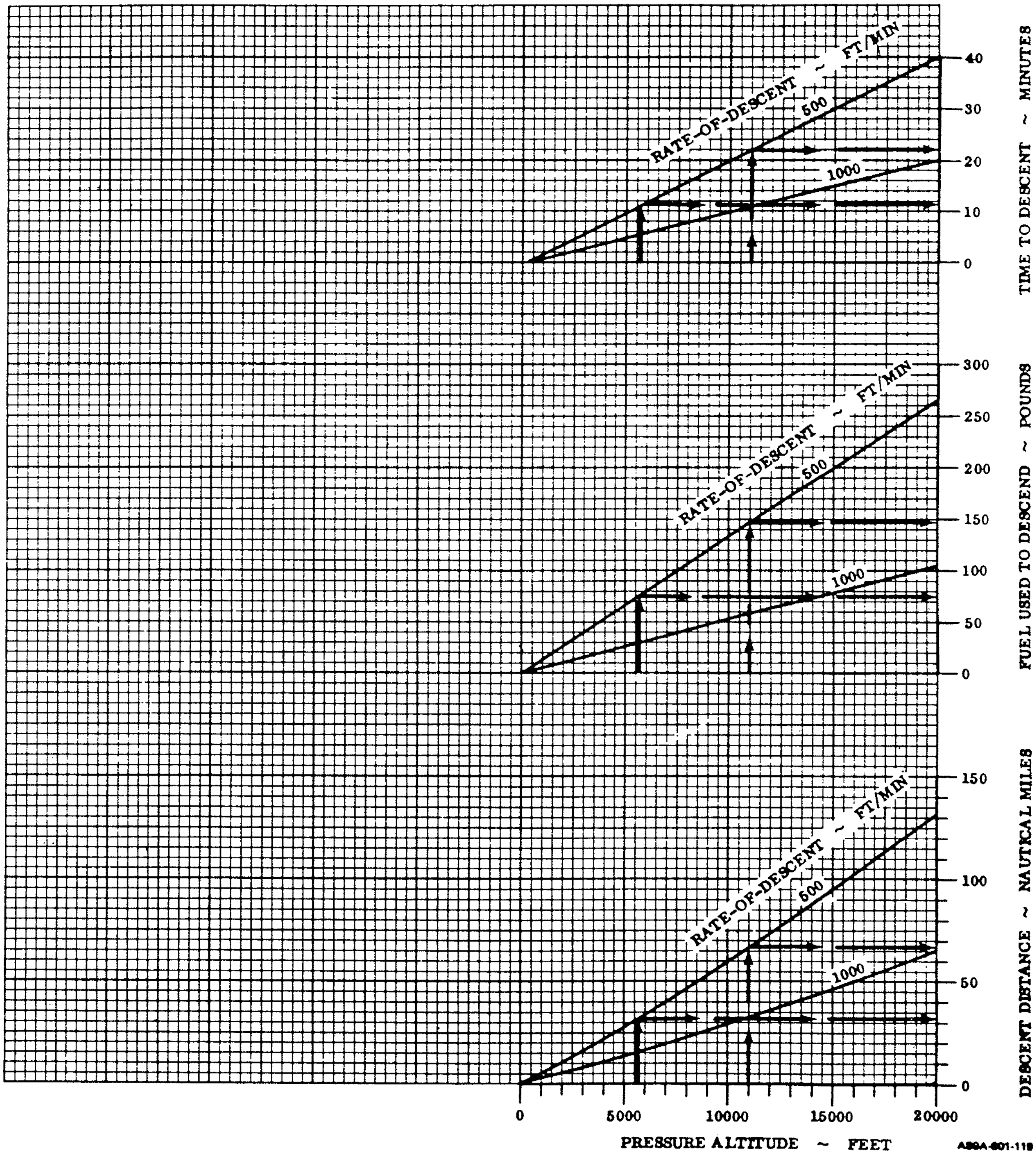
DESCENT

DESCENT SPEED: 170 KIAS

ASSOCIATED CONDITIONS:	
POWER	AS REQUIRED FOR DESIRED RATE OF DESCENT
FLAPS	UP
GEAR	UP
TEMPERATURE	APPROXIMATELY APPLICABLE FOR ALL TEMPERATURES

EXAMPLE:	
INITIAL ALTITUDE	11000 FT
FINAL ALTITUDE	5668 FT
RATE-OF-DESCENT	500 FT/MIN

DESCENT	
DISTANCE TRAVELED (67-32)	35 NM
FUEL USED (148-75)	73 LBS
TIME (22-11)	11 MIN



MAXIMUM RECOMMENDED CRUISE POWER

ISA - 30°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	-9	16	1530	354	708	226	214	226	214	226	214
2000	-13	9	1575	355	710	226	220	226	220	226	220
4000	-16	3	1621	357	714	225	225	226	227	226	227
6000	-20	-4	1628	355	710	222	230	224	231	225	237
8000	-24	-10	1628	352	704	220	234	221	236	223	237
10000	-27	-17	1628	350	700	217	238	220	240	220	242
12000	-31	-24	1628	350	700	215	243	216	245	218	246
14000	-35	-30	1610	346	692	211	246	213	248	215	251
16000	-39	-38	1475	318	636	201	242	203	245	206	247
18000	-43	-45	1338	288	576	190	236	193	240	195	243
20000	-47	-53	1214	262	524	179	230	183	235	186	239
22000	-52	-61	1097	237	474	168	222	172	229	176	233
24000	-56	-69	984	213	426	155	212	161	221	166	227
26000	-61	-77	881	192	384	139	198	149	211	155	220
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA -20°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	1	34	1560	362	724	226	218	226	218	226	218
2000	-2	28	1606	363	726	226	224	226	224	226	224
4000	-6	21	1628	362	724	223	228	225	230	226	231
6000	-10	15	1628	357	714	221	232	222	234	224	236
8000	-13	8	1628	354	708	218	237	220	239	221	240
10000	-17	1	1628	353	706	216	241	217	243	219	245
12000	-21	-5	1628	353	706	213	246	215	248	216	250
14000	-25	-12	1543	334	668	206	245	208	248	210	250
16000	-29	-20	1450	314	628	198	243	200	246	202	249
18000	-33	-27	1357	295	590	190	241	192	245	195	248
20000	-37	-35	1237	269	538	179	235	183	240	186	244
22000	-41	-42	1119	244	488	167	227	172	234	176	239
24000	-46	-50	1005	220	440	154	217	161	226	165	232
26000	-50	-59	900	198	396	139	202	148	216	155	225
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA -10°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	11	53	1589	370	740	226	222	226	222	226	222
2000	8	46	1628	370	740	224	227	226	228	226	229
4000	4	40	1628	365	730	222	231	223	232	225	234
6000	1	33	1628	360	720	219	235	221	237	222	238
8000	-3	26	1628	357	714	217	240	218	242	220	243
10000	-7	20	1628	355	710	214	244	216	246	217	248
12000	-11	13	1541	336	672	207	243	209	246	210	248
14000	-15	5	1450	316	632	199	242	201	245	203	247
16000	-10	-2	1363	298	596	191	240	194	243	196	246
18000	-23	-9	1279	180	560	183	237	186	242	189	245
20000	-27	-17	1199	263	526	175	234	178	239	181	243
22000	-31	-24	1115	245	490	165	229	170	236	174	241
24000	-36	-32	1025	226	452	154	221	160	230	165	237
26000	-40	-40	919	203	406	139	206	148	221	155	230
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	22	71	1617	378	756	225	225	226	226	226	226
2000	18	64	1628	373	746	223	229	224	231	226	232
4000	14	58	1628	367	734	220	233	222	235	223	237
6000	11	51	1628	362	724	218	238	219	240	221	241
8000	7	44	1602	354	708	213	241	215	243	217	245
10000	3	37	1521	335	670	206	240	209	243	210	245
12000	-1	30	1437	316	632	199	239	201	242	204	244
14000	-5	23	1359	299	598	192	238	194	241	197	244
16000	-9	16	1280	282	564	184	236	187	240	190	243
18000	-13	8	1200	264	528	176	233	179	238	182	242
20000	-17	1	1124	248	496	167	229	172	235	175	240
22000	-21	-7	1050	232	464	158	224	164	232	168	238
24000	-26	-14	978	217	434	148	217	155	227	160	235
26000	-30	-22	909	202	404	136	206	145	221	152	231
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA +10°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	32	89	1628	383	766	224	227	225	229	226	230
2000	28	83	1628	375	750	221	232	223	233	224	235
4000	24	76	1607	365	730	217	235	219	237	221	238
6000	21	69	1545	349	698	212	235	213	238	215	240
8000	17	62	1476	332	664	205	235	207	238	209	240
10000	13	55	1403	314	628	198	235	201	238	203	240
12000	9	48	1326	296	592	191	233	194	237	196	240
14000	5	40	1254	280	560	183	232	187	236	189	239
16000	1	33	1183	264	528	176	230	179	234	182	238
18000	-4	26	1114	248	496	168	227	172	232	176	237
20000	-8	18	1048	234	468	159	223	165	230	169	235
22000	-12	11	981	219	438	150	217	156	226	161	233
24000	-16	3	913	205	410	138	207	147	220	153	230
26000	-21	-5	847	190	380	123	191	137	212	145	225
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA +20°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	42	107	1571	375	750	219	227	221	228	222	230
2000	38	100	1523	359	718	214	228	216	230	217	232
4000	34	93	1472	343	686	209	229	211	231	212	233
6000	30	86	1418	327	654	203	230	205	232	207	234
8000	26	80	1352	311	622	196	229	199	232	201	235
10000	22	72	1285	294	588	189	228	192	232	195	235
12000	18	65	1215	277	554	182	227	185	231	188	234
14000	14	58	1151	262	524	175	225	178	230	182	234
16000	10	50	1087	247	494	167	222	171	228	175	233
18000	6	43	1023	232	464	158	218	164	225	168	231
20000	2	35	962	218	436	149	213	156	222	161	229
22000	-2	28	901	205	410	139	204	147	217	153	226
24000	-7	20	841	192	384	125	191	138	210	145	222
26000	-11	12	781	179	358	---	---	126	200	137	217
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA +30°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	51	125	1408	350	700	209	219	211	221	212	223
2000	48	118	1371	335	670	204	221	206	223	207	225
4000	44	111	1331	321	642	199	222	201	225	203	227
6000	40	104	1289	307	614	194	223	196	226	198	228
8000	36	97	1233	291	582	187	222	190	226	193	229
10000	32	89	1173	276	552	180	221	184	225	186	229
12000	28	82	1109	260	520	173	219	177	224	180	228
14000	24	75	1049	245	490	165	216	170	222	173	227
16000	20	67	990	231	462	157	212	162	220	167	226
18000	16	60	931	217	434	148	207	155	217	160	224
20000	11	52	876	204	408	137	199	146	212	153	221
22000	7	45	820	191	382	124	186	137	206	145	218
24000	3	37	765	179	353	---	---	126	196	136	212
26000	-2	28	709	166	332	---	---	109	176	127	204
28000											
30000											
31000											

MAXIMUM RECOMMENDED CRUISE POWER

ISA +40°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500 LBS		9500 LBS		8500 LBS	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	61	142	1251	327	654	197	211	200	213	202	216
2000	57	135	1221	313	626	193	212	195	215	198	217
4000	53	128	1190	300	600	188	213	191	217	193	219
6000	49	121	1157	287	574	183	214	186	218	189	221
8000	45	114	1108	272	544	177	214	180	218	183	221
10000	41	107	1055	257	514	170	212	174	217	177	221
12000	37	99	1001	242	484	162	209	167	216	171	221
14000	33	92	949	229	458	155	206	160	214	165	219
16000	29	85	897	216	432	146	200	153	211	158	218
18000	25	77	844	203	406	135	193	145	206	151	215
20000	21	69	791	190	380	121	179	135	199	143	212
22000	16	61	741	178	356	---	---	124	190	135	207
24000	11	52	688	166	332	---	---	106	168	125	199
26000	8	47	654	156	312	---	---	---	---	113	187
28000											
30000											
31000											

RANGE PROFILE - MAXIMUM RECOMMENDED CRUISE POWER

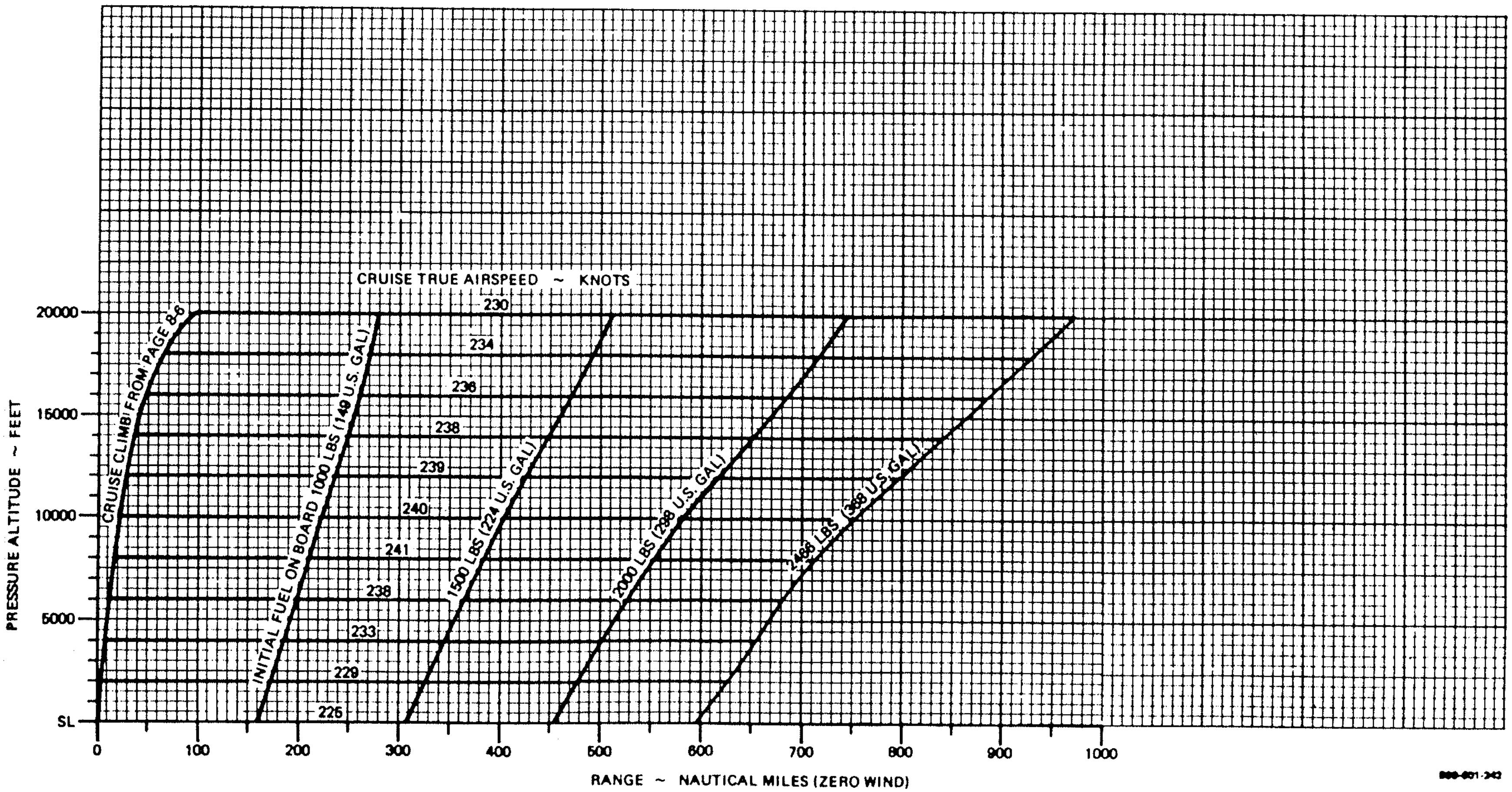
STANDARD DAY (ISA)

1900 RPM

ASSOCIATED CONDITIONS:

WEIGHT	10955 LBS BEFORE ENGINE START
FUEL	AVIATION KEROSENE
FUEL DENSITY	6.7 LBS/GAL

NOTE: RANGE INCLUDES START, TAXI, CLIMB, DESCENT, AND 45 MINUTES RESERVE FUEL AT MAXIMUM RANGE POWER



MAXIMUM RANGE POWER

ISA -30 °C 1900 RPM

			10500 LBS				9500 LBS				8500 LBS			
PRESSURE ALTITUDE	I.O.A.T.		TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	-11	13	1027	271	542	191	979	264	528	180	896	250	500	176
2000	-15	6	1007	260	520	187	938	249	498	180	870	238	476	176
4000	-19	-2	975	247	494	182	903	235	470	180	847	226	452	177
6000	-23	-9	961	238	476	179	887	226	452	181	814	214	428	177
8000	-26	-16	941	229	458	174	864	216	432	182	802	206	412	179
10000	-30	-23	923	220	440	170	857	209	418	184	779	196	392	180
12000	-34	-30	919	215	430	167	838	201	402	185	759	187	374	181
14000	-38	-37	905	208	416	163	822	194	388	186	742	180	360	182
16000	-42	-44	893	203	406	159	809	188	376	187	738	176	352	184
18000	-46	-51	886	199	398	155	798	182	364	189	724	169	338	185
20000	-50	-58	884	196	392	152	801	180	360	192	713	164	328	187
22000	-54	-64	903	197	394	151	803	178	356	194	706	160	320	188
24000	-57	-71	891	195	390	146	799	176	352	196	701	157	314	190
26000	-61	-78	...	...	...	...	802	175	350	199	702	156	312	193
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA -20 °C 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS				9500 LBS				8500 LBS			
			TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	-1	31	1053	279	558	185	988	268	536	182	924	258	516	180
2000	-4	24	1018	265	530	185	950	254	508	183	901	246	492	181
4000	-8	17	1002	254	508	187	931	243	486	184	862	232	464	181
6000	-12	10	971	242	484	187	897	230	460	184	840	221	442	182
8000	-16	3	964	235	470	189	888	222	444	186	813	210	420	182
10000	-20	-4	944	226	452	190	866	213	426	187	789	200	400	183
12000	-24	-11	928	219	438	192	848	205	410	188	780	194	388	185
14000	-28	-18	926	214	428	194	844	200	400	191	763	186	372	186
16000	-32	-25	914	208	416	196	831	194	388	192	748	179	358	187
18000	-36	-32	905	204	408	197	820	189	378	193	746	175	350	190
20000	-40	-39	901	201	402	199	821	185	370	196	735	179	340	192
22000	-43	-46	903	200	400	202	814	182	364	198	727	165	330	193
24000	-47	-53	909	200	400	205	811	180	360	200	721	162	324	195
26000	-51	-60	...	...	...	...	811	180	360	202	719	160	320	197
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA -10 °C 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS				9500 LBS				8500 LBS			
			TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	10	49	1043	279	558	186	976	268	536	183	930	261	522	182
2000	6	42	1031	269	538	188	963	258	516	186	896	247	494	183
4000	2	35	1003	257	514	189	933	246	492	186	864	234	468	183
6000	-2	28	978	246	492	190	921	236	472	188	850	225	450	185
8000	-6	21	969	238	476	192	895	226	452	189	822	214	428	185
10000	-10	14	950	230	460	193	873	216	432	190	811	206	412	187
12000	-14	7	945	223	446	195	865	210	420	192	787	197	394	188
14000	-18	0	931	217	434	197	850	203	406	193	770	189	378	190
16000	-21	-7	922	212	424	198	838	197	394	195	765	184	368	191
18000	-25	-14	921	208	416	201	835	192	384	198	752	178	356	193
20000	-29	-20	916	205	410	203	828	188	376	199	743	173	346	195
22000	-33	-27	916	204	408	205	824	185	370	201	742	170	340	197
24000	-37	-34	923	205	410	209	824	184	368	204	735	166	342	199
26000	-41	-42	- - -	- - -	- - -	- - -	825	183	366	206	732	164	328	201
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA 1900 RPM

			10500 LBS				9500 LBS				8500 LBS			
PRESSURE ALTITUDE	I.O.A.T.		TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	20	67	1038	281	562	188	969	270	549	185	924	262	524	184
2000	16	60	1025	271	542	190	955	259	518	187	886	248	496	184
4000	12	53	997	258	516	190	924	246	492	187	871	237	474	186
6000	8	46	989	250	500	193	915	237	474	189	843	225	450	186
8000	4	39	970	240	480	194	893	228	456	191	834	218	436	188
10000	0	33	964	234	468	196	887	221	442	193	881	208	416	189
12000	-4	25	947	226	452	197	868	212	424	194	791	200	400	190
14000	-7	19	946	221	442	200	864	207	414	197	785	193	386	193
16000	-11	12	935	216	432	202	850	200	400	198	769	187	374	194
18000	-15	5	929	212	424	204	841	195	390	200	756	180	360	195
20000	-19	-2	932	210	420	207	841	192	384	202	755	176	352	198
22000	-23	-9	931	208	416	209	836	190	380	204	747	172	344	200
24000	-26	-16	938	209	418	212	835	187	374	207	743	169	338	202
26000	-31	-23	...	...	...	...	841	188	376	210	745	168	336	205
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA +30 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	50	122	1027	288	576	192	955	275	550	189	886	264	528	186
2000	46	115	1004	276	552	193	949	265	530	192	875	253	506	188
4000	42	108	1001	267	534	196	921	253	506	192	844	240	480	188
6000	38	101	998	258	516	199	916	244	488	195	836	231	462	191
8000	34	94	983	250	500	200	897	235	470	196	815	221	442	192
10000	31	87	983	244	488	203	896	228	456	199	812	214	428	195
12000	27	80	975	237	474	206	883	221	442	201	796	206	412	196
14000	23	73	973	232	464	208	875	215	430	203	795	200	400	199
16000	19	66	...	...	...	...	876	210	420	206	784	194	398	201
18000	15	59	...	...	...	...	875	206	412	209	777	189	378	203
20000	11	52	...	...	...	...	...	...	...	...	778	185	370	207
22000	7	45	...	...	...	...	...	...	...	...	778	182	364	210
24000														
26000														
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA + 20 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	9500 LBS TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	8500 LBS TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	40	104	1037	286	572	191	966	274	548	188	898	263	526	185
2000	36	97	1009	273	546	192	934	261	522	189	886	252	504	187
4000	32	90	1003	264	528	194	927	251	502	191	855	239	478	188
6000	28	83	984	254	508	196	905	240	480	192	847	230	460	190
8000	24	76	982	247	494	199	902	233	466	195	825	220	440	191
10000	20	69	969	239	478	200	886	225	450	196	819	213	426	194
12000	17	62	965	233	466	203	881	218	436	199	799	204	408	195
14000	13	55	959	228	456	205	870	212	424	201	785	197	394	196
16000	9	48	961	224	448	208	869	207	414	204	782	912	384	199
18000	5	41	958	220	440	211	863	202	404	206	773	186	372	201
20000	1	34	...	...	...	...	863	199	398	209	769	182	364	204
22000	-3	27	...	...	...	...	862	197	394	211	766	179	358	206
24000	-7	20	...	...	...	...	...	...	...	...	765	176	352	209
26000	-11	13	...	...	...	...	...	...	...	...	770	175	350	212
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA +10 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	30	86	1047	285	570	190	979	274	548	187	913	263	526	185
2000	26	79	1019	272	544	191	948	260	520	188	879	249	498	185
4000	22	72	1012	263	526	193	938	251	502	190	866	239	478	187
6000	19	65	987	252	504	194	910	239	478	191	836	226	452	187
8000	14	58	982	245	490	197	904	231	462	193	828	218	436	190
10000	10	51	966	236	472	198	885	222	444	195	806	209	418	191
12000	7	44	955	229	458	200	870	215	430	196	800	202	404	193
14000	3	37	952	225	450	203	866	209	418	199	784	195	390	194
16000	-1	30	945	220	440	205	856	203	406	200	771	188	376	196
18000	-5	23	945	216	432	207	854	199	398	203	767	183	366	199
20000	-9	16	945	214	428	210	849	196	392	205	759	179	358	200
22000	-13	9	950	214	428	213	848	193	386	208	755	175	350	203
24000	-17	2	- - -	- - -	- - -	- - -	854	192	384	211	755	173	346	206
26000	-21	-5	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	755	171	342	208
28000														
30000														
31000														

MAXIMUM RANGE POWER

ISA +40 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS				9500 LBS				8500 LBS			
			TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	60	140	1014	289	578	192	938	275	550	189	869	263	526	186
2000	56	133	1014	279	558	195	935	266	532	192	861	253	506	188
4000	52	126	996	268	536	197	912	254	508	193	834	241	482	189
6000	48	119	997	261	522	200	911	246	492	196	831	232	464	192
8000	45	112	988	253	506	202	898	237	474	198	812	223	446	193
10000	41	105	990	247	494	206	898	231	462	201	811	216	432	196
12000	37	98	...	...	...	...	888	224	448	203	798	208	416	198
14000	33	91	...	...	...	...	890	219	438	207	798	203	406	201
16000	29	84	...	...	...	...	887	214	428	209	790	197	394	204
18000	25	77	...	...	...	...	...	...	...	...	791	193	386	207
20000	21	70	...	...	...	...	...	...	...	...	790	189	378	210
22000														
24000														
26000														
28000														
30000														
31000														

RANGE PROFILE - MAXIMUM RANGE POWER

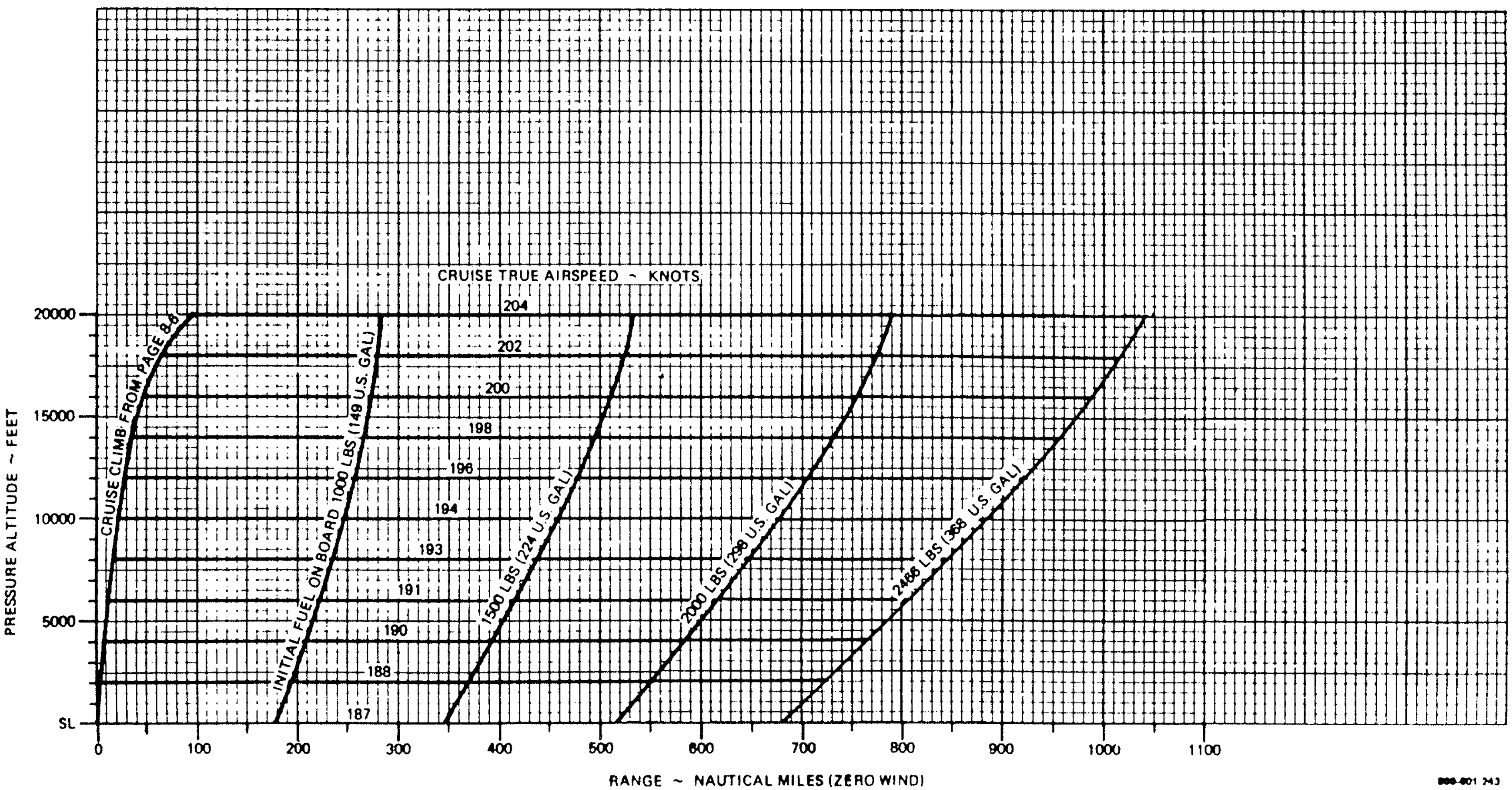
STANDARD DAY (ISA)

1900 RPM

ASSOCIATED CONDITIONS:

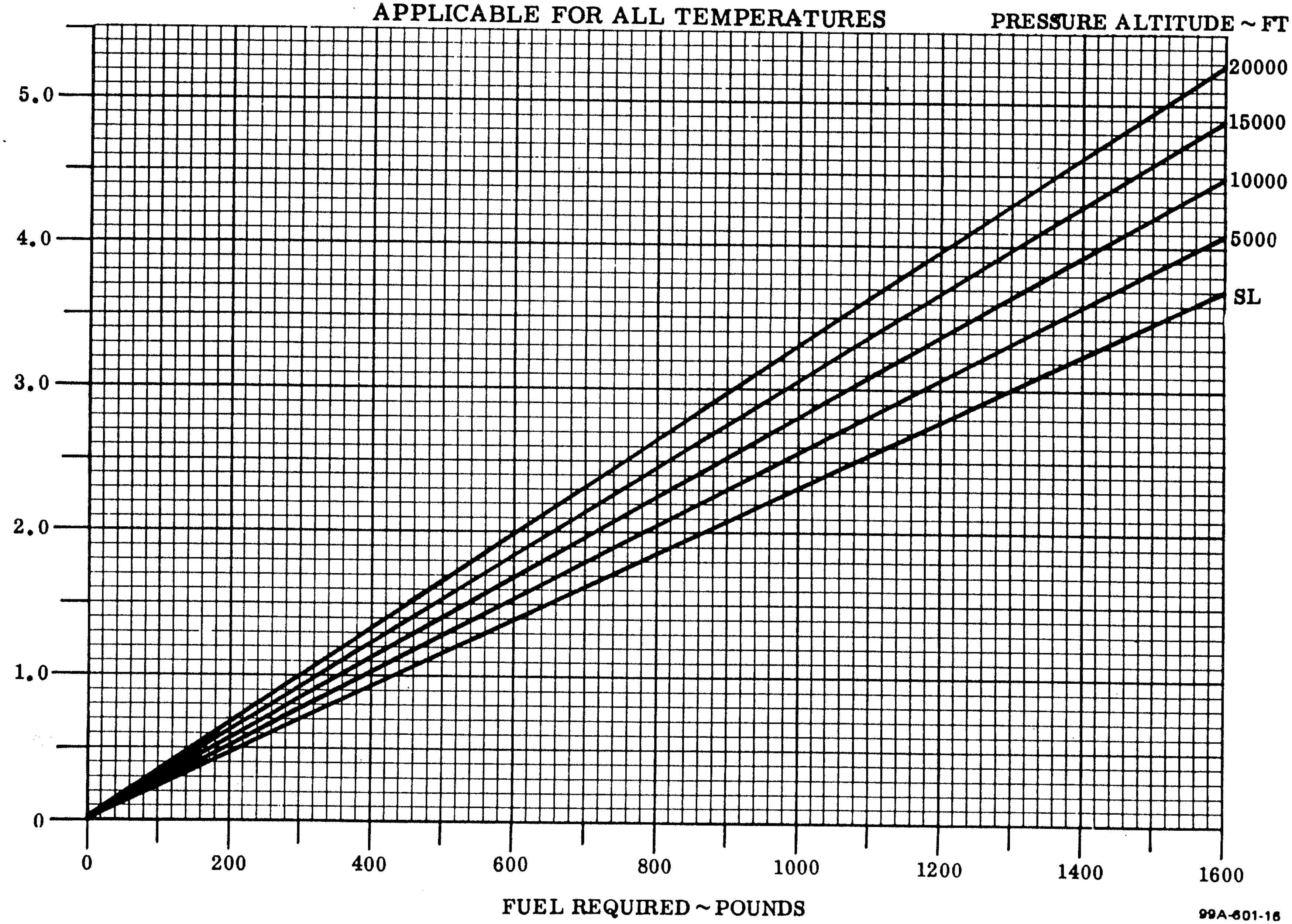
WEIGHT	10955 LBS BEFORE ENGINE START
FUEL	AVIATION KEROSENE
FUEL DENSITY	6.7 LBS/GAL

NOTE: RANGE INCLUDES START, TAXI, CLIMB, DESCENT, AND 45 MINUTES RESERVE FUEL AT MAXIMUM RANGE POWER



HOLDING TIME

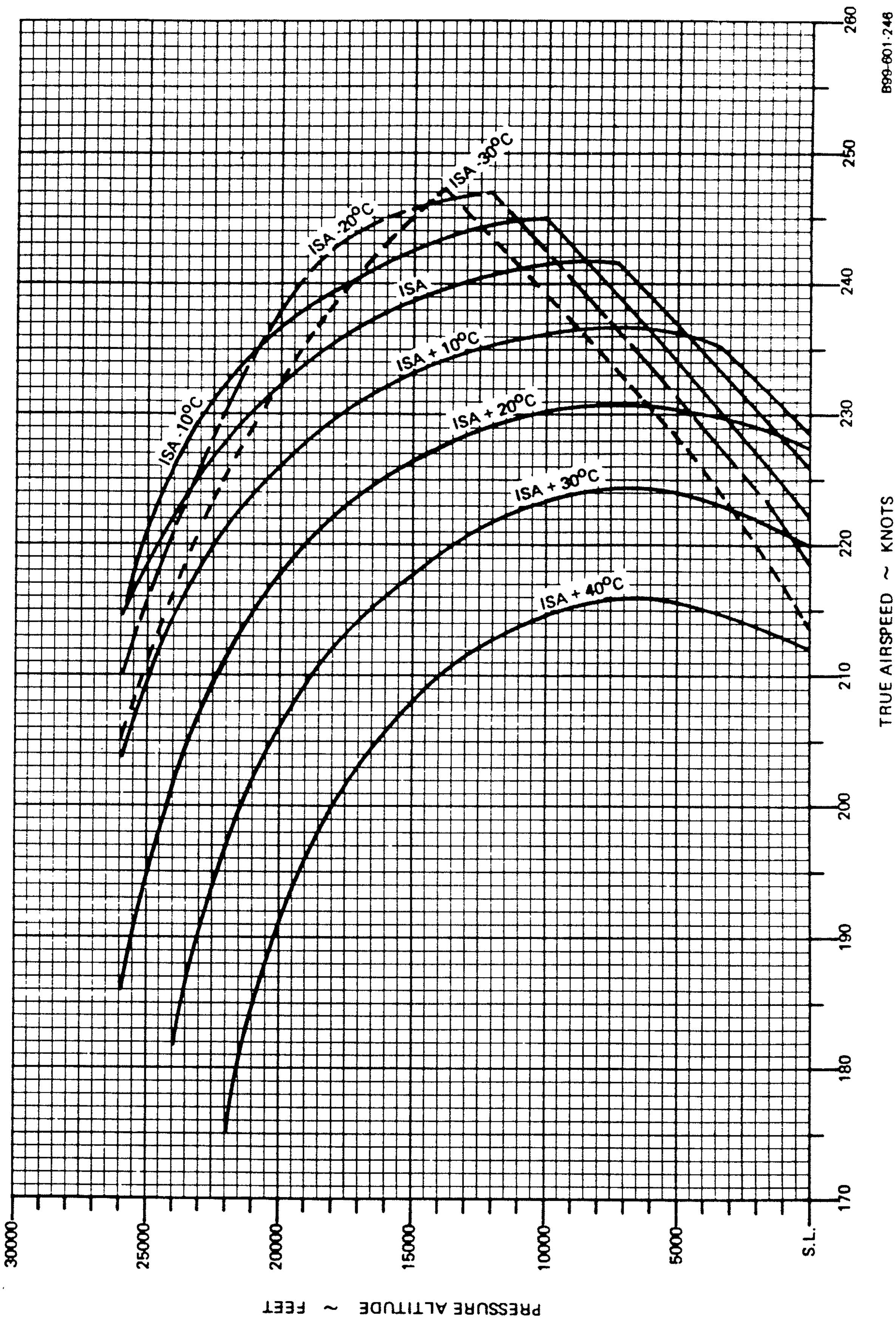
TORQUE SETTING
600 FT LBS AT 1900 RPM
APPLICABLE FOR ALL TEMPERATURES



MAXIMUM CRUISE SPEED

MAXIMUM RECOMMEND CRUISE POWER - 1900 RPM

WEIGHT 10,000 LBS

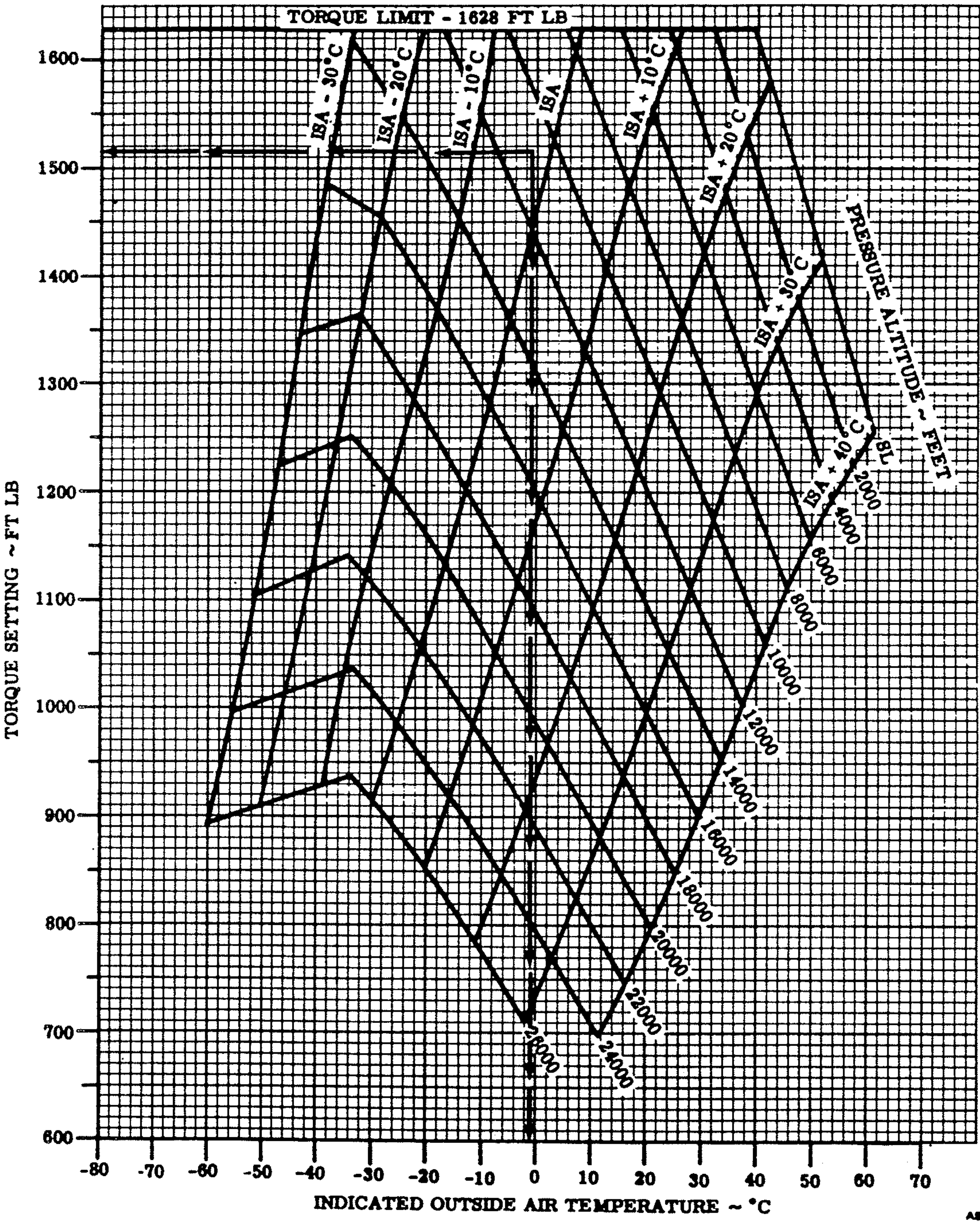


MAXIMUM RECOMMENDED CRUISE POWER

1900 RPM

<u>EXAMPLE</u>:

CRUISE ALTITUDE	11000	FT
TEMPERATURE (ISA - 3°C)	-10	°C
TORQUE SETTING	1515	FT LB
INDICATED OUTSIDE AIR TEMPERATURE	-1	°C

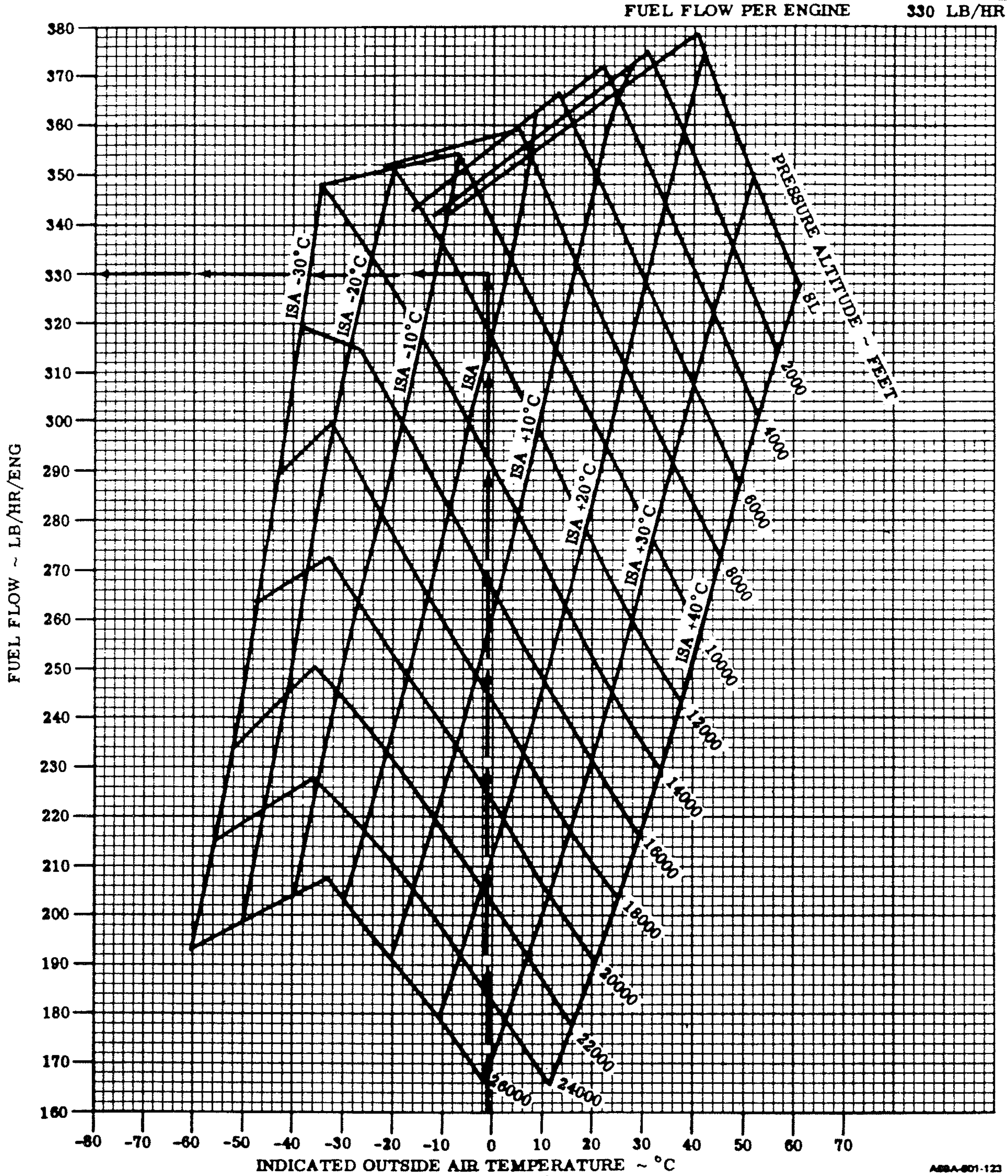


FUEL FLOW AT MAXIMUM RECOMMENDED CRUISE POWER

1900 RPM

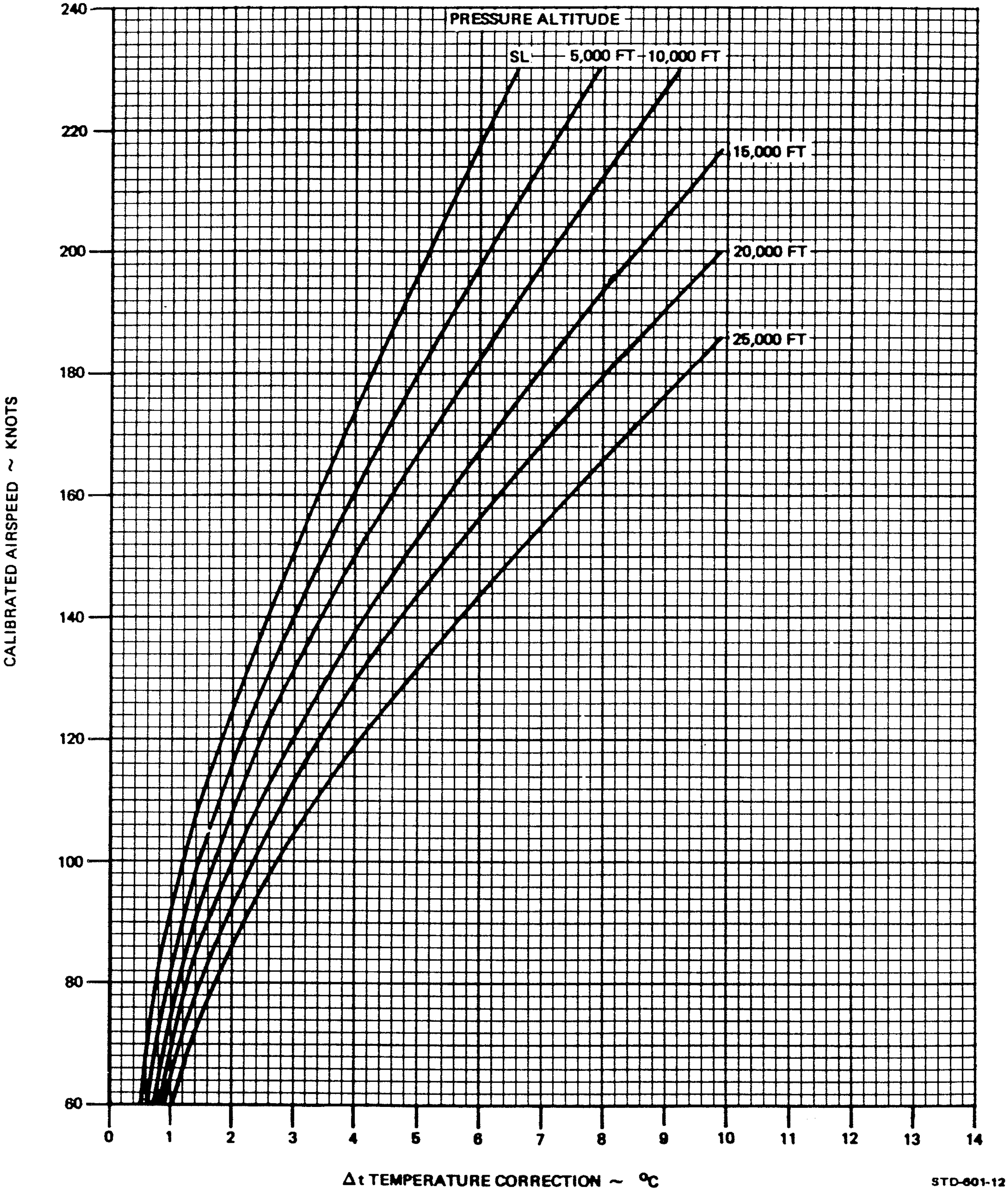
EXAMPLE:

INDICATED OUTSIDE AIR TEMPERATURE	-1 °C
PRESSURE ALTITUDE	11000 FT
FUEL FLOW PER ENGINE	330 LB/HR



OUTSIDE AIR TEMPERATURE CORRECTION

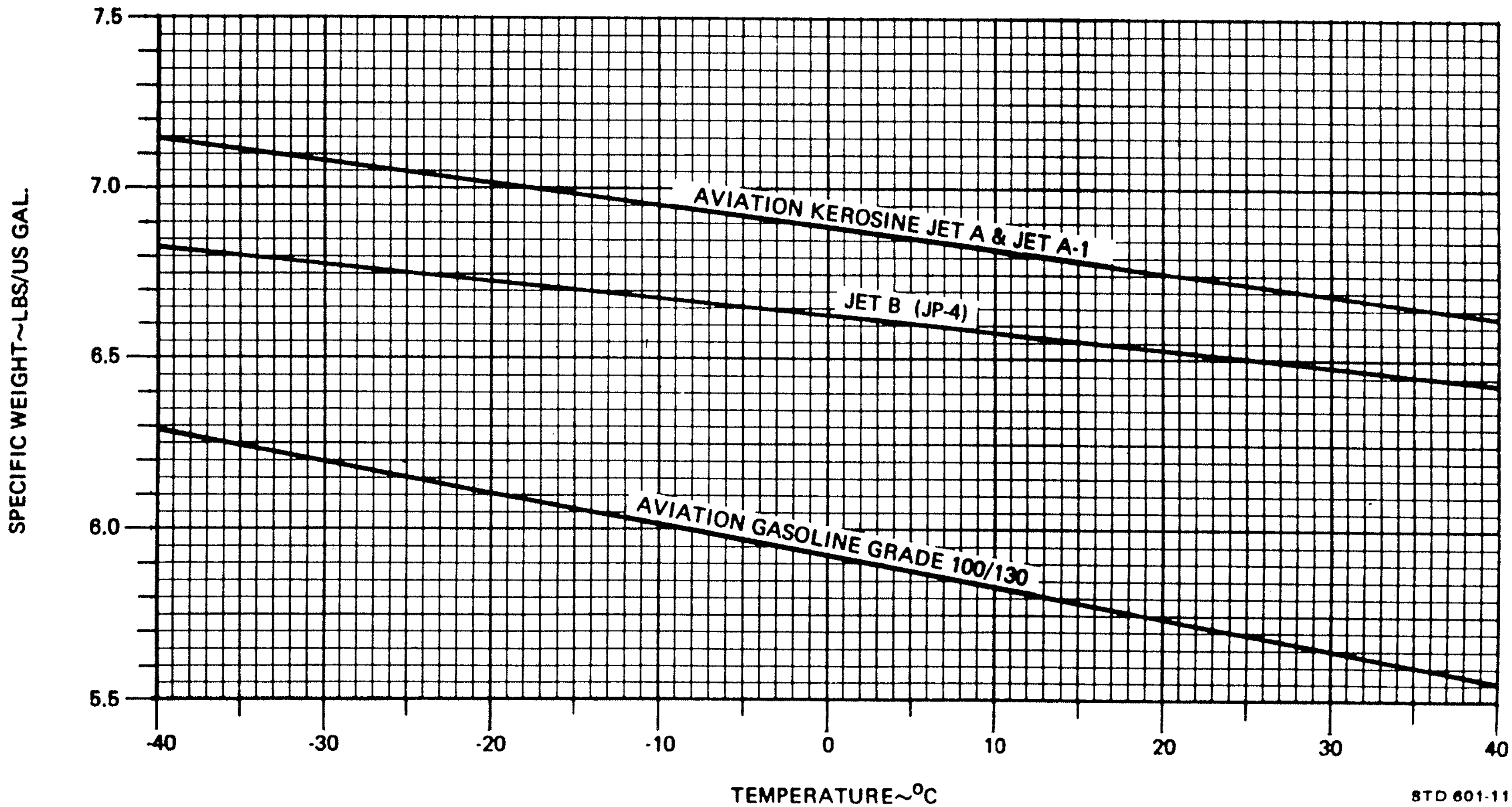
SUBTRACT Δt FROM INDICATED OAT TO OBTAIN TRUE OAT
(INDICATED OAT IS RAM AIR TEMPERATURE ASSUMING A RECOVERY FACTOR OF 1.)



DENSITY VARIATION OF AVIATION FUEL

BASED ON AVERAGE SPECIFIC GRAVITY

FUEL	AVERAGE SPECIFIC GRAVITY AT 15°C (59°F)
AVIATION KEROSINE JET A AND JET A1	.812
JET B (JP-4)	.785
AV GAS GRADE 100/130	.703



SECTION VIII

CRUISE CONTROL

TABLE OF CONTENTS

INTRODUCTION TO CRUISE CONTROL

The graphs and tables in this section present performance information for flight planning at various parameters of weight, power altitude and temperature. Graphs and/or tables are included for Cruise Climb, Descent, Cruise at Maximum Recommended Power, *Cruise at Maximum Range Power and Holding Time.

*NOTE

Maximum recommended cruise power has been established by the engine manufacturer in accordance with engine warranty.

Calculations for flight time, block speed and fuel requirements for a proposed flight are detailed below using the same conditions as presented on page 4-3.

CONDITIONS

At Billings

Outside Air Temperature	25°C (77°F)
Field Elevation	3606 ft
Altimeter Setting	29.56
Wind	360° At 10 Knots
Runway 34 Length	5600 ft

Route of Trip:
BIL - V19 - CPR

Weather Conditions IFR For Cruise Altitude of 11000 Feet.

ROUTE SEGMENT	MAGNETIC HEADING	DISTANCE N.M.	MEA FEET	WIND AT 11000 FEET	OAT AT 11000 °C	OAT AT MEA °C	ALTIMETER SETTING
BIL - SHR	114°	88	8000	010/20	-10	0	29.56
SHR - CZI	136°	57	9000	350/30	-10	-4	29.60
CZI - CPR	158° 201°	55 13	7600	040/35	-10	0	29.60

REFERENCE: Enroute Low Altitude Charts L-8 and L-9

At Casper

Outside Air Temperature	15°C (59°F)
Field Elevation	5348 ft
Altimeter Setting	29.60
Wind	270° At 10 Knots
Runway 25 Length	8681 ft

The pressure altitude at BIL is 3966 ft
The pressure altitude at CPR is 5668 ft
(Refer to page 4-4)

Enter the graph for ISA CONVERSION, Page 8-5, At the Conditions Indicated:

BIL:	Pressure Altitude	= 3966 ft
	OAT	= 25°C
	ISA Condition	= ISA + 18°C
Enroute:	Pressure Altitude (Approx.)	= 11000 ft
	OAT	= -10°C
	ISA Condition	= ISA - 3°C
CPR:	Pressure Altitude	= 5668 ft
	OAT	= 15°C
	ISA Condition	= ISA + 11°C

Enter the Graph For Two Engine Cruise Climb, Page 8-6, at 3966 and 11000 feet, 10725 pounds and ISA + 18°C: (NOTE: The ISA Condition at take-off was arbitrarily used. The result using this temperature are conservative since the ISA Condition at 11000 feet is less.)

