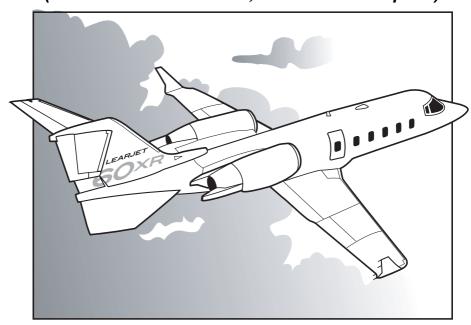
FAA APPROVED

AIRPLANE FLIGHT MANUAL

LEARJET 60XR

(Model 60 Aircraft 60-307, 60-319 & Subsequent)



This airplane must be operated in compliance with the prescribed limitations in Section I of this manual.

	Serial Number	
	N	
FAA APPROVED	for, MARGARET KLINE, MANAGER AIRCRAFT CERTIFICATION OFFICE EFDER AL AVIATION ADMINISTRATION	<u>/0</u> 7

WICHITA, KANSAS



Approval Statements

European Aviation Safety Agency (EASA)

This flight manual is approved by the FAA on behalf of EASA, using the bi-lateral arrangements between the U.S. and EU member states. This flight manual was prepared in accordance with European requirements.

IMPORTANT

TO THE OWNER OF THIS AIRPLANE

To ensure that you receive all applicable changes to this manual, please fill in the blanks below and mail to the address at the bottom of the page.

There is no charge for the one Flight Manual assigned to the aircraft and you will receive all changes to the assigned manual at no charge. There is, however, a yearly subscription charge for all Flight Manuals not assigned to the aircraft.

AIRCRAFT SERIAL NUMBER			
MAILING ADDRESS FOR CHANGES:			

MAIL THIS SHEET TO:

Learjet Inc. P.O. Box 7707 Wichita, Kansas 67277-7707

Attn: Technical Data Control Center (Mail Stop 71)

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AIRCRAFT CONFIGURATION

This list is intended to assist the flight crew in determining whether configuration changes have been made which affect the use of AFM procedures. Only those configurations which are referenced in the AFM need be listed here. It is the responsibility of the aircraft owner and operator to maintain this list. Insert this list behind the AFM title page.

DATE	CONFIGURATION OF:
	Auxiliary Power Unit (option) =
	Emergency Batteries = - BAT 1 and BAT 2 (standard) - BAT 3 (option)
	Datalink (option) =
	Supplemental Wx (options) = - XM Weather (satelite based) - Universal Weather (VHF datalink based) - Stormscope
	Terrain Awareness Warning System (see following pages)
	Runway Awareness Advisory System (option) = (see following pages)
	Flight Data Recorder (option) =
	Crew Oxygen Masks Installed =
	OTHER ITEMS:

Continued

TAWS CONFIGURATION

This list is intended to inform the flight crew as to which optional configurations of the TAWS have been incorporated in the listed aircraft.

Aircraft Serial Number	Option Inc	corporated
Option	Yes	No
"TWENTY - FIVE HUNDRED" Aural message		
"ONE THOUSAND" Aural message		
"FIVE HUNDRED" (smart) Aural message		
"FIVE HUNDRED" Aural message		
"FOUR HUNDRED" Aural message		
"THREE HUNDRED" Aural message		
"TWO HUNDRED" Aural message		
"ONE HUNDRED" Aural message		
"FIFTY" Aural message		
"FORTY" Aural message		
"THIRTY" Aural message		
"TWENTY" Aural message		
"TEN" Aural message		
"FIVE" Aural message		
"MINIMUMS - MINIMUMS" Aural message		
"BANK ANGLE, BANK ANGLE" Aural message		
"MINIMUMS" Aural message		
"APPROACHING MINIMUMS" Aural message		
"RADIO ALTIMETER" Aural message		
PEAKS		
"CAUTION WINDSHEAR" Aural message		
"WHOOP, WHOOP - PULL-UP" Aural message		

Aircraft Serial Number	Option Incorporated	
Option	Yes	No
"CAUTION TERRAIN, CAUTION TERRAIN" Aural message		
"TERRAIN, TERRAIN - PULL-UP" Aural message		
"TERRAIN AHEAD, TERRAIN AHEAD" Aural message		
"TERRAIN AHEAD - PULL-UP" Aural message		
"CAUTION OBSTACLE, CAUTION OBSTACLE" Aural message		
"OBSTACLE, OBSTACLE - PULL-UP" Aural message		
"OBSTACLE AHEAD, OBSTACLE AHEAD" Aural message		
"OBSTACLE AHEAD - PULL-UP" Aural message		
Runway Awareness Advisory System (RAAS)		
Taxiway Takeoff		
Runway End Advisory		
Distance Unit of Measure	Feet	Meters
Voice Gender	Male	Female
Insufficient Runway Length (takeoff)	Off	. 1
¹ Enter nominal required takeoff distance.	On (Always)1
Extended Holding on Runway	Off	.0
² Enter holding time (seconds) that will trigger the	On ()² ()³
advisory. Enter either OFF or the additional time after which the advisory repeats.	Ποροαίο	()
Approaching Runway (landing)	Off	
This value represents the height (above field elevation) at which this advisory is inhibited so as not to interfere with the 500-foot altitude callout.	On (450-	-550) *
Approaching Short Runway (landing)	Off	-
⁵ Enter nominal required landing distance.	On (Always) ⁵
Distance Remaining (rejected takeoff)	Off	۱,6
Enter the distance remaining value at which this advisory is initiated.	☐0n (☐50% of r	/
Distance Remaining (landing)	Off On (١7
⁷ Enter the distance remaining value at which this advisory is initiated.	☐0n (/



LOG OF TEMPORARY FLIGHT MANUAL CHANGES

This list is intended to assist the flight crew in determining the applicable AFM temporary flight manual changes for Model 60XR aircraft. It is the responsibility of the aircraft owner and operator to maintain their basic AFM with the temporary changes applicable to their aircraft. Insert this list after the AIRCRAFT CONFIGURATION page.

TFM #	Section		
Dated	or Page	Description	Status
2007-08 10-3-2007	3-32	Revises STALL WARNING ACTIVATES procedure.	Removed by Chg 3.



LIST OF EFFECTIVE PAGES

Use this List of Effective Pages to determine the current status of the Airplane Flight Manual. Pages affected by the current change are indicated by an asterisk (*) immediately preceding the page number.

Dates of issue for Original and Changed pages are:

Original O 11 Jan 2007	Change 2 13 Sep 2007
Reissue A21 Jun 2007	Change 320 Dec 2007
Change116 Jul 2007	



change supersedes and incorporates TFM 2007-08. Remove superseded temporary change from the AFM.

The pages in this manual and this list show the aircraft applicability of the pages. Only the pages applicable to the aircraft assigned to this Flight Manual must be retained. Pages not applicable to the aircraft may be removed from the Flight Manual.

Page Title I*A and B	2	Aircraft Affected All All All
*C (Added) i thru viii		All All
Limitations		
I-1 I-2		All All
I-3 1-1 thru 1-8	A	All All
1-9 1-10 thru 1-14 1-15 and 1-16	A	All All All
1-17 thru 1-19* 1-20	A	All All
1-21 and 1-22 1-23 thru 1-35	1	All All

Approved /

Date 10/20/07

for MARGARET KLINE, MANAGER AIRCRAFT CERTIFICATION OFFICE FEDERAL AVIATION ADMINISTRATION WICHITA, KANSAS



LIST OF EFFECTIVE PAGES (Cont)

LIST OF EFFECTI		` ,
Page	Change	Aircraft Affected
Normal Procedures		
II-1 thru II-3	Α	All
II-4		All
II-5		All
2-1 thru 2-8		All
2-9	1	All
2-10 thru 2-17	A	All
2-18 and 2-19	1	All
2-20 thru 2-38		All
*2-39		All
2-40 thru 2-75		All
2-76 thru 2-78		All
2-79		All
2-80		All
*2-81 and 2-82		All
2-83 thru 2-115	A	All
Emergency Procedures		
III-1 and III-2	A	All
3-1 and 3-2	A	All
3-3	1	All
3-4 and 3-5	A	All
3-6	1	All
3-7 thru 3-18	A	All
3-19 thru 3-21	1	All
3-22 thru 3-31	A	All
*3-32	3	All
3-33		All
3-34		All
3-35 and 3-36		All
*3-37 and 3-38	3	All
Abnormal Procedures		
IV-1	1	All
IV-2	A	All
IV-3 thru IV-5	1	All
4-1 thru 4-17	A	All
4-18	1	All
4-18A		All
4-19 and 4-20		All
*4-21		All
4-22 thru 4-35		All
*4-36		All
4-37 thru 4-49		All
4-50	1	All



LIST OF EFFECTIVE PAGES (Cont) -

Page	Change	Aircraft Affected
4-51 thru 4-54	A	All
4-55	1	All
4-56 thru 4-66	A	All
*4-67	3	All
4-68 thru 4-78	A	All
4-79 thru 4-82	1	All
4-83 thru 4-86	A	All
Performance Data		
V-1 thru V-4	A	All
5-1 thru 5-104	A	All
Weight and Balance Data		
VI-1	A	All
6-1 thru 6-15	A	All



INTRODUCTION

THIS AIRPLANE FLIGHT MANUAL MUST BE CARRIED IN THE AIRCRAFT AT ALL TIMES.

NOTICE T

This Airplane Flight Manual has been prepared by Learjet, Inc. Its entire contents are the result of design, engineering, testing, and manufacturing efforts proprietary to Learjet, Inc. It is to be used solely in connection with the operation and care of Learjet aircraft and is to be transferred only with the aircraft. It is not to be duplicated or its contents used for any purpose beyond the operation and care of the aircraft without the prior written consent of Learjet, Inc.

THE MANUAL

The manual consists of this introduction and the following basic sections:

Section I — LIMITATIONS containing FAA approved operating limitations which must be observed, except where a deviation is specifically authorized, during operation of the aircraft.

Section II — NORMAL PROCEDURES containing FAA approved operating procedures for the aircraft and its systems which may be considered routine in day-to-day operations.

Section III — EMERGENCY PROCEDURES containing FAA approved operating procedures requiring the use of special systems and/or regular systems in order to protect the occupants and the aircraft from harm during a critical condition requiring immediate response. Steps of procedures emphasized by enclosure in a box such as this and boldfaced should be accomplished without the aid of the checklist (memorized). Data that is enclosed in a box but **not** boldface need not be memorized.

Section IV — ABNORMAL PROCEDURES containing FAA approved operating procedures requiring the use of special systems and/or alternate use of regular systems which, if followed, will maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure condition.

Section V — PERFORMANCE containing FAA approved data defining the aircraft performance under standard performance conditions. Refer to FLIGHT MANUAL PERFORMANCE DATA in this Introduction.

Section VI — WEIGHT AND BALANCE DATA containing FAA approved data intended to assist the operator in ensuring that the aircraft is properly loaded.

Section VII — SUPPLEMENTS & APPENDICES containing Approved Airplane Flight Manual Supplements and Appendices. Supplements contain operating limitations, procedures, and performance data and other necessary data for aircraft conducting special operations and/or equipped with specific equipment requiring the supplement. Appendices contain ancillary information which may or may not be required for the operation of the aircraft.

Section VIII — WET/CONTAMINATED RUNWAY DATA contains guidance material intended to assist the operator in operating on a wet or contaminated runway.

Section IX — ADDENDA contains servicing and operational data intended to assist the operator in routine service and operation.

Section I through Section VI is composed of material approved by the Federal Aviation Administration and together with the FAA Approved Airplane Flight Manual Supplements and Appendices in Section VII constitute the FAA Approved Airplane Flight Manual. Sections VIII (Wet/Contaminated Runway Data) and IX (Addenda) are not FAA approved material but are included in this manual for the operator's convenience.



- A weight and balance data package, which is not FAA Approved, is provided by the manufacturer at time of initial aircraft delivery. This package provides data specific to one aircraft and although not FAA Approved, may be kept with this manual for operator's convenience.
- Section IX (Addenda) contains addenda, each of which covers a separate subject.

REVISING THE MANUAL

The data presented in this manual is the result of extensive flight tests and has been approved by the Federal Aviation Administration. However, development does not stop with the issuance of this manual and as new procedures are developed they will be forwarded to the holder of this manual. Revised material will be in the form of Temporary Flight Manual Changes or Numbered Changes. It is the responsibility of the operator to ensure that the Flight Manual is current at all times. Therefore, it is very important that changes (temporary or numbered) be incorporated in the manual as soon as they are received.



TEMPORARY FLIGHT MANUAL CHANGES

Temporary Flight Manual Changes may be issued against the Flight Manual when required. These changes generally contain material that is not so extensive as to require a Numbered Change and allow Learjet, Inc. to transmit revised data to the operator faster than with the Numbered Change system. Temporary Flight Manual Changes are printed on yellow paper and include all necessary information (Publication Affected, Description of Change, and Filing Instructions) on the change itself. Temporary Flight Manual Changes are to be retained in the Flight Manual until removed by some other authority — usually a superseding Temporary Change or a Numbered Change.

NUMBERED CHANGES

Numbered Changes issued against the Flight Manual differ from Temporary Flight Manual Changes in that the pages contained in the Numbered Change supersede like pages in the Flight Manual. Each page in a Numbered Change has a "Change" number located at the lower corner of the page immediately below the FAA APPROVED date. Portions of the text affected by the change are indicated by a vertical bar at the outer margin of the page. The vertical bars may not appear on pages that contain changes to graphs or tables. Additionally, when a "changed" page is the result of a rearrangement of material due to a change on a previous page no vertical bar will appear.

The List of Effective Pages provides the user with a guide to establish the current effective date of each page in the Flight Manual and an instruction sheet for incorporating the latest Numbered Change into the Flight Manual. Information included in the List of Effective Pages states the current Change Number and Aircraft Affected for each page, the dates of Original Issue and Numbered Changes, and the Temporary Flight Manual Changes the current Numbered Change supersedes. An asterisk (*) next to a page number indicates pages changed, added, or deleted by the current change.



Numbered Changes do not automatically supersede all outstanding Temporary Flight Manual Changes. Follow instructions given in "Note" on List of Effective Pages to determine which Temporary Flight Manual Changes to remove when incorporating a Numbered Change.



FLIGHT MANUAL PERFORMANCE DATA

The performance data in Section V of this manual provides performance data for all aircraft with the same model designation rather than performance data for a specific serial number aircraft. Therefore, due to serial number changes or the incorporation of Service Bulletins, performance charts may be issued against this Flight Manual which are not applicable to the specific aircraft assigned to the Flight Manual. Charts not effective for a particular aircraft may be removed from the Flight Manual for that aircraft and need not be retained. The airplane effectivity of each chart is listed on the page containing the chart and in the List of Effective Pages.



To assure that all charts required for your particular aircraft are retained, use special care and cross-check aircraft effectivities when removing charts or incorporating numbered changes.

NOTES, CAUTIONS, AND WARNINGS

Notes, Cautions, and Warnings are used throughout this manual to focus attention on special conditions or procedures as follows:



Notes are used to highlight specific operating conditions or steps of a procedure.



Cautions are used to call attention to operating procedures which, if not strictly observed, may result in damage to equipment.



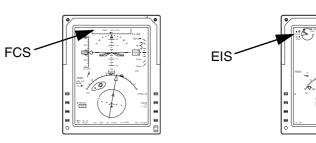
Warnings are used to call attention to operating procedures which, if not strictly adhered to, may result in personal injury or loss of life.

MANUAL CONVENTIONS

PFD and MFD Annunciations

The Primary Flight Displays (PFD) and MultiFunction Displays (MFD) are used extensively to present various data to the crew. This manual will refer to the location of these data using the terms PFD, MFD, FCS and EIS. The Flight Control System (FCS) display resides atop the attitude ball on each PFD. The Engine Indicating System (EIS) is usually displayed at the top of each MFD; however, the PFDs are capable of displaying the EIS also. There are three separate pages of data (Engine, Flight and Electrical). When a procedure requires the pilots to refer to any of these data, the applicable EIS page will be specified. See the following table for sample text as used in this manual:

Sample Text	Definition	
EIS Engine Page — Select. EIS Flight Page — Select. EIS Electrical Page — Select.	If the particular EIS page is not visible, the pilot will select the page using controls for the desired PFD or MFD.	
EIS Electrical Page (VDC and AMPS) — Check.	Pilot will check the DC voltage and generator current load via the EIS electrical page.	
Check three (3) green DN symbols display on the EIS (Flight Page).	Pilot will check the EIS flight page for landing gear position indications.	
Green REV indications shall display on the EIS.	Il Describes the color and actual nomen- clature of the annunciation found on the EIS. In this sample, "REV" will appear within the N1/ITT indication.	
Autopilot/flight director mode engagement and arming is also annunciated on the PFD (FCS display).	Describes the area of the PFD in which the prescribed annunciations will appear. In this case, the Flight Control System display atop the attitude ball.	



Primary and MultiFunction Displays



SWITCH INDICATIONS

Toggle Switches — Positions are depicted by either referencing the actual labeling (indicated by the use of all capital letters [e.g., OFF]) or generic condition (e.g., Off and On). See samples below.

Pushbutton Switches (with annunciated status) — Normal switch condition will be assumed not illuminated. Switch legends will be presented in all capital letters (e.g., CABIN PWR Switch). Annunciated switch status will be also be noted in all capital letters (e.g., CABIN PWR Switch — OFF). Switch conditions that are not illuminated will be lead capped (e.g., CABIN PWR Switch — On). See the following table for sample text as used in this manual:

Sample Text	Definition
IGNITION Switch — OFF.	The pilot will place the toggle switch labeled IGNITION in the labeled OFF position.
IGNITION Switch — On.	The pilot will place the toggle switch labeled IGNITION in the on position. However, there is no labeled "ON" position.
CABIN PWR Switch — OFF.	The pilot will place the pushbutton switch labeled CABIN PWR in the off condition. An integral annunciator will illuminate "OFF".
CABIN PWR Switch — On.	The pilot will place the pushbutton switch labeled CABIN PWR in the on condition. The absence of a switch annunciation indicates "on" is the normal condition for this system.

VOICE ANNUNCIATIONS

Voice annunciations will be presented by all capital letters and within quotes. Voice annunciations are characterized as either warnings or alerts. See the following table for sample voice annunciations as used in this manual:

Sample Voice	Definition
"GLIDESLOPE" voice alert and an amber	A "GLIDESLOPE" voice alert will sound.
"PULL-UP" voice warning and a red	A "PULL-UP" voice warning will sound.



SYMBOLS AND "IF" STATEMENTS

Certain procedures are dependent on prescribed conditions. These conditions are presented as "If" statements.

"If" statements preceded by a symbol (e.g., \bullet , \blacksquare or \blacktriangle) indicate more than one condition for that step. Alternate conditions for that step will be indicated by repeating that step and symbol.

Steps beginning with an "If" statement not preceded by a special symbol are accomplished only if the statement is true. There is no alternate condition(s) to be addressed at this level of the procedure. These statements are often italicized or boldfaced to distinguish them from the required action. If the statement is false, proceed to the next step in the sequence.

The following example shows two options for step 1. and two options for substep c. Procedures completed at any substep level will be noted. (e.g., This checklist is complete.) Procedures not completed at a substep level will direct the user to the next applicable step (e.g., Go to step 2.) The last procedure of any substep will either state "This checklist is complete." or "Go to step #.", or refer the user to another appropriate procedure.

Sample Text

1. ● If source is known:

- Protective Breathing Equipment One crew member, don.
- Extinguish fire using hand-held extinguisher or eliminate b. the source of smoke or fum
- c. ■If fire is not extinguishe

(1) Land as soon as possible. (2) This checklist is complete. c. ■If fire is extinguished and can be visibly verified:

- (1) Land as som as practical. At the crew's discretion, the pressurization and oxygen systems may be returned to normal.
- (2) If smoke or fumes continue, One or Both BLEED AIR Switches — EMER until smoke or fumes are eliminated. Advancing thrust levers will increase airflow.
- (3) This checklist is complete.
- 1. If source is not known, go to step 2.
- 2.



CIRCUIT BREAKERS

Many procedures involve manipulating circuit breakers. The following criteria should be followed during "Circuit Breaker" steps.

- Circuit breakers that are "Set" should be checked for that normal condition. If the circuit breaker is not "Set", it may be reset only once. If the circuit breaker opens again, do not reset.
- Circuit breakers that "Pull" should only be pulled and not reset.
- Circuit breakers that "Pull and Reset" should be pulled, delay for several seconds, and reset only once.

Allow sufficient cooling time for circuit breakers that are "Reset" or cycled through a "Pull and Reset".

OTHER PUBLICATIONS

The following is a list of Learjet publications referenced in this Airplane Flight Manual. Such references in this manual are made by number and do not contain any revision indication. However, such references are to be understood as "the latest revision".

SERVICE BULLETINS (SB)

The following service bulletins are referenced within this flight manual:

None.



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GENERAL

CERTIFICATION STATUS

This airplane is certified in accordance with 14 CFR Part 25.

TYPE OF OPERATION

This airplane is approved for:

- VFR (Visual)
- IFR (Instrument)
- Day
- Night
- Icing

Icing conditions exist when outside air temperature (OAT) on the ground and for takeoff is 10° C (50° F) or below, or the static air temperature (SAT) in flight is 10° C (50° F) to -40° C (-40° F), and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, or ice crystals).

Icing conditions also exist when the OAT on the ground and for takeoff is 10°C (50°F) or below when operating on ramps, taxiways, or runways where surface snow, ice, standing water, or slush may be ingested by the engines, or freeze on engines, nacelles, or engine sensor probes.

When icing or frost conditions exist, this airplane must be inspected and operated in accordance with the **Cold Weather Operation** procedures of Section II. These procedures include the requirement to assure that all critical surfaces of the airplane (wing, vertical and horizontal stabilizers, flight control surfaces, spoilers and flaps) are free of frost, ice and snow for takeoff. Conducting only a visual inspection may not detect very small levels of contamination; therefore, a tactile (hand on surface) check of the wing leading edge and adjacent wing upper surface is required when the ambient temperature is less than 10°C (50°F).

This airplane is not approved for ditching under 14 CFR 25.801.

PERFORMANCE CONFIGURATION

The airplane configuration must be as presented under **STANDARD PERFORMANCE CONDITIONS** in Section V.

MINIMUM FLIGHT CREW

The minimum flight crew shall consist of pilot and copilot.

WEIGHT AND C.G. LIMITS



Ramp Weight shall not exceed Maximum Allowable Takeoff Weight by more than 250 lb (113 kg).

MAXIMUM CERTIFIED TAKEOFF WEIGHT......23,500 Pounds 10,660 kg

MAXIMUM ZERO FUEL WEIGHT 17,000 Pounds 7,711 kg



All weights in excess of Maximum Zero Fuel Weight must consist of fuel.

MAXIMUM ALLOWABLE TAKEOFF WEIGHT

The takeoff weight is limited by the most restrictive of the following requirements:

- Maximum Certified Takeoff Weight.
- The Maximum Takeoff Weight with anti-skid OFF or anti-skid protection for any wheel inoperative is 18,500 pounds (8,391 kg).
- Maximum Takeoff Weight (Climb or Brake Energy Limited) for altitude and temperature as determined from the applicable figure entitled **TAKEOFF WEIGHT LIMIT** in Section V.
- Maximum Takeoff Weight for the runway and ambient conditions as determined from the applicable figure entitled **TAKEOFF FIELD LENGTH** in Section V.

MAXIMUM CERTIFIED LANDING WEIGHT 19,500 Pounds 8,845 kg



WEIGHT AND C.G. LIMITS (Cont)

MAXIMUM ALLOWABLE LANDING WEIGHT

The landing weight is limited by the most restrictive of the following requirements:

- Maximum Certified Landing Weight.



Perform Hard or Overweight Landing Inspection (Chapter 5, Learjet 60 Maintenance Manual) if Maximum Certified Landing Weight is exceeded.

- Maximum Landing Weight for the runway and ambient conditions as determined from the ACTUAL LANDING DISTANCE chart in Section V.
- Maximum Landing Weight (Approach Climb or Brake Energy Limited) for altitude and temperature as determined from the applicable figure entitled **LANDING WEIGHT LIMIT** in Section V.



Perform High Energy Stop Inspection (Chapter 5, Learjet 60 Maintenance Manual) if the maximum brake energy weight for landing is exceeded during a landing or rejected takeoff using maximum braking effort.

CENTER-OF-GRAVITY

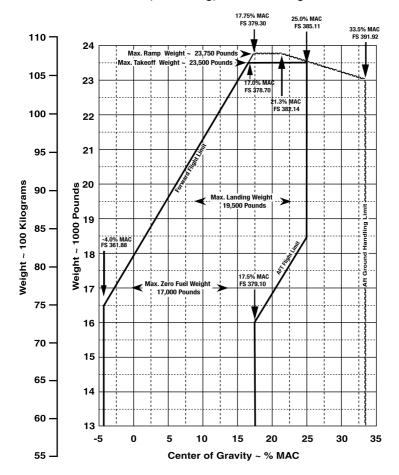
The center-of-gravity of the airplane for all flight and ground conditions must be maintained within the applicable CENTER-OF-GRAVITY ENVELOPE defined in Figure 1-1, this section.



Loading the aircraft to a center-of-gravity aft of the ground handling limit may cause the aircraft to tip over.

CENTER-OF-GRAVITY ENVELOPE

23,500 LB (10,660 Kg) Takeoff Weight



Forward Flight Limit — F.S. 361.88 (-4.0% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.70 (17.0% MAC) at 23,500 pounds (10,660 kg).

Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 23,500 pounds (10,660 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 23,500 pounds (10,660 kg) and tapers to F.S. 379.30 (17.75% MAC) at 23,750 pounds (10,773 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 382.14 (21.3% MAC) at 23,750 pounds (10,773 kg).

Figure 1-1



AIRSPEED/MACH LIMITS PRIMARY PITOT-STATIC SYSTEM

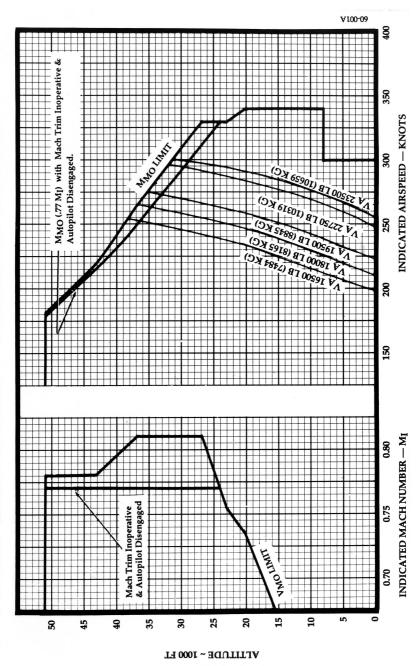


Figure 1-2



AIRSPEED/MACH LIMITS



All Airspeed/Mach Limits are expressed in terms of indicated values unless otherwise stated. Instrument error is assumed to be zero.

MAXIMUM OPERATING SPEED Vmo/Mmo



Do not extend spoilers, or operate with spoilers deployed, at speeds above VMO/MMO due to significant nose-down pitching moment associated with spoiler deployment.

VMO/MMO shall not be deliberately exceeded in any regime of flight (climb, cruise or descent) unless a higher speed is authorized for flight test.

Primary Instruments

_	-		
١	/ N	11	\cap

	,	
VMO		
-	Up to 8,000 feet	
-	8,000 to 20,000 feet	340 KIAS
-	20,000 to 23,000 feet	330 KIAS
-	23,000 to 26,750 feet	330 KIAS
Ммо		
-	26,750 to 37,000 feet	0.81 MI
-	37,000 to 43,000 feet 0.81 t	o 0.78 MI
-	43,000 feet and above	0.78 MI
-	With Mach Trim inoperative and Autopilot	
	disengaged	0.77 MI
Stand	dby Instruments	
VMO		
-	Up to 8,000 feet	298 KIAS
-	8000 to 20,000 feet	
-	20,000 to 23,000 feet	
-	23,000 to 26,750 feet	
Ммо)	

N

-	26,750 to 37,000 feet	0.81 MI
-	37,000 to 43,000 feet	0.81 to 0.78 MI
-	43,000 feet and above	0.78 MI
	With Mach Trim inoperative and Autopilot	
	disengaged	0.77 MI



AIRSPEED/MACH LIMITS (Cont)



The MMO limits expressed above are based upon compressibility effects. Refer to **Overspeed Recovery** — **Overspeed Horn Sounds** procedure in Section III — EMERGENCY PROCEDURES.

Refer to figure 1-2, entitled **AIRSPEED/MACH LIMITS** — Primary Pitot-Static System, this section.

MANEUVERING SPEED VA



Avoid rapid and large alternating control inputs, especially in combinations with large changes in pitch, roll or yaw, as they may cause structural failure at any speed, including below VA.

Refer to figure 1-2 entitled **AIRSPEED/MACH LIMITS** — Primary Pitot-Static System, this section, for VA. Maneuvers involving full application of rudder and aileron controls, as well as maneuvers that involve angles of attack near stall should be confined to speeds below VA.

MAXIMUM LANDING GEAR OPERATING SPEED VLO

VLO is the maximum speed at which the landing gear can be safely extended or retracted.

MAXIMUM LANDING GEAR EXTENDED SPEED VLE

VLE is the maximum speed at which the aircraft can be safely flown with the landing gear extended.

MAXIMUM FLAP EXTENDED SPEED VFE

VFE is the maximum speed permissible with the wing flaps in a prescribed extended position.

VFE

-	Flaps 8°	250 KIAS
-	Flaps 20°	
_	Flaps 40°	



AIRSPEED/MACH LIMITS (Cont)

MINIMUM CONTROL SPEED AIR VMCA

VMCA is a function of altitude and temperature. During flight tests, the aircraft was controllable down to stall speed. The speed shown is this minimum demonstrated speed corrected for maximum thrust effect with rudder boost on or off. Section V Performance Charts account for the appropriate values.

VMCA

-	Flaps 8°	120 KIAS
-	Flaps 20°	110 KIAS

MINIMUM CONTROL SPEED GROUND VMCG

VMCG is a function of altitude and temperature. The speed shown is a maximum, which occurs at maximum thrust conditions. Section V Performance Charts account for the appropriate values.

VMCG

-	Rudder boost ON	95 KIAS
_	Rudder hoost OFF	116 KIAS

TAKEOFF DECISION SPEED V1

Refer to applicable figure entitled **TAKEOFF SPEEDS** in Section V.

ROTATION SPEED VR

Refer to applicable figure entitled TAKEOFF SPEEDS in Section V.

TAKEOFF SAFETY SPEED V2

Refer to applicable figure entitled TAKEOFF SPEEDS in Section V.



OPERATIONAL LIMITS/REQUIREMENTS

TAKEC)FF
-------	-----

Maximum Pressure Altitud	de13,700 feet
Ambient Temperature	Refer to Figure 1-3
Tailwind Component	10 knots
Runway Conditions	
Takeoff is limited to pa	ved runways.
	accumulation3/4 inch (19 mm)
Engine Sync	OFF
Trim	All axes set for takeoff (refer to Figure 2-2)
Fuel Load	. Wings balanced within 200 pounds (91 kg)

- Trim Systems

- Stall Warning System
- Both ADC Systems
- Autospoilers **0**
- Electronic Standby Instrument Rudder Boost System

The following must be checked and operational:

EN ROUTE

Maximum Pressure Altitu	de51,000 feet
Ambient Temperature	Refer to Figure 1-3
*	Wings balanced within 500 pounds (227 kg)

OPERATION OVER WATER AND REMOTE AREAS

EMER BAT 1 will provide electrical power to the Electronic Standby Instrument System (ESIS) for 4.6 hours.

LANDING

Maximum Pressure Altitude	13,700 feet
Ambient Temperature	Refer to Figure 1-3
Tailwind Component	
Runway Conditions	
Landing is limited to paved runways.	

Runway water/slush a	ccumulation	3/4 inch (19 mm)
Pressurization		Cabin not pressurized
Engine Sync		OFF
Fuel Load	Wings balanced	l within 200 pounds (91 kg)

• Required only if system is to be armed.



OPERATIONAL LIMITS/REQUIREMENTS (Cont)

LIMIT MANEUVERING LOAD FACTORS

-	Flaps Up	+3.0 g to - 1.0 g
_	Flaps Down	+2.0 g to 0.0 g



These acceleration values limit the bank angle in a level coordinated turn to 70° (flaps up) and 60° (flaps down). In addition, pullups and pushovers must be limited to these values.

MANEUVERS

No aerobatic maneuvers, including spins, are approved.

Intentional stalls are prohibited above 18,000 feet with flaps and/or landing gear extended.

TURN-AROUND LIMITS

If the turn-around weight limit for brake energy, as determined from the applicable **LANDING WEIGHT LIMIT** chart in Section V, is exceeded during a landing or a rejected takeoff, the following limitations must be observed:

- The aircraft must be parked for a minimum waiting period of 20 minutes before the next takeoff attempt can be made.
- After the waiting period is observed, a visual inspection of the main-gear tires, wheels, and brakes for condition must be made.

SEAT BELTS AND SHOULDER HARNESSES

Seat belts and shoulder harnesses must be worn during takeoff and landing.



OPERATIONAL LIMITS/REQUIREMENTS (Cont)

AMBIENT TEMPERATURE LIMITS

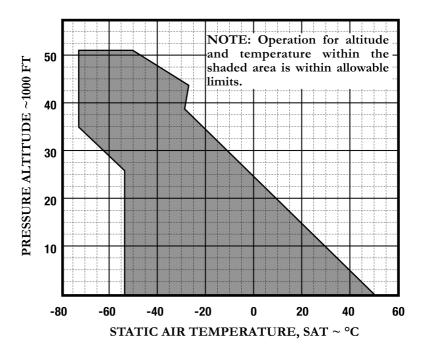


Figure 1-3



ANTI-ICE SYSTEM LIMITS

NACELLE HEAT

Nacelle heat must be On during ground or flight operations when icing conditions may exist. Refer to **TYPE OF OPERATION** limitations, this section.

Nacelle heat must be On during descent into visible moisture even if the SAT is below -40°C (-40°F).



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions (either in flight or prior to taxi.)

Ground Operation:

Do not operate nacelle heat system for more than 5 seconds when the associated engine is not running.

Do not operate nacelle heat system for more than 30 seconds when static air temperature is above 15°C (59°F).

Except for takeoff, do not operate nacelle heat system when engine RPM is greater than 65% N1.

WINDSHIELD ALCOHOL ANTI-ICE

Methyl alcohol (Methanol) per Federal Specification O-M-232, Grade A, is required.

The alcohol reservoir shall be refilled after each use.



AVIONICS SYSTEM LIMITS

AIR DATA SYSTEM

Both air data systems (ADC 1 and 2) must be operative and the onside system selected (i.e., ADC 1 for pilot's side and ADC 2 for copilot's side) for takeoff.

To assure proper air data system operation the **Before Starting Engines** overspeed warning system check must be accomplished in accordance with Section II of this manual.

This aircraft has been shown to meet the airworthiness requirements for operation in Reduced Vertical Separation Minimum (RVSM) airspace between 29,000 and 41,000 feet inclusive when the aircraft is operated at speeds no less than the published holding speed nor greater than MMO. This does not constitute an operational approval.

ATTITUDE HEADING REFERENCE SYSTEM (AHS)

The onside attitude heading system must be selected (i.e., AHS 1 for pilot's side and AHS 2 for copilot's side) and the comparator annunciators must be extinguished for takeoff.

AUTOPILOT/FLIGHT DIRECTOR

The autopilot/flight director system is approved for Category I and Category II ILS approaches.

When using autopilot, the pilot or copilot must be in their respective seat with their seat belt fastened.

Operation of the autopilot with the red TRIM fail light illuminated is prohibited.

Autopilot pitch and roll axes must not be used for takeoff and landing.

Do not intentionally overpower the autopilot.

The minimum altitude for use of the autopilot is:

-	Approach Configuration (Category I)	160 feet AGL
-	Approach Configuration (Category II)	80 feet AGL
-	Approach Configuration (Non-precision)	200 feet AGL
-	En route Configuration	600 feet AGL
-	Minimum Engage Height	600 feet AGL



AVIONICS SYSTEM LIMITS (Cont) AUTOPILOT/FLIGHT DIRECTOR (Cont)

CATEGORY II

The equipment installed meets the performance standards of Attachment 2 of AC 91-16 dated 8/7/1967 for Category II autopilot/flight director approaches. This does not constitute an operational approval.

Category II approaches are limited to full (40°) flaps with both engines operating. Spoilerons must also be operable for Category II operations.

Category II approaches may be flown using either pilot or copilot flight director, or autopilot. Approaches flown with flight director guidance only must utilize the V-bar flight director cue.

A green CAT2 annunciation must be displayed on each PFD when conducting Category II operations.

The maximum demonstrated winds allowed for Category II approaches are:

COCKPIT VOICE RECORDER (CVR)

The CVR meets the requirements of Technical Standard Order TSO-C123a and ED56A. The CVR system must be tested prior to each flight.

DATALINK (If Installed)

The datalink is approved for the transmission and receipt of messages that will not create an unsafe condition if the message is improperly received. An unsafe condition may exist if:

- The message or part of the message is delayed or not received
- The message is delivered to the wrong recipient
- The message content is corrupted

Crew actions based on messages such as pre-departure clearance, oceanic clearance, digital automatic terminal information service, weight and balance, takeoff data (speeds, trim settings, runway distances) are prohibited unless the approved operational procedures are used to verify that the message is received by the intended recipient, that the message is valid, and that the content is not corrupted.

If the datalink system is used for clearances or other flight related information, the crew must either monitor the DATALINK CDU page or periodically check the DATALINK CDU page until the reply is received and accepted (Annunciation of incoming Datalink messages is provided only by the ACTIVE ADVISORY prompt display on DATALINK CDU pages).

ELECTRONIC FLIGHT INSTRUMENT SYSTEM (EFIS)

The *Pro Line 21 Avionics System with IFIS for the Bombardier Learjet 60XR* Operator's Guide (Collins P/N 523-0807941, edition 1, dated April 24, 2006 or later applicable version) must be immediately available to the flight crew.

ELECTRONIC STANDBY INSTRUMENT SYSTEM (ESIS)

The *Pilot's Guide for the Electronic Standby Instrument System Model GH-3100* (L3 Communications P/N TP-560 Rev C, dated June 6, 2004 or later applicable version) must be immediately available to the flight crew.

EMERGENCY LOCATOR TRANSMITTER (ELT)

The ELT meets or exceeds the requirements of Technical Standard Order TSO C91A, TSO C126, TSO C97 and the mandatory automatic ELT requirements of 14 CFR Part 91.

TERRAIN AWARENESS AND WARNING SYSTEM (TAWS)

The Honeywell Mark V Enhanced Ground Proximity Warning System (EGPWS) with application software P/N -226 and configuration software P/N -226 interfaced with the Collins Pro Line 21 Avionics installation is approved.

The Enhanced Ground Proximity Warning System (EGPWS) and Runway Awareness Advisory System (RAAS) Pilot's Guide (Honeywell P/N 060-4241-000, Revision E, dated December 2003 or later applicable version) must be immediately available to the flight crew when operating the TAWS.

Navigation must not be predicated on the use of the Terrain Alerting and Display (TAD). The TAD is intended to serve as a situational awareness tool only, and may not provide the accuracy and/or fidelity on which to solely base terrain and obstacle avoidance maneuvering.

In order to avoid giving unwanted alerts, the TAD must be manually inhibited by selecting the TERR switch to INHIBIT when within 15 nm of takeoff, approach or landing at an airport that is not included in the airport database. The EGPWS has worldwide airport database information on hard surface runways 3500 feet or longer. Refer to Honeywell document 060-4267-000 or the Honeywell website for airports contained in the installed EGPWS terrain database.



AVIONICS SYSTEM LIMITS (Cont) TERRAIN AWARENESS AND WARNING SYSTEM (TAWS) (Cont)



The terrain database, displays, and alerting algorithms currently account for limited, cataloged, human-made obstructions in North America and Europe. If the database does not contain information on a given obstacle, then obstacle alerting is not available for that obstacle.

TAD must be inhibited by selecting the TERR switch to INHIBIT if the GPS fails during QFE operation.

Pilots are authorized to deviate from their current Air Traffic Control (ATC) clearance to the extent necessary to comply with an EGPWS warning.

Precipitous terrain ahead of the aircraft may exceed available climb performance. Issuance of a terrain (or obstacle) alert does not guarantee terrain (or obstacle) clearance with a vertical maneuver alone.

RUNWAY AWARENESS ADVISORY SYSTEM (RAAS) (If Installed)

Navigation must not be based solely on RAAS advisories.

The RAAS does not have knowledge of prevailing Notices to Airmen (NOTAM). Therefore factors such as runway closures, newly constructed runways, changes to runway length, or the rare change of a runway identifier are not reflected by RAAS advisories. Crews must be cognizant of prevailing NOTAM and Automatic Terminal Information Service (ATIS) data.

The RAAS does not have knowledge of locations of painted hold lines at airports. In some cases the RAAS "APPROACHING RUNWAY" Advisory may be issued after an aircraft has crossed a hold line.

The RAAS does not recognize operational runway length restrictions (e.g., landing and hold short operations).



ENHANCED SURVEILLANCE MODE S TRANSPONDER

The Enhanced Surveillance Mode S system satisfies the data requirements of ICAO Doc 7030/4, Regional Supplementary Procedures for SSR Mode S Enhanced Surveillance in designated European airspace. The capability to transmit data parameters is shown below:

PARAMETER	AVAILABLE	NOT AVAILABLE
Magnetic Heading *	X	
Indicated Airspeed ●	X	
Mach Number ●	Х	
Vertical Rate ●	Х	
Roll Angle *	Х	
Track Angle Rate		Х
True Track Angle †	Х	
Groundspeed †	Х	
True Airspeed •	Х	
Selected Altitude ●	Х	
Barometric Pressure Setting •	Х	

^{*} The selected Attitude Heading System (AHS 1 or AHS 2) transmits these parameters to the selected transponder.

[•] The selected Air Data Computer (ADC 1 or ADC 2) transmits these parameters to the selected transponder.

 $[\]dagger$ The selected Flight Management System (FMS 1 or FMS 2) transmits these parameters to the selected transponder.



FLIGHT MANAGEMENT SYSTEM (FMS)

APPROVAL STATUS

The dual Collins FMS-5000 flight management system with program version 832-4118-027 is approved for use in the Learjet 60 and meets the requirements of Technical Standard Order TSO C115b and TSO C129a class B1/C1.

The following airworthiness approvals do not constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

When the FMS is receiving appropriate navigation signals, it meets the accuracy specifications for the following operations:

- 1. Oceanic and Remote In accordance with AC 20-130A and AC 20-138A. Two FMS systems must be operating and receiving usable signals from two operating GPS sensors and used in conjunction with the Collins pre-departure GPS coverage predictor program (P/N 832-3443-008, Rev -, or later revision). For routes approved for single GPS navigation, a single FMS must be operating and receiving usable signals from a single GPS sensor and used in conjunction with the Collins GPS coverage prediction program listed above.
- 2. North Atlantic (NAT) Minimum Navigational Performance Specifications (MNPS) Airspace In accordance with the criteria of AC 91-49 and AC 20-138A. Two FMS systems must be operating and receiving usable signals from two operating GPS sensors and used in conjunction with the Collins pre-departure GPS coverage predictor program (P/N 832-3443-008, Rev -, or later revision).
- 3. **RNP-10 Airspace** In accordance with the criteria of FAA Order 8400.12A without time limitations. Two FMS systems must be operating and receiving usable signals from two operating GPS sensors and used in conjunction with the Collins predeparture GPS coverage predictor program (P/N 832-3443-008, Rev -, or later revision).



FLIGHT MANAGEMENT SYSTEM (FMS) (Cont)

APPROVAL STATUS (Cont)

- 4. **P-RNAV** In accordance with the criteria of JAA TGL-10 and AC 90-96A. The FMS is capable of P-RNAV operations provided the FMS is not in Dead Reckoning (FMS DR not displayed on the PFD, MFD or CDU) and is receiving usable signals from one or more of the following:
 - One GPS sensor
 - Multiple DMEs
 - A single DME if auto-tune is selected

Determine the requirements of the national, area, or local air traffic control agency for determining the availability of GPS RAIM for the intended route of flight prior to departure. Some terminal areas may require dual, operating FMS and GPS equipment.

P-RNAV and B-RNAV operations utilizing GPS as the only navigation sensor require the following pre-flight planning:

- During the pre-flight planning phase, the crew must confirm, for the intended flight (route and time), the availability of Receiver Autonomous Integrity Monitoring (RAIM) with the latest information from the U.S. Coast Guard giving details of satellite non-availability (see http://www.navcen.uscg.gov). The U.S. Notices to Airmen (NOTAM) office also provides satellite non-availability data.
- The confirmation of the availability of RAIM should be obtained from the Collins pre-departure GPS coverage predictor program (P/N 832-3443-008, Rev -, or later revision). Dispatch should not be made in the event of predicted continuous loss of RAIM of more than 5 minutes for any part of the intended flight. The use of the EUROCONTROL AUGUR tool may be used to satisfy this requirement (see http://augur.ecacnav.com).

FLIGHT MANAGEMENT SYSTEM (FMS) (Cont)

APPROVAL STATUS (Cont)

- 5. En Route and Terminal, including B-RNAV/RNP-5 In accordance with AC 90-45A, AC 90-96A, AMC 20-4, and AMC 20-5. The FMS must not be in Dead Reckoning (FMS DR not displayed on the PFD, MFD or CDU). The FMS must be receiving usable signals from one or more of the following:
 - VOR/DME or multiple DMEs.
 - One GPS sensor
 - A single DME if auto-tune is selected
- 6. Non-Precision Approach:
 - **GPS Non-Precision Approach** In accordance with AC 20-130A, AC 20-138A, AC 90-94, and TSO C129a Class B1/C1. The FMS must be receiving usable signals from (at least) one GPS sensor, and the GPS APPR annunciator must be illuminated at the final approach fix.
 - VOR/DME Approach In accordance with TSO C115b.
 The FMS must be receiving the approach reference VOR/
 DME station, and the APPR (if GPS not available) or GPS
 APPR annunciator must be illuminated at the final approach fix.
- 7. **RNAV/SID/STAR** The FMS is capable of operations on U.S. Area Navigation (RNAV) routes, Standard Instrument Departures (SID), and Standard Terminal Arrival Routes (STAR) in accordance with the criteria of FAA AC 90-100A provided:
 - The FMS is not in Dead Reckoning (FMS DR not displayed on the PFD, MFD or CDU).
 - The crew has entered NOTAM'd navaids on the CDU VOR/DME CONTROL page.
 - The VORs have been disabled for use on the VOR/DME CTL page of the FMS.
 - The FMS is receiving usable GPS signals (NO GPS RAIM, GPS NOT AVAILABLE, GPS-FMS DISAGREE not displayed on CDU) for procedures requiring GPS or for operations based on GPS capability.
 - The confirmation of the availability of RAIM should be obtained from the Collins pre-departure GPS coverage predictor program (P/N 832-3443-008, Rev -, or later revision).



FLIGHT MANAGEMENT SYSTEM (FMS) (Cont)

APPROVAL STATUS (Cont)

8. **Barometric VNAV** — In accordance with AC 20-129. The VNAV function is approved for en route, terminal, and approach operations. In accordance with AC 90-97, AC 20-130A and TSO C129a Class B1/C1, the FMS is approved for RNAV instrument approach procedures with published VNAV decision altitude. For a particular approach, GPS must be an active component (NO GPS RAIM, GPS NOT AVAILABLE, GPS-FMS DISAGREE not displayed on CDU) of the aircraft's navigation solution.

GENERAL

- 1. The Collins FMS-5000 Flight Management System for the Learjet 60XR Operator's Guide (Collins P/N 523-0807942, edition 1, dated June 16, 2006 or later applicable version) must be immediately available to the flight crew.
- 2. The PROGRAM number displayed on the STATUS page must be SCID 832-4118-027.
- 3. The PERF DATA BASE number displayed on the STATUS page must be 091-4982-001.
- 4. The VSPD DATA BASE number displayed on the STATUS page must be 815-9771-002.
- 5. IFR en route, terminal, and approach navigation is prohibited unless the pilot verified the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.
- As required by the operating rules applicable to the specific type of operation, the aircraft must have additional navigation equipment appropriate to the intended route, and it must be operational.
- During periods of dead reckoning, as indicated by the FMS DR annunciation, the FMS shall not be used as the primary source of navigation.
- 8. Fuel display parameters are advisory only and do not replace the primary fuel quantity or fuel flow gauges for loading or range/reserve planning.



FLIGHT MANAGEMENT SYSTEM (FMS) (Cont)

GENERAL (Cont)

- 9. FMS navigation is prohibited in airspace not defined below:
 - U.S. National Airspace
 - Airspace bounded by N60° latitude and S60° latitude (any longitude).
 - Airspace bounded by N60° and N70° latitude east of W75° longitude and west of W120° longitude.
 - Airspace bounded by N70° and N80° latitude east of W50° longitude and west of E70° longitude.
 - Airspace bounded by S60° and S70° latitude except for the 45 degrees between E120° and E165° longitude.
- 10. FMS navigation is limited to airspace that is referenced to the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A, AC 91-49 Change 1, and AC 20-138. Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.

VERTICAL NAVIGATION

- 1. When using FMS VNAV, the barometric altimeters must be used as the primary altitude reference for all operations.
- 2. VNAV approach guidance to a Decision Altitude (DA) is not authorized if the reported surface temperature is below the Baro-VNAV minimum temperature limitation specified on the applicable approach procedure chart.
- 3. When conducting instrument approach using LNAV/VNAV DA minimums, the flight director or autopilot must be used and VNAV Glidepath (VGP) mode must be active.
- 4. Use of VNAV while conducting a missed approach procedure is prohibited.



FLIGHT MANAGEMENT SYSTEM (FMS) (Cont)

APPROACH

- 1. FMS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the FMS navigation database. The FMS database must incorporate the current update cycle.
- 2. The FMS with inputs from the GPS may only be used for approach guidance if the reference coordinate data system for the instrument approach is WGS-84 or NAD-83.
- Use of barometric VNAV Decision Altitude (DA) is not authorized with a remote altimeter setting. A current altimeter setting for the landing airport is required. Where remote altimeter minima are shown, the VNAV function may be used only to the published MDA.
- 4. ILS, LOC, LOC-BC, LDA and SDF approaches using the FMS for approach guidance are prohibited.
- 5. When the approach at the destination is based on GPS guidance and an alternate airport is required by the applicable operating rules, it must be served by an approach based on other then GPS navigation, the aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operational.



SUPPLEMENTAL WEATHER DATA SOURCES (EXCLUDING RADAR)

Severe weather avoidance must not be predicated solely upon the use of supplemental weather data sources. This includes, but is not limited to, Stormscope, XM Weather data, and Universal Weather data sources.

Airplane performance, navigation, and operation must not be predicated upon the use of the supplemental weather data sources described in this section.

For more information on supplemental weather data sources and their use, refer to the *Pro Line 21 Avionics System with IFIS for the Bombardier Learjet 60XR* Operator's Guide.

TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS)

Pilots are authorized to deviate from their current ATC clearance to the extent necessary to comply with a TCAS II resolution advisory.

Maneuvers must not be based solely on information presented on the traffic display.

The traffic alert and collision avoidance system must be tested prior to the first flight of each flight day.

If ATC requires that transponder altitude reporting be disabled, the transponder must be set to ALT OFF using the Radio Tuning Unit (RTU) or the tuning functions of the CDU. The white TCAS OFF will be displayed on the PFDs and MFDs indicating that the TCAS is in standby mode.



ENGINE SYSTEM LIMITS

AUTOMATIC PERFORMANCE RESERVE (APR)

Manual selection of APR during a two-engine takeoff is limited to emergency conditions.

ENGINE TYPE

Pratt and Whitney Canada PW305A turbofan engines.

ENGINE COMPUTER

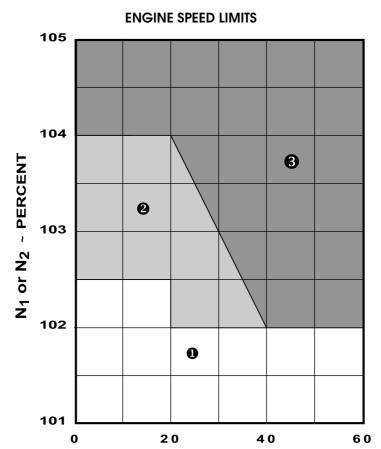
The engines must be operated at all times with the ENG CMPTR switches in the AUTO position, except as specified in EMERGENCY and ABNORMAL PROCEDURES in Section III and Section IV of this manual.



ENGINE OPERATING LIMITS

	erating ndition	Operating Limits				
Thrust Setting	Time Limit Minutes	N1 %	Max ITT °C	N2 %	Oil Press psi 2 9	Oil Temp °C
APR or T/O	5 0	102	785	102	36 to 80	10 to 135
MCT or MCR	Continuous	102	785	102	36 to 80	10 to 135
Reverse Thrust	5	-	785	-	36 to 80	10 to 135
Ground Idle	Continuous	-	N/A	52	20 to 80	10 to 135
Flight Idle	Continuous	-	N/A	65	20 to 80	10 to 135
Starting		-	950 Fig 1-8A	-	20 to 220	-40 (minimum)
Transient	20 sec	104 Fig 1-4	825 Fig 1-5B	104 Fig 1-4	0 to 220	135 to 143
nansient	90 sec	-	-	-	10 to 220	135 to 143

- Time limit commences when the power lever is first advanced to the T/O position.
- ② An oil pressure below 36 psi is undesirable and should be allowed for the completion of the flight, preferably at a reduced power setting to maintain the oil temperature within limits. Steady state operation with less than 20 psi could result in engine damage.
- **1** If engine windmills in flight for more than 15 minutes without a positive oil pressure indication, refer to the engine maintenance manual for required maintenance action.



- No action required.
- **2** Record in engine log.
- **8** Refer to engine maintenance manual.

Figure 1-4

TIME ~ SECONDS

ENGINE TEMPERATURE LIMITS (ITT)

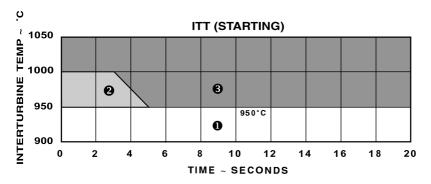


Figure 1-5A

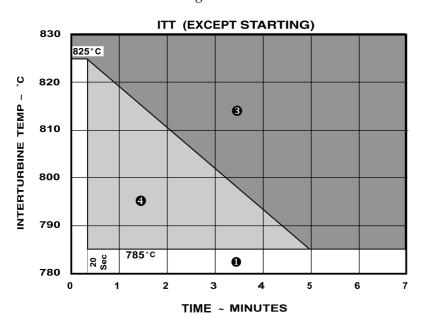


Figure 1-5B

- **1** No action required.
- **9** Determine cause and correct. Perform visual inspection. Record in engine log book.
- **3** Refer to engine maintenance manual.
- Determine cause and correct. Perform hot section inspection. Record in engine log book.



