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Quick Reference Handbook

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Revision Number: 10
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Intentionally
Blank

Non-Normal Checklists

Chapter NNC

Miscellaneous

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Intentionally
Blank

Crash Landing or Ditching

Condition: Airplane crash landing or ditching and evacuation are needed.

Note: Refer to the FCTM, chapter 8, Flight Crew Duties Summary for Emergency Landing/Ditching Evacuation.

Note: If time and circumstances permit, direct crew to take appropriate crash landing or ditching action, initiate transmission of emergency messages and set ATC transponder.

- 1 NO SMOKE/SEAT BELTS switches ON
- 2 TERRAIN OVRD switch light OVRD
- 3 Plan a flaps 25 landing.

Note: A flaps 25 approach will provide best lift/drag ratio under ditching conditions for both two- and single-engine cases. Approach body angles will be slightly higher than a flaps 40 approach.

- 4 When below 10,00 feet,
CABIN PRESS SYSTEM switch MANUAL
- 5 CABIN PRESS MANUAL rate selector CLIMB
(Manually depressurize)

Note: Cabin is depressurized to ensure all doors and exits can be readily opened.

- 6 L/R PACK switches OFF

▼ Continued on next page ▼

▼ Crash Landing or Ditching continued ▼

7 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
Minimums	___ , xckd	C&F
Landing data	.25, ___	C&F
Approach briefing	complete	PM
Hydraulic panel	set	PM
Seat belt signs	ON	PM

Approach Considerations

- Select best touchdown site available, considering winds.
- If ditching, plan touchdown parallel to the primary swells on upwind side of swell unless surface winds are strong.
- Contact at minimum forward and sink speeds but do not stall prior to touchdown.

Approach Checklist

Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

▼ Continued on next page ▼

▼ Crash Landing or Ditching continued ▼

Additional Deferred Items

Choose one:

◆ **Ditching** is required:

▶▶ **Go to step 8**



◆ **Crash landing** is required:

▶▶ **Go to Landing Checklist - Crash Landing below.**



- 8 **When** depressurized,
CABIN PRESS MANUAL
rate selector DESC (close valve)
- 9 AVIONICS COOLING Switch FAN
- 10 Gear handle UP

Landing Checklist - Ditching

Landing gear	up	C&F
Flaps	25, 25	C&F
Spoilers	disarmed	C&F
EAD.	ckd	PM

▼ Continued on next page ▼

▼ Crash Landing or Ditching continued ▼

At 500 feet AFE

Advise cabin. Command "BRACE FOR LANDING."

Prior to Touchdown

EMER LTS switch ON

Note: EMER LTS switch ON will ensure cabin emergency lights are illuminated to assist in evacuation of airplane.

After ditching, airplane will assume a slight tail down attitude (floor angle not more than 5° airplane nose up). At high gross weights, wings will be awash, while at lower gross weights, upper wing surfaces will be clear of water.

When airplane has stopped and if time permits

ENG FIRE handles Pull
FIRE AGENT (as required) Discharge

Note: BATT switch must be on to discharge fire extinguishing agent as generator or TR power will not be available.

Initiate evacuation.



▼ Continued on next page ▼

▼ Crash Landing or Ditching continued ▼

Landing Checklist - Crash Landing

Landing gear	down	C&F
Flaps	25, 25	C&F
Spoilers	.ARM	C&F
EAD.	ckd	PM

Note: Extended landing gear will absorb impact forces.

At 500 feet AFE

Advise cabin. Command "BRACE FOR LANDING."

Prior to Touchdown

EMER LTS switch ON

Note: EMER LTS switch ON will ensure cabin emergency lights are illuminated to assist in evacuation of airplane.

When airplane has stopped and if time permits

ENG FIRE handles Pull

FIRE AGENT (as required) Discharge

Note: BATT switch must be on to discharge fire extinguishing agent as generator or TR power will not be available.

Initiate evacuation.



Driftdown

Condition: Engine failure or shutdown during cruise.

- 1 CONFIRM ENG OUT prompt Select

Warning! The FCP altitude must be reset to a lower altitude. The airplane will depart the clearance altitude in order to maintain Vmin speed.

- 2 FCP altitude Set MAXFL or lower
- 3 Monitor deceleration to FMS D/D speed.
- 4 Monitor PROF descent to level off altitude.
- 5 At level off, monitor acceleration to ECON speed.
- 6 Plan to land at the nearest suitable airport.



Emergency Descent

Condition: A rapid descent is needed.

Caution! Descent not to exceed 10° pitch or 30° bank.

- 1 NO SMOKE/SEAT BELTS switches ON
- 2 Altitude select knob Reduce/pull
- 3 Commence IAS/MACH SEL descent.
- 4 Speed brakes EXTEND
- 5 Choose one:

◆ Structural damage **known** or **suspected**:

Caution! Known failures affecting structural integrity and/or turbulence may dictate more conservative speed profiles or entry maneuvers.

Descent speed. Establish
(0.75 M/275 KIAS)

▶▶ **Go to step 6**

◆ Structural damage is **not** known or suspected:

Descent speed. Established
(0.80 M/320 KIAS)

▶▶ **Go to step 6**

▼ Continued on next page ▼

▼Emergency Descent continued▼

6 To reactivate boom mike when O2 mask is no longer required:

O2 Mask Doors. CLOSE

| TEST/RESET lever. Push

7 Cabin Advise

Advise the cabin by PA when the descent is complete and the use of oxygen system can be discontinued. Request passenger and cabin status to include the lavatories.



EFB Failure – All

Condition: One of the following occurs:

- All EFBs are inoperative or unavailable
- A required application has failed on all EFBs

1 Choose one:

◆ Failure occurs **on the ground**:

▶▶ **Go to step 2**

◆ Failure occurs **in flight**:

▶▶ **Go to step 6**

2 If not at gate, return to gate.

3 Attempt to obtain spare EFBs.

4 Choose one:

◆ **Two** EFBs available:

Proceed normally.



◆ Only **one** EFB available:

▶▶ **Go to the EFB Failure – Single checklist on page 0.13**



◆ **No** spare EFBs available:

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

- 5 Contact Dispatch to obtain the following printed material:
- FOM, chapter 10, Emergency/Irregular Operations
 - FOM, chapter 4, section 4, Sensitive Security Information
 - All Bulletins
 - Vol. 1, Limitations
 - Vol. 1, NOI section
 - Vol. 1, SP material applicable to the flight, e.g., cold weather operations
 - Airway Manual Ops Specs material applicable to flight
 - Applicable Communications Failure pages from Jeppesen text pages, Emergency section
 - Applicable Jeppesen charts for departure, destination, and alternates
 - ODM, OPERATIONAL LANDING DISTANCES tables

Note: ODM tables are not required if ACARS Landing Performance Request (LPR) functionality operative.

Caution! No dangerous goods allowed.



▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

6 Contact Dispatch.

EFB may be obtained from a non-working crew member.

Consider weather, operating region, fuel reserves, and destination airport characteristics.

Note: A flight may continue to destination airport without Jeppesen terminal charts if the captain and dispatcher agree that such a continuation will not affect the safety of flight.

7 Consider using the FMS to decrease workload and obtain/verify relevant instrument procedure information.

Program the FMS for approach (if available).

Using the FMS, review the following approach information: runway length, and approach course.

From the F-PLN page, review approach/missed approach segments and altitude restrictions.

From the MAP or PLAN Mode display on the ND, review the general approach depiction to include the missed approach segment.

8 See Additional Information at end of this checklist and record arrival, approach, and landing data.



▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

Additional Information**Terminal chart unavailable:**

Before conducting an instrument approach without an approach chart, obtain the following information as appropriate from Dispatch or ATC.

Note: Use ATC only in time critical situations as a last option.

- NOTAMs
- Arrival (STAR) / fixes, airspeed, altitudes
- Arrival (STAR) waypoints
- ATIS frequency
- Approach / tower / ground frequency
- Wx required / minimums
- MSA
- Nav aids
- Approach courses, altitude constraints, and airspeed constraints
- Airport elevation
- Initial approach altitude
- If a procedure turn is required:
 - the direction of the procedure turn from the outbound course
 - the distance from the initial approach fix within which the procedure turn must be completed
 - the procedure turn altitude
- Step-down altitude / distance
- Glideslope intercept altitude
- DA/DH or MDA
- Airport Elevation / TDZE
- Missed approach point (if applicable)
- Missed approach procedure
- Runway length, width, and lighting

EFB Failure – Single

Condition: One of the following occurs:

- An EFB is inoperative or unavailable
- A required application has failed

1 Choose one:

◆ Failure occurs **before** pushback:

Attempt to obtain spare EFB.

Utilize EFB loaner cart if station is equipped.

EFB may be obtained from a non-working crew member.

►► **Go to step 2**

◆ Failure occurs **after** pushback:

Attempt to obtain spare EFB.

EFB may be obtained from a non-working crew member.

►► **Go to step 2**

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

2 Choose one:

◆ Spare EFB **available**:

Utilize spare EFB.

If the spare EFB is obtained from another crew member, obtain password.

Coordinate with Dispatch to determine future need of replacement EFB.



◆ Spare EFB **unavailable**:

►► **Go to step 3**

- 3 Contact Dispatch. Operation with only one operative EFB may be authorized. Additional printed materials may be required.
- 4 Conserve battery on remaining EFB.

Note: Use powered keyboard or approved charging device.

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

5 Choose one:

◆ Battery power **is above and expected to remain** above 10%:

Continue operation with one operative EFB.



◆ Battery power **drops or is expected to drop** below 10%:

Use approved charging device, if available, to charge EFB to at least 10% prior to TOD.

If battery is below or is expected to be below 10% at TOD, record relevant arrival/approach information for all crew members.

►► **Go to the EFB Failure – All checklist on page 0.9**



EFB or Application Unresponsive

Condition: One of the following occurs:

- An EFB is unresponsive
- An application within the EFB is unresponsive

- 1 Choose one:
- ◆**EFB** is unresponsive:
 - ▶▶**Go to step 3**
 - ◆**Application** within EFB is unresponsive:
 - Close and restart application.
 - ▶▶**Go to step 2**
- 2 Choose one:
- ◆Application operates **normally**:
 - Continue normal operation.
 - ■ ■ ■
 - ◆Application within EFB remains **unresponsive**:
 - ▶▶**Go to the EFB Failure – Single checklist on page 0.13**
- 3 Battery power Check
- If able, verify EFB battery status indicator displays at least 10% battery power available. Connect power source, if necessary.

▼ Continued on next page ▼

▼ EFB or Application Unresponsive continued ▼

4 **When** sufficient battery power is available:

Power button Press and hold

Press and hold the power button for ten seconds, then release. This ensures the Surface® shuts down instead of entering sleep mode.

Power button Press and release

Press and release the power button; SURFACE should appear on the screen.

5 Choose one:

◆ EFB normal operation is **restored**:

Accomplish normal logon procedure.



◆ EFB **fails** to restart:

Press and hold the power button for forty-five seconds, then release. This forces the Surface® into a hard restart.

▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ EFB or Application Unresponsive continued ▼

6 Choose one:

◆ EFB normal operation is **restored**:

Accomplish normal logon procedure.



◆ EFB **fails** to restart:

Refer to applicable EFB Non-Normal Checklist.



Emergency Landing Considerations

Condition: The captain has determined a red emergency exists.

Objective: To assist the crew in managing a red emergency.

- Declare an emergency
- Transponder - 7700 (if required)
- Brief the flight attendants and passengers
- Consider reducing fuel load
- Seat belt sign - ON
- When below 10,000 feet:

L and R PACK switches OFF

Note: When air conditioning input is shut off, cabin altitude may ascend at approximately 4,000 fpm (at full differential pressure) until outflow valve is fully closed. When outflow valve is closed, rate of ascent will be approximately 1,000 fpm (depending on airplane configuration).

CABIN PRESS SYSTEM switch MANUAL

CABIN PRESS MANUAL rate selector . . . CLIMB

Note: Cabin is depressurized to ensure all doors and exits can be readily opened

AVIONICS COOLING switch FAN

▼ Continued on next page ▼

▼ Emergency Landing Considerations continued ▼

- When at 1,000 feet:

Announce “BRACE FOR LANDING” over the PA.

- After landing:

Evaluate the need for emergency evacuation.

If emergency evacuation is appropriate:

Perform the EVACUATION checklist (back cover).

If emergency evacuation is NOT appropriate:

Make the following PA:

“THIS IS THE CAPTAIN, REMAIN SEATED
WITH YOUR SEAT BELT FASTENED.”



Level 1 Alert

Messages: Level 1 Alert

Condition: Any Level 1 Alert displays.

1 Consult Level 1 Alerts table on following pages for the displayed alert.

2 Choose one:

◆ Level 1 alert code is **NO T/O**:

▶▶ **Go to step 5**



◆ Level 1 alert code is **not** NO T/O:

▶▶ **Go to step 3**

3 Choose one:

◆ Level 1 alert code is **INFO**:

Flight crew awareness and possible subsequent crew action required.

Make an appropriate maintenance log book entry. MEL relief may be available.



◆ Level 1 alert code is **not** INFO:

▶▶ **Go to step 4**

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

4 Choose one:

◆ Level 1 alert code is **ACT**:

Flight crew action is required. These alerts usually do not indicate an airplane malfunction, but prompt the crew to perform some action in response to the airplane condition.

◆ Level 1 alert code is **SW**:

This alert is the result of a deliberate flight crew action and reflects an abnormal switch or control position. The flight crew should confirm the desired configuration.



5 Choose one:

◆ On the **ground**:

Do not takeoff unless MEL relief for the related system discrepancy is documented in the aircraft's maintenance log.

▶▶ **Go to step 6**

◆ In **flight**:

▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

- 6 Review Consequences message(s) and continue to an appropriate destination considering Consequences message(s) and maintenance/MEL relief requirements.
- 7 Make an appropriate maintenance log book entry.



▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
ACARS NO COMM	INFO	ACARS communication has been lost.
ACCESS COMPT DOOR	NO T/O	Accessory compartment door may not be closed and locked. (If pressurization is normal, the indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.
ADIRU 1/2 FAULT	INFO	Respective inertial navigation portion of the ADIRU may have degraded navigation performance or there is a failure of the baro set input bus from either VIA.
AFT BULKHEAD DOOR	NO T/O	Aft bulkhead door may not be closed and locked. (If pressurization is normal, the indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.
AGS FAIL	INFO	Auto ground spoiler (AGS) system has detected a failure which may cause the AGS to not deploy. "DISARM SPOILERS" will display if the AGS is armed.
AIL TRIM FAIL	INFO	Aileron trim system has failed.
AIR DATA HEAT OFF	SW	Air data probe heater switch is OFF.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
AIR ISOL DISAG	NO T/O	Consequences: DEPART ICING AREA. Pneumatic system isolation valve is not in the commanded position.
AIR SYS FAULT	NO T/O	Related bleed air system has a failure that prevents satisfactory anti-ice operation.
AIR SYS L/R NOT OFF	INFO	Respective bleed air system is still pressurized when commanded off.
AIR SYS L/R OFF	SW	Respective bleed air system is off and the ISOL valve is closed.
ANTISKID FAULT	INFO	Antiskid system has detected a fault that could result in a reduction or loss of system redundancy.
ANTISKID OFF	SW	ANTISKID switch is selected off.
AOA HEAT L/R FAIL	NO T/O	Consequences: DEPART ICING AREA. Angle of attack probe heat has failed.
A/P NOT AVAIL	INFO	Consequences: CHECK/CONFIRM V SPEEDS. Autopilot is not available.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
APU AUTO SHUTDOWN	INFO	APU has detected a fault and has executed automatic shutdown. Alert will remain displayed until the APU MASTER switch is selected to OFF. When the alert is removed from the displays, subsequent APU start attempts are permitted.
APU DOOR OPEN	INFO	APU inlet door is open with APU commanded off.
APU VALVE DISAG	NO T/O	The APU bleed valve is not in the commanded position.
ATC XPDR 1/2 FAIL	INFO	Respective ATC transponder has failed. Select other transponder.
AUTO TRIM FAIL	INFO	Consequences: MACH TRIM FAILED. POSSIBLE PITCH CHANGES IF A/P DISC. DO NOT EXCEED 0.78 MACH. AUTOPILOT TRIM INOPERATIVE. The FCC is unable to trim the stabilizer, resulting in a loss of autopilot trim and Mach trim.
AUTOPILOT SINGLE	INFO	Only one autopilot available.
AVNCS COOL OVRD	SW	AVIONICS COOLING switch is in OVRD position.
BATT CHARGER FAIL	NO T/O	Consequences: NO TAKEOFF. Battery charger is inoperative.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
BATT CHARGING	NO T/O	Battery is charging. Alert is normal after extended use of battery such as during APU start. Alert displayed for an extended period may indicate a malfunction.
BATT DISCHARGING	NO T/O	Consequences: APU AND EMER PWR MAY NOT BE AVAILABLE. Battery is discharging without emergency power on.
BATT SWITCH OFF	SW	BATT switch is OFF.
BLEED AIR L/R OFF	SW	Bleed air switch is OFF with bleed air source available.
BRAKE PRESS LO	NO T/O	One or both brake accumulator pressures are low.
BUS AC GS OFF	NO T/O	►► Go to the BUS AC GS OFF checklist on page 6.10 AC ground service bus (AC tie bus) is OFF or the associated sensing circuit has failed.
BUS AC L/R OFF	NO T/O	Main generator AC bus is not powered or associated sensing circuit has failed.
BUS DC L/R OFF	NO T/O	Main DC bus is not powered or the associated sensing circuit has failed.
BUS TIE L/R LOCKOUT	NO T/O	AC bus tie is locked open due to a failure.
BUS TIE L/R OPEN	SW	Bus tie switch is in OPEN position.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
CAB PRES MAN FAIL	NO T/O	Consequences: NO TAKEOFF. CPC panel or manual control of outflow valve has failed.
CAB PRES SYS MAN	SW	Cabin pressurization control system is selected to manual.
CABIN DOOR	NO T/O	Forward cabin door may not be closed and locked. (If pressurization is normal, the indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.
CABIN RATE	INFO	Cabin rate of climb or descent exceeds comfortable limits.
CABIN TEMP MANUAL	SW	CABIN TEMP control is selected to manual.
CARGO AGENT 1/2 LO	NO T/O	One or more of the cargo compartment fire agent bottles has been discharged.
CARGO DOOR FWD/AFT	NO T/O	Respective cargo compartment door may not be closed and locked. (If pressurization is normal, the indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.
CAWS FAIL	NO T/O	The central aural warning system has failed.
COLUMN DISC	NO T/O	The control columns are disconnected from each other.
CKPT TEMP MANUAL	SW	CKPT TEMP control is selected to manual.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
CPC 1/2 FAIL	INFO	Cabin pressure controller has failed.
CRG SMK FWD/AFT FAIL	NO T/O	Respective cargo smoke detection system is set in the single mode of operation.
CRG SMK FWD/AFT SGL	SW	Respective cargo smoke detection system is set in the single mode of operation.
CTR FWD/AFT PUMP OFF	SW	Respective tank pump is selected tank pump is OFF with usable fuel in center tank.
DC TIE SW OPEN	SW	DC BUS TIE switch is in the OPEN position.
DCU CHANNEL FAIL	INFO	One data concentrator unit (DCU) channel has failed.
DCU FAIL	NO T/O	Consequences: SYNOPTIC DISPLAYS INCOMPLETE LOSS OF SOME ALERTS. The data concentrator unit (DCU) has failed.
DCU FAULT	INFO	Consequences: SYNOPTIC DISPLAYS INCOMPLETE LOSS OF SOME ALERTS. The data concentrator unit (DCU) has an internal fault that may result in loss of data redundancy.
DISARM SPOILERS	ACT	Consequences: USE MANUAL SPOILERS. The auto ground spoilers (AGS) system has detected a failure which may cause the AGS to not deploy. The ground spoilers should be deployed manually.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
DISCH CARGO AGENT	ACT	AGENT 1 or 2 DISCH PUSH switchlight is flashing, and agent should be discharged. Alert will extinguish when flashing switchlight is pushed.
DME 1/2 FAIL	INFO	Respective DME receiver has failed.
DOOR OPEN	SW	The DOOR OPEN alert only displays on the ground with the engines off. One or more aircraft doors or access hatches are not closed. With the engines off, the open doors are listed on the MISC page.
DRAIN MAST HEAT	INFO	Consequences: FWD GALLEY/LAV SINK MAY NOT DRAIN. COORDINATE WITH CABIN CREW. Drain mast heater has failed.
EIS SINGLE SOURCE	NO T/O	Consequences: NO CROSS COCKPIT COMPARE POSSIBLE. A single VIA channel is driving all six displays. Captain's and first officer's PFDs display the same data (not independent).
ELEC COMPT DOOR	NO T/O	E/E bay door may not be closed and locked. (If pressurization is normal, indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.
ELEC FAULT	NO T/O	Electrical system has detected a fault.
EMER LTS DISARM	SW	EMER LT switch is in the OFF or ON position.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
EMER PWR ON	NO T/O	Emergency power is on and the battery is powering the DC transfer bus, AC emergency bus, and DC emergency bus.
EMER PWR SW OFF	SW	EMER PWR switch is OFF.
EMER PWR TST FAIL	NO T/O	Emergency electrical power preflight test has failed. (The test may fail if battery is not fully charged.)
ENG L/R A-ICE DISAG	NO T/O	Consequences: DEPART ICING AREA. Respective anti-ice valve position disagrees with commanded position.
ENG L/R FADEC ALTN	SW	FADEC MODE ALTN mode has been selected. Autothrottle will disconnect.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
ENG L/R FUEL FILTER	NO T/O	If both ENG L FUEL FILTER and ENG R FUEL FILTER are displayed: ►► Go to the ENG L FUEL FILTER and ENG R FUEL FILTER Both Displayed checklist on page 7.18 If both ENG L FUEL FILTER and ENG R FUEL FILTER are displayed: PLAN TO LAND AT NEAREST SUITABLE AIRPORT. Engine fuel filter is partially clogged and bypass is imminent. Engine fuel system is automatically heated. Fuel contamination from other than ice is the most likely cause.
ENG L/R FUEL PRES	NO T/O	Engine inlet fuel pressure is low. Possible engine flameout.
ENG L/R OIL FILTER	NO T/O	Engine oil filter is partially clogged and bypass is imminent.
ENG L/R START ABORT	ACT	►► Go to the Aborted Start checklist on page 7.1 Respective EEC has detected an abnormal condition and automatically aborted start.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
ENG L/R SYS FAIL	NO T/O	Consequences: NO TAKEOFF. Respective engine is in a "no dispatch" condition.
ENG L/R SYS FAULT	INFO	Respective engine is in a "time limited" dispatch condition.
ENG VIB HI	INFO	►► Go to the High Engine Vibrations/ Ice Shedding checklist on page 3.3 Engine vibration parameters exceed 4.0 units. Monitor other engine parameters.
FCC 1/2 FAIL	INFO	Respective flight control computer has failed.
FCC 1/2 FAULT	INFO	One flight control computer channel has failed.
F/D G/A ONLY	INFO	Indicates autopilot go-around is not available. If go-around is required, disconnect autopilot.
FIRE AGENT 1/2 LO	NO T/O	Respective engine fire-extinguishing agent has been discharged.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
FIRE DET APU FAIL	INFO	►► Go to the FIRE DET APU FAIL checklist on page 8.16 Consequences: APU NOT AVAILABLE. Both APU fire detection loops are inoperative. APU fire detection is not available.
FIRE DET L/R FAIL	NO T/O	►► Go to the FIRE DET L/R FAIL checklist on page 8.17 Consequences: NO TAKEOFF. Both engine fire detection loops on respective engine are inoperative. Engine fire detection is not available on that engine.
FIRE L A/B FAULT	INFO	Respective left engine fire detection loop has failed.
FIRE R A/B FAULT	INFO	Respective right engine fire detection loop has failed.
FIRE APU A/B FAULT	INFO	Respective APU fire detection loop has detected a fault.
FLT REC FAIL	INFO	Flight recorder is inoperative. Digital flight data recorder or flight data acquisition unit has failed.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
FMS 1/2 FAIL	INFO	►► Go to the FMS FAIL checklist on page 11.2 Respective flight management function of the VIA has failed. Select off-side FMS function.
FMS DUAL FAIL	INFO	►► Go to the FMS DUAL FAIL checklist on page 11.1 Flight management function of both VIAs has failed.
FUEL LEVEL LO	NO T/O	Consequences: LAND AT NEAREST SUITABLE AIRPORT. Center and left or right main tank has low fuel.
FUEL RTT L/R INOP	INFO	Fuel return-to-tank (RTT) has failed. Fuel suction feed performance is degraded.
GALLEY DOOR	NO T/O	Forward galley service door may not be closed and locked. (If pressurization is normal, the indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
GEN APU OFF	SW	►► Go to the GEN APU OFF checklist on page 6.18 APU generator switch is in the OFF position.
GEN L/R OFF	SW	►► Go to the GEN L OFF checklist on page 6.19 OR ►► Go to the GEN R OFF checklist on page 6.27 Respective GEN switch is in the OFF position. (Also displayed when associated engine fire control handle is pulled.)
GPS 1/2 FAIL	INFO	GPS function of the respective MMR has failed.
GPWS FAIL	INFO	Consequences: SELECT ANY ND TO WXR Ground proximity warning system has failed.
GPWS FAULT	INFO	The ground proximity warning system (GPWS) has detected a fault.
GPWS TERR OFF	SW	Enhanced ground proximity system terrain mode is selected OFF.
HYD AUX PUMP FAIL	INFO	Low pressure output from aux hydraulic pump with pump commanded ON.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
HYD AUX PUMP OFF	SW	Aux hydraulic pump is not ON with the slats extended and at least one engine on.
HYD L/R OFF	SW	All hydraulic pumps in the respective system are commanded OFF.
HYD PUMP L/R FAIL	INFO	Low pressure output from engine hydraulic pump with pump commanded ON.
HYD PUMP L/R OFF	SW	Hydraulic pump is commanded OFF.
HYD TRANS DISAG	INFO	Hydraulic transfer pump is not in commanded position.
HYD TRANS OFF	SW	Hydraulic transfer pump is not ON with the slats extended and at least one engine on.
ILS 1/2 FAIL	INFO	Respective ILS function of the MMR has failed.
IRS BATT LO	NO T/O	IRS 2 battery voltage below 21 volts.
IRS 2 ON BATT	NO T/O	The IRS battery can supply 30 minutes of secondary power when fully charged.
IRS 1/2 NO ALIGN	NO T/O	Respective IRS has failed to complete an alignment.
IRS OFF	SW	One or more IRUs have been selected OFF in flight.
LAT FUEL UNBAL	SW	Consequences: BALANCE FUEL AS REQUIRED. Left and right main tank fuel quantity differs by at least 1,400 lbs. Open fuel crossfeed and transfer fuel as required.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
LAVATORY SMOKE	NO T/O	►► Go to the LAVATORY SMOKE checklist on page 8.18 Consequences: COORDINATE WITH CABIN CREW. Smoke has been detected in a lavatory.
LDG ALTITUDE MAN	SW	Landing field elevation has been set manually.
MANUAL G/A ONLY	INFO	Autopilot and flight director guidance for go-around is not available. If go-around is required, disconnect autopilot and fly go-around with raw data.
NO AUTOLAND	INFO	Autoland function is not available.
OVERWING DOOR	NO T/O	Indicates one or more overwing emergency exit doors is not closed and locked. (If pressurization is normal, the indication may be due to a faulty door position sensor.) If in flight and pressurization is normal, continue.
PACK L/R FLO DISAG	INFO	Respective pack has been selected ON, but no flow detected after 20 seconds; or respective pack selected OFF, but there is still flow after 10 seconds. Note: With external air connected, PACK L and/or R FLO DISAG alerts may illuminate. These alerts will extinguish after external air has been disconnected.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
PACK L/R OFF	SW	Respective pack has been commanded OFF or both packs are off above 4,500 ft AGL.
PACK OVRD	SW	PACK SHUTDOWN switch is in the OVRD position.
PITOT AUX/CAPT/FO FAIL	NO T/O	Consequences: AIRSPEED MAY BE UNRELIABLE. Respective pitot probe heater has failed.
PODS A-ICE FAULT	INFO	PODS system has a fault in the wing or tail ice protection system and cannot detect an overheat.
PODS FAIL	NO T/O	Consequences: NO TAKEOFF PODS system has failed and is unable to detect manifold failure or overheat in the tail compartment.
PODS FAULT	INFO	One loop or controller channel in the PODS system has failed. Overheat and manifold failure detection are still operative.
PODS TEST FAIL	NO T/O	The PODS system test has failed.
PRED WSHEAR FAIL	INFO	Predictive windshear function is not available.
PRED WSHEAR FAULT	INFO	Consequences: SELECT ANY ND TO WXR. The enhanced ground proximity warning system (EGPWS) has detected a fault in the predictive windshear mode.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
PSEU FAIL	NO T/O	►► Go to the PSEU FAIL checklist on page 9.16 Proximity sensor system has failed resulting in the loss of data for gear position, door position, and slat position.
PSEU FAULT	INFO	PSEU had detected an internal fault or detected a failure of a redundant sensor.
RAT PROBE FAIL	NO T/O	Ram air temperature probe heat has failed.
REV L/R DEPLOYED	INFO	►► Go to the REV DEPLOYED In Flight checklist on page 7.25 Respective thrust reverser has deployed in flight.
REV L/R FAULT	INFO	Consequences: THRUST REVERSER MAY NOT DEPLOY. Respective EEC has detected a thrust reverser abnormal condition that may inhibit its operation.
RUD PITOT FAIL	NO T/O	Rudder limiter pitot probe heater has failed. Possible over-restricted or under-restricted rudder.
RUDDER LIM FAULT	INFO	There is a fault in either the primary or secondary rudder limiter system. Rudder limiting is still available.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
RUDDER PWR OFF	SW INFO	Rudder is in the manual mode either due to hydraulic failure or HYD CONT RUDDER switch selected OFF.
RUDDER RESTRICTED	NO T/O	►► Go to the Rudder Jammed checklist on page 9.18 Rudder is restricted more than it should be for the flight conditions.
SECU FAULT	INFO	Spoiler system has detected a fault.
SEL CAB PRES MAN	ACT	►► Go to the SEL CAB PRES MAN checklist on page 2.12 Both auto cabin pressure controllers have failed and the system must be selected to MANUAL.
SEL CTR PUMPS OFF	ACT	Center fuel tank is empty of usable fuel.
SEL CTR PUMPS ON	ACT	Center fuel tank pumps are off with usable fuel in the tank.
SET LDG ALTITUDE	ACT	Cabin pressurization system has lost landing field elevation data from the FMS. Enter landing field elevation manually on CPC panel.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
SPEEDBRAKE DISAG	ACT	Consequences: RETRACT SPEED BRAKES. Speedbrakes are extended and throttles are advanced to a high power setting. The SECU has retracted the speedbrakes. Retract the speedbrake handle.
SPEEDBRAKE/ FLAP	ACT	Consequences: RETRACT SPEED BRAKES. Speedbrakes are extended with flaps in landing range.
SPOILER FAULT	NO T/O	Consequences: NO TAKEOFF The spoiler system has detected a fault.
SPOILER INBD/OTBD FAIL	NO T/O	Consequences: REDUCED ROLL RATE AVAILABLE. A pair of spoilers has shut down due to a SECU or actuator failure.
STAB OUT OF TRIM	INFO	Consequences: POSSIBLE PITCH CHANGE IF A/P DISC. Stabilizer is not responding to autopilot trim commands. Possible transient on A/P disconnect.
STAB TRIM OFF	SW	Consequences: USE ALTERNATE STABILIZER TRIM. STABILIZER TRIM switch is selected OFF.
STALL WARN FAIL	NO T/O	Stall warning (stick shaker, SSRS, and stick pusher) will not function.
STALL WARN FAULT	NO T/O	Stall warning system has lost two channels of stall warnings, and/or one channel of stick pusher.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
START AIR PRES LO	ACT	Manifold pressure is insufficient for engine start. Select alternate pneumatic source or increase power for crossbleed start.
STATIC L/R HEAT	INFO	Indicates static plate heater has failed.
STICK PUSHER FAIL	INFO	Stick pusher has failed.
TERRAIN FAIL	INFO	Terrain mode of the enhanced ground proximity warning system (EGPWS) has failed.
TERRAIN NOT AVAIL	INFO	Terrain mode of the enhanced ground proximity warning system (EGPWS) is not available.
TNK L/R FWD/AFT PMP OFF	SW	Respective main tank pump switch OFF with respective engine FUEL switch ON.
TNK L/R FWD/AFT PMP LO	INFO	Respective main tank pump commanded ON, but indicates low pressure.
TANK L/R PUMPS LO	NO T/O	Low fuel pressure output from respective main tank with all respective main tank pumps commanded ON.
TANK L/R PUMPS OFF	SW	Forward and aft pumps in tank are commanded OFF with the respective engine FUEL switch ON.
TR L/C/R FAIL	INFO	Transformer-rectifier unit has failed (voltage low).
UNABLE RNP	INFO	FMS required navigational performance not within limits for particular phase of flight.