Time to Climb	= 12 - 3 = 9 min
Fuel Used to Climb	= 118 - 34 = 84 lbs
Distance Traveled	= 35 - 6 = 29 NM

Enter the Graph For Descent, Page 8-7, at 5668, 11000 Feet; and 500 ft/min Rate of Descent:

Time to Descend	= 22 - 11 = 11 min
Fuel Used to Descend	= 148 - 68 = 80 lbs
Distance Traveled	= 67 - 32 = 35 NM

Enter the Tables For Maximum Recommended Cruise Power at ISA - 10°C and ISA, Pages 8-10 and 8-11, respectively. Read cruise speeds at 10,000 feet, 12000 feet and 10500 pounds (Estimated Average Cruise Weight) as follows:

Altitude	Cruise True Airspeed	
	ISA - 10°C	ISA
10000	248	245
12000	248	244

Interpolate between these speeds for 11000 feet and ISA - 3°C:

Cruise True Airspeed = 246 knots

Enter the Graph for Maximum Recommended Cruise Power at ISA - 3°C and 11000 Feet Pressure Altitude: (NOTE: For flight planning, enter this graph at the forecasted ISA Condition. For enroute power settings, enter at the actual indicated OAT.)

Torque setting per engine	= 1515 ft lb
Indicated outside air temperature	= -1°C

Enter the Graph for Fuel Flow at Maximum Recommended Cruise Power at ISA - 3°C (or indicated outside air temperature of - 1°C) and 11000 feet pressure altitude:

Fuel flow per engine	= 330 lb/hr
Total fuel flow	= 660 lb/hr

Time and Fuel used were calculated at Maximum Recommended Cruise Power as follows:

$$\text{Time} = \frac{\text{Distance}}{\text{Ground Speed}}$$ Distance

Fuel Used = (time) (total fuel flow)

RESULTS ARE AS FOLLOWS:

ROUTE SEGMENT	DISTANCE NM	ESTIMATED GROUND SPEED KNOTS	TIME AT CRUISE ALTITUDE HRS : MIN	FUEL USED FOR CRUISE LBS.
BIL - SHR	59*	255	0 : 14	153
SHR - CZI	57	274	0 : 13	137
CZI - CPR	33*	268	0 : 07	81

* Distance to Climb or Descend subtracted from Distance

DETERMINATION OF FLIGHT TIME
BLOCK SPEED AND FUEL REQUIREMENT

ITEM	TIME HRS : MINS	FUEL POUNDS	DISTANCE NAUTICAL MILES
Start, Runup, Taxi, Take-off, Accelerate	00 : 00	55	0 0
Climb	: 09	84	29
Cruise	: 34	371	149
Descent	: 11	80	35
Total	: 54	590	213

Total Flight Time: 54 Min

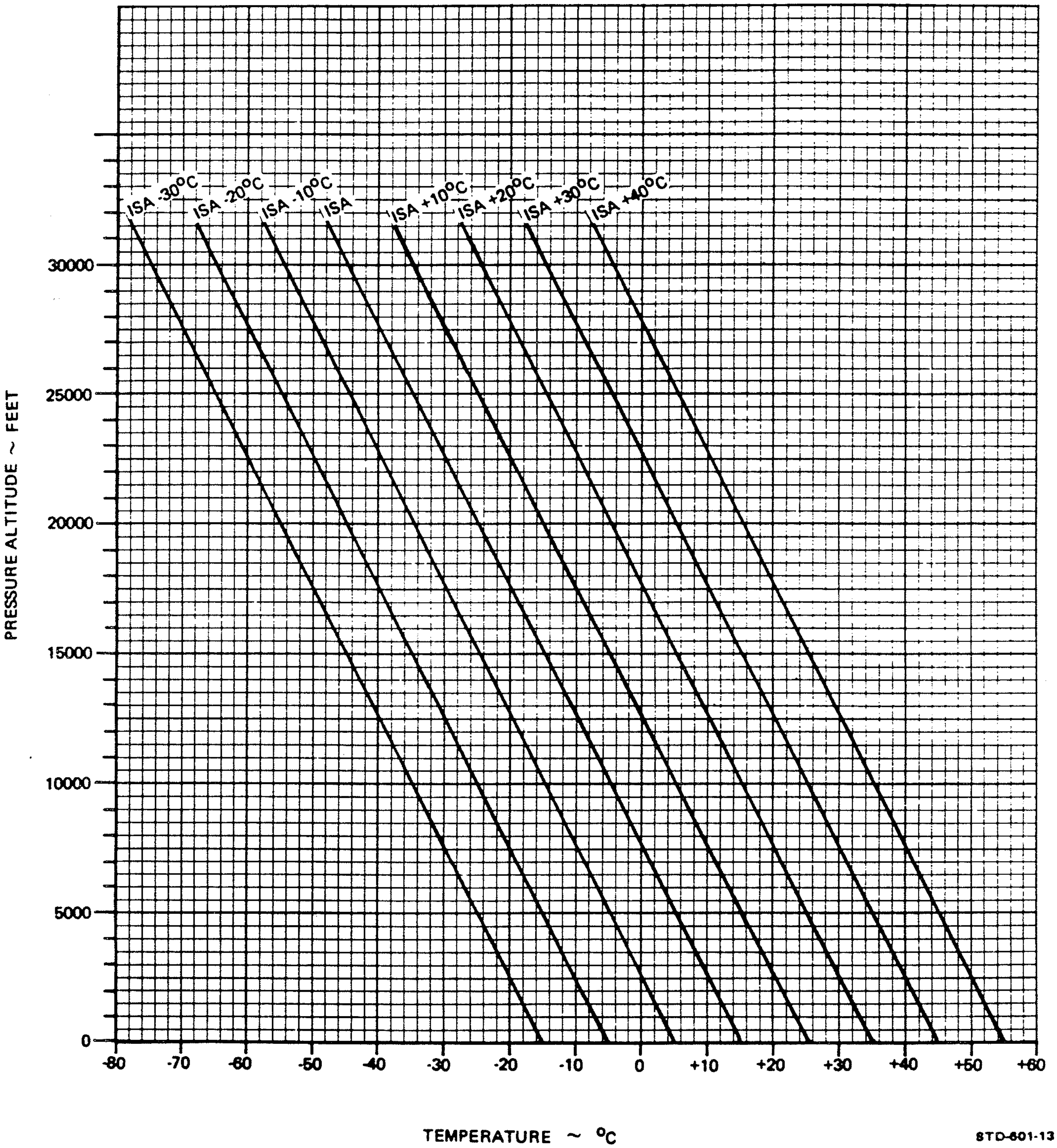
Block Speed:

Reserve Fuel): Assumed here to be 45 minutes at maximum recommended cruise power).
45 min x 660 lb/hr. - 495 lbs

Total Fuel: 590 + 495 - 1085 lbs (162 Gal. Aviation Kerosene)

ISA CONVERSION

PRESSURE ALTITUDE VS OUTSIDE AIR TEMPERATURE



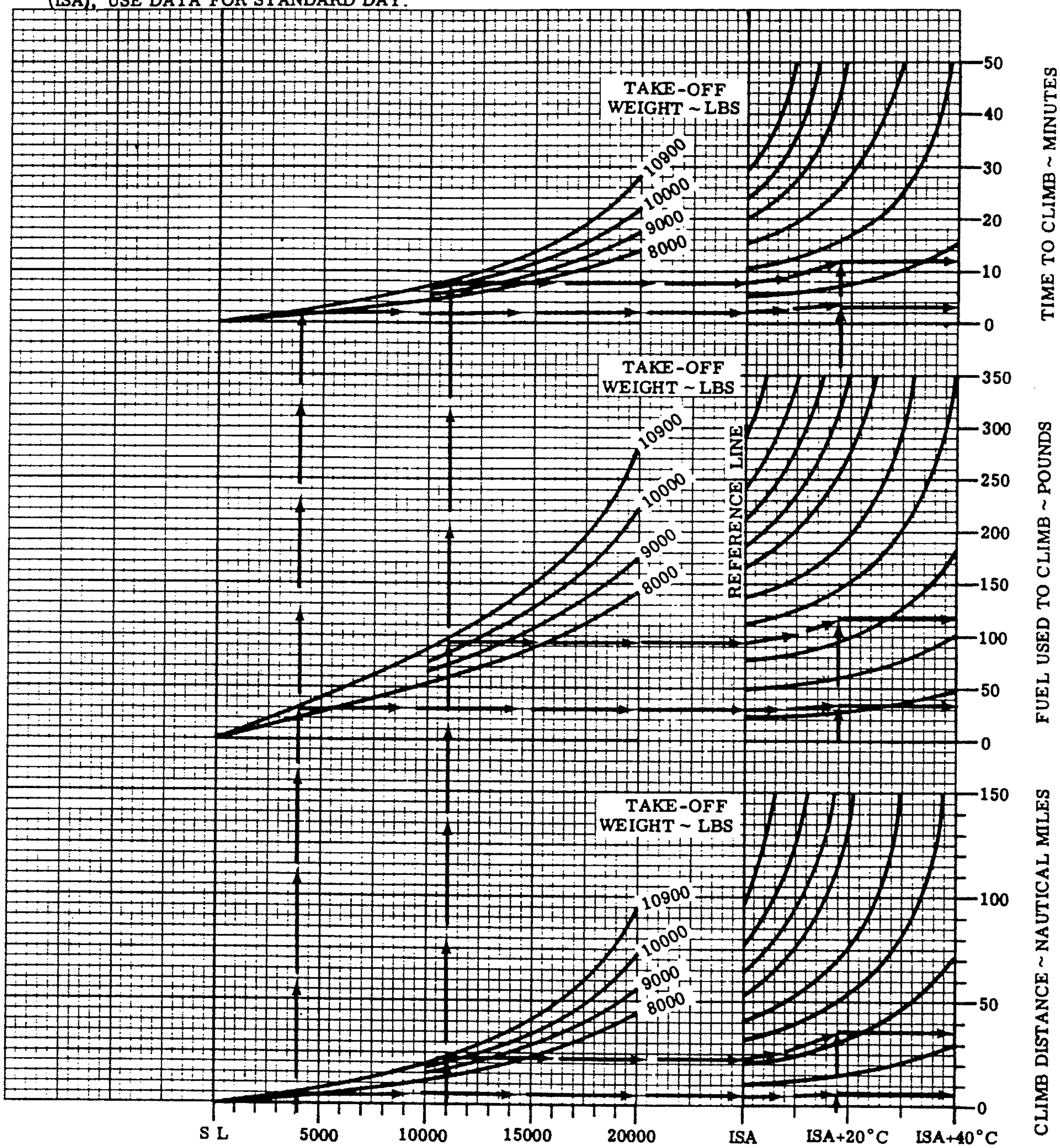
CRUISE CLIMB

CLIMB SPEED 160 KIAS
PROPELLER SPEED 2000 RPM
ITT 695 °C
OR
TORQUE 1628 FT LBS

NOTE: ADD 55 LBS FUEL FOR TAXI, TAKE-OFF, AND ACCELERATION TO 160 KIAS. FOR TEMPERATURE BELOW STANDARD DAY (ISA), USE DATA FOR STANDARD DAY.

EXAMPLE:

AIRPORT PRESSURE ALTITUDE	3966 FT
ALTITUDE AT END OF CLIMB	11000 FT
INITIAL CLIMB WEIGHT	10725 LBS
OAT (ISA + 18°C)	25 °C
TIME TO CLIMB (12 - 3)	9 MIN
FUEL USED TO CLIMB (118-34)	84 LBS
DISTANCE TRAVELED DURING CLIMB (35 - 6)	29 NM



A99A-601-110

DESCENT

DESCENT SPEED: 170 KIAS

ASSOCIATED CONDITIONS:

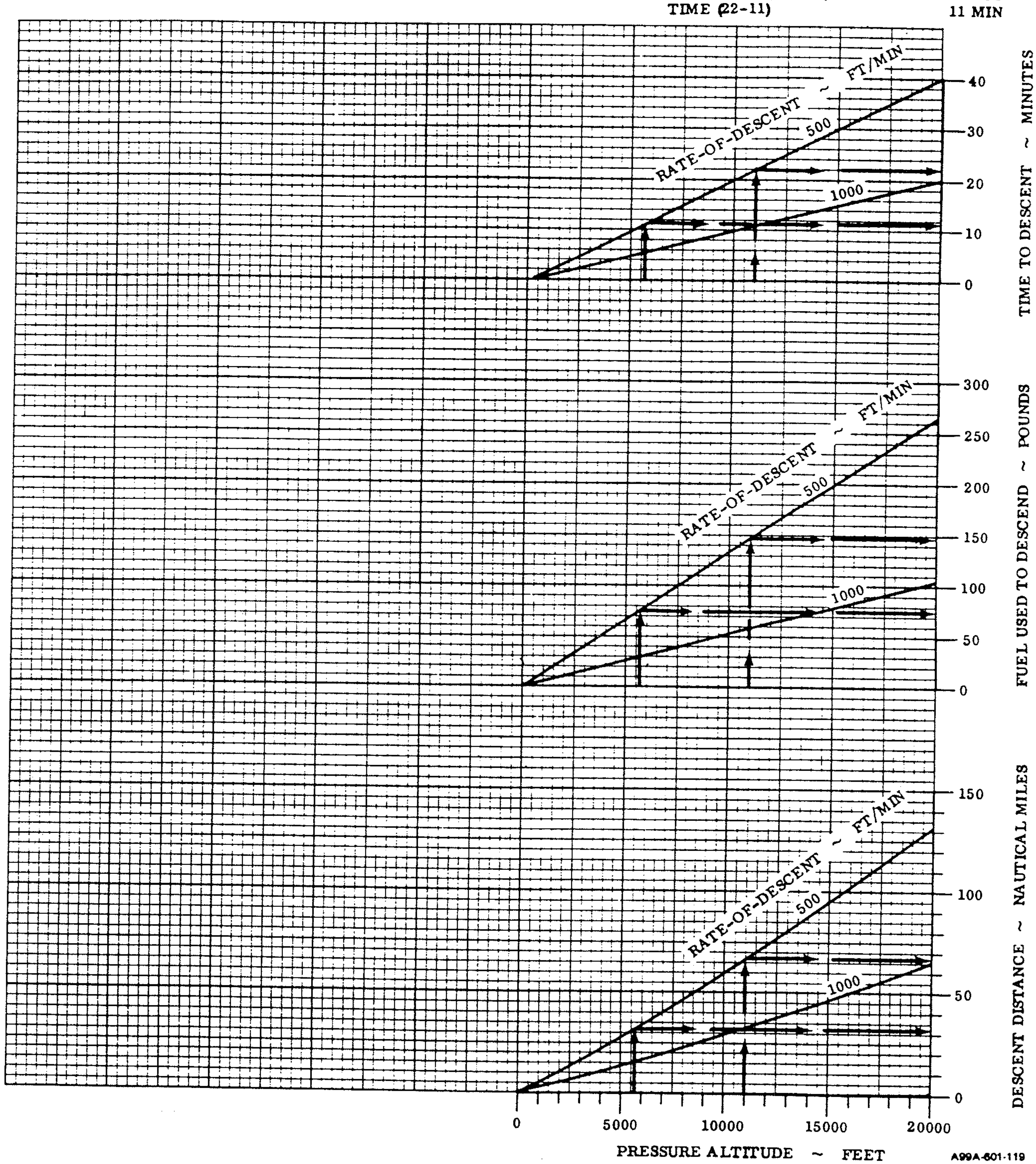
POWER	AS REQUIRED FOR DESIRED RATE OF DESCENT
FLAPS	UP
GEAR	UP
TEMPERATURE	APPROXIMATELY APPLICABLE FOR ALL TEMPERATURES

EXAMPLE:

INITIAL ALTITUDE	11000 FT
FINAL ALTITUDE	5668 FT
RATE-OF-DESCENT	500 FT/MIN

DESCENT

DISTANCE TRAVELED (67-32)	35 NM
FUEL USED (148-68)	80 LBS
TIME (22-11)	11 MIN



MAXIMUM RECOMMENDED CRUISE POWER

ISA -30°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT °C	IOAT °F	TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS 10500 CAS	10500 TAS	9500 CAS	9500 TAS	8500 CAS	8500 TAS
SL	-9	16	1459	342	684	226	214	226	214	226	214
2000	-13	9	1501	341	682	226	220	226	220	226	220
4000	-16	3	1546	343	686	226	227	226	227	226	227
6000	-20	-3	1592	347	694	226	233	226	233	226	233
8000	-23	-10	1628	351	702	224	238	225	240	226	240
10000	-27	-16	1628	350	700	221	242	223	244	224	246
12000	-31	-23	1628	349	698	218	247	220	249	222	251
14000	-34	-30	1621	348	696	215	251	217	253	219	256
16000	-38	-37	1486	319	638	205	247	207	250	210	252
18000	-43	-45	1347	290	580	194	242	197	245	199	248
20000	-47	-53	1224	264	528	184	236	187	240	190	244
22000	-51	-60	1106	239	478	172	229	176	234	180	239
24000	-56	-68	993	215	430	160	219	165	267	169	233
26000	-60	-76	891	194	388	145	206	154	218	159	226

MAXIMUM RECOMMENDED CRUISE POWER

ISA -20°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	1	34	1487	349	698	226	218	226	218	226	218
2000	-2	28	1531	349	698	226	224	226	224	226	224
4000	-6	21	1576	351	702	226	231	226	231	226	231
6000	-9	15	1624	356	712	225	236	226	238	226	238
8000	-13	8	1628	354	708	222	241	224	243	225	245
10000	-17	2	1628	352	704	219	245	221	247	223	249
12000	-20	-5	1628	352	704	217	250	218	252	220	254
14000	-24	-12	1550	335	670	210	250	212	252	214	255
16000	-28	-19	1457	315	630	202	248	204	251	206	254
18000	-32	-26	1366	296	592	194	246	196	250	199	253
20000	-37	-34	1246	270	540	183	241	187	245	189	249
22000	-41	-42	1129	245	490	172	234	176	239	179	244
24000	-45	-50	1015	221	442	160	224	165	232	169	238
26000	-50	-58	910	199	398	145	211	153	223	159	231

MAXIMUM RECOMMENDED CRUISE POWER

ISA -10°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	11	53	1515	357	714	226	222	226	222	226	222
2000	8	46	1559	357	714	226	229	226	229	226	229
4000	4	40	1606	359	718	225	235	226	236	226	236
6000	1	34	1628	359	718	223	239	225	241	226	243
8000	-3	27	1628	356	712	220	244	222	246	224	248
10000	-7	20	1628	354	708	218	248	219	250	221	252
12000	-10	13	1548	336	672	210	248	213	250	215	253
14000	-15	6	1457	317	634	203	247	205	249	207	252
16000	-19	-1	1370	299	598	195	245	197	248	200	251
18000	-23	-8	1285	281	562	187	243	190	246	192	250
20000	-27	-16	1205	264	528	179	240	182	245	185	248
22000	-31	-23	1122	246	492	170	236	174	242	177	246
24000	-35	-31	1035	227	454	159	229	165	237	169	243
26000	-40	-38	929	205	410	145	216	153	228	159	236

MAXIMUM RECOMMENDED CRUISE POWER

ISA 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	22	71	1542	364	728	226	226	226	226	226	226
2000	18	65	1588	365	730	226	233	226	233	226	233
4000	15	58	1628	366	732	224	238	226	239	226	240
6000	[redacted]										
8000	7	45	1608	354	708	217	245	219	247	221	250
10000	3	38	1527	336	672	210	245	213	247	214	250
12000	-1	31	1443	317	634	203	244	205	246	207	249
14000	-5	23	1365	300	600	196	243	198	246	201	249
16000	-9	16	1286	282	564	188	241	191	245	193	248
18000	13	9	1205	265	530	180	238	183	243	186	246
20000	-17	1	1130	249	498	172	235	176	240	179	245
22000	-21	-6	1056	233	466	163	231	168	238	171	243
24000	-25	-14	985	218	436	153	225	159	234	164	240
26000	-30	-21	916	203	406	142	215	150	228	156	237

MAXIMUM RECOMMENDED CRUISE POWER

ISA +10°C   1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	32	90	1568	372	744	226	230	226	230	226	230
2000	28	83	1615	373	746	225	236	226	237	226	237
4000	25	77	1613	366	732	221	239	223	241	225	243
6000	21	70	1552	349	698	215	240	217	242	219	244
8000	17	62	1482	332	664	209	240	211	242	213	245
10000	13	55	1409	315	630	202	240	204	242	207	245
12000	9	48	1332	297	594	195	238	197	242	200	244
14000	5	41	1260	281	562	188	237	190	241	193	244
16000	1	34	1189	265	530	180	235	183	239	186	243
18000	-3	26	1120	249	498	172	232	176	238	179	242
20000	-7	19	1054	235	470	164	229	169	235	172	241
22000	-11	11	987	220	440	155	224	161	232	165	238
24000	-16	4	920	205	410	144	215	152	227	157	235
26000	-20	-4	854	191	382	129	200	142	220	149	231

MAXIMUM RECOMMENDED CRUISE POWER

ISA +20°C   1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	42	108	1577	375	750	223	231	225	233	226	234
2000	38	101	1529	360	720	218	232	220	234	222	236
4000	34	94	1478	344	688	213	233	215	236	216	238
6000	30	87	1423	328	656	207	234	209	237	211	239
8000	27	80	1358	311	622	200	234	203	237	205	239
10000	23	73	1291	294	588	193	233	196	236	198	239
12000	19	65	1221	278	556	186	232	189	236	192	239
14000	15	58	1156	263	526	179	230	182	235	185	238
16000	11	51	1092	248	496	171	228	175	233	178	237
18000	6	44	1029	233	466	163	225	168	231	172	236
20000	2	36	968	219	438	154	220	160	228	165	234
22000	-2	29	908	206	412	144	212	152	224	157	232
24000	-6	21	848	192	384	131	200	143	218	150	229
26000	-11	13	788	180	360	---	---	132	209	141	224

MAXIMUM RECOMMENDED CRUISE POWER

ISA +30°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	52	125	1414	351	702	212	223	215	225	216	227
2000	48	118	1376	336	672	208	225	210	227	212	229
4000	44	111	1336	321	642	203	226	205	229	207	231
6000	40	104	1294	307	614	197	227	200	230	202	233
8000	36	97	1239	292	584	191	227	194	230	196	233
10000	32	90	1179	276	552	184	226	187	230	190	233
12000	28	83	1115	260	520	177	224	181	229	183	232
14000	24	75	1054	245	490	170	222	174	227	177	232
16000	20	68	996	231	462	162	219	167	226	170	231
18000	16	61	937	217	434	153	214	159	223	163	229
20000	12	53	882	204	408	143	207	151	219	156	227
22000	7	45	827	192	384	130	195	142	213	149	224
24000	3	37	771	179	358	---	---	131	204	141	219
26000	-2	28	713	167	334	---	---	114	185	132	212

MAXIMUM RECOMMENDED CRUISE POWER

ISA +40°C 1900 RPM

PRESSURE ALTITUDE FEET	IOAT		TORQUE PER ENGINE FT LBS	FUEL FLOW PER ENGINE LBS/HR	TOTAL FUEL FLOW LBS/HR	AIRSPEED KNOTS					
						10500		9500		8500	
	°C	°F				CAS	TAS	CAS	TAS	CAS	TAS
SL	61	142	1257	327	654	202	215	204	217	206	220
2000	57	135	1227	313	626	197	217	199	219	201	222
4000	54	128	1195	300	600	192	218	195	221	197	224
6000	50	121	1162	287	574	188	220	190	222	193	225
8000	46	114	1113	272	544	181	219	184	223	187	226
10000	42	107	1061	258	516	175	218	178	222	181	226
12000	38	100	1006	243	486	167	216	171	221	175	225
14000	34	93	955	229	458	160	213	165	219	168	224
16000	30	85	903	216	432	152	209	157	217	162	223
18000	25	78	850	203	406	142	202	149	213	155	221
20000	21	70	798	190	380	129	190	140	207	148	218
22000	17	62	745	178	356	---	---	129	198	140	213
24000	12	53	691	166	332	---	---	111	176	130	206
26000	9	47	657	157	314	---	---	---	---	119	195

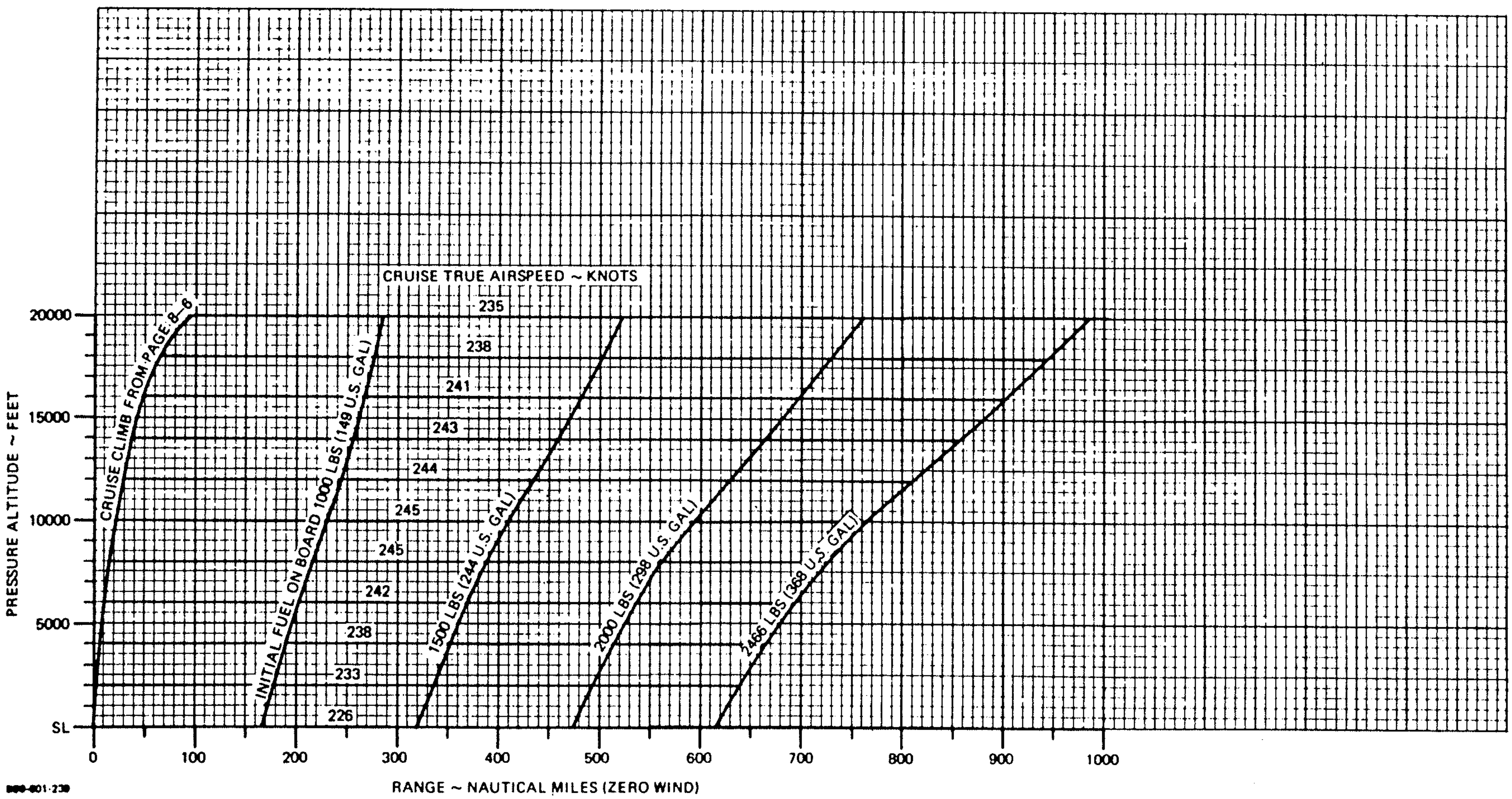
RANGE PROFILE — MAXIMUM RECOMMENDED CRUISE POWER

STANDARD DAY (ISA)
1900 RPM

ASSOCIATED CONDITIONS:

WEIGHT	10955 LBS BEFORE ENGINE START
FUEL	AVIATION KEROSENE
FUEL DENSITY	6.7 LBS/GAL

NOTE: RANGE INCLUDES START, TAXI, CLIMB, DESCENT, AND 45 MINUTES RESERVE FUEL AT MAXIMUM RANGE POWER



MAXIMUM RANGE POWER

ISA −30°C   1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	-11	13	1015	269	538	184	934	256	512	179	849	243	486	175
2000	-15	6	993	258	516	185	911	244	488	181	828	231	462	176
4000	-19	-1	962	245	490	185	890	233	466	182	807	220	440	177
6000	-22	-8	947	236	472	187	872	223	446	183	788	209	418	178
8000	-26	-15	929	227	454	188	851	214	428	184	776	201	402	180
10000	-30	-22	913	219	438	190	833	205	410	186	765	194	388	182
12000	-34	-29	898	211	422	191	827	199	398	188	747	185	370	183
14000	-38	-36	887	205	410	193	813	192	384	189	731	178	356	184
16000	-42	-43	878	200	400	194	802	186	372	191	718	171	342	186
18000	-46	-50	871	195	390	196	793	181	362	193	706	165	330	187
20000	-50	-57	868	192	384	199	788	177	354	195	699	161	322	189
22000	-53	-64	868	191	382	201	776	173	346	196	695	157	314	191
24000	-57	-71	870	190	380	204	777	171	342	198	694	155	310	194
26000	-61	-78	---	---	---	---	781	171	342	202	700	154	308	198

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA −20°C   1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	-1	31	1043	277	554	188	964	264	528	184	883	252	504	180
2000	-4	24	1009	263	526	188	942	252	504	185	861	239	478	181
4000	-8	17	990	252	506	190	920	241	482	187	838	228	456	182
6000	-12	9	961	240	480	190	887	228	456	187	815	216	432	183
8000	-16	3	941	231	462	191	865	218	436	188	801	208	416	185
10000	-20	-4	924	223	446	193	856	211	422	190	779	199	398	186
12000	-24	-11	920	217	434	195	839	203	406	191	760	190	380	187
14000	-28	-18	908	211	422	197	826	196	392	193	754	184	368	189
16000	-32	-25	899	205	410	199	815	190	380	195	741	178	356	191
18000	-36	-32	891	200	400	201	806	185	370	196	730	172	344	192
20000	-39	-39	886	197	394	203	799	181	362	198	721	167	334	194
22000	-43	-46	884	195	390	205	795	178	356	201	715	163	326	196
24000	-47	-53	886	195	390	208	794	176	352	203	710	160	320	199
26000	-51	-60	---	---	---	---	795	175	350	206	709	158	316	201

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA −10°C 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	10	49	1035	278	556	189	969	267	534	186	885	254	508	182
2000	6	42	1006	265	530	190	954	256	512	188	873	243	486	184
4000	2	35	995	255	510	192	925	244	488	189	858	233	466	186
6000	-2	28	970	244	488	193	898	232	464	190	842	223	446	188
8000	-6	21	949	234	468	194	887	224	448	192	814	212	424	188
10000	-10	14	943	228	456	197	866	215	430	193	790	202	404	189
12000	-14	7	927	220	440	198	847	206	412	194	779	195	390	191
14000	-18	0	915	213	426	200	833	199	398	196	763	187	374	192
16000	-21	-7	906	208	416	202	831	195	390	199	749	181	362	194
18000	-25	-14	907	205	410	205	821	189	378	200	738	175	350	196
20000	-29	-21	902	202	404	207	815	185	370	202	730	170	340	198
22000	-33	-27	900	200	400	209	810	182	364	205	730	167	334	201
24000	-37	-34	900	199	398	212	807	180	360	207	725	163	326	203
26000	-41	-41	---	---	---	---	809	179	358	210	722	161	322	205

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	20	67	1032	280	560	191	964	268	536	188	898	258	516	185
2000	16	60	1001	266	532	191	948	257	514	190	880	246	492	187
4000	12	53	990	257	514	194	918	245	490	190	864	236	472	188
[redacted]												224	448	189
8000	4	39	962	239	478	197	887	226	452	194	814	214	428	190
10000	0	32	945	230	460	199	868	217	434	195	805	207	414	193
12000	-4	25	930	222	444	200	851	209	418	196	785	198	396	194
14000	-7	19	919	216	432	202	848	203	406	199	768	190	380	195
16000	-11	12	919	212	424	205	835	197	394	201	754	183	366	196
18000	-15	5	913	208	416	207	826	192	384	203	751	178	356	199
20000	-19	-2	909	205	410	209	820	188	376	205	742	173	346	201
22000	-23	-9	909	203	406	212	823	186	372	208	735	169	338	203
24000	-27	-16	916	204	408	216	821	184	368	211	730	166	332	205
26000	-30	-23	---	---	---	---	824	184	368	214	728	164	328	208

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA +10°C   1900 RPM

			10500 LBS				9500 LBS				8500 LBS			
PRESSURE ALTITUDE	I.O.A.T.		TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS	TORQUE PER ENG	FUEL FLOW PER ENG	FUEL FLOW TOTAL	TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	30	86	1021	281	562	192	953	269	538	189	908	261	522	188
2000	26	79	1015	271	542	194	944	259	518	191	875	248	496	188
4000	22	72	989	259	518	195	916	247	494	192	861	237	474	190
6000	18	65	966	248	496	196	905	237	474	194	831	225	450	190
8000	14	58	962	241	482	199	884	228	456	195	808	215	430	191
10000	11	51	947	232	464	201	867	219	438	197	801	208	416	194
12000	7	44	935	225	450	203	862	212	424	200	783	199	398	195
14000	3	37	934	221	442	206	849	206	412	201	768	192	384	197
16000	-1	30	925	215	430	208	839	200	400	203	765	186	372	200
18000	-5	24	920	211	422	210	831	195	390	205	753	180	360	201
20000	-9	17	920	209	418	213	834	192	384	209	745	176	352	203
22000	-12	10	924	208	416	216	831	189	378	211	740	172	344	206
24000	-17	2	---	---	---	---	832	188	376	214	736	169	338	208
26000	-21	-5	---	---	---	---	---	---	---	---	736	167	334	211

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA +20°C   1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	40	104	1012	282	564	193	940	270	540	189	895	261	522	188
2000	36	97	1005	272	544	195	931	259	518	192	861	248	496	189
4000	32	90	981	260	520	196	905	247	494	193	852	238	476	191
6000	28	83	979	252	504	199	901	239	478	196	826	226	452	192
8000	24	76	962	243	486	201	883	230	460	197	820	219	438	195
10000	21	69	948	235	470	203	867	221	442	199	800	209	418	196
12000	17	62	946	229	458	206	863	214	428	202	783	201	402	197
14000	13	55	937	223	446	208	852	208	416	203	769	194	388	199
16000	9	48	933	219	438	210	844	202	404	206	766	188	376	202
18000	5	42	931	215	430	213	844	198	396	209	757	183	366	204
20000	2	35	929	213	426	215	840	195	390	211	751	178	356	206
22000	-3	27	---	---	---	---	839	192	384	214	746	174	348	209
24000	-7	20	---	---	---	---	---	---	---	---	749	172	344	212
26000	-10	13	---	---	---	---	---	---	---	---	750	171	342	215

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA +30°C 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	50	122	1002	283	566	194	930	271	542	190	884	262	524	189
2000	46	115	1000	274	548	197	925	261	522	193	852	249	498	189
4000	42	108	978	262	524	198	899	249	498	194	843	239	478	192
6000	38	101	976	254	508	201	895	240	480	197	816	227	454	193
8000	35	94	961	245	490	203	877	231	462	198	812	220	440	196
10000	31	87	949	238	476	205	877	225	450	202	794	211	422	197
12000	27	81	952	232	464	208	864	217	434	203	779	202	404	199
14000	23	74	945	227	454	210	854	210	420	205	779	197	394	202
16000	19	67	941	222	444	213	848	205	410	208	767	190	380	204
18000	15	59	---	---	---	---	850	201	402	211	758	185	370	206
20000	11	52	---	---	---	---	848	198	396	214	756	181	362	209
22000	7	45	---	---	---	---	---	---	---	---	757	178	356	212
24000	4	38	---	---	---	---	---	---	---	---	755	175	350	215
26000														

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

MAXIMUM RANGE POWER

ISA +40°C 1900 RPM

PRESSURE ALTITUDE	I.O.A.T.		10500 LBS TORQUE PER ENG	10500 LBS FUEL FLOW PER ENG	10500 LBS FUEL FLOW TOTAL	10500 LBS TAS	9500 LBS TORQUE PER ENG	9500 LBS FUEL FLOW PER ENG	9500 LBS FUEL FLOW TOTAL	9500 LBS TAS	8500 LBS TORQUE PER ENG	8500 LBS FUEL FLOW PER ENG	8500 LBS FUEL FLOW TOTAL	8500 LBS TAS
FEET	°C	°F	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS	FT LB	LB/HR	LB/HR	KNOTS
S.L.	60	140	988	283	566	194	912	271	542	190	867	262	524	189
2000	56	133	989	274	548	197	911	261	522	194	837	249	498	190
4000	52	126	970	264	528	199	889	250	500	195	833	239	478	193
6000	49	119	974	256	512	202	891	242	484	198	810	228	456	194
8000	45	112	961	248	496	204	876	233	466	200	809	221	442	197
10000	41	105	952	240	480	206	877	227	454	203	792	212	424	198
12000	37	99	955	235	470	210	865	219	438	205	778	204	408	200
14000	33	91	---	---	---	---	858	213	426	208	780	199	398	204
16000	29	84	---	---	---	---	854	208	416	210	770	193	386	206
18000	25	77	---	---	---	---	---	---	---	---	764	188	376	208
20000	21	70	---	---	---	---	---	---	---	---	762	184	368	211
22000														
24000														
26000														

NOTE: TEMPERATURE AND ALTITUDE COMBINATIONS WHICH HAVE BEEN DELETED INDICATE THAT AIRSPEED IS LIMITED BY MAXIMUM CRUISE POWER.

RANGE PROFILE — MAXIMUM RANGE POWER

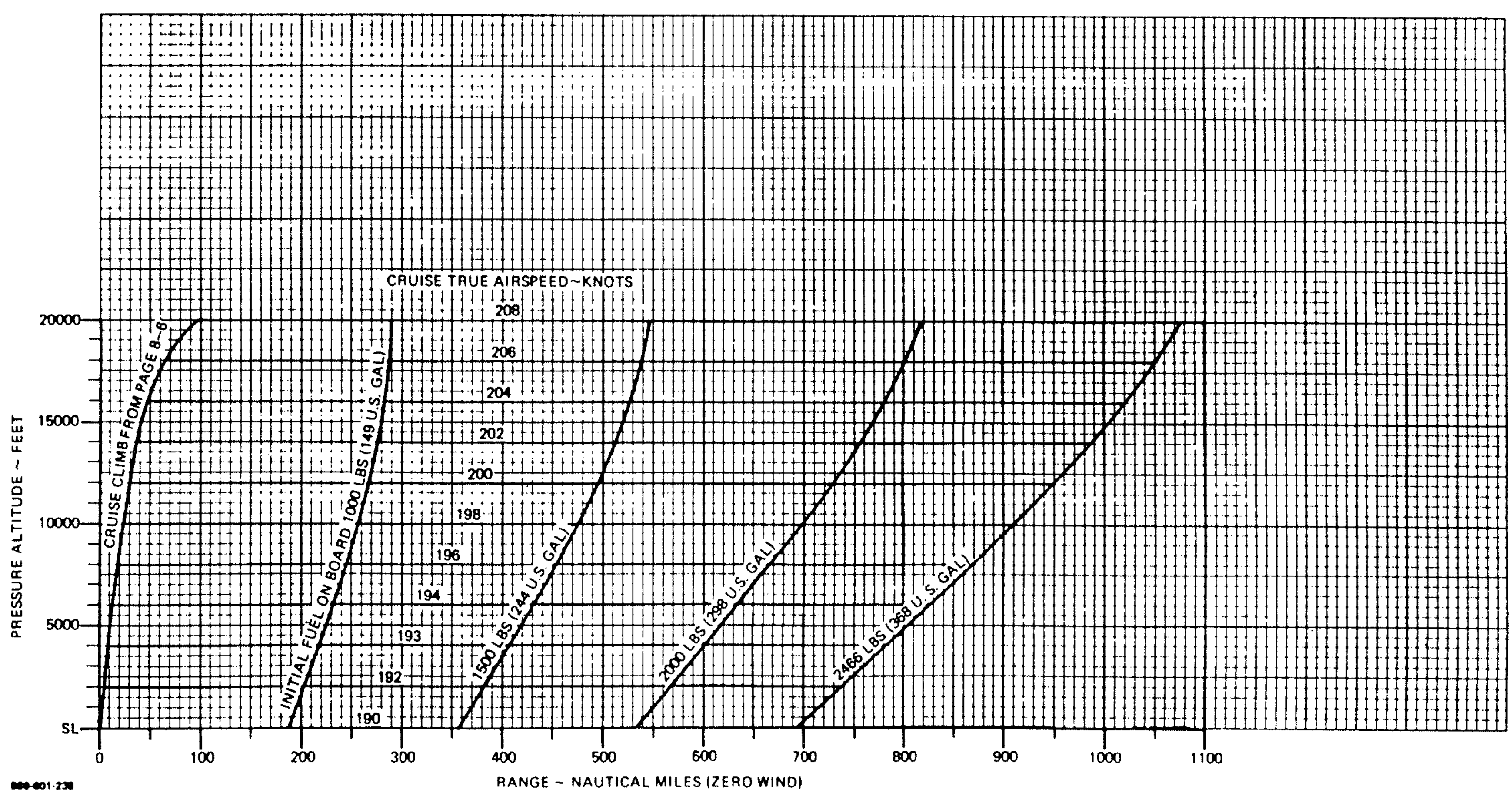
STANDARD DAY (ISA)

1900 RPM

ASSOCIATED CONDITIONS:

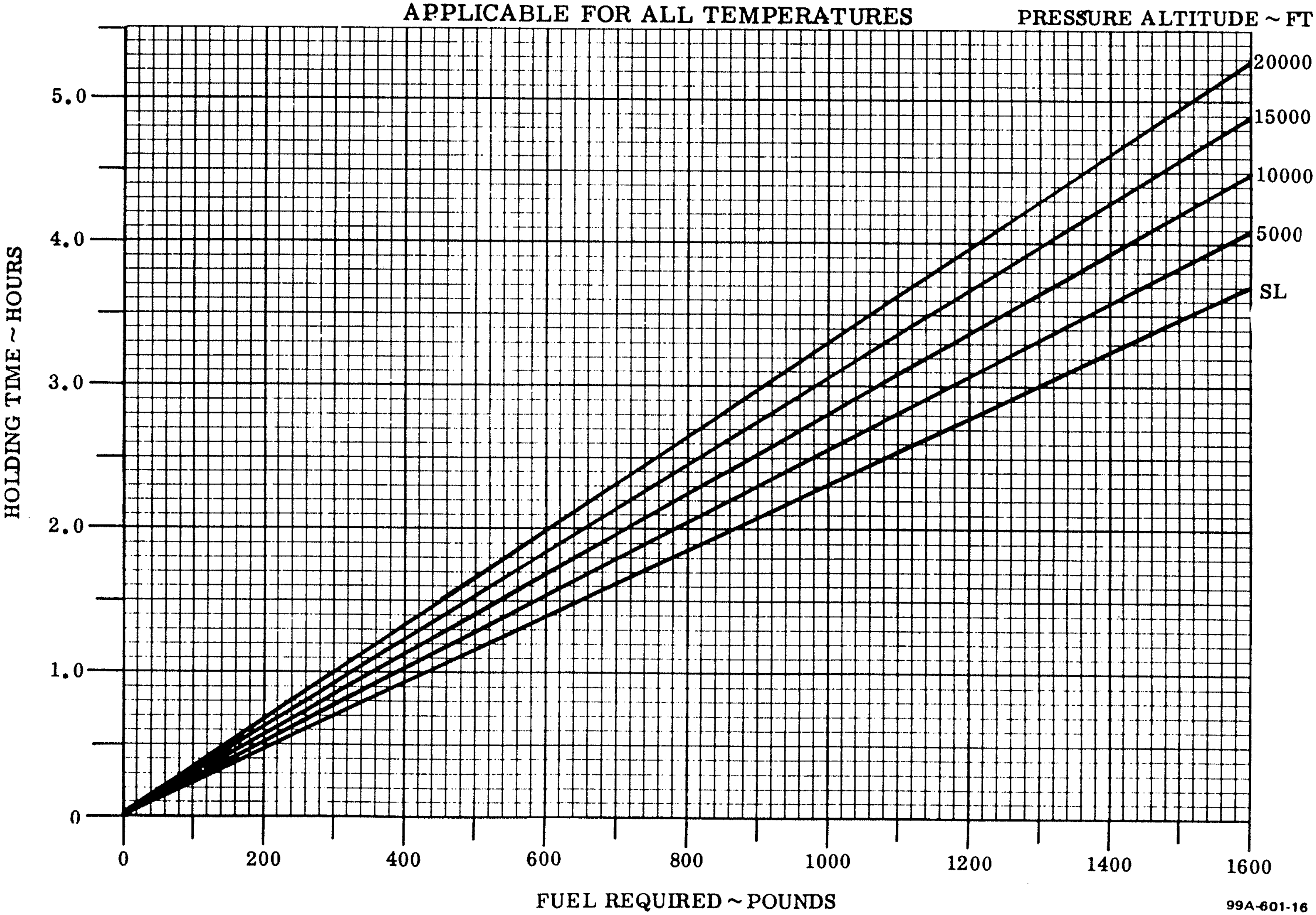
WEIGHT	10955 LBS BEFORE ENGINE START
FUEL	AVIATION KEROSENE
FUEL DENSITY	6.7 LBS/GAL

NOTE: RANGE INCLUDES START, TAXI, CLIMB, DESCENT, AND 45 MINUTES RESERVE FUEL AT MAXIMUM RANGE POWER



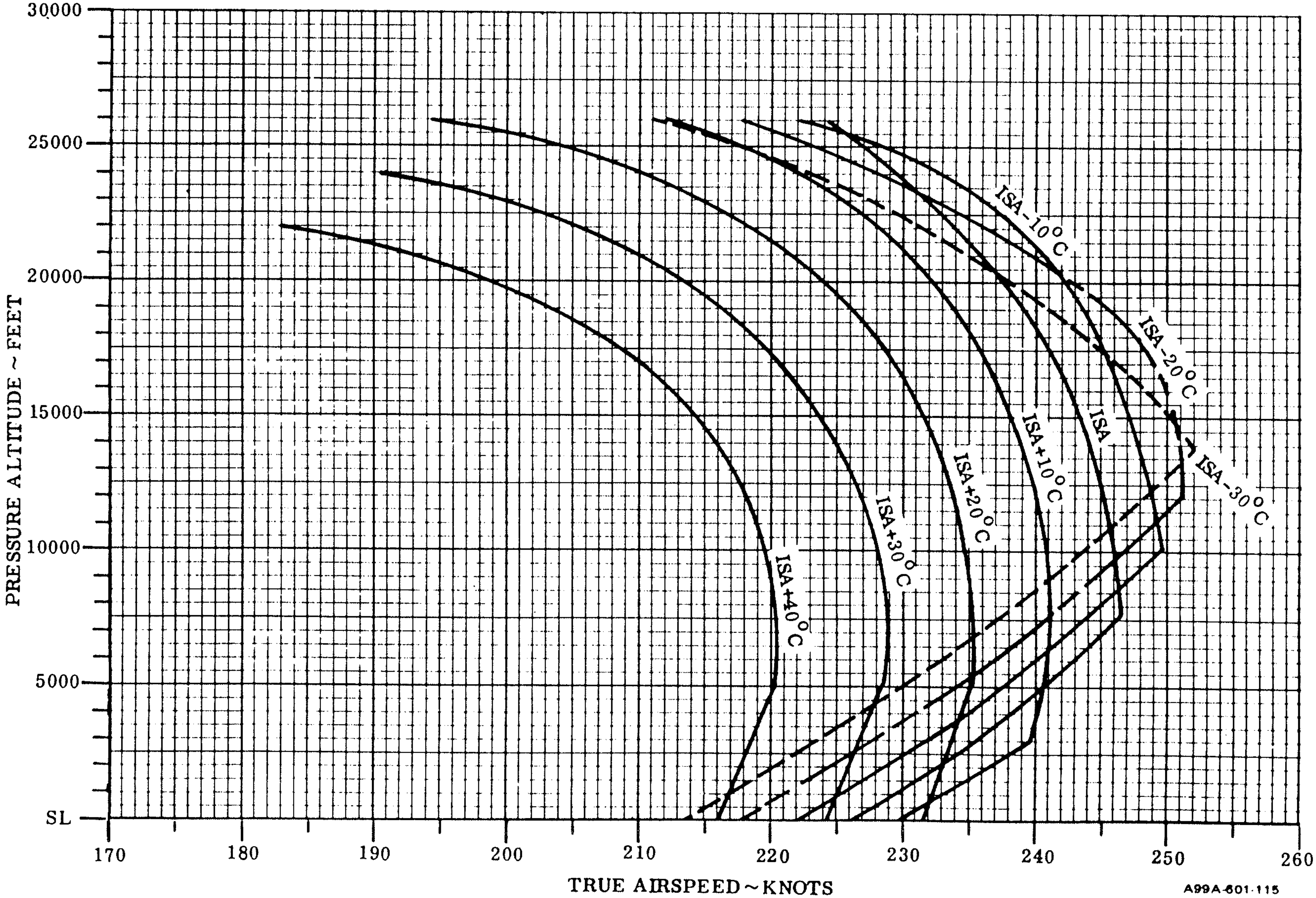
HOLDING TIME

TORQUE SETTING
600 FT LBS AT 1900 RPM
APPLICABLE FOR ALL TEMPERATURES



MAXIMUM CRUISE SPEED

MAXIMUM RECOMMENDED CRUISE POWER — 1900 RPM
WEIGHT 10,000 LBS

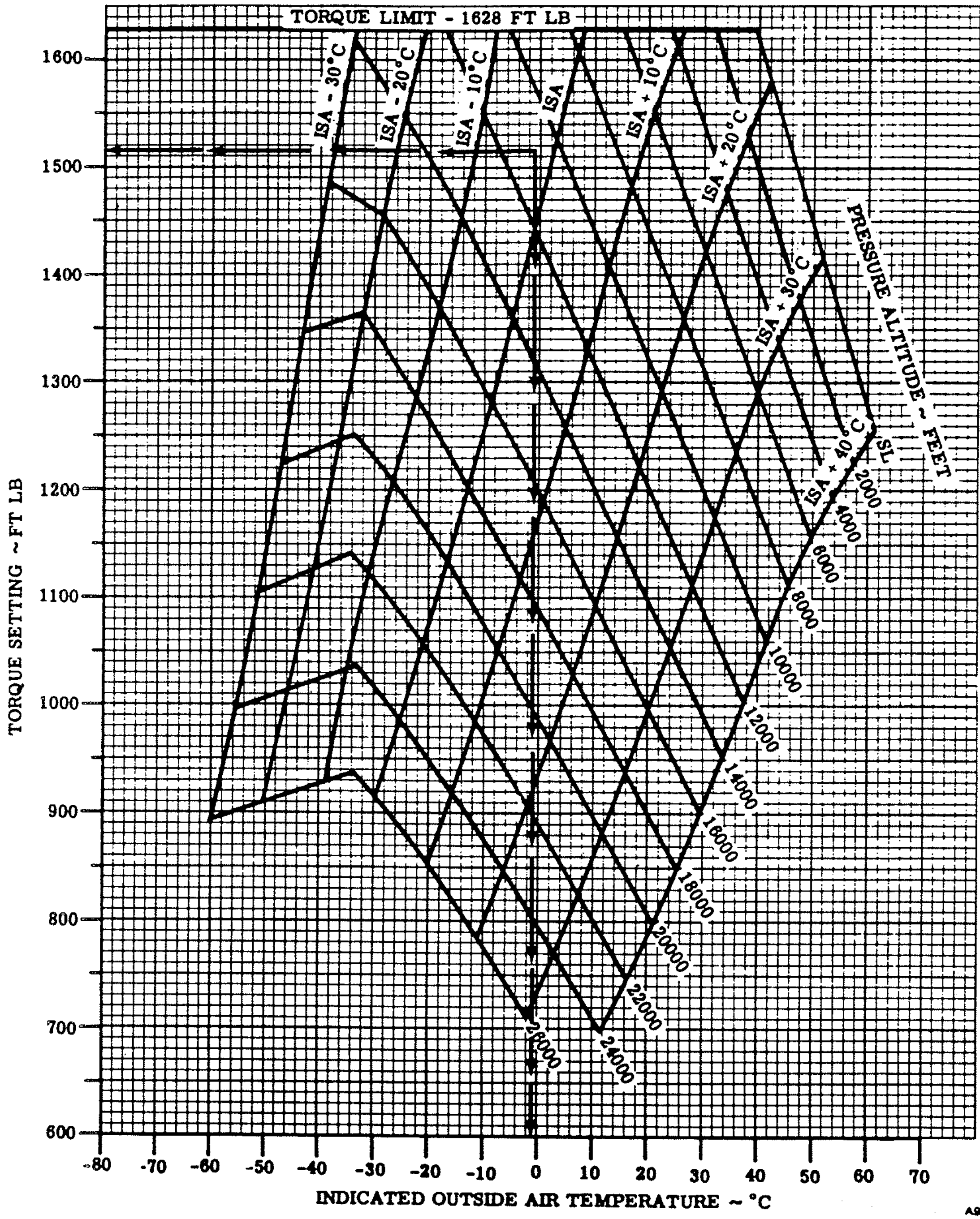


MAXIMUM RECOMMENDED CRUISE POWER

1900 RPM

EXAMPLE:

CRUISE ALTITUDE	11000	FT
TEMPERATURE (ISA - 3°C)	-10	°C
TORQUE SETTING	1515	FT LB
INDICATED OUTSIDE AIR TEMPERATURE	-1	°C

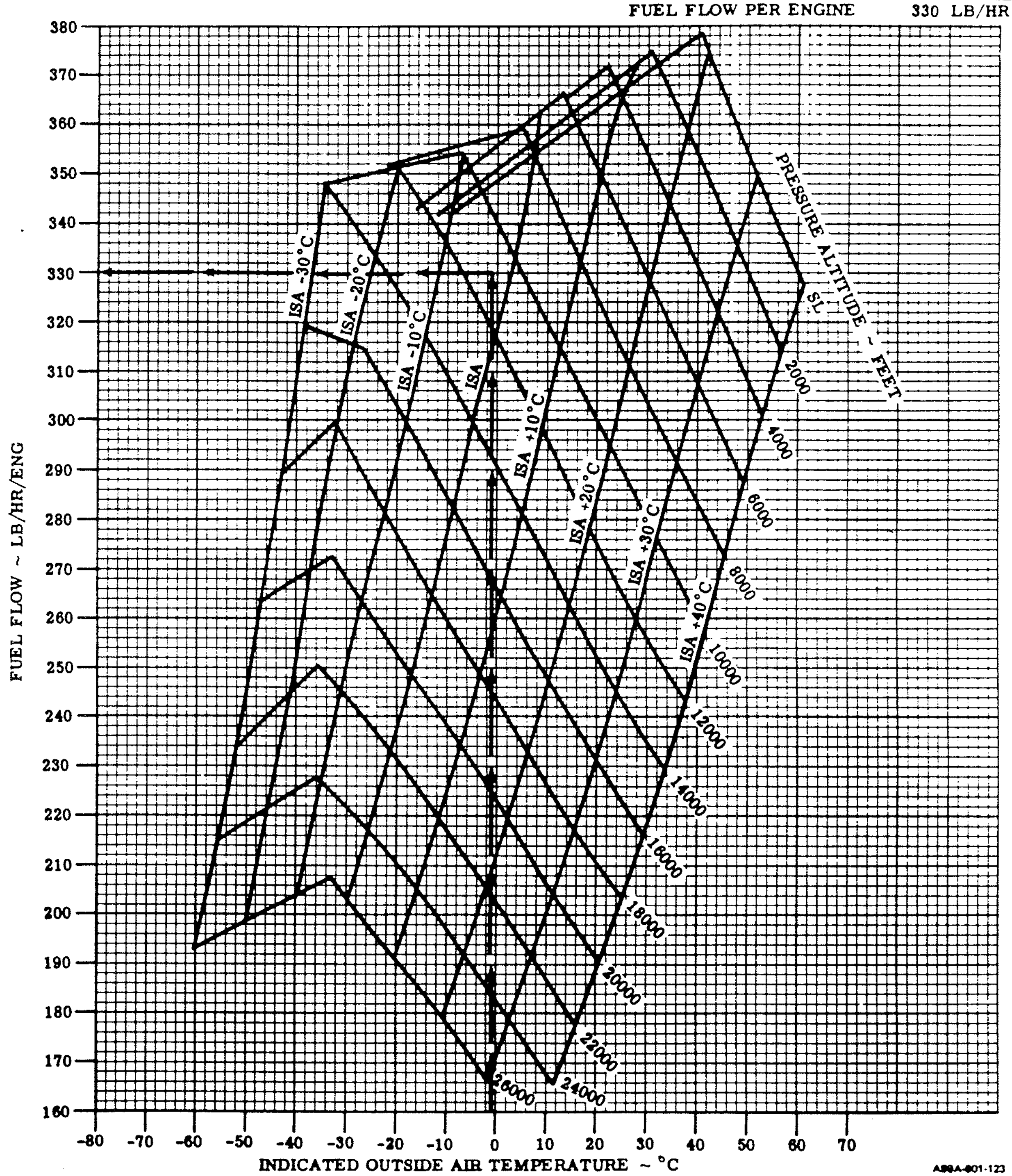


FUEL FLOW AT MAXIMUM RECOMMENDED CRUISE POWER

1900 RPM

EXAMPLE:

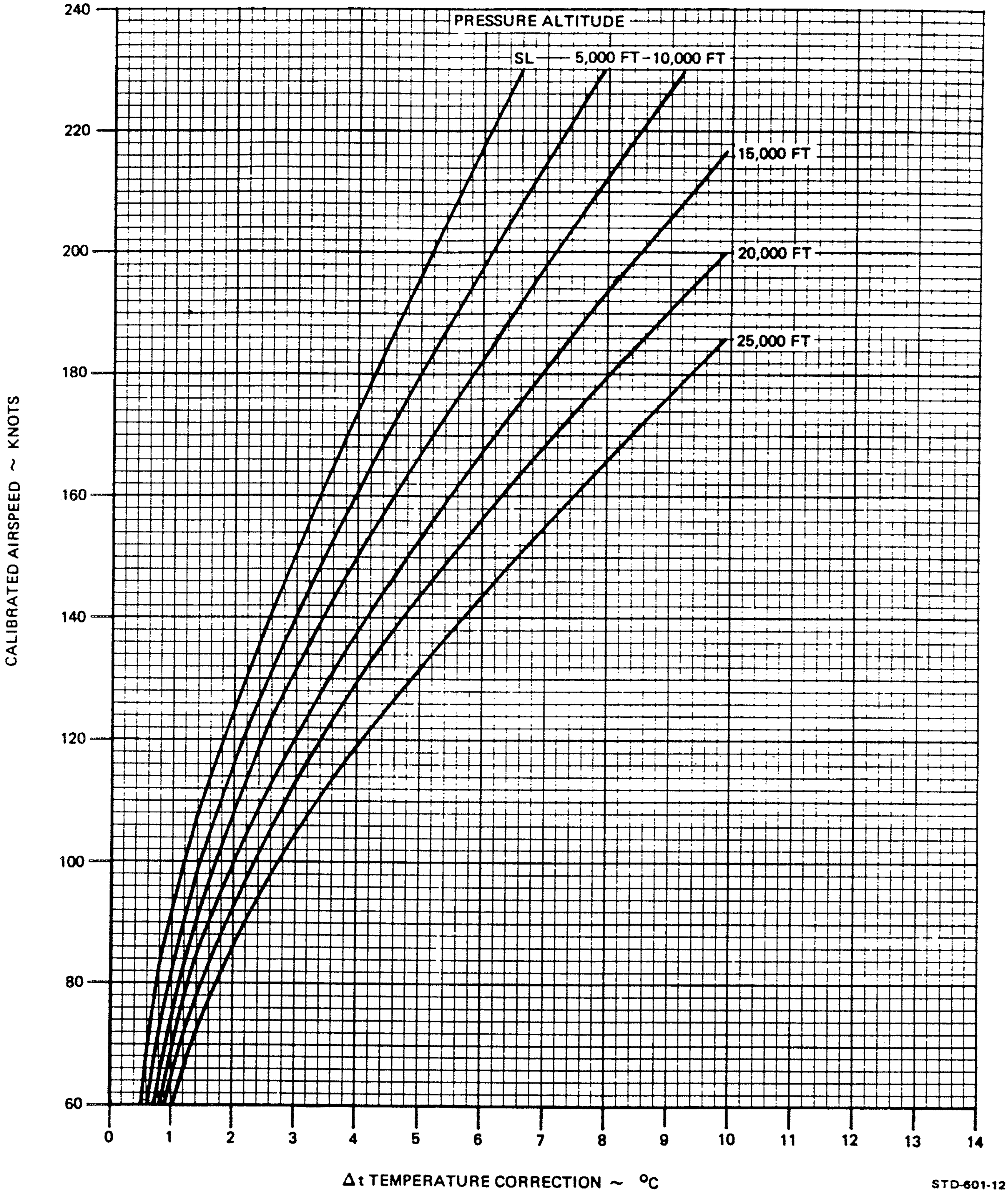
INDICATED OUTSIDE AIR TEMPERATURE	-1 °C
PRESSURE ALTITUDE	11000 FT
FUEL FLOW PER ENGINE	330 LB/HR



A99A-601-123

OUTSIDE AIR TEMPERATURE CORRECTION

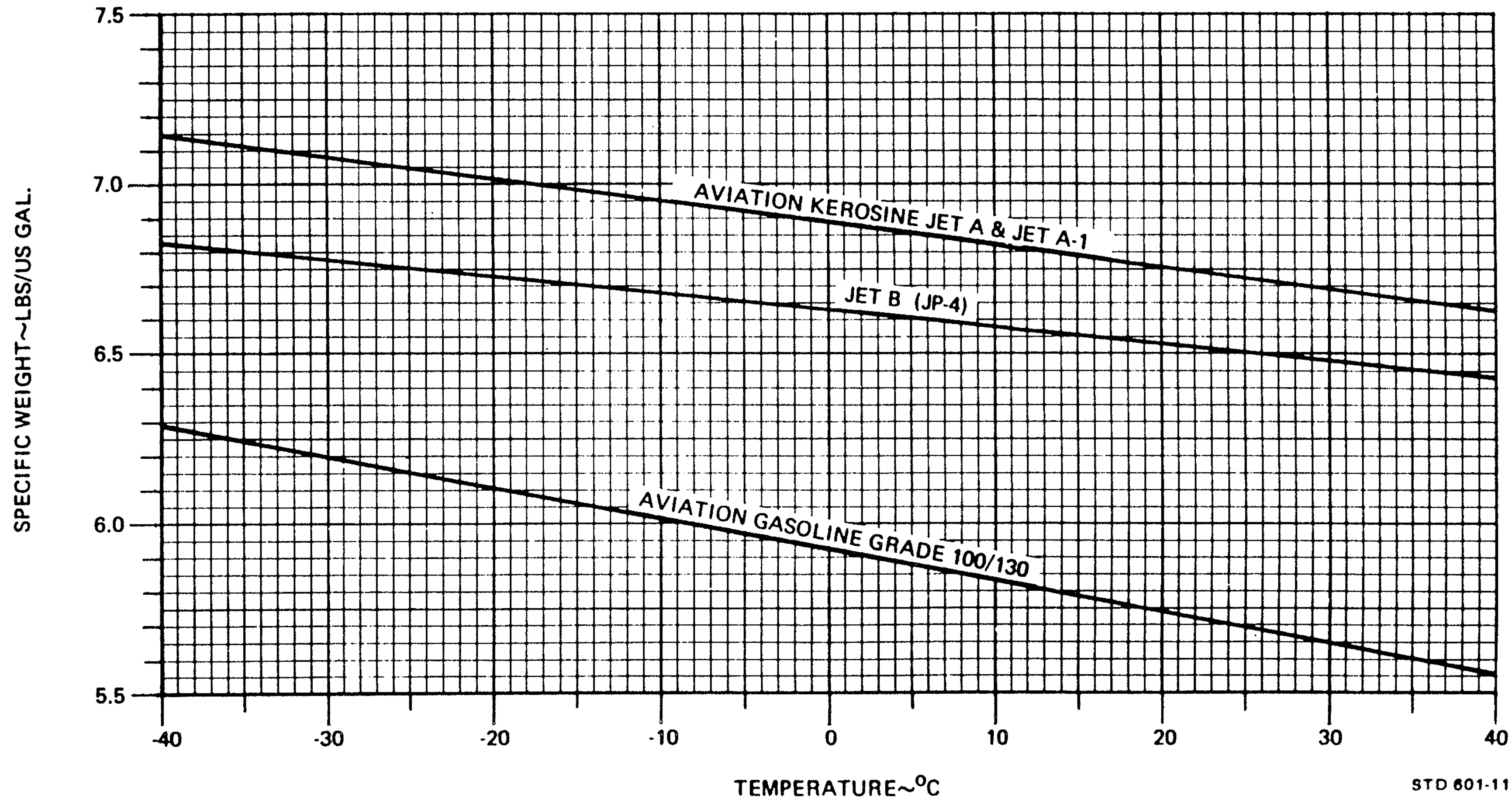
SUBTRACT Δt FROM INDICATED OAT TO OBTAIN TRUE OAT
(INDICATED OAT IS RAM AIR TEMPERATURE ASSUMING A RECOVERY FACTOR OF 1.)



DENSITY VARIATION OF AVIATION FUEL

BASED ON AVERAGE SPECIFIC GRAVITY

FUEL	AVERAGE SPECIFIC GRAVITY AT 15°C (59°F)
AVIATION KEROSINE JET A AND JET A1	.812
JET B (JP-4)	.785
AV GAS GRADE 100/130	.703



Beechcraft.

B99 EQUIPMENT LIST

SERIAL NO. L-151 **REGISTRATION NO.** N222[illegible]L **DATE** 6/[illegible]/91

STATUS OF EQUIPMENT: **X= Installed in Airplane** **O = Not Installed in Airplane**

		ITEM		WEIGHT (each)	ARM
	1		Full feathering, three-bladed reversing propeller system.		
		A.	Two Hartzell HC-B3TN-3 or HC-B3TN-3B Hubs with Hartzell T10173E-8 or T10173B-8 aluminum blades and Hartzell C-3065 or C-3065P spinners.	120	79
		B.	Two primary propeller governors, Beech 50-389077-15.	3	89
		D.	Two overspeed propeller governors, Beech 115-389 014-3.	4	85
	101		Fuel Pumps (Electric)		
		A.	Two jet pumps 99-389005-1 (Total Weight)	1	187
		B.	Four boost pumps 50-389053-5	3	152
	102		Oil Radiator		
		C.	Two engine oil radiators 97-389001-1	8	132
	103		Starter - Generator		
		D.	Two starter-generators 97-389001-1	31	142
	201		Main Wheel Assemblies		
		D.	Four multi-disc brake assemblies 99-8003-5	16	209
		E.	Four 6.50 x 10 type III wheel assemblies 99-8003-7.	10	209
	202		Main Wheel Tires		
		C.	Four 6.50 x 10 (10 ply rating) type III tube type tires with regular tubes.	12	209
	203		Nose Wheel Assembly		
		D.	One 6.50 x 10 type III wheel assembly Beech 99-8004-3.	9	-6
	302		Battery		
		E.	One GE 45 AMP-HR. battery (wing).	74	179

Beechcraft.

B99 EQUIPMENT LIST

SERIAL NO. **REGISTRATION NO.** **DATE**

STATUS OF EQUIPMENT: **X= Installed in Airplane** **O = Not Installed in Airplane**

	ITEM	WEIGHT (each)	ARM
	303 Landing Lights		
	A. Four GE 4596 sealed beam lamps (total wt.)	2	182
	304 Anti-Collision Lights		
	A. One rotating light (upper) Grimes 40-0127-1	2	486
	B. One rotating light (lower) Grimes 40-0127-3	3	203
	305 Voltage Regulators		
	B. Two Leland CSV-1152-10 voltage regulators.	2	172
	401 Approved Flight Manual		
	D. FAA approved flight manual (B99) 99-590026-1, 10900 pounds gross weight, dated March 13, 1972 or later.		
	402 ~~Cabin Heater Installation~~	50	105
	Optional aft blower.	13	252
	405 Seats - Cockpit		
	A. Two cockpit seats	31	131
	Seats - Cabin		
	502 Surface De-Ice System	38	287
	503 Windshield		
	A. Electric windshield assembly (LH and RH)	7	108
	504 Engine and Engine Accessories		
	A. Two engine air inlet electro-thermal boots, Beech 50-389028 (total weight).	1	97
	601 Stabilizer Actuator		
	E. One actuator - Talley 115-380111-19.	11	425
	602 Pre-Stall Warning Indicator		

![Beechcraft]

B99 EQUIPMENT LIST

SERIAL NO. **REGISTRATION NO.** **DATE**

STATUS OF EQUIPMENT: **X= Installed in Airplane** **O = Not Installed in Airplane**

		ITEM	WEIGHT (each)	ARM
		C. One electric stall warning transducer vane, heated - Safe Flight 795-6.	NEGL	
	603	One Electric Speed Control Indicator - Safe Flight 571-28.	NEGL	
	604	Two Electrically Heated Pitot Tubes, Beech 115-384038 -1 and -2 (total weight).	1	76
	605	B. Emergency Instrument Static Air Valve - Kohler K4566-3.	NEGL	
	606	Engine Fire Detection System	3	164
	701	Cargo Baggage Pod Installation Per Beech Drawing 99-4002.	148	204
		Special Equipment		
		Flight hour meter	1	109
		Strobe lights	20	191
		Cargo door (exchange)	20	280
		Cabin door snubber	7	328
		Standby heating system (kit no. 99-90031).	28	143
		Avionics		
		King KX-175 NAV/COMM no.1		
		King KX-175 transceiver	7	101
		KN-70 glideslope receiver	4	4
		331A-3G indicator	3	101
		KA-39 voltage converter	1	1
		35-5003 antenna (99-430022-1)	3	241
		35-5017 antenna (99-340035-5)	7	408
		Wiring, plugs, etc.	3	90
		King KX-175 NAV/COMM no. 2		
		King KX-175 transceiver	7	101
		KI-211C NAV/glideslope indicator	3	101
		KA-39 voltage converter	1	-1

Beechcraft.

B99 EQUIPMENT LIST

SERIAL NO. **REGISTRATION NO.** **DATE**

STATUS OF EQUIPMENT: **X= Installed in Airplane** **O = Not Installed in Airplane**

	ITEM	WEIGHT (each)	ARM
	35-5003 antenna (99-340067-1)	3	66
	Wiring, plugs, etc.	3	90
	King KR-85 ADF		
	KR-85 receiver	4	101
	KI-225 indicator	2	101
	Loop antenna installation (99-340138-1)	5	172
	Sense antenna installation (99-340072-4)	2	173
	20128 filter	1	7
	Wiring, plugs, etc.	2	90
	Collins Aidio System		
	358C-4 isolation amplifier (2)	2	86
	356-F speaker amplifier (2)	1	6
	Wiring, plugs, etc.	3	45
	Narco MBT-24R Marker Beacon		
	MBT-24R receiver	1	6
	35-5016 antenna (99-340105-2)	1	50
	Wiring, plugs, etc.	1	54
	Collins PN-101 Compass System		
	3234-2G flox detector	1	196
	Bracket installation	1	196
	328A-3G slaving accessory and mount	4	-5
	332E-4 directional gyro and mount	5	8
	Wiring, plugs, etc.	3	100
	King KN-65 DME		
	KN-65 receiver and mount	9	4
	KI-265 indicator	1	101
	35-5018 antenna (99-340063-31)	3	87
	Wiring, plugs, etc.	3	60
	KT76A/ACK A-30 transponder		
	RCA AVQ-47 Radar		
	MI-585035 transceiver and mount	15	-10
	MI-585036-1 indicator	7	97
	MI-585034-1 antenna, reflector and waveguide	5	014

Beechcraft

B99 EQUIPMENT LIST

SERIAL NO. **REGISTRATION NO.** **DATE**

STATUS OF EQUIPMENT: **X= Installed in Airplane** **O = Not Installed in Airplane**

	ITEM	WEIGHT (each)	ARM
	Structure installation	1	-11
	Wiring, plugs, etc.	5	55
	Miscellaneous		
	Deco 20051 inverter (2)	14	203
	AAR 2502W monitor	2	101
	AIM 500 ECF gyro horizon	3	101
	50-384919 amplifier	1	1
	Emergency locator transmitter and antenna	3	402
	Radio shelves and accessories (115-340030-291)	7	58
	Radio control panel	3	101
	Relays and transformers	3	30
	Note: 1-weight is pounds each unless specified. Otherwise, weight for avionics units is total for number of units shown. Arm is inches aft of datum.		
	Note: 2-the numbered descriptions are items from drawing 99-002000, master equipment list-model B99.		
	Note: 3-loose equipment items are not included in basic empty weight of airplane.		
	Crew hatch installation per mod approval #0-LSA-91-177.	23.0	137.0

UP TO DATE

AIRCRAFT WEIGHT AND BALANCE REPORT

: over 3000 lbs. gross weight must be re-weighed every five years. All aircraft must .eighed immediately when alterations have resulted in an estimated 2% change in the empty either from a single change or an accumulation of changes.

IRCRAFT IDENTIFICATION	
Manufacturer:	BEECH
odel:	B99
erial Number:	U-151
egistration:	C -FBRO
ame and Address of Operator:	R.M.A.

2. PERMISSIBLE LIMITS: (from aircraft specification)	Gross Weight	C of G Limits
Wheels	10,900	179 - 195.0
Skis	N/A	
Floats	N/A	

IGHING DATA: Aircraft should be weighed with all required, optional or special equipment stalled, full hydraulic and de-icing fluid and residual fuel and oil. If aircraft is not ighed empty, use space below to delete items installed but not included in empty weight, to add items which are not installed, but which should be included in the empty weight.

tum Location: ______

pe of Scales Used: LOADMETER Aircraft weighed on Wheels XX Skis ___ Floats ___

aircraft is weighed on skis or floats, list the applicable installation drawings below:

tallation Drawings: N/A

	Gross Wt.	Tare Wt.	Net Wt.	Arm	Moment
ft Scale	2935	0	2935	209	613415
ght Scale	2945	0	2935	209	613415
ont/Rear Scale	670	0	670	-6	-4020

pty Weight 6570 Total Moment 1222810

pty weight center of gravity = Total Moment / Empty Weight = 186.4 ins. aft of datum

DELETE	WEIGHT	ARM	MOMENT	ADD	WEIGHT	ARM	MOMENT
ENGINE OIL	-56	131	-7336				
UNUSEABLE FUEL	-35	163	-5705				

SED EMPTY WEIGHT C OF G = 187.0 AFT OF DATUM USEFUL LOAD =

If center of gravity is outside of permissible limits, additional calculations should be ed on a separate page to show that the center of gravity of the aircraft, when loaded in st critical configuration can be brought within permissible limits. If fixed ballast is ed to bring the center of gravity within limits this ballast should be included in the ent list.

tify that this data has been prepared in accordance with the provisions of the ing and Inspection Manual and to the best of my knowledge represents the true weight and centre of gravity of this aircraft".

d at: SPRINGBANK AIRPORT, CALGARY Date: JUNE 4, 1992

[signature]

Signat...

Beechcraft®

EQUIPMENT LIST

699 AIRLINER

AIRCRAFT SERIAL NO. U-151

DATE 1FEB73

REGISTRATION NO. N338PL

I.D.		DESCRIPTION	WEIGHT	ARM
10	1	FULL FEATHERING, THREE-BLADED REVERSING PROPELLER SYSTEM		
20		A. TWO HARTZELL HC-B3TN-3 OR HC-B3TN-3B HUBS WITH HARTZELL T10173E-8 OR T10173B-8 ALUMINUM BLADES AND HARTZELL C-3065 OR C-3065P SPINNERS	120	79
30		B. TWO PRIMARY PROPELLER GOVERNORS, BEECH 50-389077-15	3	89
40		D. TWO OVERSPEED PROPELLER GOVERNORS, BEECH 115-389014-3	4	88
50	101	FUEL PUMPS [ELECTRIC]		
60		A. TWO JET PUMPS 99-389005-1 [TOTAL WEIGHT]	1	187
70		E. FOUR BOOST PUMPS 50-389053-5	3	152
80	102	OIL RADIATOR		
90		C. TWO ENGINE OIL RADIATORS 50-389048-3	8	132
100	103	STARTER - GENERATOR		
110		D. TWO STARTER-GENERATORS 97-389001-1	31	142
150	201	MAIN WHEEL ASSEMBLIES		
190		D. FOUR MULTI-DISC BRAKE ASSEMBLIES 99-8003-5	16	209
191		E. FOUR 6.50 X 10 TYPE III WHEEL ASSEMBLIES 99-8003-7	10	209
200	202	MAIN WHEEL TIRES		
210		C. FOUR 6.50 X 10 [6 PLY RATING] TYPE III TUBE TYPE TIRES WITH REGULAR TUBES	12	209
250	203	NOSE WHEEL ASSEMBLY		
270		D. ONE 6.50 X 10 TYPE III WHEEL ASSEMBLY BEECH 99-8004-3	9	-6
300	204	NOSE WHEEL TIRE		
310		B. ONE 6.50 X 10 [6 PLY] TIRE W/ REGULAR TUBE	14	-6

90-35736

Beechcraft®

EQUIPMENT LIST

B99 AIRLINER

AIRCRAFT SERIAL NO. U-151

DATE 1FEB73

REGISTRATION NO. N338PL

I.D.		DESCRIPTION	WEIGHT	ARM
350	302	BATTERY		
380		E. ONE GE 45 AMP-HR. BATTERY 43BH34RB26 (WING)	74	179
400	303	LANDING LIGHTS		
410		A. FOUR GE 4596 SEALED BEAM LAMPS (TOTAL WT.)	2	182
420	304	ANTI-COLLISION LIGHTS		
430		A. ONE ROTATING LIGHT (UPPER) GRIMES 40-0127-1	2	486
440		B. ONE ROTATING LIGHT (LOWER) GRIMES 40-0127-3	3	203
470	305	VOLTAGE REGULATORS		
490		B. TWO LELAND CSV-1152-10 VOLTAGE REGULATORS	2	172
500	401	APPROVED FLIGHT MANUAL		
510		U. FAA APPROVED FLIGHT MANUAL (B99) 99-590026-1, 10900 POUNDS GROSS WEIGHT, DATED MARCH 13, 1972 OR LATER		
550	402	CABIN HEATER INSTALLATION	58	105
570	403	CABIN AIR CONDITIONER INSTALLATION	138	127
580		OPTIONAL AFT BLOWER	13	252
700	405	SEATS - COCKPIT		
710		A. TWO COCKPIT SEATS	31	131
800		SEATS - CABIN		
810		FLOOR MOUNTED CHAIRS W/ARM RESTS		
820		ROW I (2)	21	156
821		ROW II (2)	21	184
822		ROW III (2)	21	212
823		ROW IV (2)	21	240
824		ROW V (2)	21	268
825		ROW VI (1)	21	296
826		ROW VII (2)	12	326
827		ROW VIII (2)	11	352
900	502	SURFACE DE-ICE SYSTEM	38	287

Beechcraft

EQUIPMENT LIST

B99 AIRLINER

AIRCRAFT SERIAL NO. U-151

DATE 1FEB73

REGISTRATION NO. N338PL

I.D.		DESCRIPTION	WEIGHT	ARM
910	503	WINDSHIELD		
920		A. ELECTRIC WINDSHIELD ASSEMBLY [LH AND RH]	7	108
950	504	ENGINE AND ENGINE ACCESSORIES		
960		A. TWO ENGINE AIR INLET ELECTRO-THERMAL BOOTS, BEECH 50-389028 [TOTAL WEIGHT]	1	97
970	601	STABILIZER ACTUATOR		
990		E. ONE ACTUATOR - TALLEY 115-380111-19	11	425
1000	602	PRE-STALL WARNING INDICATOR		
1022		C. ONE ELECTRIC STALL WARNING TRANSDUCER VANE, HEATED - SAFE FLIGHT 795-6	NEGL	
1030	603	ONE ELECTRIC SPEED CONTROL INDICATOR SAFE FLIGHT 571-28	NEGL	
1040	604	TWO ELECTRICALLY HEATED PITOT TUBES, BEECH 115-384038-1 AND -2 [TOTAL WEIGHT]	1	76
1060	605	B. EMERGENCY INSTRUMENT STATIC AIR VALVE KOHLER K4566-3	NEGL	
1070	606	ENGINE FIRE DETECTION SYSTEM	3	164
1100	701	CARGO BAGGAGE POD INSTALLATION PER BEECH DRAWING 99-4002	148	204
1150		SPECIAL EQUIPMENT		
1160		FLIGHT HOUR METER	1	109
1165		STROBE LIGHTS	20	191
1170		CARGO DOOR [EXCHANGE]	20	280
1190		SEAT BELT CHIME	1	251
1210		CABIN DOOR SNUBBER	7	328
1220		STANDBY HEATING SYSTEM [KIT NO. 99-9003]	28	143
1250		CENTER AISLE CARPET RUNNER	4	248

90-35736

Beechcraft

EQUIPMENT LIST

B99 AIRLINER — AIRCRAFT SERIAL NO. U-151

DATE 1FEB73 — REGISTRATION NO. N338PL

I.D.	DESCRIPTION	WEIGHT	ARM
8650	KING KN-65 DME		
8605	KN-65 RECEIVER AND MOUNT	9	4
8620	KI-265 INDICATOR	1	101
8630	35-5018 ANTENNA (99-340063-3)	3	87
8645	WIRING, PLUGS, ETC.	3	60
9100	WILCOX 1014A TRANSPONDER		
9110	1014A TRANSPONDER AND MOUNT	7	4
9130	VC-150W-PM105W GABLES CONTROL	1	101
9140	35-5018 ANTENNA (99-340063-7)	2	87
9145	WIRING, PLUGS, ETC.	3	64
9900	RCA AVQ-47 RADAR		
9910	MI-585035 TRANSCEIVER AND MOUNT	15	-10
9920	MI-585036-1 INDICATOR	7	97
9930	MI-585034-1 ANTENNA, REFLECTOR, AND WAVEGUIDE	5	-14
9940	STRUCTURE INSTALLATION	1	-11
9945	WIRING, PLUGS, ETC.	5	65
11600	MISCELLANEOUS		
11610	OECO 20051 INVERTER (2)	14	203
11700	AAR 2502W MONITOR	2	101
11720	AIM 500 ECF GYRO HORIZON	3	101
11800	CABIN SPEAKERS (4)	5	208
11848	50-384919 AMPLIFIER	1	1
11900	EMERGENCY LOCATOR TRANSMITTER AND ANTENNA	3	402
12000	RADIO SHELVES AND ACCESSORIES (115-340030-29)	7	68
12050	RADIO CONTROL PANEL	3	101
12100	RELAYS AND TRANSFORMERS	3	30
25000	NOTE 1-WEIGHT IS POUNDS EACH UNLESS SPECIFIED OTHERWISE. WEIGHT FOR AVIONICS UNITS IS TOTAL FOR NUMBER OF UNITS SHOWN. ARM IS INCHES AFT OF DATUM.		
25001	NOTE 2-THE NUMBERED DESCRIPTIONS ARE ITEMS FROM DRAWING 99-002000, MASTER EQUIPMENT LIST-MODEL B99		
25002	NOTE 3-LOOSE EQUIPMENT ITEMS ARE NOT INCLUDED IN BASIC EMPTY WEIGHT OF AIRPLANE		
	KT 76A	3.4	97
	HCK A 30	0.5	85

Beechcraft.

B99 EQUIPMENT LIST

SERIAL NO. U-151 REGISTRATION NO. C-FBRO DATE June 6, 1991

STATUS OF EQUIPMENT: X= Installed in Airplane O = Not Installed in Airplane

	ITEM	WEIGHT (each)	ARM
X	Crew hatch installation per mod approval #0-LSA-91-177	23.0	137.(

SECTION IX
WEIGHT AND BALANCE
TABLE OF CONTENTS

Beechcraft.

B99

WEIGHING INSTRUCTIONS

Periodic weighing of the Model B99 may be required to keep the Basic Empty Weight current. Frequency of weighing is to be determined by the operator. All changes to the airplane affecting weight and/or balance are the responsibility of the aircraft operator.

1. Aircraft may be weighed on wheels or jack points. Three jack points are provided with one on the nose section of the fuselage at station 85.3 and two on the wing center section rear spar at station 225.5. Wheel reaction locations should be measured as described in paragraph 6 below.

2. Fuel should be drained preparatory to weighing. Tanks are drained from the regular drain ports with the airplane in static ground attitude. When tanks are drained, 7 pounds of unusable fuel remains in the aircraft at an arm of 187 inches. The remainder of the unusable fuel to be added to a drained system is 28 pounds at station 157. If it is not possible to drain the tanks, then fill them to the full level. Determine the specific weight of the fuel with a hydrometer. Full usable fuel of 368 gallons has a center of gravity at station 184.7.

3. Engine oil must be at the full level in each tank. Total engine oil aboard when both tanks are full is 56 pounds at an arm of 131 inches.

4. To determine aircraft configuration at time of weighing, installed equipment is checked against the aircraft equipment list, or the superseding forms. All equipment must be in its proper place during weighing.

5. The aircraft is placed on the scales in a level attitude. Leveling screws are located on the fuselage entrance door frame. Leveling is accomplished with a plumb bob. Jack pad leveling may require the nose gear shock to be secured in the static position to prevent its extension. Wheel weighings can be leveled by varying the amounts of air in the shocks and tires.

6. Measurement of the reaction arms for a wheel weighing is made using the nose jacking point for a reference. Using a steel measuring tape, measurements are taken with the airplane level on the scales from the reference (a plumb bob hung from the center of the nose jacking point) to the axle center line of the nose gear and then from the nose gear axle center line to the main wheel axle center line. The main wheel center line is best located by stretching a string across from one main wheel to the other. All measurements are to be taken with the tape level with the hanger floor and parallel to the fuselage center line. The locations of the wheel reactions will be approximately at an arm of 209 inches for main wheels and -6 inches for the nose wheel.

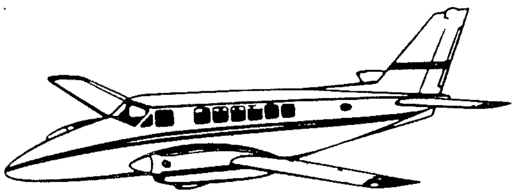
7. The Basic Empty Weight and Moment are determined from the scale readings. Items weighed which are not part of the empty airplanes are subtracted, i.e., usable fuel. Unusable fuel and engine oil are added if not already in the airplane.

8. Weighings should always be made in an enclosed area which is free from air currents. The scales used should be properly calibrated and certified.

AIRCRAFT BASIC EMPTY WEIGHT AND BALANCE

Beechcraft®

B99



		NOSE	MAIN
STRUT POSITION:	EXTENDED	-6.9	208.5
	COMPRESSED	-5.6	210.5
JACK POINT LOCATION:		FORWARD	AFT
		85.3	225.5

DATE

SERIAL NO.

REGISTRATION NO.

PREPARED BY:

REACTION WHEEL-JACK POINTS	SCALE READING	TARE	NET WEIGHT	ARM	MOMENT
LEFT MAIN					
RIGHT MAIN					
SUB TOTAL			X	=	
NOSE			X	=	
TOTAL (AS WEIGHED)					

EMPTY WEIGHT			
ENGINE OIL	56	131	7336
UNUSABLE FUEL	35	163	5705
BASIC EMPTY WEIGHT			

Beechcraft

B99

LOADING INSTRUCTIONS

It is the responsibility of the airplane operator to ensure that the airplane is properly loaded. At the time of delivery, Beech Aircraft Corporation provides the necessary weight and balance data for the computation of individual loadings. All subsequent changes in weight and balance are the responsibility of the airplane owner and/or operator.

The Basic Empty Weight and Moment of the Airplane at the time of delivery is shown on the aircraft Basic Empty Weight and Balance Form. Useful load items which may be loaded into the Airplane are shown on the Useful Load Weights and Moments Tables. The minimum and maximum Moments approved by the FAA are shown on the Gross Weight Moment Limits Table. These moments correspond to the forward and aft Center of Gravity flight limits for a particular weight. All moments are divided by 100 to simplify computations.

WARNING

Operation of this aircraft with pilot only or with pilot and co-pilot only may exceed the forward C.G. limit. Avoid use of forward chairs and nose baggage area with very light passenger loads. Check fuel usage as indicated in Item 4. Add baggage and/or removable ballast in aft baggage compartment as required up to allowable maximum.

1. Record the Basic Empty Weight and Moment from the Aircraft Empty Weight and Balance Form (or from the latest superseding forms). The moment must be divided by 100 to correspond to Useful Load Moments.

2. Record the weight and corresponding moment/100 of each item, including fuel, to be carried. These values are found on the Useful Load Weights and Moments Tables.

3. Total the weight column and moment column. The total weight must not exceed the maximum allowable gross weight for take-off, and the total moment/100 must be within the minimum and maximum moments shown on the Gross Weight Moment Limits Table.

4. When Step 3 indicates that the airplane C.G. is near the forward limit, check the following conditions:

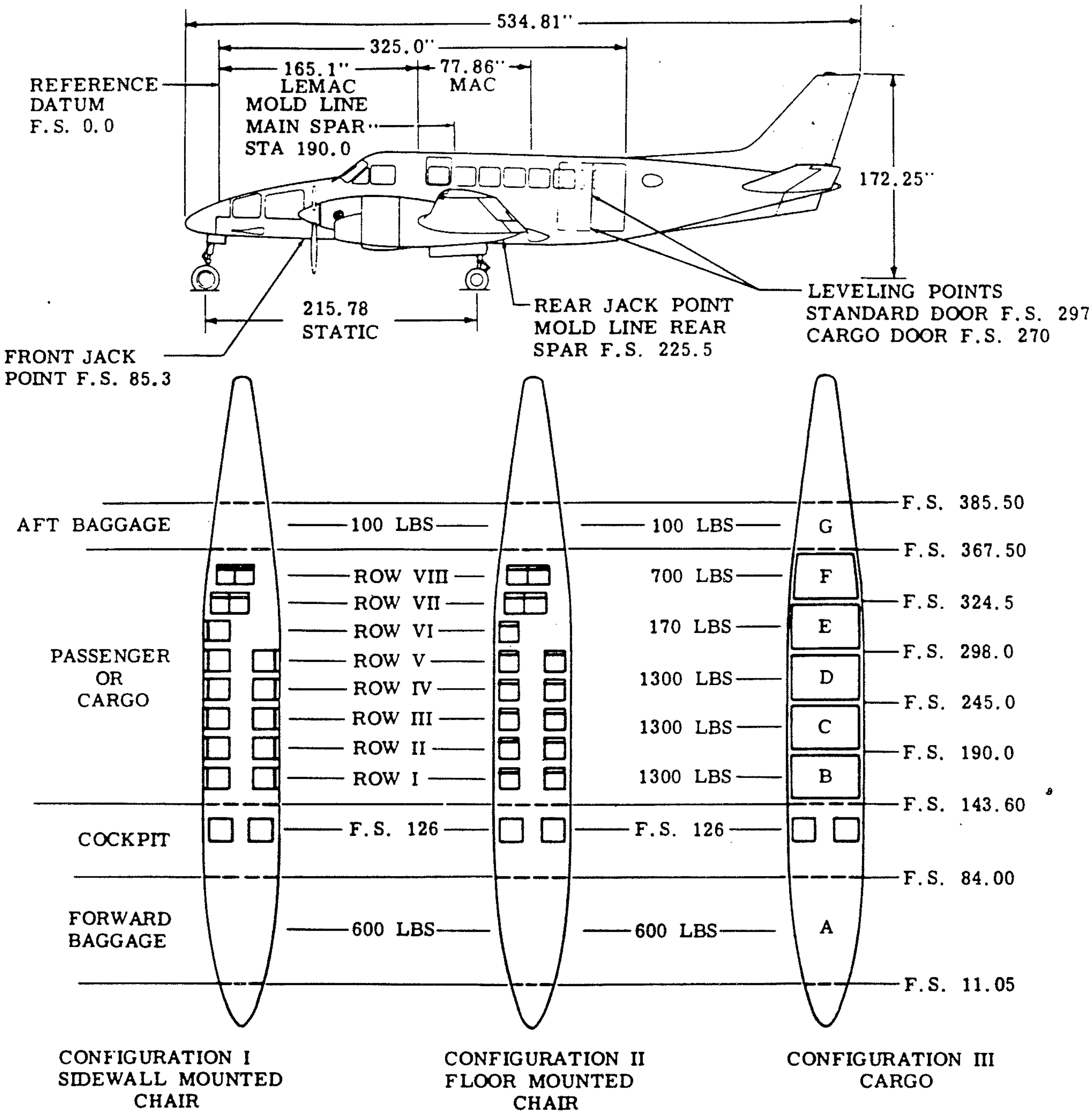
   (a) The weight and moment/100 at landing.

   (b) The weight and moment/100 at the 110 gallon fuel level, if it is above the landing fuel level.

   To determine from the fuel table the weight and moment/100 of the fuel to be used, subtract the weight and moment/100 of the fuel remaining from the weight and moment/100 of the fuel on board at take-off. Subtract this difference from the total weight column and moment column. When operating near the aft limit, checks at take-off and landing are sufficient.

5. The applicable moment must be within the minimum and maximum moments shown on Gross Weight and Moment Limits table for the weight. If the total moment is less than the minimum moment allowed, useful load items must be shifted aft, or forward load items reduced. If the total moment is greater than the maximum moment allowed, useful load items must be shifted forward, or aft load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

DIMENSIONAL AND LOADING DATA



PASSENGER	CENTROIDS
COPILOT	F.S. 126
ROW I	F.S. 157
ROW II	F.S. 185
ROW III	F.S. 213
ROW IV	F.S. 241
ROW V	F.S. 270
ROW VI	F.S. 297
ROW VII	F.S. 324
ROW VIII	F.S. 350

PASSENGER	CENTROIDS
COPILOT	F.S. 126
ROW I	F.S. 155
ROW II	F.S. 183
ROW III	F.S. 211
ROW IV	F.S. 239
ROW V	F.S. 267
ROW VI	F.S. 295
ROW VII	F.S. 324
ROW VIII	F.S. 350

CARGO	CENTROIDS
CARGO A	F.S. 52
CARGO B	F.S. 166
CARGO C	F.S. 219
CARGO D	F.S. 272
CARGO E	F.S. 311
CARGO F	F.S. 344
CARGO G	F.S. 378

Beechcraft®

B99

WEIGHT AND BALANCE LOADING FORM

AIRCRAFT: B 99	REGISTRATION NO: F 13RO		DATE: 09 JUNE
FLIGHT NO:	FROM: LOCAL	TO:	CAPTAIN: TM

PASSENGERS				BAGGAGE			
LOCATION	NAME	WEIGHT	MOMENT / ~~100~~	WEIGHT	FWD	AFT	POD
					MOMENT / 100		
126	1. CREW	348	43848				
155	2. INSPECTO	174	26970				
	3.			50		!	
	4.						
	5.						
	6.						
	7.						
	8.						
	9.						
	10.						
	11.						
	12.						
	13.						
	14.						
	15.						
	16.						
TOTALS		522					

ITEM	WEIGHT	MOMENT / 100
BASIC EMPTY WEIGHT		
CREW		
CREW'S BAGGAGE		
EXTRA EQUIPMENT		
OPERATING WEIGHT		
PASSENGERS		
WEIGHT-LESS FUEL & BAGGAGE		
BAGGAGE-FREIGHT-FWD		
-AFT		
-POD		
CARGO		
WEIGHT-LESS FUEL		
FUEL		
TOTAL-RAMP GROSS		
FUEL-TAXI & WARM-UP		
TOTAL-TAKEOFF		
FUEL-USED AT 110 GAL (REF. 3)		
SUB—TOTAL		
TOTAL — TAKE—OFF		
FUEL USED AT LANDING (REF. 6)		
TOTAL — LANDING		

CARGO COMPARTMENT	WEIGHT	MOMENT / 100
A		
B		
C		
D		
E		
F		
G		
TOTAL		

ITEM	WEIGHT	MOMENT / 100
1. TAKE-OFF FUEL		
2. LESS 110 GAL. FUEL		
3. FUEL USED		
4. TAKE-OFF FUEL		
5. LESS LANDING FUEL		
6. FUEL USED AT LANDING		

COLGAN AIRWAYS

N-151-CJ S/N U-151

November 19, 1985 REVISED WEIGHT & BALANCE DATA

Superseded FJ 11-14-85

Reposition seats in cabin

		ARM	MOMENT
Empty Weight	6765.2 lbs.	182.55	1235008.9
Remove			
2 Seats	-42 lbs.	156.0	- 6552.0
2 Seats	-42 lbs.	184.0	- 7728.0
2 Seats	-42 lbs.	212.0	- 8904.0
2 Seats	-42 lbs.	240.0	-10080.0
2 Seats	-42 lbs.	268.0	-11256.0
1 Seat	-21 lbs.	296.0	- 6216.0
	6534.2	GOOD ARMS	1184272.9
Install			
2 Seats	42 lbs.	164.0	6888.0
2 Seats	42 lbs.	194.5	8169.0
2 Seats	42 lbs.	228.0	9576.0
2 Seats	42 lbs.	258.0	10836.0
2 Seats	42 lbs.	288.0	12096.0
	6744.2		1231837.9

Empty Weight	6744.2
E.W.C.G.	182.65 Aft Datum
Moment	1231837.9
Gross Weight	10,900 lbs.
Useful Load	4155.8 lbs.

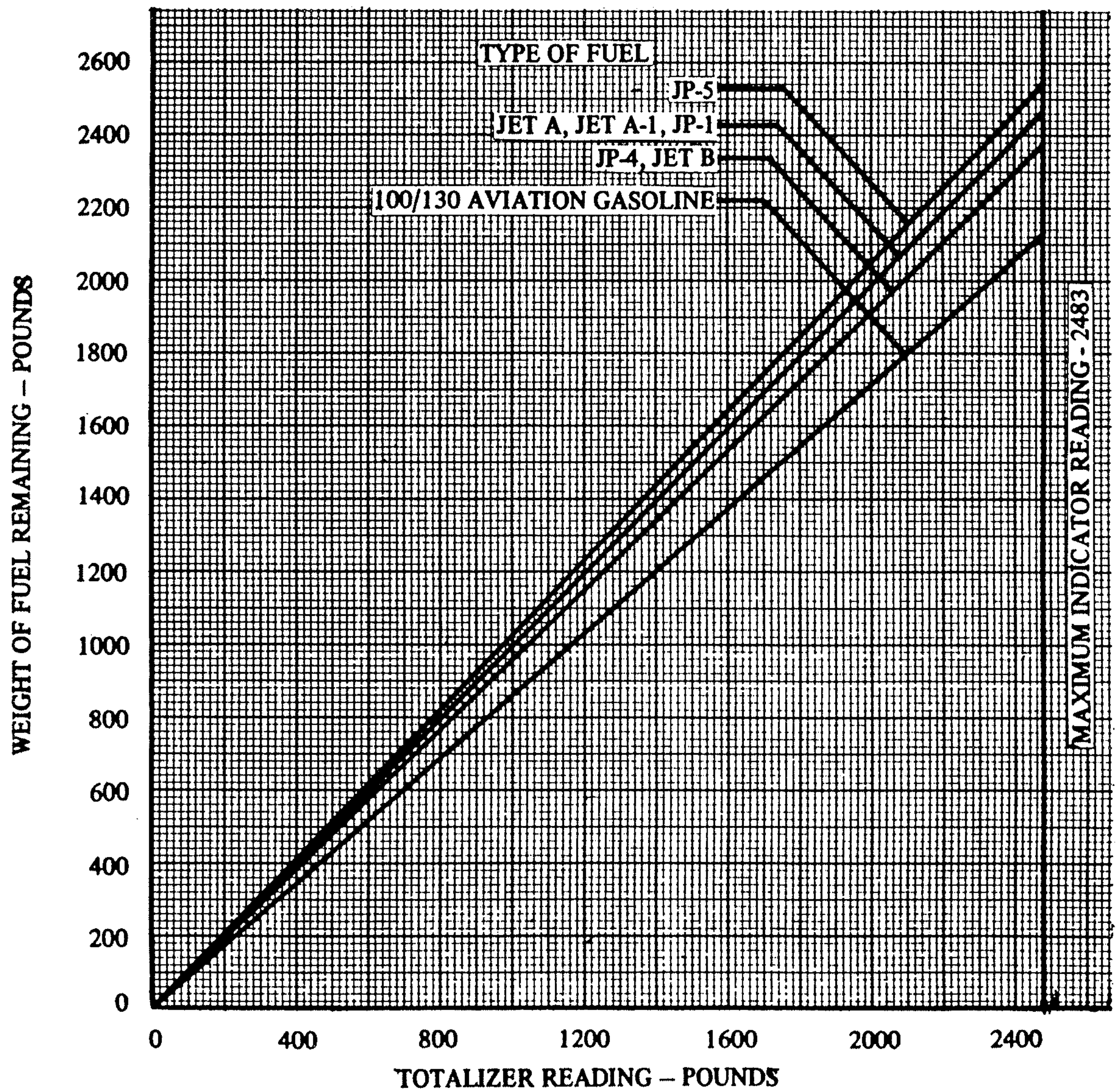
Prepared By:

Frank J. Wiederman
Airline Maintenance Supervisor

Frank J. Wiederman
IA 2584[illegible]

GRAPH 2

CALIBRATION OF TOTALIZER READING FOR VARIOUS FUEL TYPES



ASSOCIATED CONDITIONS:

1. Weights are based on average fuel density at 80° F.

2. The maximum error expected is ± 6.6% after totalizer reading has been corrected. Approximately ± 4.0% of this error is due to variations in fuel density normally experienced during fuel refinement.

CHART 1

Gallons	Column 1 (Initial Setting of Totalizer) Jet A, Jet A-1 & JP-1 Density 6.71 Lb/Gal	Column 2 JP-4 and Jet B Density 6.44 Lb/Gal	Column 3 JP-5 Density 6.89 Lb/Gal	Column 4 100/300 Aviation Gasoline Density 5.79 Lb/Gal
10	67	64	69	58
20	134	129	138	116
30	201	193	207	174
40	268	258	276	232
50	336	322	345	290
60	403	386	413	347
70	470	451	482	405
80	537	515	551	463
90	604	580	620	521
100	671	644	689	579
110	738	708	758	637
120	805	773	827	695
130	872	837	896	753
140	939	902	965	811
150	1007	966	1034	869
160	1074	1030	1102	926
170	1141	1095	1171	984
180	1208	1159	1240	1042
190	1275	1224	1309	1100
200	1342	1288	1378	1158
210	1409	1352	1447	1216
220	1476	1417	1516	1274
230	1543	1481	1585	1332
240	1610	1546	1654	1390
250	1678	1610	1723	1448
260	1745	1674	1791	1505
270	1812	1739	1860	1563
280	1879	1803	1929	1621
290	1946	1863	1998	1679
300	2013	1932	2067	1737
310	2080	1996	2136	1795
320	2147	2061	2205	1853
330	2214	2125	2274	1911
340	2281	2190	2343	1969
350	2349	2254	2412	2027
360	2416	2318	2480	2084
370	2483	2383	2549	2142

FAA Approved
Date: March 13, 1972
P/N 99-590026-5

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

WEIGHT	PILOT OR COPILOT	SIDEWALL MOUNTED CHAIR							
	F.S. 126	Row I F.S. 157	Row II F.S. 185	Row III F.S. 213	Row IV F.S. 241	Row V F.S. 270	Row VI F.S. 297	Row VII F.S. 324	Row VIII F.S. 350
	MOMENT/100								
80	101	126	148	170	193	216	238	259	280
90	113	141	167	192	217	243	267	292	315
100	126	157	185	213	241	270	297	324	350
110	139	173	204	234	265	297	327	356	385
120	151	188	222	256	289	324	356	389	420
130	164	209	241	277	313	351	386	421	455
140	176	220	259	298	337	378	416	454	490
150	189	236	278	320	362	405	446	486	525
160	202	251	296	341	386	432	475	518	560
170	214	267	315	362	410	459	505	551	595
180	227	283	333	383	434	486	535	583	630
190	239	298	352	405	458	513	564	616	665
200	252	314	370	426	482	540	594	648	700
210	265	330	389	447	506	567	624	680	735
220	277	345	407	469	530	594	653	713	770
230	290	361	426	490	554	621	683	745	805
240	302	377	444	511	578	648	713	778	840

OCCUPANTS

WEIGHT	PILOT OR COPILOT	FLOOR MOUNTED CHAIR						SIDEWALL MOUNTED CHAIR	
	F.S. 126	Row I F.S. 155	Row II F.S. 183	Row III F.S. 211	Row IV F.S. 239	Row V F.S. 267	Row VI F.S. 295	Row VII F.S. 324	Row VIII F.S. 350
	MOMENT/100								
80	101	124	146	169	191	214	236	259	280
90	113	140	165	190	215	240	266	292	315
100	126	155	183	211	239	267	295	324	350
110	139	171	201	232	263	294	325	356	385
120	151	186	220	253	287	320	354	389	420
130	164	202	238	274	311	347	384	421	455
140	176	217	256	295	335	374	413	454	490
150	189	233	275	317	359	400	443	486	525
160	202	248	293	338	382	427	472	518	560
170	214	264	311	359	406	454	502	551	595
180	227	279	329	380	430	481	531	583	630
190	239	295	348	401	454	507	561	616	665
200	252	310	366	422	478	534	590	648	700
210	265	326	384	443	502	561	620	680	735
220	277	341	403	464	526	587	649	713	770
230	290	357	421	485	550	614	679	745	805
240	302	372	439	506	574	641	708	778	840

USEFUL LOAD WEIGHTS AND MOMENTS

BAGGAGE

WEIGHT	FWD COMPARTMENT F.S. 52	FWD COMPARTMENT F.S. 62*	AFT COMPARTMENT F.S. 378
	MOMENT/100		
10	5	6	38
20	10	12	76
30	16	19	113
40	21	25	151
50	26	31	189
60	31	37	227
70	36	43	265
80	42	50	302
90	47	56	340
100	52	62	378
200	104	124	
300	156	186	
400	208	248	
500	260	310	
600	312		

*TABLE TO BE USED WHEN FORWARD COMPARTMENT (F.S. 11 TO F.S. 38) IS USED FOR INSTALLATION OF AVIONICS EQUIPMENT.