ENGINE SYNCHRONIZER

Engine sync must be OFF for takeoff, landing, and single-engine operation.

EXTERNAL POWER

The maximum amperage from an external power source must be limited to 1500 amps.

GENERATOR LIMITS

Generator output is limited as follows:

Ground Operations

- Continuous 325 amps. The system may limit current output to below this value to prevent overheating. If more electrical load is applied than can be supplied by the generators, the current will be drawn from the aircraft batteries and will not be shown on the DC amps display. If this occurs, DC voltage will be reduced.
- <u>Transient</u> Higher transient loads for cross-starts and battery charging, up to maximum generator output, are authorized.

Flight Operations

- Continuous
 - $^{\circ}$ 400 amps up to 31,000 feet
 - ° 325 amps from 31,000 to 46,000 feet
 - ° 300 amps from 46,000 to 51,000 feet
- <u>Transient</u> Higher transient loads for cross-starts and battery charging, up to maximum generator output, are authorized.

APPROVED OILS

Oils conforming to PWA521 and service bulletin SB24001 are approved. Refer to Addendum II — OIL SERVICING for a listing of approved oils.

STARTER LIMITS

The following cooling periods must be observed between consecutive uses of the starter during ground operations:

After Start Attempt	Wait
1	Three Minutes
2	Fifteen Minutes
3	Thirty Minutes



THRUST REVERSERS

Thrust reverser system use is limited to ground operations on paved surfaces and attempts to deploy shall not be made in flight.

Thrust reversers must not be used to back up the aircraft.

If successful completion of the thrust reverser operational check, per Section II of this manual has not been accomplished, the thrust reversers must be pinned per the Learjet 60 MAINTENANCE MANUAL prior to takeoff.

Thrust reversers must not be used for touch-and-go landings.

Use of reverse thrust is limited as follows:

Aircraft Speed	Usable Reverse Thrust Range
Below 50 KIAS	Limited to Idle
50 KIAS & Above	From Idle to Maximum



ENVIRONMENTAL SYSTEM LIMITS

CABIN PRESSURIZATION

For takeoffs and landings above 8000 feet, the automatic pressurization mode must be used.

Do not land with the cabin pressurized.

COOLING SYSTEM

The cooling system must be OFF or the cabin temperature control must be in the manual mode with full cold selected for takeoff and landing.

OXYGEN SYSTEM

The following aircraft certification requirements are in addition to the requirements of applicable operating rules. The most restrictive requirements (certification or operating) must be observed.

Hats and "ear-muff" type headsets must be removed prior to donning crew oxygen masks.



Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

Crew and passenger oxygen masks are not approved for use above 40,000 feet cabin altitude.



- Passenger masks are intended for use during an emergency descent to an altitude not requiring supplemental oxygen.
- Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended.



FUEL SYSTEM LIMITS



Prolonged operation at ambient temperatures below the freeze point of the fuel used may result in a reduction in usable fuel because of fuel freezing if proper fuel management procedures are not used. Refer to **Fuel Management** procedures in Section II — NORMAL PROCEDURES.

FUEL LOAD/BALANCE

Do not takeoff or land with wing fuel unbalance greater than 200 pounds (91 kg).

During flight, wing fuel balance must be maintained within 500 pounds (227 kg).

APPROVED FUELS

The mixing of fuel types is allowed.

JP-5, JP-8, Jet A and Jet A-1 fuels conforming to Pratt and Whitney Canada CPW204 and Service Bulletin SB24004 are approved. Refer to Addendum I — FUEL SERVICING for a listing of approved fuels.

AVIATION GASOLINE

The use of aviation gasoline is prohibited.

FUEL ADDITIVES

ANTI-ICING ADDITIVE

Anti-icing additive is not a requirement. However, for microbial protection, it is recommended that fuel containing either an approved biocide additive or an anti-icing additive conforming to MIL-I-27686 be used at least once a week for aircraft in regular use and whenever a fueled aircraft will be out of service for a week or more.

BIOCIDE ADDITIVE

Biocide additive is not a requirement. However, Biobor JF is approved for use as a biocide additive when premixed in the fuel supply facility. Additive concentration is not to exceed 270 ppm. Refer to Addendum I — FUEL SERVICING for additional information.

TEMPORARY FLIGHT MANUAL CHANGE

Publication Affected: Learjet 60 AFM (FM-123)

Learjet 60XR AFM (FM-133)

Description of Change: Added table to Tires Limitation Section with

allowable tire pressure range based on maximum certified takeoff weight. Revises Exterior Preflight procedure by adding an additional check for

proper tire pressure inflation.

Revised step 4, added new step, added NOTE and WARNING to ABORTED TAKEOFF procedure.

Revised NOTE to a WARNING to INADVERT-ENT STOW OF THRUST REVERSER AFTER A CREW-COMMANDED DEPLOYEMENT proce-

dure.

Filing Instructions: This document consists of 9 pages. Insert the

individual pages in accordance with the following filing instructions and retain until further notice. Record this temporary change in the "Log of Temporary Flight Manual Changes" at the front of

3/9/09

the AFM.

	Insert adjacent to FM-123 page number	Insert adjacent to FM-133 page number
page 2 of 9	1-25	1-33
page 3 of 9	2-3	2-3
page 4 of 9	2-4	2-4
page 5 of 9	2-7	2-7
page 6 of 9	3-32	_
page 7 of 9	3-32	_
page 8 of 9	_	3-33
page 9 of 9	_	3-37

FAA APPROVED

for MARGARET KLINE, MANAGER
AIRCRAFT CERTIFICATION OFFICE
FEDERAL AVIATION ADMINISTRATION

WICHITA, KANSAS

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Insert this page adjacent to the TIRES Limitation under SYSTEM LIMITS in the affected manual.

Add the following to the TIRES limitation under SYSTEM LIMITS:

The nose and main tire pressures must be checked within 96 hours (not flight hours) prior to takeoff using the procedures listed in Chapter 12 of the Learjet 60 Maintenance Manual.



- Aircraft parked for extended periods (10 or more consecutive days) will have tire pressure checked periodically in accordance with Chapter 12 of the Learjet 60 Maintenance Manual.
- The following table is provided for reference only.

AIRCRAFT WITH THE FOLLOWING MAXIMUM CERTIFIED TAKEOFF WEIGHT	ALLOWABLE TIRE PRESSURE RANGE	
All	Nose Gear	104 - 114 psig (718 - 785 kPa)
22,750 Pounds (10,319 kg) 	Main Gear	205 - 215 psig (1413 - 1481 kPa)
23,500 Pounds (10,660 kg)	Main Gear	209 - 219 psig (1441 - 1508 kPa)

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HYDRAULIC SYSTEM LIMITS

Do not exceed auxiliary hydraulic pump duty cycle of 3 minutes ON, then 20 minutes OFF.

Only hydraulic fluid conforming to MIL-H-5606 is approved.

When SAT is below -25°C (-13°F), engines must be operated 3 minutes prior to takeoff in order to bring the hydraulic system up to normal operating temperature.

LANDING GEAR AND BRAKING SYSTEM LIMITS

TIRES

Main Tire Limiting Speed (Ground Speed)182 knots



The takeoff and landing speeds presented in this manual will not exceed this limit.

SPOILER SYSTEM LIMITS

SPOILERS

If the spoilers are inoperative during flight, the maximum operating altitude is limited to 38,000 feet.

Do not extend spoilers with flaps extended while airborne.

Do not extend spoilers, or operate with spoilers deployed, at speeds above VMO/MMO.

AUTOSPOILERS

Do not arm autospoilers for training maneuvers where engine failure will be simulated above V1 speed or for touch-and-go landings.



STALL WARNING SYSTEM LIMITS

The stall warning operation checks must be accomplished in accordance with Section II of this manual.

The angle-of-attack indicators and low speed cues (refer to **Stall Warning System**, in Section II) may be used as a reference but do not replace the airspeed indicators as primary reference.

TRIM SYSTEM LIMITS

To assure proper trim systems operation, the **Trim Checks** must be accomplished in accordance with Section II of this manual.



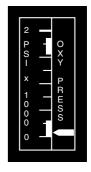
Failure to conduct a pitch trim preflight check prior to each flight increases the probability of an undetected system failure. An additional single failure in the trim system could result in a trim runaway.



INSTRUMENT MARKINGS

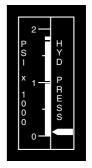
OXYGEN PRESSURE

Green Segment	1550 to 1850 PSI
Amber Segment	0 to 300 PSI
Red Line	2000 PSI



HYDRAULIC PRESSURE

Amber Segment	0 to	o 1000	PSI
Green Segment	1000 to	o 1750	PSI
Red Line		. 1750	PSI

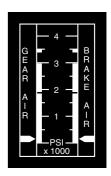


GEAR AIR/BRAKE AIR

Amber Segment	0 to	1800 PSI
Green Segment	1800 to	3000 PSI
Red Line		3450 PSI



If air bottles are serviced near the high end of yellow segment, (slightly above 1800 psi) pressure may drop during flight as the system cools; satisfactory gear extension and braking can still be expected.





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Introduction

The procedures in this section of the manual have been developed by Learjet Inc. for the certification of this aircraft. This section contains those procedures which may be considered routine in day-to-day operations. The presentation includes, but is not limited to, detailed checklist procedures by flight phase. These normal procedures are provided as guidance and should not be construed as prohibiting the operator from developing equivalent normal procedures in accordance with applicable operating rules.

Through-Flight Procedures (Both Engines Shut Down)

Normal preflight procedures (all checklist line items) must be accomplished prior to takeoff at the original departure point of a flight. At each intermediate stop of flight where both engines are shutdown, the Through-Flight Checklist may be used for preflight provided certain criteria are met. In the following section, procedures marked with this symbol (�) denote Through-Flight Checklist items. When permitted, accomplishment of all Through-Flight Checklist items fulfills a minimum preflight requirement.

The Through-Flight Checklist may be used following an intermediate stop with both engines shutdown provided the following criteria have been satisfied during that stop:

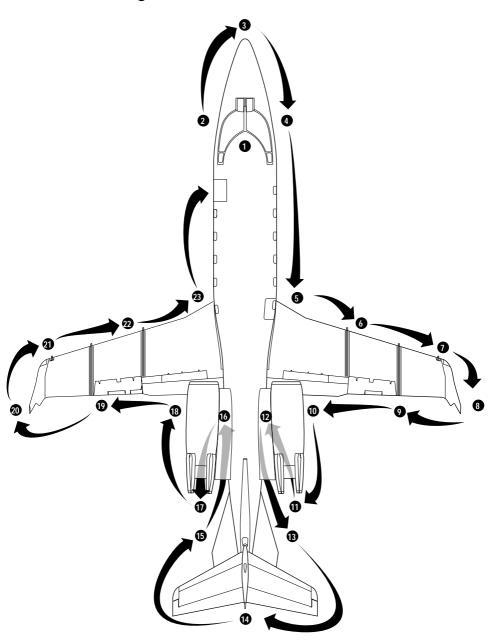
- There has been no change in flight crew personnel.
- No maintenance has been performed on the aircraft. Routine line servicing is not considered maintenance.
- No more than three (3) hours have elapsed between engine shutdown and engine start.
- Extreme weather conditions (heavy precipitation, ice, snow, extreme cold, etc.) have not occurred which would change the preflight status of the aircraft.



TURN-AROUND LIMITS in Sections I and V of this manual must be observed.

For intermediate stops with one or no engine shut down, completion of the Quick Turn-Around procedure in this section provides the minimum preflight requirements.

Exterior Preflight



Walk-Around Inspection Figure 2-1

Filing Instructions:

Insert this page adjacent to page containing Exterior Preflight, area 2 in the affected manual.

Added additional step within the Exterior Preflight procedure:

2

Nosewheel Tire Pressure — Check (refer to Limitations Section).

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Exterior Preflight (Cont)

Power Off Checks

- ◆ During Exterior Preflight, check all vents clear, check access doors for security, and all aircraft surfaces for condition.
- ↑ a. Controls Lock Remove and stow.
- a. Pilot's Windshield Alcohol Discharge Outlets and Pilot's Defog Outlet Clear of obstructions.
 - ◆ b. Left Pitot-Static Probe Cover removed, clear of obstructions.
 - c. Left Stall Warning Vane Freedom of movement, leave in down position.
 - d. Left Pitot-Static (2) Drain Valves Drain. Required only if moisture in the pitot-static system is known or suspected.



If pitot-static valves are opened, assure that valve stem returns to closed position.

- e. Oxygen System Discharge Indicator Condition.
- f. Nose Compartment Doors Secure.
- g. Nose Gear and Wheel Well Hydraulic leakage, condition, and cooling vents clear.
- ♦ h. Nose Wheel and Tire Condition and nose gear uplock forward.



Chine on nose tire must be a minimum of 3/4 inch (19 mm) from ground to operate safely with an accumulation of 3/4 inch (19 mm) water on runway surface.

- 3
- a. Radome and Radome Erosion Shoe Condition.
- 4
- ◆ a. Right and Standby Pitot-Static Probes Covers removed, clear of obstructions.
- ◆ b. Right Stall Warning Vane Freedom of movement, leave in down position.
 - c. Pressurization Static Port Clear of obstructions.
 - d. Right Pitot-Static Drain Valves (4) Drain. Required only if moisture in the pitot-static system is known or suspected.



If pitot-static valves are opened, assure that valve stem returns to closed position.

- e. Total Air Temperature Probe Condition.
- f. Nose Compartment Doors Secure.

Filing Instructions:

Insert this page adjacent to page containing Exterior Preflight, area 5 in the affected manual.

Added additional step within the Exterior Preflight procedure:

5

Right Main Tire Pressure — Check (refer to Limitations Section).

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Exterior Preflight (Cont)

- g. Copilot's Windshield Defog Outlet Clear of obstructions.
- h. Wing Inspection Light and Lens Condition.
- Lower Fuselage Antennas, Beacon/Strobe Light and Lens
 Condition.
- 5
- a. Aft Cabin Door Condition.
- b. Upper Fuselage Antennas, and Dorsal Inlets Condition.
- ◆ c. Fuselage Tank Access Door Secure.
- ◆ d. Toilet Servicing Door Secure.
- ◆ e. Right Engine Inlet and Fan Clear of obstructions and condition.

WARNING

- If fan is windmilling, stop by pressing on fan spinner. Do not attempt to stop windmilling by grabbing blades.
- The wing, flight control surfaces, and engine inlet must be free of frost, snow, and ice.
- f. Generator Cooling Scoop Clear.
- g. Fuel Crossover Drain Valve, Wing Scavenge Pump Drain Valves (2), Wing Sump Drain Valves (2), and Engine Fuel Drain Valves (2) Drain.
- h. Right Main Gear and Wheel Well Hydraulic/fuel leakage and condition.
- i. Right Main Gear Landing Light and Doors Condition.
- ◆ j. Right Main Gear Wheels, Brakes and Tires Condition.
- 6
- a. Wing Stall Fences Condition.
- b. Leading Edge Condition.
- c. Inboard Fuel Vent Ram Airscoop (underside of wing) Clear of obstructions.
- Right Wing Access Panels (underside of wing) Check for fuel leakage.
- a. Outboard Fuel Vent Ram Airscoop (underside of wing) —
 Clear of obstructions. Outboard Vent Sump Drain.
 - ◆ b. Right Wing Fuel Filler Cap Condition and security.
 - c. Right Winglet Navigation Light and Lens Condition.
- a. Right Winglet Static Discharge Wicks (4) Condition.
 b. Recognition and Beacon/Strobe Light and Lens
 - b. Recognition and Beacon/Strobe Light and Lens Condition.



Exterior Preflight (Cont)



- a. Right Aileron Check free motion, balance tab linkage and brush seal condition.
- b. Boundary Layer Energizers Condition.
- 10
- a. Right Spoiler and Flap Condition.
- b. Right Engine Oil Check oil level (normal).



If preflight oil level checks low, start and run engine until stabilized at idle. Shut down engine and recheck oil level. If there is no oil level indication, add enough oil to obtain an indication before starting engine to recheck oil level.

- **11** ◆ a. Right Engine Turbine Exhaust Area Condition, clear of obstructions.
 - ◆ b. Right Thrust Reverser Condition and completely stowed.
- 12
- ◆ a. Single-Point Fueling Access Doors Secure.
 - b. Hydraulic Service Access Panel Check hydraulic accumulator pressures (750 psi minimum for both).
 - c. Fuselage Tank Sump Drain Valve, Expansion Line Drain Valves (2), and Transfer Line Drain Valves (2) Drain.
 - d. Fuel Filter Drain Valves (2) Drain.
 - e. Fuselage Fuel Vent Clear.
 - f. Single-point Fueling Pressure Vent Screen Clear.
 - g. Battery Vents Clear.
- 13
- a. Right VOR/LOC Antenna Condition.



a. Vertical Stabilizer, Rudder, Horizontal Stabilizer, Elevator, and Delta Fins — Condition, drain holes clear.



The vertical and horizontal stabilizer, and flight control surfaces must be free of frost, snow, and ice.

- b. Static Discharge Wicks (6 on elevators, 1 above nav light, and 4 on delta fins) Condition.
- c. Vertical Fin Navigation Light and Lens Condition.
- ♦ d. Tailstand Removed.



Exterior Preflight (Cont)



- a. Oxygen System Discharge Indicator Condition.
- b. Left VOR/LOC Antenna Condition.
- c. HF Antenna Condition.
- d. Tailcone Interior Open access, check for fluid leaks, security and condition of installed equipment, main engine fire bottle pressures, then close access.
- ◆ e. Aft Baggage Compartment Door Secure.



- a. Engine Fire Extinguisher Discharge Indicators Condition.
- 1
- a. Left Engine Turbine Exhaust Area Condition, clear of obstructions.
- ◆ b. Left Thrust Reverser Condition and completely stowed.



a. Left Engine Oil — Check oil level (normal).

NOTE

If preflight oil level checks low, start and run engine until stabilized at idle. Shut down engine and recheck oil level. If there is no oil level indication, add enough oil to obtain an indication before starting engine to recheck oil level.

- b. Left Spoiler and Flap Condition.
- 19
- a. Left Aileron Check free motion, balance and trim tab linkage and brush seal condition.
- b. Boundary Layer Energizers Condition.
- 20
- a. Left Winglet Static Discharge Wicks (4) Condition.
- 21
- a. Left Winglet Navigation Light and Lens Condition.
- ♦ b. Left Wing Fuel Filler Cap Condition and security.
 - c. Outboard Fuel Vent Ram Airscoop (underside of wing) Clear of obstructions. Outboard Vent Sump Drain.
- 22
- Left Wing Access Panels (underside of wing) Check for fuel leakage.
- Inboard Fuel Vent Ram Airscoop (underside of wing) Clear of obstructions.
- c. Leading Edge Condition.
- d. Wing Stall Fences Condition.

Filing Instructions:

Insert this page adjacent to page containing Exterior Preflight, area 23 in the affected manual.

Added additional step within the Exterior Preflight procedure:



Left Main Tire Pressure — Check (refer to Limitations Section).

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Exterior Preflight (Cont)



- a. Left Main Gear and Wheel Well Hydraulic/fuel leakage and condition.
- b. Left Main Gear Landing Light and Doors Condition.
- ◆ c. Left Main Gear Wheels, Brakes and Tires Condition.
- ◆ d. Left Engine Inlet and Fan Clear of obstructions and condition.



- If fan is windmilling, stop by pressing on fan spinner. Do not attempt to stop windmilling by grabbing blades.
- The wing, flight control surfaces, and engine inlet must be free of frost, snow, and ice.
- e. Generator Cooling Scoop Clear.

Power On Checks

- 1 LANDING GEAR Switch DN. Both BATTERY Switches On. Fuel Quantities Check. PITOT HEAT Switches On.
- Use caution when touching pitot-static mast leading edges and probes, pressurization static port, and stall warning vanes to check for heat. Set PITOT HEAT Switches OFF.



The TAT probe heat is disabled on the ground by the squat switch relay. The heater may be checked on the ground by pulling the SQUAT SW circuit breaker (L TRIM-FLT CONT group) and setting the PITOT HEAT switches on.

- 5 7 If night flight is anticipated, check exterior lighting.
 All Exterior Light Switches On. Check proper illumination,
- 14 21 then all exterior light switches Off.
 - 1 Both BATTERY Switches OFF.



Cabin Preflight

- ◆ 1. Baggage Secure.
- ◆ 2. Aft Cabin Door Closed and latched.
 - a. Handle Aft.
 - b. Lock Pin (streamered) Removed.
 - c. Lavatory Door Open and access unobstructed.
- ◆ 3. Aisle Clear.
- ◆ 4. Brief passengers. Briefing to include oxygen system operation, seat belt operation, life vest location & operation, fire extinguisher location, and emergency evacuation.



- Passengers must be informed that smoking is prohibited in the lavatory.
- Passengers should be advised not to use portable electronic equipment during takeoff, approach and landing.



Before Starting Engines

- ◆ 1. Controls Lock Stowed.
- ◆ 2. Safety Belts, Shoulder Harnesses, and Seats Secure and adjust.



Ensure that seat is adjusted so that full travel can be obtained on all controls.

- ◆ 3. Flight Controls Check. Full travel on all controls.
- ◆ 4. Circuit Breaker Panels:
 - a. Breakers In.
 - o. BUS TIE Switches OPEN (down).
 - 5. EMER BAT 1, BAT 2, and BAT 3 (if installed) Switches On. Check associated amber EMER PWR 1, 2, and 3 lights illuminated, and three (3) green DN indications are displayed on RTU 1. Check Electronic Standby Instrument System (ESIS) is powered.



RTU 1 will default to the ENG/SYS DATA page with EMER BAT 2 Switch selected On and both main BATTERY switches selected OFF.

- ♦ *For through-flight,* EMER BAT Switches On.
- ♦ 6. Panel Switches and Avionics Off or set:
 - a. L INSTR LIGHTS As required.
 - b. Pilot's FREE-SLAVE Switch SLAVE.
 - c. STATIC SOURCE Switch BOTH.
 - d. RUDDER BOOST Switch On.
 - e. EMER BUS Switch NORMAL.
 - f. ENG CMPTR Switches AUTO.
 - g. LANDING GEAR Switch DN.
 - h. ANTI-SKID Switch On.
 - i. L and R BLEED AIR Switches ON.
 - j. Copilot's FREE-SLAVE Switch SLAVE.
 - k. R INSTR LIGHTS As required.
 - 7. Battery Check:



Do not move the aircraft during AHS alignment. AHS alignment is indicated on the PFDs with the message "ATT/HDG ALIGNING DO NOT TAXI".

- a. BATTERY 1 Switch Set to BATTERY 1. Check for proper voltage.
- b. BATTERY 2 Switch Set to BATTERY 2.
- c. BATTERY 1 Switch OFF. Check for proper voltage, then BATTERY 1 Switch set to BATTERY 1.
- ♦ *For through-flight,* both BATTERY Switches On.



◆ 8. GPU (if desired) — Connect.



Ensure unit is regulated to 28 VDC and limited to 1500 amps maximum.

◆ 9. L and R INVERTER Switches — On. Check L and R VAC readings are within normal range.



For normal operation, the left and right AC buses are separated (AC BUS TIE open).

- 10. Emergency Exit Lights:
- a. EMERGENCY EXIT LIGHTS Switch ARMED.
 - b. TEST Switch BAT 1. Check for illumination.
 - c. TEST Switch BAT 2. Check for illumination.
- ◆ 11. Systems Pressure Checks:
 - a. HYD PRESS Check. If pressure is below 1000 psi, HYD PUMP Switch On.
 - b. GEAR AIR and BRAKE AIR pressure Check (1800 to 3000 psi).
- ◆ 12. PARKING BRAKE Set. PARK BRAKE light illuminated.
 - 13. EMER BRAKE Pull the handle out of the recess then return. DO NOT push the handle downward, as it may introduce emergency brake air into the hydraulic system.
- ◆ 14. HYD PUMP Switch OFF.
 - 15. Oxygen System:
 - a. PASSENGER OXYGEN Valve AUTO.
- ♦ b. OXY PRESS Gauge(s) Check.
 - c. Crew Oxygen Masks and Smoke Goggles Check oxygen flow available. Masks and smoke goggles properly stowed.
- ◆ 16. Pressurization Controls Set:
 - a. CAB AIR Switch OFF.
 - b. LDG ALT Selector Set landing field elevation of intended destination.
 - c. MAN ALT Control Center.
 - d. MAN RATE Control MIN.
 - e. Pressurization MODE Automatic (MANUAL not illuminated).
 - f. EMER DEPRESS Extinguished.



- 17. CABIN CLIMATE Controls As Desired.
 - Automatic Mode Operation:
 - a. Crew AUTO-MAN Switch AUTO.
 - b. Cabin AUTO-CABIN-MAN Switch AUTO or CABIN.



With switch in AUTO, the instrument panel mounted CABIN COLD-HOT knob will control the cabin temperature. With switch in CABIN, the remotely mounted temperature selector will control the cabin temperature.

c. COLD-HOT Knobs — Rotate to desired temperature. After takeoff, the cabin temperature control system will automatically maintain the cabin at the desired setting.

Manual Mode Operation:

- a. AUTO-MAN Switches MAN.
- b. COLD-HOT Knobs Rotate to desired setting.
- 18. Fuel System:
- a. Fuel Quantity Check.
 - b. Standby Pumps Check:
 - (1) Left STBY PUMP ON. Check red L FUEL PRESS light extinguishes and FUEL SYS light illuminates.
 - (2) Left STBY PUMP OFF.
 - (3) Right STBY PUMP ON. Check red R FUEL PRESS light extinguishes and FUEL SYS light illuminates.
 - (4) Right STBY PUMP OFF.
- ◆ c. Fuel Control Panel Indicator Lights and FUEL SYS Light —
 All lights extinguished except LO FUEL PRESS lights.
 - 19. Pilot's or copilot's Lights Test Switch (glareshield) Depress and check that all glareshield, instrument panel, and pedestal lights illuminate. After releasing the TEST switch, the following lights normally remain illuminated: L and R OIL PRESS, L and R FUEL PRESS, L and R HYDR PRESS, L and R GEN, CABIN AIR, and PITOT HT. The following lights may be illuminated: T.O. TRIM, ENTRY DOOR, AFT CAB DOOR, and EXT DOORS.
- ◆ 20. Either Master WARN/CAUT Light Depress and hold until Master CAUT light illuminates steady. This inhibits the master caution system.



◆ 21. Electrical Power — If GPU or APU are not available, start one engine. Refer to **Starting Engines** checklist, this section.



Before starting one engine, perform Fire Detect System check per step 23d, below.

- 22. AVIONICS LEFT and RIGHT MASTER Switches ON.
- 23. Warning System Checks:
 - a. Windshield Ice Detect Lights (for night flight) Check illuminated by placing an object between the lights and windshield, use care to prevent scratching windshield when checking Ice Detect Lights.
 - b. Takeoff Warning System Check horn. Advance right thrust lever to MCR detent and note that warning horn sounds. Return thrust lever to CUTOFF.
 - c. Landing GEAR Display:
 - (1) Check three (3) green DN symbols display on the EIS (Flight Page).
 - (2) SYSTEM TEST Switch Rotate to GEAR.
 - (3) TEST Button Depress and hold. Check horn sounds. Press MUTE and verify that amber MUTE light illuminates and horn is silenced.
 - (4) TEST Button Release.
 - d. Fire Detect System:
 - (1) SYSTEM TEST Switch Rotate to FIRE DET.
 - (2) TEST Button Depress. ENG FIRE PULL shall illuminate and flash. This indicates continuity of the fire detect systems. ENG EXT ARMED shall illuminate. This indicates continuity through the two left and two right fire extinguisher squibs. Both BLEED AIR L and R lights shall illuminate. This indicates continuity through the tailcone bleed air overheat sensor system.
 - (3) TEST Button Release.
 - e. Overspeed Warning:
 - (1) SYSTEM TEST Switch Rotate to OVSP.
 - (2) TEST Button Depress and hold. The overspeed warning shall sound 3 times each separated by a brief pause. The third warning horn will continue until the TEST button is released.
 - (3) TEST Button Release.



- f. Cabin Altitude Warning:
 - (1) SYSTEM TEST Switch Rotate to CABIN ALT.
 - (2) TEST Button Depress and hold. Cabin altitude warning horn shall sound, the CABIN ALT HI light will illuminate, and the Master WARN lights shall flash.
 - (3) TEST Button Release.
- g. Stall Warning System:
 - (1) SYSTEM TEST Switch Rotate to L STALL.
 - (2) TEST Button Depress and hold. The pilot's angle-of-attack indicator needle will begin to sweep from the green segment to the red segment. As the needle passes the green-amber margin, the shaker will actuate, the Master WARN lights will illuminate, and the red L STALL light will flash then become steady. Shaker actuation is made evident by high-frequency vibration of the control column.
 - (3) TEST Button Release.
 - (4) Rotate SYSTEM TEST Switch to R STALL.
 - (5) TEST Button Depress and hold. The test operation will be identical to step (2) above except needle will sweep the copilot's angle-of-attack indicator, and the red R STALL light will flash and then become steady.
 - (6) TEST Button Release.



Except for system test, the stall warning shakers and lights are disabled on the ground. However, the angle-of-attack indicators will function normally.

- h. Mach Trim:
 - (1) SYSTEM TEST Switch Rotate to MACH TRIM.
 - (2) TEST Button Depress and hold. The stabilizer should trim slowly in the nose up direction for 1 to 3 seconds and then stop. Trim-in-motion audio clicker may or may not sound. The amber MACH TRIM and PITCH TRIM lights will illuminate and the aural overspeed warning will sound.
 - (3) TEST Button Release. The MACH TRIM and PITCH TRIM lights will extinguish and the aural warning will cease.



- i. Trim Speed Monitor:
 - (1) Assure pitch trim is in NU side of index point (▶) on ELEV indicator (high trim rate/low airspeed range) on the EIS (Flight Page).
 - (2) SYSTEM TEST Switch Rotate to TRIM OVSP.
 - (3) TEST Button Depress and hold.
 - (4) Either Control Wheel Trim Switch (arming button depressed) Operate NOSE UP. Amber PITCH TRIM light shall illuminate.
 - (5) TEST Button Release.

24. Trim Checks:



- Throughout the following procedure, verify that the trim-in-motion audio clicker sounds approximately 1 second after initiating pitch trim. The trim-in-motion audio clicker will not sound when the flaps are lowered beyond 3°.
- Trim rate with ELEV indicator pointer on ND (high airspeed) side of index point is approximately one-fourth the trim rate with pointer on NU (low airspeed) side of index point (▶).
- The amber PITCH TRIM light on the glareshield will illuminate whenever either Control Wheel Master Switch (MSW) is depressed.
- a. Flap Switch UP.
- b. PITCH TRIM Selector Switch (pedestal) SEC.
 - (1) NOSE DN-OFF-NOSE UP Switch (pedestal) Operate NOSE UP and NOSE DN. Horizontal stabilizer trim movement shall occur in both directions.
 - (2) Check that depressing pilot's Control Wheel Master Switch (MSW) while trimming NOSE UP and NOSE DN will stop trim motion while Control Wheel Master Switch (MSW) is held. Repeat using copilot's Control Wheel Master Switch (MSW).
 - (3) Pilot's Control Wheel Trim Switch (arming button depressed) Operate NOSE UP and NOSE DN. Trim motion shall not occur and amber PITCH TRIM light shall illuminate. Repeat using copilot's Control Wheel Trim Switch.





Illumination of the amber PITCH TRIM light indicates that a pitch trim change has been commanded of the primary pitch trim system and the system cannot respond because secondary pitch trim is selected.

c. PITCH TRIM Selector Switch (pedestal) — OFF. Amber PITCH TRIM light will illuminate.



Illumination of the amber PITCH TRIM light indicates that power is on the aircraft and the PITCH TRIM selector switch is in the OFF position.

- (1) NOSE DN-OFF-NOSE UP Switch (pedestal) Operate NOSE UP and NOSE DN. Trim motion shall not occur.
- (2) Pilot's Control Wheel Trim Switch (arming button depressed) Operate NOSE UP and NOSE DOWN. Trim motion shall not occur. Repeat using copilot's Control Wheel Trim Switch.
- d. PITCH TRIM Selector Switch (pedestal) PRI. Amber PITCH TRIM light shall extinguish.
- e. Pilot's and copilot's Control Wheel Trim Switches Check individually as follows:
 - (1) Without depressing arming button, move switch NOSE UP and NOSE DOWN. Trim motion shall not occur.
 - (2) Without depressing arming button, move switch LWD and RWD. Trim motion shall not occur.
 - (3) Depress arming button. Trim motion shall not occur.
 - (4) Depress arming button and move switch NOSE UP and NOSE DOWN. Trim motion shall occur in all directions.
 - (5) Depress arming button and move switch LWD and RWD. Trim motion shall occur.
- (6) Check that depressing pilot's Control Wheel Master Switch (MSW) while trimming NOSE UP, NOSE DOWN, LWD and RWD will stop trim motion.



- f. Trim by positioning copilot's Control Wheel Trim Switch. While trimming, trim in opposite direction using pilot's Control Wheel Trim Switch. Pilot's trim shall override copilot's trim. Repeat for each trim position.
- g. Trim Speed Check as follows (with EIS [Flight Page]):
 - Control Wheel Trim Switch Trim as required to assure ELEV indicator pointer passes index point (►). Trim rate shall change as pointer passes the index point (►).



Trim rate with ELEV indicator pointer on ND (high airspeed) side of index point is approximately one-fourth the trim rate with pointer on NU (low airspeed) side of index point ().

- (2) Control Wheel Trim Switch Trim in opposite direction. Assure ELEV indicator pointer passes index point (▶). Verify trim rate change.
- ♦ h. T.O. TRIM Light Check as follows:
 - (1) Either Control Wheel Trim Switch Operate as required to move ELEV indicator pointer through the entire T.O. segment.
 - (2) The amber T.O. TRIM light shall illuminate when the indicator pointer is slightly outside of the T.O. segment.
 - (3) The amber T.O. TRIM light shall extinguish whenever the indicator pointer is within the T.O. segment.
 - i. Pitch Trim Takeoff Configuration Warning Check operation as follows:
 - (1) Flap Switch— 20° or 8°.
 - (2) PARKING BRAKE Release.
 - (3) Control Wheel Trim Switch Trim as required to assure ELEV trim pointer is within the T.O. segment.
 - (4) Advance the right thrust lever to the MCR detent or beyond. No horn sounds when the ELEV pointer is within the T.O. segment.
 - (5) Trim NOSE DOWN beyond the T.O. segment. Check that the T.O. TRIM light illuminates and the takeoff configuration warning horn sounds.
 - (6) Trim NOSE UP until the horn is silenced and the T.O. TRIM light extinguishes.

- (7) Continue to trim NOSE UP beyond the T.O. segment. Check that the T.O. TRIM light illuminates and the takeoff configuration warning horn sounds.
- (8) Trim NOSE DOWN until the horn is silenced and the T.O. TRIM light extinguishes.
- (9) Right Thust Lever CUTOFF.
- j. Rudder Trim Switch (pedestal) Check operation as follows:
 - (1) Move each half of switch separately to NOSE LEFT and NOSE RIGHT. Trim motion shall not occur.
 - (2) Move both halves of switch simultaneously to NOSE LEFT and NOSE RIGHT. Trim motion shall occur.
 - (3) Check that depressing pilot's Control Wheel Master Switch (MSW) while trimming will stop trim motion. Repeat step using copilot's Control Wheel Master Switch (MSW).
- ♦ k. Trim Set all axes for takeoff and amber T.O. TRIM light extinguished. Refer to Figure 2-2 (Takeoff Trim Setting).

	CENTER-OF-GRAVITY ~ % MAC						
	-4.0 to 6	8	12	16	20	23	25
T/O TRIM SETTING DEGREES	8.75	8.4	7.8	7.1	6.5	6.0	5.7

Takeoff Trim Setting Figure 2-2



- 25. TCAS Check:
 - a. On the RTU top-level page, press the TCAS line select key twice to display the TCAS menu.
 - b. Push the TEST line select key on the TCAS main display page to activate the TCAS test.
 - c. During the test, verify the following:
 - The MFD traffic display and PFD vertical speed scale display test patterns and the MFD test pattern includes the four types of traffic symbols.
 - The messages TCAS TEST (cyan) shows on the MFD and PFD. Red and green vertical speed advisory bands show on the PFD vertical speed scale.
 - The message TCAS TEST (white) shows below the vertical speed scale.
 - The audio message "TCAS SYSTEM TEST OK" is broadcast over the flight deck audio system.
 - d. TCAS Menu Select TA/RA or TA ONLY.
- 26. EFIS CONTROL Panels Normal (no amber annunciations).
- 27. Avionics:
 - a. FMS Initialize.
 - b. Flight Plan Program.
- ◆ c. CVR Test.
 - d. Avionics Set.
- ◆ 28. Check Electronic Standby Instrument System (ESIS) for proper initialization.
 - 29. CABIN PWR Switch On.
 - 30. Terrain Awareness and Warning System (TAWS) Check:



The following procedure accomplishes the minimum TAWS preflight check. For the expanded TAWS operational check refer to **Terrain Awareness** and **Warning System (TAWS)**, this section.

- a. TERR Switch INHIBIT not selected.
- b. SYSTEM TEST Switch Rotate to TAWS.
- c. TEST Button Depress (less than 2 seconds). The short self-test will begin.



- d. Verify the following items occur:
 - A boxed GPWS and WS display on both PFDs followed by GND PROX displayed on the PFDs and TERRAIN FAIL displayed on the MFDs.
 - "GLIDESLOPE" voice alert is announced as GND PROX flashes on the PFDs and TERRAIN FAIL flashes on the MFDs, followed by INHIBIT illuminating on the G/S INHIBIT switch, then extinguishing.
 - PULL-UP displays on both PFDs when the Master WARN annunciators flash and "PULL-UP" voice warning is announced, followed by the PULL-UP and Master WARN annunciations extinguishing.
 - The red WINDSHEAR warning flashes on both PFDs and then goes steady followed by the "WINDSHEAR, WINDSHEAR, WINDSHEAR" voice message alert.
 - The amber WINDSHEAR caution flashes on both PFDs and then goes steady before extinguishing.
 - PULL-UP flashes on both PFDs as the "TERRAIN, TERRAIN, PULL-UP" voice warning is announced while the Terrain Alerting and Display test pattern is shown on the MFDs, after which PULL-UP is extinguished from the PFDs and the test pattern is removed after several sweeps. The loaded terrain database and RAAS configuration database (if installed) will display while the test pattern is visible.
 - "RUNWAY AWARENESS OK FEET (or METERS)" voice advisory (if installed) is announced.



If "RUNWAY AWARENESS NOT AVAILABLE" voice advisory is announced, the airport may not be validated for RAAS in the EGPWS terrain database.

- The boxed GPWS and WS on the PFDs and the TERRAIN FAIL annunciation on the MFDs are removed.
- 31. Rudder Boost System Check:
 - a. RUDDER BOOST Switch On.
 - b. Flaps 8° or lower.
 - c. Depress rudder pedal. Green RB annunciator shall illuminate when rudder pedal force reaches approximately 50 pounds and extinguish when rudder pedal force is released.
 - d. Repeat check using opposite rudder pedal.



Starting Engines

Engine starts may be made using either a GPU or the airplane batteries. It is recommended that a GPU be used when ambient temperature is 32°F (0°C) or below. Ensure GPU supply is regulated to 28 VDC, has adequate capacity (at least 500 amps) for engine starting and is limited to 1500 amps maximum. Refer to **Cold Weather Operation**, this section, for additional information when operating in extremely cold weather.



Airflow into the PW 305 engine is sufficient to draw personnel and equipment into the engine inlet. Personnel in proximity of the engine inlet should maintain a safe distance at all times during engine operation.

- ◆ 1. Cabin Doors Closed and latched.
 - a. Both Cabin Entry Door Handles Forward.
 - b. Upper Cabin Door Lock Pawl Retracted.
 - c. Aft Cabin Door Handle Aft.
 - d. ENTRY DOOR, AFT CAB DOOR and EXT DOORS Lights
 — Out.
- ◆ 2. COOL Switch OFF.
- ◆ 3. AUX HT Switch OFF.
 - 4. AVIONICS LEFT and RIGHT MASTER Switches OFF.
- ◆ 5. EIS Electrical Page Check for minimum voltage.



Do not attempt a battery start with less than 24 VDC each battery at 70°F (21°C) or below, or less than 25 VDC each battery at 110°F (43°C) or above. Interpolate for temperatures between 70°F (21°C) and 110°F (43°C).

- ◆ 6. PARKING BRAKE (hydraulic pressure required) Set.
 - 7. HYD PUMP Switch OFF.
- ◆ 8. BCN/STROBE Light Switch BCN.
- ◆ 9. Thrust Levers IDLE.



Starting Engines (Cont)

◆ 10. Engine — Start:



Engine starting characteristics may be improved during battery only starts by leaving the thrust lever in CUTOFF until 10% N2 is attained.

- a. START-GEN Switch START. Amber starter engaged light will illuminate.
- b. Monitor the following:
 - (1) Fuel Flow and green IGNITION light at approximately 6% N2.



Should the engine fail to light off within 10 seconds of achieving 5.2% N2, move the thrust lever to CUT-OFF. Continue to motor the engine for an additional 15 seconds to clear trapped fuel or vapors. The N2 rotor should be allowed to stop before attempting another start.

(2) N1 — Increasing as N2 increases.



If N2 reaches 40% with no indication of N1 rotation, abort start and refer problem to maintenance personnel.

- (3) ITT 950°C maximum.
- (4) Oil Pressure Indication.
- c. At approximately 40% N2, ignition will automatically turn off. IGNITION light Out.
- d. At approximately 45% N2, starter will automatically disengage. Starter Engaged Light Out. If starter engaged light remains illuminated, refer to Starter Engaged Light Remains Illuminated After Start procedure, Section IV.



- If engine does not start, refer to **STARTER LIMITS**, Section I, for the cooling period before attempting another start.
- If engine fails to start in three consecutive starting attempts, refer problem to maintenance personnel for fault isolation.
- ◆ 11. START-GEN Switch GEN at idle. The generator will not come on line with a GPU connected.



Starting Engines (Cont)

- 12. Spoilerons Check:
 - a. FLAP Switch DN.
 - b. SPOILER Lever RET.
 - c. Control Wheel Center.
 - d. SYSTEM TEST Switch Rotate to SPOILER RESET.
 - e. TEST Button Depress. Rotate control wheel. SPOILER MON light shall illuminate. Release TEST button.
 - f. Control Wheel Center.
 - g. TEST Button Depress. SPOILER MON light will extinguish. Rotate control wheel in opposite direction. SPOILER MON light shall illuminate. Release TEST button.



Control wheel movement to cause SPOILER MON light to illuminate shall be approximately the same in both directions.

- h. Control Wheel Center.
- i. TEST Button Depress and release. SPOILER MON light will extinguish.
- j. Control Wheel Rotate left then right. Verify SPOILER MON light remains extinguished.
- k. Flaps Set 20° or 8°.
- ◆ 13. Spoiler/Autospoilers Check:



This check may be accomplished with one or both engines operating.

- a. Thrust Levers IDLE.
- b. SPOILER Lever ARM. Check that spoiler indicator shows spoilers extend fully in approximately 1 to 2 seconds. SPOILER ARM and SPOILER EXT lights shall illuminate.
- c. SYSTEM TEST Switch Rotate to SPOILER RESET.
- d. TEST Button Depress. SPOILER MON light shall illuminate, spoilers shall slam down (retract within 1 second), SPOILER ARM and SPOILER EXT lights shall extinguish.
- e. TEST Button Release. SPOILER MON light shall extinguish, spoilers shall extend, SPOILER ARM and SPOILER EXT lights shall illuminate.
- f. SPOILER Lever RET. Spoilers shall retract. SPOILER ARM and SPOILER EXT lights will extinguish.
- g. SPOILER Lever ARM. Spoilers shall extend. SPOILER ARM and SPOILER EXT lights shall illuminate.



Starting Engines (Cont)

- h. Thrust Levers Advance above IDLE. Spoilers shall retract and SPOILER EXT light shall extinguish. SPOILER ARM light will remain illuminated.
- i. Thrust Levers IDLE. Spoilers shall remain retracted.
- j. TEST Button Depress and release. Spoilers shall extend and SPOILER EXT light shall illuminate.
- k. Left Thrust Lever Advance above IDLE. Spoilers shall retract and SPOILER EXT light shall extinguish. SPOILER ARM light will remain illuminated.
- l. Left Thrust Lever IDLE. Spoilers shall remain retracted and SPOILER ARM remains illuminated.
- m. Repeat steps j through l using right thrust lever.
- ♦ 14. Flaps Set 20° or 8°.
- ◆ 15. HYD PRESS Check (1500 to 1575 psi).
- ◆ 16. EIS Electrical Page (VDC and AMPS) Check.
- ◆ 17. Start other engine by repeating steps 10 and 11.
 - 18. Fuel Control Panel and Quantity Checked.
- ◆ 19. GPU (if applicable) Disconnect. Note that both generators come on line.
- ◆ 20. EIS Electrical Page (VDC and AMPS) Check. GEN lights extinguished.



Before Taxi

- ♦ 1. Avionics:
 - a. AVIONICS LEFT and RIGHT MASTER Switches ON.
 - b. FMS PERFormance INITialize (PERF INIT).
 - c. Takeoff Data (V1, VR, V2, VT, Takeoff Distance) Computed and V-speeds set (refer to Section V).
 - d. Avionics and Nav Equipment Set for departure.
- ◆ 2. Circuit Breakers Set.
 - 3. Coffee/Oven Switches (if installed) On, if desired.
 - 4. Anti-Ice Systems:
- ◆ a. WSHLD DEFOG On, if desired.
- b. Purge windshield heat system of possible moisture accumulation (first flight of day and if exposed to moisture):
 - c. WSHLD HEAT Switch On until water has cleared.
 - d. WSHLD HEAT Switch As required.
 - e. STAB WING HEAT Switch On. Check STAB HEAT light illuminated, and DC amperes increase for 3 seconds then decrease. N1 bugs may decrease.



If STAB HEAT light does not illuminate and/or DC amperes do not decrease, immediately set STAB WING HEAT switch to OFF.

- f. STAB WING HEAT Switch As required.
- g. PITOT HEAT Switches On. Check PITOT HEAT, L, R, and STBY lights extinguished.
- h. PITOT HEAT Switches OFF.
- NAC HEAT Switches ON one at a time. Check amber NAC HT lights extinguished, N1 bugs drop, and green NAC HT ON light illuminated.
- j. NAC HEAT Switches As required.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to taxi if the OAT is 10°C (50°F) or below and visible moisture is present.

- 5. Emergency Pressurization Check:
 - a. L BLEED AIR Switch EMER. Check amber EMER PRESS light illuminates and emergency airflow activates.
 - b. L BLEED AIR Switch OFF. Check EMER PRESS light extinguishes and emergency airflow stops.
 - c. L BLEED AIR Switch ON.
 - d. Repeat procedure using R BLEED AIR switch.
- ♦ 6. Engine Instruments and N1 Bugs Check; verify left and right bugs agree within 1%.



Before Taxi (Cont)

- 7. Flight Controls Checked.
- ♦ 8. Cabin Check:
 - a. Passengers briefed.
 - b. Swivel Seats Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
 - c. Work Tables and Toilet Doors Check stowed.
 - d. Aisle Clear.
 - e. Aft Cabin Door Unobstructed.
- ◆ 9. NO SMOKING FASTEN SEAT BELT Switch On.
- ◆ 10. Aircraft Lighting ON, as required.



Nav lights should be on for all night operations.

◆ 11. Nose Wheel Steering — ARM.



- Nosewheel steering is armed by depressing the NOSE STEER Switch. The ARM and STEER ON lights will illuminate. Steering may be disengaged at any time by depressing and releasing the pilot's or copilot's Control Wheel Master Switch (MSW) or by depressing the NOSE STEER Switch.
- The PITCH TRIM light will illuminate whenever either Control Wheel Master Switch (MSW) is depressed.
- ◆ 12. L and R ANTI-SKID Lights Extinguished.
 - 13. Parking Brake Release. Check PARK BRAKE light extinguished.



Taxi and Before Takeoff

◆ 1. Brakes and Nose Wheel Steering — Check, and as required throughout taxi.



When taxiing through slush or snow, use the brakes to create some friction heat in the brake discs to prevent brakes from freezing.

◆ 2. Flight Instruments — Check.



Heading splits which were caused by proximity to large metal objects may be cleared by cycling the HEADING FREE-SLAVE switch to FREE and then back to SLAVE while the aircraft is not turning or accelerating.

3. Thrust Reversers — Check operation:



- Use of reverse thrust on poorly cleaned or maintained runway, taxiway, or ramp surfaces may cause foreign object damage to engine fan blades.
- It is recommend that the aircraft be headed into the wind during thrust reverser ground operational check. Keep thrust reverser deployed time to a minimum to prevent foreign object damage.



Should the thrust reversers fail to operate properly as indicated by the sequence of REV, UNL, and DEP indications in the following check, both thrust reversers must be pinned per the Learjet 60 MAINTENANCE MANUAL or the malfunction corrected before flight.

- a. Thrust Levers IDLE. Green REV indications shall display on the EIS.
- b. Thrust Levers Advance slightly above IDLE. Green REV indications extinguish.
- c. Thrust Levers IDLE. Green REV indications display on the EIS and remain displayed.
- d. Thrust Reverser Levers Lift to the DEPLOY detent. Check the following:
 - Amber UNL displays on the EIS as the thrust reversers deploy.
 - Amber UNL extinguishes and white DEP displays when the thrust reversers are fully deployed.
 - N1 bugs reposition to approximately 50%.



Taxi and Before Takeoff (Cont)

- e. Thrust Reverser Levers Return to the STOW position. Check the following:
 - White DEP extinguishes.
 - Amber UNL extinguishes when thrust reversers are fully stowed and green REV displays.
 - N1 bugs reposition to takeoff thrust setting.
- ◆ 4. Radar On or Off.
- ◆ 5. Spoilers Armed / Retracted.
- ◆ 6. Flaps Set 20° or 8°, check indication.
- ◆ 7. Trims Set for takeoff.
- ♦ 8. CAB AIR Switch ON, check CABIN AIR light extinguishes.
- 9. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- ◆ 10. Crew Takeoff Briefing Complete.



Runway Lineup

- ◆ 1. PARKING BRAKE Released. Check PARK BRAKE light extinguished.
- ◆ 2. Transponder ON.
- ◆ 3. PITOT HEAT Switches On. All PITOT HEAT lights extinguished.
- ◆ 4. Anti-Ice Systems:
 - a. WSHLD HEAT Switch As required.
 - b. NAC HEAT Switches As required.
 - c. STAB WING HEAT Switch As required.



- The wings, vertical and horizontal stabilizers, flight control surfaces, and engine inlets must be free of frost, snow, and ice.
- Even small accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to takeoff if anti-ice is required.



- Anti-Ice systems must be turned on prior to flight into visible moisture and SAT of 10°C (50°F) or below. If anti-ice systems are required during takeoff, they should be turned on prior to setting takeoff thrust.
- Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff is made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes after takeoff will help to clear moisture on the wheels and brakes. Monitor WING TEMP gauge for overheat condition.
- ◆ 5. Lights:
 - a. RECOG/PULSE Light Switch RECOG or PULSE.
 - b. BCN/STROBE Light Switch BCN/STROBE or BCN.
 - c. LDG LT-TAXI Switches On, as desired.
- ◆ 6. IGNITION Switches On.



Runway Lineup (Cont)

◆ 7. APR Switch — ARM. Check APR ARM displayed on EIS.



If either APR or autospoilers are not armed, a takeoff distance correction must be applied. Refer to the takeoff field length charts in Section V.

◆ 8. Annunciator Lights — Out, except STEER ON, SPOILER ARM, and APR ARM displayed on the EIS.



- STAB HEAT, WSHLD HT, and NAC HT ON lights will illuminate if the corresponding systems have been turned on.
- L and R WS DEFOG lights will illuminate upon initial activation of the windshield defog system and remain illuminated until windshield temperature reaches 85°F (29°C).



After Takeoff



If taxi and/or takeoff were on ice, snow, or slush, allow the wheels to spin down prior to gear retraction to throw off as much slush as possible.

- 1. LANDING GEAR Switch UP. Landing gear should be fully retracted prior to retracting flaps.
- 2. Yaw Damper Engage, as desired.
- 3. FLAP Switch UP prior to VFE.
- 4. IGNITION Switches OFF unless ambient conditions require ignition to remain On.



During periods of heavy precipitation, set IGNITION switches On to prevent possible engine flameout due to large quantities of water entering the engines.

- 5. SPOILER Lever RET.
- 6. APR Switch OFF.
- 7. LDG LT-TAXI Switches OFF.
- 8. HYD PRESS Gauge Check (1500 to 1575 psi).
- 9. Anti-Ice Systems As required.



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions.



- Anti-Ice systems must be turned on prior to flight into visible moisture and SAT of 10°C (50°F) or below.
- Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff is made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes after takeoff will help to clear moisture on the wheels and brakes. Monitor WING TEMP gauge for overheat condition.



Climb

10,000 Ft Checks:

- 1. NO SMOKING FASTEN SEAT BELT Switch As required.
- 2. Pressurization Check.

18,000 Ft (or Transition Altitude) Checks:

- 3. Altimeters (x3) Set to 29.92" Hg (1013 hPa).
- 4. RECOG/PULSE Light Switch OFF.
- 5. WSHLD DEFOG Switch As desired.
- 6. OXY PRESS Gauge Check.

Cruise

Once established at cruise altitude, crew duties consist mainly of monitoring aircraft systems indications and annunciators to assure proper operation. Monitor pressurization and engine instruments. Monitor fuel distribution and transfer fuel as required. Use small thrust adjustments as necessary to maintain desired cruise Mach.



Descent

- 1. LDG ALT Selector Check, destination field elevation is set.
- 2. Anti-Ice Systems As required.



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions and during descent into visible moisture even if the SAT is below -40°C (-40°F).



- Anti-Ice systems must be turned on prior to flight into visible moisture and SAT of 10°C (50°F) or below.
- If descending into an area with a high dew point, set WSHLD HEAT switch to WSHLD HEAT to provide windshield exterior defogging.