▼ Continued on next page ▼

▼ Level 1 Alerts continued ▼

Level 1 Alert	Code	Consequences/ Description
VIA CONFIG DISAG	NO T/O	Consequences: NO TAKEOFF. Configuration of VIA-1 and VIA-2 does not agree.
VIA FAIL	NO T/O	Consequences (may not be displayed): DO NOT CHANGE EIS SOURCE FUEL QUANTITY TEST MISCOMPARE VIA computers have detected a failure in the display system.
VIA FAULT	INFO	Consequences: (may not be displayed) ENG COMPARISON MONITOR INOPERATIVE. A VIA has a limited dispatch condition or the engine comparison monitor has failed.
VOR 1/2 FAIL	INFO	Respective VOR receiver has failed.
WING ICE DETECTED [AFM]	NO T/O	Consequences: OVERWING DE-ICING REQUIRED. Indicates detection of ice buildup on left or right wing surface.
WING ICE L/R FAIL	INFO	Consequences: VISUAL INSPECTION FOR ICE REQUIRED. One overwing ice detection system has failed. Visual wing ice inspection required prior to departure.
WSHEAR DET FAIL	INFO	The reactive windshear detection system has failed.
WSHLD A-ICE OFF	SW	Windshield heat has been selected OFF.
YAW DAMP FAIL	INFO	Yaw damp function has failed.



Overweight Landing

Condition: A landing at greater than maximum landing weight is required.

Note: Refer to the Overweight Landing Considerations, in this section, as time and conditions allow.



Overweight Landing Considerations

Condition: A decision is being considered or has been made to land over the maximum landing weight limitation.

Note: Exercising captain's emergency authority does not require the declaration of an emergency with air traffic control. Refer to FOM, 10.2, Overweight Landings.

Note: When considering an immediate return to the takeoff runway, the landing distance is generally less than the takeoff distance at all gross weights when landing with flaps 25 or 40 and the runway is dry.

Approach:

- Consider landing on the longest available runway.
- Review landing distance required in the Approach/Landing or Abnormal section of the ODM (OPERATIONAL LANDING DISTANCES or ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS).
- The aircraft is not certified to autoland at greater than maximum landing weight. If the captain determines that an autoland is the safest course of action, the approach, flare, and landing must be closely monitored at all times.
- The vertical speed required to maintain glidepath may be significantly higher than normal. The captain should brief contingencies if "SINK RATE" cautions are received on short final.

▼ Continued on next page ▼

▼ Overweight Landing Considerations continued ▼

Landing:

- Do not hold the airplane off waiting for a smooth landing.
- Fly the airplane onto the runway at the normal touchdown point.
- Attempt to touch down at approximately 200 - 300 fpm. If able, note the vertical speed at touchdown.
- If a long landing is likely to occur, a go-around should be accomplished.
- Apply reverse thrust commensurate with runway length and conditions.

After Landing:

- Be alert for the possibility of tire, grease, or hydraulic fire and the possibility of wheel fuse plugs melting. Advise the ground crew of the hot brake hazard.
- Make a logbook entry including the phrase "overweight landing." Include actual landing weight, maximum landing weight, and vertical speed at touchdown, if known.



Rejected Takeoff - Post RTO Considerations

Condition: A takeoff has been discontinued after takeoff thrust is set and/or initiation of the takeoff roll has begun.

Following the RTO:

- Wind direction in case of fire. If able, park with fire on the downwind side of the aircraft.
- The possible need for emergency equipment.
- The possible need to evacuate the aircraft.
- Complete non-normal checklist (if appropriate) for the condition(s) causing the RTO.
- The need to clear the runway. Check entry/exit door status and ensure passengers are seated prior to taxi.
- Refer to FOM, chapter 3.4, Rejected Takeoff (RTO).

Prior to a subsequent takeoff:

- Contact Flight Control.
- Observe brake cooling schedule and precautions in the ODM.
- Accomplish any required MEL actions.
- Consider additional de-icing requirements.
- Consider additional fueling requirements.
- Verify FMS information.
- Accomplish the appropriate normal checklists (e.g., After Landing checklist, Taxi checklist, Before Takeoff checklist).

▼ Continued on next page ▼

▼ Rejected Takeoff - Post RTO Considerations continued ▼**Return to the gate:**

- Accomplish the After Landing checklist.
- Coordinate with station.
- Consider the possibility of wheel fuse plugs melting and/or remote parking.
- Advise the ground crew of the hot brake hazard.



Volcanic Ash

Condition: Volcanic Ash is suspected when one or more of these occur:

- A static discharge around the windshield
- A bright glow in the engine inlets
- Smoke or dust on the flight deck
- An acrid odor.

- 1 **If** a volcanic ash cloud is inadvertently entered during flight, depart the area by the shortest route possible. Consider executing a descending 180° turn. Do not use windshield wipers.

Note: Use of windshield wipers for ash or dust removal will result in minute scratches on the windshield. These will create a blossoming effect at night and could make approach and landing difficult.

Caution! If airspeed indications are abnormal, refer to the **Airspeed Unreliable checklist for pitch guidance information.**

Note: Airspeed indications may be erratic and unreliable or a complete loss of airspeed indication may occur.

Note: Avoid rapid throttle movements if possible.

Note: If compressor and/or turbine blades have been eroded, an increase in fuel flow and TGT may be noticed.

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

2 Perform the following actions **as rapidly as possible**:

Autothrottles DISENGAGE
 Throttles (all) IDLE
 IGNITION switch ON
 ENG anti-ice switches ON
 WING and TAIL AIR FOIL
 anti-ice switches ON
 FLOW switch HIGH

Note: Decreasing TGT will reduce debris buildup on the turbine blades and hot section, and significantly reduce damage to the compressor section and blade tips due to erosion.

3 Choose one:

◆ Engine(s) **flamed out** or **stalled** or TGT beyond limits, or increasing rapidly toward limits:

▶▶ **Go to step 4**

◆ Engine(s) are **not** flamed out or stalled, or TGT is **not** beyond limits or increasing rapidly toward limits:

▶▶ **Go to step 12**

4 START PUMP switch ON

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

- 5 FUEL X-FEED lever ON
- 6 Windmill start envelope is Vmo to 250 KIAS. A minimum N2 of 8% is required for an air start. Higher airspeed increases N2 rpm and improves airstart capability.
- 7 FUEL switch
(affected engine(s)). . .Confirm OFF
- 8 Time and conditions permitting, leave fuel switch in the OFF position for 15 to 30 seconds to allow engine to cool.

Note: Allowing engine hot section to cool before restart may allow shedding of accreted molten volcanic ash material from Nozzle Guide Vanes.

- 9 FUEL switch
(affected engine(s)). . .Confirm ON
- 10 Monitor start.

Note: Engines may accelerate to idle very slowly at high altitudes. This may be incorrectly interpreted as a hung start or an engine malfunction not caused by volcanic ash.

Note: If an engine fails to start, repeated attempts should be made immediately. A successful start may not be possible until clear of volcanic ash cloud and airspeed and altitude are within normal range.

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

Note: Consider starting the APU, if available. The APU can be used to power the electrical system in the event of multiple engine loss.

11 Choose one:

- ◆ APU or engine generator **powering** airplane:
 EMER PWR switch OFF, then ARM
 ▶▶ **Go to step 12**
- ◆ APU or engine generator is **not** powering airplane:
 ▶▶ **Go to step 12**

12 Plan to land at the nearest suitable airport.

Note: A precautionary landing should be made if damage has occurred to the airplane or abnormal engine operation was observed while operating in the ash cloud.

Note: The abrasive effects of volcanic ash on windshields and landing lights may significantly decrease visibility for approach and landing.

13 For ground operations in volcanic ash or dust conditions, review the following notes.

Note: Limit braking. The presence of volcanic ash or dust will increase brake wear. A light layer of ash or dust on the taxiway or runway may reduce tire adhesion.

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

Note: Avoid use of air conditioning while on the ground. If dust is visible and air conditioning use is necessary, operate air conditioning at full cold setting.

Note: Limit use of the APU to engine start.



▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

Additional Information

Discontinue bleed air use when reverser operation is imminent.

Limit use of reverse thrust to prevent ingestion of volcanic ash into engines and to prevent further reduction of visibility.

Maintain a greater than normal separation from other airplanes while taxiing. Use caution when taxiing – limit thrust operation to the minimum required to taxi.

Use all engines during taxi. Taxi at low speed. Whenever possible, avoid operating the engines above idle.

Volcanic ash or dust covered taxiways or runways, especially if wet, will reduce braking efficiency.

Ash or dust deposits should be hosed off the windshield with water. Any ash or dust residue should be removed with a clean cloth.

Verify pitot and static ports are free of ash or dust.

Inspect all ventilation scoops and inlets and ensure they are clear of ash or dust accumulations.

Check engine inlets for acoustic panel dust coating.

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Non-Normal Checklists

Chapter NNC

Airplane Gen., Emer. Equip., Doors, Windows

Section 1

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TAILCONE UNLOCK.....	1.3

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LOCK FAIL

Condition: The red LOCK FAIL light remains illuminated when the flight deck door locking solenoid is retracted either because of a solenoid or keypad failure.

- 1 RAS Keypad circuit breaker (P23) and
RAS Control circuit breaker (R23) Pull

Removing power from the system will silence the aural alert.

- 2 Deadbolt lock Locked, Key inoperable

Note: The deadbolt position allowing access with a key is to be used on the ground only.

A second crew member is required to secure the flight deck door deadbolt when a pilot leaves the flight deck. Reference FOM for flight deck entry/exit procedures.



Oxygen Low Pressure - Crew

Condition: The flight crew oxygen supply is low or depleted during flight.

Warning! When the flight crew oxygen supply is depleted during flight, the flight crew is vulnerable to smoke, fumes, or a loss of cabin pressurization. Initiate an immediate diversion to the nearest suitable airport.

- 1 Position a cabin portable oxygen bottle/mask and a PBE near each pilot.
- 2 Consider a descent to 10,000 feet or MEA which ever is higher, if conditions permit.
- 3 Review Rapid Depressurization on page 2.1 and Smoke, Fire or Fumes on page 8.5.

Caution! If an emergency situation occurs resulting in use of the portable oxygen bottles / masks or PBEs, a lack of communication capability may cause flight crew and ATC coordination problems.



TAILCONE UNLOCK

Messages: TAILCONE UNLOCK

Condition: Tailcone is not locked.

1 Choose one:

◆ On the **ground**:

▶▶ **Go to step 2**

◆ In **flight**:

▶▶ **Go to step 3**

2 Ground Control Notify

Advise ground control that tailcone may have
deployed on taxiway or runway.



3 Tower or ATC Notify

Advise tower or ATC that tailcone may drop on
runway during landing rollout.



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Non-Normal Checklists

Chapter NNC

Air Systems

Section 2

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CABIN ALTITUDE or Rapid Depressurization

Messages: CABIN ALTITUDE

Condition: A cabin altitude exceedance occurs. Cabin altitude above 10,000 ft.

- 1 Oxygen masks ON/100%
- 2 Crew communications Establish
- - - - -

- 3 Outflow VALVE Verify closed
- 4 If cabin altitude exceeds 14,000 feet:
PASS OXY MASK switch EJECT

- 5 Choose one:

◆ Cabin altitude **controllable**:

Operate cabin pressure system as required.

▶▶ **Go to step 6**

◆ Cabin altitude is **not** controllable:

▶▶ **Go to the Emergency Descent
checklist on page 0.7**



- 6 Cabin Advise
Advise the cabin by PA when the use of oxygen system can be discontinued. Request passenger and cabin status to include the lavatories.



AIR SYS PRES LO

Messages: AIR SYS L PRES LO AIR SYS R PRES LO

Condition: Respective system is on with low pressure.

- 1 BLEED switch (affected engine) OFF
- 2 PACK switch (affected engine) OFF
- 3 **If operating in icing conditions:**
 - ▶▶ **Go to the Anti-Ice Operation with Single Pneumatic Source checklist on page 3.1**



AVNCS AIR FLO OFF

Messages: AVNCS AIR FLO OFF

Condition: Failure of one or both avionics cooling fans.

1 Choose one:

◆ On the **ground**:

Call maintenance.



◆ In **flight**:

►► **Go to step 2**

2 AVIONICS COOLING switch OVRD

3 **After** landing:

Shut down all unnecessary radio and electronic equipment as soon as possible.

Caution! Prolonged use of electronic equipment on the ground with the avionics fan inoperative will cause overheating and could damage equipment.



BLD AIR TEMP HI

Messages: BLD AIR L TEMP HI BLD AIR R TEMP HI

Condition: Respective bleed manifold temperature high.

- 1 BLEED switch (affected engine) OFF
- 2 PACK switch (affected engine) OFF
- 3 **If** operating in icing conditions:

**▶▶ Go to the Anti-Ice Operation with
Single Pneumatic Source checklist on
page 3.1**



BLD AIR TEMP LO

Messages: BLD AIR L TEMP LO BLD AIR R TEMP LO

Condition: Bleed temperature too low for airfoil anti-ice.

1 Throttles Advance

2 Choose one:

◆ BLD AIR TEMP LO alert is **not** displayed.



◆ BLD AIR TEMP LO alert is **displayed**:

▶▶ **Go to step 3**

3 BLEED switch (affected engine).. OFF

4 PACK switch (affected engine). OFF

5 **If** operating in icing conditions:

▶▶ **Go to the Anti-Ice Operation with
Single Pneumatic Source checklist on
page 3.1**



BLEED AIR FAIL

Messages: BLD AIR L FAIL BLD AIR R FAIL

Condition: Pressure regulator valve failed or pneumatic system controller channel failed.

- 1 BLEED switch (affected engine) OFF
- 2 PACK switch (affected engine) OFF
- 3 **If** operating in icing conditions:

▶▶ **Go to the Anti-Ice Operation with Single Pneumatic Source checklist on page 3.1**



**Auto Pressurization Inop
or
Cabin Differential
Pressure Uncontrollable, Off
Schedule or Oscillates**

Condition: SEL CAB PRES MAN level 1 alert. Auto pressurization does not function normally.

1 CABIN PRESS SYSTEM switch MANUAL

►► **Go to the Manual Pressurization Control checklist on page 2.12**



CABIN DUCT OVHT

Messages: CABIN DUCT OVHT

Condition: Cabin duct temperature exceeds limit. Pack shut down could occur.

1 CABIN TEMP selector. MAN COLD



CABIN INFLO LO

Messages: CABIN INFLO LO

Condition: Pack airflow is insufficient to maintain pressurization.

- 1 FLOW switch. HIGH
- 2 Throttles (if required) Advance

If throttles are at low power (conditions permitting) advance throttles until air conditioning pack supply is normal.

3 Choose one:

◆ CABIN INFLO LO alert is **not** displayed/cabin does **not** continue to depressurize:



◆ CABIN INFLO LO alert is **displayed**/cabin **continues** to depressurize:

Descend to an altitude where adequate pressurization can be maintained.



CABIN PRES HI

Messages: CABIN PRES HI

Condition: Cabin differential pressure exceeds limit.

- 1 CABIN PRESS SYSTEM switch MANUAL
- 2 CABIN PRESS MANUAL rate selector CLIMB

Move selector to momentary climb sufficient to decrease differential pressure.

- 3 Choose one:

◆ Cabin outflow valve moves toward open:

Adjust cabin altitude to normal schedule.



◆ Cabin outflow valve does **not** move toward open:

►► **Go to step 4**

- 4 Terrain and conditions permitting:
Descend (to 10,00 feet) Initiate
- 5 L or R PACK switch OFF

Turn either the L or R PACK switch OFF and maintain a comfortable cabin rate of descent by varying throttle position on the side of operating air conditioning system.

▼ Continued on next page ▼

▼ CABIN PRES HI continued ▼

6 **When** below 10,000 feet:

PACK switches (both) OFF

Note: Cabin altitude may be below sea level. When cabin altitude indicates 2,000 feet above destination altitude, continue descent, approach, and landing.

RAM AIR switch ON

7 **After** landing:

Clearview Window(s) Open

Note: Air conditioning may be resumed for passenger comfort.

Note: Do not close clearview window(s) after restarting air conditioning system(s).



CABIN PRESSURIZED

Messages: CABIN PRESSURIZED

Condition: Cabin is pressurized while the airplane is on the ground.

- 1 CABIN PRESS SYSTEM switch MANUAL
- 2 CABIN PRESS MANUAL rate selector CLIMB
- 3 Choose one:

◆ Cabin outflow valve indicates **open**:

Open cabin doors when differential pressure indicates zero.



◆ Cabin outflow valve indicates **closed**:

►► **Go to step 4**

- 4 L/R PACK switches OFF



CKPT DUCT OVHT

Messages: CKPT DUCT OVHT

Condition: Cockpit duct temperature exceeds limit.
Pack shutdown could occur.

- 1 CKPT TEMP selector MAN COLD



**Manual Pressurization Control
or
SEL CAB PRES MAN**

Messages: SEL CAB PRES MAN

Condition: Both cabin pressurization controllers have failed.

- 1 CABIN PRESS SYSTEM
switch MANUAL

Note: Power changes will affect cabin climb/descent rates. Increasing engine thrust will increase air input into airplane necessitating opening of outflow valve to maintain the desired climb/descent rate. Decreasing engine thrust will have opposite effect.

- 2 Altitude SCHED placard CHECK
- Determine desired cabin altitude from SCHED placard on cabin pressure selector panel.

▼ Continued on next page ▼

▼ Manual Pressurization Control continued ▼

3 Choose one:

◆ On the **ground** and **takeoff** is **desired**:

CABIN PRESS MANUAL
rate selector CLIMB

Observe outflow VALVE indicator
moves to full VALVE OP.

▶▶ **Go to step 4**

◆ In **flight**:

▶▶ **Go to step 4**

4 Choose one:

◆ In after takeoff phase:

Accomplish as soon as practical:

CABIN PRESS MANUAL
rate selector DESC

Move CABIN PRESS MANUAL rate
selector to DESC until outflow valve
position indicates 1/3 of indicator
toward VALVE CL, then release.

▶▶ **Go to step 5**

◆ In another phase of flight:

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ Manual Pressurization Control continued ▼

5 Choose one:

◆ After slats retract and during climb phase:

CABIN RATE 500 CLIMB

Adjust outflow valve to indicate 500 FPM cabin climb on secondary engine page synoptic. If decreased cabin climb rate is desired, move CABIN PRESS MANUAL rate selector to DESC. This moves the outflow valve toward closed and will decrease cabin climb rate.

▶▶ Go to step 6

◆ In another phase of flight:

▶▶ Go to step 6

6 Choose one:

◆ At cruise cabin altitude:

CABIN RATE 0

Using CABIN PRESS MANUAL rate selector, adjust outflow valve to indicate 0 FPM on secondary engine synoptic page.

▶▶ Go to step 7

◆ In another phase of flight:

▶▶ Go to step 7

▼ Continued on next page ▼

▼ Manual Pressurization Control continued ▼

- 7 At the start of descent:
- 8 CABIN RATE. 300 FPM descent
Reduce power slowly. Be prepared to move CABIN PRESS MANUAL rate selector toward DESC to maintain zero cabin rate change. When engine power is reduced to desired level, move CABIN PRESS MANUAL rate selector to obtain 300 FPM rate of descent. Move CABIN PRESS MANUAL selector toward DESC to increase cabin descent rate or CLIMB to decrease cabin descent rate.
- 9 **When** cabin altitude is 2,000 feet above destination field elevation, maintain cabin rate at zero until cabin altitude equals aircraft altitude.
- 10 **When** cabin altitude and aircraft altitude are equal:
CABIN PRESS MANUAL
rate selector CLIMB

Note: During approach and landing, cabin altitude will decrease or climb at the same rate as aircraft altitude.



NO MASKS

Messages: NO MASKS

Condition: Cabin altitude exceeds 14,750 feet and passenger oxygen masks have not automatically deployed.

Caution! Holding PASS OXY MASK switch in EJECT position in excess of 5 seconds may cause damage to the oxygen compartment latches.

- 1 PASS OXY
MASK switch EJECT & hold 3 to 5 seconds



PACK OVERHEAT

Messages: PACK L OVERHEAT PACK R OVERHEAT

Condition: Respective air conditioning pack has shut down due to high temperature.

- 1 PACK switch (affected engine) OFF



Unpressurized Flight

Condition: Pressurization must be manually controlled and monitored.

- 1 CABIN PRESS SYSTEM switch MANUAL
- 2 CABIN PRESS MANUAL rate selector CLIMB

Observe outflow VALVE indicator moves to full OP.

Note: Valve position indication should remain in VALVE OP throughout flight.

Note: Flight altitude must be limited to 10,000 feet. At altitudes above 9,500 feet, expect vocal warning and horn to sound, CABIN ALTITUDE alert to display, and MASTER WARNING light to illuminate.

- 3 Choose one:

◆ Air conditioning packs **are** available:

Air conditioning pack(s) As desired



◆ Air conditioning packs **are not** available:

RAM AIR switch ON



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Non-Normal Checklists**Chapter NNC****Anti-Ice, Rain****Section 3****Table of Contents**

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Anti-Ice Operation with Single Pneumatic Source

Condition: Anti-ice operations required with only one bleed source available.

- 1 BLEED switch (affected engine) OFF
- 2 PACK switch (affected engine) OFF
- 3 ISOL switch AUTO
- 4 Choose one:

◆ Flight into icing conditions is **not** required:



◆ Flight into icing conditions is **required**:

►► **Go to step 5**

- 5 WING and TAIL AIR FOIL anti-ice switches . . . ON
- 6 **On** final approach:

Within 1 minute prior to selecting 25° landing flaps (normally just prior to landing gear extension):

TAIL AIR FOIL
anti-ice switch OFF, then ON
Flaps/Slats 25/EXT

Note: Do not extend flaps beyond 25/EXT.

▼ Continued on next page ▼

▼ Anti-Ice Operation with Single Pneumatic Source continued ▼

7 Choose one:

◆ Go around **required**:

Flaps/slats retract to 18/EXT and use appropriate maneuvering speeds.

▶▶ **Go to step 8**

◆ Go around **not** required:

▶▶ **Go to step 8**

8 **When** clear of icing conditions:

WING AIR FOIL anti-ice switch OFF

After 3 minutes,

TAIL AIR FOIL anti-ice switch OFF



High Engine Vibrations / Ice Shedding

Messages: ENG VIB HI

Condition: High engine vibrations while in icing conditions.

Note: This procedure assumes that if the airplane is in icing conditions, the engine anti-ice is selected on. If engine anti-ice is not selected on and fan blade icing is suspected, verify IGNITION is on, reduce thrust (one engine at a time) to idle, turn on engine anti-ice, and return thrust to required setting.

1 Choose one:

◆ Airplane is **not** in icing conditions:

If all other engine indications are normal, continue to operate engine. Should any abnormal indicators occur during the remainder of the flight (airframe vibration, high TGT, etc.), the flight crew should evaluate the condition and, if required, shut down the engine.



◆ Airplane in icing conditions:

►► **Go to step 2**

- 2 Autothrottles Disconnect
- 3 Associated throttle IDLE

▼ Continued on next page ▼

▼ High Engine Vibrations/Ice Shedding continued ▼

- 4 **After** throttle is at idle for approximately 5 seconds,
Associated throttle 90% N1
- 5 Closely monitor engine instruments (especially TGT) for any abnormalities.
- 6 **After** engine reaches 90% N1, reduce thrust to required setting.
- 7 Choose one:

◆ Vibration reduces to **below** 4.0 units:

Vibration was due to ice build-up on the spinner and/or blades. If possible, depart icing conditions. Should vibrations return, accomplish procedure as required.



◆ Vibration stays **above** 4.0 units:

If all other engine indications are normal, continue to operate engine. Should any abnormal indicators occur during the remainder of the flight (airframe vibration, high TGT, etc.), the flight crew should evaluate the condition and, if required, shut down the engine.



Severe Turbulence / Heavy Rain Ingestion

Condition: Aircraft is encountering severe turbulence and/or heavy rain.

Note: Turbulence penetration speed is 275 KIAS or .75 M, whichever range is lower.

Note: Below 10,000 feet, the greater of 250 KIAS or minimum maneuvering speed may be used.

- 1 IGNITION switch ON
- 2 Autothrottles OFF

Note: Use speedbrakes to slow airplane. Adjust throttles only if necessary to avoid excessive airspeed variations. Use smooth power changes and maintain thrust as high as practicable. Do not chase airspeed.

Note: If throttles are at idle when extreme precipitation is encountered, N2 should be monitored for spool-down below idle RPM. Delay throttle advance as long as possible and, when necessary, very slowly advance one throttle at a time while monitoring N2 for response. If no response is noted, return throttle to idle and wait for indications of spool-up to idle rpm.

▼ Continued on next page ▼

▼ Severe Turbulence/Heavy Rain Ingestion continued ▼

Warning! Do not attempt to overpower the autopilot with control forces. This can cause the autopilot to disengage with too much control input, which could result in over-control during recovery. Every attempt should be made not to over-control.

Warning! Longitudinal control forces at high altitude will be lighter than those which the pilot experiences at low altitude due to altitude effects.

Warning! When the autopilot is off, use minimum control inputs to fly attitude.

3 Autopilot Monitor

Note: Use autopilot in turbulence. Closely monitor autopilot operation and be prepared to disconnect autopilot only if airplane does not maintain an acceptable attitude. If autopilot disconnects, pilot should smoothly take control and stabilize pitch attitude. Fly attitude as the primary pitch reference. Sacrifice altitude to maintain attitude. Disregard flight director pitch bar. Do not trim manually. After recovery, autopilot should be reengaged if available.

▼ Continued on next page ▼

▼ Severe Turbulence/Heavy Rain Ingestion continued ▼

- 4 ENG and AIR FOIL
anti-ice switches As required

Note: Reduced engine bleeds will increase engine flameout margin during periods of heavy rain ingestion.

- 5 **When** conditions no longer exist:
ENG and AIR FOIL
anti-ice switches As required
Autothrottles ON
IGNITION switch AUTO



TAIL A-ICE DISAG

Messages: TAIL A-ICE DISAG

Condition: The tail anti-ice valve position disagrees with the commanded position.

Caution! Leading edge of horizontal stabilizer may be damaged if tail anti-ice is operated on the ground.

- 1 Choose one:
- ◆ On the **ground**:
 - ▶▶ **Go to step 2**
 - ◆ In **flight**:
 - ▶▶ **Go to step 6**
- 2 APU AIR switch. OFF
- 3 R BLEED switch OFF
- 4 ISOL switch CLSD
- 5 TAIL AIR FOIL anti-ice switch OFF
- ■ ■ ■

- 6 Choose one:
- ◆ TAIL AIR FOIL anti-ice switch **ON**:
 - ▶▶ **Go to step 7**
 - ◆ TAIL AIR FOIL anti-ice switch **OFF**:
 - ▶▶ **Go to step 11**

▼ Continued on next page ▼

▼TAIL A-ICE DISAG continued▼

- 7 Depart icing area.
- 8 TAIL AIR FOIL anti-ice switch OFF
- 9 Use 25/EXT flaps for landing.
- 10 Prior to final approach, add 5 knots to all V_{min} and V_{app} speeds, do not exceed $V_{ref} + 20$. Do not extend flaps beyond 25/EXT as a decrease in airplane controllability may result.



- 11 Assume tail anti-ice is on.

12 **After** landing:

R BLEED switch OFF

ISOL switch CLSD

Do not pressurize right pneumatic system.

Do not move APU AIR switch to ON.



TAIL A-ICE OFF

Messages: TAIL A-ICE OFF

Condition: The tail anti-ice system is shut down by PODS due to an overheat or a manifold failure.

- 1 Depart icing conditions.
- 2 **After** departing icing conditions:
TAIL AIR FOIL anti-ice switch OFF
- 3 Prior to final approach, add 5 knots to all V_{min} and V_{app} speeds, do not exceed $V_{ref} + 20$. Do not extend flaps beyond 25/EXT as a decrease in airplane controllability may result.



TAIL MANF FAIL

Messages: TAIL MANF FAIL

Condition: PODS has detected an overheat condition in the tail anti-ice manifold and has failed to close the ice-protection shutoff valve.

- 1 R BLEED switch OFF
- 2 ISOL switch CLSD
- 3 R PACK switch OFF
- 4 TAIL AIR FOIL anti-ice switch OFF
- 5 Depart icing conditions.
- 6 Prior to final approach, add 5 knots to all minimum maneuvering and approach speeds. Do not extend flaps beyond 25/EXT as a decrease in controllability may result.



TAIL TEMP HI

Messages: TAIL TEMP L HI TAIL TEMP R HI

Condition: PODS has detected an overheat condition or manifold failure in the tail compartment.

- 1 WING/TAIL anti-ice switches OFF
- 2 ISOL switch CLSD
- 3 BLEED switch (affected engine) OFF
- 4 PACK switch (affected engine) OFF
- 5 Depart icing conditions.
- 6 **If** unable to depart icing conditions or if tail icing is suspected, prior to final approach add 5 knots to all minimum maneuvering and approach speeds. Do not extend flaps beyond 25/EXT as a decrease in airplane controllability may result.
- 7 **After** 2 minutes:

Choose one:

◆ TAIL TEMP HI alert is **not** displayed:



◆ TAIL TEMP HI alert **displayed**:

▶▶ **Go to step 8**

- 8 BLEED switches (both) OFF

Note: Cabin will depressurize.

- 9 PACK switches (both) OFF

- 10 Plan to land at the nearest suitable airport.



Windshield Cracked or Arcing

Condition: Windshield is cracked or arcing.