CARGO

WEIGHT	A F.S. 11-84	B F.S. 144-188	C F.S. 192-245	D F.S. 245-298	E F.S. 298-325	F F.S. 325-368	G F.S. 368-386
	CENTROID F.S. 52	F.S. 166	F.S. 219	F.S. 272	F.S. 311	F.S. 344	F.S. 378
	MOMENT/100						
10	5	17	22	27	31	34	38
20	10	33	44	54	62	69	76
30	16	50	66	82	93	103	113
40	21	66	88	109	124	138	151
50	26	83	110	136	156	172	189
60	31	100	131	163	187	206	227
70	36	116	153	190	218	241	265
80	42	133	175	218	249	275	302
90	47	149	197	245	280	310	340
100	52	166	219	272	311	344	378
170	88	282	372	462	529	585	
200	104	332	438	544		688	
300	156	498	657	816		1032	
400	208	664	876	1088		1376	
500	260	830	1095	1360		1720	
600	312	996	1314	1632		2064	
700		1162	1533	1904		2408	
800		1328	1752	2176			
900		1494	1971	2448			
1000		1660	2190	2720			
1100		1826	2409	2992			
1200		1992	2628	3264			
1300		2158	2847	3536			

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B99
USEFUL LOAD WEIGHTS AND MOMENTS
BAGGAGE POD

TOTAL LOADING AREA-FUS. STA. 120 TO 254					
UNIFORMLY DISTRIBUTED LOAD LOAD CENTROID F.S. 187					
WEIGHT	MOM/100	WEIGHT	MOM/100	WEIGHT	MOM/100
10	19	120	224	350	654
20	37	140	262	400	748
30	56	160	299	450	842
40	75	180	337	500	935
50	94	200	374	550	1028
60	112	220	411	600	1122
70	131	240	449	650	1216
80	150	260	486	700	1309
90	168	280	524	750	1402
100	187	300	561	800	1496

INDIVIDUAL COMPARTMENTS

FORWARD		CENTER				AFT	
F.S. 120-148 LOAD CENTROID F.S. 134		F.S. 149-183 LOAD CENTROID F.S. 166		F.S. 183-219 LOAD CENTROID F.S. 201		F.S. 220-254 LOAD CENTROID F.S. 237	
WEIGHT	MOM/100	WEIGHT	MOM/100	WEIGHT	MOM/100	WEIGHT	MOM/100
10	13	10	17	10	20	10	24
20	27	20	33	20	40	20	47
30	40	30	50	30	60	30	71
40	54	40	66	40	80	40	95
60	80	60	100	60	121	60	142
80	107	80	133	80	161	80	190
100	134	100	166	100	201	100	237
120	161	120	199	120	241	120	284
140	188	140	232	140	281	140	332
160	214	160	266	160	322	160	379
165	221	180	299	180	362	180	427
		200	332	200	402	200	474
		215	357	215	432	205	486

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B99

USEFUL LOAD WEIGHTS AND MOMENTS

USABLE FUEL

GALLONS	6.4 LB/GAL		6.5 LB/GAL		6.6 LB/GAL		6.7 LB/GAL	
	WEIGHT	MOMENT/100	WEIGHT	MOMENT/100	WEIGHT	MOMENT/100	WEIGHT	MOMENT/100
10	64	98	65	100	66	101	67	103
20	128	194	130	197	132	200	134	203
30	192	290	195	294	198	299	201	303
40	256	388	260	394	264	400	268	406
50	320	493	325	501	330	508	335	516
60	384	597	390	606	396	616	402	625
70	448	702	455	713	462	723	469	734
80	512	806	520	819	528	832	536	844
90	576	912	585	926	594	940	603	955
100	640	1018	650	1034	660	1050	670	1066
110	704	1126	715	1144	726	1162	737	1179
120	768	1240	780	1259	792	1278	804	1298
130	832	1366	845	1387	858	1409	871	1430
140	896	1500	910	1523	924	1547	938	1570
150	960	1627	975	1653	990	1678	1005	1703
160	1024	1756	1040	1784	1056	1811	1072	1838
170	1088	1887	1105	1916	1122	1946	1139	1975
180	1152	2015	1170	2046	1188	2078	1206	2109
190	1216	2140	1235	2174	1254	2207	1273	2240
200	1280	2268	1300	2304	1320	2339	1340	2374
210	1344	2392	1365	2430	1386	2467	1407	2504
220	1408	2518	1430	2557	1452	2596	1474	2636
230	1472	2642	1495	2684	1518	2725	1541	2766
240	1536	2769	1560	2813	1584	2856	1608	2899
250	1600	2891	1625	2936	1650	2982	1675	3027
260	1664	3017	1690	3064	1716	3111	1742	3158
270	1728	3138	1755	3187	1782	3236	1809	3285
280	1792	3267	1820	3318	1848	3369	1876	3420
290	1856	3391	1885	3444	1914	3497	1943	3550
300	1920	3514	1950	3569	1980	3623	2010	3678
310	1984	3637	2015	3693	2046	3750	2077	3807
320	2048	3760	2080	3819	2112	3878	2144	3936
330	2112	3880	2145	3940	2178	4001	2211	4062
340	2176	4004	2210	4066	2244	4129	2278	4192
350	2240	4126	2275	4191	2310	4255	2345	4319
360	2304	4251	2340	4317	2376	4384	2412	4450
368	2355	4350	2392	4418	2429	4486	2466	4555

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B99

GROSS WEIGHT AND MOMENT LIMITS

GROSS WEIGHT	MINIMUM MOMENT / 100	MAXIMUM MOMENT / 100	GROSS WEIGHT	MINIMUM MOMENT / 100	MAXIMUM MOMENT / 100
6000	10740	11700	8500	15215	16575
6050	10830	11798	8550	15305	16673
6100	10919	11895	8600	15394	16770
6150	11009	11993	8650	15484	15868
6200	11098	12090	8700	15573	16965
6250	11188	12188	8750	15663	17063
6300	11277	12285	8800	15752	17160
6350	11367	12383	8850	15842	17258
6400	11456	12480	8900	15931	17355
6450	11546	12578	8950	16021	17453
6500	11635	12675	9000	16110	17550
6550	11725	12773	9050	16200	17648
6600	11814	12870	9100	16289	17745
6650	11904	12968	9150	16379	17843
6700	11993	13065	9200	16468	17940
6750	12083	13163	9250	16558	18038
6800	12172	13260	9300	16647	18135
6850	12262	13358	9350	16737	18233
6900	12351	13455	9400	16826	18330
6950	12441	13553	9450	16916	18428
7000	12530	13650	9500	17005	18525
7050	12620	13748	9550	17095	18623
7100	12709	13845	9600	17184	18720
7150	12799	13943	9650	17274	18818
7200	12888	14040	9700	17363	18915
7250	12978	14138	9750	17453	19013
7300	13067	14235	9800	17542	19110
7350	13157	14333	9850	17632	19208
7400	13246	14430	9900	17721	19305
7450	13336	14528	9950	17811	19403
7500	13425	14625	10000	17900	19500
7550	13515	14723	10050	17990	19598
7600	13604	14820	10100	18079	19695
7650	13694	14918	10150	18169	19793
7700	13783	15015	10200	18258	19890
7750	13873	15113	10250	18348	19988
7800	13962	15210	10300	18437	20085
7850	14052	15308	10350	18527	20183
7900	14141	15405	10400	18616	20280
7950	14231	15503	10450	18706	20378
8000	14320	15600	10500	18795	20475
8050	14410	15698	10550	18885	20573
8100	14499	15795	10600	18974	20670
8150	14589	15893	10650	19064	20768
8200	14678	15990	10700	19153	20865
8250	14768	16088	10750	19243	20963
8300	14857	16185	10800	19332	21060
8350	14947	16283	10850	19421	21158
8400	15036	16380	10900	19511	21255
8450	15126	16478			

CENTER OF GRAVITY LIMITS: (LANDING GEAR DOWN)

WEIGHT CONDITION	FORWARD C.G. LIMITS	AFT C.G. LIMITS
10900 POUNDS OR LESS (ALL CONDITIONS)	179.0 (17.8% MAC)	195.0 (38.4% MAC)

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759

example Trip YUR → YZT alternate YQG 30" Reserve TOTAL Fuel NEED 1200
600/hrs 1 hrs → YZT
.5 → YQG
.5 → Reserve

Beechcraft.

all MALE
300 PDS Bag in NOSE

B99 EQUIPMENT LIST

SERIAL NO. **REGISTRATION NO.** **DATE**

STATUS OF EQUIPMENT: **X= Installed in Airplane** **O = Not Installed in Airplane**

ITEM			M x 100	WEIGHT (each)	ARM
T/O (THK off) AEW	6570		12228		
Crew	348		428		
Row I	348		590		
Row II	348		695		
Row III	348		793		
Row IV	348		897		
Row V	348		1002		
Row VI	348		1127		
Row VII	348		1218		
TOTAL PAX + CREW + AC	9354		18446		
BAG	300	x 52	156		
	9654		19104		
+ Fuel at T/O	1200		2110		
at T/O + ARM =	10854	195.4	21214		
AT Landing + ARM	9654		19104		
	600		960		
	10254	195.6	20064		

NB if only 100 PDS of Bag is available with 1024 PDS of Fuel ARM JUMP AT 198.0
2" off limit

 179 → 195

SECTION X

SYSTEMS

TABLE OF CONTENTS

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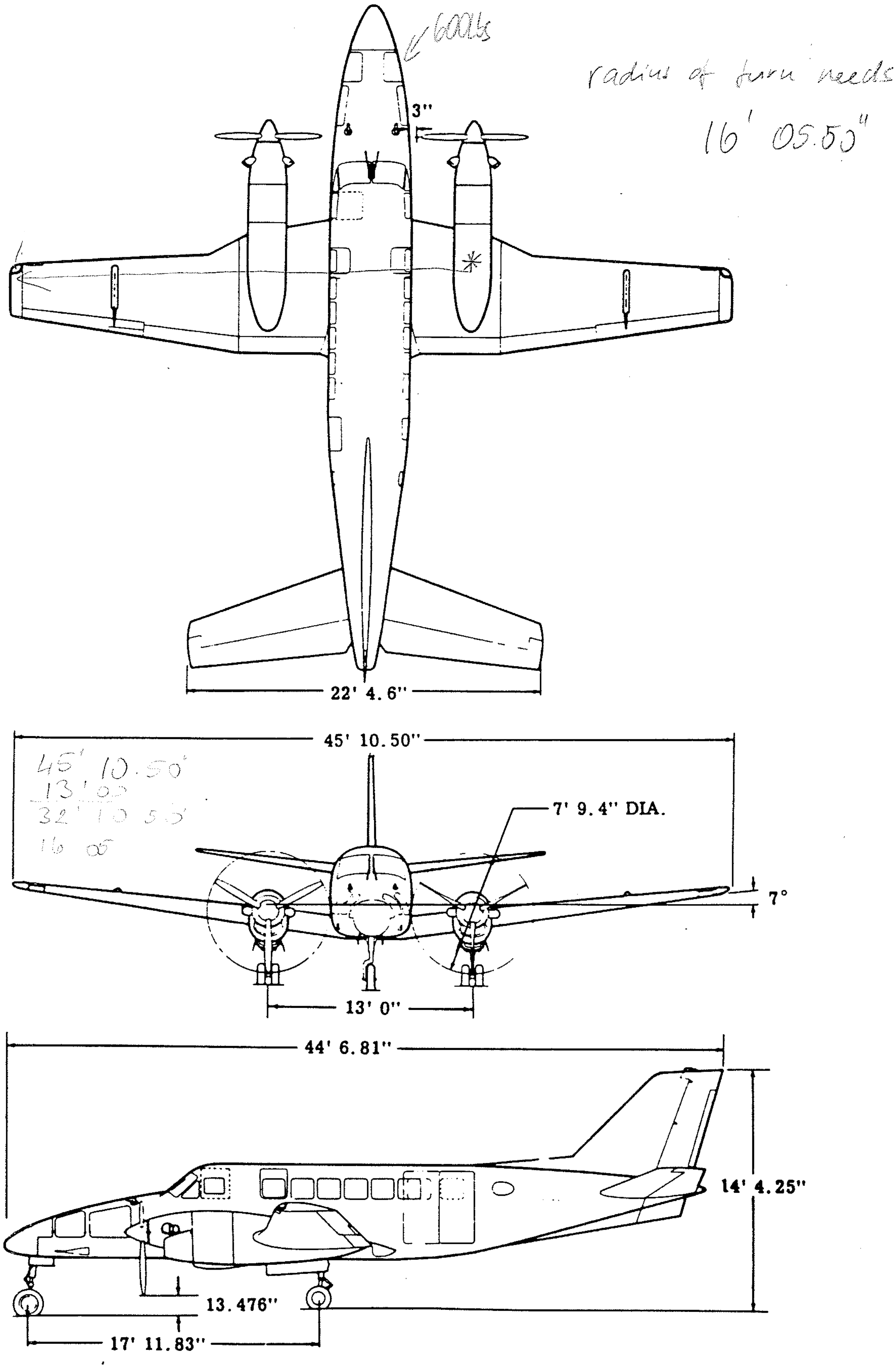

600lbs
radius of turn needs
16' 05.50"
3"
22' 4.6"
45' 10.50"
45' 10.50'
13' 0
32' 10.5'
16' 05
7' 9.4" DIA.
7°
13' 0"
44' 6.81"
14' 4.25"
13.476"
17' 11.83"

THREE VIEW

GENERAL SPECIFICATIONS

WEIGHTS

	11 300
Maximum Take-off Weight	10,900 pounds
Maximum Landing Weight	10,900 pounds
Maximum Ramp Weight	10,955 pounds

WING AREA AND LOADING

Wing Area	279.7 sq ft
Wing Loading at gross weight	39.0 lbs/sq ft
Power Loading at gross weight	8.0 lbs/hp

DIMENSIONS

Wing Span	45 ft, 10.50 in
Length	44 ft, 6.81 in
Height to top of fin	14 ft, 4.25 in

CABIN DIMENSIONS

Length	224.5 in
Height	57 in
Width	55 in
Entrance Door	27 in x 51-1/2 in
Cargo Door	53-1/2 in x 51-1/2 in
Nose Baggage Compartment Volume	43.9 cu ft
Rear Baggage Compartment Volume	17 cu ft

FUEL AND OIL CAPACITY

Fuel Capacity in Nacelle Tanks	112 gallons	112
Fuel Capacity in Wing Tanks	256 gallons	256
Oil Capacity (each engine)	3.5 gallons	368

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PROPULSION SYSTEMS

ENGINE

The PT6A-27 or PT6A-28 engine has a three stage axial, single stage centrifugal compressor, driven by a single stage reaction turbine. The power turbine, another single-stage reaction turbine, drives the output shaft. Both the compressor turbine and the power turbine are located in the approximate center of the engine with their shafts extending in opposite directions. Being a reverse flow engine, the ram air supply enters the lower portion of the nacelle and passes into the engine at the aft end through protective screens. The air is then routed into the compressor. After it is compressed, it is forced into the annular chamber, where it is mixed with fuel being sprayed in through 14 individually removable nozzles mounted around the gas generator case. An ignition unit and two igniter plugs are used to start combustion. A pneumatic fuel control schedules fuel flow to maintain the power set by the gas generator power lever. After combustion, the exhaust leaves the power turbine and is routed through two exhaust ports near the front of the engine. Propeller speed remains constant at any selected propeller control lever position through the action of a propeller governor, except in the beta range where the maximum propeller speed is controlled by the hydraulic section of the propeller governor.

The accessory drive at the aft end of the engine provides power to drive the fuel pump, fuel control, oil pump, starter/generator, and tachometer. At this point, the speed of the drive (N_1) is the true speed of the compressor side of the engine, 37,500 rpm at 100% N_1. Maximum permissible operating limit of the engine is 38,100 rpm, which equals 101.5% N_1.

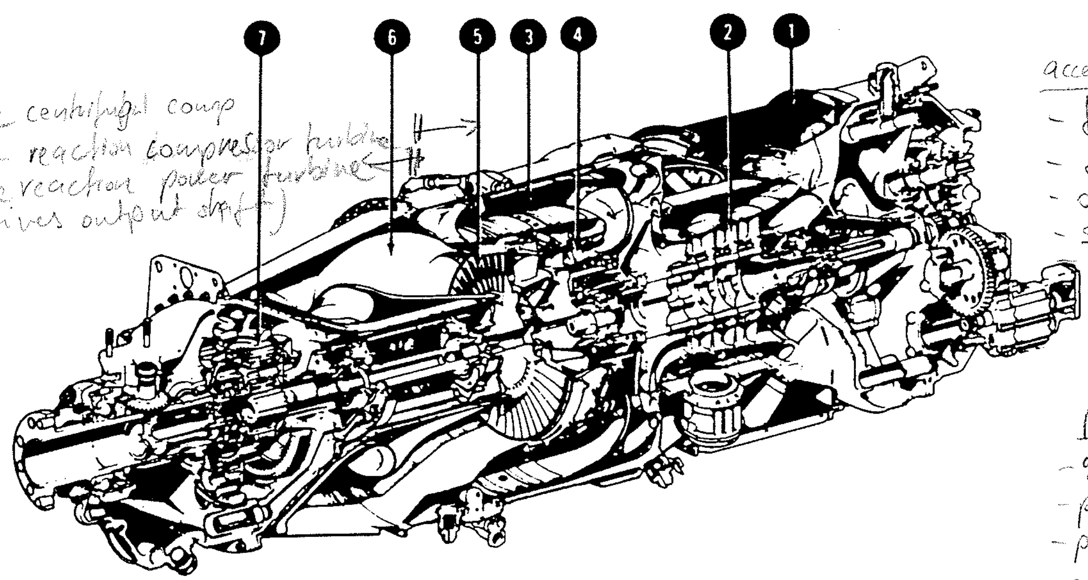
The N_2 gear box forward of the power turbine provides gearing for the propeller, propeller tachometer, propeller overspeed governor, and propeller governor. Prior to gear reduction, the turbine speed on the power side of the engine is 33,000 rpm at 2200 propeller rpm.

Propeller torque value is achieved by measurement of oil pressure created by the force from the propeller shaft driving against a set of beveled gears. The beveled gear with propeller force against it is drawn aft by the torque, which in turn drives a piston aft, which compresses engine oil in the torque cylinder. A torquemeter valve regulates the input of engine oil into the torque cylinder to stabilize the piston position. The pressure created in the torque cylinder is plumbed to the torquemeter to give a relative reading of torque.

Deceleration on the ground is achieved by bringing the propeller blades through the flat pitch Beta range into a reversing pitch by utilizing the pitch change mechanism. The power levers must be retarded below idle by raising them over a detent. Reversing power is available in direct proportion to the retarding of the levers.

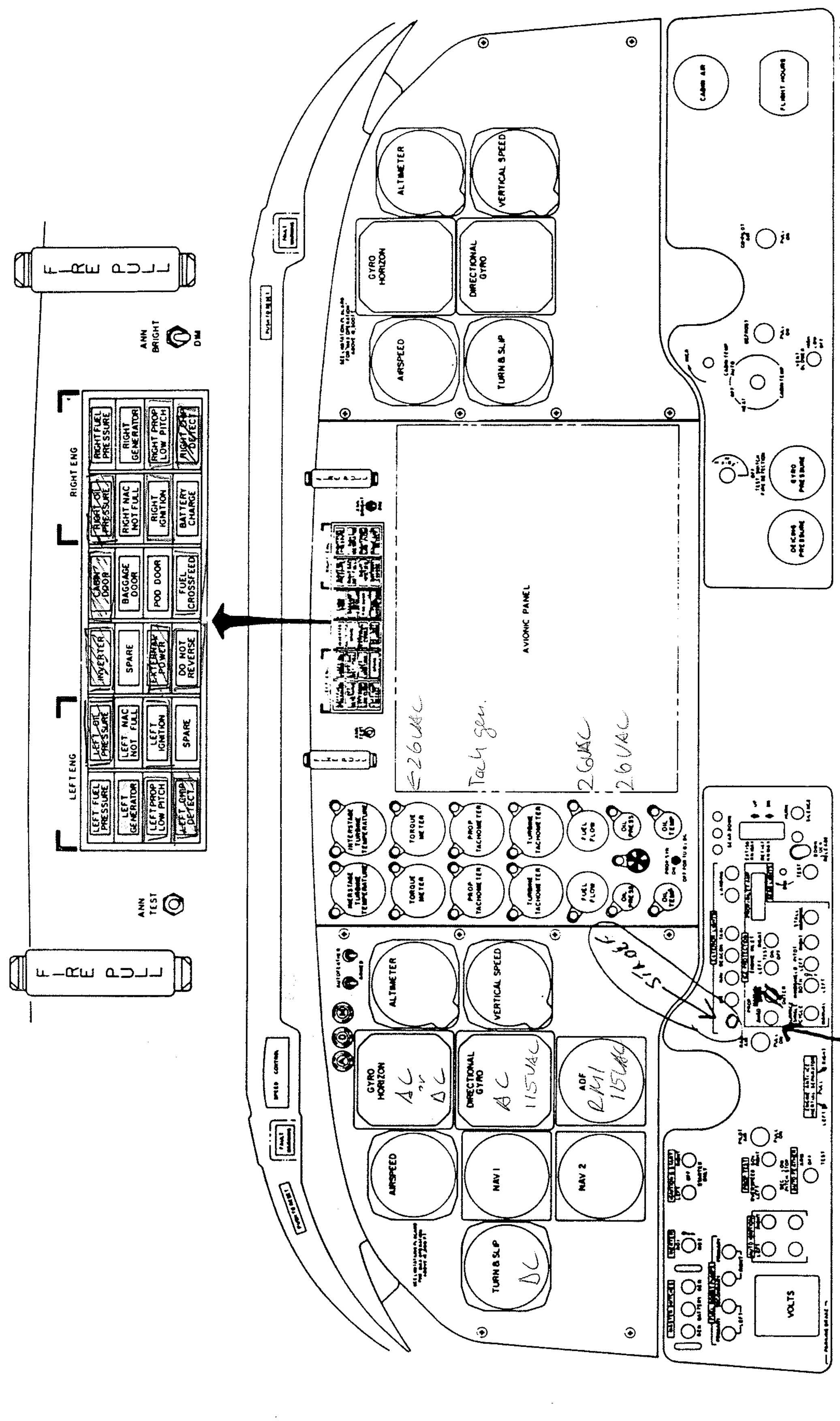
IGNITION

Each engine is started by a switch located on the left subpanel that is placarded: IGNITION AND START-STOP-STARTER ONLY. When positioned in the IGNITION AND START mode, each switch completes two separate circuits to the corresponding engine. One circuit activates the starter, the other activates engine ignition to start fuel burning and will signify the ignition action by illuminating the appropriate white IGNITION light in the annunciator panel. The starter is a 200-ampere starter/generator. When engine power has stabilized above idle speed (51% N_1 or above), the starter drive action is stopped by placing the IGNITION AND START switch in the STOP position.

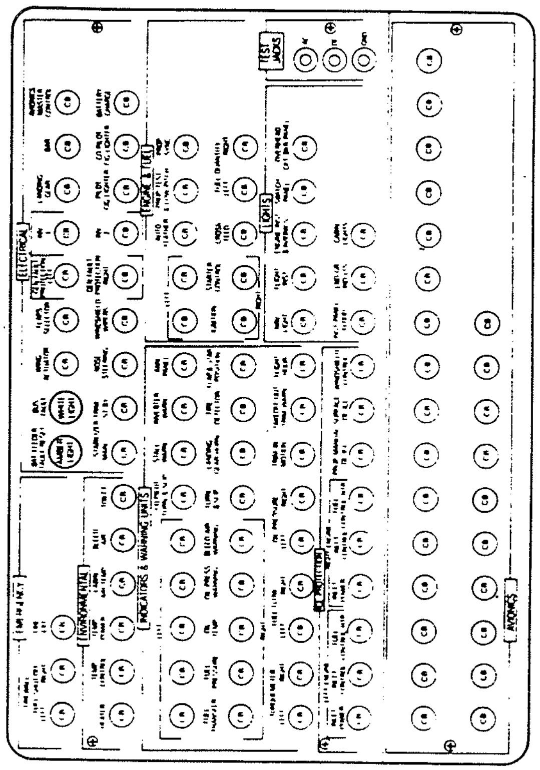


1. Engine Inlet
2. Compressor
3. Combustion Chamber
4. Compressor Turbine
5. Power Turbine
6. Exhaust
7. Reduction Gear

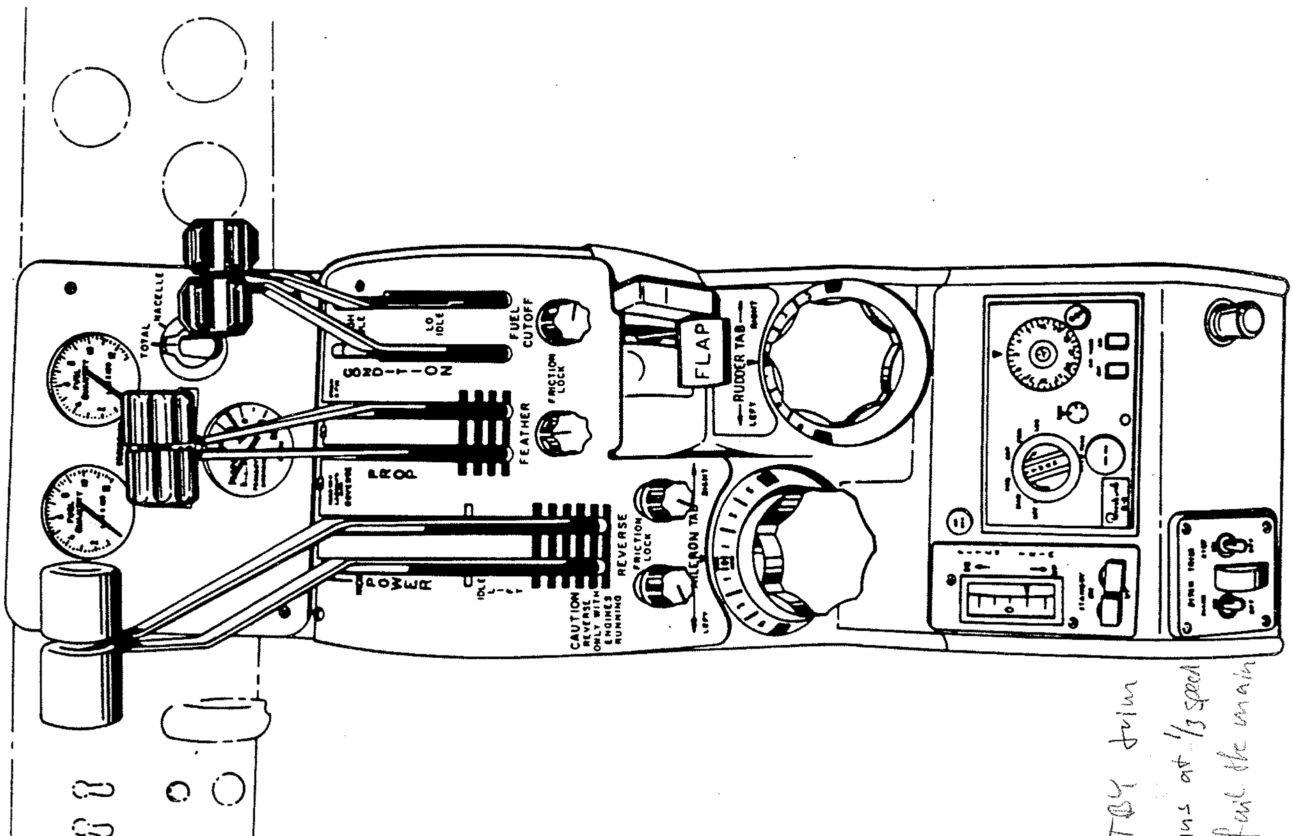
ENGINE CUTAWAY



TYPICAL INSTRUMENT PANEL



CIRCUIT BREAKER PANEL



PEDESTAL

STBY trim runs at 1/3 speed of the main

AUTO-IGNITION

The auto-ignition system provides automatic ignition to prevent engine loss due to combustion failure. This system should be used for icing flights and night flights above 14,000 feet. To activate the system, move the switches placarded AUTO IGNITION, located on the pilot's subpanel, from OFF to ARM. When the engine torque rises above 425 ft lbs, two green lights, located immediately below the switches, will illuminate and remain lighted while the system is armed. If for any reason the engine torque falls below 400 ft lbs, the igniter will automatically energize and the IGNITION ON light on the annunciator panel will illuminate. Simultaneously, the respective green ARM light will extinguish, giving the dual indication that the ignition system is functioning.

FUEL CONTROL

The basic engine fuel system consists of an engine driven pump, a fuel control unit, a starting control unit, a common fuel manifold with fourteen fuel nozzles. Two automatic fuel dump valves are provided to drain residual fuel after engine shutdown. Engine gas generator and power turbine governors supply information for the fuel control unit which is located on the engine accessory case. This unit is a hydromechanical computing and metering device which determines the proper fuel schedule for the engine to provide the power required, as established by the position of the power levers. This is accomplished by controlling the speed of the compressor turbine.

PROPULSION SYSTEM CONTROLS

The propulsion system is operated by three sets of controls: the Power Levers, Propeller Levers and Condition Levers. The Power Levers and Condition Levers serve to control engine power. The Propeller Levers are operated conventionally and control constant speed propellers through the primary governor.

The Power Levers provide control of engine power from idle through take-off power by operation of the gas generator (N_1) governor in the fuel control unit. Increasing N_1 rpm results in increased engine power.

Each Propeller Lever operates a speeder spring inside the primary governor to reposition the pilot valve, which results in an increase or decrease of propeller rpm. For propeller feathering, each Propeller Lever manually lifts the pilot valve to a position which causes complete dumping of high pressure oil. Detents at the rear of lever travel prevent inadvertent movement into the feathering range. Normal operating range is 1800 through 2200 rpm.

The Condition Lever has three positions, CUT-OFF, LOW IDLE and HIGH IDLE. This lever controls the idle cut-off function of the start control unit, controls idle speed between 50% and 70% N_1 and resets the power lever idle stop to provide from 70% up to take-off power.

PROPELLER REVERSING

When the power levers are lifted over the IDLE detent, they control engine power through the Beta and Reverse ranges.

CAUTION

> Propeller reversing on unimproved surfaces should be accomplished carefully to prevent propeller erosion from reversed airflow and, in dusty conditions, to prevent obscuring the operator's vision.

Condition levers, when set at HIGH IDLE, keep the engines operating at 70% minimum idle speed for maximum reversing performance. Power levers should not be moved into the reversing position when the engines are not running.

ENGINE INSTRUMENTATION

Engine instruments, located on the left of the center instrument panel, are grouped according to their function. At the top, the ITT (Interstage Turbine Temperature) gages and torquemeters are used to set take-off power. Climb and cruise power are established with the torquemeters and propeller tachometers while observing ITT limits. Gas generator (N_1) operation is monitored by the gas generator tachometers. The lower grouping consists of the fuel flow indicators and the oil pressure and temperature gages.

The ITT gages give an instantaneous and accurate reading of engine temperature between the compressor drive and power turbines. The temperature reading on this instrument reflects the temperature of the gases coming in contact with the turbine wheels.

The torquemeters give an indication in ft lbs of the power being applied to the propeller. Proper observation and interpretation of these gages provide an accurate indication of engine performance and condition.

The propeller tachometer is read directly in revolutions per minute. The N_1 or gas generator tachometer is read in percent of rpm, based on a figure of 37,500 rpm at 100%. Maximum gas generator speed is limited to 38,100 rpm or 101.5% N_1.

A propeller synchroscope, located between the oil pressure gages, operates to give an indication of synchronization of propellers. If the right propeller is operating at a higher rpm than the left, the face of the synchroscope, a black and white cross pattern, spins in a clockwise rotation. Left or counterclockwise, rotation indicates a higher rpm of the left propeller. This instrument aids the pilot in obtaining complete synchronization of the propellers.

MAGNETIC CHIP DETECTOR (IF INSTALLED)

A magnetic chip detector is installed in the nose gearbox drain plug of each engine. When ferrous oil contamination is detected, a red annunciator light illuminates to alert the pilot to the condition, which indicates rapid engine deterioration and the probability of imminent power loss.

ENGINE LUBRICATION

Engine oil, contained in an integral tank between the engine air intake and the accessory case, cools as well as lubricates the engine. A non-congealing external oil radiator keeps the engine oil temperature within the operating limits. Part of the engine oil operates the propeller and the engine torquemeter system.

The lubrication system capacity per engine is 3.5 gallons, of which 2.3 gallons is contained in the oil tank. The dipstick is attached to the oil filler cap and is marked to measure five quarts for the purpose of adding oil. Approximately 5 quarts are required to fill the lines and cooler, giving a total system capacity of 14 quarts. The engine will trap approximately 1.5 quarts of oil that cannot be drained. Recommended types and procedures for changing oil are listed in the Servicing Section.

ANNUNCIATOR SYSTEM

The annunciator system consists of an annunciator panel, located in the upper center portion of the instrument panel and two fault warning lights, one in front of each pilot in the glare shield edge. Individual function lights are of the word-read-out style and are color coded. A momentary

ANNUNCIATOR PANEL

NOMENCLATURE	*COLOR*	*PROBABLE CAUSE FOR ILLUMINATION*
LEFT FUEL PRESSURE	Yellow	Failure of left boost pump.
LEFT GENERATOR	Yellow	Left generator off the line.
LEFT PROP LOW PITCH (IF INSTALLED)	White	Left prop is past primary low pitch stop.
LEFT OIL PRESSURE	Red	Left oil pressure below acceptable minimum.
LEFT NAC NOT FULL	Yellow	Left nacelle fuel tank is not full and the fuel select switch is in the TOTAL position. < 12Lbs (2Gal
L CHIP DETECT (IF INSTALLED)	Red	Contamination in left engine oil is detected.
LEFT IGNITION	White	Left starter ignition switch is in the ignition start mode or left ignition switch is in the ignition only mode.
INVERTER	Red	The inverter selected is inoperative.
EXTERNAL POWER	Red	External power being used.
DO NOT REVERSE	White	Propeller levers are not in the high rpm low pitch position.
CABIN BAG DOOR*	Red	Cabin and/or baggage doors not secured.
SPARE** OR AUTOPILOT OUT OF TRIM	Blue or Red	Autopilot out of trim.
FUEL CROSSFEED	White	Crossfeed valve is open.
RIGHT OIL PRESSURE	Red	Right oil pressure below acceptable minimums.
RIGHT NAC NOT FULL	Yellow	Right nacelle fuel tank is not full and the fuel select switch is in the TOTAL position. < 12lbs (2Gal)
R CHIP DETECT (IF INSTALLED)	Red	Contamination in right engine oil is detected.
RIGHT IGNITION	White	Right starter ignition switch is in the ignition and start mode or the right ignition switch is in the ignition only mode.
RIGHT FUEL PRESSURE	Yellow	Failure of the right fuel boost pump.
RIGHT GENERATOR	Yellow	Right generator is off the line.
RIGHT PROP LOW PITCH (IF INSTALLED)	White	Right prop is past primary low pitch stop.

* CABIN DOOR and BAG DOOR warning annunciators may be separate or combined depending upon the annunciator panel configuration installed.

** Spare is indicated by two horizontal parallel lines (blue).

toggle switch is provided for testing the lamps. A second switch allows a selection of lamp intensity. If a fault should occur a signal is sent to the respective channel in the annunciator panel. If the fault requires the immediate attention of the pilot, both flashing fault warning lights are illuminated. These lights are reset by pressing the face of either one.

The only exception to the normal system is in the generator circuit. The failure of a single generator does not require the immediate attention of the pilot and, therefore, does not actuate the flashing fault warning lights. Failure of both generators will cause the fault warning lights to flash in addition to the illumination of the individual function lights.

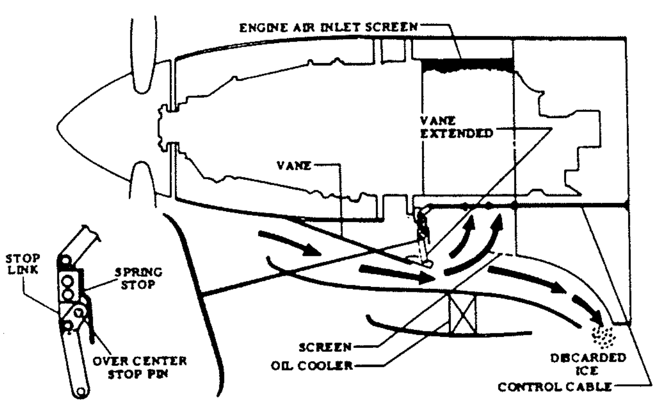
The NAC NOT FULL lights illuminate when the nacelle tanks are not full and the fuel select switch is in the TOTAL position. The NAC NOT FULL lights will not illuminate with the fuel select switch in the NACELLE position. This design feature allows the pilot to use fuel from the nacelle tanks without the NAC NOT FULL lights burning for the duration of this procedure.

ENGINE ICE PROTECTION

An oil to fuel heat exchanger, located on the engine accessory case, operates continuously and automatically to heat the fuel sufficiently to prevent freezing of any water in the fuel.

Each fuel control's temperature compensating line is protected against ice by electrically heated jackets. Power is supplied to each fuel control air line heater by a switch that is actuated whenever the condition lever for that engine is moved from idle cut off.

The engine air inlet lip boots are electrically heated to prevent the formation of ice and consequent distortion of the airflow. The boots are operated by the two switches on the left center subpanel placarded: ENGINE INLET, LEFT - RIGHT, and TEST-ON-OFF. The current drain of each boot may be monitored individually during flight on the indicator placarded PROP INLET AMPS, by placing the appropriate switch in the TEST position.



INERTIAL SEPARATOR SYSTEM

INERTIAL SEPARATORS

An inertial separation system is built into each engine air inlet to prevent moisture particles, from entering the engine inlet plenum under freezing conditions. This is done by introducing a sudden turn in the airstream to the engine, causing the moisture particles to continue on undeflected because of their greater momentum and to be discharged overboard.

During normal operation, a movable vane is raised out of the direct ram airstream. For cold weather (+5°C or below) operation in visible moisture, it should be lowered into the airstream. The anti-ice vanes are operated by individual T-handle, push-pull controls, located below the left subpanel. The controls are placarded: ENGINE ANTI-ICE - PULL. Vane position during operation is indicated by the position of the T-handles, and by a slight decrease in torque with the engine ice protection controls extended. The vanes should be either fully retracted or fully extended; there are no intermediate positions.

PROPELLER SYSTEM

STANDARD REVERSING PROPELLER

The Hartzell propeller is of the full feathering, constant speed, overcounter-weighted, reversing type controlled by engine oil through single acting, engine driven propeller governors. The propeller is three bladed and is flange mounted to the engine shaft. Centrifugal counter-weights, assisted by a feathering spring, move the blades toward the low rpm (high pitch) position and into the feathered position. Governor boosted engine oil pressure moves the propeller to the high rpm (low pitch) hydraulic stop and reverse position. The propellers have no low rpm (high pitch) stops; this allows the blades to feather after engine shut-down.

LOW PITCH STOPS

The low pitch blade position is determined by the Primary Low Pitch Stop. This is a mechanically monitored, hydraulic stop which allows the blades to rotate beyond the low pitch position into reverse when selected. Beta and reverse blade angles are provided by adjusting the low pitch stop, controlled by the Power Lever in the reverse range. Some airplanes may be equipped with another system referred to as the Secondary Low Pitch Stop. Activation of this system also illuminates the white light on the annunciator panel placarded SECONDARY LOW PITCH STOP.

PROPELLER GOVERNORS

Two governors, one primary and one back-up, control the propeller rpm. The primary governor, mounted on top of the gear reduction housing, controls the propeller through its entire range. The Propeller Control Lever operates the propeller by means of this governor. If the primary governor should malfunction and request more than 2200 rpm, an overspeed governor cuts in at 2288 rpm and dumps oil from the propeller to keep the rpm from exceeding approximately 2288. A solenoid, actuated by the PROP GOV TEST switch, is provided for resetting the overspeed governor to approximately 1900 to 2100 rpm for test purposes.

If the propeller should stick or move too slowly during a transient condition, the propeller governor might not act in time to prevent an overspeed condition. To provide for this contingency, the power turbine governor, contained within the primary governor housing, acts as a fuel topping governor. When the propeller rpm reaches 2332, the fuel topping governor limits the fuel flow into the engine, reducing N_1 rpm. During operation in the reverse range, the fuel topping governor is reset to provide a speed slightly below selected propeller speed to prevent governor interaction.

AUTOFEATHER SYSTEM

The automatic feathering system provides a means of immediately dumping oil from the propeller governor to enable the feathering spring to start the feathering action of the blades. Although the system is ARMED by a switch on the sub-panel, the complete arming of the system occurs when both Power Levers are advanced above the 90% N_1 position at which time both the right and left ARMED lights illuminate indicating a fully armed system. The system will remain inoperative as long as either power lever is retarded below 90% N_1 position. The system is designed for use only during take-off and should be turned off when establishing take-off climb. During take-off, should torquemeter oil pressure on either engine drop below a prescribed setting, the oil is dumped from the governor, the feathering spring starts the blades toward feather and the autofeather system of the other engine is disarmed. The disarming of the operating engine's propeller system is further indicated when the armed light of that engine goes out. The autofeather system may be checked as follows:

1. Move the autofeather arm switch to the TEST position with the power levers set at idle. Check that the propellers remain unfeathered and that the AUTOFEATHER ARM lights remain out.

2. With the switch still in the TEST position and the engine controls set to obtain 500 foot-pounds of torque, both AUTOFEATHER ARM lights should illuminate.

3. Slowly retard the left engine power lever and check that the right AUTOFEATHER ARM light extinguishes at 330 to 410 foot-pounds of torque. Continue retarding the left engine power lever and check that both the left and right AUTOFEATHER ARM lights are extinguished and that left engine propeller starts to feather at 160 to 240 foot-pounds of torque.

NOTE

As the propeller blades rotate toward feather, the torque load will increase above switch setting and the system will cycle during ground test giving a flashing indication on the Armed lights.

4. Repeat the preceding check with the right engine.

5. Return the autofeather arm switch to the ARM position.

FUEL SYSTEM

The fuel system consists of two separate systems connected by a crossfeed system.

Fuel for each engine is supplied from a 44 gallon center section tank, a 56 gallon nacelle tank, a 38 gallon wing leading edge tank, a 23 gallon wing outboard tank, and a 23 gallon wing inboard tank. The wing tanks are interconnected and supply the center section and nacelle tanks by gravity flow. A crossfeed system allows the total 368 gallons to be supplied to either engine.

Each system has two filler openings, one in the nacelle tank and one in the leading edge tank. The accuracy of the fuel gage depends on a full nacelle tank. To assure that the system is properly filled, service the nacelle tank first, then the wing tanks.

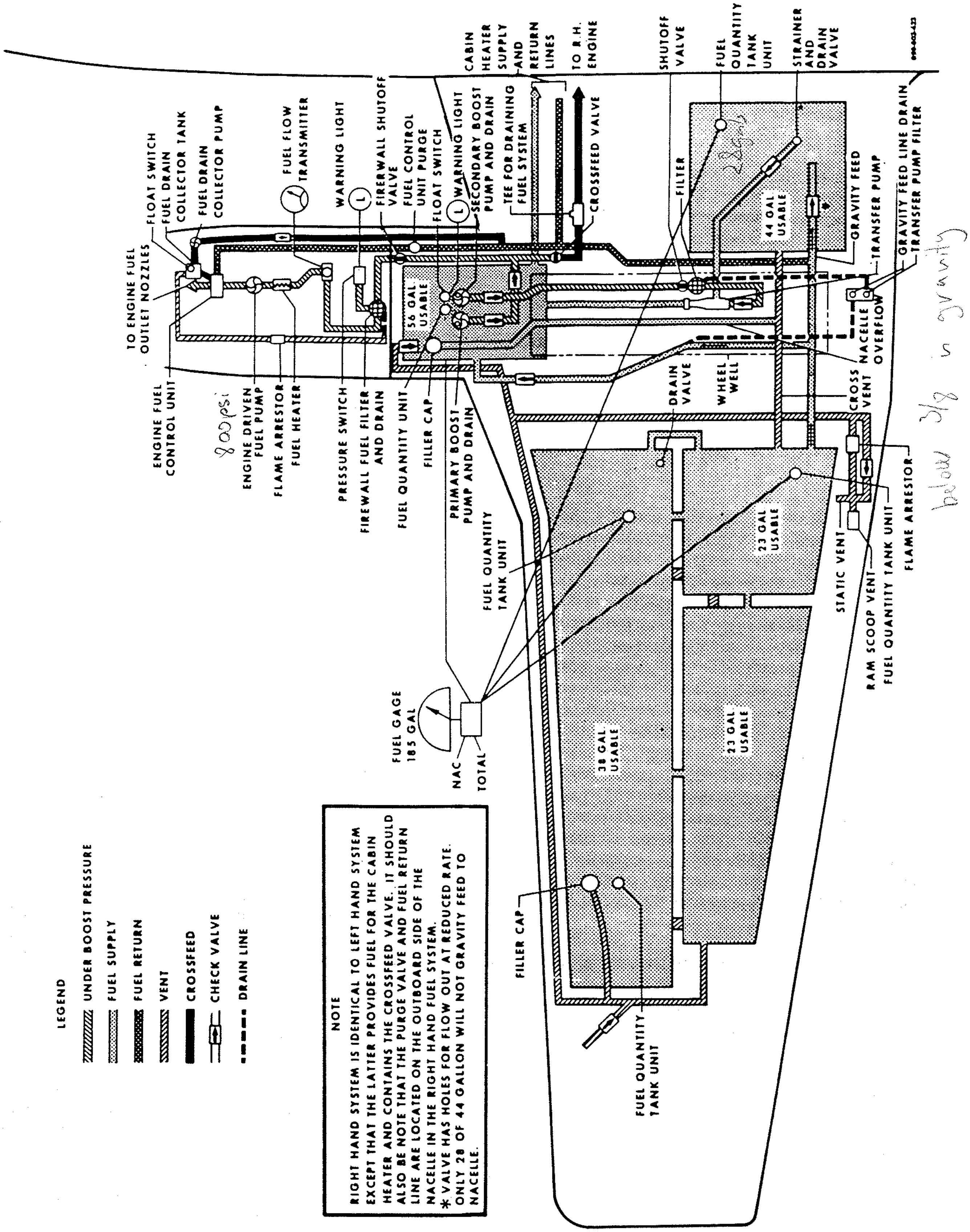
The system is vented through a recessed vent, coupled to a static port on the underside of the wing, adjacent to the nacelle. One vent is recessed to prevent icing. The static port is added as a backup, should the recessed vent become plugged.

BOOST PUMPS

The primary and secondary boost pumps, actuated by circuit breaker switches on the left subpanel, are installed in the bottom of the nacelle tank. Either the primary or secondary boost pump is capable of maintaining adequate pressure to the engine.

FUEL TRANSFER JET PUMP

A fuel transfer jet pump mounted on the inboard side of the main landing gear wheel will transfer from the center section tank fuel sump to the nacelle tank. The jet pump receives its motive flow from either boost pump through a check valve and filter mounted on the inboard side of the wheel well. As long as either boost pump is operative and there is fuel in the center section tank, the transfer pump will feed the nacelle tank. In the event of a boost pump failure, the respective FUEL PRESSURE yellow light will illuminate. The fuel boost light will illuminate at 9-11 psig



FUEL SYSTEM SCHEMATIC

decreasing pressure and the light will be extinguished by switching to the other boost pump and increasing pressure to 9-11 psig.

The failure of both boost pumps will cause the transfer jet pump to become inoperative. With transfer jet pump failure, the nacelle fuel level drops and a float switch in the nacelle tank turns on the appropriate NAC NOT FULL light on the annunciator panel, provided the fuel select switch is in the TOTAL position. If the transfer pump fails to operate during flight, gravity feed from the center section tank will begin when the nacelle tank drops to approximately 3/8 full. All wing fuel except 28 gallons will transfer to the nacelle tank during gravity feed. Fuel quantity should be monitored by performing both wing and nacelle checks on the quantity gage.

NOTE

The NAC NOT FULL light on the annunciator panel will also illuminate when the center section tank becomes empty with transfer system in operation and fuel select switch in the TOTAL position.

CROSSFEED

Both boost pumps should be in operation on the side from which crossfeed is desired. The manual crossfeed switch should be actuated and the crossfeed valve will open. When the crossfeed is open, a white CROSSFEED light in the annunciator panel illuminates. Both engines are then being supplied from one side. The crossfeed system will not shift fuel from one side to the other, but it will permit one or both sides to supply both engines.

FIREWALL SHUT-OFF

The system incorporates two firewall shutoff valves, one on each side. These normally open valves are controlled by two FIRE PULL handles located on the upper center instrument panel. When the respective FIRE PULL handle is pulled, it not only closes the firewall shutoff valve but also arms the respective fire extinguisher, if installed.

Just forward of the firewall shutoff valve is the main fuel filter. From the main fuel filter, the fuel is routed through the fuel flow indicator transmitter, and then through a fuel heater that utilizes heat from the engine oil to warm the fuel. The fuel is then routed to the fuel control unit.

FUEL DRAIN COLLECTOR SYSTEM

After engine shutdown, a small amount of fuel present in the fuel control unit gravity drains into a small collector tank. The tank is mounted to one of the lower fire shields in the aft engine compartment. An electric float switch senses the tank fuel level and activates an electric pump which then transfers the fuel back to the center section tank. When the collector tank is emptied, the float switch turns off the pump. The entire operation is automatic and requires no input or additional duties from the crew.

FUEL DRAINS

During each preflight, the fuel sumps on the tanks, pumps and filters should be drained to check for fuel contamination. There are four sump drains and one filter drain in each wing and are located as follows:

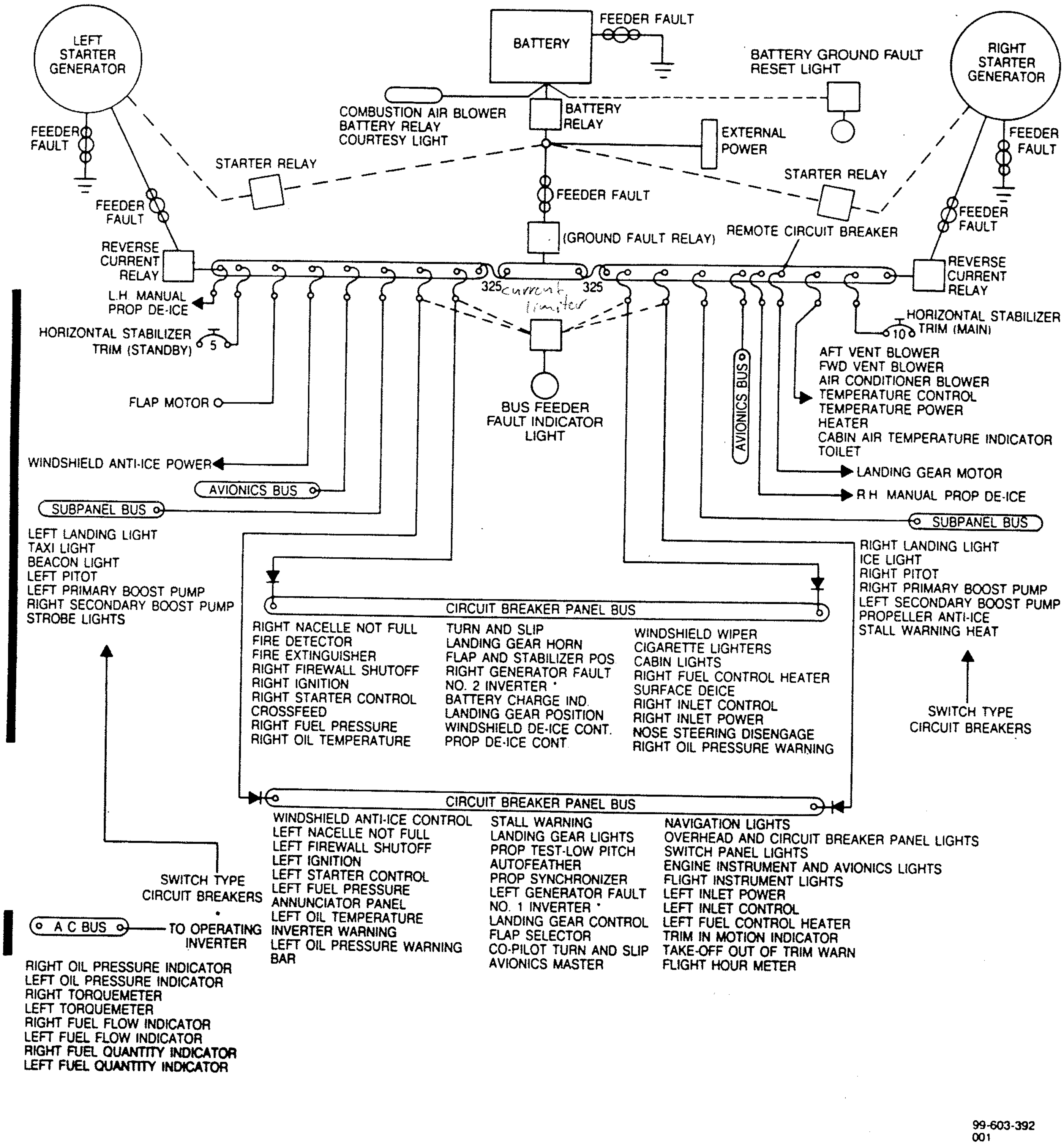
NUMBER	DRAINS	LOCATION
1	Leading Edge Tank	Outboard of nacelle underside of wing.
1	Main Fuel Filter	Pull ring located under upper forward cowling cover, in aft inboard corner.
2	Boost Pumps	Bottom center of nacelle forward of wheel well.
1	Transfer Pump Drain	Manifold aft of wheel well
1	Gravity feed line drain	Manifold aft of wheel well.
1	Center Section Tank	At wing root just forward of the flap.

FUEL GAGING SYSTEM

The fuel quantity indicating system includes a selector switch mounted below the fuel quantity gages. The total quantity of fuel in each wing fuel system is indicated by its respective fuel quantity gage when the selector switch is placed in the TOTAL position. If the selector switch is moved to the NACELLE position, the fuel quantity indicating circuitry for all fuel cells except the one in each nacelle is bypassed so that each fuel gage indicates only the quantity of fuel in its respective nacelle fuel cell.

ELECTRICAL SYSTEM

A 24 volt, 40 ampere-hour battery and two 30 volt, 200 ampere starter-generators connected in parallel provide power to the airplane electrical system. The battery is located in either the right wing center section forward of the main spar or in the nose compartment. The battery supplies power through an adjacent relay to a starter relay mounted in the center section aft of the leading edge and adjacent to the inboard side of each nacelle. The starting cycle is controlled by a three-position switch in the left subpanel placarded: IGNITION AND START STOP STARTER ONLY. The switch is spring-loaded to return to the STOP position from the STARTER ONLY position that momentarily actuates the starter for "motoring" to clear fuel from the engine. When placed in the IGNITION



ELECTRICAL SYSTEM SCHEMATIC

AND START position, the switch energizes the starter relay, the ignition system, the purge valve and deactivates the ground fault trip system. The generator phase of operation is controlled by the generator switches located with the battery switch in the left subpanel under the MASTER SWITCHES gang bar for simultaneous cutoff.

The generator field is controlled by a field relay mounted on the upper electrical equipment panel under the center aisle floor. Each field relay contains a tripping coil for opening the field during fault conditions. A reset coil in the relay closes the field when the generator switch is placed in the OFF position. An anti-cycle relay mounted adjacent to the field relay, prevents the field relay from continuously tripping and resetting during the fault condition. An overvoltage relay located in the same area, opens and closes the generator field relay. The overvoltage relay trips the field at 32 to 34 volts to provide overvoltage protection.

The field relay opens the reverse current relay. If the voltage regulator malfunctioned to cause the overvoltage condition, the field relay will stop the overvoltage condition. If some other failure caused the overvoltage condition, the reverse current relay will isolate the overvoltage generator from the bus to protect the rest of the system against damage.

The generators are paralleled by utilizing the voltage developed between the "D" terminal of the generators and ground. This terminal of each generator is connected from its respective voltage regulator to that of the opposite generator through the intervening voltage regulators mounted on the upper equipment panel. The paralleling circuit also includes the overvoltage relays and a pair of paralleling relays. The field power of the generator carrying the higher current is reduced while that of the generator carrying the lower current is increased until the load on each is equal. When one generator is on the line and the other is off the line at the same voltage, the voltage of the former is depressed and that of the latter is increased through the paralleling circuit until both generators are on the line. Generator paralleling is effective only for electrical loads above 0.14 per generator and engine speeds greater than 53% N_1. Should one generator fall off the line while taxiing, the off line generator will be restored when the electrical load is increased above 0.14 and engine speed is raised to 60% N_1. The generator control switch should not be cycled to restore parallel operation of both generators. Lack of paralleling below 0.14 electrical load is not serious since the maximum load placed on the remaining generator, should the opposite generator switch off is insufficient to cause generator over-load. This is far below the 200-amp generator rating. Should an overvoltage condition occur, the paralleling circuit acts through the overvoltage relays to lower the trip voltage on the overvoltage generator to take the overvoltage unit off the line, leaving the other generator to supply the entire load.

Each generator is protected from a ground fault by a ground fault system. A current transformer is mounted on the engine firewall directly above the starter-generator and another current transformer is mounted on the power distribution panel adjacent to the reverse current relay. The voltage and magnetic coupling of the two transformers is the same during normal operation; however, should the generator power lead be grounded, the current generated between the transformers actuates the ground fault control relay mounted on the equipment panel with the overvoltage and field relays. The control relay then trips the field relay and reverse current relay to remove the affected generator from the line. If during generator buildup, the rate of current change is not sufficiently rapid for the transformers to actuate the control relay, the relay is tripped by the current from the "D" terminal of the generator to ground through the generator-out relay. This circuit is opened when the generator contactor closes.

Should either reverse current relay open due to a generator failure or generators not paralleling, the respective generator caution light in the annunciator panel illuminates. Should both relays open, both caution lights illuminate and the red warning lights in the glareshield flash.

During variations in engine speed and electrical load requirements, voltage output is maintained at a constant level by two transistorized voltage regulators mounted on the upper electrical equipment panel under the center aisle floor immediately forward of the main spar. The load on the generators is indicated by two loadmeters located on the extreme left of the subpanel. The scale on each loadmeter reads in tenths. A load of 1.0 indicates full load.

The voltmeter portion of the indicator monitors the bus voltage.

An external power receptacle with polarity protection circuitry is included. A relay in the external power circuit will close only if the external source polarity is correct. The auxiliary power unit should be turned OFF while the connection is being made to avoid possible arcing. The battery switch should be ON when using the external power source to absorb voltage transients that might damage the many solid state components in the airplane. External power sources capable of up to 1000 amperes may be used for starting. Greater capacity units might damage the starter. The ground fault system is disabled during the use of an auxiliary power source to prevent nuisance tripping of the system.

GROUND FAULT PROTECTION

The ground fault system is designed to prevent structural damage to the airplane due to a fault or short circuit of the large power carrying wires. Transformers at the ground and bus terminations of the battery and generator leads sense fluctuations of current in the leads. If a fault to ground occurs, the current throughout the circuit is no longer balanced and the voltages developed by the transformers no longer cancel. The ground fault sense relay is thus tripped to actuate the necessary components to remove the power from the affected circuit.

INTENTIONALLY LEFT BLANK

A fault in the battery leads will actuate the ground fault sense relay causing the battery relay and the ground fault control relay to open, thus removing the battery from the bus. A fault on the leads of either generator would actuate the appropriate portion of the ground fault sense relay, trip the field relay and remove the affected generator from the line.

BATTERY GROUND FAULT RESET LIGHT

Actuation of the battery portion of the ground fault sense relay applies battery voltage to the fault trip silicon controlled rectifier (SCR) assembly. The resultant current through the SCR assembly resistor applies a positive voltage to the SCR gate. The SCR is thus triggered into conduction and a ground potential is now applied to the fault trip transistor assembly. The current through the resistors of the fault trip transistor assembly biases the transistor into conduction. The voltage developed by this current is applied to the battery relay control transistor. The transistor is now biased to cut-off. The ground fault control relay is thus de-energized removing the path to ground for the battery relay and the ground fault relay causing them to de-energize. A path to the airframe for battery ground fault light is provided through the ground fault control relay causing the annunciator to illuminate. The system may be reset by momentarily pressing the BAT FEEDER FAULT RESET annunciator and reset switch. This interrupts the current through the SCR, turning if off.

The fault trip transistor and the battery relay control transistor return to their normal condition. If, when the reset switch is released, the fault is cleared, the battery relay and the fault relay will now energize to connect the battery to the bus. If the fault still exists, the system is recycled to remove the battery from the bus.

BUS FEEDER FAULT INDICATOR

The feeder out indicator circuit provides additional protection by indicating the presence of an open bus feeder limiter in addition to a ground fault in the system. The circuit consists of a printed circuit board assembly and transistor, and a feeder out (PRESS TO TEST) indicator lamp. The transistor is normally "cut off", which opens the indicator circuit and keeps the light extinguished. The transistor is kept at "cut-off" by application of a normally present DC bus voltage. A voltage is supplied by the feeder buses through each bus feeder limiter. This positive voltage is maintained at the base of the transistor to keep it "cut off". Should any of the four bus feeder circuit breakers OPEN, or a ground fault occur on any of the power lines, the positive DC voltage at the associated terminal is removed. The removal of this positive voltage decreases the positive potential at the base of the transistor and allows it to conduct. With the transistor conducting, the indicator circuit is complete and the lamp is illuminated. The lamp will remain illuminated until the fault is cleared.

AIRFRAME

ENTRANCES AND EXITS

AIRSTAIR ENTRANCE DOOR

The airplane comes equipped with a standard swing-down type airstair door. The door is supported by hinge mechanisms on the door sill and two plastic encased cables which allow the door to swing out sufficiently to give convenient 9 inch riser steps from ground to entrance. On airplanes conforming with BEECHCRAFT Service Bulletin

No. 2007 when the door is closed the upper step may be folded flush by removing the pins at each side of the step. The other two steps remain stationary. If BEECHCRAFT Service Bulletin No. 2007 has not been implemented all three steps are stationary. The support cables serve as hand rails and are also used to close the door from inside the airplane.