FL 180 (or Transition Level) Checks:

- 3. Altimeters (x3) Set to field barometric pressure. Cross-check pilot's, copilot's, and standby instruments.
- 4. RECOG/PULSE Light Switch RECOG or PULSE, as desired.
- 5. Pressurization Check.
- 6. NO SMOKING FASTEN SEAT BELT Switch On.
- 7. Cabin Check:
 - a. Passengers briefed.
 - b. Swivel Seats Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
 - c. Work Tables and Toilet Doors Check stowed.
 - d. Aisle Clear.
 - e. Aft Cabin Door Unobstructed.
- 8. Fuel Balanced.



Approach

- 1. Circuit Breakers Check in.
- 2. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 3. Landing Data (VREF, VAPP, VT, Distance) Computed and Set. Refer to Section V.



It is recommended that if turbulence is anticipated due to gusty winds, wake turbulence, or windshear, the approach speed be increased. For gusty wind conditions, an increase in approach speed of onehalf the gust factor is recommended.

- 4. Crew Approach Briefing Complete.
- 5. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.



Before Landing

- 1. SPOILER Lever ARM.
- 2. ENG SYNC Switch OFF.
- 3. LANDING GEAR Switch DN at VLO or less. Check for three green DN indications.



If taxi and/or takeoff were on ice, snow or slush; ANTI-SKID Switch — Off, pump brakes 6 to 10 times, then ANTI-SKID Switch — On. Brake application will tend to crack any ice between brake discs and between the discs and wheels.

4. NOSE STEER Switch — Check ARM.



The Nose Steer system will not arm unless the nose gear is down and locked.

5. LDG LT-TAXI Switches — As required.



The left landing light will not illuminate unless the left main gear is down and locked. The right landing light will not illuminate unless the right main gear is down and locked.

- 6. L and R ANTI-SKID Lights Extinguished.
- 7. Flaps DN, check indication.
- 8. HYD PRESS Gauge Check (1500 to 1575 psi).
- 9. IGNITION Switches On.
- 10. Autopilot Disengage.



Control Wheel Master Switch (MSW) will also disengage yaw damper.

11. Yaw Damper — As desired.



Go Around

1. Autopilot — Disengaged.



Depressing GO-AROUND button in left thrust lever handle will disengage autopilot and select flight director go-around mode.

- 2. Thrust Levers Select T/O detent or as required.
- 3. Spoilers Check retracted.
- 4. Flaps -8° .
- 5. LANDING GEAR Switch UP after positive rate of climb is established.
- 6. Climb at approach climb speed.
- 7. When clear of obstacles, accelerate to VT (VREF +20) and retract flaps.



Landing

1. Brakes — As required.



- If upon touchdown, one or more ANTI-SKID lights illuminate, anti-skid protection for the associated wheel is inoperative and has reverted to manual brake control. Apply brakes cautiously.
- Do not turn on cooling system during landing with anti-skid system operating. Initial voltage drop may cause false signals in the anti-skid system and dump brake pressure for 2 to 3 seconds.
- 2. Spoilers Verify extended.



If autospoilers do not deploy, Spoiler Lever — EXT.

3. Thrust Reversers — Deploy, as desired:



When landing on snow covered runways, apply reverse thrust with caution as visibility may be impaired.



- Verify the nose wheel is firmly on the runway prior to deploying the thrust reversers. Initiating deployment of the thrust reversers before the nose wheel is firmly on the runway, can result in nose gear retraction.
- Use of thrust reversers on poorly cleaned or maintained runways may cause foreign object damage to engine fan blades.
- If full reverse power is maintained below 50 KIAS, reingestion of exhaust gases in the engine and foreign object damage may occur.



- Thrust reverser arming will be delayed during soft landings.
- Excessive force applied to the thrust reverser levers may prevent the balk solenoid from releasing.
- 4. Nose Wheel Steering Check STEER ON light illuminated below 90 knots.



After Landing/Clearing Runway

- 1. IGNITION Switches OFF.
- 2. CAB AIR Switch OFF.
- 3. Anti-Ice Systems:
 - a. WSHLD DEFOG and WSHLD HEAT Switches As required.
 - b. WSHLD ALC Switch OFF.
 - c. STAB WING HEAT Switch As required. Monitor WING TEMP indicator to prevent overheat condition.



If STAB HEAT light is not illuminated and DC AMPS indicates stabilizer heat operation, immediately set STAB WING HEAT switch to OFF.

- d. PITOT HEAT Switches OFF.
- e. NAC HEAT Switches As required.
- 4. Aircraft Lighting ON, as desired.



Nav lights should be on for all night operations.

- 5. SPOILER Lever RET.
- 6. FLAP Switch 20°, 8° or UP.
- 7. Transponder STBY.
- 8. Thrust Lever (on engine started first) CUTOFF (optional).

NOTE

Idle engine for 1 minute prior to thrust lever CUTOFF.



Shutdown

1. PARKING BRAKE and/or Chocks — Set.



If heavy braking was used during landing, setting the PARKING BRAKE will decrease brake cooling efficiency and increase the possibility of wheel fuse plug release. Therefore, use of chocks is recommended.

- 2. WSHLD DEFOG Switch OFF.
- 3. Anti-Ice Systems OFF.
- 4. AVIONICS LEFT and RIGHT MASTER Switches OFF.
- 5. Thrust Lever(s) CUTOFF.
- 6. Fuel System Check FUEL SYS light extinguished.
- 7. BCN/STROBE Switch OFF.
- 8. EMERGENCY EXIT LIGHTS Switch OFF.
- 9. Coffee/Oven Switches (if installed) Off.
- 10. START-GEN Switches OFF.
- 11. INVERTER Switches OFF.
- 12. EMER BAT Switches OFF.
- 13. BATTERY Switches OFF.
- 14. Controls Lock Install.

Quick Turn-Around (One or No Engine Shutdown)



TURN-AROUND LIMITS in Sections I and V of this manual must be observed.

- 1. LDG ALT Selector Set landing field elevation of intended destination.
- 2. Fuel Control Panel and Quantity Checked.
- 3. Nav Equipment Set.
- 4. Cabin Doors Closed and latched. DOOR Lights Out.
- 5. COOL Switch OFF.
- 6. AUX HT Switch OFF.
- 7. Engine Start (2 running).
- 8. START-GEN Switches GEN.
- 9. EIS Electrical Page (VDC and AMPS) Check. GEN lights extinguished.
- 10. AVIONICS LEFT and RIGHT MASTER Switches ON.
- 11. FMS Set.
- 12. Takeoff Data (V1, VR, V2, VT, Takeoff Distance) Computed and V-speeds set (refer to Section V).
- 13. Circuit Breakers In.



Quick Turn-Around (Cont)

14. Anti-Ice Systems — As required.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to taxi if the OAT is 10°C (50°F) or below and visible moisture is present.

- 15. Engine Instruments and N₁ Bugs Check; verify left and right bugs agree within 1%.
- 16. Flight Controls Check.
- 17. SPOILER Lever ARM. Check SPOILER ARM light illuminated.



If spoilers are not retracted, advance one or both thrust levers to retract spoilers.

- 18. Flaps Set 20° or 8°, check indication.
- 19. Cabin Check:
 - a. Passengers briefed.
 - b. Swivel Seats Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
 - c. Work Tables and Toilet Doors Check stowed.
 - d. Aisle Clear.
 - e. Aft Cabin Door Unobstructed.
- 20. NO SMOKING FASTEN SEAT BELT Switch On.

Taxi

- 1. Flight Instruments Check.
- 2. Radar On/Off.
- 3. Spoilers Armed/Retracted.
- 4. Flaps 20° or 8° , check indication.
- 5. Trims Set for takeoff.
- 6. CAB AIR Switch ON, check CABIN AIR light extinguishes.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ullet If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ullet If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. Crew Takeoff Briefing Complete.
- 9. Go to **Runway Lineup** procedure, this section.



Category II Operations

The autopilot/flight director is equipped with a Category II monitor to ensure the required conditions for Category II operations are met. The Category II monitor is activated when RA minimums is set to an altitude below 200 feet. The following conditions must be met for a green CAT 2 annunciation on the PFD:

- NAV 1 and NAV 2 tuned to the same ILS frequency and front course set.
- NAV 1 is selected as pilot's PFD NAV source.
- NAV 2 is selected as copilot's PFD NAV source.
- AHS 1 selected and valid on pilot's side.
- AHS 2 selected and valid on copilot's side.
- PFD not reverted on either side.
- Pilot or copilot FD command bars are in view.
- HDG or Attitude (PIT or ROL) comparator annunciation not active.
- Valid radio altitude displayed.
- Go-around not selected.

If the aircraft deviates beyond the excess deviation monitor, the glideslope deviation monitor will flash amber.



Excess deviation monitors are active between 100 feet and 600 feet AGL.

Approach

- 1. Complete normal **Approach** procedure, this section.
- 2. Select an RA minimum below 200 feet to activate the Category II monitors.



Approach flaps may be used to intercept the final approach course, however, a stabilized landing configuration (Gear – DN, Flaps – DN) shall be established prior to glideslope capture.



Category II Operations (Cont) Before Landing

- 1. Complete normal **Before Landing** procedure, this section.
- 2. CAT 2 Annunciations Monitor:



The CAT 2 annunciations may be amber upon initial activation. Provided all of the conditions listed above are met, the CAT 2 annunciation will turn green upon localizer and glideslope intercept. The CAT 2 annunciations will remain green below 100 feet AGL, provided that no monitor was tripped during the approach.

If a CAT 2 annunciation turns amber inside the Final Approach Fix:

- a. Continue the approach using the appropriate non-Category II approach criteria.
- b. Time permitting, correct the monitored item. Both CAT 2 annunciators must be green to continue an approach to Category II minimums.
- 3. Maintain localizer and glideslope:

If localizer or glideslope indication flashes amber:

- a. Change flight path to correct deviation, or execute a go-around, as necessary.
- 4. Autopilot Disengage at or above 100 feet AGL.



Cold Weather Operation

Operational problems related to cold weather may occur unless proper preflight and inspection procedures are accomplished. Additionally, operational difficulties due to ice, snow, slush, or water accumulation may be encountered. The following instructions supplement the normal procedures and, when followed, will help ensure satisfactory operation of the aircraft and its systems in cold climatic conditions.

Preflight Preparation

It is essential to take off with an aerodynamically clean airplane. Low temperatures and precipitation associated with cold weather operation create problems while the airplane is on the ground, in that frost, ice and snow adhere to and accumulate on the surfaces of the airplane. All surfaces of the airplane (wing, vertical and horizontal stabilizers, flight controls, spoilers and flaps) must be free of frost, ice and snow before takeoff. During periods of precipitation, once the airplane has been deiced, anti-icing is likely to be required to ensure that the airplane remains aerodynamically clean for departure. De-icing/anti-icing must be accomplished at the last possible time prior to takeoff to maximize the time that anti-icing will be able to provide protection (holdover time). Refer to Learjet Addendum — DE-ICING/ANTI-ICING for de-icing/anti-icing procedures.

Preflight Inspection

- 1. Conduct normal exterior inspection.
- 2. Check the entire aircraft (including top surface of horizontal stabilizer) for ice, snow, and frost. Brush off light snow. Remove all frost, encrusted snow, and ice.
- 3. Remove ice, snow, and dirt from landing gear shock struts and wheel wells. Check gear doors, position switches, squat switches, wheels, brakes, and tires.
- 4. Carefully inspect engines for frozen precipitation in fan duct and tailpipe. Under certain climatic conditions, ice can form on the back of fan blades and cause vibration during start.



Cold Weather Operation (Cont) Engine Start

Use of a GPU for an engine start is recommended at ambient temperatures of 32°F (0°C) or below. Ensure GPU is regulated to 28 VDC, has adequate capacity (at least 500 amps), and is limited to 1500 amps maximum.

If the engines are exposed to extremely cold temperatures (below -40°F [-40°C]) for an extended period, the engines should be preheated prior to attempting a start. For ambient temperatures between -40°F (-40°C) and -65°F (-54°C), direct warm air flow into each engine for a minimum of 30 minutes prior to engine start. Ensure that the engine oil temperature indicators indicate above -40°C before attempting a start.

During engine starts in cold weather, engine acceleration is slower than normal. Additionally, higher than normal oil pressure can be expected.



If ITT is rising rapidly and appears likely to exceed the start limit, abort start attempt.

When the aircraft has been cold soaked at ambient temperatures below -13°F (-25°C), the engines should be operated a minimum of 3 minutes to bring the hydraulic system up to normal operating temperature.



Cold Weather Operation (Cont) Taxing

Use normal taxi procedures if the ramp and taxiways are clean and dry. If it is necessary to taxi on ice, snow, slush, or water, taxi at reduced speed and allow greater distance for decreased braking efficiency.

If taxi is to be accomplished through slush or snow, use the brakes to create some friction-induced heating of the brake discs to prevent the brakes from freezing.

Use both engines for taxi on slippery surfaces. Directional control may be difficult to maintain during one-engine taxi on a slick surface.

Use anti-ice systems as required (if icing conditions exist or are expected.)



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to taxi if the OAT is 10°C (50°F) or below and visible moisture is present.

Insofar as possible, taxi should be accomplished with the flaps up on snow or slush covered surfaces.

Avoid taxiing in the exhaust wake or propeller wash of other aircraft on other than hard packed or dry surfaces.

Thrust reversers should be used with extreme caution on slippery surfaces and only when absolutely necessary to maintain directional control.

Do not use thrust reversers if taxiways and ramps are covered with slush, ice, standing water or snow except in the interest of safety.



Use of reverse thrust on surfaces treated with sand or other materials may cause foreign object damage to engine fan blades.



Cold Weather Operation (Cont) Takeoff

If anti-ice systems are required for takeoff, the systems should be energized prior to setting takeoff thrust.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to takeoff if anti-ice is required.

Do not take off with runway water or slush accumulation of 3/4 inch (19 mm) or more. Refer to the **WET/CONTAMINATED RUNWAY DATA** for guidance material pertaining to takeoff on a wet or contaminated runway.

Do not take off with frost, snow, or ice on the wings or aircraft control surfaces, including the horizontal stabilizer and elevators.



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

After Takeoff

After takeoff from a snow-covered or slush-covered runway, delay retracting landing gear to allow residual slush to be thrown or blown off.

Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff was made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes will help to clear moisture on the wheels and brakes. Monitor WING TEMP indicator for overheat condition.

Before Landing

If taxi or takeoff was made from a snow-covered or slush-covered field, it is recommended that the following procedure be used to help crack any ice between brake discs and between the brake discs and wheels:

- 1. After landing gear is extended, set ANTI-SKID switch to OFF.
- 2. Pump brakes 6 to 10 times. Use moderate to heavy braking pressure.
- 3. Prior to touchdown, set ANTI-SKID switch On and check ANTI-SKID lights are out.

Landing

Refer to the WET/CONTAMINATED RUNWAY DATA for guidance material pertaining to landing on a wet or contaminated runway.



Cold Weather Operation (Cont) After Clearing Runway



For taxi after landing on a slush or snow covered field, it is recommended that the flaps not be retracted above 20°. This will protect flaps and wing from damage in the event ice or snow has accumulated on the flaps.

Shutdown and Postflight

When the aircraft must be parked outside in extremely cold or fluctuating freeze/thaw temperatures, perform the following in addition to the normal shutdown and post-flight procedures:

- 1. Chock main gear wheels before releasing parking brake. Do not leave aircraft parked for extended periods in subfreezing weather with parking brake set.
- 2. Remove ice, snow, and dirt from landing gear shock struts and wheel wells. Check gear doors, position switches, squat switches, wheels, and tires.
- 3. Remove ice, snow, and dirt from flaps and flap tracks before retracting flaps.
- 4. If the aircraft is to be parked for an extended period at ambient temperatures of 20°F (-6.7°C) or below, it is recommended that the crew oxygen masks be stowed in a heated room or the cabin should be warmed to at least 20°F (-6.7°C) before use.
- 5. If the aircraft is to remain in subfreezing temperatures for an extended period, remove water and beverage containers from the aircraft. Disconnect water supply tank, depress faucet cold tap and pump water from the line. Ensure the toilet is serviced to prevent freezing of the flush fluid.
- 6. Install aircraft protective covers.
- 7. If the aircraft will be exposed to extremely cold temperatures for an extended period, it is recommended that the batteries be removed and stored in a warm area if possible.



Ice Detection

During atmospheric conditions conducive to icing, identification of ice on aircraft surfaces may be accomplished by the following methods:

- 1. During daylight operations, a visual inspection of the lower corners of the windshield or the wing leading edge for ice accumulation can be made.
- 2. The windshield ice detect lights will indicate ice or moisture formation on the windshield during night operations. These lights are illuminated whenever the BATTERY switches are On and will cause red areas approximately 1-1/2 inches (38 mm) in diameter to appear on the windshield if ice or moisture is encountered. The light on the pilot's side is located in the antice airstream and the light on the copilot's side is located outside the anti-ice airstream. Therefore, the copilot's light must be monitored whenever windshield heat or alcohol anti-ice systems are operating. The lights indicate ice encounters when SAT is below freezing and moisture encounters when SAT is above freezing.
- 3. The wing inspection light may be used to visually inspect the right wing leading edge for ice accumulation during night operations. The light is illuminated by depressing the WING INSP LIGHT button. This switch is located on the copilot's switch panel. The light illuminates a black dot on the outboard wing leading edge to enhance visual detection of ice accumulation.



Anti-Ice Systems

Anti-ice systems must be turned on prior to operation in icing conditions.

Icing conditions exist when outside air temperature (OAT) on the ground and for takeoff is 10°C (50°F) or below, or the static air temperature (SAT) in flight is 10°C (50°F) to -40°C (-40°F), and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, or ice crystals). Nacelle heat must be On during descent into visible moisture even if the SAT is below -40°C (-40°F).

Icing conditions also exist when the OAT on the ground and for takeoff is 10°C (50°F) or below when operating on ramps, taxiways, or runways where surface snow, ice, standing water, or slush may be ingested by the engines, or freeze on engines, nacelles, or engine sensor probes.

Operate the nacelle heat system in accordance with the **NACELLE HEAT** limits in Section I.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions (either in flight or prior to taxi.)

If icing conditions are encountered and the anti-ice systems have not been energized, turn them on prior to significant ice accumulation. Observe recommendations for normal use of all anti-ice systems.



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

In the event of significant ice accumulation or failure of any portion of the anti-ice system, refer to **Inadvertent Icing Encounter** and/or anti-icing system failure procedures in Section IV.

When using anti-ice systems, maintain sufficient engine speed to keep the WING TEMP indicator in the green band. This will provide sufficient bleed air for all bleed air anti-icing systems. Use of spoilers may be required for descents and/or decelerations.

When using anti-ice systems at high altitude, the cabin altitude may increase unless engine speed is maintained to compensate for the additional bleed air extraction.

Minimize the duration of icing encounters as much as practical. Minimize holding in icing conditions with flaps extended. This includes requesting an altitude above or below icing conditions, if practical.



Anti-Ice Systems (Cont)

Intermittently operating with the autopilot off will allow more readily detectable changes in flight control feel.

If flight has been conducted in icing conditions, remove any accumulated ice prior to next flight.

Aircraft anti-icing is accomplished through the use of electrically heated anti-ice systems, engine bleed-air heated anti-ice systems, and an alcohol anti-ice system. Electrically heated systems include pitot-static probes, engine inlet air temperature/pressure sensors, stall warning vanes, total temperature probe, and horizontal stabilizer. Engine bleed air is utilized to heat the wing leading edge, windshields, nacelle inlets, engine inlet guide vanes, and engine fan spinners. An alcohol anti-ice system is installed as a back-up for the pilot's windshield bleed air anti-ice system.

An electrically heated windshield provides defogging of the windshield interior. The heat output of the windshield is not sufficient to prevent ice formation. Therefore, bleed air windshield heat (WSHLD HEAT) should be turned on prior to entering icing conditions.

Systems controls and control functions are as follows:

- 1. STAB WING HEAT Switch Controls wing heat system (bleed air) and the horizontal stabilizer heat system (electric).
- 2. NAC HEAT Switches Control engine inlet and inlet guide vane anti-icing (bleed air) and engine inlet air temperature/pressure sensor electric heaters. Anti-icing bleed air is continually routed to the engine fan spinner.
- 3. PITOT HEAT Switches Energize pitot-static probe, stall warning vane, and total temperature probe electric heaters.
- 4. WSHLD ALC Switch Controls pilot's windshield alcohol anti-ice system.
- 5. WSHLD HEAT Switch Controls bleed air to the windshield for anti-ice and ground rain removal.
- WSHLD DEFOG NORM/LOW Switch Controls the electrically heated windshield for interior defog. The intermediate LOW setting may be used during low humidity conditions (dew point less than 70°F [21°C]).



Anti-Ice Systems (Cont) Exterior Windshield Anti-Ice and Rain Removal

Bleed airflow to the windshield exterior is pilot controlled through the WSHLD HEAT switch. In the OFF position, no airflow is available. In the WSHLD HEAT position, maximum airflow is available unless the WSHLD OV HT light is illuminated. The pilot controlled valve will fully open or close within approximately 15 seconds.

To activate the system:

- 1. WSHLD HEAT Switch WSHLD HEAT. The green WSHLD HT light will illuminate when the valve begins to open. If the amber WSHLD OV HT light illuminates, the airflow will automatically stop, until the windshield has cooled, then resume.
- 2. To reduce flow in the event of excessive noise or overheating: WSHLD HEAT Switch OFF, then HOLD when flow is acceptable.

Windshield Alcohol Anti-Ice

The windshield alcohol anti-ice system provides an alternate way to anti-ice the pilot's windshield.

To activate and use the system:

- 1. WSHLD ALC Switch WSHLD ALC. This will anti-ice the pilot's windshield only and give alcohol flow for approximately 45 minutes. The amber ALC LOW light will illuminate when alcohol level is low.
- 2. WSHLD ALC Switch OFF when alcohol is depleted or when out of icing conditions.
- 3. After landing, assure alcohol reservoir is properly replenished.



Anti-Ice Systems (Cont) Wing Anti-Ice

The wing anti-ice system utilizes engine bleed air directed through diffuser tubes in the wing leading edge for anti-icing.

Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff was made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes will help to clear moisture on the wheels and brakes. Monitor WING TEMP indicator for overheat condition.

To activate the system:

- STAB WING HEAT Switch STAB WING HEAT. It is normal for the amber WING HT light to illuminate upon initial activation of the wing heat system until the leading edge temperature reaches the normal operating range.
- 2. Monitor WING TEMP indicator. Adjust engine power to keep the WING TEMP indicator in the green band. When the indicator pointer is in the green band, the wing temperature is warm enough to prevent wing icing. When the indicator pointer is in the blue band, the wing temperature is cold enough for ice to form on the leading edge. Visually monitor both wings for any ice accumulation. At night, the wing inspection light will be required. If indicator progresses into the red band, structure is approaching "too hot" condition.



If the system is on with sufficient engine power and any or all of the following indications are observed, a system failure has occurred:

- The amber WING HT light is illuminated and the WING TEMP indicator pointer is in the blue band.
- Either wing shows signs of ice accumulation. Refer to **WING HT Light Illuminated** procedure, in Section IV.



Anti-Ice Systems (Cont) Horizontal Stabilizer Anti-Ice

The horizontal stabilizer anti-ice system utilizes sequenced electrical heating elements along the horizontal stabilizer leading edge for anti-icing. The system is controlled by the STAB WING HEAT switch. Control circuits for the system are wired through the squat switch to prevent overheating the elements when the airplane is on the ground.

To activate the system:

- 1. STAB WING HEAT Switch STAB WING HEAT.
- 2. Monitor AMPS for an increase in load from the heating elements.



For ground operation, to prevent overheating of the horizontal stabilizer heating elements, ensure that the amber STAB HT light is illuminated. On the ground, activation of the system initiates a self test characterized by the illumination of the STAB HT light and an AMPS increase for approximately three seconds. If the STAB HT light is not illuminated and AMPS do not reduce within five seconds, **immediately** set STAB WING HEAT switch OFF. Flashing of the STAB HT light during or after the self test indicates a failed heating element. The test sequence requires a minimum of three minutes between each test.



- During flight, if an electrical heating element should fail, the amber STAB HT light on the annunciator panel will illuminate. The remaining elements will continue to operate. Monitor AMPS for current load.
- The cooling system is inoperative when the STAB WING HEAT switch is in the On position.



Anti-Ice Systems (Cont) Nacelle Heat

The NAC HEAT switches select nacelle heat and engine inlet guide vane heat (bleed air), and engine inlet air pressure and temperature sensor heat (electrical).

To activate the system:

 L and R NAC HEAT Switches — NAC HEAT. The green NAC HT ON light will illuminate anytime a NAC HEAT switch is set On. The respective N1 bug will show the proper anti-ice on power rating.



- To prevent damage to engine inlet sensors, nacelle heat operation should be limited to 5 seconds if the engine is not running.
- To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions and during descent into visible moisture even if the SAT is below -40°C (-40°F).



- Illumination of the amber L or R NAC HT lights with the NAC HEAT switches On indicates that bleed air pressure is not being applied to the nacelle heat system because of a malfunction.
- Illumination of the amber L or R NAC HT lights with the NAC HEAT switches OFF indicates that bleed air pressure is being applied to the nacelle heat system because of a malfunction.
- Momentary illumination of the amber L or R NAC HT lights during engine starts is normal.



Anti-Ice Systems (Cont) Pitot-Static Heat

Anti-ice protection for pitot-static probes, stall warning vanes, and total temperature probe (weight-on-wheels switch in the air mode) is accomplished by setting the L and R PITOT HEAT switches On. The R PITOT HEAT switch also controls standby pitot-static probe heat.

A pitot heat monitor system provides the crew with a means of determining if sufficient current is being applied to the pitot-static probe heating elements. With the BATTERY and PITOT HEAT switches On, illumination of the amber PITOT HT light indicates insufficient current is being applied to a pitot-static probe heating element. A failure in any system (left, right or standby) will cause the light to illuminate. The light will also illuminate whenever the BATTERY switches are On and either PITOT HEAT switch is OFF.

Windshield Defog

Windshield interior defogging is provided by electrically heated windshield panels. Windshield exterior defogging is provided by the windshield anti-ice and rain removal system.

To provide windshield interior defogging:

WSHLD DEFOG NORM/LOW Switch — NORM. This activates the electrically heated windshield panels. The intermediate LOW setting may be used during low humidity conditions (dew point less than 70°F [21°C]).



Normal system operation is indicated by illumination of the L and R WS DEFOG lights when the system is activated (windshield temperature below 85°F [29°C]). When the windshield is heated above 85°F (29°C), the WS DEFOG lights will extinguish. Should a WS DEFOG light illuminate anytime other than initial activation of the system, refer to **WS DEFOG Light Illuminated** procedure, in Section IV.

To provide windshield exterior defogging:



Use this procedure when descending into areas of high dew point where windshield fogging is likely.

- 1. At start of descent, WSHLD HEAT Switch WSHLD HEAT.
- 2. Leave windshield defog and windshield heat on until shutdown.



Annunciations

The cockpit annunciator panel lights may be tested by pressing the test switch on either side of the panel. During the first 3 seconds of the lamp test, the two bulbs in each light will alternately illuminate. Thereafter, all the bulbs will illuminate until the test switch is released. Photoelectric cells, outboard of each ENG FIRE PULL switch, automatically dim the annunciator panel lights to a level corresponding to existing light in the cockpit or to a minimum preset level for a totally dark cockpit. Other cockpit annunciator lights are dimmed when the NAV lights are on.

If an annunciator light illuminates and the condition is corrected, the light will extinguish. If the condition recurs, the light will again illuminate.

Illumination of any red cockpit annunciator will cause both Master WARN lights to illuminate and flash. Depressing the Master WARN/CAUT light will extinguish the Master WARN light even though the annunciator light may be flashing (ENTRY DOOR, AFT CAB DOOR, L or R STALL, CABIN FIRE, or either ENG FIRE PULL).

Illumination of any amber cockpit annunciator, except starter engaged lights (during ground operations), will cause both Master CAUT lights to illuminate and flash unless the master caution feature has been inhibited. Depressing the Master WARN/CAUT light will extinguish the Master CAUT light even though the annunciator light may be illuminated. The annunciator light will remain on as long as the condition exists. When the aircraft is on the ground, the master caution feature may be inhibited by depressing and holding either Master WARN/CAUT light until the Master CAUT light illuminates steadily. After liftoff, the master caution feature will revert to the normal (uninhibited) mode.

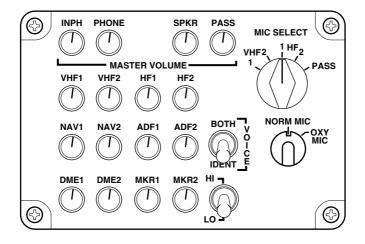
Some white annunciators may be extinguished in flight by depressing either Master WARN/CAUT light. Depressing either annunciator lights test switch will cause the annunciators to illuminate again. Any white annunciators which were extinguished in flight will again illuminate shortly after touchdown.

Additionally, system tolerances are also monitored and displayed within the Engine Indicating System (EIS). Refer to **Engine Indicating System (EIS)**, this section, for more information.



Audio Control System

The audio control system panels provide a means of controlling communications and/or navigation audio information being received or transmitted. The panel also controls audio communication within the cabin.



Audio Control Panels Figure 2-3



Audio Control System (Cont) MIC SELECT Switch

The MIC SELECT Switch is a multi-position rotary-type switch labeled VHF 1, VHF 2, HF 1, HF 2 and PASS. This switch provides the proper microphone audio inputs for the respective functions.

- 1. VHF 1, VHF 2, HF 1 and HF 2 Positions When any of these positions are selected, microphone inputs are provided for the respective transceiver. Microphone must be keyed to transmit.
- 2. PASS Position When this position is selected, the pilot or copilot, utilizing this function, may speak to the passengers through the passenger speaker. Microphone must be keyed to transmit.



PASS should not be selected on both audio control panels simultaneously as degradation of the volume level may result.

NORM MIC/OXY MIC Switch

- 1. NORM MIC Position When the switch is in this position, voice transmissions are accomplished with the headset microphone or hand-held microphone.
- 2. OXY MIC Position When the switch is in this position, voice transmissions are accomplished with the oxygen mask microphone. Both cockpit speakers, phone and interphone function (see **Volume Controls**) will be active. The microphone must be keyed to transmit to the passengers or via a communications radio.



Audio Control System (Cont) Volume Controls

The volume controls consist of four MASTER VOLUME (INPH, PHONE, SPKR and PASS) controls. Each control is rotated to regulate the overall volume level to the applicable output device. The INPH and SPKR controls have a push-ON/push-OFF function. In the "ON" position, the control knob will protrude further than in the "OFF" position. Also, the controls will illuminate in the "ON" position.

- 1. INPH Volume This control regulates the volume level of the crew interphone system. The interphone employs a voice-activated hot microphone.
- 2. SPKR Volume This control regulates the volume level of the on-side cockpit speaker audio.
- 3. PHONE Volume This control regulates the volume level of the on-side headphone audio.
- 4. PASS Volume When PASS is selected on the MIC SELECT Switch, this control regulates the volume level of the passenger speaker audio.

Radio Monitor Switches

Each control has a push-ON/push-OFF function and a volume control which is rotated to regulate the volume level of individual audio inputs. In the "ON" position, the control knob will protrude further than in the "OFF" position. Also, the control will illuminate in the "ON" position. Radio monitor switches on the audio control panel are labeled and perform the following functions:

- 1. VHF 1 and VHF 2 Switches When in the "ON" position, provide audio from the VHF 1 and VHF 2 transceivers respectively.
- 2. HF 1 and HF 2 Switches When in the "ON" position, provide audio from the HF 1 and HF 2 (if installed) transceivers respectively.
- 3. NAV 1 and NAV 2 Switches When in the "ON" position, provide audio from the NAV 1 and NAV 2 receivers respectively.
- 4. ADF 1 and ADF 2 Switches When in the "ON" position, provide audio from the ADF 1 and ADF 2 (if installed) receivers respectively.
- 5. DME 1 and DME 2 Switches When in the "ON" position, provide audio from the DME 1 and DME 2 transceivers respectively.
- 6. MKR 1 and MKR 2 Switches When in the "ON" position, provide audio from the MKR 1 and MKR 2 receivers respectively.



Audio Control System (Cont) BOTH/VOICE/IDENT Switch

This switch controls the audio filtering for the NAV and ADF receivers.

- 1. BOTH Position When the switch is in this position, both the station identifier and voice transmissions will be heard. The BOTH position is the normal position.
- 2. VOICE Position When the switch is in this position, only the voice transmissions will be heard.
- 3. IDENT Position When the switch is in this position, only the station identifier will be heard.

Marker Beacon HI/LO Switch

The HI/LO switch on the pilot's audio control panel controls the #1 marker beacon receiver and the HI/LO switch on the copilot's audio control panel controls the #2 marker beacon receiver.

- 1. HI Position When the switch is in this position, the marker beacon receiver sensitivity is increased.
- 2. LO Position When the switch is in this position, the marker beacon receiver sensitivity is decreased.

Audio Control — Flight Operation

- 1. Applicable MASTER VOLUME Controls Set to the "ON" position and rotate to a comfortable listening level.
- 2. Applicable Radio Monitor Switches Set to the "ON" position and rotate to a comfortable listening level.



The VHF 1 and VHF 2 volume controls do not affect sidetone levels. The HF 1 and HF 2 volume controls will affect the sidetone level on most models since audio and sidetone utilize a common line from the transceivers. Some HF transceivers do not have sidetone capabilities.

3. MIC SELECT Switch — Rotate to desired position.



Avionics Master Switch

Two avionics master switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER switch is installed on the pilot's switch panel and RIGHT MASTER switch is installed on the copilot's switch panel.

The equipment controlled by the avionics master switches is shown in the following list:

LEFT MASTER	RIGHT MASTER	
AP 1	AP 2	
DATALINK RADIO (if installed)	/ ··· =	
L IAPS	DATALINK (CMU if installed)	
•	R IAPS	
LO SPD WARN 1	LO SPD WARN 2	
PFD 1	PFD 2	
SATCOM (if installed)	ADF 2 (if installed)	
TAWS	ATC 2	
	CDU 2	
	COMM 2	
	FMS DISPLAY 2	
	MFD 2	
	NAV 2	
	RTU 2	
	STORMSCOPE (if installed)	
	TCAS	
	WX RADAR	

Additional equipment may be controlled by the avionics master switches as a result of optional equipment installations.



- VHF COMM 1 is not controlled by the avionics master switches.
- Both avionics master switches must be on for the autopilot, yaw damper and rudder boost to be operative.



Integrated Avionics System

The integrated avionics and flight guidance system is comprised of flight instruments, autopilot, yaw damper, rudder boost, engine and system displays, communication and navigation systems. The central feature of the avionics system is the Integrated Avionics Processor System (IAPS) located in the avionics nose compartment. The IAPS provides the following functions: data concentration and distribution, autopilot/flight director, flight management, and maintenance diagnostics. The IAPS maintains a controlled environment (including lightning and HIRF protection) for the modules it houses.

For additional information, refer to the *Pro Line 21 Avionics System with IFIS for the Bombardier Learjet 60XR* Operator's Guide.

Electronic Flight Instrument System (EFIS)

The EFIS is comprised of the following components:

- Four Adaptive Flight Displays (AFD)
- Two Display Control Panels (DCP)
- Two Cursor Control Panels (CCP)
- Two EFIS Control Panels (for reversionary switching)

Adaptive Flight Displays

Four 8" × 10" liquid crystal Adaptive Flight Displays (AFDs) provide airplane altitude, airspeed/Mach, vertical speed, air temperature, attitude data, navigational data, flight director commands, mode annunciators, weather, checklists, warnings and cautionary information, engine indications, aircraft system data, and diagnostic messages. The outboard displays function as Primary Flight Displays (PFD) and the inboard displays function as MultiFunction Displays (MFD). To allow for the failure of either display, each is capable of providing all the instrumentation for the safe operation of the aircraft. The engine parameters from the Engine Indicating System (EIS) are normally displayed on the left MFD and system information on the right MFD. In reversion, any operative AFD is capable of displaying primary flight and navigational data.



Display Control Panel

A Display Control Panel (DCP) is installed above each MFD. The DCP, in conjunction with the bezel-mounted line select keys on the AFDs, control menu items and display settings on the AFDs.

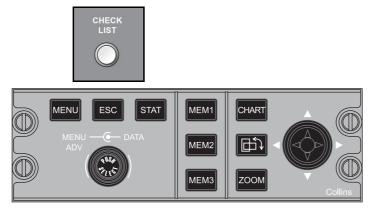


Display Control Panel (DCP) Figure 2-4

Cursor Control Panel

A Cursor Control Panel (CCP) is installed for each MFD. The CCPs are located on the center pedestal just forward of the CDUs. The CCP is used to select and control the optional Integrated Flight Information System (IFIS) functions using on-screen menus and to adjust the orientation of the optional FMS 3D map.

The CHECKLIST button is located on the center pedestal just forward of the CCP. The button controls the checklist displayed on the copilot's MFD. The CHECKLIST button is used in conjunction with the CCP joystick to select and scroll through checklist items.



Cursor Control Panel (CCP) and CHECKLIST Button Figure 2-5



EFIS CONTROL Panel

An EFIS control panel is installed on both the pilot's and copilot's instrument panel. Each panel controls its respective EFIS. Each switch is an alternate action switch. On-side selection is indicated by a green annunciation and cross-side or reversionary mode selection is indicated by an amber annunciation.



EFIS CONTROL Panel Location (copilot)
Figure 2-6



This switch selects the attitude heading system for the respective EFIS display, autopilot and other systems requiring attitude or heading data. The switch is used to recover attitude and heading data if the on-side AHS fails.

Whenever cross-side AHS data is selected, the pitch, roll, and heading comparators will be disabled, and all equipment normally sourced by the on-side AHS will be sourced by the cross-side AHS.



This switch selects the air data system for the respective EFIS display, autopilot and other systems requiring air data. The switch is used to recover air data if the on-side ADC fails.



EFIS CONTROL Panel (Cont)



This reversionary mode switch is used to recover data from a failed PFD. With REV mode selected, the on-side PFD is powered down and PFD data is displayed on the on-side MFD in composite mode (PFD and EIS page).



- When in reversionary mode, the pilot's MFD will display the EIS Engine Page. When in reversionary mode, the copilot's MFD will display the EIS Flight Page. Other EIS pages can be selected using the SYS button on the corresponding DCP; however, after 20 seconds, the display will revert to the default EIS page (Engine on pilot's MFD and Flight on copilot's MFD).
 - The autopilot vertical and/or lateral modes may not transfer when MFD REV is selected. After MFD reversion, verify that the autopilot/flight director modes are as desired.



This reversionary mode switch is used to recover EIS data from a failed MFD. With REV mode selected, the on-side MFD is powered down and EIS data is displayed on the on-side PFD in composite mode (PFD and EIS page).



This switch is used to select the EIS Engine Page for display on the copilot's PFD. When selected ON, the copilot's PFD functions as a composite display with the EIS engine data presented on the top portion of the PFD.

Engine Indicating System (EIS)

The engine indicating system is normally displayed on the top portion of both MFDs (The Engine Page on the pilot's and the Flight Page on the copilot's). Specific EIS pages are selected using the line select keys on the MFD.

Engine and system information may also be displayed on the PFDs. Pressing the SYS button, on the corresponding DCP, cycles through the following pages: [Engine] [Flight] [Electrical] and [Off].

The EIS alerts the crew whenever a system parameter is out of normal range and the page displaying that parameter is not currently in view. When an amber (caution) or red (warning) flag (ENG, FLT or ELEC) appears on the active EIS page(s), the crew should select the applicable page to view the exceeded parameter.



Engine Page Display

The engine page is normally displayed on the pilot's MFD and contains a full time display of engine N1, ITT, N2, Oil Temperature, Oil Pressure, Fuel Flow, as well as other advisory messages including APR, engine SYNC, and thrust reverser status. The N1 and ITT pointers are displayed simultaneously on a 290 degree arc. Digital values for N1, N1 REF, and ITT are also displayed adjacent to the respective arc displays. Digital values for N2, Fuel Flow, Oil Pressure, and Oil Temperature (°C) are also displayed for each engine. Thrust reverser status is presented for each engine on the respective N1/ITT display, just below the zero tick mark. Refer to **Thrust Reverser System** description, this section, for more information.



Engine Page Display Figure 2-7

Flight Page Display

The flight page is normally displayed on the copilot's MFD and contains the following information:

- Landing Gear Position SPOILER Position FLAP Position
- ELEV Trim Position AIL Trim Position RUDDER Trim Position
- SELCAL (if installed)

While on the ground, the ELEV trim pointer is green when the pointer is within the takeoff band and white when it is outside the takeoff band.



Due to system tolerances, the ELEV trim pointer may not show full travel when the trim has been selected full nose up (NU) or full nose down (ND).



Flight Page Display Figure 2-8



Electrical Page Display

The electrical page contains the following information:

- Left and Right AC Bus Voltage (VAC) DC Bus Voltage (VDC)
- Left and Right Generator Load (AMPS) Cabin Temperature Indicator
- Temperature Control Settings (CREW and CABIN)



Electrical Page Display Figure 2-9

Whenever an electrical parameter goes out of the normal range, the readout color changes from green to amber (or red) and flashes for 5 seconds.

Magenta dashes indicate invalid or missing data.

An amber boxed "C", adjacent to each VAC readout, indicates the left and right inverters are out of phase.

Integrated Flight Information System (IFIS)

The optional Integrated Flight Information System (IFIS) adds the following features:

- Electronic Charts Enhanced Maps
- Graphical Weather

These features are presented on the pilot's and copilot's MFD.



Integrated Avionics System (Cont) Autopilot/Flight Guidance System

The autopilot/flight guidance system provides automatic flight control and guidance for climb, cruise, descent, and approach. The system's flight control computer provides dual-channel flight guidance. Either channel can be coupled to the autopilot.

Flight Control Panel

Mode selection and annunciation for each flight guidance channel and engage controls for autopilot and yaw damper are provided through the glareshield mounted Flight Control Panel (FCP). Altitude preselect modes (ALTS and ALTV) are not annunciated on the FCP. However, annunciation is provided on the FCS.



Flight Control Panel (FCP) Figure 2-10

Flight Control System (FCS) mode and status annunciations are presented on the PFD above the attitude ball.



Flight Control System (FCS) Display Figure 2-11

Heading/Speed/Altitude Panel

Heading selection, speed selection, and altitude preselect inputs are commanded from the Heading/Speed/Altitude (HSA) panel located below the FCP on the glareshield.



Heading/Speed/Altitude (HSA) panel Figure 2-12

Course Selection

Two CRS knobs are located on the center pedestal just forward of the CCPs. Each CRS knob controls the on-side course pointer.



Autopilot/Flight Director Mode Selection

Autopilot and flight director modes are selected by depressing the applicable mode selector button on the FCP. Flight director only operation is accomplished by selecting a mode without the autopilot engaged. A light above the mode selector button will illuminate if all conditions for the mode are satisfied. Flight director modes may be disengaged by depressing the selector button a second time or selecting an incompatible mode. Autopilot/flight director mode engagement and arming is also annunciated on the PFD (FCS display).



1/2 BANK mode is automatically active at altitudes above 41,500 feet.

Self-Test

The system initiates a self-test sequence when the system is powered up (LEFT and RIGHT AVIONICS MASTER switches ON). If the self-test sequence is not successfully completed, the autopilot will not engage and an "FD" flag will be displayed on the EFIS displays.

Autopilot Engagement

- 1. AP XFR Button Select the desired flight director (pilot's or copilot's) to couple to the autopilot. A green triangle, on the FCP, will illuminate and point to the side which will couple to the autopilot, when engaged.
- 2. AP Button Depress. Green AP Light will illuminate and a green AP ← or AP ← (as appropriate) annunciation will appear on the PFD (FCS display). The yaw damper will also engage if not already engaged.



- The autopilot will not engage with the PITCH TRIM selector switch in the OFF position.
- Upon engagement, if no modes are selected, the autopilot will automatically assume the attitude hold mode and maintain the attitude existing at the time of engagement.
- Independent flight director mode is indicated with a double-headed arrow (AP →→). The filled arrowhead indicates the side to which the autopilot is coupled.



Autopilot Disengagement

- If autopilot is engaged, depressing the AP Button will disengage the autopilot.
- Either control wheel trim switch (arming button depressed) moved in any of four directions (NOSE UP, NOSE DOWN, LWD, or RWD) will disengage the pitch and roll axes.
- Either control wheel master switch (MSW), when depressed, will disengage the pitch and roll axes, and the yaw damper.
- PITCH TRIM selector switch, when moved to OFF position, will disengage the pitch and roll axes.
- Moving the pedestal NOSE DN-OFF-NOSE UP switch to NOSE UP or NOSE DN will disengage the pitch and roll axes.
- Depressing the GO-AROUND button (left thrust lever knob) will disengage the pitch and roll axes and select flight director go-around mode.



- Whenever the autopilot is disengaged by pilot action, the autopilot disengage tone will sound, and the autopilot engaged annunciation on both the FCS and the FCP will no longer be displayed.
- If the autopilot is disengaged automatically due to a system fault, a continuous tone will sound. The continuous tone can be cancelled by depressing either control wheel master switch.

FMS to Autopilot/Flight Director Interface

When FMS is the active NAV source on the pilot's or copilot's PFD, lateral FMS steering can be obtained through the autopilot/flight director NAV mode.

Roll steering is normally limited to 25°. If 1/2 BANK is active on the coupled flight director, the flight management system limits roll steering commands to 12.5°.

Control Wheel Master Switch (MSW)

Depressing the control wheel master switch (MSW) on the outboard horn of either control wheel will disengage the autopilot and the yaw damper.



Control Wheel Trim Switches (Vertical and Lateral Command)

When either control wheel trim switch (arming button depressed) is moved to any of the four positions (LWD, RWD, NOSE UP or NOSE DOWN), an aircraft trim input is made and the autopilot will disengage. If the arming button is not depressed, the on-side switch may be used to input lateral commands (LWD and RWD) and vertical commands (NOSE UP and NOSE DOWN) to the autopilot. Using this feature causes active modes (except GS) in the applicable axis to disengage and revert to the attitude hold mode. Armed modes are not affected. The control wheel trim switch has no effect on the flight director.

SYNC Switches

The SYNC switches, on the control wheels, are normally used with the on-side flight director to change a vertical mode (except GS) reference value without reselecting the mode. The only lateral mode in which SYNC switches are active is roll attitude hold (ROLL). When SYNC is commanded, a SYNC indication displays on the FCS display.

FD CLEAR Switches

The FD CLEAR switches, on the control wheels, are used with the onside flight director to toggle between command bars in-view and out-of-view.

On-side flight director **not** coupled to autopilot — Use of FD CLEAR switch will remove the command bars and cancel any selected vertical and lateral modes from the on-side flight director.

On-side flight director coupled to autopilot — Use of FD CLEAR switch will remove the command bars without cancelling selected modes.

GO-AROUND Switch

Depressing the GO-AROUND switch, in the left thrust lever knob, will disengage the autopilot and select flight director GA mode.



Integrated Avionics System (Cont) Yaw Damper System

Yaw damping and turn coordination is provided by the yaw damper system. The yaw damper system can be engaged without engaging the autopilot, and it may be disengaged without disengaging the autopilot.

Yaw Damper Engagement

- Yaw damper will automatically engage each time the autopilot is engaged.
- If the yaw damper is not engaged, depressing the YD button will engage the yaw damper.



Yaw damper engagement is annunciated with a green indicator light above the YD button on the FCP and a green YD on the PFD (FCS display).

Yaw Damper Disengagement

- If yaw damper is engaged, depressing the YD button will disengage the yaw damper.
- Depressing either control wheel master switch will disengage the yaw damper.



Whenever the yaw damper is disengaged by pilot action, the yaw damper disengage tone will sound, and the yaw damper engaged annunciations will extinguish.



Integrated Avionics System (Cont) Rudder Boost System

The rudder boost system reduces rudder forces, increases directional control effectiveness and improves takeoff performance. Whenever the flaps are 8° or lower and the pilot exerts approximately 50 pounds of rudder pedal force, the system engages (if armed) and using the yaw damper servo assists the pilot in deflecting the rudder. A RUDDER BOOST switch is used to arm the system and system status is provided by green RB (active) and amber RB (fail) lights on the FCP. If a conflict exists between the yaw damper and rudder boost commands, the rudder boost system will override the yaw damper.

Self-Test

The system initiates a self-test when the system is powered up (RUDDER BOOST switch ON and both AVIONICS MASTER switches ON). During the self-test sequence, the amber RB fail light will be continuously displayed. Successful completion of the self-test sequence will extinguish the amber RB light and arm the rudder boost system. Failure of the self-test sequence will leave the amber RB light illuminated and rudder boost will not be armed.

Arm Rudder Boost System

- 1. RUDDER BOOST Switch ON.
- 2. Flaps Extend to 8° or greater.

When rudder pedal force of approximately 50 pounds or more is present, the rudder boost computer will activate rudder boost and assist the pilot in deflecting the rudder. The green RB light will illuminate to indicate rudder boost is active. Failure of the rudder boost system is indicated by illumination of the amber RB light.

Disarm Rudder Boost System

- Setting the RUDDER BOOST switch to OFF will disarm rudder boost.
- Retracting the flaps will disarm rudder boost.
- Depressing either control wheel master switch (MSW) will disable rudder boost while the switch is held.



Integrated Avionics System (Cont) Flight Management System (FMS)

The FMS provides centralized control for navigation, flight planning, radio tuning, performance calculation, and fuel management functions.

For additional information, refer to the FMS-5000 Flight Management System for the Learjet 60XR Operator's Guide.

When FMS is the selected NAV source, Course Deviation Indicator (CDI) scaling is as follows:

FULL SCALE REPRESENTS:			
EN ROUTE	TERMINAL	FMS APPROACH	GPS APPROACH
5 NM	1 NM	1 NM	0.3 NM

FMS-Based Approach Procedure

1. On the CDU, press the DEP ARR function key to show the ARRIVAL page.



- Either an ORIGIN or a DESTination airport must be specified in the flight plan for approach selections to be available on the ARRIVAL page.
- When the DEP ARR key is pressed, one of three pages is shown: the DEPART, ARRIVAL, or DEP/ARR INDEX page. If the aircraft is on the ground, or airborne less than 50 NM from the origin airport, or less than halfway to the destination airport, the DEPART page for the origin airport shows. If the aircraft is airborne and more than halfway to the destination airport, the ARRIVAL page for the destination airport is shown.
- 2. Press the line select key adjacent to the desired approach under the APPR list.
- 3. Select the approach transition by selecting the transition under the TRANS list, or select VECTORS if no transition is required.



If the desired approach or transition is not visible under the APPR or TRANS list, press the NEXT or PREV function keys to scroll through additional selections.



FMS-Based Approach Procedure (Cont)

4. Once the approach and transition have been selected, press the EXEC function key to add the approach to the flight plan. Once the change is made to the flight plan, the SEL indications will change to ACT.



When an approach is added to a flight plan from the ARRIVAL page, a discontinuity is added immediately before the approach procedure in the flight plan.

- 5. When intercepting a non-precision final approach course, select the flight director APPR mode. When flying an approach via a transition (other than VECTORS), select the APPR mode prior to 2 NM from the final approach fix.
- 6. To select glidepath guidance on a non-precision approach, select VNAV mode at least 2 NM prior to the final approach fix. The FMS will provide a vertical path to those approaches with RWY listed as the altitude at the runway or missed approach point.



If APPR mode is selected on the FCP, a white GP annunciation will be displayed prior to 2 NM from the final approach fix. This indicates the system is armed to capture and track a glidepath past the final approach fix. After glidepath capture, the annunciation will change to a green VGP.



In VGP mode, the VNAV system will not level off at the preselected altitude. The preselector can be set to the missed approach altitude. Operation in VGP mode is similar to GS mode for an ILS approach.

7. VNAV guidance is not provided past the final approach fix for those approaches with the missed approach point altitude labeled as a V-MDA. If VNAV is being utilized to descend to the final approach fix, pitch mode will arm (white PTCH on the PFD [FCS display]) prior to the FAF and become the active mode holding the aircraft's current pitch attitude at the FAF and beyond. Another vertical mode may be selected beyond the FAF for descent to the MDA.



Integrated Avionics System (Cont) Flight Management System (FMS) (Cont)

Missed Approach Procedure

Missed approach procedures are automatically added to the flight plan with the selection of an approach. The missed approach waypoint shows on the LEGS page as the waypoint just before the MISSED APPR label. It will also display on the FPLN page as MISSED APPROACH. A missed approach is activated by pressing the GO-AROUND switch.

1. ● If a missed approach is required from a localizer-based approach:

- a. Perform **Go Around** procedure, this section.
- b. From the LEGS page, ensure the AUTO sequence is selected.
- c. Make sure the TO waypoint is the first waypoint of the missed approach.
- d. Select FMS as the NAV source.
- Select the appropriate lateral and vertical flight director modes.
- f. Engage the autopilot (if desired).

1. • If a missed approach is required from an FMS-based approach:

- a. Perform **Go Around** procedure, this section.
- From the LEGS page, ensure the AUTO sequence is selected.
- c. Make sure the TO waypoint is the first waypoint of the missed approach.
- d. Select the appropriate lateral and vertical flight director modes.
- e. Engage the autopilot (if desired).



Integrated Avionics System (Cont) Terrain Awareness and Warning System (TAWS)

Refer to the Honeywell *Enhanced Ground Proximity Warning System* (*EGPWS*) and *Runway Awareness Advisory System* (*RAAS*) pilot's guide for detailed descriptions of all aural and visual warnings. Use of the terms EGPWS and TAWS are considered synonymous for purposes of this manual and when referencing other related publications.

The TAWS provides the pilot with aural and visual warnings of possible terrain (or obstacle) proximity, excessive deviation below ILS glideslope, and detection of severe windshear conditions. The TAWS also provides aural alerts for descent below pre-defined altitudes during final approach, including a minimum descent altitude awareness callout and excessive bank angle alerting. Visual warnings and annuciations are provided on the Electronic Flight Instrument System (EFIS).

Terrain Alerting and Display (TAD) Feature

The TAD shows an image of the surrounding terrain ahead of the airplane in varying density dot patterns of red, yellow and green. The image is generated by comparing aircraft altitude and the terrain (or obstacle) data stored in the system computer. The dot patterns represent specific terrain separation with respect to aircraft position. The TAD can be displayed on both PFDs and MFDs.

A "CAUTION TERRAIN, CAUTION TERRAIN" or "CAUTION OBSTACLE, CAUTION OBSTACLE" voice alert is generated approximately 60 seconds from projected terrain (or obstacle) conflict. Conflict areas will be displayed in solid amber.