- 1 WINDSHIELD ANTI-ICE
and ANTI-FOG switches. OFF
- 2 Choose one:
 - ◆ Inner glass pane **cracked**:
 - ▶▶ **Go to step 3**
 - ◆ Inner glass pane is **not** cracked:
 - ▶▶ **Go to step 6**
- 3 Locate and pull affected WINDOW ANTI-FOG CB
(lower EPC).
 - CAPT, F/O & CENTER CB: X-26
 - Clearview (& eyebrow) CB: Z-26
- 4 WINDSHIELD ANTI-ICE
and ANTI-FOG switches. As required
- 5 **Below** 10,000 feet, do not exceed 235 KIAS.
 - ■ ■ ■
- 6 Locate and pull affected WINDSHIELD ANTI-ICE CB
(lower EPC).
 - Left anti-ice CB: X-24
 - Center anti-ice CB: X-25
 - Right anti-ice CB: Z-24

▼ Continued on next page ▼

▼Windshield Cracked or Arcing continued▼

- 7 WINDSHIELD ANTI-ICE
and ANTI-FOG switches. As required
- 8 **Below** 10,000 feet, do not exceed 315 KIAS.


WING A-ICE DISAG

Messages: WING A-ICE DISAG

Condition: The wing anti-ice valve position disagrees with the commanded position.

Caution! Slats may be damaged if wing anti-ice is operated on the ground.

1 Choose one:

◆ On the **ground**:

▶▶ **Go to step 2**

◆ In **flight**:

▶▶ **Go to step 5**

2 L BLEED switch OFF

3 ISOL switch. CLSD

4 WING AIR FOIL anti-ice switch. OFF



5 Choose one:

◆ Wing air foil anti-ice switch **ON**:

▶▶ **Go to step 6**

◆ Wing air foil anti-ice switch **OFF**:

▶▶ **Go to step 8**

6 Depart icing area.

▼ Continued on next page ▼

▼ WING A-ICE DISAG continued ▼

7 WING AIR FOIL anti-ice switch OFF
■ ■ ■ ■

8 **After** landing:
L BLEED switch OFF
ISOL switch. CLSD
Assume wing anti-ice is on.
Do not pressurize left pneumatic system.
■ ■ ■ ■

WING A-ICE OFF

Messages: WING A-ICE OFF
Condition: The wing anti-ice system is shut down by PODS due to an overheat or a manifold failure.

1 WING AIR FOIL anti-ice switch OFF
2 Avoid icing conditions.
■ ■ ■ ■

WING MANF FAIL

Messages: WING MANF FAIL

Condition: PODS has detected an overheat condition in the wing anti-ice manifold and has failed to close the ice-protection shutoff valve.

- 1 L BLEED switch OFF
- 2 ISOL switch CLSD
- 3 L PACK switch OFF
- 4 WING AIR FOIL anti-ice switch OFF
- 5 Avoid icing conditions.



WSHLD HEAT FAIL

Messages: WSHLD HEAT FAIL

Condition: The windshield heater has overtemped.

1 Choose one:

◆ Windshield is **cracked** or **arcing**:

▶▶ **Go to the Windshield Cracked or Arcing checklist on page 3.13**



◆ Windshield is **not** cracked or arcing:

Continue flight with WINDSHIELD ANTI-ICE switch in the ON position.

Contact maintenance prior to turning WINDSHIELD ANTI-ICE switch OFF. (In order for maintenance to determine the correct windshield, a test must be completed prior to turning off the system.)



A/P Not Available	4.1

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A/P Not Available

Condition: All autopilots are disengaged.

- 1 Fly the aircraft manually or re-engage an autopilot.

Note: Flight may not be permitted in RVSM airspace. Contact ATC. Refer to the Airway Manual, Airspace & Enroute Navigation, Navigation, RVSM System Requirements.



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Cabin Interphone Communications on Emergency Power

Condition: ATTND CALL is inoperative.

- 1 CAB interphone switch ON
- 2 ATTND CALL switch light PUSH
- 3 Choose one:

◆ Cabin interphone communication **established**:



◆ Cabin interphone communication is **not**
established:

PA Initiate PA announcement
to flight attendant in cabin

Cabin interphone
communication Establish



**Cabin Interphone System
Inoperative**

Condition: The cabin interphone system is inoperative.

- 1 Ensure all cabin handsets are properly stowed.
Improperly stowed handsets may be the cause of the malfunction.
- 2 **If** interphone still inoperative:
 - Flight attendants Notify
 - Contact flight leader and establish plan for communications under normal conditions.
 - Avoid use of PA for direct messages to flight attendants except in an emergency.
 - Brief the flight attendants on the following alternate emergency procedures.

▼ Continued on next page ▼

▼ Cabin Interphone System Inoperative continued ▼

Cabin Interphone System Inoperative			
Source of Abnormal		Pilot Action	Briefing Items
Flight Deck	Cabin		
Smoke/Fire		Use PA.	Use the following procedure if an evacuation is required: Pilots will use the PA to contact the flight attendants. Subsequent communication will be face-to-face, time permitting.
Emergency Landing			
Ditching			
Evacuation or Rejected Takeoff			
	Smoke/Fire	Monitor PA.	Flight attendant will use the emergency signal to notify pilots to monitor the PA.
	Hijacking		Flight attendant will use the emergency signal to notify pilots to monitor the PA.
	Passenger Problem (Medical/ Disturbance)		Flight attendant will use the emergency signal to notify pilots to monitor the PA. If not possible, flight attendant will come to the flight deck door and use the briefed entry method.



PA System Inoperative

Condition: The Public Address (PA) system is inoperative.

1 Flight attendants Notify

Contact flight leader and establish plan for communications under normal conditions, including:

Use of standard flight deck/cabin call signals.

Advising flight leader to review location and operation of portable megaphones with flight attendants.

Use of evacuation signal.

Advise flight leader 20 minutes and 5 minutes before landing.

Note: With the PA inoperative, the F/As must individually (few seats at a time) brief passengers before takeoff and landing. Coordinate as required to provide sufficient time to meet these requirements.

Brief the flight attendants on the following alternate emergency procedures.

▼ Continued on next page ▼

▼ PA System Inoperative continued ▼

Public Address System Inoperative			
Source of Abnormal		Pilot Action	Briefing Items
Flight Deck	Cabin		
Smoke/Fire		Use cabin interphone.	No changes to current procedures. Pilots and flight attendants will use the cabin interphone for communication. Any public announcements will be made by the flight attendants using megaphones.
Emergency Landing		Use emergency signal followed by cabin interphone or face-to-face.	Pilots will use the emergency signal to alert the flight attendants to an emergency situation. Subsequent communication will then be via the interphone or face-to-face, time permitting. The interphone will be used to command an evacuation. Any public announcements will be made by the flight attendants using megaphones.
Ditching			
Evacuation or Rejected Takeoff			
	Smoke/Fire	Use cabin interphone.	No changes to current procedures. Pilots and flight attendants will use the cabin interphone for communication. Any public announcements will be made by the flight attendants using megaphones.
	Hijacking		
	Passenger Problem (Medical/ Disturbance)		



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**Complete Loss of AC Power
or
GEN ALL OFF**

Messages: GEN ALL OFF

Condition: Left, Right, and APU generators are off due to faults.

1 EMER PWR selector ON

2 CAB interphone volume switch ON

Note: Use PA to contact flight attendants.

3 GEN switches (all) RESET/ON

4 Choose one:

◆ Generator bus(es) **restored:**

EMER PWR selector OFF, then ARM



◆ Generator bus(es) **are not** restored:

►► **Go to step 5**

5 CABIN PRESS SYSTEM switch MANUAL

Note: Use emergency power as required. Battery power cannot be relied upon for more than 60 minutes.

Note: Cabin pressure must be manually controlled to maintain desired cabin altitude.

▼ **Continued on next page** ▼

▼ Complete Loss of AC Power or GEN ALL OFF continued ▼

**All Generators Unpowered
Inoperative Items**

Call chime
Stall warning system
Slat and gear position indications
Stabilizer trim and position indications
Automatic cockpit /cabin temperature control
Flight director /autopilot / autothrottle
Ground proximity warning system
Speed brakes and ground spoilers
Thrust reversers
Cabin pressurization control Manual available.
On the ground, engine idle speed will be in flight idle

6 Plan to land at the nearest suitable airport.

▼ Continued on next page ▼

▼ Complete Loss of AC Power or GEN ALL OFF continued ▼

7 **Prior to landing:**

Choose one:

◆ In trim with landing flaps set:

Continue approach and land with selected flaps.



◆ Not in trim with landing flaps set:

►► **Go to step 8**

Warning! Landing distance will be significantly greater than normal.

- 8 Refer to the ODM, Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, GEN ALL OFF OR TOTAL LOSS OF AC POWER, table.
- 9 Use FLAPS 40 for landing, and the GEN ALL OFF OR TOTAL LOSS OF AC POWER Vref speed from the ODM.
- 10 Do not reduce thrust until landing flare has been initiated and sink rate has been reduced.
- 11 Make positive main gear touchdown to minimize float and take positive action to lower nose to runway.

Note: Antiskid is operational, fly the nose to touchdown, and apply brakes to full pedal deflection.



BUS DC XFER OFF

Messages: BUS DC XFER OFF

Condition: DC transfer bus has failed.

1 Choose one:

- ◆ Display unit 2 and/or standby instrument
operating:

Note: When Display Unit 2 and/or the standby instrument is operating, the DC transfer bus is powered.

Note: The DC transfer bus sensing circuit has failed.



- ◆ Display unit 2 and/or standby instrument is **not** operating:

▶▶ **Go to step 2**

2 Plan to land at the nearest suitable airport.

Caution! Do not attempt to reset the DC TRANSFER BUS FEED circuit breakers if either or both are tripped (opened).

Caution! Engine and APU fire/overheat detection and fire extinguishing systems are inoperative.

Caution! Cargo smoke detection and fire extinguishing systems are inoperative.

▼ Continued on next page ▼

▼ BUS DC XFER OFF continued ▼

**DC Transfer Bus Unpowered
Inoperative Items**

Left thrust reverser

U/L will be displayed on the EAD.

Both engine fuel switches

FLOW switch

Air conditioning packs default to high output.

**APU, L GEN, and R GEN lights on ELECTRICAL
Power Control Panel inoperative**

BAT SWITCH OFF level 1 alert will be displayed.

EMER PWR selector ON position

External power AVAIL light/indication

**Captain's MASTER WARNING and MASTER
CAUTION lights on glareshield**

APU

Emergency lights switch DISARM position

Emergency lights cannot be disarmed.

▼ Continued on next page ▼

▼ BUS DC XFER OFF continued ▼

- 3 Parking brake may be used, but will not hold the airplane after hydraulic systems are shut down. Confirm with ground personnel that airplane has been properly chocked before shutting down engines and hydraulic pumps.

Note: Obtain external power at the gate/parking area if available. External power AVAIL and EXT lights on overhead panel are inoperative. EXT indication on the ELEC synoptic is functional. If external power is not available, leave one engine running until all passengers and cabin crew have exited the airplane. Emergency lighting will be activated when the DC emergency bus becomes unpowered.

- 4 **When** ready to shut down engines,
Respective engine fire handle. PULL

Engine shutdown may take 1 to 2 minutes after fire handles are pulled. Fuel switches will not command engine fuel shutoff valves to OFF position.



BUS AC EMER OFF

Messages: BUS AC EMER OFF

Condition: AC emergency bus is off.

1 EMER PWR selector. OFF

Note: Continued flight with the EMER PWR ON level 1 alert displayed and EMER PWR ON light illuminated will result in depletion of the battery.

Note: Automatic activation of emergency power has been disabled.

Note: BUS AC EMER OFF level 2 alert and EMER PWR SW OFF level 1 alert will be displayed for the remainder of the flight.

2 Choose one:

◆ MCDU 1 and/or VOR 1 **operating**:

Note: When MCDU 1 and/or VOR 1 are operating, the AC emergency bus is powered.

Note: The AC emergency bus sensing circuit has failed.



◆ MCDU 1 and/or VOR 1 are **not** operating:

►► **Go to step 3**

▼ Continued on next page ▼

▼ BUS AC EMER OFF continued ▼

3 Plan to land at the nearest suitable airport.

Caution! Do not attempt to reset EMER AC BUS FEED circuit breaker if it is tripped (opened).

Note: MCDU 1 is inoperative when the AC emergency bus is unpowered.

Note: ILS 1 is inoperative. A red “X” may be observed on the captain’s PFD localizer and glide slope scales. If the ND/APPR mode has been selected, the CDI will be removed from the display.

Note: GPS 1 is inoperative and GPS 1 FAIL level 1 alert will be displayed on the status page.

4 Captain’s SISP APPR switch CAPT ON 2

Note: Selecting CAPT ON 2 with the captain’s SISP APPR switch will display ILS 2 in amber at the right of the localizer scale and below the glide slope scale on the captain’s PFD.

Note: VOR 1 and Marker Beacon 1 are inoperative. An amber “X” may be observed on the lower left of the ND/MAP and the VOR 1 bearing indicator will be removed from display if it was selected by the crew. If the ND/VOR has been selected, the CDI will be removed from the display and VOR 1 FAIL will be displayed in amber in the center of the display.

▼ Continued on next page ▼

▼BUS AC EMER OFF continued▼

5 Captain's SISP VOR switch. CAPT ON 2

Note: Selecting CAPT ON 2 with the captain's SISP VOR switch will display VOR 2 in amber at the lower left of the ND/VOR when it has been selected.

AC Emergency Bus Unpowered Inoperative Items

Manual temperature control - flight deck and cabin

Standby compass lighting

MCDU 1

ILS 1

GPS 1

VOR 1

Marker beacon receiver 1



BUS AC GS OFF

Messages: BUS AC GS OFF

Condition: The AC ground service bus is unpowered.

- 1 Choose one:
 - ◆ EMER PWR ON level 1 alert is displayed:
 - ▶▶ **Go to step 2**
 - ◆ EMER PWR ON level 1 alert is **not** displayed:
 - ▶▶ **Go to step 4**
- 2 Plan to land at the nearest suitable airport.
- 3 EMER PWR selector ON

Note: The AC ground service bus is unpowered.

▼ Continued on next page ▼

▼ BUS AC GS OFF continued ▼

Note: Emergency lights will be illuminated. Rotating the EMER PWR selector to ON is necessary to restore power to the emergency lighting system ARM & FLIGHT CHARGE circuit which will extinguish the emergency lights, preserving the system for use in the event it is needed for an after landing emergency.

Note: Emergency AC bus is being powered by the ship's battery and inverter. The emergency power system is designed to provide power for approximately one hour. This is the last remaining source of power for the emergency AC bus.

Note: Battery Charger is not powered. The BATT CHARGER FAIL Level 1 alert is inhibited when the BUS AC GS OFF Level 1 alert is displayed.

Note: Cabin standby lights will be illuminated and cannot be extinguished.

▼ Continued on next page ▼

▼BUS AC GS OFF continued▼

Inoperative Items

- Right main fuel tank aft boost pump
Expect the TNK R AFT PMP LO Level 1 alert to be displayed.
- Floor and circuit breaker panel lights
- Forward aisle, aft aisle, entry galley area, and attendant lights
- Ground flood lights
- Wingtip position and strobe lights



- 4 EMER LT switch OFF
- 5 Contact the forward flight attendant and advise that person to verify the EMERGENCY LIGHT guarded switch is in the OFF position.

Note: The ground service bus sensing circuit has failed. All systems except the emergency lighting should operate normally.

Note: Selecting the emergency lights off is necessary to avoid depletion of the emergency light battery packs.

Note: EMER LTS DISARM Level 0 alert will be displayed until the EMER LT switch is returned to the ARM position prior to landing.

▼ Continued on next page ▼

▼BUS AC GS OFF continued▼

Note: When the emergency lights have been selected off, the ground charging circuit will allow the emergency lighting batteries to be slowly charged while the DC transfer bus remains powered.

Note: Cabin standby lights will be illuminated and cannot be extinguished.

- 6 Just prior to final landing configuration
(approximately 3 minutes from touchdown):

EMER PWR selector ON

Note: EMER PWR selector must be in the ON position to enable arming of the emergency lights.

- 7 EMER LT switch ARM

- 8 **After** parking when all passengers and cabin crew have exited the airplane:

EMER LT switch OFF

- 9 EMER PWR selector OFF

Note: EMER PWR selector should be selected to the OFF position after the EMER LT switch is selected to OFF to avoid depletion of the aircraft battery.



BUS DC EMER OFF

Messages: BUS DC EMER OFF

Condition: DC emergency bus is off.

1 EMER PWR selector OFF

Note: Continued flight with the EMER PWR ON level 1 alert displayed/EMER PWR ON light illuminated would result in depletion of the battery.

Note: Automatic activation of emergency power has been disabled.

Note: BUS DC EMER OFF level 2 alert and EMER PWR SW OFF level 1 alert will be displayed for the remainder of the flight.

2 Choose one:

◆ Display units 1 and/or 3 **operating**:

Note: When display units 1 and/or 3 are operating, the DC emergency bus is powered.

Note: The DC emergency bus sensing circuit has failed.



◆ Display units 1 and/or 3 **not** operating:

►► **Go to step 3**

▼ Continued on next page ▼

▼ BUS DC EMER OFF continued ▼

3 EMER LT switch. OFF

Note: Selecting the EMER LT switch to the OFF position is necessary to extinguish the emergency lights and avoid depletion of the emergency light battery packs.

Note: When the emergency lights have been selected off, the ground charging circuit will allow the emergency lighting battery packs to be slowly charged when the DC transfer bus is powered.

4 Plan to land at the nearest suitable airport.

Caution! Do not attempt to reset EMER DC BUS FEED circuit breaker if it is tripped (opened).

Caution! Captain's pitot heat is inoperative. Use first officer's airspeed as erroneous airspeed indications may occur on the captain's PFD. IAS comparator message will be displayed on the PFDs if the computed difference between ADIRU 1 and ADIRU 2 airspeed exceeds a predetermined tolerance. Erroneous airspeed indications may cause abnormal autopilot / autothrottle operation. MISC flashing reminder message will be displayed on the EAD. PITOT CAPT FAIL level 1 alert will be displayed on the MISC S/D page.

▼ Continued on next page ▼

▼ BUS DC EMER OFF continued ▼

- 5 **If** use of autopilot is desired and available, use AP 2 due to captain's pitot not being heated.

Note: Display units 1 and 3 are inoperative.

Note: Standby lighting is inoperative.

Note: The EMER LT switch on the overhead panel is no longer capable of illuminating the emergency lights. When emergency lighting is required, the EMERGENCY LIGHT switch at the forward flight attendant's station must be used.

Note: If the captain considers it operationally desirable, the forward flight attendant may be briefed to select the EMERGENCY LIGHT switch to ARM, and then ON at the captain's direction. The batteries are designed to provide power to the emergency lighting system for approximately 10 minutes when they are fully charged. Expect the emergency lights to fail after approximately 10 minutes.

Note: The right thrust reverser is inoperative. Right U/L will be displayed on the EAD.

▼ Continued on next page ▼

▼ BUS DC EMER OFF continued ▼

6 When required:

EMERGENCY LIGHT switch
(forward flight attendant's station) . . . ARM/ON

Move the EMERGENCY LIGHT switch to ARM and then release to ON, observing the switch moves back to the ON position and the emergency lights are illuminated.

**DC Emergency Bus Unpowered
Inoperative Items**

Maintenance interphone

Left and right pack auto shutdown relays and normal control solenoids

Captain's Audio Control Panel

Public address system

Emergency power ON light

Cabin standby lighting

Captain's pitot heat

CABIN PRESS control panel

Right engine FADEC back-up power supply

Right engine thrust reverser

VHF COMM 1

Pneumatic ISOL valve switch OPEN position is inoperative.

The switch AUTO and OFF positions will remain functional.



GEN APU OFF

Messages: GEN APU OFF
Condition: APU generator is off due to a fault.

- 1 APU generator switch RESET/ON
- 2 Choose one:
 - ◆ GEN APU OFF alert **does not** remain displayed:
■ ■ ■ ■
 - ◆ GEN APU OFF alert **remains** displayed:
▶▶ **Go to step 3**
- 3 APU generator switch OFF
- 4 APU MASTER switch OFF
■ ■ ■ ■

GEN L OFF

Messages: GEN L OFF

Condition: Left generator is off due to a fault.

Note: If on the ground after one reset attempt, alert remains displayed, place affected generator switch to off and contact maintenance.

1 L GEN switch RESET/ON

2 Choose one:

◆ GEN L OFF alert **does not** remain displayed:



◆ GEN L OFF alert **remains** displayed:

L GEN switch OFF

►► **Go to step 3**

▼ Continued on next page ▼

▼ GEN L OFF continued ▼

3 Choose one:

- ◆ ELEC synoptic **displays** left AC and left DC bus symbols green:
 ▶▶ **Go to step 4**
- ◆ ELEC synoptic **displays** left AC bus symbol amber, and left DC bus symbol green:
 ▶▶ **Go to step 5**
- ◆ ELEC synoptic **displays** both left AC bus symbol amber, and left DC bus symbol amber:
 ▶▶ **Go to step 7**

4 APU (if available) START

Note: If APU generator is available, continue flight with engine driven generator inoperative.

Note: If APU generator is not available, plan to land at the nearest suitable airport.



5 Plan to land at the nearest suitable airport.

Caution! False stall warnings (stick shaker, klaxon, STALL voice) may occur when GEN L OFF alert is displayed and left AC and DC buses are not powered. If warnings occur, check airplane flight condition to determine if indications are valid.

▼ Continued on next page ▼

▼ GEN L OFF continued ▼

- 6 **If FUEL QTY SYS FAIL** alert is displayed, pushing QTY A/B switch may restore fuel quantity indications and extinguish alert.

Inoperative Items

Primary stabilizer trim

FLAP DISAG alert may be displayed.

RUDDER LIM FAULT alert may be displayed.

When DU 6 is powered and fuel pumps are selected on and not operating, a generator bus fault condition may exist.

Automatic cockpit temperature control

Hydraulic auxiliary pump and left hydraulic quantity

HYD AUX PUMP FAIL alert will be displayed if AUX pump switch is in ON.

Left and center windshield anti-ice and left / center / right anti-fog

Left wing landing light and left nose gear taxi light

Multiple Level 2 and Level 1 alerts will be displayed when left AC bus is unpowered



▼ Continued on next page ▼

▼ GEN L OFF continued ▼

7 EMER PWR selector ON

Caution! Battery power cannot be relied upon for more than 60 minutes. Do not start APU. Battery is not being charged.

Note: Use PA to contact flight attendants.

8 CAB interphone volume switch ON

9 Plan to land at the nearest suitable airport.

Caution! False stall warnings (stick shaker, klaxon, STALL voice) may occur when GEN L OFF alert is displayed and left AC and DC buses are not powered. If warnings occur, check airplane flight condition to determine if indications are valid.

▼ Continued on next page ▼

▼ GEN L OFF continued ▼

- 10 **If FUEL QTY SYS FAIL** alert is displayed, pushing QTY A/B switch may restore fuel quantity indications and extinguish alert.

Inoperative Items

Primary stabilizer trim

FLAP DISAG alert may be displayed.

RUDDER LIM FAULT alert may be displayed.

Vmin (amber foot) indicators may be unreliable.

Autopilot 1

Inboard spoilers

Automatic cockpit temperature control

Hydraulic auxiliary pump and left hydraulic quantity

HYD AUX PUMP FAIL alert will be displayed if AUX pump switch is in ON.

Left and center windshield anti-ice and left / center / right anti-fog

Left wing landing and nose gear taxi lights

GEAR DOOR OPEN alert

Multiple Level 2 and Level 1 alerts will be displayed

Synoptic displays will be incomplete

Call chime

▼ Continued on next page ▼

▼ GEN L OFF continued▼

11 **When** ready to land:

Refer to the ODM, Approach/Landing section,
LANDING REFERENCE SPEEDS, VREF table.

12 Gear handle DOWN

Gear lights will not be illuminated.

13 **After** 30 seconds:

Emergency gear
extension lever Pull full up/latched
Raise cover, forcibly pull emergency gear
extension lever to full up.
Position and check holding latch is engaged.

14 Verify gear indications on CONFIG page.

Aircraft may have to slow to VREF to allow nose
gear to lock down.

▼ Continued on next page ▼

▼ GEN L OFF continued ▼

15 Before landing and time permitting, the emergency gear extension lever may be stowed to retract and latch the main gear doors. Gear indications on CONFIG page will not be available after lever is stowed.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

16 Choose one:

◆ Emergency landing gear extension lever is **stowed**:



◆ Emergency landing gear extension lever is **not** stowed:

►► **Go to step 17**

▼ Continued on next page ▼

▼ GEN L OFF continued ▼

17 Stop on the runway.

Gear doors will contact runway at low speeds.
Nosewheel steering to left will be restricted.

18 **Prior** to taxiing or towing:

Have ground crew install landing gear pins prior to taxi or tow.

Caution! Do not stow the emergency landing gear extension lever until the malfunction has been corrected or until the main landing gear bypass lever has been activated.

19 Emergency gear extension lever. Stow

After contacting ground crew, coordinate lever stowing to allow gear doors to be latched in the UP position.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

20 Have ground crew close and latch main gear doors manually.



GEN R OFF

Messages: GEN R OFF

Condition: Right generator is off due to a fault.

Note: If on the ground after one reset attempt, alert remains displayed, place affected generator switch to off and contact maintenance.

1 R GEN switch RESET/ON

2 Choose one:

◆ GEN R OFF alert **does not** remain displayed:



◆ GEN R OFF alert **remains** displayed:

R GEN switch OFF

►► **Go to step 3**

▼ Continued on next page ▼

▼ GEN R OFF continued ▼

- 3 Choose one:
- ◆ ELEC synoptic **displays** right AC and right DC bus symbols green:
▶▶ **Go to step 4**
 - ◆ ELEC synoptic **displays** right AC bus symbol amber, and right DC bus symbol green:
▶▶ **Go to step 5**
 - ◆ ELEC synoptic **displays** both right AC bus symbol amber, and right DC bus symbol amber:
▶▶ **Go to step 7**

4 APU (if available) START

Note: If APU generator is available, continue flight with engine driven generator inoperative.

Note: If APU generator is not available, plan to land at the nearest suitable airport.



▼ Continued on next page ▼

▼ GEN R OFF continued ▼

- 5 Plan to land at the nearest suitable airport.

Caution! False stall warnings (stick shaker, klaxon, STALL voice) may occur when GEN R OFF alert is displayed and right AC bus is not powered. If warnings occur, check airplane flight condition to determine if indications are valid.

- 6 **If** FUEL QTY SYS FAIL alert is displayed, pushing QTY A/B switch may restore fuel quantity indications and extinguish alert.

▼ Continued on next page ▼

▼ GEN R OFF continued ▼

Inoperative Items**Autopilot stabilizer trim****Alternate trim switch****FLAP DISAG alert may be displayed.****RUDDER LIM FAULT alert may be displayed.****IRS 2 ON BATT Level 2 alert may be displayed (fully charged ADIRU battery life is approximately 30 minutes).****When fuel pumps are selected on and are not operating, a generator bus fault condition may exist.****Right hydraulic quantity indication****Automatic cabin temperature control****Right windshield anti-ice****Right wing landing and right nose gear taxi lights****Multiple Level 2 and Level 1 alerts will be displayed when right ac bus is unpowered**

▼ Continued on next page ▼

▼ GEN R OFF continued ▼

7 Plan to land at the nearest suitable airport.

Caution! False stall warnings (stick shaker, klaxon, STALL voice) may occur when GEN R OFF alert is displayed and right AC and DC buses are not powered. If warnings occur, check airplane flight condition to determine if indications are valid.

- 8 **If** FUEL QTY SYS FAIL alert is displayed, pushing QTY A/B switch may restore fuel quantity indications and extinguish alert.
- 9 **When** ready to land.....Refer to the ODM, Approach/Landing section, LANDING REFERENCE SPEEDS, VREF table.

▼ Continued on next page ▼

▼ GEN R OFF continued ▼

Inoperative Items**Autopilot stabilizer trim****Alternate trim switches****Autopilot 2****FLAP DISAG alert may be displayed.****RUDDER LIM FAULT alert may be displayed.****Aileron and rudder trim****IRS 2 ON BATT Level 1 alert may be displayed (fully charged ADIRU battery life is approximately 30 minutes).****Right hydraulic quantity indication****Hydraulic transfer pump remains in last commanded condition (on or off). HYD TRANS DISAG Level 1 alert may be displayed.****VMIN (amber foot) may be unreliable.****Outboard spoilers.****When fuel pumps are selected on, and are not operating, a PCDU fault condition may exist.****Automatic cabin temperature control****Right windshield anti-ice****Right wing landing and right nose gear taxi lights****Multiple Level 2 and Level 1 alerts will be displayed****Synoptic displays will be incomplete****Call chime**

Non-Normal Checklists

Chapter NNC

Engines, APU

Section 7

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Aborted Start

Messages: ENG L START ABORT ENG R START ABORT

Condition: An abnormal condition is detected in the respective engine and autostart sequence is aborted or an abnormal condition exists which requires the start to be manually aborted.

- 1 FUEL switch OFF
- 2 IGNITION switch AUTO
- - - - -

Caution! If start was aborted for an TGT exceeding max limit, contact Maintenance prior to attempting another start.

3 Choose one:

◆ Start switch is still engaged:

Engine rotation Continue

Continue rotation 30 seconds to clear fuel.

ENG START switch OFF

▶▶ **Go to step 5**

◆ Start switch not engaged

▶▶ **Go to step 4**

▼ Continued on next page ▼

▼ Aborted Start continued ▼

4 Motor engine to clear fuel.

With N2 less than 40%:

ENG START Switch PULL

After 30 seconds:

ENG START Switch OFF

5 **If** no limitations were exceeded, another start may be attempted.

Note: For subsequent start attempt, motor engine for 30 seconds before moving FUEL switch to ON.

6 For an abort due to no ignition with the ignition switch in AUTO, accomplish a manual start. See Volume 1, SP.7, Manual Engine Start Procedure.



ENG COMP STALL or Engine Compressor Stall / Surge

Messages: ENG L COMP STALL ENG R COMP STALL

Condition: Engine compressor stall.

Caution! Avoid operating engines in a persistent surge or compressor stall condition. Surges or compressor stalls may not always be audible. Surges or compressor stalls are evidenced by engine thrust loss and rapidly rising or abnormally high TGT. Multiple surges or continuous compressor stall may cause compressor damage and possible engine failure.

Note: For any loss of thrust during takeoff, the Takeoff Profile - Engine Failure should be flown until reaching a safe altitude, or until obstacle clearance is assured.

- 1 Autothrottle OFF
- 2 Throttle (affected engine(s)) Retard

Note: Retard throttle(s) on affected engine(s) (minimum for safe flight) until engine stabilizes or throttle reaches idle, whichever occurs first.

- 3 Affected ENG anti-ice switch ON

▼ Continued on next page ▼

**▼ ENG COMP STALL or
Engine Compressor Stall/Surge continued ▼**

4 WING or TAIL anti-ice switch ON

Note: Select WING anti-ice ON for ENG L COMP STALL. Select TAIL anti-ice ON for ENG R COMP STALL.

5 FLOW switch HIGH

6 Choose one:

◆ TGT, N1, N2 indications are **normal**:

▶▶ **Go to step 7**

◆ TGT, N1, N2 indications are **not** normal:

▶▶ **Go to step 13**

7 Operate engine(s) at level(s) at which stalls/surges do not recur.

8 Affected ENG anti-ice switch As required

9 FLOW switch As required

10 WING or TAIL anti-ice switch As required

11 Closely monitor engine parameters for remainder of flight.

12 Do not use autoland.

▶▶ Go to the One Engine Inoperative / Reduced Thrust Landing checklist on page 7.22



▼ Continued on next page ▼

▼ ENG COMP STALL or
Engine Compressor Stall/Surge continued ▼

13 FUEL switch
(affected engine) . . . Confirm OFF, then ON

If both engines are affected, toggle switches
one at a time.