CAUTION

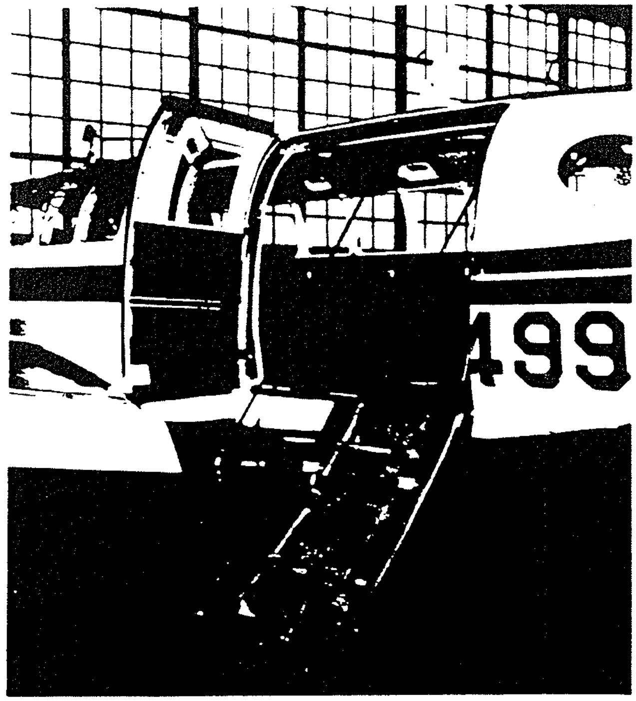
Only one person at a time should be on the door stairway.

A dual locking device functions from the center of the door and is operated by handles on both the outside and the inside of the airplane. Sight windows are provided over each pin lock. When the handles are in the locked position, a green stripe on the lock pin is visible indicating a secure door. If BEECHCRAFT Service Bulletin No. 2007 has been implemented the folding step will cover the sight windows; therefore, the lock pin position must be checked before the step is secured. Some airplanes may have a chain located on the aft door frame that may be secured in a catch on the door to aid in preventing inadvertent opening. The outside door handle may be locked with a key to provide additional security when the airplane is parked.

Never attempt to unlock or check the security of the door in flight. If the *CABIN DOOR or CABIN BAG DOOR warning annunciator should illuminate in flight, or if the pilot has any reason to suspect the door is not properly secured, all occupants should be instructed to remain seated with seat belts fastened until a landing can be made. See EMERGENCY PROCEDURES Section.

CARGO DOOR (OPTIONAL)

The Cargo Door incorporates an additional side hinged, double latched, swing-out door located immediately



forward of the airstair door. The forward edge of the door is hinged to the fuselage while the aft edge forms the seal for the airstair door. The forward cable supporting the airstair door is detachable to allow a clear opening of 53-1/2 inches wide by 51-1/2 inches high for loading bulky cargo. The cargo door is secured by a top and bottom pin type latch which can only be operated from the inside of the aircraft. Each locking pin is covered by an ecutcheon plate as a protection against an inadvertant opening of the door.

PILOT'S COCKPIT HATCH (OPTIONAL)

The Pilot's Cockpit Hatch is located on the left side of the cockpit and contains the pilot's side window. It is used by the pilot when the aircraft is so loaded with bulky cargo as to preclude his use of the normal entrance to the cockpit.

The door is secured by a double hook-draw type locking device with handles both inside and outside of the aircraft. The outside handle also incorporates a key lock for normal aircraft security. A self-locking extension strut is used to hold the door in the open position. For closing, the door is released by a slide-type lock located on the upper end of the extension strut. Access to the entrance is gained by the use of a ladder which hooks on the button-type hangers on the side of the cockpit section. Normal storage of the ladder is in the forward baggage compartment but when used, it is stored in the cockpit on the back of the pilot's seat.

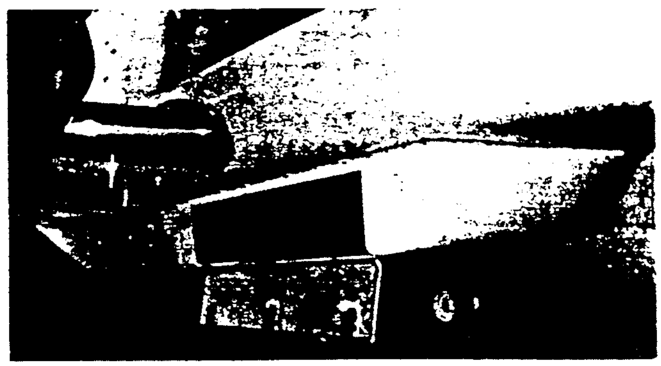
BAGGAGE COMPARTMENT DOORS

The aft fuselage baggage compartment door is located on the right side of the aft fuselage area, just forward of the empennage. The baggage door is opened by turning a "D" shaped handle and is held in the open position by a folding support brace. The latching mechanism is similar to that of the cabin entrance door, which incorporates a bayonet type latching mechanism. The door also has a locking mechanism installed which is locked by a key from the outside of the aircraft.

Two doors, one located on each side of the nose section, service the Forward Baggage Compartment. Each door incorporates a pair of push-to-release type latches and a key lock for security. A warning device is installed in the latching mechanism which causes a light on the annunciator panel to illuminate any time the door is not latched.

BAGGAGE POD (OPTIONAL)

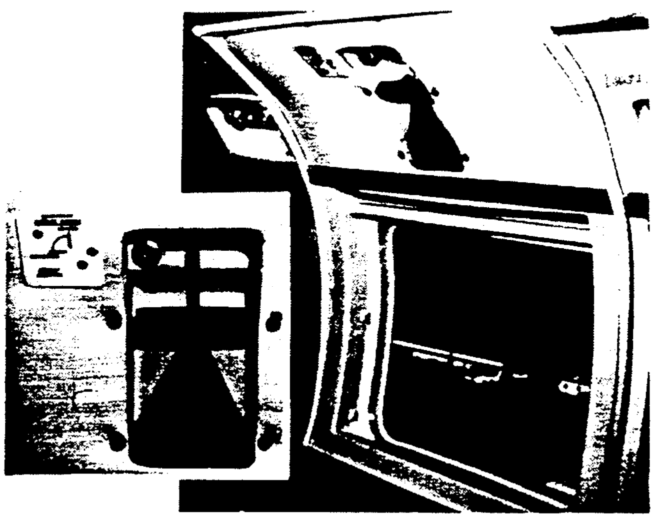
The baggage pod provides for baggage loading up to 800



lbs. which may be equally distributed in the four lighted compartments of the pod without disturbing the C.G. of the aircraft. Two forward compartments are accessible through the forward access door. The aft compartments may be serviced through an identical door below the trailing edge of the wing. A pair of flush mounted snap-lock latches secure each door. Both compartments are divided into two sections with hinged, swing-up partitions that fasten at the top corners with Dzus fasteners. These partitions prevent shifting of baggage while the aircraft is in operation. A warning light on the annunciator panel illuminates if either of the baggage pod doors is not secure.

EMERGENCY EXITS

The emergency exit doors are located on both sides of the passenger cabin area in the forward cabin windows. The doors are released from inside the cabin by a pull-down handle, and on the outside by a flush mounted pull-out handle. The doors are of the plug, nonhinged type which remove completely from the frame when the latches are



released. The emergency exits can be locked with a key from inside the cabin to prevent opening from the outside. In the event that the exits are not unlocked before flight and an emergency arises, the inside actuator handle will override the lock mechanism and allow the doors to open.

FLIGHT CONTROLS

Conventional dual controls are provided, and nose steering is accomplished by use of the individually adjustable rudder pedals.

Trim tabs on the rudder and left aileron are adjustable from the center pedestal through closed circuit cable systems which drive jackscrew-type actuators. Position indicators for each of the trim tabs are integrated with their respective controls. Elevator trim is accomplished through the Electric Pitch Trim System.

ELECTRIC HORIZONTAL STABILIZER TRIM

The Airliner is equipped with a dual electric horizontal stabilizer trim system. In normal use the system is activated by a pedestal mounted switch placarded PITCH TRIM - MAIN - ON - OFF, and operated with dual pitch trim switches on each control wheel. A switch for the standby system is adjacent to the main trim switch and is placarded PITCH TRIM - STDBY - ON - OFF. While the standby system is activated, movement of the stabilizer may be effected by the alternate switches above the main pitch trim switch on the pedestal. These alternate switches then take the place of the thumb switches on the control wheel. The position of the horizontal stabilizer is shown by a pedestal mounted indicator.

Both the standby trim switches on the pedestal and the control wheel mounted trim switches are dual element type switches. Both switches on each system move together to operate the pitch trim. If only one switch is moved, the circuit should not be completed. A check of the switches will be accomplished during the pre-takeoff check by moving the switches individually on both control wheels and on the pedestal. No one switch alone should operate the system; operation should occur only by movement of pairs of switches. Monitor the pitch trim indicator while operating the individual switches. Any movement on the indicator denotes a malfunctioning system and take-off should not be made.

The control wheel switches are placarded: PITCH TRIM - NOSE UP - NOSE DOWN and TRIM REL. By moving the pair of switches forward, the stabilizer will move to effect a nose down trim condition. The movement of the stabilizer can be stopped immediately by returning the switches to the center (off) position. Moving the switches aft brings the aircraft to a nose up trim condition. In the event of a malfunction that causes the trim motor to continue to run after the thumb switch has been released, a push button on the side of the control wheel grip, placarded TRIM REL, acts to interrupt the circuit until the main switch can be turned off. Opposing the pilot's switches with the copilot's switches will cause the trim motion to stop.

The standby switches on the pedestal operate in the same manner as the main switches, by movement of pairs of switches. The standby system has no trim release switch as does the main system, and is deactivated by moving the PITCH TRIM - STDBY switch to the OFF position.

An audio stabilizer movement system is installed to advise the pilot each time the trim system is activated. The signal is in the form of intermittent tones which come through the speaker or head phone while the stabilizer is in motion. This sound is independent of the radio system and will be heard any time the stabilizer moves.

An out of trim warning system is installed to advise the pilot of a mistrim condition during take-off. A switch is installed on the left throttle quadrant at the 90% N_1 position which will activate the warning horn if the stabilizer trim is not set for takeoff. A squat switch on the landing gear will deactivate the system on lift-off so that the trim can function, in any position within its range, without the horn sounding.

NOTE

> The Main Pitch Trim System master switch and the Standby Pitch Trim System master switch shall not be in the ON position at the same time. These systems shall be operated independently of each other.

FLAPS

The flaps are operated by a sliding lever located on the center section of the pedestal. Flap travel is measured from 0% (full up) to 100% (full down) of travel and incorporates a side located detent to provide for rapid selection of 30% (take-off and approach). The flaps are of the infinite selection type which allows for travel to any selected position from any pre-selected setting.

Flap motor power is supplied by a 20-ampere circuit breaker while the control circuitry is powered by a 5-ampere circuit breaker. Protective circuitry is installed to detect either an open or short in the command circuit. Should such a malfunction occur, the protective device will open the control circuit breaker preventing a runaway flap.

A gear warning switch is actuated by the flap control which will cause the warning horn to sound if all gears are not down and locked when a flap position greater than approach (30%) is commanded. Flap position in percent of travel is indicated by an electric indicator on the pedestal.

LANDING GEAR SYSTEM

MECHANICALLY ACTUATED SYSTEM

The landing gear is retracted and extended by a 28-volt split field motor, which is located on the forward side of the center section main spar. To prevent over-travel of the gear, the system incorporates a dynamic brake. Cross-shafts drive the main gear and double-row chains drive the nose gear through conventional jackscrew actuators. Spring-loaded friction clutches between the gear box and the torque shafts protect the system in the event of mechanical malfunction. A 200-ampere, remote circuit breaker, located on the power distribution panel and a two-ampere landing gear control circuit breaker protects the system from electrical overload.

HYDRAULICALLY ACTUATED SYSTEM

The nose and main landing gear assemblies are retracted and extended by a hydraulic power pack, which is located forward of the main center section spar. The power pack consists primarily of a hydraulic pump, a 28 volt DC motor, a two section reservoir, a filter, a gear selector solenoid, and an uplock pressure switch. Hydraulic lines for normal gear extension and retraction, and manual gear extension are routed from the power pack to the nose gear actuator and to each main gear hydraulic actuator. The normal and manual hydraulic gear extension lines are connected to the upper end of each hydraulic gear actuator. The hydraulic gear retraction lines are connected to the lower end of the gear hydraulic actuators.

Nose gear downlock is accomplished by an internal mechanical lock in the nose gear actuator and the over-center action of the nose gear drag leg assembly. Notched hook, lock link and lock link guide attachments fitted to each main gear upper drag leg, provide a positive mechanical down-lock action for the main gear (Same as the MECHANICALLY ACTUATED SYSTEM). As the landing gear moves to the full down position, the down lock switches are actuated and interrupt current to the hydraulic pump motor. The extinguishing of the red in-transit light in the gear handle indicates that the landing gear is in the fully retracted position. Hydraulic system pressure performs the uplock function of holding the gear in this position. When the pressure reaches approximately 1650 psi, a pressure switch will interrupt current to the hydraulic pump motor. This same pressure switch will activate the pump motor should system pressure drop to approximately 1300 psi.

There is a press-to-test warning light placarded LDG GEAR HYD FLUID LOW, located on the pilot's instrument panel, which will illuminate whenever the internal thermistor in the hydraulic reservoir senses a low hydraulic fluid level.

MANUAL LANDING GEAR EXTENSION

MECHANICAL SYSTEM

The Manual Landing Gear Extension System, which is placarded LANDING GEAR EMERGENCY EXTENSION, is located on the floor between the pilot's and the copilot's seats. It is designed primarily for actual emergency gear extensions, but can be used to practice an emergency gear extension whenever deemed necessary by the pilot. The following procedures are recommended for emergency and practice extensions. After establishing an airspeed of approximately 120 to 130 knots, pull the LANDING GEAR CONT circuit breaker and place the landing gear control handle in the DN position. As shown on the placard, engage the manual system by pulling up on the emergency engage handle and turning it 90 degrees clockwise to lock it in the engaged position. Then remove the extension lever from the securing clip, and pump until the three green GEAR DOWN indicator lights illuminate. After an EMERGENCY landing gear extension has been made, DO NOT stow the pump handle or move any other landing gear controls or reset any switches or circuit breakers, until the airplane is on the ground and the cause of the malfunction has been determined and corrected. After a practice manual extension of the landing gear, the gear may be retracted mechanically by rotating the emergency engage handle counterclockwise and pushing it down, securing the pump handle under the clip, pushing the LANDING GEAR CONT circuit breaker in, and moving the landing gear control handle to the UP position.

HYDRAULIC SYSTEM

The Manual Landing Gear Extension System, is located on the floor between the pilot's and copilot's seats. It is designed primarily for actual emergency gear extensions, but can be used for practice gear extensions by establishing an air speed of approximately 120 to 130 knots, pulling the LANDING GEAR CONT circuit breaker and placing the landing gear control handle in the DN position.

Remove the pump handle from the securing clip and pump the handle up and down until the three green GEAR DOWN indicator lights illuminate, then secure the handle in the securing clip. After an EMERGENCY gear extension has been made, and the pump handle placed in the securing clip, DO NOT MOVE any other landing gear controls or reset any switches or circuit breakers, until the airplane is on the ground and the cause of the malfunction has been determined and corrected. After a practice manual extension of the landing gear, the gear may be retracted hydraulically by pushing the LANDING GEAR CONT circuit breaker in, and moving the landing gear control handle to the UP position.

SHOCK STRUTS AND STEERING

The Beech air-oil type shock struts are filled with both compressed air and hydraulic fluid. Direct linkage from the rudder pedals allows for nose wheel steering. When the rudder control is augmented by a main wheel brake, the nose wheel deflection can be considerably increased.

The nose gear is centered and the nose steering mechanism is disconnected from the rudder pedals by an electric actuator when the landing gear safety switch is closed. This places the nose gear in a centered position at all times while the aircraft is in flight.

A safety switch on the right main strut opens the control circuit when the strut is compressed. The safety switch also actuates a solenoid-operated downlock hook, which prevents the landing gear handle from being raised when the plane is on the ground. The hook automatically unlocks when the plane leaves the ground, but can be manually overridden by pressing down on the red button placarded DN LCK REL.

INDICATOR SYSTEM

Visual indication of landing gear position is provided by individual green GEAR DOWN indicator lights for each landing gear. Two red, GEAR UNLOCKED, parallel-wired lights are located in the control handle and may be checked by pressing the HDL LT TEST button to the left of the control handle. These lights illuminate to show that the gear is in transit or unlocked. They also illuminate when the landing gear warning horn is actuated.

The landing gear control circuit provides power to the landing gear handle light when the warning horn is silenced. The warning horn will sound intermittently and the landing gear handle light will illuminate when either or both power levers are retarded below an N_1 speed of approximately 79%. **As long as the gear remains retracted and the wing flaps have not been extended beyond the 30% position, the horn can be deactivated by pressing the HORN SILENCE button but the landing gear handle light will remain illuminated. Extending the wing flaps beyond 30% will** cause the horn to sound and can be silenced only by extending the gear. Advancing the power lever or levers beyond the 79% N_1 position will cause the light to extinguish and the full system is again ready for use. If the horn is silenced with only one power lever retarded, it will not sound when the other power lever is retarded.

LANDING GEAR DOORS

The main landing gear doors consist of a single set of doors on each of the two main landing gears. The door actuators are connected to the landing gear assembly in such a manner as to open when the landing gear is in the extended position and to remain open until the gear is retracted. The nose gear doors consist of a dual set of doors; the smaller set located at the forward portion of the wheel well. The smaller forward set of doors are connected in the same manner as the main landing gear doors, that is, to remain open when the landing gear is in the extended position. The larger aft set of nose landing gear doors is connected in such a manner as to open only to allow the gear to pass in or out of the wheel well; in other words, the doors are in the closed position when the nose landing gear is in either the fully retracted or extended position.

BRAKE SYSTEM

The dual hydraulic brakes are operated by depressing either the pilot's or copilot's rudder pedals. A shuttle valve adjacent to each set of pedals permits changing braking action from one set of pedals to the other.

Dual parking valves are installed adjacent to the rudder pedals between the master cylinders of the pilot's rudder pedals and the wheel brakes. After the pilot's brake pedals have been depressed to build up pressure in the brake lines, both valves can be closed simultaneously by pulling out the parking brake handle on the left subpanel. This closes the valve to retain the pressure that was previously pumped into the brake lines. The parking brake is released when the parking brake handle is pushed in and the pedals are depressed briefly to equalize the pressure on both sides of the valve, allowing it to open.

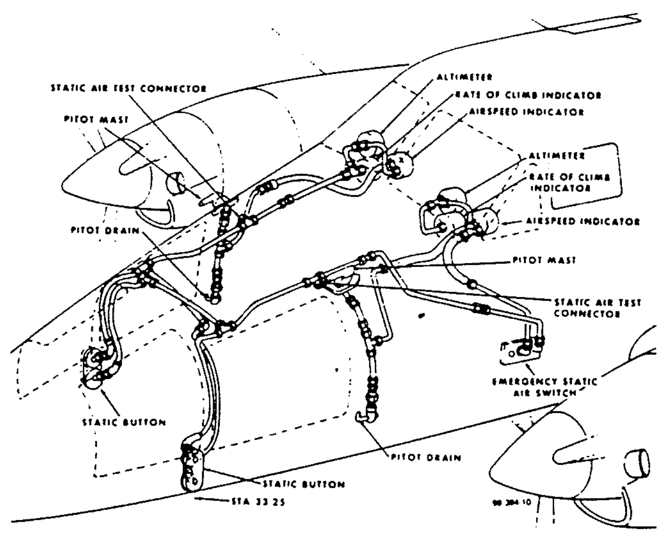
CAUTION

If either the pilot's or the copilot's brake pedals are pumped repeatedly while continuous pressure is being applied to the other set of brake pedals braking capability from the "continuous-pressure" side may be lost. Normal brake function can be restored by momentarily removing all pressure from the pedals on the "continuous-pressure" side.

The parking brake should be left off and wheel chocks installed if the airplane is to be left unattended. Changes in ambient temperature can cause the brakes to release or to exert excessive pressures.

PITOT AND STATIC PRESSURE SYSTEM

The pitot and static pressure system provides a source of impact air pressure and static air for the operation of the instruments. The pitot portion of the system is comprised of two electrically-heated masts located on the upper-fuselage nose. The impact air pressure entering the masts is transmitted through separate tubing to the dual airspeed indicators mounted on the instrument panel. A heating element located in each mast prevents the opening of the mast from becoming clogged with ice. The interconnecting tubing is sloped to permit moisture to settle at the lowest point in each line. The moisture in the lines is drained through a pair of drain petcocks located directly inside and aft of the nose baggage compartment door on each side. These drain petcocks should be checked and opened to allow the release of any trapped moisture following each flight in atmosphere containing precipitation or high humidity.

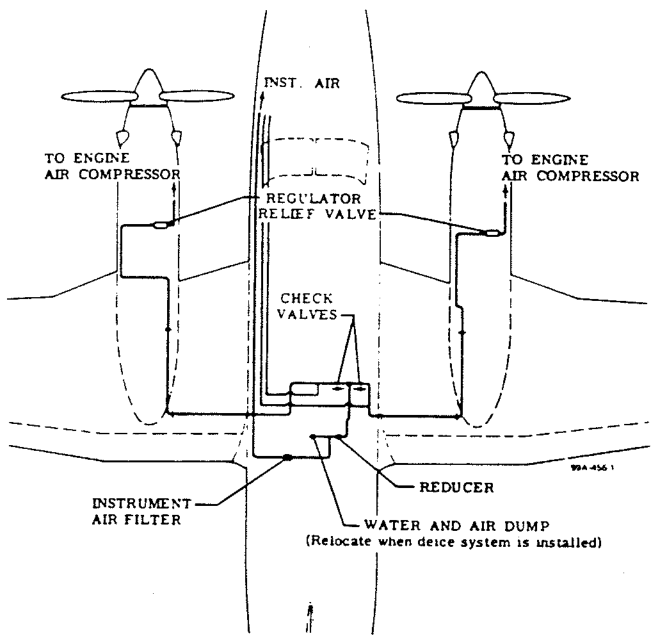


PITOT AND STATIC PRESSURE SYSTEM

The static portion of the system includes two separate static ports or "buttons" located on each side of the nose area immediately forward of the nose baggage compartment. Each static button is located at the lowest point in the interconnecting lines; therefore, drain petcocks are not required as each line has a built-in gravity drain through the button opening. Should the static air lines become clogged, an emergency static air source is provided by a static air relief valve located in the aircraft cockpit on the pilot's side panel for the pilot's instruments only.

ENGINE BLEED AIR PNEUMATIC SYSTEM

High pressure engine compressor bleed air, regulated at 16 psi, supplies pressure to drive the flight instruments, optional surface deice and optional autopilot systems. One engine can supply enough bleed air for all these systems. Check valves in both the bleed air lines prevent flow back through the system during single engine operation. A subpanel mounted pressure gage is furnished to indicate instrument air pressure. A second pressure gage is furnished with the optional surface deice system to indicate air pressure available to the deice distributor valve.



ENGINE BLEED AIR PNEUMATIC SYSTEM

FLIGHT INSTRUMENTS

The flight instruments are arranged on the floating instrument panel in a standard grouping. Complete pilot and copilot flight instrumentation is installed, including dual navigation systems, one electric and one pressure directional indicator, horizon, and turn and slip indicator.

LIGHTING

The overhead light control panel incorporates a breakdown of all lighting systems in the cockpit. Separate rheostats are provided for the integrated flight system, the pilot's flight control panel, and copilot's flight panel, the engine instrument section, the radio panel, the instrument panel floodlights, the overhead cockpit lights, the subpanel, pedestal, fuel and pneumatic panel lights.

Exterior light switches are located on the left subpanel. There are two switches placarded LANDING to control the left and right wing-mounted landing lights, a switch placarded TAXI, for the nose gear mounted taxi light, a switch placarded NAV, for the navigation lights, a switch placarded BEACON, for the upper and lower rotating beacons, a switch placarded ICE, for the wing ice lights and a switch, placarded STROBE, for the optional wing tip and the tail strobe lights.

STALL WARNING/SAFE FLIGHT SYSTEM

The stall warning/safe flight system consist of a safe flight indicator mounted on the left side of glareshield, a breaker type switch on the left subpanel, a warning horn forward of right instrument panel, a heated lift transducer vane and face plate on the leading edge of the left wing. The heater for the lift transducer vane receives power any time the master switch is on. The heater for the face plate is activated by positioning the STALL WARNING switch to ON.

When aerodynamic pressure on the lift transducer vane indicates that a stall is imminent, the transistor switch is actuated to complete the circuit to the stall warning horn.

CAUTION

The formation of ice at the transducer vane may prevent the system from indicating an incipient stall during icing conditions.

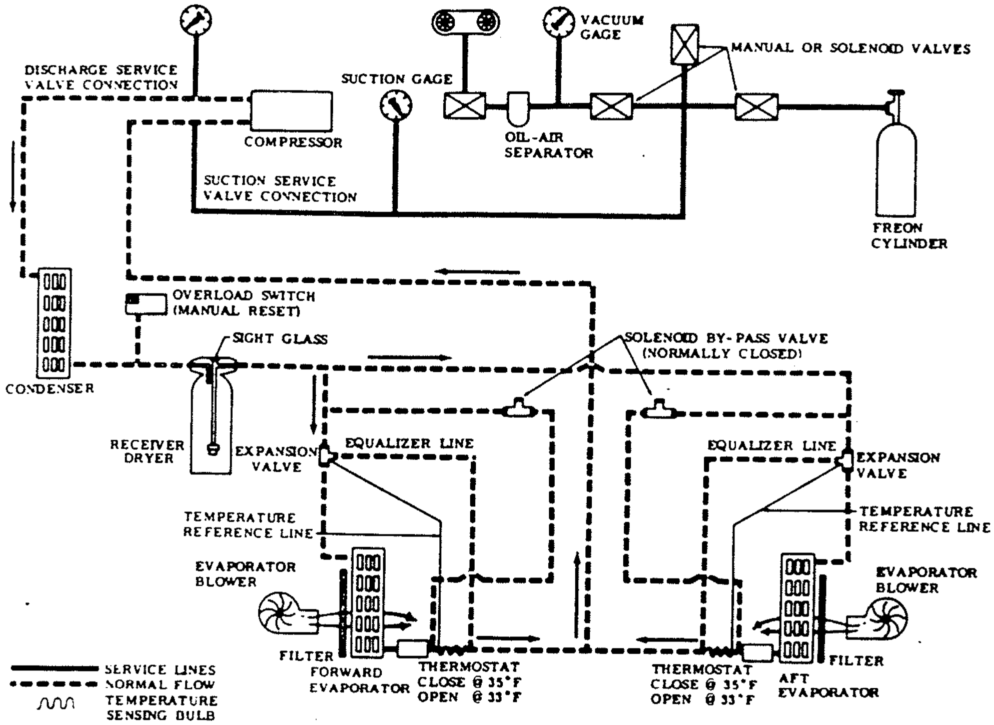
The lift transducer also senses the angle of attack and transmits this information as a relative speed reading on the linear scale of the safe flight indicator. The best approach speed is indicated when the needle centers on the scale of the indicator.

CAUTION

The stall warning is inoperative with the master switch OFF.

AIR CONDITIONING SYSTEM

The optional air conditioner is a vapor-cycle system containing two refrigerative type evaporators. The compressor is belt-driven off the right engine accessory case. One of the evaporators is installed in the nose under the baggage compartment floor and the other under the right seat track at fuselage station 263.5 (even with the aft side of the fifth cabin window). A valve controlled by two solenoids is located immediately aft of the aft evaporator. During the heating mode, one of the solenoids closes the



AIR CONDITIONING SYSTEM

valve to prevent heated air from entering the overhead distribution ducts. During the manual cooling mode, the other solenoid opens the valve to facilitate air conditioning by enabling the flow of evaporator air to rapidly cool down the distribution ducts. Each evaporator has a two-speed ventilation blower controlled through a VENT BLOWER switch on the copilot's subpanel next to the airconditioning mode selector switch. A 33°F thermal switch at each evaporator actuates a refrigerant bypass valve to prevent the evaporators from icing up.

When the aircraft is on the ground, a vane-axial blower (operating through the landing gear up-lock switch), draws air through a grill in the aft end of the nose wheel well to the condenser and exhausts air through louvers on the lower right side of the nose. During the flight the condenser blower is inoperative and ram air is directed to the condenser from the air scoop along the left side of the nose. The air conditioning system operates either automatically or manually as selected by the mode switch. When the AUTO position is selected, the heating and air conditioning systems are automatically controlled through a balanced wheatstone bridge by the control box as described in the heater portion of this section. When the cabin has cooled down to the selected temperature setting, the automatic temperature control opens the bypass solenoids that route the refrigerant around the evaporators. A 4°F dead zone between the heating and cooling modes prevents cycling between the two. When the selector switch is placed in the MANUAL COOL position, the automatic temperature control system is bypassed.

To protect the compressor from excessive line pressure, an overload switch (located under the nose baggage compartment floor) will release the electric compressor clutch whenever the pressure exceeds 390 psi.

WARNING

The overload switch cannot be reset in flight. The switch must be reset manually, but only after a complete system checkout to determine the cause for tripping.

NOTE

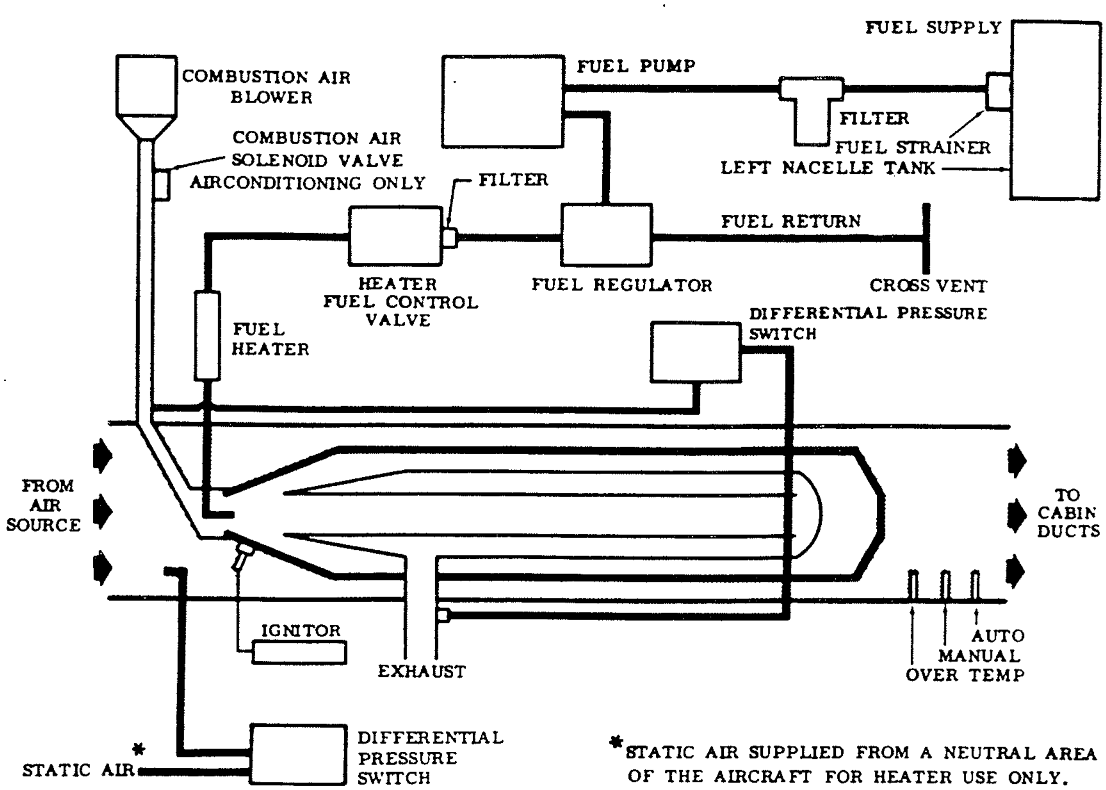
If it appears, due to a lack of cool air being emitted from the vents, that the air conditioner is inoperative, the system should be turned off to prevent compressor clutch damage.

REFRIGERATIVE AIR COOLING SYSTEM

The belt-driven compressor changes the refrigerant to a high pressure, high temperature gas. This gas passes through the condenser where cooling air removes heat from the gas, condensing it to a liquid state. The liquid passes through the receiver-dryer where any moisture or foreign material is removed from the system. The refrigerant flows to the expansion valves where it is metered into each evaporator at a rate which allows all the liquid to return to a gas. The heat required for evaporation is absorbed from the cabin air passing over the evaporator coils. After passing through the evaporators, the refrigerant returns to the compressor at a reduced pressure.

HEATING SYSTEM

The heater is a 100,000 BTU combustion heater designed to operate on any fuel used by the engines. Fuel for the heater is drawn from the engines supply in the left wing



INTERNAL COMBUSTION HEATER

stub. A fuel pump, regulator and fuel solenoid in the left wing center section supplies fuel to the heater at a regulated pressure of 95 to 100 psi.

Heater combustion air is provided by a combustion air blower located under the baggage compartment floor aft of the nose wheel well. Cabin air circulation through the heater is supplied by a ventilation blower, located under the nose baggage floor to the left of the heater. An optional aft blower located under the left floorboard at fuselage station 256 provides additional air circulation. The combustion air blower, ignitor and heater fuel pump operate continuously. The heater is cycled by the fuel control valve. The heating system is controlled by a rotary CABIN TEMPERATURE MODE select switch on the right subpanel. The heater may be operated in MANUAL mode with the heater fuel control valve controlled by a 225° thermal cycling switch in the heater discharge plenum. In AUTO mode, the heater fuel valve is controlled by the cabin temperature control box mounted under the center aisle floor aft of the main spar. The cabin temperature control box regulates heater cycling in response to information derived from a balanced bridge circuit consisting of cabin air sensor, outside air sensor, heater discharge sensor and the cabin control rheostat. If an air conditioner is installed, a 4° dead zone prevents constant fluctuation between heat and cool modes of the system.

The ventilation blower(s) operate at low speed whenever any CABIN TEMP MODE is selected. Increased ventilation flow may be achieved by placing the VENT BLOWER SWITCH in the HIGH position. The ventilation blower(s) may be operated independently of heater operation by a switch placarded VENT BLOWER, HIGH-LOW-OFF. Electrical power for the heater system control and for the combustion blower is supplied through circuit breakers on the lower circuit breaker panel at the copilot's right. Power for the ventilation blower and the optional aft ventilation blower (if installed) is supplied through current limiters mounted on the power distribution panel below the cabin center aisle floor.

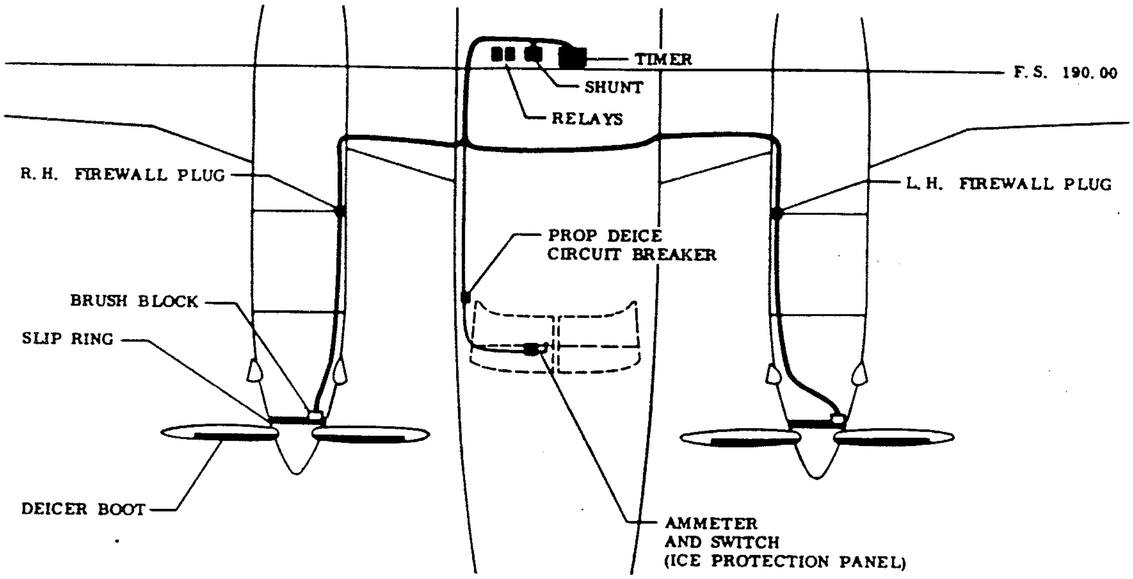
A heater safety fuse located on the relay panel under the left cabin floor forward of the main spar routes power to the fuel pump, fuel valve, and ignitor.

This fuse will open or blow through the actuation of a 300°F over-temperature thermal switch in the heater discharge plenum.

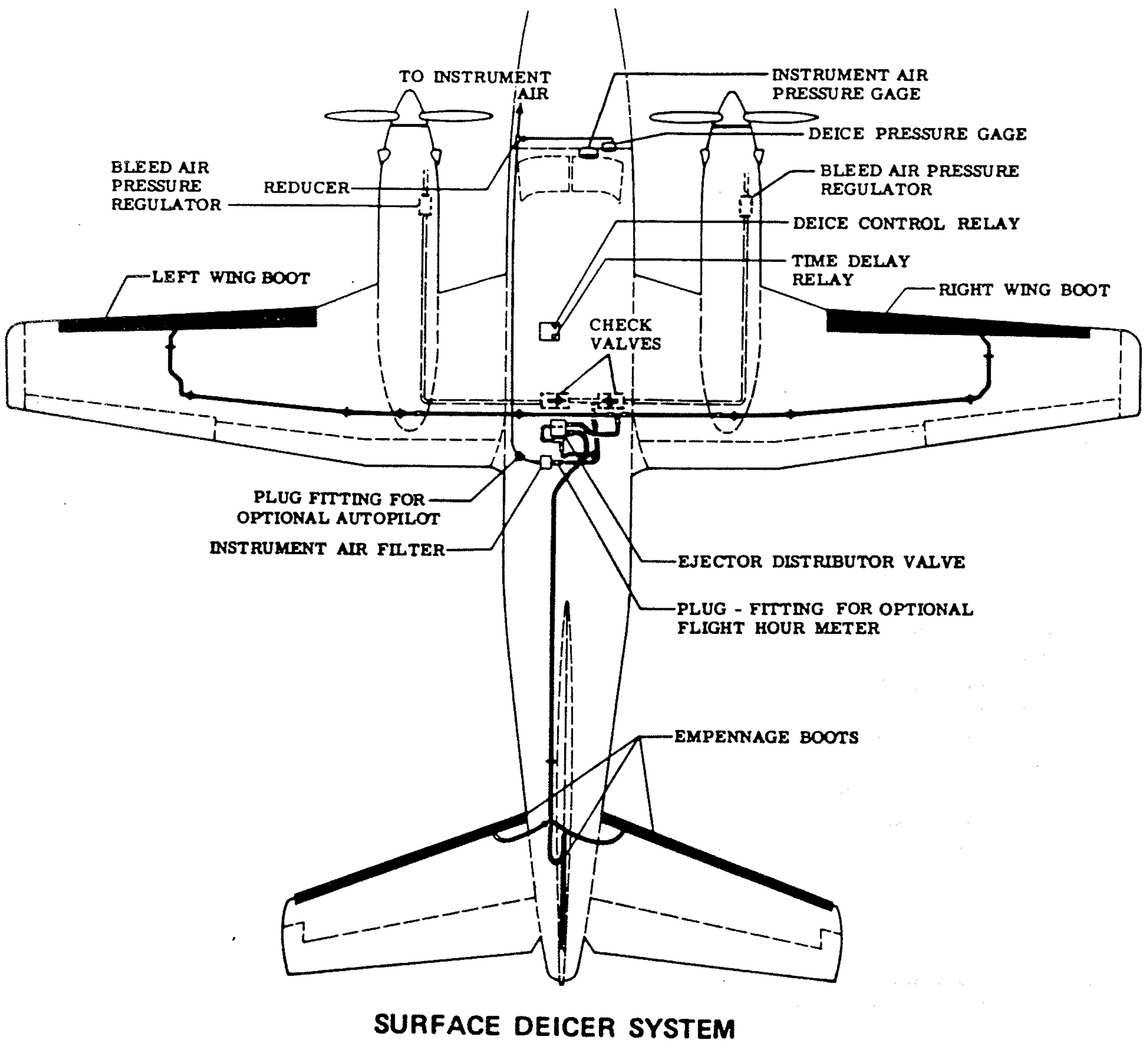
The fuel pump will cease to function by:

1. Ventilation blower failure, sensed by a differential pressure switch mounted under the inboard end of the blower.

2. Combustion blower failure, sensed by a differential pressure switch located under the heater.



PROPELLER DEICER SYSTEM



SURFACE DEICER SYSTEM

VENTILATION AND DEFROST SYSTEM MANUAL CONTROL

The pilot and copilot have separate controls to operate individual air outlets under the instrument panel. The DEFROST AIR control is located next to the copilot's outlet control. The defroster valve, which regulates air flow to the windshield defrost ducts, works in conjunction with the cabin air duct shut-off valve. As the defroster valve starts to open, the shutoff valve begins to close the valve. If the DEFROST AIR control is pulled completely out, all heat will be routed through the defroster duct. If the defroster control is only partially pulled, air will divert to the defroster ducts and still allow heated air to the cabin outlets.

When the RAM AIR control is pulled, a door in the ram air scoop opens to allow outside ram air to the ventilation blower. The outside air then circulates through the cabin and is exhausted through the overhead outlets.

OXYGEN SYSTEM (OPTIONAL)

Oxygen for flight at high altitude is supplied by high pressure bottles mounted under the avionics compartment floor in the nose section. An ON-OFF control located on the oxygen panel on the sidewall to the pilot's left, opens the system for use.

The system is of the constant-flow type. Each mask plug is equipped with its own regulating orifice. Since the orifice is in the mask plug, the Oxygen Duration Chart on Page 2-9 is valid only for BEECHCRAFT standard continuous flow masks. The passengers' oxygen masks are kept in seat back pockets with an oxygen outlet located in the individual overhead console above each cabin seat. Plugging the mask into the outlet in the overhead console starts the oxygen flow if the pilot's OXYGEN SHUT-OFF valve is open. Each mask is plugged in by pushing it firmly into an outlet and turning clockwise approximately one quarter turn. Unplugging is accomplished by reversing the motion.

ICE PROTECTION SYSTEMS

PROPELLER ELECTRIC DEICE SYSTEM

The propeller electric deice system includes an electrically heated boot for each propeller blade, brush assemblies, slip rings, an ammeter, and an on-off switch on the subpanel. When the switch is turned on, the ammeter on the subpanel registers the amount of current (14 to 18 amperes) passing through the system. If the current rises beyond the switch limit, an integral circuit breaker will cut off the power to the timer. The current flows from the timer, located under the center aisle floor aft of the main spar, to the brush assembly mounted on the front of the engine case and is conducted by the brush assembly to the slip rings installed on the spinner backing plate. The slip rings distribute current to the deice boots on the propeller blades. Heat from the boots reduces the grip of the ice, which is then removed by the centrifugal effect of propeller rotation and the blast of the air stream. Power to the two heating elements on each blade is cycled by the timer to the outboard and inboard heating elements in the following sequence: right outboard, right inboard, left outboard, left inboard. Since each of these phases is 30 seconds in duration, the timer makes a complete cycle every two minutes. Whenever the timer switches to the next phase of operation, the ammeter on the left subpanel will register a momentary deflection.

A manual propeller deice system (Serials U-152 through U-164) is provided as a backup to the automatic system. Activation of the system is controlled by a switch placarded PROP MANUAL - INNER - OUTER. The switch is of the momentary type and must be held in the selected position for approximately 45 seconds (or until ice has been removed). Selection of the INNER or OUTER position will supply power to the INNER or OUTER heating elements of both propellers simultaneously. The propeller deice ammeter will not indicate a load while the system is being activated manually. However, the loadmeters will indicate an increase of approximately .05 in load per meter while the manual system is functioning.

SURFACE DEICE SYSTEM (OPTIONAL)

The surface deice system removes ice accumulation from the leading edges of the wings and the horizontal and vertical stabilizers. Ice removal is performed by the action of alternately inflating and deflating boots. The boots are inflated by air pressure and deflated by vacuum. Air pressure and vacuum are obtained by bleeding air from the engine compressors. The bleed air is routed through a regulator valve that is set to maintain the pressure required to inflate the surface deice boots. To assure operation of the system should one engine fail, a check valve is incorporated in the bleed line from each engine to prevent the escape of air pressure into the chamber of the inoperative compressor. The bleed air from the engine is routed through an ejector that uses venturi effect to produce vacuum. The vacuum is used to deflate the deice boots and to maintain a smooth contour when the system is not in operation. The inflation and deflation phases of operation are controlled by a distributor valve. The surface deice system is actuated by a three-position switch on the left subpanel; the switch is spring loaded to return to the off position from either the MANUAL or SINGLE position. When the SINGLE position is selected, the distributor valve opens to inflate the boots. After an inflation period of approximately 7 seconds, a timer delay relay switches the valve to deflate the boots. When deflation is complete, the cycle is complete. When the MANUAL position is selected the boots will inflate and will remain inflated as long as the switch is held in position. When the switch is released, the distributor valve returns to the off position and the boots will deflate. The boots then will remain deflated until again actuated by the switch.

CAUTION

Operation of the surface deice system in ambient temperatures below -40°C can cause permanent damage to the deice boots.

ENGINE FUEL CONTROL LINE HEATER

A heating element is wrapped around the engine air pressure sense line immediately before entering the engine fuel control unit. Each heating element is controlled by an individual circuit breaker switch through an idle cutoff switch actuated by the condition lever. Movement of either condition lever from the idle cutoff position actuates an idle cutoff switch in the upper pedestal. This provides power to the fuel control line heater through the circuit breaker switch located on the circuit breaker panel to the copilot's right.

PITOT MAST

Heating elements are installed in the pitot masts on either side of the upper nose area. Each heating element is controlled by an individual 5 amp circuit breaker switch. The pitot heat switches are located on the pilot's ICE PROTECTION panel.

WINDSHIELD ANTI-ICE (OPTIONAL)

The pilot's windshield is protected against icing by electrical heating elements. The copilot's windshield may also be protected as an additional installation. The systems are controlled by a switch located on the pilot's subpanel. An ON-OFF type switch in the pilot's installation and a three position switch (BOTH-OFF-LEFT) for the dual installation, controls the windshield anti-ice system. The controller is mounted on the upper left corner of the forward bulkhead behind the pilot's instrument panel. Controller power is supplied by a 1/2 amp circuit breaker located on the circuit breaker panel to the copilot's right. A 30 amp current limiter (50 amp current limiter for dual installation) on the power distribution panel provides power to the system through the windshield anti-ice relay on the lower equipment panel. The power distribution panels are located under the center aisle floor.

WINDSHIELD WIPER

The windshield wiper installation consists of a motor, arm assemblies, drive shafts and converters located forward of the instrument panel. The system includes a control switch, located in the overhead panel, and the system circuit breaker in the right sidewall panel.

FIRE EXTINGUISHER SYSTEM (OPTIONAL)

The system utilizes two cylinders charged with 2-1/2 pounds of Bromotrifluoromethane, pressurized by dry nitrogen to 450 psi, at 70°F, as the extinguishing agent. Lines from the cylinders are routed to each nacelle. These lines branch into a network of spray tubes about the engine which serve to diffuse the extinguishing agent around the engine. Each system is armed by pulling its FIRE PULL handle. To actuate the system the FIRE EXT push button is depressed. This is a single shot system for each engine.

CAUTION

Do not attempt to start the engine after the extinguisher has been actuated.

FIRE DETECTION SYSTEM

To provide immediate indication in the event of fire at the engine, a fire detection system is installed. The basic fire detection system consists of three photoconductive cells in each engine nacelle, two control amplifiers under the center aisle floor just aft of the main spar, two indicator lights on the fire extinguisher T-handles, a test switch on the right subpanel and a circuit breaker on the INDICATORS AND WARNING circuit breaker panel on the copilot's right. The flame detectors, sensitive to infrared rays, are positioned in the engine compartments to receive direct and reflected rays, thus viewing the entire compartment with only three cells. Heat level and rate of heat rise are not factors in the sensing method. The cell emits an electrical signal whose potential is proportional to the infrared intensity and ratio in the radiation striking the cell. To prevent stray light rays from signaling a false alarm, a relay in the control amplifier closes only when the signal reaches a preset alarm level. When the relay closes, the appropriate warning light on the fire extinguisher T-handle illuminates. After the fire is extinguished, the cell output voltage drops below the alarm level and the relay in the control amplifier opens. No manual resetting is required to reactivate the detection system. The test switch on the subpanel has positions to test each of the detectors. The system may be tested any time on the ground on in flight by rotating the switch through the various positions. The three test positions activate one corresponding set of flame detectors in each nacelle. Failure of a light to glow in any one position indicates trouble in that particular detector circuit rather than a trouble affecting all detectors.

SECTION XI

SERVICING

TABLE OF CONTENTS

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INTRODUCTION TO SERVICING

The purpose of this section is to outline the requirements for maintaining the B99 Airliner in a condition equal to that of its original manufacture. This information sets the time frequency intervals in which the airplane should be taken to a Beechcraft Parts and Service Outlet for periodic servicing or preventive maintenance.

The Federal Aviation Regulations place the responsibility for the maintenance of this airplane on the Owner and Operator, who should make certain that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

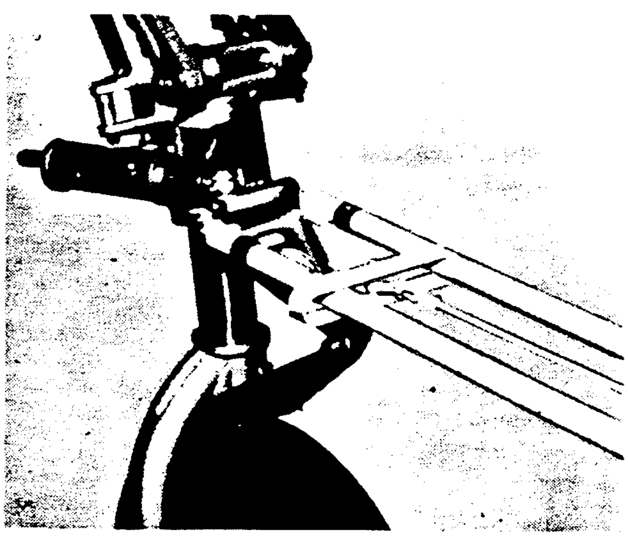
All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this manual are considered mandatory.

Authorized BEECHCRAFT Parts and Service Outlets will have recommended modification, service, and operating procedures issued by both FAA and Beech Aircraft Corporation, designed to get maximum utility and safety from the airplane.

If a question arises concerning the care of the B99 Airliner, it is important that the airplane serial number be included in any correspondence. The serial number may be found on the Manufacturer's Identification Plaque located on the aft frame of the airstair door.

TOWING

With the tow bar connected to the towing lugs on the upper torque knee fitting of the nose strut, the airplane can be steered with the nose wheel when moving it by hand or with a tug. Although steering is automatic when the airplane is being towed by the nose strut, someone should ride in the pilot's seat to operate the brakes in the event of an emergency. Do not tow airplane with rudder locks installed as severe damage to the steering linkage can result. When using a tug, observe turn limits marked on the nose gear strut to prevent damage to the nose gear. When spotting the airplane, do not push on the propeller or control surfaces.



Towing The Airplane

PARKING

The brakes can be set for parking by pulling out the parking brake control and depressing the pilot's brake pedals. Do not attempt to lock the parking brake by applying force to the parking brake handle; it controls a valve only, and cannot apply pressure to the brake system. To release the brakes, push the parking brake control in.

NOTE

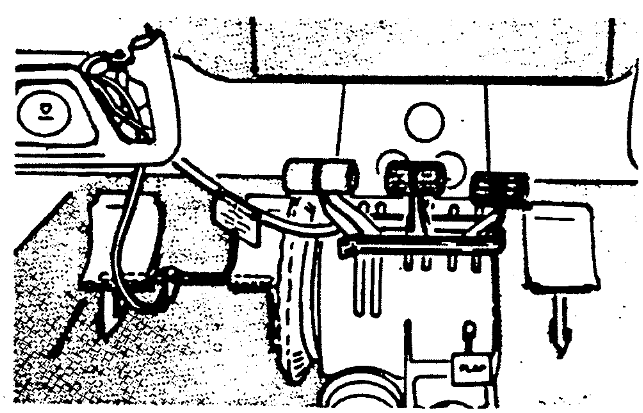
Do not set the parking brakes during low temperatures when an accumulation of moisture may cause the brakes to freeze, or when they are hot from severe use.

CAUTION

The parking brake should be left off and wheel chocks installed if the airplane is to be left unattended. Changes in ambient temperature can cause the brakes to release or to exert excessive pressures.

CONTROL LOCK

The control lock consists of a U-shaped clamp and two pins connected by a chain. The pins lock the primary flight controls and the U-shaped clamp fits around the engine power control levers and serves to warn the pilot not to start the engine with the control locks installed. It is important that the locks be installed or removed together due to the possibility of an attempt to taxi or fly the



Control Lock

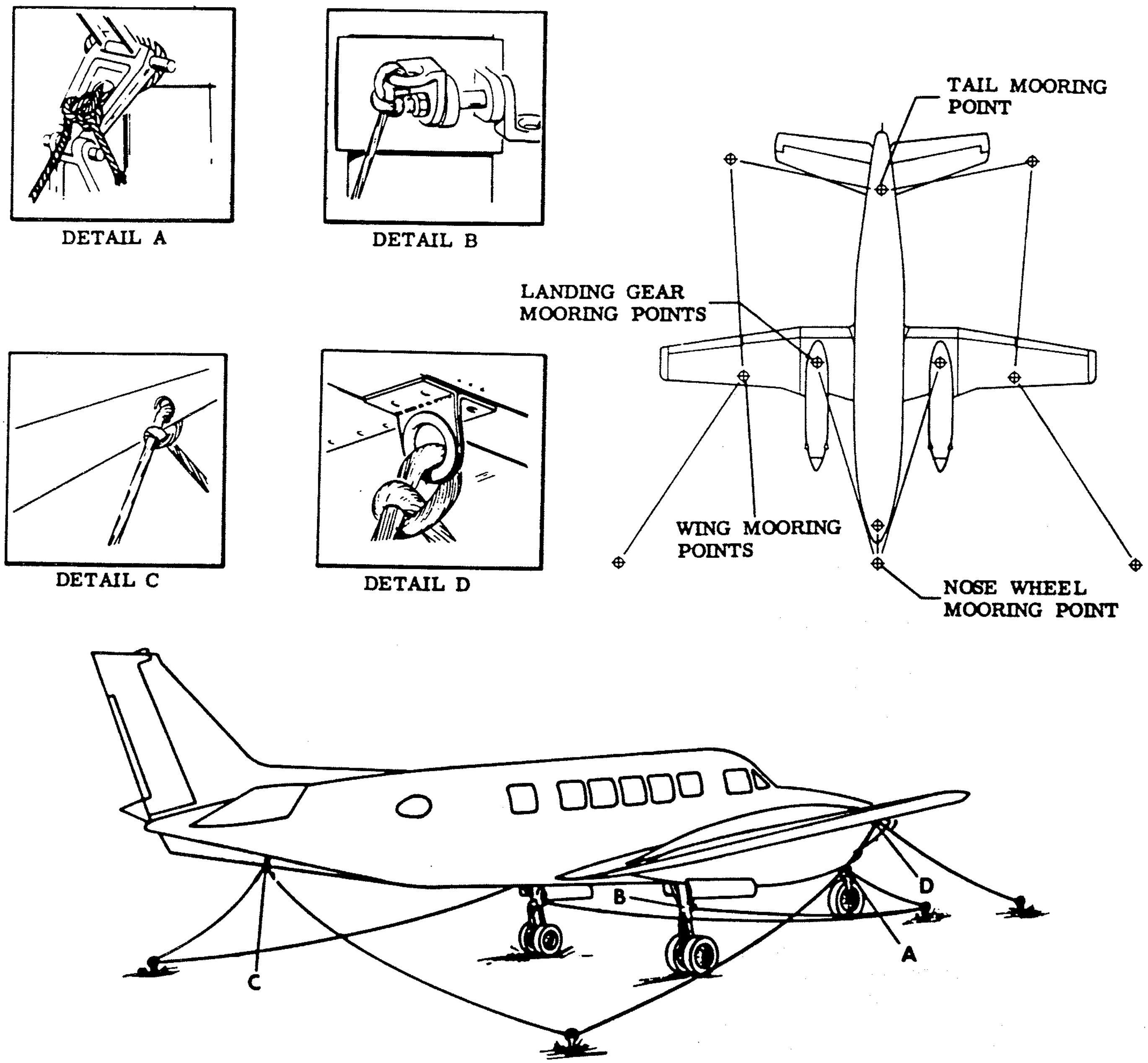
airplane with the power levers released and the pins still installed in the flight controls. Install the control locks in the following sequence: position the U-clamp around the engine power controls; insert the small pin in the elevator-aileron pilot's control from the upper side of the column; insert the largest pin in the pilot's rudder pedals by pushing forward on the left pedal and inserting the pin into the hole located on the inside of the right rudder pedal. Neutralize the pedals and slide the pin into the hole in the left rudder pedal. To remove the locks use the same procedure in the reverse sequence. A placard attached to the chain displays the installation sequence.