A "TERRAIN, TERRAIN, PULL-UP" or "OBSTACLE, OBSTACLE, PULL-UP" voice warning is generated approximately 30 seconds from projected terrain (or obstacle) conflict. Conflict areas will be displayed in solid red.

Terrain Clearance Floor (TCF) Feature

The TCF feature warns the pilot of possible premature descent, regardless of aircraft configuration. The TCF function creates a high resolution terrain clearance envelope around the airport to provide protection against Controlled Flight Into Terrain (CFIT) situations.



Integrated Avionics System (Cont) Terrain Awareness and Warning System (TAWS) (Cont) PEAKS Feature

The PEAKS feature provides additional terrain display features for enhanced situational awareness, independent of the aircraft's altitude. It includes digital elevations, displayed in the appropriate color for the elevation, for the highest and lowest displayed terrain, and additional elevation (color) bands. The elevations are expressed in hundreds of feet above sea level with the highest elevation on top and the lowest elevation on the bottom. In the event there is no appreciable difference in elevations, only the higher value is displayed.

System Switches



INHIBIT: The amber INHIBIT annunciator (top half of the G/S INH switch on the instrument panel) illuminates when the glideslope inhibit feature has been selected. The primary purpose of this feature is to inhibit glideslope alerts during localizer only approach procedures.

G/S INH: The white G/S INH switch on the instrument panel is used to inhibit mode 5 visual and voice alerts. Depressing the G/S INH switch after descending below 2000 feet radio altitude will inhibit the "GLIDESLOPE..." voice alert and the GND PROX indications (PFD). The mode will automatically reset prior to the next approach, provided the aircraft has descended below 30 feet AGL or climbed above 2000 feet AGL.



INHIBIT: The amber INHIBIT annunciator (top half of the TERR switch on the instrument panel) illuminates when the TAD and TCF features have been inhibited. Additionally, TERR INHB is displayed on the PFD and MFD terrain display area.

TERR: The white TERR switch is used to inhibit the TAD and TCF features.



OVRD: The amber OVRD annunciator (top half of the TAWS FLAP switch on the instrument panel) illuminates when the "TOO LOW FLAPS" voice alert is disabled. The purpose of this feature is to override the voice alert when conducting an abnormal landing (one without full flaps).

TAWS FLAP: The white TAWS FLAP switch is used to disable the mode 4 "TOO LOW FLAPS" voice alert. When the switch is in its normal setting (amber OVRD not illuminated), the "TOO LOW FLAPS" voice alert is enabled.



Integrated Avionics System (Cont) Terrain Awareness and Warning System (TAWS) (Cont)

Self-Test

The system provides for a short self-test and a long self-test. The short test is performed as part of the **Before Starting Engines** procedure, this section. The following long self-test may be used to verify the TAWS during ground operations only:

- 1. SYSTEM TEST Switch Rotate to TAWS.
- 2. TEST Button Depress and hold for more than 2 seconds. The short self-test sequence will be performed followed by the long self-test described below. The TAD self-test pattern will remain on throughout the long self-test. The boxed GPWS and boxed WS (PFD), and amber TERRAIN FAIL (MFD) indications remain on throughout the long self-test. If the self-test is not successful, the boxed GPWS and/or the boxed WS indications will remain displayed.
- 3. The following aural warnings and alerts will be annunciated:



Aural messages vary depending on customer selection. Refer to the aircraft configuration page (at the front of this manual) for specific information on your aircraft's TAWS configuration.

- "SINK RATE"
- "PULL-UP" ("WHOOP WHOOP PULL-UP")
- "TERRAIN"
- "PULL-UP"
- "DON'T SINK DON'T SINK"
- "TOO LOW TERRAIN"
- "TOO LOW GEAR"
- "TOO LOW FLAPS"
- "TOO LOW TERRAIN"
- "GLIDESLOPE"
- "BANK ANGLE, BANK ANGLE"
- "MINIMUMS, MINIMUMS"
- "FIFTY"
- "FORTY"
- "THIRTY"
- "TWENTY"
- "TEN"
- "FIVE HUNDRED"
- A beep followed by "WINDSHEAR WINDSHEAR"
- "CAUTION WINDSHEAR"
- "TOO LOW TERRAIN"



Integrated Avionics System (Cont) Terrain Awareness and Warning System (TAWS) (Cont)

- "CAUTION TERRAIN CAUTION TERRAIN"
- "TERRAIN TERRAIN PULL-UP"
- "CAUTION OBSTACLE CAUTION OBSTACLE"
- "OBSTACLE OBSTACLE PULL-UP"
- The boxed GPWS and WS on the PFDs and the TERRAIN FAIL annunciation on the MFDs are removed.

Ground Proximity and Windshear Warnings

The TAWS provides aural and visual warnings of possible terrain danger under the following conditions:

Mode 1 (Excessive Sink Rate) – This mode provides alerts and warnings for excessive descent rates with respect to radio altitude and is active for all phases of flight.

Mode 2 (Excessive Closure to Terrain) – This mode provides alerts and warnings for excessive closure rates to terrain with respect to radio altitude, phase of flight, and airspeed. Mode 2 exists in two forms: 2A and 2B depending on the phase of flight and aircraft configuration. Typically, the mode is active during climb out, cruise, and initial approach.

Mode 3 (Altitude Loss After Takeoff) – This mode provides alerts for significant altitude loss after a takeoff or low altitude go-around with gear or flaps not in landing configuration. This mode provides alerts throughout the first, second and third segments of climb.

Mode 4 (Unsafe Terrain Clearance) – This mode provides alerts for insufficient terrain clearance with respect to aircraft configuration and airspeed. These alerts are given even with low closure rates. Mode 4 alerts exist in three forms: 4A, 4B, and 4C depending on phase of flight and configuration.

Mode 5 (Excessive Glideslope Deviation) – This mode provides alerts for excessive flight path deviation when the aircraft descends below the glideslope on ILS approaches. Alerts are given below 1000 feet radio altitude if flight path deviation exceeds 1.3 dots below glideslope.



Integrated Avionics System (Cont) Terrain Awareness and Warning System (TAWS) (Cont)

Mode 6 (Advisory Callouts) – This mode provides optional aural-only callouts as the aircraft descends through predefined radio altitudes below 2500 feet AGL and passes through the selected RA or BARO MIN. Mode 6 also provides bank angle callouts during all phases of flight.

Altitude Callouts – Each optional altitude callout is annunciated only once during each approach.

Smart 500 Foot Callout – The smart "FIVE HUNDRED" callout is designed to be used in conjunction with a non-precision approach where vertical guidance is unavailable. This callout is inhibited during a precision approach unless the aircraft has deviated more than two dots from glideslope or localizer passing 500 feet AGL.

Minimums Callout – When the aircraft descends through the selected RA or BARO MIN, the "MINIMUMS" voice alert may be given and MIN illuminates on the PFD. To inhibit this advisory for VFR approaches, do not select either RA or BARO MIN.

Bank Angle Callout – The callout "BANK ANGLE, BANK ANGLE" advises the crew of a roll attitude that is excessive for the flight conditions. This callout is available at all altitudes.

Mode 7 (Windshear Warnings and Cautions) – Windshear warnings and cautions are provided between rotation and 1500 feet radio altitude during the initial takeoff and between 1500 and 10 feet radio altitude during the final approach phase. If the level of windshear exceeds predetermined threshold values, a warning or caution will be issued. These shears result from vertical winds and rapidly changing horizontal winds. Windshear detection and annunciation cannot predict the actual severity of windshear ahead of the aircraft.

Aural Message Priority

Two or more message envelopes may be penetrated simultaneously; therefore, a priority of messages has been established. Messages of a higher priority will immediately override a lower priority message in progress. Lower order priorities will function only upon the cessation of a higher order message. The message priority is listed in the Honeywell Enhanced Ground Proximity Warning System (EGPWS) and Runway Awareness Advisory System (RAAS) pilot's guide.



Integrated Avionics System (Cont) Runway Awareness Advisory System (RAAS) (If Installed)

The optional RAAS provides position awareness advisories (aural) relative to runways during ground operations and approach to landing. The RAAS uses inputs already available to the TAWS such as GPS position, heading, groundspeed and runway database.



For a specific list of airports validated for RAAS, see http://egpws.com.

The RAAS comprises ten advisory messages, divided into five routine advisories and five non-routine advisories. Routine advisories are those that will be experienced in normal operations.

Routine Advisory	Purpose		
Approaching the Runway (on ground)	Awareness of a runway being approached by the aircraft during ground operations (e.g., "Approaching one-one").		
On Runway (on ground)	Awareness of which runway the aircraft is lined-up with during ground operations (e.g., "On runway three-four left").		
Approaching Runway (in air)	Awareness of which runway the aircraft is tracking on final approach (e.g., "Approaching one-six right").		
Landing Distance Remaining	Awareness of aircraft position relative to the runway end (e.g., "One thousand remaining").		
Runway End	Awareness of the position of the aircraft relative to the runway end (e.g., "One hundred remaining").		

Non-routine advisories are those that advise of non-normal situations.

Non-Routine Advisory	Purpose
Taxiway Takeoff	Awareness of excessive taxi speeds or a takeoff on a taxiway ("On taxiway! On taxiway!").
Insufficient Runway Length (on ground)	Awareness of which runway the aircraft is lined up with, and that the runway length available for takeoff is less than a defined nominal takeoff runway length (e.g., "On runway three-four left, six-hundred remaining").
Extended Holding on Runway	Awareness of an extended holding period on the runway (e.g., "On runway three-four left, on runway three-four left").

Continued



Integrated Avionics System (Cont) Runway Awareness Advisory System (RAAS) (Cont)

Non-Routine Advisory	Purpose
Distance Remaining (rejected takeoff)	Awareness of aircraft position during an RTO (e.g. "two-thousand remaining").
way (in air)	Awareness of which runway the aircraft is tracking, and that the runway length available for landing is less than a defined nominal landing runway length (e.g., "Approaching three-four right, three-thousand remaining").



Integrated Avionics System (Cont) Electronic Standby Instrument System (ESIS)

The ESIS is a self-contained instrument that displays attitude (pitch and roll), baro-corrected altitude, indicated airspeed, Mach number, vertical speed, and slip/skid information. These data are derived from an internal three-axis inertial sensor and air data sensor. In addition, navigational information (VOR, ILS and marker beacon) can be displayed.



The course deviation indicator does not automatically reverse when flying a localizer back-course approach. ILS BC mode must be selected from the menu.

The VMO/MMO limit is indicated by the red bar on the airspeed scale. The airspeed value changes to red when VMO/MMO is exceeded. The ESIS does not trigger an aural overspeed warning.

The excessive pitch display is a chevron type format. Chevrons, pointing towards the horizon, appear when the zero pitch line approaches view limits.

External inputs include: pitot-static pressure (standby probe), localizer/glideslope/marker beacon (VOR/ILS 1) and power from EMER BAT 1.

A bezel-mounted sensor provides automatic display dimming, with manual control achieved through the menu mode.

Refer to the *Pilot's Guide for the Electronic Standby Instrument System Model GH-3100* for a detailed description and operation of the ESIS.

Power Up

When EMER BAT 1 is switched on, the ESIS will perform a self test followed by an alignment procedure. The self test and the alignment procedure require approximately 3 minutes. When the alignment procedure is complete, the ESIS enters its normal operating mode.



Do not move the aircraft during the alignment procedure.

In-Flight Alignment Procedure

- 1. Establish aircraft in straight and level, unaccelerated flight.
- 2. Select FAST ERECT from the menu. Alignment should occur in approximately 15 seconds.
- 3. *If alignment does not occur,* select FAST ALIGN from the menu.



Integrated Avionics System (Cont) Traffic Alert and Collision Avoidance System (TCAS)

The TCAS system provides the pilot with aural and visual indications of potentially dangerous flight paths relative to other aircraft in the vicinity. The system uses the transponder to interrogate other transponder-equipped aircraft and determine their bearing, range, and altitude. With this information, the TCAS processor can generate advisories to prevent or correct traffic conflicts.

The system is active whenever DC power is available to the receiver/transmitter/processor and the mode S transponder with altitude reporting is active. Refer to the *Pro Line 21 Avionics System with IFIS for the Bombardier Learjet 60XR* Operator's Guide for a detailed description and operation of the TCAS system.

Self-Test

The system provides for a self-test that is performed as part of the **Before Starting Engines** procedure, this section.

Cockpit Voice Recorder (CVR)

The Cockpit Voice Recorder (CVR) system is installed to record all cockpit audio (including voices, radio communications, aural annunciations, and aural navigation signal).

CVR Test

- 1. CVR TEST Switch Press and hold for at least 2 seconds.
- 2. During the test, observe the following:
 - a. PASS and FAIL annunciators flash alternately for approximately 15 seconds.
 - b. At the end of a successful test the PASS annunciator will illuminate steady for approximately 10 seconds.
- 3. If the test fails, the FAIL annunciator will come on either steady or flashing. The pattern of flashes is an indication to maintenance personnel as to the nature of the failure.

Bulk Erase Function

A bulk erase function is available when the airplane is on the ground.

- 1. PARKING BRAKE Set.
- 2. ANTI-SKID Switch On.
- 3. CVR ERASE Switch Press and hold for approximately 2 seconds. Completion of the erasure cycle is indicated by simultaneous flashing of the PASS and FAIL annunciators for approximately 10 seconds.



Integrated Avionics System (Cont) Flight Data Recorder (FDR) (If Installed)

The FDR records pertinent flight profile data. The data recorder has sufficient storage capacity to record the last 25 hours of operation. A white FDR FAIL annunciator is installed in the annunciator panel to annunciate system malfunctions. The following parameters are recorded:

- Altitude
- Indicated Airspeed
- Magnetic Heading
- Pitch Angle - Roll Angle
- Three-Axis Accelerations
- Weight-on-Wheels Status
- Gear Position
- Flap Position
- Spoiler Lever Position
- Spoiler Angle (L/R)
- Stabilizer Position
- Thrust Lever Position (L/R)
- Thrust Reverser Position (L/R)
- FADEC Channel (L/R)
- AP/FD Status (P/CP)
- Yaw Damper Status
- Total Air Temperature - TAWS Modes

- Selected Decision Height
- Radar Altitude
- Angle of Attack (L/R)
- Greenwich Mean Time
- Lat/Lon Position
- N1 (L/R)
- Nav/ILS Data
- Desired Track
- Marker Beacon Passage
- COM Keying (P/CP)
- Selected Course
- Selected Altitude
- Vertical Speed Reference
- IAS Reference
- Mach Reference
- Baro Correction
- PFD Modes (P/CP)
- MFD Modes (P/CP)
- TCAS TA/RA

Power Up

The FDR is functional whenever power is applied to the aircraft. An inertia switch is installed to interrupt power in the event of a crash. There are no controls or switches associated with the FDR and operation is completely automatic.

Upon power-up, the system will perform a self test. When the BATTERY switches are set to on, the FDR FAIL annunciator will illuminate briefly (approximately 5 seconds) then extinguish. The test will continue for another 60 seconds and the light should not come back on during the test. The FDR will immediately start recording and continue until power is interrupted.

Illumination of FDR Fail Light in Flight

Illumination of the FDR FAIL light indicates a malfunction of, or loss of power to, the FDR. There is no action required of the crew.



Integrated Avionics System (Cont) Emergency Locator Transmitter (ELT)

The ELT cockpit remote control provides a manual ON and ARM positions. A red indicator light on the cockpit switch panel flashes continuously if the ELT has been activated and is transmitting.

To arm the transmitter for automatic activation:

1. ON/ARM Switch - ARM.

To manually activate the transmitter:

1. ON/ARM Switch - ON.

To reset the transmitter:

1. ON/ARM Switch - ON and then immediately back to ARM. Check that the flashing cockpit ELT indicator light extinguishes.

ELT Test

Perform the following test to determine if the ELT is operational:



Always perform the ELT test within 5 minutes after the hour for less than 15 seconds. After 15 seconds, the satellite system will respond to the transmission as a real emergency.

- 1. Tune a VHF Comm receiver to 121.5 Mhz.
- 2. ON/ARM Switch ON.
- 3. Listen for 3 down-swept tones of the ELT.
- 4. Verify the ELT light is flashing.
- 5. ON/ARM Switch ARM.
- 6. Verify the down-swept tone stops.
- 7. Verify the ELT light extinguishes.

CABIN PWR Switch

The CABIN PWR switch quickly and efficiently sheds the CABIN PWR BUS electrical load by selecting the CABIN PWR switch to OFF. The CABIN PWR switch is located on the instrument panel, centered below the pilot's PFD and MFD. This switch is normally left in the On position (OFF not illuminated).



Selecting CABIN PWR — OFF will disable the NO SMOKING/FASTEN SEATBELT sign and tone.



Engine Systems Automatic Performance Reserve (APR)

The APR system provides for an automatic change in thrust (from take-off N1 rating to APR rating) from the operative engine in the event of loss of thrust from one engine during takeoff. The system consists of an APR switch on the forward pedestal, APR ARM and APR ON indications that display on the EIS. To detect loss of thrust, the Full Authority Digital Engine Control (FADEC) continuously monitors the opposite engine's N1 and N2 signals.

APR system operation is pilot controlled through the APR ARM-OFF switch. For automatic operation the switch is set to ARM. When ARM is selected, the green APR ARM indication will display provided no faults exist which affect the APR function. When a loss of thrust is detected by one of the FADECs, a change in thrust from the operative engine is commanded. The FADEC checks that the change to the appropriate APR N1 setting has been triggered and if it has, the amber APR ON indication will display. Should automatic activation of APR fail to occur, APR can be manually activated by setting the thrust lever to the APR detent. Once invoked, the APR thrust schedule will remain activated until the APR switch is set to OFF returning the thrust schedule to normal.



APR Annunciation Figure 2-13



Engine Systems (Cont) Engine Synchronizer

Engine synchronization is provided by the Full Authority Digital Engine Control (FADEC). Additional components include two ENG SYNC switches below the thrust levers, a green or amber ENG SYNC indication on the EIS display, and an amber ENG SYNC light in the glareshield annunciator panel. During flight, the engine synchronizer, if selected, will maintain the left and right engine N1 or N2 in sync with each other. When the ENG SYNC switch is set to SYNC, the N1 Indicator compensation will be removed; therefore, the N1 and N1 bug presentations will reflect actual N1 speed. The engine synchronizer must not be used during takeoff, landing or during single-engine operations.

The amber ENG SYNC indication will display whenever the nose gear is not up and the ENG SYNC switch is in the SYNC position.

Automatic engine synchronization can be utilized whenever the ENG SYNC switch is set to SYNC, the Thrust Lever Angle (TLA) of each engine is in or below the MCT detent, and the difference between the left and right N1 is equal to or less than 5%. The system will not drive the engine below idle or above MCT.

To obtain automatic engine synchronization:

- 1. Thrust Levers As required to manually sync engines' N1 to within 5% in the IDLE to MCT range.
- 2. ENG SYNC Selector Switch (pedestal) N1 or N2 as desired.
- 3. ENG SYNC SYNC-OFF Switch (pedestal) SYNC.



Environmental Systems Bleed Air Heating and Cooling

Cabin and crew air is provided by cooling engine bleed air in a ram air heat exchanger. Primary heating and cooling is obtained by controlling the amount of warm air that goes through the heat exchanger by modulating the cabin or crew temperature control valve. Temperature control valve position is indicated on the TEMP CONTROL: CREW and CABIN displays (EIS Electrical page). Full-cold position is indicated by a zero (0), and full-hot is indicated by a nine (9).

An amber DUCT OV HT light is installed on the glareshield annunciator panel to alert the crew that a duct temperature limiter in either the cabin or crew tailcone ducting has sensed an overheat condition and will close the affected temperature control valve as required to maintain duct temperature within limits. The DUCT OV HT light will extinguish when satisfactory duct temperature is regained.

- 1. BLEED AIR Switches ON.
- 2. CAB AIR Switch ON.



With the aircraft sitting statically on the ground, do not perform extended engine operation above IDLE with CAB AIR Switch ON. There is no ram airflow through the heat exchanger and possible damage to air conditioning components may occur.

3. CABIN or CREW Climate Controls — Operate as follows:



The CAB TEMP indicator (EIS Electical page) can be used to assist the crew in maintaining a comfortable cabin temperature.

- a. ●For Crew Temp, AUTO-MAN Switch AUTO.
- a. •For Cabin Temp, AUTO-CABIN-MAN Switch AUTO or CABIN.



With switch in AUTO, the instrument panel mounted CABIN COLD-HOT knob will control the cabin temperature. With switch in CABIN, the temperature selector, located in the cabin, will control the cabin temperature.

b. COLD-HOT Knob — Rotate to desired cabin temperature. In flight, the cabin and crew temperature control system will automatically maintain the cabin and cockpit at the desired temperature.



Environmental Systems (Cont) Bleed Air Heating and Cooling (Cont)

If satisfactory temperature is not maintained:

- c. AUTO-MAN or AUTO-CABIN-MAN Switch MAN.
- d. COLD-HOT Knob Rotate to desired setting.

Additional Cooling



- On the ground, power to the cooling system must be supplied by an engine generator, a GPU or an APU (if installed). In flight, both generators must be on-line (GEN lights out) to power the cooling system.
- The cooling system is inoperative when the STAB WING HEAT switch is in the On position.
- With the COOL switch in the COOL position, the cooling system will automatically shut down when the TEMP CONTROL CABIN indication increases toward hot from the full-cold position (0).
- Power to the cooling system will be lost if the fault isolator circuit trips. If the fault clears, power can be restored by cycling the COOL switch to OFF and back to COOL.
- The cabin overhead eyeball outlets provide cool air from the crew fan.

Ground Operation:

- 1. One generator, a GPU or an APU (if installed) on-line.
- 2. TEMP CONTROL CABIN Indication 0.
- 3. CAB AIR Switch OFF.
- 4. COOL Switch COOL.
- 5. CREW FAN Control Rotate to desired setting.
- 6. CABIN FAN Control Rotate to desired setting.

In-flight Operation:

- 1. Both generators on-line (GEN lights out).
- 2. TEMP CONTROL CABIN Indication 0.
- 3. COOL Switch COOL.
- 4. CREW FAN Control Rotate to desired setting.
- 5. CABIN FAN Control Rotate to desired setting.



Environmental Systems (Cont) Additional Heating



- On the ground, power to operate the auxiliary heater and cockpit floorboard heaters must be supplied by an engine generator, a GPU or an APU (if installed).
- In flight, both generators must be on-line (GEN lights out) to power the cockpit floorboard heaters (CREW AUX HT).
- Cabin AUX HT is inoperative when the CAB AIR Switch is set to ON.

Cockpit

Ground Operation:

- 1. One generator, a GPU or an APU (if installed) on-line.
- 2. AUX HT Switch CREW or CAB & CREW.

In-flight Operation:

- 1. Both generators on-line (GEN lights out).
- 2. AUX HT Switch CREW or CAB & CREW.

Cabin

Ground Operation:

- 1. One generator, a GPU or an APU (if installed) on-line.
- 2. CAB AIR Switch OFF.
- 3. AUX HT Switch CAB & CREW.
- 4. CABIN FAN Control Rotate to desired setting.



Environmental Systems (Cont) Additional Air Circulation

Ground Operation:



- Use of a GPU or an APU is recommended to prevent draining the batteries.
- If power is not supplied by an engine generator, a GPU or an APU (if installed), the cabin fan will not operate.
- 1. CAB AIR Switch OFF.
- 2. CABIN FAN Control Rotate to desired setting.
- 3. CREW FAN Control Rotate to desired setting.
- 4. Adjust cockpit and cabin overhead eyeball outlets as desired.



The cabin overhead eyeball outlets provide air circulation with the CREW FAN on.

In-flight Operation:

- 1. CABIN FAN Control Rotate to desired setting.
- 2. CREW FAN Control Rotate to desired setting.
- 3. Adjust cockpit and cabin overhead eyeball outlets as desired.



The cabin overhead eyeball outlets provide air circulation with the CREW FAN on.



Environmental Systems (Cont) Oxygen System



Smoking is prohibited while oxygen system is in use.

Oxygen Duration

Figure 4-2, in Section IV, shows oxygen supply duration of a fully charged system as a function of cabin altitude and number of occupants using the system. Passenger durations above 30,000 feet cabin altitude are provided for information only. Prior to extended over water flights, plan oxygen requirements to provide sufficient oxygen for all occupants in the event of a pressurization failure. Additional oxygen may be required to assure that both oxygen duration and range (fuel) requirements are satisfied.

A fully charged oxygen bottle is serviced to approximately 1850 psi at a specified temperature. The indicated pressure may drop as the oxygen bottle cold soaks. The amount of pressure drop may be a few hundred psi. This drop in pressure has no effect on the amount of oxygen available, since the oxygen is warmed back up as it enters the cabin.

Passenger Oxygen



- Passenger masks are intended for use during an emergency descent to an altitude not requiring supplemental oxygen.
- Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended.
- 1. With the PASSENGER OXYGEN valve in the OFF position, no oxygen is supplied to the cabin.
- 2. With the PASSENGER OXYGEN valve in the AUTO position, oxygen is available to the passenger oxygen distribution system and the passenger oxygen masks will drop from their storage compartments if the cabin altitude reaches 14,500 feet. Whenever the oxygen masks deploy, the overhead lights will illuminate to provide maximum visibility for donning masks. The passengers must don the masks and pull the attached lanyards to start the flow of oxygen.



If GEN and BATTERY switches are OFF, automatic presentation of masks will not occur. In this event, turn PASSENGER OXYGEN valve to DEPLOY if passenger oxygen is required.



Passenger Oxygen (Cont)

- 3. With the PASSENGER OXYGEN valve in the DEPLOY position, the passenger oxygen masks will drop from their storage compartments. The passengers must don the masks and pull the attached lanyards to start the flow of oxygen. This should be used if automatic presentation of the masks does not occur.
- 4. Deploy passenger oxygen if pressurization irregularities are encountered above 10.000 feet MSL.



The rebreather bag may not inflate even though oxygen is flowing. This is normal.

Crew Oxygen (EROS Crew Masks)

- 1. If oxygen is required by the crew only, PASSENGER OXYGEN Valve OFF.
- 2. When oxygen masks are worn by the crew, NORM MIC/OXY MIC Switches OXY MIC. The interphone function of the audio control system will be active allowing communication between crew members.

Preflight

- 1. On aircraft utilizing a mask stowage box:
 - To check for oxygen availability to the mask while stowed, depress the PRESS TO TEST lever on the mask stowage box

 — oxygen will flow for a short period of time. Flow will be shown on the flow indicator.
- 1. On aircraft utilizing a mask stowage cup:
 - a. Press the red control knob on the bottom of regulator and verify oxygen flow. An inline pressure detector will show green when oxygen pressure is available to the mask.
 - b. Push the N-100% red control lever to 100%.
 - c. *If an adjustable crew mask is installed*, set the black adjustable harness toggle to NORM and turn the roller control up to MAX.

Operation

1. Remove hats and "ear muff" type headsets.



Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

- 2. Remove mask from stowage box or cup.
- 3. Squeeze and hold the red levers on the mask pressure regulator together to inflate the pneumatic harness for donning.
- 4. Position harness over the head, position mask as desired, then release red levers.



Crew Oxygen (EROS Crew Masks) (Cont)

- 5. Release the thumb or forefinger from the red inflation control lever to deflate the harness. Guide the mask into position on the face.
- 6. Ensure that mask is properly sealed. Reposition mask if required.



Beards worn by crew members may make proper sealing of the mask more difficult.

- 7. *On aircraft utilizing a mask stowage box,* oxygen flow is shown on the flow indicator at the upper left corner of the mask stowage box.
- 9. To obtain 100% oxygen at any time, depress 100% lever on mask pressure regulator.
- 10. For emergency operation (positive pressure breathing), push the red N-100% lever to 100% and turn the control knob on the bottom of the regulator to EMERGENCY (rotate PRESS TO TEST button/knob to ●). With the mask pressure regulator controls in this position the crew mask will deliver 100% oxygen at all cabin altitudes and maintain a positive pressure in the mask cup at all times for respiratory protection from smoke or fumes.

Donning Smoke Goggles (if required)

- 1. Smoke Goggles Don.
- 2. Open the vent valve on top of the oxygen mask by pulling the slide down. This will provide oxygen flow to the goggles to purge smoke and gases and to prevent lens from fogging.
- 3. Turn the control knob on bottom of regulator to EMERGENCY.

Adjusting Mask

- 1. After the harness has deflated, depress the inflation control lever to partially inflate the harness until the mask can be easily moved.
- 2. Adjust the mask for optimum fit and release the inflation control lever.



Crew Oxygen (EROS Crew Masks) (Cont)

Adjusting Harness Tension (if applicable)

- 1. Switch the toggle to COMF.
- 2. Turn the roller control up to MAX.
- 3. Depress the inflation control lever to slowly inflate the harness.
- 4. Release the inflation control lever when a comfortable mask tension is achieved.
- 5. Rotate the roller control down to reduce the harness residual pressure.
- 6. To relax the harness and readjust the mask, depress the inflation control lever to obtain a comfortable setting.

Emergency with Toggle in COMF Position (if applicable)

1. If an emergency occurs while the harness is relaxed, switch the toggle back to NORM. The harness will immediately deflate and apply full tension to the head.

Mask Removal

- 1. Switch the toggle to NORM (if applicable).
- 2. Depress the red inflation control lever to inflate the harness.
- 3. Remove the mask and harness while depressing the inflation control lever.

Crew Oxygen (Puritan Bennett Sweep-On 2000 Crew Masks)

- 1. If oxygen is required by the crew only, PASSENGER OXYGEN Valve OFF.
- When oxygen masks are worn by the crew, NORM MIC/OXY MIC Switches — OXY MIC. The interphone function of the audio control system will be active allowing communication between crew members.

Preflight

- 1. On aircraft utilizing a mask stowage box:
 - To check for oxygen availability to the mask while stowed, depress the PRESS TO TEST lever on the mask stowage box

 — oxygen will flow for a short period of time. Flow will be shown on the flow indicator blinker.
- 1. On aircraft utilizing a mask stowage cup:
 - a. To check for oxygen availability to the mask, observe inline pressure indicator is green or rotate mask regulator knob to the EMER position and note oxygen flow, then reset to 100% position.



Crew Oxygen (Puritan Bennett Sweep-On 2000 Crew Masks) (Cont)

Operation

1. Remove hats and "ear muff" type headsets.



Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

- 2. Remove mask from stowage box or cup.
- 3. Squeeze and hold the red lever on the mask pressure regulator to inflate the pneumatic harness for donning.
- 4. Position harness over the head, position mask as desired, then release the red lever.
- 5. Ensure that mask is properly sealed. Reposition mask if required.



Beards worn by crew members may make proper sealing of the mask more difficult.

- 6. *On aircraft utilizing a mask stowage box,* oxygen flow is shown on the flow indicator at the upper left corner of the mask stowage box.
- 7. With the regulator set to NORM, the mask will deliver automatic oxygen dilution from S.L. to 33,000 feet cabin altitude, 100% oxygen above 33,000 feet cabin altitude, and automatic pressure breathing above approximately 39,000 feet cabin altitude.
- 8. To obtain 100% oxygen at any time, rotate the regulator knob to 100%.
- 9. For emergency operation (positive pressure breathing), turn the control knob to EMER. With the mask pressure regulator knob in this position, the crew mask will deliver 100% oxygen at all cabin altitudes and maintain a positive pressure in the mask cup at all times for respiratory protection from smoke or fumes.

Donning Smoke Goggles (if required)

- 1. Smoke Goggles Don. A purge valve will automatically bias open.
- 2. Turn the control knob to EMER.

Mask Removal

- 1. Depress and hold the red inflation control lever until the harness fully inflates.
- 2. Remove the mask and release the red inflation control lever.



Environmental Systems (Cont) Pressurization System

The pressurization system can be operated in either automatic or manual mode. When automatic mode is selected, the system uses data provided by the aircraft's air data system, crew input, and various discrete signals to automatically control the cabin pressurization during climb, cruise and descent. When manual mode is selected, the crew maintains cabin pressurization with the MAN ALT Control.

The pressurization system (in automatic mode) provides the capability to operate at high-altitude fields (8,000 - 13,700 ft elevation) without triggering annunciations and emergency pressurization. The logic employed for this feature is as follows:

Conditions	Pressurization system will:		
TAKEOFF			
Takeoff from field elevation less than 8000 ft	Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 8600 feet. Activate emergency pressurization if cabin altitude exceeds 9500 feet. Activate cabin altitude warning horn if cabin altitude exceeds 10,100 feet. Activate red CABIN ALT HI light if cabin altitude exceeds 10,100 feet.		
Takeoff from field elevation greater than 8000 ft	Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 14,500 feet. Activate emergency pressurization if cabin altitude exceeds 14,500 feet. Activate cabin altitude warning horn if cabin altitude exceeds 14,500 feet. Activate red CABIN ALT HI light if cabin altitude exceeds 14,500 feet. When the aircraft climbs above 25,000 feet. Resume settings specified in "Takeoff from field elevation less than 8000 ft". NOTE: It is possible for the aircraft to climb above 25,000 feet before an 8000-foot cabin altitude is obtained. If this happens, annunciations and emergency pressurization may occur because of the lower settings triggered at 25,000 feet.		
	LANDING		
Landing at field elevation less than 8000 ft (as selected on LDG ALT)	Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 8600 feet. Activate emergency pressurization if cabin altitude exceeds 9500 feet. Activate cabin altitude warning horn if cabin altitude exceeds 10,100 feet. Activate red CABIN ALT HI light if cabin altitude exceeds 10,100 feet.		
Landing at field elevation greater than 8000 ft (as selected on LDG ALT)	Maintain the settings specified in "Landing at field elevation less than 8000 ft (as selected on LDG ALT)" until the aircraft descends below 25,000 ft. When the aircraft descends below 25,000 feet: Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 14,500 feet. Activate emergency pressurization if cabin altitude exceeds 14,500 feet. Activate cabin altitude warning horn if cabin altitude exceeds 14,500 feet. Activate red CABIN ALT HI light if cabin altitude exceeds 14,500 feet.		



Applicable operating rules, pertaining to the use of oxygen at high cabin altitude, must be observed.



Pressurization System (Cont)

Automatic Mode Operation

- 1. MODE Select Switch Select automatic mode. MANUAL will extinguish when automatic mode is selected.
- 2. LDG ALT Selector Prior to takeoff, set to landing field elevation of intended destination.
- 3. *If a takeoff is made from a field elevation above 8000 feet,* ensure the cabin altitude is 8000 feet or less as the aircraft climbs through 25,000 feet.



- If the cabin altitude exceeds 8000 feet as the aircraft climbs through 25,000 feet, PRESS SYS annunciation, emergency pressurization, and cabin altitude warning horn may activate. In addition, the red CABIN ALT HI light may also activate.
- When a takeoff is made from a field elevation above 8000 feet, the cabin altitude will descend to and/or remain at 8000 feet until the pressurization descent mode is entered.

Operation with a QFE Altimeter Setting

1. *If a QFE altimeter setting is being used for landing,* LDG ALT Selector — Set to zero feet.

Manual Mode Operation



Manual mode must not be used for takeoff and landing at field elevations above 8000 feet.

- 1. MODE Select Switch Depress. MANUAL will illuminate.
- 2. MAN ALT Control UP, center, or DN as required to maintain satisfactory pressurization.
- 3. MAN RATE Control Rotate to the desired setting.



Environmental Systems (Cont) Pressurization System (Cont)

Return To Automatic Mode Operation



If cabin altitude exceeds 8600 (±200) feet, the automatic pressurization mode is deactivated and the amber PRESS SYS and pressurization FAULT lights will illuminate. Automatic mode operation will not be available until the cabin altitude is decreased and the pressurization system is cycled to unlatch the fault.

- 1. MAN ALT Control Center or DN as required to maintain cabin altitude below 8000 feet.
- 2. MODE Select Switch Depress to select automatic mode. If the FAULT light remains extinguished, the system has successfully returned to the automatic mode.

If the pressurization FAULT light remains illuminated:

3. CABIN PRESS SYS Circuit Breaker (R ENVIRONMENT group) — Pull and reset. If the FAULT light extinguishes, the system has successfully returned to the automatic mode.

If the pressurization FAULT light remains illuminated:

4. The fault has not cleared and automatic mode operation is not available. Refer to **Manual Mode Operation**, previous page.

CABIN AIR Light

A white CABIN AIR advisory light indicates that any of the following switches are in the off position: L BLEED AIR, R BLEED AIR or CAB AIR.



Fuel Management Fuel Quantity Indicator

A fuel quantity indicator is provided to indicate the amount of fuel in individual tanks (L WING, R WING & FUSELAGE) and the total amount of fuel on-board (TOTAL). Each individual tank and the TOTAL indication reads zero when its unusable fuel quantity is reached. The accuracy of all fuel quantity readings will be enhanced when taken with the aircraft in wings level, unaccelerated cruise flight.

If a wing fuel imbalance of 500 pounds/227 kg (200 pounds/91 kg if flaps are 8° or lower) or more occurs, the fuel quantity reading representing the heavy wing will flash and IMB will be annunciated on the fuel quantity indicator. The flashing may be cancelled by depressing the mute switch in the right thrust lever; however, IMB will remain annunciated until the fuel balance is within limits.

If a fault is detected in the fuel quantity indicating system, an error code(s) is displayed on the fuel quantity indicator. Depending on the error, the accuracy of the remaining fuel quantity indications may be degraded.

The fuel quantity indicator uses aircraft attitude information to compensate for changes in the aircraft pitch attitude. Indicated fuel quantity for the fuselage tank is accurate throughout the flight envelope. Indicated fuel quantities for the wing tanks are accurate for steady state, unaccelerated cruise flight conditions between -2° and +6° pitch.



- When aircraft attitude is greater than +6°, wing fuel in excess of approximately 1150 pounds (522 kg) will not register. Each wing tank could have up to 299 pounds (136 kg) more fuel than the indicator shows.
- If the left wing tank is allowed to go dry, the fuel quantity temperature compensator probe will be uncovered and may cause erroneous fuel quantity indications. Maintain a minimum of 50 pounds (23 kg) of fuel in the left wing tank until fuel is required.
- Fuselage tank transfer pumps are located to transfer the maximum quantity of fuel in level flight.



Fuel Management (Cont) Fuel System Annunciators

The amber LOW FUEL light on the glareshield annunciator panel will illuminate when the fuel level in either wing tank is approximately 410 pounds (186 kg).

The FUEL SYS light on the glareshield annunciator panel will be illuminated whenever the crossflow valve is open, a standby pump is on, or any transfer/fill operation is in progress. The FUEL SYS light will flash when the fuselage tank is full and FILL is selected or empty and fuel transfer is selected. The crossflow valve will be open during wing to wing transfer, wing to fuselage transfer, or fuselage to wing transfer.

Usable Fuel

USABLE FUEL			
L Wing	Fuselage	R Wing	Total
1449 lb	5012 lb	1449 lb	7910 lb
657 kg	2273 kg	657 kg	3587 kg

Fuel Control Panel

The fuel control panel on the pedestal contains all the necessary switches to fuel the aircraft and maintain proper fuel management. The switches are alternate action type with lighted legends and status annunciators for the devices (valves and pumps) being controlled.



This switch controls the position (open or closed) of the respective motive flow valve. When the motive flow valve is closed, the on-side jet pumps will be deactivated and the OFF annunciation will illuminate. Jet pump OFF selection will cause the Master CAUT lights to flash. If the motive flow valve is neither open nor closed, the OFF annunciation will flash.



This switch controls the operation of the respective standby electric pumps. Illumination of the ON annunciation indicates power is applied to the corresponding standby pump.



This switch controls the position (open or closed) of the crossflow valve. Illumination of the horizontal bar indicates the crossflow valve is in the open position. If the crossflow valve is neither open nor closed, the horizontal bar will flash.



Fuel Management (Cont) Fuel Control Panel (Cont)



This switch selects the normal fuselage fuel transfer function. Illumination of the vertical bar indicates the left fuselage transfer valve is in the open position. If the transfer valve is neither open nor closed, the vertical bar will flash. Illumination of the ON annunciation indicates power is applied to the left fuselage transfer pump.



This switch selects the auxiliary fuselage fuel transfer function. Illumination of the vertical bar indicates the right fuselage transfer valve is in the open position. If the transfer valve is neither open nor closed, the vertical bar will flash. Illumination of the ON annunciation indicates power is applied to the right fuselage transfer pump.



This switch selects the gravity fuselage fuel transfer function. Illumination of the ON annunciation indicates gravity transfer is selected.



This switch selects the fuselage tank fill function. Illumination of the ON annunciation indicates fuselage fill is selected.



This annunciator shows the status of the fuel pressure in the respective engine fuel supply line. Illumination of this annunciator indicates loss of fuel pressure to the associated engine. The applicable L or R FUEL PRESS light, on the glareshield annunciator panel, will also illuminate.



This annunciator shows the status of the fuel level in the fuselage fuel tank. Illumination of the FULL annunciation indicates the fuselage fuel tank is full and FILL is selected. Illumination of the EMPTY annunciation indicates the fuselage fuel tank is empty and NORM XFR and/or AUX XFR is selected.



Fuel Management (Cont) Fuselage Tank to Wing Fuel Transfer

Fuel may be transferred from the fuselage tank to the wings by any of the methods described below. However, fuel transfer pump operation may be minimized by selecting gravity transfer after cruise attitude has been established. If gravity transfer is selected, normal transfer should be selected when the wing fuel quantity starts to decrease.

Normal Transfer Procedure

- NORM XFR Switch Depress to select when wing tank fuel quantity indicates 1200 pounds (544 kg) or less in each tank. When NORM XFR is selected, the standby pumps will be deenergized, the crossflow valve will open, the left fuselage fuel transfer valve will open, and the left transfer pump will be energized. If either left or right wing tank becomes full, the left fuselage transfer valve will close and the left transfer pump will shut off until the fuel level in the wing tank drops enough to reactivate the transfer system.
- 2. NORM XFR Switch Depress to deselect when desired transfer is complete or Fuselage EMPTY light illuminates.

Auxiliary Transfer Procedure

- 1. AUX XFR Switch Depress to select when wing tank fuel quantity indicates 1200 pounds (544 kg) or less in each tank. When AUX XFR is selected, the standby pumps will be deenergized, the crossflow valve will open, the right fuselage transfer valve will open, and the right fuselage transfer pump will be energized. The system will continuously transfer fuel from the fuselage tank to the wing tanks until AUX XFR is deselected.
- 2. AUX XFR Switch Depress to deselect when desired transfer is complete or Fuselage EMPTY light illuminates.

Rapid Transfer Procedure

If rapid transfer of fuselage fuel is desired:

- NORM XFR and AUX XFR Switches Depress to select. When NORM XFR and AUX XFR are selected, the standby pumps will be de-energized, the crossflow valve will open, both fuselage transfer valves will open, and both fuselage transfer pumps will be energized.
- 2. NORM XFR and AUX XFR Switches Depress to deselect when desired transfer is complete or Fuselage EMPTY light illuminates.



Fuel Management (Cont)

Gravity Transfer Procedure

- 1. GRVTY XFR Switch Depress to select. When GRVTY XFR is selected, the standby pumps will be de-energized, the crossflow valve will open, and both transfer valves will open. Fuel will gravity flow from the fuselage tank until the wing tanks are full or the fuselage and wing tank heads are equal. When using GRVTY XFR, approximately 350 pounds (159 kg) of fuselage fuel will be unusable.
- 2. GRVTY XFR Switch Depress to deselect when gravity transfer is complete or prior to approach.



- Gravity transfer may be used after cruise is established to minimize transfer pump operation. When the wing fuel quantity starts to decrease use **Normal Transfer Procedure** to transfer remaining fuselage fuel.
- When flying in extreme nose-up attitude for extended periods, fuel may gravity flow from the wing tanks to the fuselage tank. Periodically transfer fuel back into wings.

Wing to Fuselage Tank Fuel Transfer

To transfer fuel from the wing tanks to the fuselage tank, the following procedure may be used:

- FILL Switch Depress and hold for approximately 3 seconds to select. When FILL is selected, both standby pumps will be energized, both transfer valves will open, and the crossflow valve will open. Fuel will be transferred from the wing tanks to the fuselage tank until:
 - a. Fuselage FULL light comes on, causing the standby pumps to de-energize and both transfer valves to close. When the FILL function is deselected, the FULL light will go out and the crossflow valve will close.
 - b. LOW FUEL light comes on (only if left wing switch trips the light), causing the FILL function to be deselected. Transfer can be restarted with the LOW FUEL light on, if required.
 - c. The aircraft lifts off causing the FILL function to be deselected. Transfer can be restarted after liftoff, if required.
- 2. FILL Switch Depress to deselect when desired fuselage fuel quantity is reached. Check that fuel transfer and crossflow valves close.



Fuel Management (Cont) Fuel Crossflow (Wing-to-Wing Transfer)

To transfer fuel from one wing tank to the other wing tank, the following procedure may be used:



Do not crossflow with main jet pump(s) inoperative. Engine starvation may occur due to fuel being pumped through the open crossflow valve into opposite wing.

- 1. XFLO VALVE Switch Depress to select open.
- 2. STBY PUMP Switch (heavy wing) Depress to select ON.
- 3. Standby Pump (light wing) Check Off.
- 4. XFLO VALVE Switch Depress to select closed after fuel balance is obtained.
- 5. STBY PUMP Switches Select Off.

Operation with Cold Wing Fuel

Operation on wing fuel exposed to indicated Total Air Temperatures (TAT) below the freeze points shown below for 30 minutes or more may result in a reduction of usable fuel because of fuel freezing.

FUEL TYPE	FREEZE POINT (TAT)
JET A	40°C
JP-5	46°C
JET A-1	50°C
JP-8	50°C

To minimize fuel freezing at TATs below these values, transfer the warmer fuel from the fuselage tank to maintain approximately 800 pounds (363 kg) of fuel in each wing tank.

Refueling

The airplane may be fueled through a filler located in the top of each wing tank or through the single-point pressure filler below the right engine. Usable fuel using the various refuel procedures is given with the applicable procedure. Refer to Addendum I — FUEL SERVICING for refuel procedures.

Refer to Addendum I — FUEL SERVICING, for recommended anti-ice additive blending procedure.



Landing Gear and Brakes Landing Gear Warning and Indications

The landing gear warning horn will sound and three red gear unsafe indications (EIS [Flight Page]) will display under the following conditions:

- Altitude is below 16,300 feet.
- Airspeed is below 170 KIAS.
- At least one thrust lever is below approximately 60% N1.



When the horn sounds under these conditions, the horn can be silenced by depressing the Landing Gear MUTE switch or depressing the MUTE button in the right thrust lever handle (The amber MUTE light will illuminate). The gear unsafe indication will continue until either the gear is lowered or one of the above conditions is corrected.

The landing gear warning horn only will sound under the following conditions:

- Landing gear is not extended.
- Flaps are lowered beyond 25°.



When the horn sounds because the flaps are lowered, the horn cannot be silenced by the MUTE switches.



Landing Gear and Brakes (Cont)

The GEAR display, on the EIS (Flight Page), will display the following, depending upon landing gear condition:

Condition	Presentation	
Landing gear down and locked.	GEAR R SELCAL VHF 1 VHF 2	
Landing gear in transition.	GEAR SELCAL VHF 1 VHF 2	
Landing gear in unsafe condition.	GEAR SELCAL VHF 1 VHF 2	
Landing gear down, locked, and door open with airspeed less than 200 KIAS.	SELCAL VHF 1 VHF 2	
Landing gear down, locked, and door open with airspeed greater than 200 KIAS.		
Landing gear position data invalid or data not available.	GEAR	



Landing Gear and Brakes (Cont) Brake System

The primary brake system utilizes hydraulic system pressure for power boost and incorporates an anti-skid system to prevent tire skid and/or tire blow-out during landing or aborted takeoff. The brakes are operated by depressing the upper portion of the rudder pedals.



Large temperature differences between wheels after landing may indicate improper brake operation.

The parking brake is operated by depressing and holding the toe brakes (hydraulic system pressurized) and then pulling the PARKING BRAKE handle to set the brakes. Whenever the PARKING BRAKE handle is not fully in, the PARK BRAKE light will be illuminated.

An emergency air braking system is installed to provide emergency braking in the event of a hydraulic system failure. Refer to Section III for emergency braking procedures.

Normal Braking

Anti-Skid On Operation:

- 1. ANTI-SKID Switch On. Check ANTI-SKID lights extinguished.
- 2. Apply brakes as required. Maximum braking pressures can be maintained when anti-skid is operative.



The takeoff and landing distances with anti-skid On, presented in Section V of this manual, are based on full anti-skid braking from first brake application to complete stop.

Anti-Skid Off Operation:

When anti-skid is inoperative, care must be used during brake application and stopping distances will be increased. Refer to Section IV for operation of the brake system with anti-skid off and Section V for increased stopping distances.

Emergency Braking

In the event of a normal brake system failure, emergency (pneumatic) brakes can be used to stop the airplane. Refer to Section III for operation of the emergency brake system.



Spoiler System Normal Spoilers

During the normal spoiler mode, the spoilers are symmetrically extended and retracted through the SPOILER EXT-ARM-RET lever on the forward pedestal. Normal spoiler operation overrides the aileron augmentation mode of operation and the SPOILER EXT annunciator light will be illuminated anytime spoilers are extended 1° or more during normal spoiler operation. With flaps extended 3° or more and spoilers extended, the SPOILER EXT light will flash. The spoilers may be extended to any desired position. Detents for approximately 10° and 20° positions are provided between the ARM and EXT positions of the lever. On the ground, the spoilers will extend fully whenever any partial extension is selected. The maximum attainable extension will be reduced as airspeed increases. The spoiler position is shown on the EIS (Flight Page). Without AC electrical power available, the EXT mode will not provide spoiler extension until both squat switches are in the ground mode.

Autospoilers

The autospoiler system is pilot controlled through the SPOILER EXT-ARM-RET lever on the forward pedestal. When ARM is selected with both squat switches in the ground mode and both thrust levers at IDLE (see note for single engine operation), the autospoilers will automatically deploy, and the SPOILER ARM and SPOILER EXT lights will illuminate. The autospoilers will not deploy if either thrust lever is above IDLE when ARM is selected. Failure of the SPOILER ARM light to illuminate indicates a malfunction.

When the spoilers have been automatically deployed, advancing either thrust lever above IDLE will cause the autospoilers to retract. The autospoilers will automatically deploy at ground speeds above 40 knots with both thrust levers in IDLE (see note for single engine operation), as in the case of an aborted takeoff.

The autospoiler system is also used to automatically extend the autospoilers on landing. Upon landing with ARM selected and both thrust levers in IDLE, the autospoilers will deploy when the wheels spin up through 40 knots or when both squat switches transition to ground mode. Advancing either thrust lever above IDLE will cause the autospoilers to retract.



Taxiing with autospoilers armed at a ground speed greater than 40 knots and thrust levers in IDLE may cause the autospoilers to deploy.



Spoiler System (Cont) Autospoilers (Cont)

Without AC electrical power available, both squat switches must be in ground mode for autospoilers to extend (regardless of wheel speed). Therefore, autospoiler extension may be delayed slightly during soft landings without AC electrical power.

Autospoilers are not operational when manual EXT or RET is selected.



During single engine operation, the autospoilers will operate normally with the inoperative engine's thrust lever in either IDLE or CUTOFF.

Spoilerons (Aileron Augmentation)

During the spoileron (aileron augmentation) mode, the spoilers are independently raised and lowered with the up-going aileron to improve lateral control with the flaps down. Aileron augmentation is automatically engaged when the flaps are lowered beyond 25° and the SPOILER lever is in the ARM or RET position.

During the spoileron test, if SPOILER MON light does not come on, possible failures are:

- Computer monitor failure
- Spoileron selector valve failure

Continued operation with either of these failure modes could result in inadvertent asymmetrical spoiler extension. Malfunction should be corrected before flight.

Spoiler Monitor

If the spoiler or spoileron system malfunctions, the SPOILER MON light will come on and the spoilers will retract. Refer to the **SPOILER MON Light Illuminated In Flight** procedure, in Section IV.



Stall Warning System

The aircraft is equipped with a stall warning system to provide the crew with visual and tactile warning of an impending stall. The stall warning system consists of an angle-of-attack indicator for each crew position, L and R STALL warning lights, a stick shaker for each crew position, and Low Speed Cues (LSC) on both PFDs (airspeed displays).

The system will automatically decrease stall warning speeds as the flaps go from 0° to 40°. Above approximately 18,100 feet pressure altitude, the system increases stall warning speeds by approximately 15 knots. These shifts in stall speeds are reflected in the LSC on each PFD.

Angle-of-Attack Indicators

The angle-of-attack (AOA) indicators, located on the pilot's and copilot's instrument panels, provide a visual indication of angle-of-attack. The scale ranges from 1.0 (max lift) to 0 (zero lift). Each indicator face is divided into three segments as follows: green-safe, ambercaution/shaker (activated at .82 AOA), and red-warning.



Angle-of-Attack (AOA) Indicator Figure 2-14



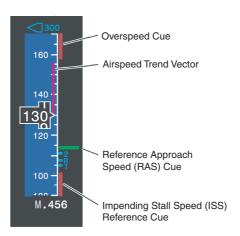
Stall Warning System (Cont) Low Speed Cues (LSC)

The PFDs (airspeed displays) show the following types of low speed cues:

- Impending Stall Speed (ISS) cue is a vertical red line drawn from the bottom of the airspeed scale. The top of the red line represents stick shaker speed (.82 AOA).
- Reference Approach Speed (RAS) cue is a horizontal green line on the airspeed display and represents 1.3 Vs (.6 AOA).
- The airspeed trend vector cue is a vertical magenta line attached to the airspeed pointer, and provides an approximation of what the airspeed will be in 10 seconds at the present rate of acceleration.



Low speed cues serve as an approximation of stall speed and do not replace the actual stall warning system.



Low Speed Cues Figure 2-15



Thrust Reverser System

The thrust reverser system is designed for use on the ground to reduce the aircraft stopping distance. Hydraulically actuated target-type doors are used to redirect the exhaust gases to produce the reverse thrust.



Anytime the hydraulic system is pressurized by an engine-driven pump(s) or an external hydraulic source, the thrust reversers have the potential to deploy. Pressure from the auxiliary hydraulic pump is not available to the thrust reverser system.

The system is electrically controlled with the status of each thrust reverser annunciated on the EIS (green REV, amber REV, amber UNL, red UNL, white DEP, red DEP).



- Only one, of the possible six, EIS indications can be displayed at any given time.
- Except as described in Normal Deploy and Normal Stow below, all amber or red annunciations indicate abnormal or emergency conditions.