14 Choose one:

◆ TGT, N1, N2 indications return to **normal**:

▶▶ **Go to step 15**

◆ TGT, N1, N2 indications do **not** return to normal:

▶▶ **Go to step 20**

15 Operate engine(s) at level(s) at which stalls/surges
do not recur.

16 Affected ENG anti-ice switch As required

17 FLOW switch As required

18 WING or TAIL anti-ice switch As required

19 Closely monitor engine parameters for remainder
of flight.

▶▶ **Go to the One Engine Inoperative/Reduced
Thrust Landing checklist on page 7.22**



20 FUEL switch
(affected engine) . . . Confirm OFF

▼ Continued on next page ▼

**▼ ENG COMP STALL or
Engine Compressor Stall/Surge continued ▼**

Note: Normally an engine should not be restarted if it was shut down due to compressor stall/surge. However, at the captain’s discretion, a restart may be attempted if the engine is critical for sustaining safe flight. In this case, engine operation should be carefully monitored after restart and for the remainder of the flight, to ensure that a compressor stall/surge has not resulted in engine damage.

- 21 Affected ENG anti-ice switch OFF
- 22 FLOW switch As required
- 23 WING or TAIL anti-ice switch As required

►► Go to the Engine Failure or Shutdown checklist on page 7.7



Engine Failure or Shutdown or ENG RPM LO

Messages: ENG L RPM LO ENG R RPM LO

Condition: N2 speed has dropped below idle
(less than 55%).

Condition: Engine speed is below idle.

Objective: To attempt engine restart if needed, or
configure for single engine operation.

Note: Indications of severe damage may include airplane vibration and, on the affected side, erratic or no indications in engine displays, rapid loss of hydraulic pressure, and sudden loss of generator power. If severe damage is suspected, refer to the **Engine Severe Damage or Separation** checklist on page 8.2

- 1 Autothrottles Off
- 2 Throttle
(affected engine) . . . Confirm Idle
- 3 FUEL switch
(affected engine) . . . Confirm OFF

▼ Continued on next page ▼

▼ Engine Failure or Shutdown or ENG RPM LO continued ▼

4 Choose one:

◆ If restart **desired**:

▶▶ **Go to the In Flight Start checklist
on page 7.19**



◆ If restart **not** desired:

▶▶ **Go to step 5**

- 5 Throttles Align
- 6 Autothrottles On, if desired
- 7 CONFIRM ENGINE OUT prompt. Select
- 8 APU START
- 9 Plan to land at the nearest suitable airport.

▶▶ **Go to the One Engine
Inoperative/Reduced Thrust Landing
checklist on page 7.22**

Note: If in icing conditions, refer to Anti-Ice
Operation with Single Pneumatic Source
checklist on page 3.1



Two Engine Flameout

Condition: Engine speed for both engines is below idle.

- 1 IGNITION switch ON
- 2 START PUMP switch ON

Windmill start envelope is V_{mo} to 250 KIAS. A minimum N₂ of 8% is required for air start. Higher airspeeds increase N₂ rpm and improve air start capability.

- 3 Throttles IDLE
- 4 FUEL switches OFF, then ON
- 5 Choose one:

◆ One or both engines **start**:

▶▶ **Go to step 6**

◆ **Neither** engine starts:

Continue start attempts.

Note: A minimum N₂ of 8% is required for air start. Higher airspeeds increase N₂ rpm and improve air start capability.

▶▶ **Go to the Crash Landing checklist on page 0.1 if repeated start attempts are unsuccessful.**



▼ Continued on next page ▼

▼ Two Engine Flameout continued ▼

6 GEN switch(es). RESET/ON

Move GEN switch(es) for engine(s) that restarts to RESET momentarily, then to ON.

7 Choose one:

◆ **Both** generators remain **off**:

▶▶ **Go to the Complete Loss of AC
Power checklist on page 6.1**



◆ **One** generator remains **off**:

▶▶ **Go to step 8**

◆ **Both** generators are **operative**:

▶▶ **Go to step 10**

8 GEN switch (inoperative generator) OFF

9 APU (if available) START

Note: When operating on EMER PWR, each APU start attempt will reduce remaining battery energy by approximately 3 percent.

Note: Normal deterioration and wear of the APU may adversely affect APU starting capability at the FL370 maximum start altitude. If time and conditions permit, crews should consider descending below FL330.

▼ Continued on next page ▼

▼ Two Engine Flameout continued ▼

- 10 FUEL boost pump switches (all) Verify ON
11 START PUMP switch OFF
12 FUEL X-FEED lever As required
13 EMER PWR selector. OFF, then ARM



APU EGT HI

Messages: APU EGT HI

Condition: APU EGT exceeds 100%.

1 Choose one:

◆ APU **desired** for flight:

Continue APU operation. Monitor RPM and EGT.

Note: APU will automatically shut down 10 minutes after landing.



◆ APU **not** desired for flight:

►► **Go to step 2**

2 APU MASTER switch OFF



APU FAULT

Messages: APU FAULT

Condition: APU detects a fault which results in auto shutdown on the ground, but prevents shutdown in flight.

1 Choose one:

◆ APU **desired** for flight:

Continue APU operation. Monitor RPM and EGT.

Note: APU will automatically shut down 10 minutes after landing.



◆ APU **not** desired for flight:

►► **Go to step 2**

2 APU MASTER switch OFF



ENG BRG OVHT

Messages: ENG L BRG OVHT ENG R BRG OVHT

Condition: Overheat detected in the aft bearing compartment.

- 1 Autothrottles OFF
- 2 Throttle (affected engine). . .Confirm Idle
- 3 **When** engine at idle:

Choose one:

◆ ENG BRG OVHT alert **remains** displayed:

FUEL switch
(affected engine). .Confirm. .OFF

►► **Go to the Engine Failure or
Shutdown checklist on page
7.7**



◆ ENG BRG OVHT alert is **not** displayed:

Continue operation at idle power
setting.

►► **Go to the One Engine
Inoperative / Reduced
Thrust Landing checklist on
page 7.22**



ENG OIL PRES LO

Messages: ENG L OIL PRES LO ENG R OIL PRES LO

Condition: Engine oil pressure is low.

- 1 Throttle
 (affected engine) . . . Confirm Idle
- 2 FUEL switch
 (affected engine) . . . Confirm OFF

►► **Go to the Engine Failure or Shutdown
checklist on page 7.7**



ENG OIL TEMP HI

Messages: ENG L OIL TEMP HI ENG R OIL TEMP HI

Condition: Engine oil temperature exceeds red line limit.

- 1 Throttle
(affected engine) . . . Confirm Adjust

If at high thrust, retard throttles. If at idle, increase thrust to provide higher fuel flow for improved cooling.

Note: Oil temperature stabilization may take several minutes following thrust changes.

- 2 Choose one:

◆ ENG OIL TEMP HI alert **remains** displayed:

Throttle
(affected engine) . . . Confirm Idle

FUEL switch
(affected engine) . . . Confirm OFF

►► **Go to the Engine Failure or Shutdown checklist on page 7.7**



◆ ENG OIL TEMP HI alert is **not** displayed:

Continue engine operation. Monitor oil temperature.



ENG RPM HI

Messages: ENG L RPM HI

ENG R RPM HI

Condition: N1 or N2 has exceeded the red line limit.

1 Throttle
(affected engine) . . . Confirm Idle

2 Choose one:

◆ RPM remains above red line:

FUEL switch

(affected engine) . . . Confirm OFF

►► **Go to the Engine Failure or
Shutdown checklist on page 7.7**



◆ RPM falls **below** red line:

Operate engine at a throttle setting
necessary to maintain RPM below red line.

►► **Go to the One Engine
Inoperative / Reduced Thrust
Landing checklist on page 7.22**



ENG TGT HI

Messages: ENG L TGT HI

ENG R TGT HI

Condition: Respective engine TGT exceeds red line limit
or exceeds amber line limit after 5 minutes.

1 Throttle
(affected engine) . . . Confirm Idle

2 Choose one:

◆ TGT remains **above** red line:

FUEL switch
(affected engine). . . Confirm OFF

►► **Go to the Engine Failure or
Shutdown checklist on page 7.7**



◆ TGT falls **below** red line:

Operate engine at a throttle setting
necessary to maintain an acceptable TGT.

►► **Go to the One Engine
Inoperative/Reduced Thrust
Landing checklist on page 7.22**



**ENG L FUEL FILTER and
ENG R FUEL FILTER
Both Displayed**

Messages: ENG L FUEL FILTER ENG R FUEL FILTER

Condition: Both engines have high differential pressure across fuel filter indicating impending fuel filter clog.

Caution! With both ENG L FUEL FILTER and ENG R FUEL FILTER alerts displayed, plan to land at the nearest suitable airport.

1 Engine instruments. Monitor

Solid contaminants and/or fuel contamination may cause both the engine fuel filters to become clogged and bypass unfiltered fuel into the engines. Crews should maintain engine operation while closely monitoring engine instruments.



In Flight Start

Condition: An engine start is needed after a shutdown with no fire or apparent damage.

Caution! Auto-Abort protection is not available for any in flight engine starts. All engine restarts in flight require the crew to monitor engine parameters for start exceedances, regardless of how long the FUEL switch was in the OFF position. If engine start parameters are exceeded, the start must be manually aborted.

Note: Air starts may be attempted at any altitude and airspeed. Air starts have been demonstrated below FL 300.

- 1 FUEL switch
(affected engine) . . . Confirm OFF
- 2 Autothrottle OFF
- 3 Throttle
(affected engine) . . . Confirm IDLE
- 4 L/R FWD/AFT FUEL PUMP switches ON
- 5 HYDRAULICS PUMP switch
(affected engine) OFF
- 6 ENG anti-ice switch (affected engine) OFF
- 7 AIR FOIL anti-ice switches OFF
- 8 ISOL switch OPEN

▼ Continued on next page ▼

▼ In Flight Start continued ▼

- 9 PACK switch (at least one) OFF
- 10 ENG START switch Pull
- 11 **When** N2 rpm is above 14%:
- FUEL switch ON

Note: If TGT and RPM rise do not occur within 30 seconds, or if TGT exceeds 850°C after FUEL switch was moved to ON, move FUEL switch to OFF.

12 Choose one:

◆ Engine **restarts**:

Note: If conditions permit, operate engine at idle for 5 minutes after start.

▶▶ **Go to step 13**

◆ Engine does **not** restart:

▶▶ **Go to step 19**

- 13 HYDRAULICS PUMP switch ON
- 14 ISOL switch AUTO
- 15 PACK switches As required
- 16 ENG/AIR FOIL anti-ice switches As required
- 17 FUEL X-FEED As required
- 18 Clear FMS engine out prompt.



▼ Continued on next page ▼

▼ In Flight Start continued ▼

- 19 ENG START switch PUSH
- 20 FUEL switch
 (affected engine) . . . Confirm OFF
- 21 ISOL switch AUTO
- 22 ENG/AIR FOIL anti-ice switches As required

Note: If engine severe damage is not suspected, additional engine restarts may be attempted.

►► **Go to the Engine Failure or Shutdown checklist on page 7.7 if restart attempts are unsuccessful.**



One Engine Inoperative / Reduced Thrust Landing

Condition: Landing must be made with one engine inoperative or at reduced thrust.

- 1 CONFIRM ENGINE OUT prompt. Select
- 2 TRANS and AUX HYDRAULIC pump switches ON
- 3 FUEL PUMPS/FUEL X FEED lever As required

Note: Use crossfeed as necessary to maintain fuel balance.

- 4 BLEED switch (affected engine) OFF
- 5 PACK switch (affected engine) OFF
- 6 PACK SHUTDOWN switch OVRD
- 7 Transponder TA

Note: Aircraft performance with an engine inoperative may not meet RA requirements.

- 8 Plan to land at the nearest suitable airport.
- 9 Plan a FLAPS 25 landing.
- 10 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ One Engine Inoperative/Reduced Thrust Landing continued ▼

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■ Minimums	____, ___ , xckd	C&F
■ Landing data	25 , ___	C&F
■ Approach briefing	complete	PM
Hydraulic panel.	set	PM
Seat belt signs	ON	PM

Go-Around Procedure Review

Do the normal go-around procedure.

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

Additional Deferred Items

Fuel balance check
Rudder trim as reqd

▼ Continued on next page ▼

▼ One Engine Inoperative/Reduced Thrust Landing continued ▼

Landing Checklist

- Landing gear downC&F
- Flaps 25, 25**C&F
- Spoilers ARM C&F
- EAD. ckd PM



**Reverser Deployed In Flight
or
U/L or REV Displayed In Flight
or
REV DEPLOYED In Flight**

Messages: REV L DEPLOYED REV R DEPLOYED

Condition: Thrust reverser doors are uncommanded deployed.

Note: Engine thrust will be reduced to idle whenever respective EEC detects uncommanded reverser deployment.

- 1 Autopilot and Autothrottles OFF
- 2 Throttle
(affected engine) . . . Confirm IDLE
- 3 Reverser levers Full down

▼ Continued on next page ▼

▼ Reverser Deployed In Flight or U/L or REV Displayed In Flight or
REV DEPLOYED In Flight continued ▼

4 Choose one:

◆ U/L OR REV **remains** displayed or airplane buffeting or trim change:

FUEL switch
(affected engine). . . Confirm OFF

►► **Go to the Engine Failure or
Shutdown checklist on page 7.7**

Plan to land at the nearest suitable airport.



◆ U/L OR REV **not** displayed or airplane is not buffeting or no trim change:

Operate engine at idle.

Plan to land at the nearest suitable airport.



SELECT FADEC ALTN

Messages: SELECT FADEC ALTN

Condition: An engine has reverted to N1 mode.

- 1 FADEC MODE switch (affected engine) Push
Observe ENG FADEC ALTN alert is displayed.
Observe FADEC MODE ALTN light is illuminated.
Observe FADEC MODE SELECT light is extinguished.
- 2 FADEC MODE switch (affected engine) Push

Note: First push selects FADEC ALTN mode. Second push attempts to return FADEC to normal mode.

- 3 Choose one:

◆ SELECT FADEC ALTN alert is **not** displayed:

Continue normal engine operation.



◆ SELECT FADEC ALTN alert is **displayed**:

►► **Go to step 4**

▼ Continued on next page ▼

▼SELECT FADEC ALTN continued▼

- 4 FADEC MODE switch (affected engine) Push
Observe ENG FADEC ALTN alert is displayed.

Note: Autothrottle will be inoperative when either engine is in N1 mode.

- 5 Opposite FADEC MODE switch Push
Observe ENG FADEC ALTN alert is displayed.



START VLV OPEN

Messages: START VLV L OPEN START VLV R OPEN

Condition: Start valve is open when engine is above starter cutout speed (41%).

1 Choose one:

◆ On the **ground**:

▶▶ Go to step 2

◆ In **flight**:

▶▶ Go to step 5

2 APU AIR switch/external air source OFF

3 ISOL switch CLSD

4 FUEL switch
(affected engine) . . . Confirm OFF



5 ISOL switch CLSD

6 BLEED switch (affected engine) OFF

7 PACK switch (affected engine) OFF

8 Avoid icing conditions.

9 Do not repressurize affected pneumatic system
unless necessary.



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Non-Normal Checklists
Fire Protection

Chapter NNC
Section 8

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APU FIRE

Messages: APU FIRE

Condition: APU compartment fire is detected.

Note: The APU will automatically shut down when an APU fire is detected.

- 1 APU FIRE CONT switch OFF & AGENT ARM
- 2 Choose one:
 - ◆ APU FIRE alert **remains** displayed:
 - ▶▶ **Go to step 3**
 - ◆ APU FIRE alert **does not** remain displayed:
 - ▶▶ **Go to step 6**
- 3 APU FIRE AGENT
switch NO 1 or NO 2 DISCH/check
- 4 **After** 30 seconds:
 - Choose one:
 - ◆ APU FIRE alert **remains** displayed:
 - ▶▶ **Go to step 5**
 - ◆ APU FIRE alert **does not** remain displayed:
 - ▶▶ **Go to step 6**
- 5 Remaining APU FIRE
AGENT switch DISCH/check
- 6 APU MASTER switch OFF



ENGINE FIRE
or
Engine Severe Damage or
Separation

Messages: ENGINE L FIRE ENGINE R FIRE

Condition: A fire or severe damage is
detected/suspected in the engine.

Note: A fire warning may not appear with severe engine damage.

Note: Indications of severe damage may include airplane vibration and, on the affected side, erratic or no indications in engine displays, rapid loss of hydraulic pressure, and sudden loss of generator power.

Note: Severe airframe/engine vibration may be caused by unbalanced engine rotating components following an engine failure. These vibrations often are most severe only at specific engine rotor windmilling RPMs. A change in airspeed, either decrease or increase, may change the engine windmilling RPM and reduce the severity of the resultant airframe/engine vibration.

- 1 Autothrottles OFF
- 2 Throttle
 (affected engine) . . .Confirm Idle
- — — — —

▼ Continued on next page ▼

▼ ENGINE FIRE or
Engine Severe Damage or Separation continued ▼

3 Choose one:

◆ ENGINE FIRE alert **remains** displayed **OR** severe damage or separation **is** suspected:

FUEL switch
(affected engine). . . Confirm OFF

ENG FIRE handle
(affected engine). . . Confirm Pull

AGENT DISCH. 1 or 2

Pull handle completely to the stop
and rotate the handle to the selected
agent.

►► **Go to step 4**

◆ ENGINE FIRE alert is **not** displayed **OR** severe damage or separation is **not** suspected:

►► **Go to step 8**

▼ Continued on next page ▼

▼ ENGINE FIRE or
Engine Severe Damage or Separation continued ▼

4 Choose one:

◆ ENGINE FIRE alert **remains** displayed after 30 seconds:

ENG FIRE handle
(affected engine). . . Confirm . . . Discharge
remaining agent

▶▶ **Go to step 5**

◆ ENGINE FIRE alert **does not** remain displayed after 30 seconds:

▶▶ **Go to step 5**

5 Throttles Align

6 Autothrottles On, if desired

7 CONFIRM ENGINE OUT prompt. Select

8 APU START

9 Plan to land at the nearest suitable airport.

▶▶ **Go to the One Engine
Inoperative / Reduced Thrust Landing
checklist on page 7.22**



Smoke, Fire or Fumes

Condition: Smoke, fire or fumes is identified.

- 1 Diversion may be needed.
- 2 Don oxygen masks and set regulators to 100%, as needed.
- 3 Establish crew and cabin communications.
- 4 GALLEY power switch Off
- 5 GASPER BOOSTER FAN OFF
- 6 Advise the cabin crew to turn **on**:
Aisle lights (as required)
- 7 Advise the cabin crew to turn **off**:
Ceiling and sidewall lights
- 8 **Anytime** the smoke or fumes becomes the greatest threat:
▶▶ Go to the Smoke or Fumes Removal checklist on page 8.19

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

9 Choose one:

- ◆ Source of the smoke, fire or fumes is **obvious and** can be **extinguished quickly**:

Isolate and extinguish the source.

If possible, remove power from the affected equipment by switch or circuit breaker in the flight deck or cabin.

▶▶ **Go to step 10**

- ◆ Source of the smoke, fire or fumes is **not obvious or cannot** be extinguished quickly:

▶▶ **Go to step 11**

10 Choose one:

- ◆ Source is **visually confirmed** to be extinguished **and** the smoke or fumes are **decreasing**:

Continue the flight at the captain's discretion.

Restore unpowered items at the captain's discretion.

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.19, if needed.**



- ◆ Source is **not** visually confirmed to be extinguished **or** smoke or fumes are **not** decreasing:

▶▶ **Go to step 11**

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

- 11 Divert to the nearest suitable airport while continuing the checklist.
- 12 Consider an immediate landing if the smoke, fire or fumes situation becomes uncontrollable.
- 13 Do **not** delay landing in an attempt to complete all of the following steps.
- 14 ISOL switch CLSD
- 15 L PACK switch OFF
- 16 **Wait** 2 minutes unless the smoke or fumes are increasing. This allows time for the smoke or fumes to clear.
- 17 Choose one:

◆ Smoke or fumes are **decreasing**:

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.19, if needed.**



◆ Smoke or fumes **continue or are increasing**:

L PACK switch AUTO

R PACK switch OFF

▶▶ **Go to step 18**

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

18 **Wait** 2 minutes unless the smoke or fumes are increasing. This allows time for the smoke or fumes to clear.

19 Choose one:

◆ Smoke or fumes are **decreasing**:

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.19, if needed.**

■ ■ ■ ■

◆ Smoke or fumes **continue or are increasing**:

▶▶ **Go to step 20**

- 20 R PACK switch AUTO
- 21 EMER PWR selector ON
- 22 AVIONICS COOLING switch OVRD
- 23 CABIN PRESS SYSTEM switch. MANUAL

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

- 24 L GEN switch OFF
- 25 R GEN switch OFF
- 26 APU GEN switch OFF
- 27 Consider an immediate landing.

Inoperative Items

Call chime

Stall warning system

Slat and gear position indications

Stabilizer trim and position indications

Automatic cockpit / cabin temperature control

Flight director / autopilot / autothrottle

Ground proximity warning system

Speed brakes and ground spoilers

Thrust reversers

On the ground, engine idle speed will be in flight idle

Note: Use emergency power as required. Battery power cannot be relied upon for more than 60 minutes.

Cabin pressure may be manually controlled to maintain desired cabin altitude.

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

28 Prior to landing:

29 Choose one:

◆ **In** trim with landing flaps set:

Plan to land at the nearest suitable airport with selected flaps.



◆ **Not** in trim with landing flaps set:

Use FLAPS 40 for landing and increase VREF by 20 knots.

Refer to the ODM, Abnormal Section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, GEN ALL OFF OR TOTAL LOSS OF AC POWER table.

Do not reduce thrust until landing flare has been initiated and sink rate has been reduced.

Make positive main gear touchdown to minimize float and take positive action to lower nose to runway.



Tailpipe Fire

Condition: Tailpipe fire.

- 1 FUEL switch
(affected engine) . . . Confirm OFF
- 2 Choose one:
 - ◆ Starter **disengaged**:
 - ▶▶ Go to step 3
 - ◆ Starter **engaged**:
 - ▶▶ Go to step 4
- 3 Allow N2 to decrease to 40% or less; then:
ENG START switch Pull

Caution! Tailpipe fires are not annunciated in the flight deck. The first notification of a tailpipe fire may be from an external source. Discharging the engine fire extinguishing agent will not extinguish the fire. If the fire cannot be extinguished by motoring, or if motoring is not possible, the use of ground fire fighting equipment may be required.

- 4 **After** fire is extinguished:
ENG START switch Push



CARGO SMOKE

Messages: CARGO SMOKE FWD CARGO SMOKE AFT

Condition: Smoke has been detected in forward/aft cargo compartment.

1 Plan to land at the nearest suitable airport.

Note: In addition to the CARGO SMOKE alert displayed, an aural warning will sound.

2 Flashing CARGO SMOKE

AGENT 1 DISCH switch Push

Observe LOW light illuminates.

Note: If CARGO SMOKE AGENT 2 DISCH switch is pushed inadvertently, AGENT 2 cylinder will discharge and associated CARGO SMOKE AGENT 1 DISCH switch will continue flashing. If so, push AGENT 1 switch.

3 **After** approximately 1 minute elapsed time:

Choose one:

◆ CARGO SMOKE AGENT 1 DISCH LOW light illuminated:

▶▶ **Go to step 4**

◆ CARGO SMOKE AGENT 1 DISCH LOW light is **not** illuminated:

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ CARGO SMOKE continued ▼

- 4 Approximately 6 minutes after AGENT 1 has been discharged, DISCH CARGO AGENT alert will be displayed on EAD and CARGO SMOKE AGENT 2 DISCH switch will flash. Push the flashing CARGO SMOKE AGENT 2 DISCH switch.

Note: CARGO SMOKE AGENT DISCH switch will stop flashing when DISCH light switch is pushed.

Note: Approximately 2 hours after CARGO SMOKE AGENT 2 DISCH switch is pushed, low light will illuminate.

Warning! Notify ground personnel not to open any cargo door until all passengers and crew have exited airplane and fire fighting equipment is available at airplane.



- 5 Associated CARGO SMOKE
AGENT 2 DISCH switch PUSH

Warning! Notify ground personnel not to open any cargo door until all passengers and crew have exited airplane and fire fighting equipment is available at airplane.



EFB Battery Overheat or Fire

Condition: Battery for an EFB or PED has overheated or is on fire.

Warning! Use this procedure only when an electronic device battery overheats or fire is positively identified. If in doubt, Go to the Smoke, Fire or Fumes checklist on page 8.5.

- 1 External power source. Unplug
Remove device from powered keyboard, battery, or external power.
- 2 Fire. Extinguish
Use a halon fire extinguisher, water fire extinguisher, or available liquid to extinguish fire.

Warning! Do not attempt to pick up or move a smoking or burning device. Do not move the device until certain the fire is extinguished and the device is cool.

▼ Continued on next page ▼

▼ EFB Battery Overheat or Fire continued ▼

Warning! Do not cover the device or use ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.

- 3 **After** extinguishing the fire, immediately douse the device with water or other liquid to cool the device and prevent additional battery cells from reaching thermal runaway.



FIRE DET APU FAIL

Messages: FIRE DET APU FAIL

Condition: Indicates both APU fire detection loops are inoperative. Fire detection is not available.

1 Choose one:

◆ APU **is** required:

Land at nearest suitable airport.



◆ APU is **not** required:

APU MASTER switch OFF



FIRE DET L/R FAIL

Messages: FIRE DET L/R FAIL

Condition: Indicates both engine fire detection loops are inoperative. Fire detection is not available.

- 1 Land at nearest suitable airport.
- 2 Monitor affected engine parameters for any abnormal indications.



LAVATORY SMOKE

Messages: LAVATORY SMOKE

Condition: Smoke in the lavatory.

- 1 Contact cabin crew and verify status.



Smoke or Fumes Removal

Condition: Smoke or fumes removal is needed.

- 1 Do this checklist **only** when directed by the Smoke, Fire or Fumes checklist.
- 2 Do **not** delay landing in an attempt to complete the following steps.
- 3 Close the flight deck door and louver panel.
- 4 Choose one:
 - ◆ **Both** PACKS are **OFF**:
 - ▶▶ **Go to step 5**
 - ◆ **A single or both** PACKS are in **AUTO**:
 - ▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

5 Choose one:

◆ Smoke or fumes source is confirmed to be **outside** the flight deck:



◆ Smoke or fumes source is confirmed to be **on** the flight deck:

Caution! Window should not be opened unless the source is confirmed to be on the flight deck.

Slow to 165 knots. High airspeed may prevent opening the window.

Open the first officer's sliding window.

▶▶ **Go to the Smoke, Fire or Fumes checklist on page 8.5 and do the remaining steps**



Do **not** turn on any PACK switch that was turned off by the Smoke, Fire or Fumes checklist.

- 6  Operating PACK switch(es) AUTO
- 7 CABIN ALT 9,500 feet
- CABIN PRESS SYSTEM switch MANUAL
- CABIN PRESS MANUAL rate selector . . . CLIMB
- Observe SD CABIN ALT display reads 9500

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

- 8 Cockpit air outlets (all) Full open
- 9 Flow switch High

**Caution! Do not open any flight deck window.
Keep the flight deck door closed.**

10 Choose one:

◆ Smoke or fumes are **controllable**:

▶▶ **Go to the Smoke, Fire or Fumes
checklist on page 8.5 and do the
remaining steps**



◆ Smoke or fumes are **not** controllable:

▶▶ **Go to step 11**

11 Descend to the lowest safe altitude or 10,000 feet,
whichever is higher.

12 **When** at 14,000 feet or below:

CABIN PRESS SYSTEM switch MANUAL

CABIN PRESS MANUAL rate selector . . . CLIMB

Observe outflow VALVE indicator moves to full
OP.

▶▶ **Go to the Smoke, Fire or Fumes checklist on
page 8.5 and do the remaining steps**



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Runaway Stabilizer

Condition: Stabilizer movement occurs continuously in a manner not appropriate for flight conditions.

Caution! Avoid manual pitch inputs until the autopilot is disconnected.

Note: Extended trim operation may result in trim motor thermal shutdown. Trim motor operation may return after a sufficient cooling period.

- 1 Autopilot (if engaged) Disconnect
- 2 If stabilizer runaway continues,
control wheel trim switches Trim opposite
direction of runaway as necessary

- 3 Choose one:

◆ Runaway **stopped** when autopilot was disconnected:

▶▶ **Go to step 4**

◆ Runaway **did not stop** when autopilot was disconnected:

▶▶ **Go to step 7**

- 4 Do not re-engage autopilot.
- 5 Use primary trim for remainder of flight.

▼ Continued on next page ▼

▼ Runaway Stabilizer continued ▼

6 Do not exceed 0.78M.



7 Choose one:

◆ Stabilizer **moves** in **opposite direction** of runaway:

▶▶ **Go to step 8**

◆ Stabilizer **does not** move in the **opposite direction** of runaway:

▶▶ **Go to step 12**

8 Autopilot & alternate longitudinal trim
CBs D-9, D-10, D-11 (upper EPC). . . . Open (Pull)

9 Do not exceed 0.78M.

10 Continue flight using primary trim system.

11 Autopilot is available, but autotrim and mach trim functions are inoperative. After trimming, the autopilot may be engaged, but should be disconnected/retrimmed periodically as needed.



▼ Continued on next page ▼

▼ Runaway Stabilizer continued ▼

12 STABILIZER TRIM

(guarded) switch OFF (Push)

13 ALT LONG TRIM switch Retrim

14 Continue flight using alternate trim system.

15 Do not exceed 0.78M.

16 Autopilot is available.



Aileron Controls Jammed or Restricted

Condition: Aileron controls jammed or restricted.

- 1 **If** airplane control is adequate, continue to normal descent point.

Note: If freezing water is the cause, control may be regained by descending into warmer air.

- 2 Choose one:
 - ◆ Aileron controls remain jammed or restricted:
 - ▶▶ **Go to step 3**
 - ◆ Aileron controls are free:
 - ■ ■ ■

- 3 SEAT BELTS switch. ON
- 4 Autopilot. Disconnect
- 5 Maximum Airspeed. 270 KIAS/.76M

Note: To minimize dynamic loads, reduce airspeed to as low as practical prior to disconnecting control paths.

- 6 Autothrottles Disconnect

▼ Continued on next page ▼

▼ Aileron Controls Jammed or Restricted continued ▼

7 Control Wheels. Disconnect

Use force, as required, (~100 pounds at wheel radius) to disconnect the two halves of the control system.

Note: If the jam is in the control wheel, the opposite control wheel can be disconnected and provide normal aileron control. One pair of spoiler panels (inboard or outboard) will operate normally to augment roll.

Note: If this action does not provide sufficient lateral control, use of aileron trim, or small and careful application of rudder can enhance roll control authority.

8 Autothrottles will be available. Autopilot may be available.

9 Select a runway with the least crosswind component, and plan to fly a long straight in approach.



Elevator Controls Jammed or Restricted

Condition: Elevator controls jammed or restricted.

Warning! Do not attempt troubleshooting to free jammed flight controls beyond the scope of this checklist, unless the airplane cannot be safely landed in the existing condition.