TIE DOWN

Three mooring eyes are provided, one on each wing and one on the tail. To moor the airplane, chock the wheels fore and aft, install the control lock and tie the airplane down at all three points. Avoid overtightening the rear line and pulling the nose of the airplane up so far that wind will creat lift on the wings. If extreme weather is anticipated, it is advisable to nose the airplane into the wind. Install engine inlet and exhaust covers and pitot mast covers when mooring the aircraft.

To tie down your aircraft securely, use the following steps:

1. Chock the wheels fore and aft.
2. Install the control locks.
3. Tie each wing with a nylon line or chain through its mooring eye.
4. Tie the tail with a nylon line or chain through the mooring eye in the ventral fin.



SERVICING

EXTERNAL POWER

The aircraft electrical system is protected against damage from an external power source with reversed polarity by a relay and diodes in the external power circuit. The external power receptacle is located either just outboard of the nacelle in the right center section, or below and aft of the airstair door. The receptacle is designed for a standard AN type plug. To supply power for ground checks or to assist in starting, a ground power source capable of delivering a continuous load of 300 amperes and up to 1000 amperes for .1 second is required. Observe the following precautions when using an external power source.

1. Use only an auxiliary power source that is negatively grounded. If the polarity of the power source is unknown, determine the polarity with a voltmeter before connecting the unit to the airplane.

2. Before connecting an external power unit, ensure that a battery is installed in the aircraft and that the battery switch is ON. All other electrical and avionics equipment should be turned OFF to prevent damage from transient voltage spikes.

3. If the unit does not have a standard AN plug, check the polarity and connect the positive lead from the external power unit to the center post and the negative lead to the front post of the airplane's external power receptacle. The small pin of the receptacle must be supplied with +24 VDC to close the external power relay that provides protection against damage by reversing polarity.

BATTERY

Servicing the 24 volt nickel-cadmium battery is normally limited to checking the electrolyte level at each periodic inspection, cleaning the battery box and the associated components as necessary, equalizing the cells annually or more often, as necessary, and occasionally recharging the battery.

CAUTION

> The electrolyte in the nickel-cadmium battery is an alkali. When possible, use equipment reserved for nickel-cadmium batteries only. If equipment which has been used for lead-acid batteries must be used, thoroughly clean the equipment of all possible acid contamination with a sodium bicarbonate solution. Even minute traces of acid can damage a nickel-cadmium battery.

Since the battery electrolyte level depends on the state of charge in the battery, check the level only when the battery is in a fully charged state. If the battery is less than fully charged, the level will appear low.

LANDING GEAR

TIRE INSPECTION AND INFLATION

Maintaining proper tire inflation will help to avoid damage from landing shock, contact with sharp stones and ruts, and will minimize tread wear. When inflating the tires, inspect them for cuts, cracks, breaks and tread wear.

The standard main tires are 18 x 5.5 8-ply tubeless tires, and should be inflated to 92-96 PSI. The optional tires are 18 x 5.5 10-ply Type VII tubeless tires, and should be inflated to 82-86 PSI.

The "Hi-Flotation" main gear tires are 10 x 6.5 6-ply Type III, tubeless tires, and should be inflated to 51-55 PSI. Only 6-ply tires are approved for "Hi-Flotation" landing gear.

The standard nose gear tire is a 10 x 6.5 6-ply Type III tubeless tire and should be inflated to 53-57 PSI.

CAUTION

> Do not intermix 10-ply tires and 8-ply tires on the same set of dual wheels on any one landing gear. Tires that have picked up a fuel or oil film should be washed down as soon as possible, with a detergent solution to prevent contamination of the rubber.

SHOCK STRUTS

To check the fluid level in the landing gear shock absorbers, deflate the strut by releasing the air through the valve, then remove the filler valve adapter. The fluid level should be at the bottom of the valve standpipe with the struts fully compressed. If the level is low, add MIL-H-5606 hydraulic fluid to reach the standpipe. work the strut slightly to eliminate any trapped air, then add more fluid as necessary.

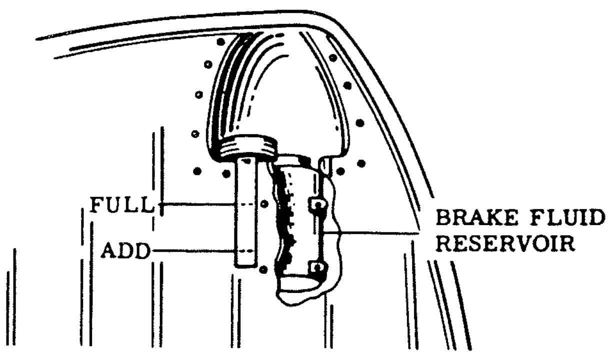
WARNING

> Release the air pressure entirely before removing the valve adapter.

With the airplane empty except for fuel and oil inflate the nose strut until the piston is extended 3 to 3-1/2 inches and the main strut until the piston is extended 4 to 4-1/2 inches.

BRAKE SYSTEM

Brake system servicing is limited primarily to maintaining the hydraulic fluid level in the reservoir mounted in the upper left corner of the aft bulkhead of the nose baggage compartment. A dip stick is provided for measuring the fluid level. When the reservoir is low on fluid, add a sufficient quantity of MIL-H-5606 hydraulic fluid to fill the reservoir to the full mark on dipstick. The only other requirement related to servicing involves the wheel brakes



Brake Fluid Reservoir

themselves. The brake must be checked periodically for indication of excessive wear. For detailed information relating to the proper inspection and repair procedures, refer to the BEECHCRAFT Servicing and Maintenance Instruction for BEECHCRAFT 99 Airliner Brakes.

OIL SYSTEM

Servicing the engine oil system primarily involves maintaining the engine oil at the proper level and changing the filter element and the oil at the proper intervals. The disposable filter element should be changed at 300 hour intervals. The metal oil screen must be cleaned every 400 hours or 9 months (whichever occurs first) on aircraft operated 50 hours a month or less. On high utility, commuter airline type operations, the metal screen should be cleaned and inspected every 800 hours (1200 hours if 5 Centistoke oils are used) or 9 months, whichever occurs first.

NOTE

In addition to the maximum intervals defined above, check the oil screen at 100-hour intervals and clean as necessary.

For engines operated at a utilization rate of 50 hours per month or less, oil should be changed every 400 hours or 9 months, whichever occurs first. For engines operated at a higher rate of utilization, oil should be changed at 800 hours (1200 hours if 5 Centistoke oils are used) or 9 months, whichever occurs first.

CAUTION

Do not mix different brands of oil when adding oil between oil changes, for different brands of oil may be incompatible because of the difference in their chemical structure.

The oil tank is provided with an oil filter neck and quantity dipstick cap which protrude through the accessory gearcase at the eleven o'clock position. The dipstick is marked in U.S. quarts and indicates the amount of oil required to fill the tank. Access to the dipstick cap is gained by opening the aft engine cowl. Service the oil system with oil as specified in the Consumable Materials Chart. Do not mix the oil brands. Oil Tank capacity is 2.3 U. S. gallons with 5 quarts measured on the dipstick as usable, for adding purposes. When a dry engine is first serviced it will require approximately 5 quarts in addition to tank capacity to fill the lines and cooler, giving a total system capacity of 14 quarts. The engine will trap approximately 1.5 quarts which cannot be drained; therefore, when performing an oil change, refill the system with 12 quarts and add additional oil based on dipstick reading.

CAUTION

Spilled oil should be removed immediately to prevent possible tire contamination or damage.

OIL FILTER CHANGING

The engine oil filter is located under the square cover plate at the three o'clock position of the compressor inlet case and just behind the aft fire seal.

DISPOSABLE OIL FILTER

If the engine is equipped with a cartridge-type disposable filter element it may be changed as follows:

The engine oil filter uses a cartridge-type disposable element. It is located under the square cover plate at the three o'clock position of the compressor inlet case and just behind the aft fire seal. The filter element may be changed as follows:

1. Remove the four self-locking nuts and plain washers securing the filter cover to the compressor inlet case and remove the cover.
2. Withdraw the element from the filter housing. Inspect the filter element for the presence of foreign particles.
3. Insert a new filter element in the filter housing.
4. Coat a new "0" ring seal with engine oil and install the seal and cover on the engine.
5. Secure the filter cover with four plain washers and self-locking nuts. Torque the nuts to between 20 and 30 inch-pounds above the torque necessary to turn the nuts before seating.

NONDISPOSABLE OIL FILTER

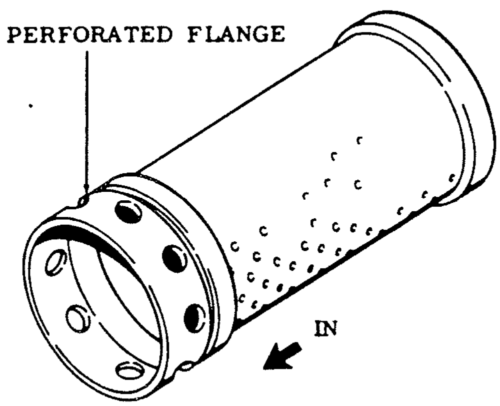
If the engine is equipped with a nondisposable oil filter, the following cleaning procedure should be accomplished at every oil change:

1. Remove the four self-locking nuts and plain washers securing the filter cover to the compressor inlet case. Remove the cover and withdraw the element from the filter housing.
2. Agitate the element for five minutes in clean,

unused Varsol.

3. Dry the element with clean, filtered air or allow to stand until dry.

4. Visually inspect and repeat the cleaning process if required. The filter should be inspected at 100 hour intervals. Inspect the filter element with a magnifying glass. If more than 5% of the visible passages are blocked, the element must be cleaned and inspected at an approved overhaul facility. If dents or broken wires are found in the filter element screen, the filter element must be replaced. Each time the filter is removed for cleaning or inspection, the "0" ring seal inside the perforated flange must be replaced.



Installing Engine Oil Filter

CHANGING THE ENGINE OIL

CAUTION

When changing to a different brand of oil, completely drain the aircraft oil system as indicated in the procedure below. Remove the oil filter and immerse it in the brand of oil to be used. Reinstall the oil filter and drain plugs. Fill the system to the proper level, and ground run the engines for 20 minutes to thoroughly circulate the new brand of oil throughout the system. Completely drain the aircraft oil system and again remove the oil filter and immerse it in the new brand of oil. Refill the aircraft oil system as indicated below. This will thoroughly purge the system of the old oil to prevent chemical interaction between it and the new brand.

1. To gain access to the oil drain plug, remove the fiberglass duct from around the oil cooler and remove the metal bypass duct immediately aft of the oil cooler.

2. Unsafety and remove the drain plug from the oil cooler and drain the oil into a container.

3. Remove the cotter pin from the oil plug retaining pin.

4. Position the oil drain funnel under the oil plug.

5. Remove the drain plug retaining pin and pull the drain plug from the engine. Allow all oil to drain from the engine.

6. Remove the forward engine cowling and unsafety and remove the drain plug from the nose case. Refer to SECTION 6 of the Shop Manual for removal of the lower forward cowling.

7. With all the drain plugs removed, motor the engine over with the starter only (no ignition) to permit the scavenge pumps to clear the engine.

CAUTION

Limit motoring to the time required to accomplish the above because of the limited lubrication available to the engine during this operation. To prevent damage to the fuel control unit, leave the condition lever in IDLE CUT-OFF while motoring the engine.

8. Install a new oil filter element as described in OIL FILTER CHANGING.

9. Coat a new "0" ring seal with engine oil and install it on the engine drain plug.

10. Insert the drain plug into the engine and install the plug retaining pin. Make sure a new cotter pin is installed in the drain plug retaining pin.

11. Reinstall and safety the nose case drain plug. Reinstall the forward cowlings.

12. Reinstall and safety the oil cooler drain plug.

CAUTION

Damage to the threads will result if the drain plug is tightened to a torque exceeding 50 to 60 inch-pounds. Apply MIL-P-17232, Type A, Class 2, anti-seize compound to the drain prior to reinstallation.

13. Fill the engine with the correct amount and type of oil as specified in CONSUMABLE MATERIALS.

14. Motor the engine over, with the starter only, long enough to get an oil pressure reading.

CAUTION

Do not exceed the starter motor operating time limits (2 minutes).

15. Check the engine for oil leaks.

16. Refill the engine to the proper level.

17. Reinstall the metal bypass duct immediately aft of the oil cooler with the retaining screws and reinstall the fiberglass duct around the oil cooler on the lower cowl.

FUEL SYSTEM

FUEL HANDLING PRACTICES

All hydrocarbon fuels contain some dissolved and some suspended water. The quantity of water contained in the fuel depends on temperature and the type of fuel. Kerosene, with its higher aromatic content, tends to absorb and suspend more water than aviation gasoline. Along with the water, it will suspend rust, lint and other foreign materials longer. Given sufficient time, these suspended contaminants will settle to the bottom of the tank. However, the settling time for kerosene is five times that of aviation gasoline. Due to this fact, jet fuels require good fuel handling practices to assure that the BEECHCRAFT Airliner is serviced with clean fuel. If recommended ground procedures are carefully followed, solid contaminants will settle and free water can be reduced to 30 parts per million (ppm), a value that is currently accepted by the major airlines. Since most suspended matter can be removed from the fuel by sufficient settling time and proper filtration, they are not a major problem. Dissolved water has been found to be the major fuel contamination problem. Its effects are multiplied in aircraft operating primarily in humid regions and warm climates.

Dissolved water cannot be filtered from the fuel by micronic type filters, but can be released by lowering the fuel temperature, such as will occur in flight. For example, a kerosene fuel may contain 65 ppm (8 ounces per 1000 gallons) of dissolved water at 80°F. When the fuel temperature is lowered to 15°F, only about 25 ppm will remain in solution. The difference of 40 ppm will have been released as supercooled water droplets which need only a piece of solid contaminant or an impact shock to convert them to ice crystals. Tests indicate that these water droplets will not settle during flight and are pumped freely through the system. If they become icy crystals in the tank, they will not settle since the specific gravity of ice is approximately equal to that of kerosene. The 40 ppm of suspended water seems like a very small quantity, but when added to suspended water in the fuel at the time of delivery, is sufficient to ice a filter. While the critical fuel temperature range is from 0° to -20°F, which produces severe system icing, water droplets can freeze at any temperature below 32°F.

Water in jet fuel also creates an environment favorable to the growth of a microbiological "sludge" in the settlement areas of the fuel cells. This sludge, plus other contaminants in the fuel, can cause corrosion of metal parts in the fuel system as well as clogging the fuel filters. Although the BEECHCRAFT Airliner uses bladder type fuel cells and all metal parts, except the main boost pumps and transfer pumps, are mounted above the settlement areas, the possibility of filter clogging and corrosive attachs on fuel pumps exists if contaminated fuels are consistently used.

Since fuel temperature and settling time affect total water content and foreign matter suspension, contamination can be minimized by keeping equipment clean, using adequate filtration equipment and careful water drainage procedures, storing the fuel in the coolest areas possible, and allowing adequate settling time. Underground storage is recommended for fuels. Filtering the fuel each time it is transferred will minimize the quantity of suspended contaminants carried by the fuel.

The primary means of fuel contamination control by the owner/operator is careful handling. This applies not only to fuel supply, but to keeping the aircraft system clean. The following is a list of steps that may be taken to prevent and recognize contamination problems.

1. Know your supplier. It is impractical to assume that fuel free from contaminants will always be available, but it is feasible to exercise precaution and be watchful for signs of fuel contamination.
2. Assure, as much as possible, that the fuel obtained has been properly stored, filtered as it is pumped to the truck, and again as it is pumped from the truck to the aircraft.
3. Perform filter inspections to determine if sludge is present.
4. Maintain good housekeeping by periodically flushing the fuel tankage system. The frequency of flushing will be determined by the climate and the presence of sludge.
5. Since aviation gas is an alternate fuel, it should be used occasionally as a means to change fuel tank environ.nent, thus destroying a possible microgiological growth pattern. The 150 hours maximum operation of an engine on aviation gas per a "Time Between Overhaul" should be observed.
6. Use only clean fuel servicing equipment.
7. After refueling, allow a three hour settle period whenever possible, then drain a small amount of fuel from each drain.

CAUTION

Jet fuel spilled in ramp areas should be removed immediately to prevent tire contamination and subsequent tire damage.

FUEL GRADES AND TYPES

Jet A, Jet A-1, Jet B, JP4, JP5, and JP8 turbine fuels may be mixed in any ratio. Aviation gasoline, grades 80 Red (80/87), 100LL Blue or 100L Green (foreign), 100 Green (100/130), and 115/145 Purple, are âlternate fuels and may be mixed in any ratio with the normal fuels when necessary. However, use of the lowest octane rating available is suggested due to its lower lead content. The use of aviation gasoline shall be limited to 150 hours operation during each engine Time Between Overhaul (TBO) period.

Page 11-13 gives fuel refiner's brand name, along with the corresponding designations established by the American Petroleum Institute (API) and the American Society of Testing Material (ASTM). The brand names are listed for ready reference and are not specifically recommended by

Beech Aircraft Corporation. Any product conforming to the recommended specification may be used.

FILLING THE TANKS

When filling the aircraft fuel tanks, always observe the following:

a. Make sure the aircraft is statically grounded to the servicing unit and to the ramp.

b. Service main tanks of each side first. The main tank filler caps are located at the top of each nacelle. The auxiliary filler caps are located in the top of the wing, outboard of the nacelles.

c. Allow a three hour settle period whenever possible, then drain a small amount of fuel from each drain point.

DRAINING FUEL SYSTEM

The boost pumps may be utilized to drain the fuel system. To accomplish this, remove the cover from the underside of the left center section adjacent to the inboard side of the nacelle to gain access to the tee connection used for draining. Connect a line to the tee and pump the fuel into a suitable tank or container. The crossfeed valve must be in the open position if the left fuel system is to be drained.

ENGINE FUEL FILTERS AND SCREENS

CLEANING FILTERS

Clean the firewall filter every 100 hours as follows:

1. Open the access door on the left side of the aft lower cowling to gain access to the firewall filter.
2. Remove the drain hose from the firewall filter.
3. Cut the lockwire securing the filter housing retaining nut and remove the nut.
4. Remove the filter housing from the filter body.
5. Remove the filter pack assembly (the packs need not be removed from the center tube).
6. Inspect the filter pack for foreign material and microbiological sludge.
7. Plug the open ends of the center tube and wash the unit in solvent, Specification PD680, or its equivalent.
8. Install the filter pack assembly, filter housing, and the filter housing retaining nut. Safety the retaining nut with lockwire.
9. Reattach the drain hose to the firewall filter.

CLEANING FUEL PUMP SCREEN (VICKERS FUEL PUMP)

Clean as follows at intervals of 100 operating hours:

1. Cut the lockwire securing the fuel screen cap-nut to the fuel pump.
2. Unscrew and remove the cap-nut and screen together, lifting the assembly vertically to avoid damaging the screen body.
3. Disconnect the fuel inlet line at the pump end to drain off the residue of fuel.
4. Blow all foreign matter from the screen with clean, dry compressed air.
5. Fit a new O-ring packing to the groove on the screen cap-nut.
6. Reinstall the screen and cap-nut assembly and tighten the cap-nut to a torque of 75 to 100 inch-pounds, then safety the cap-nut with lockwire.
7. Reconnect the fuel inlet line to the pump, torque the coupling nut in accordance with the Engine Maintenance Manual, and safety the nut with lockwire.
8. Perform an engine run-up, then check the pump body for leaks after engine shut-down.

CLEANING PESCO FUEL PUMP FILTER (Every 100 hours)

1. Cut the lockwire and remove the attaching bolts and washers from the filter cover on the bottom of the fuel pump.
2. Insert a No. 10 (.190) 32UNF3B screw in the filter removal hole in the cover subassembly, and pull firmly on the screw to remove the filter from the pump housing.

CAUTION

Never pry the cover off with a sharp instrument for it may damage the pump housing or cover.

3. Separate the spring and filter from the cover by removing the retaining bolt and washer.
4. Remove the preformed packings from the cover.
5. Clean the filter with PD680 solvent and blow dry with filtered, compressed air.
6. Reinstall the preformed packings on the filter cover.
7. Secure the filter and spring to the filter cover with the retaining bolt and washer. Torque the retaining bolt to 25 to 30 inch-pounds.
8. Reinstall the assembled filter and cover in the pump housing and torque the attaching bolts to 40 to 46 inch-pounds. Safety the cover bolts with lockwire.

ENGINE BLEED AIR AND SURFACE DEICE SYSTEM

Since the (optional) deice boots and related components. operate on clean air bled directly from the engine, the system requires little servicing. The only source of contamination is through the engine. The individual pressure instruments on the BEECHCRAFT Airliner are equipped with air filters to protect them from foreign particles.

To replace the filter assembly on the instrument, remove the air filter body cover by taking out the four fillister-head machine screws. Lift out the snap ring which holds the filter in place, remove the filter, and replace it with a new one. Replace the air filter body cover and gasket, securing them with the screws. If the air filter body cover is not used, the filter may be removed by lifting the snap ring past the four protective lugs.

An instrument air filter is mounted in the instrument air lines under the floor just aft of the rear spar. It is incorporated in the lines to provide additional protection for the instruments from dust, smoke and other foreign particles in the air. The filter contains a sealed disposable filter unit which should be replaced every 500 hours or less during operation in dusty or heavy smoke conditions. Replacement is made as follows:

1. Remove the floorboard on the left side of the passenger compartment just aft of the rear spar.
2. Disconnect the line at the base of the housing and remove the filter housing.
3. Discard the old filter and install a new filter by reversing the above procedure.

Other than the previously mentioned filters, the only servicing required is for the dual regulator relief valves mounted in the engine bleed air lines in each nacelle just forward of the firewall. The regulator relief valves prevent the pressure system from exceeding normal operating limits required for the system to function properly. Access to the left engine valve is gained through the inboard nacelle access door just forward of the left firewall. Access to the right engine valve is gained through the outboard nacelle access door, just forward of the right firewall.

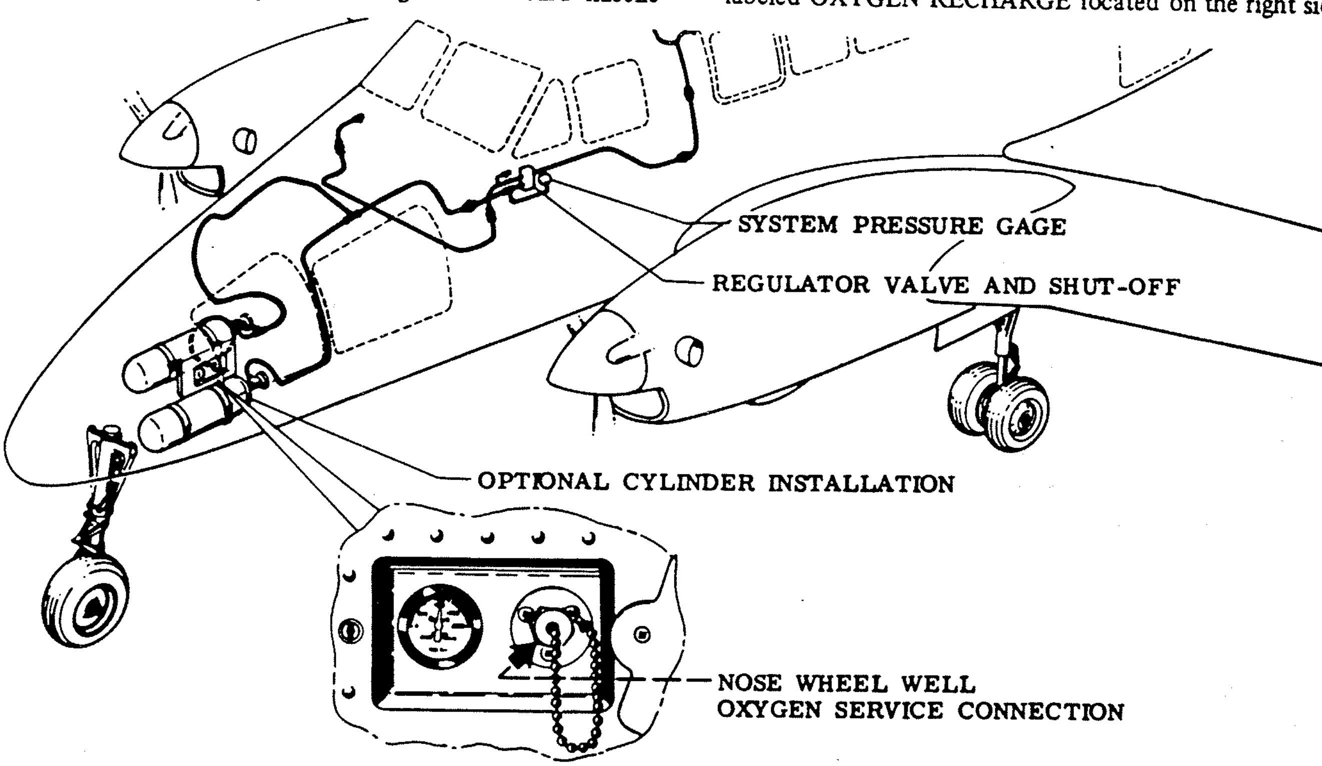
Frequency of cleaning the valves will vary with prevailing conditions under which the aircraft is operating. However, should it appear that the valves need adjusting in order to regulate the pressure, the screens should be cleaned and the setting rechecked before readjusting the valve. Remove the valves by disconnecting the retaining nuts and connecting lines. The valves should be cleaned with PD-680 solvent and blown dry with compressed air. For readjustment of the valves, refer to the BEECHCRAFT 99 Shop Manual.

SURFACE DEICE BOOT CLEANING

The surfaces of the deice boots should be checked for indications of engine oil after servicing and at the end of each flight. Any oil spots that are found should be removed with a non-detergent soap and water solution. Care should be exercised during cleaning to avoid scrubbing the surface of the boots, as this will tend to remove the special A56B coating. The deice boots are made of soft, flexible stock, which may be damaged if gasoline hoses are dragged over the surface of the boots or if ladders and platforms are rested against them.

SERVICING THE OXYGEN SYSTEM

Access to the pressure indicator and filler valve of the oxygen system may be gained through an access door labeled OXYGEN RECHARGE located on the right side of



Servicing The Oxygen System

the nose wheel well. To recharge the oxygen system, remove the protective filler cap from the filler valve and attach the hose from an oxygen recharging cart to the filler valve.

WARNING

> Avoid making sparks and keep all burning cigarettes or fire away from the vicinity of the airplane. Make sure that the oxygen shutoff valve in the cockpit is in the closed position. Inspect the filler connection for cleanliness before attaching it to the filler valve. Make sure that your hands, tools, and clothing are clean, particularly of grease or oil, for these contaminants will ignite above contact with pure oxygen under pressure. As a further preoaution against fire, open and close all oxygen valves slowly.

To prevent overheating, fill the oxygen system slowly by adjusting the recharging rate with the pressure regulating valve on the cart. Fill the cylinder to a pressure of 1800 ± 50 psig at a temperature of 70°F. (This is a steady state condition, after the cylinder has cooled from the recharging heat build-up.) This pressure may be increased an additional 3.5 psi for each degree of increase in temperature; similarly, for each degree of drop in temperature, reduce the pressure for the cylinder by 3.5 psi. When the oxygen system is properly charged, disconnect the filler hose from the filler valve and replace the protective cap on the filler valve.

AIRCRAFT FINISH CARE

Because they are impervious to synthetic oil and most solvents and have excellent abrasion resistance, both Epoxy and Urethane paints are available for the BEECHCRAFT Airliner. Finishes of this type are necessary because the oil used in the turbine engines will damage enamel and lacquer finishes. Besides forming a tougher film than either enamel or lacquer, both epoxy and urethane have a very lustrous sparkle. Epoxy, however, oxidizes a little faster than urethane, lacquer or enamel and must be polished more frequently to retain its sheen. Exposure to the sun accelerates oxidation; so, in hot weather, oxidation will occur faster than in cold weather. A good coat of wax will protect the surface from the sun's rays and keep the surface from oxidizing as fast. Any good automotive polish or wax may be used on the BEECHCRAFT Airliner.

CLEANING PLASTIC WINDOWS

Cleaning of the acrylic plastic windows should never be attempted when they are dry. The window should first be flushed with water or a mild soap solution, then rubbed lightly with a grit-free soft cloth, chamois or sponge. Stubborn grease or oil deposits are readily removed with aliphatic naphtha or hexane. Rinse with clean water.

SERVICING THE AIR CONDITIONER (OPTIONAL)

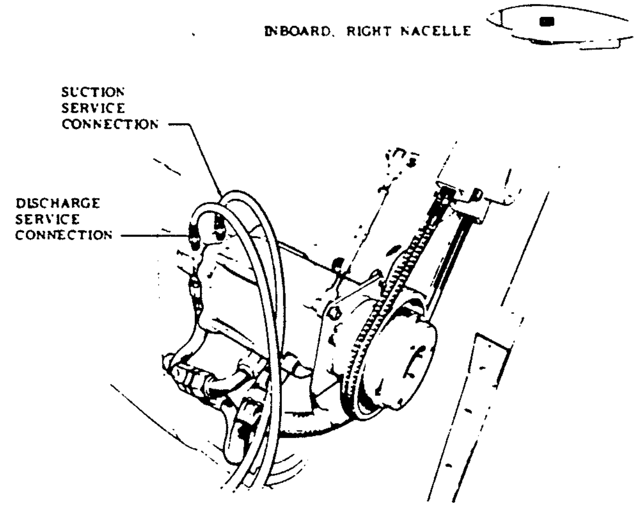
Servicing the air conditioner system consists of checking and maintaining the correct refrigerant level, compressor oil level, belt tension and condition, system leak detection and replacement of the evaporator air filters.

CHARGING THE SYSTEM

The system should be recharged when:

1. The refrigerant level is insufficient when it contains bubbles or appears milky as observed through the sight glass in the receiver-dryer. The sight glass is a plexiglass cover located in the forward baggage compartment floorboard on the right side.
2. Leaks have been detected in the system.
3. Air has entered the system.
4. Components carrying refrigerant have been replaced.

The total capacity of the system is 150 ounces of refrigerant. The system should be serviced by a qualified air conditioner service-man. Access to the air conditioner servicing connections is gained through the compressor access door located in the left cowling of the right nacelle just forward of the firewall. Hook the service unit to the connections on the compressor. The discharge valve connection is the one nearest to the access opening. Charge the system to a pressure of 60 to 70 psig. The refrigerant should be added in a vapor form to prevent liquid "slugging", which may cause damage to the compressor. Run the compressor until all bubbles are gone from the sight glass on the receiver-dryer (visible through the plexiglass cover in the forward baggage compartment floorboard on the right side).



Servicing The Air Conditioner

CHECKING THE COMPRESSOR OIL LEVEL

The compressor oil level should only be checked at the following times:

1. After the air conditioner is operated for the first time in the aircraft.
2. At the beginning of each season's operation.
3. When oil is emitted from compressor during service operations.
4. After the system is recharged.
5. After any damage has occurred to the compressor or plumbing lines.

The suggested method for checking the air conditioner oil level is as follows:

1. Remove the air conditioner compressor access door on the inboard side of the right nacelle.
2. Note the location of the compressor oil filler plug located at the lower inboard side of the compressor housing.
3. Unscrew the filler plug only far enough to allow a slight discharge.

WARNING

The oil and refrigerant in the compressor is under pressure and complete removal of the filler plug will allow all of the refrigerant and oil to escape.

4. Note that:

a. If the discharge is frothy and bubbly, the oil is at the proper level for operation.
b. If the discharge contains only gas, the system is low on oil or out of oil.
c. If the discharge contains a slight squirt of oil followed by refrigerant gas, the system is low on oil.

NOTE

Unless the above mentioned check is performed while the compressor unit is still warm from operation, such as immediately following a flight or engine run-up in which the air conditioning unit has been utilized, a false reading may occur.

Oil may be added to the system in the following manner:

NOTE

The total capacity of the system is 26 ounces, but only 4 ounces of oil should be added at any one time to avoid overloading the system in the event of a false reading.

Frigidaire 525 viscosity refrigerant oil or equivalent is recommended for use on the BEECHCRAFT Airliner air conditioner compressor. Since the refrigerant-oil mixture in the compressor is under pressure, extreme caution must be used when adding oil to the compressor. Frigidaire 525 viscosity refrigerant oil is packed in an aerosol type can (under pressure) which inserts the oil under pressure into the compressor connection. The recommended position for adding oil to the compressor is at the suction service connection on the compressor. Disconnect the suction service connection and apply 4 ounces of oil (or 26 ounces of oil if the oil in the system has been completely evacuated), then connect the suction service connection.

HEATING SYSTEM

Servicing the heating system consists of cleaning the fuel control valve filter and fuel filter every 100 hours.

1. Close the shutoff valve adjacent to the filter. Cut the lockwire from the filter bowl and body mounted on the inboard side of the left main wheel well.
2. Remove the filter bowl and element.
3. Clean the element with PD-680 solvent or its equivalent and blow the element dry with compressed air.
4. Reinstall the element and bowl. Safety the bowl with lockwire.
5. Remove the large square access door from the underside of the left wing center section just inboard of the nacelle and forward of the main spar.
6. Remove the fitting from the inlet port of the heater fuel control valve and remove the filter.
7. Clean the filter with PD-680 solvent or its equivalent and blow the filter dry with compressed air.
8. Reinstall the filter and fitting at the inlet port of the fuel control valve.

FUEL BRAND AND TYPE DESIGNATIONS

PRODUCT NAME	DESIGNATION
AMERICAN OIL COMPANY	
American Jet Fuel Type A	Jet A
American Jet Fuel Type A-1	Jet A-1
ATLANTIC REFINING COMPANY	
Arcojet-A	Jet A
Arcojet-A-1	Jet A-1
Arcojet-B	Jet B
BP TRADING COMPANY	
BP A.T.K.	Jet A-1
BP A.T.G.	Jet B
CALIFORNIA TEXAS COMPANY	
Caltex Jet A-1	Jet A-1
Caltex Jet B	Jet B
CITIES SERVICE COMPANY	
Turbine Type A	Jet A
CONTINENTAL OIL COMPANY	
Conoco Jet-40	Jet A
Conoco Jet-50	Jet A
Conoco Jet-60	Jet A-1
Conoco JP-4	Jet B
GULF OIL COMPANY	
Gulf Jet A	Jet A
Gulf Jet A-1	Jet A-1
Gulf Jet B	Jet B
HUMBLE OIL COMPANY	
Enco Turbo Fuel A	Jet A
Enco Turbo Fuel 1-A	Jet A-1
Enco Turbo Fuel 4	Jet B
Esso Turbo Fuel A	Jet A
Esso Turbo Fuel 1-A	Jet A-1
Esso Turbo Fuel 4	Jet B
MOBIL OIL COMPANY	
Mobil Jet A	Jet A
Mobil Jet A-1	Jet A-1
Mobil Jet B	Jet B
PHILLIPS PETROLEUM COMPANY	
Philjet A-50	Jet A
Philjet JP-4	Jet B
PURE OIL COMPANY	
Purejet Turbine Fuel Type A	Jet A
Purejet Turbine Fuel Type A-1	Jet A-1

PRODUCT NAME	DESIGNATION
RICHFIELD PETROLEUM COMPANY	
Richfield Turbine Fuel A	Jet A
Richfield Turbine Fuel A-1	Jet A-1
SHELL OIL COMPANY	
Aeroshell Turbine Fuel 640	Jet A
Aeroshell Turbine Fuel 650	Jet A-1
Aeroshell Turbine Fuel JP-4	Jet B
SINCLAIR OIL COMPANY	
Sinclair Superjet Fuel	Jet A
Sinclair Superjet Fuel	Jet A-1
STANDARD OIL OF CALIFORNIA	
Chevron TF-1	Jet A-1
Chevron JP-4	Jet B
STANDARD OIL OF KENTUCKY	
Standard JF A	Jet A
Standard JF A-1	Jet A-1
Standard JF B	Jet B
STANDARD OIL OF OHIO	
Jet A Kerosene	Jet A
Jet A-1 Kerosene	Jet A-1
TEXACO	
Texaco Avjet K-40	Jet A
Texaco Avjet K-58	Jet A-1
Texaco Avjet JP-4	Jet B
UNION OIL COMPANY	
76 Turbine Fuel	Jet A-1
Union JP-4	Jet B

NOTE

Jet A - Aviation Kerosene type fuel with -40°F (-40°C) maximum Freeze Point.

Jet A-1 - Aviation Kerosene type fuel with -58°F (-50°C) maximum Freeze Point.

Jet B - Aviation wide-cut gasoline type fuel similar to MIL-F-5624 grade JP-4, but may have Freeze Point -60°F (-51°C) instead of maximum -76°F (-60°C).

BULB REPLACEMENT GUIDE

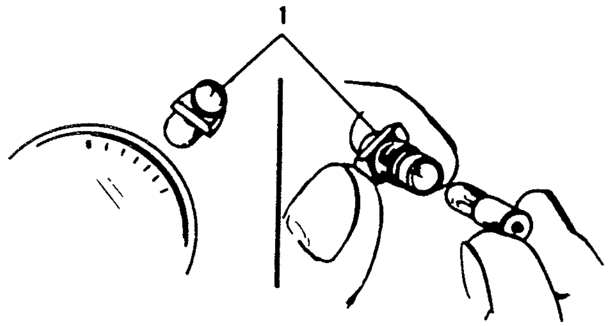
LOCATION	*BULB NUMBER*
Aft Dome Light	MS25232-307
Aisle Light	1864
Annunciator Panel Fault Warning Light	CMB682
Annunciator Panel Light	327
Forward and Aft Baggage Compartment Light	327
Cabin Door Warning Light	327
Cabin Overhead Light	1864
Cabin Reading Light	1495
Compass Light	327
Deice Pressure Gage Light	327
Dome Light	307
Engine Anti-ice Light	327
Engine Fire Warning Light	327
Engine Igniter Light	327
Flight Hour Meter Light	327
Free Air Temperature Light	327
Fuel Crossfeed Light	327
Fuel Panel Circuit Board Light (Red)*	D158-100-4T1
Fuel Panel Circuit Board Light (White)	D158-100-5T1
Generator Overvoltage Light	327
Instrument Indirect Light (Red)*	1864R
Instrument Indirect Light (White)	1864
Instrument Overhead Light	327
Inverter Warning Light	327
Landing Gear Control Knob Light	327
Landing Gear Indicator Light	327
Landing Gear Warning Light	327
Landing Light	4596
Map Light (Pilots and Copilots)	1495
Map Overhead Light (Red)*	303R

BULB REPLACEMENT GUIDE (CONT'D)

LOCATION	*BULB NUMBER*
Map Overhead Light (White)	303
Navigation Light	A7512-24
No Smoking and Fasten Seat Belt Light	303
Outside Air Temperature Light	334
Overhead Panel Light (Red)*	D158-100-4T1
Overhead Panel Light (White)	D158-100-4T1
Oxygen Quantity Indicator Light	327
Pedestal Edge Light (Red)*	D158-100-4T1
Pedestal Edge Light (White)	D158-100-5T1
Post Light	327
Propeller Synchronizer Indicator Light	327
Reading Light	1495
Rotating Beacon Light	A7079-R24
Stop Watch Light	327
Strobe Light Tail (Flashtube)*	31-0725-1
Strobe Light Wing (Green)*	A1815A-G24
Strobe Light Wing (Flashtube)*	55-0101-1
Strobe Light Wing (Red)*	A1815A-R24
Strobe Light Wing (White)*	30-0199-3
Subpanel Edge Light (Red)*	D158-100-4T1
Subpanel Edge Light (White)	D158-100-5T1
Subpanel Light	327
Tail Navigation Light	1683
Taxi Light	4587
Wing Ice Light	A7079-A24
Wing Navigation Light	A7512-24

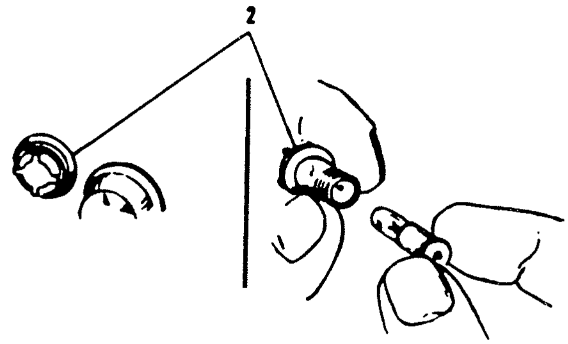
*OPTIONAL

INSTRUMENT LIGHTS



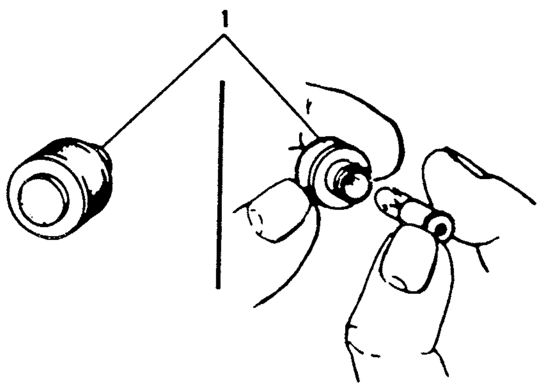
1. Pull light shield (1) from light assembly
2. Remove lamp

SCREW-IN LIGHTS



1. Unscrew cap filter assembly (2)
2. Remove lamp

INDICATOR LIGHTS

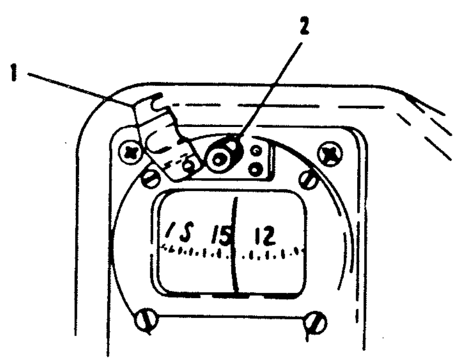


1. Unscrew cap assembly (1)
2. Remove lamp

INDIRECT INSTRUMENT (GLARESHIELD) LIGHTS

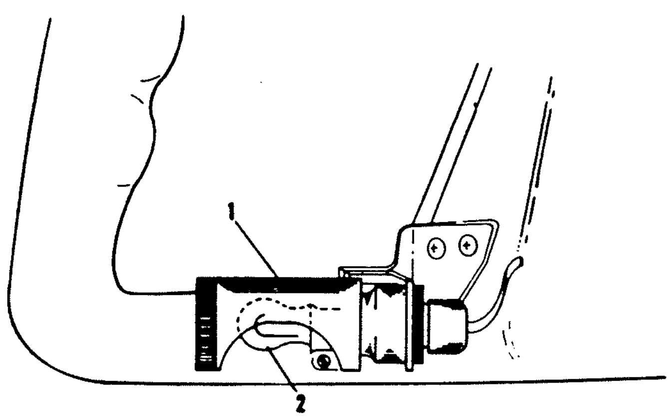
1. Locate faulty bulb under glareshield
2. Remove bulb by turning counter-clockwise

COMPASS LIGHT



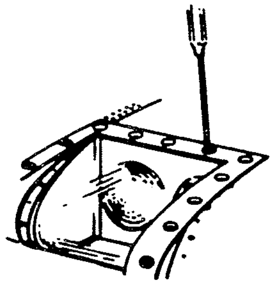
1. Swing shield (1) up
2. Remove lamp (2)

CONTROL WHEEL MAP LIGHT

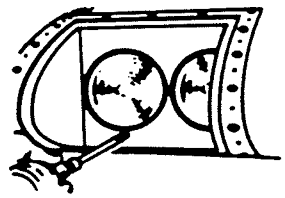


1. Remove light deflector case (1)
2. Remove bulb (2)

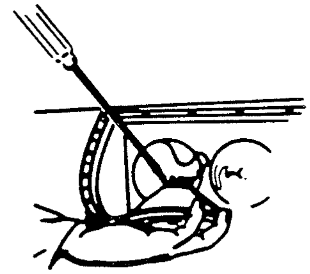
LANDING LIGHTS



1. Remove transparent shield

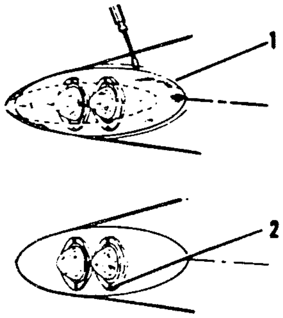


2. Remove retaining ring



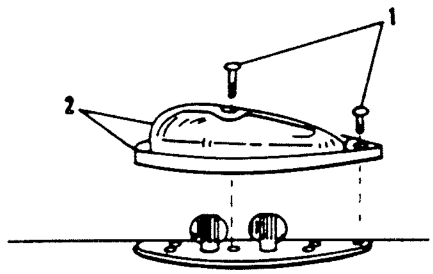
3. Remove sealed-beam unit

TAIL NAVIGATION LIGHT



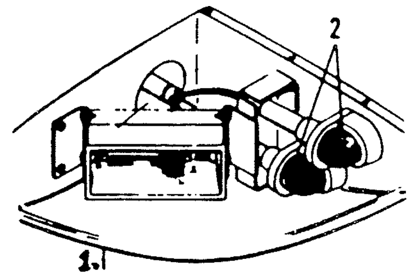
1. Remove transparent shield (1)
2. Remove retaining screws (2)
3. Remove bulb

ROTATING BEACON



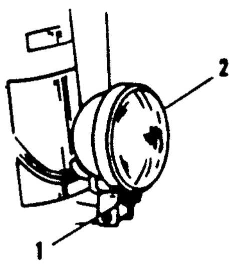
1. Remove retaining screws
2. Remove lens and retaining ring
3. Replace bulbs

WING NAVIGATION LIGHT



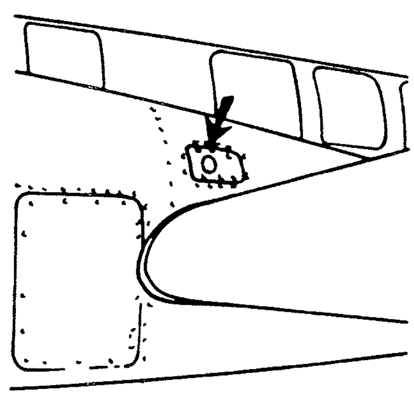
1. Remove transparent cover (1) and shield (2)
2. Remove bulb

TAXI LIGHT



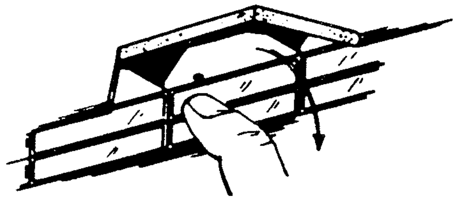
1. Remove retaining ring (1)
2. Remove sealed beam unit (2)

WING ICE LIGHT

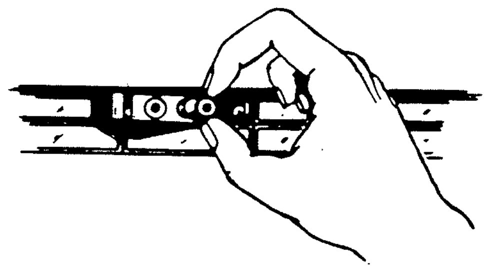


1. Remove access door
2. Remove bulb

ANNUNCIATOR PANEL LIGHTS

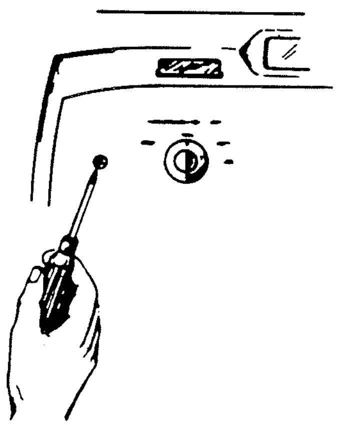


1. Depress left side of indicator panel to rotate in direction shown

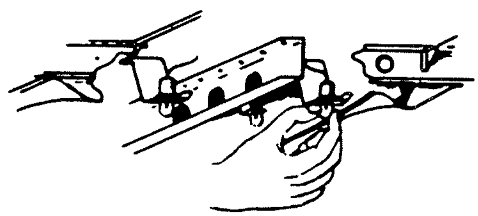


2. Pull bulb from rear of indicator panel

OVERHEAD MAP LIGHTS

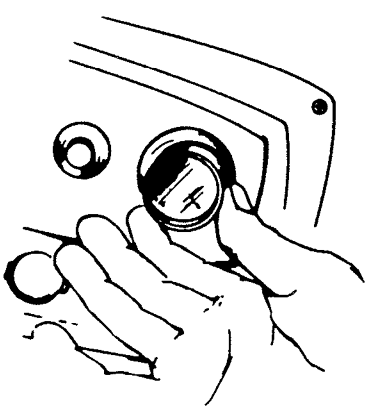


1. Remove light control panel by removing recessed attaching screws

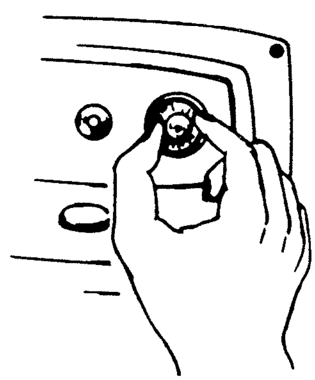


2. Remove bulb from socket under light filter panel

CABIN READING LIGHTS



1. Pull filter from light



2. Remove bulb from reflector assembly

CONSUMABLE MATERIALS

MATERIAL	SPECIFICATION	PRODUCT	VENDOR
Recommended Engine Fuel	Jet A (NATO F-30, F-34) Jet A-1 (JP-5, NATO F-42) Jet B JP-4, NATO F-40) MIL-J-5624		
Alternate (Limited to 150 hours between each overhaul period)	80/87 91/96 100/130 115/145		
Engine Oil		**7.5 CENTISTOKE OILS**	
		Esso Extra Turbo Oil 274	Esso International Inc., 15 West 51 Street New York, New York 10019
		Aeroshell 750	Shell Oil Company, 50 West 50th Street, New York, New York 10020
		Wakefield Castrol 98 Castrol 98 U.K.	Castrol Inc., 254 Doremus Ave. Newark, New Jersey 07105
		Esso Extra Turbo Oil 274	Humble Oil and Refining Co., Box 2180, Houston, Texas 77001
		Sinclair-S-1048 Improved	Sinclair Refining Co., 600 Fifth Ave., New York, New York 10017
		Castrol 98 U.K.	Stauffer Chemical Co., 299 Park Ave., New York, New York 10017
		Caltex Synthetic Aircraft Turbine Oil 35	California Texas Oil Corp. 380 Madison Ave., New York, New York 10017
		Texaco Synthetic Aircraft Turbine Oil 35	Texaco Inc., 135 East 42nd St., New York, New York 10017
		BP Aero Turbine Oil 40	BPC (North America Ltd., 620 Fifth Ave., New York, New York 10017
		5 CENTISTOKE OILS	
		Monsanto Skylube 450	Monsanto Co Inc., St Louis, Missouri
		Chevron Jet Engine Oil 5	Chevron Oil Co., Western Division, Denver, Colorado 80202
		Esso Turbo Oil 2380	Esso International Inc., 15 West 51 Street, New York, New York 10019
		Aeroshell Turbine Oil 500	Shell Oil Company, 50 West 50th Street, New York, New York 10020
		Castrol 205	Castrol Oil Canada Ltd., P.O. Box 3, New Toronto Postal Station, Toronto, Ontario
		Enco Turbo Oil 2380	Humble Oil and Refining Co., Box 2180 Houston, Texas 77001
		Sinclair Turbo S Oil Type II	Sinclair Refining Co., 600 Fifth Ave., New York, New York 10017
		Stauffer Jet II	Stauffer Chemical Co., 299 Park Ave., New York, New York 10017
		Caltex Sato 7388 Caltex Sato 7730	California Texas Oil Corp. 380 Madison Ave., New York, New York 10017
		Texaco Sato 7388 Texaco Sato 7730	Texaco Inc., 135 East 42nd St., New York, New York 10017

CONSUMABLE MATERIALS (Continued)

MATERIAL	SPECIFICATION	PRODUCT	VENDOR
		Mobile Jet Oil II	Mobil Oil Corporation 150 East 42nd Street, New York, New York 10017
		BP Enerjet 51	BPC (North America) Ltd., 620 Fifth Ave., New York, New York 10017
Lubricating Oil Special Preservative	VV-L-800	Brayco 300	Bray Oil Co. Los Angeles, California 90063
		Royco 308	Royal Lubricants Co. Hanover, New Jersey
		Nox Rust 518 (Code R-62-203-1)	Daubert Chemical Co. Chicago, Illinois 60638
Lubricating Oil General Purposes Low Temperature	MIL-L-7870	Caltex Low Temp Oil	Caltex Oil Products Co. New York, New York
		Sinclair Aircraft Orbitlube	Sinclair Refining Co., 600 Fifth Ave., New York, New York
		1692 Low Temp Oil	Texaco, Inc., 135 East 42nd St., New York, New York
Lubricating Oil		Marvel Mystery	Marvel Oil Company, Inc. 331-337 N. Main St., Port Chester, New York 10573
Lubricating Oil		Aeroshell No. 12	Shell Oil Co., 50 West 50th., New York, New York 10020
Lubricating Oil	MIL-L-10324A	Trojan Gear Oil 6086M	Cities Service Oil Co. New York, New York
		Gear Lubricant SZ9285	American Oil Co., 910 S. Michigan Ave., Chicago, Illinois 60680
		ILCO Lubricant Gear Universal Sub Zero (S-5017)	International Lubricant Corp. P. O. Box 51118, New Orleans, Louisiana 70150
		Ace Lub K-24	Ace-Lub Oil Co. 3983 Pacific Boulevard, San Mateo, California 94403
		RP 95-X Formula No. RP497AA	Mobil Oil Corporation, Paulsboro, New Jersey 08066
Lubricating Oil Heavy Duty	MIL-L-2104	Phillips 66 HDS Motor (Grade 10)	Phillips Petroleum Co. Bartlesville, Oklahoma 74003
		Super Lonet (Grade 10)	Sinclair Refining Company 600 Fifth Ave., New YORK, New York 10020
		PED 3342 (Grade 10)	Standard Oil of California 225 Bush Street, San Francisco, California 94120
Lubricating Grease, General	MIL-G-7711	Regal Starfak Premium 2	Caltex Oil Products Co. New York, New York
		PED-3040	Standard Oil of California 225 Bush St., San Francisco, California 94120
		Aeroshell Grease 6	Shell Oil Co., 50 West 50th., New York, New York 10020
		Regal AFB2	Texaco, Inc., 135 East 42nd., New York, New York