There is no thrust reverser control panel. The thrust reverser levers located on top of the thrust levers and the system's circuit breakers are the only devices used by the crew to operate the system.

Normal Deploy

In order to deploy a thrust reverser, the following prerequisite conditions must be satisfied:

TR CONT and TR AUTO STOW Circuit Breakers — In.



The TR AUTO STOW circuit breaker should be set, but is not required for the thrust reverser to deploy.

- Aircraft on the ground (weight-on-wheels switches in ground mode).
- Applicable Thrust Lever IDLE.
- Hydraulic pressure available from an engine-driven hydraulic pump.

When the above conditions are satisfied, the green REV indication will display on the EIS, indicating hydraulic pressure is available to the thrust reverser. Lifting the thrust reverser lever to the DEPLOY detent will initiate deployment of the thrust reverser doors. While the doors transition from stow to deploy, the amber UNL annunciation will display and a signal to the engine FADEC will limit thrust to idle power. When the doors reach the fully deployed position, the white DEP



Thrust Reverser System (Cont) Normal Deploy (Cont)

indication will display and a signal to the engine FADEC will allow engine thrust to increase above idle. The N1 bug will reposition indicating the FADEC is utilizing the reverse thrust schedule. The system incorporates a throttle balk solenoid which inhibits either thrust reverser lever from moving significantly above reverse idle until both thrust reversers are fully deployed.



Excessive force applied to the thrust reverser levers may prevent the balk solenoid from releasing.

Moving the thrust reverser lever above reverse idle allows the engine to spool up providing the desired amount of reverse thrust. The FADEC will schedule reverse thrust as a function of airspeed (provided by ADC 1 and 2), decreasing thrust as the airplane slows down. If airspeed data is not provided to the FADEC, the maximum reverse thrust available will be 65% N1.

Normal Stow

Each thrust reverser door is mechanically secured in the stowed position by a four-bar over-center door linkage. This mechanism is referred to as the primary latch. Each thrust reverser door is also secured in the stowed position by a hydraulically-actuated secondary latch.

After a normal deployment and use of reverse thrust, normal stow is accomplished by returning the thrust reverser levers to the STOW position. While the doors transition from deploy to stow, the white DEP indication will be replaced by the amber UNL annunciation on the EIS. Once the doors are in the fully stowed position (primary latch engaged), normal forward thrust will be available. When the doors reach the fully stowed and locked position (both primary and secondary latches engaged), the amber UNL annunciation will be removed from the EIS and a green REV indication will be displayed.

Auto Stow

Each thrust reverser door is mechanically secured in the stowed position by a four-bar over-center door linkage (primary latch). If the system senses an unlocked primary latch in flight, the automatic stowing sequence is initiated which reduces engine thrust to idle and hydraulically stows and secures the thrust reverser doors.



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Introduction

The procedures in this section of the manual have been developed by Learjet Inc. for certification of this aircraft. This section contains those operating procedures requiring the use of special systems and/or regular systems in order to protect the occupants and the aircraft from harm during a critical situation requiring immediate response. Procedures or parts of procedures in this section emphasized by enclosure in a box such as this and boldfaced should be accomplished without reference to this manual (memorized). Data that is enclosed in a box but **not** boldface need not be memorized.

The procedures located in this section supplement normal procedures when an emergency condition exists. Use of normal procedures should be continued when applicable. Sound judgement as well as thorough knowledge of the aircraft, its characteristics, and the flight manual procedures are essential in the handling of any emergency situation.

OVERRIDING CONSIDERATIONS

In all emergencies, the overriding consideration must be to:

- Maintain Airplane Control
- Analyze the Situation
- Take Proper Action

Terminology

Many emergencies require some urgency in landing the aircraft. The degree of urgency required varies with the emergency; therefore, the terms "land as soon as possible" and "land as soon as practical" are employed. These terms are defined as follows:

Land as soon as possible — A landing should be accomplished at the nearest suitable airfield considering the severity of the emergency, weather conditions, field facilities, ambient lighting, and aircraft gross weight.

Land as soon as practical — Emergency conditions are less urgent, and although the mission is to be terminated, the degree of the emergency is such that an immediate landing at the nearest adequate airfield may not be necessary.



Dual Generator Failure

- 1. START-GEN Switches Check, GEN.
- 2. L and R START (ENGINE Group) and GEN (ELECTRICAL Group) Circuit Breakers Set.
- 3. Electrical Load Reduce.
 - COOL Switch OFF.
 - b. AUX HT Switch OFF.
 - WSHLD DEFOG Switch OFF.
- 4. GEN RESET Switches RESET momentarily.



Depressing and holding the GEN RESET switch(es) longer than one second, or multiple activations, may cause damage to the electrical system.

If generators do not reset:

- 5. N2 80% RPM or above.
- 6. START-GEN Switches OFF, then GEN.
- 7. GEN RESET Switches RESET momentarily.



Depressing and holding the GEN RESET switch(es) longer than one second, or multiple activations, may cause damage to the electrical system.

If generators do not reset:

- 8. START-GEN Switches OFF.
- 9. JET PUMP Switches Check, On.
- 10. If there is fuel in the fuselage tank, GRVTY XFR Switch Select ON.



With GRVTY XFR selected, approximately 350 pounds (159 kg) of fuselage fuel will be unusable.

- 11. Floodlights On for night operations.
- 12. EMER BAT Switches Check, On.
- 13. MFD Switch (pilot's EFIS Control Panel) Select REV mode.
- 14. EMER BUS Switch EMER BUS.



EMER BUS switch may be returned to the NORMAL position if it is desired to restore electrical power to all systems. The main batteries will discharge at a faster rate under this condition.



Battery duration with both generators off is as follows:

POWERED	EMER BAT		MAIN	
EQUIPMENT	1	2	3 §	BATTERIES
ESIS	Χ			
Compass/RTU 1/CDU 1 Lighting	Х			
NAV 1/RTU 1		Х		
AHS 1 and 2 **		Х		
ADC 1 and 2		Х		
DCU 1 and 2		Х		
ADF 1			Х	
COM 1/AUDIO 1 ***			Х	
CDU 1			Х	
GPS 1			Х	
EMER BUS Loads				Х
Battery Duration *	4.6 hours	1.5 hours	1.3 hours	0.6 hour

[§] If Installed

- 15. Airspeed 0.77 MI or below.
- 16. Altitude 38,000 feet or below.



When using the standby indications (ESIS), refer to AIRSPEED and MACH CALIBRATION — STANDBY SYSTEM and ALTITUDE POSITION CORRECTION — STANDBY SYSTEM, in Section V.

17. The following table lists the conditions that will exist in EMER BUS Mode:

SYSTEM	CONDITION
Anti-Ice	
Nacelle Heat	Nacelle heat (bleed air) will be on regardless of NAC HEAT Switch position.
Pitot Heat	L & R Inoperative; Standby Operative.
Wing Temp Indicator	Inoperative.
All Other Systems	Inoperative. Avoid icing conditions.
Autopilot/Yaw Damper	Inoperative.

Continued

^{*} Battery duration, for each power source, begins from the time of dual generator failure. Both main batteries AND emergency batteries begin depleting once dual generator failure occurs.

^{**} EMER BAT 2 maintains AHS 1 and 2 for 11 minutes after normal power source is exhausted.

^{***} Time based on ten 30-second VHF COM 1 transmissions.



OVOTELL	CONDITION
SYSTEM	CONDITION
Avionics/Displays	
ADC	ADC 1 & ADC 2 Operative.
ADF	ADF 1 Operative; ADF 2 (if installed) Inoperative.
AHS	AHS 1 & AHS 2 Operative.
ATC	ATC 1 Operative; ATC 2 Inoperative.
Audio Panels	Operative.
CCP	CCP 1 Operative; CCP 2 Inoperative.
CDU	CDU 1 Operative (GPS POS page only); CDU 2 Inoperative.
COM (VHF)	COM 1 Operative; COM 2 Inoperative.
CVR	Operative.
DCP	DCP 1 Operative; DCP 2 Inoperative.
EFIS Displays	MFD 1 Operative, Both PFDs Inoperative.
EFIS Control	Pilot's Operative, Copilot's Inoperative.
EIS	Operative (displayed on MFD 1).
FDR	Operative (if installed).
FMS	Both Inoperative.
FSU	FSU 1 Operative; FSU 2 (if installed) Inoperative.
NAV	NAV 1 Operative; NAV 2 Inoperative.
RTU	RTU 1 Operative; RTU 2 Inoperative.
TAWS (EGPWS)	Inoperative.
All Other Avionics	Inoperative.
Climate Controls	
Cabin Temp	Inoperative (will go to full cold).
Cockpit Temp	Inoperative (will go to full cold).
Engine	
Fire Detection	Operative.
Fire Extinguishing	Operative.
Ignition	Operative.
N1 Display	Operative (on MFD 1 and RTU 1).
ITT Display	Operative (on MFD 1 and RTU 1).
N2 Display	Operative (on MFD 1 and RTU 1).
Fuel Flow Display	Inoperative.
Oil Press Display	Inoperative.
Oil Temp Display	Operative (on MFD 1 and RTU 1).
SYNC	Inoperative.
Firewall Shutoff Valves	Operative.
Flap System	Operative.
Flap Display	Operative (on MFD 1 and RTU 1).
Fuel System	
Crossflow Valve	Operative.
Fill	Inoperative.
Fuel Quantity	Operative. The TOTAL fuel quantity window will display an error
Indicator	code. The fuel quantity for individual tanks remains valid.
Fus Tank Pumps	Operative. Use only if necessary to transfer fuel rapidly.
Gravity Transfer	Operative.
Jet Pumps	Operative.
Standby Pumps	Inoperative.

Continued

SYSTEM	CONDITION
Hydraulic System	
HYD PRESS Indicator	Inoperative.
Aux Hydraulic Pump	Operative.
Landing Gear System	Operative.
Anti-Skid	Inoperative.
BRAKE AIR Indicator	Inoperative.
GEAR AIR Indicator	Inoperative.
Gear Displays	Operative (on MFD 1 and RTU 1).
Lighting — Cockpit	
Floodlights	Operative.
CENTER PNL/ PEDESTAL	Lighting for cabin pressure indicator, angle-of-attack indicators, fuel quantity indicator, fuel control panel and magnetic compass is operative. For night operations, a flashlight may be necessary.
All Other Lighting	Inoperative.
Lighting — Exterior	Inoperative.
Pressurization System	
Auto Mode	Operative.
Cabin Press Indicator	Operative.
EMER Mode	Inoperative.
Manual Mode	Operative.
Oxygen System	Operative.
Oxygen Indicator	Inoperative.
Spoiler System	
Spoilers/Spoilerons	Inoperative in flight. Spoilers operative on ground.
Spoiler Display	Operative on MFD 1.
Stall Warning System	Operative.
AOA Indicators	Operative.
Standby Instruments	
ESIS	Operative.
Magnetic Compass	Operative.
Standby Lighting	Operative.
Trim System	
Aileron & Rudder Trim	Inoperative. Will remain at last setting.
Mach Trim	Inoperative. Do not exceed .77 MI.
Pri & Sec Pitch Trim	Operative.
Trim Display (x3)	Operative on MFD 1.
Warning System	
Lights	Operative.
Horns	Operative.
Trim-In-Motion	Operative.



- 18.●If the time to the landing airport will NOT exceed main battery operating time:
 - a. Land as soon as practical.

Before Landing:

- b. EMER BUS Switch NORMAL.
- c. GRVTY XFR Switch Select Off.
- d. This checklist is complete.
- 18. If the time to the landing airport exceeds main battery operating time:
 - a. Land as soon as possible.
 - b. EIS Electrical Page (VDC) Monitor.

When the aircraft battery voltage reaches 22 Volts:

c. Both BATTERY Switches — OFF.



If the aircraft's main batteries are depleted or selected OFF, the only electrical power available will be from the emergency power supplies.

- d. Refer to **Normal Electrical System Failure Landing** procedure, Section IV.
- e. The following table lists the conditions that will exist (main batteries depleted or selected OFF):

SYSTEM	CONDITION
Anti-Ice	
Nacelle Heat	Nacelle heat (bleed air) will be on regardless of NAC HEAT Switch position.
Wing Temp Indicator	Inoperative.
All Other Systems	Inoperative. Avoid icing conditions.
Autopilot/Yaw Damper	Inoperative.
Avionics/Displays	
Audio Panels	Pilot's Operative (if EMER BAT 3 installed); Copilot's Inoperative.
ADF	ADF 1 Operative (if EMER BAT 3 installed); ADF 2 (if installed) Inoperative.
CDU 1/GPS 1	Operative (if EMER BAT 3 installed). Provides GPS data on CDU 1.
COM (VHF)	COM 1 Operative (if EMER BAT 3 installed); COM 2 Inoperative.
EFIS Displays	Inoperative. Use standby instruments.
NAV	NAV 1 Operative; NAV 2 Inoperative.
RTU	RTU 1 Operative; RTU 2 Inoperative.
All Other Avionics	Inoperative.
Climate Controls	
Cabin Temp	Inoperative (will go to full cold).
Cockpit Temp	Inoperative (will go to full cold).

Continued



SYSTEM	CONDITION
Engine	
Fire Detection	Inoperative.
Fire Extinguishing	Inoperative.
Ignition	Inoperative.
N₁ Display	Operative (on RTU 1).
ITT Display	Operative (on RTU 1).
N2 Display	Operative (on RTU 1).
Fuel Flow Display	Inoperative.
Oil Press Display	Operative (on RTU 1).
Oil Temp Display	Operative (on RTU 1).
SYNC	Inoperative.
Firewall Shutoff Valves	Inoperative.
Flap System	Inoperative.
Flap Display	Inoperative.
Fuel System	
Electric Pumps	Inoperative.
Fuel Quantity Indicator	Inoperative.
System Valves	Will remain in their last position.
Hydraulic System	
HYD PRESS Indicator	Inoperative.
Aux Hydraulic Pump	Inoperative.
Landing Gear System	Inoperative. Use Alternate Gear Extension/Electrical Malfunction
	procedure, Section IV.
Anti-Skid	Inoperative.
BRAKE AIR Indicator	Inoperative.
GEAR AIR Indicator	Inoperative.
Gear Displays	Operative (on RTU 1).
Lighting — Cockpit	
Floodlights	Inoperative.
Instruments	Lighting for magnetic compass and bezel lighting for CDU 1, ESIS, and RTU 1 will be operative. For night operations, a flash-light may be necessary.
All Other Lighting	Inoperative.
Lighting — Exterior	Inoperative.
Pressurization System	
Auto Mode	Inoperative.
Cabin Press Indicator	Inoperative.
EMER Mode	Inoperative.
Manual Mode	Operative.
Oxygen System	Operative.
Oxygen Indicator	Inoperative.
Spoiler System	
Spoilers/Spoilerons	Inoperative.
Spoiler Display	Inoperative.
Stall Warning System	Inoperative. Maintain adequate margin above stall speed by reference to standby airspeed indication (ESIS).
AOA Indicators	Inoperative.

Continued



SYSTEM	CONDITION
Standby Instruments	
ESIS	Operative.
Magnetic Compass	Operative.
Standby Lighting	Operative.
Trim System	
Aileron & Rudder Trim	Inoperative. Will remain at last setting.
Mach Trim	Inoperative. Do not exceed .77 MI.
Pri & Sec Pitch Trim	Inoperative.
Trim Display (x3)	Inoperative.
Warning System	
Lights	Inoperative.
Horns	Inoperative.
Trim-In-Motion	Inoperative.



Engine Failure

During Takeoff

Below V1 Speed

- 1. Wheel Brakes Apply.
- 2. Thrust Levers IDLE.
- Spoilers EXT.
- 4. Thrust Reversers Deploy, if necessary.
- 5. If rejected takeoff was made at a weight above the turnaround brake energy weight (see applicable LANDING WEIGHT LIMIT chart in Section V), observe the TURNAROUND LIMITS in Section I.
- 5. If rejected takeoff was made at a weight above the landing maximum brake energy weight (see applicable LANDING WEIGHT LIMIT chart in Section V), see maintenance personnel to perform the High Energy Stop inspection.



If the stop was conducted above the landing maximum brake energy limit, it is recommended that the PARKING BRAKE be released and chocks used. This will increase brake cooling efficiency and reduce the possibility of wheel fuse plug release and brake/tire fire.

Above V1 Speed

- 1. Rudder and Ailerons As required, for directional control.
- 2. Accelerate to VR. Keep nose wheel on the ground.
- 3. Rotate at VR; Climb at V2.
- 4. GEAR UP, when positive rate of climb is established.
- 5. When clear of obstacles, accelerate to VT (V2 + 20) and retract flaps.
- 6. APR Switch OFF.
- 7. Refer to Engine Shutdown In Flight procedure, Section IV or Engine Fire Shutdown procedure, this section.



Engine Failure (Cont)

In Flight

- 1. Control Wheel Master Switch (MSW) Depress and release. Yaw damper and autopilot will disengage.
- 2. Rudder and Ailerons As required, for directional control.
- 3. Thrust Lever (operative engine) Increase as required.
- 4. ENG SYNC Switch OFF.
- 5. Rudder Trim As required.
- 6. Yaw Damper As desired.
- 7. Autopilot As desired.
- 8. Refer to Engine Shutdown In Flight procedure, Section IV.

During Approach

- Control Wheel Master Switch (MSW) Depress and release.
 Yaw damper and autopilot will disengage.
- 2. Thrust Lever (operative engine) Increase as required.
- 3. Flaps 20° maximum.
- 4. Airspeed 1.3 Vs (Flaps 20°) minimum.
- 5. Rudder Trim As required.



During a coupled approach, full rudder trim may be required with an actual engine failure. Use rudder pedal force as necessary to maintain slip/skid indicator centered.

6. Yaw Damper — As desired.



- Approach may not be continued to Category II minimums.
- Autopilot may be re-engaged, but must be disengaged at 200 feet AGL.
- 7. Autopilot As desired.
- 8. Refer to either of the following procedures as applicable:
 - Single-Engine Landing, Section IV.
 - Go Around, Section II and Engine Shutdown In Flight, Section IV.

Engine Fire — Shutdown

An engine fire is usually accompanied by other indications, such as: excessive ITT, erratic or rough engine operation, fluctuating engine indications, or smoke in the cabin.

Affected engine:

- 1. Thrust Lever IDLE, unless a critical thrust situation exists.
- 2. If fire continues more than 15 seconds or there are other indi-



Engine compressor stalls and unusual engine sounds may occur during engine shutdown. This is normal and will not cause any damage to the engine.



1. Thrust Lever — IDLE, unless a critical thrust situation of 2. ● If fire continues more than 15 seconds or there are other cations of fire:

a. Thrust Lever — CUTOFF

Engine compressor stalls and unusual sounds may occur during engine shutdown. normal and will not cause any damage to the observation of the fuel and hydraulic fluid to the engine, shuts of air from the engine, and arms the engine fire guishing system.

c. ENG EXT ARMED Light — Depress one. Pulling the ENG FIRE PULL handle stops the flow of fuel and hydraulic fluid to the engine, shuts off bleed air from the engine, and arms the engine fire extin-

- d. ■If fire continues:
 - (1) Depress remaining ENG EXT ARMED Light.
 - (2) Land as soon as possible.
 - (3) Go to step e.
- d. ■If fire extinguishes:
 - (1) Land as soon as practical.
 - (2) Go to step e.
- IGNITION Switch OFF. e.
- Yaw Damper Off, retrim as desired; then Yaw Damper f. As desired.
- ENG SYNC Switch OFF. g.
- JET PUMP Switch OFF; STBY PUMP Switch Select Off.
- START-GEN Switch OFF. i.
- Electrical Load Monitor. Reduce, if required to prevent overloading the operating generator.



During single-generator operations in flight, the COOLing system, CREW AUX HT, and loads on the CABIN PWR BUS are automatically deactivated. Further load reduction may be required to observe generator limits.

> Continued 3 - 11



Engine Fire — Shutdown (Cont)

XFLO VALVE Switch — Select Open. Monitor fuel balance. k. Crossflow as required.



During single-engine operation, maintain slip/skid indicator centered.

- 1. Refer to Single-Engine Landing, Section IV.
- m. This checklist is complete.
- 2. If fire extinguishes in less than 15 seconds:
 - Leave thrust lever at IDLE, unless a critical thrust situation a.
 - Yaw Damper Off, retrim as desired; then Yaw Damper b. As desired.
 - ENG SYNC Switch OFF. c.
 - Monitor fuel balance. Crossflow as required. d.
 - e. TCAS — Select TA ONLY.
 - f. Land as soon as practical.
 - Refer to Single-Engine Landing, Section IV. g.
 - This checklist is complete.

Immediate Engine Airstart



Do not attempt an airstart following an engine failure which was accompanied by indications of internal engine damage or fire.

Successful immediate relights have been accomplished at 25% N2 and altitudes up to 35,000 feet and at 40% N2 at 40,000 feet. An immediate airstart may be attempted before engine decelerates below 25% N2:

Affected engine:

- 1. Thrust Lever IDLE.
 2. IGNITION Switch On.

 2. IGNITION switch On.

 3. Cocconds:
 - Thrust Lever CUTOFF. a.

- IGNITION Switch OFF. b.
- c. Perform Engine Shutdown In Flight procedure, Section IV.
- This checklist is complete.
- 3. If airstart is complete:
 - Thrust Lever Advance.
 - IGNITION Switch OFF. h.
 - c. This checklist is complete.

OIL PRESS Light Illuminated or OIL TEMP is High

Illumination of a red OIL PRESS warning light indicates that oil pressure for the respective engine is below 20 psi (138 kPa). High oil temperature is indicated by the OIL TEMP display (EIS) changing from green to red. In the event low OIL PRESS or high OIL TEMP is indicated in flight:

Affected engine:

- 1. Check oil pressure and oil temperature.
- 2. ●Oil pressure is less than 20 psi:
 - a. *If flight conditions permit,* a precautionary engine shutdown is advised. Refer to **Engine Shutdown In Flight** procedure, Section IV.
 - b. This checklist is complete.
- 2. Oil pressure is between 20 and 36 psi, or oil temperature is high:
 - a. *If flight conditions permit,* reduce power to maintain oil temperature limits.
 - b. This checklist is complete.
- 2. Oil pressure and oil temperature are normal:
 - a. Continue to monitor engine operation.
 - b. This checklist is complete.



ENTRY DOOR or AFT CAB DOOR Light Illuminated

Illumination of either the red ENTRY DOOR or AFT CAB DOOR light indicates that one or more of the locking pins in the respective door may not be fully engaged. The ENTRY DOOR light will also illuminate if the key lock is in the locked position. The AFT CAB DOOR light will also illuminate if the door handles are not in the latched position or the streamered lock pin is installed. During flight, the respective door should not be approached if the red ENTRY DOOR or AFT CAB DOOR light is illuminated; however, while on the ground, door latch pin engagement may be visually verified.

The cabin entry door has 12 latch pins. Six pins on the upper portion can be viewed through ports in the door upholstery. Four pins in the lower portion may be viewed by lifting the carpet tabs to reveal the view ports. Assure that white lines on door structure align with white lines on latch pins. Two latch pins located at the upper/lower door interface, are visible through the upholstery gap at the interface and do not have white lines.

The aft cabin door has 8 latch pins. Six pins can be viewed through ports in the door upholstery. Assure that white lines on door structure align with white lines on latch pins. Two latch pins are visible through the upholstery gap at the base of the door and do not have white lines.

If all latch pins are fully engaged, the most probable cause of an illuminated DOOR light is a latch pin switch malfunction.



Door failure may be indicated by loud noise, pressurization leak, or rumble emanating from door area. **Do not approach door**.

DOOR Light Accompanied by Evidence of Door Failure

- 1. FASTEN SEAT BELT Switch On.
- 2. EMER DEPRESS Switch Lift guard and depress. The cabin altitude will climb to approximately 13,700 feet and stabilize.
- 3. Airspeed Reduce.
- 4. Establish descent.
- 5. Land as soon as practical.

DOOR Light Not Accompanied by Evidence of Door Failure

- 1. FASTEN SEAT BELT Switch On.
- 2. Continue flight. The most probable cause is a latch pin switch malfunction.



EXT DOORS Light Illuminated

Illumination of the red EXT DOORS light indicates that the tailcone baggage door and/or tailcone access door is not properly closed and latched. The primary purpose of the light is to indicate a door open condition prior to takeoff. If the doors were properly latched prior to takeoff and the light illuminates in flight, the most probable cause is a switch failure.

In the event the EXT DOORS light illuminates in flight:

- 1. Avoid slips or skids that could open doors.
- 2. Investigate and correct cause of light upon landing.



BLEED AIR Light Illuminated

If either the red BLEED AIR L or BLEED AIR R warning light illuminates, an overheat sensor in the bleed-air ducting or the pylon structure has tripped the light. If both the BLEED AIR L and BLEED AIR R warning lights illuminate simultaneously, the bleed air overheat sensor in the tailcone has tripped the lights.

One BLEED AIR Light Illuminates

- 1. Corresponding BLEED AIR Switch OFF.
- 2. If light does not go out:
 - a. Reduce power on corresponding engine.
 - b. ■If light goes out:
 - (1) Continue operation with reduced power.
 - (2) This checklist is complete.
 - b. ■If light still does not go out:
 - c. Land as soon as practical.
 - d. This checklist is complete.
- 2. If light goes out:
 - a. This checklist is complete.

Both BLEED AIR Lights Illuminate Simultaneously

- 1. Reduce the bleed air flow:
 - a. WING STAB HEAT and WSHLD HEAT Switches OFF.
- 2. If in icing conditions:
 - a. WING HEAT Circuit Breaker (R ANTI-ICE group) Pull. The WING TEMP indicator will be inoperative.
 - b. STAB WING HEAT Switch STAB WING HEAT. This will provide stabilizer heat without activating the wing heat.
 - c. WSHLD ALC Switch WSHLD ALC. This will anti-ice the pilot's windshield only and give alcohol flow for approximately 45 minutes.
 - d. Fly out of icing conditions.
 - e. Go to step 3.
- 2. If not in icing conditions, go to step 3.

BLEED AIR Light Illuminated (Cont)

3. ● If lights do not go out:

- a. R BLEED AIR Switch OFF. *If lights go out,* continue operation with switch OFF. This checklist is complete.
- b. *If lights do not go out,* R BLEED AIR Switch ON and L BLEED AIR Switch OFF. *If lights go out,* continue operation with switch OFF. This checklist is complete.

If lights still do not go out:

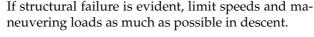
- c. One BLEED AIR Switch EMER.
- d. Other BLEED AIR Switch OFF.
- e. Adjust power on engine supplying EMER air to modulate cabin temperature.
- f. Land as soon as practical. This checklist is complete.
- 3. ●If lights go out, this checklist is complete.



CABIN ALT HI Light Illuminates (Emergency Descent)

1. Crew Oxygen Masks — Don. Select 100% oxygen.
2. Thrust Levers — IDLE.
3. Autopilot — Disengage.
4. SPOILER Lever — EXT.
5. Descend at MMO/VMO, but *not* below minimum safe altitude.
6. PASSENGER OXYGEN Valve — DEPLOY. If the CABIN ALT HI light illuminates, the cabin altitude warning horn







- To establish descent, use an initial 10°-12° nosedown pitch attitude. Descent from 51,000 feet to 15,000 feet requires approximately 4 minutes 35 seconds.
- Hats and "ear-muff" type headsets must be removed prior to donning crew oxygen masks.
- The thrust lever MUTE button will mute the cabin altitude warning horn for 60 seconds.
- 7. Pilot and Copilot NORM MIC/OXY MIC Switches OXY MIC.



With the switches in this position, both cockpit speakers, phone and interphone function will be activated, enabling the crew to communicate via the interphone.

If time and conditions permit:

- 8. Transponder Emergency 7700.
- 9. Notify controlling agency.
- 10. Check condition of passengers and provide assistance if conditions permit.



Communication with passengers can be accomplished by using PASS function of the audio control panel.



CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke or Fumes

A cabin fire is usually accompanied by the presence of smoke or fumes in the cabin area. In addition, a smoke detector installed in the aft cabin baggage area will cause the red CABIN FIRE warning light to illuminate if there is smoke in the baggage area. The warning light will extinguish when smoke is cleared.

1. Crew Oxygen Masks — Don, select 100% oxygen.

- 2. Smoke Goggles Don.
- 3. EMER DEPRESS Switch Lift guard and depress.
- 4. Pilot and Copilot NORM MIC/OXY MIC Switches OXY MIC.



- It may be necessary to select EMER on the crew oxygen mask regulator if mask does not seal properly.
- The cabin altitude will climb to aircraft altitude or approximately 13,700 feet whichever is lower and stabilize with the EMER DEPRESS switch selected on.

Whether or not smoke has dissipated, if it cannot be visibly verified that the fire has been extinguished:

- 5. CABIN FAN Control Rotate to off detent.
- 6. COOL Switch OFF.
- 7. Cockpit Door/Curtain Open.
- 8. Land as soon as possible.
- 9. ●If source is known:
 - a. Protective Breathing Equipment One crew member, don.
 - b. Extinguish fire using hand-held extinguisher or eliminate the source of smoke or fumes.



Crew exposure to high levels of Halon fire extinguisher vapors may result in dizziness, impaired coordination and reduced mental alertness.

- c. ■If fire is not extinguished:
 - (1) Land as soon as possible.
 - (2) This checklist is complete.
- c. ■If fire is extinguished and can be visibly verified:
 - (1) Land as soon as practical. At the crew's discretion, the pressurization and oxygen systems may be returned to normal.

Continued



CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke or Fumes (Cont)

- (2) *If smoke or fumes continue,* One or Both BLEED AIR Switches EMER until smoke or fumes are eliminated. Advancing thrust levers will increase airflow.
- (3) This checklist is complete.
- 9. If source is not known, go to step 10.
- 10. ■If suspected source is bleed air system:
 - a. R BLEED AIR Switch OFF. *If smoke is reduced,* continue operation with switch OFF. This checklist is complete.
 - b. *If smoke is not reduced,* R BLEED AIR Switch ON and L BLEED AIR Switch OFF. *If smoke is reduced,* continue operation with switch OFF. This checklist is complete.

10. ■If suspected source is electrical:

- a. CABIN PWR Switch OFF.
- b. Floodlights On, for night operation.
- c. EMER BAT Switches Check, On.
- d. MFD Switch (pilot's EFIS Control Panel) Select REV mode.
- e. EMER BUS Switch EMER BUS.
- f. Both START-GEN Switches OFF.



- All non-essential equipment is now off. Allow time for smoke and fumes to dissipate.
- The TOTAL fuel quantity window will display an error code. The fuel quantity for individual tanks remains valid.
- g. ■If smoke and fumes dissipate, this checklist is complete.
- g. ■If smoke or fumes continue, the malfunctioning system is connected to the EMER BUS or the EMER BAT supplies. In this event, proceed as follows:
 - (1) Both START-GEN Switches GEN.
 - (2) EMER BUS Switch NORMAL.
 - (3) MFD Switch (pilot's EFIS Control Panel) Select normal mode.
 - (4) EMER BAT Switches OFF.
 - (5) Use pilot's PFD for attitude reference.
 - (6) R DC BUS 1 Circuit Breaker (R ELECTRICAL group)
 Pull. Flap and normal gear operation is not available.
 - (7) Circuit Breakers Pull all EMER BUS (red ring on overlay) circuit breakers on copilot's panel.



CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke or Fumes (Cont)

(8) R DC BUS 1 Circuit Breaker — Reset.



Electrical power to all equipment on the EMER BAT supplies and copilot's EMER BUS is now off.

- h. If smoke and fumes dissipate, the malfunctioning system is connected to the copilot's EMER BUS or the EMER BAT supplies. In this event, proceed as follows:
 - (1) EMER BUS TIE (R ELECTRICAL group) Leave pulled. Do not reset.
 - (2) Reset EMER BUS circuit breakers one at a time. Pause after resetting each circuit breaker to determine defective system. Whenever high electrical loads and/or smoke and fumes occur, pull last circuit breaker reset.
 - (3) EMER BAT Switches On, one at a time. *If smoke and fumes recur*, set switch off.
 - (4) This checklist is complete.
- h. ■If smoke or fumes continue, the malfunctioning system is connected to the pilot's EMER BUS. In this event, proceed as follows:
 - (1) EMER BAT Switches On.
 - (2) L DC BUS 1 Circuit Breaker (L ELECTRICAL group) Pull. Neither PRI nor SEC pitch trim is available.
 - (3) Circuit Breakers Pull all EMER BUS (red ring on overlay) circuit breakers on pilot's panel.
 - (4) L DC BUS 1 Circuit Breaker Reset.



Electrical power to all equipment on the pilot's and copilot's EMER BUSes is now off.

- (5) EMER BUS TIE (R ELECTRICAL group) Leave pulled. Do not reset.
- (6) Reset EMER BUS circuit breakers one at a time. Pause after resetting each circuit breaker to determine defective system. Whenever high electrical loads and/or smoke and fumes occur, pull last circuit breaker reset.



Control System Jam

If the controls are not jammed, but there is a control axis malfunction present, perform **Pitch Axis Malfunction** or **Roll or Yaw Axis Malfunction** procedure, this section, to attempt to clear difficulty. If problem is not corrected, attempt to overpower jam. If jam can be overpowered, make a normal landing.



For landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.

Aileron Jammed



For landing, a wide runway with minimum turbulence and crosswind is recommended.

- 1. Autopilot Disengage. Do not reengage.
- 2. Rudder As required to control roll and track.



- Yaw damper should be on to minimize roll oscillations.
- For prolonged flight in a sideslip, set XFLO VALVE switch to Open and both STBY PUMP switches to ON.
- 3. Land as soon as possible.
- 4. Refer to Aileron Jammed Landing procedure, Section IV.

Elevator Jammed

- 1. Autopilot Disengage. Do not reengage.
- 2. Primary Pitch Trim As required for pitch control.



For landing, a shallow approach with flaps at 20° will minimize pitch change.

- 3. Land as soon as possible.
- 4. Refer to Elevator Jammed Landing procedure, Section IV.



Control System Jam (Cont)

Rudder Jammed



For landing, a wide runway with minimum turbulence and crosswind is recommended.

- 1. Yaw Damper Disengage. Do not reengage.
- 2. Ailerons As required to control track.
- 3. Use asymmetric power if required to minimize sideslip.



For prolonged flight in a sideslip, set XFLO VALVE switch to Open and both STBY PUMP switches to ON

- 4. Land as soon as possible.
- 5. Refer to **Rudder Jammed Landing** procedure, Section IV.



Overspeed Recovery — Overspeed Horn Sounds

If VMO/MMO is exceeded, the overspeed warning horn will sound.



Do not extend the spoilers, or operate with the spoilers deployed, at speeds above VMO/MMO due to significant nose-down pitching moment associated with spoiler deployment.





1. Thrust Levers — IDLE.
2. Autopilot — Disengage.
3. Identify aircraft pitch and roll attitude.

- Attitude (particularly roll attitude) may be difficult to identify from visual and instrument references in an extreme nose-down condition.

- Do not apply elevator force until bank angle is reduced to less than 90°. A pull elevator force when the bank angle is greater than 90° will increase the nose-down attitude.

4. Level wings.
5. Elevator and Pitch Trim — As required to raise the nose.

WARNING

On any speed excursions beyond MMO, airframe buffet will be encountered. Increasing Mach number and/or g level will increase airframe buffet. Beyond MMO, a 1.5 g pull-up may be sufficient to excite aileron activity and the g level must be limited to that required to maintain lateral control.

If Mach or airspeed is severe or if pitch and/or roll attitude is extreme or unknown:

or unknown:



enced when the gear is lowered at very high speed. Do not retract landing gear for remainder of flight. After landing, a thorough inspection of the landing gear and doors for condition must be made.



- Lowering the landing gear at high speed will increase drag and cause a moderate nose-up pitching moment which is easily controllable, but should be anticipated.
- Extending the landing gear has been flight tested to 0.85 MI and 320 KIAS. Analysis of flight test data indicates that this procedure is applicable at higher speeds.



Pitch Axis Malfunction

A nose-up pitch axis malfunction or nose-up pitch trim system runaway can result in extremely high pitch attitudes, heavy airframe buffet, and require control forces in excess of 75 pounds for recovery.

A nose-down pitch axis malfunction, nose-down pitch trim system runaway, or nose-down overspeed can result in extremely high airspeeds and require control forces in excess of 75 pounds for recovery.

A binding elevator is evidenced by difficulty in moving the control column when making manual pitch changes.



- Do not extend spoilers during any nose-down pitch upset at any speed due to significant nosedown pitching moment associated with spoiler deployment.
- On any speed excursions beyond MMO, airframe buffet will be encountered. Increasing Mach number and/or g level will increase airframe buffet. Beyond MMO, a 1.5 g pull-up may be sufficient to excite aileron activity and the g level must be limited to that required to maintain lateral control.



- Control pressures may be heavy. Copilot assistance is recommended with this procedure.
- Demonstrated altitude loss during an autopilot malfunction is:

Cruise and Maneuvering	500 feet
ILS (two engine)	80 feet
(one engine)	80 feet
Category II ILS	80 feet

1. Control Wheel Master Switch (MSW) — Depress and hold.



- Yaw damper and autopilot will disengage.
- Stabilizer trim actuator (PRI and SEC pitch trim) will be inoperative while the switch is held.
- 2. Attitude Control As required to maintain aircraft control.
- 3. Thrust Levers As required.
- 4. PITCH TRIM Switch (pedestal) OFF.



MACH TRIM light may illuminate due to speed change with the PITCH TRIM selector switch OFF.

Continued



Pitch Axis Malfunction (Cont)

- 5. PITCH SERVO Circuit Breaker (L AFCS group) Pull.
- 6. Control Wheel Master Switch (MSW) Release.

If flight conditions permit, isolate malfunction as follows:



A trim system malfunction, with the flaps up, will be accompanied by the audio clicker. The autopilot and Mach trim systems also run pitch trim.

7. PITCH TRIM Switch (pedestal) — Operate to PRI then SEC to isolate malfunctioning trim system.

8. ● If malfunction recurs in PRI pitch trim:

- a. PITCH TRIM Switch (pedestal) SEC.
- b. NOSE DN-NOSE UP Switch (pedestal) Operate to retrim aircraft as required.
- c. PRI PITCH TRIM Circuit Breaker (L TRIM-FLT CONT group) Pull.
- d. PITCH SERVO Circuit Breaker Reset.
- e. Autopilot and Yaw Damper As desired.



Mach trim will be inoperative. If autopilot is not engaged, do not exceed MMO (0.77 MI).

f. This checklist is complete.

8. ● If malfunction recurs in SEC pitch trim:

- a. PITCH TRIM Switch (pedestal) PRI.
- b. Control Wheel Trim Switch Operate to retrim aircraft as required.
- c. SEC PITCH TRIM Circuit Breaker (R TRIM-FLT CONT group) Pull.



Autopilot will be inoperative.

- d. Yaw Damper As desired.
- e. This checklist is complete.

8. ●If malfunction does not recur:

- a. PITCH TRIM Switch (pedestal) PRI or SEC as desired.
- b. Maintain aircraft trim with selected trim system.



Probable cause of malfunction was autopilot (if autopilot was engaged). **Do not engage autopilot.**

- c. Yaw Damper As desired.
- d. This checklist is complete.

8. • If neither PRI nor SEC trim can be restored:

- a. Yaw Damper As desired.
- b. Refer to **Stabilizer Jammed Landing**, Section IV.



Roll or Yaw Axis Malfunction



- Control Wheel Master Switch (MSW) Depress and hold.

 Yaw damper and autopilot will disengage.
 Roll trim, yaw trim, and rudder boost will be inoperative while the switch is held.

 Attitude Control As required to maintain aircraft control.
 If control force continues, Airspeed Reduce to minimize force.
 - 4. ROLL TRIM and YAW TRIM Circuit Breakers (L TRIM-FLT CONT group) — Pull affected axis.
 - 5. RUDDER BOOST Switch OFF.
 - 6. Control Wheel Master Switch (MSW) Release.
 - 7. If malfunction was isolated to yaw damper:
 - ROLL TRIM and YAW TRIM Circuit Breakers Reset.
 - Autopilot As desired. b.
 - Yaw Damper Ensure disengaged.
 - d. This checklist is complete.
 - 7. If malfunction was isolated to autopilot:
 - Do not engage autopilot.
 - ROLL TRIM and YAW TRIM Circuit Breakers Reset. b.
 - Yaw Damper As desired. c.
 - This checklist is complete.
 - 7. If malfunction was isolated to rudder boost system:
 - RUDDER BOOST Switch Leave OFF.
 - ROLL TRIM and YAW TRIM Circuit Breakers Reset. b.
 - c. Autopilot As desired.
 - Yaw Damper As desired. d.
 - This checklist is complete.
 - 7. If malfunction was isolated to roll or yaw trim system:
 - Use asymmetric thrust, fuel imbalance, and yaw damper as required to minimize mistrim.
 - Land as soon as practical.



A normal approach and landing can be made with only light control forces to overcome full roll or yaw trim.



FUEL PRESS Light Illuminated in Flight

Illumination of a red FUEL PRESS warning light is an indication of loss of fuel pressure to the engine.

Affected engine:

- 1. STBY PUMP Switch On.
- 2. IGNITION Switch On.
- 3. XFLO VALVE Closed.
- 4. FUSELAGE Tank Switches As follows:
 - GRVTY XFR Switch Deselect GRVTY XFR.
 - b. NORM XFR Switch Deselect NORM XFR.
 - c. AUX XFR Switch Deselect AUX XFR.
 - d. FILL Switch Deselect FILL.
- 5. JET PUMP OFF.



With the jet pump off, unusable fuel in the corresponding wing will increase to approximately 400 pounds (181 kg) when the aircraft is in a 3° to 5° nose-up cruise condition. Avoid prolonged nose-up attitudes.

- 6. If the FUEL PRESS light goes out, normal flight can be continued.
 - a. IGNITION Switch OFF.
 - b. Fuselage fuel transfer may be accomplished at 51,000 feet or lower using **Rapid Transfer Procedure** (both normal and auxiliary transfer pumps) to transfer fuselage tank fuel. Stop fuel transfer when fuselage tank quantity indicates 200 pounds (91 kg).



Fuselage fuel transfer deactivates the wing standby pumps. However, use of both fuselage transfer pumps will provide sufficient engine fuel pump inlet pressure.

- c. This checklist is complete.
- 6. If the FUEL PRESS light does not go out, flight can be continued at altitude if engines are operating properly. Make thrust lever movements slow and cautious at high altitudes.



The altitude at which the engine-driven fuel pump will suction feed sufficient fuel to supply the engine will vary depending upon fuel temperature and type.

Ditching

Ditching of this aircraft has not been demonstrated, and this aircraft has not been certified for ditching under the provisions of FAR 25. However, the following procedure should enhance the probability of a successful ditching.

Plan the descent to ensure minimum fuel remaining and improve buoyancy. Ensure sufficient fuel for controlled, power-on approach. This aircraft exhibits good buoyancy properties, floating near level or slightly tail low. After ditching, the airplane may remain afloat for some time if it does not sustain serious damage on landing.

- 1. **If time and conditions permit,** perform the following; otherwise go to step 2:
 - a. Head toward nearest land or vessel.
 - b. Notify controlling agency.
 - c. Transponder Emergency 7700.
 - d. ELT Switch ON.
 - e. Crew Life Vests On.
 - f. Brief passengers as required:
 - (1) Use of available flotation equipment.



Inform passengers not to inflate life vests while inside aircraft.

- (2) Location and operation of emergency exits. **Do not** open lower half of cabin door at any time.
- (3) All loose items Secure.
- (4) Emergency landing brace position.
- (5) Several impacts may be felt, depending on the sea conditions. **Do not** release seat belts after first impact is felt.
- g. NO SMOKING/FASTEN SEAT BELTS Switch On.



If the CABIN PWR switch has been selected OFF, the NO SMOKING/FASTEN SEAT BELTS signs and tone will be disabled. Verbal notification to the passengers is required.

- h. Go to step 2.
- 2. TERR Switch Select INHIBIT.
- 3. LANDING GEAR Switch UP.
- 4. Flaps DN.



The landing gear warning horn will sound with landing gear up and flaps down.



Ditching (Cont)

- 5. CAB AIR Switch OFF. The aircraft should be depressurized prior to landing.
- 6. EMER BAT Switches OFF.
- 7. Perform normal power-on approach at VREF.



Plan landing direction as follows:

- a. Calm Sea Into winds.
- b. Moderate Swells Parallel to swells.
- c. High Winds Into wind, attempting to land on upwind (far) side of swell.
- 8. Thrust Levers CUTOFF at touchdown.
- 9. ENG FIRE PULL T-Handles Pull.
- 10. BATTERY Switches OFF.
- 11. Seat Belts On until aircraft comes to a complete stop.
- 12. Emergency Exit(s) Open after airplane comes to a complete stop. Do not open lower half of cabin door at any time.

Emergency Braking

In the event of a normal brake system failure, emergency brakes can be used to stop the airplane. When using emergency braking, anti-skid protection is not available, and the anti-skid OFF corrections presented in Section V will be applicable.



1. Pull EMER BRAKE handle out or reconstruction.

2. Push downward on handle to apply brake pressure.

The EMER BRAKE handle must be pushed down

(5 contimeters) before braking action begins. To realize the optimum benefit from the emergency braking system, the following technique should be employed:

- a. Apply the brakes smoothly with small movements to produce improved feel and reduce the probability of tire skid. Do not pump the brake handle.
- b. Avoid taxiing if sufficient brake pressure is not available.
- 3. Rudder and/or nose wheel steering As required for directional control.

Emergency Evacuation

- 1. Stop the aircraft.
 2. PARKING BRAKE Set.
 3. Thrust Levers CUTOFF.
 4. EMER DEPRESS Switch Lift guard and d.
 5. Notify controlling agency.
 6. If an engine fire is suspected:
 a. Applicable ENG FIRE PULL Handle —
 b. Either ENG EXT ARMED Light Depr.
 c. Other ENG FIRE PULL Handle Pull.
 d. Both BATTERY Switches OFF.
 e. EMER BAT Switches OFF.
 f. Evacuate the aircraft.
 6. If engine fire is not suspected:
 a. Both ENG FIRE PULL Handle Pull.
 b. Both BATTERY Switches OFF.
 c. EMER BAT Switches OFF.
 d. Evacuate the aircraft. 4. EMER DEPRESS Switch — Lift guard and depress.

 - - Applicable ENG FIRE PULL Handle Pull.
 - Either ENG EXT ARMED Light Depress.



Use emergency exits as follows:

Cabin Entry Door — Open and exit aircraft. The upper door is openable with the landing gear retracted. Aft Cabin Door — Open and exit using the wing step area.

Forced Landing — Both Engines Inoperative

The recommended airplane best glide speed is VREF + 50 with the gear and flaps up. The still-air gliding distance is approximately 1.5 nm per 1000 feet of altitude.

- 1. If time permits, perform the following; otherwise go to step 2:
 - Transponder Emergency 7700.
 - b. Advise controlling agency.
 - Prepare passengers for emergency landing.
 - TCAS Select TA ONLY. d
- 2. TERR Switch Select INHIBIT.
- 3. HYD PUMP Switch On.
- 4. LANDING GEAR Switch DN.
- 5. Flaps DN.
- 6. ENG FIRE PULL Handles Pull.
- 7. START-GEN Switches OFF.
- 8. BATTERY Switches OFF.
- 9. Touch down in normal landing attitude.

After airplane comes to a complete stop:

- 10. EMER BAT Switches OFF.
- 11. Evacuate the aircraft:
 - Cabin Entry Door Open and exit aircraft. The upper door is openable with the landing gear retracted.
 - **Aft Cabin Door** Open and exit using the wing step area. b.

Stall Warning Activates

The stall warning system has sensed a limit angle of attack. The red L and/or R STALL lights will flash, the control column stick shaker will activate and the angle-of-attack indication will be in the yellow approaching the red.



If the aircraft is allowed to decelerate below stall warning angle of attack, priority must be given to immediately reducing the angle of attack rather than attempting to maintain altitude. Stall recovery from typical cruise altitudes and other relatively low thrust conditions will require a significant loss of altitude.

- ower the pitch attitude to reduce the angle of attack.
 hrust Levers Set to takeoff power.
 evel the wings.
 ccelerate out of the stall condition. Lower the pitch attitude to reduce the angle of attack.
 Thrust Levers — Set to takeoff power.
 Level the wings.
 Accelerate out of the stall condition.

Insert this page adjacent to page containing ABORTED TAKEOFF in the affected manual.

Added NOTE and WARNING, revised step 4 and added new step to Aborted Takeoff procedure:

Thrust Reversers — Deploy if necessary. Check for DEP indications on the EIS page.

If none of the TR lights are illuminated, both Thrust Reverser Levers — Stow.



The normal sequence of each engine's annunciators are as follows:

- Green REV Thrust Reverser ready to deploy.
- Amber UNL Thrust Reverser in transit.
- White DEP Thrust Reverser fully deployed (reverse thrust greater than idle is possible when both engine's thrust reversers have been fully deployed).

WARNING

- A damaged squat switch (or other failures) may cause
 the thrust reverser auto stow system to activate (both
 engine's clamshell doors will stow), resulting in FORWARD thrust, ranging from idle to near takeoff power,
 depending on thrust reverser LEVER position. If this
 occurs, thrust reversers LEVERS must be stowed immediately.
- Squat switch failure with the thrust reversers deployed will be indicated by the white DEP extinguishing and the red UNL annunciation illuminating on the EIS for several seconds, then extinguishing. An amber REV annunciation may flash momentarily. In summary, the absence of any thrust reverser annunciations indicates forward thrust. There may also be a change in acceleration as the engines transition from reverse thrust to forward thrust.

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Aborted Takeoff

Wheel Brakes — Apply.

- 2. Thrust Levers IDLE.
- Spoilers EXT.
- 4. Thrust Reversers Deploy, if necessary.
- 5. If rejected takeoff was made at a weight above the turnaround brake energy weight (see applicable LANDING WEIGHT LIMIT chart in Section V), observe the Turn-Around Limits in Section I. This checklist is complete.
- 5. If rejected takeoff was made at a weight above the landing maximum brake energy weight (see applicable LANDING WEIGHT LIMIT chart in Section V), see maintenance personnel to perform the high energy stop inspection. This checklist is complete.



If the stop was conducted above the landing maximum brake energy limit, it is recommended that the PARKING BRAKE be released and chocks used. This will increase brake cooling efficiency and reduce the possibility of wheel fuse plug release and brake/tire fire.

Takeoff Warning Horn Activates

The takeoff monitor warning will sound during ground operation when the right thrust lever is advanced to the MCR detent or above and one or more of the following conditions exist:

- Thrust reverser unlocked or deployed
- Flaps not set for takeoff
- Spoilers not retracted
- Pitch trim not in a safe position for takeoff
- Parking brake not released
- 1. Wheel Brakes Apply.
- 2. Thrust Levers IDLE.
- 3. After stopping, check takeoff configuration.



Terrain Awareness Warnings

Pilots are authorized to deviate from their current air traffic control (ATC) clearance to the extent necessary to comply with a ground proximity warning.

If during flight an aural or visual warning is given, initiate positive corrective action to eliminate the cause for the warnings. The corrective actions are embodied in the following procedures.

PULL-UP Warning

Siren followed by "PULL-UP, PULL-UP" voice warning and a red PULL UP warning displayed on the PFD.

- 1. Autopilot Disengage.
- 2. Thrust Levers As required.
- 3. Increase pitch attitude and climb until warnings cease or terrain clearance is assured.

TERRAIN Warning

Siren followed by "TERRAIN, TERRAIN, PULL-UP" or "TERRAIN AHEAD, TERRAIN AHEAD, PULL-UP" voice warning and a red PULL UP warning displayed on the PFD.

- 1. Autopilot Disengage.
- 2. Thrust Levers As required.
- 3. Increase pitch attitude and climb until warnings cease or terrain clearance is assured.

OBSTACLE Warning

Siren followed by "OBSTACLE, OBSTACLE, PULL-UP" or "OBSTACLE AHEAD, OBSTACLE AHEAD, PULL-UP" voice warning and a red PULL UP warning displayed on the PFD.

- 1. Autopilot Disengage.
- 2. Thrust Levers As required.
- 3. Increase pitch attitude and climb until warnings cease or terrain clearance is assured.



Terrain Awareness Warnings (Cont)

WINDSHEAR Warning During Takeoff

Siren followed by "WINDSHEAR, WINDSHEAR, WINDSHEAR" voice warning and a red WINDSHEAR warning on the PFD.

1. Thrust Levers — APR detent.



Engine overboost should be avoided unless the airplane continues to descend and safety is in doubt. When airplane safety has been assured, adjust thrust to maintain engine parameters within the approved limits.

- 2. Maintain takeoff target pitch attitude and wings level, allowing airspeed to decrease if necessary. Do not retract flaps or landing gear.
- 3. If the aircraft continues to descend, increase pitch target attitude smoothly and in small increments, reducing airspeed as necessary to stop the descent. Use stall warning onset (stick shaker) as the upper limit of pitch attitude.
- 4. Maintain escape attitude and thrust and delay retracting flaps or landing gear until safe climbout is assured.

WINDSHEAR Warning During Final Approach

Siren followed by "WINDSHEAR, WINDSHEAR, WINDSHEAR" voice warning and a red WINDSHEAR warning on the PFD.

- 1. Autopilot Disengage.
- 2. Thrust Levers APR detent.



Engine overboost should be avoided unless the airplane continues to descend and safety is in doubt. When airplane safety has been assured, adjust thrust to maintain engine parameters within the approved limits.

- 3. Spoilers Check retracted.
- 4. Rotate smoothly to the go around/takeoff pitch attitude, allowing airspeed to decrease if necessary. Maintain wings level.
- 5. If the aircraft continues to descend, increase pitch target attitude smoothly and in small increments, reducing airspeed as necessary to stop the descent. Use stall warning onset (stick shaker) as the upper limit of pitch attitude.
- 6. Maintain escape attitude and thrust and delay retracting flaps or landing gear until safe climbout is assured.



Traffic Alert and Collision Avoidance System (TCAS)

TRAFFIC Annunciation

A red TRAFFIC annunciation on the PDF indicates the issuance of a Resolution Advisory (RA) on the vertical speed scale. A voice warning will also be issued to indicate the corrective action.

1. Comply with the resolution advisory.

Inadvertent Stow of Thrust Reverser After a Crew-Commanded Deployment

 Maintain control with rudder, aileron, nose-wheel steering, and brakes.

2. Both Thrust Reverser Levers — Stow.



Samonamana

Failure to move the thrust reverser levers to stow will result in forward thrust ranging from idle to near takeoff power, depending upon the position of the thrust reverser levers.