1 If airplane control is adequate, continue to normal descent point.

Note: If freezing water is the cause, descending into warmer air may free the restriction.

2 Choose one:

◆ Elevator controls are free:



◆ Elevator controls remain jammed or restricted, or pitch control is not adequate:

►► **Go to step 3**

3 Seat Belt switch. ON

4 Autopilot. Disconnect

5 Maximum Airspeed. 270 KIAS/.76M

Note: To minimize dynamic loads, reduce airspeed to as low as practical prior to disconnecting control paths.

6 Autothrottles Disconnect

▼ Continued on next page ▼

▼ Elevator Controls Jammed or Restricted continued ▼

7 Control Columns. Disconnect

A substantial amount of differential force (about 130 pounds/59 kilograms) must be created between the captain and first officer's control columns in order for the mechanical disconnect to occur. Because it may not be apparent as to which control path is jammed, force should be applied to one column, and resistance to that force exerted on the other. If a disconnect does not occur, the application of force and column resistance should be reversed. A single audible "bang" sound may be heard from the base of the captain's control column below the floor as the mechanical disconnect occurs.

Note: Elevator authority may be reduced. Pilot with the operative elevator control system should fly the airplane to a normal approach and touchdown.

Note: If the columns cannot be disconnected and control column authority is not adequate, it may be necessary to control pitch with the stabilizer trim. In this condition, a long straight-in approach should be flown with careful control of pitch and airspeed. Path must be controlled with small thrust corrections.



ELEVATOR SPLIT

Messages: ELEVATOR SPLIT

Condition: A split between left and right elevator panels exists.

Caution! Avoid abrupt elevator inputs.

1 Airspeed Reduce

2 Choose one:

◆ ELEVATOR SPLIT alert remains displayed, or
extinguishes at airspeed **below** 240 KIAS:

Do not exceed 240 KIAS.



◆ ELEVATOR SPLIT alert extinguishes at airspeed
above 240 KIAS:

Do not exceed airspeed at which alert
extinguishes.



FLAPS DISAG

Messages: FLAPS DISAG

Condition: Left and right flap positions disagree with each other or with commanded position.

1 Return FLAP/SLAT handle to position where alert was not displayed or, if alert remains displayed, select the most symmetrical configuration and land.

2 Choose one:

◆ Final flap setting **25° or greater**:

Perform normal landing.



◆ Final flap setting **less than 25°**:

Refer to the ODM, Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, FLAP DISAG (FINAL FLAP SETTING LESS THAN 25°) table.

►► **Go to step 3**

3 GND PROX WARN switch FLAP OVRD

4 Prior to 100 feet AGL:

Autopilot Disconnect

▼ Continued on next page ▼

▼ FLAPS DISAG continued ▼

- 5 Prior to 50 feet AGL:
Autothrottles Disconnect

Note: Autothrottle retard mode is not available when flaps are less than 25°.



Flaps Jammed

Condition: Flap handle is jammed.

- 1 **If** flaps/slats are less than 13/extend:
 - ▶▶ **Go to the No Flap/No Slat or Flaps 0/Slats Extended Landing with Hydraulic Pressure checklist on page 9.13**
- 2 GND PROX WARN switch As required
If flaps are less than 25 select FLAP OVRD.
- 3 Landing Distance Determine
Refer to the ODM Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section and FLAPS 13, FLAPS 18, FLAPS 25 table, as appropriate.
- 4 VAPP Determine
VREF is the amber foot. Calculate VAPP using standard wind additives. Minimum of VREF+5.
If the amber foot is unreliable or not displayed, calculate VREF using the ODM Abnormal section.
- 5 **If** flaps are less than 25°:
Autopilot must be disconnected prior to 100 feet.
Autothrottles must be disconnected prior to 50 feet.

▼ Continued on next page ▼

▼ Flaps Jammed continued ▼

Note: Autothrottle retard mode is not available when flaps are less than 25°.

6 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
Hydraulic panel	set	PM
Seat belt signs	ON	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Spoilers	ARM	C&F
EAD	ckd	PM



**No Flap / No Slat or Flaps 0 / Slats
Extended Landing with Hydraulic
Pressure**

Condition: Flap handle is jammed in the up position or the flaps/slats do not move out of the retract position when the flap handle is moved with normal hydraulic pressure.

Note: Use longest available runway commensurate with conditions (wet or dry, crosswind, etc.).

- 1 Gross weight Reduce
Reduce gross weight to lowest practicable.
- 2 Landing Distance Determine
Refer to the ODM, Abnormal section,
ABNORMAL CONFIGURATION ACTUAL LANDING
DISTANCES AND APPROACH SPEEDS section,
NO FLAP/NO SLAT OR NO FLAPS/SLATS
EXTENDED LANDING table.
- 3 Plan a wide pattern and longer than normal final
approach for speed stabilization. Fly a normal
glideslope.
- 4 VAPP. Determine
VREF is the amber foot. Calculate VAPP using
standard wind additives. Minimum of VREF+5.
If the amber foot is unreliable or not displayed,
calculate VREF using the ODM Abnormal
section.
- 5 GND PROX WARN switch FLAP OVRD

▼ Continued on next page ▼

▼ No Flap/No Slat or Flaps 0/Slats Extended
Landing with Hydraulic Pressure continued ▼

6 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____,____, xckd	C&F
■Landing data	____,____	C&F
■Approach briefing	complete	PM
Hydraulic panel	set	PM
Seat belt signs	ON	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	____, xckd	C&F

Landing Considerations

Autopilot must be disconnected prior to 100 feet.
Autothrottles must be disconnected prior to 50 feet.

Note: Autothrottle retard mode is not available when flaps are less than 25°.

Note: Flight Director and Autothrottle Go-Around is not available with flaps less than 5 degrees.

▼ Continued on next page ▼

▼ No Flap/No Slat or Flaps 0/Slats Extended
Landing with Hydraulic Pressure continued ▼

Make positive main gear touchdown to minimize float.

Landing Checklist

Landing gear	down	C&F
Flaps	___, ___	C&F
Spoilers	.ARM	C&F
EAD.	ckd	PM

After Touchdown

Fly nose gear to runway, apply brakes smoothly to full pedal deflection.

Autospoilers and reverse will not be available until nose gear touchdown.

Throttles Reverse thrust

Use normal reverse thrust procedures. Do **not** use asymmetric reverse thrust to maintain directional control. Rudder control and differential braking should be used as required for directional control.



PSEU FAIL

Messages: PSEU FAIL

Condition: PSEU detects a failure or invalid signal from any of the proximity sensors.

1 Choose one:

◆ On the **ground**:

Do not takeoff.



◆ In **flight**:

►► **Go to step 2**

2 SLATS Extend as required

▼ Continued on next page ▼

▼ PSEU FAIL continued ▼

3 Choose one:

- ◆ Slat in transit down arrow is **not displayed** on the PFD after slat extension is complete:

Note: Do not slow the aircraft to a speed below the UP/RET minimum maneuver speed until the in transit arrow is not displayed.

FLAP/SLAT handle.....Extend as required

Note: Plan a normal landing.



- ◆ Slat in transit down arrow **remains** displayed on the PFD after slat extension is complete:

Ensure airspeed is above UP/RET minimum maneuver speed.

FLAP/SLAT handle.....UP/RET

►► **Go to the No Flap / No Slat or Flaps 0 / Slats Extended Landing with Hydraulic Pressure checklist on page 9.13**

Note: Plan a No Flap/No Slat landing.



**Rudder Jammed
or
RUDDER RESTRICTED**

Messages: RUDDER RESTRICTED

Condition: Rudder is jammed or rudder travel is restricted.

1 Choose one:

◆ RUDDER RESTRICTED alert **displayed**:

Level 1 alert indicates that either the primary or secondary rudder limiter is over-restricting the rudder. In this case, the rudder cannot be overpowered. Limited rudder control is available.

Select a runway with minimum crosswind.



◆ RUDDER RESTRICTED alert is **not** displayed:

►► **Go to step 2**

2 Use rudder trim (if available) and aileron for directional control.

Note: If freezing water is the suspected cause, and if conditions permit, descend to warmer air and attempt to regain rudder control.

Note: If rudder input is not possible, use operative flight controls, trim, and thrust as required for airplane control.

3 Select a runway with minimum crosswind.

▼ Continued on next page ▼

▼ Rudder Jammed or Restricted continued ▼

- 4 Rudder pedal steering is inoperative.
- 5 **If** directional control is a concern, use differential braking at high speed.
- 6 Tiller nose wheel steering can be used as speed decreases.



RUDDER LIM FAIL

Messages: RUDDER LIM FAIL

Condition: Both primary and secondary rudder limiters failed to unrestricted position.

- 1 Avoid abrupt rudder inputs.
- 2 Avoid high sideslips if flaps are less than 5 degrees.



SLAT DISAG

Messages: SLAT DISAG

Condition: Left and right slat positions disagree with each other or with commanded position.

Note: If slat asymmetry is indicated any time by a lateral trim change, return FLAP/SLAT handle to the last position where slats were symmetrical.

1 Choose one:

◆ Alert displayed during attempted extension:

▶▶ **Go to step 2**

◆ Alert displayed during attempted retraction or prior to extension:

▶▶ **Go to step 3**

2 FLAP/SLAT handle. UP/RET

▶▶ **Go to the No Flap / No Slat or Flaps
0 / Slats Extended Landing with
Hydraulic Pressure checklist on page
9.13**



3 FLAP/SLAT handle. 0/EXT

4 Plan normal flap/slat landing.



Spoiler Float

Condition: Airframe vibration and/or abnormal inputs in the roll axis.

Note: Spoiler float is indicated when a rapid roll occurs during extension of flaps beyond 25°.

- 1 FLAP/SLAT handle. Retract to 25/EXT
- 2 Land with flaps/slats in 25 EXT.
- 3 **Checklist Complete Except Deferred Items**

Deferred Items

Approach / Landing

Do **not** execute an autoland.

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	____, ___ , xckd	C&F
■Landing data	25 , ___	C&F
■Approach briefing	complete	PM
Hydraulic panel	.set	PM
Seat belt signs	ON	PM

▼ Continued on next page ▼

▼ Spoiler Float continued ▼

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	25, 25	C&F
Spoilers	ARM	C&F
EAD	ckd	PM



Spoiler Stuck in Extended Position

Condition: Spoiler stuck in extended position.

Caution! Do not use autopilot. Full aileron trim and 80° of control wheel input may be required to counteract a stuck spoiler panel. This control configuration will result in roll asymmetry, i.e., a slightly faster roll rate in the direction of the stuck spoiler panel and noticeably slower roll rate in the opposite direction.

- 1 Autopilot. Disconnect
- 2 Aileron trim As required
- 3 Plan to land at the nearest suitable airport.

Note: Crosswind capability of the airplane may be reduced. Select a runway with minimum crosswind.

- 4 Land with FLAPS 25.

Minimum approach speed $V_{REF} + 10$.

Note: Spoilers may be armed for landing.



Stabilizer Inoperative

Condition: Stabilizer will not move with commanded trim inputs.

Note: Extended trim operation may result in trim motor thermal shutdown. Trim motor operation may return after sufficient cooling period.

1 Choose one:

◆ **In** trim with landing flaps set:

Land with selected flaps.



◆ **Not** in trim with landing flaps set:

▶▶ **Go to step 2**

- 2 Refer to the ODM, Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, STABILIZER INOP table.
- 3 Use Flaps 40 for landing and the STABILIZER INOP VREF speed from the ODM, or if time permits, increase VREF by the speed increment from the Stabilizer Inoperative - Speed Increment table below.
- 4 Autothrottles Disconnect
before 50 feet AGL
- 5 Do not reduce thrust until landing flare has been initiated and sink rate has been reduced.

▼ Continued on next page ▼

▼ Stabilizer Inoperative continued ▼

- 6 Make positive main gear touchdown to minimize float and take positive action to lower nose to runway.

Stabilizer Inoperative - Speed Increment table

Note: Use takeoff C.G. (% MAC).

STAB ANGLE	CENTER OF GRAVITY (% MAC)					
	6	10	15	20	25	30 to 34
	SPEED ADDITIVE (KIAS)					
2.5° AND	35	31	26	20	14	9
2° AND	33	28	23	18	12	7
0°	25	21	18	12	6	1
2° ANU	20	17	13	7	1	0
4° ANU	15	12	8	1	0	0
6° ANU	11	7	3	0	0	0
8° ANU	6	2	0	0	0	0
10° ANU	1	0	0	0	0	0



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AIR DATA FAIL

Messages: AIR DATA 1 FAIL AIR DATA 2 FAIL

Condition: Respective air data system has failed.

1 Choose one:

◆ AIR DATA **1** fail:

AIR DATA switch
(captain's SISP panel) CAPT ON 2

Push AIR DATA switch on the
captain's SISP and observe CAPT ON
2 light illuminates.

◆ AIR DATA **2** fail:

AIR DATA switch
(F/O's SISP panel) F/O ON 1

Push AIR DATA switch on the F/O's
SISP and observe F/O ON 1 light
illuminates.



Airspeed Unreliable

Condition: Unreliable airspeed indications and/or the pitch attitude is not consistent with the phase of flight, altitude, thrust and weight, or low frequency buffeting is experienced.

- 1 AFS OVRD switches OFF
- 2 If necessary to stabilize the aircraft or climb to a safe altitude, set the following pitch attitude and thrust:
 - Aircraft clean 4° and 80% N1
 - All other configurations 10° and 80% N1

Note: These pitch and power settings provide a simple reference setting for the crew to use for a short period of time while the initial steps of the checklist are accomplished. These settings do not ensure a level flight or constant airspeed at any particular altitude/airspeed/weight combination.



Note: Approximately 10° pitch attitude and MCT thrust will provide a safe initial climb condition if a climb is required.

- 3 Disregard IAS/flight director pitch bar and high speed warnings. Use pitch attitude or FPA as the primary flight reference.

Note: With autopilot disconnected at altitude, control wheel may seem sensitive in pitch.

- 4 Capt and F/O FLT DIR OFF switches OFF

▼ Continued on next page ▼

▼ **Airspeed Unreliable continued** ▼

Note: The following information and displays can be considered reliable:

- PFD attitude
- ground speed readout
- engine N1
- stick shaker.

Note: It is important that the flight crews recognize an unreliable airspeed condition in a timely fashion, and imperative that their initial action is to maintain aircraft control.

Note: The following are some of the indications the flight crew might see if a malfunction occurs in the pitot-static system or in the ADIRU:

- Indicated airspeed not consistent with normal pitch attitude for phase of flight
- Indicated altitude different from expected actual altitude
- PITOT HEAT alert, indicating associated pitot heater is OFF
- Amber IAS, ATT, and/or ALT displayed on PFD
- Level 1 and Level 2 alerts
- Engine FADEC and EPR messages
- Pressurization system problems.

▼ **Continued on next page** ▼

▼ Airspeed Unreliable continued ▼

Caution! Under certain failures FPA and PLI may be unreliable. Check against primary flight references before using PLI or FPA.

- 5 Disregard all alerts and warnings, except stick shaker, until after airplane is stabilized and safe operations achieved. Alerts and aural warnings can produce conflicting and disorienting cues.

Note: Initial concern is establishing control of the airplane through pitch/thrust relation. Attention should not be directed toward responding to malfunction alerts until safe flight is assured.

- 6 **If** practical, fly to VFR conditions at earliest possible opportunity.
- 7 **After** the airplane is safely stabilized in flight, ensure terrain avoidance.
- 8 Compare pilot and standby flight instruments.
- 9 Choose one:
- ◆ **Able** to identify unreliable air data source:
 - AIR DATA switch
(unreliable side) Select other side
 - ▶▶ **Go to step 10**
 - ◆ **Unable** to identify unreliable air data source:
 - ▶▶ **Go to step 16**

▼ Continued on next page ▼

▼ **Airspeed Unreliable continued** ▼

10 Choose one:

◆ Air data returns to **normal**:

▶▶ **Go to step 11**

◆ Air data does **not** return to normal:

▶▶ **Go to step 16**

11 AFS OVRD OFF switch
(reliable side) Normal position

12 Use autopilot and autothrottles associated with the reliable ADIRU.

13 Flight Directors may be engaged using the reliable ADIRU.

14 Choose one:

◆ ADIRU **1** is reliable:

Select FLT DIR. F/O ON 1

▶▶ **Go to step 15**

◆ ADIRU **2** is reliable:

Select FLT DIR. CAPT ON 2

▶▶ **Go to step 15**

15 Continue to monitor pitch, thrust, and airspeed to ensure accuracy of selected instruments.



▼ **Continued on next page** ▼

▼ **Airspeed Unreliable continued** ▼

- 16 Attitude and thrust Adjust
- 17 Maintain normal pitch attitude and thrust for the phase of flight.

Note: The following may or may not be reliable, depending on the cause of lost or suspect airspeed (radio NAV may be required when referring to these instruments):

- FPA
- PLI
- low speed pitch protection
- IVSI
- altimeter
- FMS NAV
- altitude reporting including TCAS.

Note: The following will not be reliable:

- autothrottle speed protection
- high speed pitch protection
- overspeed warning.

- 18 Refer to the ODM Abnormal section, OPERATION WITHOUT AIRSPEED INDICATION to determine thrust/pitch relation for remainder of flight.

▼ **Continued on next page** ▼

▼ **Airspeed Unreliable continued** ▼

19 **When** ready for approach and landing:

Maintain Vmc.

Establish landing configuration.

Use IRS ground speed and reported winds to verify airspeed.

Use radar altimeter.

Use a runway with electronic visual glideslope.



▼ **Continued on next page** ▼

▼ Airspeed Unreliable continued ▼**Additional Information**

Unreliable airspeed/Mach, vertical speed and altitude information can be caused by pitot static system or Air Data Inertial Reference Unit (ADIRU) malfunctions. This may or may not be accompanied by Level 1 and Level 2 alerts, autopilot/autothrottle disconnects and/or instrument failure indications. These malfunctions can have several causes, including pitot-static blockage, volcanic ash, system damage, loss or damage to the radome, ice accumulation, and improper maintenance. Cases where all pitot-static-sources malfunctioned have occurred. When all systems are in error, comparisons are not available and the flight crews are unable to identify the errors.

During takeoff roll, pitot-static or ADIRU malfunctions may be recognized by abnormal indications at standard airspeed callouts such as “80 KNOTS.” In flight recognition occurs by normal monitoring of basic flight instruments and crew familiarity with pitch, power and airspeed relationships.

Air data and pitot system malfunctions can result in different EIS alerting system displays or erroneous indications depending on the nature of the cause of the malfunction. Not all malfunctions will be readily obvious or result in specific alerts.

Suspected Electronic Interference

Condition: EFB or other PED is suspected of interfering with aircraft systems.

- 1 Airplane Mode (all EFBs) Verify/select ON
- 2 WiFi and Bluetooth® (all EFBs) . . . Verify/select Off
- 3 All PEDs (except EFBs) Off

Ensure all PEDs (except EFBs), including those being used in the cabin, are turned off.

4 Choose one:

◆ Interference does **not continue**:

Continue normal EFB operation.

Ensure all other PEDs remain off for the duration of the flight.



◆ Interference **continues**:

EFBs (all) Off

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ Suspected Electronic Interference continued ▼

5 Choose one:

◆ Interference does **not continue**:

If possible, determine which EFB is causing the interference by turning on one EFB at a time.

▶▶ **Go to step 6**

◆ Interference **continues**:

EFBs (all) On
Resume normal flight using EFBs.

Attempt to determine the source since interference is unrelated to EFBs or PEDs.



6 Choose one:

◆ Interference does **not continue** with **specific** EFB:

Complete flight using unaffected EFB(s).
Ensure affected EFB remains off.



◆ Interference **resumes** with **all** EFBs selected on:

All EFBs Off

▶▶ **Go to the EFB Failure – All checklist on page 0.9**





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FMS DUAL FAIL

Messages: FMS DUAL FAIL

Condition: No 1L FMC1 and FMC2 prompt on MENU page. 1R STANDBY NAV/RAD prompt displayed.

Note: The FMS speed "foot" (VMIN) is not available. VREF must be calculated using ODM. FMS INOP reference speed information for different configurations is in the FCTM.

- 1 MENU key Push
- 2 STANDBY NAV/RAD prompt Select

MENU, F-PLN, DIR INTC, NAV RAD, and PROG pages are available.

Navigation frequencies must be entered manually on the NAV RAD page.

Left side radios are tuned with the captain's MCDU and right side radios with the first officer's MCDU.



FMS FAIL

Messages: FMS 1 FAIL

FMS 2 FAIL

Condition: Respective FMS may have failed.

1 Select MENU page.

2 Choose one:

- ◆ FMC1 prompt displayed on MCDU 1 **and**
FMC2 prompt displayed on MCDU 2:

Note: This confirms independent FMS operation.

▶▶ **Go to step 3**

- ◆ FMC1 prompt displayed on MCDU 1 **or**
FMC2 prompt displayed on MCDU 2:

▶▶ **Go to step 4**

3 Continue with independent FMS operation.

Note: The FMS FAIL alert may be disregarded.

Note: Do not use SISP switching in conjunction with this condition. Both FMSs remain fully operational.

Note: Flight guidance information will be independent. Identical data must be entered into each MCDU separately whenever a modification of the flight plan or data is necessary.

▼ **Continued on next page** ▼

▼ FMS FAIL continued ▼

Note: Radio NAVAID tuning, both auto and manual, will be independent.

Note: The autopilot will use data only from the selected side.



4 Choose one:

◆ FMC1 displayed on MCDU1:

FO SISP FLT MGT FO ON 1

◆ FMC2 displayed on MCDU2:

Capt SISP FLT MGT CAPT ON 2

Note: To display information in the MAP or PLN modes, the same range must be selected on both NDs.



IRS FAIL

Messages: IRS 1 FAIL IRS 2 FAIL

Condition: Respective inertial navigation portion of the ADIRU has failed.

Note: Autopilot may be inoperative.

- 1 Choose one:
 - ◆ IRS 1 fail:
 - ▶▶ Go to step 2
 - ◆ IRS 2 fail:
 - ▶▶ Go to step 4
- 2 Leave IRS 1 mode selector in NAV.
- 3 IRS switch
(captain's SISP panel) Push

Push IRS switch on the captain's SISP and observe CAPT ON 2 or CAPT ON AUX light illuminates.

Note: IRS 2 will be displayed on both PFDs.

Note: When CAPT ON 2 or CAPT ON AUX is illuminated on the IRS switch, the F/O's IRS data has been selected for display on the captain's PFD.



- 4 Leave IRS 2 mode selector in NAV.

▼ Continued on next page ▼

▼ IRS FAIL continued ▼

- 5 IRS switch
(F/O's SISP panel) PUSH

Push IRS switch on the F/O's SISP and observe
FO ON 1 or FO ON AUX light illuminates.

Note: IRS 1 will be displayed on both PFD's.

Note: When FO ON 1 or FO ON AUX is illuminated
on the IRS switch, the captain's IRS data has
been selected for display on the F/O's PFD.



MCDUs (both) Lock-Up

Condition: Both MCDUs are unresponsive.

Consideration should be given to landing at the nearest suitable VMC airport.

Note: Pushing and releasing either autopilot disconnect button should restore normal operation to both MCDUs.

- 1 Choose one:
 - ◆ On the ground:

AUTOPILOT REL button (either) . . . Push

■ ■ ■ ■
 - ◆ In flight:

▶▶ Go to step 2
- 2 AUTOPILOT REL button (either) Push
- 3 AUTO FLIGHT switch Push
- 4 AUTO FLIGHT switch Push again
- 5 Wait ten seconds,
then any MCDU alphabetic key Push

▼ Continued on next page ▼

▼ MCDUs (both) Lock-Up continued ▼

6 Choose one:

◆ MCDU function returns:

Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 7**

7 MCDU MENU keys (one at a time) Push

8 Choose one:

◆ STANDBY NAV available:

Flight may be continued using STANDBY NAV. Consideration should be given to landing at the nearest suitable VMC airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 9**

9 Capt SISP FLT MGT switch Push

Push FLT MGT switch on the CAPT SISP and observe CAPT ON 2 light illuminates.

▼ Continued on next page ▼

▼ MCDUs (both) Lock-Up continued ▼

10 Choose one:

◆ MCDU function returns:

Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.

■ ■ ■ ■

◆ MCDUs (both) are still unresponsive:

►► **Go to step 11**

11 Capt SISP FLT MGT switch Push

Push FLT MGT switch on the CAPT SISP and observe CAPT ON 2 light extinguishes.

12 FO SISP FLT MGT switch Push

Push FLT MGT switch on the FO SISP and observe FO ON 1 light illuminates.

▼ Continued on next page ▼

▼ MCDUs (both) Lock-Up continued ▼

13 Choose one:

◆ MCDU function returns:

Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 14**

14 FO SISP FLT MGT switch Push

Push FLT MGT switch on the FO SISP and observe FO ON 1 light extinguishes.

15 MCDU-1 CB: A-5 (Overhead Panel) . . . Pull/Reset

Wait 10 seconds and reset.

16 Choose one:

◆ MCDU-1 function returns:

Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 17**

▼ Continued on next page ▼

▼ MCDUs (both) Lock-Up continued ▼

17 MCDU-2 CB: D-7 (EPC panel). Pull/Reset
Wait 10 seconds and reset.

18 Choose one:

◆ MCDU-2 function returns:
Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 19**

19 VIA-1 CBs A-16 and A-18
(Overhead Panel) Pull/Reset
Wait 10 seconds and reset both.

▼ Continued on next page ▼

▼ MCDUs (both) Lock-Up continued ▼

20 Choose one:

◆ Either MCDU function returns:

Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 21**

21 VIA-2 CBs A-22 and E-2

(Overhead Panel and EPC) Pull/Reset

Wait 10 seconds and reset both.

22 Choose one:

◆ Either MCDU function returns:

Normal flight operation may be continued at captain's discretion. Consideration should be given to landing at the nearest suitable airport.



◆ MCDUs (both) are still unresponsive:

►► **Go to step 23**

23 If able, find VMC and land. If unable to find VMC, fly the approach that was loaded on preflight. If unable to find VMC or to fly an approach, fly a PAR or ASR.



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Non-Normal Checklists

Chapter NNC

Fuel

Section 12

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Fuel Leak

Condition: An in flight fuel leak is suspected or confirmed.

Note: Lateral fuel imbalance accompanied by uncommanded filling of a tank indicates a tank-to-tank fuel leak. If fuel remaining is approximately equal to dispatch fuel quantity minus fuel used, fuel is being internally moved from tank to tank through a leak in the fuel lines. Refer to Vol. 1, SP.12, Crossfeed Operation.

Note: If fuel remaining is not approximately equal to dispatch fuel minus fuel used, it may indicate fuel is being lost overboard due to a fuel leak. If a fuel leak is suspected, the following initial actions should be taken to attempt to identify and isolate the source of the leak. A delay of several minutes may be required to observe possible fuel quantity abnormal condition(s) in this configuration.

1 Choose one:

◆ Center tank fuel **decreasing** at an abnormal rate:

▶▶ **Go to step 2**

◆ Center tank fuel is **not** decreasing at an abnormal rate:

▶▶ **Go to step 9**

2 Main tank FWD/AFT PUMP switches (all) ON

▼ **Continued on next page ▼**

▼ Fuel Leak continued ▼

- 3 CTR FWD/AFT PUMP switches. OFF
- 4 FUEL X FEED lever OFF
- 5 Choose one:
 - ◆ Center tank fuel **continues** decreasing at an abnormal rate:
 - ▶▶ **Go to step 6**
 - ◆ Center tank fuel does **not** continue decreasing at an abnormal rate:
 - ▶▶ **Go to step 8**
- 6 CTR FWD/AFT PUMP switches. As required

Note: Use center tank fuel as available.

Caution! If fuel quantity continues to decrease at an abnormal rate, consider requesting emergency services conduct an external inspection prior to taxi to parking.

- 7 Plan to land at the nearest suitable airport.
 - ■ ■ ■

- 8 Monitor main tank quantity.

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

- 9 **Either** main tank quantity decreasing at an abnormal rate:

Main Tanks FWD/AFT PUMP switches
(for tank with greater quantity) ON

Main Tanks FWD/AFT PUMP switches
(for tank with lesser quantity) OFF

FUEL X FEED lever OFF

Evaluate engine operation on suction feed.

- 10 Choose one:

◆ Failure of the engine using suction feed **occurs**:

▶▶ **Go to step 11**

◆ Failure of the engine using suction feed **does not** occur:

▶▶ **Go to step 15**

- 11 Throttle
(affected engine) . . . Confirm IDLE

- 12 FUEL switch
(affected engine) . . . Confirm OFF

- 13 ENG FIRE handle
(affected engine) Pull
(do not rotate)

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

14 FUEL X FEED lever As required

Note: Move FUEL X FEED Lever to ON (as required) and move fuel boost pump switches for supplying tank(s) to ON intermittently as required to make fuel available and maintain lateral balance.

Note: Use center tank fuel as available.

►► **Go to the Engine Failure or Shutdown checklist on page 7.7**



15 Center and Main Tank
pump switches As required

16 FUEL X FEED lever As required

Note: Move FUEL X FEED Lever to ON (as required) and move fuel boost pump switches for supplying tank(s) to ON intermittently as required to make fuel available and maintain lateral balance.

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

Caution! If a main tank fuel leak is suspected to be associated with an engine (may or may not be recognizable by high fuel flow), do not use associated thrust reverse on landing. Consider shutting down engine with the engine fire handle after landing (do not discharge agent). Request emergency services conduct an external inspection prior to taxiing to parking.

17 Continue to monitor fuel quantity and usage.

18 Plan to land at the nearest suitable airport.



Additional Information

A fuel leak may be confirmed by one or more of the following items:

- ENG L/R FUEL PRES alert displayed
- Visual observation of fuel leak or spray from either wing
- Strong odor of jet fuel in cabin area
- Excessive engine fuel flow
- Main tank fuel unbalance.

Approach with Less Than 1,000 lb
Fuel in Either Main Tank

Condition: May be accompanied with FUEL LEVEL LO alert.

Note: If a go-around is required, avoid sustained nose up attitudes in excess of 10°.

- 1 Fuel boost pump switches (all) ON
- 2 FUEL X-FEED lever ON
- 3 IGNITION switch ON

Note: A go-around is not recommended with less than 500 pounds fuel in each main tank or if both main tank aft pumps are inoperative.



BALST FUEL DISAG

Messages: BALST FUEL DISAG

Condition: Ballast fuel entry made without specifying ballast tank.

1 Choose one:

◆ On the **ground**:

Ballast fuel Verify

Verify correct quantity of ballast fuel
is loaded or revise FMS ballast fuel
entry, if required.



◆ In **flight**:

CTR PUMPS switches OFF



CTR PUMP LO

Messages: CTR FWD PUMP LO CTR AFT PUMP LO

Condition: A center tank fuel pump is not producing pressure.

Note: If both CTR FWD PUMP LO and CTR AFT PUMP LO messages are illuminated, turn off both CTR pump switches. Center tank fuel will not be available.

- 1 Failed CTR pump switch. OFF
- 2 Main tank pumps switches (both tanks) OFF
- 3 Choose one:

◆Center tank fuel is **decreasing**:

When center tank fuel quantity indicates 500 pounds, or on the approach checklist, whichever occurs first:

Main tank pumps switches
(both tanks) ON
CTR pump switch. OFF



◆Center tank fuel is **not** decreasing:

Main tank pumps switches
(both tanks) ON
CTR pump switch. OFF

Note: Center tank fuel will not be available.