CONSUMABLE MATERIALS (Continued)

MATERIAL	SPECIFICATION	PRODUCT	VENDOR
Lubricating Grease Aircraft and Instruments, Low & High Temperature	MIL-G-23827	Supermil Grease No. A72832	American Oil Company, 910 S. Michigan Ave., Chicago, Illinois 60680
		Royco 27A	Royal Lubricants Co., River Road, Hanover, New Jersey 07936
		Aeroshell 7 Grease	Shell Oil Co., 50 West 50th., New York, New York 10020
		RR-28	Socony Mobil Oil Co., Inc. Washington, D.C.
		Castrolease A1	Castrol Oils Inc. Newark, New Jersey
Lubricating Grease High Temperature	MIL-G-81322	Mobilgrease 28	Mobil Oil Corporation, Shoreham Bldg., Washington, D.C. 20005
Lubricating Grease Molybdenum Disulfide	MIL-G-21164	Castrolease MSA (C)	Castrol Oil Inc. 254-266 Doremus Avenue, Newark, New Jersey 07105
		Electro-Moly/11	Electrofilm, Inc. P.O. Box 3930, 7116 Laurel Canyon Blvd., North Hollywood, California 91605
		Everlube 211-G Moly Grease	Everlube Corporation 6940 Farmdale Ave., North Hollywood, California 91605
		Royco 64C	Royal Lubricants River Road, Hanover, New Jersey 07936
		Aeroshell Grease 17	Shell Oil Company 50 West 50th Street, New York, New York 10020
		Chevron Aviation Grease 44	Standard Oil Company of California 225 Bush Street, San Francisco, California 94120
Lubricating Grease	MIL-G-4343	Cosmolube 615	E. F. Houghton and Co. 303 West Lehigh Ave., Philadelphia, Pennsylvania 19133
		Templube No. 124	National Engineering Products Co. Washington Building, Washington, D.C.
		Royco 43	Royal Lubricants Co. River Rd., Hanover, New Jersey 07936
Grease		Molykote 505 Paste	Dow Corning, S. Saginaw Road, Midland, Michigan 48641
Molybdenum Disulfide	MIL-M-7866	Molykote Z	Haskel Engineering & Supply Co. 100 East Graham Place, Burbank, California 91502
		Molykote Z	Wilco Co., 4425 Bandini Blvd., Los Angeles, California 90023
		Moly-Paul No. 4	K. S. Paul Products Ltd. London, England
Lubricant	MIL-L-8937		Electrofilm, Inc., P.O. Box 106 7116 Laurel Canyon Blvd. North Hollywood, California 91605
			Alpha-Molykote Corporation 65 Harvard Avenue, Stamford, Connecticut

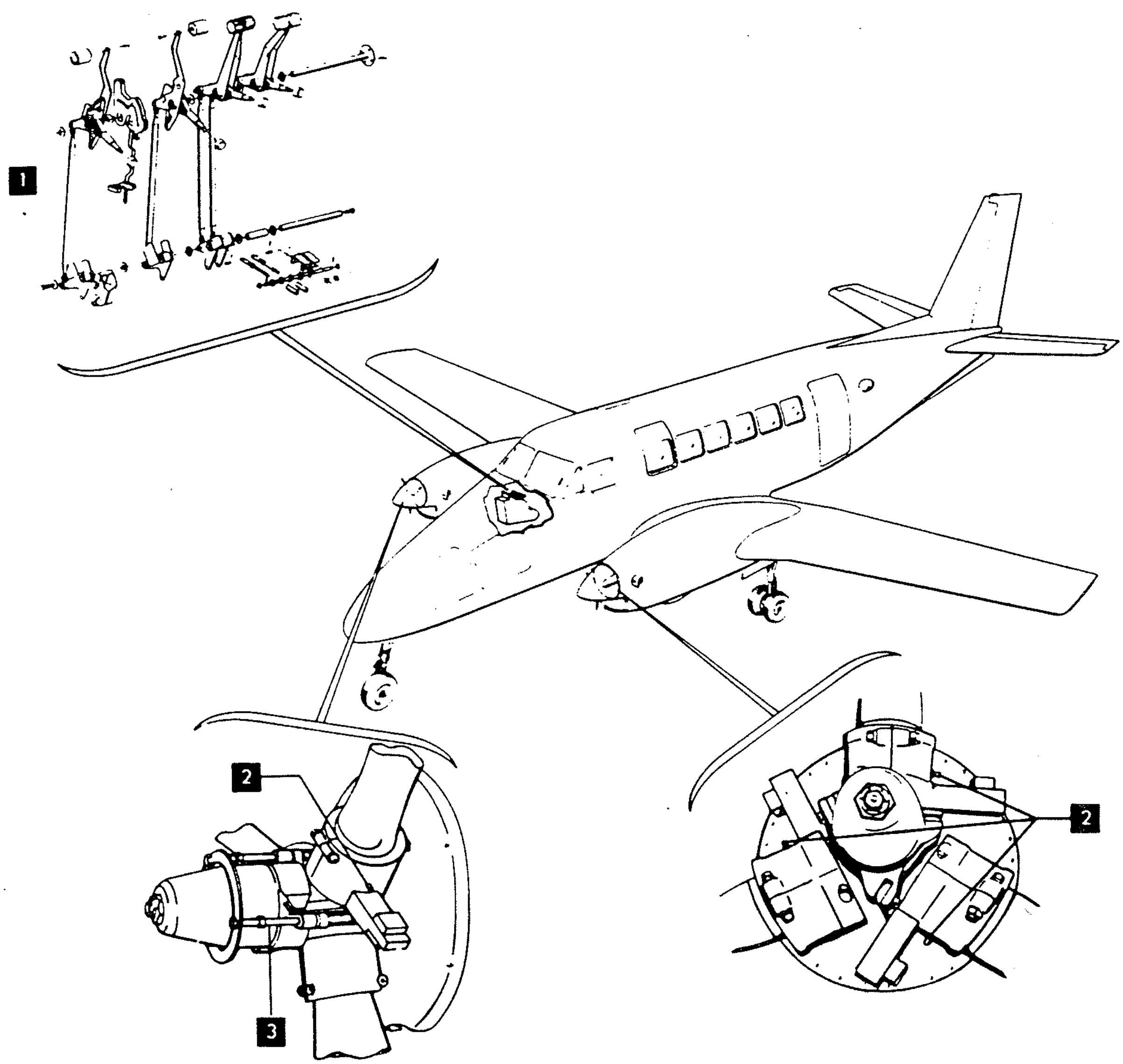
CONSUMABLE MATERIALS (Continued)

MATERIAL	SPECIFICATION	PRODUCT	VENDOR
Grease	MIL-G-10924	Shell A and A Grease	Shell Oil Co., 50 West 50th, New York, New York 10020
		PED 3355	Standard Oil Co. of California 225 Bush St., San Francisco, California 94120
		Cosmolube 506	E. F. Houghton and Company West Lehigh Ave., Philadelphia, Penn. 19133
Lubricant, Powdered Graphite	MIL-G-6711	GP-38	National Carbon Co. New York, New York
Hydraulic Fluid (Brakes and Shock Struts)	MIL-H-5606	3126 Hydraulic Oil	Humble Refining Co., Box 2180, Houston, Texas 77001
		Aeroshell Fluid 4	Shell Oil Co., 50 West 50th, New York, New York 10020
		PED 3337	Standard Oil of California 225 Bush St., San Francisco, California 94120
Oil (Air Conditioner Compressor)		Suniso No. 5	Virginia Chemical & Smelting Co. West Norfolk, Virginia
		Texaco Capella E (500 viscosity)	Texaco Inc., 135 East 42nd St., New York, New York
Air Conditioning Refrigerant		Dichlorodifluoro-methane Racon 12	Racon Inc. Wichita, Kansas
		Genetron 12	Allied Chemical Specialty Chemicals Division, Morristown, New Jersey
		Freon 12	DuPont Inc. Freon Products Division, Wilmington Delaware 19898
Solvent	PD680	Varsol	Esso Standard Eastern, Inc. 15 West 51st St., New York, New York 10019
Anti-Seize Compound	MIL-P-16232 Type M, Class 2		
Grease Stick		Door-Ease	American Grease Stick Company 2651 Hoyt, Muskegon, Michigan 49443
Toilet (Flush Type) Cleaner		Sana-Pak No. 2031	Celeste Co. Loyola Federal Building, Easton, Maryland 21601
Metal Protector		LPS No. 3	LPS Research Laboratories Los Angeles, California 90025
Soap Solution, Oxygen System Leak Testing	MIL-L-25567		
Aviator's Breathing Oxygen	MIL-0-27210		
Anti-ice Additive	MIL-I -27686	Hi-Flo Prist	Hoffman-Taff Inc. P.O. Box 1246 Springfield, Missouri
Fuel Biocide		Biobor JF	United States Borax and Chemical Corporation 3075 Wilshire Blvd. Los Angeles, California 90010

Vendors listed as meeting Federal and Military Specifications are provided as reference only and are not specifically recommended by Beech Aircraft Corporation. Any product conforming to the specifications may be used.

LUBRICATION CHART

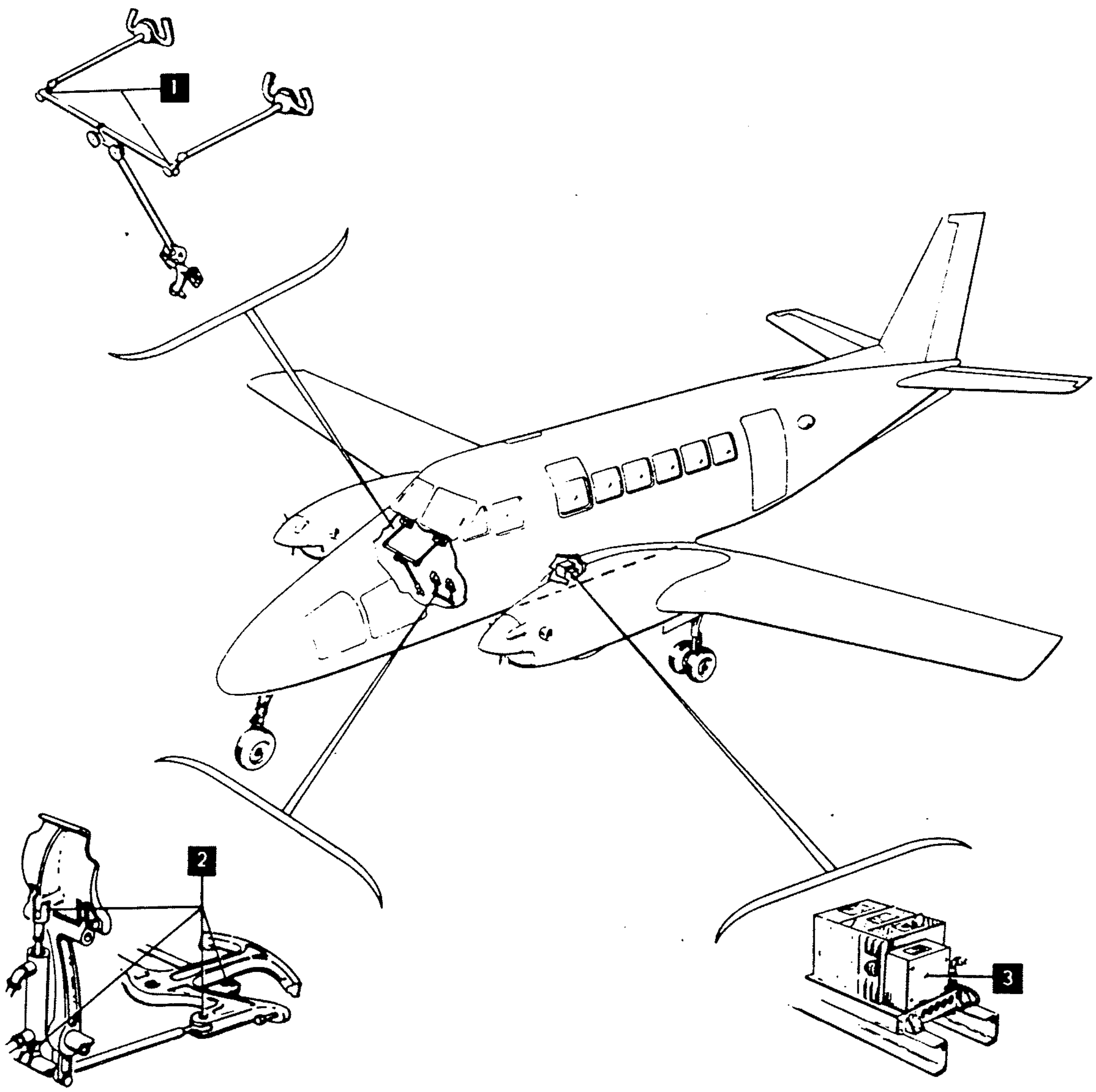
INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
1	ENGINE CONTROLS Linkage (All moving parts)	MIL-G-21164 Grease	Oil Can	As required for proper operation



INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	PROPELLER			
2	Propeller Hub	MIL-G-23827	Grease Gun	100 Hrs.
3	Low Pitch Stops Rods (Reversing Propeller)	Marvel Mystery Oil	Oil Can	100 Hrs.

LUBRICATION CHART

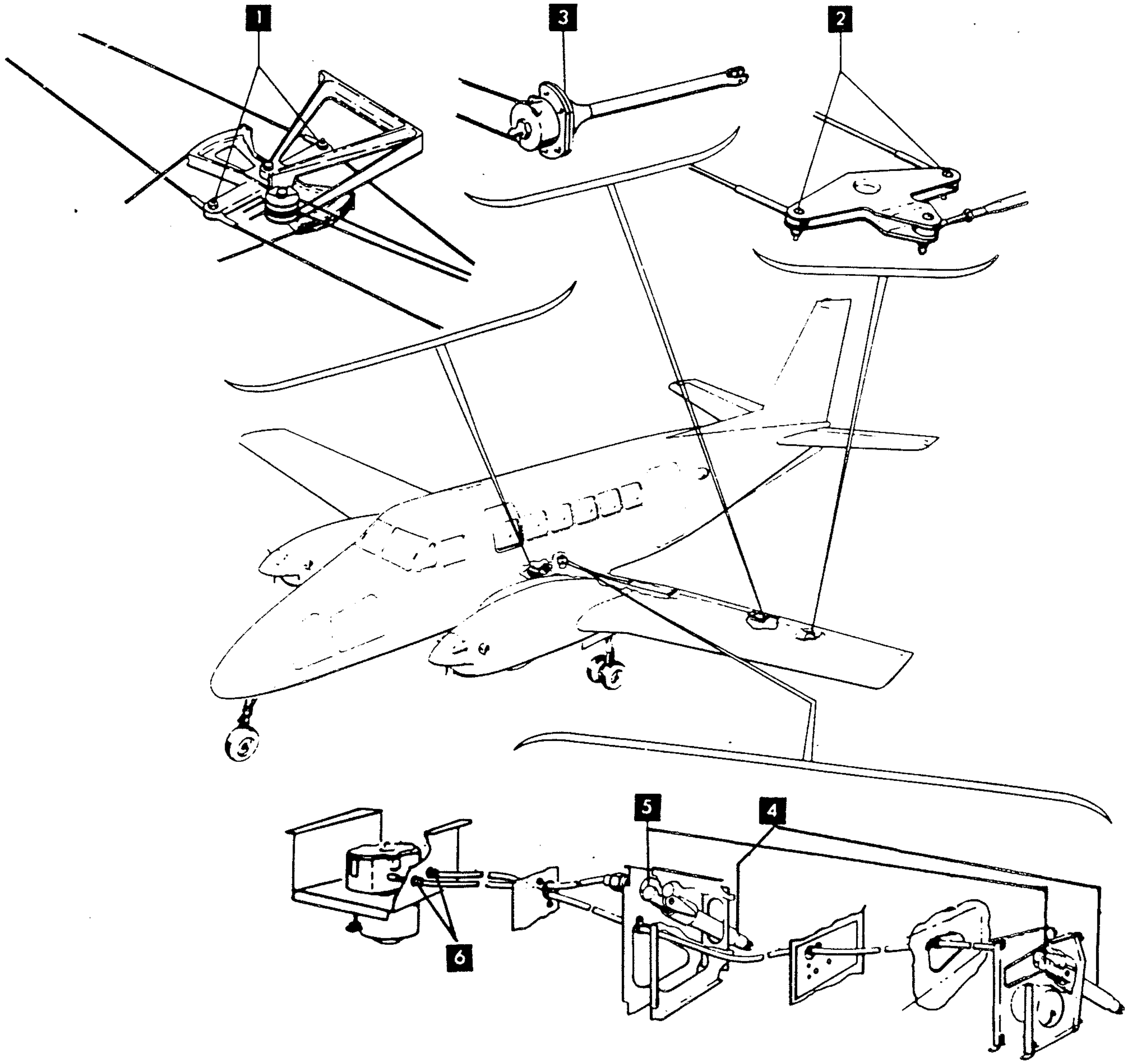
INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
1	CONTROL COLUMN Linkage	MIL-L-7870	Oil Can	200 Hrs.



INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
2	RUDDER PEDALS AND BELL CRANKS Pedal and Bell Crank Linkage	MIL-L-7870 Oil	Oil Can	200 Hrs.
3	STROBE LIGHT SYSTEM Timer Motor (cams and bearings)	Aeroshell No. 12	Oil Can	500 Hrs.

LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	AILERON CONTROL SYSTEM			
1	Aileron Quadrant	MIL-O-6086 Oil	Oil Can	200 Hrs.
2	Aileron Bell Cranks	MIL-G-21164 Grease	Hand Pack	200 Hrs.
3	Trim Tab Actuator	MIL-G-23827 Grease	Grease Gun	200 Hrs.



INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	FLAP CONTROL SYSTEM			
4	Flap Actuator Pistons	MIL-L-7870 Oil	Oil Can	As required
5	Flap Actuator 90° Drives	MIL-G-21164 Grease	Hand Pack	1000 Hrs.
6	Flap Actuator Drive Shafts	MIL-G-23827 Grease	Grease Gun	1000 Hrs.

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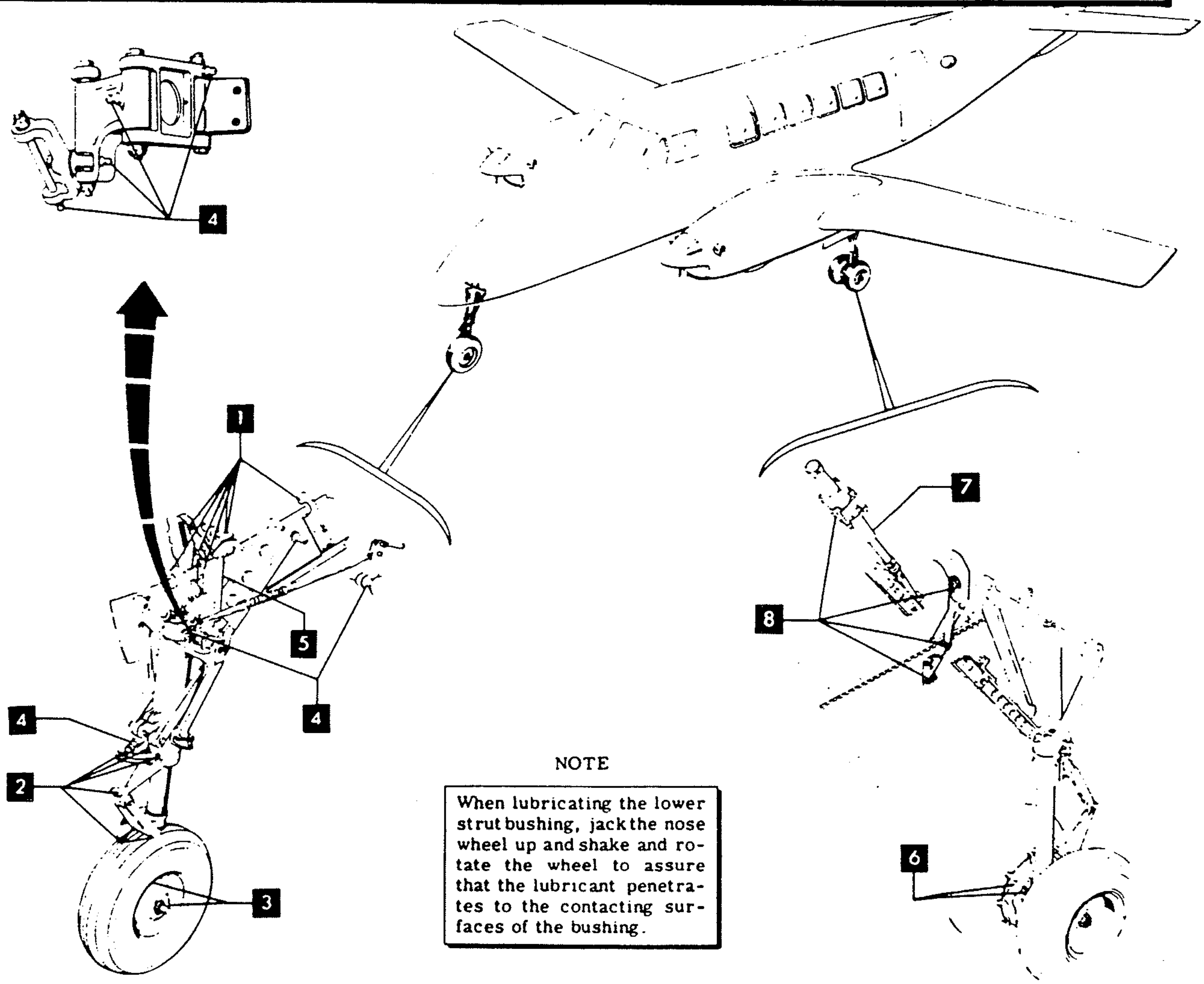
LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	NOSE LANDING GEAR			
1	Door Hinges and Retract Linkage	MIL-L-7870 Oil	Oil Can	100 Hrs.
2	Grease Fittings	MIL-G-81322 Grease	Grease Gun	100 Hrs.
3	Wheel Bearings	MIL-G-3545 Grease	Hand Pack	100 Hrs.
4	Nose Wheel Steering Mechanism	MIL-G-81322 Grease	Grease gun	50 Hrs.
5	Retract Actuator Jackscrew	MIL-G-21164 Grease	Hand Pack	1000 Hrs.



NOTE

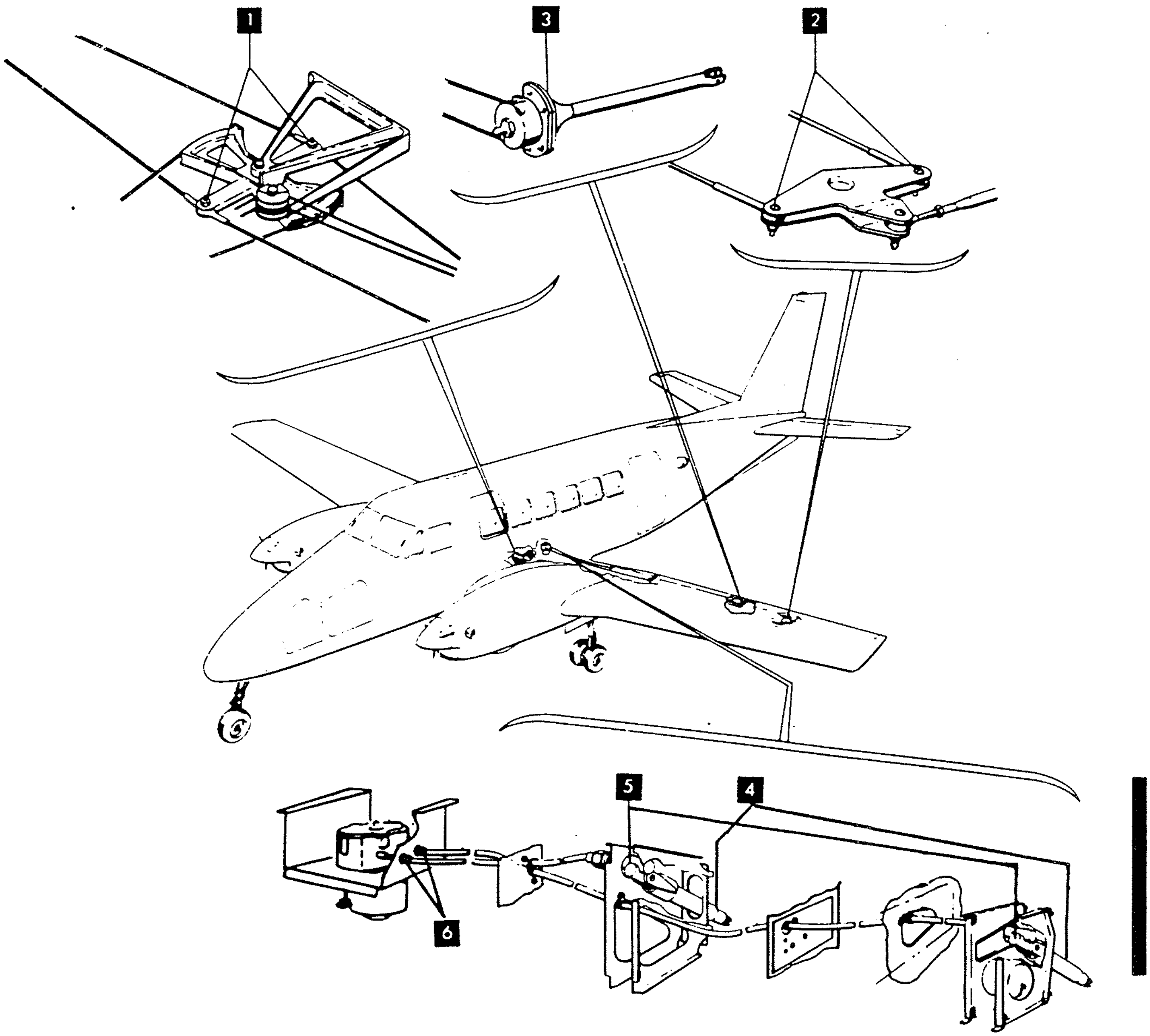
When lubricating the lower strut bushing, jack the nose wheel up and shake and rotate the wheel to assure that the lubricant penetrates to the contacting surfaces of the bushing.

MECHANICALLY ACTUATED SYSTEM

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	MAIN LANDING GEAR			
6	Wheel Bearings	MIL-G-3545 Grease	Hand Pack	100 Hrs.
7	Retract actuator Jackscrew	MIL-G-21164 Grease	Hand Pack	1000 Hrs.
8	Door Hinges and Retract Linkage	MIL-L-7870 Oil	Oil Can	100 Hrs.

LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	AILERON CONTROL SYSTEM			
1	Aileron Quadrant	MIL-O-6086 Oil	Oil Can	200 Hrs.
2	Aileron Bell Cranks	MIL-G-21164 Grease	Hand Pack	200 Hrs.
3	Trim Tab Actuator	MIL-G-23827 Grease	Grease Gun	200 Hrs.



INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	FLAP CONTROL SYSTEM			
4	Flap Actuator Pistons	MIL-L-7870 Oil	Oil Can	As required
5	Flap Actuator 90° Drives	MIL-G-21164 Grease	Hand Pack	1000 Hrs.
6	Flap Actuator Drive Shafts	MIL-G-23827 Grease	Grease Gun	1000 Hrs.

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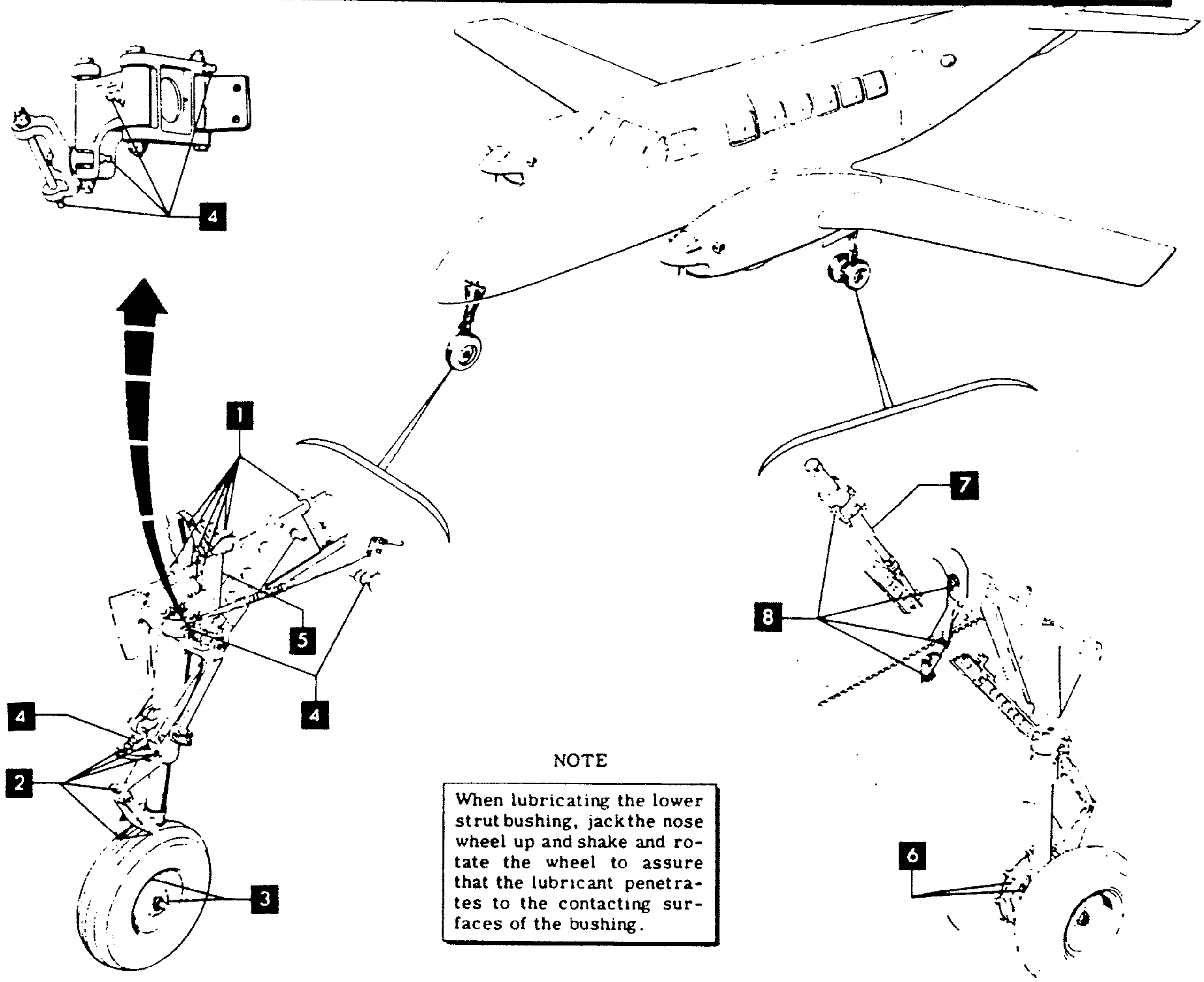
LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	NOSE LANDING GEAR			
1	Door Hinges and Retract Linkage	MIL-L-7870 Oil	Oil Can	100 Hrs.
2	Grease Fittings	MIL-G-81322 Grease	Grease Gun	100 Hrs.
3	Wheel Bearings	MIL-G-3545 Grease	Hand Pack	100 Hrs.
4	Nose Wheel Steering Mechanism	MIL-G-81322 Grease	Grease gun	50 Hrs.
5	Retract Actuator Jackscrew	MIL-G-21164 Grease	Hand Pack	1000 Hrs.



NOTE

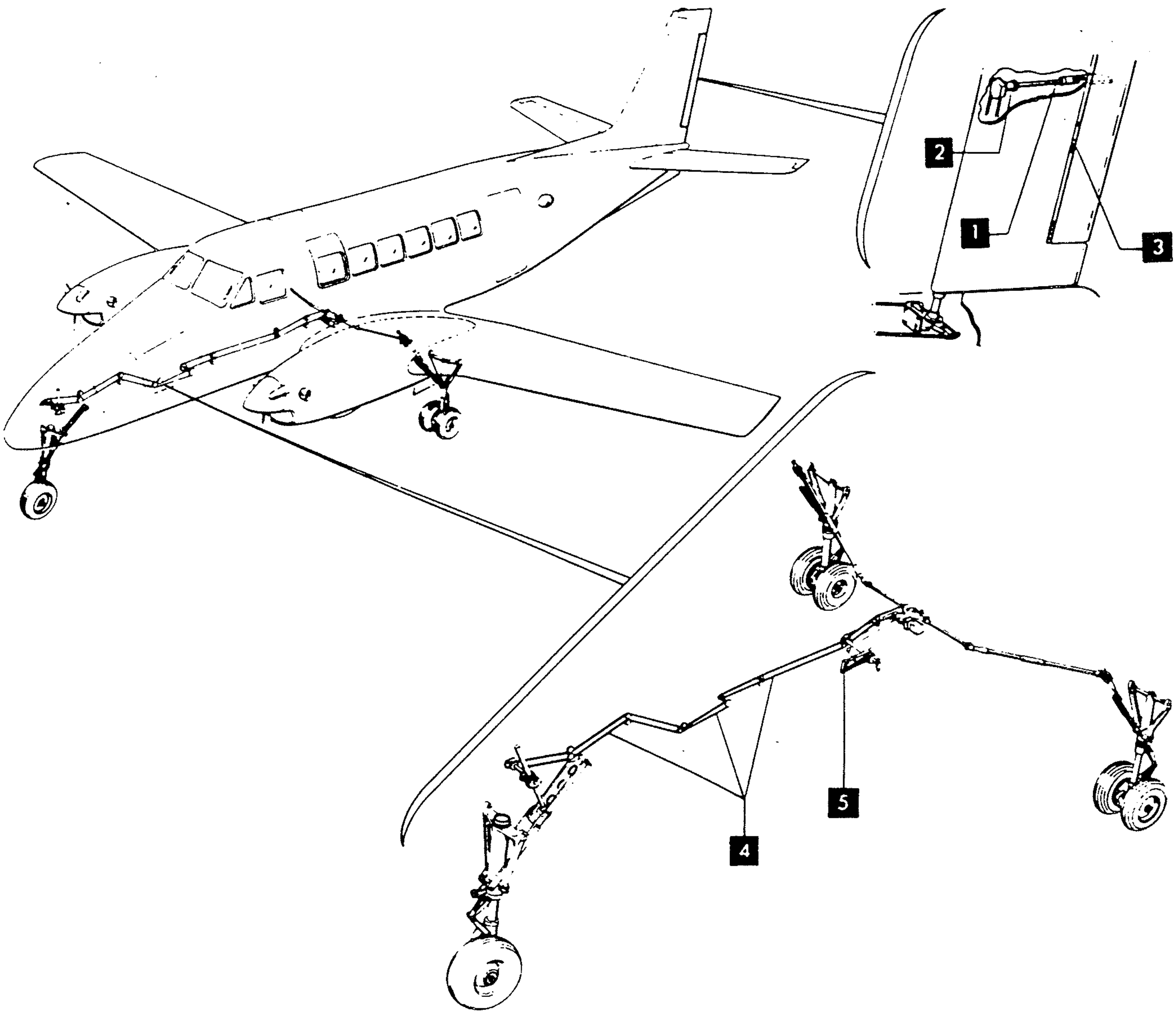
When lubricating the lower strut bushing, jack the nose wheel up and shake and rotate the wheel to assure that the lubricant penetrates to the contacting surfaces of the bushing.

MECHANICALLY ACTUATED SYSTEM

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	MAIN LANDING GEAR			
6	Wheel Bearings	MIL-G-3545 Grease	Hand Pack	100 Hrs.
7	Retract actuator Jackscrew	MIL-G-21164 Grease	Hand Pack	1000 Hrs.
8	Door Hinges and Retract Linkage	MIL-L-7870 Oil	Oil Can	100 Hrs.

LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
1	Rudder Trim Tab Tube	MIL-L-7870 Oil	Oil Can	100 Hrs.
2	Rudder Trim Tab Actuator	MIL-G-23827 Grease	Grease Gun	200 Hrs.
3	Rudder Trim Hinges	Mix MIL-G-6711 Graphite with naphtha into a paste and apply with a brush.	Hand Pack	100 Hrs.

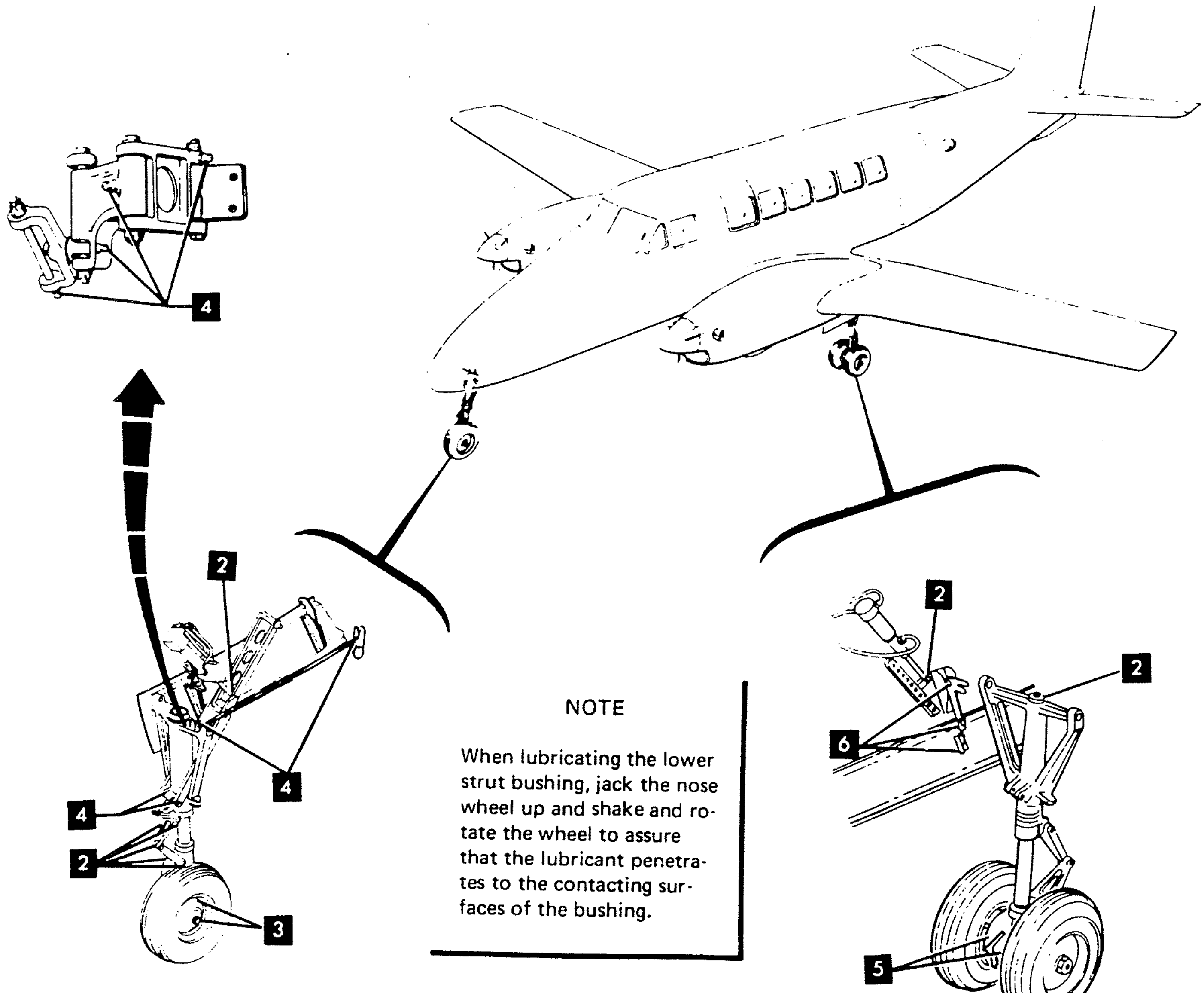


MECHANICALLY ACTUATED SYSTEM

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	LANDING GEAR RETRACT SYSTEM			
4	Retract Chains	Mix MIL-G-6711 Graphite with naphtha into a paste and apply with a brush.	Hand Pack	100 Hrs.
5	Emergency Extension Mechanism	VV-L-800 Oil	Oil Can	100 Hrs.

LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	NOSE LANDING GEAR HYDRAULIC SYSTEM			
1	Door Hinges and Retract Linkage	MIL-L-7870 Oil	Oil Can	100 Hrs.
2	Grease Fittings	MIL-G-81322 Grease	Grease Gun	100 Hrs.
3	Wheel Bearings	MIL-G-3545 Grease	Hand Pack	100 Hrs.
4	Nose Wheel Steering Mechanism	MIL-G-81322 Grease	Grease gun	50 Hrs.



NOTE

When lubricating the lower strut bushing, jack the nose wheel up and shake and rotate the wheel to assure that the lubricant penetrates to the contacting surfaces of the bushing.

HYDRAULICALLY ACTUATED SYSTEM

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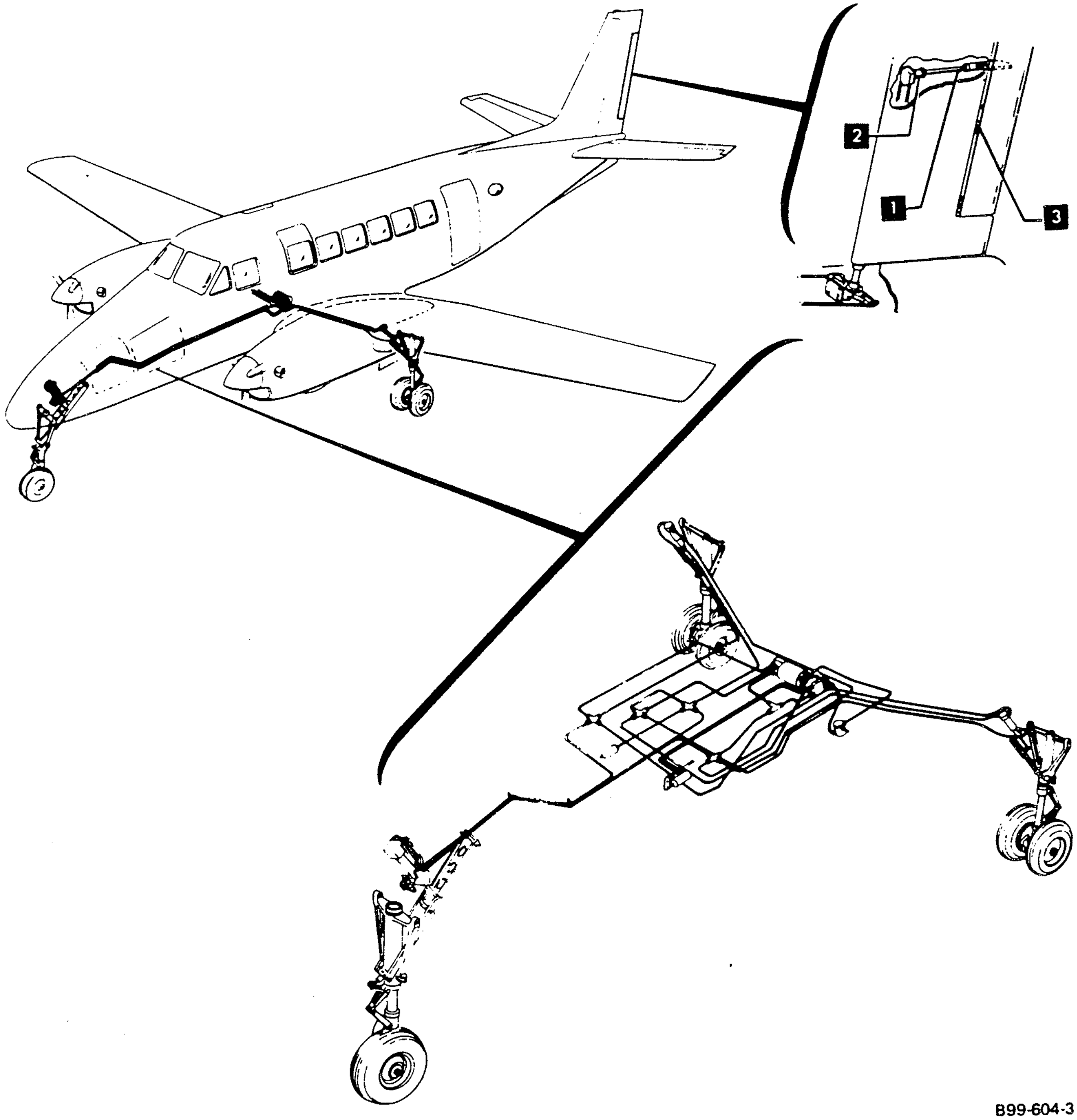
INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
	MAIN LANDING GEAR			
5	Wheel Bearings	MIL-G-3545 Grease	Hand Pack	100 Hrs.
6	Door Hinges and Retract Linkage	MIL-L-7870 Oil	Oil Can	100 Hrs.

LUBRICATION CHART

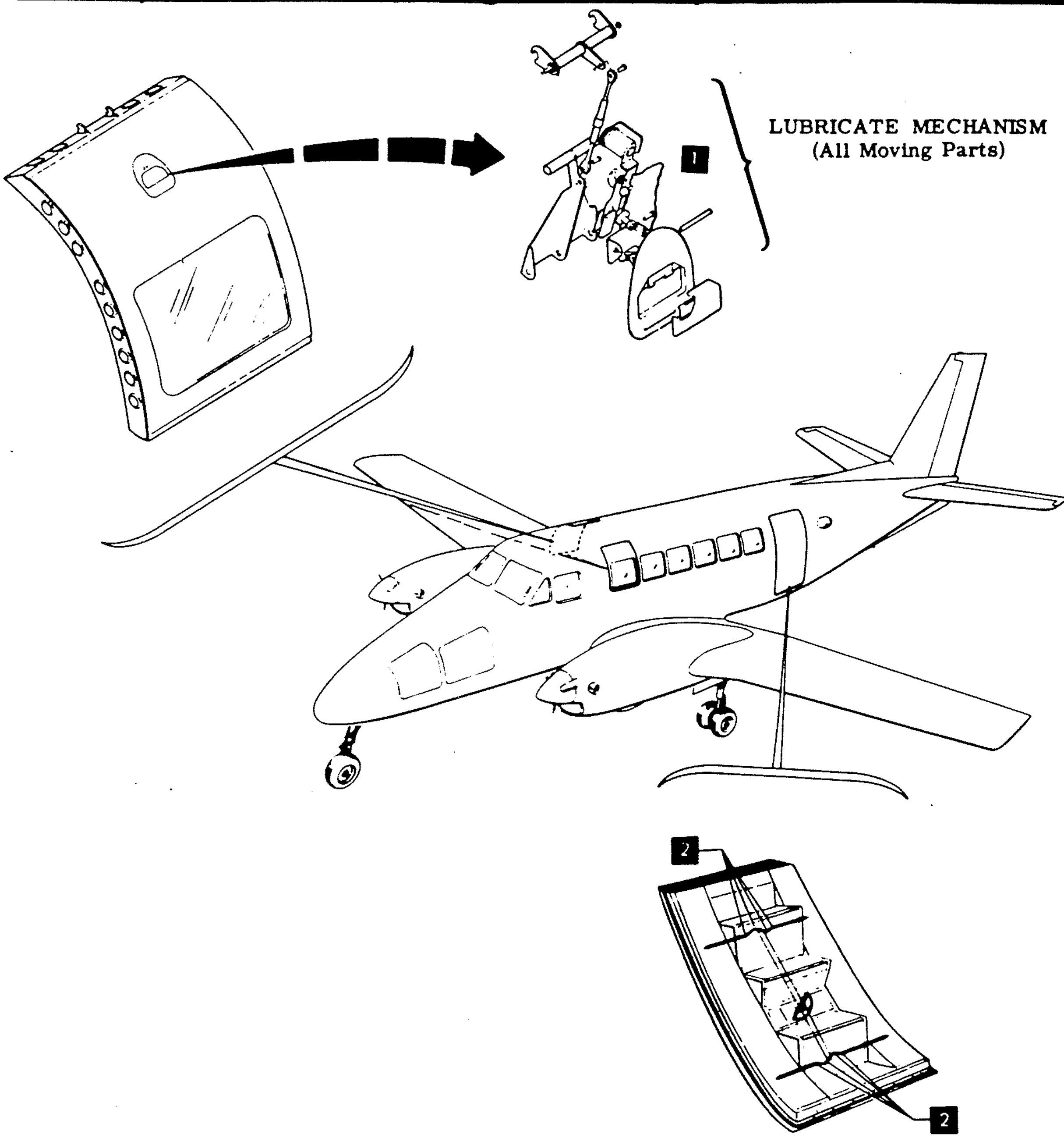
INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
1	Rudder Trim Tab Tube	MIL-L-7870 Oil	Oil Can	100 Hrs.
2	Rudder Trim Tab Actuator	MIL-G-23827 Grease	Grease Gun	200 Hrs.
3	Rudder Trim Hinges	Mix MIL-G-6711 Graphite with naphtha into a paste and apply with a brush.	Hand Pack	100 Hrs.



HYDRAULICALLY ACTUATED SYSTEM

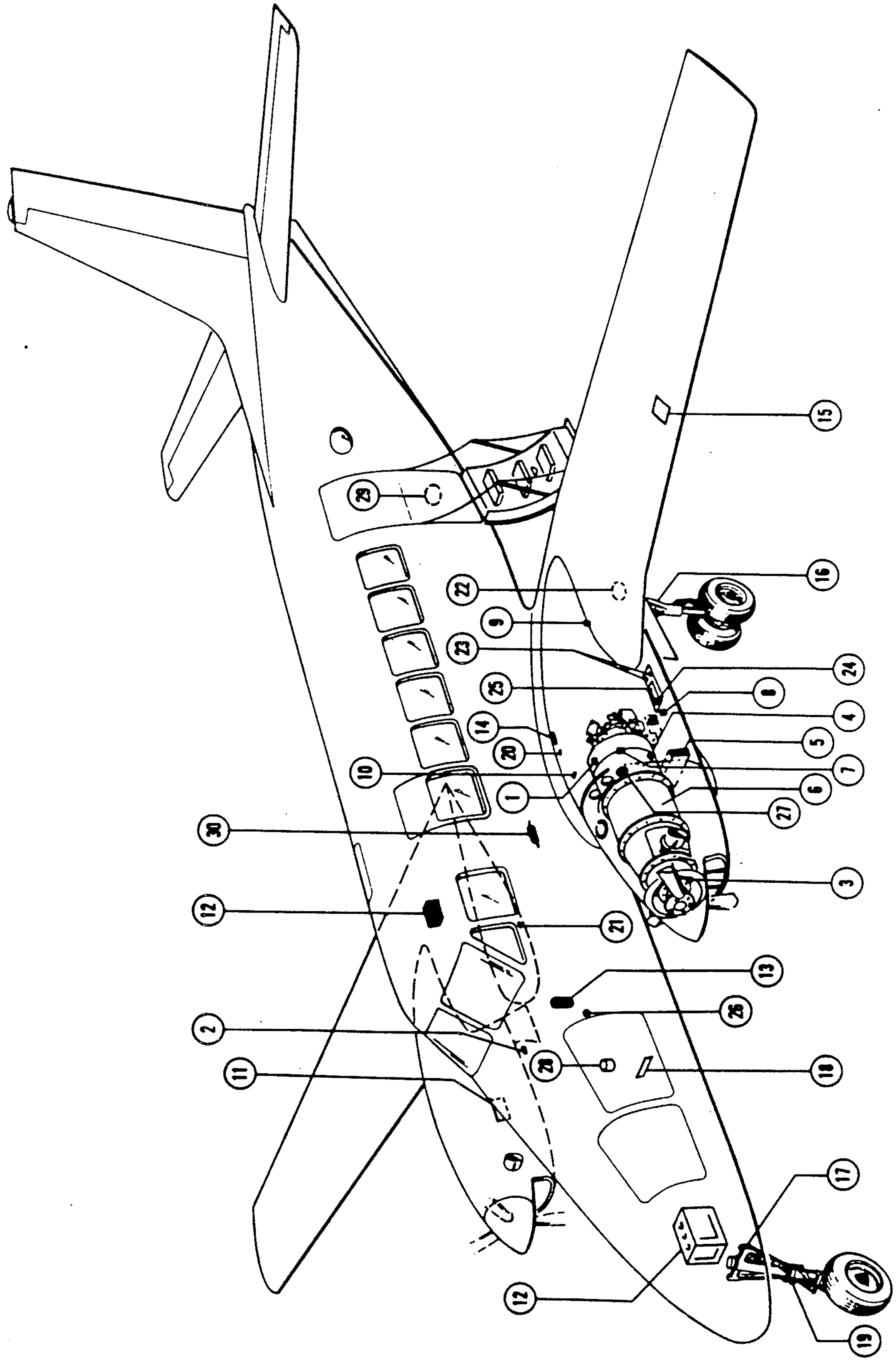
LUBRICATION CHART

INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
1	EMERGENCY EXIT DOORS Door Mechanism	MIL-M-7866 Molyb. Disulfide	Hand Pack	500 Hrs.



INDEX	LOCATION	LUBRICANT	APPLICATION	INTERVAL
2	CABIN DOOR Latching Mechanism	MIL-L-7870 Oil	Oil Can	100 Hrs.

Servicing Points



SERVICING SCHEDULE

ITEM	*LOCATION*	*SERVICE WITH*	*INTERVAL IN HOURS*
CHECK			
ENGINE OIL LEVEL	1. 11 o'clock position of accessory gear case.	See Engine Oil in Consumable Materials Chart	Preflight
REFRIGERANT LEVEL	2. Sight gage on the right side of the forward baggage compartment floorboard.	See Consumable Materials Chart.	
CHANGE ENGINE OIL	3. 4., 5. Remove forward cowlings to gain access to nose case drain. Remove fiber duct and oil cooler bypass duct to gain access to engine drain plug and oil cooler drain plug. Refill at 11 o'clock position on accessory gear case. CAUTION DO NOT exceed torque of 50 to 60 inch-pounds when reinstalling oil cooler drain plug.	See Engine Oil in Consumable Materials Chart.	50 hr per month or less: 400 hrs or 9 months whichever occurs first. Over 50 hr per month: 800 hrs (1200 hrs using 5 Centistroke oils) or 9 months, whichever occurs first.
CLEAN			
ENGINE	6. Access through cowling	Turco 4217	As Required
Engine DRIVEN FUEL PUMP SCREEN	7. Right side of engine accessory section.	Dry compressed air	100 hours
FUEL FILTERS	8. For access to the filter on each engine, remove fiberglass duct and oil cooler bypass duct. Transfer pump filter mounted in each main wheel well.	Clean with PD680 solvent and blow dry with compressed air	100 hours
HEATER FUEL FILTER	9. Mounted in the left wing stub.	Clean with PD680 solvent and blow dry with compressed air	100 hours
HEATER FUEL CONTROL VALVE FILTER	10. Remove large square access cover from underside of left center section just inboard of nacelle and forward of main spar.	Clean with PD680 solvent and blow dry with compressed air.	100 hours

SERVICING SCHEDULE (Continued)

ITEM	*LOCATION*	*SERVICE WITH*	*INTERVAL IN HOURS*
SERVICE			
AIR CONDITIONER COMPRESSOR	11. Access panel in inboard right nacelle area.		As Required
BATTERY	12. Nose area or wing right center section forward of the main spar.	Distilled water	Check and service every 100 hours.
BRAKE FLUID RESERVOIR	13. Upper left corner of the bulkhead in forward baggage compartment.	MIL-H-5606 Hydraulic fluid	As Required
HYDRAULIC LANDING GEAR FILL CAN	Left Wing Stub forward of main spar.	MIL-H-5606 Hydraulic fluid	As Required
HYDRAULIC ACCUMULATOR	Center Fuselage forward of main spar	600 PSI Dry Nitrogen	Check every 100 hours
NACELLE FUEL TANKS	14. Access panel in top of nacelle aft of the firewall.	See Consumable Materials	Preflight
WING FUEL TANKS	15. Access panel near leading edge of outboard wings.	See Consumable Materials	Preflight
MAIN LANDING GEAR STRUTS	16. Filler plug at top of each strut on main landing gear.	MIL-H-5606 Hydraulic fluid	100 hours
NOSE LANDING GEAR STRUT	17. Filler plug at top of nose gear strut.	MIL-H-5606 Hydraulic fluid	100 hours
OXYGEN SUPPLY CYLINDERS	18. Service through nose wheel well.	MIL-0-27210 Oxygen	As Required
SHIMMY DAMPENER	19. Mounted at upper knee of nose landing gear.	MIL-H-5606 Hydraulic fluid	100 hours
ENGINE OIL FILTER	27. 3 o'clock position of the compressor inlet case.		100 hours*

*After every 1500 hours or 30 months, whichever occurs first, the filter element must be cleaned and inspected at an overhaul facility, using the approved equipment. Following this cleaning at the overhaul level, the filter may be utilized for an additional 1500 hour or 30 month period maintaining the same inspection and cleaning schedule.