Filing Instructions:

Insert this page adjacent to page containing INADVERTENT STOW OF THRUST REVERSER AFTER A CREW-COMMANDED DEPLOYMENT in the affected manual.

Changed the NOTE to a WARNING to Inadvertent Stow of Thrust Reverser After a Crew-Commanded Deployment procedure:



- A damaged squat switch (or other failures) may cause the thrust reverser auto stow system to activate (both engine's clamshell doors will stow), resulting in FOR-WARD thrust, ranging from idle to near takeoff power, depending on thrust reverser LEVER position. If this occurs, thrust reversers LEVERS must be stowed immediately.
- Squat switch failure with the thrust reversers deployed will be indicated by the white DEP extinguishing and the red UNL annunciation illuminating on the EIS for several seconds, then extinguishing. An amber REV annunciation may flash momentarily. In summary, the absence of any thrust reverser annunciations indicates forward thrust. There may also be a change in acceleration as the engines transition from reverse thrust to forward thrust.

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Thrust Deployment Inadvertent Reverser Durina Takeoff

An inadvertent thrust reverser deployment during takeoff will be indicated by display of an amber UNL or red DEP on the EIS (Engine Page) with the affected engine rolling back to idle thrust. Also, both the white and amber ENG CMPTR lights will illuminate when the aircraft becomes airborne.

Below V₁ Speed

- Wheel Brakes Apply.
 Thrust Levers IDLE.
 Spoilers FYT



Directional control will be improved with both thrust reversers deployed.

Above V₁ Speed

- 1. Rudder and Ailerons — As required for directional control.
 - Accelerate to VR. Keep nose wheel on the ground.
 - 3. Rotate at VR; Climb at V2.
 - 4. GEAR UP, when positive rate of climb is established.
 - 5. When clear of obstacles, accelerate to VT (V2 + 20) and retract flaps.
 - Affected Engine Thrust Lever IDLE.



The FADEC will automatically reduce the thrust to idle if a thrust reverser primary latch unlock is detected. However, the engine thrust lever will not move.

- 7. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) — Set.
- 8. If UNL and DEP indications do not go out, shut down affected engine. Refer to Engine Shutdown In Flight and Thrust Reverser Deployed Landing procedures, Section IV. This checklist is complete.
- 8. If UNL and DEP indications go out and both white and **amber ENG CMPTR lights go out,** Affected Thrust Lever — As required. This checklist is complete.

Thrust Reverser UNL/DEP Indications and ENG CMPTR Lights Illuminated in Flight

An inadvertent thrust reverser deployment in flight will be indicated by display of a red UNL or red DEP on the EIS (Engine Page). Also, both the white and amber ENG CMPTR lights will illuminate and the affected engine will roll back to idle thrust. The autostow function will attempt to stow the reverser doors.



A red UNL indication without engine roll-back indicates a secondary latch is unlocked. For this condition, refer to **Thrust Reverser UNL Indication** procedure, Section IV.

- 1. Maintain control with rudder, aileron, and elevator.
- 2. Affected Engine Thrust Lever IDLE.



The FADEC will automatically reduce the thrust to idle if a thrust reverser primary latch unlock is detected. However, the engine thrust lever will not move.

- 3. Airspeed Reduce to 200 KIAS or 0.70 MI, whichever is less.
- 4. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) Set.
- 5. Affected Thrust Reverser Lever Stow.
- 6. ●If UNL and DEP indications do not go out, shut down affected engine. Refer to Engine Shutdown In Flight and Thrust Reverser Deployed Landing procedures, Section IV. This checklist is complete.
- 6. ●If UNL and DEP indications go out and both white and amber ENG CMPTR lights go out, Affected Thrust Lever As required. This checklist is complete.



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Introduction

The procedures in this section of the manual have been developed by Learjet Inc. for certification of this aircraft. This section contains those operating procedures requiring the use of special systems and/or alternate use of regular systems which, if followed, will maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure condition.

The procedures located in this section supplement normal procedures when a failure condition exists. Use of normal procedures should be continued when applicable. Sound judgement as well as thorough knowledge of the aircraft, its characteristics, and the flight manual procedures are essential in the handling of any failure condition.

OVERRIDING CONSIDERATIONS

In all emergencies, the overriding consideration must be to:

- Maintain Airplane Control
- Analyze the Situation
- Take Proper Action

Terminology

Some abnormal procedures require that a landing be made as soon as practical. Refer to emergency procedures for complete definitions of the terms "land as soon as possible" and "land as soon as practical."



ALC LOW Light Illuminated

Illumination of the amber ALC LOW light indicates the alcohol level in the windshield alcohol anti-ice reservoir is low.

- 1. WSHLD ALC Switch OFF when alcohol stops flowing.
- 2. After landing, assure alcohol reservoir is properly replenished.

Engine Ice Ingestion

Engine ice ingestion can result in fan damage and abnormal engine operation. Engine ice ingestion can be suspected whenever ice is shed from the wing, windshield, or nacelle. This may occur when anti-ice systems are energized after significant ice accumulation has occurred on the above surfaces. Ice ingestion may be evident by a change in engine sound or frequency, audible report, sharp rise in ITT, or RPM hang-up.

Experience to date has shown that, if proper procedures are observed, there is a very high probability of satisfactory engine operation after experiencing foreign object damage from ice in the engine fan. Such damage can reduce the compressor stall margin so that the engine could become more sensitive to rapid thrust lever movements, inlet pressure profile variation due to maneuvering, and high RPM operation. Compressor stalls may result in engine flameout.

- 1. IGNITION Switches On. Leave On for the duration of the condition.
- 2. Thrust Lever movements should be slow and cautious.
- 3. Engine RPM Set as low as possible. Maintain sufficient RPM for anti-icing heat and cabin pressure.
- 4. Avoid any abrupt changes in pitch, yaw, or roll.
- 5. To determine extent of engine damage due to ice ingestion, proceed as follows:
 - a. Thrust Levers (one at a time) Retard to IDLE. Then cautiously advance and check for any vibration or abnormal noise on each engine.



If compressor stall is encountered, retard thrust lever until smooth operation is obtained. If any of the fan blades have been damaged, the noise level and frequency will increase with an increase of RPM.

b. If either engine flames out, airstart in accordance with the Airstart procedure, this section. After restart, repeat step 5, but stay below engine speed at which engine flamed out.



Engine Ice Ingestion (Cont)

c. *If ice damage has been experienced,* land as soon as practical and stay within the operating limitations of engine as defined by this procedure.



Inspect engine for damage any time inadvertent icing conditions have been encountered.



Inadvertent Icing Encounter

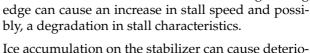
Before Heavy Ice Accumulation Occurs

 All Anti-Ice Systems — Activate immediately to preclude ice accumulation.

If approach and landing must be made with any amount of ice on the airframe:

- 2. Do not extend flaps beyond 20°.
- 3. Use landing procedure for a wing and stabilizer heat failure. Refer to Abnormal Landings, this section.







Ice accumulation on the stabilizer can cause deterioration in trim speeds, elevator buffeting, changes in elevator forces, and control column oscillations/pulsing. During flight tests, control column oscillations and pulsing tended to increase in intensity with increases in power. Low speed flight should be approached with care so that detection of abnormal flying qualities can be obtained.

Even small accumulations of ice on the wing leading

Heavy Ice Accumulation Has Occurred

If en route and destination temperatures remain below freezing, consideration should be given to landing with ice on the wings.

- 1. If landing with ice on the wings:
 - a. WING HEAT Circuit Breaker (R ANTI-ICE group) Pull. The WING TEMP indicator will be inoperative.
 - b. STAB WING HEAT Switch STAB WING HEAT. This will provide stabilizer heat without activating the wing heat.
 - c. Use landing procedure for a wing heat failure. Refer to Wing Heat Failure Landing, this section.
- 1. lacktriangle If attempting to remove ice accumulation:
 - a. IGNITION Switches On.
 - b. Engine RPM Set as low as possible. Maintain sufficient RPM for anti-icing heat and cabin pressure.
 - c. NAC HEAT Switch (for one engine) On; wait until satisfactory engine operation is apparent, then opposite engine NAC HEAT Switch On; Observe NAC HT light out for operation of engine anti-ice.
 - d. After satisfactory engine operation is apparent, STAB WING HEAT Switch On.
 - e. After satisfactory engine operation is apparent, WSHLD HEAT Switch As required.



NAC HT Light Illuminated

A failure of the nacelle heat system (bleed air) is indicated by illumination of the amber L or R NAC HT light. Two types of failures are annunciated with these lights: 1) Uncommanded application of nacelle heat, and 2) the failure of nacelle heat to activate when commanded.

Affected engine:

- NAC HEAT Circuit Breaker (ANTI-ICE group) Pull and/or reset.
- 2. ●If NAC HT light does not go out:
 - a. ■If associated NAC HEAT switch is OFF, Engine RPM Reduce to minimum required.
 - a. ■If associated NAC HEAT switch is On, Engine RPM Increase to improve airflow. Fly out of icing conditions if possible.
- 2. ●If NAC HT light goes out, this checklist is complete.

PITOT HT Light Illuminated

Illumination of the PITOT HT light indicates that one or more of the pitot-static mast heaters are inoperative or one or both PITOT HEAT switches are OFF.

- 1. PITOT HEAT Switches Check, On.
- 2. L PITOT HEAT, R PITOT-STALL-TAT HEAT, and STANDBY PITOT HEAT Circuit Breakers (ANTI-ICE group) Set.
- 3. Cross-check the three pitot-static systems.



- The overspeed warning horn will sound if either the pilot's or copilot's airspeed indication is above the overspeed cue (VMO/MMO).
- The standby pitot-static mast may be visible from the copilot's seat. Visually check mast for ice or damage.
- 4. If illumination of the PITOT HT light is accompanied by erroneous pitot-static indications, refer to Loss of Air Data or Erroneous Indications procedure, this section.



STAB HT Light Illuminated in Flight

With the STAB WING HEAT switch On, a failure of any stabilizer heating element is indicated by illumination of the amber STAB HT light while in flight. The remaining elements will continue to operate.

Ice accumulation on the stabilizer can cause deterioration in trim speeds, elevator buffeting, changes in elevator forces, and control column oscillations/pulsing. During flight tests, control column oscillations and pulsing tended to increase in intensity with increases in power. Low speed flight should be approached with care so that detection of abnormal flying qualities can be obtained.

- 1. STAB HEAT Circuit Breaker (R ANTI-ICE group) Set.
- 2. ●If STAB HT light does not go out:
 - a. Fly out of icing conditions if possible.
 - b. Do not extend flaps beyond 20°.
 - Refer to Stabilizer Heat Failure Landing procedure, this section.
- 2. ●If STAB HT light goes out, this checklist is complete.

WING HT Light Illuminated

If the amber WING HT light illuminates, the wing heat system is not maintaining the temperature of the leading edge in the normal operating range. The light will annunciate both the underheat (if STAB WING HEAT switch is on) and overheat conditions. It is normal for the light to illuminate upon initial activation of the wing heat system until the leading edge temperature reaches the normal operating range.

- 1. WING TEMP Indicator Check.
- 2. •If WING TEMP Indicator is approaching or in the blue band and/or either wing shows signs of ice accumulation, a wing underheat condition exists:
 - a. WING HEAT Circuit Breaker (R ANTI-ICE group) Set.
 - b. Engine RPM Adjust as required to maintain WING TEMP indicator in the green band.
 - c. If WING HT light does not go out and the WING TEMP indicator remains in the blue range and/or visual indications of ice accumulation, fly out of icing conditions.
 - d. Go to step 3.
- 2. If WING TEMP Indicator is approaching or in the red band, a wing overheat condition exists:
 - a. WING HEAT Circuit Breaker (R ANTI-ICE group) Pull. The WING TEMP indicator will be inoperative.
 - b. STAB WING HEAT Switch STAB WING HEAT. This will provide stabilizer heat without activating the wing heat.
 - c. Fly out of icing conditions.
- 3. *If landing with ice on the wings,* use landing procedure for a wing heat failure. Refer to **Wing Heat Failure Landing**, this section.



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.



Windshield Heat Failure

With the WSHLD HEAT system activated, a failure is indicated by the formation of ice on the heated portion of the windshield.

- 1. WSHLD HEAT Circuit Breaker (R ANTI-ICE group) Set.
- 2. WSHLD HEAT Switch WSHLD HEAT (full airflow).
- 3. Engine RPM Increase as required to improve airflow.
- 4. *If system fails to anti-ice the windshield:*
 - a. WSHLD ALC Switch WSHLD ALC if required. This will anti-ice the pilot's windshield only and give alcohol flow for approximately 45 minutes.
 - b. WSHLD ALC Switch OFF when alcohol is depleted or when out of icing conditions.

WS DEFOG Light Illuminated



Any illumination (including momentary flashes) of the L or R WS DEFOG light, other than upon initial activation, should be considered a malfunction. A momentary flash indicates cycling of the overtemperature protection circuit and is not normal.

Illumination of the amber L or R WS DEFOG light indicates an overtemperature condition (approximately 150°F [66°C] or more), undertemperature condition (approximately 85°F [29°C] or less) or loss of AC or DC power. Illumination of the WS DEFOG lights, upon initial activation when the windshield temperature is below approximately 85°F (29°C), does not indicate a malfunction. Determination of an overheat or underheat condition can be made by feeling the indicated windshield. If an under-temperature condition occurs, deactivation of the system is not required. In the event an overheat condition persists for more than 10 minutes, it is desirable to deactivate the windshield defog system.

1. ● If an underheat condition exists:

- a. Applicable WSHLD DEFOG Circuit Breakers (ANTI-ICE group) Set both AC and DC circuit breakers.
- b. Go to step 2.

1. ● If an overheat condition exists:

- a. L or R WSHLD DEFOG Circuit Breaker (ANTI-ICE group)
 Pull both AC and DC circuit breakers.
- b. Check that affected windshield does not continue to heat.
- c. Go to step 2.



WS DEFOG Light Illuminated (Cont)

- 2. If descending with an inoperative defog system into conditions requiring defogging:
 - a. WSHLD HEAT Switch WSHLD HEAT.
 - b. Cockpit Shoulder and Ankle Eyeball Outlets Open.
 - c. CREW COLD-HOT Control HOT.
 - d. At FL 350:
 - Cabin AUTO-MAN Switch MAN and Cabin COLD-HOT Knob — COLD.
 - (2) COOL Switch COOL.
 - e. Leave CAB AIR and WSHLD HEAT on until shutdown.

WSHLD OV HT Light Illuminated

Illumination of the amber WSHLD OV HT light indicates the bleed air temperature in the windshield nozzles has exceeded the system limits. Airflow should automatically shut off when the WSHLD OV HT light illuminates.

If airflow did not shut off when WSHLD OV HT light illuminated:

1. WSHLD HEAT Switch — OFF.



AC Bus Failure

Each AC bus is intended to be powered by only one inverter. Therefore, the AC BUS TIE switch (copilot's circuit breaker panel) is normally in the OPEN (down) position isolating the left and right AC buses. The AC BUS TIE switch should only be closed after setting one of the INVERTER switches to OFF.

An AC bus failure is indicated by amber or red digits in the VAC display(s) (EIS Electrical Page). The most likely cause is either an inverter failure or open AC BUS circuit breaker.

- 1. Affected INVERTER Switch(es) OFF.
- 2. AC BUS TIE Switch Ensure switch is in the OPEN (down) position.
- 3. Affected INV and AC BUS Circuit Breakers Pull and reset.
- 4. Load on Affected AC Bus(es) Reduce. Refer to table.
- 5. Affected INVERTER Switch(es) On.
- 6. ●If AC power is not regained:
 - a. Affected INVERTER Switch(es) OFF.
 - b. If it is desired to power loads on the failed bus, AC BUS TIE Switch Switch to closed (up) position. Both AC buses will be powered by the operating inverter. If the BUS TIE switch opens, leave it open.

AC circuit breakers are denoted by a white circle on the panel overlay.

AC buses and their associated loads

L AC BUS	R AC BUS
- AFCS -	- TRIM-FLT CONT -
MACH TRIM	SPOILERON
- ANTI-ICE -	NOSE STEER
L WSHLD DEFOG	- ANTI-ICE -
	R WSHLD DEFOG
	- AVIONICS -
	NOSE FAN



The L and R WSHLD DEFOG systems are not powered from the L and R AC BUS circuit breakers. The L WSHLD DEFOG system is normally powered by the left inverter and the R WSHLD DEFOG system is normally powered by the right inverter. Should one inverter fail, both WSHLD DEFOG systems will be powered by the remaining inverter (failed INVERTER switch must be set to OFF).

Continued





If a total AC power failure occurs, all of the equipment in the preceding table will be inoperative. Spoilers will be inoperative in flight and may be inoperative during ground operations. Do not exceed 38,000 feet.

- c. This checklist is complete.
- 6. ●If AC power is regained, this checklist is complete.

CUR LIM Light Illuminated

A battery charging bus current limiter failure is made evident by illumination of the amber CUR LIM light. Should a battery charging bus current limiter fail:



Generator loading may not read equally.

- 1. Check EIS Electrical Page. Failure of both 275-amp current limiters is indicated if battery voltage is 25 VDC or less and/or AMPS readings (generator load) do not increase when COOL, AUX HT or STAB HEAT is momentarily energized.
- 2. If one 275-amp current limiter has failed:
 - Electrical Load Reduce if required to observe generator
 - Continue flight but monitor electrical loads.
 - Go to step 3.
- 2. If both 275-amp current limiters have failed:



Electrical power to the battery charging bus is being supplied by the main batteries. If the batteries become depleted, primary pitch trim system will be inoperative.

- Electrical Load on Battery Charging Bus Reduce.
 - (1) AUX HT Switch OFF.
 - (2) COOL Switch OFF.
 - (3) RECOG Light Switch OFF.
 - (4) STAB HEAT Circuit Breaker (R ANTI-ICE group) Pull.
 - (5) CABIN PWR Switch OFF.
- 3. After landing, replace failed 275-amp current limiter(s) prior to next flight.



DC Bus Failure

The DC BUS TIE switches (copilot's circuit breaker panel) are normally in the OPEN (down) position isolating the left and right DC buses.



A bus tie is not provided for the left and right DC BUS 4.

The EMER BUS TIE (copilot's circuit breaker panel) is only functional when the EMER BUS switch is positioned to EMER BUS.

L or R DC BUS 1, 2 or 3 Circuit Breaker Opens in Flight

- 1. Affected BUS TIE Switch Ensure switch is in the OPEN (down) position.
- 2. Electrical Load on Affected Bus Reduce. Refer to table.
- 3. Affected DC BUS Circuit Breaker Set.



Wait at least one minute cooling time before attempting to set DC BUS circuit breakers.

4. ●If DC BUS circuit breaker holds:

- a. Add loads only as necessary for safe operation.
- b. This checklist is complete.
- 4. If DC BUS circuit breaker does not hold:
 - a. ■If attempting recovery of DC BUS 1, 2, or 3:
 - (1) Reduce load on both affected DC buses to a minimum.
 - (2) Affected BUS TIE Switch Switch to closed (up) position. If the BUS TIE switch opens, leave it open.
 - (3) This checklist is complete.
 - a. ■If *not* attempting recovery of a DC BUS, this checklist is complete.

L or R DC BUS 4 Circuit Breaker Opens in Flight

- 1. Electrical Load on Affected Bus Reduce. Refer to table.
- 2. Affected DC BUS Circuit Breaker Set.



Wait at least one minute cooling time before attempting to set DC BUS circuit breakers.

3. ●If DC BUS circuit breaker holds:

- a. Add loads only as necessary for safe operation.
- b. This checklist is complete.
- 3. ●If DC BUS circuit breaker does not hold, this checklist is complete.

Both L and R DC BUS 1 Circuit Breakers Open in Flight

- 1. DC BUS 1 TIE Switch Ensure switch is in the OPEN (down) position.
- 2. Electrical Load on L and R DC BUS 1 Reduce. Refer to table.

Continued



Both L and R DC BUS 1 Circuit Breakers Open in Flight (Cont)

3. L and R DC BUS 1 Circuit Breakers — Set, one at a time.



Wait at least one minute cooling time before attempting to set circuit breakers.

4. ● If either or both DC BUS 1 circuit breaker(s) holds:

- a. Add loads only as necessary for safe operation.
- b. Land as soon as practical.
- c. This checklist is complete.

4. ● If neither DC BUS 1 circuit breaker holds:

- a. EMER BAT Switches Check, On.
- b. MFD Switch (pilot's EFIS CONTROL panel) Depress to select REV mode.
- c. EMER BUS Switch EMER BUS.



- The generators will provide electrical service to DC BUS 2, 3 and 4. The main batteries will provide electrical service to those circuits denoted by red rings on the circuit breaker overlays. Fully charged main batteries should power the minimum electrical equipment for night instrument flight for at least 1 hour.
- The main batteries will not be charged while operating in EMER BUS mode. Occasionally switching back to NORMAL will allow the batteries to be charged, but results in the loss of service to all DC BUS 1 loads.
- d. Airspeed 0.77 MI or below.
- e. Altitude 38,000 feet or below.



When using the standby indications (ESIS), refer to AIRSPEED and MACH CALIBRATION — STANDBY SYSTEM and ALTITUDE POSITION CORRECTION — STANDBY SYSTEM, in Section V.

f. If there is fuel in the fuselage tank, GRVTY XFR Switch — Select ON.



With GRVTY XFR selected, approximately 350 pounds (159 kg) of fuselage fuel will be unusable.

- g. Land as soon as practical.
- h. Before landing, GRVTY XFR Switch Select Off.



Both L and R DC BUS 2 Circuit Breakers Open in Flight

- 1. MFD Switch (pilot's EFIS CONTROL panel) Depress to select REV mode.
- 2. DC BUS 2 TIE Switch Ensure switch is in the OPEN (down) position.
- 3. Electrical Load on L and R DC BUS 2 Reduce. Refer to table.
- 4. L and R DC BUS 2 Circuit Breakers Set, one at a time.



Wait at least one minute cooling time before attempting to set circuit breakers.

5. ● If either or both DC BUS 2 circuit breaker(s) holds:

- a. Add loads only as necessary for safe operation.
- b. Land as soon as practical.
- c. This checklist is complete.

5. ● If neither DC BUS 2 circuit breaker holds:

a. Land as soon as practical.

Both L and R DC BUS 3 Circuit Breakers Open in Flight

- 1. DC BUS 3 TIE Switch Ensure switch is in the OPEN (down) position.
- 2. Electrical Load on L and R DC BUS 3 Reduce. Refer to table.
- 3. L and R DC BUS 3 Circuit Breakers Set, one at a time.



Wait at least one minute cooling time before attempting to set circuit breakers.

4. ● If either or both DC BUS 3 circuit breaker(s) holds:

- a. Add loads only as necessary for safe operation.
- b. Land as soon as practical.
- c. This checklist is complete.

4. ● If neither DC BUS 3 circuit breaker holds:

a. Land as soon as practical.



DC buses and their associated loads (pilot's circuit breaker panel):

L DC B	US 1	L DC BUS 2	L DC BUS 3
- ELECTRICAL -	- INSTRUMENTS -	- AFCS -	- AFCS -
L INV	MFD 1	PITCH SERVO	AP 1
EMER BAT 1	ADC 1	ROLL-YAW SERVO	- FUEL -
- AFCS -	EFIS CONTROL 1	- FUEL -	L STBY-SCAV PUMP
L IAPS	AHS 1	L FUEL FLOW	- ELECTRICAL -
- FUEL -	- AVIONICS -	- L ENGINE -	EMER BAT 3 §
FUEL QTY PWR 1	FDR §	L ENG CH B	- L ENGINE -
FUS TANK XFR PUMP	IAPS TEMP	L IGN CH A	L OIL PRESS
L JET PUMP-XFR VALVE	TAWS	- LIGHTS -	L START
XFLO VALVE	AUDIO 1	NAV LTS	L IGN CH B
- L ENGINE -	COMM 1	- INSTRUMENTS -	ENGINE SYNC
L FIRE DETECT	ADF 1	PFD 1	L TR AUTO STOW
L FIRE EXT	HF 1	LO SPD WARN 1	L ENGINE VIB MON
L TR CONT	FMS DISPLAY 1	L CLOCK	- LIGHTS -
L FW SOV	MFD CONTROL 1	- AVIONICS -	L INSTR LTS
L ENG CH A	RTU 1	PHONE	L EL LTS
- LIGHTS -	NAV 1	SELCAL	CHART HOLDERS §
FLOOD LTS	DME 1	SATCOM §	- TRIM-FLT CONT -
CENTER PANEL-PED LTS	GPS 1	RADIO ALT	ROLL TRIM
WARN LTS	DISPLAY CONTROL 1	L AVIONICS MASTER	YAW TRIM
- TRIM-FLT CONT -	DCU 1		- ANTI-ICE -
PRI PITCH TRIM	ATC1		L STALL VANE HEAT
L STALL WARN	FSU 1		L ICE DETECT LIGHT
WHEEL MASTER	EDC 1		ICE DETECTOR §
SQUAT SW	- CABIN-		- ENVIRONMENT -
- ANTI-ICE -	CABIN LTS		L BLEED AIR
L WSHLD DEFOG			OXYGEN VALVE
L NAC HEAT			- AVIONICS -
- ENVIRONMENT -			DATA LINK RADIO §
COOL CONTROL			XM WEATHER §
TEMP CONTROL IND			L DC BUS 4
BLEED AIR OV HT			- AVIONICS -
CABIN PRESS IND			PFD 1 HEAT
MANUAL TEMP CONTROL			MFD 1 HEAT

[§] If Installed



DC buses and their associated loads (copilot's circuit breaker panel):

R DC BI	IS 1	R DC BUS 2	R DC BUS 3
- ELECTRICAL -	- ENVIRONMENT -	- AFCS -	- AFCS -
R INV	CABIN PRESS SYS	R IAPS	AP 2
R EMER BUS CONT	CABIN AIR	- FUEL -	- FUEL -
EMER BAT 2	AUX CABIN HEAT	R FUEL FLOW	R STBY-SCAV PUMP
- AFCS -	- INSTRUMENTS -	- R ENGINE -	- R ENGINE -
SYSTEM TEST	AHS 2	R TR CONT	R START
- FUEL -	ADC 2	R ENG CH B	R IGN CH A
FUEL QTY PWR 2	MFD 2	R IGN CH B	R OIL PRESS
FUS TANK AUX PUMP	EFIS CONTROL 2	- LIGHTS -	R TR AUTO STOW
R JET PUMP-XFR VALVE	- AVIONICS -	R INSTR LTS	R ENGINE VIB MON
- R ENGINE -	AUDIO 2	PULSE RECOG LT §	ENGINE DIAGNOSTIC
R FIRE DETECT	CVR	- HYDRAULICS -	SYSTEM
R FIRE EXT	ELT NAV	HYDRAULIC PRESS IND	- LIGHTS -
R ENG CH A	DME 2	AIR PRESS IND	LOGO LT §
R FW SOV	STORM SCOPE §	- ENVIRONMENT -	R EL LTS
- LIGHTS -	FMS DISPLAY 2	AUTO TEMP CONT	- HYDRAULICS -
WING INSP LT	MFD CONTROL 2	- INSTRUMENTS -	ANTI SKID
WARN LTS	EDC 2	STATIC SOURCE	- ANTI-ICE -
EMER LTS	FSU 2 §	PFD 2	R ICE DETECT LIGHT
BEACON-STROBE LTS	GPS 2	LO SPD WARN 2	- ENVIRONMENT -
- TRIM-FLT CONT -	DCU 2	R CLOCK	R BLEED AIR
SEC PITCH TRIM	- CABIN-	- AVIONICS -	CABIN FAN
FLAPS	CABIN FIRE DETECT	ATC 2	- AVIONICS -
TRIM-FLAP-SPOILER	PASS SPKR	RTU 2	DATA LINK §
INDICATOR		COMM 2	RADAR
R STALL WARN		ADF 2	INSTR PANEL FANS
SPOILER		NAV 2	- CABIN-
NOSE STEER		R AVIONICS MASTER	PASS INFO
RUDDER-PEDAL ADJUST		TCAS	R DC BUS 4
- HYDRAULICS -		HOUR METER	- ENVIRONMENT -
GEAR		DISPLAY CONTROL 2	CREW FAN
- ANTI-ICE -			AUX CREW HEAT
STANDBY PITOT HEAT			- AVIONICS -
R STALL VANE HEAT			PFD 2 HEAT
R WSHLD DEFOG			MFD 2 HEAT
ALCOHOL SYSTEM			- CABIN-
WSHLD HEAT			PASS AUDIO
R NAC HEAT			PASS CONTROL
STAB HEAT			110 VAC INV
WING HEAT			

§ If Installed



ELEC Indication Displayed on EIS

An ELEC display on the EIS indicates that one or more electrical system parameter is at or approaching its limit. Display of ELEC will be accompanied by flashing amber or red values on the EIS electrical page. Flashing will continue for five seconds before going steady and indicates one or more of the following:

- AC voltage is above or below limits
- DC voltage is above or below limits
- Generator load is high and may be in excess of generator limits



- Selecting the CABIN PWR Switch OFF is one means of reducing generator loads. Further load reduction may be necessary.
- During single-generator operations in flight, the cooling system (air conditioner), crew aux heater, and loads on the cabin power bus are automatically deactivated.
- 1. EIS Electrical Page—Select.
- 2. If a VAC display is amber or red:
 - a. Go to AC Bus Failure procedure, this section.
 - b. This checklist is complete.
- 2. If the VDC display is amber or red and voltage is low:
 - a. Electrical Load Reduce.
 - b. This checklist is complete.
- 2. If the VDC display is amber or red and voltage is high:
 - a. L START-GEN Switch OFF.
 - b. ■If voltage is still high:
 - (1) L START-GEN Switch ON and R START-GEN Switch OFF.
 - (2) ▲ If voltage is still high, both START-GEN Switches OFF. Go to Dual Generator Failure procedure, Section III.
 - (2) ▲ If voltage returns to normal, this checklist is complete.
 - b. ■If voltage returns to normal:
 - (1) Leave L START-GEN Switch OFF.
 - (2) This checklist is complete.
- 2. If an AMPS display is amber or red:
 - Electrical Load Reduce, if required to observe generator limits.
 - b. This checklist is complete.



EMER PWR 1 Light Illuminated

The amber EMER PWR 1 annunciator will illuminate when EMER BAT 1 is being discharged following a dual generator failure. In this case, refer to **Dual Generator Failure** procedure, in Section III.

Illumination of the EMER PWR 1 annunciator when normal electrical power is available (and EMER BUS switch is set to NORMAL) indicates an EMER BAT 1 fault or failure.



With an in-flight loss of EMER BAT 1, the maximum distance from a suitable landing airport (in terms of flight time) that the aircraft can be safely operated is greatly reduced. Should a dual generator failure be experienced, EMER BAT 1 may not be available to power the ESIS.

- 1. Adjust flight plan to remain within 1 hour of a suitable landing airport (determined by the duration of the main batteries).
- 2. Land as soon a practical.



Single Generator Failure

A generator failure is indicated by an amber L GEN or R GEN light on the annunciator panel. It will be accompanied by an indication of zero AMPS on the EIS electrical page.



During single-generator operations in flight, the cooling system (air conditioner), crew aux heater, and loads on the cabin power bus are automatically deactivated.

- 1. Affected START-GEN Switch GEN.
- 2. Affected START (ENGINE group) and GEN (ELECTRICAL group) Circuit Breakers Set.
- Electrical Load Reduce, if required to observe generator limits.
- 4. COOL Switch OFF (ensures cooling system is deactivated).
- 5. GEN RESET Switch RESET momentarily.



Depressing and holding the GEN RESET switch longer than one second, or multiple activations, may cause damage to the electrical system.

6. ● If generator does not reset:

- a. $N_2 80\%$ or greater.
- b. START-GEN Switch OFF, then GEN.
- c. GEN RESET Switch RESET momentarily.



Depressing and holding the GEN RESET switch longer than one second, or multiple activations, may cause damage to the electrical system.

d. ■If generator still does not reset:

- (1) START-GEN Switch OFF.
- (2) This checklist is complete.
- d. **If generator resets**, this checklist is complete.
- 6. ●If generator resets, this checklist is complete.



Airstart



Do not attempt an airstart following an engine failure which was accompanied by indications of internal engine damage or fire.



- Do not attempt an airstart without an indication of N1 rotation.
- If ITT is approaching the limit and rising rapidly, immediately place thrust lever in CUTOFF position and abort start.

Affected engine:

- 1. Assure aircraft is within appropriate airstart envelope as shown in Figure 4-1, this section, if conditions permit.
- 2. ENG CMPTR Switch AUTO.
- 3. Thrust Lever CUTOFF. Wait 10 seconds to allow fuel to drain from engine.
- 4. Fuel Supply Check:
 - Fuel available from wing tank.
 - ENG FIRE PULL T-Handle Check in. b.
- 5. Fuel Panel Switches As follows:
 - JET PUMP Off.
 - b. STBY PUMP ON.
 - XFLO VALVE Closed. c.
 - d. GRVTY XFR Off.
 - NORM XFR Off. e.
 - AUX XFR Off.
- 6. Electrical Load Reduce.
- 7. NAC HEAT Switch OFF.
- 8. BLEED AIR Switch OFF.
- 9. ●If Starter-Assisted Airstart:
 - START-GEN Switch START. Amber Starter Engaged Light will illuminate.
 - Thrust Lever IDLE at minimum 5% N2. b.
 - Go to step 10.

9. ● If Windmilling Airstart:

- START-GEN Switch OFF or GEN.
- Thrust Lever IDLE at minimum 7% N2. b.
- Go to step 10.
- 10. IGNITION Light and FUEL FLOW Check.
- 11. ITT Check rise.

Continued



Airstart (Cont)

- 12. ●If no indication of light-off is obtained within 60 seconds of achieving 7% N2:
 - a. Thrust Lever CUTOFF.
 - b. START-GEN Switch OFF.
 - c. Repeat Airstart procedure.

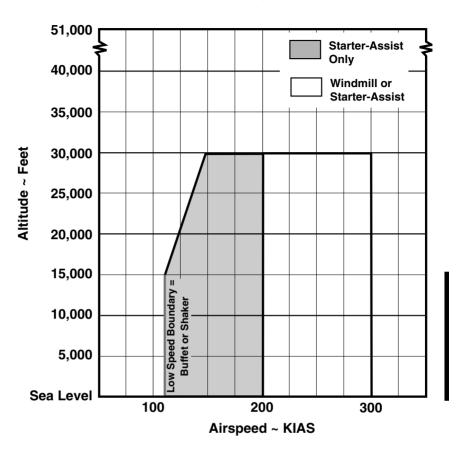


No more than three consecutive starter-assist airstarts should be attempted to prevent severe battery drain and generator burnout.

- d. If engine will not restart, go to Engine Shutdown in Flight procedure, this section.
- d. ■If engine starts, go to step 13.
- 12. If engine starts, go to step 13.
- 13. Engine Instruments Normal indications.
- 14. IGNITION and Starter Engaged Lights Out.
- 15. START-GEN Switch GEN.
- 16. BLEED AIR Switch ON.
- 17. NAC HEAT Switch On as required.
- 18. JET PUMP and STBY PUMP Switches As required.
- 19. Flight Management System Update:
 - a. FMS PERFormance INITialize (PERF INIT).
 - b. FMS CONTROL mode SYNChronized.
 - c. SELECT SYNC MASTER FMS1 or FMS2, as desired.



Airstart Envelope



- ITT may be minimized during engine start if ITT prior to start is 100°C or less.
- Use starter-assisted airstart when N2 is less than 7%.

Figure 4-1

Alternate Engine Start (Ground Only)

This alternate starting procedure may be used if an engine fails to start (on the ground) using the normal starting procedure in Section II and any of the following abnormal conditions are observed:

- No fuel flow
- No ignition
- Engine fails to accelerate

Affected engine:

- 1. Accomplish steps 1 thru 8 of the normal **Starting Engines** procedure in Section II.
- Thrust Lever IDLE.
- 3. JET PUMP Switch OFF.
- 4. STBY PUMP Switch ON.
- 5. STAB WING HEAT Switch On.
- 6. CAB AIR Switch ON.
- 7. ENG CMPTR Switch CH. A
- 8. IGNITION Switch On.
- 9. START-GEN Switch START.



If ITT is approaching the limit and rising rapidly, immediately place thrust lever in CUTOFF position and abort start.

10. ●If no indication of light-off is obtained within 10 seconds of achieving 5.2% N2:

- a. Thrust Lever CUTOFF.
- b. START-GEN Switch OFF.
- c. IGNITION Switch OFF.
- d. STBY PUMP Switch Off.
- e. After an appropriate cooling period, repeat steps 2 thru 9 using CH. B position of the ENG CMPTR switch.
- 10. If engine starts, go to step 11.
- 11. At 40% N2, IGNITION Switch OFF.
- 12. Engine Instruments Normal indications.
- 13. START-GEN Switch GEN.
- 14. ENG CMPTR Switch Select opposite channel (CH. A or CH. B as appropriate), then AUTO.
- 15. STAB WING HEAT Switch OFF.
- 16. CAB AIR Switch OFF.
- 17. JET PUMP Switch On.
- 18. STBY PUMP Switch Off.
- 19. Continue with step 12 of the normal **Starting Engines** procedure in Section II.



EDS FAULT Light Illuminated

Illumination of the white EDS FAULT light indicates one of the following about the Engine Diagnostic System (EDS):

- The EDS has lost power.
- The EDS built in test equipment (BITE) has detected a system failure.
- The EDS memory is 85% full.
- The system has detected an engine condition which is out of acceptable parameters.
- 1. If *not* preceded by an engine exceedance, notify maintenance personnel of the EDS light illumination and download the EDS data at the next suitable maintenance opportunity.
- 1. If preceded by an engine exceedance, refer problem to maintenance personnel for correction at the earliest possible maintenance.

ENG CHIP Light Illuminated

Illumination of either amber L or R ENG CHIP light indicates the presence of metallic particles in the engine oil.

- 1. Engine Instruments Monitor for indication of malfunction.
- 2. Investigate cause at earliest possible maintenance.



Amber ENG CMPTR Light Illuminated

Illumination of an amber ENG CMPTR light indicates a major malfunction in one channel of the associated engine's Full Authority Digital Engine Control (FADEC) system. With the ENG CMPTR switch in the AUTO position, the FADEC will automatically select the most capable channel (A or B) to control the engine. Engine operation is not affected.

On the ground:

Takeoff is **not** permitted with an amber ENG CMPTR light illuminated.

- 1. Complete the **After Landing/Clearing Runway** and **Shutdown** procedures in Section II.
- 2. Allow aircraft to remain de-powered for 2 minutes minimum.
- 3. Complete the **Before Starting Engines** and **Starting Engines** procedures in Section II.
- 4. If amber ENG CMPTR light remains illuminated, DO NOT TAKEOFF. Refer problem to maintenance personnel for correction.
- 4. If amber ENG CMPTR light extinguishes, continue normal procedures in Section II.

In flight:

- 1. Engine Instruments Monitor for indication of malfunction.
- 2. Refer problem to maintenance personnel for correction prior to next flight.



Amber and White ENG CMPTR Light Illuminated

Illumination of both the amber and white ENG CMPTR lights may indicate a major malfunction in both channels of the associated engine's Full Authority Digital Engine Control (FADEC) system. With the ENG CMPTR switch in the AUTO position, the FADEC will automatically select the most capable channel (A or B) to control the engine. Engine operation may be affected.

On the ground:

Takeoff is **not** permitted with both the amber and white ENG CMPTR lights illuminated.

 Refer problem to maintenance personnel for correction prior to takeoff.

In flight:

- 1. Engine Instruments Monitor for indication of malfunction.
- 2. Operate associated thrust lever cautiously.
- 3. •If engine operation is satisfactory, continue operation with ENG CMPTR switch in AUTO position. This checklist is complete.
- 3. If engine operation is not satisfactory, go to step 4.
- 4. ENG CMPTR Switch (affected engine) CH. A or CH. B. Ensure ENG CMPTR switch remains in selected channel for a minimum of 2 seconds.



Use of the ENG CMPTR switch to manually select a channel may cause degraded engine operation or flameout.

- 5. If engine operation improves, continue operation with ENG CMPTR switch in selected position. This checklist is complete.
- 5. ●If engine operation remains the same or degrades, ENG CMPTR Switch Select opposite channel.
 - a. ■If engine operation improves, continue operation with ENG CMPTR switch in selected position. This checklist is complete.
 - a. ■If engine operation remains the same or degrades, ENG CMPTR Switch Select AUTO.
 - b. If engine shutdown is required:
 - (1) Applicable Thrust Lever CUTOFF.
 - (2) If engine does not shut down, applicable ENG FIRE PULL Handle — Pull.



White ENG CMPTR Light Illuminated

Illumination of a white ENG CMPTR light indicates a minor malfunction in one or both channels of the associated engine's Full Authority Digital Engine Control (FADEC) system. With the ENG CMPTR switch in the AUTO position, the FADEC will automatically select the most capable channel (A or B) to control the engine. Engine operation is not affected.

On the ground:

Takeoff is **not** permitted with a white ENG CMPTR light illuminated.

- 1. Complete the **After Landing/Clearing Runway** and **Shutdown** procedures in Section II.
- 2. Allow aircraft to remain de-powered for 2 minutes minimum.
- 3. Complete the **Before Starting Engines** and **Starting Engines** procedures in Section II.
- 4. If white ENG CMPTR light does not go out, DO NOT TAKEOFF. Refer problem to maintenance personnel for correction.
- 4. If white ENG CMPTR light goes out, continue normal procedures in Section II.

In flight:

- 1. Engine Instruments Monitor for indication of malfunction.
- 2. Refer problem to maintenance personnel for correction when possible.

ENG Indication Displayed on EIS

An ENG display on the EIS indicates that one or more engine system parameter is at or approaching its limit.

- 1. EIS Engine Page Select.
- 2. Take appropriate action.



ENG FILTERS Light Illuminated

Illumination of either white L or R ENG FILTERS light indicates an impending bypass of one or more of the following filters:

- Associated airframe-mounted fuel filter
- Associated engine fuel filter
- Associated engine oil filter
- 1. Investigate cause prior to next flight.

ENG VIB Light Illuminated

Illumination of either amber L or R ENG VIB light indicates an abnormally high level of vibration in the associated engine.

- 1. Engine Instruments Monitor for indication of malfunction.
- 2. Investigate cause at earliest possible maintenance.

Engine Overspeed

Affected engine:

- 1. Thrust Lever Retard.
- If engine does not respond to thrust lever movement, shut down engine. Refer to Engine Shutdown in Flight procedure, this section.



Engine Shutdown in Flight

Affected engine:

- 1. ENG SYNC Switch OFF.
- 2. Thrust Lever CUTOFF.



Engine compressor stalls and unusual engine sounds may occur during engine shutdown. This is normal and will not cause any damage to the engine.



The engine fuel and hydraulic pumps will continue to operate with a windmilling engine. Prolonged operation without fluid available to the pumps may cause damage. Therefore, the ENG FIRE PULL Handle should not be pulled unless a fuel or hydraulic leak is suspected.

- 3. Rudder Trim As required.
- 4. Yaw Damper As desired.
- 5. IGNITION Switch OFF.
- 6. START-GEN Switch OFF.
- Electrical Load Reduce, if required to observe generator limits.



During single-generator operations in flight, the cooling system (air conditioner), crew aux heater, and loads on the cabin power bus are automatically deactivated.

- 8. BLEED AIR Switch OFF.
- 9. XFLO VALVE Switch Select Open. Monitor fuel balance. Crossflow as required.



During single-engine operation, maintain slip/skid indicator centered.

- 10. TCAS Select TA ONLY.
- 11. Refer to Airstart, Single-Engine Landing, or Thrust Reverser Deployed Landing procedures, this section, as appropriate.



Starter Engaged Light Remains Illuminated after Start

Ground Start

- 1. Affected START-GEN Switch GEN. If Starter Engaged light does not go out, the start contactor is still engaged.
- 2. Both Thrust Levers CUTOFF.
- 3. APU (if installed and running) Shut down:
 - a. STOP Switch Depress.
 - b. MASTER Switch Depress.
- 4. Both BATTERY Switches OFF.
- 5. All EMER BAT Switches OFF.
- 6. Do not dispatch until trouble has been corrected.

Starter-Assist Airstart

- 1. Complete airstart procedure.
- 2. Affected START-GEN Switch GEN. If Starter Engaged light does not go out, the start contactor is still engaged.
- 3. Continue flight.



A speed sensor, in the starter/generator, automatically switches the starter/generator to the generator mode at 45% N2. The generator will operate normally for the remainder of the flight (may be necessary to reset the generator). At shutdown, starter will remain engaged until BATTERY Switches are set to OFF.

4. Correct trouble before next flight.



DUCT OV HT Light Illuminated

Illumination of the amber DUCT OV HT light indicates the temperature of the cabin or crew bleed air distribution duct has exceeded the system limit. The applicable temperature control valve should automatically close.

- 1. TEMP CONTROL Display (EIS Electrical page) Verify affected valve is in full cold (0) position.
- 2. If DUCT OV HT light does not go out:
 - a. Affected system's AUTO-MAN or AUTO-CABIN-MAN Switch MAN.
 - b. Affected COLD-HOT Knob Rotate to full cold.
 - c. This checklist is complete.
- 2. If DUCT OV HT light goes out, this checklist is complete.

EMER PRESS Light Illuminated

Illumination of the EMER PRESS light without activation of emergency airflow indicates an electrical fault which may prevent activation of emergency airflow.

EMER PRESS Light without emergency airflow

1. Maintain 41,000 feet or below.

EMER PRESS Light accompanied by emergency airflow

- 1. Retard power as low as practical.
- 2. L BLEED AIR Switch OFF.
- 3. If emergency airflow continues:
 - a. L BLEED AIR Switch ON.
 - b. R BLEED AIR Switch OFF.
 - c. ■If emergency airflow continues, go to step 4.
 - c. \blacksquare If emergency airflow stops, this checklist is complete.
- 3. If emergency airflow stops, this checklist is complete.
- 4. Both BLEED AIR Switches ON.
- L and R BLEED AIR Circuit Breakers (ENVIRONMENT group)
 — Pull. Emergency pressurization will not be available. Maintain 41,000 feet or below.

Failure to Depressurize on the Ground

- 1. CAB AIR Switch OFF.
- 2. Both BLEED AIR Switches OFF.



Loss of Pressurization Indicator

Loss of the pressurization indicator is indicated by both CABIN ALT and CABIN RATE needles in the OFF position and loss of the DIFF PRESS display.

CABIN PRESS IND Circuit Breaker (L ENVIRONMENT group)
 — Pull and reset.



Loss of the pressurization indicator will not effect the operation of the automatic or manual pressurization control system. However, the cabin altitude warning horn and automatic passenger oxygen mask drop will not occur, and the PRESS SYS light will not alert the crew of a differential pressure exceedance. If operating in manual mode, the PRESS SYS light will not alert the crew of an increasing cabin altitude. Automatic activation of the emergency pressurization will occur.

2. • If indicator is not regained:

- a. Aircraft Altitude 41,000 feet or below.
- b. If emergency pressurization activates:
 - (1) Execute emergency descent. Refer to **CABIN ALT HI Light Illuminates (Emergency Descent)** procedure, in Section III.
 - (2) PASSENGER OXYGEN Valve DEPLOY (passenger oxygen masks will deploy).
- 2. If indicator is regained, this checklist is complete.

Overpressurization (Differential Pressure Exceeds 9.8 psid)

- 1. MODE Select Switch Depress to select MANUAL mode.
- 2. MAN ALT Control UP as required to maintain satisfactory pressurization.
- 3. MAN RATE Control Rotate to the desired setting.
- 4. If unable to regulate the overpressurization:
 - a. One BLEED AIR Switch OFF.
 - b. Adjust power on opposite engine to control cabin pressurization.
 - c. This checklist is complete.
- 4. ●If pressurization is satisfactory, this checklist is complete.



PRESS SYS Light Illuminated

Illumination of the PRESS SYS light indicates one or more of the following:

- Differential pressure has exceeded the limit.
- Cabin altitude is abnormally high. The cabin altitude at which this occurs varies depending upon the aircraft's situation (refer to **Pressurization System**, Section II).
- The pressurization system detects a fault.
- 1. Crew Oxygen Masks Don.
- Pilot and Copilot NORM MIC/OXY MIC Switches OXY MIC.
- 3. Check the pressurization panel and indicators for cabin altitude, differential pressure, and fault annunciations.
- 4. ●If differential pressure exceeds the limit (DIFF PRESS readout will flash), go to Overpressurization procedure, this section.



Cabin differential pressures equal to or greater than 10.0 psid cannot be fully displayed on the DIFF PRESS indicator (the first digit will not display). Indications in this category are differentiated by flashing of the digits (e.g., a display of "0.0" indicates 0.0 psid if steady and 10.0 psid if flashing).

- 4. ●If cabin altitude is abnormally high, go to Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet procedure, this section.
- 4. ●If FAULT light is illuminated:
 - a. MODE Select Switch Depress to select MANUAL mode.
 - b. Use manual mode to control cabin pressurization. Refer to **Pressurization System**, Section II.

Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet

Whenever the pressurization FAULT light illuminates, the pressurization automatic mode will deactivate and stop cabin altitude from rising higher if failure is in automatic control system. Normally, a pressurization loss causes the following events to occur in steps with increasing cabin altitude triggering each subsequent event:

- PRESS SYS (glareshield) and FAULT (switch panel) lights
- Emergency pressurization
- Cabin altitude horn
- Passenger oxygen mask deployment

In some situations all of these events could occur simultaneously (refer to **Pressurization System**, Section II).



Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet (Cont)

- 1. Crew Oxygen Masks Don. Select 100% oxygen.
- 2. If aircraft is climbing, stop climbing and level off at (or descend to) the nearest appropriate altitude.
- Pilot and Copilot NORM MIC/OXY MIC Switches OXY MIC.
- 4. CAB AIR Switch ON.
- 5. L and R BLEED AIR Switches ON.
- 6. If cabin altitude continues to climb:
 - a. MODE Select Switch Depress to select MANUAL mode.
 - b. MAN ALT Control As required to maintain satisfactory pressurization.
 - c. MAN RATE Control Rotate to the desired setting.
 - d. ■If cabin altitude continues to climb, L and R BLEED AIR Switches EMER. This checklist is complete.



- Windshield and wing bleed air anti-ice are not available with both left and right bleed air systems in the emergency pressurization mode. Engine inlet, fan spinner, and windshield alcohol anti-ice will be available.
- If cabin temperature becomes hot from the use of EMER bleed air, one BLEED AIR Switch — OFF.
 Ensure cabin pressure is maintained. If temperature is still too high, reduce power on engine supplying bleed air.

d. If cabin altitude stabilizes at a safe altitude:

- (1) Continue flight in manual pressurization mode. Continued use of the oxygen system is at the crew's discretion.
- (2) This checklist is complete.
- 6. If cabin altitude stabilizes at a safe altitude, this checklist is complete.



Oxygen Duration — Minutes

Fully Charged System

		2 Crew	2 Crew	2 Crew	2 Crew	2 Crew	2 Crew	2 Crew
		_	2 Pass	4 Pass	6 Pass	8 Pass	9 Pass	11 Pass
Final Stabilized Cabin Altitude ~ 1000 Feet	40	612	186	108	76	58	52	43
		612	186	108	76	58	52	43
	35	426	159	97	69	53	48	40
	00	426	159	97	69	53	48	40
	30	307	135	86	62	49	44	36
	30	307	135	86	62	49	44	36
	25	307	134	85	62	48	43	36
	23	223	115	76	57	45	41	34
	20	408	147	89	63	49	44	36
	20	176	99	69	52	42	38	32
	15	545	159	92	64	49	44	36
	13	141	86	61	48	39	35	30
	10	545						
		111						
	8	446	PASSENGER OXYGEN NOT REQUIRED					
i.		102						
_	7	407						
		98						

- Bold face numbers (xxx) indicate 100% oxygen.
- Light face numbers (xxx) indicate Diluter Demand.
- Crew and passenger oxygen masks are not approved for use above 40,000 feet cabin altitude. Passenger durations above 30,000 feet cabin altitude are provided for information only. Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended.
- Prior to overwater flights, plan oxygen requirements to provide sufficient oxygen
 for all occupants in the event of a pressurization failure. Additional oxygen may be
 required to assure that both oxygen duration and range (fuel) requirements are
 satisfied.
- For cabin altitudes of 10,000 feet and above, the oxygen duration times include cabin altitude ascent time from 8000 feet to final stabilized cabin altitude.
- To calculate oxygen duration for a less than fully charged system the following formula may be used:

Duration = Duration from chart x (system pressure \div 1850)

Figure 4-2



Return to Automatic Mode Operation



If cabin altitude exceeds $8600 \ (\pm 200)$ feet, the automatic pressurization mode is deactivated and the amber PRESS SYS and pressurization FAULT lights will illuminate. Automatic mode operation will not be available until the cabin altitude is decreased and the pressurization system is cycled to unlatch the fault.

- 1. MAN ALT Control Center or DN as required to maintain cabin altitude below 8000 feet.
- 2. MODE Select Switch Depress to select automatic mode.
- 3. If the FAULT light does not go out:
 - a. CABIN PRESS SYS Circuit Breaker (R ENVIRONMENT group) Pull and reset.
 - b. ■If the FAULT light does not go out, the fault has not cleared and automatic mode operation is not available:
 - (1) MODE Select Switch Depress to select MANUAL mode.
 - (2) MAN ALT Control As required to maintain satisfactory pressurization.
 - (3) MAN RATE Control Rotate to the desired setting.
 - (4) This checklist is complete.
 - b. If the FAULT light goes out, the system has successfully returned to the automatic mode. This checklist is complete.
- 3. If the FAULT light goes out, the system has successfully returned to the automatic mode. This checklist is complete.

Return to Normal Pressurization Airflow

If normal operation is assured, the following procedure accomplishes resetting emergency pressurization valves and reactivation of normal pressurization airflow.

- 1. CAB AIR Switch ON.
- 2. MAN ALT Control Center, or DN as required to maintain cabin altitude below 8000 feet.
- 3. One BLEED AIR Switch OFF then ON.
- 4. Other BLEED AIR Switch OFF then ON.
- 5. MAN ALT Control UP, center, or DN as required to maintain cabin altitude appropriate for flight altitude.



Autopilot TRIM Annunciation in Flight

Illumination of a red TRIM warning, on the PFD and FCP, indicates a failure of the autopilot's pitch trim capability.



When the autopilot is disengaged in a mistrim condition, expect an abrupt change in control force.

Autopilot — Disengage.