FUEL OFF SCHEDULE

Messages: FUEL OFF SCHEDULE

Condition: Either the left or the right main tanks have low fuel while the center tank has usable fuel.

1 CTR FWD/AFT PUMP switches ON

2 Choose one:

◆ Center tank fuel feed is **normal**:

Continue operation.

Monitor fuel system.



◆ Center tank fuel feed is **not** normal:

Plan remainder of flight using 4000 pounds or less total fuel.

Plan to land at the nearest suitable airport.



FUEL QTY FAULT

Messages: FUEL QTY FAULT

Condition: Loss of fuel gauging in one or more fuel tanks.

1 QTY A/B switch Push

2 Choose one:

◆ FUEL QTY FAULT alert **remains displayed**:

FMS FUEL and GROSS WEIGHT on INIT page 2 will now be calculated using fuel flow only.

■ ■ ■ ■

◆ FUEL QTY FAULT alert **extinguishes**:

Fuel quantity alerts and system display data will be normal.

■ ■ ■ ■

FUEL QTY SYS FAIL

Messages: FUEL QTY SYS FAIL

Condition: Complete loss of fuel gauging on one channel.

- 1 QTY A/B switch Push
- 2 Choose one:

◆ FUEL QTY SYS FAIL alert **remains displayed**:

FMS FUEL and GROSS WEIGHT on INIT page 2 will now be calculated using fuel flow only.



◆ FUEL QTY SYS FAIL alert **extinguishes**:

Fuel quantity alerts and system display data will be normal.



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Non-Normal Checklists**Chapter NNC****Hydraulics****Section 13****Table of Contents**

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HYD L PRES LO

Messages: HYD L PRES LO

Condition: Left hydraulic system pressure is low.

Note: Loss of hydraulic fluid may result in an increasing quantity indication on affected side due to foaming.

- 1 TRANS pump switch OFF
- 2 **If** both left hydraulic pressure and left hydraulic quantity are zero:

▶▶ **Go to the Hydraulic System Failure (Left System) checklist on page 13.16**

- 3 Choose one:

◆ HYD L QTY LO alert **displayed**:

Caution! Do not operate transfer pump or both systems may lose hydraulic pressure.

▶▶ **Go to the HYD L QTY LO checklist on page 13.3**



◆ HYD L QTY LO alert **not** displayed:

▼ Continued on next page ▼

▼ HYD L PRES LO continued ▼

Note: Successful repressurization of affected hydraulic system may be possible at lower altitudes. If practical, delay repressurization attempt until approximately 10,000 feet MSL or 5,000 feet above destination airport elevation, whichever is higher.

▶▶ **Go to step 4**

4 **When** ready to attempt system repressurization,

Caution! If operating hydraulic system pressure is lost when TRANS pump switch is moved to ON, move TRANS pump switch to OFF.

TRANS pump switch ON

Note: Left system pressure should be indicated in approximately 15 seconds.

5 Choose one:

◆ HYD L PRESS LO alert **displayed**:

TRANS pump switch OFF

▶▶ **Go to the Hydraulic System Failure (Left System) checklist on page 13.16**



◆ HYD L PRESS LO alert **not** displayed:

No further crew action required.



**HYD L QTY LO
or
Hydraulic Left Quantity Decreasing
or Abnormally High**

Messages: HYD L QTY LO

Condition: Left hydraulic reservoir fluid quantity is too low.

Note: Loss of hydraulic fluid may result in an increasing quantity indication on affected side due to foaming.

Caution! Do not operate transfer pump or both systems may lose hydraulic pressure.

- 1 TRANS pump switch OFF
- 2 L PUMP switch OFF

Note: An attempt to repressurize the left hydraulic system for landing may be made if any hydraulic fluid remains.

Note: Successful repressurization of affected hydraulic system may be possible at lower altitudes. If practical, delay repressurization attempt until approximately 10,000 feet MSL or 5,000 feet above destination airport elevation, whichever is higher.

▼ Continued on next page ▼

▼ HYD L QTY LO or Hydraulic Left Quantity
Decreasing or Abnormally High continued▼

3 **When** ready to begin approach:

Choose one:

◆ Left system quantity **remaining**:

▶▶ **Go to step 4**

◆ Left system quantity **not** remaining:

▶▶ **Go to the Hydraulic System
Failure (Left System) checklist on
page 13.16**



4 L PUMP switch ON

Note: Left system pressure should be indicated
within approximately 15 seconds.

5 Choose one:

◆ Left system pressure **normal**:



◆ Left system pressure **not** normal:

▶▶ **Go to the Hydraulic System Failure
(Left System) checklist on page
13.16**



HYD L TEMP HI

Messages: HYD L TEMP HI

Condition: Left hydraulic system fluid temperature is too high.

Note: This alert may be displayed as the result of the following conditions:

- Hydraulic pump failure in the associated system
- Internal bypass or leakage of a hydraulic component within the affected system
- Pump cavitation due to excessive air in the system.

- 1 TRANS pump switch OFF
- 2 L pump switch OFF

Note: Successful repressurization of affected hydraulic system may be possible at lower altitudes. If practical, delay repressurization attempt until approximately 10,000 feet MSL or 5,000 feet above destination airport elevation, whichever is higher.

▼ Continued on next page ▼

▼ HYD L TEMP HI continued ▼

3 **When** ready to attempt system repressurization:

Caution! If operating hydraulic system pressure is lost when TRANS HYD PUMPS switch is moved to ON, move TRANS HYD PUMPS switch to OFF.

TRANS pump switch ON

Note: Left system pressure should be indicated in approximately 15 seconds.

4 Choose one:

- ◆ Left system pressure **normal**:
 ■ ■ ■ ■
- ◆ Left system pressure **not** normal:
 ▶▶ **Go to step 5**

5 TRANS pump switch OFF

6 L pump switch ON

Note: Left system pressure should be indicated in approximately 15 seconds.

▼ Continued on next page ▼

▼ HYD L TEMP HI continued ▼

7 Choose one:

◆ Left system pressure **normal**:



◆ Left system pressure **not** normal:

►► **Go to the Hydraulic System Failure
(Left System) checklist on page
13.16**



HYD R PRES LO

Messages: HYD R PRES LO

Condition: Right hydraulic system pressure is low.

Note: Loss of hydraulic fluid may result in an increasing quantity indication on affected side due to foaming.

- 1 TRANS pump switch OFF
- 2 AUX pump switch OFF
- 3 **If** both right hydraulic pressure and right hydraulic quantity are zero:
 - ▶▶ **Go to the Hydraulic System Failure (Right System) checklist on page 13.19**

▼ Continued on next page ▼

▼ HYD R PRES LO continued ▼

4 Choose one:

◆ HYD R QTY LO alert **displayed**:

Caution! Do not operate transfer pump or both systems may lose hydraulic pressure.

▶▶ **Go to the HYD R QTY LO checklist on page 13.11**



◆ HYD R QTY LO alert **not** displayed:

Warning! Rudder may revert to manual. If rudder reverts to manual, minimum approach speed is 144 KIAS until landing is assured.

Note: Successful repressurization of affected hydraulic system may be possible at lower altitudes. If practical, delay repressurization attempt until approximately 10,000 feet MSL or 5,000 feet above destination airport elevation, whichever is higher.

▶▶ **Go to step 5**

5 **When** ready to attempt system repressurization:

Verify rudder is neutral and rudder trim is zero.

▼ Continued on next page ▼

▼HYD R PRES LO continued▼

6 AUX pump switch ON

Note: Right system pressure should be indicated in approximately 15 seconds.

7 Choose one:

◆HYD R PRESS LO alert **not** displayed:



◆HYD R PRESS LO alert **displayed:**

►►Go to step 8

8 AUX pump switch OFF

Caution! If operating hydraulic system pressure is lost when TRANS pump switch is moved to ON, move TRANS pump switch to OFF.

9 TRANS pump switch ON

Note: Right system pressure should be indicated in approximately 15 seconds.

10 Choose one:

◆HYD R PRESS LO alert **not** displayed:



◆HYD R PRESS LO alert **displayed:**

►►Go to the Hydraulic System Failure (Right System) checklist on page 13.19



**HYD R QTY LO
or
Hydraulic Right Quantity
Decreasing or Abnormally High**

Messages: HYD R QTY LO

Condition: Right hydraulic reservoir fluid quantity is too low.

Note: Loss of hydraulic fluid may result in an increasing quantity indication on affected side due to foaming.

Caution! Do not operate transfer pump or both systems may lose hydraulic pressure.

- 1 TRANS pump switch OFF
- 2 R PUMP switch OFF
- 3 AUX pump switch OFF

Warning! Rudder will revert to manual. Minimum approach speed is 144 KIAS until landing is assured or right system pressure is restored.

Note: An attempt to repressurize the right hydraulic system for landing may be made if any hydraulic fluid remains.

▼ Continued on next page ▼

▼HYD R QTY LO or Hydraulic Right Quantity
Decreasing or Abnormally High continued▼

Note: Successful repressurization of affected hydraulic system may be possible at lower altitudes. If practical, delay repressurization attempt until approximately 10,000 feet MSL or 5,000 feet above destination airport elevation, whichever is higher.

4 **When** ready to attempt repressurization:

Choose one:

◆Right system quantity **remaining**:

▶▶Go to step 5

◆Right system quantity **not** remaining:

▶▶Go to the Hydraulic System
Failure (Right System) checklist
on page 13.19



- 5 Verify rudder is neutral and rudder trim is zero.
- 6 R PUMP switch ON
- 7 AUX pump switch ON

Note: Right system pressure should be indicated within approximately 15 seconds.

▼ Continued on next page ▼

▼HYD R QTY LO or Hydraulic Right Quantity
Decreasing or Abnormally High continued▼

8 Choose one:

◆ Right system pressure **normal**:



◆ Right system pressure **not** normal:

►► **Go to the Hydraulic System Failure
(Right System) checklist on page
13.19**



HYD R TEMP HI

Messages: HYD R TEMP HI

Condition: Right hydraulic system fluid temperature is too high.

Note: This alert may be displayed as the result of the following conditions:

- Hydraulic pump failure in the associated system.
- Internal bypass or leakage of a hydraulic component within the affected system.
- Pump cavitation due to excessive air in the system.

- 1 TRANS pump switch OFF
- 2 R pump switch OFF
- 3 AUX pump switch OFF

Warning! Rudder will revert to manual. Minimum approach speed is 144 KIAS until landing is assured or right system pressure is restored.

Note: Successful repressurization of affected hydraulic system may be possible at lower altitudes. If practical, delay repressurization attempt until approximately 10,000 feet MSL or 5,000 feet above destination airport elevation, whichever is higher.

▼ Continued on next page ▼

▼ HYD R TEMP HI continued ▼

- 4 **When** ready to attempt system repressurization:
Verify rudder is neutral and rudder trim is zero.

- 5 AUX pump switch ON

Note: Right system pressure should be indicated in approximately 15 seconds.

- 6 Choose one:

◆ Right system pressure **normal**:



◆ Right system pressure **not** normal:

►► **Go to step 7**

- 7 AUX pump switch OFF

- 8 R pump switch ON

Note: Right system pressure should be indicated in approximately 15 seconds.

- 9 Choose one:

◆ Right system pressure **normal**:



◆ Right system pressure **not** normal:

►► **Go to the Hydraulic System Failure
(Right System) checklist on page
13.19**



**Hydraulic System Failure
(Left System)**

Condition: Left hydraulic quantity and/or pressure indicate zero.

Note: If pressure is low/zero, but quantity is normal or increasing, accomplish the HYD L PRES LO checklist first.

- 1 LEFT PUMP switch OFF

Caution! Do not operate transfer pump or both systems may lose hydraulic pressure. Several minutes may be required for the operating hydraulic system to regain pressure.

- 2 TRANS pump switch OFF
- 3 Use normal flap/slat configuration.

Inoperative Items

Inboard spoiler panels inop

The following will work on accumulator pressure:
Left thrust reverser

- 4 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ Hydraulic System Failure (Left System) continued ▼

Deferred Items

Descent Checklist

Altimeters	___, xckd	C&F
■ Minimums	___, ___, xckd	C&F
■ Landing data	___, ___,	C&F
■ Approach briefing	complete	PM
TRANS pump switch	OFF	PM
AUX pump switch	ON	PM
Seat belt signs	ON	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	___, xckd	C&F

Landing Considerations

Do **not** use autoland.

Use normal landing gear extension.

▼ Continued on next page ▼

▼ Hydraulic System Failure (Left System) continued ▼

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Spoilers	ARM	C&F
EAD.	ckd	PM

After Landing

Note: Nosewheel steering to right may be restricted.

Left thrust reverser may remain deployed.

Use single engine taxi as required.



Hydraulic System Failure (Right System)

Condition: Right hydraulic quantity and/or pressure indicate zero.

Note: If pressure is low/zero, but quantity is normal or increasing, accomplish the HYD R PRES LO checklist first.

1 RIGHT PUMP switch OFF

Caution! Do not operate transfer pump or both systems may lose hydraulic pressure. Several minutes may be required for the operating hydraulic system to regain pressure.

2 TRANS & AUX pump switches. OFF

3 Use normal flap/slat configuration.

Inoperative Items

Outboard spoiler panels inop

If the landing gear is not down and locked, plan on alternately extending the landing gear.

The following will work on accumulator pressure:

Right thrust reverser

4 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼Hydraulic System Failure (Right System) continued▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____,____, xckd	C&F
■Landing data	____,____,	C&F
■Approach briefing	complete	PM
TRANS pump switch	OFF	PM
AUX pump switch	OFF	PM
Seat belt signs	ON	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	____ , xckd	C&F

▼ Continued on next page ▼

▼ Hydraulic System Failure (Right System) continued ▼

Landing Considerations

Warning! Minimum approach speed is 144 KIAS until landing is assured.

Do **not** use autoland.

Select runway with minimum crosswind.

If landing gear is **not** down and locked:

Accomplish following ALT GEAR EXTENSION steps.

After alternate extension the landing gear cannot be retracted unless the right hydraulic system is pressurized.

Landing gear handle Down

Emergency gear
extension lever Pull full up/latched

Raise cover, forcibly pull emergency gear extension lever to full up position and check holding latch is engaged.

Gear lights 3 GREEN

Aircraft may have to slow to Vapp to allow nose gear to lock down.

GEAR DOOR OPEN alert will be displayed.

Stop on the runway. Gear doors will contact the runway at low speeds.

▼ Continued on next page ▼

▼Hydraulic System Failure (Right System) continued▼

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Spoilers	ARM	C&F
EAD.	ckd	PM

▼ Continued on next page ▼

▼Hydraulic System Failure (Right System) continued▼

Prior to Taxiing or Towing

Have ground crew install landing gear pins prior to taxi or tow.

Caution! Do not stow the emergency landing gear extension lever until the malfunction has been corrected or until the main landing gear bypass lever has been activated.

EMERG GEAR EXT lever Stow

After contacting ground crew, coordinate lever stowing to allow gear doors to be latched in the UP position.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

Close and latch main gear doors manually.

Note: Nosewheel steering to left may be restricted.
Right thrust reverser may remain deployed.

Use single engine taxi as required.



**HYD L & R FAIL
or
Landing with No Hydraulic Pressure
or
Loss of Both Hydraulic Systems**

Messages: HYD L & R FAIL

Condition: Both left and right hydraulic systems have failed.

Note: If flaps and/or slats are extended, they will remain in their last selected position.

Note: Speed brakes/ground spoilers will not be available. Rudder will revert to manual.

Note: Use longest available runway for existing conditions.

Note: The crosswind capability of the airplane is greatly reduced. Select a runway with minimum crosswind and use differential braking as necessary for control on the runway.

Note: Plan a wide pattern and longer than normal final approach for speed stabilization on final.

Note: If the landing gear is not down and locked, plan on alternately extending the landing gear.

▼ Continued on next page ▼

**▼ Loss of Both Hydraulic Systems or
Landing with No Hydraulic Pressure or HYD L & R FAIL continued ▼**

- 1 HYDRAULICS panel all pumps OFF
- 2 Gross weight Reduce
Reduce gross weight to lowest practicable.

3 Checklist Complete Except Deferred Items

Deferred Items

Descent Considerations

Refer to the ODM, Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, HYD L & R FAIL table to determine actual landing distance.

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____,____, xckd	C&F
■Landing data	____,____,	C&F
■Approach briefing	complete	PM
HYDRAULICS panel . . . All pumps OFF		PM
Seat belt signs	ON	PM

Approach Considerations

Plan a wide pattern and longer than normal final approach for speed stabilization on final. Maintain a normal glideslope.

▼ Continued on next page ▼

▼ Loss of Both Hydraulic Systems or
Landing with No Hydraulic Pressure or HYD L & R FAIL continued ▼

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	____, xckd	C&F

Landing Considerations

**Warning! Minimum approach speed is 144 KIAS
until landing is assured.**

If flaps/slats are not 25/EXT or 40/EXT:
GND PROX WARN switch OVRD

If landing gear is **not** down and locked:
Accomplish following ALT GEAR EXTENSION
steps.
After alternate extension the landing gear
cannot be retracted unless the right
hydraulic system is pressurized.

Landing gear handle Down
Emergency gear
extension lever Pull full up/latched
Raise cover, forcibly pull emergency gear
extension lever to full up position and
check holding latch is engaged.

▼ Continued on next page ▼

▼ Loss of Both Hydraulic Systems or
Landing with No Hydraulic Pressure or HYD L & R FAIL continued ▼

Gear lights 3 Green

Aircraft may have to slow to Vapp to allow
nose gear to lock down.

GEAR DOOR OPEN alert will remain
displayed.

Stop on the runway. Gear doors will
contact the runway at low speeds.

Autothrottles As desired

Note: If flaps are less than 25, autothrottles must
be disconnected before 50 feet AGL.

Autopilot As desired

Note: Autopilot must be disconnected before 100
feet AGL.

Make positive main gear touchdown to minimize
float. Do not delay lowering nose to runway (thrust
reversers will not deploy until NLG is compressed).

Anticipate slower than normal pitch rate for landing.

**Caution! Do not apply brakes until NLG is on
ground.**

▼ Continued on next page ▼

▼ Loss of Both Hydraulic Systems or
Landing with No Hydraulic Pressure or HYD L & R FAIL continued ▼

Braking Maximum available to complete stop

Apply steady symmetrical brake pedal force all the way to mechanical stops to minimize accumulator pressure loss. Use differential braking to maintain directional control as rudder control deteriorates at lower speed.

Landing Checklist

- Landing gear down C&F
- Flaps ____, ____ C&F
- Spoilers disarmed** C&F
- EAD. ckd PM

▼ Continued on next page ▼

▼ Loss of Both Hydraulic Systems or
Landing with No Hydraulic Pressure or HYD L & R FAIL continued ▼

Additional Deferred Items

Warning! Do not use asymmetrical reverse thrust to maintain directional control.

Reverse thrust Maximum reverse

Note: Immediately apply symmetrical reverse thrust. Reduce to idle reverse if directional control problems occur. At 110 KIAS, reduce to idle reverse.

Note: Maintain idle reverse until airplane is stopped and parking brake is set.

Note: Thrust reversers will not stow.

Stop on the runway.

Prior to Towing

Have ground crew install landing gear pins prior to towing.

Caution! Do not stow the emergency landing gear extension lever until the malfunction has been corrected or until the main landing gear bypass lever has been activated.

▼ Continued on next page ▼

**▼ Loss of Both Hydraulic Systems or
Landing with No Hydraulic Pressure or HYD L & R FAIL continued ▼**

Emergency gear extension lever Stow

After contacting the ground crew, coordinate lever stowing to allow gear doors to be latched in the UP position.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

Have ground crew close and latch main gear doors manually.



Non-Normal Checklists**Chapter NNC****Landing Gear****Section 14****Table of Contents**

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Abnormal Flight Mode Annunciations After Landing Gear Extension

Condition: Abnormal flight mode annunciations exists after landing gear extension.

Caution! Flight Director will display an incorrect pitch command until selected to OFF.

Note: If any of the following indications appear when the landing gear is extended and the nosewheel is down and locked, it may be an indication of a ground sensing problem:

- FLIGHT MODE ANNUNCIATOR (FMA): Roll Control Window mode will change to TAKEOFF. The Altitude Control Window thrust mode annunciation will change to T/O CLAMP, and autothrottles, if engaged, will not provide speed control.
- Autopilot, if engaged, will disconnect and cannot be re-engaged while the landing gear is extended.
- Flight Director pitch bar will command an incorrectly referenced high pitch attitude, and roll bar will command heading hold. The Flight Director will not track ILS, VOR, or FMS NAV mode guidance.
- CABIN PRESSURIZED Level 2 alert may be displayed, and cabin will depressurize as it would after landing.

1 Autothrottles (if engaged) Disconnect

▼ Continued on next page ▼

▼ Abnormal Flight Mode Annunciations
After Landing Gear Extension continued ▼

Caution! Auto spoilers must be disarmed to prevent deployment of ground spoilers before main wheel touchdown. Failure to disarm auto spoilers will allow ground spoilers to deploy automatically at approximately 7 feet radio Altimeter Altitude (RA).

2 Auto spoilers DISARM

Note: If runway has been acquired visually, and the crew elects to continue the approach, autothrottles will not provide speed control. Flight Director command bars should be turned off or disregarded. If the runway is not in sight and/or the airplane is IMC, the crew may elect to discontinue the approach.

3 Choose one:

- ◆ Captain elects to **discontinue** approach:
 - ▶▶ **Go to step 4**
- ◆ Captain elects to **continue** approach:
 - ▶▶ **Go to step 9**

▼ Continued on next page ▼

▼ Abnormal Flight Mode Annunciations
After Landing Gear Extension continued ▼

4 Go around. Initiate

Caution! Flight Director pitch bar will continue to display incorrect pitch and roll commands, and Autopilot and autothrottles will not be available until after landing gear is retracted.

Push TOGA switch on left or right throttle lever while simultaneously pushing throttle levers to stop. Adjust pitch attitude as necessary to establish positive climb at safe airspeed.

Note: After landing gear is up and locked, all Flight Director and FMA indications should return to normal and may be referenced. Autopilot and autothrottles will function normally.

Caution! Do not reset CBs K-32 and L-32 until after landing.

- 5 GROUND CONTROL RELAY
CBs K-32 and L-32 (Upper EPC) Pull
- 6 Refer to the ODM, Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, ABNORMAL FLIGHT MODE ANNUNCIATIONS AFTER LANDING GEAR EXTENSION table.

▼ Continued on next page ▼

**▼ Abnormal Flight Mode Annunciations
After Landing Gear Extension continued ▼**

- 7 **Prior** to final approach fix:
- CABIN PRESS SYSTEM switch MANUAL
 - CABIN PRESS MANUAL rate selector . . . CLIMB
 - Observe outflow VALVE position indicator moves to the full OPEN (OP) position.

Do not arm auto spoilers.

Upon touchdown, manually deploy ground spoilers.

- 8 **After** landing:
- GROUND CONTROL RELAY
 - CBs K-32 and L-32 (Upper EPC) Reset
 - AIR FOIL Anti-Ice switches (both) OFF
- ■ ■ ■

- 9 No further crew action required.
- ■ ■ ■

ANTISKID FAIL

Messages: ANTISKID L FAIL ANTISKID R FAIL

Condition: Anti-skid failed.

1 Landing performance Check

Refer to the ODM, Abnormal section, ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS section, ANTISKID FAIL table to determine landing distance with anti-skid inoperative.

2 Perform normal landing.

Caution! Do not initiate manual braking until nosewheel is on the runway and the ground spoilers have fully deployed.

3 Brakes. Apply smoothly and gradually

4 Use maximum landing flaps. Consider reducing airplane weight. Select longest runway available for existing conditions. Use full reverse thrust. Apply brakes smoothly and gradually until a moderate deceleration is felt. This manual braking technique is intended to prevent wheel lockup and blown tires.



BRAKE OVERHEAT

Messages: BRAKE OVERHEAT

Condition: Brake temperature high.

Note: BRAKE OVERHEAT alert displays when any one brake temperature exceeds 260°C and extinguishes when brakes cool to 230°C.

1 Choose one:

◆ On the **ground**:

▶▶ Go to step 2



◆ In **flight**:

▶▶▶ Go to step 3

2 Stop airplane as soon as practical. Do not set parking brake.

Warning! Ground crew must remain clear of main gear. Fuse plugs may melt.

Note: Brakes, wheels and tires will require maintenance inspection before next flight.



3 Flight conditions permitting, extend gear until 5 minutes after BRAKE OVERHEAT alert extinguishes.



GEAR DOOR OPEN

Messages: GEAR DOOR OPEN

Condition: One of the main landing gear doors is open.

Note: This procedure should be used when hydraulic pressure is normal and gear handle is down.

- 1 Emergency gear extension lever Pull full up/latched
Raise cover, forcibly pull emergency gear extension lever to full up position and check holding latch is engaged
- 2 Gear lights. 3 green
GEAR DOOR OPEN alert will remain displayed.
Gear doors will contact the runway at low speeds.
Nosewheel steering to left will be restricted.
- 3 Stop airplane on runway.
- 4 **Prior** to taxi or tow:
Have ground crew install landing gear pins prior to taxiing or towing.

▼ Continued on next page ▼

▼ GEAR DOOR OPEN continued ▼

Caution! Do not stow the emergency landing gear extension lever until the malfunction has been corrected or until the main landing gear bypass lever has been activated.

- 5 Emergency gear extension lever. Stow

After contacting ground crew, coordinate lever stowing to allow gear doors to be latched in the UP position.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

- 6 Have ground crew close and latch main gear doors manually.



Gear Handle Will Not Move to Down Position

Condition: Gear handle will not move to the down position.

- 1 Airspeed 230 KIAS max
- 2 Emergency gear extension lever Pull full up/latched
Raise cover, forcibly pull emergency extension lever to full up position and check holding latch is engaged.
- 3 Aircraft may have to slow to VREF to allow nose gear to lock down.
- 4 Gear lights. 3 GREEN
- 5 Gear handle. Down

▼ Continued on next page ▼

▼ Gear Handle Will Not Move to Down Position continued ▼

6 Choose one:

◆ Gear handle moves **down**:

Emergency gear
extension lever Stow

To stow the lever: While initially
pulling back on the emergency
landing gear extension lever, apply
left (inboard) pressure at the base of
the hold up locking arm.



◆ Gear handle remains **up**:

GEAR DOOR OPEN alert will remain
displayed.

Gear doors will contact the runway at low
speeds.

Nosewheel steering to the left will be
restricted.

7 **Prior** to taxiing or towing:

Have ground crew install landing gear pins prior
to taxi or tow.

▼ Continued on next page ▼

▼ Gear Handle Will Not Move to Down Position continued ▼

Caution! Do not stow the emergency landing gear extension lever until the malfunction has been corrected or until the main landing gear bypass lever has been activated.

- 8 Emergency gear extension lever Stow

After contacting ground crew, coordinate lever stowing to allow gear doors to be latched in the UP position.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

- 9 Have ground crew close and latch main gear doors manually.



**Gear Handle Will Not Move to Up
Position**

Condition: Gear handle will not move to the up position.

1 Airspeed 230 KIAS Max

2 Choose one:

◆ Nose steering wheel **locked** and index **centered**:

Note: Indicates failure of gear anti-retract mechanism.

▶▶ **Go to step 3**

◆ Nose steering wheel **steerable** and index is **not centered**:

▶▶ **Go to step 5**

3 GEAR HDL REL button Push/Hold

4 Gear handle Up



5 Do not retract gear.

**Caution! Nosewheel may not be centered and
damage may occur if gear is retracted.
Do not exceed 300 KIAS/.70 Mach.**

▼ Continued on next page ▼

▼ Gear Handle Will Not Move to Up Position continued ▼

6 Choose one:

◆ Ground sensing circuit in ground mode:

Note: The following are indications of ground sensing circuit in ground mode while in flight:

- Autopilot will not engage
- Cabin fails to pressurize
- T/O warning may sound.

►► **Go to the Ground Sensor Failure checklist on page 14.20**



◆ Ground sensing circuit not in ground mode:

If continuing flight to destination, consider fuel and ATC requirements.



**Gear Unsafe indications with Gear
Handle Down**

Condition: Gear unsafe indications with the gear handle down.

Note: For a faulty gear down light, the position of the landing gear may be verified by displaying the CONFIG page on the SD. If 3 down indications are verified on the CONFIG page no further crew action is required.

Note: If any gear indicator indicates unsafe, gear aural warning will sound until 100 feet AGL prior to touchdown.

Note: It may be necessary to decrease airspeed to allow nose gear to lock down.

- 1 Emergency gear extension lever. Pull full up/latched
Raise cover, forcibly pull emergency gear extension lever to full up position and check holding latch is engaged.

▼ Continued on next page ▼

**▼ Gear Unsafe Light(s) Illuminate with
Gear Handle Down continued ▼**

2 Choose one:

◆ All 3 gear indicate safe:

▶▶ Go to step 3

◆ Any gear indicates unsafe:

▶▶ Go to step 10

3 Emergency gear
extension lever Stow

While initially pulling back on the emergency
landing gear extension lever, apply left
(inboard) pressure at the base of the hold up
locking arm.

4 Choose one:

◆ All gear indications remain safe:



◆ Any gear indication unsafe:

▶▶ Go to step 5

▼ Continued on next page ▼

▼ Gear Unsafe Light(s) Illuminate with Gear Handle Down continued ▼

- 5 Emergency gear extension lever. Pull full up/latched
Raise cover, forcibly pull emergency gear extension lever to full up position and check holding latch is engaged.
GEAR DOOR OPEN alert will remain displayed.
Gear doors will contact runway at low speeds.
Nosewheel steering to left may be restricted.
- 6 Stop airplane on runway.
- 7 **Prior** to taxiing or towing:
Have ground crew install landing gear pins prior to taxi or tow.

Caution! Do not stow the emergency landing gear extension lever until the malfunction has been corrected or until the main landing gear bypass lever has been activated.

▼ Continued on next page ▼

▼ Gear Unsafe Light(s) Illuminate with
Gear Handle Down continued ▼

- 8 Emergency gear
extension lever Stow

After contacting ground crew, coordinate lever stowing to allow gear doors to be latched in the UP position.

To stow the lever: While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

- 9 Have ground crew close and latch main gear doors manually.



- 10 Emergency gear
extension lever Stow

While initially pulling back on the emergency landing gear extension lever, apply left (inboard) pressure at the base of the hold up locking arm.

►► **Go to the Landing with Abnormal
Landing Gear Configuration checklist on
page 14.23**



**Gear Unsafe Light(s) Illuminate
with Gear Handle Up**

Condition: Gear unsafe light (s) illuminate with the gear handle up.

- 1 Airspeed 230 KIAS max
- 2 HYDRAULICS TRANS and AUX pumps ON
- 3 Gear handle Down

4 Choose one:

◆ All 3 gear indicate **green**:

▶▶ **Go to step 5**

◆ All 3 gear do **not** indicate green:

▶▶ **Go to the Landing with Abnormal
Landing Gear Configuration
checklist on page 14.23**



5 Choose one:

◆ Landing gear/tire damage **suspected**:

Do not retract gear.
Plan to land at the nearest suitable airport.



◆ Landing gear/tire damage is **not** suspected:

▶▶ **Go to step 6**

- 6 Gear handle Up

▼ Continued on next page ▼

▼ Gear Unsafe Light(s) Illuminate with
Gear Handle Up continued ▼

7 Choose one:

◆ All gear lights **extinguished**:



◆ All gear lights **not** extinguished:

Airspeed 300 KIAS max/.70 M



Ground Sensor Failure

Condition: Ground shift mechanism did not shift to flight mode.