SERVICING SCHEDULE (Continued)

ITEM	*LOCATION*	*SERVICE WITH*	*INTERVAL IN HOURS*
DRAIN			
FUEL STRAINER	20. Pull ring located on right side of firewall.		Preflight
WING CENTER SECTION FUEL TANK	21. Drain cock on underside of wing center section, adjacent to the fuselage.		Preflight
WING FUEL TANK	22. Drain cock on underside of outboard wing just forward of the main spar.		Preflight
BOOST PUMPS AND NACELLE FUEL TANKS	23. Drain cocks on underside of nacelle just forward of the wheel well.		Preflight
GRAVITY FEED LINE	24. In manifold aft portion of of wheel well.		Preflight
TRANSFER PUMP FILTER	25. In manifold aft portion of wheel well.		Preflight
PITOT LINE DRAIN	26. In pitot lines, access gained through forward baggage compartment, immediately aft of the compartment opening.		100 hours and after exposure to visible moisture, in the air or on the ground.
REPLACE			
FORWARD EVAPORATOR FILTER	28. Access panel in forward baggage compartment floorboard.		300 hours
AFT EVAP-ORATOR FILTER	29. Right rear floorboard area in passenger compartment.		300 hours
INSTRUMENT AIR FILTER	30. Mounted in air pressure lines under floorboard area in passenger compartment on left hand side, forward of the main spar.		250 hours or oftener in heavy smoke con-ditions

SECTION XII

SAFETY INFORMATION

TABLE OF CONTENTS

SUBJECT *PAGE*

TABLE OF CONTENTS (Cont'd)

INTRODUCTION

The best engineering and manufacturing craftsmanship have gone into the design and building of all BEECHCRAFTS. Like any other high performance airplane, they operate efficiently and safely only in the hands of a skilled pilot.

You must be thoroughly familiar with the contents of your operating manuals, placards, and check lists to insure safe utilization of your airplane. When the airplane was manufactured, it was equipped with one or more of the following: placards, Owners Manual, FAA Flight Manual, Pilots Operating Handbook and FAA Approved Flight Manual. For simplicity and convenience we will refer to all official manuals in various models as the "Information Manual". If the airplane has changed ownership, the Information Manual may have been misplaced or may not be current. If missing or out of date, replacement Information Manuals must be obtained from any BEECHCRAFT Aviation Center as soon as possible.

For your added protection and safety, we have developed this special publication of safety information to refresh owners' and pilots' knowledge of a number of safety subjects. These subjects must be reviewed periodically and kept with the airplane, along with the Information Manual and other documents required for operation of the airplane.

Topics in this publication are dealt with in more detail in FAA Documents and other articles pertaining to the subject of safe flying. The safe pilot is familiar with this literature.

BEECHCRAFT airplanes are designed and built to provide owners and pilots with many years of safe and efficient transportation. By maintaining it properly and flying it prudently, you will realize its full potential.

WARNING

Because your aircraft is a high performance, high speed transportation vehicle, designed for operation in a three-dimensional environment, special safety precautions must be observed to reduce the risk of fatal or serious injuries to the pilot(s) and occupant(s).

It is mandatory that you fully understand the contents of this manual and the other operating and maintenance manuals which accompany the aircraft; that FAA requirements for ratings, certifications and review be scrupulously complied with; and that you allow only persons who are properly licensed and rated, and thoroughly familiar with the contents of the Information Manual, to operate the aircraft. IMPROPER OPERATION OR MAINTENANCE OF AN AIRCRAFT, NO MATTER HOW WELL BUILT INITIALLY, CAN RESULT IN CONSIDERABLE DAMAGE OR TOTAL DESTRUCTION OF THE AIRCRAFT ALONG WITH SERIOUS OR FATAL INJURIES TO ALL OCCUPANTS.

. . . . .BEECH AIRCRAFT CORPORATION

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GENERAL

As a pilot, you are responsible to yourself and to those who fly with you, to other pilots and their passengers, and to people on the ground, to fly wisely and safely.

The following material in this Safety Section covers several subjects in limited detail. Here are some condensed Do's and Don'ts.

DO'S

Be thoroughly familiar with your airplane, know its limitations and your own.

Be current in your airplane, or fly with a qualified instructor until you are current/proficient.

Pre-plan all aspects of your flight - including weather and adequate fuel reserves.

Use services available - Weather briefing, in-flight weather and Flight Service Station.

Carefully pre-flight your airplane.

Use the approved check list.

Have more than enough fuel for takeoff, plus the trip, and an adequate reserve.

Be sure your weight loading and C.G. are within limits.

Pilot(s) and passengers must use seat belts and shoulder harnesses at all times.

Be sure all loose articles and baggage are secured.

Check freedom of all controls during pre-flight inspection and before takeoff.

Maintain the prescribed airspeeds in takeoff, climb, descent and landing.

Avoid big airplane wake turbulence.

Preplan fuel and fuel tank management before the actual flight. Utilize auxiliary tanks only in level cruise flight. Take off and land on the fullest main tank.

Practice emergency procedures at safe altitudes and airspeeds, preferably with a qualified instructor pilot, until the required action is instinctive.

Keep your airplane in good mechanical condition.

Stay informed and alert; fly in a sensible manner.

DON'TS

Don't take off with frost, ice or snow on the airplane.

Don't take off with less than minimum recommended fuel, plus adequate reserves, and don't run the tank dry before switching.

Don't fly in a reckless, show-off, careless manner.

Don't fly into thunderstorms or severe weather.

Don't fly in possible icing conditions unless the airplane is approved and properly equipped.

Don't fly close to mountainous terrain.

Don't apply controls abruptly or with high forces that could exceed design loads of the airplane.

Don't fly into weather conditions that are beyond your ratings or current proficiency.

Don't attempt any take off or landing without using the check list.

Don't fly when physically or mentally exhausted or below par.

Don't trust to luck.

GENERAL SOURCES OF INFORMATION

There is a wealth of information available to the pilot created for the sole purpose of making your flying safer, easier and faster. Take advantage of this knowledge and be prepared for an emergency in the remote event that one should occur.

You, as a pilot, have responsibilities under government regulations. These are designed for your protection and the protection of your passengers. Compliance is mandatory.

RULES AND REGULATIONS

F.A.R. Part 91, General Operating and Flight Rules, is a document of law governing operation of aircraft and the owner's and pilot's responsibilities. This document covers such subjects as:

Responsibilities and authority of the pilot-in-command
Certificates required
Liquor and drugs
Flight plans
Pre-flight action
Fuel requirements
Flight rules
Maintenance, preventative maintenance, alterations, inspection, and maintenance records

These are only some of the topics covered. It is the owner's and pilot's responsibility to be thoroughly familiar with all items in F.A.R. Part 91 and to follow them.

AIRWORTHINESS DIRECTIVES

F.A.R. Part 39 specifies that no person may operate a product to which an airworthiness directive issued by the FAA applies, except in accordance with the requirements of that airworthiness directive.

AIRMAN INFORMATION, ADVISORIES, AND NOTICES - FAA AIRMAN'S INFORMATION MANUAL

AIRMAN'S INFORMATION MANUAL

The Airman's Information Manual (AIM) is designed to provide airmen with basic flight information and ATC procedures for use in the national airspace system of the United States. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the Air Traffic Control System, information on safety, and accident and hazard reporting. It is revised at six-month intervals and can be purchased locally or from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

This document contains a wealth of pilot information. Among the subjects are:

Controlled Air Space
Services Available to Pilots
Radio Phraseology and Technique
Airport Operations
Clearances and Separations
Pre-flight
Departures - IFR
Enroute - IFR
Arrival - IFR
Emergency Procedures
Weather and Icing
Mountain Flying
Wake Turbulence - Vortices
Medical Facts for Pilots
Bird Hazards
Good Operating Practices
Airport Location Directory

All pilots must be thoroughly familiar with and use the information in the AIM.

ADVISORY INFORMATION

NOTAMS (Notices to Airmen) are documents that have information of a time-critical nature that would affect a pilot's decision to make a flight; for example, an airport closed, terminal radar out of service, enroute navigational aids out of service, etc.

Airmen can subscribe to services to obtain FAA NOTAMS and Airman Advisories, and these are also available at FAA Flight Service Stations.

FAA ADVISORY CIRCULARS

The FAA issues advisory circulars to inform the aviation public in a systematic way of non-regulatory material of interest. Advisory Circulars contain a wealth of information with which the prudent pilot should be familiar. A complete list of current FAA advisory circulars is published in Advisory Circular AC00-2, which lists advisory circulars that are for sale, as well as those distributed free of charge by the FAA, and provides ordering information. Many advisory circulars which are for sale can be purchased locally in aviation bookstores or at FBO's. Some of the advisory circulars of interest to pilots are:

*	00-6A	Aviation Weather
	00-24	Thunderstorms
	00-30	Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence
*	00-45A	Aviation Weather Services
	00-46A	Aviation Safety Reporting Program
	00-50	Low Level Wind Shear
	20-5D	Plane Sense
	20-93	Flutter Due to Ice or Foreign Substance on or in Aircraft Control Surfaces
	20-105	Engine Power-Loss Accident Prevention
	39-7	Airworthiness Directives for General Aviation Aircraft
	43-12	Preventive Maintenance
	60-4	Pilot's Spatial Disorientation
	60-6A	Airplane Flight Manuals (AFM), Approved Manual Materials, Markings and Placards - Airplanes
	60-9	Induction Icing - Pilot Precautions and Procedures
	60-12	Availability of Industry-Developed Guidelines for the Conduct of the Biennial Flight Review
	60-13	The Accident Prevention Counselor Program
*	61-8D	Instrument Rating Written Test Guide
	61-9B	Pilot Transition Courses for Complex Single-Engine and Light, Twin Engine Airplanes
*	61-10A	Private and Commercial Pilots Refresher Courses
	61-12J	Student Pilot Guide
	61-19	Safety Hazard Associated with Simulated Instrument Flights
*	61-21	Flight Training Handbook
*	61-23A	Pilot's Handbook of Aeronautical Knowledge
*	61-27B	Instrument Flying Handbook
*	61-32B	Private Pilot - Airplane - Written Test Guide
*	61-34B	Federal Aviation Regulations Written Test Guide for Private, Commercial and Military Pilots
	61-47	Use of Approach Slope Indicators for Pilot Training
*	61-54A	Private Pilot Airplane - Flight Test Guide
*	61-55A	Commercial Pilot Airplane . . . Flight Test Guide
*	61-56A	Flight Test Guide - Instrument Pilot Airplane
*	61-58	Flight Instructor Practical Test Guide
	61-65	Part 61 (Revised) Certification Pilot and Flight Instructors
	61-67	Hazards Associated with Spins in Airplanes Prohibited from Intentional Spinning
*	61-70	Flight Instructor Instrument - Airplane - Written Test Guide
*	61-71A	Commercial Pilot Airplane Written Test Guide
*	61-72A	Flight Instructor - Airplane Written Test Guide

61-84	Role of Preflight Preparation
* 67-2	Medical Handbook for Pilots
90-23D	Wake Turbulence
90-34	Accidents resulting from Wheelbarrowing in Tricycle Gear Equipped Aircraft
90-42A	Traffic Advisory Practices at Non-tower airports
90-43D	Operations Reservation for High-Density Traffic Airports
90-48	Pilots' role in Collision Avoidance
90-64	Automated Radar Terminal System (ARTS) III
90-66	Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports
91-6A	Water, Slush and Snow on runway
91-8A	Use of Oxygen by General Aviation Pilots/Passengers
91-11B	Annual Inspection Reminder
91-13C	Cold Weather Operation of Aircraft
91-17	The use of View Limiting Devices on Aircraft
* 91-23A	Pilot's Weight and Balance Handbook
91-24	Aircraft Hydroplaning or Aquaplaning on Wet Runways
91-25A	Loss of Visual Cues During Low Visibility Landings
91-28	Unexpected Opening of Cabin Doors
91-33	Use of Alternate Grades of Aviation Gasoline for Grade 80/87
91-35	Noise, Hearing Damage, and Fatigue in General Aviation Pilots
91-43	Unreliable Airspeed Indications
91-46	Gyroscopic Instruments - Good Operating Practices
91-51	Airplanes Deice and Anti-Ice Systems
103-4	Hazard Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft
150/ 5200-3A	Bird Hazards to Aircraft
210-1A	National Notice to Airmen System
210-5	Military Flying Activities

* Advisory Circulars that are for sale.

FAA GENERAL AVIATION NEWS

FAA General Aviation News is published by the FAA in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of aircraft. FAA General Aviation News is sold on subscription by the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

FAA ACCIDENT PREVENTION PROGRAM

The FAA assigns accident prevention specialists to each Flight Standards and General Aviation District Office to organize accident prevention program activities. In addition, there are over 3,000 volunteer airmen serving as accident prevention counselors, sharing their technical expertise and professional knowledge with the general aviation community. The FAA conducts seminars and workshops, and distributes invaluable safety information under this program.

Usually the airport manager, the FAA Flight Service Stations (FSS), or Fixed Base Operator (F.B.O.), will have a list of accident prevention counselors and their phone numbers available. All Flight Standards and General Aviation District Offices have a list of the counselors serving the district.

Before flying over unfamiliar territory, such as mountainous terrain or desert areas, it is advisable for transient pilots to consult with local counselors. They will be familiar with the more desirable routes, the wind and weather conditions, and the service and emergency landing areas that are available along the way. They can also offer advice on the type of emergency equipment you should be carrying.

GENERAL INFORMATION ON SPECIFIC TOPICS

FLIGHT PLANNING

F.A.R. Part 91 requires that each pilot in command, before beginning a flight, familiarize himself with all available information concerning that flight.

Obtain a current and complete pre-flight briefing. This should consist of local, enroute and destination weather and enroute navaid information. Enroute terrain and obstructions, alternate airports, airport runways active, length of runways, and take-off and landing distances for the airplane for conditions expected should be known.

The prudent pilot will review his planned enroute track and stations and make a list for quick reference. It is strongly recommended a flight plan be filed with Flight Service Stations, even though the flight may be VFR. Also, advise Flight Service Stations of changes or delays of one hour or more and remember to close the flight plan at destination.

The pilot must be completely familiar with the performance of the airplane and performance data in the Information Manual. The resultant effect of temperature and pressure altitude must be taken into account in determining performance if not accounted for on the charts. An applicable FAA Approved Flight Manual, if one is provided, must be aboard the airplane at all times including the weight and balance forms and equipment list.

PASSENGER INFORMATION CARDS

Beech has available, for most current production airplanes, passenger information cards which contain important information on the proper use of restraint systems, oxygen masks, emergency exits and emergency bracing procedures. Passenger information cards may be obtained at any Beechcraft Aviation or Aero Center. A pilot should not only be familiar with the information contained in the cards himself, but should, prior to flight, always inform passengers of the information contained in the information cards. If a passenger information card is not available for your model of airplane, the pilot should orally brief the passengers on the proper use of restraint systems, doors and emergency exits, and other emergency procedures, as required by Part 91 of the FAR's.

INSPECTIONS - MAINTENANCE

In addition to maintenance inspections and pre-flight information required by F.A.R. Part 91, a complete pre-flight inspection is imperative. It is the responsibility of the owner and the operator to assure that the airplane is maintained in an airworthy condition and that proper maintenance records are kept.

Each airplane has a checklist for the pre-flight inspection which must be followed. USE THE CHECKLIST!

FLIGHT OPERATIONS

GENERAL

The pilot must be thoroughly familiar with all information published by the manufacturer concerning the airplane, and is required by law to operate the airplane in accordance with the FAA Approved Airplane Flight Manual and/or placards installed.

TURBULENT WEATHER

A complete and current weather briefing is a requirement for a safe trip.

Updating of weather information enroute is also essential. The wise pilot knows that weather conditions can change quickly, and treats weather forecasting as professional advice, rather than an absolute fact. He obtains all the advice he can, but stays alert to any sign or report of changing conditions.

Plan the flight to avoid areas of severe turbulence and thunderstorms. It is not always possible to detect individual storm areas or find the in-between clear areas.

Thunderstorms, squall lines and violent turbulence should be regarded as extremely dangerous and must be avoided. Hail and tornadic wind velocities can be encountered in thunderstorms that can destroy any airplane, just as tornadoes destroy nearly everything in their path on the ground.

Turboprop Engines - Thunderstorms also pose the possibility of a lightning strike on an aircraft. Any structure or equipment which shows evidence of a lightning strike, or of being subjected to a high current flow due to a strike, or is a suspected part of a lightning strike path through the aircraft, should be thoroughly inspected and any damage repaired prior to additional flight. The Pratt & Whitney or AiResearch Engine Maintenance Manual and Hartzell Service Letter No. 104 include inspection and maintenance requirements for engines and propellers involved in lightning strike incidents.

A roll cloud ahead of a squall line or thunderstorm is visible evidence of violent turbulence; however, the absence of a roll cloud should not be interpreted as denoting that severe turbulence is not present.

Even though flight in severe turbulence must be avoided, flight in turbulent air may be encountered unexpectedly under certain conditions.

The following recommendations should be observed for airplane operation in turbulent air:

Flying through turbulent air presents two basic problems, the answer to both of which is proper airspeed. On one hand, if you maintain an excessive airspeed, you run the risk of structural damage or failure; on the other hand, if your airspeed is too low, you may stall.

If turbulence is encountered, reduce speed to the turbulent air penetration speed, if given, or to the maneuvering speed, which is listed in the Limitations Section of the Information Manual. These speeds give the best assurance of avoiding excessive stress loads, and at the same time providing the proper margin against inadvertent stalls due to gusts.

Beware of overcontrolling in attempting to correct for changes in attitude; applying control pressure abruptly will build up G-forces rapidly and could cause structural damage or even failure. You should watch particularly your angle of bank, making turns as wide and shallow as possible. Be equally cautious in applying forward or back pressure to keep the nose level. Maintain straight and level attitude in either up or down drafts. Use trim sparingly to avoid being grossly out of trim as the vertical air columns change velocity and direction. If necessary to avoid excessive airspeeds, lower the landing gear.

FLIGHT IN ICING CONDITIONS

Every pilot of Beech airplanes (for that matter the pilot of any airplane) should be intimately acquainted with the FAA Approved National Weather Service definitions for ice intensity and accumulation which we have reprinted below:

INTENSITY	ICE ACCUMULATION
Trace	Ice becomes perceptible. Rate of accumulation slightly greater than rate of sublimation. It is not hazardous even though deicing/anti-icing equipment is not utilized, unless encountered for an extended period of time (over 1 hour).
Light	The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.
Moderate	The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or diversion is necessary.
Severe	The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.

It is no longer unusual to find deicing and anti-icing equipment on a wide range of airplane sizes and types. Since the capability of this equipment varies, it becomes the pilot's primary responsibility to understand limitations which restrict the use of his airplane in icing conditions and the conditions which may exceed the systems capacity.

Pilots and airplane owners must carefully review the Information Manual in order to ascertain the required operable equipment needed for flight in icing conditions. In addition, they must ascertain from the same sources the limits of approval or certification of their airplane for flight in icing conditions, and plan the flight accordingly, if icing conditions are known or forecast along the route.

Every owner and pilot of an airplane should understand that it is not uncommon to find aircraft equipped with less than the full complement of available systems and equipment. For example, props and pitot tube may be protected, but the aircraft might not have wing boots or tail boots. The reverse might be true. Windshield, pitot and airfoil surfaces might be protected, but the props might not be. Before undertaking any flight into areas where icing conditions might be suspected, inspect the aircraft and review the Information Manual to be certain that you are supported by the full complement of required IFR and deicing/anti-icing equipment.

Remember that regardless of its combination of deicing/anti-icing equipment, any aircraft not fully equipped and functional for IFR flight is not properly equipped for flight in icing conditions.

An airplane which is not approved or certificated for flight in icing conditions, not fully equipped, or which does not have all critical areas protected in the required manner by fully operational equipment must not be exposed to icing encounters of any intensity. When icing is detected, the pilot of such an aircraft must make an immediate diversion by flying out of the area of visible moisture or going to an altitude where icing is not encountered.

Some models of Beech airplanes were approved for flight in certain limited icing conditions under the FAA's Bureau of Flight Standards Release No. 434. Under this release, properly equipped airplanes are approved for flight in light to moderate icing conditions only. These aircraft are not approved for extended flight in moderate icing conditions or flights in any severe icing conditions. Flight in these conditions must be avoided.

Even airplanes fully equipped and certified for flight in the icing conditions described in Appendix C to FAR Part 25 must avoid flights into those conditions defined by the National Weather Service as "Severe". The National Weather Service definition of "severe icing" describes that condition as: "the rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard." No airplane equipped with any combination of deicing/anti-icing equipment can be expected to cope with such conditions. As competent pilots know, there appear to be no predictable limits for the severest weather conditions. For essentially the same reasons that airplanes, however designed or equipped for IFR flight, cannot be flown safely into conditions such as thunderstorms, tornados, hurricanes or other phenomena likely to produce severe turbulence, airplanes equipped for flight in icing conditions cannot be expected to cope with "severe" icing conditions as defined by the National Weather Service. The prudent pilot must remain alert to the possiblity that icing conditions may become "severe", and that his equipment will not cope with them. At the first indication that such condition may have been encountered or may lie ahead, he should immediately react by selecting the most expeditious and safe course for diversion.

Every pilot of a properly and fully-equipped Beech airplane who ventures into icing conditions must maintain the minimum speed (KIAS) for operation in icing conditions, which is set forth in the Normal Procedures Section of his Information Manual. If a minimum speed for flight in icing conditions is not specified in the manual, the following indicated airspeeds must be maintained:

All Baron and Travel Air Models - 130 KIAS

All other Beechcraft twin-engine models - 140 KIAS

The pilot must remain aware of the fact that if he allows his airspeed to deteriorate below this minimum speed, he will increase the angle of attack of his airplane to the point where ice may build up on the under side of the wings aft of the area protected by the boots.

The fact or extent of ice build-up in unprotected areas will not be directly observable from the cockpit. Due to distortion of the wing airfoil, increased drag and reduced lift, stalling speeds will increase as ice accumulates on the airplane. For the same reasons, stall warning devices are not accurate and cannot be relied upon in icing conditions.

Even though the pilot maintains the prescribed minimum speed for operating in icing conditions, ice is still likely to build up on other unprotected areas (the fuselage and the unprotected wing leading edge inboard of the engine nacelle). Under some atmospheric conditions, it may even build up aft of the boots despite the maintenance of the prescribed minimum speed. The effect of ice accumulation on any unprotected surface is aggravated by the length of exposure to the icing conditions. Ice buildup on unprotected surfaces will increase drag, add weight, reduce lift, and generally, adversely affect the aerodynamic characteristics and performance of the airplane. It can progress to the point where the airplane is no longer capable of flying. Therefore, the pilot operating even a fully-equipped airplane in sustained icing conditions must remain sensitive to any indication, such as observed ice accumulation, loss of airspeed, the need for increased power, reduced rate of climb, or sluggish response, that ice is accumulating on unprotected surfaces and that continued flight in these conditions is extremely hazardous, regardless of the performance of the deicing/anti-icing equipment.

Rapid cycling of the deice boots or cycling before at least one-quarter inch (1/4") of ice has accumulated (measured in the chordwise direction or forward from the leading edge), may cause the ice to grow outside the contour of the inflated boots and prevent ice removal.

For any owner or pilot whose use pattern for an aircraft exposes it to icing encounters, the following references are required reading for safe flying:

The aircraft's Information Manual, expecially the sections on Normal Procedures, Emergency Procedures, Systems, and Safety Information.

FAA Advisory Circular 91-51 - Airplane Deice and Anti-ice Systems.

Weather Flying, by Robert N. Buck.

Finally, the most important ingredients to safe flight in icing conditions - regardless of the aircraft or the combination of deicing/anti-icing equipment - are a complete and current weather briefing, sound pilot judgment, close attention to the rate and type of ice accumulations, and the knowledge that "severe icing" as defined by the National Weather Service is beyond the capability of modern aircraft and immediate diversion must be made. It is the inexperienced or uneducated pilot who presses on "regardless", hoping that steadily worsening conditions will improve, only to find himself flying an airplane which has become so loaded with ice that he can no longer maintain altitude. At this point he has lost most, if not all, of his safety options, including perhaps a 180 degree turn to retreat along the course already traveled. The responsible and well-informed pilot recognizes the limitations of weather conditions, his airplane and its systems and reacts promptly; he lives to fly again.

MOUNTAIN FLYING

Pilots flying in mountainous areas should inform themselves of all aspects of mountain flying, including the effects of topographic features on weather conditions. Many good articles have been published, and a synopsis of mountain flying operations is included in the FAA Airman's Information Manual, Part 1.

Avoid flight at low altitudes over mountainous terrain, particularly near the lee slopes. If the wind velocity near the level of the ridge is in excess of 25 knots and approximately perpendicular to the ridge, mountain wave conditions are likely over and near the lee slopes. If the wind velocity at the level of the ridge exceeds 50 knots, a strong mountain wave is probable with extreme up and down drafts and severe turbulence. The worst turbulence will be encountered in and below the rotor zone, which is usually 8 to 10 miles downwind from the ridge. This zone is sometimes characterized by the presence of "roll clouds" if sufficient moisture is present;

altocumulus standing lenticular clouds are also visible signs that a mountain wave exists, but their presence is likewise dependent on moisture. Mountain wave turbulence can, of course, occur in dry air and the absence of such clouds should not be taken as any assurance that mountain wave turbulence will not be encountered. A mountain wave downdraft may exceed the climb capability of your airplane. Avoid mountain wave downdrafts.

VFR - LOW CEILINGS

If you are not instrument rated, do not attempt "VFR on Top" or "Special VFR" flight or clearances. Being caught above a solid cloud layer when an emergency descent is required (or at destination) is an extremely hazardous position for the VFR pilot. Accepting a clearance out of certain airport control zones with no minimum ceiling and one-mile visibility as permitted with "Special VFR" is a foolish practice for the VFR pilot.

Avoid areas of low ceilings and restricted visibility unless you are instrument rated and proficient and have an instrument equipped airplane. Then proceed with caution and with planned alternates.

VFR AT NIGHT

When flying VFR at night, in addition to the altitude appropriate for the direction of flight, pilots should maintain a safe minimum altitude as dictated by terrain, obstacles such as TV towers, or communities in the area flown. This is especially true in mountainous terrain, where there is usually very little ground reference. Minimum clearance is 2,000 feet above the highest obstacle enroute. Do not depend on your ability to see obstacles in time to miss them. Flight on dark nights over sparsely populated country can be the same as IFR, and must be avoided by inexperienced or non-IFR rated pilots.

VERTIGO - DISORIENTATION

Disorientation can occur in a variety of ways. During flight, inner ear balancing mechanisms are subjected to varied forces not normally experienced on the ground. This, combined with loss of outside visual reference, can cause vertigo. False interpretations (illusions) result, and may confuse the pilot's conception of the altitude and position of his airplane.

Under VFR conditions, the visual sense, using the horizon as a reference, can override the illusions. Under low visibility conditions (night, fog, clouds, haze, etc.) the illusions predominate. Only through awareness of these illusions, and proficiency in instrument flight procedures, can an airplane be operated safety in a low visibility environment.

Flying in fog, dense haze or dust, cloud banks, or very low visibility, with strobe lights or rotating beacons turned on can contribute to vertigo. They should be turned off in these conditions, particularly at night.

All pilots should check the weather and use good judgment in planning flights. The VFR pilot should use extra caution in avoiding low visibility conditions.

Motion sickness often precedes or accompanies disorientation and may further jeopardize the flight.

Disorientation in low visibility conditions is not limited to VFR pilots. Although IFR pilots are trained to look at their instruments to gain an artificial visual reference as a replacement for the loss of a visual horizon, they do not always do so. This can happen when the pilot's physical condition will not permit him to concentrate on his instruments; when the pilot is not proficient in flying instrument conditions in the airplane he is flying; or, when the pilot's work load of flying by reference to his instruments is augmented by such factors as turbulence. Even an instrument rated pilot encountering instrument conditions, intentional or unintentional, should ask himself whether or not he is sufficiently alert and proficient in the airplane he is flying, to fly under low visibility conditions and the turbulence anticipated or encountered. If any doubt exists, the flight should not be made or it should be discontinued as soon as possible.

The result of vertigo is loss of control of the airplane. If the loss of control is sustained it will result in an excessive speed accident. Excessive speed accidents occur in one of two manners, either as an inflight airframe separation or as a high speed ground impact; and they are fatal accidents in either case. All airplanes are subject to this form of accident.

For years, Beech Information Manuals have contained instructions that the landing gear should be extended in any circumstance in which the pilot encounters IFR conditions which approach the limits of his capability or his ratings. Lowering the gear in IFR conditions or flight into heavy or severe turbulence, tends to stabilize the aircraft, assists in maintaining proper airspeed, and will substantially reduce the possibility of reaching excessive airspeeds with catastrophic consequences, even where loss of control is experienced.

Excessive speed accidents occur at airspeeds greatly in excess of two operating limitations which are specified in the manuals: Maximum maneuvering speed and the "red line" or "never exceed" speed. Such speed limits are set to protect the structure of an airplane. For example, control surfaces are designed to be used to their fullest extent only below a certain speed - maximum maneuvering speed. As a result, the control surfaces should never be suddenly or fully deflected above maximum maneuvering speed. Turbulence penetration should not be performed above that speed. The accidents we are discussing here occur at airspeeds greatly in excess of these limitations. No airplane should ever be flown beyond its FAA approved operating limitations.

FLIGHT OF MULTI-ENGINE AIRPLANES WITH ONE ENGINE INOPERATIVE.

The major difference between flying a twin-engine and single-engine airplane is knowing how to manage the flight if one engine loses power for any reason. Safe flight with one engine out requires an understanding of the basic aerodynamics involved - as well as proficiency in engine out procedures.

Loss of power from one engine affects both climb performance and controllability of any light twin. Climb performance depends on an excess of power over that required for level flight. Loss of power from one engine obviously represents a 50% loss of horsepower but, in virtually all light twins, climb performance is reduced by at least 80%. A study of the charts in your Information Manual will confirm this fact.

Single engine climb performance depends on four factors:

Airspeed	too little, or too much, will decrease climb performance.
Drag	gear, flaps, cowl flaps, prop, and speed.
Power	amount available in excess of that needed for level flight.
Weight	passengers, baggage, and fuel load greatly affect climb performance.

Loss of power on one engine creates yaw due to asymmetrical thrust. Yaw forces must be balanced with the rudder. Loss of power on one engine also reduces prop wash over the wing. In addition, yaw affects the lift distribution over the wing causing a roll toward the "dead" engine. These roll forces may be balanced by banking slightly (up to 5°) into the operating engine.

Airspeed is the key to safe single engine operations. For most light twins there is an:

	Symbol
- airspeed below which directional control cannot be maintained	Vmca
- airspeed below which an intentional engine cut should never be made	Vsse
- airspeed that will give the best single engine rate-of-climb (or the slowest loss of altitude)	Vyse

- airspeed that will give the steepest angle-of-climb with one engine-out — Vxse

MINIMUM CONTROL SPEED AIRBORNE (Vmca)

Vmca is designated by the red radial on the airspeed indicator and indicates the minimum control speed. airborne at sea level. Vmca is determined by FAA regulations as the minimum airspeed at which it is possible to recover directional control of the airplane within 20 degrees heading change. and thereafter maintain straight flight. with not more than 5 degrees of bank if one engine fails suddenly with:

- Take-off power on both engines.
- Rearmost allowable center of gravity.
- Flaps in takeoff position.
- Landing gear retracted.
- Propeller windmilling in takeoff pitch configuration (or feathered if automatically featherable).

However. sudden engine failures rarely occur with all of the factors listed above. and therefore. the actual Vmca under any particular situation may be a little slower than the red radial on the airspeed indicator. Most airplanes will not maintain level flight at speeds at or near Vmca. Consequently. it is not advisable to fly at speeds approaching Vmca. except in training situations or during flight tests. Adhering to the practice of never flying at or below the published Vmc speed for your aircraft will virtually eliminate loss of directional control as a problem in the event of engine failure.

INTENTIONAL ONE-ENGINE INOPERATIVE SPEED (Vsse)

Vsse is specified by the airplane manufacturer and is the minimum speed at which to perform intentional engine cuts. Use of Vsse is intended to reduce the accident potential from loss of control after engine cuts at or near minimum control speed. Vmca demonstrations are necessary in training. but should only be made at a safe altitude above the terrain and with the power reduction on one engine made at or above Vsse.

BEST SINGLE ENGINE RATE-OF-CLIMB SPEED (Vyse)

Vyse is designated by the blue radial on the airspeed indicator. Vyse delivers the greatest gain in altitude in the shortest possible time. and is based on the following criteria:

- critical engine inoperative. and its propeller in the minimum drag position.
- operating engine set at not more than maximum continuous power.
- landing gear retracted.
- wing flaps in the most favorable (i.e.. best lift/drag ratio position).
- cowl flaps as required for engine cooling.
- aircraft flown at recommended bank angle.

Drag caused by a windmilling propeller. extending landing gear. or flaps in the landing position. will severely degrade or destroy single engine climb performance. Since engine climb performance varies widely with type of airplane. weight. temperature. altitude. and airplane configuration. the climb gradient (altitude gain or loss per mile) may be marginal - or even negative - under some conditions. Study the Information Manual for your specific airplane and know what performance to expect with one-engine out.

BEST SINGLE ENGINE ANGLE-OF-CLIMB AIRSPEED (Vxse)

Vxse is used only to clear obstructions during initial climb-out as it gives the greatest altitude gain per unit of horizontal distance. It provides less engine cooling and requires more rudder control than Vyse.

SINGLE ENGINE SERVICING CEILING

The single engine service ceiling is the maximum altitude at which an airplane will climb, at a rate of at least 50 feet per minute in smooth air, with one engine feathered.

The single engine service ceiling chart should be used during flight planning to determine whether the airplane, as loaded, can maintain the Minimum Enroute Altitude (MEA) if IFR, or terrain clearance if VFR, following an engine failure.

BASIC SINGLE ENGINE PROCEDURES

Know and follow, to the letter, the single-engine emergency procedures specified in your Information Manual for your specific make and model airplane. However, the basic fundamentals of all the procedures are as follows:

- Maintain aircraft control and airspeed at all times. This is cardinal rule No. 1.
- Usually, apply maximum power to the operating engine. However, if the engine failure occurs at a speed below Vmca, or during cruise or in a steep turn, you may elect to use only enough power to maintain a safe speed and altitude. If the failure occurs on final approach, use power only as necessary to complete the landing.
- Reduce drag to an absolute minimum.
- Secure the failed engine and related sub-systems.

The first three steps should be done promptly and from memory. The check list should then be consulted to be sure that the inoperative engine is secured properly and that the appropriate switches are placed in the correct position. The airplane must be banked about 5° into the live engine, with the "slip/skid" ball out of center toward the live engine, to achieve rated performance.

Another note of caution: Be sure to identify the dead engine, positively, before feathering it. Remember: First, identify the suspected engine (i.e., "Dead foot means dead engine"), second, verify with cautious throttle movement, then feather.

ENGINE FAILURE ON TAKE-OFF

If an engine fails before attaining lift-off speed, or below Vmca, the only proper action is to discontinue the take-off. If the engine fails after lift-off with the landing gear still down, the take-off should still be discontinued if touch-down and roll-out on the remaining runway is still possible.

If you do find yourself in a position of not being able to climb, it is much better to pull the power on the good engine and land straight ahead than try to force a climb and lose control.

Your Information Manual contains charts that are used in calculating the runway length required to stop if the engine fails before reaching lift-off speed and also has charts showing single engine performance after lift-off.

Study your charts carefully. No airplane is capable of climbing out on one engine under all weight, pressure altitude, and temperature conditions. Know, before you take the actual runway, whether you can maintain control and climb-out if you lose an engine while the gear is still down. It may be necessary to off-load some weight, or wait for more favorable temperature or wind conditions.

WHEN TO FLY Vx, Vy, Vxse and Vyse

During normal two-engine operations, always fly Vy (Vx if necessary for obstacle clearance) on initial climb-out. Then, accelerate to your cruise climb airspeed, which may be Vy plus 10 to 15 knots after you have obtained a safe altitude. Use of cruise climb airspeed will give you better engine cooling, increased inflight visibility and better fuel economy. However, at the first indication of an engine failure during climb-out, or while on approach, establish Vyse or Vxse, whichever is appropriate. (Consult your Information Manual for specifics).

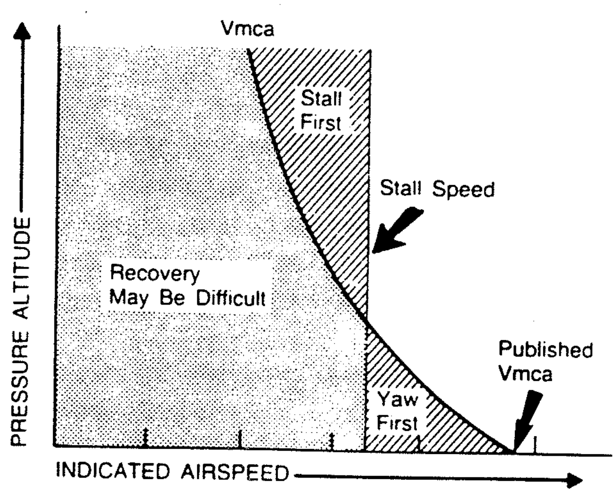
STALLS, SLOW FLIGHT AND TRAINING

The stall warning system must be kept operational at all times and must not be deactivated by interruption of circuits, circuit breakers, or fuses. Compliance with this requirement is especially important in all high performance single and multi-engine airplanes during engine-out practice, or stall demonstrations, because the stall speed is critical in all low speed operations of high-performance airplanes.

Training should be accomplished under the supervision of a qualified instructor-pilot; with careful reference to the applicable sections of the FAA Flight Test Guide and FAA Pilot Transition Courses for Complex Single Engine and Light Twin Engine Airplanes (AC61-9B). In particular, observe carefully the warnings in the flight test guides.

The single engine stall speed of a twin engine aircraft is generally slightly below the power off (engines idle) stall speed, for a given weight condition. Single engine stalls in multi-engine airplanes are not recommended. Single engine stalls have never been required by the FAA regulations for multi-engine flight tests, and should not be practiced in high performance airplanes by other than qualified engineering test pilots.

Engine out minimum control speed demonstrations in multi-engine airplanes should be conducted in strict accordance with the warning of the FAA Flight Test Guide. Engine out minimum control speed generally decreases with altitude, while the single engine stall speed remains approximately constant, for normally aspirated engines. No such demonstration should be attempted when the density altitude and temperature are such that the engine out minimum control speed is known, or discovered to be, close to the stalling speed. Loss of directional or lateral control, just as a stall occurs, is potentially hazardous.



Relationship Between Stall Speed And Vmca For Aircraft With Normally Aspirated Engines.
STD-601-38

Vsse, the airspeed below which an engine should not be intentionally rendered inoperative for practice purposes, was established because of the apparent practice of some pilots, instructors, and examiners, of intentionally rendering an engine inoperative at a time when the airplane is being operated at a speed close to, or below the power idle stall speed. Unless the pilot takes immediate and proper corrective action under such circumstances, it is possible to enter an inadvertent spin.

It is recognized that flight below Vsse with one engine inoperative, or simulated inoperative, may be required for conditions such as practice demonstration of Vmca for multi-engine pilot certification. Refer to the procedure set forth in the Information Manual for your aircraft. This procedure calls for simulating one engine inoperative by reducing the power lever (throttle) on one engine to idle while operating at an airspeed above Vsse. Power on the other engine is set at maximum, then airspeed is reduced at approximately one knot per second until either Vmca or stall warning is obtained. During this transition, rudder should be used to maintain directional control, and ailerons should be used to maintain a 5° bank toward the operative engine. At the first sign of either Vmca or stall warning (which may be evidenced by inability to maintain longitudinal, lateral or directional control, aerodynamic stall buffet, or stall warning horn sound), recovery must be initiated immediately by reducing power to idle on operative engine and lowering the nose to regain Vsse. Resume normal flight. This entire procedure should be used at a safe altitude of at least 5,000 feet above the ground in clear air only.

If stall warning is detected prior to the first sign of

Vmca, an engine-out minimum control speed demonstration cannot be accomplished under the existing density altitude and gross weight conditions and should not be attempted.

SPINS

A major cause of fatal accidents in general aviation aircraft is a stall and spin. Stall demonstrations and practice are a means for a pilot to acquire the skills to recognize when a stall is about to occur and to recover as soon as the first signs of a stall are evident. If a stall does not occur - A spin cannot occur. It is important to remember however, that a stall can occur in any flight attitude, at any airspeed, if controls are misused.

Unless your aircraft has been specifically certificated in the aerobatic category and specifically tested for spin recovery characteristics, it is placarded against intentional spins. The pilot of an airplane placarded against intentional spins should assume that the airplane may become uncontrollable in a spin, since its performance characteristics beyond certain limits specified in the FAA regulations may not have been tested and are unknown. This is why aircraft are placarded against intentional spins, and this is why stall avoidance is your protection against an inadvertent spin.

Pilots are taught that intentional spins are entered by deliberately inducing a yawing movement with the controls as the aircraft is stalled. Inadvertent spins result from the same combination - stall plus yaw. That is why it is important to use coordinated controls and to recover at the first indication of a stall when practicing stalls.

In any twin engine airplane, fundamental aerodynamics dictate that if the airplane is allowed to become fully stalled while one engine is providing lift-producing thrust the yawing movement which can induce a spin will be present. Consequently, it is important to immediately reduce power on the operating engine, lower the nose to reduce the angle of attack, and increase the airspeed to recover from the stall. In any twin engine aircraft, if application of stall recovery controls is delayed a rapid rolling and yawing motion may develop, even against full aileron and rudder, resulting in the airplane becoming inverted during the onset of a spinning motion. Once the airplane has been permitted to progress beyond the stall and is allowed to reach the rapid rolling and yawing condition, the pilot must then immediately initiate the generally accepted spin recovery procedure for multi-engine airplanes, which is as follows:

> Immediately move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as near simultaneously as possible; then continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral during recovery. THE LONGER THE PILOT DELAYS BEFORE TAKING PROPER CORRECTIVE ACTION, THE MORE DIFFICULT RECOVERY WILL BECOME.

Always remember that extra alertness and pilot techniques are required for slow flight maneuvers, including the practice or demonstration of stalls or Vmca. In addition to the foregoing mandatory procedures, always:

1. Be certain that the center of gravity of the airplane is as far forward as possible. Forward C.G. aids stall recovery, spin avoidance and spin recovery. An aft C.G. can create a tendency for a spin to flatten out, which delays recovery.
2. Whenever a student pilot will be required to practice slow flight or single-engine maneuvers, be certain that the qualified instructor pilot has a full set of operable controls in front of him. FAA regulations prohibit flight instruction without full dual controls.

3. Conduct any maneuvers which could possibly result in a spin at altitudes in excess of five thousand (5,000) feet above ground level in clear air only.
4. Remember that an airplane, at or near traffic pattern and approach altitudes, cannot recover from a spin, or perhaps even a stall, before impact with the ground. For twin engine aircraft, when descending to traffic altitude and during pattern entry and all other flight operations, maintain speed no lower than Vsse. On final approach maintain at least the airspeed shown in the flight manual. Should a go-around be required, do not apply more power than necessary until the airplane has accelerated to Vsse. Recognize that under some conditions of weight, density altitude, and aircraft configuration, a twin engine aircraft cannot climb or accelerate on a single engine. Hence a single engine go-around is impossible and the aircraft is committed to a landing. Plan your approach accordingly.
5. Remember that if an airplane flown under instrument conditions is permitted to stall or enter a spin, the pilot, without reference to the horizon, is certain to become disoriented. He may be unable to recognize a stall, spin entry, or the spin condition and he may be unable to determine even the direction of the rotation.
6. Finally, never forget that stall avoidance is your best protection against an inadvertent spin. MAINTAIN YOUR AIRSPEED.

DESCENT

In piston-powered airplanes, whether single or twin engines, supercharged or normally aspirated, it is necessary to avoid prolonged descents with low power, as this produces two problems: (1) Excessively cool cylinder head temperatures which cause premature engine wear, and (2) excessively rich mixtures due to idle enrichment (and altitude) which causes soot and lead deposits on the spark plugs (fouling). The second of these is the more serious consideration; the engine may not respond to the throttle when it is desired to discontinue the descent.

Both problems are amenable to one solution: maintain adequate power to keep cylinder head temperatures in the "green" range during descent, and lean to best power mixture (that is, progressively enrich the mixture from cruise only slightly as altitude decreases). This procedure will lengthen the descent, of course, and requires some advance planning.

If it is necessary to make a prolonged descent at or near idle, as in practicing forced landings, at least avoid the problem of fouled spark plugs by frequently advancing the throttle until the engine runs smoothly, and maintain an appropriate mixture setting with altitude. (Refer to pre-landing check list.)

VORTICES - WAKE TURBULENCE

Every airplane generates wakes of turbulence while in flight. Part of this is from the propeller or jet engine, and part from the wing tip vortices. The larger and heavier the airplane, the more pronounced and turbulent the wakes will be. Wing tip vortices from large, heavy airplanes are very severe at close range, degenerating with time, wind, and space. These are rolling in nature, from each wing tip. In tests, vortex velocities of 133 knots have been recorded.

Encountering the rolling effect of wing tip vortices within two minutes after passage of large airplanes is most hazardous to light airplanes. This roll effect can exceed the maximum counter roll obtainable in a light airplane.

The turbulent areas may remain for as long as three minutes or more, depending on wind conditions, and may extend several miles beyond the airplane. Plan to fly slightly above and to the windward side of the other airplanes. Because of the wide variety of conditions that can be encountered, there is no set rule to follow to avoid wake turbulence in all situations. However, the Airman's Information Manual, and to a greater extent Advisory Circular 90-23, Aircraft Wake Turbulence, provides a thorough discussion of the factors you should be aware of when wake turbulence may be encountered.

TAKEOFF AND LANDING CONDITIONS

When taking off on runways covered with water or freezing slush, the landing gear should remain extended for approximately ten seconds longer than normal, allowing the wheels to spin and dissipate the freezing moisture. The landing gear should then be cycled up, then down, wait approximately five seconds and then retract again.

Caution must be exercised to insure that the entire operation is performed below Maximum Landing Gear Operating Airspeed.

Use caution when landing on runways that are covered by water or slush which cause hydroplaning (aquaplaning), a phenomenon that renders braking and steering ineffective because of the lack of sufficient surface friction. Snow and ice covered runways are also hazardous. The pilot should also be alert to the possibility of the brakes freezing.

Use caution when taking off or landing during gusty wind conditions. Also be aware of the special wind conditions caused by buildings or other obstructions located near the runway in a crosswind pattern.

MEDICAL FACTS FOR PILOTS

GENERAL

When the pilot enters the airplane, he becomes an integral part of the man-machine system. He is just as essential to a successful flight as the control surfaces. To ignore the pilot in pre-flight planning would be as senseless as failing to inspect the integrity of the control surfaces or any other vital part of the machine. The pilot himself has the responsibility for determining his reliability prior to entering the airplane for flight. When piloting an airplane, an individual should be free of conditions which are harmful to alertness, ability to make correct decisions, and rapid reaction time.

FATIGUE

Fatigue generally slows reaction times and causes errors due to inattention. In addition to the most common cause of fatigue; insufficient rest and loss of sleep, the pressures of business, financial worries, and family problems can be important contributing factors. If you are tired, don't fly.

HYPOXIA

Hypoxia, in simple terms, is a lack of sufficient oxygen to keep the brain and other body tissues functioning properly. There is a wide individual variation in susceptibility to hypoxia. In addition to progressively insufficient oxygen at higher altitudes, anything interfering with the blood's ability to carry oxygen can contribute to hypoxia (anemias, carbon monoxide, and certain drugs). Also, alcohol and various drugs decrease the brain's tolerance to hypoxia.

Your body has no built-in alarm system to let you know when you are not getting enough oxygen. It is impossible to predict when or where hypoxia will occur during a given flight, or how it will manifest itself. Some of the common symptoms of hypoxia are increased breathing rate, a light-headed or dizzy sensation, tingling or warm sensation, sweating, reduced visual field, sleepiness, blue coloring of skin, fingernails, and lips, and behavior changes. A particularly dangerous feature of hypoxia is an increased sense of well-being, called euphoria. It obscures a person's ability and desire to be critical of himself, slows reaction time, and impairs thinking ability. Consequently, an hypoxic individual commonly believes things are getting progressively better while he nears total collapse.

The symptoms are slow but progressive, insidious in onset, and are most marked at altitudes starting above ten thousand feet. Night vision, however, can be impaired starting at an altitude of 5,000 feet. Persons who have recently overindulged in alcohol, who are moderate to heavy smokers, or who take certain drugs, may be more susceptible to hypoxia. Susceptibility may also vary in the same individual from day to day or even morning to evening. Use oxygen on flights above 10,000 feet and at any time when symptoms appear.

Depending upon altitude, an hypoxic individual has a limited time to make decisions and perform useful acts, even though he may remain conscious for a longer period. If pressurization equipment fails at certain altitudes the pilot and passengers have only a certain amount of time to get an oxygen mask on before they exceed their time of useful consciousness. The time of useful consciousness is approximately 3-5 minutes at 25,000 feet of altitude in the average individual and diminishes markedly as altitude increases. At 30,000 feet altitude, for example, the time of useful consciousness is approximately 1 to 2 minutes. Therefore, in the event of depressurization, oxygen masks should be obtained and used immediately.

Should symptoms occur that cannot definitely be identified as either hypoxia or hyperventilation, try three or four deep breaths of oxygen. The symptoms should improve markedly if the condition was hypoxia (recovery from hypoxia is rapid).

HYPERVENTILATION

Hyperventilation, or overbreathing, is a disturbance of respiration that may occur in individuals as a result of emotional tension or anxiety. Under conditions of emotional stress, fright, or pain, breathing rate may increase, causing increased lung ventilation, although the carbon dioxide output of the body cells does not increase. As a result, carbon dioxide is "washed out" of the blood. The most common symptoms of hyperventilation are: dizziness; hot and cold sensations; tingling of the hands, legs and feet; tetany; nausea; sleepiness; and finally, unconsciousness. If the symptoms persist, discontinue use of oxygen and consciously slow your breathing rate until symptoms clear, and then resume normal breathing rate. Normal breathing can be aided by talking aloud.

ALCOHOL

Common sense and scientific evidence dictate that you must not fly as a crew member while under the influence of alcohol. Alcohol, even in small amounts, produces, among other things, a dulling of critical judgment; a decreased sense of responsibility; diminished skill reactions and coordination; decreased speed and strength of muscular reflexes (even after one ounce of alcohol); decreases in efficiency of eye movements during reading (after one ounce of alcohol); increased frequency of errors (after one ounce of alcohol); constriction of visual fields; decreased ability to see under dim illuminations; loss of efficiency of sense of touch; decrease of memory and reasoning ability; increased susceptibility to fatigue and decreased attention span; decreased relevance of response; increased self confidence with decreased insight into immediate capabilities.

Tests have shown that pilots commit major errors of judgment and procedure at blood alcohol levels substantially less than the minimum legal levels of intoxication for most states. These tests further show a continuation of impairment from alcohol up to as many as 14 hours after consumption, with no appreciable diminution of impairment. The body metabolizes ingested alcohol at a rate of about one-third of an ounce per hour. Even after the body completely destroys a moderate amount of alcohol, a pilot can still be severely impaired for many hours by hangover.

The effects of alcohol on the body are magnified at altitudes, as 2 oz. of alcohol at 18,000 feet produce the same adverse effects as 6 oz. at sea level. In other words, "the higher you get, the higher you get".

Because of the slow destruction of alcohol by the body, a pilot may still be under influence eight hours after drinking a moderate amount of alcohol. Therefore, an excellent rule is to allow at least 12 to 24 hours between "bottle and throttle", depending on the amount of alcoholic beverage consumed.

DRUGS

Self-medication or taking medicine in any form when you are flying can be extremely hazardous. Even simple home or over-the-counter remedies and drugs such as aspirin, antihistamines, cold tablets, cough mixtures, laxatives, tranquilizers, and appetite suppressors, may seriously impair the judgment and coordination needed while flying. The safest rule is to take no medicine before or while flying, except after consultation with your Aviation Medical Examiner.

SCUBA DIVING

Flying shortly after any prolonged scuba diving could be dangerous. Under the increased pressure of the water, excess nitrogen is absorbed into your system. If sufficient time has not elapsed prior to takeoff for your system to rid itself of this excess gas, you may experience the bends at altitudes even under 10,000 feet, where most light planes fly.

CARBON MONOXIDE AND NIGHT VISION

The presence of carbon monoxide results in hypoxia which will affect night vision in the same manner and extent as hypoxia from high altitudes. Even small levels of carbon monoxide have the same effect as an altitude increase of 8,000 to 10,000 feet. Smoking several cigarettes can result in a carbon monoxide saturation sufficient to effect visual sensitivity equal to an increase of 8,000 feet altitude.

ADDITIONAL INFORMATION

In addition to the coverage of subjects in this section, the National Transportation Safety Board and the Federal Aviation Administration periodically issue, in greater detail, general aviation pamphlets concerning aviation safety. FAA Regional Offices also publish material under the FAA General Aviation Accident Prevention Program. These can be obtained at FAA Offices, Weather Stations, Flight Service Stations or Airport Facilities, and are very good sources of information and are highly recommended for study. Some of these are titled:

Airman's Information Manual
12 Golden Rules for Pilots
Weather or Not
Disorientation
Plane Sense
Weather Info Guide for Pilots
Wake Turbulence
Don't Trust to Luck, Trust to Safety
Rain, Fog, Snow
Thunderstorm - TRW
Icing
Pilot's Weather Briefing Guide
Thunderstorms Don't Flirt . . . Skirt 'em
IFR-VFR - Either Way Disorientation Can be Fatal
IFR Pilot Exam-O-Grams
VFR Pilot Exam-O-Grams
Flying Light Twins Safely
Tips on Engine Operation in Small General Aviation Aircraft
Estimating Inflight Visibility
Is the Aircraft Ready for Flight
Tips on Mountain Flying
Tips on Desert Flying
Always Leave Yourself An Out
Safety Guide for Private Aircraft Owners
Tips on How to Use the Flight Planner
Tips on the Use of Ailerons and Rudder
Some Hard Facts About Soft Landings
Propeller Operation and Care
Torque "What it Means to the Pilot"
Weight and Balance, An Important Safety Consideration for Pilots

SPECIAL CONDITIONS

MAINTENANCE

Airplanes operated for Air Taxi or other than normal operation, and airplanes operated in humid tropics, or cold and damp climates, etc., may need more frequent inspections for wear, corrosion and/or lack of lubrication. In these areas, periodic inspections should be performed until the operator can set his own inspection periods based on experience.

NOTE

The required periods do not constitute a guarantee that the item will reach the period without malfunction, as the aforementioned factors cannot be controlled by the manufacturer.

Corrosion, and its effects, must be treated at the earliest possible opportunity. A clean, dry surface is virtually immune to corrosion. Make sure that all drain holes remain unobstructed. Protective films and sealants help to keep corrosive agents from contacting metallic surfaces. Corrosion inspections should be made most frequently under high-corrosion-risk operating conditions, such as in areas of excessive airborne salt concentrations (e.g., near the sea) and in high-humidity areas (e.g., tropical regions).