Autopilot/Yaw Damper Mistrim Annunciation











Mistrim Annunciations Figure 4-3

Illumination of a boxed E (Elevator), A (Aileron) or R (Rudder) annunciation on the PFD indicates that the autopilot or yaw damper is flying the airplane in a mistrimmed condition. The direction of the arrow indicates the direction in which the aircraft is mistrimmed.

An amber annunciation indicates a moderately mistrimmed condition; whereas, a red annunciation indicates a significantly mistrimmed condition.



When autopilot or yaw damper is disengaged in a mistrim condition, expect an abrupt change in control force.

If an amber mistrim annunciation continues for an extended period or transitions to a red annunciation:

- 1. Autopilot or Yaw Damper Disengage.
- 2. Fuel Balance Check and correct imbalance if necessary.
- 3. Retrim aircraft if necessary.
- 4. Autopilot or Yaw Damper As desired.



FD Flag Illuminated on PFD

Display of the flight director flag (red FD on the PFD) and removal of the flight director steering commands indicates a failure in the flight director system or loss of sensor data required for the active modes. If using the cross pointer presentation, it is possible to display only one axis of guidance. If the flight director flag appears because of internal failure, loss of AHS data, or selection of AHS reversion, the autopilot will disconnect. If the flight director flag appears because of invalid sensor data, the autopilot will not disconnect; however, a flag on the PFD will annunciate the invalid sensor.

- 1. Monitor aircraft attitude and position.
- 2. *If sensor signal is not restored,* change flight director mode, select a different sensor, transfer autopilot or flight director, or disconnect autopilot as appropriate.



If flight director flag appears because of temporary NAV signal loss, the NAV mode may reacquire and track upon signal restoration.

FLT Indication Displayed on EIS

An amber FLT display on the EIS indicates that an abnormal condition exists on the EIS Flight page.

- 1. EIS Flight Page Select.
- 2. Take appropriate action.



MACH TRIM Light Illuminated

Illumination of only the amber MACH TRIM light indicates the Mach trim system has shut down due to a power loss to the Mach trim computer, a power loss to the primary pitch trim system, or the Mach trim monitor has detected a Mach number/horizontal stabilizer position error. If above 0.77 MI and the autopilot is not engaged, the overspeed warning horn will sound.

- 1. Airspeed Below 0.77 MI.
- 2. Check that primary pitch trim is available:
 - a. PITCH TRIM Switch PRI.
 - b. PRI PITCH TRIM Circuit Breaker (L TRIM-FLT CONT group) Set.
- 3. If the MACH TRIM Circuit Breaker (L AFCS group) is open:
 - a. MACH TRIM Circuit Breaker Reset.
 - b. SYSTEM TEST Switch Rotate to MACH TRIM.
 - c. TEST Button Depress, then release to resynchronize the system.
 - d. If the MACH TRIM circuit breaker opens again:
 - (1) Leave it open.
 - (2) This checklist is complete.
 - d. If the MACH TRIM circuit breaker holds, this checklist is complete.
- 3. If the MACH TRIM circuit breaker is closed, the Mach trim monitor has deactivated the system. Reset the monitor:
 - a. SYSTEM TEST Switch Rotate to MACH TRIM.
 - b. TEST Button Depress, then release to resynchronize the system.
 - c. ■If the MACH TRIM light does not go out:
 - (1) MACH TRIM Circuit Breaker Pull.
 - (2) This checklist is complete.



With the Mach trim system inoperative, flight above 0.77 MI is permitted when the autopilot is engaged.

c. If the MACH TRIM light goes out, this checklist is complete.



MACH TRIM and PITCH TRIM Lights Illuminated

Illumination of the amber MACH TRIM and amber PITCH TRIM lights indicates that the Mach monitor has detected a Mach trim computer output fault and has shut down the Mach trim and primary pitch trim systems. If above 0.77 MI and the autopilot is not engaged, the overspeed warning horn will sound.

- 1. Airspeed Below 0.77 MI.
- 2. PITCH TRIM Switch SEC.
- 3. MACH TRIM Circuit Breaker (L AFCS group) Pull.
- 4. PITCH TRIM Switch PRI. If the PITCH TRIM light illuminates again, select SEC pitch trim for remainder of flight.



With the Mach trim system inoperative, flight above 0.77 MI is permitted when the autopilot is engaged.

PITCH TRIM Light Illuminates in Flight

Illumination of the amber PITCH TRIM light in flight indicates that the trim speed monitor has detected a trim speed fault, the SEC PITCH TRIM circuit breaker is open, the PITCH TRIM selector switch is OFF, or an attempt has been made to trim the aircraft using a control wheel trim switch and the PITCH TRIM selector switch was in the SEC position.



If MACH TRIM light is also illuminated, refer to MACH TRIM and PITCH TRIM Lights Illuminated procedure, this section.

- SEC PITCH TRIM Circuit Breaker (R TRIM-FLT CONT group)
 — Set.
- 2. If circuit breaker opens, the autopilot will be inoperative. This checklist is complete.
- 2. If circuit breaker is closed (and PITCH TRIM selector switch is in PRI position):
 - a. EIS Flight Page Check ELEV trim position.



If the ELEV indicator pointer is on the ND side of the index () point, the trim speed monitor has detected a trim speed fault.

- b. PITCH TRIM Selector Switch SEC.
- NOSE DN-OFF-NOSE UP Switch Operate as required to maintain trim.



SPOILER MON Light Illuminated in Flight

If the spoiler or spoileron system malfunctions, the SPOILER MON light will illuminate and the spoilers will retract. Actuating the SPOILER RESET will restore normal operation if the system malfunction clears.

- 1. SPOILER Lever RET.
- 2. SYSTEM TEST Switch Rotate to SPOILER RESET, then depress and release.
- 3. If SPOILER MON light does not go out:
 - a. SPOILERON Circuit Breaker (R TRIM-FLT CONT group)
 Pull.



Do not reset the SPOILERON circuit breaker after it has been pulled. The monitor may be affected.

- b. Spoilers will be inoperative in flight. Limit altitude to 38,000 feet.
- c. Spoilerons will be inoperative in flight.
- d. SYSTEM TEST Switch Rotate to OFF.
- e. Spoilers may be inoperative during ground operations. Refer to **One or Both Spoilers Up Landing** or **Spoilers Failed Landing** procedure, this section, as appropriate.
- f. This checklist is complete.
- 3. ●If SPOILER MON light goes out:
 - a. SYSTEM TEST Switch Rotate to OFF.
 - b. This checklist is complete.

Stall Warning System Failure

Failure of a stall warning system is indicated by steady illumination of the corresponding STALL light and an AOA indicator failure. If both left and right stall warning systems fail, stalls may be avoided by reference to the airspeed indicator. In this event:

- 1. Maintain airspeed at least 30 knots above stall speeds shown in Section V. VREF may be maintained on final approach in the landing configuration.
- 2. Limit bank angles to 30° maximum.



In case of both L and R stall warning failure, the air-speed indicators on the PFD, will display an amber band and crosshatched red band. In this condition, the top of the amber band will correspond to the maximum shaker speed (heavy weight/flaps up). The top of the red band will correspond to the minimum shaker speed (light weight/flaps down).



Crossflow Valve Fails to Open

- 1. Maintain wing fuel balance by adjusting power setting.
- 2. Use **Rapid Transfer Procedure** or **Gravity Transfer Procedure** in Section II to transfer fuselage tank fuel.
- 3. Monitor individual wing fuel indications to ensure fuel balance.
- 4. If right wing becomes heavy during fuselage fuel transfer:
 - a. NORM XFR Switch Select NORM XFR.
 - AUX XFR Switch Deselect AUX XFR until wing tanks are balanced.
- 4. If left wing becomes heavy during fuselage fuel transfer:
 - a. AUX XFR Switch Select AUX XFR.
 - b. NORM XFR Switch Deselect NORM XFR until wing tanks are balanced.

Fuel Imbalance

IMB, on the fuel quantity indicator, will illuminate when fuel imbalance exceeds operational limits. The fuel quantity reading representing the heavy wing will flash.



Do not crossflow with main jet pump(s) inoperative. Engine starvation may occur due to fuel being pumped through the open crossflow valve into opposite wing.

- 1. XFLO VALVE Switch Depress to select open.
- 2. STBY PUMP Switch (heavy wing) Depress to select ON.
- 3. Standby Pump (light wing) Check Off.
- 4. XFLO VALVE Switch Depress to select closed after fuel balance is obtained.
- 5. STBY PUMP Switches Select Off.
- 6. If preceding procedure fails to balance fuel, unequal power setting may be used to balance the wings.

Fuel Quantity Indicator Error Displayed

The fuel quantity indicator monitors the system for faults, and displays corresponding error codes if a fault is detected.

On the Ground

- 1. Record the error code(s) and the location (L WING, R WING, FUSELAGE or TOTAL).
- 2. FUEL QTY PWR 1 and 2 Circuit Breakers (FUEL group) Pull and reset.
- 3. If fault does *not* clear, refer problem to maintenance personnel for correction prior to takeoff.

3. ● If fault clears:

- a. Continue planned flight.
- b. At earliest possible maintenance, notify maintenance personnel of the recorded error code(s).

In Flight

- 1. Record the error code(s) and the location (L WING, R WING, FUSELAGE or TOTAL).
- 2. FUEL QTY PWR 1 and 2 Circuit Breakers (FUEL group) Pull and reset.
- 3. If fault does *not* clear, continue flight using alternate means to ensure adequate fuel and proper fuel distribution.
- 3. ●If fault clears, continue flight.
- 4. At earliest possible maintenance, notify maintenance personnel of the recorded error code(s).



Fuselage Tank Fuel Transfer Valve Fails to Close

Failure of a fuselage fuel transfer valve does not affect operation of the crossflow valve. If a fuselage fuel transfer valve fails to close at the completion of fuel transfer, the corresponding transfer valve and FUEL SYS lights will remain illuminated. The crossflow valve will close normally and operation of the corresponding standby pump will transfer fuel back into the fuselage tank.

- 1. Conduct fuel crossflow operations with caution as standby pump operation will transfer some fuel back into the fuselage tank.
- 2. Periodically transfer fuel back into wings.



In the event a jet pump fails, continuous operation of a standby pump may not be possible and a descent to an altitude at which the engine will suction feed may be required. The altitude at which the enginedriven fuel pump will suction feed sufficient fuel to supply the engine will vary depending upon fuel temperature and type.

LOW FUEL Light Illuminated

The amber LOW FUEL light on the glareshield annunciator panel will illuminate when the fuel level in either wing tank is approximately 410 pounds (186 kg) and the aircraft is in level flight.

- 1. Fuel Quantities Check. Correct fuel distribution, if required:
 - Balance wing fuel. Refer to Fuel Crossflow procedure in Section II.
 - b. Transfer fuselage fuel to the wings. Refer to **Fuselage Tank to Wing Fuel Transfer** procedure in Section II.
- 2. Replan flight if necessary.



Standby Pump Fails to Shut Off

Operation of the electric standby fuel pumps is indicated by illumination of the corresponding STBY PUMP ON and the FUEL SYS lights. The pumps are turned on manually with the corresponding STBY PUMP switch and automatically during starter-assisted engine starts and during fuselage tank FILL.

If STBY PUMP ON light does *not* go out when pump is selected off:

- 1. Corresponding STBY PUMP Switch Cycle.
- 2. If STBY PUMP ON light does not go out:
 - a. Corresponding STBY-SCAV PUMP CB (FUEL group) Pull.
 - b. This checklist is complete.
- 2. If STBY PUMP ON light goes out, this checklist is complete.

HYDR PRESS Light(s) Illuminated

Either engine-driven hydraulic pump will supply sufficient pressure to operate all hydraulic systems. Illumination of either the L or R HYDR PRESS light indicates loss of pressure from the respective pump.

In flight:

- 1. HYD PRESS Gage Check.
- 2. ●If pressure is low:
 - a. Assume spoilers inoperative. Limit altitude to 38,000 feet.
 - Go to Hydraulic System Failure/Alternate Gear Extension procedure and Hydraulic System Failure Landing procedure, this section.
- 2. ●If pressure is normal, continue to monitor.



Hydraulic System Failure/Alternate Gear Extension

Hydraulic system failure is indicated by illumination of both the L & R HYDR PRESS lights and/or by a loss of hydraulic system pressure. Landing gear, flap, spoiler, thrust reversers, and wheel brake systems will be affected. If engine-driven hydraulic pressure is not regained, spoilers and thrust reversers will not be available. If neither engine-driven nor auxiliary hydraulic pressure is regained, emergency brakes will be required after landing.

- 1. SPOILER Lever RET.
- 2. Airspeed VLO or less (1.3 Vs [flaps 0°] recommended).
- 3. FLAP Switch 20°.
- 4. TAWS FLAP Switch Depress to select OVRD.
- 5. ENG SYNC Switch OFF.
- 6. LANDING GEAR Switch DN.
- 7. GEAR Circuit Breaker (R HYDRAULICS group) Pull.
- 8. SPOILERON Circuit Breaker (R TRIM-FLT CONT group) Pull.

Extend landing gear as follows:



- It is recommended that blow down extension be selected first. Gear free fall should only be selected if blow down fails to extend and lock gear.
- After blow down or free fall gear extension, the inboard gear doors remain open.
- 9. EMER BLOW DOWN GEAR Lever (right side of pedestal aft of free fall lever) Push full down (until lever latches).



Do not attempt to retract landing gear once blow down has been selected. To do so may cause excessive air pressure to be introduced into the hydraulic system return lines, thereby rupturing the reservoir.

- 10. EIS Flight Page Check three gear are down and locked (green DN).
- 11. If all three gear are down and locked, go to Hydraulic System Failure Landing procedure, this section.
- 11. If any gear is not down and locked:
 - a. Airspeed 180 KIAS recommended.
 - b. EMER FREE FALL GEAR Lever (forward of blow down lever) Push full down (until lever latches).



Landing gear position indications may not illuminate until after the EMER FREE FALL GEAR lever is returned to the up position.

Continued 4-45



Hydraulic System Failure/Alternate Gear Extension (Cont)

c. After 30 seconds, return the EMER FREE FALL GEAR lever to the up position. This is accomplished by lifting the lever release (small metal tab available through hole immediately forward of extension lever) and then pulling the extension lever to the full up (latched) position.



The EMER FREE FALL GEAR lever must be returned to the up position or any remaining hydraulic pressure cannot be regained and emergency braking will not be available in the event of an air leak in the free fall extension system.

d. EIS Flight Page — Check three gear are down and locked (green DN).



Side slips (up to 1 ball) or increasing airspeed (not to exceed VLO) may be required to lock the landing gear down.

- e. If all three gear are down and locked, go to Hydraulic System Failure Landing procedure, this section.
- e. If any gear is *not* down and locked, go to Gear Up Landing procedure, this section.



Attitude Heading System (AHS) Malfunction

A system malfunction is indicated by a red ATT and/or a red HDG flag and loss of attitude and/or heading data on the flight displays.



With the loss of one AHS or with reversionary mode selected, the autopilot and yaw damper will disengage and will not re-engage.

1. AHS Switch (EFIS CONTROL panel on failed side) — Select cross-side AHS.



The cross-side AHS will drive the flight displays and equipment normally sourced by the failed AHS. Pitch, roll, and heading comparators will be disabled. The flight director, on the failed side, will not be operative.

Monitor Electronic Standby Instrument System (ESIS).

If time and conditions permit, recover failed AHS:



Recovery of a failed AHS may be possible, but should only be attempted when flight situation permits operation without one attitude display during straight and level flight for approximately 45 seconds.

- 3. Establish aircraft in straight and level, unaccelerated flight.
- EMER BAT 2 Switch OFF.
- 5. Failed AHS Circuit Breaker (INSTRUMENTS group) Pull and reset.
- 6. EMER BAT 2 Switch On.
- 7. AHS Switch (on failed side) Reselect on-side AHS to monitor AHS initialization. Maintain aircraft attitude by monitoring the operating side flight display and the ESIS. Initialization should occur within approximately 45 seconds. Successful initialization is indicated by attitude and heading displays with no flags. Turbulence or changes in aircraft attitude or heading may extend the initialization time beyond 45 seconds.



Verify proper attitude and heading information before utilizing displays.

8. • If initialization does not occur:

- AHS Switch (on failed side) Select cross-side AHS.
- b. AP XFR Button (FCP) — Select the operative side.
- Flight Director As desired. c.
- d. Monitor Electronic Standby Instrument System (ESIS).
- This checklist is complete.
- 8. If initialization occurs, this checklist is complete.



PFD Comparator Flags

A mismatch of pilot's and copilot's flight data is indicated by amber annunciations (flags) on the PFDs. The available comparators are:





The loss of a comparator is annunciated by a white boxed indication. A lack of comparison for PIT, ROL and HDG is indicated by a white XAHS flag. A lack of comparison of ALT and IAS is indicated by a white XADC flag. A lack of comparison between the affected engine's data sources (DCU/EDC [Data Concentrator Unit/Engine Data Concentrator]), is indicated by a white ENG1 or ENG2 flag.

ATT, PIT or ROL Flag

- 1. Compare indications with the Electronic Standby Instrument System (ESIS) to determine faulty system.
- 2. Autopilot and Yaw Damper Disengage.
- 3. AHS Switch (EFIS CONTROL panel on failed side) Select cross-side AHS.
- 4. AP XFR Button (FCP) Select the operative side.



The autopilot and yaw damper will not re-engage.

HDG Flag

- 1. Compare indications with the magnetic compass to determine faulty system.
- 2. Establish aircraft in straight and level, unaccelerated flight.
- 3. ●If single system is in error, associated HEADING SLAVE-FREE Switch FREE, then SLAVE. Go to step 4.
- 3. ●If heading cannot be determined, both HEADING SLAVE-FREE Switches FREE, then SLAVE. Go to step 4.
- 4. ■If heading split cannot be corrected:
 - a. Autopilot and Yaw Damper Disengage.
 - AHS Switch (EFIS CONTROL panel on failed side) Select cross-side AHS.
 - c. AP XFR Button (FCP) Select the operative side.



The autopilot and yaw damper will not re-engage. The flight director, on the failed side, will not be operative.

- d. This checklist is complete.
- 4. ■If heading split is corrected, this checklist is complete.



PFD Comparator Flags (Cont)

ALT or IAS Flag

- 1. Compare indications with the Electronic Standby Instrument System (ESIS) to determine faulty system.
- 2. ADC Switch (EFIS CONTROL panel on failed side) Select cross-side ADC.
- 3. Autopilot and Yaw Damper Monitor.



RVSM compliance may not be possible. Take appropriate action.

LOC or GS Flag

- 1. Attempt to determine operative source.
- 2. If unable to determine operative source, discontinue any Category II operations and consider a go-around. This checklist is complete.
- 2. If operative source is determined:
 - a. AP XFR Button (FCP) Select the operative side.
 - b. At pilot's discretion, continue the approach to Category I minimums.

FD Flag

- 1. Autopilot Disengage.
- 2. Attempt to determine operative flight director.
- 3. If unable to determine operative flight director, discontinue flight director use.

Electronic Flight Instrument System Failure (EFIS)

Primary Flight Display (PFD) Failure

1. MFD Switch (EFIS CONTROL panel on failed side) — Depress to select REV mode. The data which was displayed on the PFD will now display on the MFD in composite mode (PFD and EIS information).

MultiFunction Display (MFD) Failure

 PFD Switch (EFIS CONTROL panel on failed side) — Depress to select REV mode. The EIS data which was displayed on the MFD will now display on the PFD in composite mode (PFD and EIS information).



Flight Management System (FMS) Failure

FMS1 or FMS2 Fail Flag

- 1. NAV Source Deselect the failed FMS.
- 2. Takeoff and Landing Data (including V-speeds) Compare FMS-computed data with flight manual data. If mismatch exists, use flight manual data only.

CDU Failure

- 1. FMS DISPLAY 1 or 2 Circuit Breaker (AVIONICS group on failed side) Set.
- 2. If the FMS DISPLAY 1 or 2 circuit breaker opens after setting, leave open.Control of FMS from failed CDU is inhibited.
 - a. NAV Source Deselect the failed FMS.
 - b. Tune radios using RTUs and operative CDU.
 - c. This checklist is complete.
- 2. If the FMS DISPLAY 1 or 2 circuit breaker holds, this checklist is complete.

Erroneous RTU Operation

Failure of an FMS may affect operation of the Radio Tuning Units (RTU). If this occurs:

- 1. FMS DISPLAY 1 or 2 Circuit Breaker (AVIONICS group on failed side) Pull.
- 2. Tune radios using RTUs and operative CDU.



Loss of Air Data or Erroneous Indications

An Air Data Computer (ADC) failure is indicated by failure flags and loss of air data on the corresponding PFD.

A pitot-static malfunction is indicated by erroneous indications and discrepancies between the pilot's, copilot's and ESIS airspeed, Mach and/or altimeter indications.

1. Maintain safe aircraft attitude and power setting.



Erratic autopilot operation may occur with an air data or pitot-static malfunction.

2. Maintain aircraft control by reference to the ESIS airspeed/ Mach and altitude indications.



When using the ESIS indications, refer to Airspeed/Mach Calibration — Standby System and Altitude Position Correction — Standby System in Section V.

- 3. Cross-check angle-of-attack indicators.
- 4. Refer to one of the following procedures as appropriate:
 - If the air data loss is limited to a single PFD, refer to **Single Air Data Computer (ADC) Failure**.
 - If the air data loss occurs in both PFDs, refer to **Dual Air Data Computer (ADC) Failure**.
 - *If the air data indications are erroneous,* refer to **Pitot-Static System Malfunction**.



Loss of Air Data or Erroneous Indications (Cont) Single Air Data Computer (ADC) Failure

1. ADC Switch (EFIS CONTROL Panel on failed side) — Select cross-side ADC. Air data references on both PFDs will be controlled by the Heading/Speed/Altitude (HSA) panel.



- If the autopilot is coupled to the side using crossside ADC, all air data modes will synchronize at engagement.
- Barometric settings will continue to operate independently via the DCP.

If time and conditions permit, recover failed ADC:

- 2. EMER BAT 2 Switch OFF.
- 3. Failed ADC Circuit Breaker (INSTRUMENTS group) Pull and reset.
- 4. EMER BAT 2 Switch On.
- 5. ADC Switch (on failed side) Reselect on-side ADC.
- 6. Cross-check airspeed and altitude indications with the ESIS.
- 7. If ADC is *not* recovered:
 - a. ADC Switch (on failed side) Select cross-side ADC.



- All air data reference functions, on failed side, will be inoperative. The cross-side ADC will provide air data to the flight displays and equipment normally sourced by the failed ADC. ALT and IAS comparators will be disabled.
- Transponder and FMS will automatically switch to the valid ADC source.
- b. This checklist is complete.
- 7. If ADC is recovered, this checklist is complete.



Loss of Air Data or Erroneous Indications (Cont) Dual Air Data Computer (ADC) Failure

- 1. EMER BAT 2 Switch OFF.
- 2. ADC 1 and 2 Circuit Breakers (INSTRUMENTS group) Pull and reset.
- 3. EMER BAT 2 Switch On.

4. ● If neither ADC is recovered:

- a. Use ESIS for airspeed and altitude indications.
- b. Both AHSs will revert to basic mode. Do not engage autopilot.



Engagement of the autopilot may result in monitored disconnects because of differences in the AHS attitude. Similar disconnects may occur with yaw damper engagement. The flight director will be operative.

- c. The following systems and instruments will be inoperative:
 - Pilot's and copilot's air data displays
 - Temperature displays
 - Altitude alerter
 - Mach trim
 - Low-speed awareness cue
 - Overspeed warning horn and cue
 - Left and right stall warning systems altitude bias
 - Landing gear horn altitude and airspeed bias
 - Certain functions of the FMS system requiring air data
 - Encoded altitude function of the transponders.
 - Reverse thrust scheduling as a function of airspeed. Maximum reverse thrust available will be 65% N1.
 - Pressurization automatic mode.
- d. This checklist is complete.

4. ●If either ADC is recovered:

- a. Cross-check airspeed and altitude indications with the ESIS.
- b. This checklist is complete.



Loss of Air Data or Erroneous Indications (Cont) Pitot-Static System Malfunction

Static pressure for the pilot's air data computer is supplied by a static port on the left and right pitot-static probes. Static pressure for the copilot's air data computer is supplied by another static port on these pitot-static probes. Either or both of these pitot-static probes can be selected to supply static pressure to the pilot's and copilot's air data computers through the STATIC SOURCE switch. Normally the switch is in the BOTH position.

Pitot pressure for the pilot's air data computer is supplied by the left pitot-static probe. Pitot pressure for the copilot's air data computer is supplied by the right pitot-static probe.

Pitot and static pressure for the ESIS is supplied by the standby pitotstatic probe.

If pitot-static source malfunction is known or suspected:

- 1. Compare pilot's, copilot's, and ESIS air data indications. A pitot pressure malfunction will affect airspeed and Mach indications in one system only. A static pressure malfunction in the primary system can affect airspeed, Mach, altitude, and vertical speed indications on both the pilot's and copilot's PFDs.
- 2. Pitot Heat:
 - a. PITOT HEAT Switches Check On.
 - L PITOT HEAT, R PITOT-STALL-TAT HEAT, and STANDBY PITOT HEAT Circuit Breakers (ANTI-ICE group) — Set.
- 3. Determine malfunctioning system by cross-checking the three pitot-static systems. If the malfunctioning system can be identified, selecting cross-side ADC may restore valid air data.



- When using the ESIS indications, refer to Airspeed/Mach Calibration — Standby System and Altitude Position Correction — Standby System in Section V.
- The standby pitot-static mast may be visible from the copilot's seat. Visually check mast for ice or damage.
- The overspeed warning horn will sound if either the pilot's or copilot's airspeed indication is above the overspeed cue (VMO/MMO).

Continued



Loss of Air Data or Erroneous Indications (Cont) Pitot-Static System Malfunction (Cont)

4. If static pressure malfunction is known or suspected, STATIC SOURCE Switch — L or R as applicable.



Selecting L or R static source does not affect airspeed calibrations or altitude position corrections as presented in Section V.

Radio Tuning Unit (RTU) Failure or Erratic Operation

- 1. Associated RTU Switch OFF.
- Tune radios using the cross-side RTU's 1/2 function or either CDU.
- 3. *If both RTUs have failed,* tune radios using the CDUs.



- Each CDU is capable of tuning the radios.
- Transponder and TCAS will revert to standby mode and will not be usable.

VSPEEDS DISAGREE Displayed on CDU

An amber VSPEEDS DISAGREE display on either CDU indicates a mismatch of one or more FMS-computed Vspeed values.

1. Takeoff and Landing Data (including V-speeds) — Use flight manual data only.



ANTI-SKID Light Illuminated — Anti-Skid Off Operation

Illumination of any amber ANTI-SKID light indicates an anti-skid problem with the associated wheel. If ANTI-SKID switch is OFF, all four ANTI-SKID lights will illuminate. When anti-skid (for any wheel) is inoperative, care must be used during brake application and stopping distances will be increased. Refer to Section V for increased stopping distances for takeoff and landing.

- 1. ANTI-SKID Switch OFF, then On. This should clear the system.
- 2. ●If any ANTI-SKID lights remain illuminated:
 - a. ANTI-SKID Switch OFF. Refer to Section V for increased stopping distances for takeoff and landing.
 - b. Cautiously apply brakes as required.



With anti-skid inoperative, heavy brake pressures may skid the tires and cause tire blow-out. During flight tests, it was determined that modulating toe-brake pressures will produce improved feel and reduce the probability of tire skid.

- c. Be prepared to use **Emergency Braking** Procedure, Section III, if necessary.
- 2. If all ANTI-SKID lights go out, this checklist is complete.



Alternate Gear Extension/Electrical Malfunction

- 1. Airspeed VLO or less (180 KIAS recommended).
- 2. ENG SYNC Switch OFF.
- 3. LANDING GEAR Switch DN.
- 4. GEAR Circuit Breaker (R HYDRAULICS group) Pull.

Extend landing gear as follows:



- It is recommended that blow down extension be selected first. Gear free fall should only be selected if blow down fails to extend and lock gear.
- After blow down or free fall gear extension, the inboard gear doors remain open.
- 5. EMER BLOW DOWN GEAR Lever (right side of pedestal aft of free fall lever) Push full down (until lever latches).



Do not attempt to retract landing gear once blow down has been selected. To do so may cause excessive air pressure to be introduced into the hydraulic system return lines, thereby rupturing the reservoir.

- 6. EIS Flight Page Check three gear are down and locked (green DN).
- 7. ●If all three gear are down and locked, this checklist is complete.
- 7. ullet If any gear is *not* down and locked:
 - a. EMER FREE FALL GEAR Lever (forward of blow down lever) Push full down (until lever latches).



Landing gear position indications may not illuminate until after the EMER FREE FALL GEAR lever is returned to the up position.

b. After 30 seconds, return the EMER FREE FALL GEAR lever to the up position. This is accomplished by lifting the lever release (small metal tab available through hole immediately forward of extension lever) and then pulling the extension lever to the full up (latched) position.



The EMER FREE FALL GEAR lever must be returned to the up position or any remaining hydraulic pressure cannot be regained and emergency braking will not be available in the event of an air leak in the free fall extension system.

Continued



Alternate Gear Extension/Electrical Malfunction (Cont)

c. EIS Flight Page — Check three gear are down and locked (green DN).



Side slips (up to 1 ball) or increasing airspeed (not to exceed VLO) may be required to lock the landing gear down.

- d. If any gear is *not* down and locked, go to Gear Up Landing procedure, this section.
- d. If all three gear are down and locked, this checklist is complete.

Nosewheel Steering Malfunction

In the event the nosewheel steering system malfunctions, internal monitors should disconnect the system and a disconnect tone will sound. A nosewheel steering malfunction may be accompanied by an unwanted swerve in either direction.



- If NOSE STEER switch was used to engage nosewheel steering, depressing and then releasing the control wheel master switch (MSW) or depressing the NOSE STEER switch will disengage steering.
- If control wheel master switch (MSW) was used to engage nosewheel steering, releasing MSW will disengage steering.

At Normal Taxi Speeds

- 1. Nosewheel Steering Disengage (use MSW).
- 2. Thrust Levers IDLE.
- 3. Brake to a stop.
- 4. Taxi using differential braking and thrust.

During Takeoff or Landing

- 1. Nosewheel Steering Disengage immediately (use MSW).
- 2. Continue takeoff or landing using rudder and/or brakes for directional control.



Operation with Nosewheel Steering not Armed

Normally the nosewheel steering is operated in the armed mode (ARM light illuminated), but may be operated without being armed by depressing and holding either control wheel master switch (MSW). The system's internal monitor will prevent the system from arming if it detects certain faults. Depending on what faults may be detected by the monitor, full authority or limited authority steering will be available using the control wheel master switch (MSW). If a fault is detected in the rudder force sensors, only limited authority will be available.

- Either Control Wheel Master Switch (MSW) Depress and hold.
- 2. Taxi slowly to determine the amount of steering authority.
- 3. If full authority is available, taxi normally. Go to step 4.
- 3. ●If limited authority is available:
 - a. Taxi using rudder pedal movement for control.
 - b. Use differential braking as desired.
 - c. Avoid sharp turns, if possible.
- 4. STEER ON Light Monitor.



- In the event of a malfunction, the internal monitors should disconnect the system. When the system disconnects, the STEER ON light will go out; however, the disconnect tone will not sound.
- If only limited authority steering is available, the minimum turn radius will approximately double.



Operation with Nosewheel Steering Inoperative

The aircraft may be operated with the nosewheel steering inoperative. Nosewheel shimmy damping is provided through mechanical means; therefore, no electric power is required to provide shimmy damping.

Taxi

Taxi operations are relatively easy.

- 1. Taxi using differential braking and thrust.
- 2. Avoid sharp turns, if possible.



When taxiing without the nosewheel steering system engaged, it is possible to cause the nose wheel to turn 180° from the desired straight ahead position as the nose wheel free castors when the electric steering system is not engaged. If takeoff is performed with the nose wheel in this position, the uplock will not engage.

Runway Lineup

1. Visually ensure nose gear uplock is forward.

Takeoff

1. Taxi on runway centerline for a short distance to ensure the nose wheel is straight, before applying takeoff power.



Abnormal and Overweight Landings

Abnormal and overweight landings typically require high brake energies at maximum braking to bring the aircraft to a full stop within the distances prescribed in this section. When the landing brake energy defined in Section V is exceeded, wheel fuse plugs may release. When the maximum takeoff brake energy is approached, the possibility of a wheel well fire and some brake fade due to the energy absorbed by the brakes exists.

An overweight landing may exceed the **landing brake energy** limit. Refer to Section V.



If the stop was conducted above the landing maximum brake energy limit, it is recommended that the PARKING BRAKE be released and chocks used. This will increase brake cooling efficiency and reduce the possibility of wheel fuse plug release and brake/tire fire.

An abnormal landing will require no more than the maximum **takeoff brake energy** requirements demonstrated in flight tests if the following weight/altitude parameters are observed:

- If the landing weight is 17,000 pounds (7711 kg) or less, the airport elevation must be less than 5000 feet.
- If the landing weight is between 17,000 and 18,000 pounds (7711 to 8165 kg), the airport elevation must be less than 3000 feet.
- If the landing weight is between 18,000 and 19,000 pounds (8165 to 8618 kg), the airport elevation must be less than 1000 feet and the ambient temperature must be 90°F (32°C) or less.
- If the landing weight is between 19,000 and 19,500 pounds (8618 to 8845 kg), the airport elevation must be less than 1000 feet and the ambient temperature must be $64^{\circ}F$ ($18^{\circ}C$) or less.

If the available field length is greater than the requirements prescribed, gradual or reduced braking should be utilized to stop the aircraft with lower brake energies and within the available field length.

The landing weights, altitudes, landing distance factors and brake energy limits do not take into account the use of thrust reversers. Use of thrust reversers can significantly reduce the amount of energy absorbed by the brakes.



Stabilizer Heat Failure Landing

If approach and landing must be made with any ice (or suspected ice) on the horizontal stabilizer:

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set, or as required.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed 1.3 Vs (Flaps 20°).
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. ENG SYNC Switch OFF.
- 11. LANDING GEAR Switch DN. Check for three green DN indications.
- 12. NOSE STEER Switch Check ARM.
- 13. LDG LT-TAXI Switches As required.
- 14. L and R ANTI-SKID Lights Extinguished.
- 15. Landing Configuration Flaps 20°
- 16. HYD PRESS Gage Check (1500 to 1575 psi).
- 17. IGNITION Switches On.
- 18. Autopilot Disengage.
- 19. Yaw Damper —As desired.

NOTE

Use of thrust reversers is recommended.



Wing Heat Failure Landing

If approach and landing must be made with any ice (or suspected ice) on the wing leading edge:



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed VREF + 15.
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. ENG SYNC Switch OFF.
- 10. LANDING GEAR Switch DN. Check for three green DN indications.
- 11. NOSE STEER Switch ARM.
- 12. LDG LT-TAXI Switches As required.
- 13. L and R ANTI-SKID Lights Extinguished.
- 14. Flaps DN, check indication.
- 15. HYD PRESS Gage Check (1500 to 1575 psi).
- 16. IGNITION Switches On.
- 17. Autopilot Disengage.
- 18. Yaw Damper As desired.



Use of thrust reversers is recommended.



Wing and Stabilizer Heat Failure Landing

If approach and landing must be made with any ice on the wing leading edge and any ice on the horizontal stabilizer:



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed VREF + 25, Flaps 20°.
- 5. Normal Landing Distance Multiply by 1.4
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. ENG SYNC Switch OFF.
- 11. LANDING GEAR Switch DN. Check for three green DN indications.
- 12. NOSE STEER Switch ARM.
- 13. LDG LT-TAXI Switches As required.
- 14. L and R ANTI-SKID Lights Extinguished.
- 15. Landing Configuration Flaps 20° .
- 16. HYD PRESS Gage Check (1500 to 1575 psi).
- 17. IGNITION Switches On.
- 18. Autopilot Disengage.
- 19. Yaw Damper As desired.

NOTE

Use of thrust reversers is recommended



Normal Electrical System Failure Landing

This procedure would be used for landing with no electrical power except emergency batteries.



- Selection of a long, wide runway with minimum turbulence and crosswind is recommended.
- Roll control authority will be less than normal. Directional control on the runway will be limited without nosewheel steering.

Operative equipment associated with landing:

- Cabin pressurization. Use manual mode to control.
- Electronic Standby Instrument System (ESIS) Attitude, airspeed, altitude, and VHF NAV 1.
- RTU 1 Engine data (N1, N2, ITT, Oil Temp), and GEAR position indication.
- Normal brakes (Anti-Skid Off).
- Emergency brakes.
- Nacelle heat (defaults ON regardless of switch position).

Inoperative equipment associated with landing:

- All anti-ice except nacelle heat.
- All external and LDG/TAXI lights.
- Pitch, aileron, and rudder trim.
- Flaps.
- Spoilers/Spoilerons.
- Gear warning horn.
- Anti-Skid.
- Thrust reversers.
- Nosewheel steering.
- Stall warning system.
- 1. Pressurization Use MAN ALT Control to control cabin altitude to the landing field elevation.
- 2. ESIS Altimeter Setting Set.
- 3. Cabin Check:
 - a. Passengers Brief.



Passenger address system and NO SMOKING FASTEN SEAT BELT signs are inoperative. It may be necessary to turn towards the cabin and shout instructions, including no smoking and seat belt requirements.

Continued



Normal Electrical System Failure Landing (Cont)

- b. Swivel Seats Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
- c. Work Tables and Toilet Doors Check stowed.
- d. Aisle Clear.
- e. Aft Cabin Door Unobstructed.
- 4. Final Approach Speed 1.3 Vs (Flaps 0°).
- 5. Normal Landing Distance (Anti-Skid On) Multiply by 3.
- 6. Crew Approach Briefing Complete.
- 7. Landing Gear Use Alternate Gear Extension/Electrical Malfunction procedure, this section.
- 8. Landing Configuration Flaps UP.

After touchdown:

9. Anti-Skid is inoperative. Apply brakes smoothly to reduce the probability of tire skid.



Single-Engine Landing

- 1. Complete **Descent** procedure, Section II.
- Circuit Breakers Set.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Approach Speeds 1.3 Vs (Flaps 20°) and VAPP, computed and bugs set.
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. COOL Switch OFF.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. LANDING GEAR Switch DN. Check for three green DN indications.
- 11. NOSE STEER Switch ARM.
- 12. LDG LT-TAXI Switches As required.
- 13. L and R ANTI SKID Lights Extinguished.
- 14. Landing Configuration Flaps 20°.
- 15. HYD PRESS Gage Check (1500 to 1575 psi).
- 16. IGNITION Switch (operative engine) On.
- 17. Autopilot Disengage.
- 18. Yaw Damper As desired.



If one thrust lever is in CUTOFF, neither thrust reverser will operate.



Aileron Jammed Landing



- When landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.
- Landing on a wide runway with minimum turbulence and crosswind is recommended.
- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed 1.3 Vs (Flaps 20°).
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. ENG SYNC Switch OFF.
- 11. LANDING GEAR Switch DN. Check for three green DN indications.
- 12. NOSE STEER Switch ARM.
- 13. LDG LT-TAXI Switches As required.
- 14. L and R ANTI-SKID Lights Extinguished.
- 15. Landing Configuration Flaps 20°.
- 16. HYD PRESS Gage Check (1500 to 1575 psi).
- 17. IGNITION Switches On.
- 18. Maintain power to touchdown and do not flare.



Elevator Jammed Landing



- When landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.
- Landing on a wide runway with minimum turbulence and crosswind is recommended.
- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set.
- 3. Primary Pitch Trim As required for pitch control.
- 4. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 5. Final Approach Speed 1.3 Vs (Flaps 20°).



A shallow approach with flaps at 20° will minimize pitch change.

- 6. Normal Landing Distance Multiply by 1.2
- 7. Crew Approach Briefing Complete.
- 8. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 9. SPOILER Lever ARM.
- 10. TAWS FLAP Switch Depress to select OVRD.
- 11. ENG SYNC Switch OFF.
- 12. LANDING GEAR Switch DN. Check for three green DN indications.
- 13. NOSE STEER Switch ARM.
- 14. LDG LT-TAXI Switches As required.
- 15. L and R ANTI-SKID Lights Extinguished.
- 16. Landing Configuration Flaps 20°.
- 17. HYD PRESS Gage Check (1500 to 1575 psi).
- 18. IGNITION Switches On.
- 19. Maintain power to touchdown and do not flare.

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One or Both Spoilers Up Landing

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set, or as required.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed VREF + 30, (Flaps UP).
- 5. Normal Landing Distance Multiply by 1.4
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. TAWS FLAP Switch Depress to select OVRD.
- 9. ENG SYNC Switch OFF.
- LANDING GEAR Switch DN. Check for three green DN indications.
- 11. NOSE STEER Switch Check ARM.
- 12. LDG LT-TAXI Switches As required.
- 13. L and R ANTI-SKID Lights Extinguished.
- 14. Landing Configuration Flaps UP.
- 15. HYD PRESS Gage Check (1500 to 1575 psi).
- 16. IGNITION Switches On.
- 17. Autopilot Disengage.
- 18. Yaw Damper Off, prior to landing.



- Use of thrust reversers is recommended.
- With one or both spoilers up, the aircraft will not float when thrust levers are moved to IDLE. Maintain power to touchdown.
- Aerodynamic braking at higher speeds will cause the aircraft to become airborne even with the spoilers extended.



Partial Flaps Landing

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed 1.3 Vs for the flap deflection obtained (0°, 8° or 20°). Refer to APPROACH SPEEDS ABNORMAL LANDINGS, Figure 5-70, Section V. Use the approach speed for the lesser flap deflection for flap settings between those listed.
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. ENG SYNC Switch OFF.
- LANDING GEAR Switch DN. Check for three green DN indications.
- 12. NOSE STEER Switch Check ARM.
- 13. LDG LT-TAXI Switches As required.
- 14. L & R ANTI-SKID Lights Extinguished.
- 15. Landing Configuration Flaps As obtained.
- 16. HYD PRESS Gage Check (1500 to 1575 psi).
- 17. IGNITION Switches On.
- 18. Autopilot Disengage.
- 19. Yaw Damper Off, prior to landing.

NOTE

Use of thrust reversers is recommended.



Rudder Jammed Landing



- When landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.
- Landing on a wide runway with minimum turbulence and crosswind is recommended.
- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed 1.3 Vs (Flaps 20°).
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. ENG SYNC Switch OFF.
- 11. LANDING GEAR Switch DN. Check for three green DN indications.
- 12. NOSE STEER Switch Depress to disarm system. ARM light off prior to touchdown.
- 13. LDG LT-TAXI Switches As required.
- 14. L and R ANTI-SKID Lights Extinguished.
- 15. Landing Configuration Flaps 20°.
- 16. HYD PRESS Gage Check (1500 to 1575 psi).
- 17. Maintain power to touchdown and do not flare.
- 18. After landing, maintain directional control with differential braking.



If asymmetric power is used, do not retard power until directional control is established.



Spoilers Failed Landing

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set, or as required.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed VREF.
- 5. Normal Landing Distance Multiply by 1.3
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. ●If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. ENG SYNC Switch OFF.
- LANDING GEAR Switch DN. Check for three green DN indications.
- 10. NOSE STEER Switch Check ARM.
- 11. LDG LT-TAXI Switches As required.
- 12. L and R ANTI-SKID Lights Extinguished.
- 13. Landing Configuration Flaps DN.
- 14. HYD PRESS Gage Check (1500 to 1575 psi).
- 15. IGNITION Switches On.
- 16. Autopilot Disengage.
- 17. Yaw Damper As desired.



Use of thrust reversers is recommended.



Stabilizer Jammed Landing

Elevator Pull Force is Encountered (Nose-Down Trim Position)





Heavy control column pull forces will be encountered. Copilot assistance is recommended and may be required during the approach and landing to relieve some of the pull force on the column. Throttle control may require assistance also.

- If the stabilizer jams during a high-speed condition, delay reducing airspeed as long as possible to minimize the time out of trim.
- Move C.G. aft if possible. Transfer fuel to the fuselage tank if possible.
- Land as soon as practical to minimize forward C.G. movement.
- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set, or as required.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed 1.3 Vs (Flaps 8°).
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. ENG SYNC Switch OFF.
- 11. LANDING GEAR Switch DN. Check for three green DN indications.
- 12. NOSE STEER Switch ARM.
- 13. LDG LT-TAXI Switches As required.
- 14. L and R ANTI SKID Lights Extinguished.
- 15. Landing Configuration Flaps 8°.
- 16. HYD PRESS Gage Check (1500 to 1575 psi).
- 17. IGNITION Switches On.
- 18. Yaw Damper As desired.

NOTE

Use of thrust reversers is recommended.



Stabilizer Jammed Landing (Cont)

Elevator Push Force is Encountered (Nose-Up Trim Position)

- 1. Move C.G. forward if possible. Transfer fuel to the wing tanks if possible. Conduct normal landing.
- 2. Complete **Descent** procedure, Section II.
- 3. Complete Approach procedure, Section II.
- 4. Complete **Before Landing** procedure, Section II.

Hydraulic System Failure Landing

- 1. Complete **Descent** procedure, Section II.
- 2. Complete **Hydraulic System Failure/Alternate Gear Extension** procedure, this section.
- 3. Circuit Breakers Set, or as required
- 4. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 5. HYD PUMP Switch On.
- 6. If auxiliary hydraulic pressure is *not* available, go to step 7.
- 6. ●If auxiliary hydraulic pressure is available:
 - a. FLAP Switch DN.
 - b. HYD PUMP Switch OFF, when maximum flap angle is obtained.
- 7. Final Approach Speed 1.3Vs for the flap deflection obtained (0°, 8° or 20°), or VREF if 40°. Refer to APPROACH SPEEDS ABNORMAL LANDINGS, Figure 5-70, Section V. Use the approach speed for the lesser flap deflection for flap settings between those listed.
- 8. Normal Landing Distance Multiply by 3.
- 9. Crew Approach Briefing Complete.
- 10. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. ●If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 11. TAWS FLAP Switch Depress to select OVRD.
- 12. ENG SYNC Switch OFF.
- 13. NOSE STEER Switch Check ARM.
- 14. LDG LT-TAXI Switches As required.
- 15. L and R ANTI SKID Lights Extinguished.
- 16. Landing Configuration Flaps As obtained.
- 17. IGNITION Switches On.
- 18. EMER BRAKE Handle Pull out to the ready position.

Continued



Hydraulic System Failure Landing (Cont)

Just prior to landing:

- 19. Autopilot Disengage.
- 20. ●If flaps are up, Yaw Damper Off. Go to step 21.
- 20. If flaps are in any position except up, Yaw Damper As desired.
- 21. HYD PUMP Switch On.
- 22. HYD PRESS Gage Check.

After touchdown:



Use of thrust reversers is **not** recommended with abnormal hydraulic system indications. Use of thrust reversers may deplete hydraulic pressure available to other systems.

23. • If hydraulic pressure is being maintained:

- SPOILER Switch EXT.
- b. Brakes As required.
- c. This checklist is complete.

23. • If hydraulic pressure is *not* being maintained:

- a. EMER BRAKE Handle Push down slowly on handle, (approximately 2 inches [5 centimeters] before braking action begins). The anti-skid system is inoperative. Apply the brakes smoothly with small movements to produce improved feel and reduce the probability of tire skid. Do not pump the brake handle.
- Rudder and/or nose wheel steering As required for directional control.



Gear Up Landing

If a gear up landing must be made, select a long, wide runway with as little crosswind as possible. If time and conditions permit, plan the descent to ensure minimum fuel remaining on the aircraft. Ensure sufficient fuel for controlled, power-on approach.



If the ALTERNATE GEAR EXTENSION — EMER BLOW DOWN has been selected, **do not** attempt to retract the landing gear. To do so may cause excessive air pressure to be introduced into the hydraulic system return lines, thereby rupturing the reservoir.

- 1. Complete **Descent** procedure, Section II.
- 2. Brief passengers as required:
 - a. Location and operation of emergency exits.
 - b. All Loose Items Secure.
 - c. Shoulder Harness and Seat Belts Secure.
 - d. Emergency landing brace position.
- 3. Circuit Breakers Set, or as required.
- 4. Landing Approach Speed (VREF) and Approach Climb Speed (VAPP) Computed and set. Refer to Section V.
- 5. Crew Approach Briefing Complete.
- 6. ENG SYNC Switch OFF.
- 7. CAB AIR Switch OFF. The aircraft should be depressurized prior to landing.
- 8. TERR Switch Depress to select INHIB.
- 9. Flaps DN.



The landing gear warning will sound and will not be mutable with any landing gear not down and the flaps full down. In addition, the TAWS alerts, "TOO LOW - GEAR" and "PULL-UP" will sound.

- 10. IGNITION Switches On.
- 11. EMER BAT Switches OFF.
- 12. Autopilot Disengage.
- 13. Yaw Damper As desired.
- 14. Perform normal power-on approach at VREF and touch down at the lowest airspeed with minimum sink rate. **Do not** decelerate below shaker speed.

Continued



Gear Up Landing (Cont)

15. ●If no gear have extended:

- a. Touch down slightly nose high.
- b. Go to step 16.

15. ●If the nose gear fails to extend:

- a. Relocate passengers aft to obtain aft CG, if possible.
- b. SPOILER Lever ARM.
- c. HYD PUMP Switch On.
- d. Hold the nose off the runway as long as elevator control is available. If hydraulic pressure is available, normal braking may be available. Use rudder and/or brakes for directional control. Be prepared to use EMER BRAKE. Refer to Emergency Braking procedure, Section III.



Use of thrust reversers is **not** recommended with abnormal hydraulic system indications. Use of thrust reversers may deplete hydraulic pressure available to other systems.

e. Go to step 16.

15. ●If a main gear fails to extend:

- a. Land on the same side of the runway as the extended gear.
- b. HYD PUMP Switch On.
- c. ANTI-SKID Switch OFF.



Heavy brake pressures may skid the tires and cause tire blow-out.

- d. NOSE STEER Switch ARM, to assist in directional control. Nosewheel steering may arm but not operate.
- e. Hold the applicable wing up as long as possible. Maintain directional control with rudder and nosewheel steering. If hydraulic pressure is available, braking (anti-skid off) may be available. Refer to **Anti-Skid Off Operation**, this section. Be prepared to use EMER BRAKE. Refer to **Emergency Braking** procedure, Section III.
- 16. Thrust Levers CUTOFF at touchdown.
- 17. ENG FIRE PULL T-handles Pull.
- 18. After aircraft stops, BATTERY Switches OFF.
- 19. Evacuate the aircraft:
 - a. **Cabin Entry Door** Open and exit aircraft. The upper door may be opened with the landing gear retracted.
 - b. **Aft Cabin Door** Open and exit using the wing step area.



Runway Awareness Advisory System (RAAS) RAAS Advisory

If the Runway Awareness Advisory System (RAAS) issues a voice advisory that conflicts with expectations, respond as follows:

Airborne or high-speed ground operation

- 1. Verify position and/or distance remaining or distance available.
- 2. Contact controlling agency for assistance if necessary.

Low-speed ground operation



The GPS occasionally transmits erroneously high values for groundspeed when the aircraft is parked near, or moving slowly near, large reflecting surfaces (hangars, etc.). This erroneous groundspeed can cause nuisance "ON TAXIWAY" voice advisories.

- 1. Stop aircraft.
- 2. Verify position.
- 3. Contact controlling agency for assistance if necessary.

Terrain Awareness and Warning System Failure Flags

Boxed GPWS Annunciation

Illumination of an amber boxed GPWS annunciation on the PFD indicates that one or more of the basic modes (1 thru 7) are inoperative and some or all of the aural and visual alerts may not be present.

TERRAIN FAIL Annunciation

This annunciation occurs only if TERRain overlay is selected. Illumination of an amber TERRAIN FAIL annunciation on the PFD or MFD indicates that the enhanced terrain functions are inoperative. The basic modes (1 thru 7) are operative.

TERR Annunciation

Illumination of an amber TERR annunciation on the PFD (below and to the right of the compass rose) indicates that the enhanced terrain functions are unavailable. The basic modes (1 thru 7) are operative.

Boxed WS Annunciation

Illumination of an amber boxed WS annunciation on the PFD indicates that the windshear alerting mode is inoperative.



Terrain Awareness and Warning System (Cont) Terrain Awareness Alerts

If during flight a voice or visual alert is given, initiate positive corrective action to eliminate the cause for the alert. The corrective actions are embodied in the following procedures.

BANK ANGLE Alert

"BANK ANGLE" voice alert and an amber GND PROX annunciation on the PFD indicates the aircraft roll attitude is excessive for the flight conditions.

1. Reduce bank angle until alert ceases.

DON'T SINK Alert

"DON'T SINK" voice alert and an amber GND PROX annunciation on the PFD indicates the aircraft has lost a significant amount of altitude after takeoff or go-around.

1. Adjust flight path and take positive corrective action.

FLAPS Alert

"TOO LOW FLAPS" voice alert and an amber GND PROX annunciation on the PFD indicates flaps are not DN, but the aircraft appears to be landing (low height above terrain and low airspeed).

1. ● If conducting an abnormal landing (less than full flaps):

- a. TAWS FLAP Switch Depress to select OVRD.
- b. This checklist is complete.

1. ● If adequate time is available to extend flaps:

- a. Flaps DN, check indication.
- b. This checklist is complete.

$1. \bullet$ If adequate time is not available to extend flaps:

a. Execute a go-around.

GEAR Alert

"TOO LOW GEAR" voice alert and an amber GND PROX annunciation on the PFD indicates landing gear is not down and locked, but the aircraft appears to be landing (low height above terrain and low airspeed).

1. ● If adequate time is available to extend gear:

- a. LANDING GEAR Switch DN (3 green DN indications).
- b. This checklist is complete.

1. ● If adequate time is *not* available to extend gear:

a. Execute a go-around.



Terrain Awareness and Warning System (Cont) Terrain Awareness Alerts (Cont)

GLIDESLOPE Alert

"GLIDESLOPE" voice alert and an amber GND PROX annunciation on the PFD indicates glideslope deviation is more than 1.3 dots below the glideslope. Once triggered, alerts may be cancelled by selecting INHIBIT with the G/S INH switch.

1. Fly aircraft to glideslope.

OBSTACLE Alert

"CAUTION OBSTACLE, CAUTION OBSTACLE" or "OBSTACLE AHEAD, OBSTACLE AHEAD" voice alert and an amber GND PROX annunciation on the PFD indicates corrective action must be taken to avoid an obstacle conflict.

- 1. Adjust flight path and take positive corrective action.
- 2. TAWS Terrain Awareness Display Monitor.