Note: When ground shift mechanism does not shift to flight mode, some systems will not be in normal mode:

- Autopilot cannot be engaged
- Takeoff warning sounds when flaps or slats are retracted
- Cabin fails to pressurize.

1 GROUND CONTROL RELAY CBs
K-32 and L-32 (upper EPC) Pull

2 **During** approach and just prior to final approach fix:

CABIN PRESS SYSTEM switch MANUAL

CABIN PRESS MANUAL rate selector . . . CLIMB

Observe outflow VALVE indicator moves to full OP.

Do not arm auto spoilers.

3 Upon touchdown, manually deploy ground spoilers.

Note: With ground control relay circuit breakers pulled, thrust reversers will not be available and engines will remain in flight idle mode.

▼ Continued on next page ▼

▼ Ground Sensor Failure continued ▼

4 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____,____, xckd	C&F
■Landing data	____,____,	C&F
■Approach briefing	complete	PM
Hydraulic panel.	.set	PM
Seat belt signs	ON	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	____ , xckd	C&F

▼ Continued on next page ▼

▼ Ground Sensor Failure continued ▼

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Spoilers	disarmed	C&F
EAD.	ckd	PM

Additional Deferred Items

After landing:

- GROUND CONTROL RELAY CBs
- K-32 and L-32 (upper EPC) RESET
- AIR FOIL anti-ice switches (both) OFF



Landing with Abnormal Landing Gear Configuration

Condition: At least one of the nose or main gear is not down and locked.

Note: Refer to FCTM, chapter 8, Flight Crew Duties Summary for Emergency Landing/Ditching Evacuation.

Note: If time and circumstances permit, direct crew to take appropriate crash landing action.

- 1 NO SMOKE/SEAT BELTS switches ON
- 2 Landing gross weight Reduce
- 3 Plan a flaps 40 landing.
- 4 GROUND PROXIMITY WARNING COMPUTER
CB: (F20) Pull
- 5 APU MASTER switch OFF

Shut down the APU for landing unless it is the sole source of electrical power.

6 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ Landing with Abnormal Landing Gear Configuration continued ▼

Deferred Items

Descent Checklist

Altimeters	___, xckd	C&F
■ Minimums	___, ___, xckd	C&F
■ Landing data	___, ___,	C&F
■ Approach briefing	complete	PM
Hydraulic panel	set	PM
Seat belt signs	ON	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters	___, xckd	C&F

Additional Deferred Items

L and R PACK switches	OFF

Note: When air conditioning input is shut off, cabin altitude may ascend at approximately 4,000 fpm (at full differential pressure) until outflow valve is fully closed. When outflow valve is closed, rate of ascent will be approximately 1,000 fpm (depending on airplane configuration).

▼ Continued on next page ▼

▼ Landing with Abnormal Landing Gear Configuration continued ▼

CABIN PRESS SYSTEM switch MANUAL

CABIN PRESS MANUAL rate selector CLIMB

Note: Cabin is depressurized to ensure all doors and exits can be readily opened.

Landing Procedure Review

Any gear which can be extended should be extended for landing whether on a prepared or unprepared surface.

Note: Nosewheel will provide some additional directional control if extended. Main gear is designed to shear as required and will provide protection for fuselage.

Perform normal approach for landing.

If nose gear unsafe, both main gear extended:

Ensure gear handle is down and spoilers are armed for deployment at touchdown.

At touchdown PF begin actuating trim control to nose up to assist in holding nose off runway.

PM monitor spoiler deployment and manually deploy spoilers if necessary.

After touchdown PF should hold nose off until approximately 80 KIAS. Idle reverse thrust may be used with caution for deceleration. Under normal conditions, deployment of thrust reversers while airplane is in excess of 8° nose high attitude may result in thrust reversers striking runway.

▼ Continued on next page ▼

▼ Landing with Abnormal Landing Gear Configuration continued ▼

While elevator control is still effective, lower nosewheel gently to runway.

Upon nose contact, use maximum braking (within limits of directional control) to stop airplane.

After stopping, do the Evacuation checklist, if needed.

▶▶ Go to Landing Checklist below

If one main gear partially or fully retracted:

Note: Consideration should be given to selecting the widest runway available for landing due to the possibility of severe directional control difficulties. Consider touching down on the side of the runway corresponding to extended main gear.

Perform normal approach for landing. Ensure that gear handle is down and that spoilers are disarmed and not used during landing.

Touch down on extended main gear. While elevator control is still effective, lower nose gear gently to runway and hold wings level with ailerons as long as possible.

Maintain directional control with nosewheel steering.

After stopping, do the Evacuation checklist, if needed.

▶▶ Go to Landing Checklist below

▼ Continued on next page ▼

▼ Landing with Abnormal Landing Gear Configuration continued ▼

If other combination of extended/retracted landing gear exists:

Perform normal approach for landing. Ensure that gear handle is down and that spoilers are disarmed and not used during landing.

Touch down on main gear, if extended, and hold nose off as long as possible.

Lower nose gently to runway and hold wings level with ailerons as long as possible.

Maintain directional control with nosewheel steering (if available).

After stopping, do the Evacuation checklist, if needed.

►► Go to Landing Checklist below

Landing Checklist

Landing gear	down	C&F
Flaps	40, 40	C&F
Spoilers	as required	C&F
EAD.	ckd	PM



Tire Failure

Condition: One or more tires have failed or are suspected to have failed.

Note: Aircraft vibration or the blowout of a tire should provide external cues of a tire failure.

1 Choose one:

◆ **Before** takeoff roll:

Do not takeoff.



◆ **After** takeoff roll:

▶▶ **Go to step 2**

2 Reject or continue take off, depending on conditions.

Note: At speeds in excess of V1-20, consider continuing takeoff. Stopping performance is degraded with tire failure.

3 Choose one:

◆ Landing gear **extended**:

Do not retract landing gear.

▶▶ **Go to step 4**



◆ Landing gear is **not** extended:

▶▶ **Go to step 4**

▼ Continued on next page ▼

▼ Tire Failure continued ▼**4 Prior to landing:**

Gross weight Reduce as required



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Non-Normal Operational InformationChapter NNOI

Non-Normal Ops Info

Section 1

ILS Approach Equipment Requirements (Not for Dispatch)

If operable, both the autopilot and flight director will be utilized for all ILS approaches when the reported weather is below 4,000 RVR or 3/4 mile.

Equipment Required	CAT I	CAT II	CAT III
ADIRU	(1) 2 in Nav (B)	2 in Nav	2 in Nav
Air Data Computer (ADC)	1	2	2
Auto Pitch Trim	0	1	1
Auto Spoilers	0	0	0
Autopilot(s) and/or Flight Director Displays	1 or 1 (D)	1 A/P and 2 F/Ds (A)	1 A/P and 2 F/Ds (A)
Autothrottles	0	1	1
Display Units	2 or more	4 or more	4 or more
Electrical Power Sources	1	2	2
Engines Operating	1 or 2 (C)	1 or 2 (C)	1 or 2 (C)
Flight Control Computer (FCC)	1	1	1
Hydraulics Systems	1	2	2
ILS/Multi Mode Receiver	1	2	2
MCDU	1	1	1
Radio Altimeter(s)	1	2	2
VIA	1	2	2

Notes:

(A) Autopilot must be on.

(B) Only one ADIRU required when flying a CAT I flight director only.

(C) Single engine use flaps 25.

(D) For approaches with “autopilot coupled approaches not authorized” restrictions, hand-flown CAT I are authorized to applicable minimums with an operable flight director.

RNAV Approach Equipment Requirements (Not for Dispatch)

Equipment Required	RNAV (GPS)	RNAV (RNP)
ADIRU	2	Not authorized
Autopilot	1	Not authorized
Autothrottles	0	Not authorized
EGPWS	0	Not authorized
Electrical Power Sources	1	Not authorized
Flight Director	1	Not authorized
FMC with current navigation database	1	Not authorized
Go-Around switches	1	Not authorized
GPS	1	Not authorized
MCDU	1	Not authorized
Nav Display	1	Not authorized
PFD	1	Not authorized
Radar Altimeter	1	Not authorized

RNAV Enroute Equipment Requirements (Not for Dispatch)

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Non-Normal Checklist Instructions Chapter NNCI

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Non-Normal Checklist Instructions Chapter NNCI

Non-Normal Checklists Section 1

Introduction

The non-normal checklists chapter contains checklists used by the flight crew to manage non-normal situations. The checklists are grouped in sections which match the system description chapters in Volume 2.

Most checklists correspond to a light, alert or other indication. In most cases, the MASTER CAUTION and system annunciator lights also illuminate to indicate the non-normal condition. These lights, alerts and other indications are the cues to select and do the associated checklist.

Checklists without a light, alert or other indication are called unannunciated checklists. Most unannunciated checklists are in the associated system section. For example, Fuel Leak is in section 12, Fuel. Unannunciated checklists with no associated system (such as Volcanic Ash) are in section 0, Miscellaneous. In addition, the Miscellaneous section contains checklists titled “Considerations.” These checklists are designed to assist crewmembers in the decision making process to accomplish a non-normal maneuver (such as a decision to perform an overweight landing), assist in the preparation and execution of a non-normal maneuver (such as preparation for a ditching), and/or provide considerations that should be taken into account after a non-normal maneuver has been executed (such as post RTO). These checklists should be referenced as time and conditions allow.

All checklists have condition statements. The condition statement briefly describes the situation that caused the light, alert or other indication. Unannunciated checklists also have condition statements to help in understanding the reason for the checklist.

Some checklists have objective statements. The objective statement briefly describes the expected result of doing the checklist or briefly describes the reason for steps in the checklist.

Checklists can have both memory and reference items. Memory items are critical steps that must be done before reading the checklist. Condition, objective and precaution statements, and notes associated with memory items (i.e., above the dashed line) support action steps and are not considered memory items. The last memory item is followed by a dashed horizontal line. Reference items are actions to be done while reading the checklist.

Note: Crewmembers must maintain a sufficient knowledge of all designated memory items so that they can accomplish the critical steps in proper sequence without omission. Verbatim memorization of the steps is not required.

Some checklists have additional information at the end of the checklist. The additional information provides data the crew may wish to consider. The additional information does not need to be read.

Checklists that need a quick response are listed in the Quick Action Index. In each system section, Quick Action Index checklists are listed first, followed by checklist that are not in the Quick Action Index. The titles of Quick Action Index checklists are printed in **bold** type. Checklist titles in upper case (such as AIRFLICE PRES ABNML) are annunciated by a message, light, alert, or other indication. Checklist titles in upper and lower case (such as Windshield Arcing) are not annunciated. Some checklist titles are shown in a larger font (such as Evacuation) to make them easier to read under conditions where crewmembers may be wearing an oxygen mask or under conditions of reduced visibility.

Non-Normal Checklist Operation

General

Non-normal checklists start with steps to correct the situation. If needed, information for planning the rest of the flight is included. When special items are needed to configure the airplane for landing, the items are included in the Deferred Items section of the checklist. Flight patterns for some non-normal situations are located in the Flight Crew Training Manual (FCTM) and show the sequence of configuration changes.

If a checklist or a step in a checklist is not applicable to all airplanes, airplane effectivity information is included in the checklist. Airplane effectivity can be listed by ship number or airplane model. If a checklist is applicable to some but not all airplanes, airplane effectivity is centered below the checklist title. If a step in a checklist is applicable to some but not all airplanes, airplane effectivity is included above the step. If a checklist or a step in a checklist is applicable to all airplanes, airplane effectivity information is not included.

After engine start and before takeoff, illumination of a red warning light, an amber caution light, an alert or other indication requires completion of the associated checklist.

While every attempt is made to supply needed non-normal checklists, it is not possible to develop checklists for all conceivable situations. In some smoke, fire or fumes situations, the flight crew may need to move between the Smoke, Fire or Fumes checklist and the Smoke or Fumes Removal checklist. In some multiple failure situations, the flight crew may need to combine the elements of more than one checklist. In all situations, the captain must assess the situation and use good judgment to determine the safest course of action.

Landing at the Nearest Suitable Airport

There are some situations where the flight crew must land at the nearest suitable airport. These situations include, but are not limited to, conditions where:

- the non-normal checklist includes the item “Plan to land at the nearest suitable airport.”
- fire or smoke continues
- only one AC power source remains (engine or APU generator)
- any other situation determined by the flight crew to have a significant adverse effect on safety if the flight is continued.

Land Immediately

It must be stressed that for smoke that continues or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and evacuation must be done.

If a smoke, fire or fumes situation becomes uncontrollable, the flight crew should consider an immediate landing. Immediate landing implies immediate diversion to a runway. However, in a severe situation, the flight crew should consider an overweight landing, a tailwind landing, an off-airport landing, or a ditching.

Checklists Directing Engine Shutdown

Checklists directing an engine shutdown must be evaluated by the captain to determine whether an actual shutdown or operation at reduced thrust is the safest course of action. Consideration must be given to the probable effects of running the engine at reduced thrust.

There are no non-normal checklists for the loss of an engine indication or automatic display of the secondary engine indications. Continue normal engine operation unless a limit is exceeded.

Non-Normal Checklist Assumptions

Non-normal checklists assume:

- During engine start and before takeoff, the associated non-normal checklist is done if a non-normal situation is identified. After completion of the checklist, consult the Minimum Equipment List (MEL) to determine if dispatch relief is available.
- System controls are in the normal configuration for the phase of flight before the start of the non-normal checklist.
- If the MASTER CAUTION and system annunciator lights illuminate, all related amber lights are reviewed to assist in recognizing the cause(s) of the alert.
- Aural alerts are silenced and the master caution system is reset by the flight crew as soon as the cause of the alert is recognized.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks to remove contaminants. The 100% position of the oxygen regulator is used when positive pressure is not needed but contamination of the flight deck air exists. The Normal position of the oxygen regulator is used if prolonged use is needed and the situation allows. Normal boom microphone operation is restored when oxygen is no longer in use.
- Indicator lights are tested to verify suspected faults.

Circuit Breaker Reset

WARNING: Do not reset any tripped fuel pump or hydraulic auxiliary pump circuit breakers. [AFM]

Flight crew reset of a tripped circuit breaker is not recommended unless directed by a non-normal checklist.

However, a tripped circuit breaker may be reset once, after a short cooling period if, in the judgment of the captain, the situation resulting from the circuit breaker trip has a significant adverse effect on safety. A reset of a tripped circuit breaker should only be accomplished after maintenance and the flight crew have determined it is safe to reset the circuit breaker.

Flight crew may cycle (pull and reset) the circuit breaker(s) of a degraded or inoperative system (normally only one time per event) provided the Captain determines the affected system is desirable for the conduct of the flight and one of the following conditions exists:

- the circuit breaker had not previously tripped, and there is no specific non-normal procedure in the checklist prohibiting reset, or
- maintenance has determined cycling the CB is safe.

If a circuit breaker is cycled during flight, notify maintenance. A logbook entry shall be made to document the occurrence.

Non-Normal Checklist Use

General

Non-normal checklist use starts when the airplane flight path and configuration are correctly established. Usually, time is available to assess the situation before corrective action is started. All actions must then be coordinated under the captain's supervision and done in a deliberate, systematic manner. Flight path control must never be compromised. As a general rule, use the following as guidelines:

- Fly the aircraft
- Cancel the warning
- Identify the emergency or non-normal
- Accomplish recall items from memory (if applicable)
- Read the checklist
- Do not hurry

Calling for the Checklist

When a non-normal situation occurs, at the direction of the Captain both crewmembers systematically and without delay accomplish all memory items in their areas of responsibility.

The Captain may also direct reference checklists to be done by memory if no hazard is created by such action, or if the situation does not allow reference to the checklist.

The pilot flying calls for the checklist when:

- the flight path is under control
- the airplane is not in a critical phase of flight (such as takeoff or landing)
- all memory items are complete

Reading the Checklist

The pilot monitoring reads aloud:

- the checklist title
- as much of the condition statement as needed to verify that the correct checklist has been selected
- as much of the objective statement (if applicable) as needed to understand the expected result of doing the checklist.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

For checklists with memory items, the pilot monitoring first verifies that each memory item has been done. The checklist is normally read aloud during this verification. The pilot flying does not need to respond except for items that are not in agreement with the checklist. The item numbers do not need to be read.

Non-memory items are called reference items. The pilot monitoring reads aloud the reference items, including:

- the precaution (if any)
- the response or action
- any amplifying information.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood. The item numbers do not need to be read.

After moving any control, the crewmember taking the action also states the checklist response.

Checklists include an Inoperative Items table only when the condition of the items is needed for planning the rest of the flight. The inoperative items, including the consequences (if any), are read aloud by the pilot monitoring. The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

Dual Verification of Critical Controls

The word “Confirm” is added to checklist items when both crewmembers must verbally agree before action is taken. During an inflight non-normal situation, verbal confirmation is required prior to the movement of the following critical controls:

- throttle reduction of a failed engine
- FUEL switch
- ENG FIRE handle
- IRS mode selector

After determination that a critical control must be actuated in flight, the following steps must be taken:

- Both pilots must verbally and visually identify the affected control.
- The pilot performing the action will place his hand on the affected control.
- The pilot monitoring the action will verbally and visually confirm the proper control has been selected.
- The pilot performing the action then actuates the affected control.

Deferred Items

When there are deferred items, the non-normal checklist will include the item “**Checklist Complete Except Deferred Items.**” The pilot flying is to be made aware when there are deferred items. These items are included in the Deferred Items section of the checklist and may be delayed until the usual point during descent, approach or landing.

The deferred items are read aloud by the pilot monitoring. The crewmember taking the action states the response.

When there are deferred items, the Deferred Items section of the non-normal checklist will include the Descent, Approach and Landing normal checklists. These checklists should be used instead of the usual DESCENT, APPROACH and LANDING normal checklists. If a normal checklist item is changed as a result of the non-normal situation, the changed response is printed in **bold** type.

When there are no deferred items, the DESCENT, APPROACH and LANDING normal checklists are used to verify that the configuration is correct for each phase of flight.

A ■ indicates items that should be considered for re-accomplishment in the event of an approach change or go-around.

Checklist Completion

Each checklist has a checklist complete symbol at the end. The following symbol indicates that the checklist is complete:



The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

After completion of each non-normal checklist, the pilot monitoring states “___ CHECKLIST COMPLETE.”

Additional information at the end of the checklist is not required to be read.

Checklist Limitations

The flight crew must be aware that checklists cannot be created for all conceivable situations and are not intended to replace good judgment. In some situations, at the captain’s discretion, deviation from a checklist may be needed.

Non-Normal Checklist Legend

Redirection Symbol



The redirection symbol is used in two ways:

- In the Table of Contents of a system section, to direct the flight crew to a different system section.
- In a non-normal checklist, with the word “Go to”, to direct the flight crew to a different checklist or to a different step in the current checklist.

Separator Symbol



The separator symbol is used in two ways:

- In certain system section tables of contents, to separate the titles of QAI checklists from non-QAI checklists.
- In a non-normal checklist, to separate the memory items from the reference items.

Task Divider Symbol



The task divider symbol is used to indicate the end of one task and the beginning of another task.

Decision Symbol

Choose one:



The decision symbol is used to identify possible choices.

Precaution Symbol



The precaution symbol is used to identify information the flight crew must consider before taking the action.

Emergency Evacuation Flow/Philosophy

Evacuation flow items listed below are not included within the Passenger Evacuation checklist. They are meant to refresh the logical pattern of procedures that must occur for a successful evacuation. In the unlikely event that the checklist cannot be read due to smoke/fire, darkness, injury or incapacitation, this simple flow or philosophy should lead the pilot to completion of all critical tasks contributing to the safest possible evacuation. The checklist follows the flow pattern of:

STOP
CONFIGURE
SHUTDOWN
EVACUATE

Intentionally
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Revision Record
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Model Identification

Chapter RR

Section ModID

General

The airplanes listed in the table below are covered in this manual. The numbers are used to distinguish data peculiar to one or more, but not all of the airplanes. Where data applies to all airplanes listed, no reference is made to individual airplane numbers.

The table permits flight crew correlation of configuration differences by Registry Number in alpha/numeric order within an operator's fleet for airplanes covered in this manual. Configuration data reflects the airplane as delivered configuration and is updated for service bulletin incorporations in conformance with the policy stated in the introduction section of this chapter.

Airplane number is supplied by the operator. Registry number is supplied by the national regulatory agency. Serial and tabulation numbers are supplied by Boeing. The procedures and information contained in this manual also apply to aircraft acquired by Delta Air Lines subsequent to the current revision; however, this document may not address all pertinent information for these airplanes. In such instances, specific operating procedures and systems information can be found in appropriate Differences Chapter(s) and/or Fleet Bulletin(s) prior to their incorporation in the next scheduled revision.

Ship Number	Airplane Number	Registry Number	Serial Number
9500	95A001	N949AT	55003
9501	95A002	N940AT	55004
9502	95A003	N942AT	55005
9503	95A004	N943AT	55006
9504	95A005	N944AT	55007
9505	95A006	N945AT	55008
9506	95A007	N946AT	55009
9507	95A008	N947AT	55010
9508	95A009	N948AT	55011
9509	95A010	N950AT	55012
9510	95A011	N951AT	55013
9511	95A012	N952AT	55014

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Ship Number	Airplane Number	Registry Number	Serial Number
9512	95A013	N953AT	55015
9513	95A014	N954AT	55016
9514	95A015	N955AT	55017
9515	95A016	N956AT	55018
9516	95A017	N957AT	55019
9517	95A018	N958AT	55020
9518	95A019	N959AT	55021
9519	95A020	N960AT	55022
9520	95A021	N961AT	55023
9521	95A310	N988AT	55068
9522	95A022	N963AT	55024
9523	95A023	N964AT	55025
9524	95A024	N965AT	55026
9525	95A025	N966AT	55027
9526	95A026	N967AT	55028
9527	95A311	N989AT	55152
9528	95A312	N990AT	55134
9529	95A313	N991AT	55135
9530	95A027	N968AT	55029
9531	95A028	N969AT	55030
9532	95A029	N970AT	55031
9533	95A030	N971AT	55032
9534	95A031	N972AT	55033
9535	95A314	N992AT	55136
9536	95A032	N974AT	55034
9537	95A033	N975AT	55035
9538	95A315	N993AT	55137

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Ship Number	Airplane Number	Registry Number	Serial Number
9539	95A316	N994AT	55138
9540	95A317	N995AT	55139
9541	95A034	N977AT	55036
9542	95A318	N996AT	55140
9543	95A035	N978AT	55037
9544	95A036	N979AT	55038
9545	95A319	N997AT	55141
9546	95A037	N980AT	55039
9547	95A320	N998AT	55142
9548	95A038	N981AT	55040
9549	95A039	N982AT	55041
9550	95A040	N717JL	55042
9551	95A050	N891AT	55043
9552	95A051	N892AT	55044
9553	95A052	N893AT	55045
9554	95A053	N894AT	55046
9555	95A054	N895AT	55047
9556	95A055	N896AT	55048
9557	95A056	N899AT	55049
9558	95A057	N922AT	55050
9559	95A058	N923AT	55051
9560	95A059	N983AT	55052
9561	95A060	N938AT	55098
9562	95A061	N939AT	55099
9563	95A401	N936AT	55058
9564	95A402	N935AT	55069
9565	95A403	N934AT	55070

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Ship Number	Airplane Number	Registry Number	Serial Number
9566	95A404	N933AT	55071
9567	95A405	N930AT	55072
9568	95A406	N932AT	55073
9569	95A407	N607AT	55074
9570	95A408	N929AT	55075
9571	95A409	N928AT	55076
9572	95A410	N927AT	55077
9573	95A411	N926AT	55078
9574	95A412	N925AT	55079
9575	95A413	N924AT	55080
9576	95A414	N608AT	55081
9577	95A415	N921AT	55082
9578	95A416	N920AT	55083
9579	95A417	N919AT	55084
9580	95A418	N915AT	55085
9581	95A419	N910AT	55086
9582	95A420	N906AT	55087
9583	95A421	N987AT	55088
9584	95A422	N986AT	55089
9585	95A423	N985AT	55090
9586	95A424	N937AT	55091
9587	95A306	N987DN	55064
9588	95A307	N988DN	55065
9589	95A309	N989DN	55067
9594	95A508	N603AT	55127
And Subsequent			

Revision Record
Introduction**Chapter RR**
Section Intro

General

The manufacturer has developed normal and non-normal procedures for the 717 aircraft. Delta Air Lines, Inc. has modified some of these procedures for simplification and standardization, when appropriate, with other aircraft operated by Delta Air Lines, Inc. Finally, the FAA has approved the procedures presented in this Operations Manual.

These procedures are intended to be followed during normal ground operations and in flight. Deviations from these procedures should be made only with good cause and based on the safest course of action. The captain's best judgment must be applied if an abnormality occurs that is not covered by these procedures.

Manual Rights

The 717 Operations Manual has been prepared for the exclusive use of Delta Air Lines, Inc., Flight Operations personnel under the direction and authority of Delta and shall, at all times, remain the property of Delta. The holder hereof acknowledges and agrees that this manual contains or may contain trade secrets, copyrighted material and commercial and proprietary information, privileged and confidential, to the interest of Delta, and the holder hereof further agrees that this manual may not be reproduced, distributed or copied, in whole or in part, without the express prior written consent of Delta.

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Corrections to the Manual

Log on to the Delta Flight Operations Portal, <http://deltanet.delta.com> and submit a Publications Change Request (PCR) to correct any errors or discrepancies discovered in this manual, or to submit a suggested change to any Aircraft Operating Manual, Volume 1, Volume 2, Quick Reference Handbook (QRH), Flight Crew Training Manual (FCTM), Normal Checklist, Airway Manual (AM), Flight Operations Manual (FOM), Operating Experience (OE/TOE) Guide, Fleet Bulletin (FB), or All Pilot Bulletin (APB).

There is a link to the PCR form at Deltanet > My Division > Pilot Support > Forms and Reports. Once submitted, the PCR is automatically routed to the applicable Fleet Technical Manager and Technical Writer for that manual.

Organization

The operations manual is organized in the following manner.

Volume 1

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Limitations - Covers operational limitations.
- Normal Procedures - Covers all amplified normal operating procedures and are based on a thorough analysis of crew activity required to operate the aircraft, and reflect the latest knowledge and experience available.
- Normal Operational Information - Contains reference material used to support normal procedures.
- Supplementary Procedures is organized by system and covers:
 - any procedure that is non-routine in nature,
 - any first-flight-of-the-day test or other systems test,
 - guidance on lengthy operating procedures, and
 - adverse weather procedures and guidance.
- Differences - Notes differences between aircraft models and variants.

Volume 2

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Contains general aircraft and systems information. These chapters are generally subdivided into sections covering controls and indicators and systems descriptions.

QRH

- Non-normal checklists - Contains checklists used to manage non-normal situations.
- Non-Normal Operational Information - Contains reference material used to support non-normal procedures.
- Non-Normal Checklist Instructions - Contains non-normal checklist instructions and evacuation flow/philosophy.
- Revision Record - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.

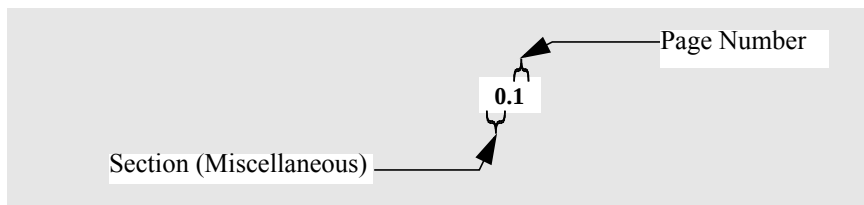
FCTM

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Provides information and recommendations on aircraft operations, maneuvers, techniques, and human factors.

Page Numbering

This manual uses a decimal page numbering system. The page number is divided into two fields; section and page. An example of a page number follows:

Example Page Number



Warnings, Cautions, and Notes

The following levels of written advisories are used throughout the manual and are not to be confused with EICAS messages, which are identified in separate text.

Warning - A warning is an instruction about a hazard that if ignored could result in injury, loss of aircraft control, or loss of life. A warning will appear prior to the applicable step or item.

Warning! Do not pressurize any hydraulic or pneumatic system until clearance is obtained from Maintenance.

Caution - A caution is an instruction concerning a hazard that if ignored could result in damage to equipment. A caution will appear prior to the applicable step or item.

Caution! Do not set takeoff thrust until oil temperature is above 50°C.

Note - A note provides amplified information, instruction, or emphasis. A note will appear after the applicable step or item.

Note: The checklist must not be modified in any way.

Aircraft Effectivities

Differences in aircraft configuration are shown by use of aircraft effectivities throughout Volumes 1 and 2, QRH, and the FCTM. The following rules are used to express aircraft effectivities:

- Aircraft effectivities are listed by model and/or ship number. A range of aircraft is defined by a dash, e.g. 9901 - 9910. A comma in the effectivity range indicates a break in the range, e.g. 9901 - 9910, 9912 - 9925; aircraft 9911 is excluded from the range. Aircraft introduced to the fleet following manual publication are effective as subsequent ships, e.g. 9901 & Subsequent.
- Aircraft effectivities are listed in bold text throughout the manual.
- Aircraft effectivities apply only to the paragraph, illustration, operational note, procedural step, etc. and to subordinate items (if any). Refer to the examples below.

Example (with subordinate items):

9951 – 9961	
CTR TK PUMP (affected).....	OFF
Do not open the WING X FEED valve.	
OUTR TK XFR.....	ON

In this example, the effectivity 9951 - 9961 applies to the first procedural step (CTR TK PUMP.....) and the further indented/subordinate step (Do not...). The effectivity does not apply to the next equivalently indented step (OUTR TK XFR.....).

Example (without subordinate items):

Using ship number:

9951 – 9961	
CTR TK PUMP (affected).....	ON
OUTR TK XFR.....	OFF

In this example, the effectivity 9951 - 9961 applies to the first procedural step (CTR TK PUMP) only. The effectivity does not apply to the next procedural step (OUTR TK XFR).

When airplane effectivities are centered immediately below a checklist title, the entire checklist applies to the listed airplanes. In the following example, the FUEL L + R CTR PUMPS LO PR checklist is applicable to 9951-9961 only:

FUEL L + R CTR PUMPS LO PR
9951-9961

Revision Record

Abbreviations

Chapter RR

Section Abbrev

General

The following abbreviations may be found throughout the manual. Some abbreviations may also appear in lowercase letters. Abbreviations having very limited use are explained in the chapter where they are used. Since this list is compiled across several fleets, there may be some abbreviations that do not apply to this specific fleet.

A	
AC	Alternating Current or Aircraft
ACARS	Aircraft Communications Addressing and Reporting System
ACE	Actuator Control Electronics
ACP	Audio Control Panel
ACT	Active
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Director Indicator
ADIRS	Air Data Inertial Reference System
ADIRU	Air Data Inertial Reference Unit
ADL	Airborne Data Loader
ADM	Air Data Module
ADS	Automatic Dependent Surveillance

AED	Automated External Defibrillator
AFB	Alternate Fuel Burn
AFDC	Autopilot Flight Director Computer
AFDS	Autopilot Flight Director System
AFE	Above Field Elevation
AFM	Airplane Flight Manual (FAA approved)
AFM - DPI	Airplane Flight Manual - Digital Performance Information
AFS	Automatic Flight System (Autopilot or Autothrottle)
A/G	Air/Ground
AGL	Above Ground Level
AH	Alert Height
AHRS	Attitude Heading Reference System

AI	Anti-Ice
A-ICE	
AIL	Aileron
AIMS	Airplane Information Management System
ALFA	Safe Stall Margin Speed
ALN	Align
ALT	Altitude
ALT ACQ	Altitude Acquire
ALT HOLD	Altitude Hold
ALTN	Alternate
AM	Amplitude Modulation
AMI	Airline Modifiable Information
AMM	Aircraft Maintenance Manual
AND	Aircraft Nose Down
ANP	Actual Navigational Performance
ANT	Antenna
ANNUN	Annunciator
ANU	Aircraft Nose Up
AOA	Angle of Attack
AOC	Airline Operational Communication Data Link
A/P	Autopilot

APCDU	APU Power Conversion and Distribution Units
APL	Airplane
APP	Approach
APU	Auxiliary Power Unit
AR	Authorization Required
AREU	Audio Remote Electronics Unit
ARINC	Aeronautical Radio, Incorporated
ARPT	Airport
ARR	Arrival
ART	Automatic Reserve Thrust
A/S	Airspeed
ASA	Autoland Status Annunciator
ASAP	Aviation Safety Action Program
ASI	Airspeed Indicator
ASR	Airport Surveillance Radar
ASYM	Asymmetry
A/T	Autothrottle
ATA	Actual Time of Arrival
ATC	Air Traffic Control
ATIS	Automated Terminal Information Service

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ATM	Assumed Temperature Method
ATR	Automatic Thrust Restoration
ATT	Attitude
ATTND	Attendant
AUTO	Automatic
AUTO-THROT	Autothrottle
AUX	Auxiliary
AVAIL	Available
AWABS	Automated Weight and Balance System
B	
BARO	Barometric
BAT or BATT	Battery
B/C or B/CRS or BAC or BCS	Back Course
BFO	Beat Frequency Oscillator
BITE	Built-In Test Equipment
BKR	Breaker
BLD	Bleed
BLS	Bezel Light Sensor
BLW	Below
BRG	Bearing
BRT	Bright

BTL	Bottle
BTL DISCH	Bottle Discharge (fire extinguisher)
BTMS	Brake Temperature Monitoring System
C	
C	Captain or Celsius or Center or Cool
CAA	Civil Aviation Authority
CADC	Central Air Data Computer
CALSEL	Call Select
CANC/RCL	Cancel/Recall
CANPA	Constant Angle Non-Precision Approach
CAP	Capture
CAPT	Captain
CAWS	Central Aural Warning System
CB	Circuit Breaker
CCD	Cursor Control Device
CDS	Common Display System
CDU	Control Display Unit
CFIT	Controlled Flight Into Terrain
CG	Center of Gravity

CH or CHAN	Channel
CHKL	Checklist
CHR	Chronograph
CKD	Checked
CKPT	Cockpit
CKT	Circuit
CL	Close
CLB	Climb
CLMP	Computer Lockout Manual Power
CLR	Clear
CMD	Command
CMP or CMPTR	Computer
CO	Company
COMM	Communication
COMP	Comparator
COMPT	Compartment
CON	Continuous
CONFIG	Configuration
CONSEQ	Consequence
CONT	Control
COOL	Cooling
CPA	Closest Point of Approach
CPC	Cabin Pressure Controller
C/PDLC	Controller/Pilot Datalink Communications

CRM	Crew Resource Management
CRS	Course
CRT	Cathode Ray Tube
CRZ	Cruise
CTL	Control
CTR	Center or Crosstie Relay
CVR	Cockpit Voice Recorder
CWS	Control Wheel Steering
D	
DA	Decision Altitude
DA(H)	Decision Altitude (Height)
DC	Direct Current
DCU	Display/Data Concentrator Unit
D/D	Direct Descent or Driftdown
DDA	Derived Decision Altitude (MDA +50 feet)
DDG	Dispatch Deviations Guide
DECR	Decrease
DEG	Degree
DEL	Delete
DEP	Departure
DEP ARR	Departure Arrival
DEPR	Depressurize

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DES or DESC	Descent
DEST	Destination
DET	Detector or Detection or Detect
DEU	Display Electronic Unit
DFCS	Digital Flight Control System
DFDAU	Digital Flight Data Acquisition Unit
DFDR	Digital Flight Data Recorder
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
DH	Decision Height
DIFF	Differential
DIR	Direct
DIR INTC	Direct Intercept
DISAG	Disagree
DISC	Disconnect
DISCH	Discharge
DK	Deck
DME	Distance Measuring Equipment
DN	Down
DP	Departure Procedures

DPC	Display Processing Computer
DSP	Display Select Panel
DSPL	Display
DTG	Distance to Go
DTW	Distance to Waypoint
DU	Display Unit
E	
EAD	Engine and Alert Display
EADI	Electronic Attitude Director Indicator
ECON	Economy
ECP	Electronic Control Panel
E/D	End of Descent
E/E	Electrical/ Electronic
EEC	Electronic Engine Control
EFB	Electronic Flight Bag
EFI	Electronic Flight Instruments
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System
EGT	Exhaust Gas Temperature

EHSI	Electronic Horizontal Situation Indicator
EICAS	Engine Indication and Crew Alerting System
EIS	Electronic Instrument System
ELEC	Electrical
ELEV	Elevator
EMER	Emergency
ENG	Engine
ENG OUT	Engine Out
ENG OUT D/D	Engine Out Driftdown
ENT	Entry
EO or E/O	Engine Out
EOAP	Electronic Overhead Annunciation Panel
EPC	Electrical Power Center
EPCU	Electrical Power Control Unit
EPR	Engine Pressure Ratio
EQPT or EQUIP	Equipment
ET	Elapsed Time
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure

ETE	Estimated Time En Route
ETOPS	Extended Range Operation with Twin Engine Airplanes
ETP	Equal Time Point
EVAC	Evacuation
EXEC	Execute
EXT	Extend or External
F	
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	Final Approach Course
FADEC	Full Authority Digital Engine Control
FAF	Final Approach Fix
FANS	Future Air Navigation System
FAR	Federal Aviation Regulation
FB	Fleet Bulletin
FCC	Flight Control Computer
FCOM	Flight Crew Operations Manual
FCP	Flight Control Panel
FCTL	Flight Control
FCTM	Flight Crew Training Manual

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FCU	Flush Control Unit
FD, F/D or FLT DIR	Flight Director
FF	Fuel Flow
FFM	Force Fight Monitor
FGCP	Flight Guidance Control Panel
FGS	Flight Guidance System
FILT	Filter
FIR	Flight Information Region
FL	Flight Level
FLAR or FLR	Flare
FL CH or FLCH	Flight Level Change
FLEX TO	Flex Takeoff
FLO	Flow
FLT	Flight
FLT CTRL	Flight Control
FLT RCDR	Flight Recorder
FLPRN	Flaperon
FMA	Flight Mode Annunciator
FMC	Flight Management Computer
FMS	Flight Management System
F/O or F O	First Officer
FOM	Flight Operations Manual

FOQA	Flight Operations Quality Assurance
FPA	Flight Path Angle
FPM	Feet Per Minute
FPV	Flight Path Vector
FQS	Fuel Quantity System
FREQ	Frequency
F/S	Fast/Slow
FT	Feet
FWD	Forward
FWSOV	Fire Wall Shut Off Valve
FX	Fix
G	
G	Acceleration of Gravity or Generator
GA	Go-Around
GEN	Generator
GLS	GNSS Landing System
GMT	Greenwich Mean Time
GND	Ground
GNSS	Global Navigation Satellite System
GNSSU	Global Navigation System Sensor Units
GP or G/P	Glide Path

GPS	Global Positioning System
GPWS	Ground Proximity Warning System
GS	Ground Speed or Ground Service
G/S	Glide Slope
GW	Gross Weight
H	
HAA	Height Above Airport
HAT	Height Above Touchdown
HDG	Heading or Hydraulic Driven Generator
HDG REF	Heading Reference
HDG SEL	Heading Select
HF	High Frequency
HGS	Head-Up Guidance System (HGS® is a registered trademark of Flight Dynamics)
HI	High
HLD	Hold
HP	High Pressure
HPA	Hectopascals
HPSOV	High Pressure Shut Off Valve
HSI	Horizontal Situation Indicator
HUD	Head-Up Display

HYD	Hydraulic
I	
I/O	Input/Output
IAF	Initial Approach Fix
IAN	Integrated Approach Navigation
IAS	Indicated Airspeed
ICAO	International Civil Aviation Organization
IDENT	Identification
IDG	Integrated Drive Generator
IFE	In-Flight Entertainment System
IFR	Instrument Flight Rules
IGN	Ignition
IGS	Instrument Guidance System
ILS	Instrument Landing System
IM	Inner Marker
IMC	Instrument Meteorological Conditions
IMPF	Improved Performance
IN	Inches
INBD	Inboard
INCR	Increase

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IND	Indicator
IND LTS	Indicator Lights
IN HG	Inches of Mercury
INOP	Inoperative
INIT	Initialization
INSTR	Instrument
INT or INTPH	Interphone
INTC	Intercept
INTC CRS	Intercept Course
IP	Instructor Pilot
IQ	Initial Qualification
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISA	International Standard Atmosphere
ISDU	Inertial System Display Unit
ISFD	Integrated Standby Flight Display
ISIS	Integrated Standby Instrument System
ISOL	Isolation
ISLN	Isolation
J	
JAA	Joint Aviation Authority

K	
K or KTS	Knots
KCAS	Knots Calibrated Airspeed
KGS	Kilograms
KIAS	Knots Indicated Airspeed
L	
L	Left
LAT	Latitude or Lateral
LBS	Pounds
LCDU	Liquid-Crystal Display Units
LCM	Logic Control Module
LD	Load
LDA	Localizer-type Directional Aid
LDG	Landing
LDG ALT	Landing Altitude
LE	Leading Edge
LED	Light Emitting Diode
LIM	Limit
LIM SPD	Limit Speed
LKD	Locked
L NAV or LNAV	Lateral Navigation
LND	Land
LO	Low

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LOC	Localizer
LOC-BC	Localizer Back Course
LOE	Line Oriented Evaluation
LOM	Locator Outer Marker
LON or LONG	Longitude
LP	Low Pressure
LPR	Landing Performance Request
LRC	Long Range Cruise
LRU	Line Replaceable Unit
LSK	Line Select Key
LT	Light
LWD	Left Wing Down
LWR CTR	Lower Center
LWR DSPLY or LWR DSPL	Lower Display
M	
M	Mach
MAG	Magnetic
MAHP	Missed Approach Holding Point
MAINT	Maintenance
MAN	Manual or Maneuvering

MAP	Missed Approach Point
MASI	Mach/Airspeed Indicator
MAX	Maximum
MAX ALT	Maximum Engine Out Altitude
MAX CLB	Maximum Climb
MAX DES	Maximum Descent
MAX END	Maximum Endurance
MB	Millibars
MCA	Minimum Crossing Altitude
MCC	Maintenance Control Center
MCDU	Multi-function Control and Display Unit
MCL	Maximum Climb (Engine Rating)
MCO	Maintenance Carry Over
MCP	Mode Control Panel
MCT	Maximum Continuous Thrust
MDA	Minimum Descent Altitude
MDA(H)	Minimum Descent Altitude (Height)
MDM	Mechanical Dispatch Manual

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MEA	Minimum Enroute Altitude	MORA	Minimum OffRoute Altitude
MECH	Mechanic	MSA	Minimum Safe Altitude
MED	Medium	MSG	Message
MEL	Minimum Equipment List	MSGS RCVD	Messages Received
MFD	Multifunction Display	MSL	Mean Sea Level
MHZ	Megahertz	MSP	Mode Select Panel
MIC	Microphone	MTES	Maintenance Test Enable Switch
MIN	Minimum	MTOGW	Maximum Takeoff Gross Weight
MISC	Miscellaneous	MTRS	Meters
MKR	Marker	MU	Management Unit
MLG	Main Landing Gear	MUH	Minimum Use Height
MLS	Microwave Landing System	MVA	Minimum Vector Altitude
MLW	Maximum Landing Weight	N	
MM	Middle Marker	N	Normal
MMEL	Master Minimum Equipment List	N/A	Not Available
MMO	Maximum Mach Operating Speed	NACL	Nacelle
MNPS	Minimum Navigation Performance Specification	NADP	Noise Abatement Departure Procedures
MOCA	Minimum Obstruction Clearance Altitude	NAR	North American Route
MOD	Modify	NASA	National Aeronautics and Space Administration
MOM	Momentary		

NATS	North Atlantic Track System
NAV	Navigation
NAV RAD	Navigation Radio
ND	Navigation Display
NDB	Non-Directional Beacon
NGS	Nitrogen Generation System
NL	Nose Left
NLG	Nose Landing Gear
NLT	No Later Than
NM	Nautical Mile(s)
NNC	Non-Normal Checklists
NNM	Non-Normal Maneuvers
NPS	Navigation Performance Scales
NORM	Normal
NTSB	National Transportation Safety Board
NR	Nose Right
N1	Low Pressure Rotor Speed

N2	High Pressure Rotor Speed (Pratt & Whitney and GE engines) or Intermediate Pressure Rotor Speed (Rolls Royce Engines)
N3	High Pressure Rotor Speed (Rolls Royce Engines)
O	
OAT	Outside Air Temperature
OCC	Operations Control Center
ODM	Operational Data Manual
OFST	Offset
OHU	Overhead Unit
OM	Outer Marker
OP	Open
OUTBD DSPL	Outboard Display
OVHD	Overhead
OVHT	Overheat
OVRD	Override
OVSPD	Overspeed
OXY or O2	Oxygen
P	
PA	Passenger Address

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PAPI	Precision Approach Path Indicator	PFC	Primary Flight Computer
PAR	Precision Approach Radar	PFD	Primary Flight Display
PASS	Passenger	PI	Performance Inflight
PBD	Place/Bearing/Distance	PIP	Product Improvement Package
PBE	Protective Breathing Equipment	PLAN	Plan Mode
PCDU	Power Conversion and Distribution Units	PLI	Pitch Limit Indicator
PCP	Pilot Call Panel	PM	Pilot Monitoring
PDC	Pitch Data Computer or Performance Data Computer or Pre-Departure Clearance	PMC	Power Management Control
PED	Person Electronic Device or Pedestal	PMP	Pump
PERF	Performance	PNEU	Pneumatic
PERF INIT	Performance Initialization	PNF	Pilot Not Flying
PERF PEN	Performance Penalty	PNL	Panel
PES	Pitch Enhancement System	PODS	Pneumatic Overheat Detection System
PF	Pilot Flying	POS	Position
PFAF	Precision Final Approach Fix	POS INIT	Position Initialization
		POS REF	Position Reference
		PPH	Pounds Per Hour
		PPI	Planned Position Indicator
		PPOS	Present Position
		PRAM	Prerecorded Announcement Machine

PRES or PRESS	Pressure
PREV	Previous
PRI	Primary
PRAIM	Predictive Receiver Autonomous Integrity Monitoring
PROF	Profile
PROG	Progress
PROX	Proximity
P/RST	Push To Reset
PRV	Pressure Regulating Valve
PSEU	Proximity Switch Electronics Unit
PSI	Pounds Per Square Inch
PSU	Passenger Service Utilities
PTH	Path
PTT	Push To Talk
PTU	Power Transfer Unit
PWR	Power
PWS	Predictive Windshear System
Q	
Q	Quantity
QFE	Local Station Pressure
QNH	Altimeter Setting

QRH	Quick Reference Handbook
QTY	Quantity
R	
R	Right
RA	Radio Altitude or Resolution Advisory
RAD	Radio
RAS	Remote Access System
RAT	Ram Air Temperature or Ram Air Turbine
RATOW	Runway Allowable Takeoff Weight
RCL	Request for Clearance
RDMI	Radio Distance Magnetic Indicator
RDR	Rudder
REC	Recorder
RECIR or RECIRC	Recirculation
REF	Reference
RET	Retract
RETD	Retard
REV	Reverse
RF	Radius-to-Fix (RF) Legs or Refill

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RHM	Rudder Hook Monitor
RLS	Remote Light Sensor
RMI	Radio Magnetic Indicator
RON	Remain Overnight
RNAV or RNV	Area Navigation
RNP	Required Navigational Performance
RPL	Rudder Pressure Limiter
RPM	Revolutions Per Minute
RPR	Rudder Pressure Reducer
RSEP	Rudder System Enhancement Program
RSL	Rudder Stop Limiter
RST	Reset
RSVR	Reservoir
R/T	Radio Transmit
RTE	Route
RTO	Rejected Takeoff
RTP	Radio Tuning Panel
RUD	Rudder
RVR	Runway Visual Range

RVSM	Reduced Vertical Separation Minimum
RWD	Right Wing Down
RWY	Runway
S	
SAAAR	Special Aircraft and Aircrew Authorization Required
SAARU	Secondary Attitude Air Data Reference Unit
SAT	Static Air Temperature or Satellite
SATCOM	Satellite Communication System
SB	Service Bulletin
S/B	Speedbrake
S/C	Step Climb
SCP	System Control Panel
S/D	Step Descent
SD	System Display
SDCP	System Display Control Panel
SDF	Simplified Directional Facility
SDP	System Display Panel

SEI	Standby Engine Indicator
SEL	Select
SELCAL	Selective Calling
SENS	Sensitivity
SERV	Service
SG	Symbol Generator
SID	Standard Instrument Departure
SISP	Source Input Select Panel
SMGCS	Surface Movement and Guidance Control System
SMOK	Smoking
SMS	Safety Management System
SPD	Speed
SPDBRK	Speedbrake
STA	Station
STAB	Stabilizer
STAR	Standard Terminal Arrival Route
STAT	Status
STBY	Standby
STD	Standard
SW	Switch
SYNC	Synchronizer
SYS	System

T	
T or TRU	True
T or TK or TRK	Track (to a Navaid)
TA	Traffic Advisory
TAA	Terminal Arrival Area
TACAN	Tactical Air Navigation
TAC	Thrust Asymmetry Compensation
TAI	Thermal Anti-Ice
TAS	True Airspeed
TAT	Total Air Temperature
TBD	To Be Determined
T/C	Top of Climb
TCA	Terminal Control Area
TCAS	Traffic Alert and Collision Avoidance System
T/D	Top of Descent
TD	Traffic Display
TDZ	Touch Down Zone
TDZE	Touch Down Zone Elevation
TE	Trailing Edge
TEM	Threat Error Management
TEMP	Temperature

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TERP	Terminal Instrument Procedures
TERR	Terrain
TFC	Traffic
TFR	Transfer
TGT	Turbine Gas Temperature
THNDSTRM	Thunderstorm
THR	Throttle or Thrust
THR HOLD	Throttle Hold
THROT	Throttle
TMC	Thrust Management Computer
TMI	Track Message Identifier
TMSP	Thrust Mode Select Panel
TO or T/O	Takeoff
TOC	Top of Climb
TOD	Top of Descent
TO FLEX	Takeoff Flexible Derate
TO/GA	Takeoff/Go—Around
TOGW	Takeoff Gross Weight
TOPR	Takeoff Performance Request
TPC	Tactical Pilotage Charts

TR	Traffic Resolution or Transformer Rectifier
TRK	Track
TRP	Thrust Rating Panel
TRU	Transformer Rectifier Unit
TURB	Turbine or Turbulence
U	
UNBAL	Unbalanced
UNLKD or U/L	Unlocked
UNSCHD or UNSCHED	Unscheduled
UPR DSPL	Upper Display
U.S.	United States
USB	Upper Side Band
UTC	Universal Time Coordinated
UTIL	Utility
V	
VA	Design maneuvering speed
VAL	Valve
VANP	Vertical Actual Navigational Performance
Vapp	Approach Speed
VASI	Visual Approach Slope Indicator

VDC	Volts Direct Current
VDP	Visual Descent Point
VEF	Speed at Engine Failure
VERT	Vertical
VFE	Flap Extend Speed
VFR	Flap Retract Speed
VFR	Visual Flight Rules
VG	Vertical Gyro
VGE	Gear Extend Speed
VGR	Gear Retract Speed
VHF	Very High Frequency
VIA	Versatile Integrated Avionics
VIB	Vibration
VLOF	Lift Off Speed
VLV	Valve
VMAX	FMC Calculated Max Operating Speed
VMIN	FMC Calculated Min Operating Speed
VMC	Visual Meteorological Conditions
VMCA	Minimum Control Airspeed or Single Engine Minimum Control Airspeed

VMCG	Minimum Control Speed Ground
VMO	Maximum Operating Speed
V NAV or VNAV	Vertical Navigation
VOL	Volume
VOR	VHF Omnidirectional Range
VP	Tire Hydroplaning Speed
VR	Rotation Speed
VREF	Reference Speed
VRNP	Vertical Required Navigation Performance
V/S	Vertical Speed
VS	Stall Speed
VSCF	Variable Speed Constant Frequency
VSD	Vertical Situation Display
VSE	Slat Extend Speed
VSI	Vertical Speed Indicator
VSO	Stall Speed in Landing Configuration
VSR	Slat Retract Speed
VSS	Stick-shaker Speed
VTK	Vertical Track

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V1	Takeoff Decision Speed	WX+T	Weather and Turbulence
V1 (MCG)	Minimum V1 for Control on the Ground	X	
V2	Scheduled Takeoff Target Speed	X-FEED	Crossfeed
V3	Final Segment Climb Speed	XFER or XFR	Transfer
W		XPDR or XPNDR	Transponder
W	Warm	XTK	Cross Track
WAGS	Windshear Alert Guidance System	Z	
WARN	Warning	ZFW	Zero Fuel Weight
WATRS	Western Atlantic Route System	ZFWCG	Zero Fuel Weight Center of Gravity
WDR	Weight Data Record		
WGS-84	World Geodetic System of 1984		
WHL	Wheel		
WINDSHR or WNDSHR	Windshear		
WOW	Weight On Wheel		
WPT	Waypoint		
W/S	Windshear		
WSC	Windshear Computer		
WT	Weight		
WX or WXR	Weather Radar		
WXBRT	Weather Radar Brightness		

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Revision Record**Revision Record****Chapter RR****Section RR****QRH Revision Transmittal Letter**

To: All holders of Delta Air Lines, Inc. 717 Operations Manual, Quick Reference Handbook.

Subject: Operations Manual Revision.

This revision reflects the most current information available to Delta Air Lines, Inc. The following revision highlights explain changes in this revision. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed
0	April 1, 2013	
2	August 29, 2013	
4	January 16, 2014	
6	December 18, 2014	
8	September 8, 2015	
10	July 29, 2016	

No.	Revision Date	Date Filed
1	June 6, 2013	
3	September 26, 2013	
5	May 8, 2014	
7	March 24, 2015	
9	December 29, 2015	

General

Delta Air Lines, Inc. issues operations manual revisions to provide new or revised procedures and information. Formal revisions also incorporate appropriate information from previously issued Fleet Bulletins.

The revision date is the approximate date the manual is distributed and considered current. The revision should be incorporated as soon as it is received, but may be incorporated as much as 21 days after the revision date.

Formal revisions include a Transmittal Letter, a new Revision Record, Revision Highlights, and a current List of Effective Pages. Use the information on the new Revision Record and List of Effective Pages to verify the operations manual content.

The record above should be completed by the person incorporating the revision into the manual.

Filing Instructions

Consult the QRH List of Effective Pages (RR.LEP). Pages identified with an asterisk (*) are either replacement pages or new (original) issue pages. Remove corresponding old pages and replace or add new pages. Remove pages that are marked DELETED; there are no replacement pages for deleted pages.

Revision Highlights

Be careful when inserting the new pages and tabs. Using the List of Effective Pages (RR.LEP) can help determine the correct content and order of the manual.

Pages containing revised technical and non-technical revisions have revision bars associated with the changed text or illustration.

Repaginated material not containing technical revisions are identified only by a new page date.

Chapter NNC - Non-Normal Checklists

Section 0 - Miscellaneous

Ditching

- 0.1 - Revised Note for clarity.

Emergency Descent

- 0.8 - Revised to TEST/RESET, to match labeling on actual lever.

Section 1 - Airplane Gen., Emer. Equip., Doors, Windows

LOCK FAIL

- 1.1 - Added new NNC for door LOCK FAIL.

Section 3 - Anti-Ice, Rain

Windshield Cracked or Arcing

- 3.13 - Revised circuit breaker designations.

Section 4 - Unannunciated Checklists

A/P Not Available

- 4.1 - Revised reference to the Airway Manual.

Section 7 - Engines, APU

ENG RPM LO

- 7.7 - Revised reference to "Engine Severe Damage or Separation."

Section 9 - Flight Controls

Flaps Jammed

9.11 - Revised title for improved indexing.

RUDDER RESTRICTED

9.18 - Revised title for improved indexing.

Chapter NNOI - Non-Normal Operational Information

Section 1 - Non-Normal Ops Info

ILS Approach Equipment Requirements (Not for Dispatch)

NNOI.1.1 - Removed Yaw Damper from the list of items required for CAT I, II or III approaches.

NNOI.1.1 - Added language "(D) For approaches with “autopilot coupled approaches not authorized” restrictions, hand-flown CAT I are authorized to applicable minimums with an operable flight director.”

Chapter NNCI - Non-Normal Checklist Instructions

Section 1 - Non-Normal Checklists

Non-Normal Checklist Assumptions

NNCI.1.4 - Revised to consult MEL as opposed to MDM.

Chapter RR - Revision Record

Section ModID - Model Identification

RR.ModID.4 - Added new ship to Model Id's.

Section Intro - Introduction

Corrections to the Manual

RR.Intro.2 - Updated reference to the new Deltanet web portal and reference from FOB to APB.

Organization

RR.Intro.3 - Added "Human Factors" to FCTM description.

Section Abbrev - Abbreviations

RR.Abbrev.2 - Added ASAP - Aviation Safety Action Program.

RR.Abbrev.5 - Added DP - Departure Procedures.

RR.Abbrev.7 - Added FOQA - Flight Operations Quality Assurance.

RR.Abbrev.8 - Added IMPF - Improved Performance.

RR.Abbrev.9 - Added IQ - Initial Qualification.
RR.Abbrev.10 - Added LOE - Line Oriented Evaluation.
RR.Abbrev.10 - Added LPR - Landing Performance Request.
RR.Abbrev.10 - Added MCA - Minimum Crossing Altitude.
RR.Abbrev.11 - Added MVA - Minimum Vector Altitude.
RR.Abbrev.11 - Added NASA - National Aeronautics and Space Administration.
RR.Abbrev.12 - Added NATS - North Atlantic Track System.
RR.Abbrev.12 - Added NTSB - National Transportation Safety Board.
RR.Abbrev.13 - Added PNF - Pilot Not Flying.
RR.Abbrev.14 - Added RATOW - Runway Allowable Takeoff Weight.
RR.Abbrev.16 - Added SMS - Safety Management System.
RR.Abbrev.16 - Added TEM - Threat Error Management.
RR.Abbrev.17 - Added TERP - Terminal Instrument Procedures.
RR.Abbrev.17 - Added TOPR - Takeoff Performance Request.
RR.Abbrev.17 - Added TPC - Tactical Pilotage Charts.
RR.Abbrev.18 - Added VLOF - Lift Off Speed.
RR.Abbrev.18 - Added VP - Tire Hydroplaning Speed.

Revision Record

QRH List of Effective Pages

Chapter RR

Section LEP

Page	Date
Quick Reference Handbook	
Quick Action Index	
* QA.Index.1-2	July 29, 2016
Annunciated Index (tab)	
* Annun.Index.1-12	July 29, 2016
Unannunciated Index (tab)	
* Unann.Index.1-4	July 29, 2016
Alphabetical Index (tab)	
* Alpha.Index.1-16	July 29, 2016
0 Miscellaneous (tab)	
* 0.TOC.1-2	July 29, 2016
* 0.1-56	July 29, 2016
1 Airplane Gen., Emer. Equip., Doors, Windows (tab)	
* 1.TOC.1-2	July 29, 2016
* 1.1-4	July 29, 2016
2 Air Systems (tab)	
* 2.TOC.1-2	July 29, 2016
* 2.1-18	July 29, 2016
3 Anti-Ice, Rain (tab)	
* 3.TOC.1-2	July 29, 2016
* 3.1-18	July 29, 2016
4 Automatic Flight (tab)	
* 4.TOC.1-2	July 29, 2016
* 4.1-2	July 29, 2016
5 Communications (tab)	
* 5.TOC.1-2	July 29, 2016
* 5.1-6	July 29, 2016

Page	Date
6 Electrical (tab)	
* 6.TOC.1-2	July 29, 2016
* 6.1-32	July 29, 2016
7 Engines, APU (tab)	
* 7.TOC.1-2	July 29, 2016
* 7.1-30	July 29, 2016
8 Fire Protection (tab)	
* 8.TOC.1-2	July 29, 2016
* 8.1-22	July 29, 2016
9 Flight Controls (tab)	
* 9.TOC.1-2	July 29, 2016
* 9.1-26	July 29, 2016
10 Flight Instruments, Displays (tab)	
* 10.TOC.1-2	July 29, 2016
* 10.1-10	July 29, 2016
11 Flight Management, Navigation (tab)	
* 11.TOC.1-2	July 29, 2016
* 11.1-12	July 29, 2016
12 Fuel (tab)	
* 12.TOC.1-2	July 29, 2016
* 12.1-12	July 29, 2016
13 Hydraulics (tab)	
* 13.TOC.1-2	July 29, 2016
* 13.1-30	July 29, 2016
14 Landing Gear (tab)	
* 14.TOC.1-2	July 29, 2016
* 14.1-30	July 29, 2016

* = Revised, Added, or Deleted

Page	Date
15 Warning Systems (tab)	
* 15.TOC.1-2	July 29, 2016
Non-Normal Operational Information (tab)	
* NNOI.TOC.0.1-2	July 29, 2016
* NNOI.1.1-4	July 29, 2016
Non-Normal Checklist Instructions (tab)	
* NNCL.TOC.0.1-2	July 29, 2016
* NNCL.1.1-10	July 29, 2016
Revision Record (tab)	
* RR.TOC.RR.1-2	July 29, 2016
* RR.ModID.1-4	July 29, 2016
* RR.Intro.1-6	July 29, 2016
* RR.Abbrev.1-20	July 29, 2016
* RR.RR.1-4	July 29, 2016
* RR.LEP.1-2	July 29, 2016
Evacuation	
* Back Cover.1-2	July 29, 2016

* = Revised, Added, or Deleted

**Evacuation Checklist is on the
reverse side of this page.**

Evacuation

Condition: An evacuation is needed.

- 1 PARK BRAKE set
- 2 Outflow VALVE OP
- 3 EMER PWR selector ON
- 4 EMER LT switch ON
- 5 SPEED BRAKE lever RET
- 6 FLAP/SLAT handle 25
- 7 Notify flight attendants:
"EASY VICTOR, EASY VICTOR, EASY VICTOR."
- 8 FUEL switches OFF
- 9 ENG FIRE handles PULL
- 10 Fire AGENT(S) (if reqd) DISCH
- 11 APU FIRE CONT switch OFF & AGENT ARM
- 12 APU FIRE AGENT(S) switches (if reqd) . . . DISCH
- 13 Notify flight attendants:
"THIS IS THE CAPTAIN. EVACUATE, EVACUATE."
- 14 Advise the tower.
- 15 BATT switch OFF