SINKRATE Alert

"SINKRATE" voice alert and an amber GND PROX annunciation on the PFD indicates the aircraft is approaching terrain at an excessive rate-of-descent.

1. Adjust flight path and take positive corrective action.

TERRAIN Alert

"CAUTION TERRAIN, CAUTION TERRAIN" or "TERRAIN AHEAD, TERRAIN AHEAD" voice alert and an amber GND PROX annunciation on the PFD indicates corrective action must be taken to avoid a terrain conflict.

- 1. Adjust flight path and take positive corrective action.
- 2. TAWS Terrain Awareness Display Monitor.

TOO LOW TERRAIN Alert

"TOO LOW, TERRAIN" voice alert and an amber GND PROX annunciation on the PFD indicates the aircraft is not maintaining minimum terrain clearance.

1. Adjust flight path and take positive corrective action.



Terrain Awareness and Warning System (Cont) Terrain Awareness Alerts (Cont)

WINDSHEAR Alert

"CAUTION WINDSHEAR" voice alert and an amber WINDSHEAR annunciation on the PFD indicates increasing performance conditions (i.e., increasing headwind/decreasing tailwind and/or updraft). The flight crew should be aware of the possibility of subsequent significant airspeed loss and downdraft conditions.

During takeoff

1. Thrust Levers — APR detent.



Engine overboost should be avoided unless the airplane safety is in doubt. When airplane safety has been assured, adjust thrust to maintain engine parameters within the approved limits.

2. Maintain takeoff target pitch attitude and wings level until safe climb-out is assured.

During final approach



Coupled with other weather factors, the alert should be considered in determining the advisability of executing a go-around.

- 1. Add wind and gust allowances to the approach speed. Increase thrust if necessary.
- 2. Avoid getting low on the approach glide path or letting the thrust levers remain at flight idle for extended periods of time.

Traffic Alert and Collision Avoidance System (TCAS)

TCAS FAIL Annunciation

An amber TCAS FAIL annunciation on both the PFD and MFD indicates the TCAS system is inoperative.

1. TCAS Circuit Breaker (R AVIONICS group) — Pull and reset.

TRAFFIC Annunciation

"TRAFFIC, TRAFFIC" voice alert and an amber TRAFFIC annunciation on the PFD indicates a traffic advisory.

1. Monitor traffic display (MFD).



Thrust Reverser Deployed Landing

- 1. Complete **Descent** procedure, Section II.
- 2. Circuit Breakers Set, or as required.
- 3. Systems Pressure Check:
 - a. HYD PRESS 1500 to 1575 psi.
 - b. GEAR AIR and BRAKE AIR 1800 to 3000 psi.
- 4. Final Approach Speed 1.3 Vs (Flaps 20°).
- 5. Normal Landing Distance Multiply by 1.2
- 6. Crew Approach Briefing Complete.
- 7. CABIN CLIMATE Controls (inhibit system compressor cycling):
 - a. If cooling system is *not* desired:
 - (1) COOL Switch OFF.
 - a. If cooling system is desired:
 - (1) COOL Switch COOL.
 - (2) Cabin AUTO-MAN Switch MAN.
 - (3) Cabin COLD-HOT Knob COLD.
- 8. SPOILER Lever ARM.
- 9. TAWS FLAP Switch Depress to select OVRD.
- 10. LANDING GEAR Switch DN. Check for three green DN indications.
- 11. NOSE STEER Switch ARM.
- 12. LDG LT-TAXI Switches As required.
- 13. L and R ANTI-SKID Lights Extinguished.
- 14. Landing Configuration Flaps 20°
- 15. HYD PRESS Gage Check (1500 to 1575 psi).
- 16. IGNITION Switch (operative engine) On.
- 17. Autopilot Disengage.
- 18. Yaw Damper As desired.



After landing, use of the operative thrust reverser is allowable.

Failure of Thrust Reverser to Stow after Landing

- 1. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) Set.
- 2. Affected Thrust Reverser Lever Deploy, then stow.
- 3. *If thrust reverser does not stow,* Affected Thrust Lever CUTOFF.



Thrust Reverser Amber REV Indication in Flight

If an amber thrust reverser REV indication flashes on the EIS while in flight, it indicates that hydraulic pressure is available for thrust reverser operation. This is not a normal condition while airborne.

- Affected TR AUTO STOW Circuit Breaker (ENGINE group) Set.
- 2. Affected Thrust Lever IDLE.
- 3. Airspeed Reduce to 200 KIAS or 0.70 MI, whichever is less.
- 4. Affected TR CONT circuit breaker (ENGINE group) Pull and allow time for thrust reverser system hydraulic pressure to bleed off.

5. ●If REV indication goes out:

- a. TR CONT Circuit Breaker Leave pulled.
- b. Affected Thrust Lever As required; continue flight.
- c. This checklist is complete.

5. ●If REV indication does not go out:

- a. TR CONT Circuit Breaker Reset.
- b. TR AUTO STOW Circuit Breaker Pull.
- c. ■If REV indication goes out:
 - (1) TR AUTO STOW Circuit Breaker Leave pulled.
 - (2) Affected Thrust Lever As required; continue flight.
 - (3) This checklist is complete.

c. ■If REV indication does not go out:

- (1) TR AUTO STOW Circuit Breaker Reset.
- (2) Land as soon as practical.



Thrust Reverser Amber UNL Indication

If an amber UNL indication is displayed on the EIS, it indicates the associated thrust reverser is not stowed and locked. This displays during a normal deploy and stow cycle. However, when a normal deploy or stow has **not** been commanded, the amber UNL indicates an unlocked condition. **Do not** dispatch with this condition.

If UNL is displayed in flight and engine roll-back does not occur, the most likely cause is a secondary latch malfunction. If UNL is accompanied by an engine roll-back, refer to Thrust Reverser UNL/DEP Indications and ENG CMPTR Lights Illuminated in Flight procedure, Section III.

- 1. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) Set.
- 2. Continue flight monitoring engine instruments and thrust reverser annunciators.
- 3. Land as soon as practical. Thrust reversers may be used after landing.
- 4. Refer problem to maintenance personnel for correction prior to next flight.



Turbulent Air Penetration

Flight through severe turbulence should be avoided if possible. When flying at 30,000 feet or higher, it is not advisable to avoid a turbulent area by climbing over it unless it is obvious that it can be overflown well in the clear. For turbulence of the same intensity, greater buffet margins are achieved by flying the recommended speeds at reduced altitude.

- 1. Airspeed 250 KIAS or 0.73 MI, whichever is less. Severe turbulence will cause large and often rapid variations in indicated airspeed. **Do not chase the airspeed**.
- 2. IGNITION Switches On.
- 3. Thrust Make an initial thrust setting for the target airspeed. Change thrust only in the case of extreme airspeed variation.
- 4. Attitude Maintain wings level and desired pitch attitude. Use attitude indicator as the primary instrument. In extreme drafts, large altitude changes may occur. **Do not use sudden large control movements**.
- 5. Stabilizer Maintain control of the airplane with the elevators. After establishing the trim setting for penetration speed, **do not change the stabilizer trim**.
- 6. Altitude Allow the altitude to vary. Large altitude variations are possible in severe turbulence. Sacrifice altitude in order to maintain the desired attitude and airspeed. **Do not chase altitude**.
- 7. Yaw Damper Engaged.
- 8. *If severe turbulence is penetrated with autopilot engaged,* use attitude hold mode with turbulence (TURB) mode engaged.





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This section contains data and procedures enabling the aircraft operator to maintain weight and balance of the aircraft within the prescribed envelope. It is the responsibility of the operator to ensure that the aircraft is loaded properly. A separate data package, which is specific to a particular aircraft serial number, is provided by the manufacturer at time of initial aircraft delivery. This package includes the aircraft equipment list, the aircraft weighing record, and a payload moments chart. It is the responsibility of the aircraft owner and operator to update this data package when required by aircraft changes.

Owners are advised to contact the aircraft manufacturer when any change is made to the aircraft which would appreciably affect the location of useful load items

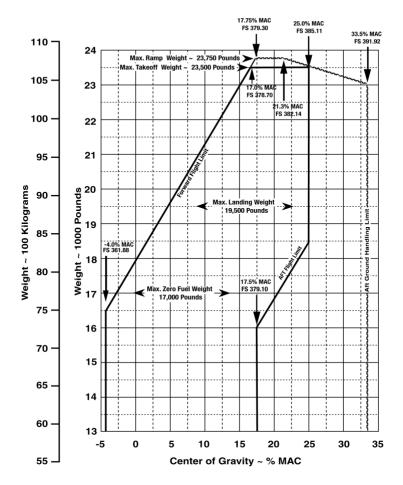
WEIGHT AND CENTER-OF-GRAVITY LIMITS



The normal empty weight center-of-gravity may be aft of the flight limit.

The center-of-gravity of the airplane for all flight and ground conditions must be maintained within the applicable **CENTER-OF-GRAVITY ENVELOPE** defined in Figure 6-1.

CENTER-OF-GRAVITY ENVELOPE

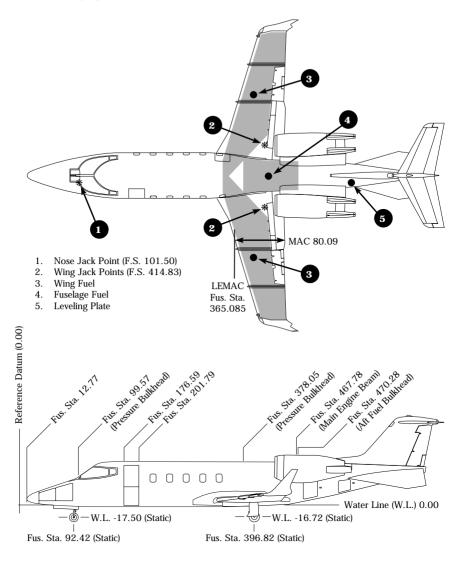


Forward Flight Limit — F.S. 361.88 (-4.0% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.70 (17.0% MAC) at 23,500 pounds (10,660 kg).

Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 23,500 pounds (10,660 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 23,500 pounds (10,660 kg) and tapers to F.S. 379.30 (17.75% MAC) at 23,750 pounds (10,773 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 382.14 (21.3% MAC) at 23,750 pounds (10,773 kg).

Figure 6-1



NOSE WHEEL	ፍ WHEEL FUS. STA.	MAIN WHEELS	© WHEEL FUS. STA.
FULLY COMPRESSED	92.72	FULLY COMPRESSED	397.00
STATIC	92.42	STATIC	396.82
FULLY EXTENDED	91.36	FULLY EXTENDED	396.04

Figure 6-2

LINEAR CONVERSIONS

- To convert from centimeters to inches, find, in the bold face columns, the number of centimeters to be converted. The equivalent number of inches is read in the adiacent column headed INCHES.
- To convert from inches to centimeters, find, in the bold face columns, the number of inches to be converted. The equivalent number of centimeters is read in the adjacent column headed CENTIMETERS.

CENTIMETERS	4 ►	INCHES	CENTIMETERS	∢ ►	INCHES
2.54	1	0.39	939.80	370	145.67
5.08	2	0.79	965.20	380	149.61
7.62	3	1.18	990.60	390	153.54
10.16	4	1.57	1016.00	400	157.48
12.70	5	1.97	1041.40	410	161.42
15.24	6	2.36	1066.80	420	165.35
17.78	7	2.76	1092.20	430	169.29
20.32	8	3.15	1117.60	440	173.23
22.86	9	3.54	1143.00	450	177.16
25.40	10	3.94	1168.40	460	181.10
50.80	20	7.87	1193.80	470	185.04
76.20	30	11.81	1219.20	480	188.98
101.60	40	15.75	1244.60	490	192.91
127.00	50	19.68	1270.00	500	196.85
152.40	60	23.62	1295.40	510	200.79
177.80	70	27.56	1320.80	520	204.72
203.20	80	31.50	1346.20	530	208.66
228.60	90	35.43	1371.60	540	212.60
254.00	100	39.37	1397.00	550	216.53
279.40	110	43.31	1422.40	560	220.47
304.80	120	47.24	1447.80	570	224.41
330.20	130	51.18	1473.20	580	228.35
355.60	140	55.12	1498.60	590	232.28
381.00	150	59.05	1524.00	600	236.22
406.40	160	62.99	1549.40	610	240.16
431.80	170	66.93	1574.80	620	244.09
457.20	180	70.87	1600.20	630	248.03
482.60	190	74.80	1625.60	640	251.97
508.00	200	78.74	1651.00	650	255.90
533.40	210	82.68	1676.40	660	259.84
558.80	220	86.61	1701.80	670	263.78
584.20	230	90.55	1727.20	680	267.72
609.60	240	94.49	1752.60	690	271.65
635.00	250	98.42	1778.00	700	275.59
660.40	260	102.36	1803.40	710	279.53
685.80	270	106.30	1828.80	720	283.46
711.20	280	110.24	1854.20	730	287.40
736.60	290	114.17	1879.60	740	291.34
762.00	300	118.11	1905.00	750	295.27
787.40	310	122.05	1930.40	760	299.21
812.80	320	125.98	1955.80	770	303.15
838.20	330	129.92	1981.20	780	307.09
863.60	340	133.86	2006.60	790	311.02
889.00	350	137.79	2032.00	800	314.96
914.40	360	141.73			

Figure 6-3

VOLUME CONVERSIONS

- To convert from liters to gallons, find, in the bold face columns, the number of liters to be converted. The equivalent number of gallons is read in the adjacent column headed GALLONS.
- To convert from gallons to liters, find, in the bold face columns, the number of gallons to be converted. The equivalent number of liters is read in the adjacent column headed LITERS.

LITERS	∢ ►	GALLONS	LITERS	∢ ►	GALLONS	LITERS	∢ ►	GALLONS
18.9	5	1.3	1476.2	390	103.0	2952.3	780	206.1
37.9	10	2.6	1514.0	400	105.7	2990.2	790	208.7
75.7	20	5.3	1551.9	410	108.3	3028.0	800	211.4
113.6	30	7.9	1589.7	420	111.0	3065.9	810	214.0
151.4	40	10.6	1627.6	430	113.6	3103.7	820	216.6
189.3	50	13.2	1665.4	440	116.2	3141.6	830	219.3
227.1	60	15.9	1703.3	450	118.9	3179.4	840	221.9
265.0	70	18.5	1741.1	460	121.5	3217.3	850	224.6
302.8	80	21.1	1779.0	470	124.2	3255.1	860	227.2
340.7	90	23.8	1816.8	480	126.8	3293.0	870	229.9
378.5	100	26.4	1854.7	490	129.5	3330.8	880	232.5
416.4	110	29.1	1892.5	500	132.1	3368.7	890	235.1
454.2	120	31.7	1930.4	510	134.7	3406.5	900	237.8
492.1	130	34.3	1968.2	520	137.4	3444.4	910	240.4
529.9	140	37.0	2006.1	530	140.0	3482.2	920	243.1
567.8	150	39.6	2043.9	540	142.7	3520.1	930	245.7
605.6	160	42.3	2081.8	550	145.3	3557.9	940	248.3
643.5	170	44.9	2119.6	560	148.0	3595.8	950	251.0
681.3	180	47.6	2157.5	570	150.6	3633.6	960	253.6
719.2	190	50.2	2195.3	580	153.2	3671.5	970	256.3
757.0	200	52.8	2233.2	590	155.9	3709.3	980	258.9
794.9	210	55.5	2271.0	600	158.5	3747.2	990	261.6
832.7	220	58.1	2308.9	610	161.2	3785.0	1000	264.2
870.6	230	60.8	2346.7	620	163.8	4163.5	1100	290.6
908.4	240	63.4	2384.6	630	166.4	4542.0	1200	317.0
946.3	250	66.1	2422.4	640	169.1	4920.5	1300	343.5
984.1	260	68.7	2460.3	650	171.7	5299.0	1400	369.9
1022.0	270	71.3	2498.1	660	174.4	5677.5	1500	396.3
1059.8	280	74.0	2536.0	670	177.0	6056.0	1600	422.7
1097.7	290	76.6	2573.8	680	179.7	6434.5	1700	449.1
1135.5	300	79.3	2611.7	690	182.3	6813.0	1800	475.6
1173.4	310	81.9	2649.5	700	184.9	7191.5	1900	502.0
1211.2	320	84.5	2687.4	710	187.6	7570.0	2000	528.4
1249.1	330	87.2	2725.2	720	190.2	7948.5	2100	554.8
1286.9	340	89.8	2763.1	730	192.9	8327.0	2200	581.2
1324.8	350	92.5	2800.9	740	195.5	8705.5	2300	607.7
1362.6	360	95.1	2838.8	750	198.2	9084.0	2400	634.1
1400.5	370	97.8	2876.6	760	200.8	9462.5	2500	660.5
1438.3	380	100.4	2914.5	770	203.4	9841.0	2600	686.9

Figure 6-4

WEIGHT CONVERSIONS

- To convert from kilograms to pounds, find, in the bold face columns, the number of kilograms to be converted. The equivalent number of pounds is read in the adjacent column headed POUNDS.
- To convert from pounds to kilograms, find, in the bold face columns, the number of pounds to be converted. The equivalent number of kilograms is read in the adjacent column headed KILOGRAMS.

KILOGRAMS	◆ ►	POUNDS	KILOGRAMS	4 •	POUNDS	KILOGRAMS	4 •	POUNDS
4.5	10	22.0	208.7	460	1014.1	412.8	910	2006.2
9.1	20	44.1	213.2	470	1036.2	417.3	920	2028.2
13.6	30	66.1	217.7	480	1058.2	421.8	930	2050.3
18.1	40	88.2	222.3	490	1080.3	426.4	940	2072.3
22.7	50	110.2	226.8	500	1102.3	430.9	950	2094.4
27.2	60	132.3	231.3	510	1124.3	435.5	960	2116.4
31.8	70	154.3	235.9	520	1146.4	440.0	970	2138.5
36.3	80	176.4	240.4	530	1168.4	444.5	980	2160.5
40.8	90	198.4	244.9	540	1190.5	449.1	990	2182.6
45.4	100	220.5	249.5	550	1212.5	453.6	1000	2204.6
49.9	110	242.5	254.0	560	1234.6	499.0	1100	2425.1
54.4	120	264.6	258.6	570	1256.6	544.3	1200	2645.5
59.0	130	286.6	263.1	580	1278.7	589.7	1300	2866.0
63.5	140	308.6	267.6	590	1300.7	635.0	1400	3086.4
68.0	150	330.7	272.2	600	1322.8	680.4	1500	3306.9
72.6	160	352.7	276.7	610	1344.8	907.2	2000	4409.2
77.1	170	374.8	281.2	620	1366.9	1134.0	2500	5511.5
81.6	180	396.8	285.8	630	1388.9	1360.8	3000	6613.8
86.2	190	418.9	290.3	640	1410.9	1587.6	3500	7716.1
90.7	200	440.9	294.8	650	1433.0	1814.4	4000	8818.4
95.3	210	463.0	299.4	660	1455.0	2041.2	4500	9920.7
99.8	220	485.0	303.9	670	1477.1	2268.0	5000	11023.0
104.3	230	507.1	308.4	680	1499.1	2494.8	5500	12125.3
108.9	240	529.1	313.0	690	1521.2	2721.6	6000	13227.6
113.4	250	551.1	317.5	700	1543.2	2948.4	6500	14329.9
117.9	260	573.2	322.1	710	1565.3	3175.2	7000	15432.2
122.5	270	595.2	326.6	720	1587.3	3402.0	7500	16534.5
127.0	280	617.3	331.1	730	1609.4	3628.8	8000	17636.8
131.5	290	639.3	335.7	740	1631.4	3855.6	8500	18739.1
136.1	300	661.4	340.2	750	1653.4	4082.4	9000	19841.4
140.6	310	683.4	344.7	760	1675.5	4309.2	9500	20943.7
145.2	320	705.5	349.3	770	1697.5	4536.0	10000	22046.0
149.7	330 340	727.5	353.8	780 790	1719.6	4989.6	11000 12000	24250.6
154.2		749.6	358.3		1741.6	5443.2		26455.2
158.8	350	771.6	362.9	800	1763.7	5896.8	13000	28659.8
163.3	360	793.7	367.4	810	1785.7	6350.4	14000	30864.4
167.8	370 380	815.7	371.9	820	1807.8	6804.0	15000	33069.0
172.4		837.7	376.5	830	1829.8	7257.6	16000	35273.6
176.9	390 400	859.8	381.0	840	1851.9	7711.1 8164.7	17000 18000	37478.2
181.4		881.8	385.6	850 860	1873.9		18000 19000	39682.8
186.0	410	903.9	390.1	860	1896.0	8618.3		41887.4
190.5	420	925.9	394.6	870 880	1918.0	9071.9	20000	44092.0
195.0 199.6	430 440	948.0	399.2	880 890	1940.0	9525.5	21000 22000	46296.6
204.1	440 450	970.0 992.1	403.7 408.2	900	1962.1 1984.1	9979.1 10432.7	23000	48501.2 50705.8
204.1	430	992. I	400.2	900	1904.1	10432.7	23000	30703.8

Figure 6-5

LOADING INSTRUCTIONS

It is the responsibility of the pilot to see that this aircraft is loaded within the weight and C.G. limits. The loading form (Figure 6-6) may be used.

- 1. Enter the aircraft's BASIC EMPTY WEIGHT and MOMENT from the current weighing record.
- 2. Enter the payload weights and moments (crew, passengers, provisions, baggage, etc.) using the payload moments charts provided in the aircraft's weight and balance data package.
- 3. Compute the ZERO FUEL WEIGHT and MOMENT (OPERAT-ING WEIGHT values plus passenger and baggage values).
- 4. Enter the fuel weights and moments using the fuel moments charts, figure 6-9.
- 5. Compute RAMP WEIGHT and MOMENT (ZERO FUEL WEIGHT values plus fuel values).
- 6. Compute TAKEOFF WEIGHT and MOMENT (RAMP WEIGHT values minus taxi burnoff out of wings).
- 7. Compare TAKEOFF WEIGHT and MOMENT with weight and C.G. limits from weight-moment-c.g. envelope, Figure 6-7, or center-of-gravity table, Figure 6-8. If not within limits, reduce weight or rearrange load as required to obtain weight and C.G. within limits.
- 8. LANDING WEIGHT and MOMENT may be calculated by adding the fuel weight and moment remaining at the destination to the ZERO FUEL WEIGHT.
- 9. The formula to calculate the C.G. in % MAC is:

C.G. in % MAC =
$$\frac{\text{Fuse lage Station}}{\text{(Center of Gravity)} - 365.085} \times 100$$



AIRCRAFT LOADING FORM

Interior Configuration	
Missing or Additional Equipment	

	WEIGHT	F.S.	MOM/1000	% MAC
BASIC EMPTY WEIGHT				
Missing/Additional Equipment				_
Crew				_
Provisions — Refreshment Cabinet				_
Provisions — Refreshment Cabinet				_
Provisions — Vanity/Lavatory				_
Provisions — Toilet				_
Water				_
Miscellaneous				_
				_
OPERATING WEIGHT EMPTY				
Baggage — Cabin				_
Baggage — Tailcone				_
Passenger 1				_
Passenger 2				_
Passenger 3				_
Passenger 4				_
Passenger 5				_
Passenger 6				_
Passenger 7				_
Passenger 8				_
				_
ZERO FUEL WEIGHT				
Fuel — Fuselage Tank				_
Fuel — Wing Tanks				_
RAMP WEIGHT				
Taxi Burnoff Out of Wings *				_
TAKEOFF GROSS WEIGHT				

ZERO FUEL WEIGHT		
Fuel — Wing Tanks		_
Fuel — Fuselage Tank		_
LANDING WEIGHT		

^{*} Fuel burnoff is approximately 3.7 pounds per engine per minute.

Figure 6-6



NOTE

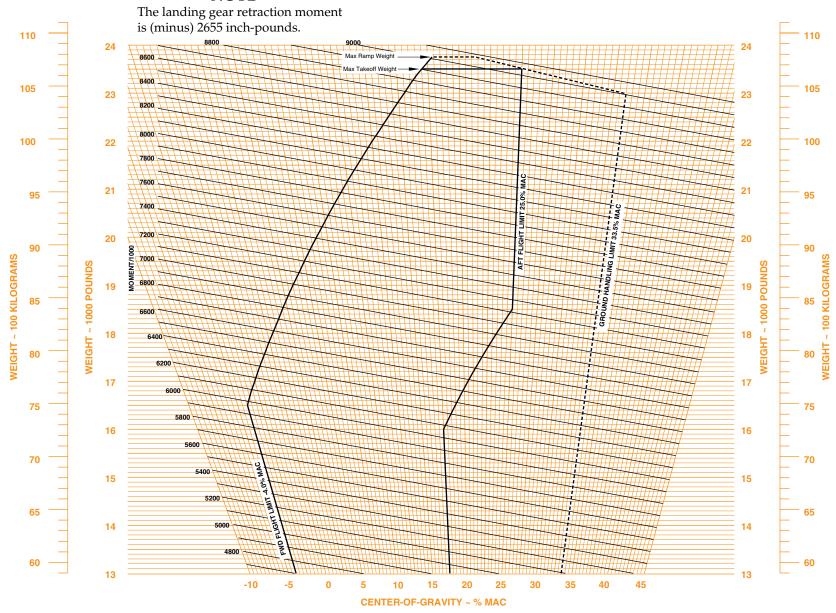


Figure 6-7



LEARJET 60XR

NOTE

Data given for weights above 23,500 pounds reflects the ground handling envelope only.

MOMENT / 1000

POUNDS WINCE STA STA	4928.31 4966.22 5004.13 5042.04 5079.95
WEIGHT	4966.22 5004.13 5042.04 5079.95
13100	4966.22 5004.13 5042.04 5079.95
13100	4966.22 5004.13 5042.04 5079.95
13200 -4.00 361.88 4776.83 4819.12 4871.98 4924.84 4977.70 17.50 379.11 13400 -4.00 361.88 4849.21 4892.14 4998.89 4962.15 5015.41 17.50 379.11 13500 -4.00 361.88 4849.21 4892.14 4892.14 5005.77 5090.83 17.50 379.11 13600 -4.00 361.88 4885.63 4962.65 4962.71 5006.77 5090.83 17.50 379.11 13700 -4.00 361.88 4977.78 5001.66 5056.53 5111.39 5166.25 17.50 379.11 13700 -4.00 361.88 4993.96 5038.17 5093.44 5184.70 5203.96 17.50 379.11 13800 -4.00 361.88 4993.96 5038.17 5093.44 5184.70 5203.96 17.50 379.11 13900 -4.00 361.88 5066.34 5111.19 5167.25 5223.32 5279.38 5271.09 5241.67 17.50 379.11 14100 -4.00 361.88 5102.53 5147.70 5204.16 5260.83 5270.50 5270.40 5200.20 5270.20 5277.88 5355.24 539.51 5270.50 575.11 14200 -4.00 361.88 5102.53 5147.70 5297.93 5354.80 5174.90 5257.22 5277.88 5355.24 539.51 577.50 379.11 14500 -4.00 361.88 5211.09 5257.22 5277.88 5355.24 539.51 577.50 379.11 14500 -4.00 361.88 5247.28 5293.73 5331.80 5409.88 5467.93 17.50 379.11 14500 -4.00 361.88 5247.28 5293.73 5361.80 5409.88 5467.93 17.50 379.11 14600 -4.00 361.88 5247.28 5293.73 5361.80 5409.88 5556.64 17.50 379.11 14600 -4.00 361.88 5247.28 5293.73 5361.80 5409.88 5556.64 17.50 379.11 14600 -4.00 361.88 5247.28 5293.73 5361.80 5409.88 5556.64 17.50 379.11 14500 -4.00 361.88 5395.64 5403.26 5462.52 5521.79 5581.00 17.50 379.11 1500 -4.00 361.88 5365.67 5425.62 5484.48 5543.35 17.50 379.11 1500 -4.00 361.88 5365.67 5425.62 5484.89 5569.49 17.50 379.11 1500 -4.00 361.88 5468.22 5476.27 5536.34 5569.41 5656.48 17.50 379.11 1500 -4.00 361.88 5468.22 5476.27 5536.34 5569.41 5668.48 17.50 379.11 1500 -4.00	5004.13 5042.04 5079.95
13300	5042.04 5079.95
13400	5079.95
13500	
13600	
13700	5117.86
13800	5155.77
13900	5193.68
14000	5231.59
14100	5269.50
14200	5307.41
14300	5345.32
14400	5383.23
14500 -4.00 361.88 5247.28 5293.73 5351.80 5409.86 5467.93 17.50 379.11 14600 -4.00 361.88 5283.47 5330.24 5388.71 5447.17 5505.64 17.50 379.11 14700 -4.00 361.88 5319.66 5366.75 5425.62 5484.48 5543.35 17.50 379.11 14800 -4.00 361.88 5355.84 5403.26 5482.52 5521.79 5581.06 17.50 379.11 14900 -4.00 361.88 5392.03 5439.77 5499.43 5559.10 5618.77 17.50 379.11 1500 -4.00 361.88 5428.22 5476.27 5536.34 5596.41 5656.48 17.50 379.11 15200 -4.00 361.88 5500.60 5549.29 5610.16 5671.03 5731.90 17.50 379.11 15300 -4.00 361.88 5508.79 5585.80 5647.07 5708.34 5769.61 17	5421.14
14600 -4.00 361.88 5283.47 5330.24 5388.71 5447.17 5505.64 17.50 379.10 14700 -4.00 361.88 5319.66 5366.75 5425.62 5484.48 5543.35 17.50 379.10 14900 -4.00 361.88 5355.84 5403.26 5462.52 5581.06 17.50 379.10 15000 -4.00 361.88 5392.03 5439.77 5499.43 5559.10 5618.77 17.50 379.10 15100 -4.00 361.88 5484.41 5512.78 5573.25 5693.72 5694.19 17.50 379.10 15200 -4.00 361.88 5500.60 5549.29 5610.16 5671.03 5731.90 17.50 379.10 15200 -4.00 361.88 5536.79 5585.80 5647.07 5708.34 5798.61 17.50 379.10 15400 -4.00 361.88 5609.16 5658.82 5720.89 5782.96 5845.03 17.50 379	5459.05
14700 -4.00 361.88 5319.66 5366.75 5425.62 5484.48 5543.35 17.50 379.10 14800 -4.00 361.88 5355.84 5403.26 5482.52 5521.79 5581.06 17.50 379.10 14900 -4.00 361.88 5392.03 5439.77 5499.43 5559.10 5618.77 17.50 379.10 15000 -4.00 361.88 5428.22 5476.27 5536.34 5596.41 5656.48 17.50 379.10 15100 -4.00 361.88 5464.41 5512.78 5573.25 5683.72 5694.19 17.50 379.10 15200 -4.00 361.88 5506.60 5549.29 5610.16 5671.03 5731.90 17.50 379.10 15300 -4.00 361.88 5536.79 5682.80 5647.07 5708.34 5769.61 17.50 379.10 15500 -4.00 361.88 5691.60 5658.82 5720.89 5782.96 5845.03 1	5496.96
14800 -4.00 361.88 5355.84 5403.26 5462.52 5521.79 5581.06 17.50 379.10 14900 -4.00 361.88 5392.03 5439.77 5499.43 5559.10 5618.77 17.50 379.10 15000 -4.00 361.88 5484.41 5512.78 5573.25 5596.41 5656.48 17.50 379.10 15200 -4.00 361.88 5500.60 5549.29 5610.16 5671.03 5731.90 17.50 379.10 15300 -4.00 361.88 5536.79 5585.80 5647.07 5708.34 5769.61 17.50 379.10 15400 -4.00 361.88 5500.79 5585.80 5647.07 5708.34 5769.61 17.50 379.10 15500 -4.00 361.88 5609.16 5658.82 5720.89 5782.96 5845.03 17.50 379.10 15600 -4.00 361.88 5681.54 5731.83 5794.71 5857.88 5920.45 1	5534.87
14900 -4.00 361.88 5392.03 5439.77 5499.43 5559.10 5618.77 17.50 379.10 15000 -4.00 361.88 5428.22 5476.27 5536.34 5596.41 5656.48 17.50 379.10 15100 -4.00 361.88 5464.41 5512.78 5573.25 5693.72 5694.19 17.50 379.10 15200 -4.00 361.88 5500.60 5549.29 5610.16 5671.03 5731.90 17.50 379.10 15300 -4.00 361.88 5536.79 5585.80 5647.07 5708.34 5799.61 17.50 379.10 15400 -4.00 361.88 5609.16 5658.82 5720.89 5782.96 5845.03 17.50 379.10 15500 -4.00 361.88 5691.33 5757.80 582.27 5882.74 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5797.80 5882.74 17.50 379.10 <tr< th=""><th>5572.78</th></tr<>	5572.78
15000	5610.69
15100 -4.00 361.88 5464.41 5512.78 5573.25 5633.72 5694.19 17.50 379.10 15200 -4.00 361.88 5500.60 5549.29 5610.16 5671.03 5731.90 17.50 379.10 15300 -4.00 361.88 5536.79 5585.80 5647.07 5708.34 5769.61 17.50 379.10 15500 -4.00 361.88 5609.16 5658.82 572.89 5885.90 5845.03 17.50 379.10 15600 -4.00 361.88 5609.16 5658.82 572.89 5885.92 58845.03 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.58 5920.45 17.50 379.10 15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5773.91 5804.85 5885.2 5932.19 5995.87 17.	5648.60
15200 -4.00 361.88 5500.60 5549.29 5610.16 5671.03 5731.90 17.50 379.10 15300 -4.00 361.88 5536.79 5585.80 5647.07 5708.34 5769.61 17.50 379.10 15400 -4.00 361.88 5572.97 5622.31 5683.98 5745.65 5807.32 17.50 379.10 15500 -4.00 361.88 5609.16 5658.82 572.89 5782.96 5845.03 17.50 379.10 15600 -4.00 361.88 5645.35 5695.33 5757.80 5820.27 5882.74 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.58 5920.45 17.50 379.10 15800 -4.00 361.88 5753.91 5804.85 5885.62 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5905.50 6033.58 17	5686.51
15300 -4.00 361.88 5536.79 5585.80 5647.07 5708.34 5769.61 17.50 379.10 15400 -4.00 361.88 5572.97 5622.31 5683.98 5745.65 5807.32 17.50 379.10 15500 -4.00 361.88 5691.6 5685.82 5720.89 5782.96 5845.03 17.50 379.10 15700 -4.00 361.88 5645.35 5695.33 5757.80 5802.27 5882.74 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.88 5920.45 17.50 379.10 15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.11 1600 -4.00 361.88 5769.10 5841.36 5905.43 5969.50 6033.58 17.	5724.42
15400 -4.00 361.88 5572.97 5622.31 5683.98 5745.65 5807.32 17.50 379.10 15500 -4.00 361.88 5699.16 5658.82 5720.89 5782.96 5845.03 17.50 379.10 15600 -4.00 361.88 5645.35 5695.33 5757.80 5820.27 5882.74 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.58 5920.45 17.50 379.10 15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5985.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5969.50 6033.58 17.50 379.10 16100 -4.00 361.88 5862.29 5877.87 5942.34 6006.81 6071.29 1	5762.33
15500 -4.00 361.88 5609.16 5658.82 5720.89 5782.96 5845.03 17.50 379.10 15600 -4.00 361.88 5645.35 5695.33 5757.80 5820.27 5882.74 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.58 5920.45 17.50 379.10 15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5989.50 6033.58 17.50 379.10 16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.30 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 1	5800.24
15600 -4.00 361.88 5645.35 5695.33 5757.80 5820.27 5882.74 17.50 379.10 15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.58 5920.45 17.50 379.10 15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5995.50 6033.58 17.50 379.10 16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.30 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.81 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 1	5838.15
15700 -4.00 361.88 5681.54 5731.83 5794.71 5857.58 5920.45 17.50 379.10 15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5905.50 6033.58 17.50 379.10 16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.30 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.50 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.80 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 1	5876.06
15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5969.50 6033.58 17.50 379.10 16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.30 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.50 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.80 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.00 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 1	5913.97
15800 -4.00 361.88 5717.73 5768.34 5831.61 5894.89 5958.16 17.50 379.10 15900 -4.00 361.88 5753.91 5804.85 5868.52 5932.19 5995.87 17.50 379.10 16000 -4.00 361.88 5790.10 5841.36 5905.43 5969.50 6033.58 17.50 379.10 16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.30 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.50 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.80 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.00 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 1	5951.88
16000 -4.00 361.88 5790.10 5841.36 5905.43 5969.50 6033.58 17.50 379.10 16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.30 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.51 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.81 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.01 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 19.00 380.31 16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.51 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 1	5989.79
16100 -4.00 361.88 5826.29 5877.87 5942.34 6006.81 6071.29 17.80 379.34 16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.56 16300 -4.00 361.88 5988.67 5950.89 6016.16 6081.43 6146.71 18.40 379.86 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.06 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 19.00 380.36 16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.56 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.76	6027.70
16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.51 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.81 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.01 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 19.00 380.30 16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.50 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.70	6065.61
16200 -4.00 361.88 5862.48 5914.38 5979.25 6044.12 6109.00 18.10 379.50 16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.80 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.00 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 19.00 380.30 16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.50 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.70	6107.39
16300 -4.00 361.88 5898.67 5950.89 6016.16 6081.43 6146.71 18.40 379.80 16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.00 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 19.00 380.30 16600 -3.70 362.12 6011.22 6060.41 6128.98 6193.36 6259.84 19.30 380.56 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.76	6149.22
16400 -4.00 361.88 5934.85 5987.39 6053.07 6118.74 6184.42 18.70 380.01 16500 -4.00 361.88 5971.04 6023.90 6089.98 6156.05 6222.13 19.00 380.31 16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.51 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.71	6191.09
16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.5 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.74	6233.01
16600 -3.70 362.12 6011.22 6060.41 6126.89 6193.36 6259.84 19.30 380.5 16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.74	6274.98
16700 -3.40 362.36 6051.44 6096.92 6163.79 6230.67 6297.54 19.60 380.74	6317.00
	6359.07
10000 -5.10 302.00 0091.72 0155.45 0200.70 1 0207.90 1 0555.25 1 19.90 501.0	6401.18
16900 -2.80 362.84 6132.04 6169.94 6237.61 6305.29 6372.96 6440.64 20.20 381.20	6443.35
17000 -2.50 363.08 6172.41 6206.44 6274.52 6342.60 6410.67 6478.75 20.50 381.51	6485.56
17100 -2.20 363.32 6212.82 6242.95 6311.43 6379.91 6448.38 6516.86 20.80 331.75	6527.82
17200 -1.90 363.56 6253.29 6279.46 6348.34 6417.22 6486.09 6554.97 21.10 381.91	6570.12
17300 -1.60 363.80 6293.80 6315.97 6385.25 6454.53 6523.80 6593.08 21.40 382.27	6612.48
17400 -1.30 364.04 6334.36 6352.48 6422.16 6491.84 6561.51 6631.19 21.70 382.44	6654.88
17500 -1.00 364.28 6374.97 6388.99 6459.07 6529.14 6599.22 6669.30 22.00 382.77	6697.33
17600 -0.70 364.52 6415.63 6425.50 6495.98 6566.45 6636.93 6707.41 22.30 382.9	6739.83
17700 -0.40 364.76 6456.33 6462.00 6532.88 6603.76 6674.64 6745.52 22.60 383.11	6782.38
17800 -0.10 365.00 6497.09 6498.51 6569.79 6641.07 6712.35 6783.63 22.90 383.45	6824.98
17900 0.20 365.25 6537.89 6606.70 6678.38 6750.06 6821.74 23.20 383.60	6867.62
18000 0.50 365.49 6578.74 6643.61 6715.69 6787.77 6859.85 23.50 383.9	6910.31
18100 0.80 365.73 6619.64 6680.52 6753.00 6825.48 6897.96 23.80 384.18	6953.05
18200 1.10 365.97 6660.58 6717.43 6790.31 6863.19 6936.07 24.10 384.31	6995.84
18300 1.40 366.21 6701.57 6754.34 6827.62 6900.90 6974.18 24.40 384.6	7038.67
18400 1.70 366.45 6742.62 6791.25 6864.93 6938.61 7012.30 24.70 384.83	7081.56

POUNDS GROSS WEIGHT	% MAC	FWD LIMIT STA		5 % MAC STA 369.09	10 % MAC STA 373.09	15% MAC STA 377.10	20% MAC STA 381.10	% MAC	AFT LIMIT STA	
18500	2.00	366.69	6783.71	6828.16	6902.24	6976.32	7050.41	25.00	385.11	7124.49
18600	2.30	366.93	6824.84	6865.06	6939.55	7014.03	7088.52	25.00	385.11	7163.00
18700	2.60	367.17	6866.03	6901.97	6976.86	7051.74	7126.63	25.00	385.11	7201.51
18800	2.90	367.41	6907.26	6938.88	7014.17	7089.45	7164.74	25.00	385.11	7240.02
18900	3.20	367.65	6948.54	6975.79	7051.48	7127.16	7202.85	25.00	385.11	7278.53
19000	3.50	367.89	6989.87	7012.70	7088.79	7164.87	7240.96	25.00	385.11	7317.04
19100	3.80	368.13	7031.25	7049.61	7126.10	7202.58	7279.07	25.00	385.11	7355.55
19200	4.10	368.37	7072.68	7086.52	7163.40	7240.29	7317.18	25.00	385.11	7394.06
19300	4.40	368.61	7114.15	7123.43	7200.71	7278.00	7355.29	25.00	385.11	7432.57
19400	4.70	368.85	7155.68	7160.34	7238.02	7315.71	7393.40	25.00	385.11	7471.09
19500	5.00	369.09	7197.25	7197.25	7275.33	7353.42	7431.51	25.00	385.11	7509.60
19600	5.30	369.33	7238.86		7312.64	7391.13	7469.62	25.00	385.11	7548.11
19700	5.60	369.57	7280.53		7349.95	7428.84	7507.73	25.00	385.11	7586.62
19800	5.90	369.81	7322.24		7387.26	7466.55	7545.84	25.00	385.11	7625.13
19900	6.20	370.05	7364.01		7424.57	7504.26	7583.95	25.00	385.11	7663.64
20000	6.50	370.29	7405.82		7461.88	7541.97	7622.06	25.00	385.11	7702.15
20100	6.80	370.53	7447.68		7499.19	7579.68	7660.17	25.00	385.11	7740.66
20200	7.10	370.77	7489.58		7536.50	7617.39	7698.28	25.00	385.11	7779.17
20300	7.40	371.01	7531.54		7573.81	7655.10	7736.39	25.00	385.11	7817.68
20400	7.70	371.25	7573.54		7611.12	7692.81	7774.50	25.00	385.11	7856.19
20500	8.00	371.49	7615.59		7648.43	7730.52	7812.61	25.00	385.11	7894.70
20600	8.30	371.73	7657.69		7685.74	7768.23	7850.72	25.00	385.11	7933.21
20700	8.60	371.97	7699.84		7723.05	7805.94	7888.83	25.00	385.11	7971.73
20800	8.90	372.21	7742.03		7760.36	7843.65	7926.94	25.00	385.11	8010.24
20900	9.20	372.45	7784.27		7797.66	7881.36	7965.05	25.00	385.11	8048.75
21000	9.50	372.69	7826.56		7834.97	7919.07	8003.16	25.00	385.11	8087.26
21100	9.80	372.93	7868.90		7872.28	7956.78	8041.27	25.00	385.11	8125.77
21200	10.10	373.17	7911.29		7072.20	7994.49	8079.38	25.00	385.11	8164.28
21300	10.40	373.41	7953.73			8032.20	8117.49	25.00	385.11	8202.79
21400	10.40	373.65	7996.21			8069.91	8155.60	25.00	385.11	8241.30
21500	11.00	373.89	8038.74			8107.62	8193.71	25.00	385.11	8279.81
21600	11.30	374.14	8081.32			8145.33	8231.82	25.00	385.11	8318.32
21700	11.60	374.14	8123.95			8183.04	8269.94	25.00	385.11	8356.83
21800 21900	11.90	374.62	8166.62			8220.75	8308.05	25.00	385.11	8395.34
22000	12.20	374.86	8209.35			8258.46	8346.16	25.00	385.11	8433.85
	12.50	375.10	8252.12			8296.17	8384.27	25.00	385.11	8472.36
22100	12.80	375.34	8294.94			8333.88	8422.38	25.00	385.11	8510.88
22200	13.10	375.58	8337.80			8371.59	8460.49	25.00	385.11	8549.39
22300	13.40	375.82	8380.72			8409.30	8498.60	25.00	385.11	8587.90
22400	13.70	376.06	8423.68			8447.01	8536.71	25.00	385.11	8626.41
22500	14.00	376.30	8466.70			8484.72	8574.82	25.00	385.11	8664.92
22600	14.30	376.54	8509.76	BEY	OND	8522.43	8612.93	25.00	385.11	8703.43
22700	14.60	376.78	8552.86	LIN	/IITS	8560.14	8651.04	25.00	385.11	8741.94
22800	14.90	377.02	8596.02			8597.85	8689.15	25.00	385.11	8780.45
22900	15.20	377.26	8639.22				8727.26	25.00	385.11	8818.96
23000	15.50	377.50	8682.48				8765.37	25.00	385.11	8857.47
23100	15.80	377.74	8725.78				8803.48	25.00	385.11	8895.98
23200	16.10	377.98	8769.12				8841.59	25.00	385.11	8934.49
23300	16.40	378.22	8812.52				8879.70	25.00	385.11	8973.00
23400	16.70	378.46	8855.96				8917.81	25.00	385.11	9011.52
23500	17.00	378.70	8899.46				8955.92	25.00	385.11	9050.03
23600	17.30	378.94	8943.00				8994.03	23.70	384.07	9063.94
23700	17.60	379.18	8986.59				9032.14	22.10	382.78	9071.99
23750	17.75	379.30	9008.40				9051.20	21.30	382.14	9075.92

USABLE FUEL MOMENTS



WING AND FUSELAGE TANK

[LEDOOFNE	11/11	
	GALLONS/LITERS	MOMEN	IT/10

		GALLONS/LITERS		MOMENT/1000		
		KERO	DSENE	WING	FUSELAGE	
POUND	S/ KG	6.7	#/GAL	KEROSENE	KEROSENE	
100/	45	15/	56	38.41	44.55	
200/	90	30/	113	76.85	89.18	
300/	136	45/	169	114.75	133.67	
400/	181	60/	226	154.42	178.07	
500/	226	75/	282	190.05	222.64	
600/	272	90/	339	228.02	267.39	
700/	317	104/	395	266.33	312.18	
800/	362	119/	452	304.70	356.51	
900/	408	134/	508	343.13	400.17	
1000/	453	149/	565	381.71	443.06	
1100/	499	164/	621	420.36	485.48	
1200/	544	179/	678	459.03	527.86	
1300/	589	194/	734	497.87	570.23	
1400/	635	209/	791	536.81	612.62	
1500/	680	224/	847	575.78	655.04	
1600/	725	239/	904	614.83	697.46	
1700/	771	254/	960	654.02	739.87	
1800/	816	269/	1017	693.31	782.25	
1900/	861	284/	1073	732.92	824.57	
2000/	907	299/	1130	772.77	866.87	
2100/	952	313/	1186	812.67	909.22	
2200/	997	328/	1243	852.78	951.62	
2300/	1043	343/	1299	893.07	994.09	
2400/	1088	358/	1356	933.48	1036.56	
2500/	1134	373/	1412	973.92	1079.03	
2600/	1179	388/	1469	1014.40	1121.49	
2700/	1224	403/	1525	1054.90	1163.96	
2800/	1270	418/	1582	1095.37	1206.43	
2898/	1314	433/	1637	1135.15	1248.00	
2900/	1315	433/	1638		1248.85	

	GALLONS/LITERS	MOMEN	NT/1000
	KEROSENE	WING	FUSELAGE
POUNDS/KG	6.7 #/GAL	KEROSENE	KEROSENE
3000/ 1360	448/ 1695	_	1291.20
3100/ 1406	463/ 1751	_	1333.43
3200/ 1451	478/ 1808	_	1375.68
3300/ 1496	493/ 1864	_	1418.05
3400/ 1542	507/ 1921	_	1460.45
3500/ 1587	522/ 1977	_	1502.93
3600/ 1633	537/ 2034	_	1545.30
3700/ 1678	552/ 2090	_	1587.66
3800/ 1723	567/ 2147	_	1630.07
3900/ 1769	582/ 2203	_	1672.56
4000/ 1814	597/ 2260	_	1715.00
4100/ 1859	612/ 2316	_	1757.29
4200/ 1905	627/ 2373	_	1799.51
4300/ 1950	642/ 2429	_	1841.70
4400/ 1995	657/ 2486	_	1883.90
4500/ 2041	672/ 2542	_	1925.98
4600/ 2086	687/ 2599	_	1967.94
4700/ 2131	701/ 2655	_	2009.80
4800/ 2177	716/ 2712	_	2051.89
4900/ 2222	731/ 2768	_	2093.69
5000/ 2268	746/ 2825	_	2135.36
5012/ 2273	748/ 2831	_	2140.42

WEIGHING INSTRUCTIONS

Occasional weighing may be required to keep the basic empty weight current. All changes to the aircraft affecting weight and balance are the responsibility of the aircraft operator. For additional detail information relating to weighing and leveling procedures, refer to Maintenance Manual, Chapter 8.

- 1. The basic empty weight C.G. is established with the wheels
- 2. Fuel should be drained through the drain valves prior to weighing and with the aircraft in level or static position. If unable to drain fuel, refer to the UNUSABLE AND TRAPPED FUEL table (Figure 6-10) to determine weight and balance. Unusable and trapped fluids are included in the basic empty weight.
- 3. The engine oil must be at full level in each oil tank. Total engine oil is 34 pounds at Fuselage Station 467.1.
- 4. Hydraulic reservoir, accumulator, oxygen bottles, alcohol tank, and gear shock struts must be filled to normal operating capacities.
- 5. Determine aircraft configuration at time of weighing. Missing items or items in aircraft (but not part of basic empty weight) should be noted and the final basic empty weight shall be corrected for these items. All items should be in their normal place during weighing.
- 6. The aircraft must be in a level attitude at the time of weighing. Level is determined with a plumb bob attached to a clip on the upper side of one of the frames in the tailcone and the level plate hole on the lower portion of the frame.
- 7. Weighing should always be made in an enclosed area free of drafts. The scales used should be properly certified and calibrated.
- 8. Weighing the aircraft on jacks.
 - a. Three jackpoints are provided for weighing: Two on the wing at Fuselage Station 414.83, and one on the forward fuselage at Fuselage Station 101.50.
 - b. Leveling is accomplished by adjusting the jacks.
- 9. Weighing the aircraft on wheels.
 - a. Inflate the tires to the proper pressure.
 - b. Deflate the shock struts. This is to establish the fuselage station of the centerline of the nose wheel axle. The fuselage station for the nose wheel axle in this condition is 92.72.
 - c. Leveling is accomplished by inflating the main gear struts.

WEIGHING INSTRUCTIONS (Cont)

- d. Measure the perpendicular distance between the nose and main gear axle center lines. Add this measurement to the nose gear axle position (Fuselage Station 92.72) to obtain the main gear fuselage station.
- e. Substitute the nose and main gear stations for the jackpoint stations on the aircraft weighing record and proceed as in jackpoint weighing.

UNUSABLE AND TRAPPED FLUIDS

The basic empty weight includes full oil, trapped, sump, and unusable fuel. If the aircraft is weighed after draining the fuel and oil, the sump and unusable fuel and drainable oil must be added to the "as weighed" condition to obtain the basic empty weight.

When the aircraft is weighed with completely dry fuel and drained oil systems, the trapped, sump, and unusable fuel and drainable oil weight and moment must be added to the "as weighed" condition to obtain the basic empty weight of the aircraft. This dry fuel condition would occur only if the fuel system were purged.

UNUSABLE AND TRAPPED FUEL

	POUNDS	MOMENT/1000
ITEM	KEROSENE 6.7#/GAL.	KEROSENE
TRAPPED FUEL	12.1	4.44
DRAINABLE SUMP	11.9	4.61
INFLIGHT UNUSABLE	32.0	12.24
TOTAL	56.0	21.29

TRAPPED AND DRAINABLE ENGINE OIL

ITEM	GALLONS	WEIGHT (8.0#/GAL.)	MOMENT/1000
TRAPPED OIL	0.5	4.0	1.9
DRAINABLE OIL	3.7	30.0	14.0
TOTAL OIL	4.2	34.0	15.9

Figure 6-10



AIRCRAFT WEIGHING RECORD FORM

F					
Date Weighed		Model	60	Serial No.	
Place Weighed		Weighing Inspec		ector	
Reaction	Scale Reading	Tare	Net Weight	Arm	Moment
Left Jack					
Right Jack					
Sub Total				414.83*	
Nose Jack				101.50*	
Total (As Weighed)					
Total Items Table I			-		
Total Items Table II			+		
Basic Airplane					

TABLE I

Items weighed but not part of basic airplane	Weight	Arm	Moment
jack pads			
TOTAL			

TABLE II

Basic items not in when weighed	Weight	Arm	Moment
unusable fuel			
TOTAL			

^{*} Jackpoint stations for electronic scales weighing.

LEARJET MODEL 60

WEIGHT AND BALANCE DATA PACKAGE

AIRCRAFT SERIAL NO.	
BASIC EMPTY WEIGHT	
C.G.	
MOMENT	
e data provided in this packa	ge reflects the configuration of

DATE

The data provided in this package reflects the configuration of the aircraft at the time of its initial delivery by the manufacturer. It is the responsibility of the aircraft owner and operator to update this data package when required by aircraft changes.

Included in this package are:

- ☐ Aircraft Weighing Record
- ☐ Payload Moments Chart
- ☐ C.G. Envelope diagraming the effects of various loading configurations (includes the supporting data)
- ☐ Aircraft Equipment List

LOG OF SUPPLEMENTS

Assigned	to	Aircraft Seria	ıl Num	ber
Assigned	to	Aircraft Seria	ıl Num	ber

This list is intended to assist the flight crew in determining the applicable AFM supplements for the assigned aircraft. Only those supplements which apply to the assigned aircraft need be listed here. It is the responsibility of the aircraft owner and operator to maintain this list. Insert this list behind the AFM SUPPLEMENTS & APPENDICES divider tab.

	APPLICABLE SUPPLEMENTS		
DATE	AFMS Number	Title	

Continued

Log of Supplements

	APPLICABLE SUPPLEMENTS		
DATE	AFMS Number	Title	



LEARJET

ADDENDA

- FUEL SERVICING
- ENGINE OIL SERVICING
- GROUND DE-ICING/ANTI-ICING

— NOTICE ——

The material in this Section is not FAA Approved data but is included in this manual for convenience.